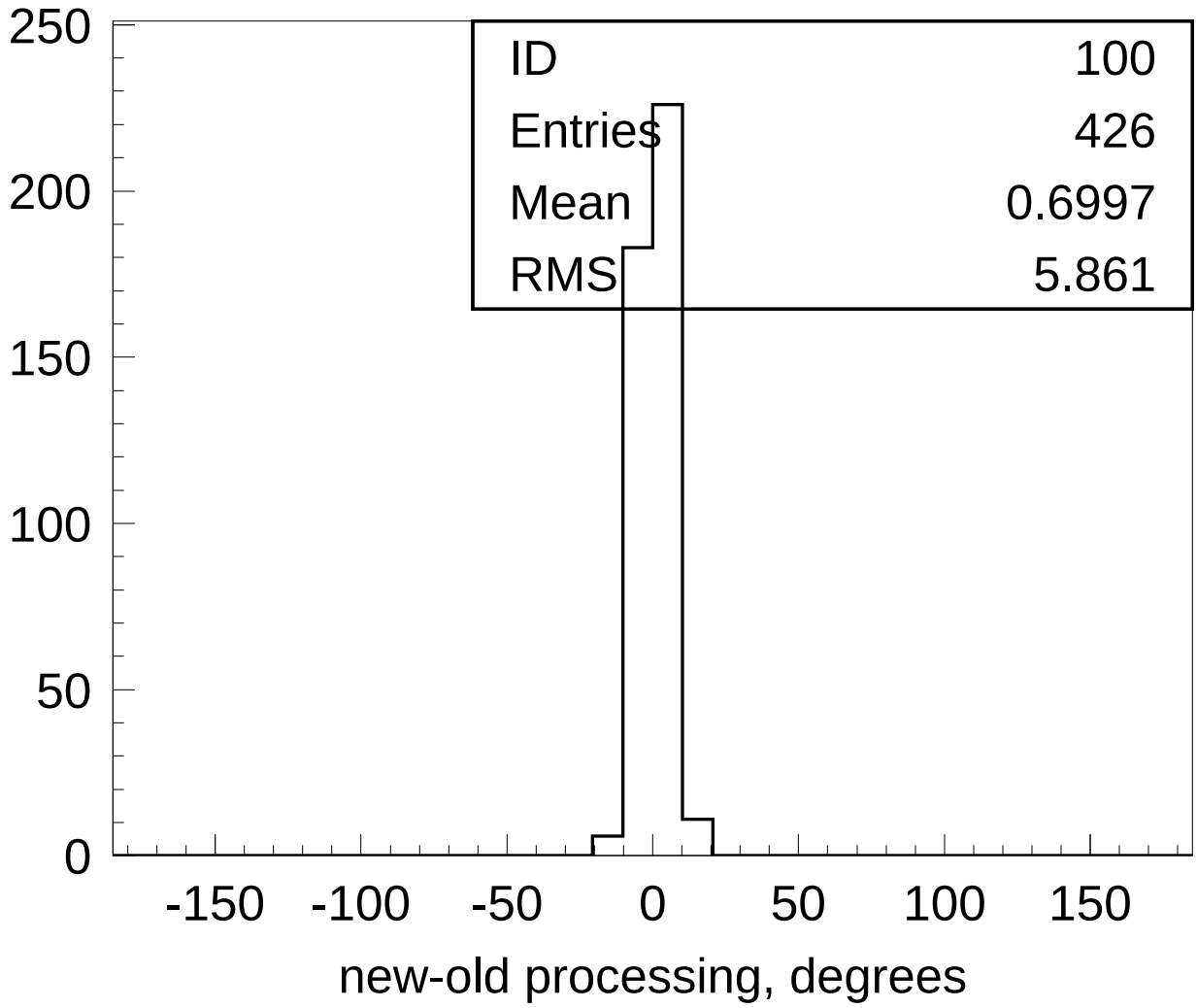
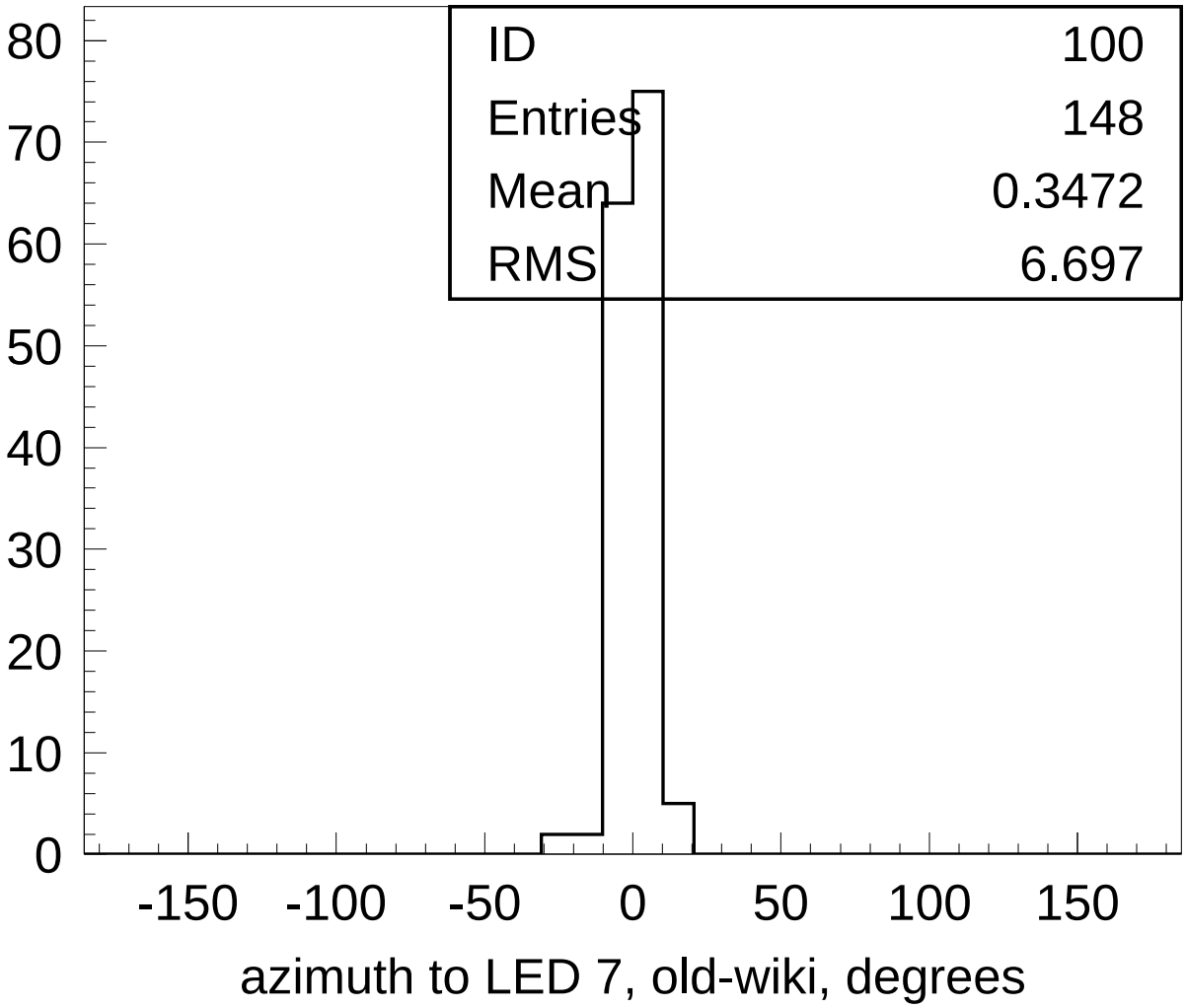
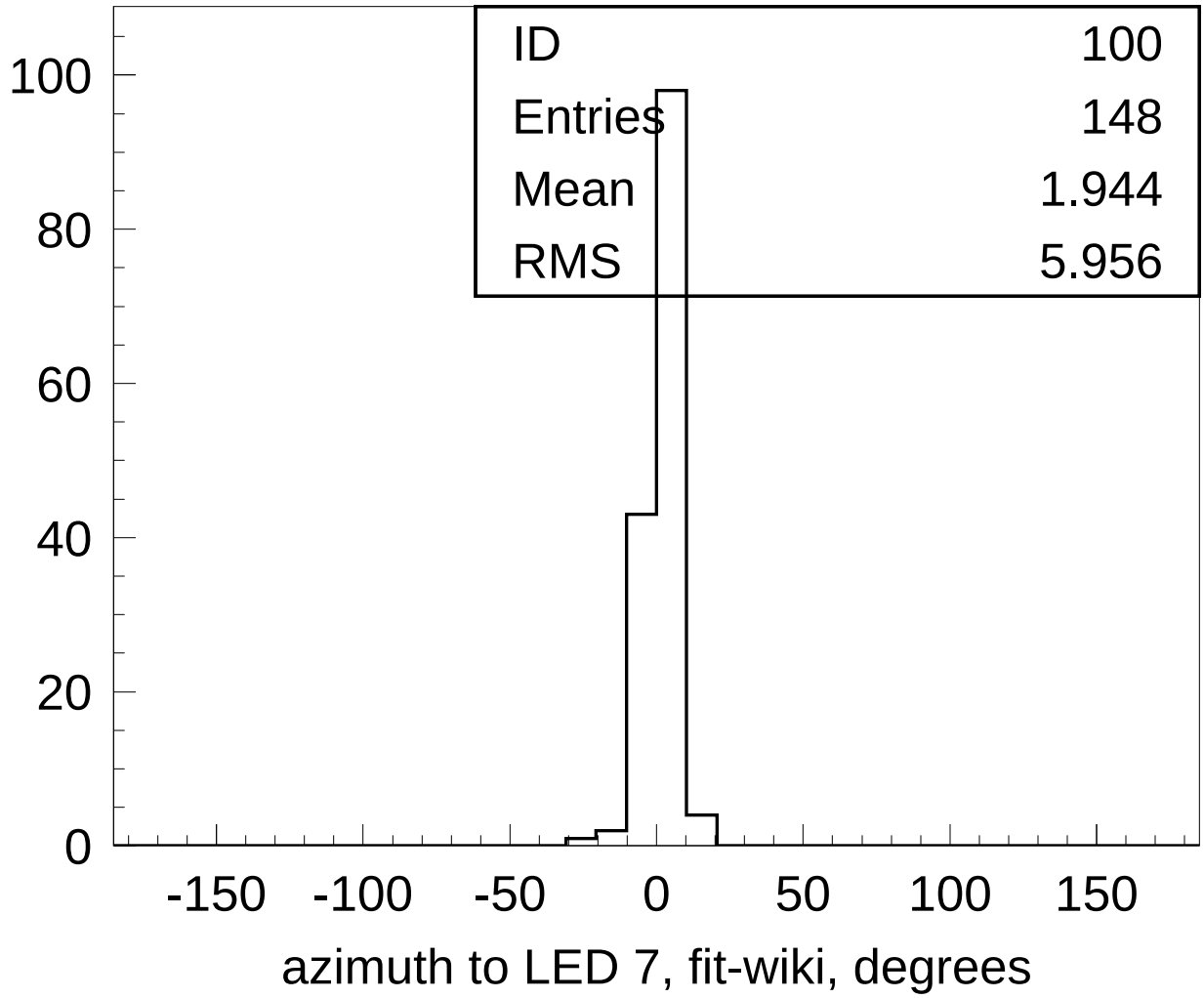
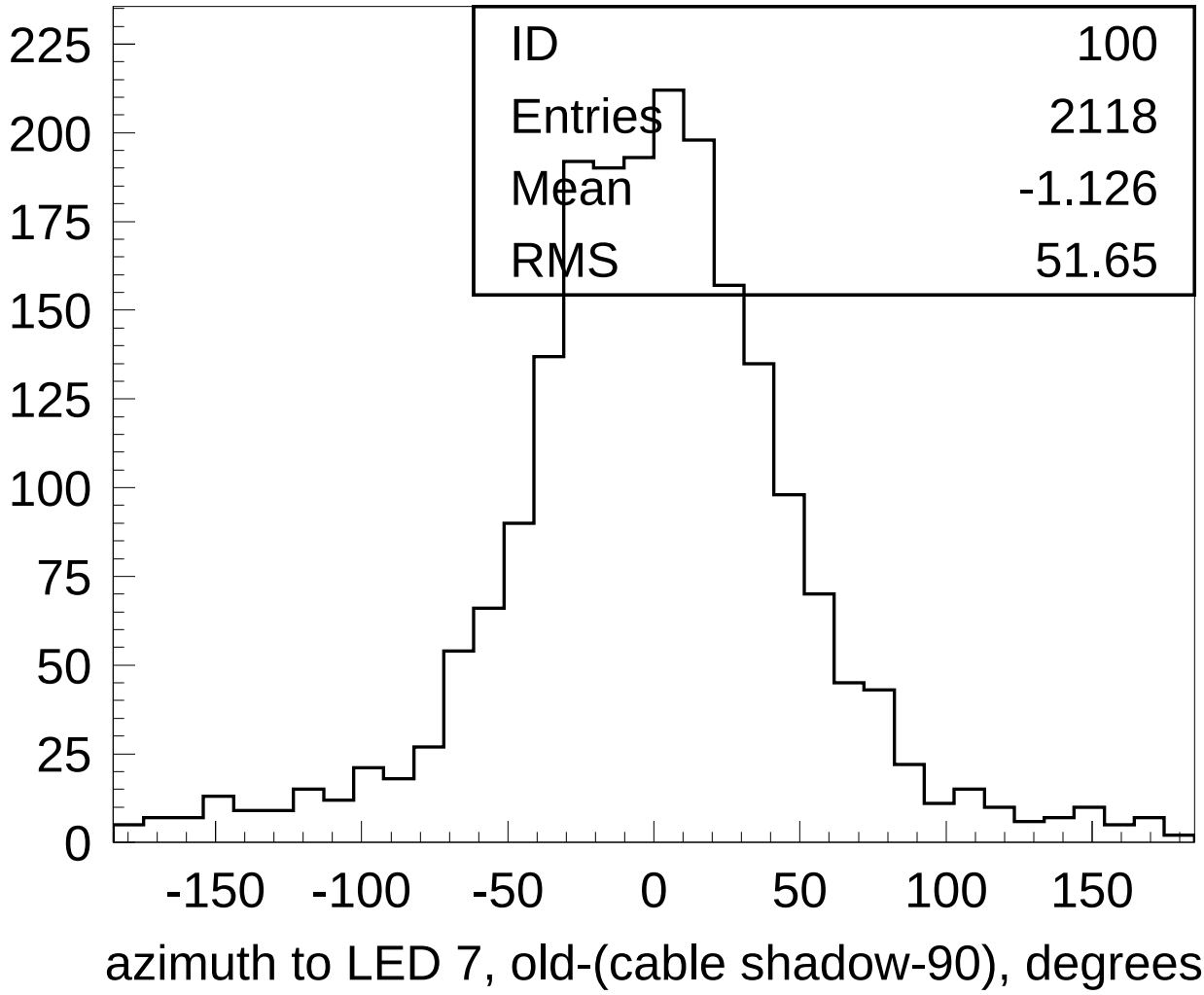
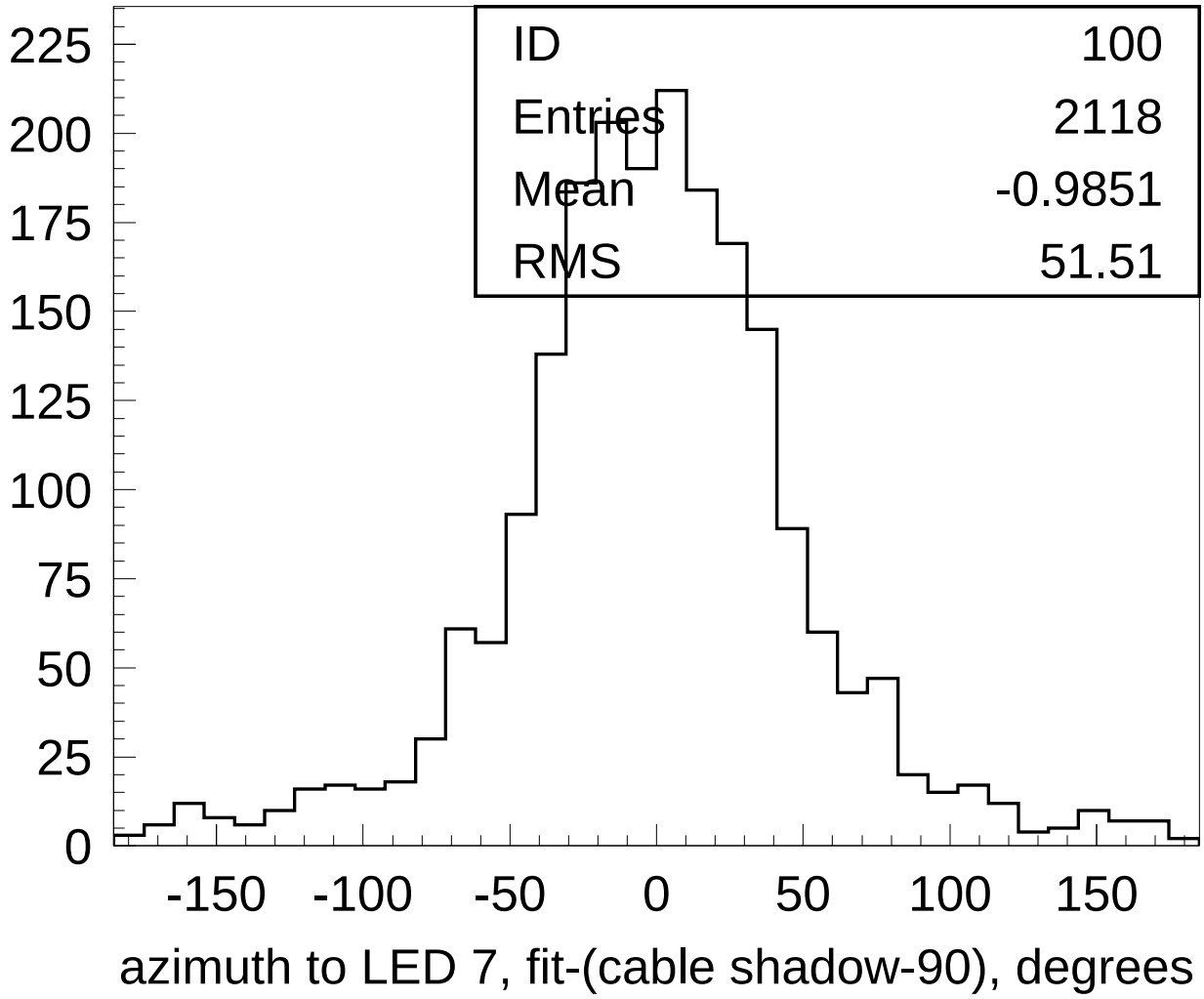
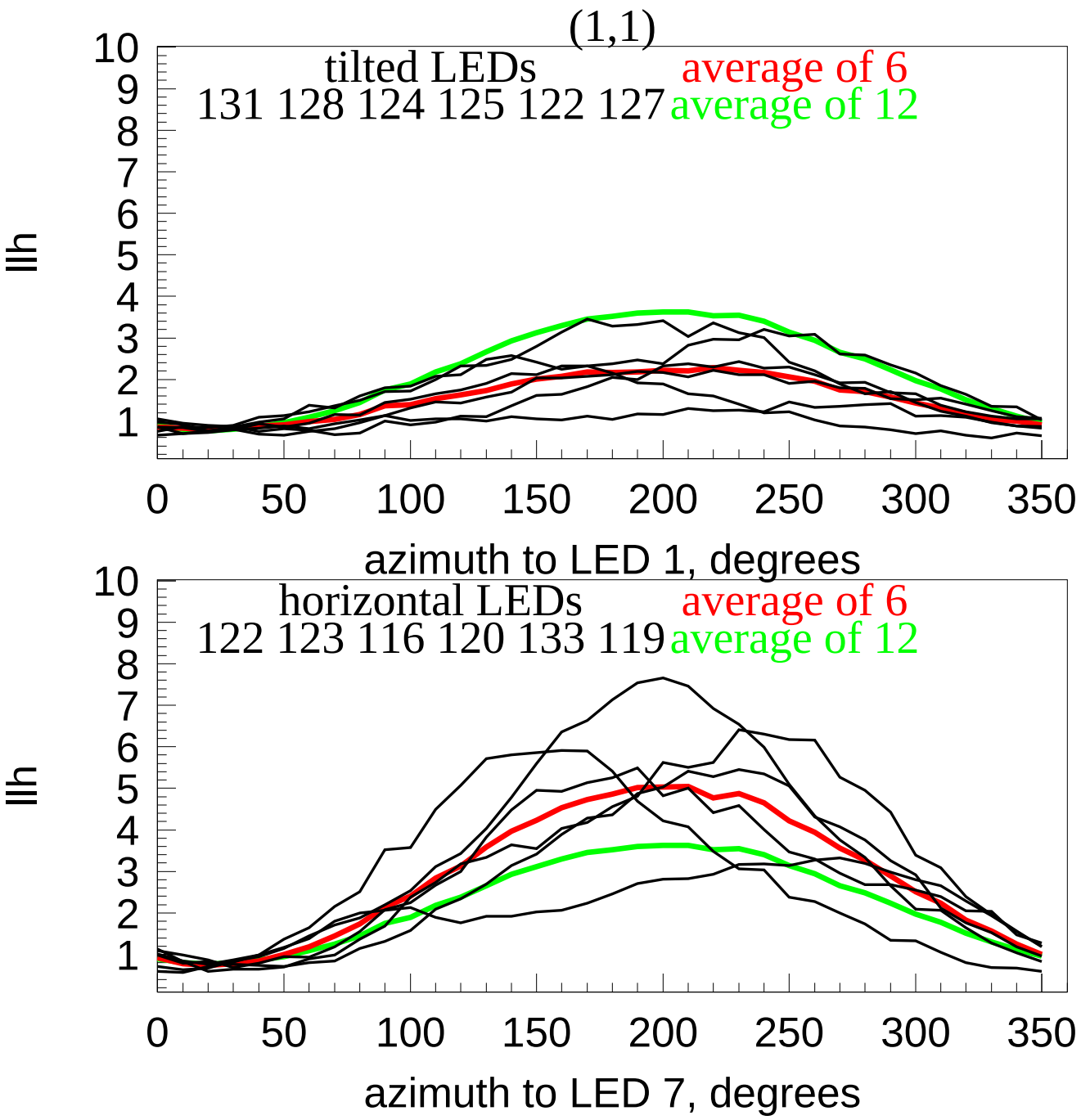

ID 100
Entries 426
Mean 0.6997
RMS 5.861
250
200
150
100
50
0
-150
-100
-50
0
50
100
150
new-old processing, degrees

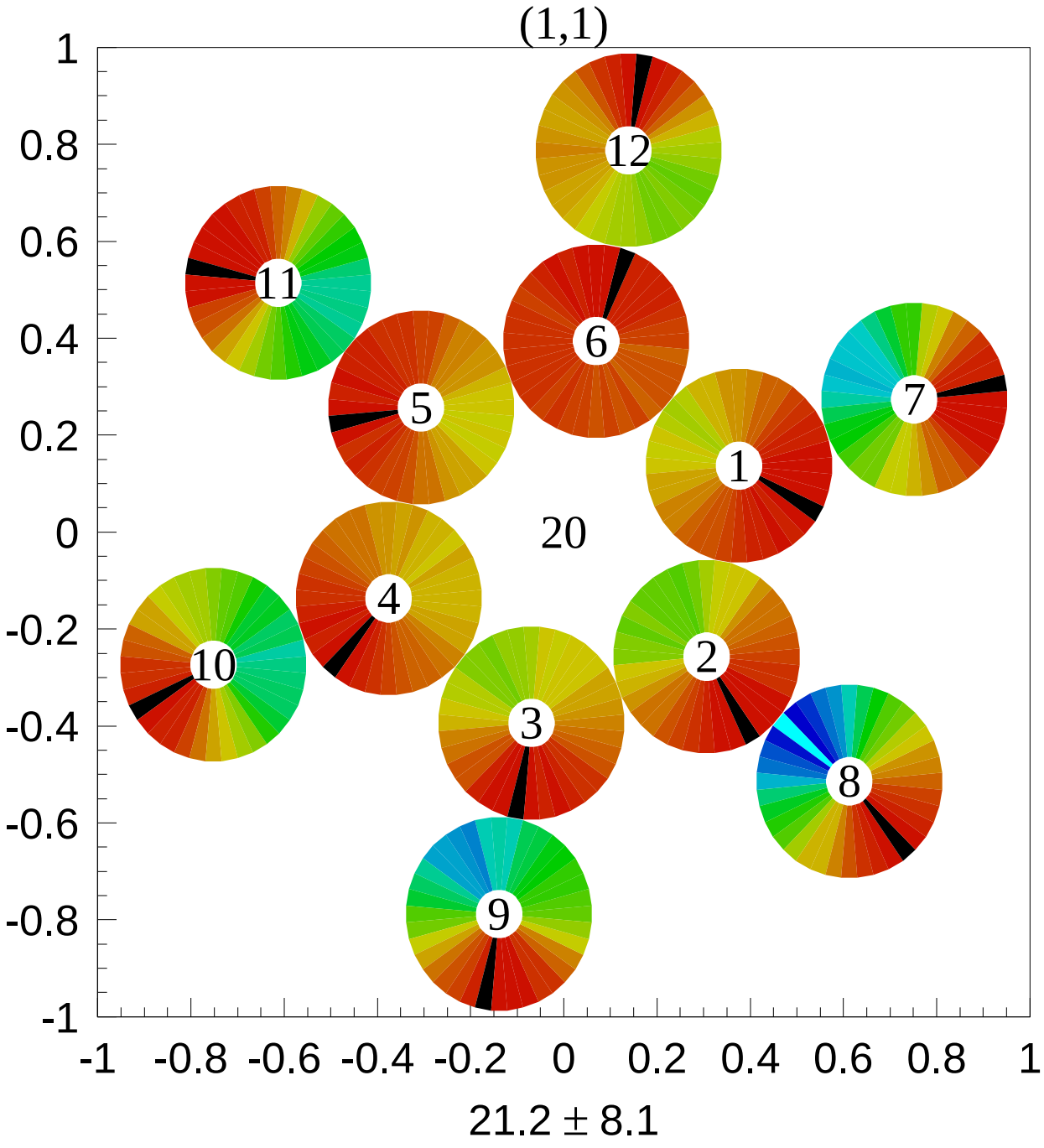

ID 100
Entries 148
Mean 0.3472
RMS 6.697
80
70
60
50
40
30
20
10
0
-150
-100
-50
0
50
100
150
azimuth to LED 7, old-wiki, degrees

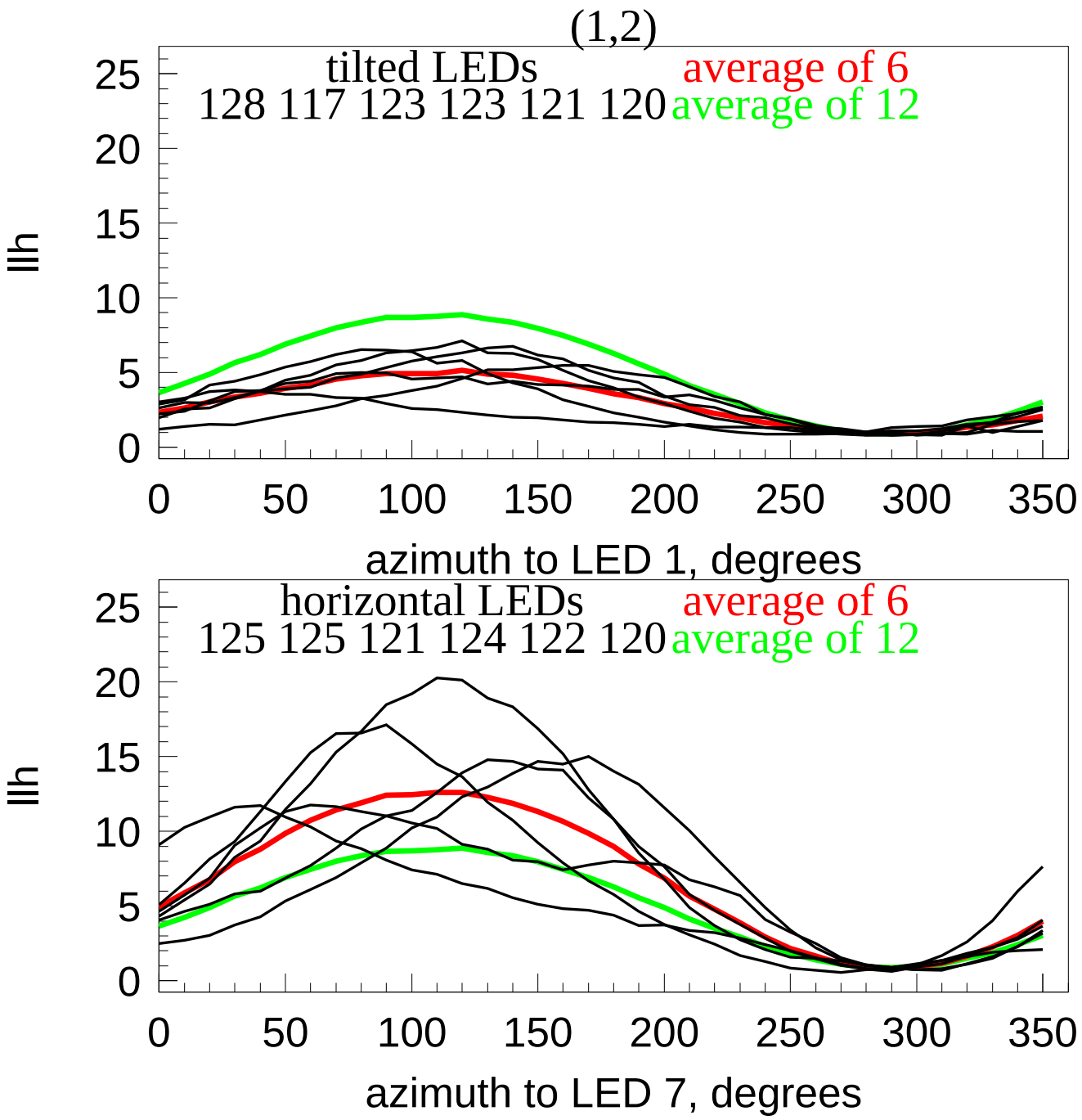

ID 100
Entries 148
Mean 1.944
RMS 5.956
100
80
60
40
20
0
-150
-100
-50
0
50
100
150
azimuth to LED 7, fit-wiki, degrees

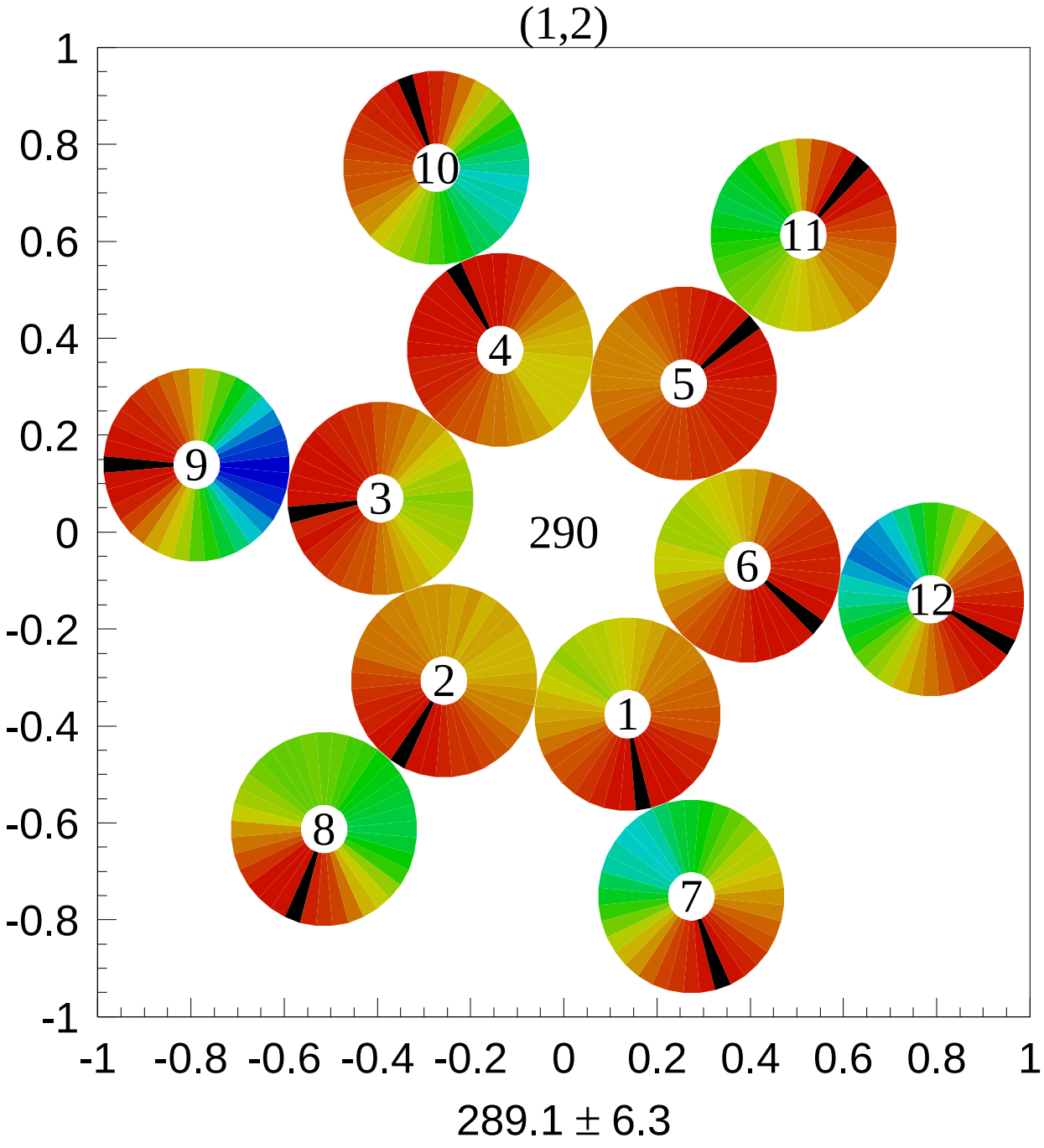

ID 100
Entries 2118
Mean -1.126
RMS 51.65
225
200
175
150
125
100
75
50
25
0
-150
-100
-50
0
50
100
150
azimuth to LED 7, old-(cable shadow-90), degrees

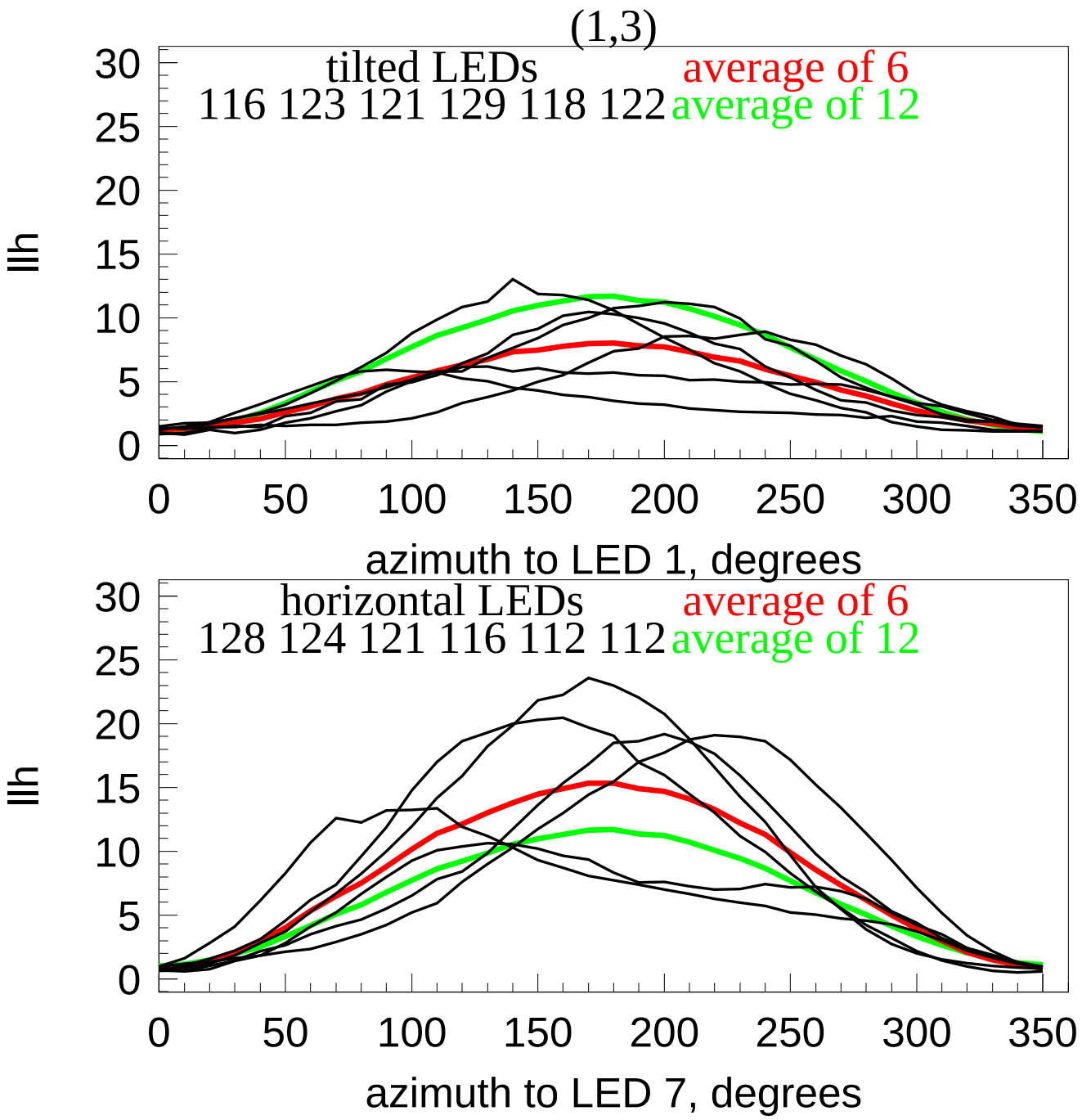

ID 100
Entries 2118
Mean -0.9851
RMS 51.51
225
200
175
150
125
100
75
50
25
0
-150
-100
-50
0
50
100
150
azimuth to LED 7, fit-(cable shadow-90), degrees

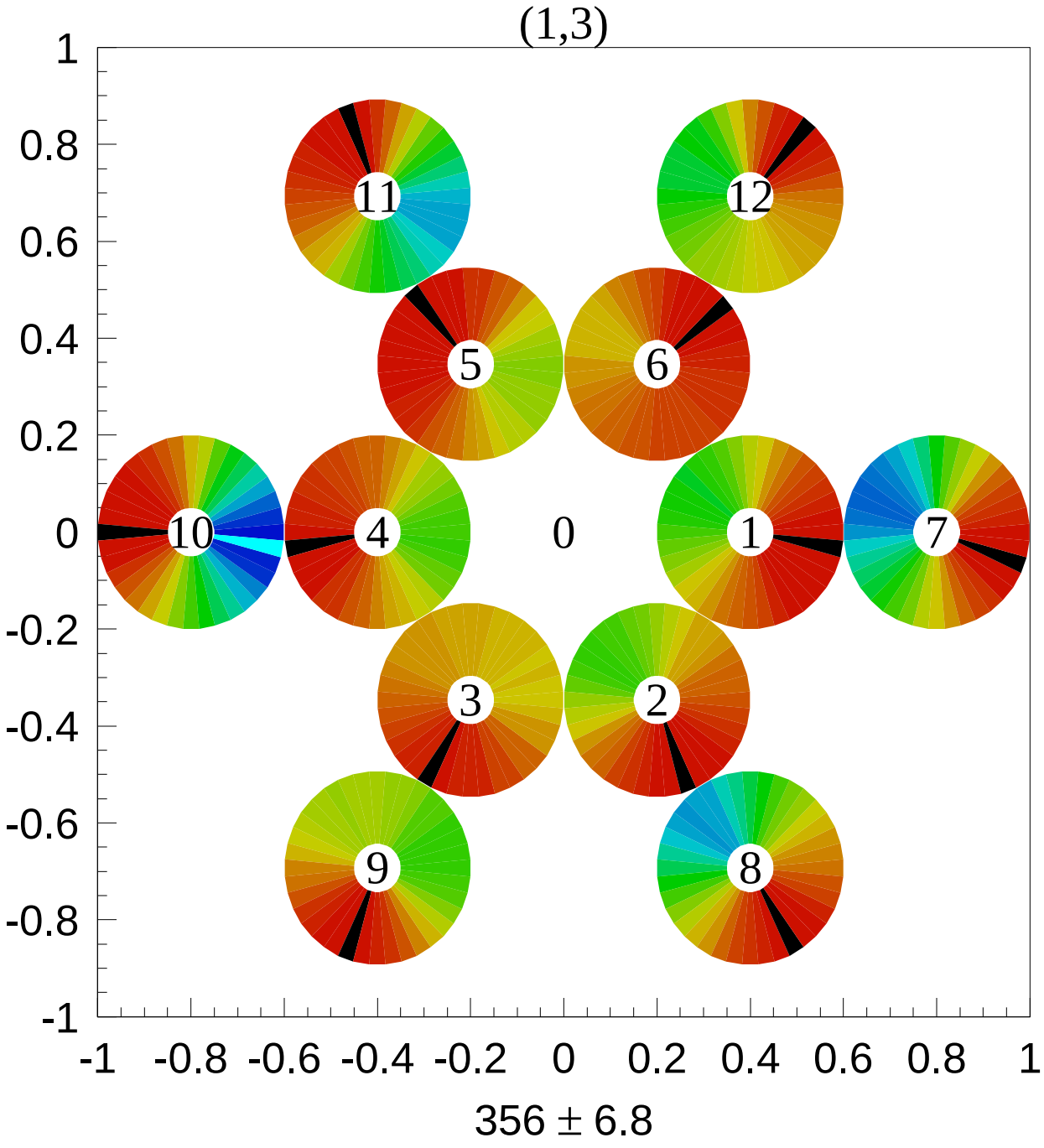

(1,1)
tilted LEDs
131 128 124 125 122 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 116 120 133 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

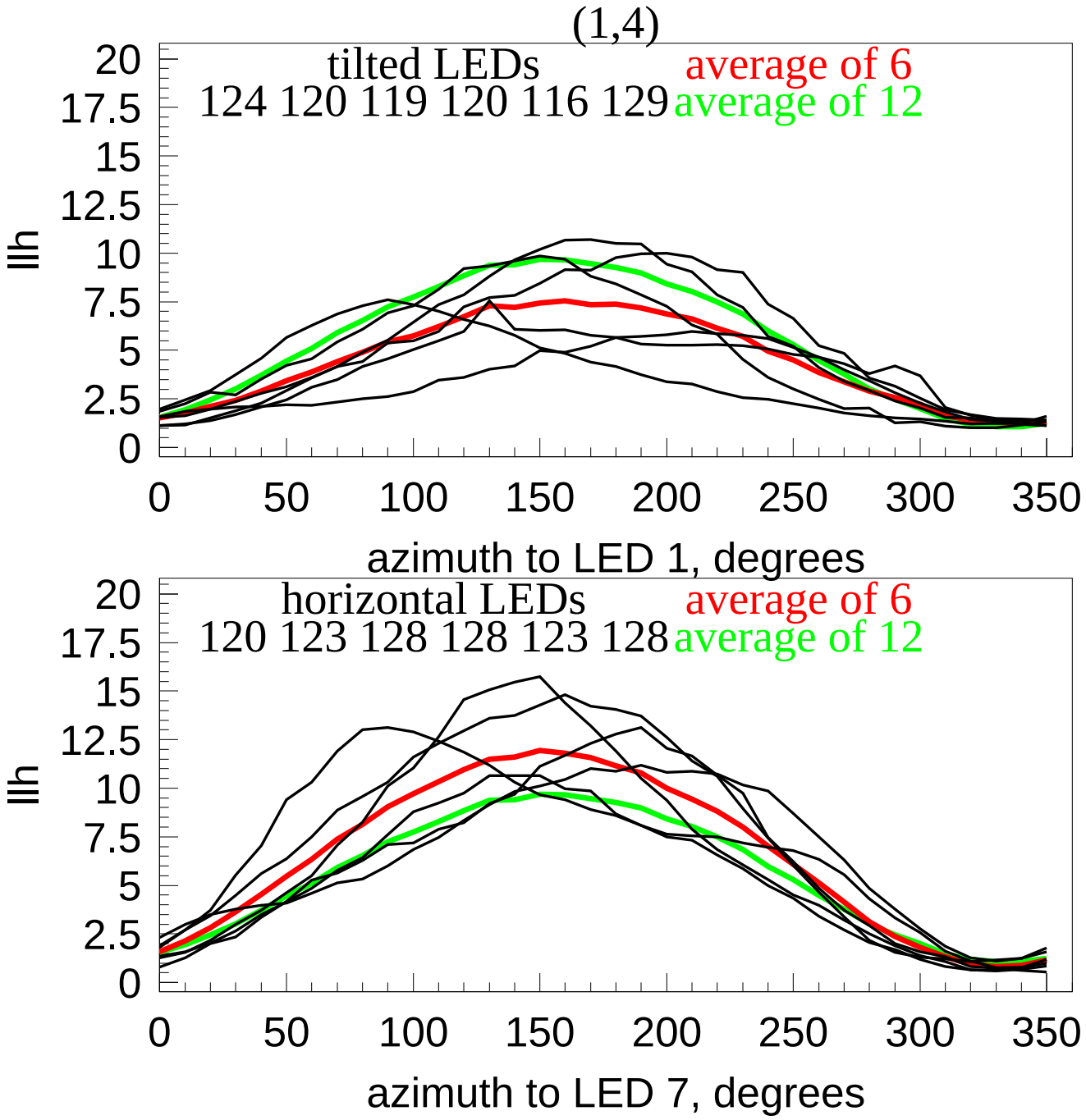

(1,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
21.2 ± 8.1

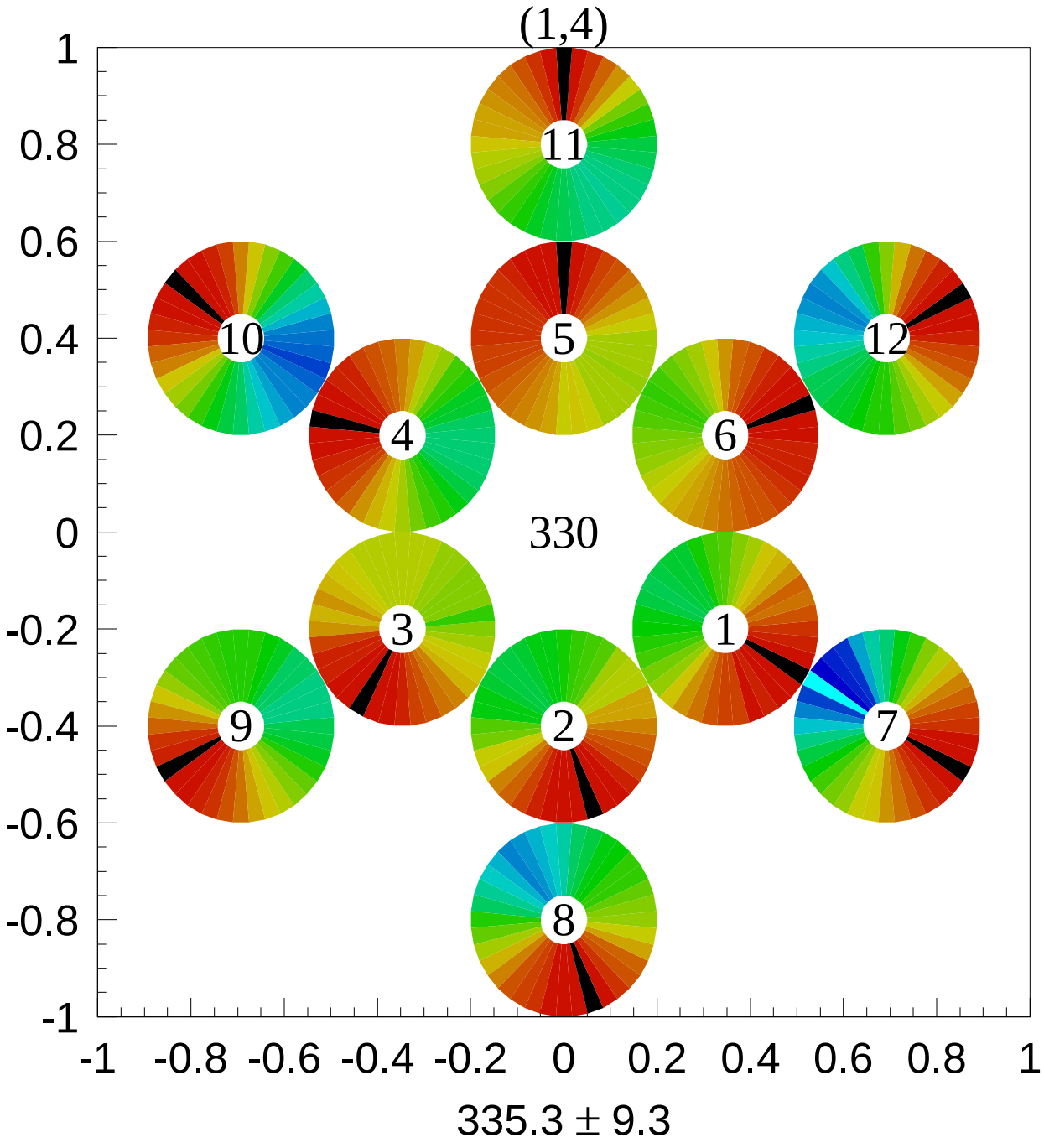

(1,2)
tilted LEDs
128 117 123 123 121 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 121 124 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

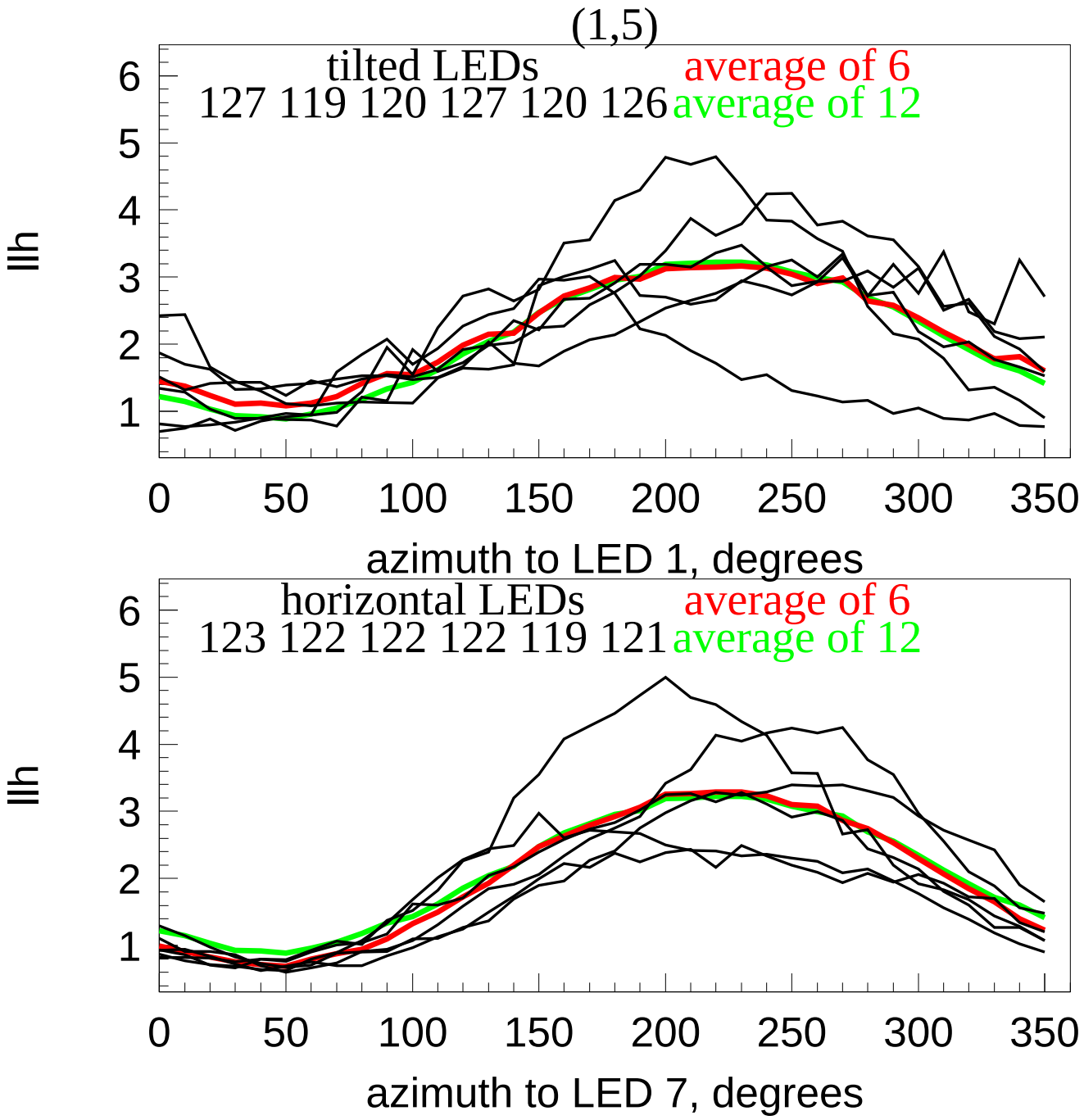

(1,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
289.1 ± 6.3

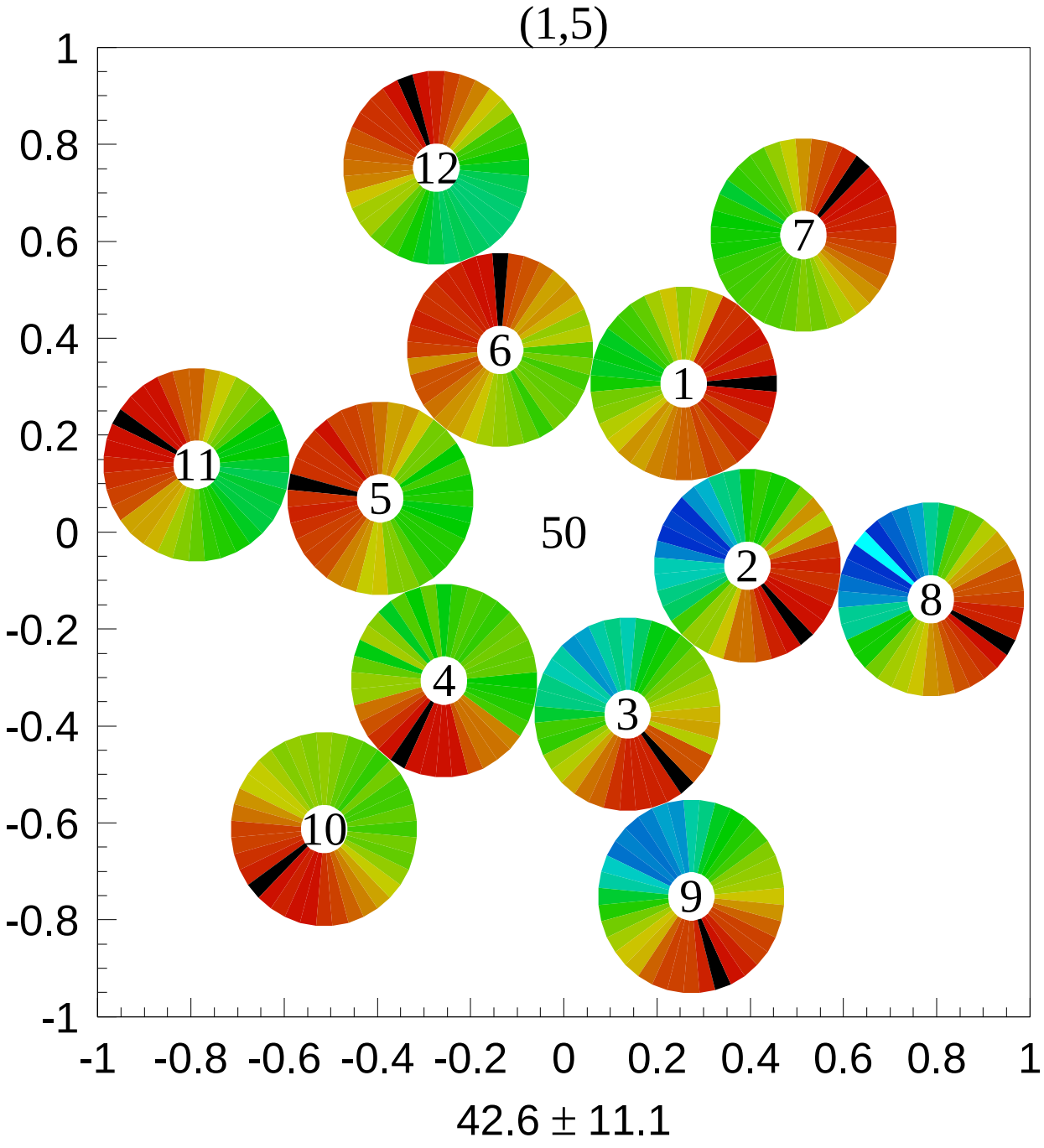

(1,3)
tilted LEDs
116 123 121 129 118 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 124 121 116 112 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

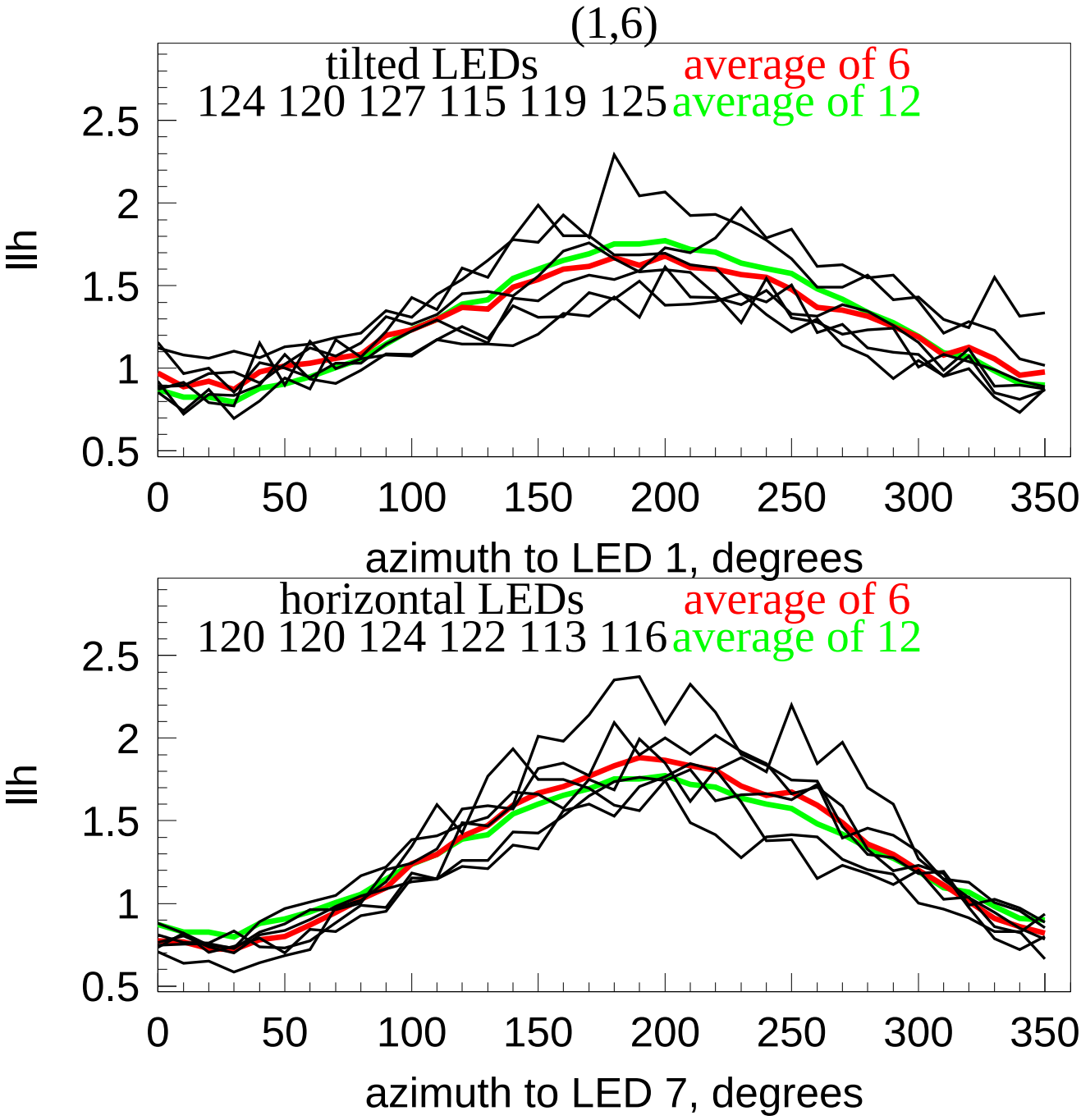

(1,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
356 ± 6.8

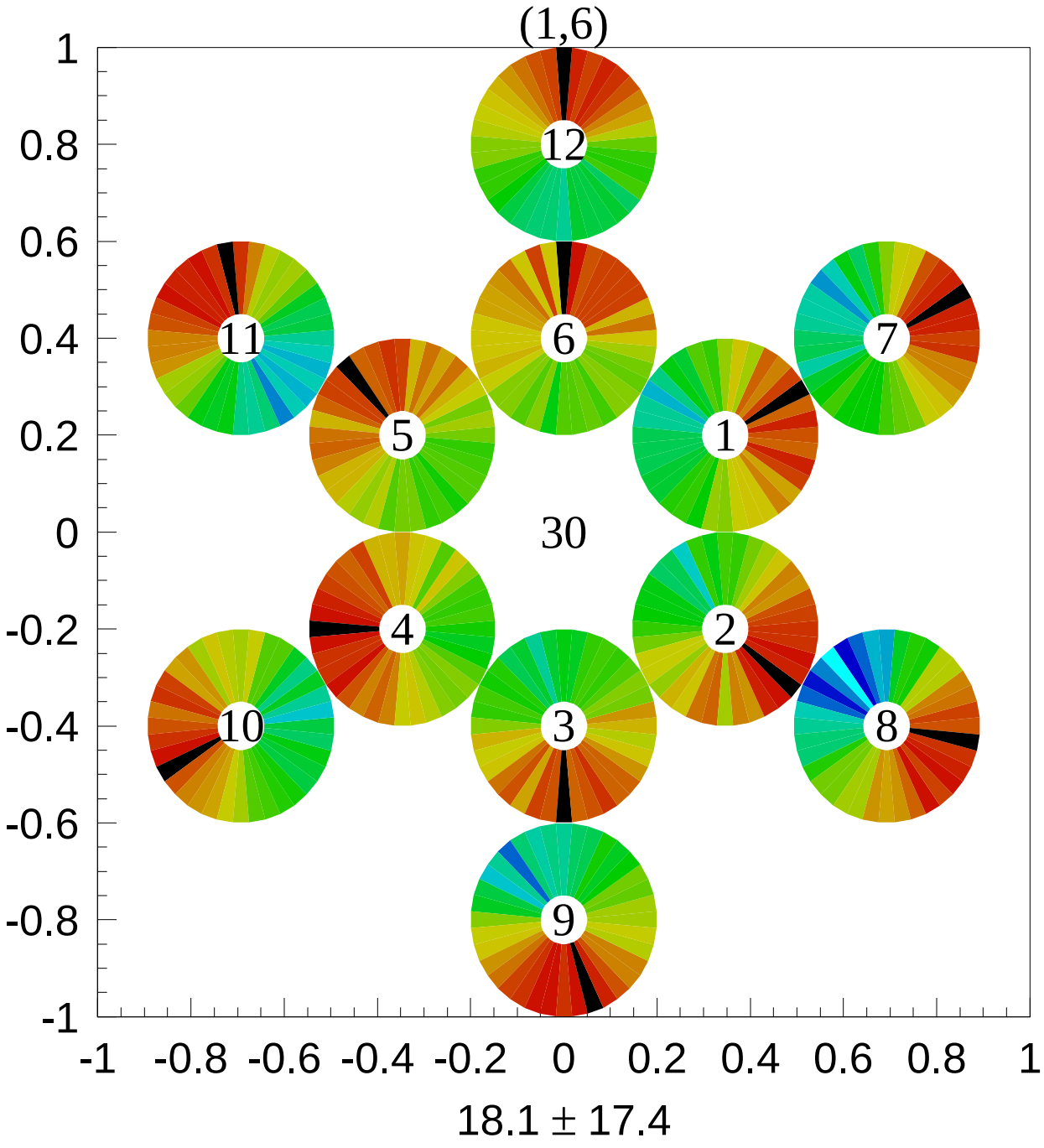

(1,4)
tilted LEDs
124 120 119 120 116 129
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 123 128 128 123 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

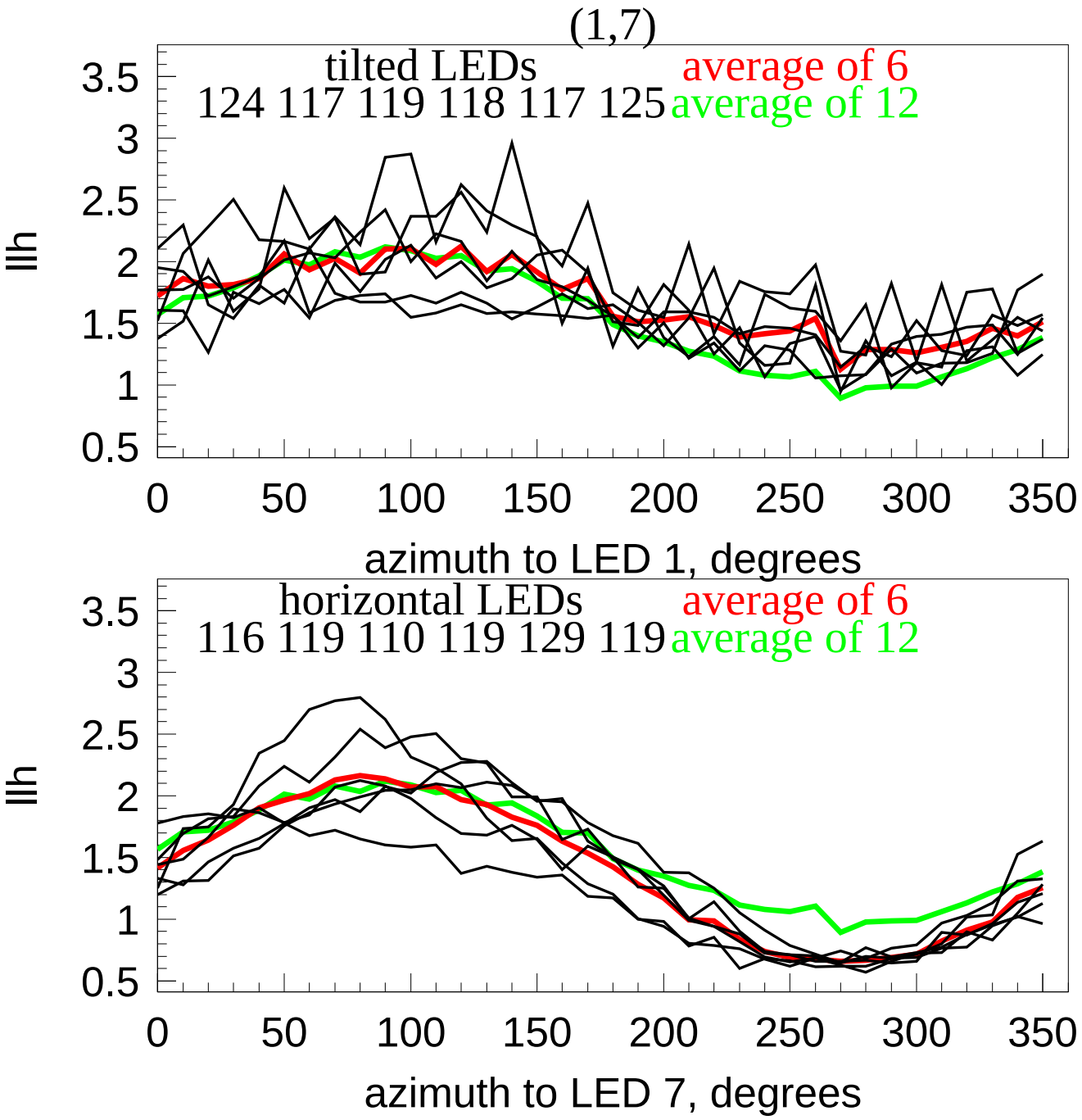

(1,4)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
335.3 ± 9.3

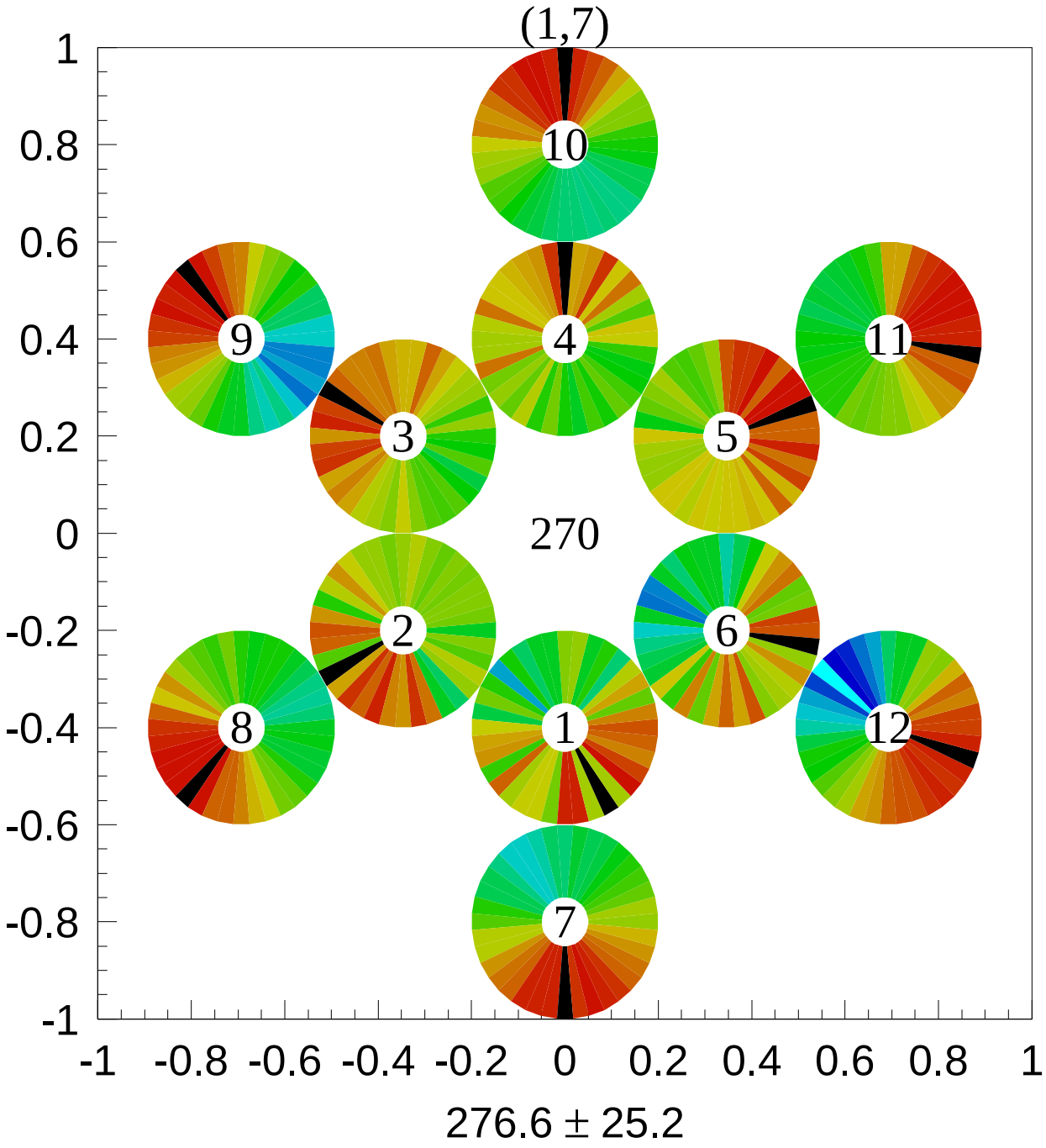

(1,5)
tilted LEDs
127 119 120 127 120 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 122 122 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

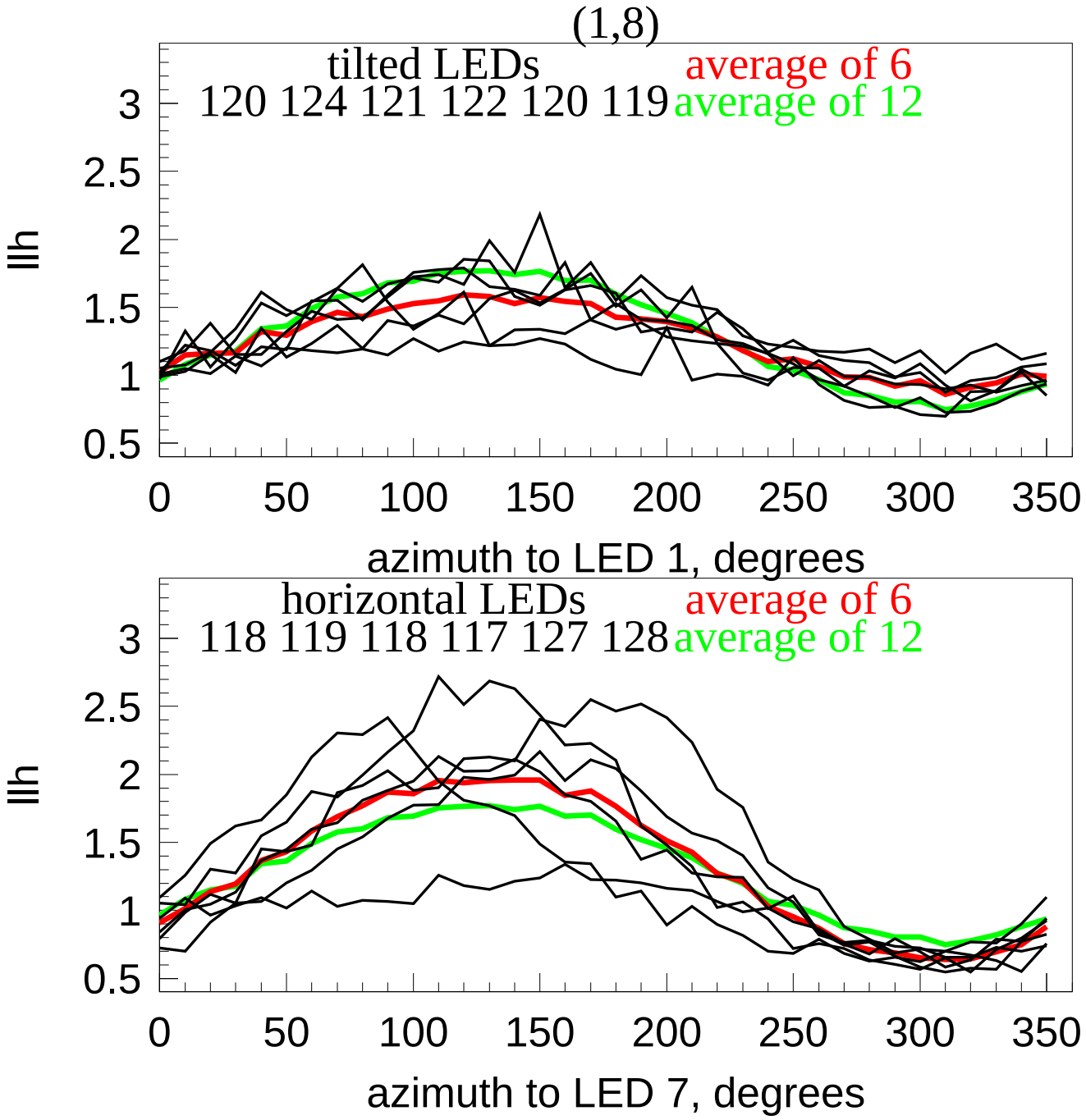

(1,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
42.6 ± 11.1

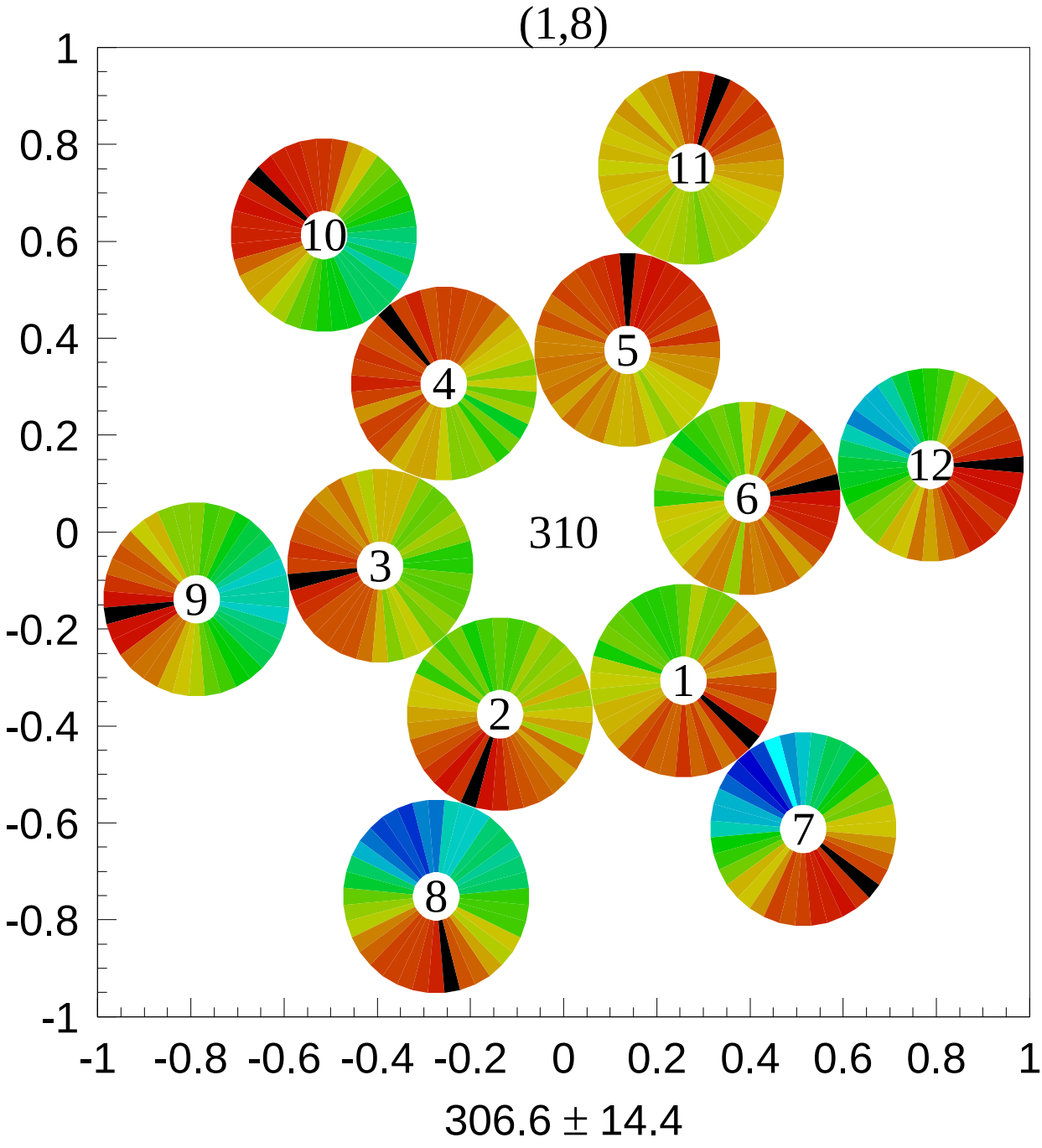

(1,6)
tilted LEDs
124 120 127 115 119 125
average of 6
average of 12
llh
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 120 124 122 113 116
average of 6
average of 12
llh
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

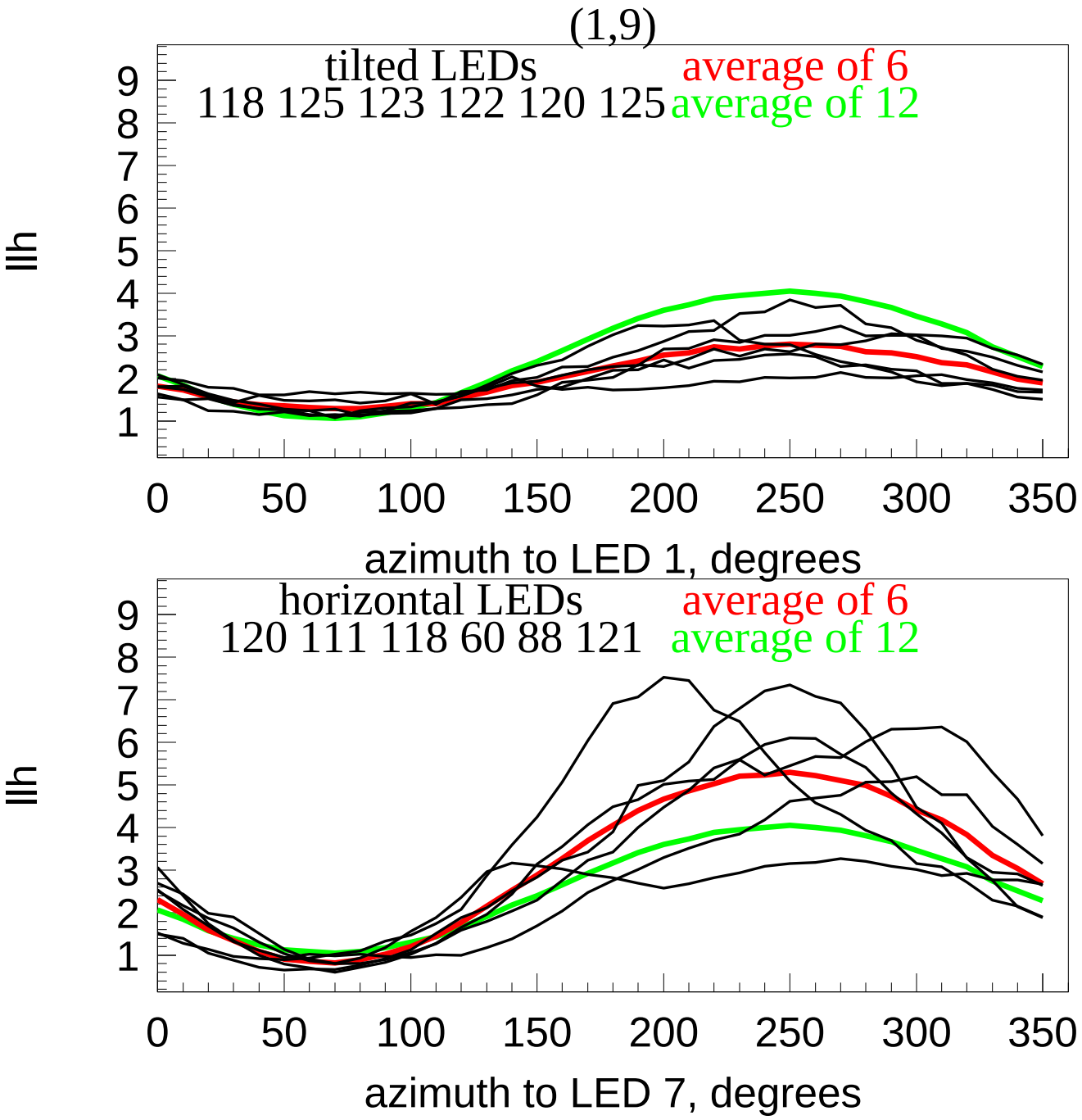

(1,6)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
18.1 ± 17.4

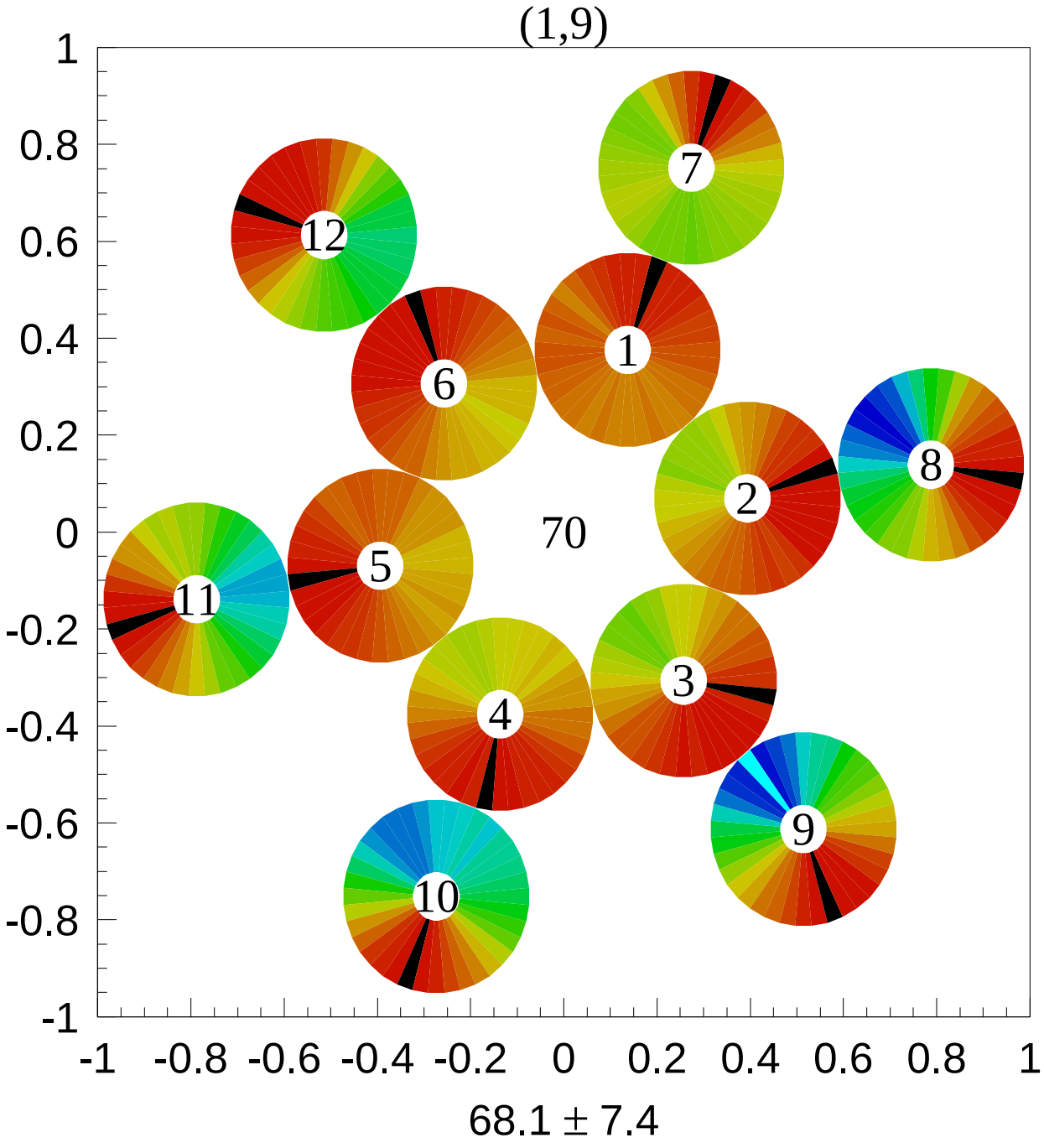

(1,7)
tilted LEDs
124 117 119 118 117 125
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 119 110 119 129 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

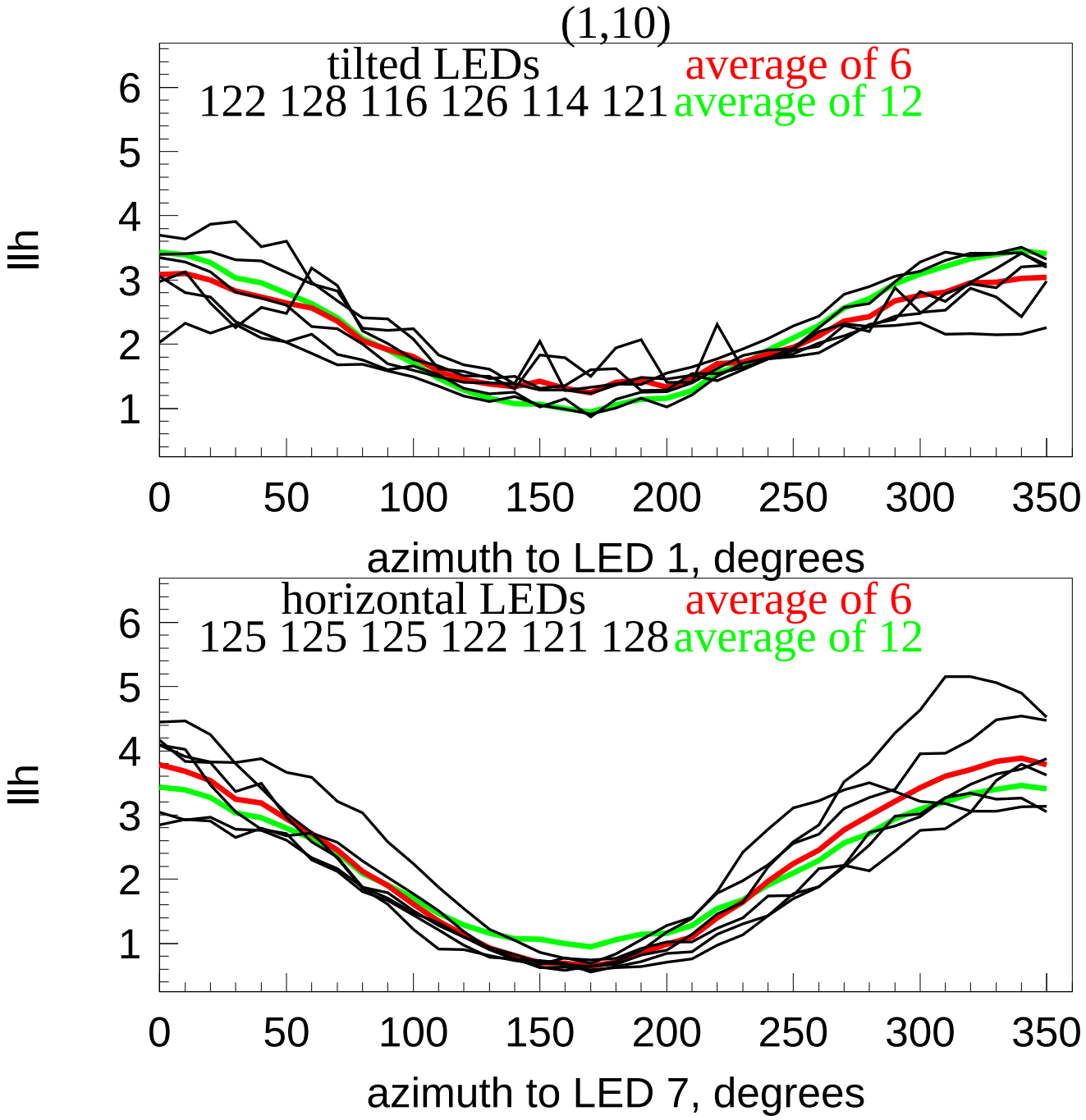

(1,7)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
276.6 ± 25.2

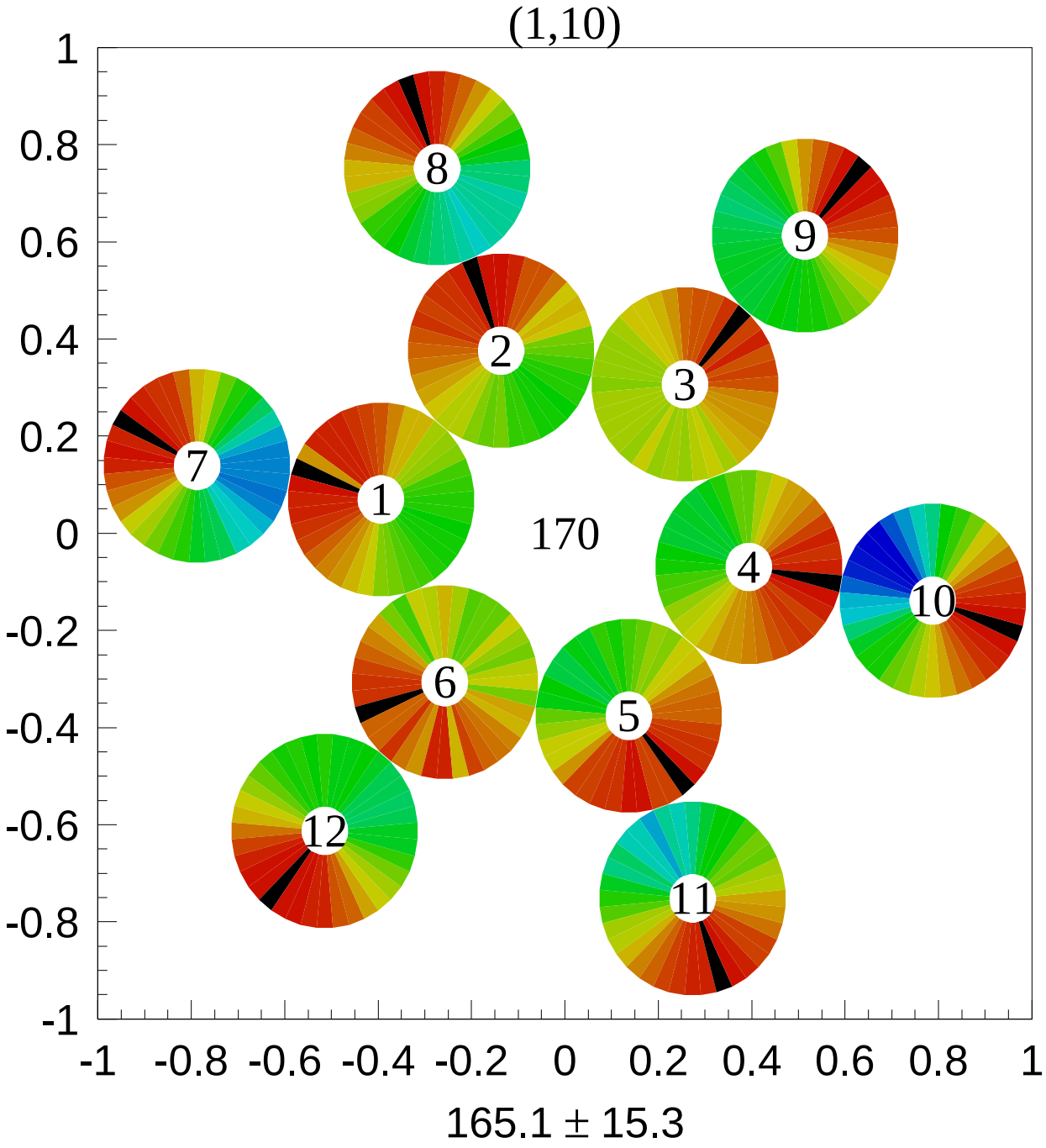

(1,8)
tilted LEDs
120 124 121 122 120 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 119 118 117 127 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

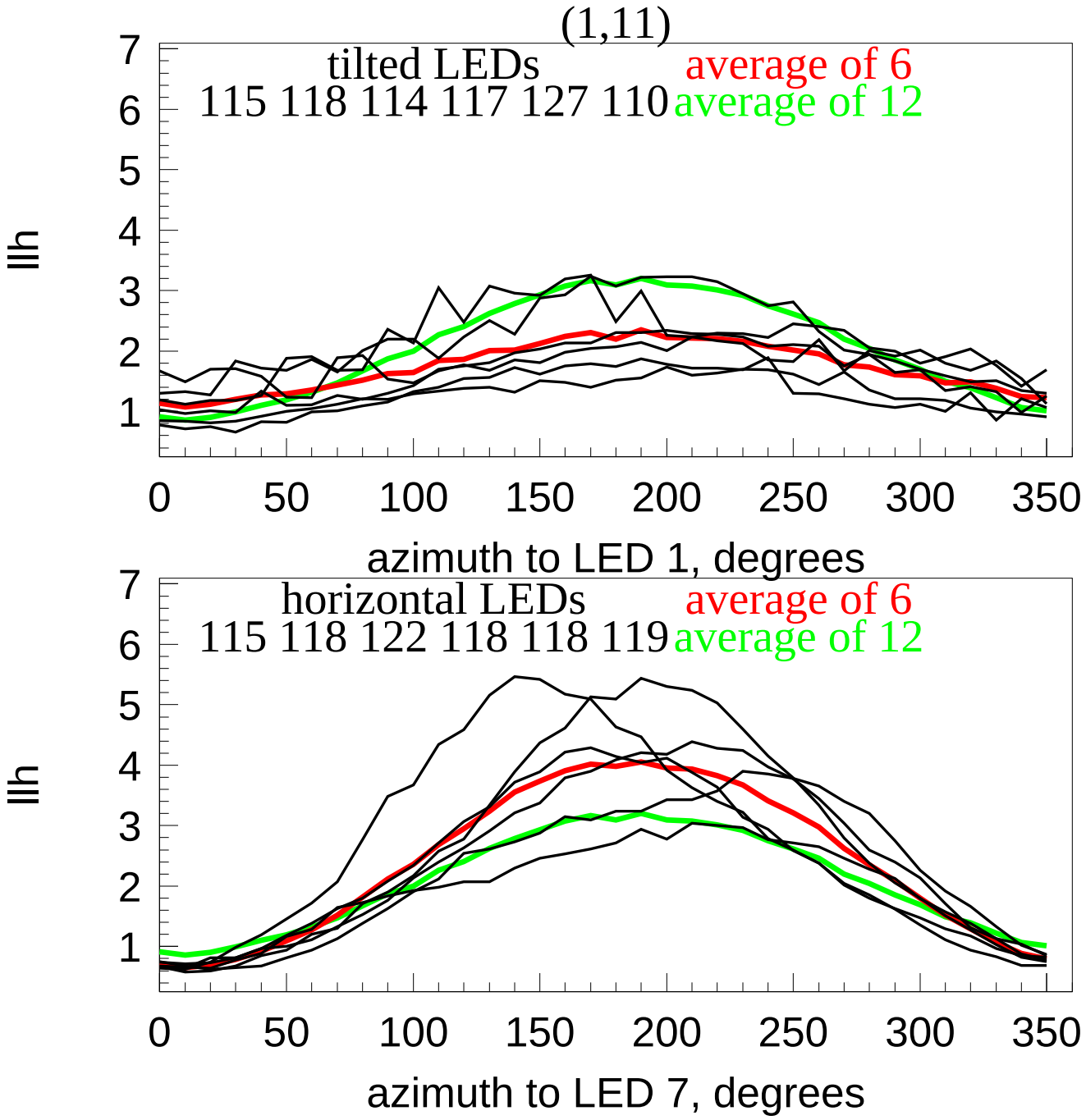

(1,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
306.6 ± 14.4

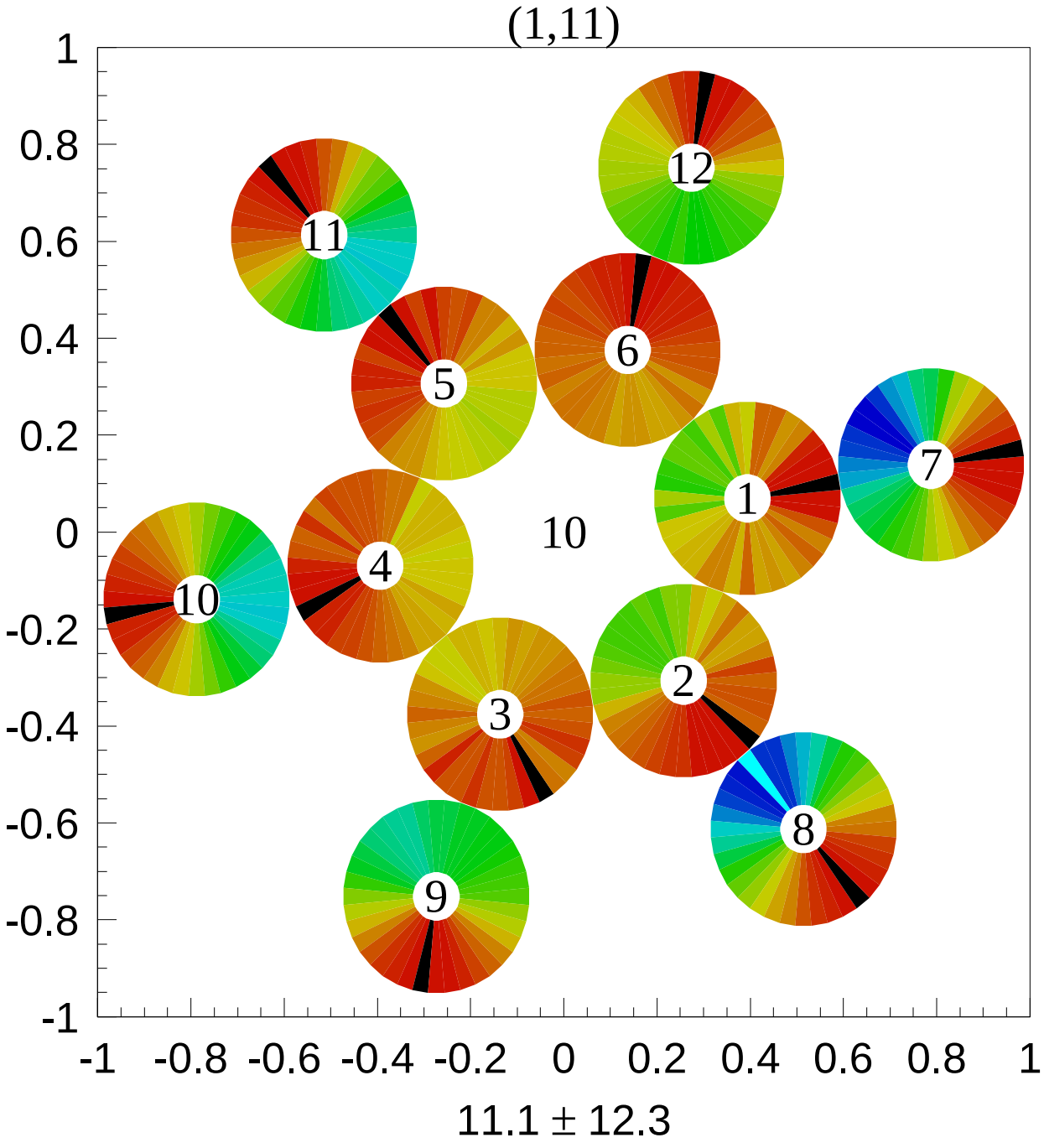

(1,9)
tilted LEDs
118 125 123 122 120 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 111 118 60 88 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

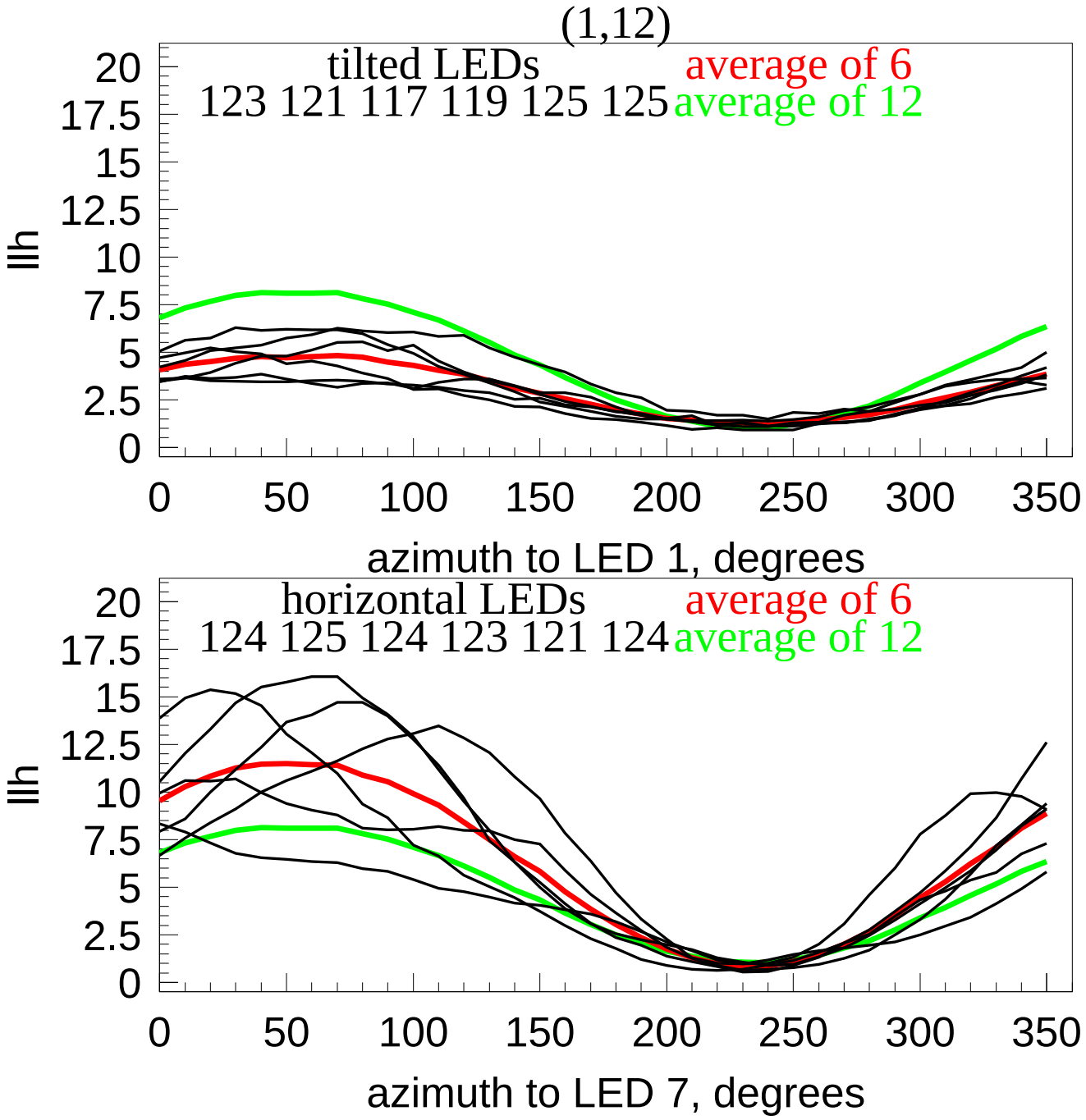

(1,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
70
5
11
4
3
9
10
68.1 ± 7.4

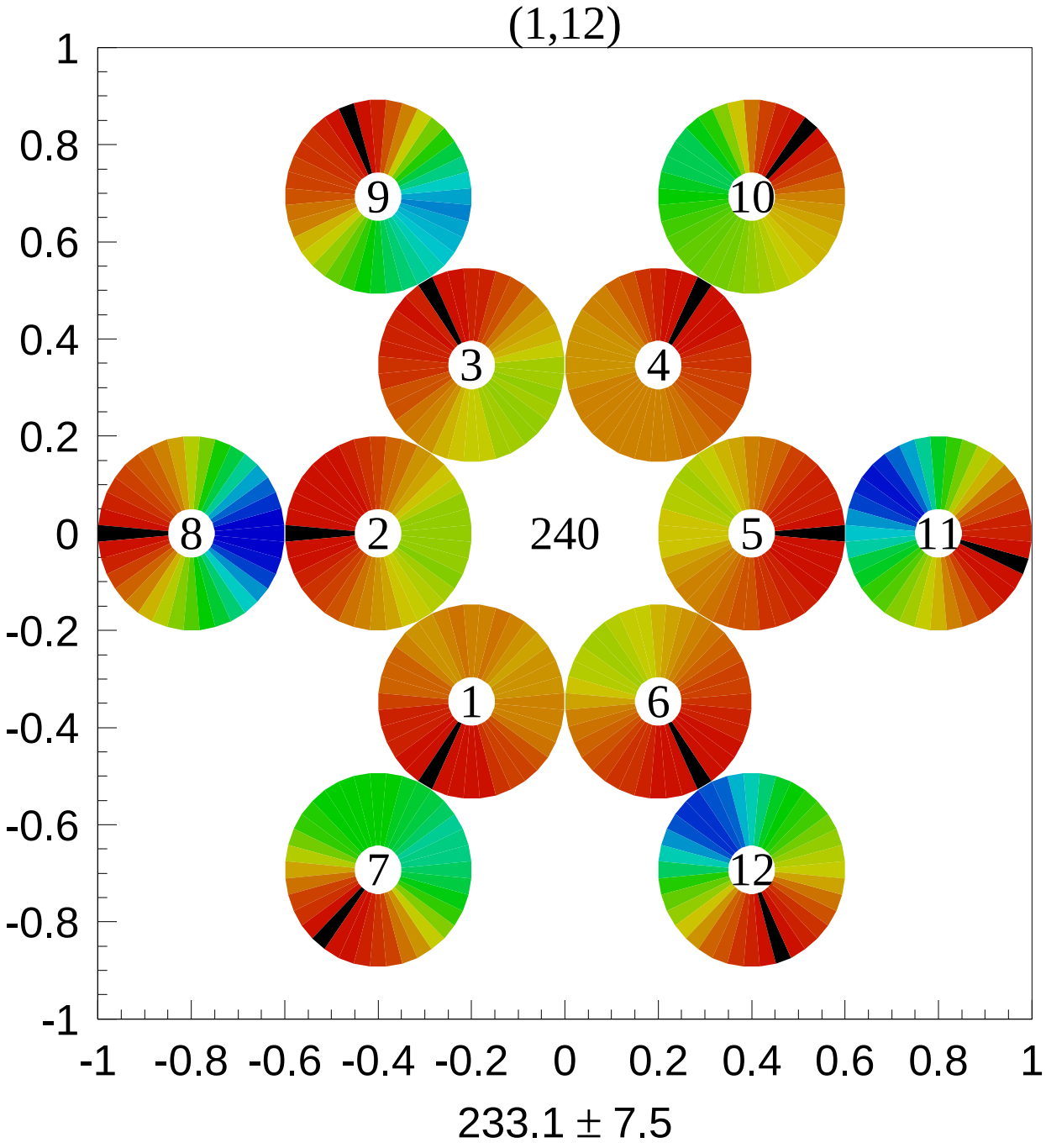

(1,10)
tilted LEDs
122 128 116 126 114 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 125 122 121 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

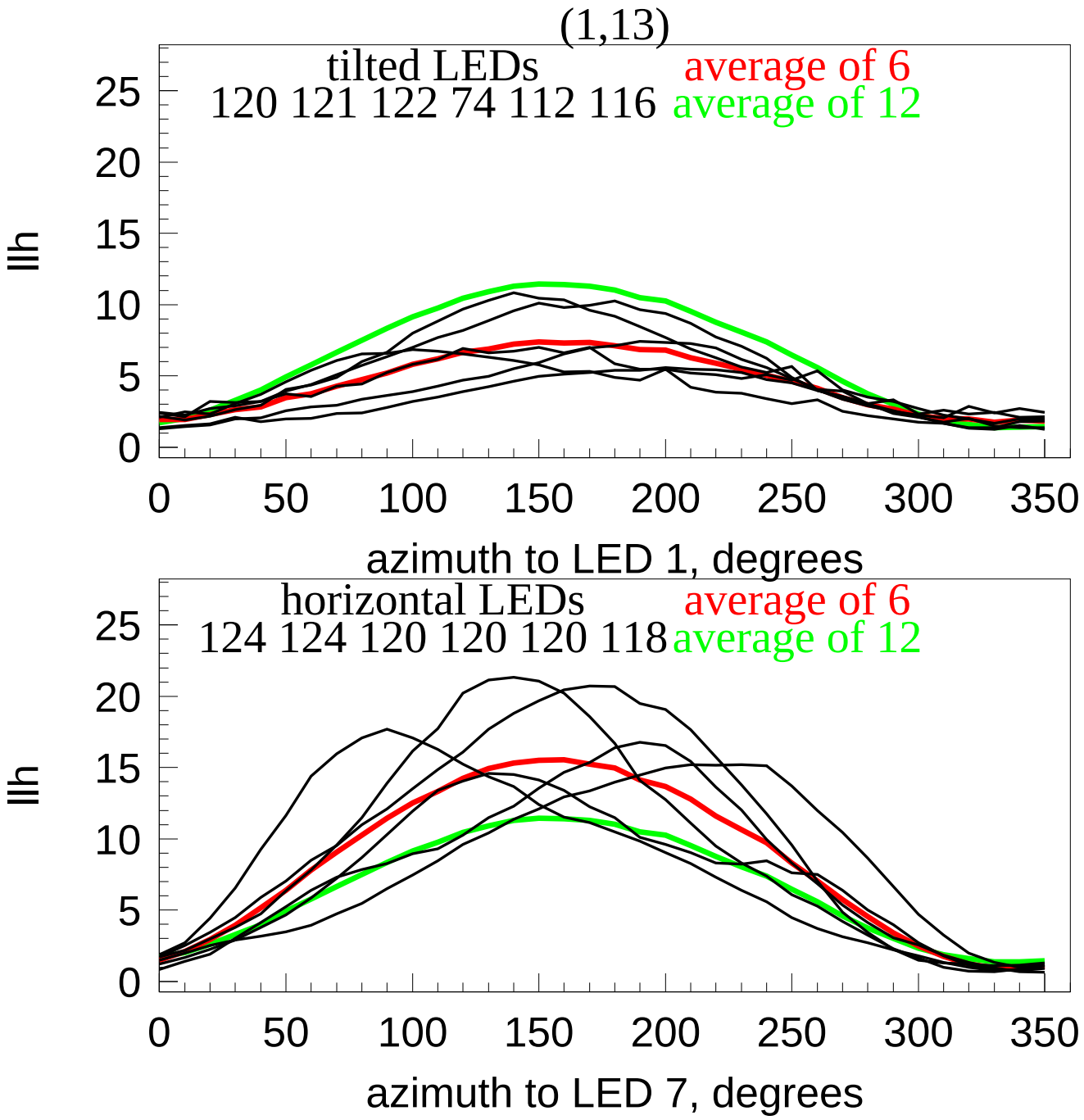

(1,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
165.1 ± 15.3

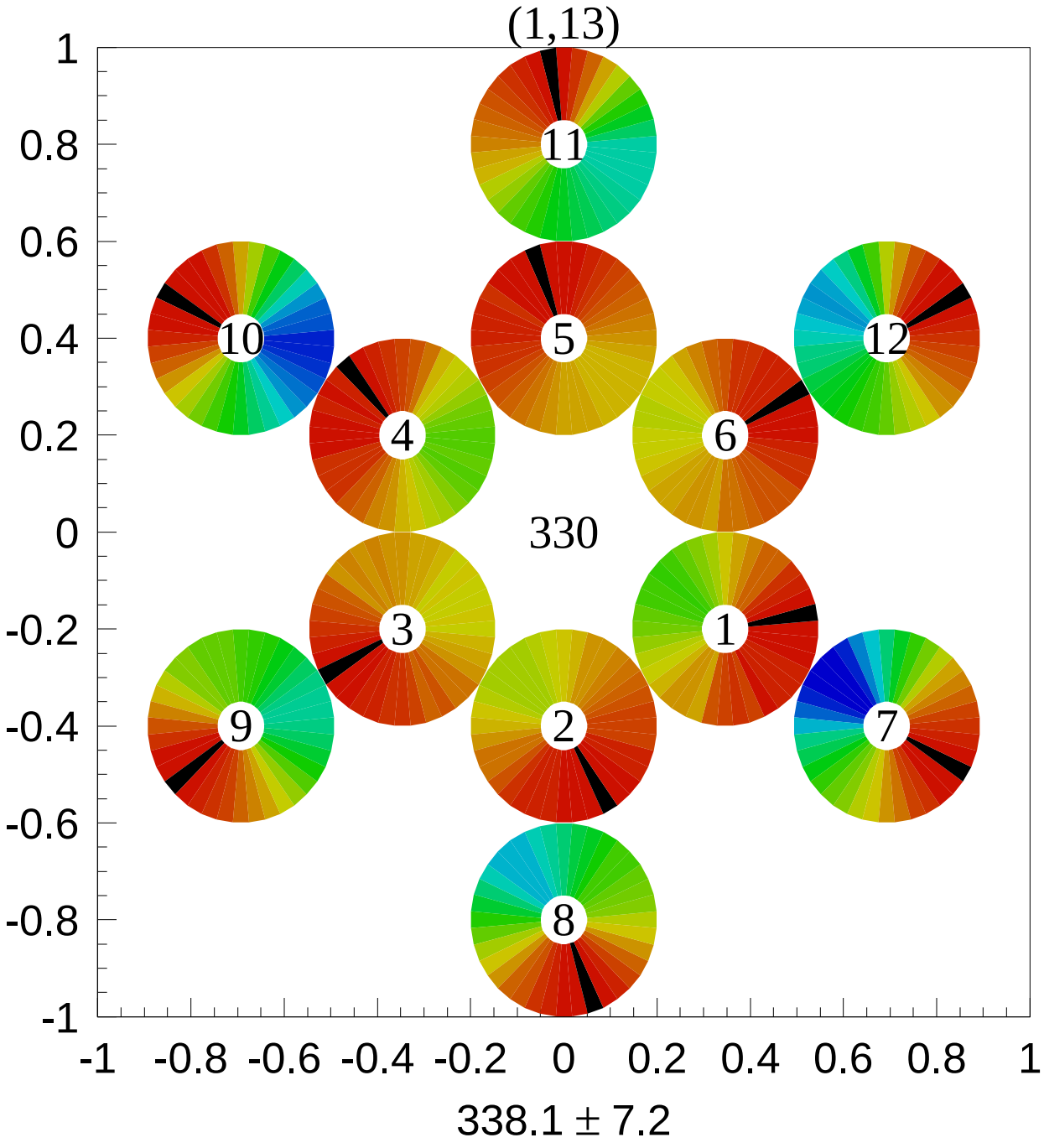

(1,11)
tilted LEDs
115 118 114 117 127 110
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 118 122 118 118 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

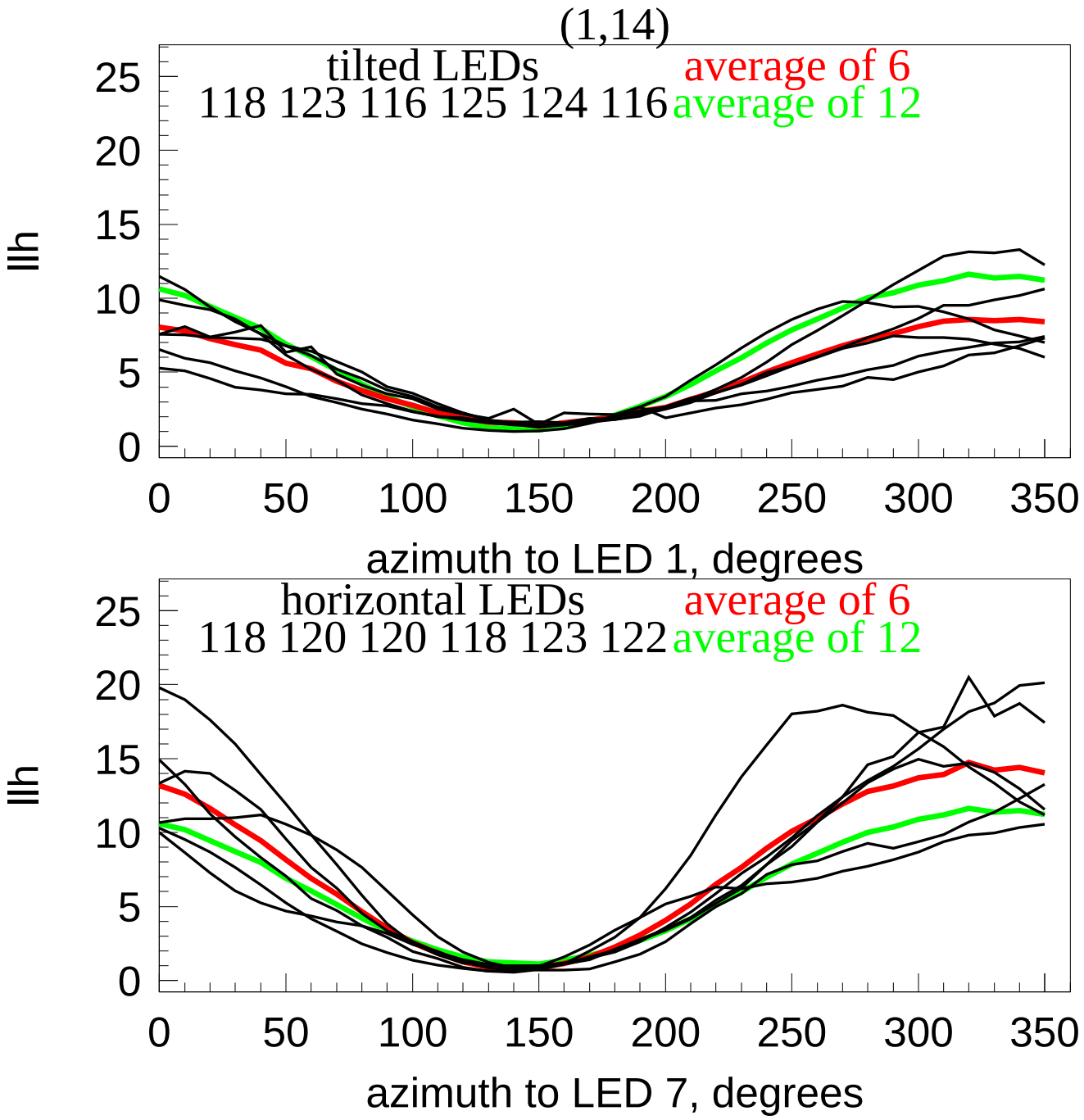

(1,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11.1 ± 12.3
12
11
6
5
7
1
10
4
10
2
3
8
9

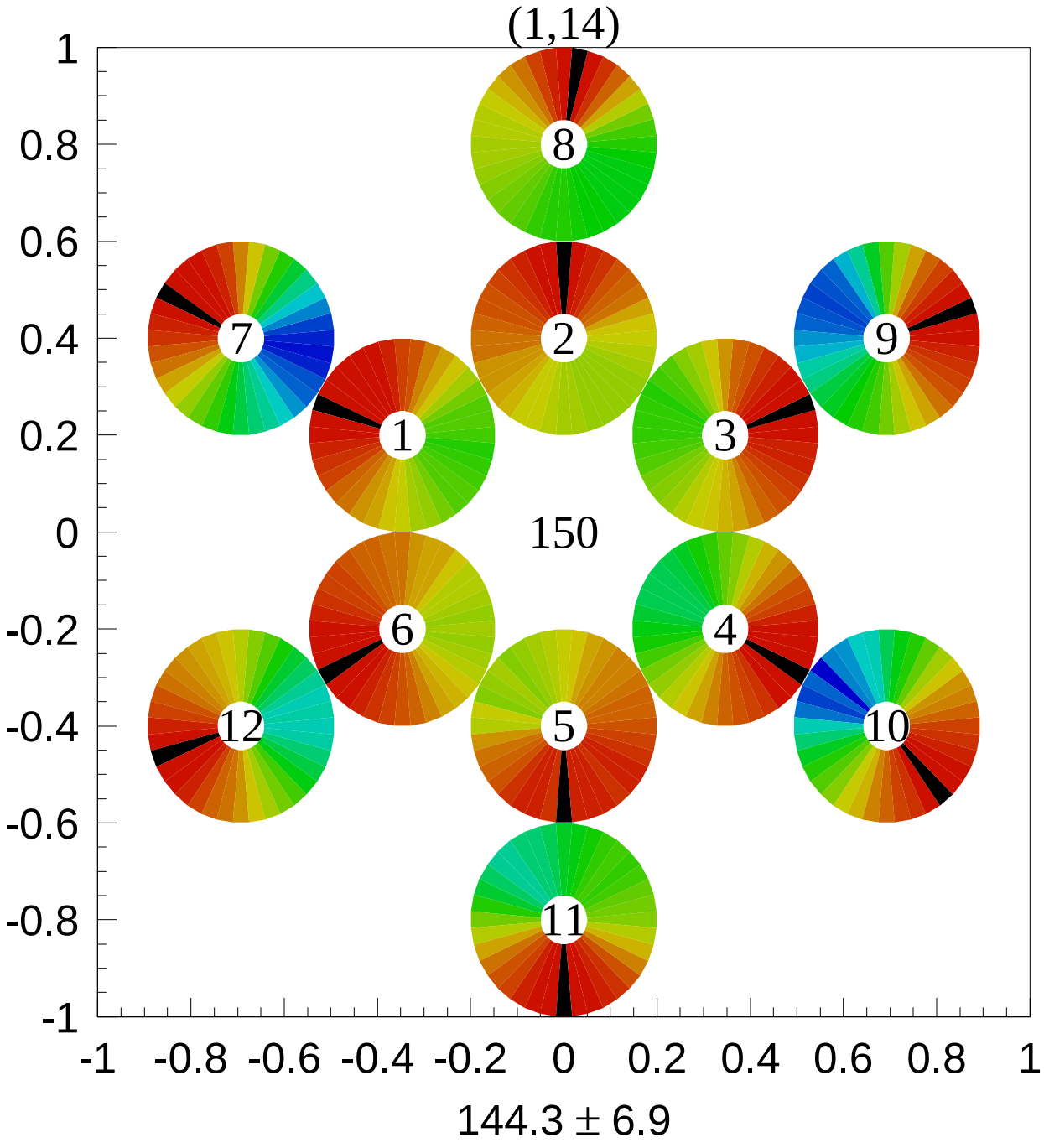

(1,12)
tilted LEDs
123 121 117 119 125 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 124 123 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

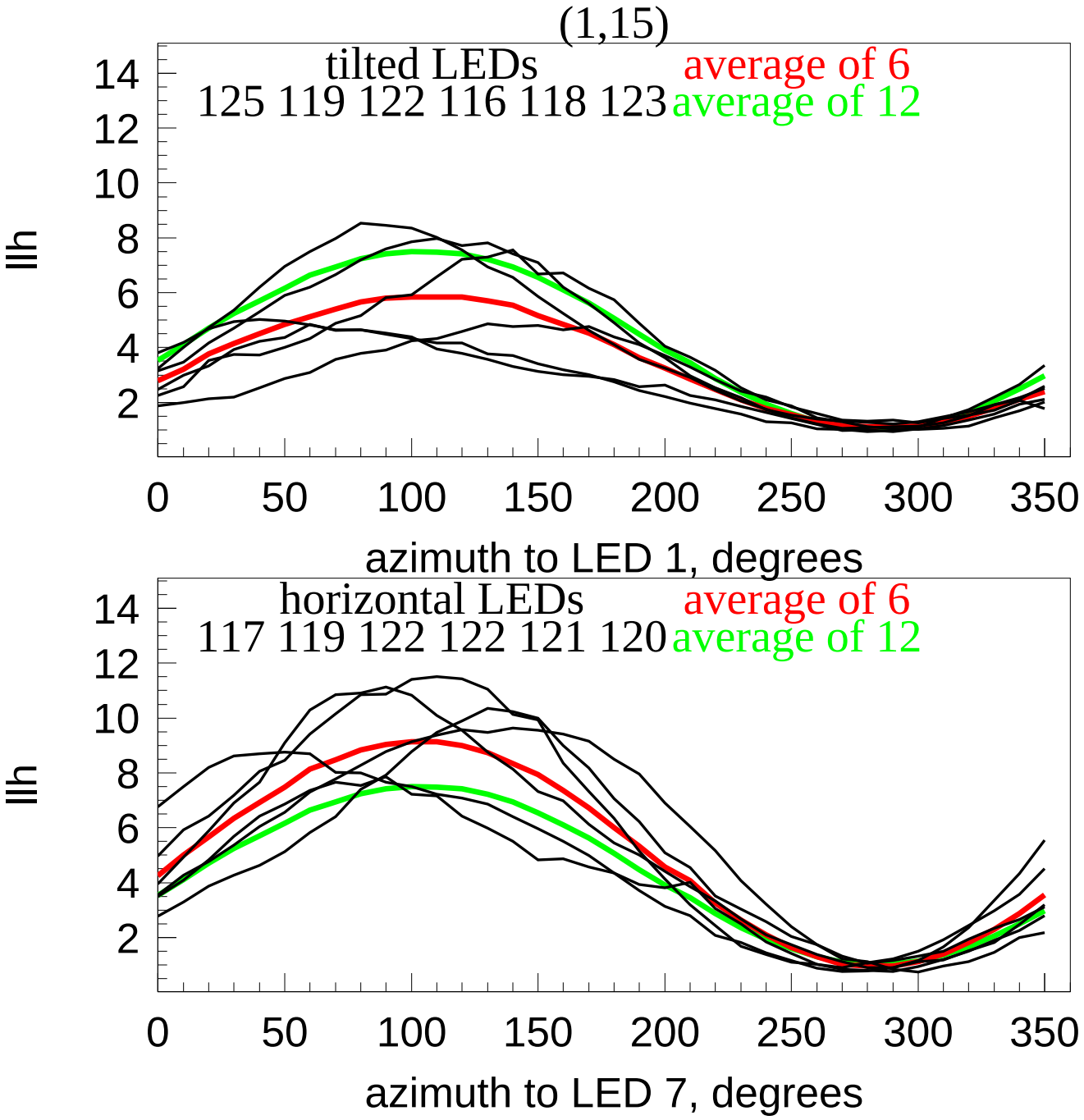

(1,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
233.1 ± 7.5

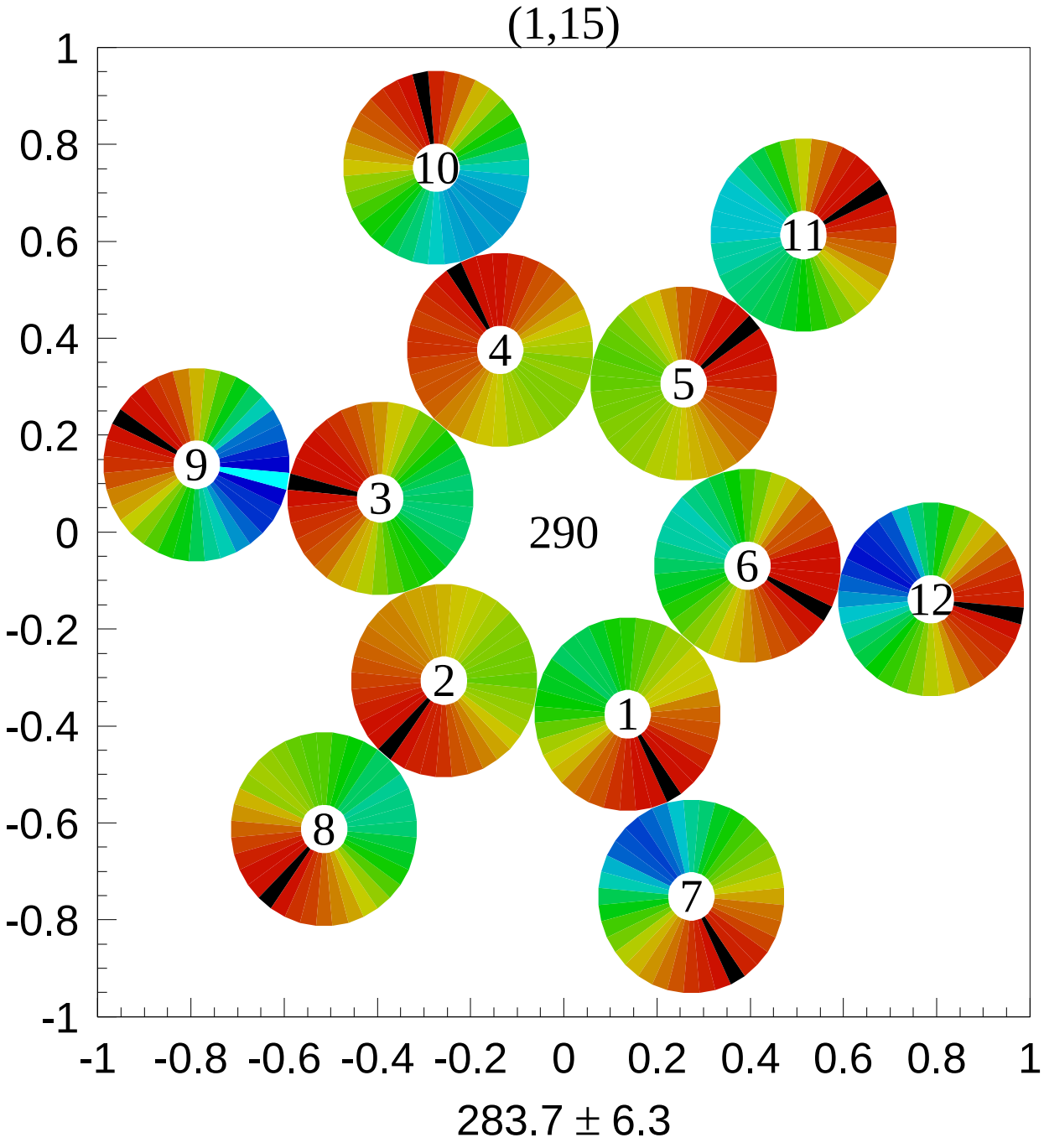

(1,13)
tilted LEDs
120 121 122 74 112 116
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 124 120 120 120 118
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

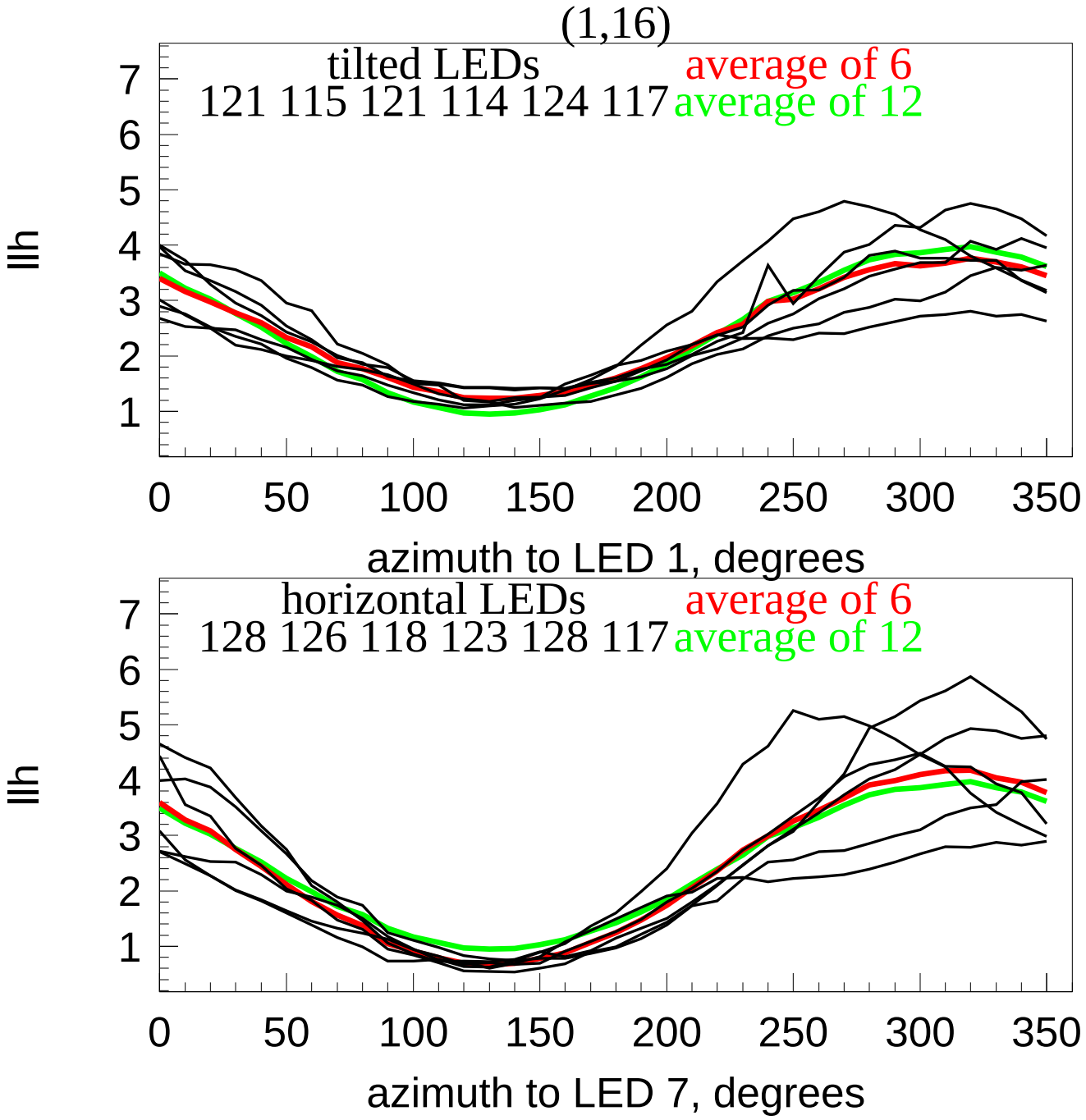

(1,13)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
338.1 ± 7.2

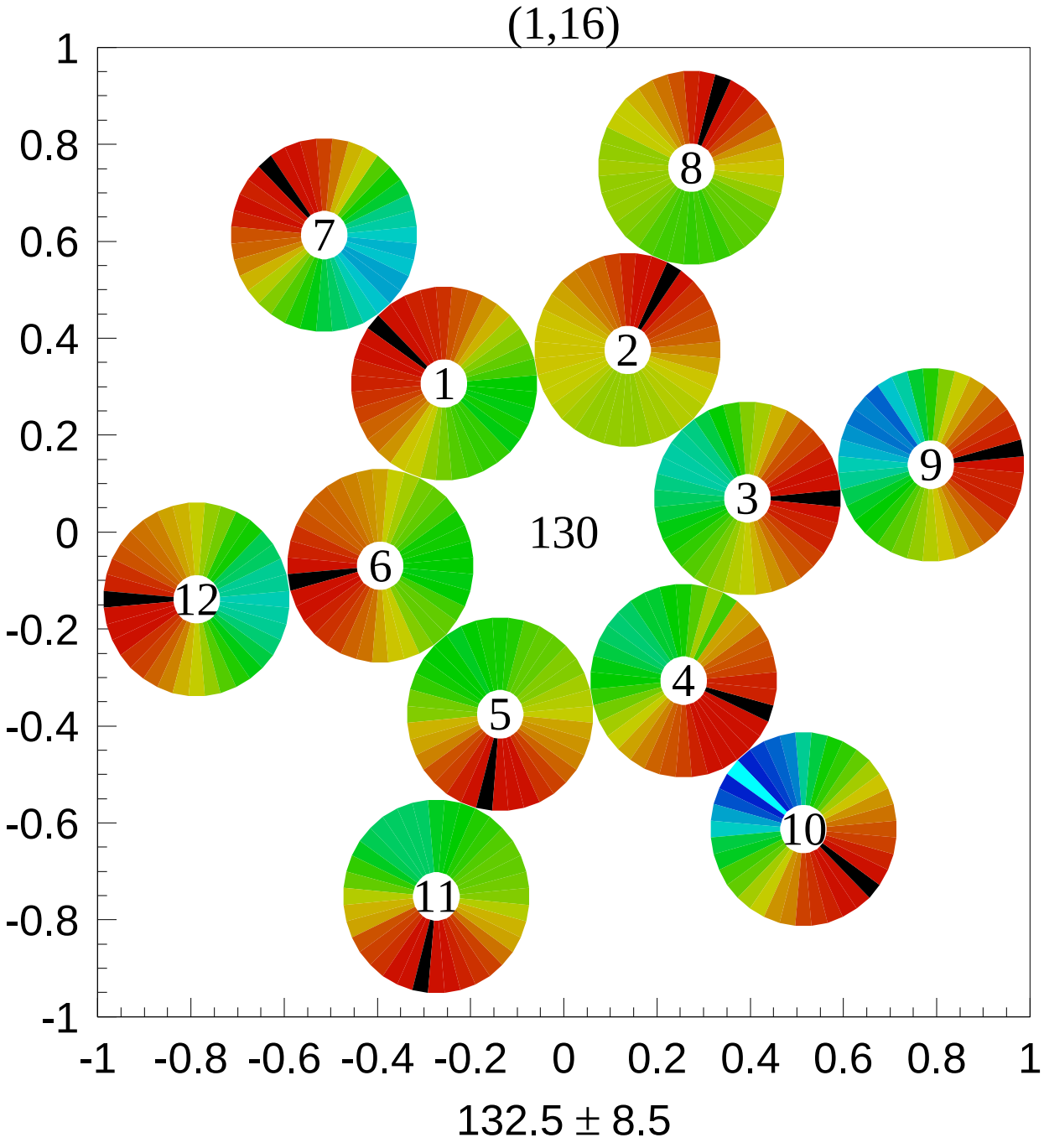

(1,14)
tilted LEDs
118 123 116 125 124 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 120 118 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

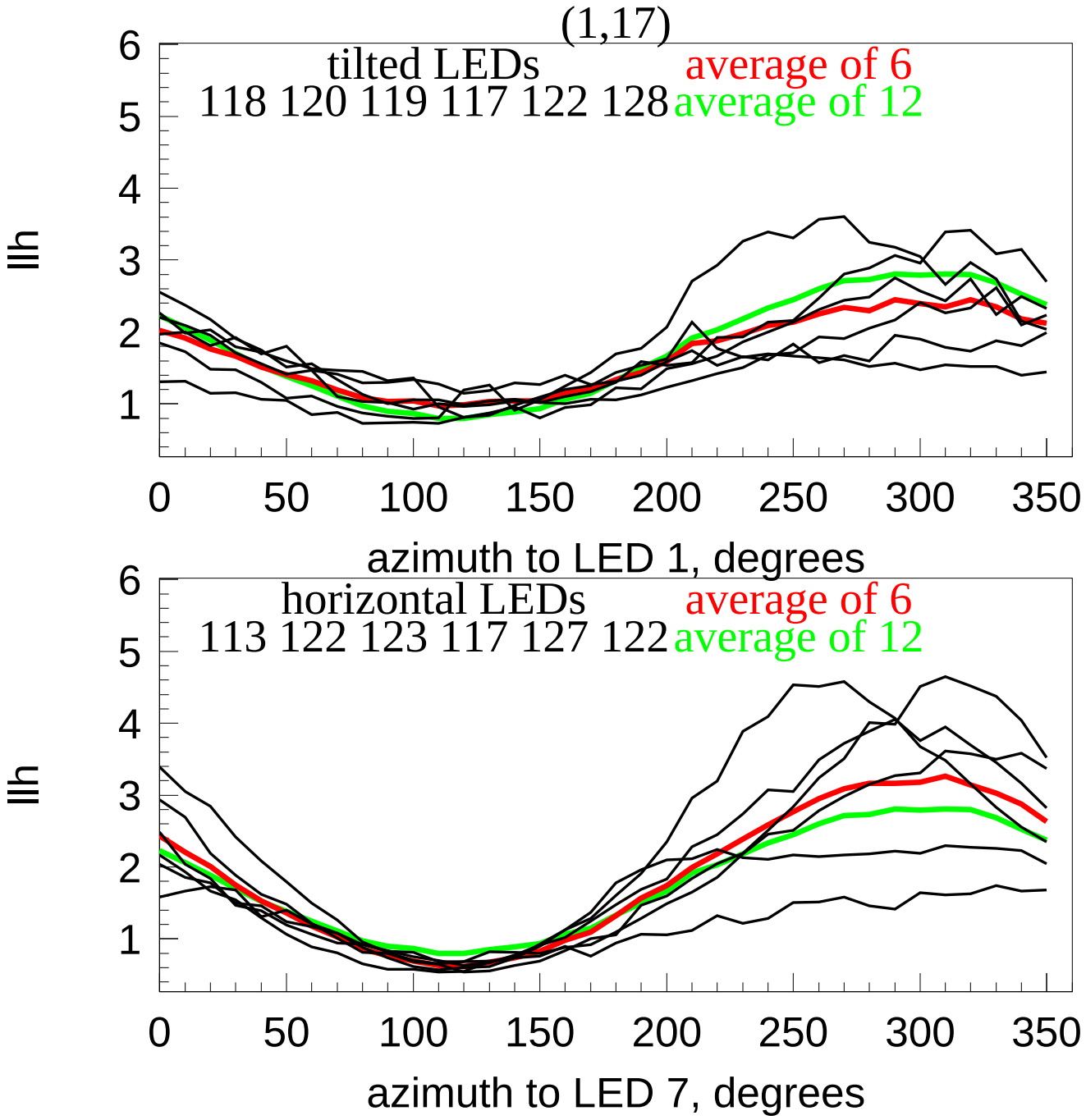

(1,14)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
144.3 ± 6.9

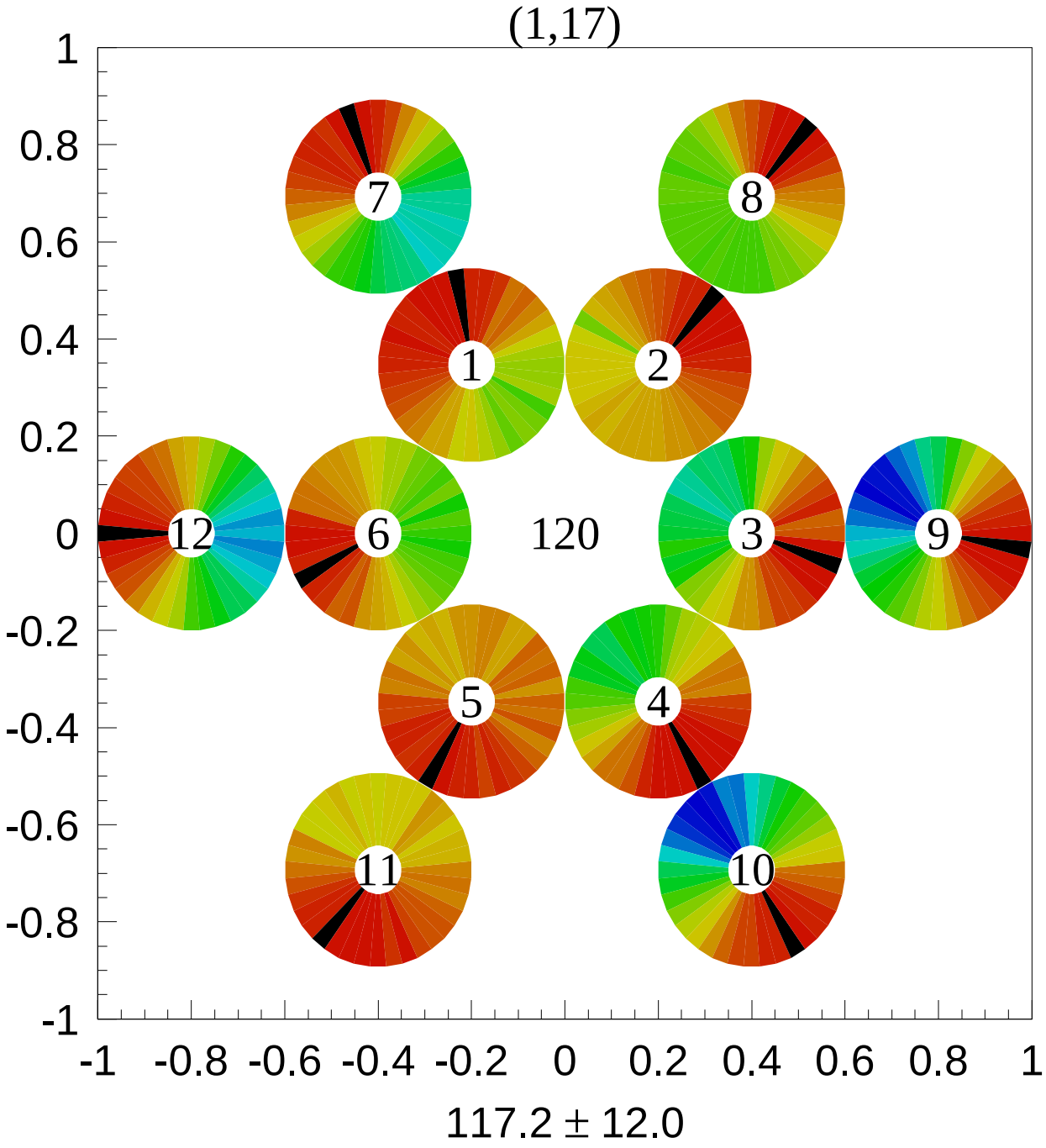

(1,15)
tilted LEDs
125 119 122 116 118 123
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 119 122 122 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

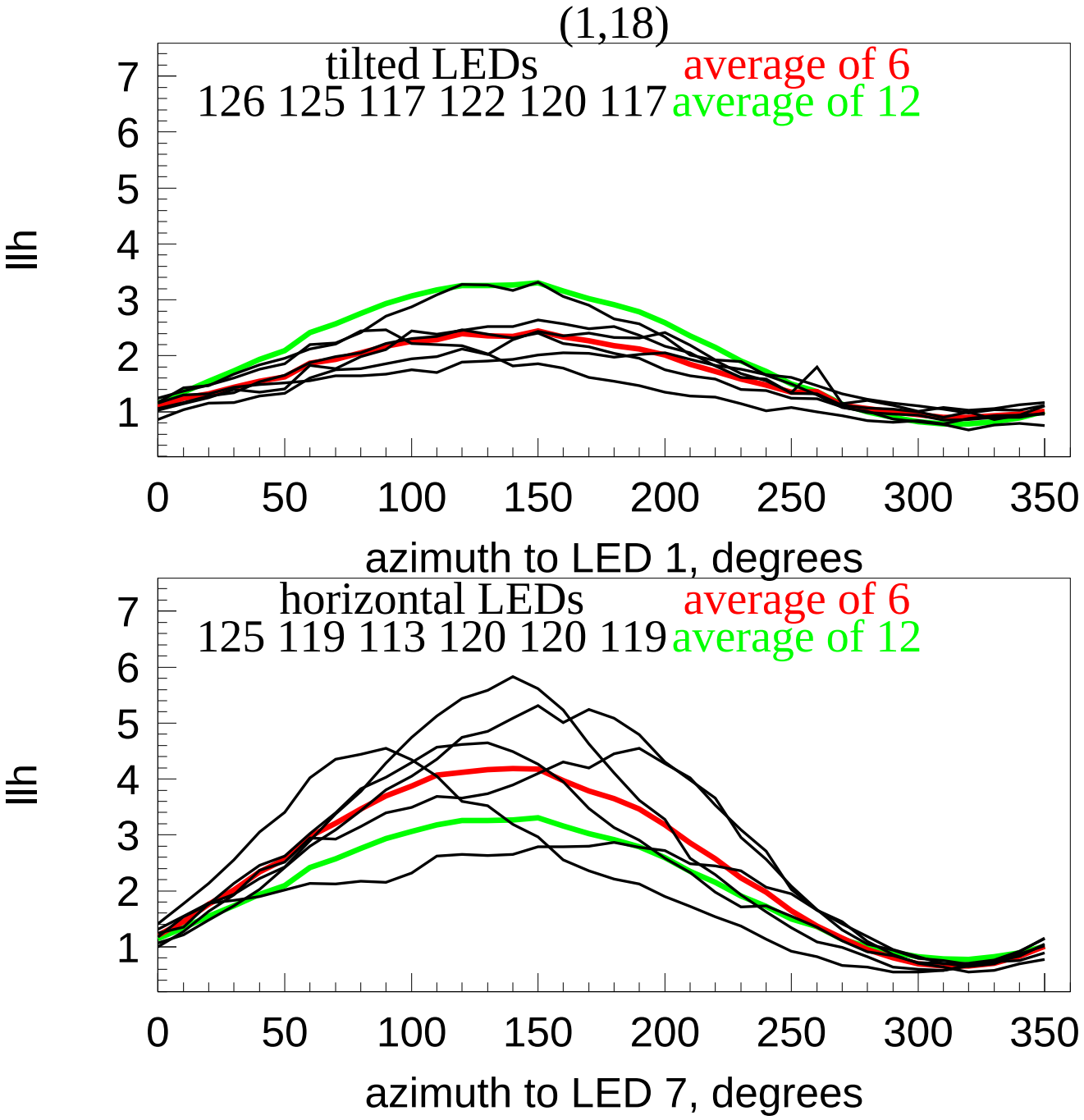

(1,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
283.7 ± 6.3

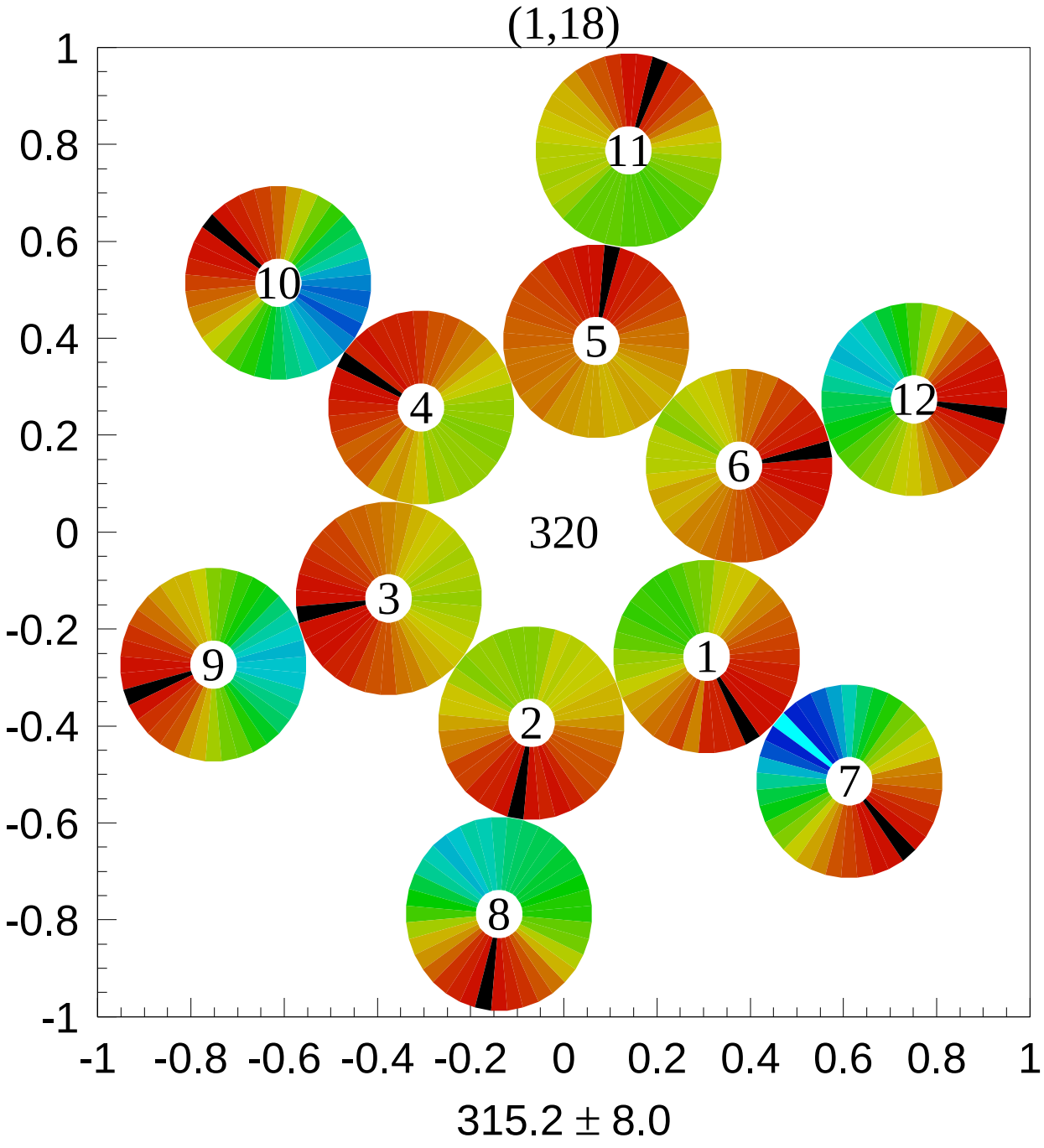

(1,16)
tilted LEDs
121 115 121 114 124 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 126 118 123 128 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

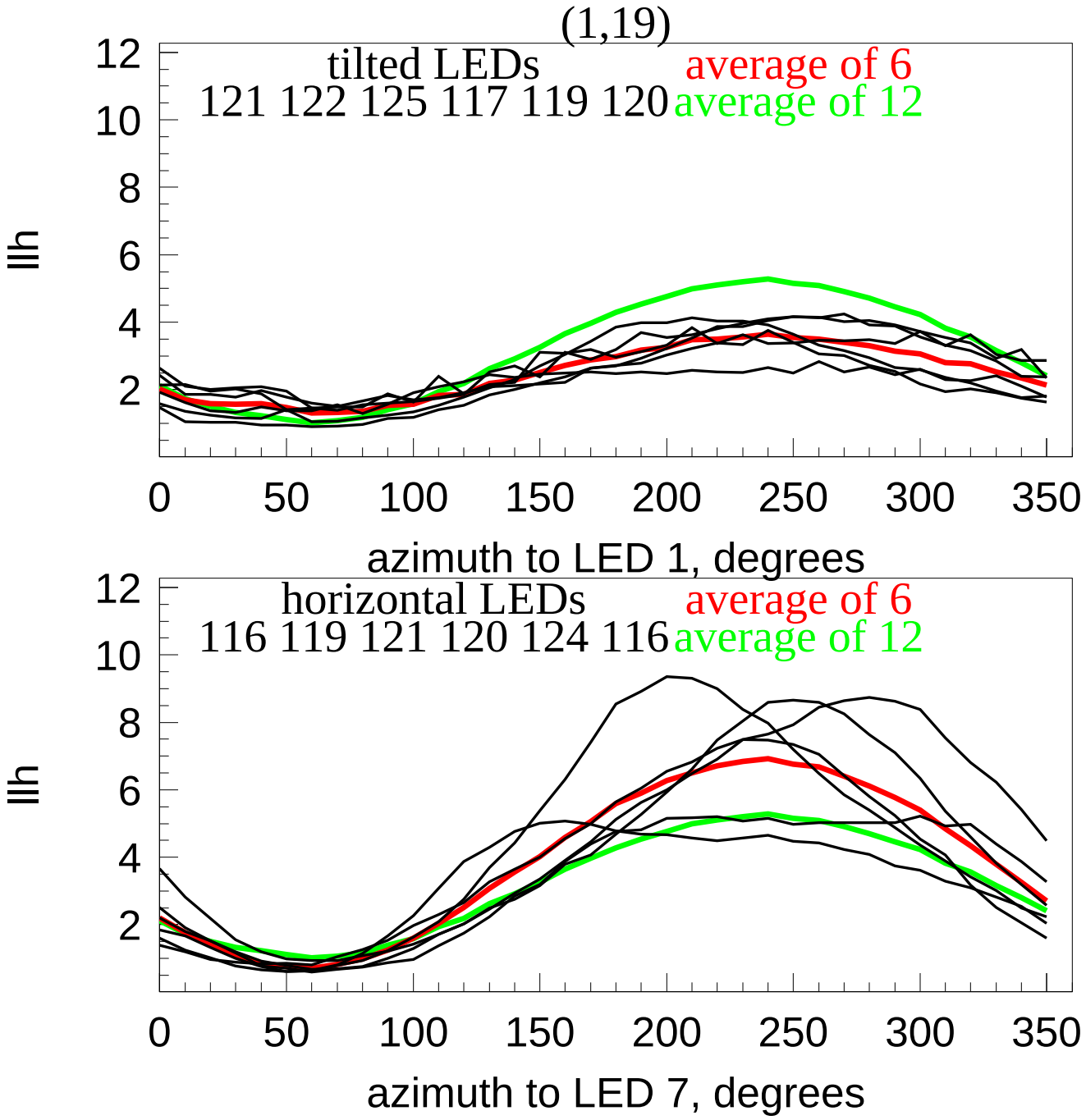

(1,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
132.5 ± 8.5
130
1
2
3
4
5
6
7
8
9
10
11
12

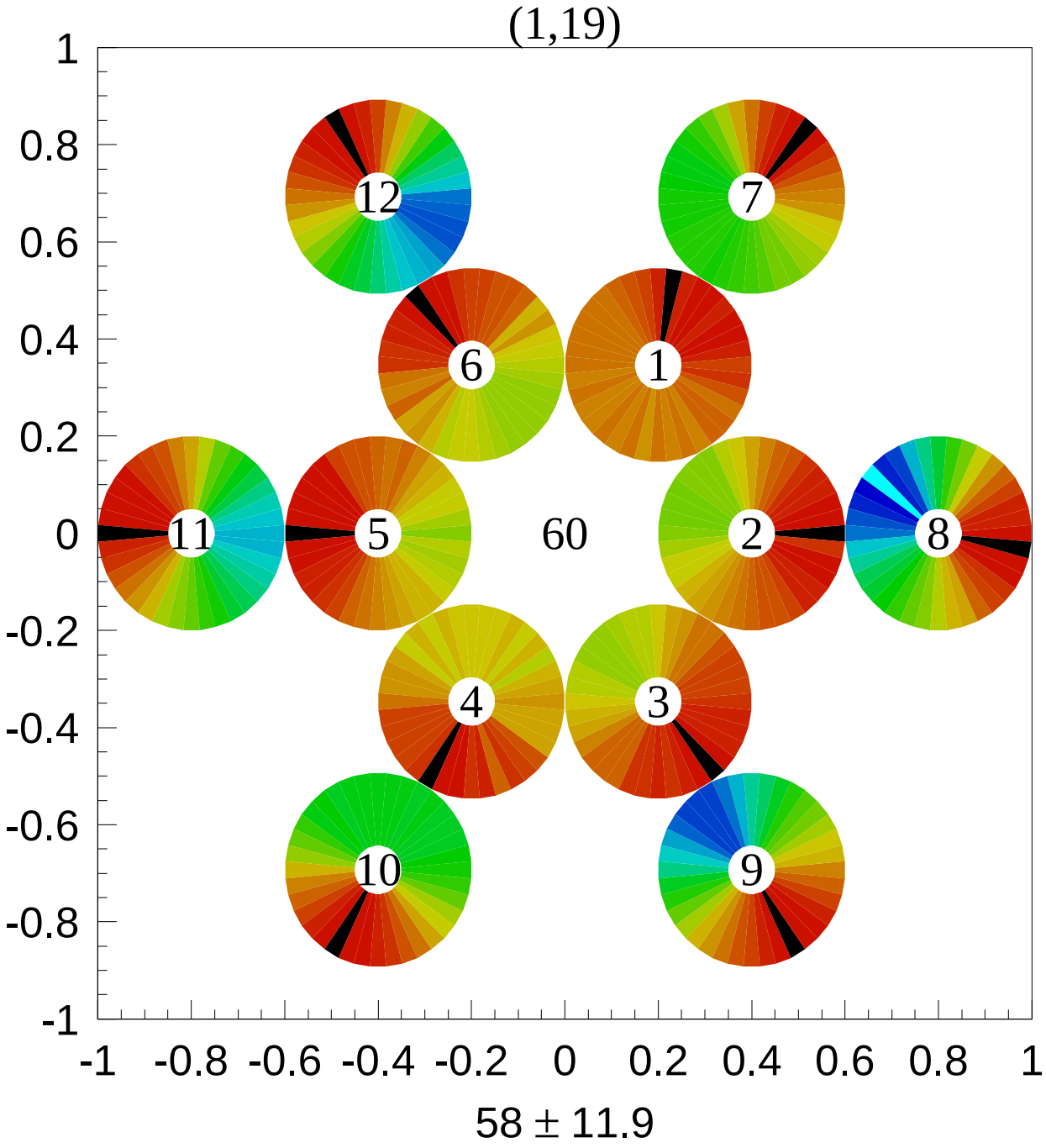

(1,17)
tilted LEDs
118 120 119 117 122 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
113 122 123 117 127 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

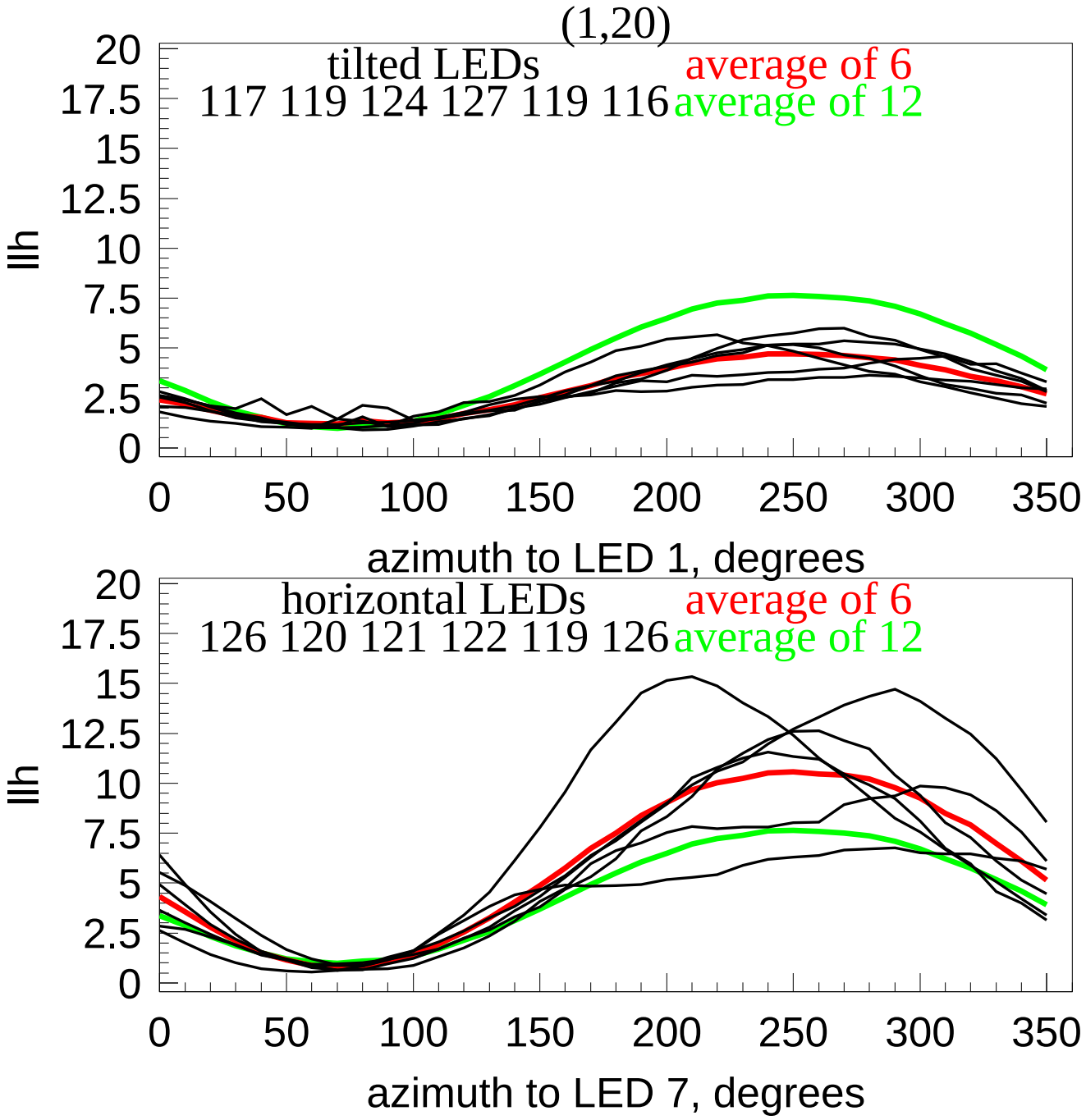

(1,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
117.2 ± 12.0

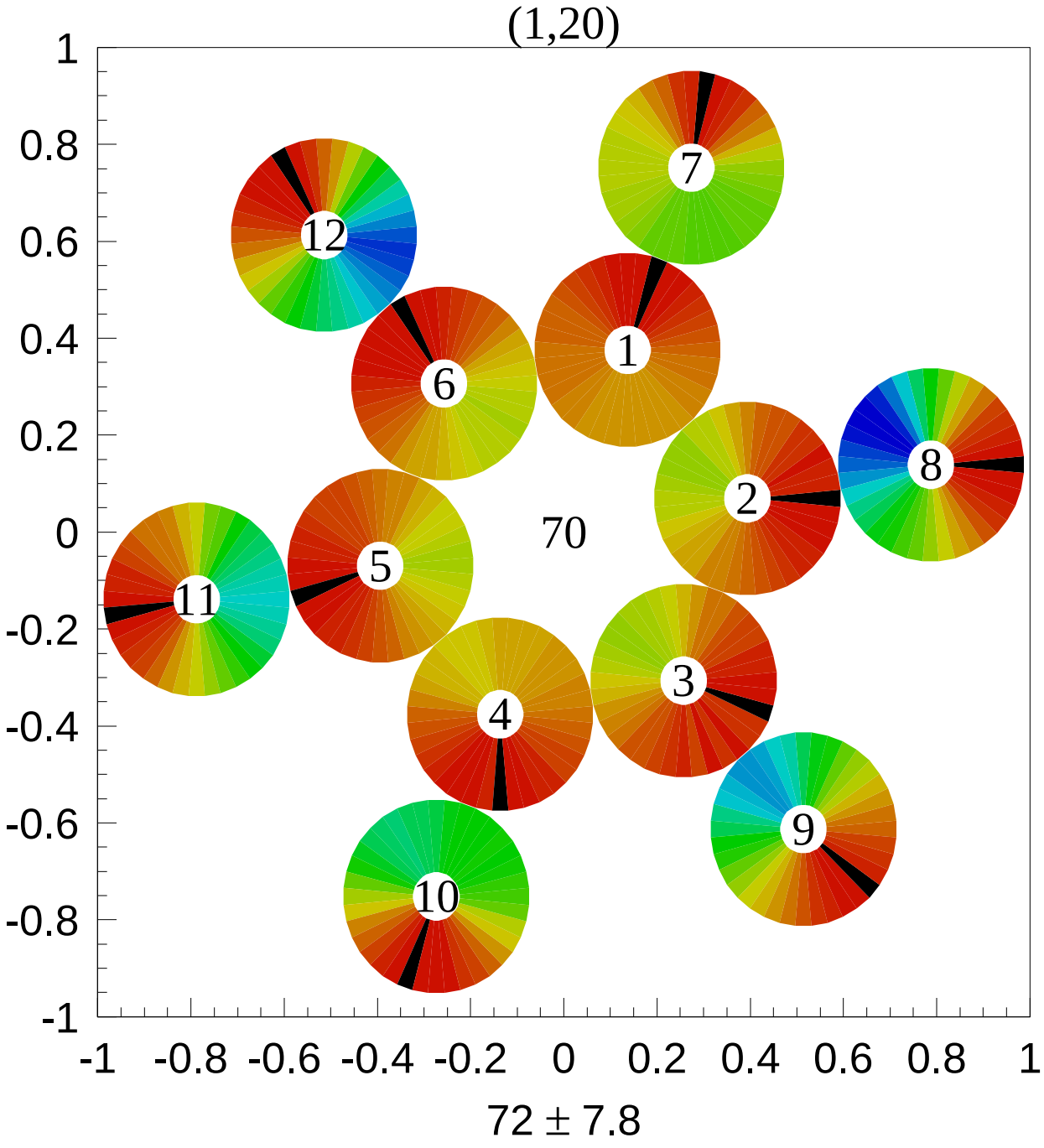

(1,18)
tilted LEDs
126 125 117 122 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 119 113 120 120 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

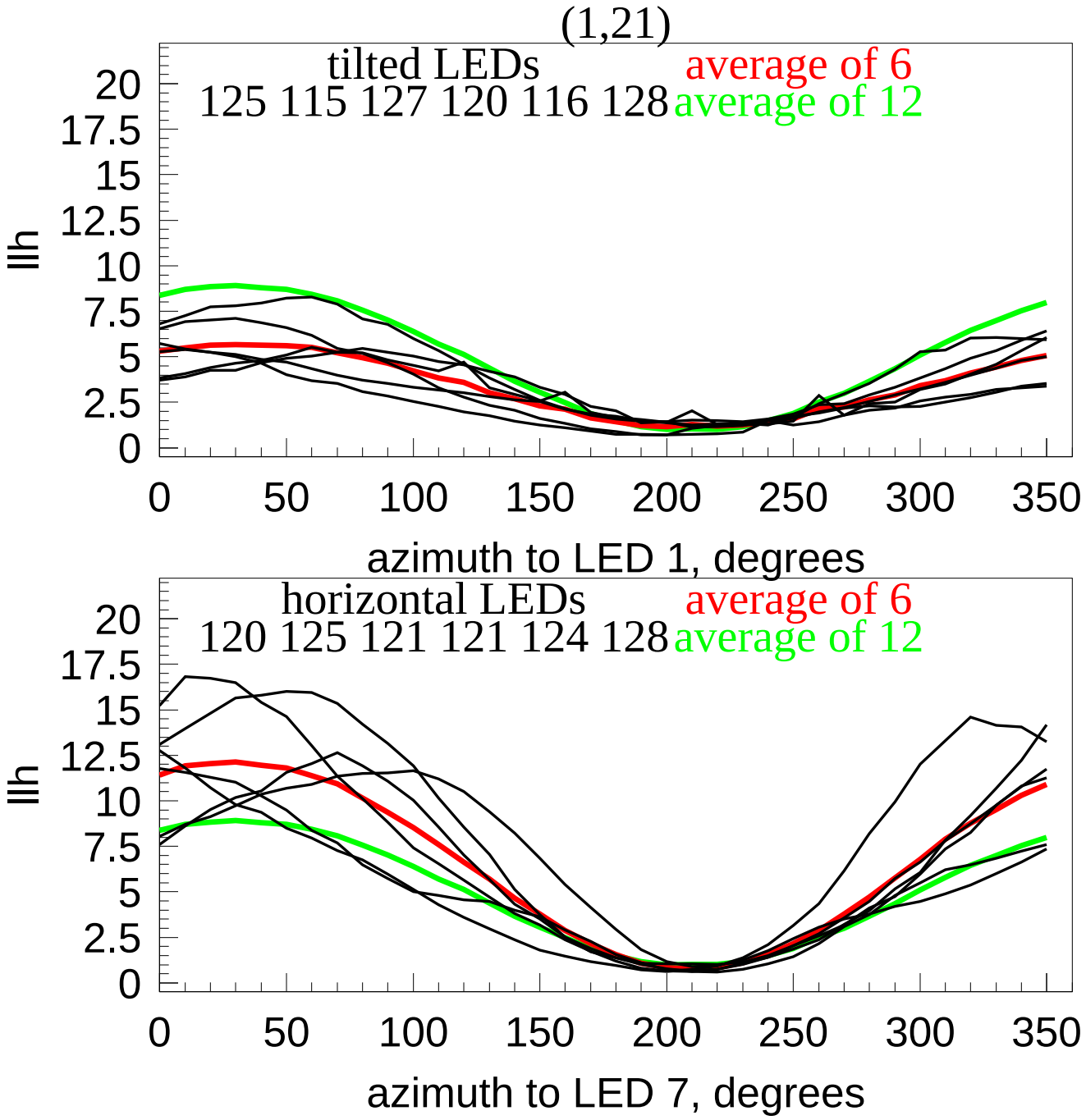

(1,18)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
315.2 ± 8.0

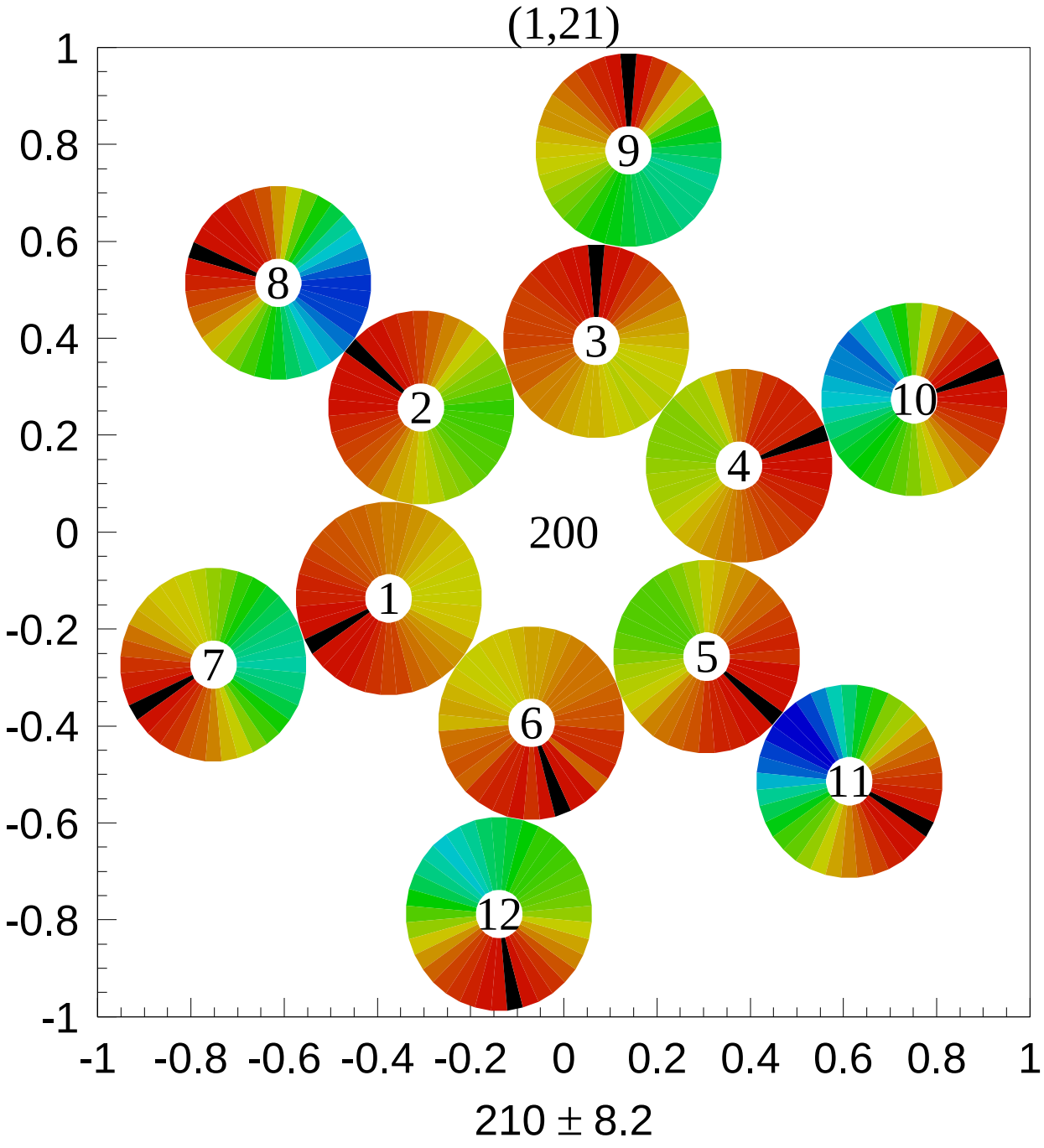

(1,19)
tilted LEDs
121 122 125 117 119 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 119 121 120 124 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

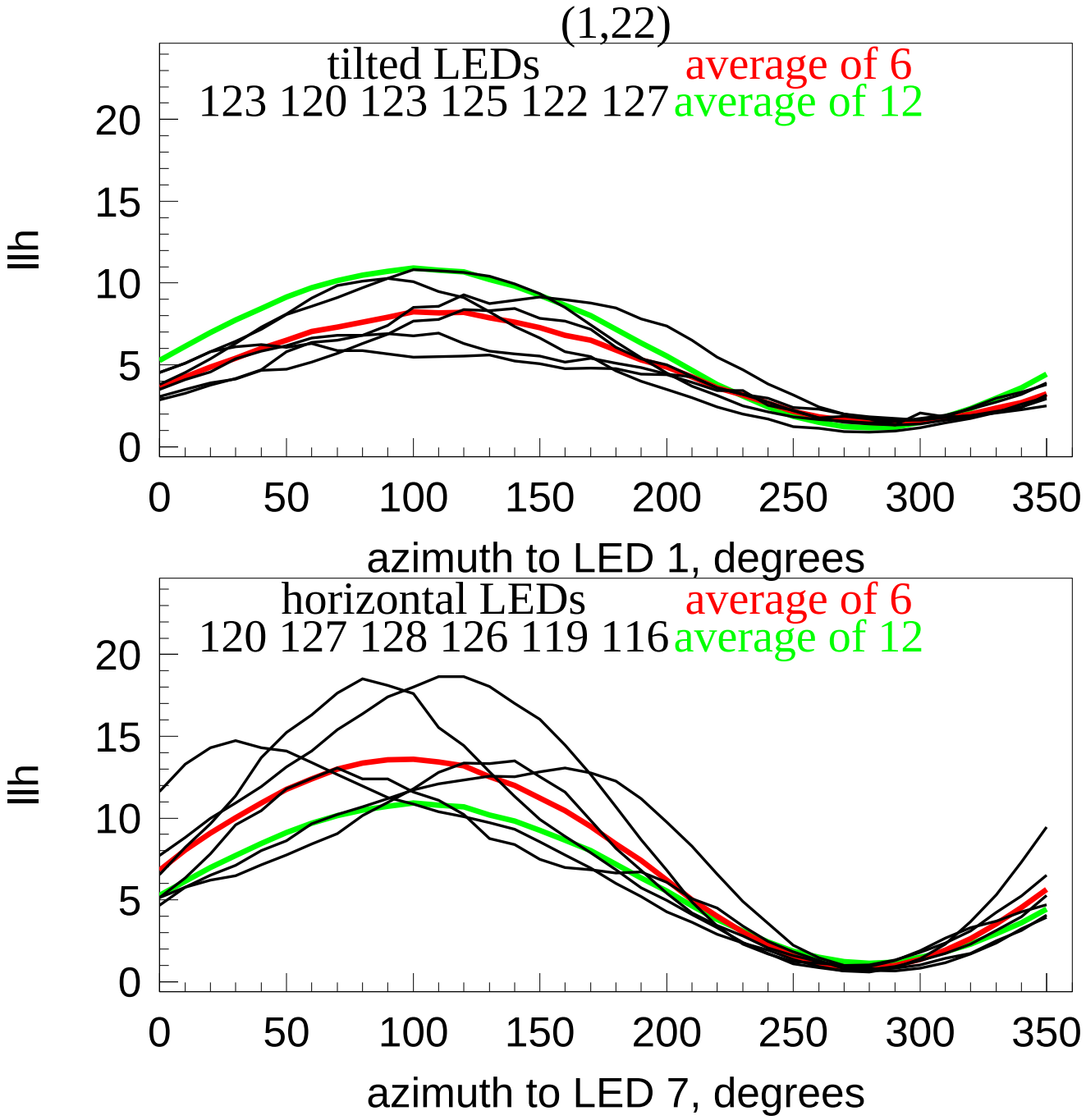

(1,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
58 ± 11.9

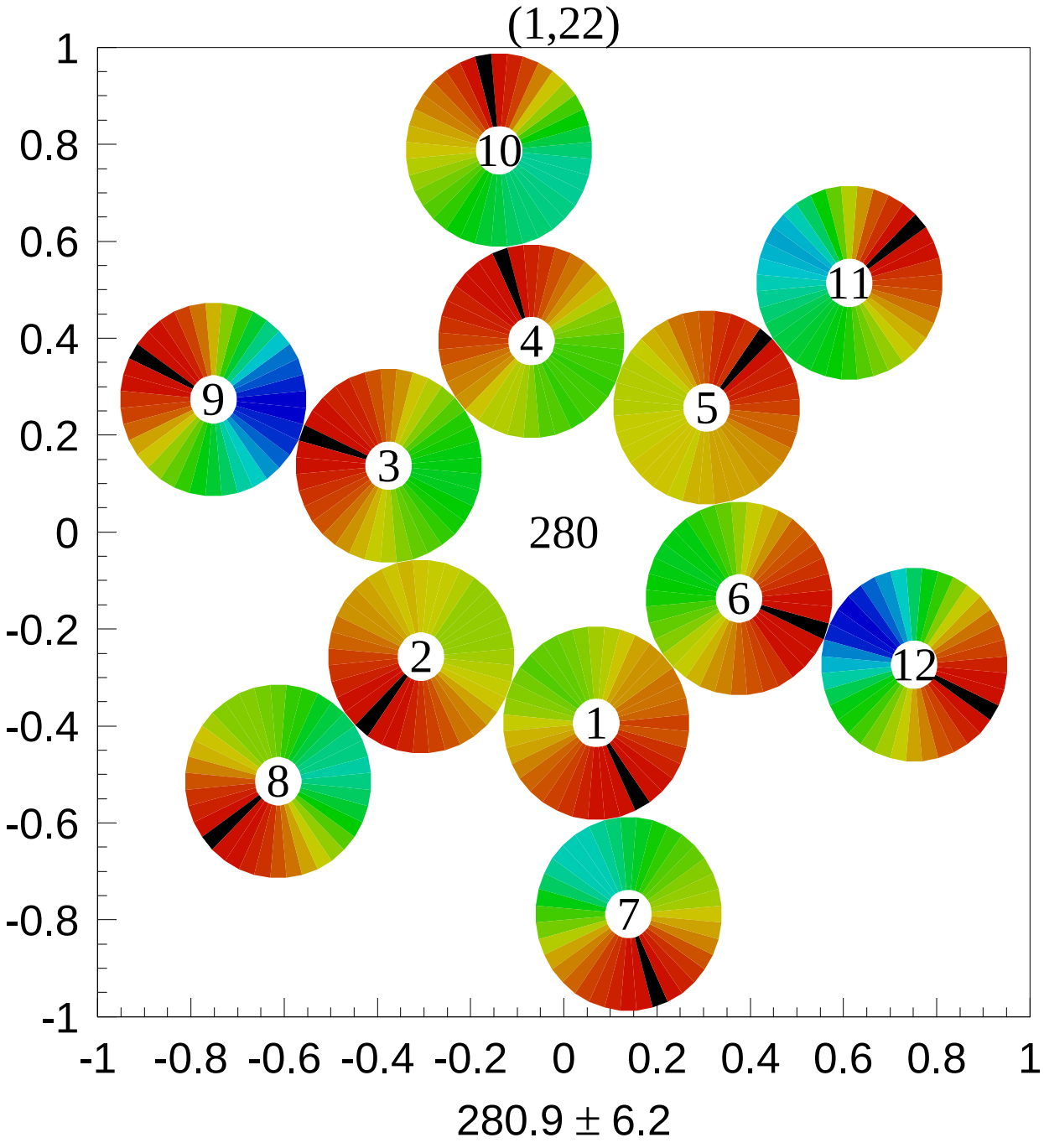

(1,20)
tilted LEDs
117 119 124 127 119 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 120 121 122 119 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

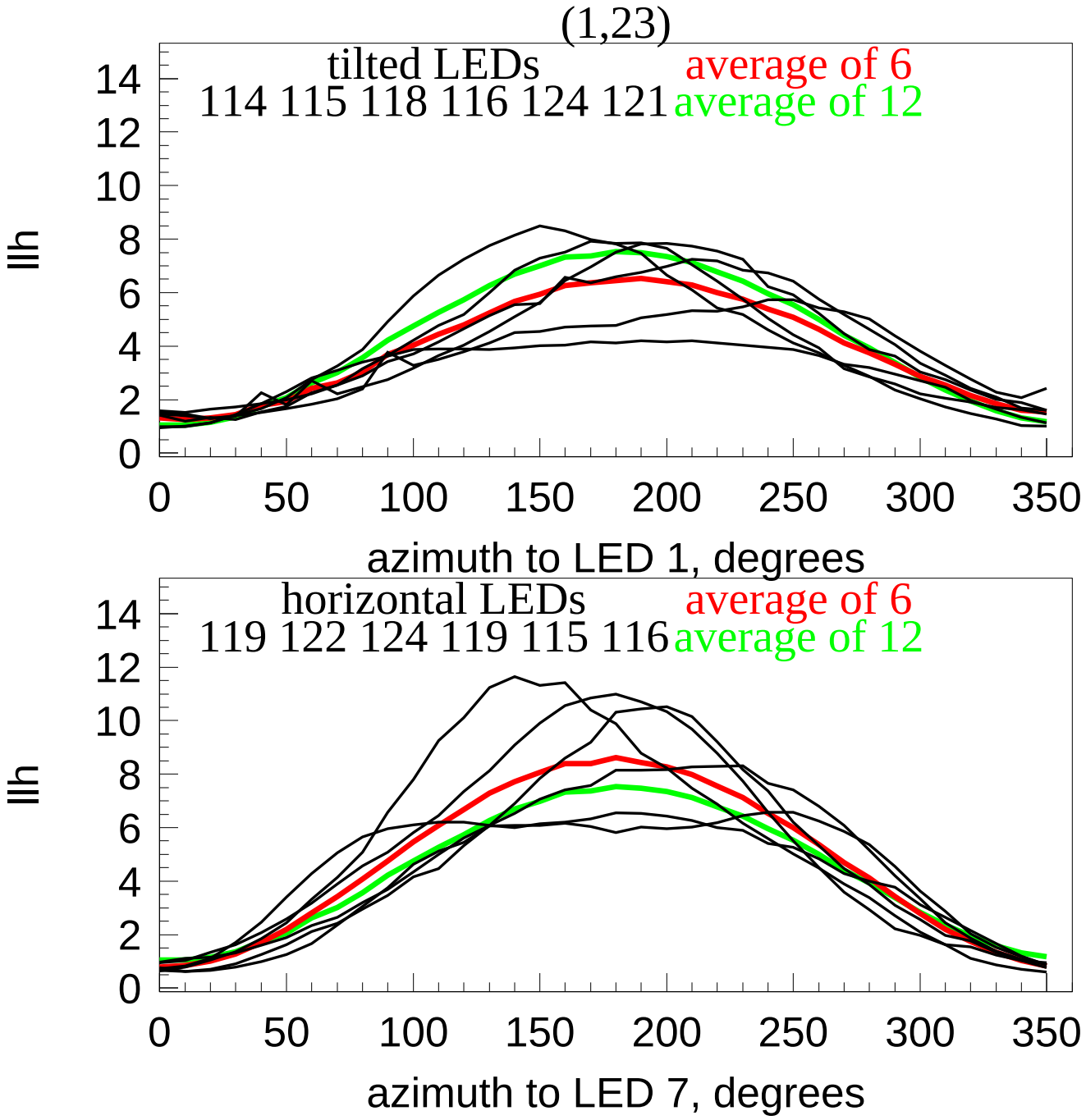

(1,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
70
5
11
3
4
9
10
72 ± 7.8

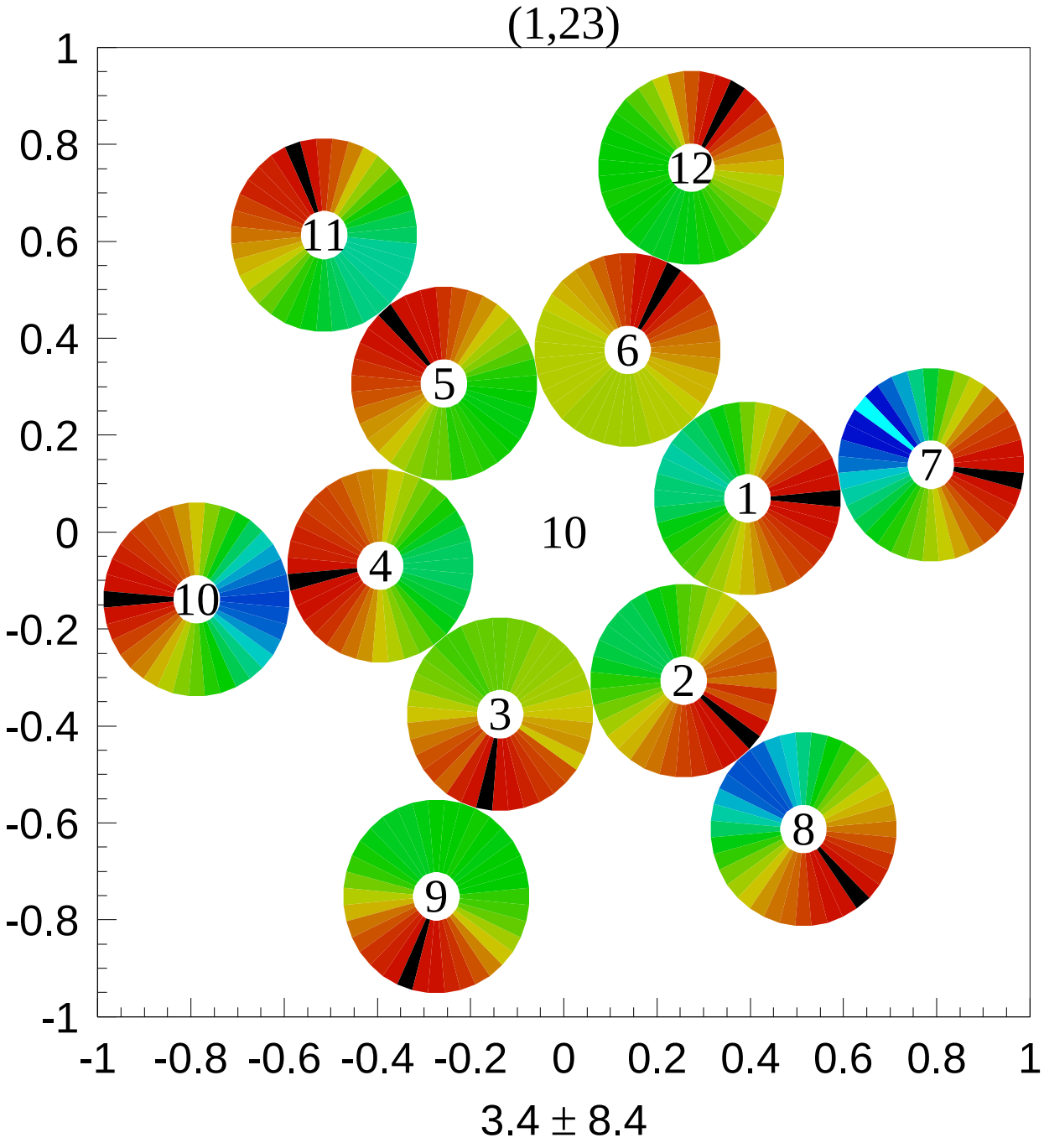

(1,21)
tilted LEDs
125 115 127 120 116 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 125 121 121 124 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

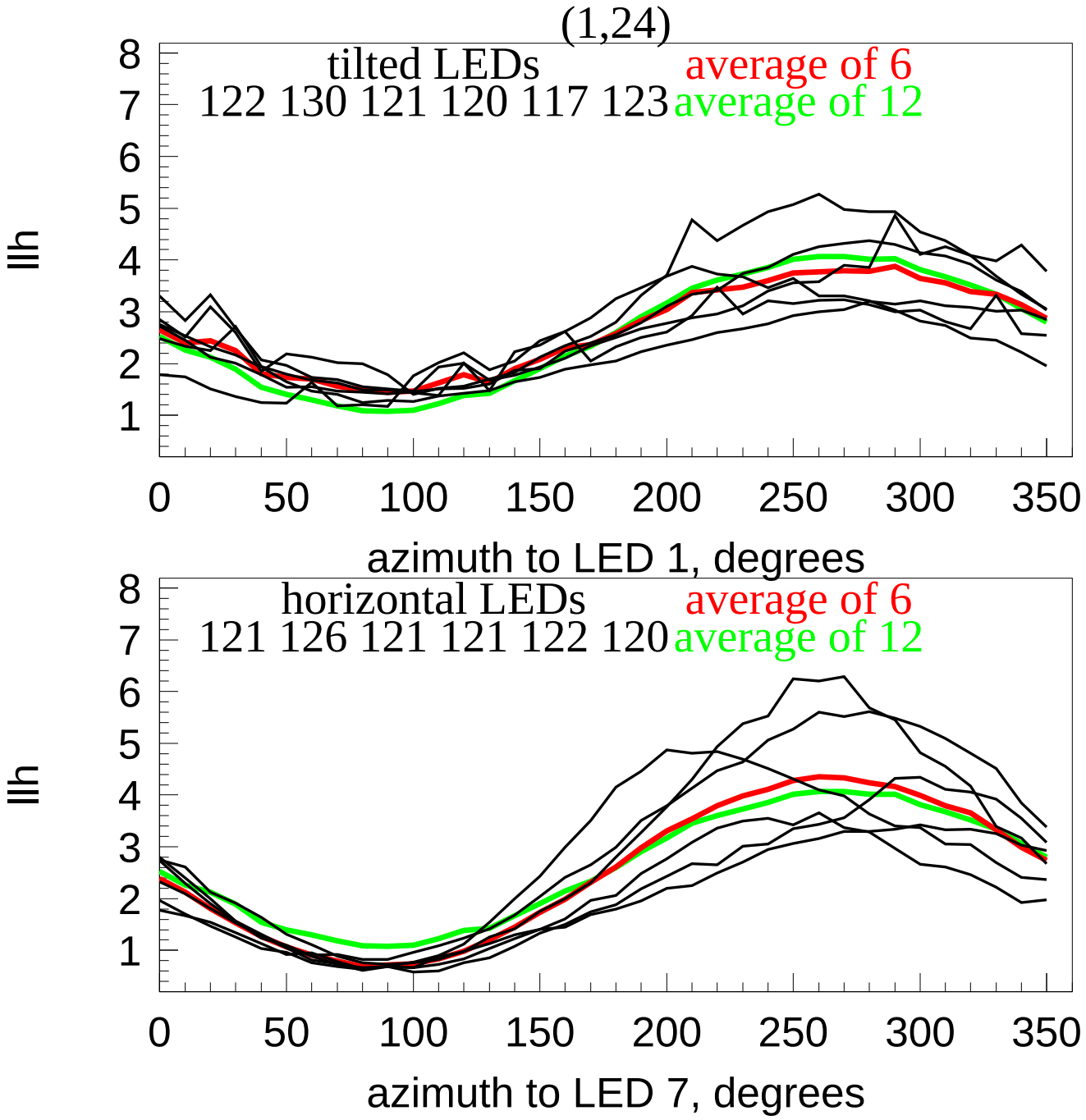

(1,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
210 ± 8.2
200
1
2
3
4
5
6
7
8
9
10
11
12

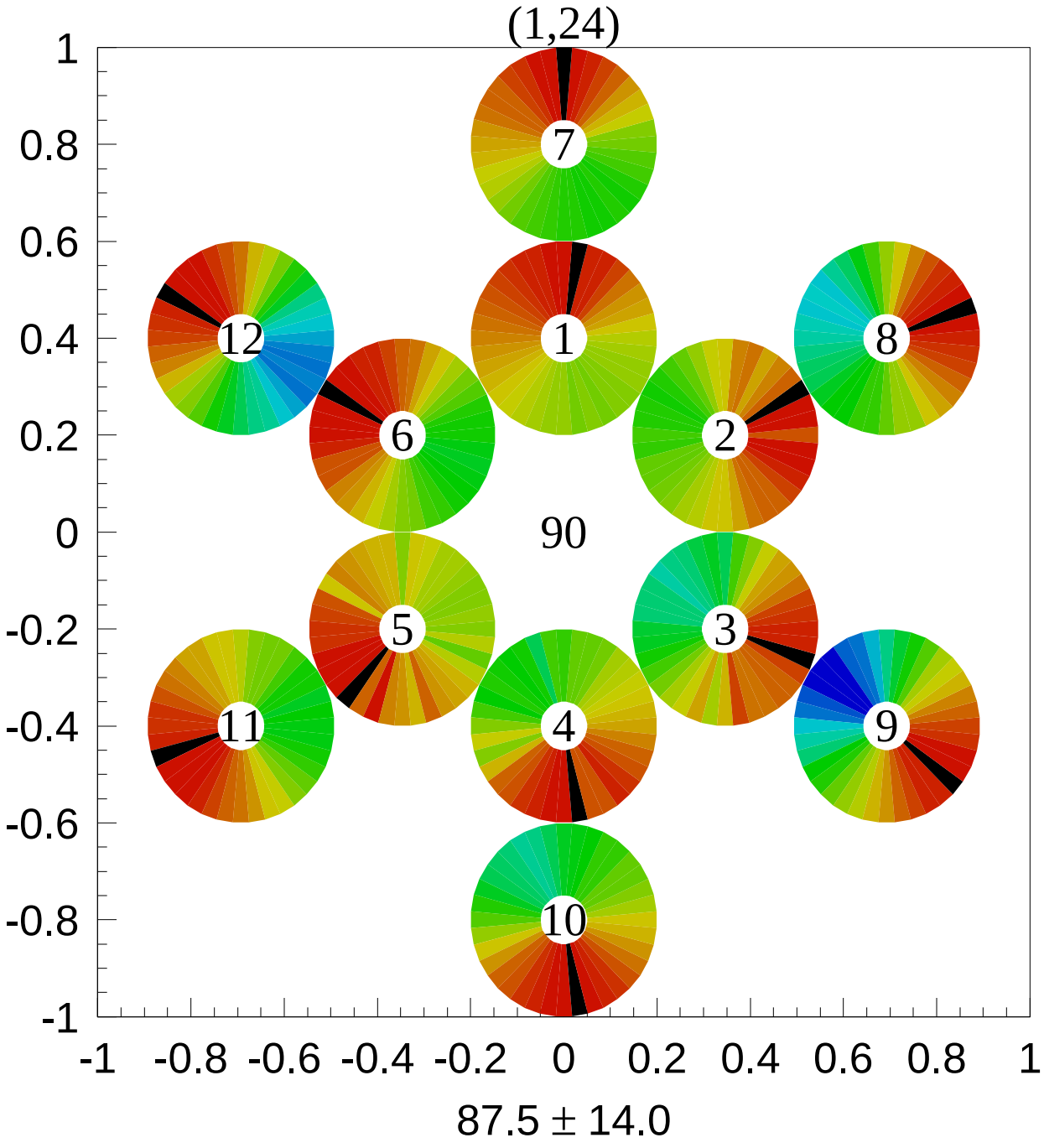

(1,22)
tilted LEDs
123 120 123 125 122 127
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 127 128 126 119 116
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

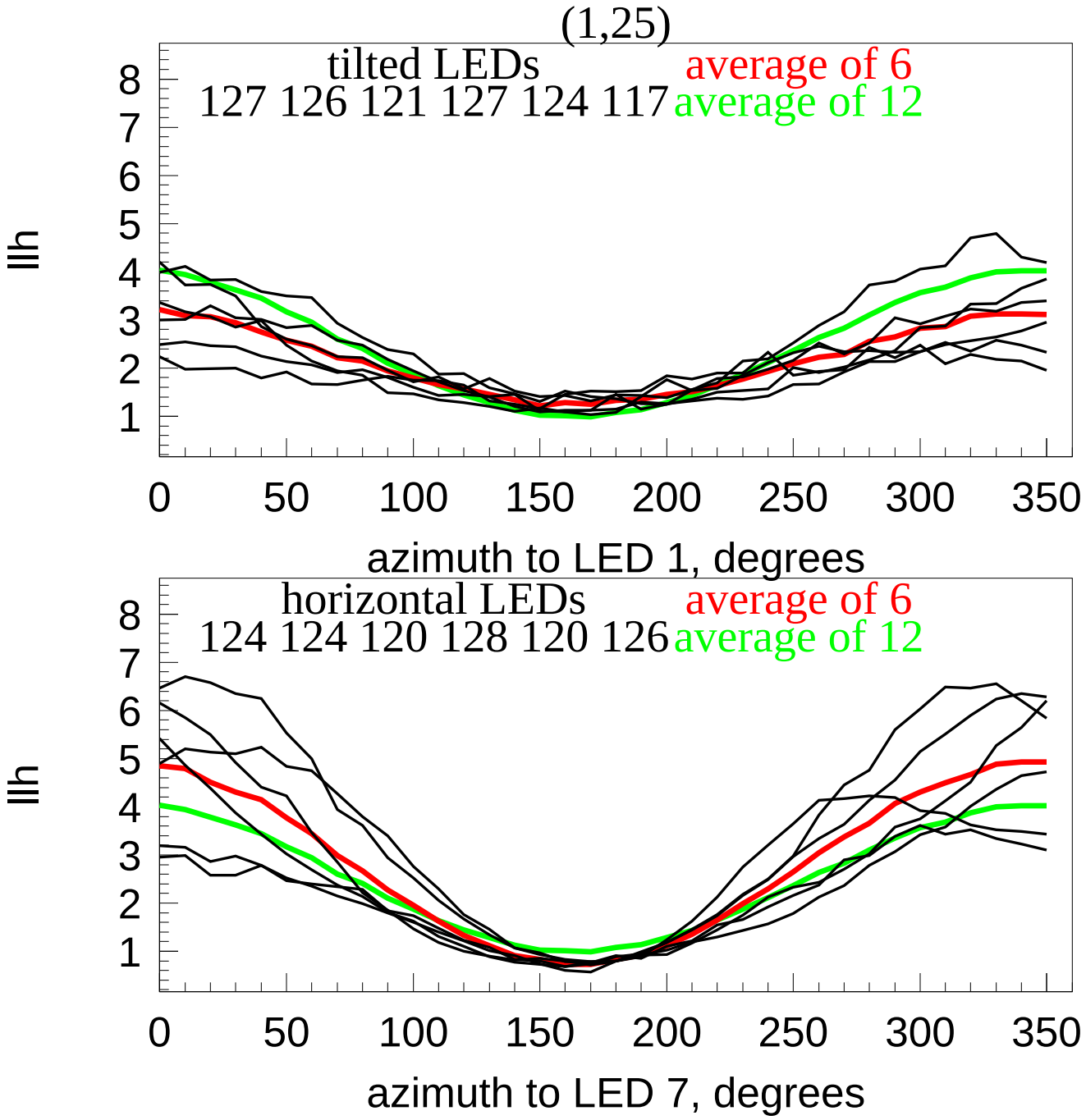

(1,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
280.9 ± 6.2

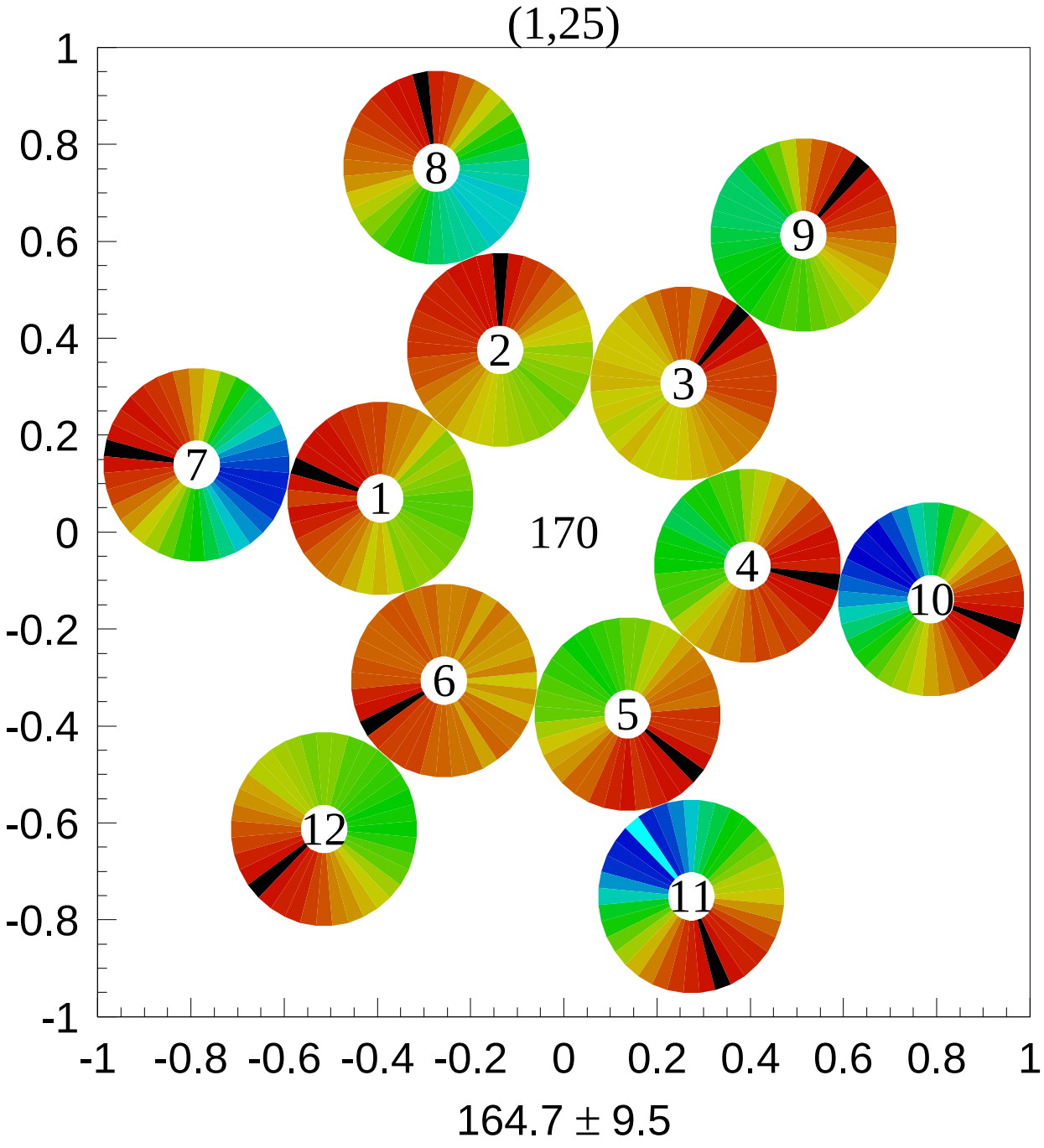

(1,23)
tilted LEDs
114 115 118 116 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 124 119 115 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

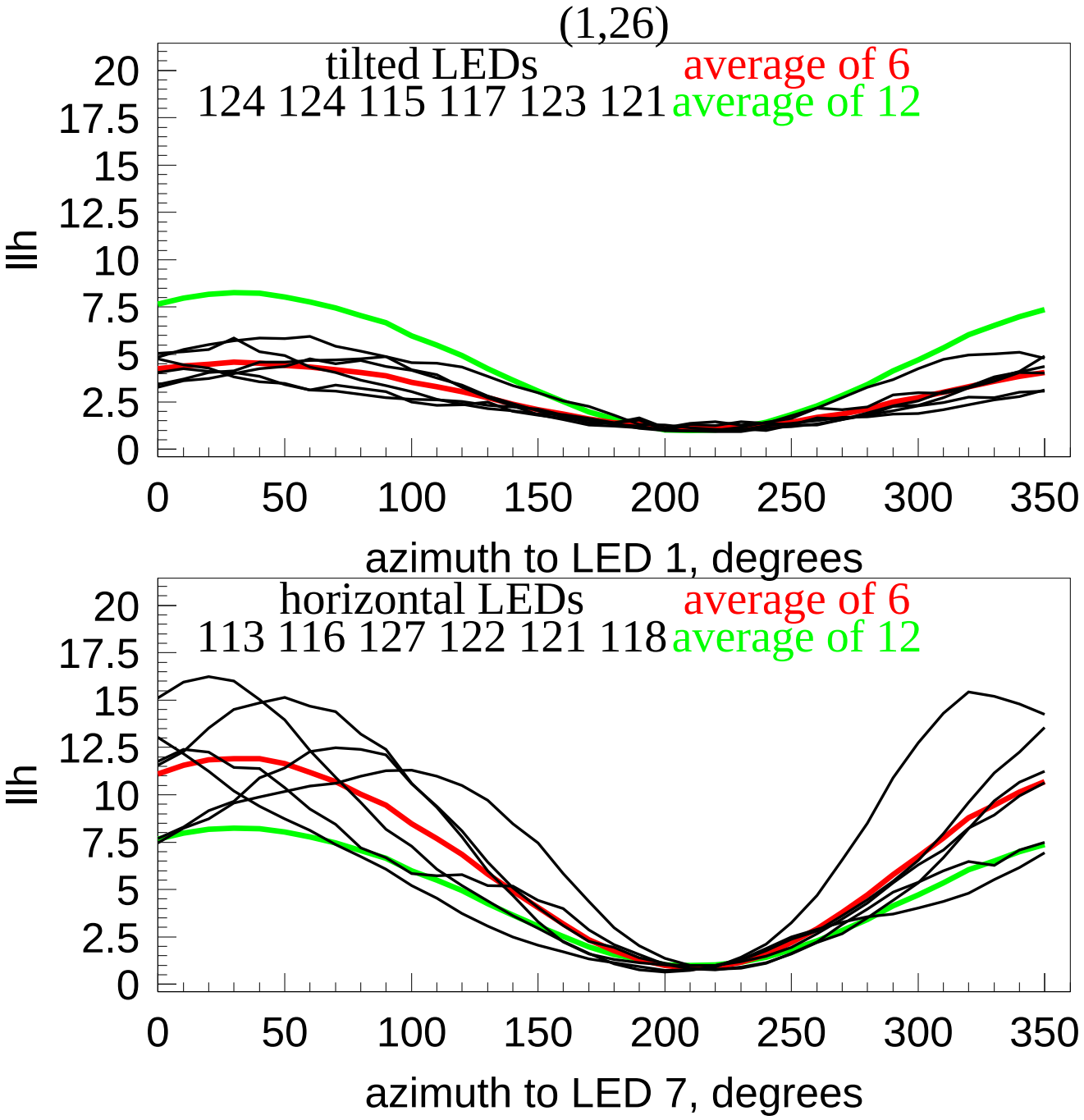

(1,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
3.4 ± 8.4

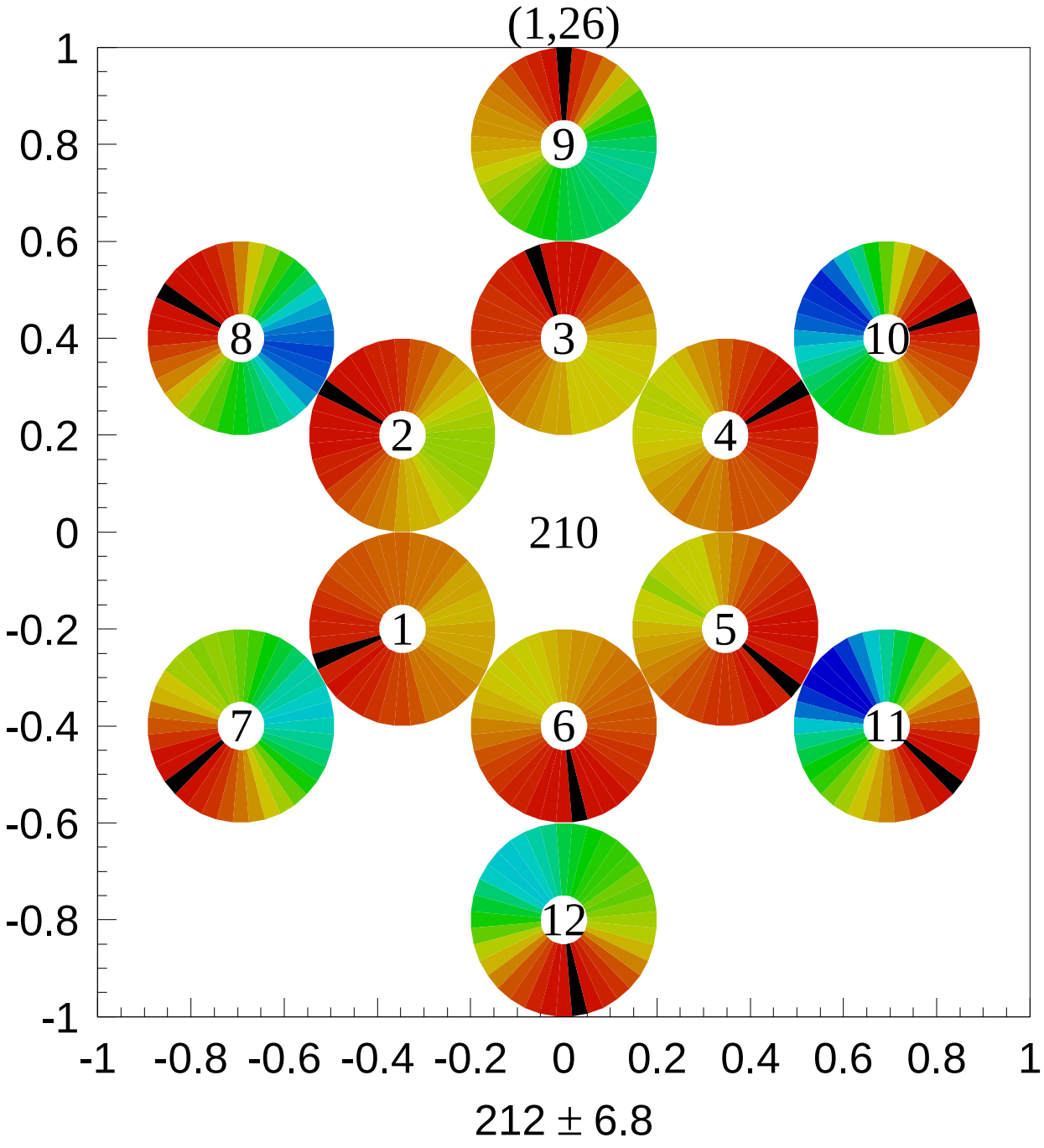

(1,24)
tilted LEDs
122 130 121 120 117 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 126 121 121 122 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

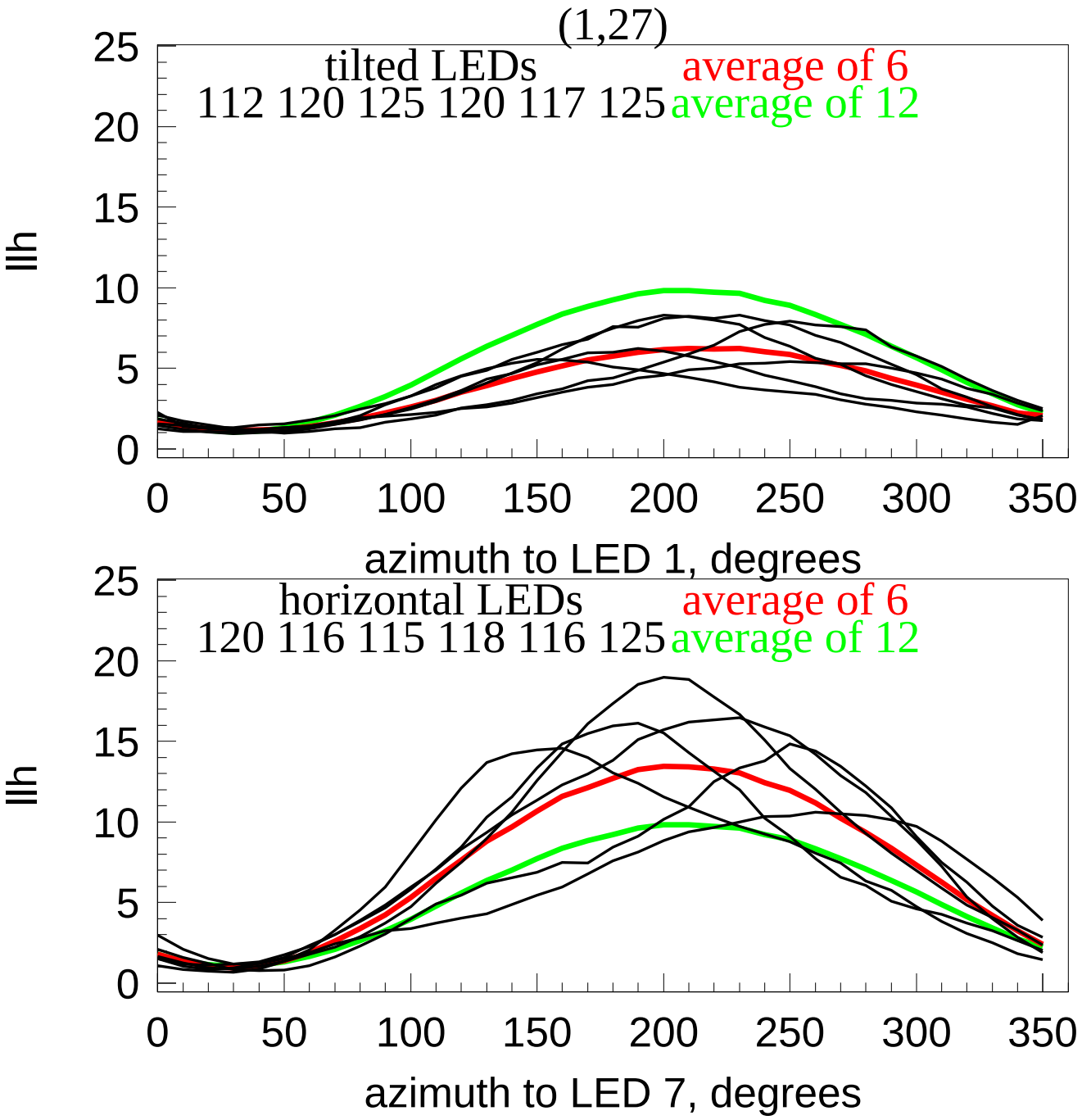

(1,24)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
87.5 ± 14.0

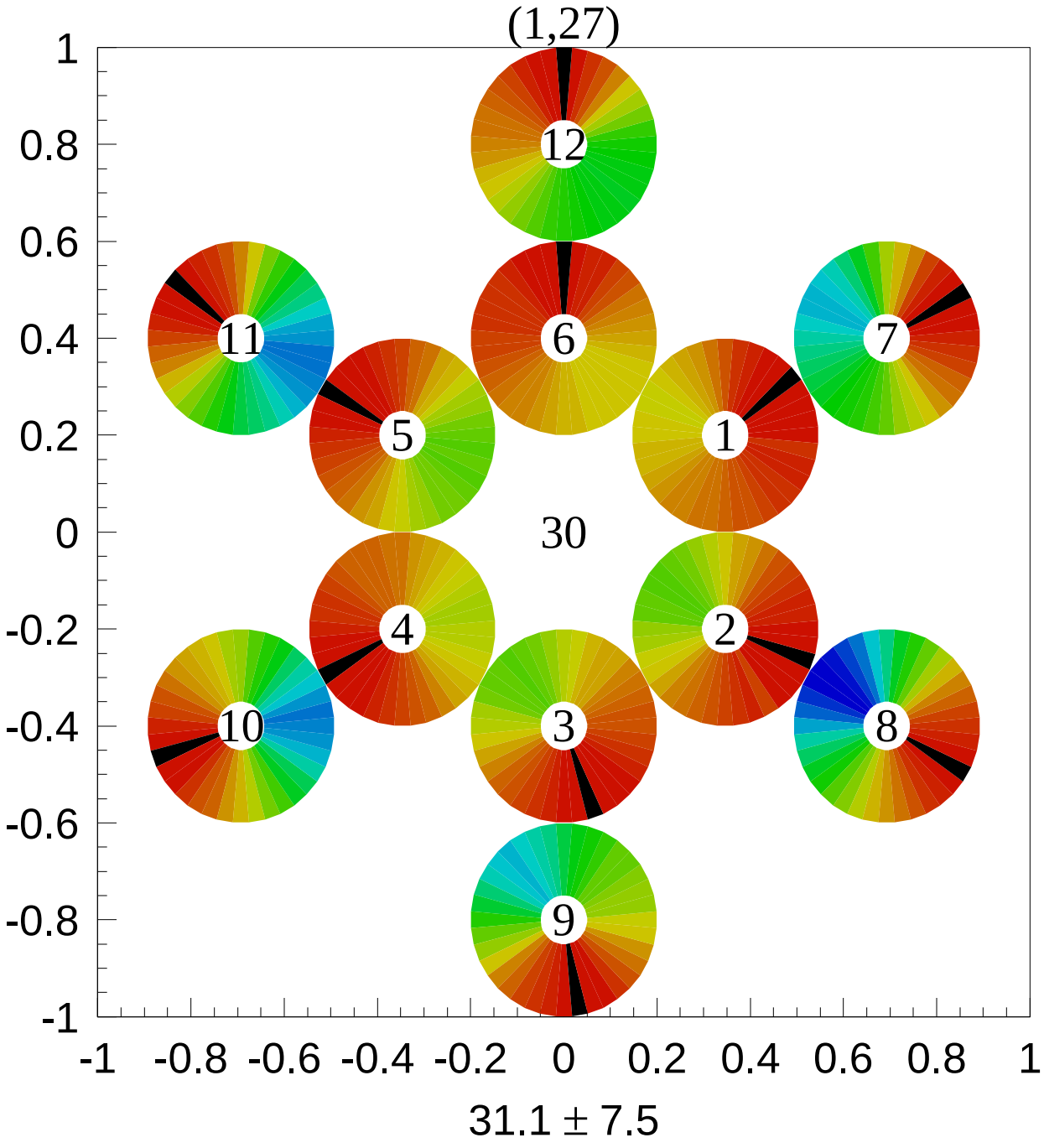

(1,25)
tilted LEDs
127 126 121 127 124 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 120 128 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

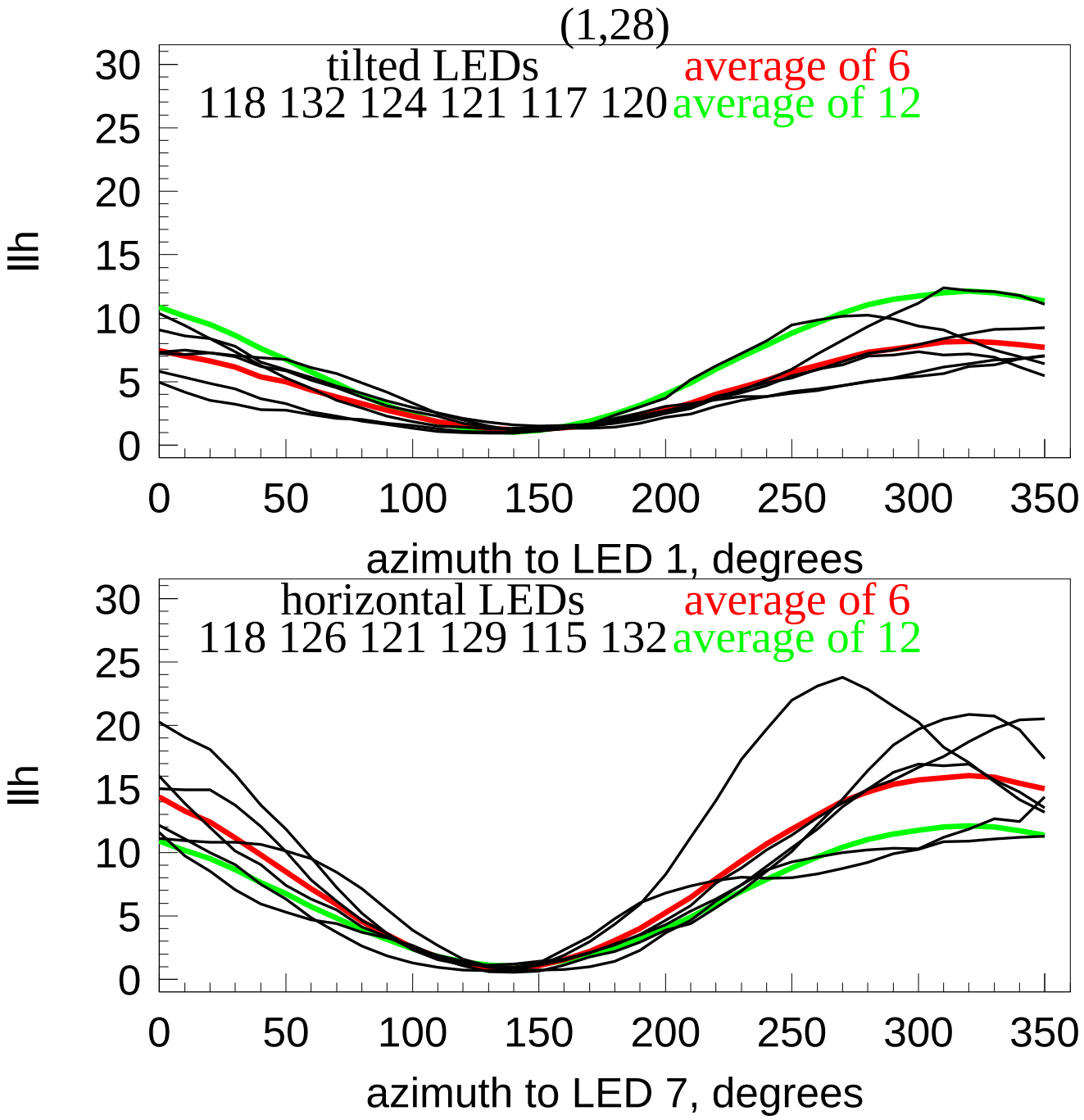

(1,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
164.7 ± 9.5

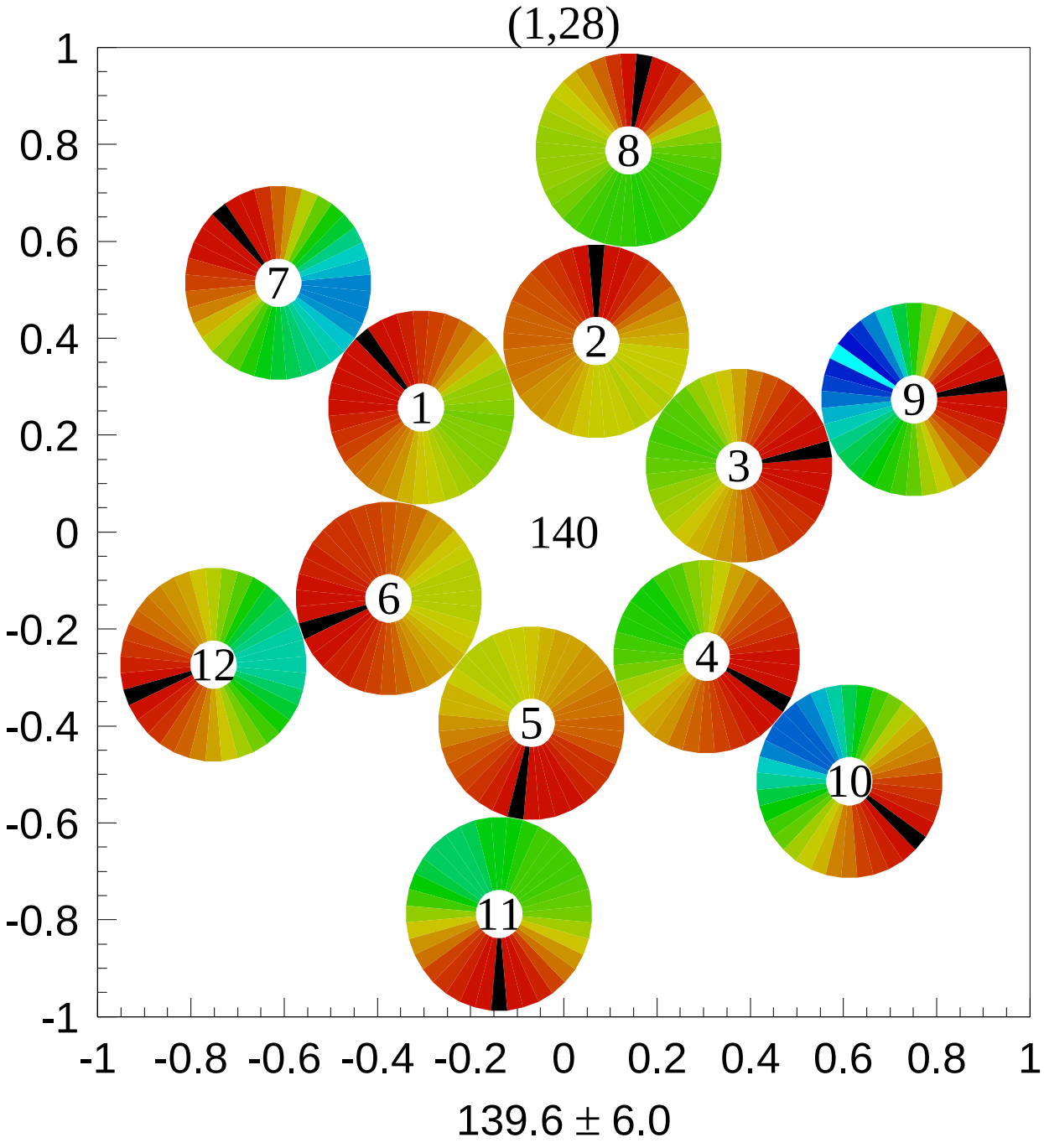

(1,26)
tilted LEDs
124 124 115 117 123 121
average of 6
average of 12
llh
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
113 116 127 122 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

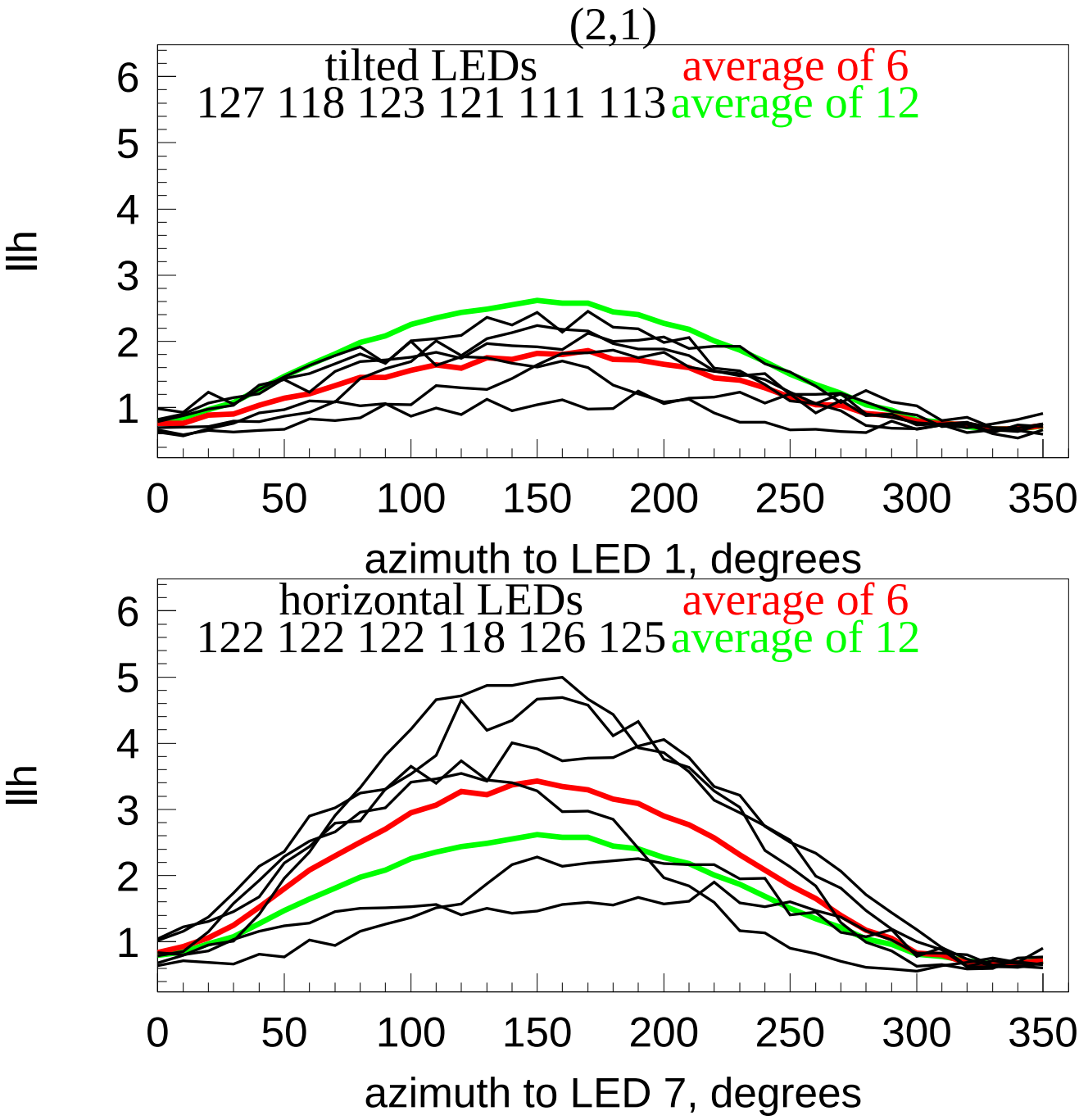

(1,26)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
212 ± 6.8

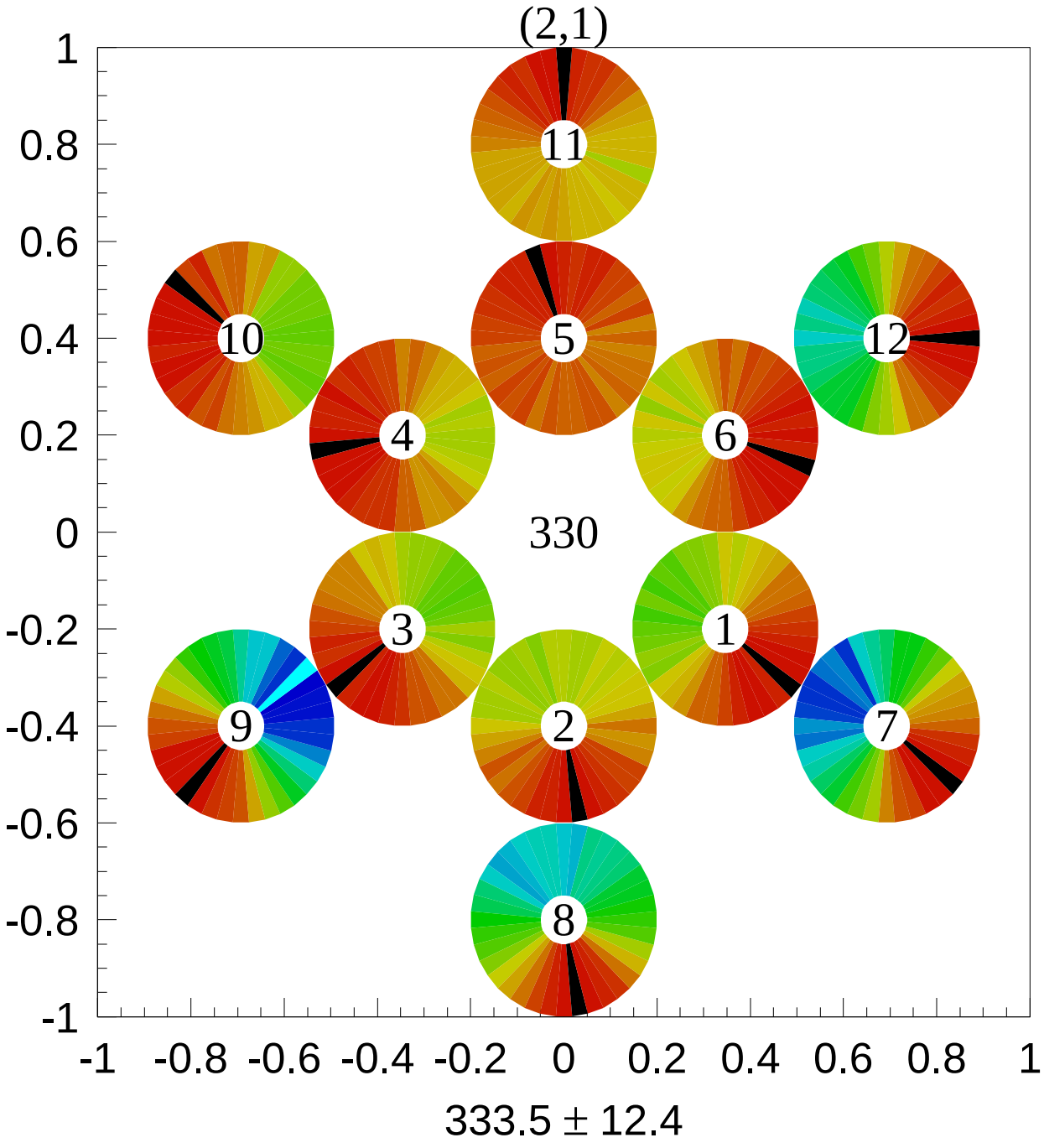

(1,27)
tilted LEDs
112 120 125 120 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 116 115 118 116 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

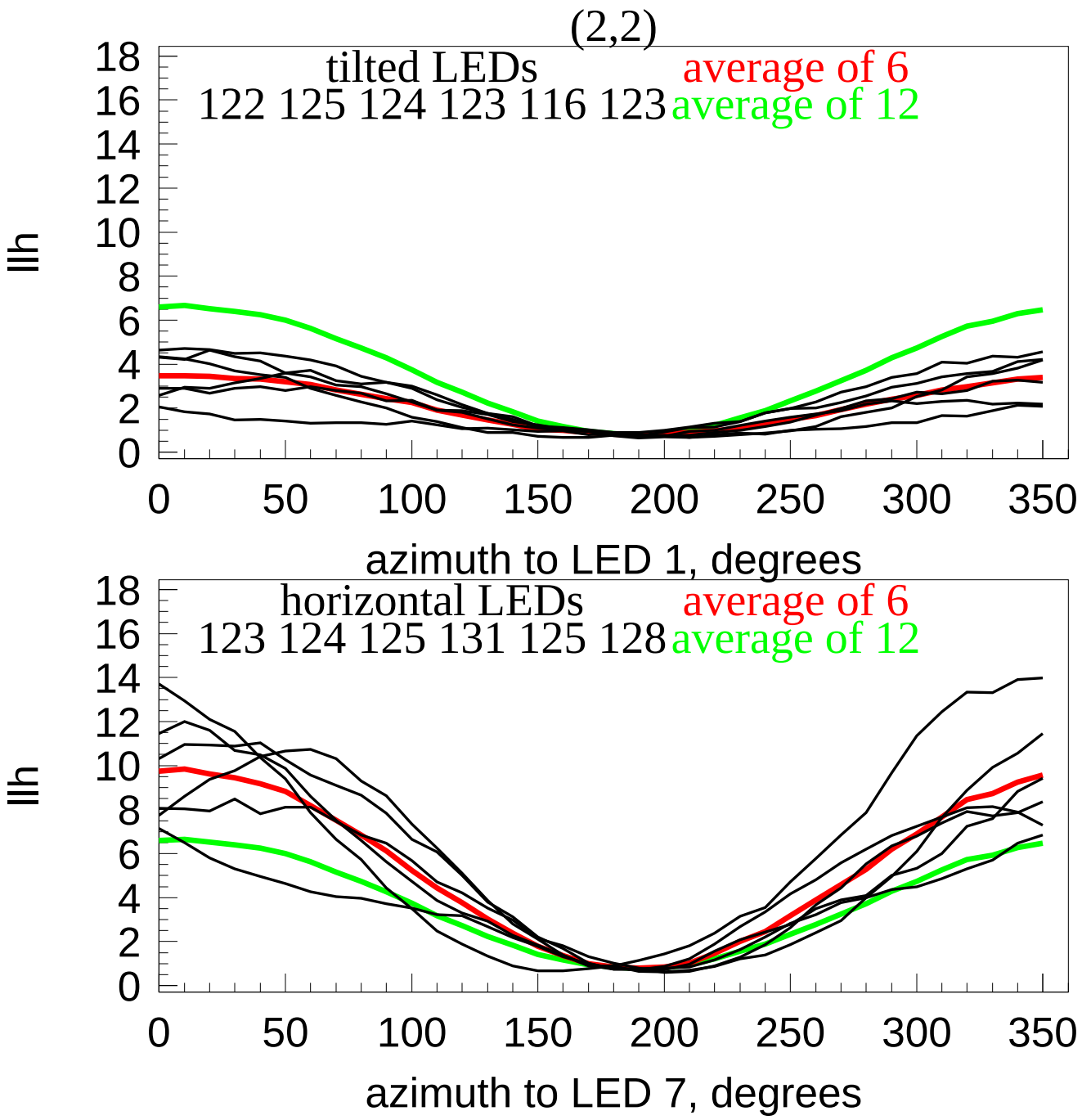

(1,27)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
31.1 ± 7.5

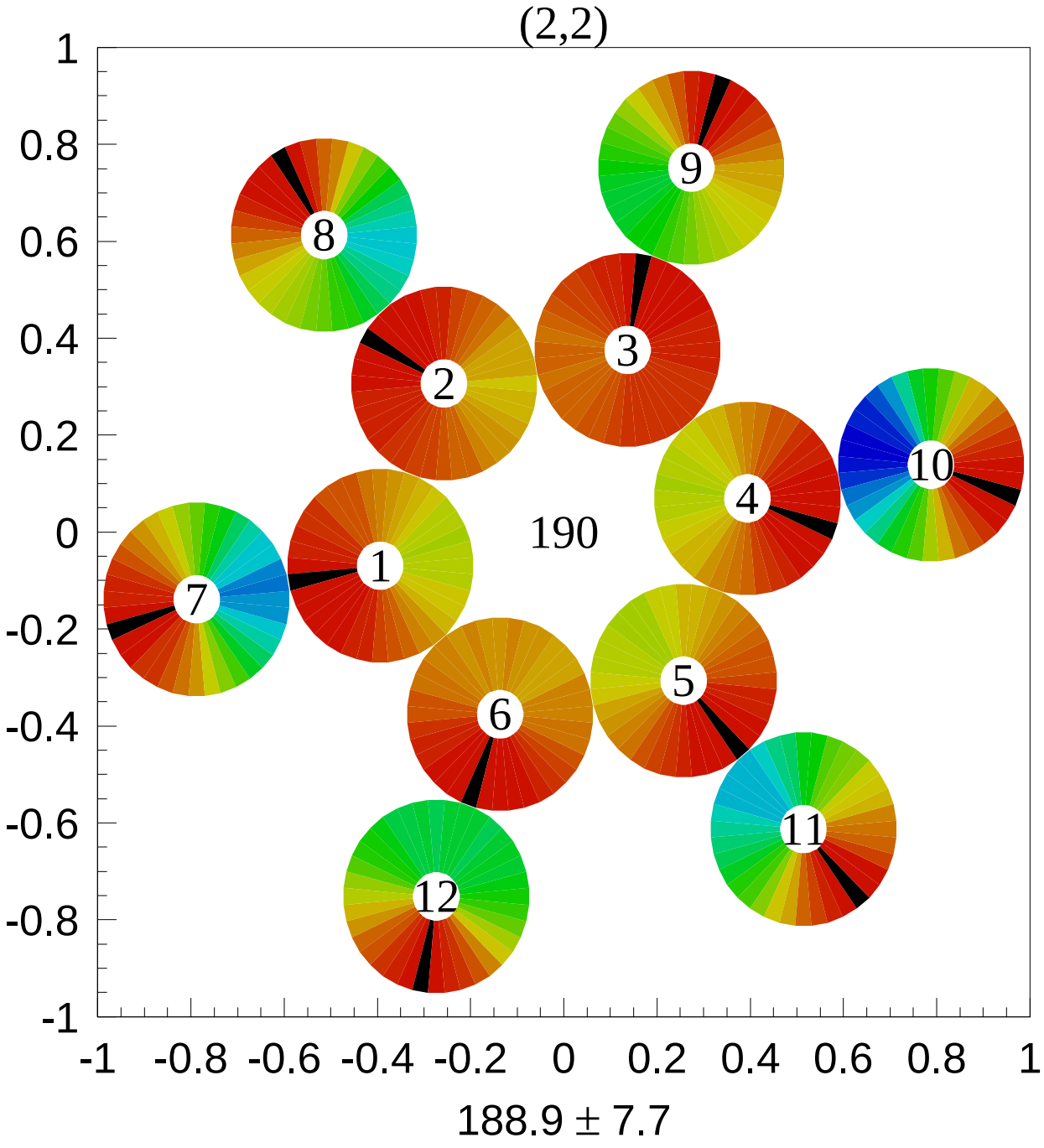

(1,28)
tilted LEDs
118 132 124 121 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 126 121 129 115 132
average of 6
average of 12
llh
azimuth to LED 7, degrees

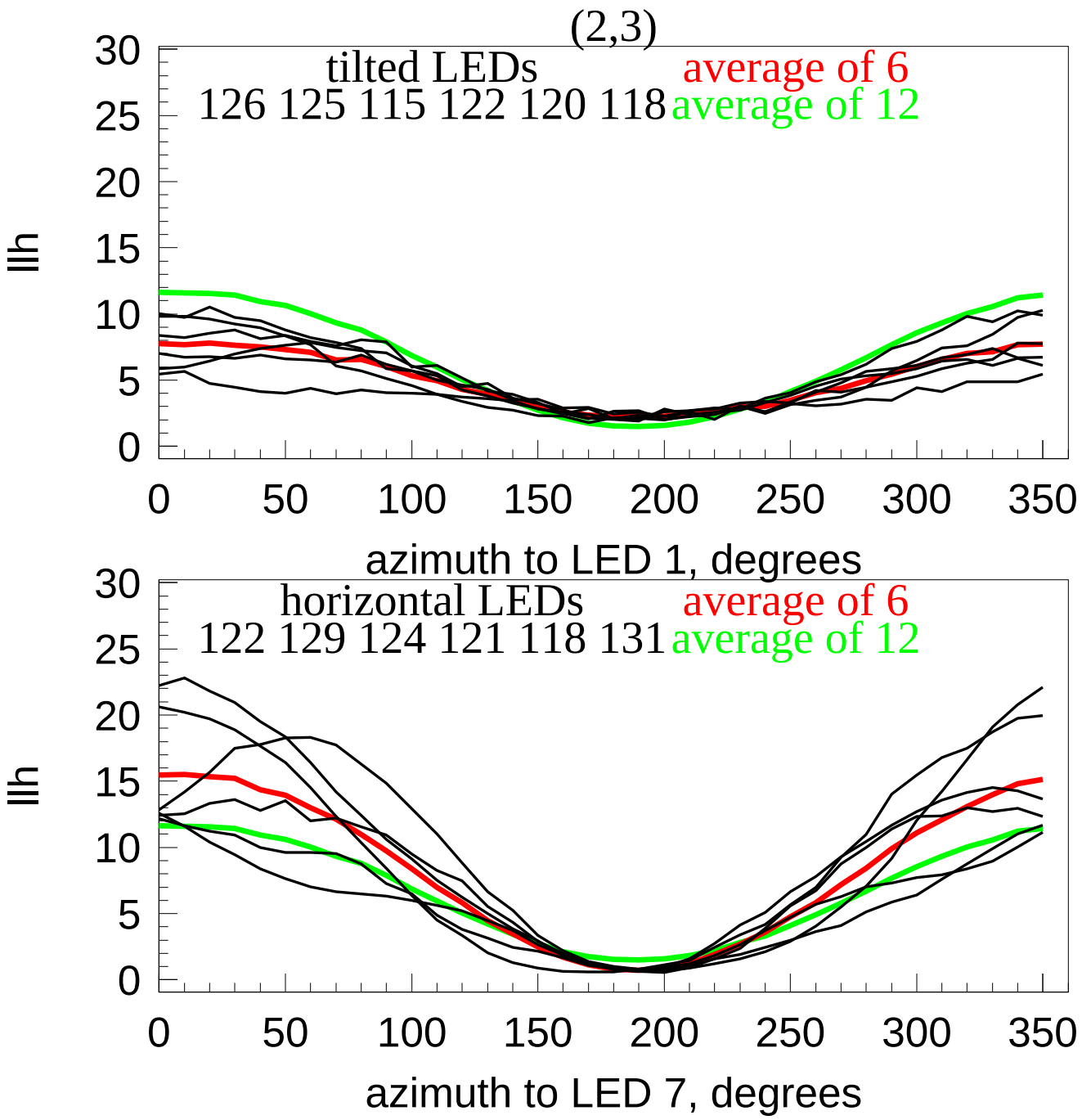

(1,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
139.6 ± 6.0

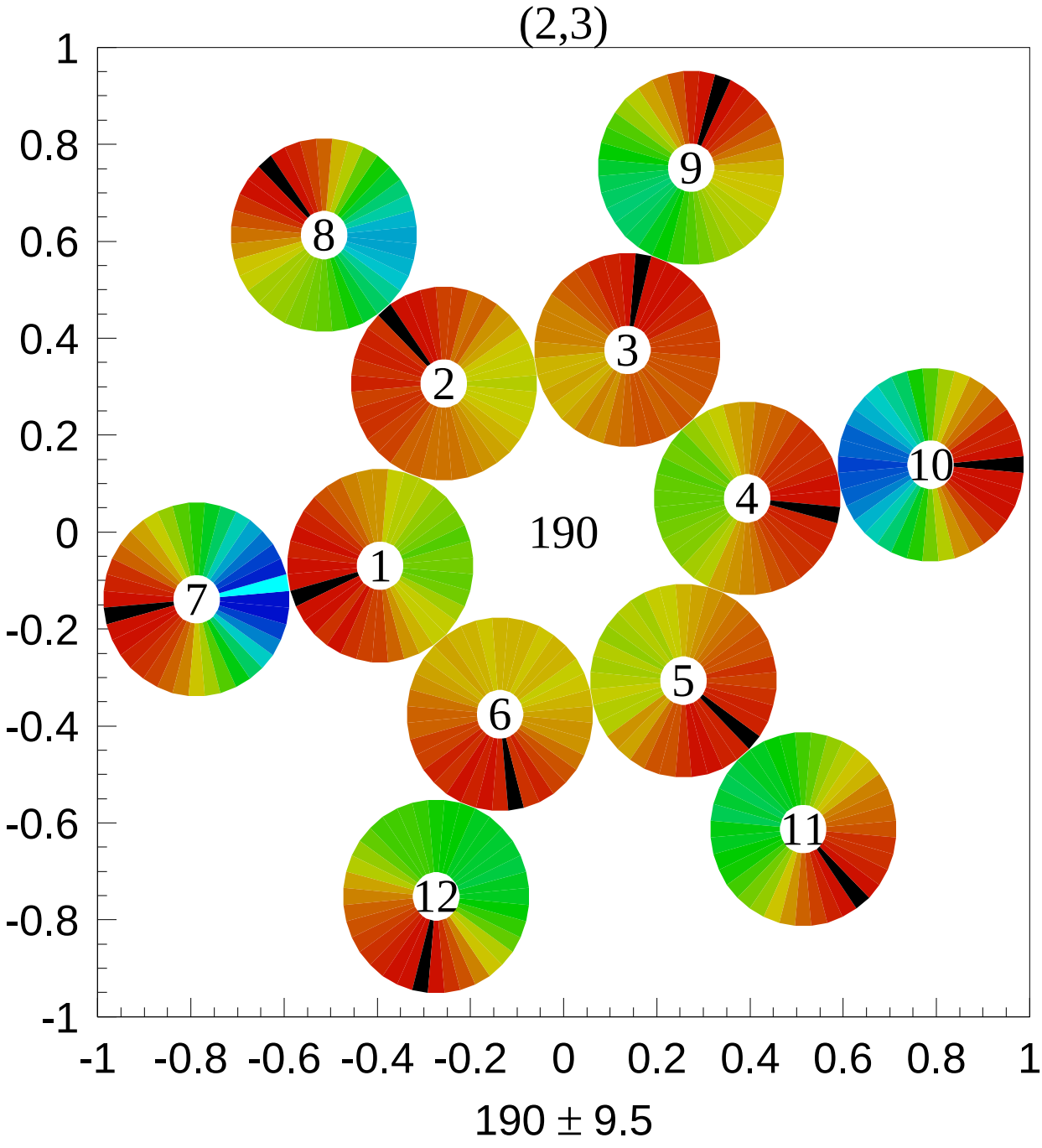

(2,1)
tilted LEDs
127 118 123 121 111 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 122 118 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

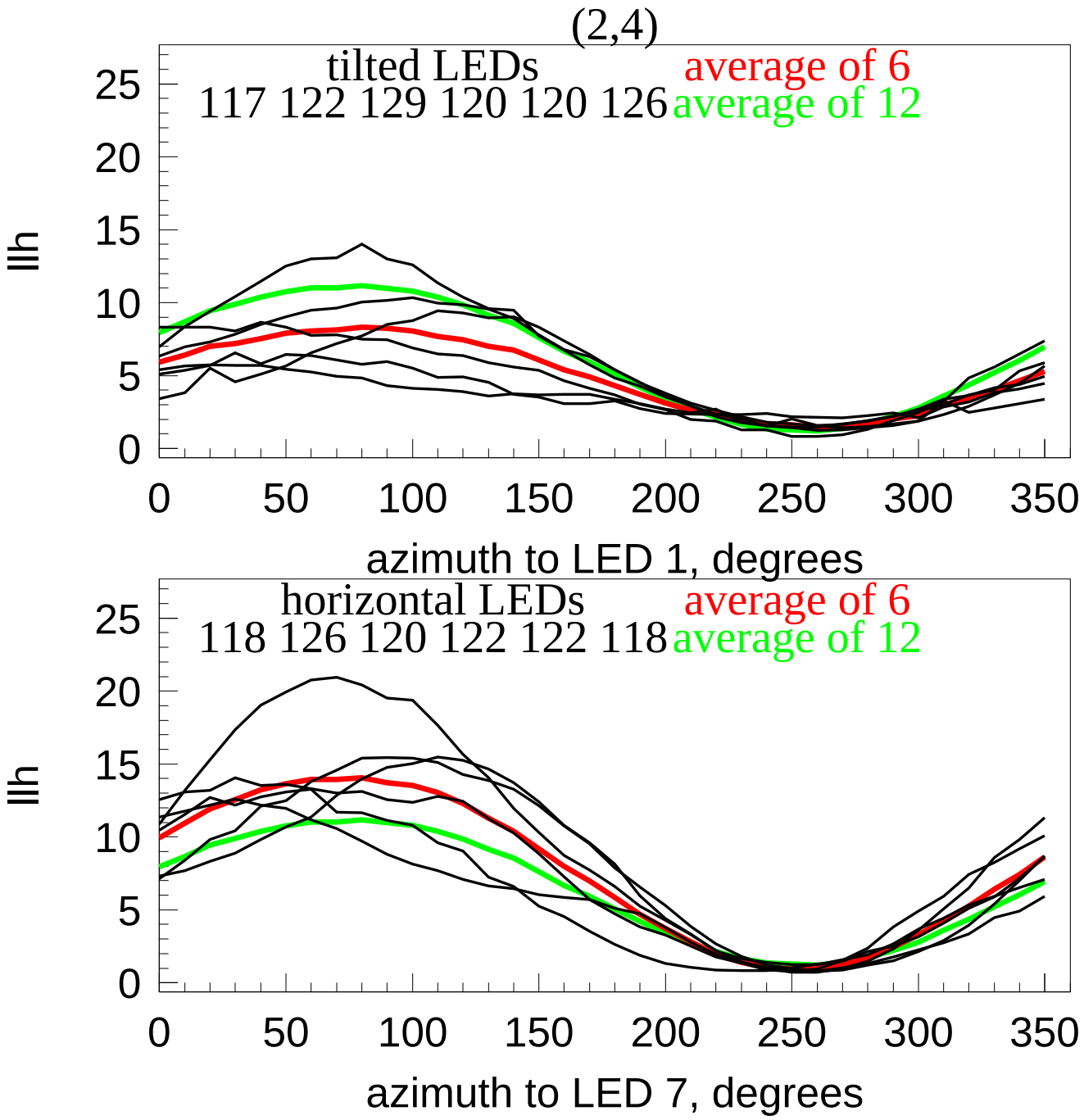

(2,1)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
333.5 ± 12.4

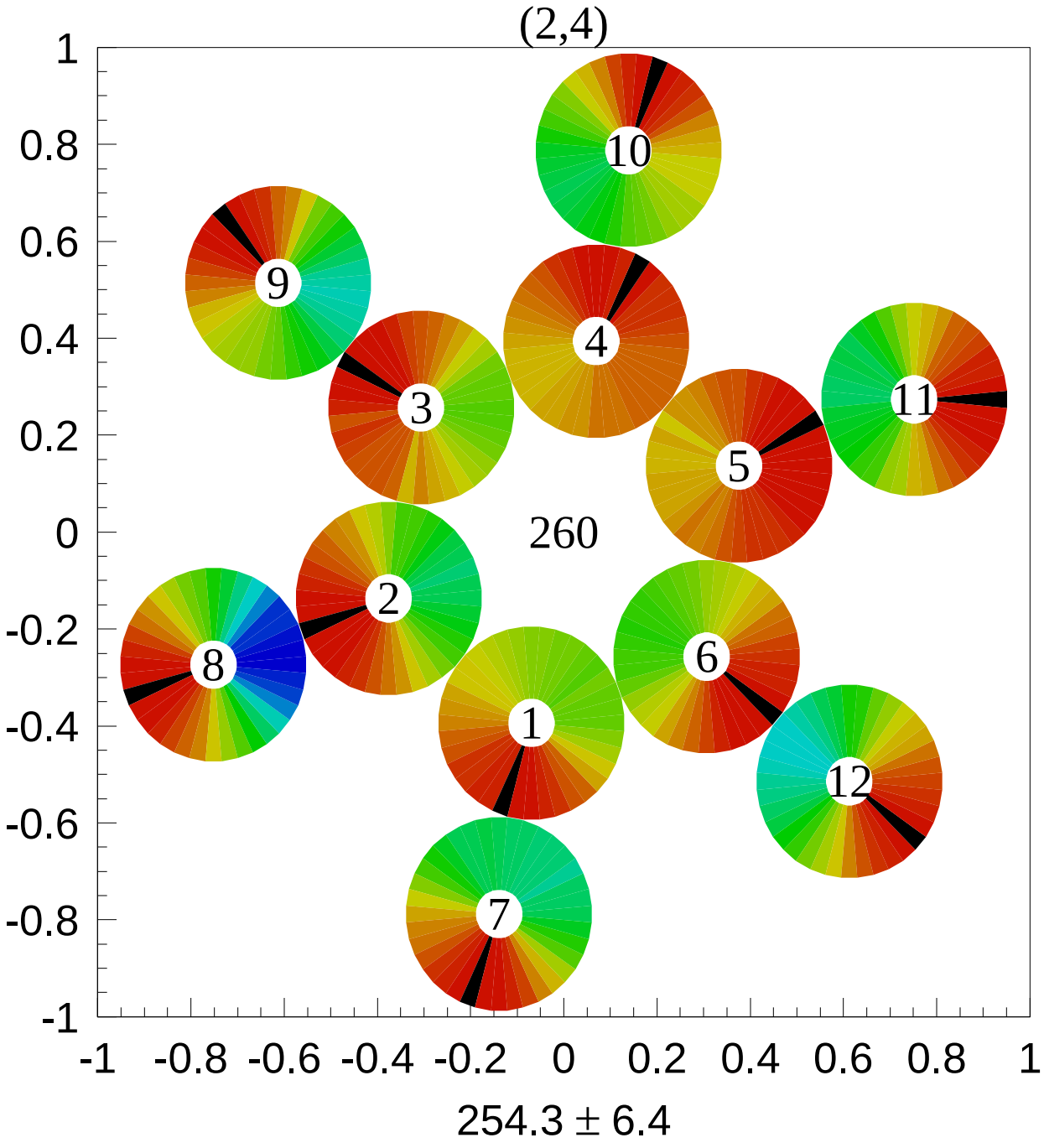

(2,2)
tilted LEDs
122 125 124 123 116 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 124 125 131 125 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

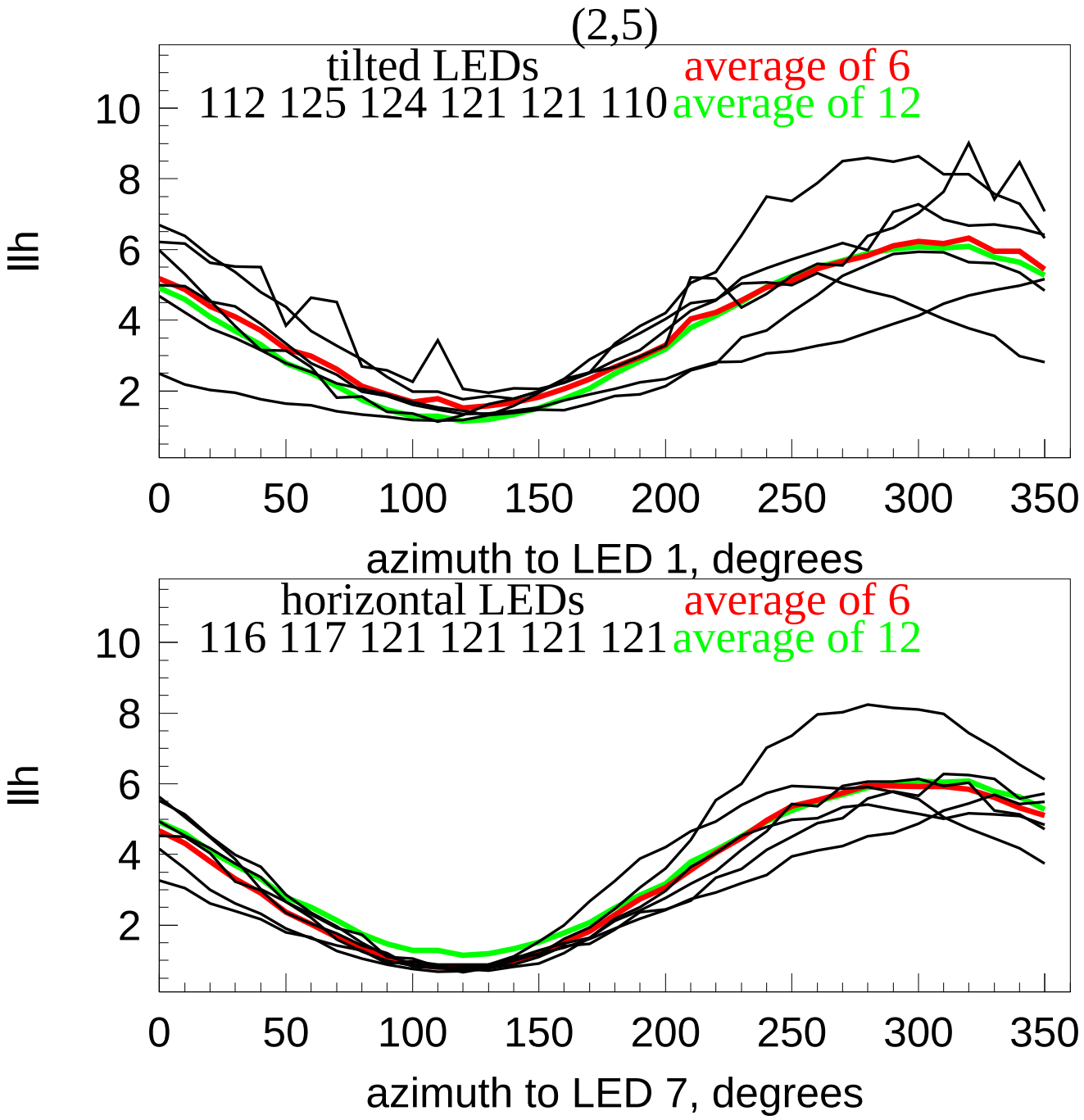

(2,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
188.9 ± 7.7

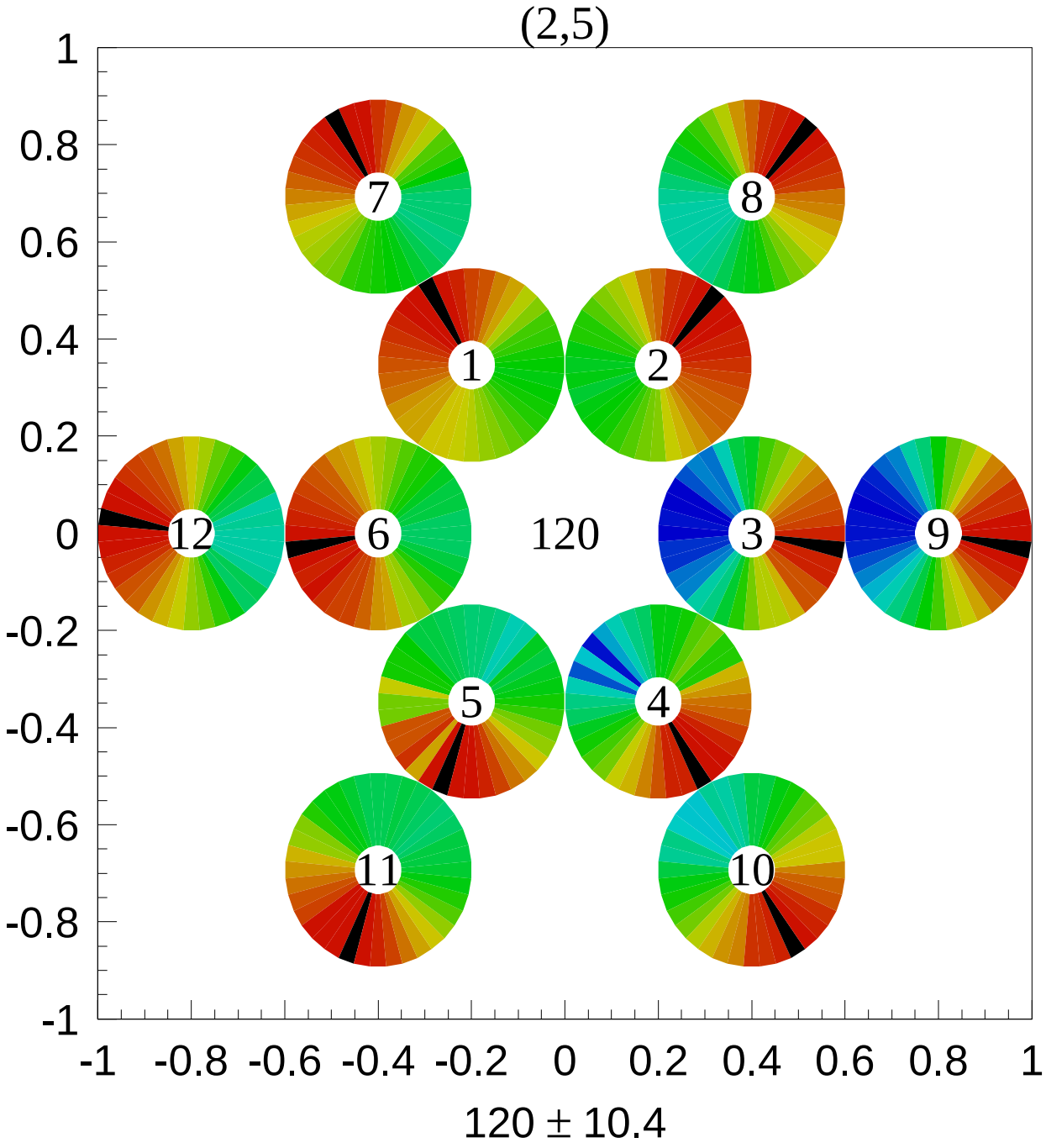

(2,3)
tilted LEDs
126 125 115 122 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 129 124 121 118 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

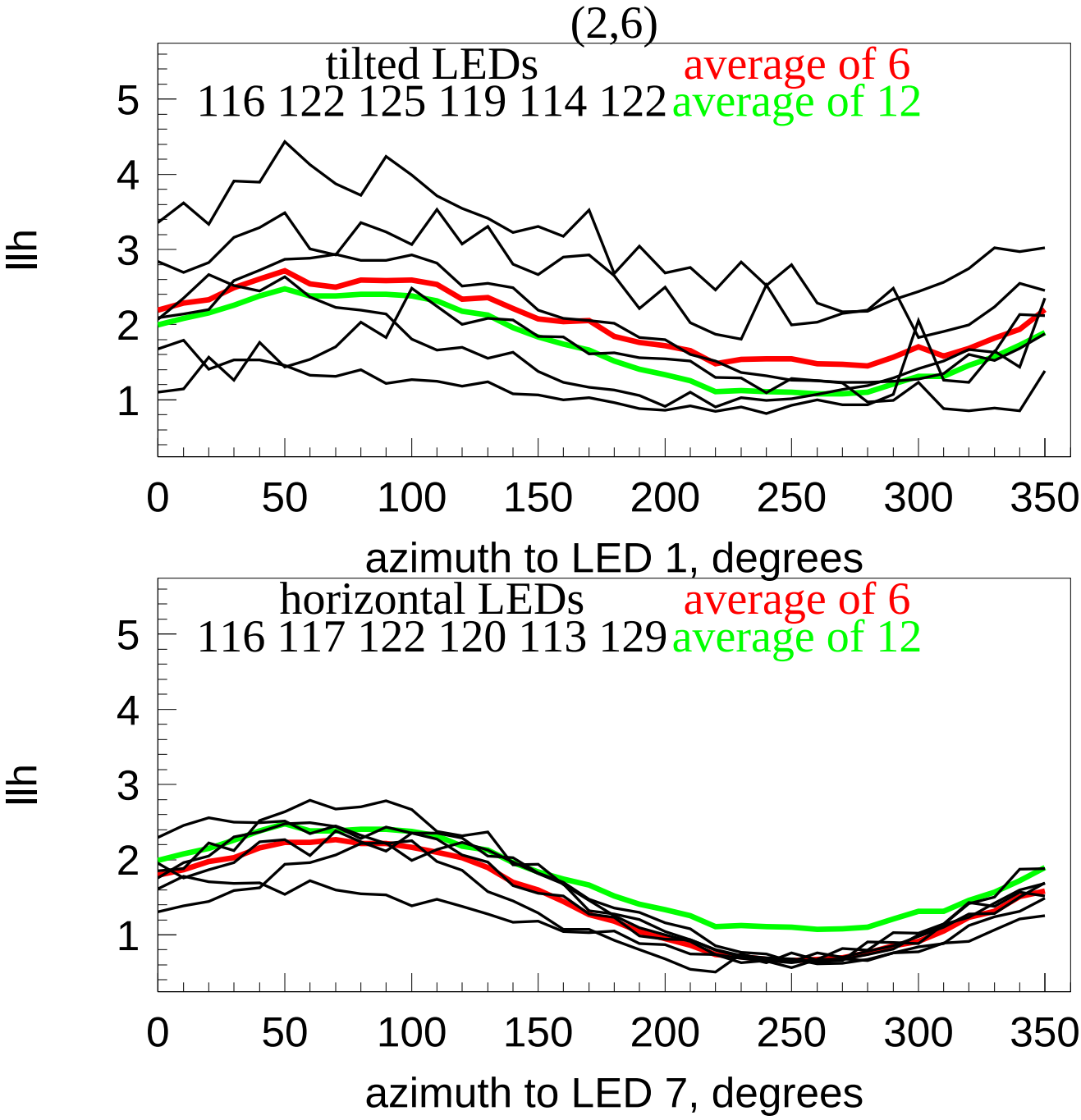

(2,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
190 ± 9.5
1
2
3
4
5
6
7
8
9
10
11
12

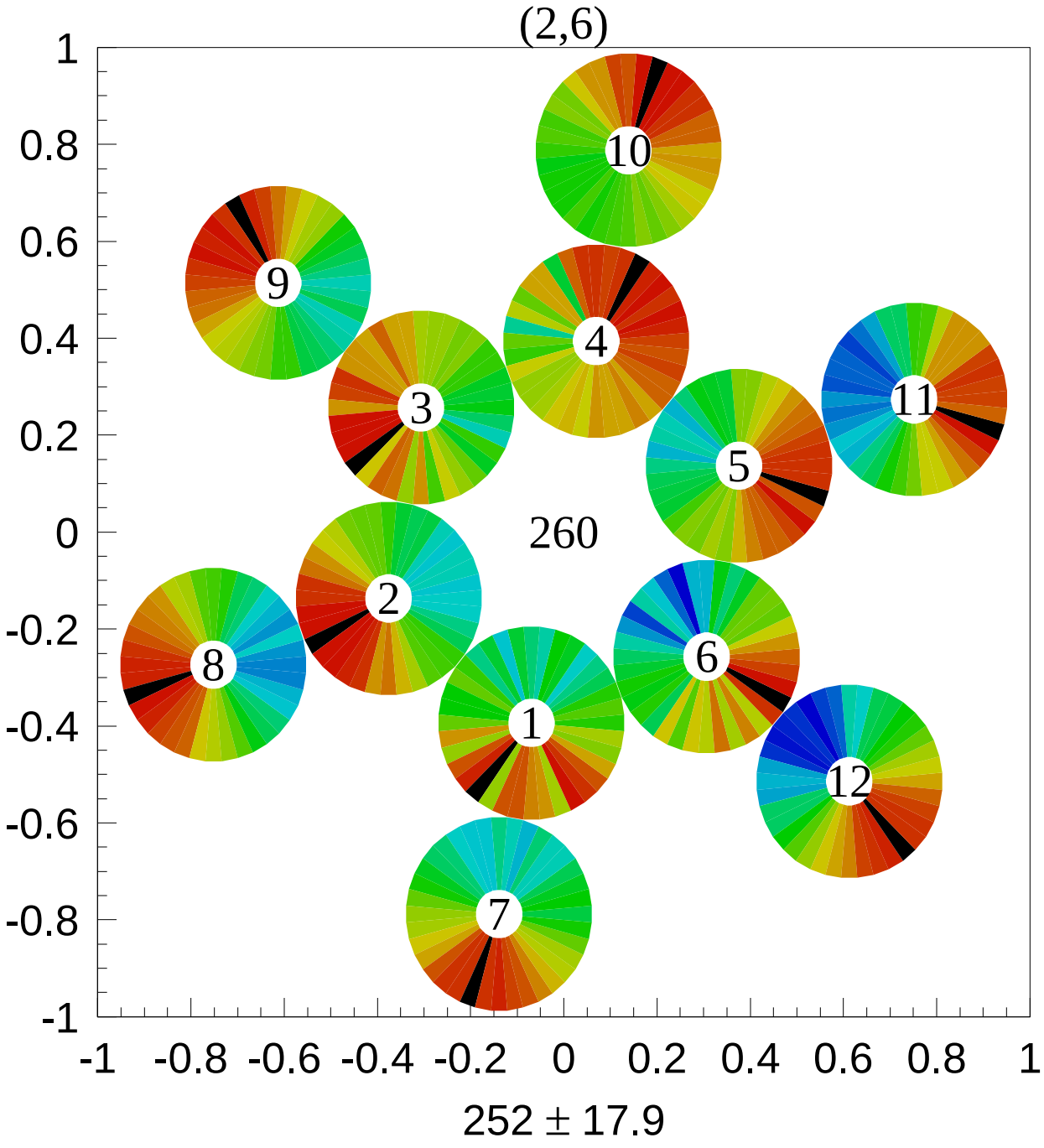

(2,4)
tilted LEDs
117 122 129 120 120 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 126 120 122 122 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

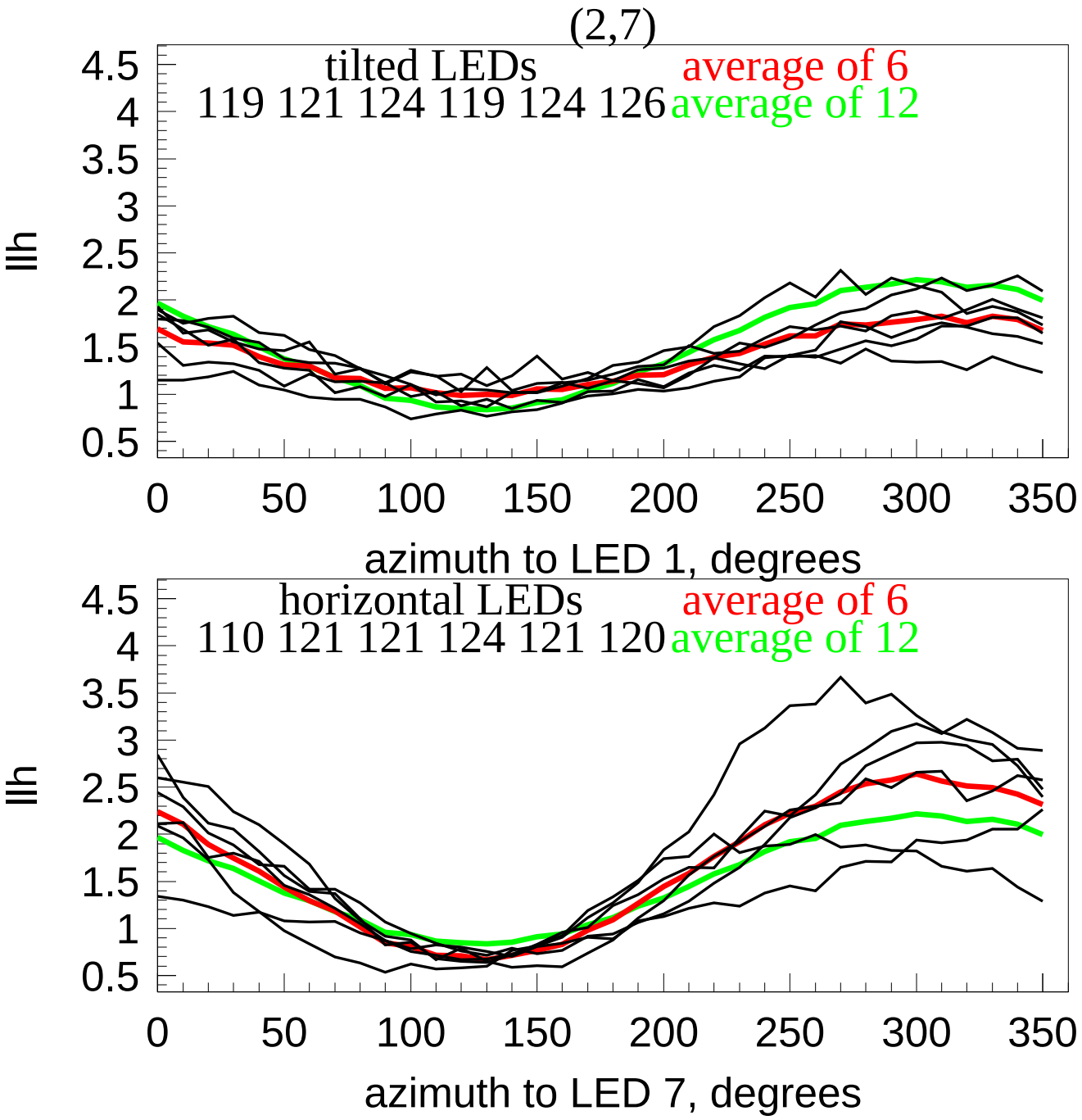

(2,4)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
254.3 ± 6.4

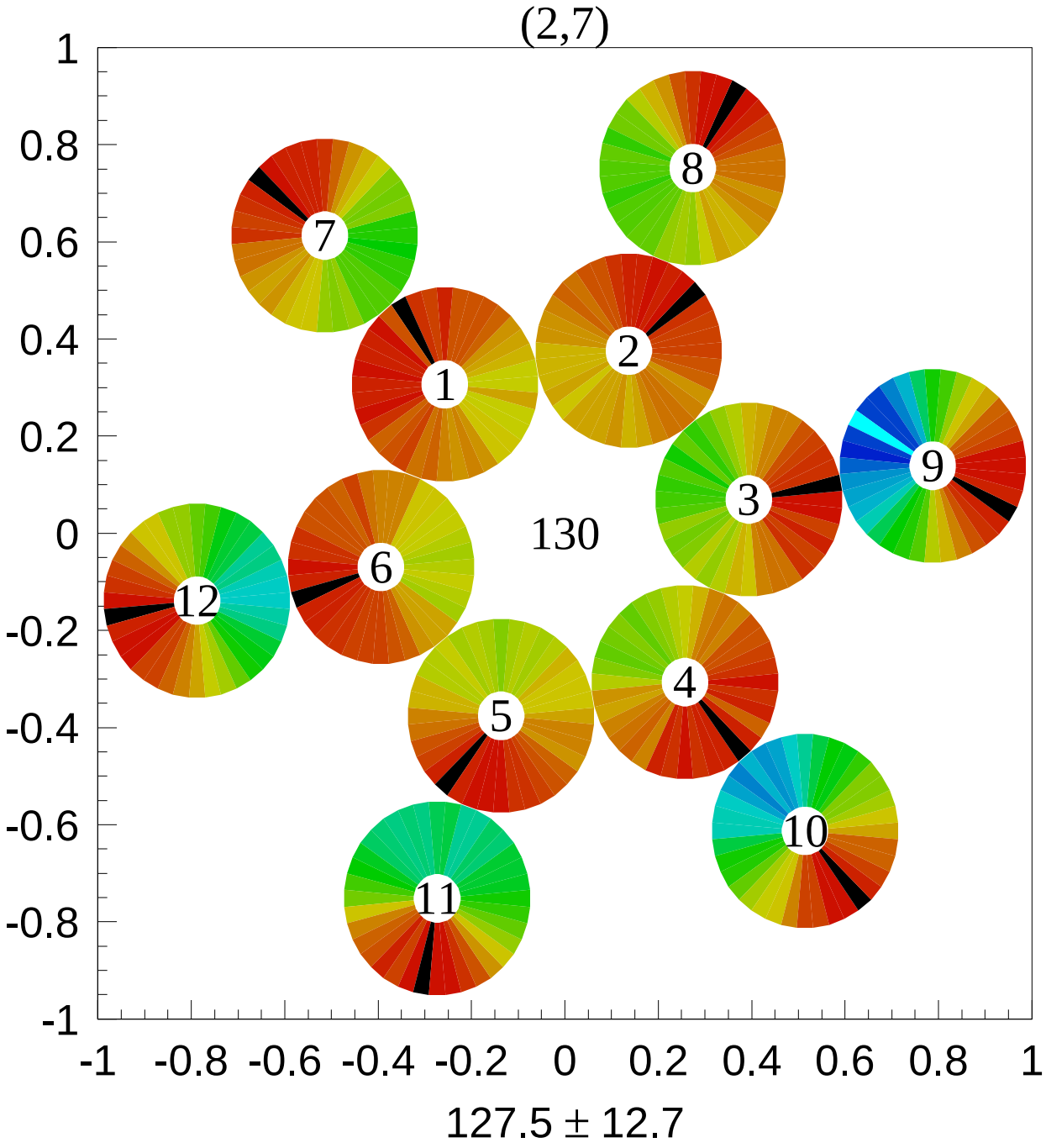

(2,5)
tilted LEDs
112 125 124 121 121 110
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 117 121 121 121 121
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

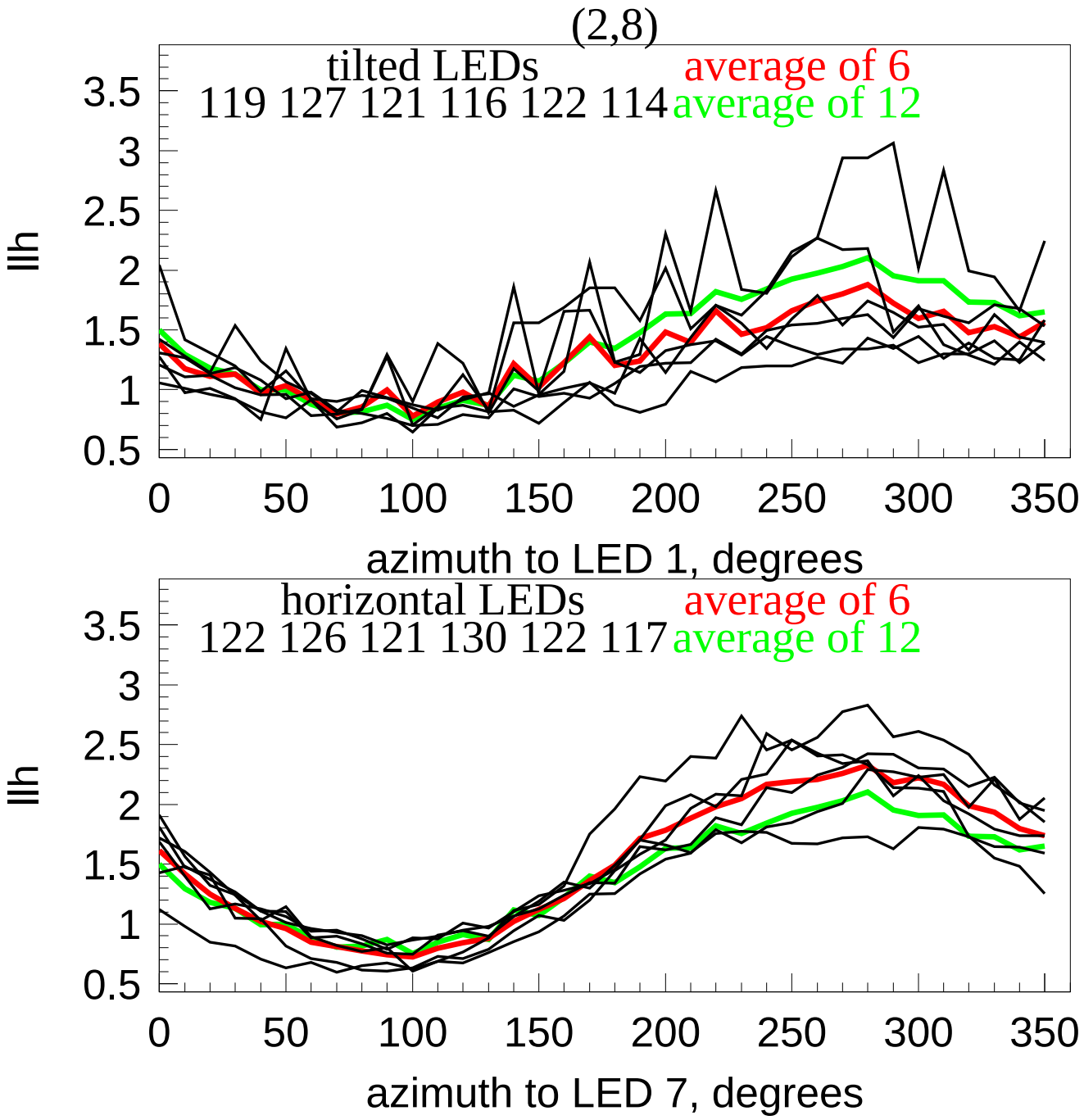

(2,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
120 ± 10.4
7
8
1
2
12
6
120
3
9
5
4
11
10

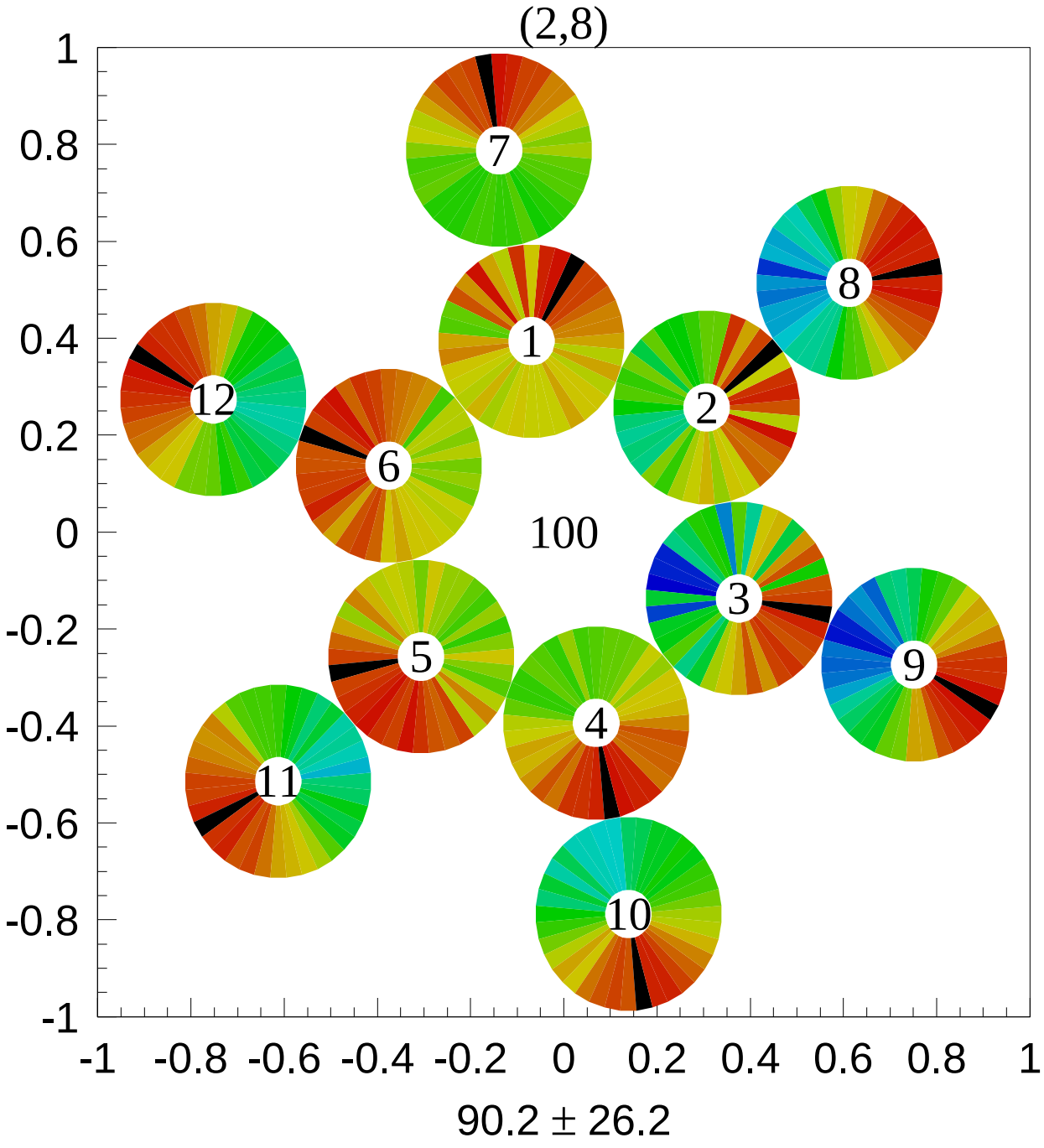

(2,6)
tilted LEDs
116 122 125 119 114 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 117 122 120 113 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

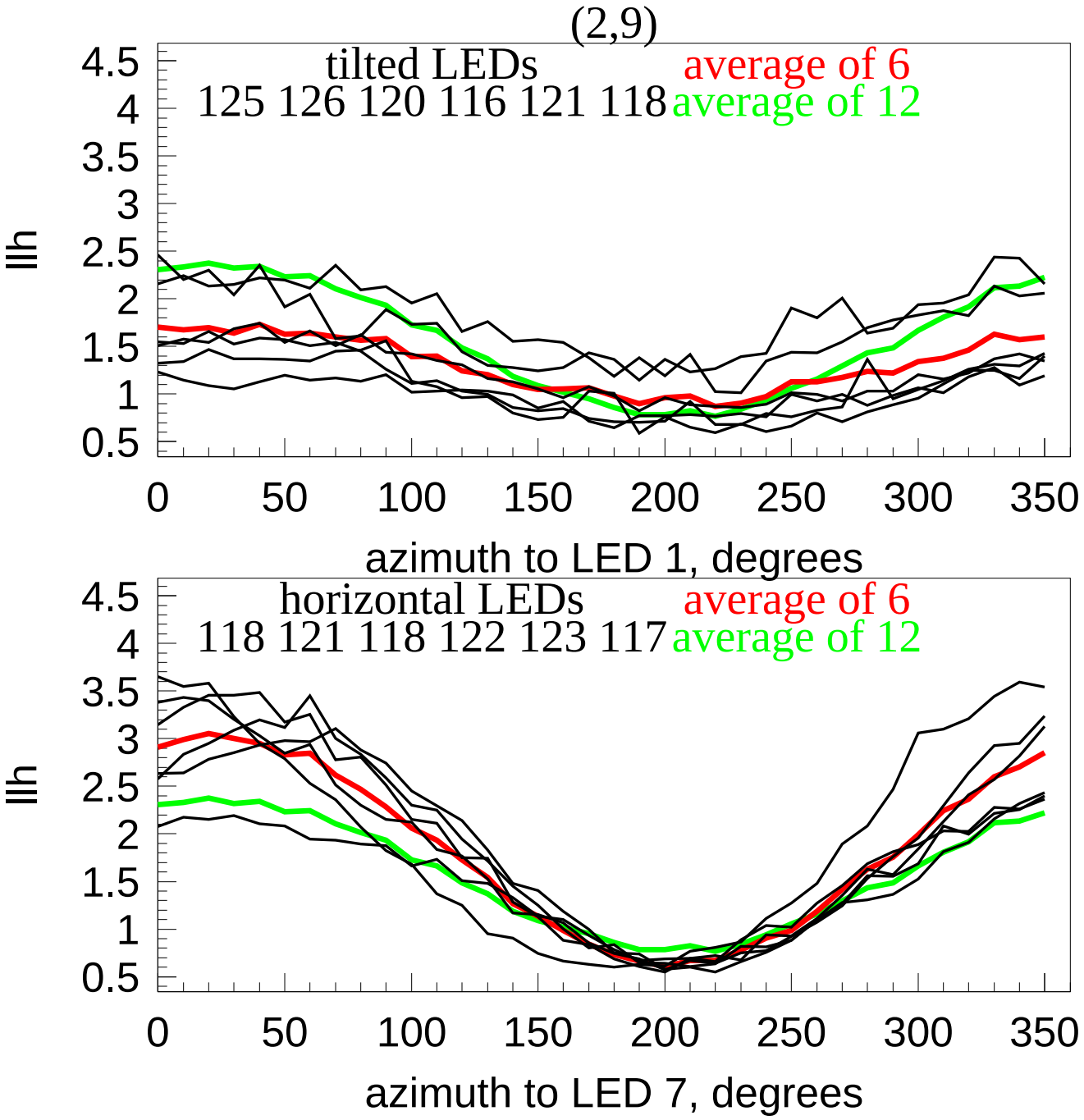

(2,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
252 ± 17.9

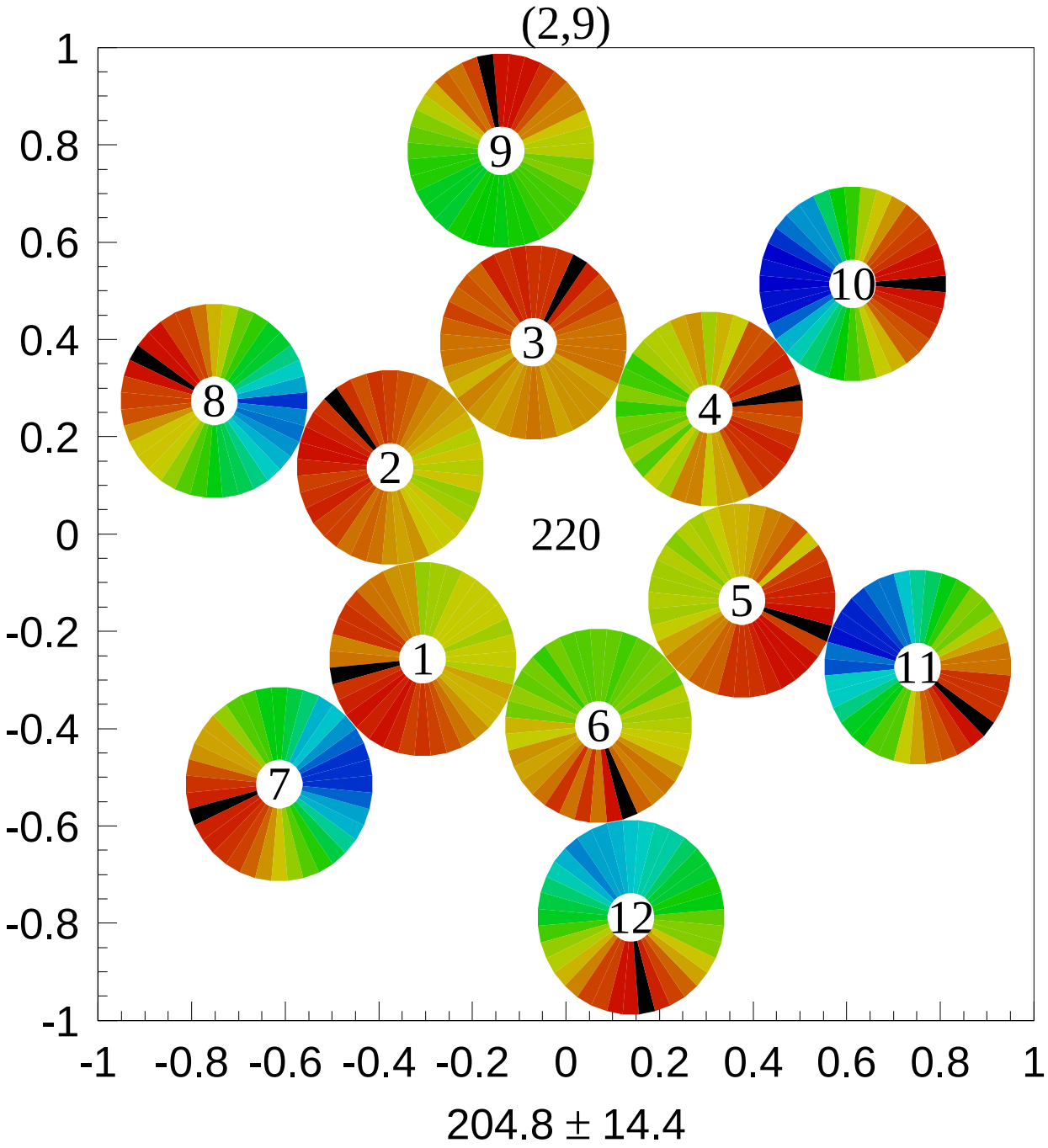

(2,7)
tilted LEDs
119 121 124 119 124 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
110 121 121 124 121 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

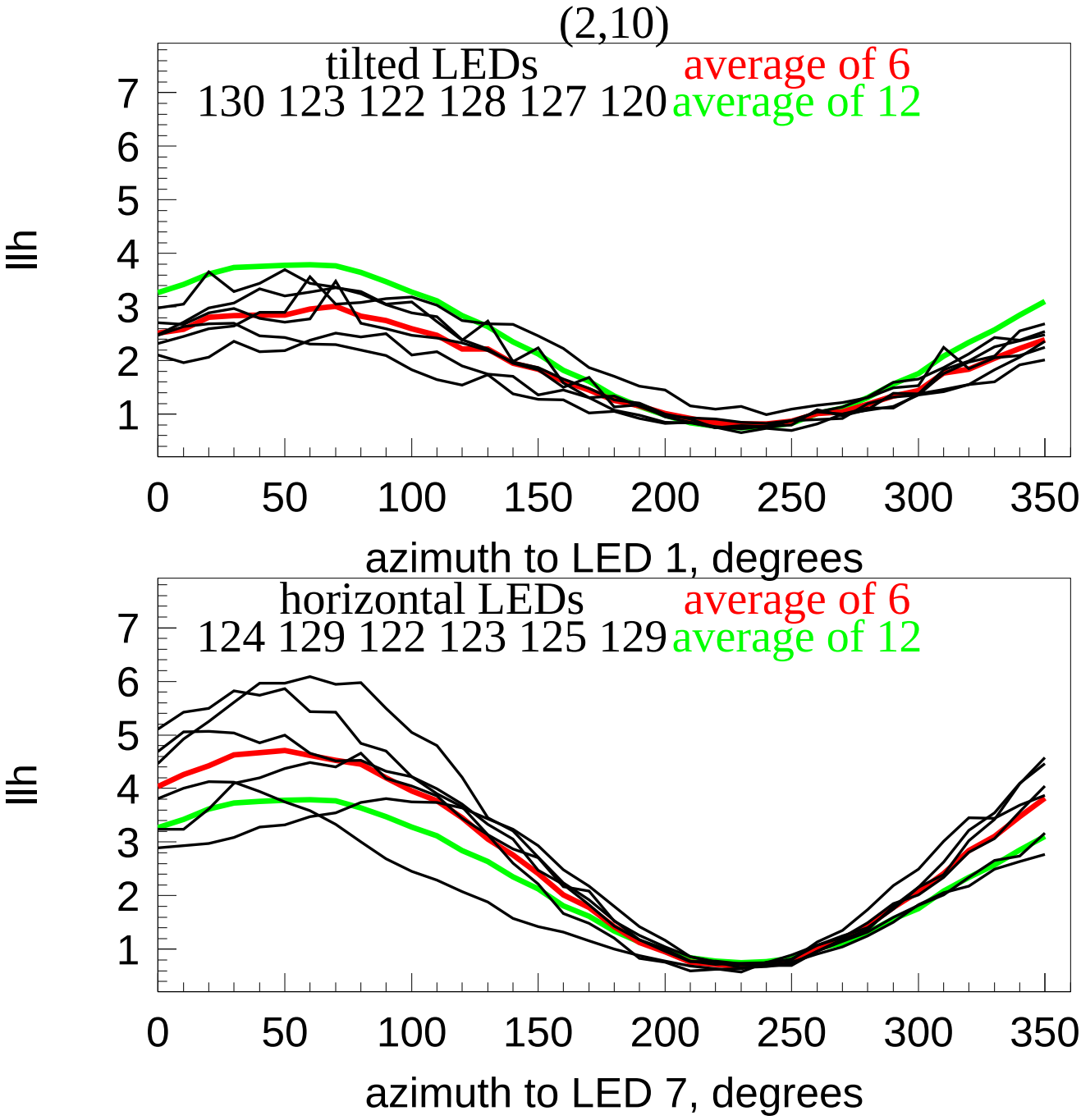

(2,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
127.5 ± 12.7
130
1
2
3
4
5
6
7
8
9
10
11
12

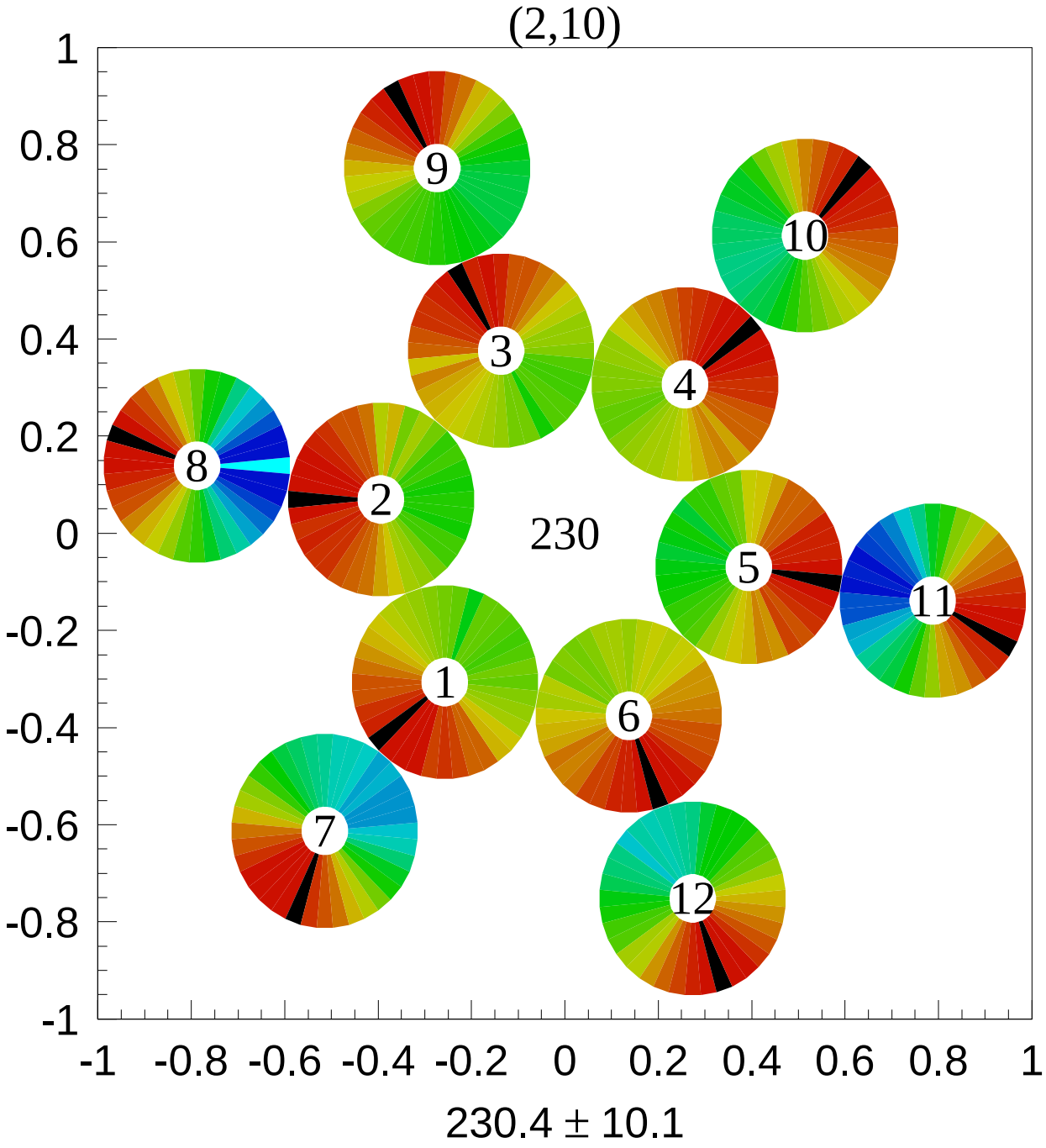

(2,8)
tilted LEDs
119 127 121 116 122 114
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 126 121 130 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

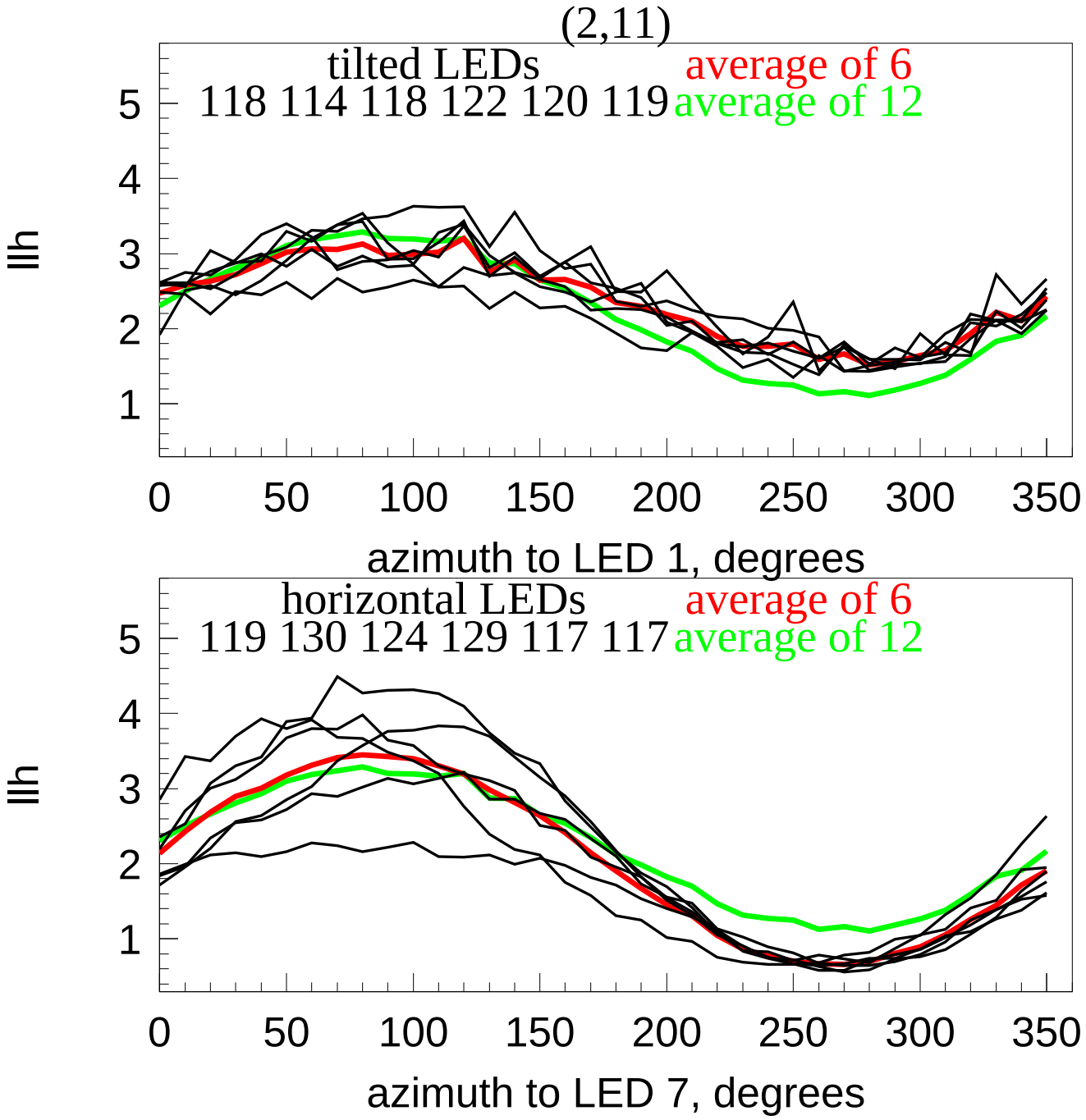

(2,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
90.2 ± 26.2

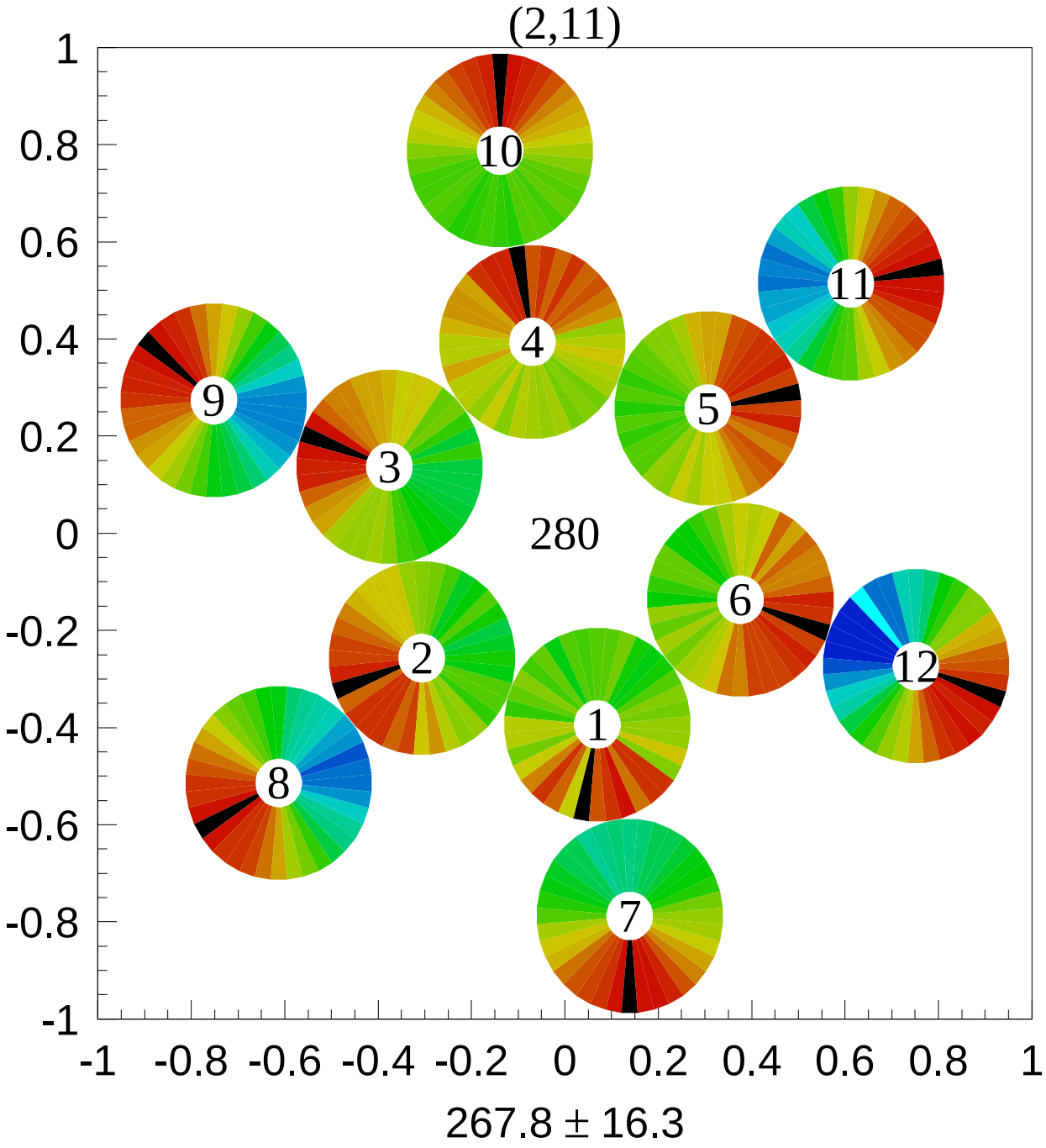

(2,9)
tilted LEDs
125 126 120 116 121 118
average of 6
average of 12
IIh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 121 118 122 123 117
average of 6
average of 12
IIh
azimuth to LED 7, degrees

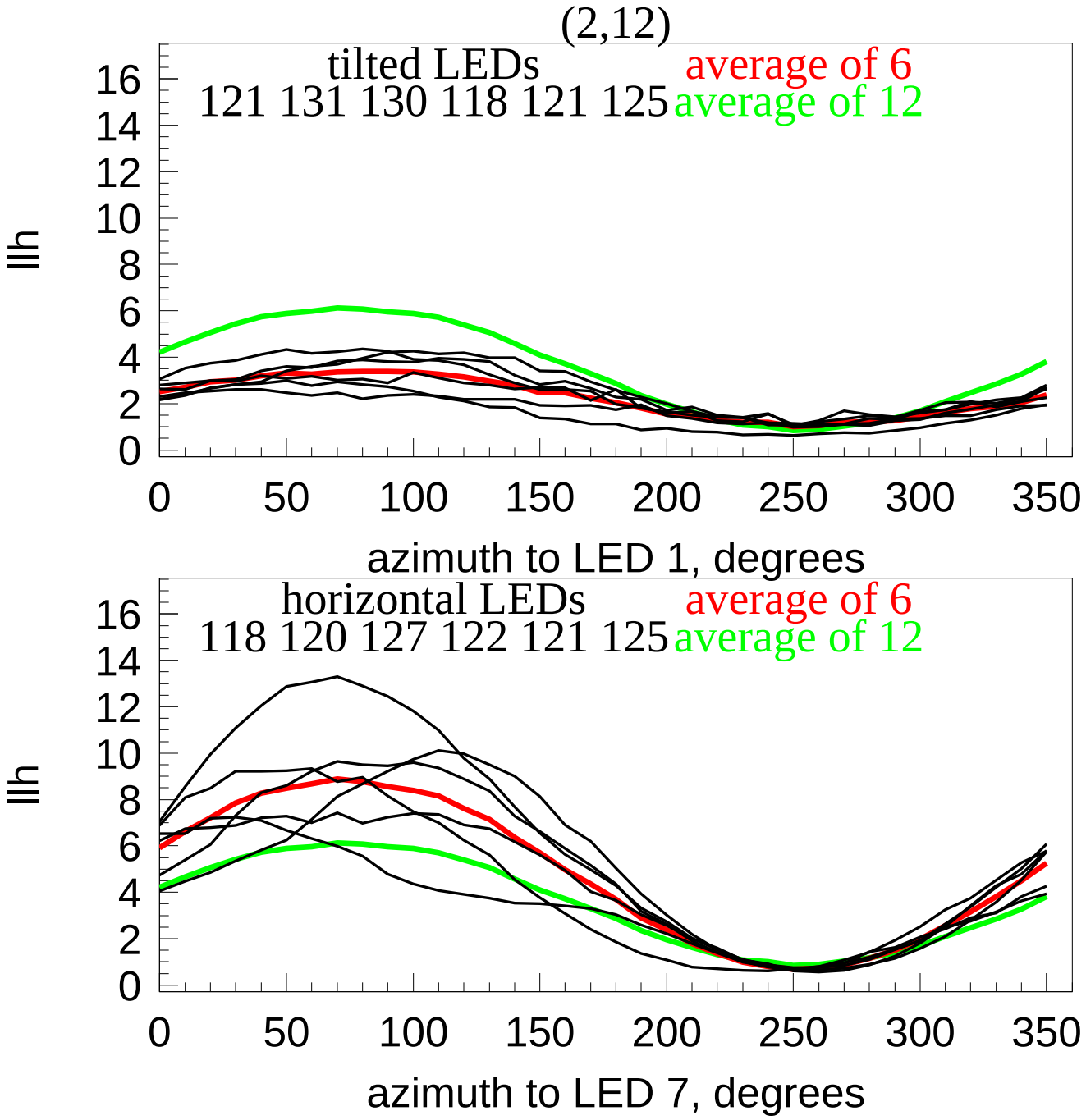

(2,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
204.8 ± 14.4

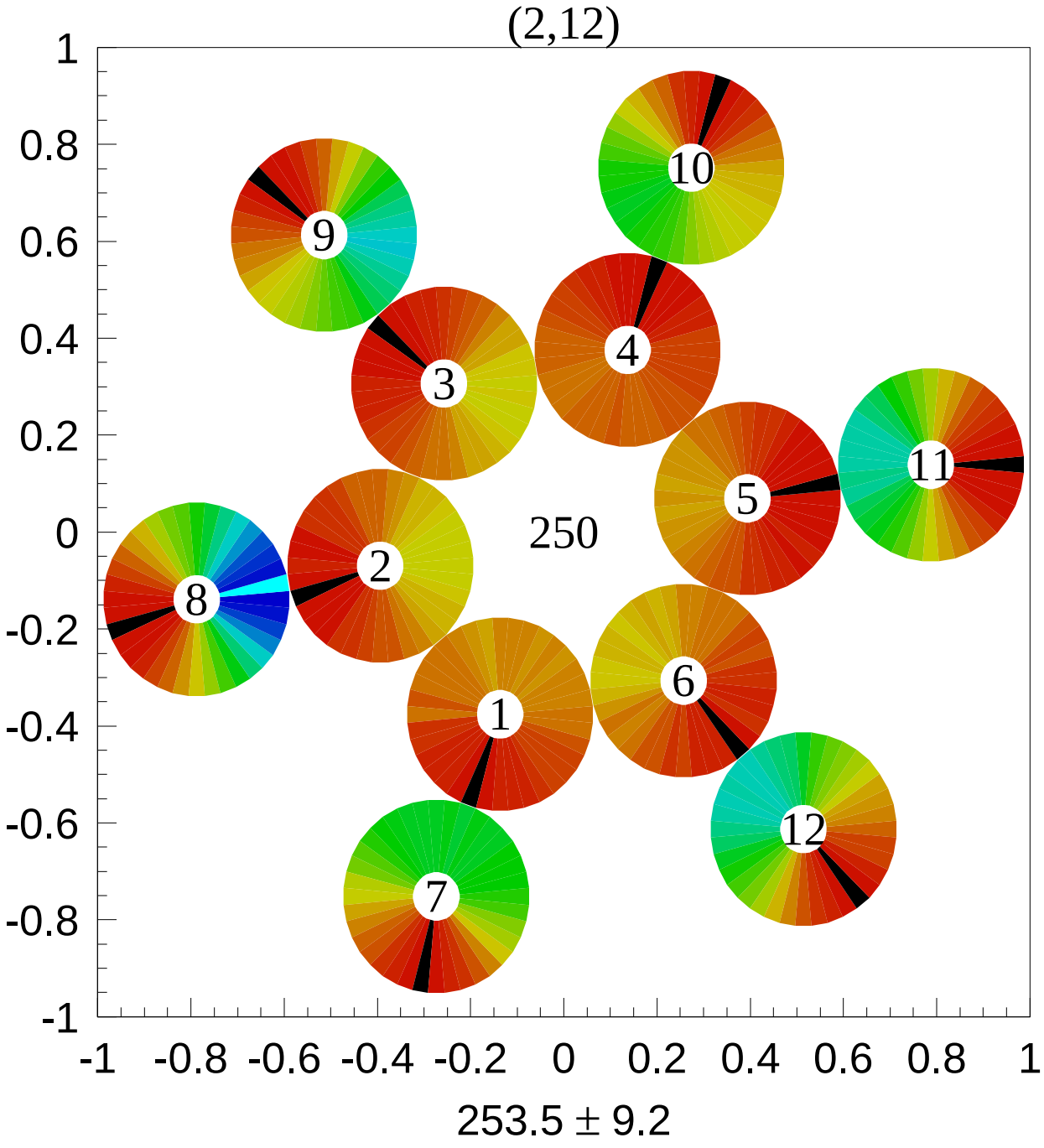

(2,10)
tilted LEDs
130 123 122 128 127 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 129 122 123 125 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

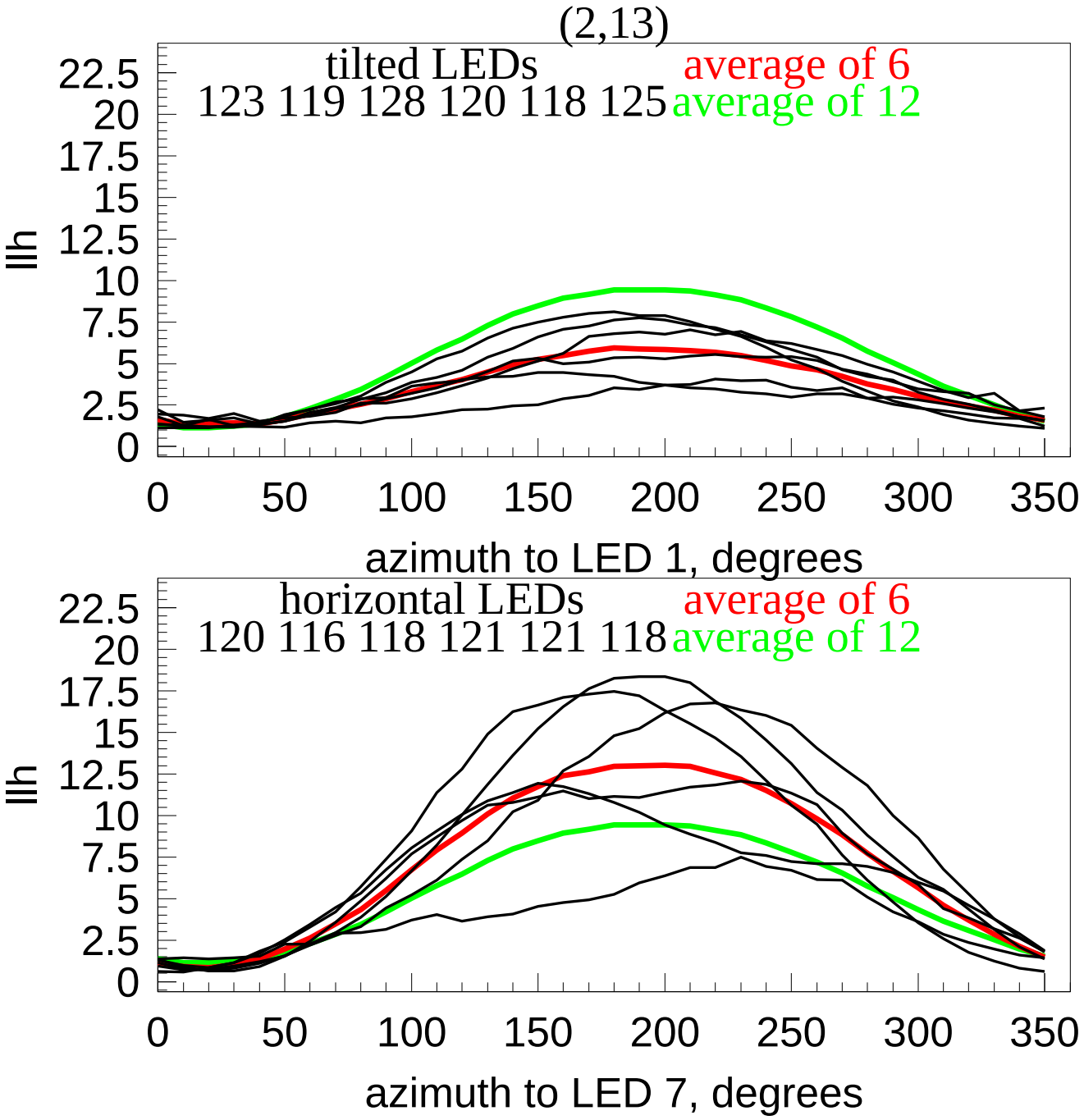

(2,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
230.4 ± 10.1

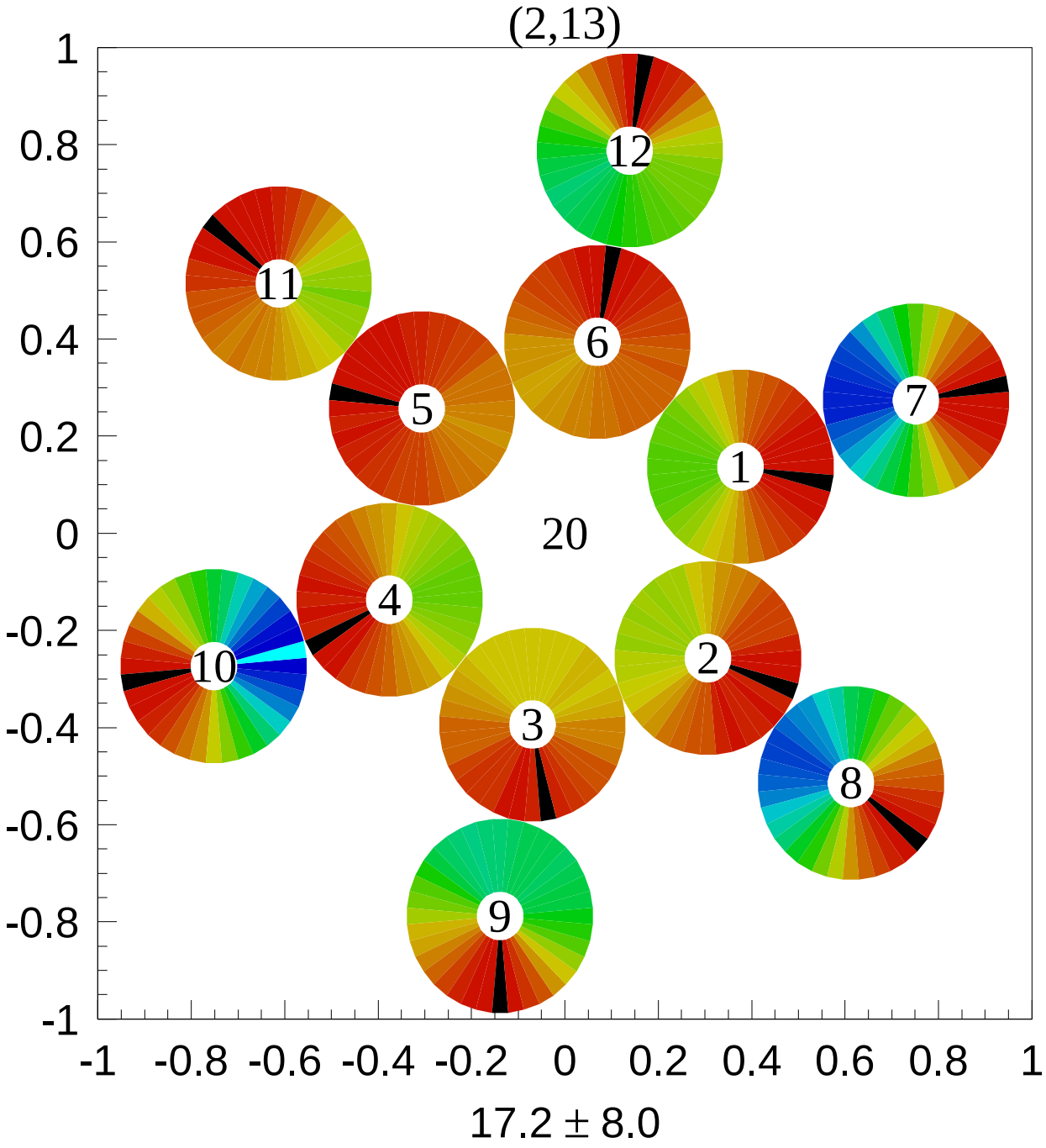

(2,11)
tilted LEDs
118 114 118 122 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 130 124 129 117 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

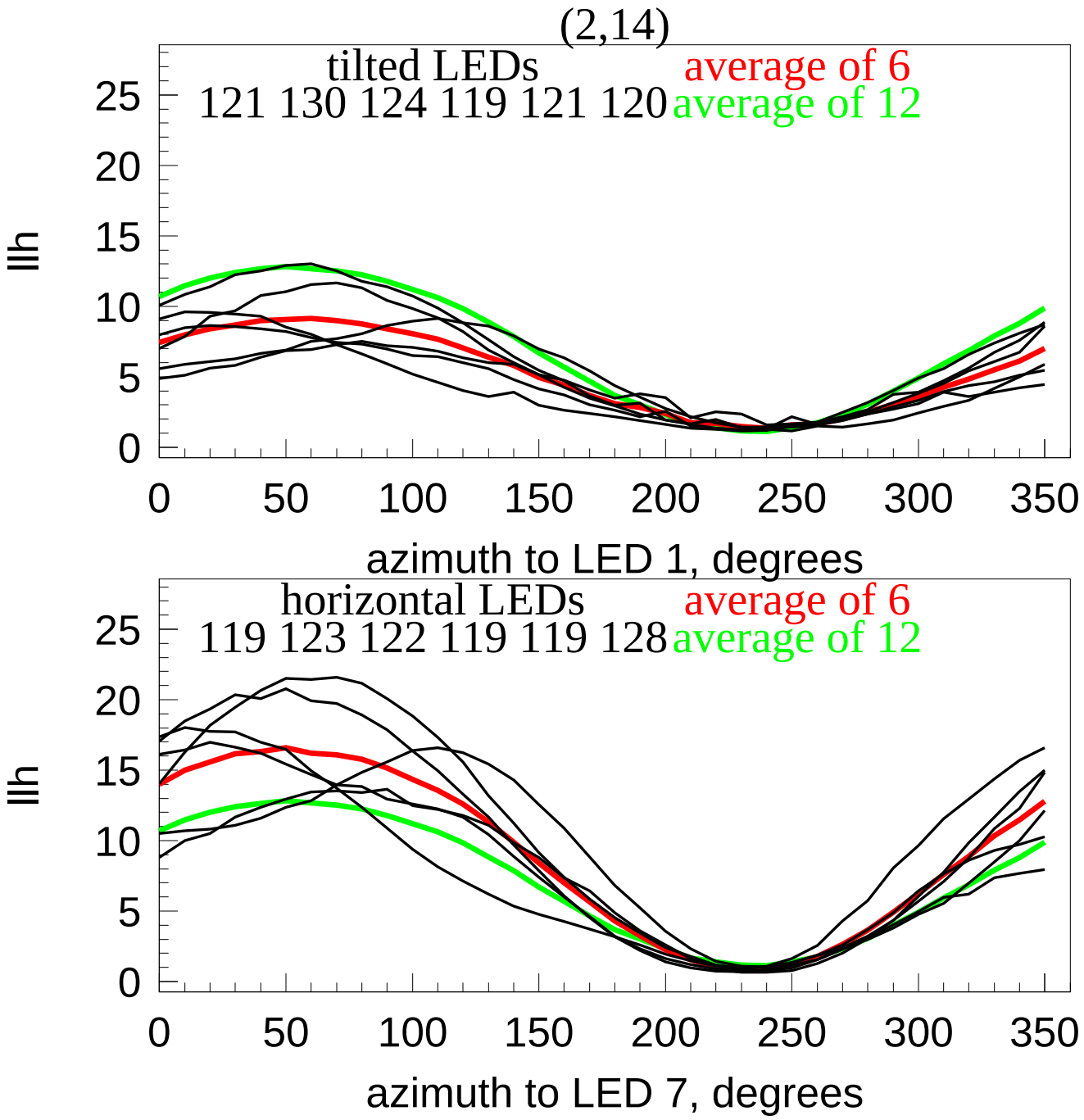

(2,11)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
267.8 ± 16.3

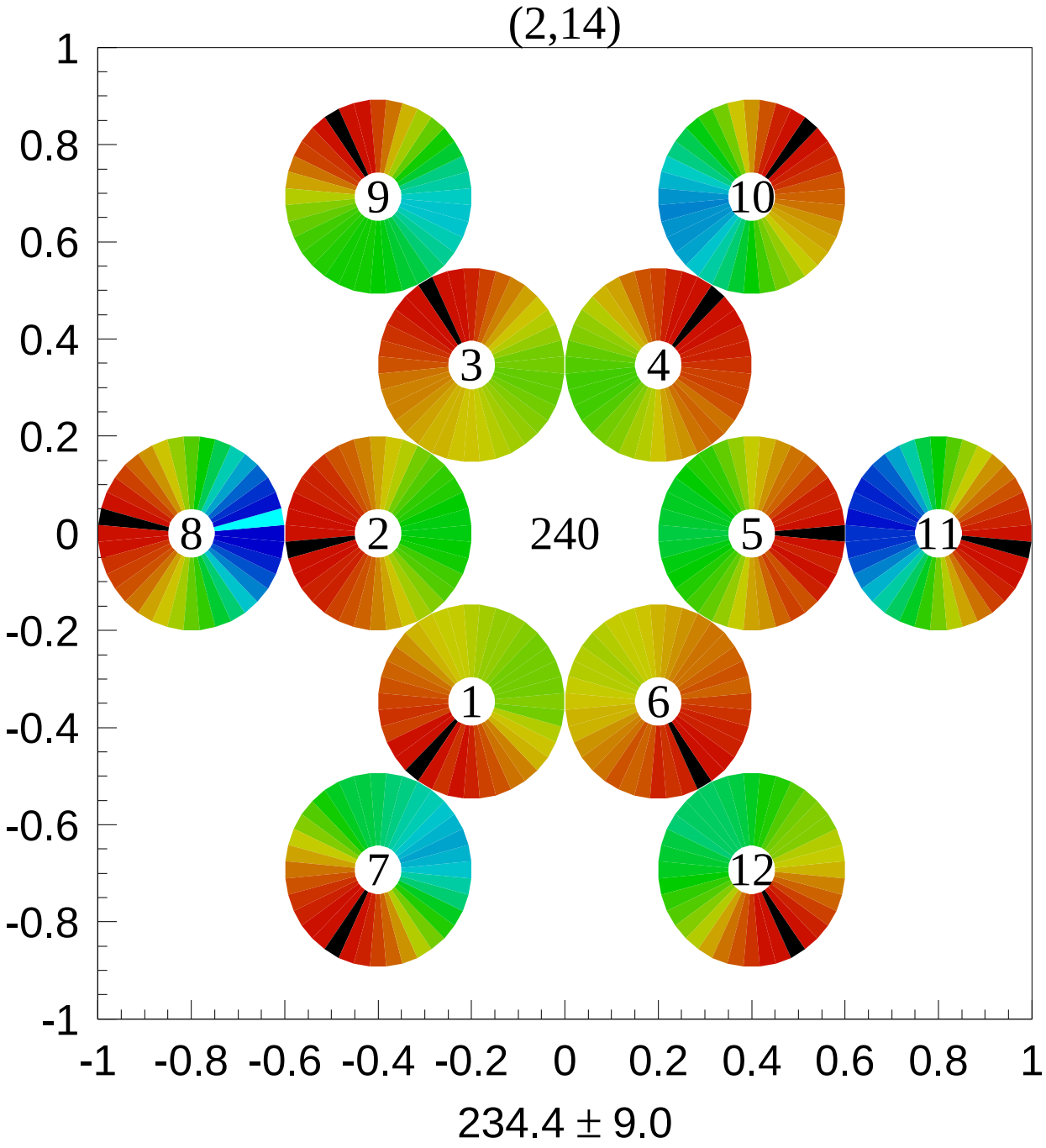

(2,12)
tilted LEDs
121 131 130 118 121 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 127 122 121 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

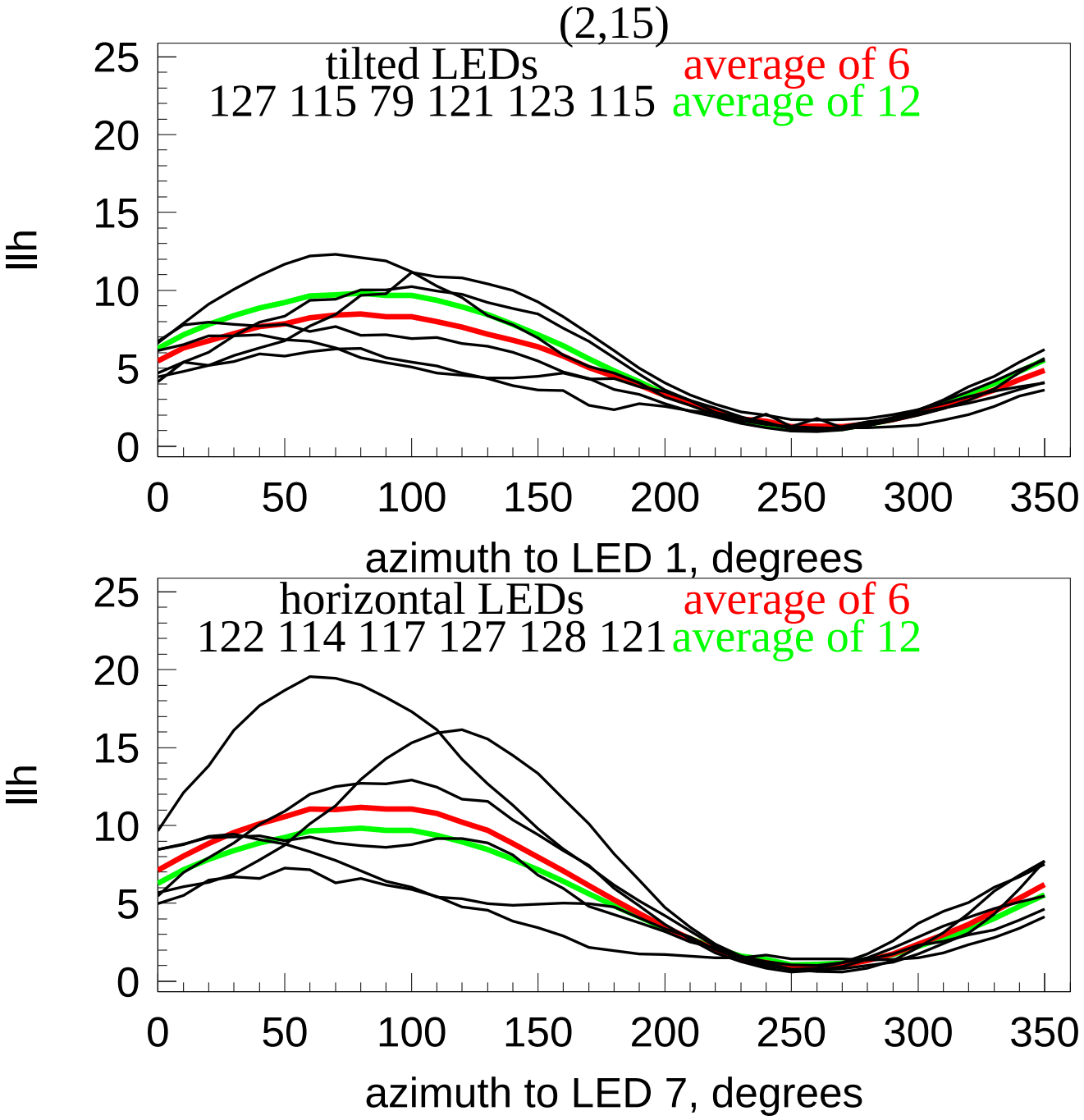

(2,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
253.5 ± 9.2

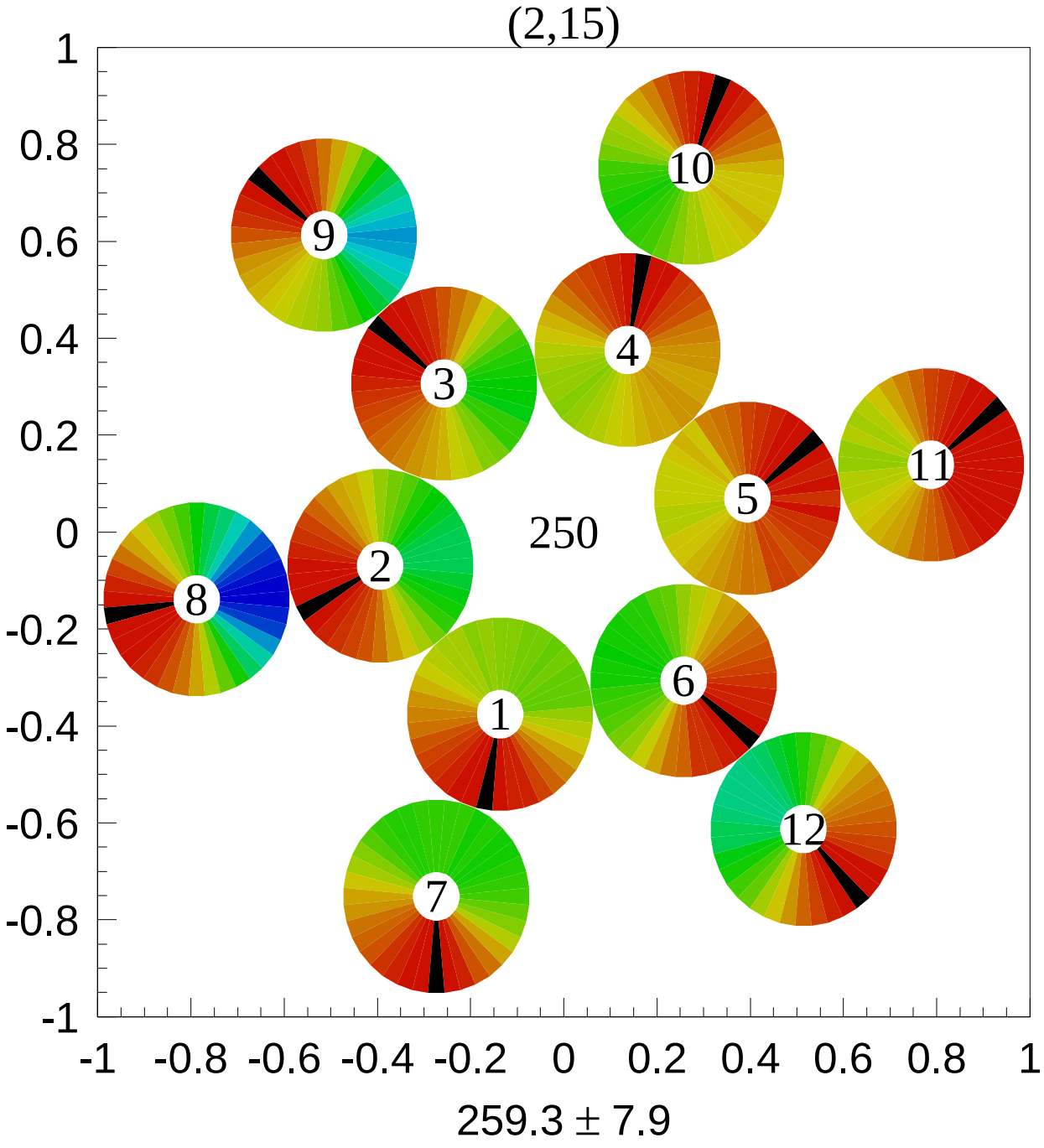

(2,13)
tilted LEDs
123 119 128 120 118 125
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 116 118 121 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

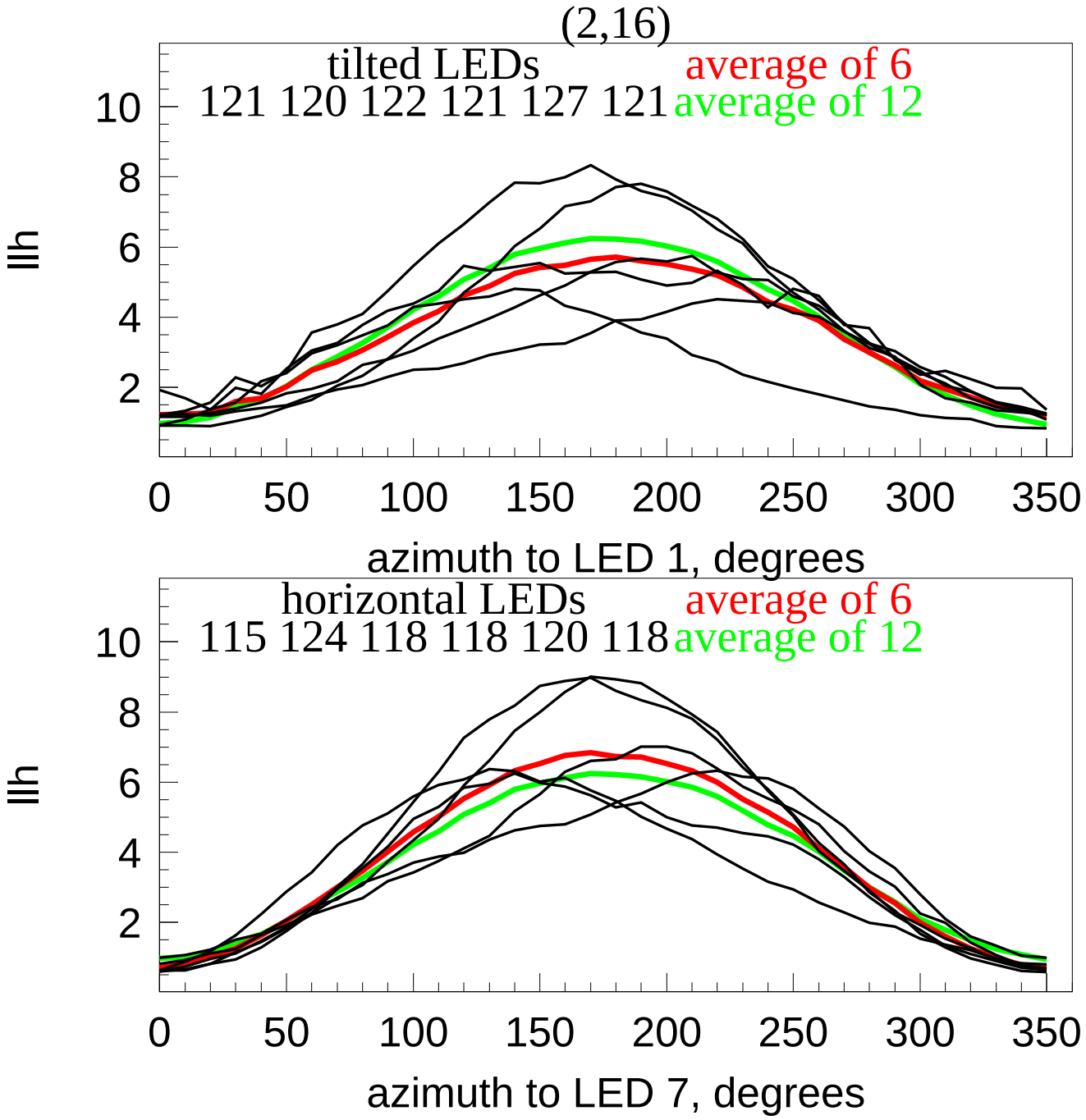

(2,13)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
17.2 ± 8.0

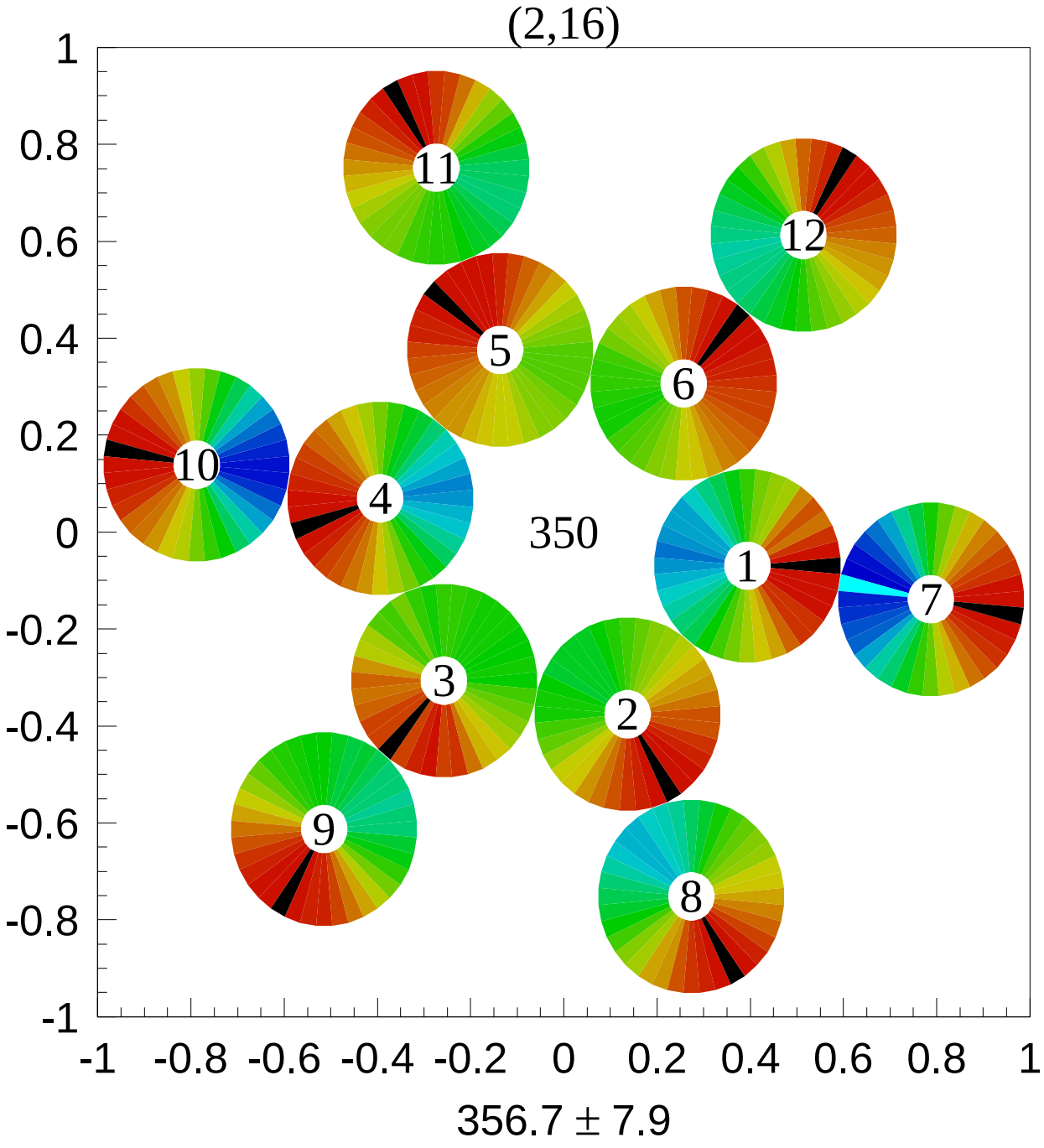

(2,14)
tilted LEDs
121 130 124 119 121 120
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 123 122 119 119 128
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

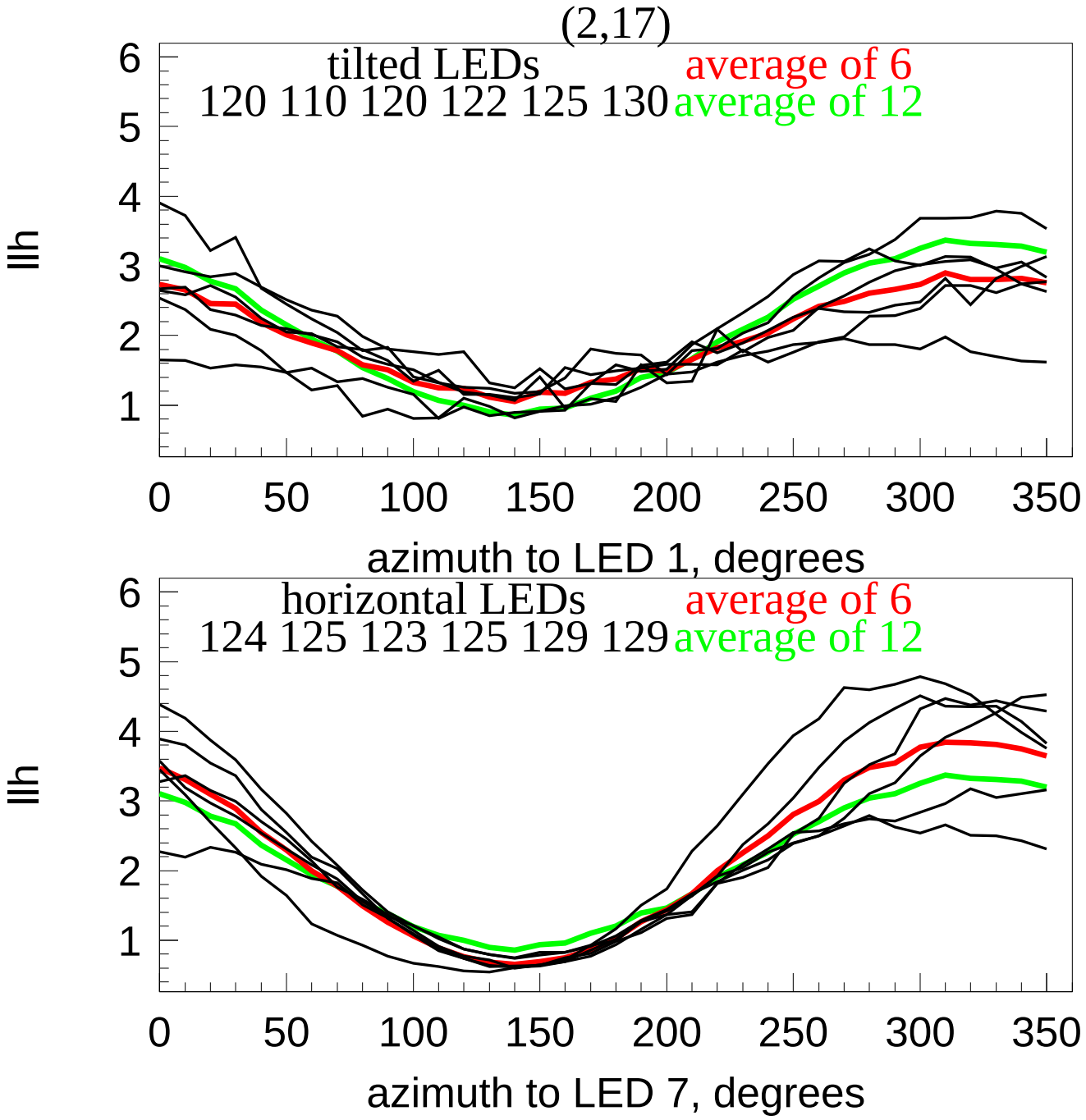

(2,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
234.4 ± 9.0

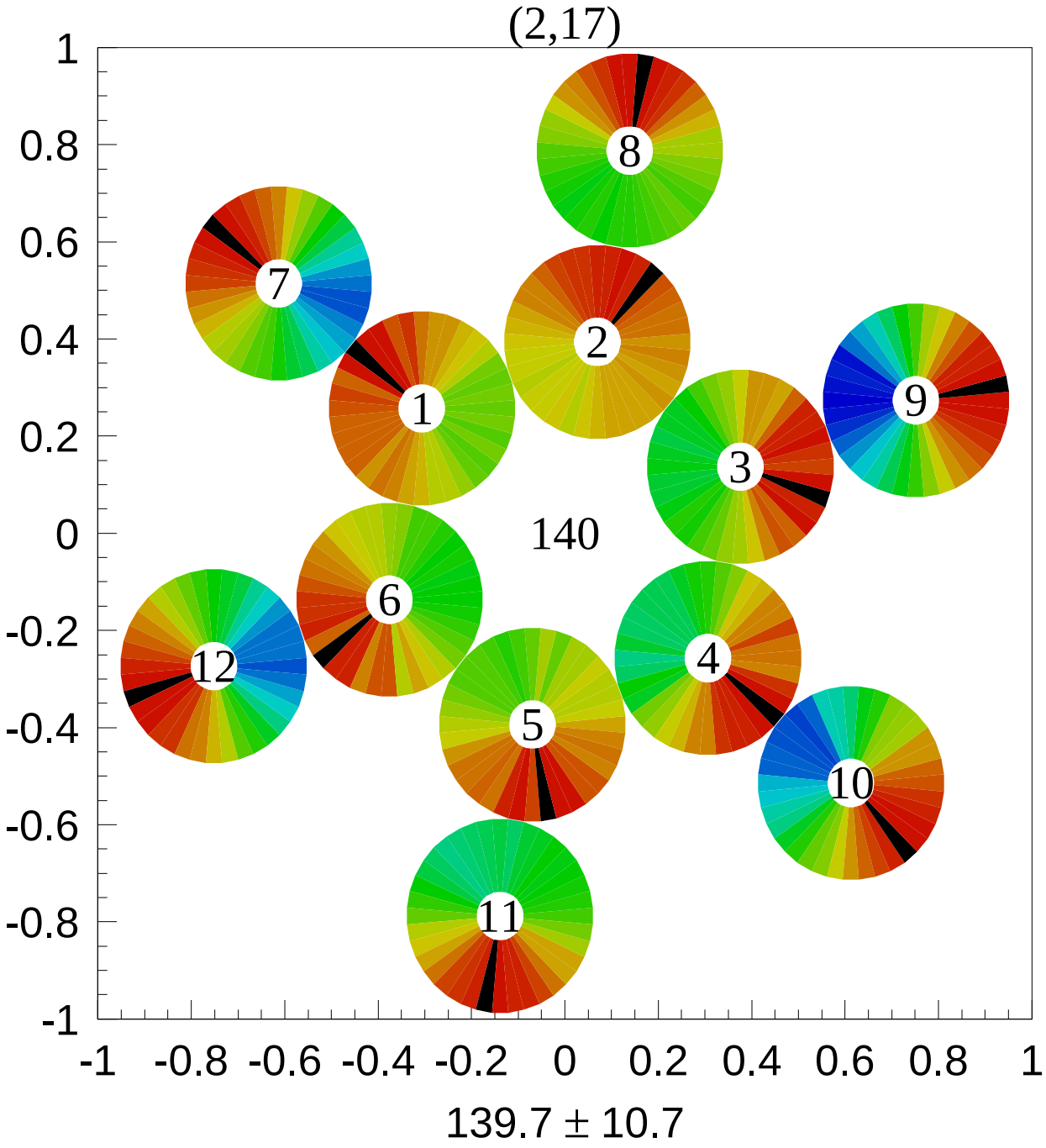

(2,15)
tilted LEDs
127 115 79 121 123 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 114 117 127 128 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

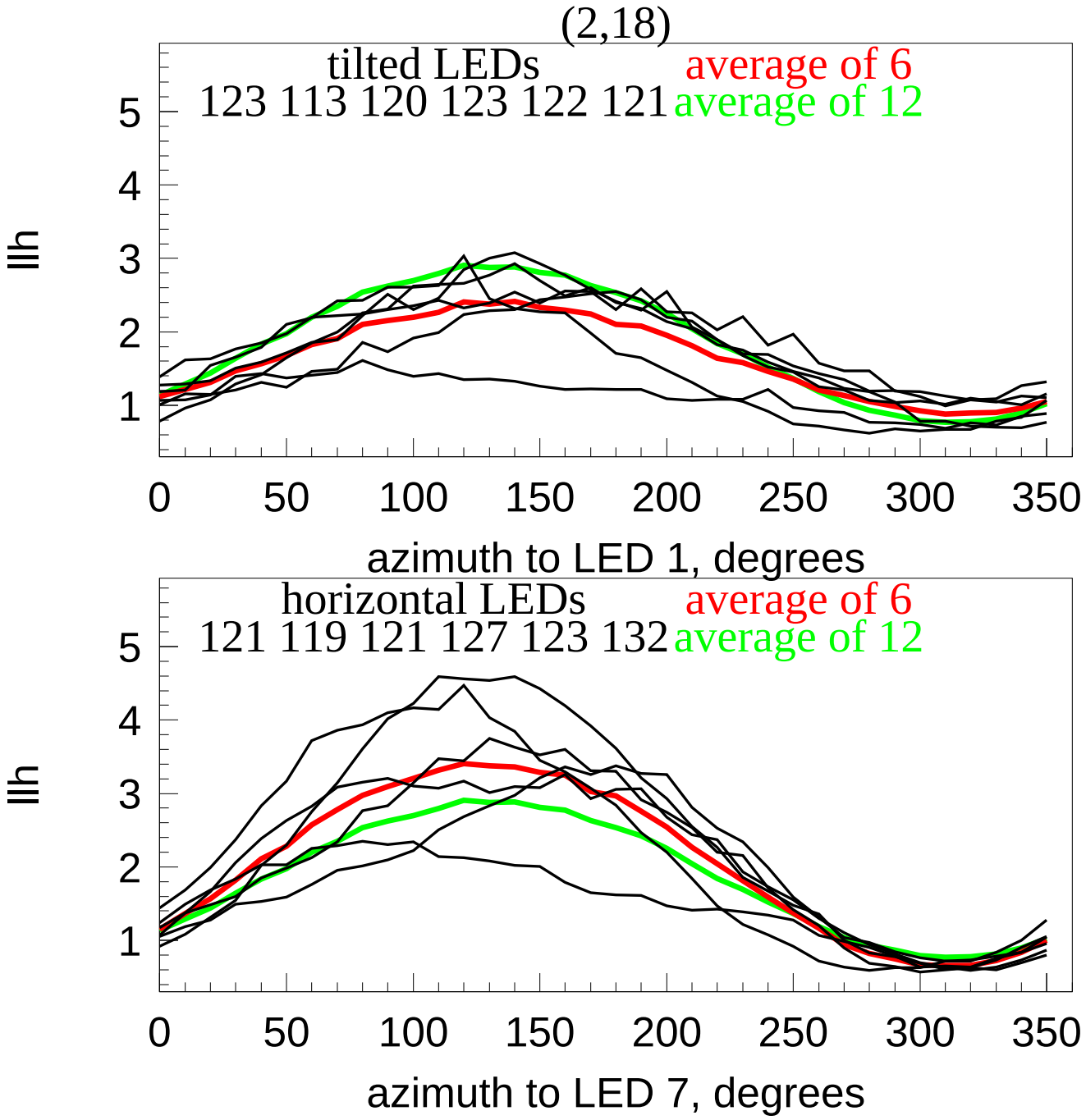

(2,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
259.3 ± 7.9
250
1
2
3
4
5
6
7
8
9
10
11
12

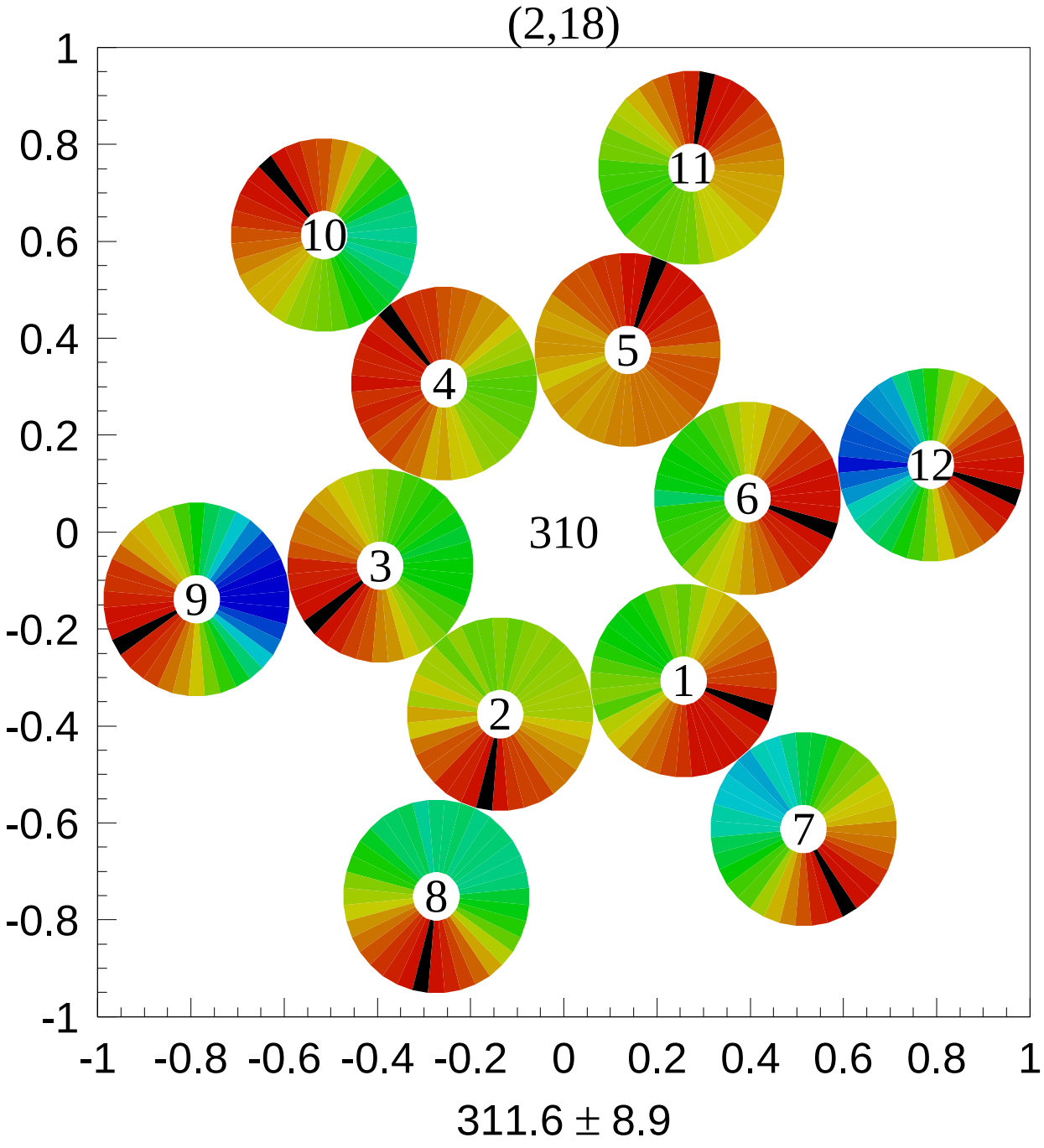

(2,16)
tilted LEDs
121 120 122 121 127 121
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
115 124 118 118 120 118
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

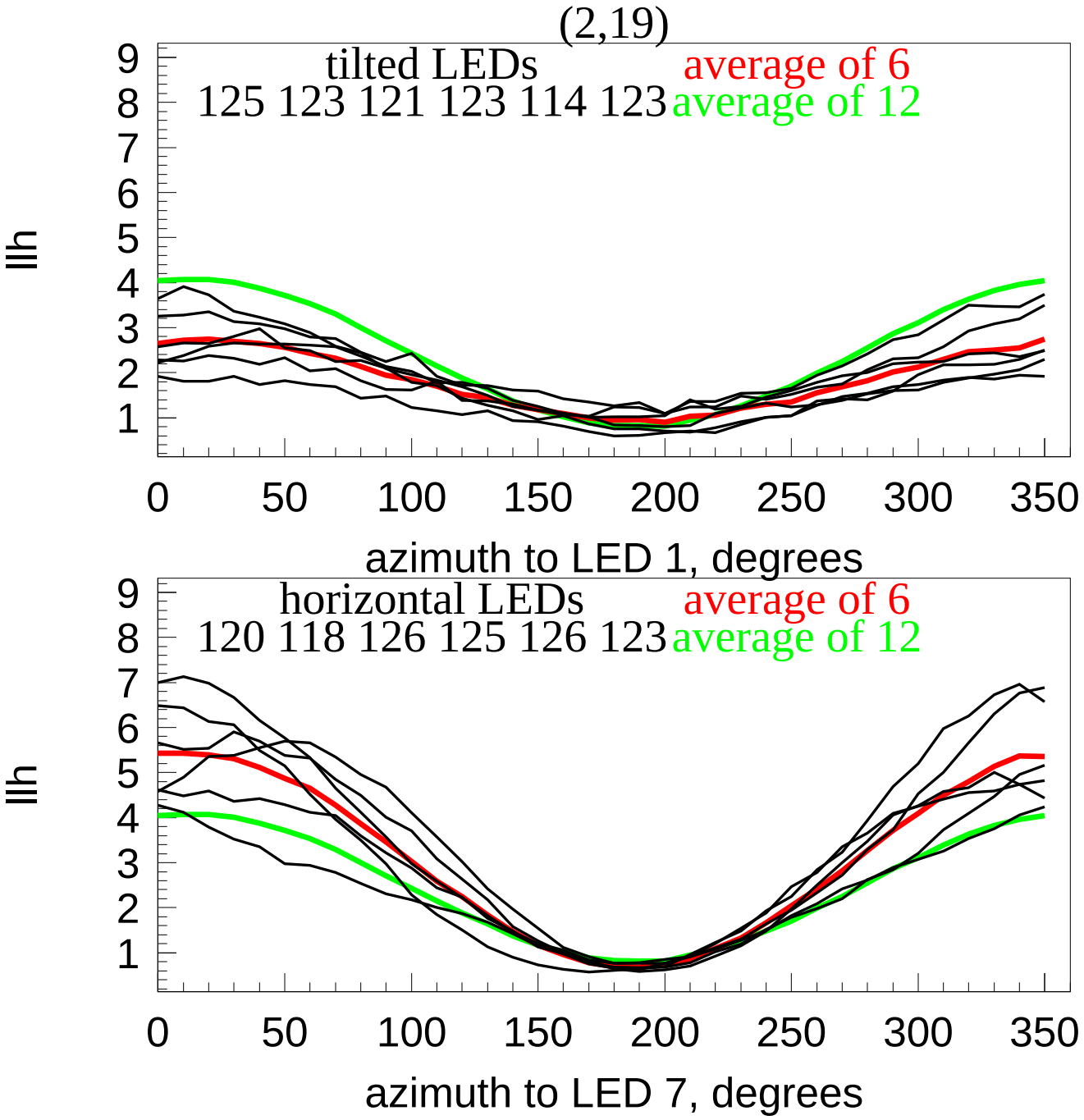

(2,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
356.7 ± 7.9

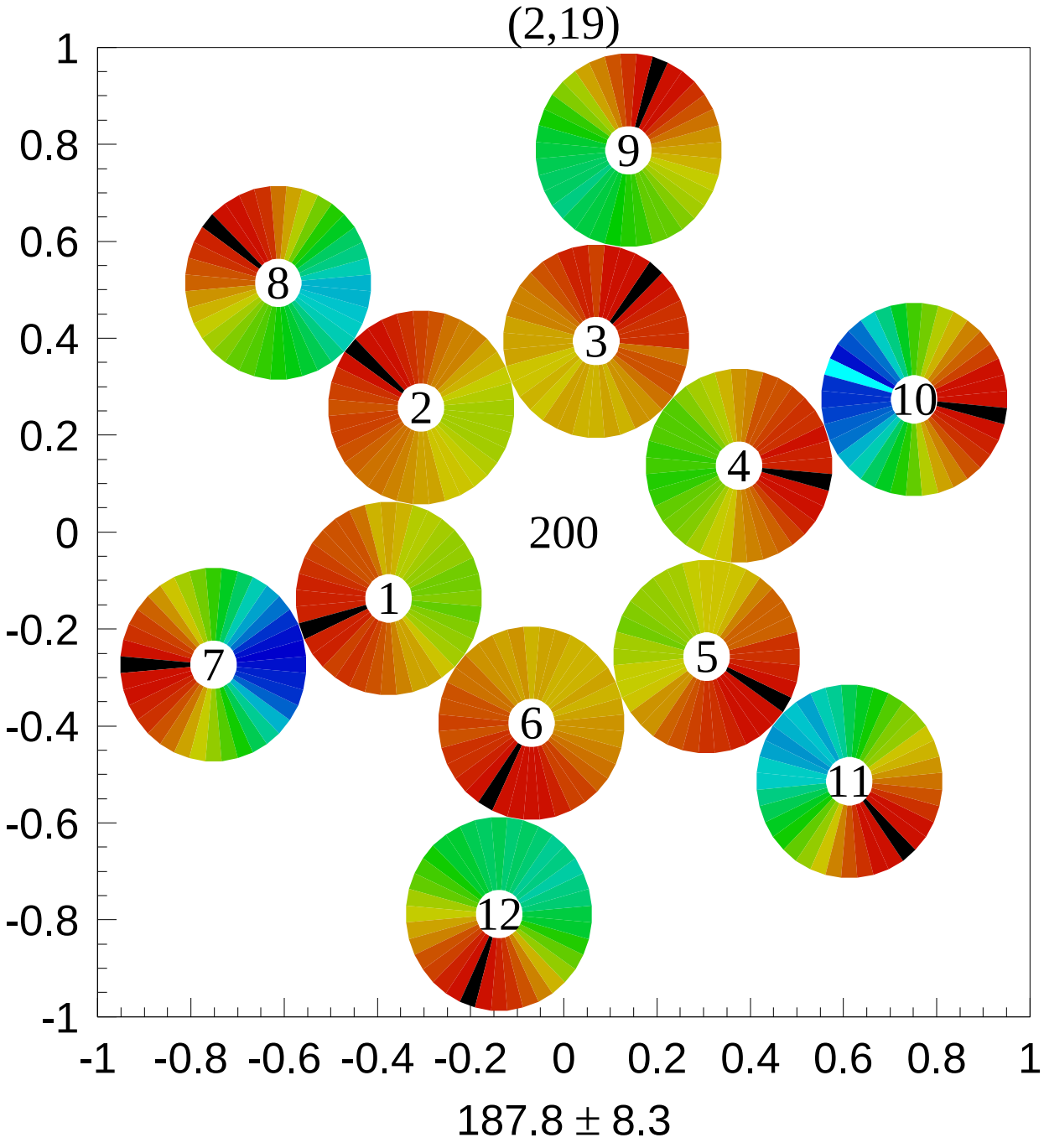

(2,17)
tilted LEDs
120 110 120 122 125 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 123 125 129 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

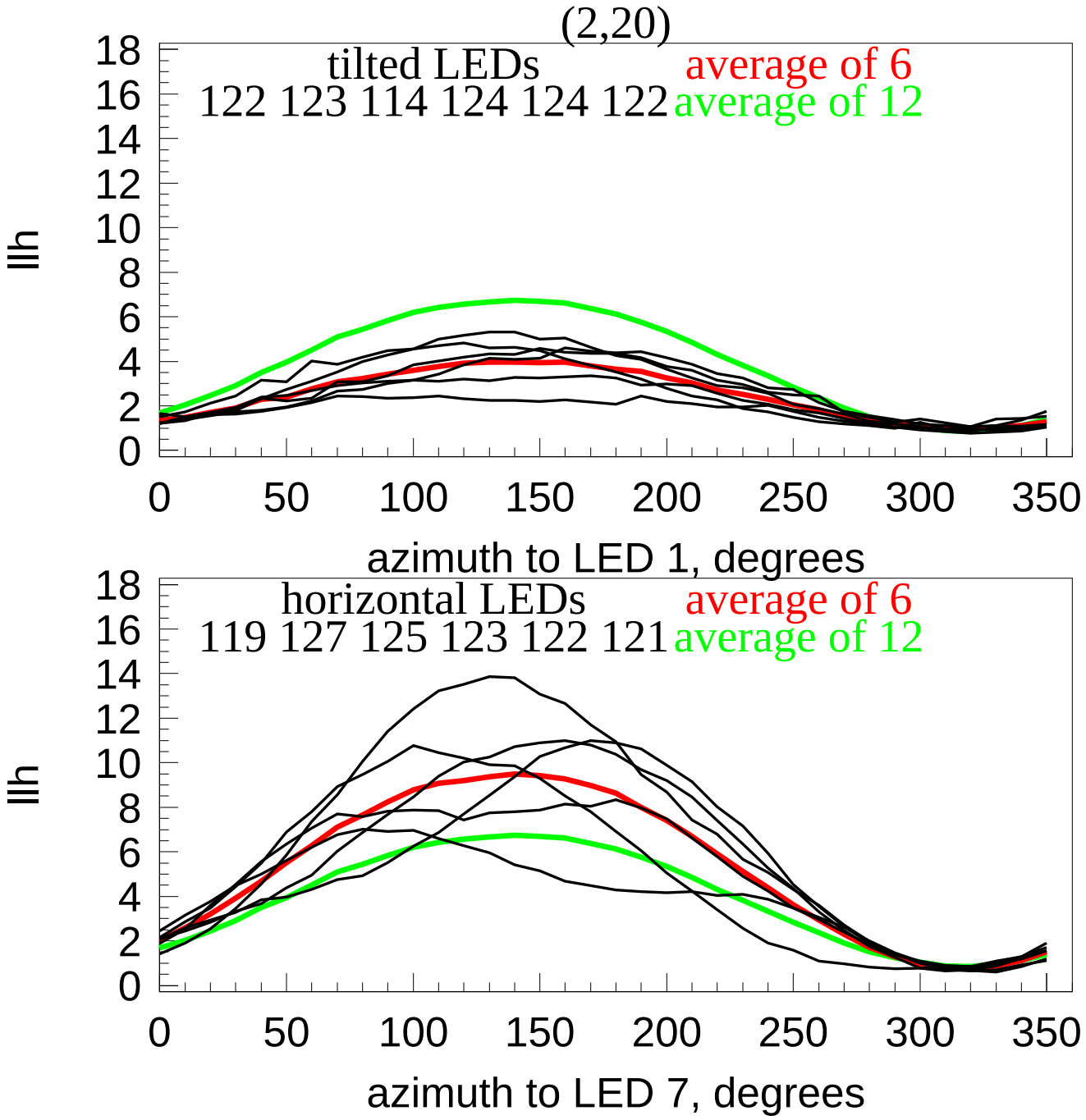

(2,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
139.7 ± 10.7

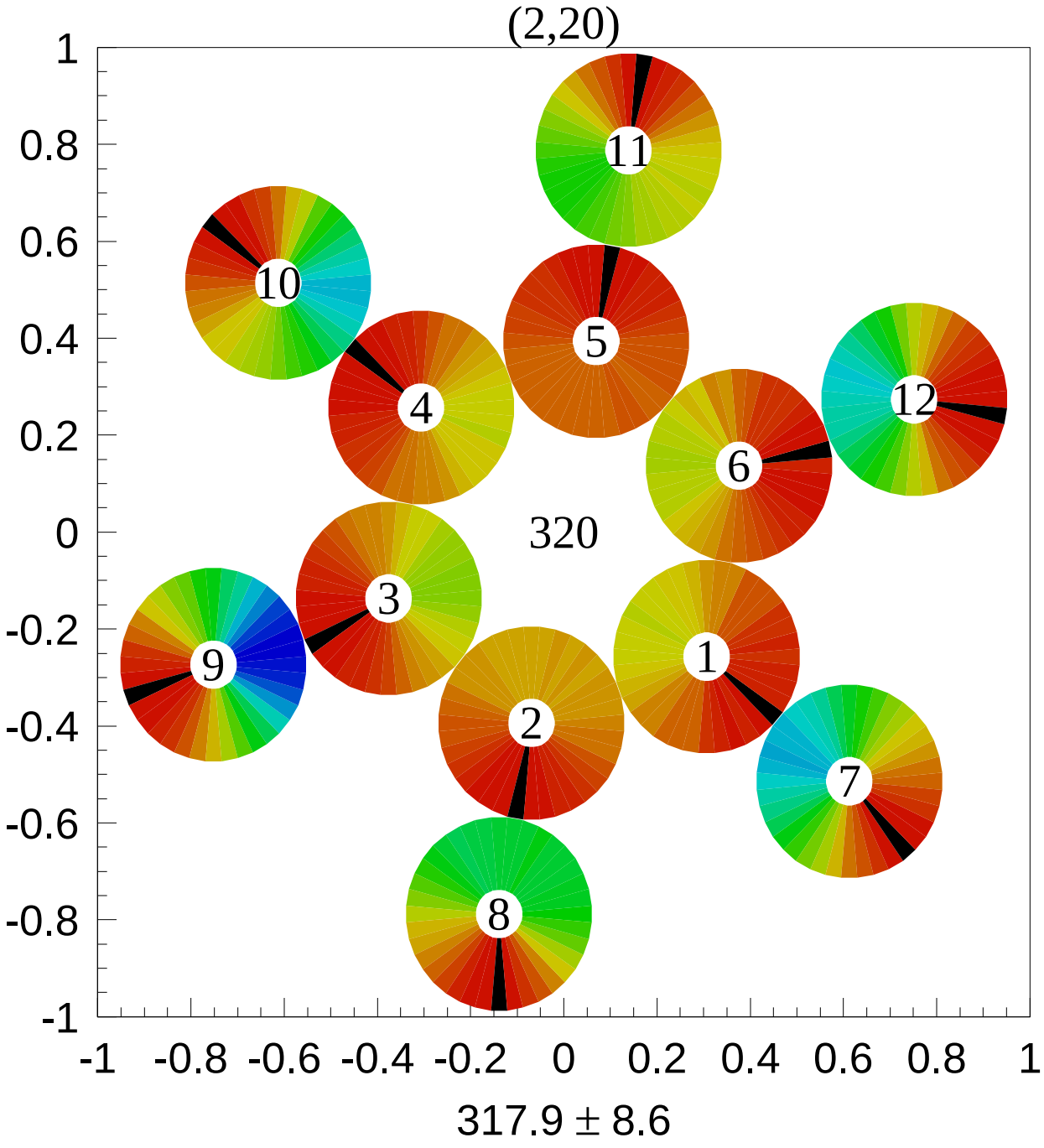

(2,18)
tilted LEDs
123 113 120 123 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 121 127 123 132
average of 6
average of 12
llh
azimuth to LED 7, degrees

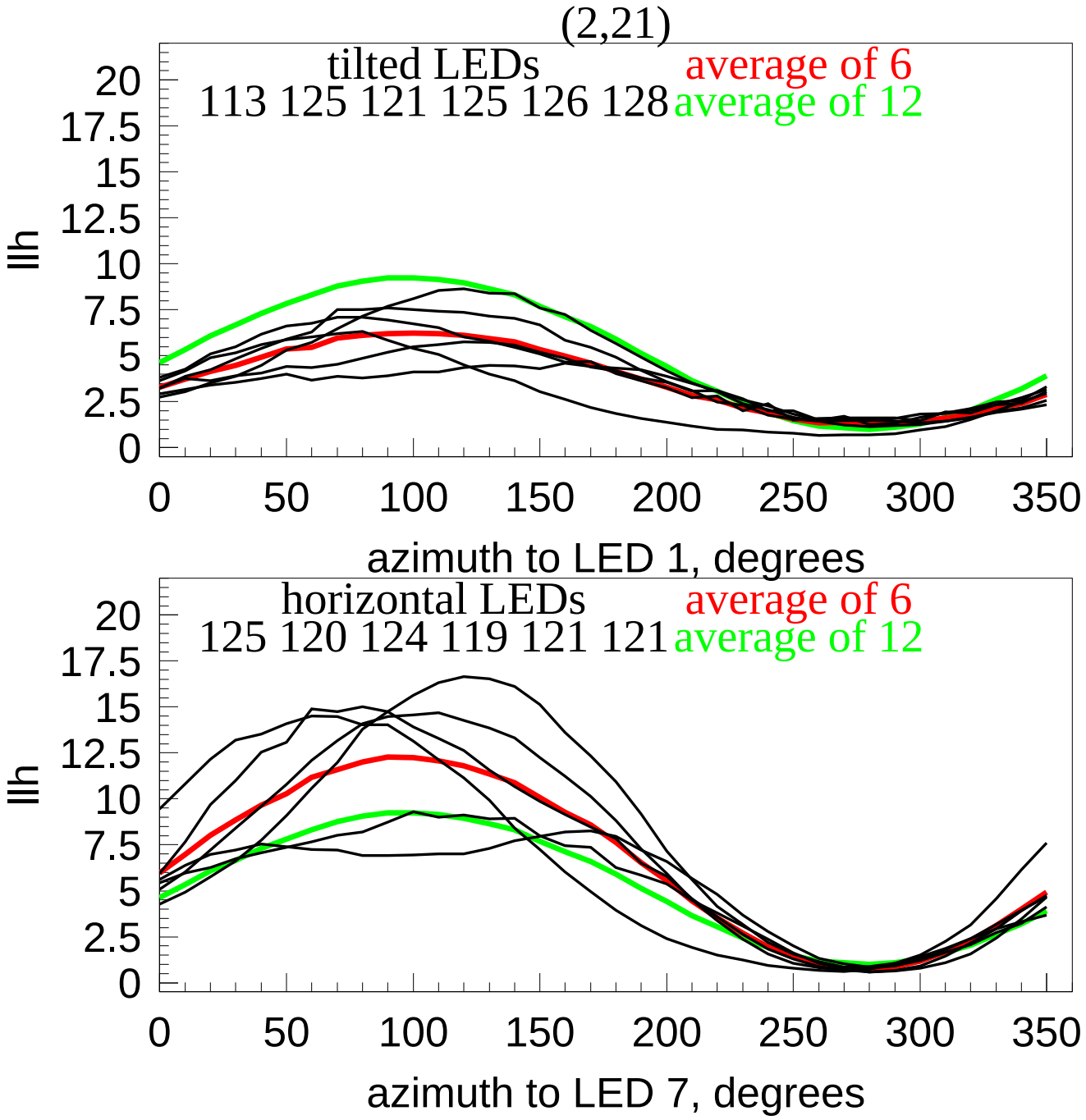

(2,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
311.6 ± 8.9

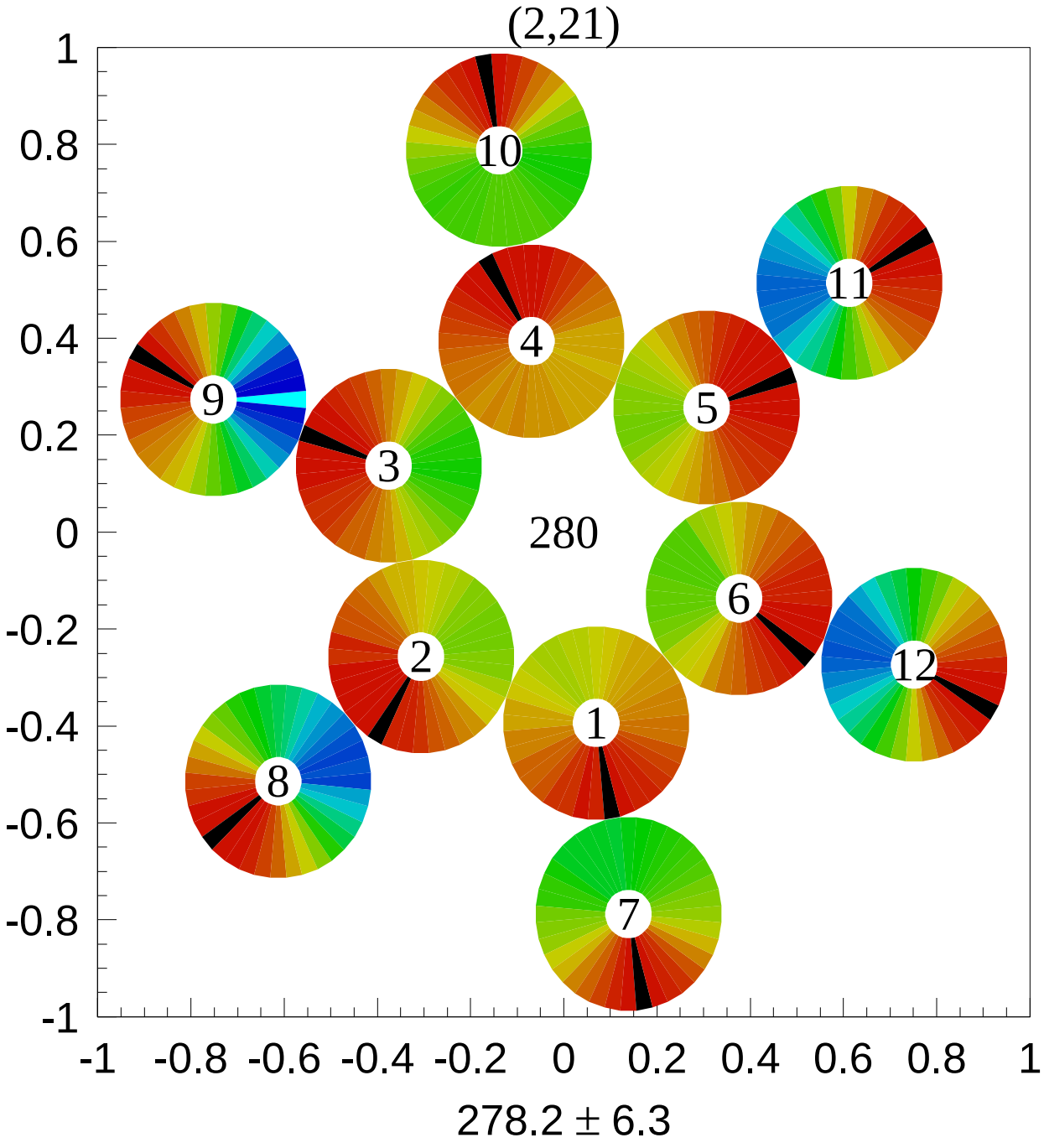

(2,19)
tilted LEDs
125 123 121 123 114 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 118 126 125 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

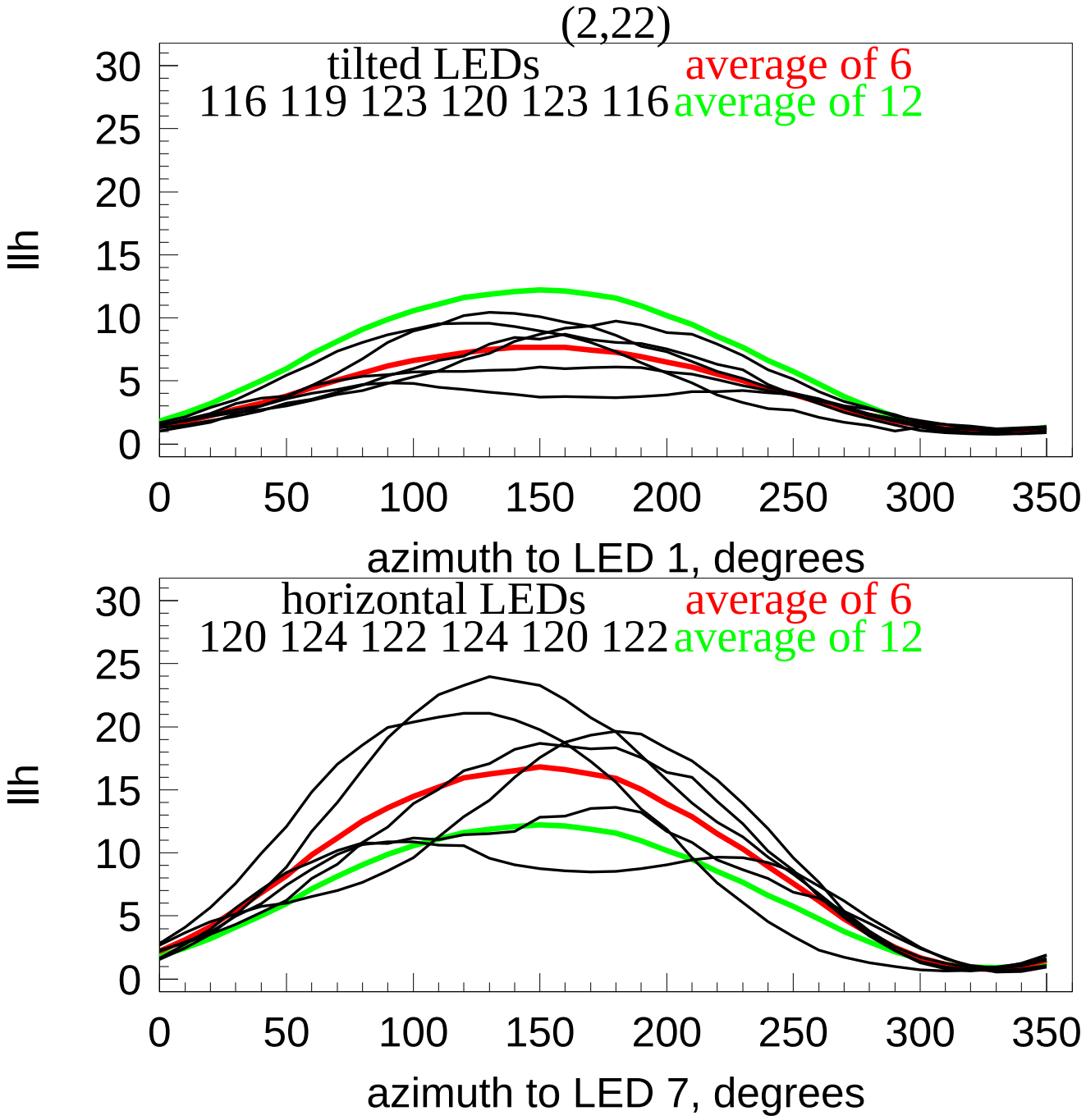

(2,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
187.8 ± 8.3

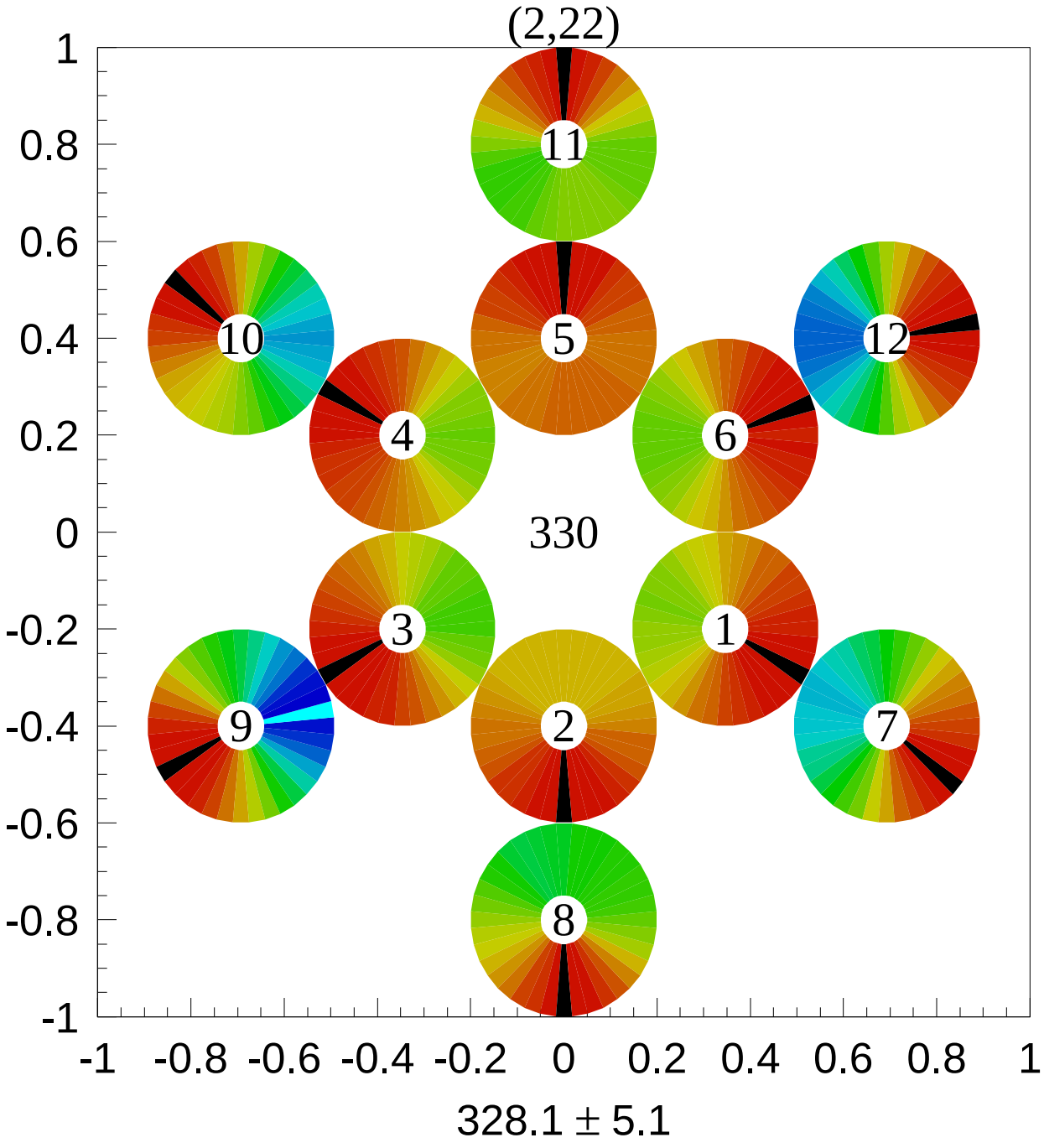

(2,20)
tilted LEDs
122 123 114 124 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 127 125 123 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

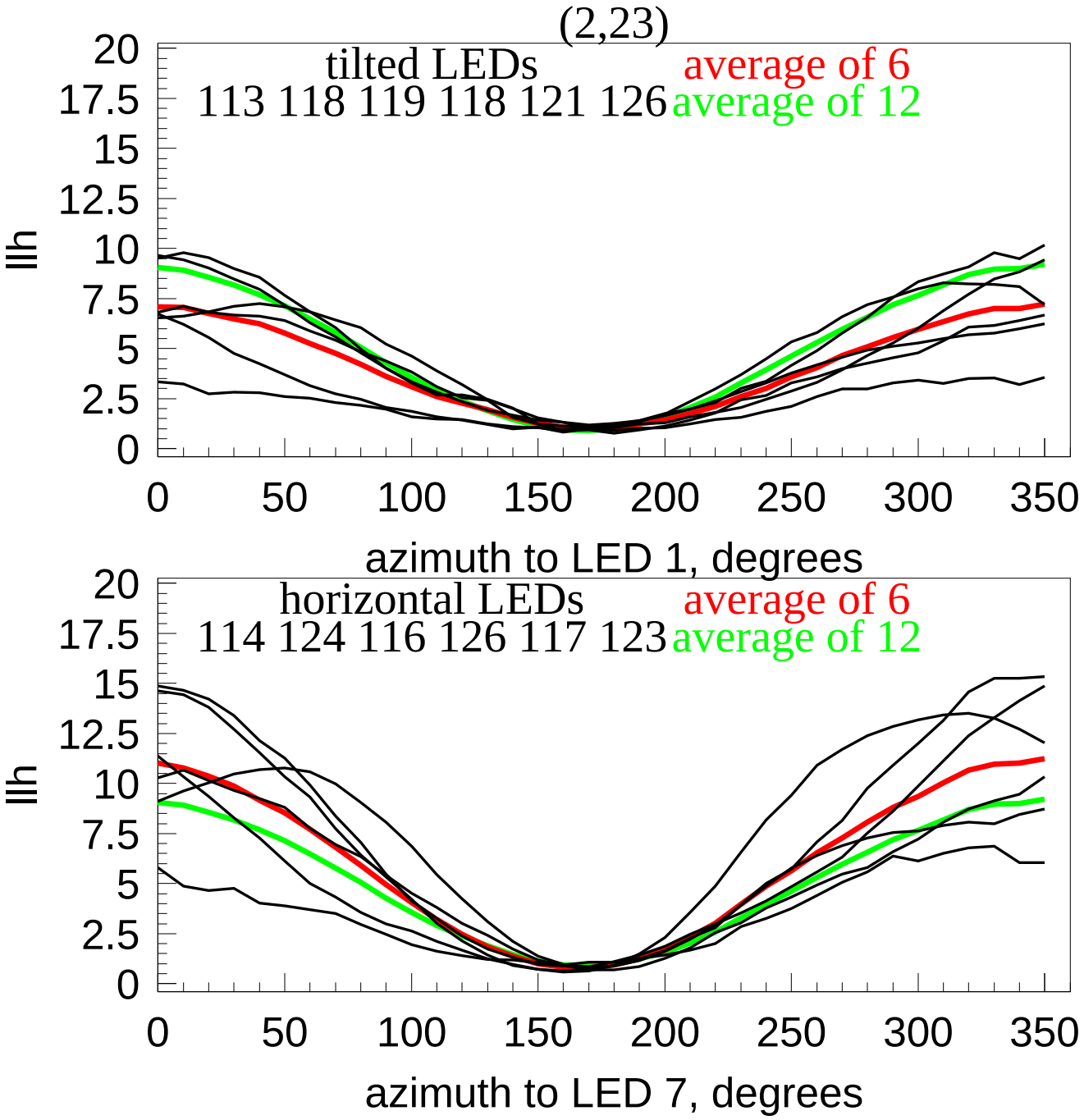

(2,20)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
317.9 ± 8.6

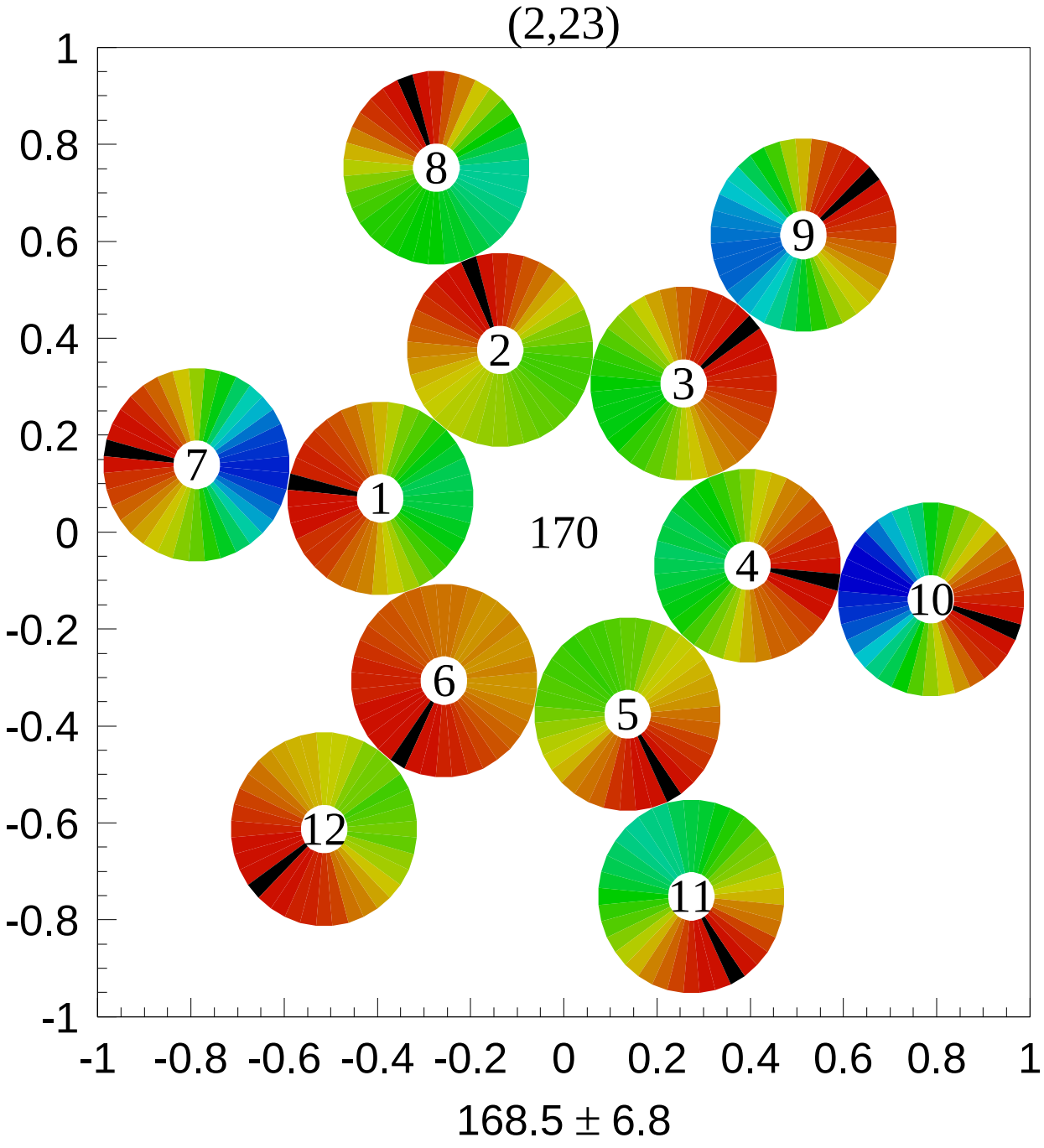

(2,21)
tilted LEDs
113 125 121 125 126 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 124 119 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

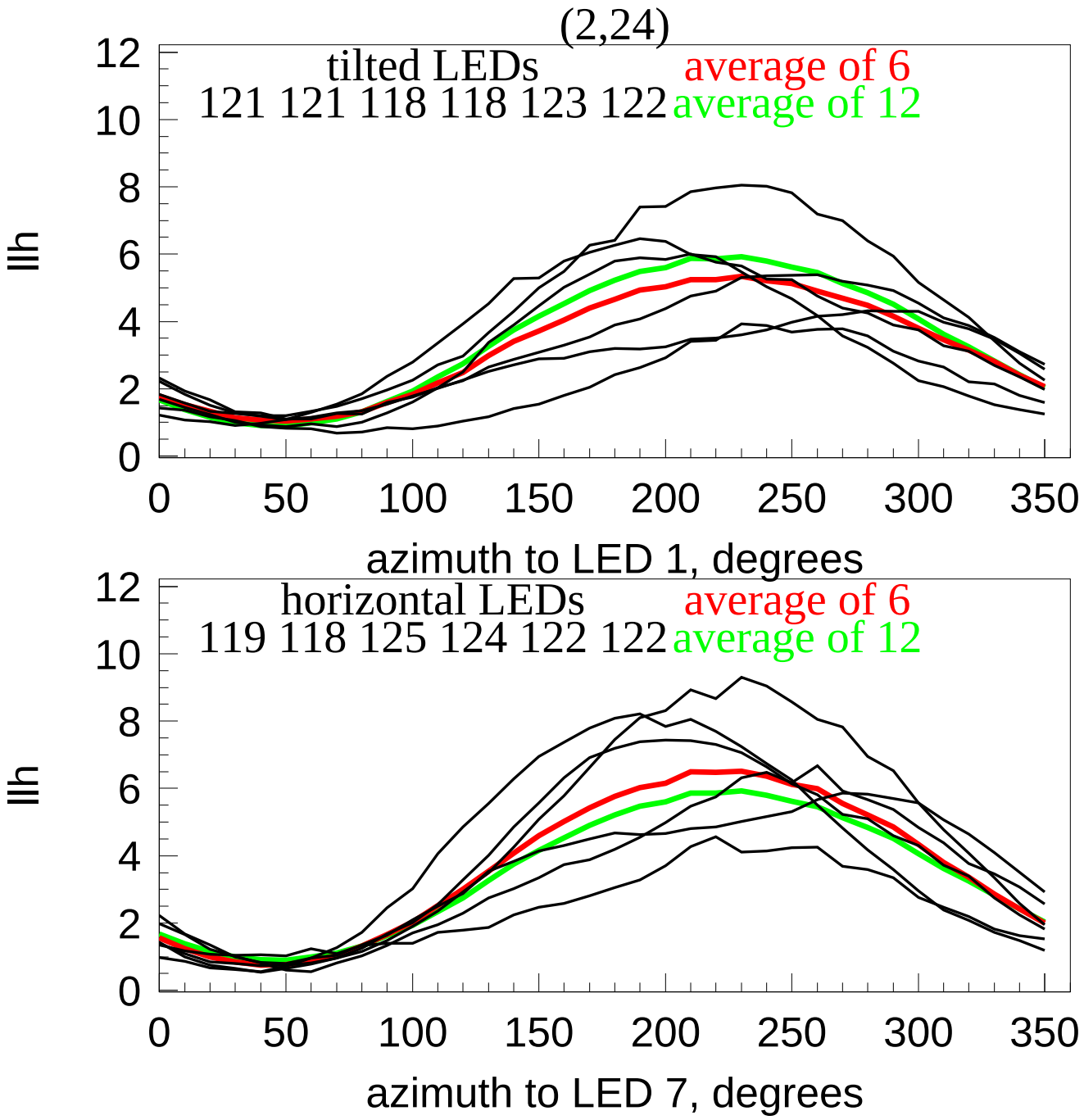

(2,21)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
278.2 ± 6.3

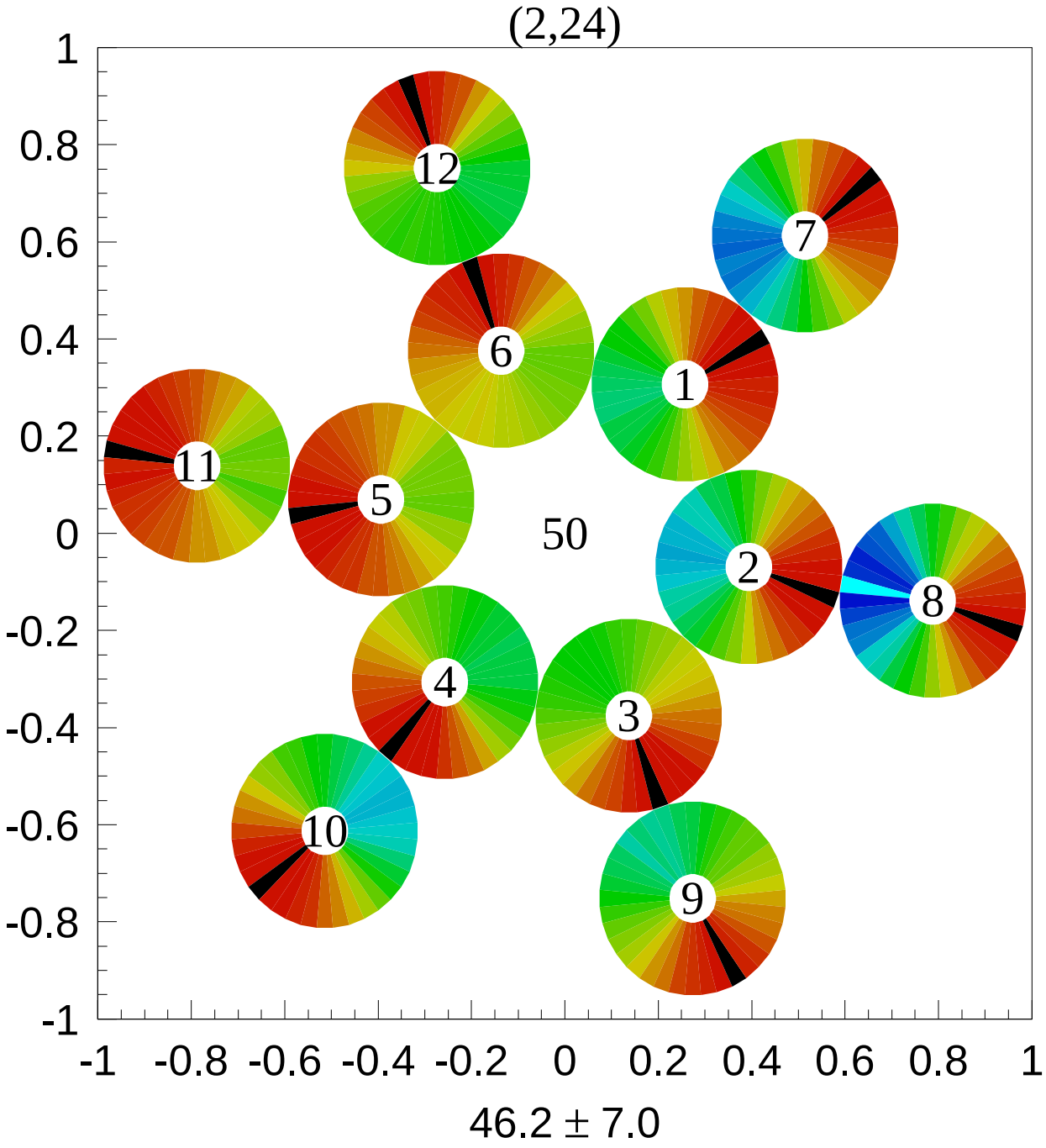

(2,22)
tilted LEDs
116 119 123 120 123 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 124 122 124 120 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

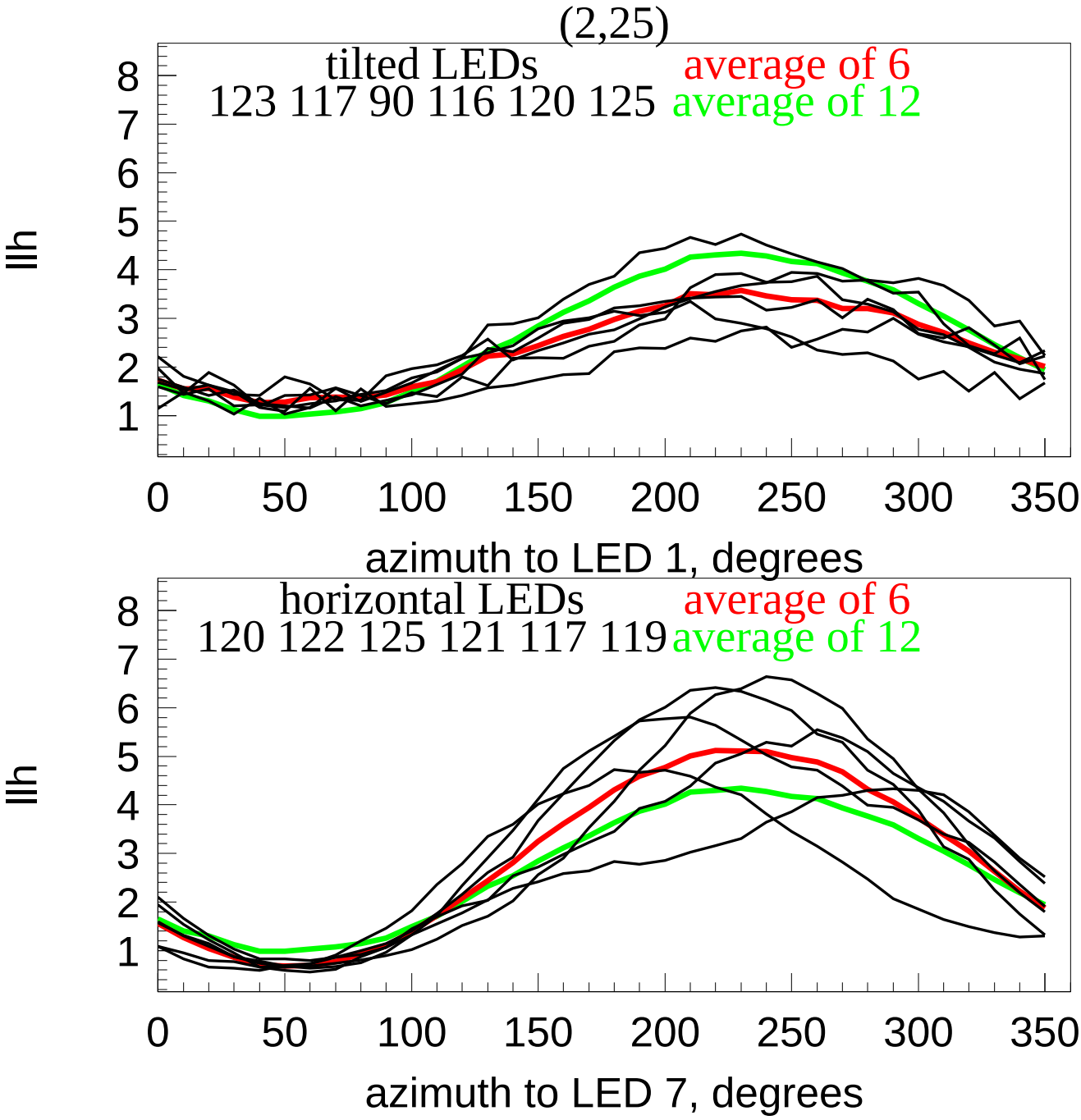

(2,22)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
328.1 ± 5.1

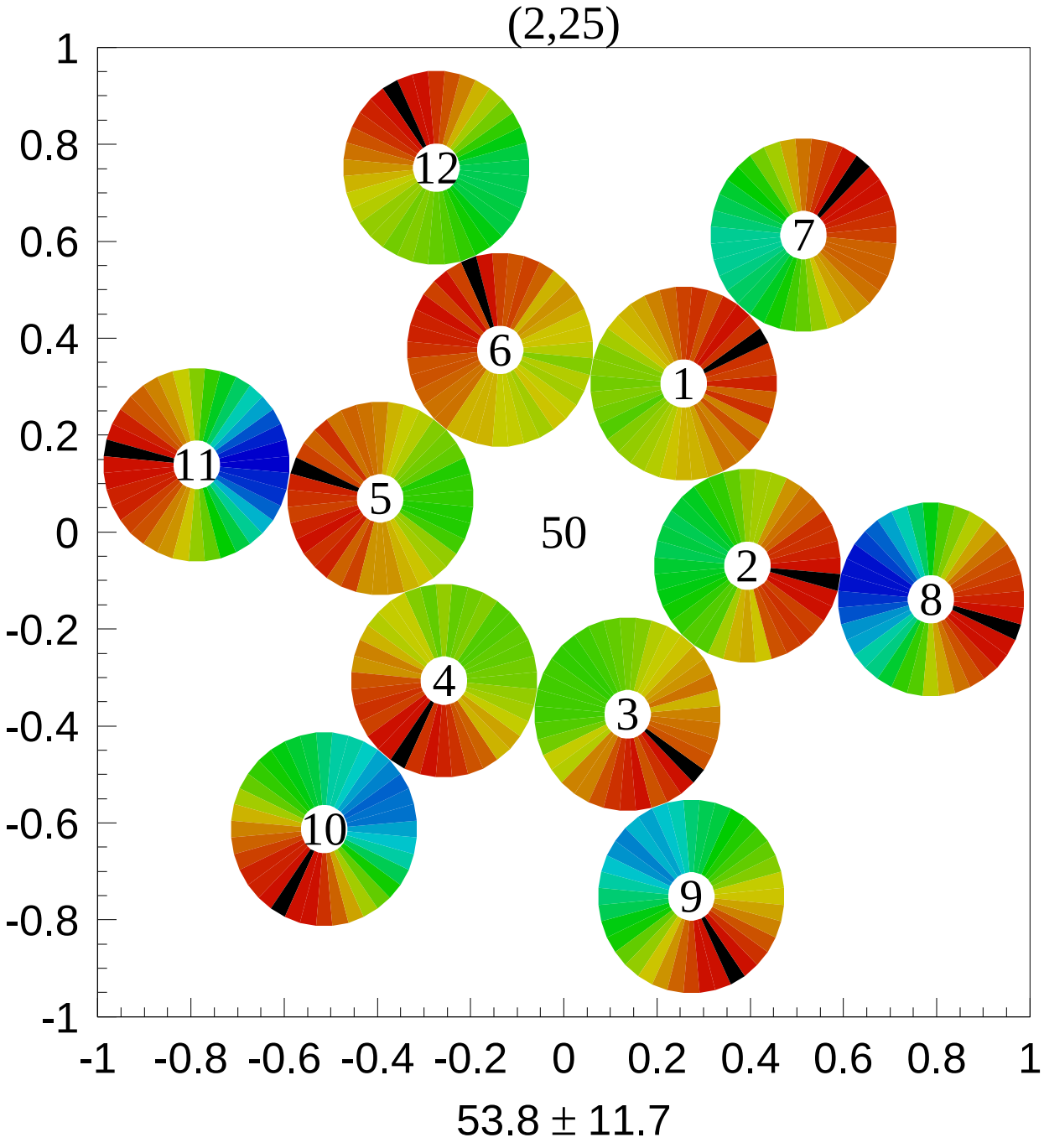

(2,23)
tilted LEDs
113 118 119 118 121 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 124 116 126 117 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

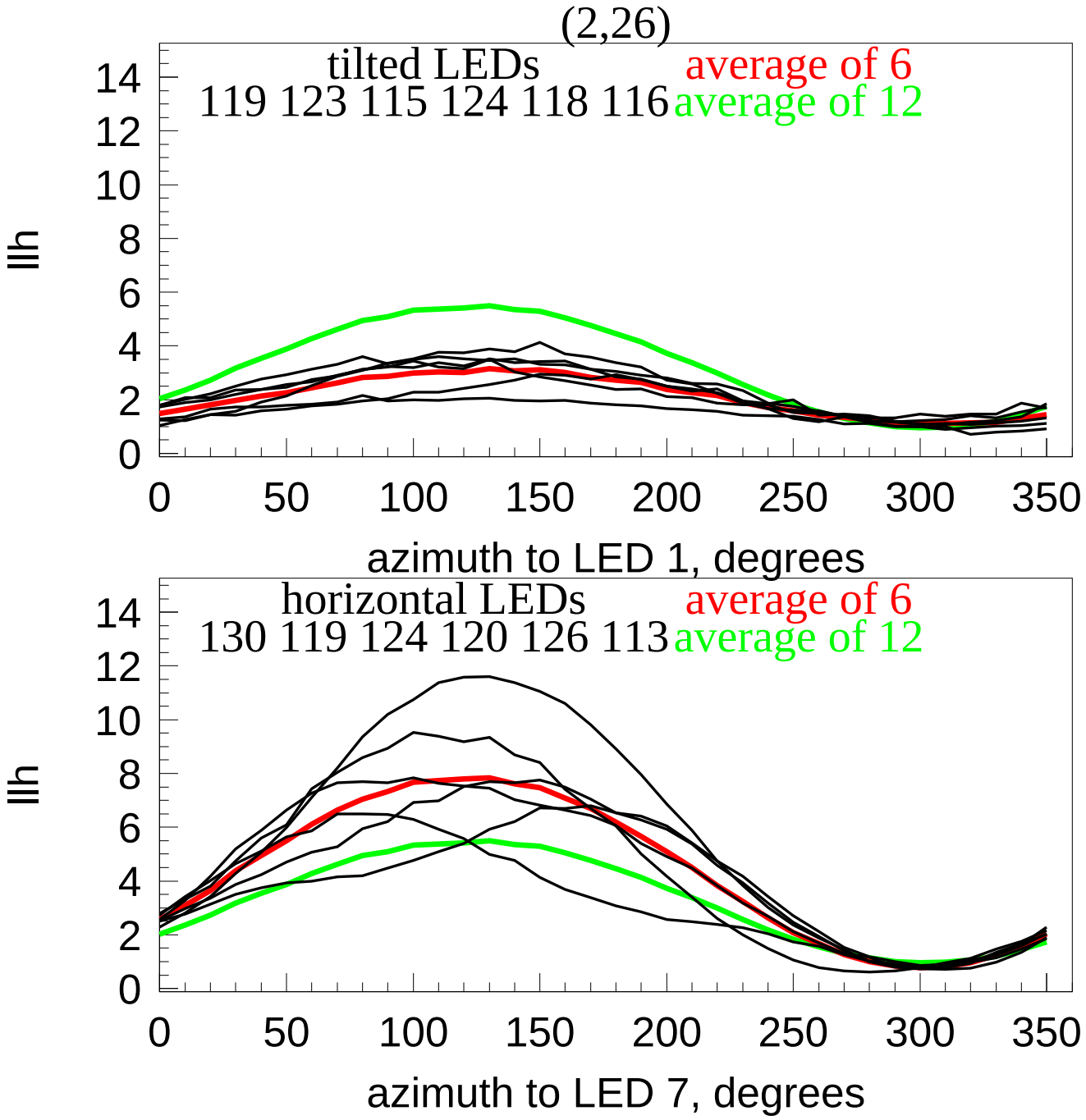

(2,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
168.5 ± 6.8

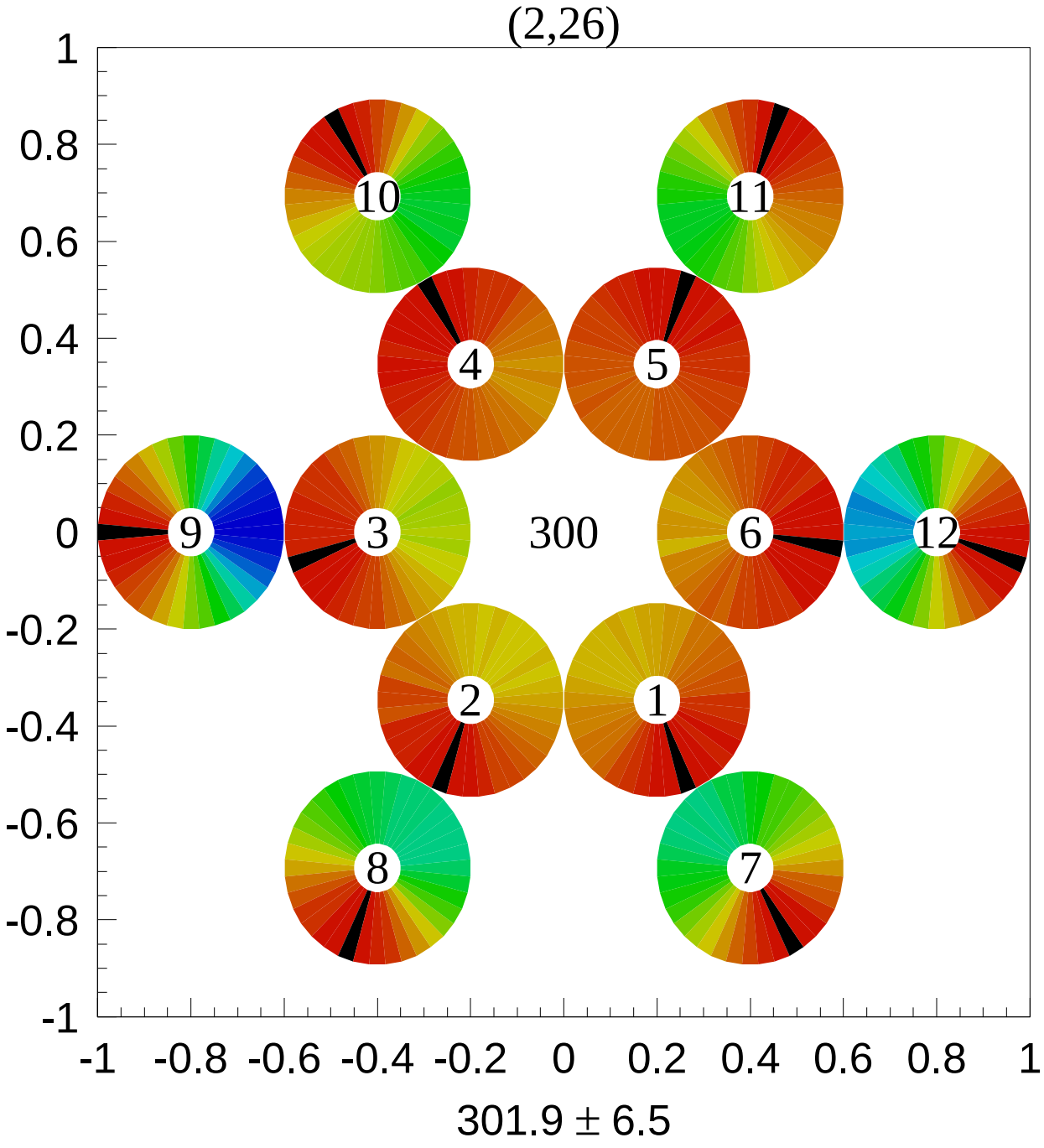

(2,24)
tilted LEDs
121 121 118 118 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 125 124 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

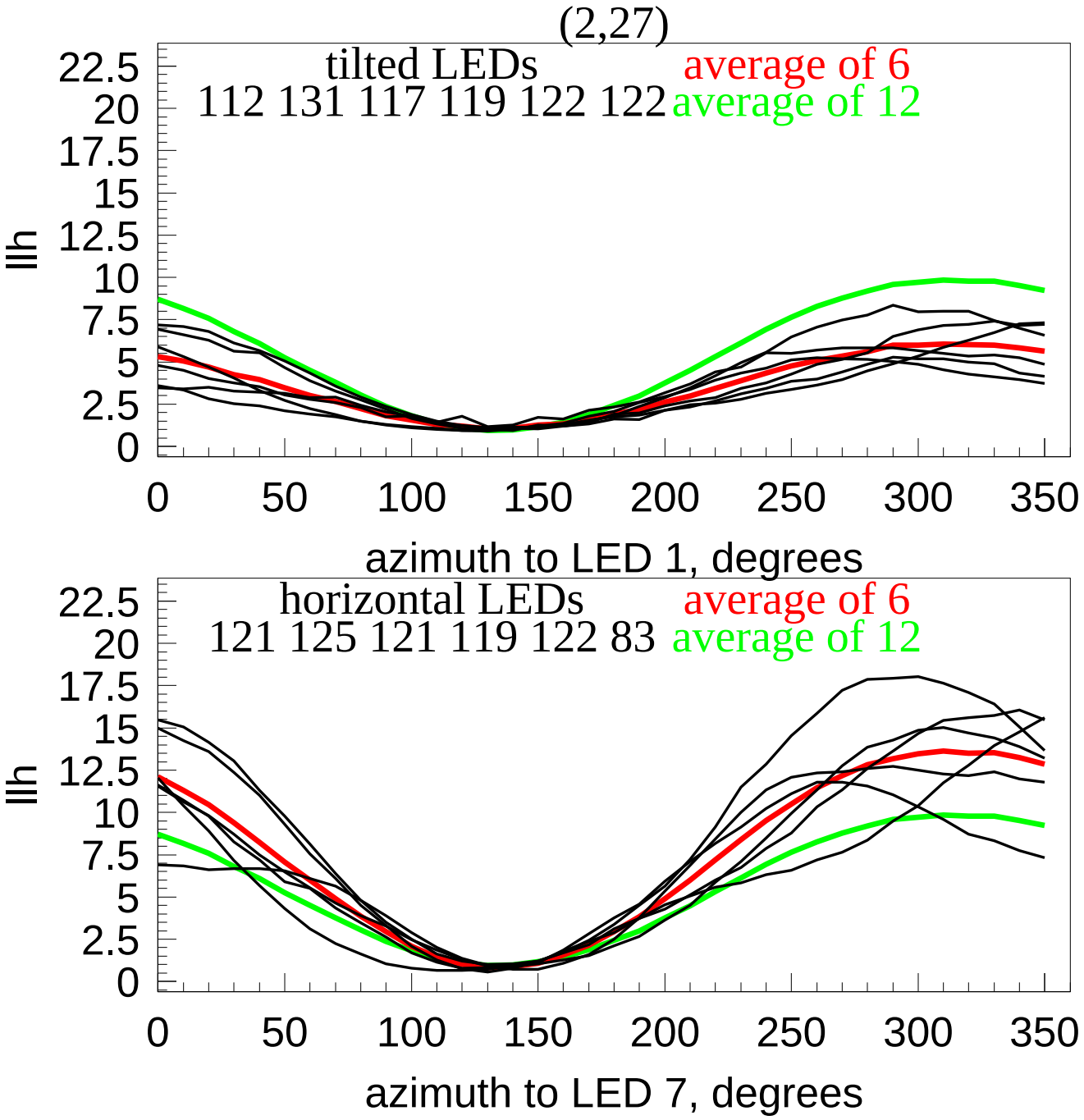

(2,24)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
46.2 ± 7.0

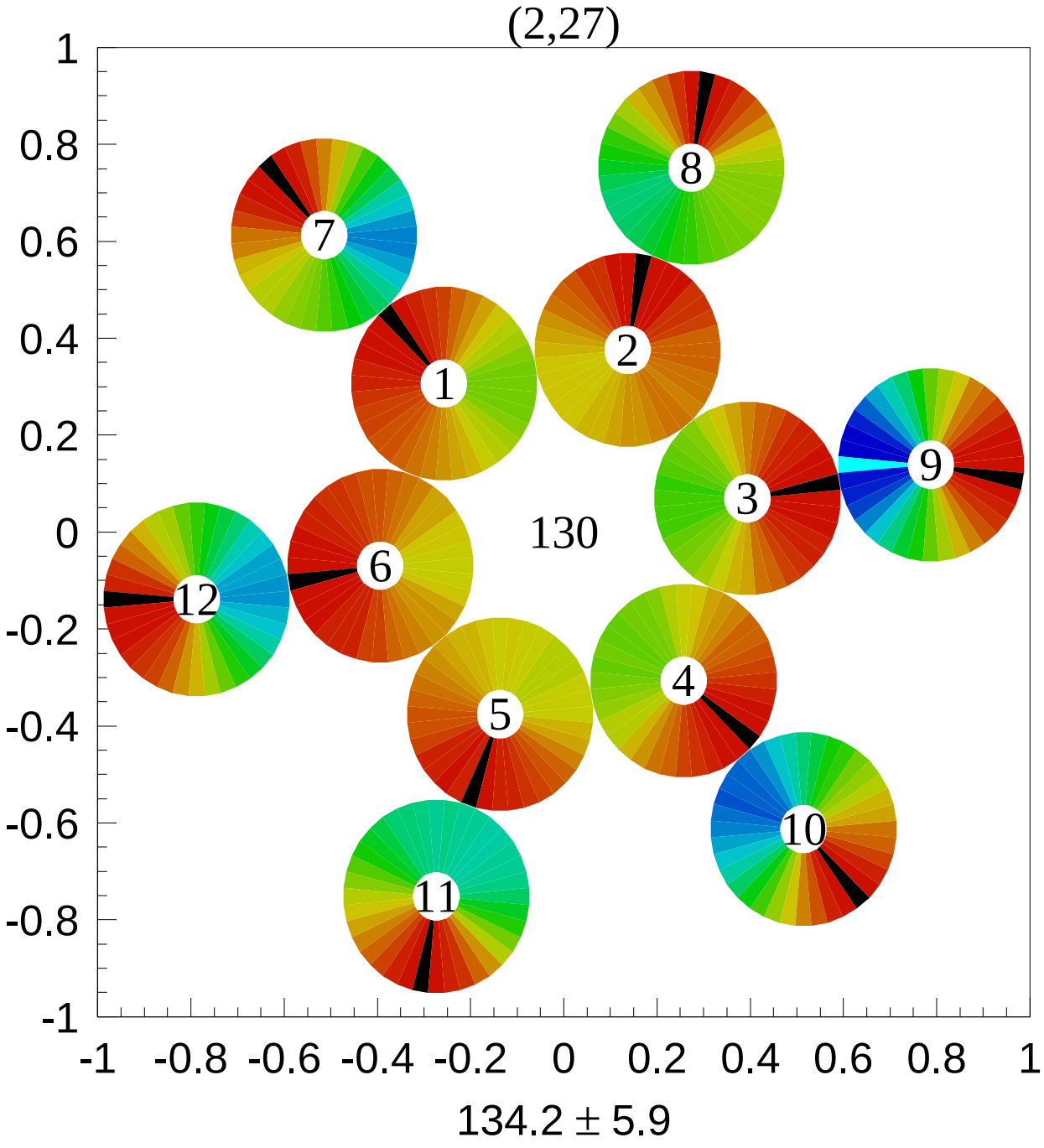

(2,25)
tilted LEDs
123 117 90 116 120 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 125 121 117 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

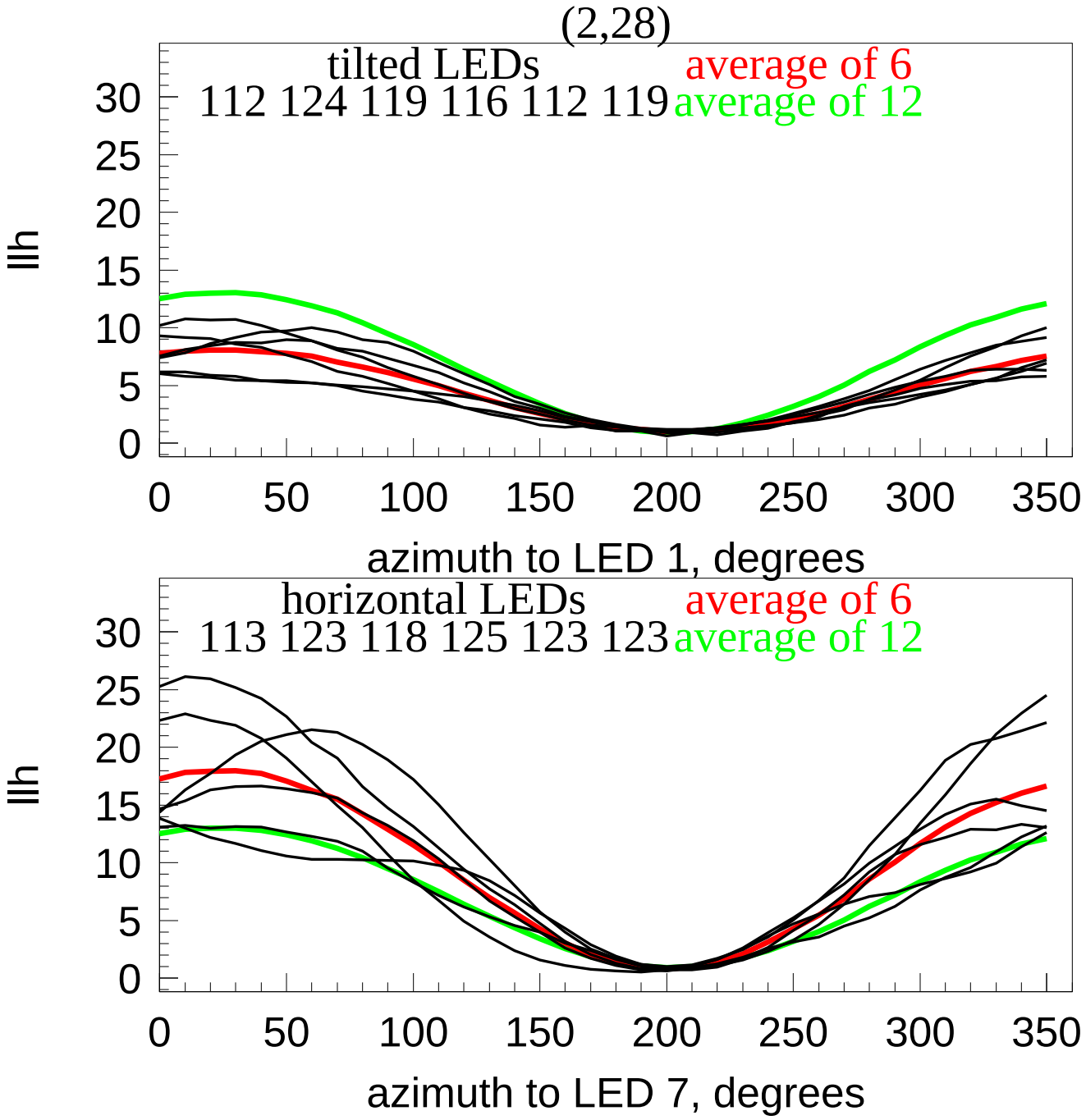

(2,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
53.8 ± 11.7

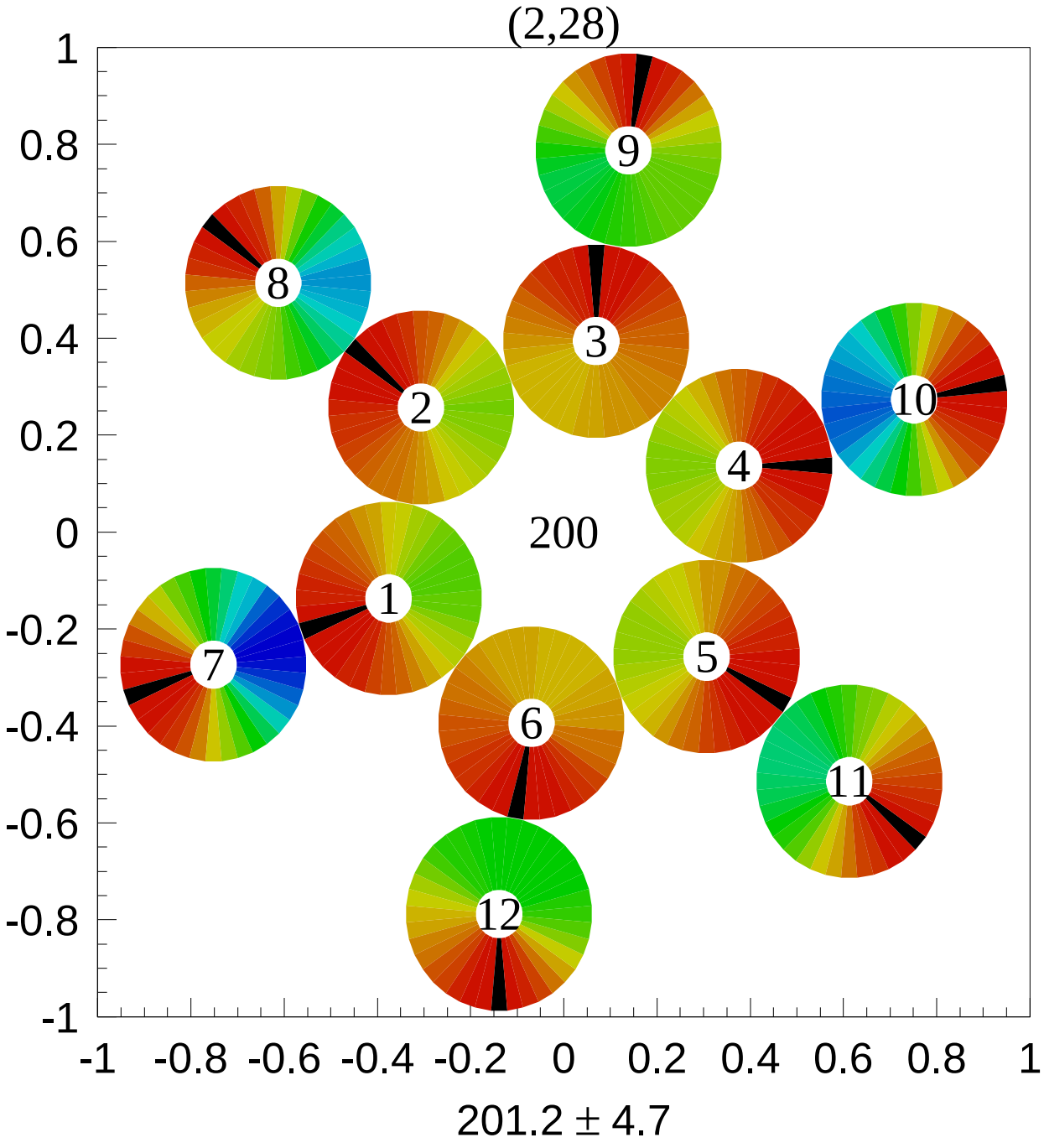

(2,26)
tilted LEDs
119 123 115 124 118 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 119 124 120 126 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

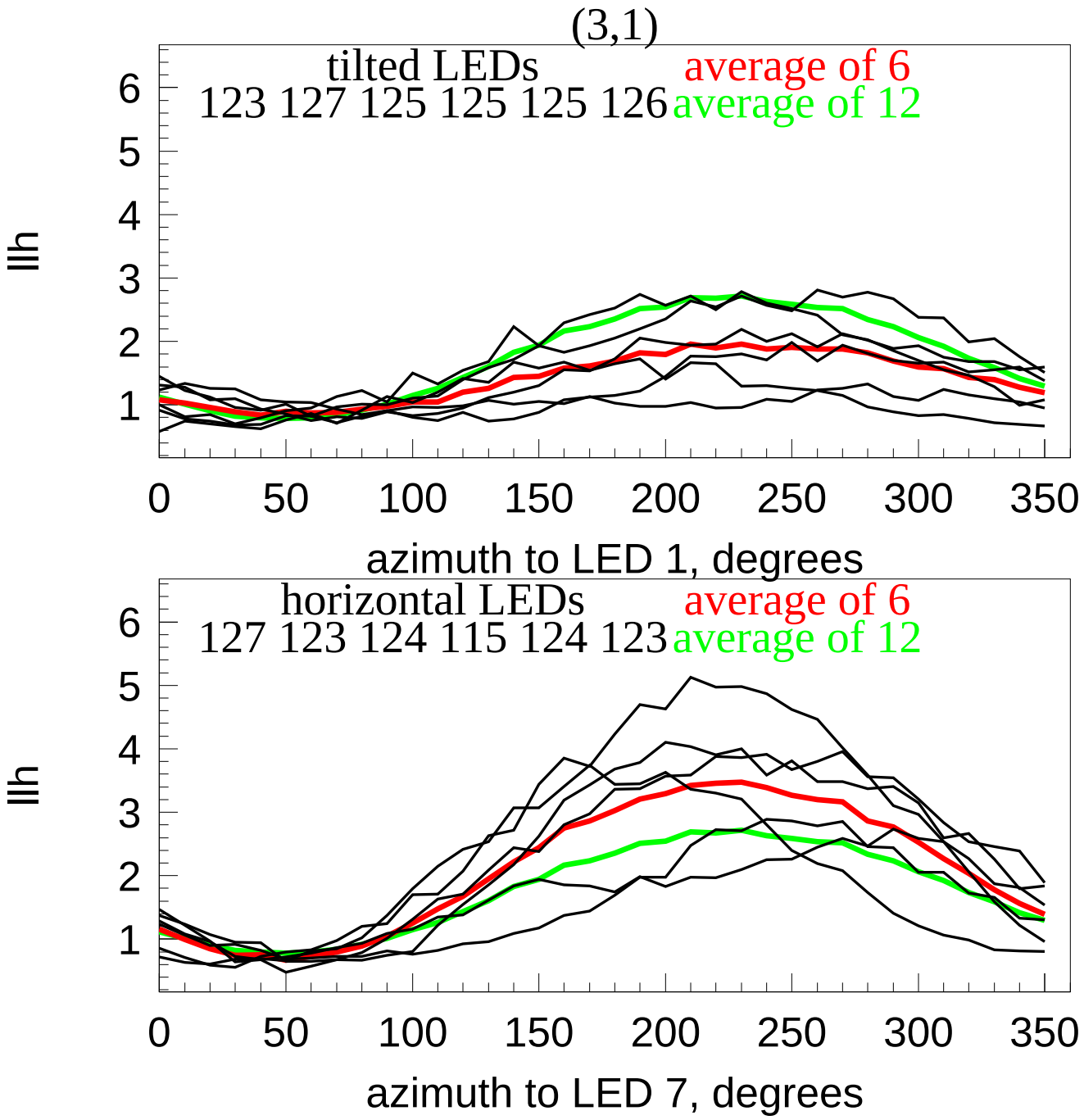

(2,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
301.9 ± 6.5

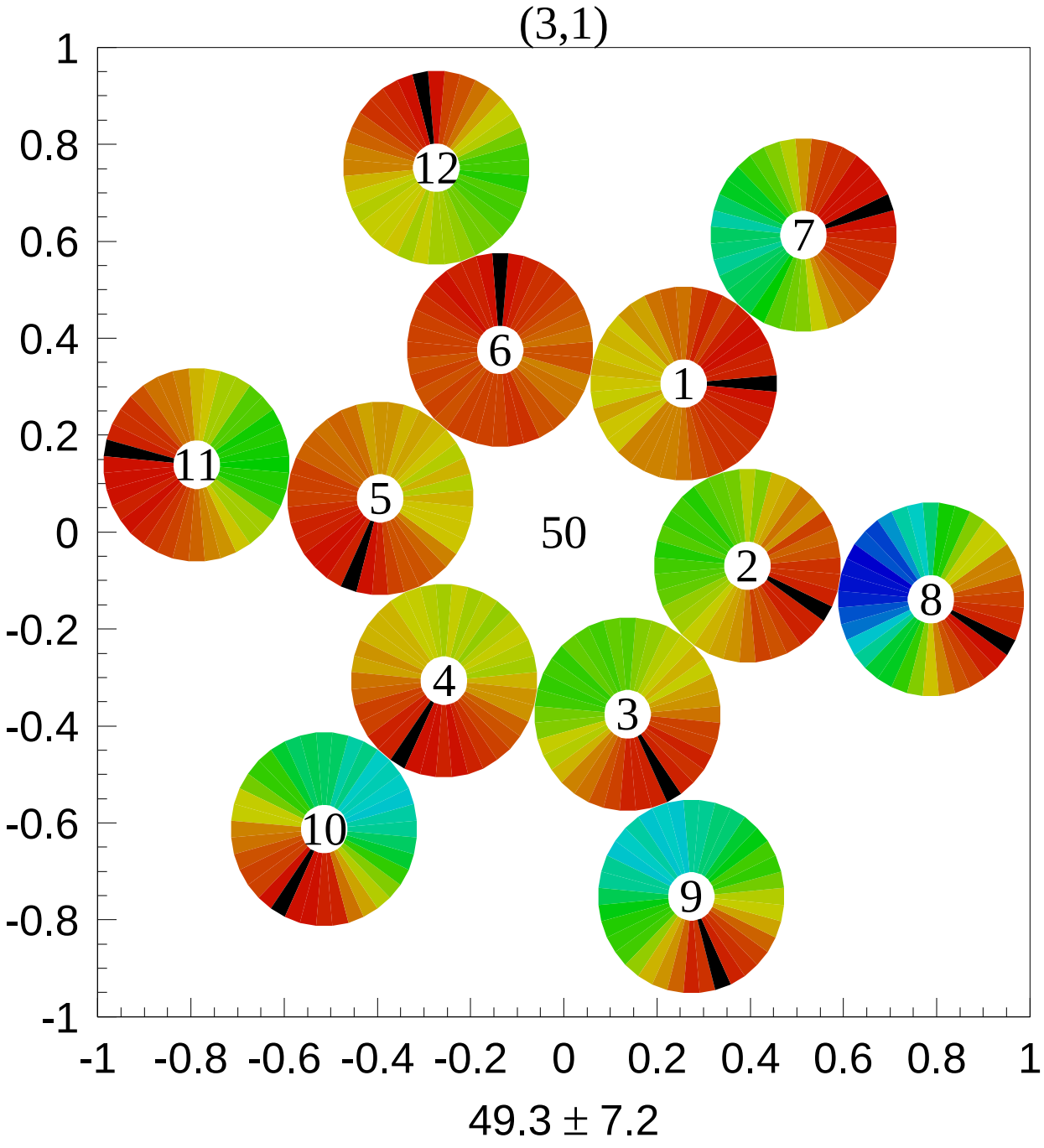

(2,27)
tilted LEDs
112 131 117 119 122 122
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 125 121 119 122 83
average of 6
average of 12
llh
azimuth to LED 7, degrees

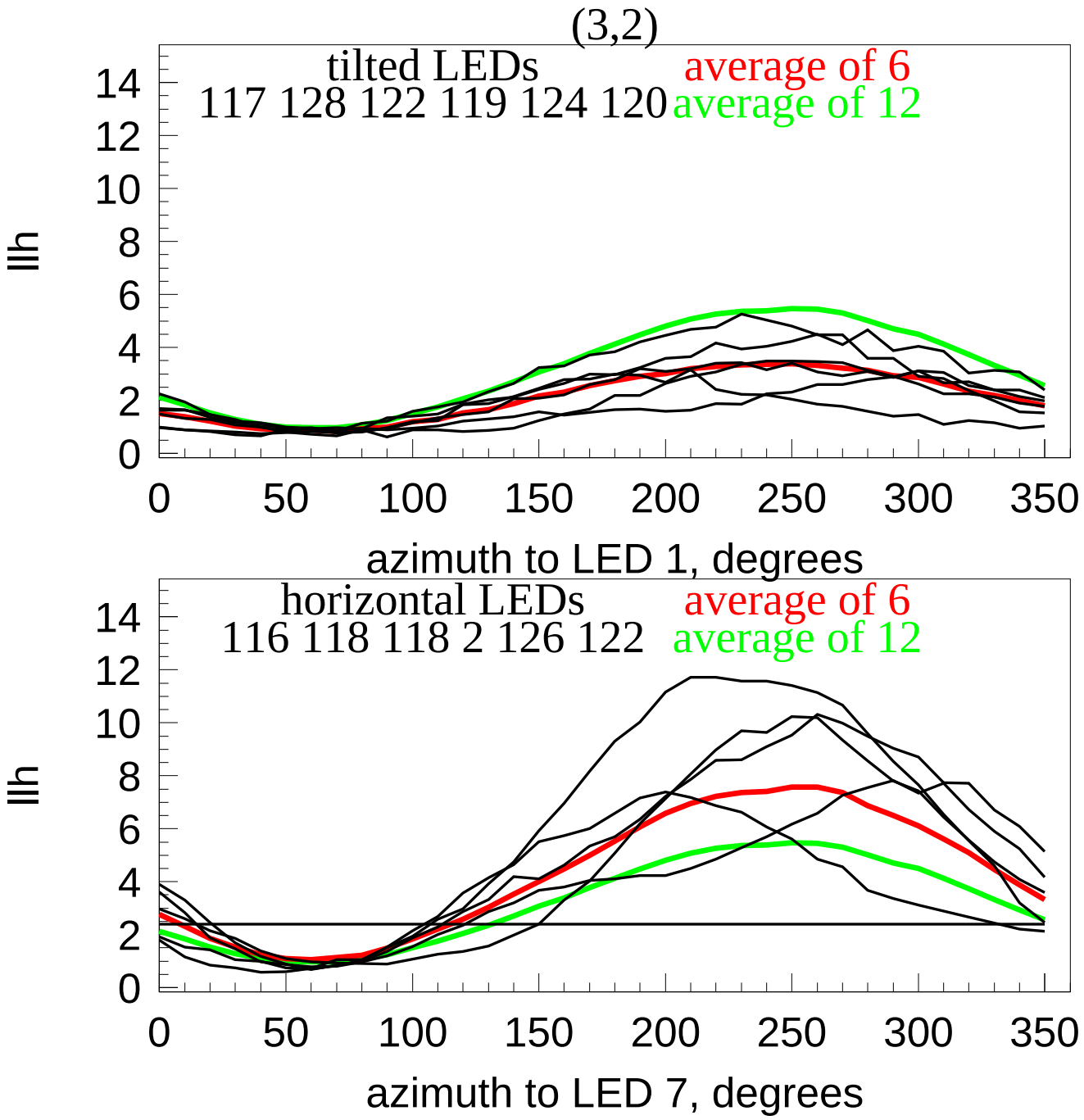

(2,27)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
134.2 ± 5.9

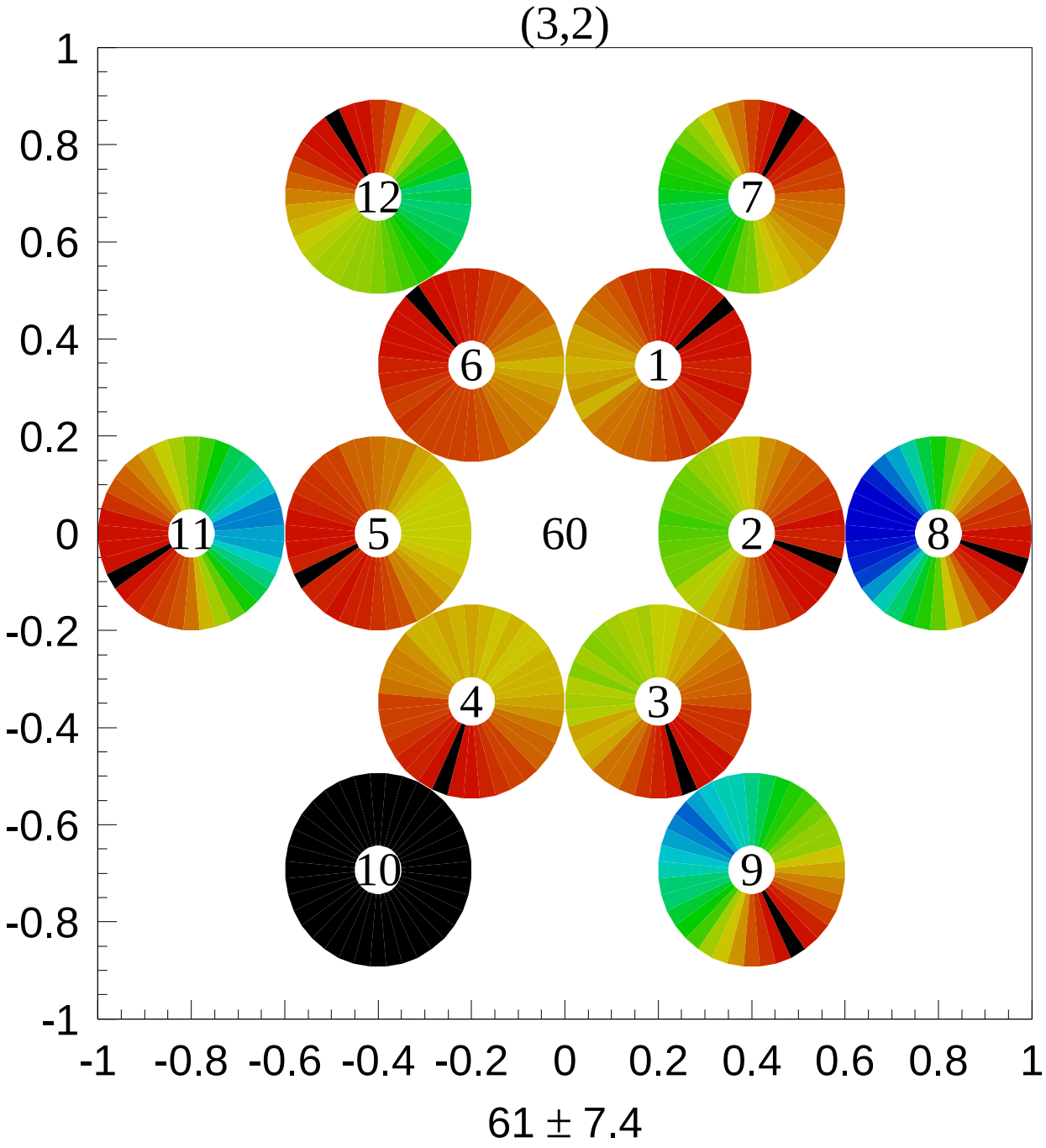

(2,28)
tilted LEDs
112 124 119 116 112 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 123 118 125 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

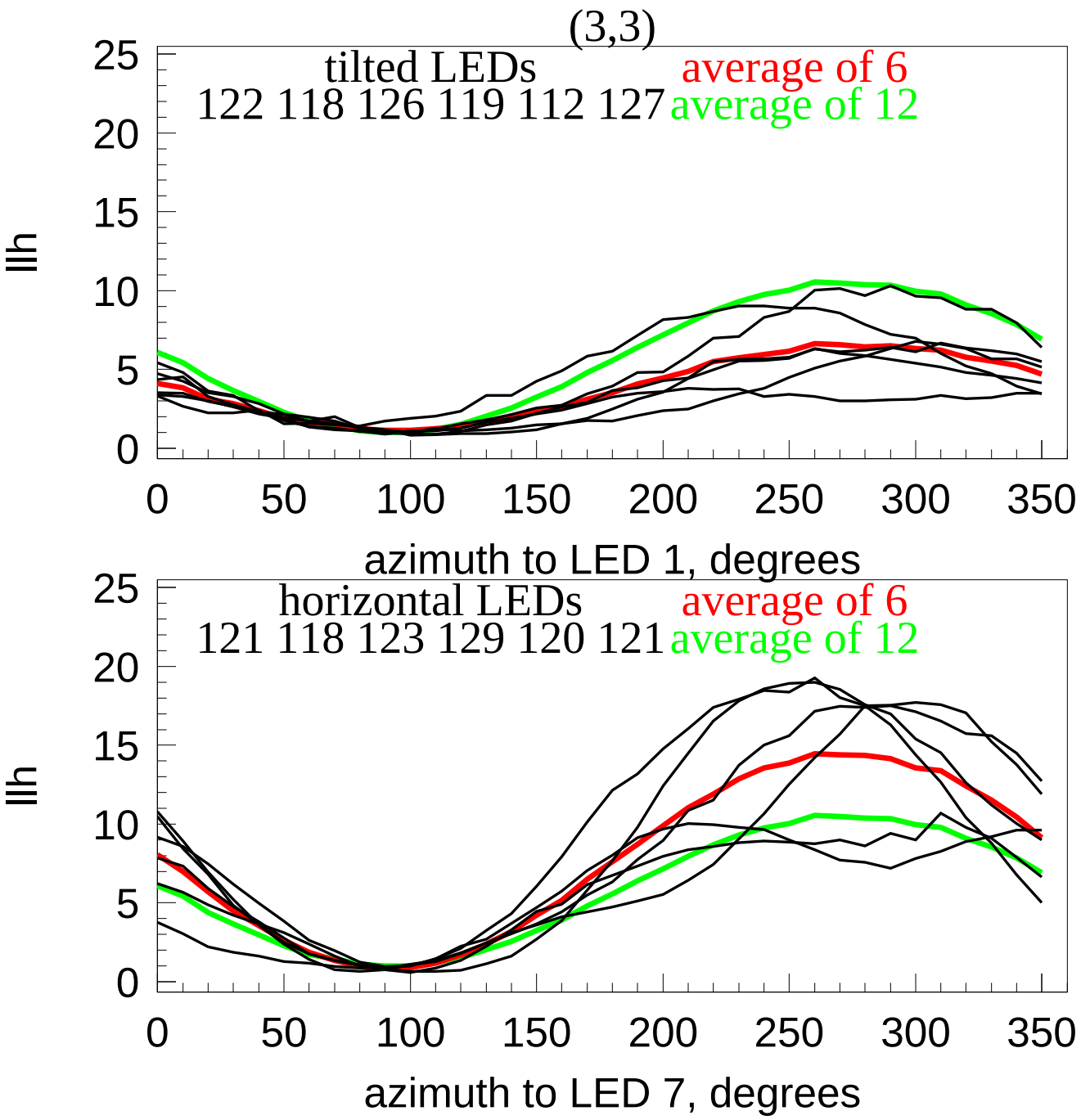

(2,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
201.2 ± 4.7

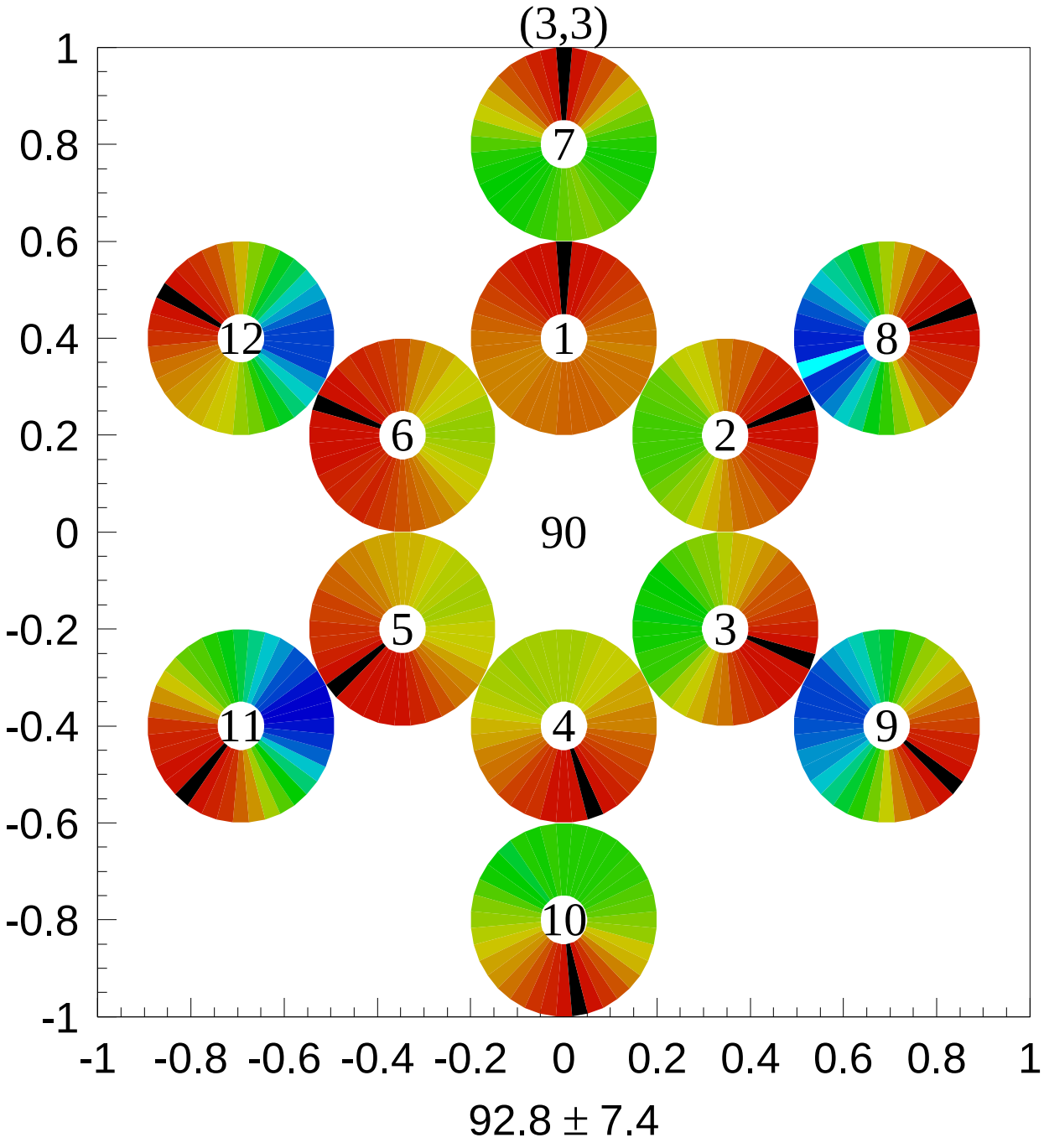

(3,1)
tilted LEDs
123 127 125 125 125 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 123 124 115 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

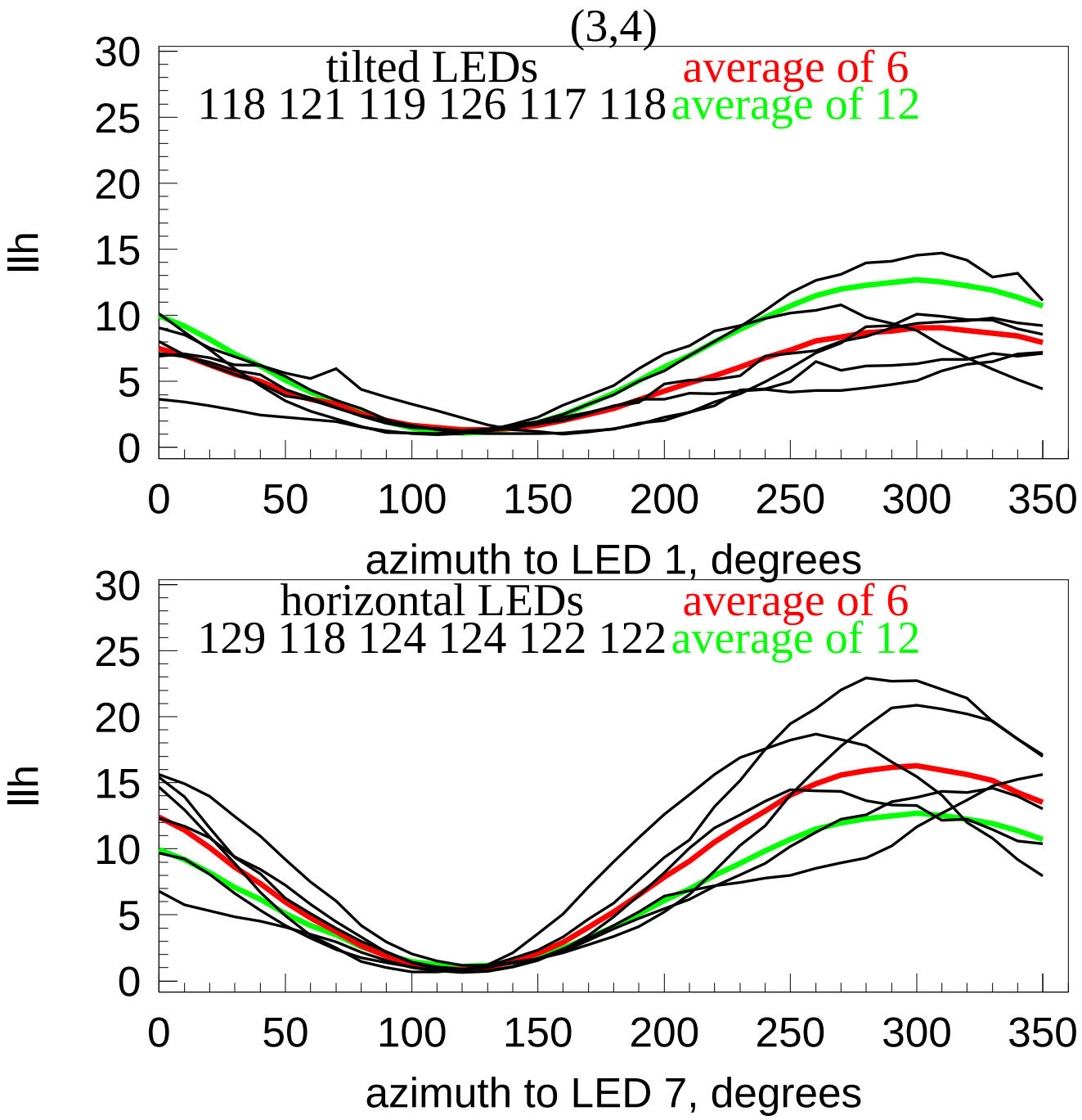

(3,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
49.3 ± 7.2

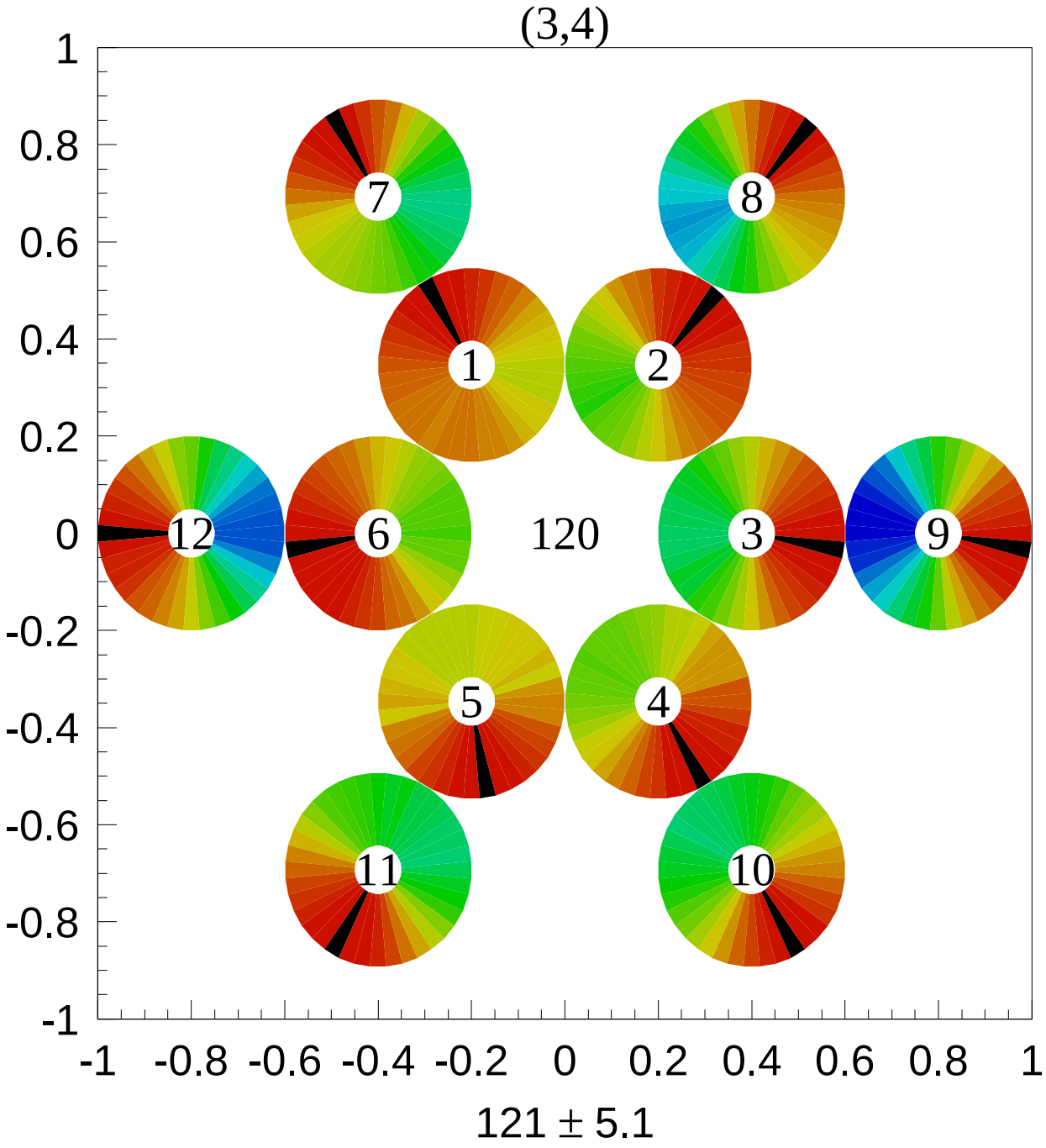

(3,2)
tilted LEDs
117 128 122 119 124 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 118 118 2 126 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

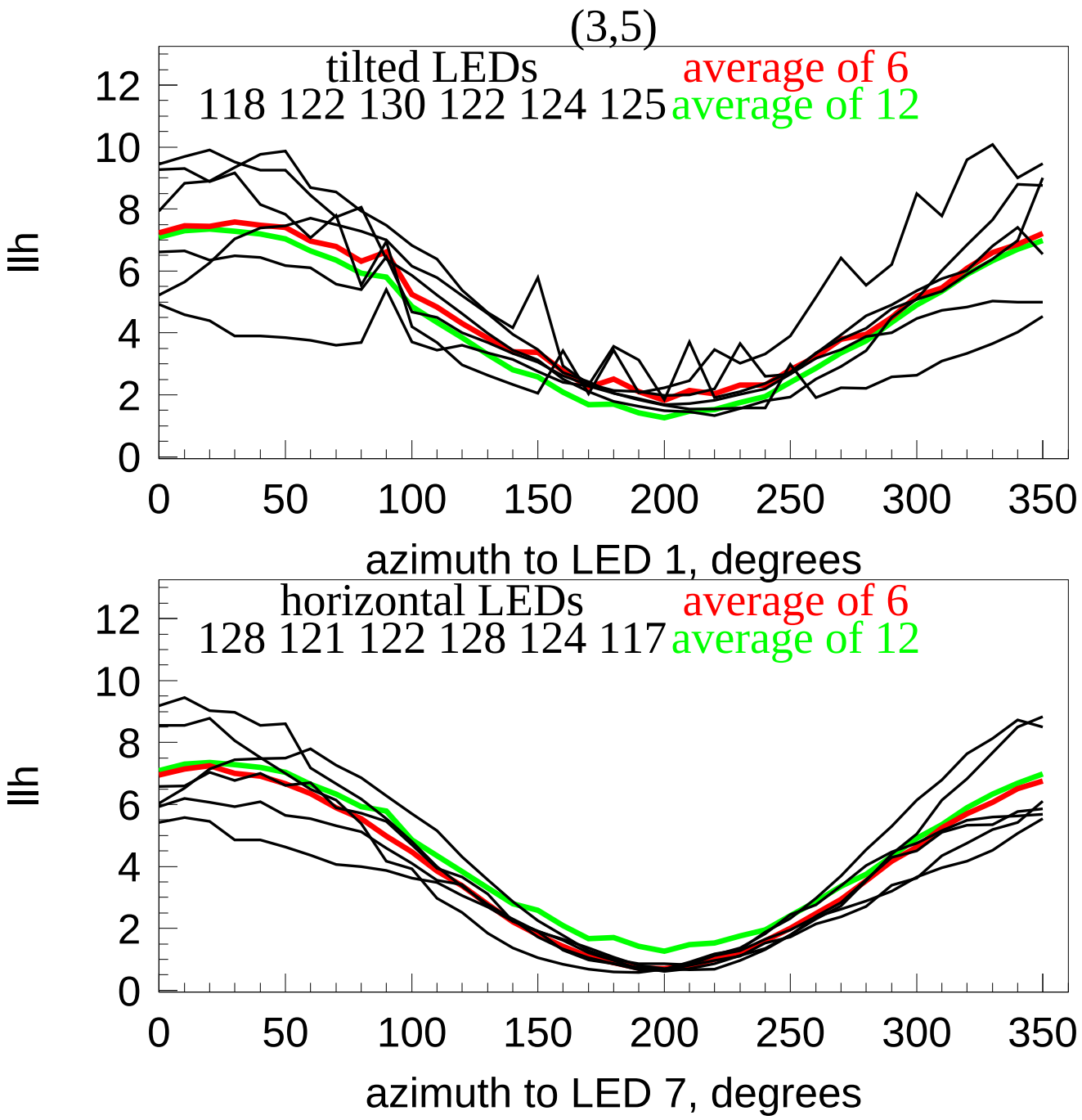

(3,2)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
61 ± 7.4

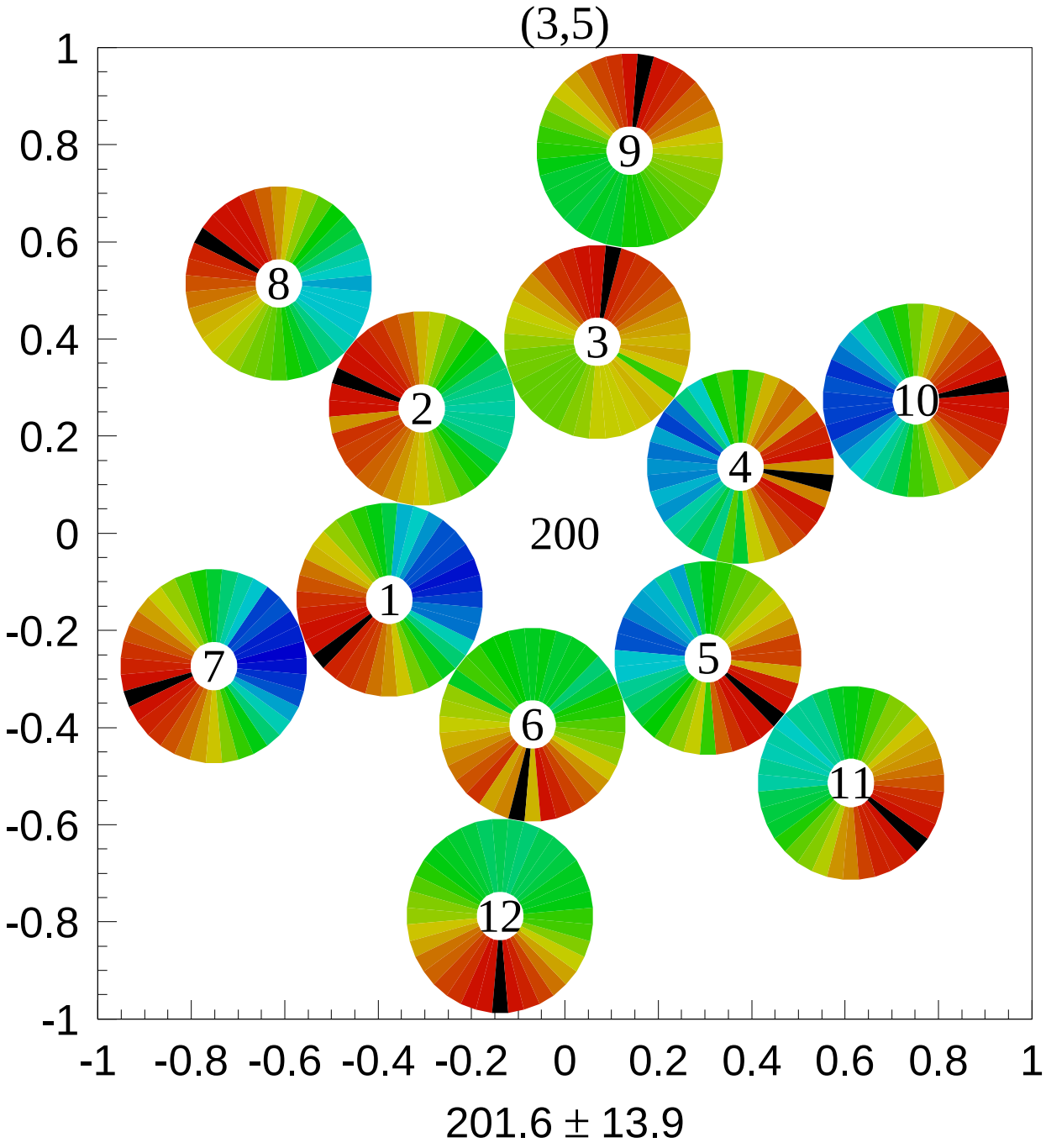

(3,3)
tilted LEDs
122 118 126 119 112 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 118 123 129 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

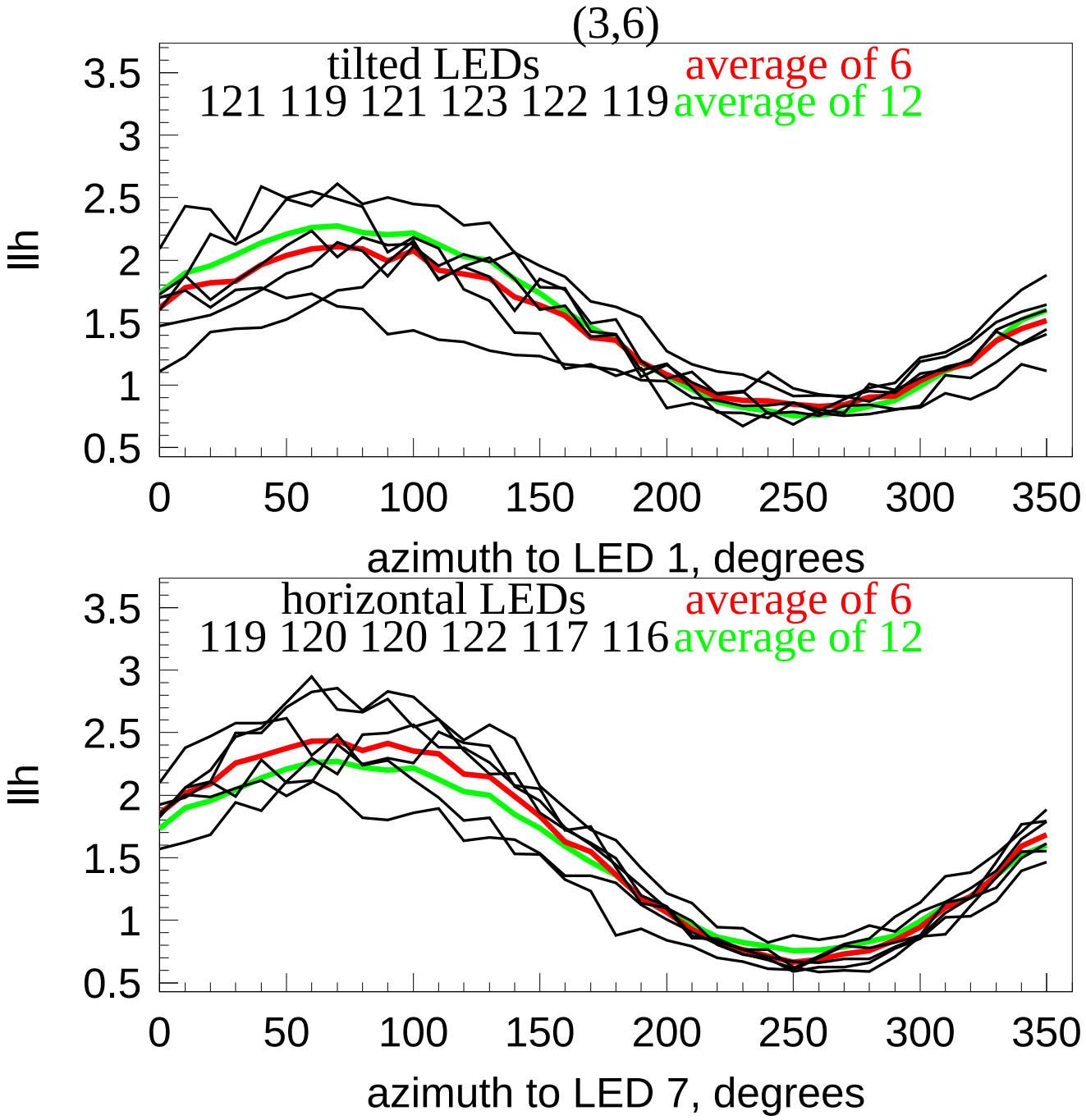

(3,3)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
92.8 ± 7.4

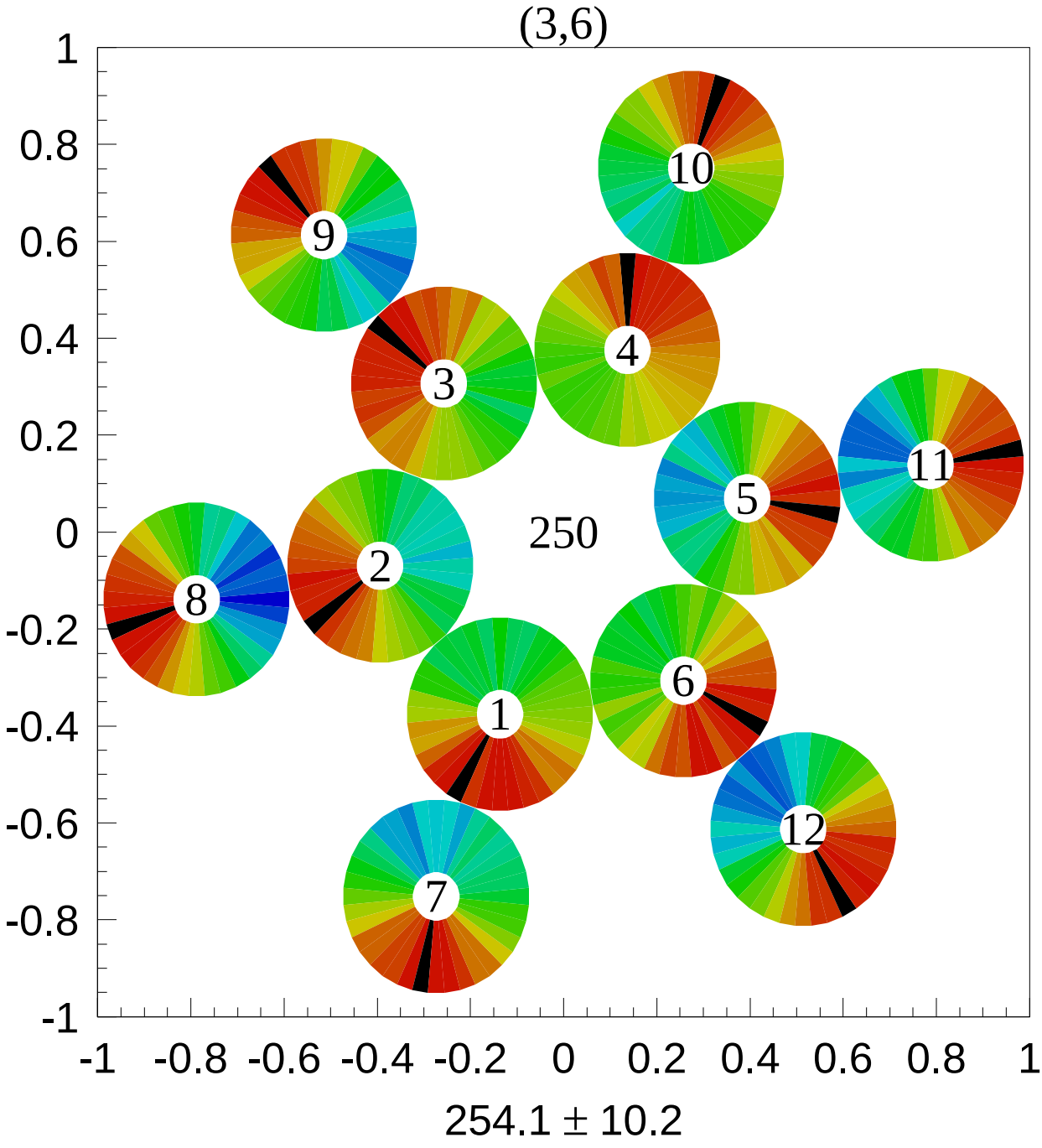

(3,4)
tilted LEDs
118 121 119 126 117 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 118 124 124 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

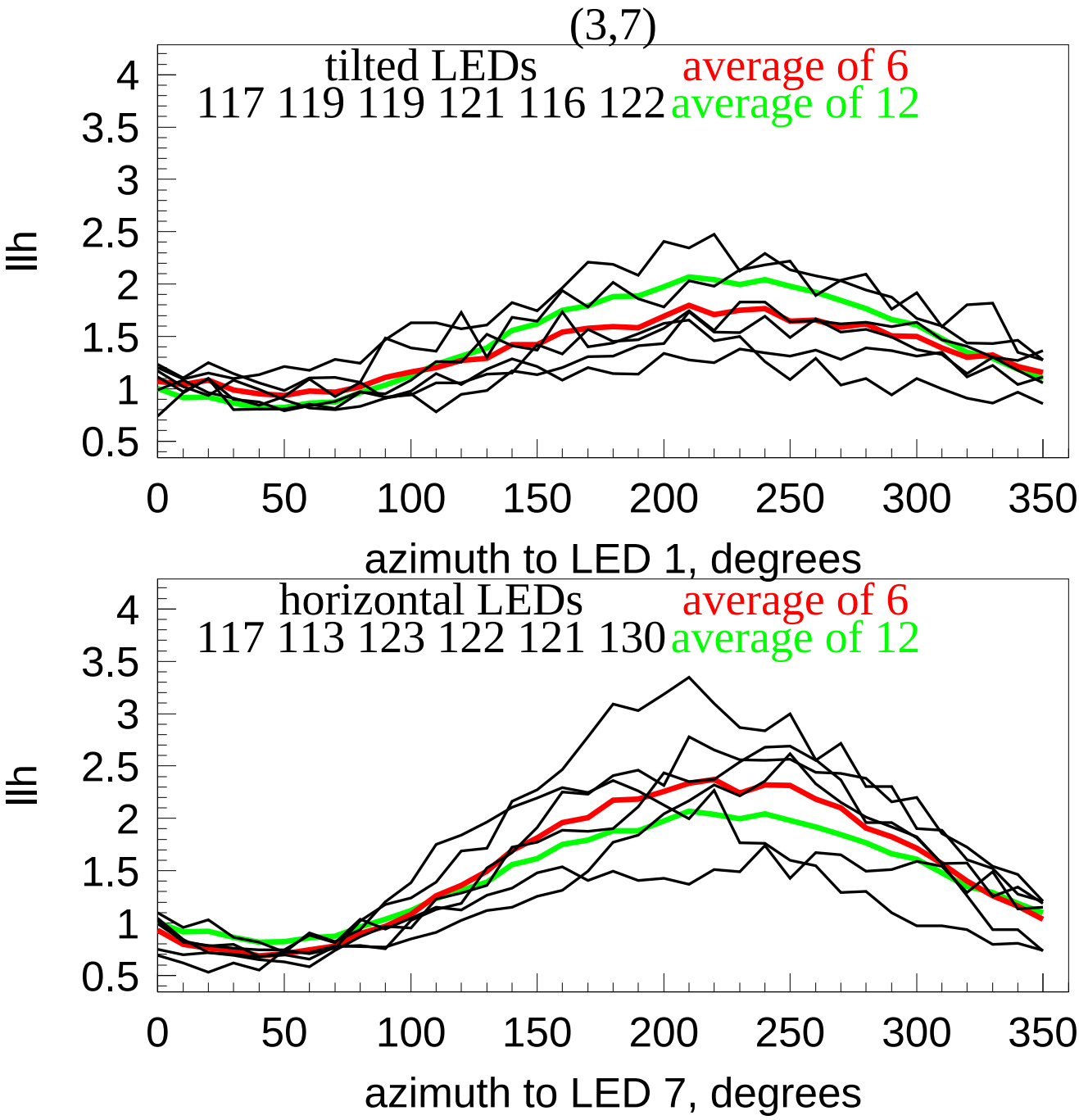

(3,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
121 ± 5.1

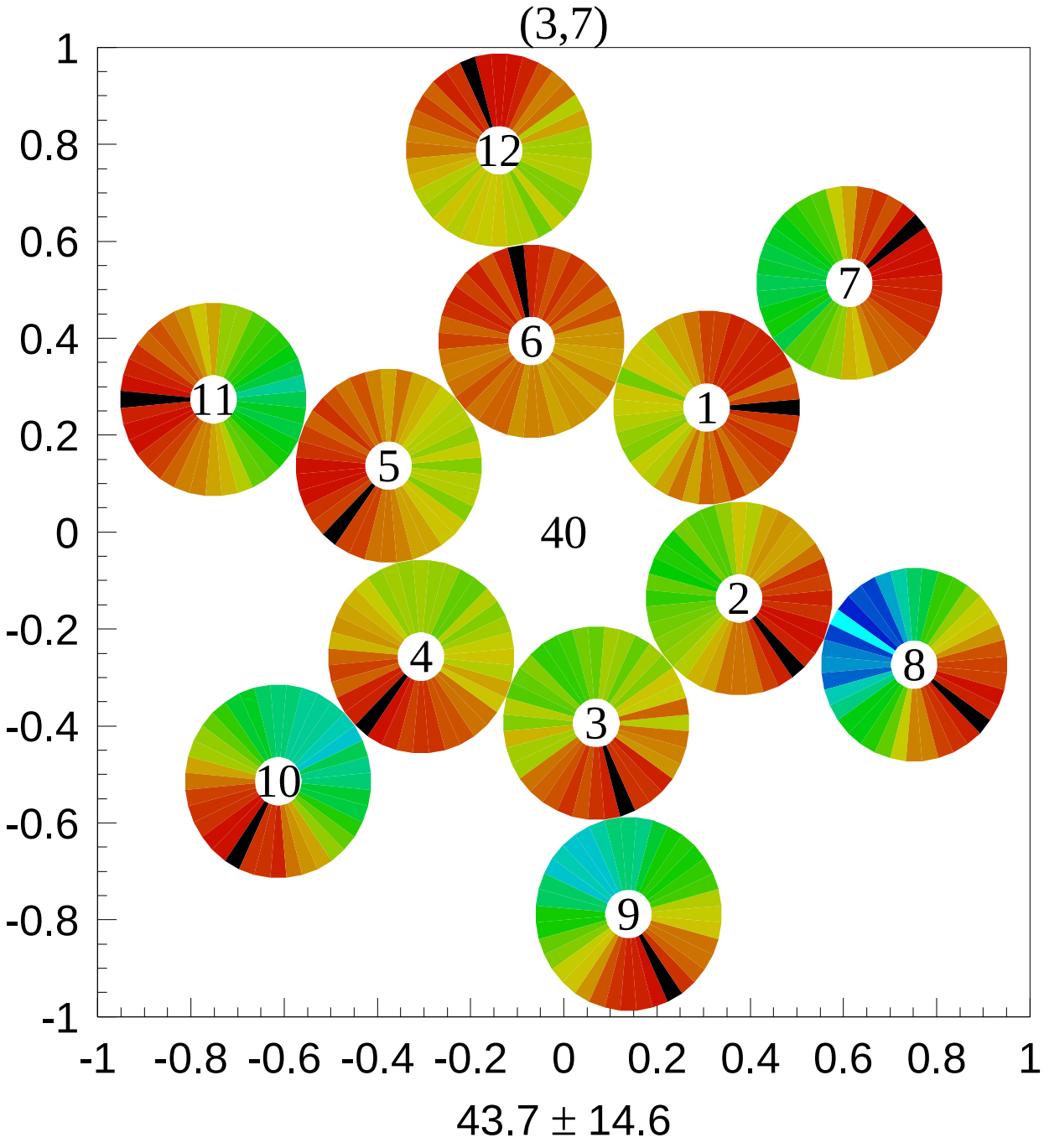

(3,5)
tilted LEDs
118 122 130 122 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 121 122 128 124 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

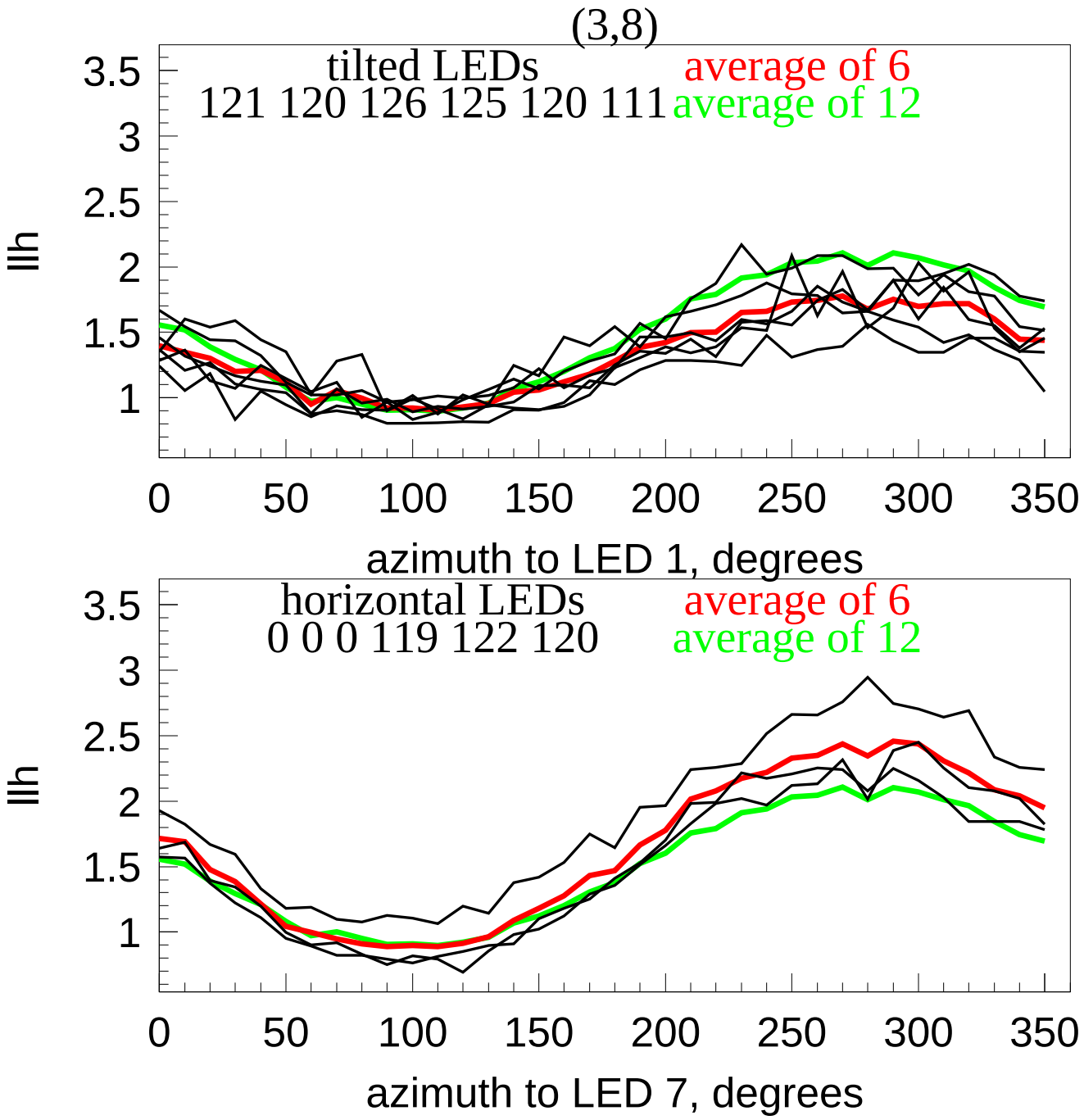

(3,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
201.6 ± 13.9

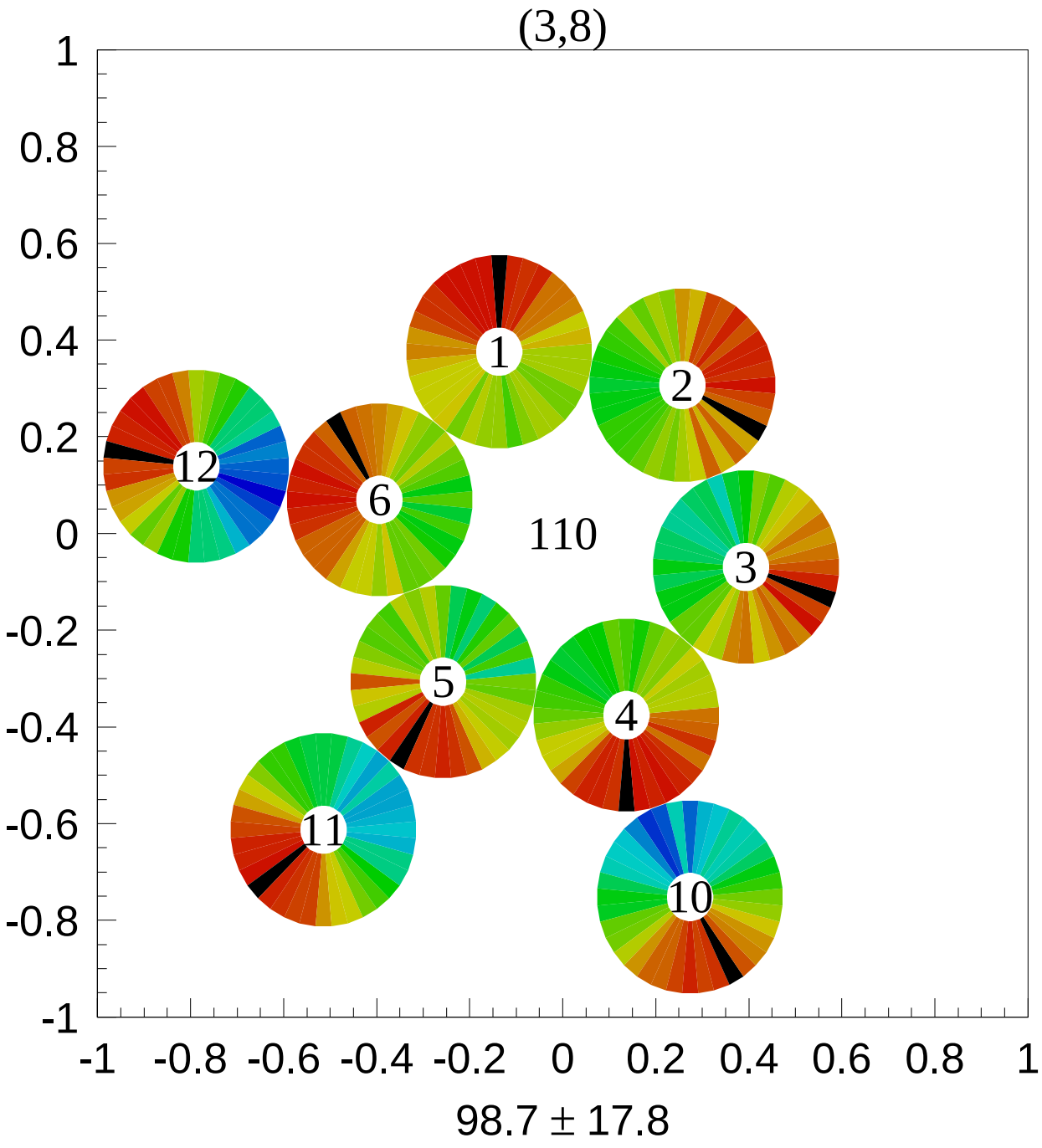

(3,6)
tilted LEDs
121 119 121 123 122 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 120 120 122 117 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

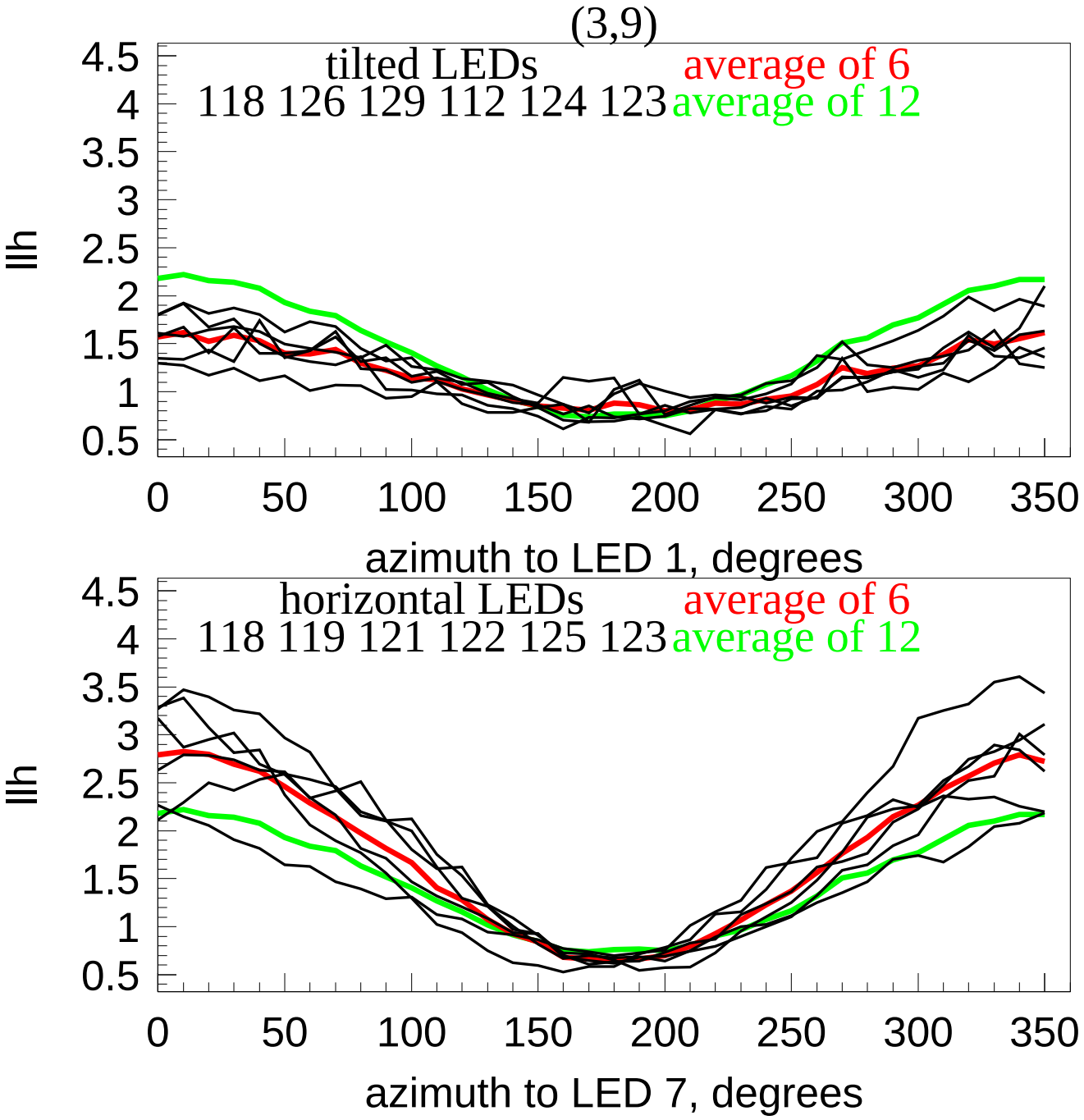

(3,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
1
6
12
7
254.1 ± 10.2

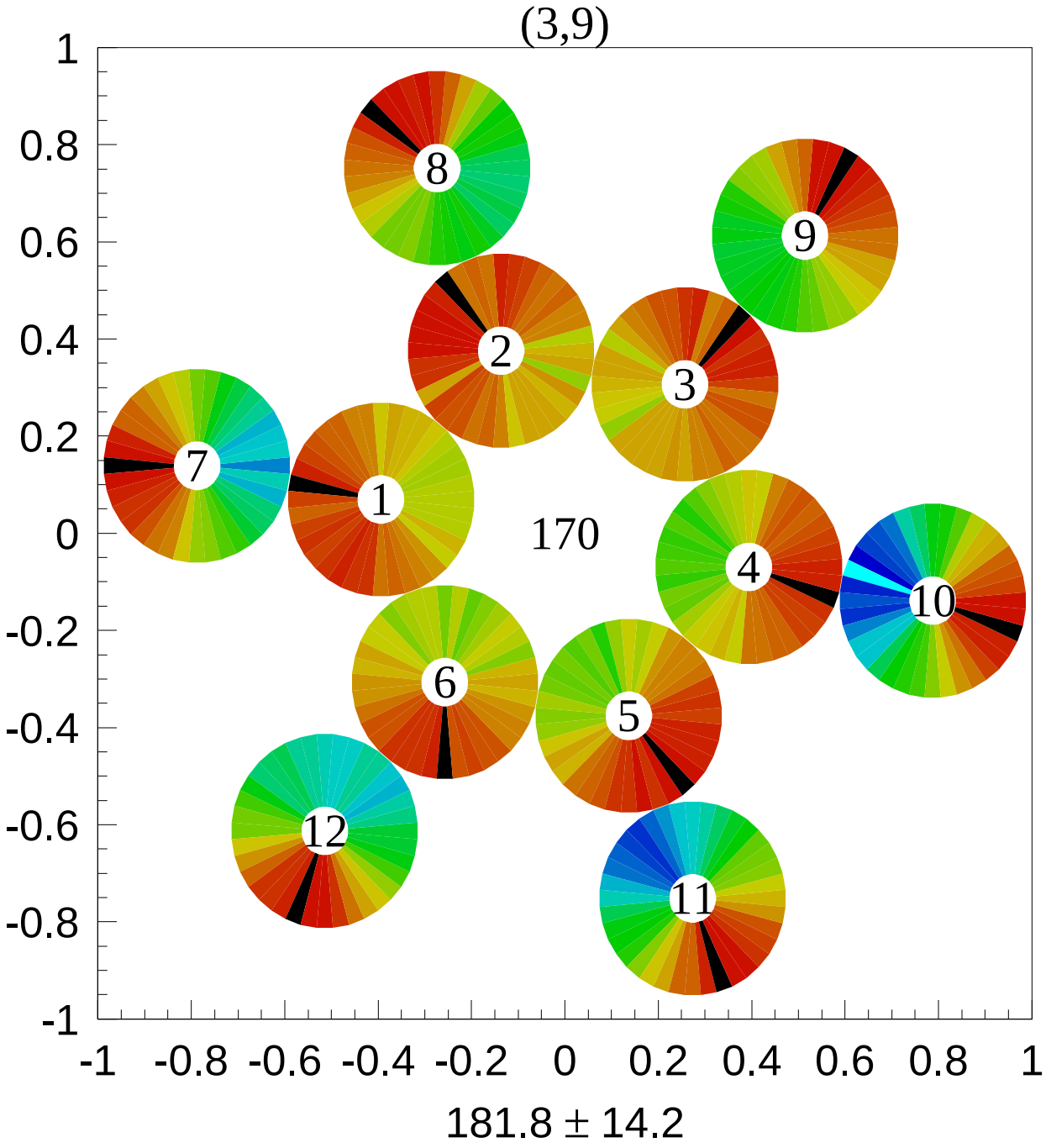

(3,7)
tilted LEDs
117 119 119 121 116 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 113 123 122 121 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

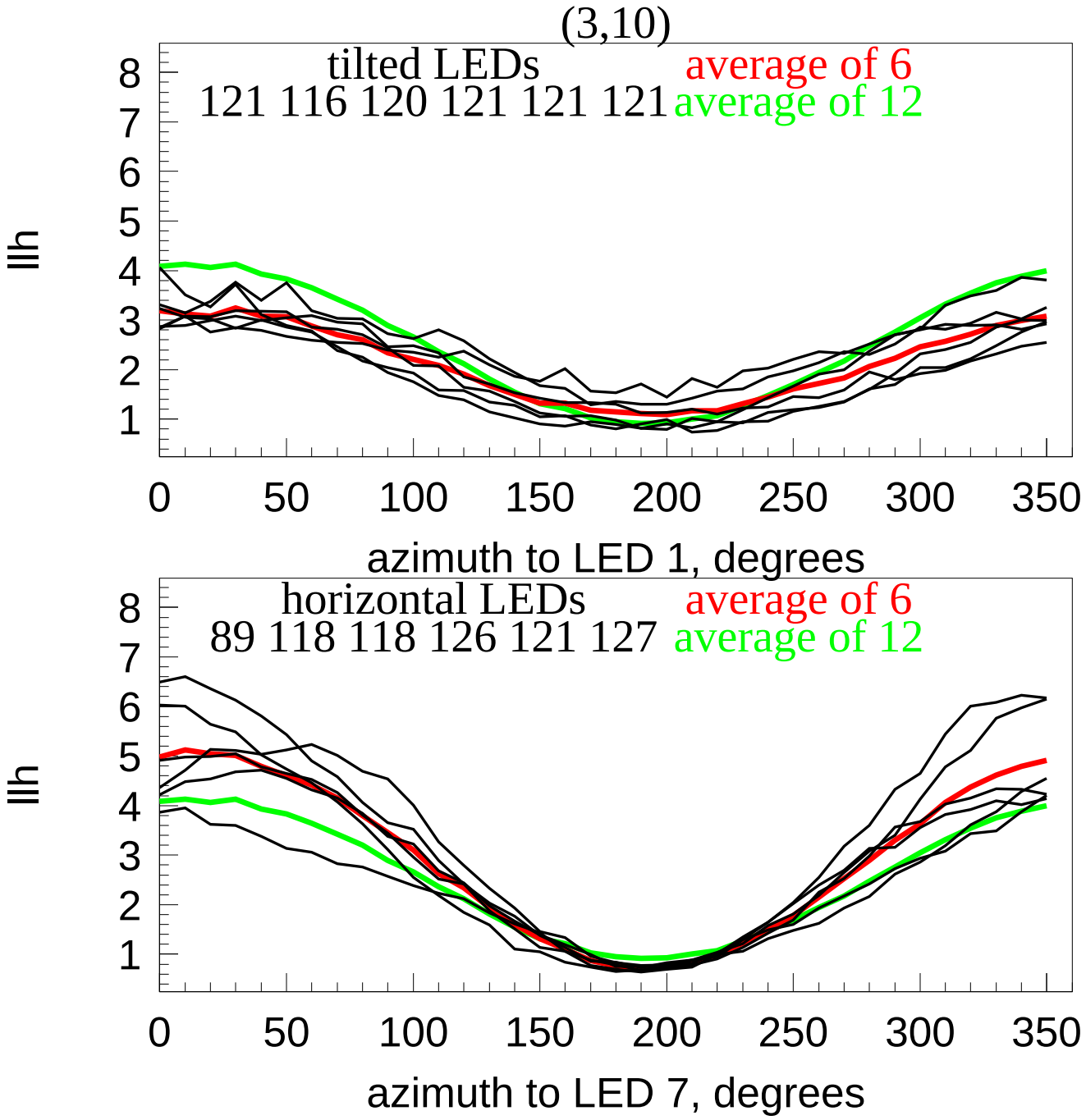

(3,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
43.7 ± 14.6

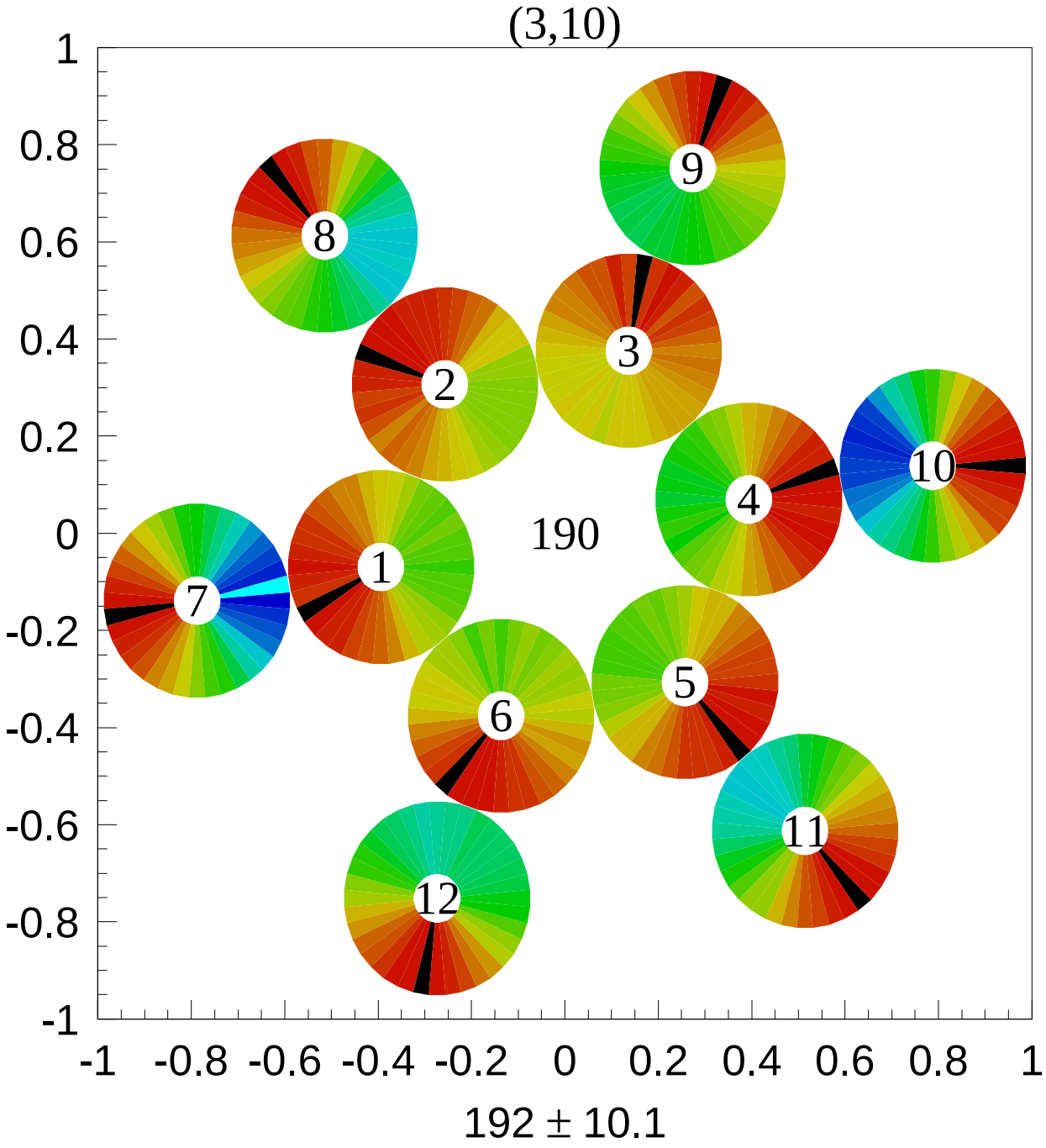

(3,8)
tilted LEDs
121 120 126 125 120 111
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
0 0 0 119 122 120
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

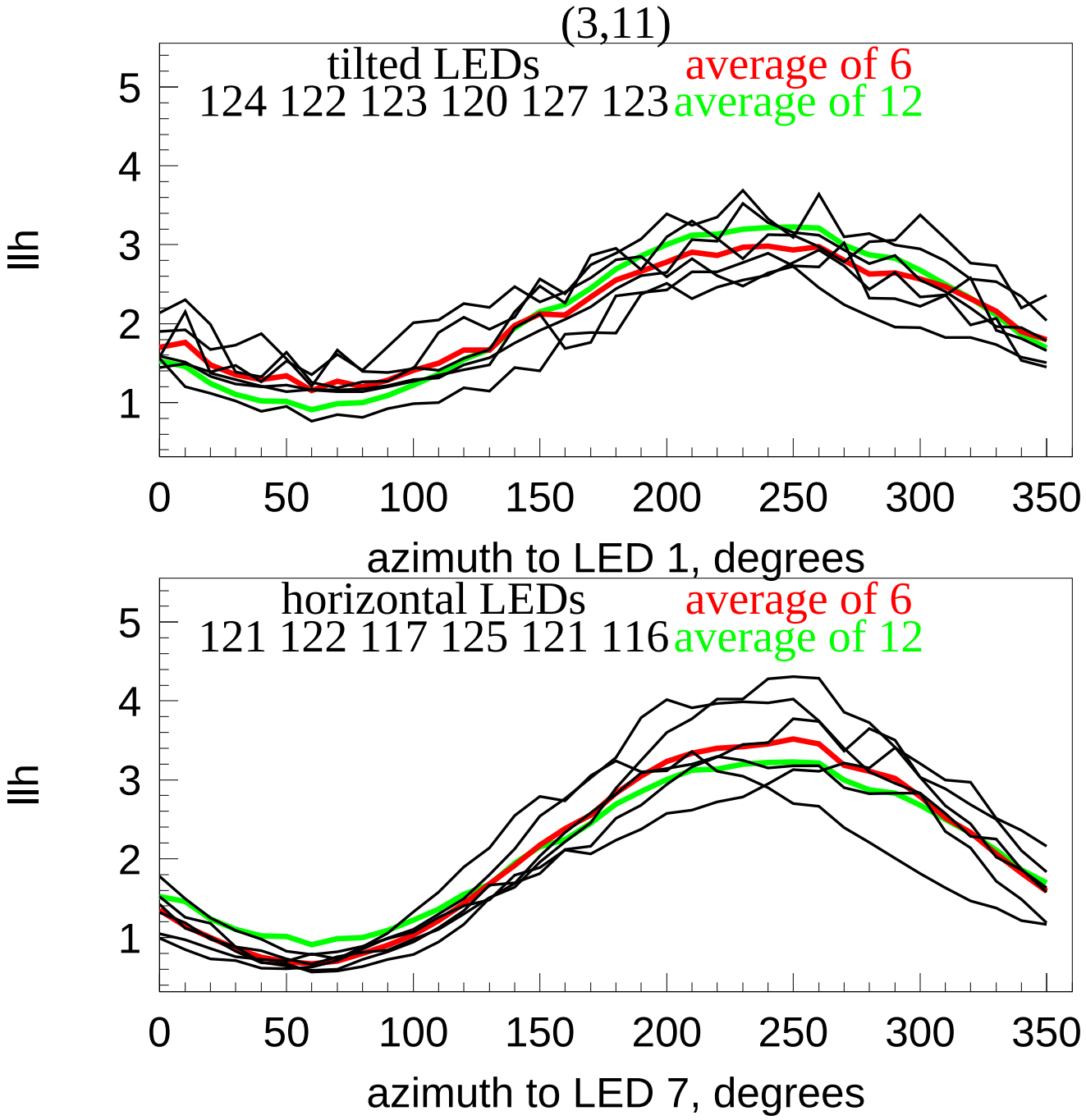

(3,8)
1
2
3
4
5
6
10
11
12
110
98.7 ± 17.8

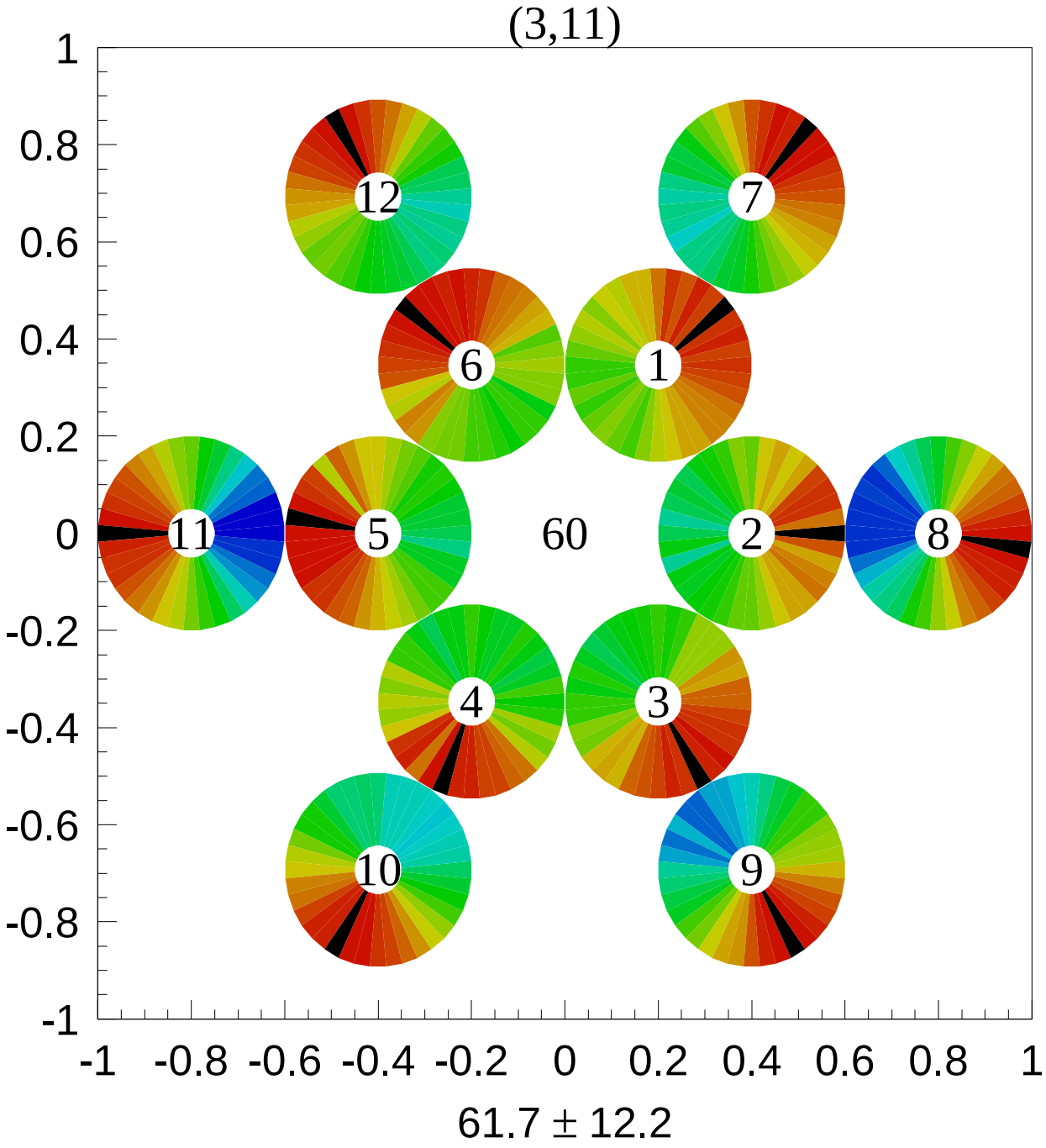

(3,9)
tilted LEDs
118 126 129 112 124 123
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 119 121 122 125 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

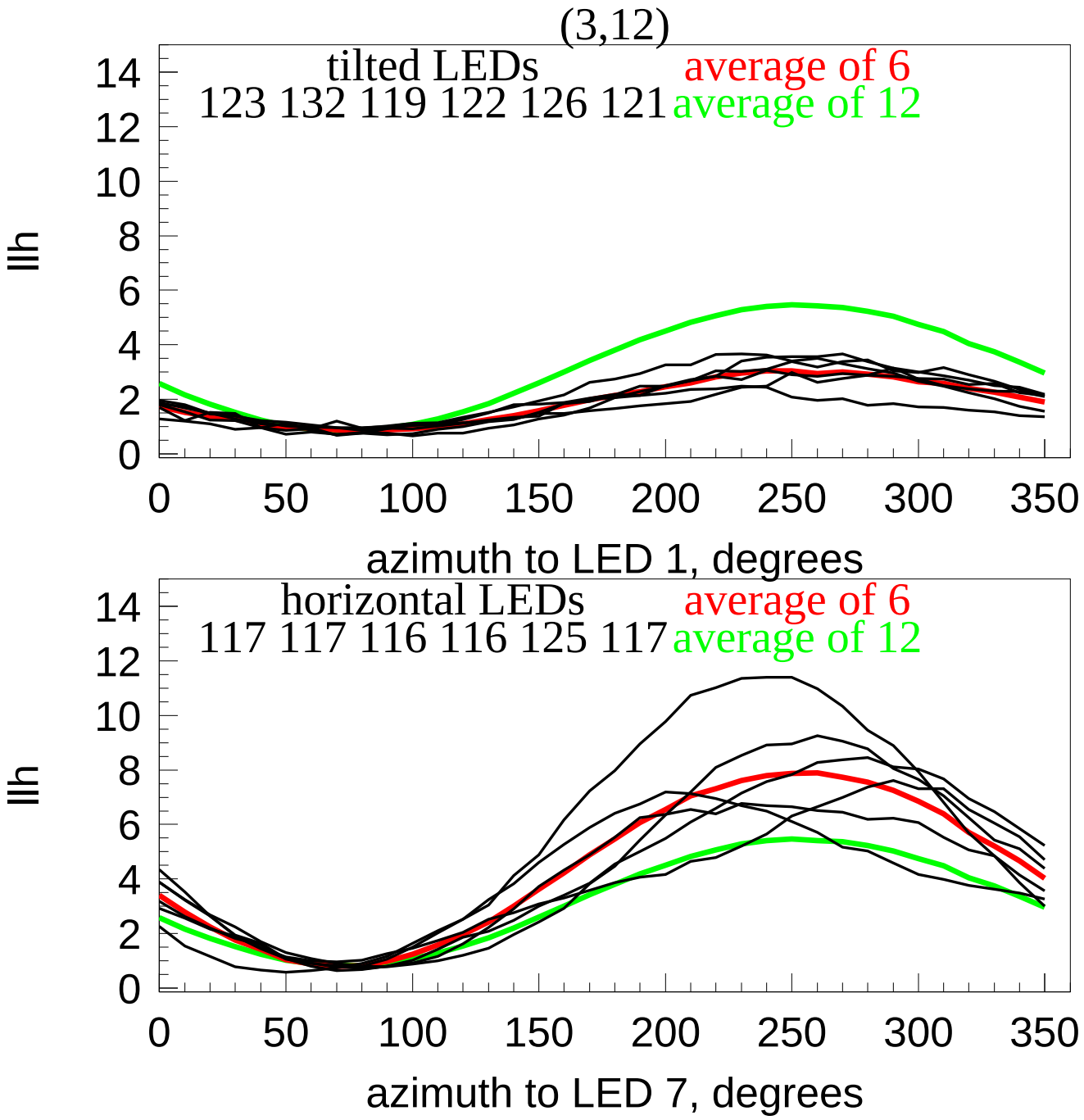

(3,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
181.8 ± 14.2

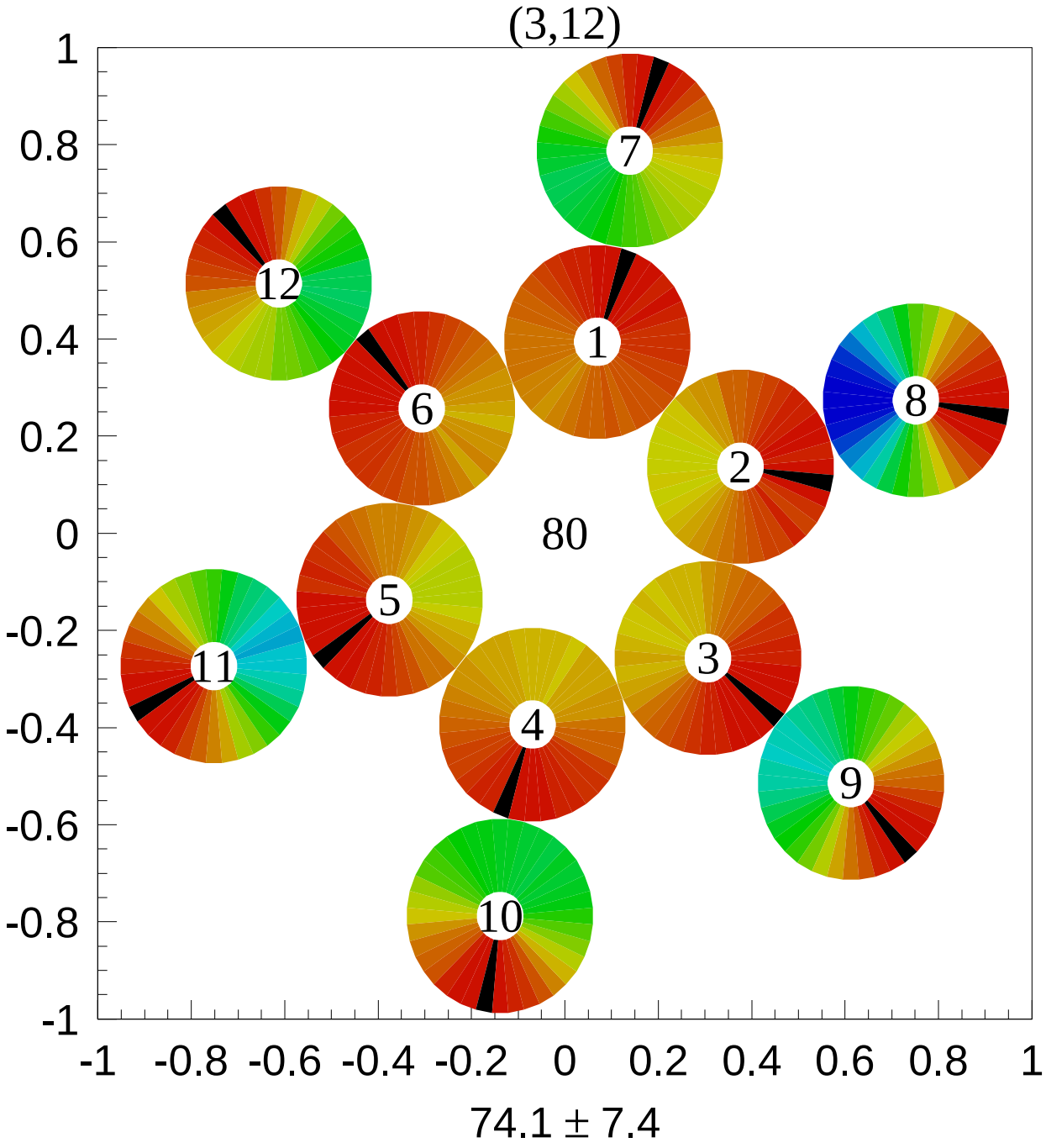

(3,10)
tilted LEDs
121 116 120 121 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
89 118 118 126 121 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

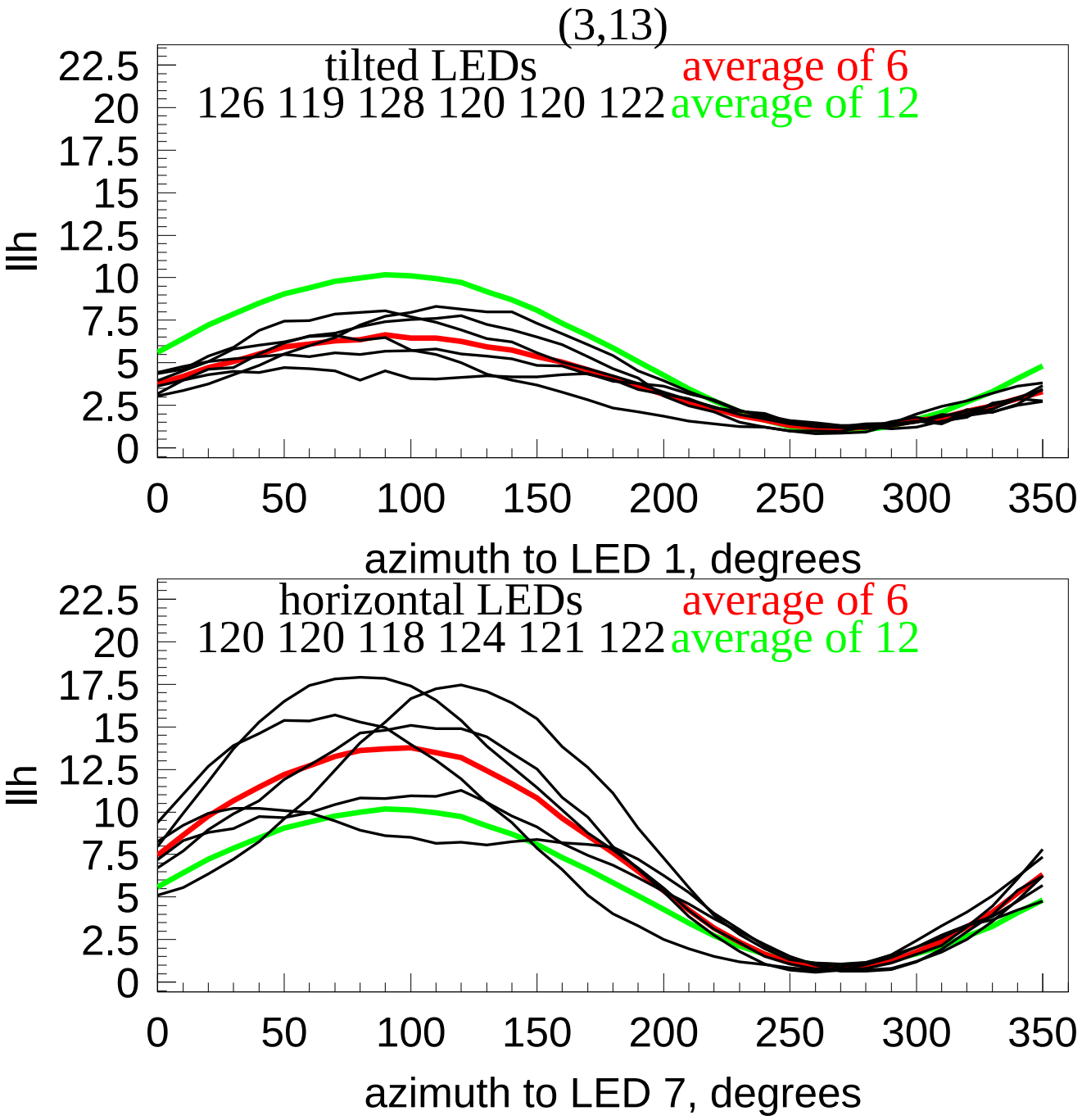

(3,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
192 ± 10.1
190
1
2
3
4
5
6
7
8
9
10
11
12

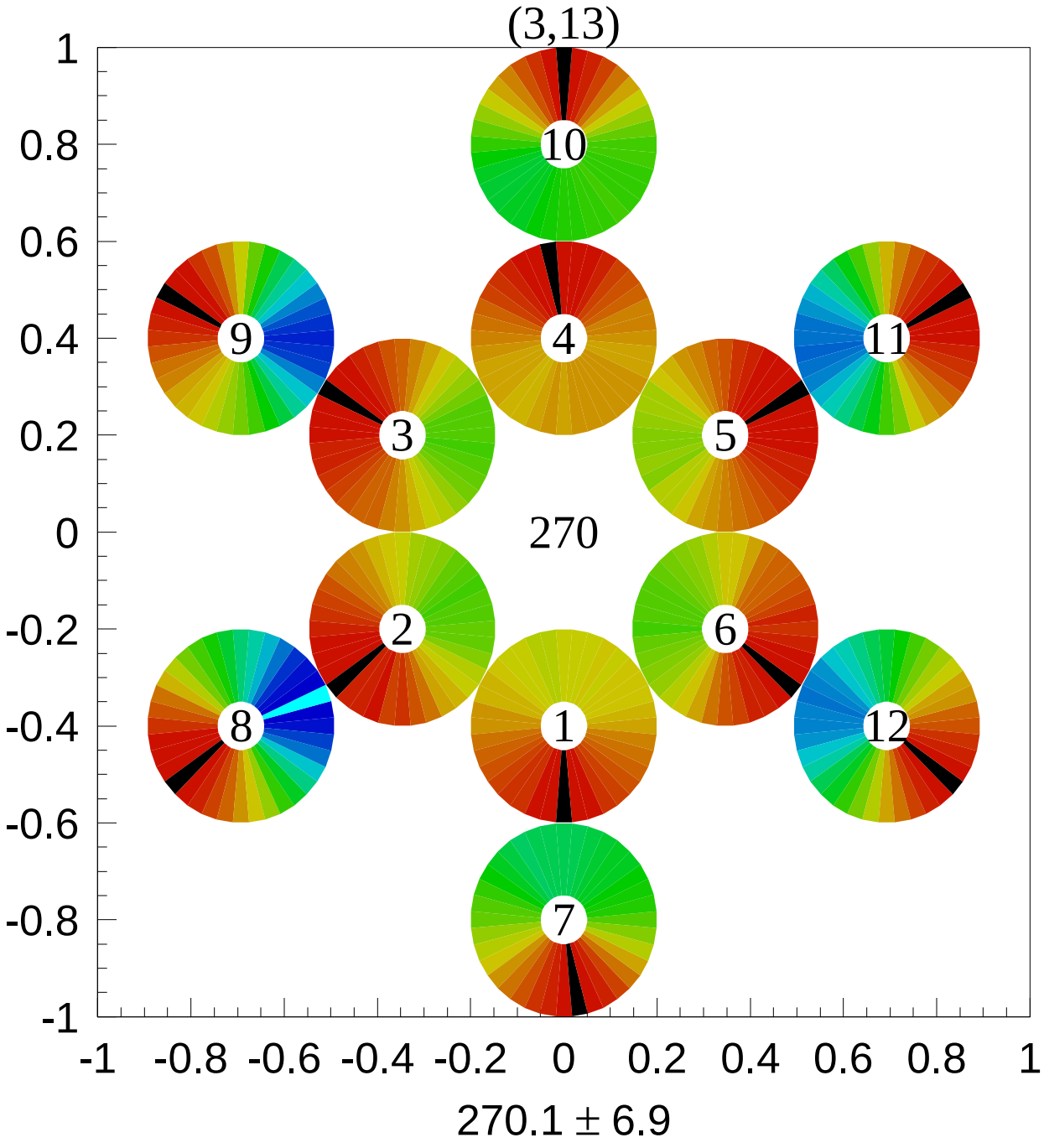

(3,11)
tilted LEDs
124 122 123 120 127 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 117 125 121 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

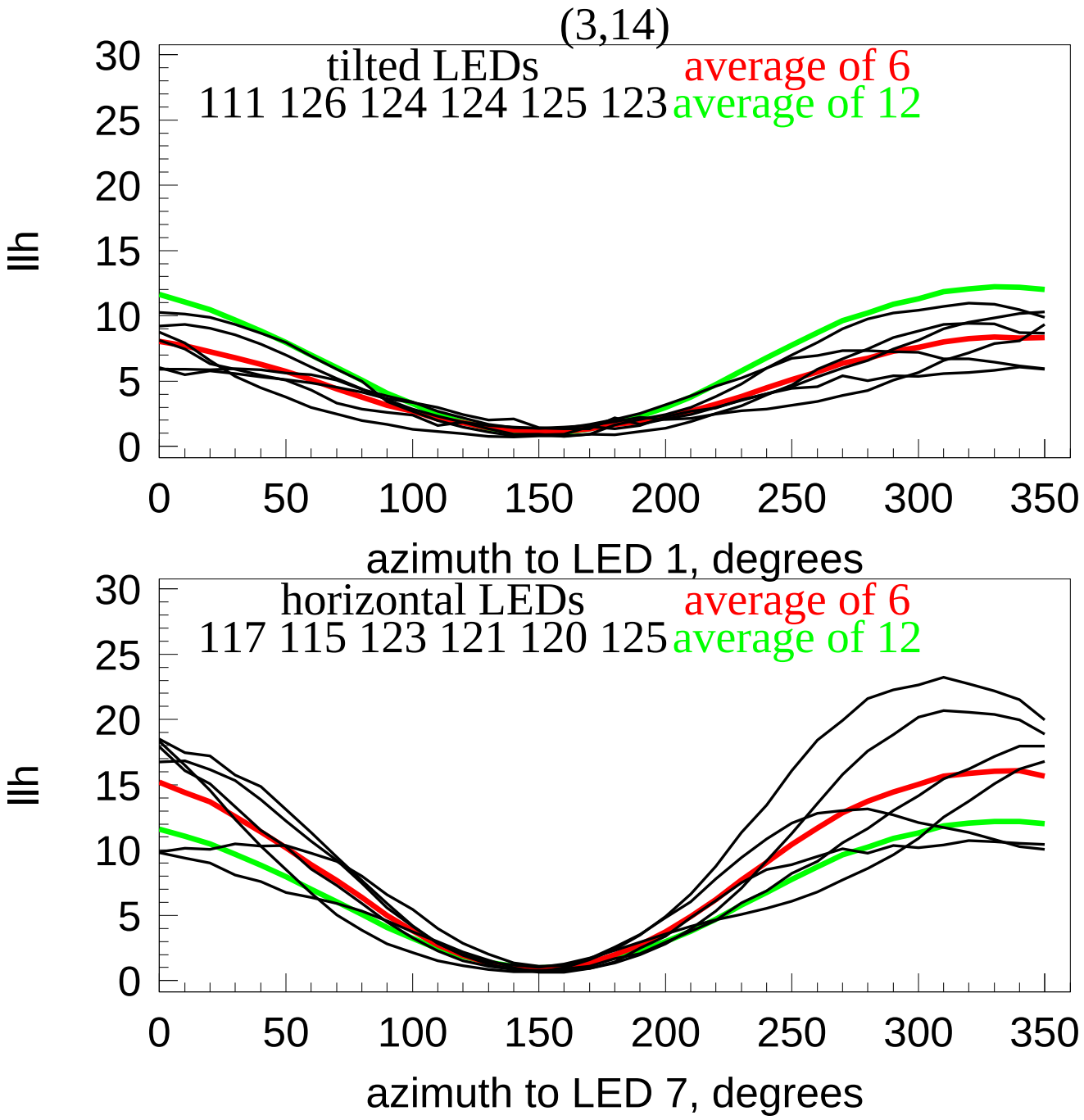

(3,11)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
61.7 ± 12.2

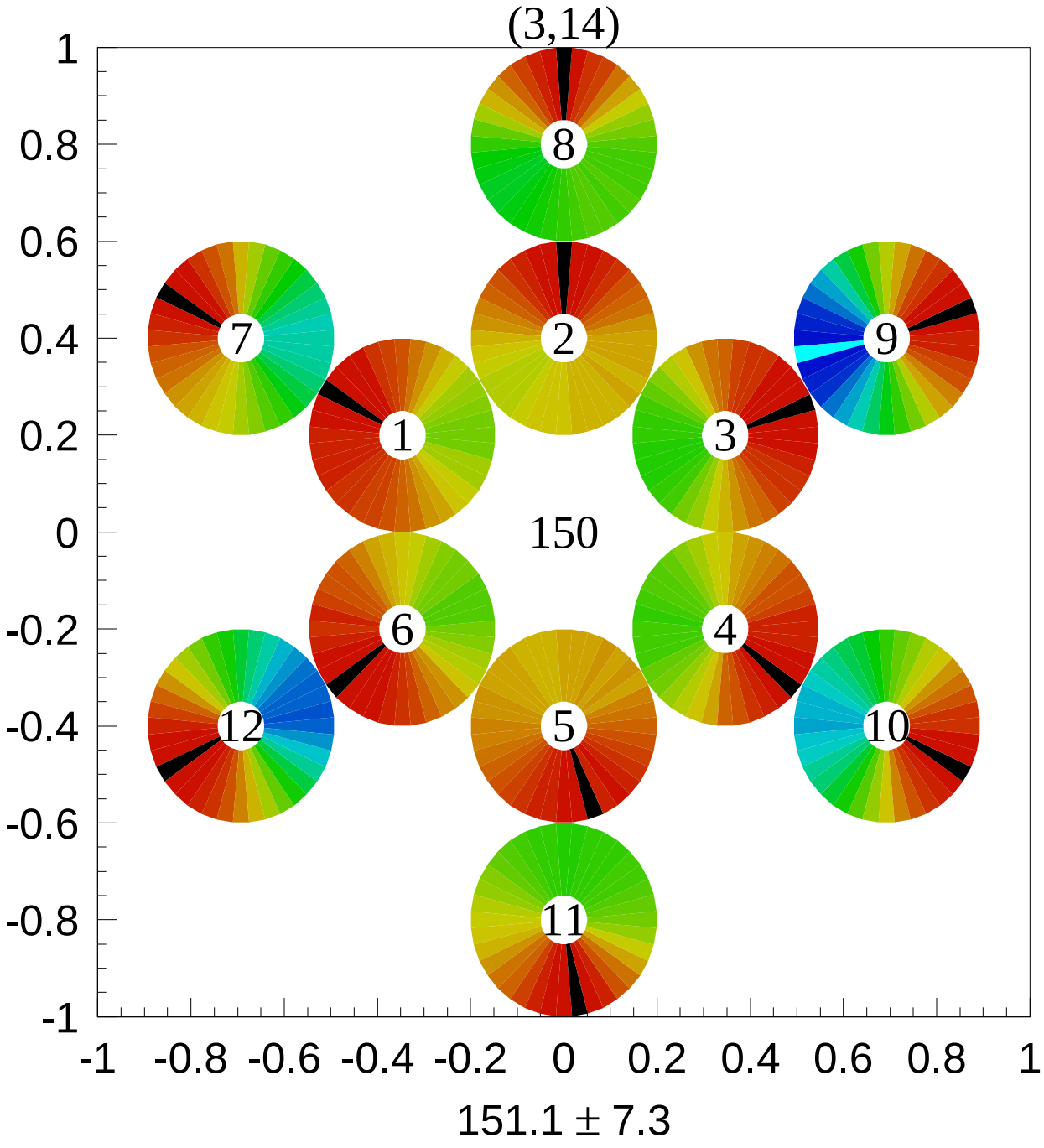

(3,12)
tilted LEDs
123 132 119 122 126 121
average of 6
average of 12
llh
0
2
4
6
8
10
12
14
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 117 116 116 125 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

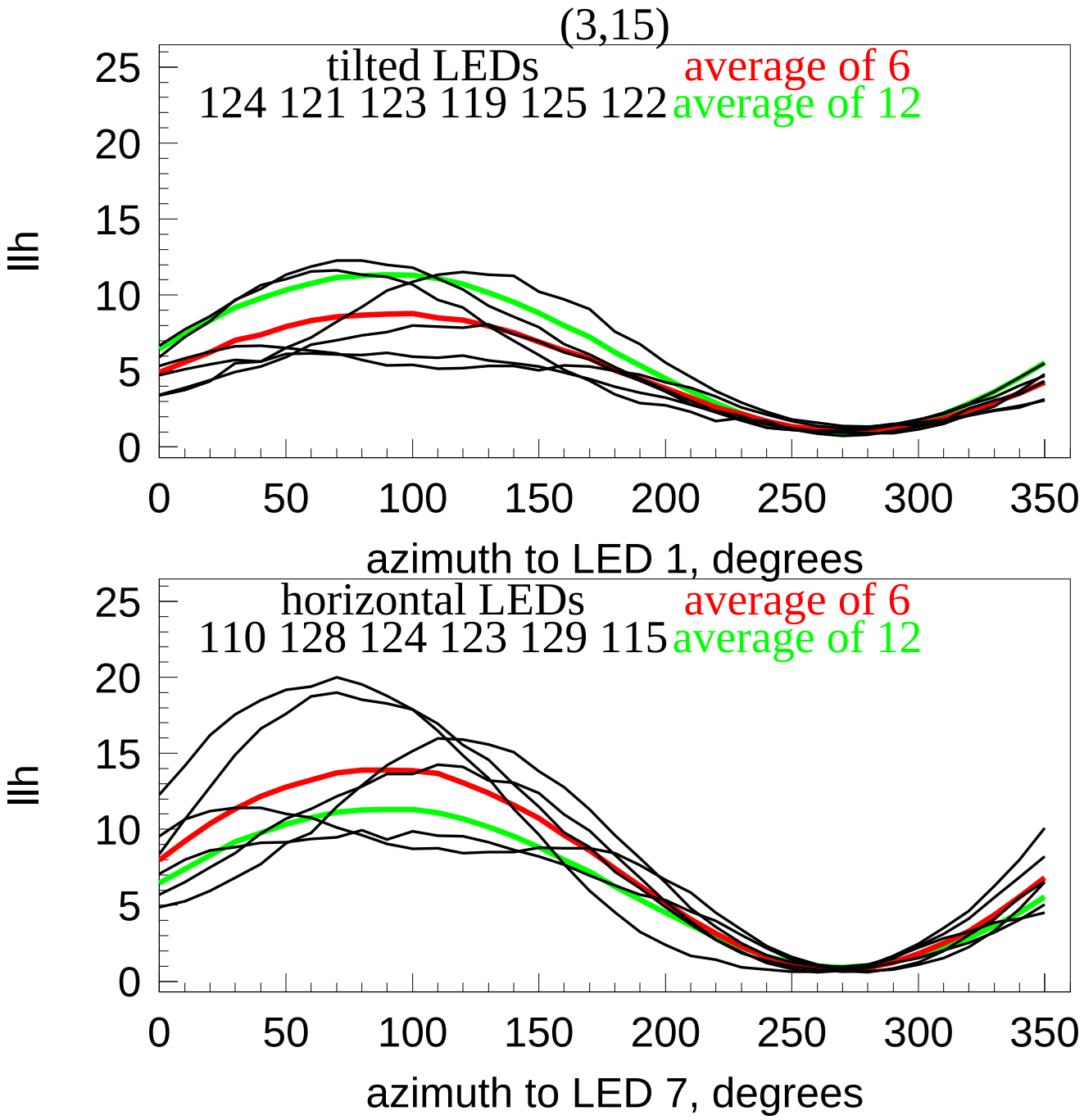

(3,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
74.1 ± 7.4

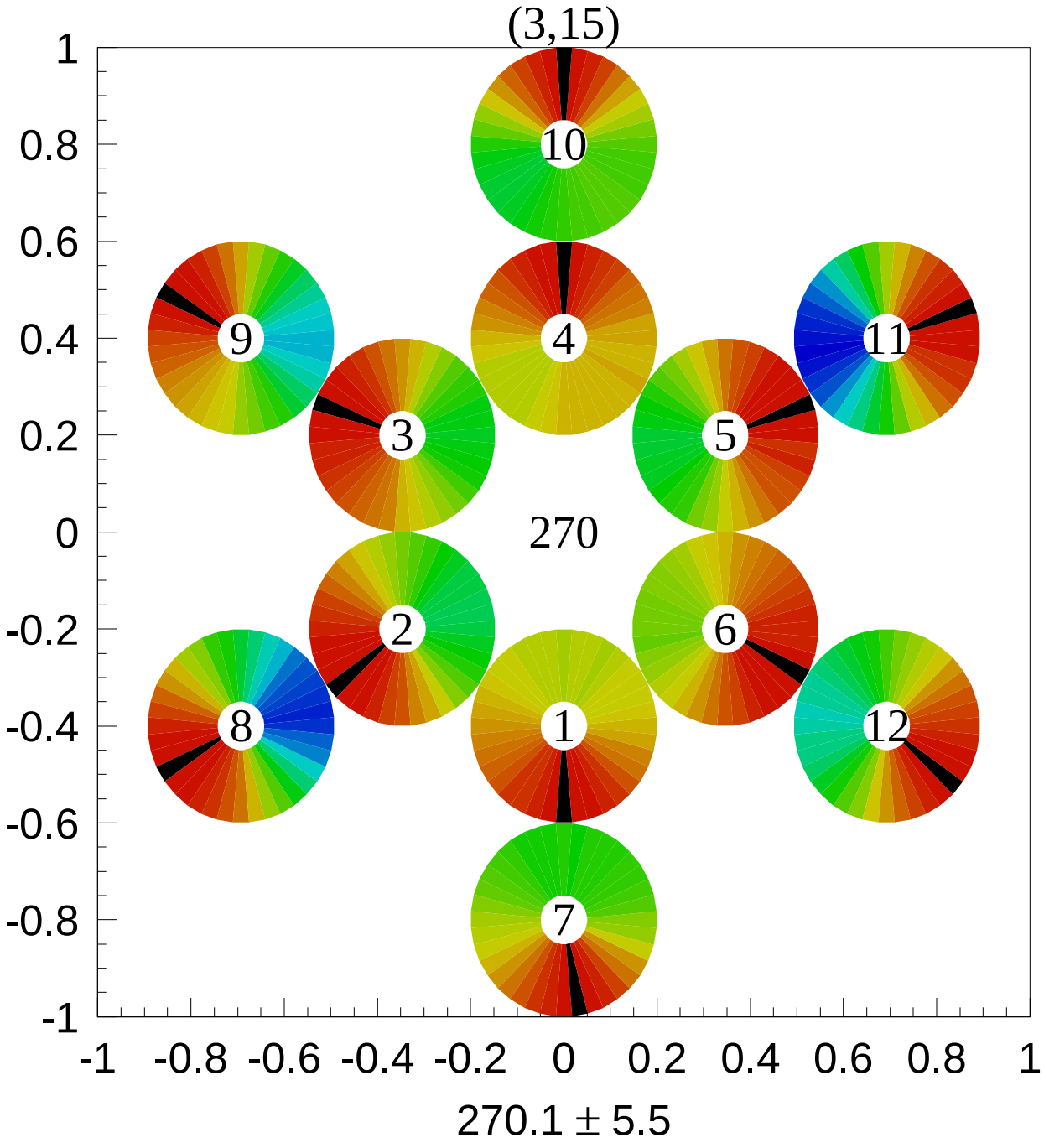

(3,13)
tilted LEDs
126 119 128 120 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 118 124 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

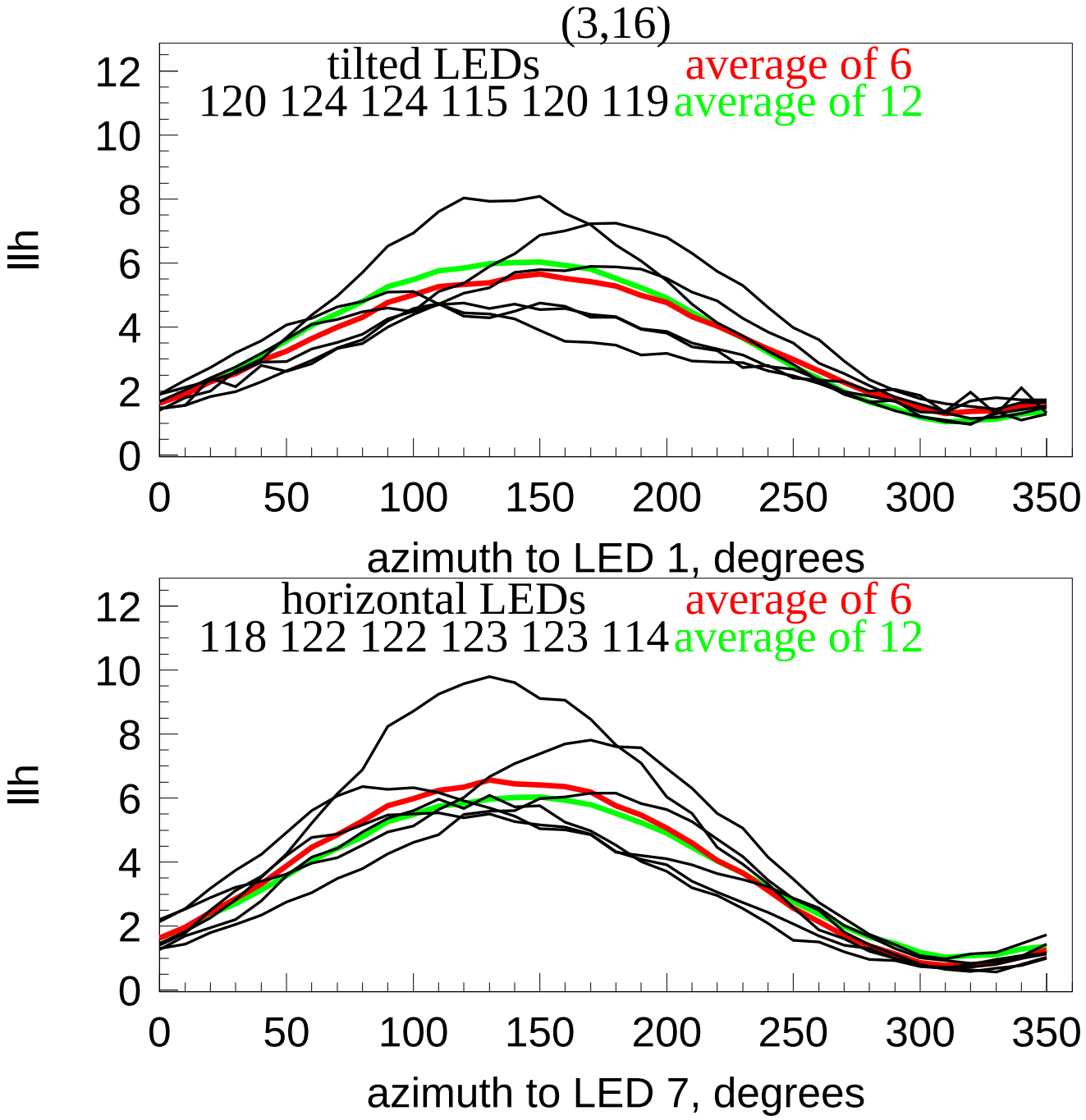

(3,13)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
270.1 ± 6.9

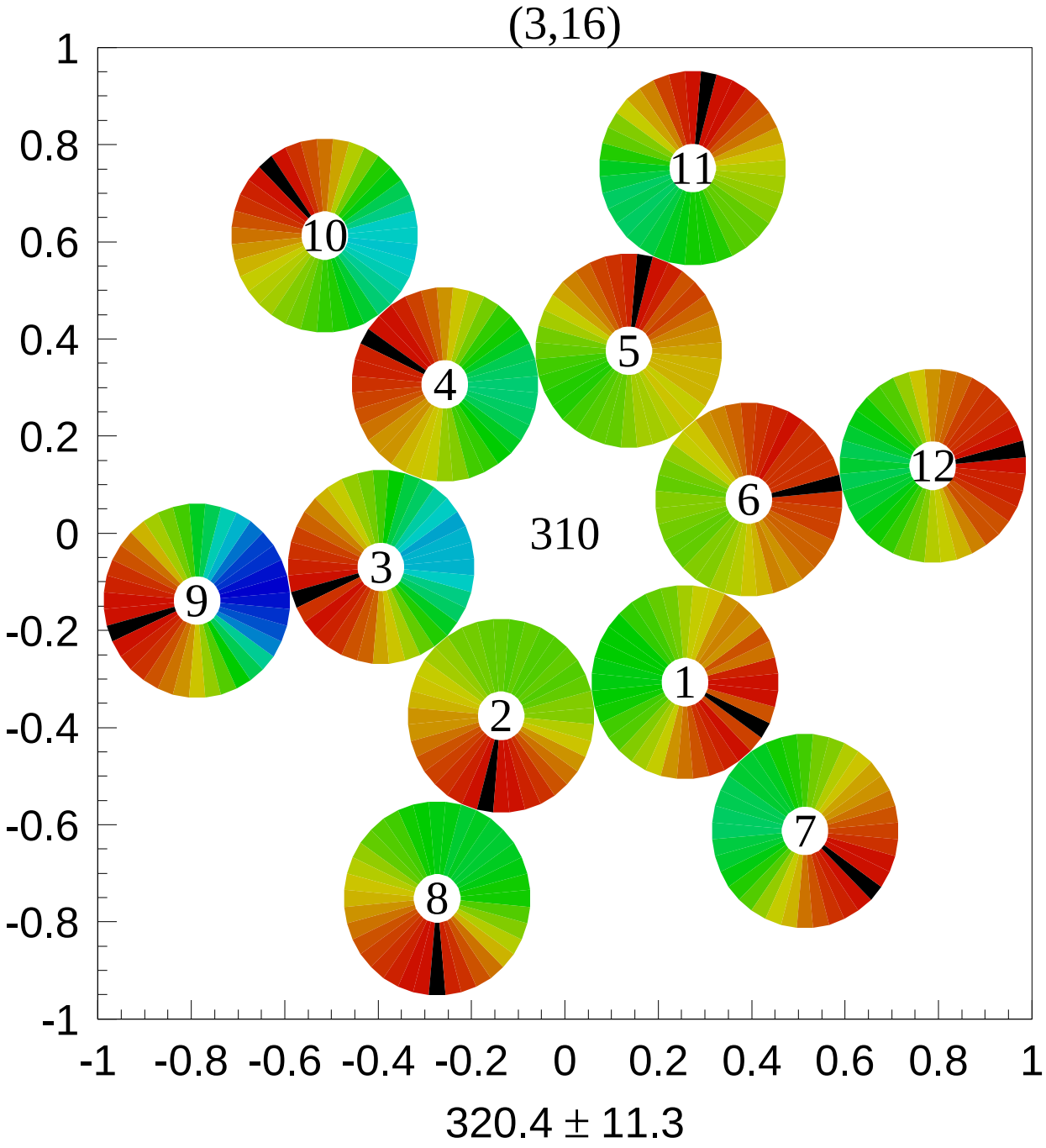

(3,14)
tilted LEDs
111 126 124 124 125 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 115 123 121 120 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

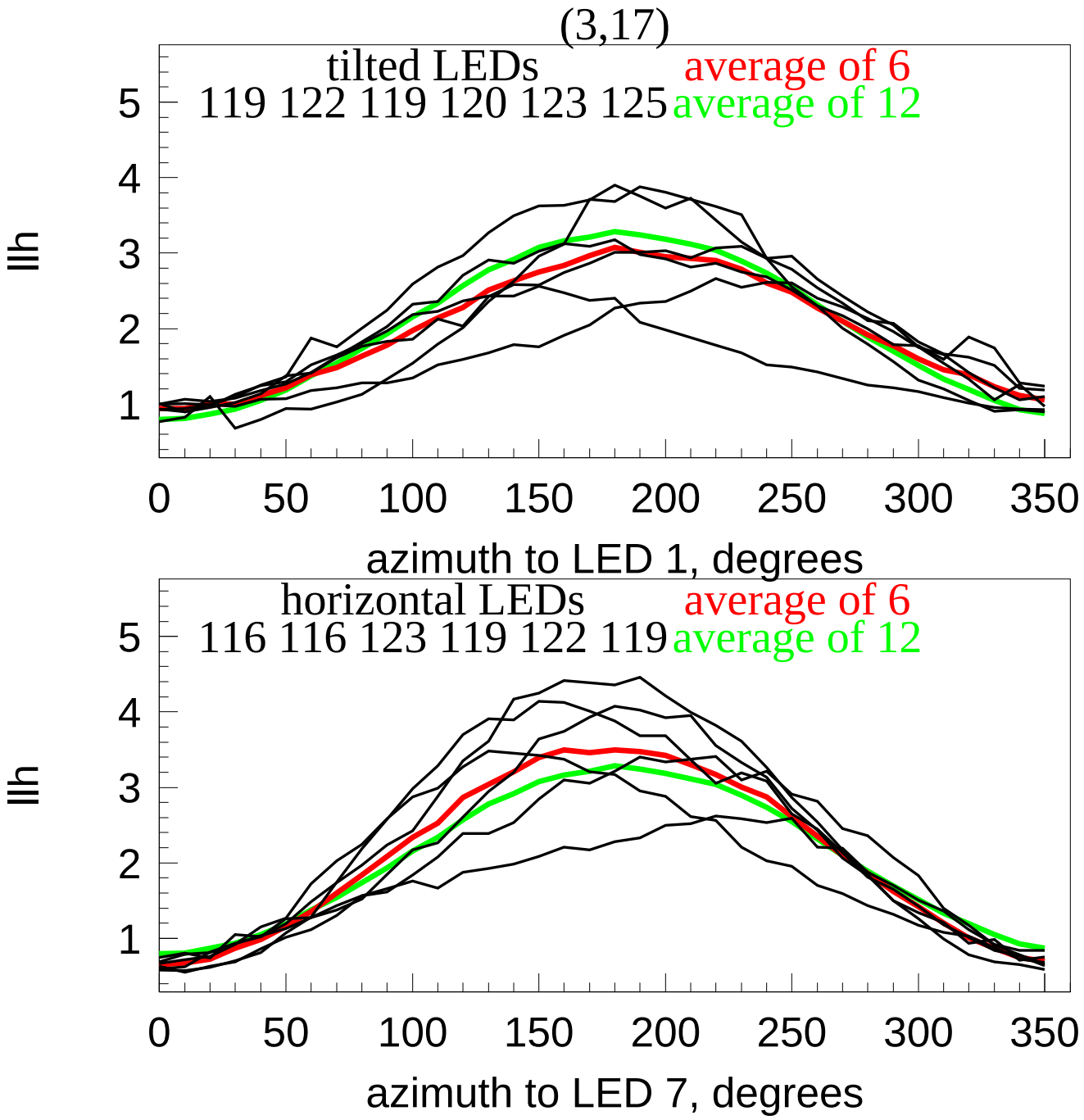

(3,14)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
151.1 ± 7.3

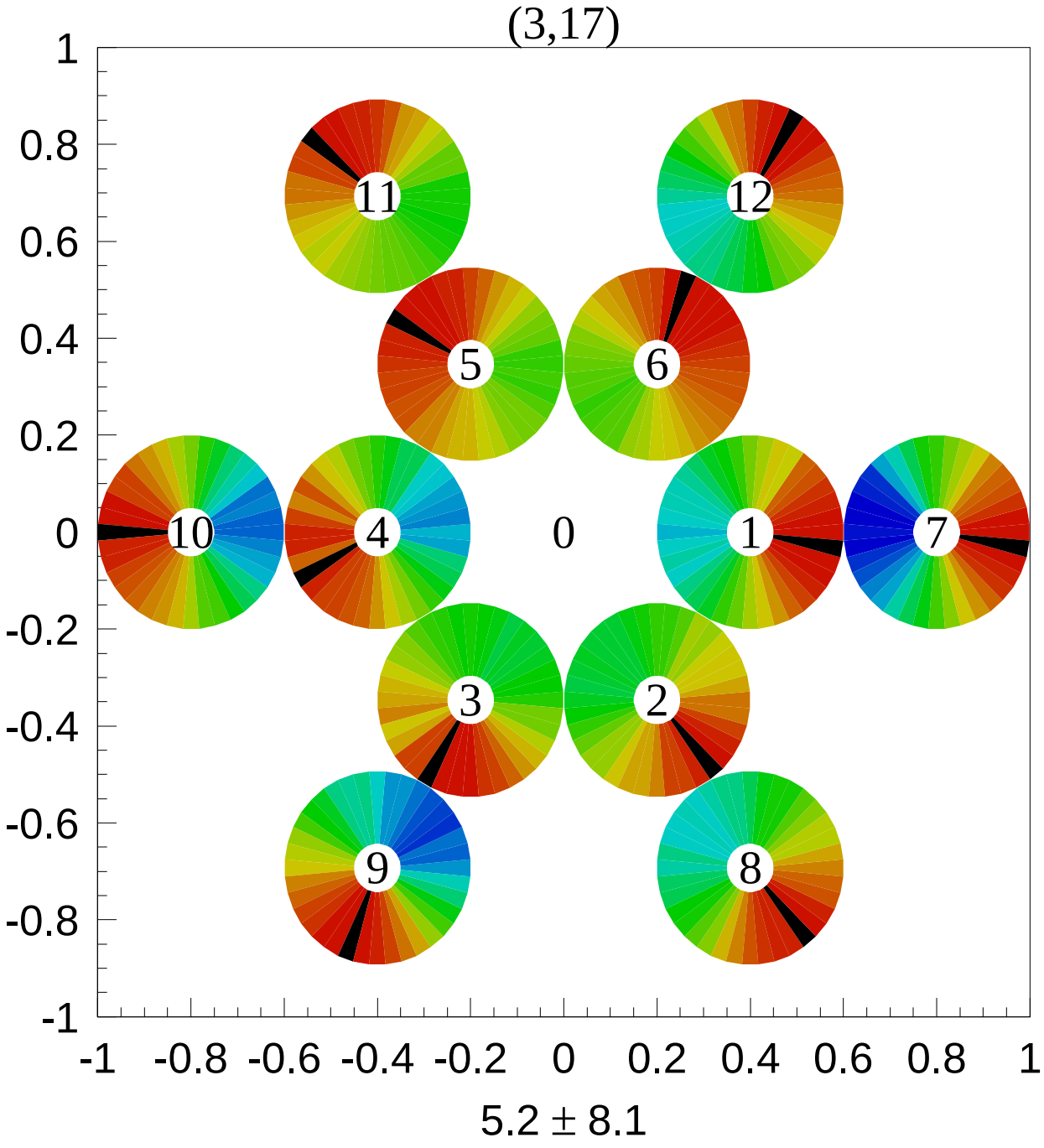

(3,15)
tilted LEDs
124 121 123 119 125 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
110 128 124 123 129 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

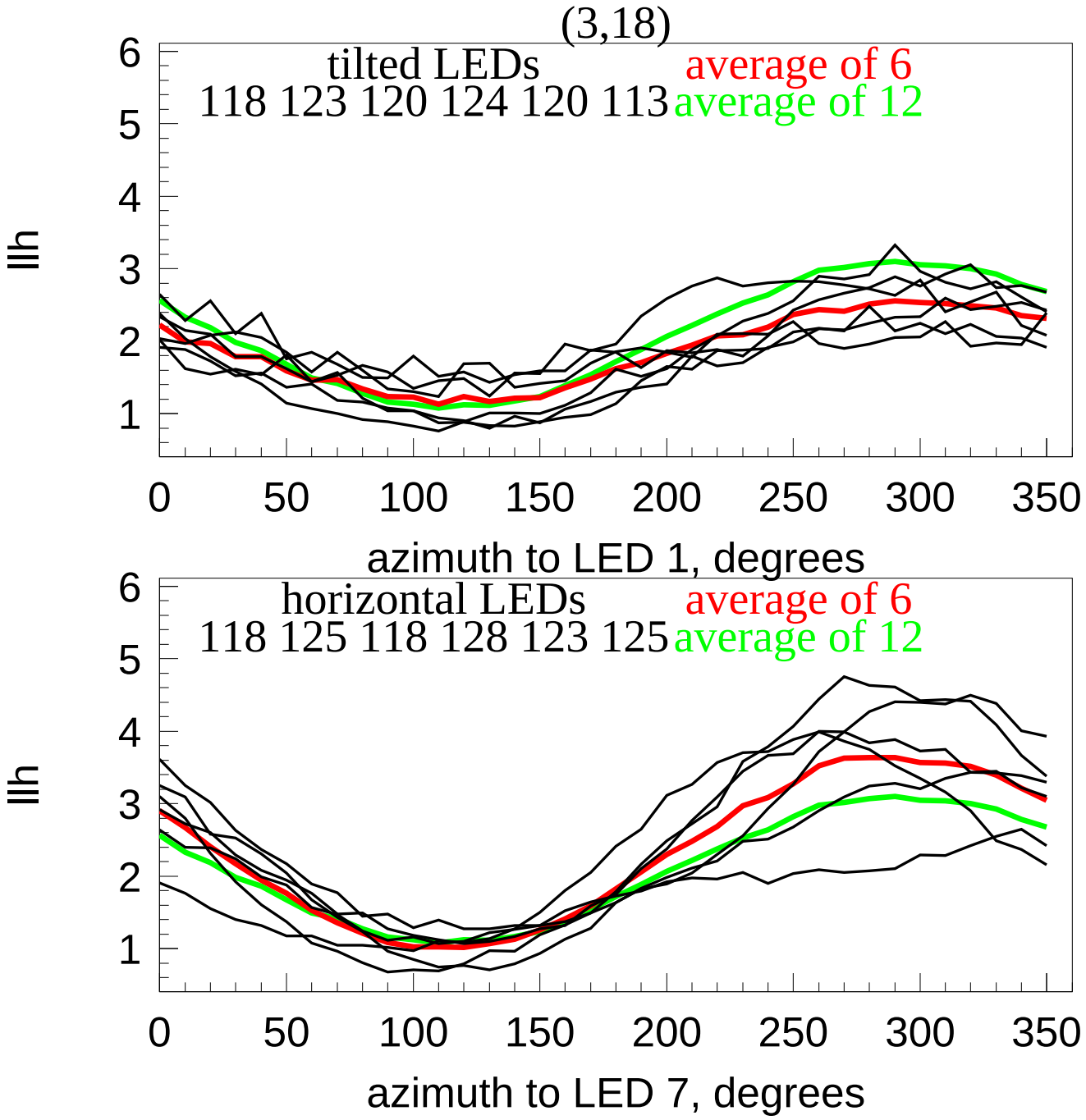

(3,15)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
270.1 ± 5.5

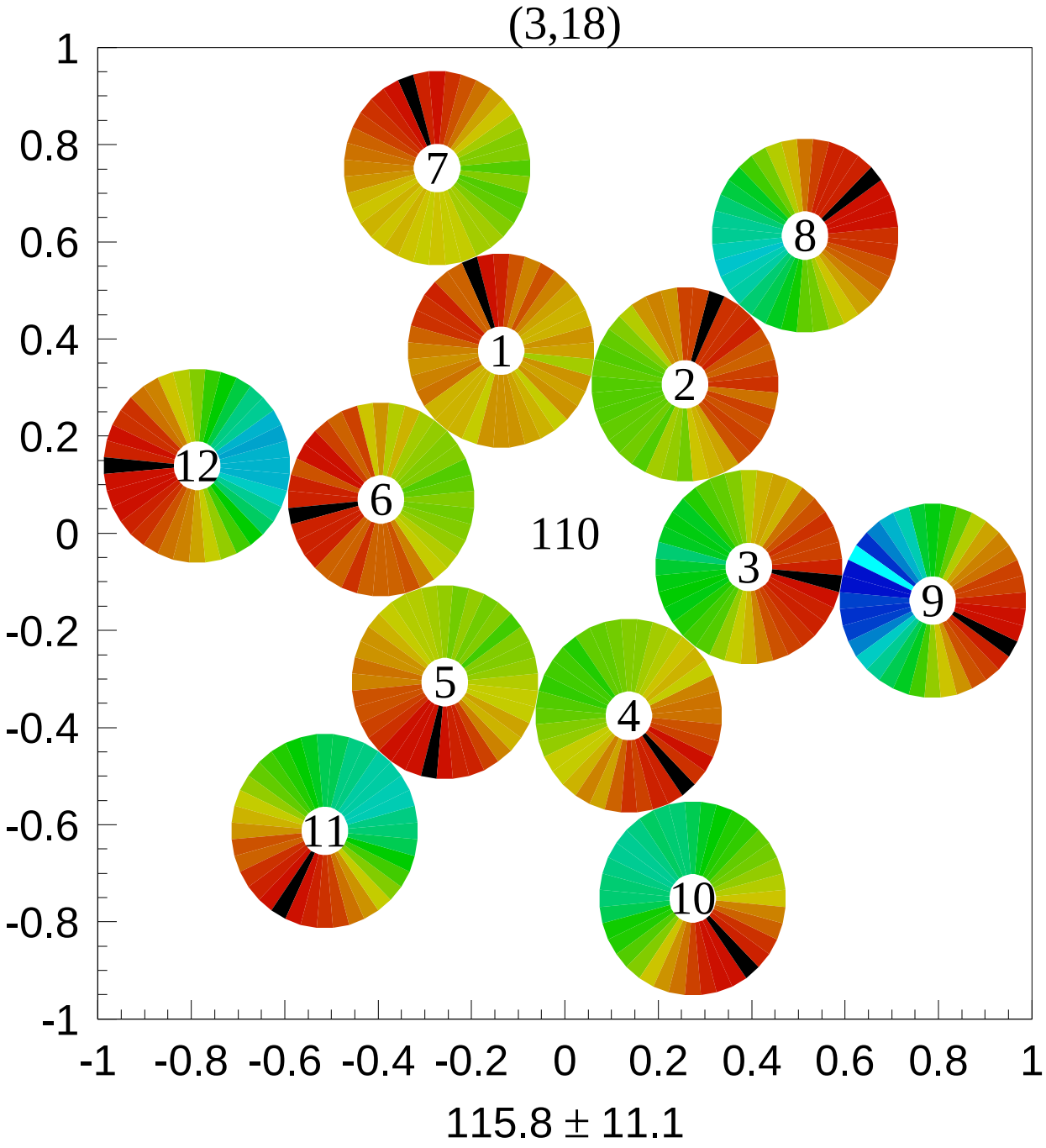

(3,16)
tilted LEDs
120 124 124 115 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 122 122 123 123 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

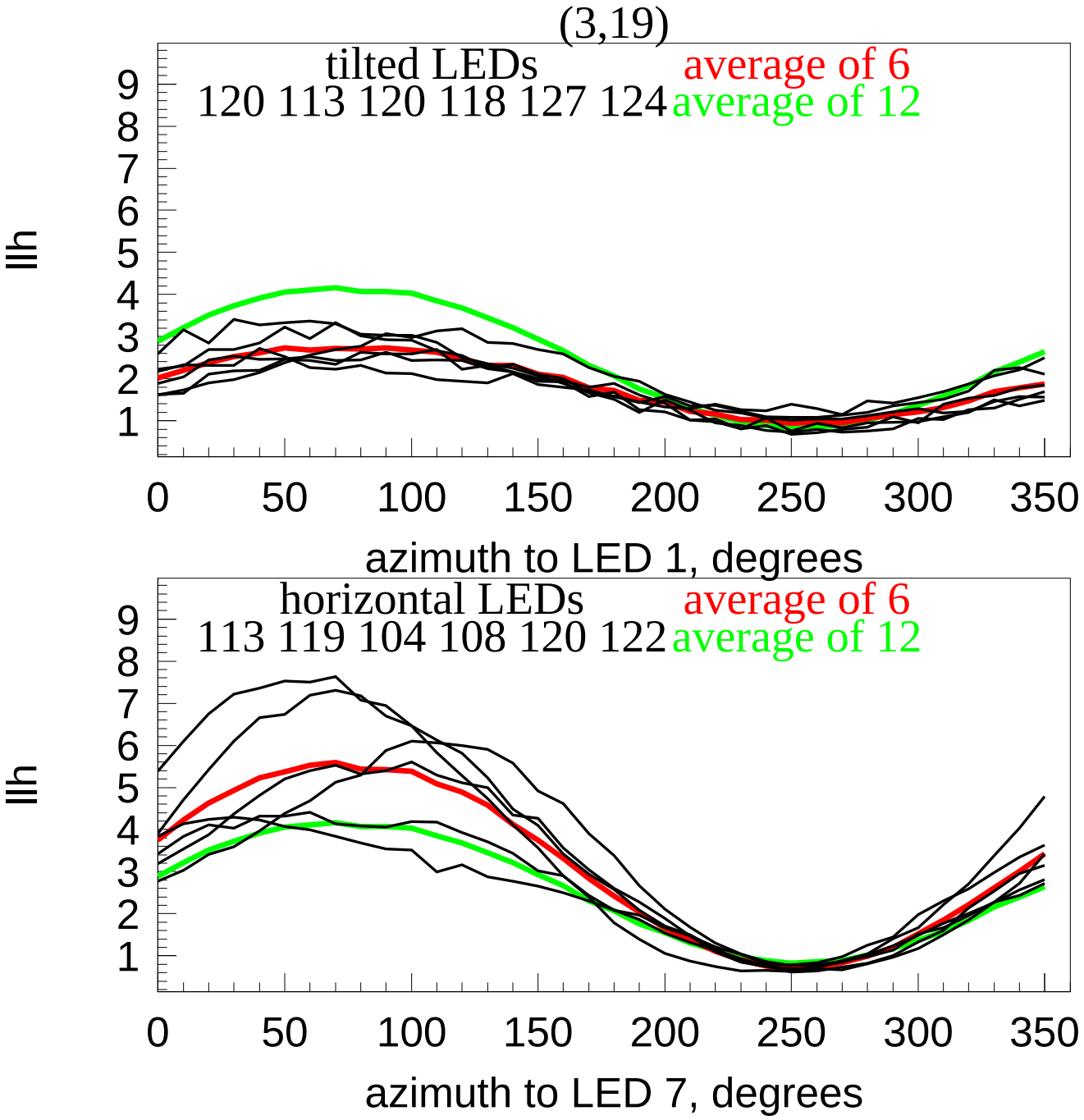

(3,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
320.4 ± 11.3

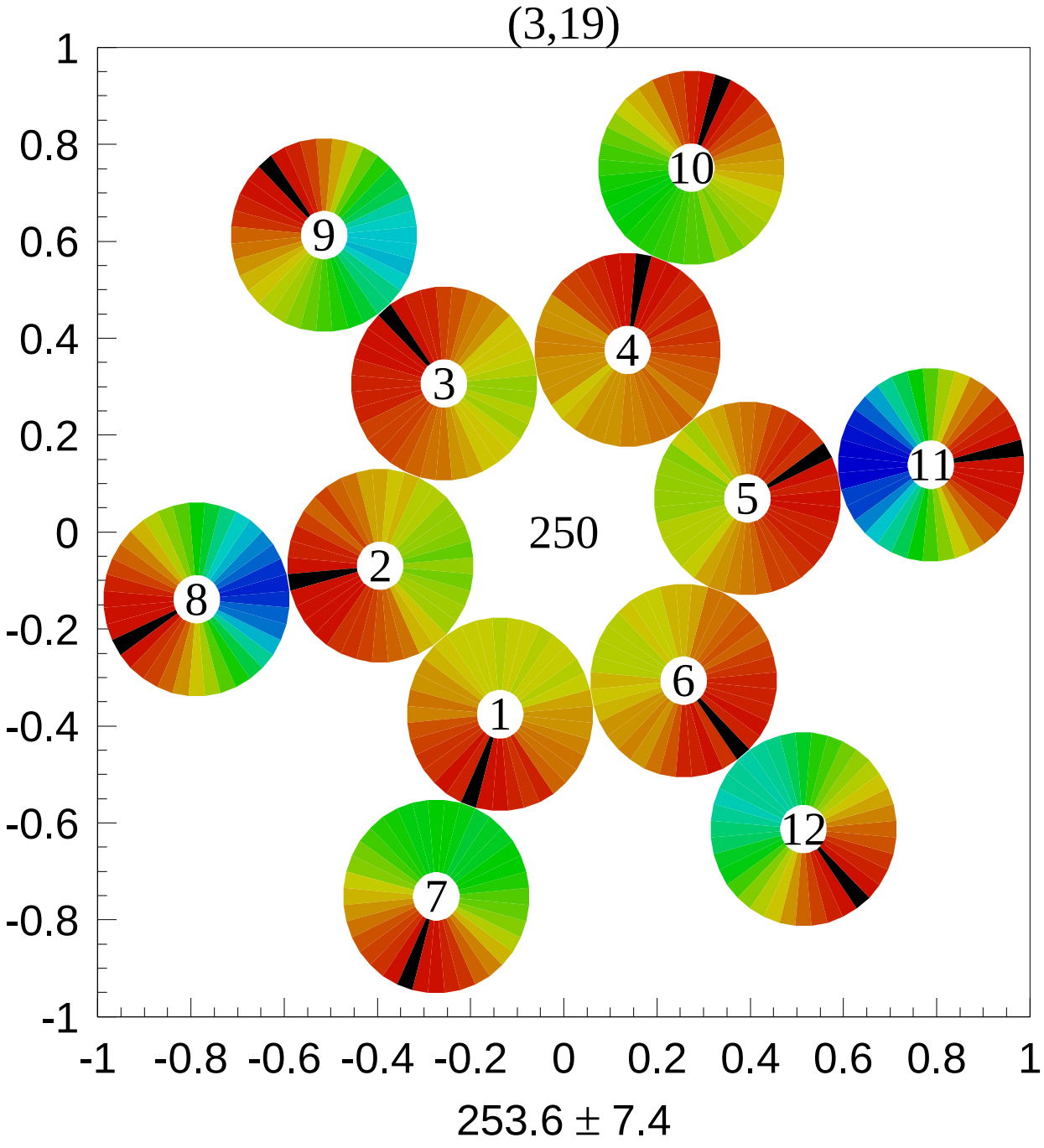

(3,17)
tilted LEDs
119 122 119 120 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 116 123 119 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

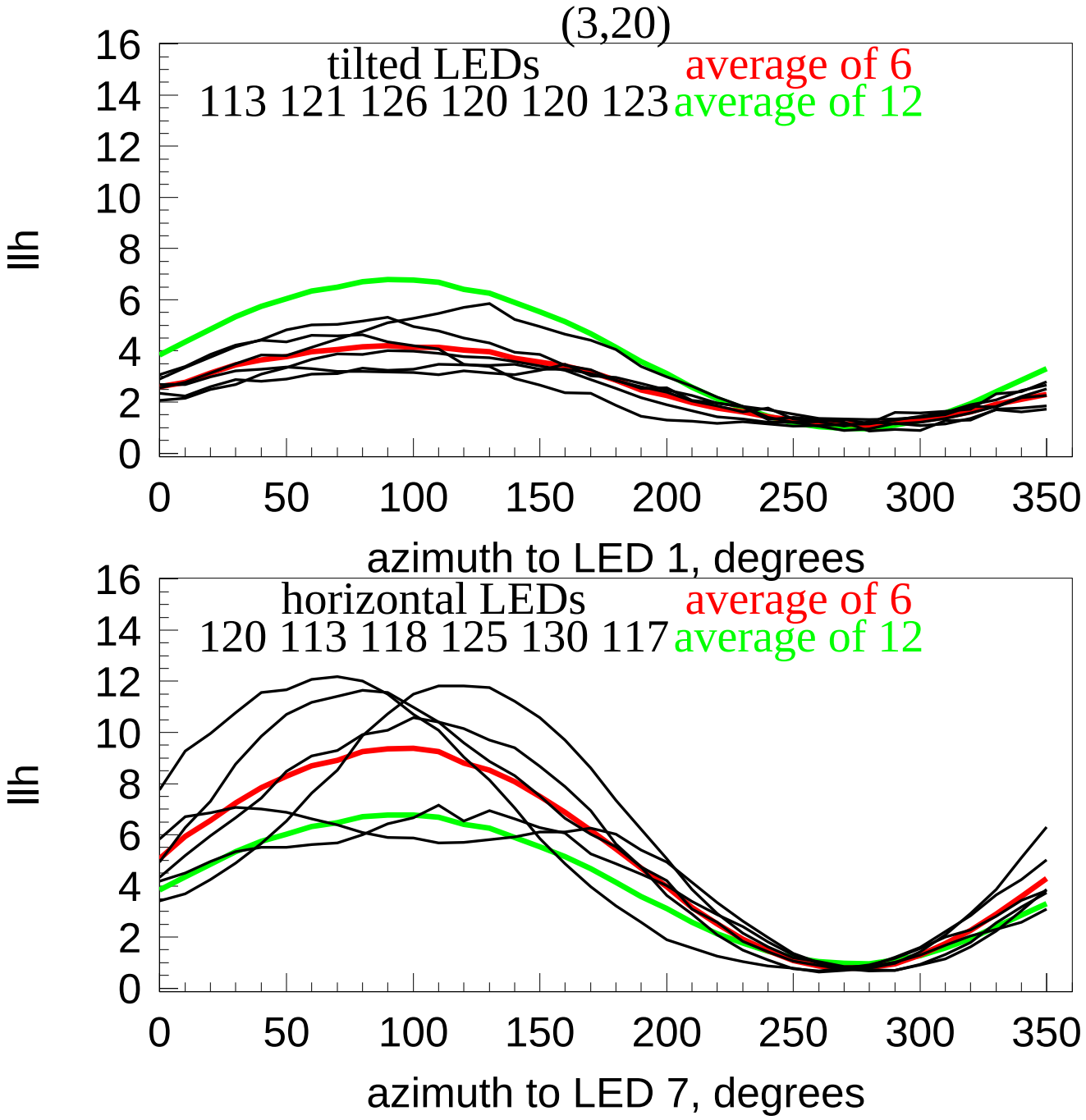

(3,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
5.2 ± 8.1

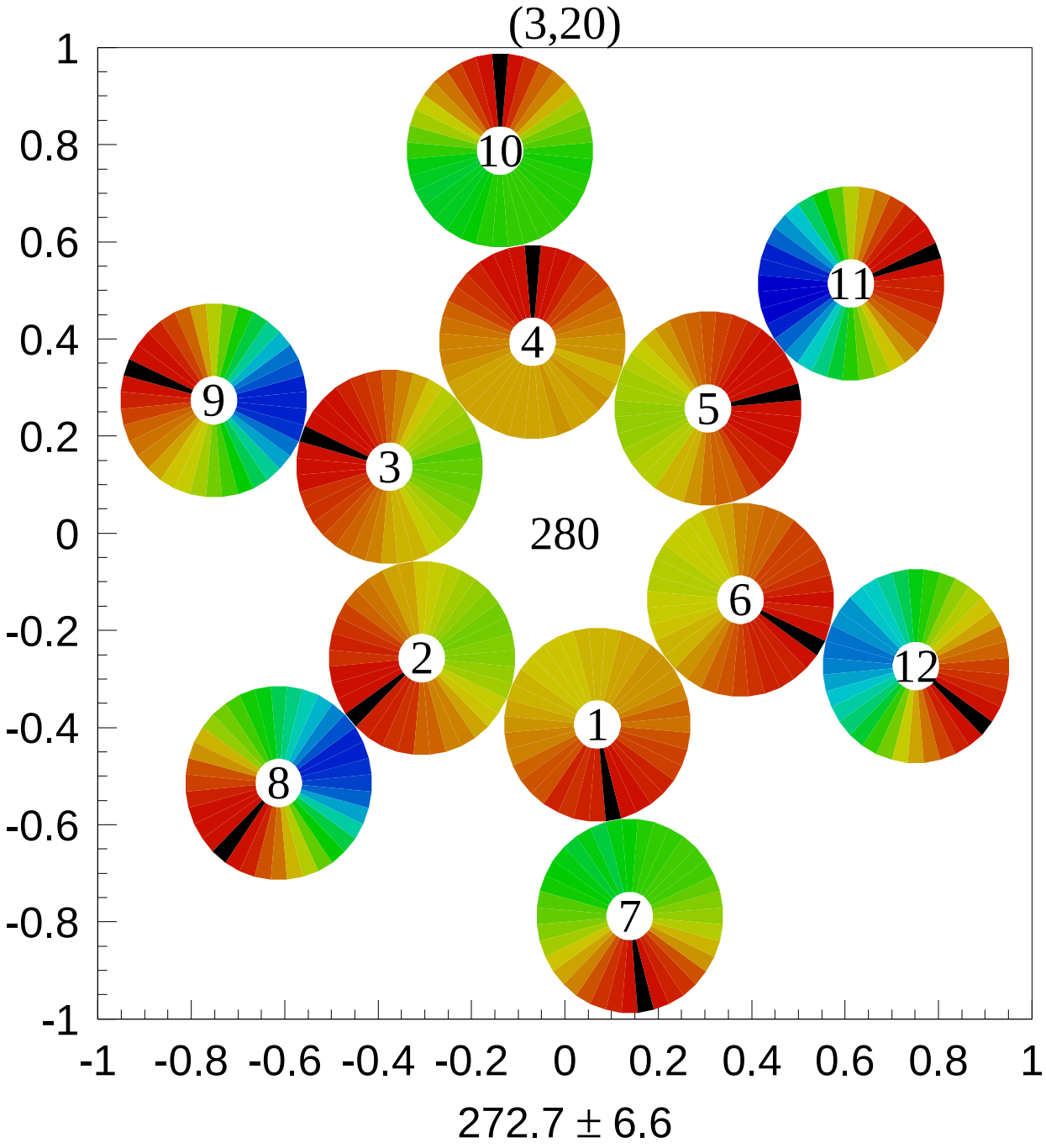

(3,18)
tilted LEDs
118 123 120 124 120 113
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 125 118 128 123 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

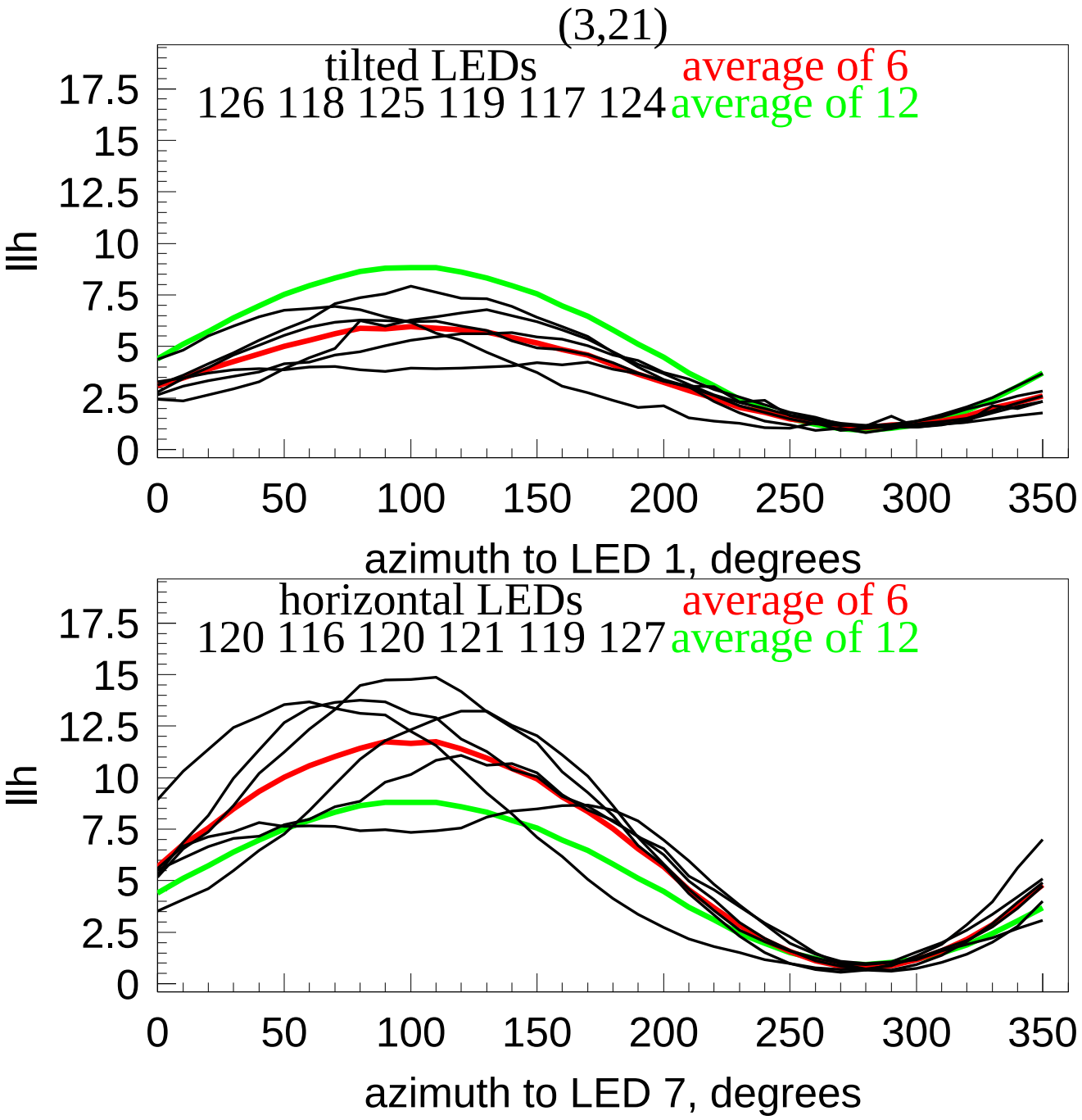

(3,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
115.8 ± 11.1

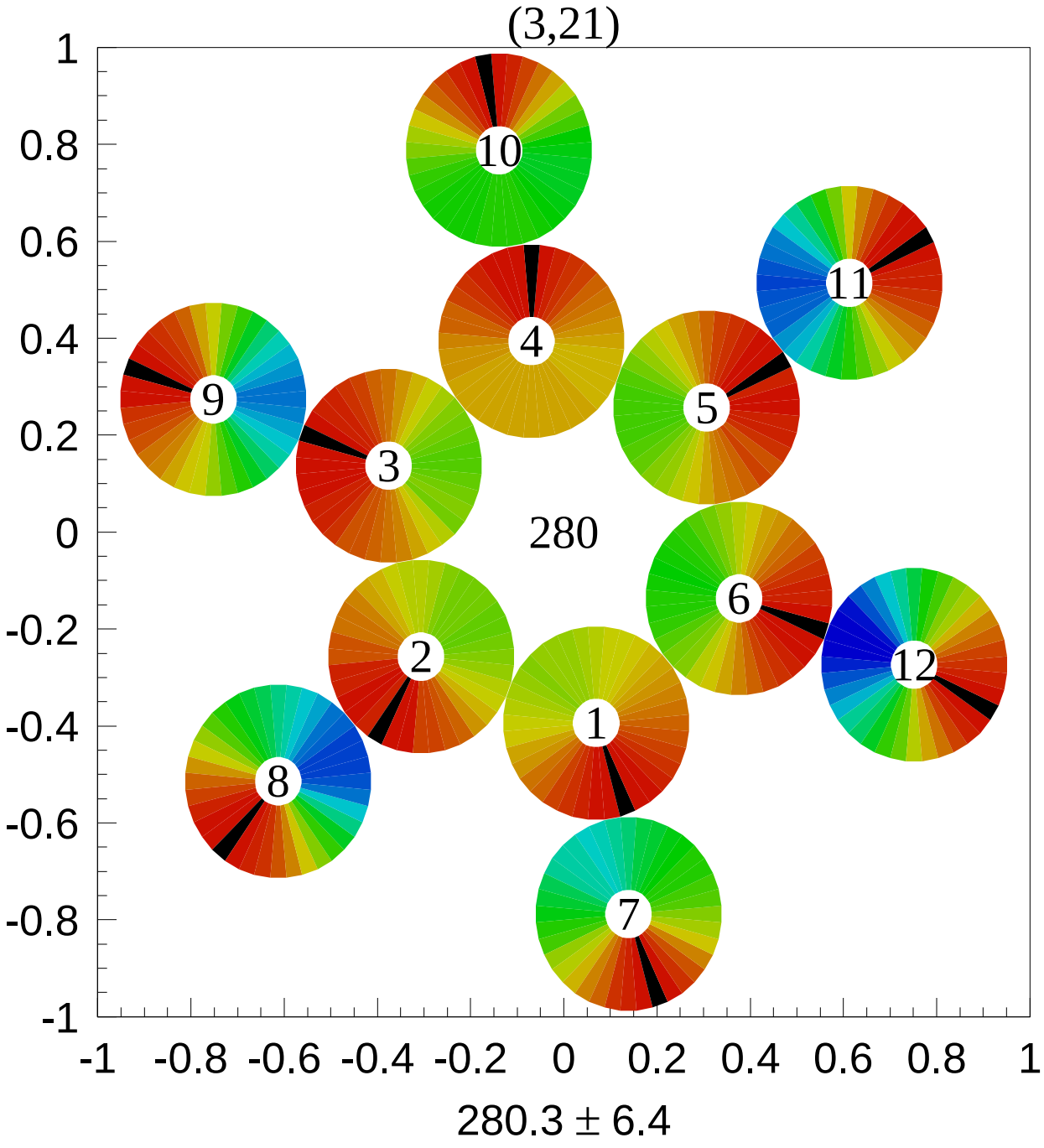

(3,19)
tilted LEDs
120 113 120 118 127 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 119 104 108 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

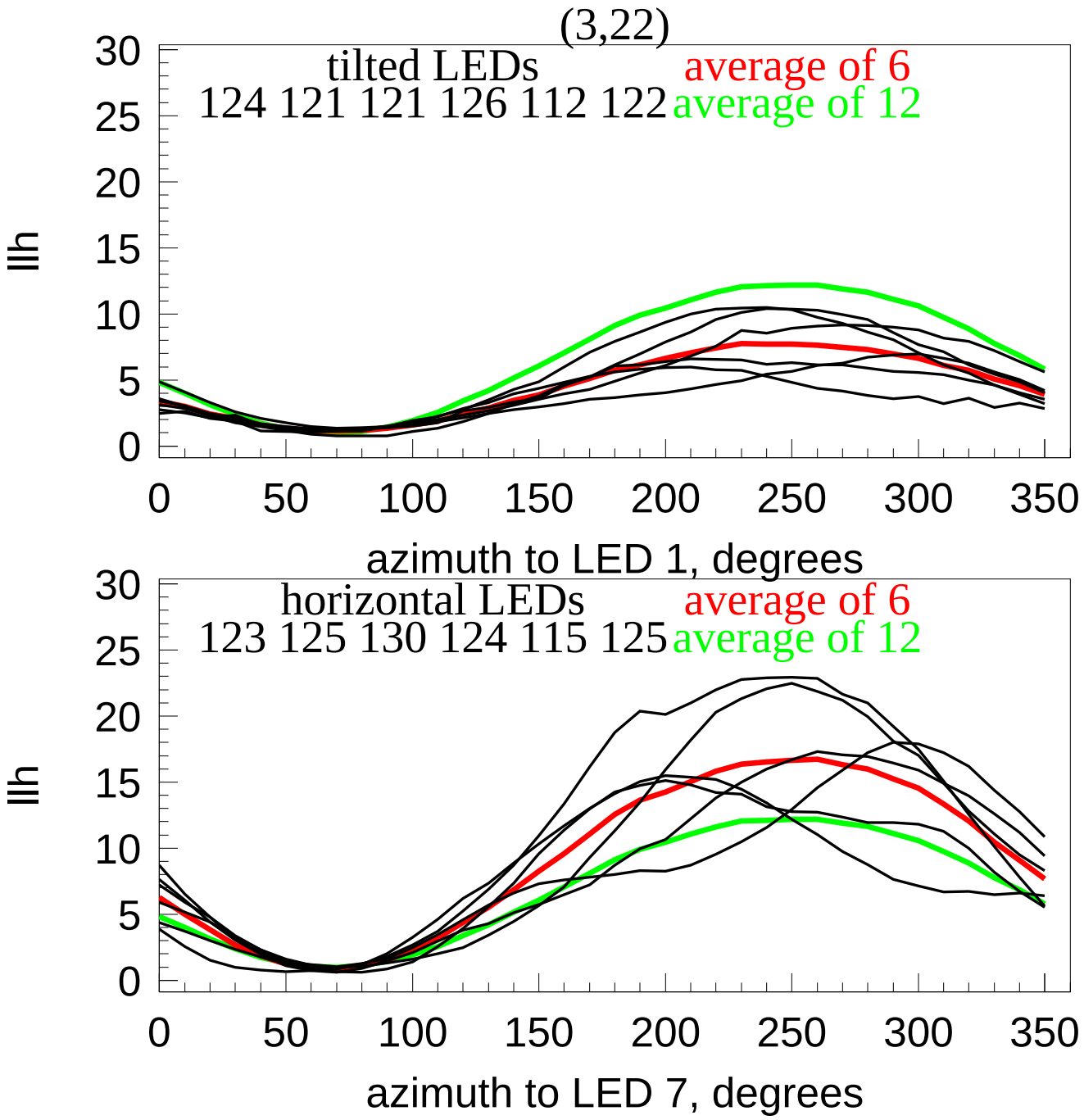

(3,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
253.6 ± 7.4

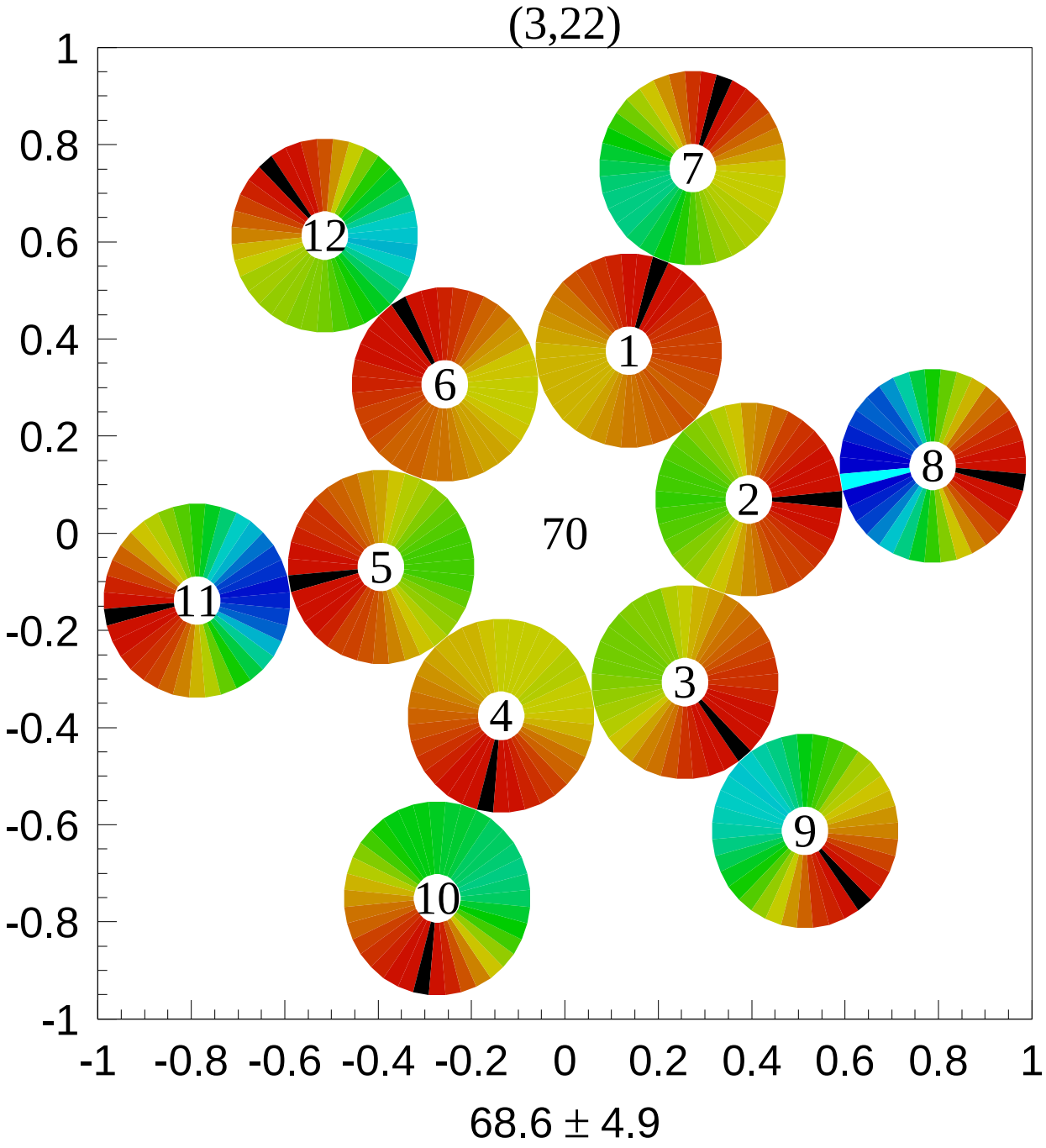

(3,20)
tilted LEDs
113 121 126 120 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 113 118 125 130 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

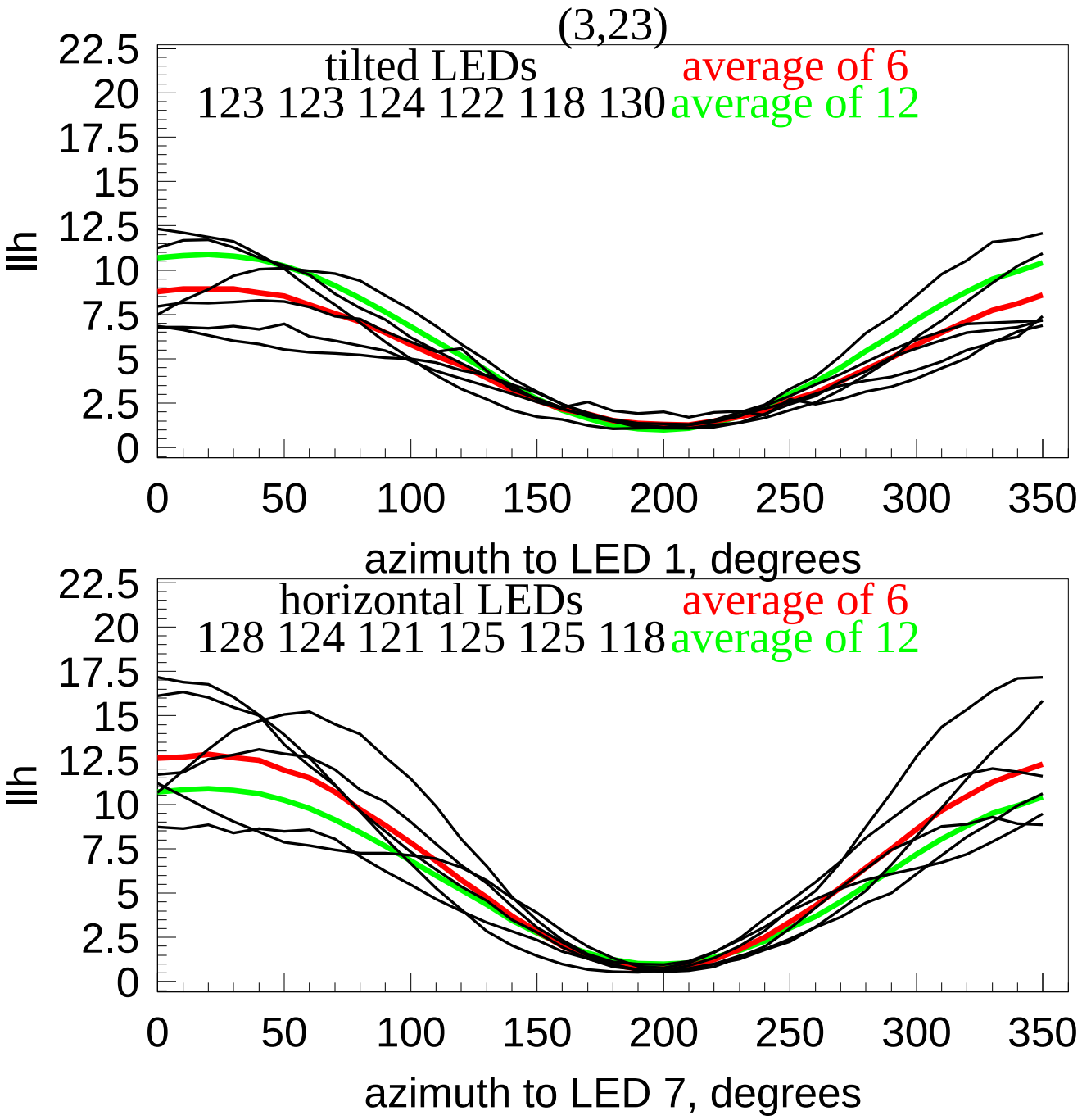

(3,20)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.7 ± 6.6

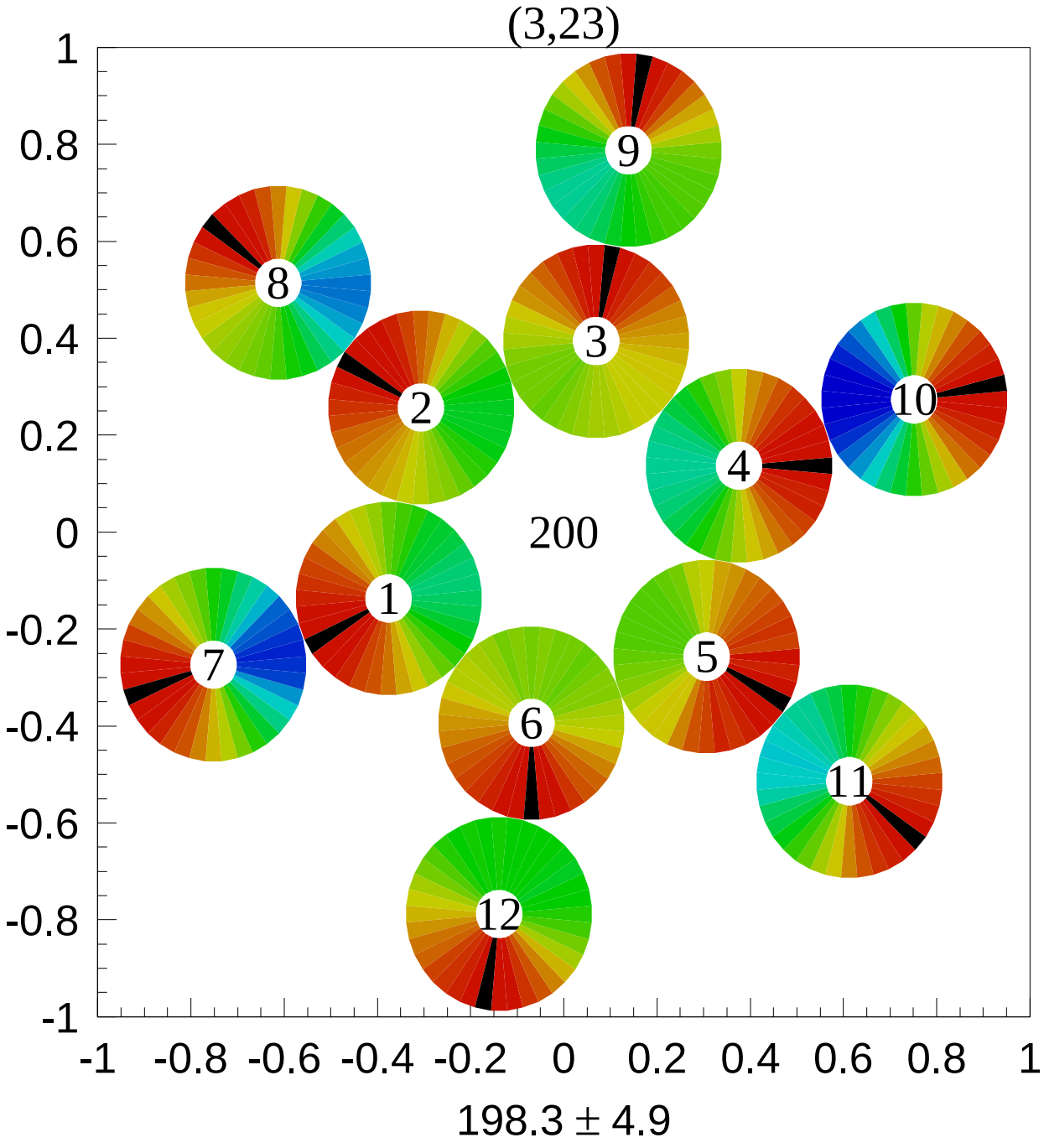

(3,21)
tilted LEDs
126 118 125 119 117 124
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 116 120 121 119 127
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

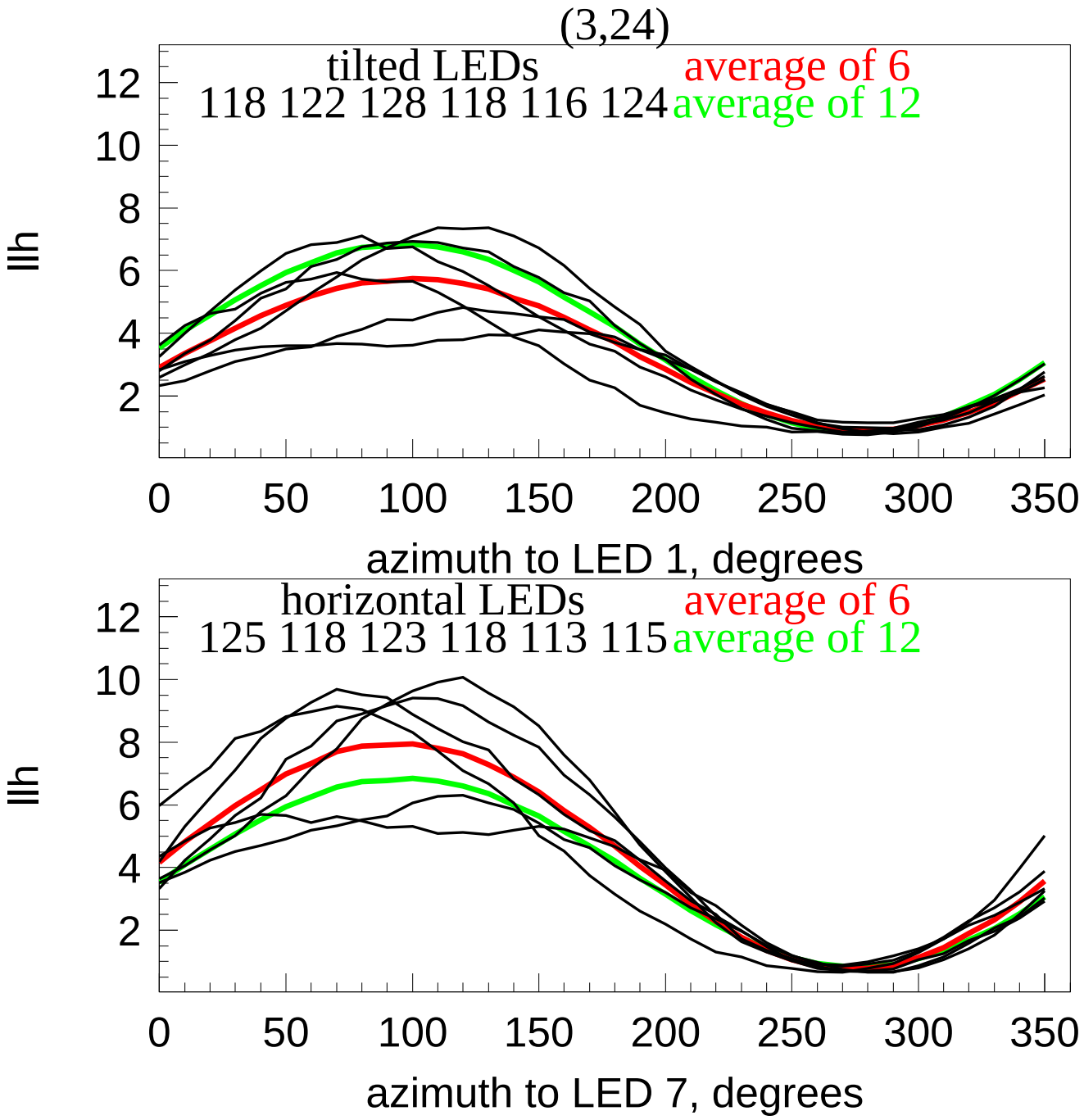

(3,21)
10
4
11
9
3
5
280
6
2
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
280.3 ± 6.4

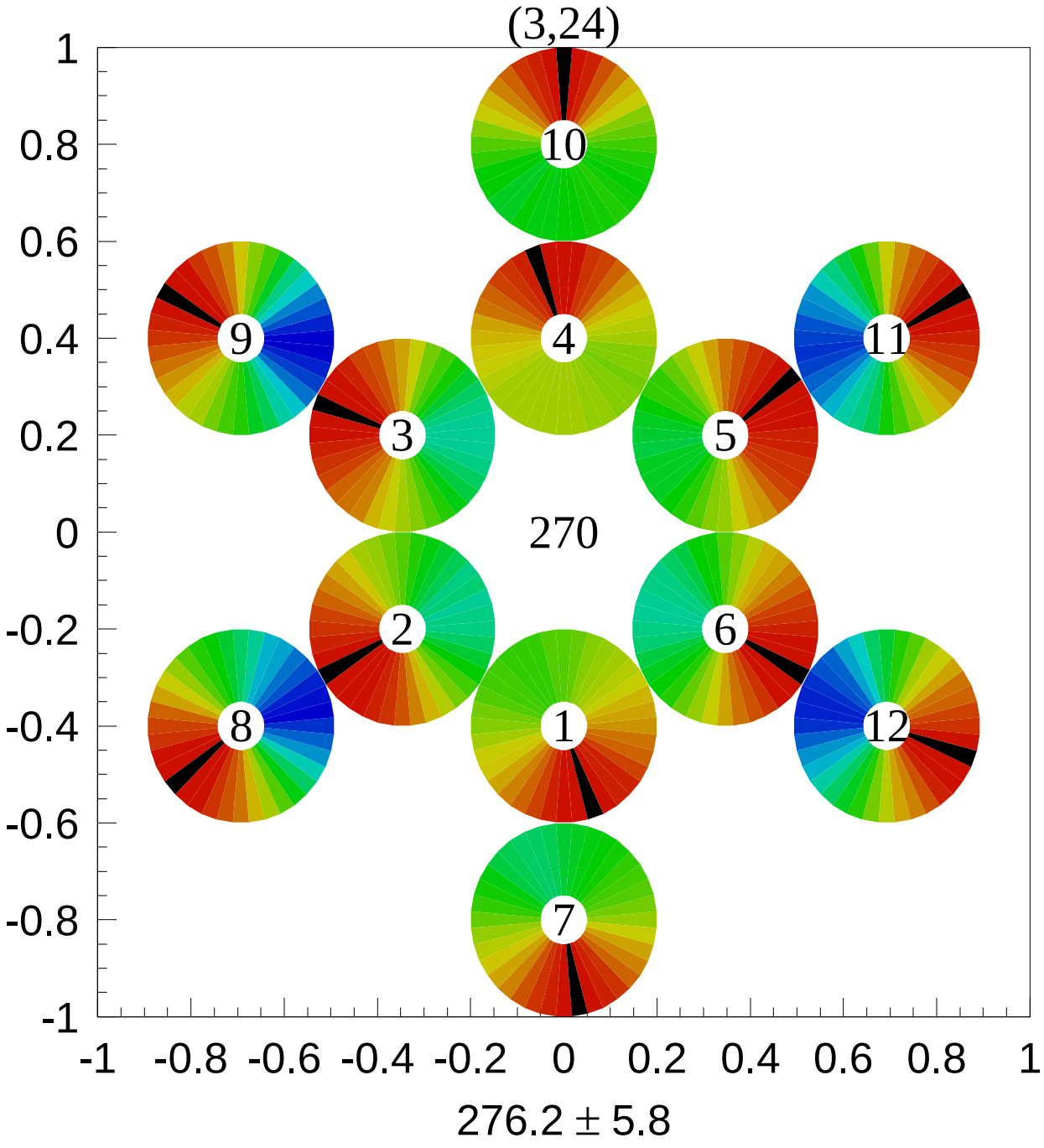

(3,22)
tilted LEDs
124 121 121 126 112 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 130 124 115 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

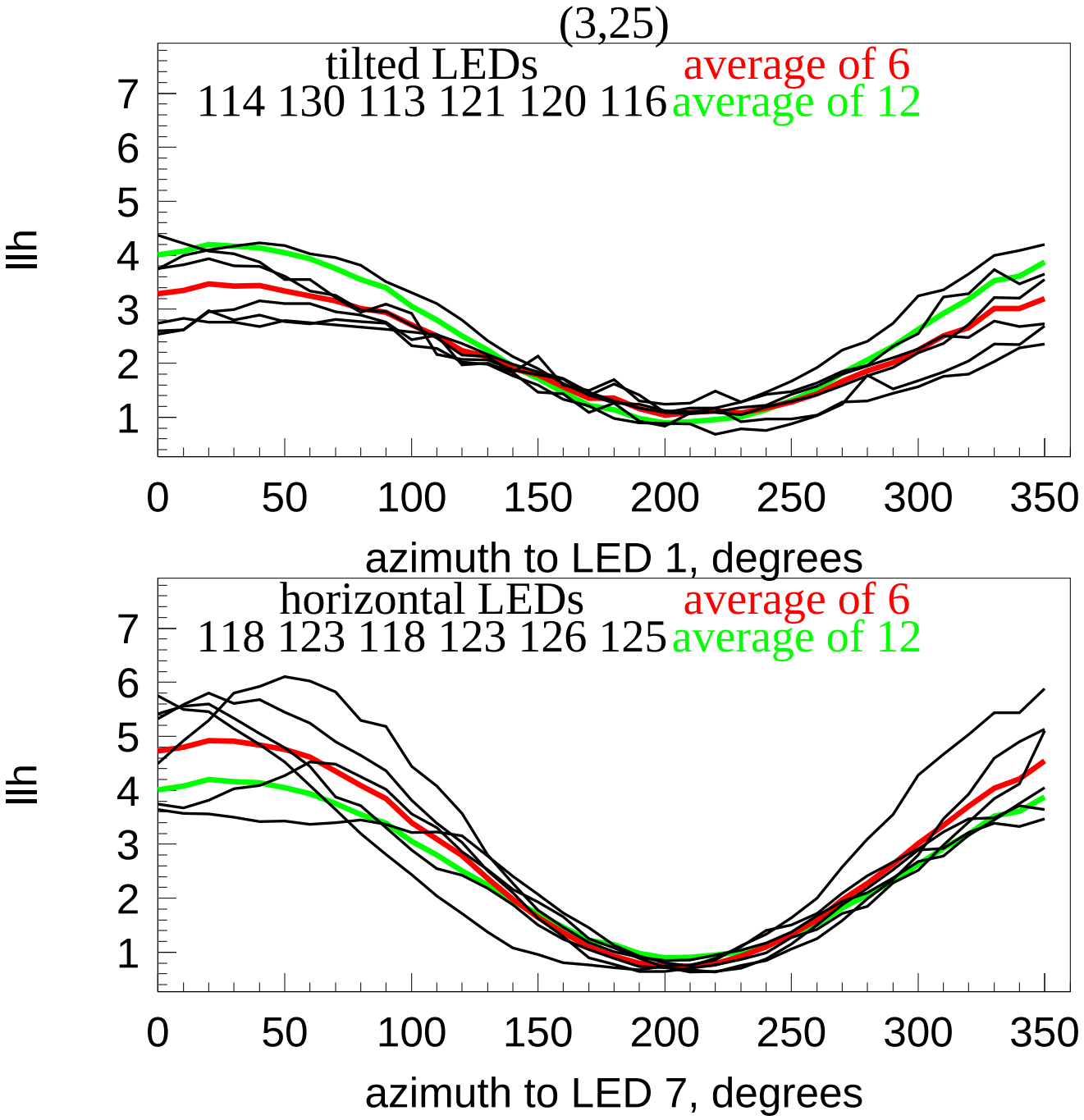

(3,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
70
1
2
3
4
5
6
7
8
9
10
11
12
68.6 ± 4.9

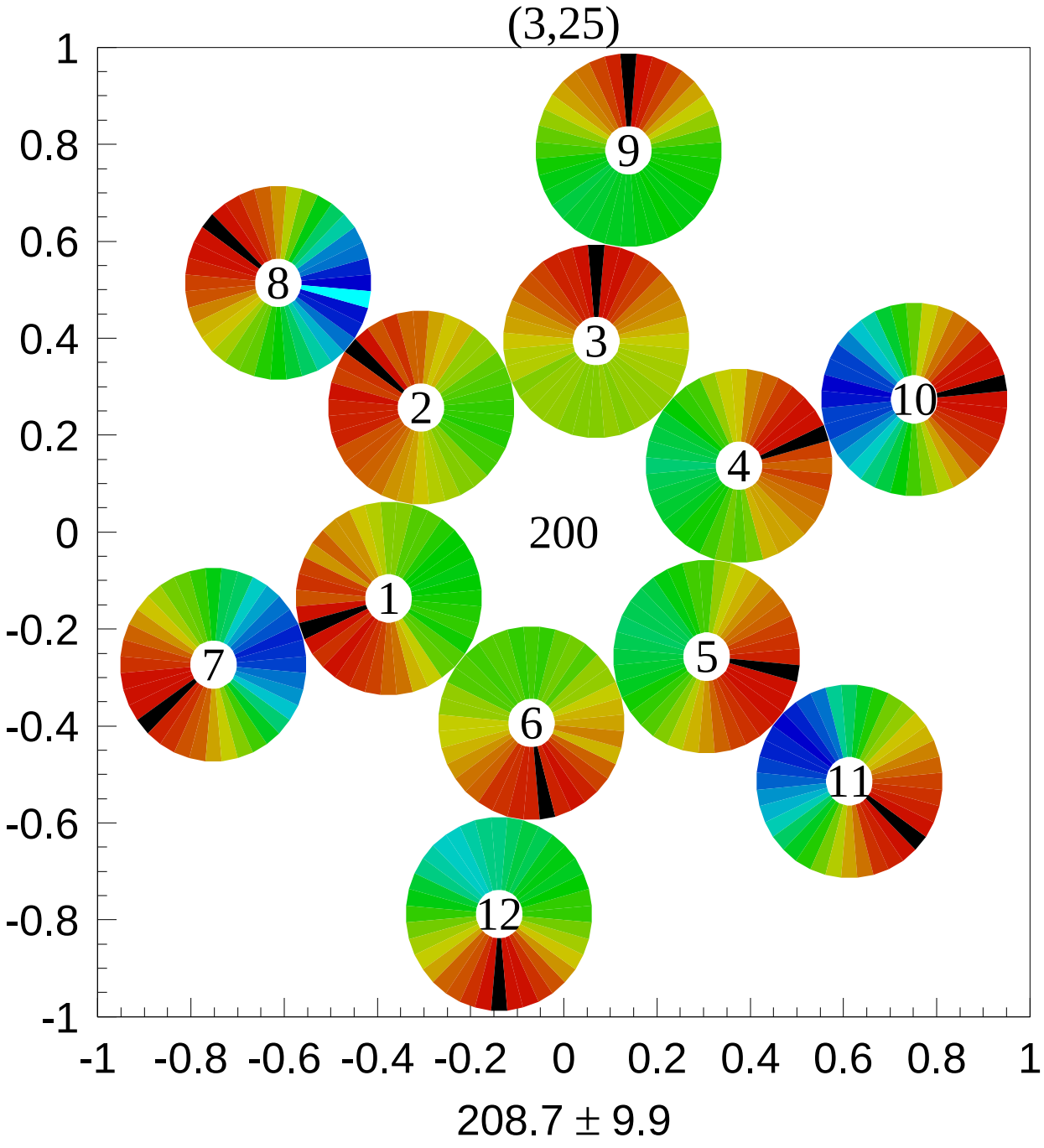

(3,23)
tilted LEDs
123 123 124 122 118 130
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 124 121 125 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

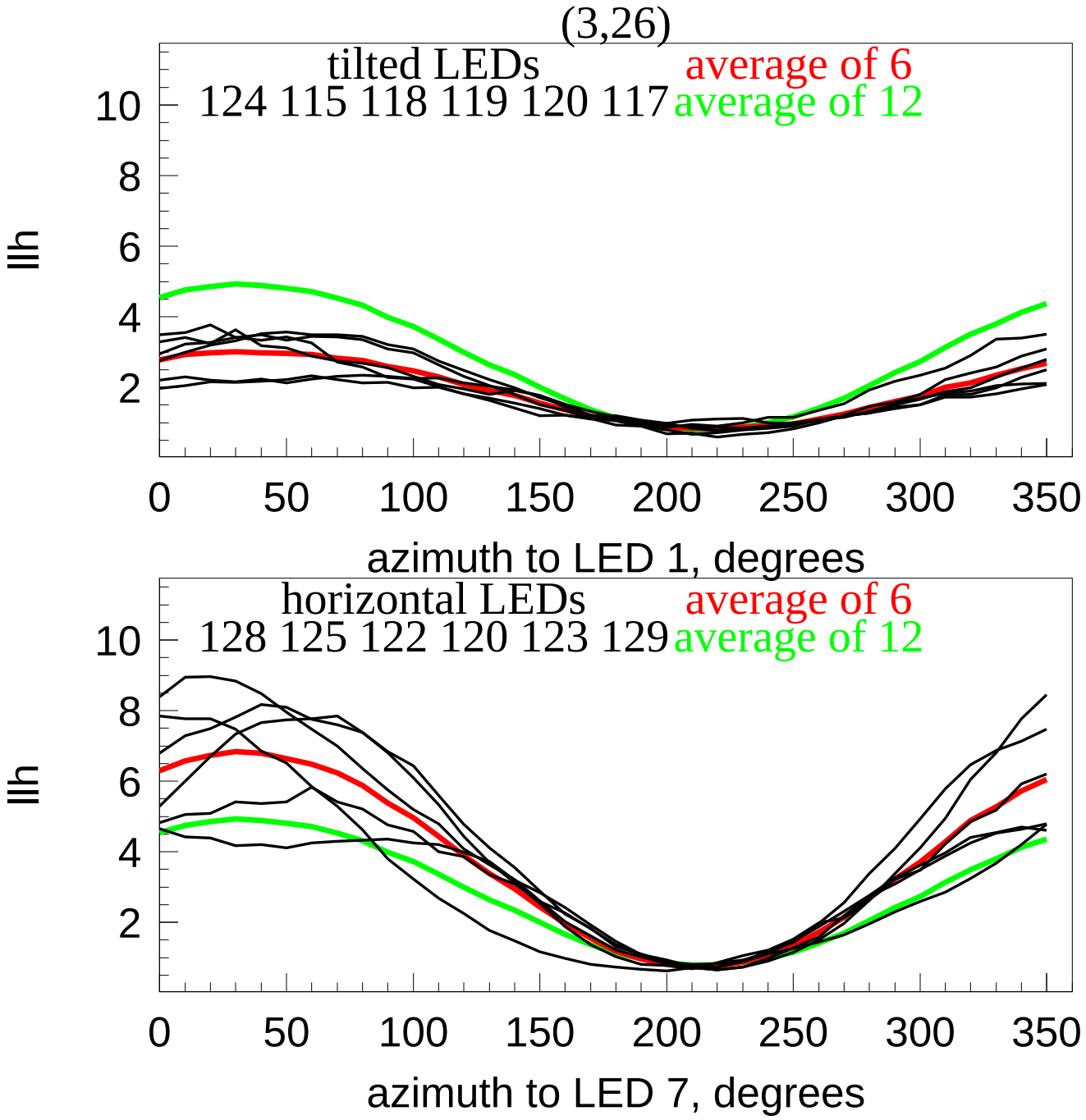

(3,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
198.3 ± 4.9

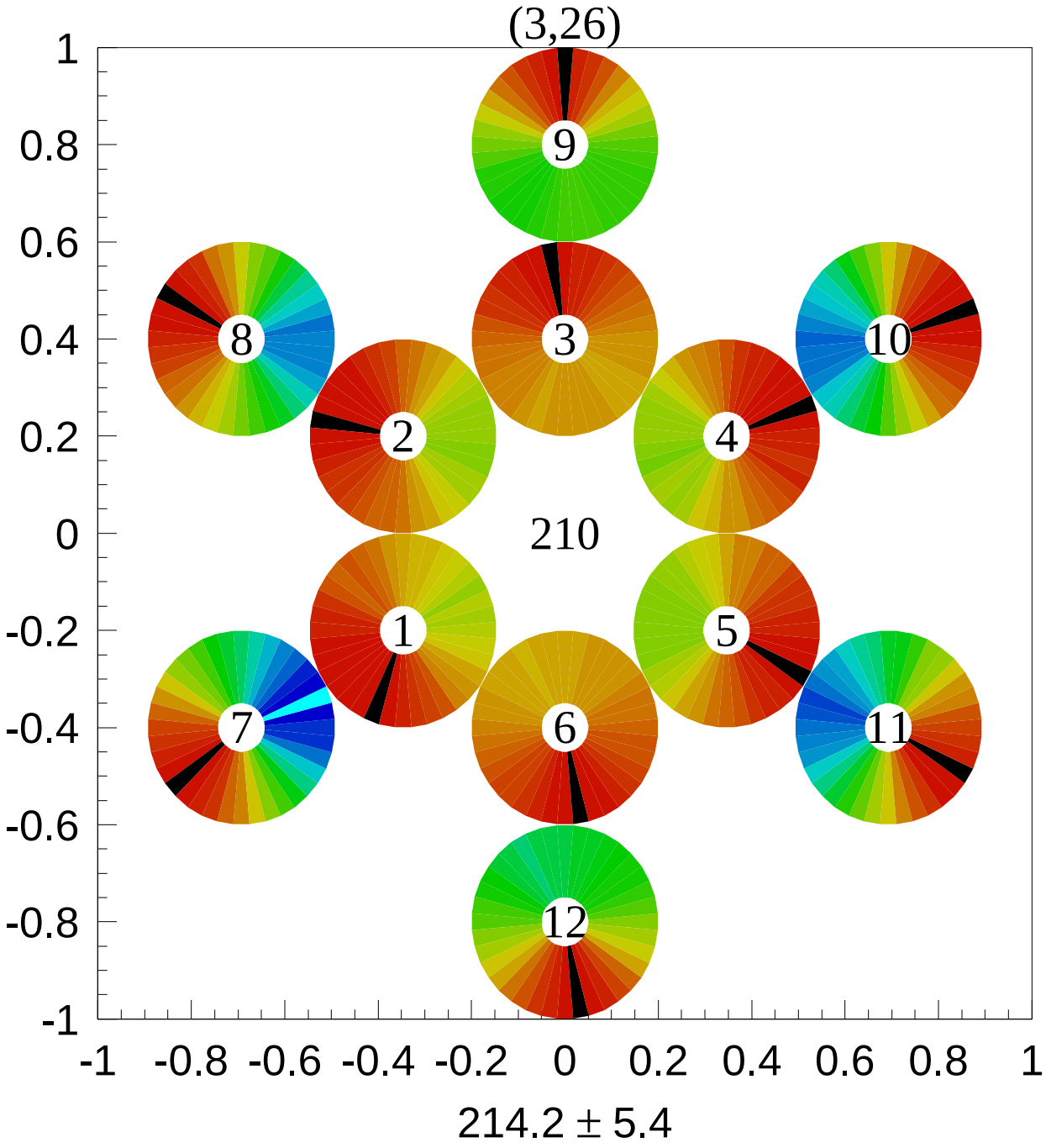

(3,24)
tilted LEDs
118 122 128 118 116 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 118 123 118 113 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

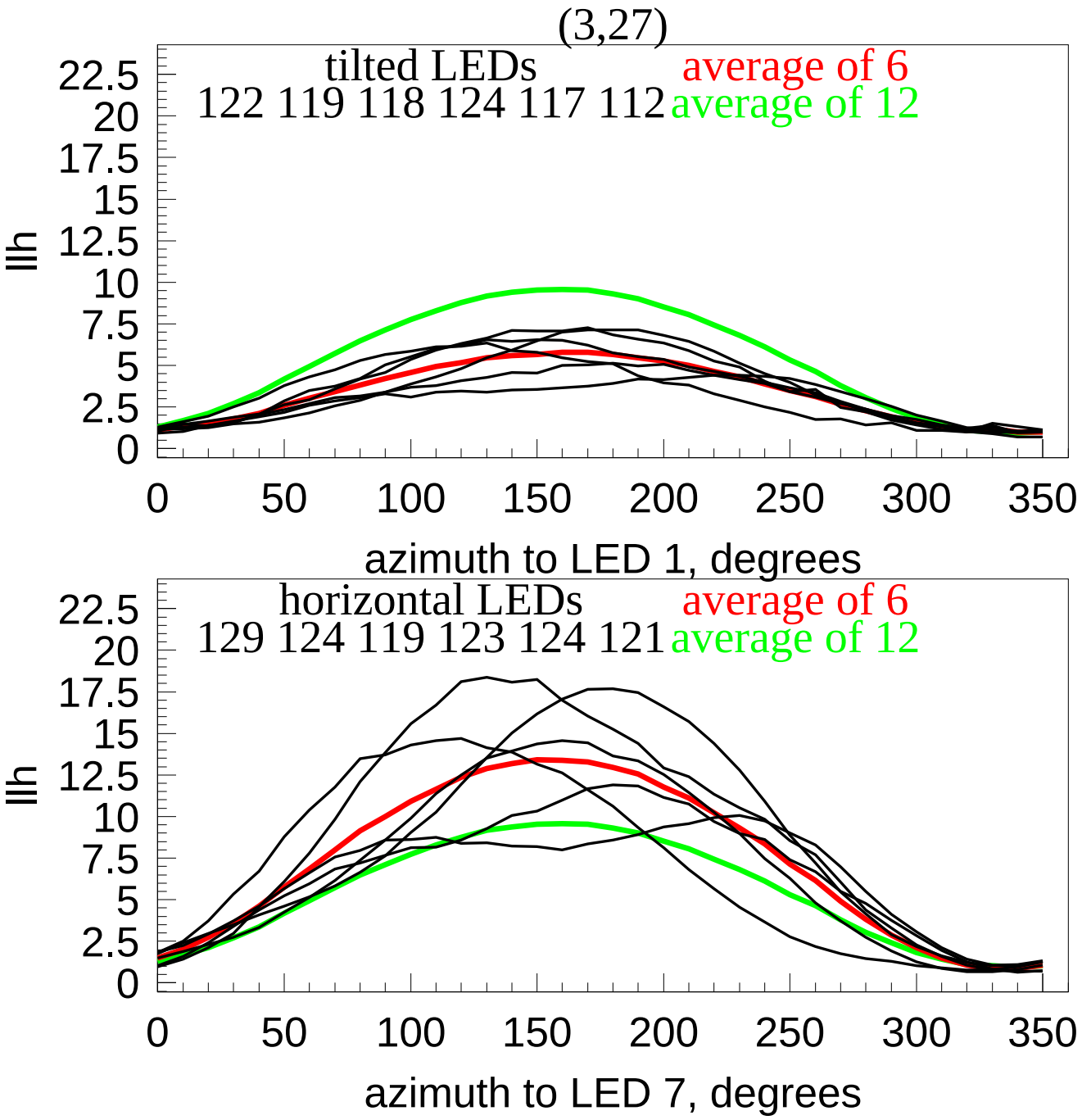

(3,24)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
276.2 ± 5.8

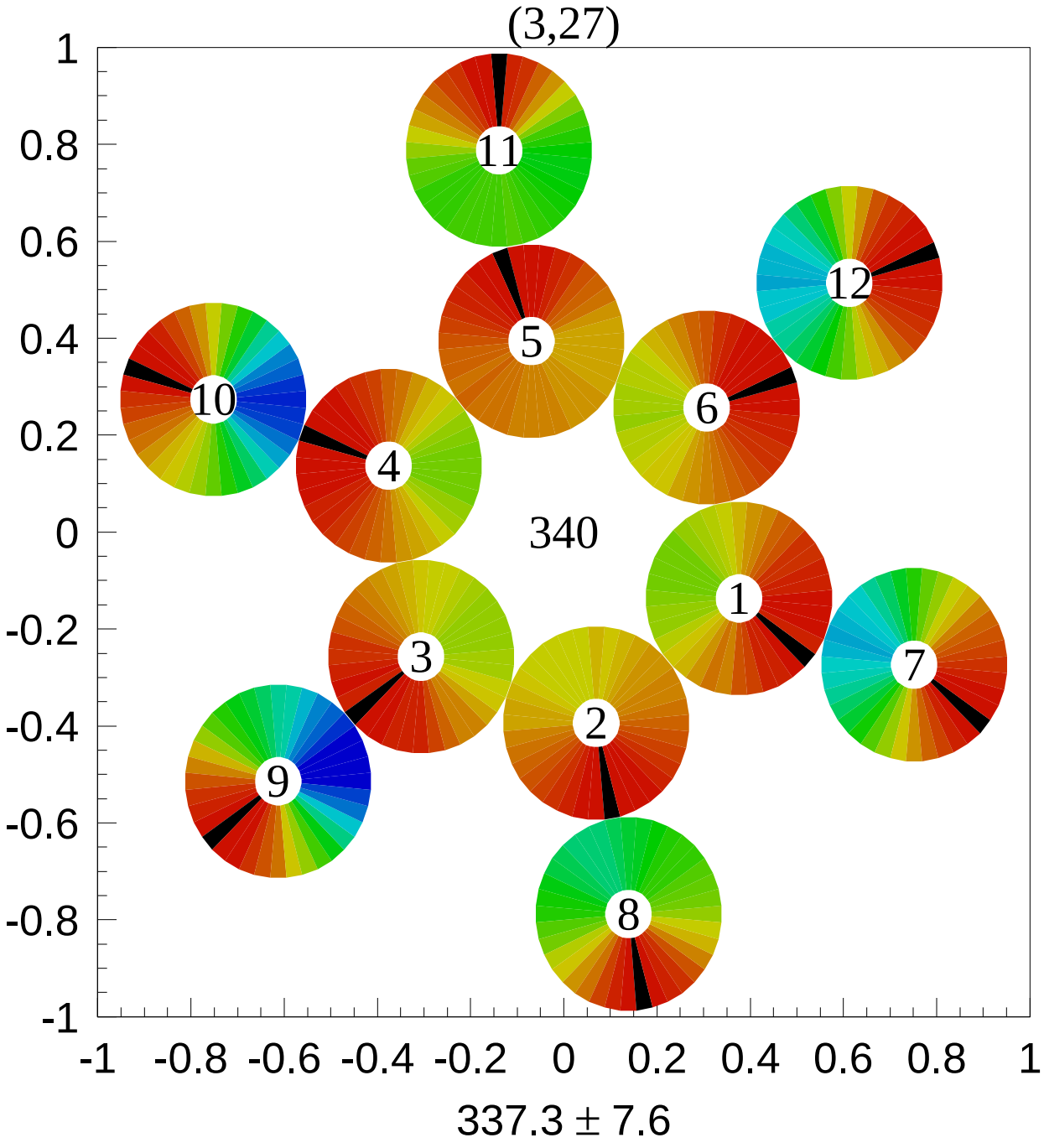

(3,25)
tilted LEDs
114 130 113 121 120 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 123 118 123 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

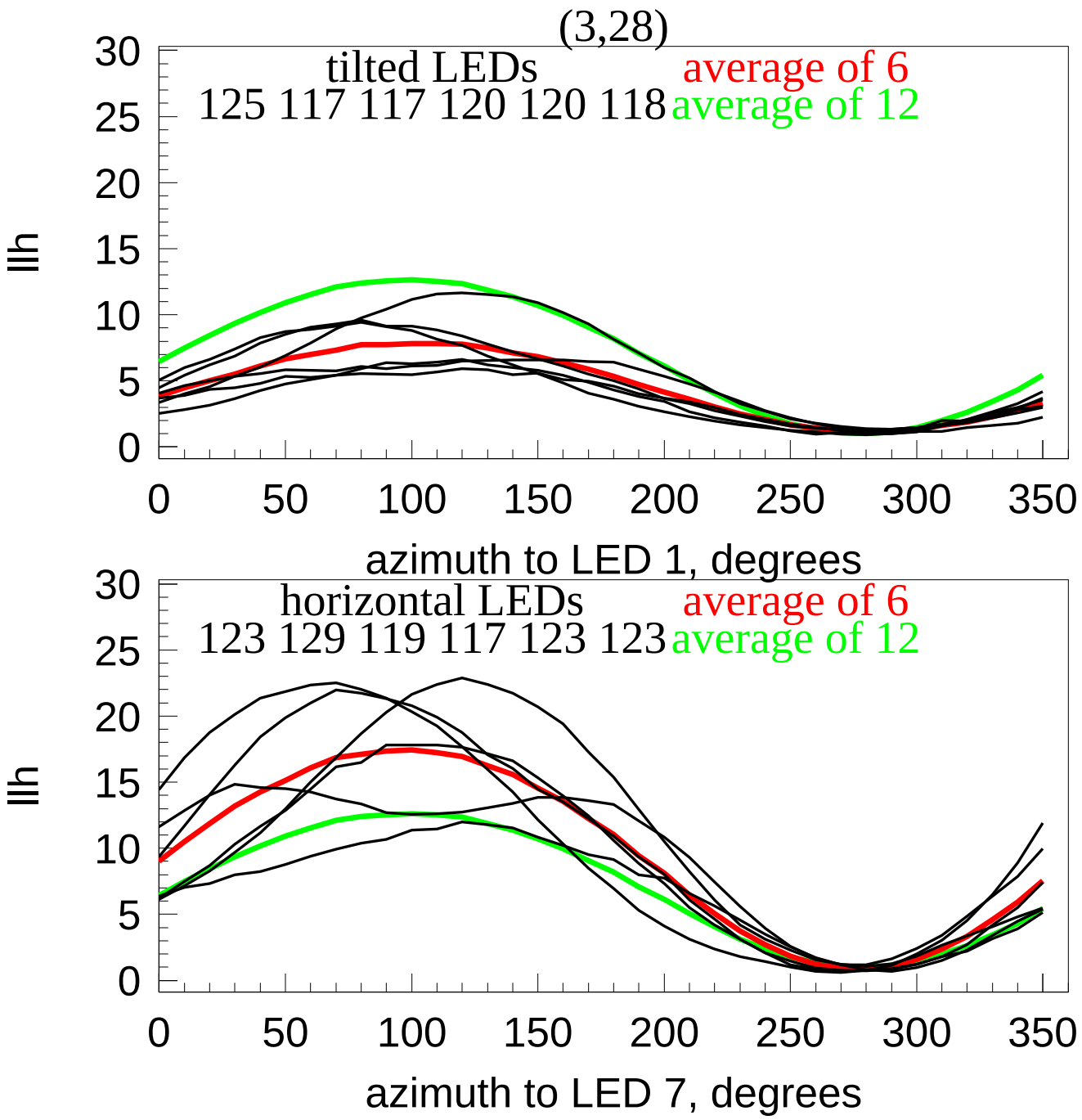

(3,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
208.7 ± 9.9

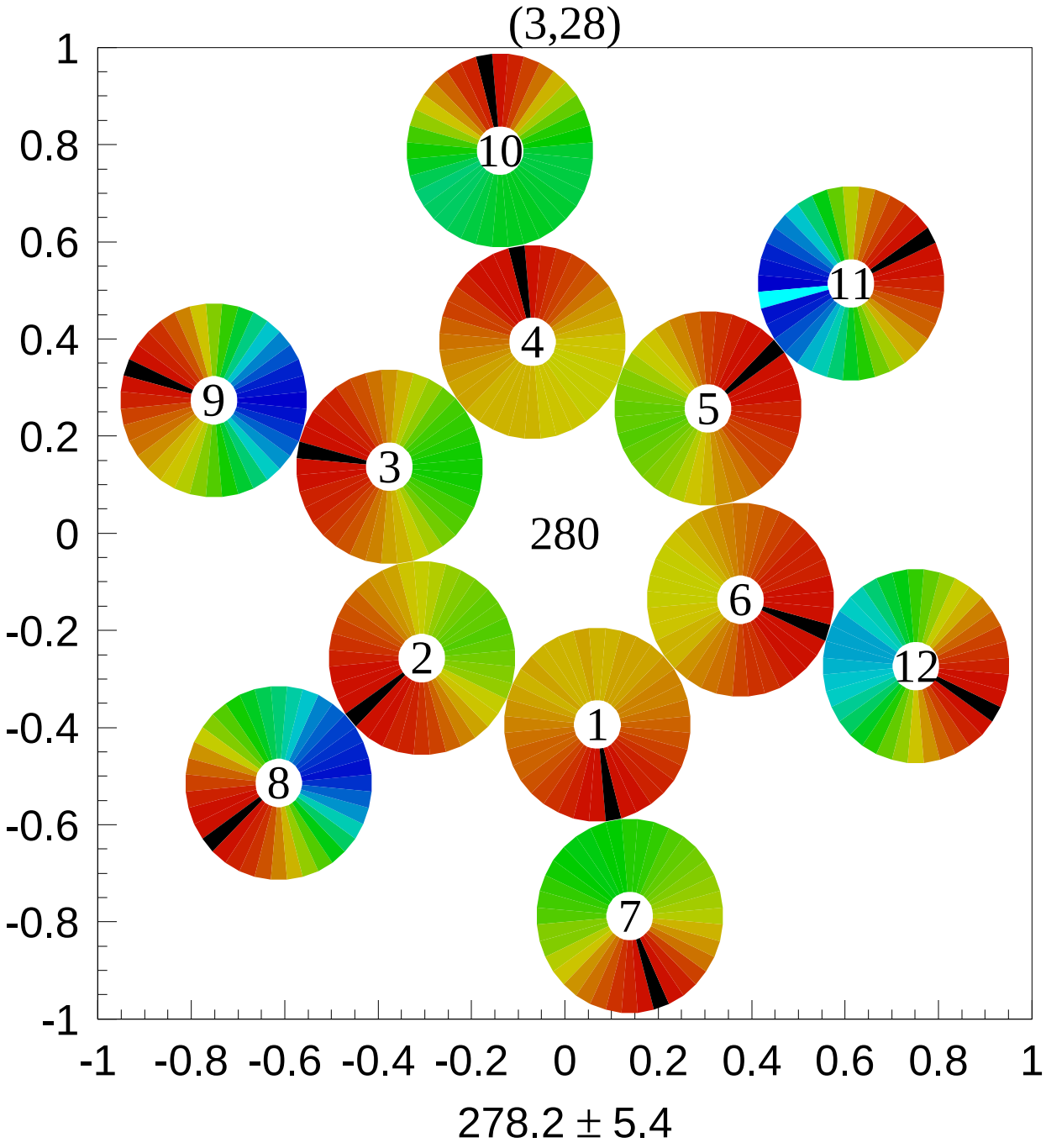

(3,26)
tilted LEDs
124 115 118 119 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 125 122 120 123 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

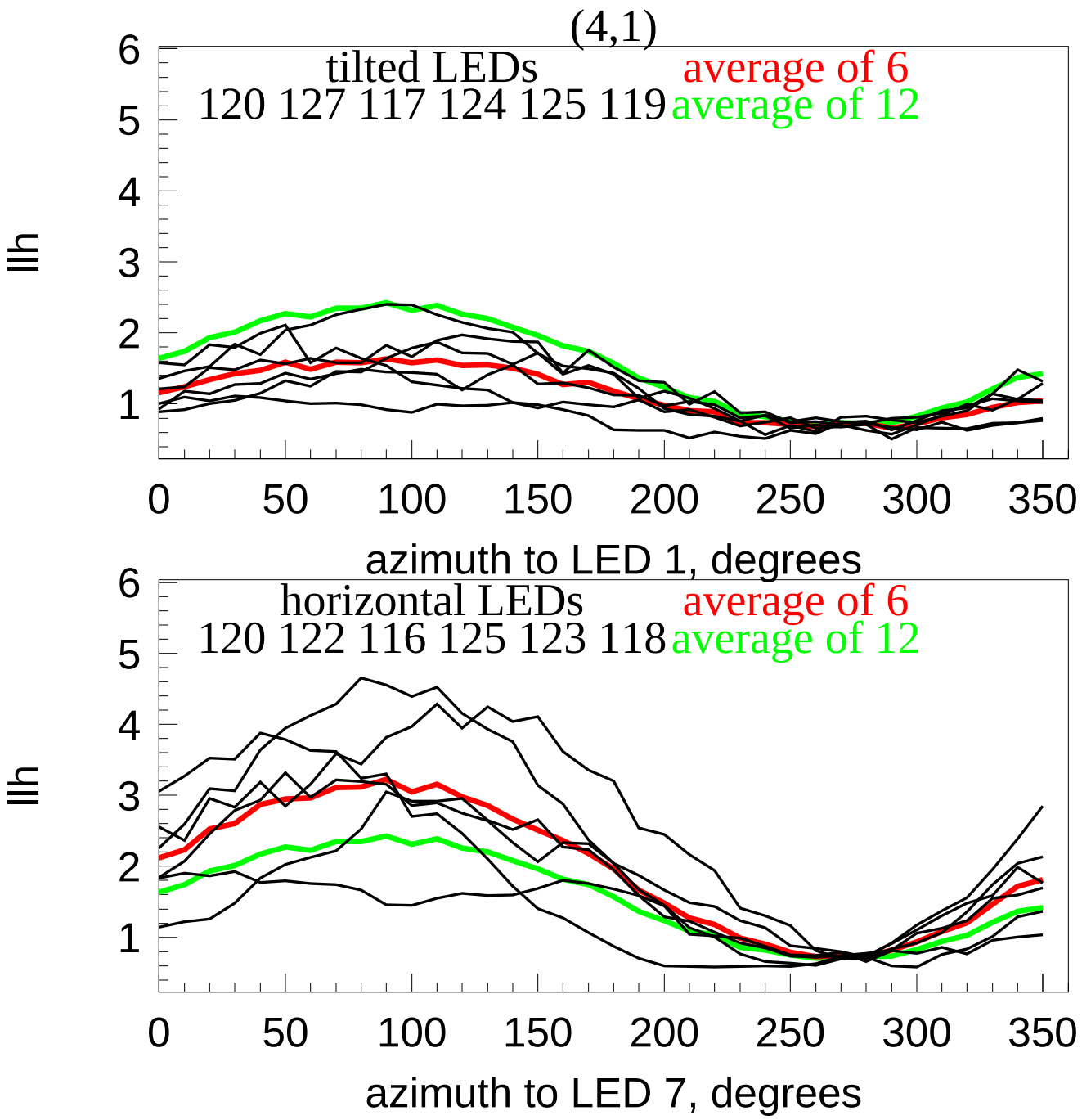

(3,26)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
214.2 ± 5.4

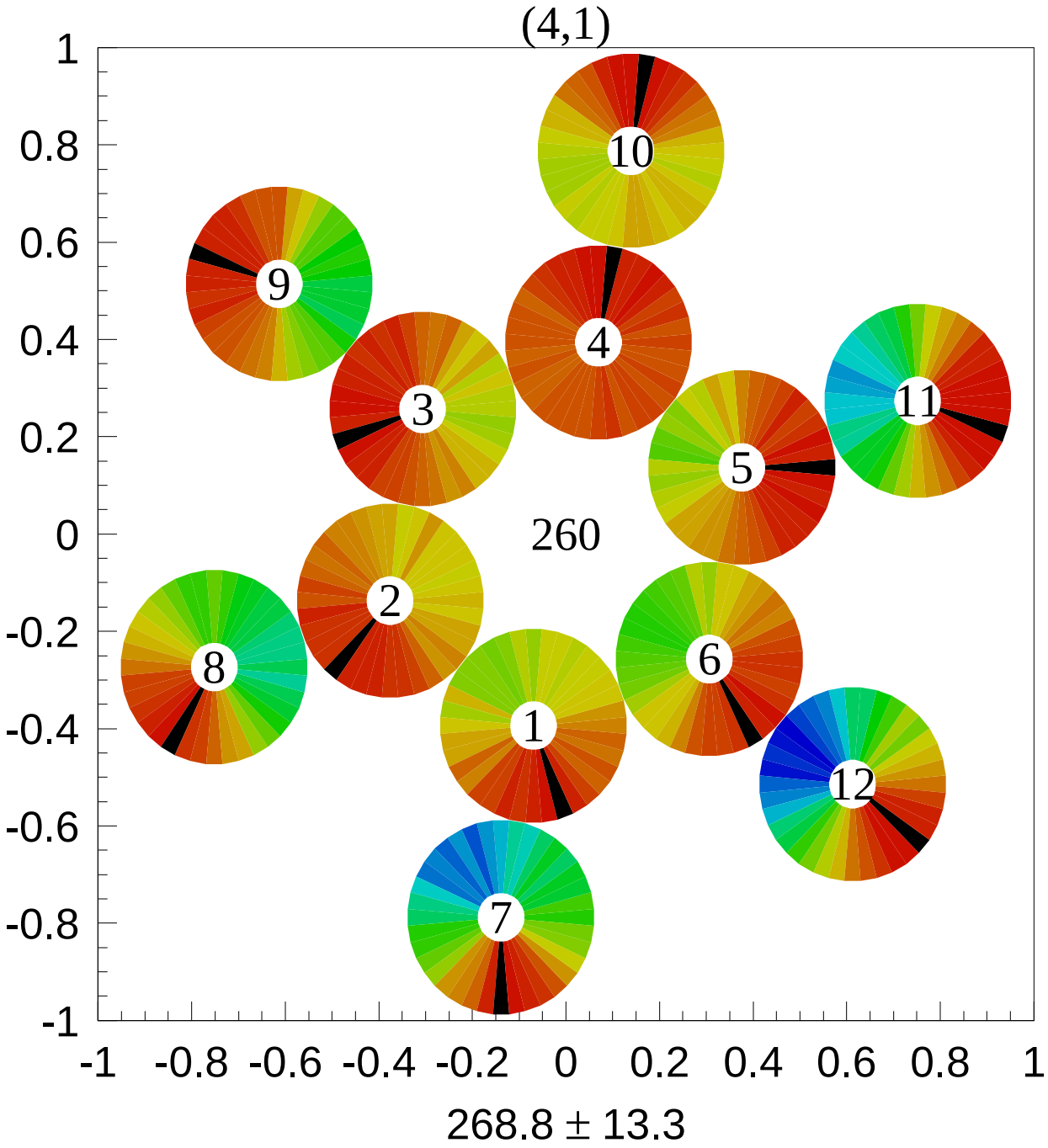

(3,27)
tilted LEDs
122 119 118 124 117 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 124 119 123 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

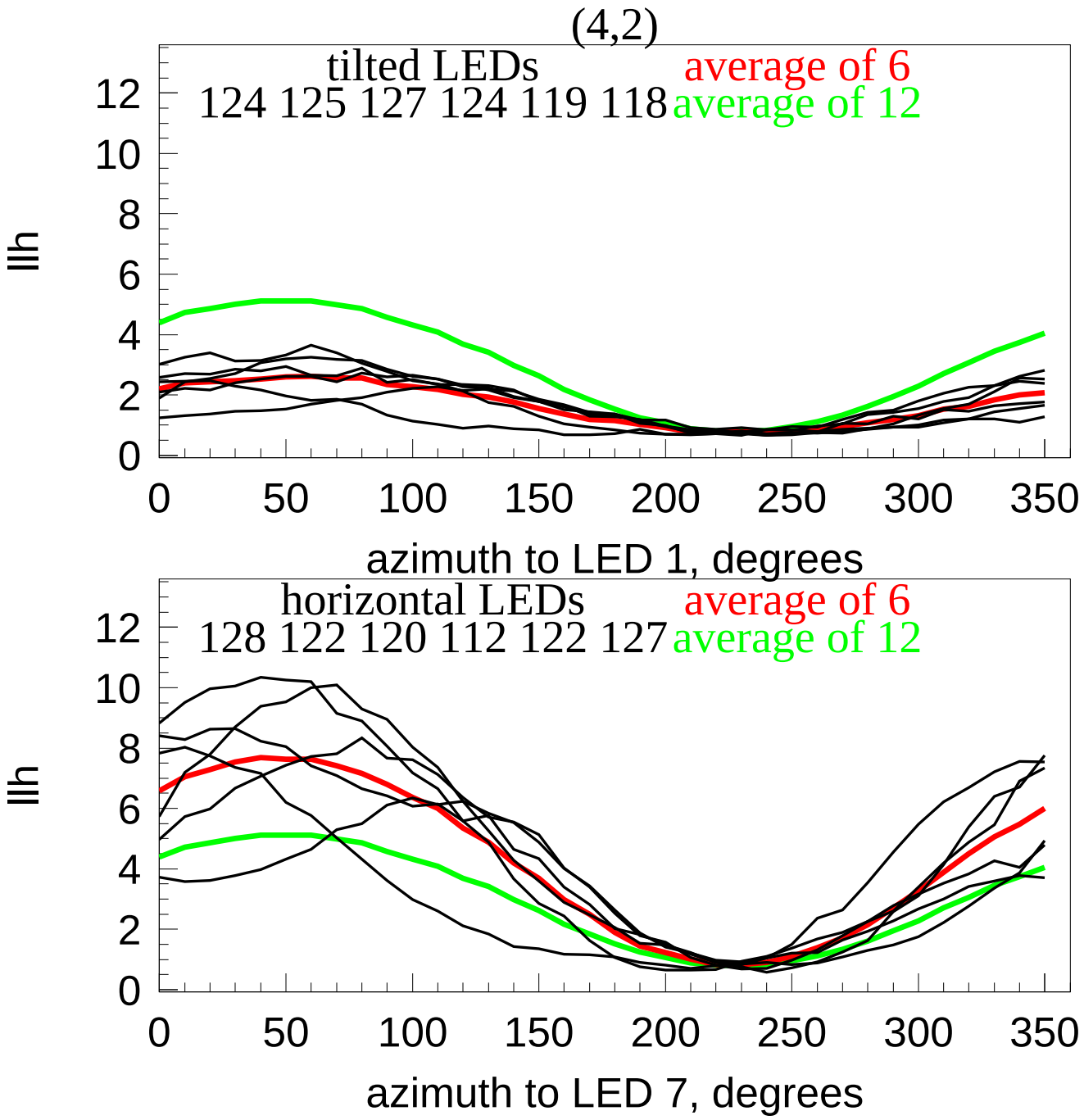

(3,27)
11
12
5
6
10
4
340
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
337.3 ± 7.6

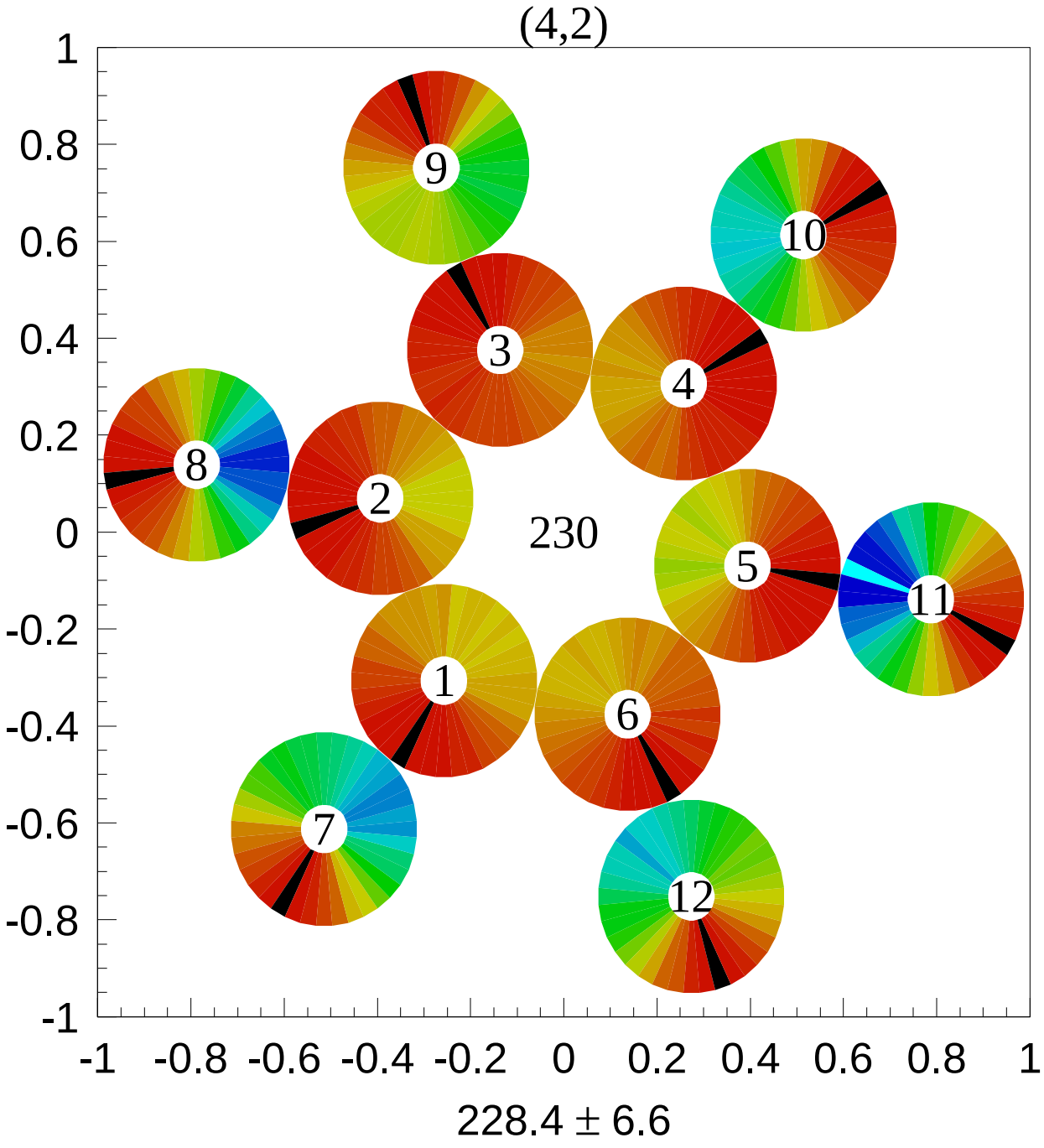

(3,28)
tilted LEDs
125 117 117 120 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 129 119 117 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

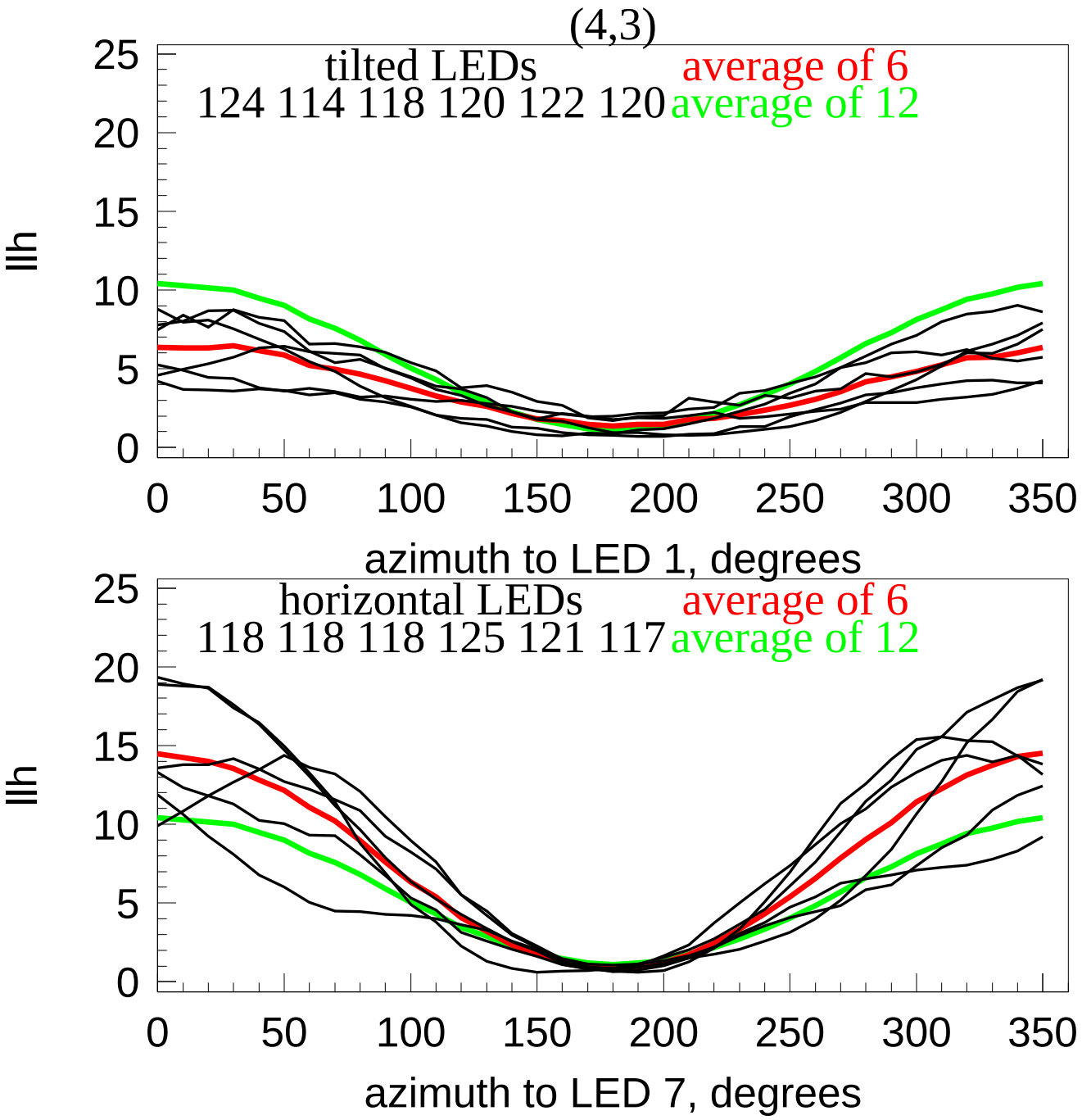

(3,28)
10
11
4
9
5
3
280
6
2
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
278.2 ± 5.4

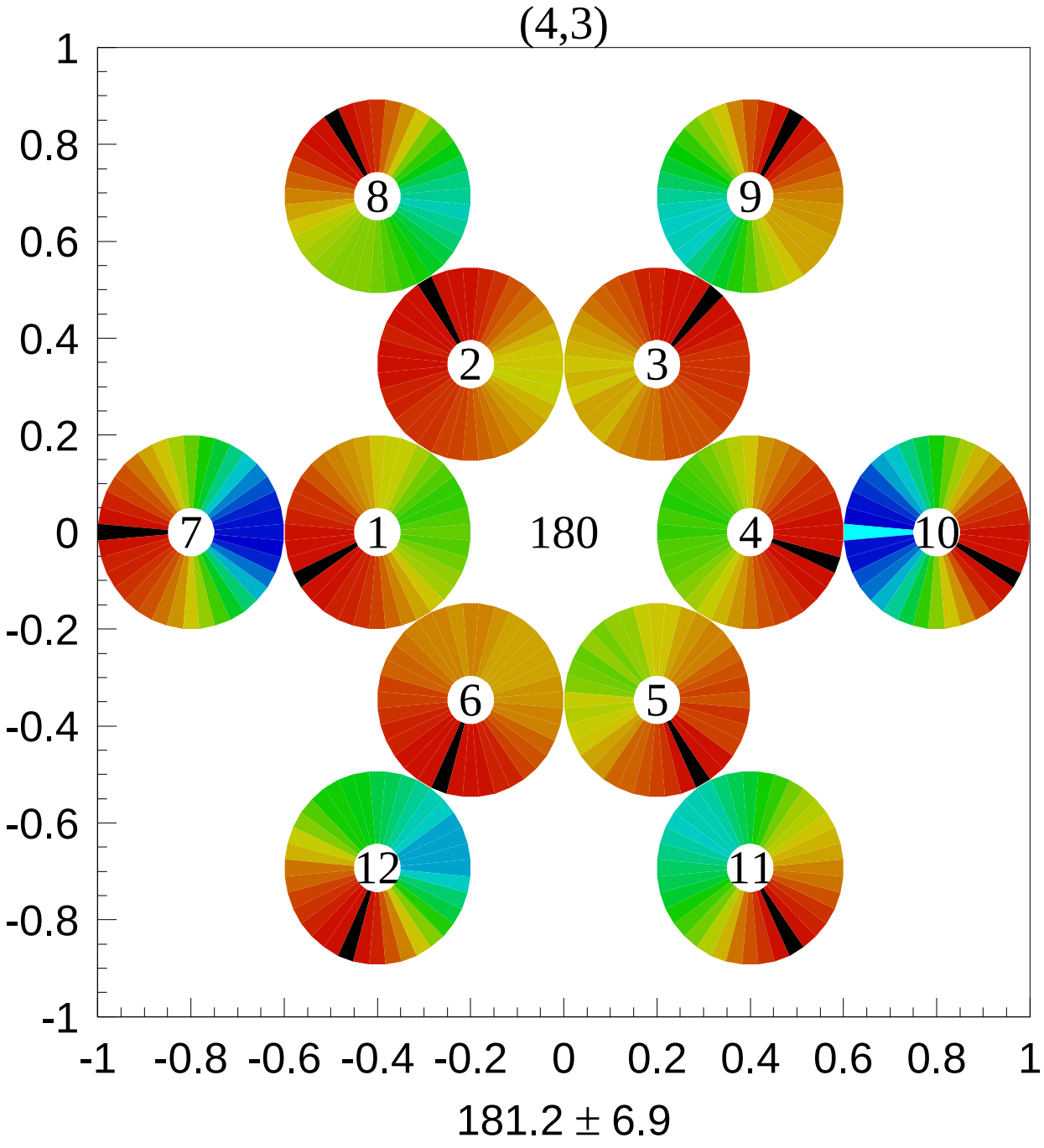

(4,1)
tilted LEDs
120 127 117 124 125 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 122 116 125 123 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

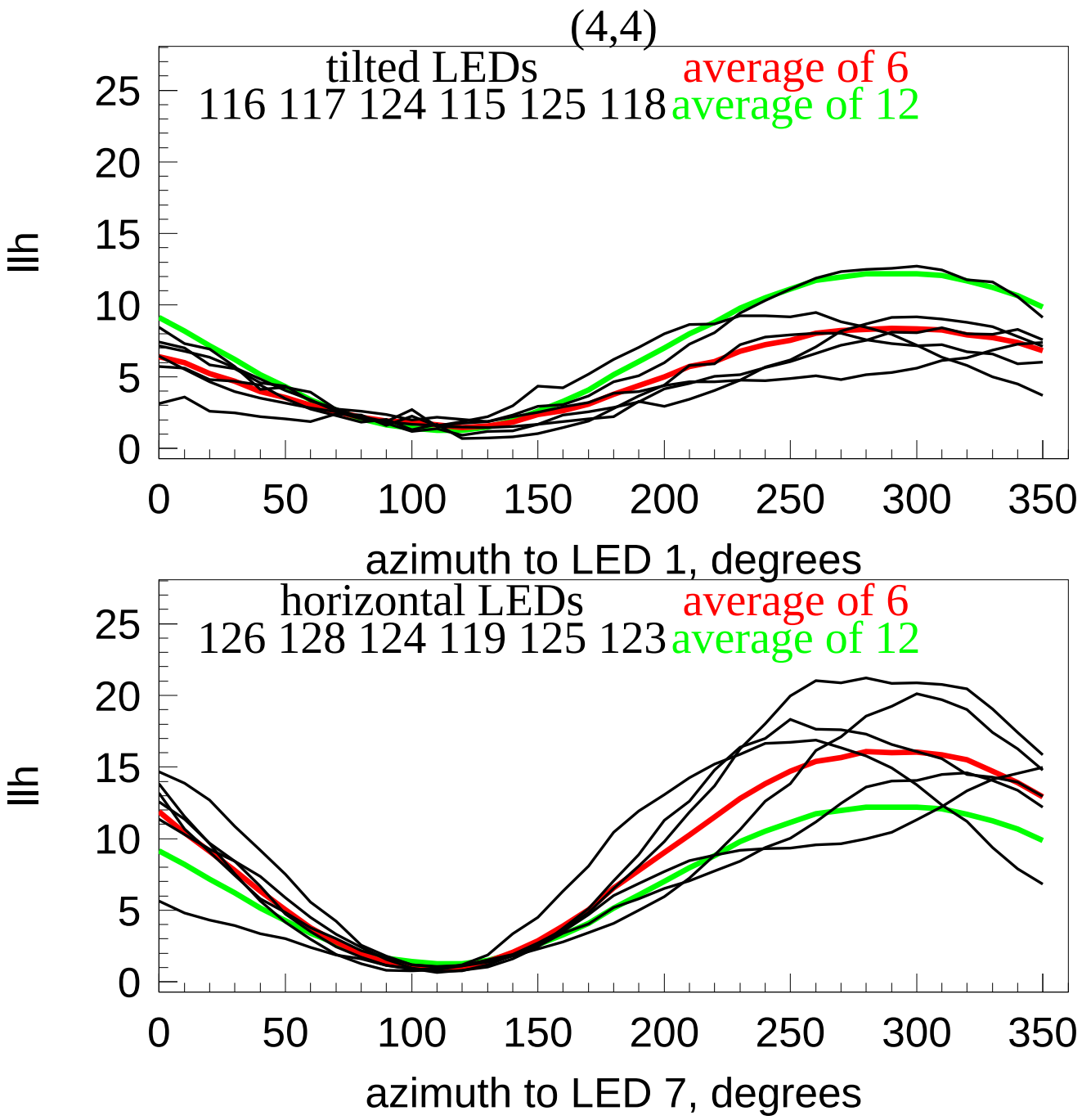

(4,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
268.8 ± 13.3

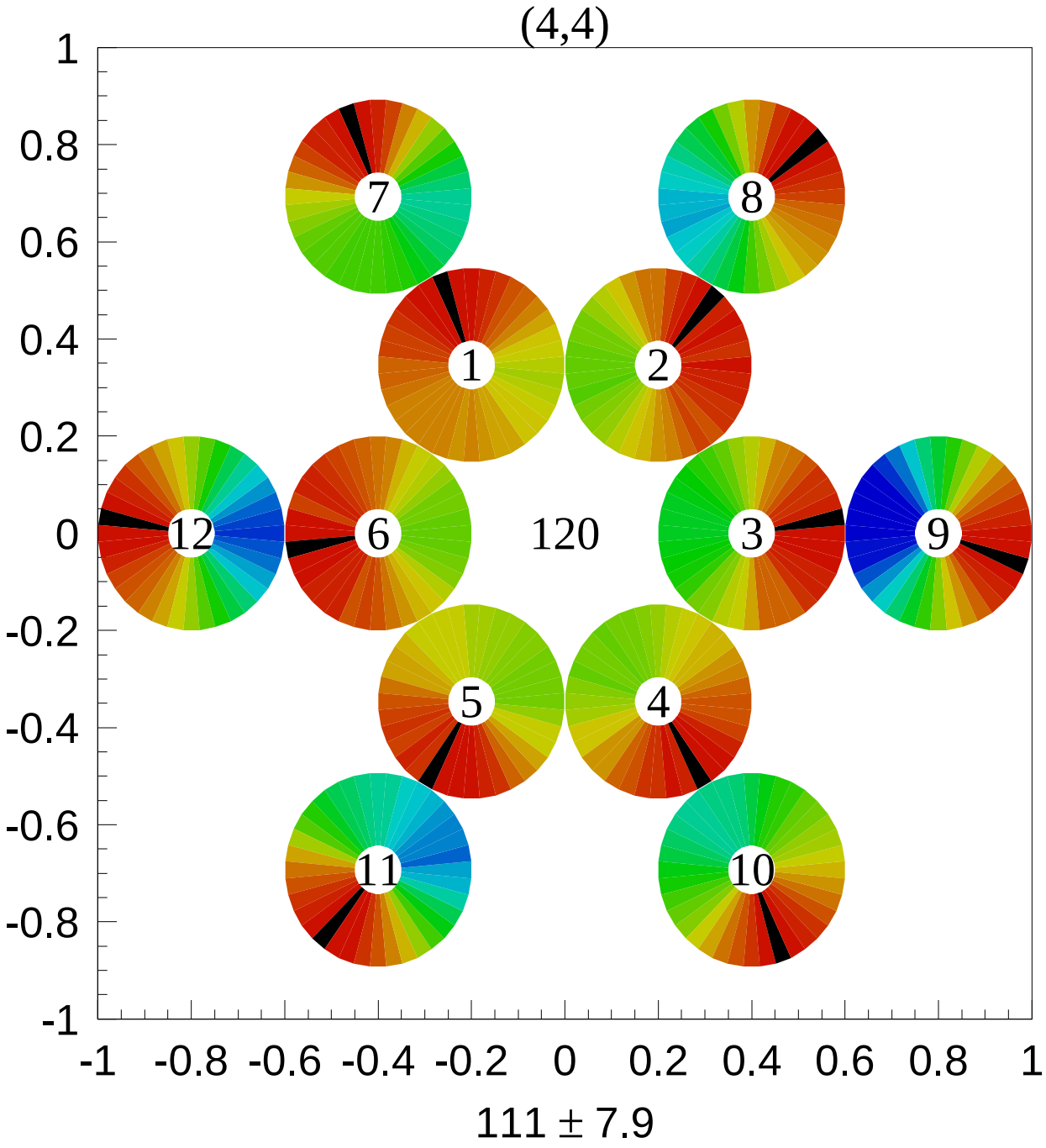

(4,2)
tilted LEDs
124 125 127 124 119 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 122 120 112 122 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

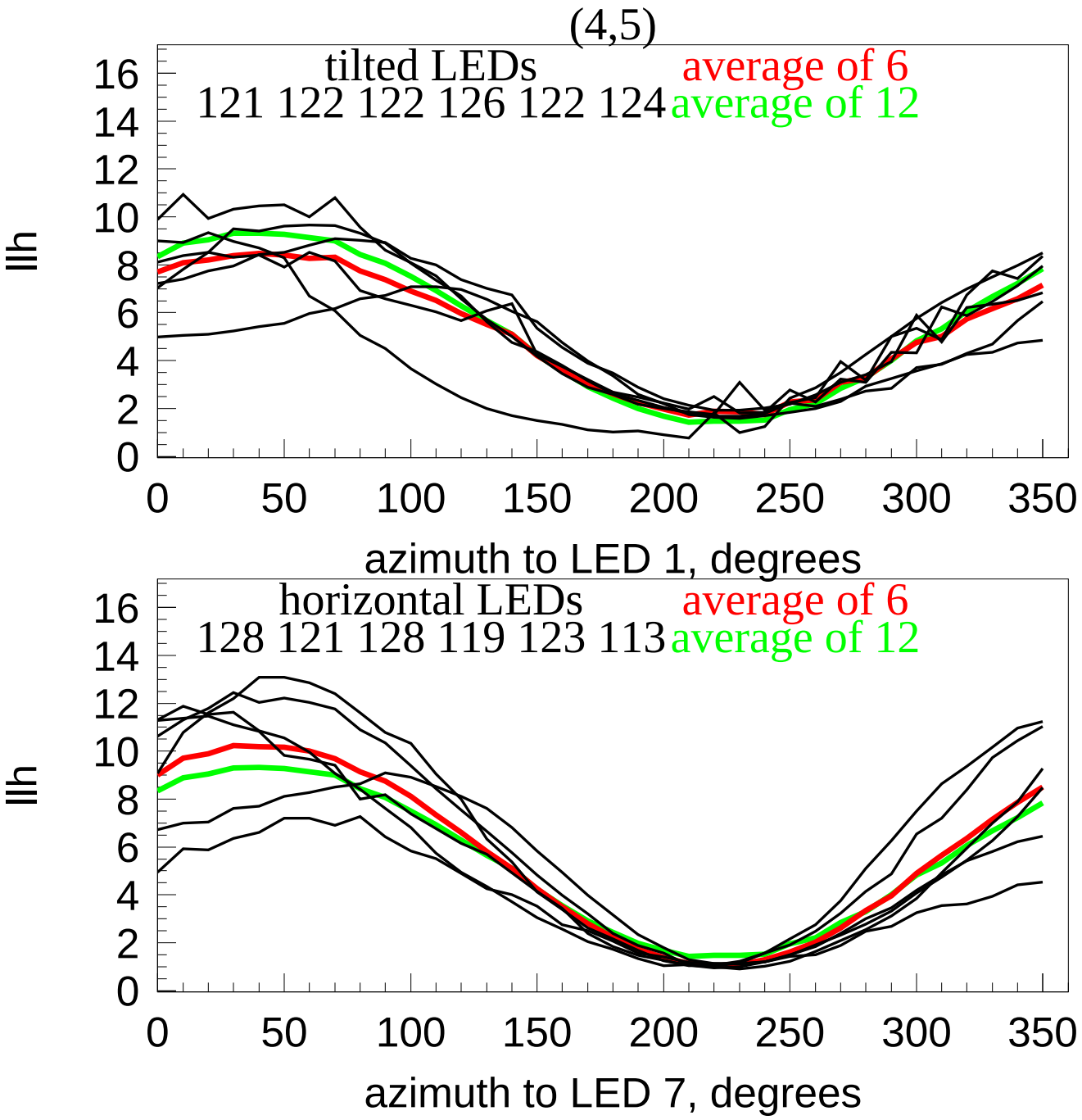

(4,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
228.4 ± 6.6

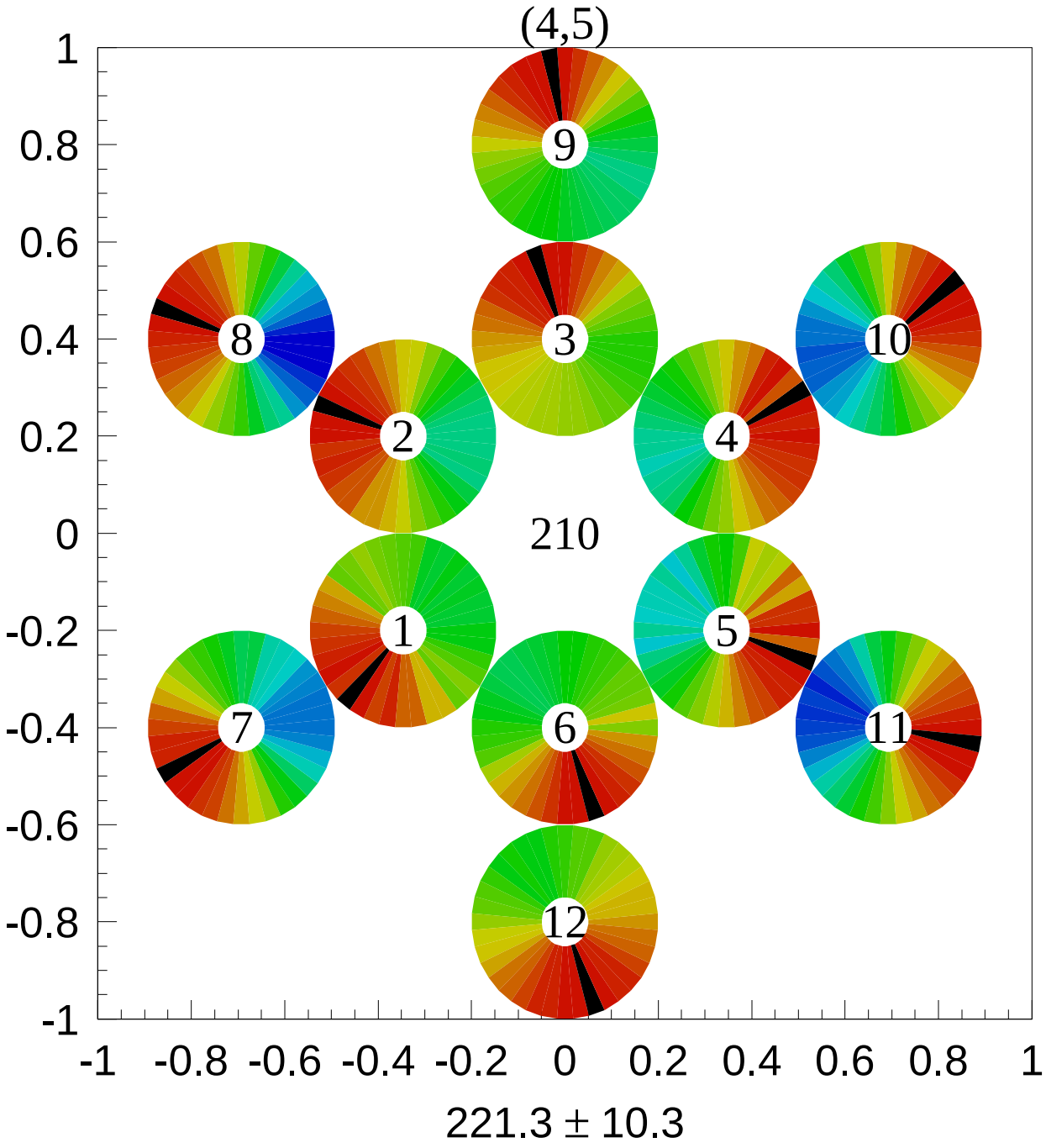

(4,3)
tilted LEDs
124 114 118 120 122 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 118 118 125 121 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

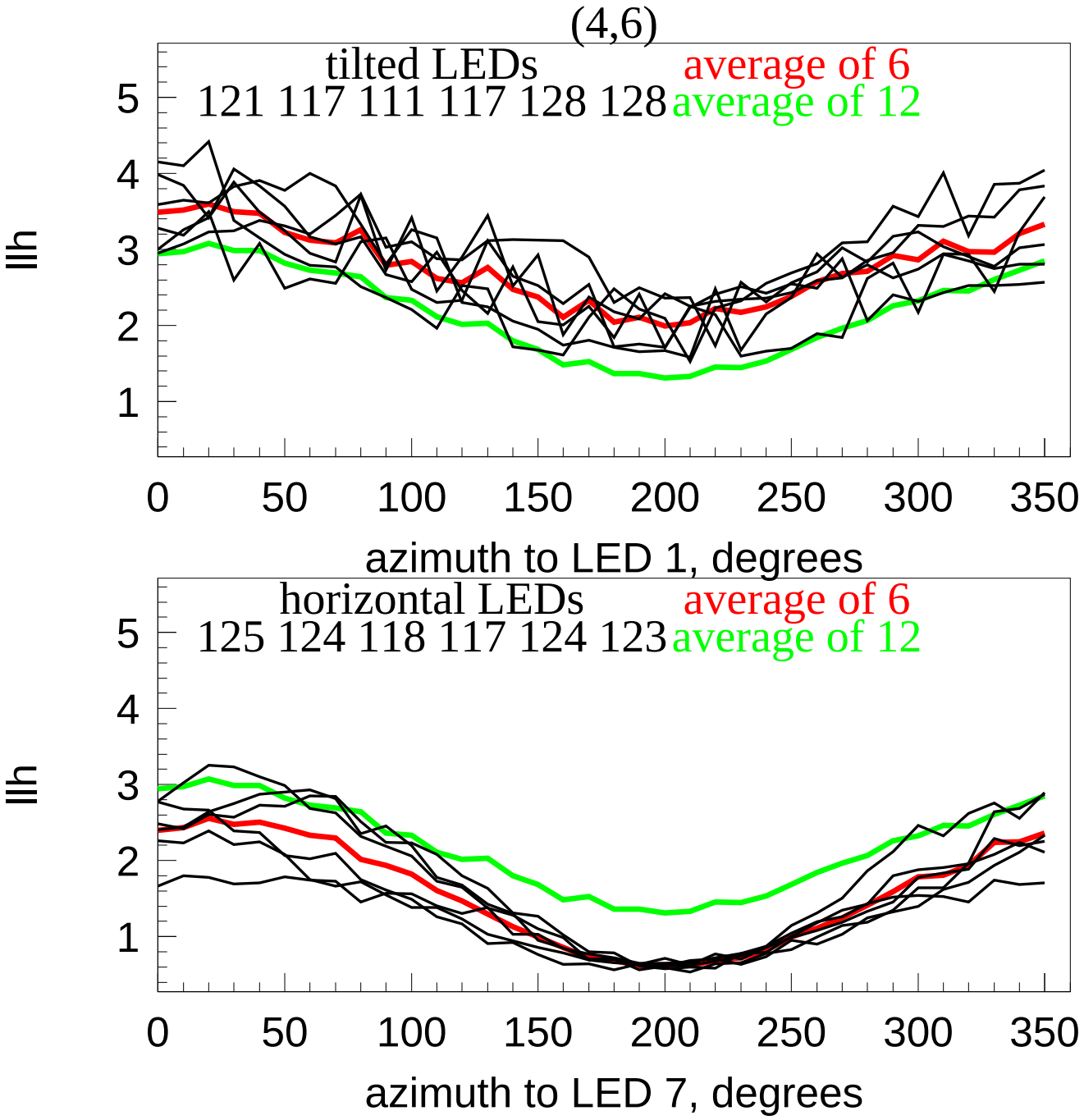

(4,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
181.2 ± 6.9

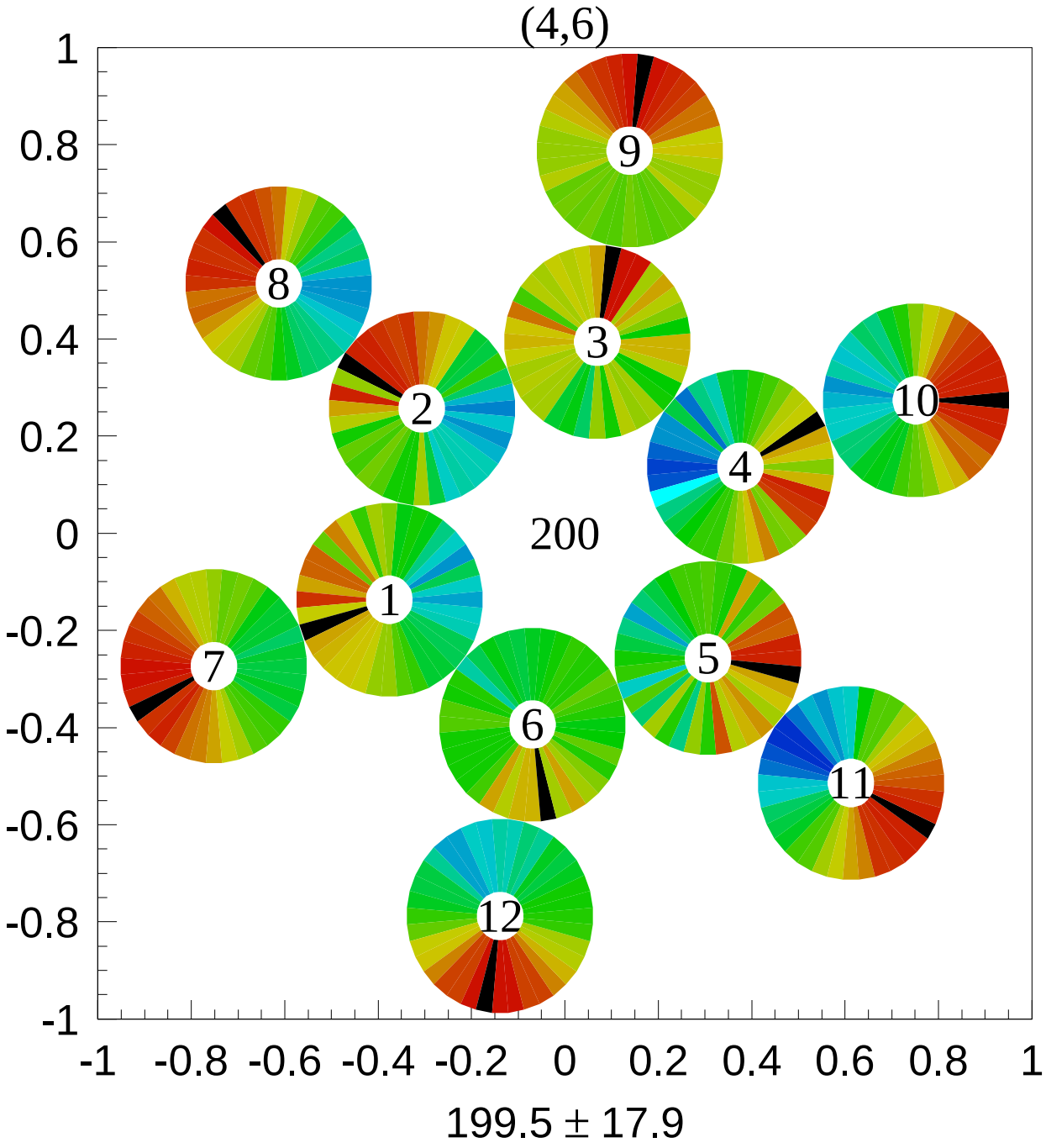

(4,4)
tilted LEDs
116 117 124 115 125 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 128 124 119 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

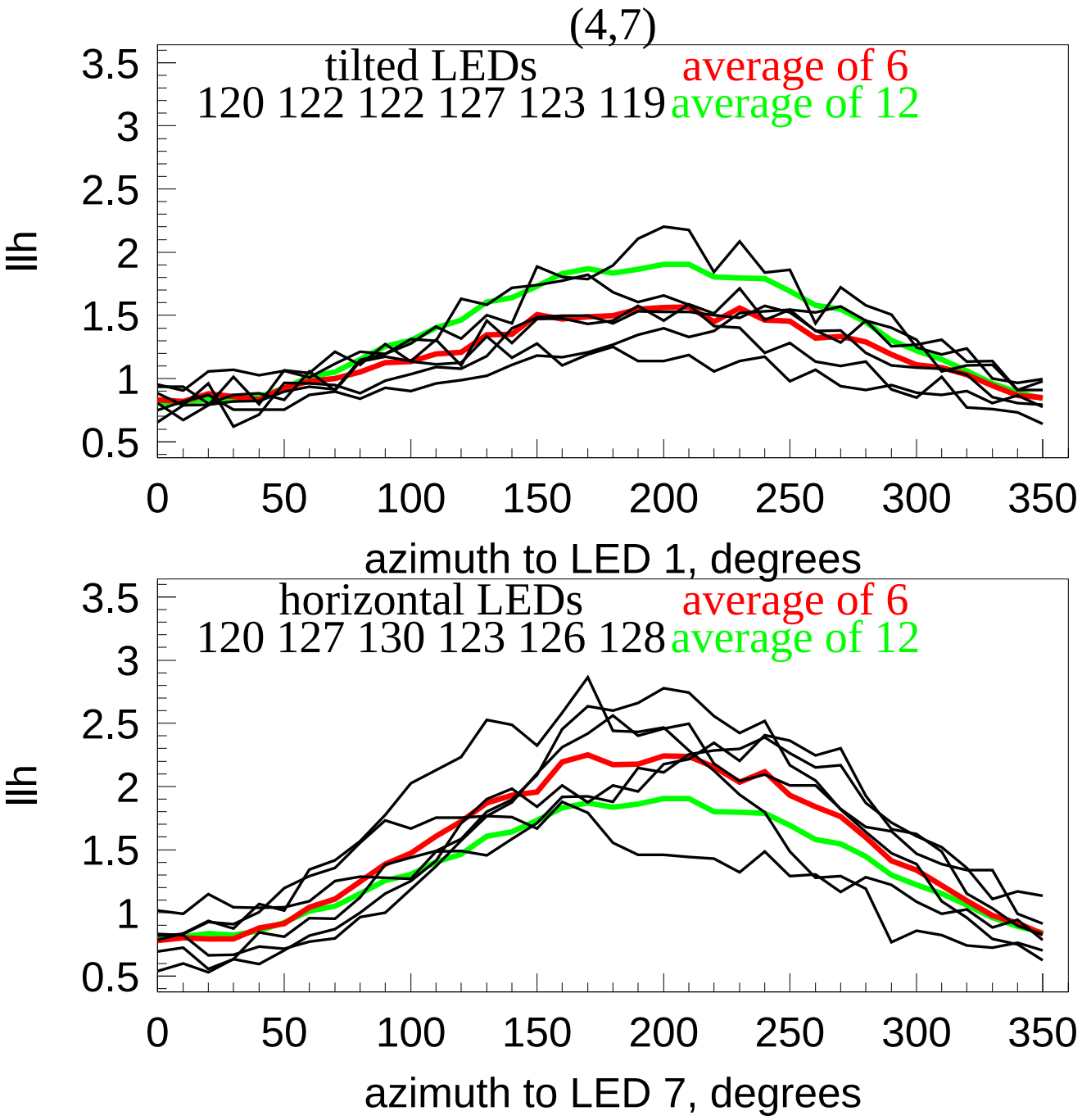

(4,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
111 ± 7.9

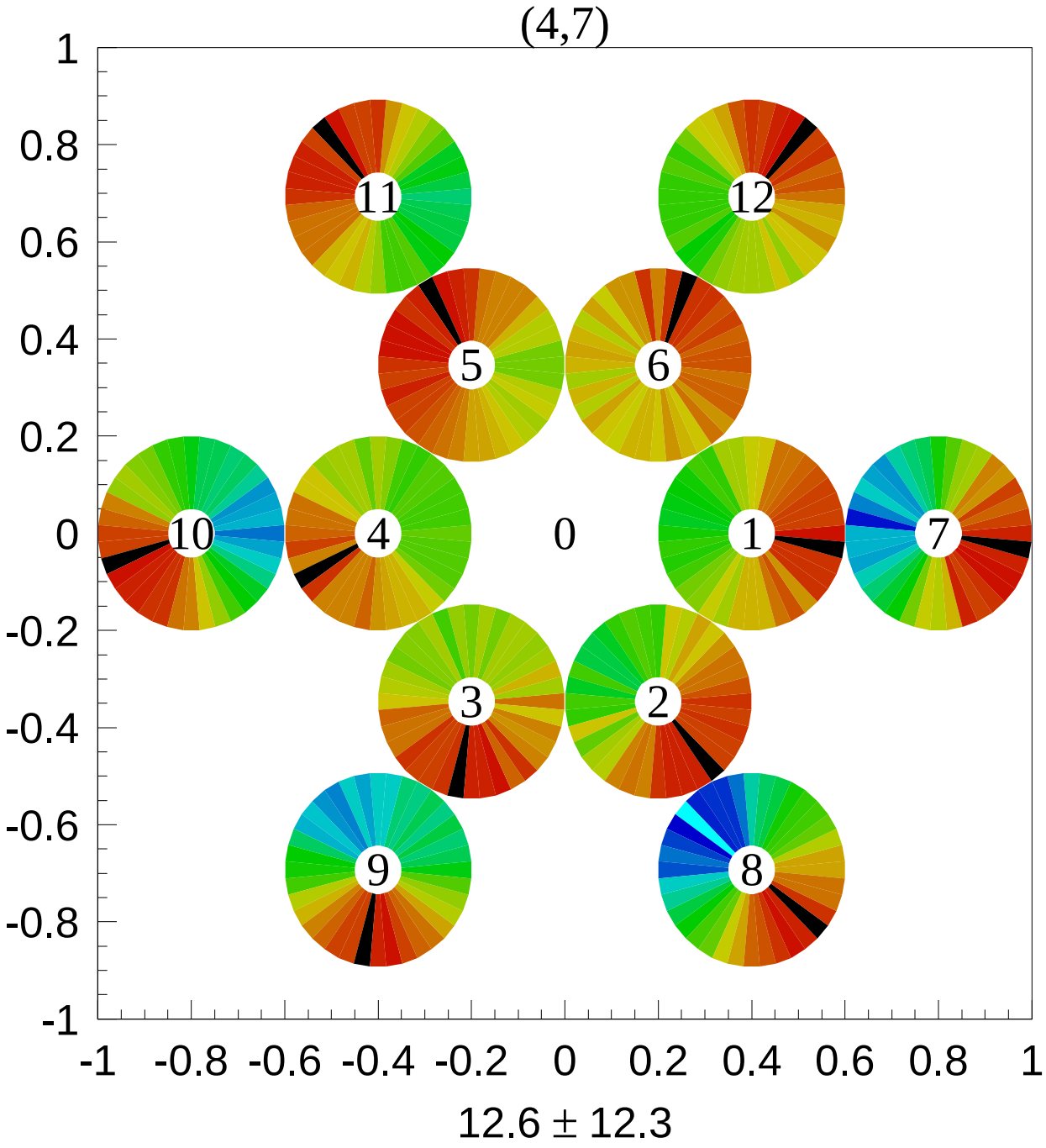

(4,5)
tilted LEDs
121 122 122 126 122 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 121 128 119 123 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

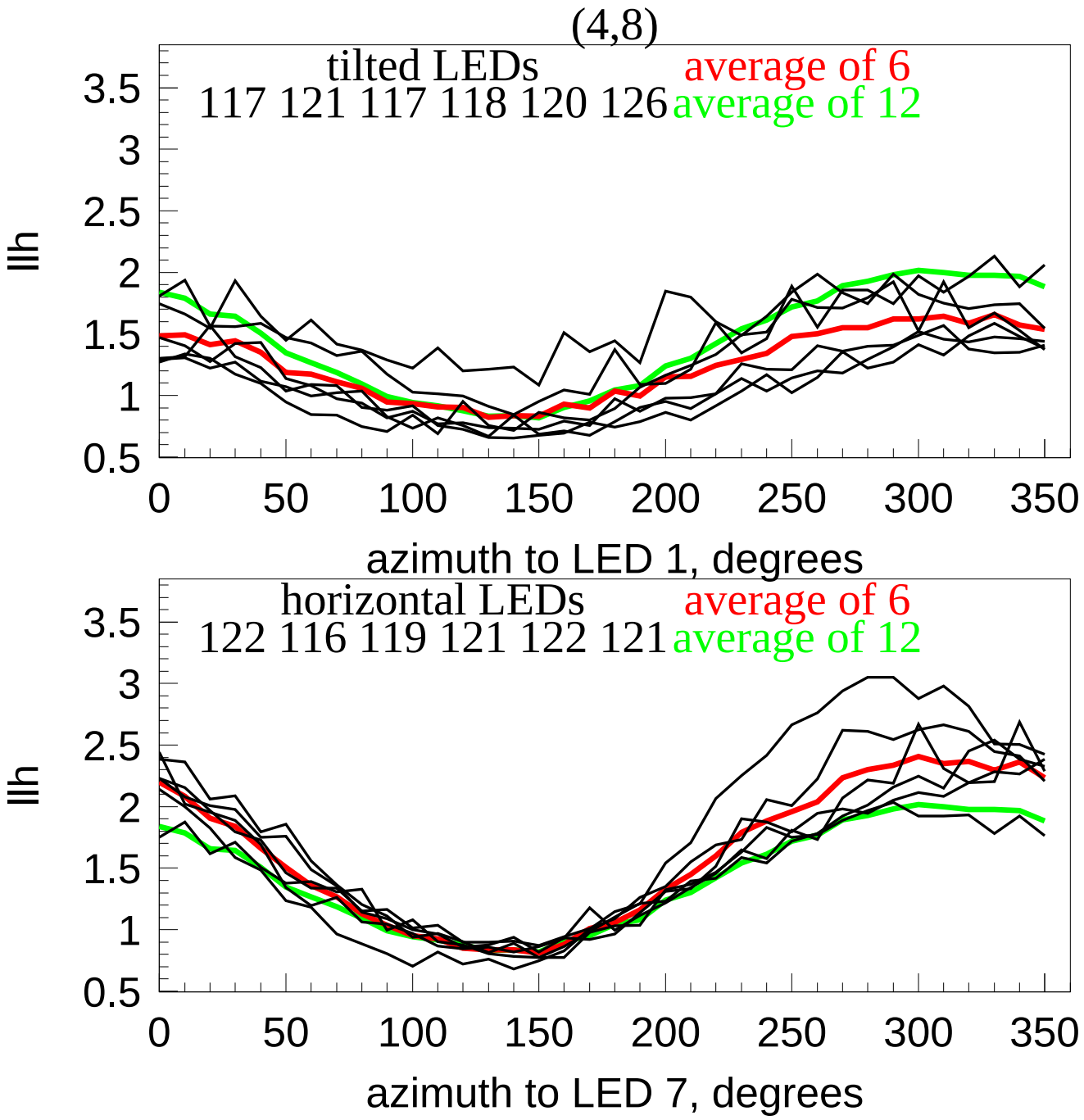

(4,5)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
221.3 ± 10.3

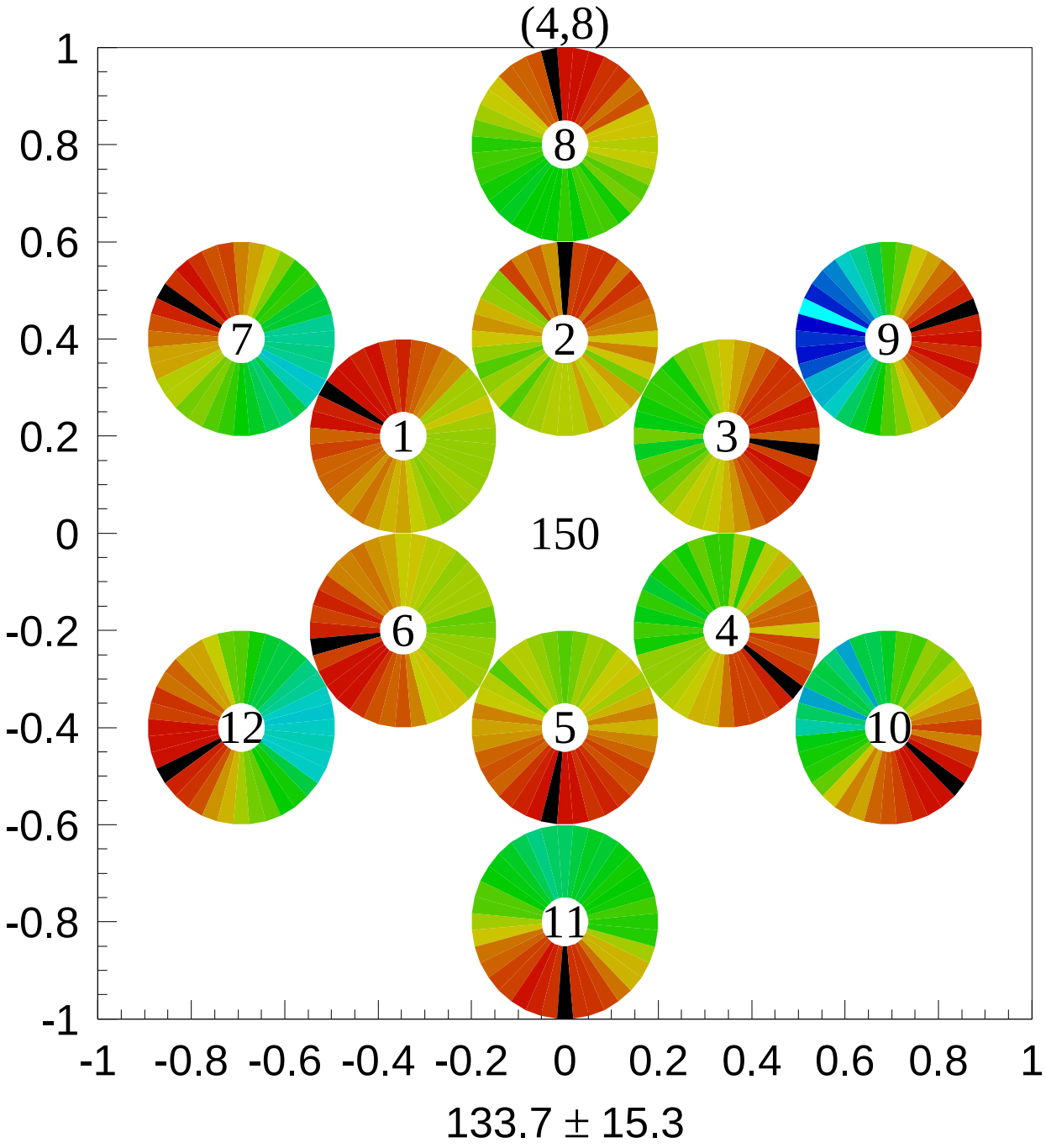

(4,6)
tilted LEDs
121 117 111 117 128 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 124 118 117 124 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

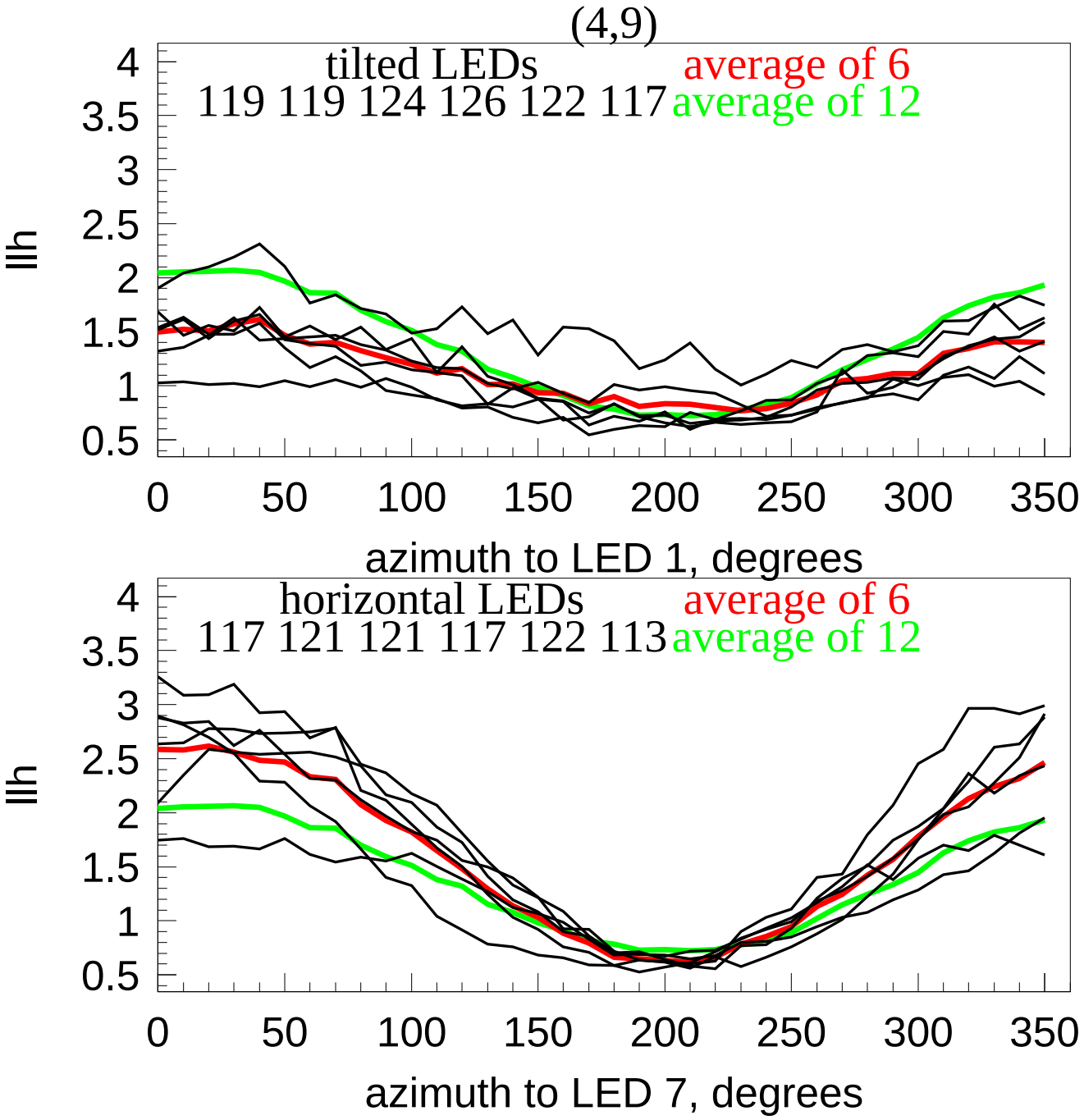

(4,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
199.5 ± 17.9

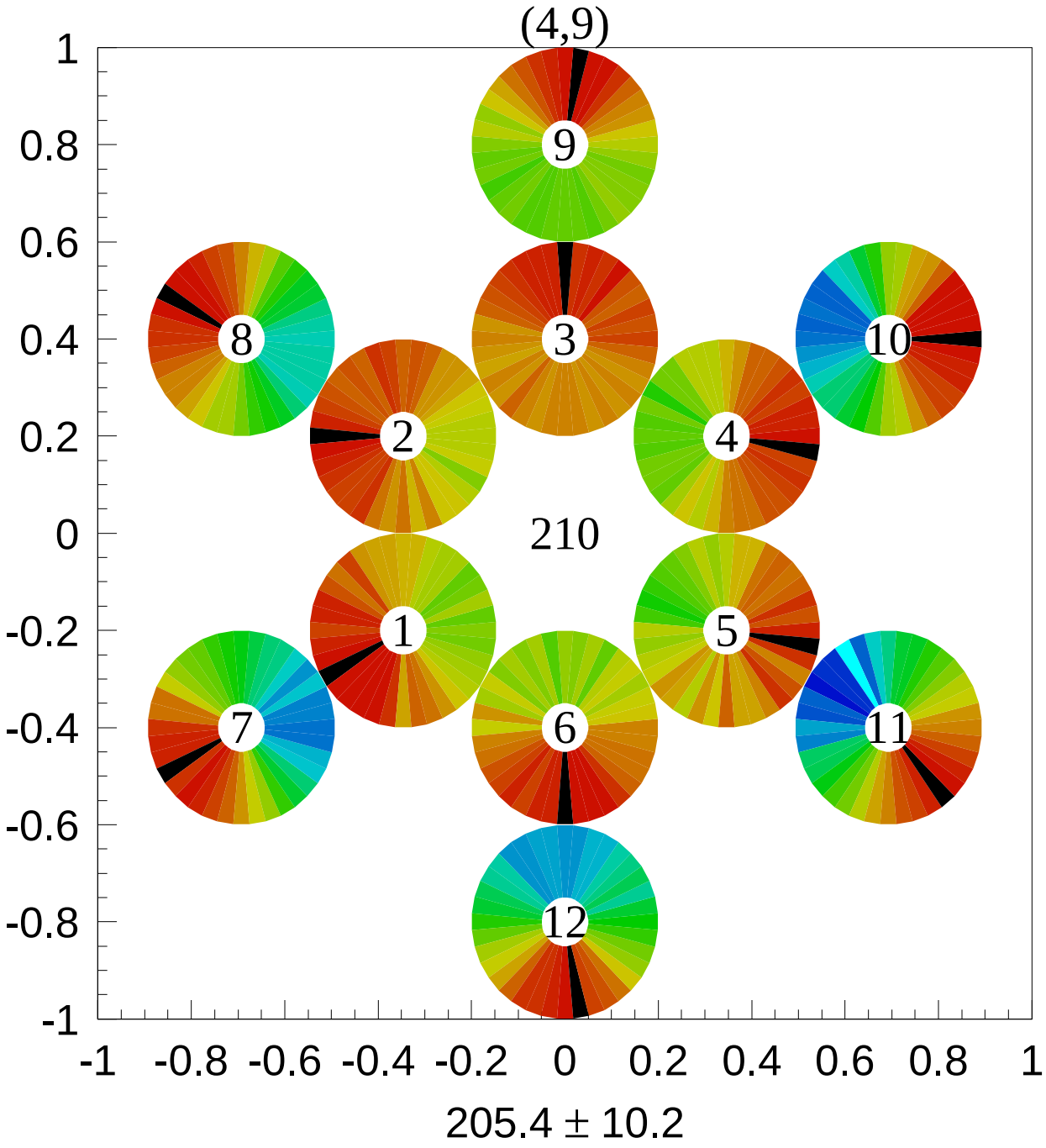

(4,7)
tilted LEDs
120 122 122 127 123 119
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 127 130 123 126 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

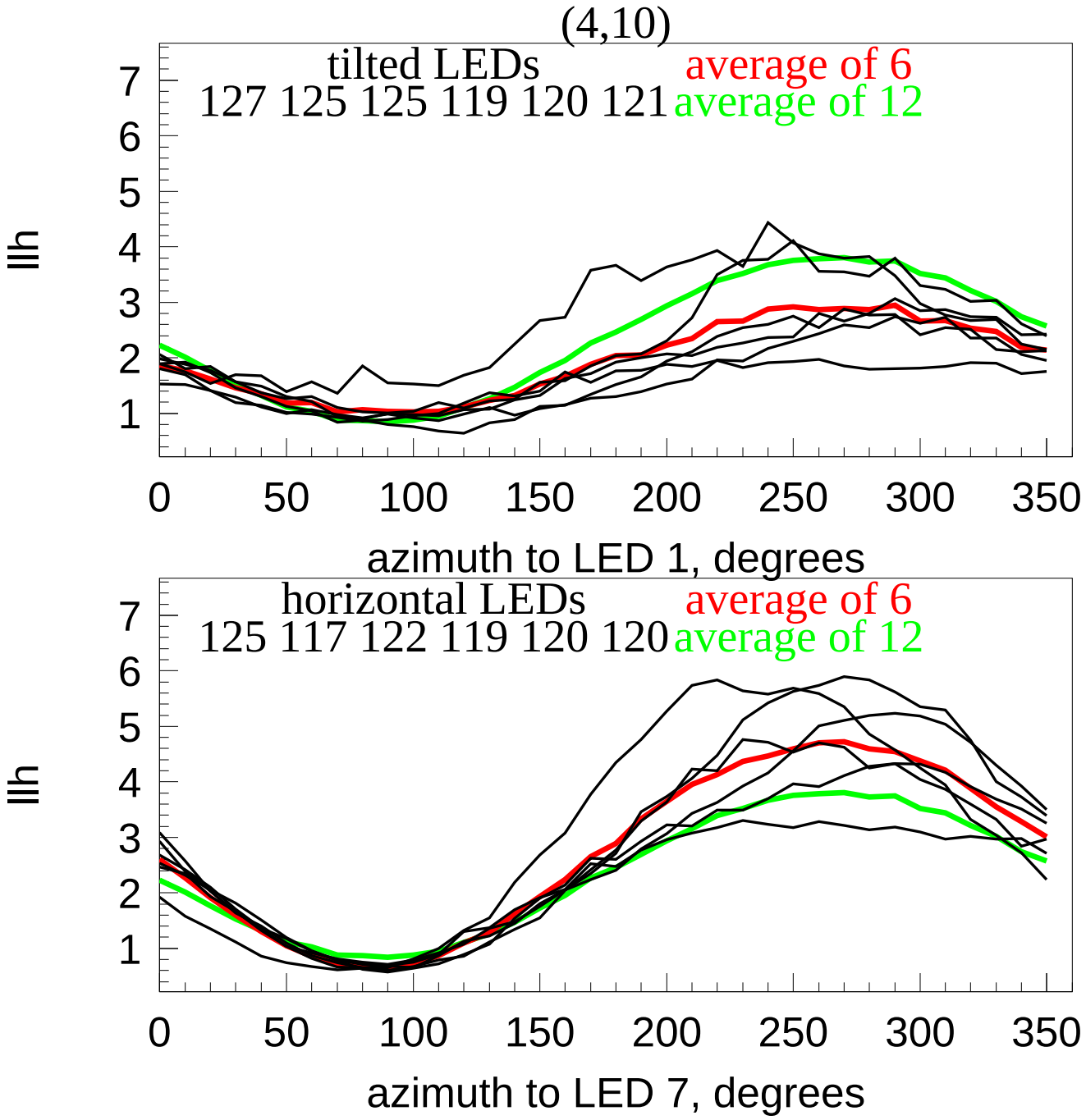

(4,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12.6 ± 12.3
11
12
5
6
10
4
0
1
7
3
2
9
8

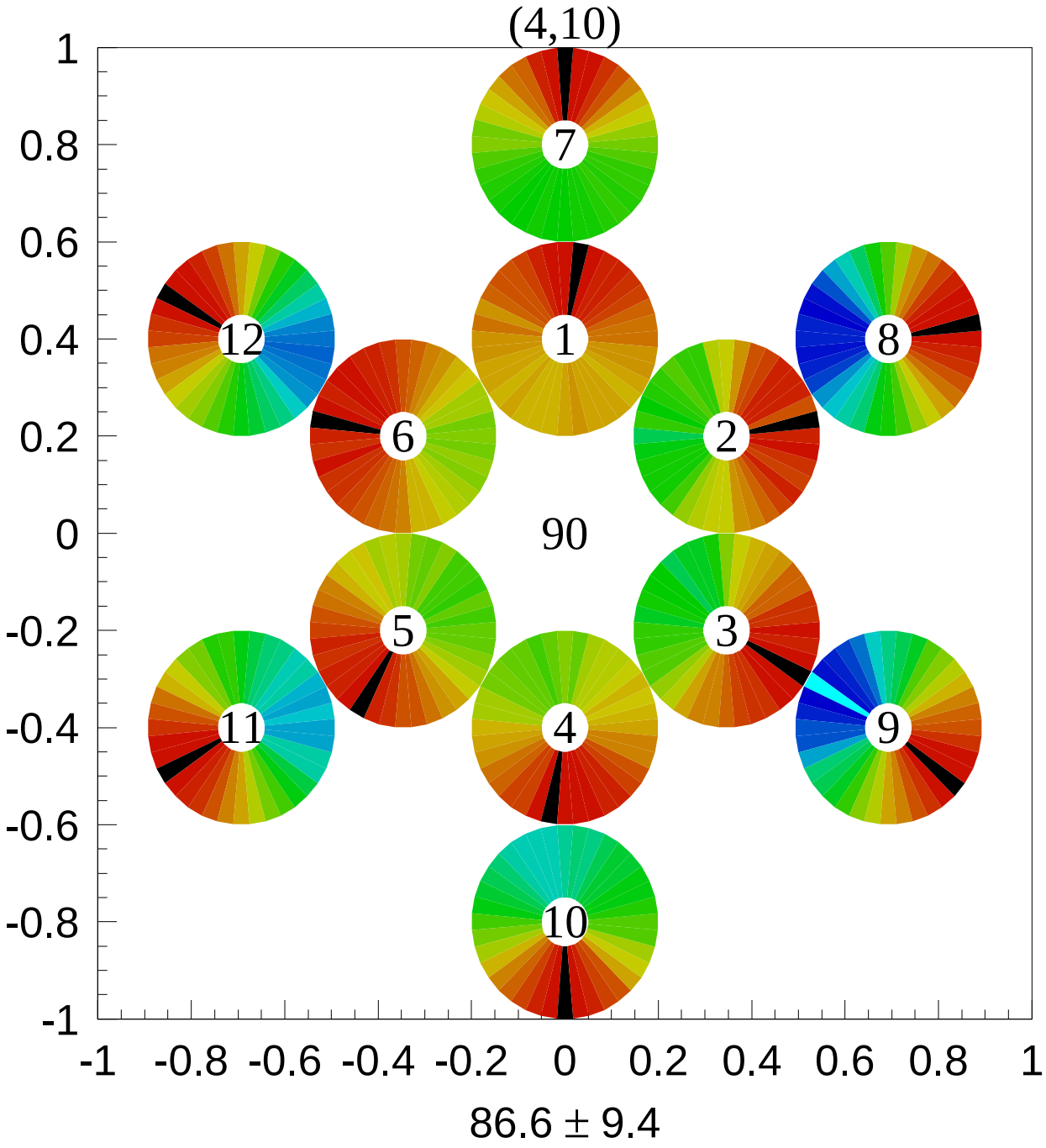

(4,8)
tilted LEDs
117 121 117 118 120 126
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 116 119 121 122 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

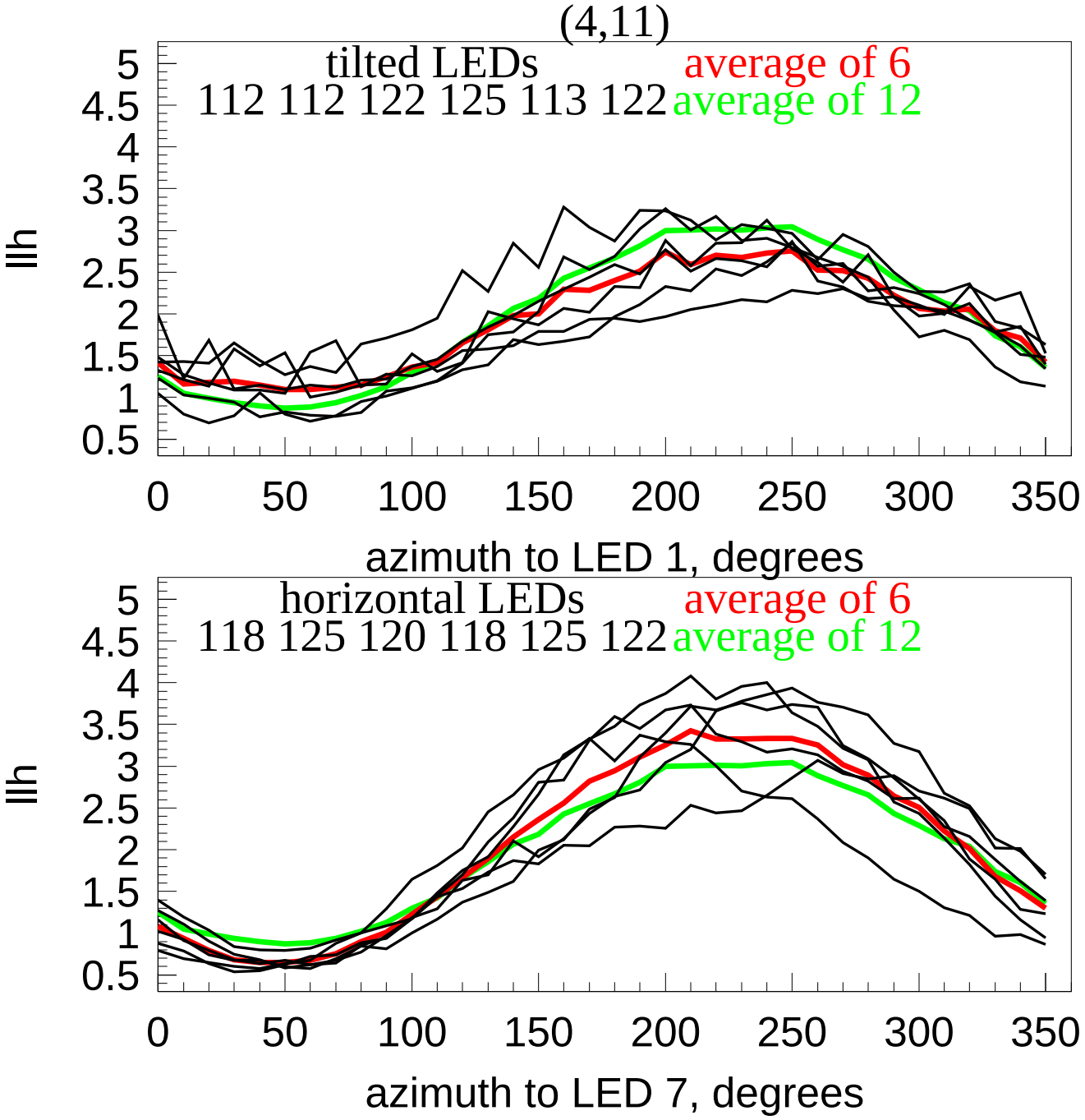

(4,8)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
133.7 ± 15.3

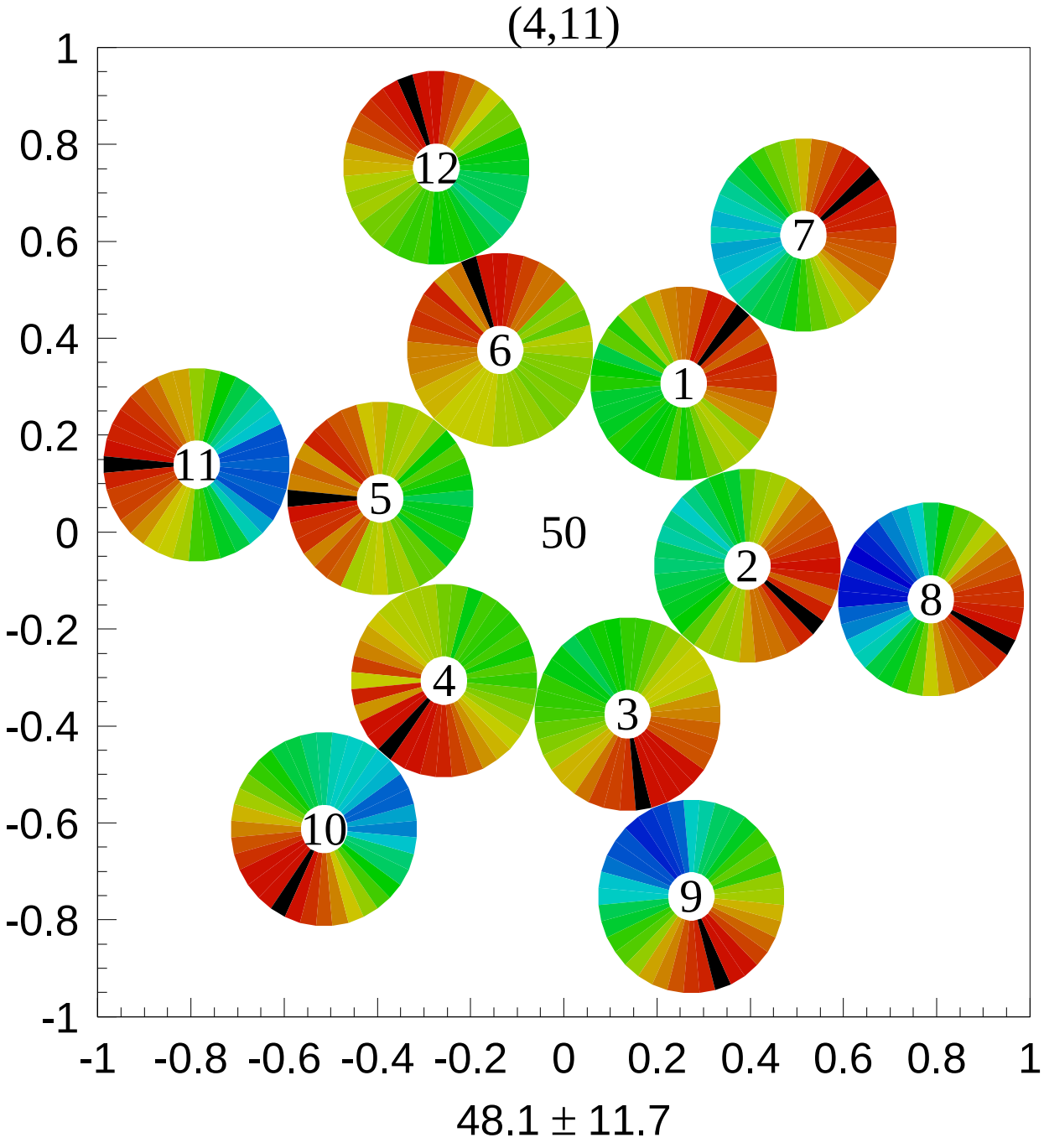

(4,9)
tilted LEDs
119 119 124 126 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 121 121 117 122 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

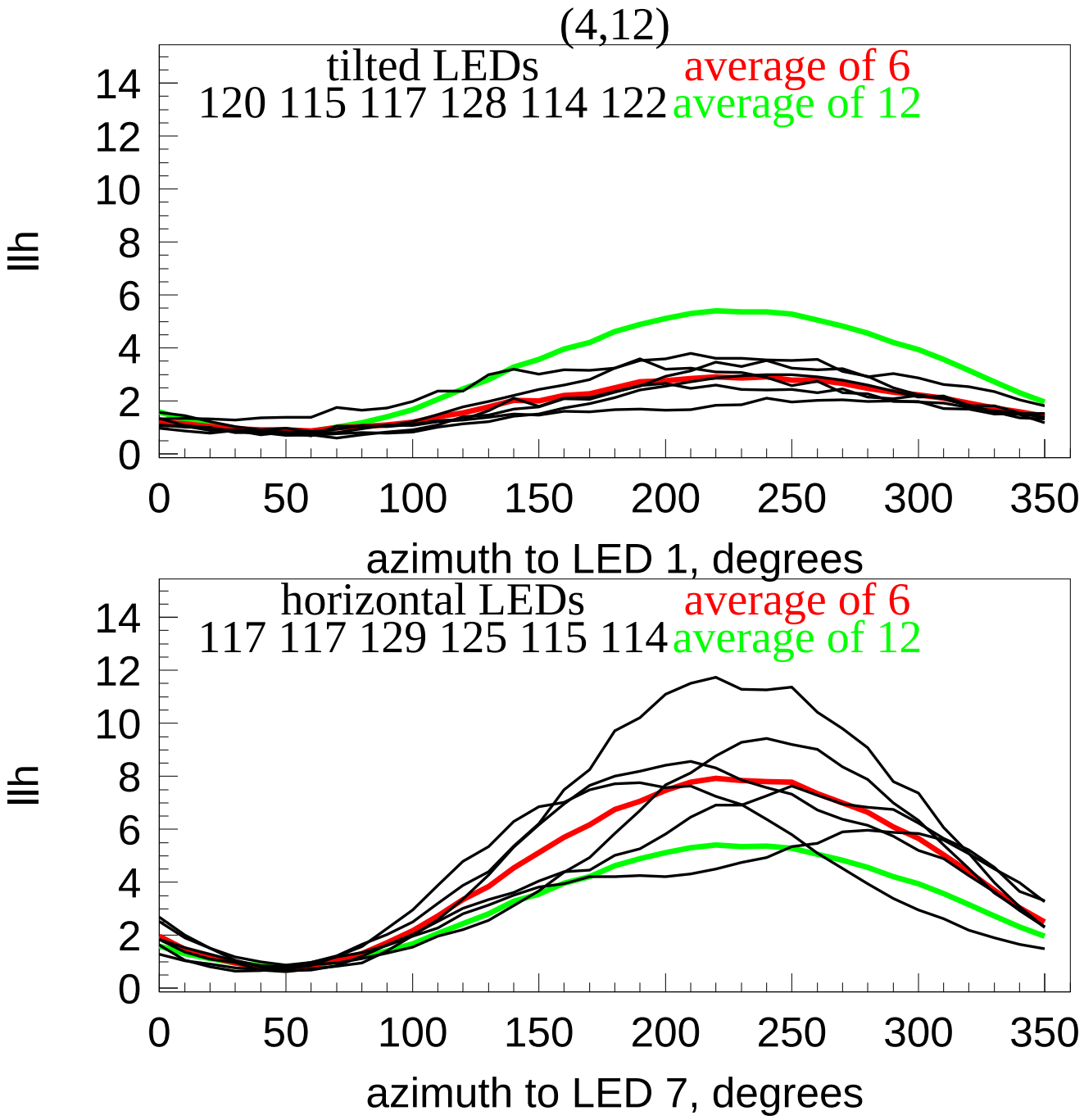

(4,9)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
205.4 ± 10.2

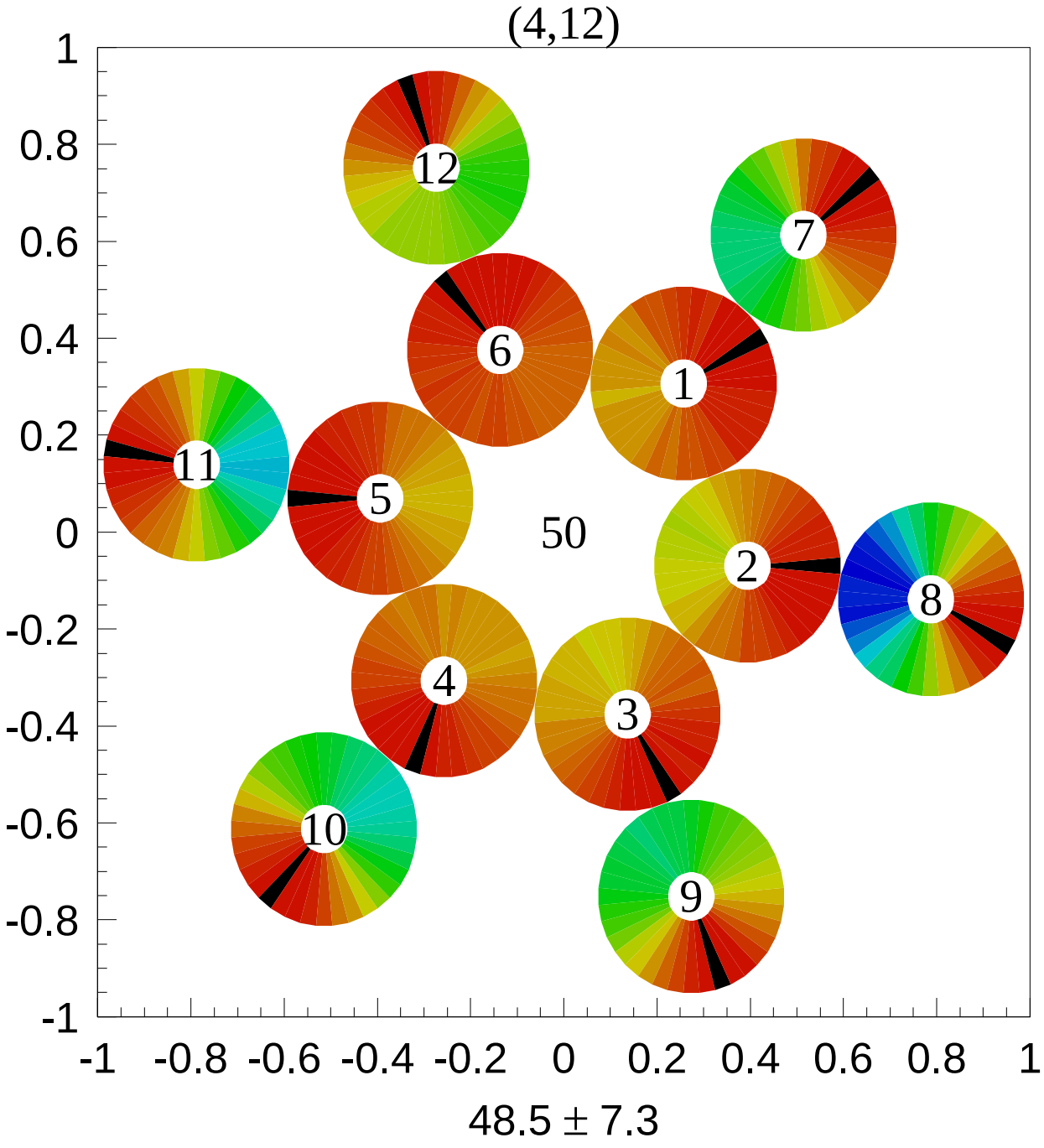

(4,10)
tilted LEDs
127 125 125 119 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 117 122 119 120 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

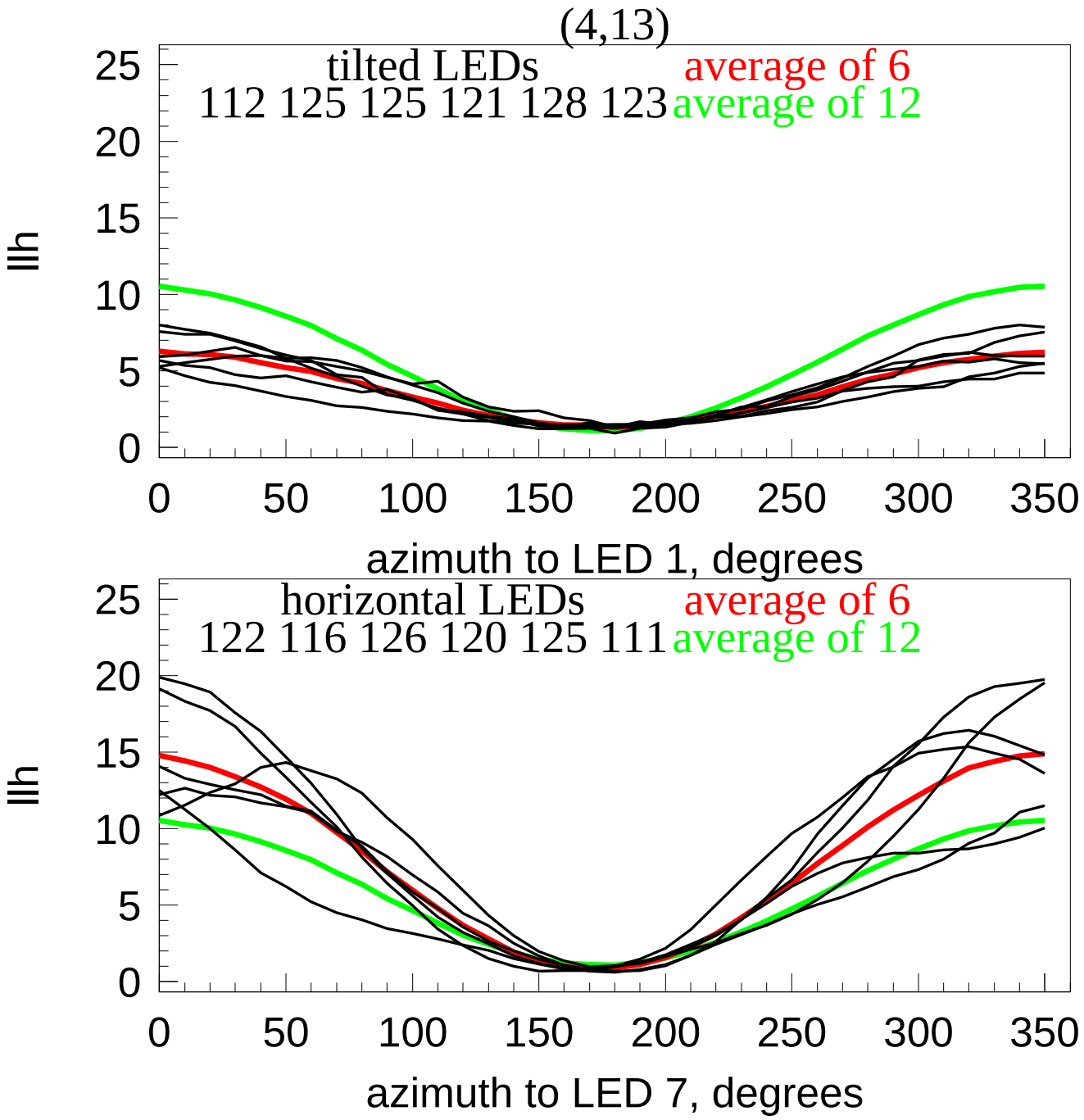

(4,10)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
86.6 ± 9.4

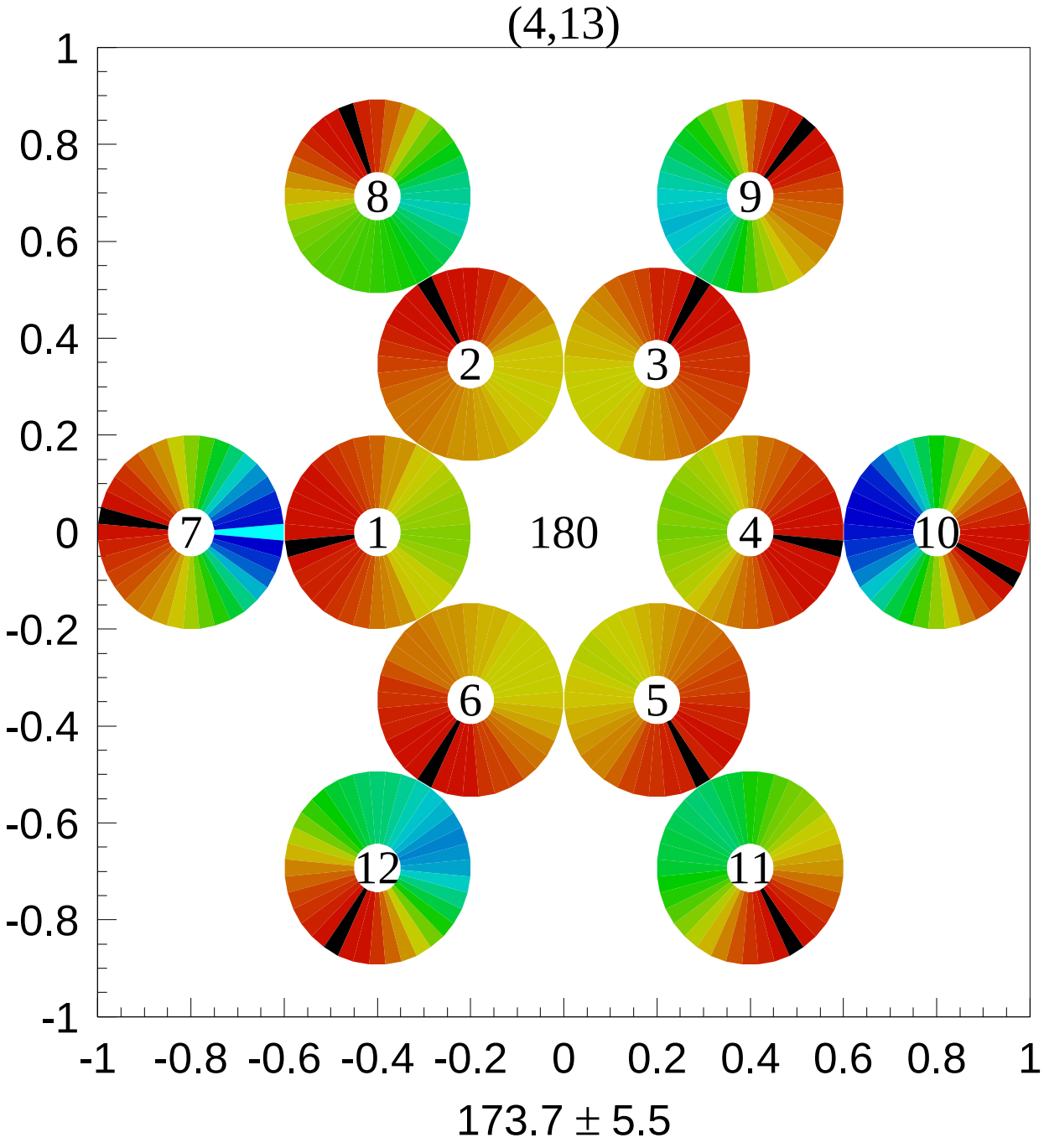

(4,11)
tilted LEDs
112 112 122 125 113 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 125 120 118 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

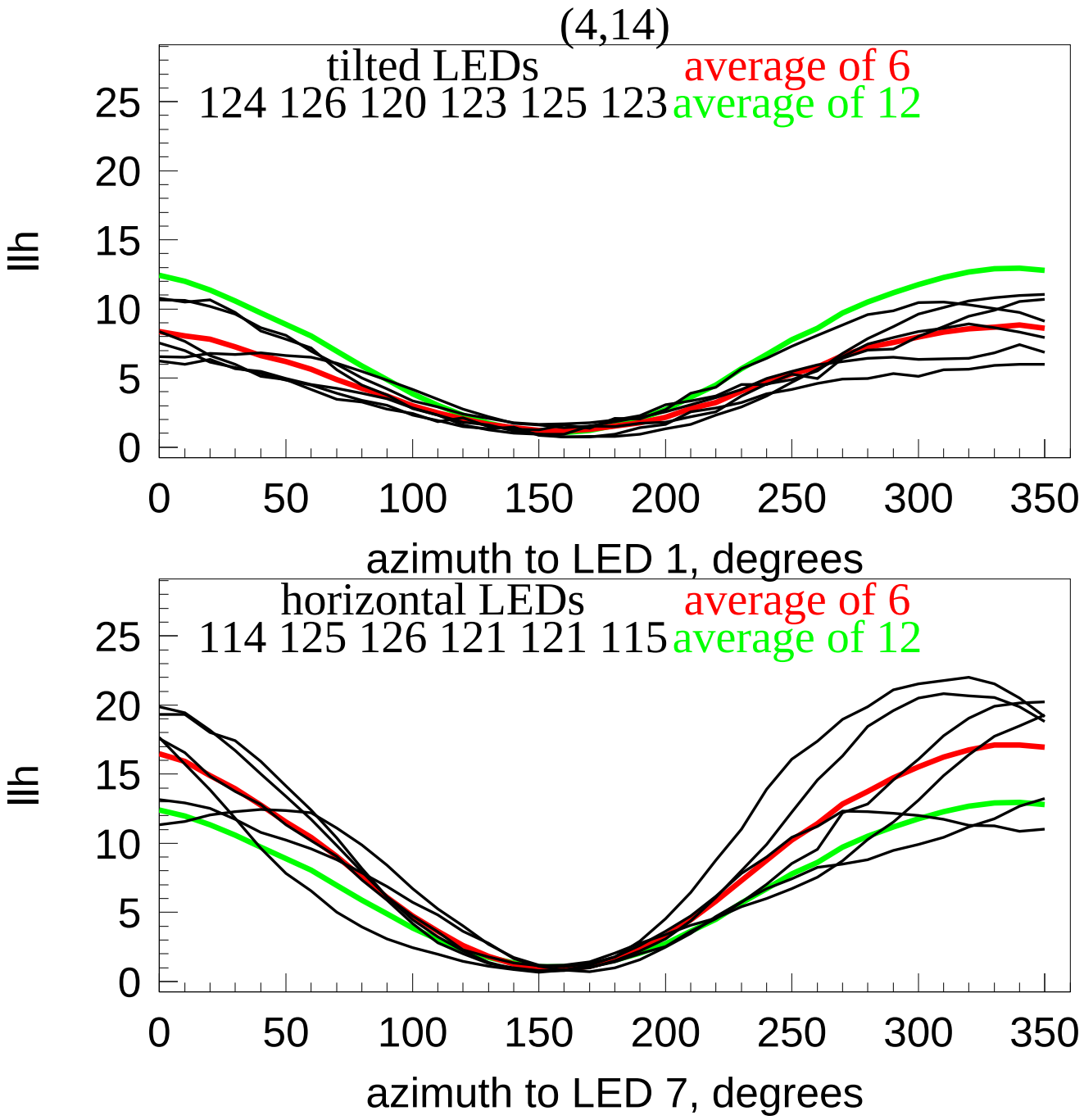

(4,11)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
48.1 ± 11.7

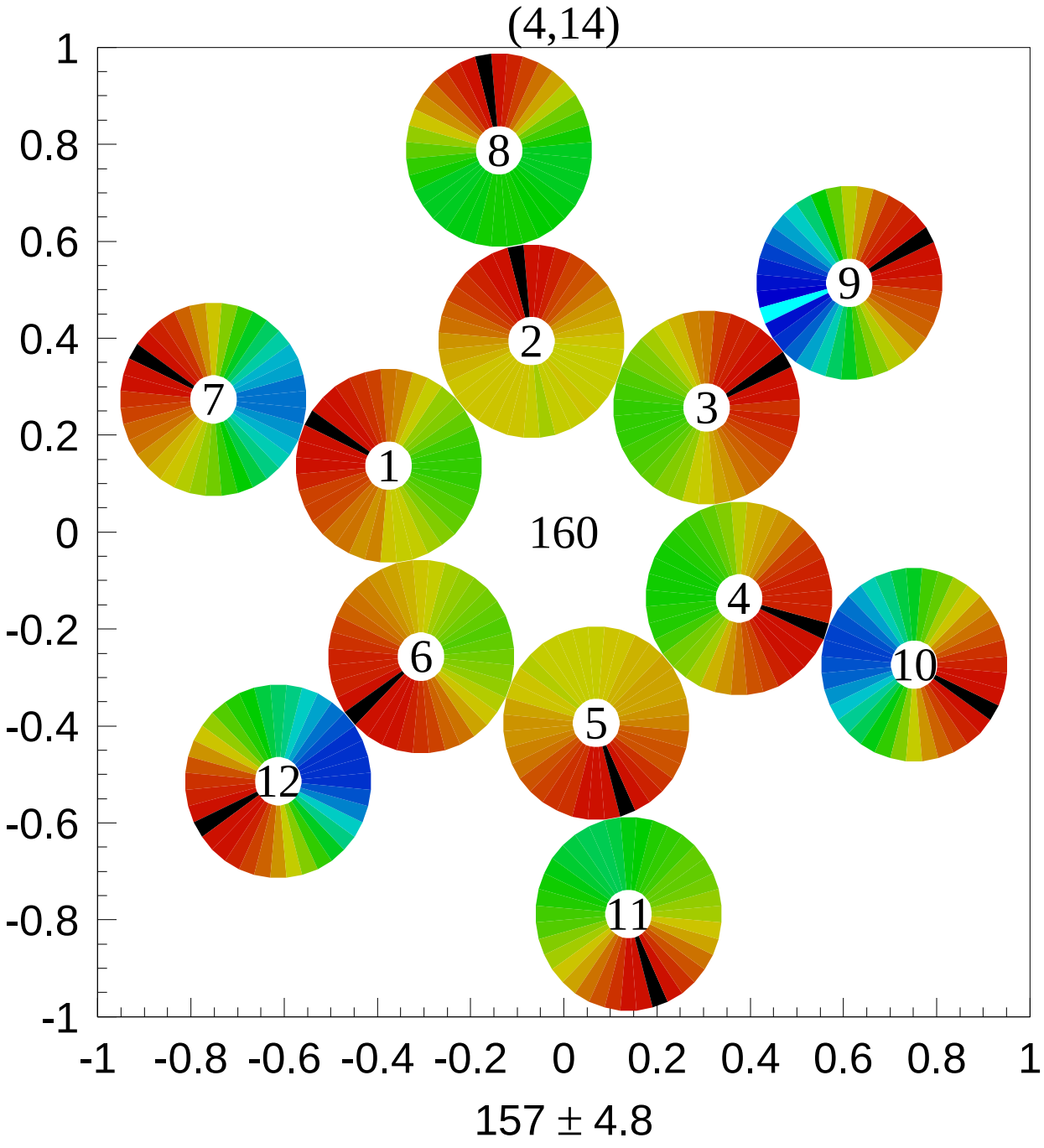

(4,12)
tilted LEDs
120 115 117 128 114 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 117 129 125 115 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

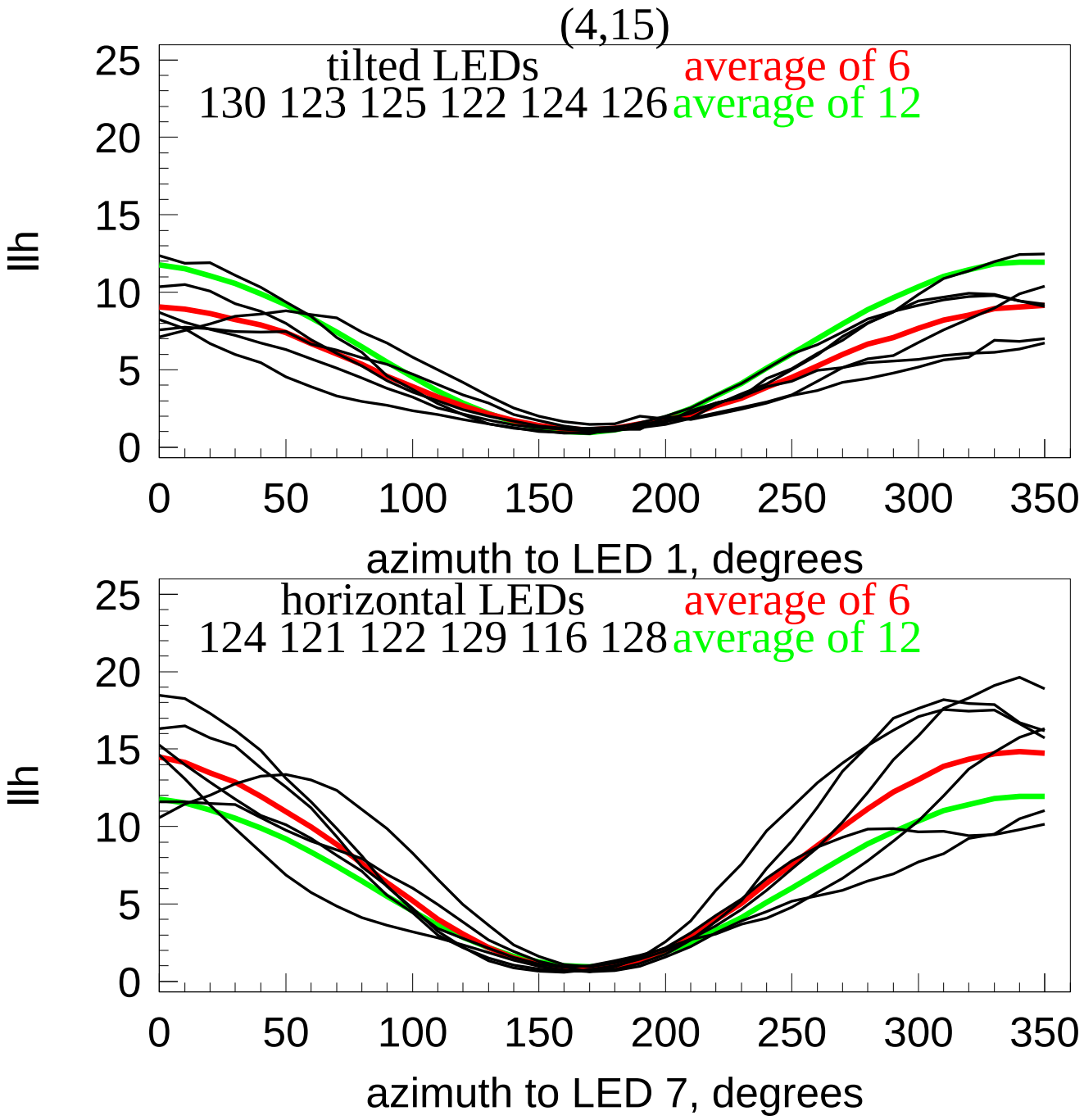

(4,12)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
48.5 ± 7.3

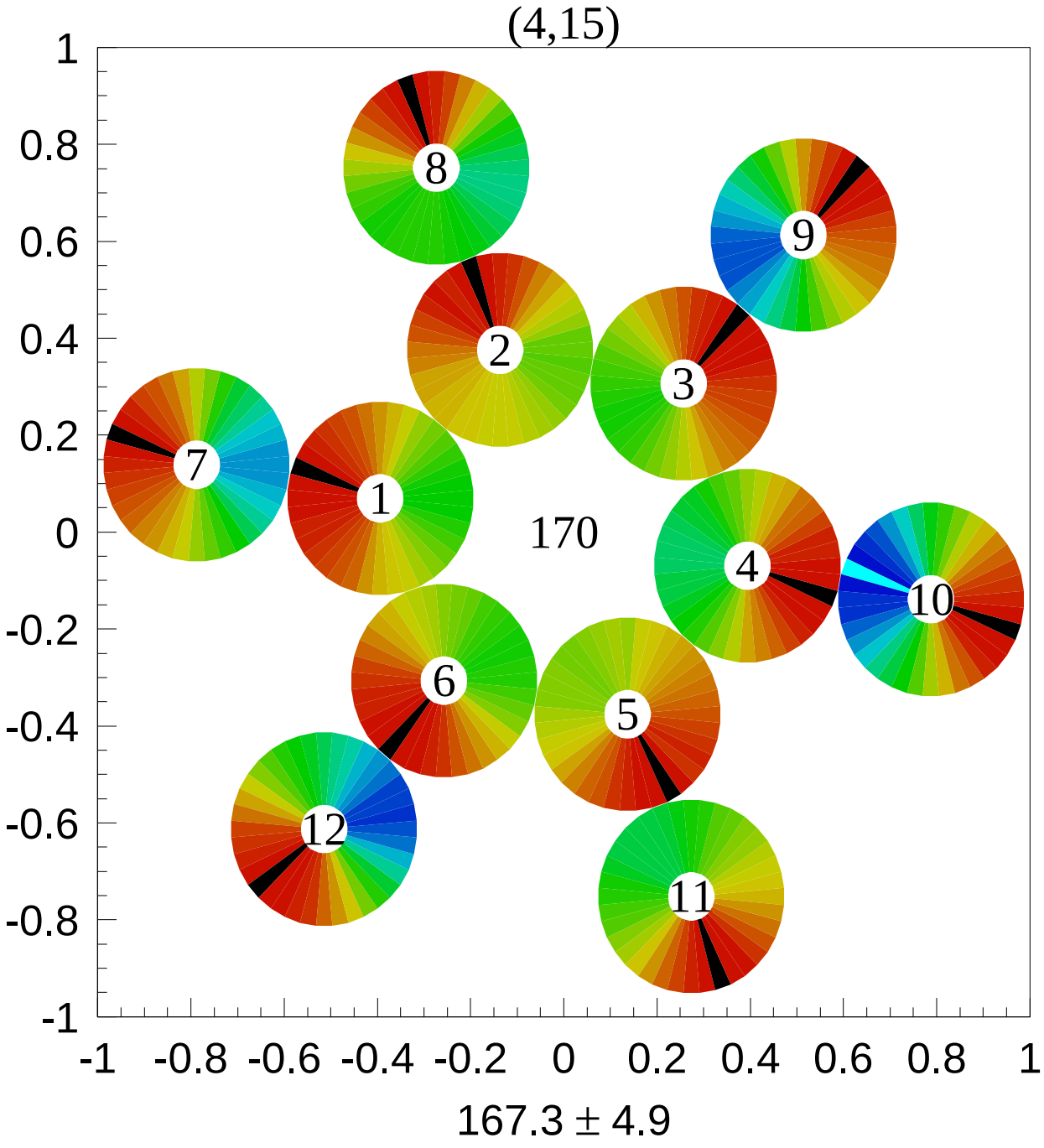

(4,13)
tilted LEDs
112 125 125 121 128 123
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 116 126 120 125 111
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

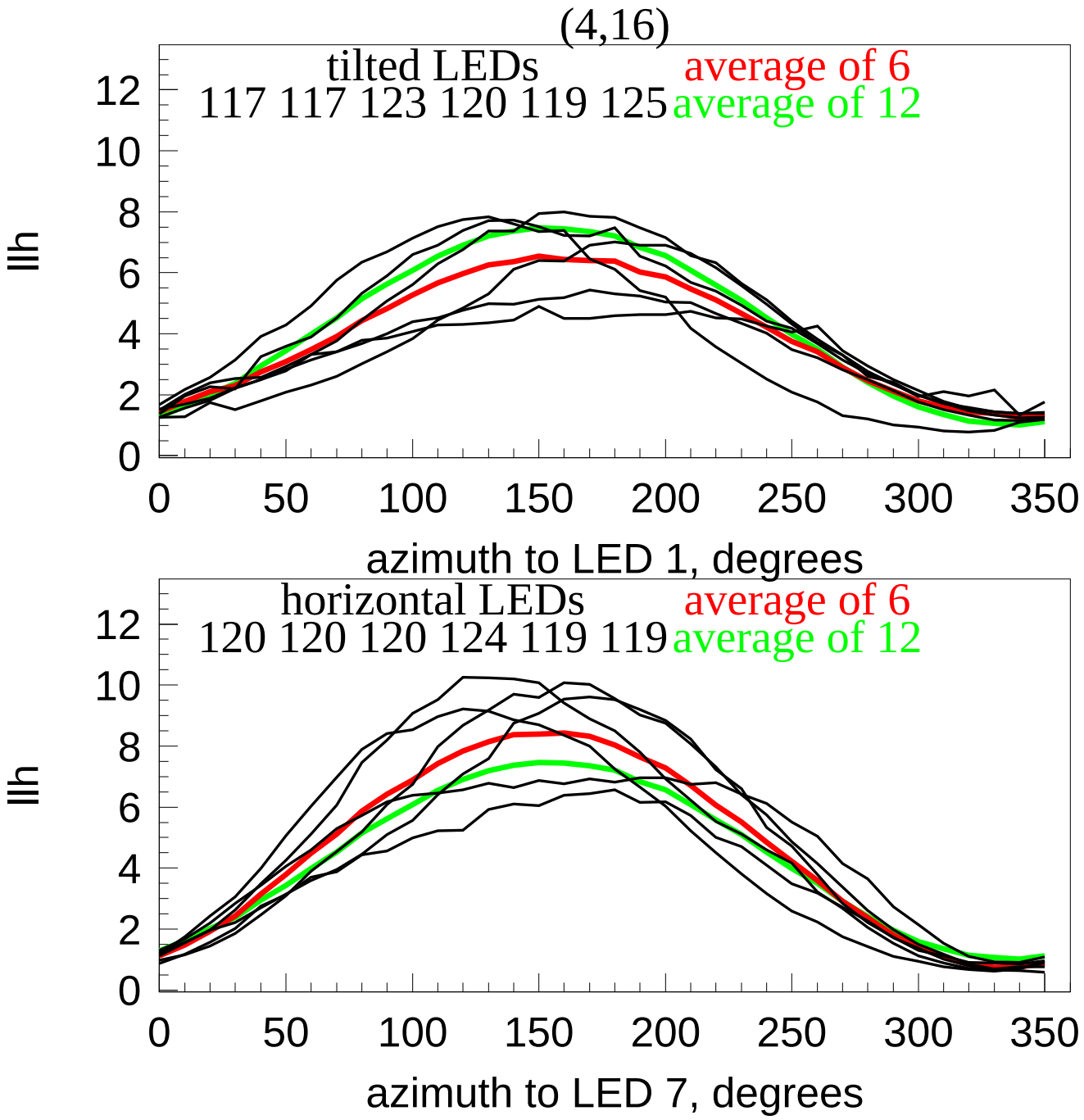

(4,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
173.7 ± 5.5

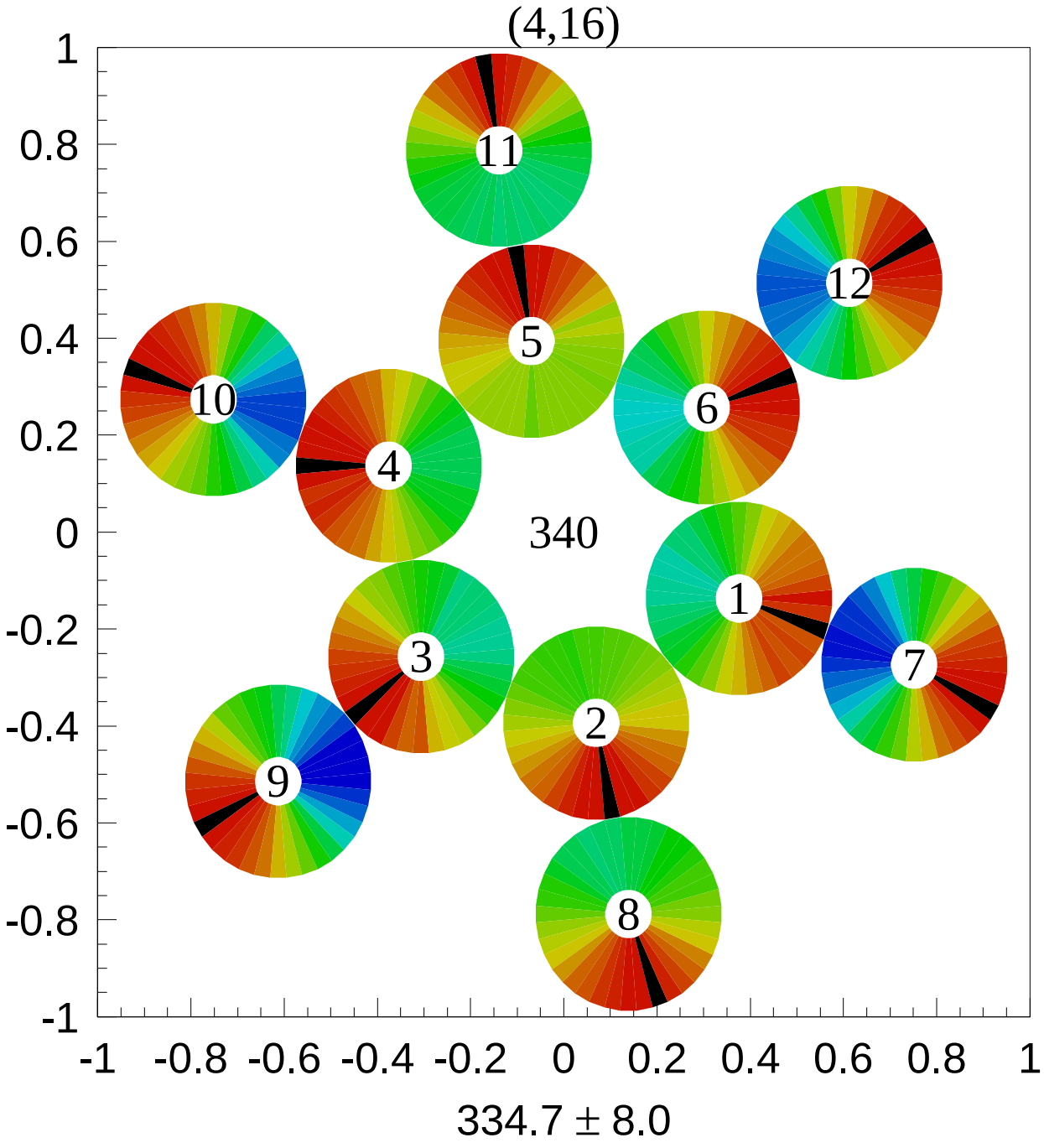

(4,14)
tilted LEDs
124 126 120 123 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 125 126 121 121 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

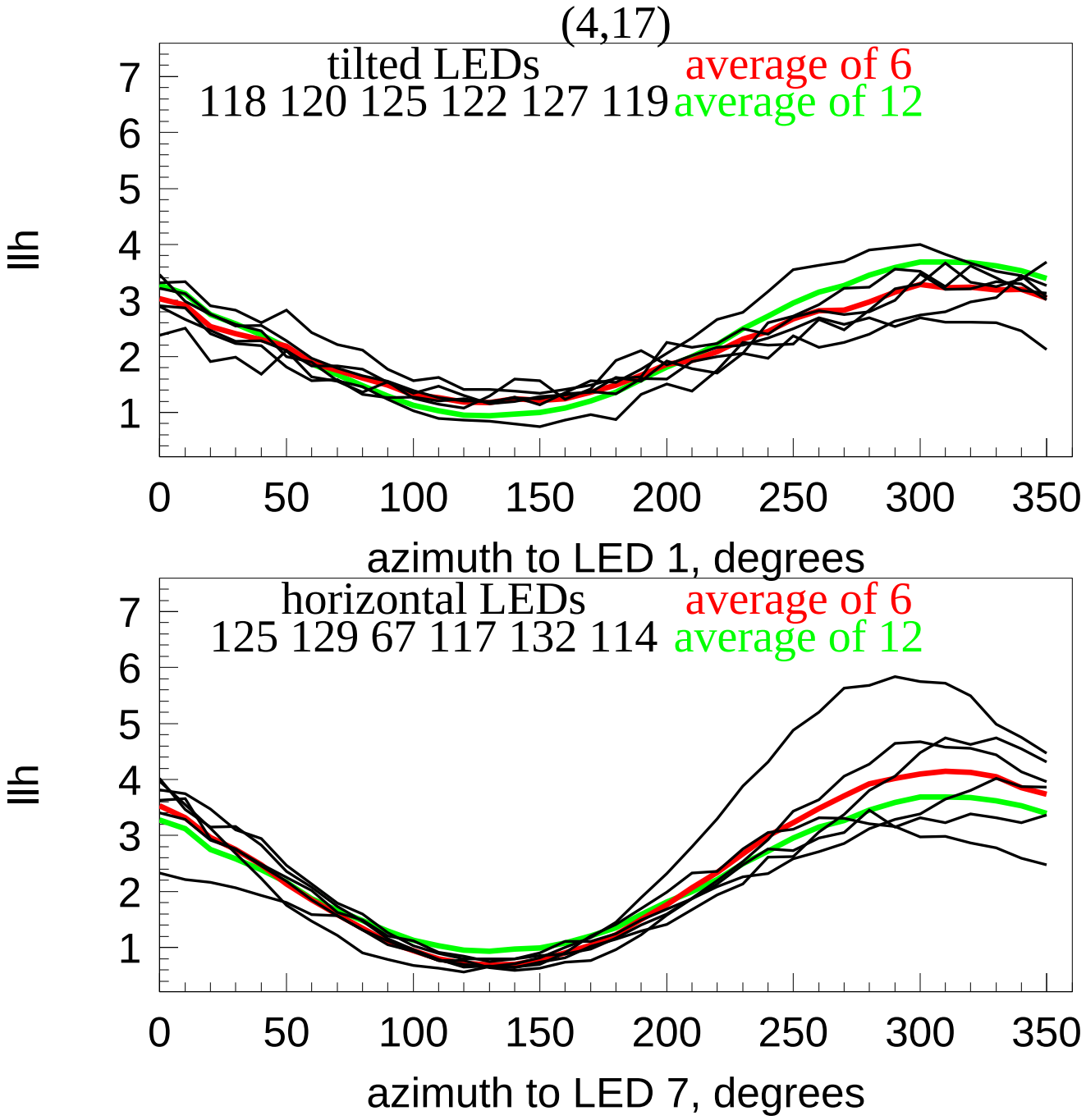

(4,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
157 ± 4.8

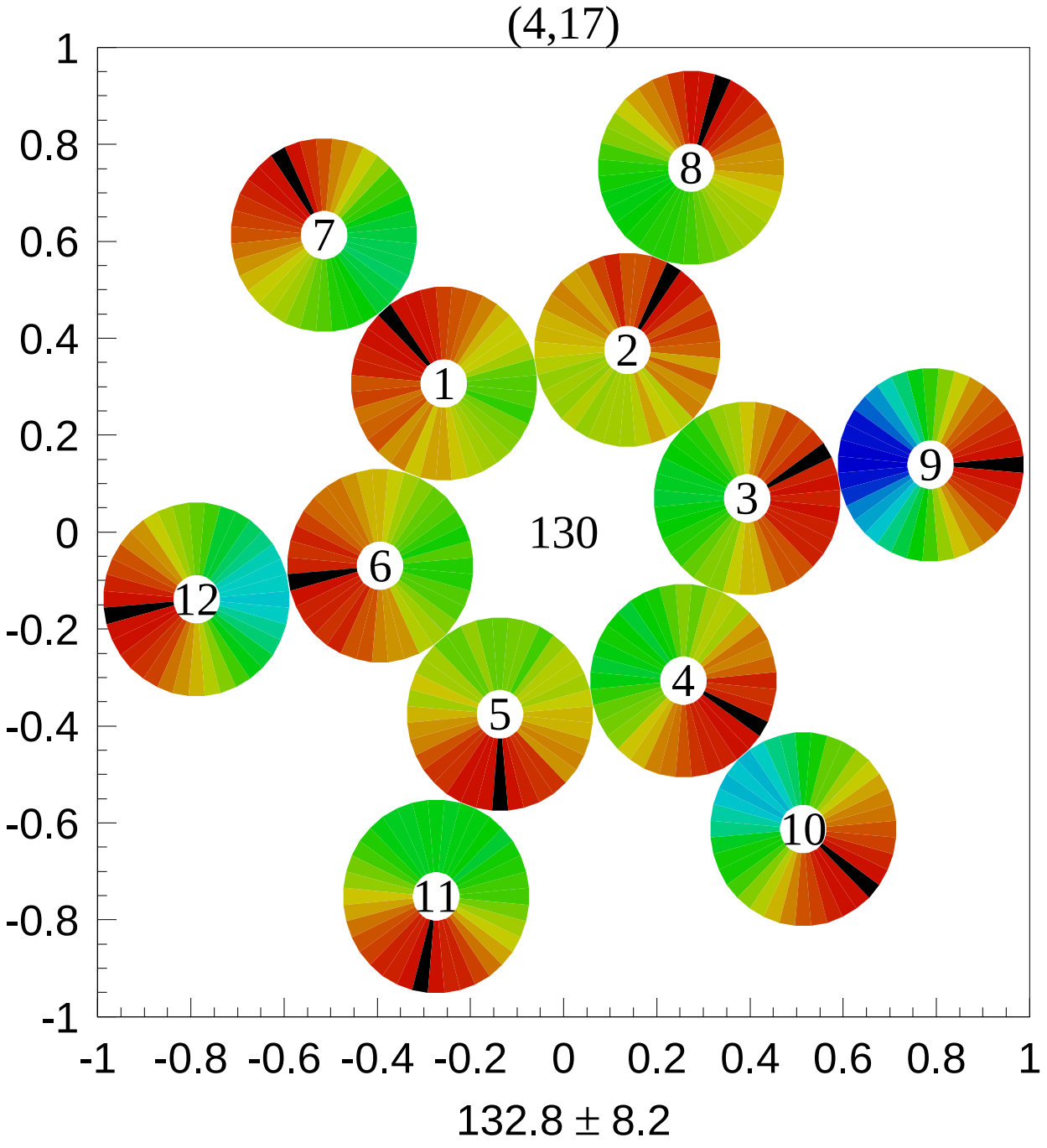

(4,15)
tilted LEDs
130 123 125 122 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 122 129 116 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

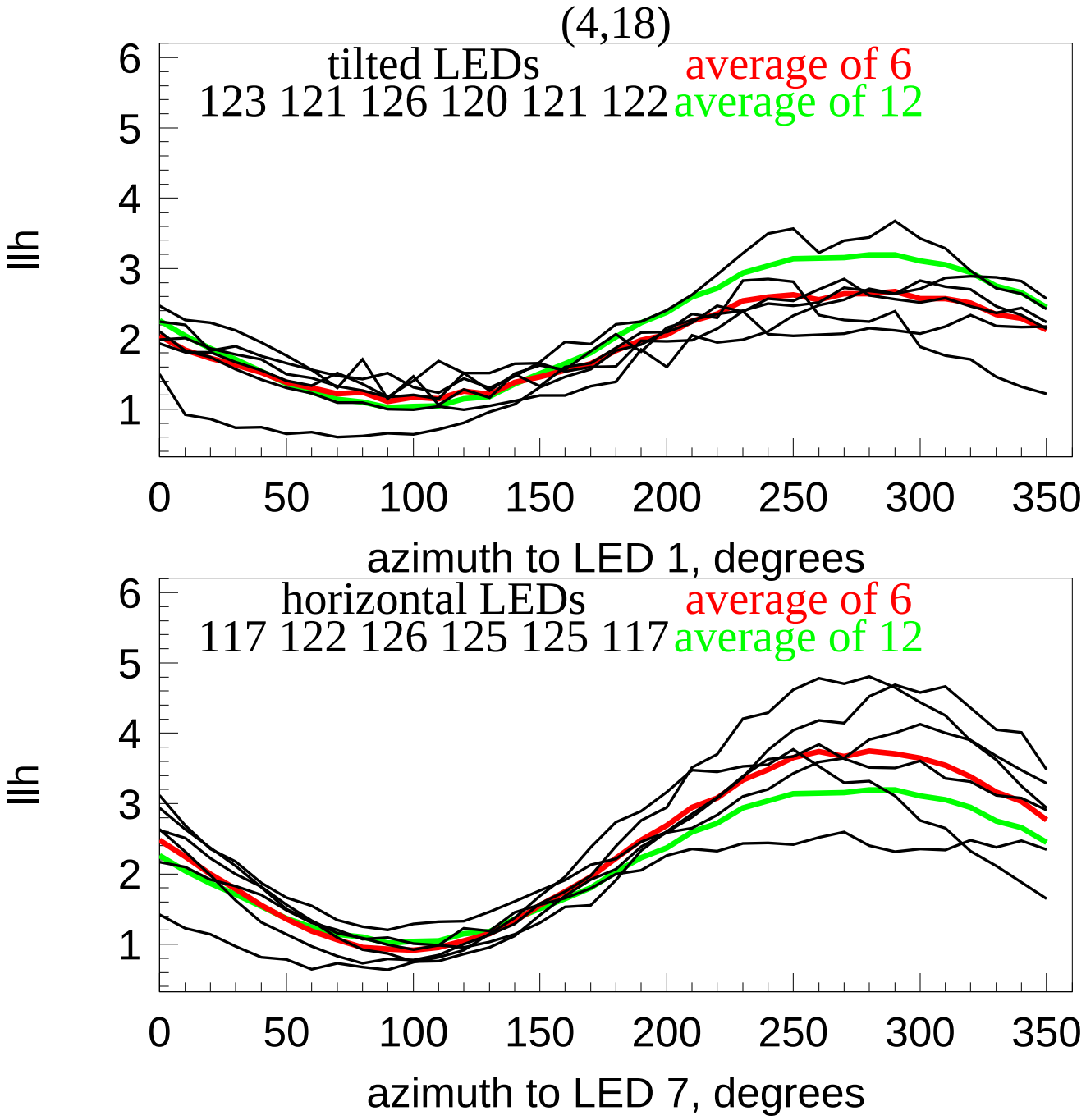

(4,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
167.3 ± 4.9

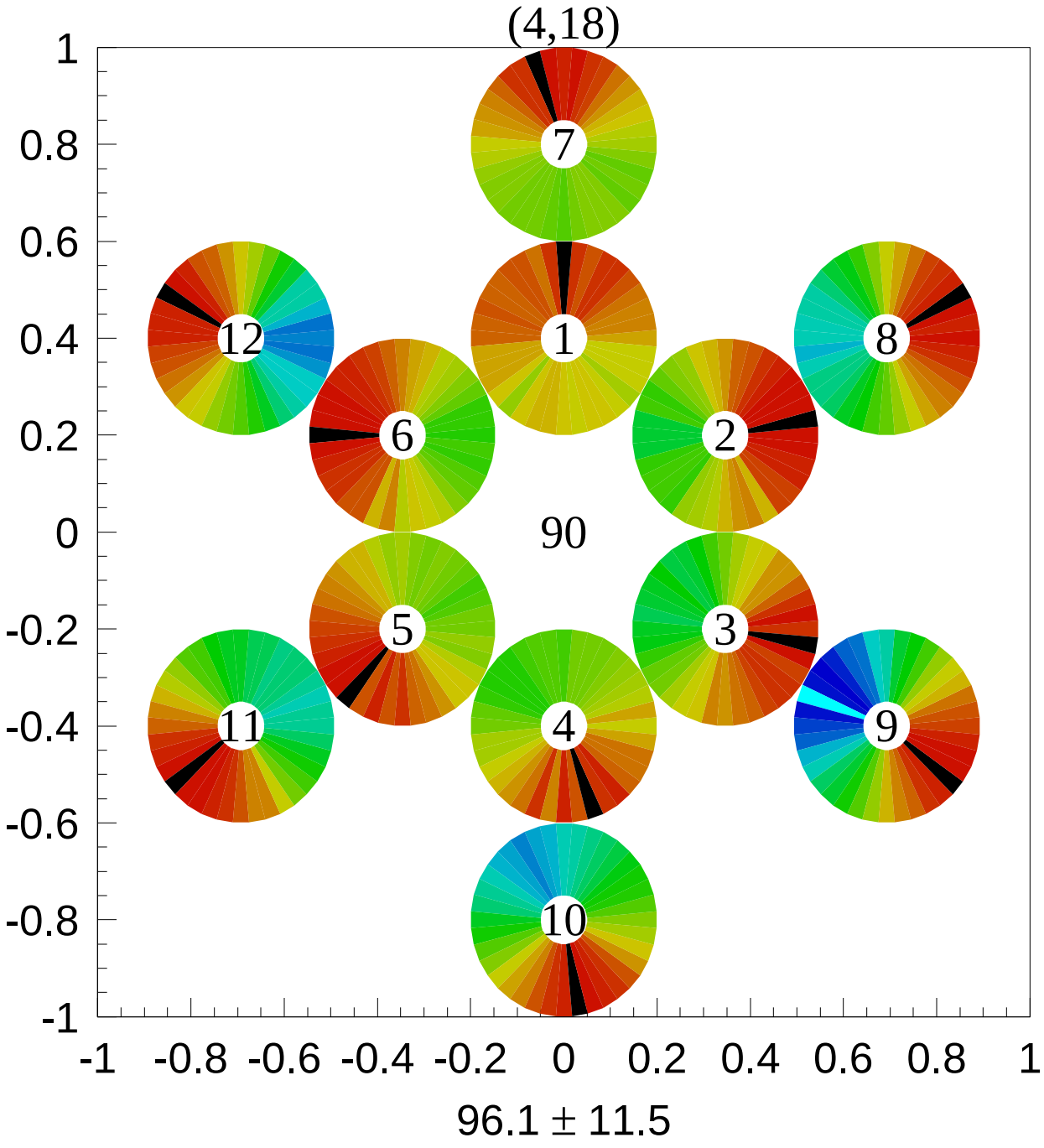

(4,16)
tilted LEDs
117 117 123 120 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 120 124 119 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

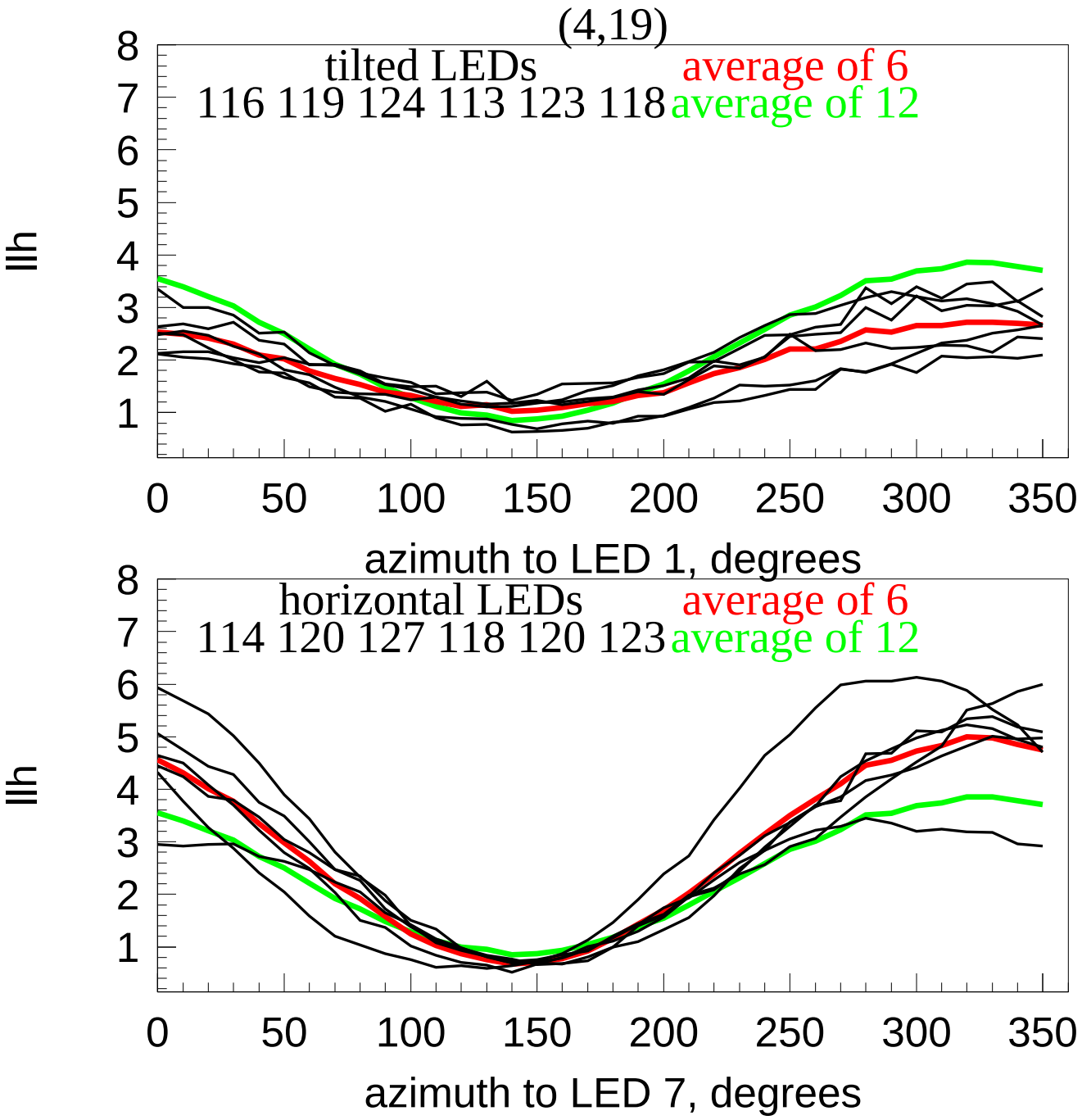

(4,16)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
334.7 ± 8.0

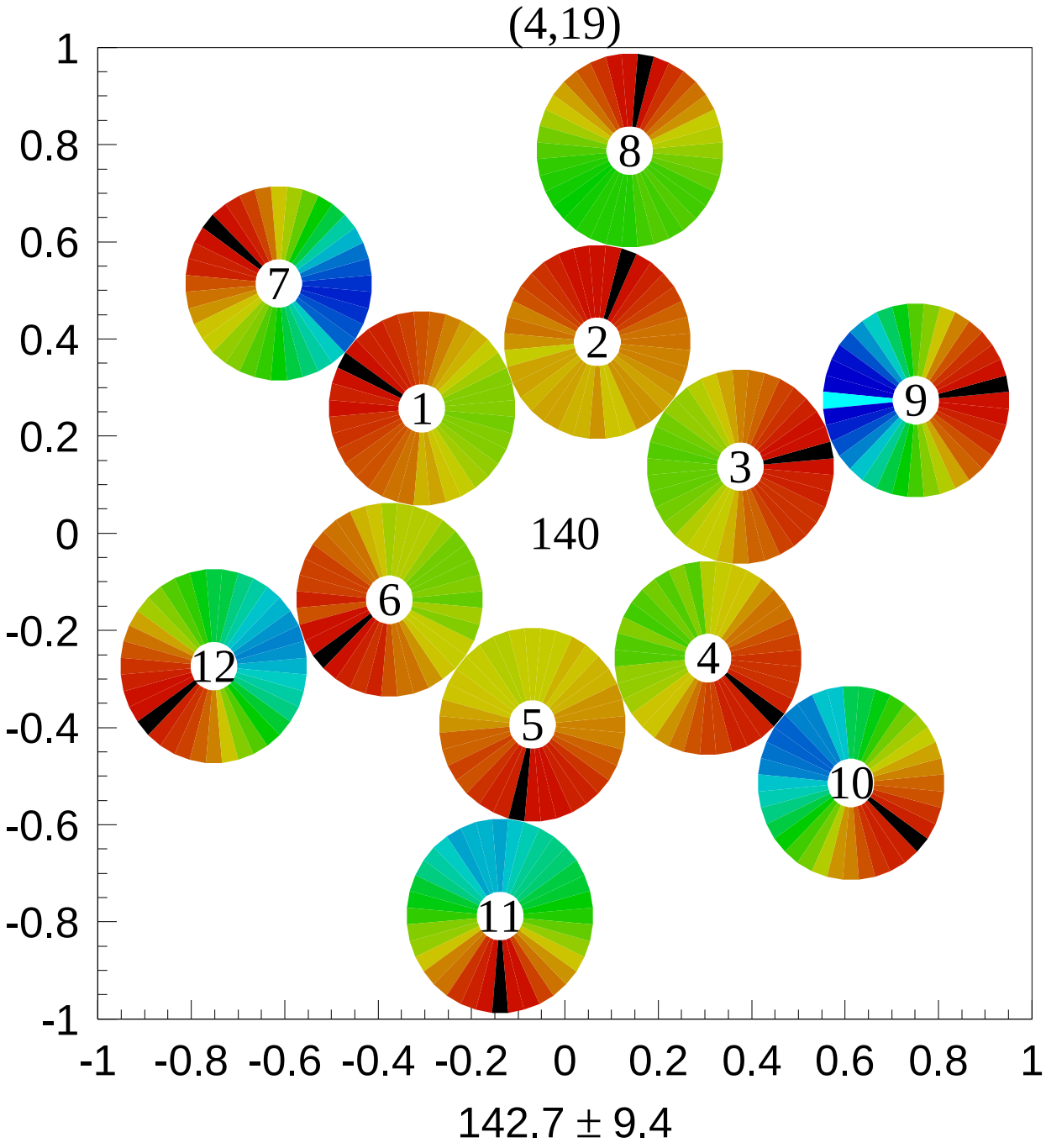

(4,17)
tilted LEDs
118 120 125 122 127 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 129 67 117 132 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

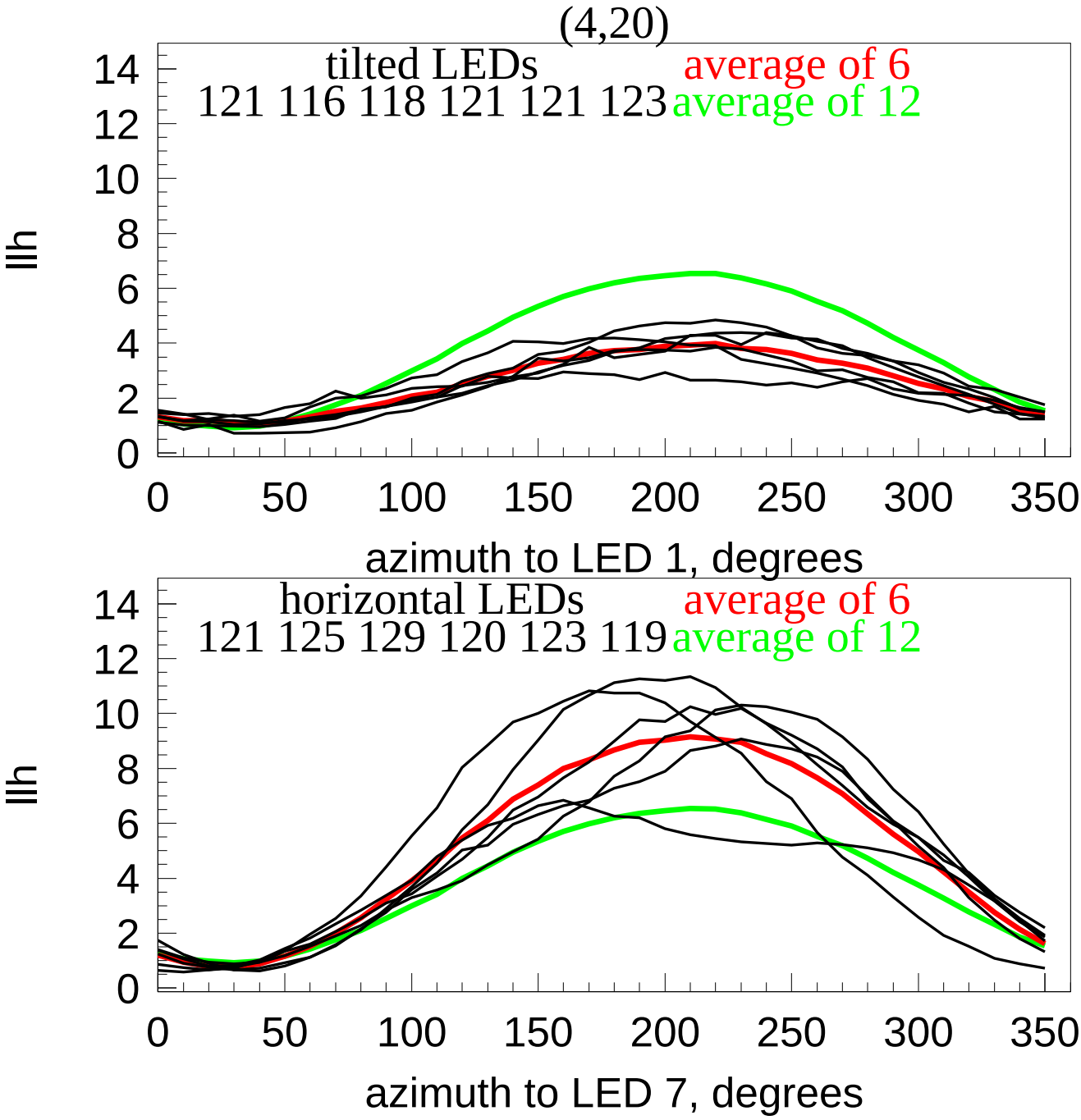

(4,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
132.8 ± 8.2
130
1
2
3
4
5
6
7
8
9
10
11
12

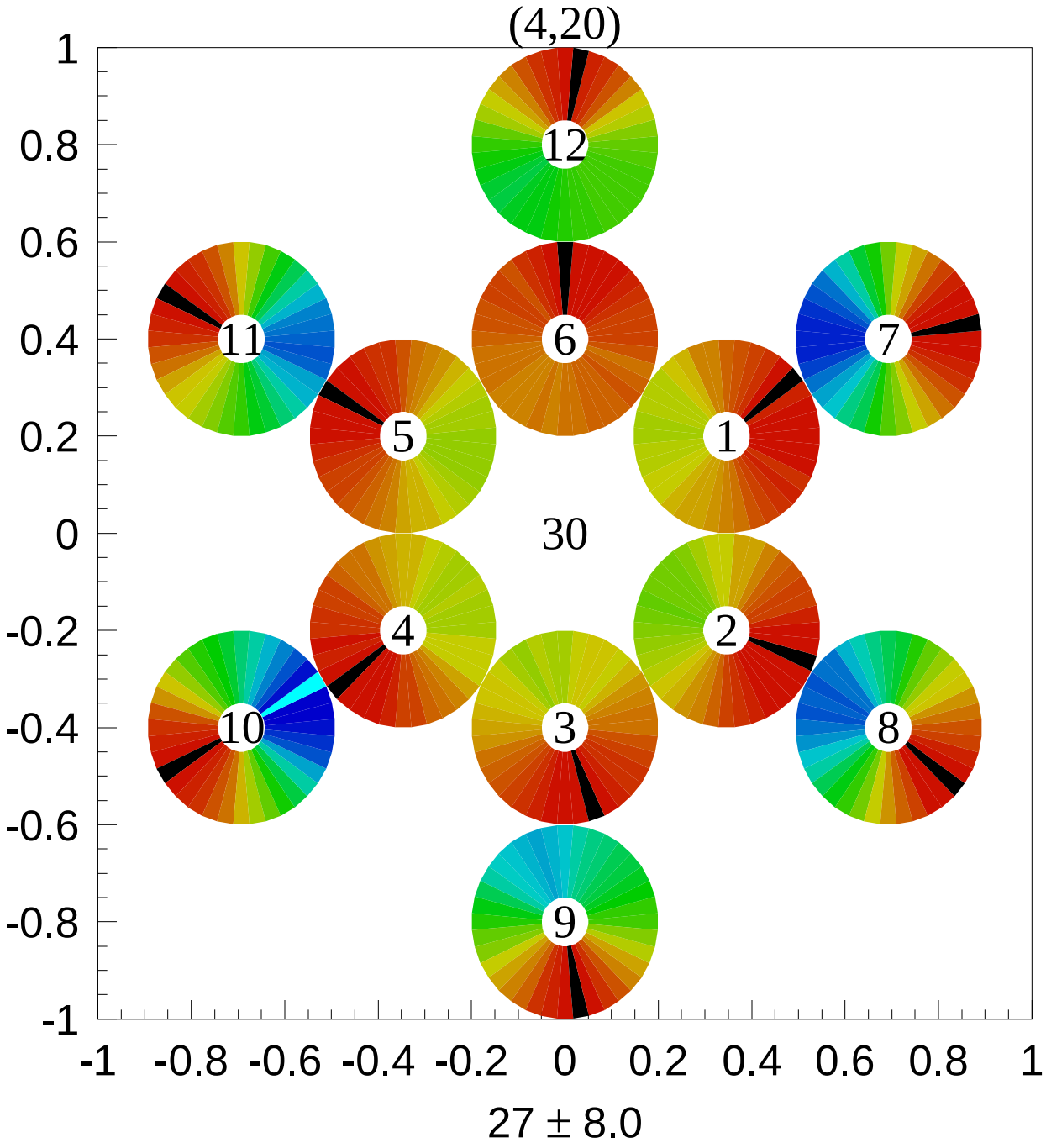

(4,18)
tilted LEDs
123 121 126 120 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 126 125 125 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

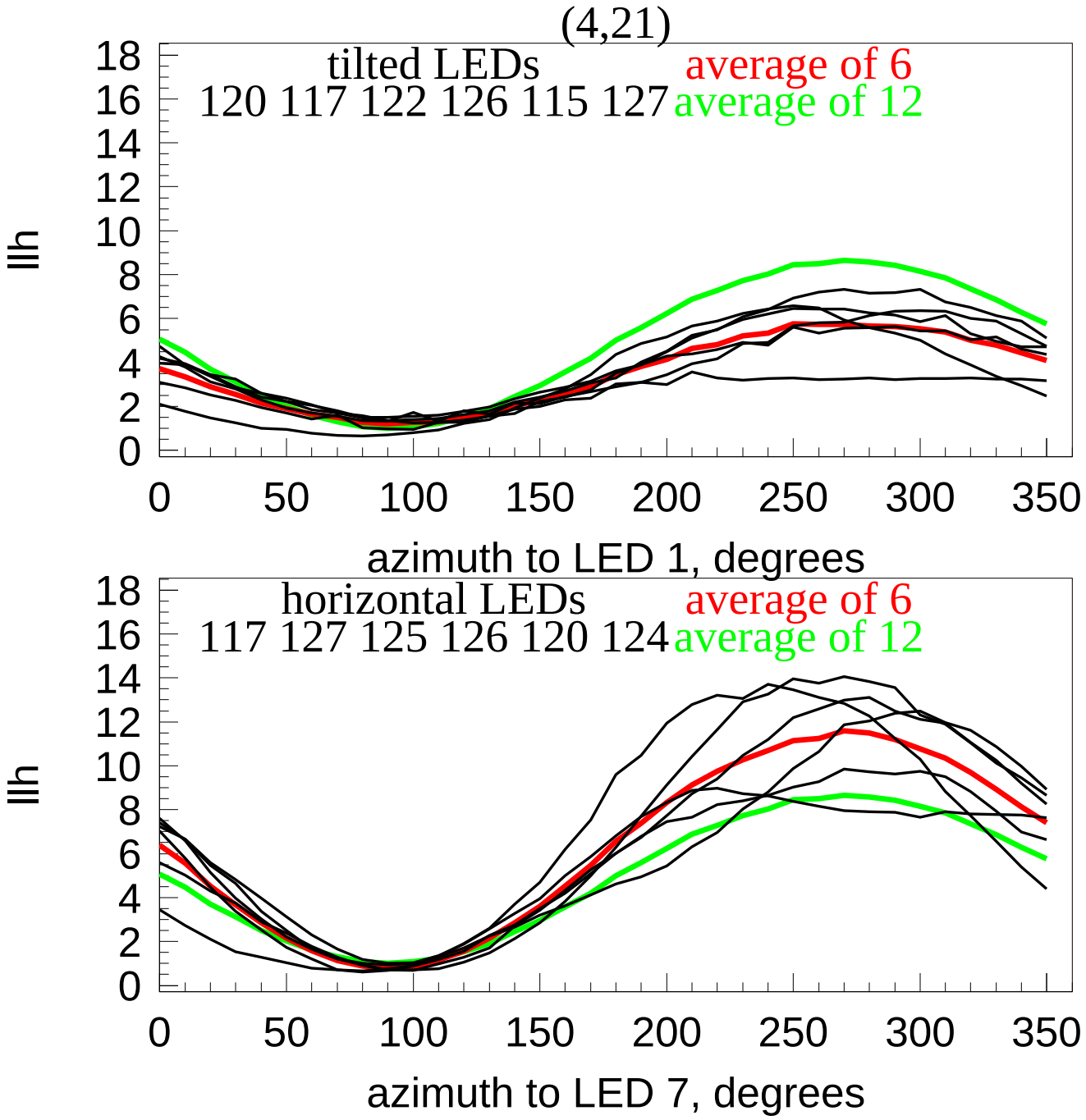

(4,18)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
96.1 ± 11.5

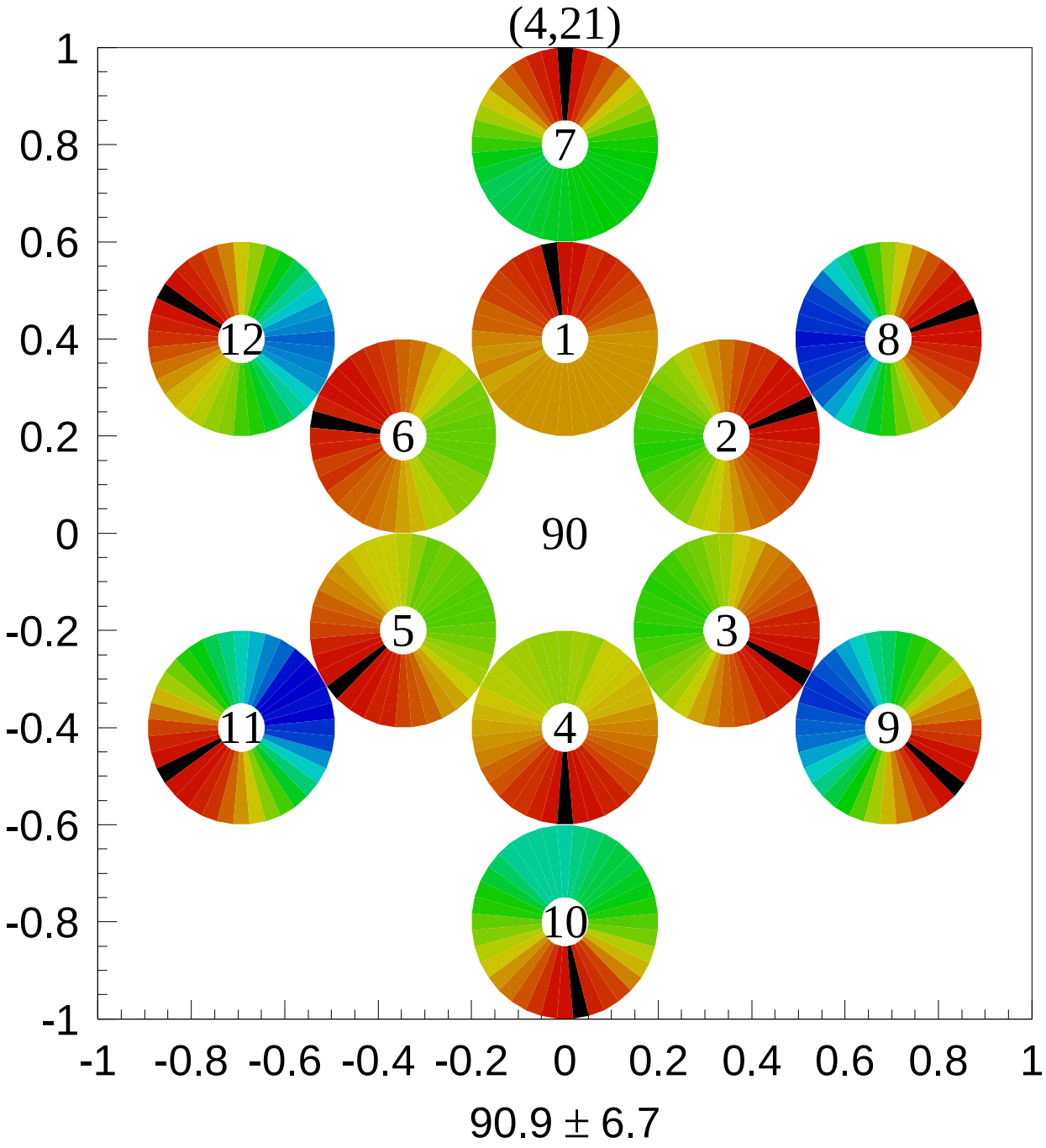

(4,19)
tilted LEDs
116 119 124 113 123 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 120 127 118 120 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

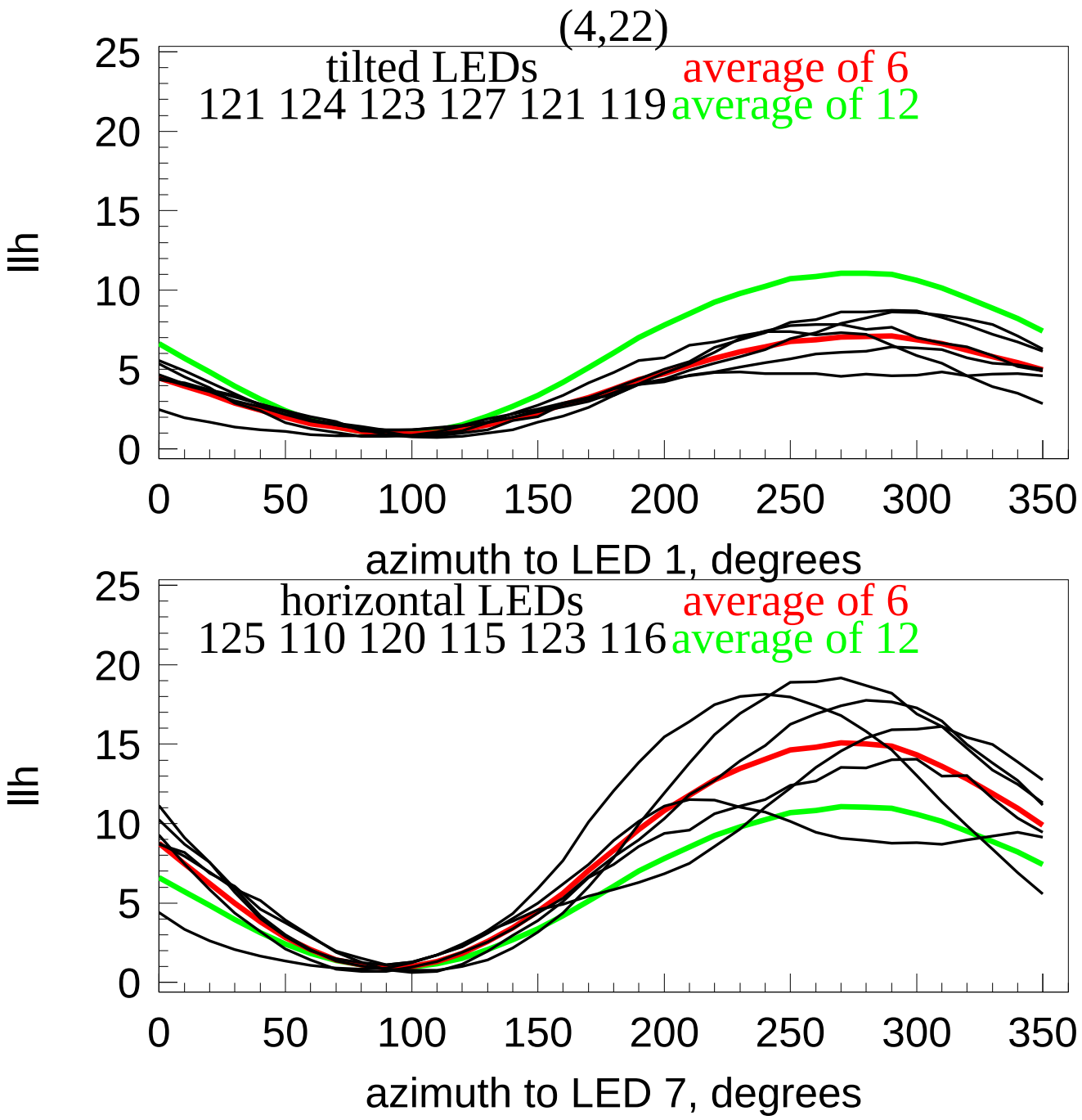

(4,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
140
1
2
3
4
5
6
7
8
9
10
11
12
142.7 ± 9.4

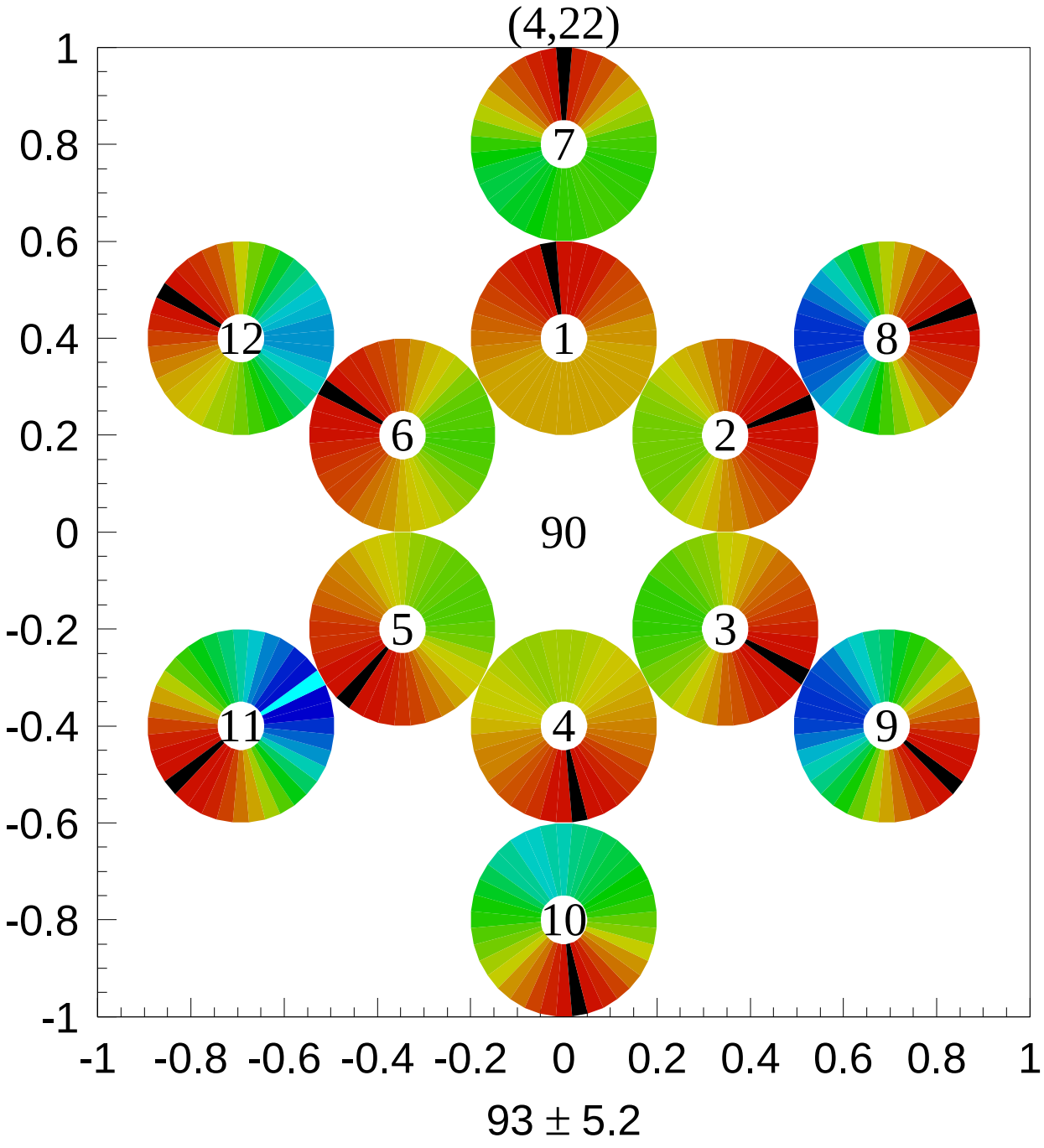

(4,20)
tilted LEDs
121 116 118 121 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 129 120 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

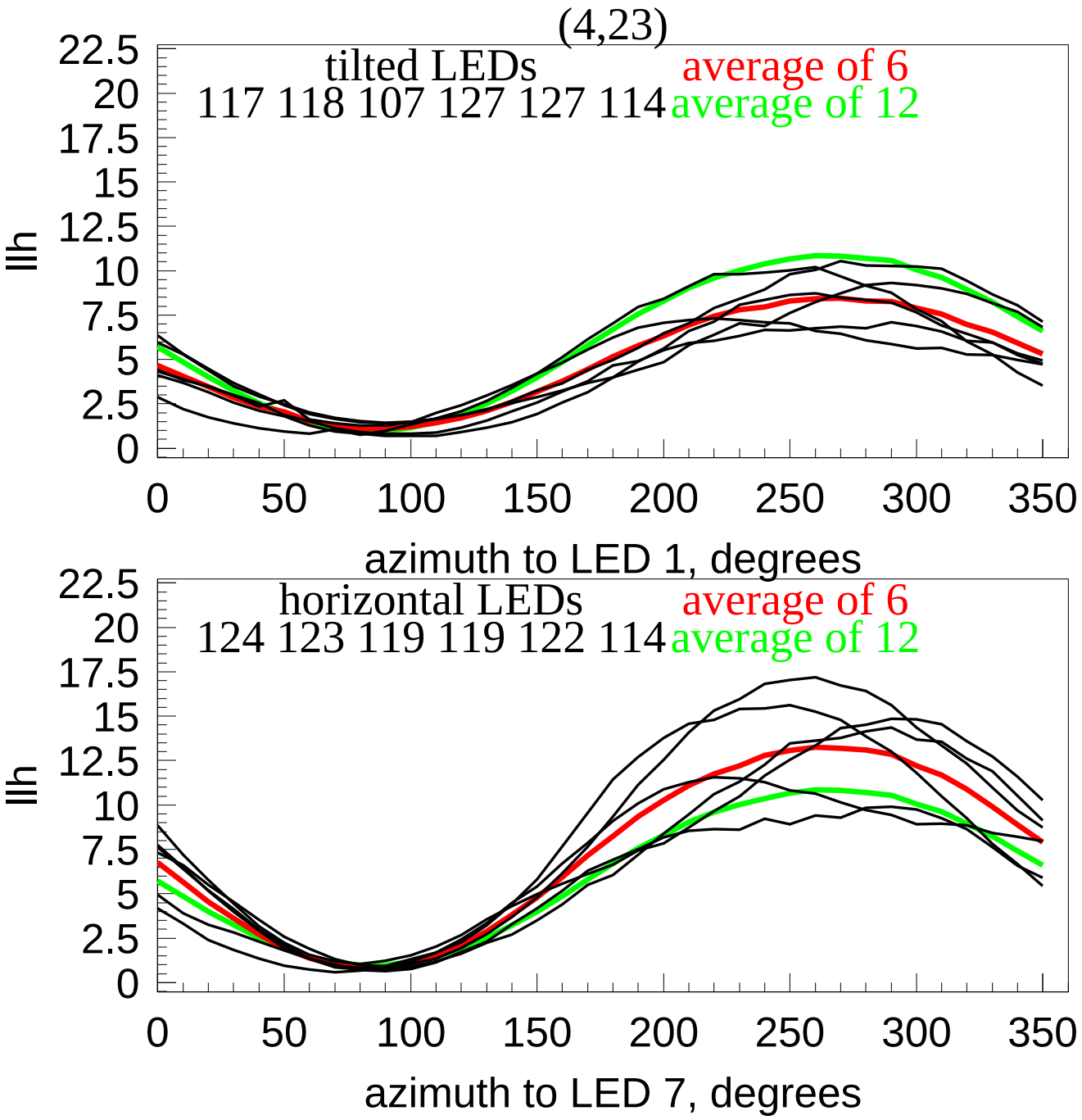

(4,20)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
27 ± 8.0

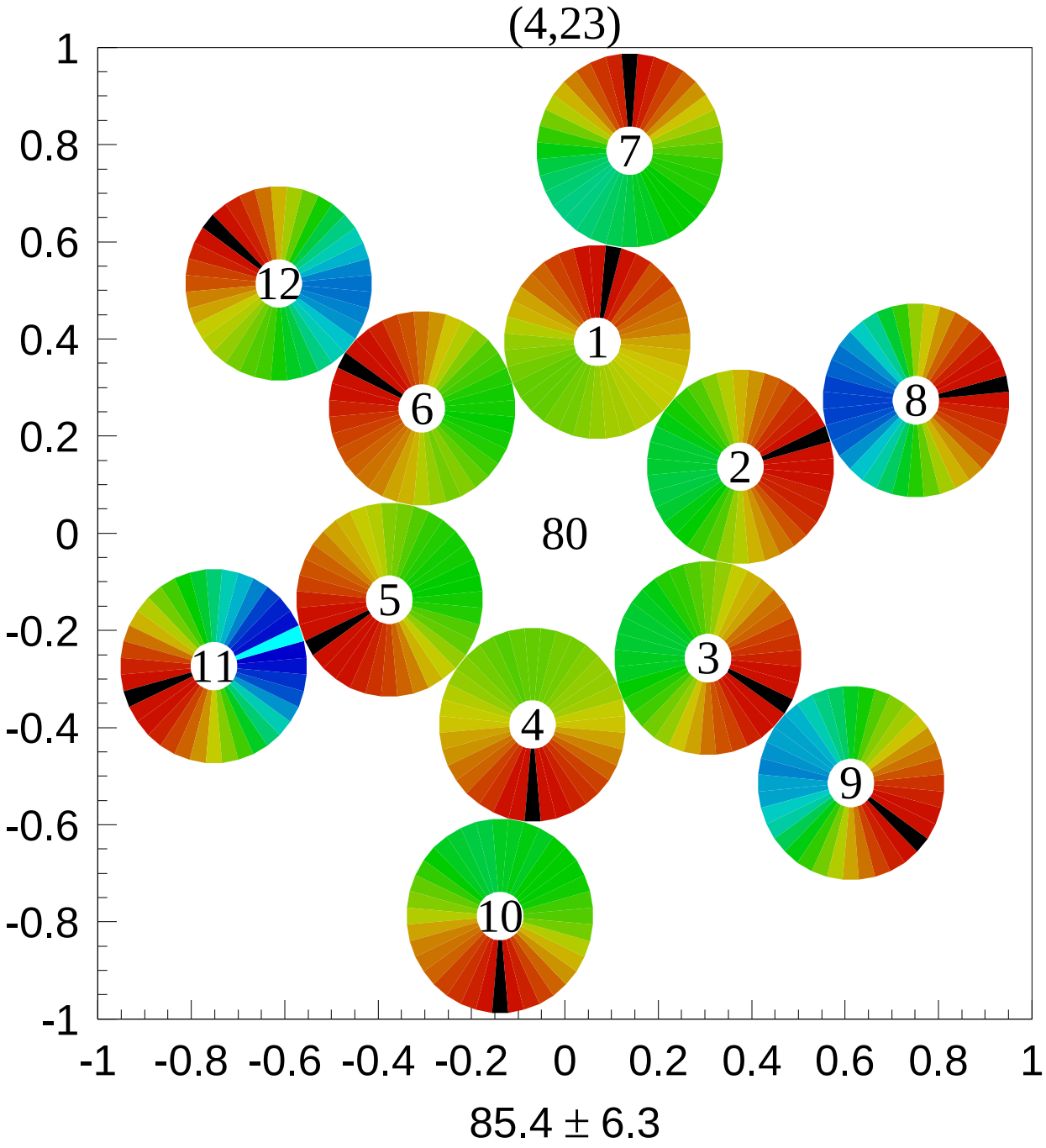

(4,21)
tilted LEDs
120 117 122 126 115 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 127 125 126 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

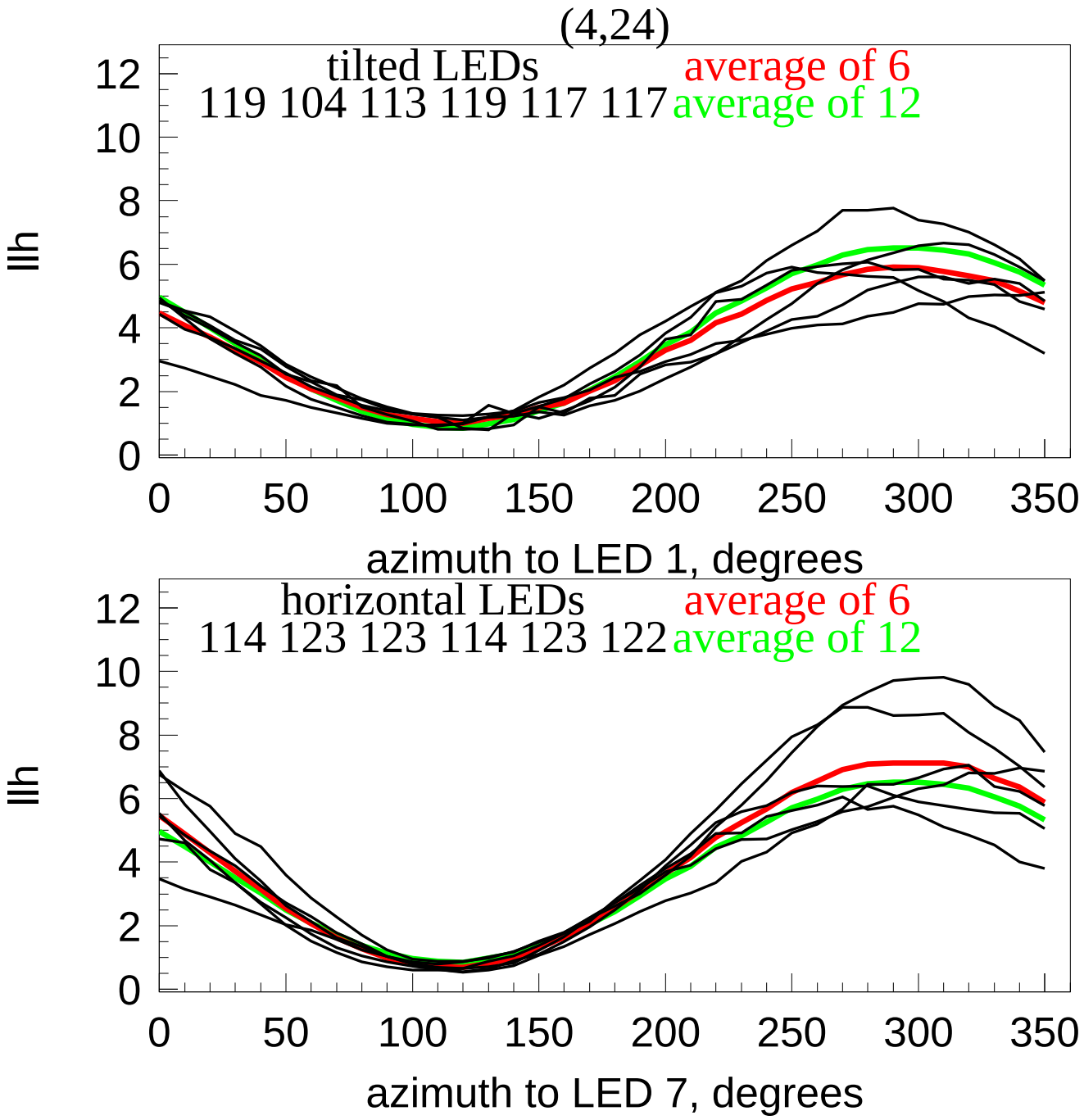

(4,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
90.9 ± 6.7

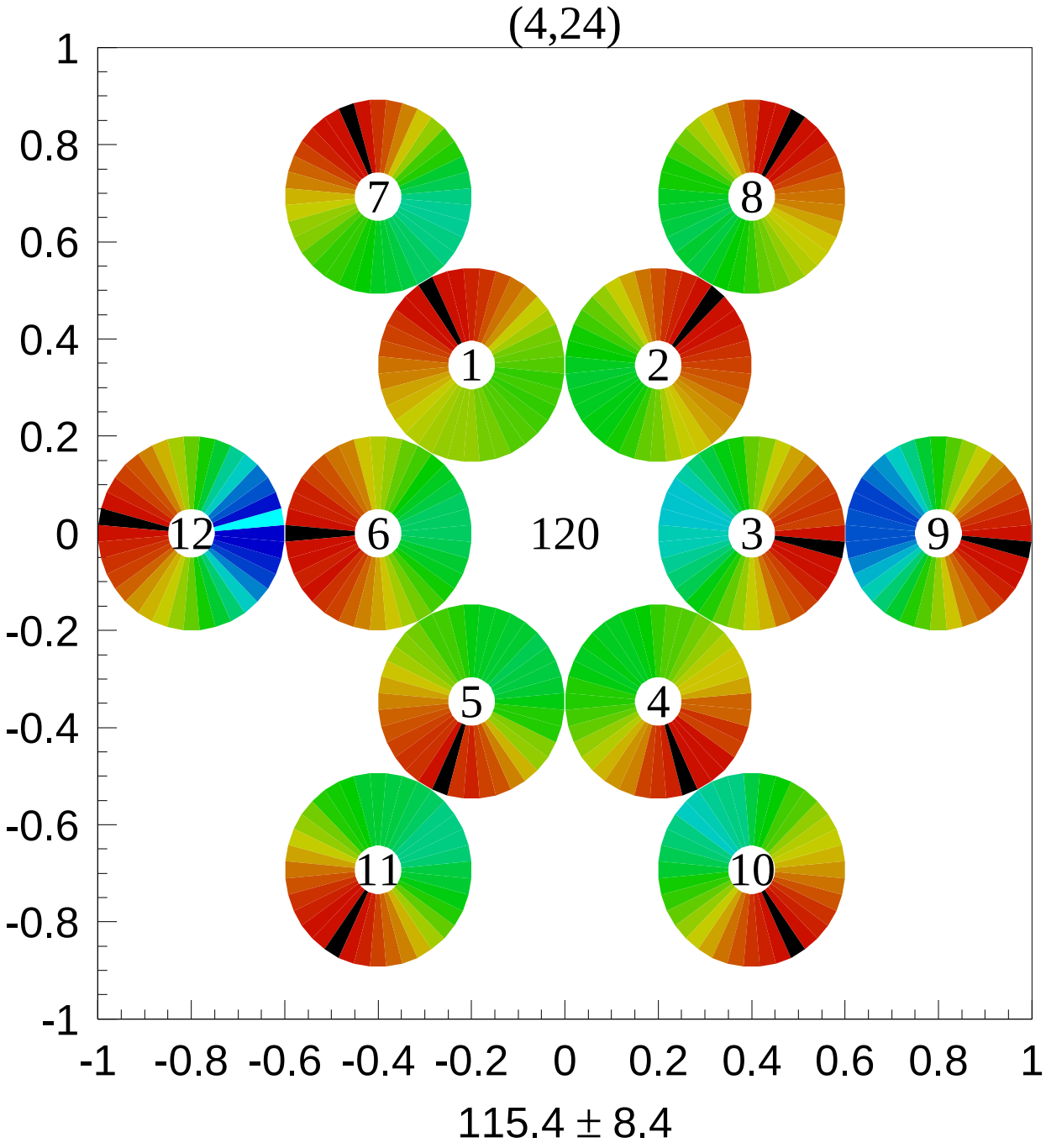

(4,22)
tilted LEDs
121 124 123 127 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 110 120 115 123 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

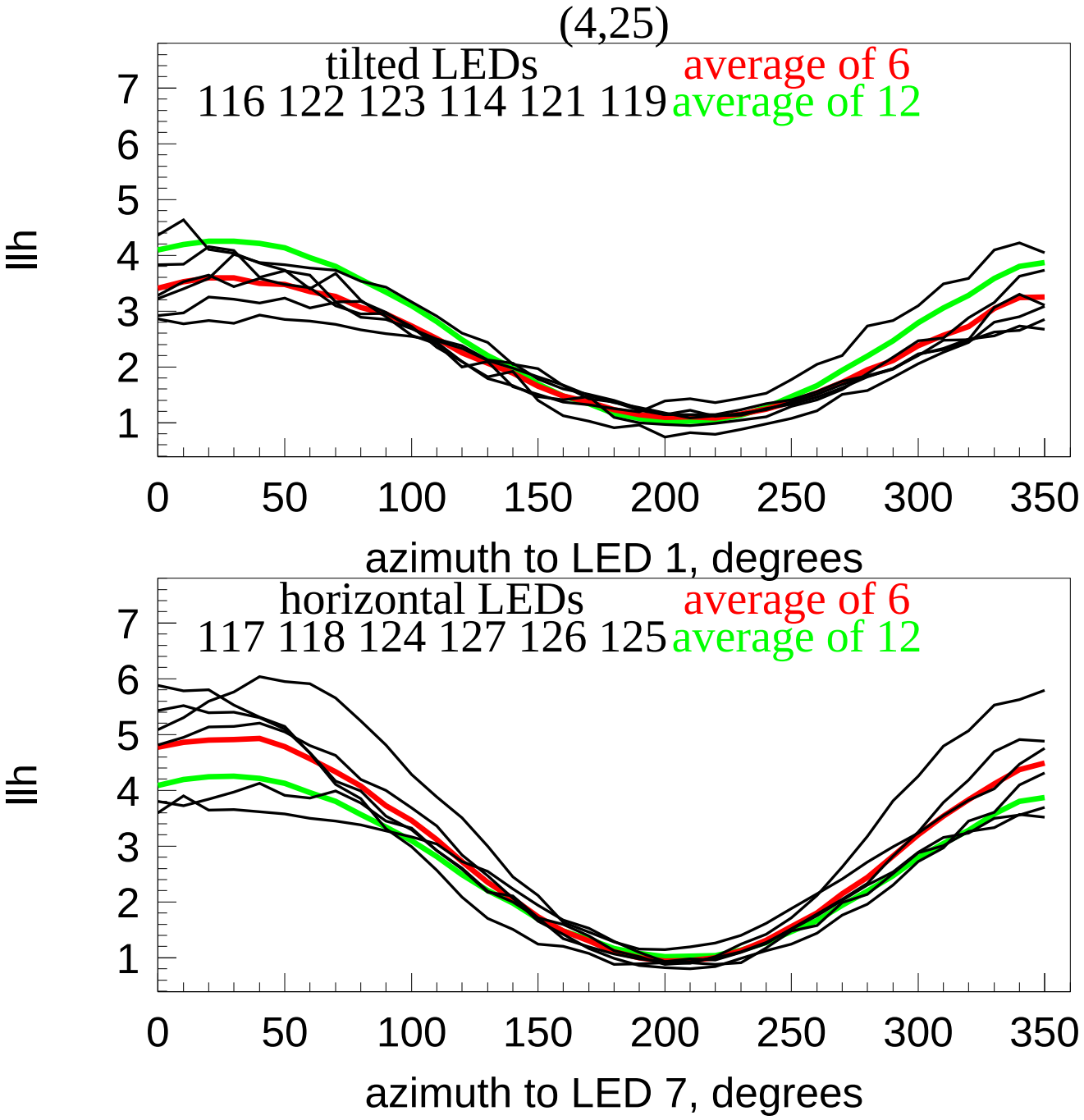

(4,22)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
93 ± 5.2

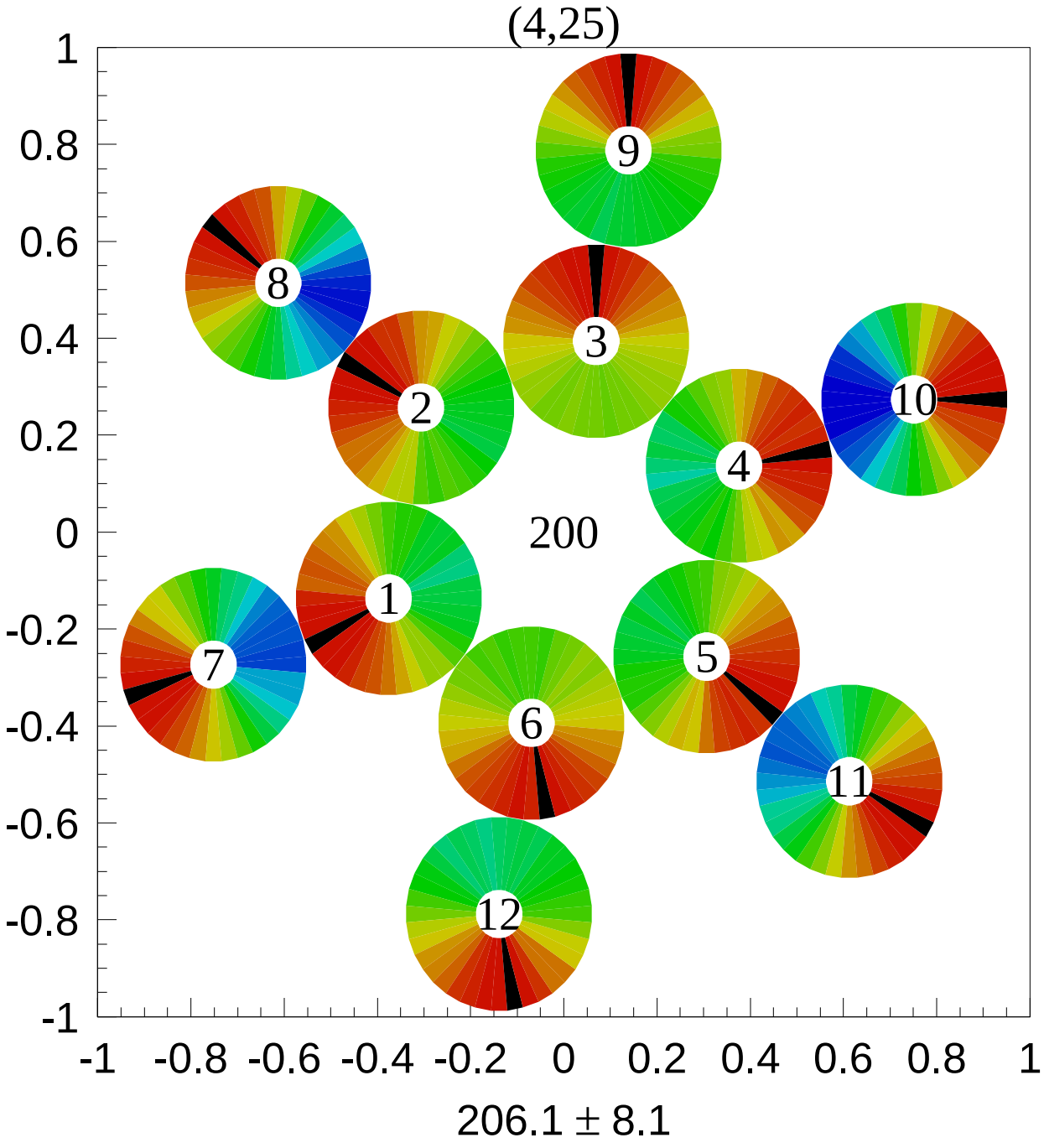

(4,23)
tilted LEDs
117 118 107 127 127 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 119 119 122 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

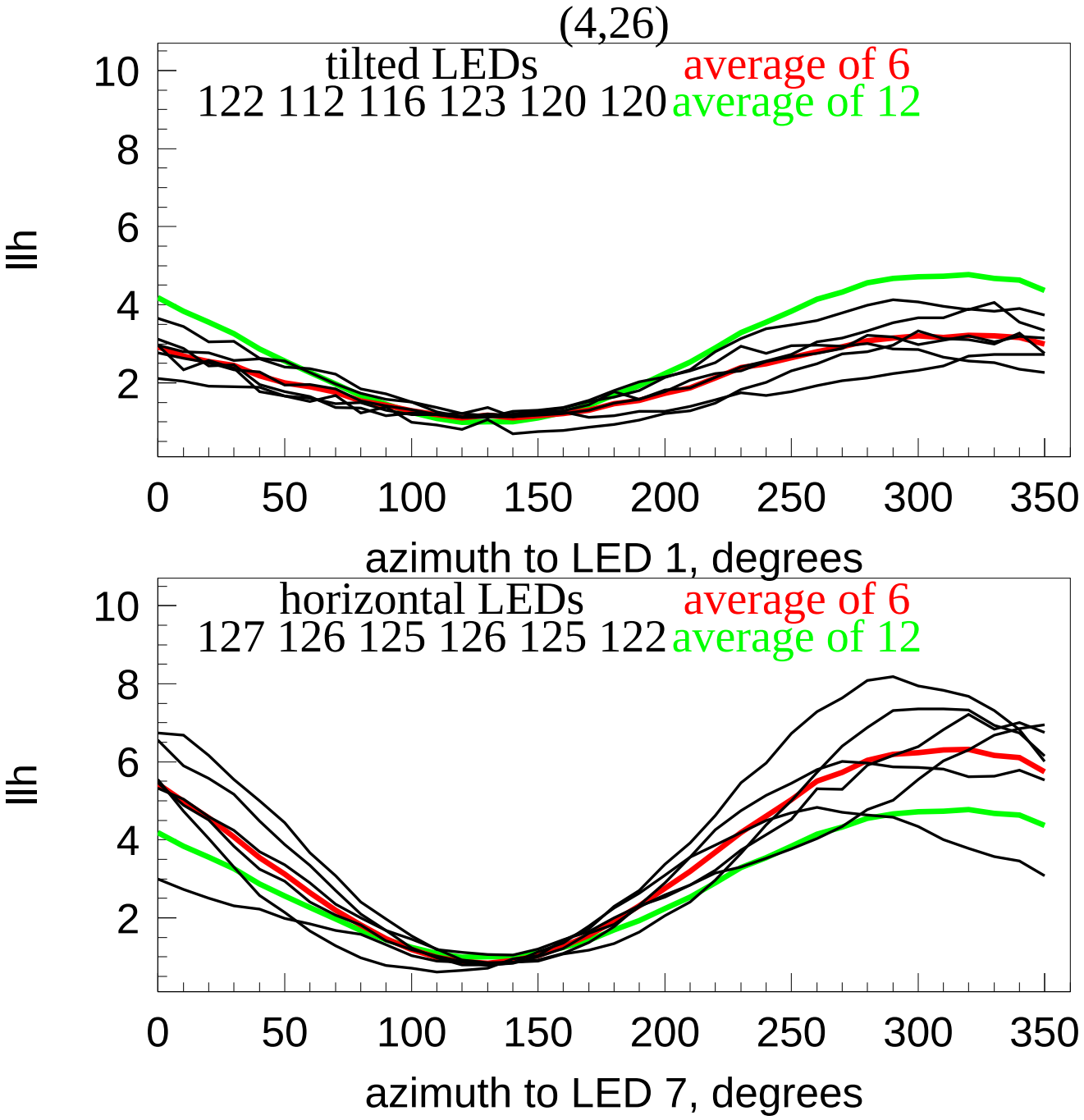

(4,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
85.4 ± 6.3

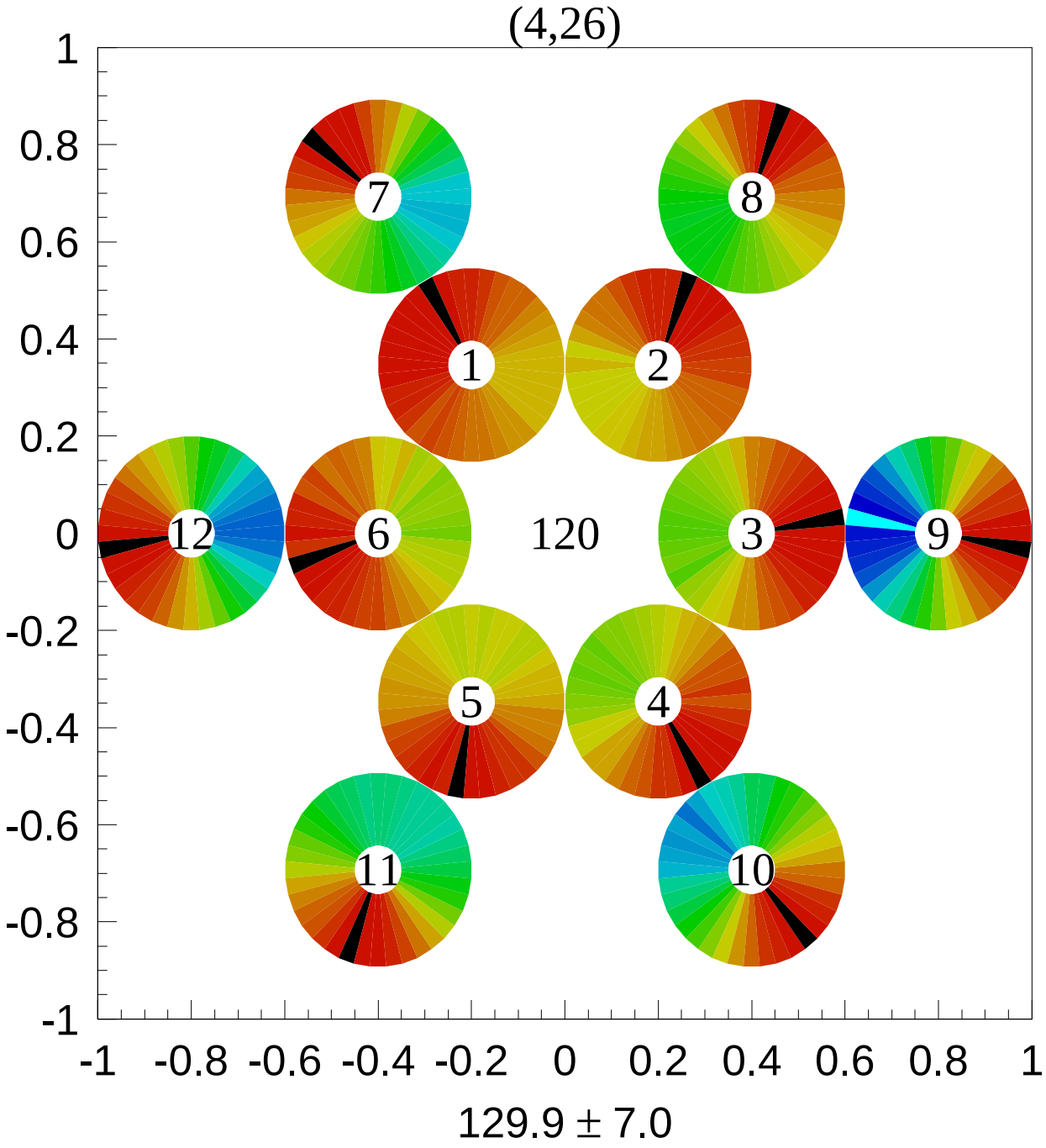

(4,24)
tilted LEDs
119 104 113 119 117 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 123 123 114 123 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

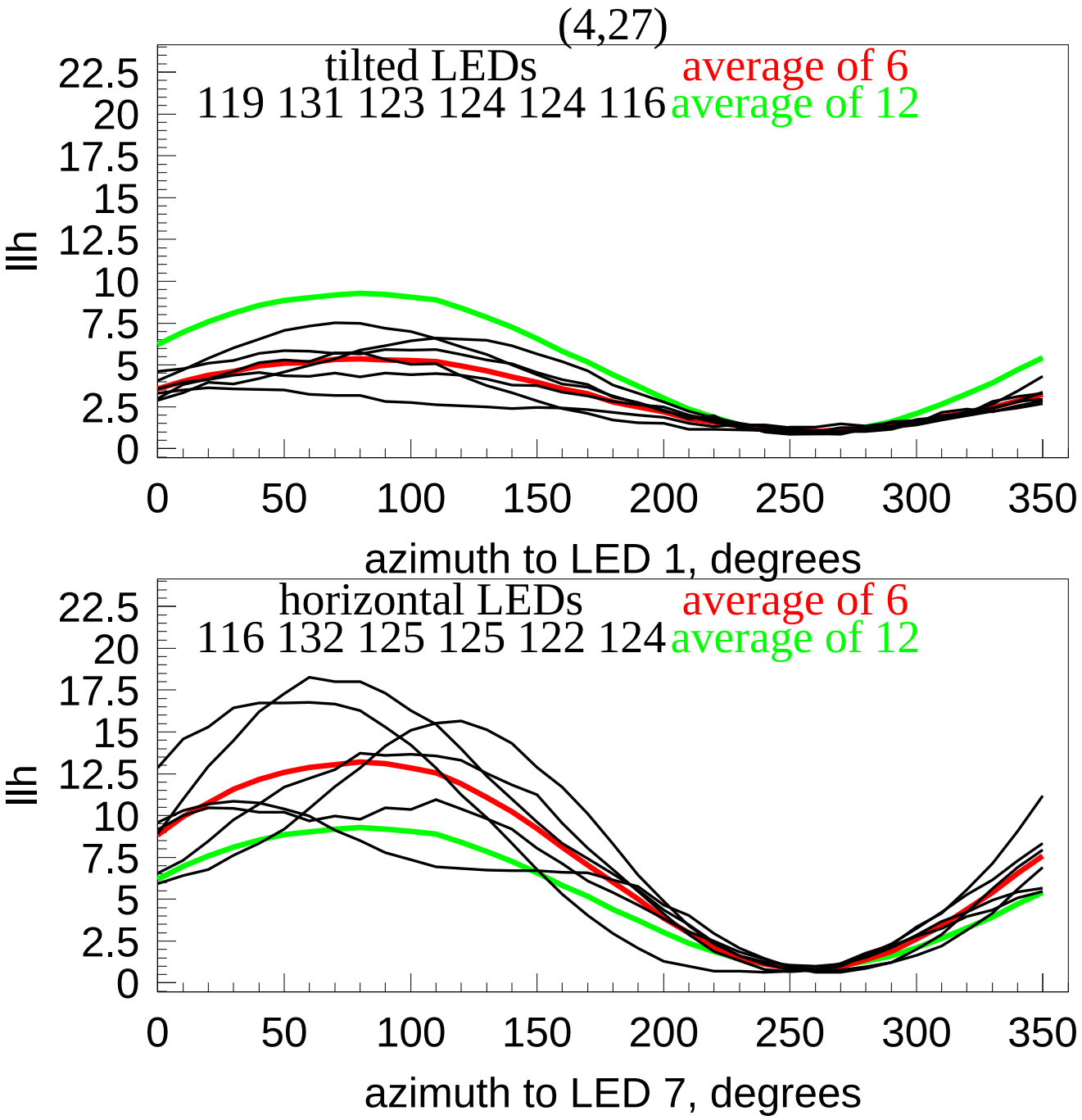

(4,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
115.4 ± 8.4

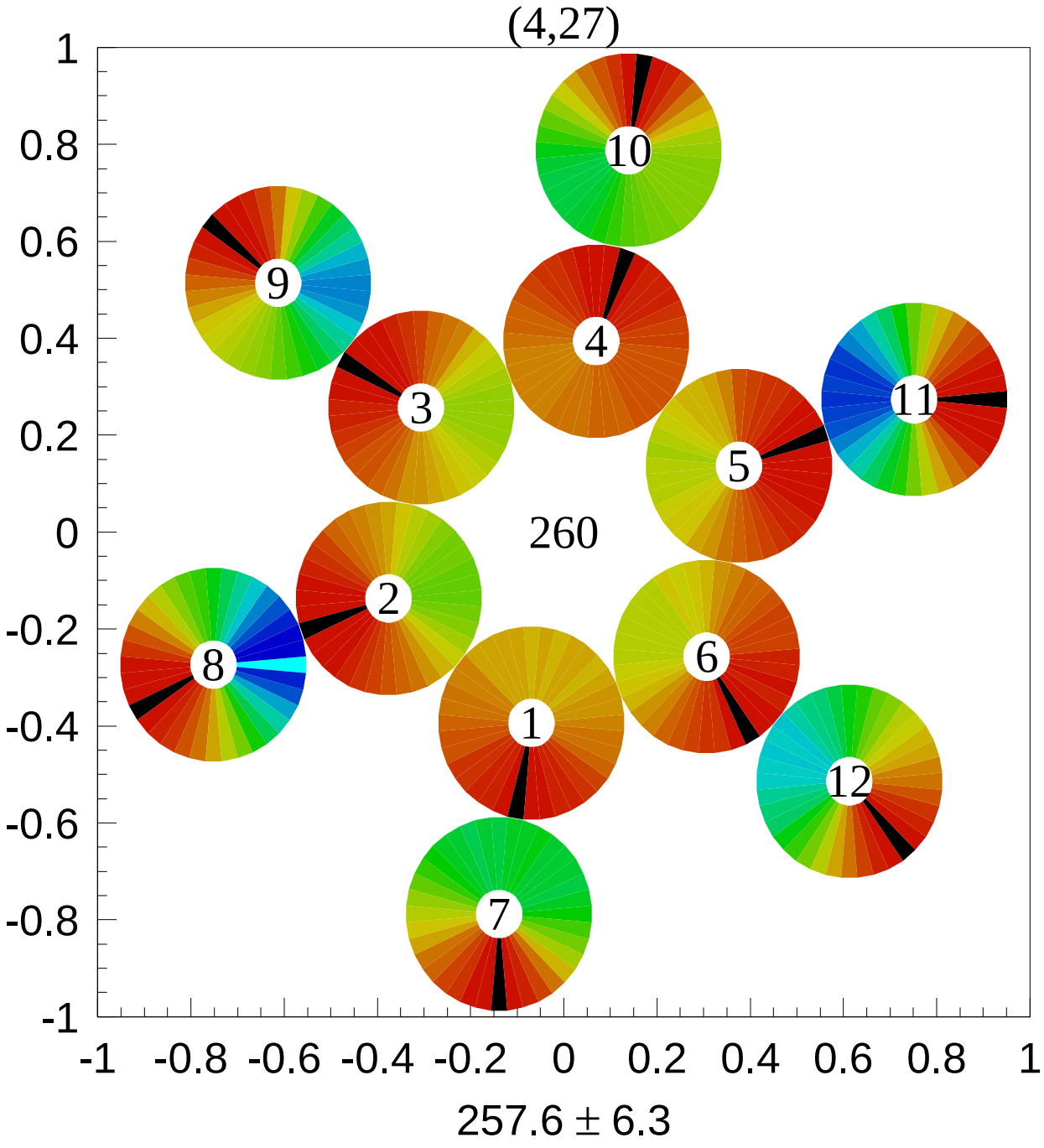

(4,25)
tilted LEDs
116 122 123 114 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 124 127 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

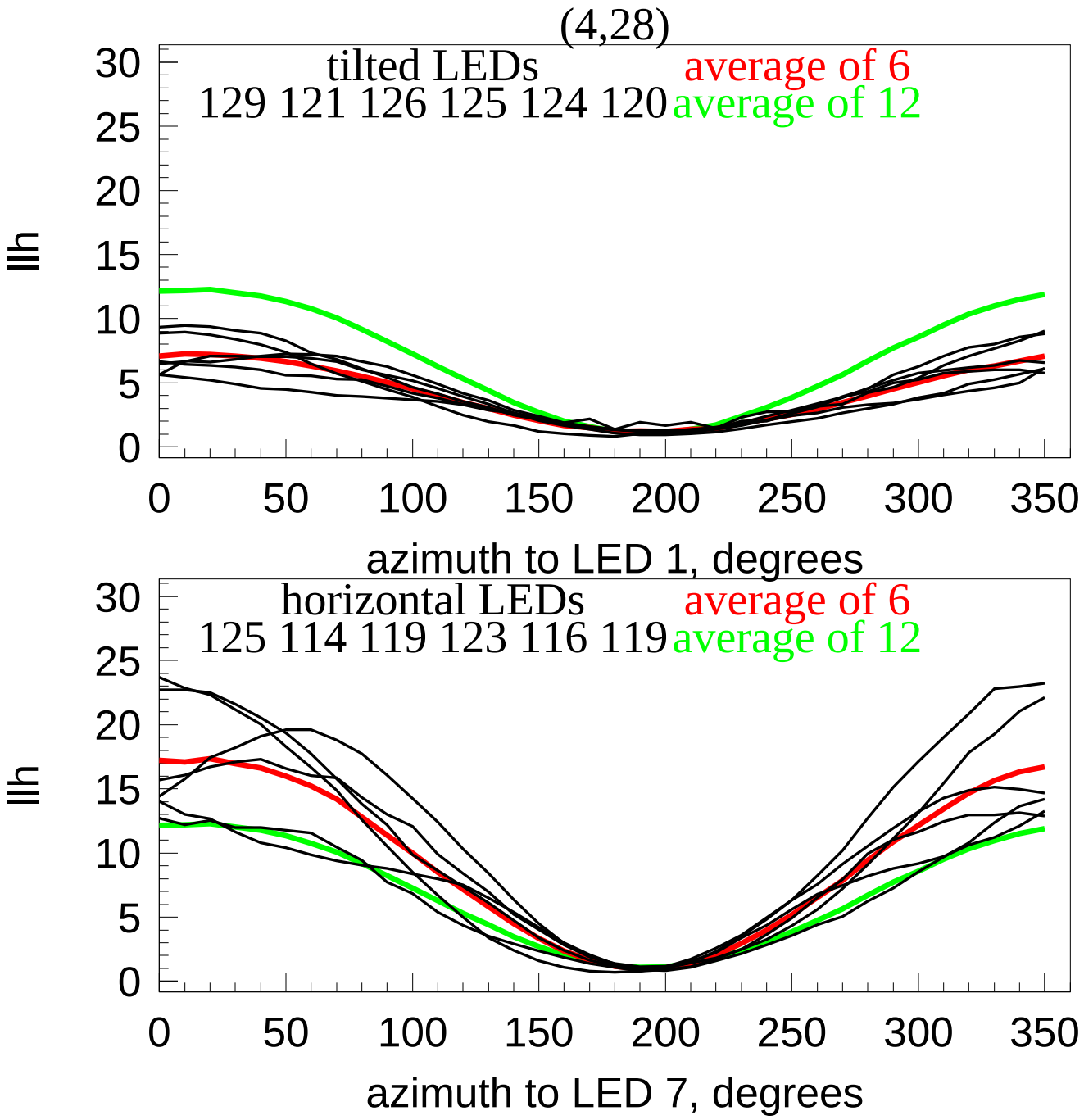

(4,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
206.1 ± 8.1

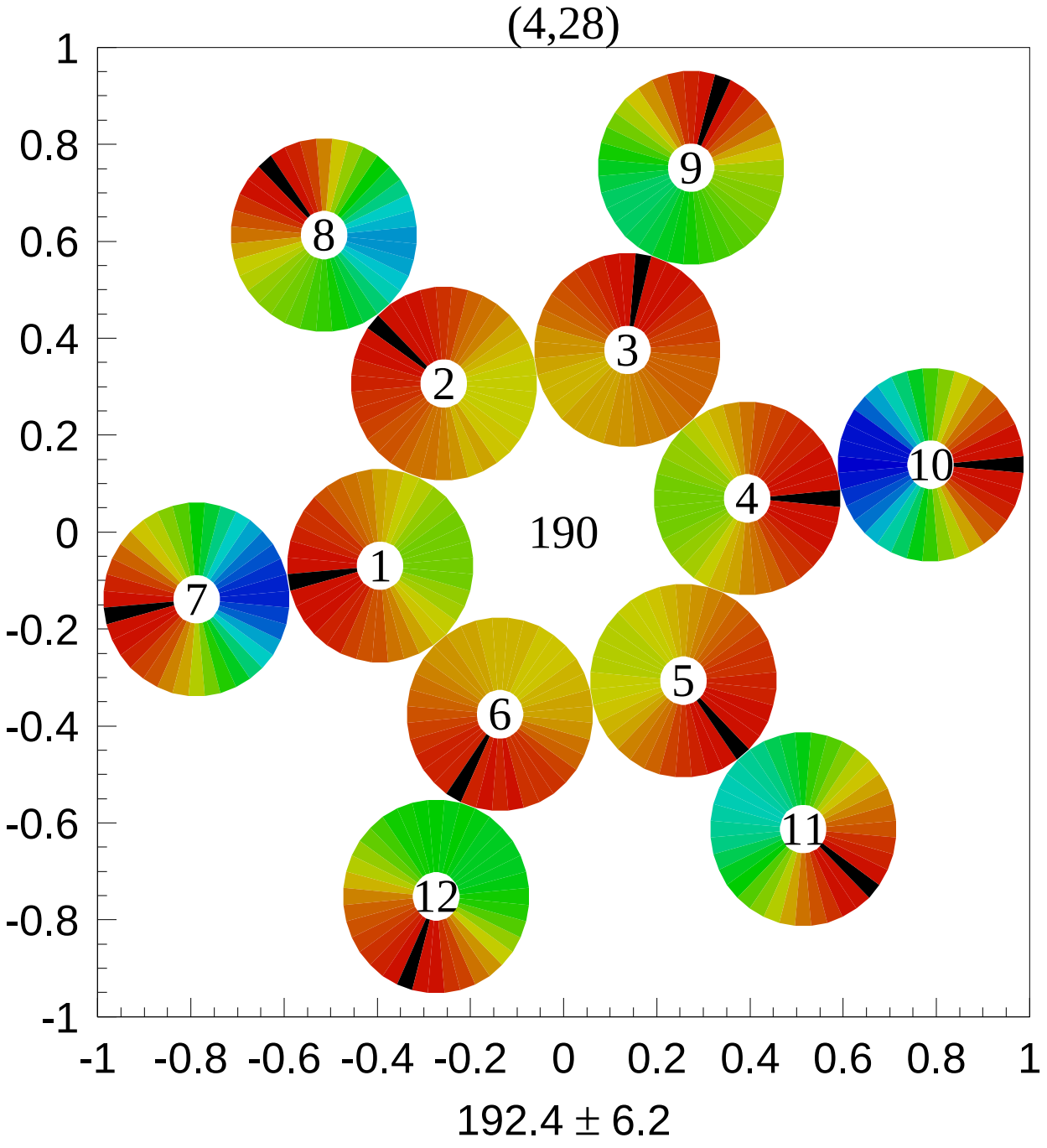

(4,26)
tilted LEDs
122 112 116 123 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 126 125 126 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

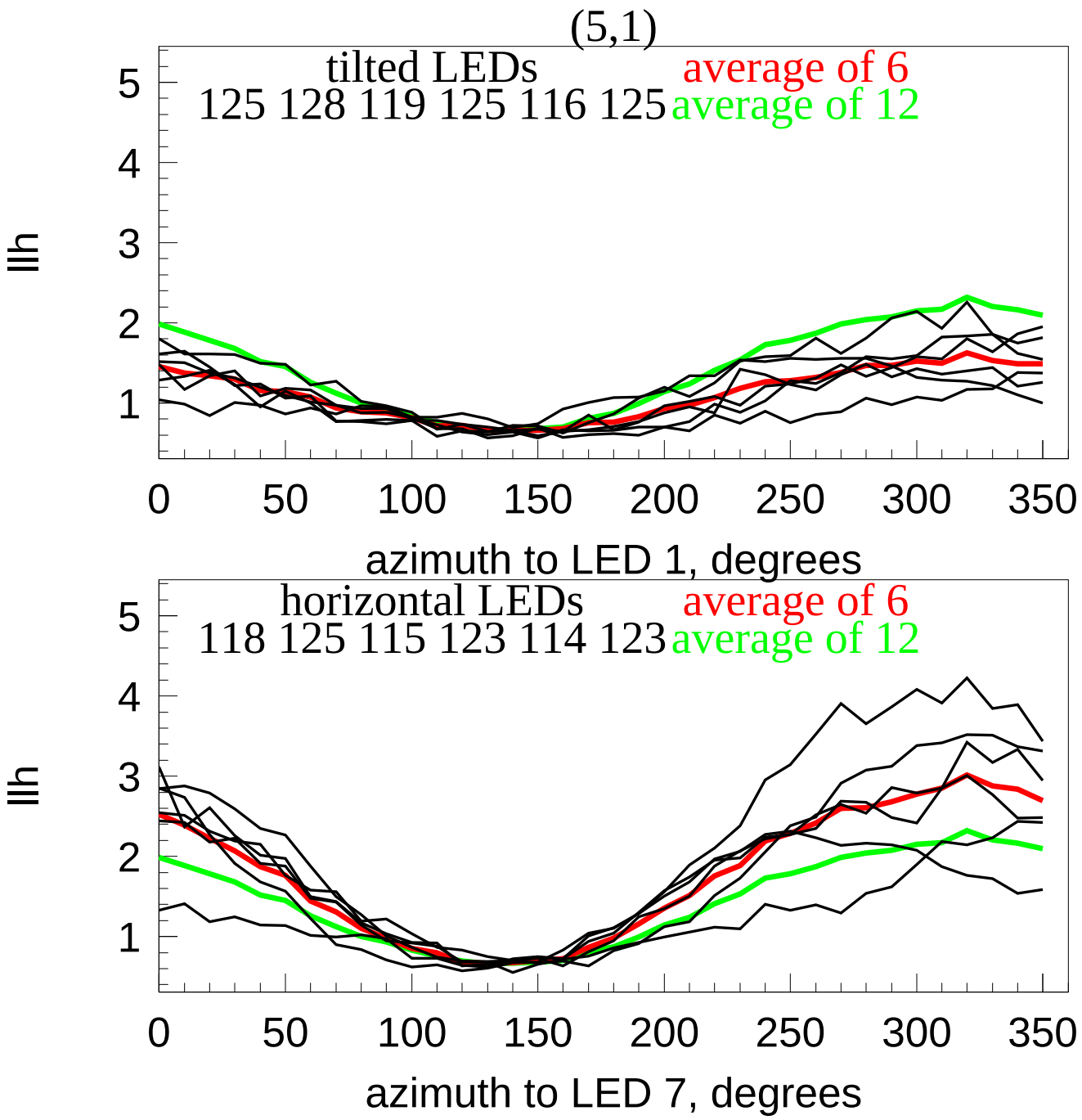

(4,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
129.9 ± 7.0

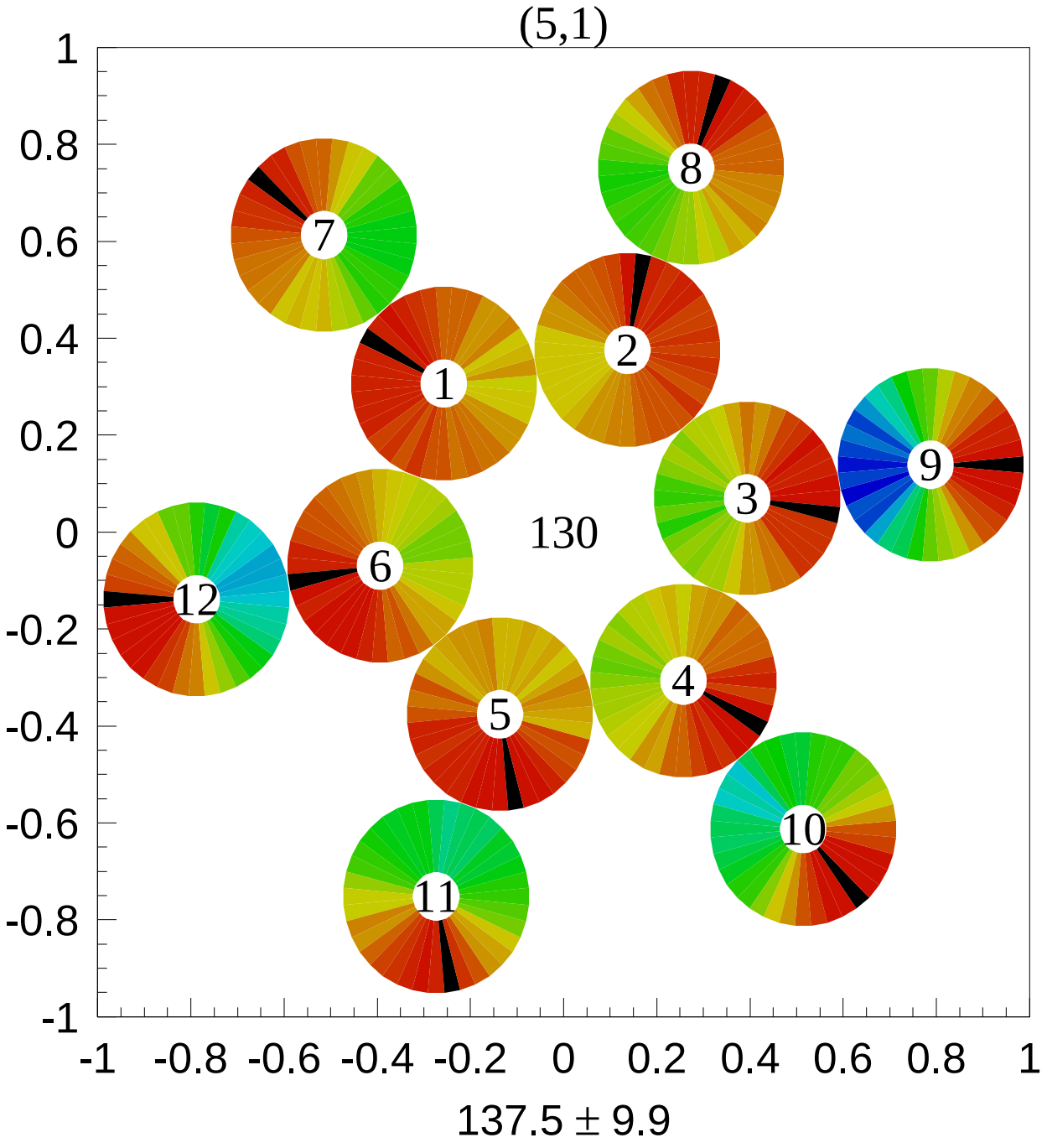

(4,27)
tilted LEDs
119 131 123 124 124 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 132 125 125 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

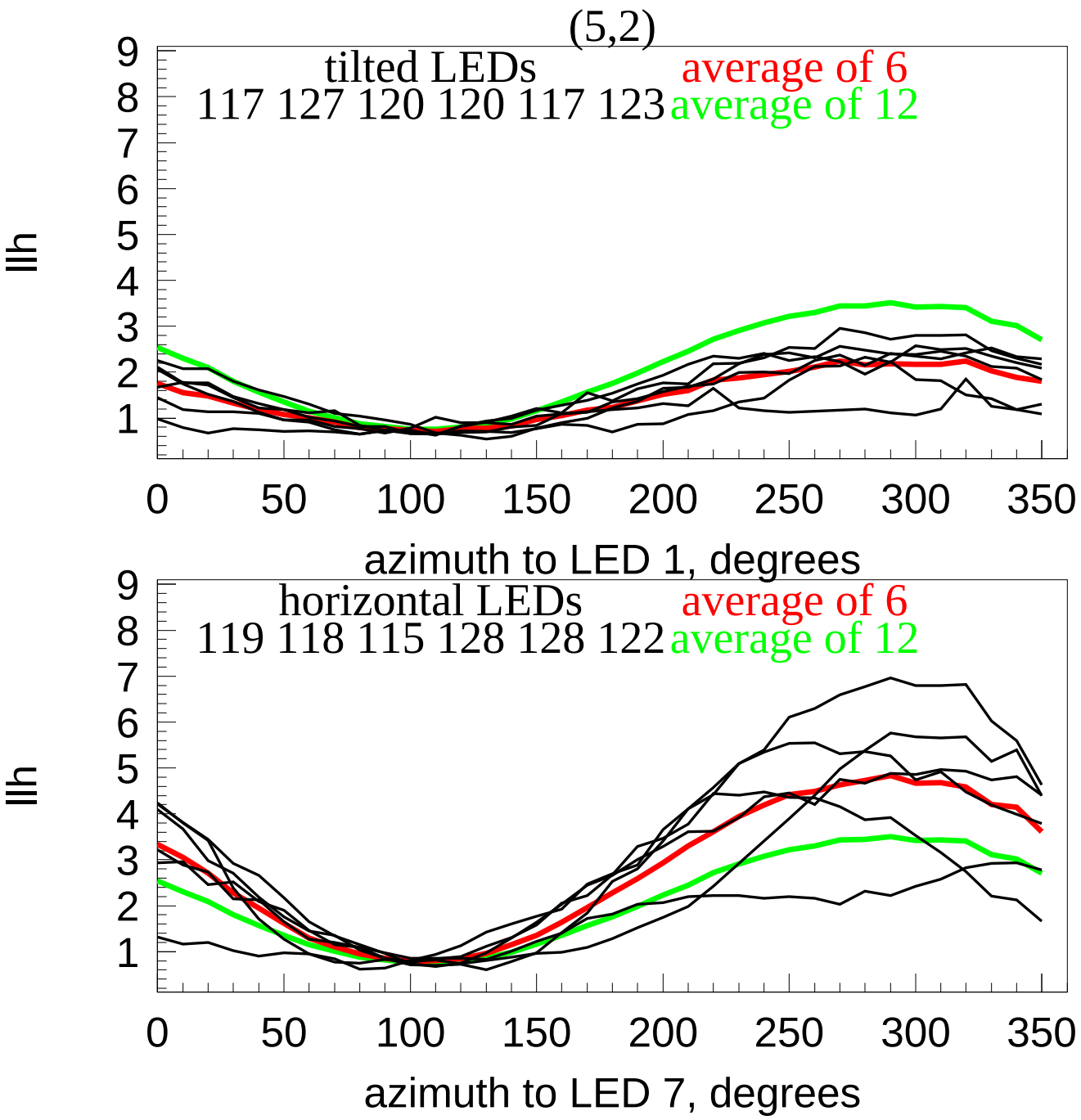

(4,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
257.6 ± 6.3

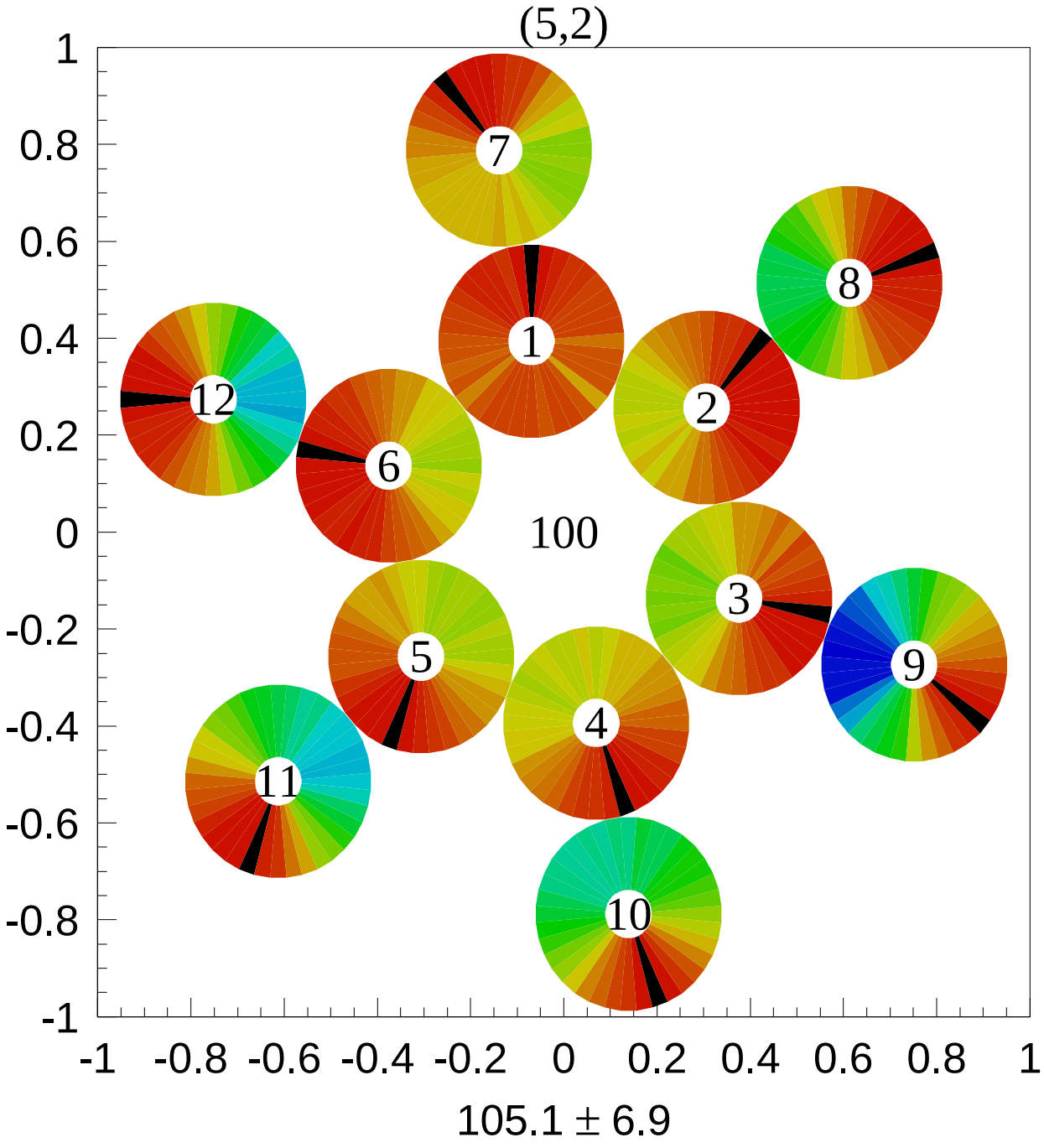

(4,28)
tilted LEDs
129 121 126 125 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 114 119 123 116 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

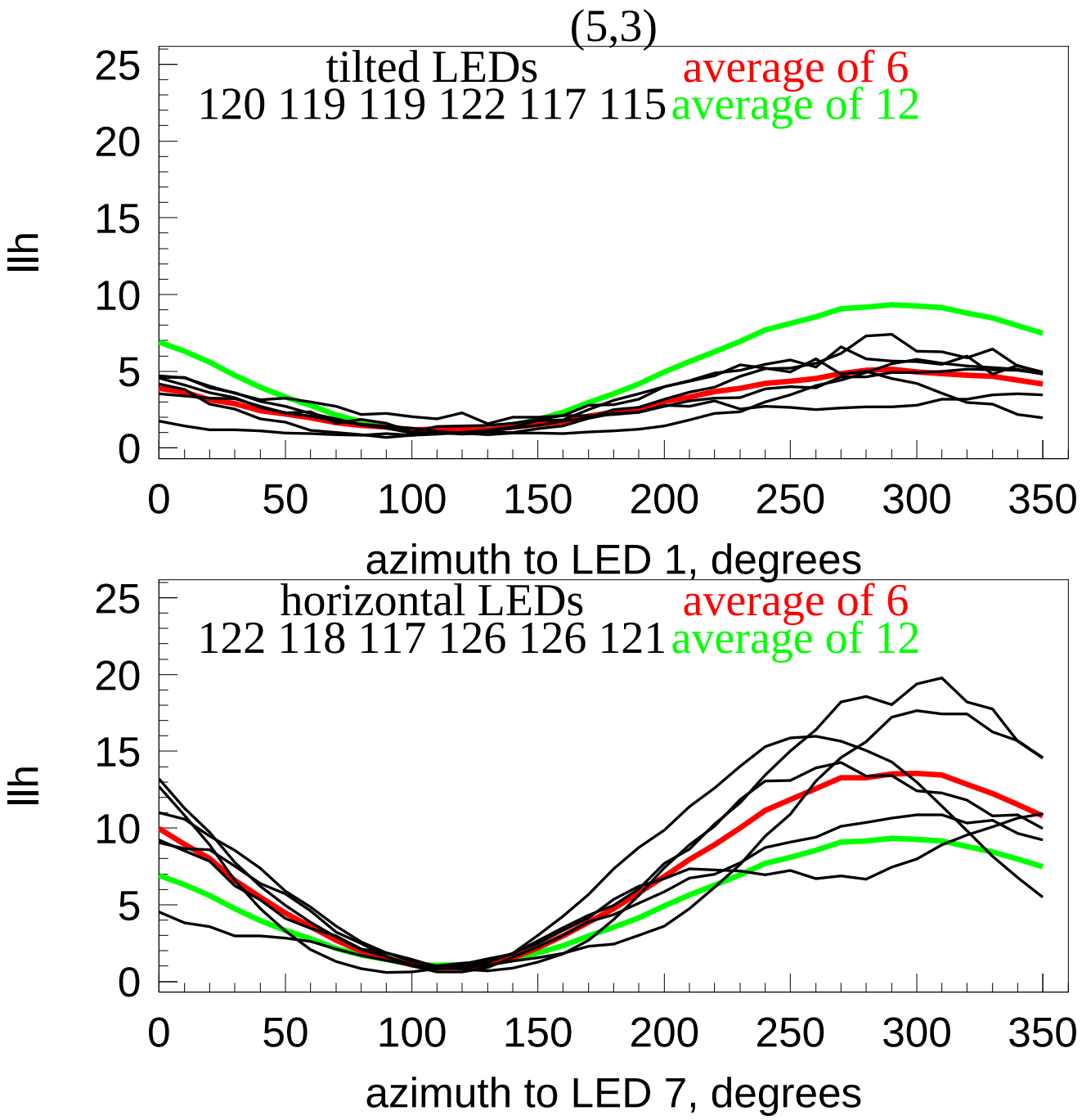

(4,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
192.4 ± 6.2
190
1
2
3
4
5
6
7
8
9
10
11
12

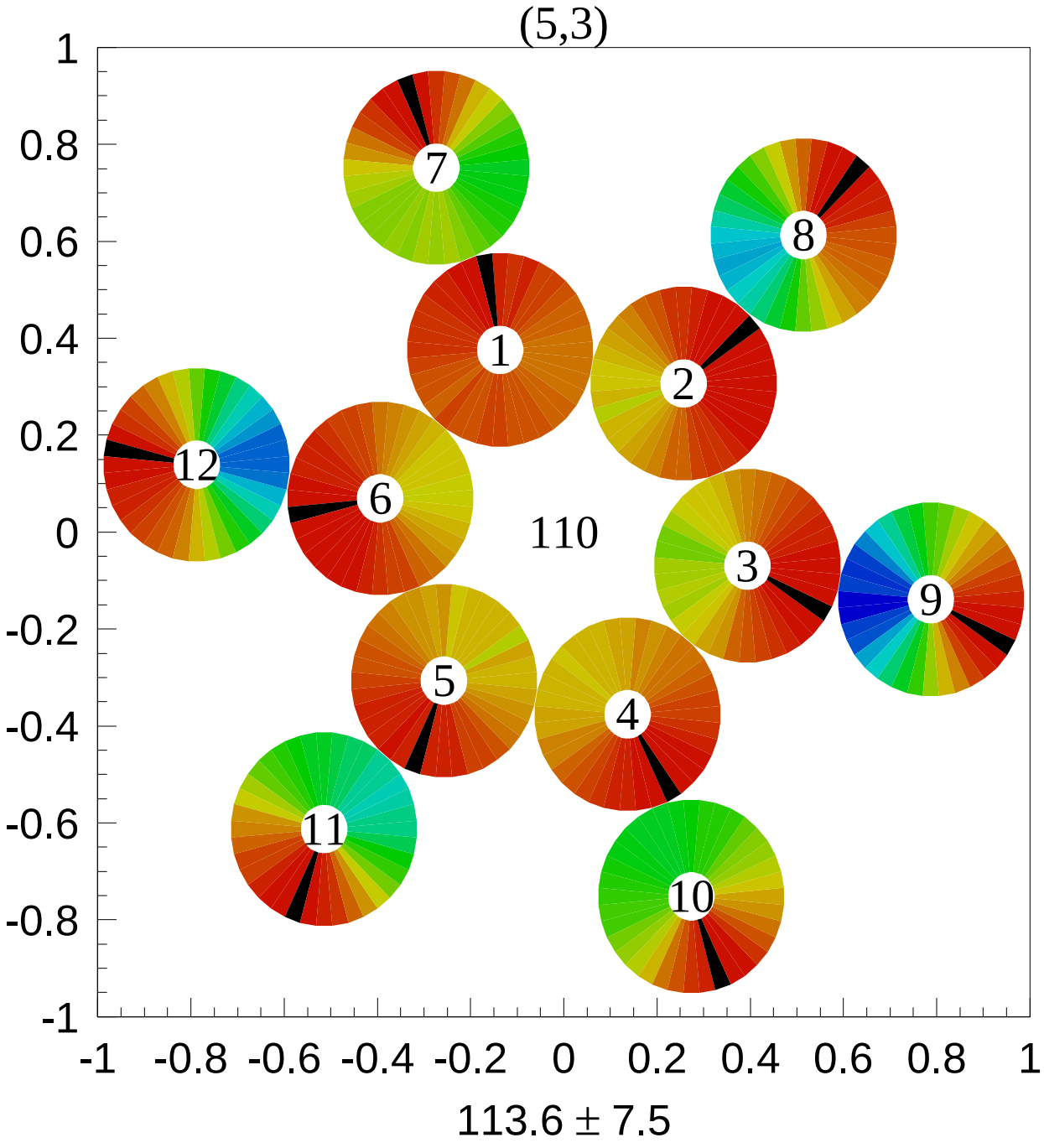

(5,1)
tilted LEDs
125 128 119 125 116 125
average of 6
average of 12
llh
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 125 115 123 114 123
average of 6
average of 12
llh
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

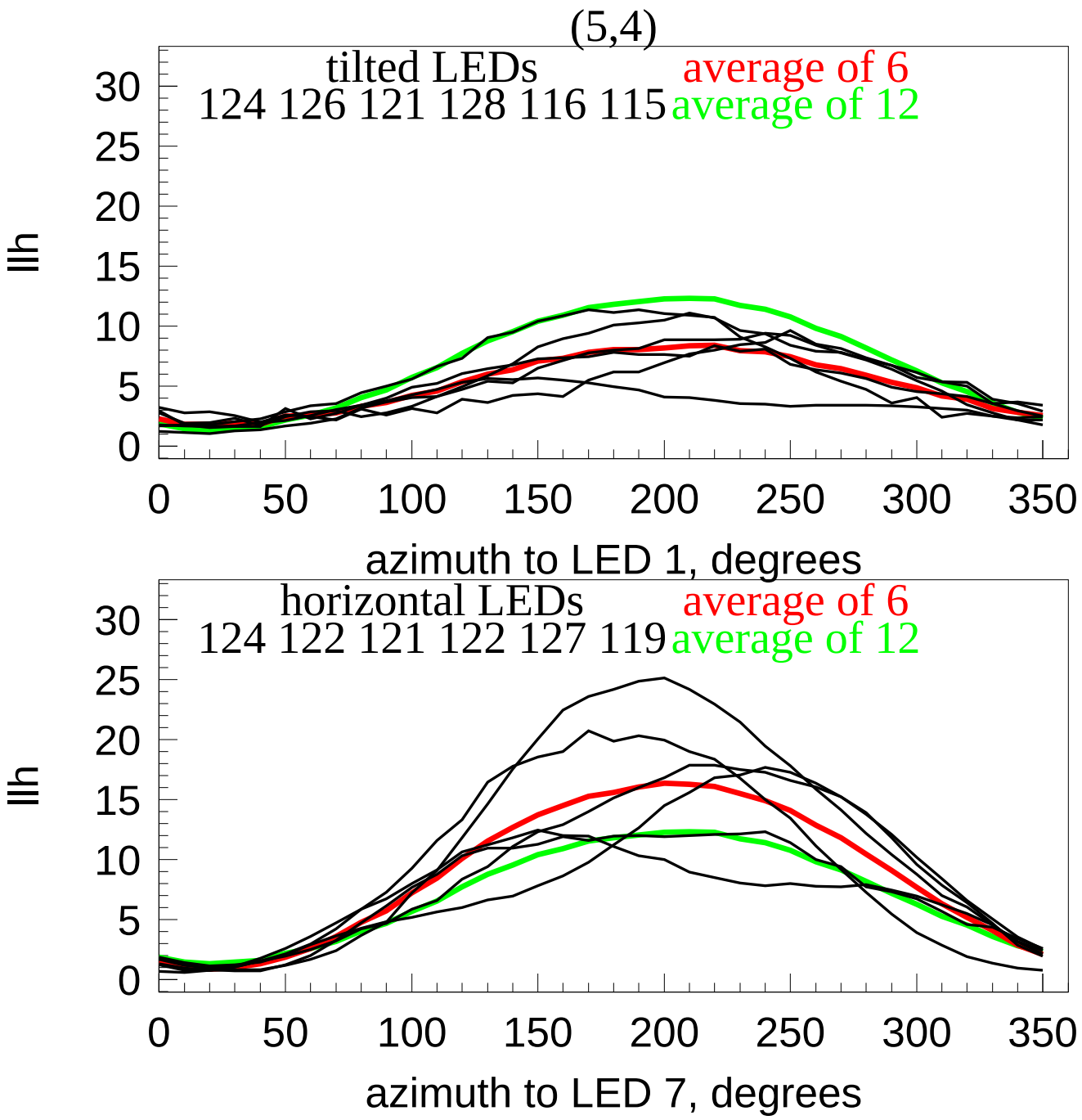

(5,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
137.5 ± 9.9
130
1
2
3
4
5
6
7
8
9
10
11
12

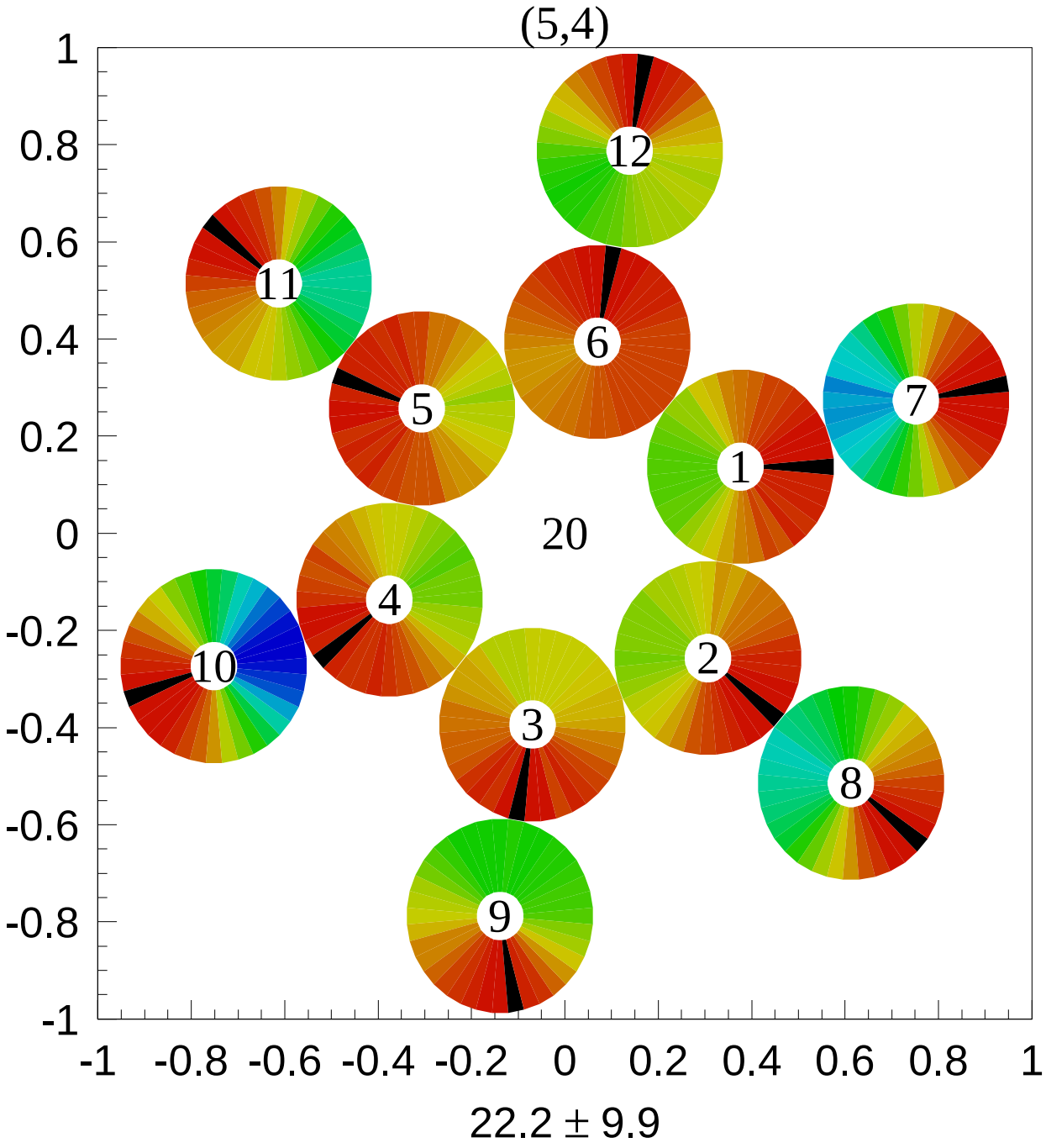

(5,2)
tilted LEDs
117 127 120 120 117 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 115 128 128 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

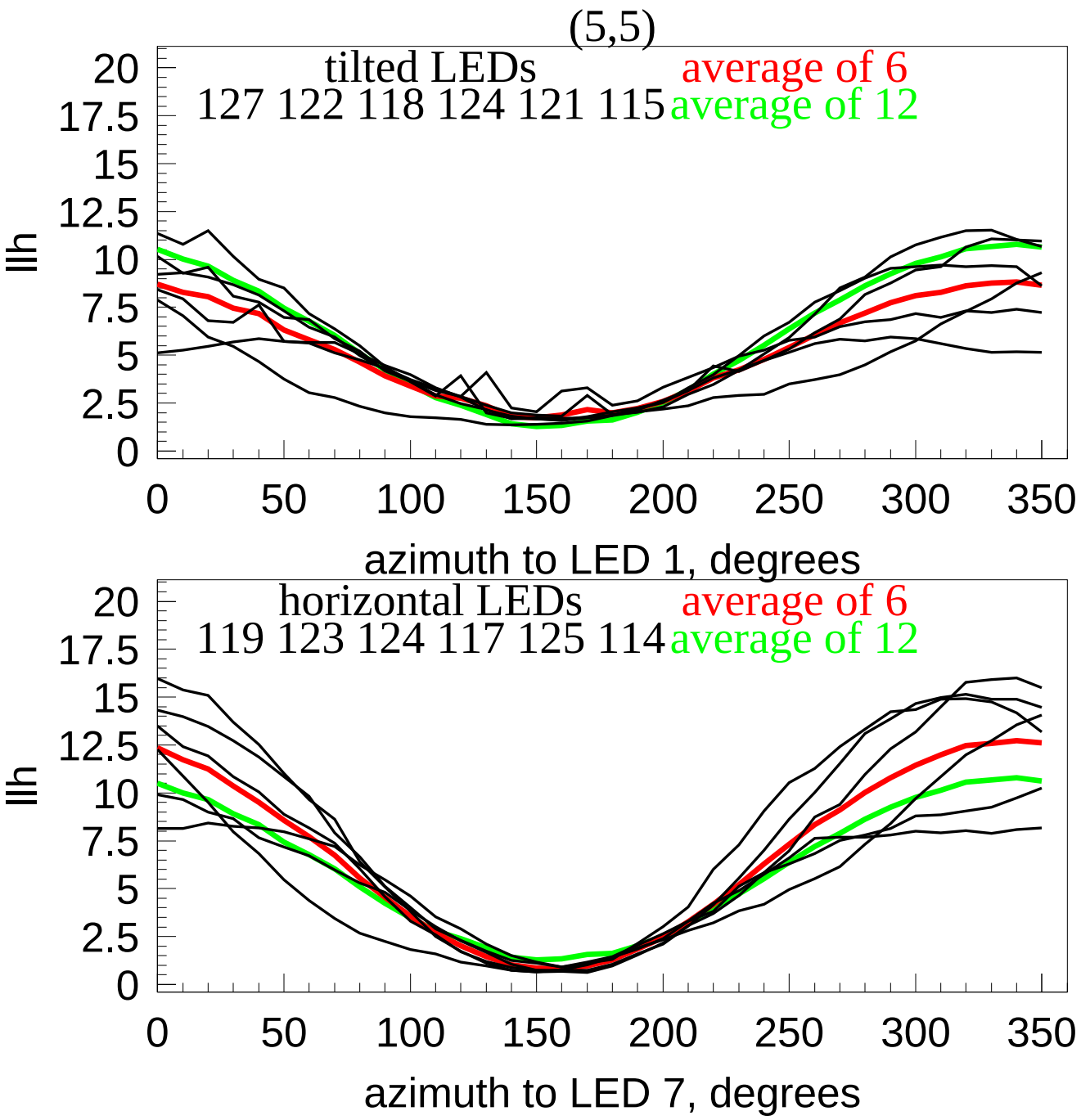

(5,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
105.1 ± 6.9

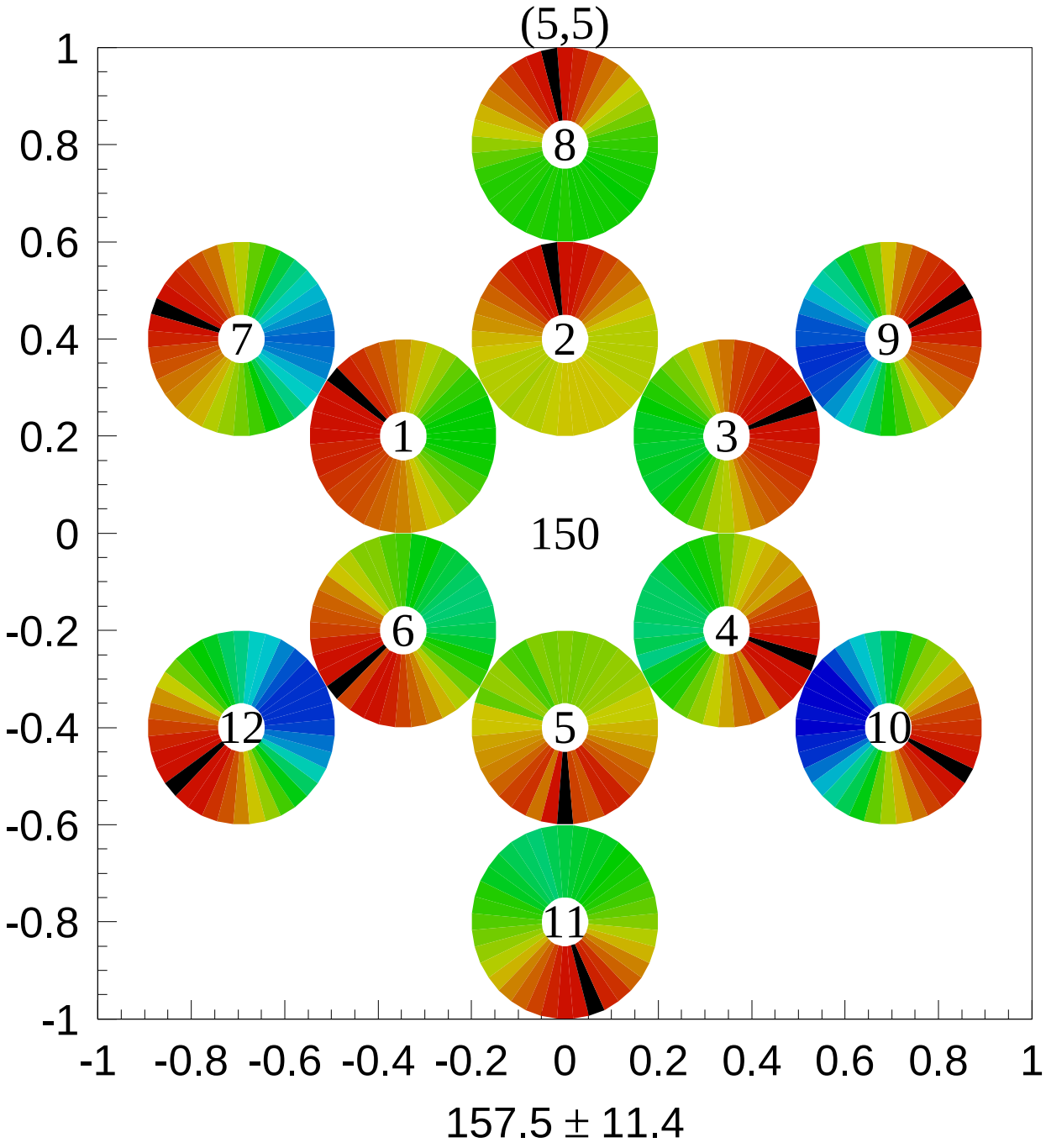

(5,3)
tilted LEDs
120 119 119 122 117 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 118 117 126 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

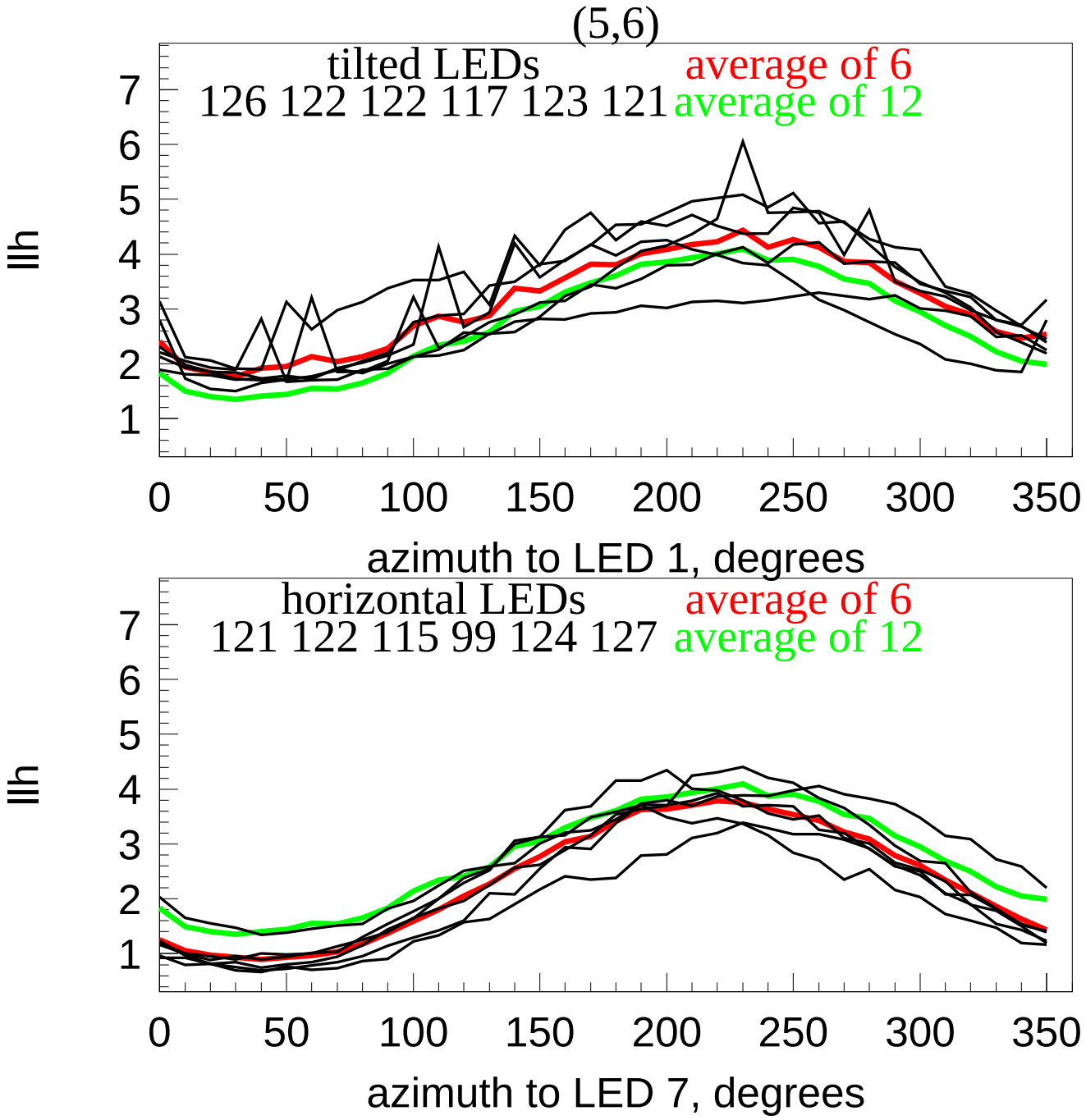

(5,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
113.6 ± 7.5

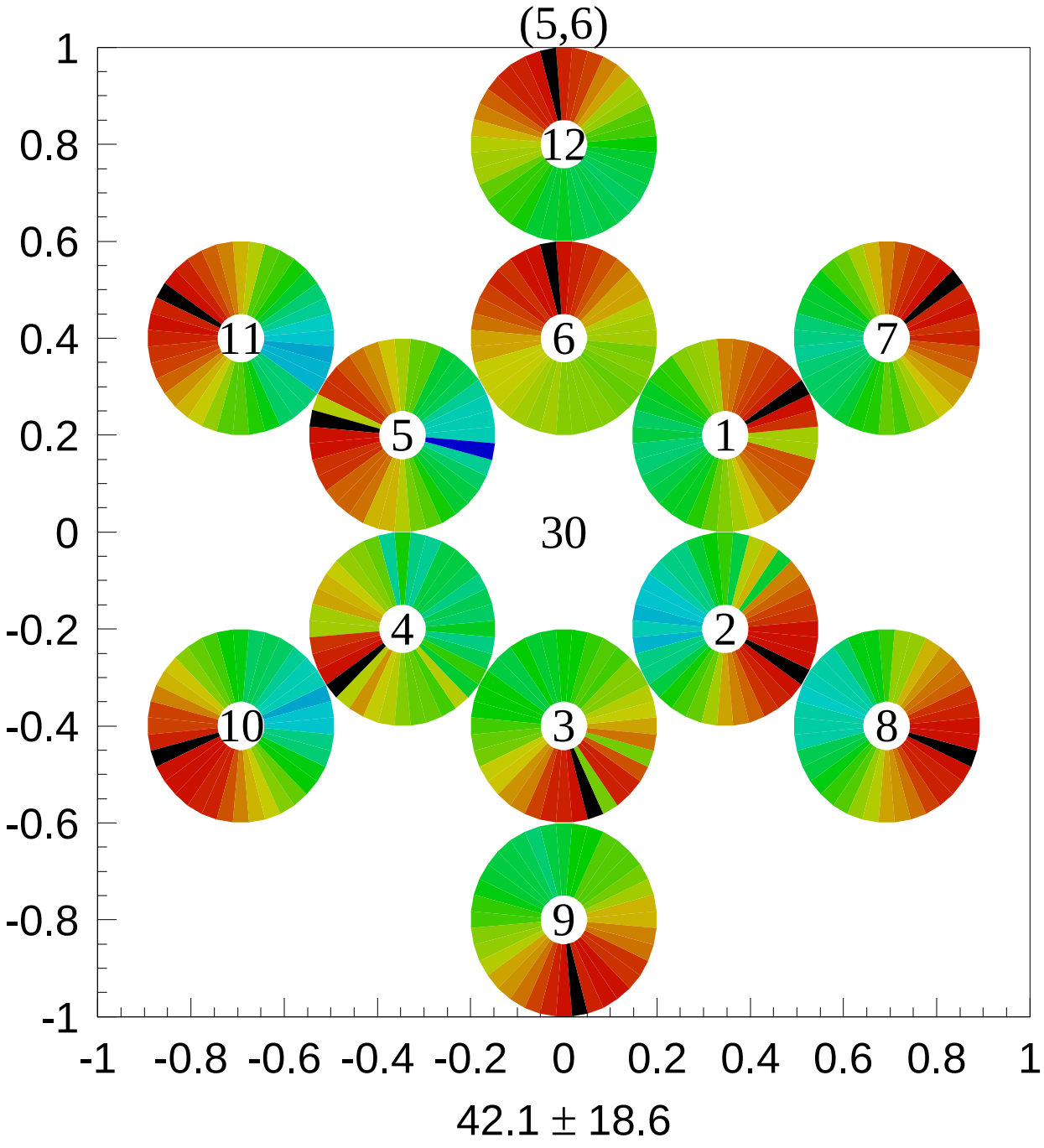

(5,4)
tilted LEDs
124 126 121 128 116 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 121 122 127 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

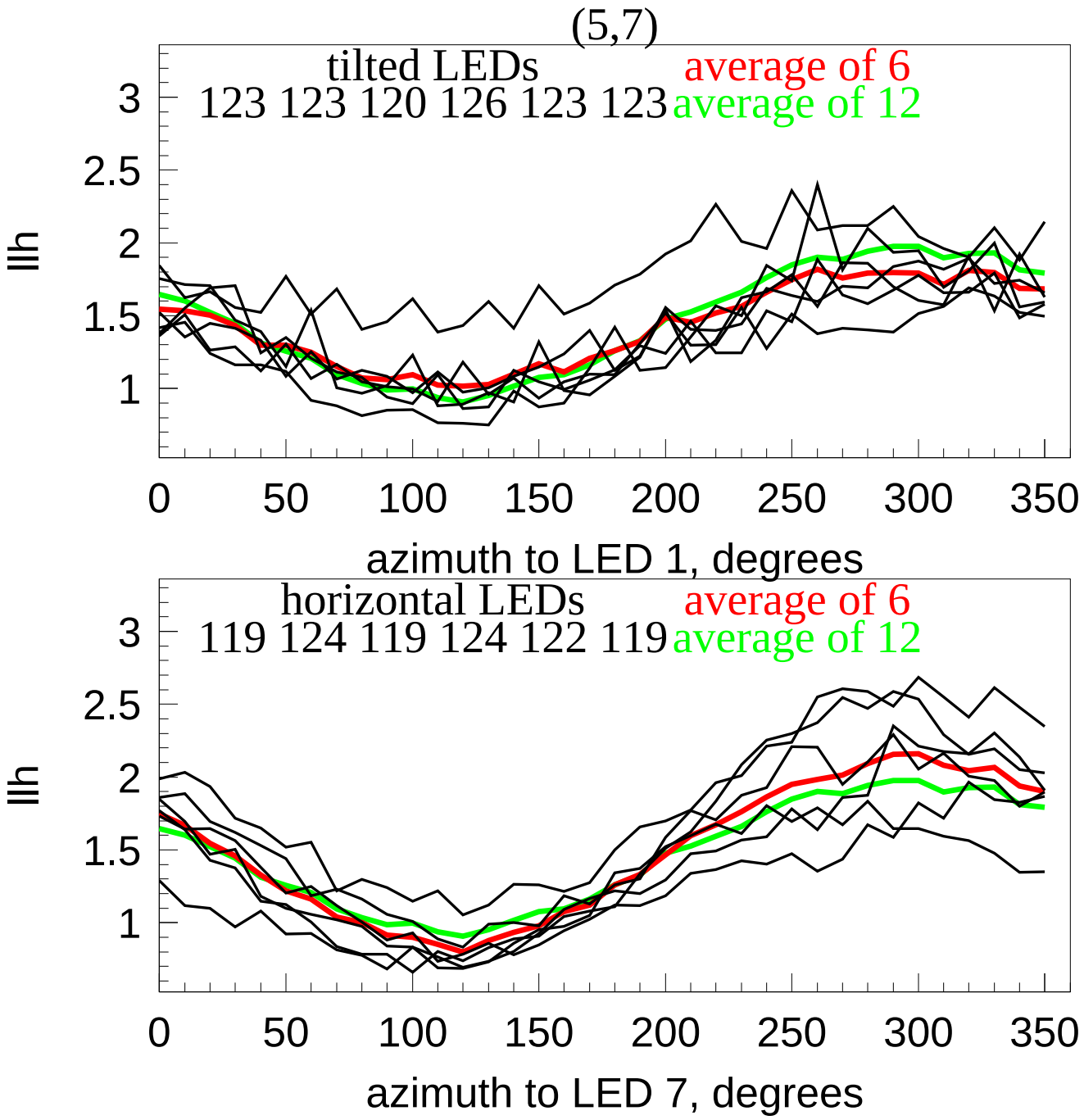

(5,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
22.2 ± 9.9

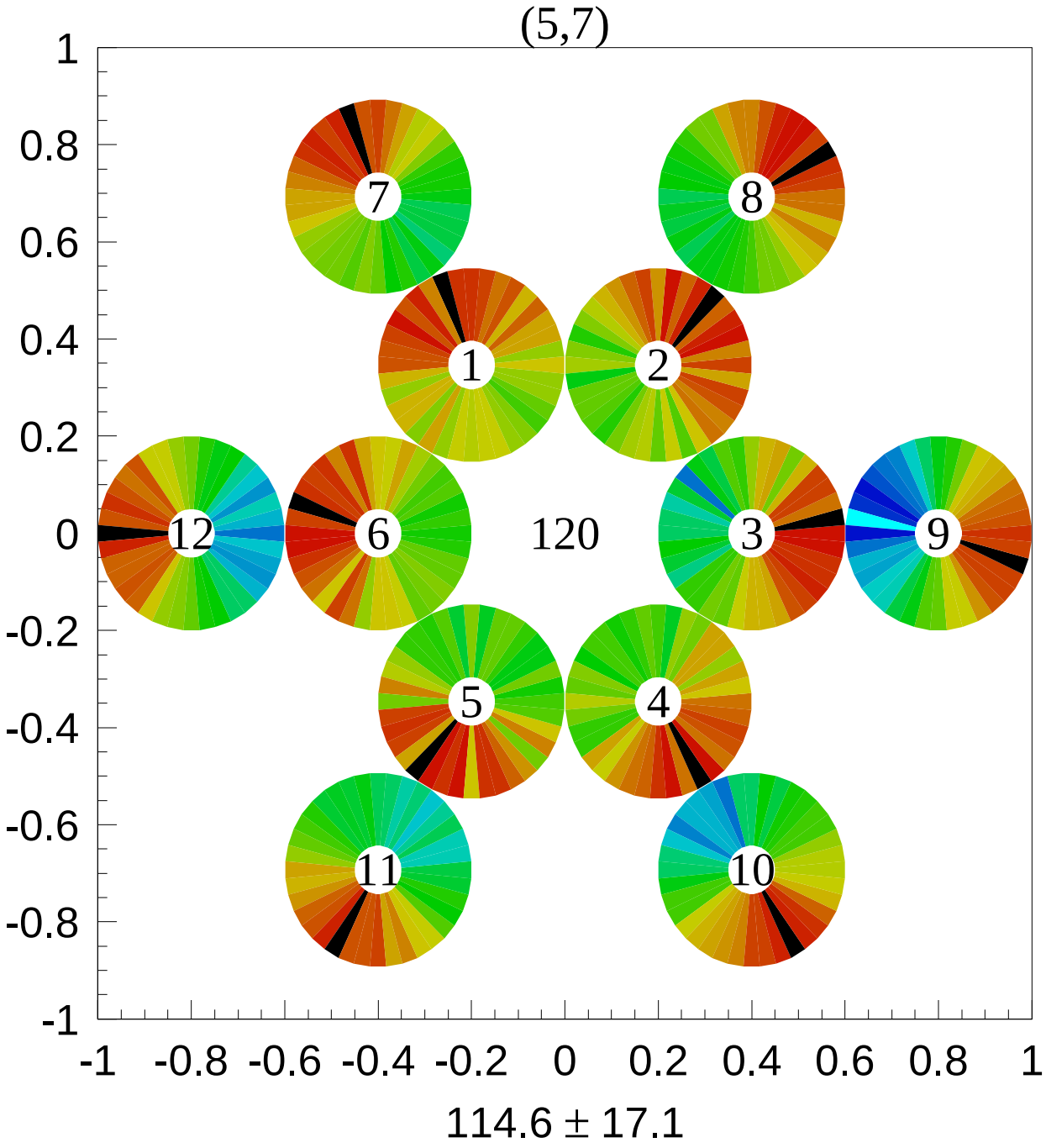

(5,5)
tilted LEDs
127 122 118 124 121 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 124 117 125 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

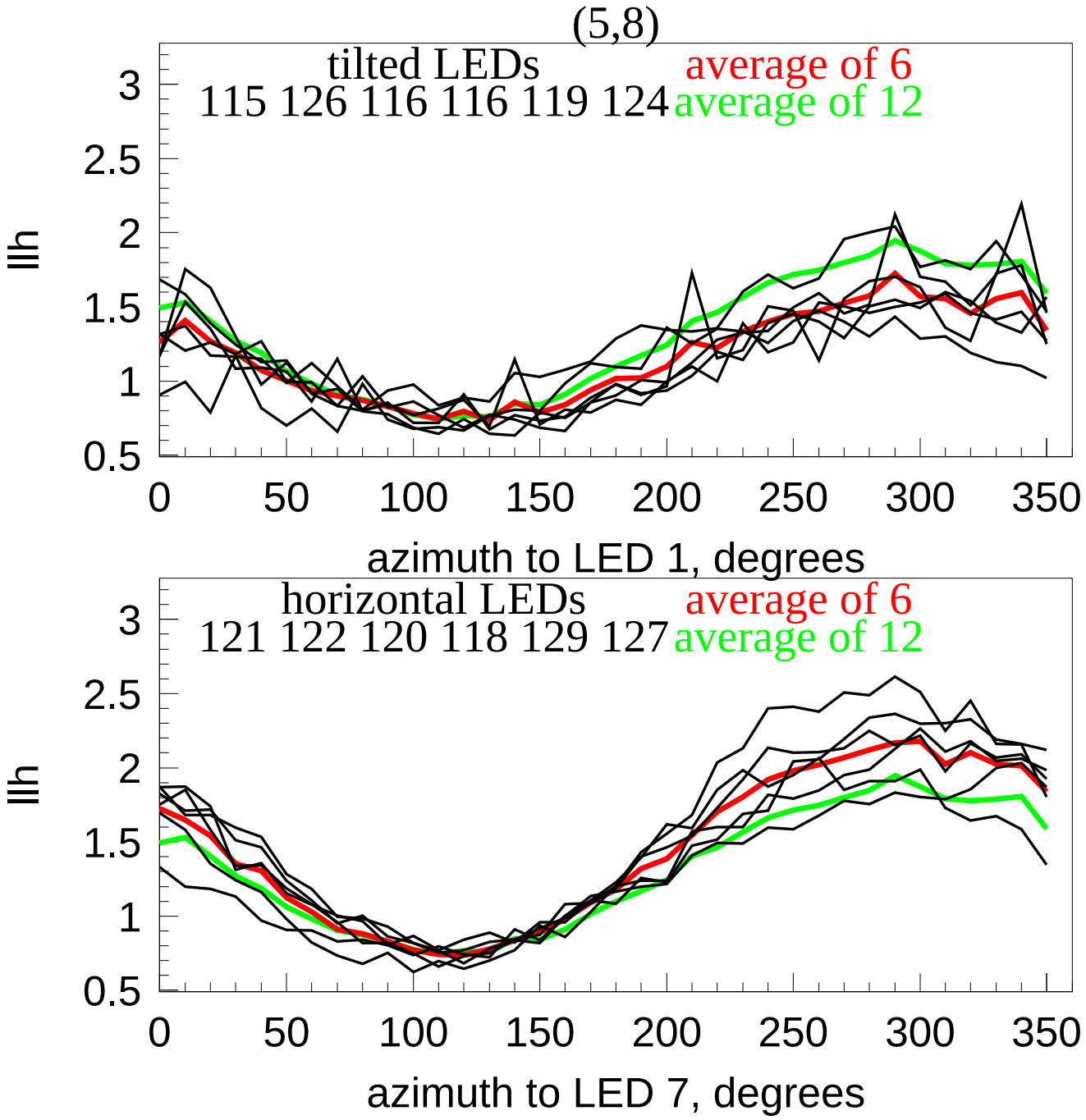

(5,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
157.5 ± 11.4

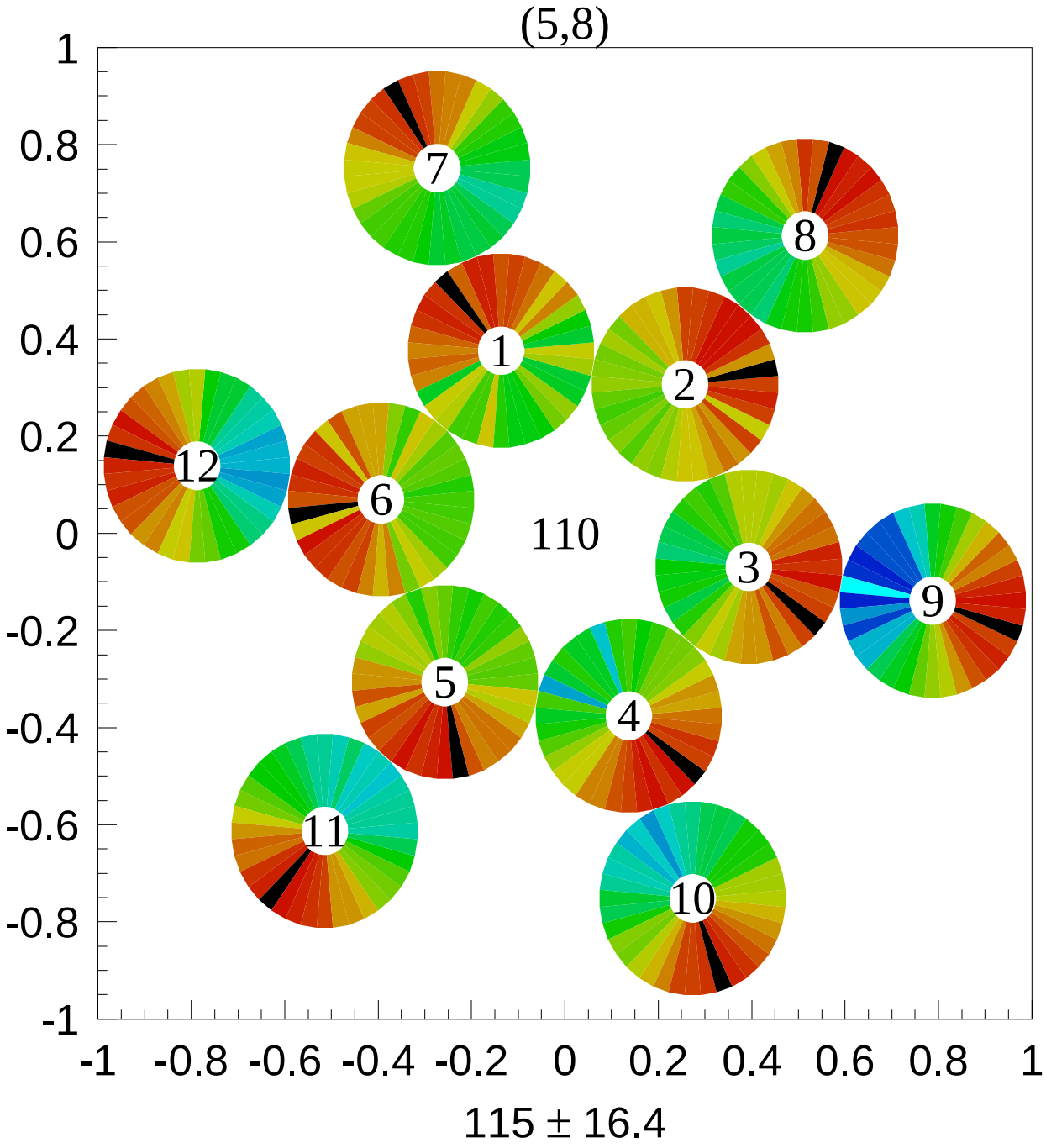

(5,6)
tilted LEDs
126 122 122 117 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 115 99 124 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

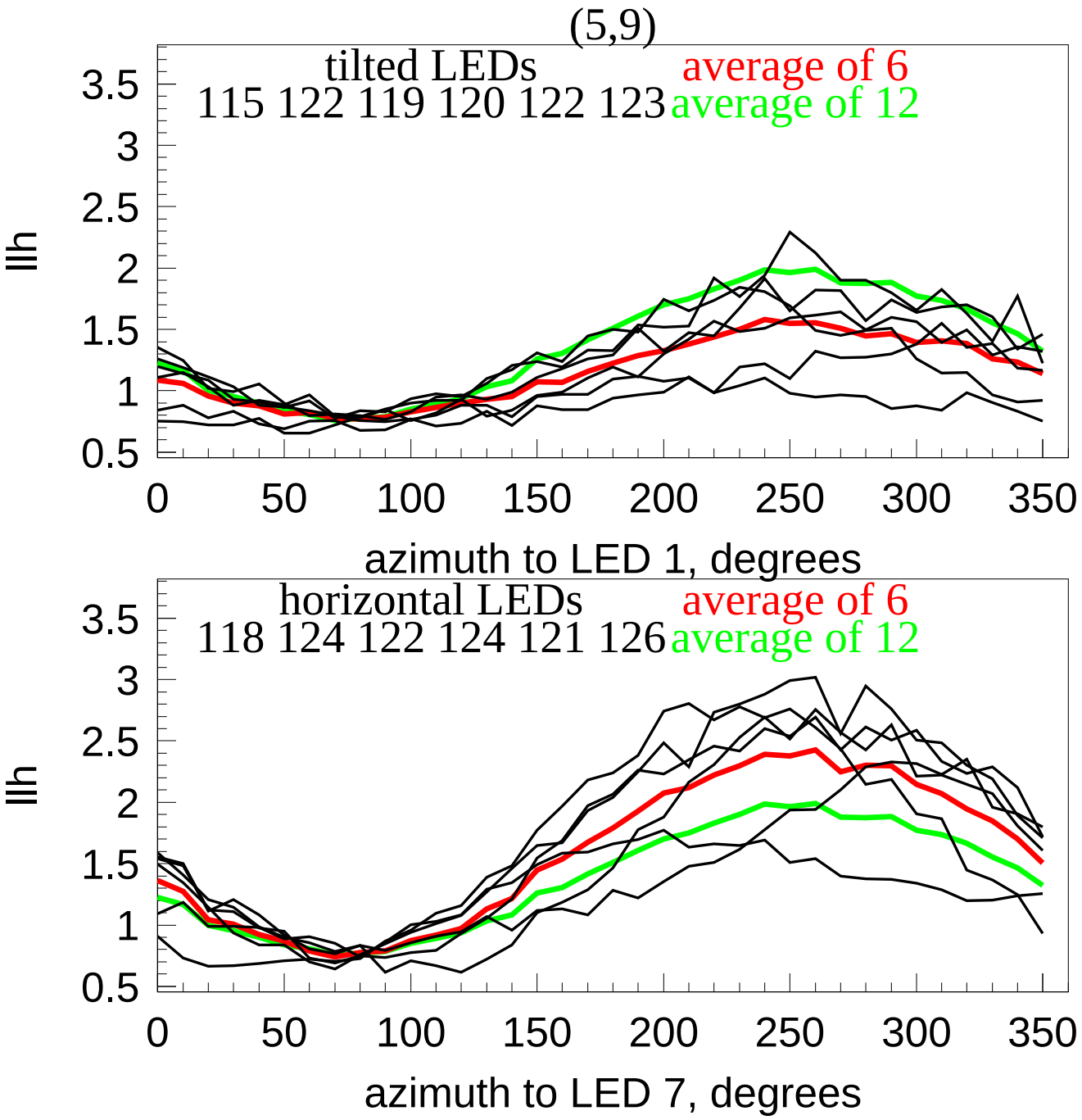

(5,6)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
42.1 ± 18.6

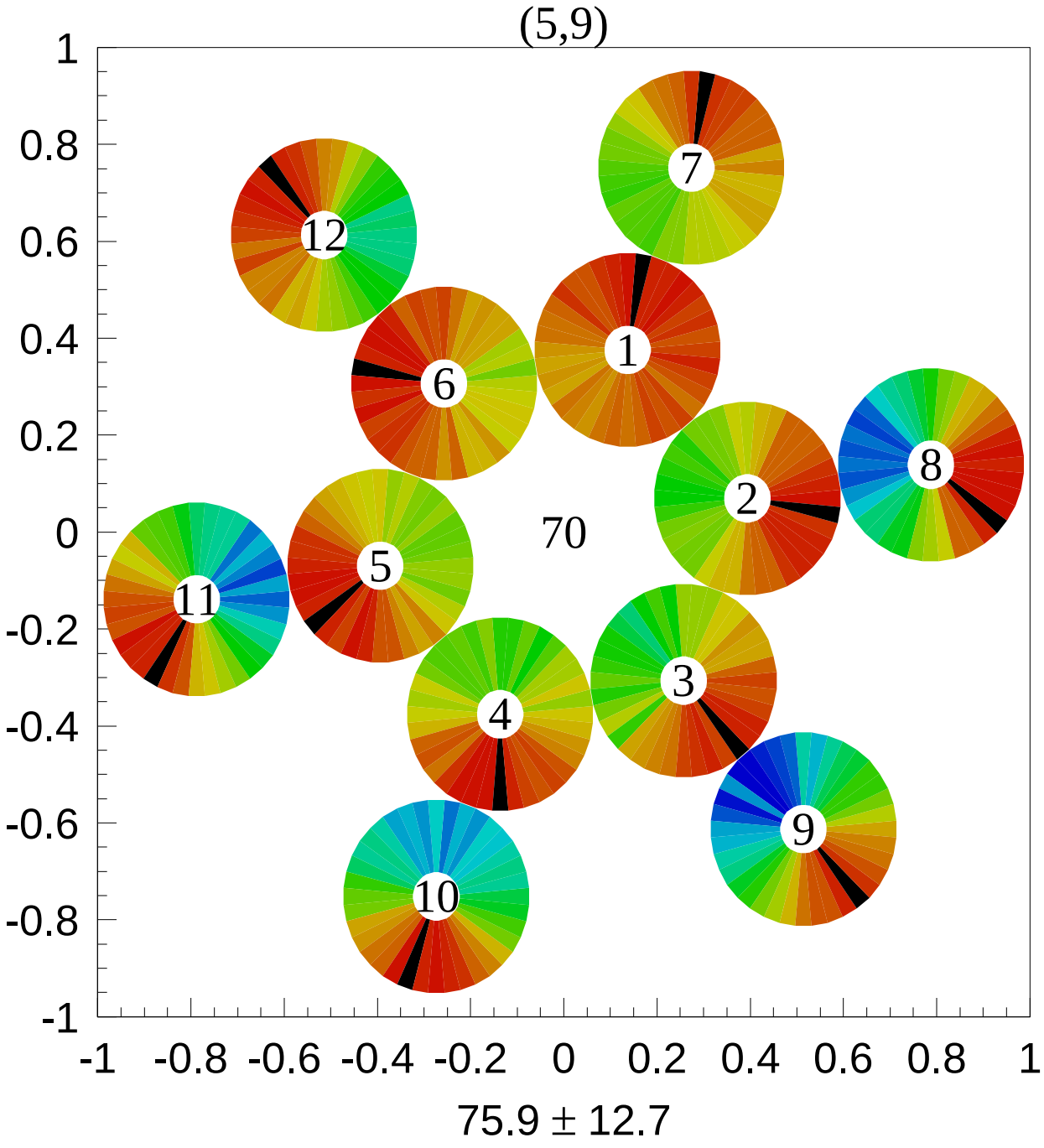

(5,7)
tilted LEDs
123 123 120 126 123 123
average of 6
average of 12
Ilh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 124 119 124 122 119
average of 6
average of 12
Ilh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

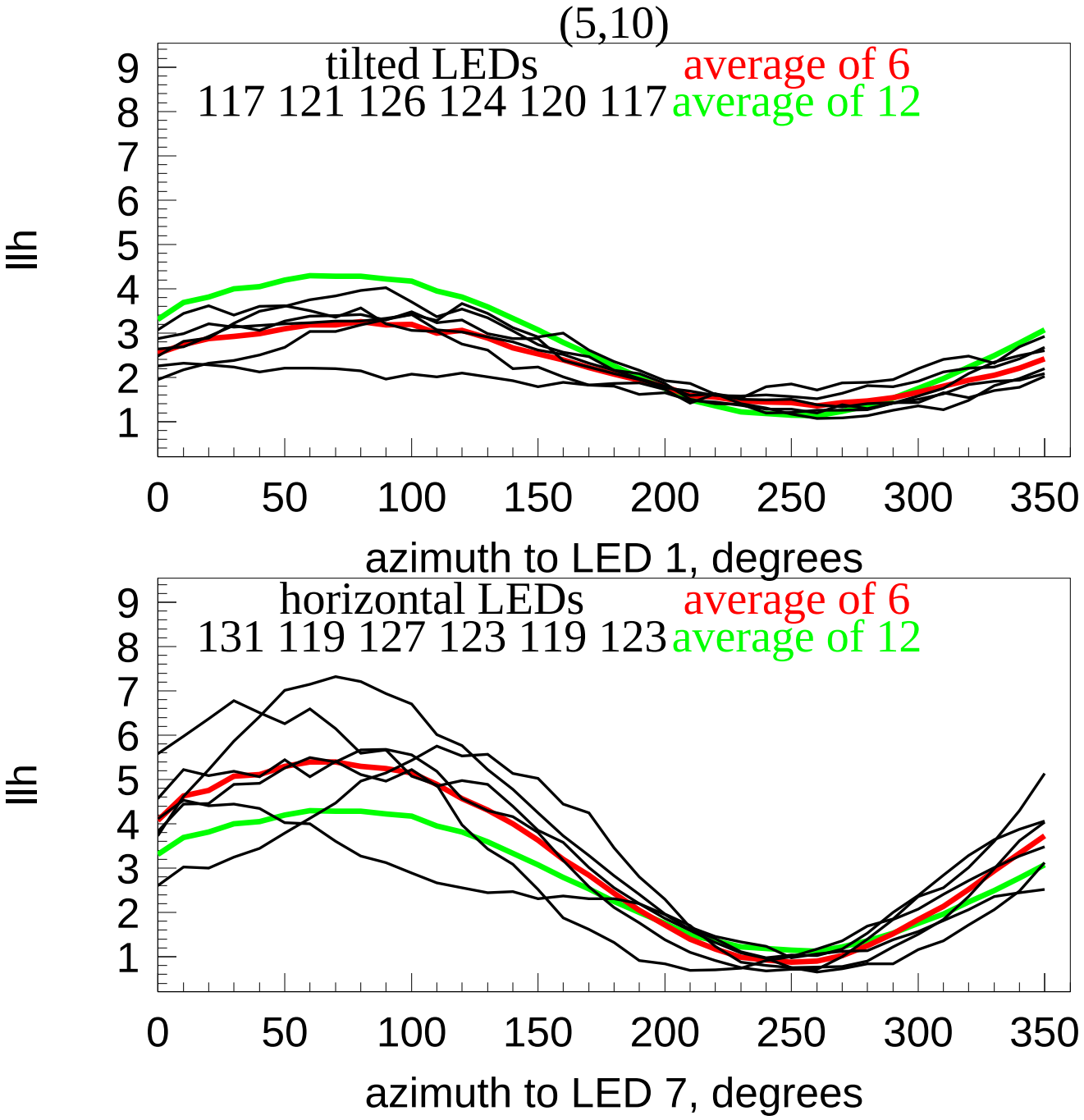

(5,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
114.6 ± 17.1

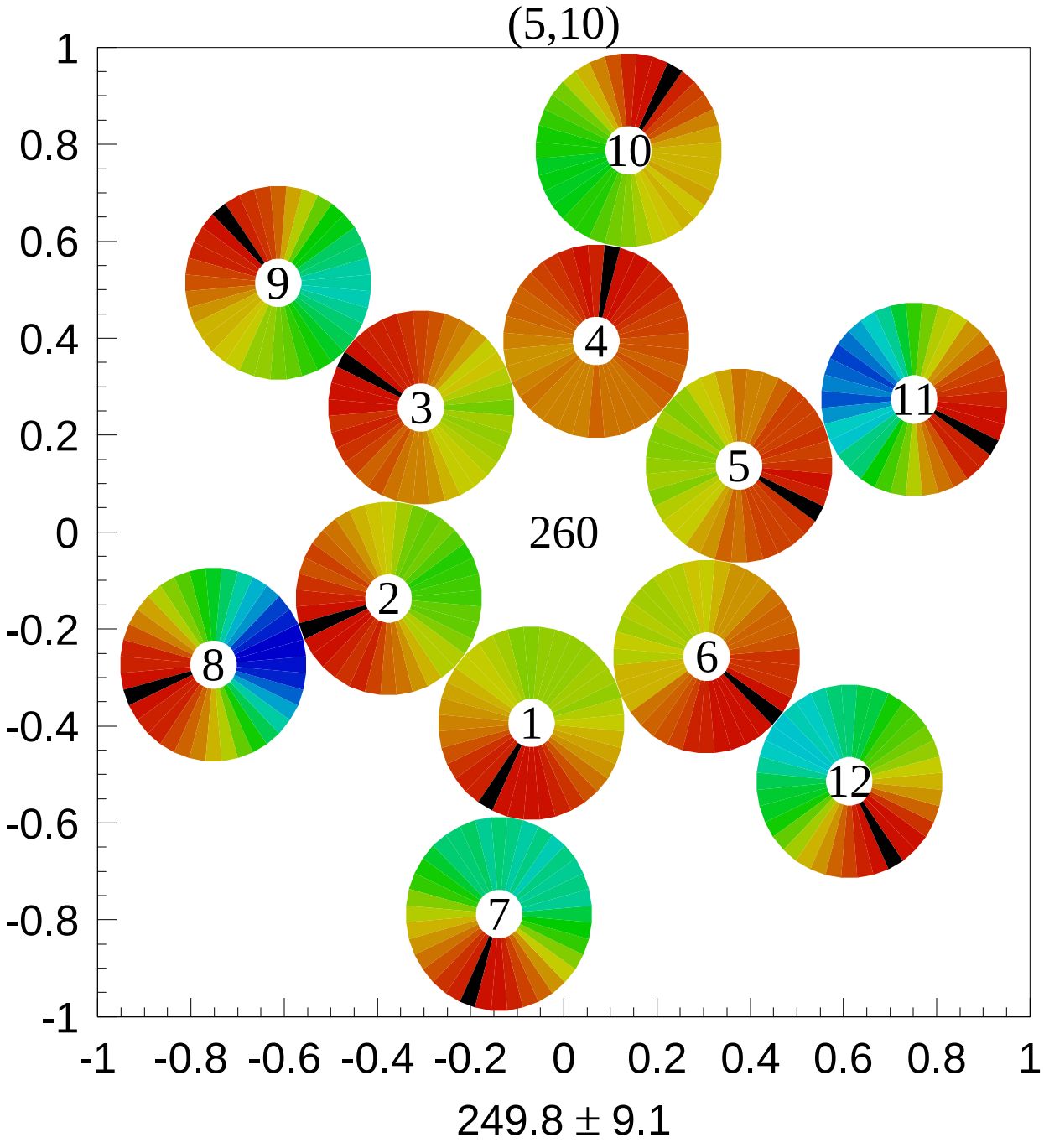

(5,8)
tilted LEDs
115 126 116 116 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 120 118 129 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

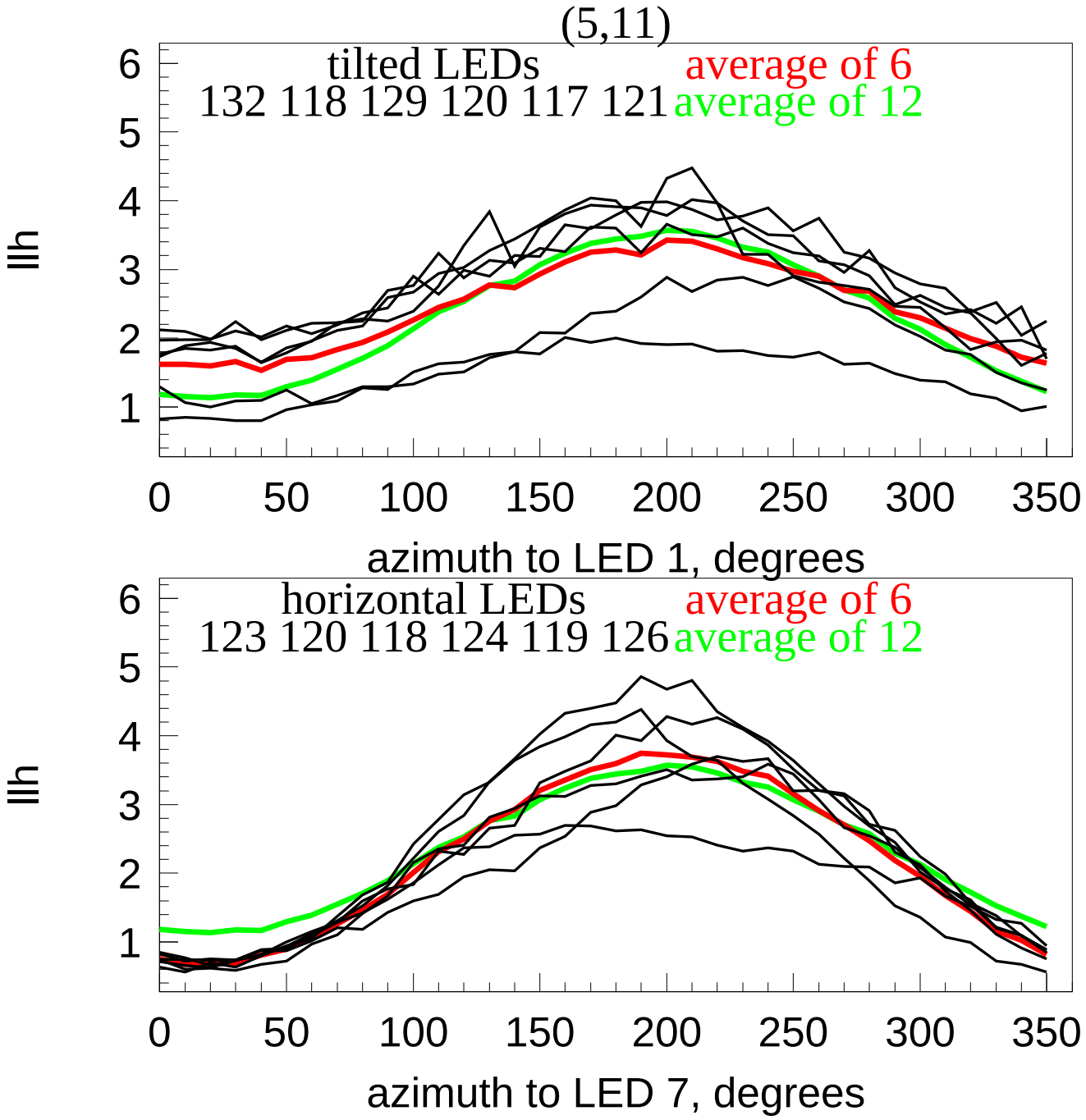

(5,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
115 ± 16.4

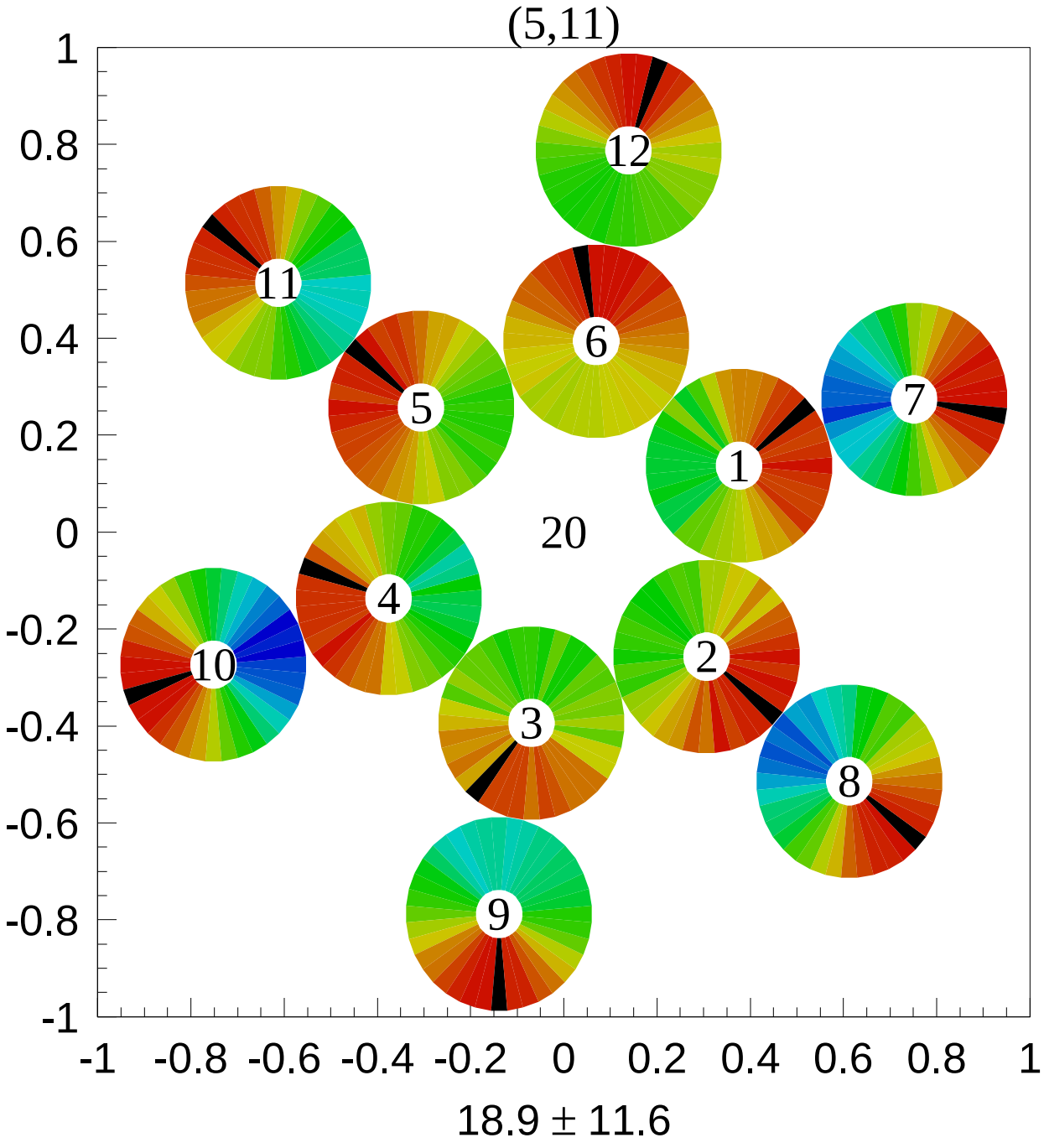

(5,9)
tilted LEDs
115 122 119 120 122 123
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 124 122 124 121 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

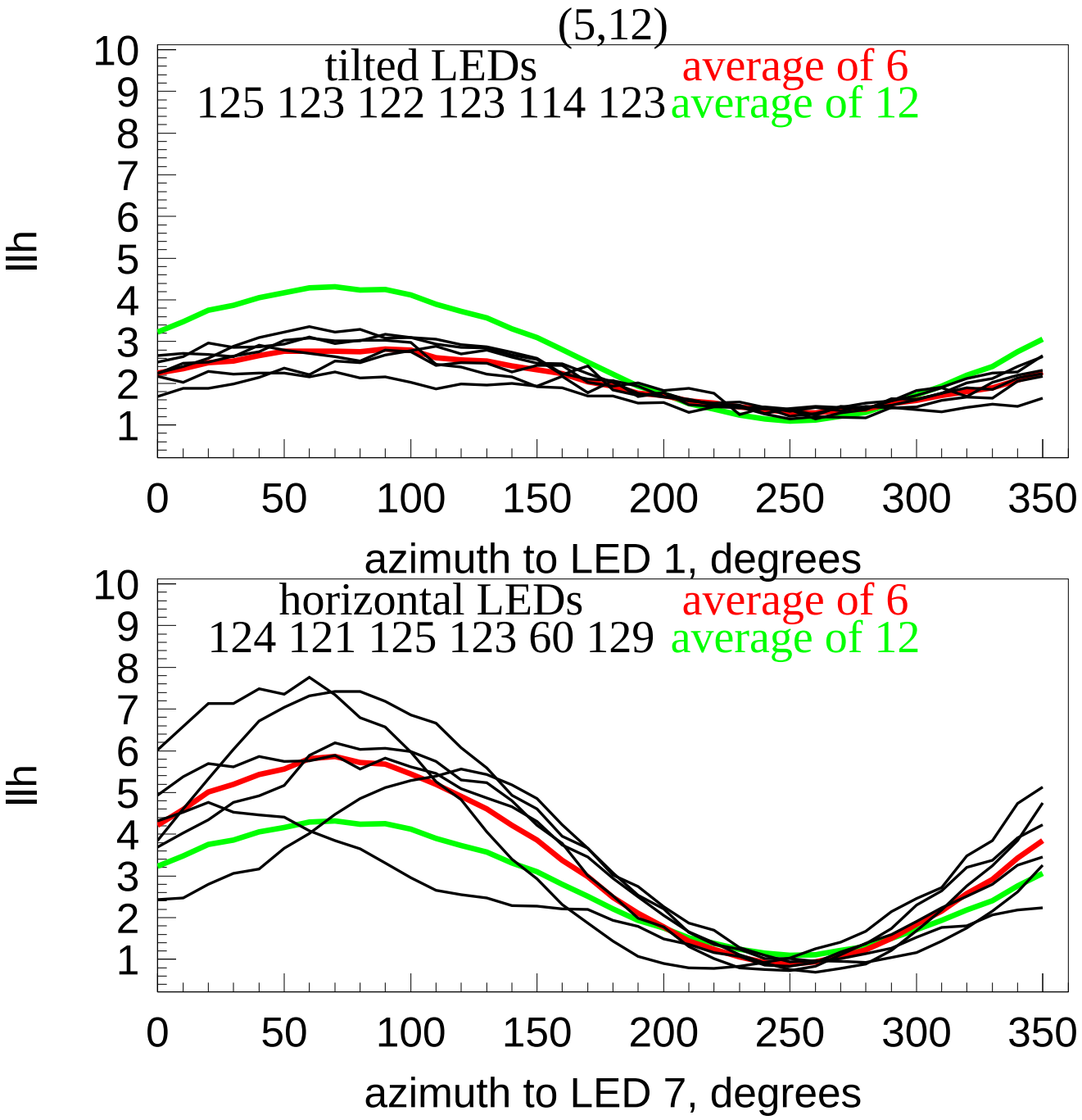

(5,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
70
5
11
4
3
9
10
75.9 ± 12.7

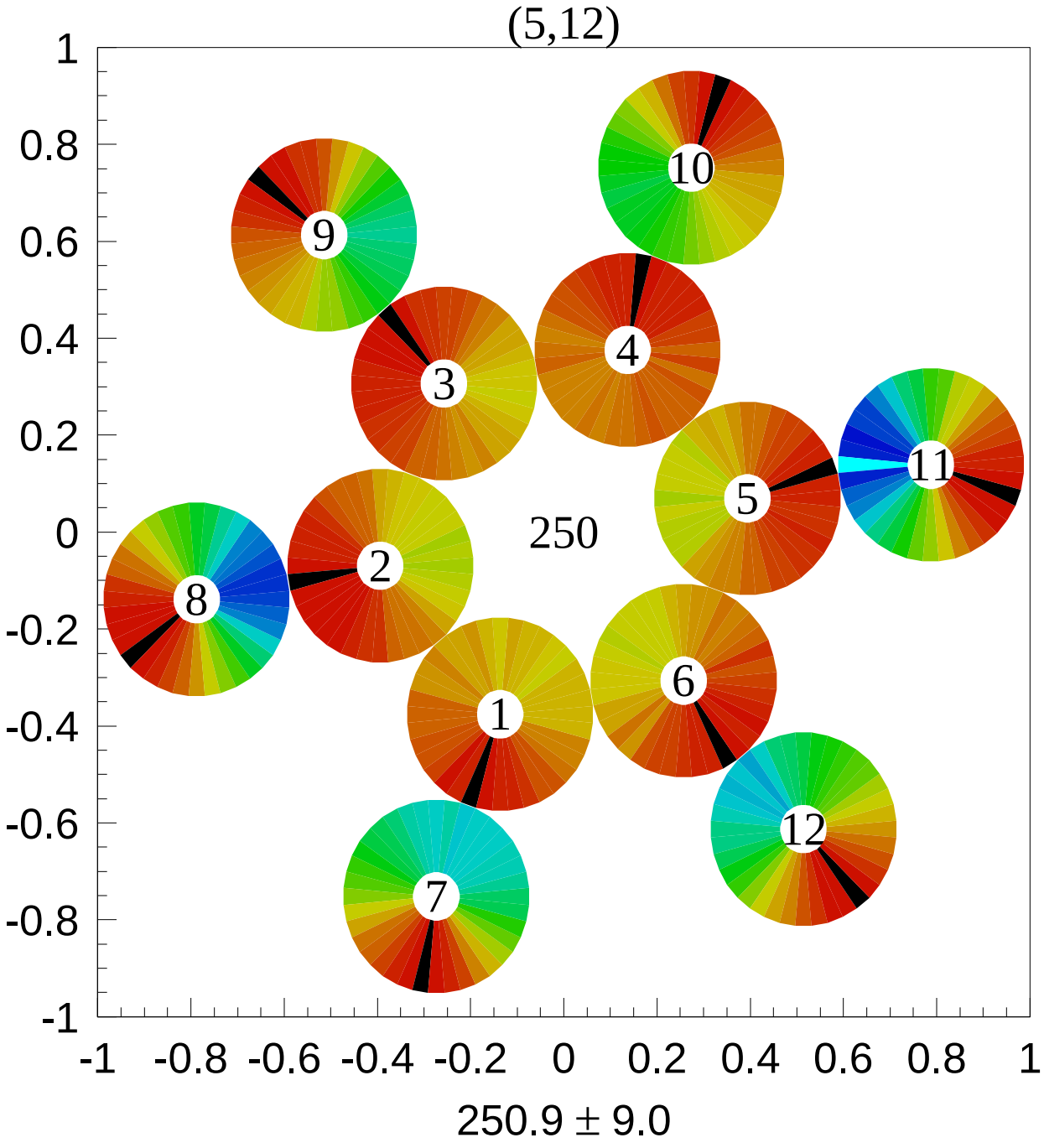

(5,10)
tilted LEDs
117 121 126 124 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 119 127 123 119 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

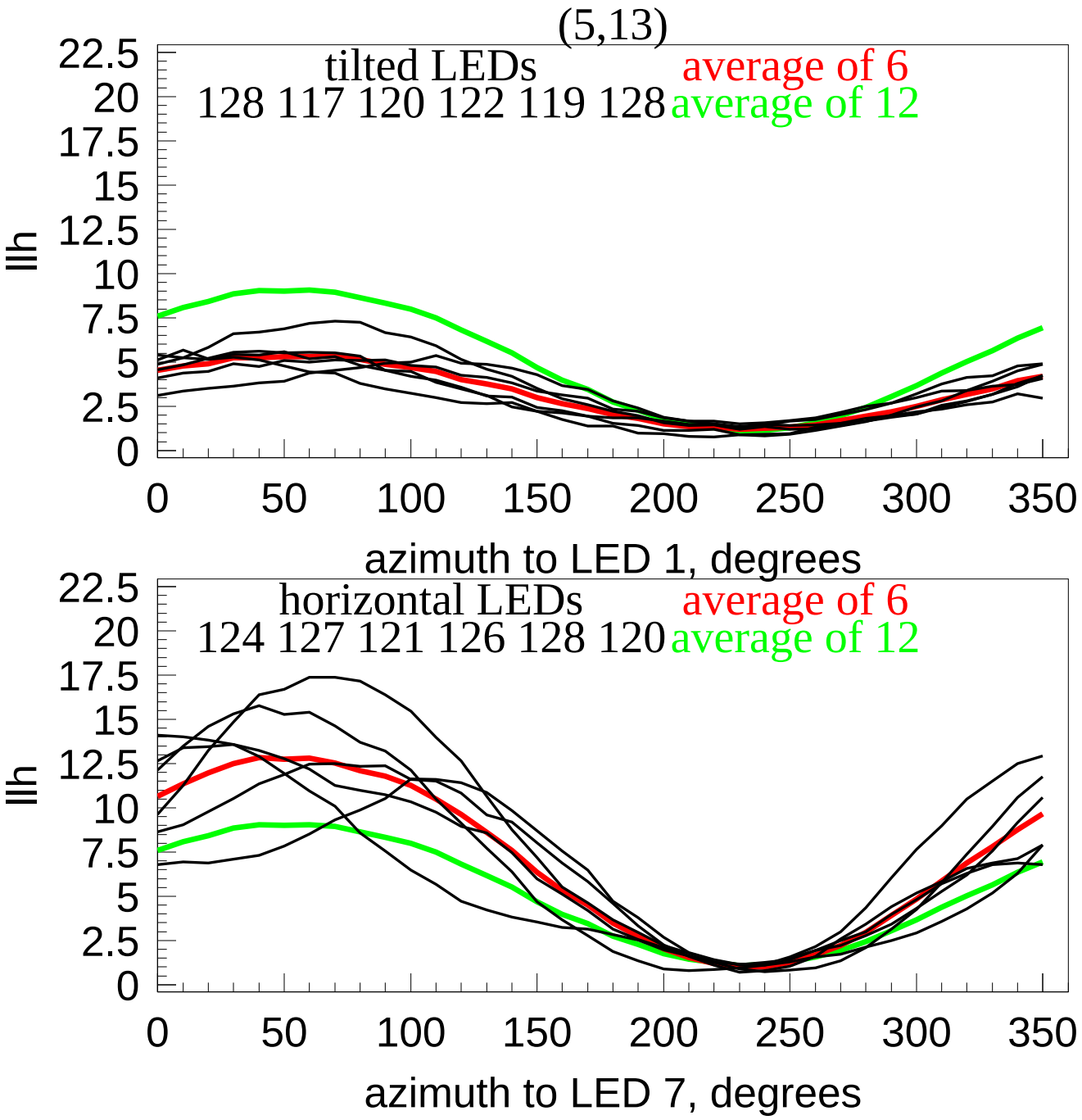

(5,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
249.8 ± 9.1

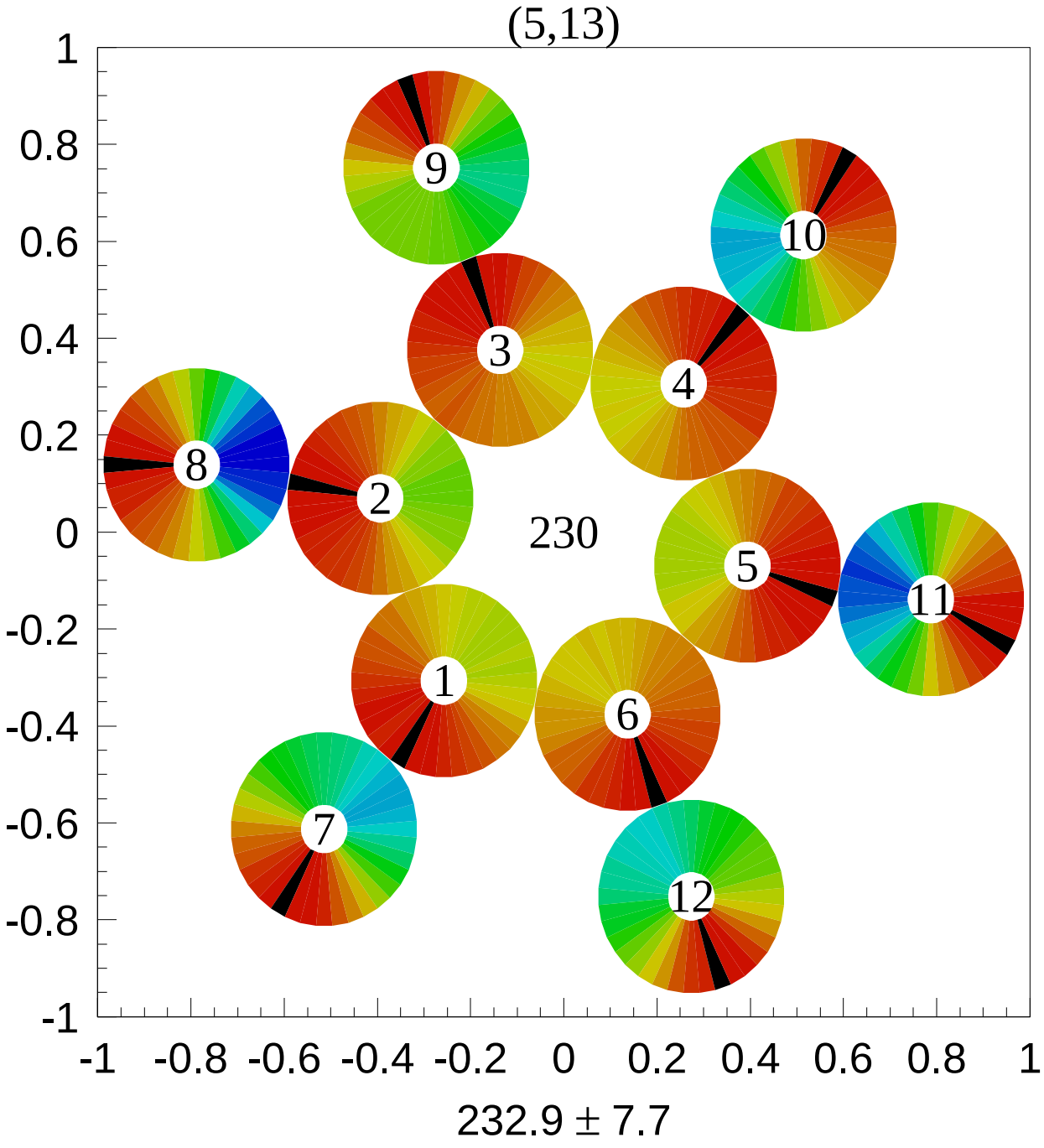

(5,11)
tilted LEDs
132 118 129 120 117 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 118 124 119 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

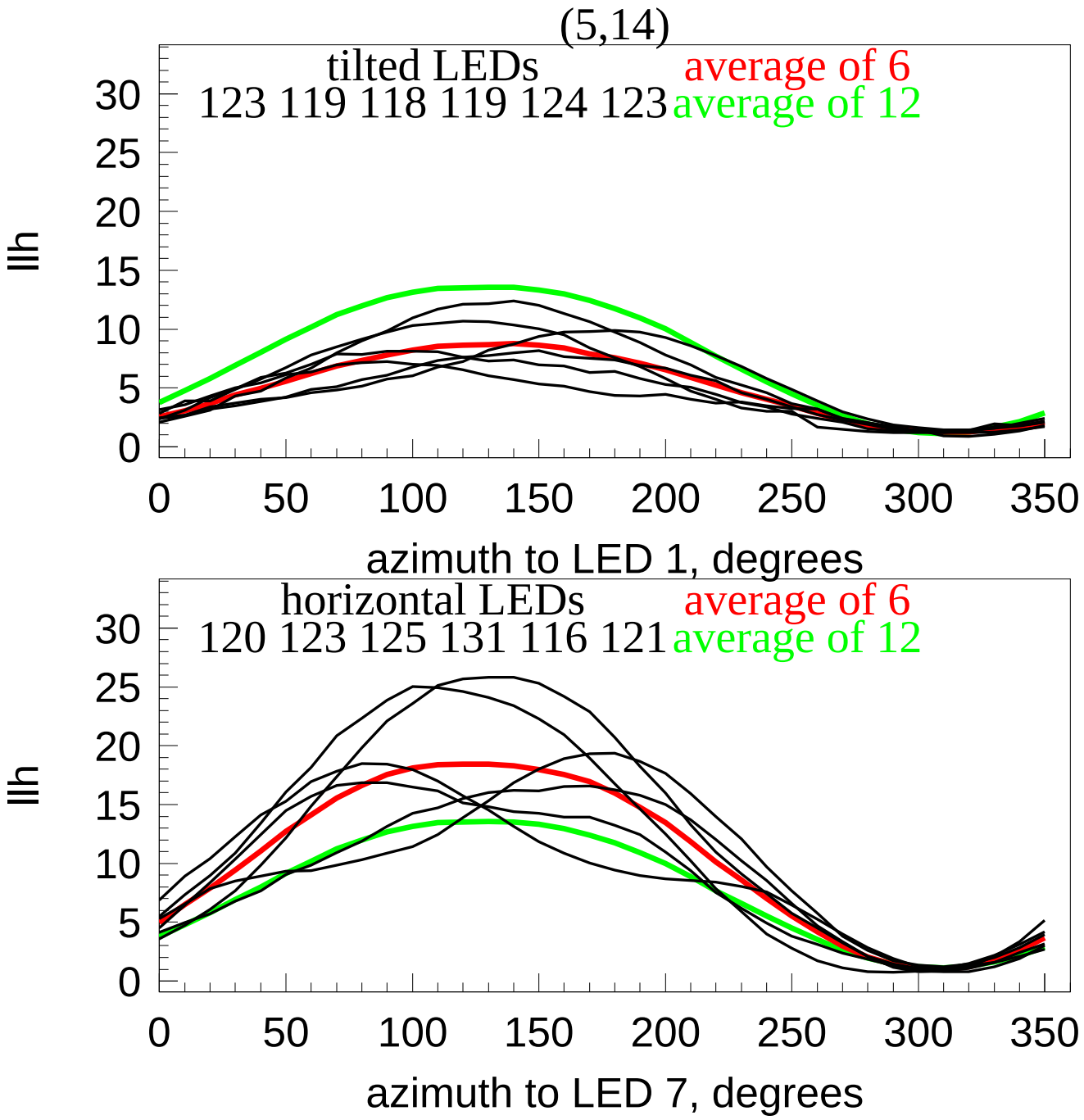

(5,11)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
18.9 ± 11.6

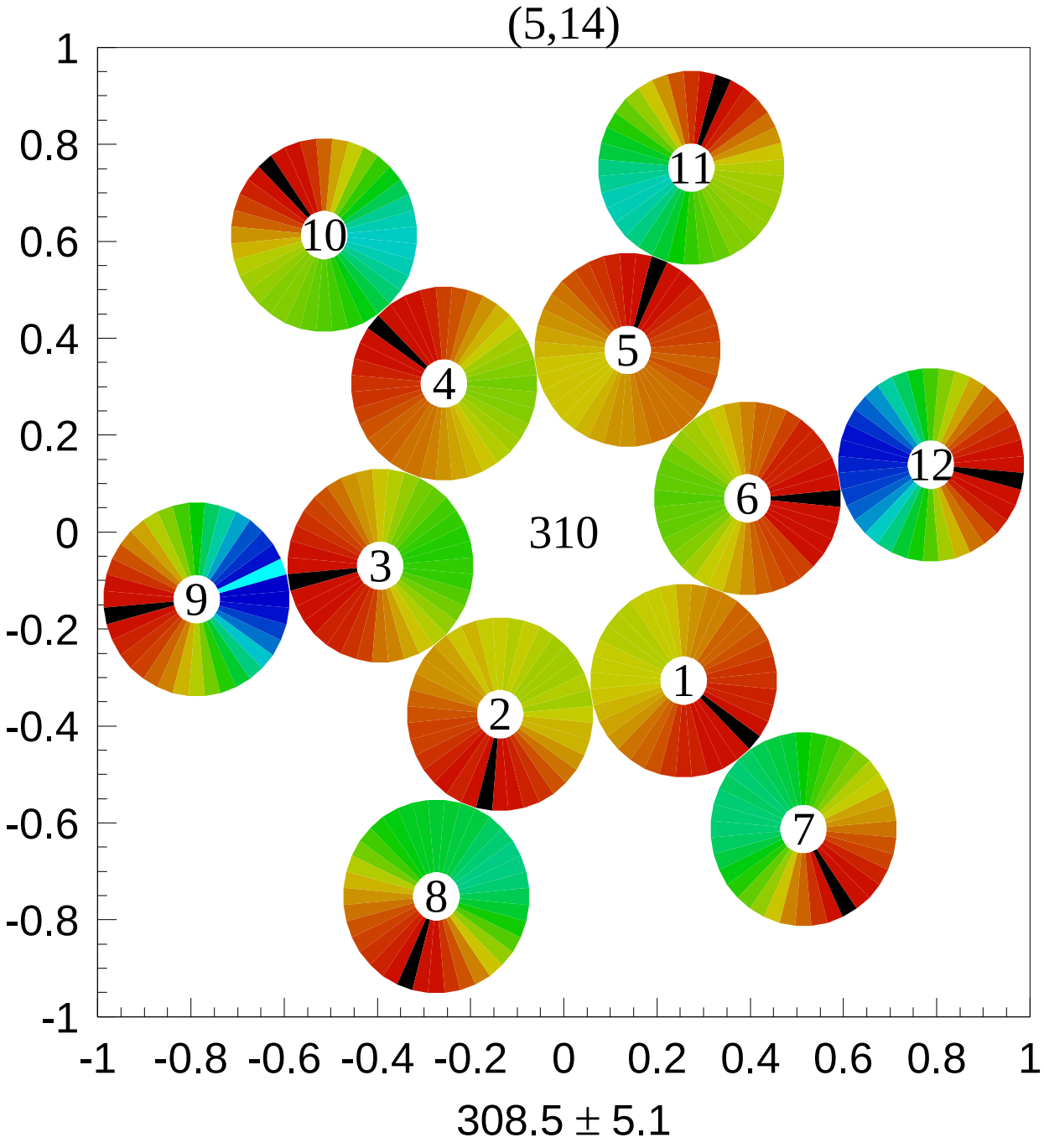

(5,12)
tilted LEDs
125 123 122 123 114 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 125 123 60 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

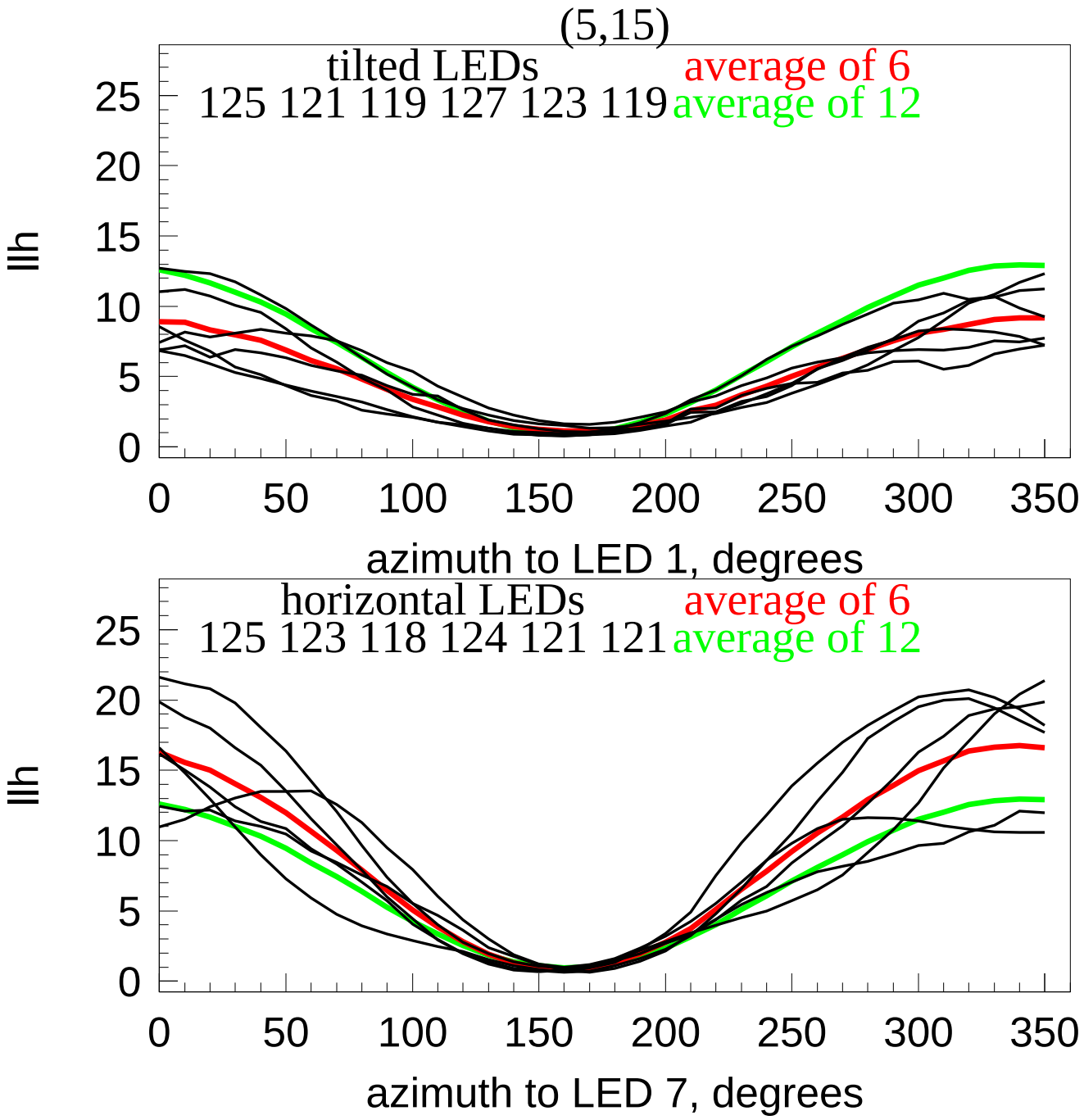

(5,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
250
10
9
4
3
11
5
2
8
6
1
12
7
250.9 ± 9.0

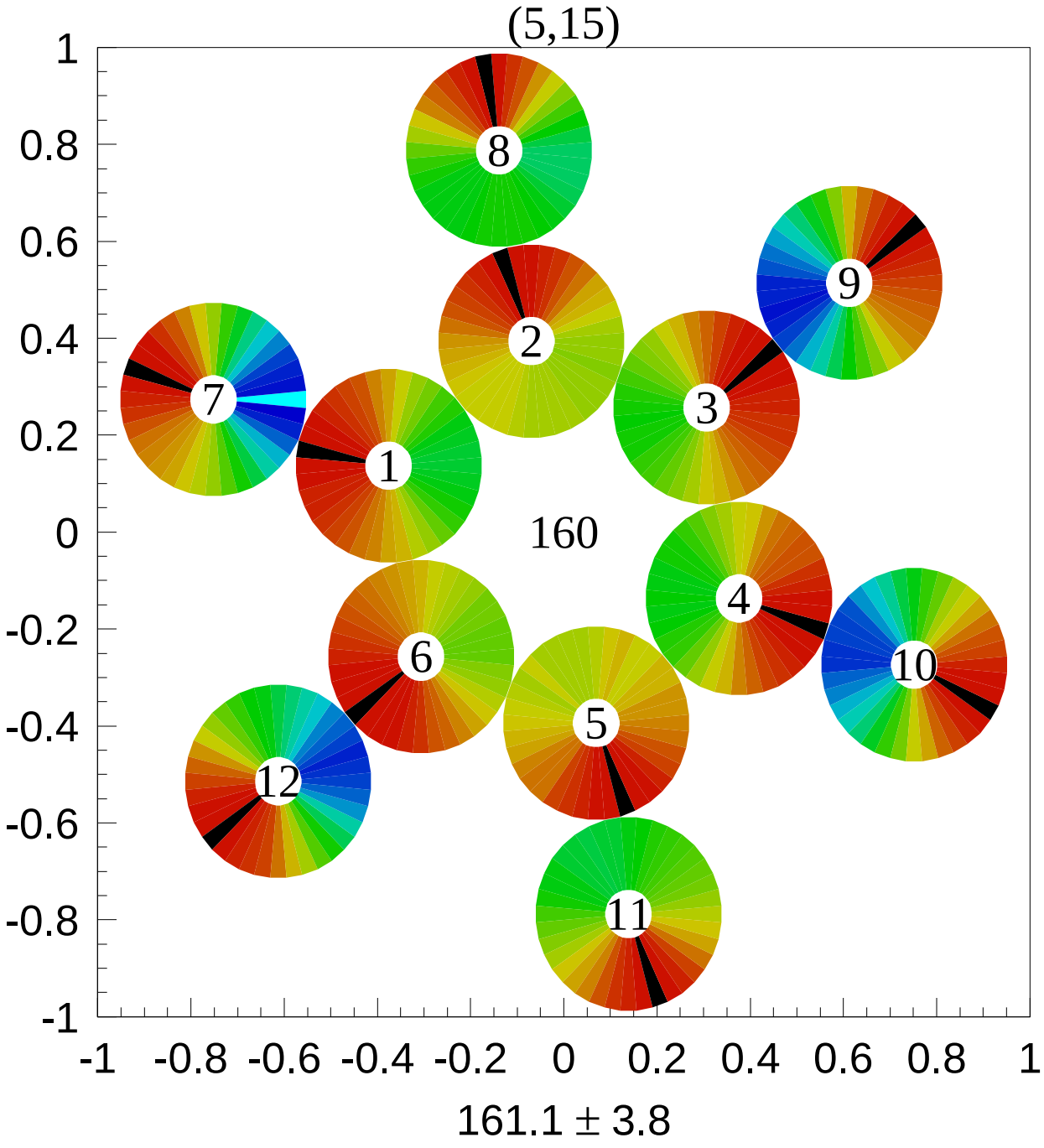

(5,13)
tilted LEDs
128 117 120 122 119 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 127 121 126 128 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

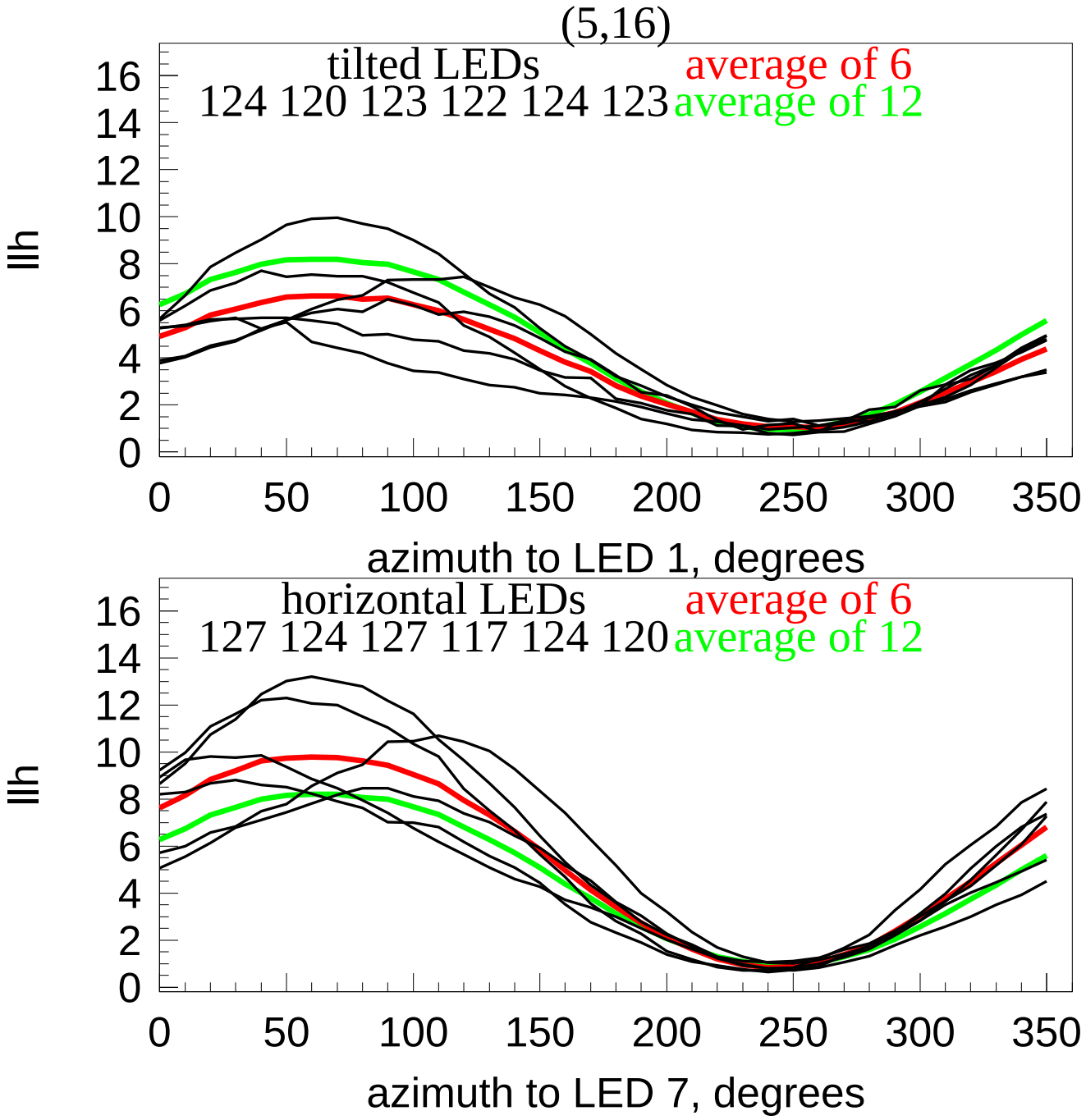

(5,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
232.9 ± 7.7

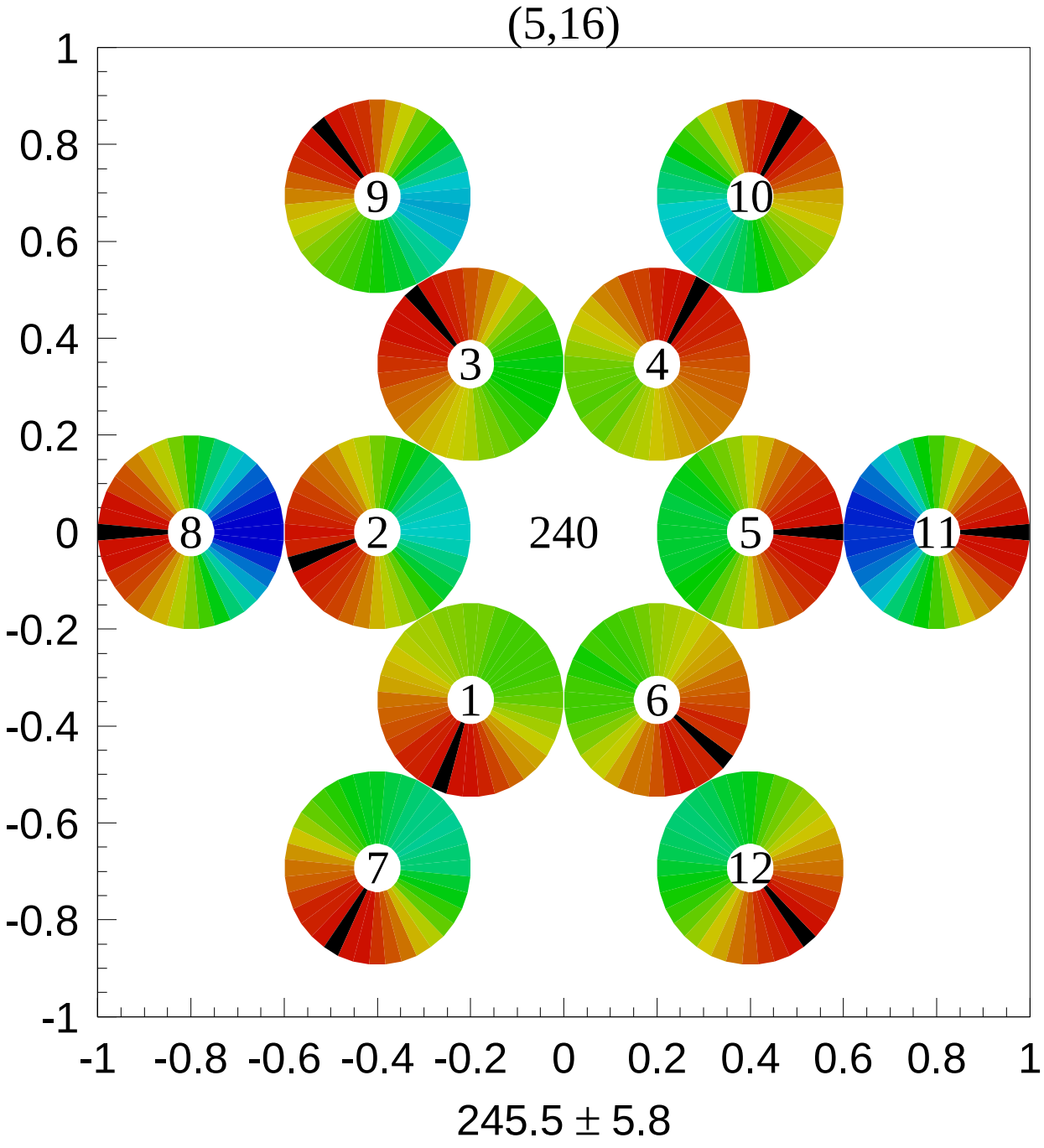

(5,14)
tilted LEDs
123 119 118 119 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 123 125 131 116 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

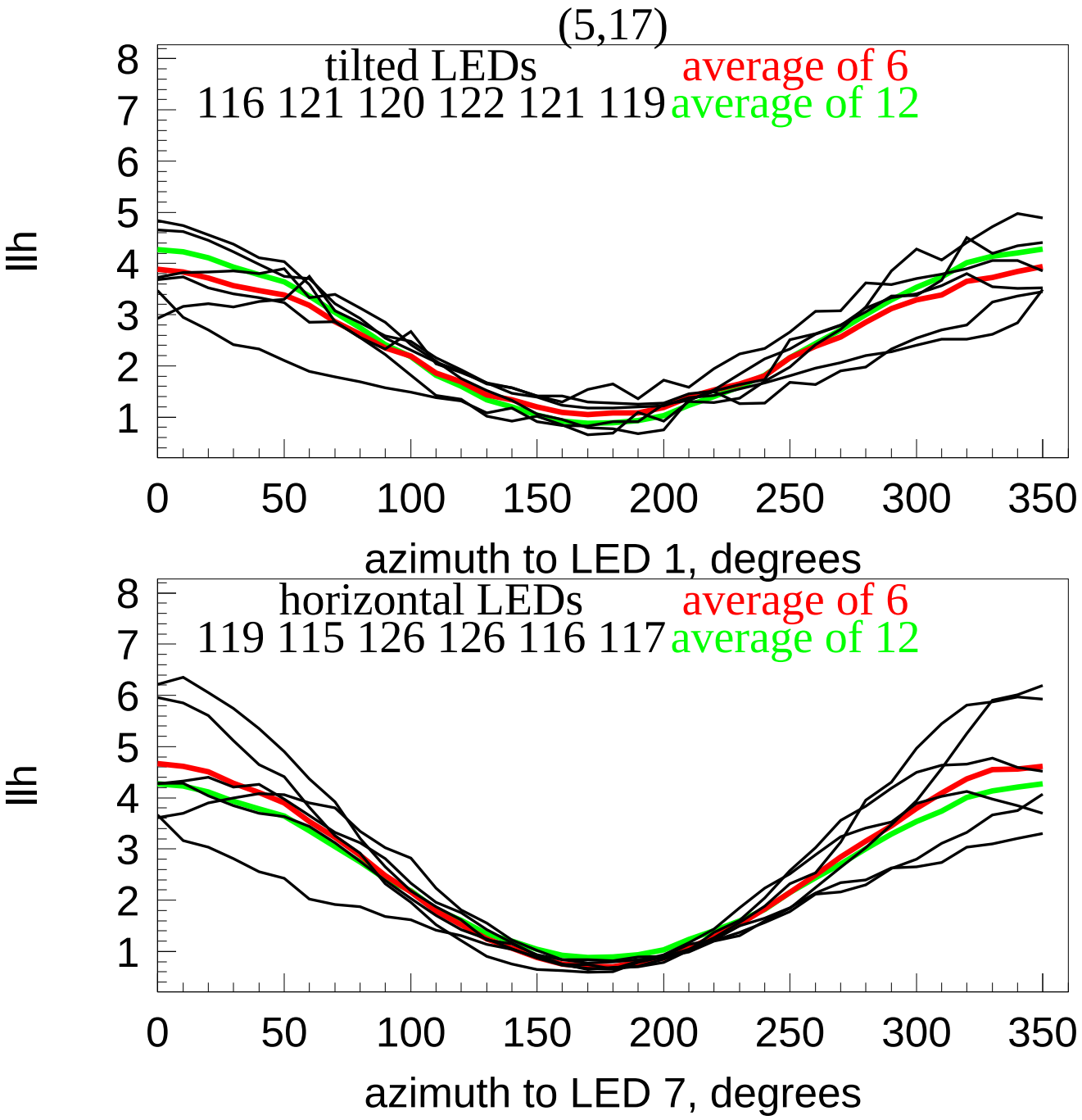

(5,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
308.5 ± 5.1

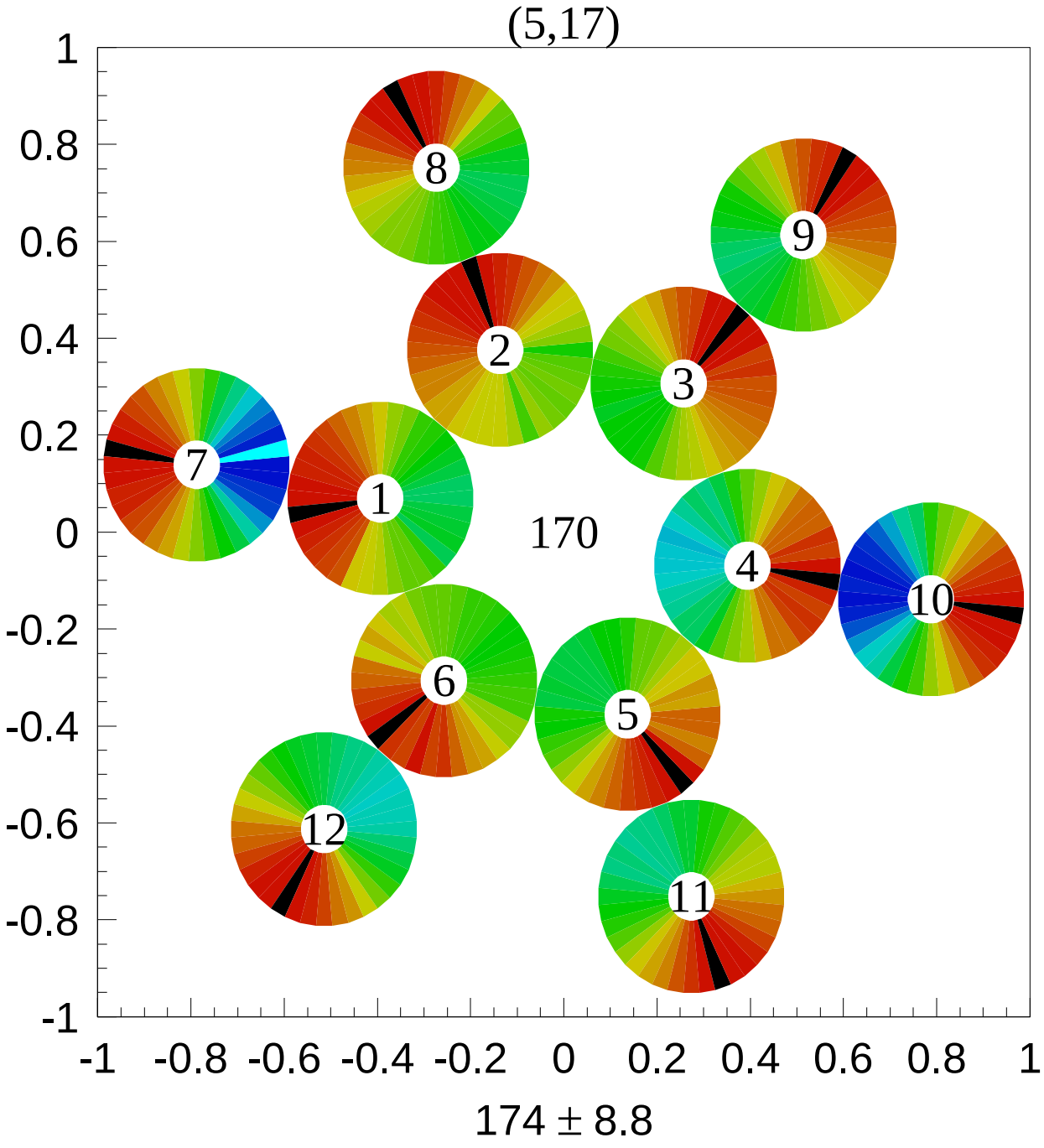

(5,15)
tilted LEDs
125 121 119 127 123 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 118 124 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

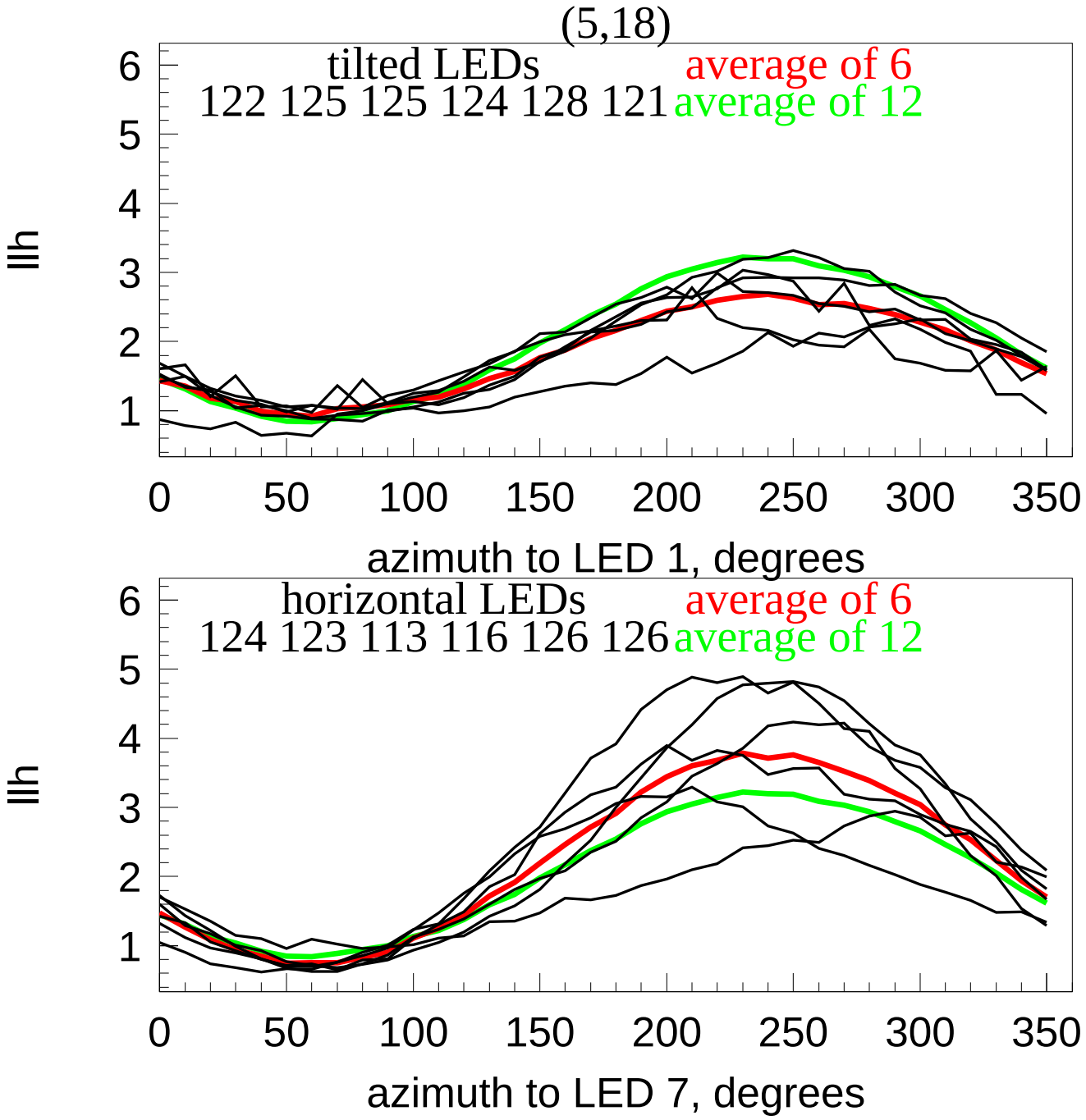

(5,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
10
6
5
12
11
161.1 ± 3.8

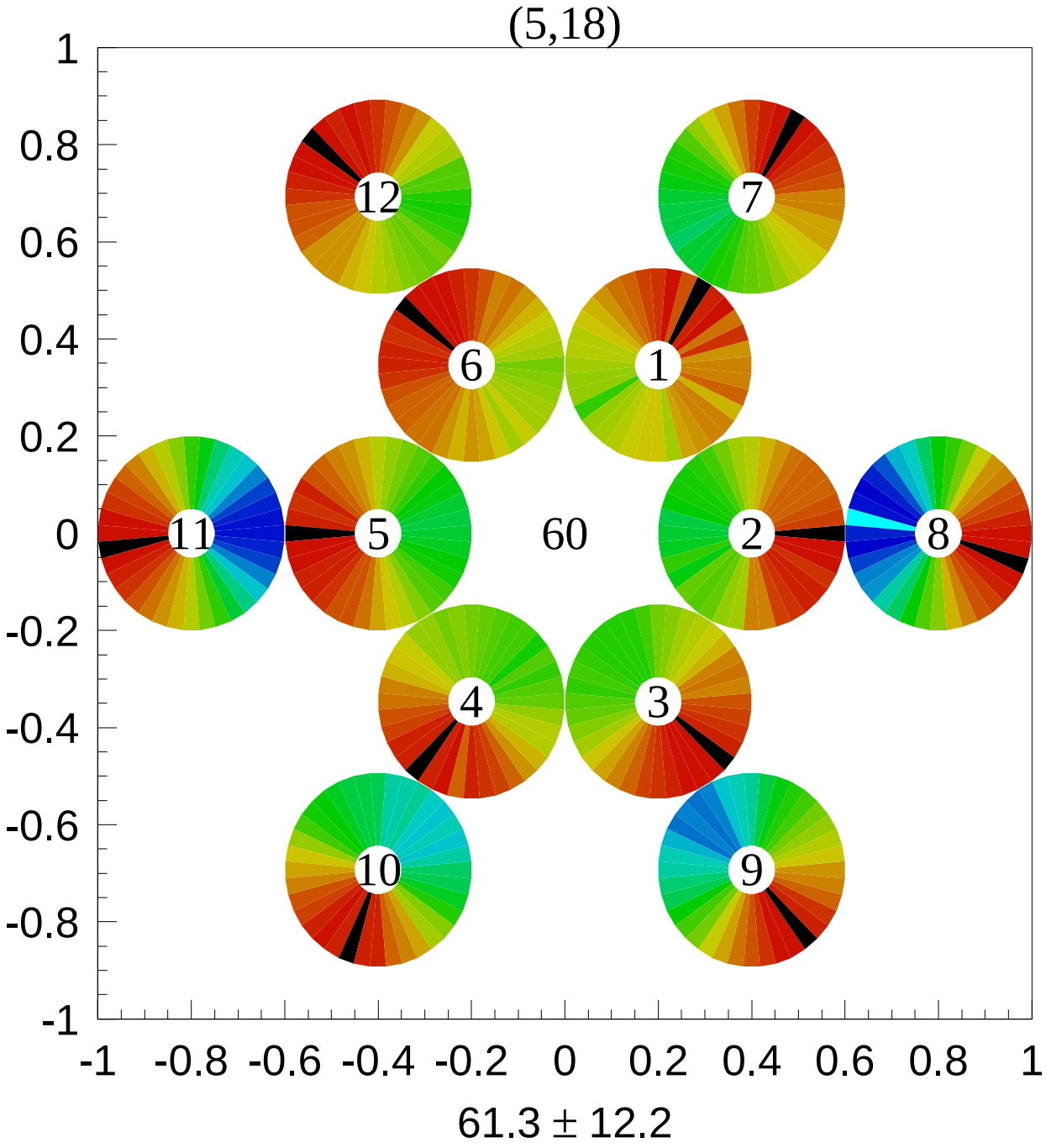

(5,16)
tilted LEDs
124 120 123 122 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 124 127 117 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

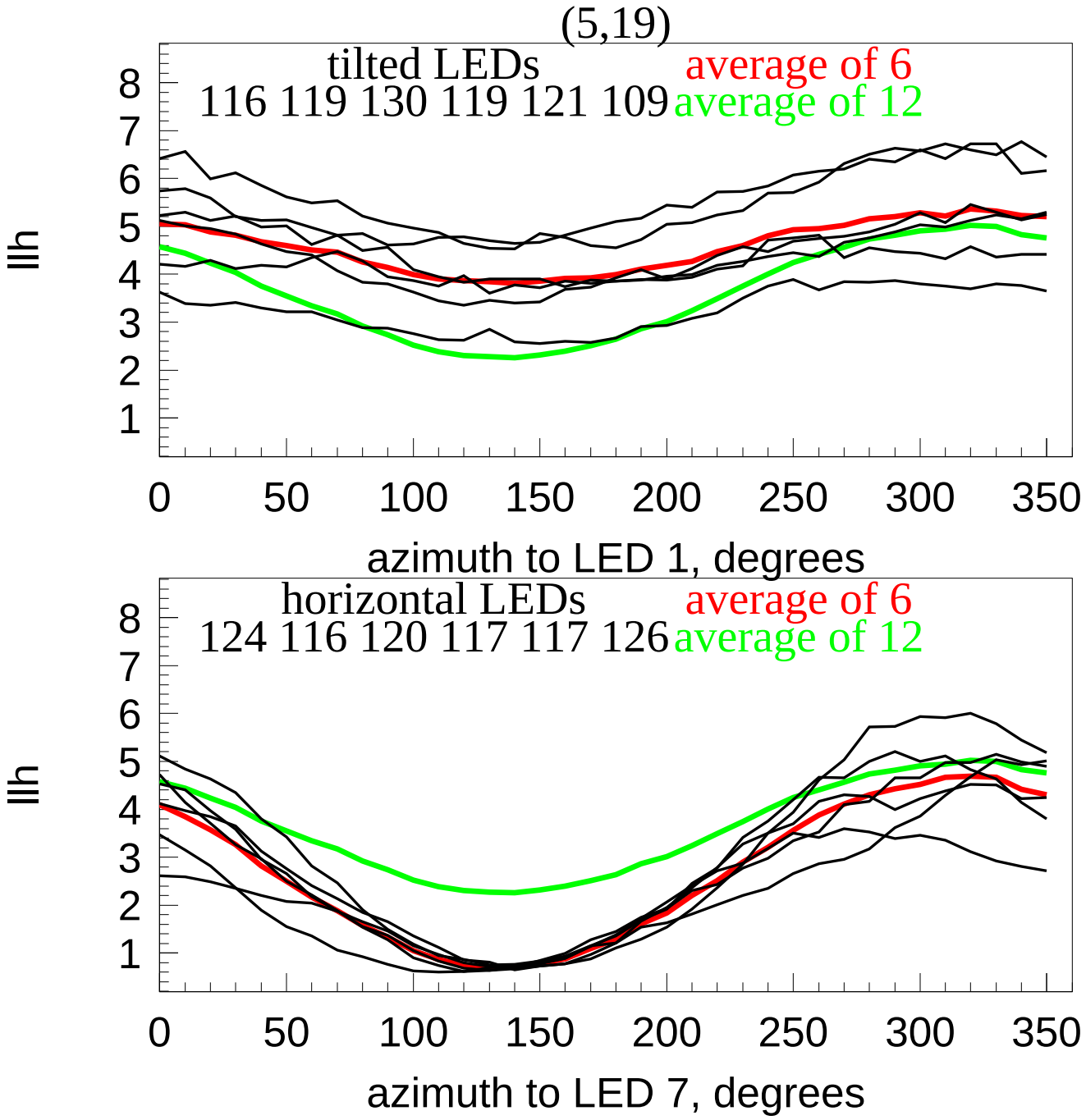

(5,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
245.5 ± 5.8

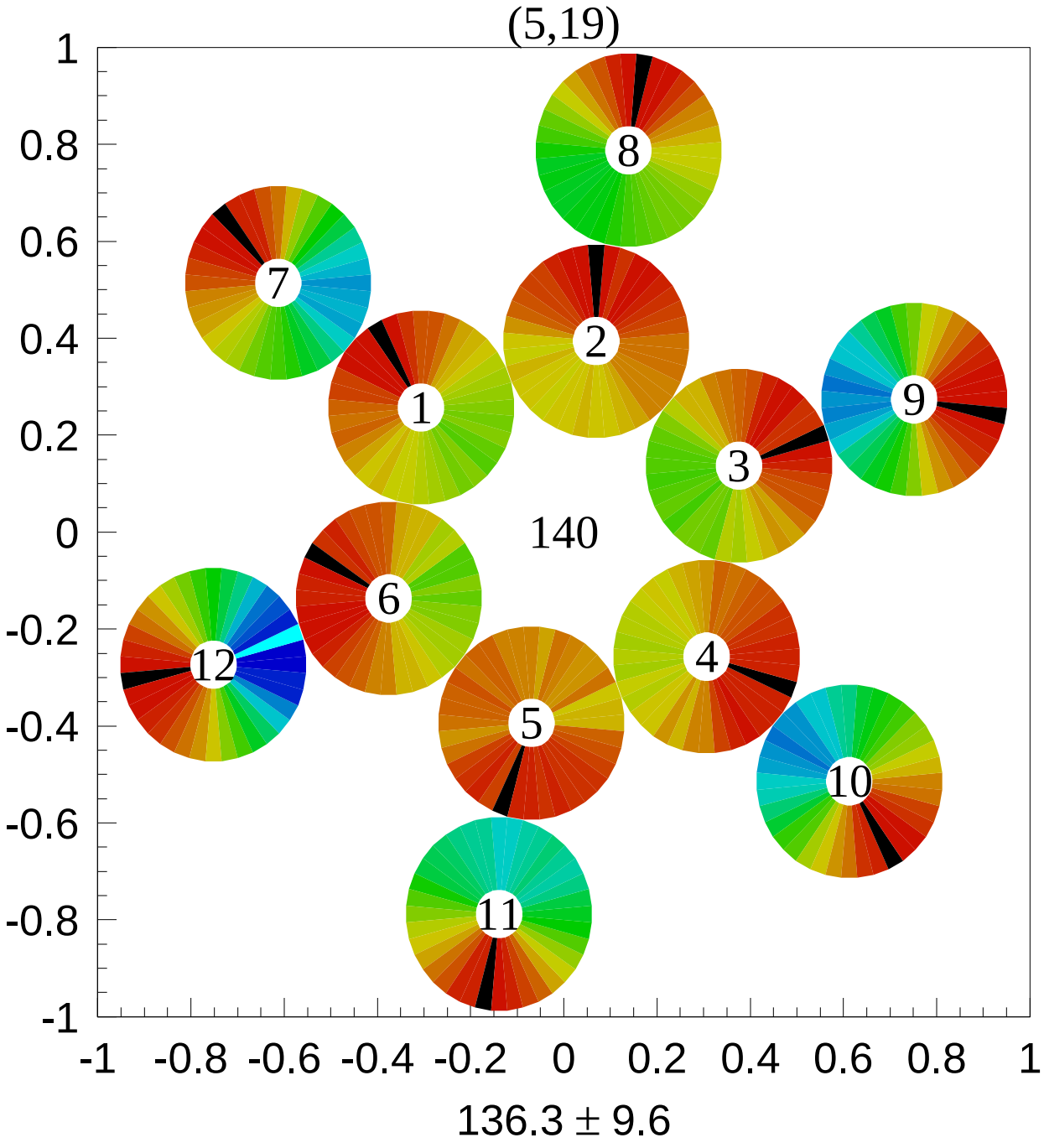

(5,17)
tilted LEDs
116 121 120 122 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 115 126 126 116 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

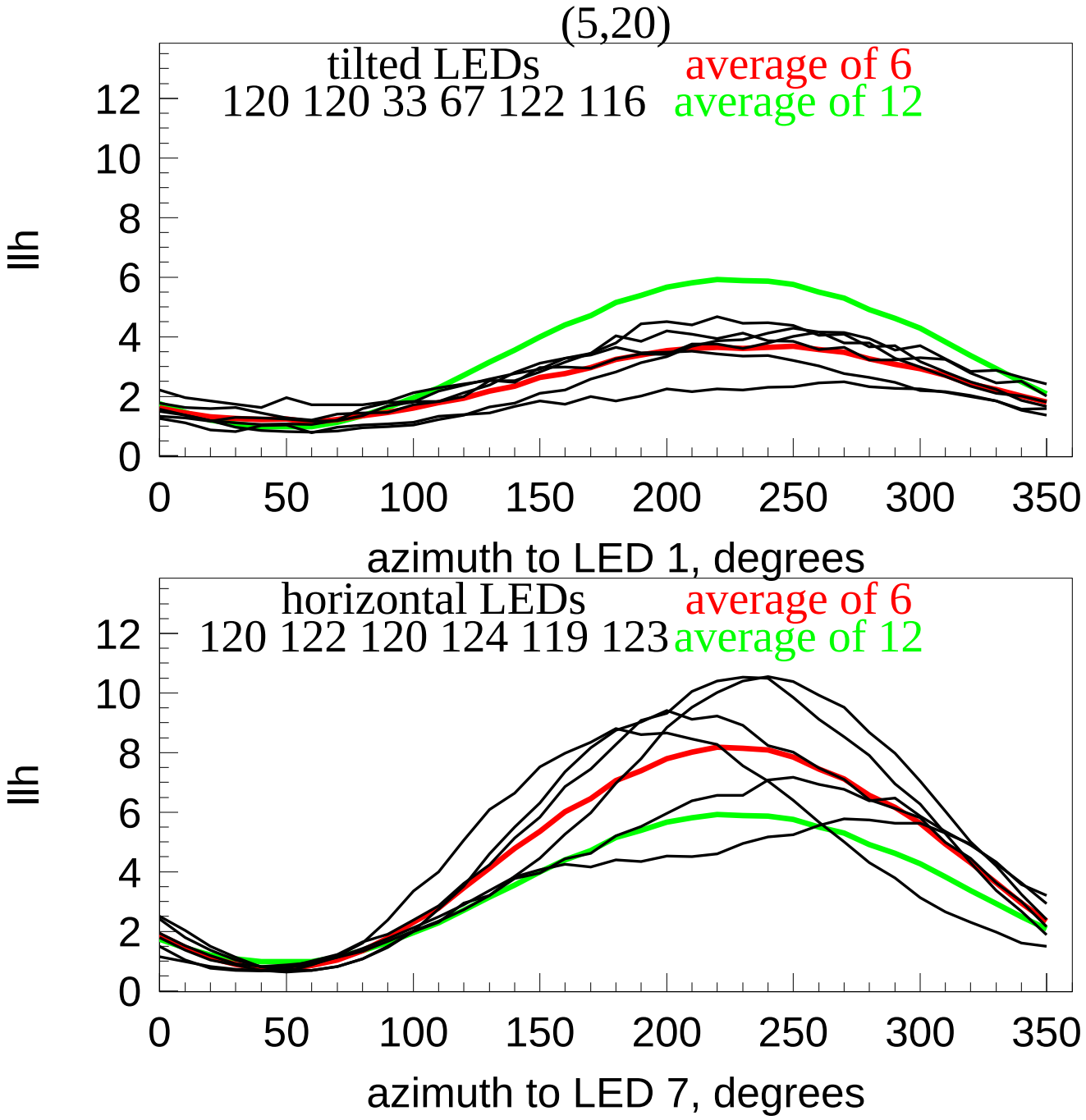

(5,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
174 ± 8.8

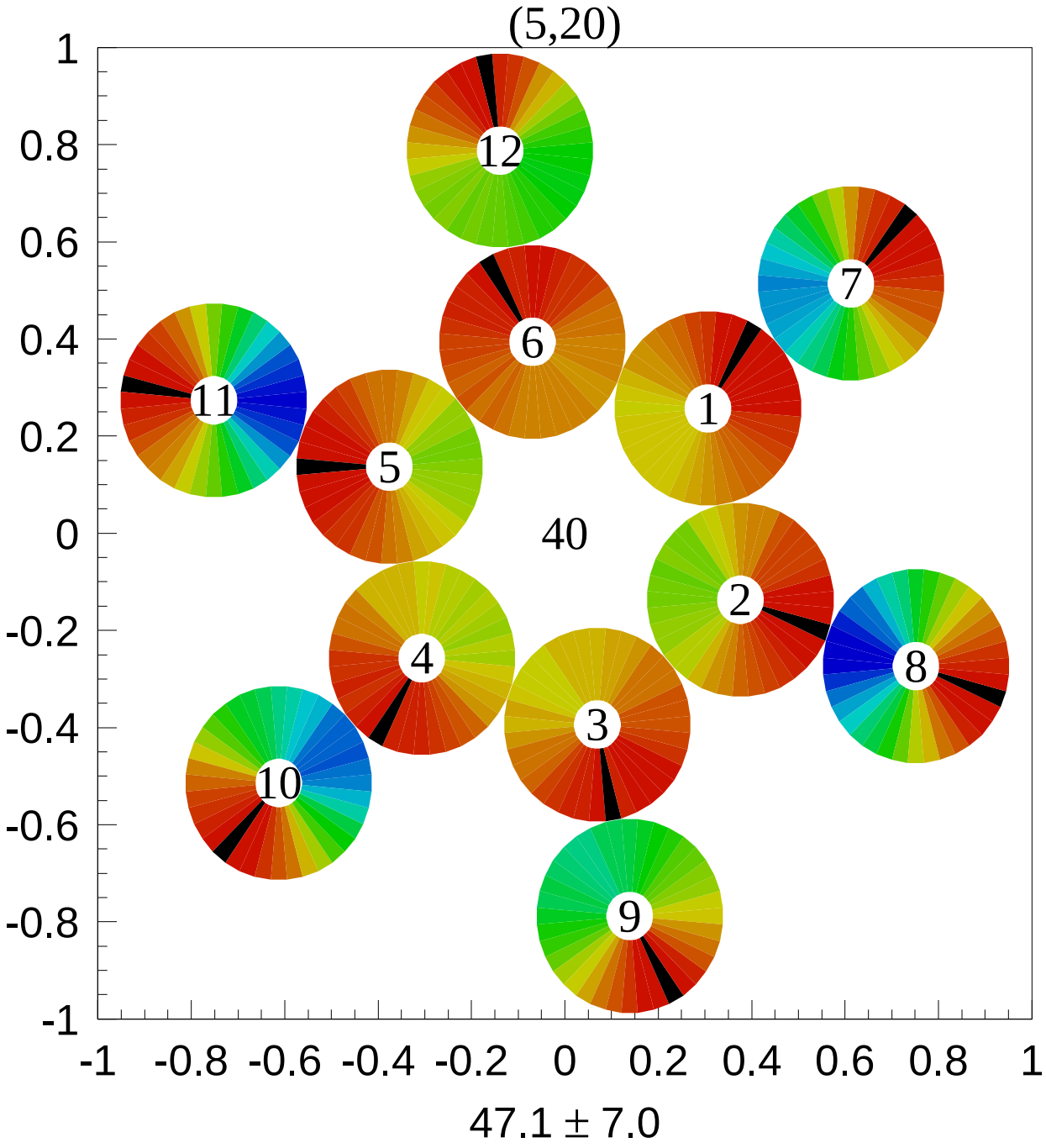

(5,18)
tilted LEDs
122 125 125 124 128 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 113 116 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

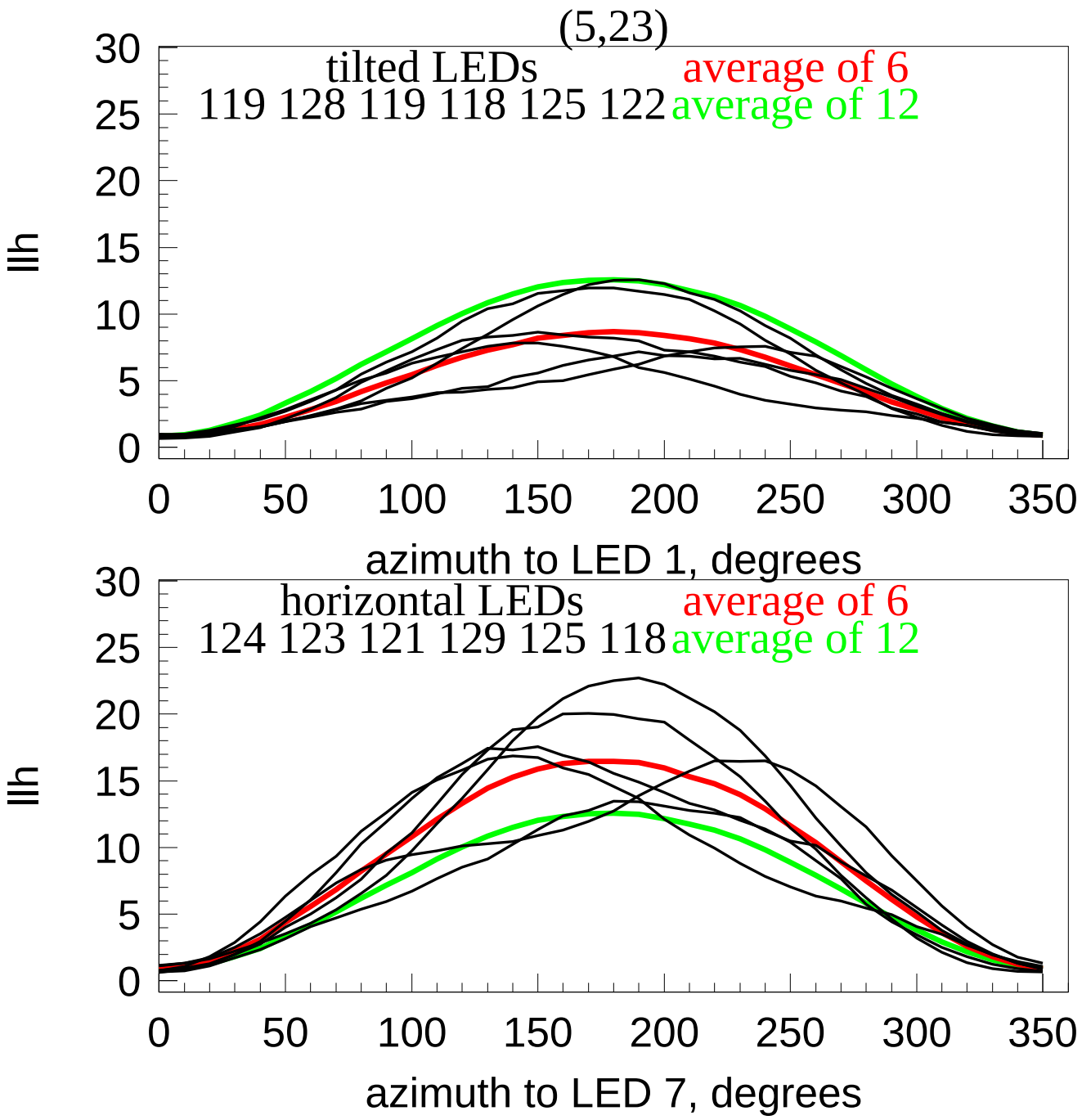

(5,18)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
61.3 ± 12.2

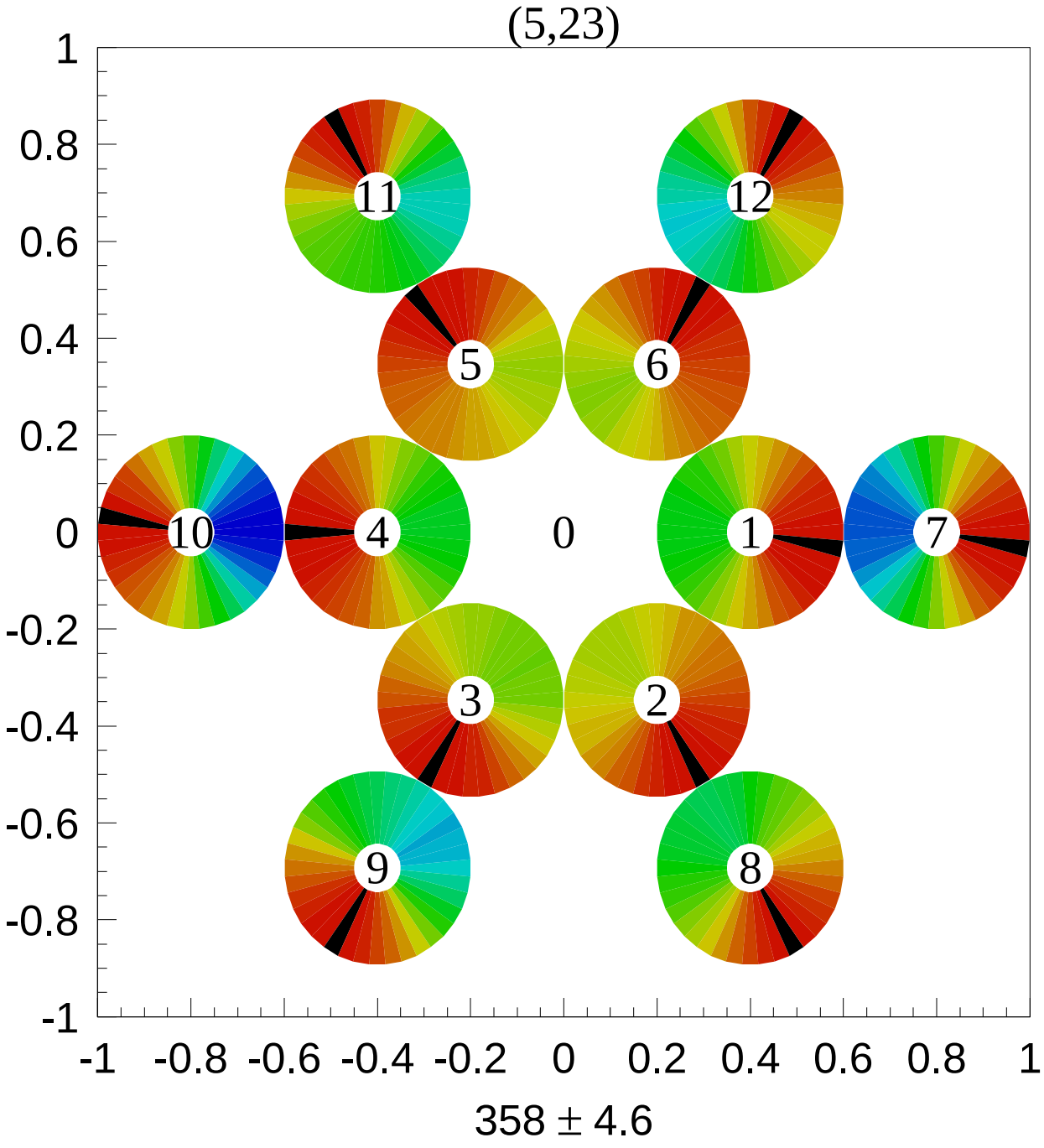

(5,19)
tilted LEDs
116 119 130 119 121 109
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 116 120 117 117 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

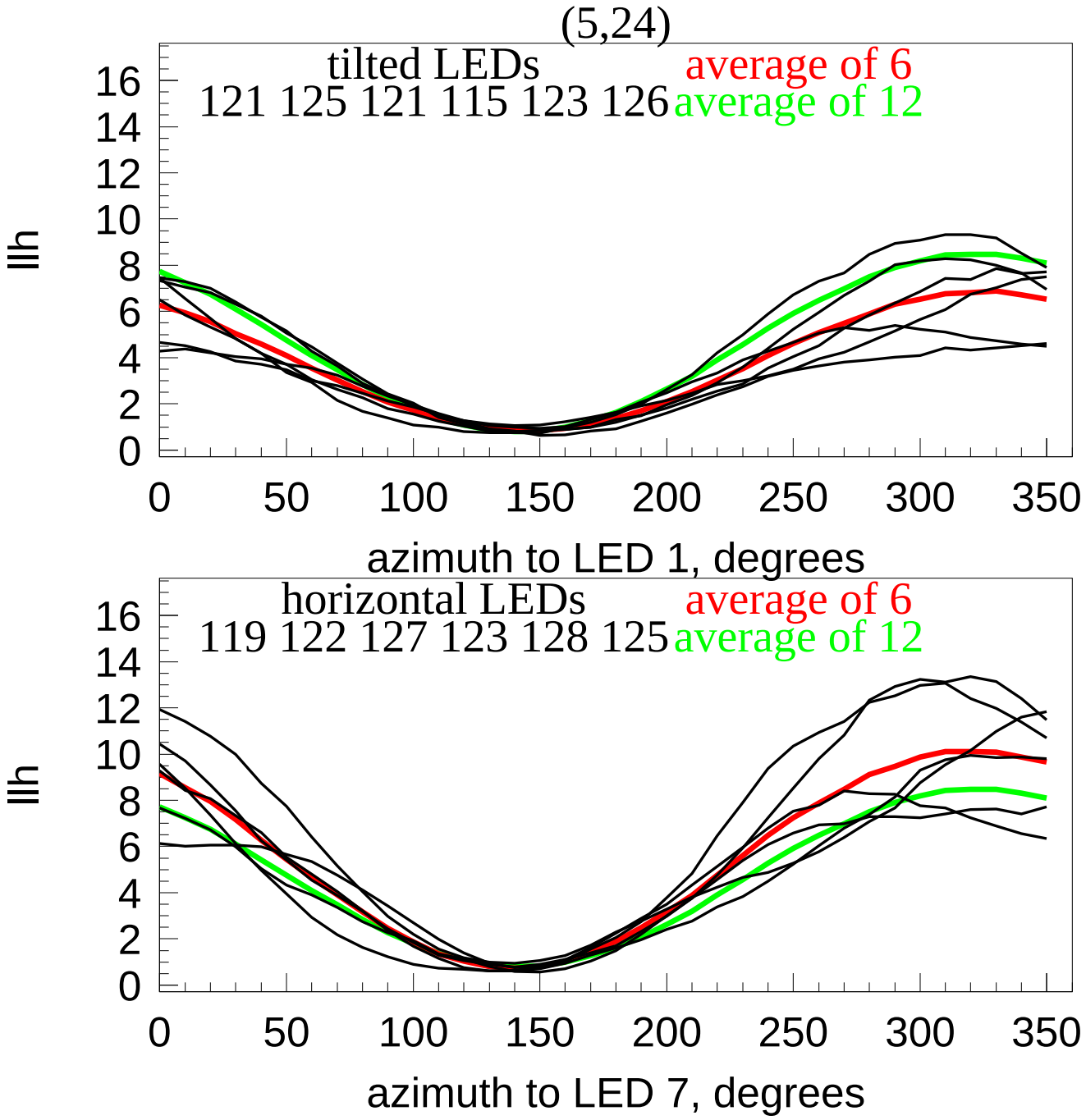

(5,19)
1
2
3
4
5
6
7
8
9
10
11
12
140
136.3 ± 9.6
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1

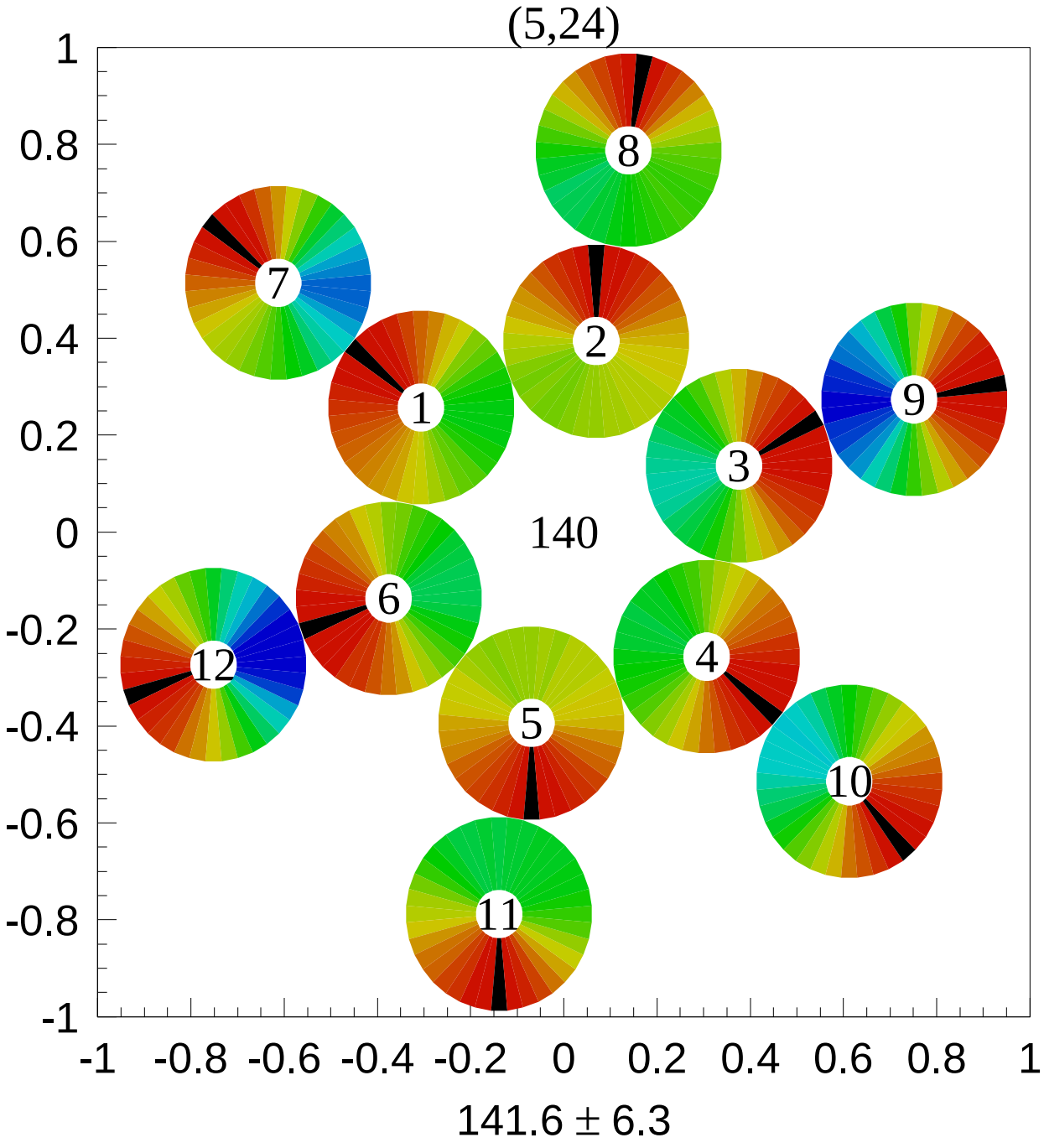

(5,20)
tilted LEDs
120 120 33 67 122 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 120 124 119 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

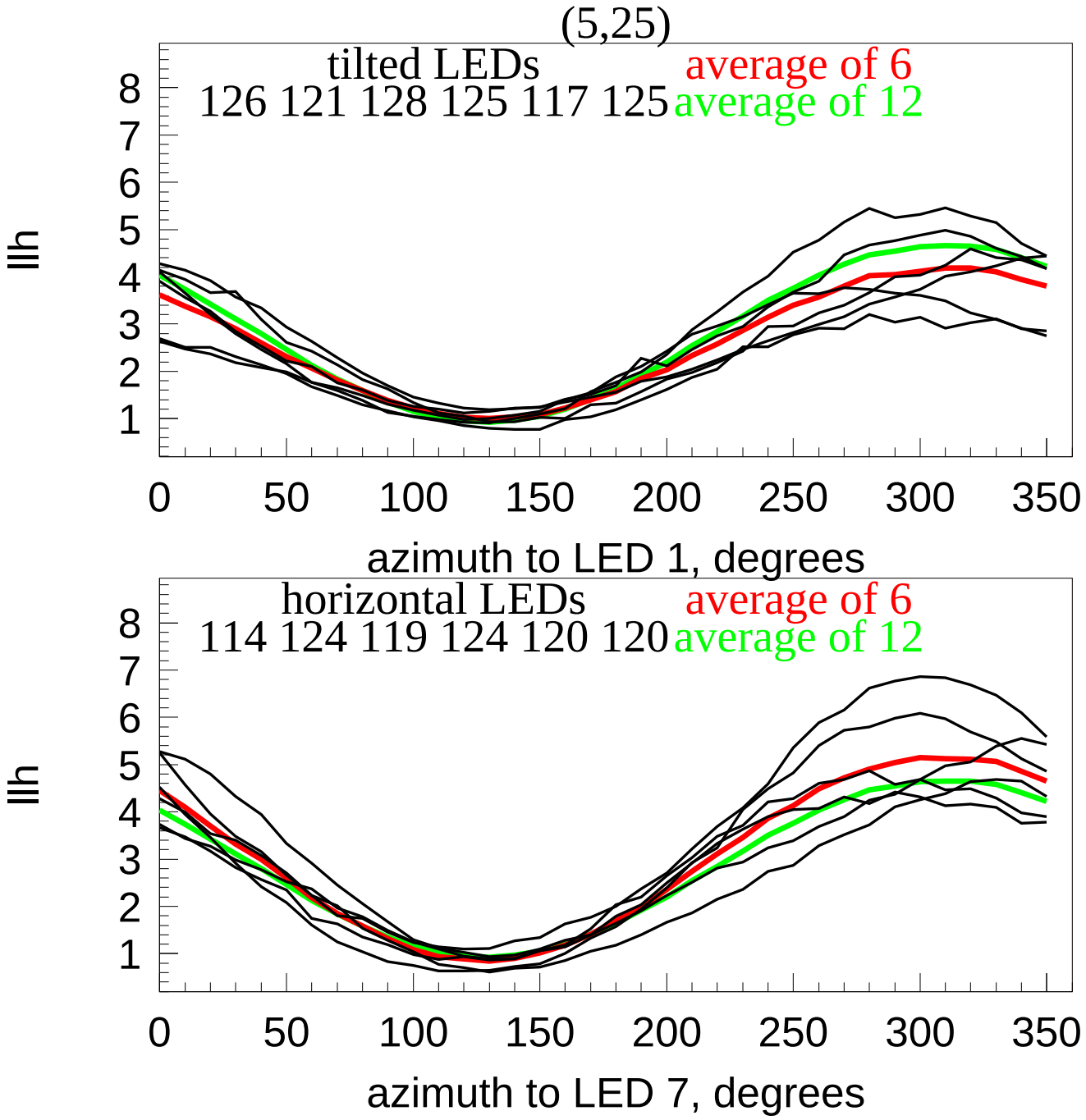

(5,20)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
47.1 ± 7.0

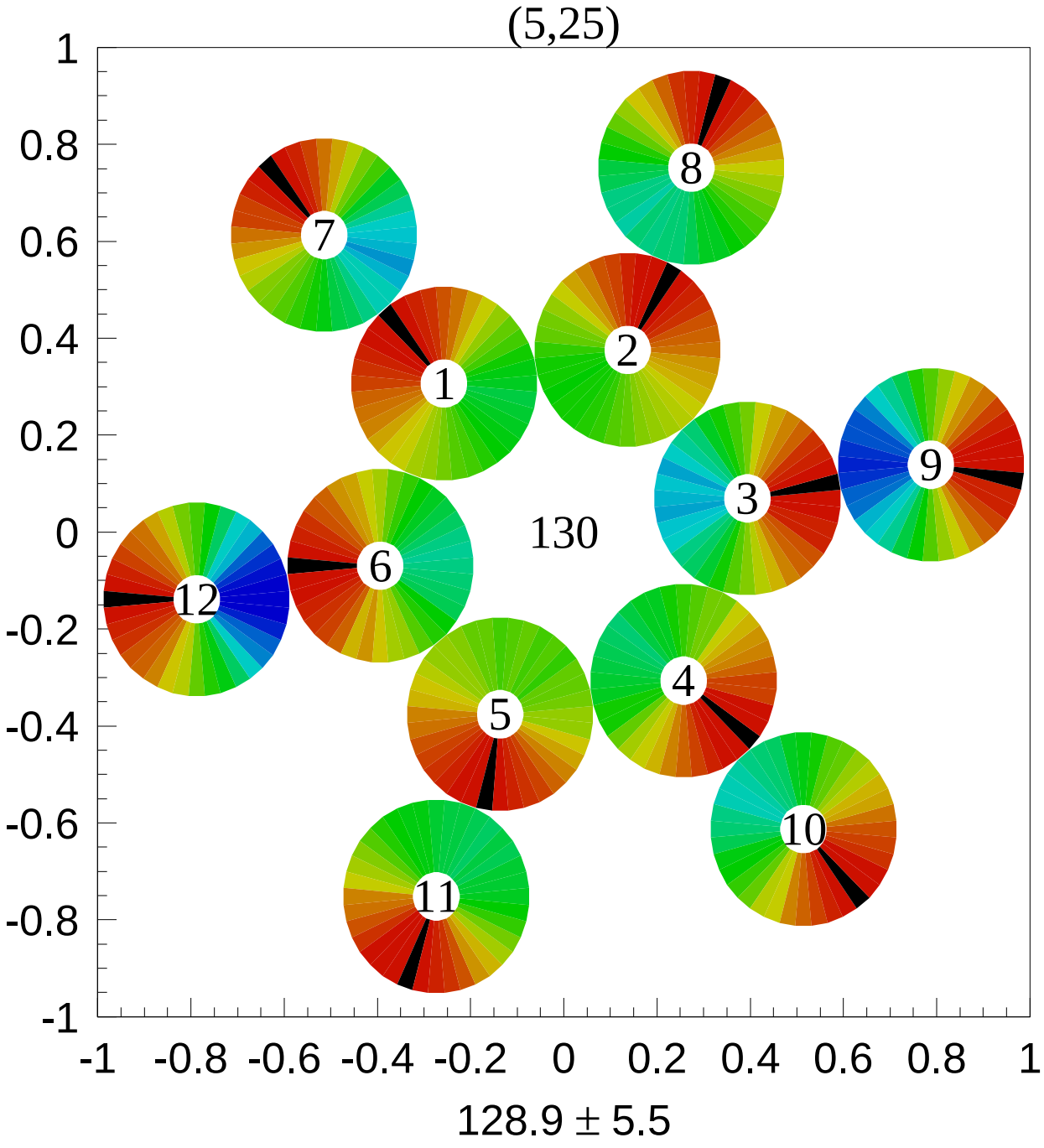

(5,23)
tilted LEDs
119 128 119 118 125 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 121 129 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

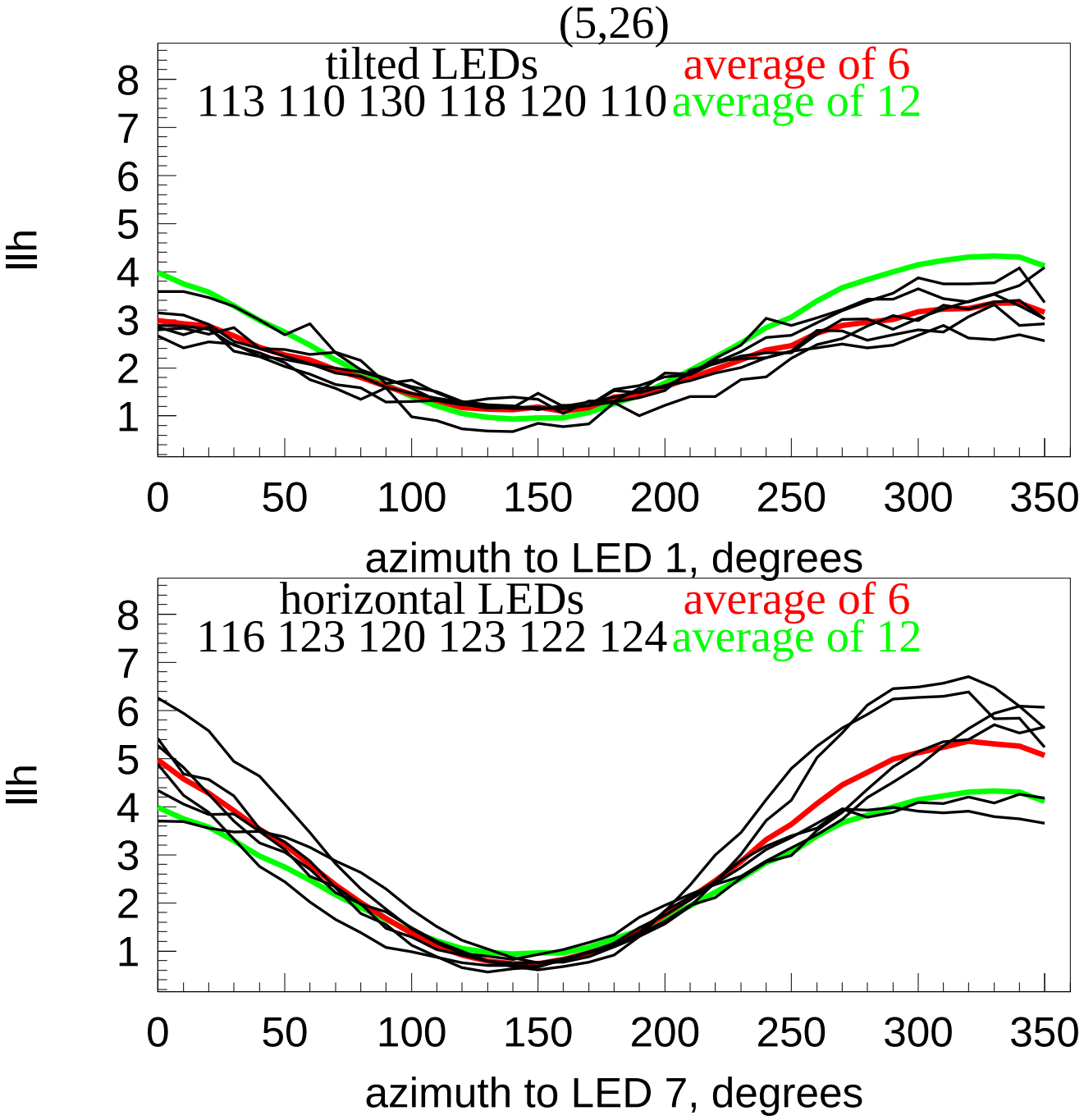

(5,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
358 ± 4.6

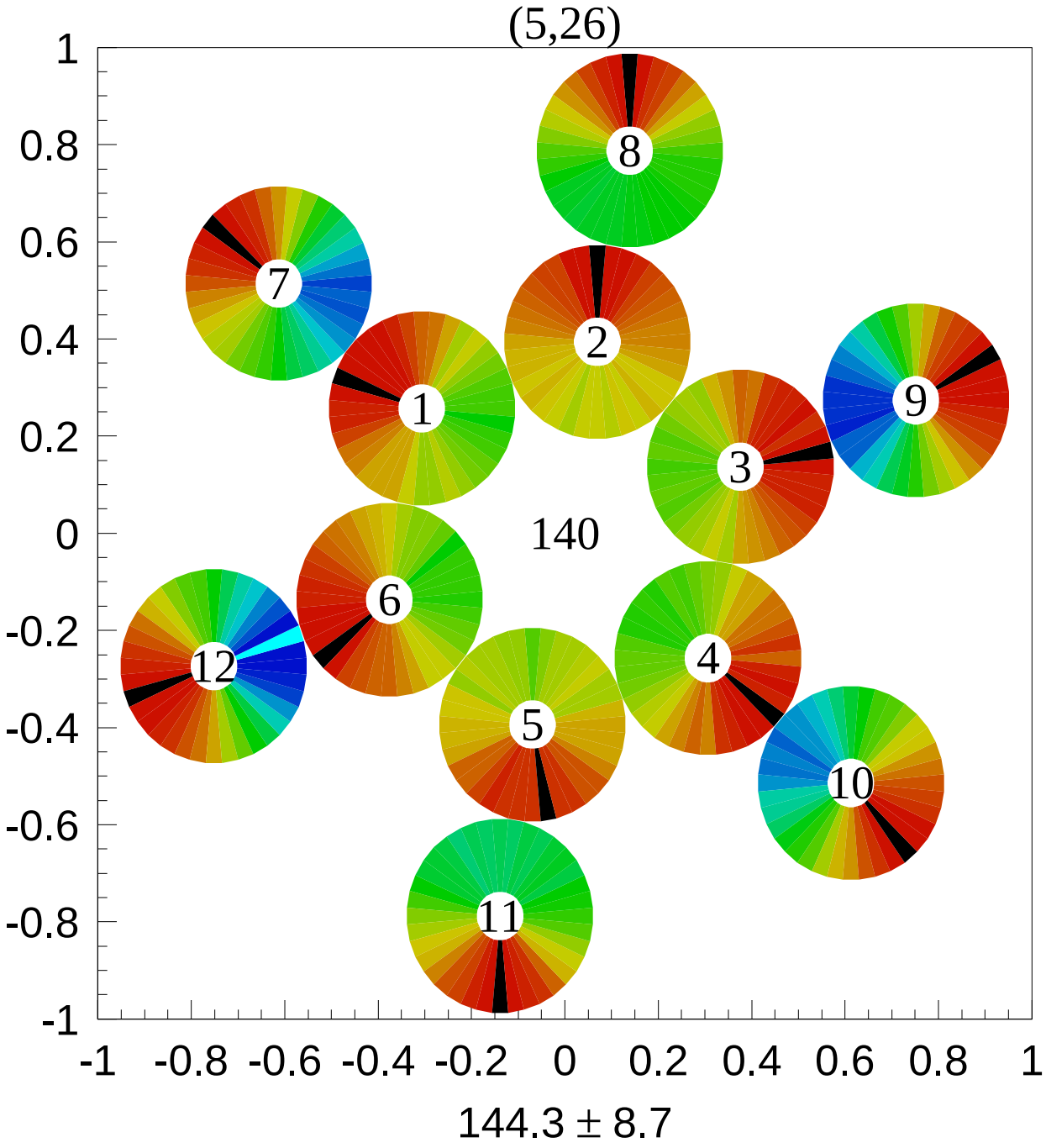

(5,24)
tilted LEDs
121 125 121 115 123 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 127 123 128 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

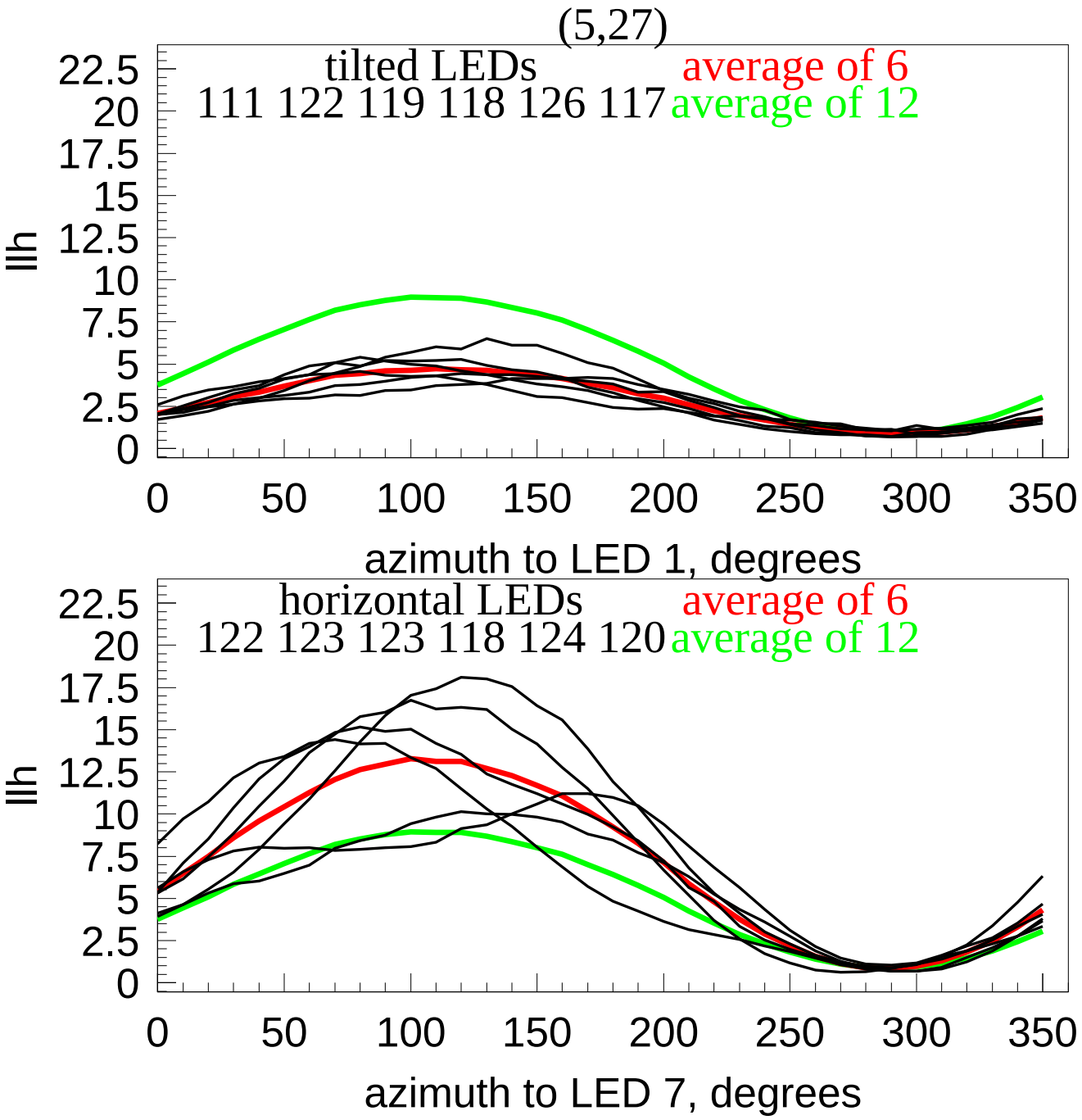

(5,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
141.6 ± 6.3
140
1
2
3
4
5
6
7
8
9
10
11
12

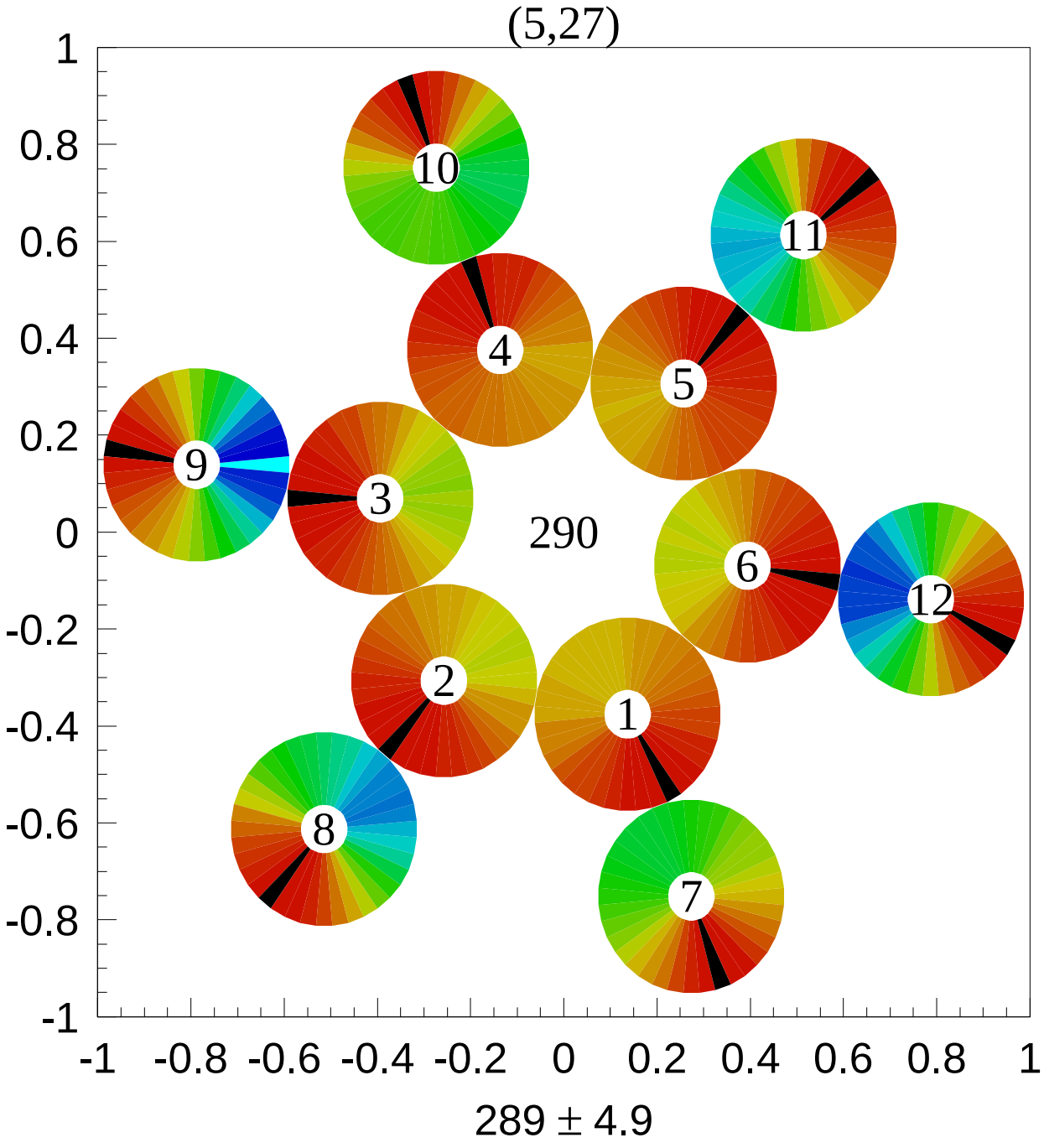

(5,25)
tilted LEDs
126 121 128 125 117 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 124 119 124 120 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

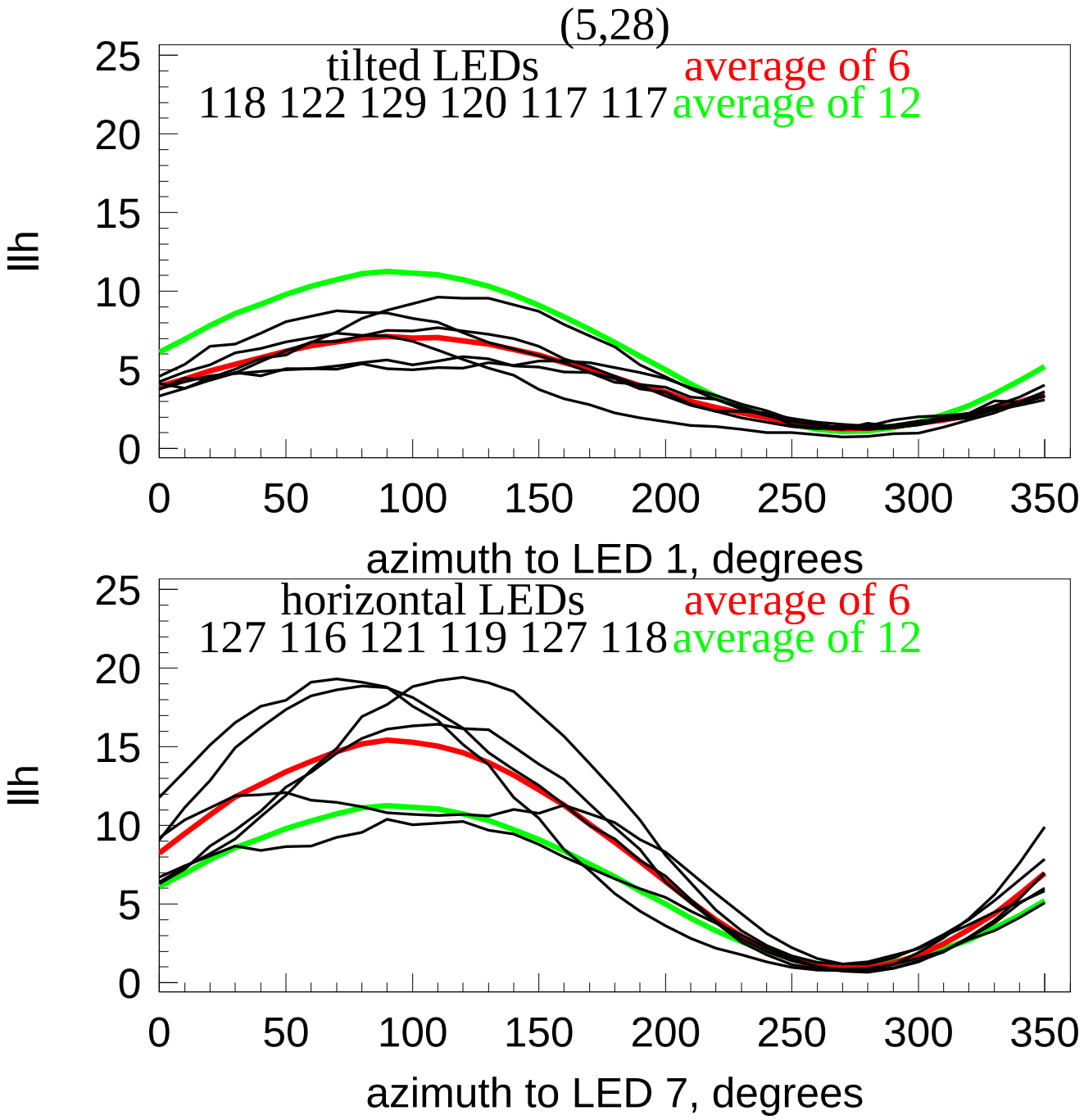

(5,25)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
128.9 ± 5.5

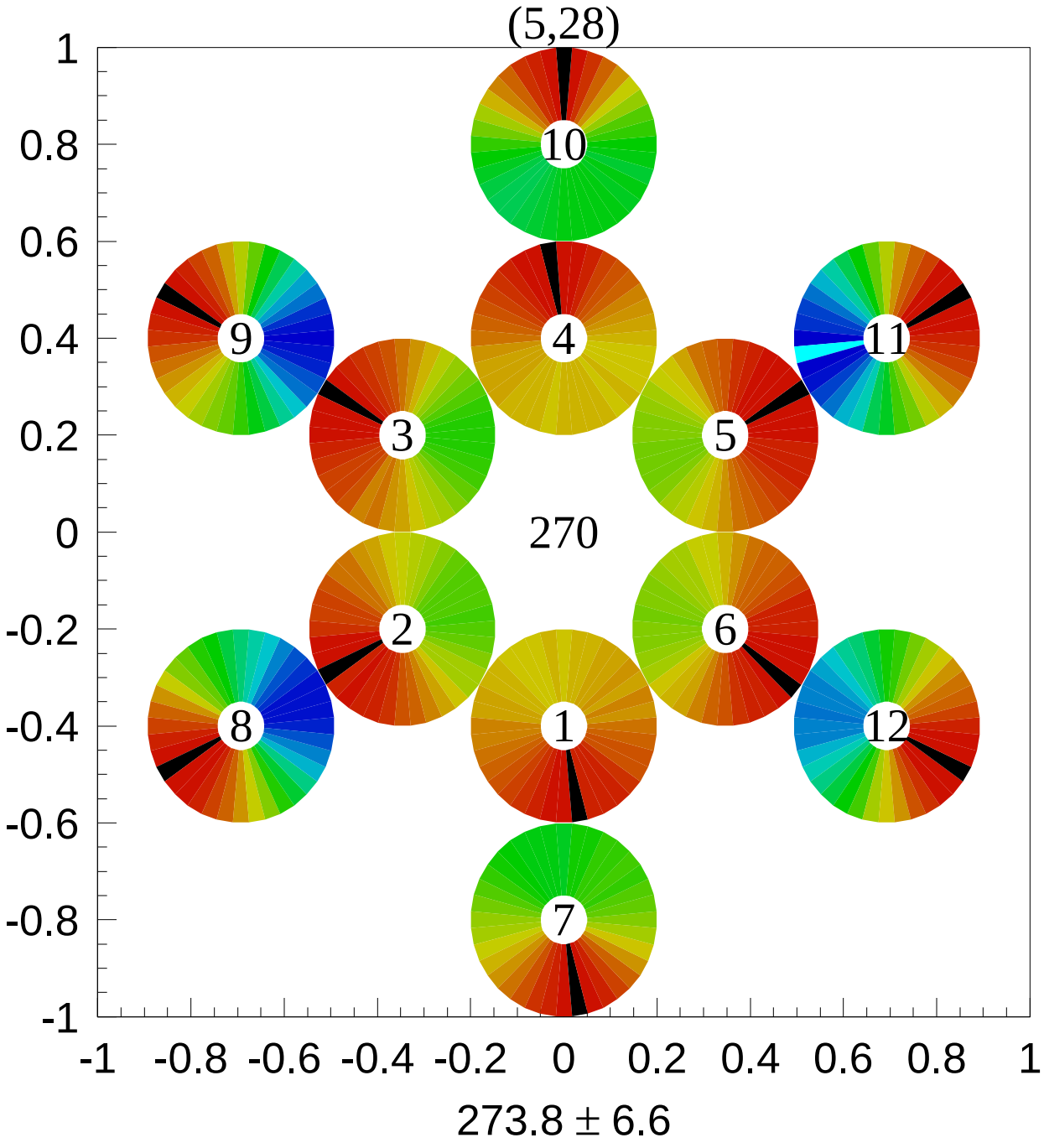

(5,26)
tilted LEDs
113 110 130 118 120 110
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 123 120 123 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

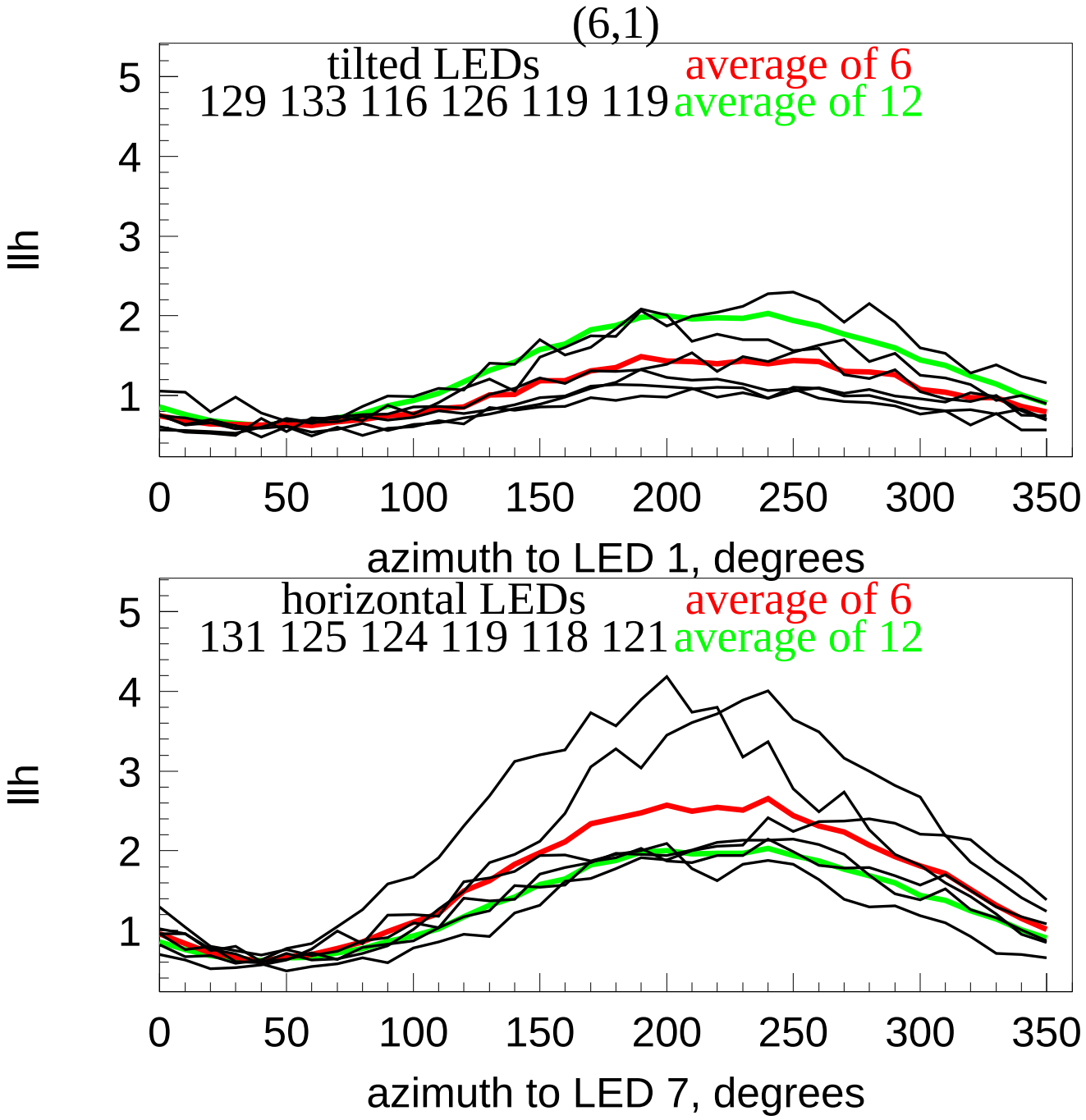

(5,26)
1
2
3
4
5
6
7
8
9
10
11
12
140
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
144.3 ± 8.7

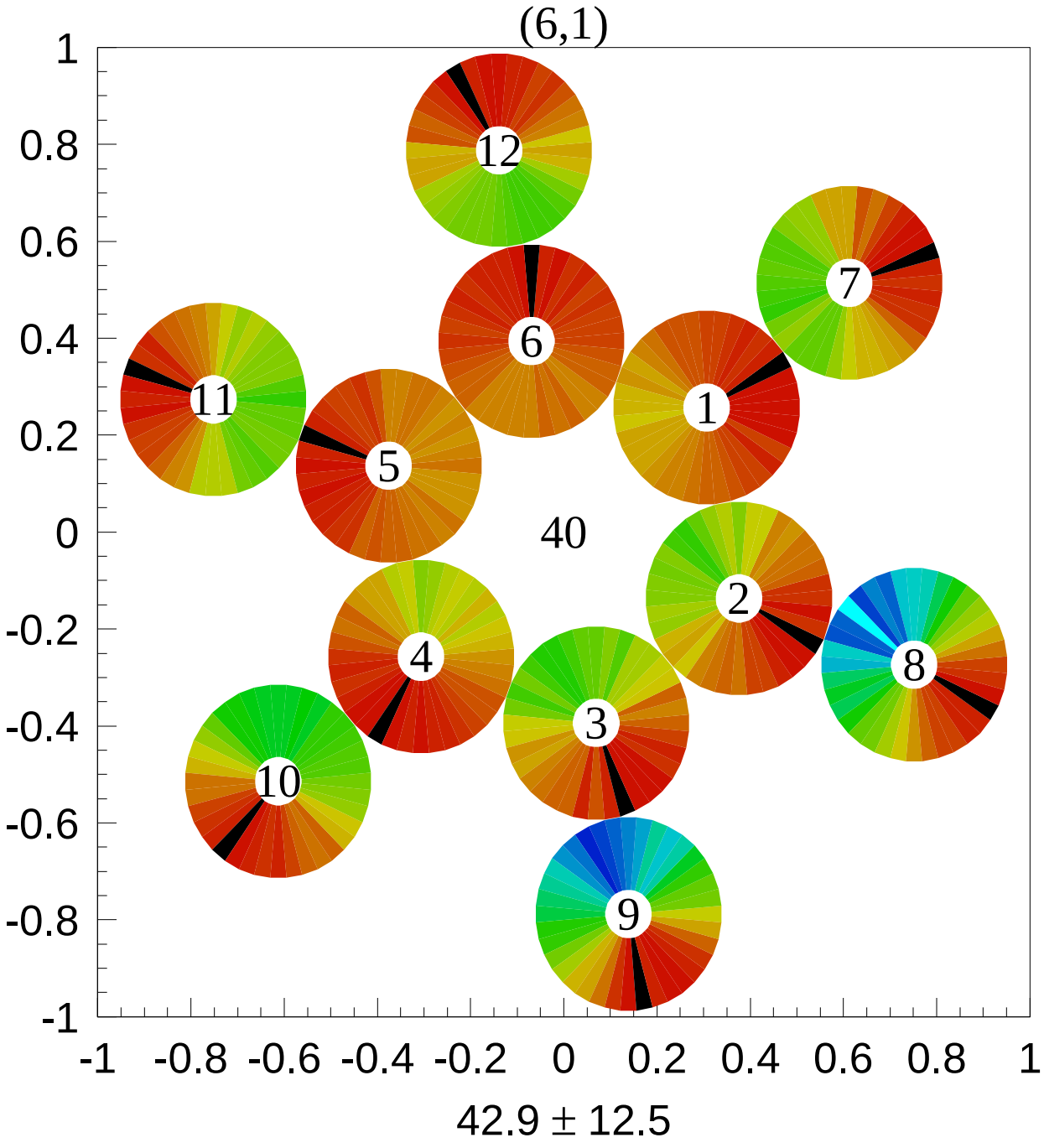

(5,27)
tilted LEDs
111 122 119 118 126 117
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 123 123 118 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

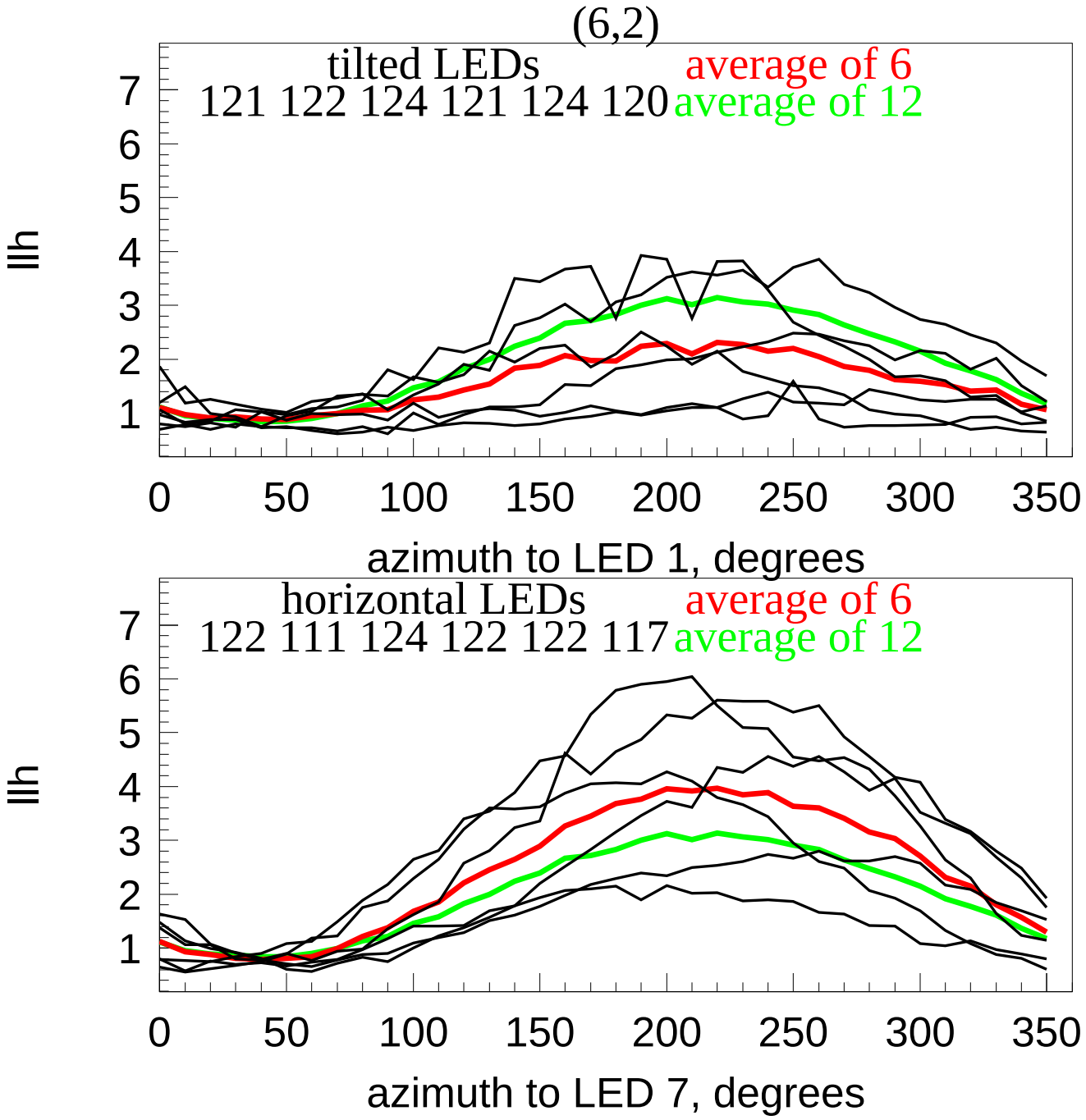

(5,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
289 ± 4.9

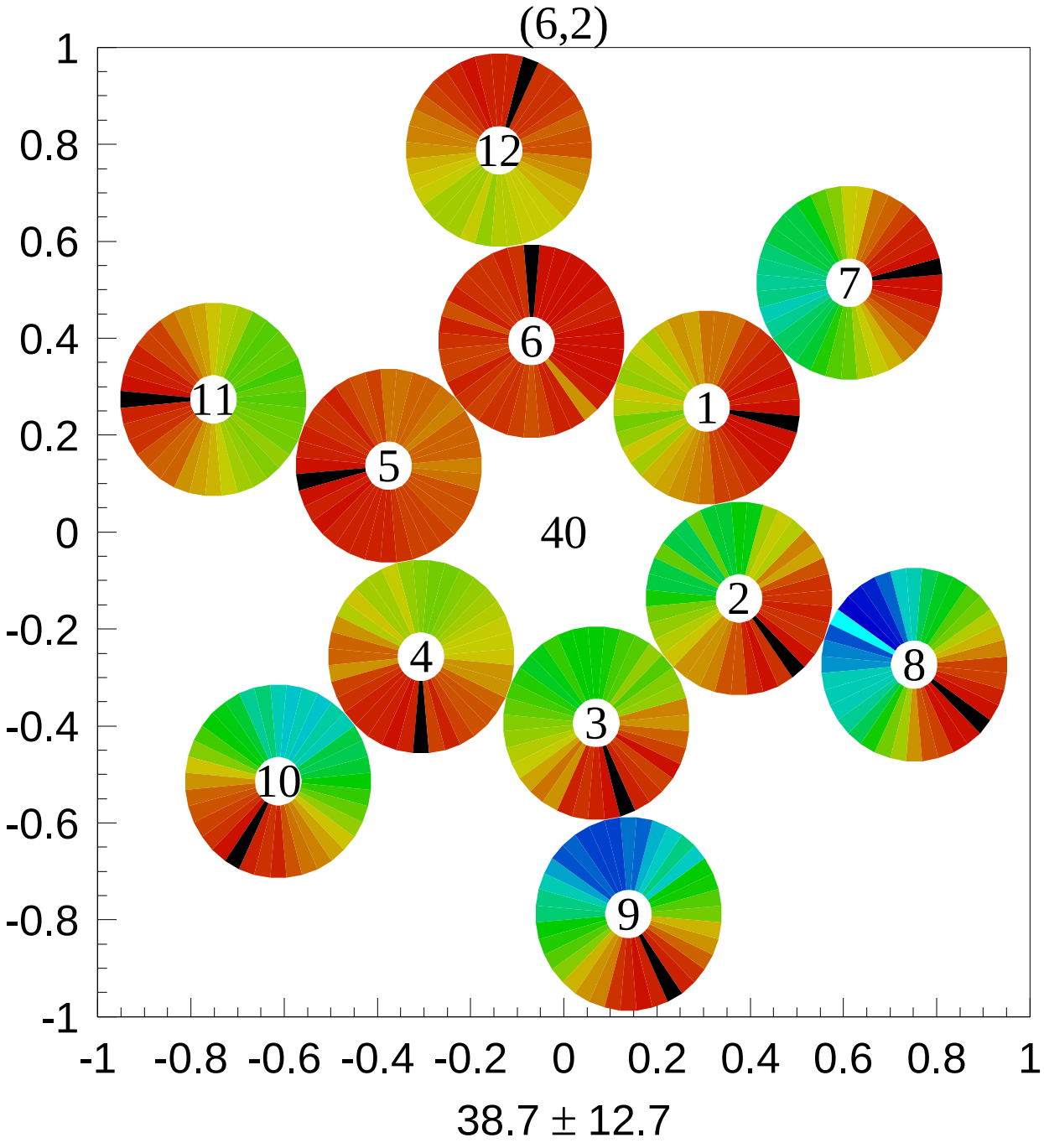

(5,28)
tilted LEDs
118 122 129 120 117 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 116 121 119 127 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

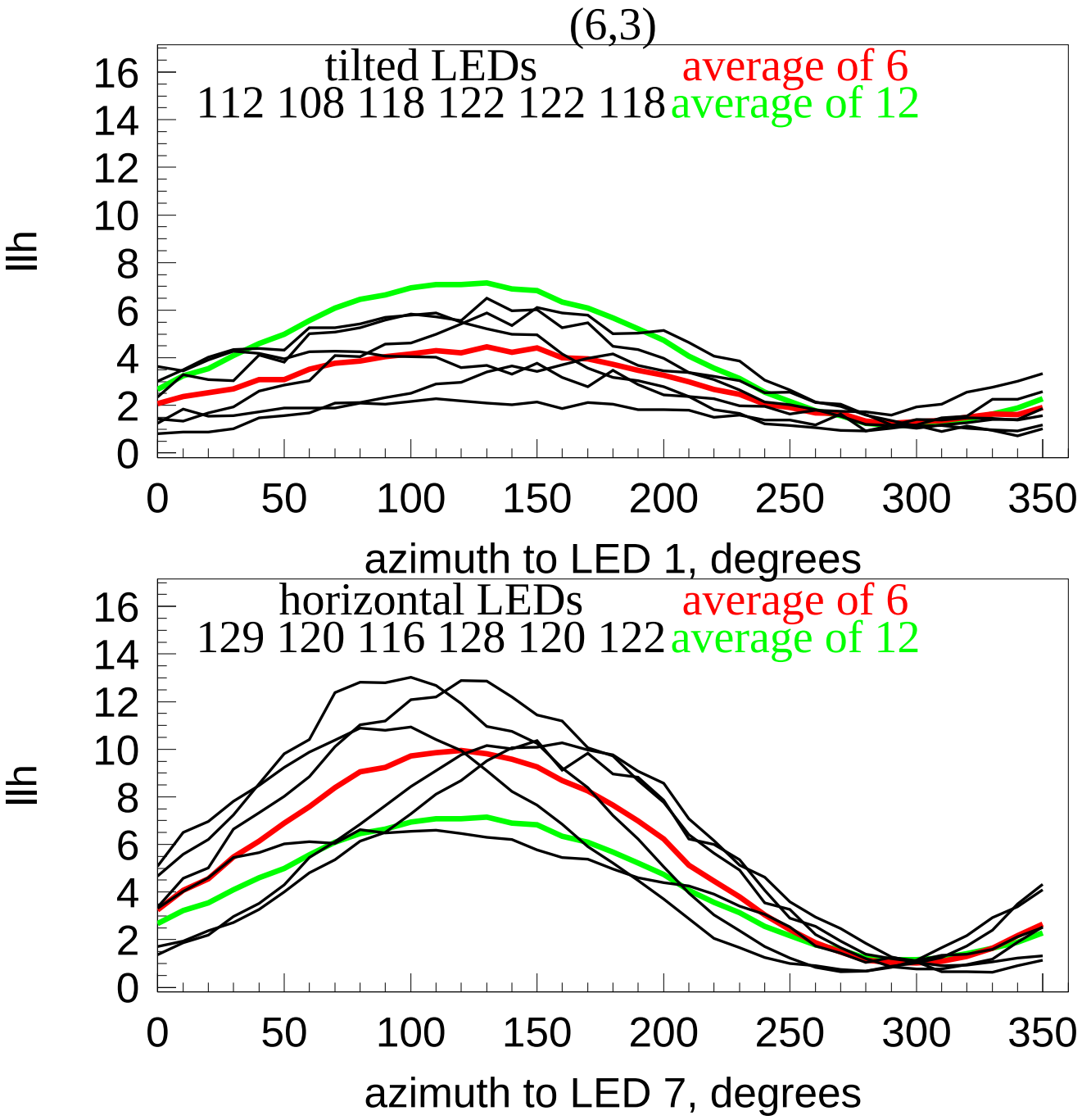

(5,28)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
273.8 ± 6.6

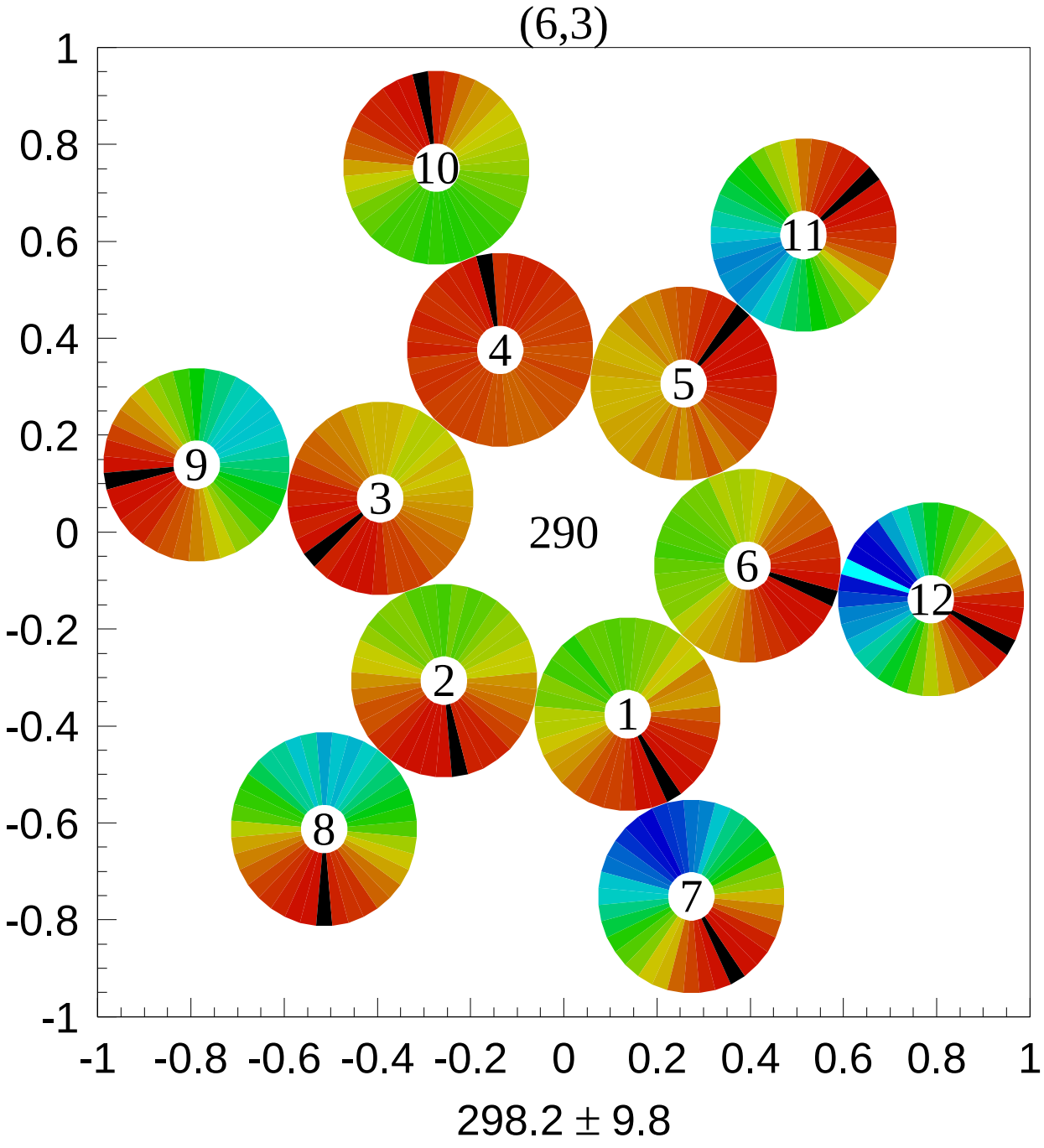

(6,1)
tilted LEDs
129 133 116 126 119 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
131 125 124 119 118 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

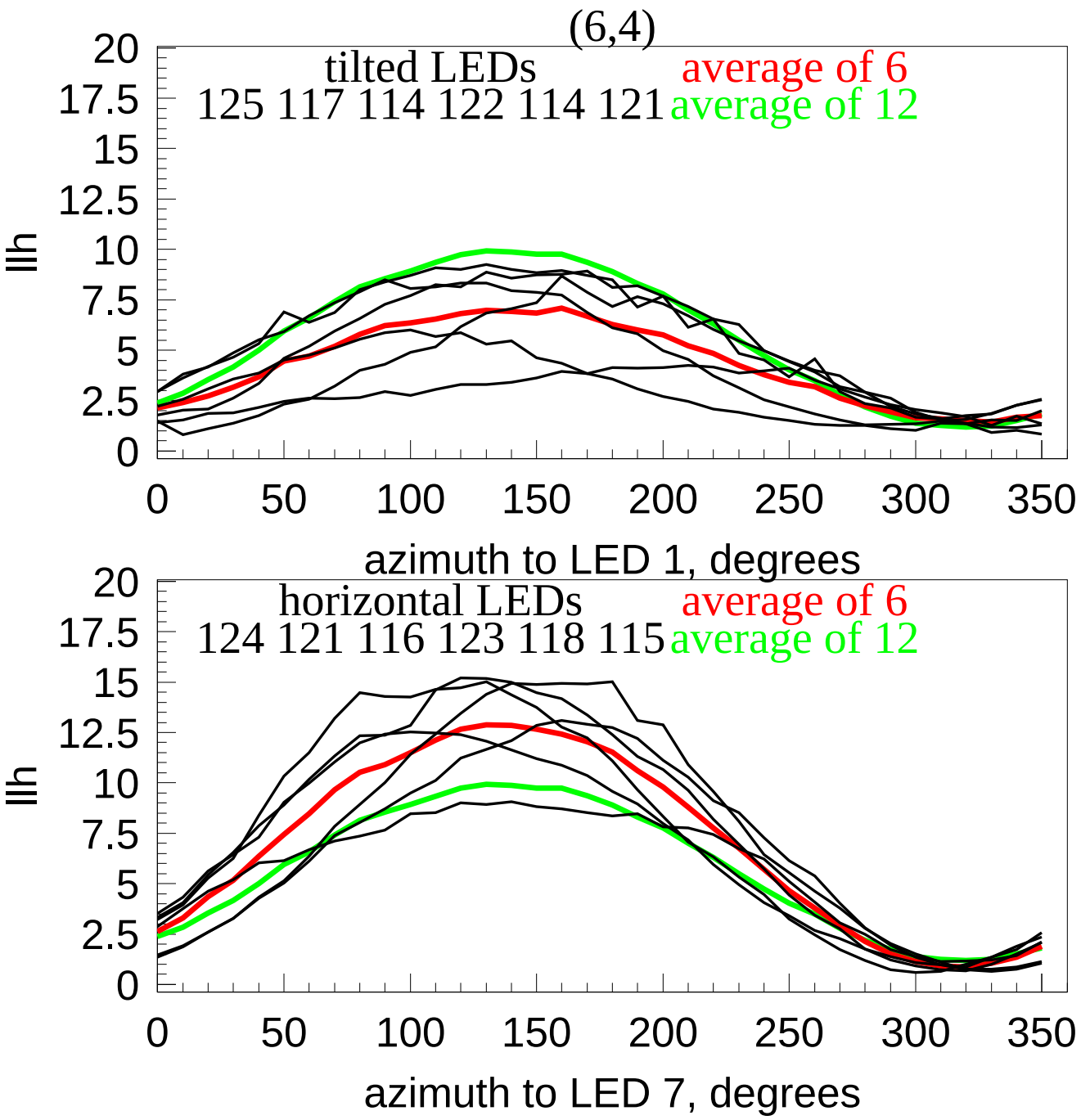

(6,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
42.9 ± 12.5

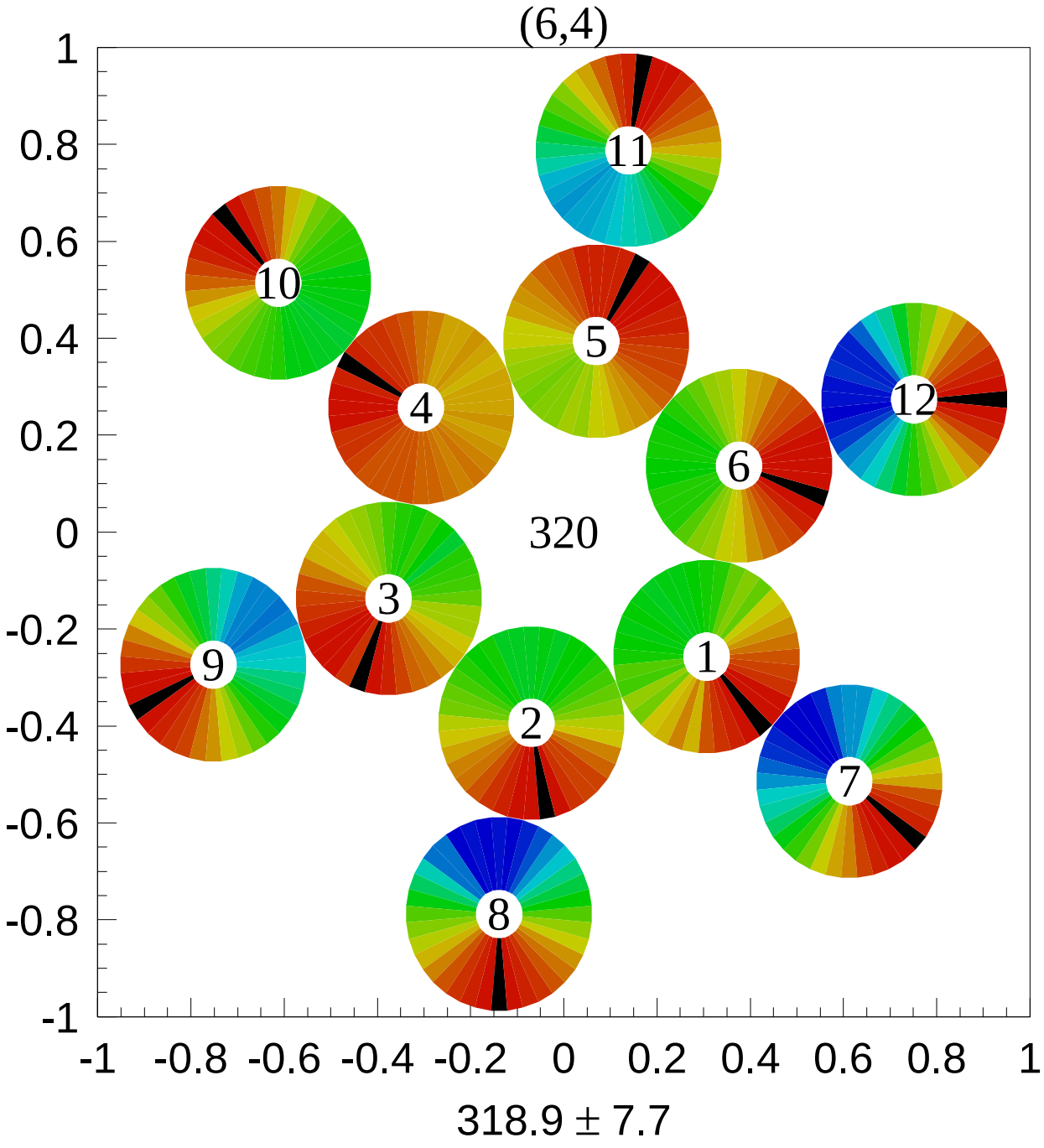

(6,2)
tilted LEDs
121 122 124 121 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 111 124 122 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

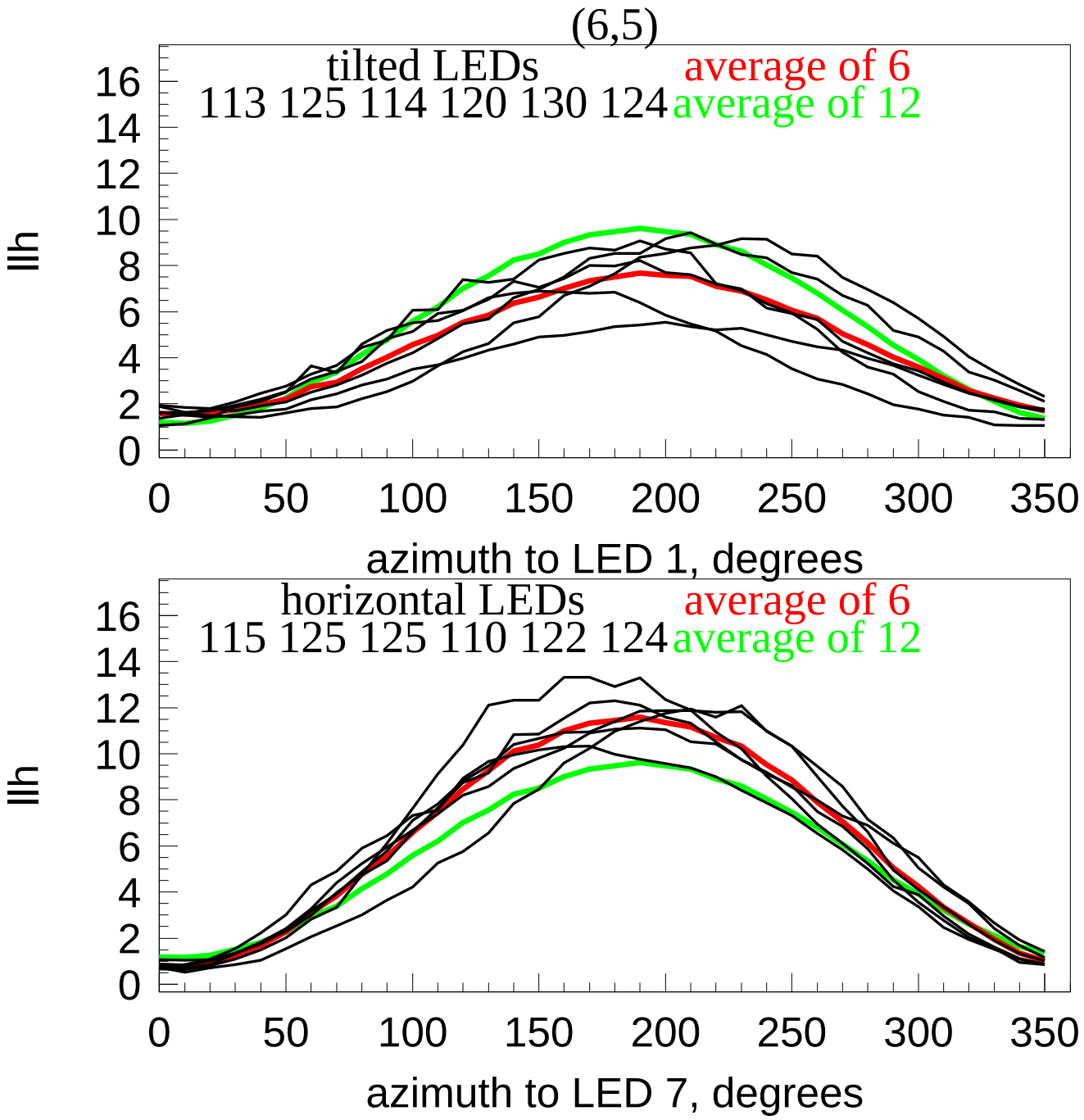

(6,2)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
38.7 ± 12.7

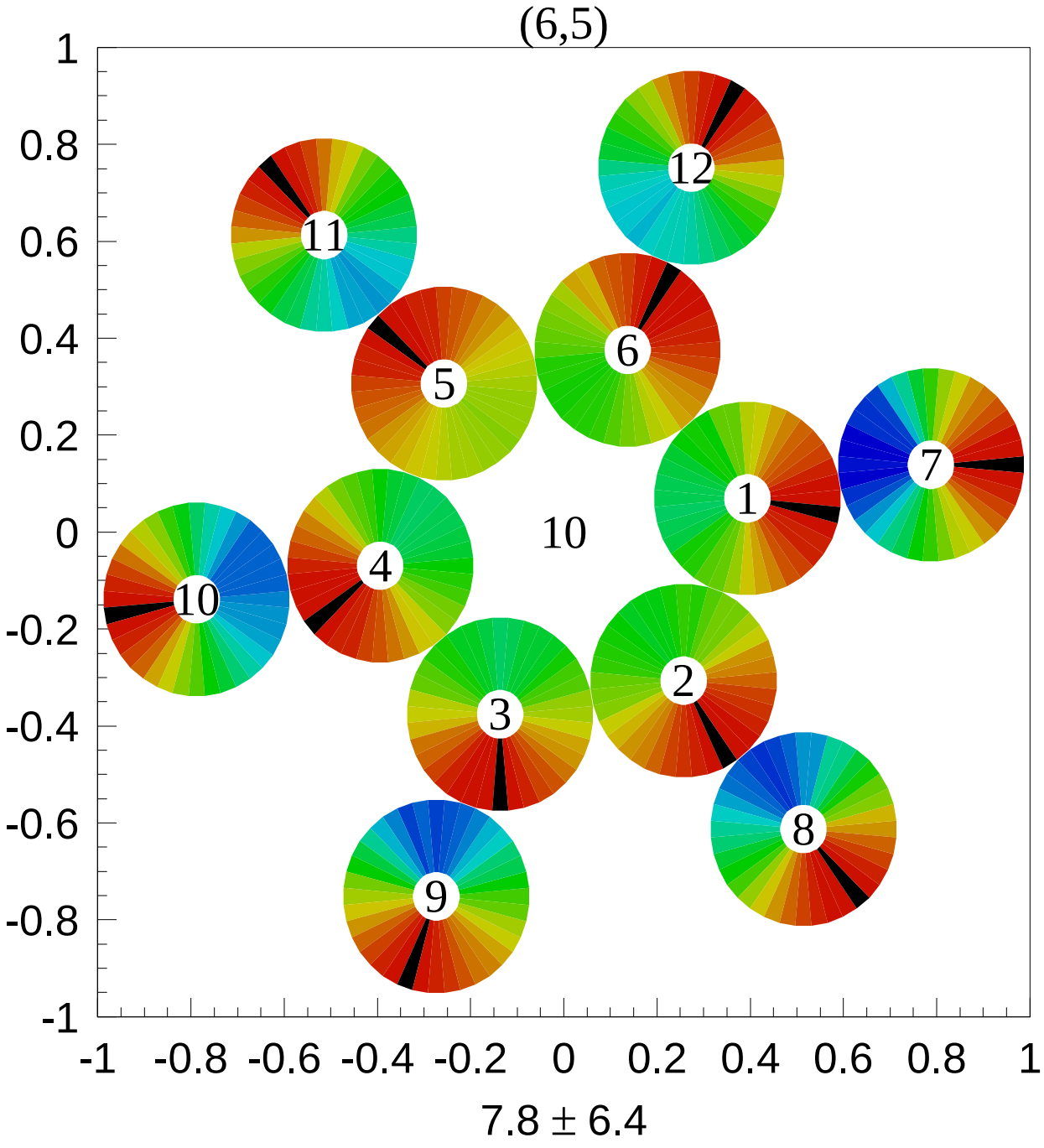

(6,3)
tilted LEDs
112 108 118 122 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 120 116 128 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

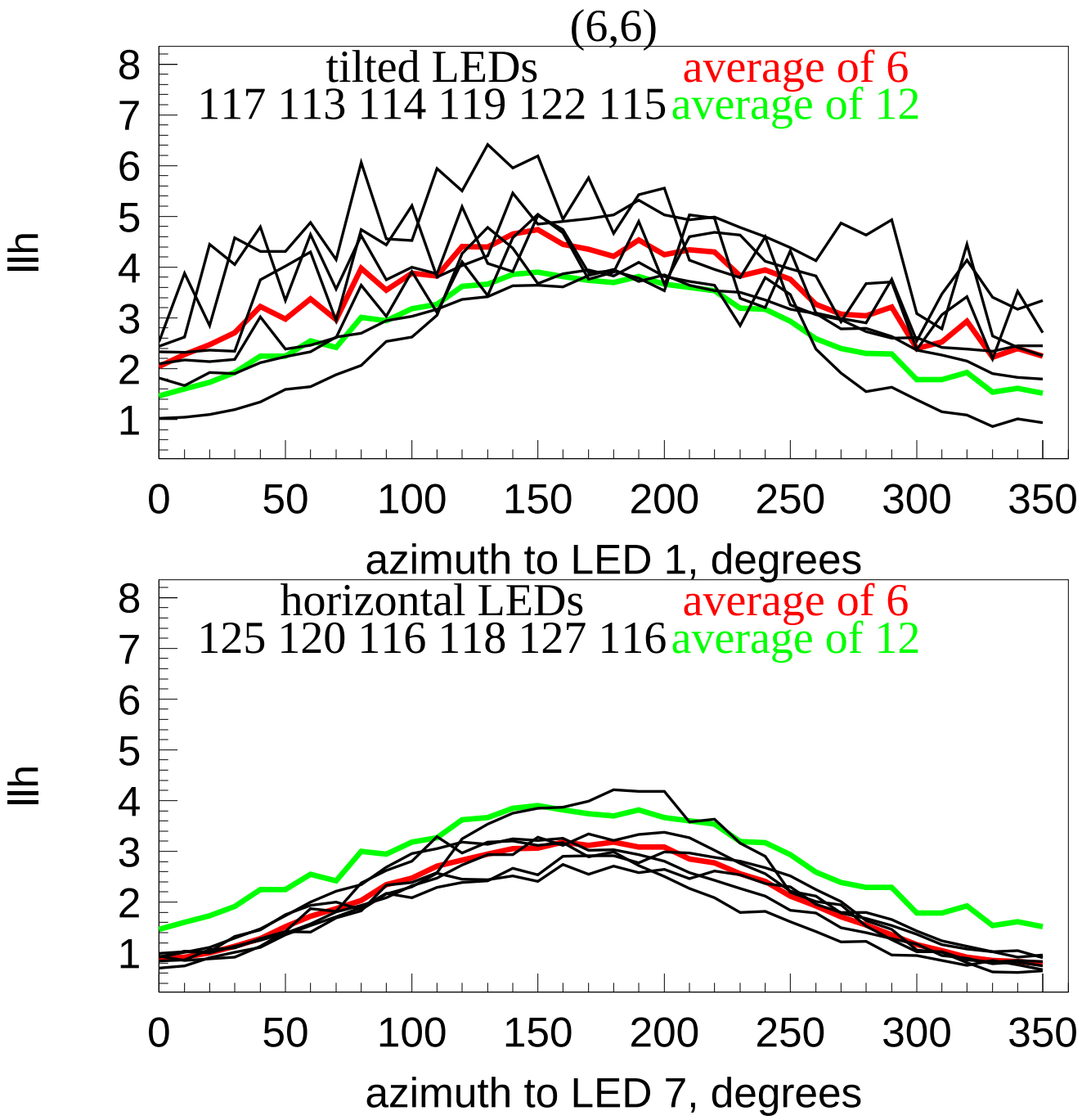

(6,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
298.2 ± 9.8

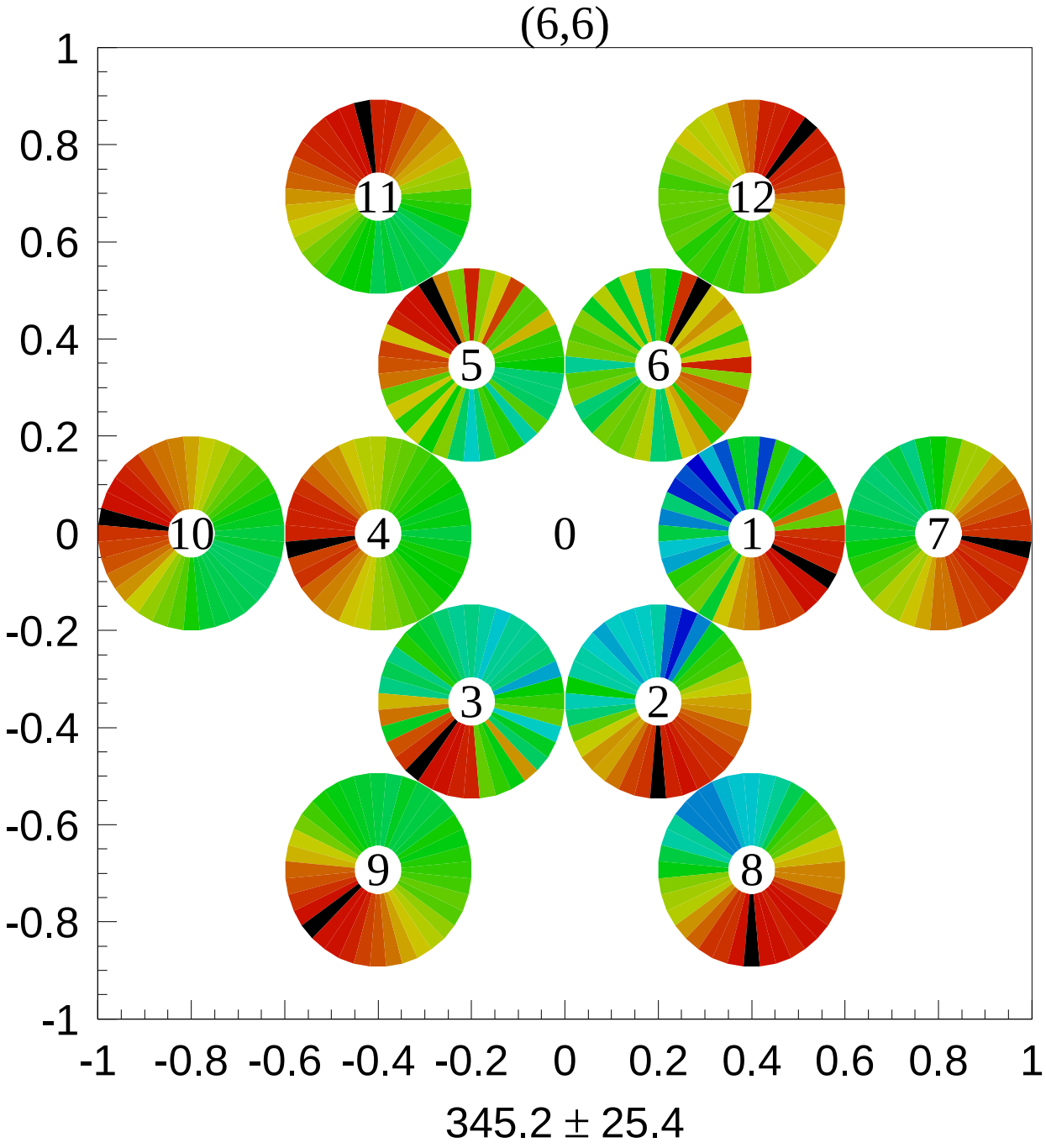

(6,4)
tilted LEDs
125 117 114 122 114 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 121 116 123 118 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

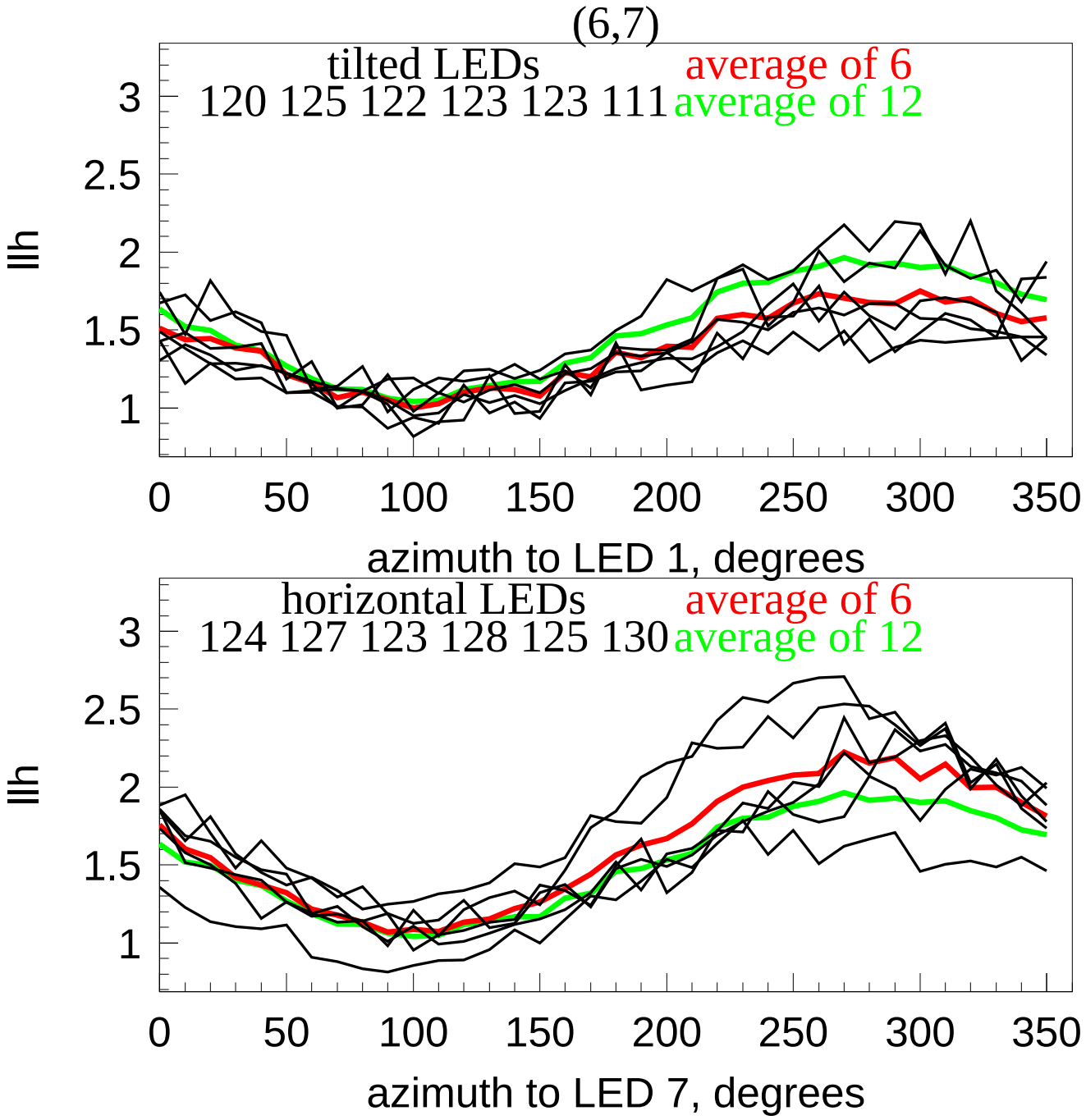

(6,4)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
318.9 ± 7.7

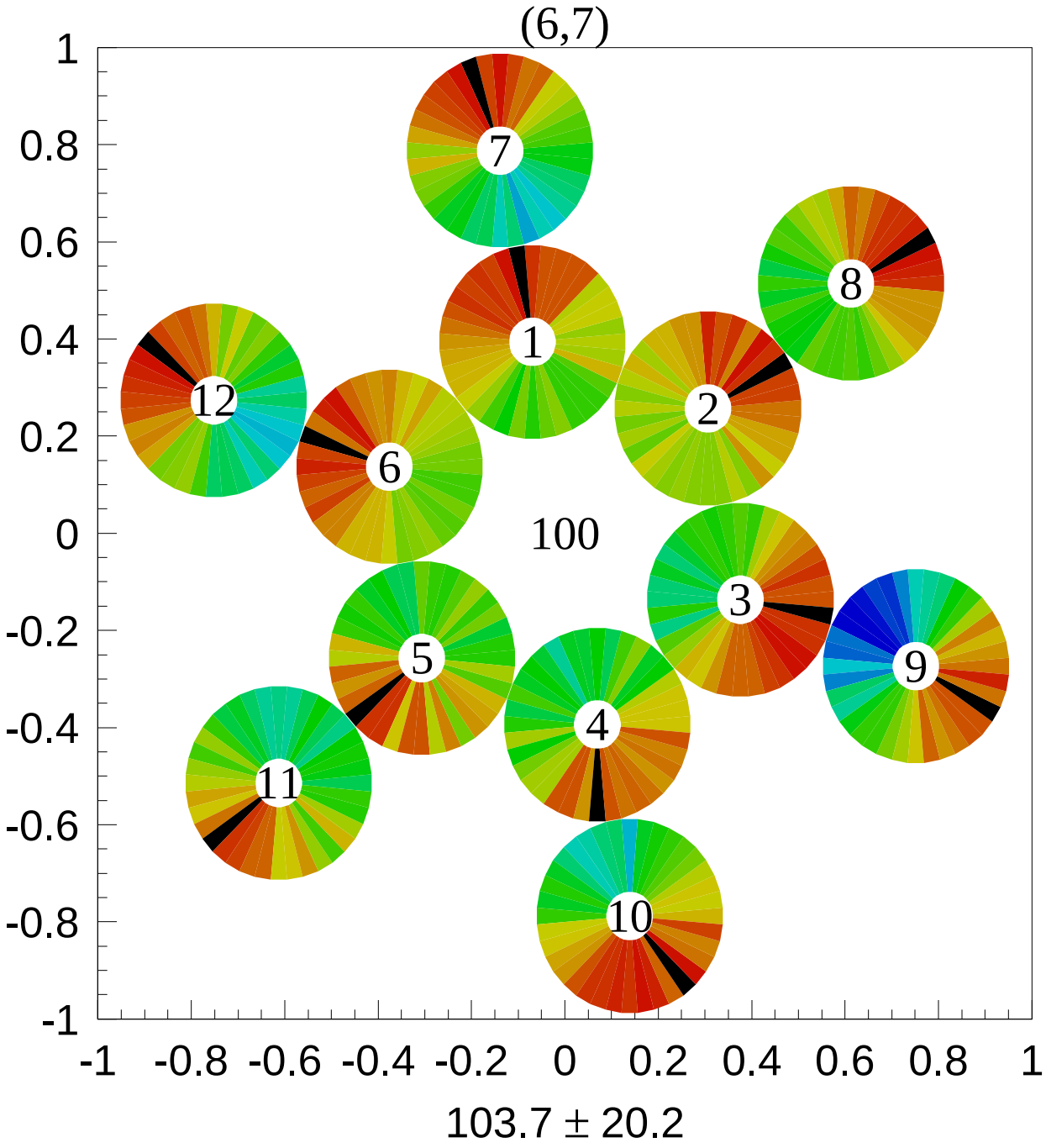

(6,5)
tilted LEDs
113 125 114 120 130 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 125 125 110 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

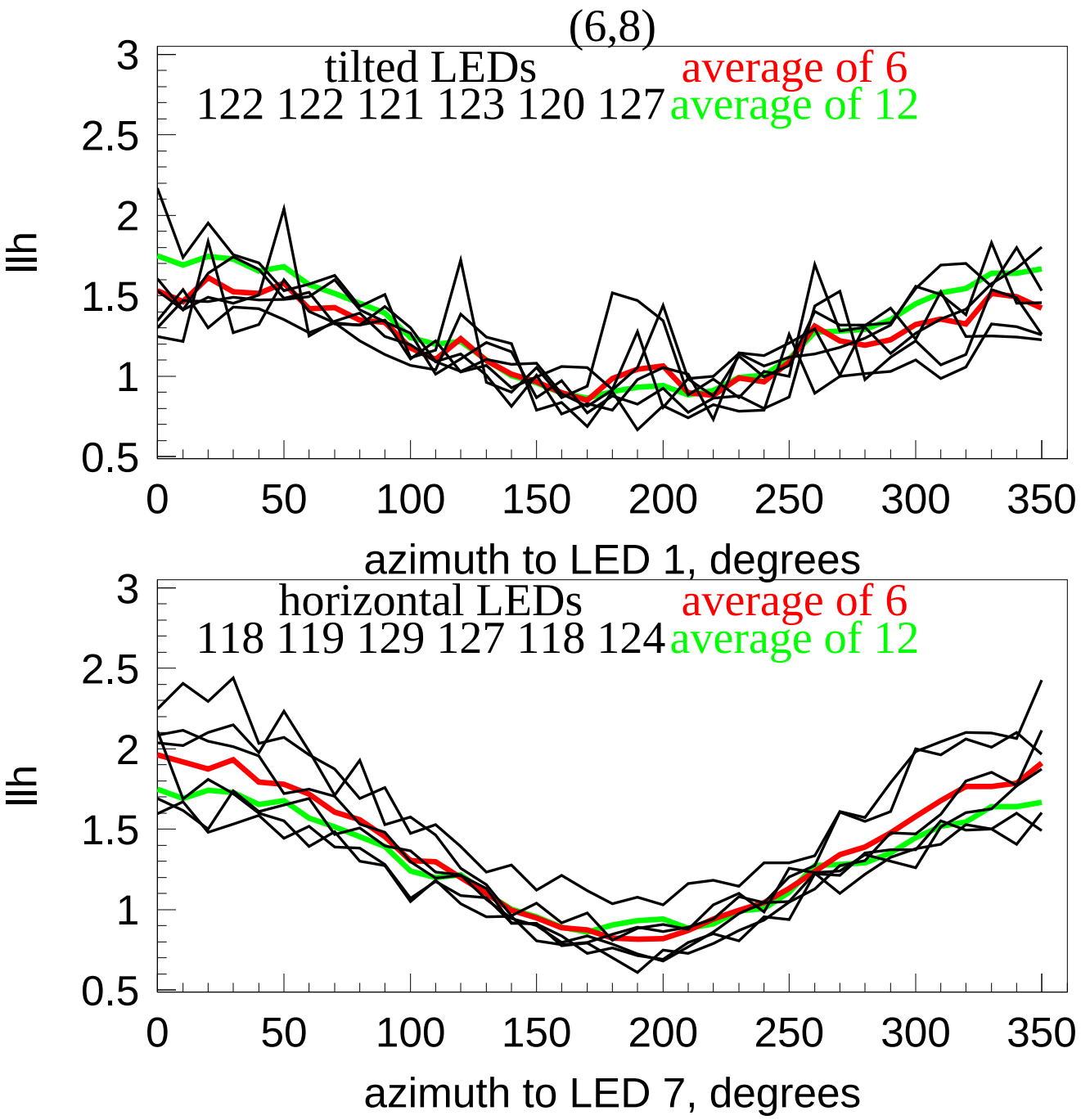

(6,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
7.8 ± 6.4

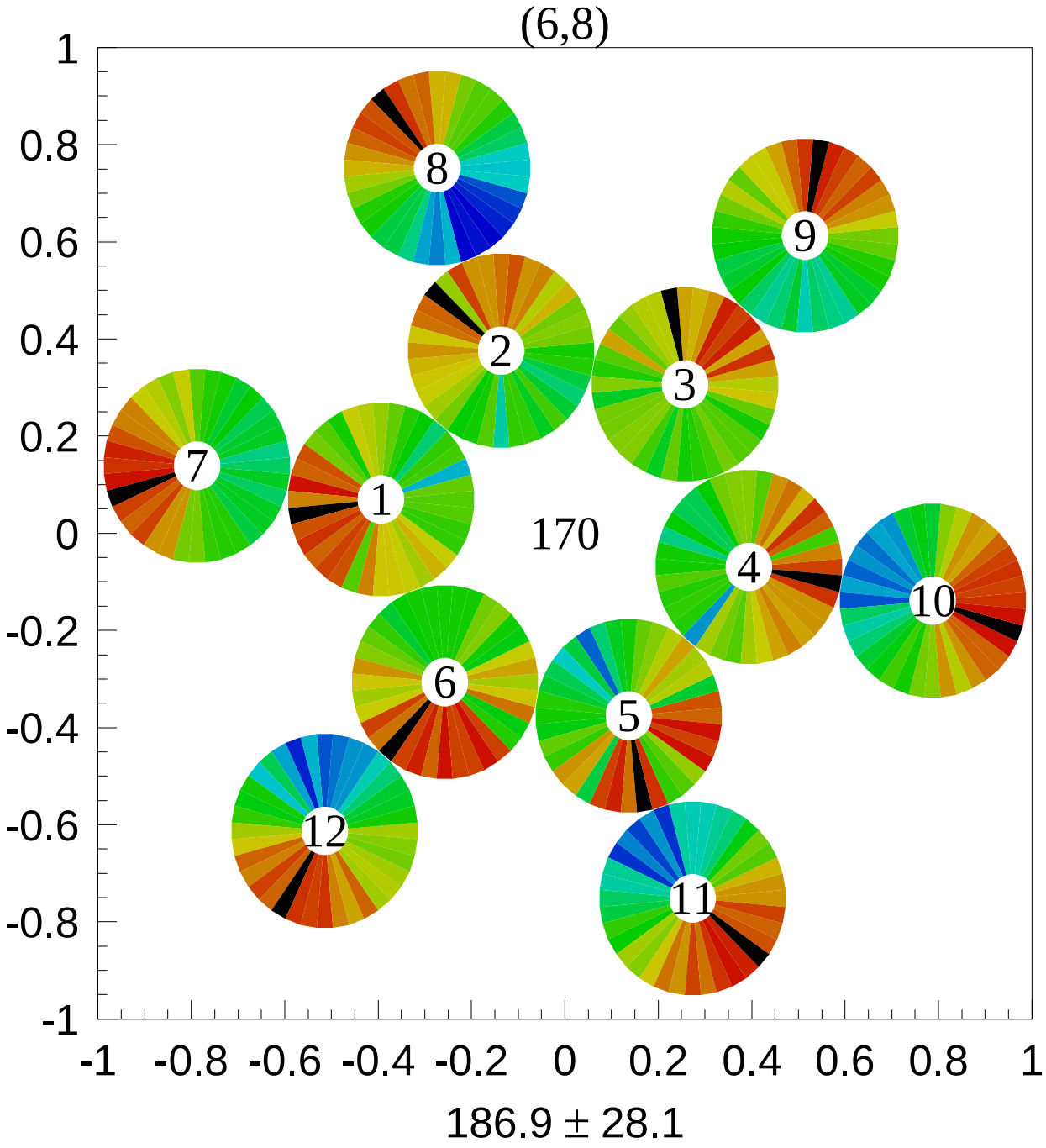

(6,6)
tilted LEDs
117 113 114 119 122 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 116 118 127 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

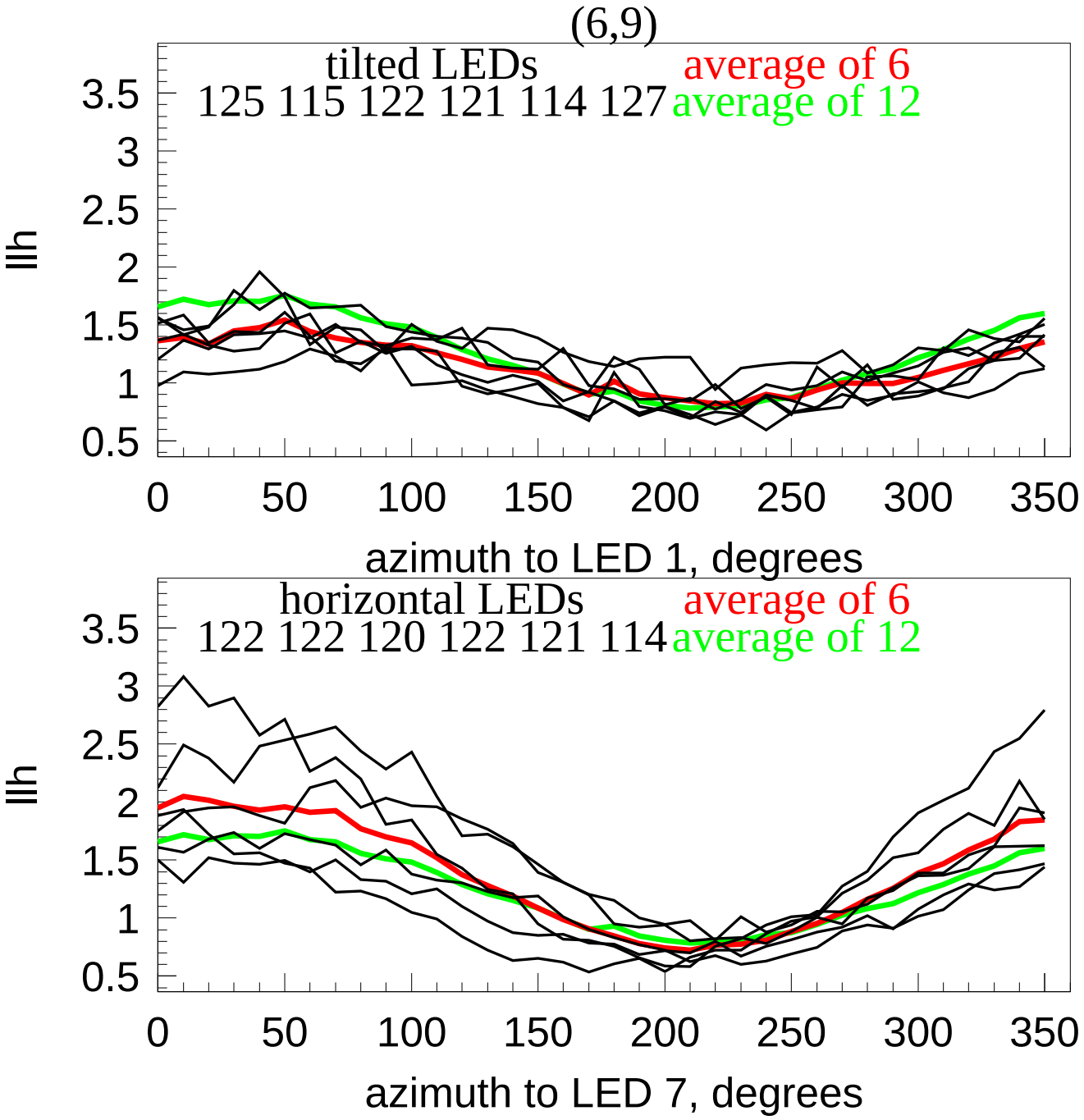

(6,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
345.2 ± 25.4

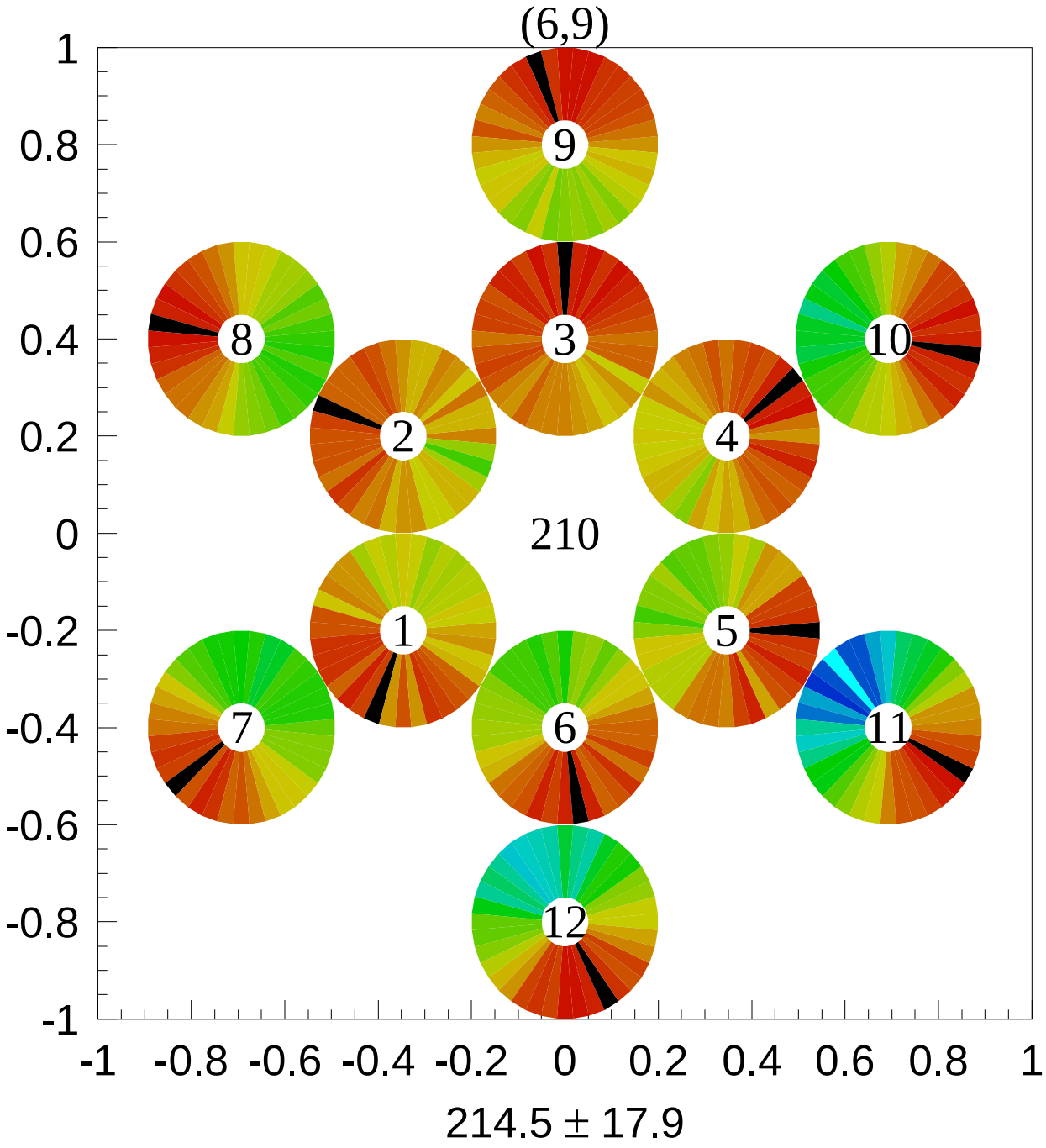

(6,7)
tilted LEDs
120 125 122 123 123 111
average of 6
average of 12
Ilh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 127 123 128 125 130
average of 6
average of 12
Ilh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

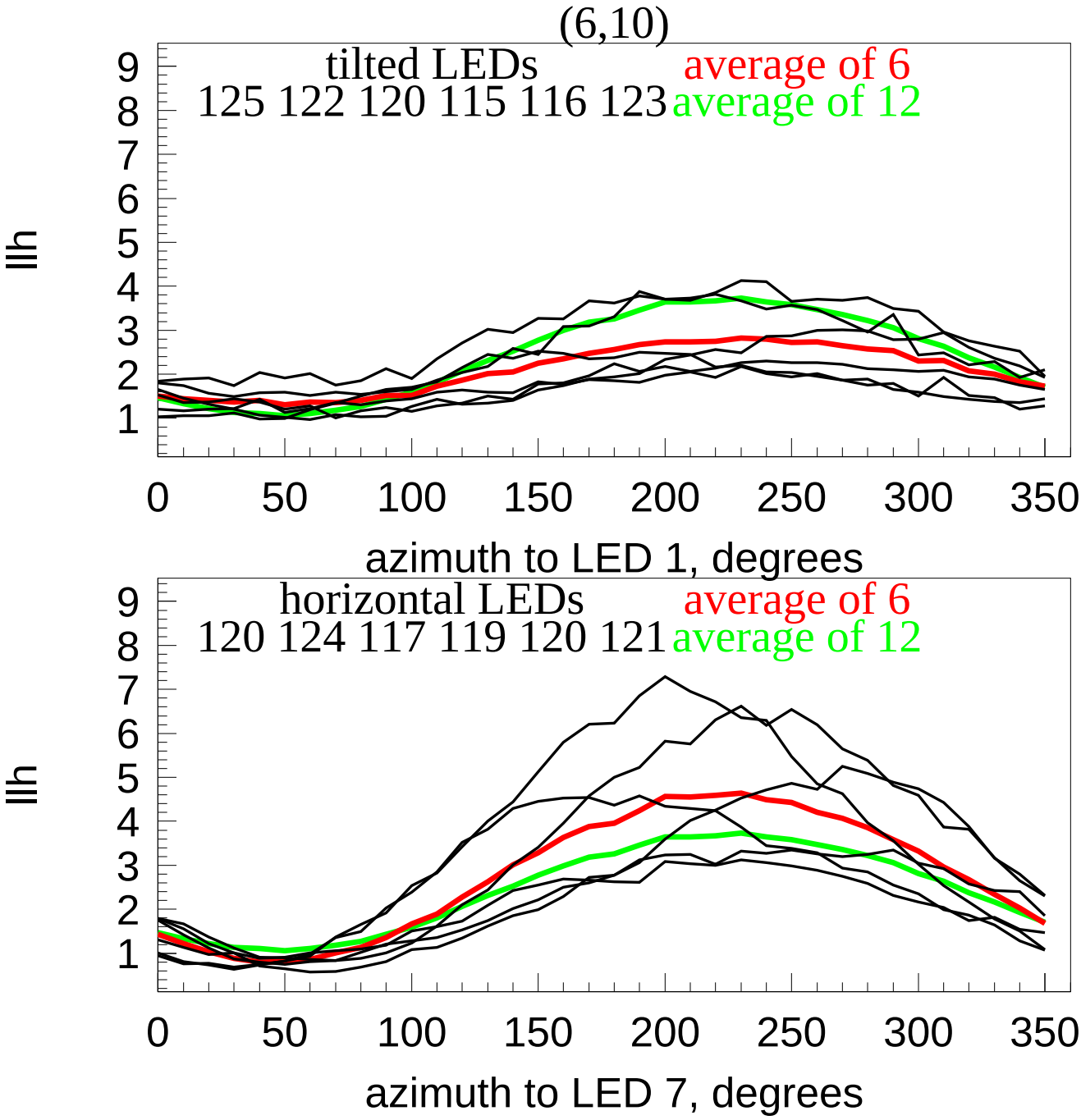

(6,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
103.7 ± 20.2

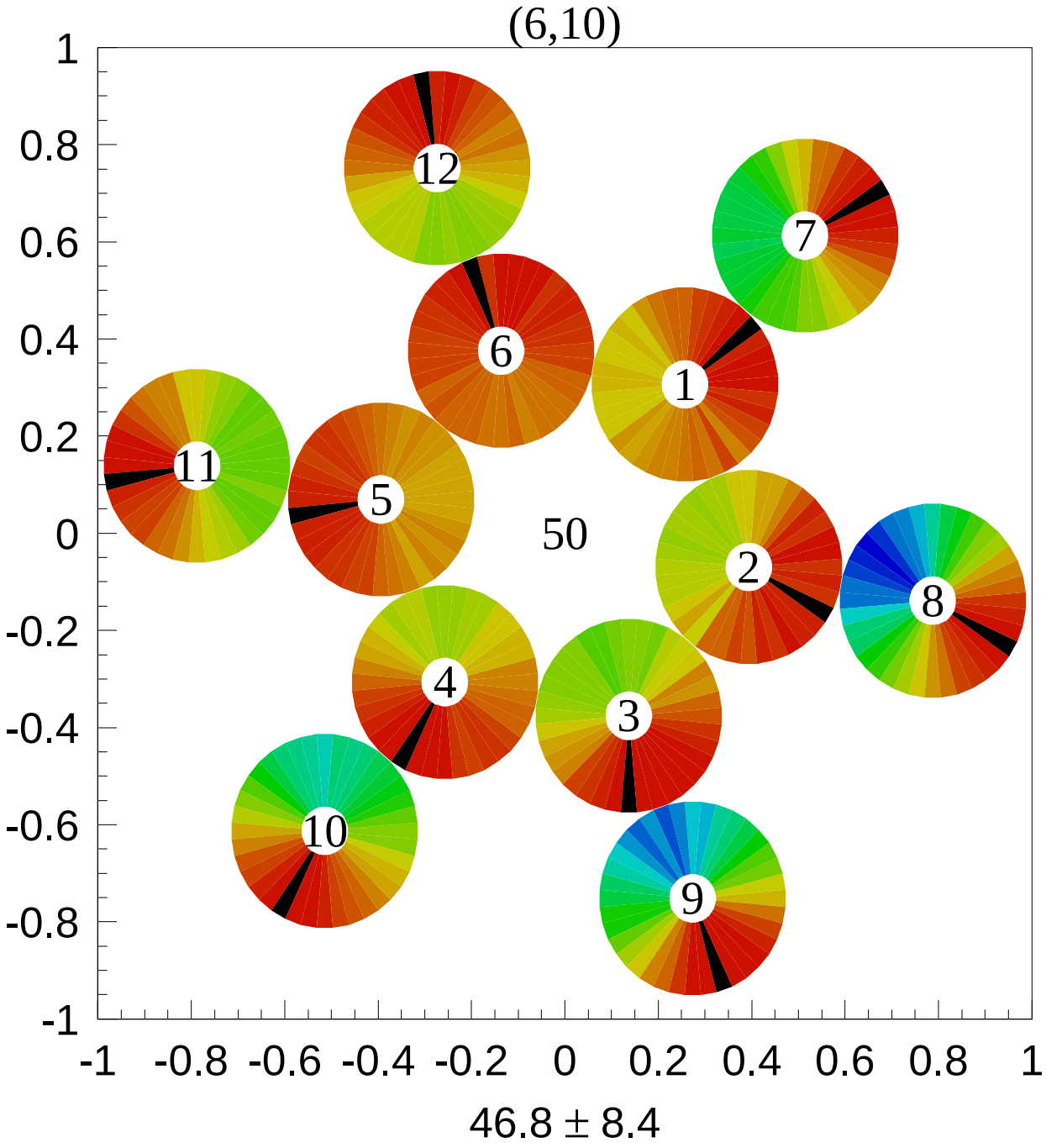

(6,8)
tilted LEDs
122 122 121 123 120 127
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 119 129 127 118 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

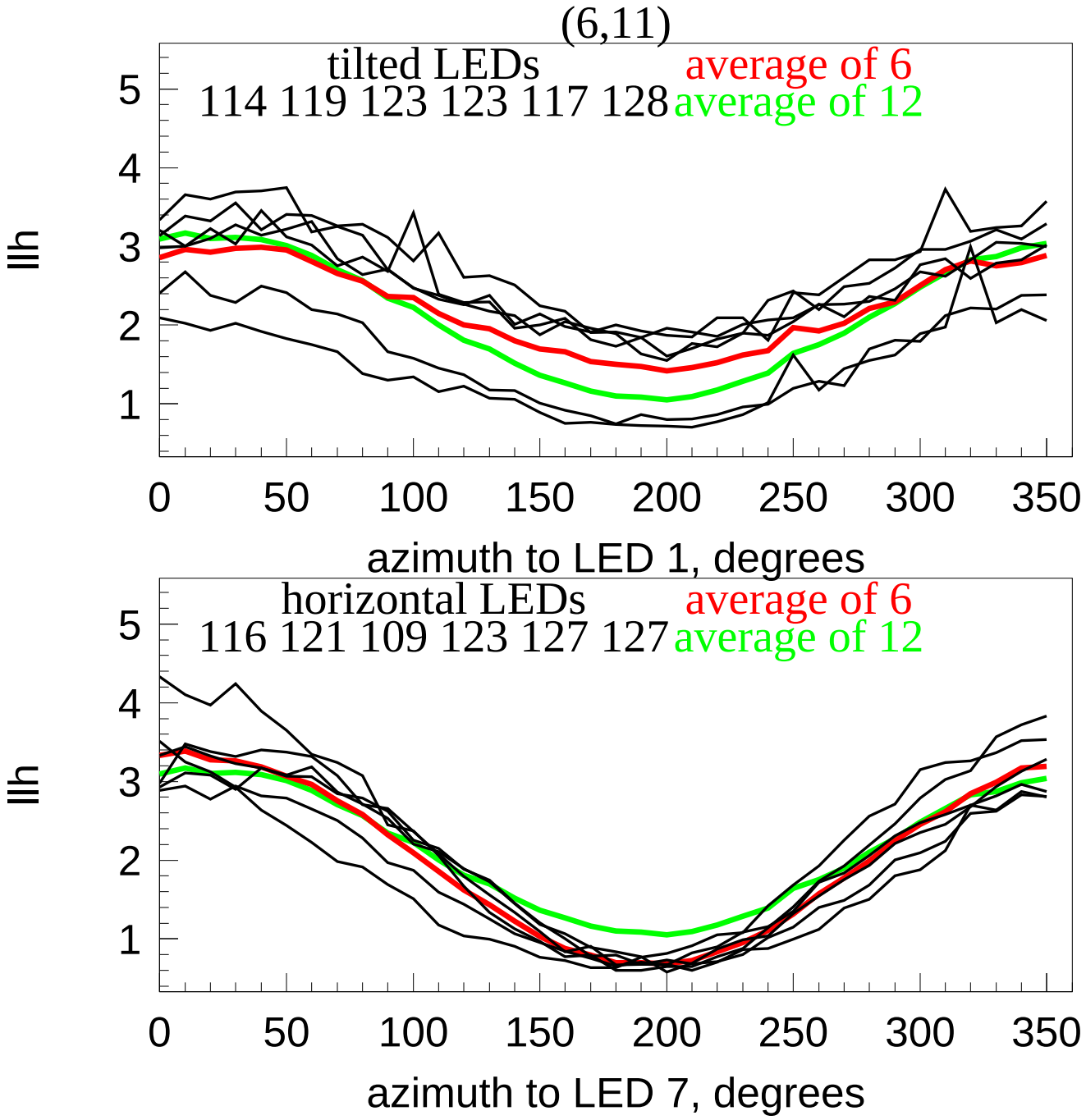

(6,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
186.9 ± 28.1

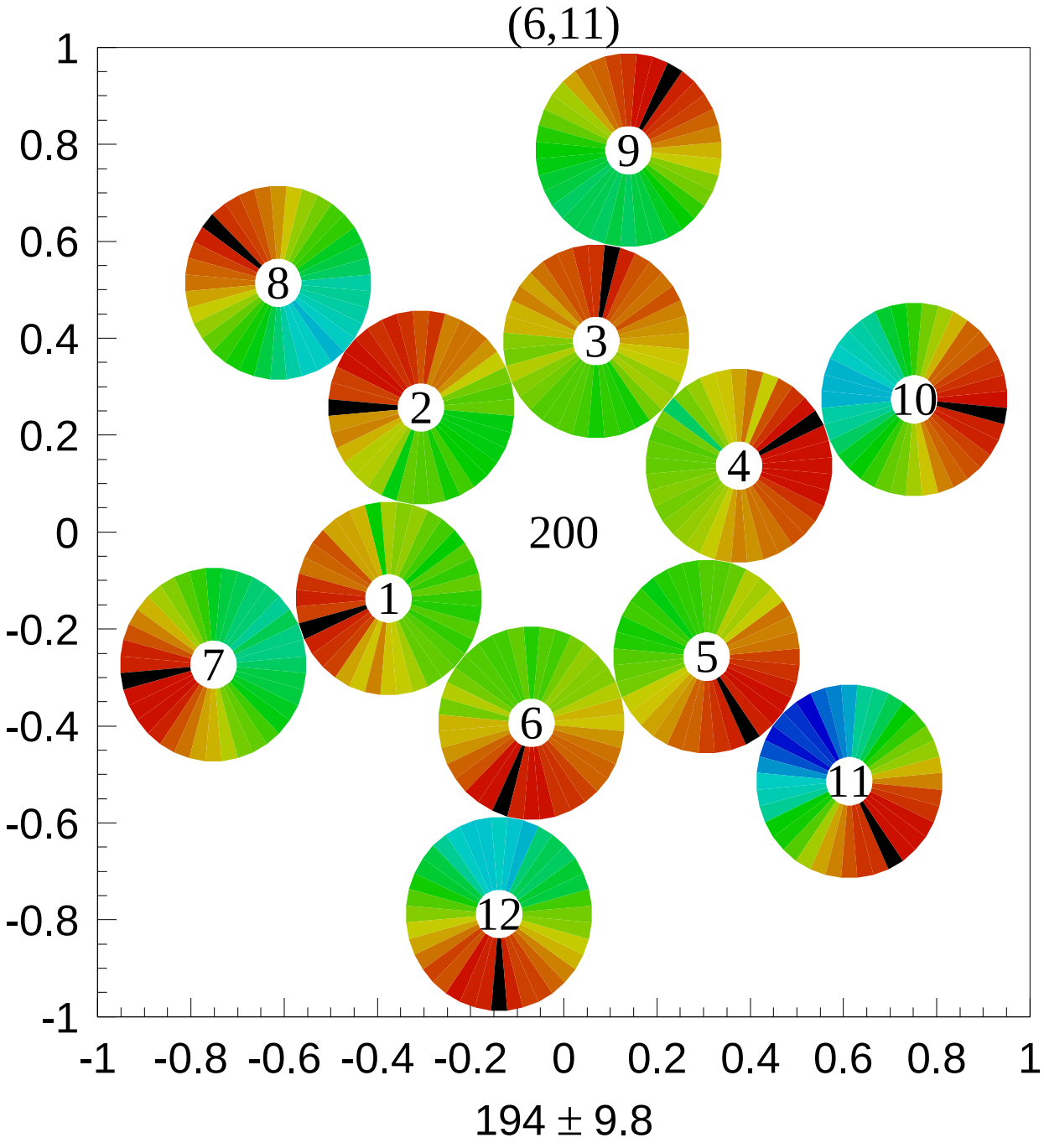

(6,9)
tilted LEDs
125 115 122 121 114 127
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 122 120 122 121 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

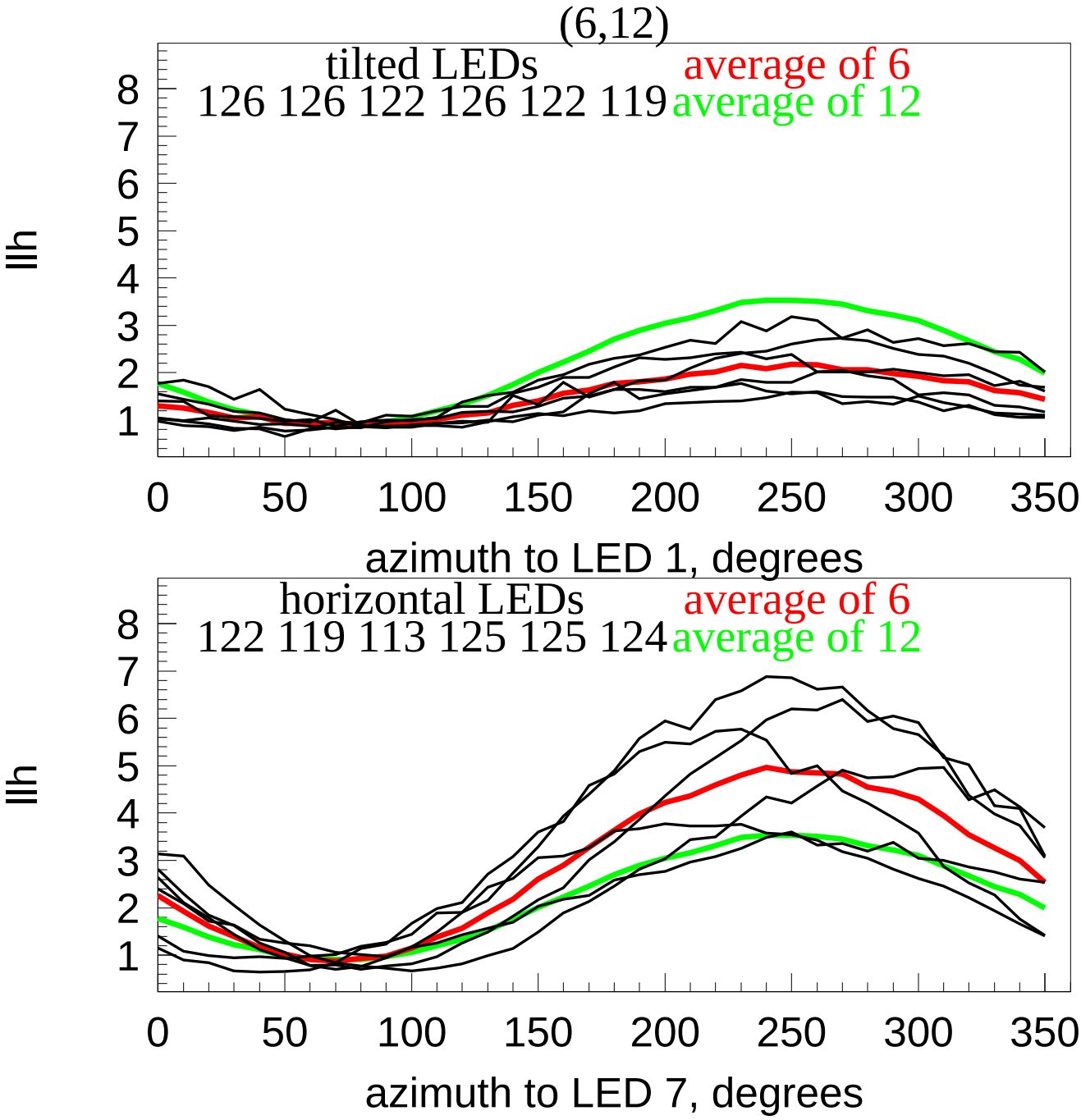

(6,9)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
214.5 ± 17.9

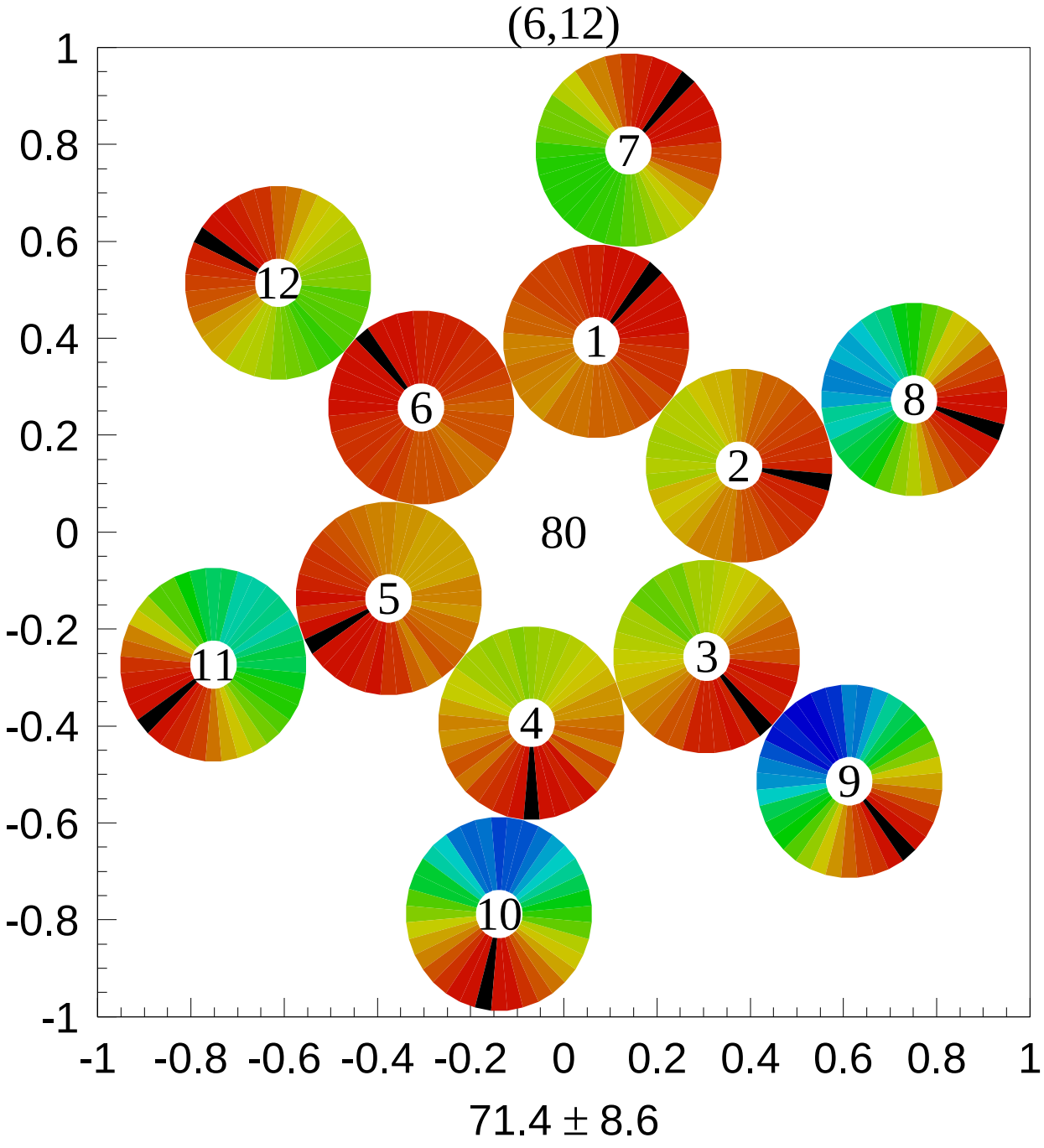

(6,10)
tilted LEDs
125 122 120 115 116 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 124 117 119 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

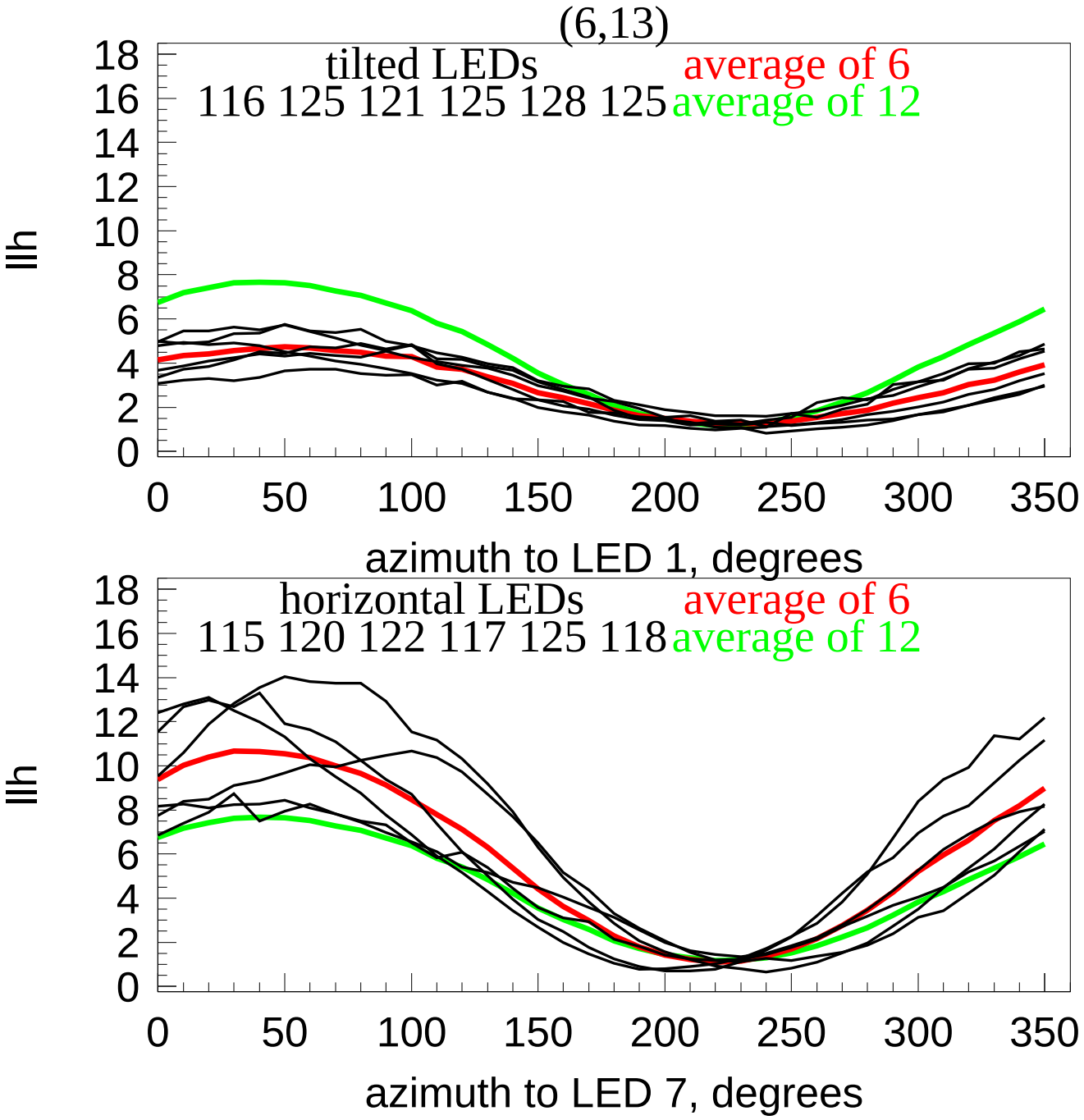

(6,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
46.8 ± 8.4

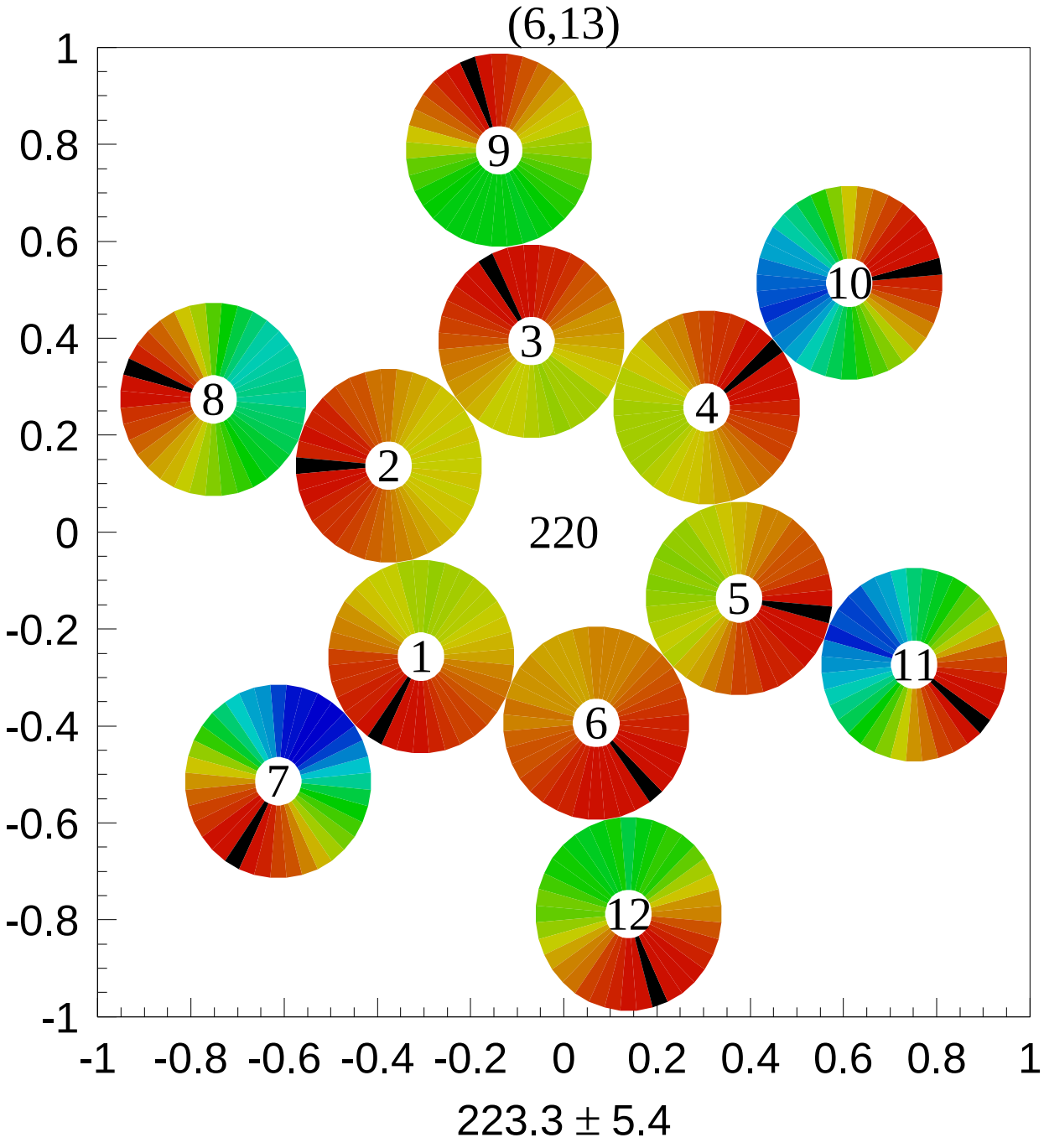

(6,11)
tilted LEDs
114 119 123 123 117 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 121 109 123 127 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

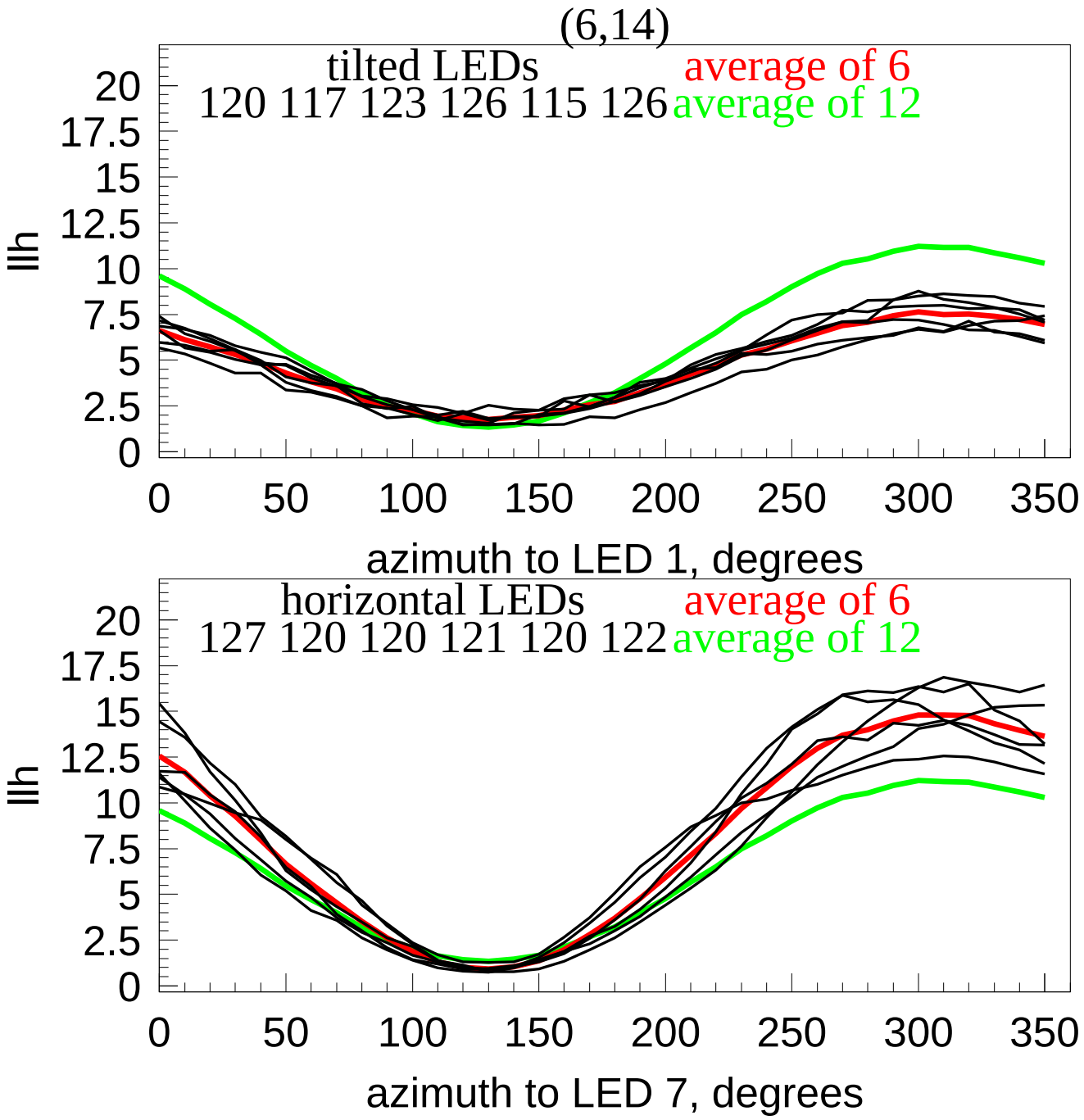

(6,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
194 ± 9.8

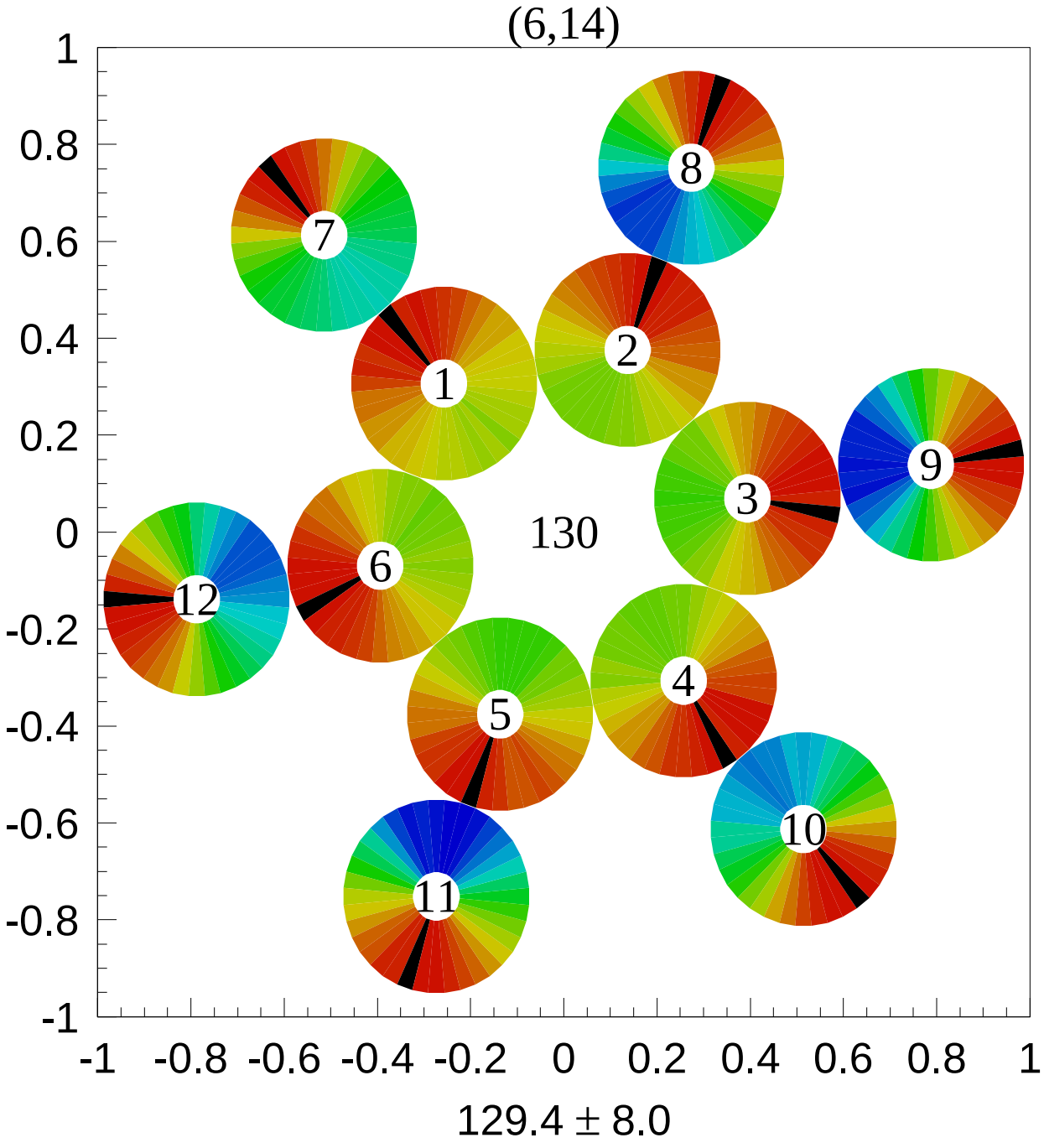

(6,12)
tilted LEDs
126 126 122 126 122 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 113 125 125 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

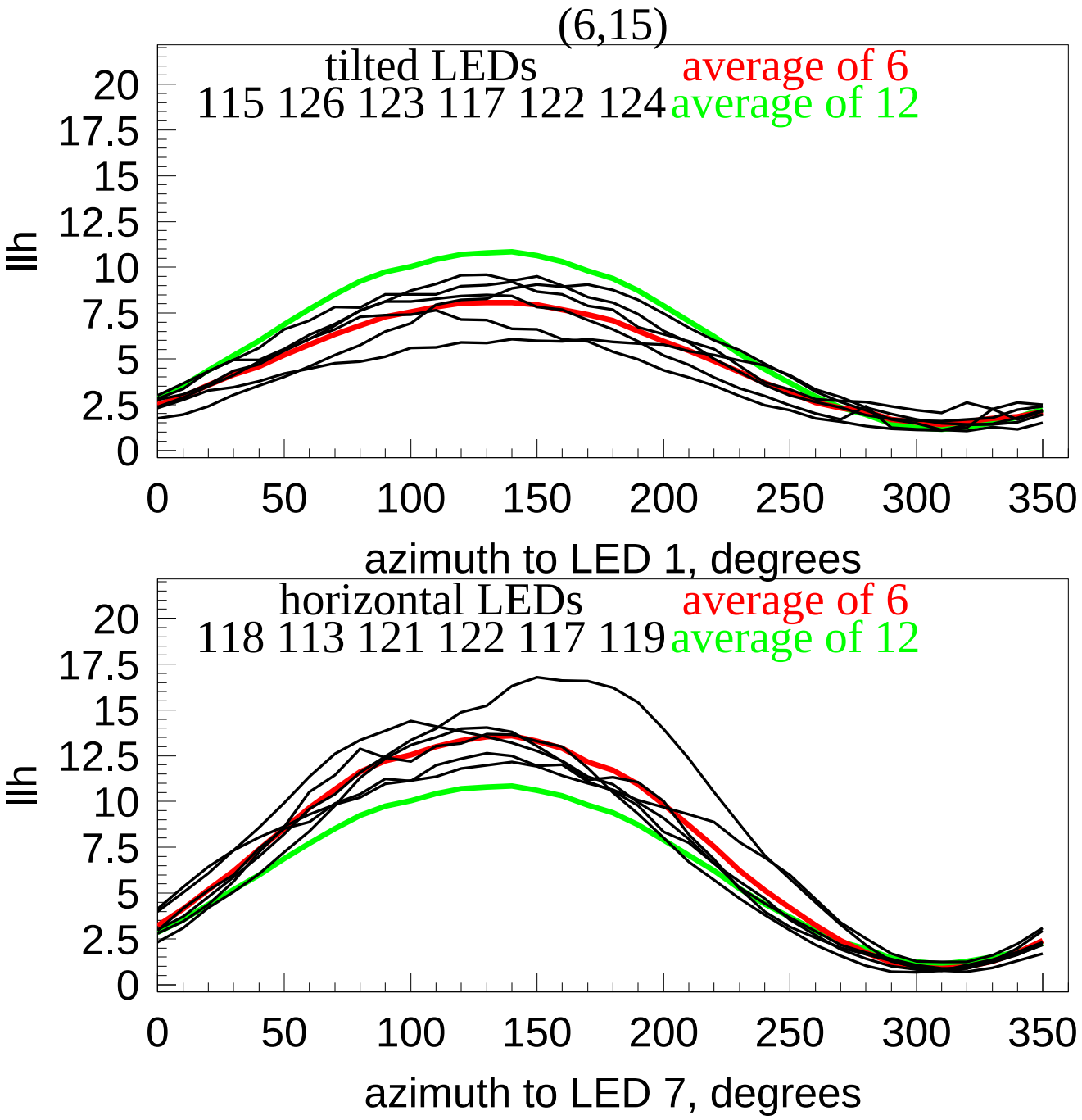

(6,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
71.4 ± 8.6
7
12
1
6
8
2
80
5
11
3
4
9
10

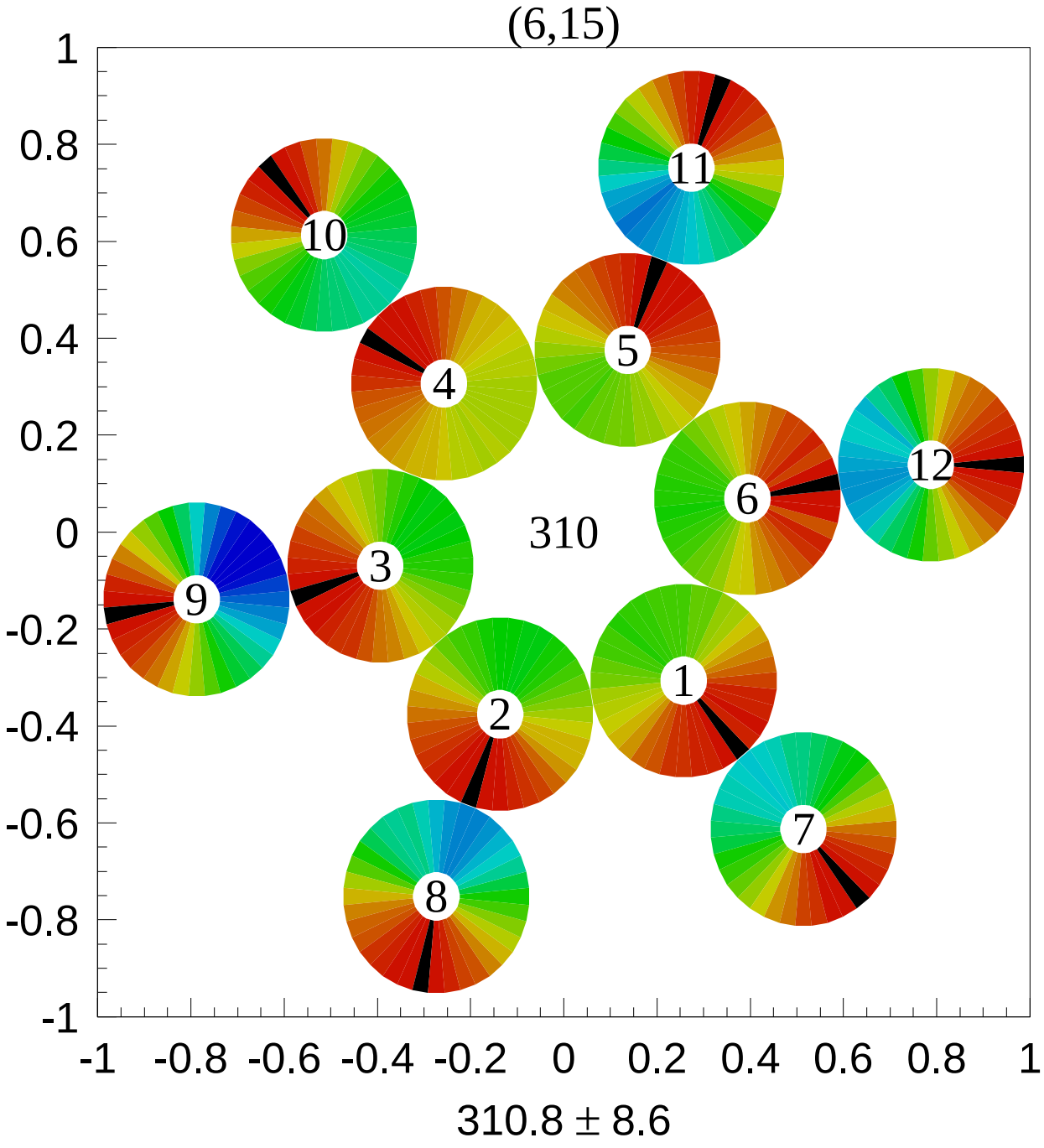

(6,13)
tilted LEDs
116 125 121 125 128 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 120 122 117 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

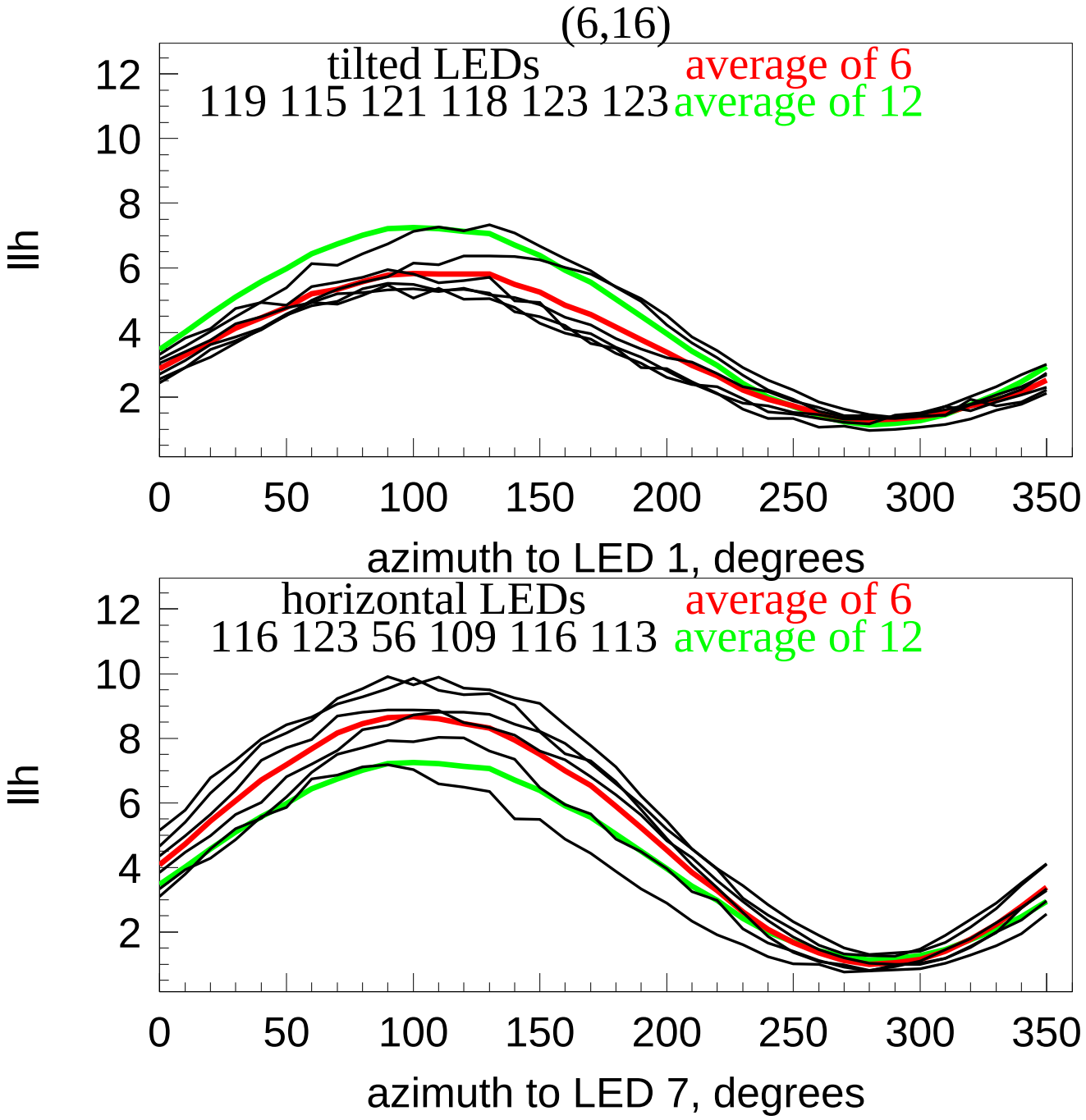

(6,13)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
223.3 ± 5.4

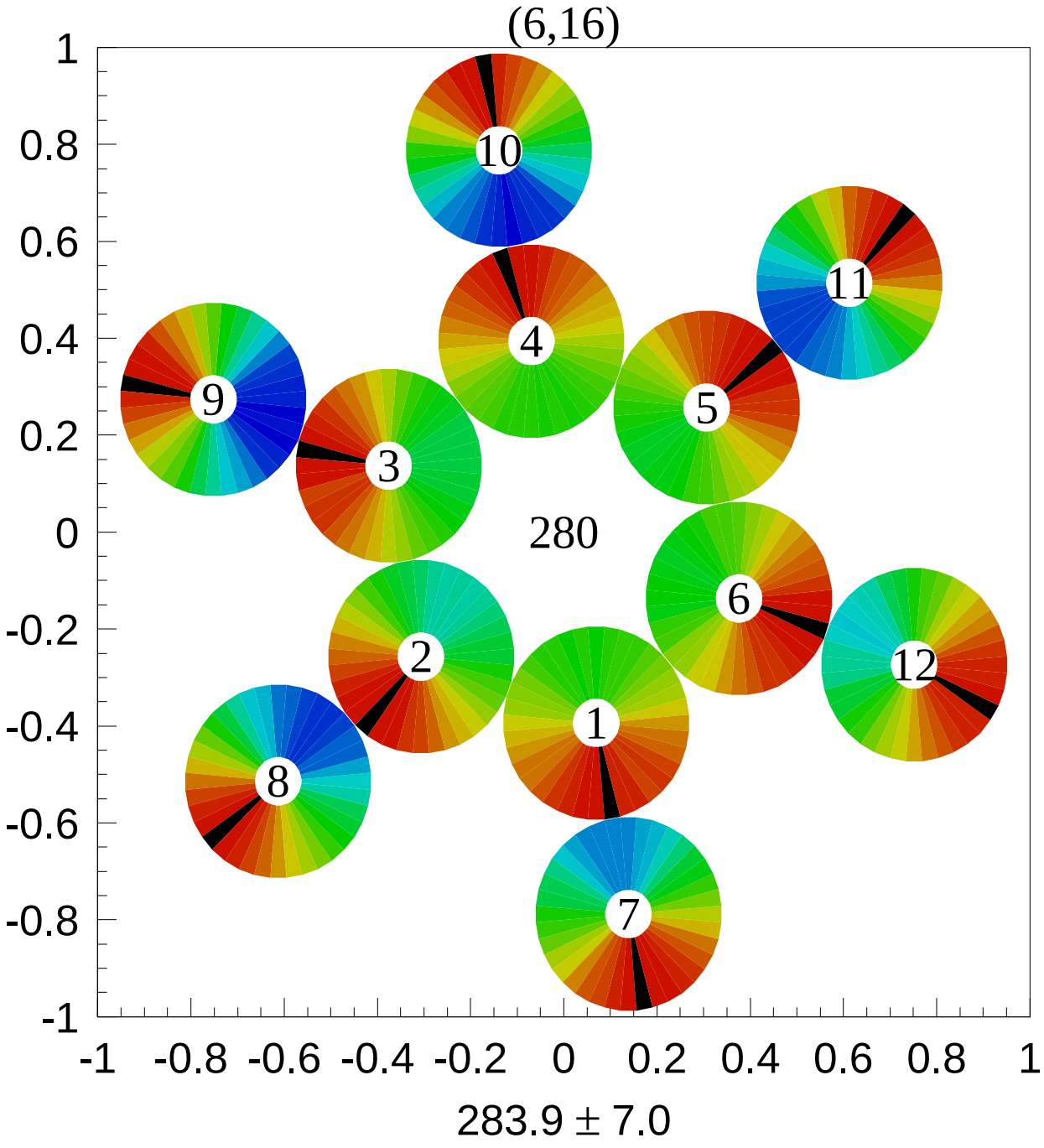

(6,14)
tilted LEDs
120 117 123 126 115 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 120 120 121 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

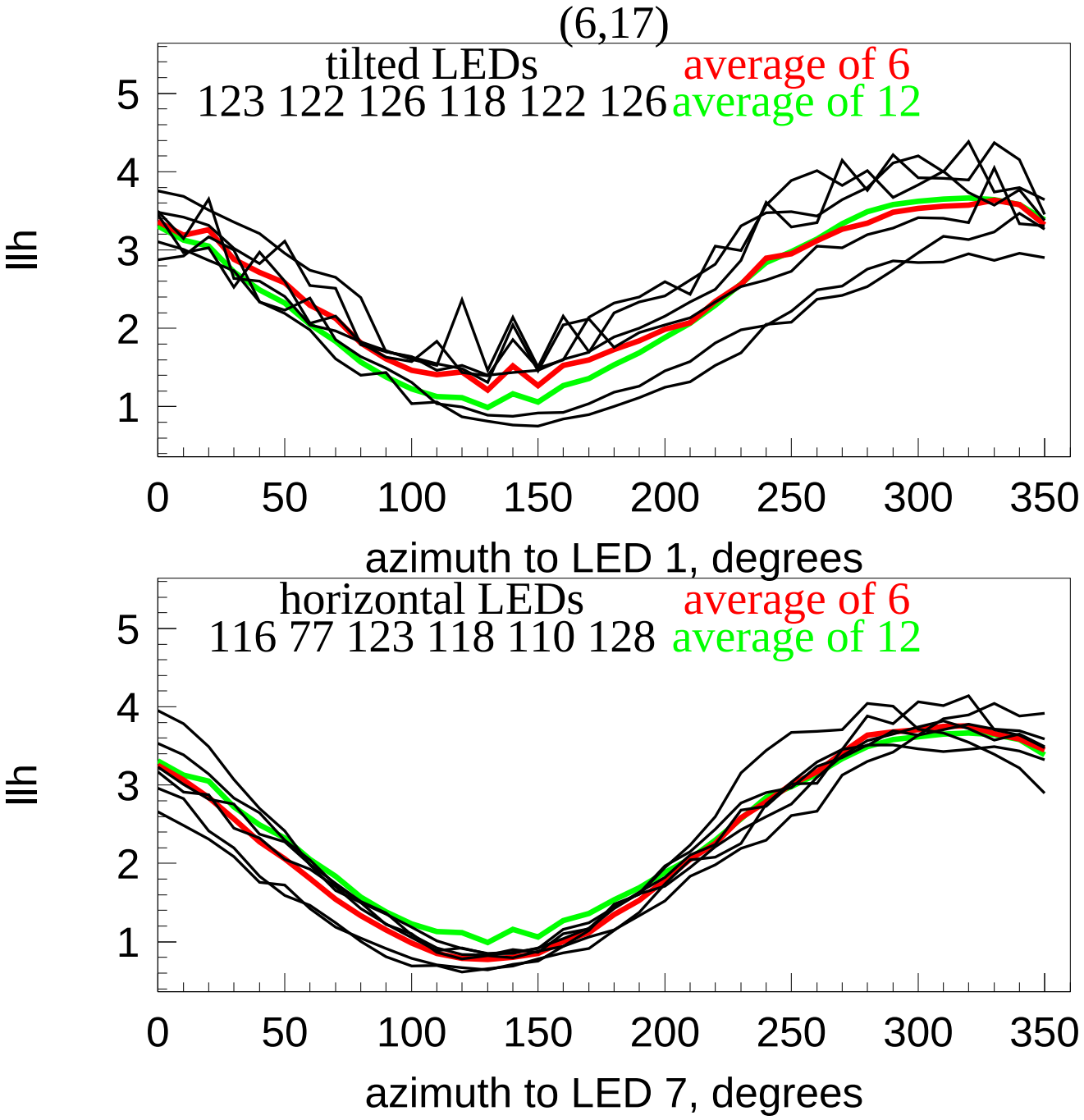

(6,14)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
129.4 ± 8.0

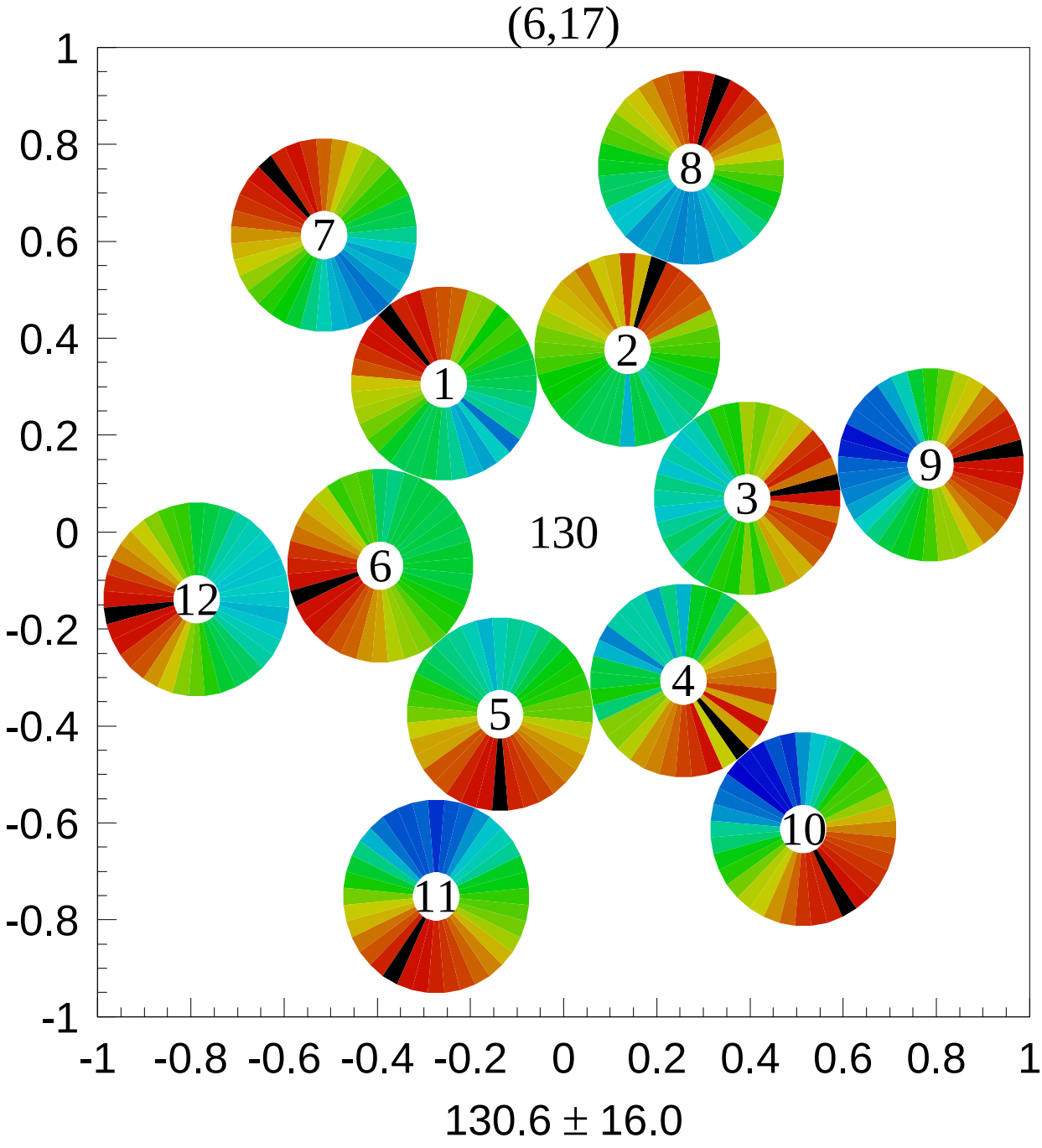

(6,15)
tilted LEDs
115 126 123 117 122 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 113 121 122 117 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

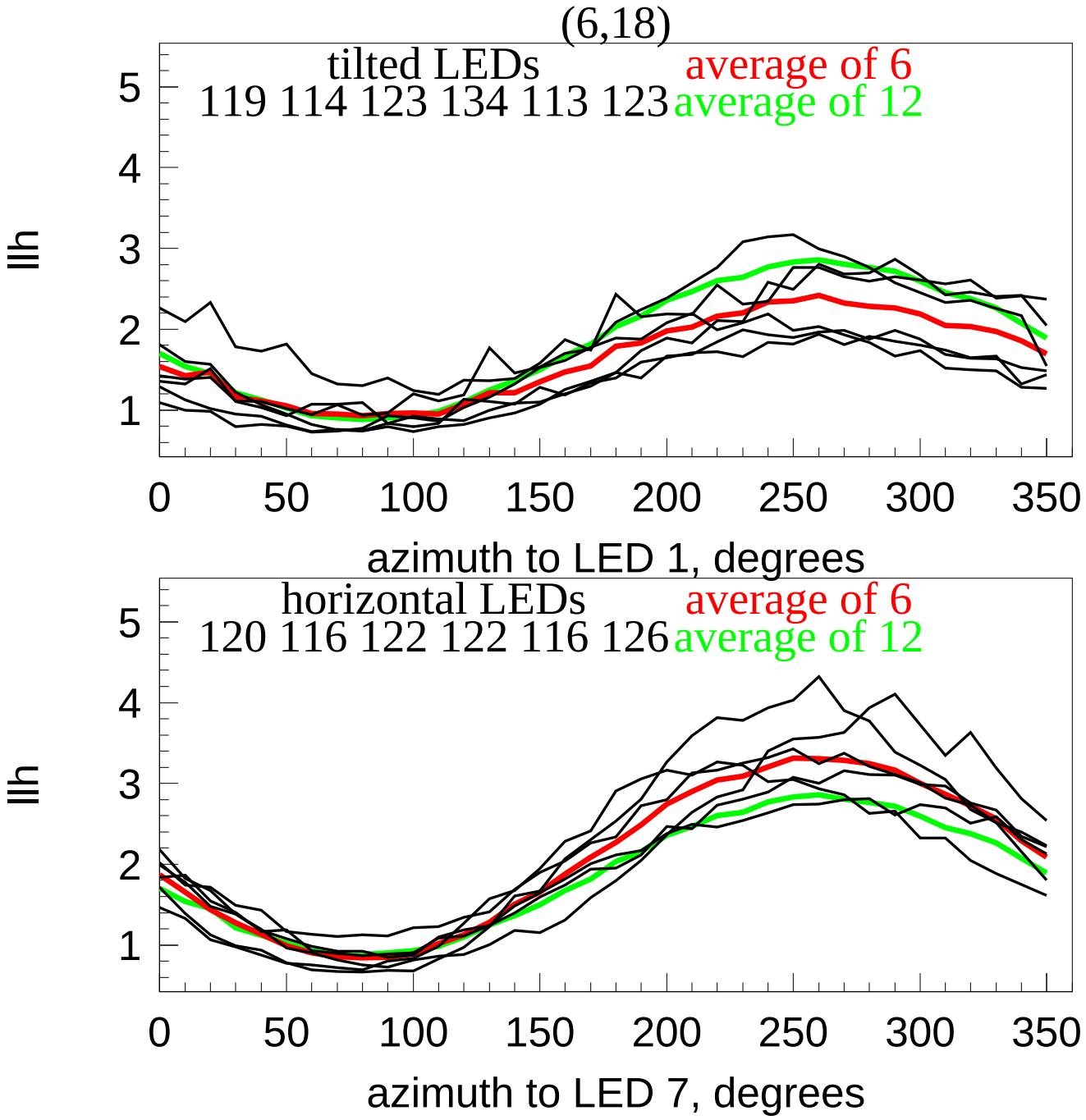

(6,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
310
310.8 ± 8.6
1
2
3
4
5
6
7
8
9
10
11
12

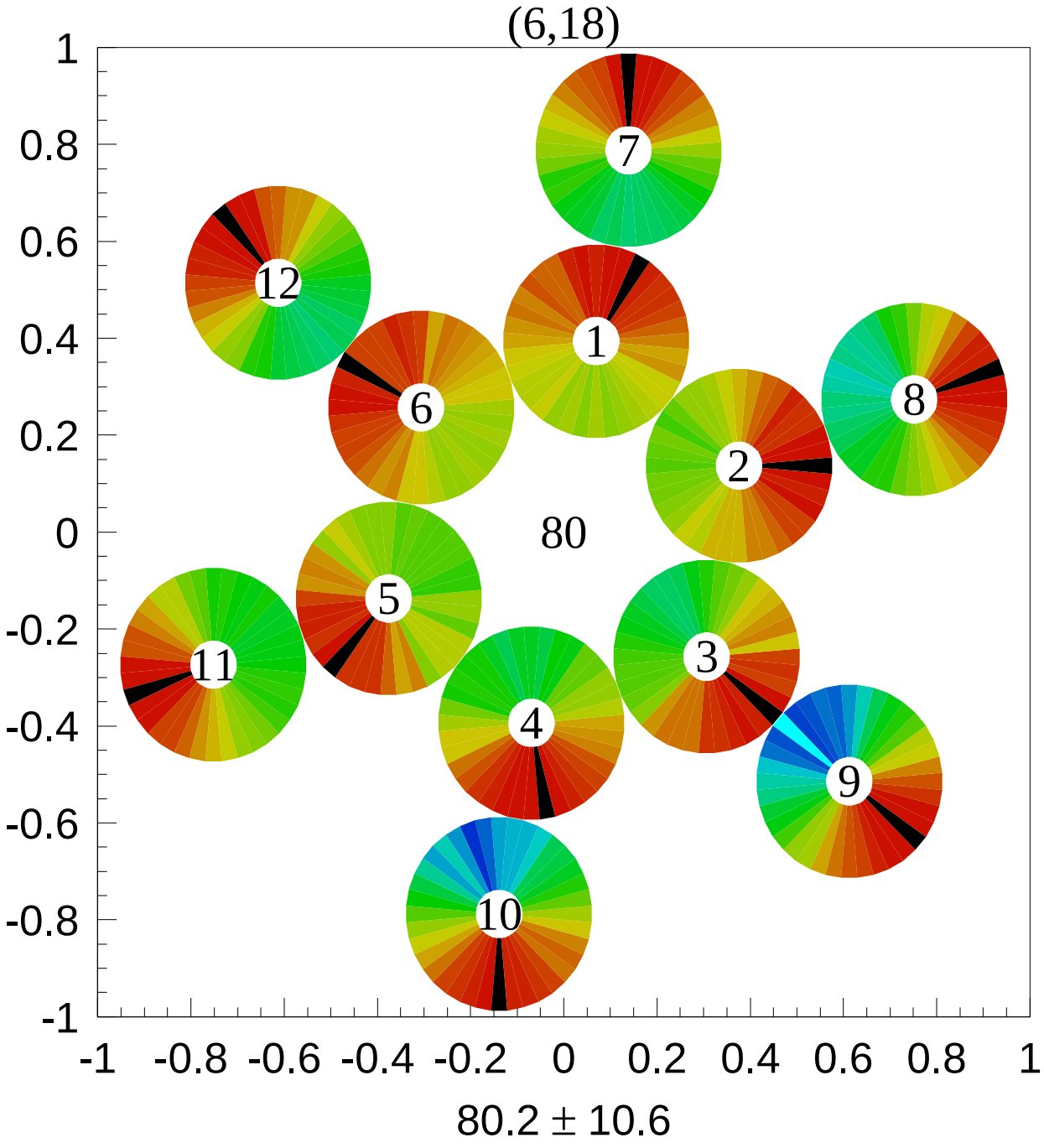

(6,16)
tilted LEDs
119 115 121 118 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 123 56 109 116 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

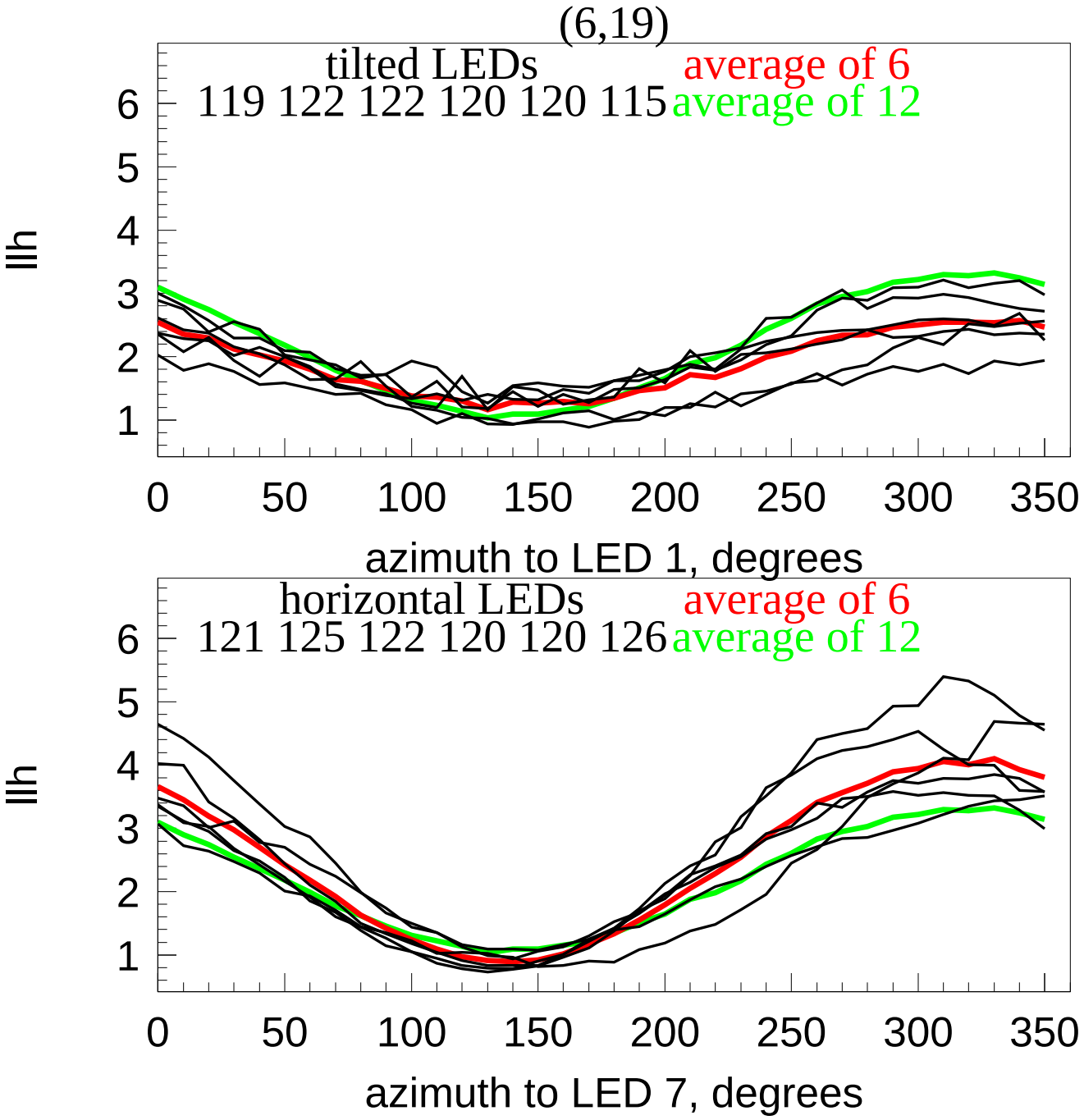

(6,16)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
283.9 ± 7.0

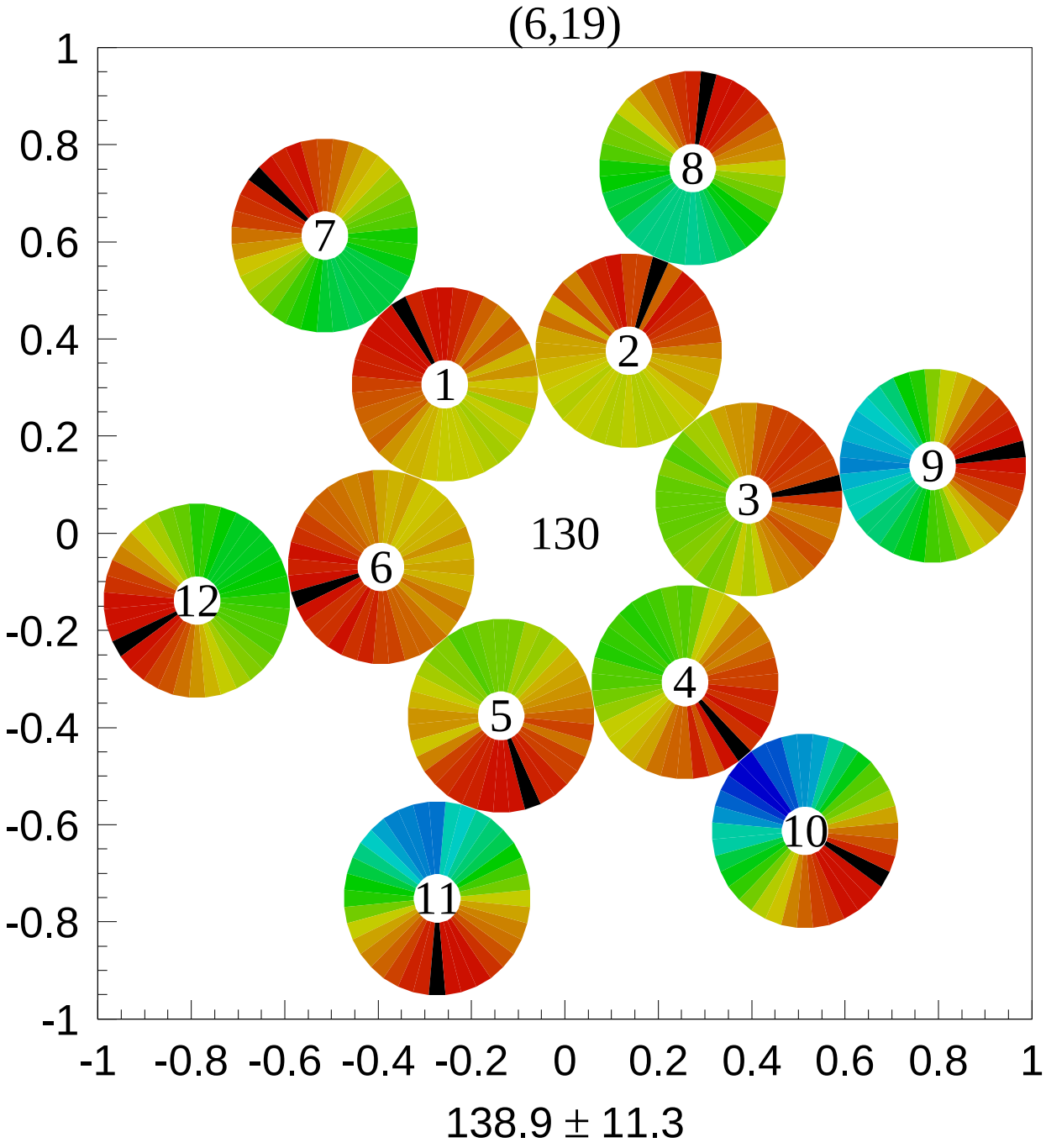

(6,17)
tilted LEDs
123 122 126 118 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 77 123 118 110 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

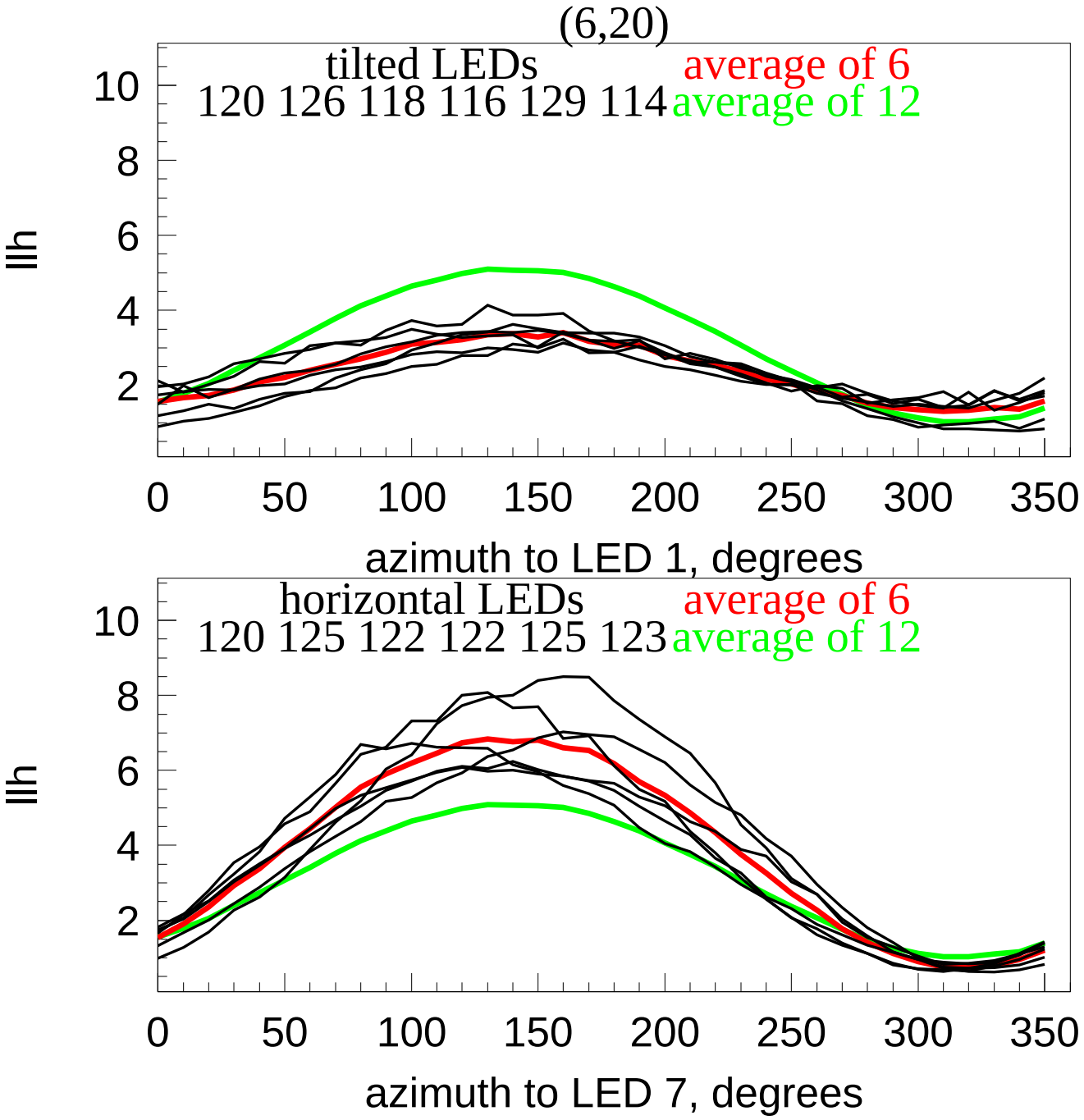

(6,17)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
130.6 ± 16.0

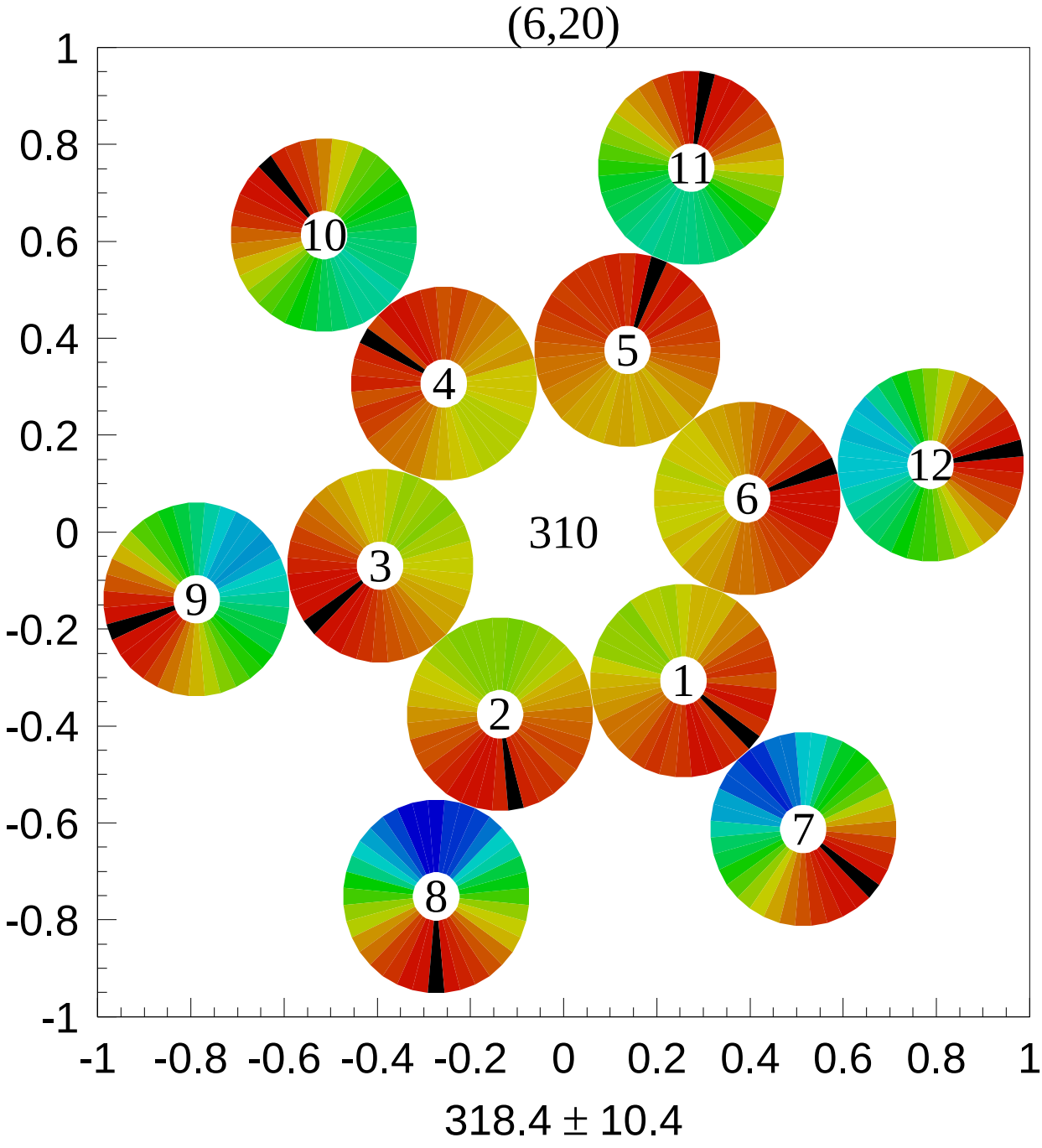

(6,18)
tilted LEDs
119 114 123 134 113 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 116 122 122 116 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

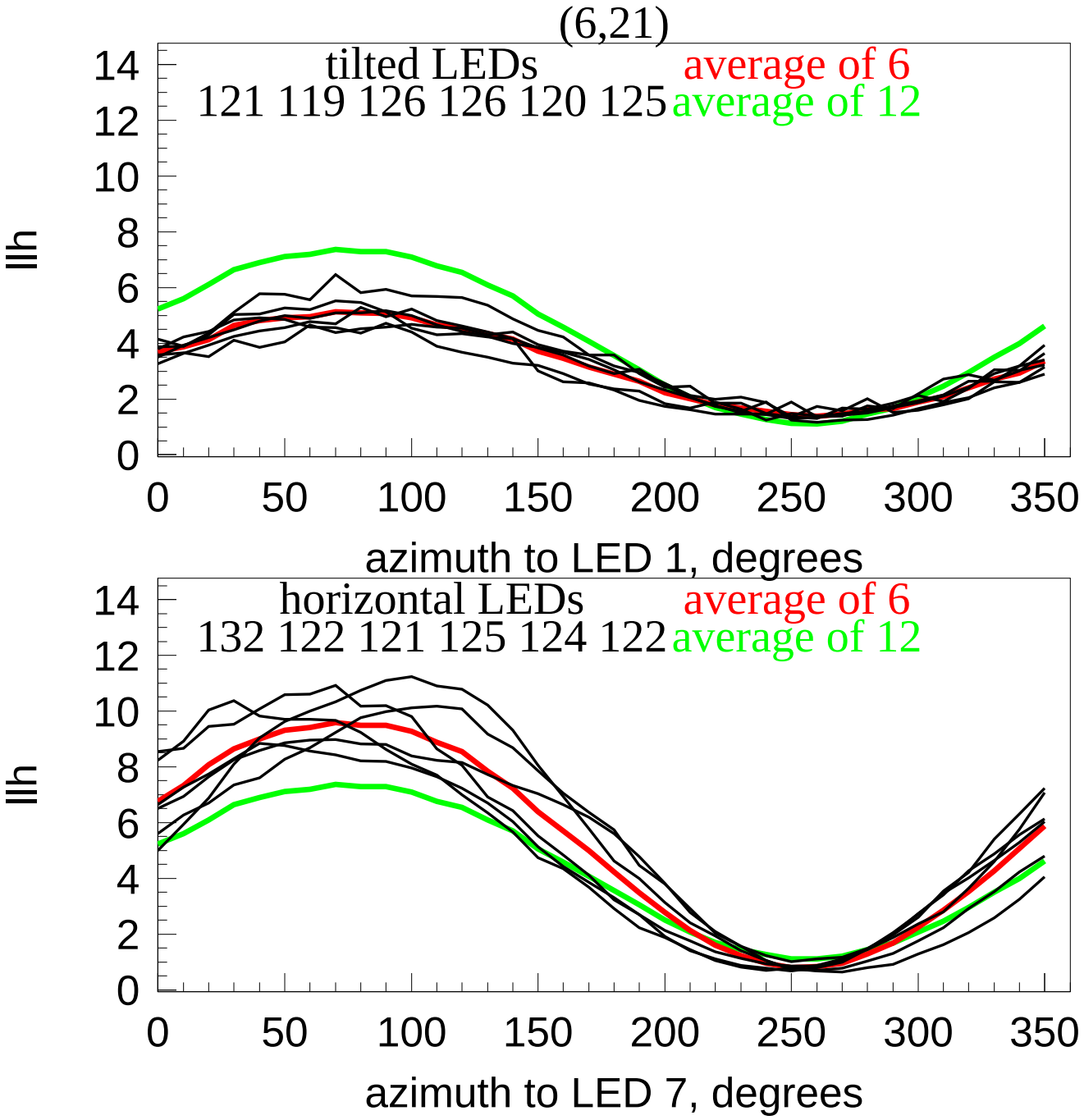

(6,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
80
7
12
1
6
8
2
5
11
3
4
9
10
80.2 ± 10.6

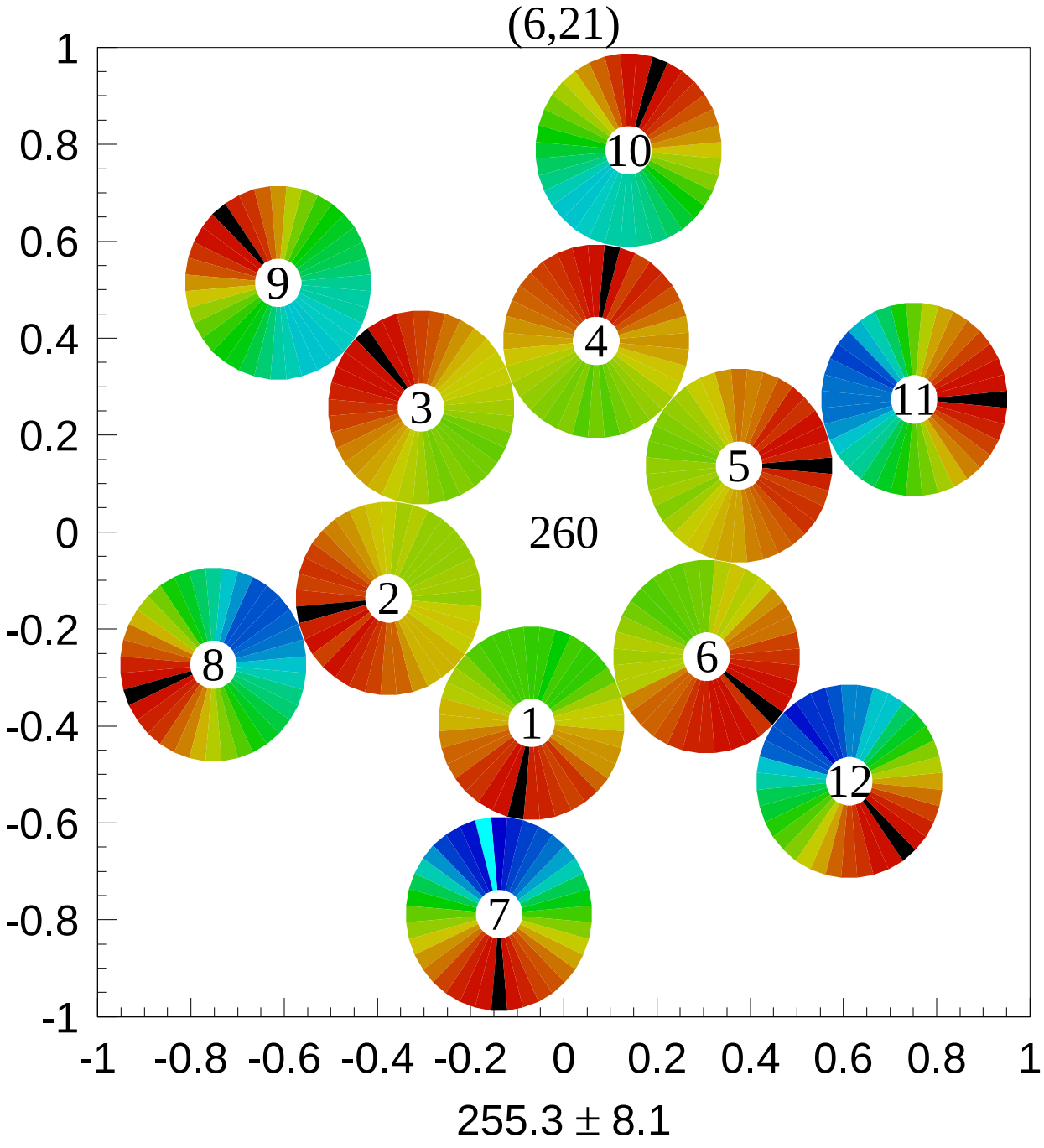

(6,19)
tilted LEDs
119 122 122 120 120 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 122 120 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

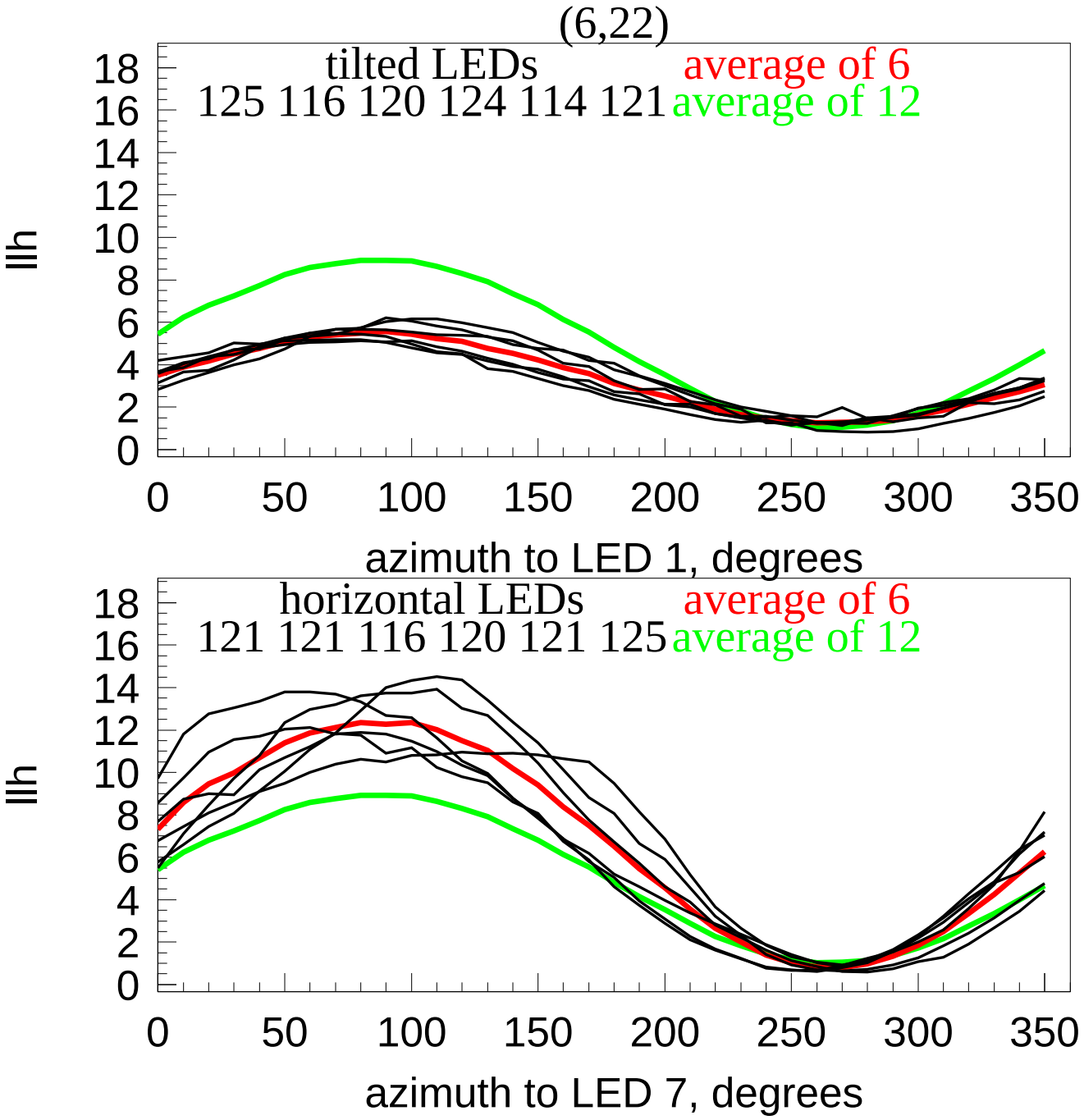

(6,19)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
138.9 ± 11.3

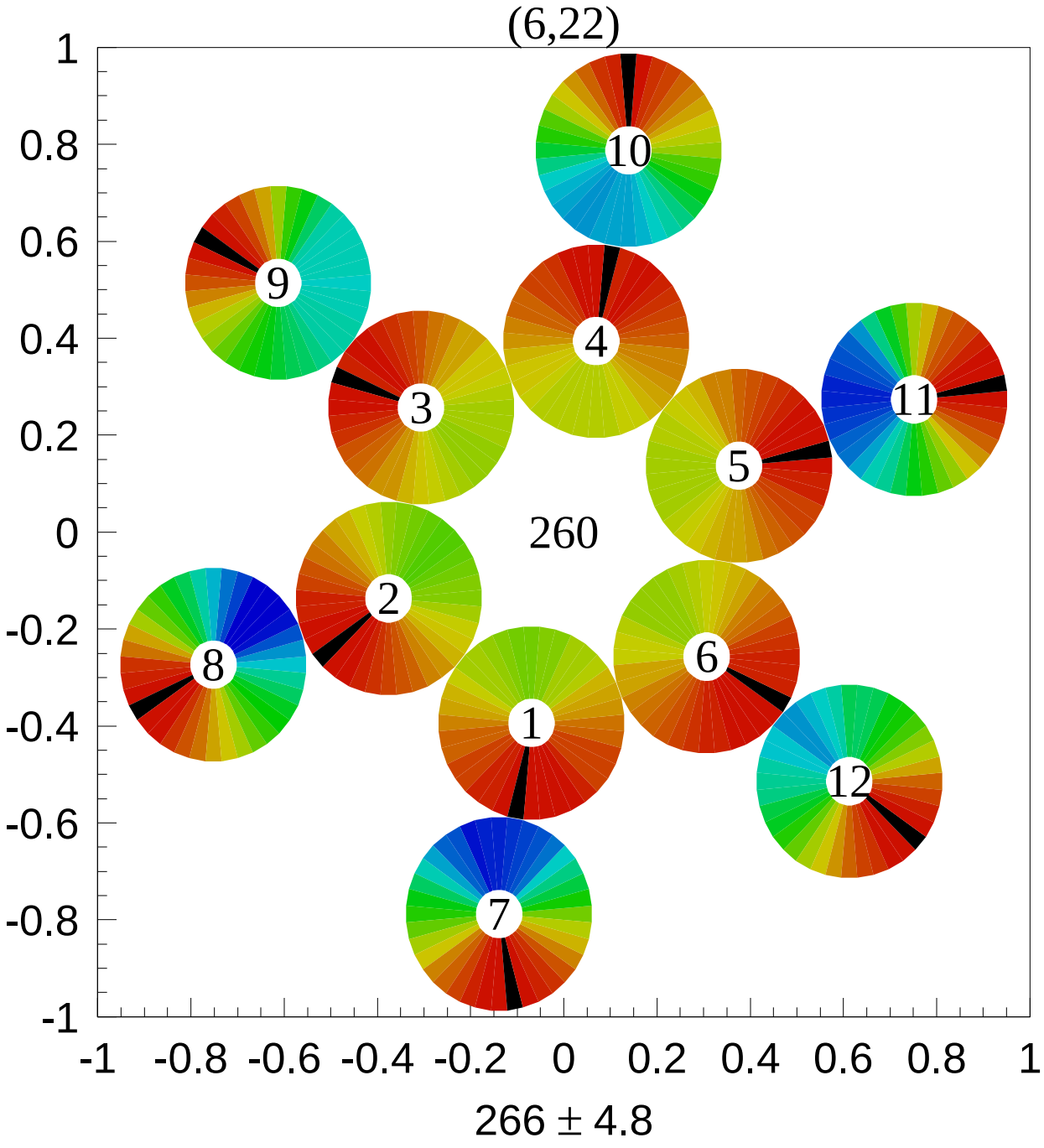

(6,20)
tilted LEDs
120 126 118 116 129 114
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 125 122 122 125 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

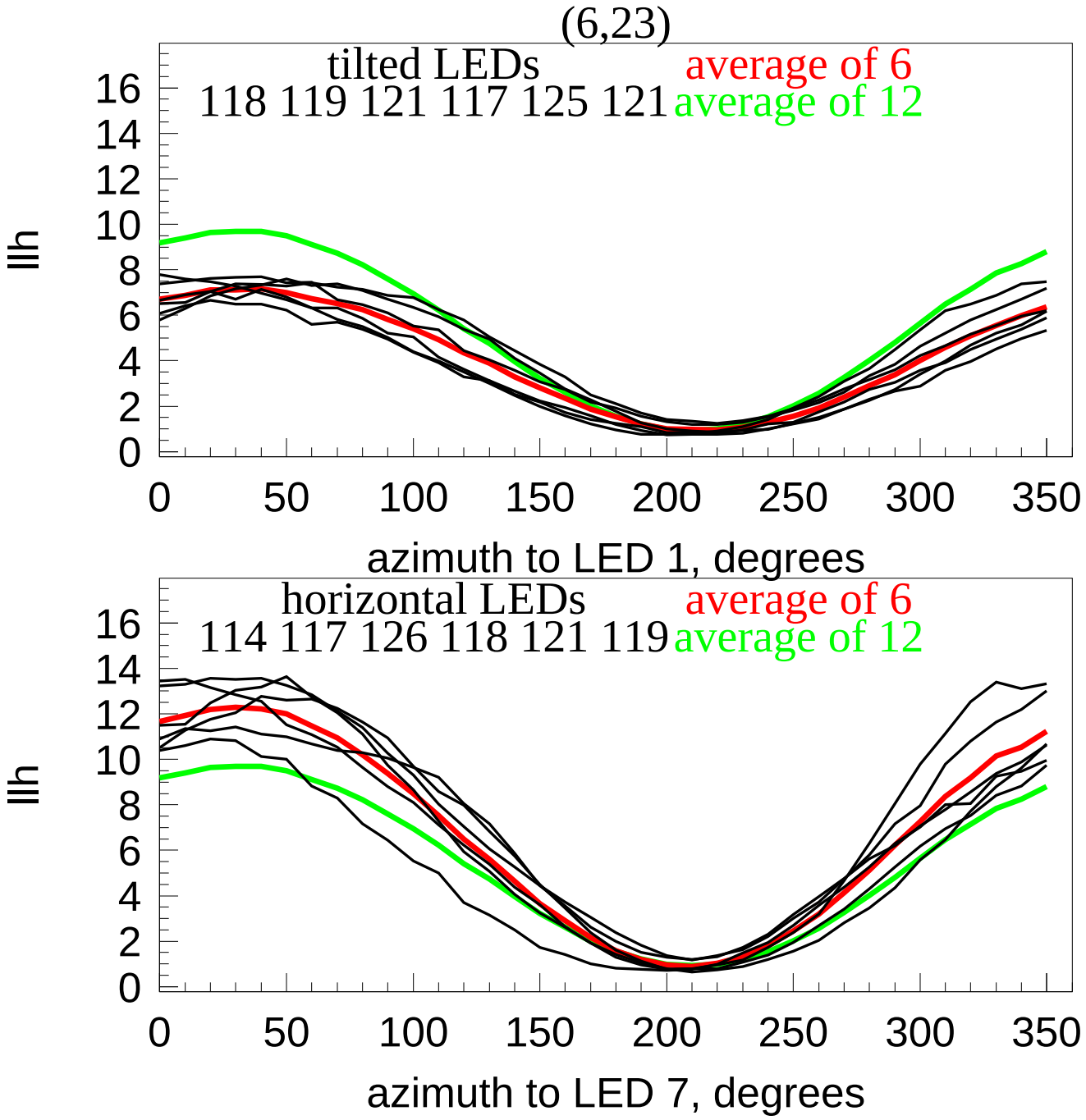

(6,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
318.4 ± 10.4
310
1
2
3
4
5
6
7
8
9
10
11
12

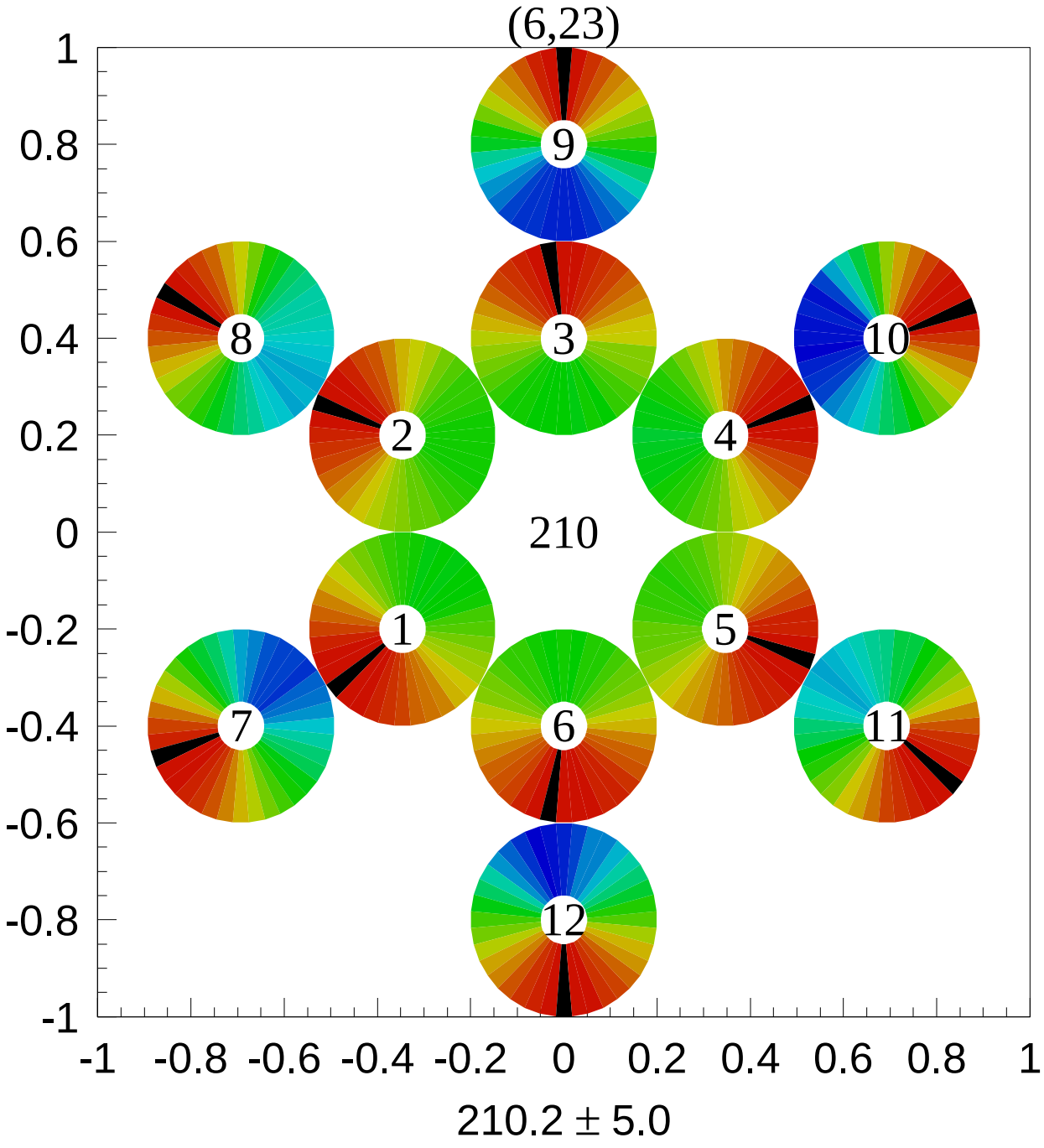

(6,21)
tilted LEDs
121 119 126 126 120 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
132 122 121 125 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

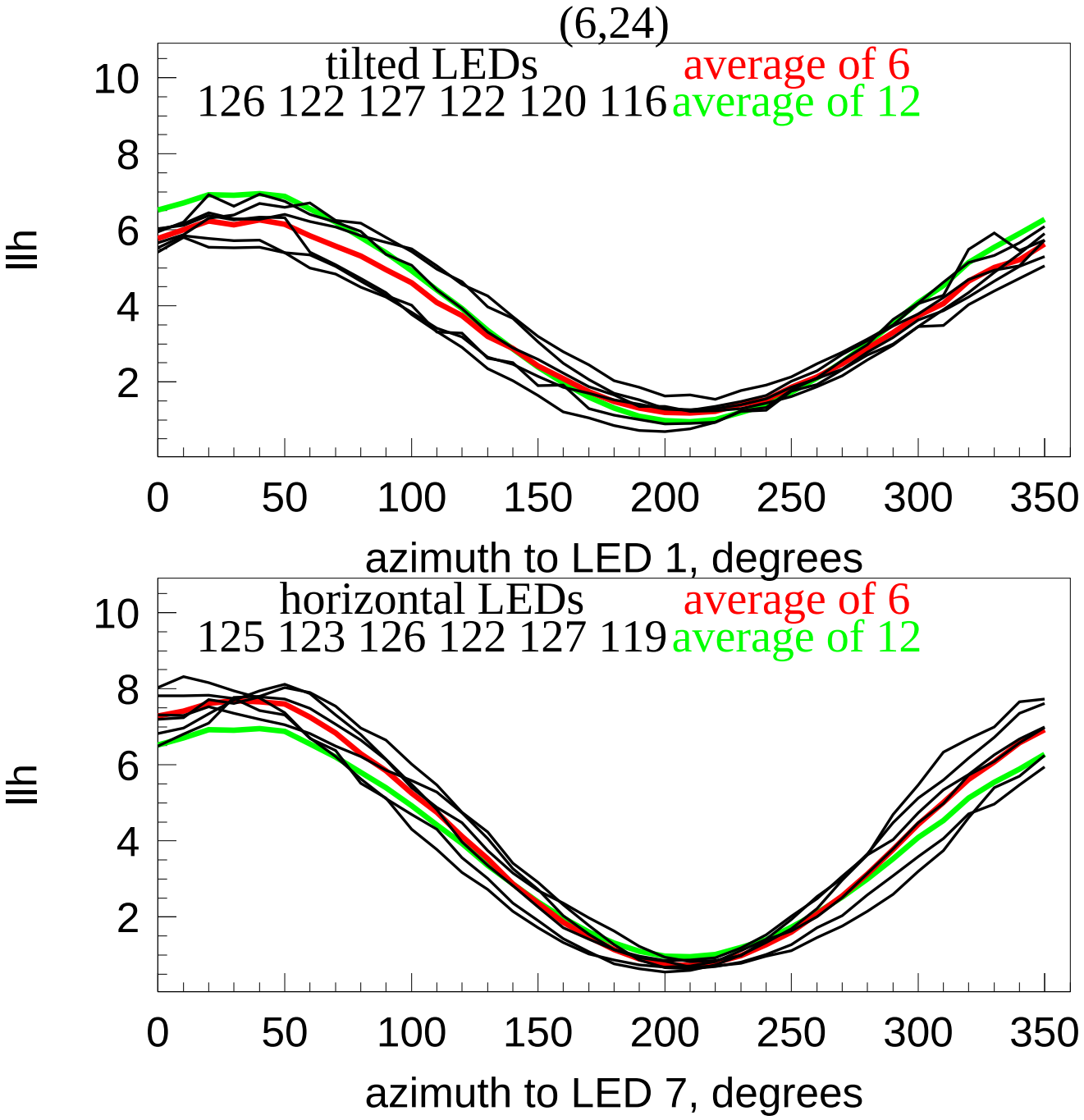

(6,21)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
255.3 ± 8.1

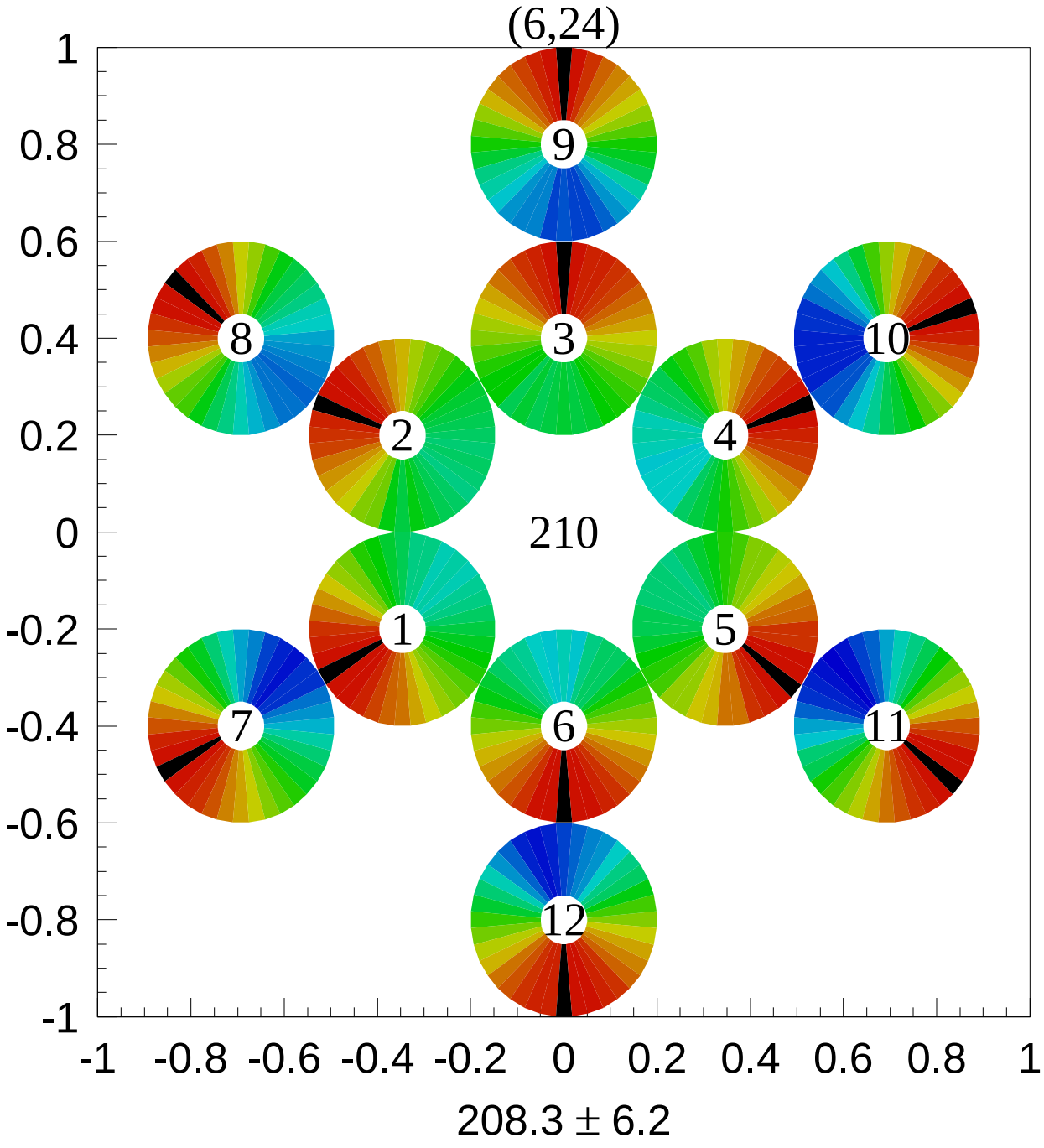

(6,22)
tilted LEDs
125 116 120 124 114 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 121 116 120 121 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

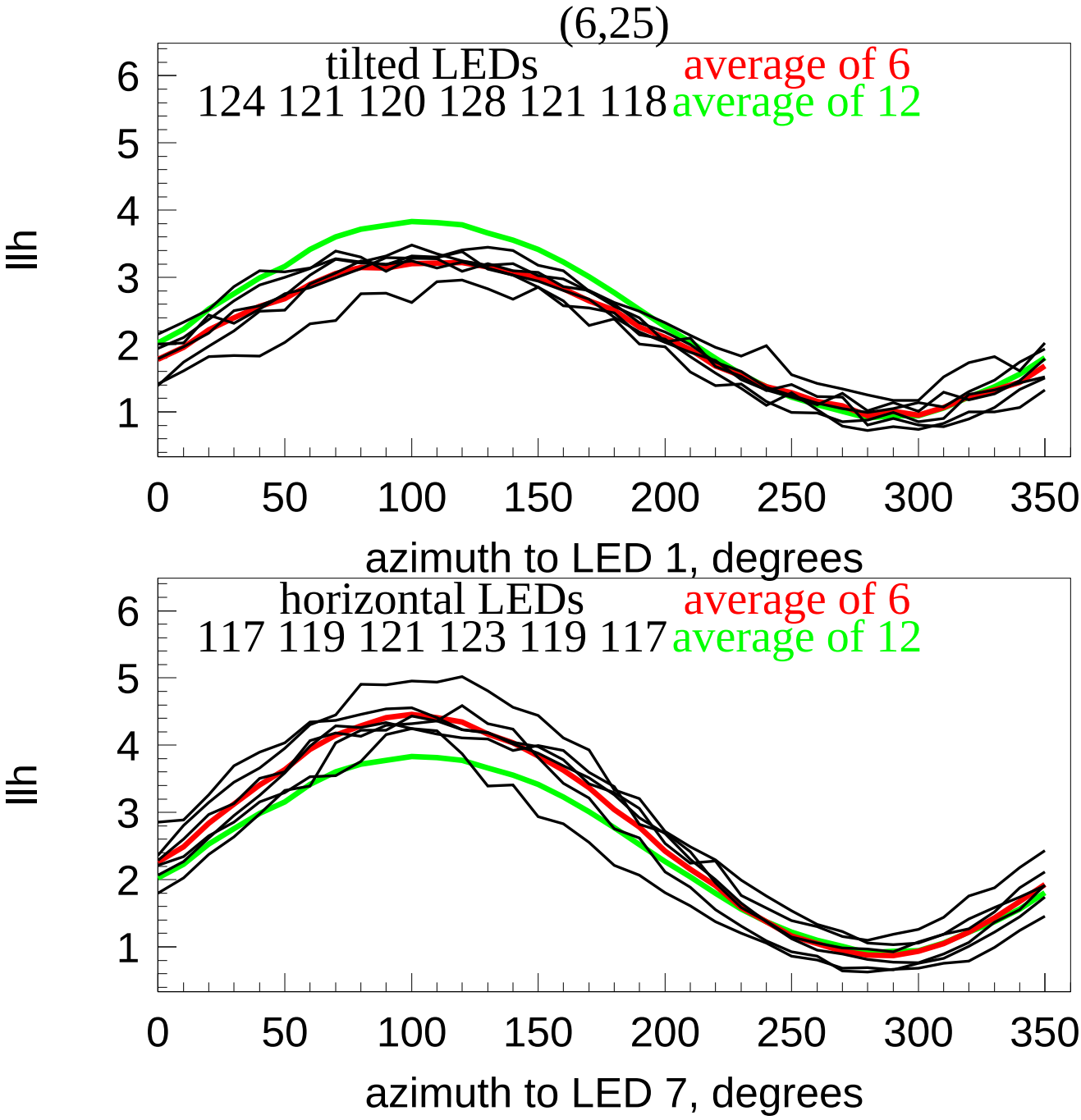

(6,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
266 ± 4.8

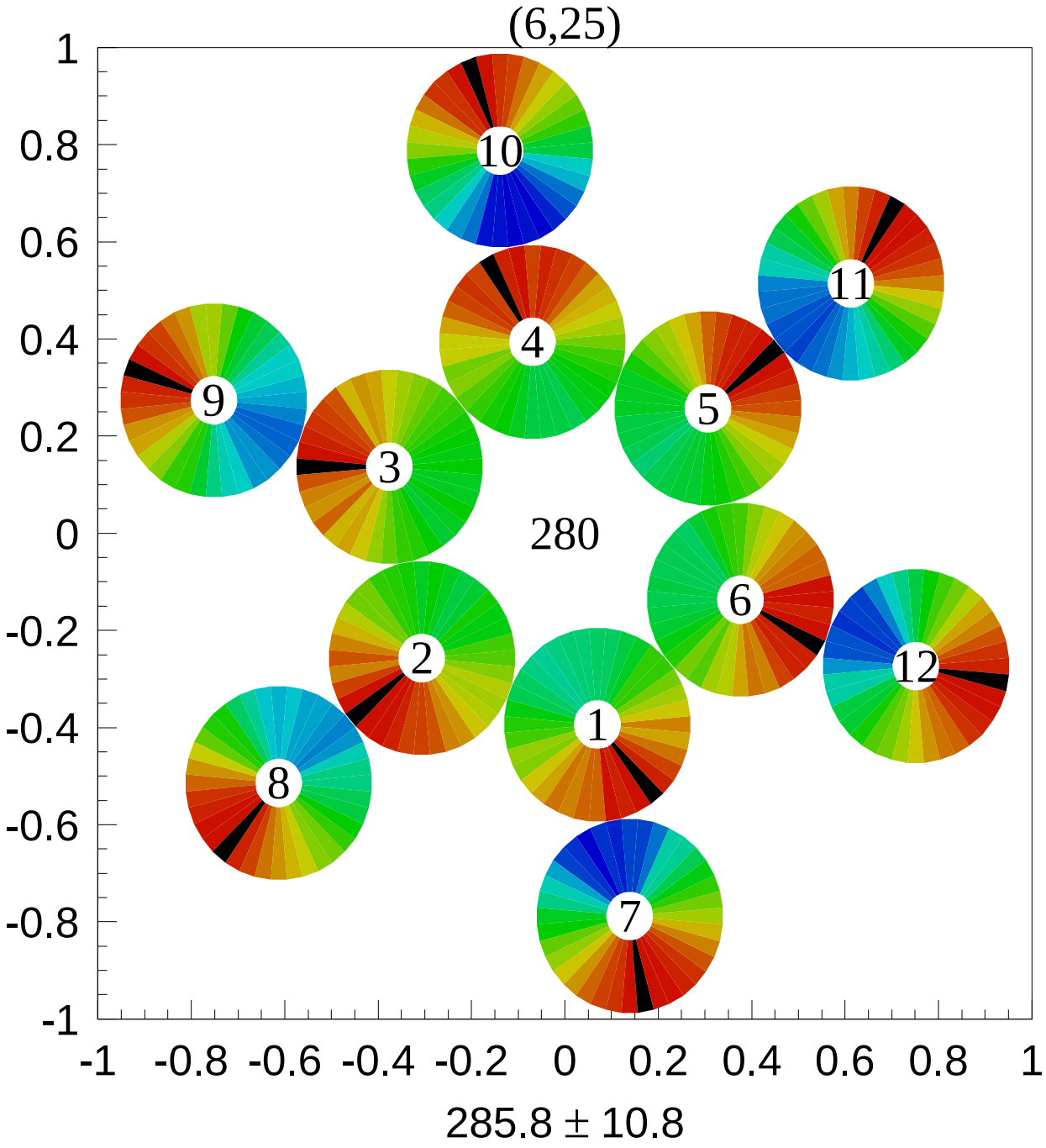

(6,23)
tilted LEDs
118 119 121 117 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 117 126 118 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

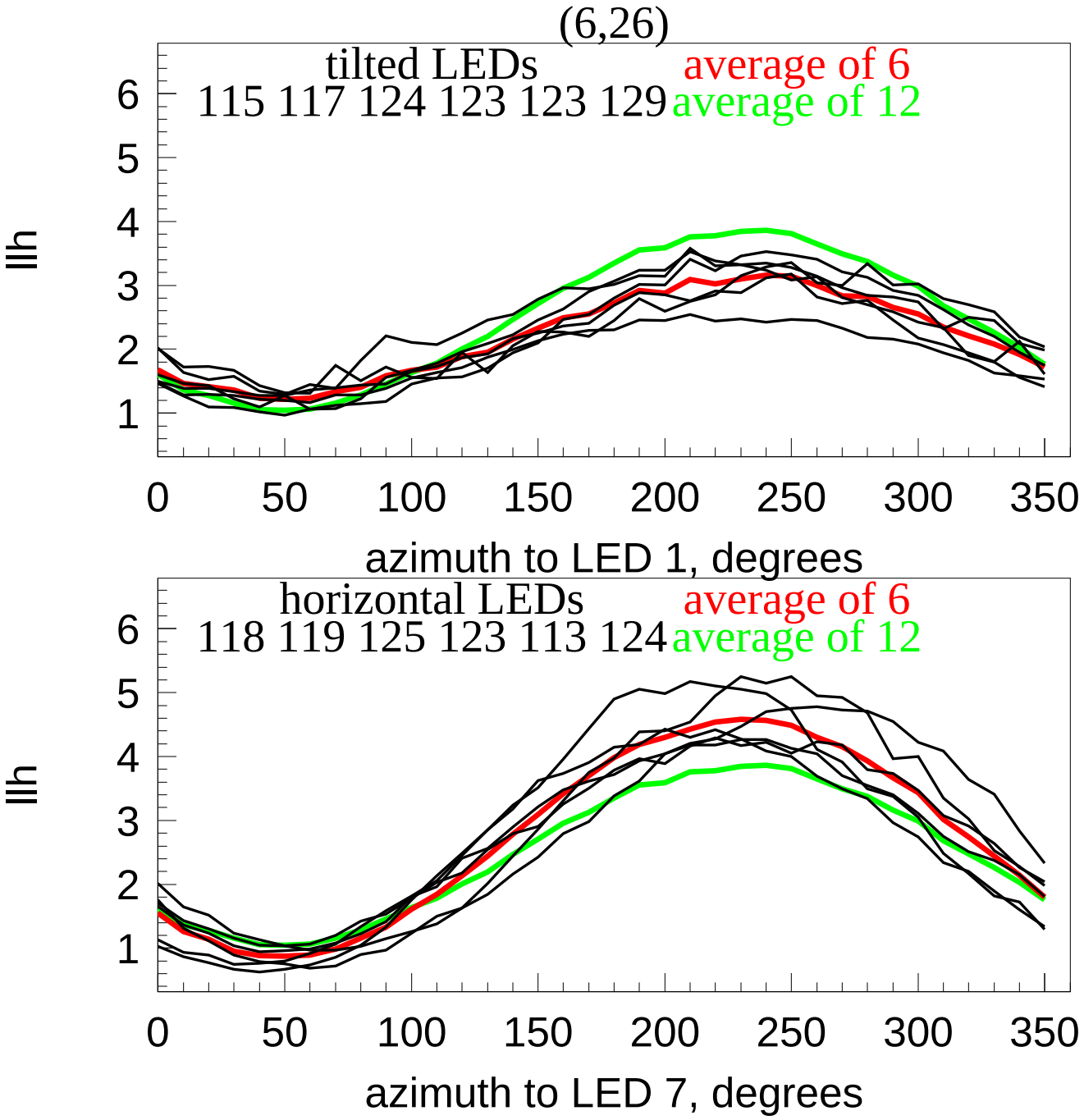

(6,23)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
210.2 ± 5.0

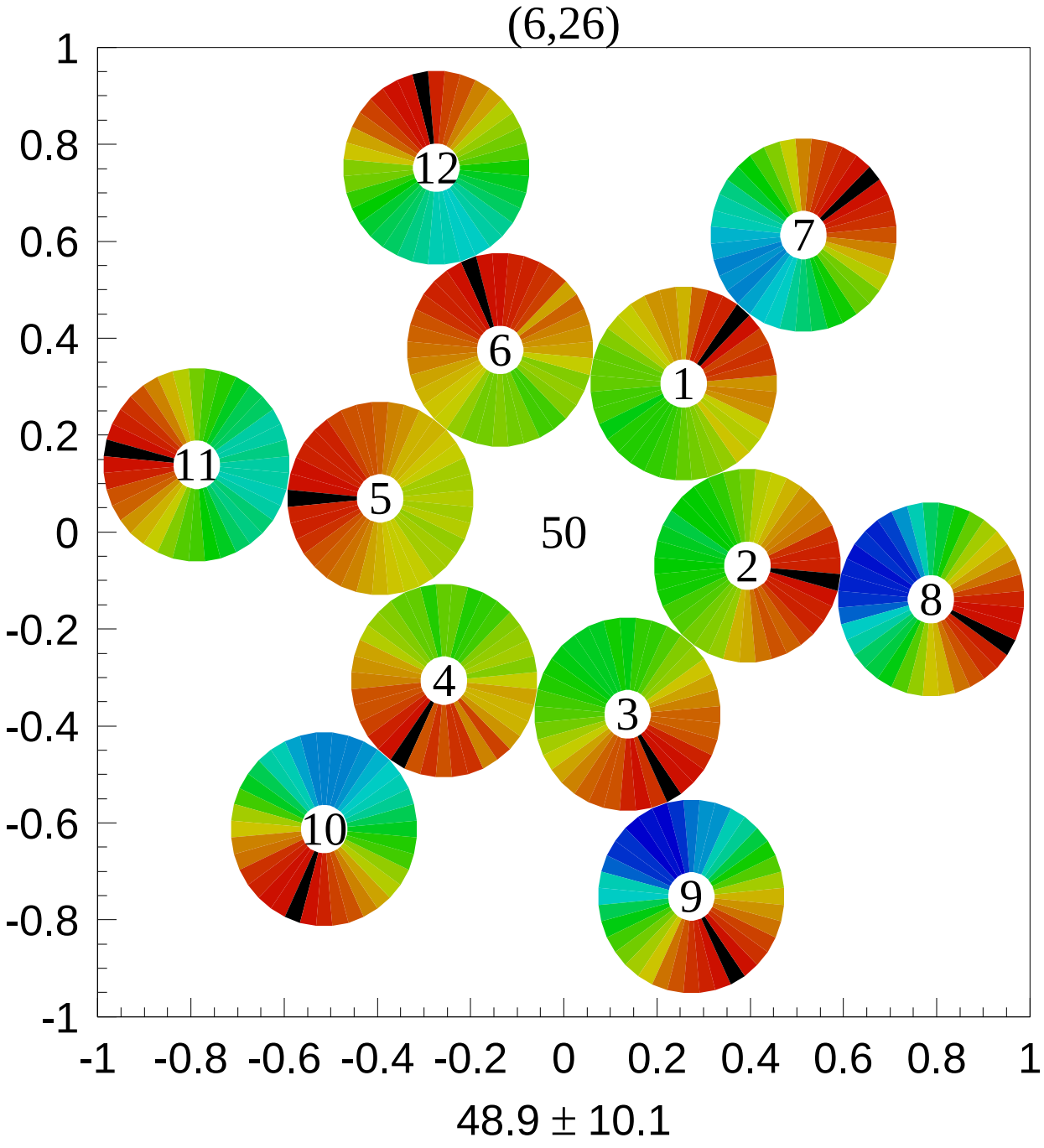

(6,24)
tilted LEDs
126 122 127 122 120 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 126 122 127 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

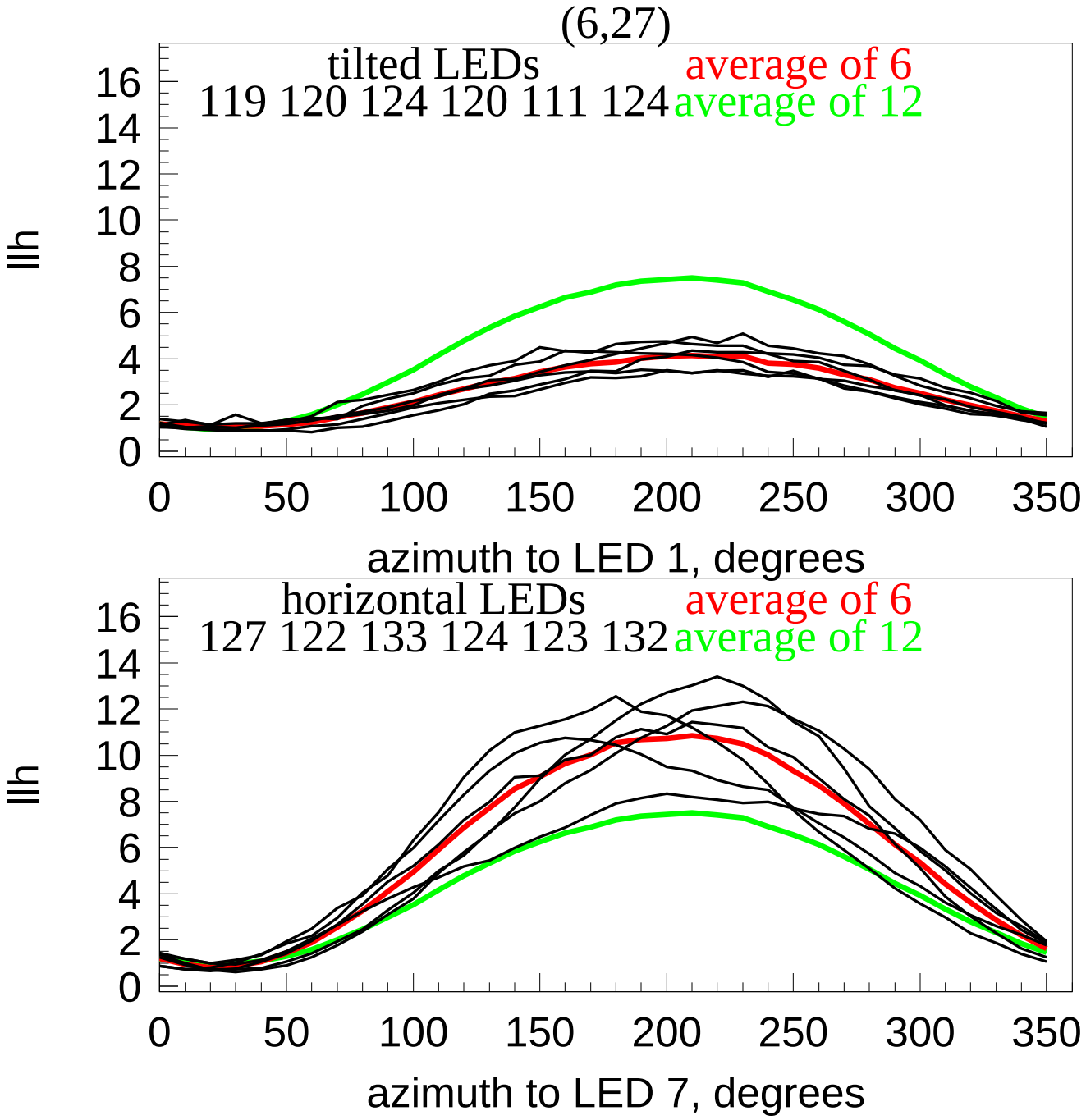

(6,24)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
208.3 ± 6.2

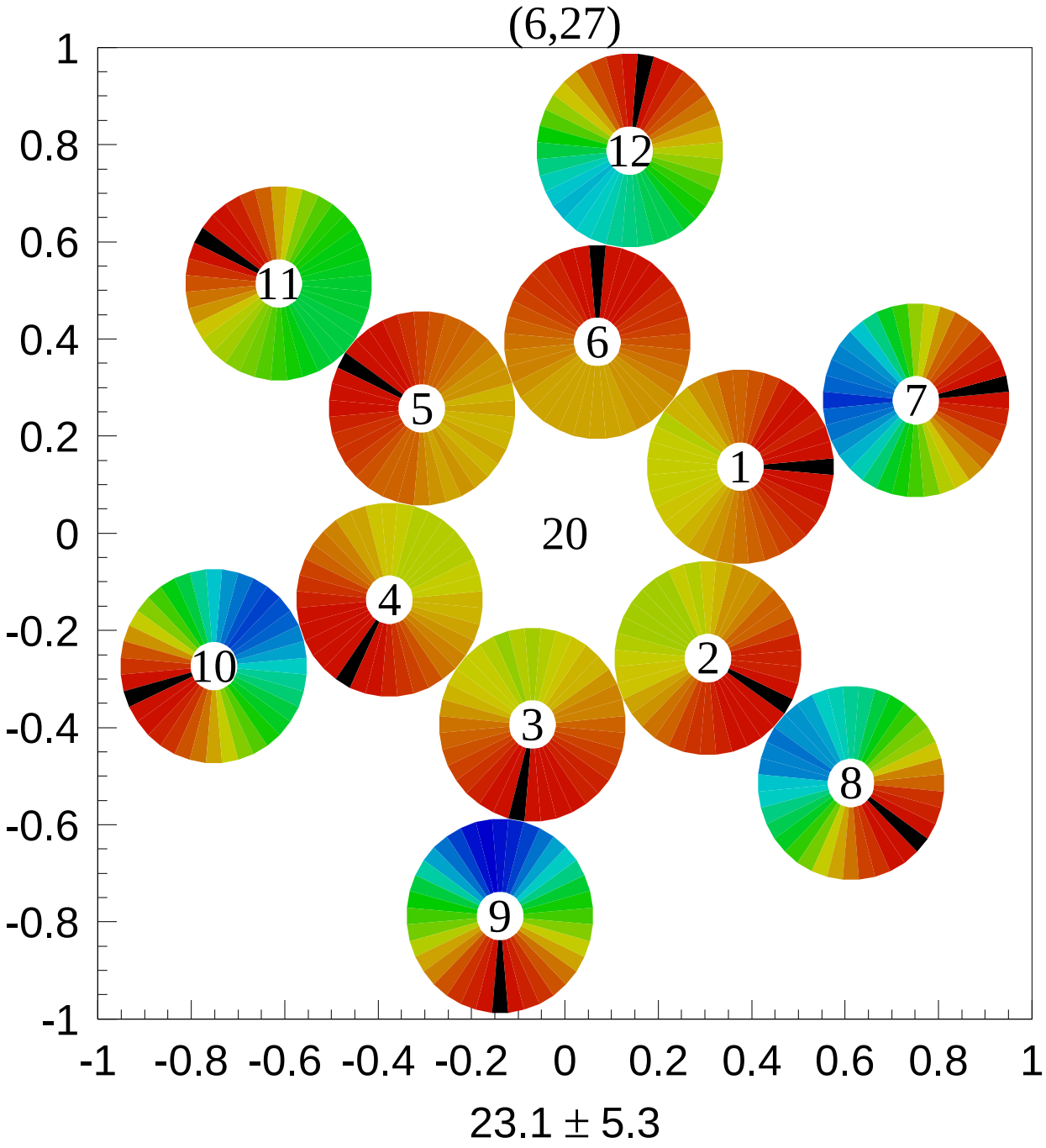

(6,25)
tilted LEDs
124 121 120 128 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 121 123 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

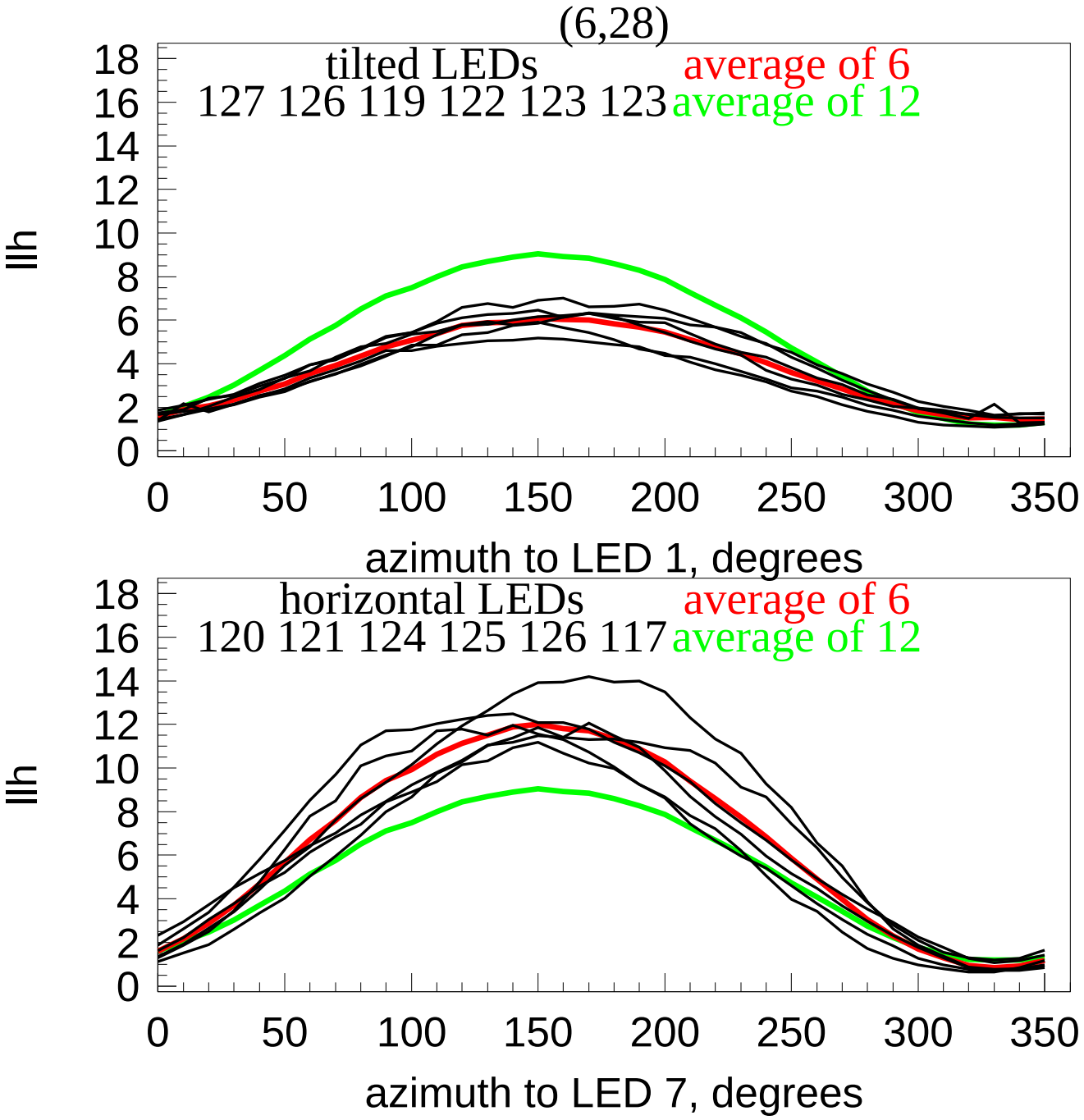

(6,25)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
285.8 ± 10.8

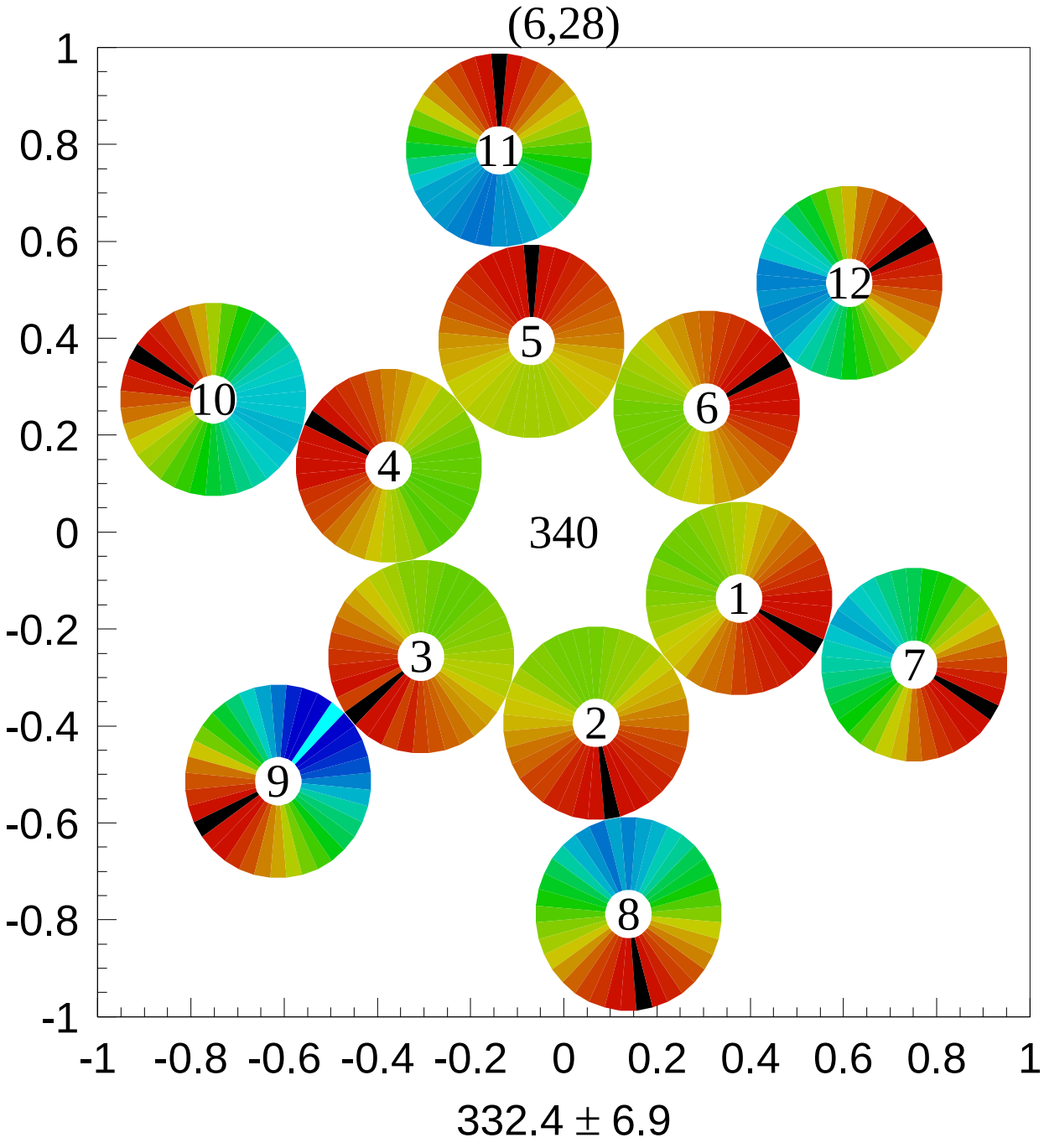

(6,26)
tilted LEDs
115 117 124 123 123 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 119 125 123 113 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

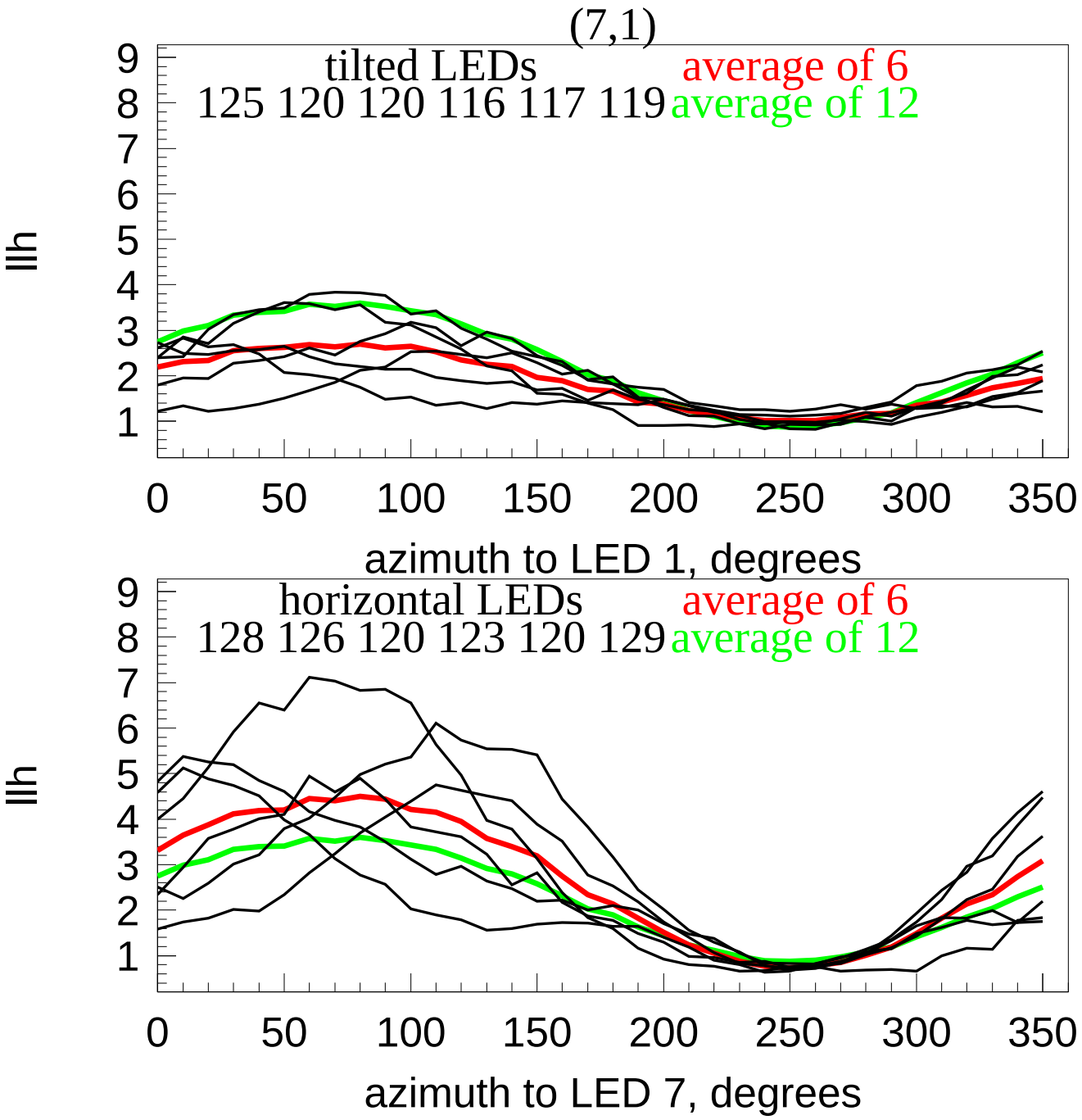

(6,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
48.9 ± 10.1

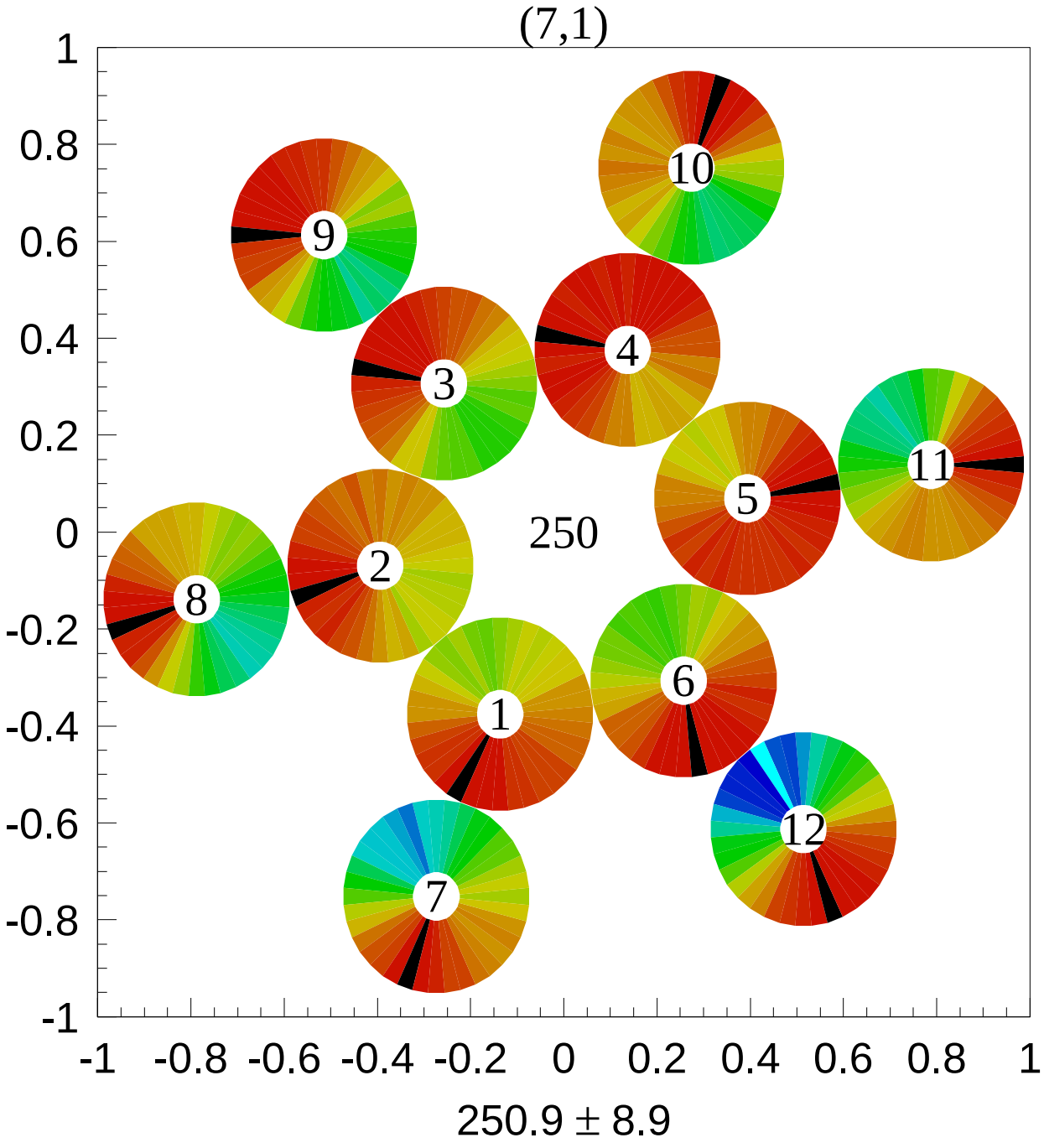

(6,27)
tilted LEDs
119 120 124 120 111 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 133 124 123 132
average of 6
average of 12
llh
azimuth to LED 7, degrees

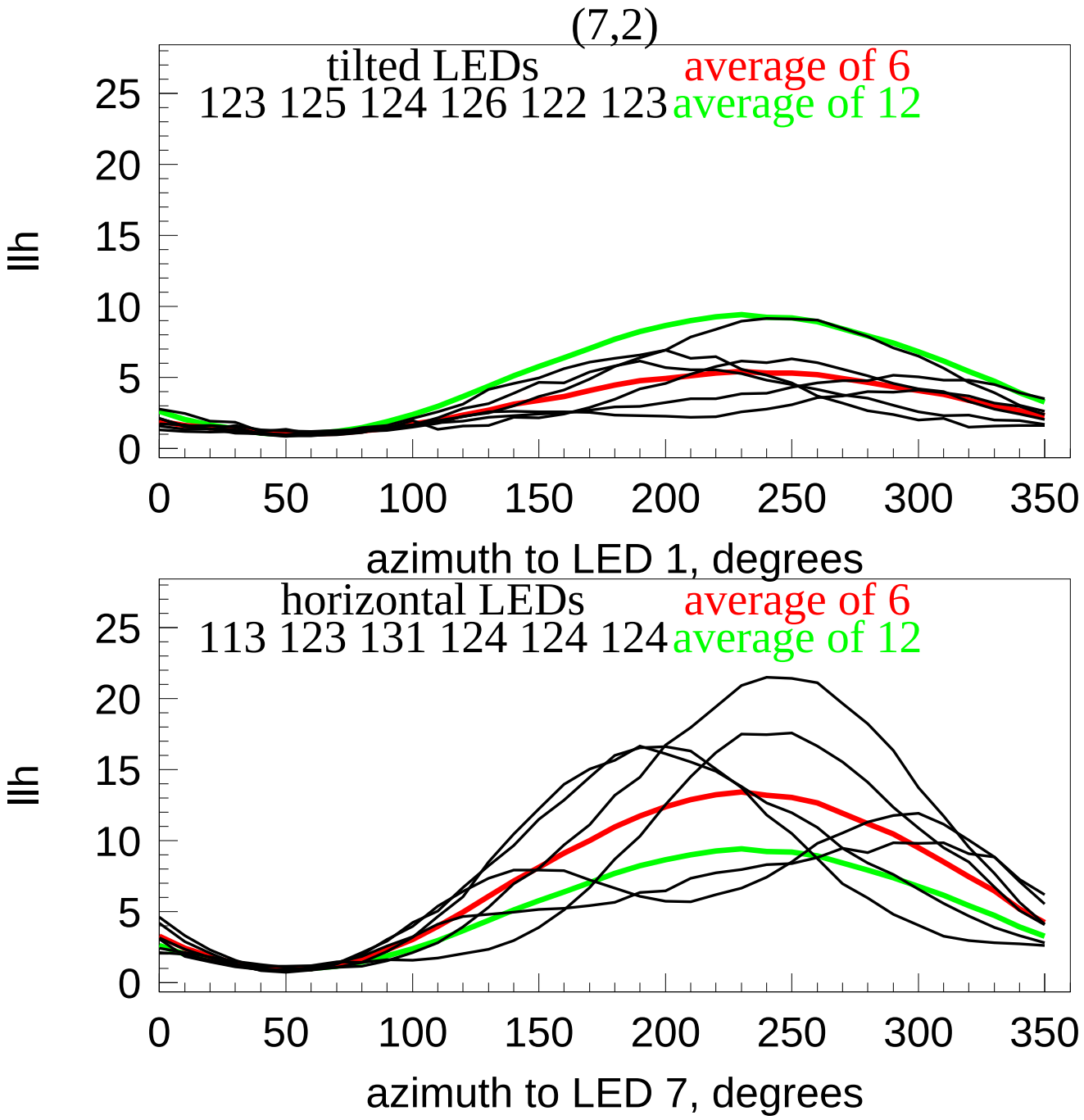

(6,27)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
23.1 ± 5.3

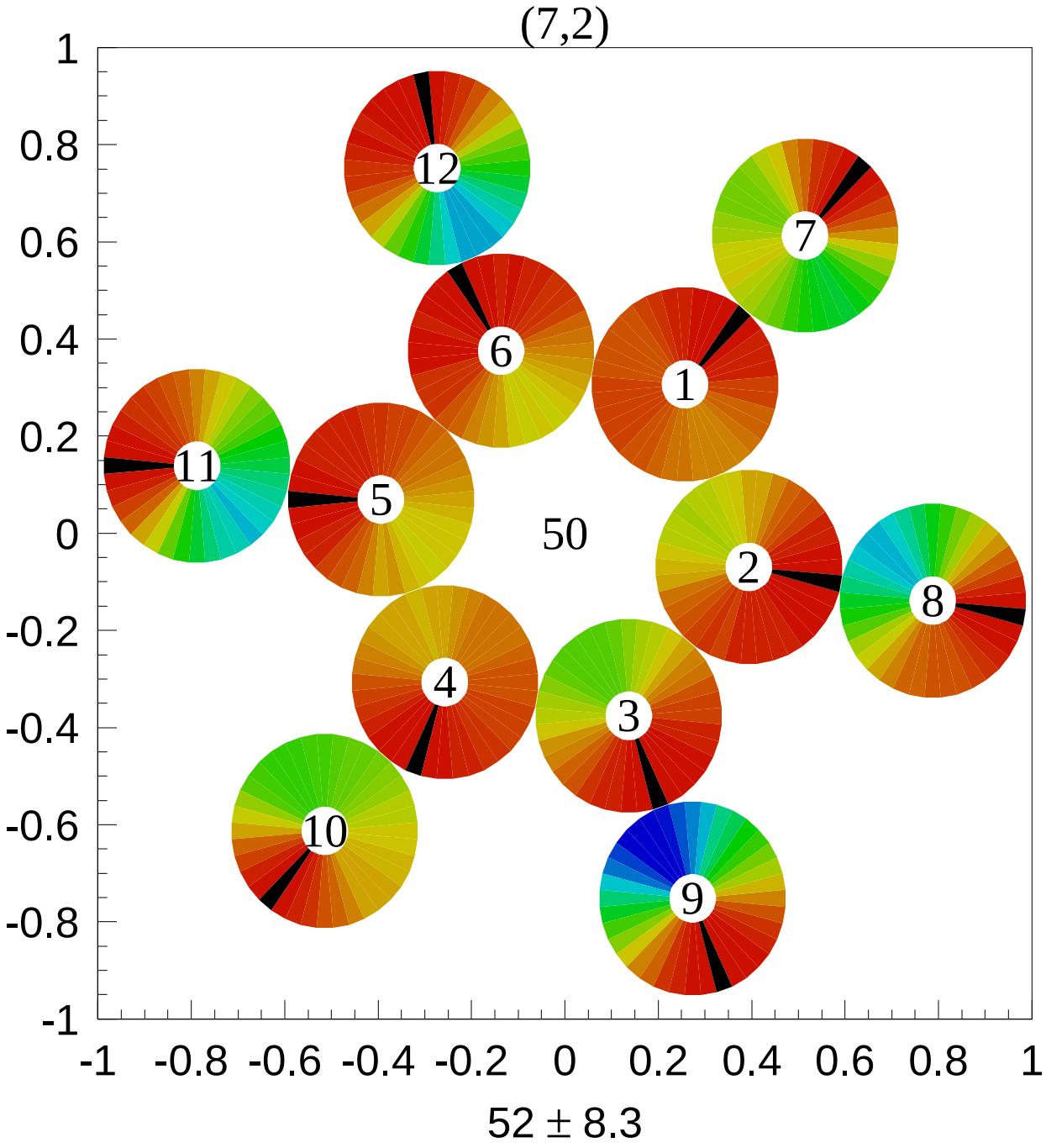

(6,28)
tilted LEDs
127 126 119 122 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 124 125 126 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

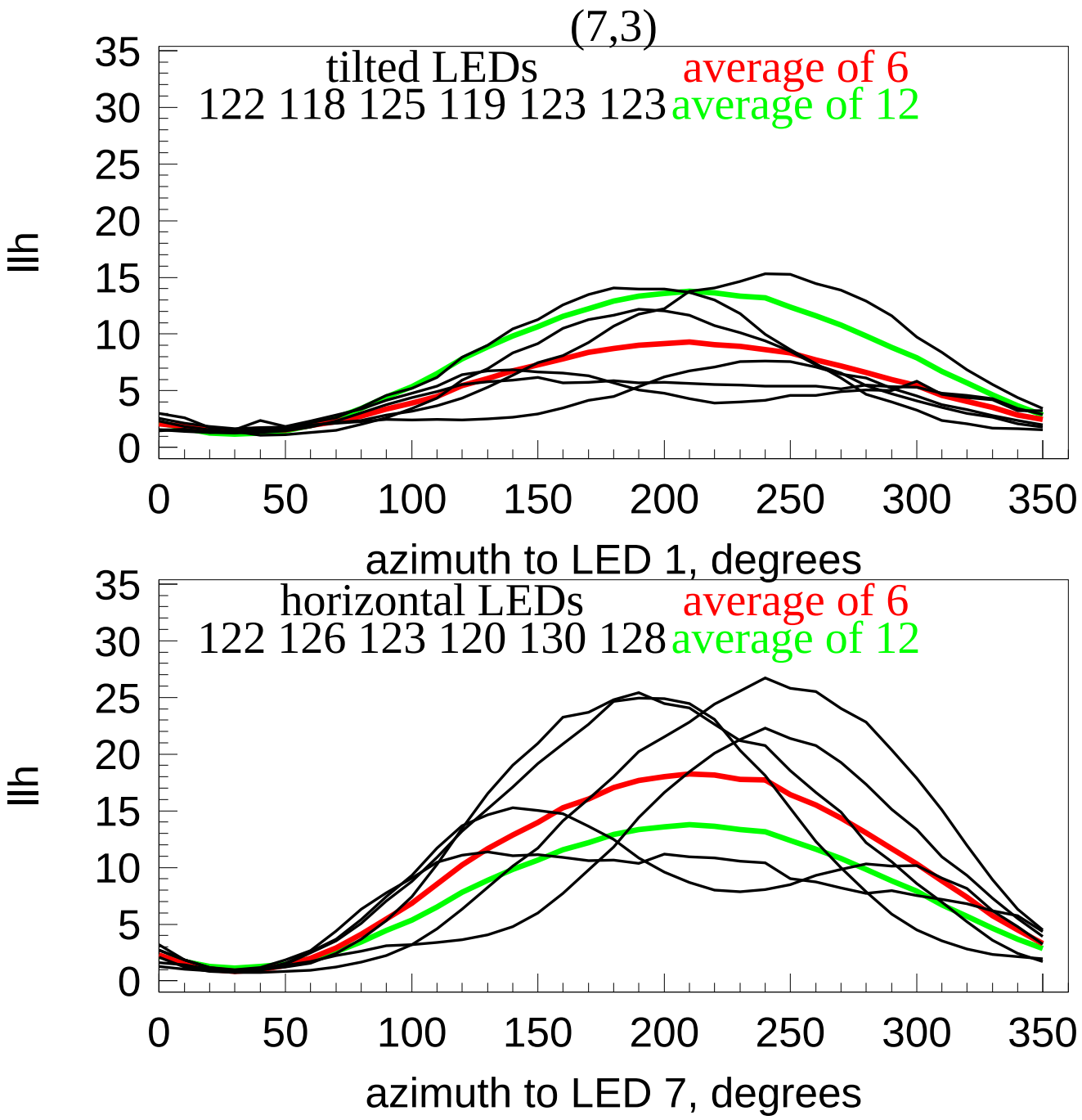

(6,28)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
332.4 ± 6.9

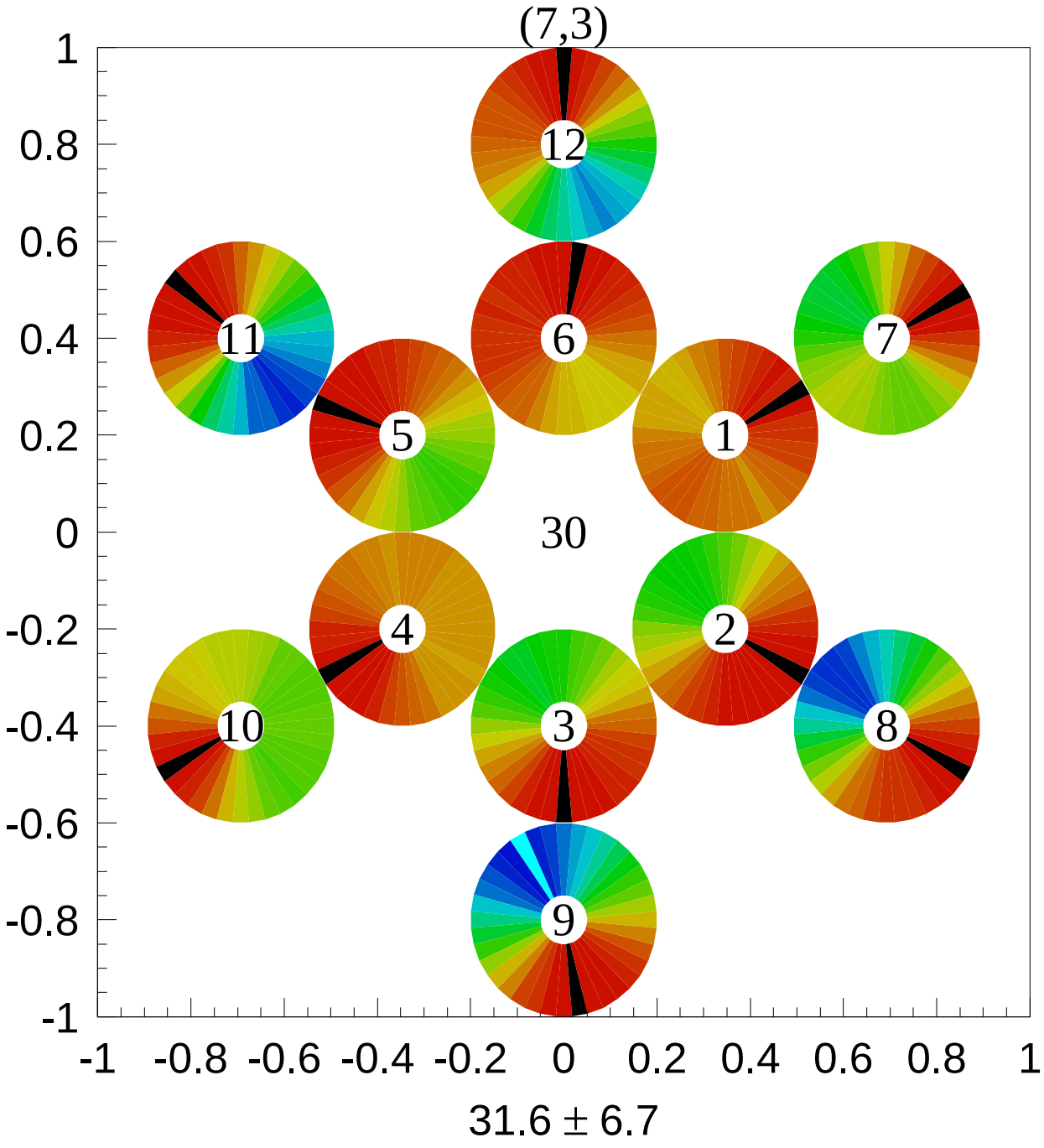

(7,1)
tilted LEDs
125 120 120 116 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 126 120 123 120 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

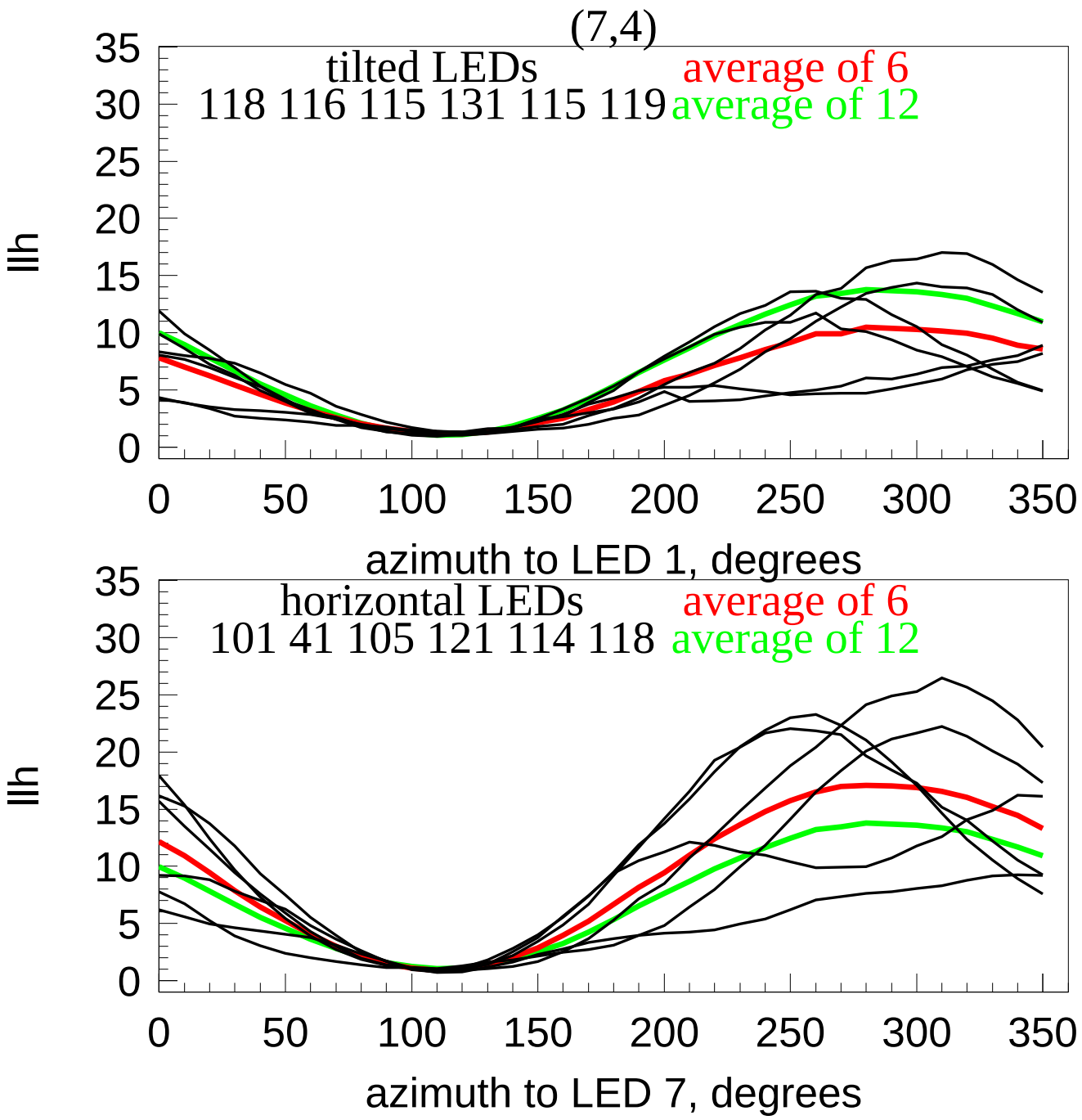

(7,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
250.9 ± 8.9
1
2
3
4
5
6
7
8
9
10
11
12

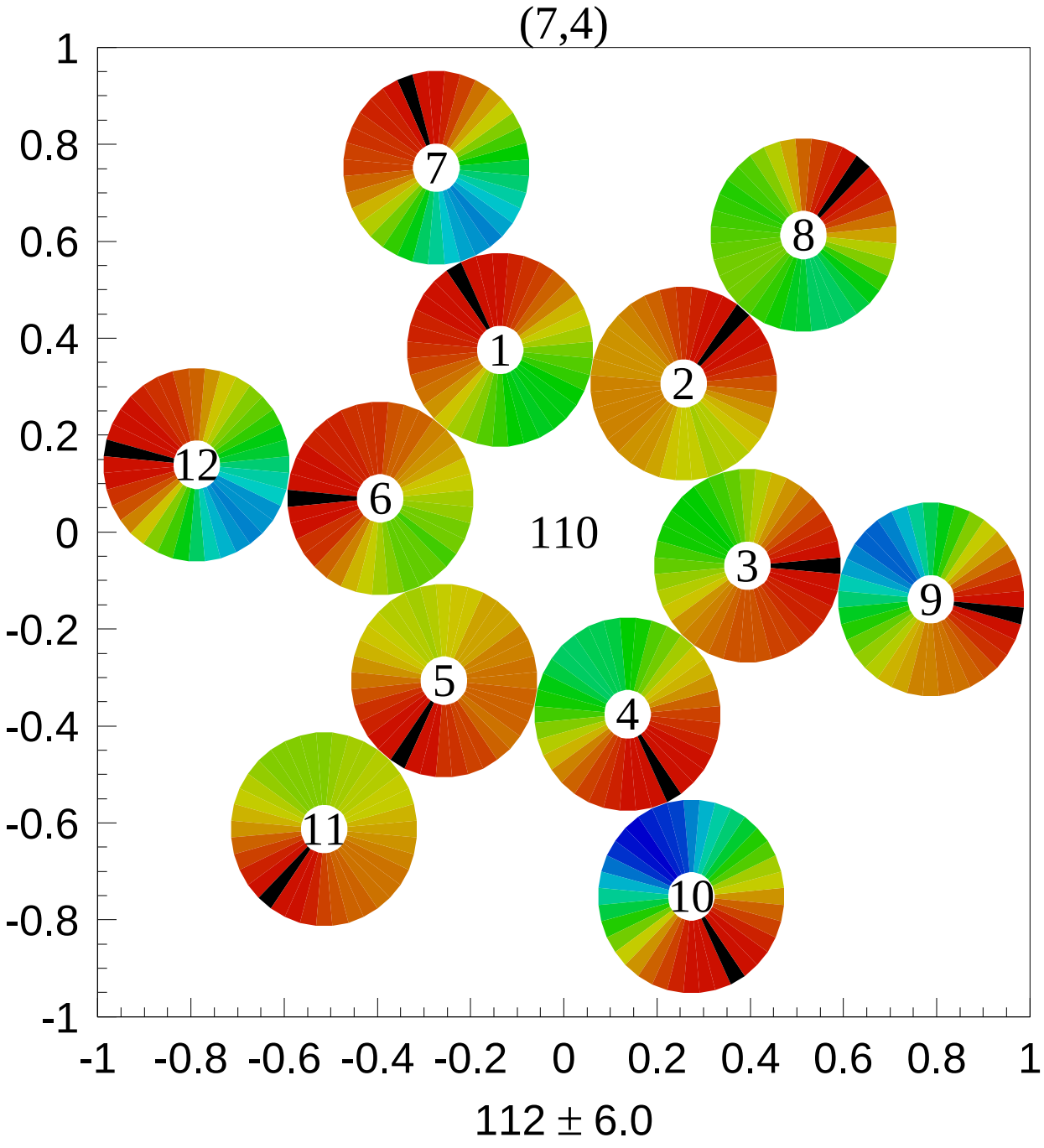

(7,2)
tilted LEDs
123 125 124 126 122 123
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
113 123 131 124 124 124
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

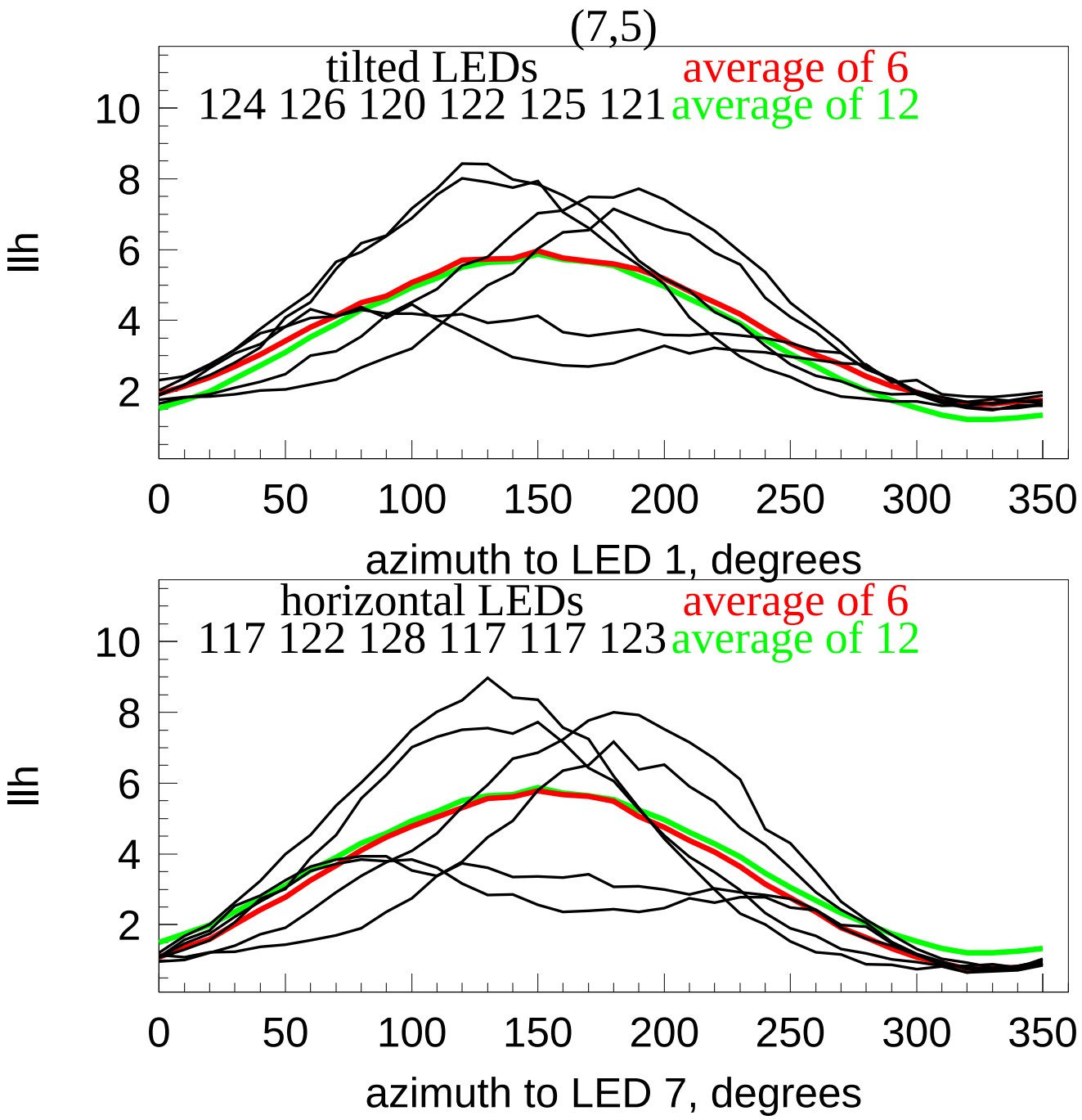

(7,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
52 ± 8.3

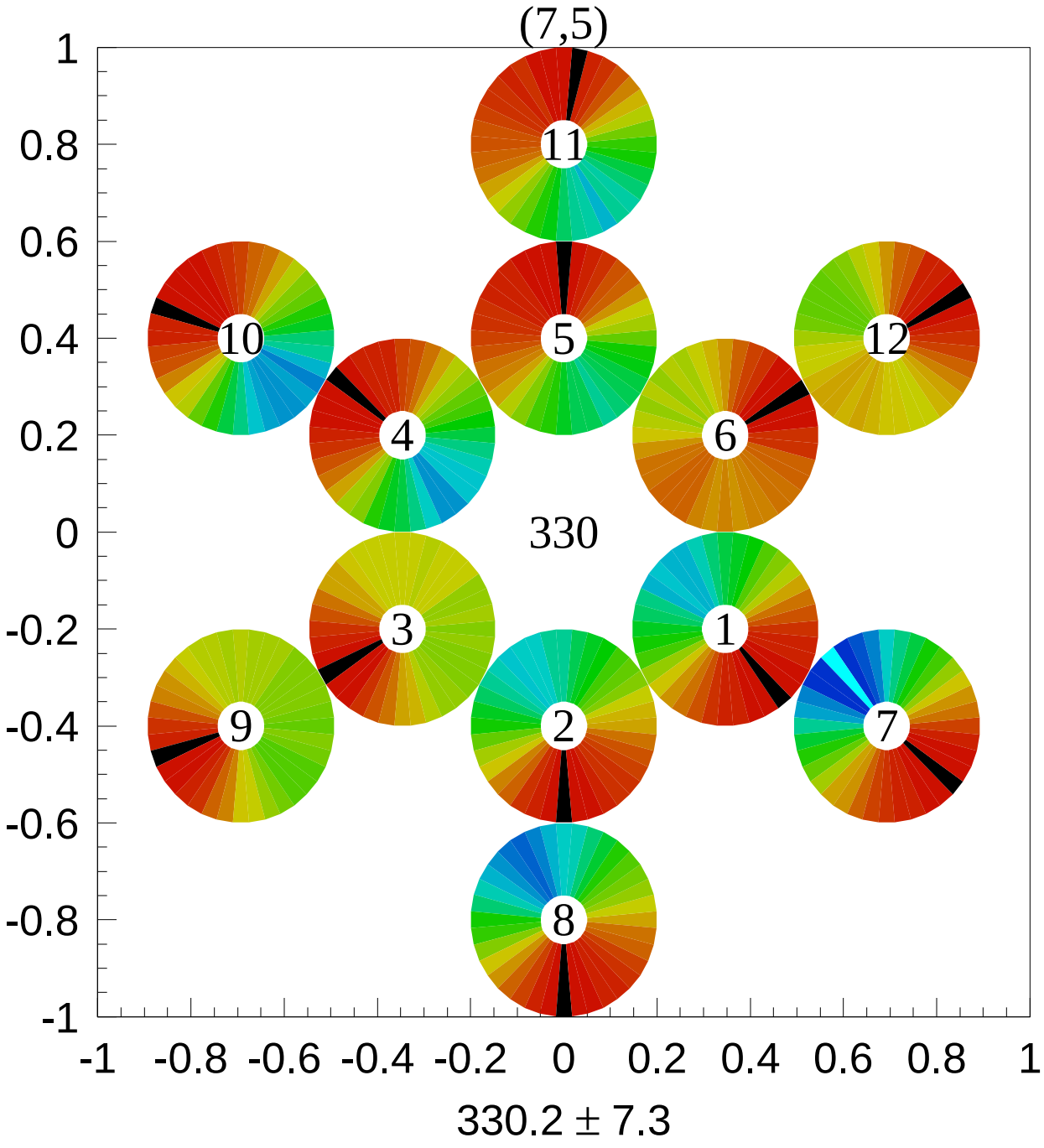

(7,3)
tilted LEDs
122 118 125 119 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 126 123 120 130 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

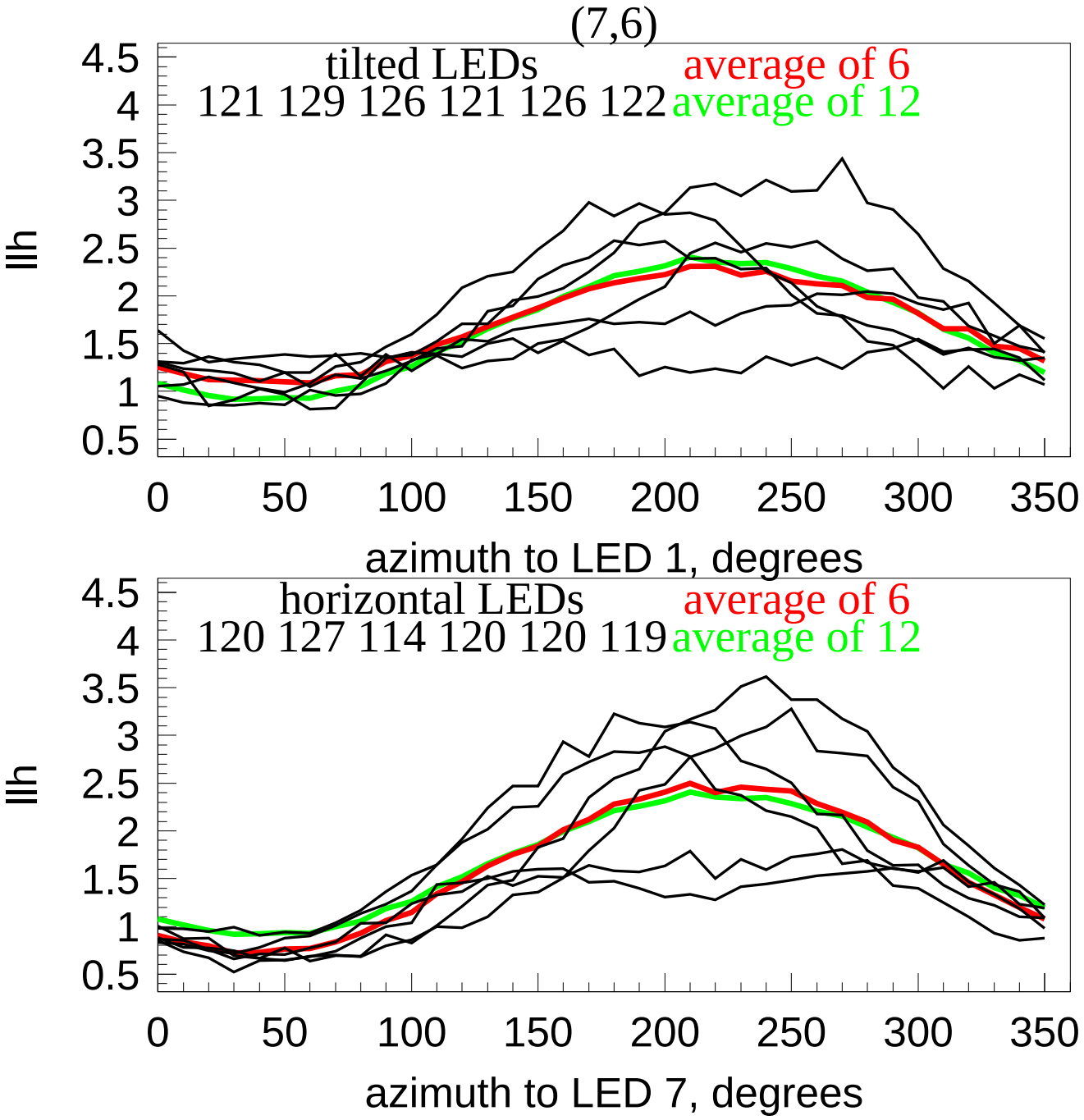

(7,3)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
31.6 ± 6.7

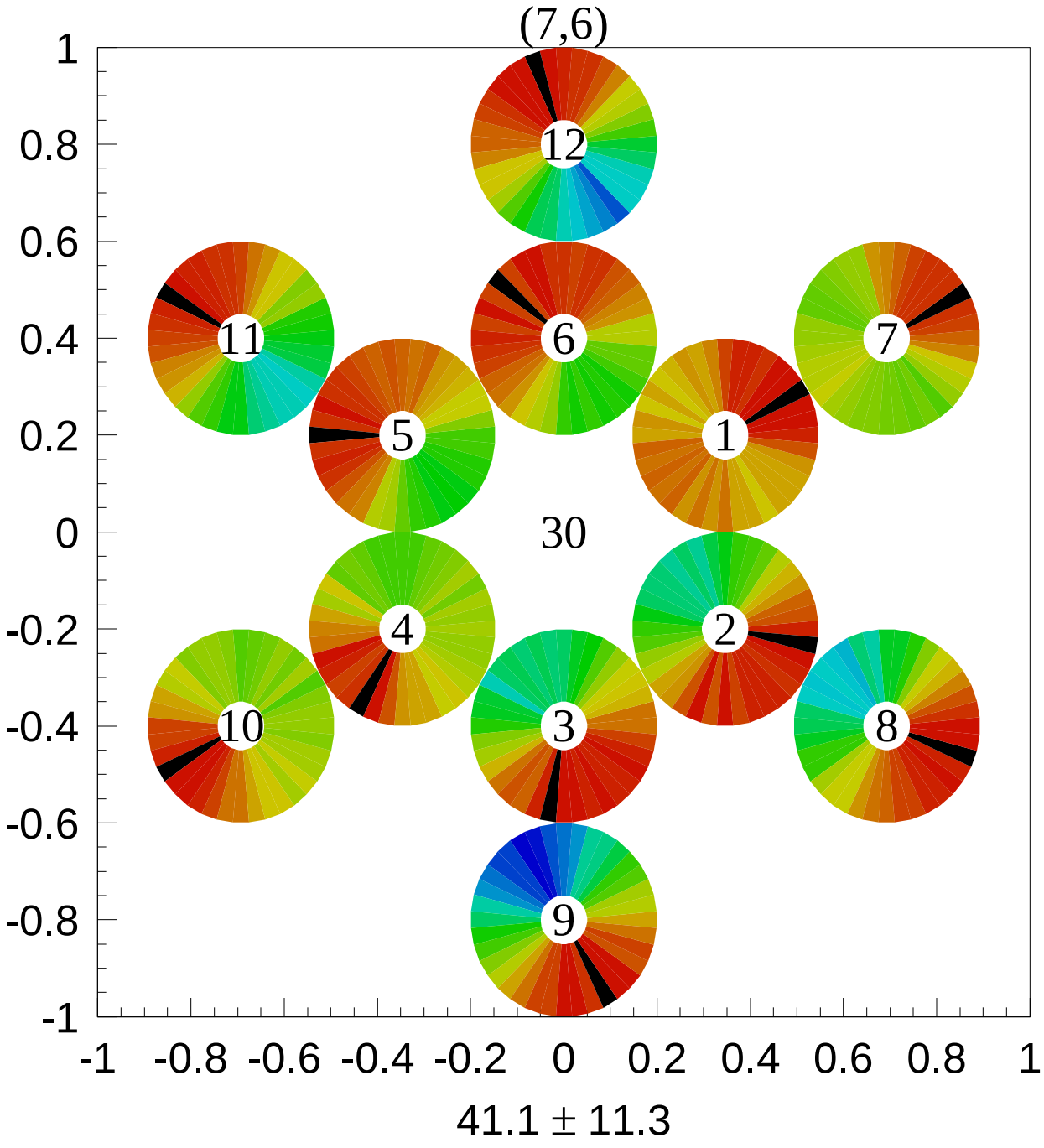

(7,4)
tilted LEDs
118 116 115 131 115 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
101 41 105 121 114 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

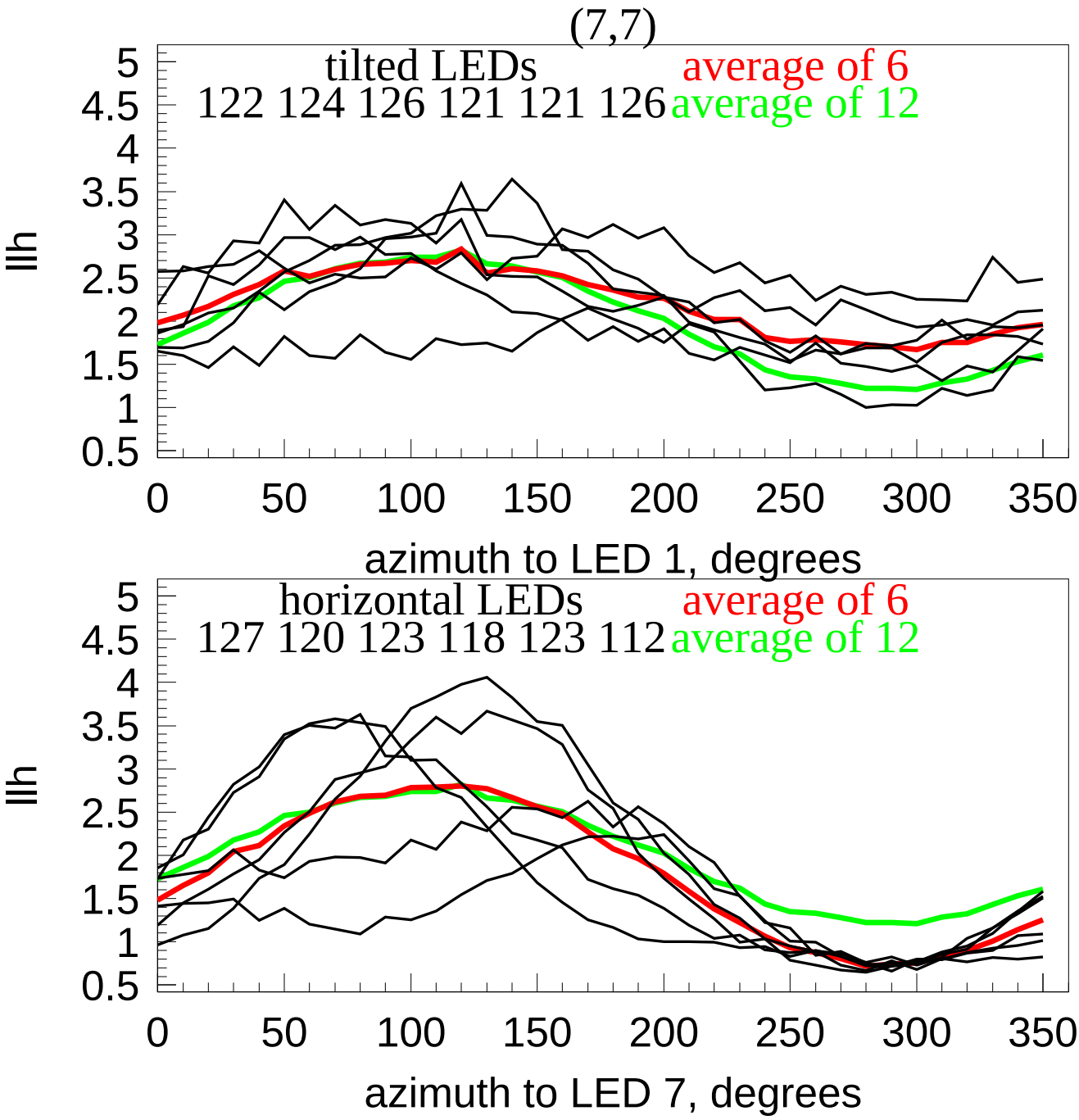

(7,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112 ± 6.0

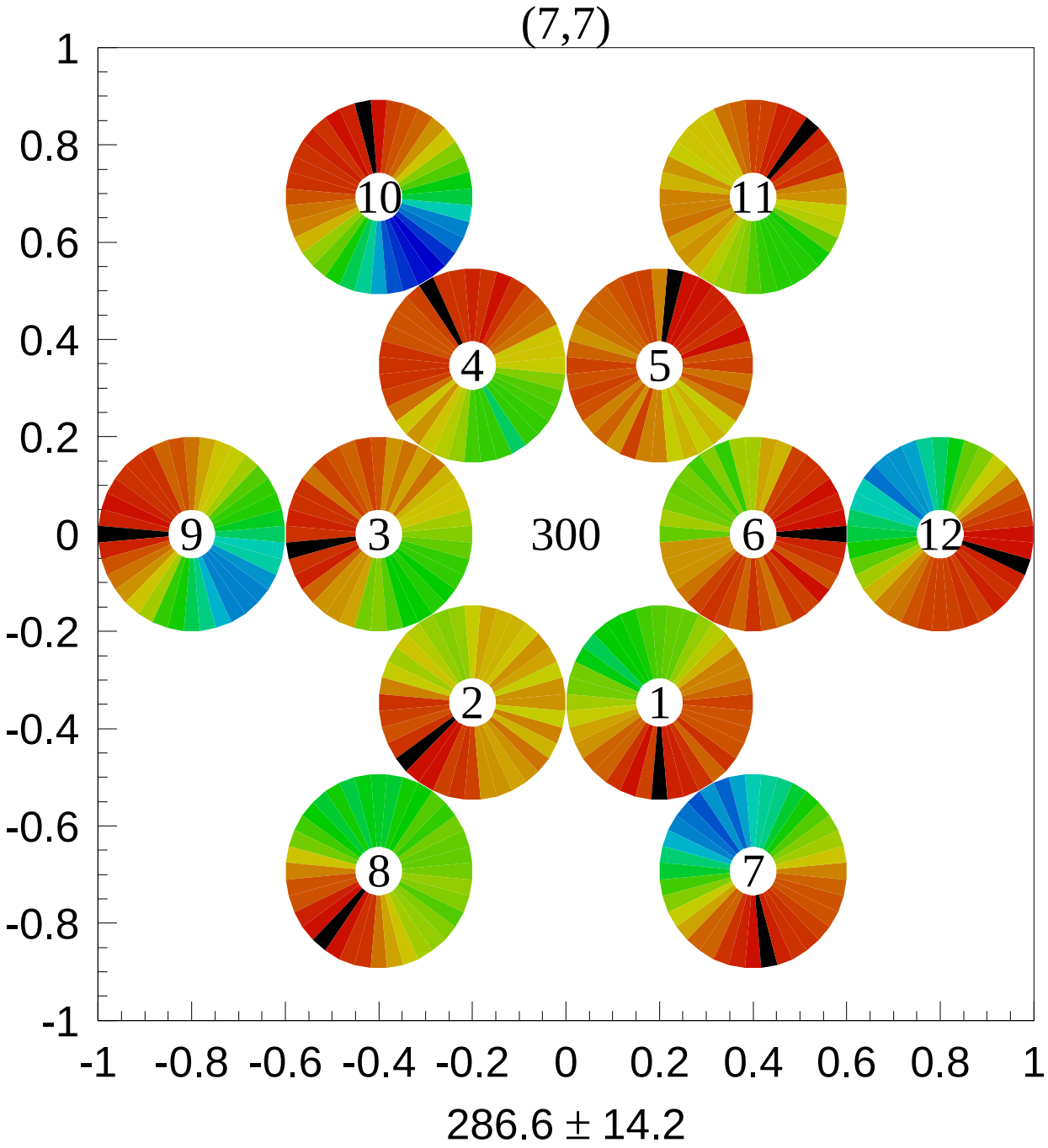

(7,5)
tilted LEDs
124 126 120 122 125 121
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 122 128 117 117 123
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

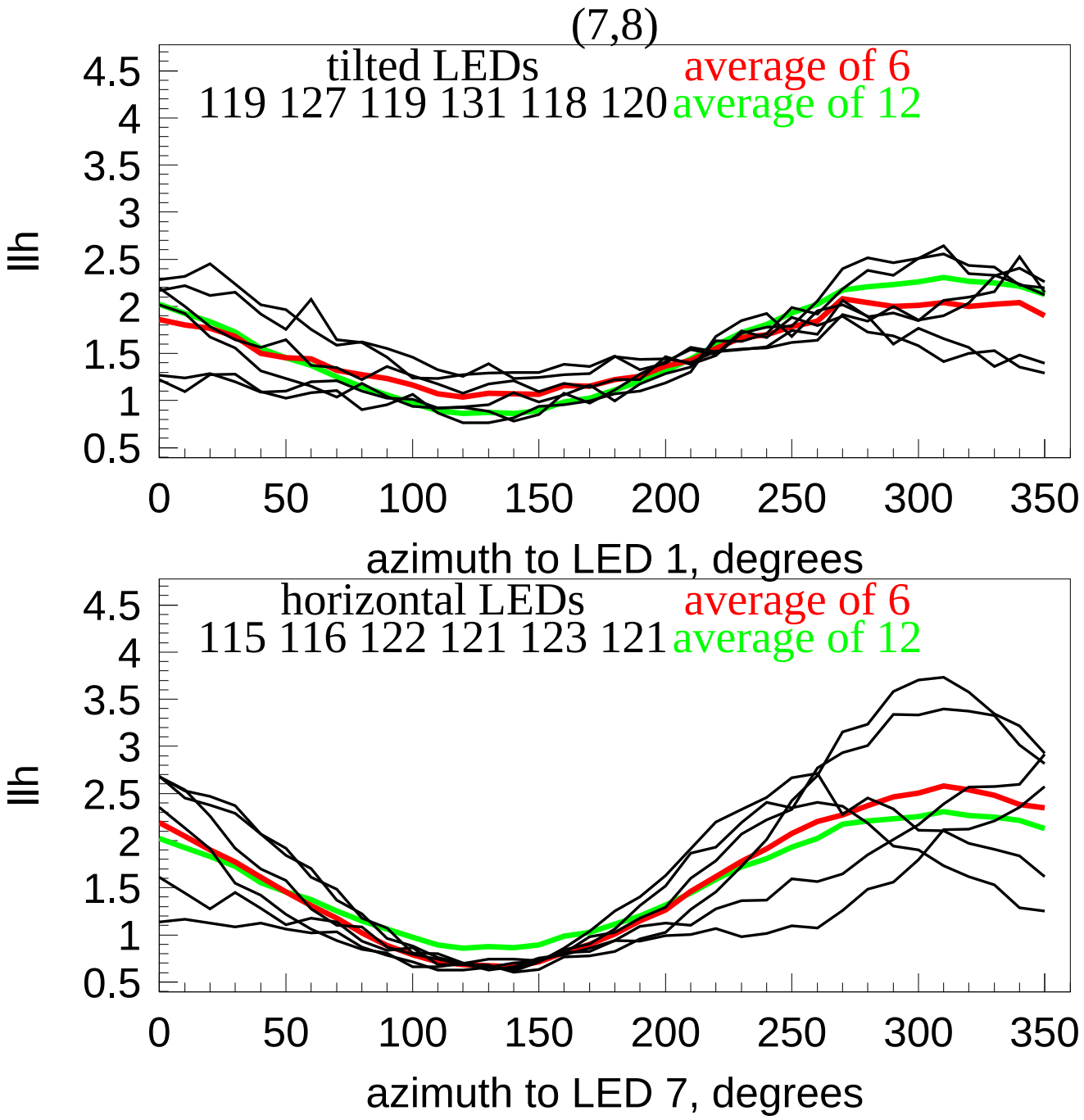

(7,5)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
330.2 ± 7.3

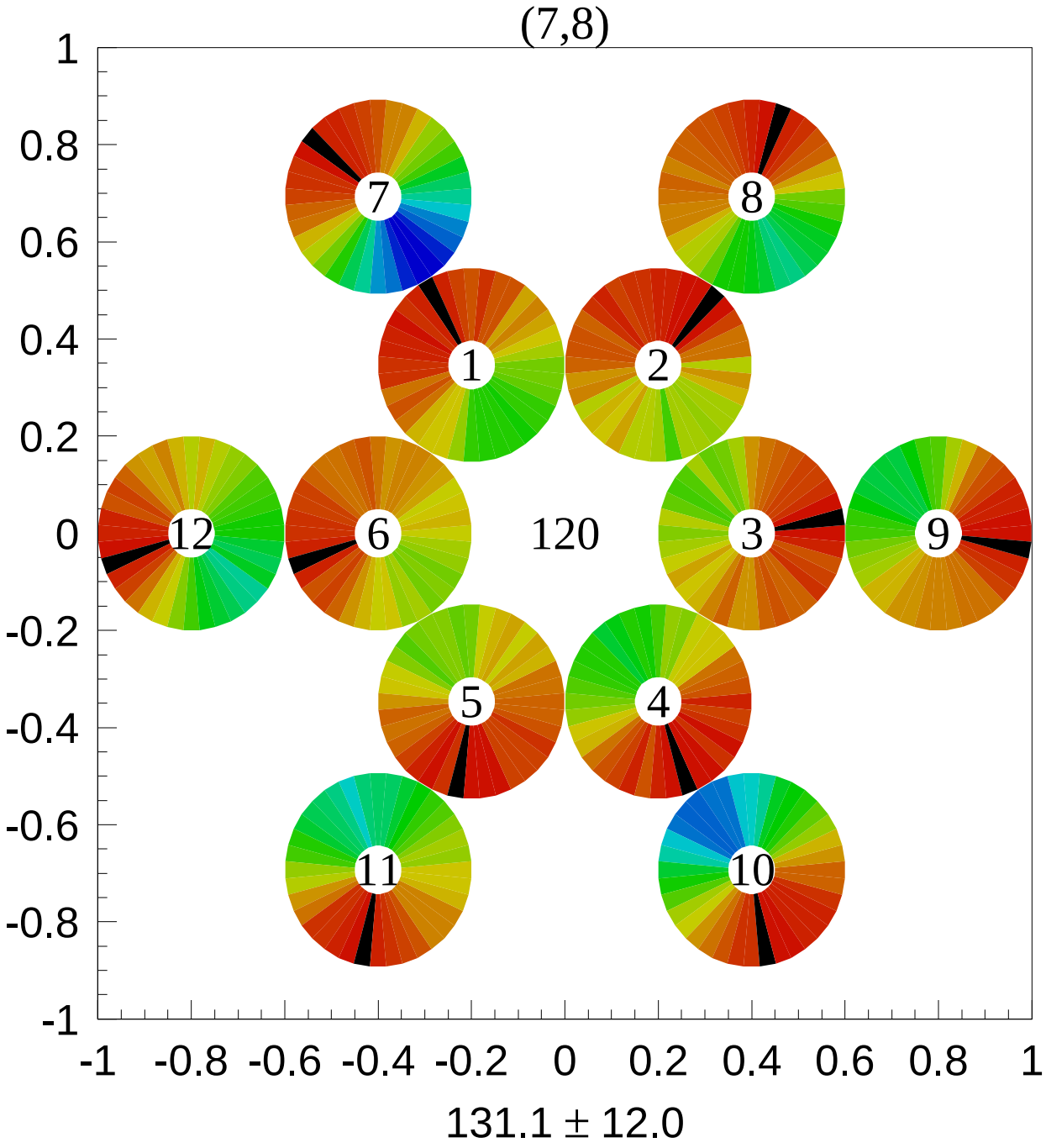

(7,6)
tilted LEDs
121 129 126 121 126 122
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 127 114 120 120 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

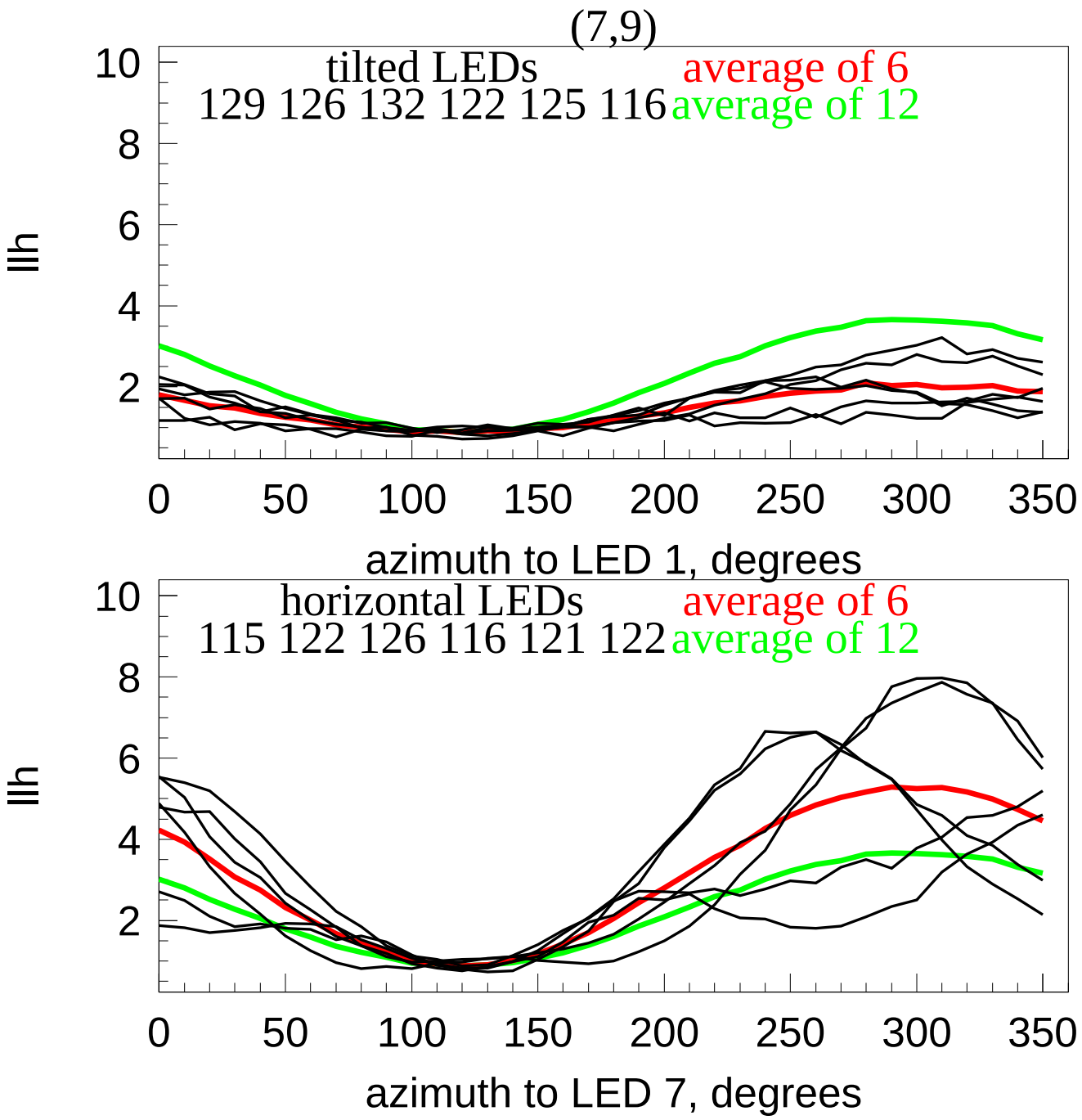

(7,6)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
41.1 ± 11.3

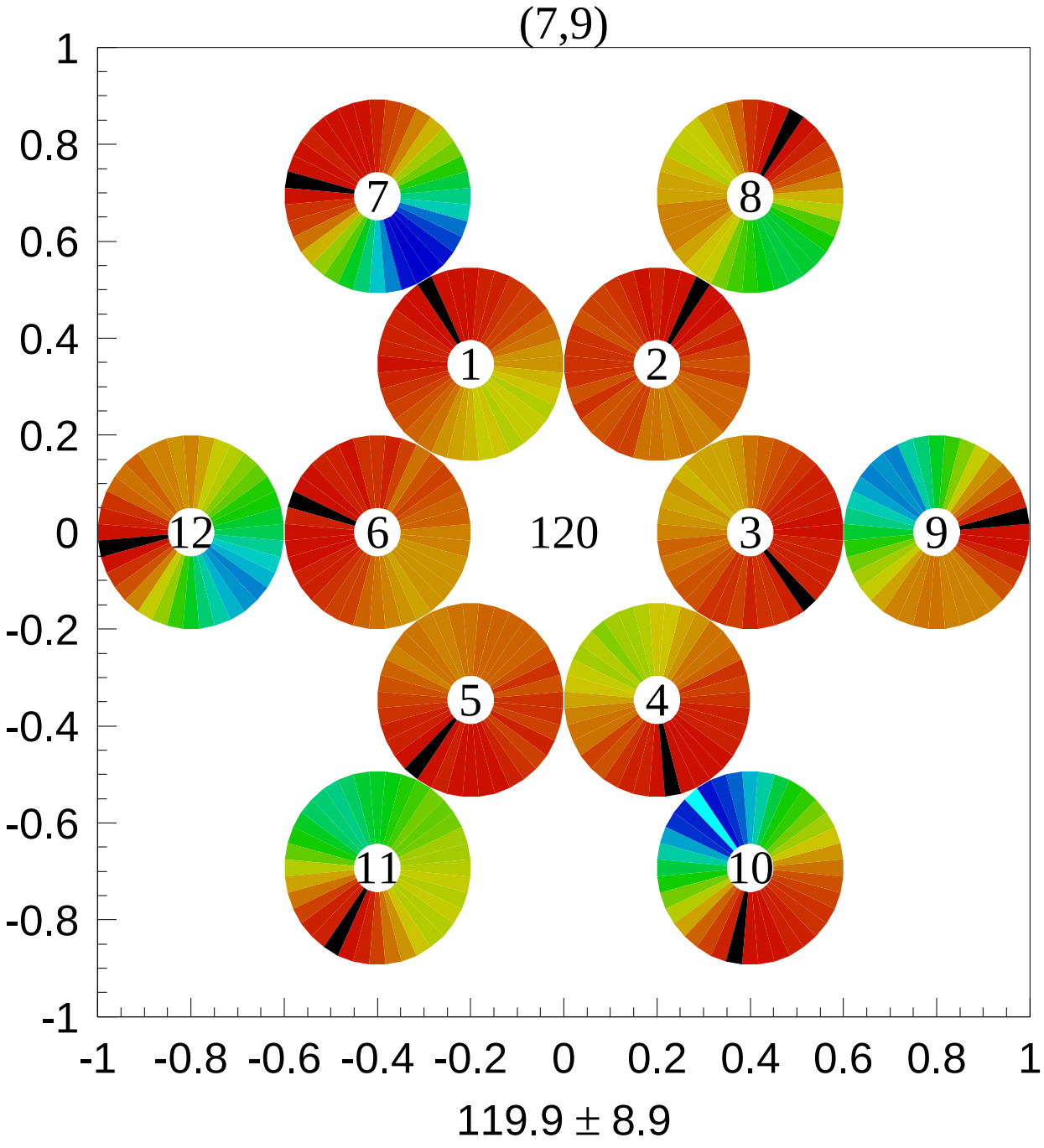

(7,7)
tilted LEDs
122 124 126 121 121 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 120 123 118 123 112
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

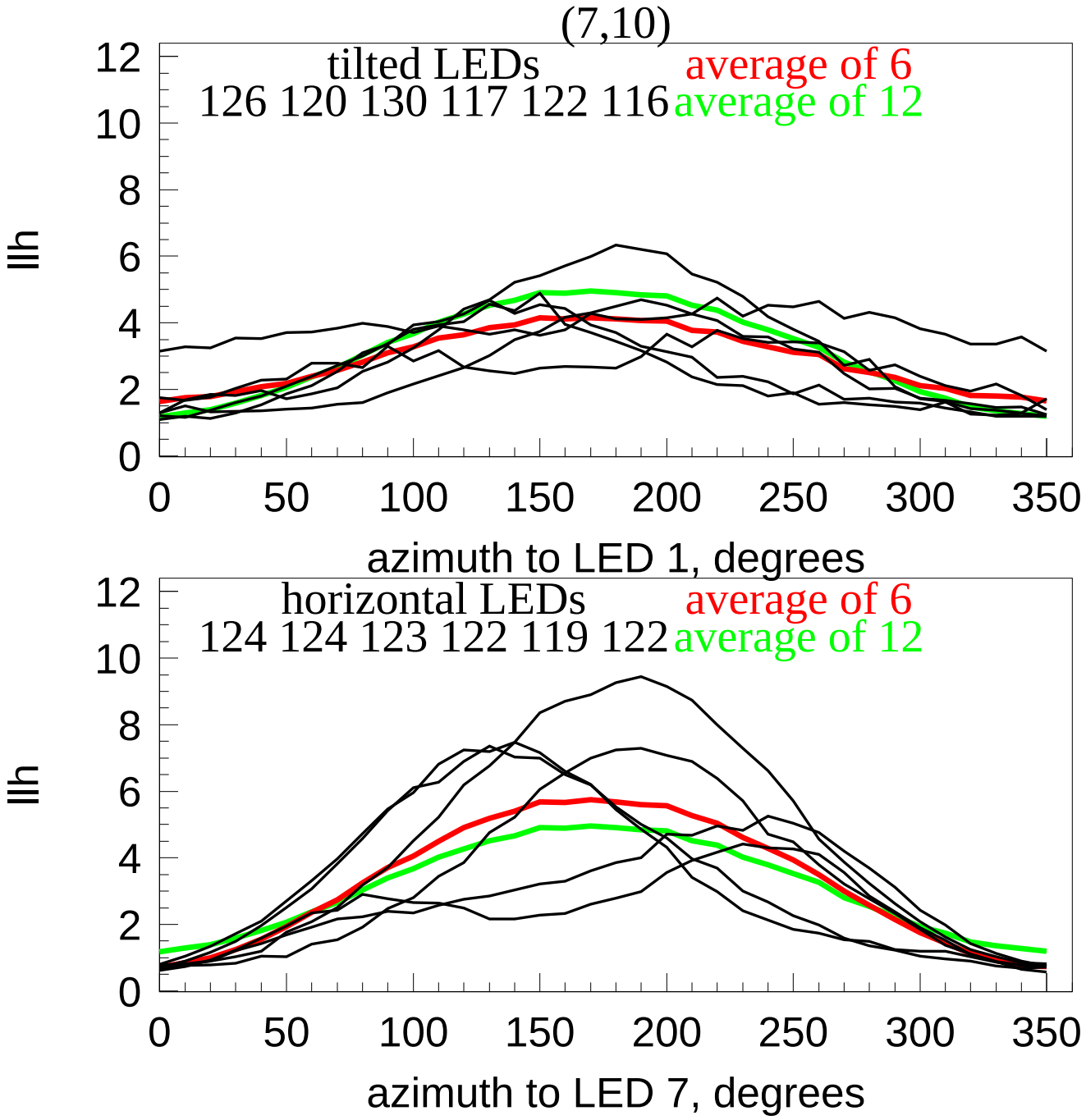

(7,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
286.6 ± 14.2

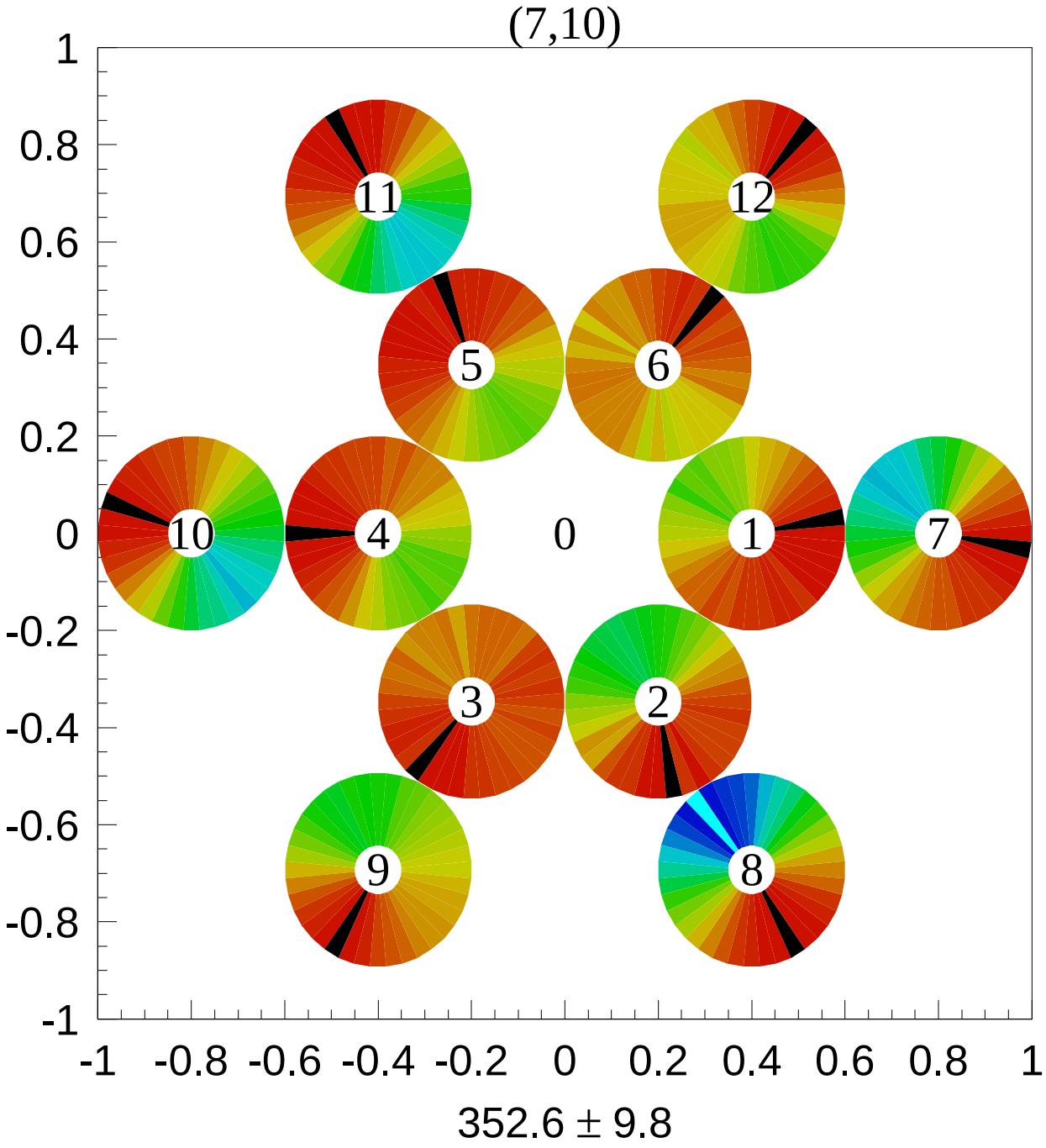

(7,8)
tilted LEDs
119 127 119 131 118 120
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
115 116 122 121 123 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

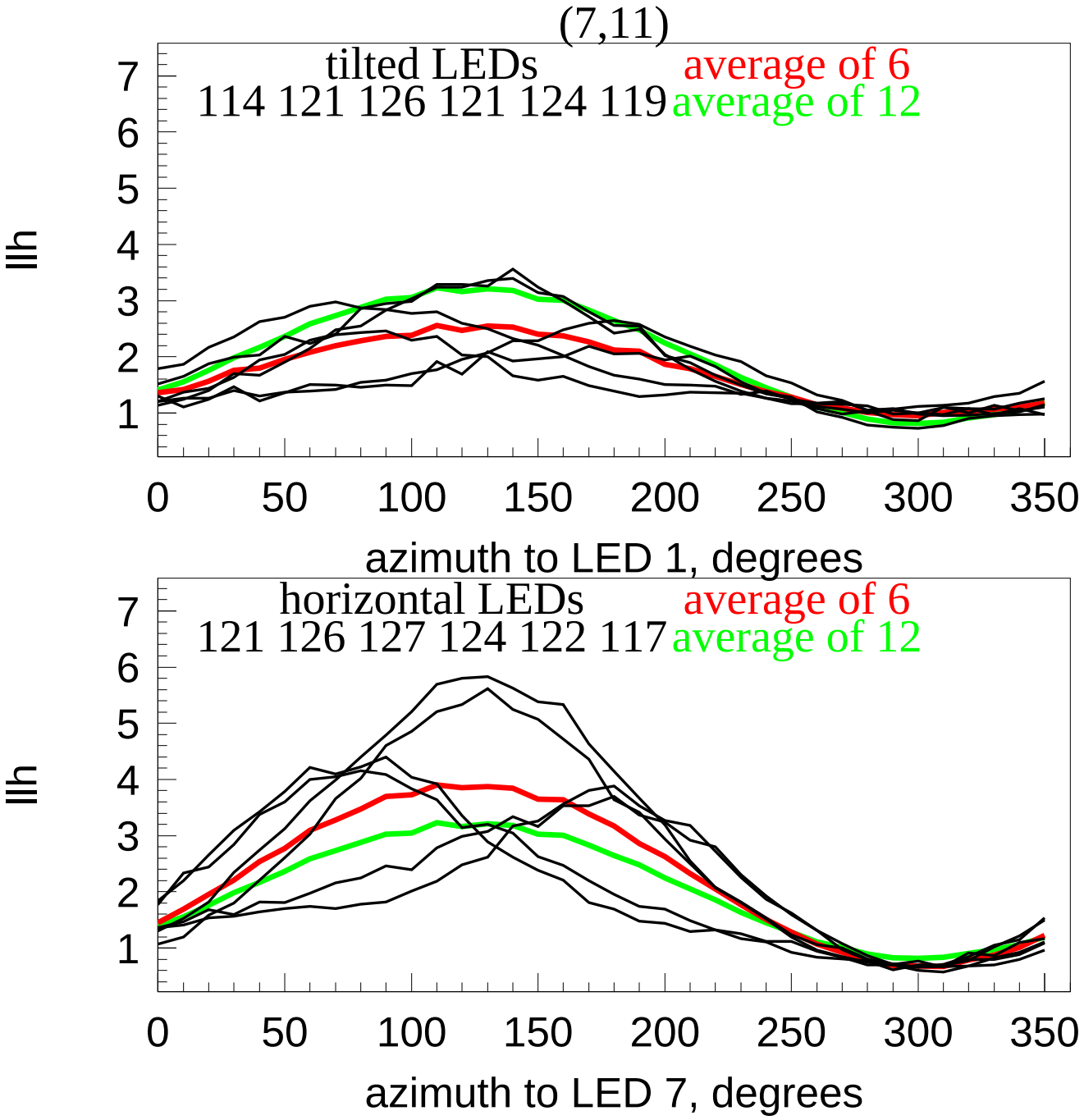

(7,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
131.1 ± 12.0

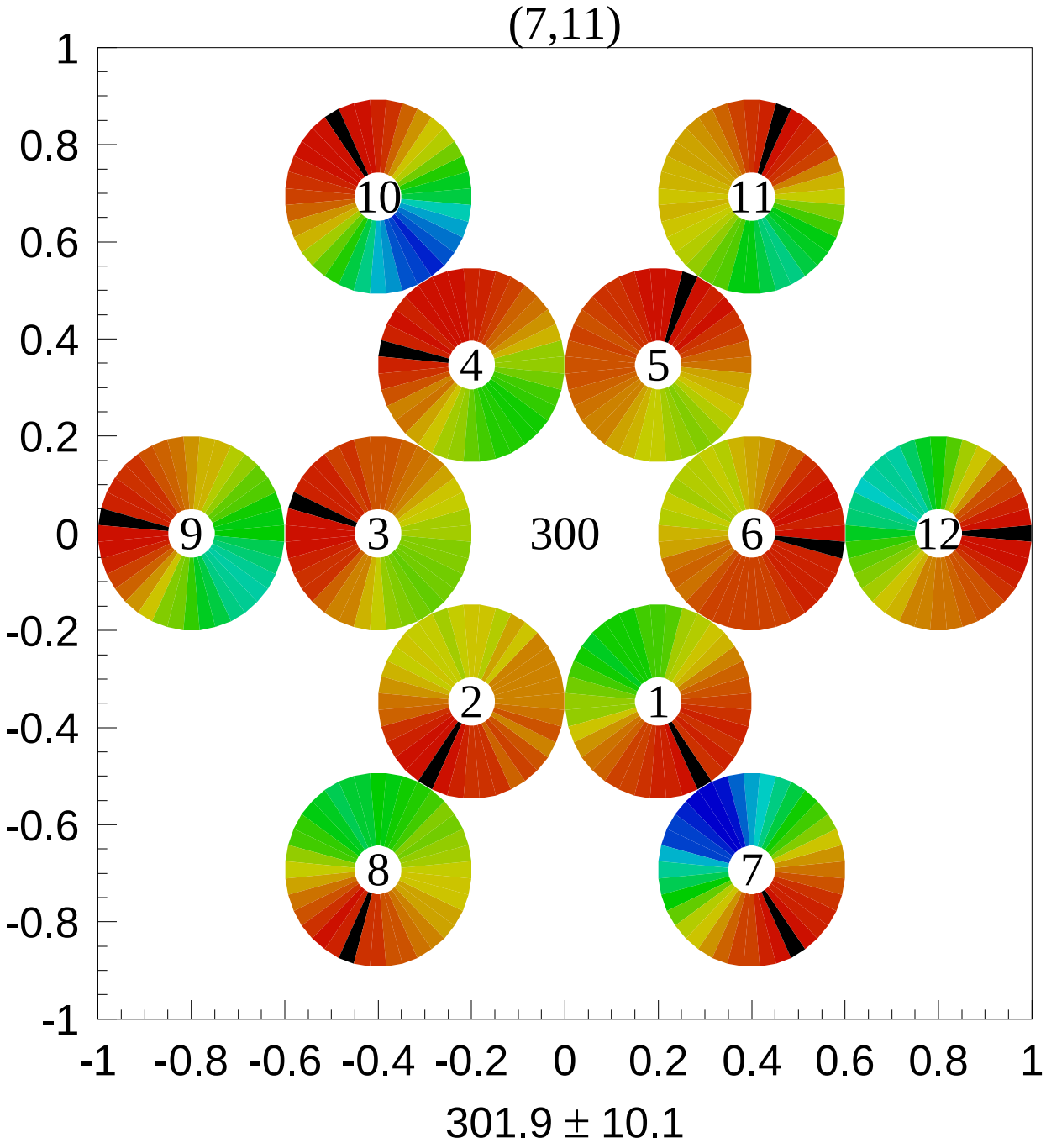

(7,9)
tilted LEDs
129 126 132 122 125 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 122 126 116 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

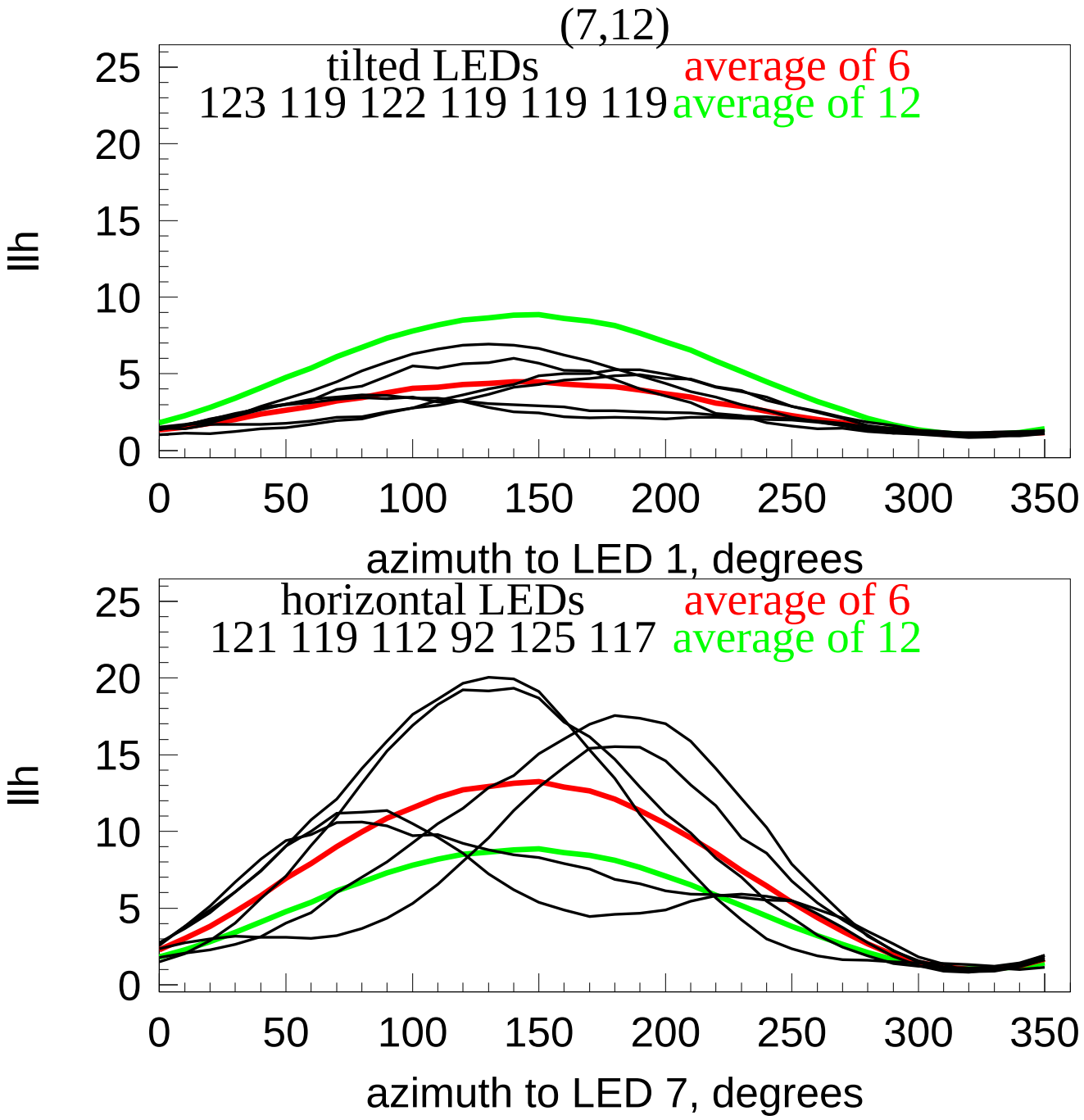

(7,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
119.9 ± 8.9

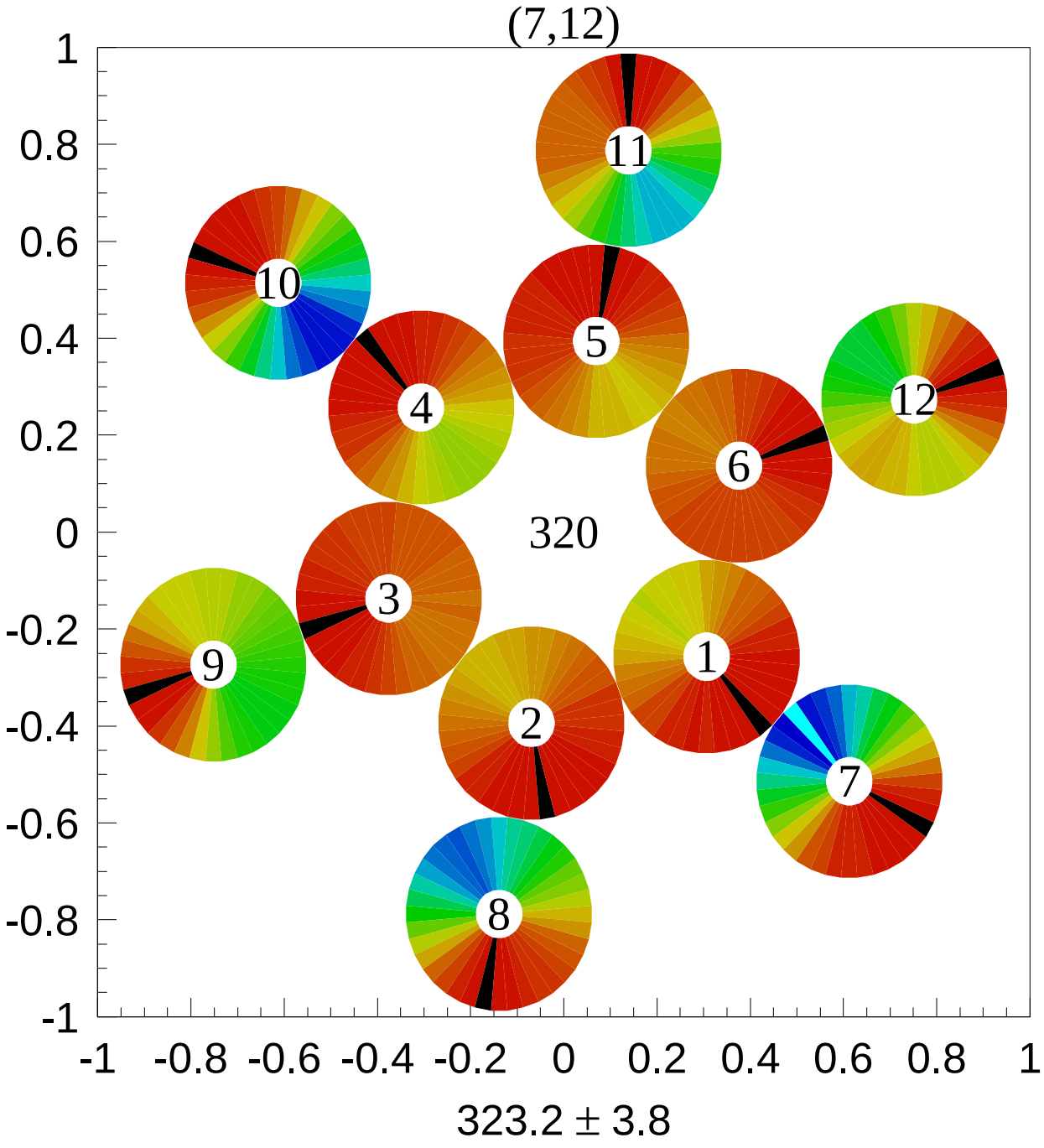

(7,10)
tilted LEDs
126 120 130 117 122 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 123 122 119 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

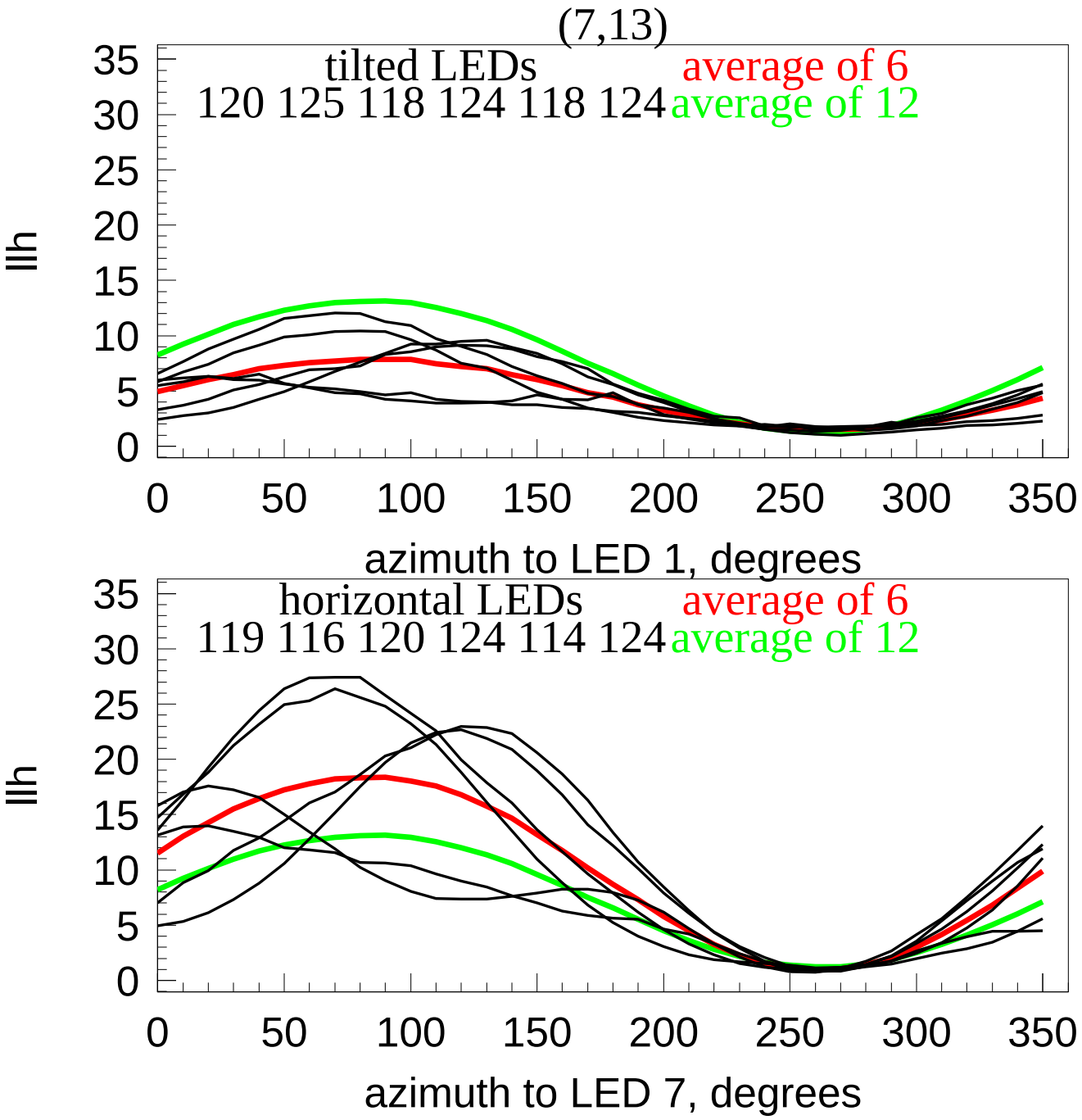

(7,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
352.6 ± 9.8

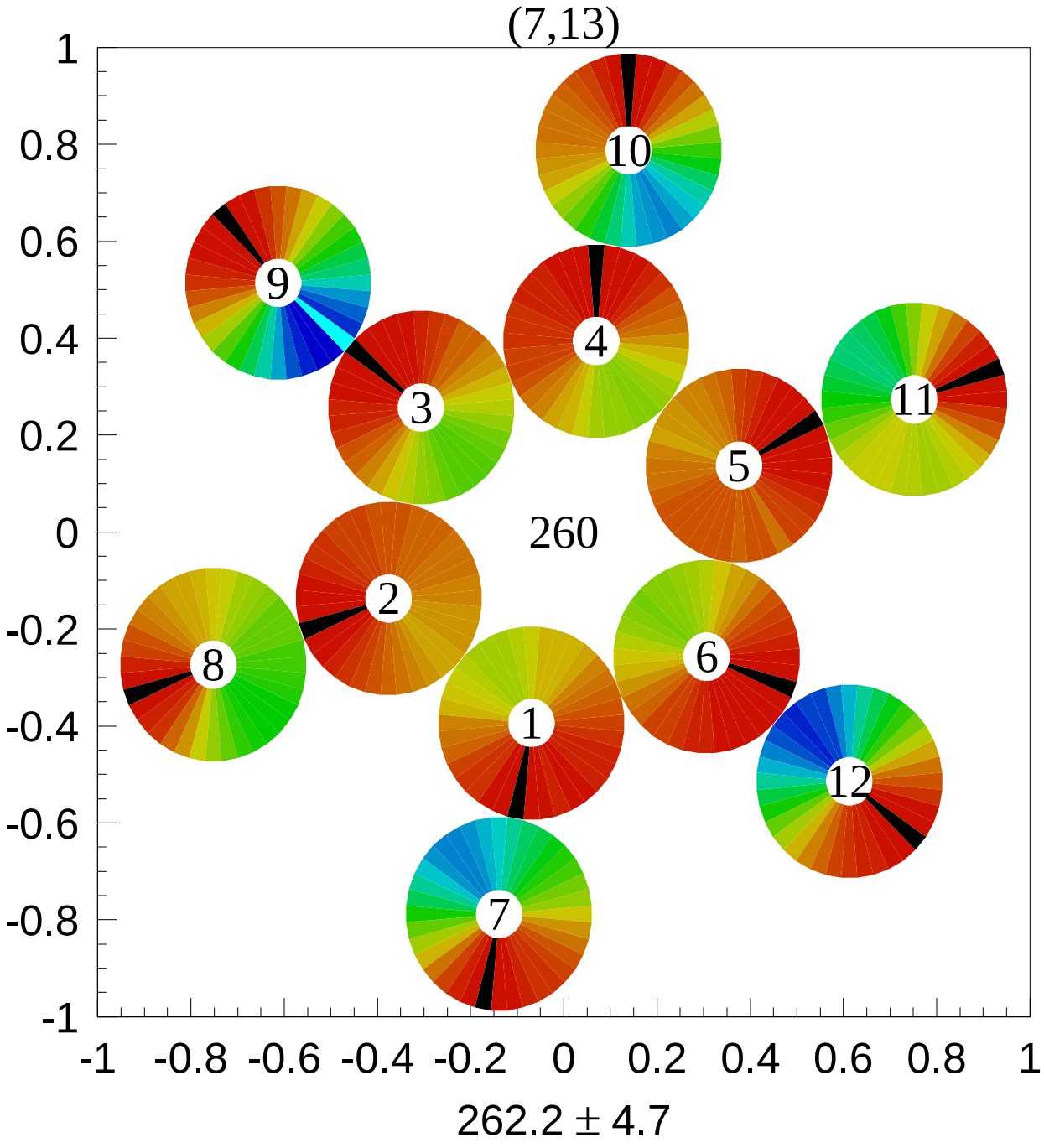

(7,11)
tilted LEDs
114 121 126 121 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 126 127 124 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

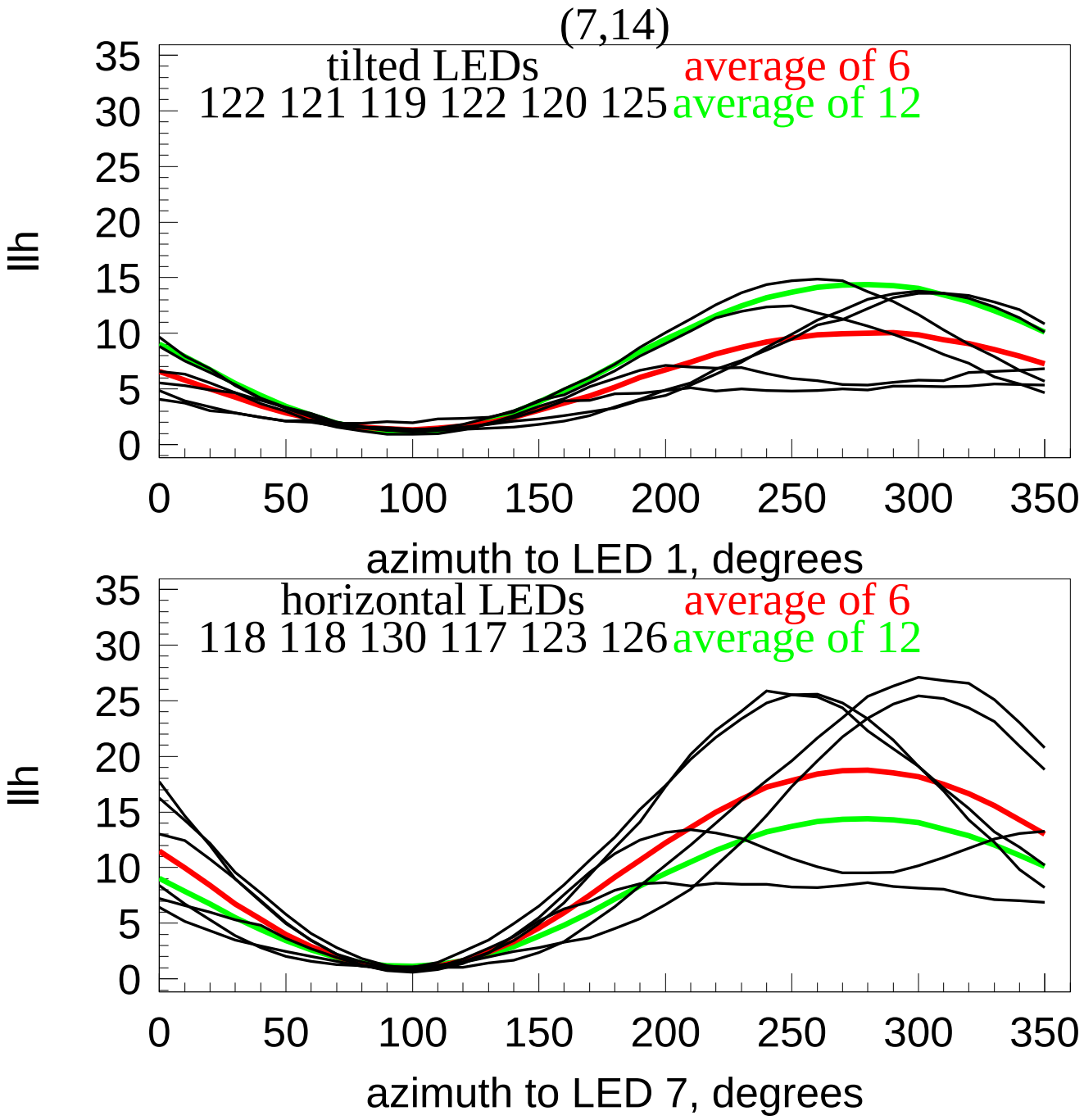

(7,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
301.9 ± 10.1

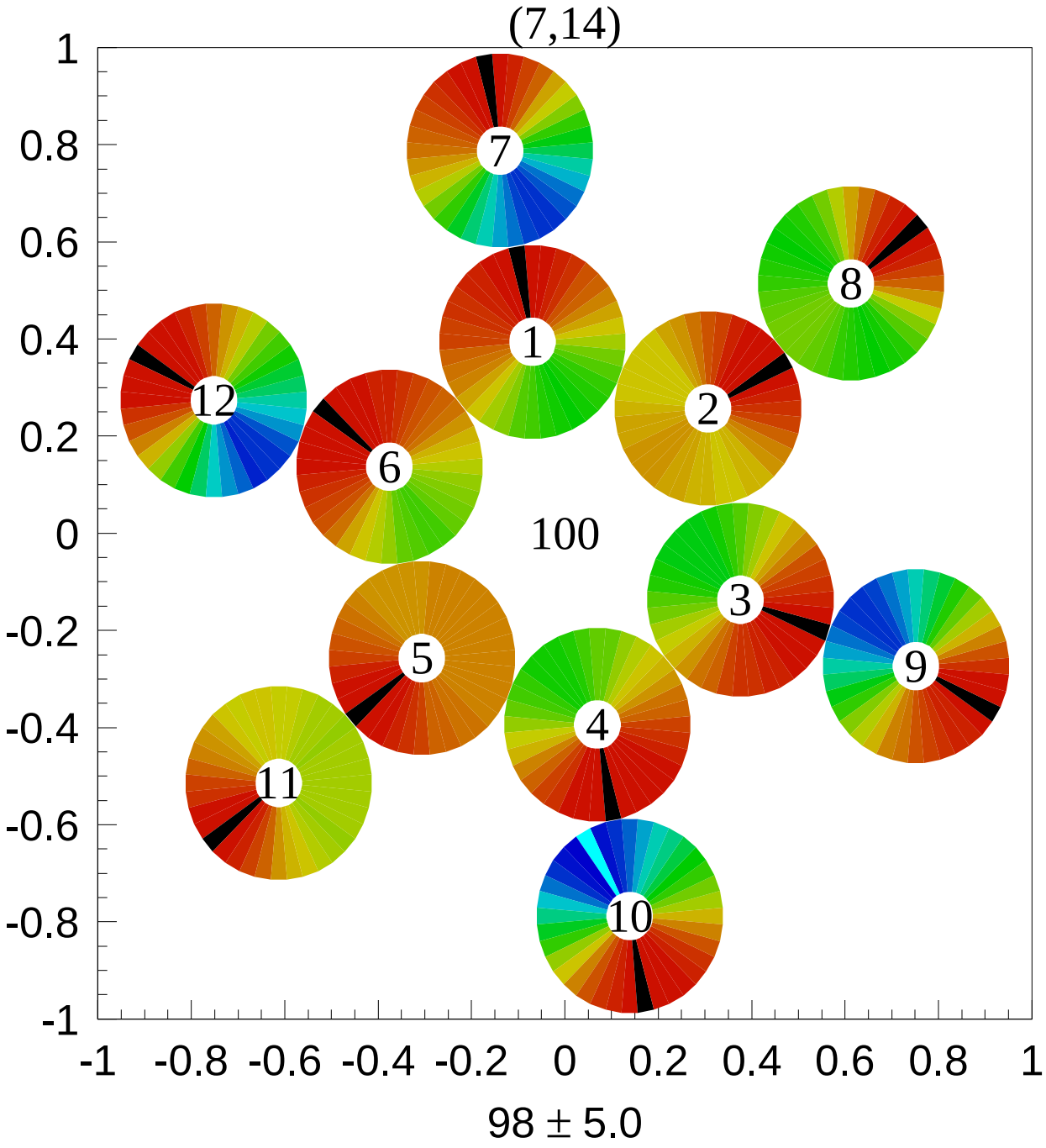

(7,12)
tilted LEDs
123 119 122 119 119 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 112 92 125 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

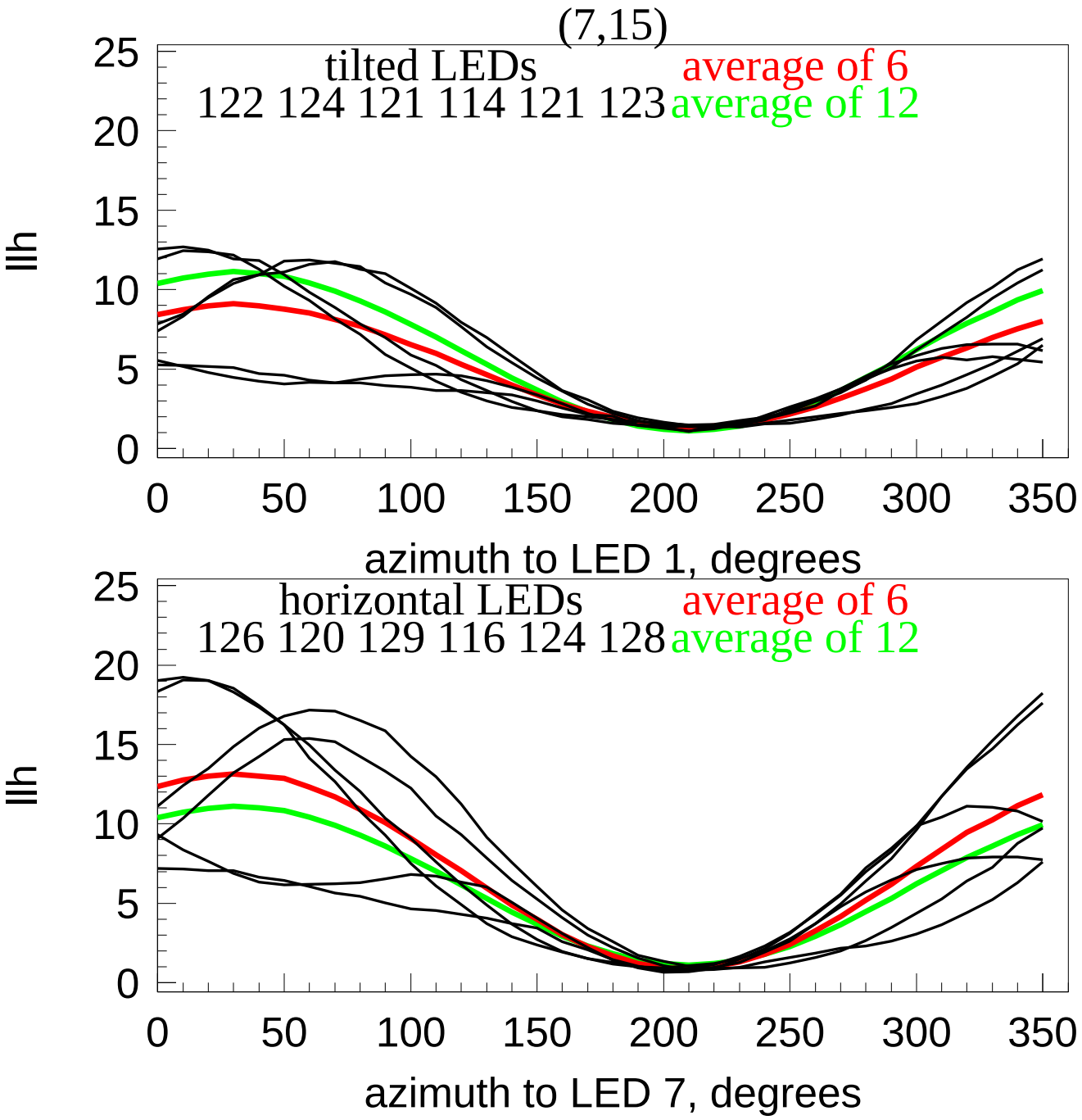

(7,12)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
323.2 ± 3.8

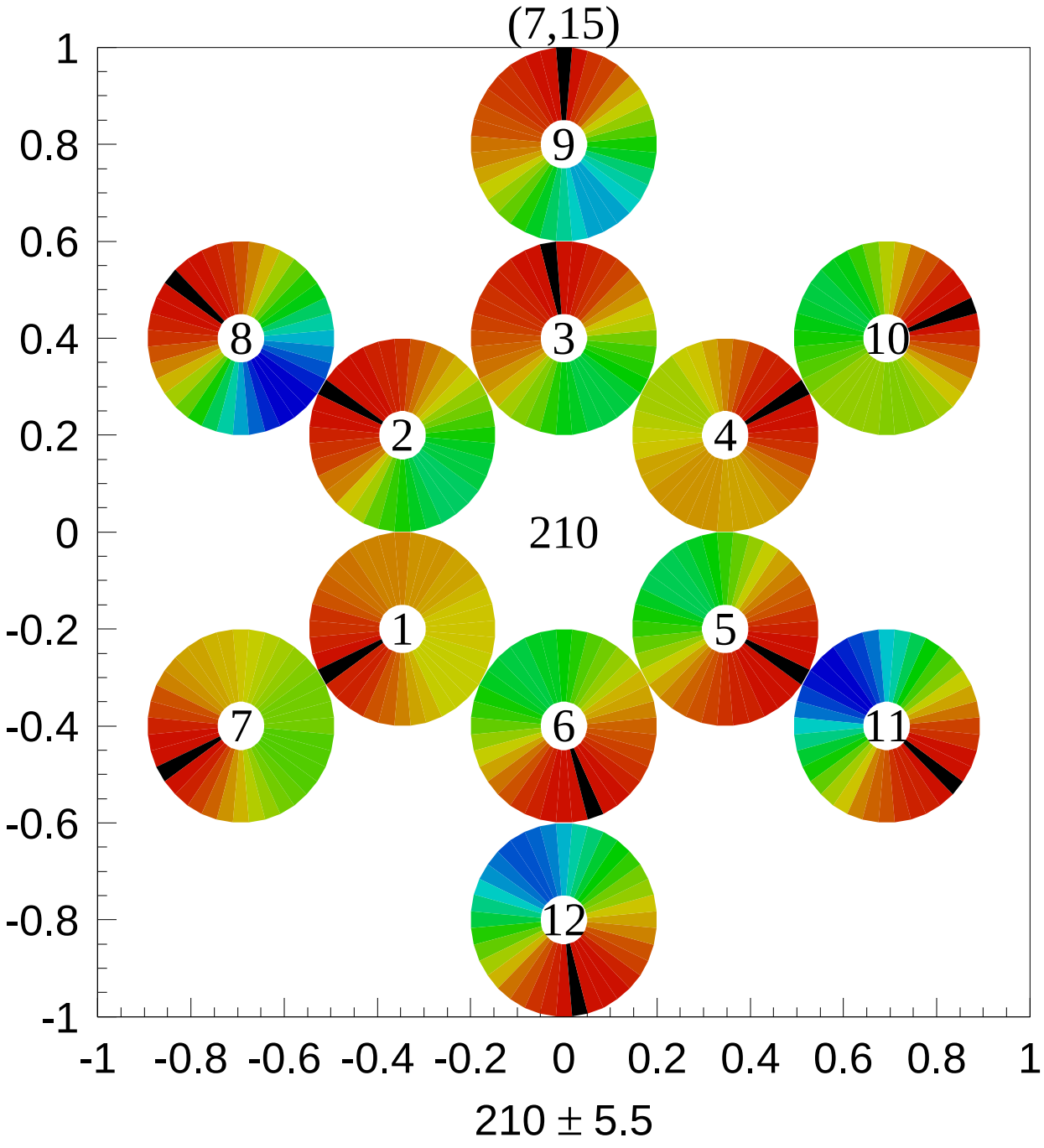

(7,13)
tilted LEDs
120 125 118 124 118 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 116 120 124 114 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

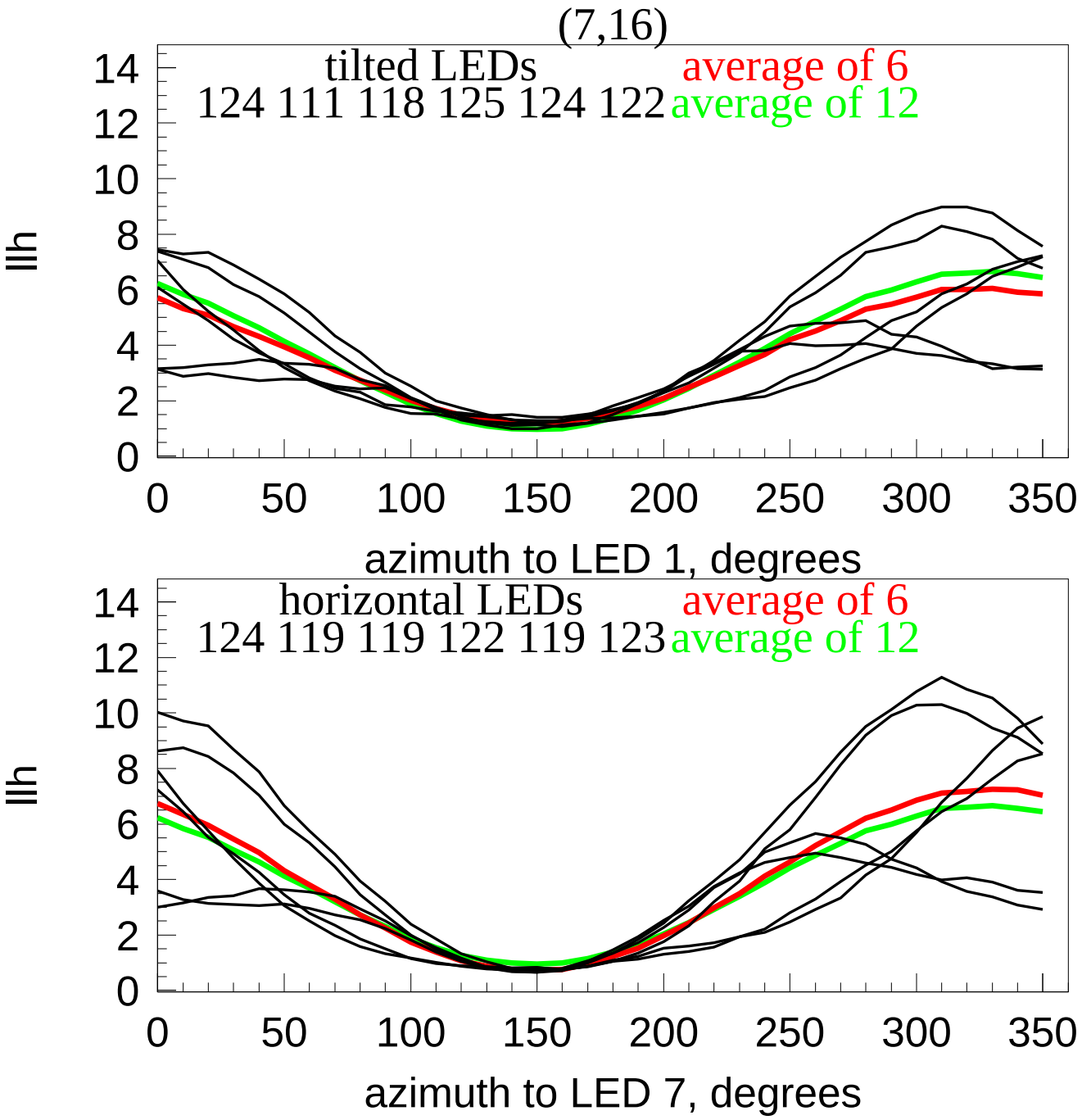

(7,13)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
262.2 ± 4.7

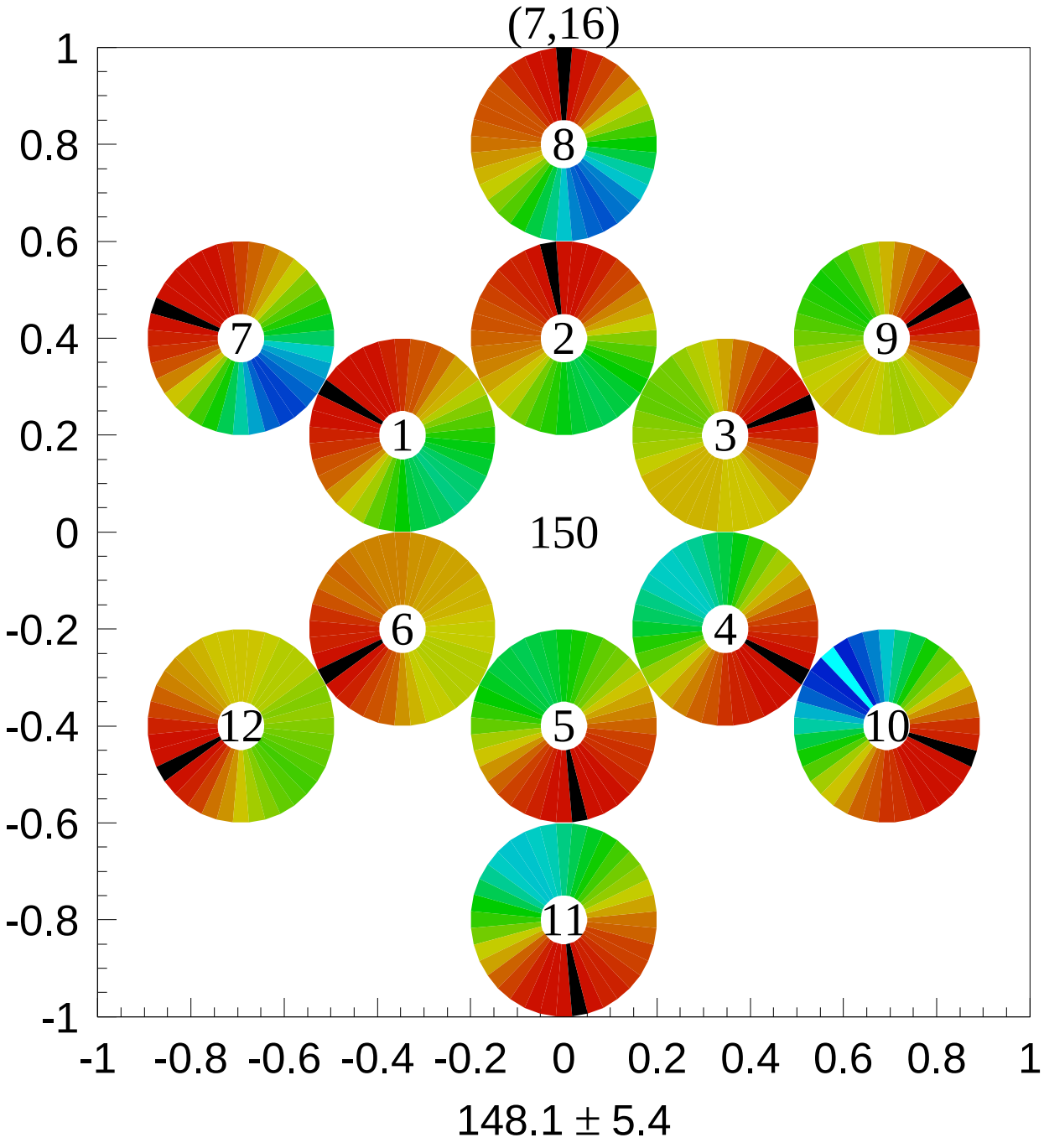

(7,14)
tilted LEDs
122 121 119 122 120 125
average of 6
average of 12
llh
35
30
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 118 130 117 123 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

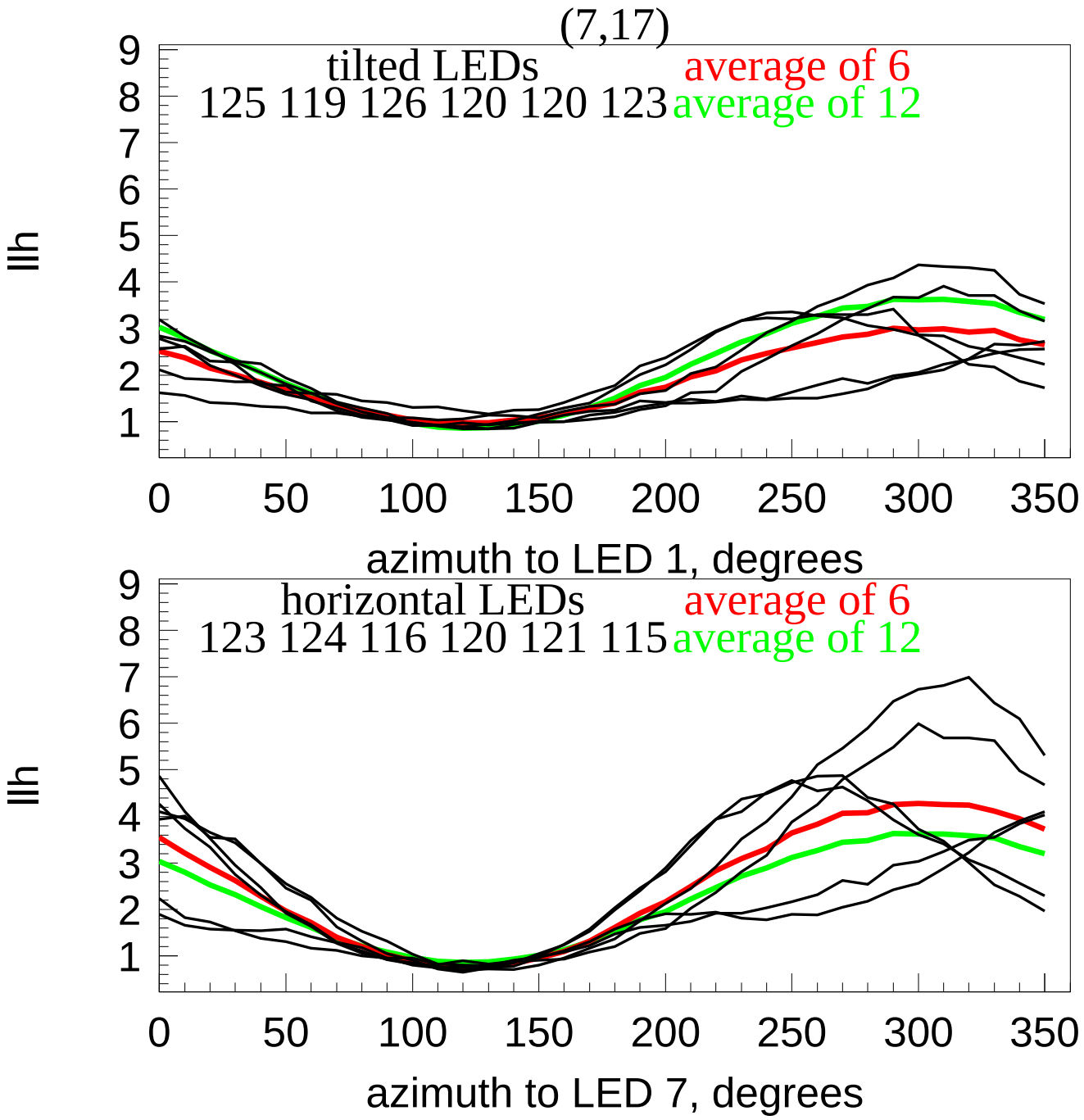

(7,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
98 ± 5.0

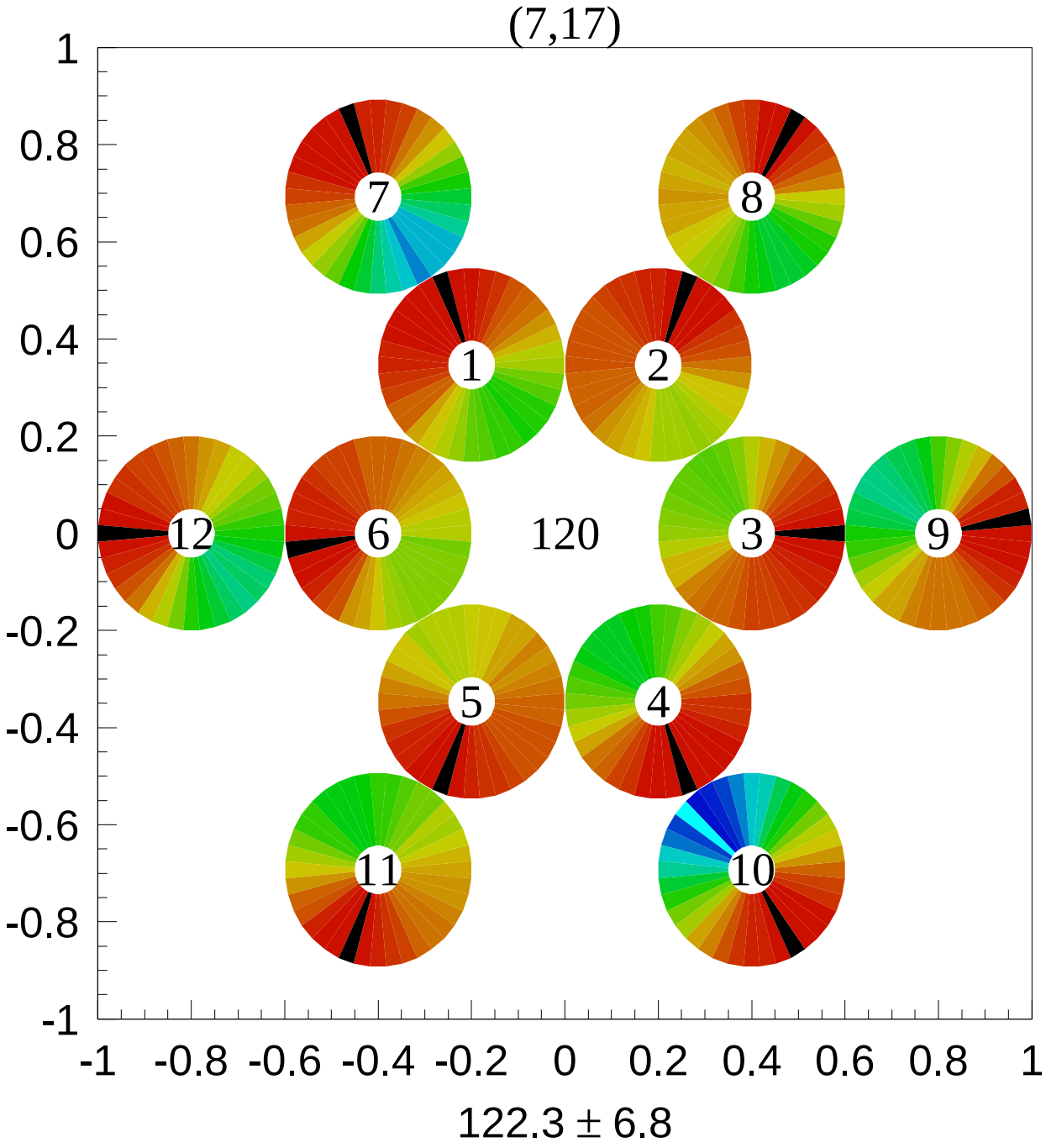

(7,15)
tilted LEDs
122 124 121 114 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 129 116 124 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

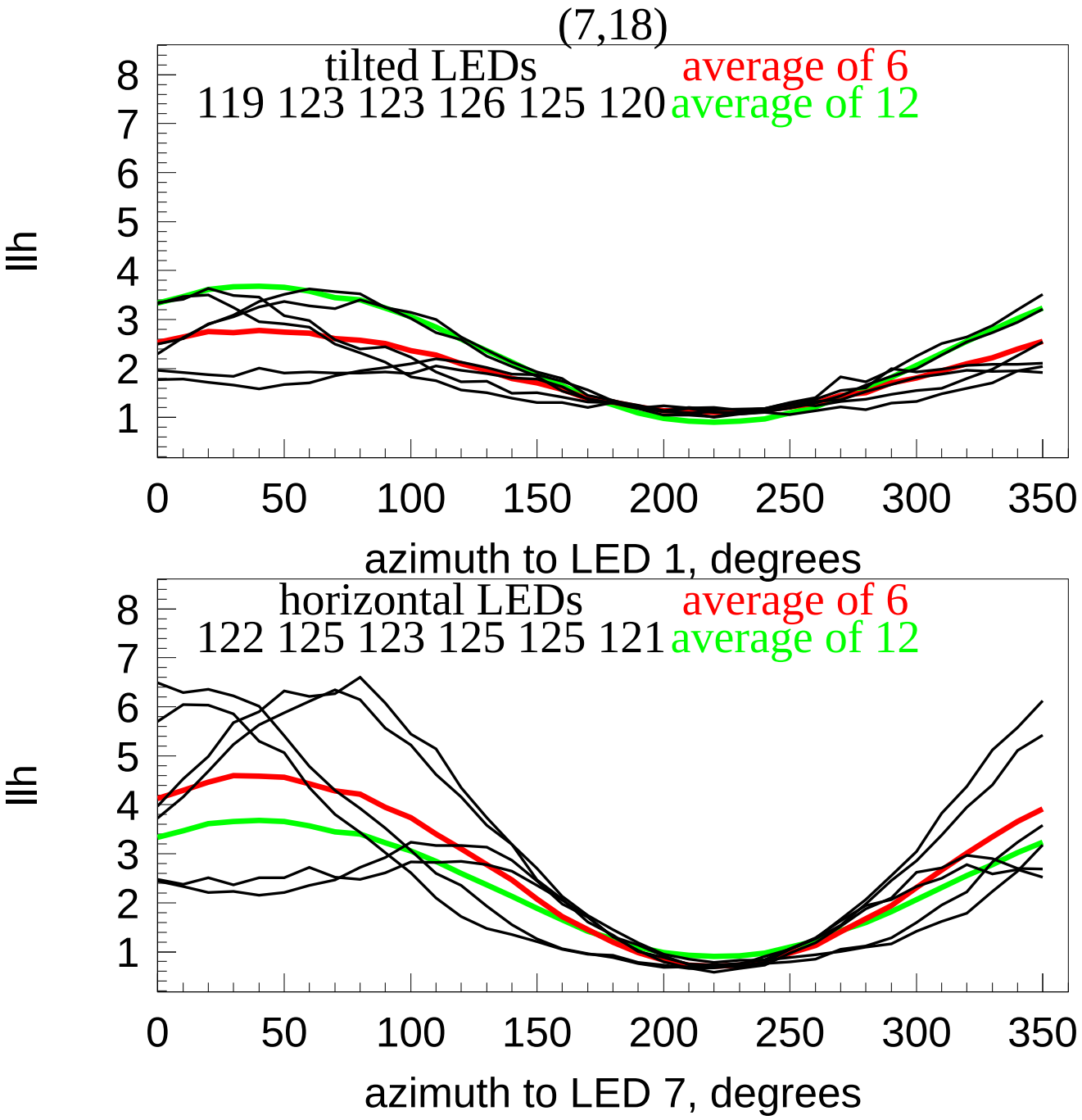

(7,15)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
210 ± 5.5

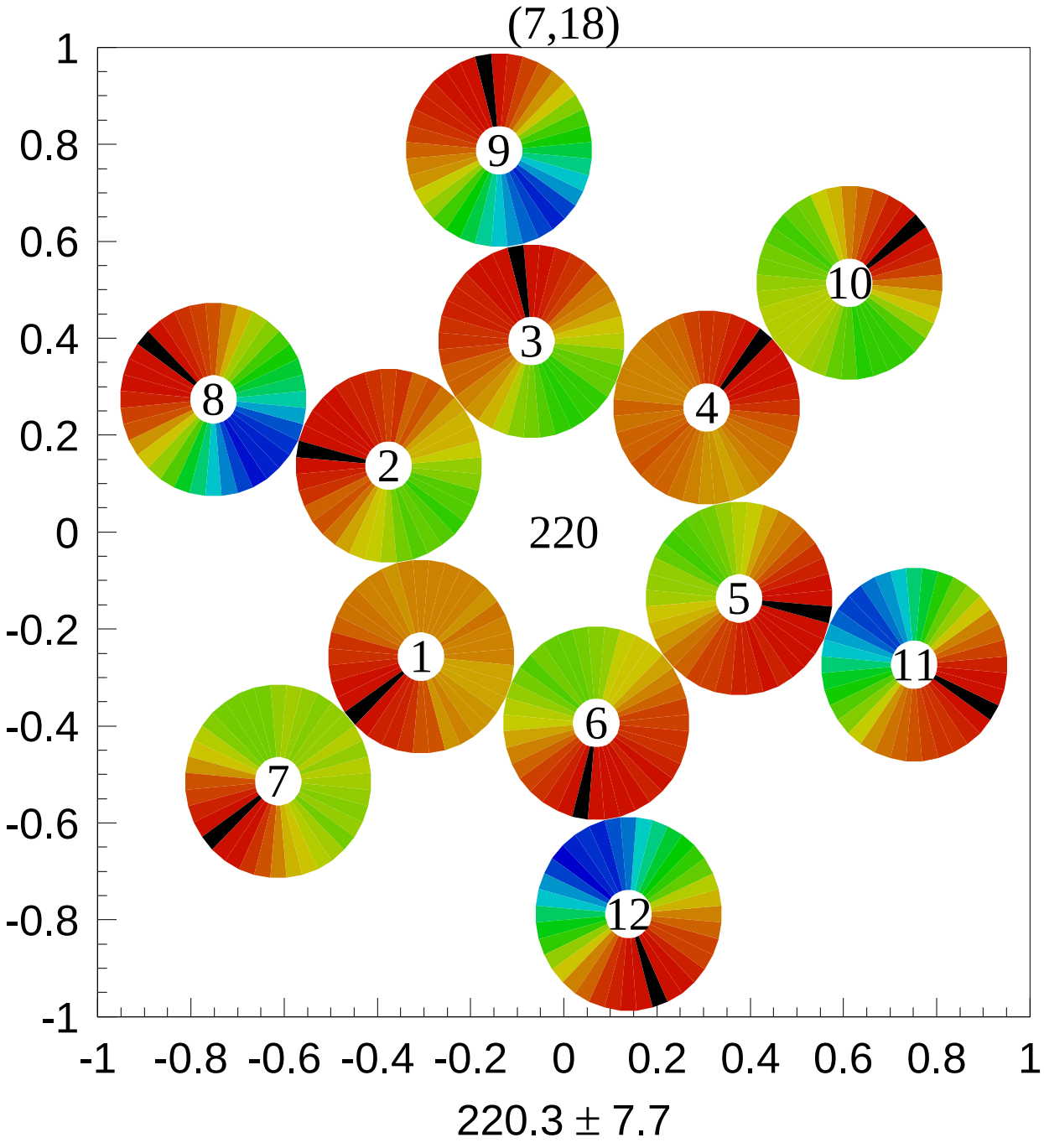

(7,16)
tilted LEDs
124 111 118 125 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 119 122 119 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

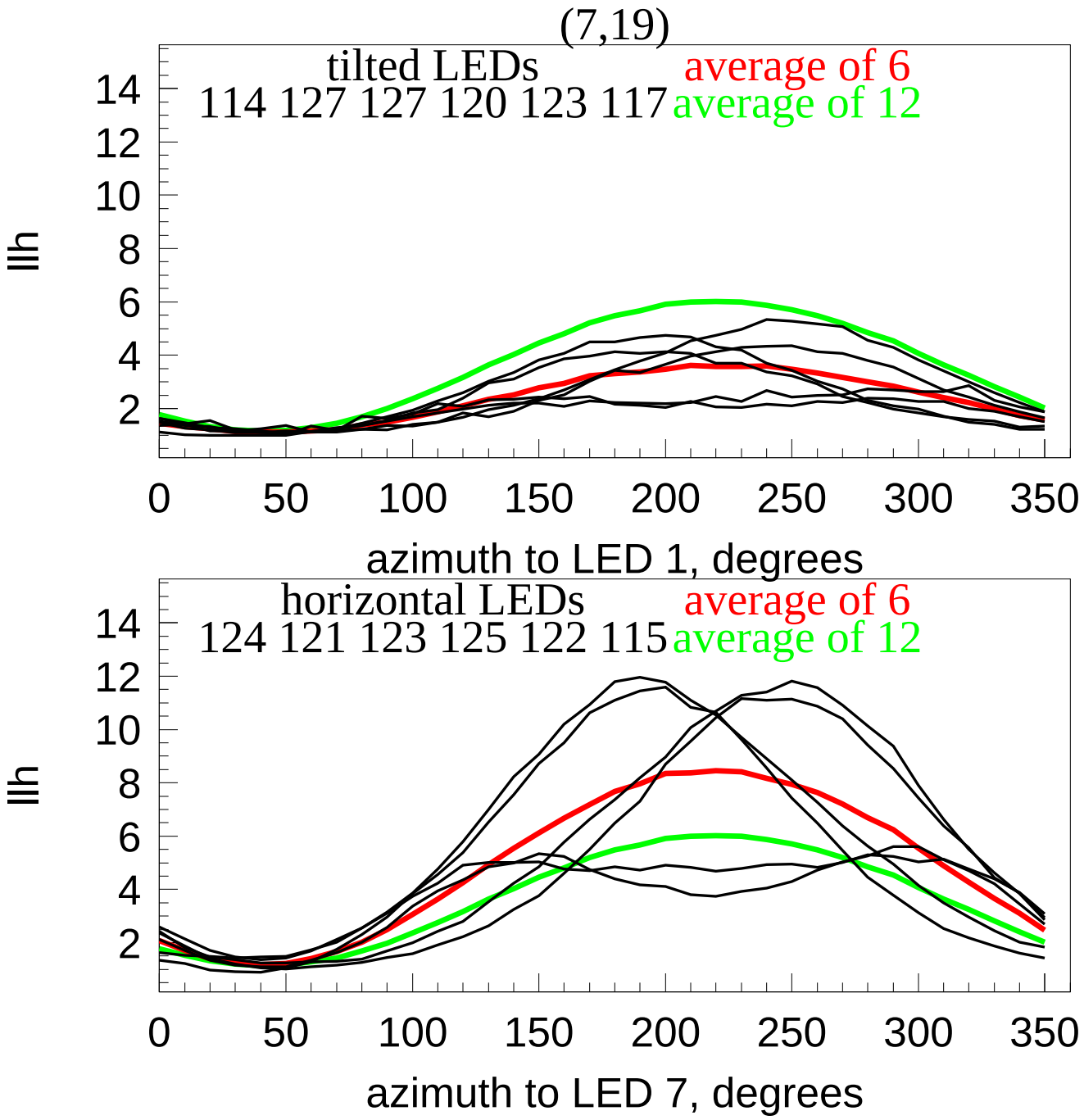

(7,16)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
148.1 ± 5.4

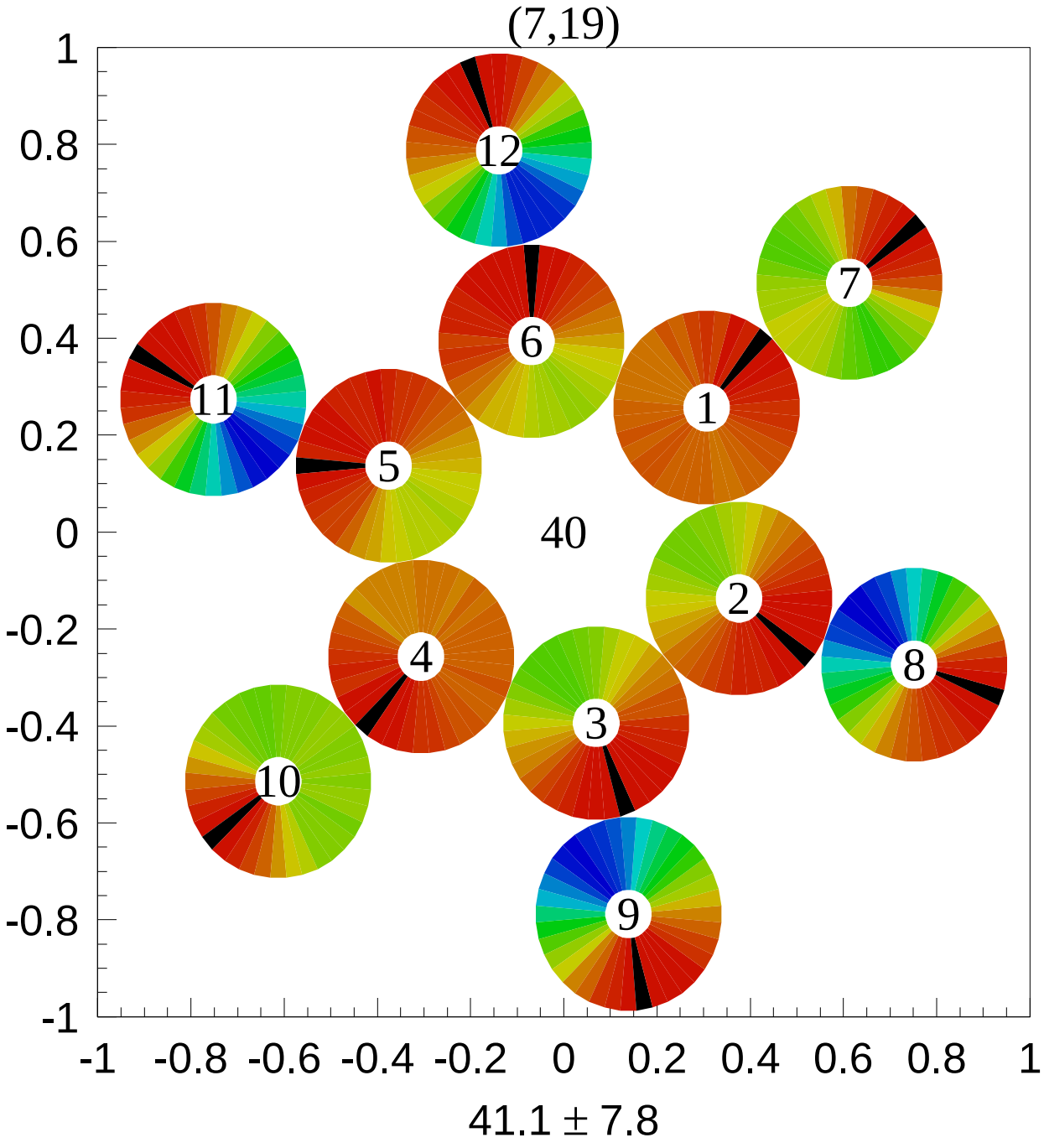

(7,17)
tilted LEDs
125 119 126 120 120 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 124 116 120 121 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

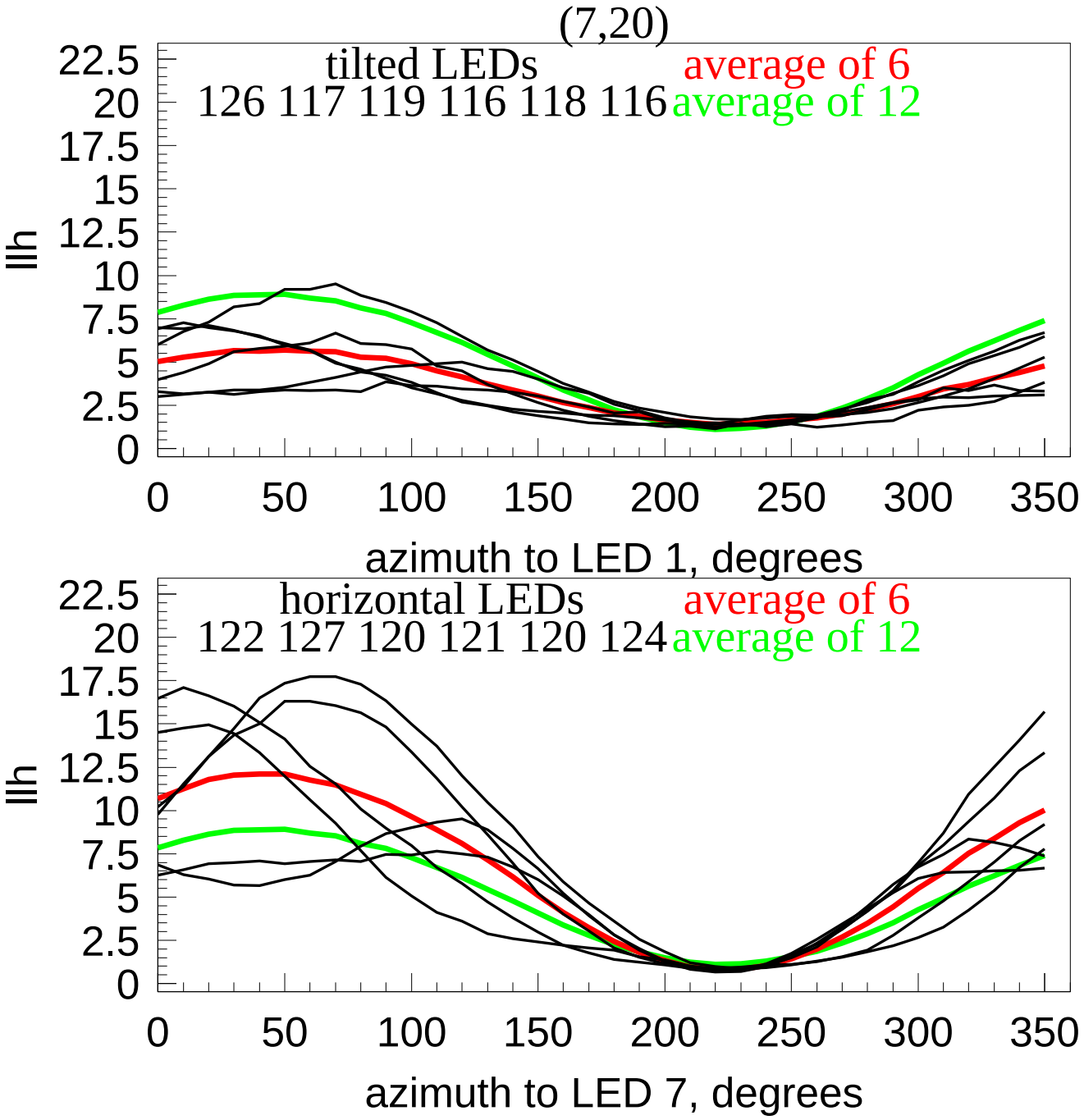

(7,17)
7
8
1
2
12
6
120
3
9
5
4
11
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
122.3 ± 6.8

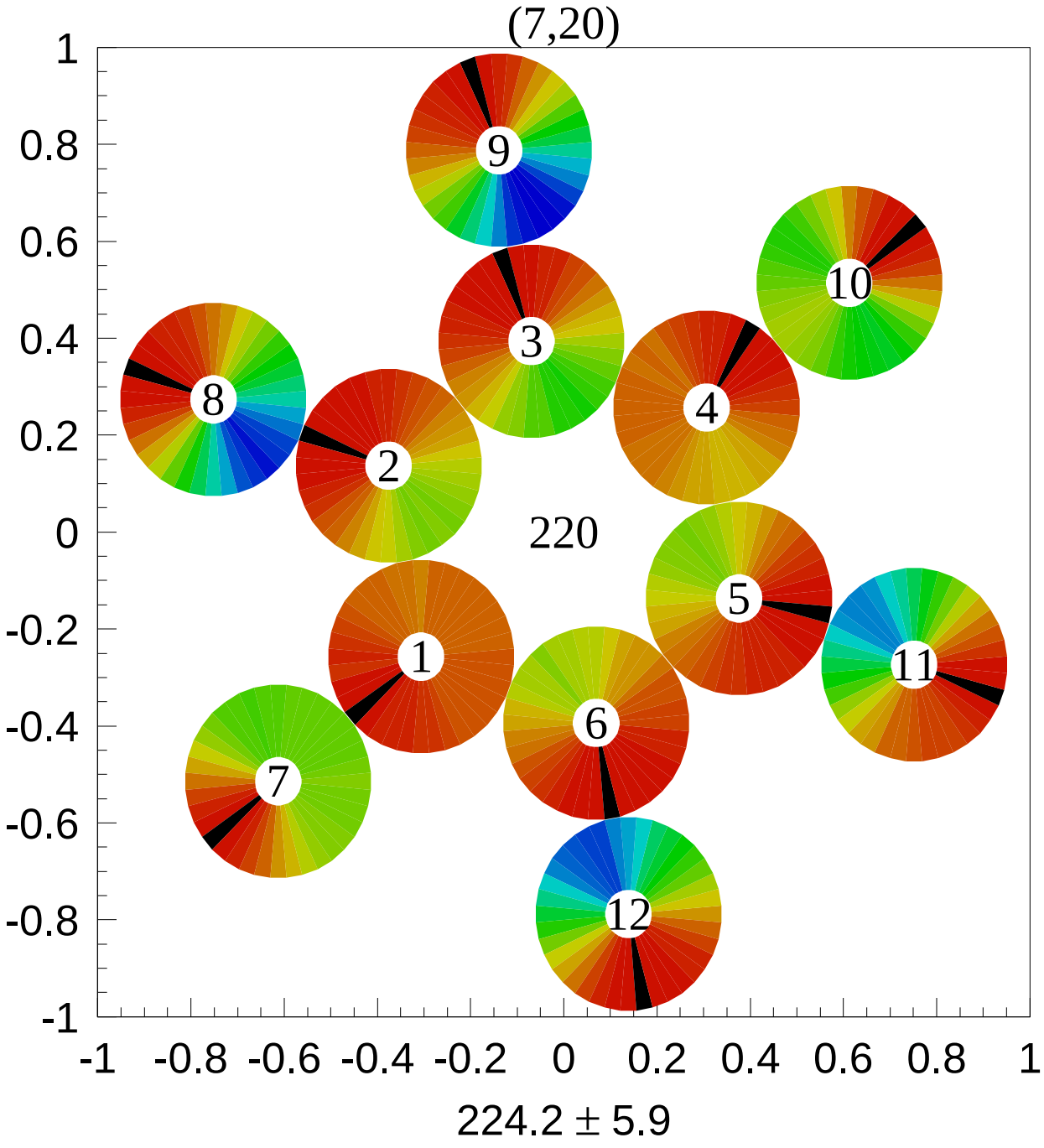

(7,18)
tilted LEDs
119 123 123 126 125 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 125 123 125 125 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

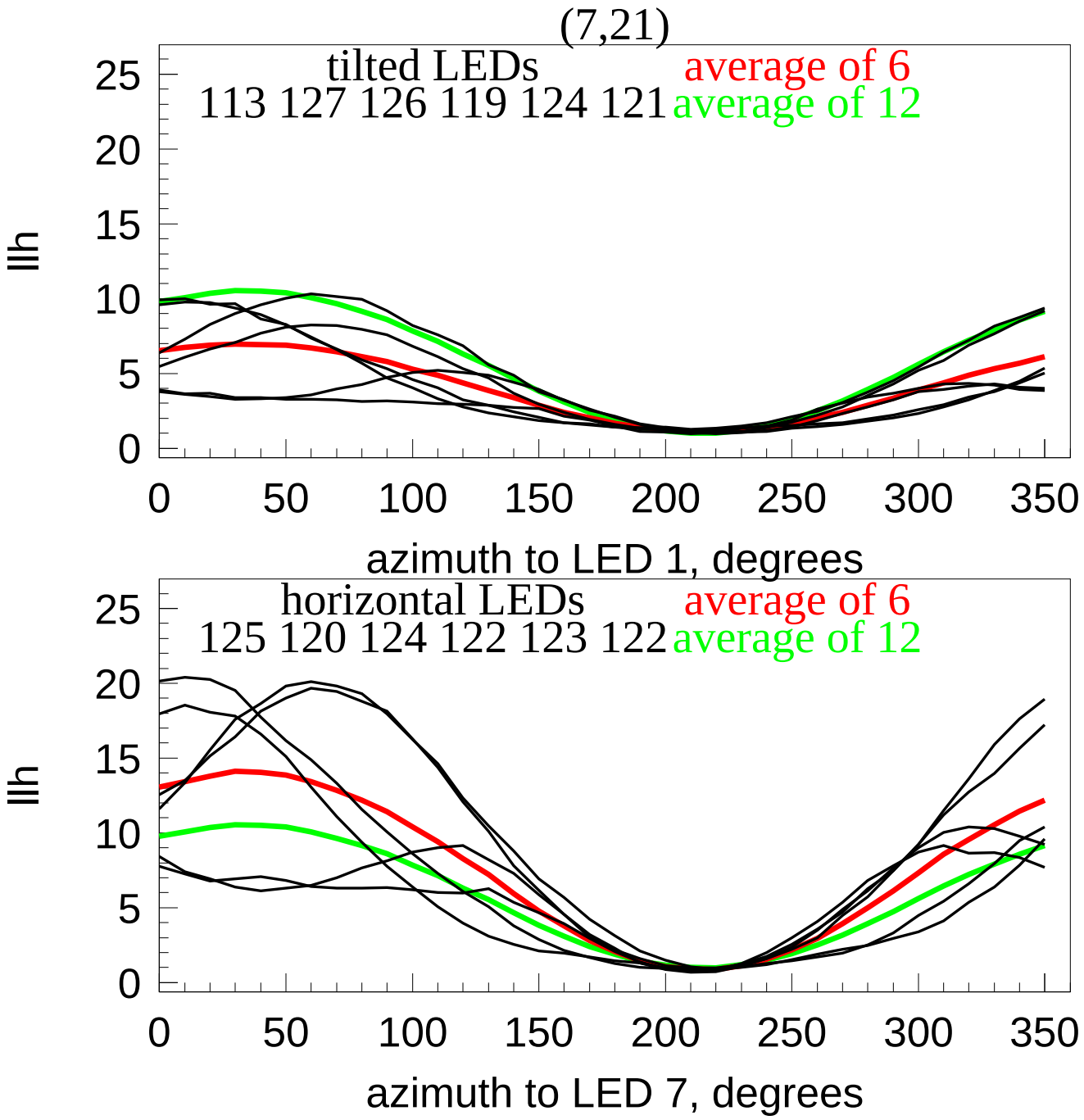

(7,18)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
220.3 ± 7.7

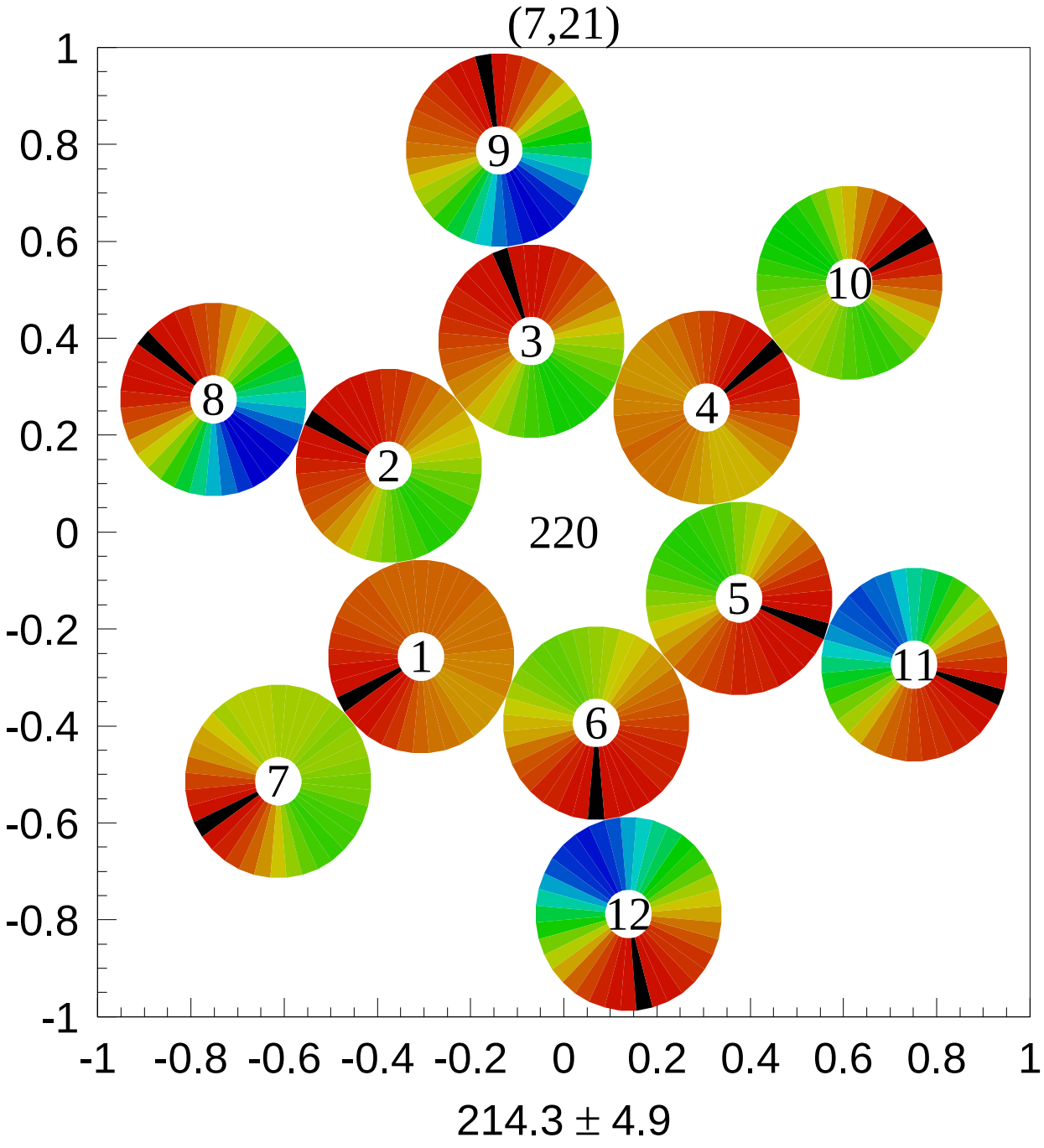

(7,19)
tilted LEDs
114 127 127 120 123 117
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 121 123 125 122 115
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

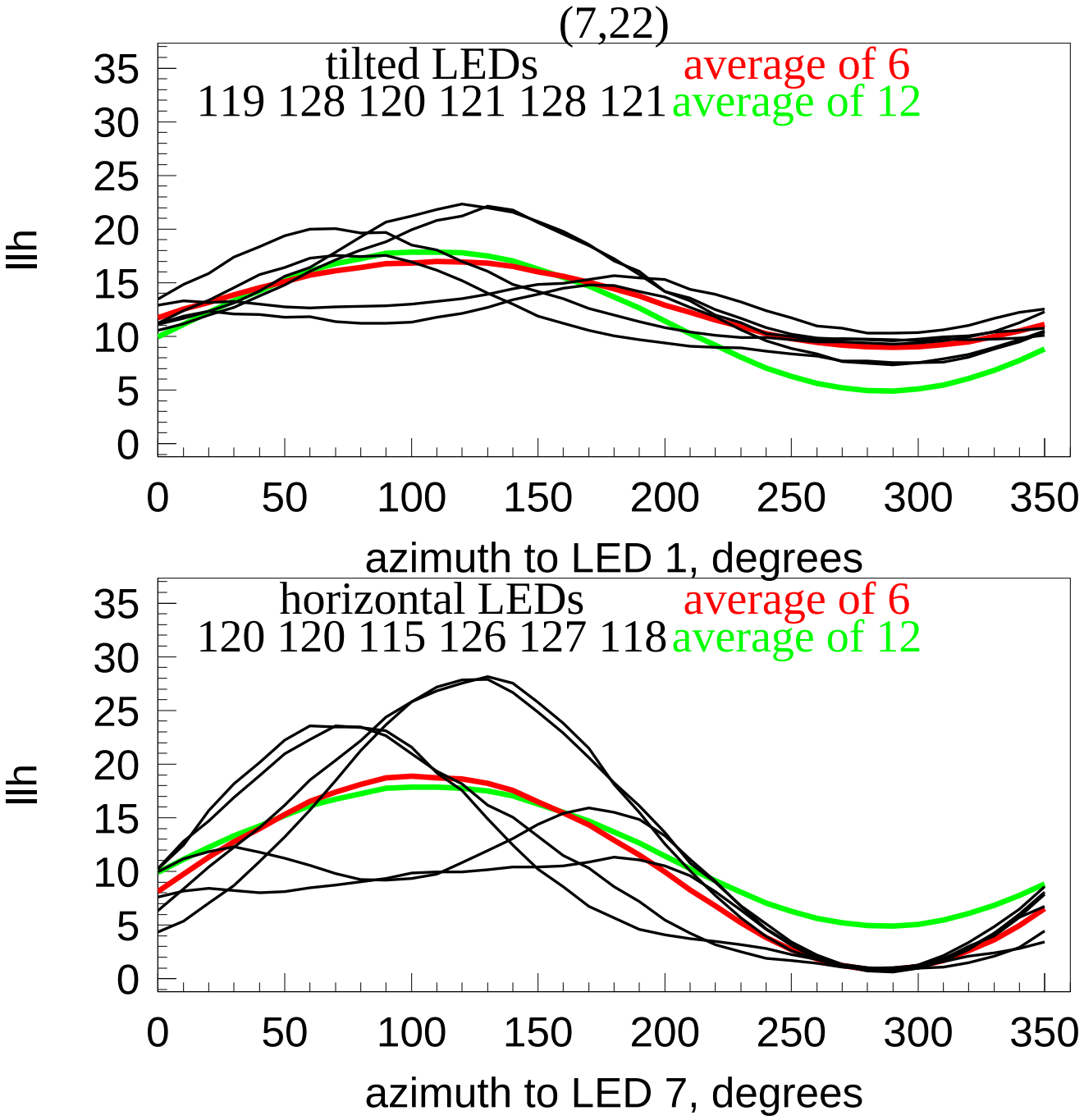

(7,19)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
41.1 ± 7.8

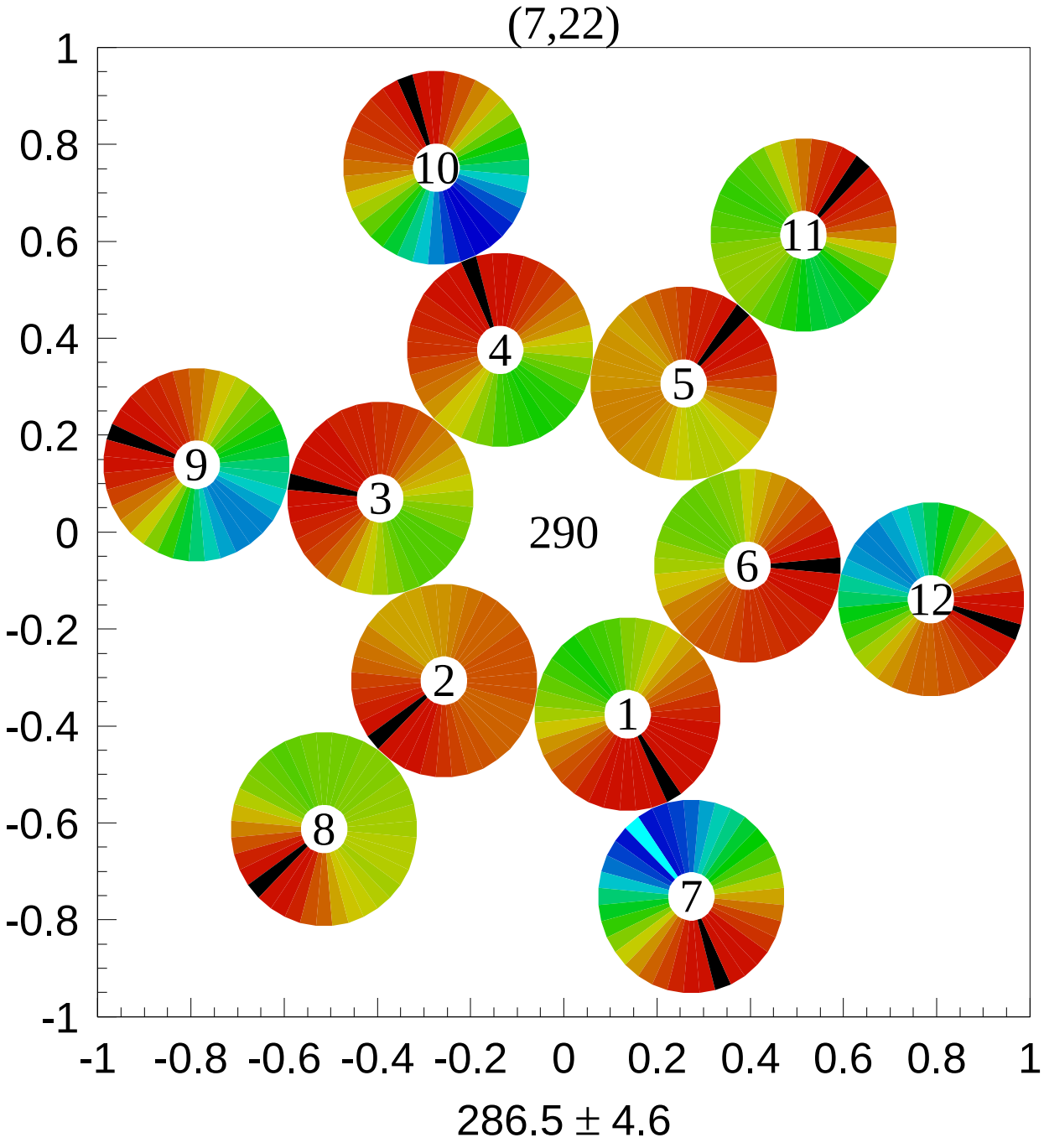

(7,20)
tilted LEDs
126 117 119 116 118 116
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 127 120 121 120 124
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

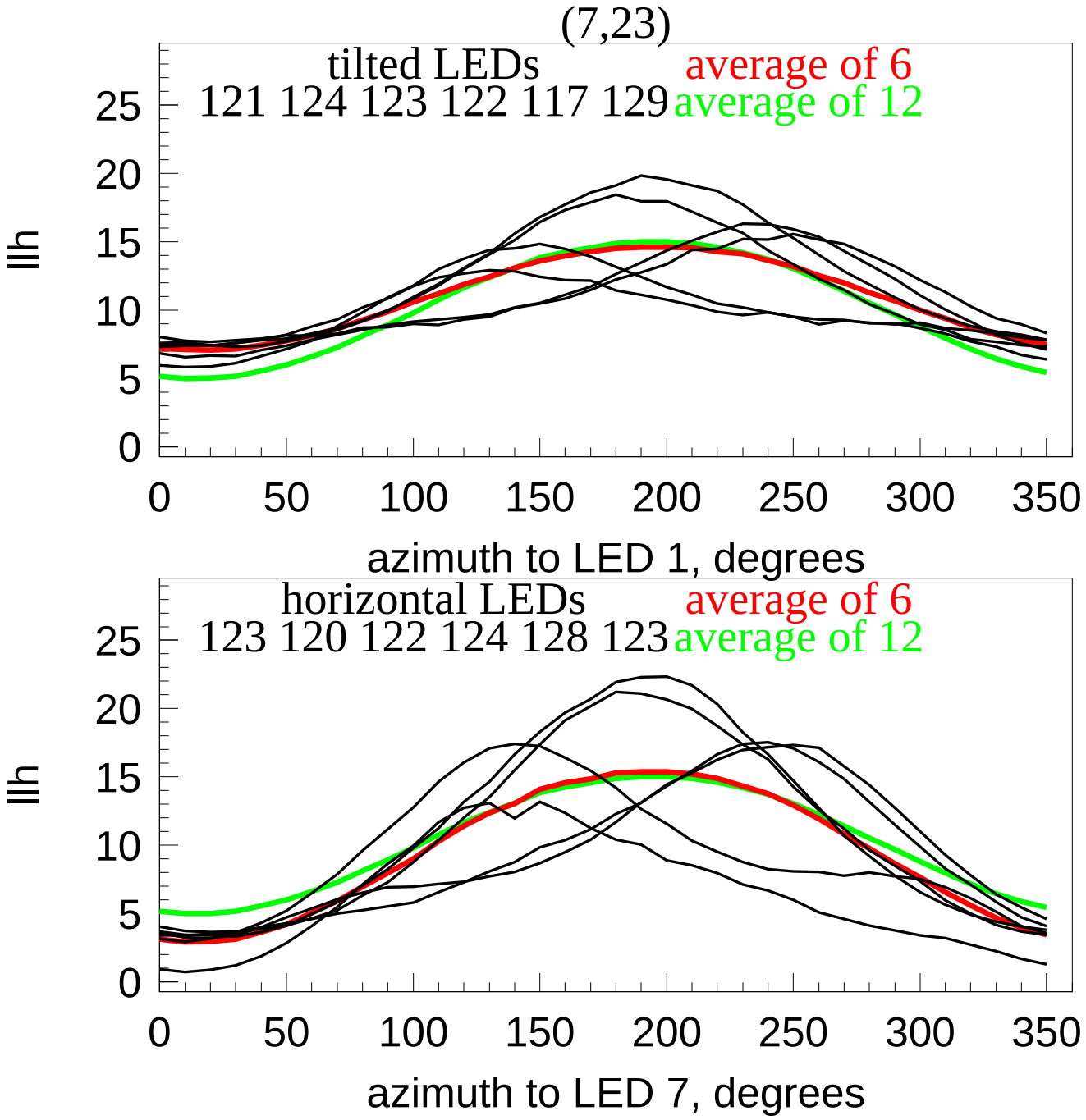

(7,20)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
224.2 ± 5.9

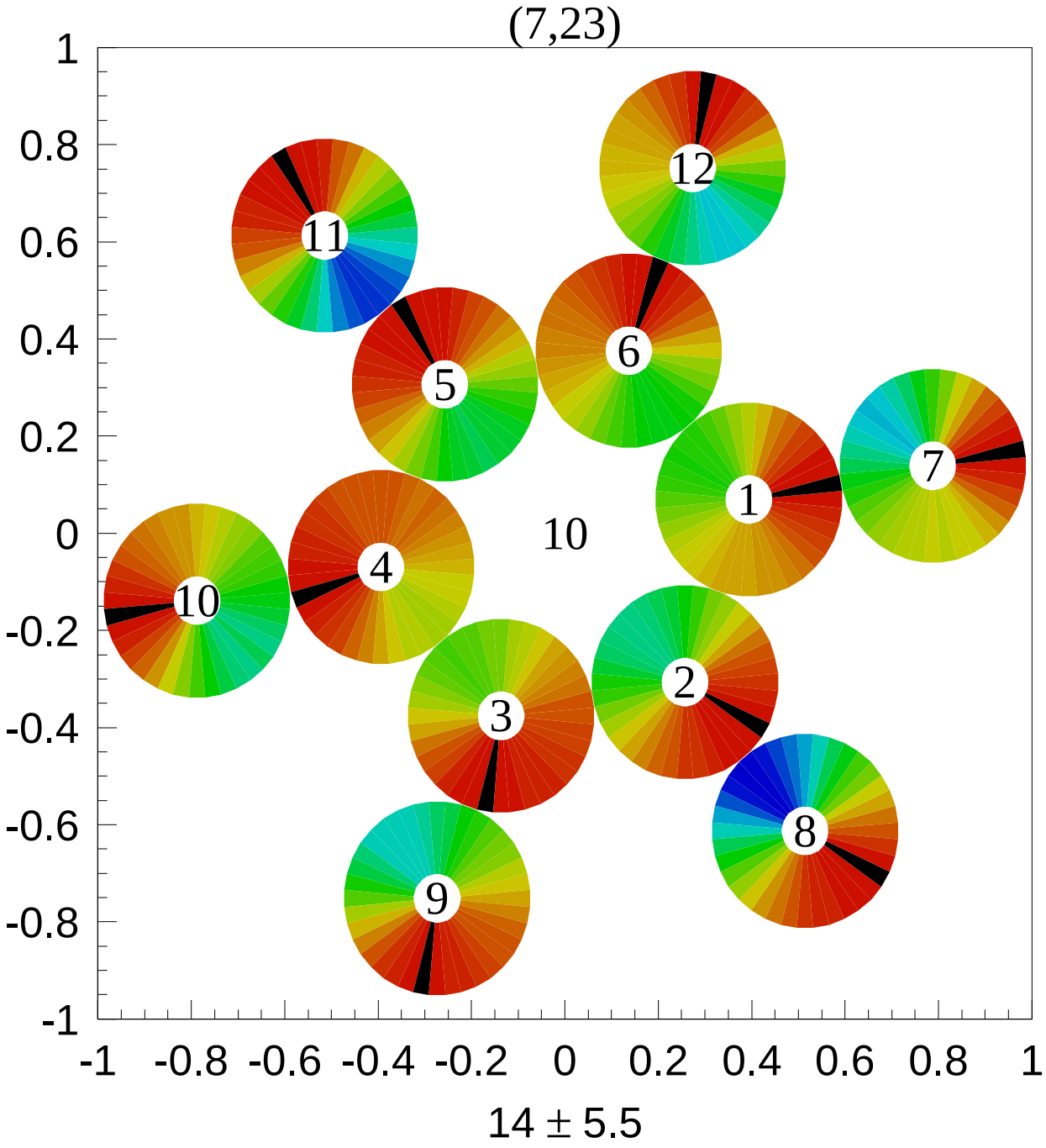

(7,21)
tilted LEDs
113 127 126 119 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 124 122 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

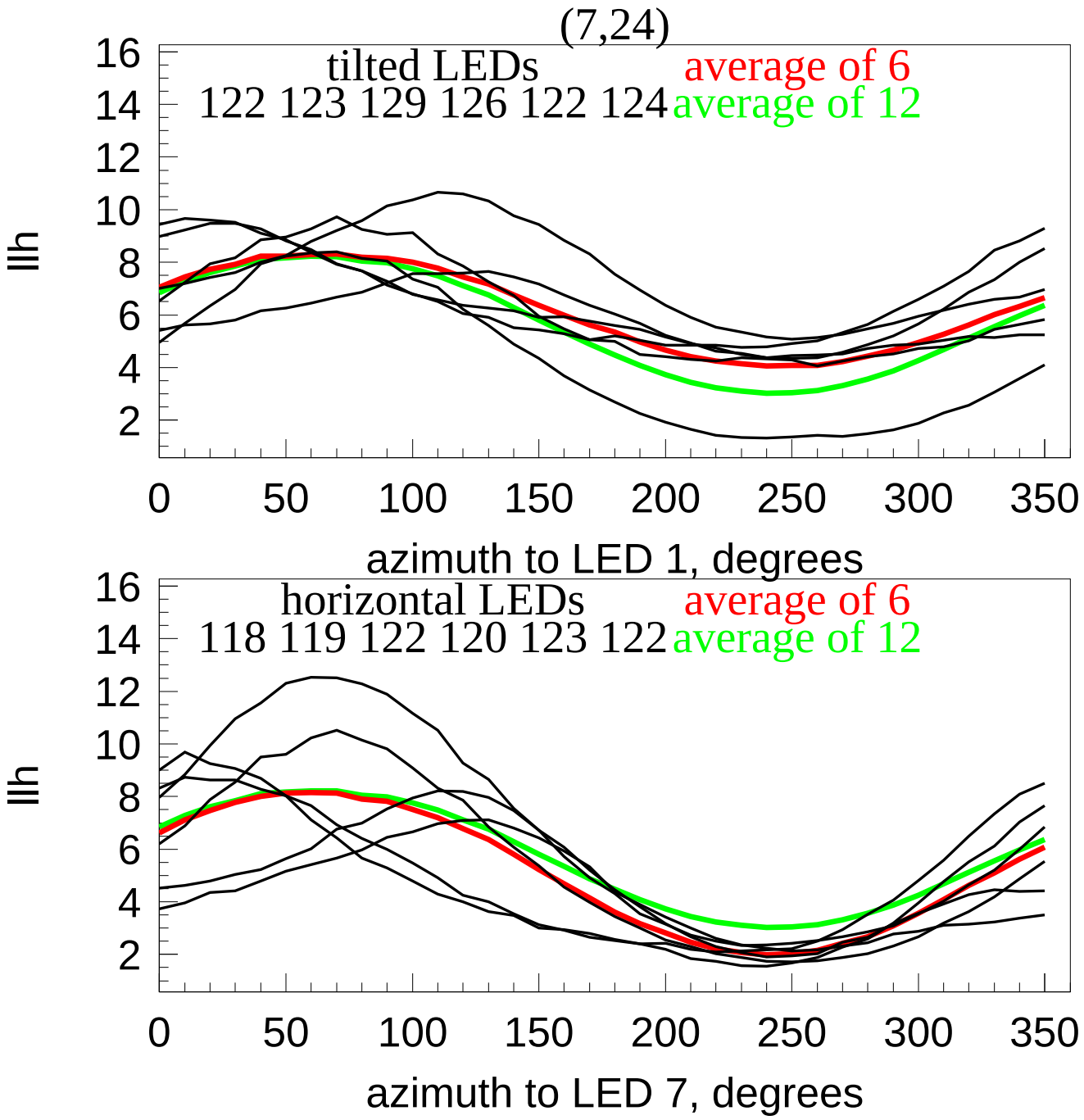

(7,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
214.3 ± 4.9

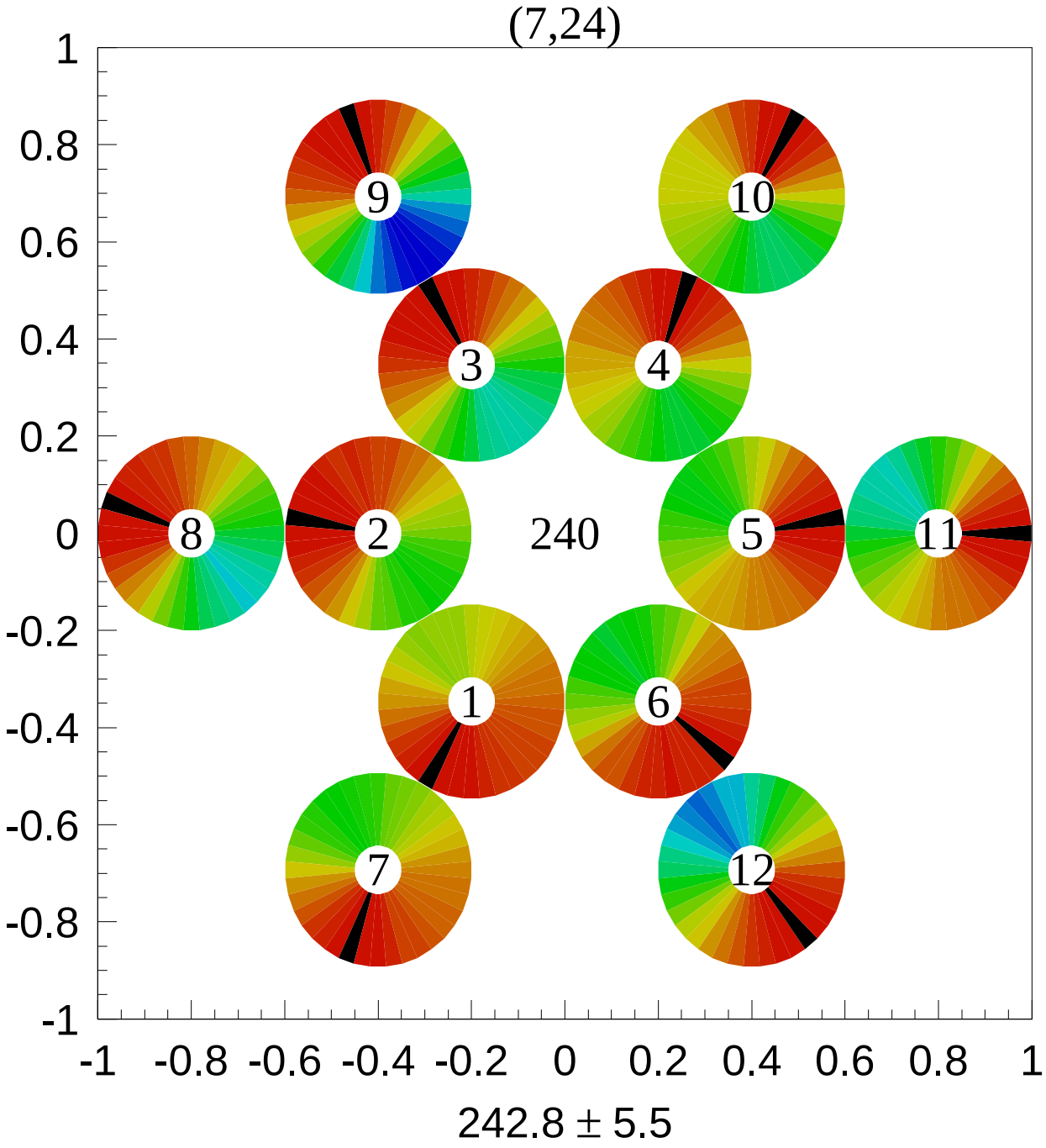

(7,22)
tilted LEDs
119 128 120 121 128 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 115 126 127 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

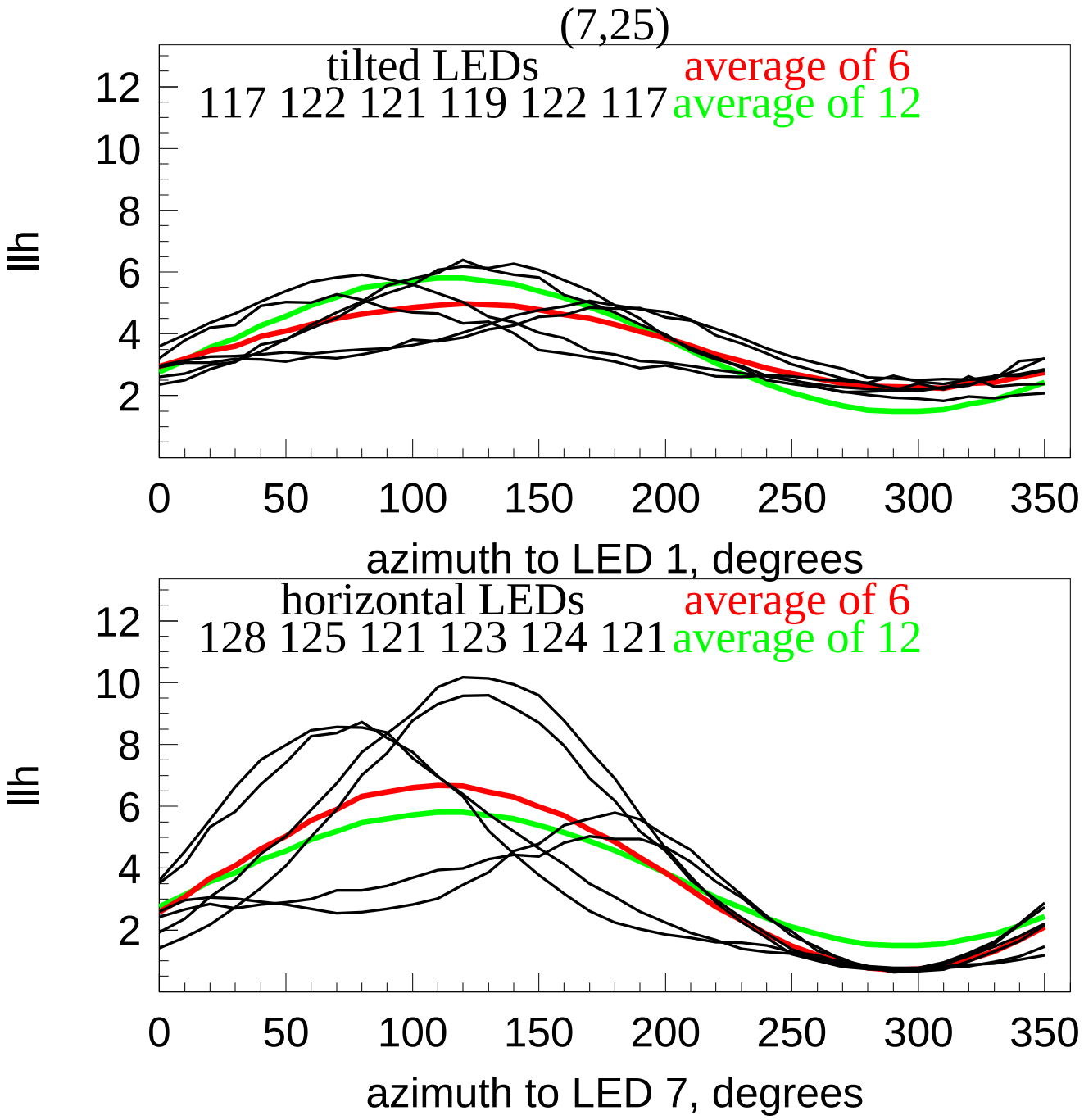

(7,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
286.5 ± 4.6

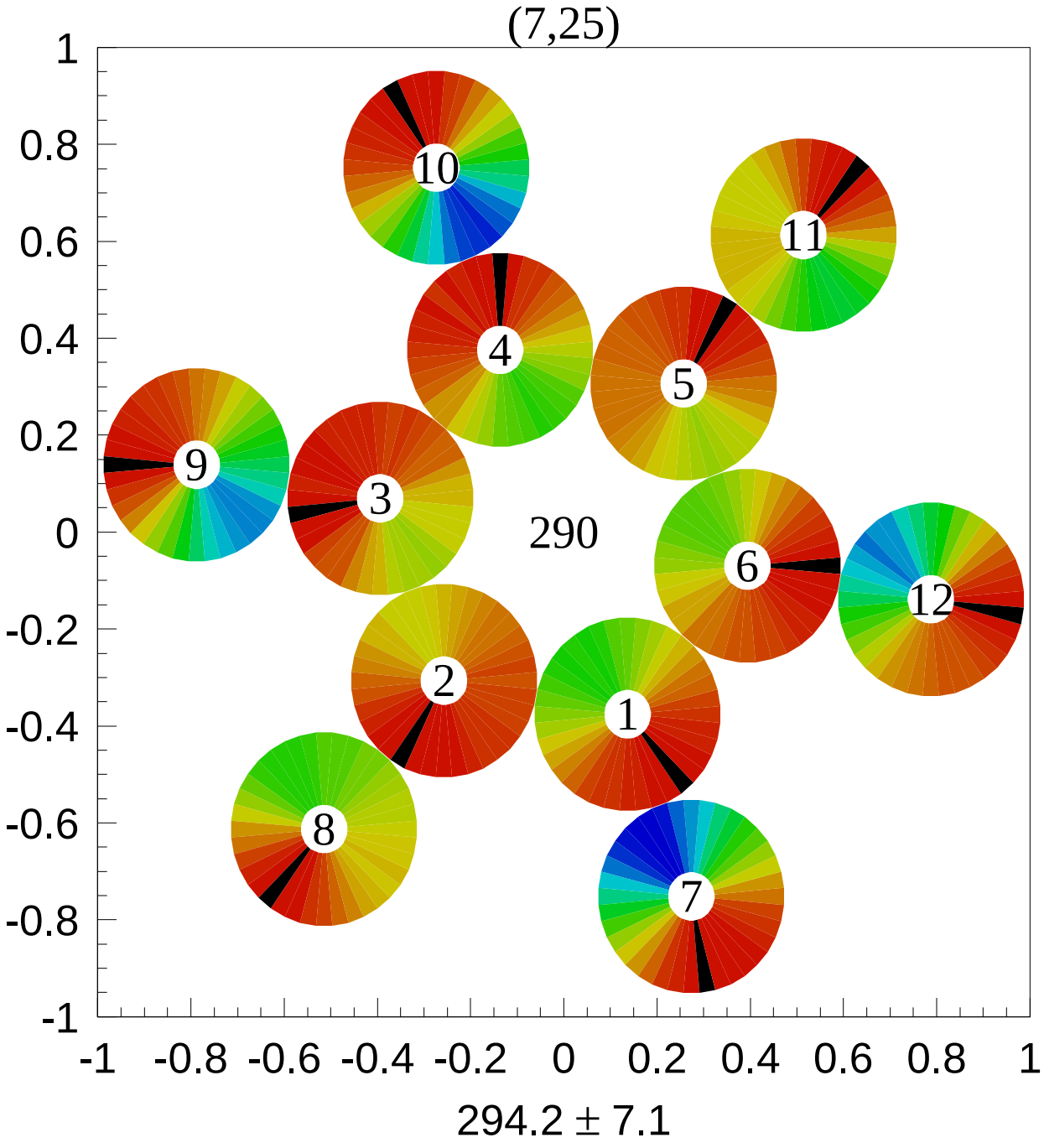

(7,23)
tilted LEDs
121 124 123 122 117 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 122 124 128 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

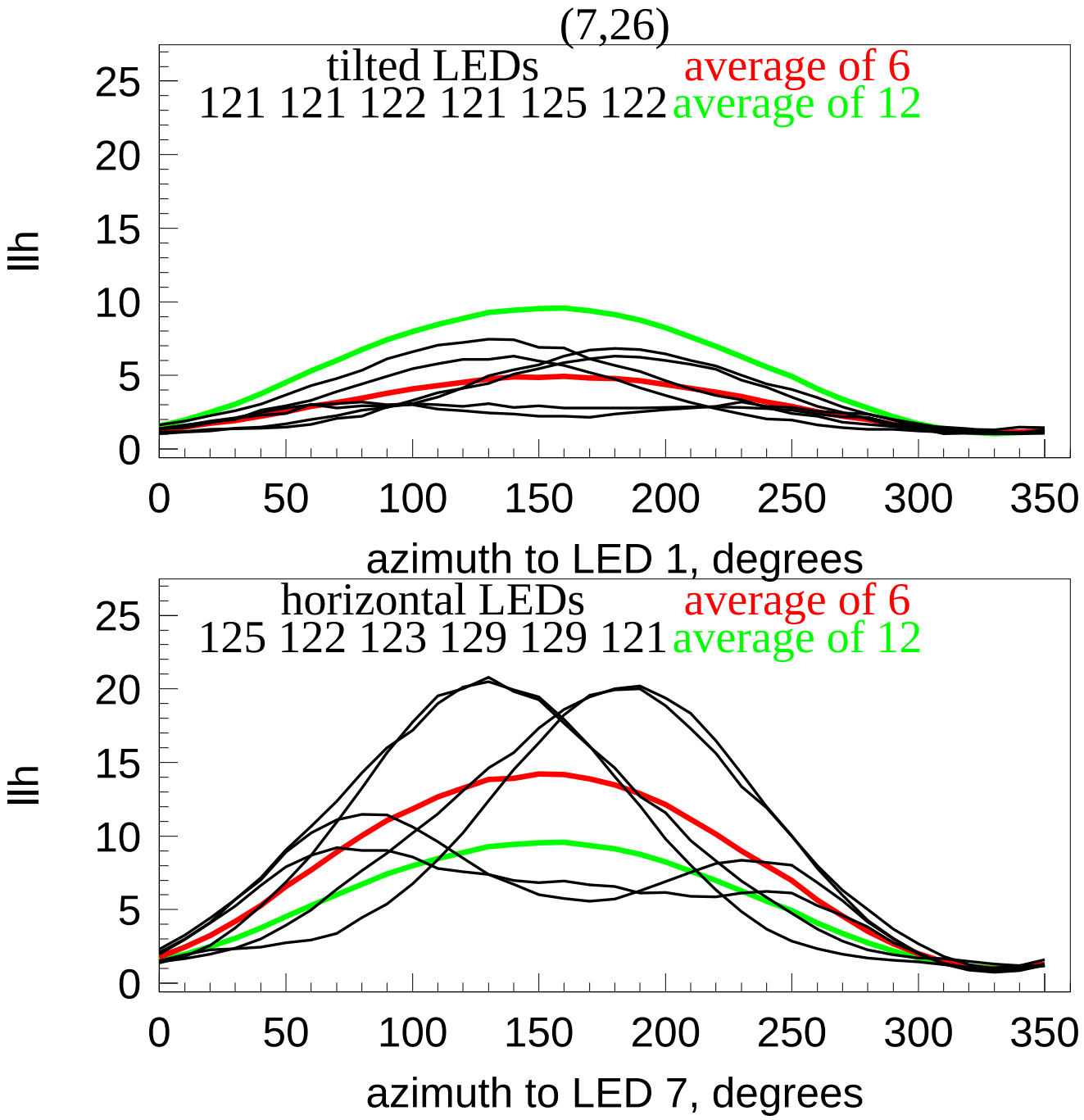

(7,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
14 ± 5.5
12
11
6
5
7
1
10
4
10
2
3
8
9

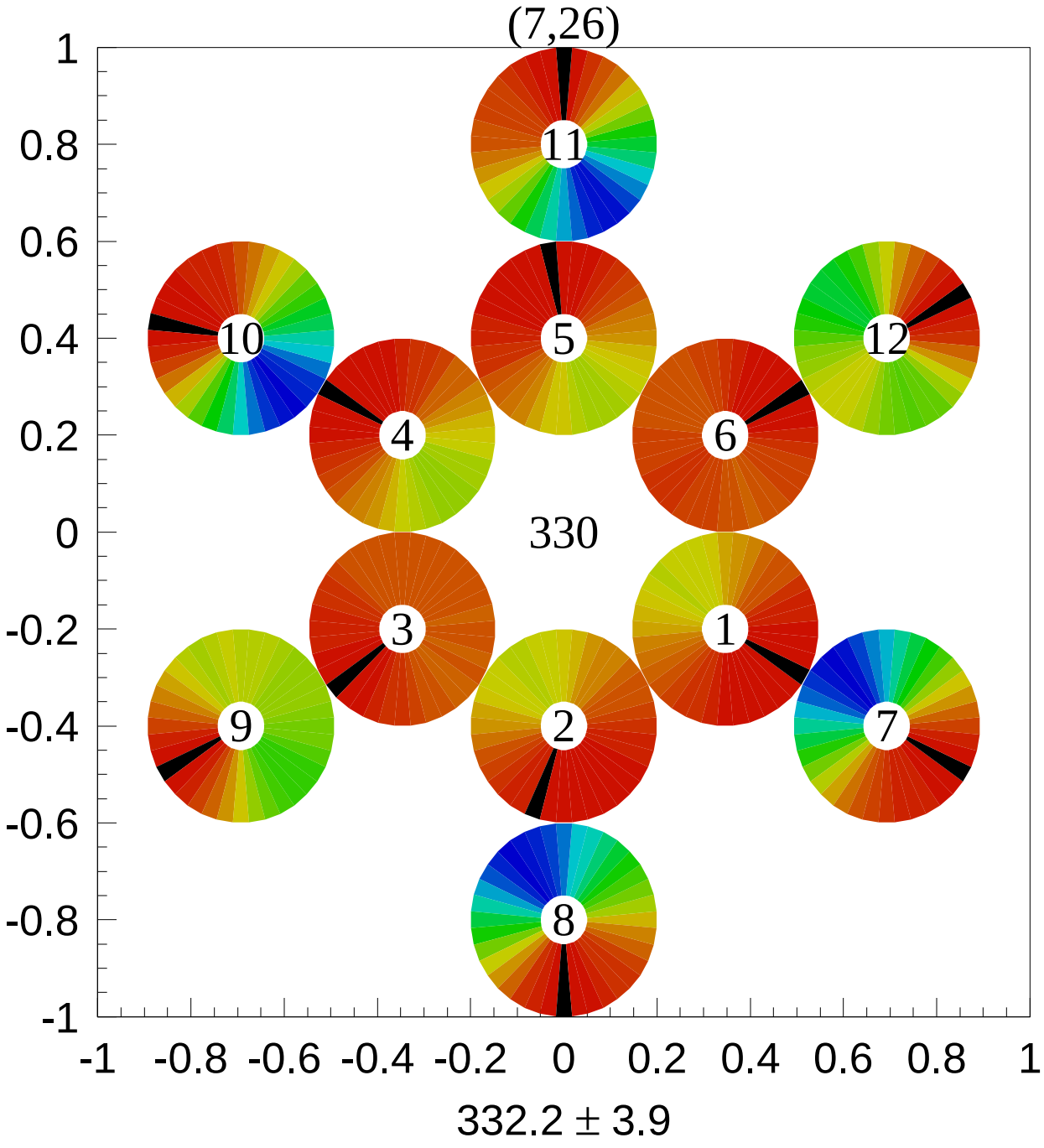

(7,24)
tilted LEDs
122 123 129 126 122 124
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 119 122 120 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

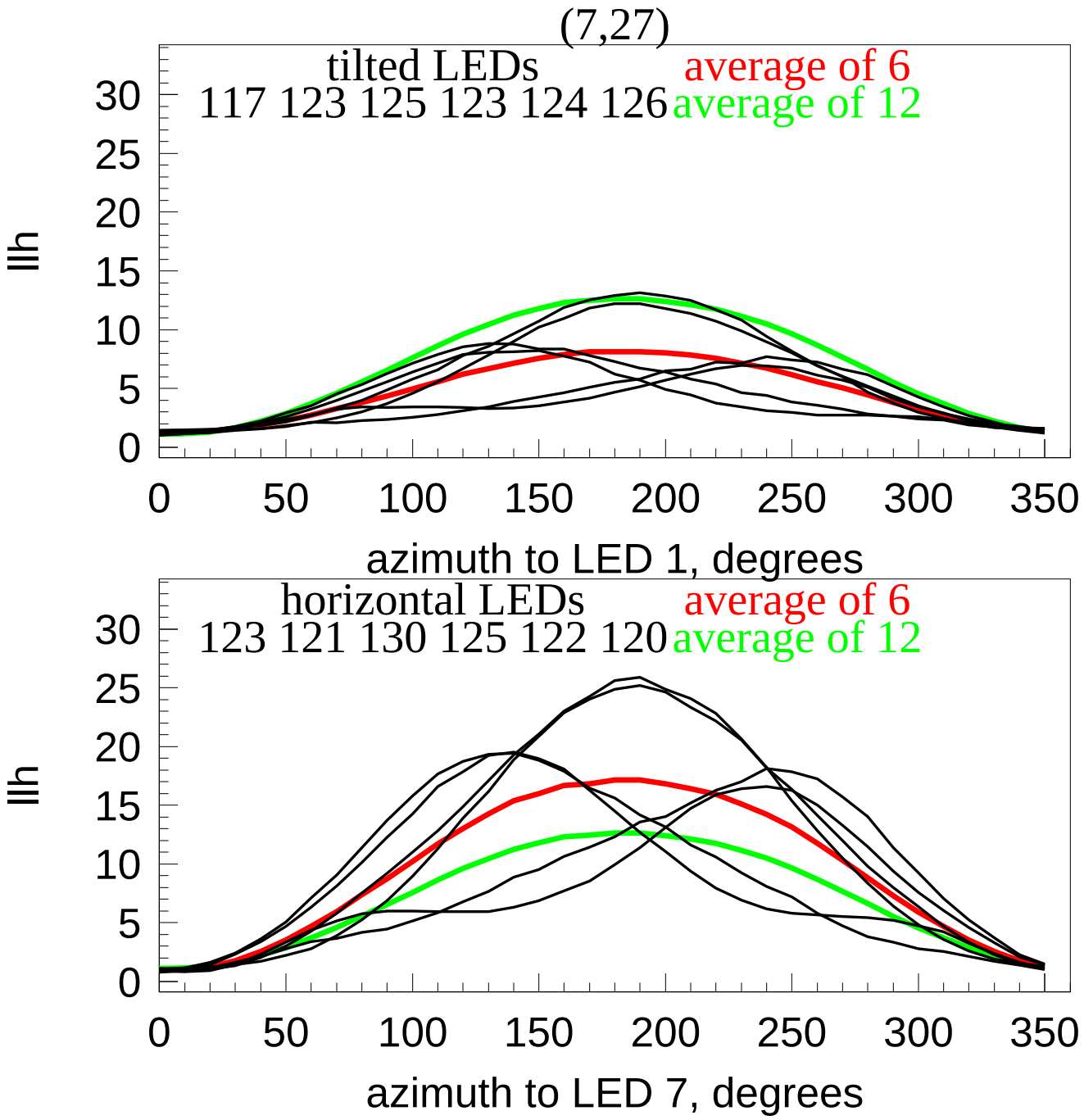

(7,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242.8 ± 5.5

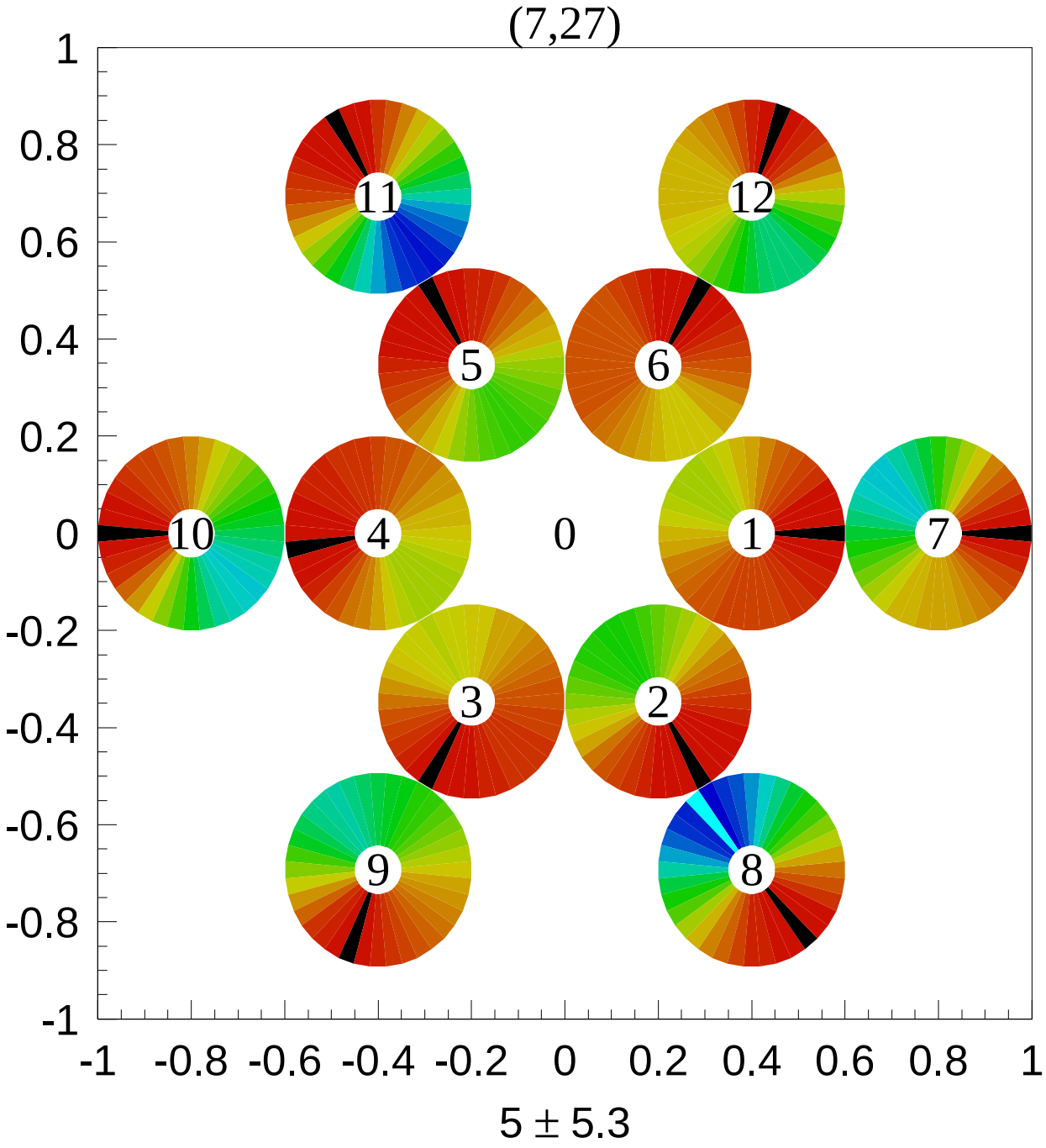

(7,25)
tilted LEDs
117 122 121 119 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 125 121 123 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

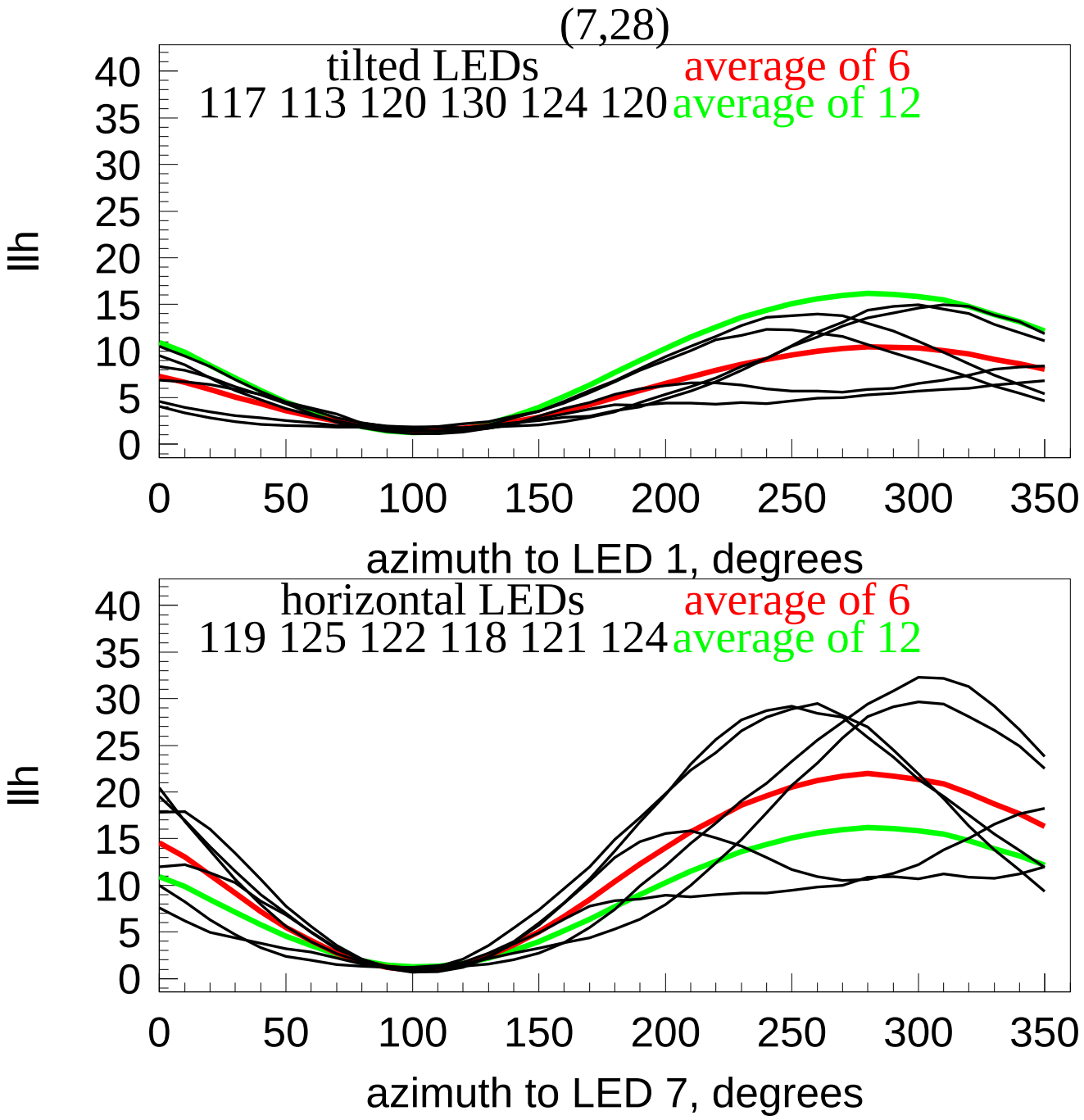

(7,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
294.2 ± 7.1

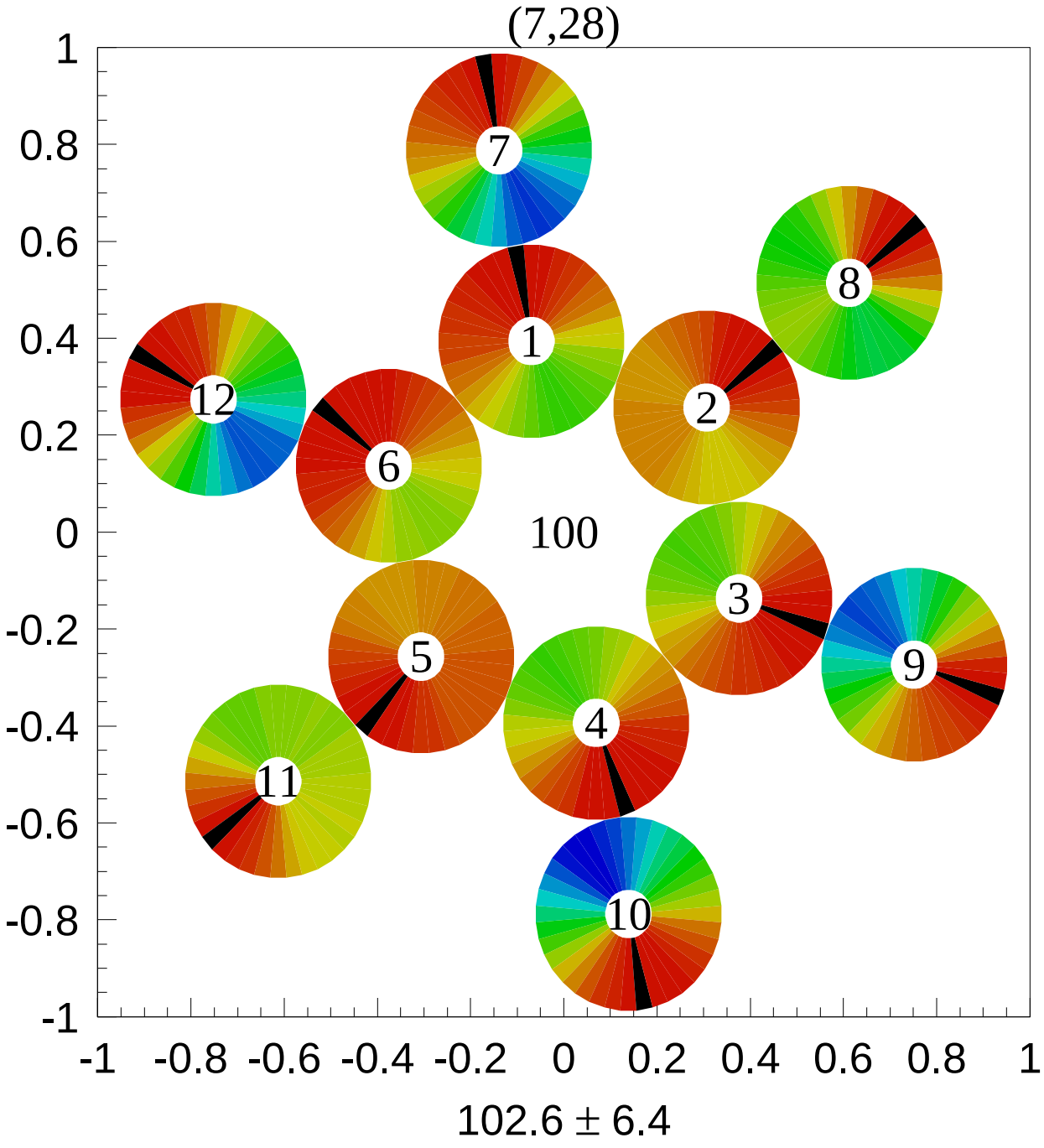

(7,26)
tilted LEDs
121 121 122 121 125 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 123 129 129 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

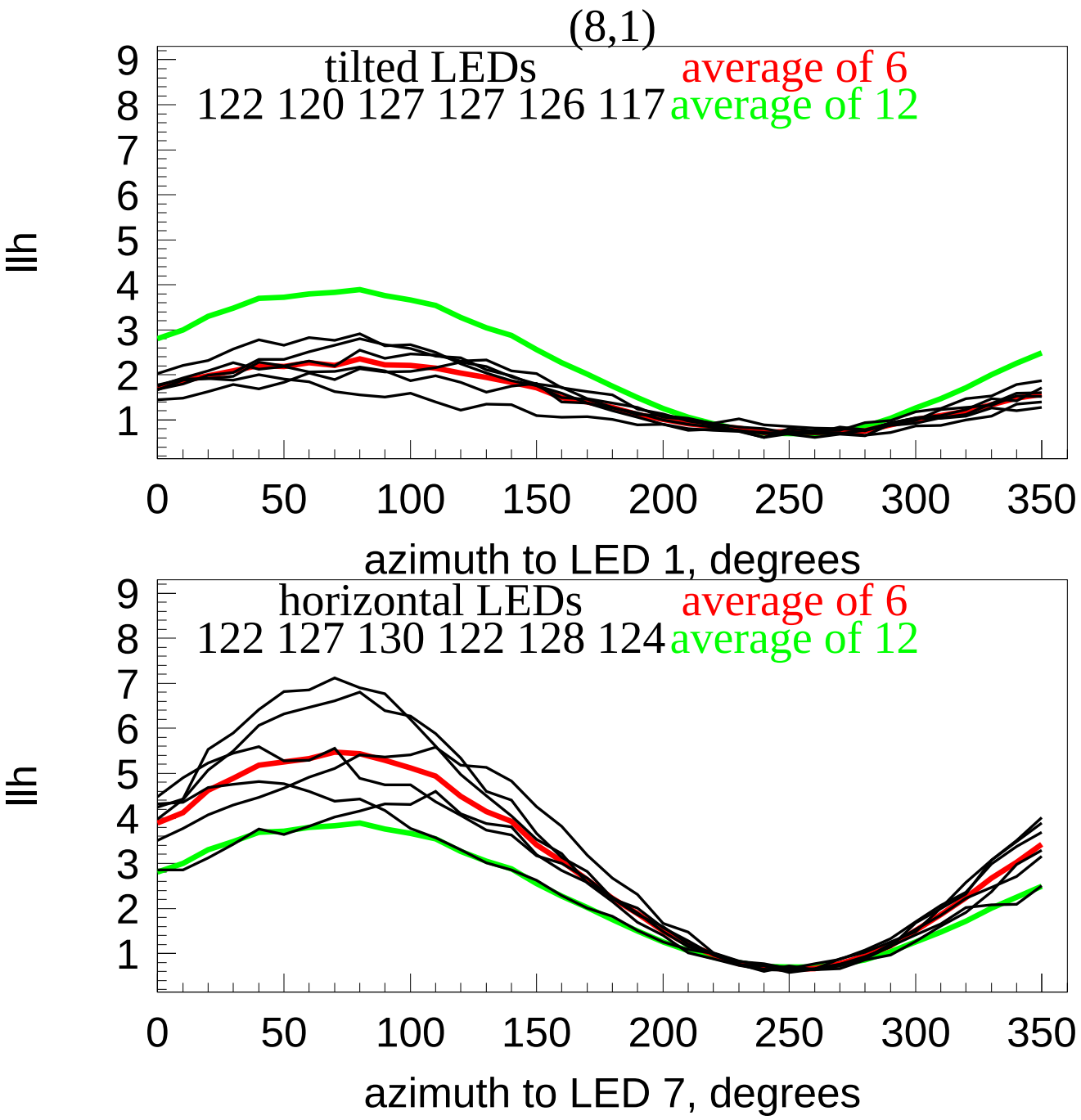

(7,26)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
332.2 ± 3.9

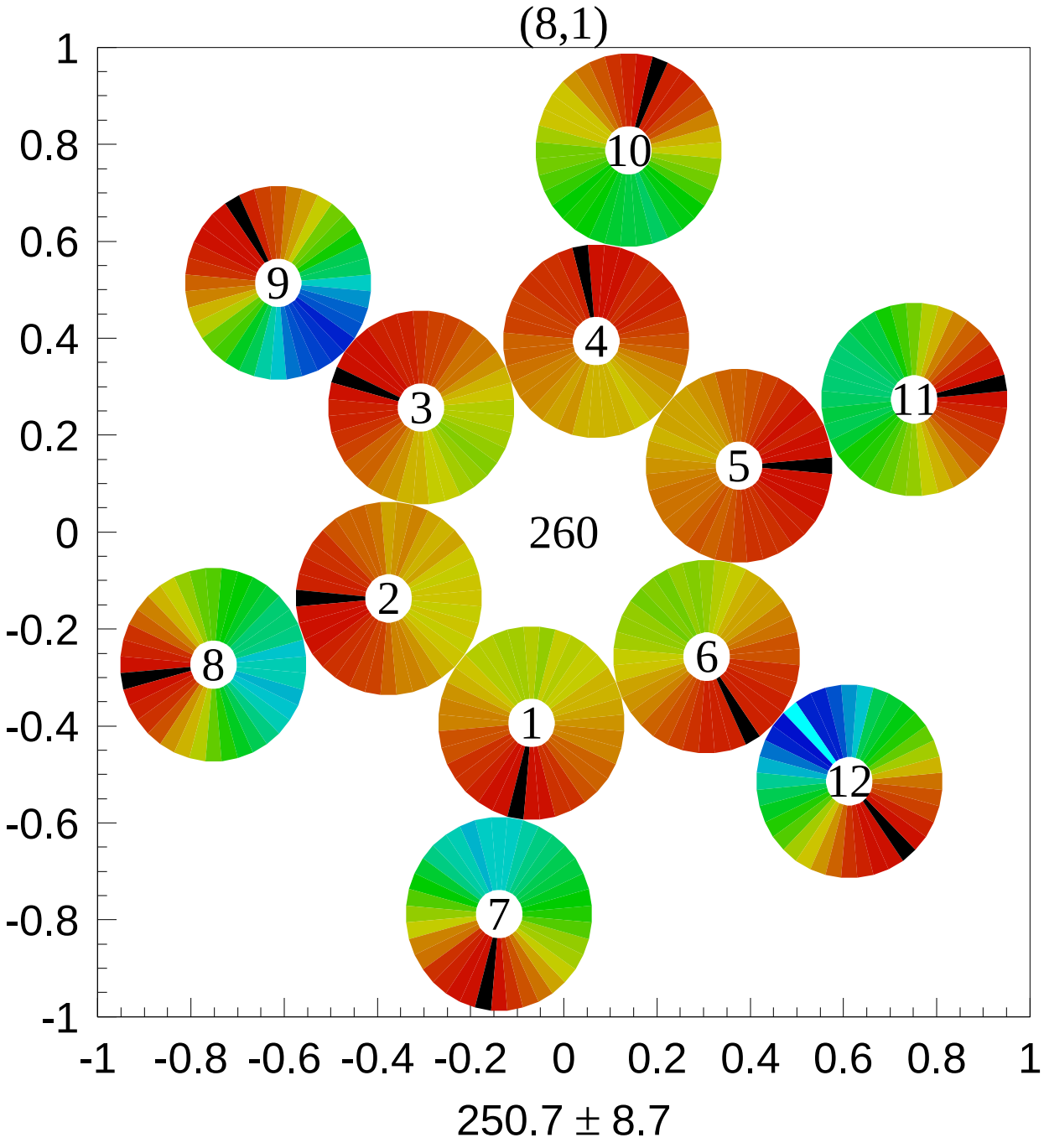

(7,27)
tilted LEDs
117 123 125 123 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 130 125 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

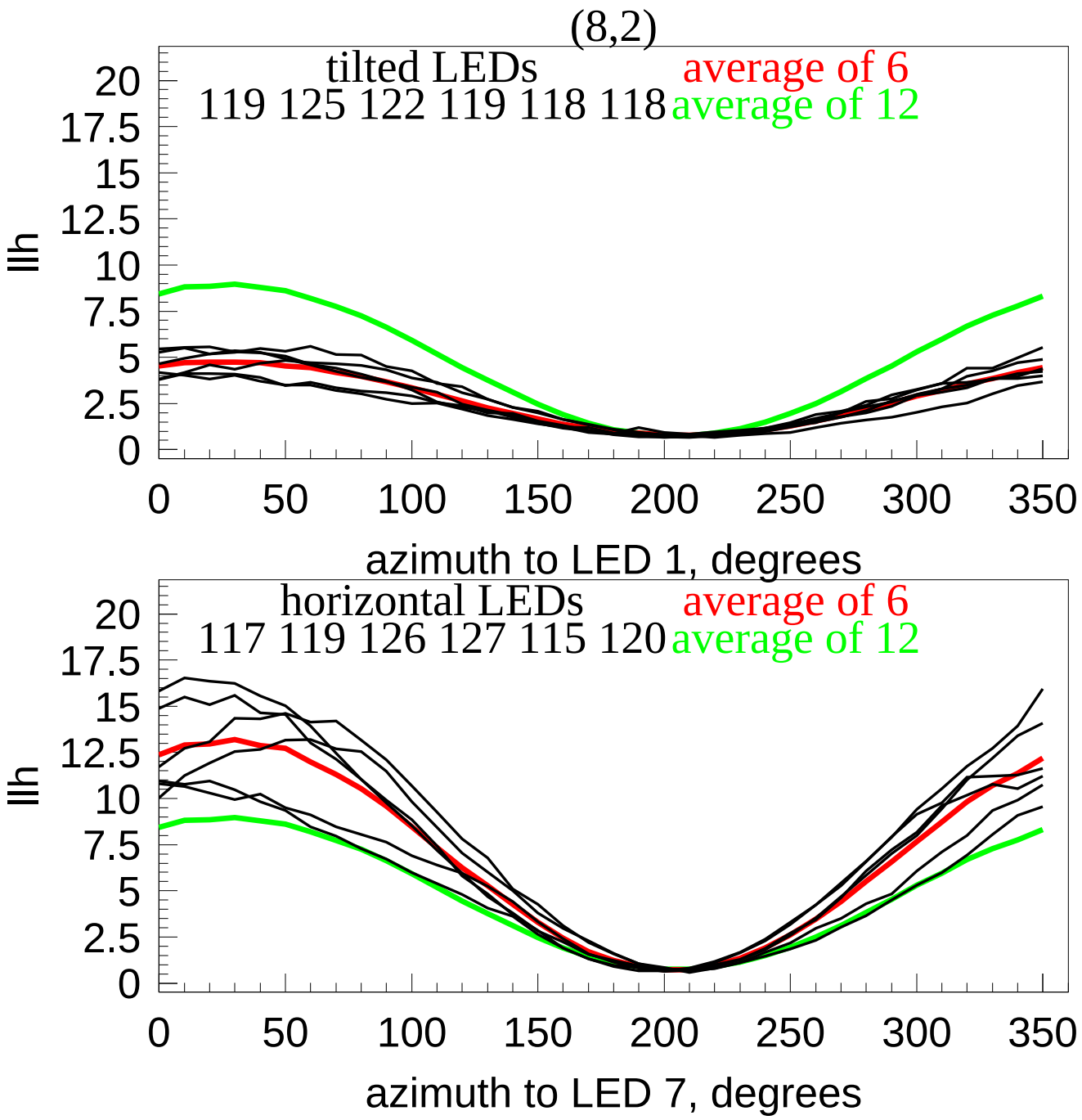

(7,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
5 ± 5.3

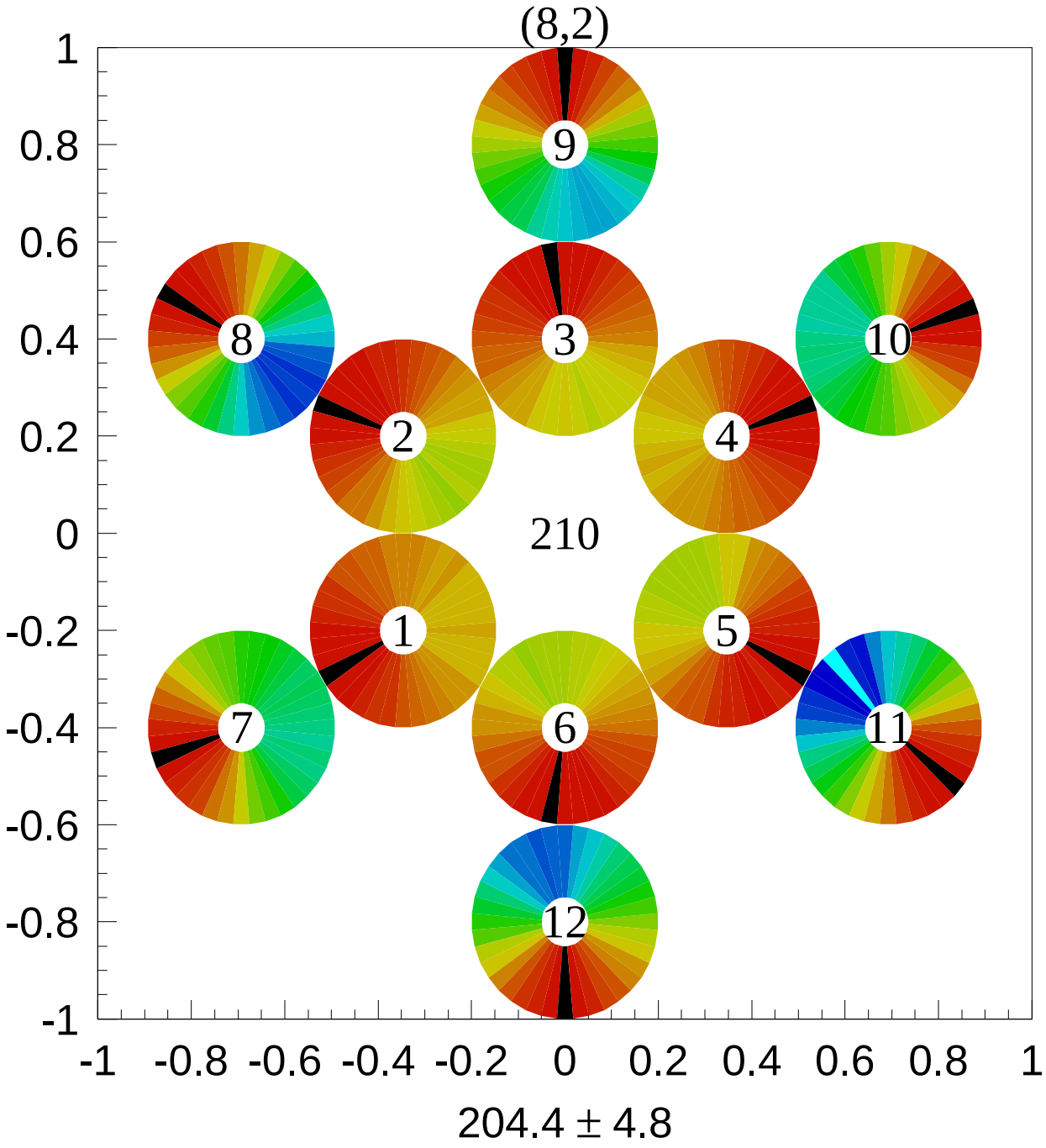

(7,28)
tilted LEDs
117 113 120 130 124 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 125 122 118 121 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

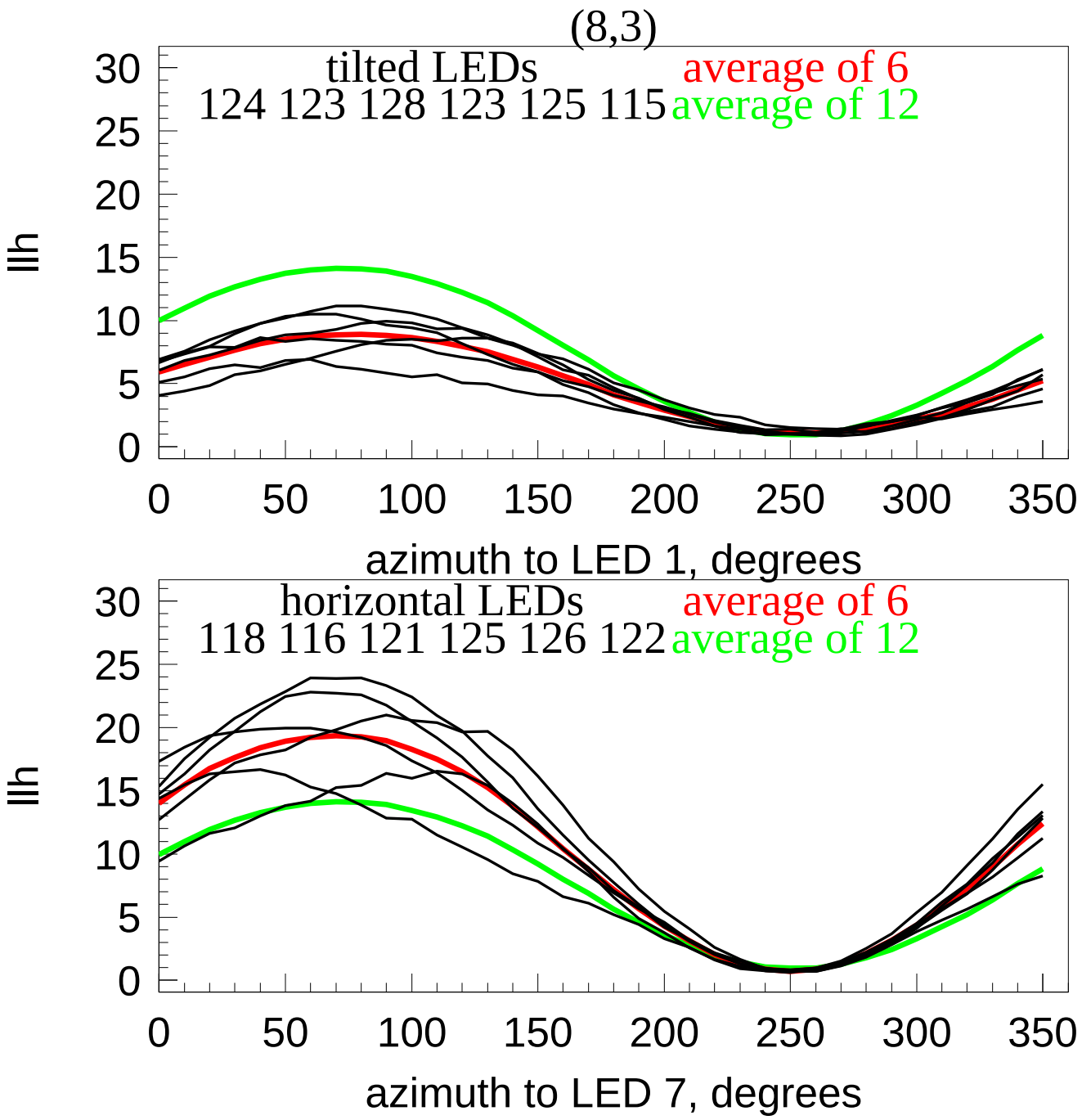

(7,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
1
8
12
2
6
100
3
5
9
4
11
10
102.6 ± 6.4

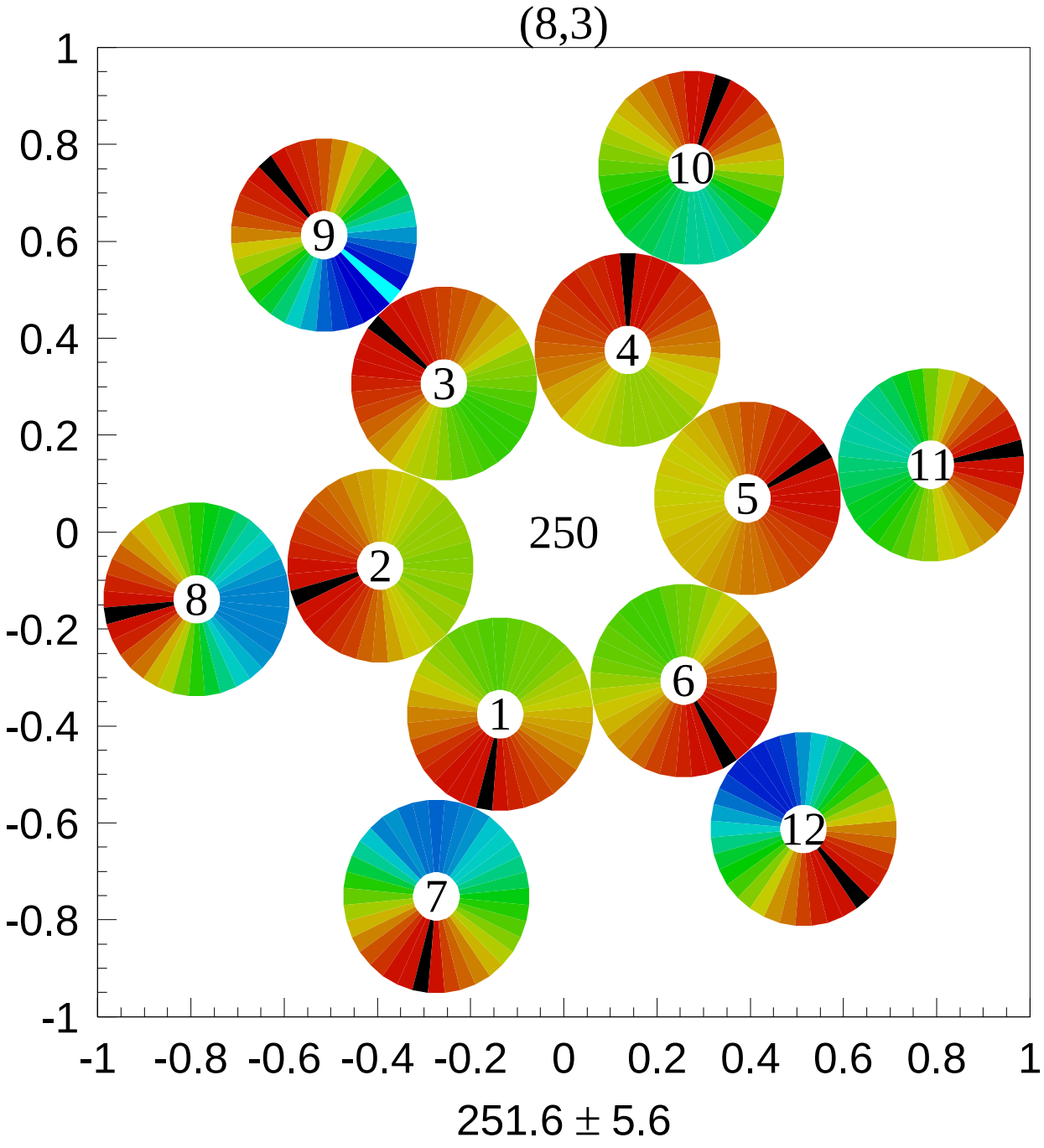

(8,1)
tilted LEDs
122 120 127 127 126 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 127 130 122 128 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

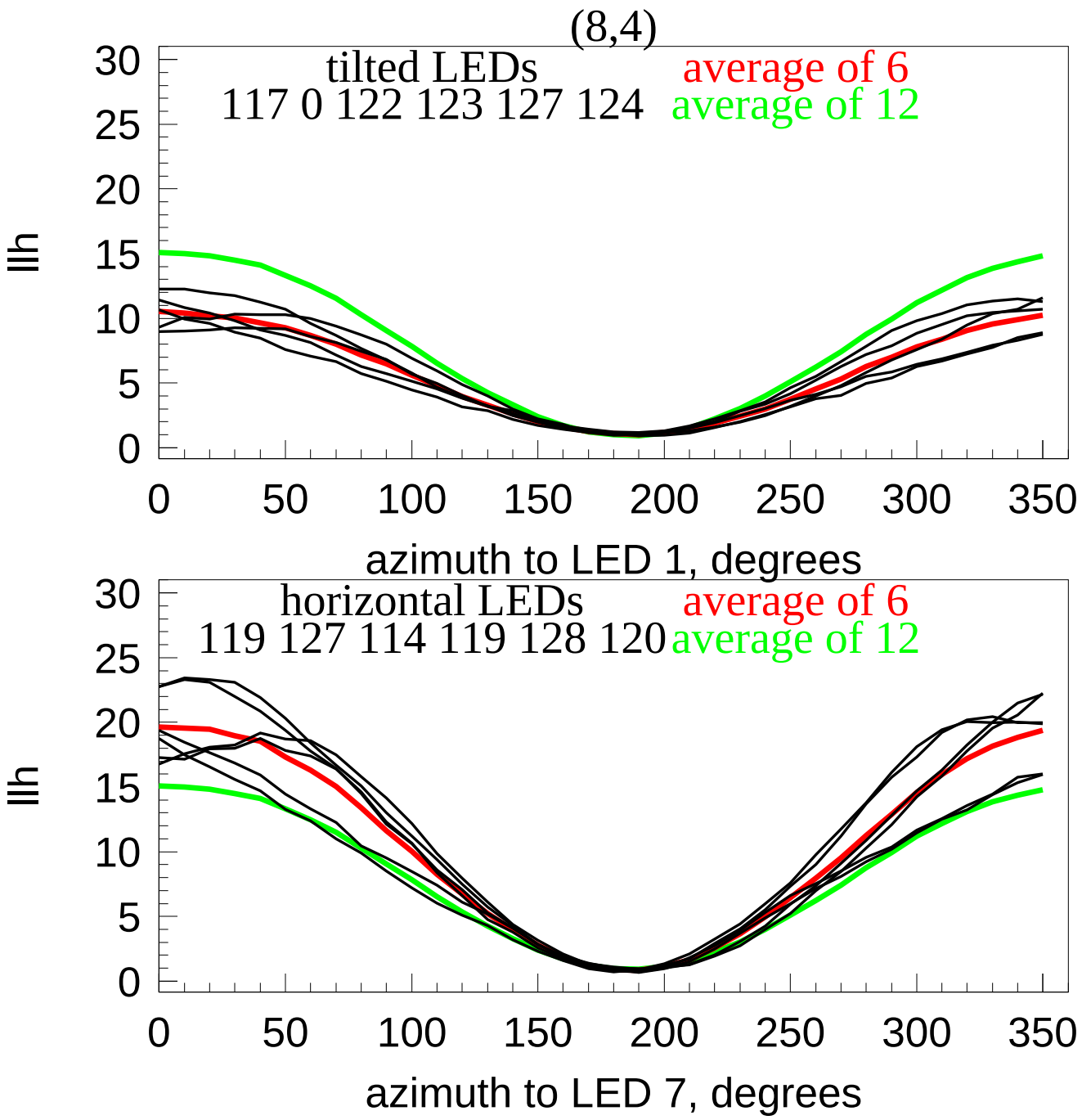

(8,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
250.7 ± 8.7

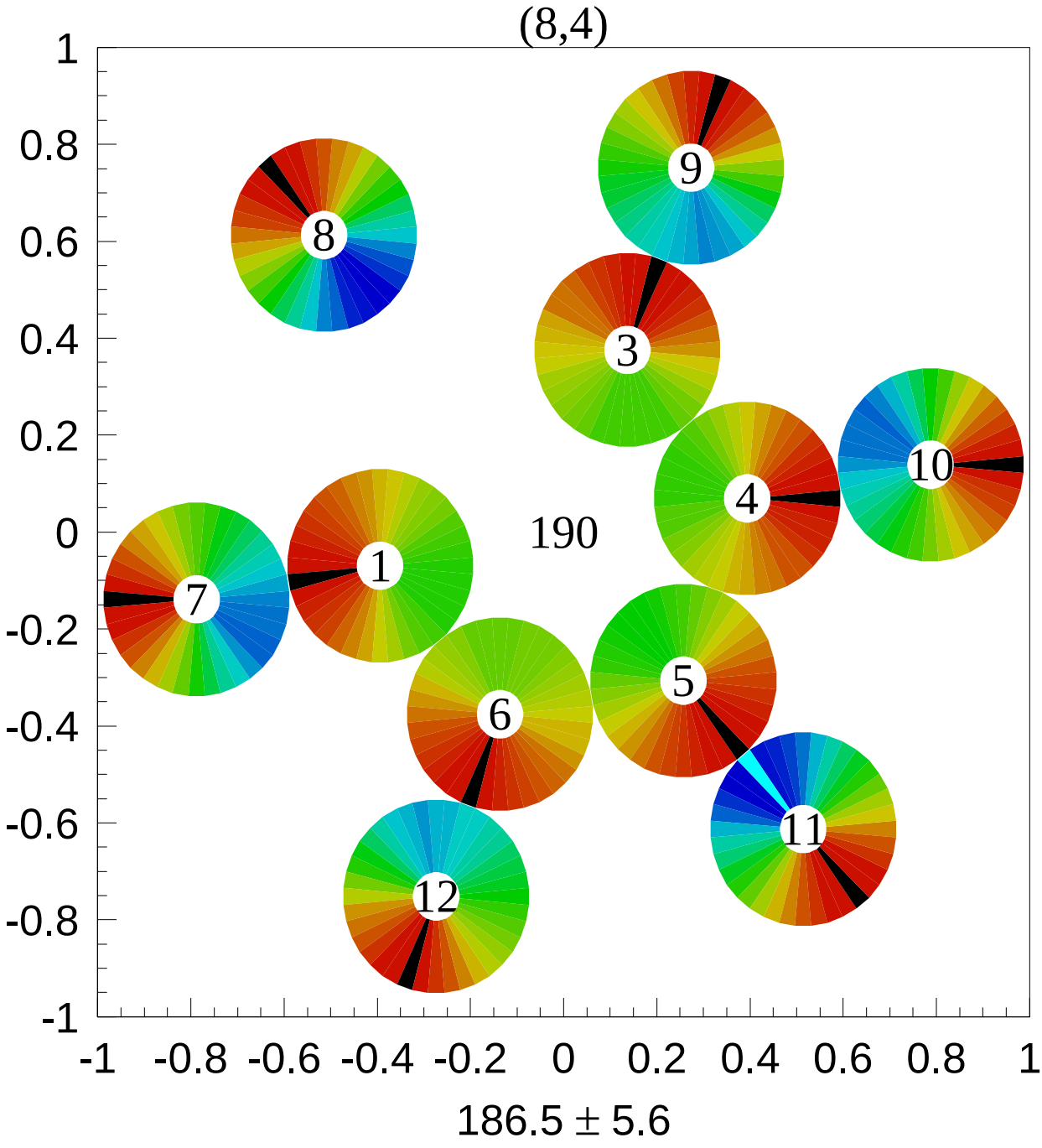

(8,2)
tilted LEDs
119 125 122 119 118 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 126 127 115 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

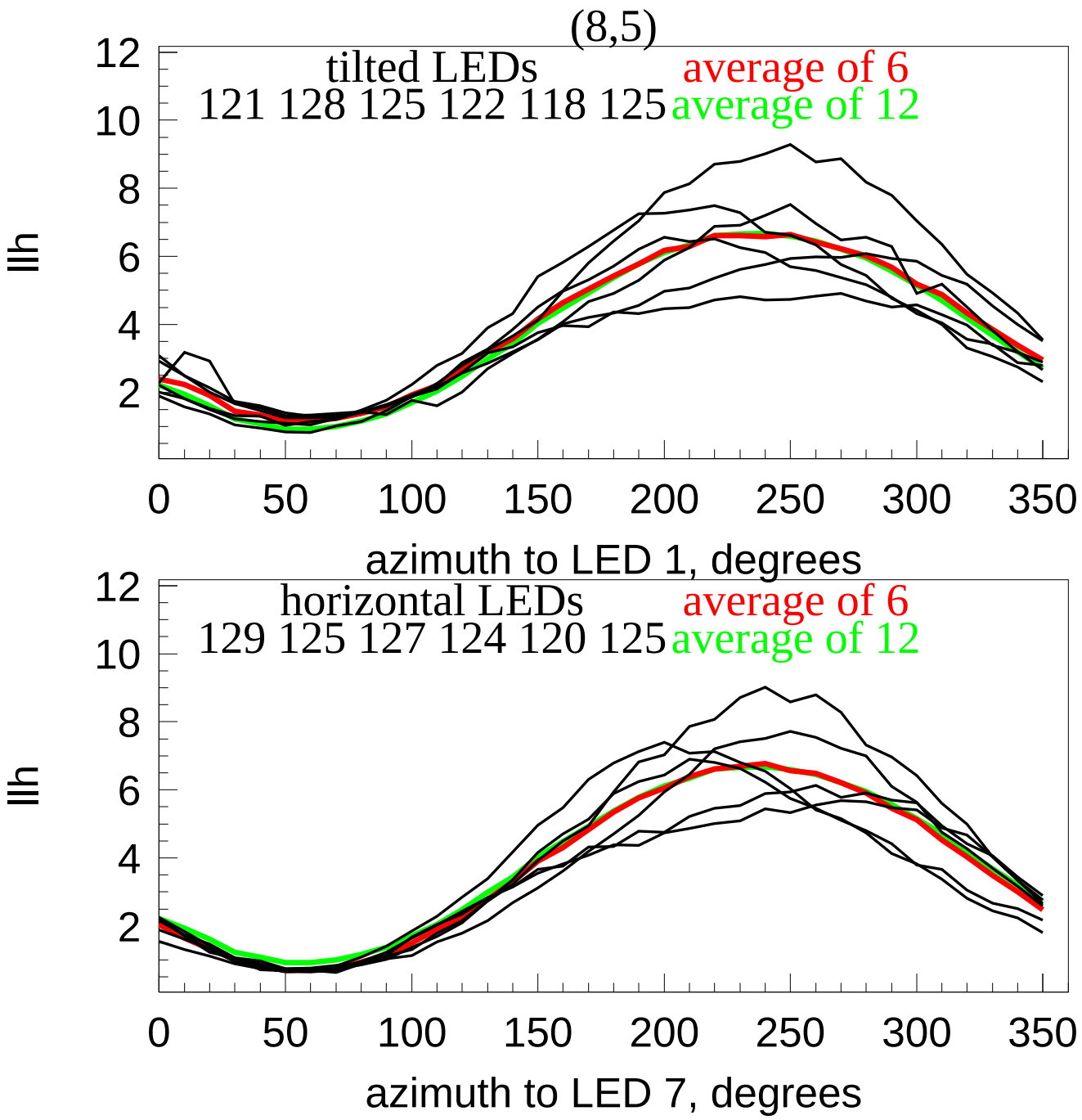

(8,2)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
204.4 ± 4.8

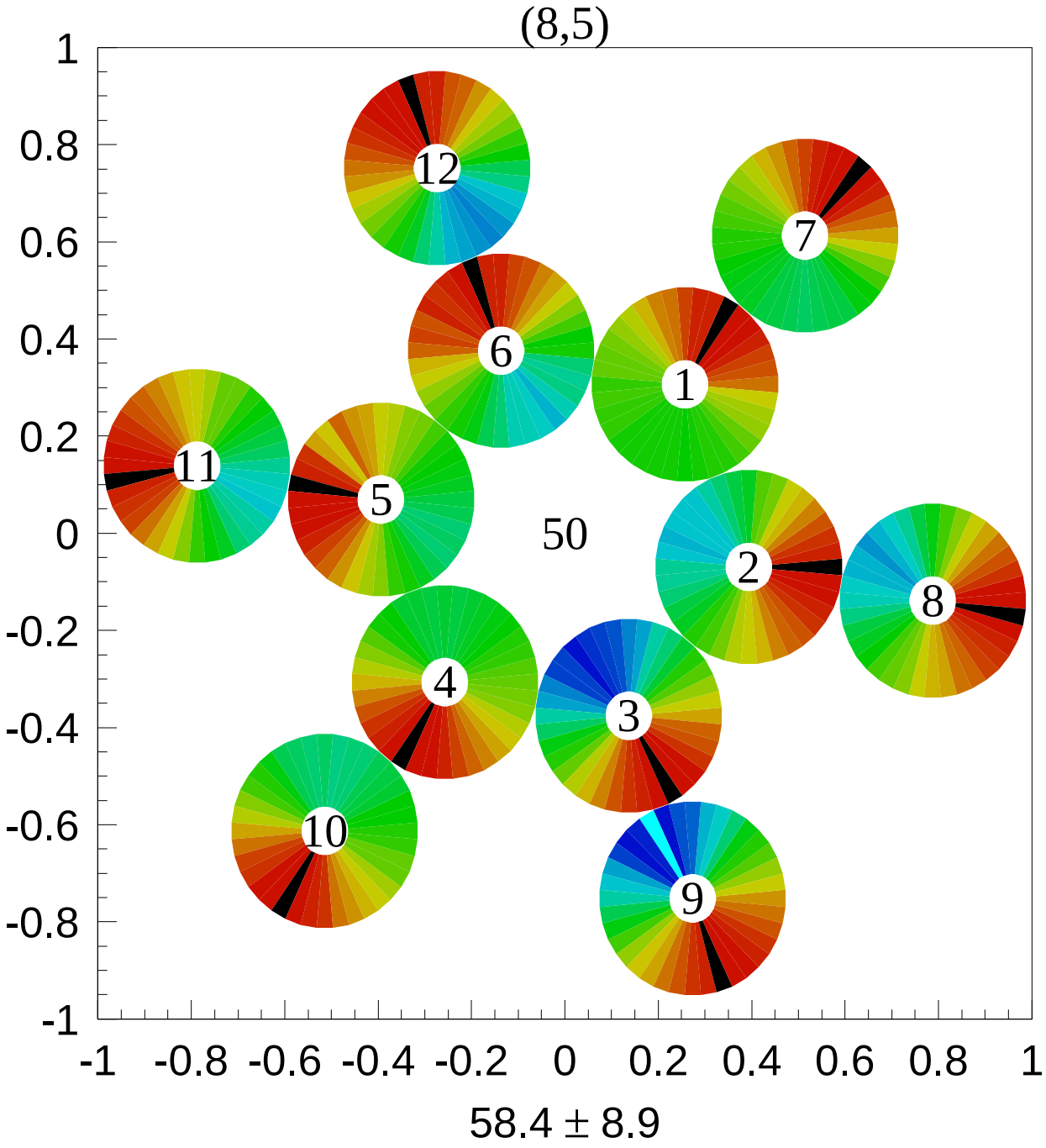

(8,3)
tilted LEDs
124 123 128 123 125 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 116 121 125 126 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

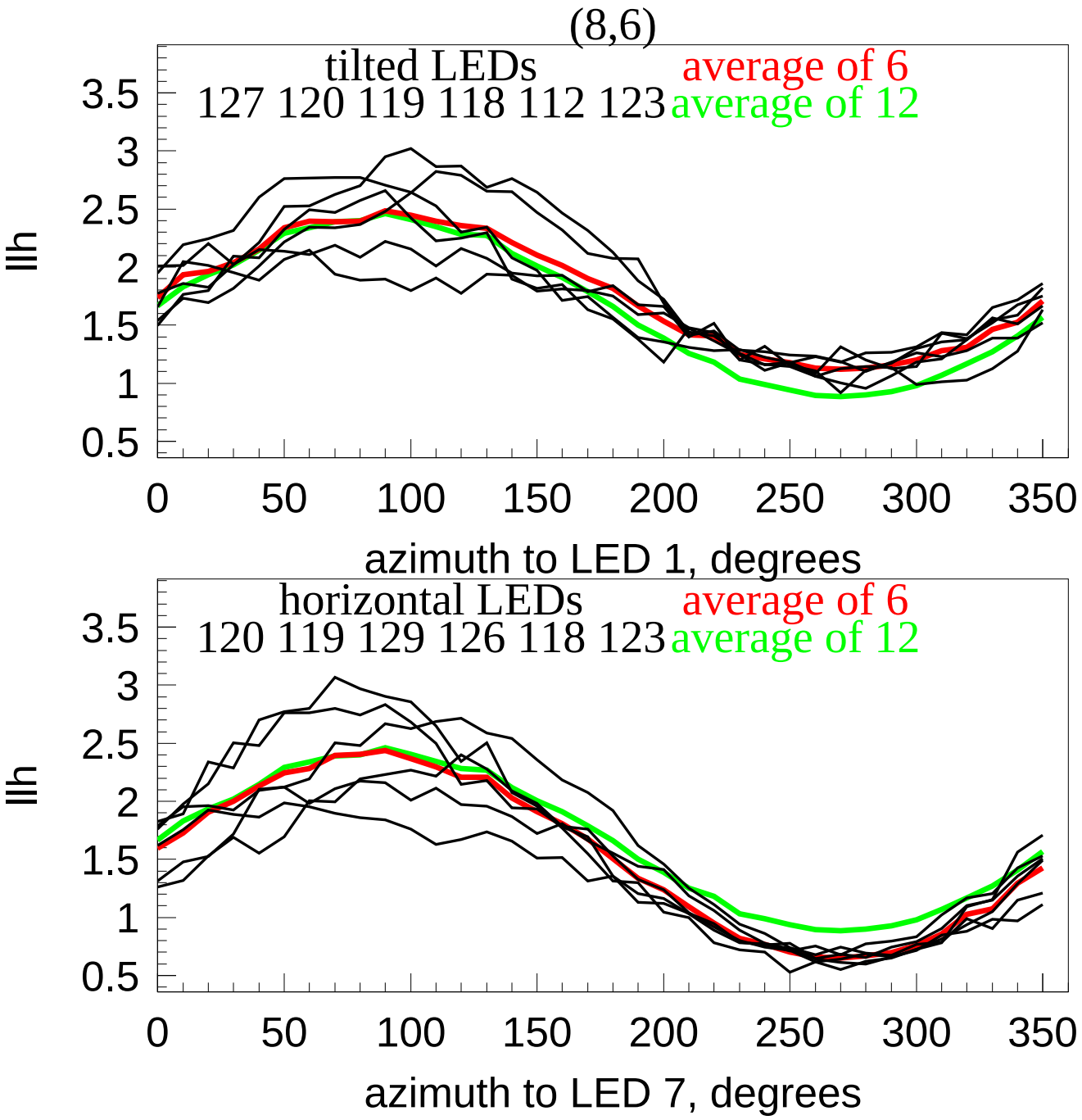

(8,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
251.6 ± 5.6

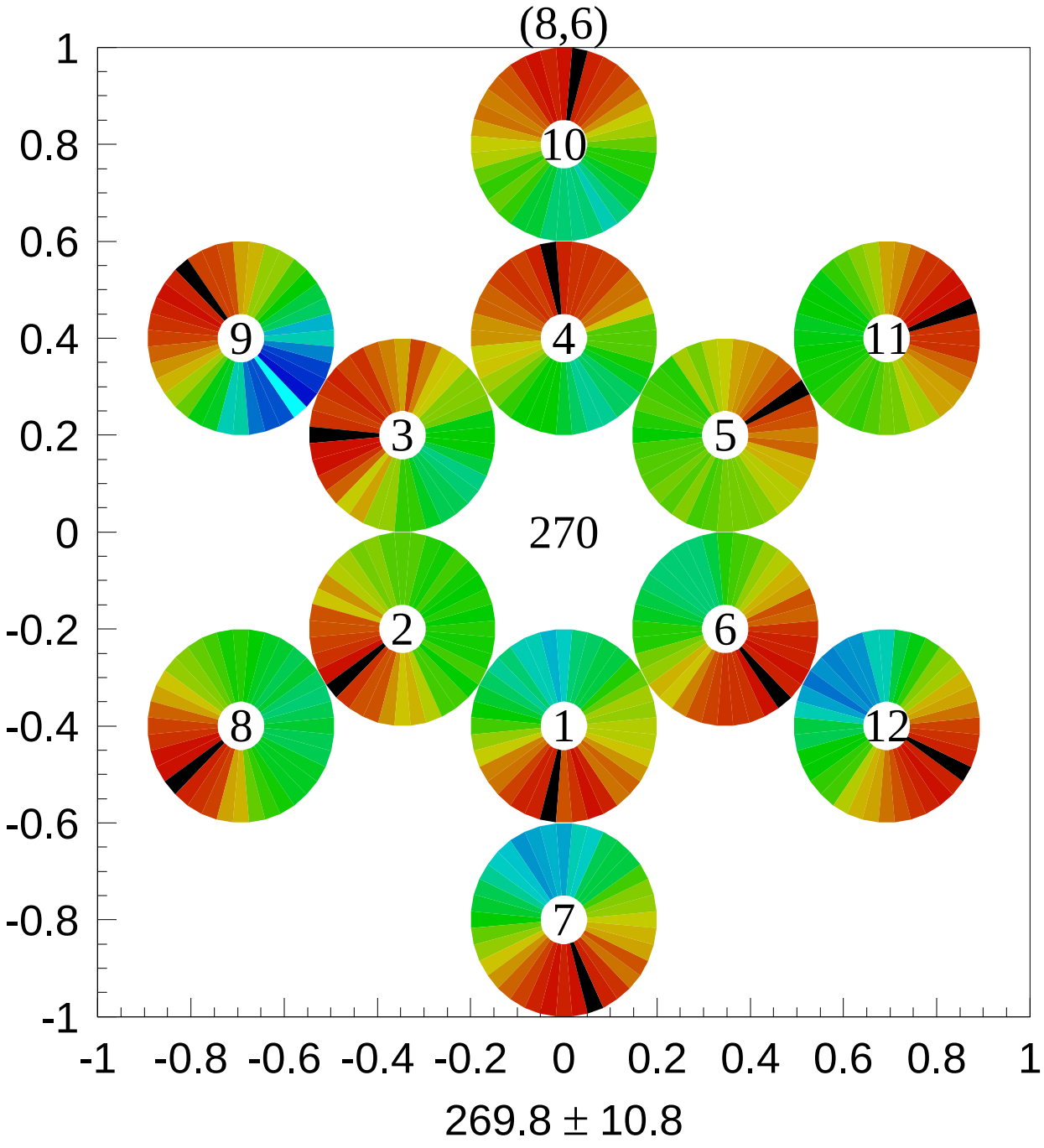

(8,4)
tilted LEDs
117 0 122 123 127 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 127 114 119 128 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

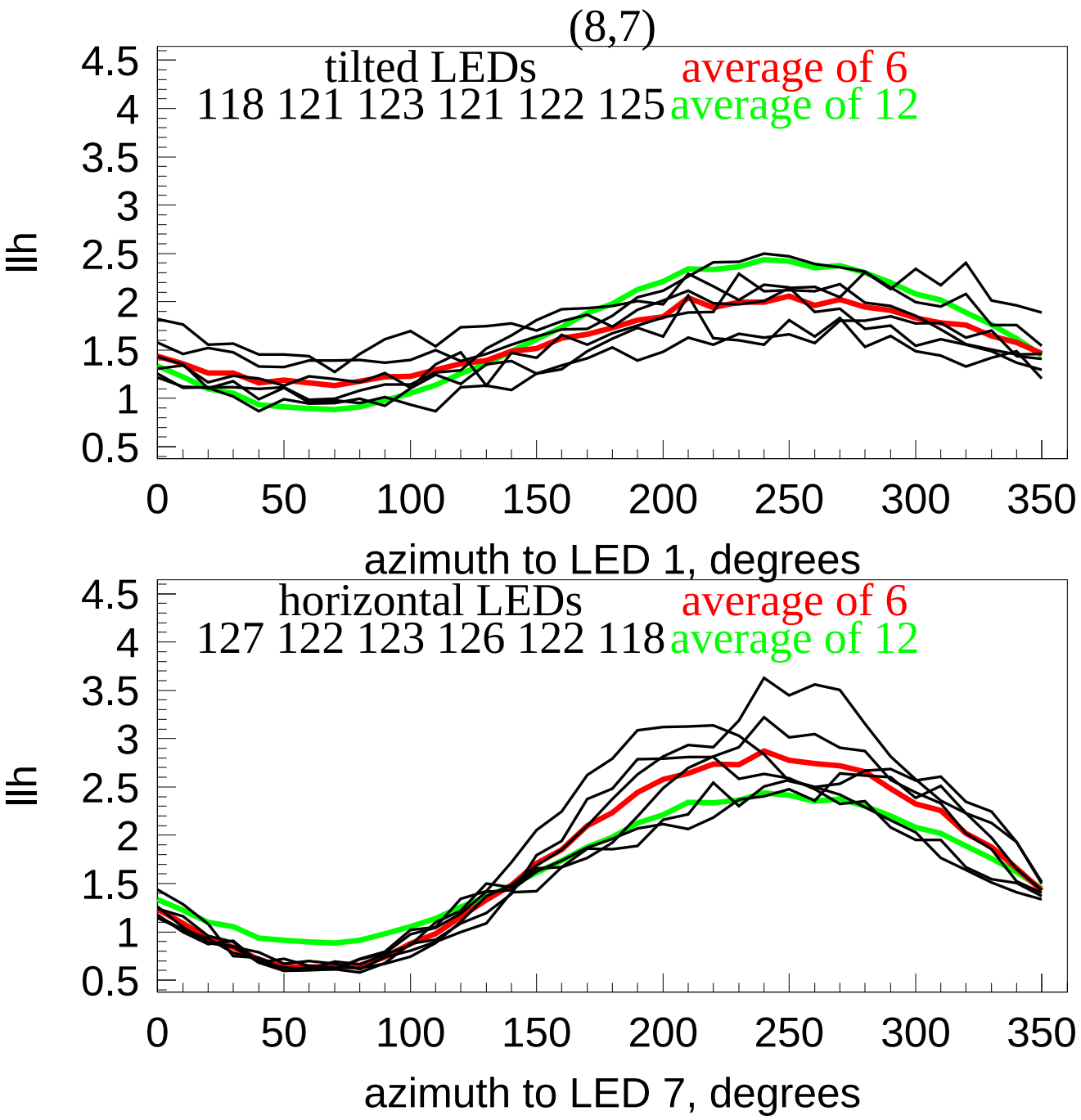

(8,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.5 ± 5.6
190
1
3
4
5
6
7
8
9
10
11
12

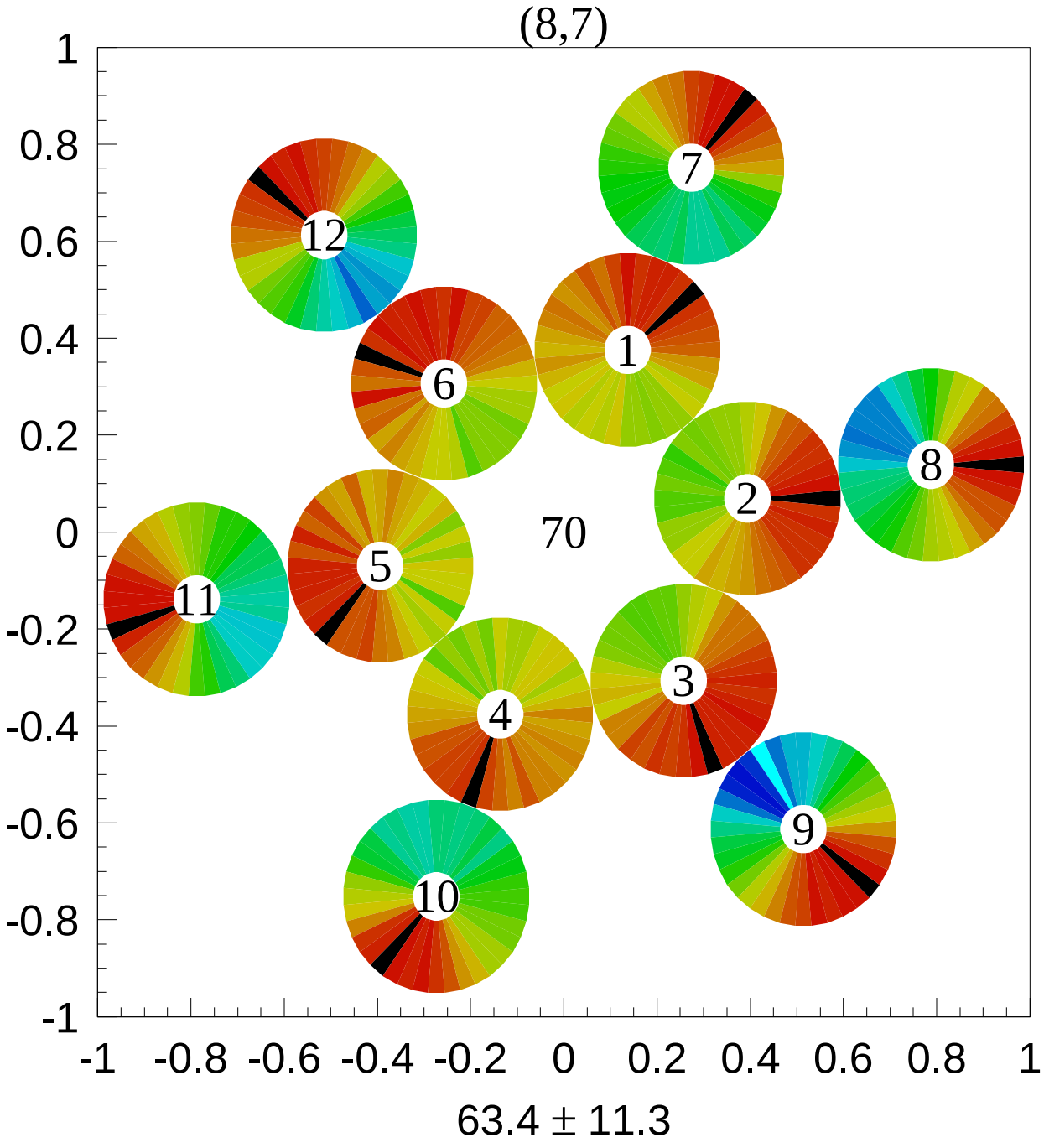

(8,5)
tilted LEDs
121 128 125 122 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 125 127 124 120 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

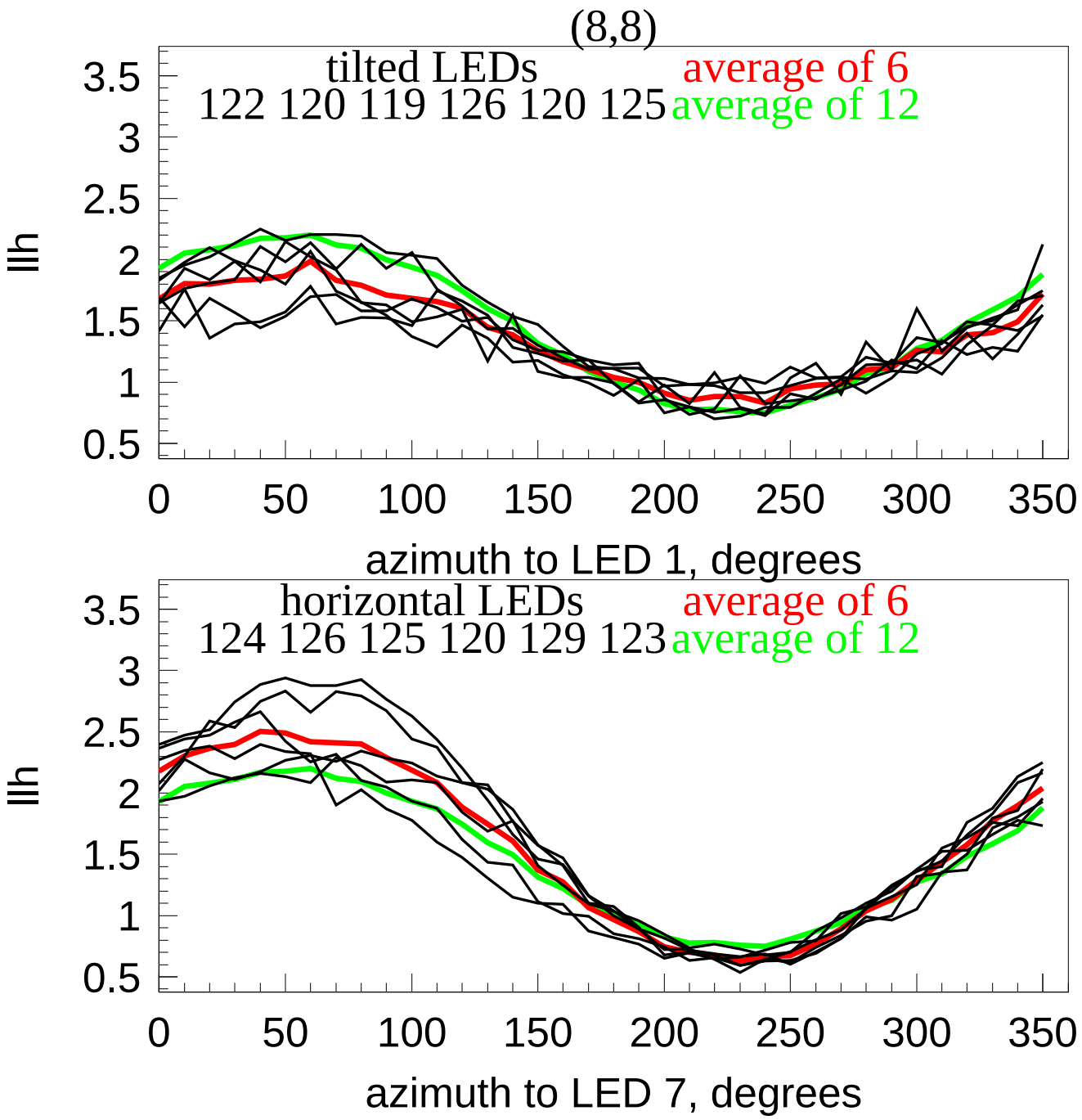

(8,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
58.4 ± 8.9

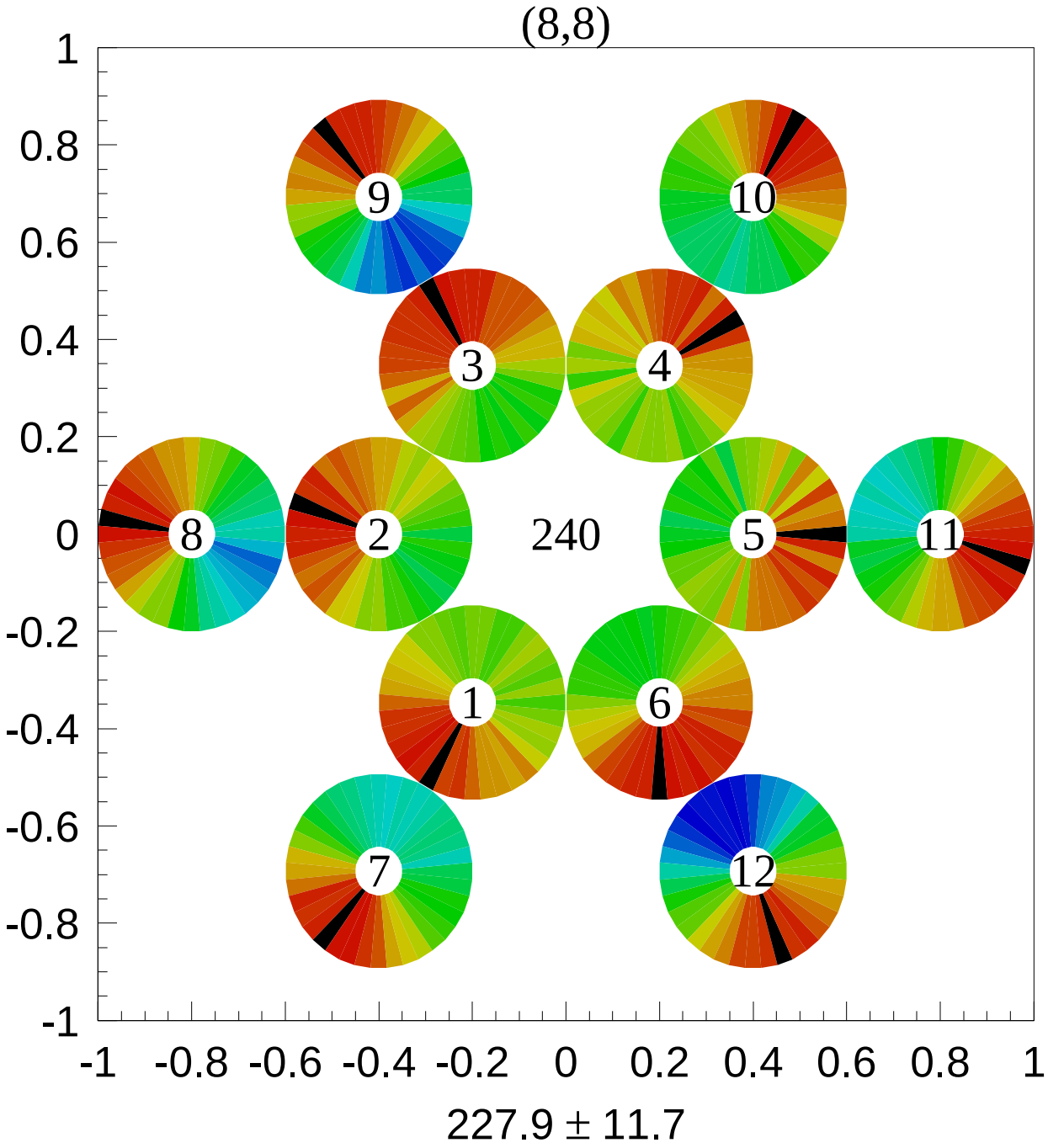

(8,6)
tilted LEDs
127 120 119 118 112 123
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 119 129 126 118 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

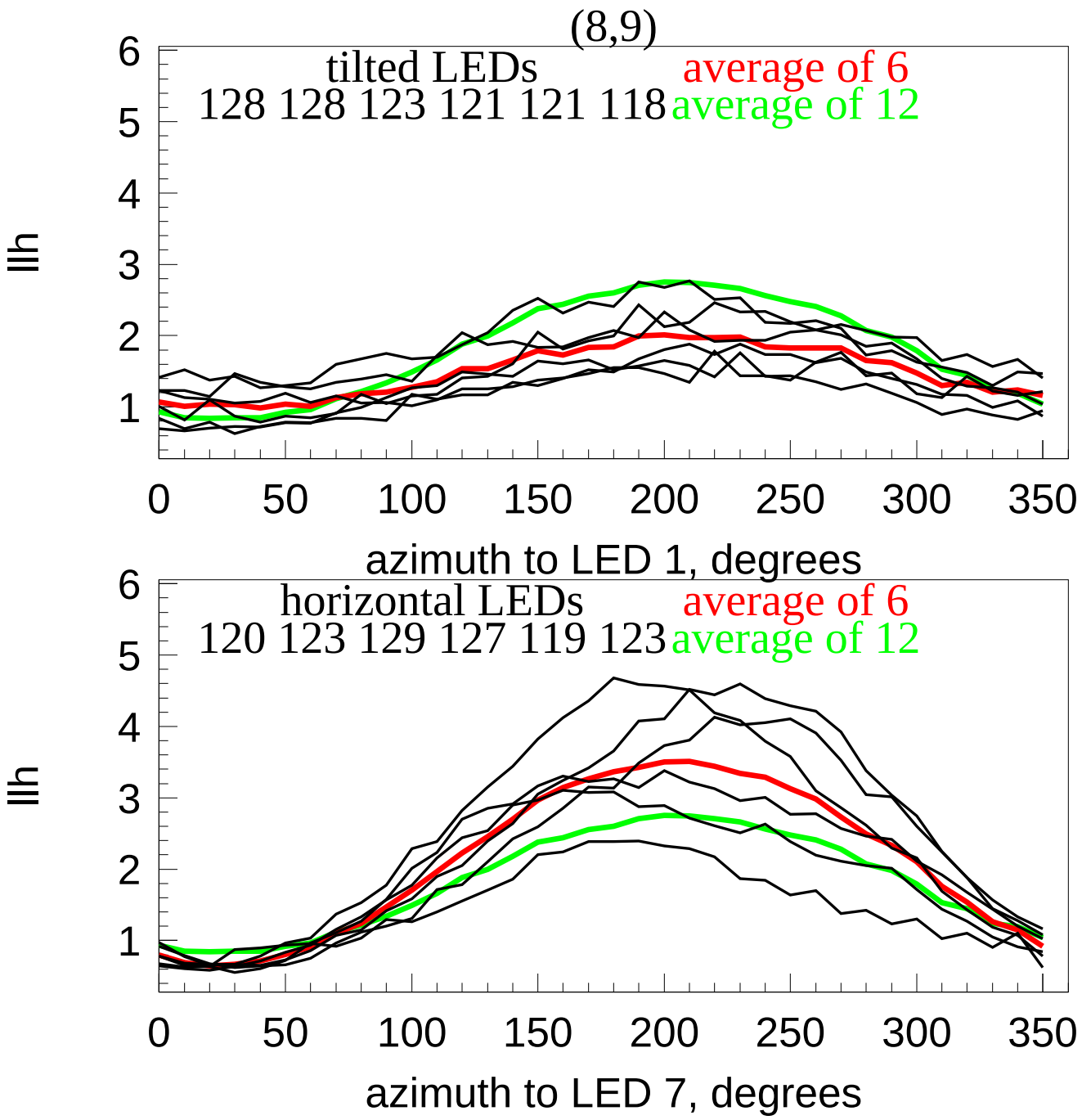

(8,6)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
269.8 ± 10.8

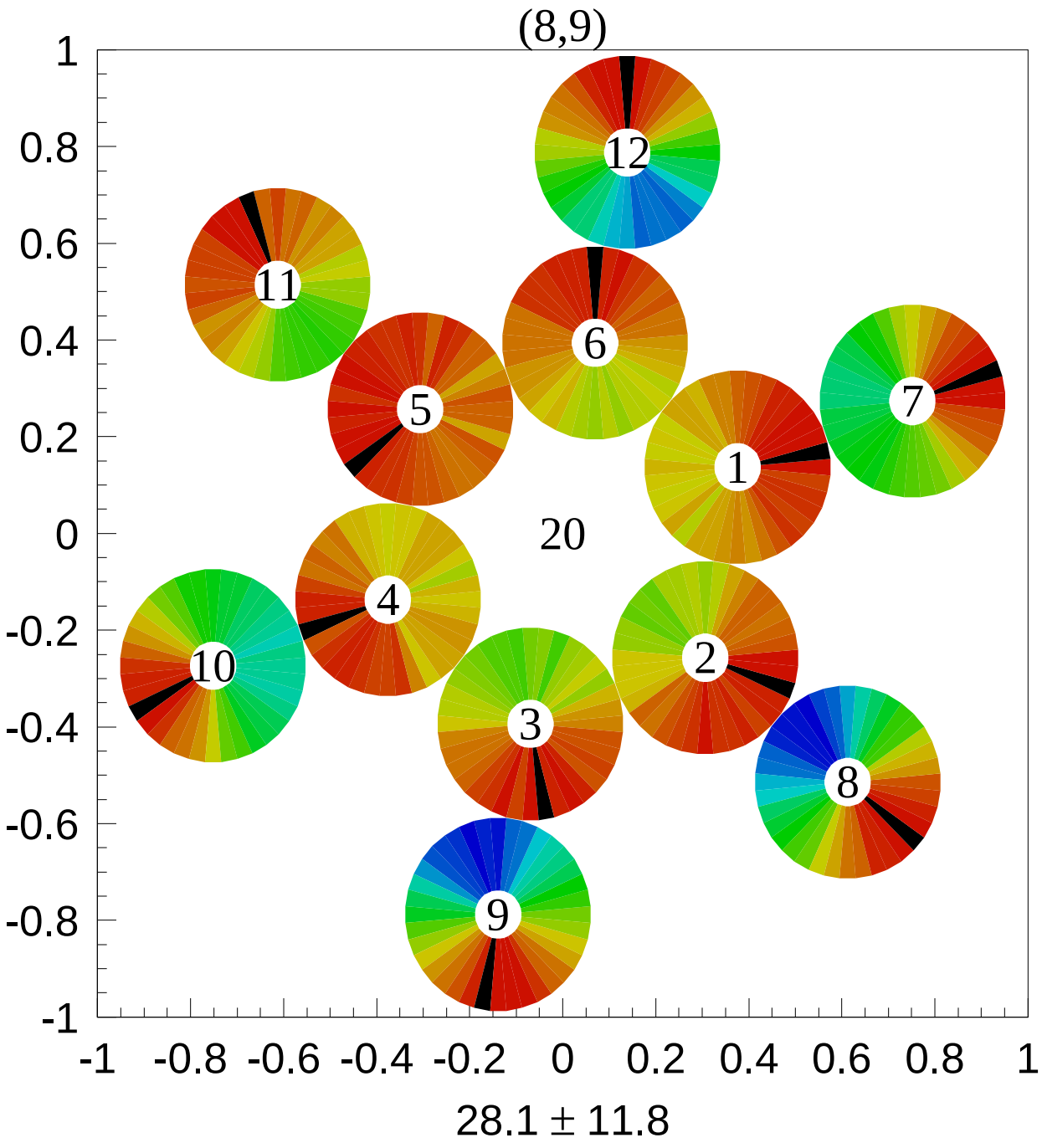

(8,7)
tilted LEDs
118 121 123 121 122 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 122 123 126 122 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

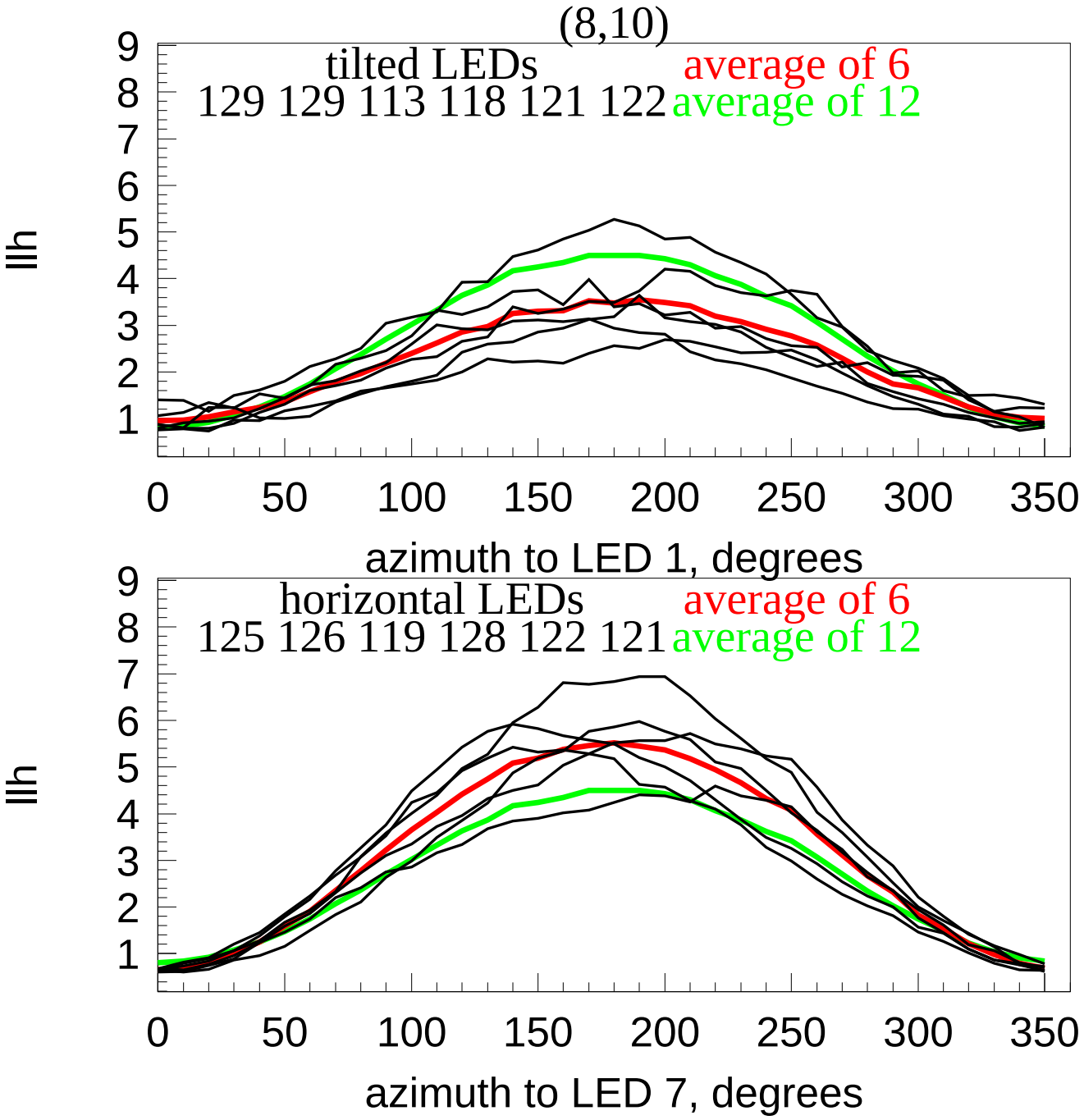

(8,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
63.4 ± 11.3

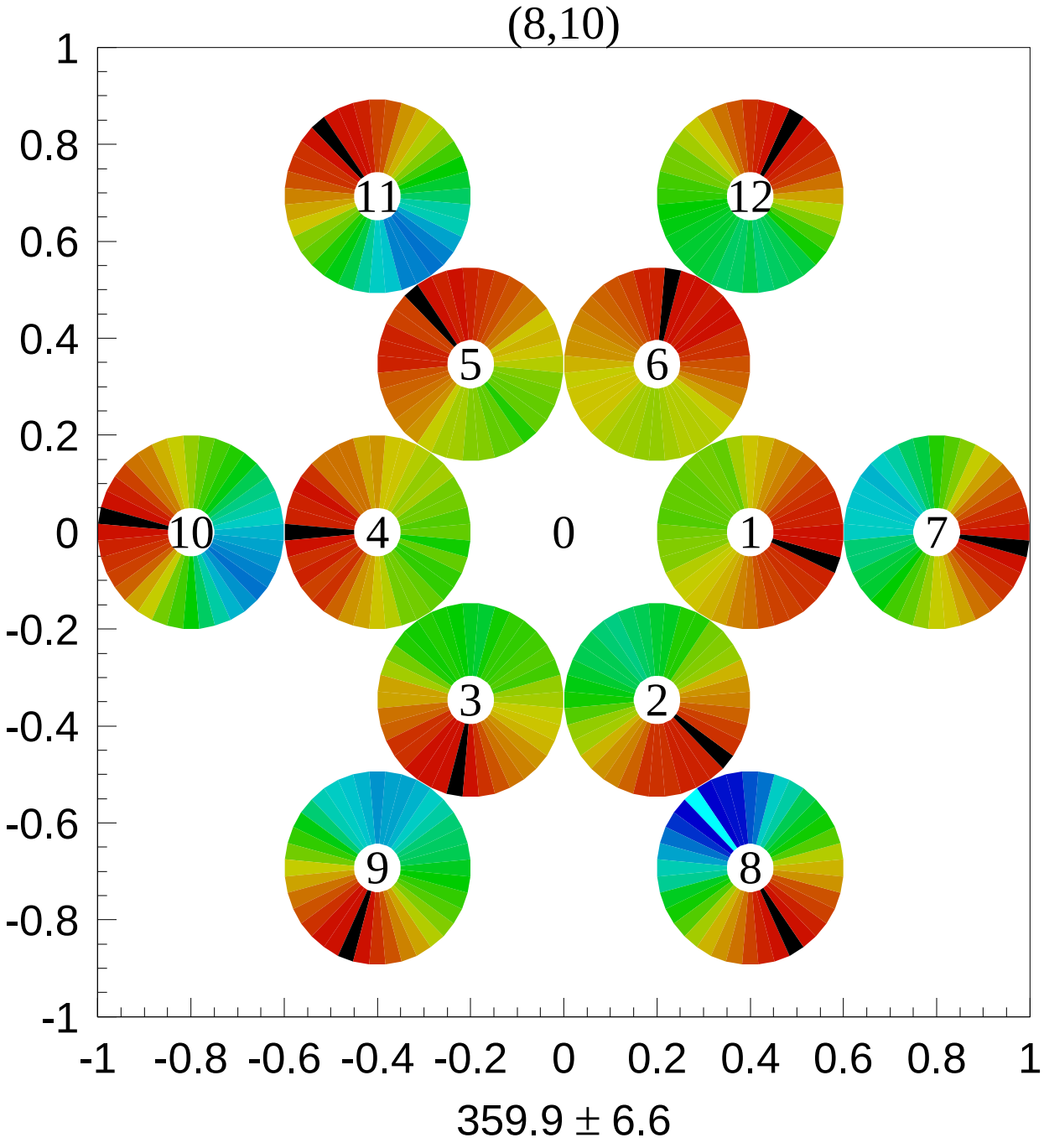

(8,8)
tilted LEDs
122 120 119 126 120 125
average of 6
average of 12
IIh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 126 125 120 129 123
average of 6
average of 12
IIh
azimuth to LED 7, degrees

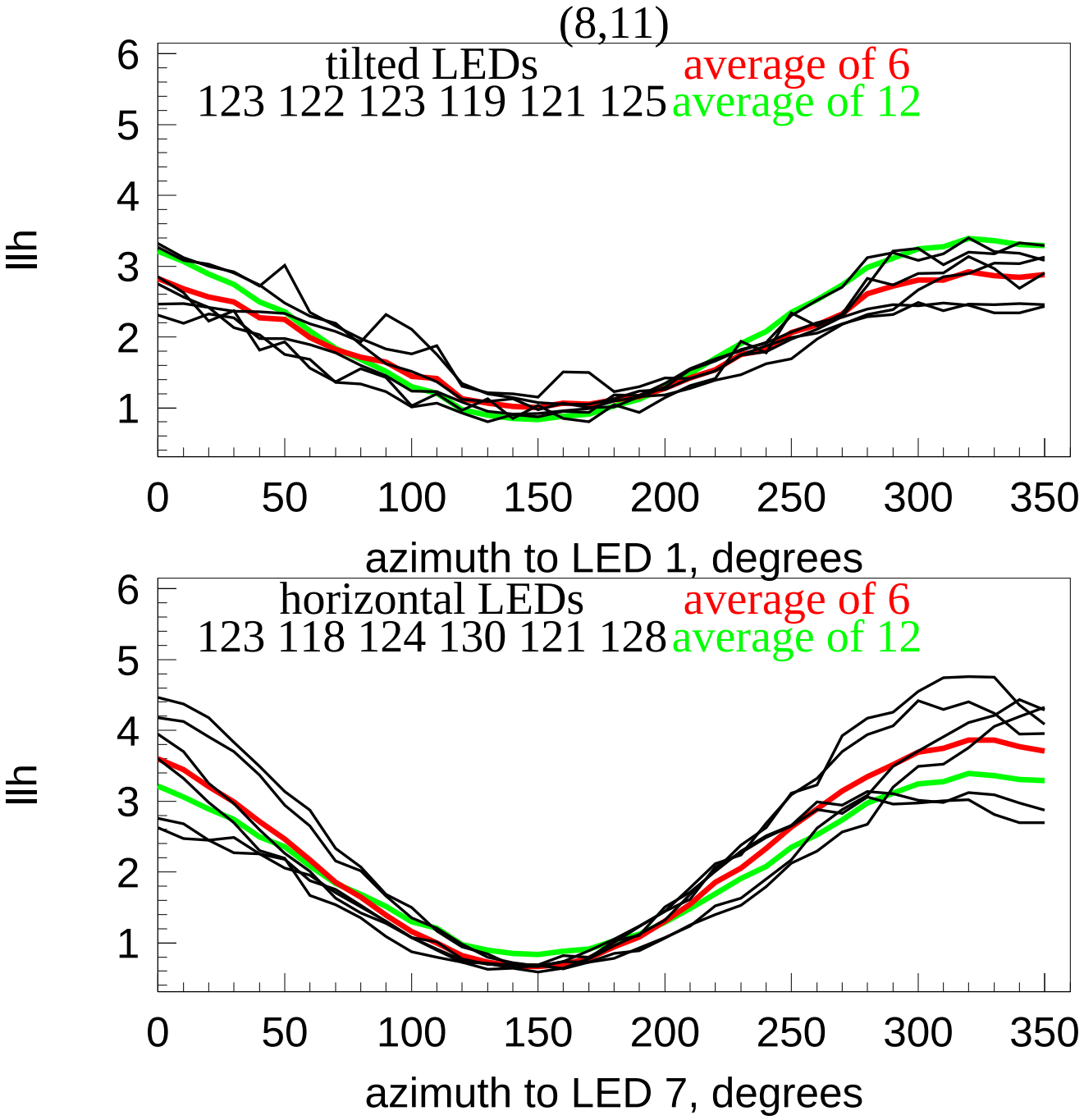

(8,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
227.9 ± 11.7

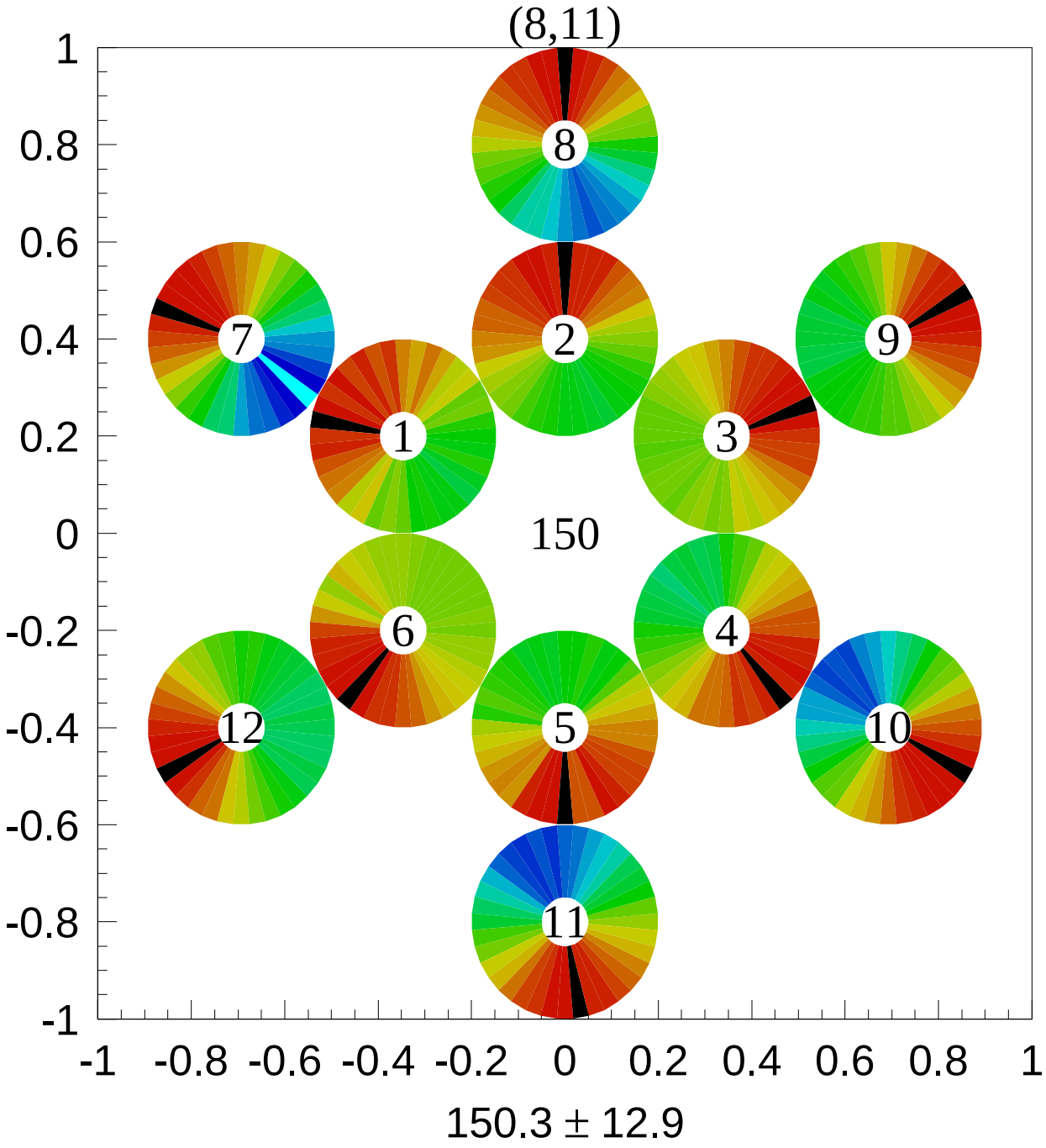

(8,9)
tilted LEDs
128 128 123 121 121 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 123 129 127 119 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

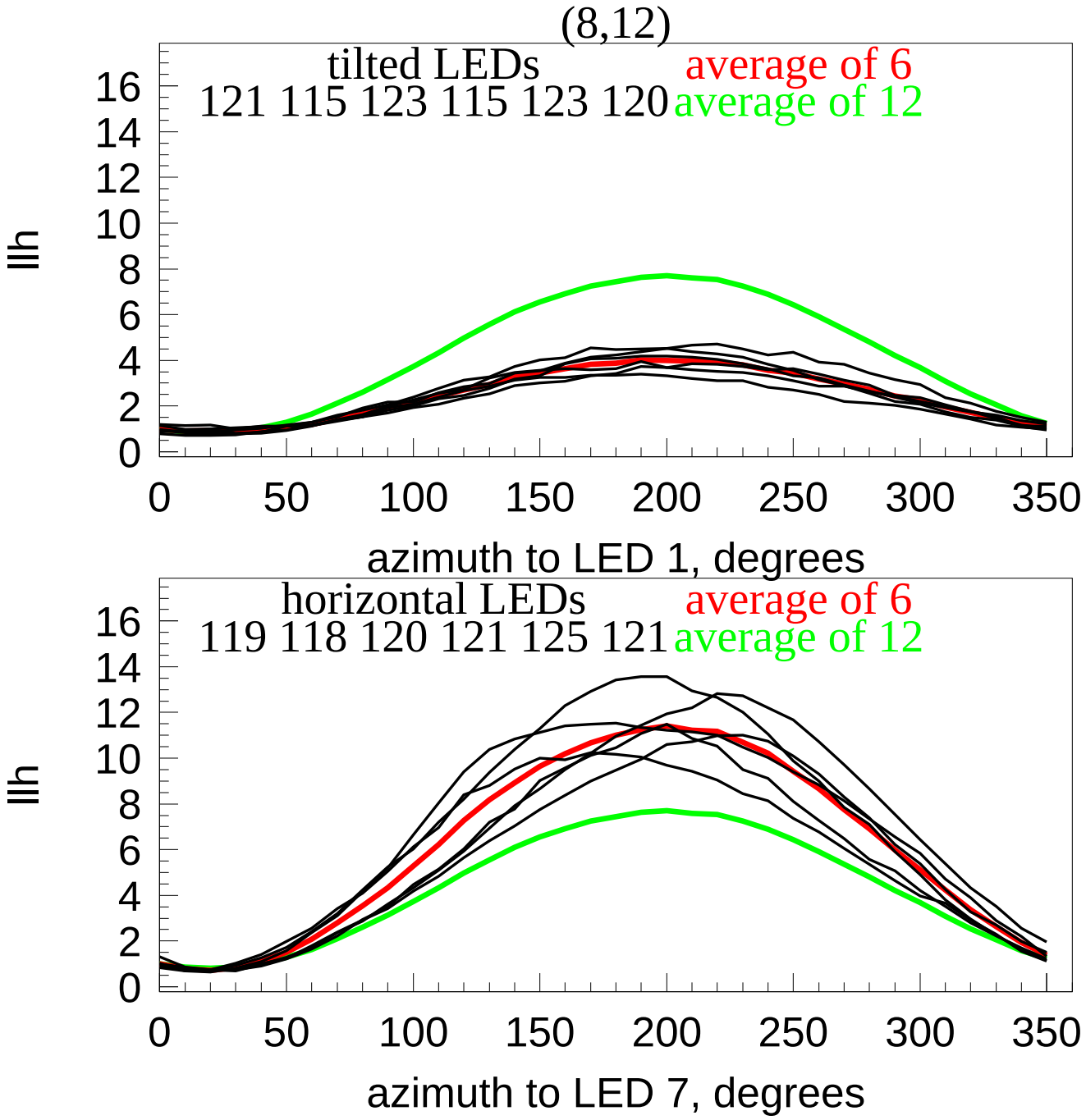

(8,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
28.1 ± 11.8

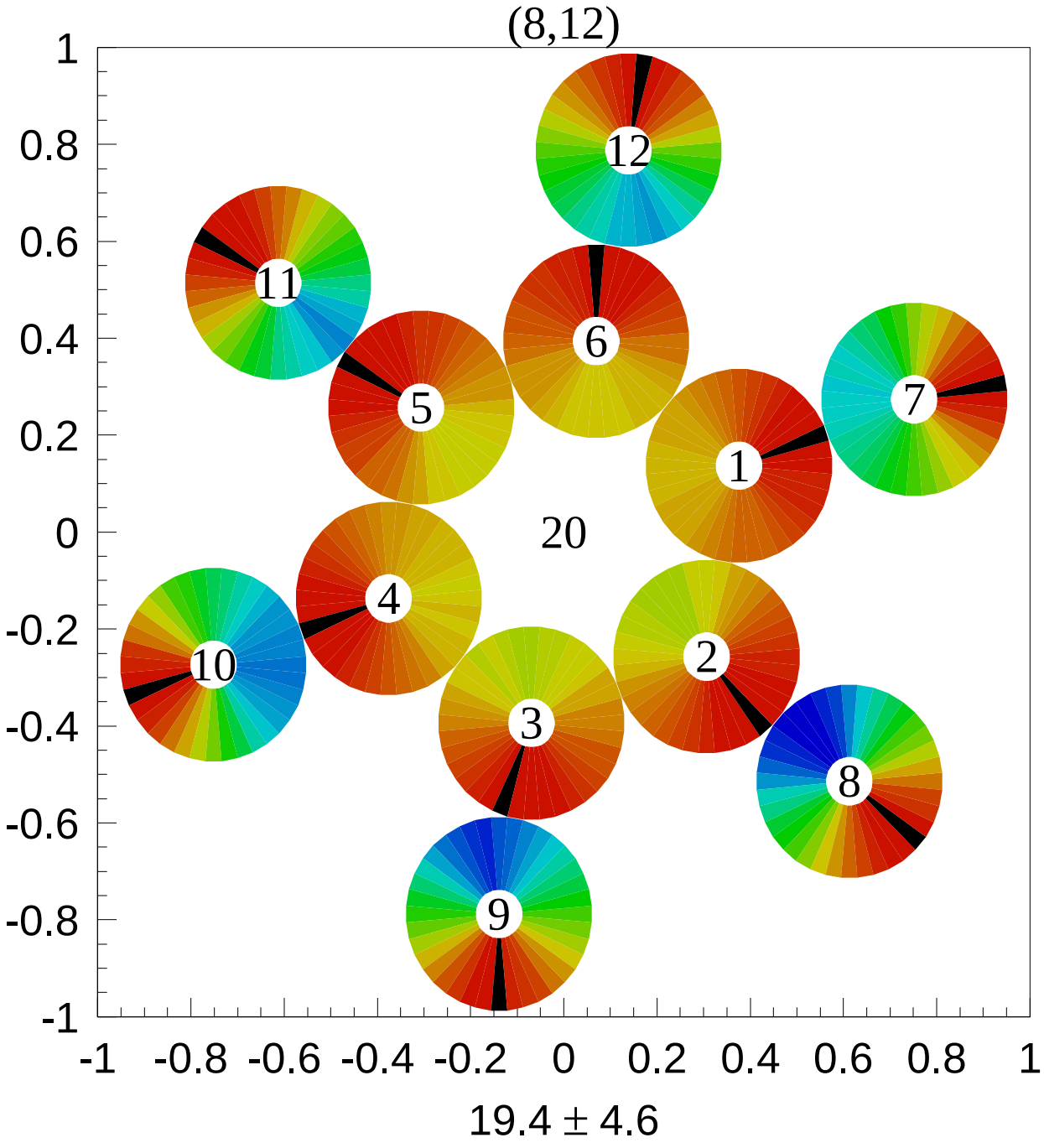

(8,10)
tilted LEDs
129 129 113 118 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 126 119 128 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

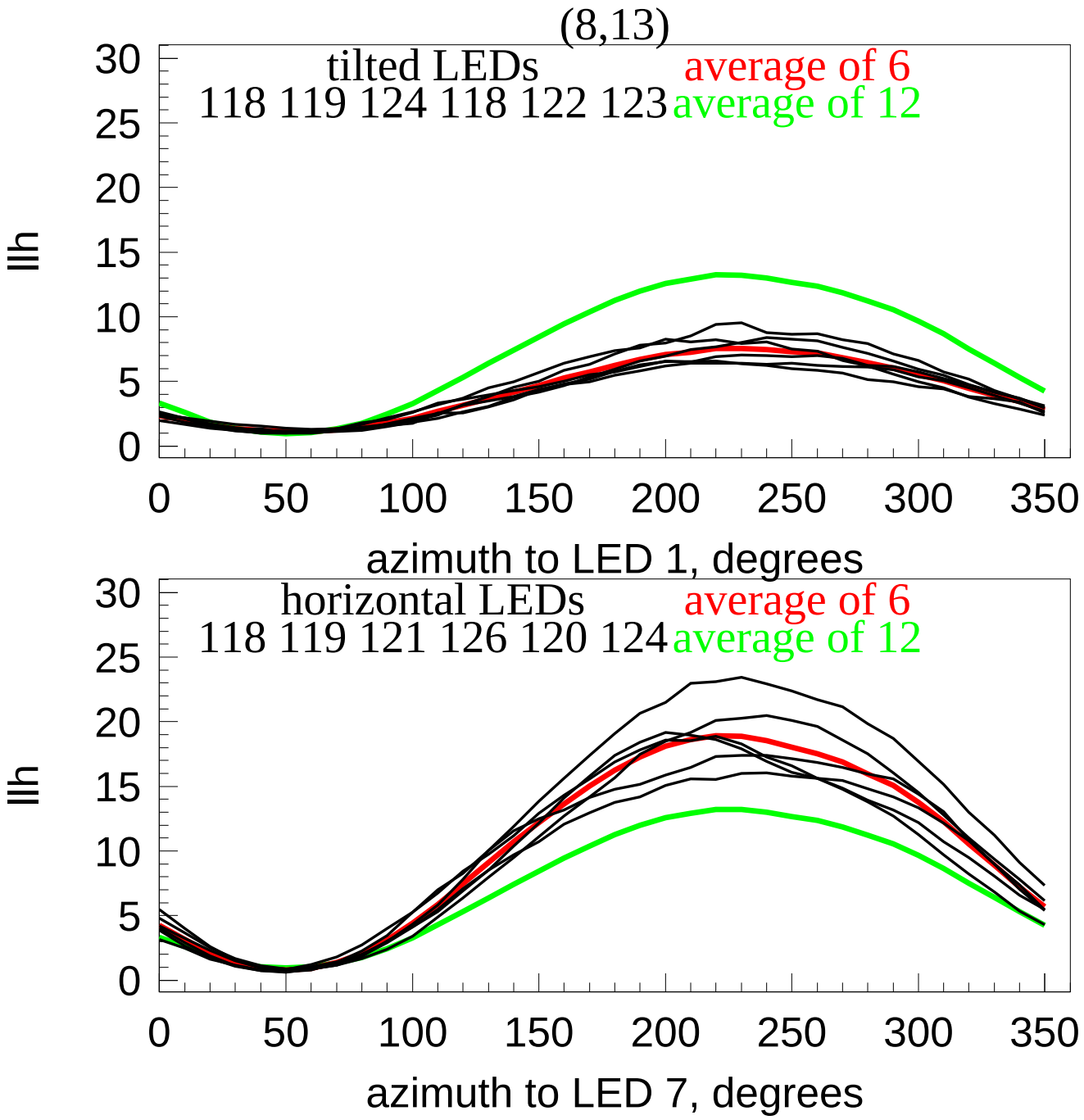

(8,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.9 ± 6.6

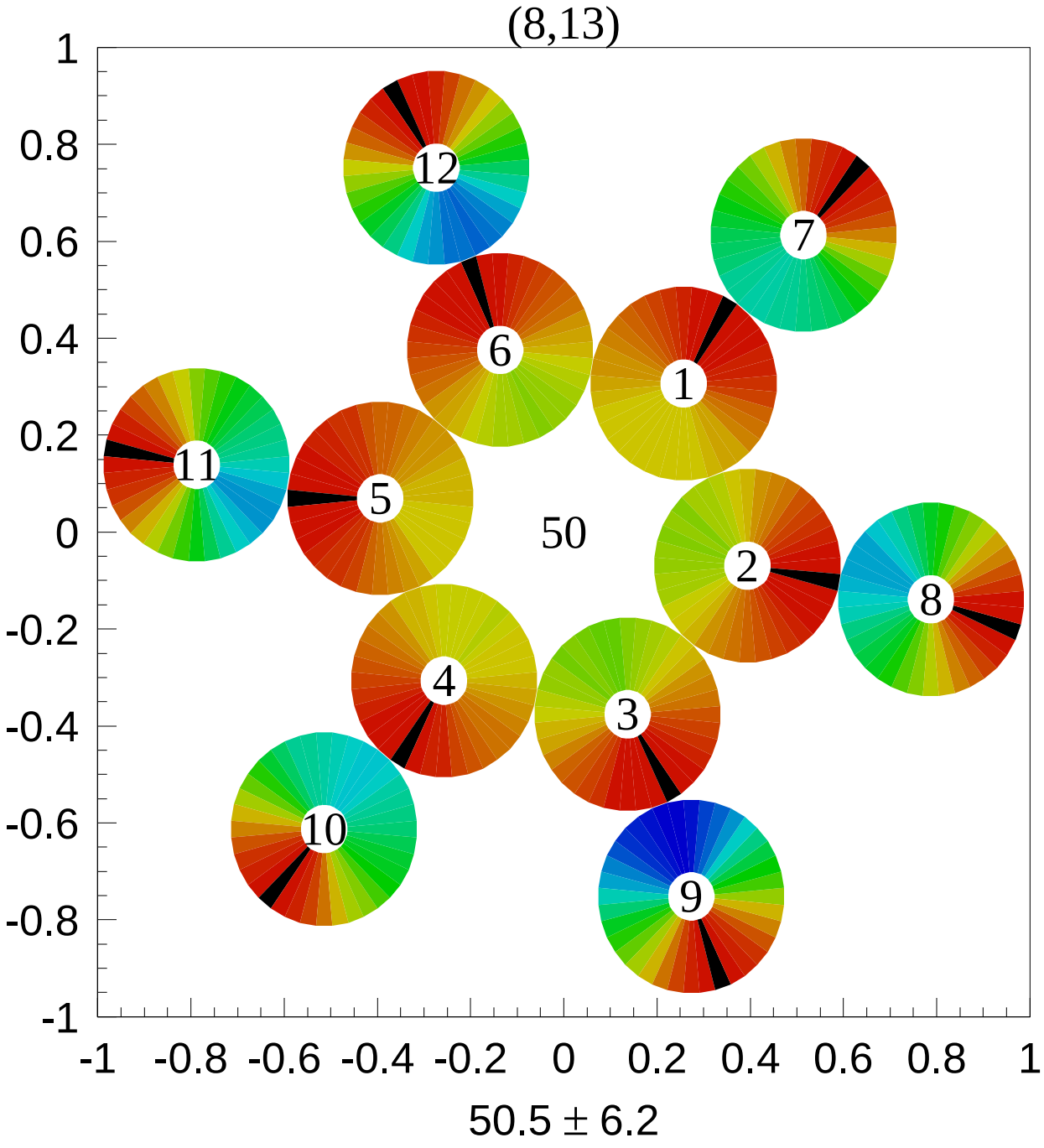

(8,11)
tilted LEDs
123 122 123 119 121 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 124 130 121 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

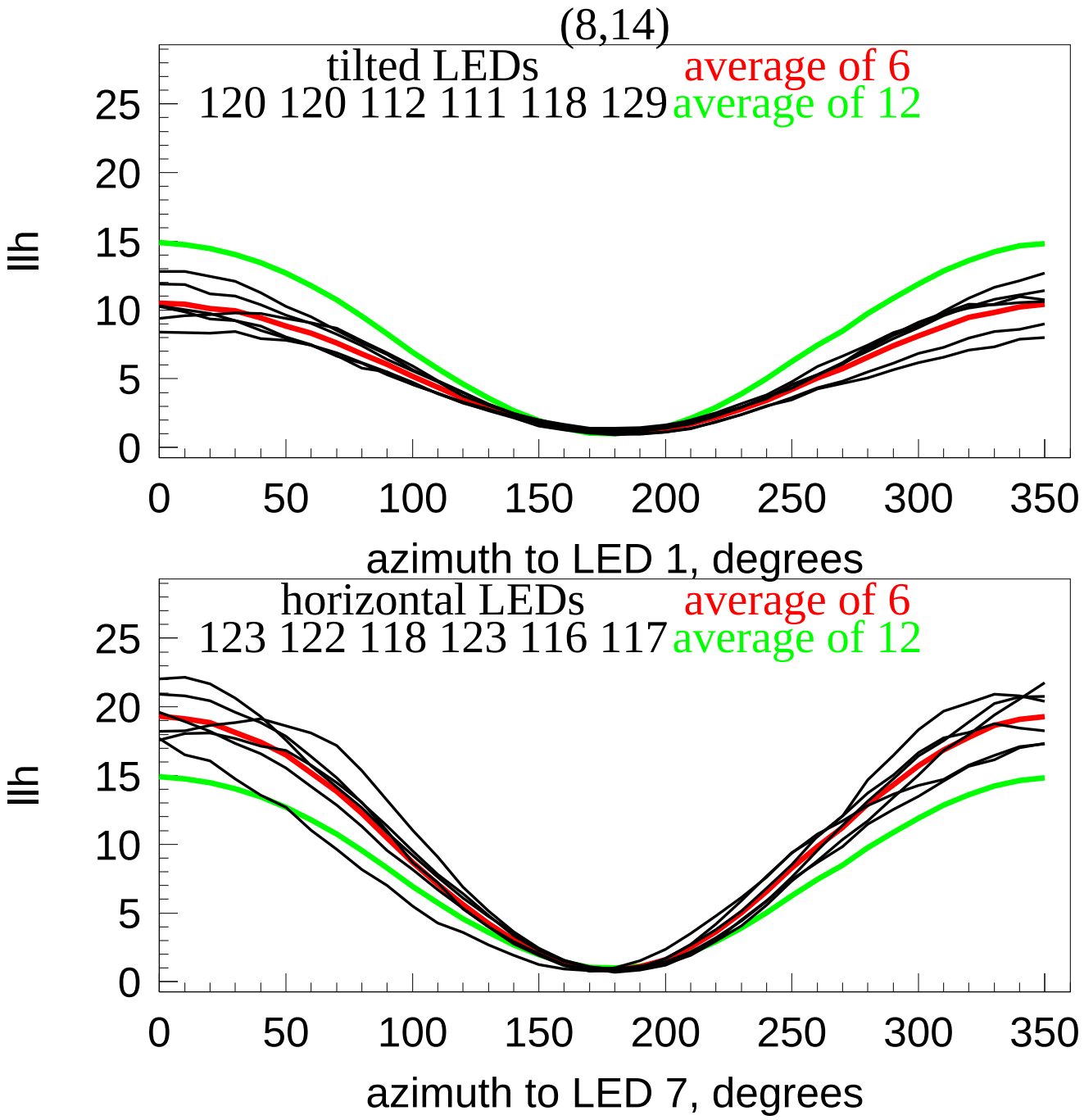

(8,11)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
150.3 ± 12.9

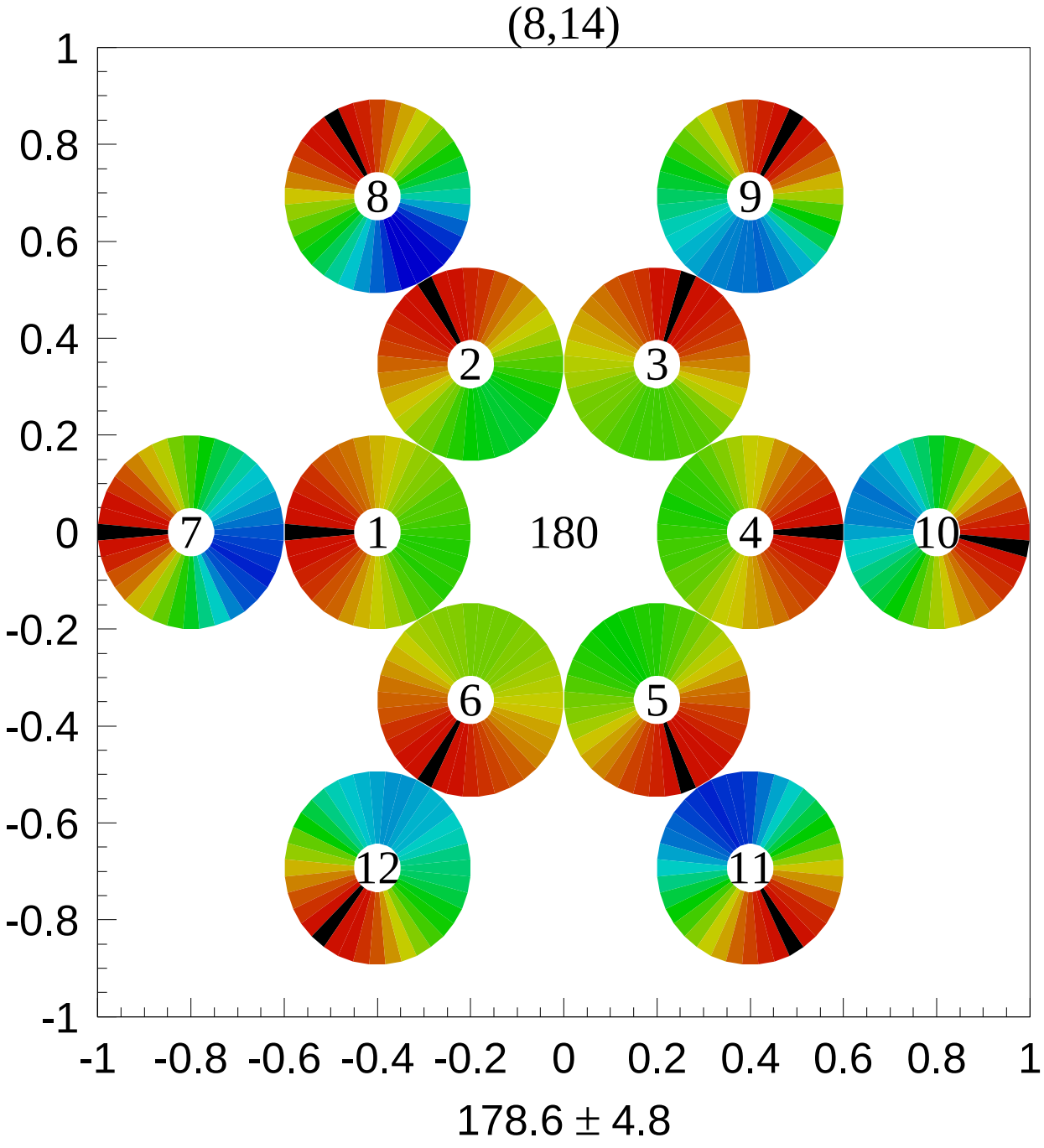

(8,12)
tilted LEDs
121 115 123 115 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 120 121 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

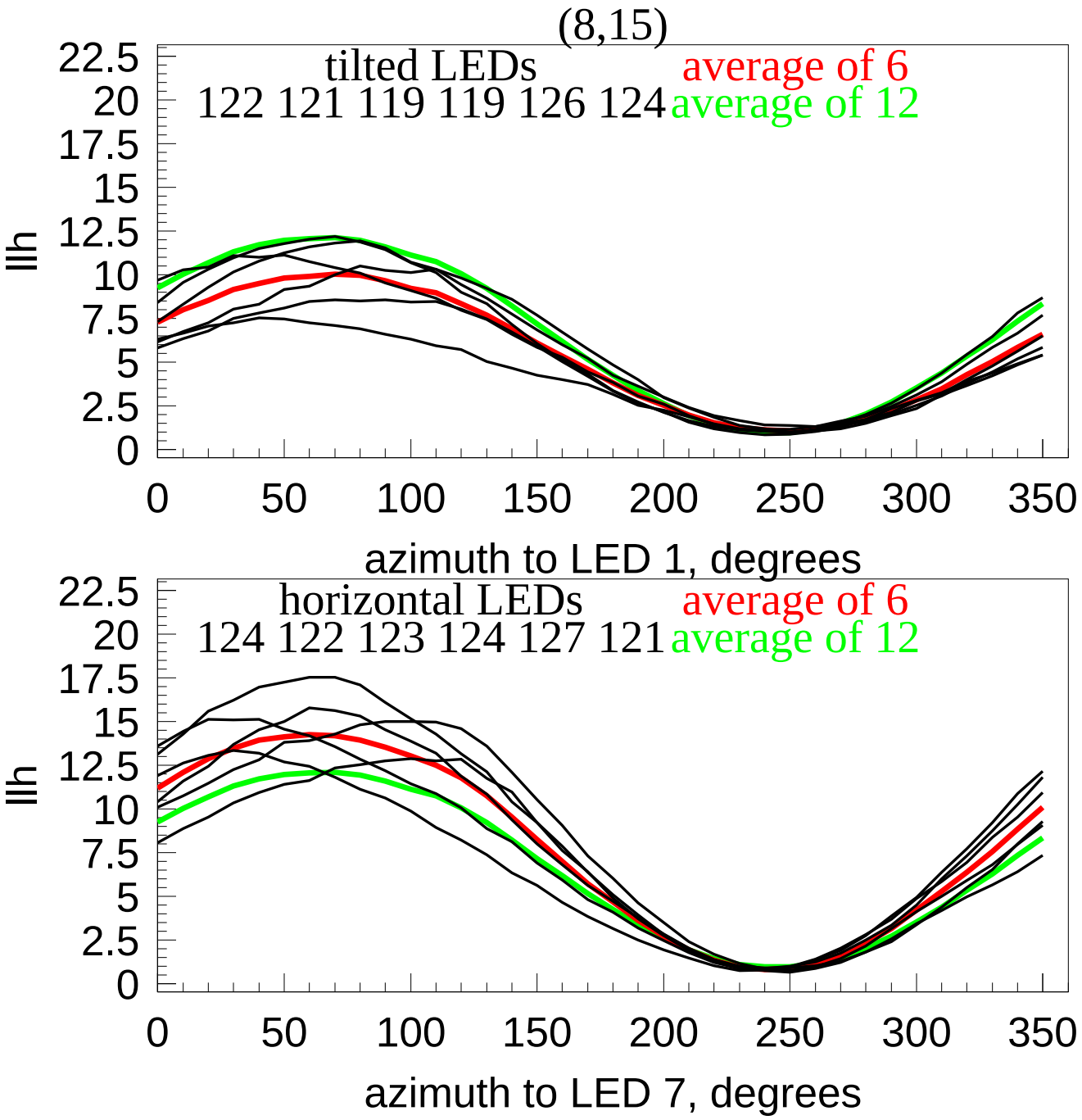

(8,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
19.4 ± 4.6

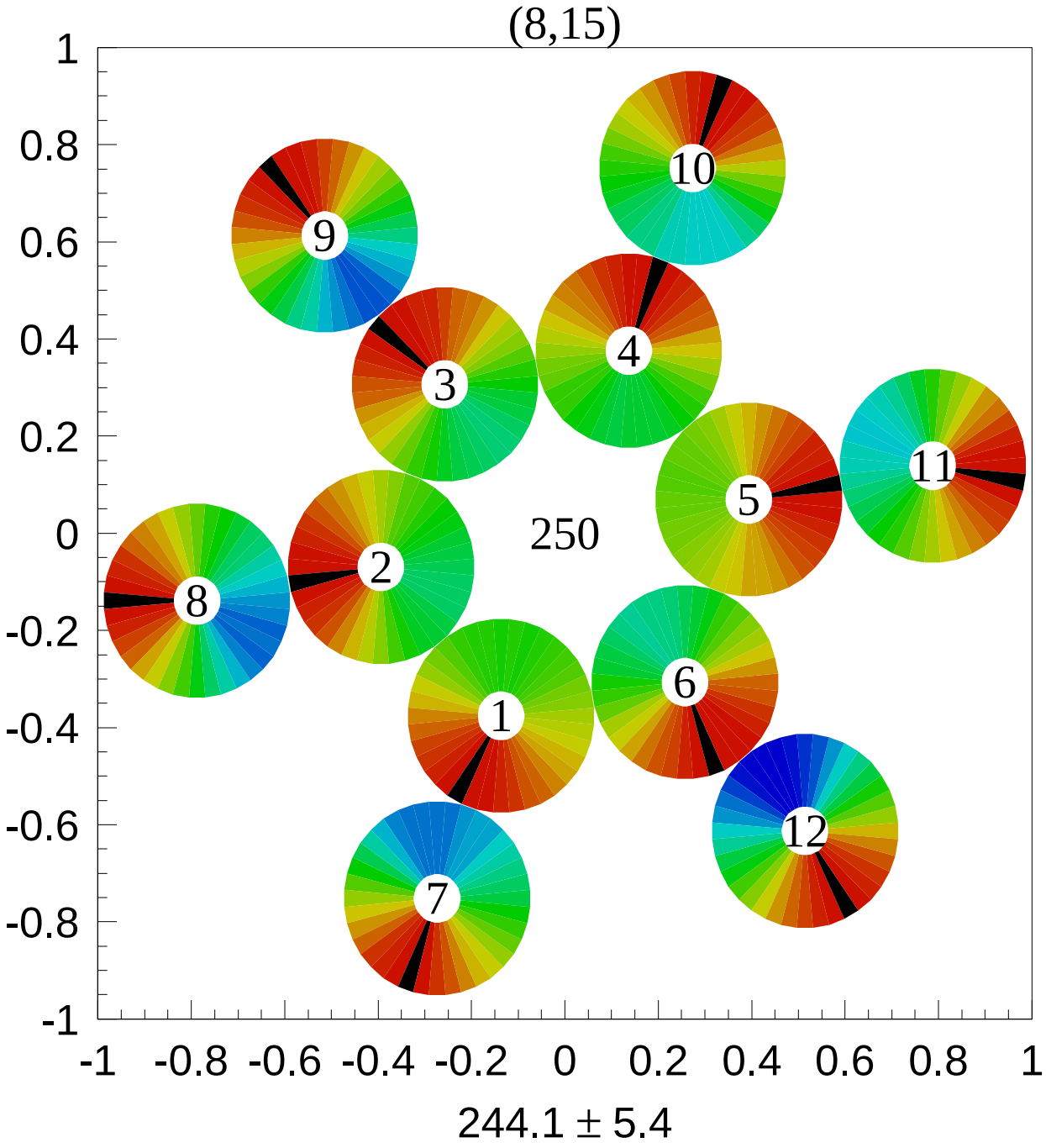

(8,13)
tilted LEDs
118 119 124 118 122 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 119 121 126 120 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

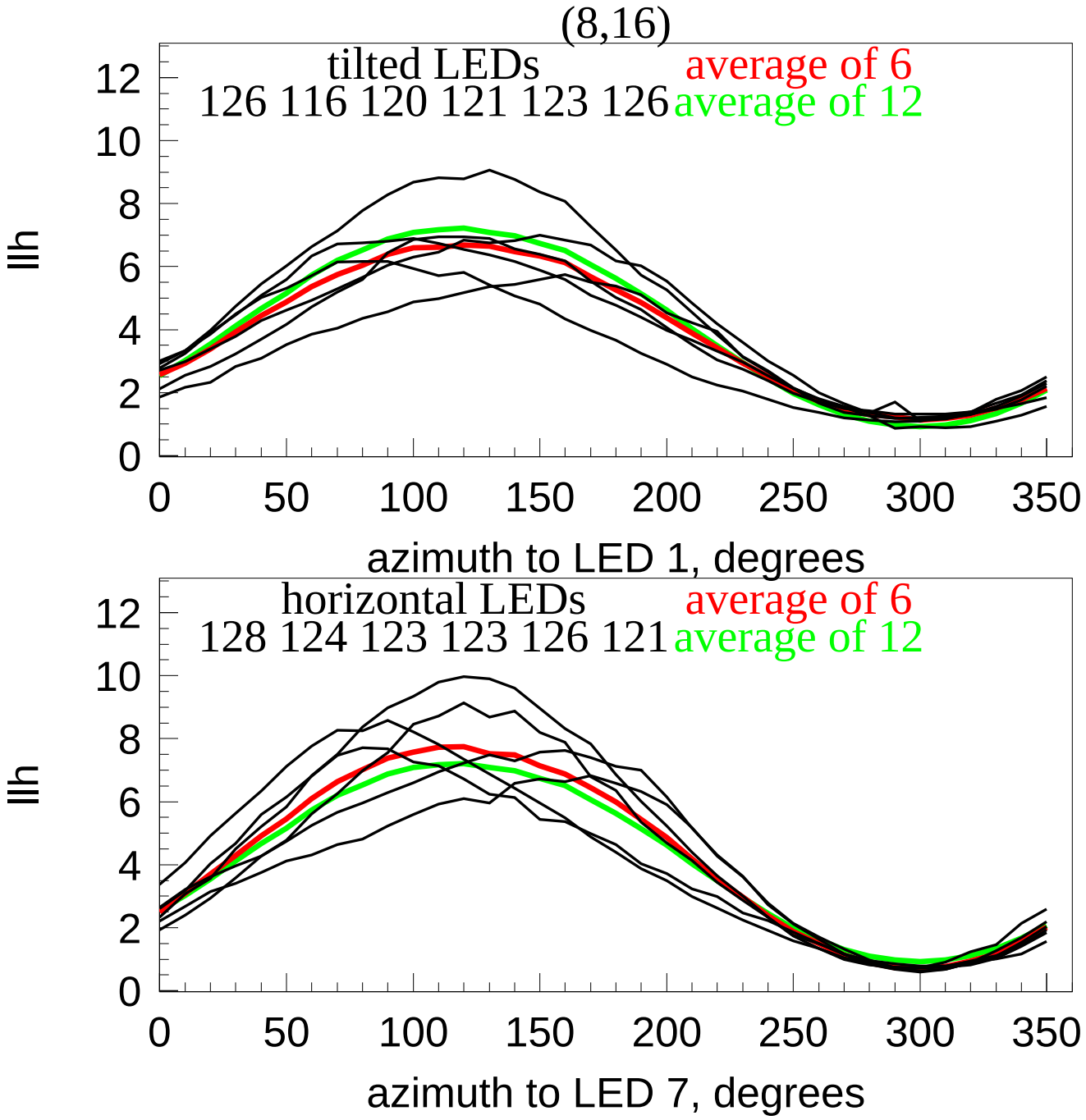

(8,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
50.5 ± 6.2

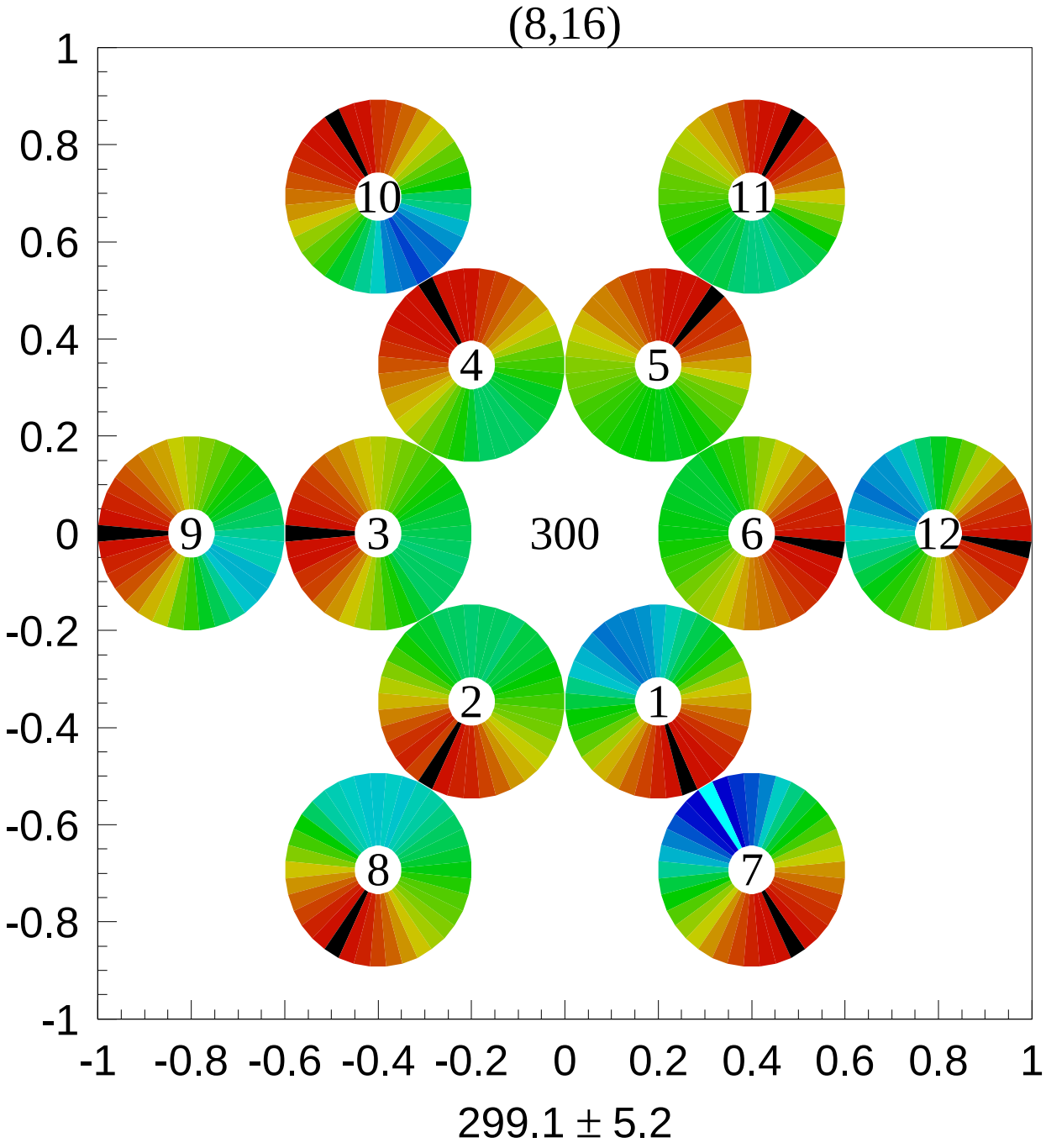

(8,14)
tilted LEDs
120 120 112 111 118 129
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 122 118 123 116 117
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

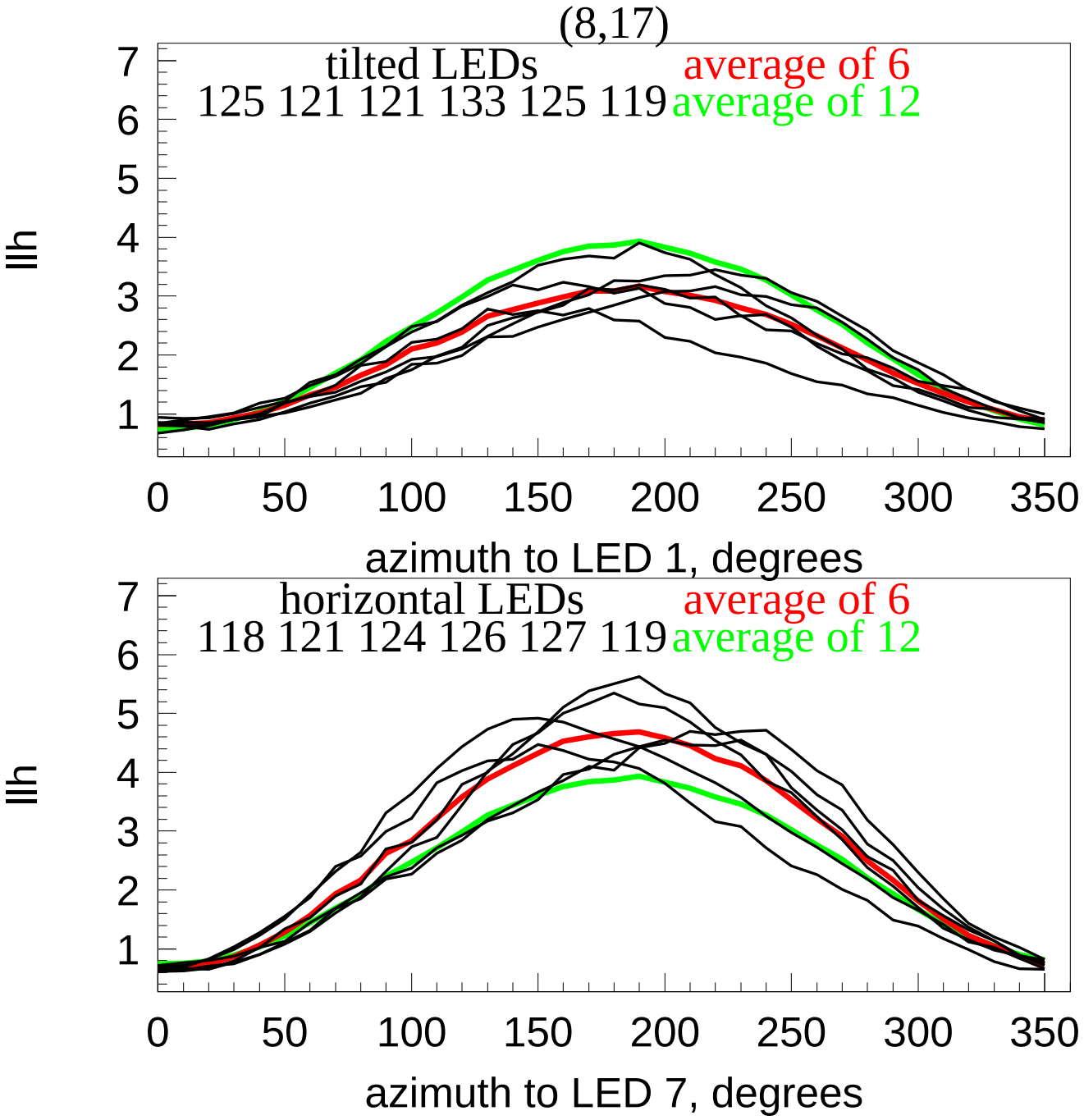

(8,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
178.6 ± 4.8

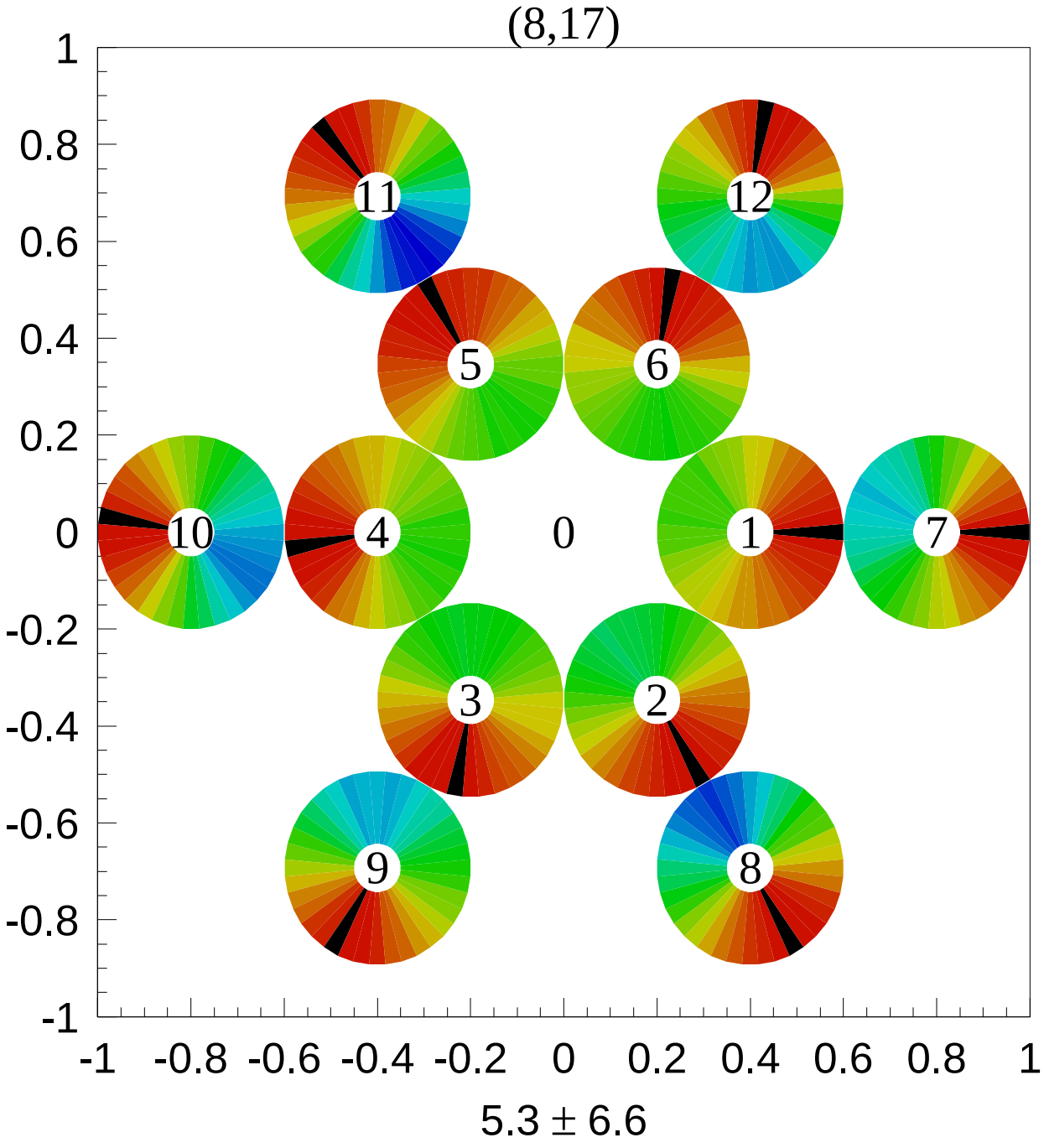

(8,15)
tilted LEDs
122 121 119 119 126 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 123 124 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

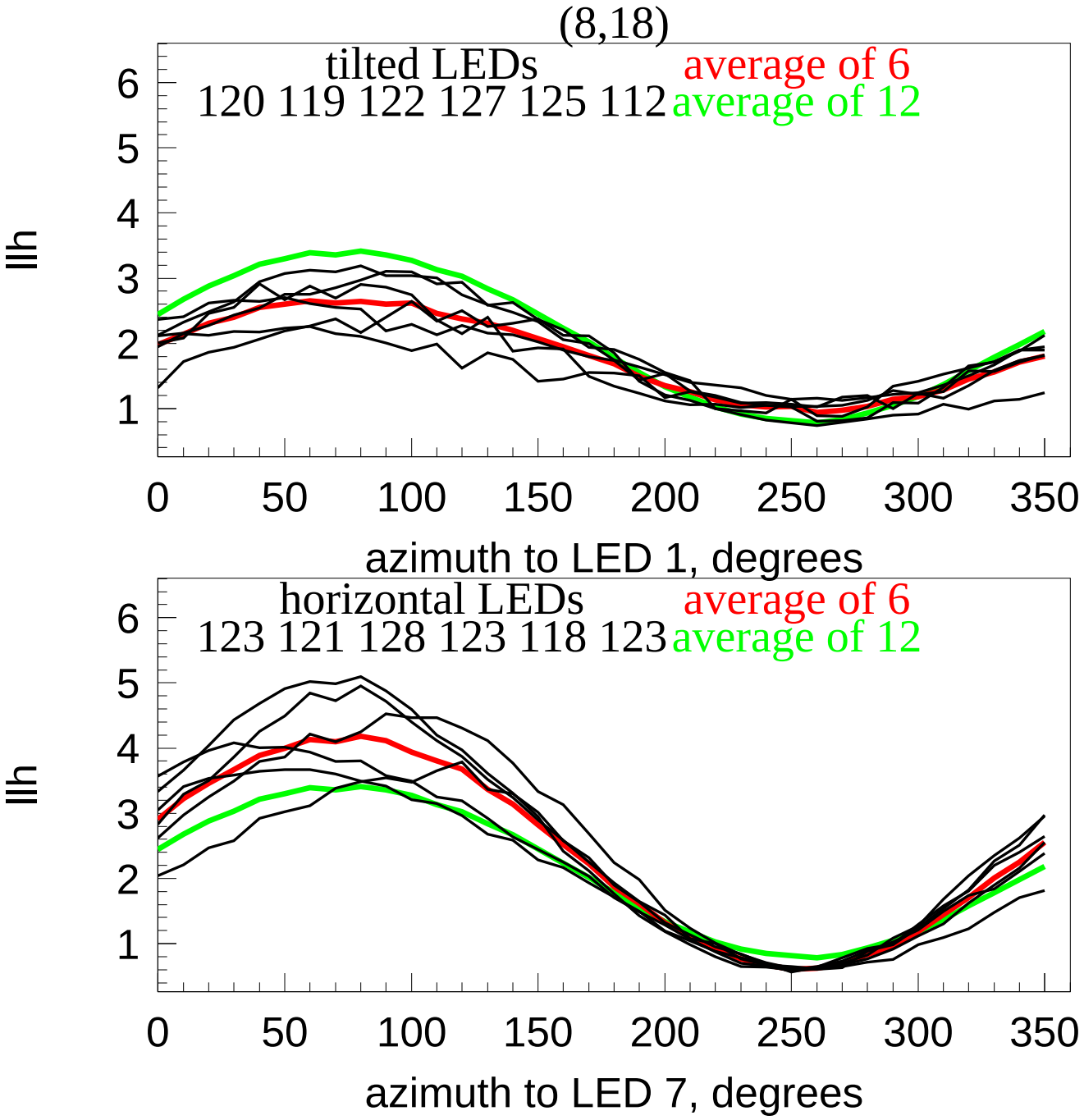

(8,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
1
6
12
7
244.1 ± 5.4

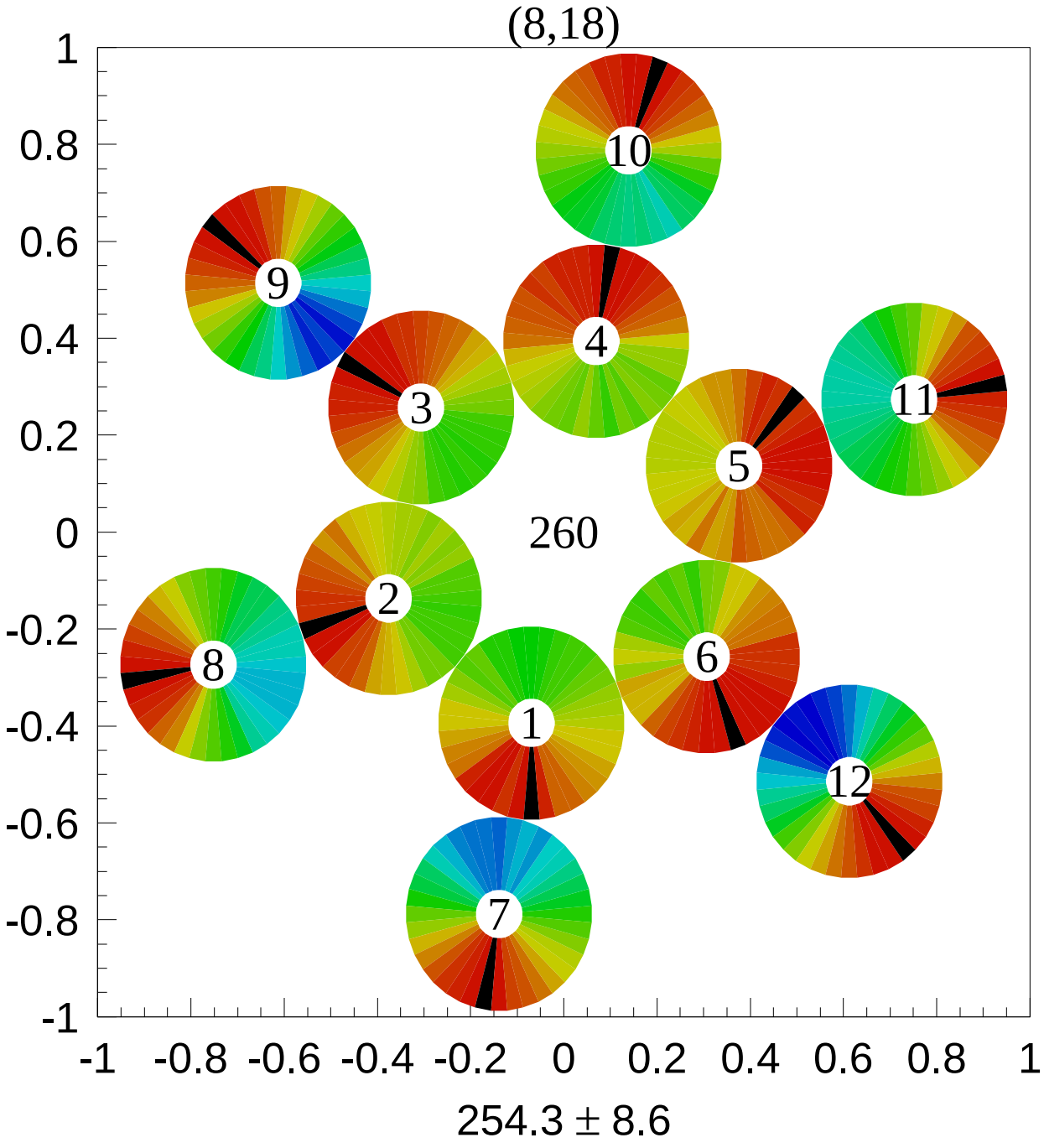

(8,16)
tilted LEDs
126 116 120 121 123 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 124 123 123 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

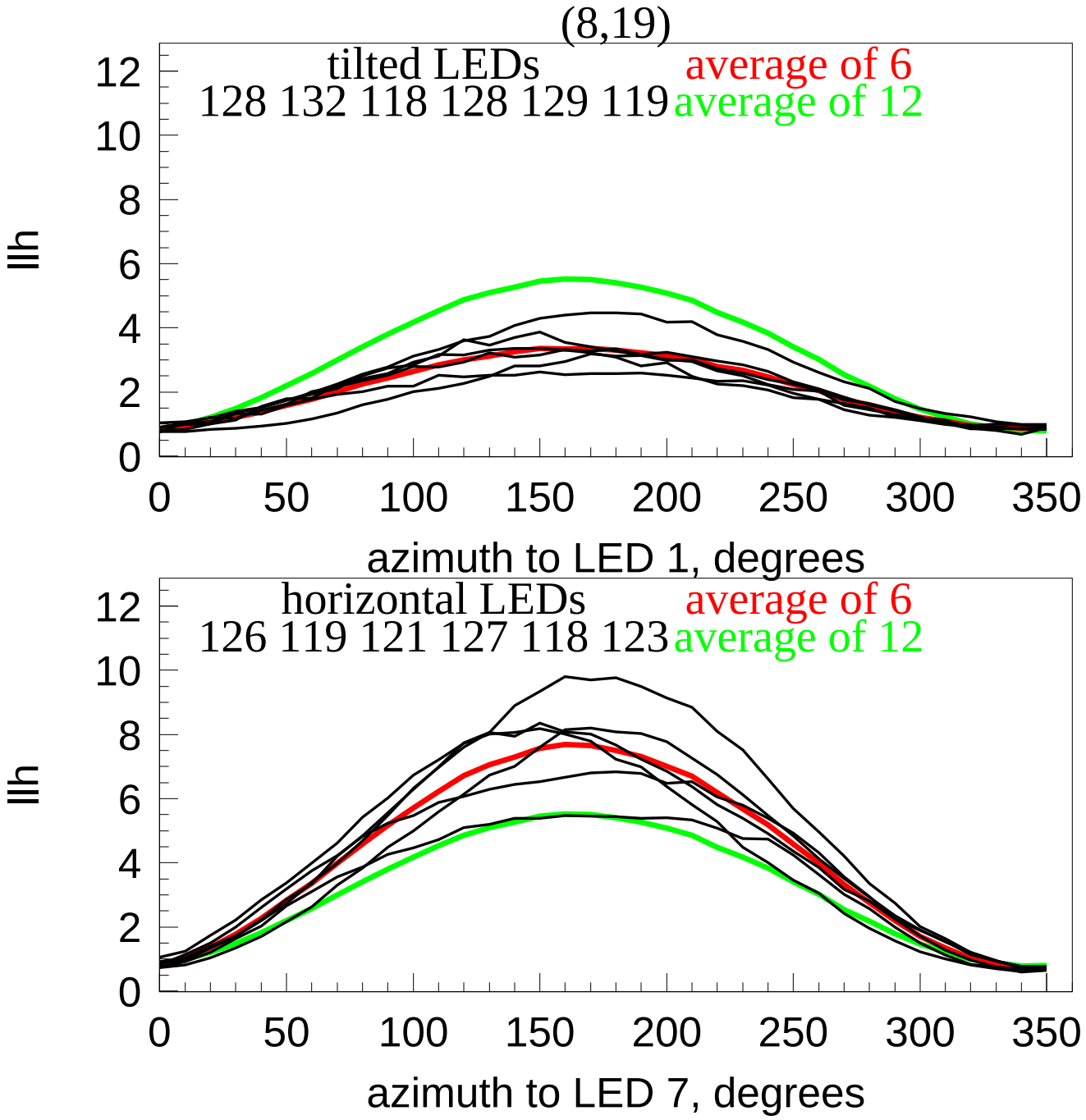

(8,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
299.1 ± 5.2

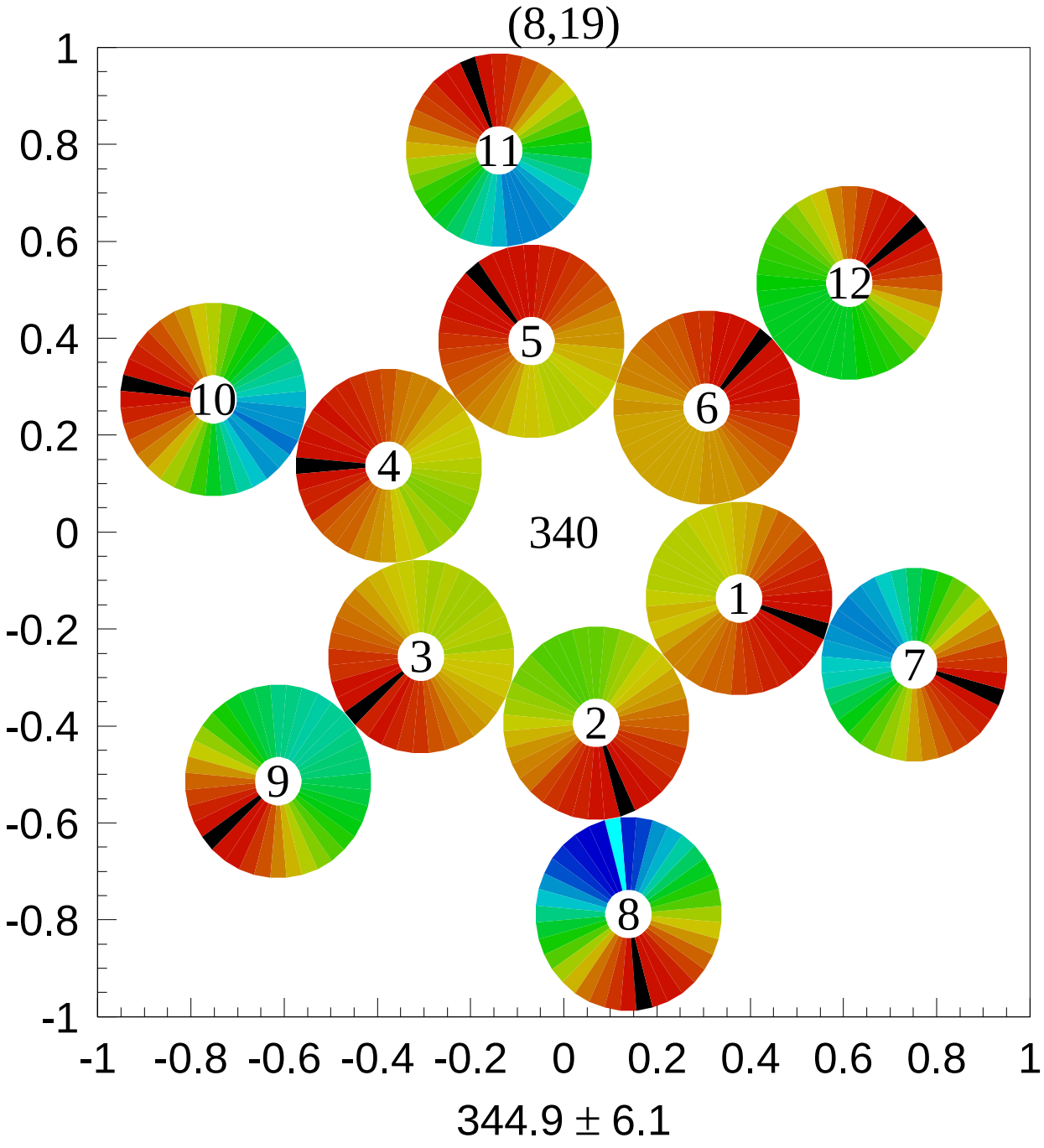

(8,17)
tilted LEDs
125 121 121 133 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 124 126 127 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

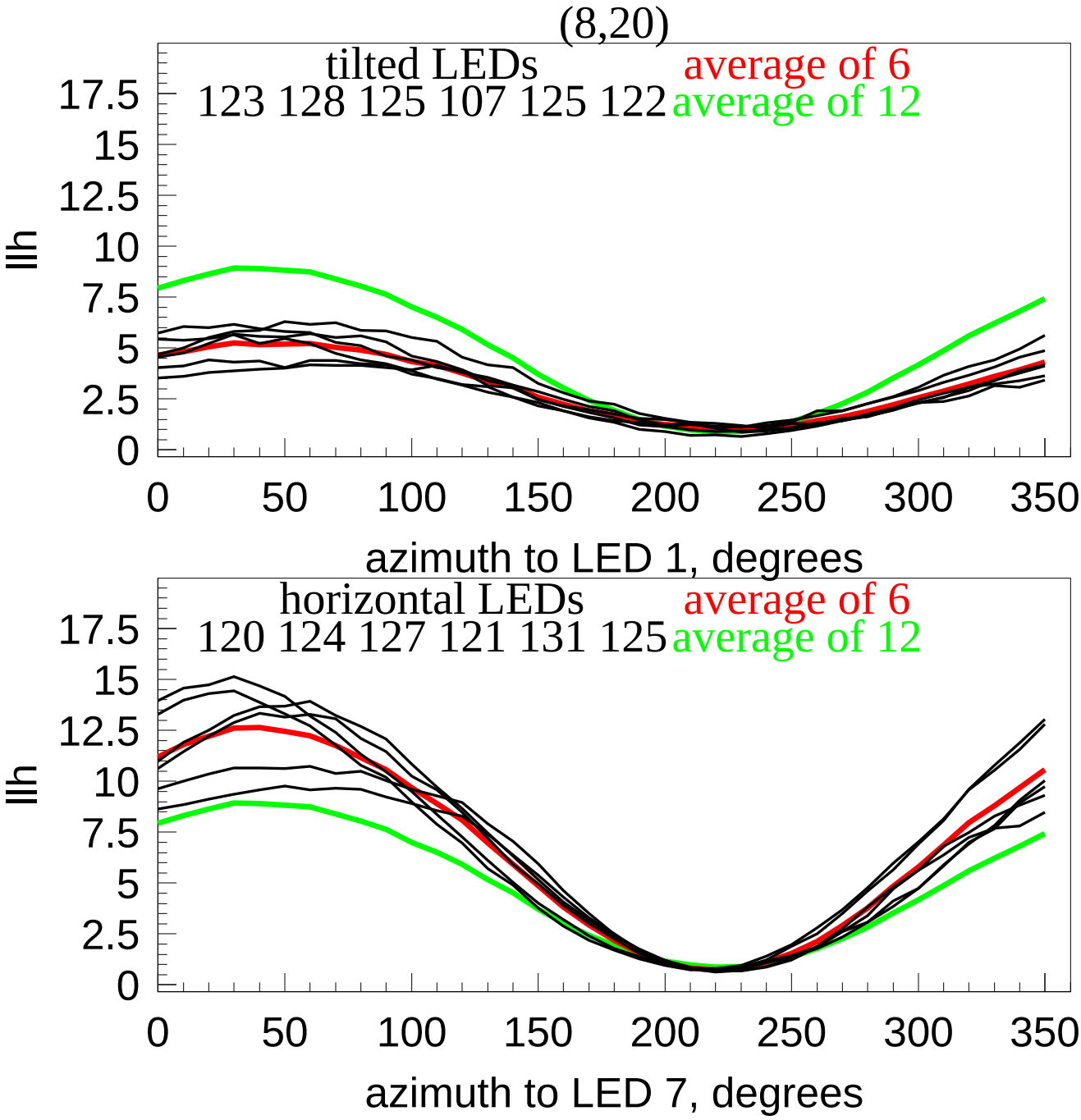

(8,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
5.3 ± 6.6

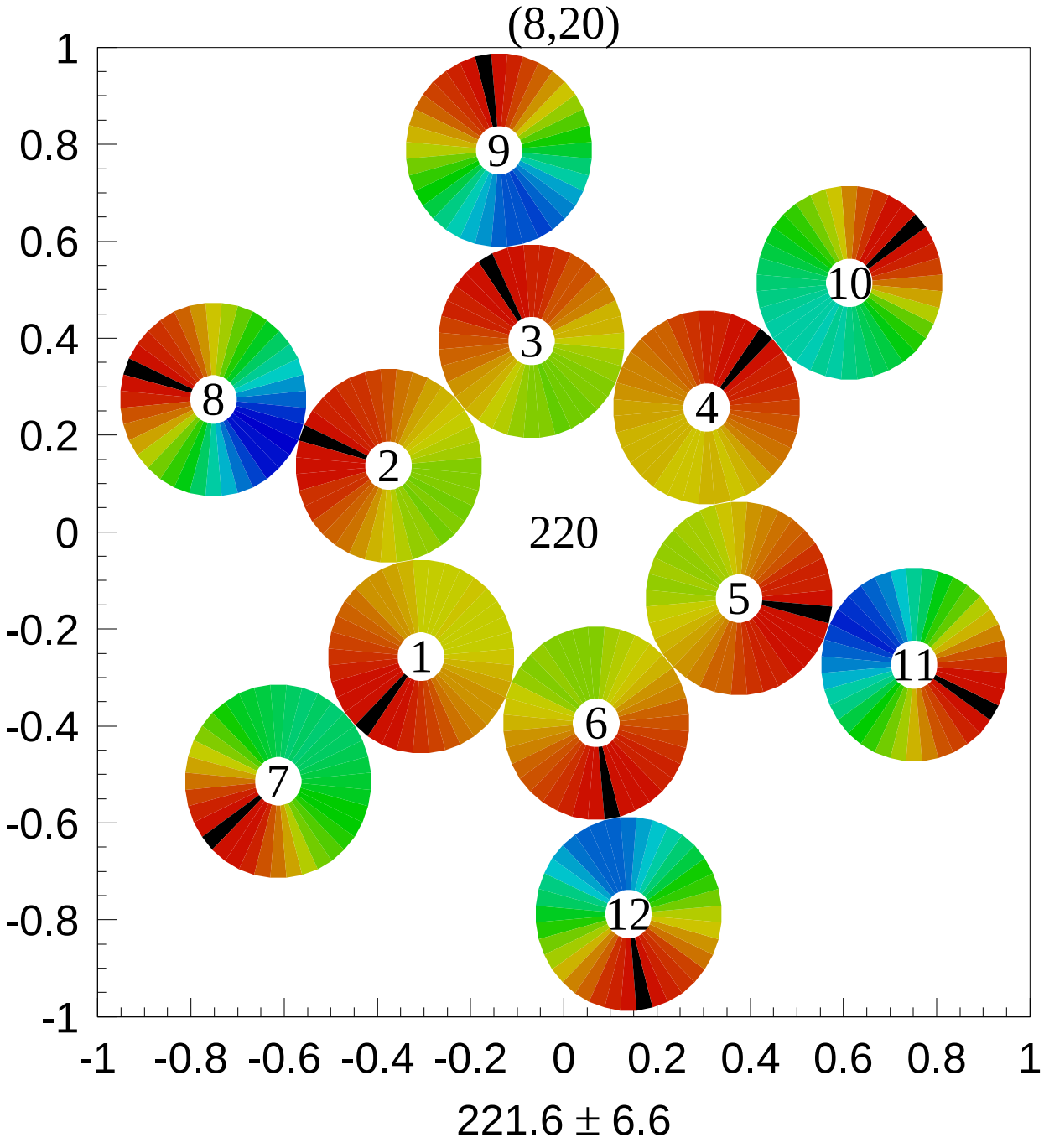

(8,18)
tilted LEDs
120 119 122 127 125 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 128 123 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

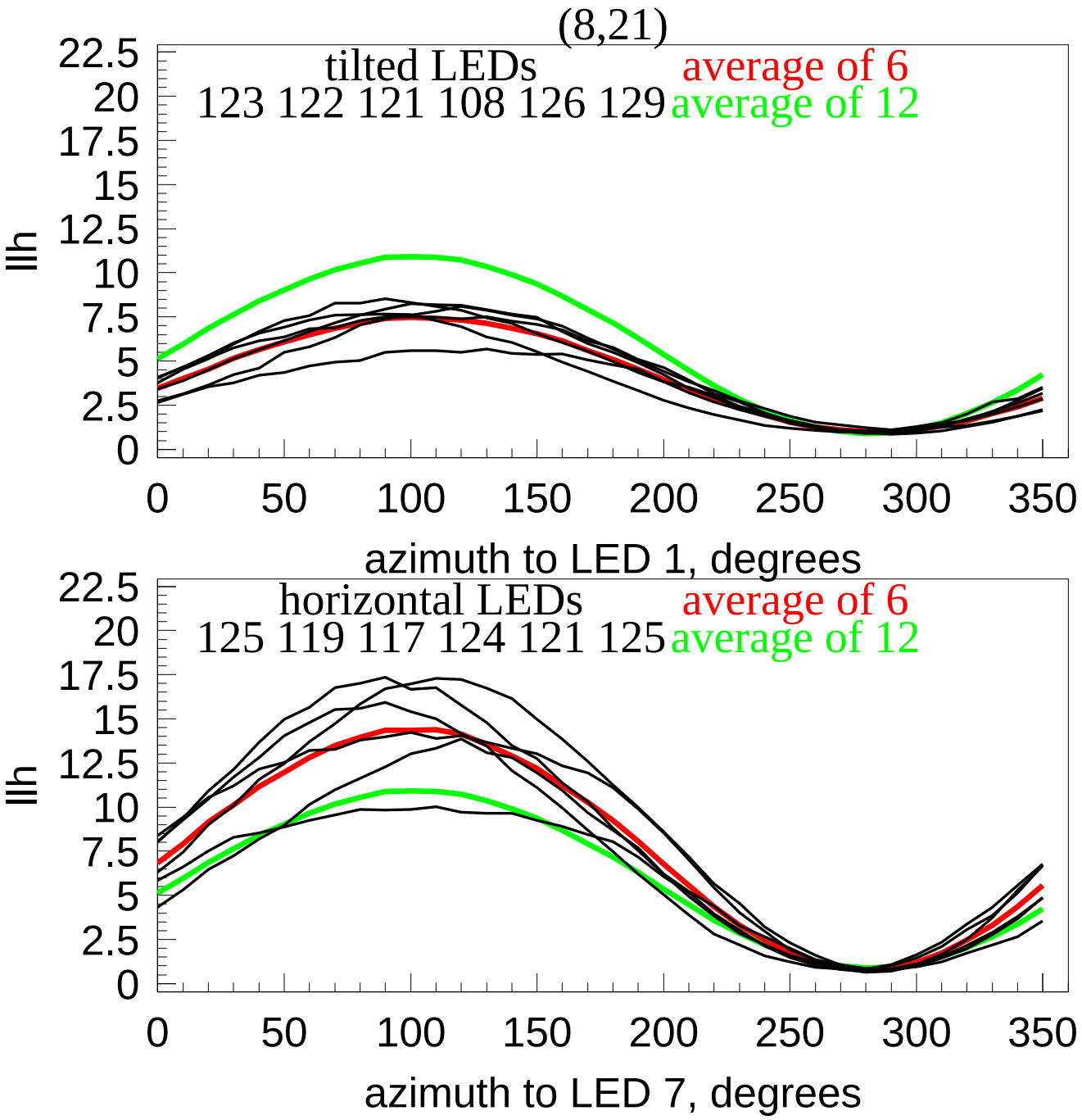

(8,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
254.3 ± 8.6

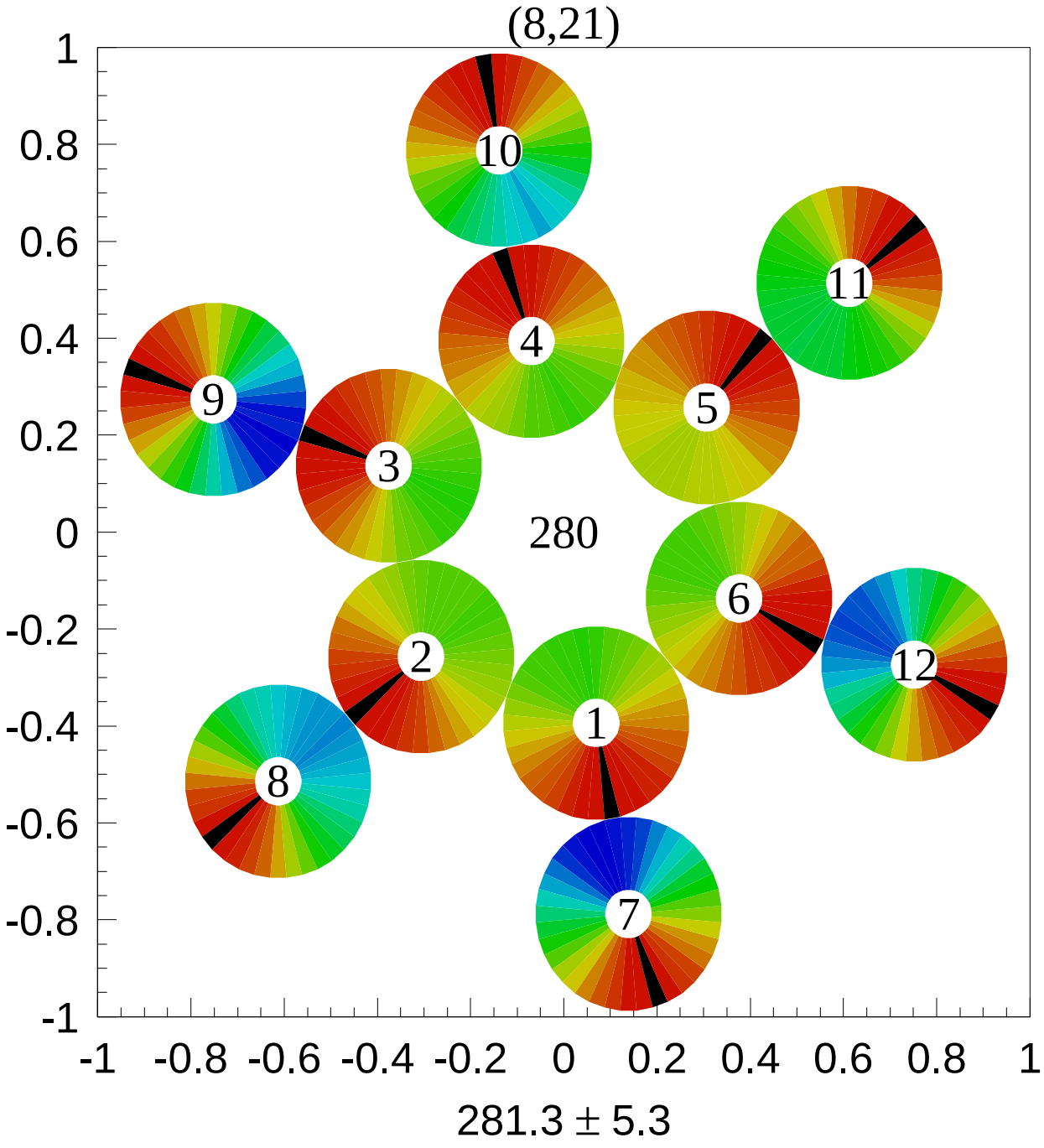

(8,19)
tilted LEDs
128 132 118 128 129 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 121 127 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

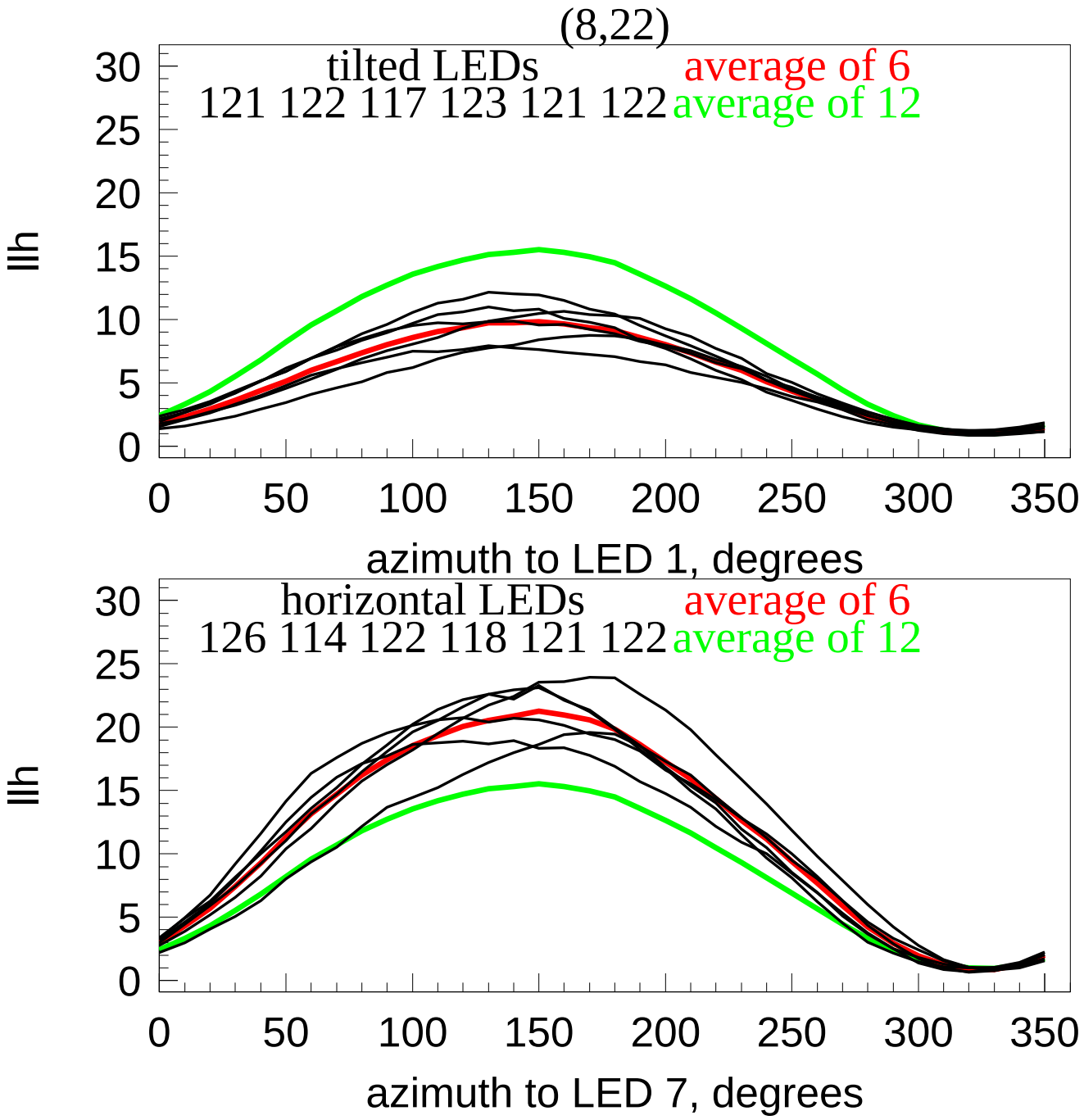

(8,19)
11
12
5
6
10
4
340
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
344.9 ± 6.1

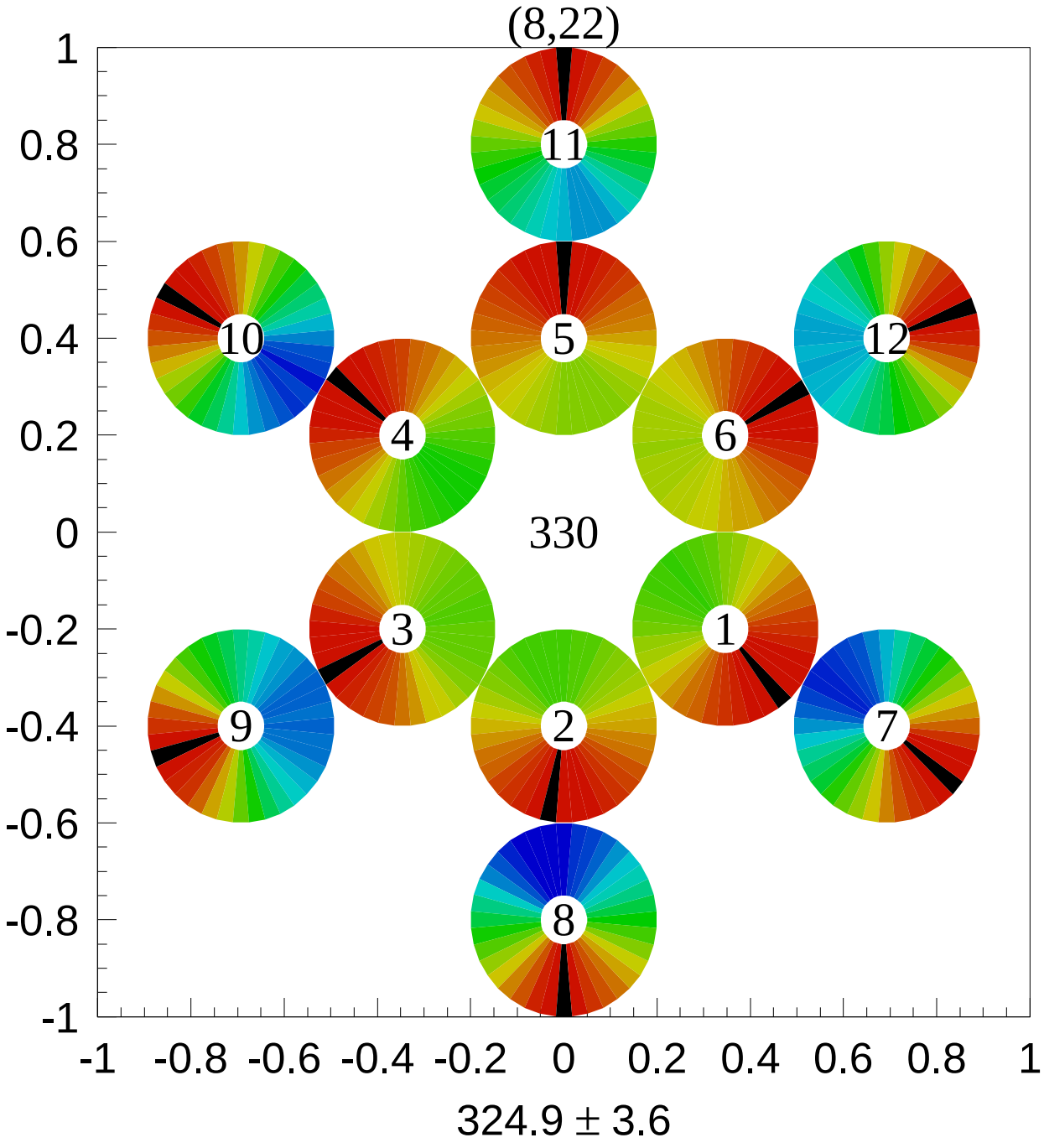

(8,20)
tilted LEDs
123 128 125 107 125 122
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 124 127 121 131 125
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

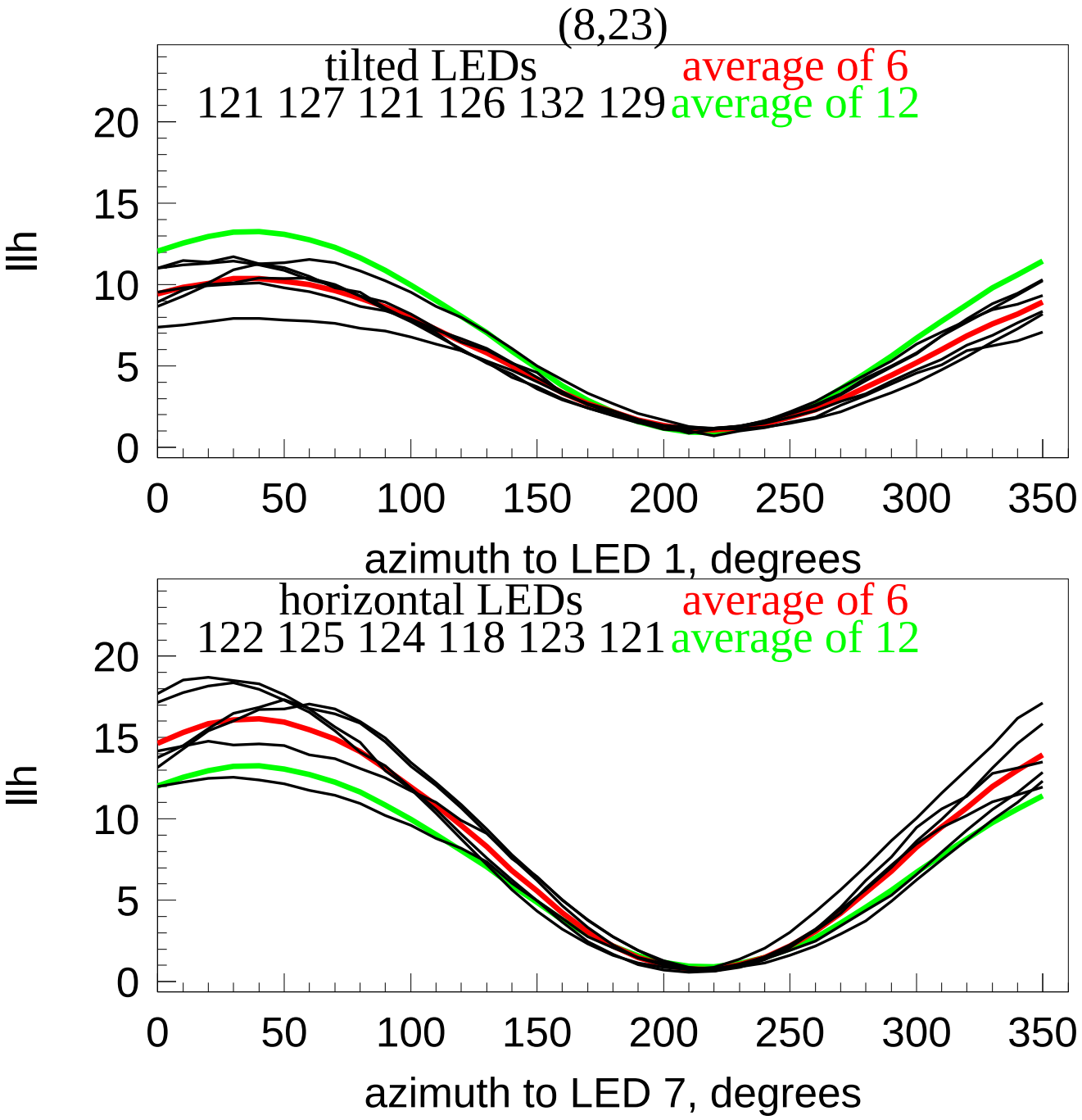

(8,20)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
221.6 ± 6.6

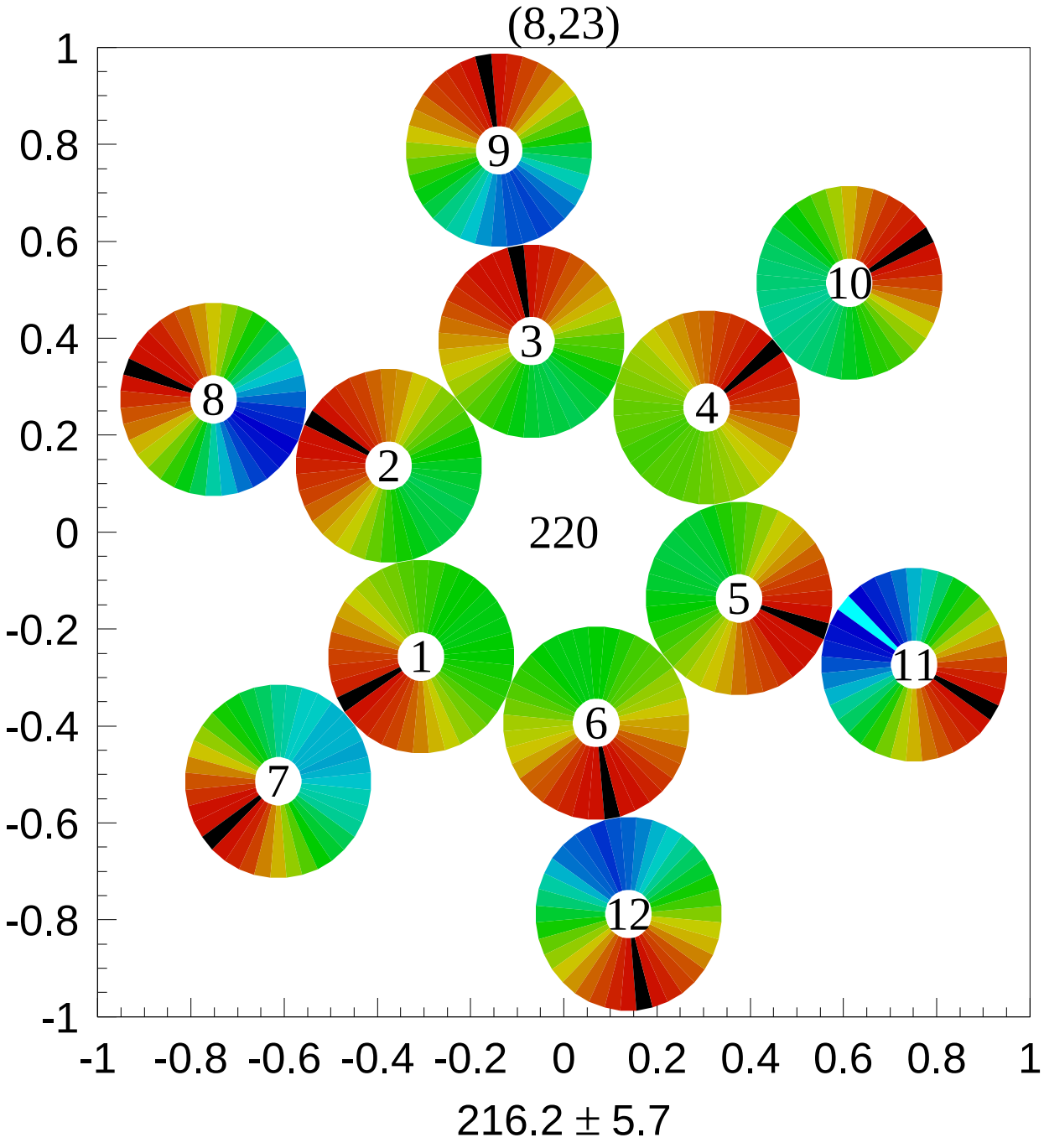

(8,21)
tilted LEDs
123 122 121 108 126 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 119 117 124 121 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

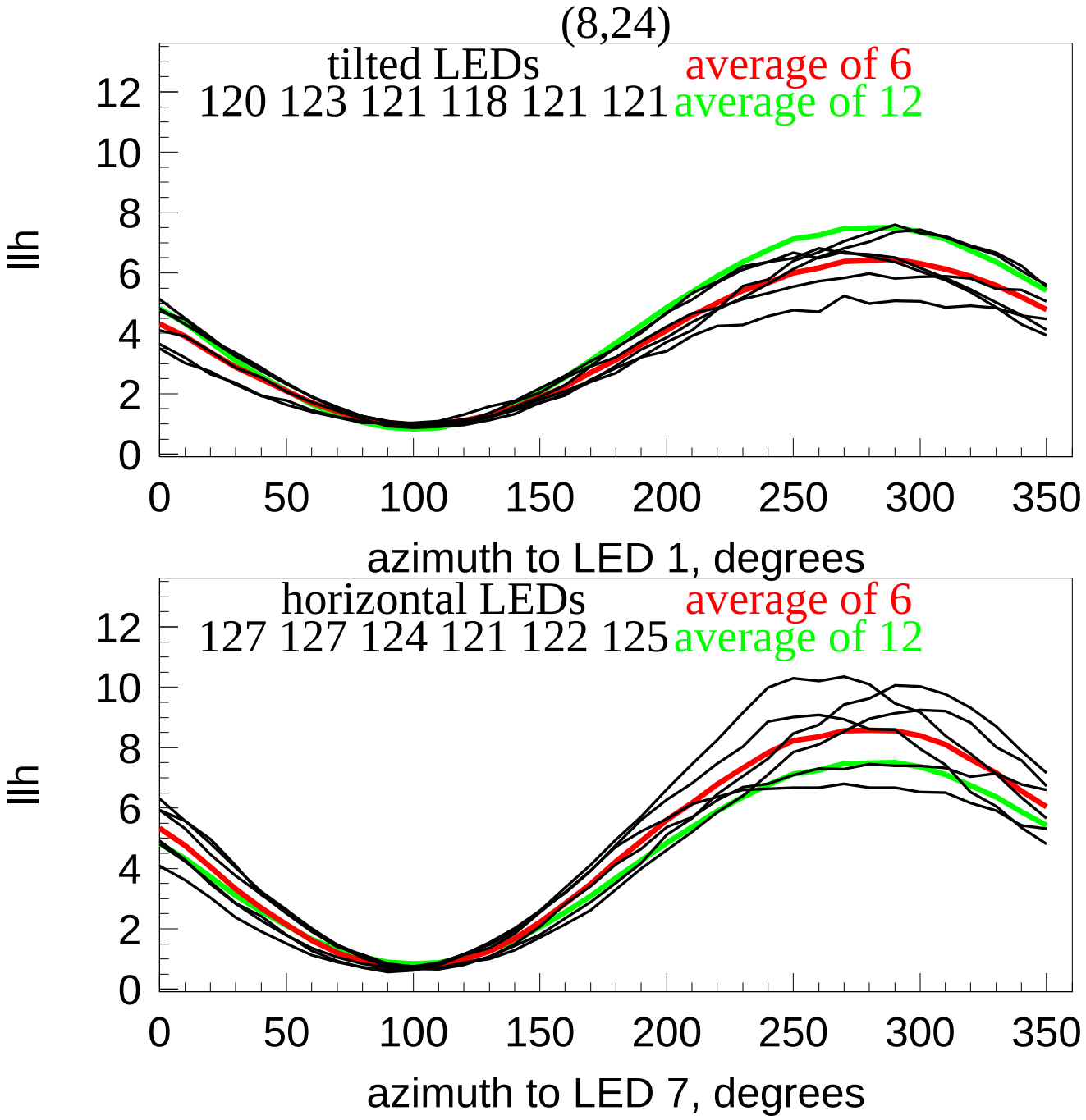

(8,21)
10
4
11
9
3
5
280
6
2
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
281.3 ± 5.3

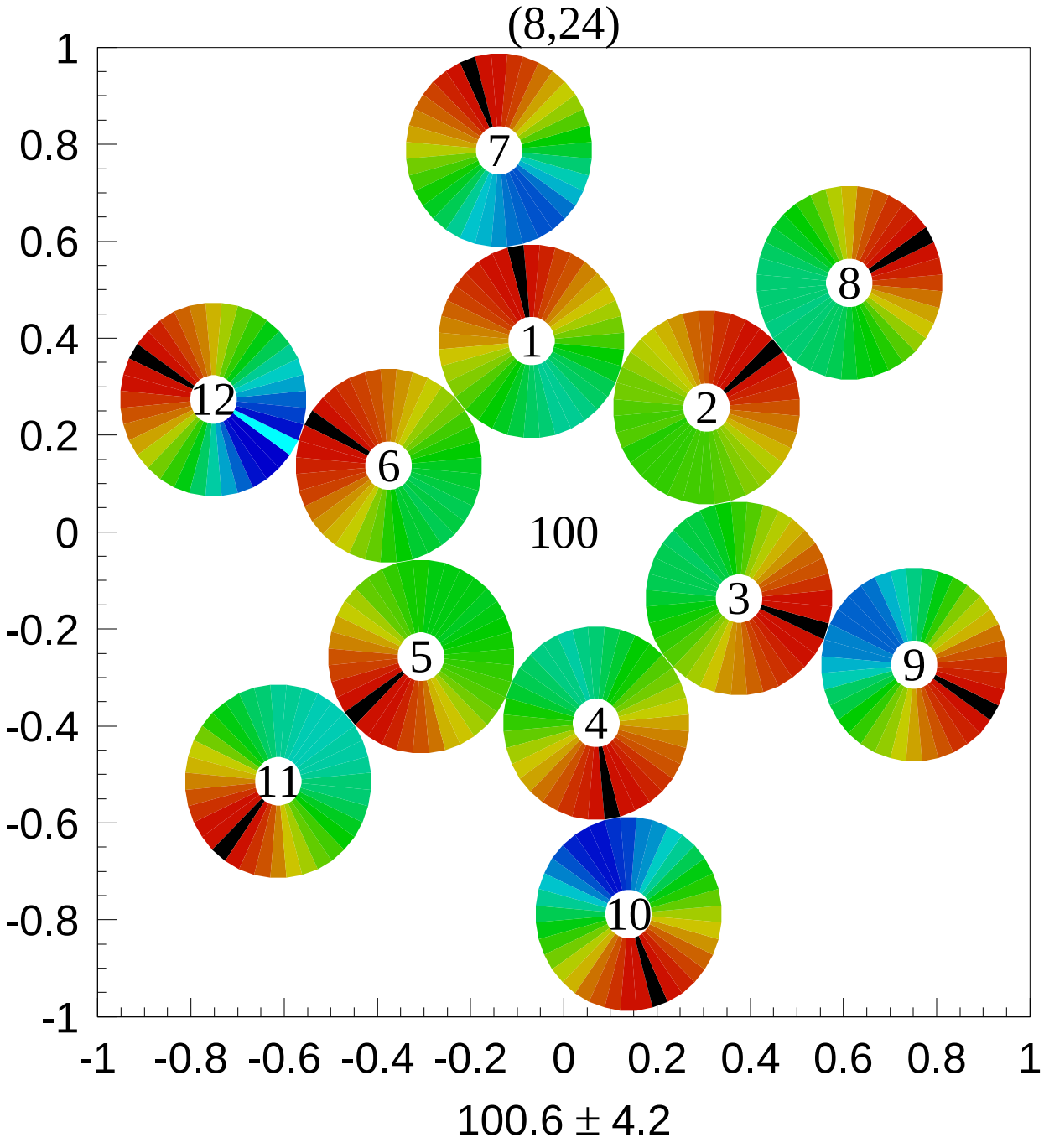

(8,22)
tilted LEDs
121 122 117 123 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 114 122 118 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

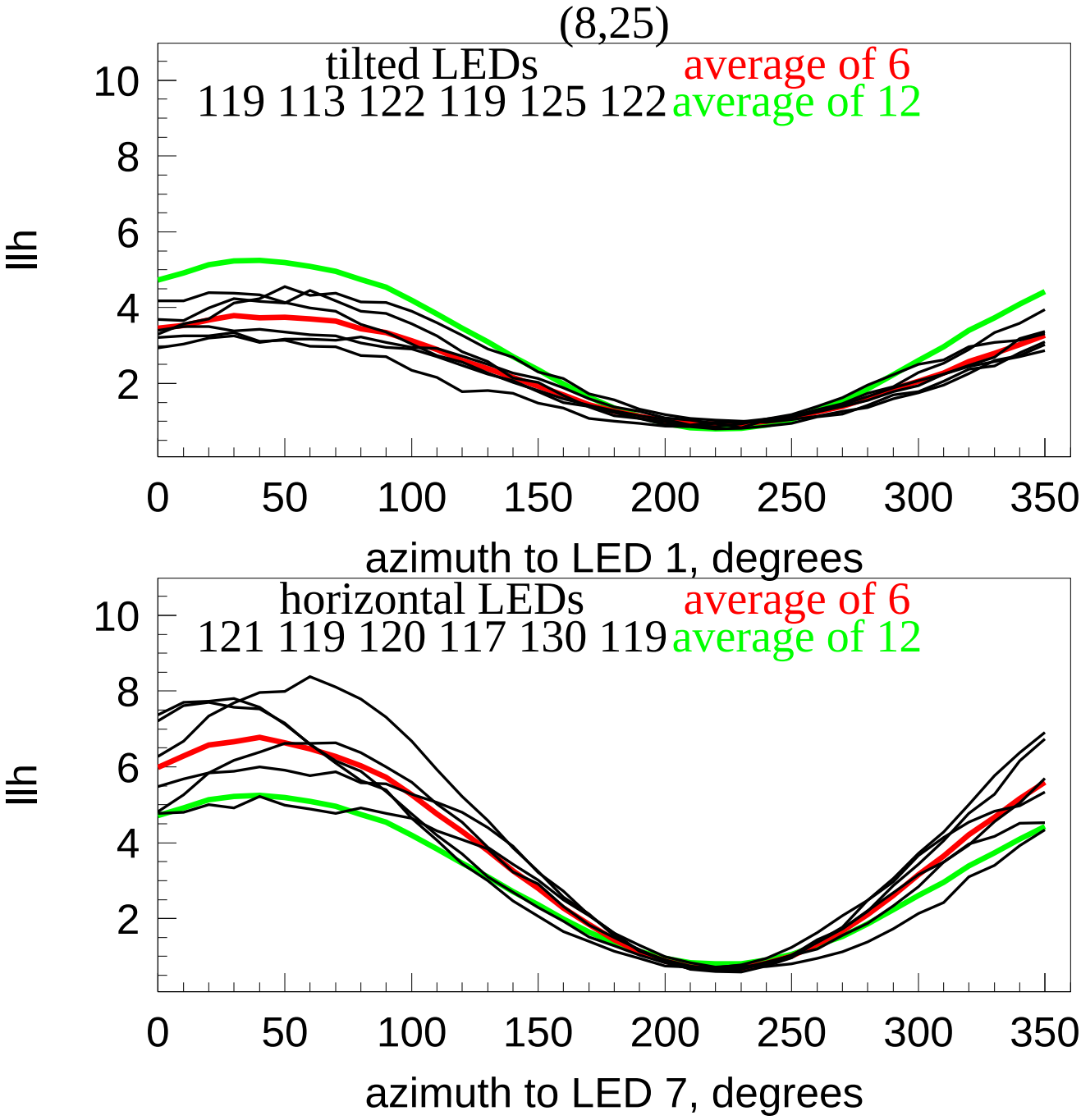

(8,22)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
324.9 ± 3.6

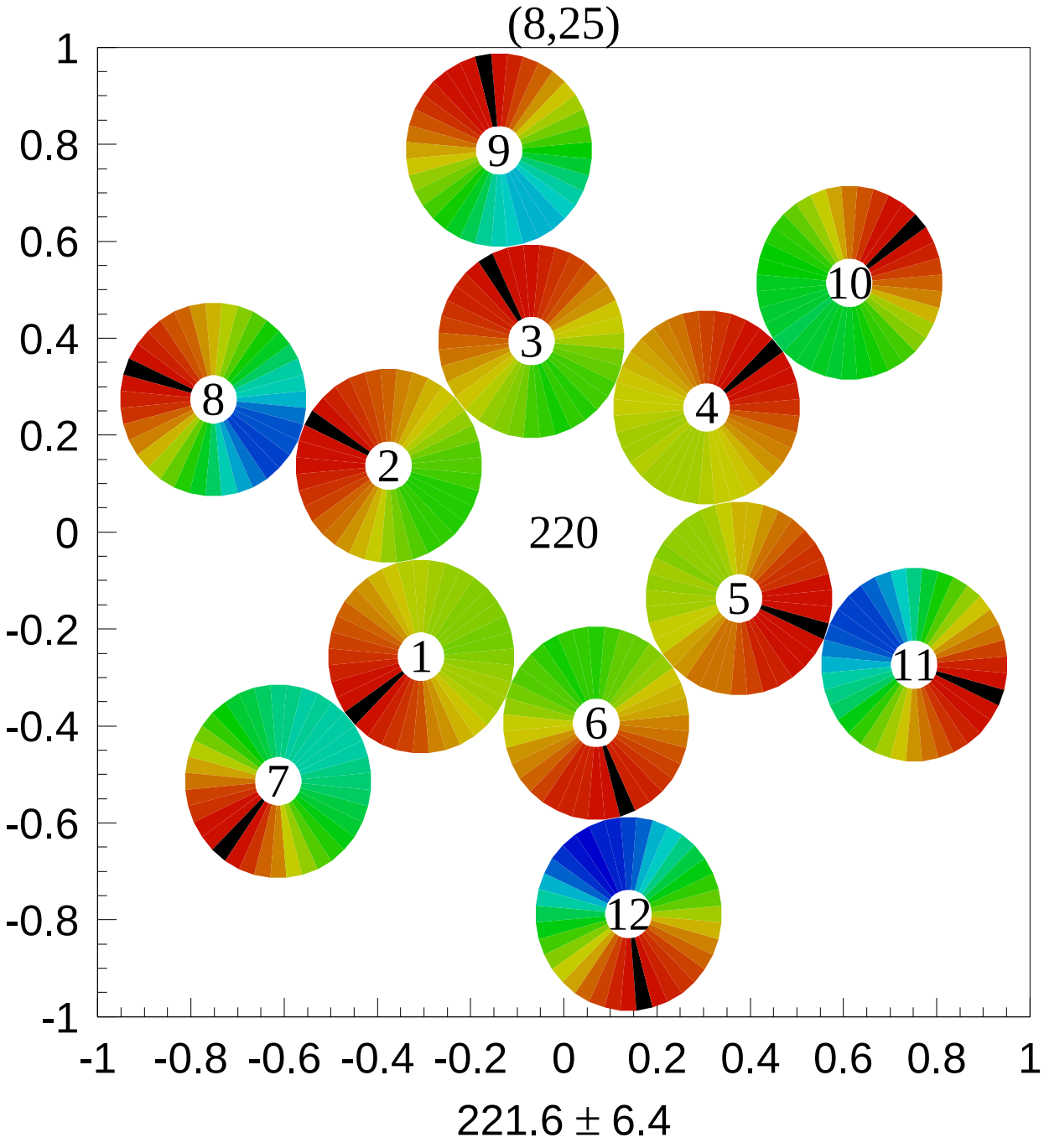

(8,23)
tilted LEDs
121 127 121 126 132 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 124 118 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

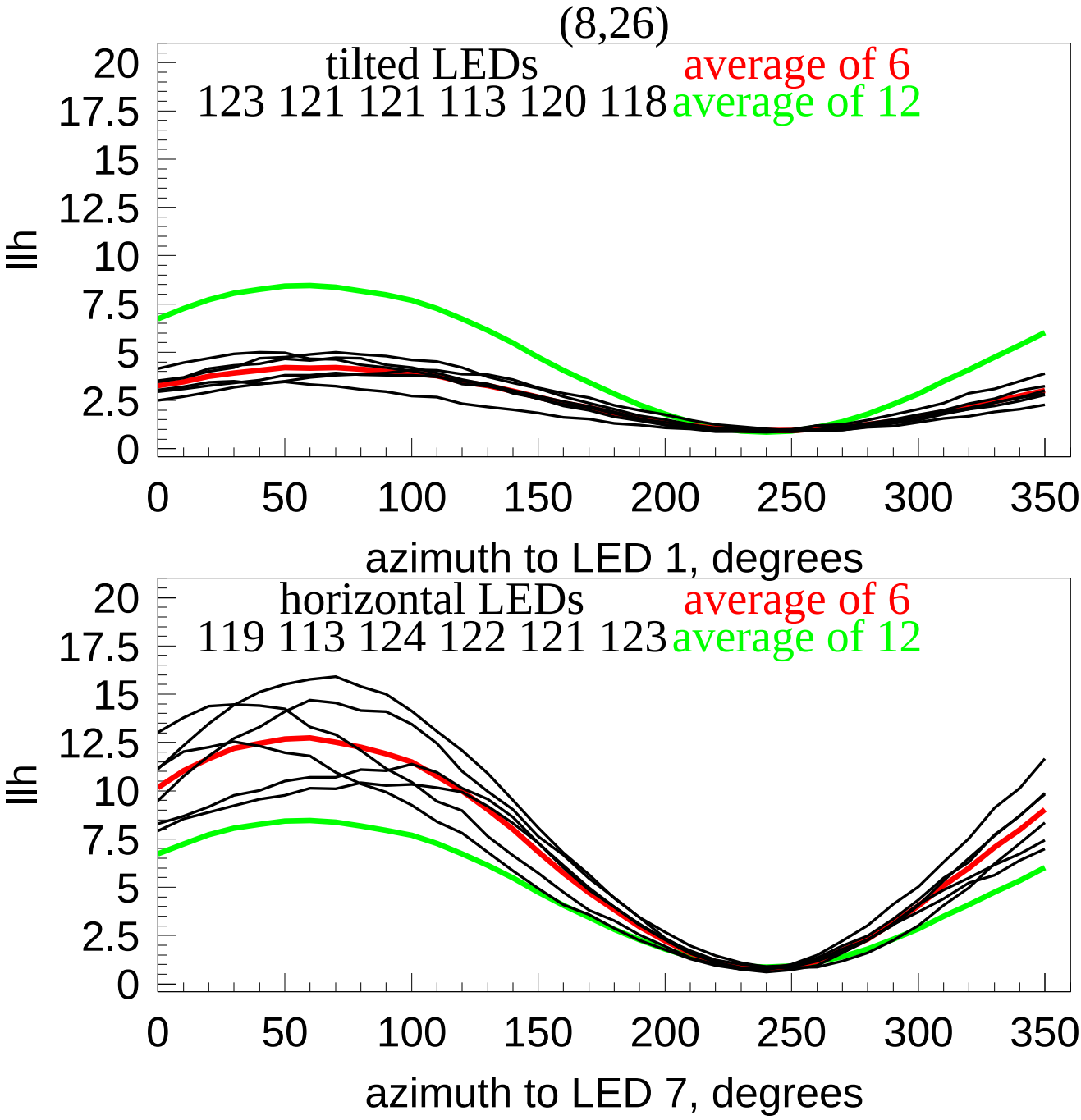

(8,23)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
216.2 ± 5.7

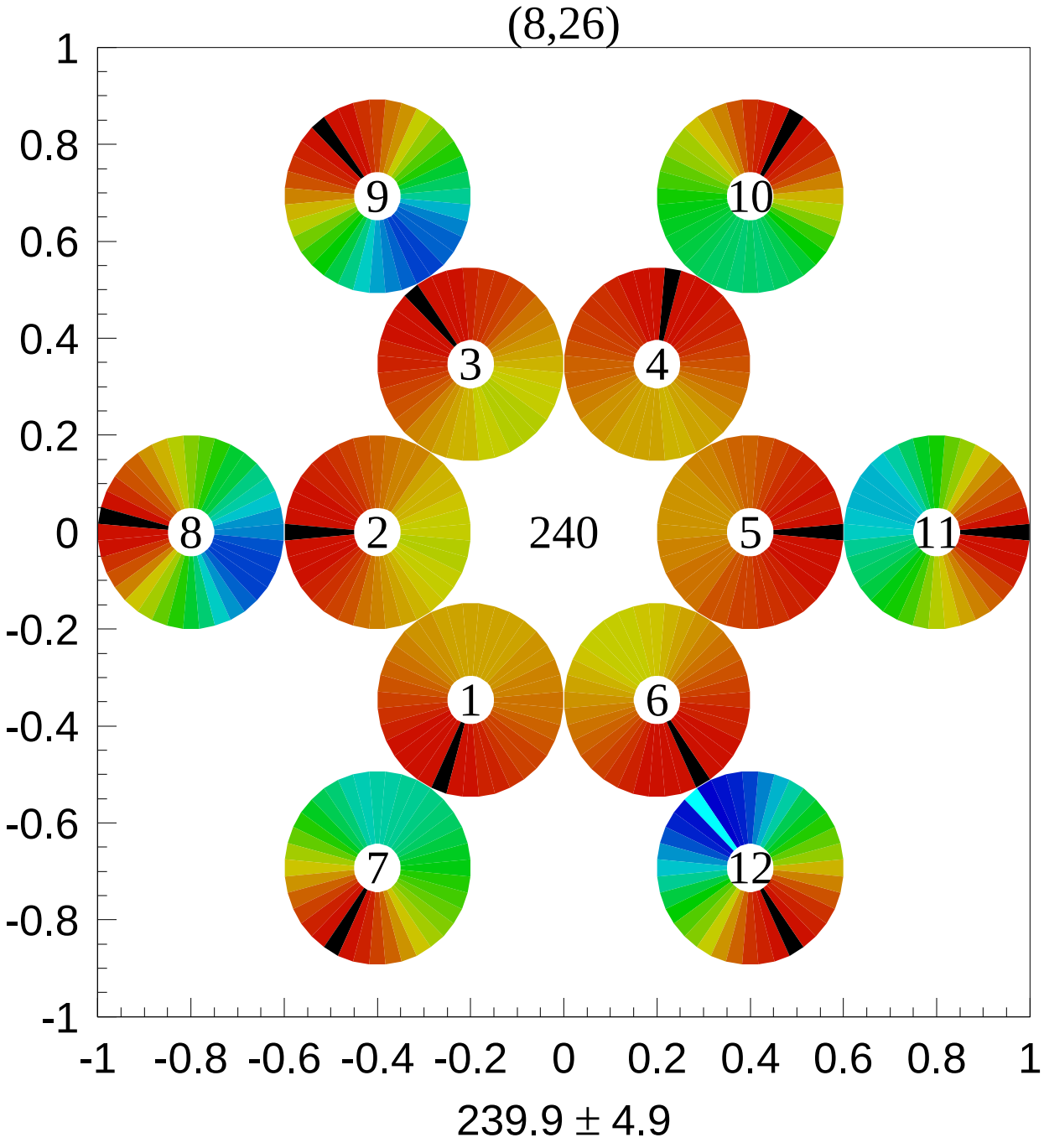

(8,24)
tilted LEDs
120 123 121 118 121 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 127 124 121 122 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

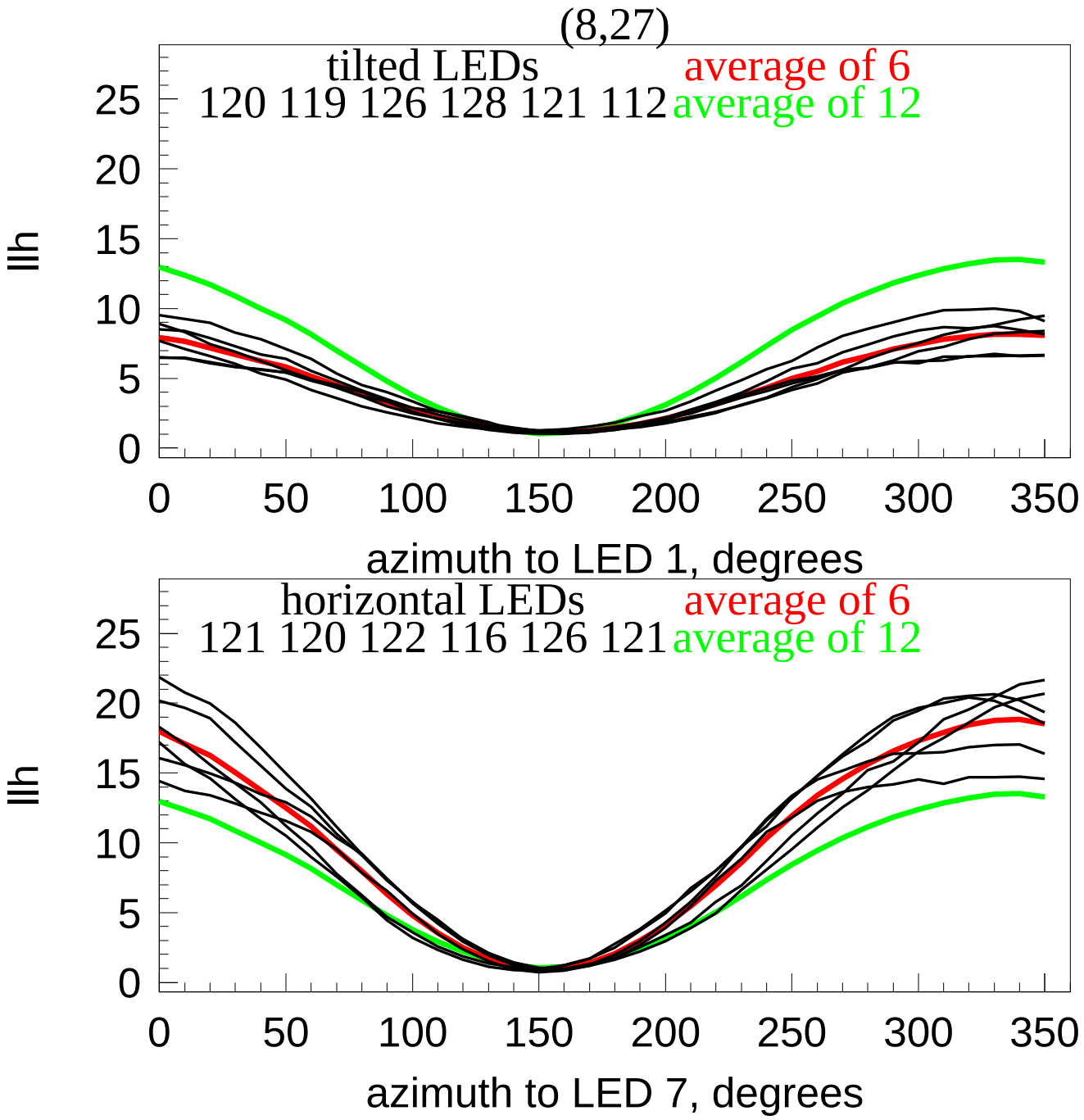

(8,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
1
8
12
2
6
100
3
5
9
4
11
10
100.6 ± 4.2

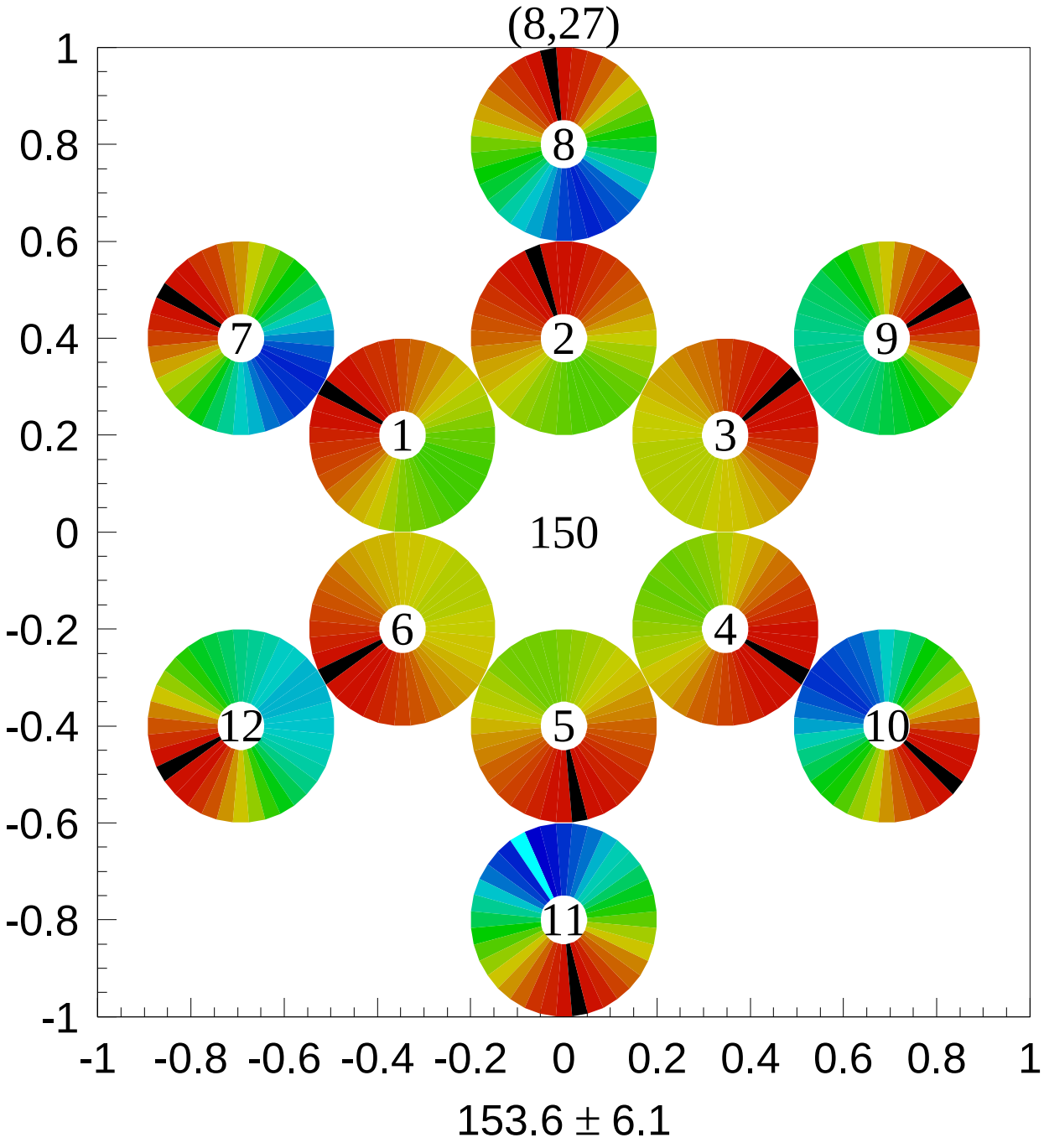

(8,25)
tilted LEDs
119 113 122 119 125 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 119 120 117 130 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

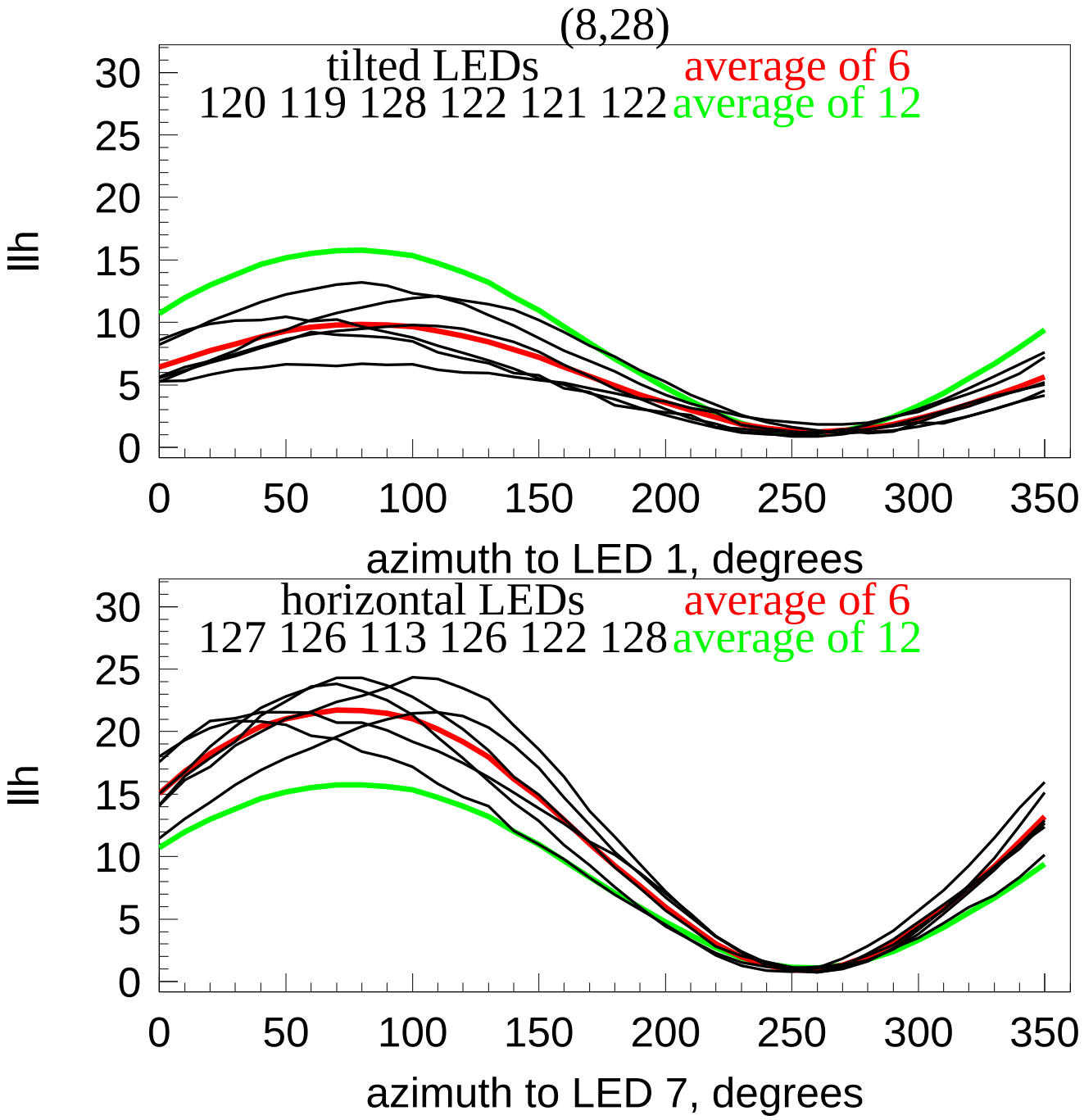

(8,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
221.6 ± 6.4

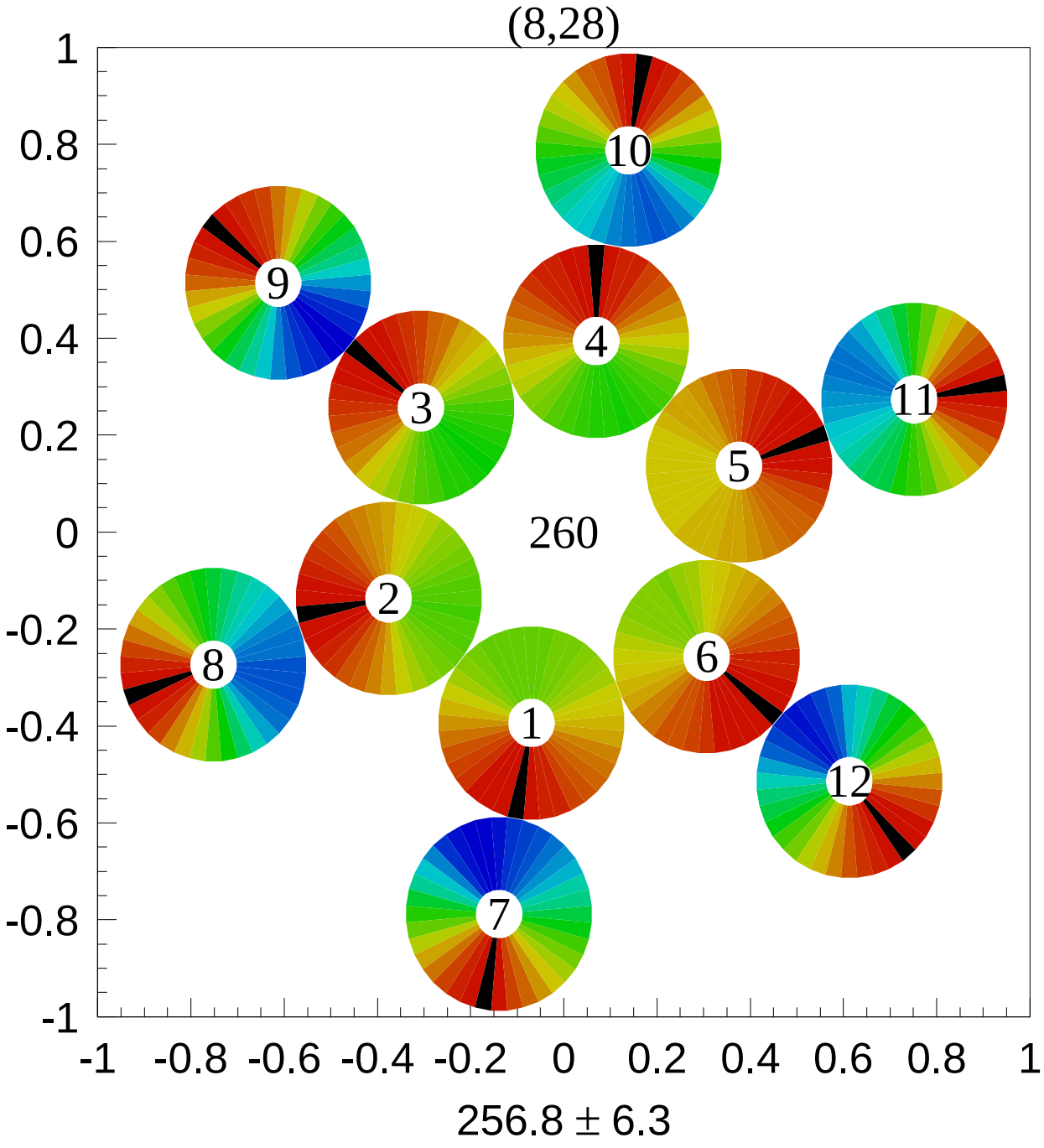

(8,26)
tilted LEDs
123 121 121 113 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 113 124 122 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

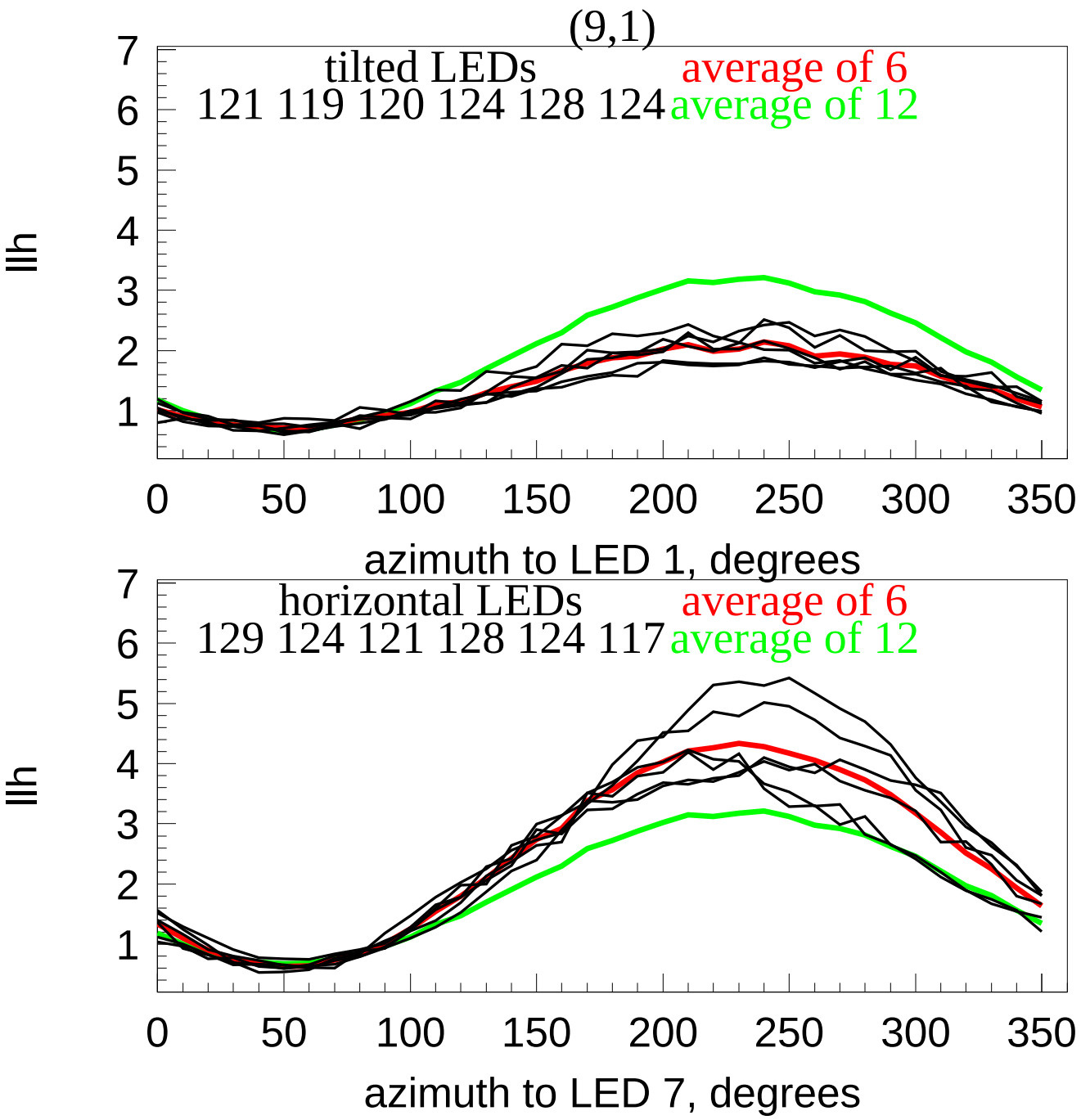

(8,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
239.9 ± 4.9

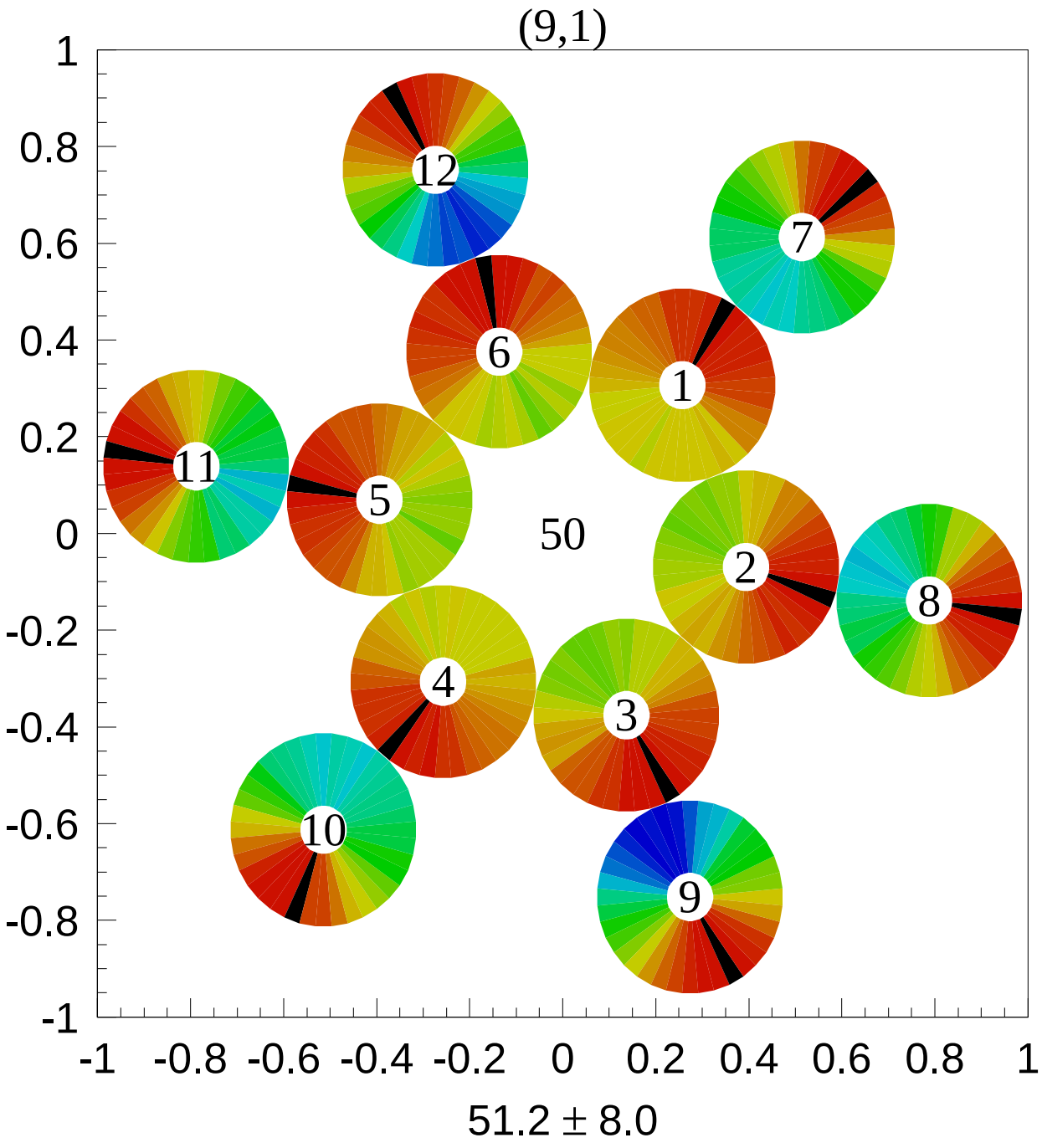

(8,27)
tilted LEDs
120 119 126 128 121 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 122 116 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

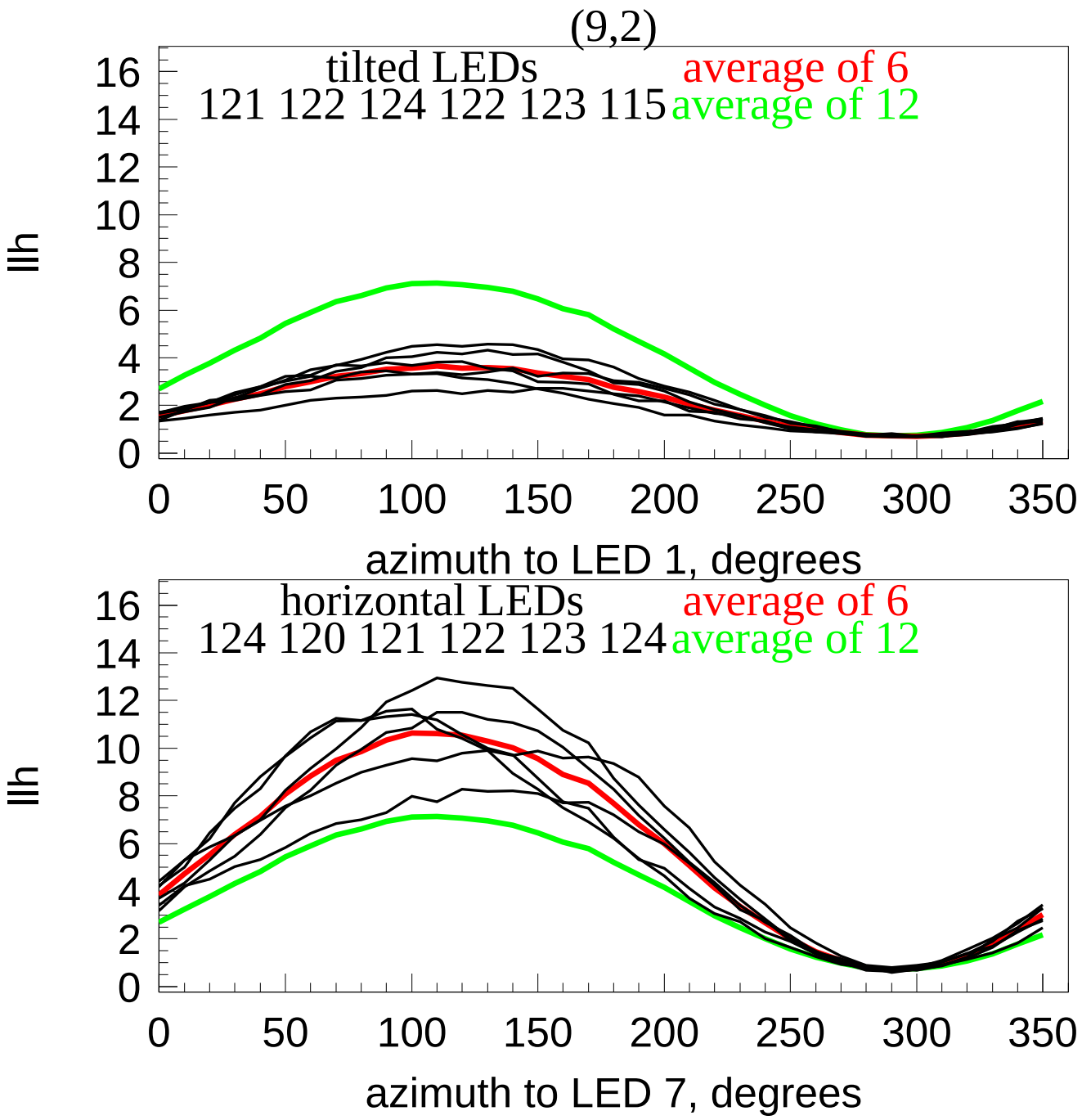

(8,27)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
153.6 ± 6.1

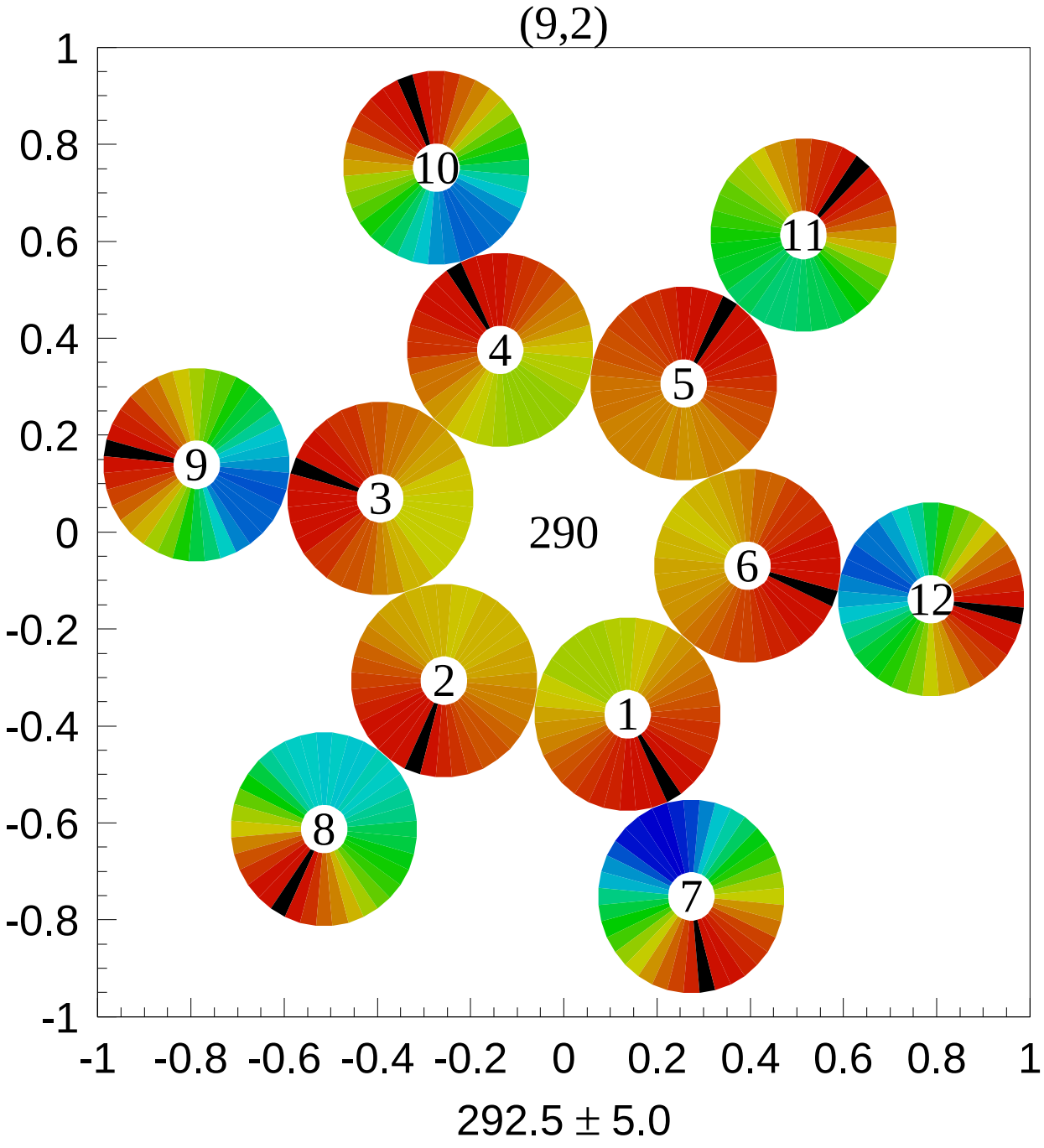

(8,28)
tilted LEDs
120 119 128 122 121 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 126 113 126 122 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

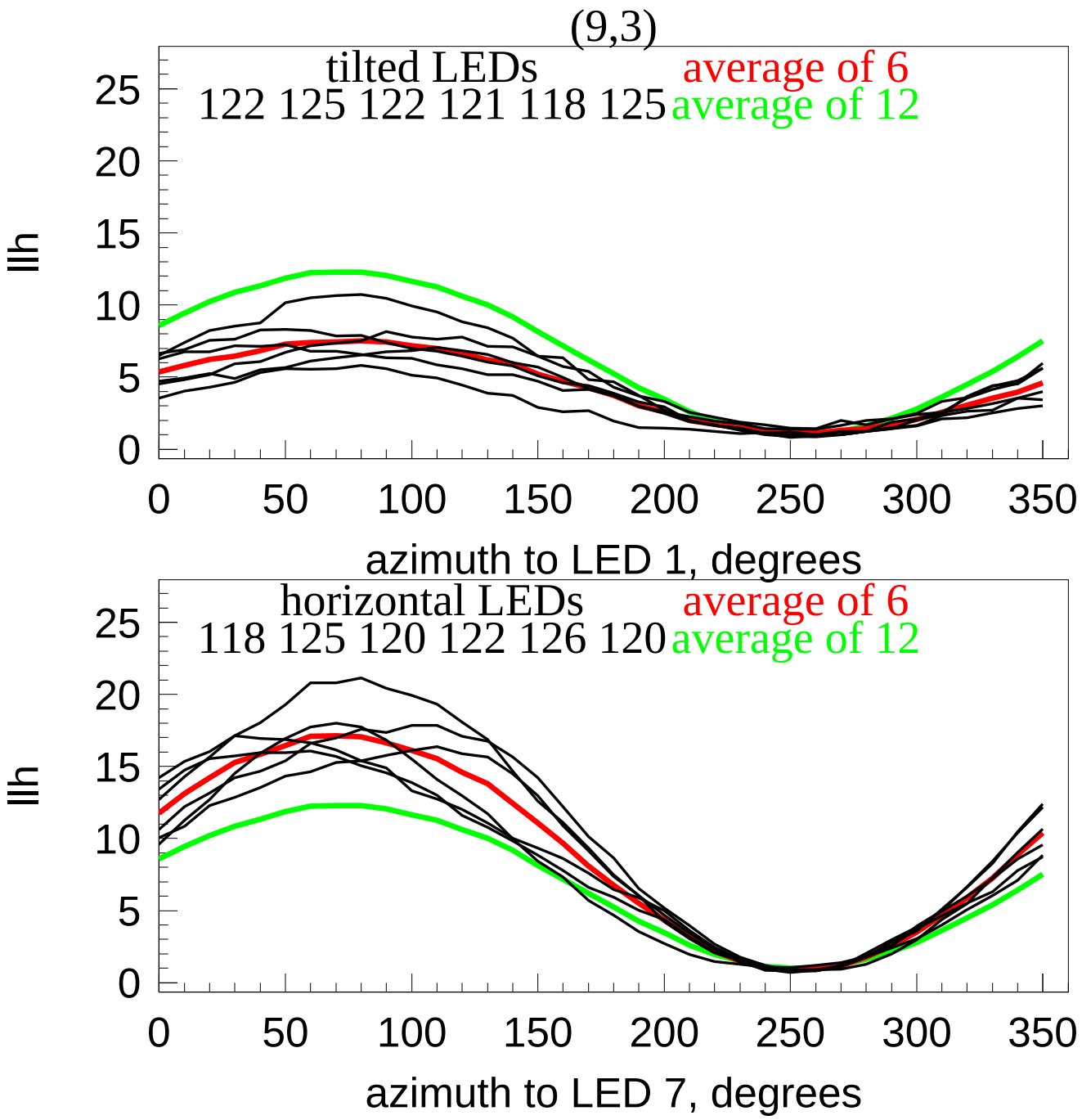

(8,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
256.8 ± 6.3

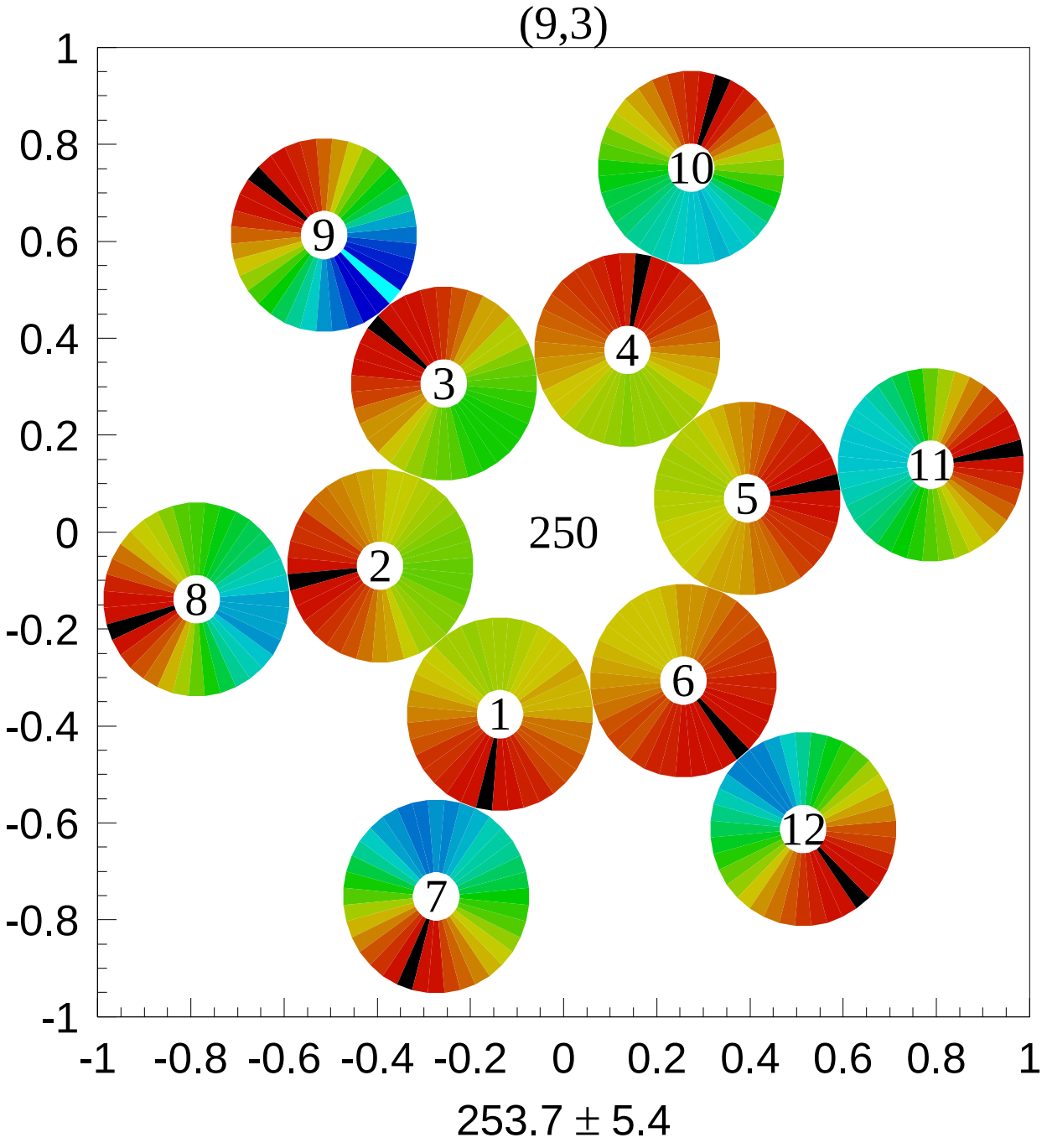

(9,1)
tilted LEDs
121 119 120 124 128 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 124 121 128 124 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

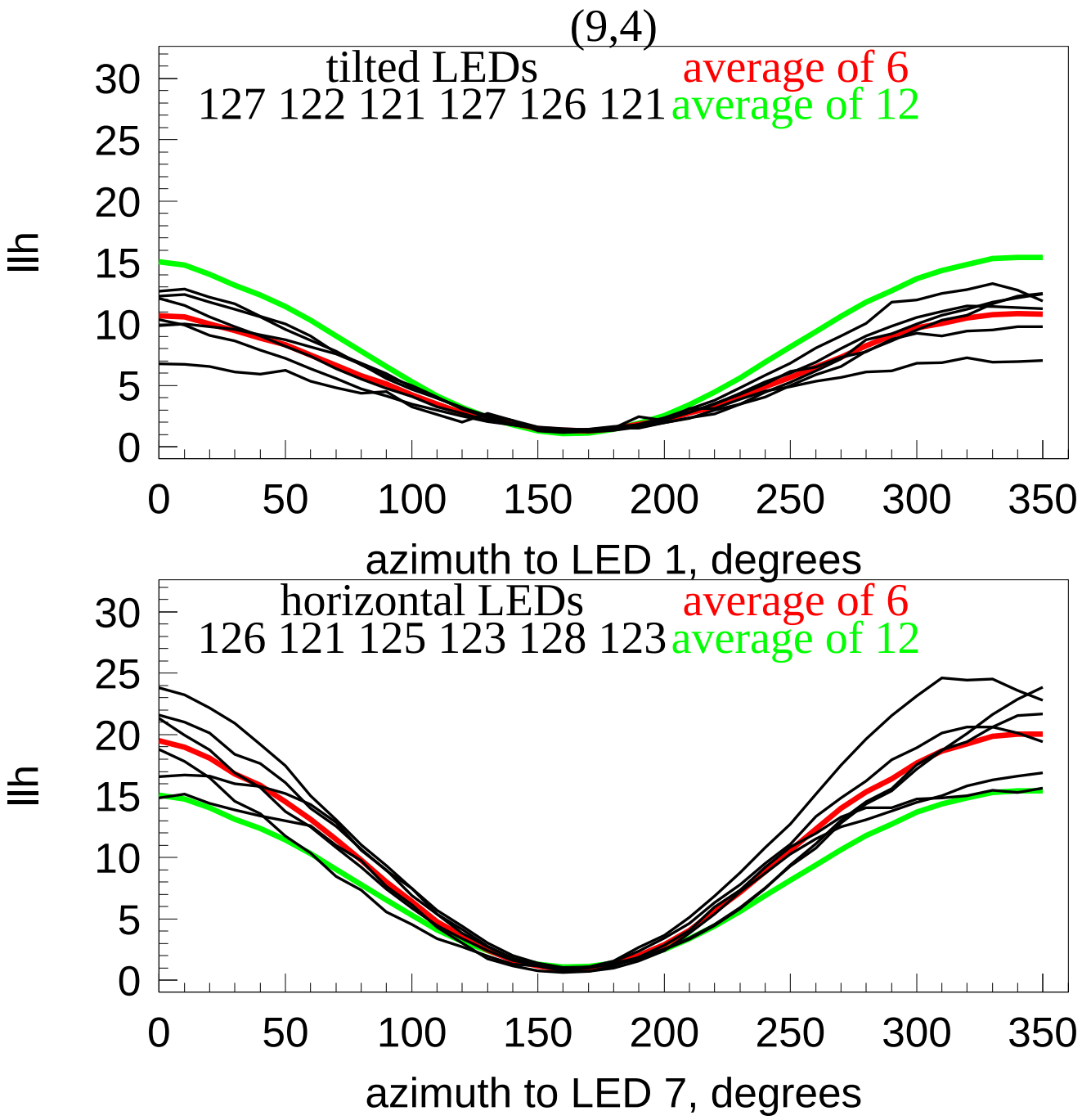

(9,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
51.2 ± 8.0

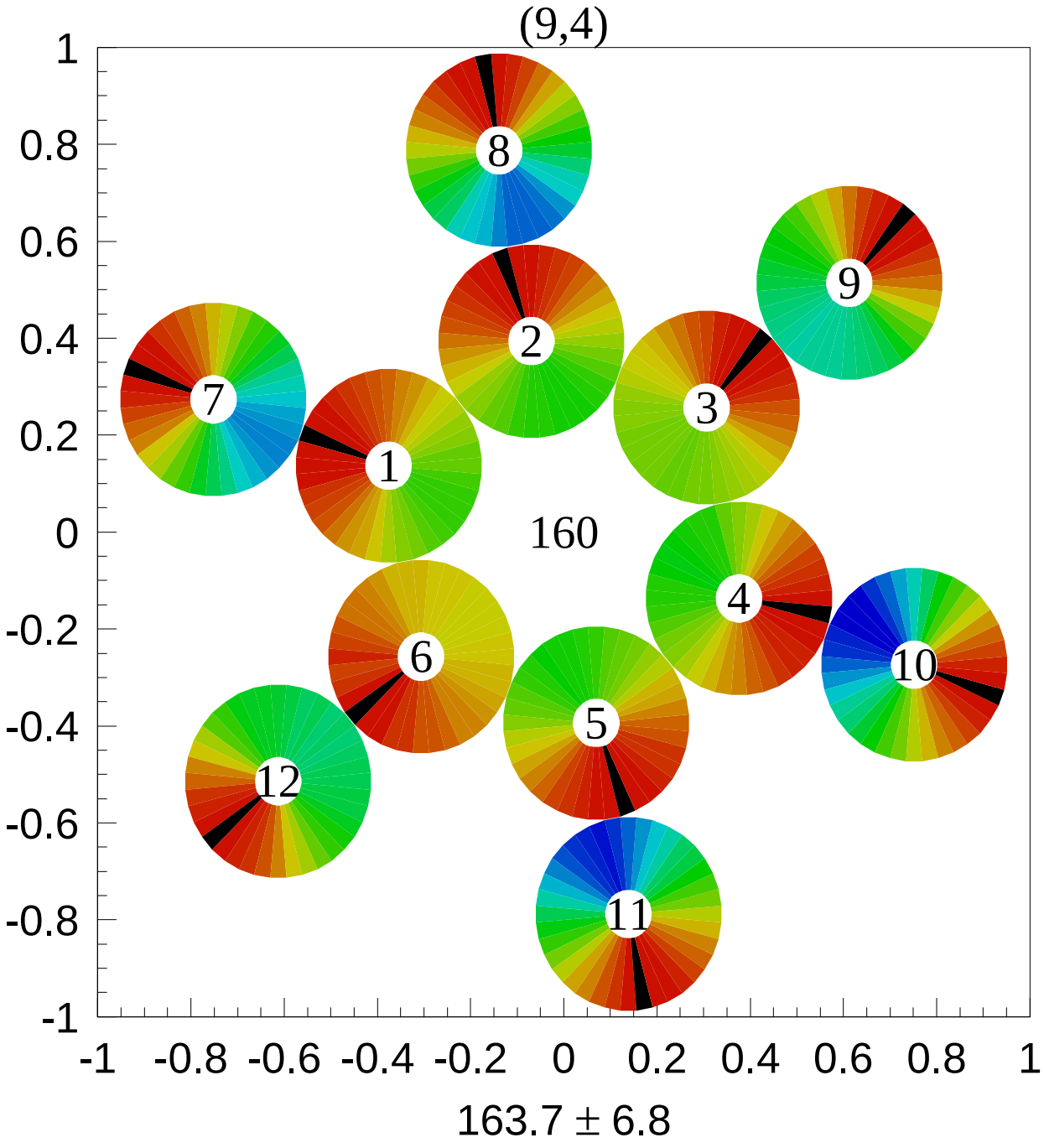

(9,2)
tilted LEDs
121 122 124 122 123 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 120 121 122 123 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

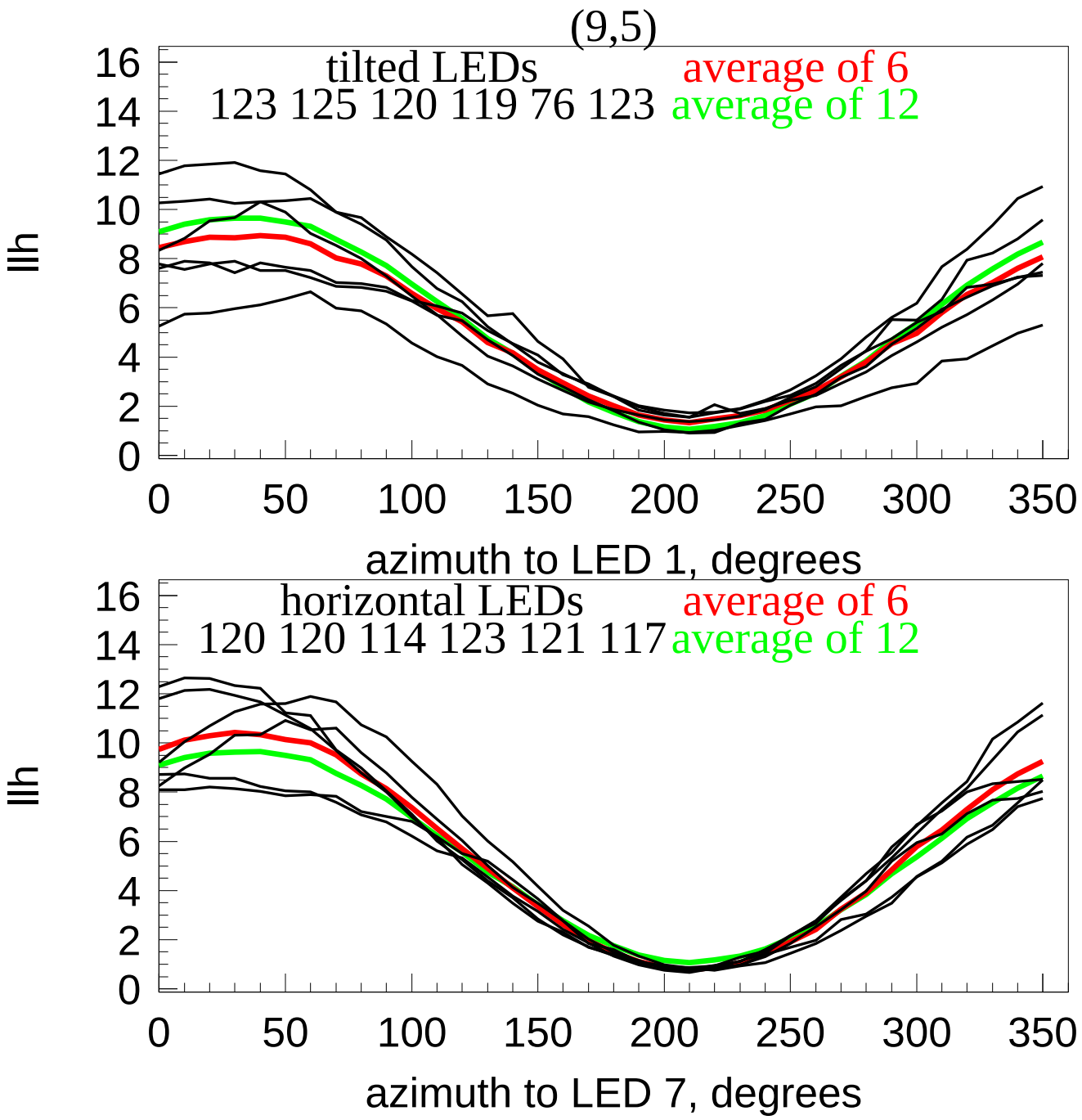

(9,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
292.5 ± 5.0

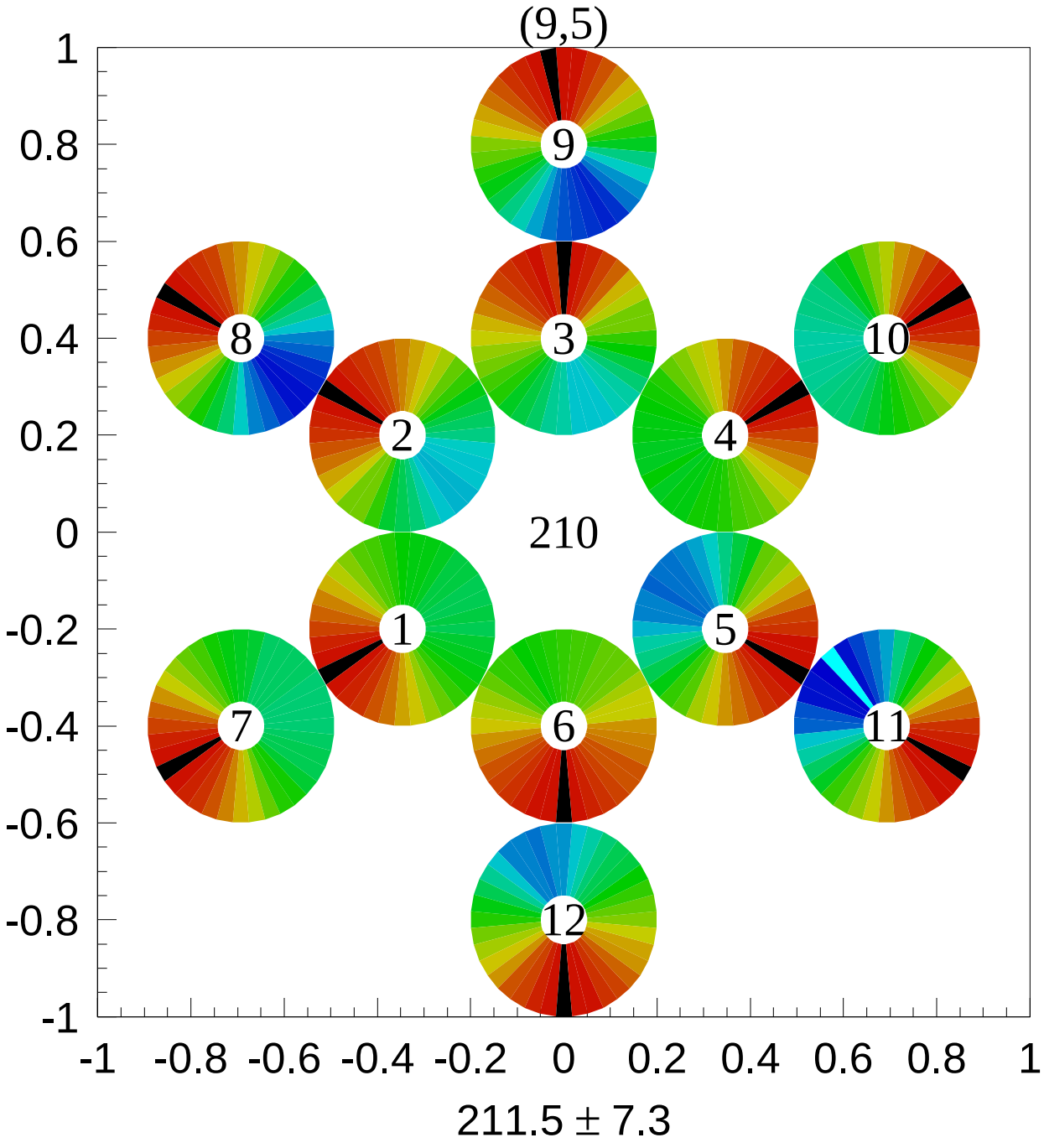

(9,3)
tilted LEDs
122 125 122 121 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 125 120 122 126 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

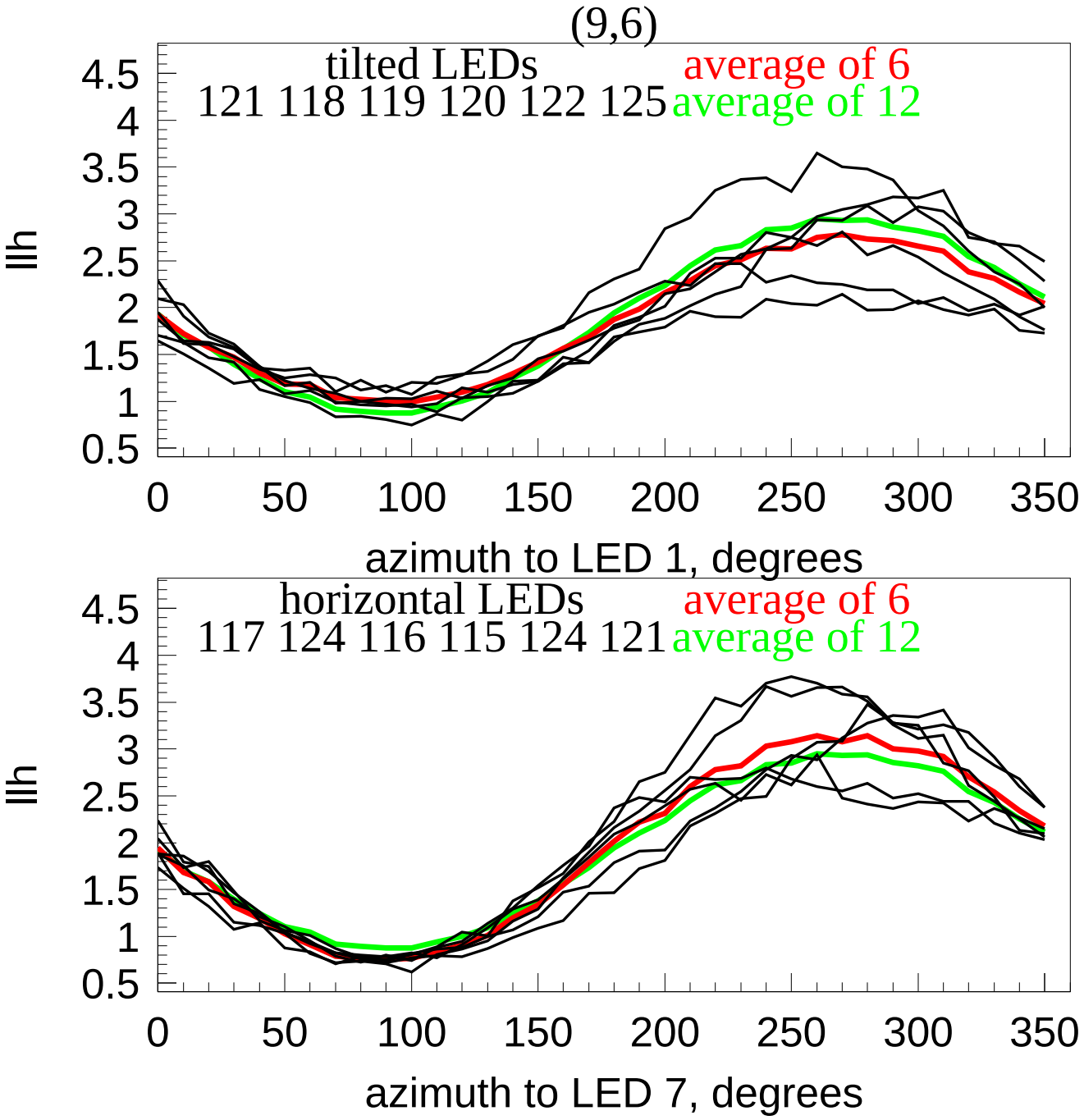

(9,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
253.7 ± 5.4

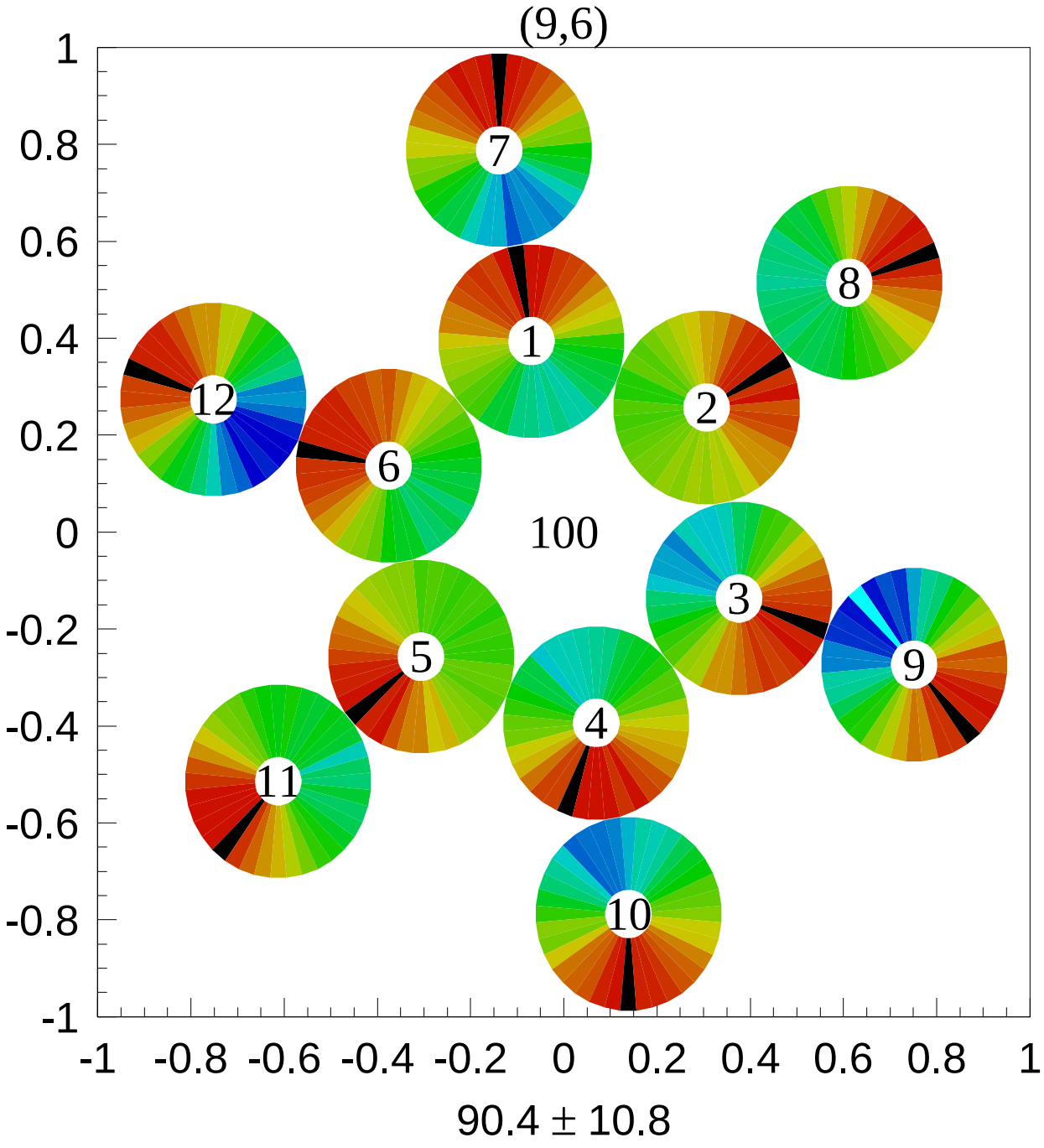

(9,4)
tilted LEDs
127 122 121 127 126 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 121 125 123 128 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

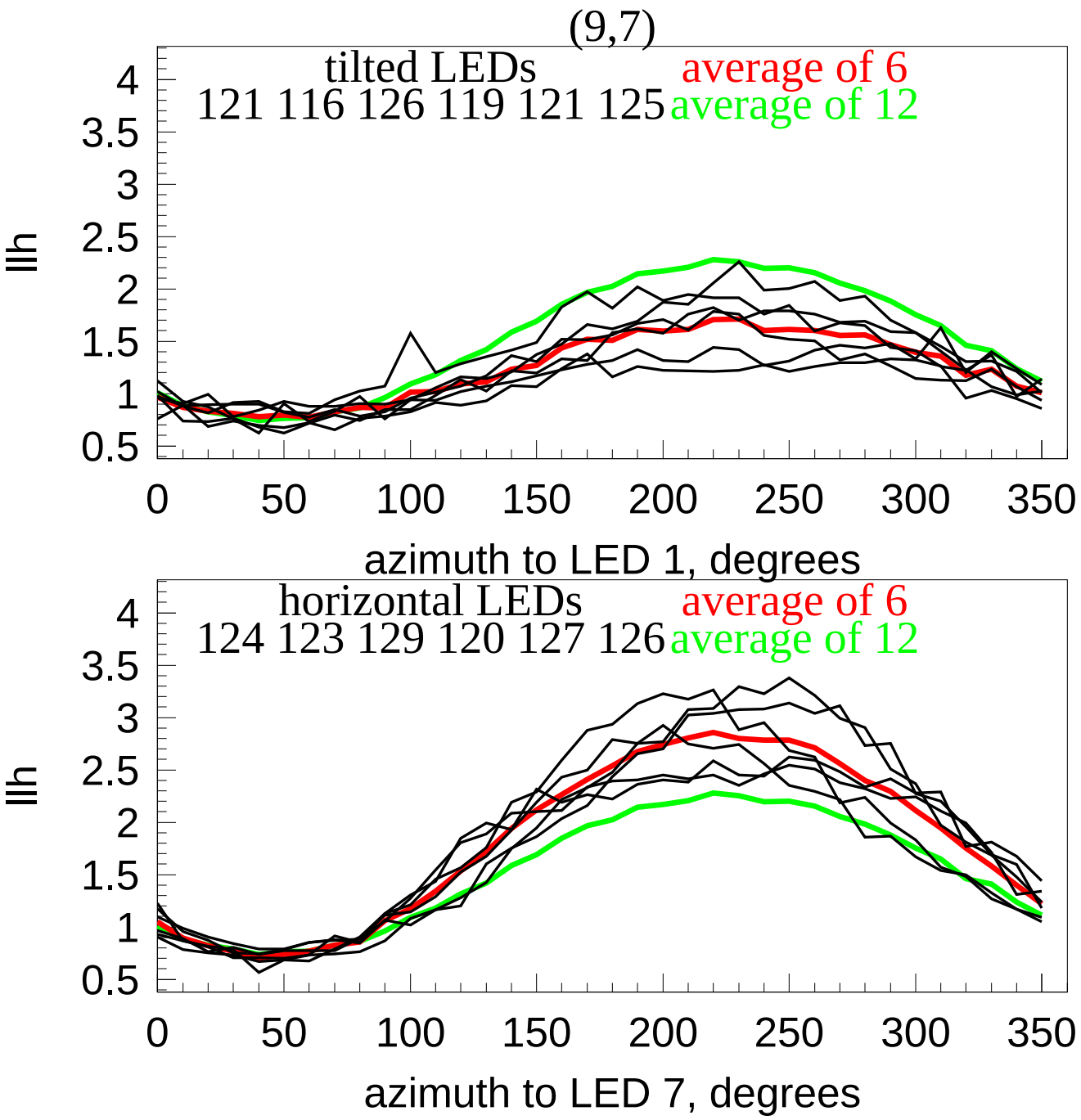

(9,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
10
6
5
12
11
163.7 ± 6.8

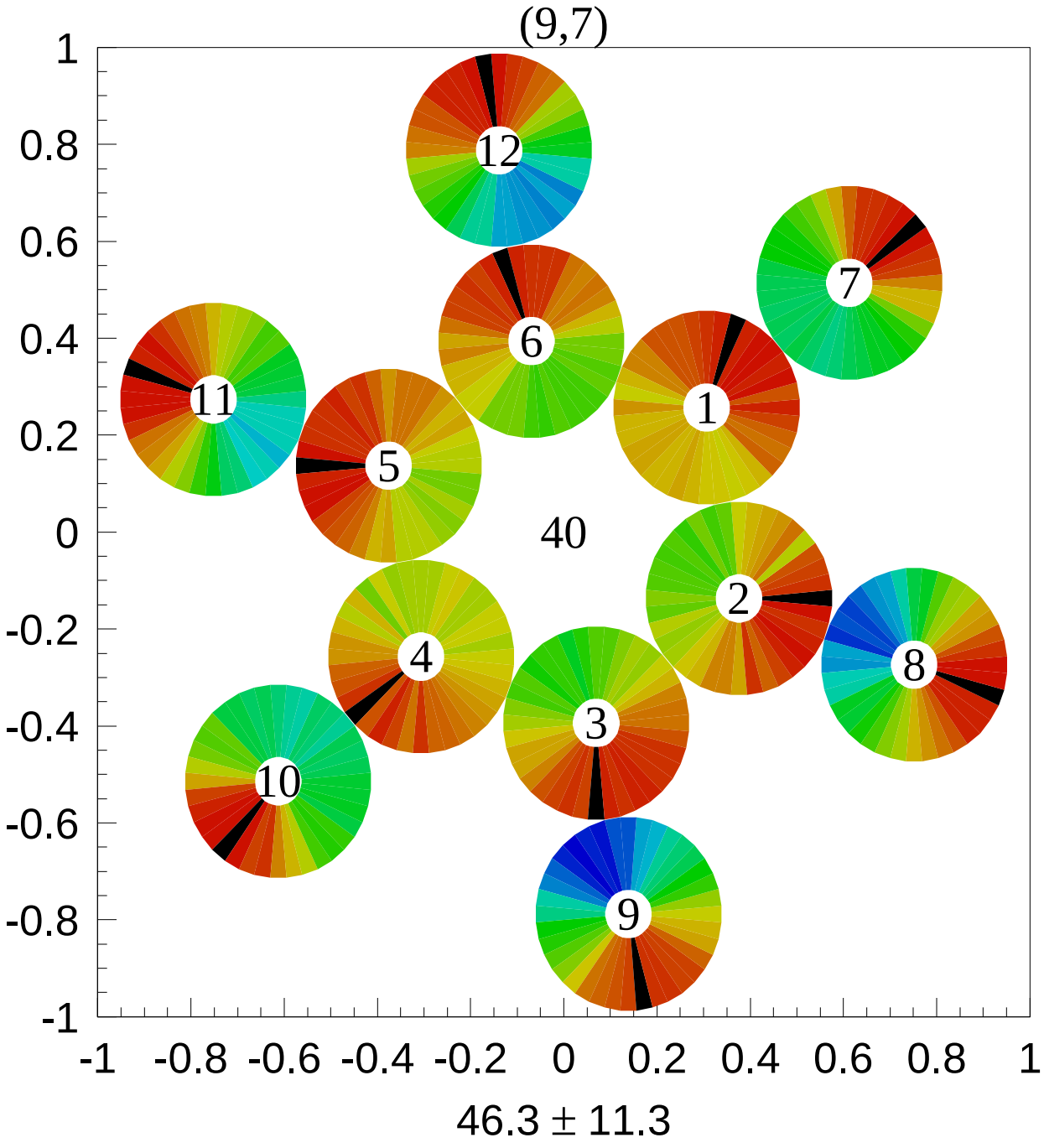

(9,5)
tilted LEDs
123 125 120 119 76 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 114 123 121 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

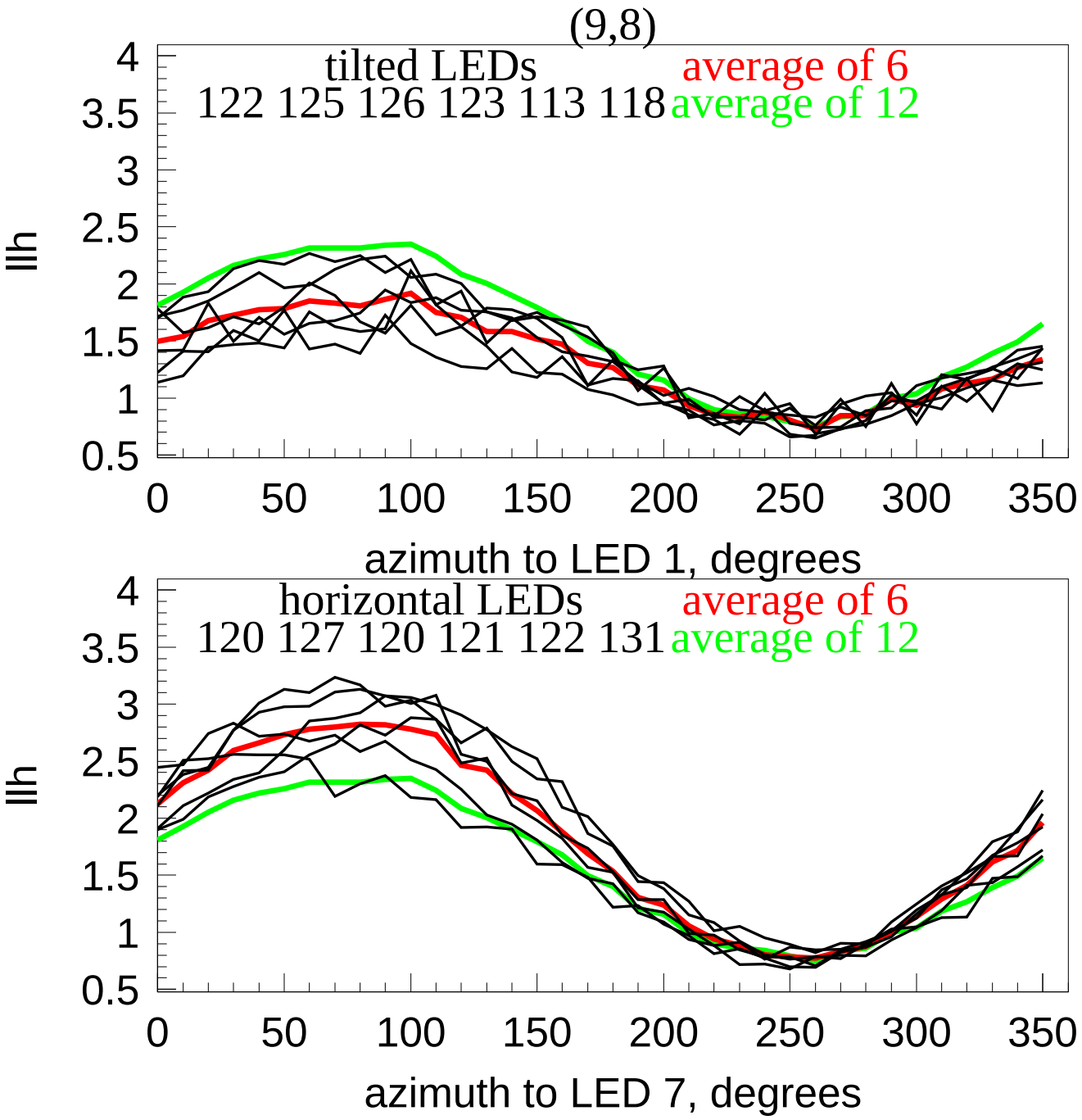

(9,5)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.5 ± 7.3

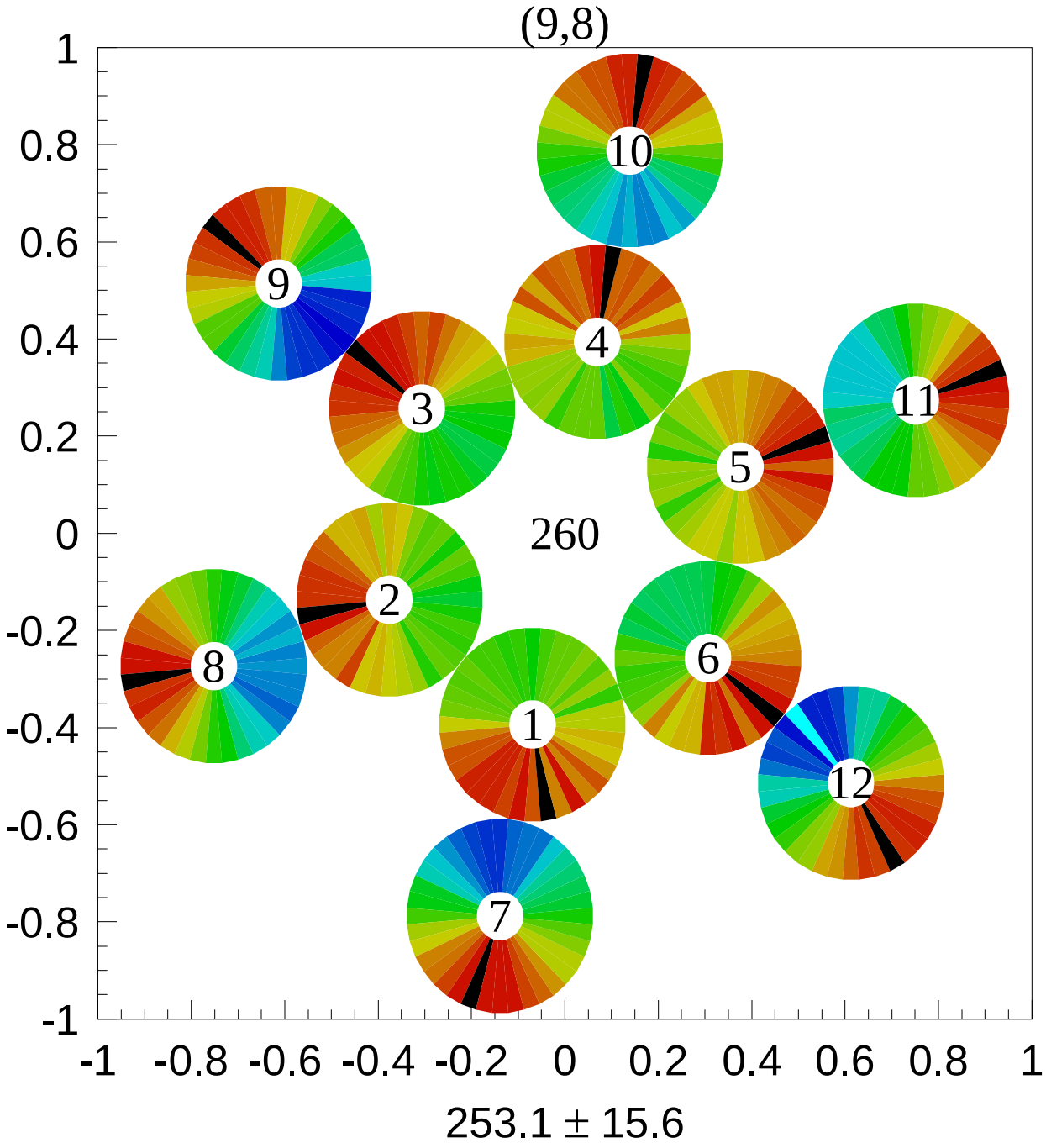

(9,6)
tilted LEDs
121 118 119 120 122 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 124 116 115 124 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

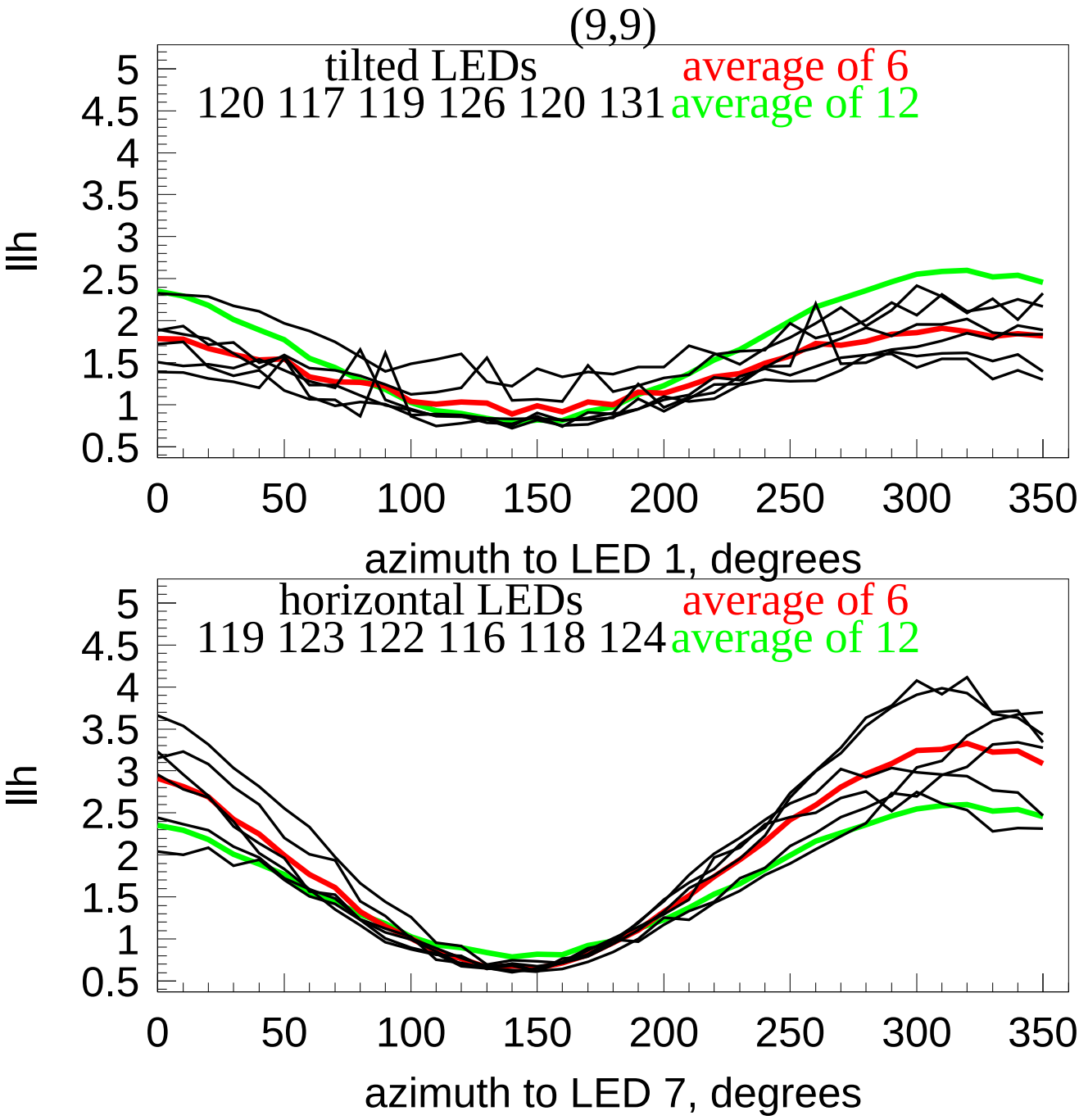

(9,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
90.4 ± 10.8

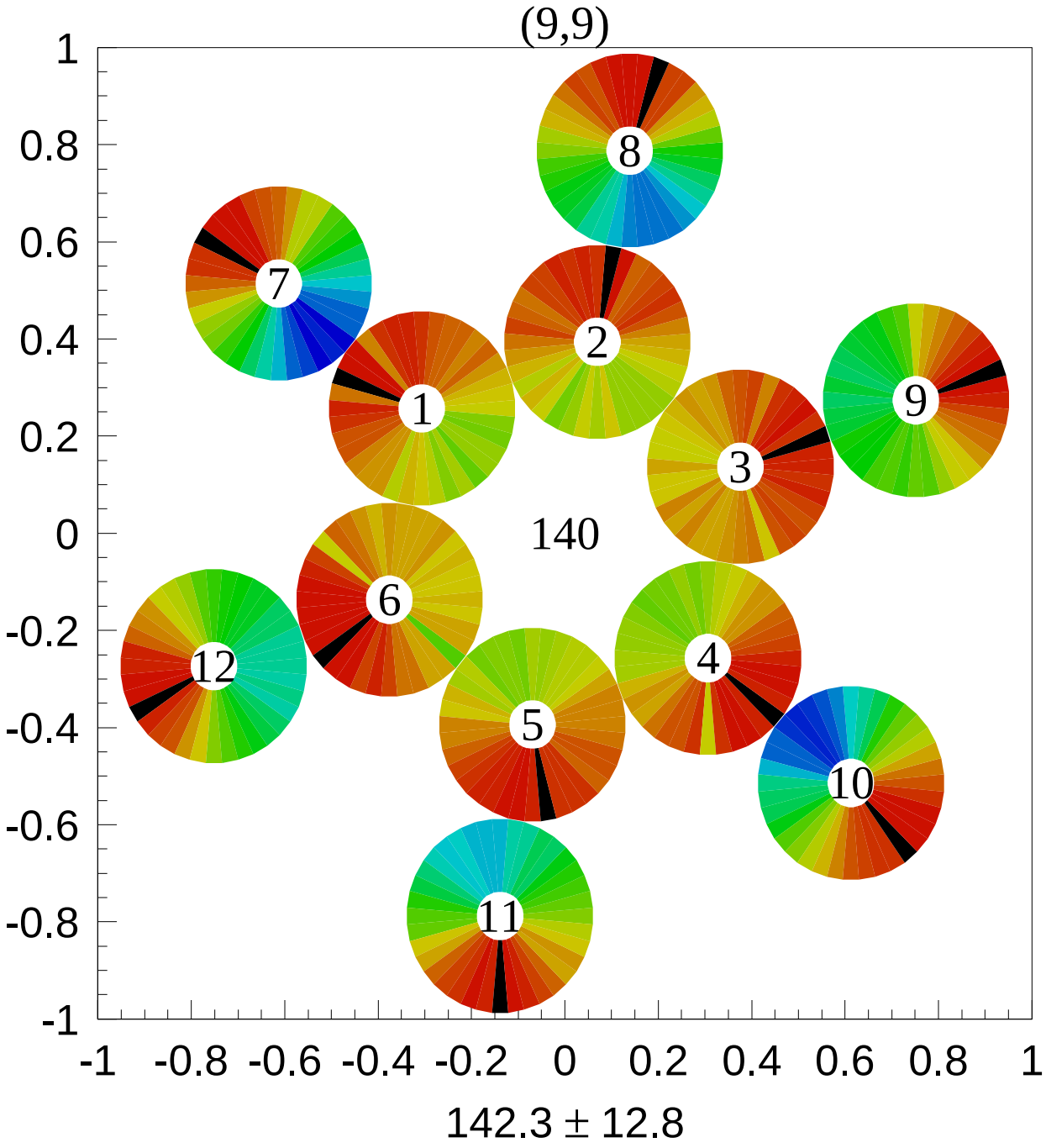

(9,7)
tilted LEDs
121 116 126 119 121 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 129 120 127 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

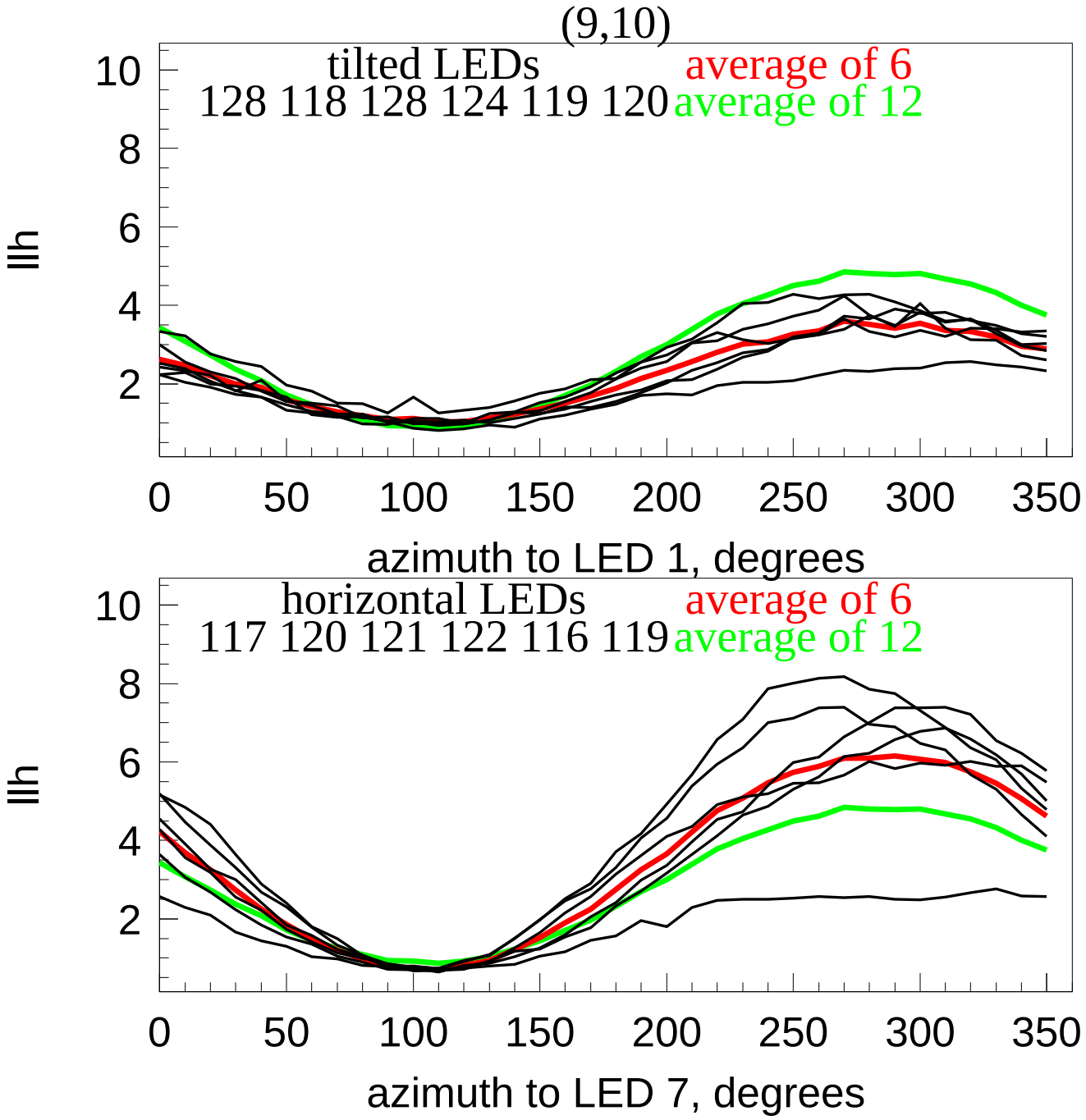

(9,7)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
46.3 ± 11.3

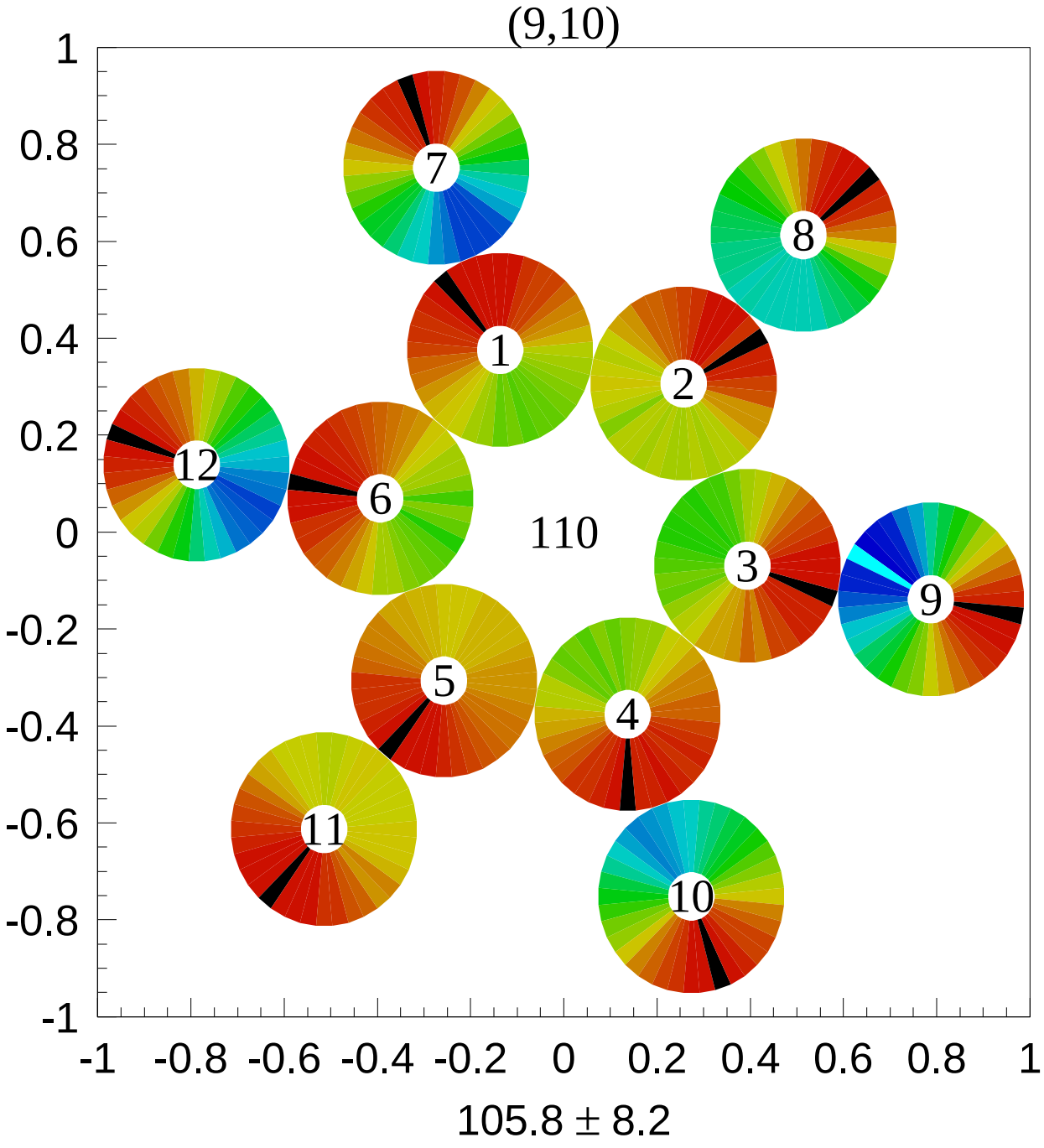

(9,8)
tilted LEDs
122 125 126 123 113 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 127 120 121 122 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

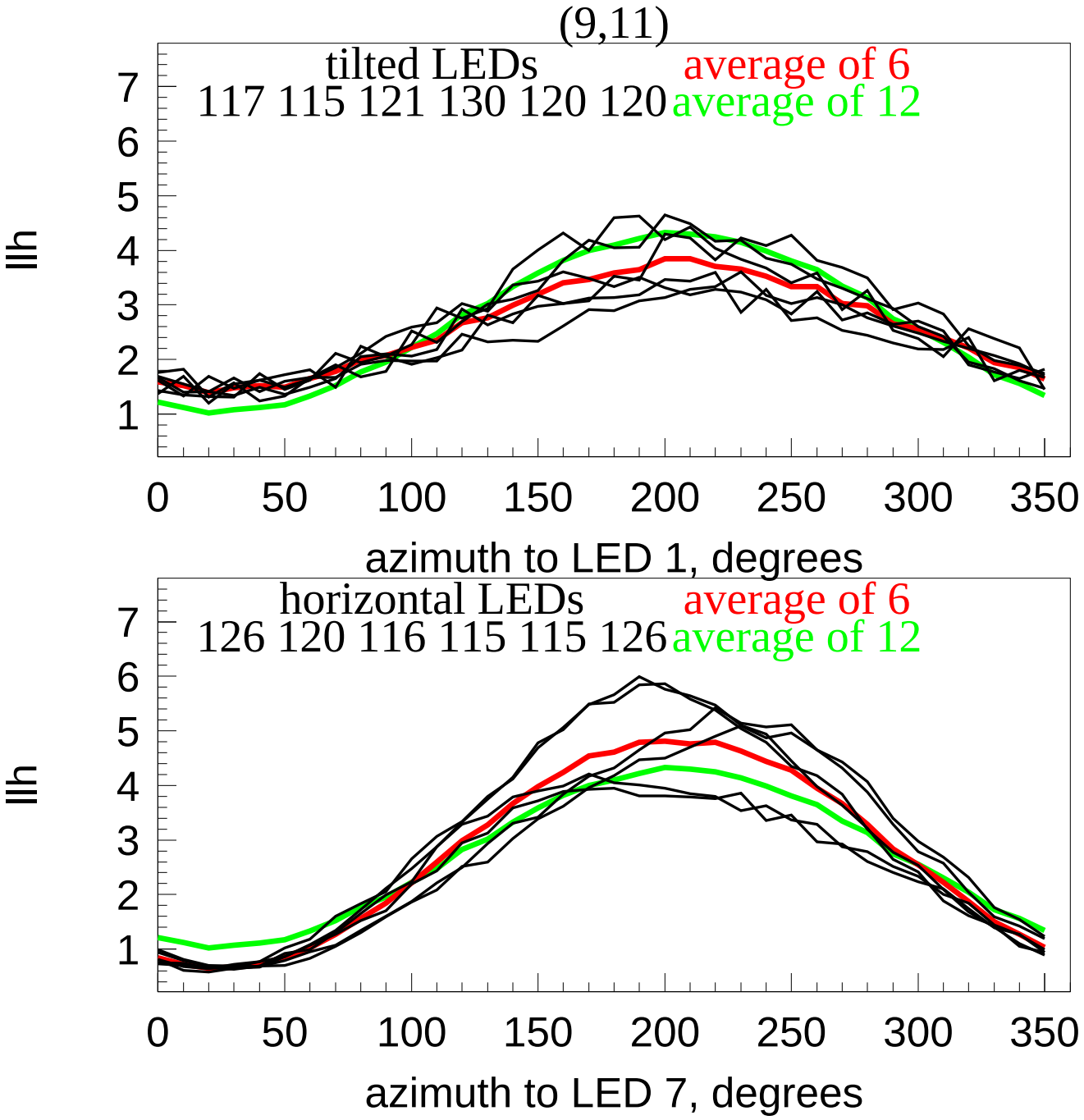

(9,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
253.1 ± 15.6

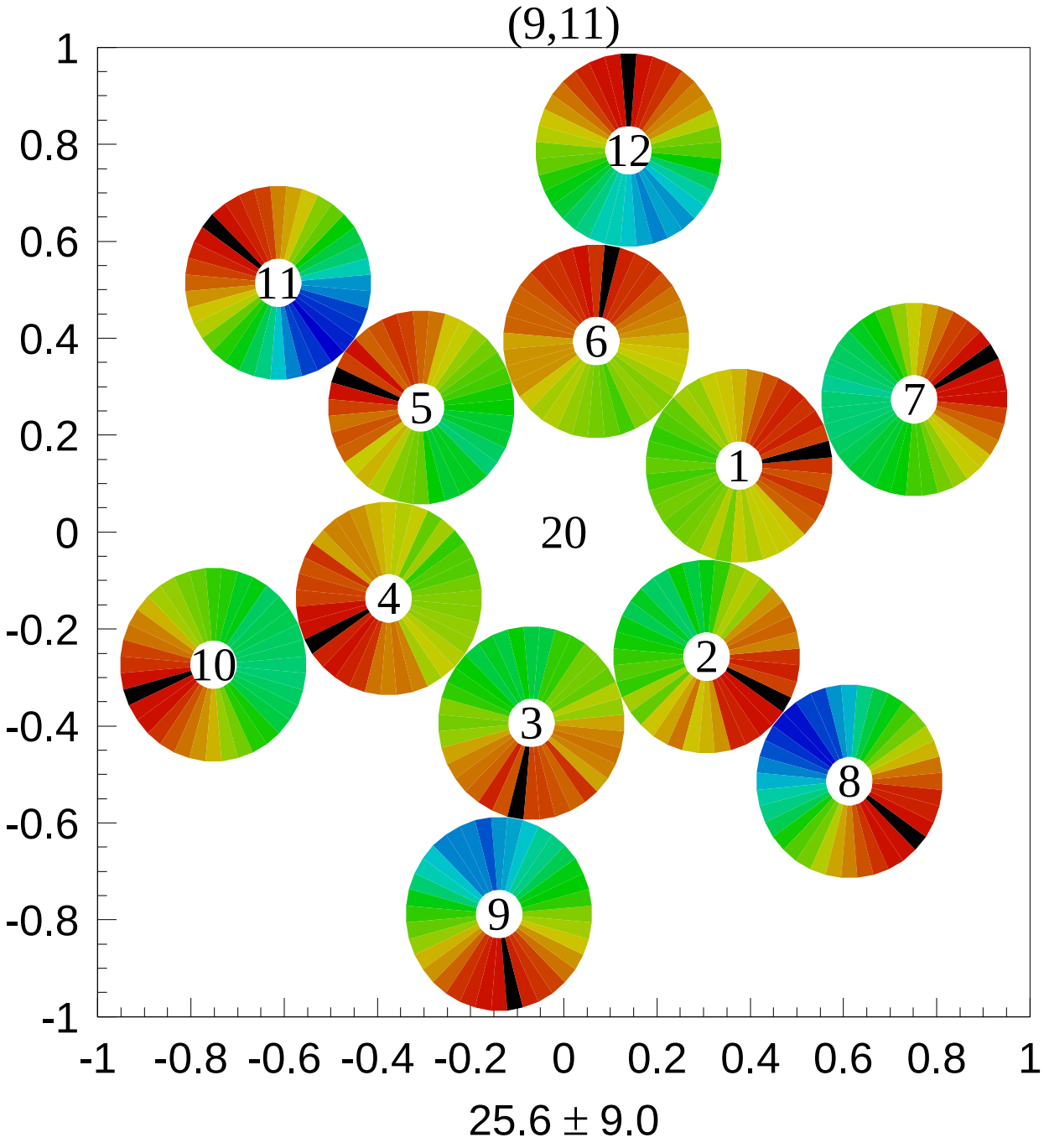

(9,9)
tilted LEDs
120 117 119 126 120 131
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 122 116 118 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

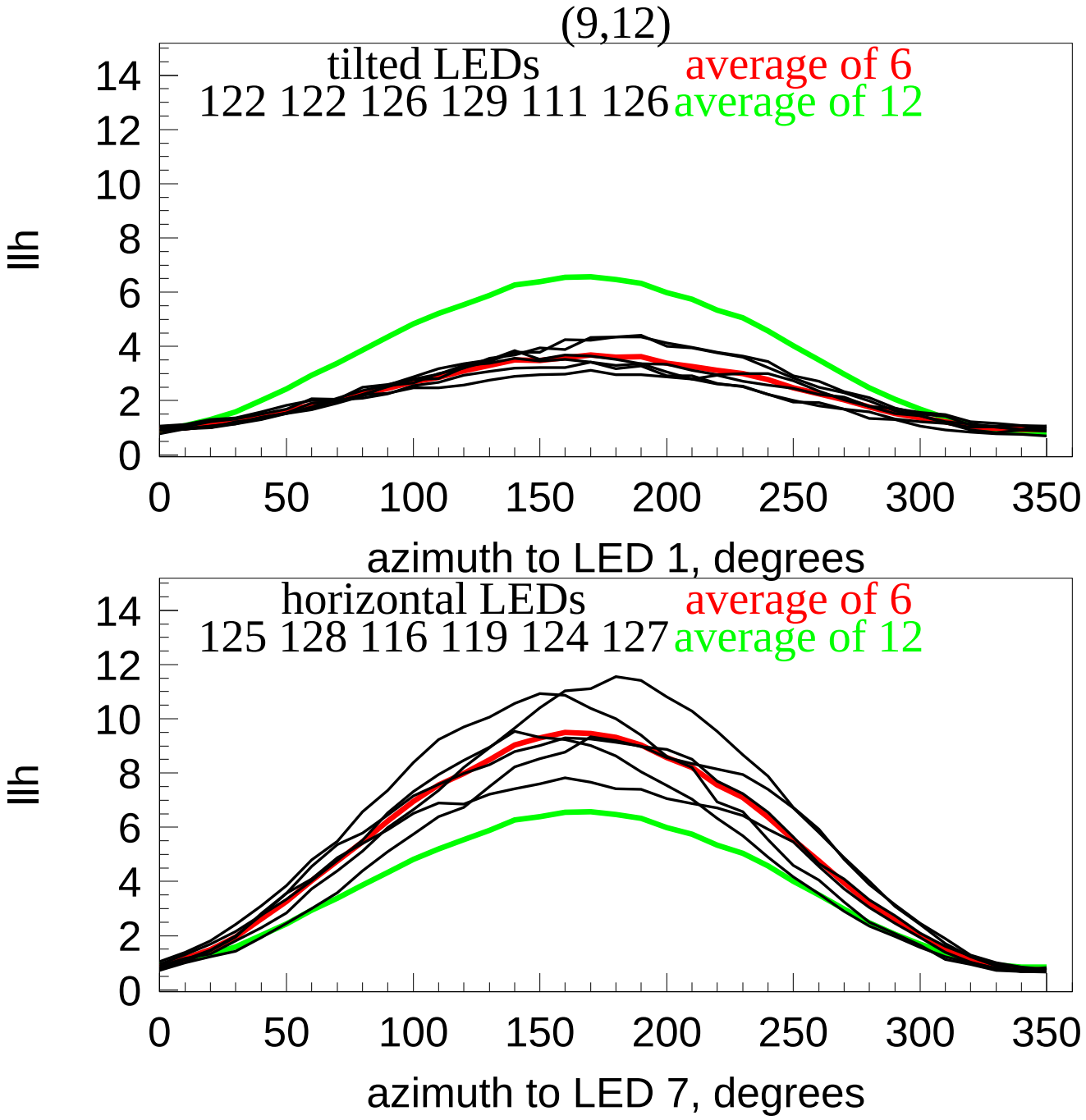

(9,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
142.3 ± 12.8
140
1
2
3
4
5
6
7
8
9
10
11
12

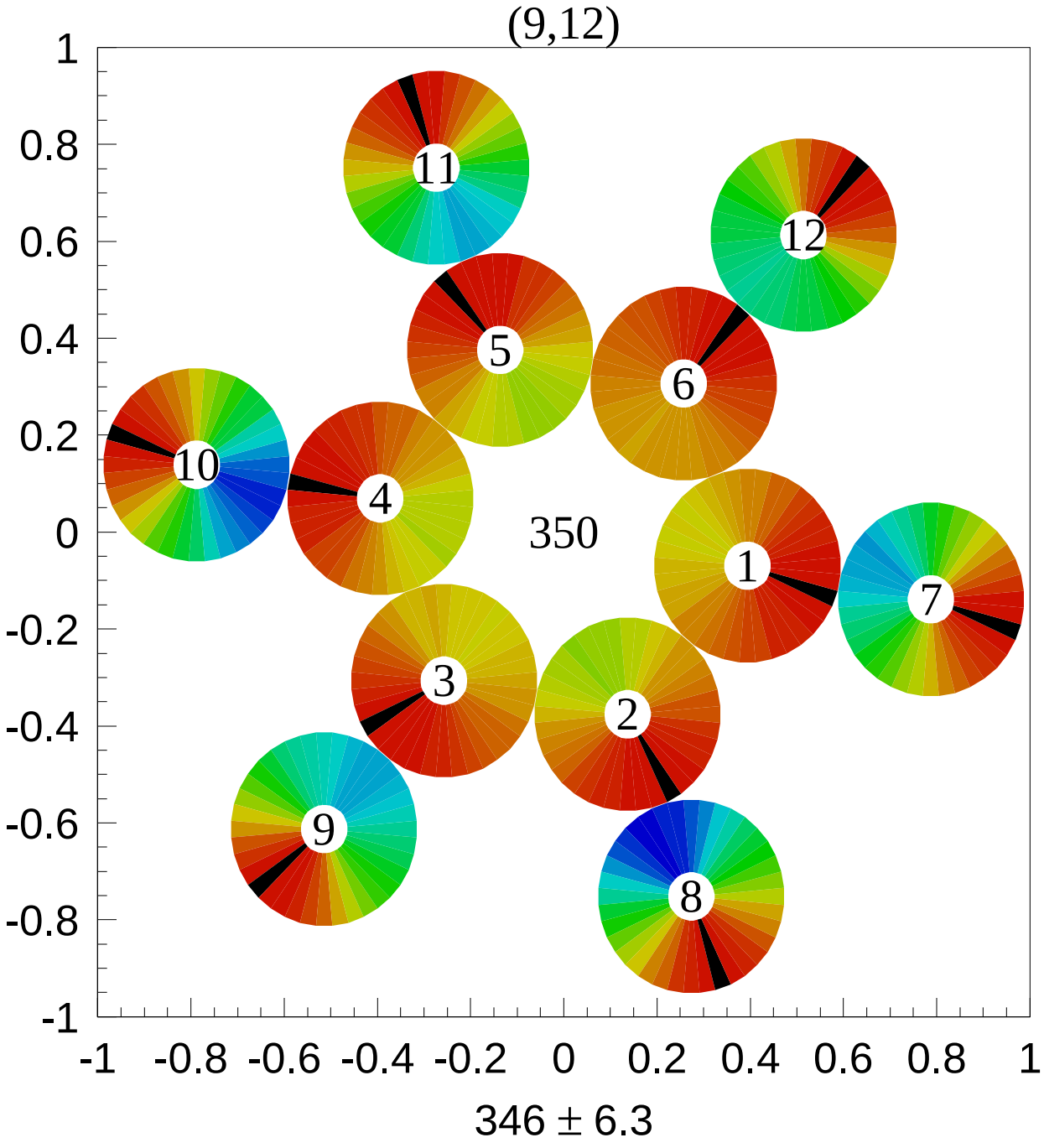

(9,10)
tilted LEDs
128 118 128 124 119 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 120 121 122 116 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

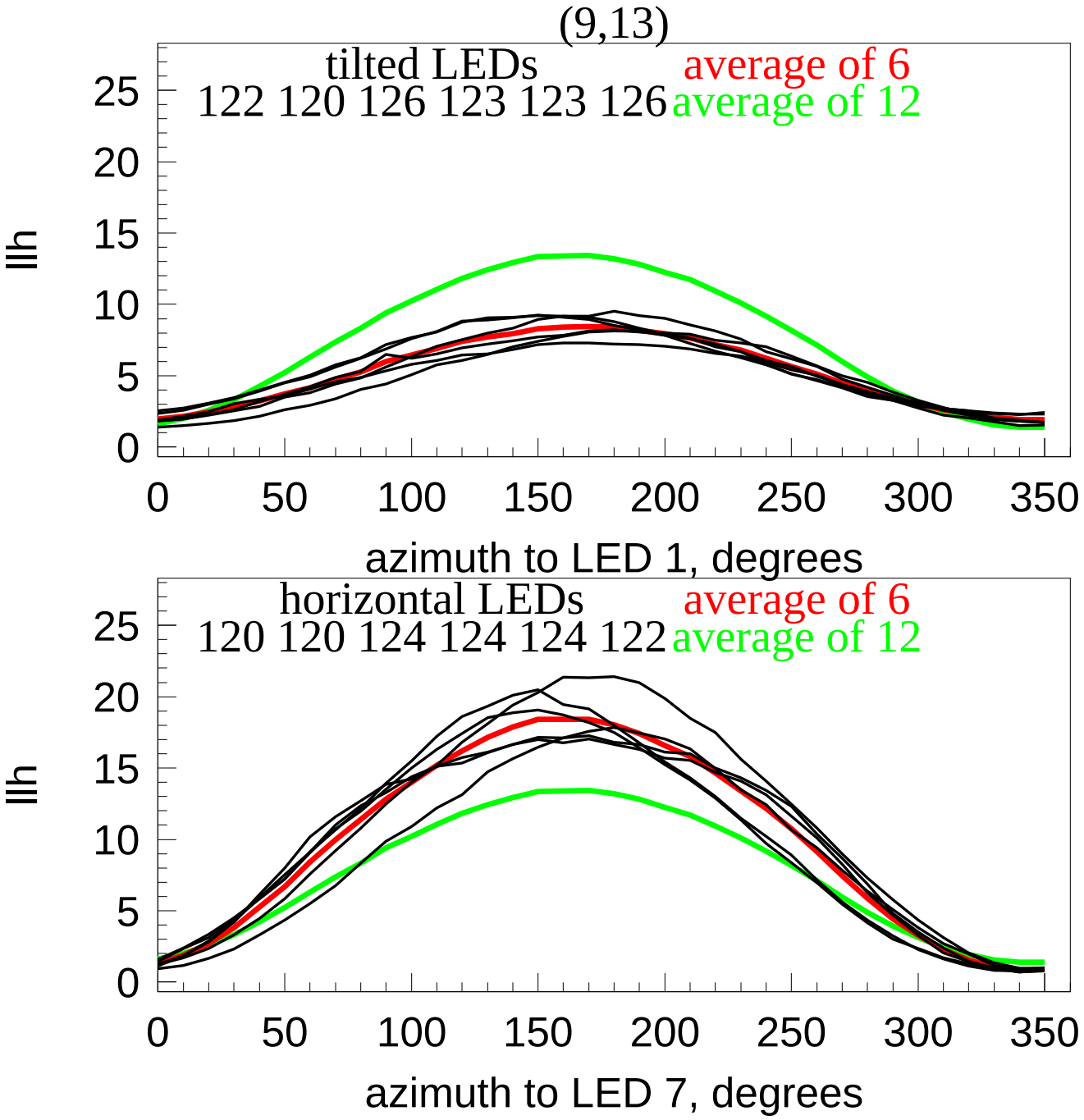

(9,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
105.8 ± 8.2

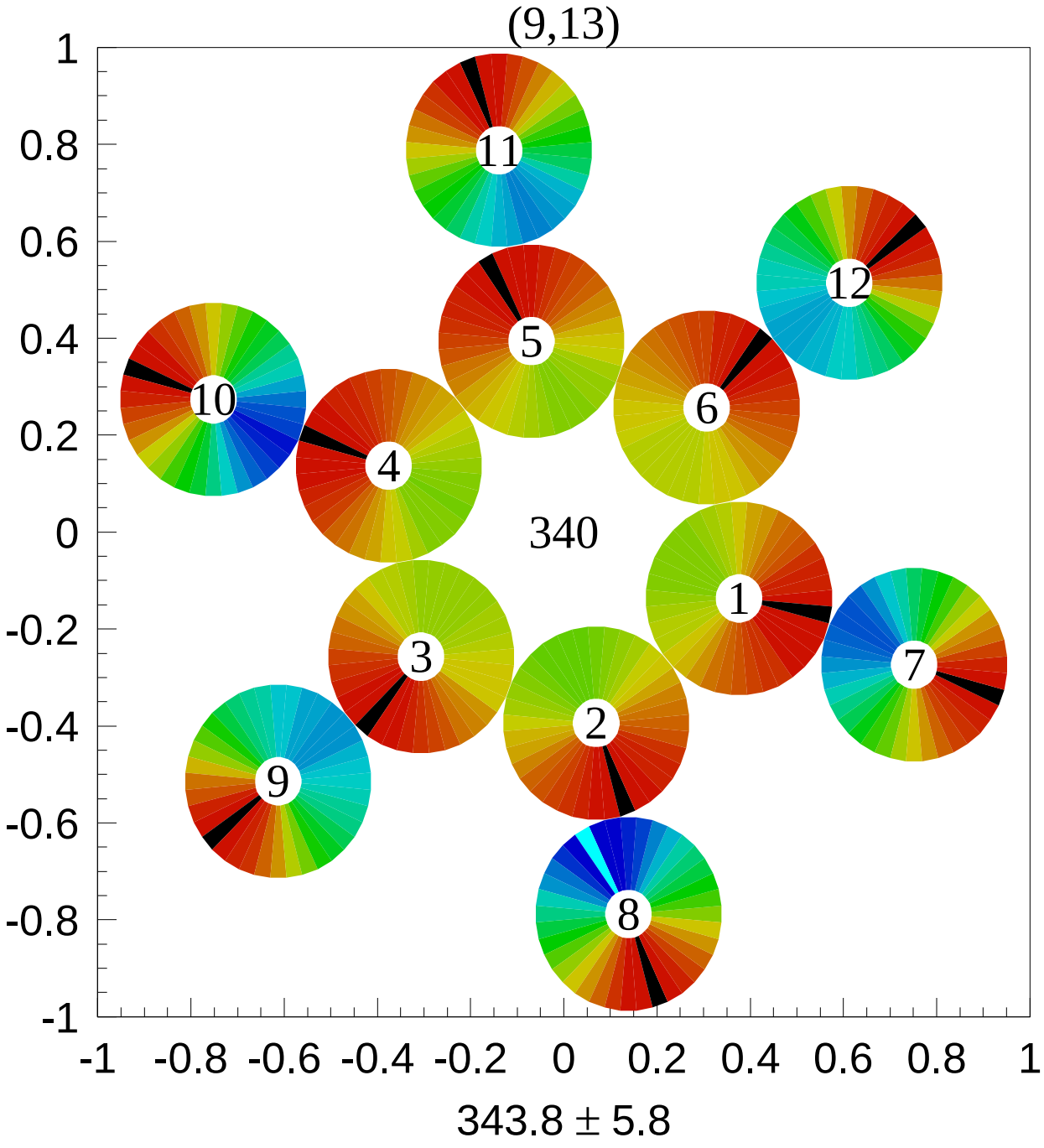

(9,11)
tilted LEDs
117 115 121 130 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 116 115 115 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

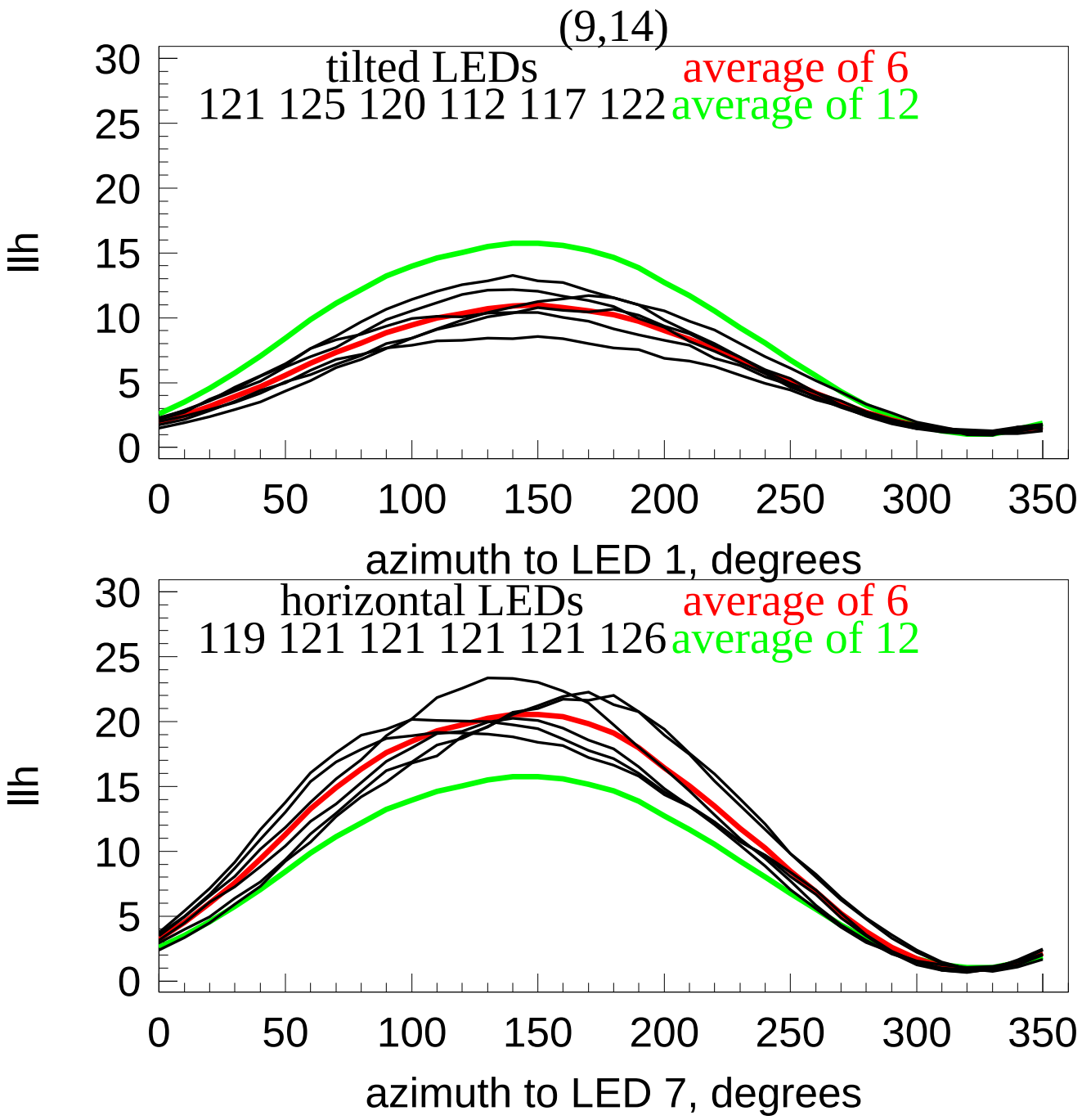

(9,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
25.6 ± 9.0

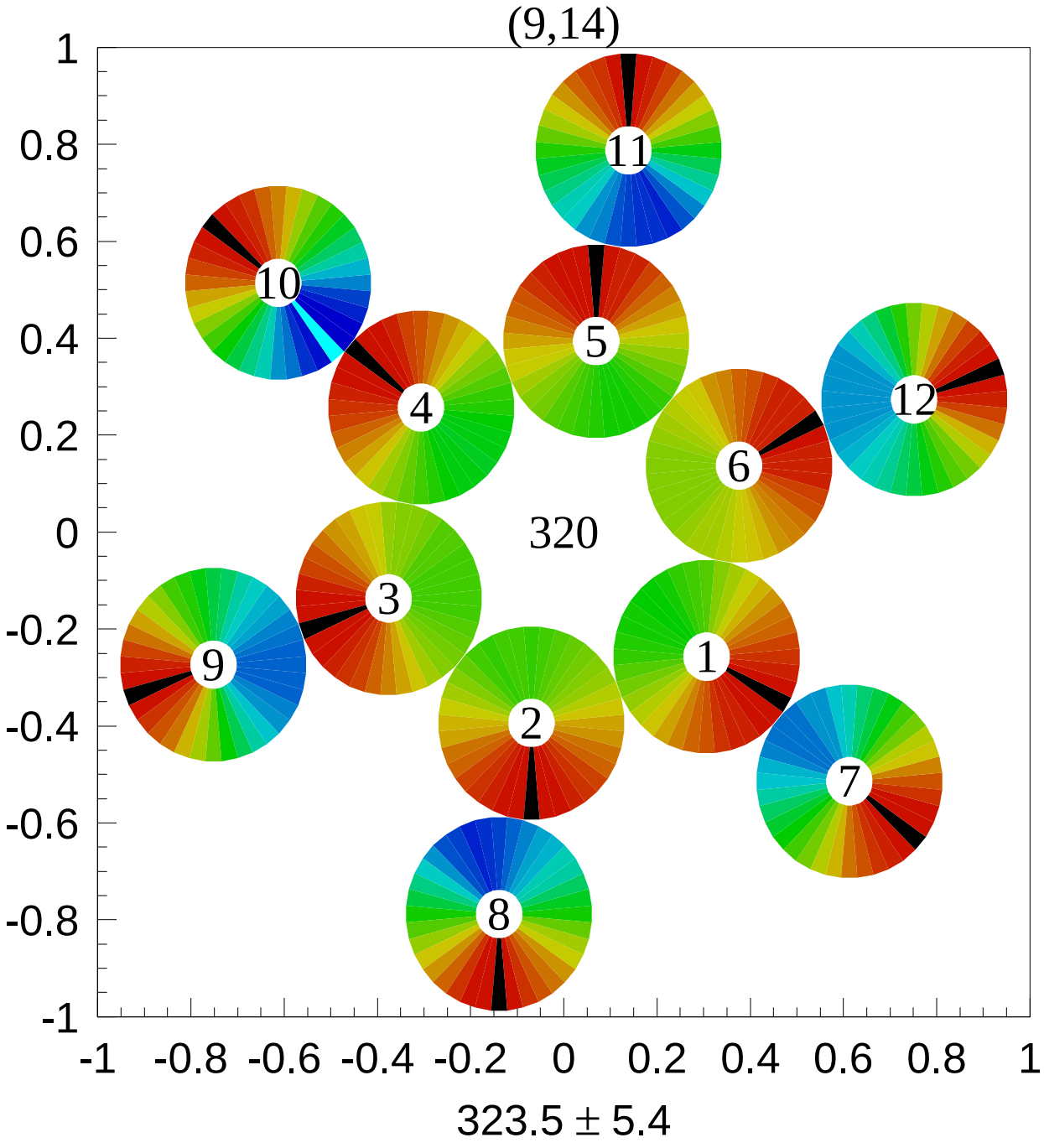

(9,12)
tilted LEDs
122 122 126 129 111 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 128 116 119 124 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

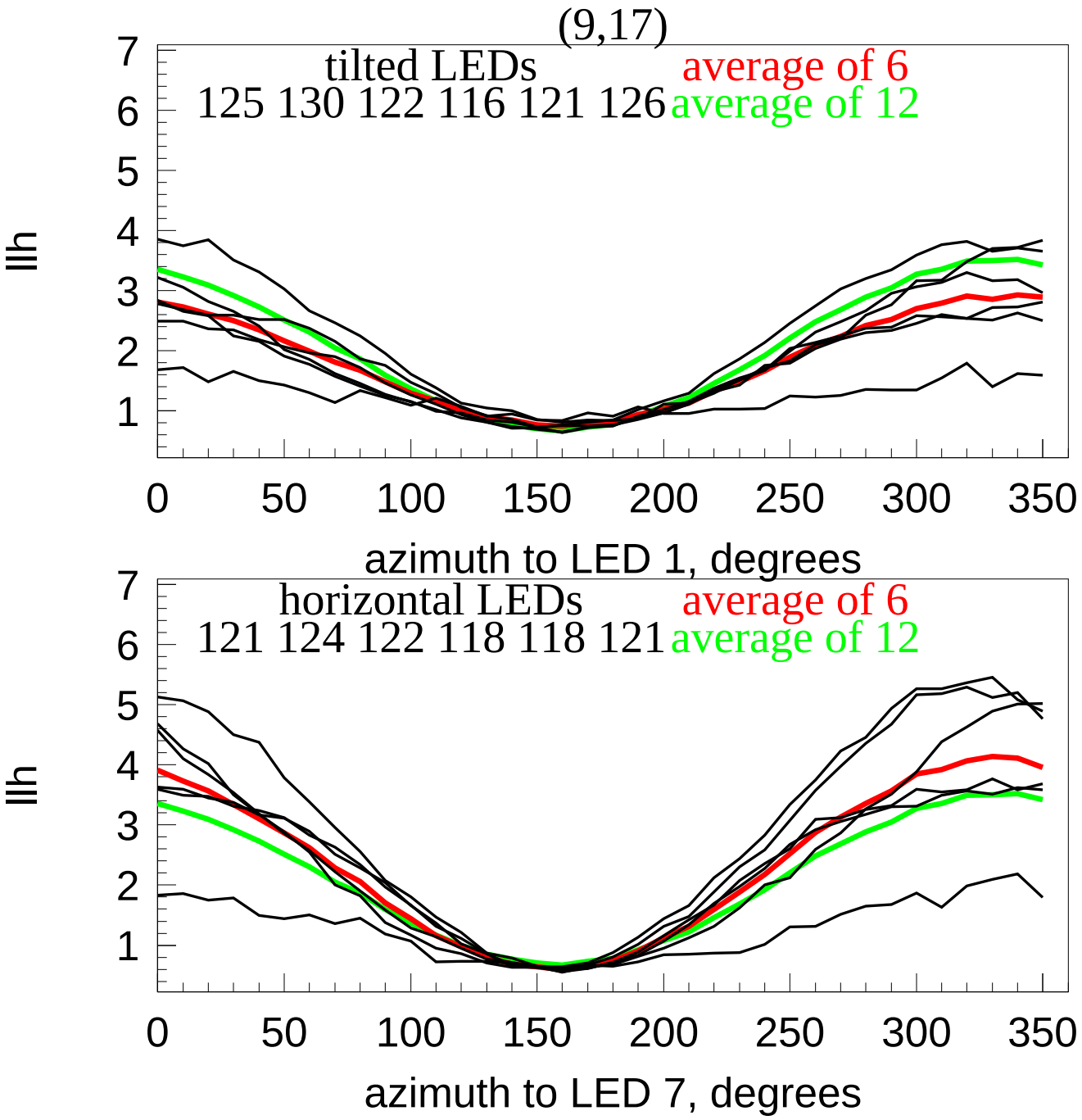

(9,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
346 ± 6.3

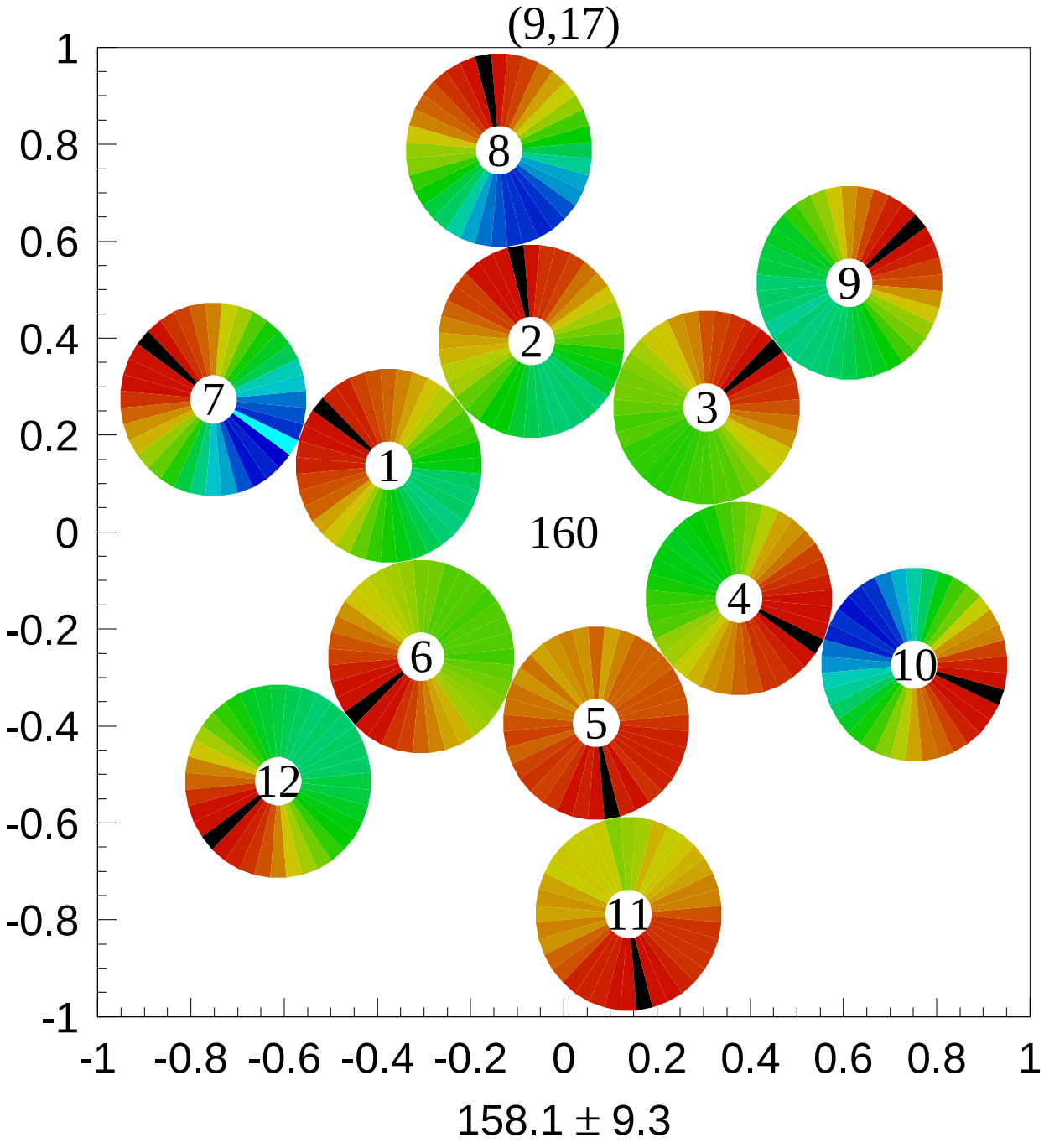

(9,13)
tilted LEDs
122 120 126 123 123 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 124 124 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

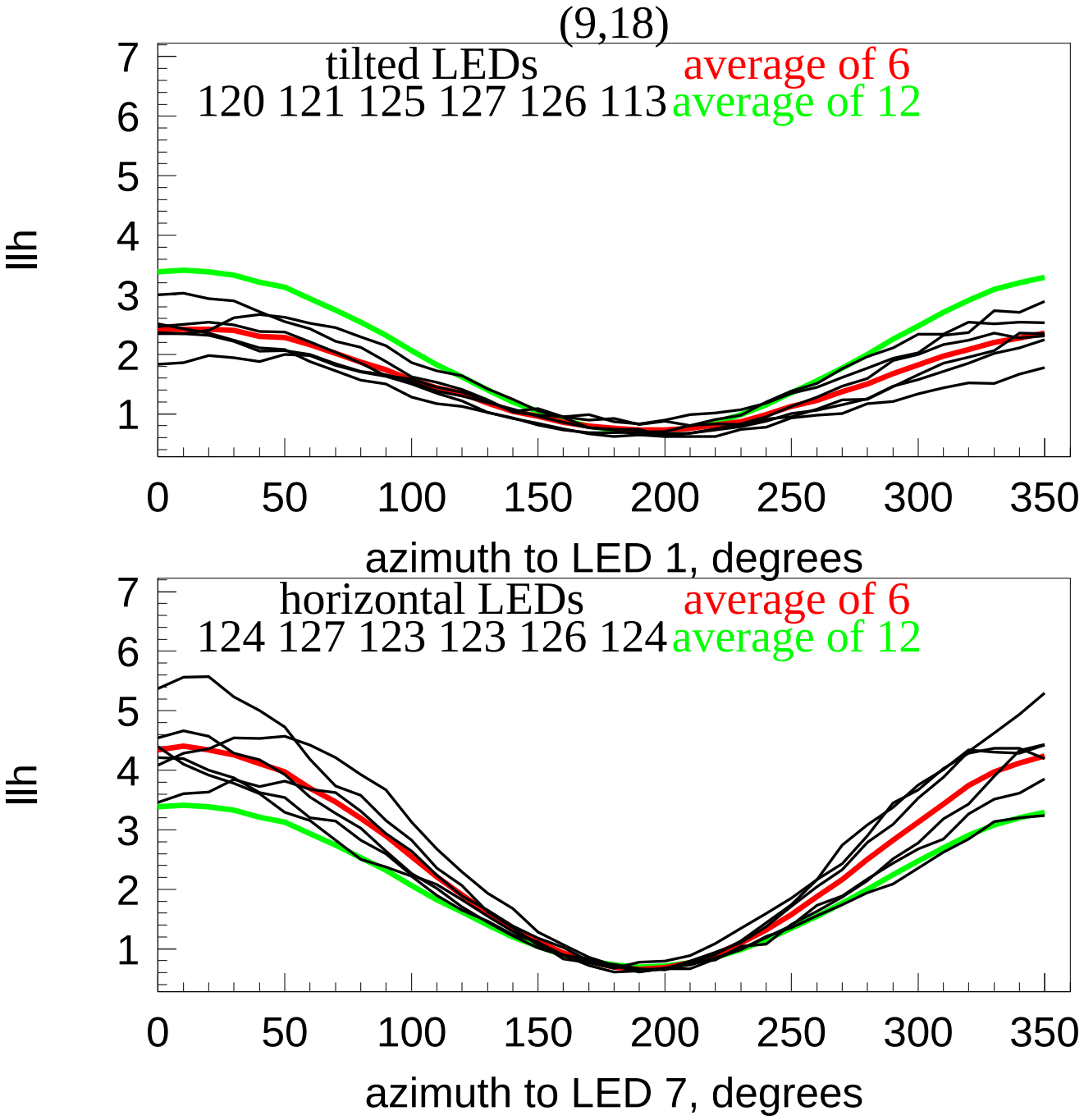

(9,13)
11
12
5
6
10
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
343.8 ± 5.8

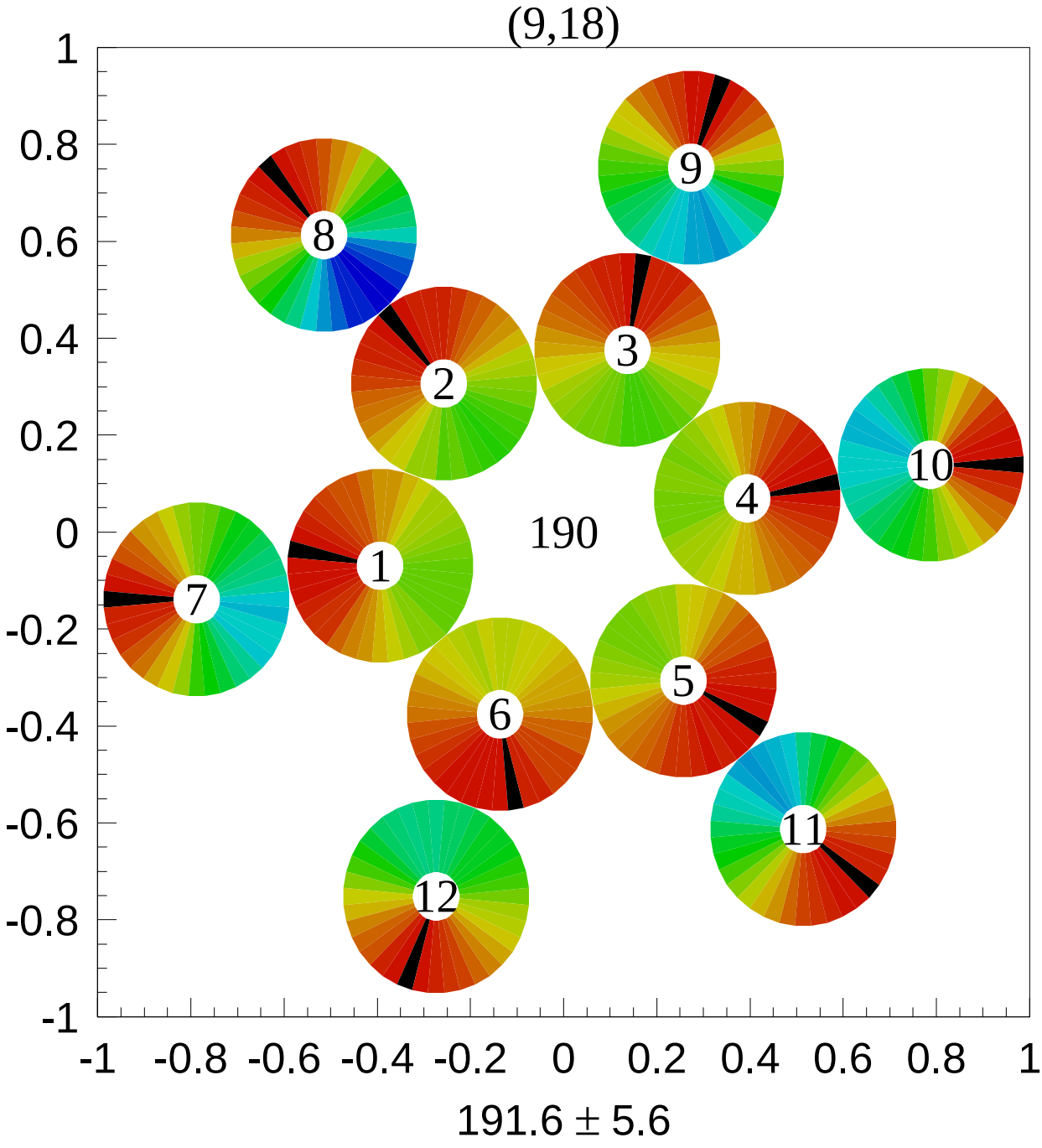

(9,14)
tilted LEDs
121 125 120 112 117 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 121 121 121 121 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees
0
5
10
15
20
25
30
0
50
100
150
200
250
300
350

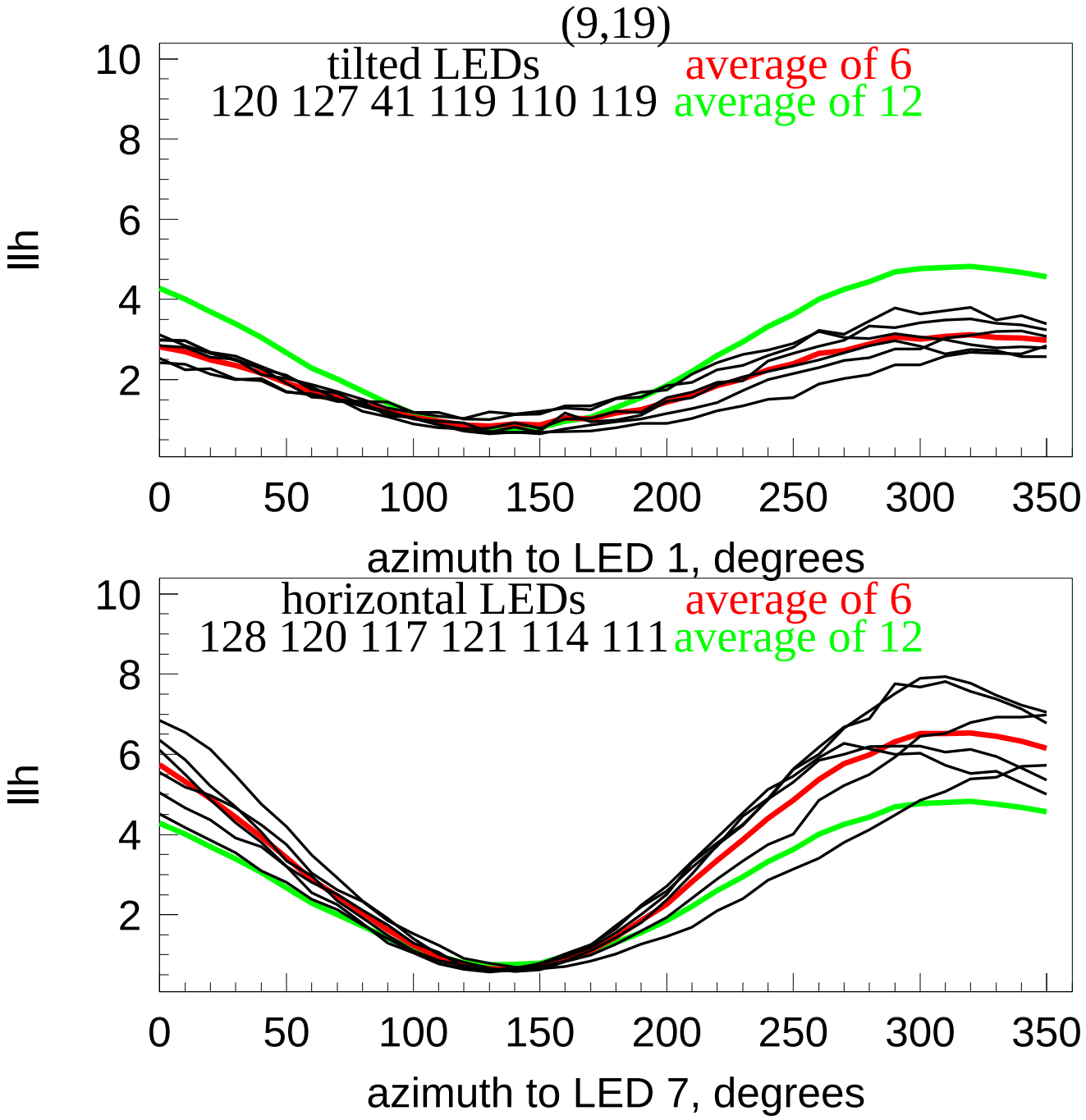

(9,14)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
323.5 ± 5.4

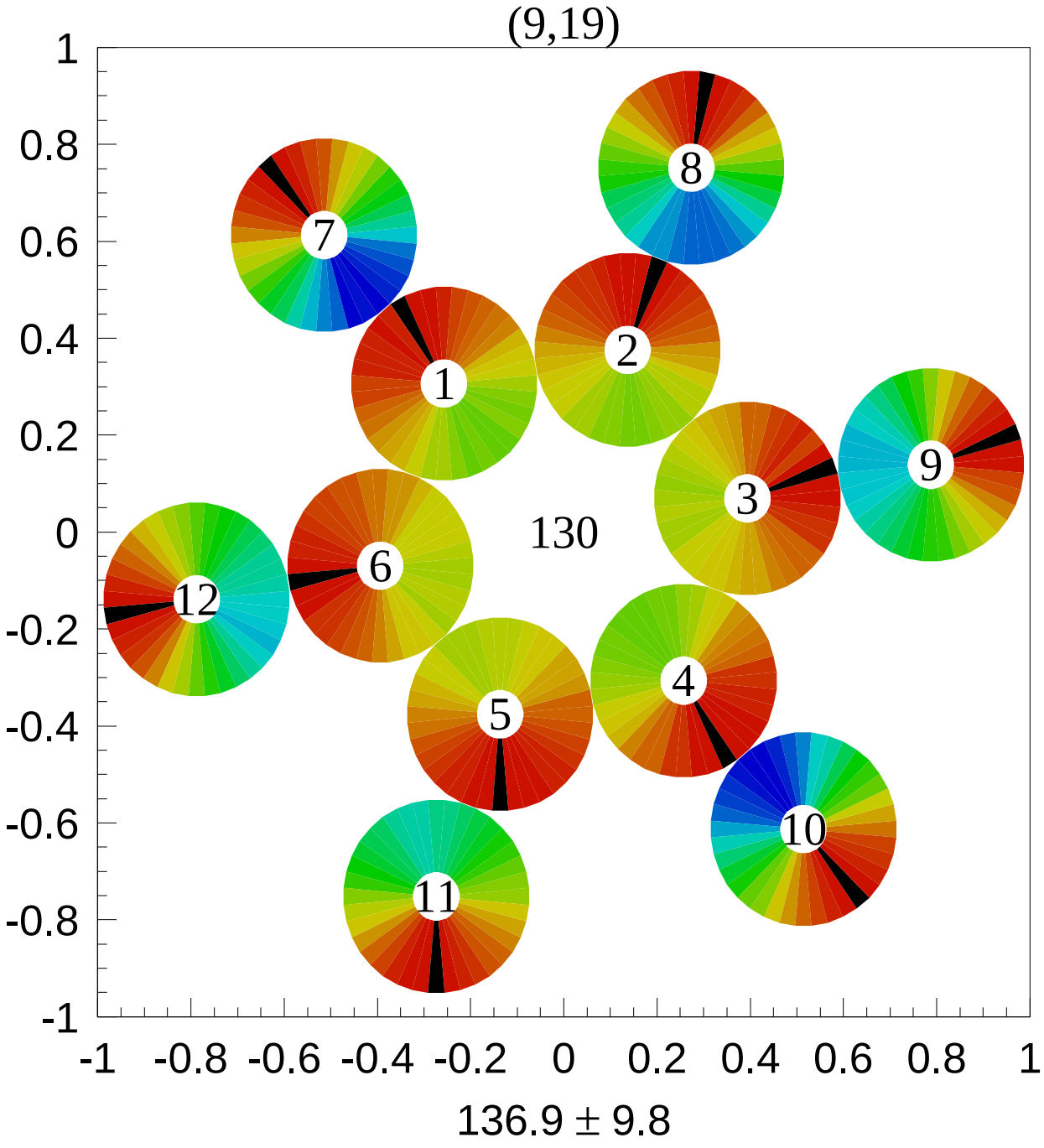

(9,17)
tilted LEDs
125 130 122 116 121 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 122 118 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

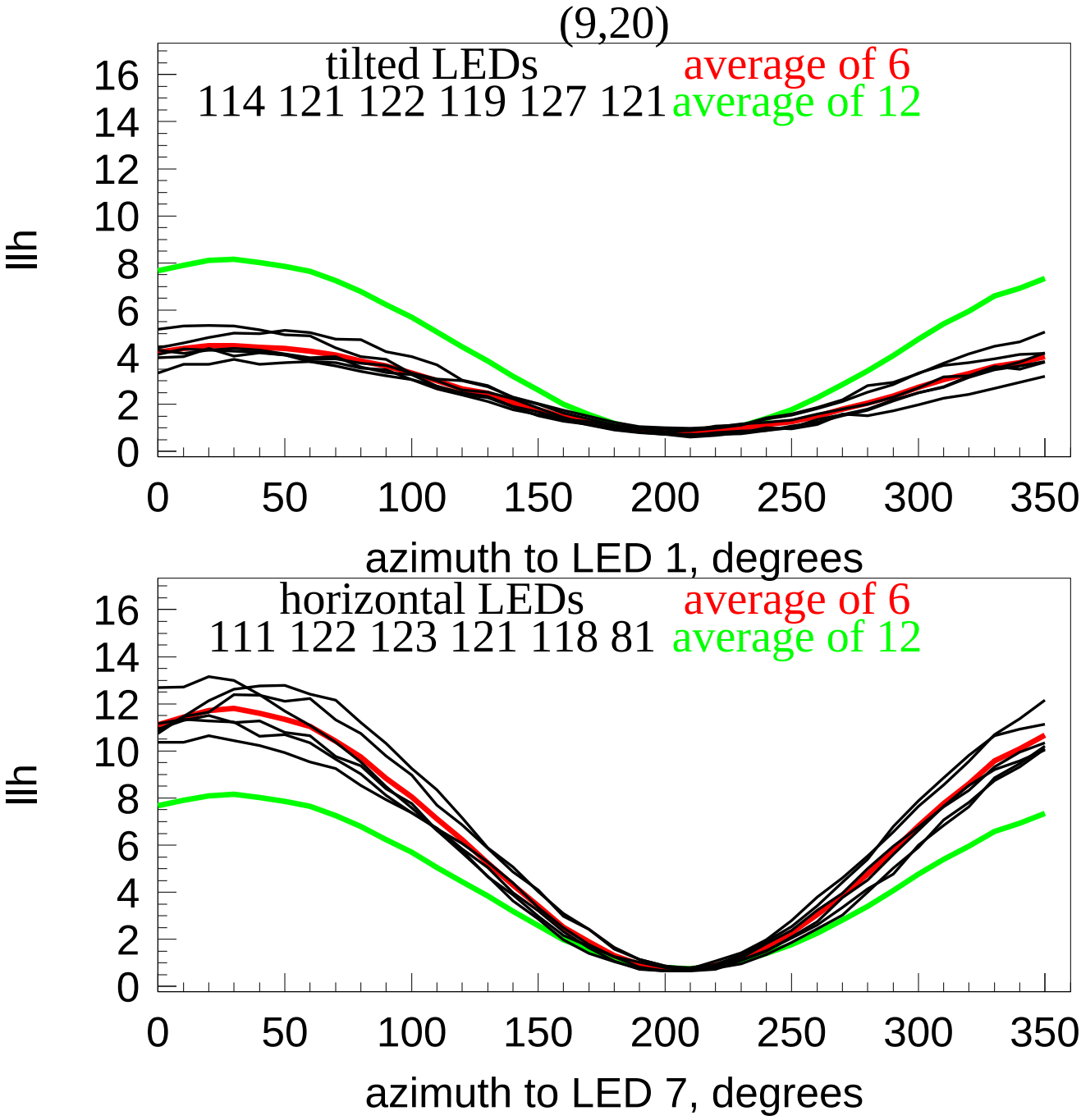

(9,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
158.1 ± 9.3

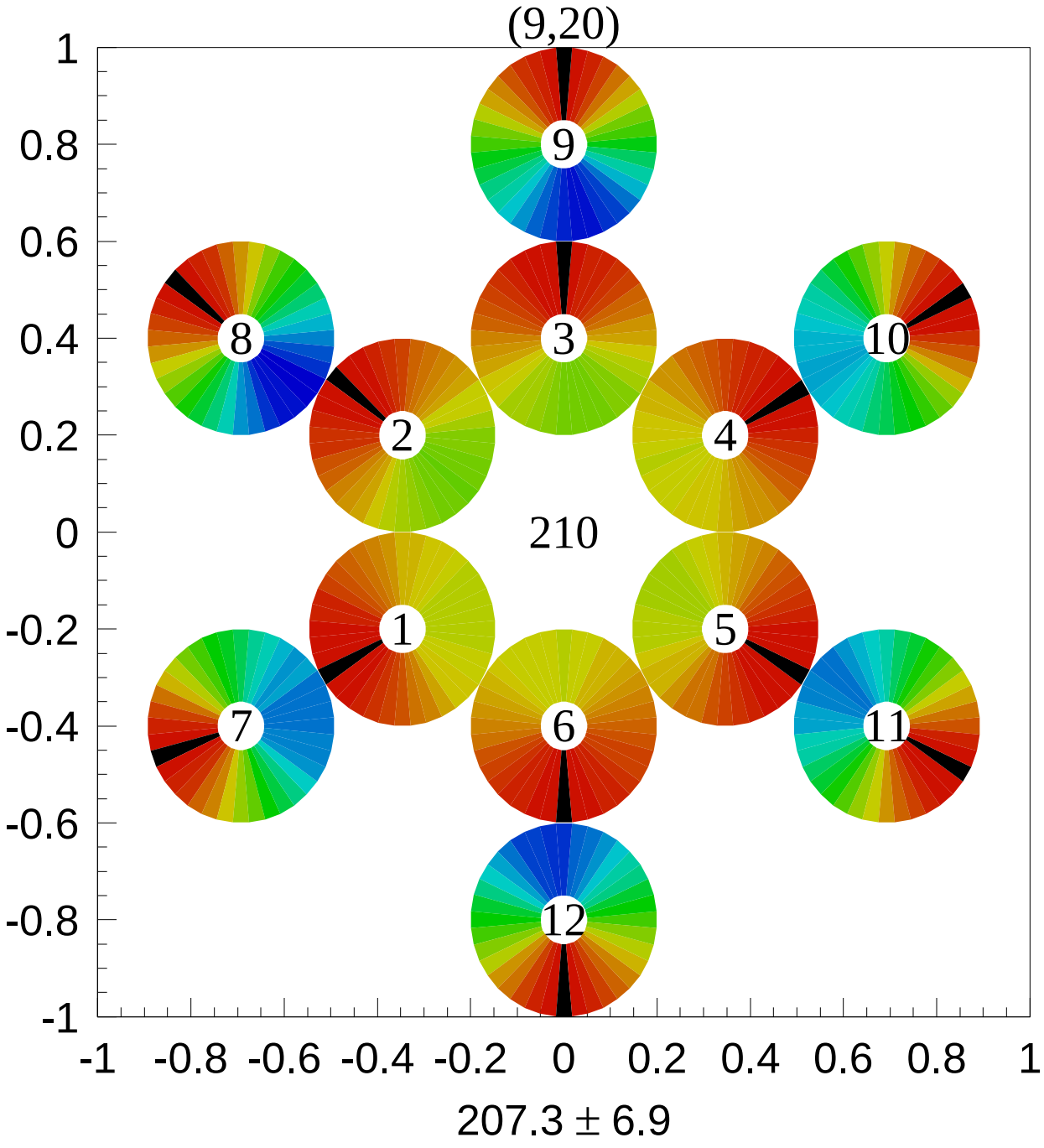

(9,18)
tilted LEDs
120 121 125 127 126 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 127 123 123 126 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

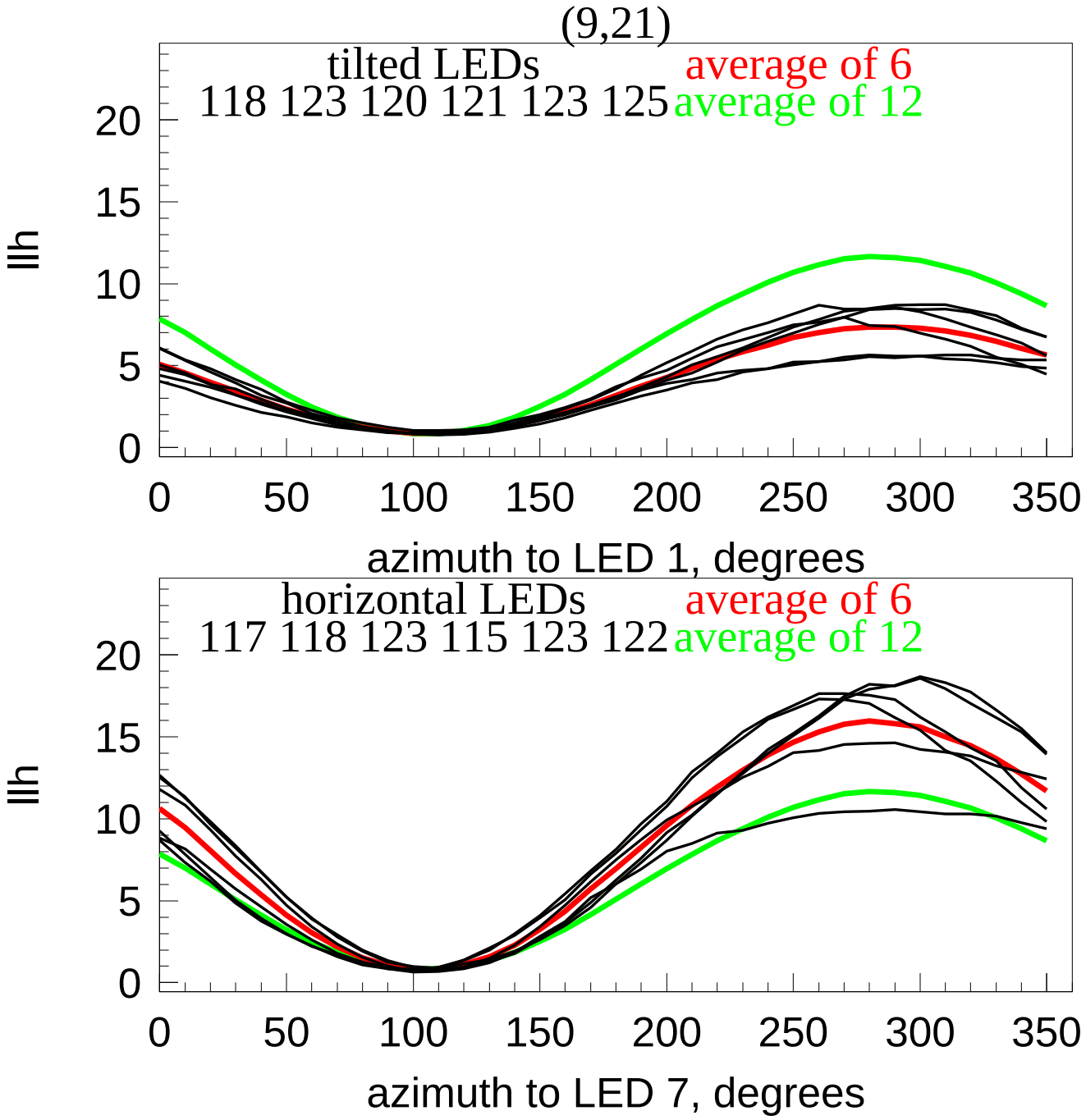

(9,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
191.6 ± 5.6
190
1
2
3
4
5
6
7
8
9
10
11
12

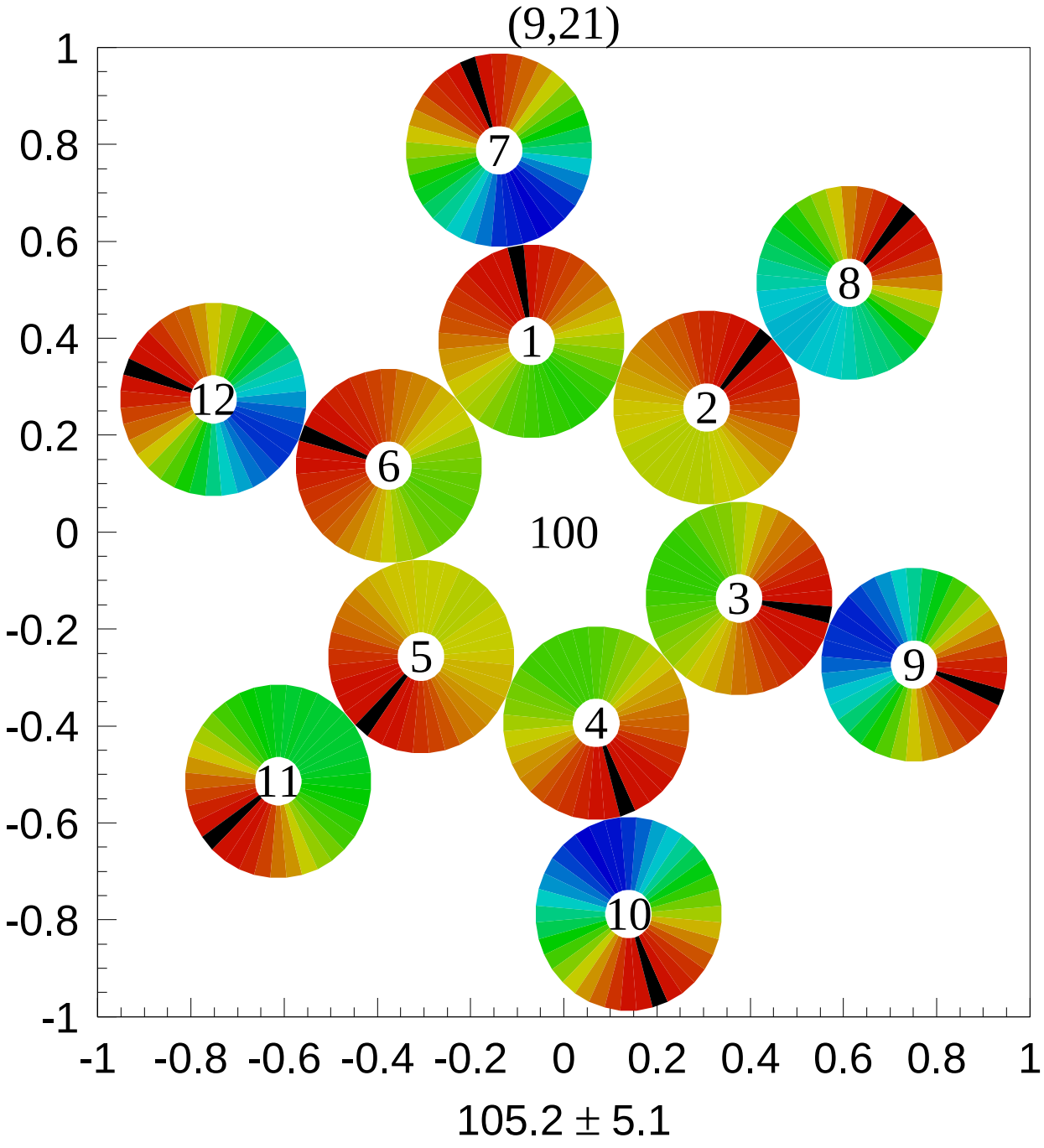

(9,19)
tilted LEDs
120 127 41 119 110 119
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 120 117 121 114 111
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

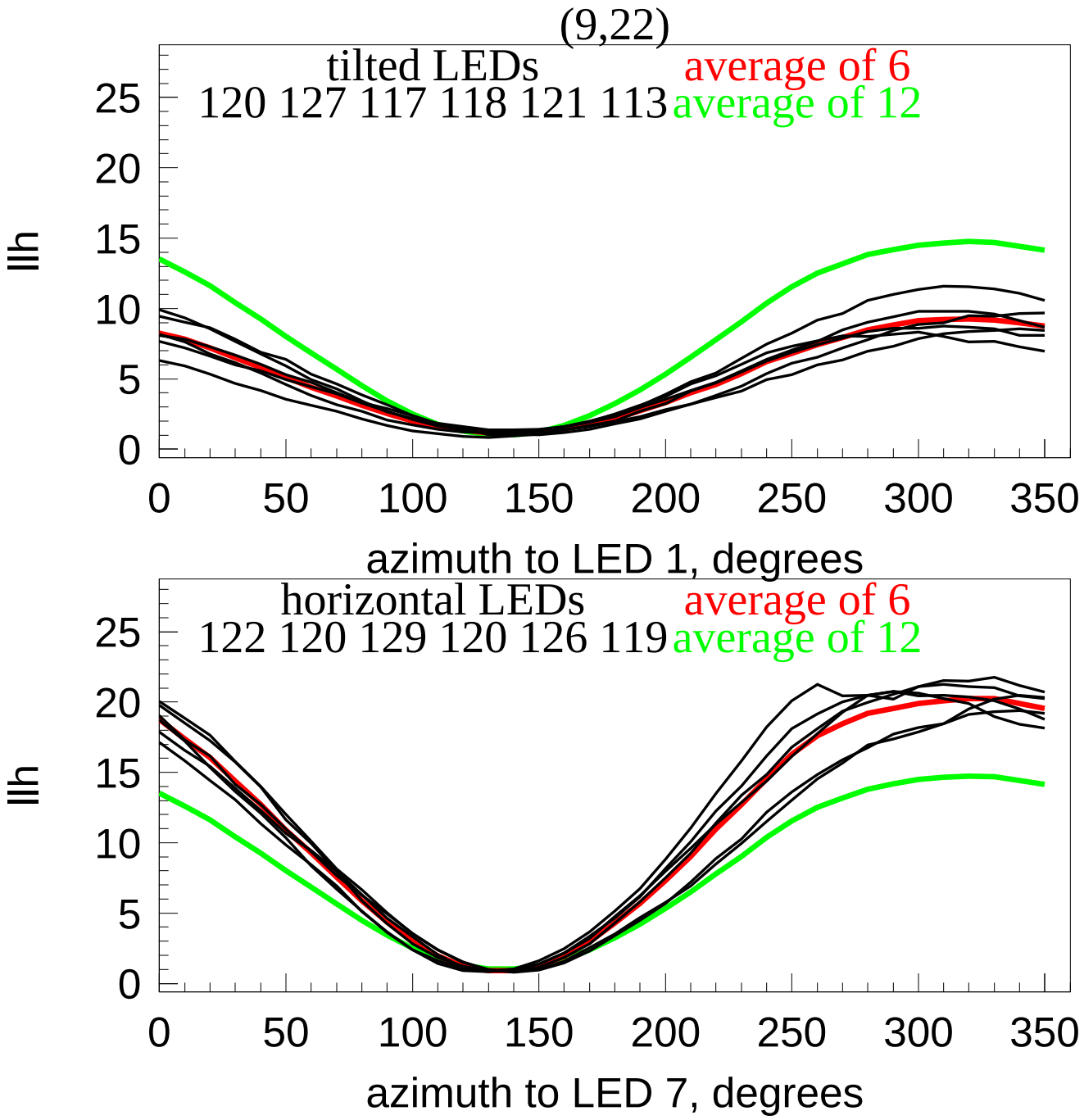

(9,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
136.9 ± 9.8
130
1
2
3
4
5
6
7
8
9
10
11
12

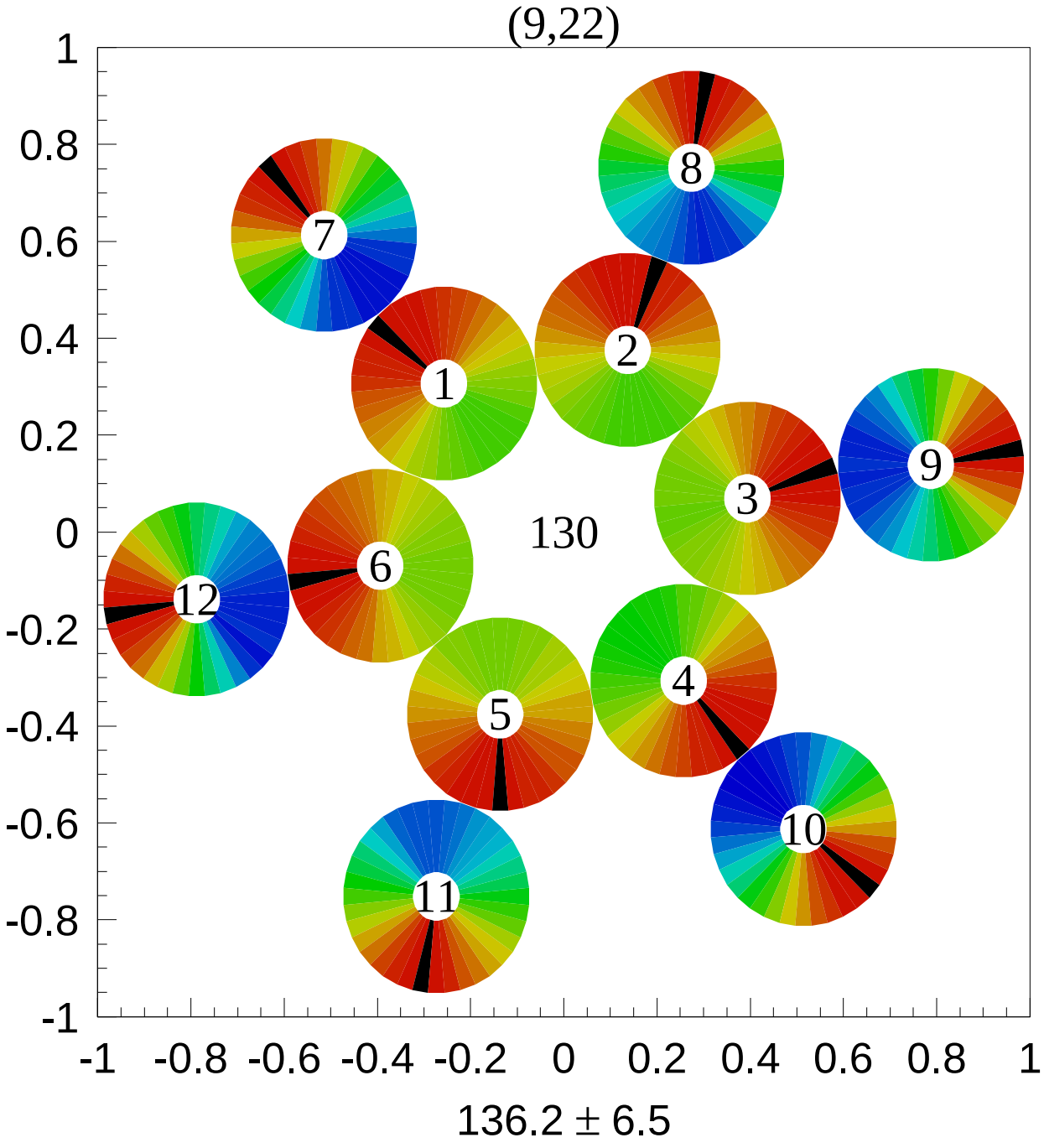

(9,20)
tilted LEDs
114 121 122 119 127 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 122 123 121 118 81
average of 6
average of 12
llh
azimuth to LED 7, degrees

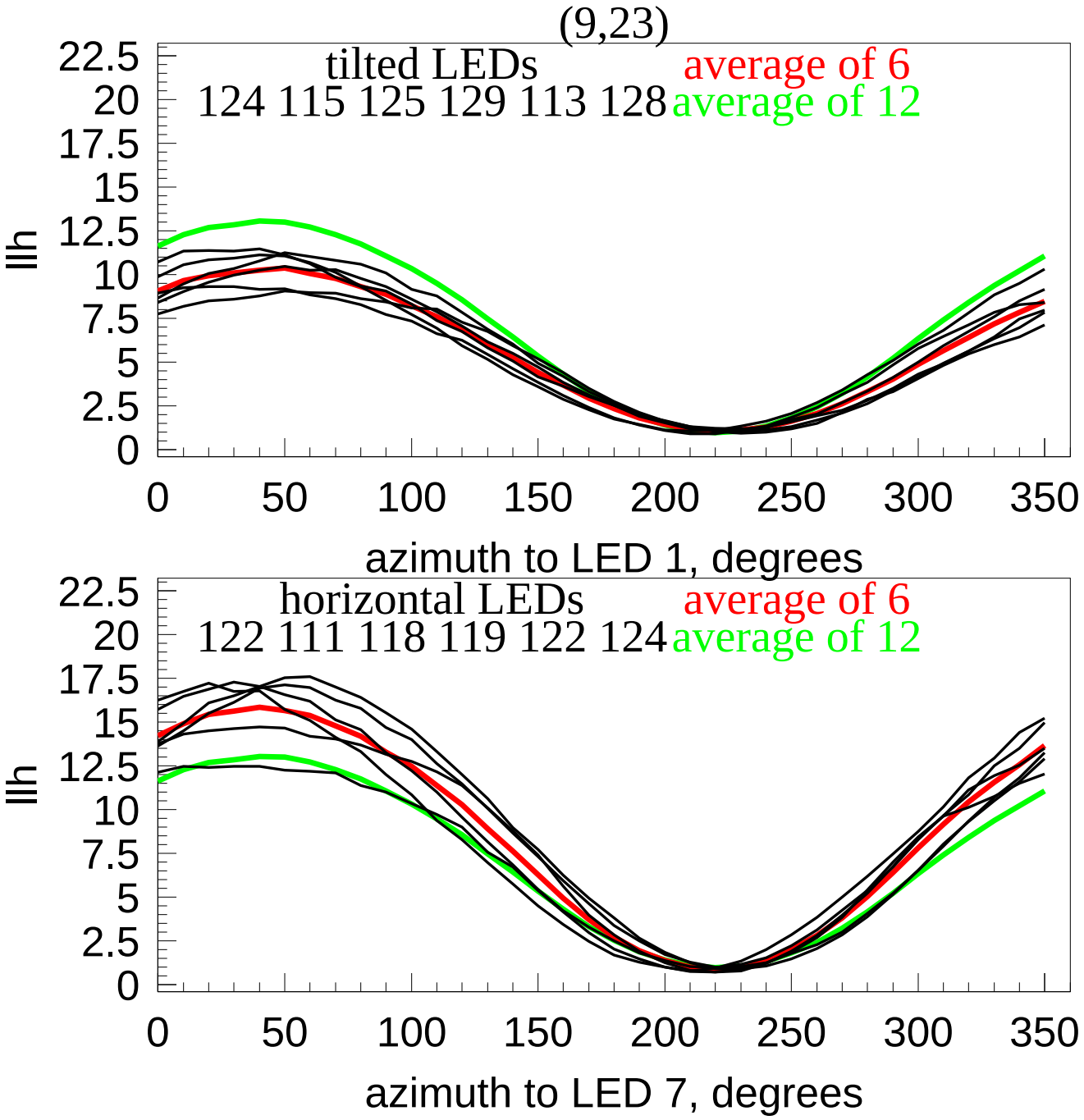

(9,20)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
207.3 ± 6.9

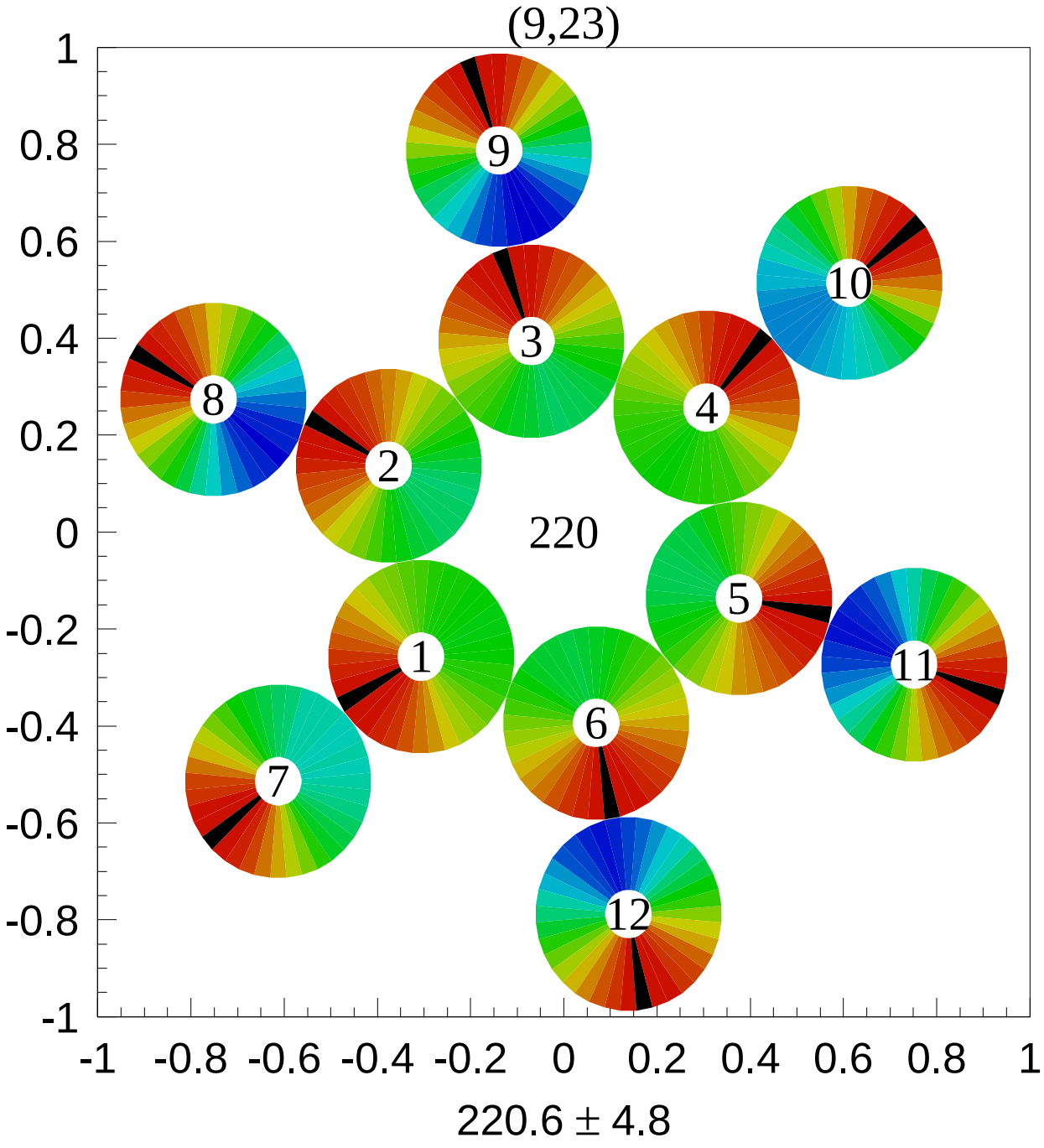

(9,21)
tilted LEDs
118 123 120 121 123 125
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 118 123 115 123 122
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

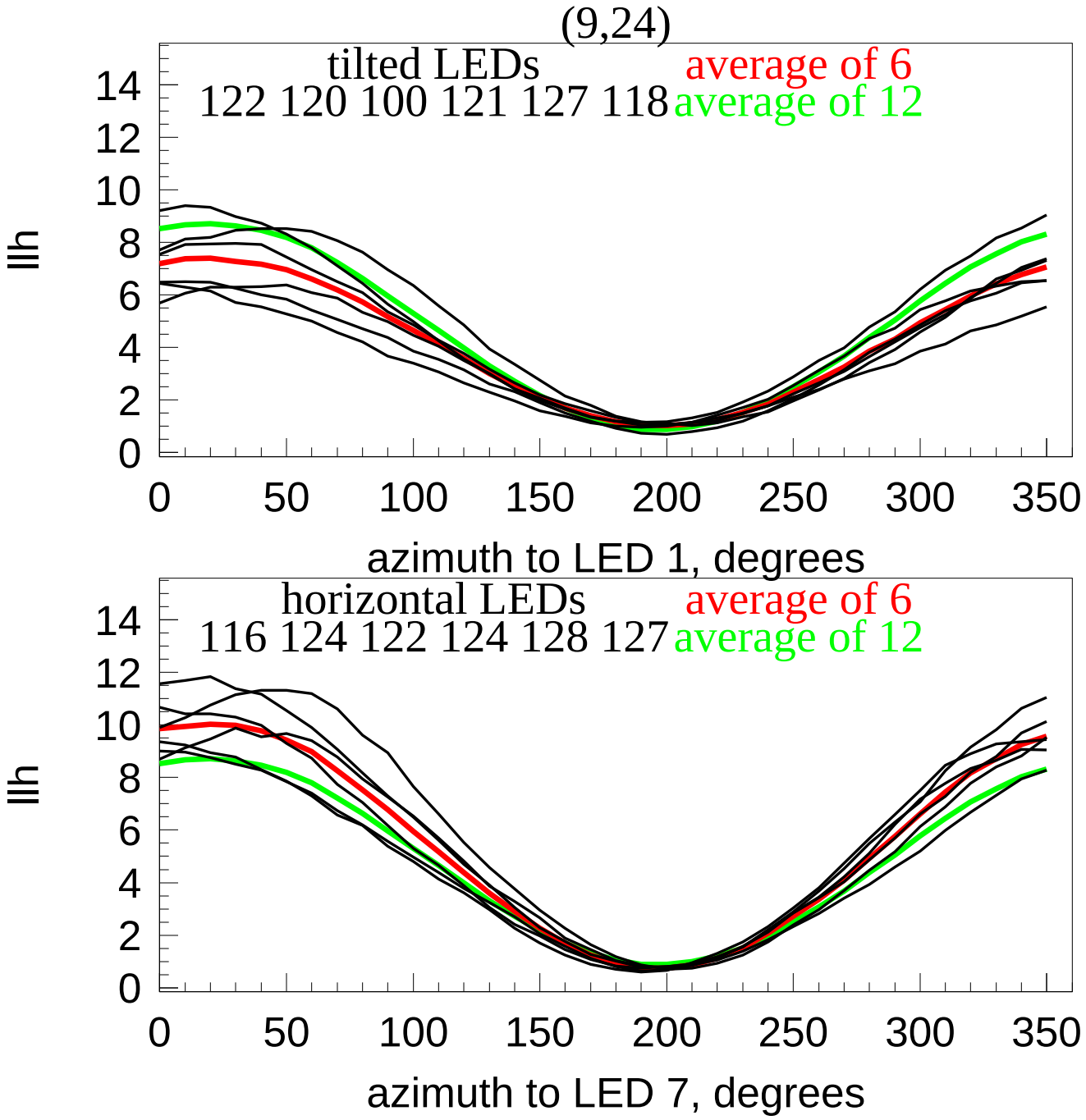

(9,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
105.2 ± 5.1
7
1
8
12
2
6
100
3
9
5
4
11
10

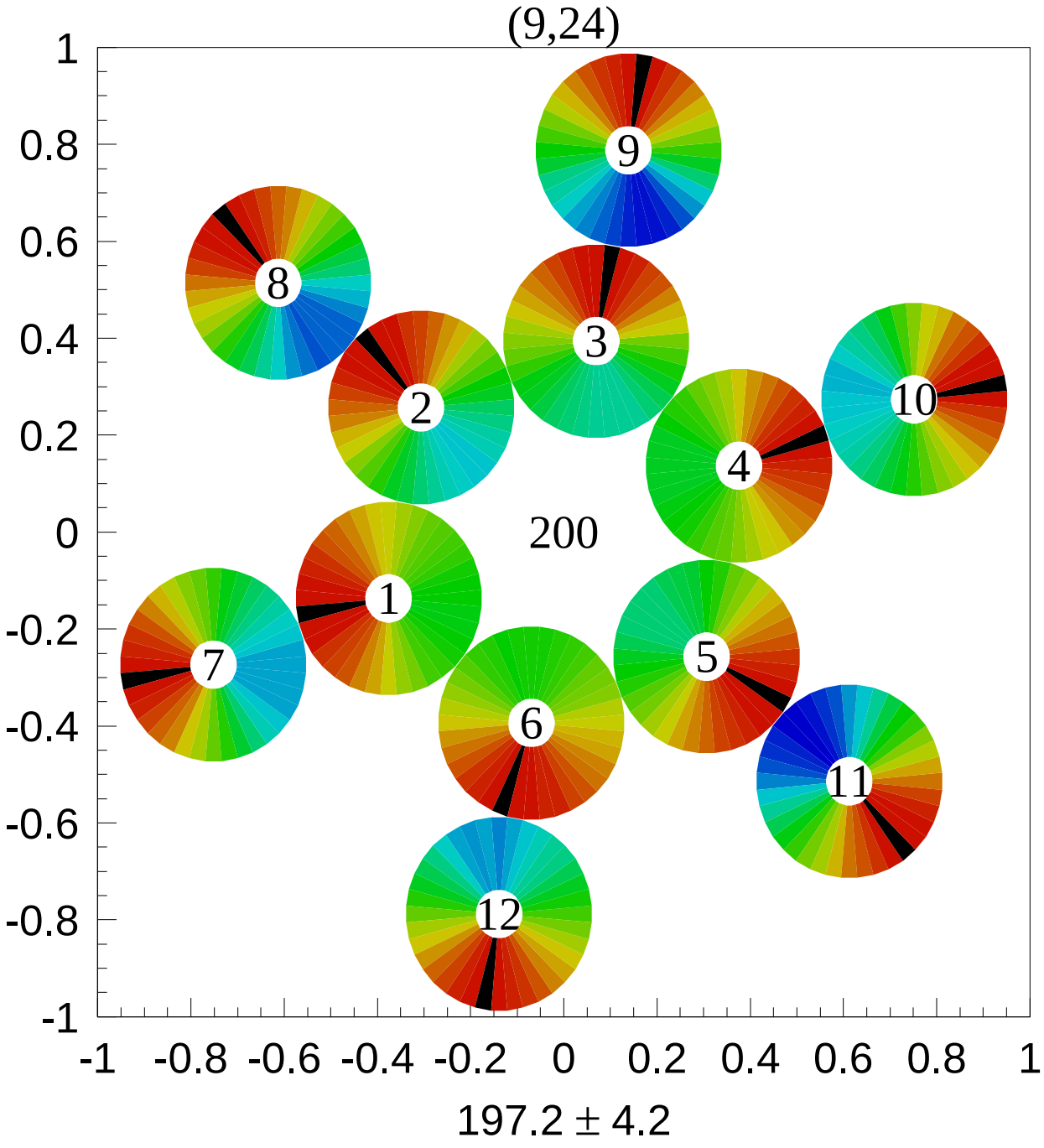

(9,22)
tilted LEDs
120 127 117 118 121 113
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 120 129 120 126 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

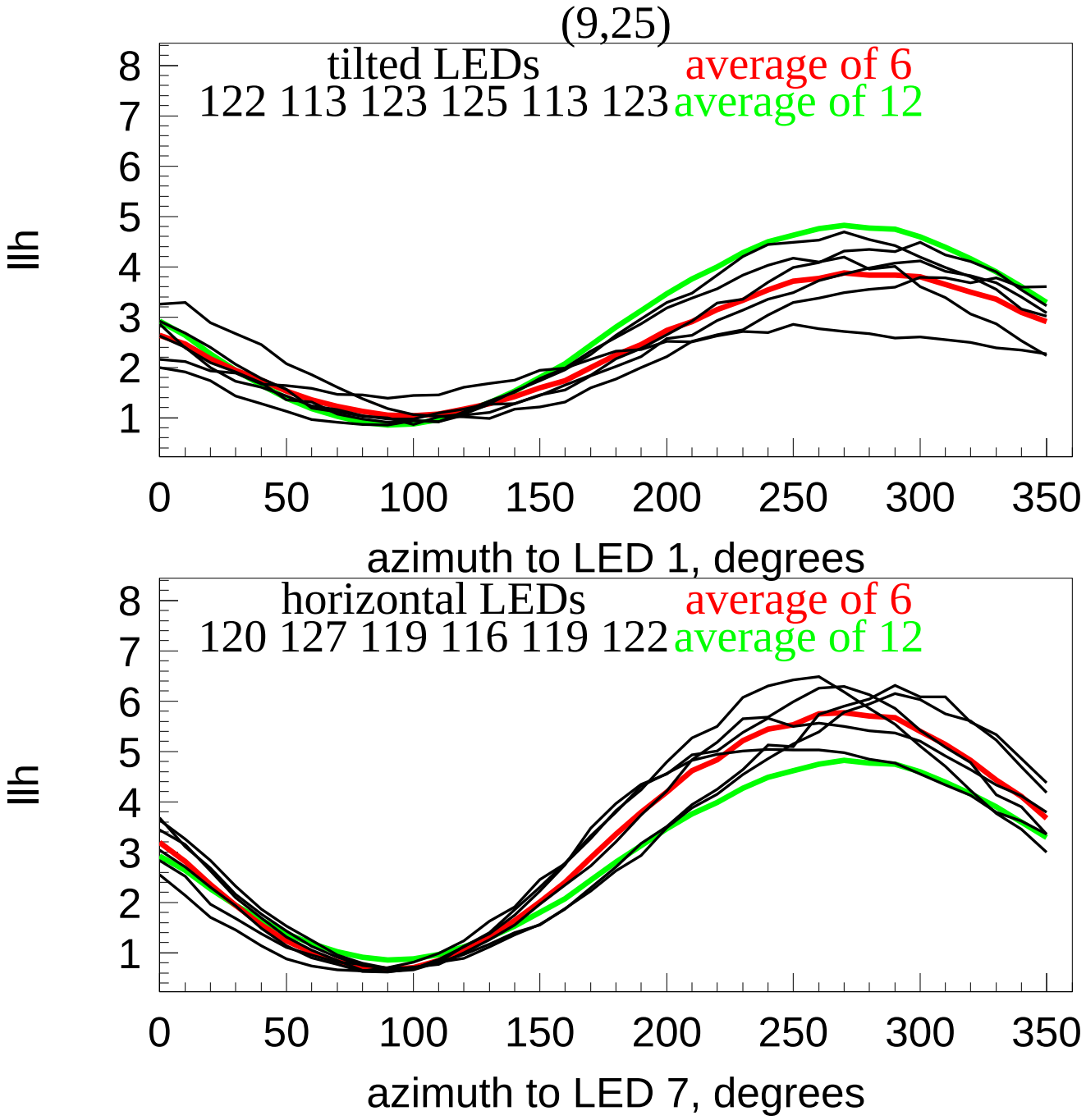

(9,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
136.2 ± 6.5
130
1
2
3
4
5
6
7
8
9
10
11
12

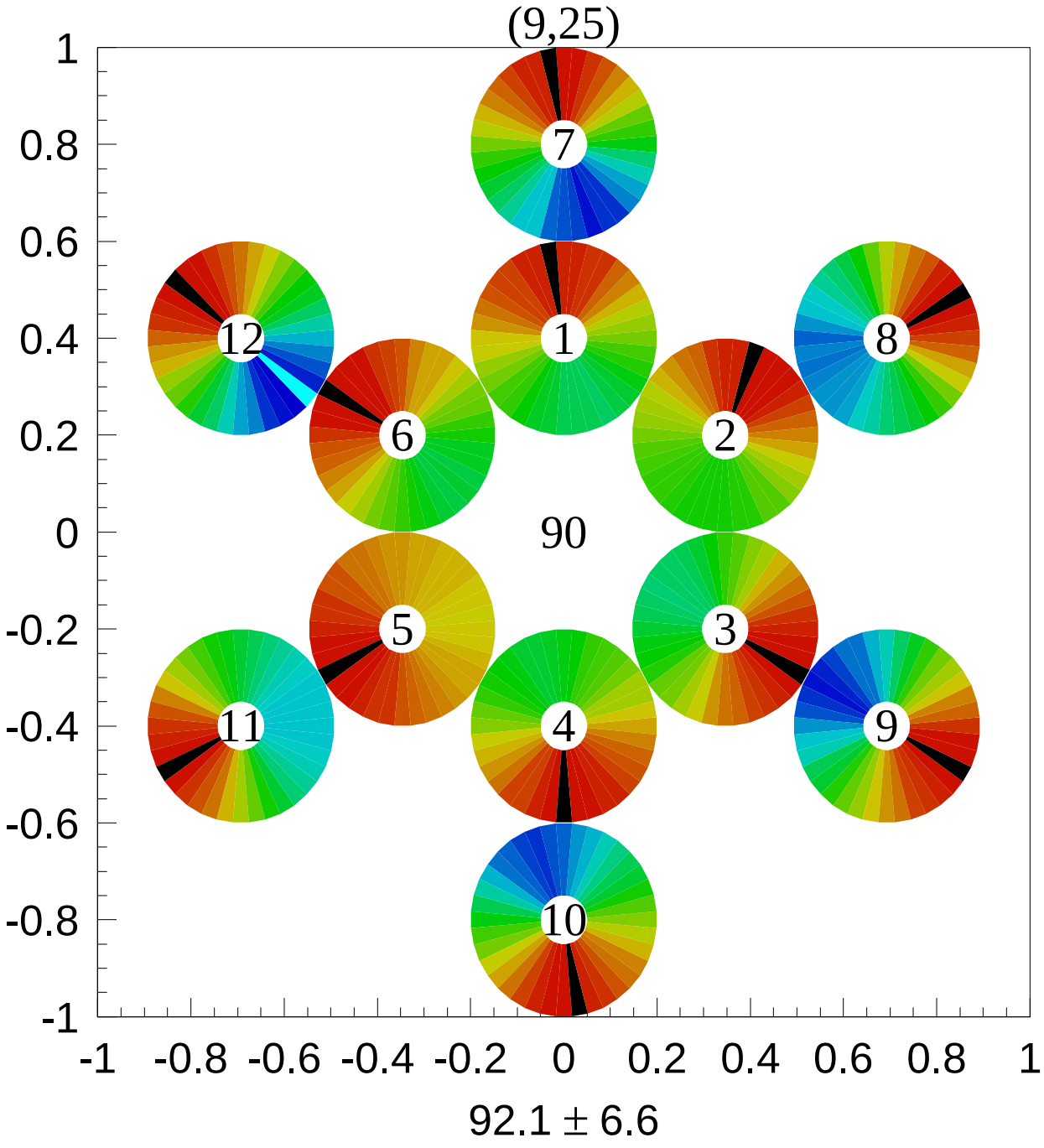

(9,23)
tilted LEDs
124 115 125 129 113 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 111 118 119 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

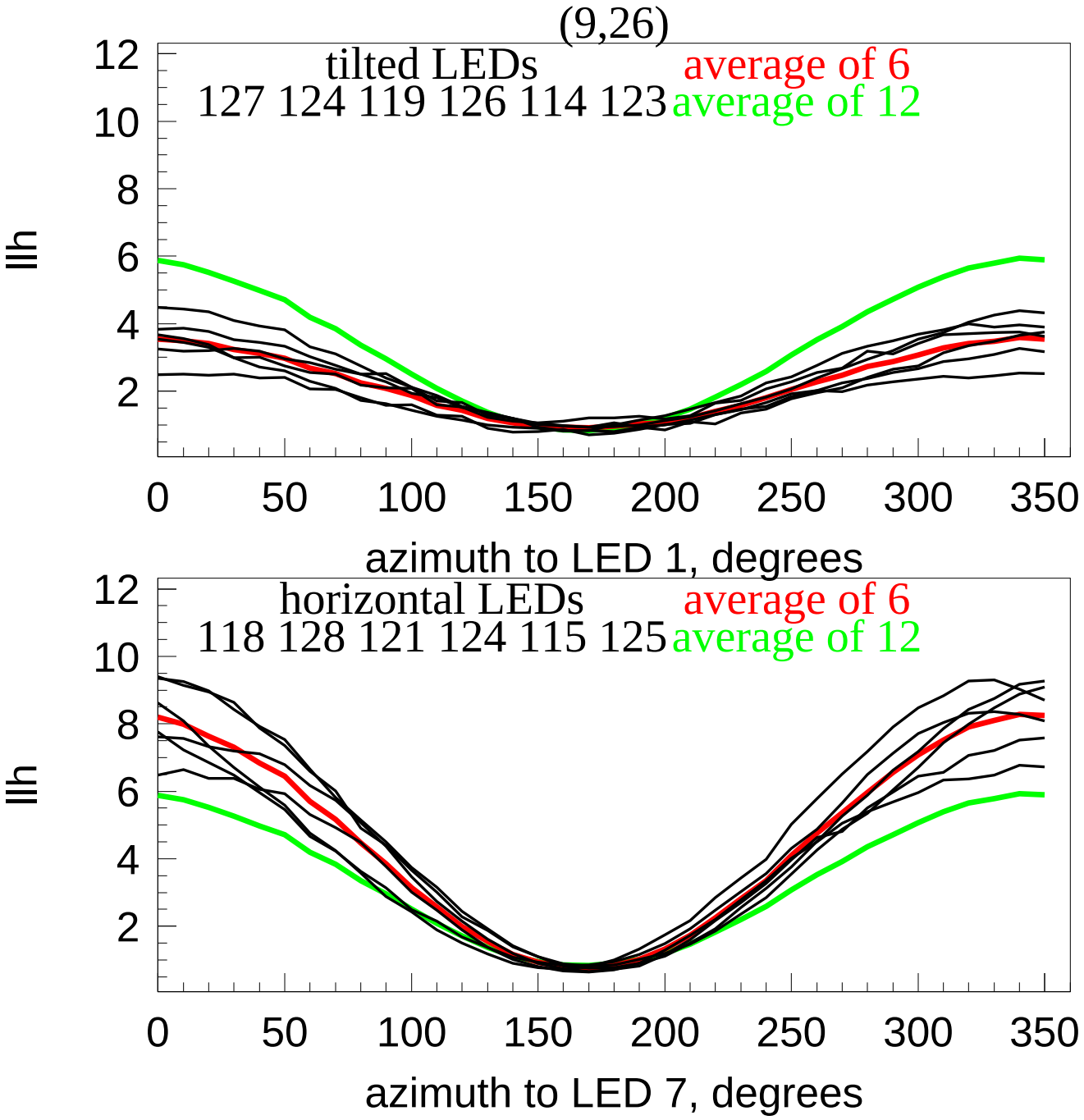

(9,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
11
1
6
7
12
220.6 ± 4.8

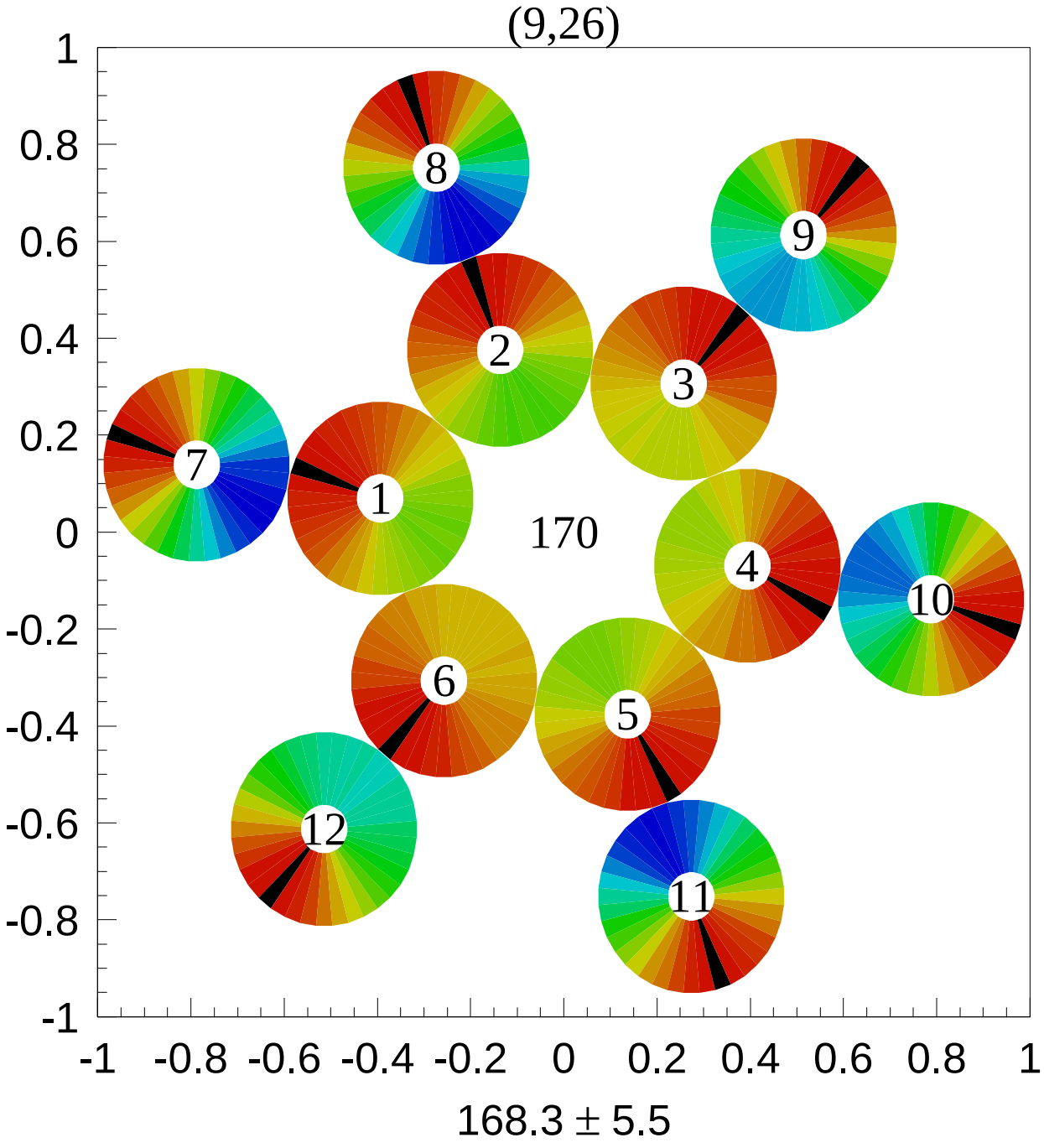

(9,24)
tilted LEDs
122 120 100 121 127 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 124 122 124 128 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

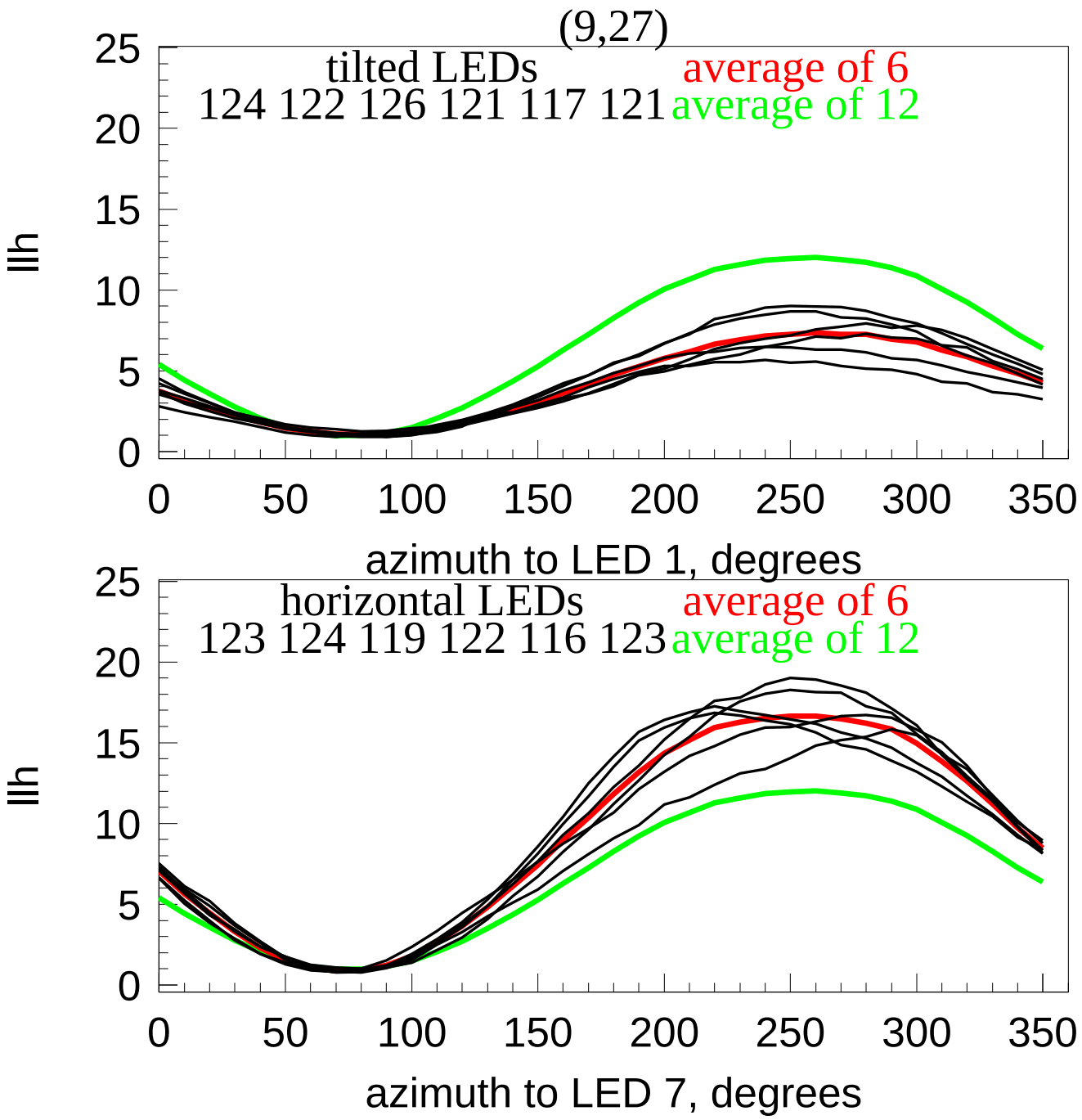

(9,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
197.2 ± 4.2

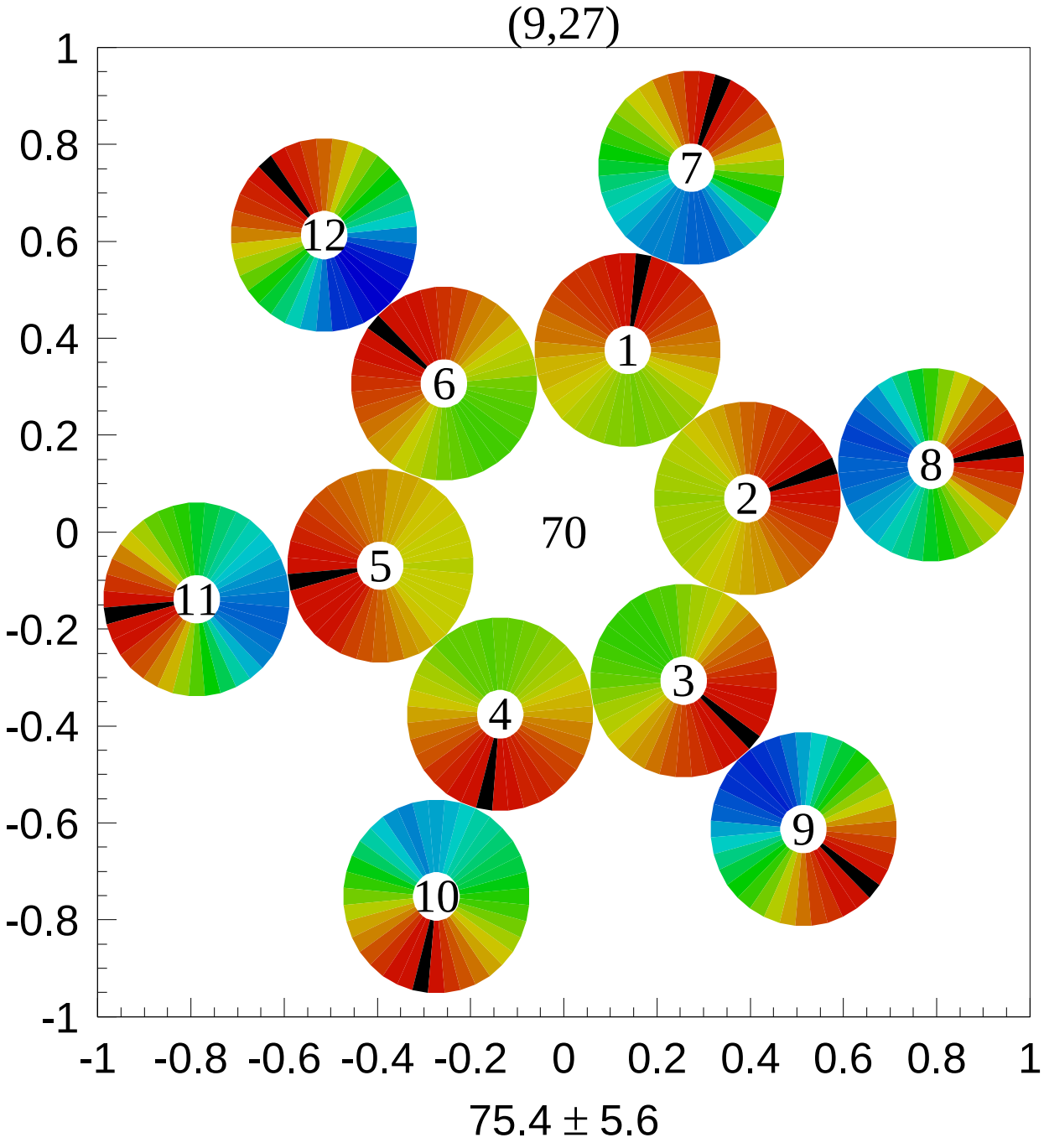

(9,25)
tilted LEDs
122 113 123 125 113 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 127 119 116 119 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

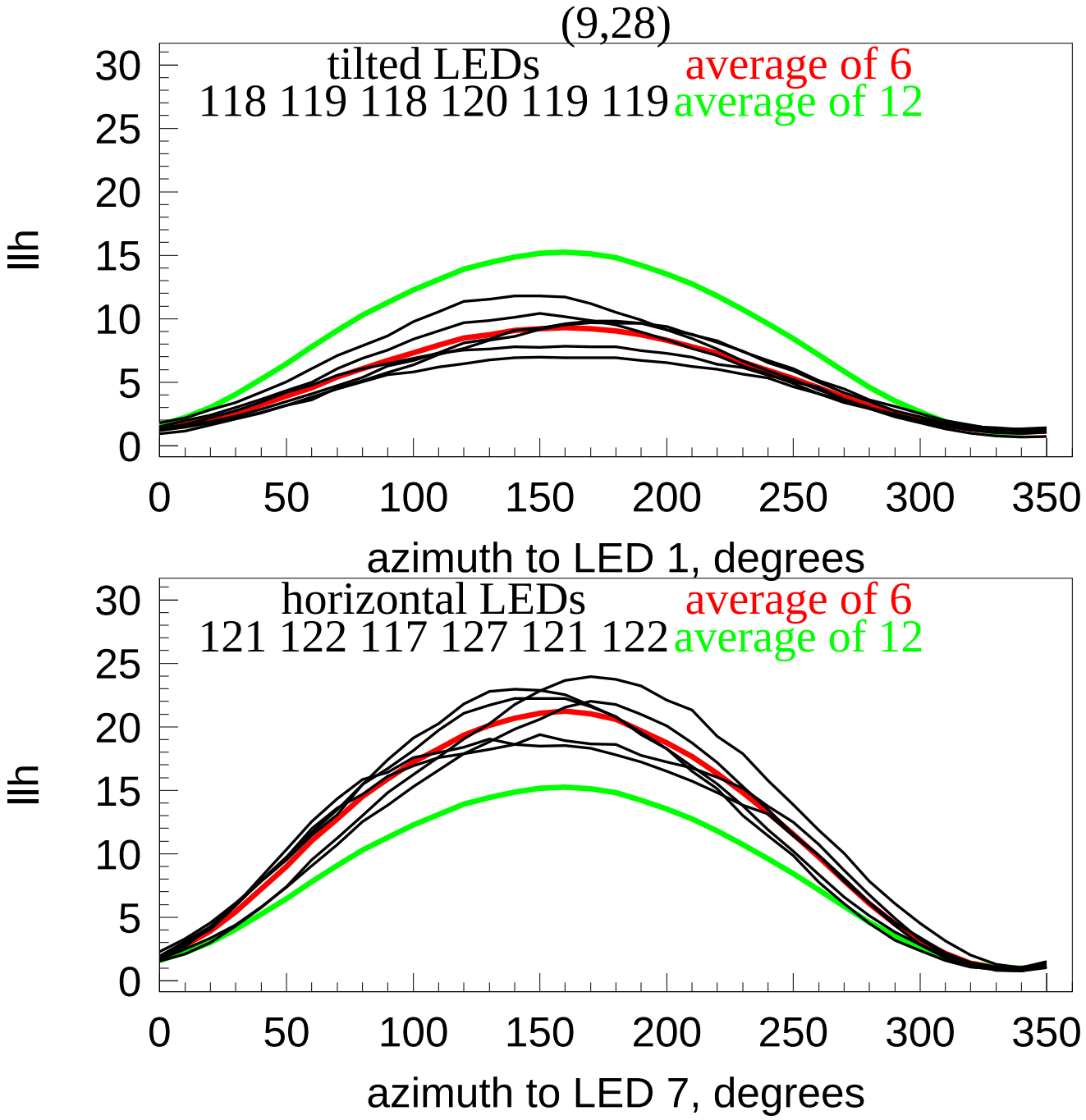

(9,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
92.1 ± 6.6

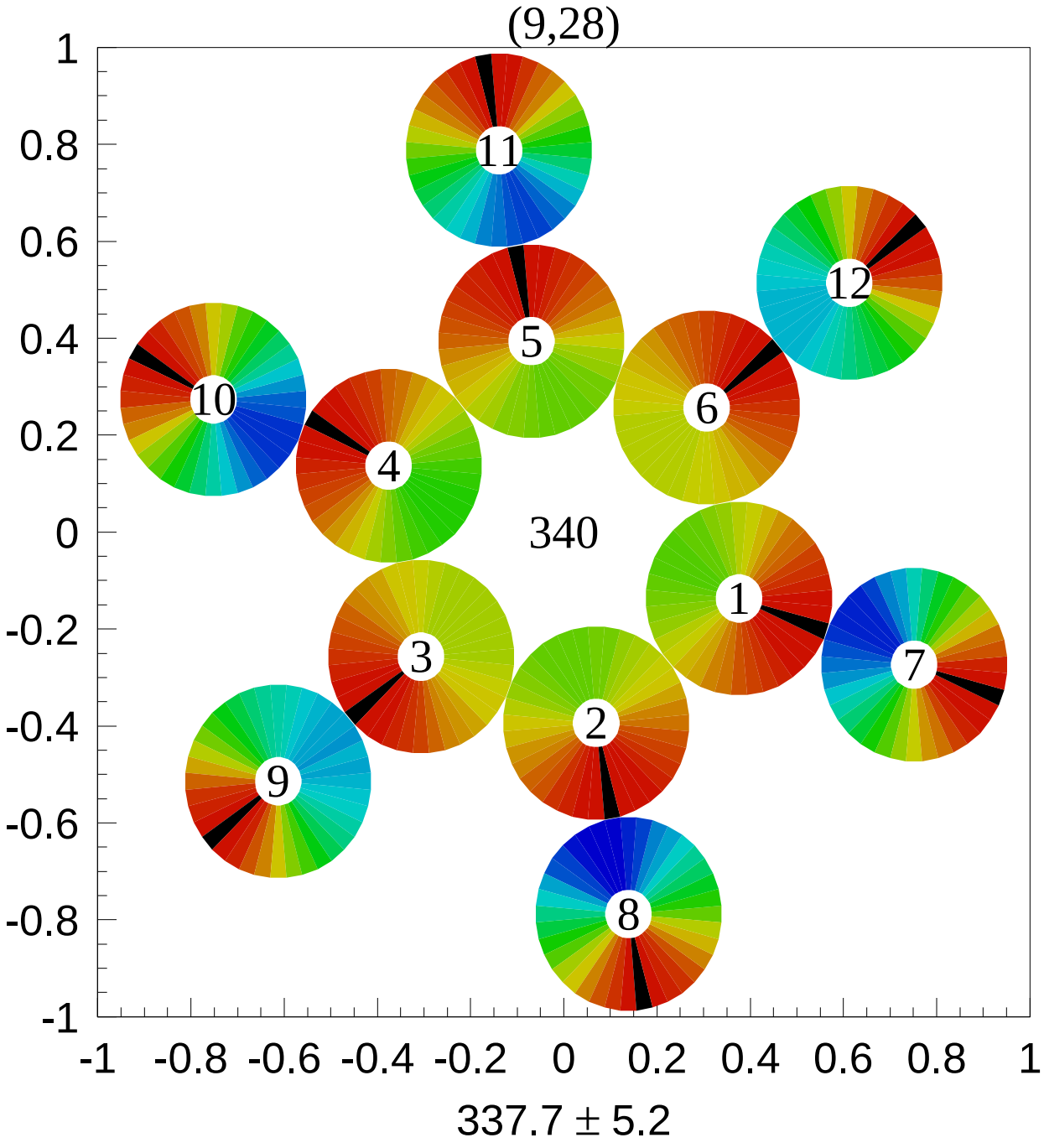

(9,26)
tilted LEDs
127 124 119 126 114 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 128 121 124 115 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

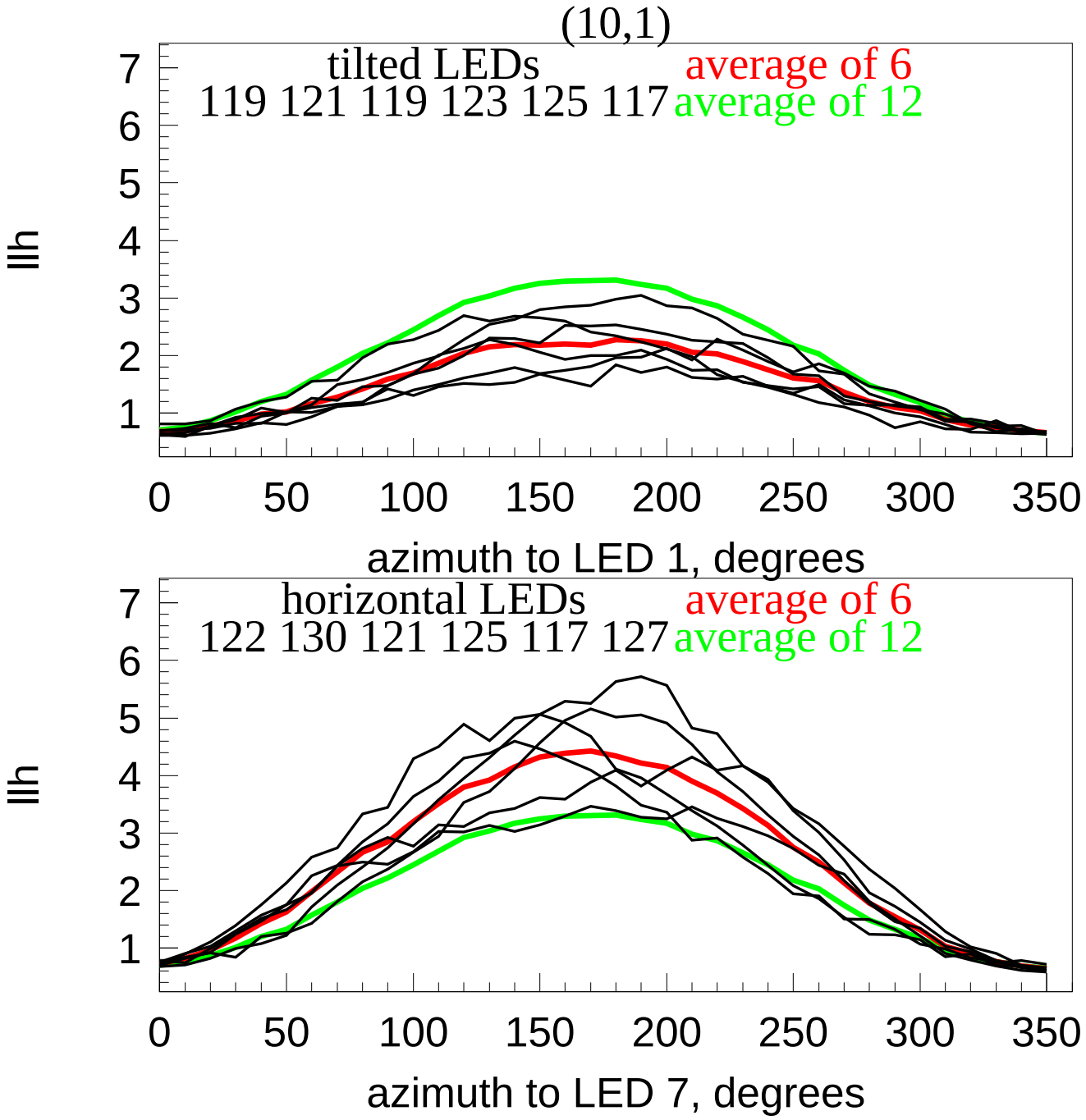

(9,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
168.3 ± 5.5

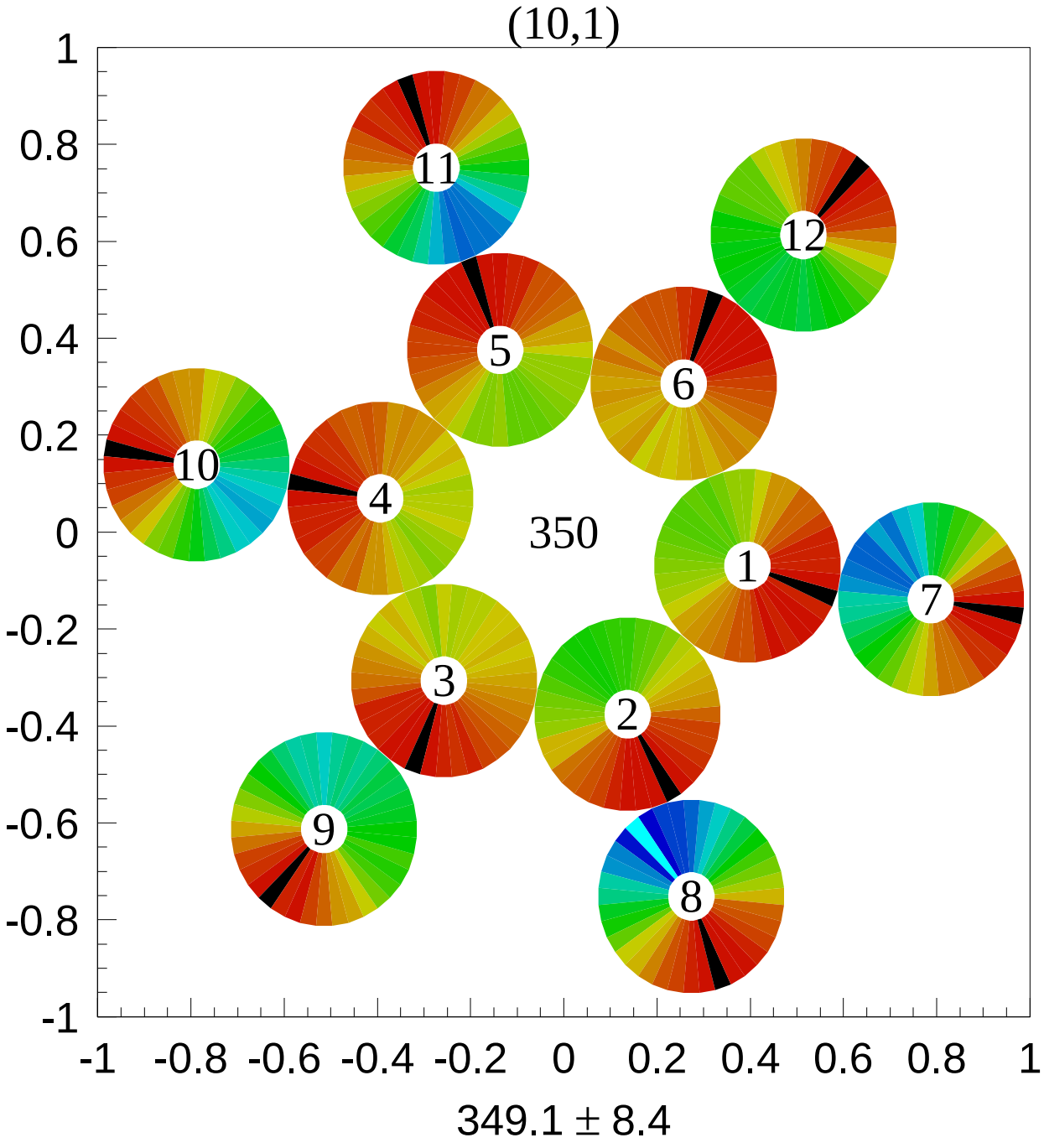

(9,27)
tilted LEDs
124 122 126 121 117 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 124 119 122 116 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

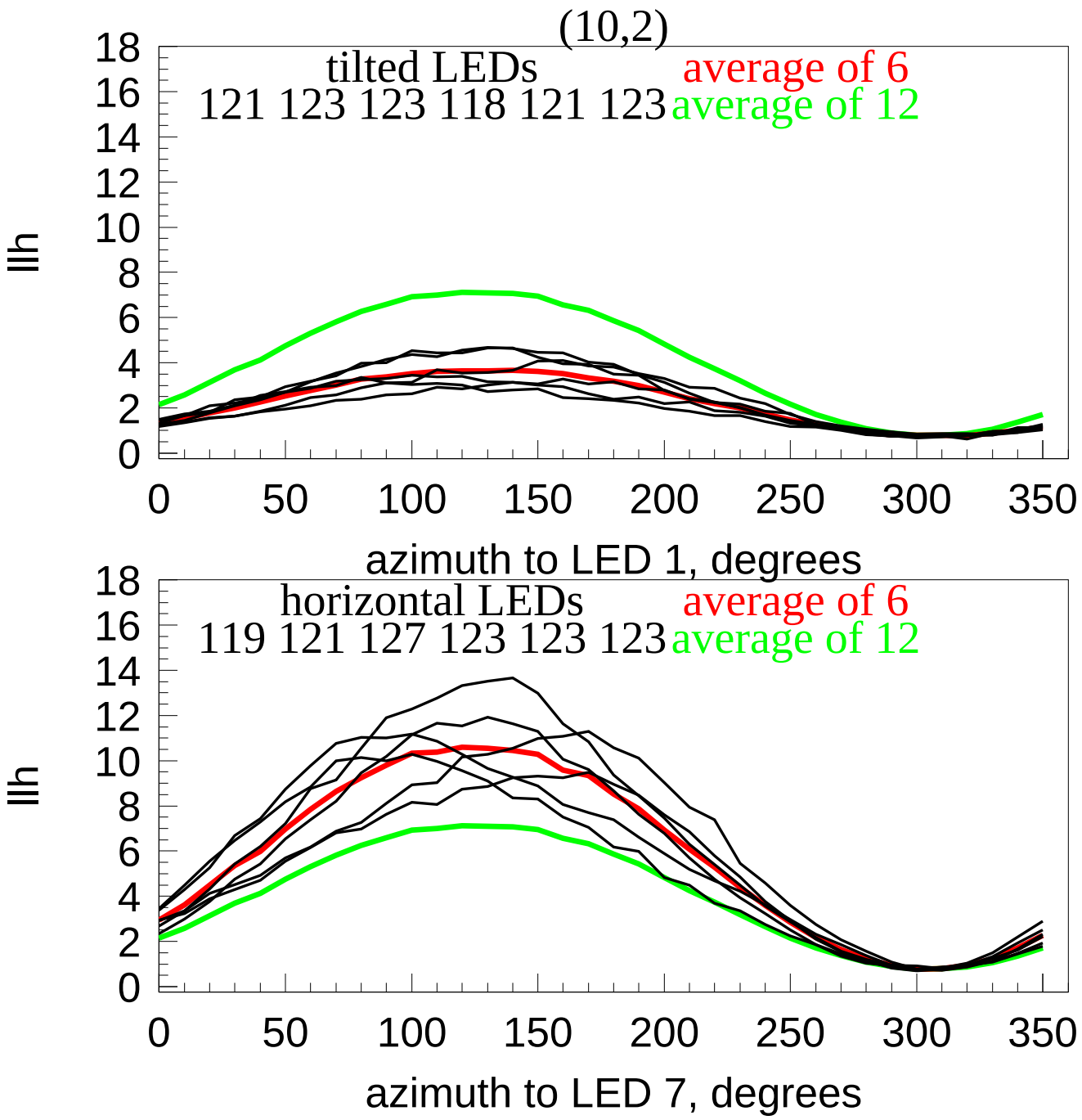

(9,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
75.4 ± 5.6

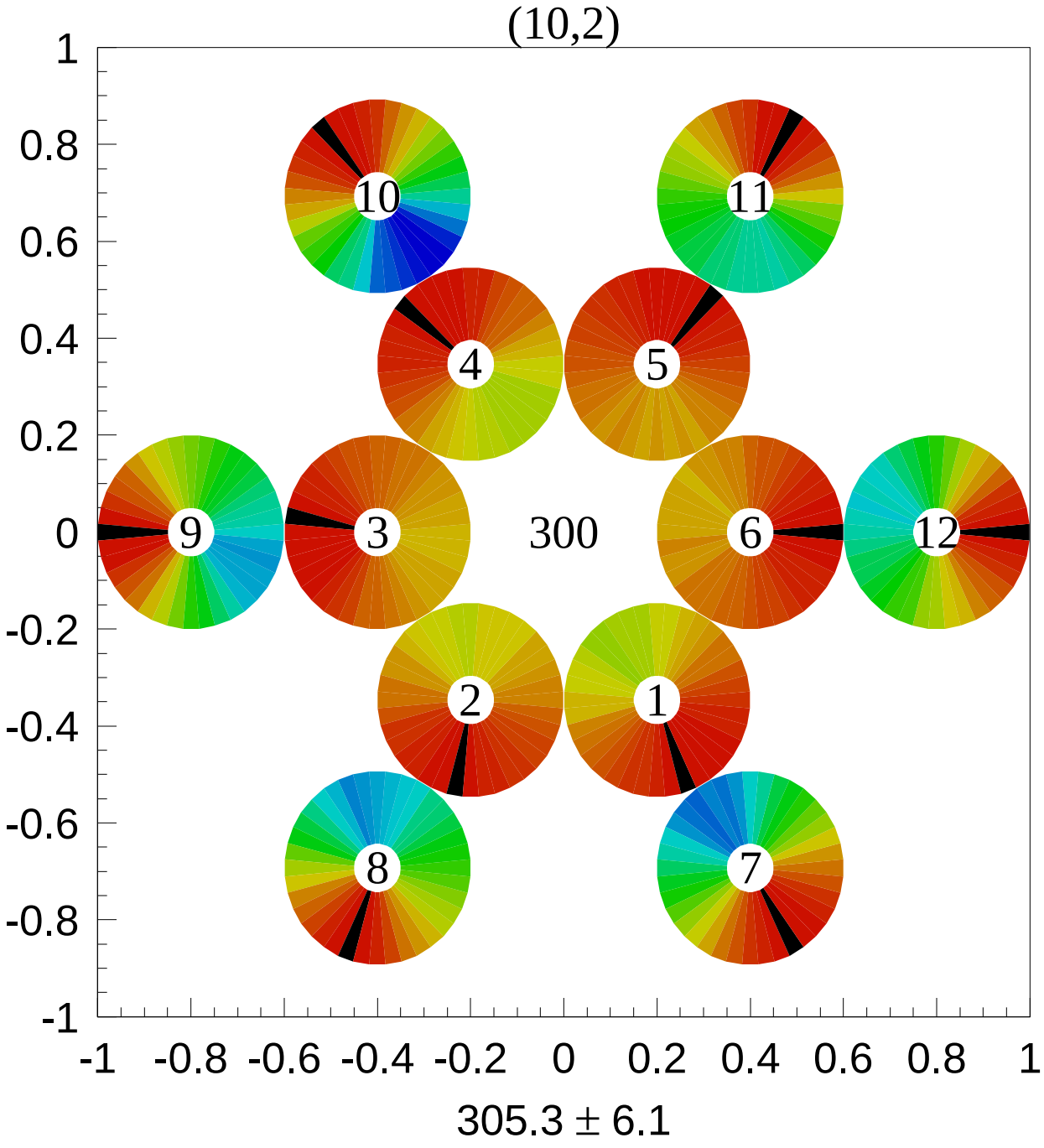

(9,28)
tilted LEDs
118 119 118 120 119 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 117 127 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

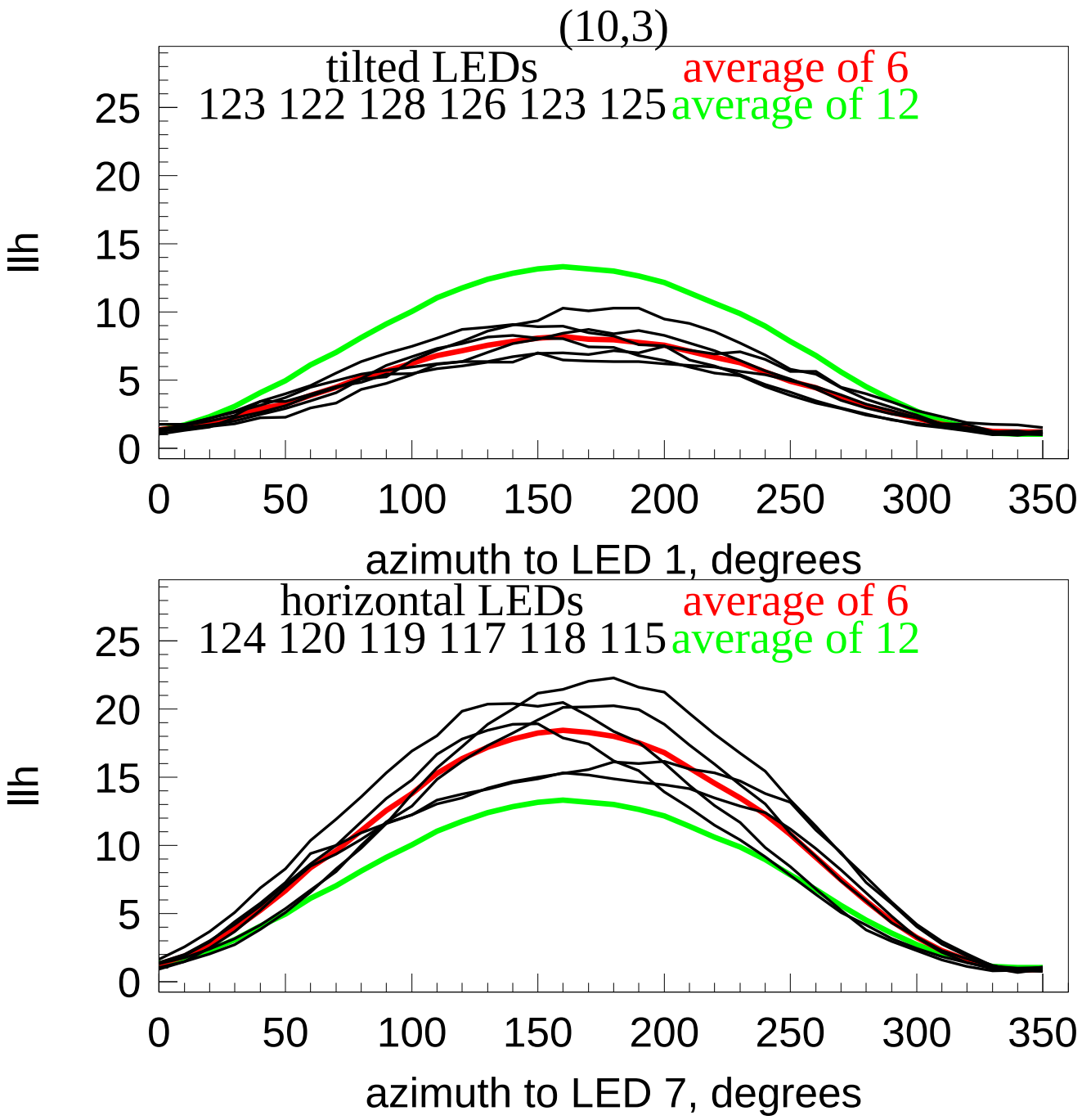

(9,28)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
337.7 ± 5.2

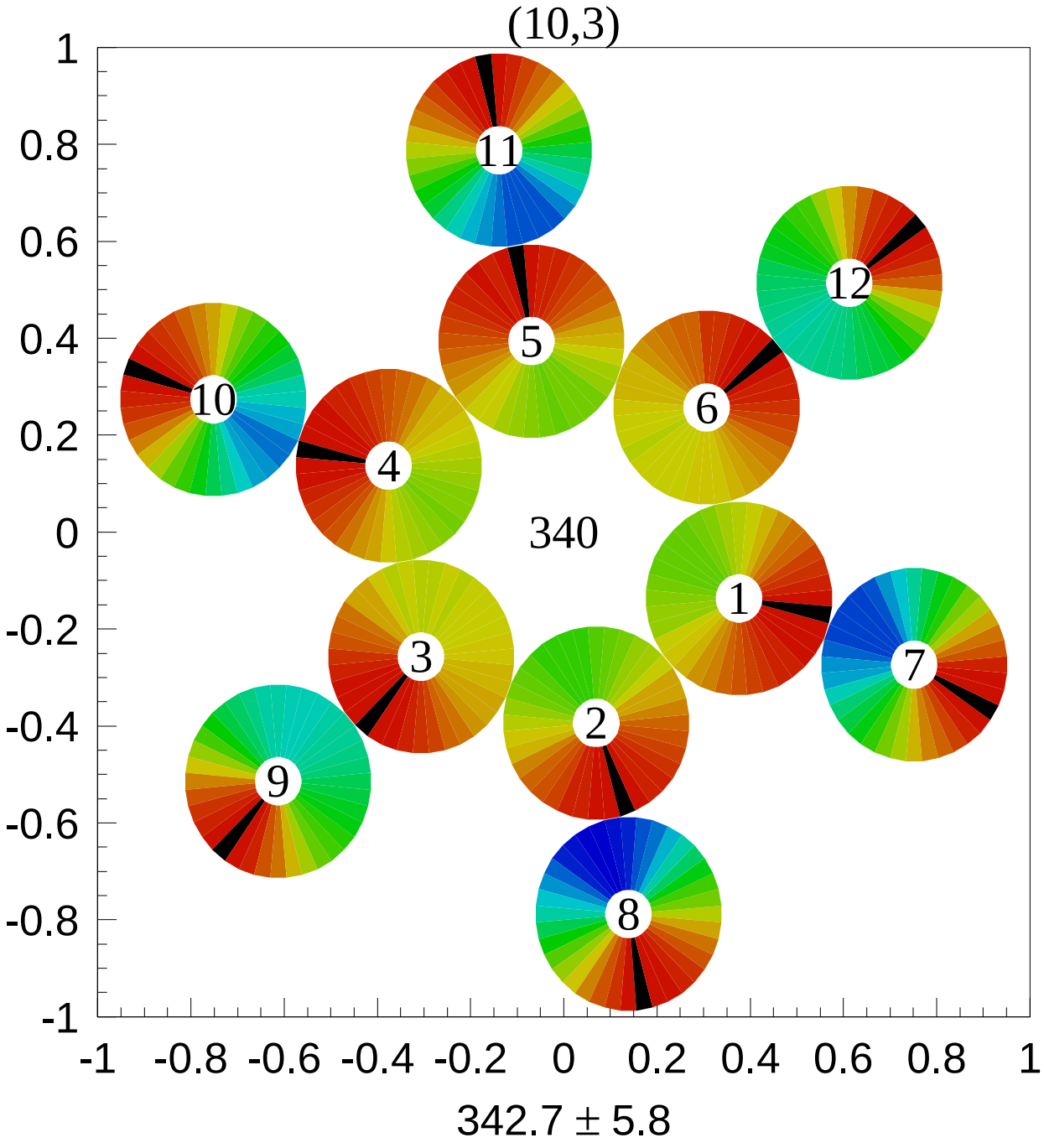

(10,1)
tilted LEDs
119 121 119 123 125 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 130 121 125 117 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

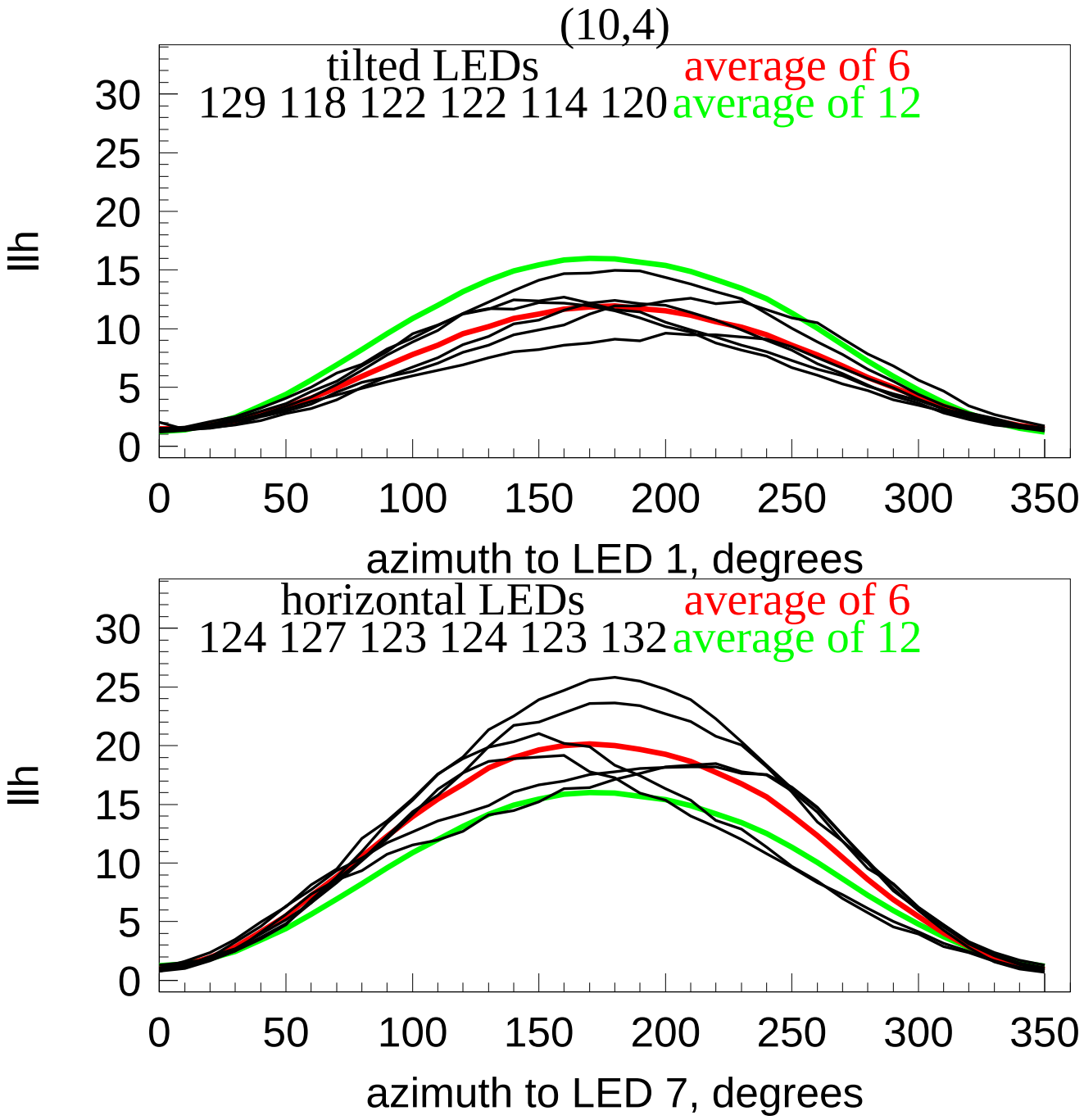

(10,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
349.1 ± 8.4

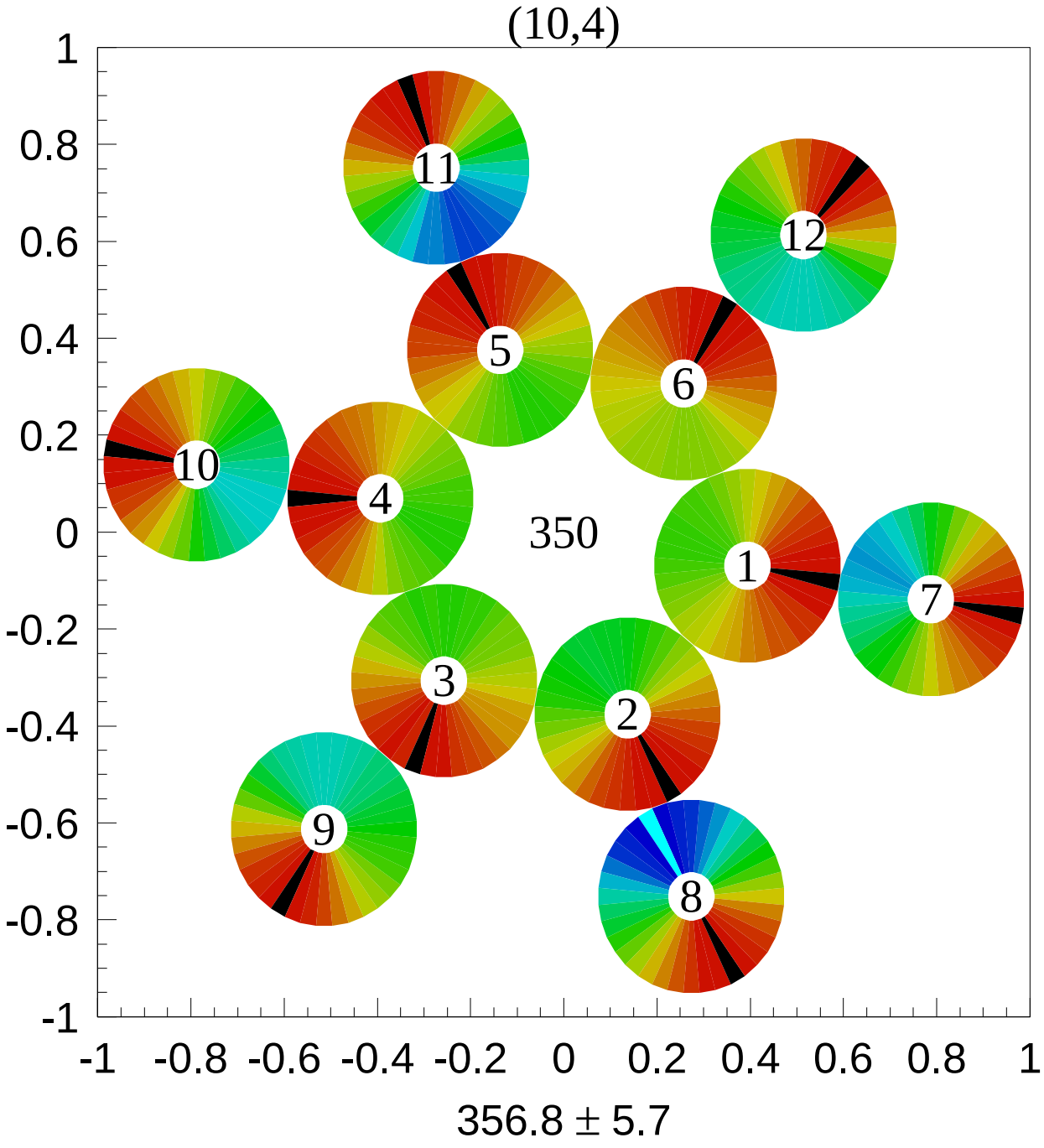

(10,2)
tilted LEDs
121 123 123 118 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 127 123 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

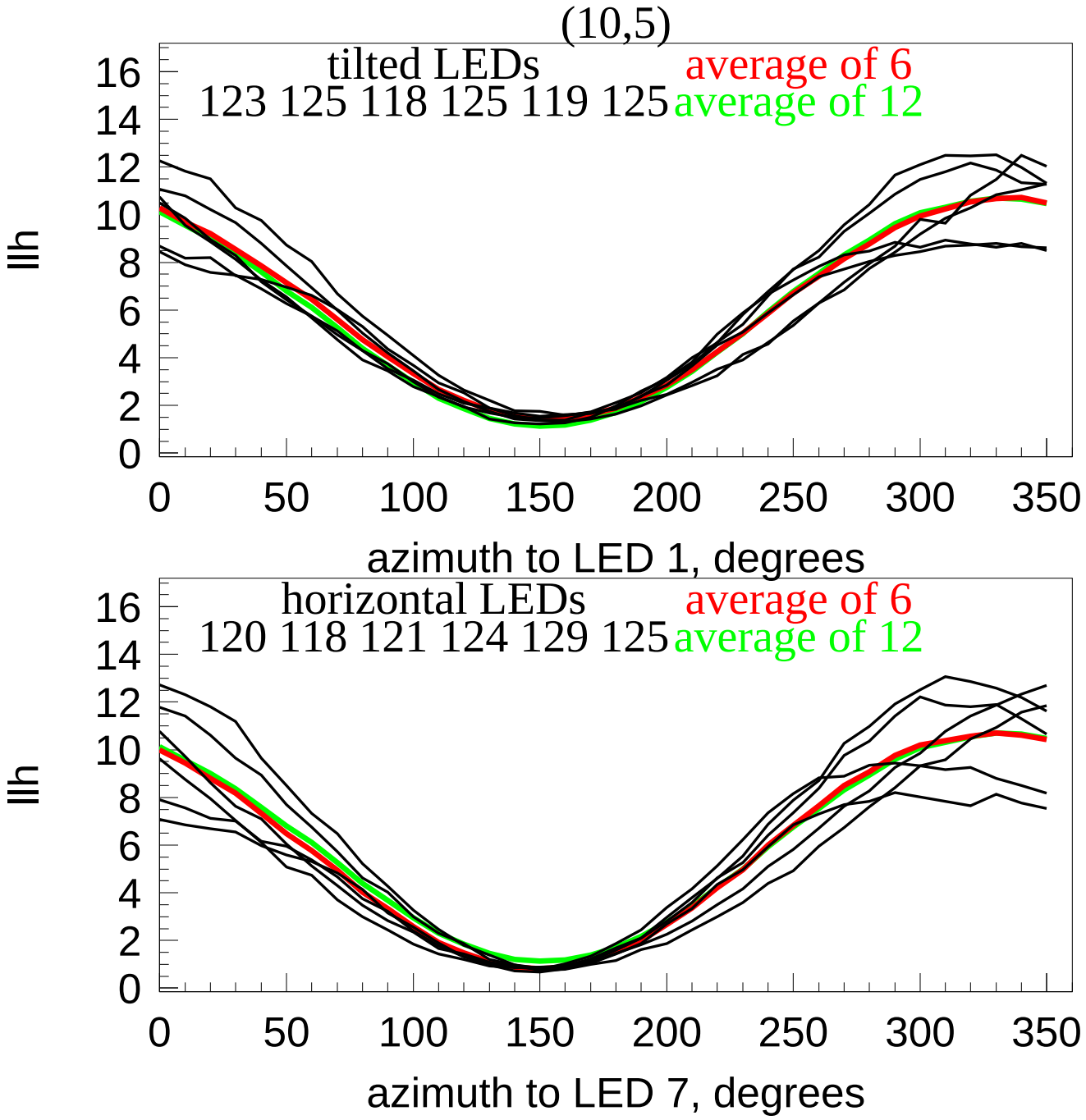

(10,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
305.3 ± 6.1

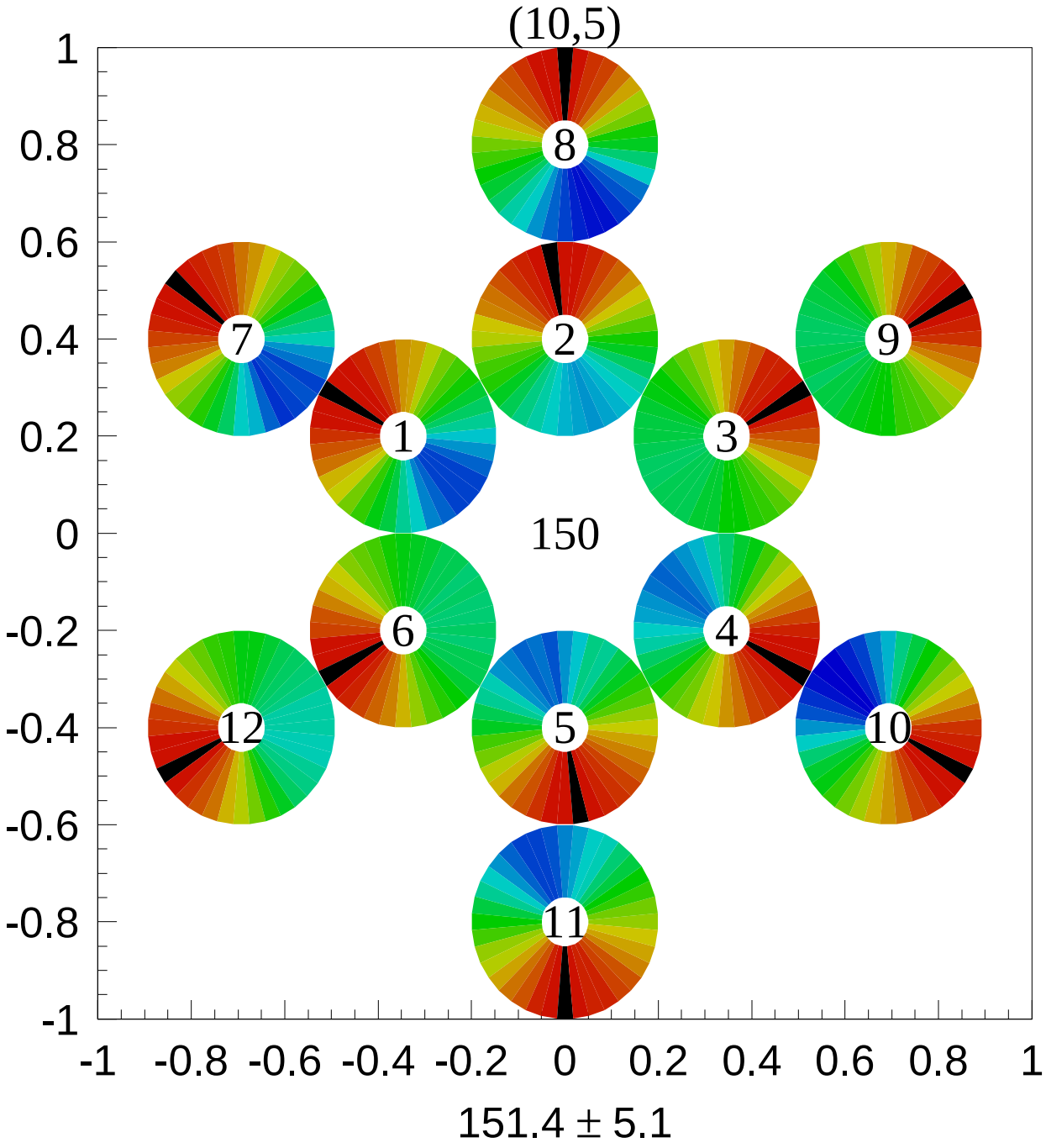

(10,3)
tilted LEDs
123 122 128 126 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 120 119 117 118 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

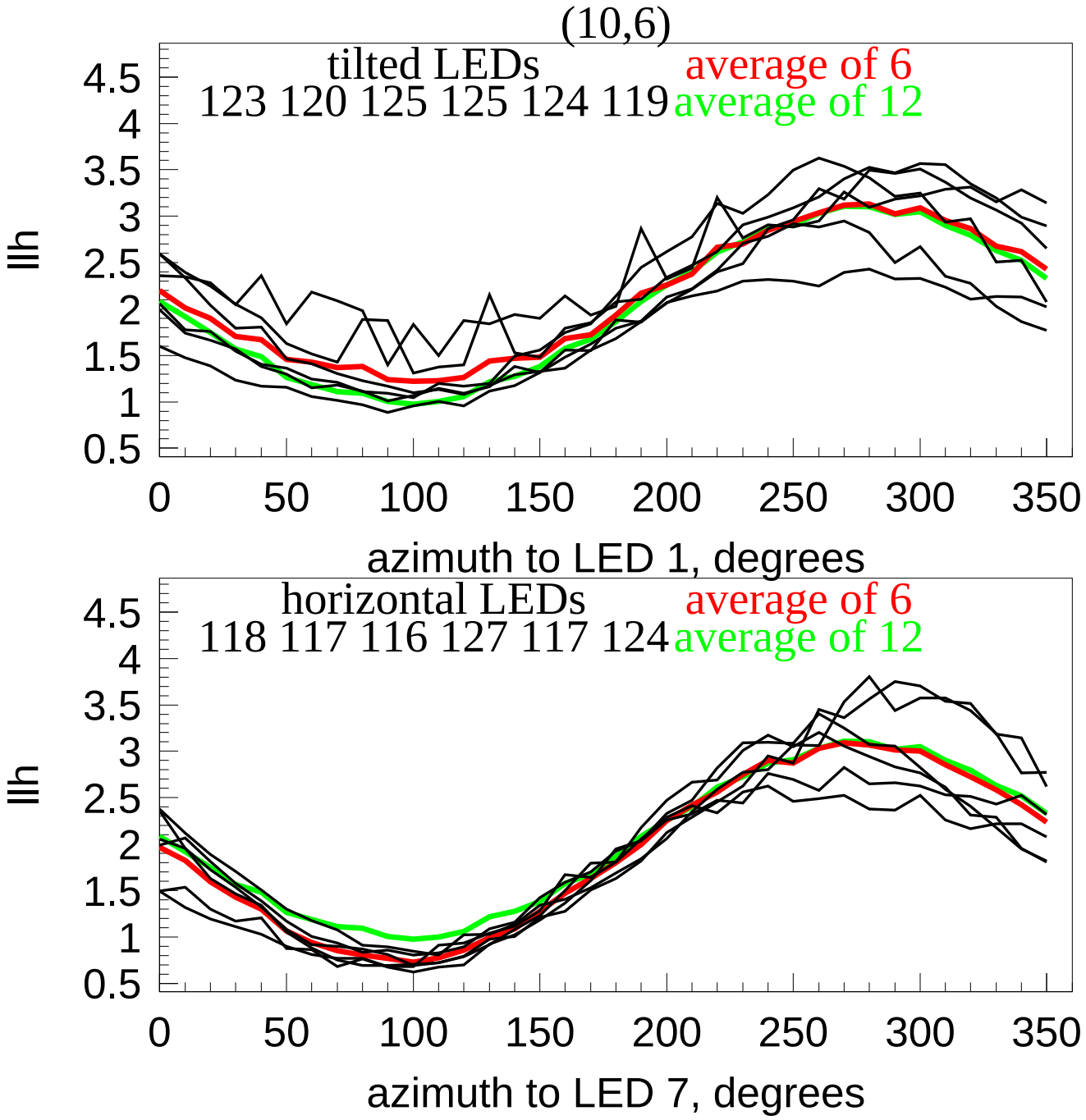

(10,3)
11
12
5
6
10
4
340
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
342.7 ± 5.8

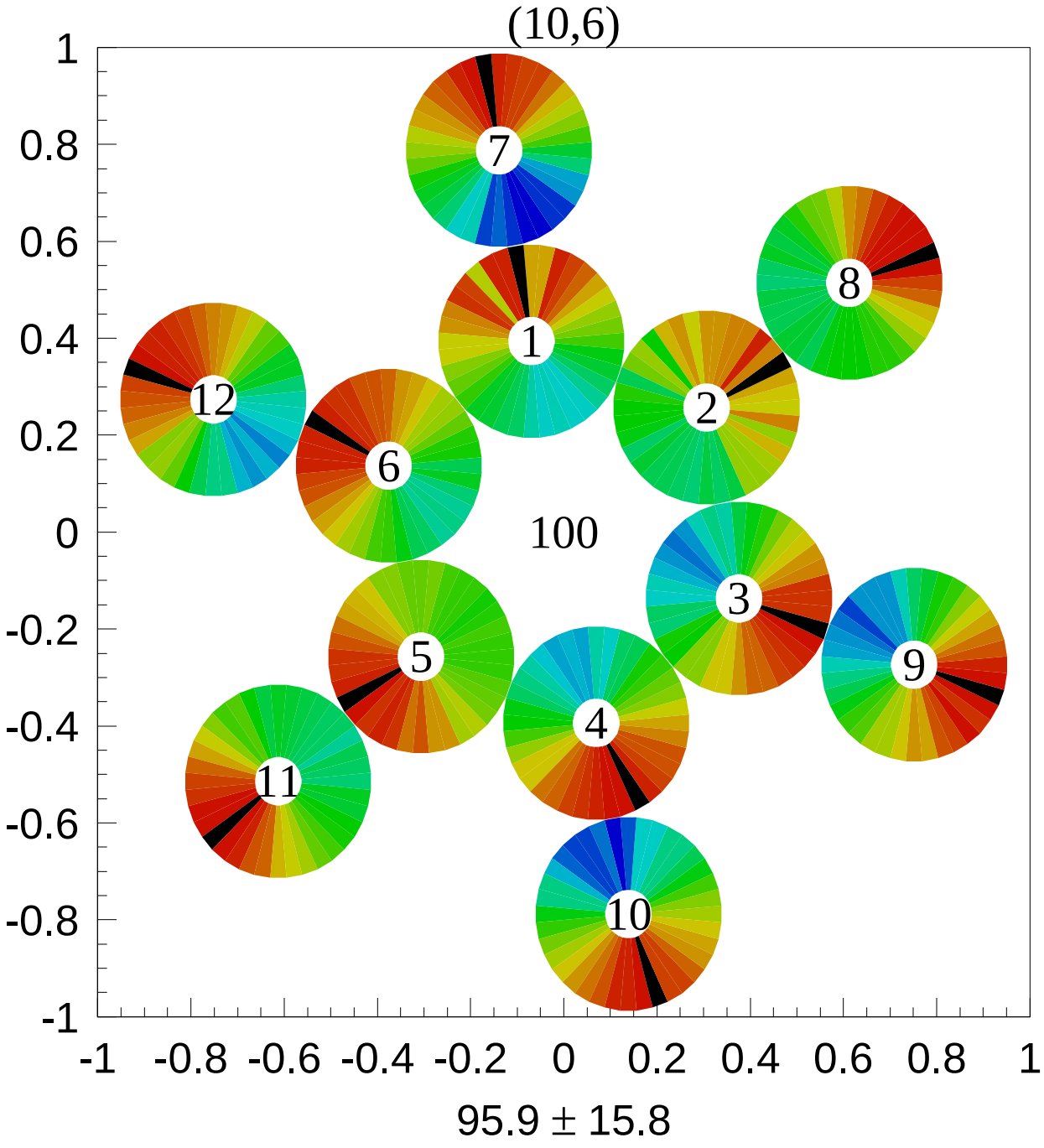

(10,4)
tilted LEDs
129 118 122 122 114 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 127 123 124 123 132
average of 6
average of 12
llh
azimuth to LED 7, degrees

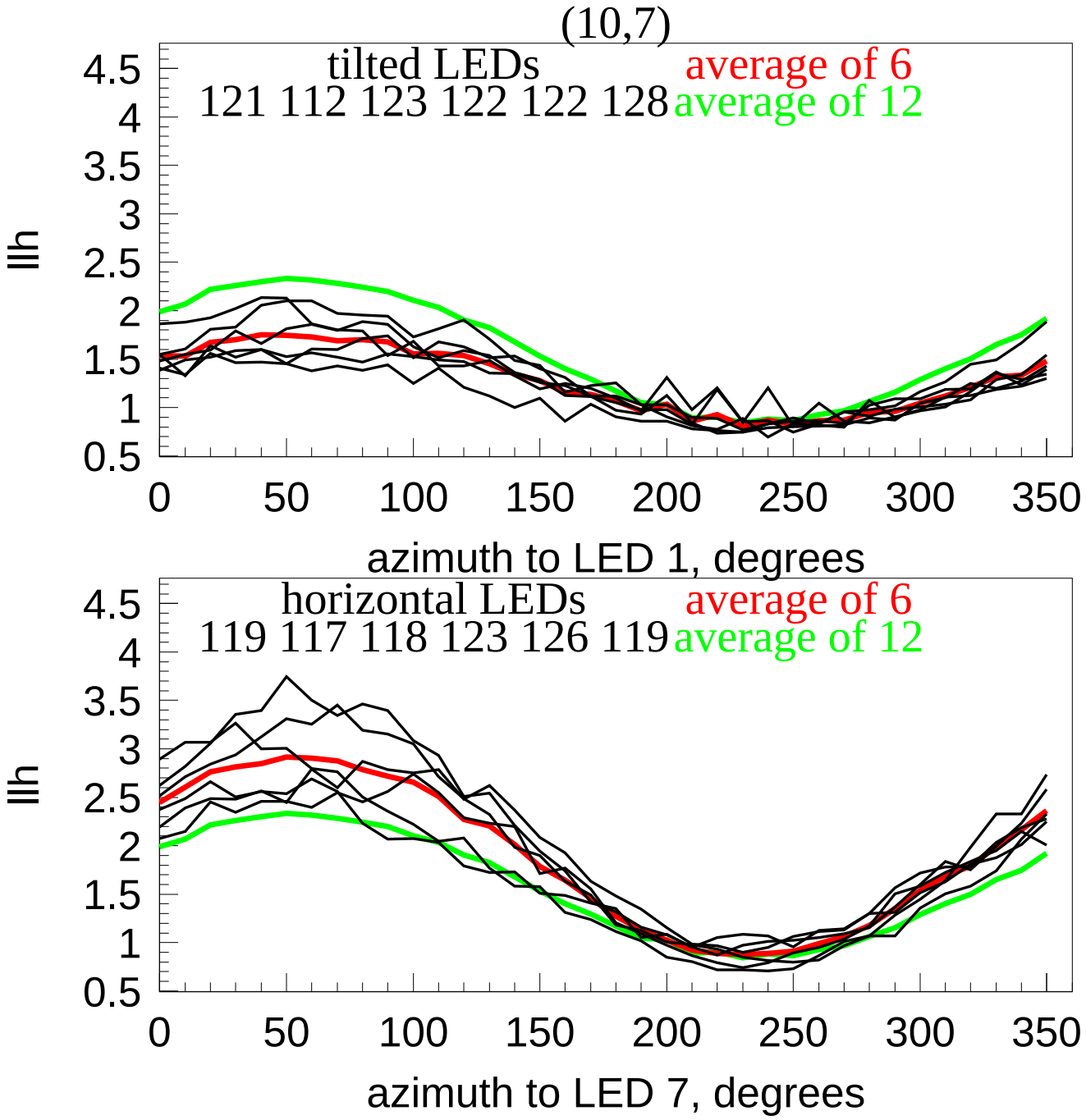

(10,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
356.8 ± 5.7

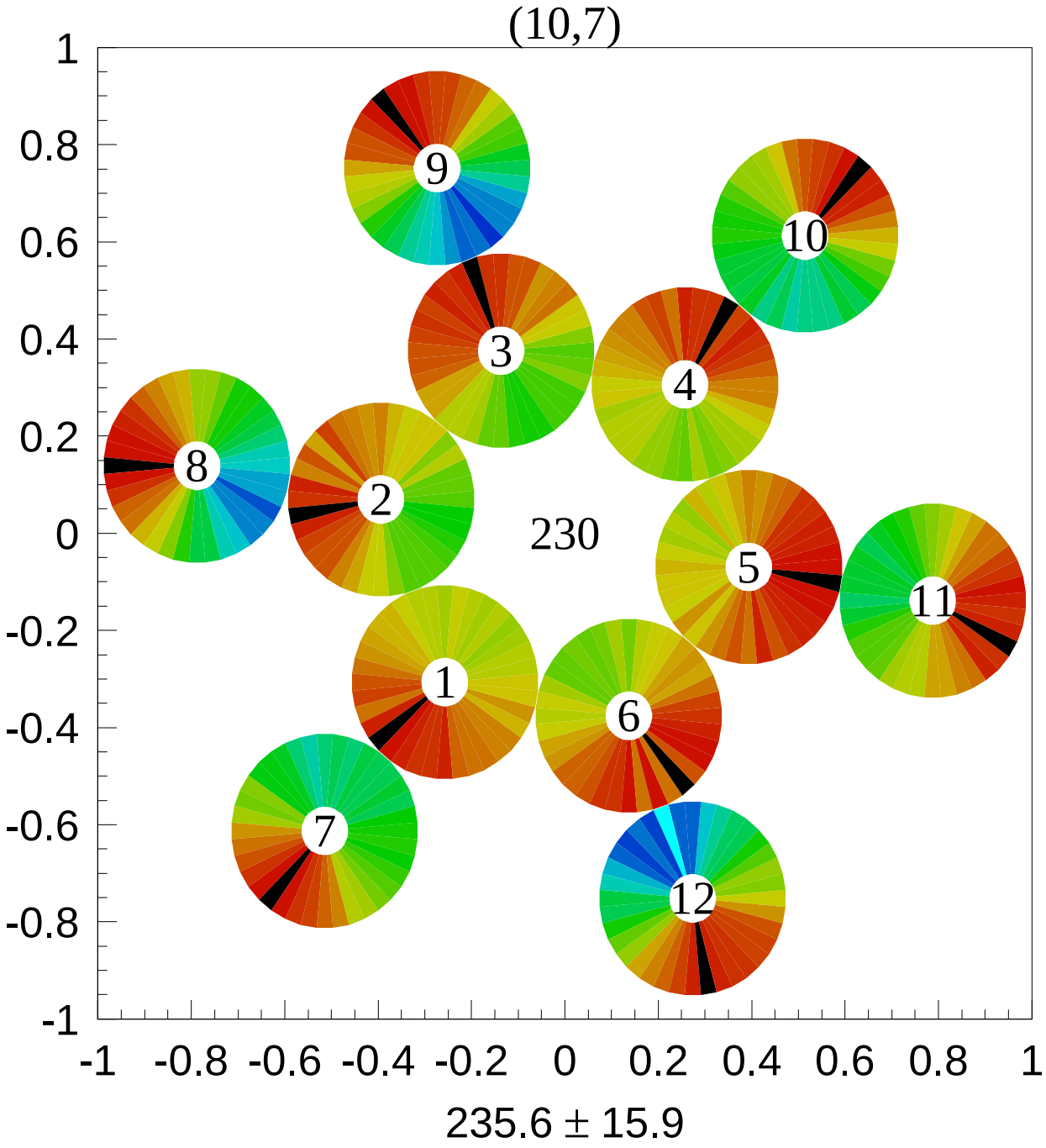

(10,5)
tilted LEDs
123 125 118 125 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 118 121 124 129 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

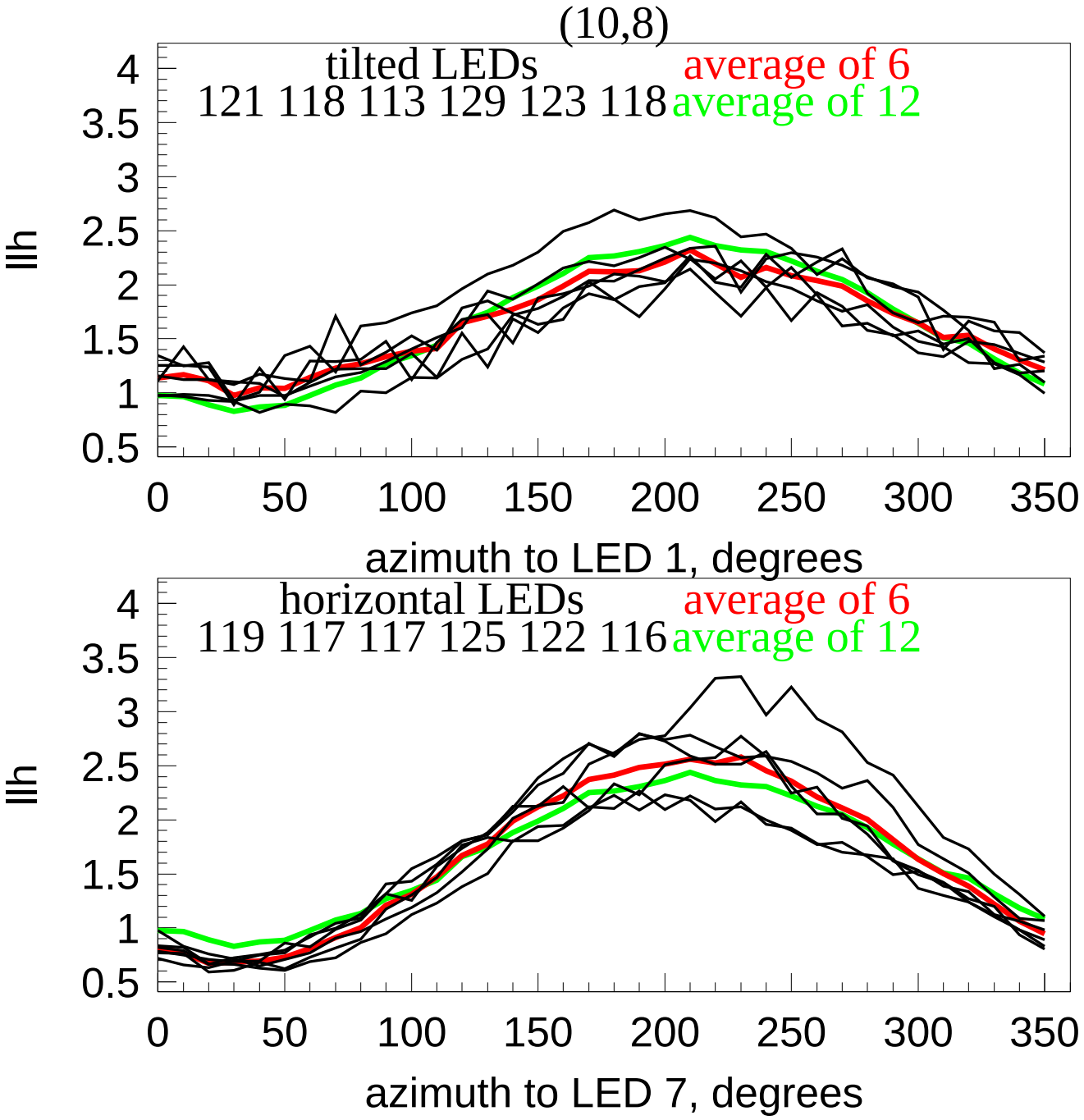

(10,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
151.4 ± 5.1

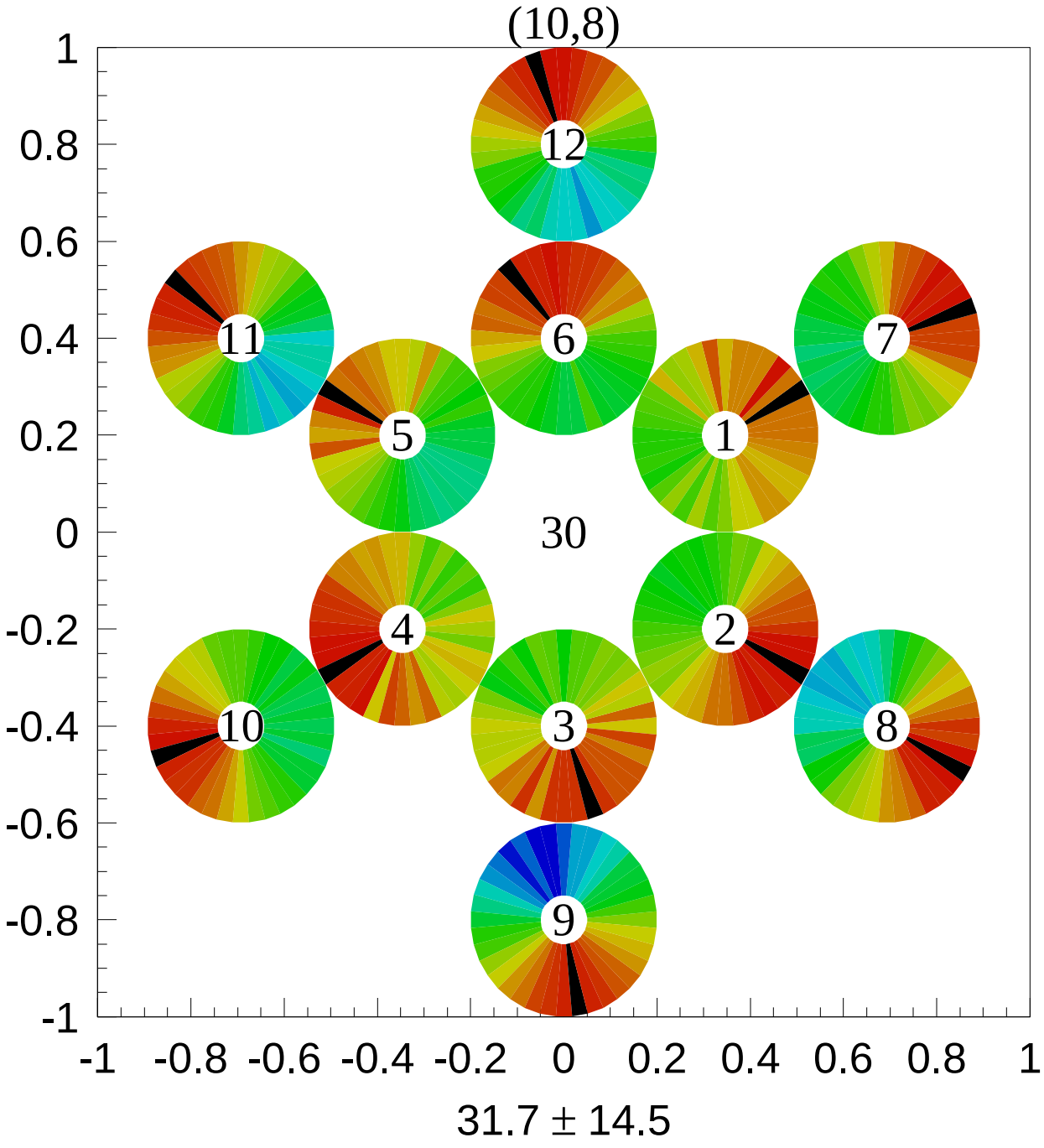

(10,6)
tilted LEDs
123 120 125 125 124 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 117 116 127 117 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

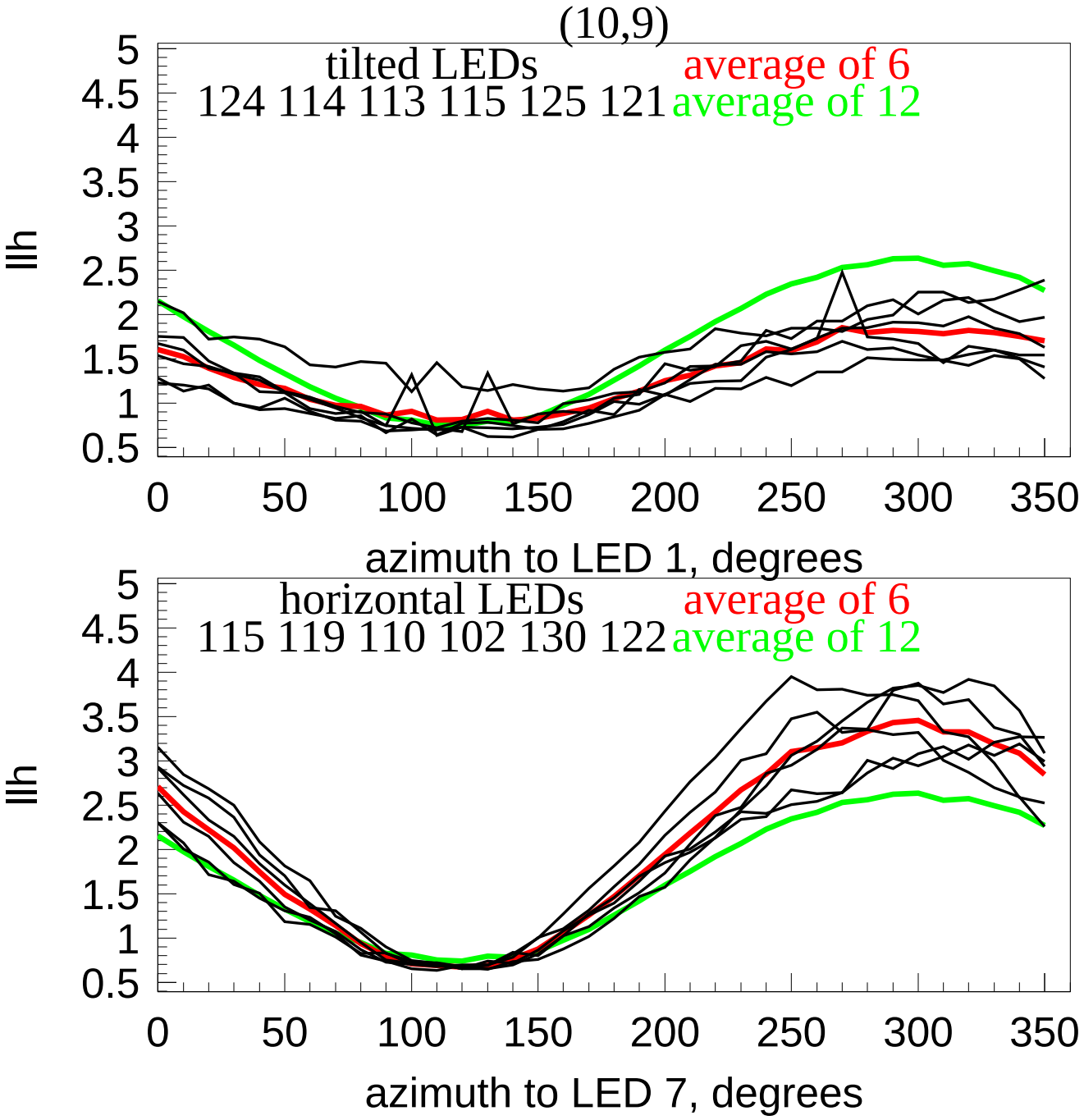

(10,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
95.9 ± 15.8

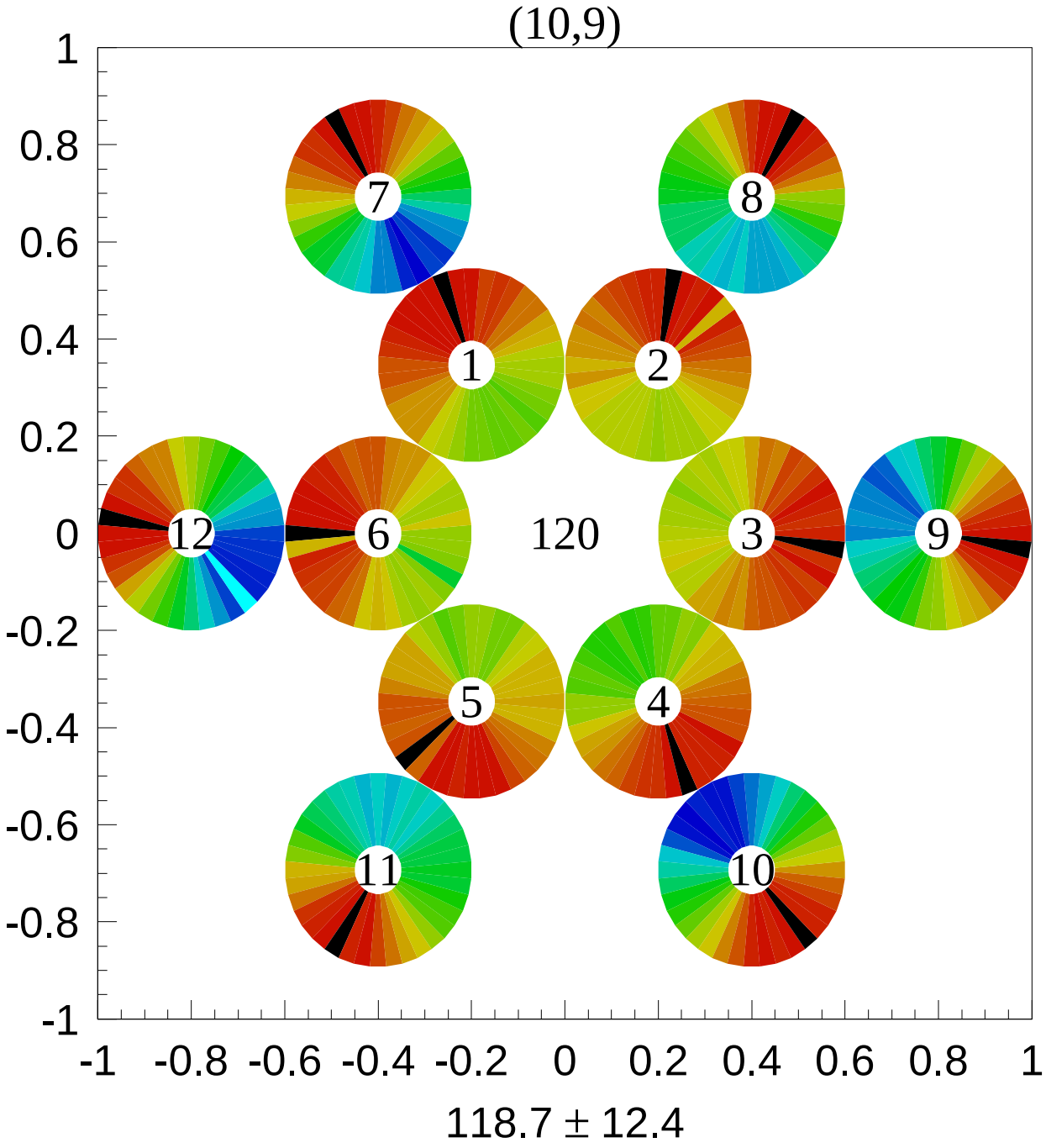

(10,7)
tilted LEDs
121 112 123 122 122 128
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 117 118 123 126 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

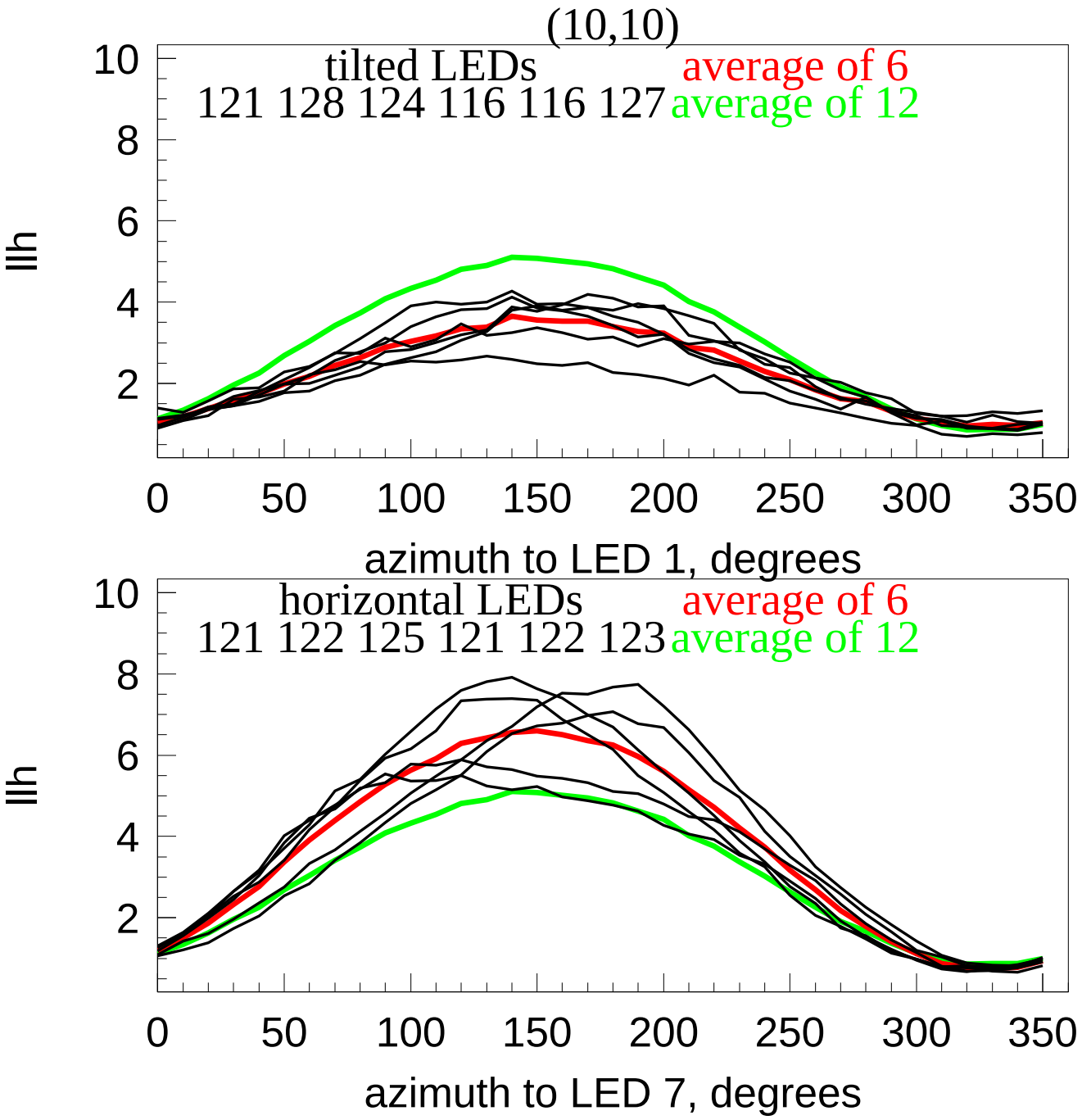

(10,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
235.6 ± 15.9

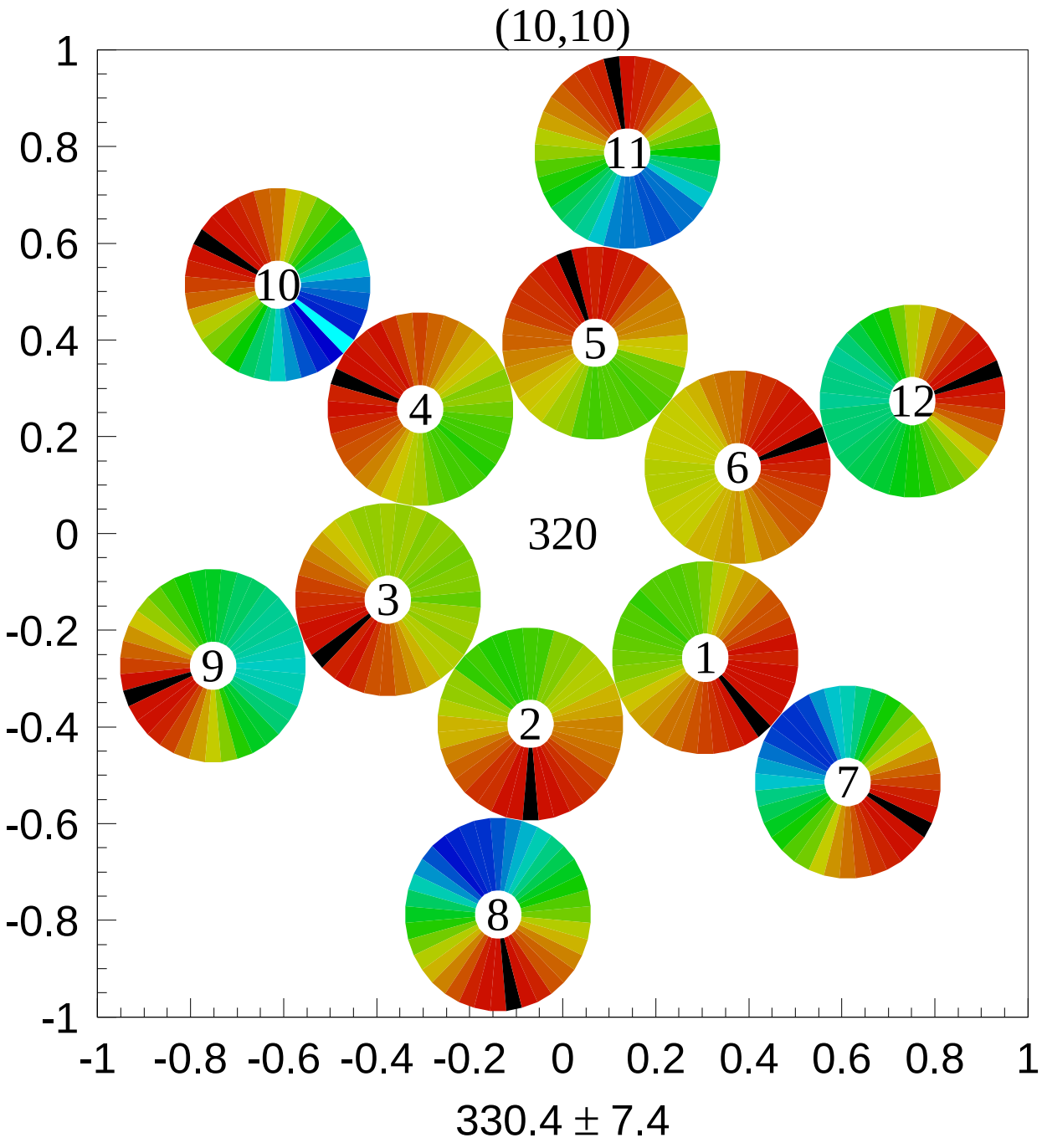

(10,8)
tilted LEDs
121 118 113 129 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 117 117 125 122 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

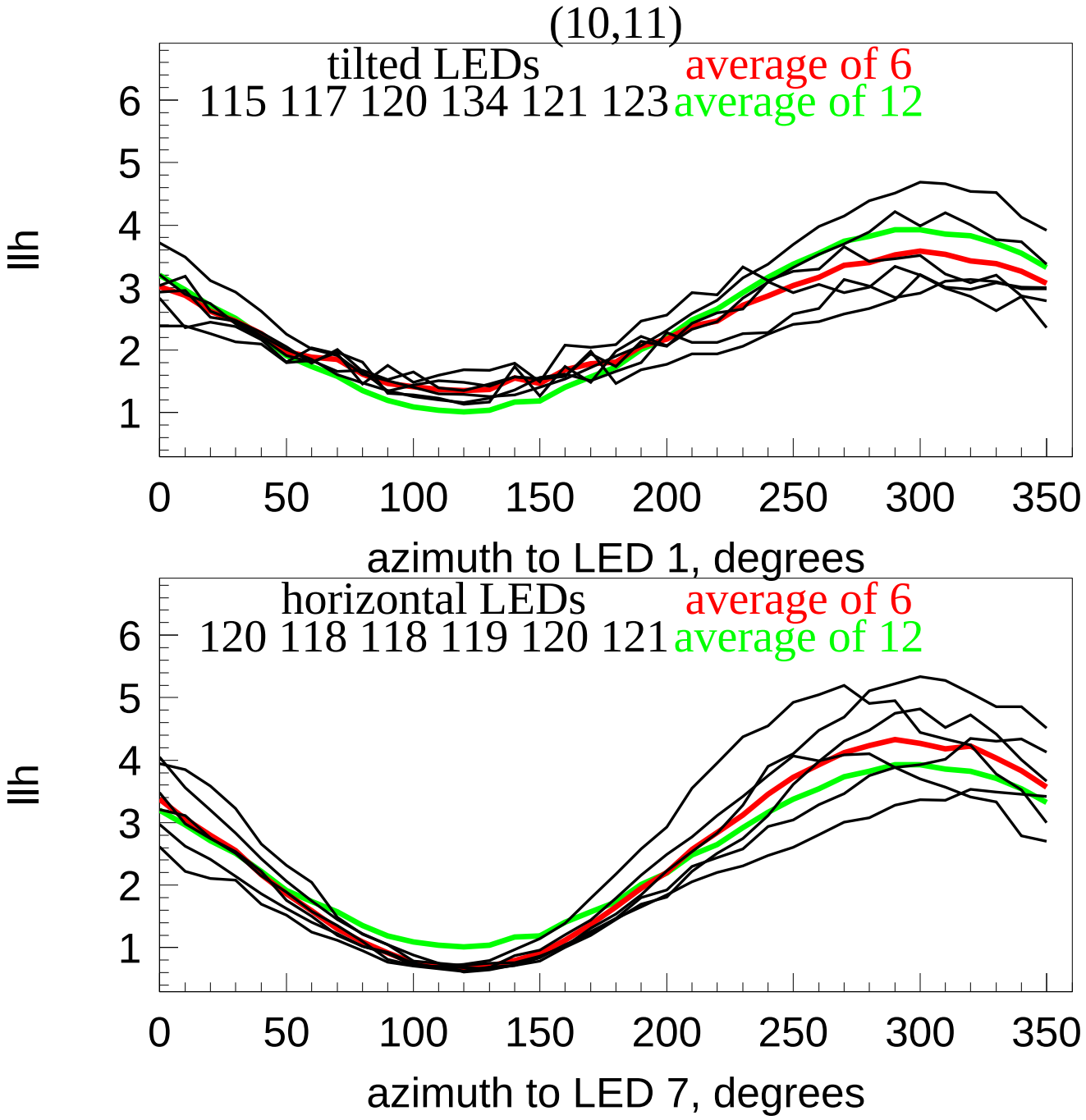

(10,8)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
31.7 ± 14.5

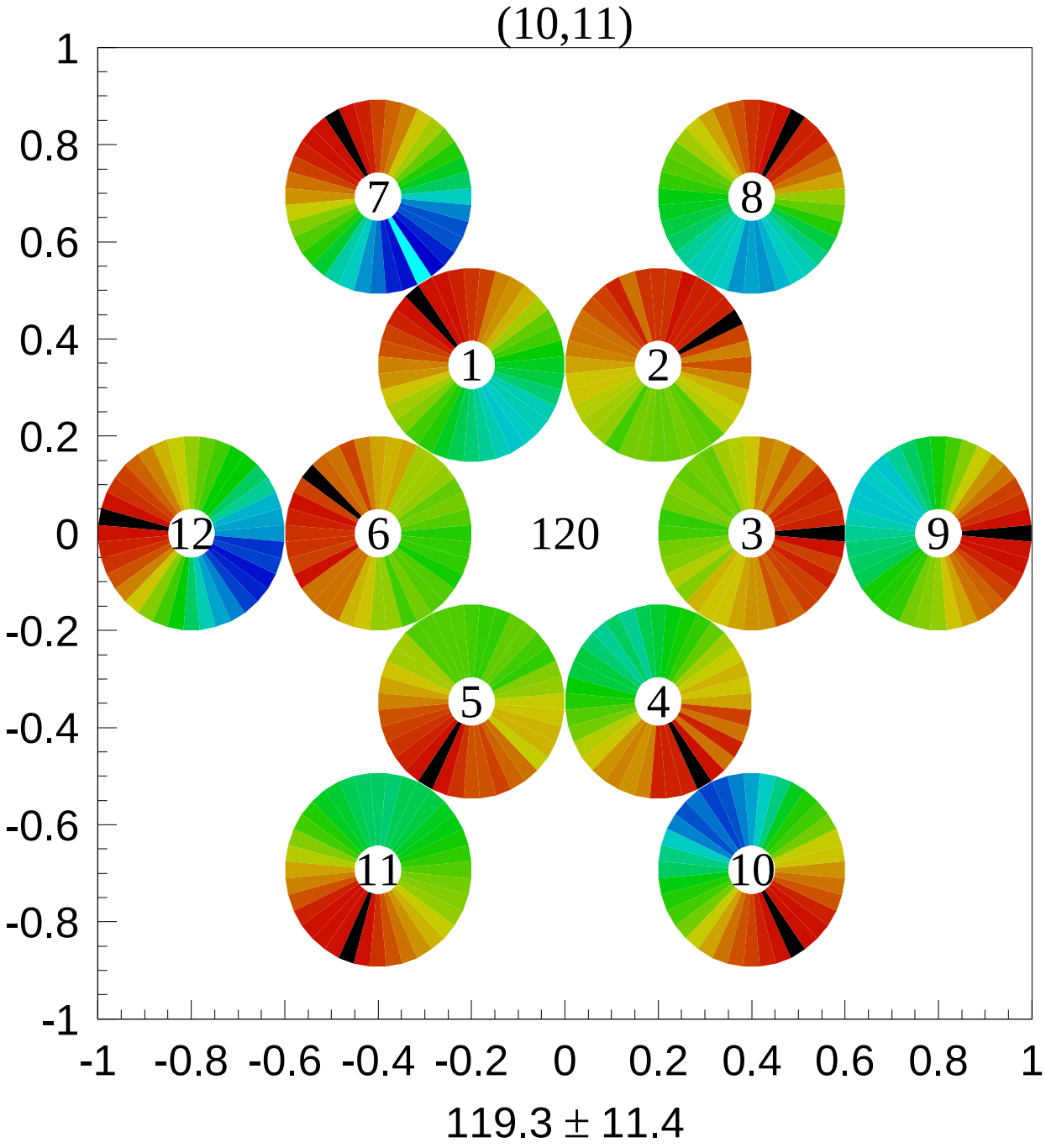

(10,9)
tilted LEDs
124 114 113 115 125 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 119 110 102 130 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

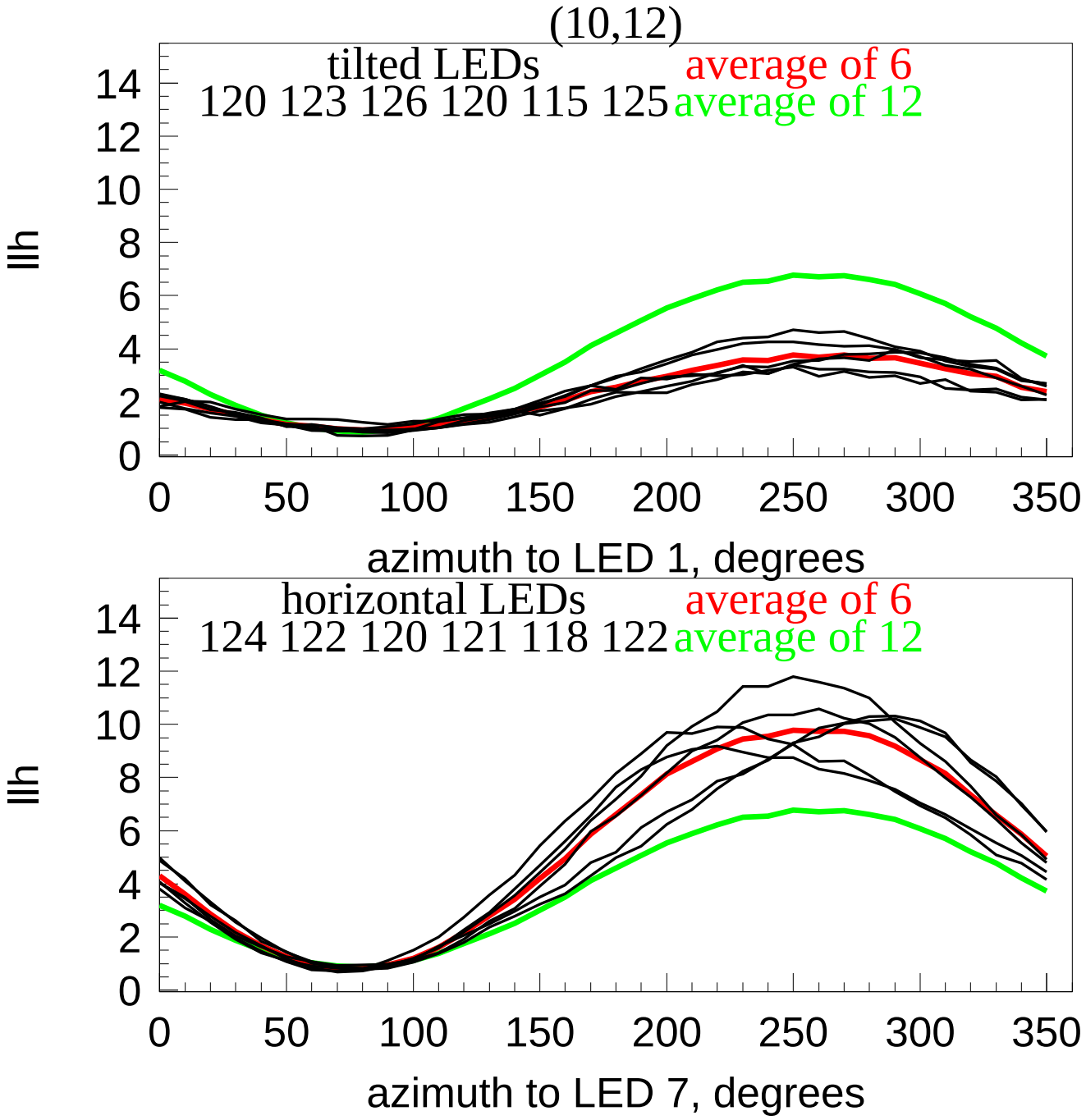

(10,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
118.7 ± 12.4

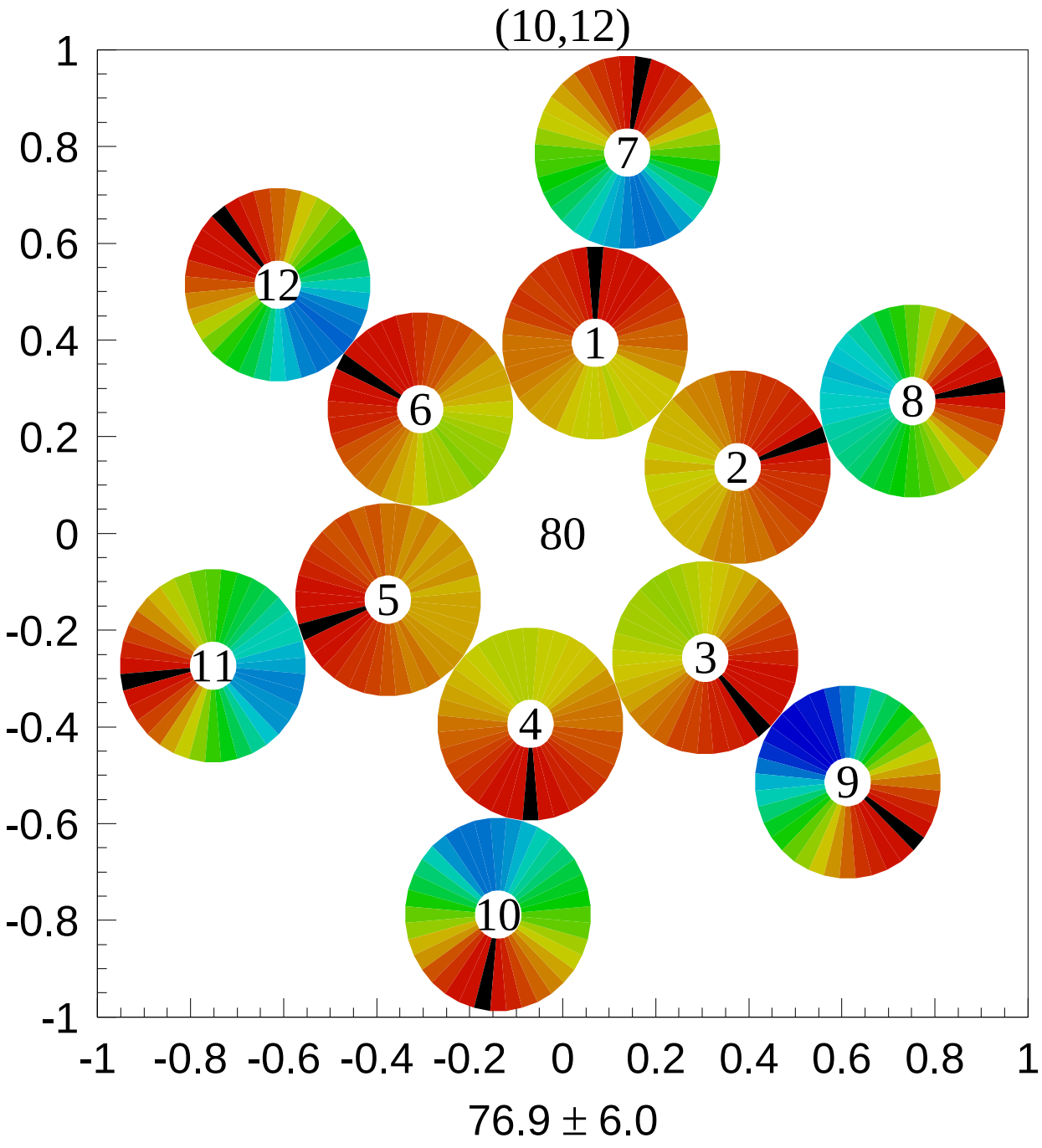

(10,10)
tilted LEDs
121 128 124 116 116 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 125 121 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

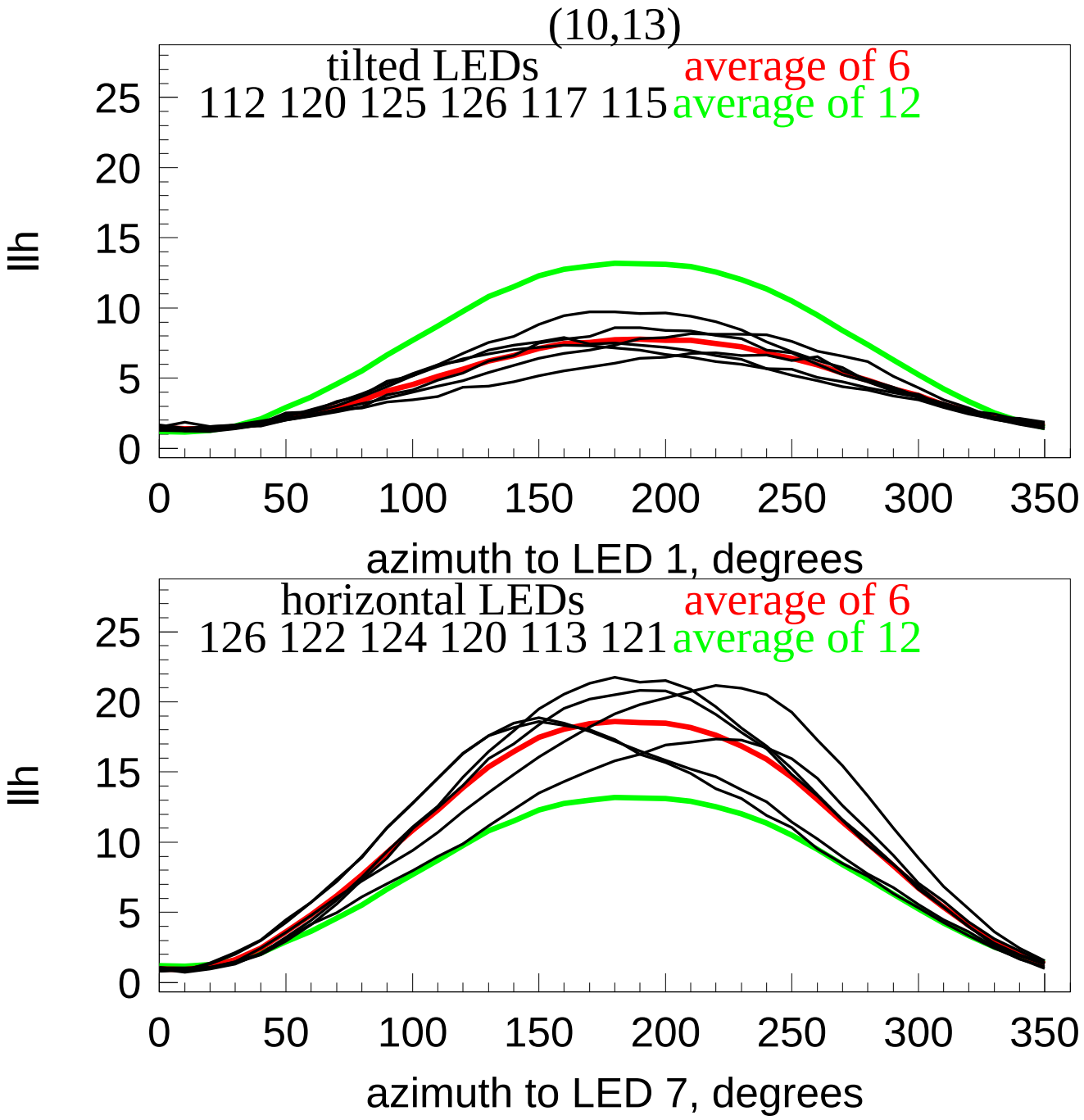

(10,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
330.4 ± 7.4

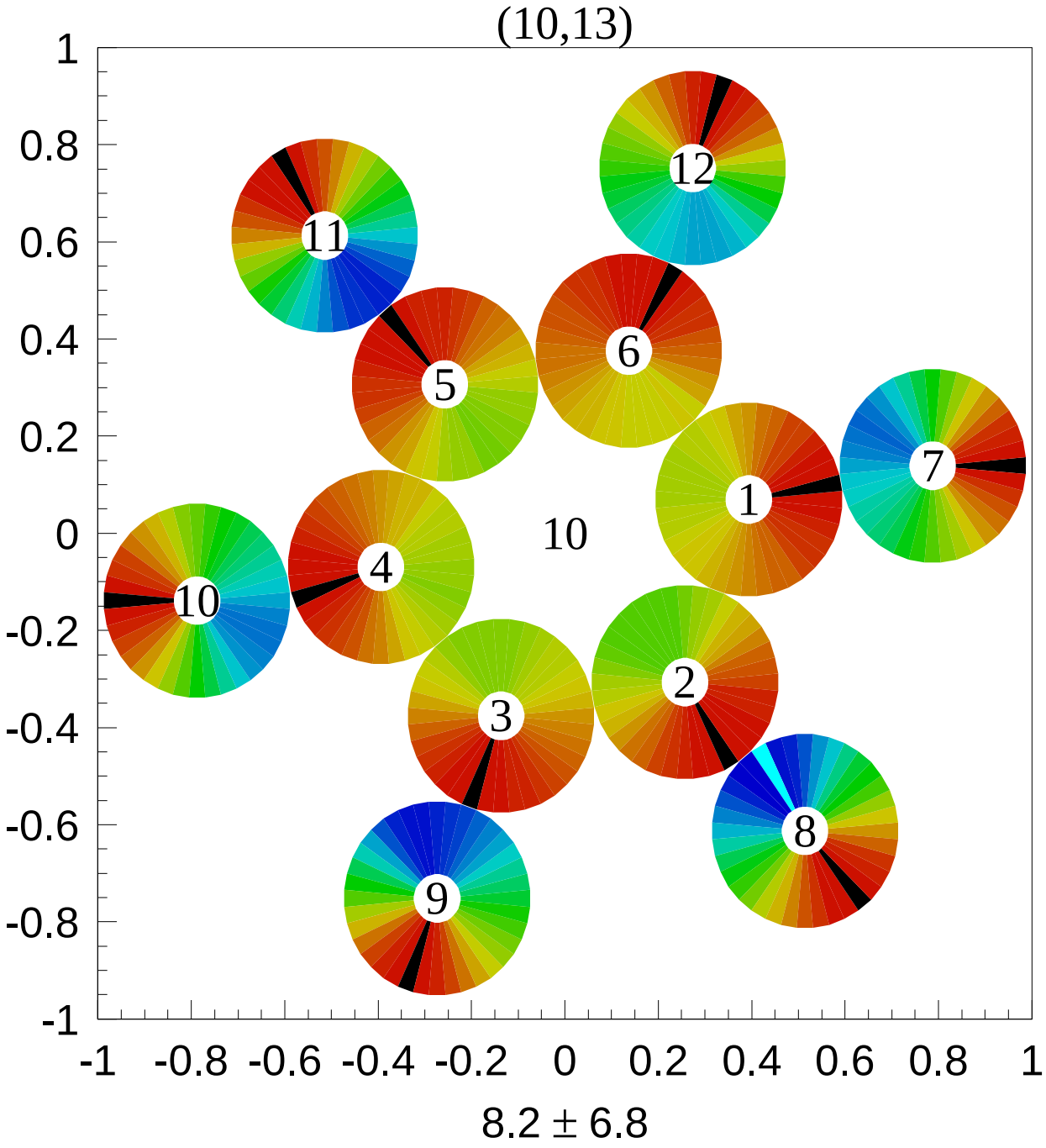

(10,11)
tilted LEDs
115 117 120 134 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 118 118 119 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

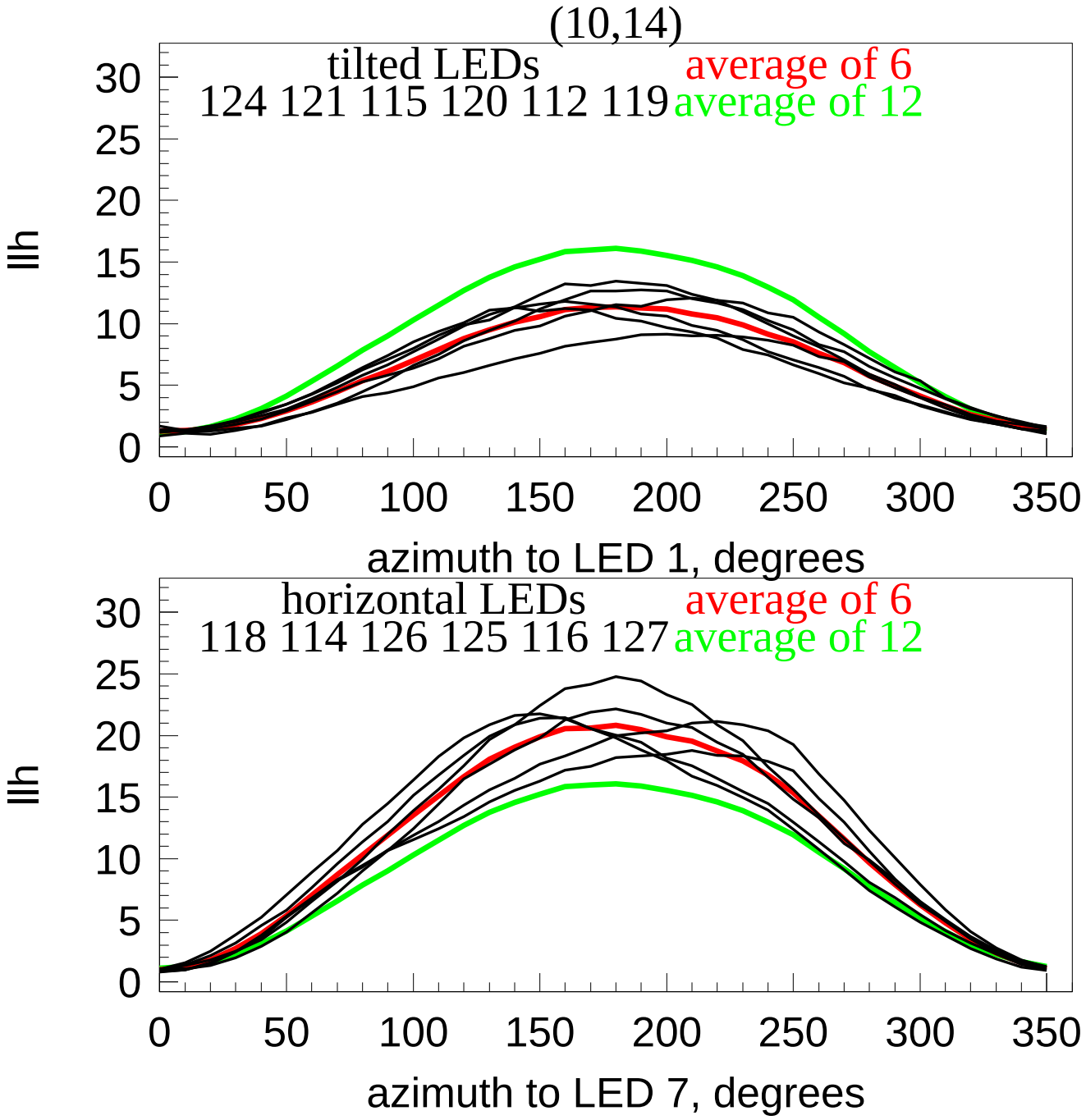

(10,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
119.3 ± 11.4

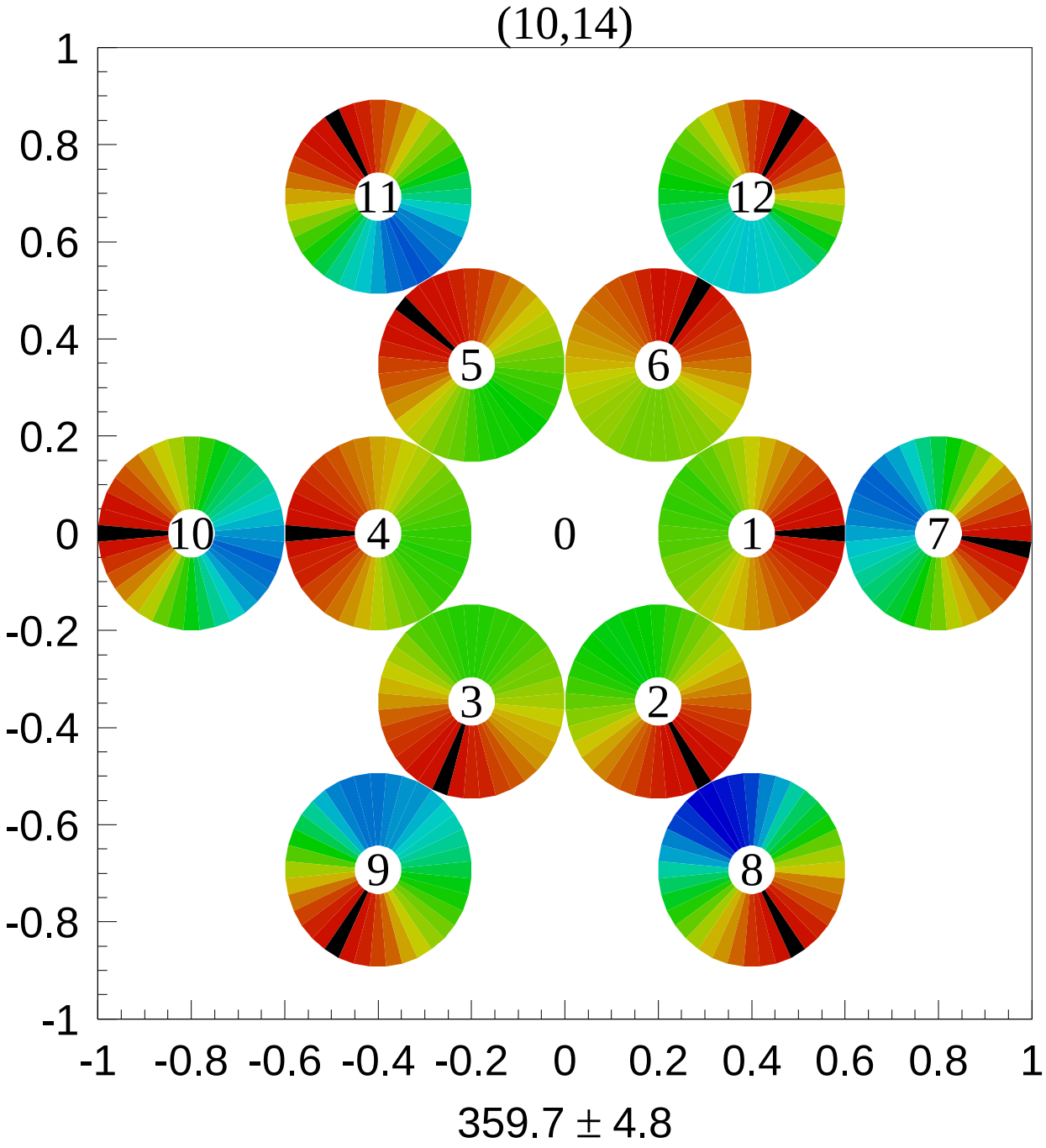

(10,12)
tilted LEDs
120 123 126 120 115 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 120 121 118 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

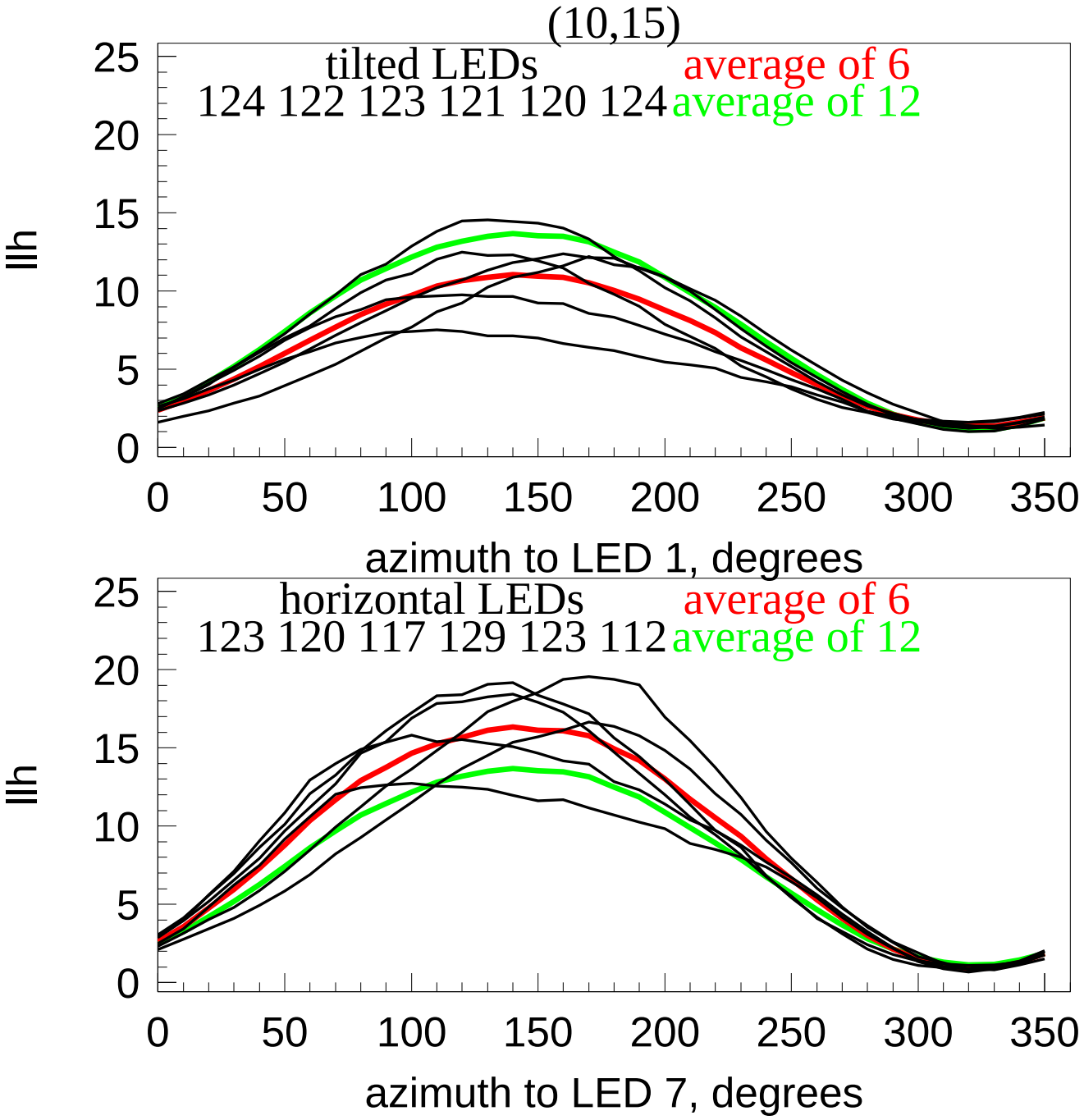

(10,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
76.9 ± 6.0
7
12
1
6
8
2
80
5
11
3
4
9
10

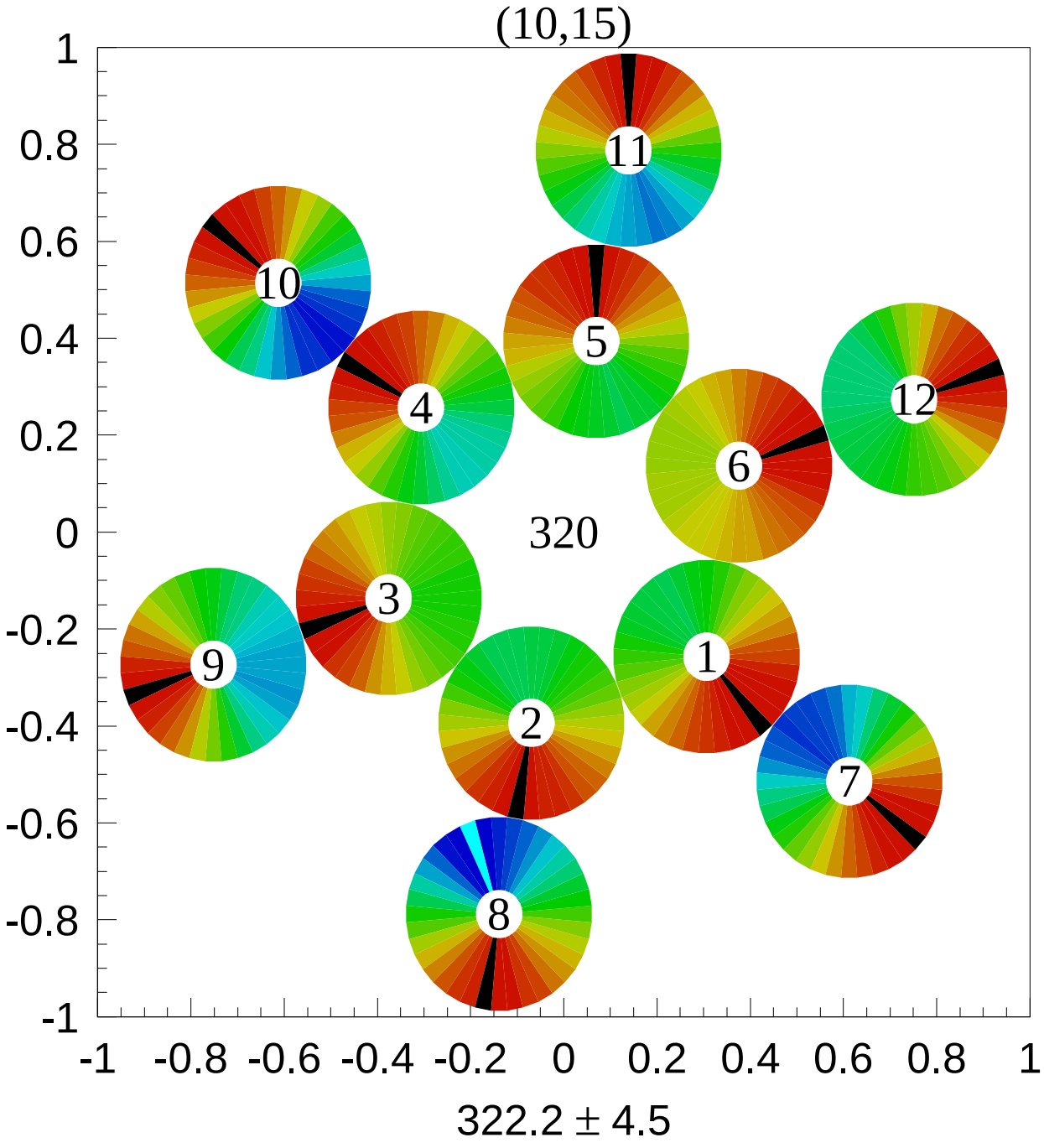

(10,13)
tilted LEDs
112 120 125 126 117 115
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 122 124 120 113 121
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

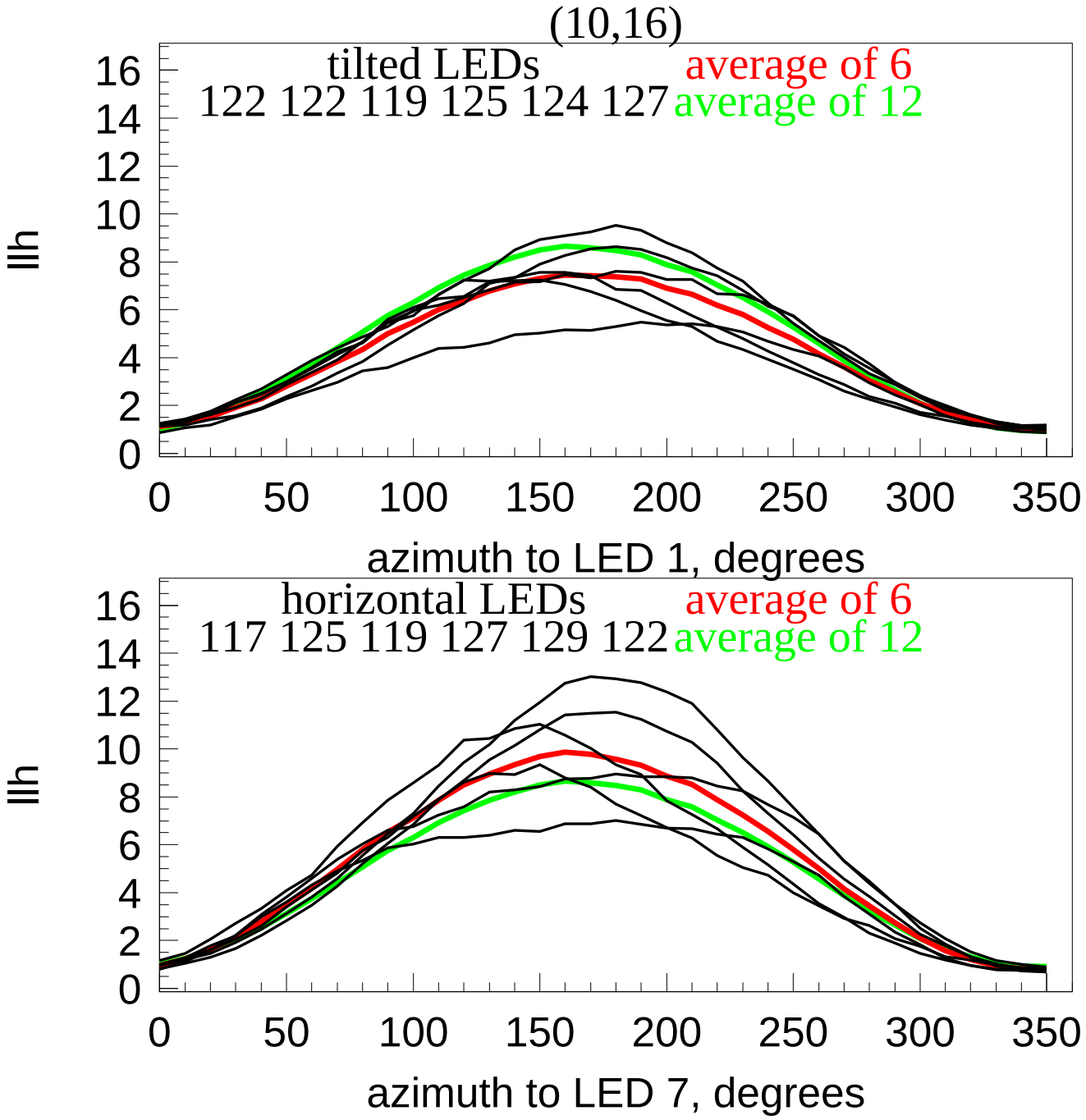

(10,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
8.2 ± 6.8

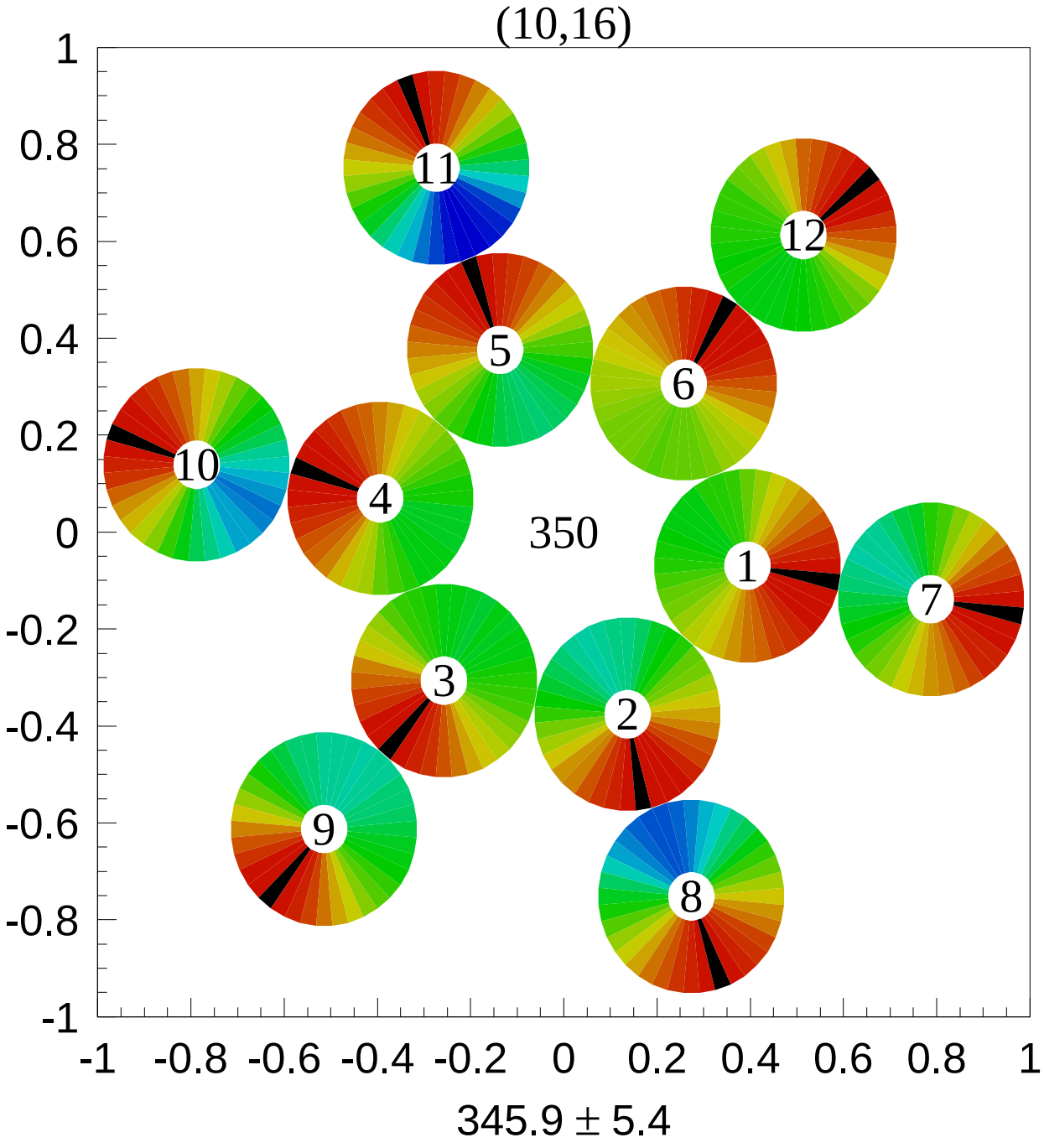

(10,14)
tilted LEDs
124 121 115 120 112 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 114 126 125 116 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

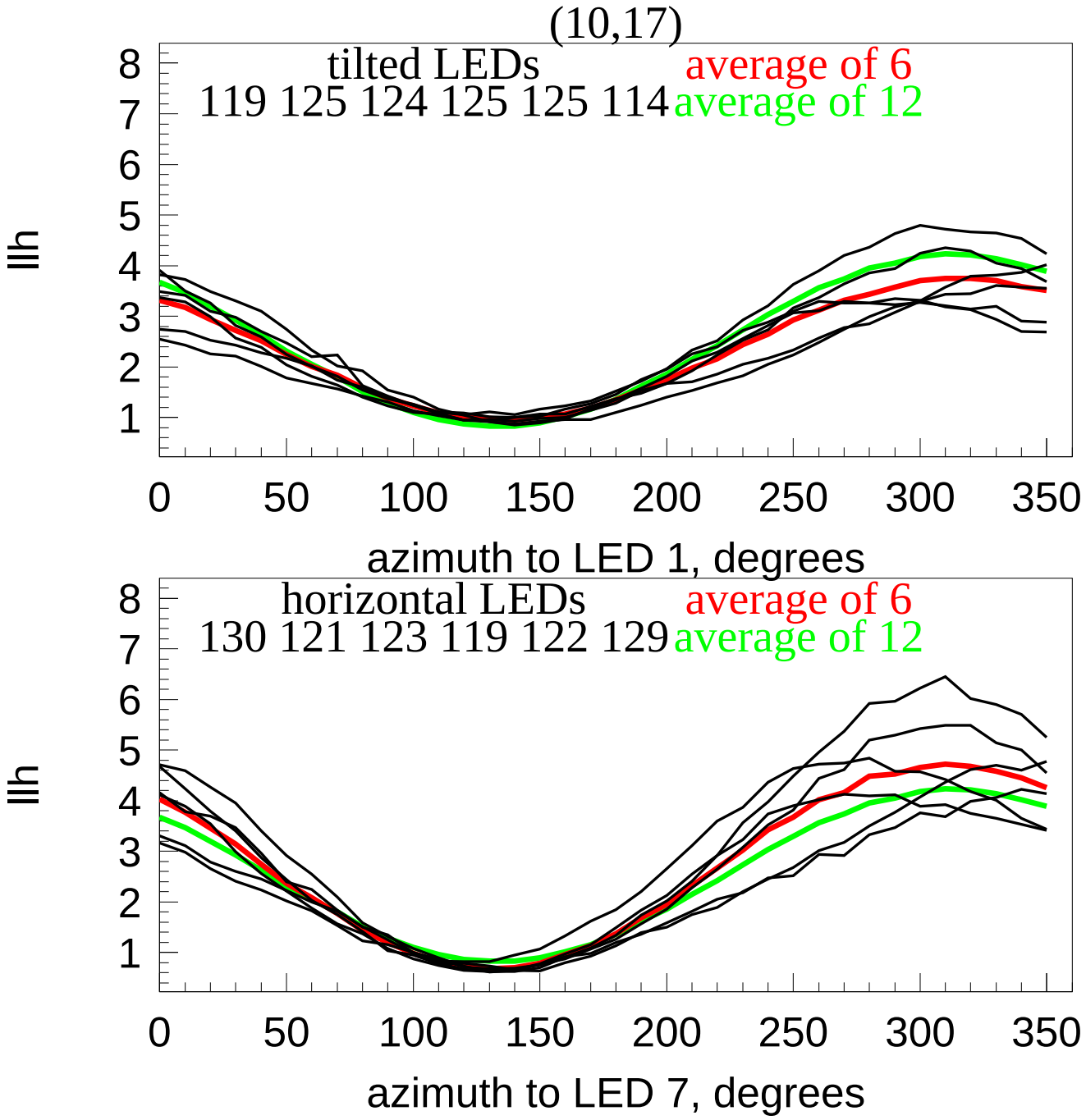

(10,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.7 ± 4.8

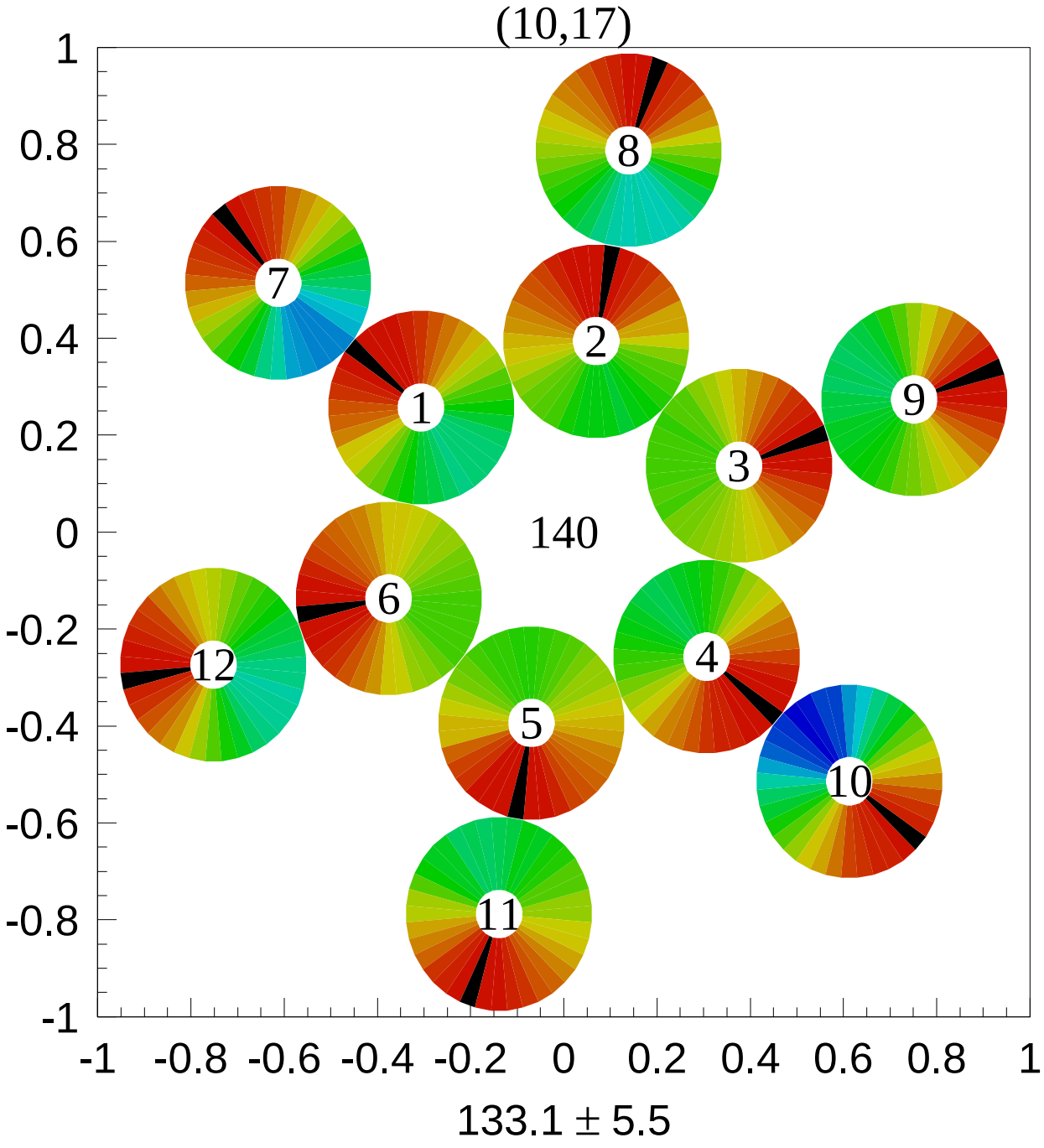

(10,15)
tilted LEDs
124 122 123 121 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 117 129 123 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

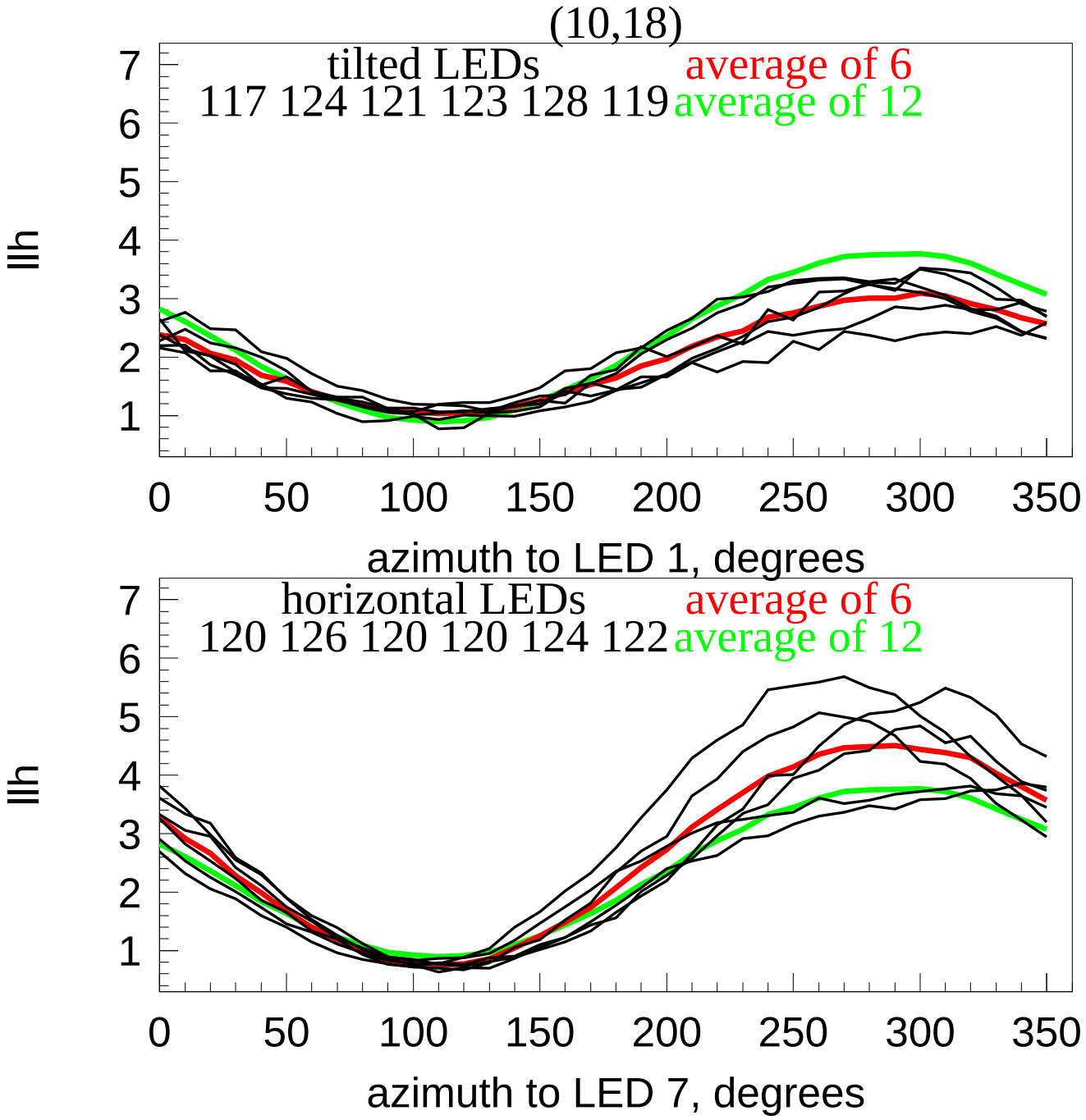

(10,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
322.2 ± 4.5

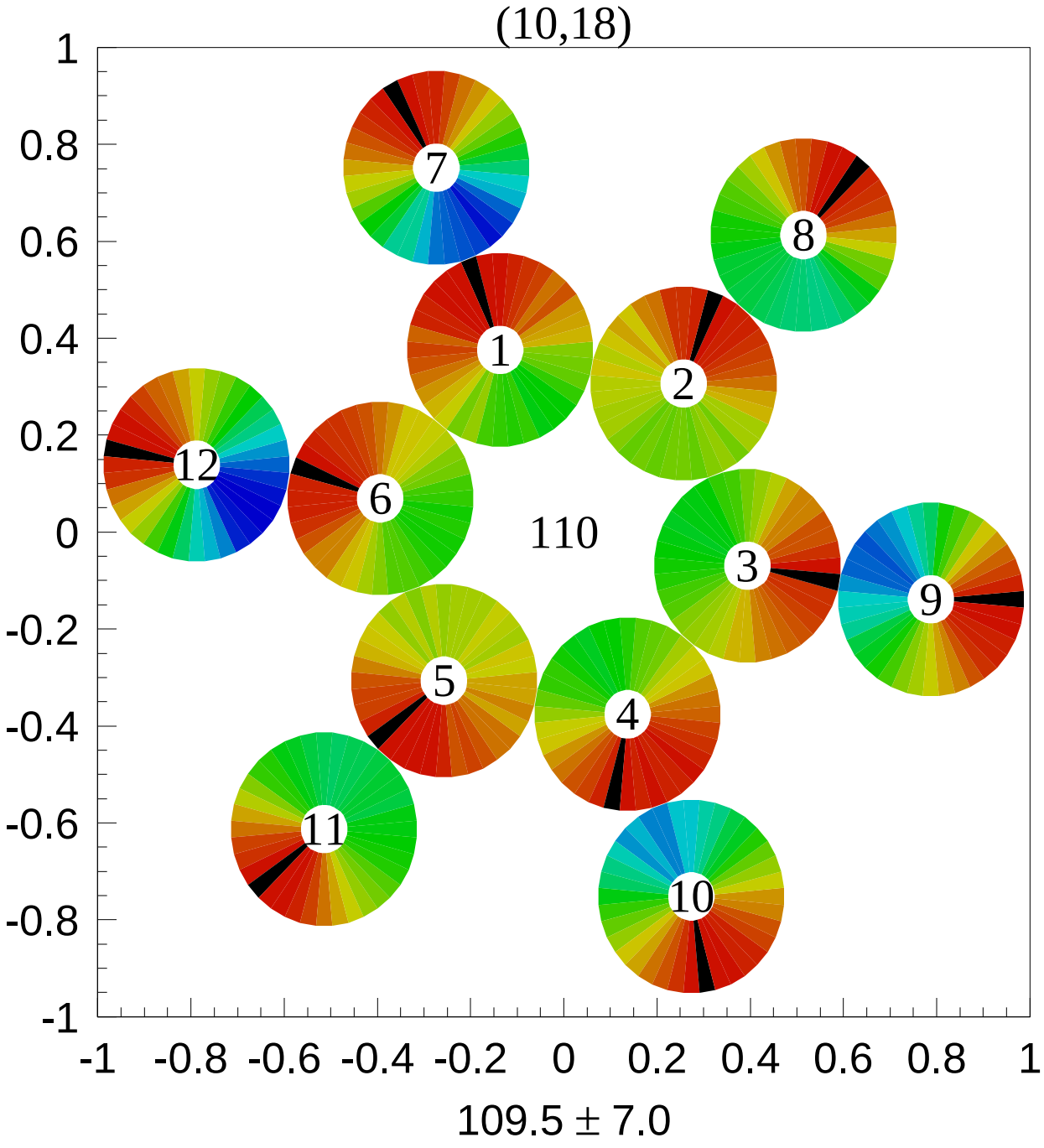

(10,16)
tilted LEDs
122 122 119 125 124 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 125 119 127 129 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

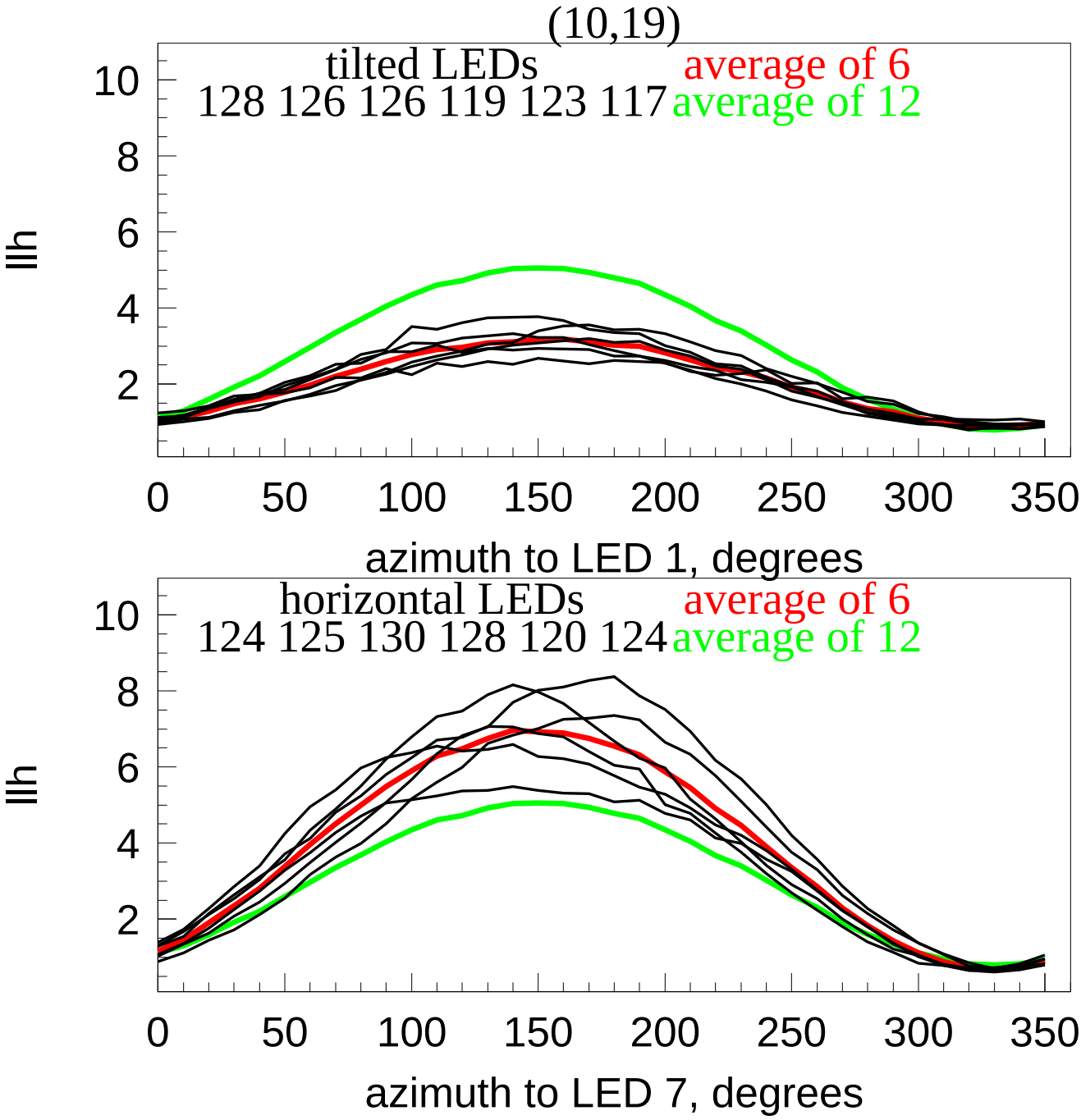

(10,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
345.9 ± 5.4

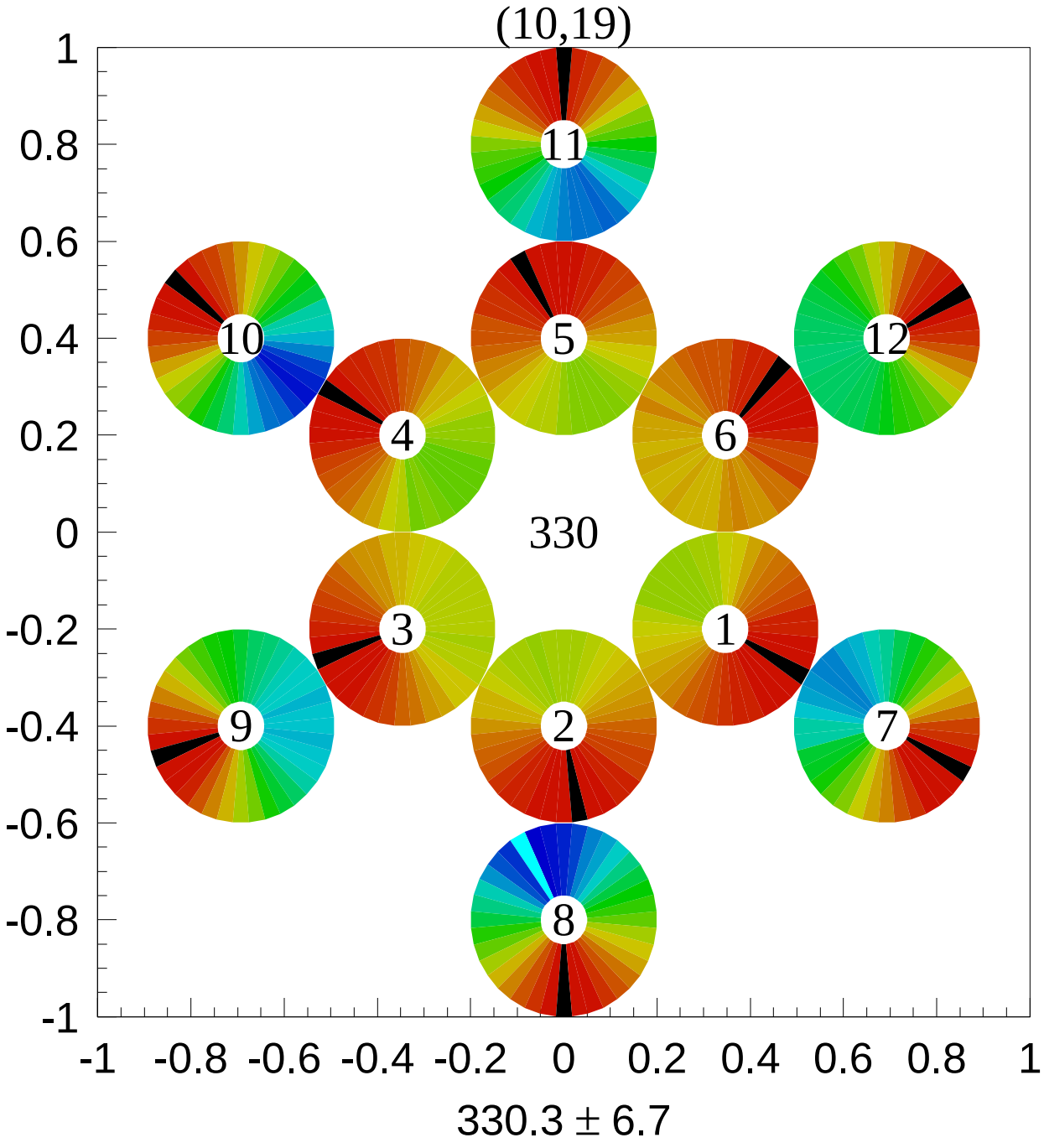

(10,17)
tilted LEDs
119 125 124 125 125 114
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
130 121 123 119 122 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

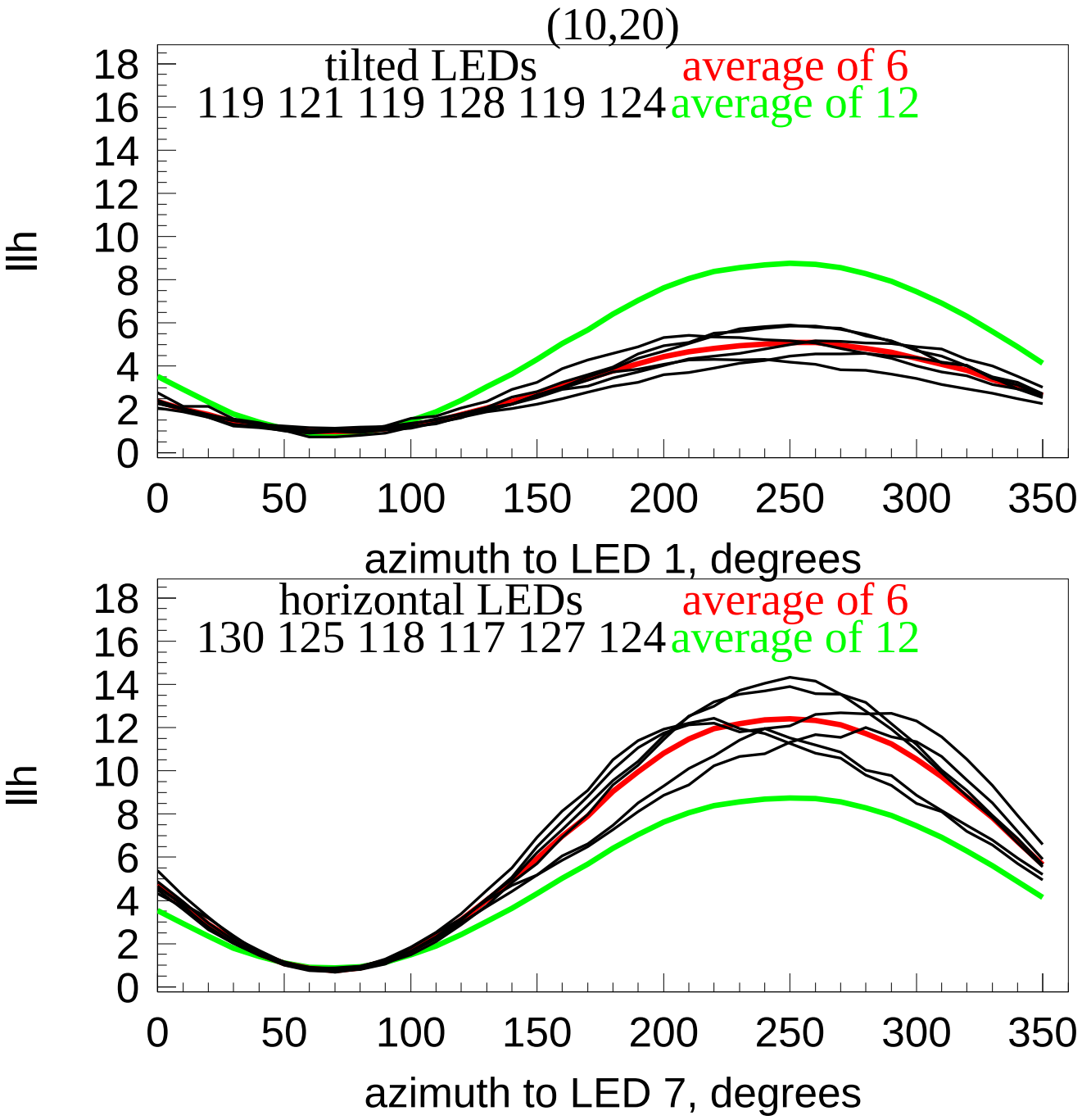

(10,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
133.1 ± 5.5

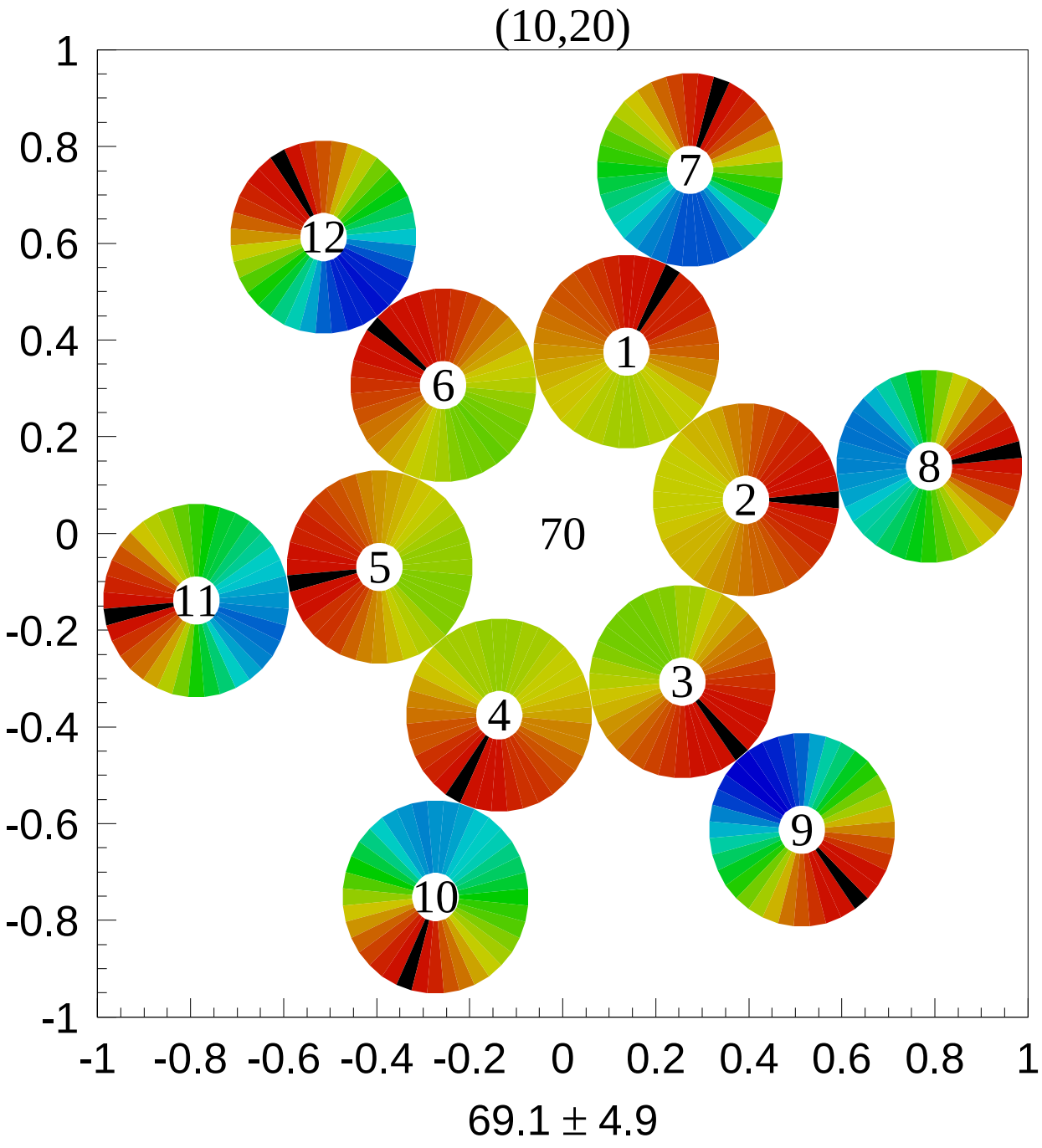

(10,18)
tilted LEDs
117 124 121 123 128 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 126 120 120 124 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

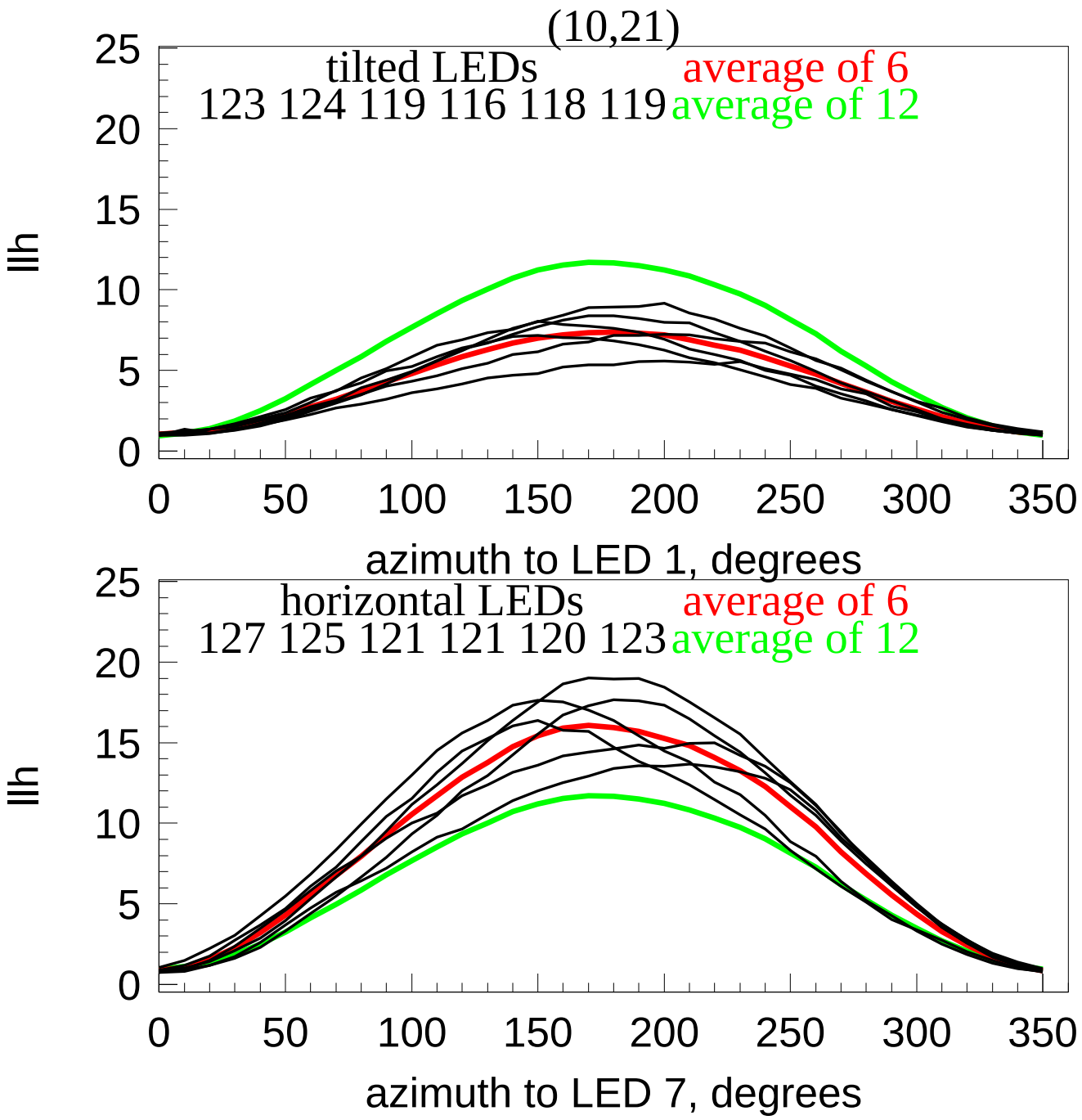

(10,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
109.5 ± 7.0

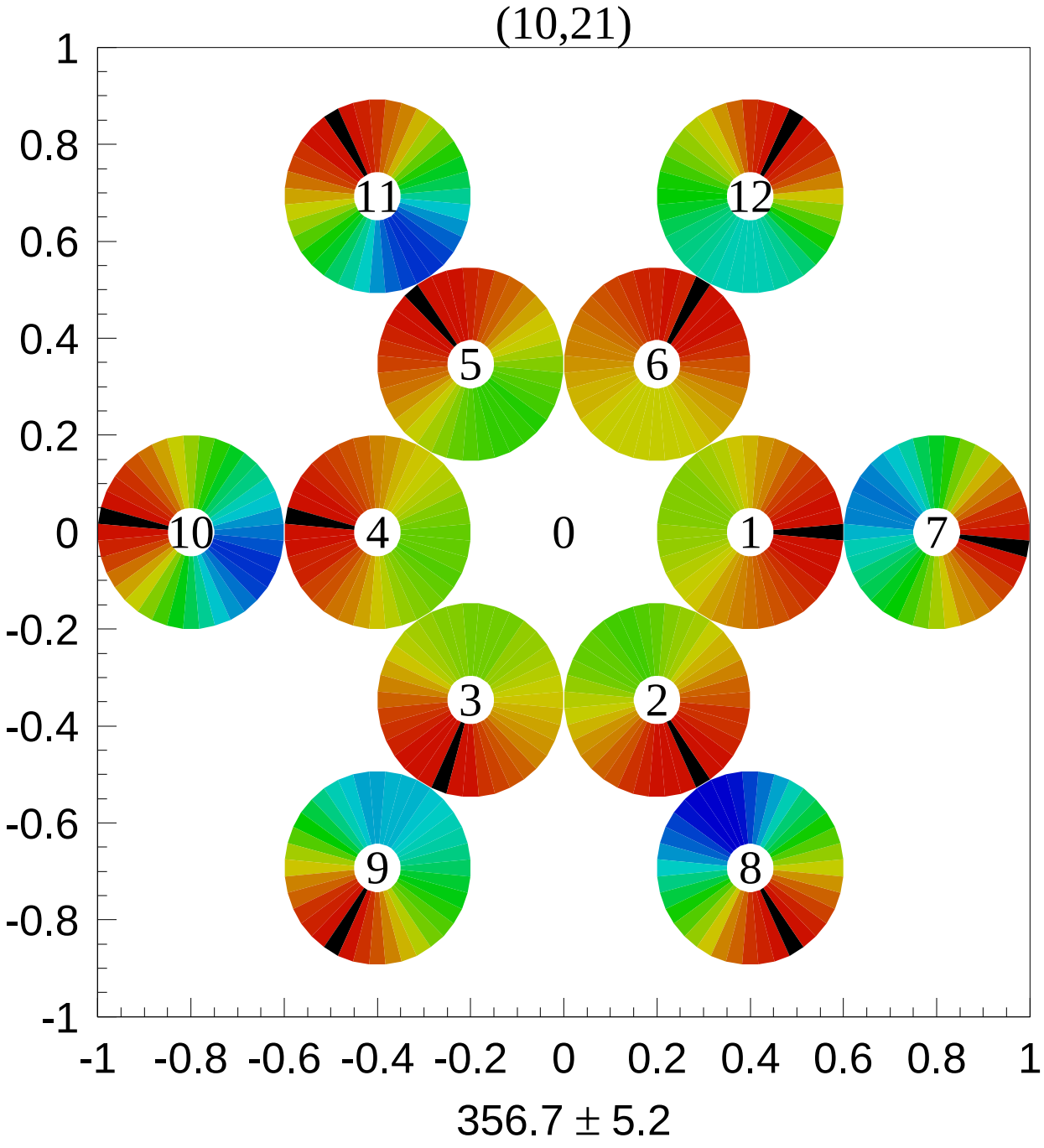

(10,19)
tilted LEDs
128 126 126 119 123 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 130 128 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

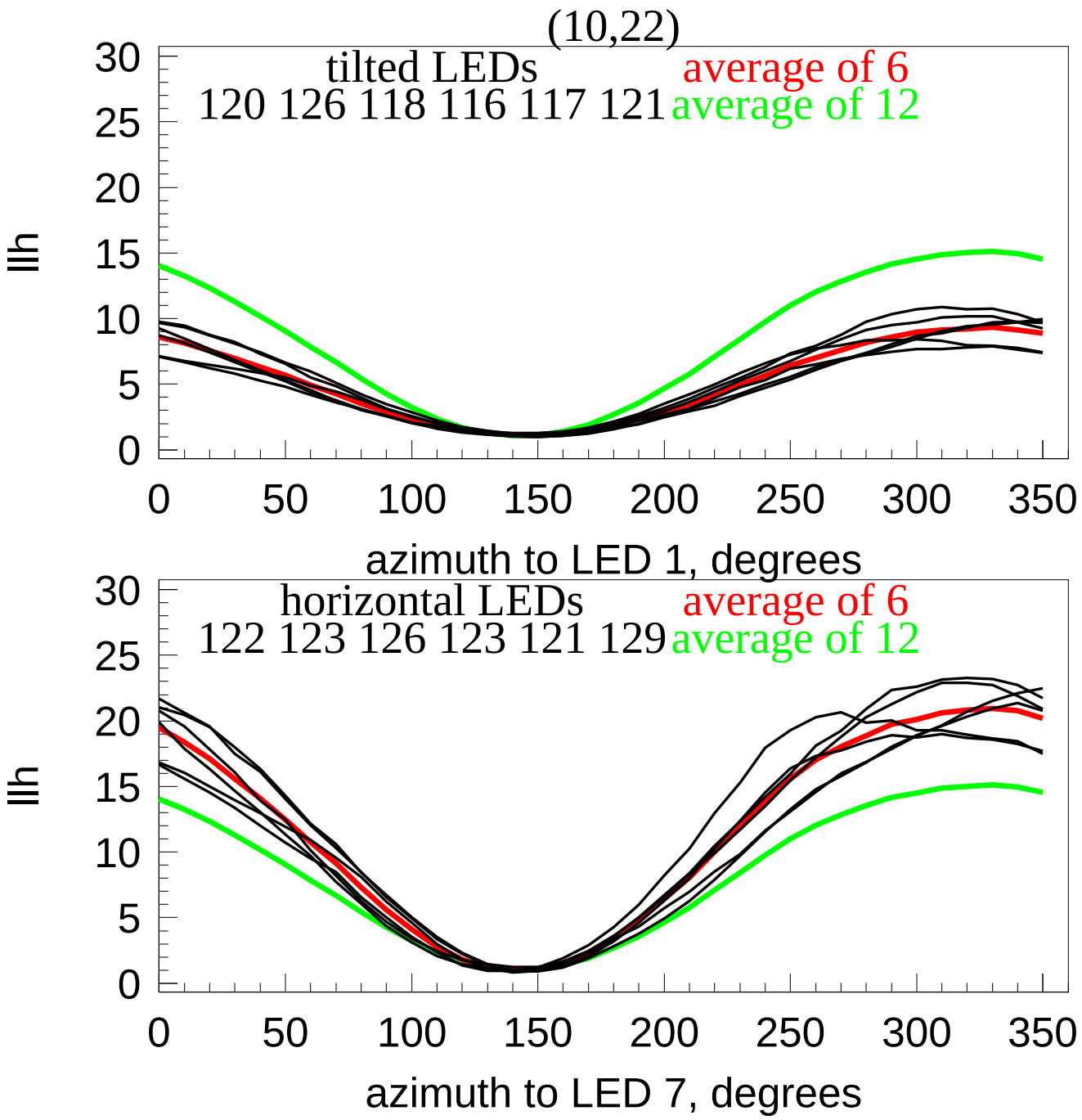

(10,19)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
330.3 ± 6.7

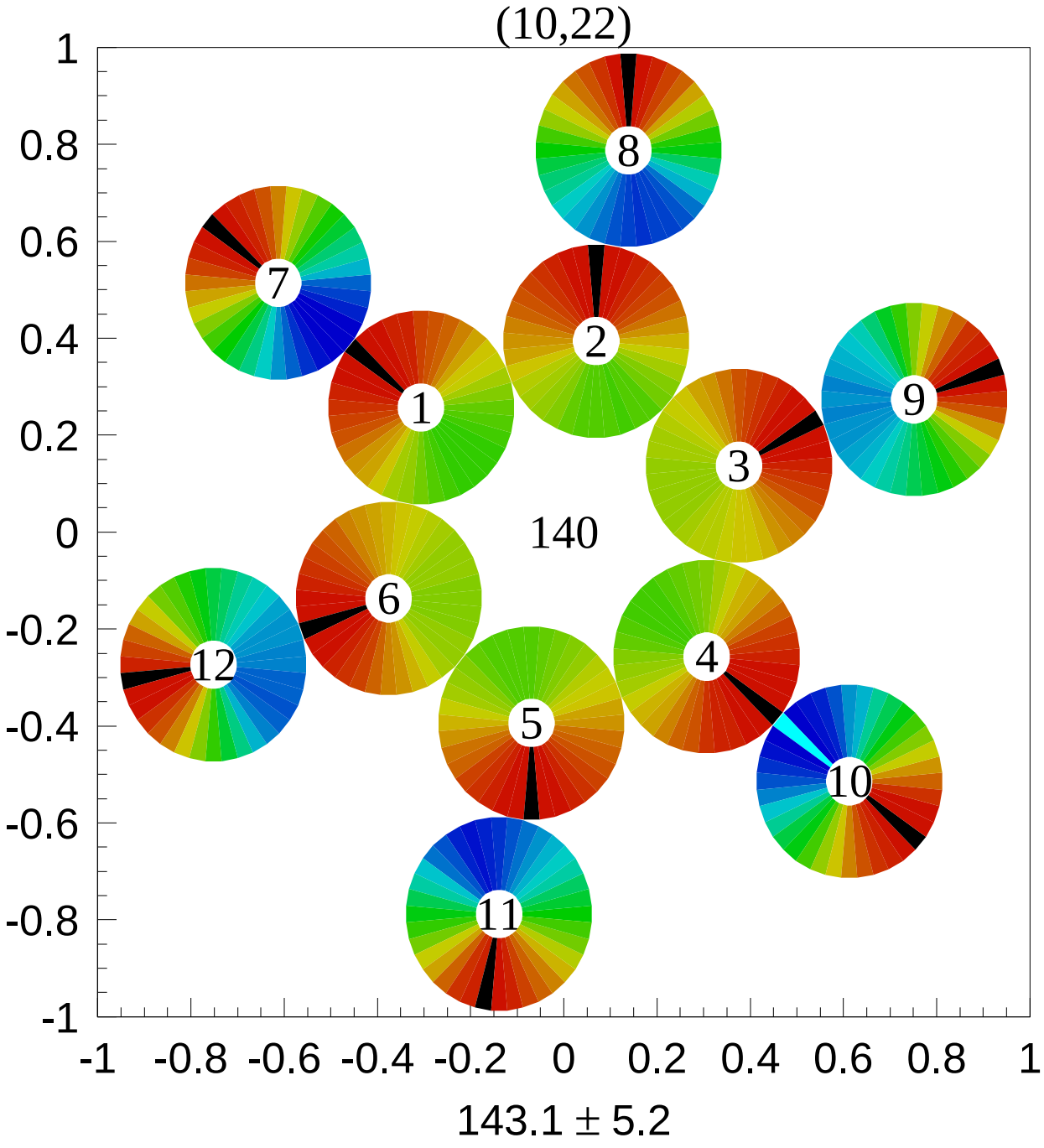

(10,20)
tilted LEDs
119 121 119 128 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 125 118 117 127 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

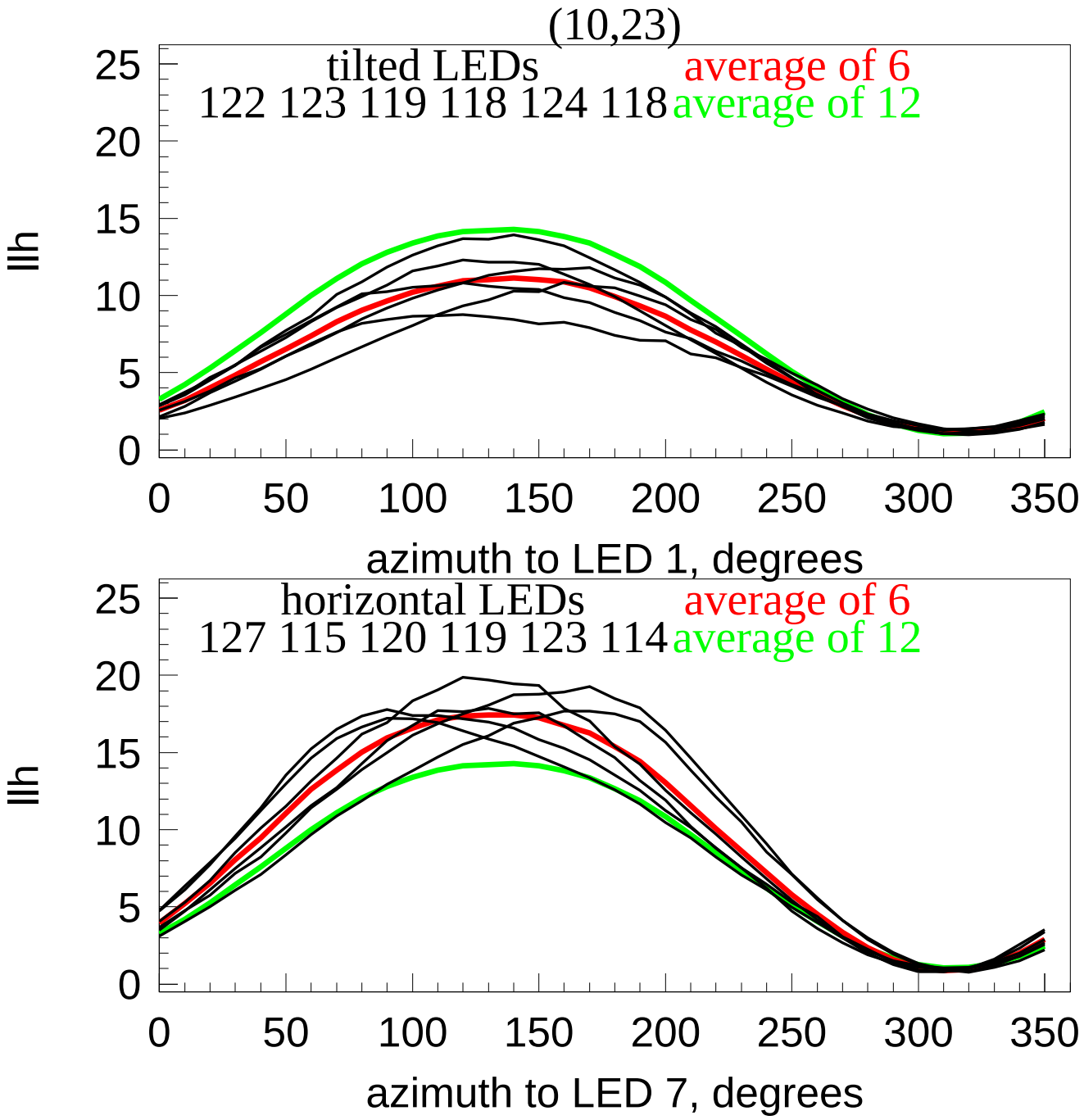

(10,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
69.1 ± 4.9

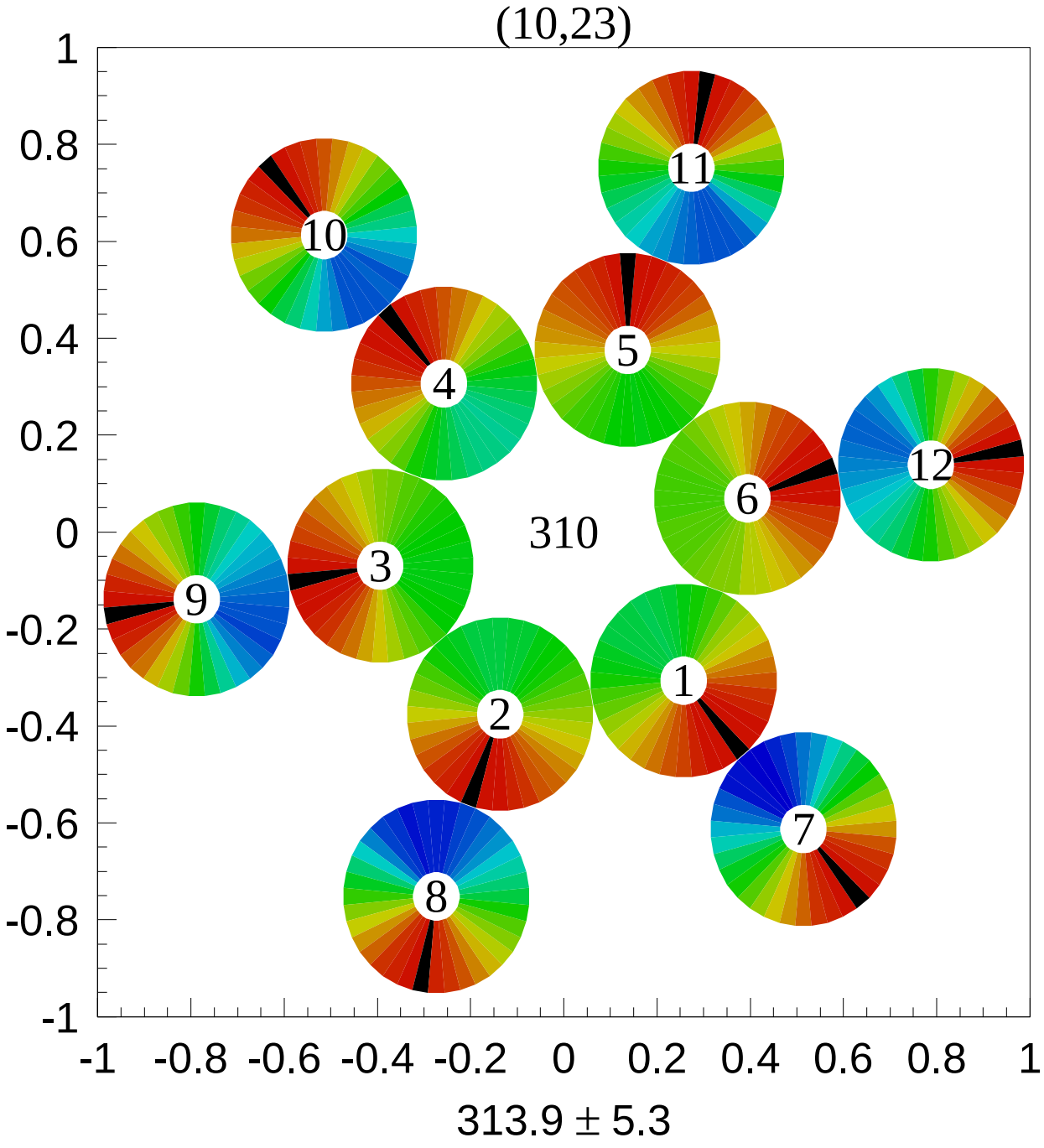

(10,21)
tilted LEDs
123 124 119 116 118 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 125 121 121 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

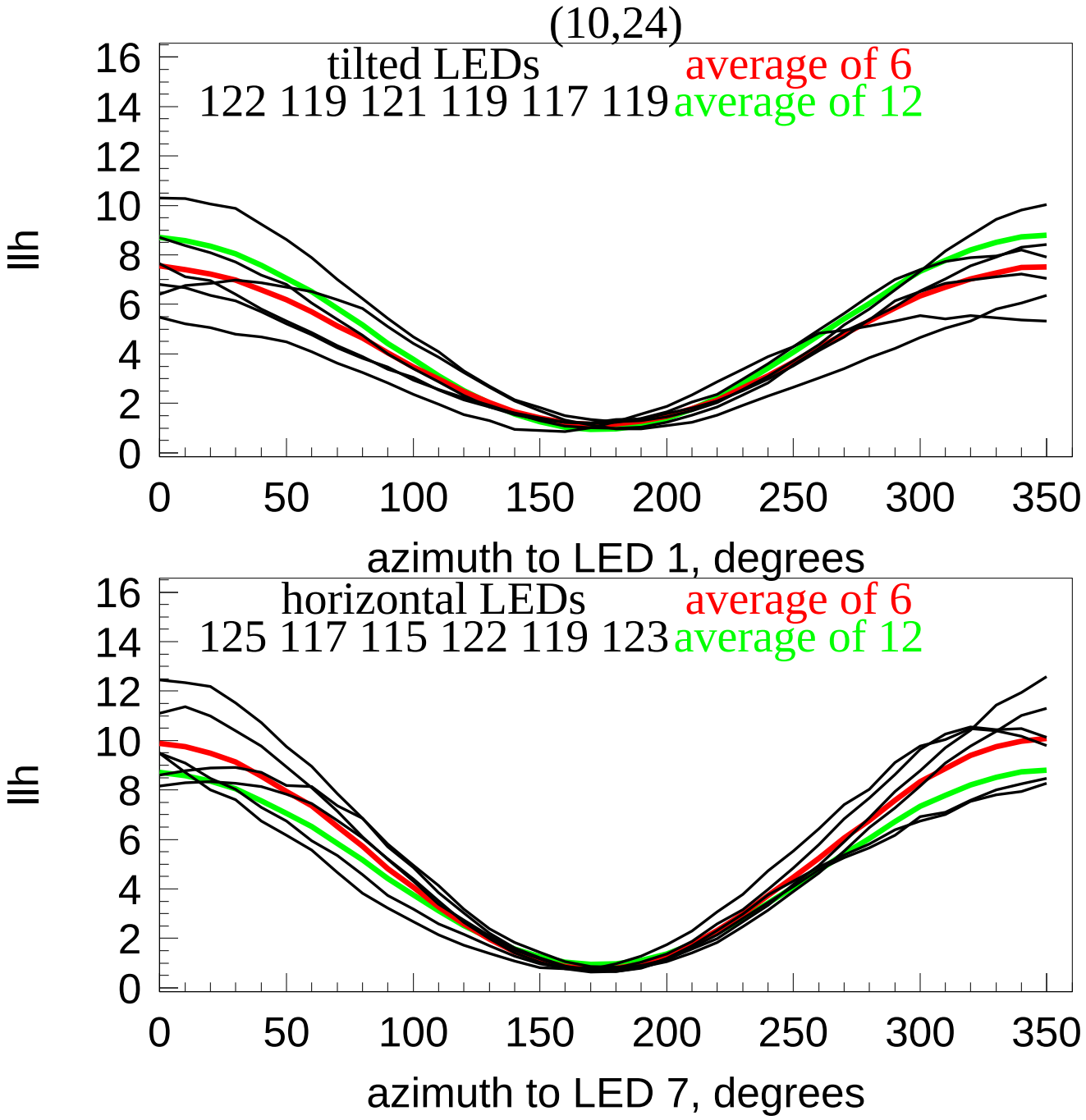

(10,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
356.7 ± 5.2

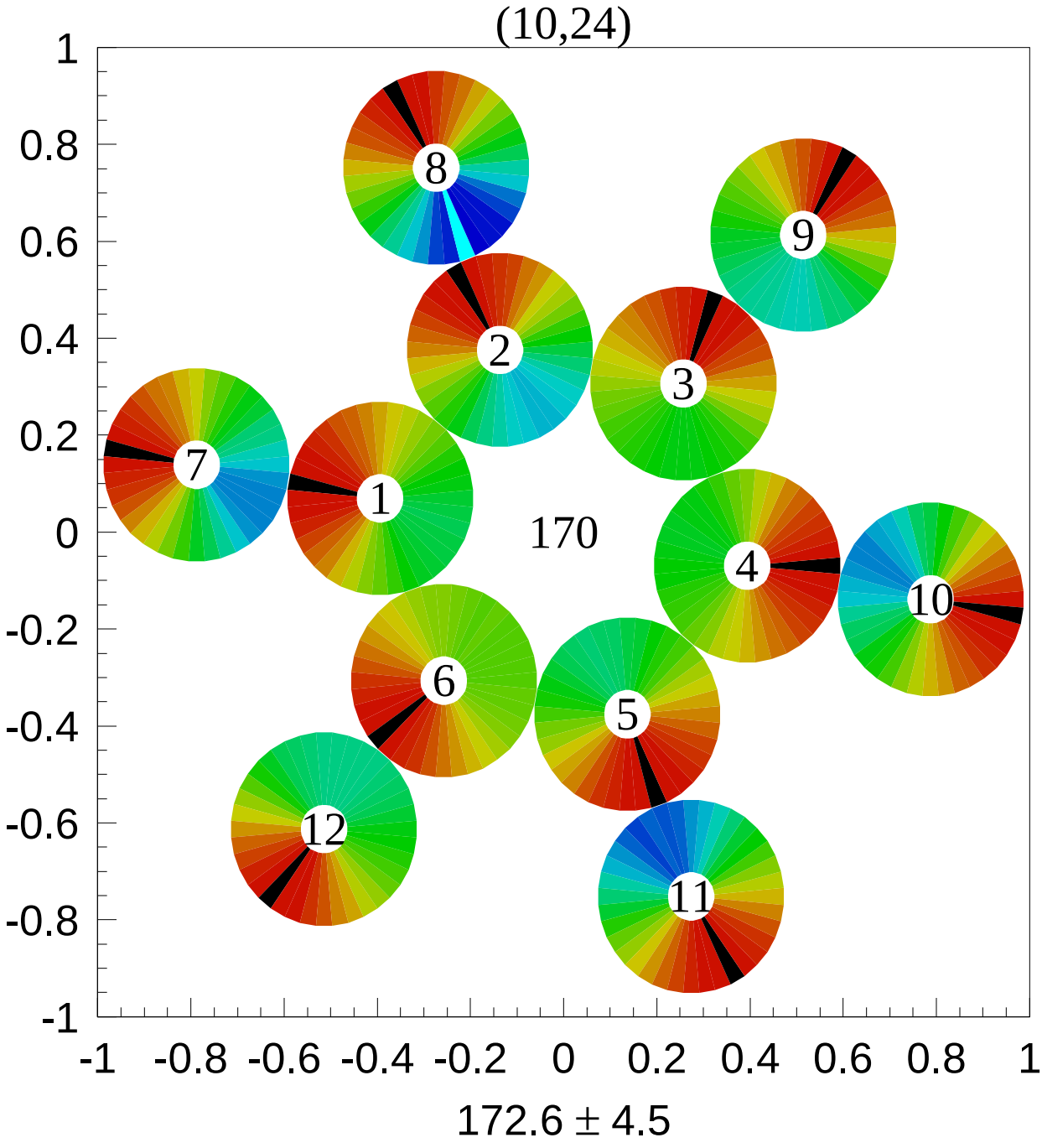

(10,22)
tilted LEDs
120 126 118 116 117 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 126 123 121 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

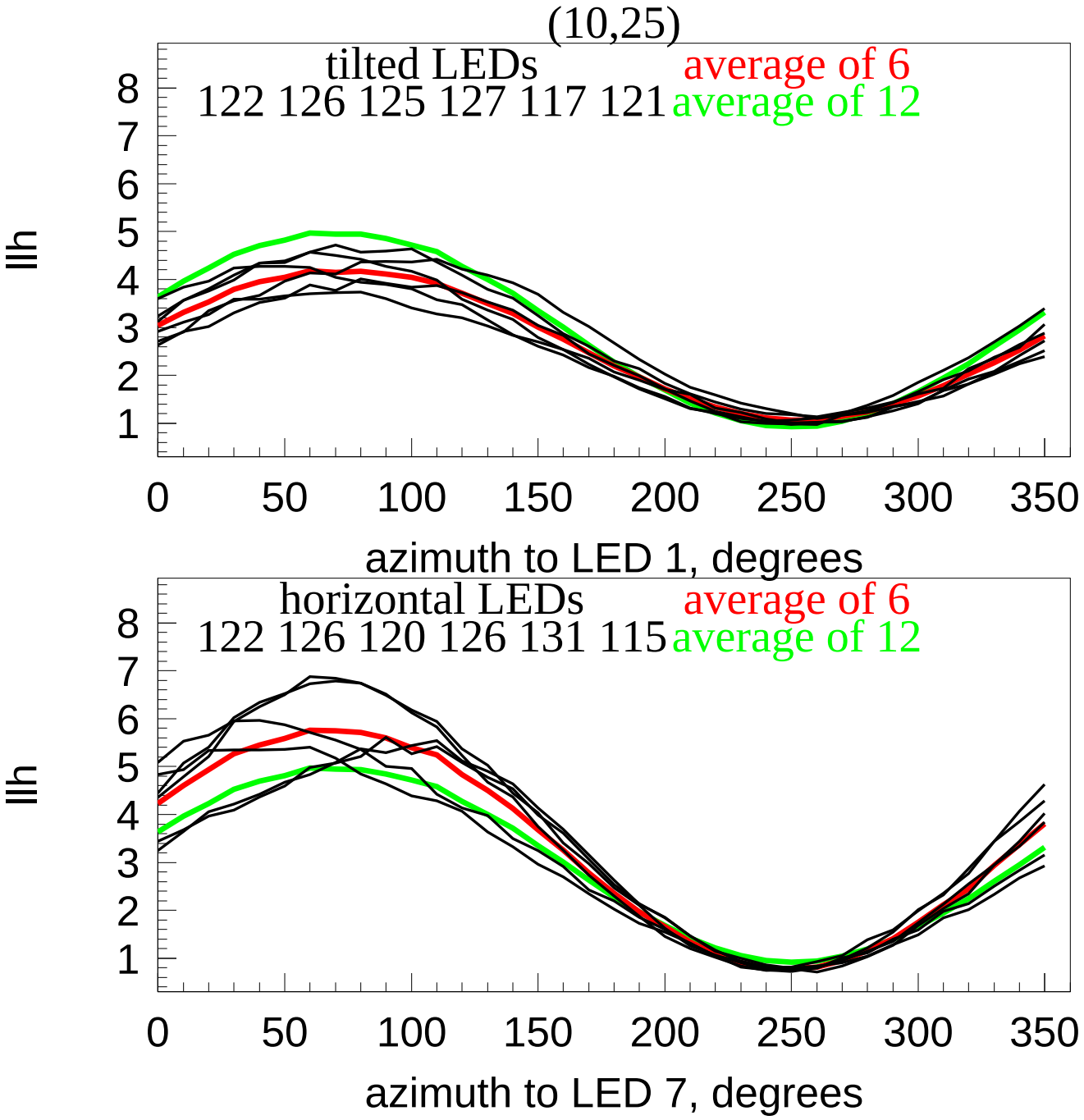

(10,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
140
143.1 ± 5.2
1
2
3
4
5
6
7
8
9
10
11
12

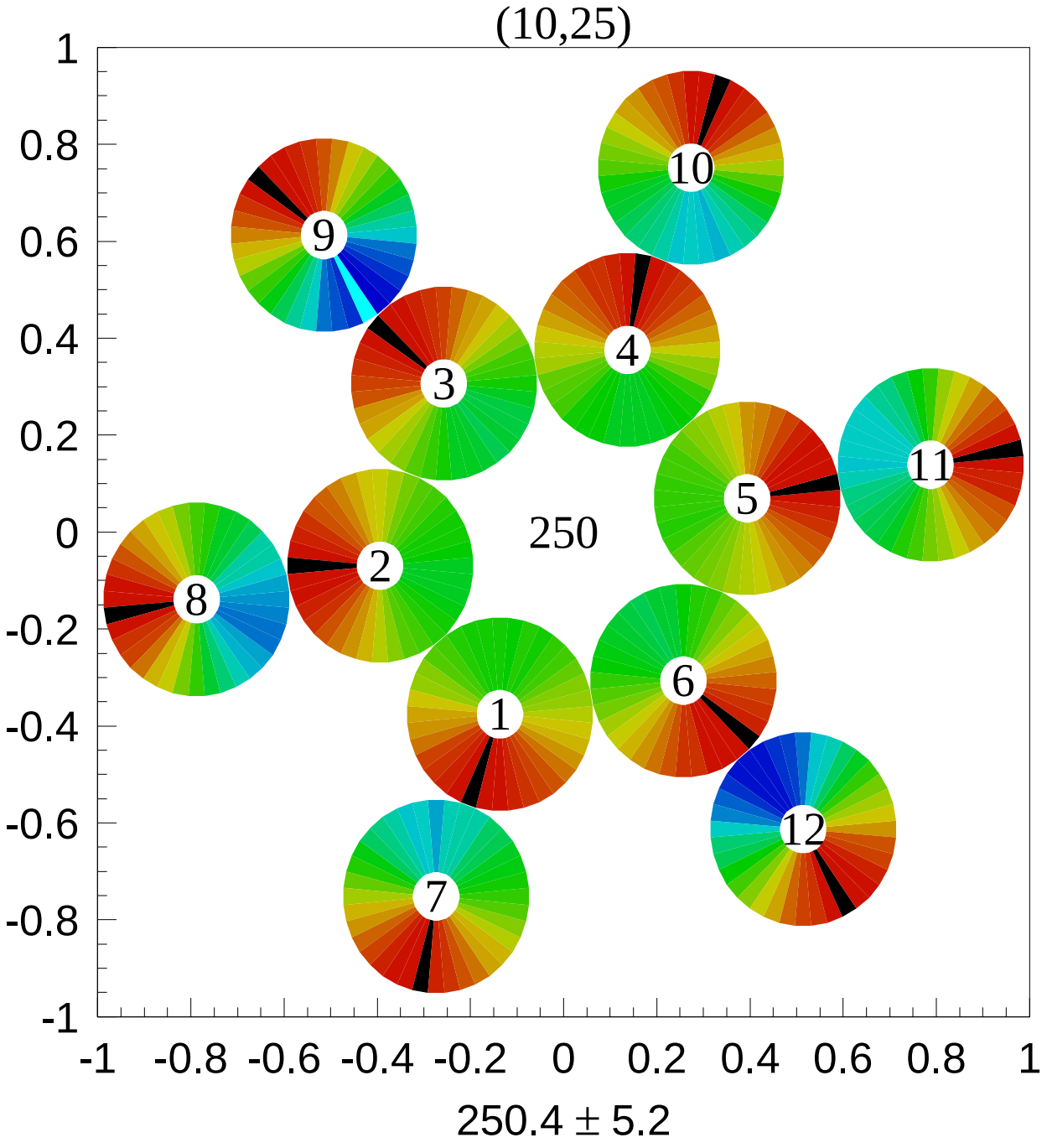

(10,23)
tilted LEDs
122 123 119 118 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 115 120 119 123 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

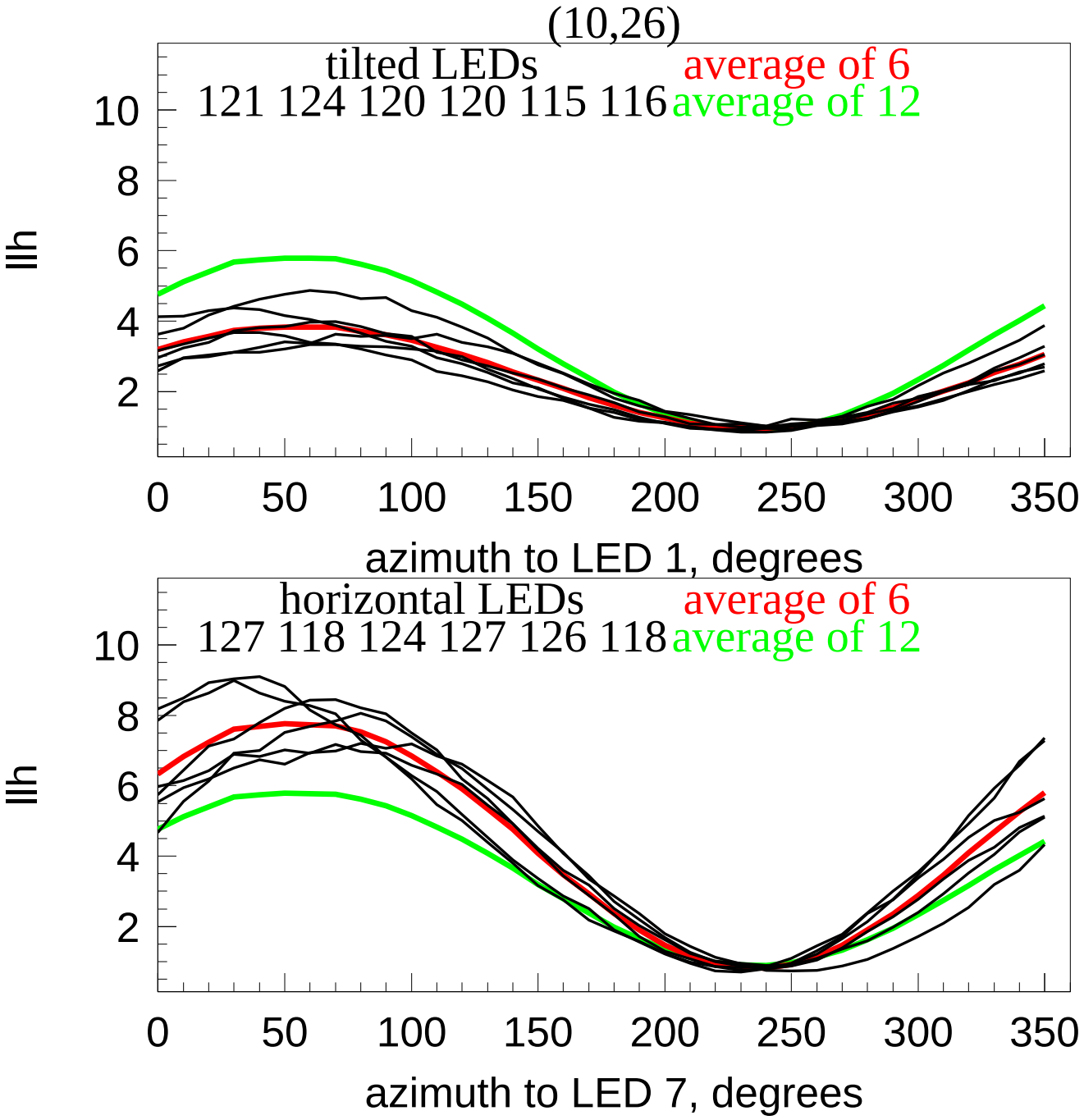

(10,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
313.9 ± 5.3

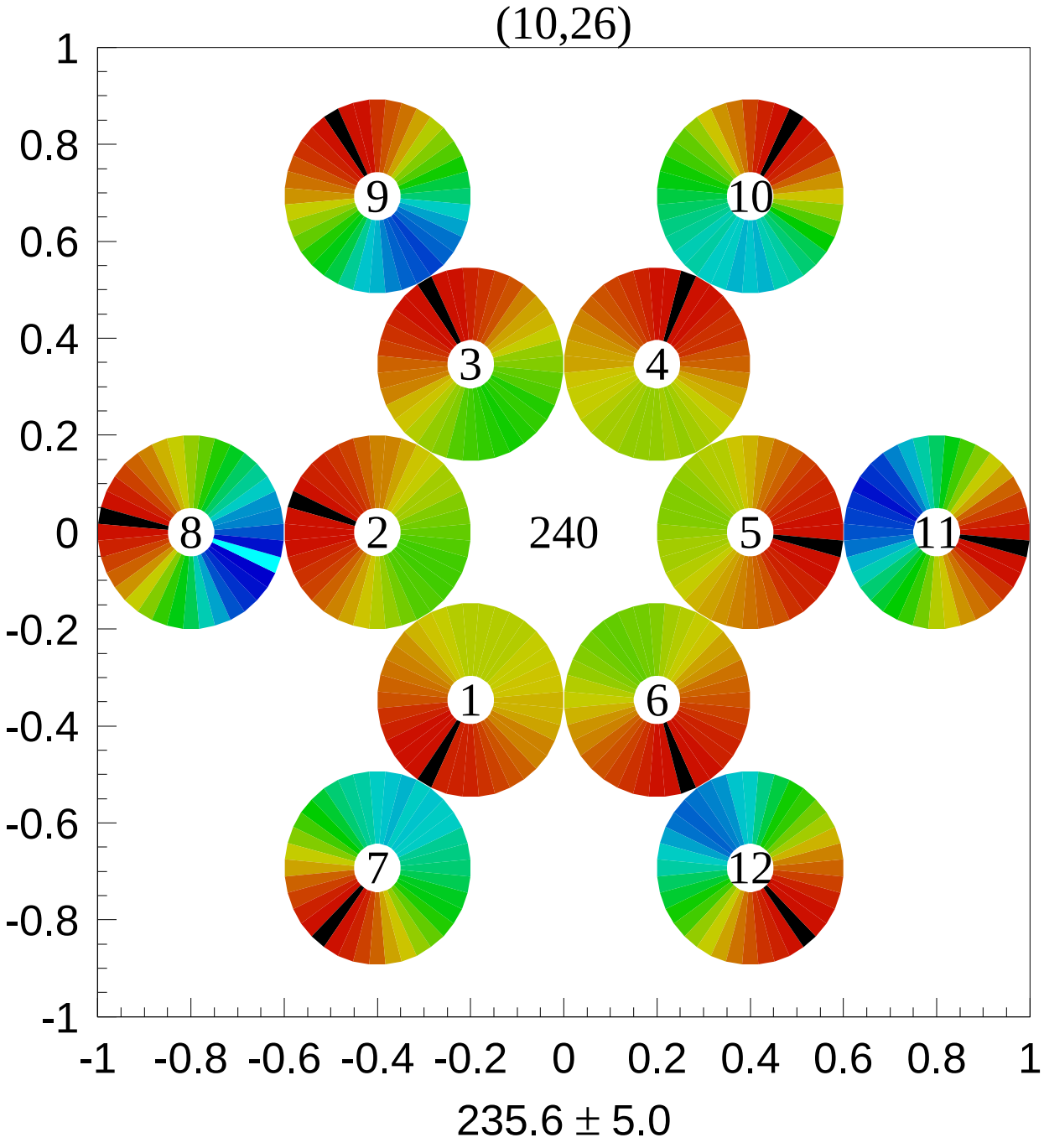

(10,24)
tilted LEDs
122 119 121 119 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 117 115 122 119 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

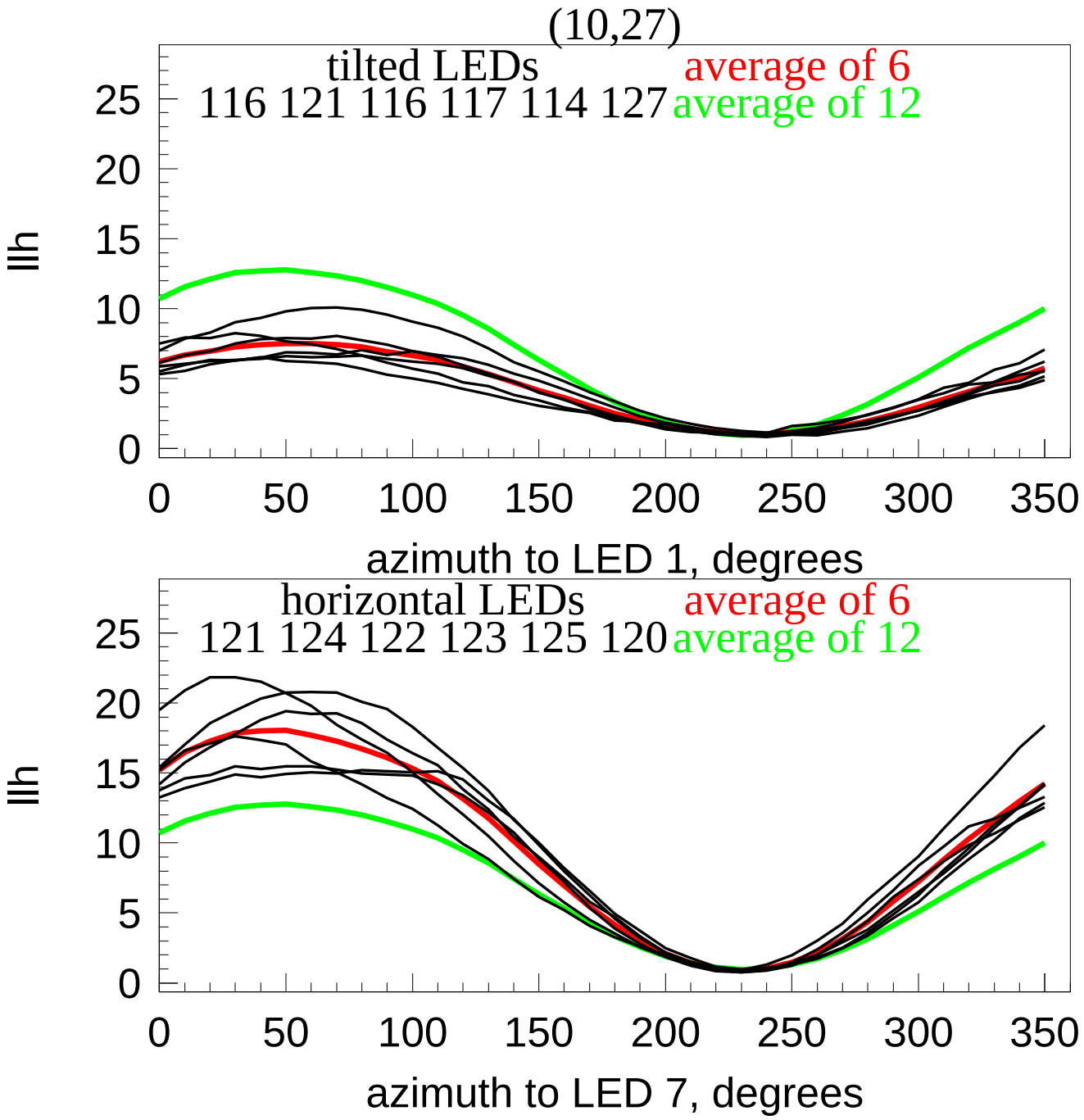

(10,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
172.6 ± 4.5

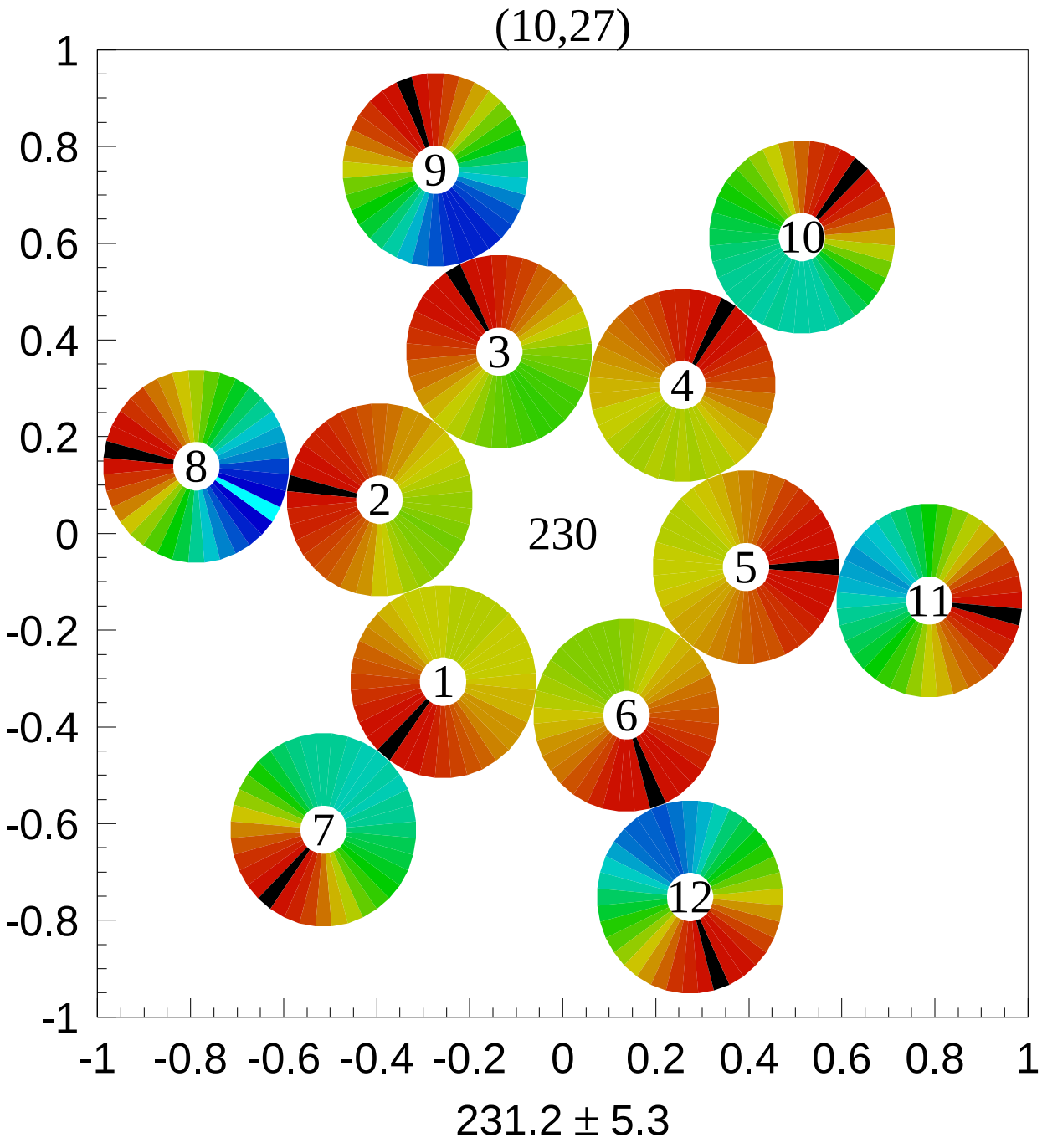

(10,25)
tilted LEDs
122 126 125 127 117 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 126 120 126 131 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

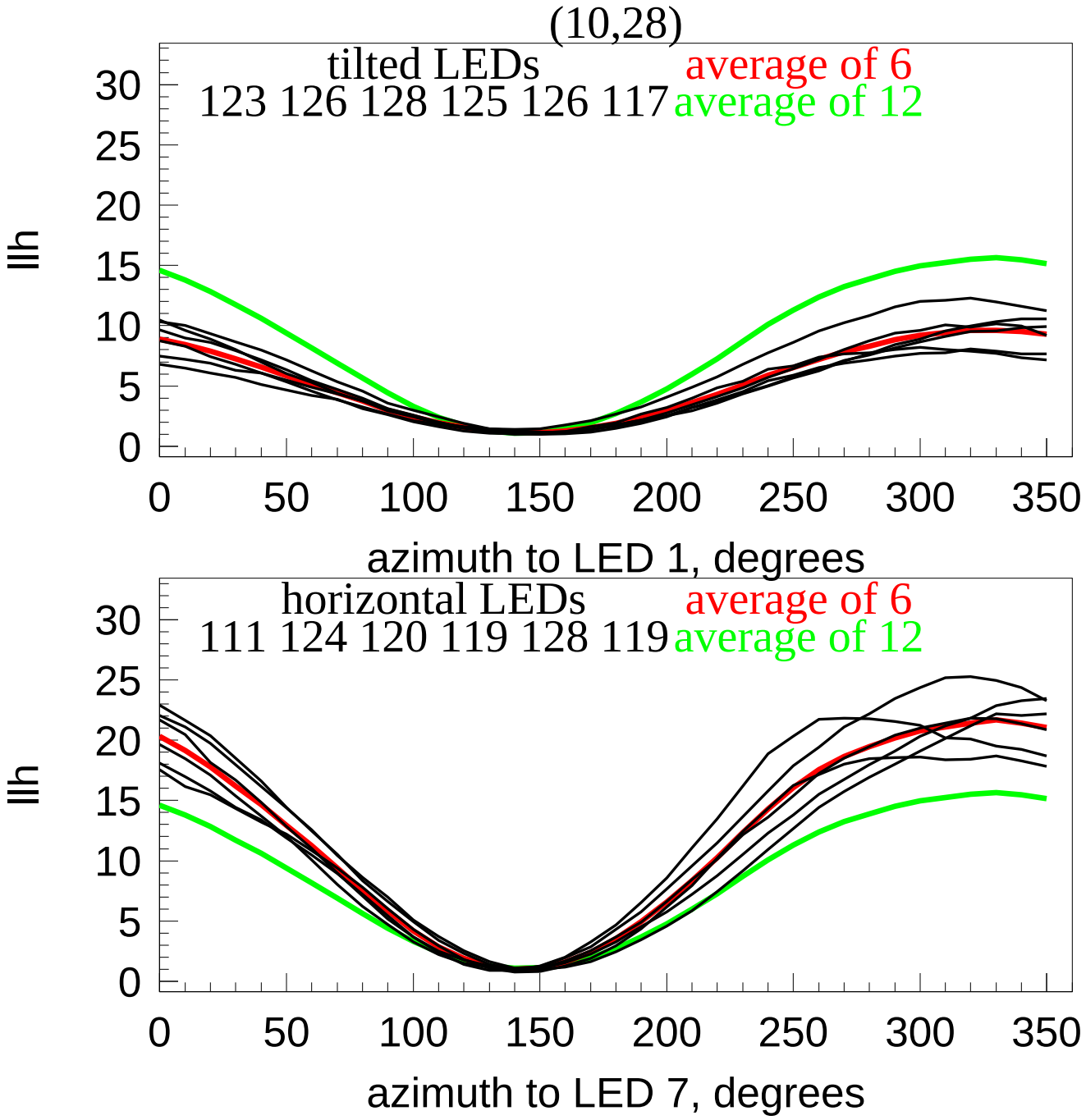

(10,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
250.4 ± 5.2
1
2
3
4
5
6
7
8
9
10
11
12

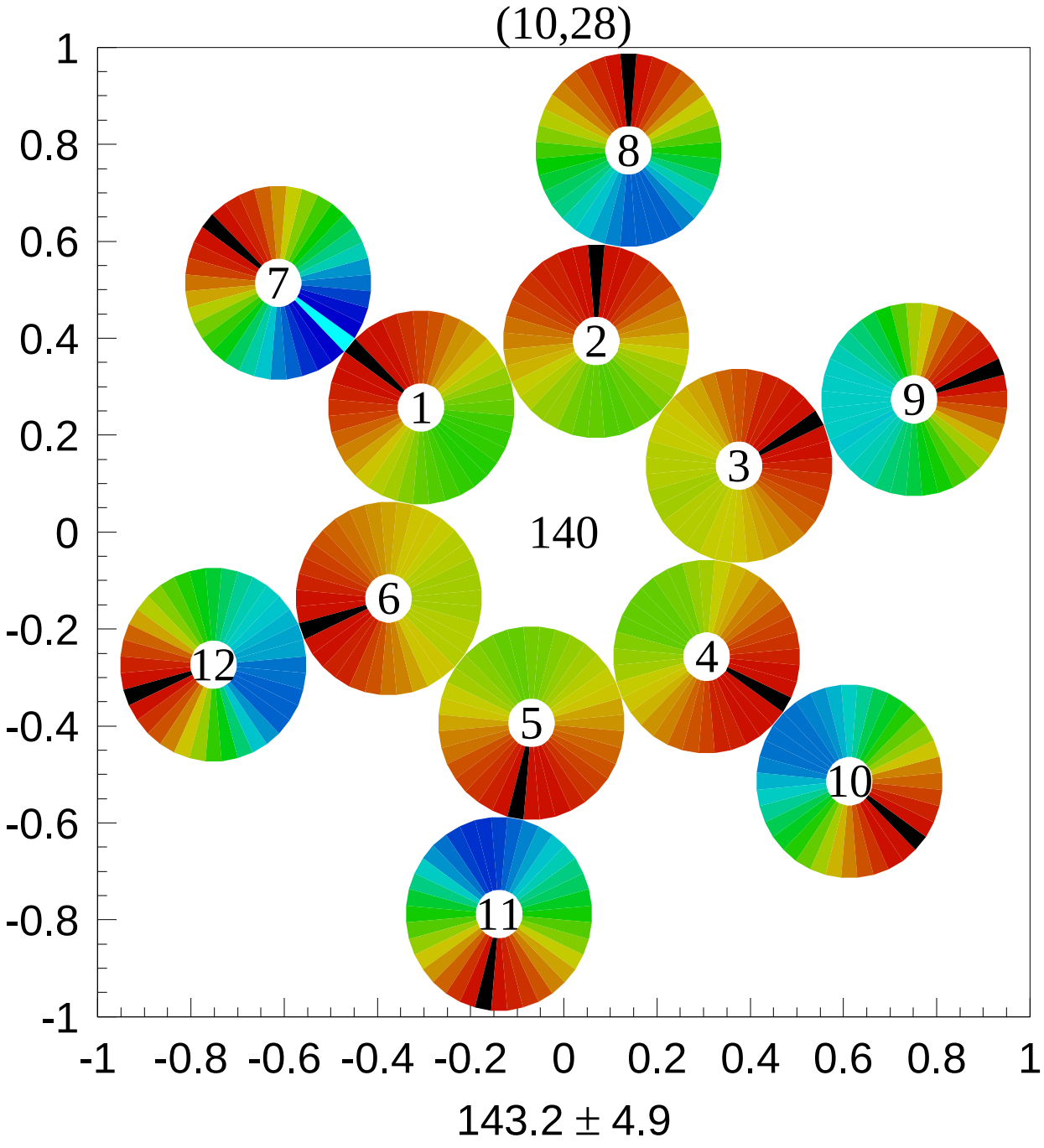

(10,26)
tilted LEDs
121 124 120 120 115 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 118 124 127 126 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

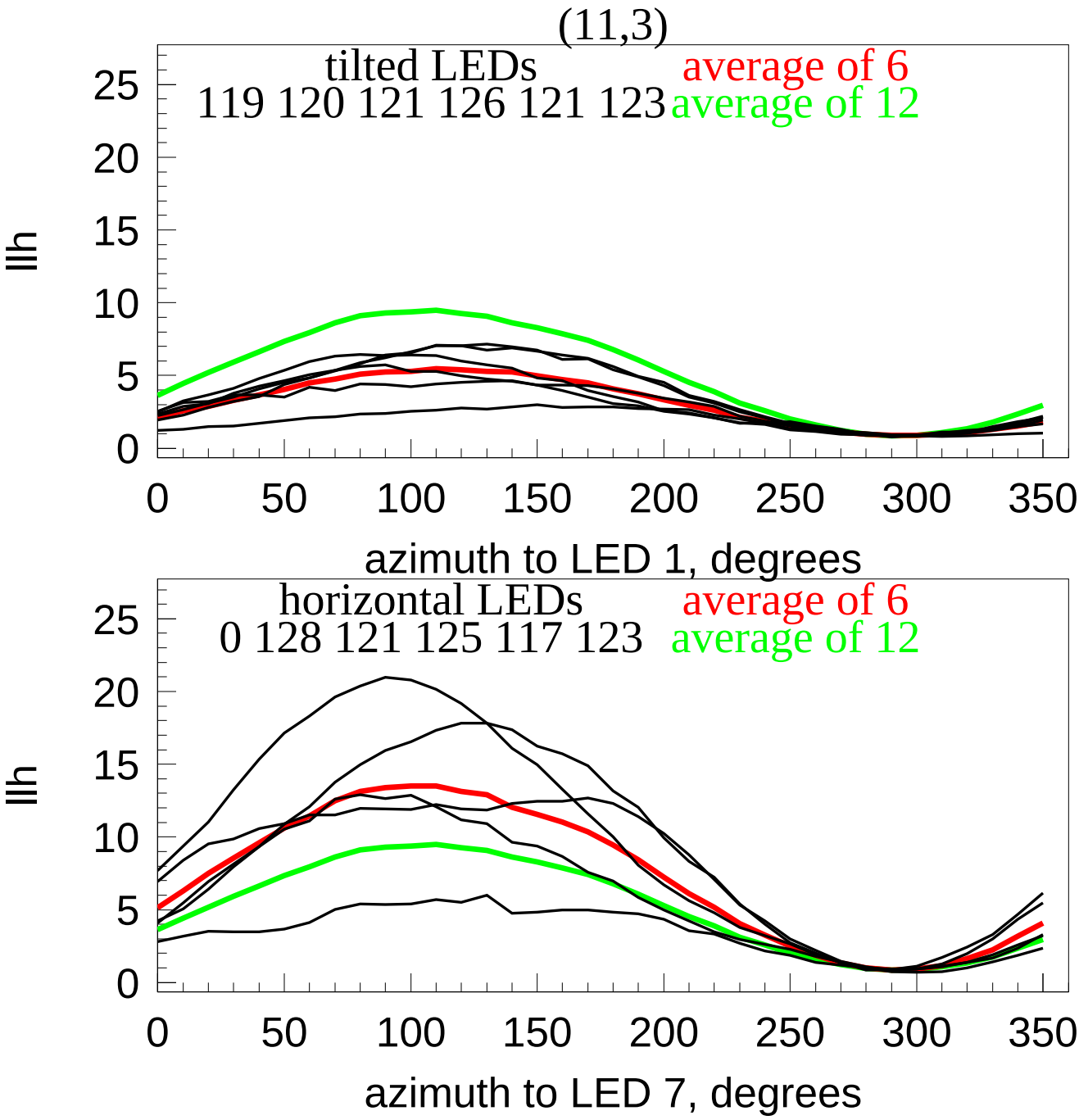

(10,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
235.6 ± 5.0

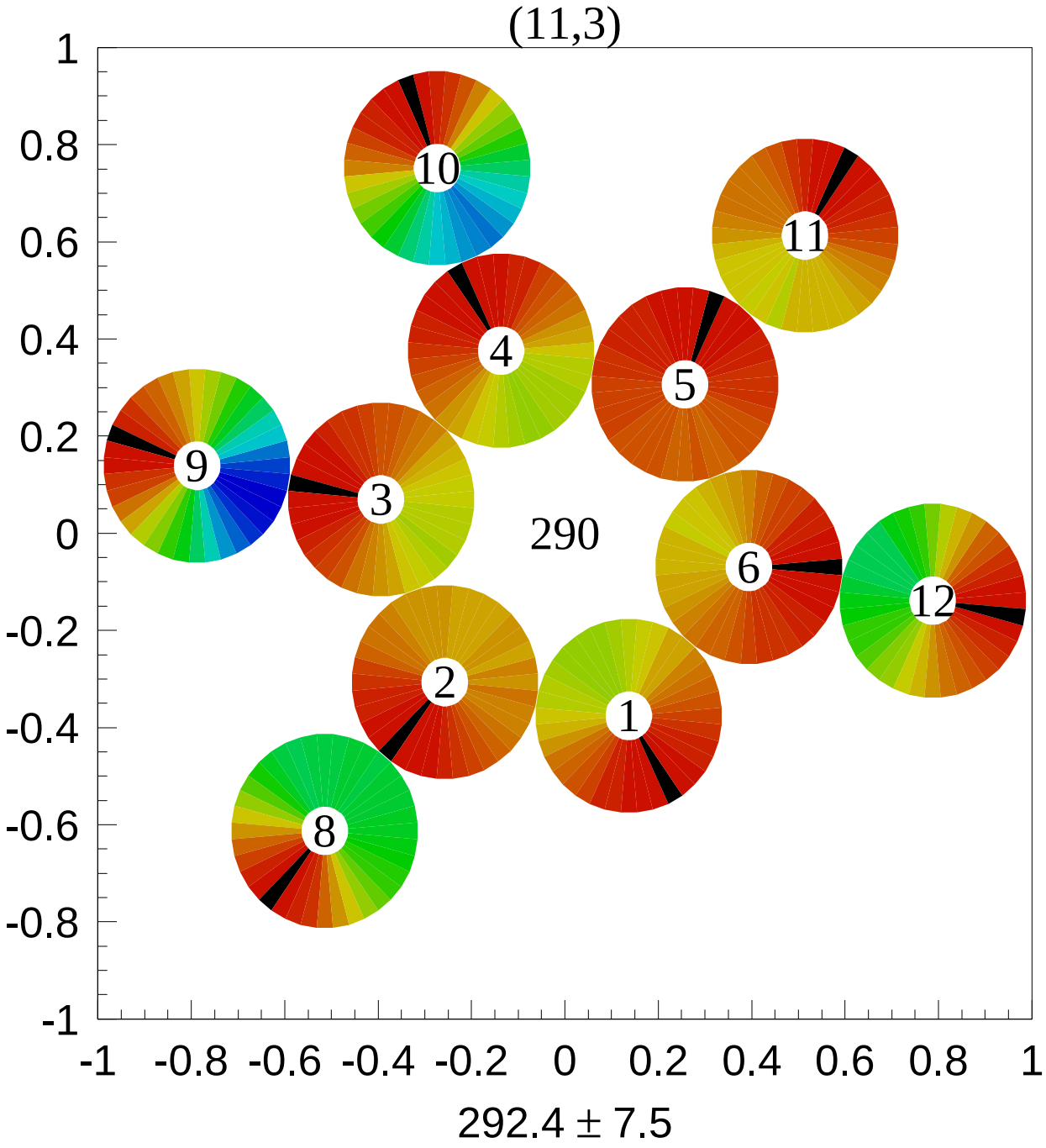

(10,27)
tilted LEDs
116 121 116 117 114 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 122 123 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

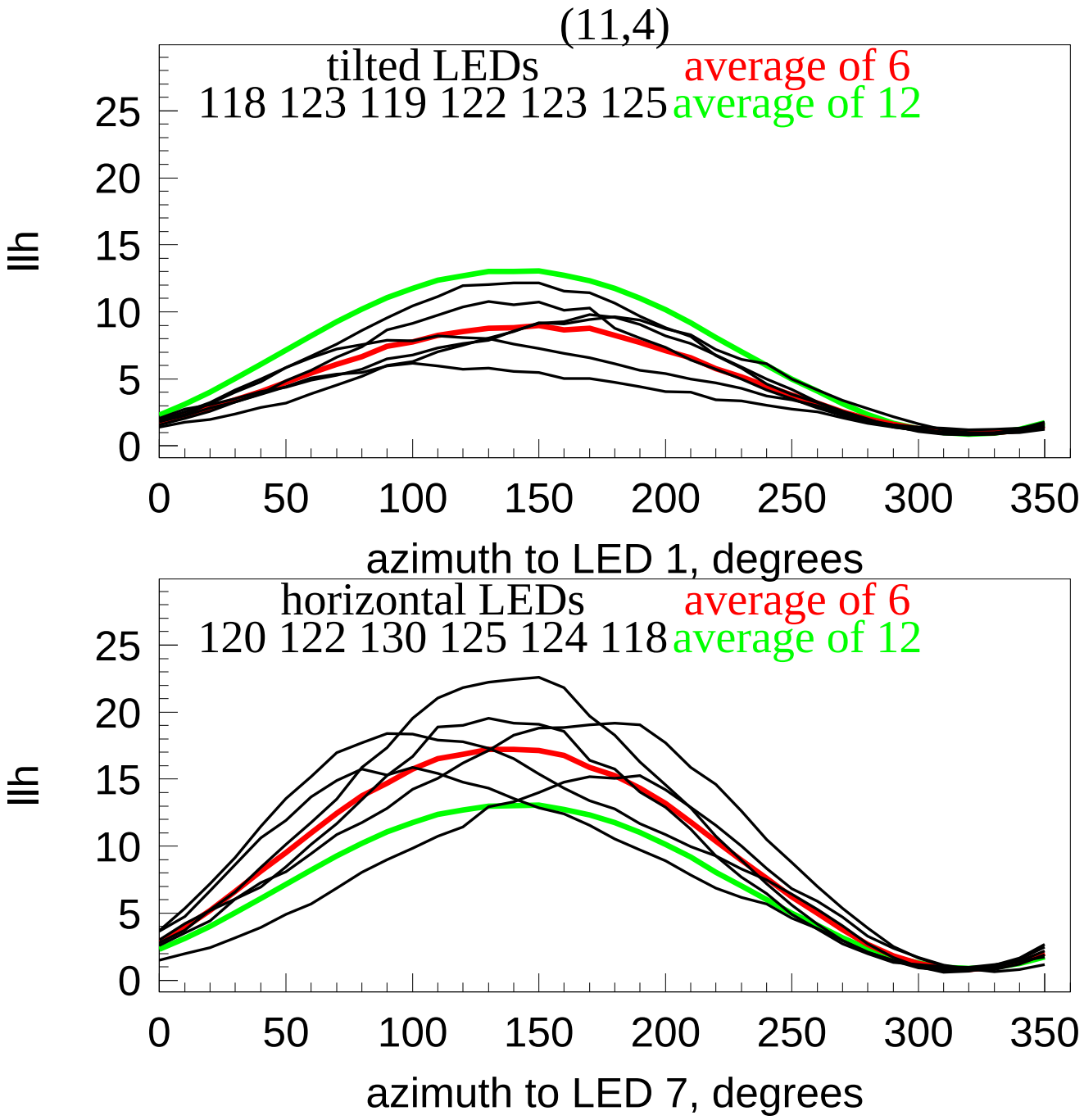

(10,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.2 ± 5.3

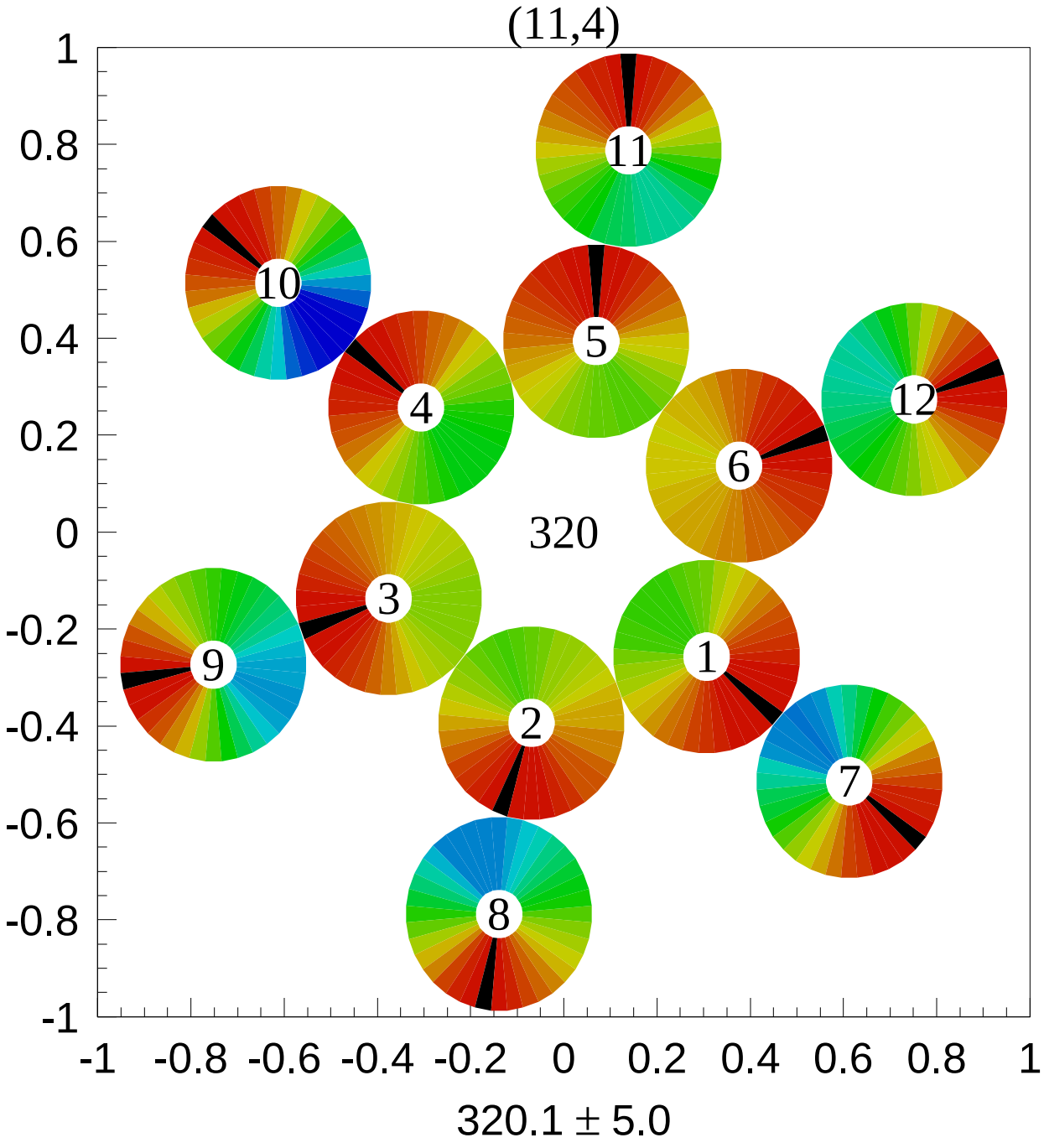

(10,28)
tilted LEDs
123 126 128 125 126 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 124 120 119 128 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

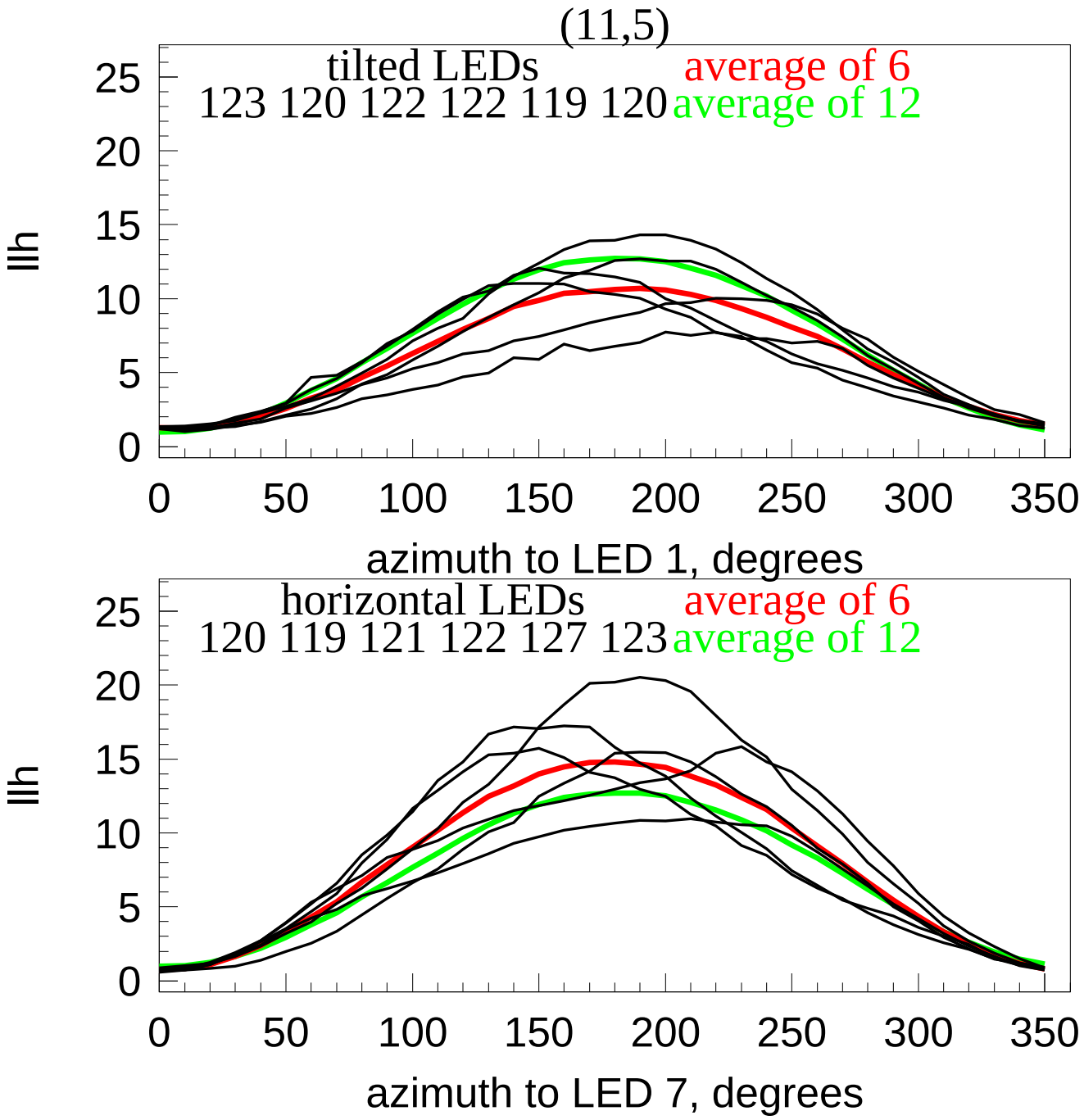

(10,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
140
143.2 ± 4.9
1
2
3
4
5
6
7
8
9
10
11
12

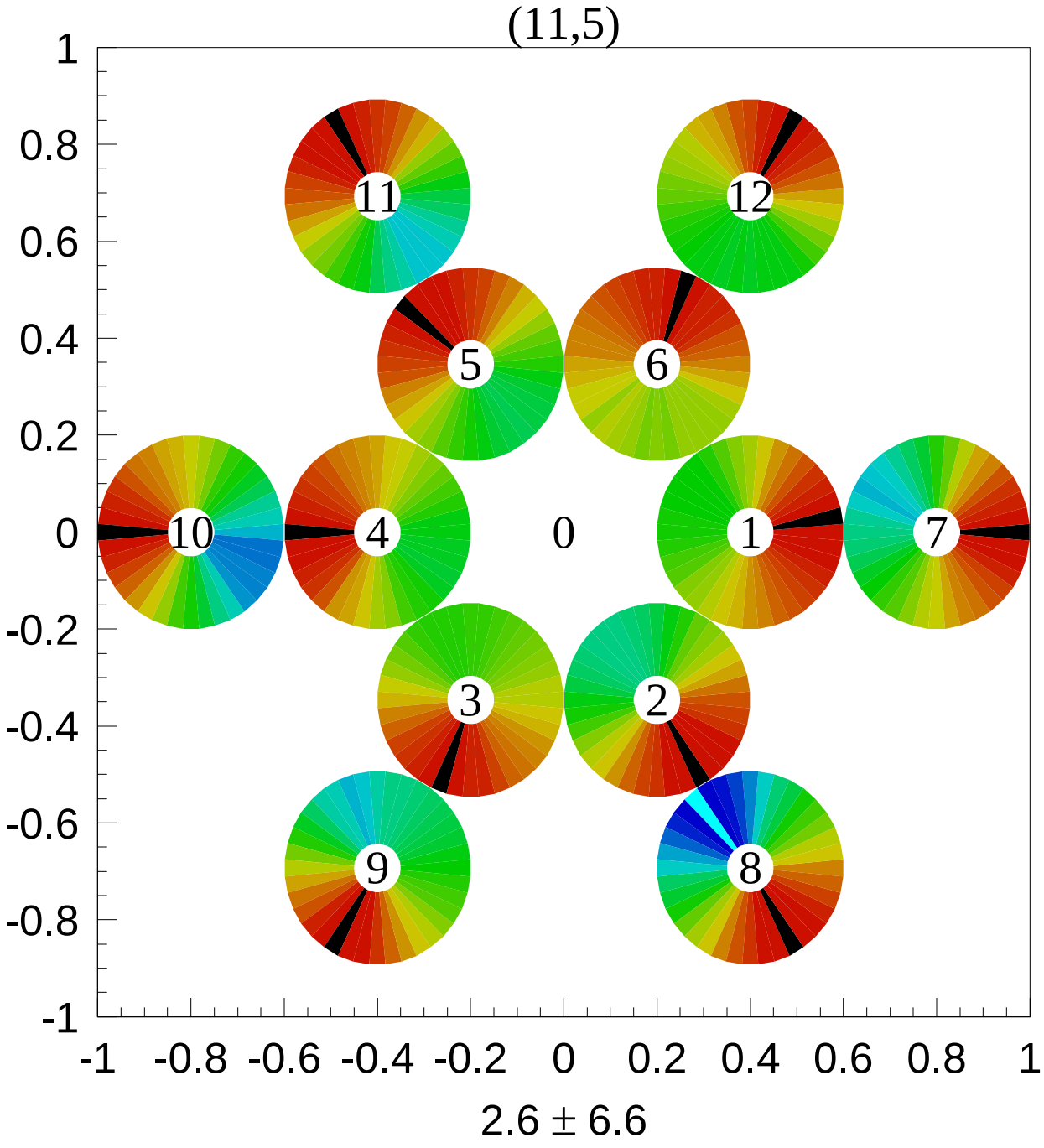

(11,3)
tilted LEDs
119 120 121 126 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
0 128 121 125 117 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

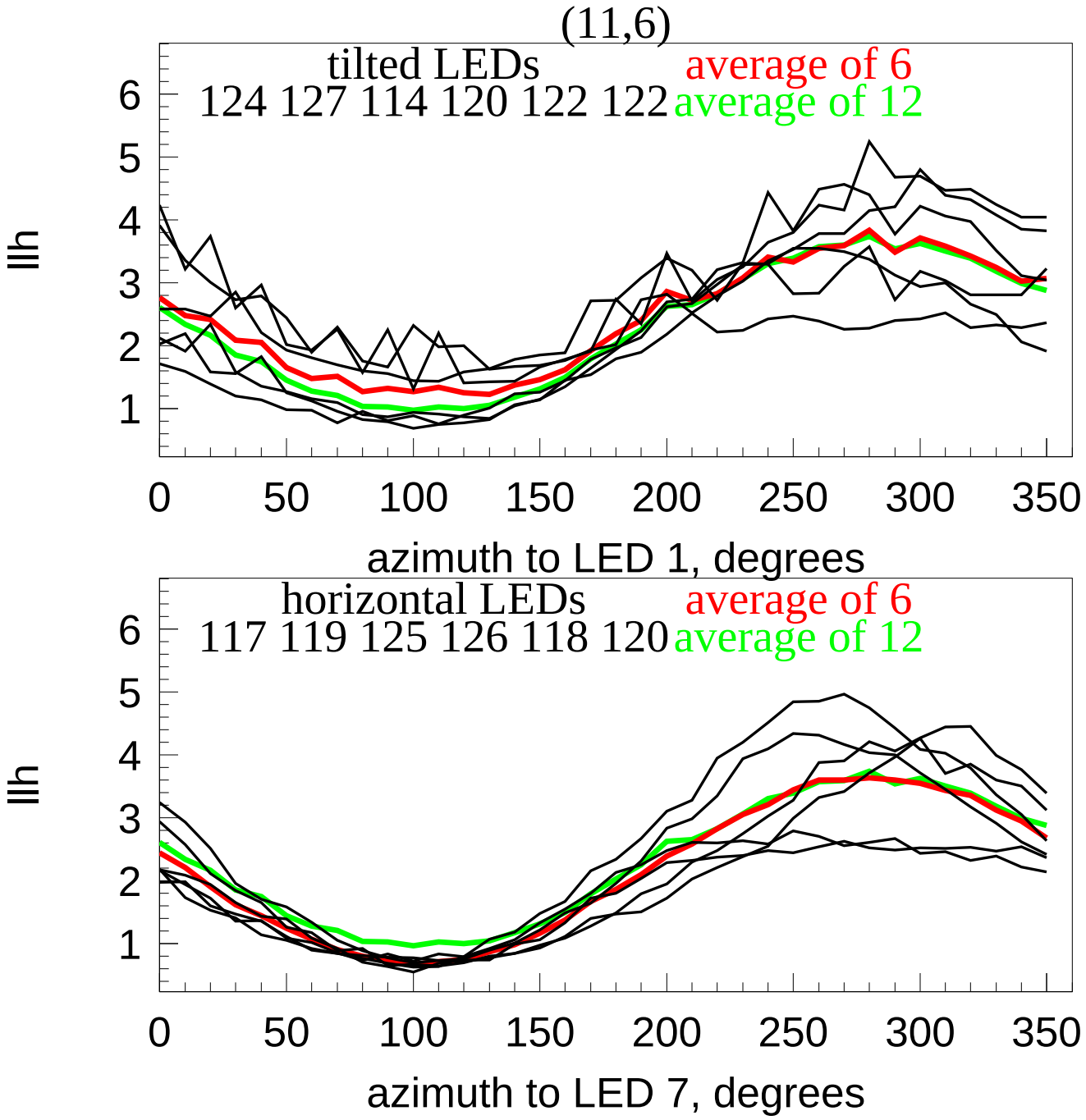

(11,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
292.4 ± 7.5

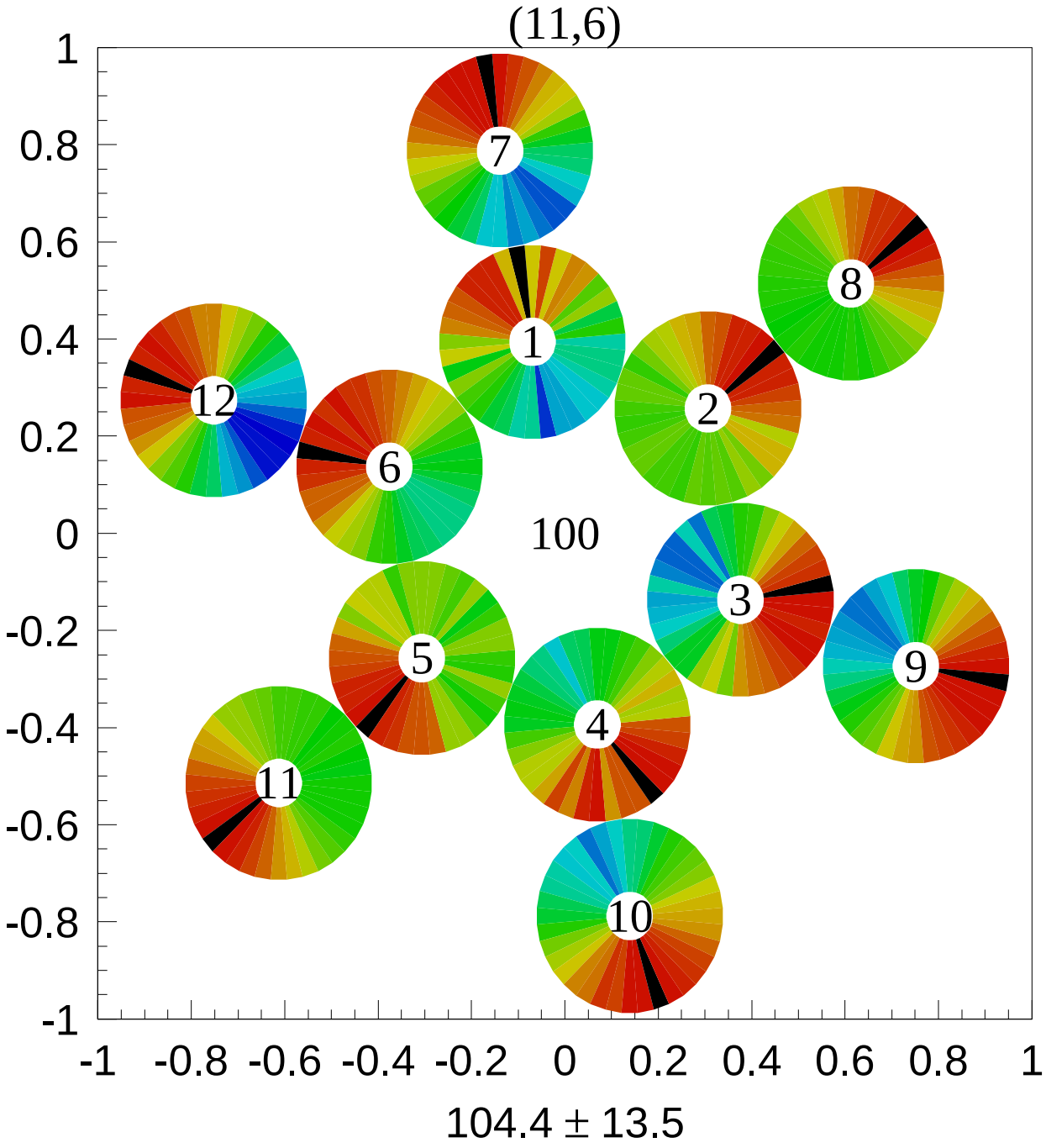

(11,4)
tilted LEDs
118 123 119 122 123 125
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 122 130 125 124 118
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

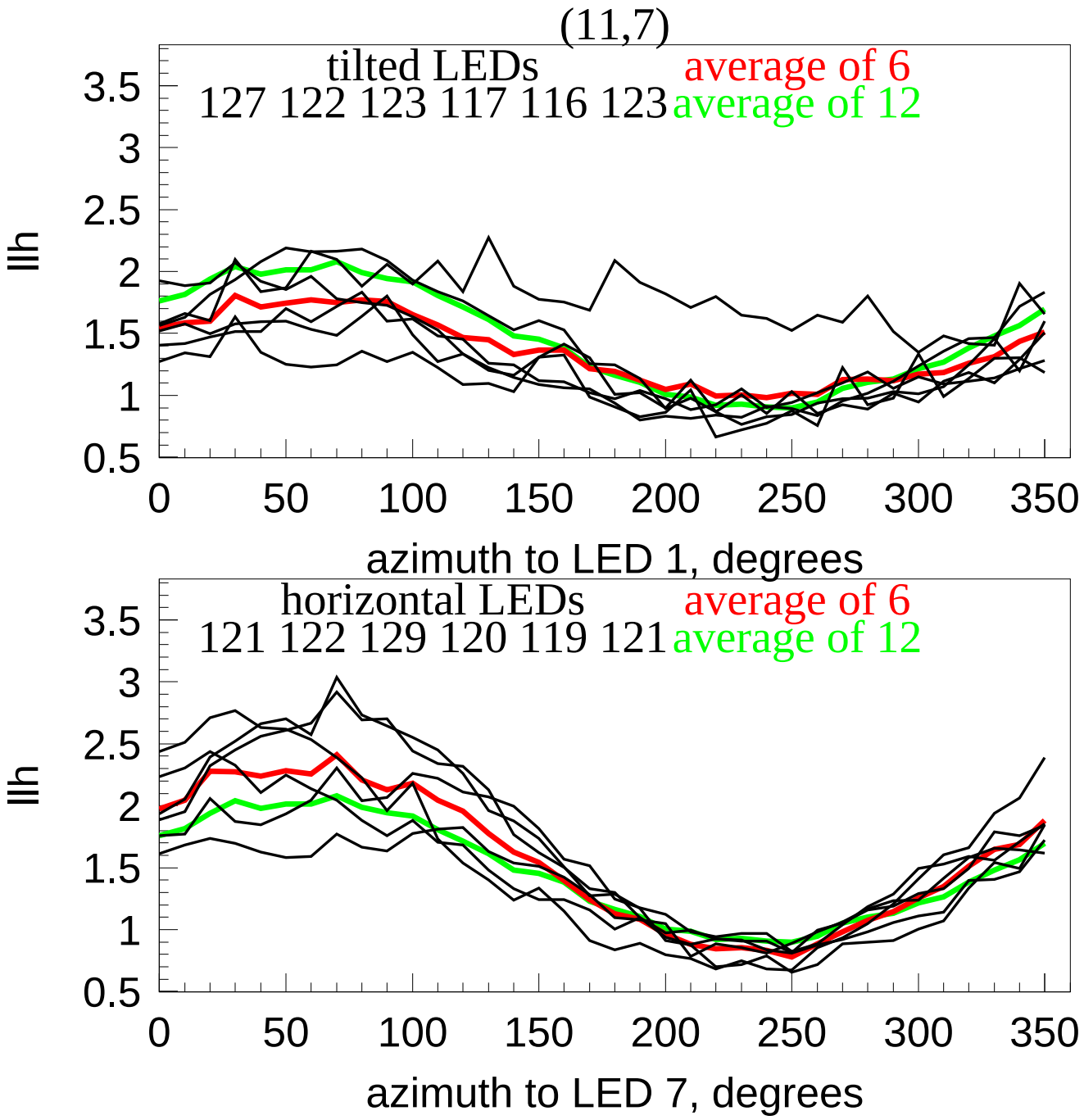

(11,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
320.1 ± 5.0

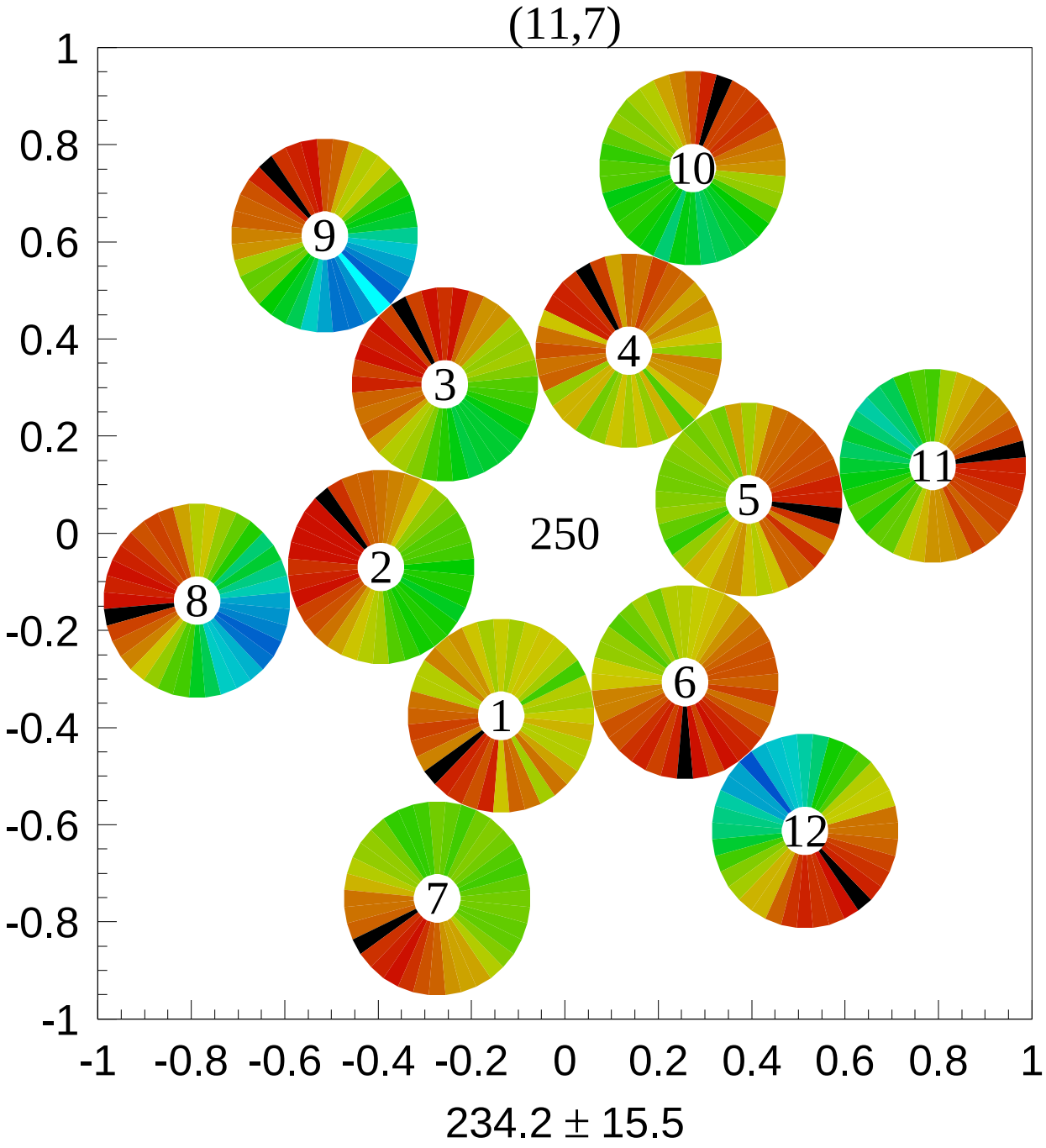

(11,5)
tilted LEDs
123 120 122 122 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 119 121 122 127 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

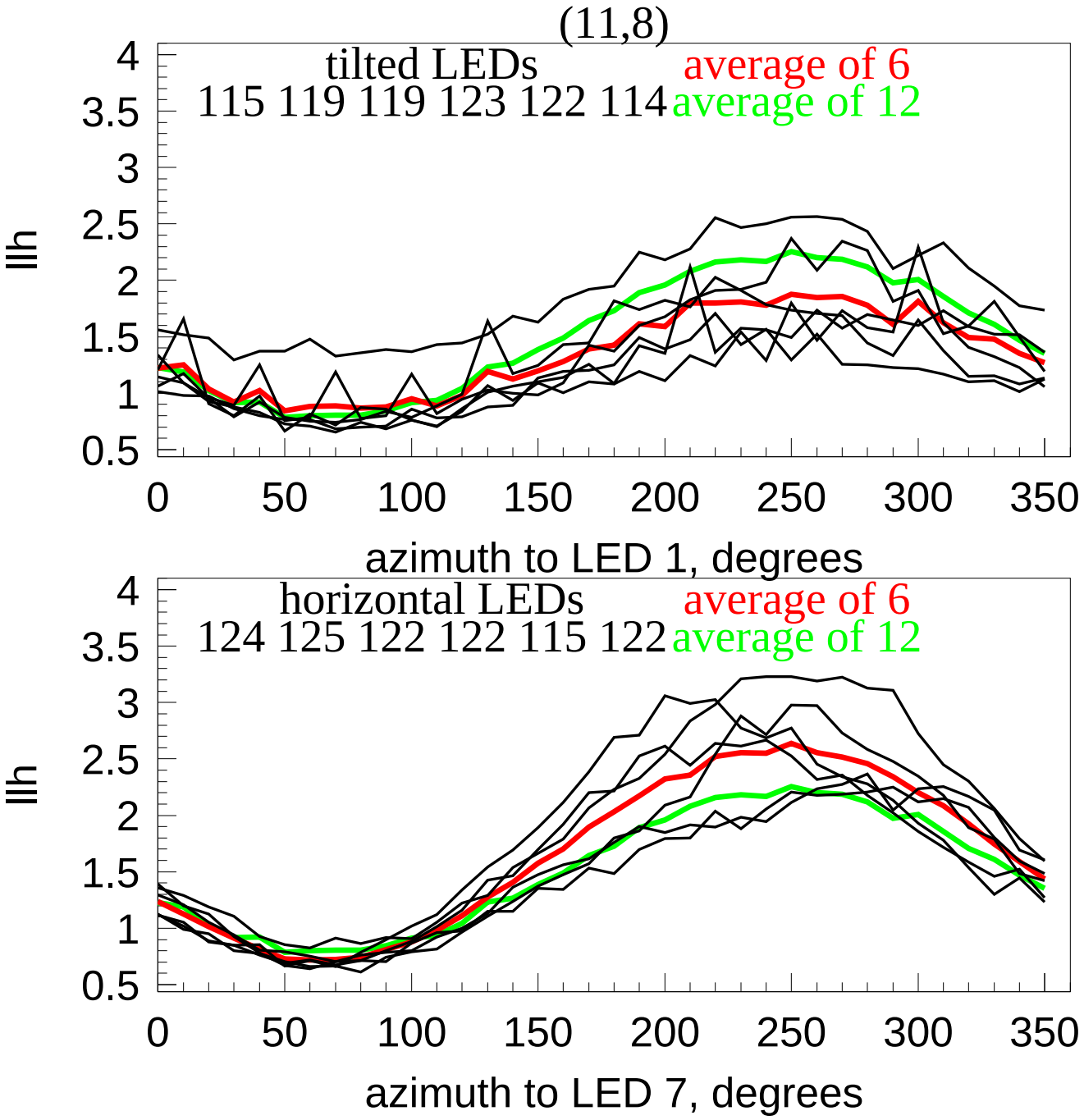

(11,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
2.6 ± 6.6
11
12
5
6
10
4
0
1
7
3
2
9
8

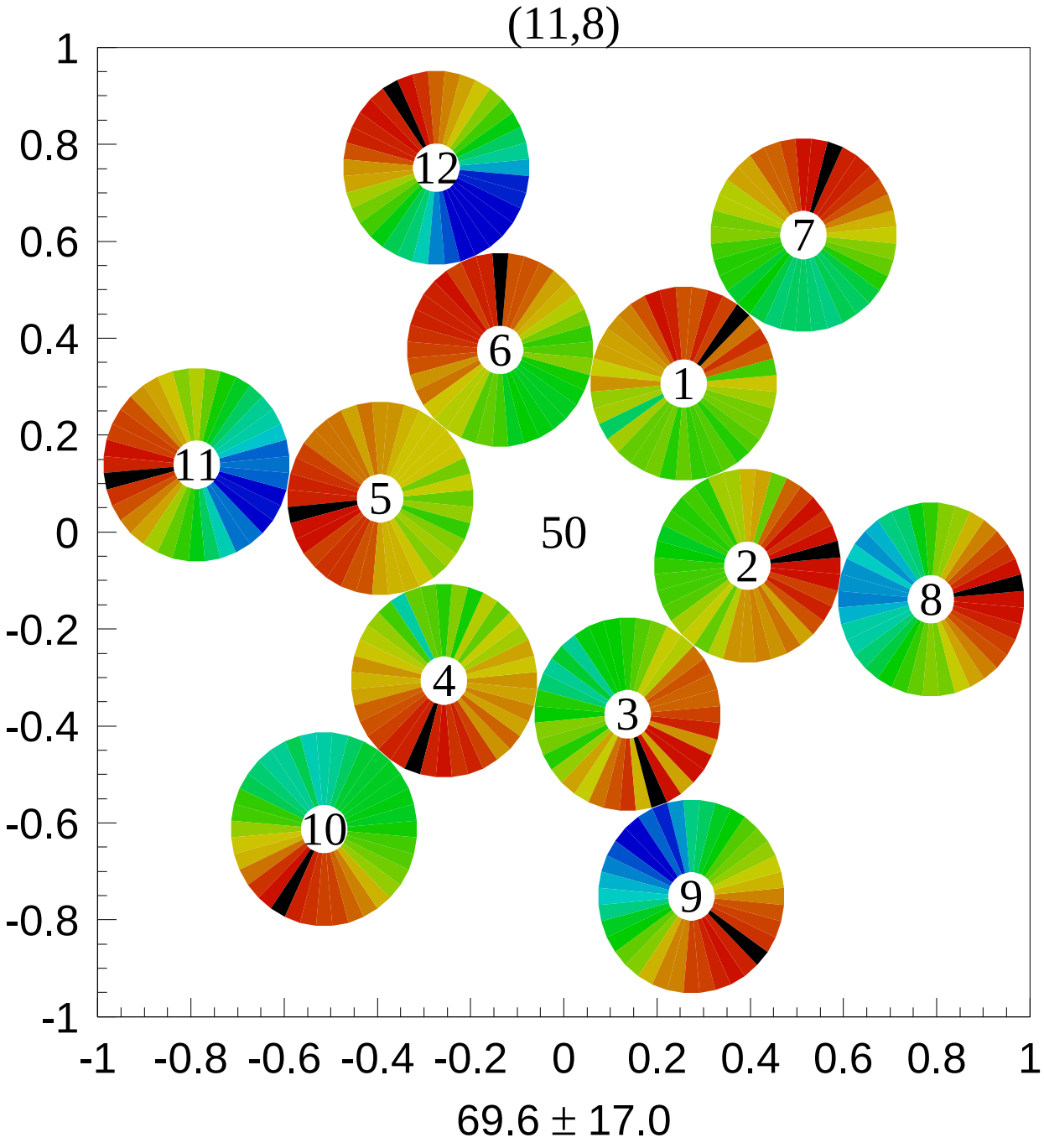

(11,6)
tilted LEDs
124 127 114 120 122 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 125 126 118 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

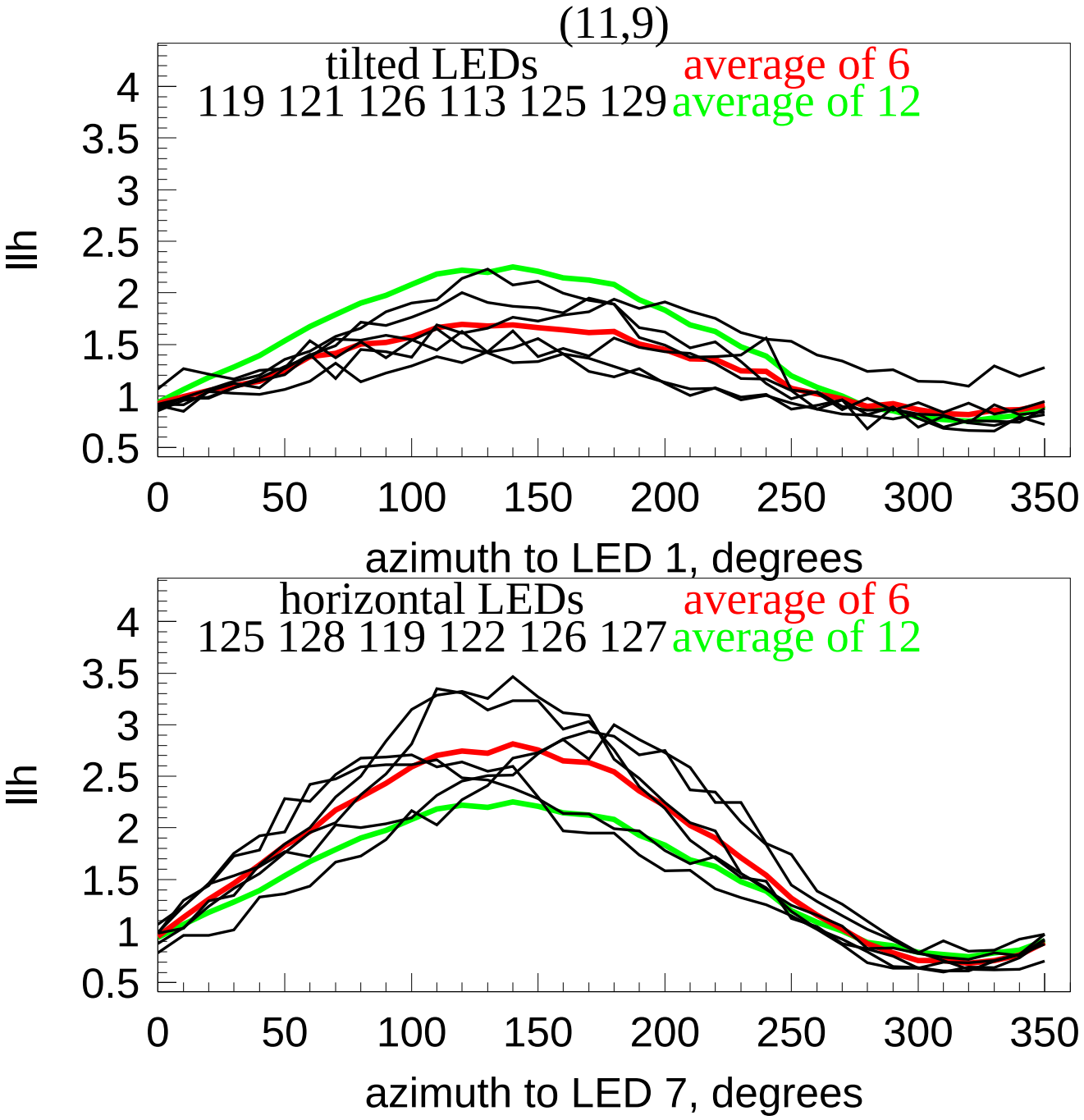

(11,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
104.4 ± 13.5
7
1
8
12
2
6
100
3
5
9
4
11
10

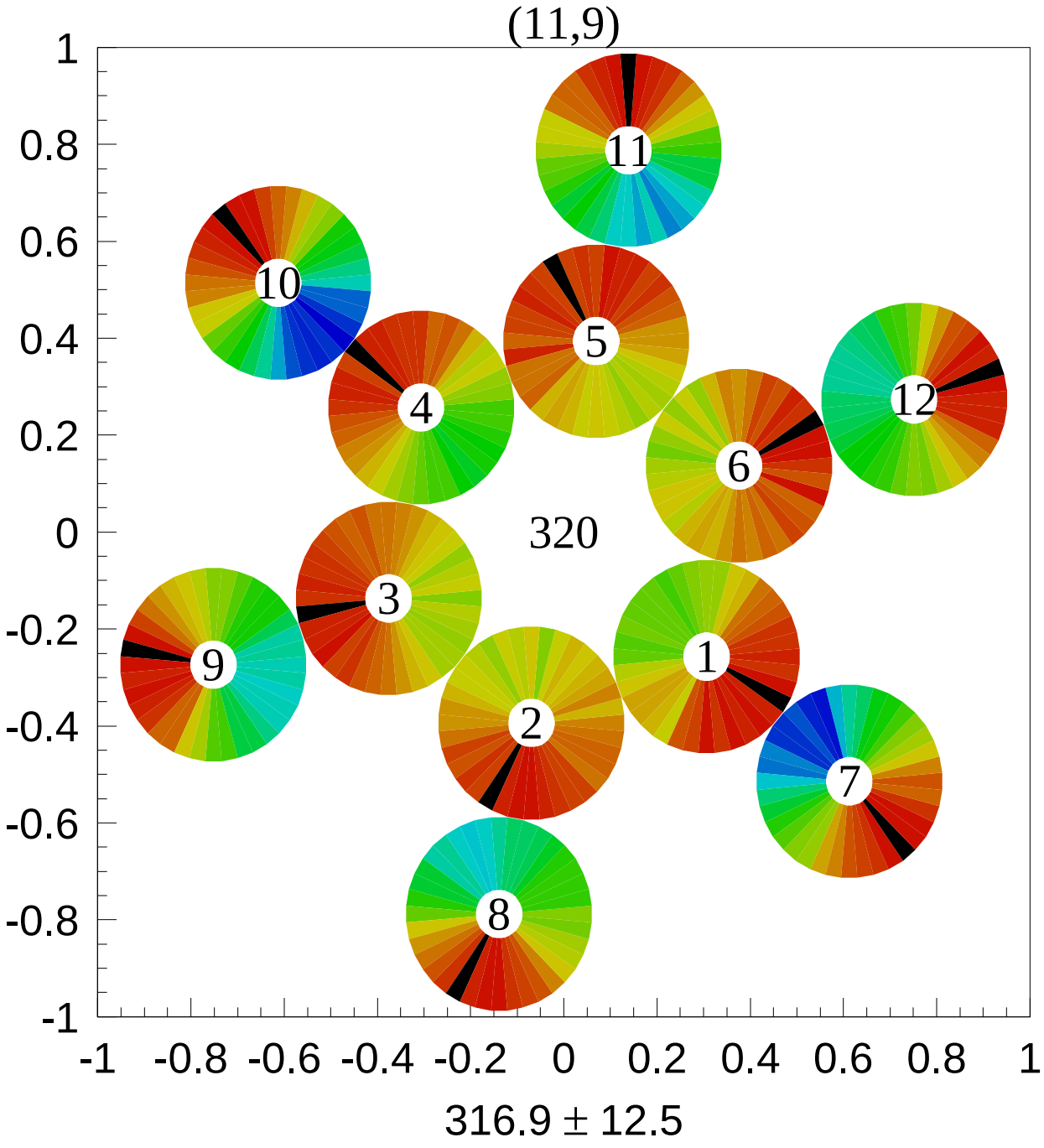

(11,7)
tilted LEDs
127 122 123 117 116 123
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 122 129 120 119 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

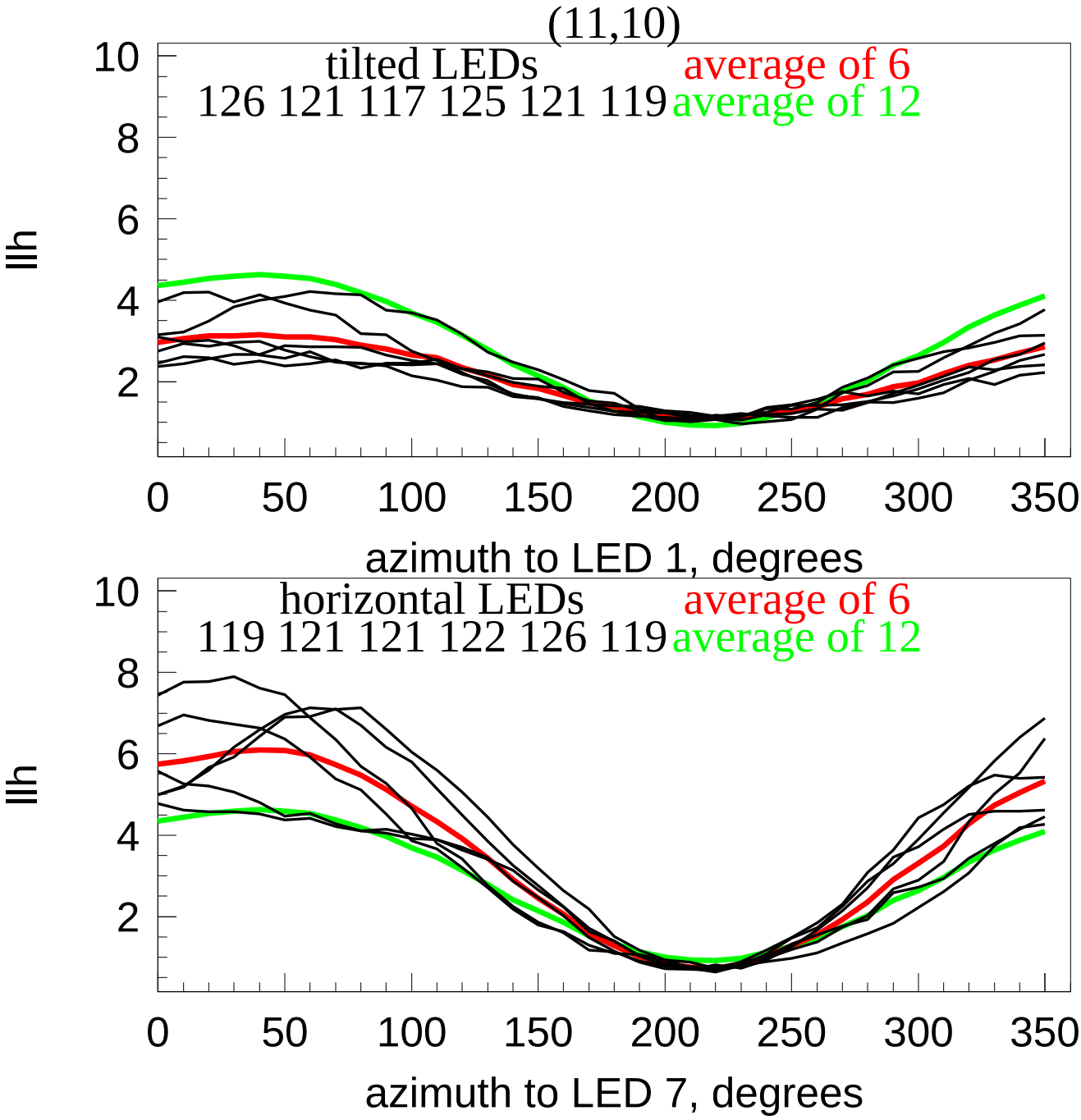

(11,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
234.2 ± 15.5
250
1
2
3
4
5
6
7
8
9
10
11
12

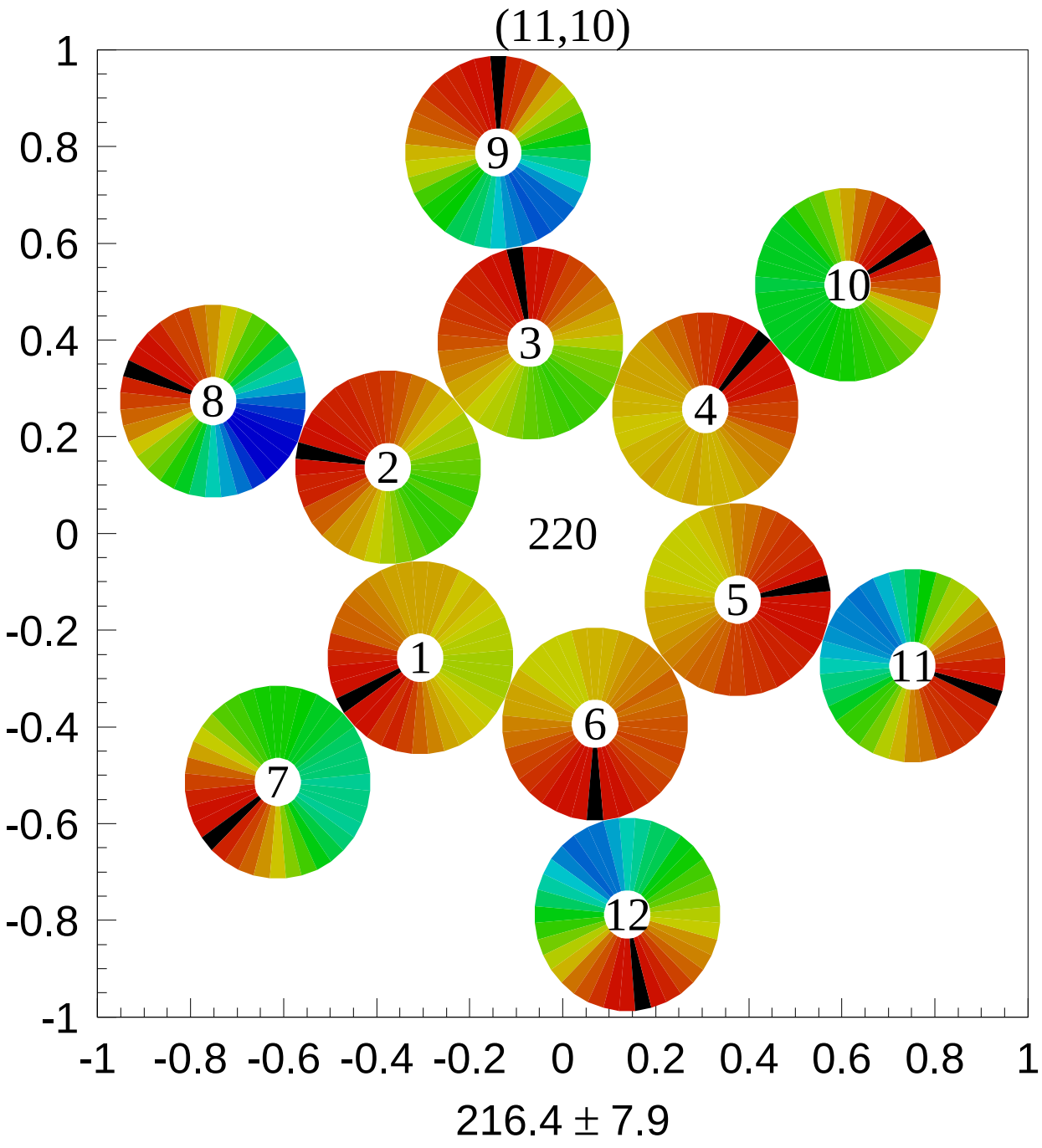

(11,8)
tilted LEDs
115 119 119 123 122 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 122 122 115 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

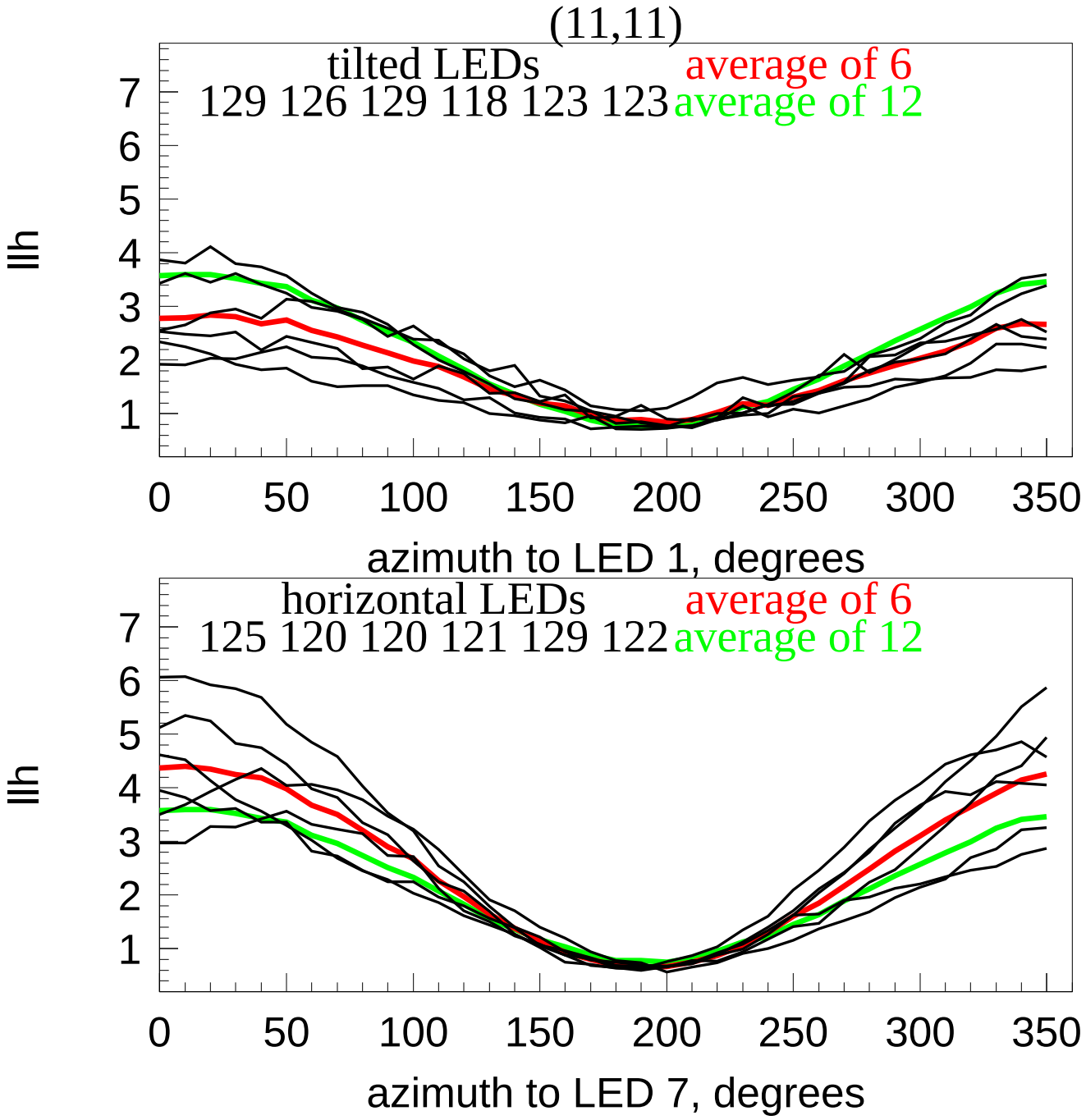

(11,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
69.6 ± 17.0

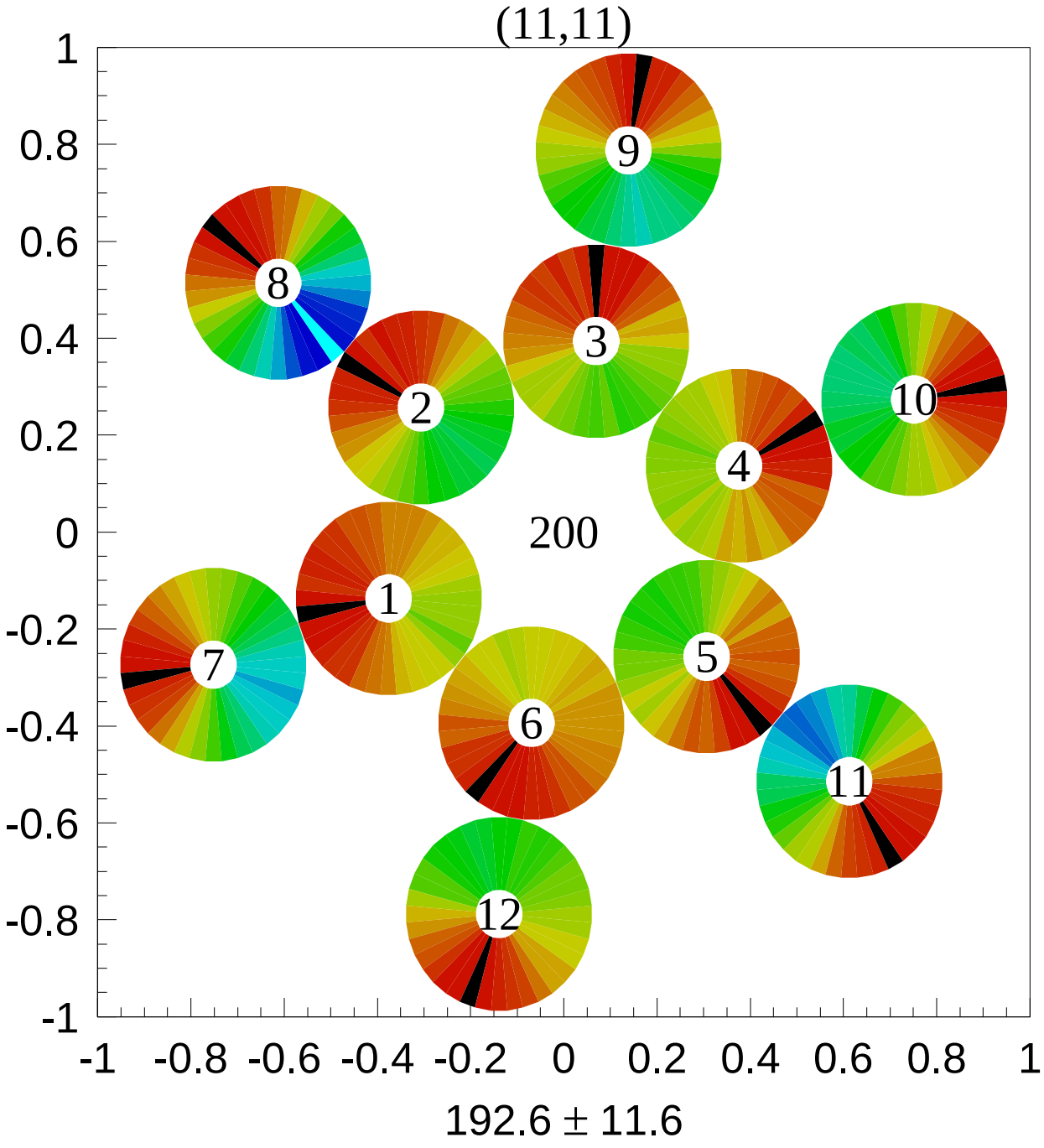

(11,9)
tilted LEDs
119 121 126 113 125 129
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 128 119 122 126 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

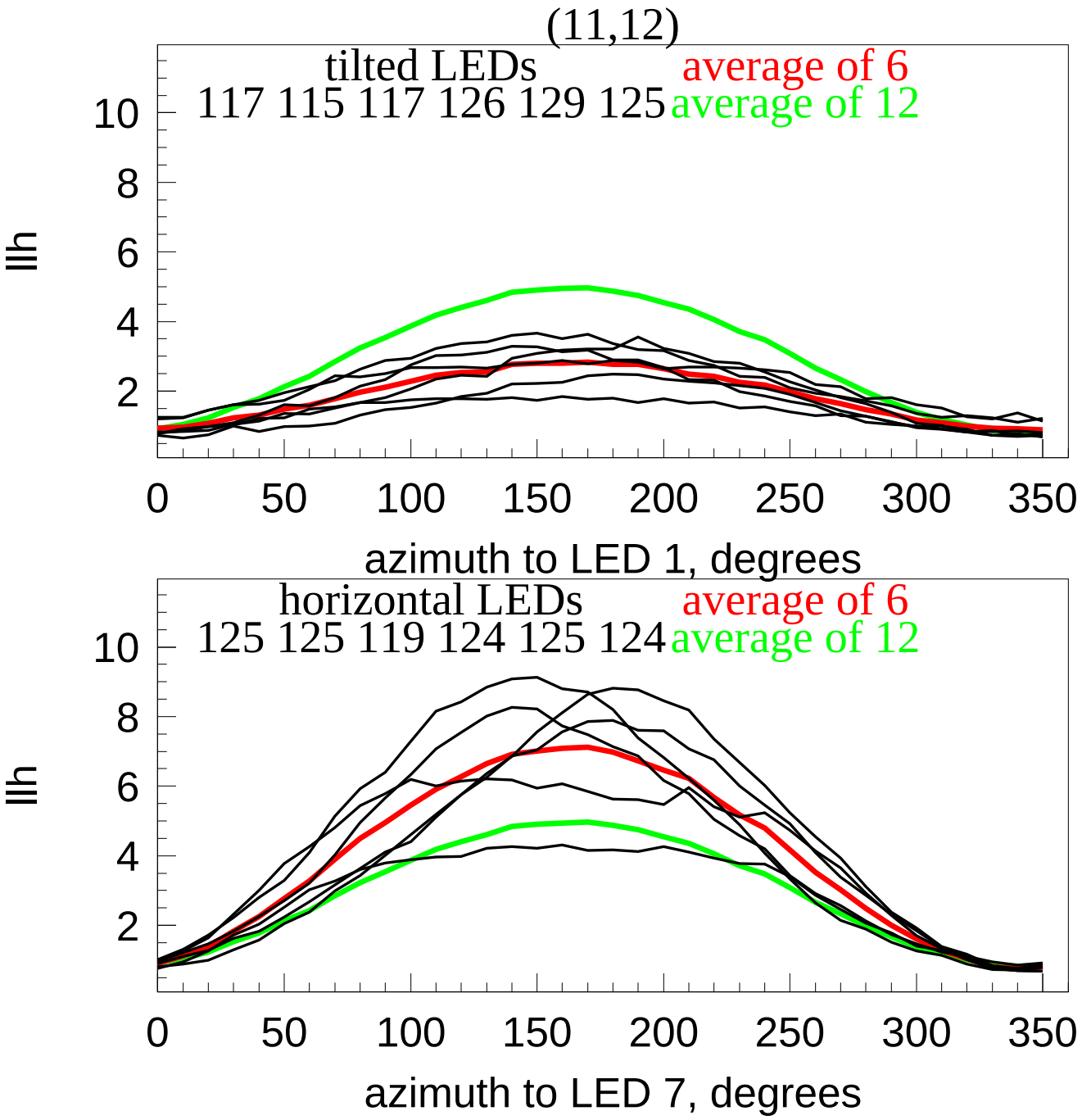

(11,9)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
316.9 ± 12.5

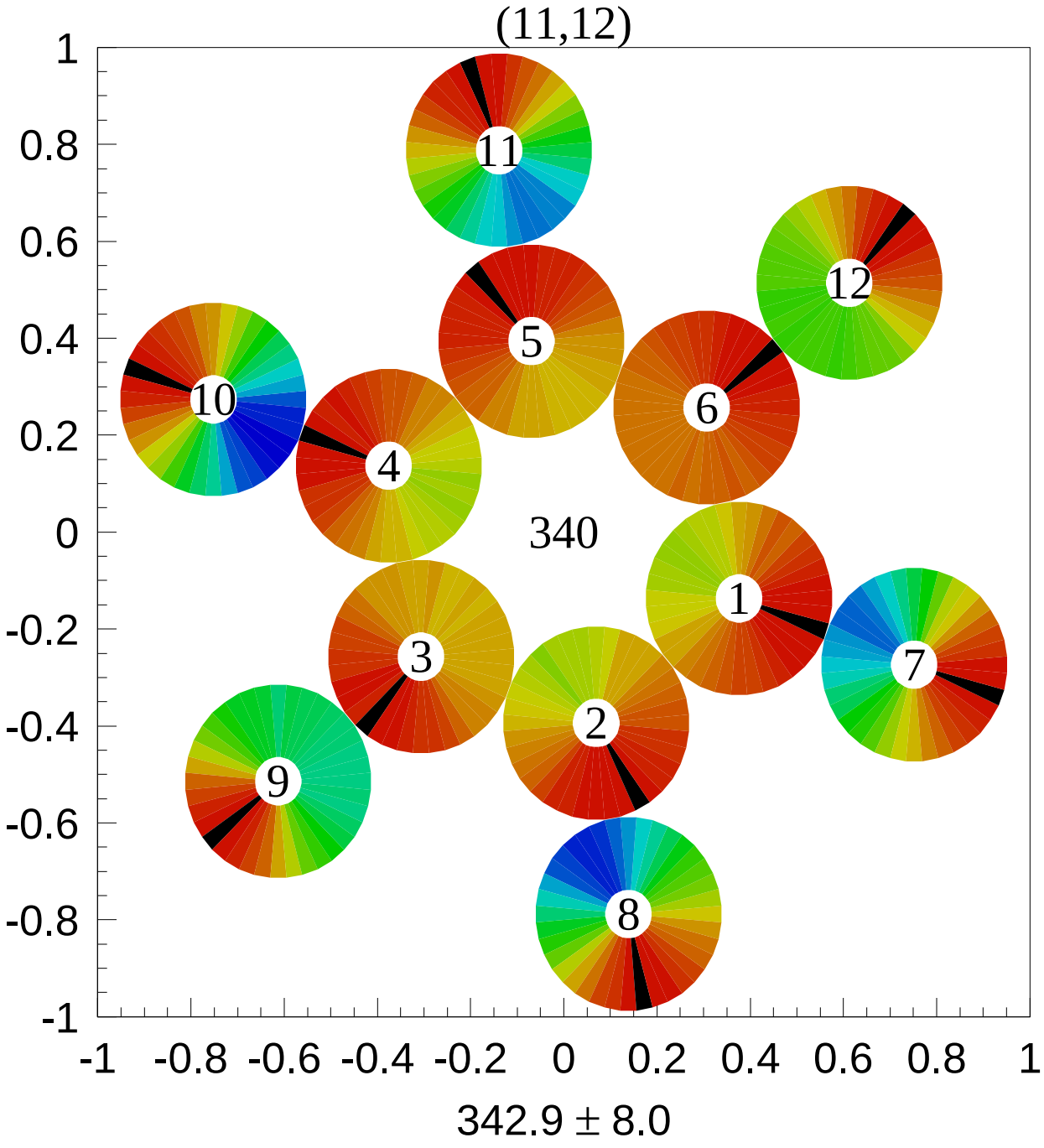

(11,10)
tilted LEDs
126 121 117 125 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 121 122 126 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

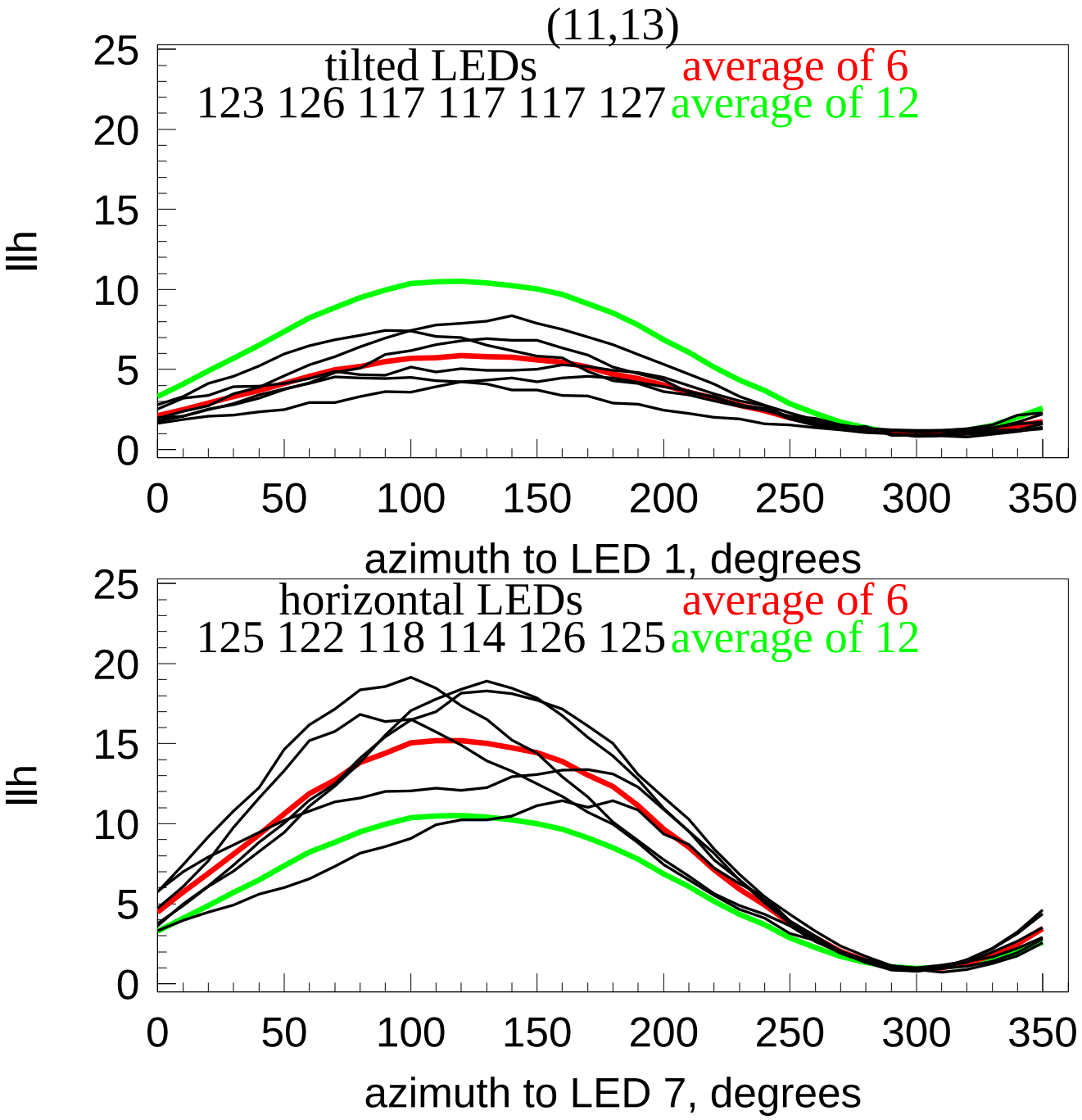

(11,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
216.4 ± 7.9

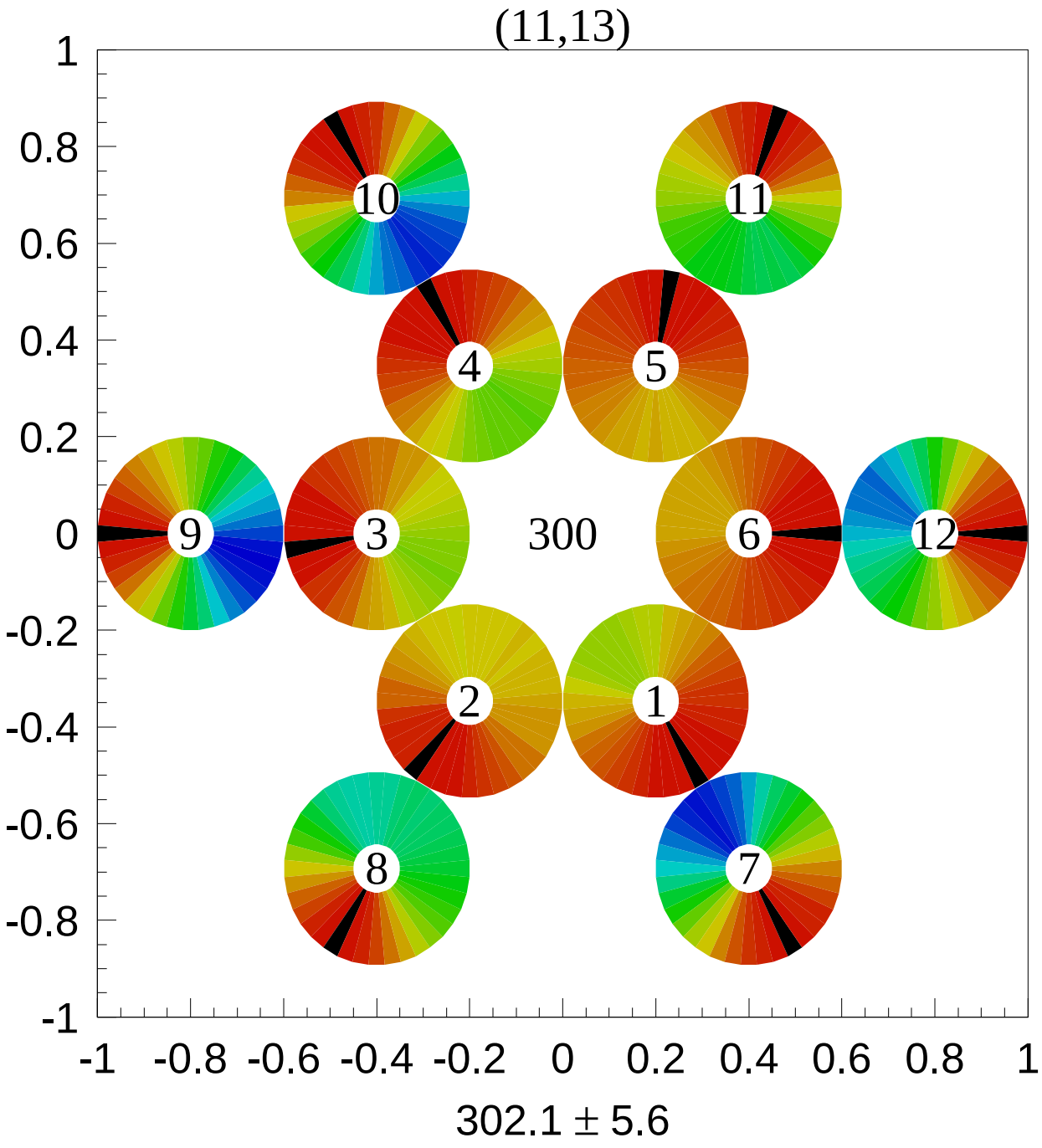

(11,11)
tilted LEDs
129 126 129 118 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 120 121 129 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

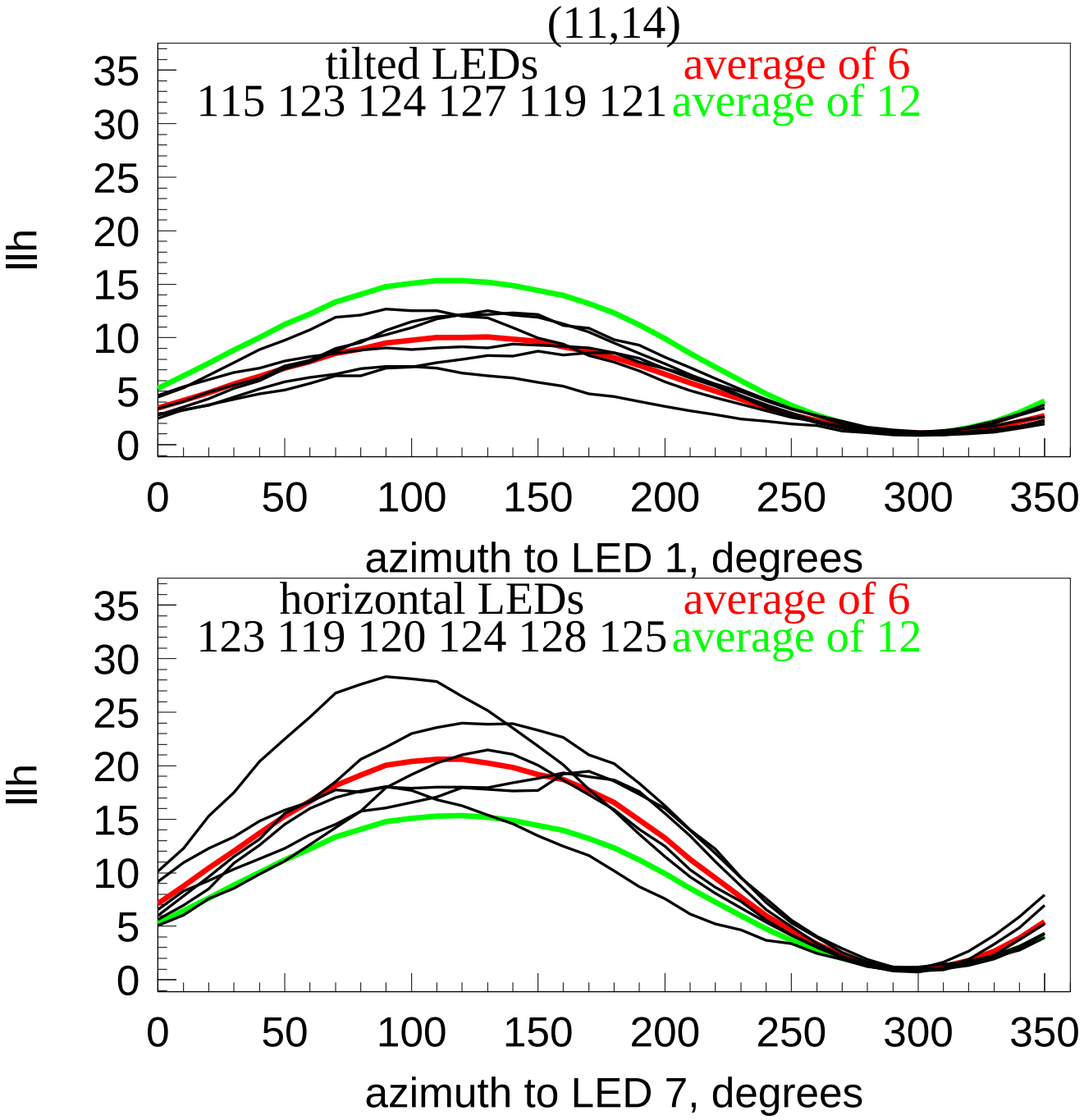

(11,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
192.6 ± 11.6

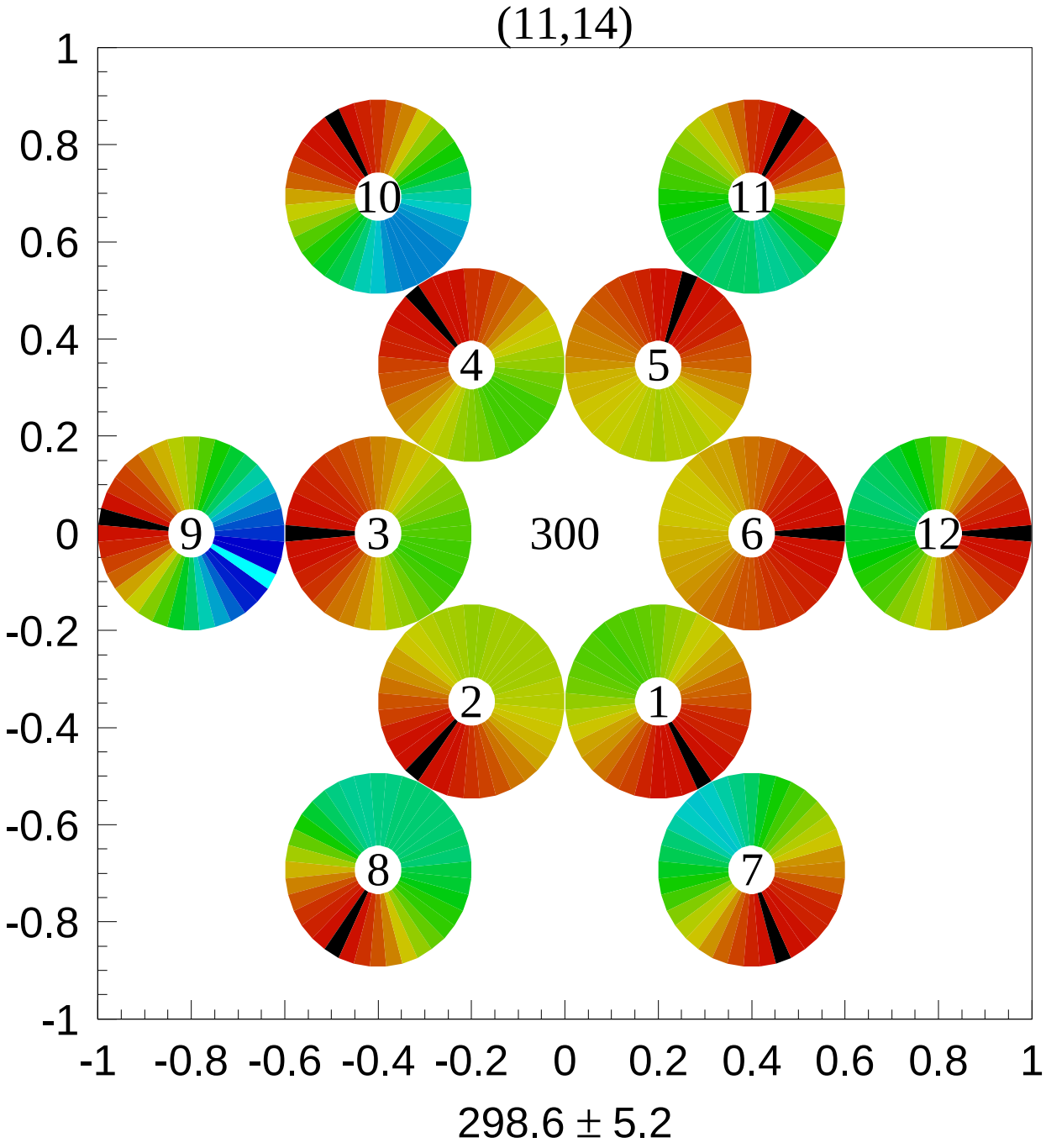

(11,12)
tilted LEDs
117 115 117 126 129 125
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 125 119 124 125 124
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

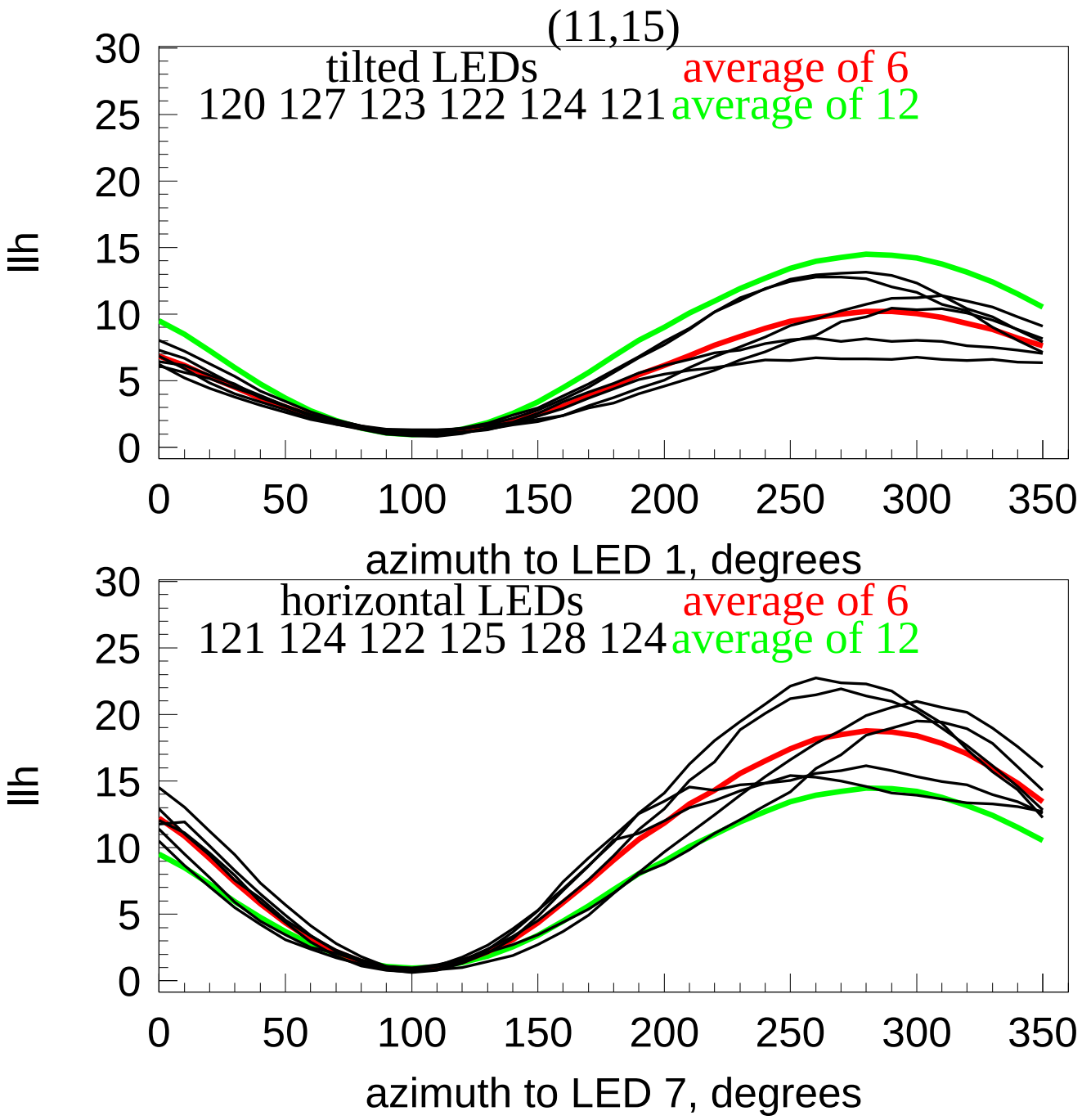

(11,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
340
1
7
3
2
9
8
342.9 ± 8.0

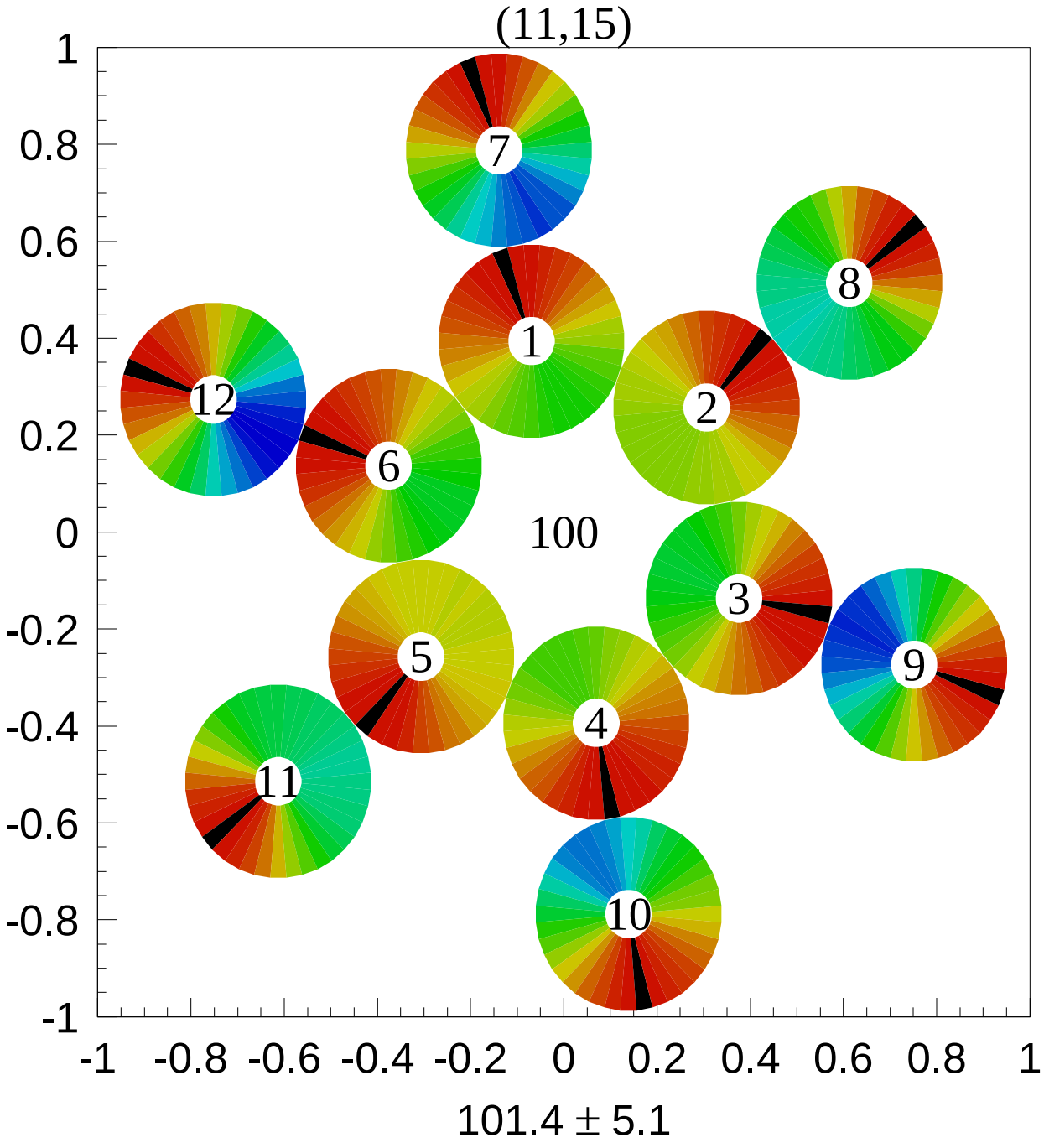

(11,13)
tilted LEDs
123 126 117 117 117 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 118 114 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

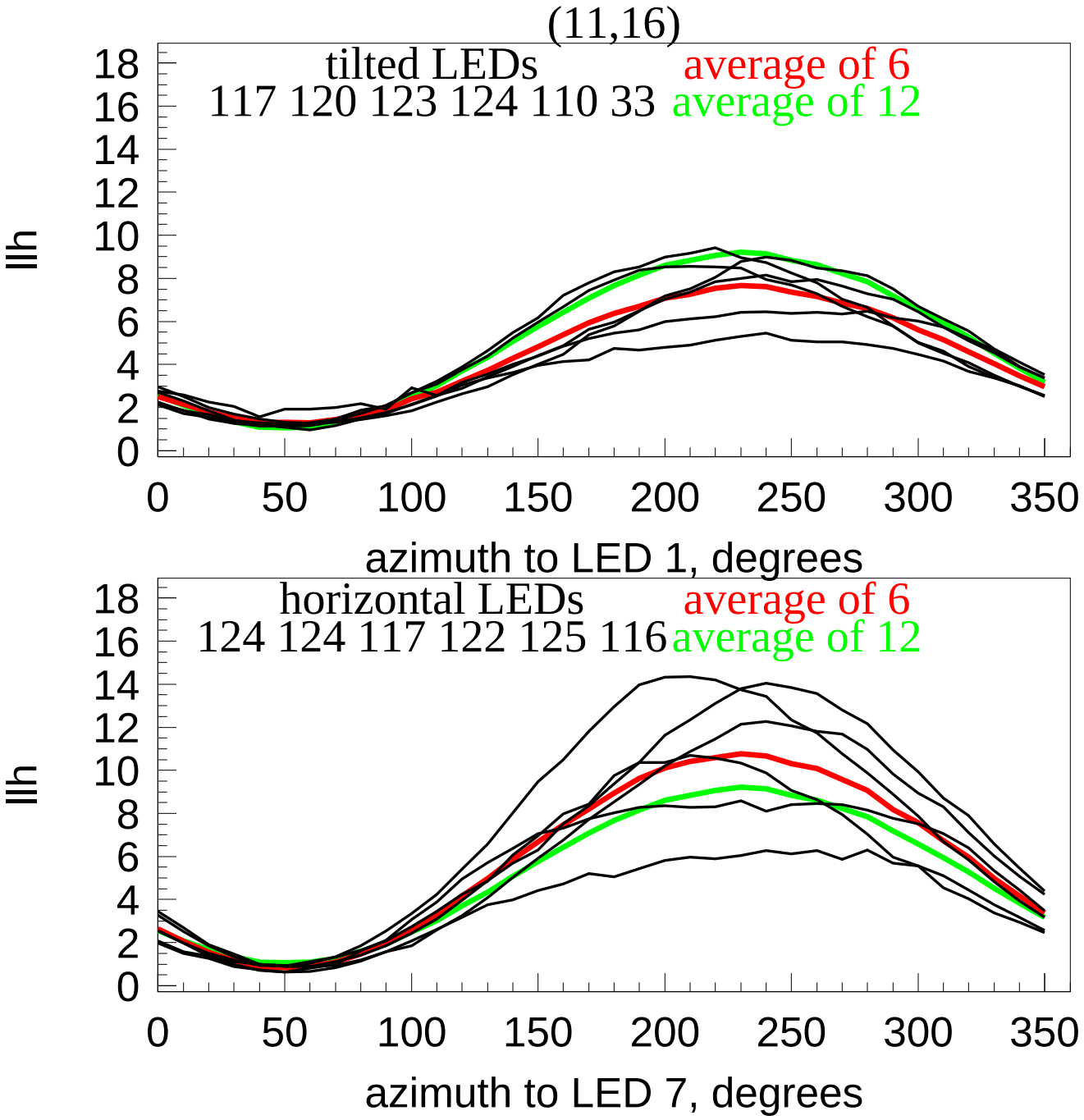

(11,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
302.1 ± 5.6

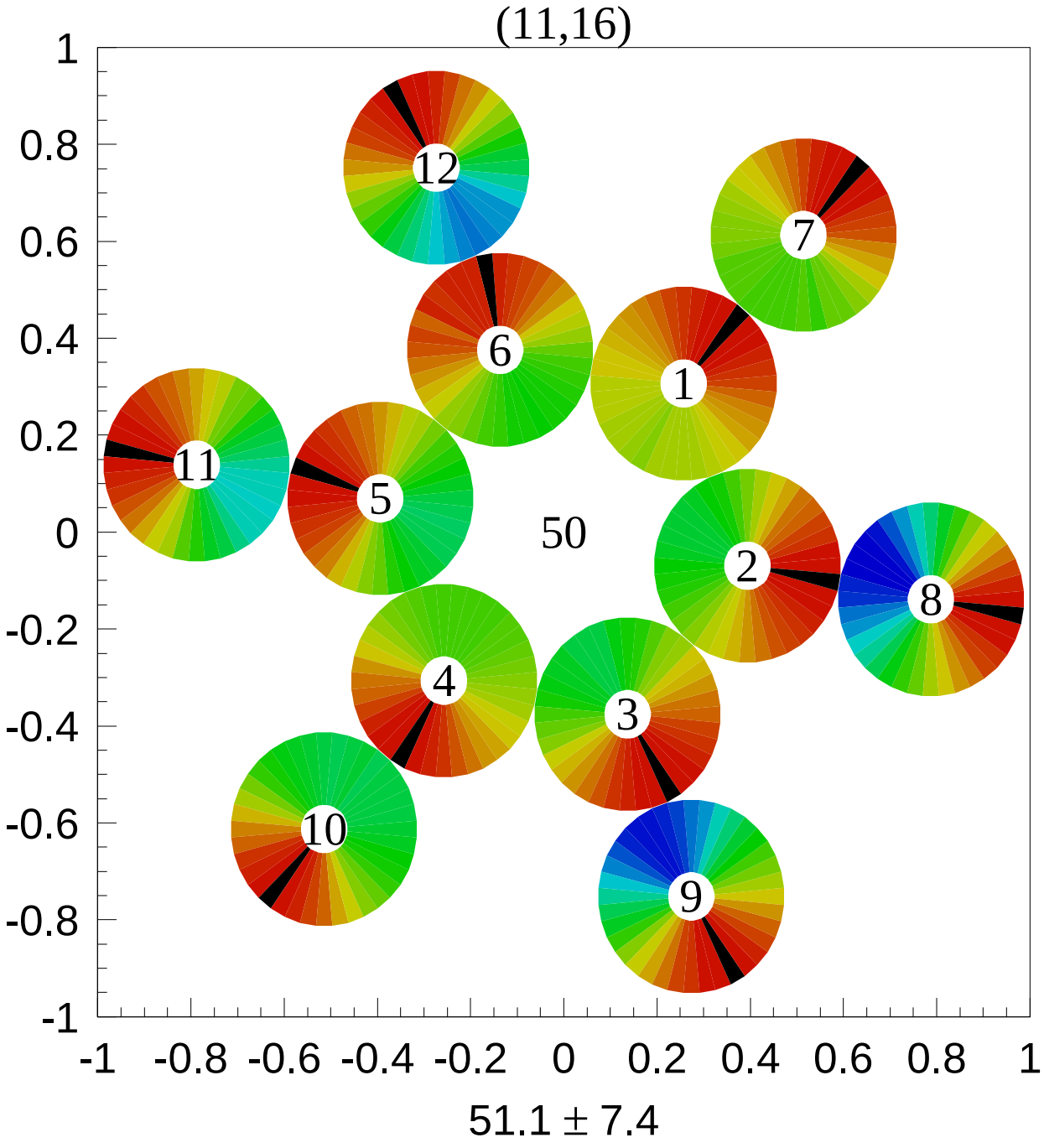

(11,14)
tilted LEDs
115 123 124 127 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 120 124 128 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

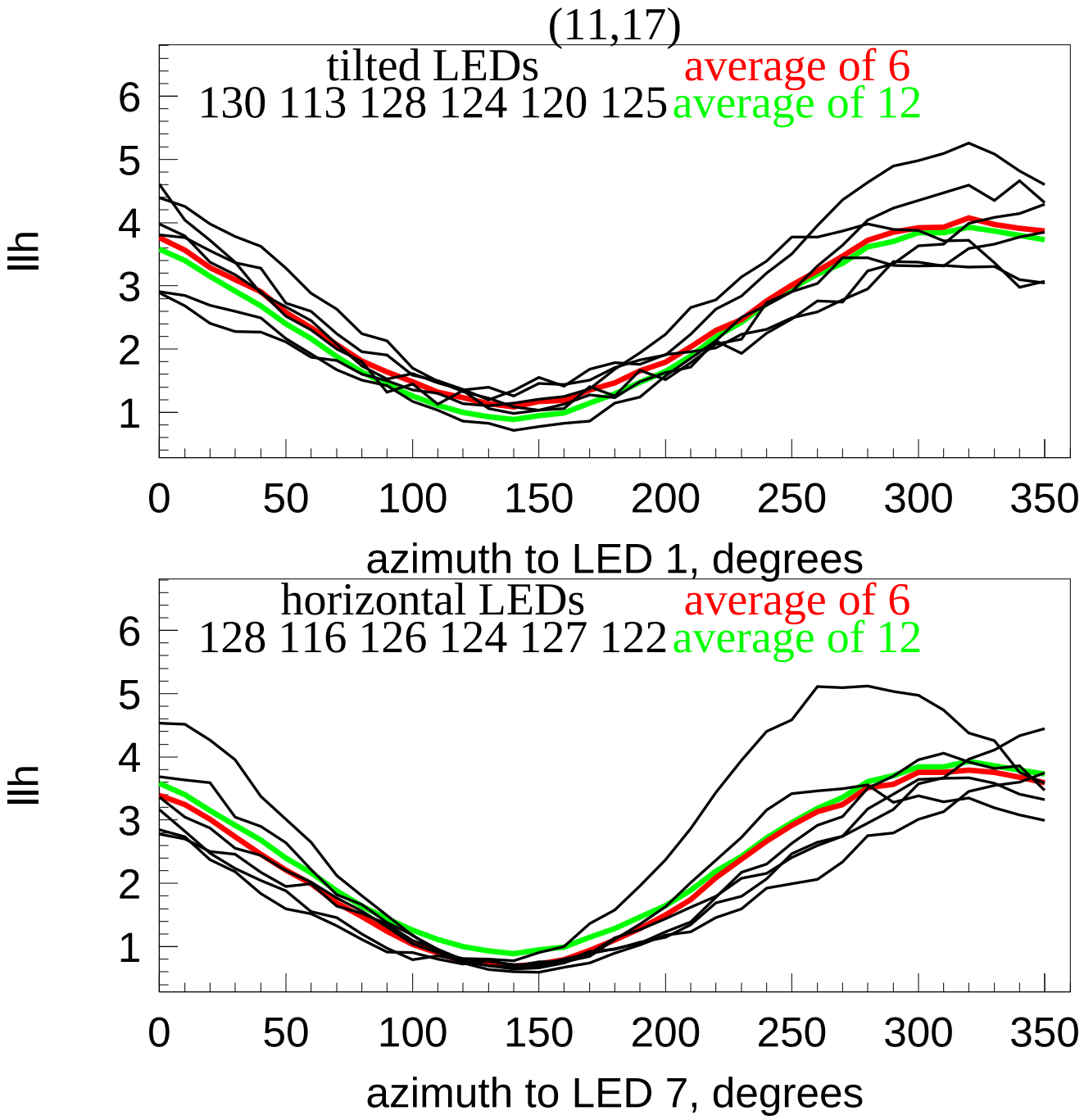

(11,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
298.6 ± 5.2

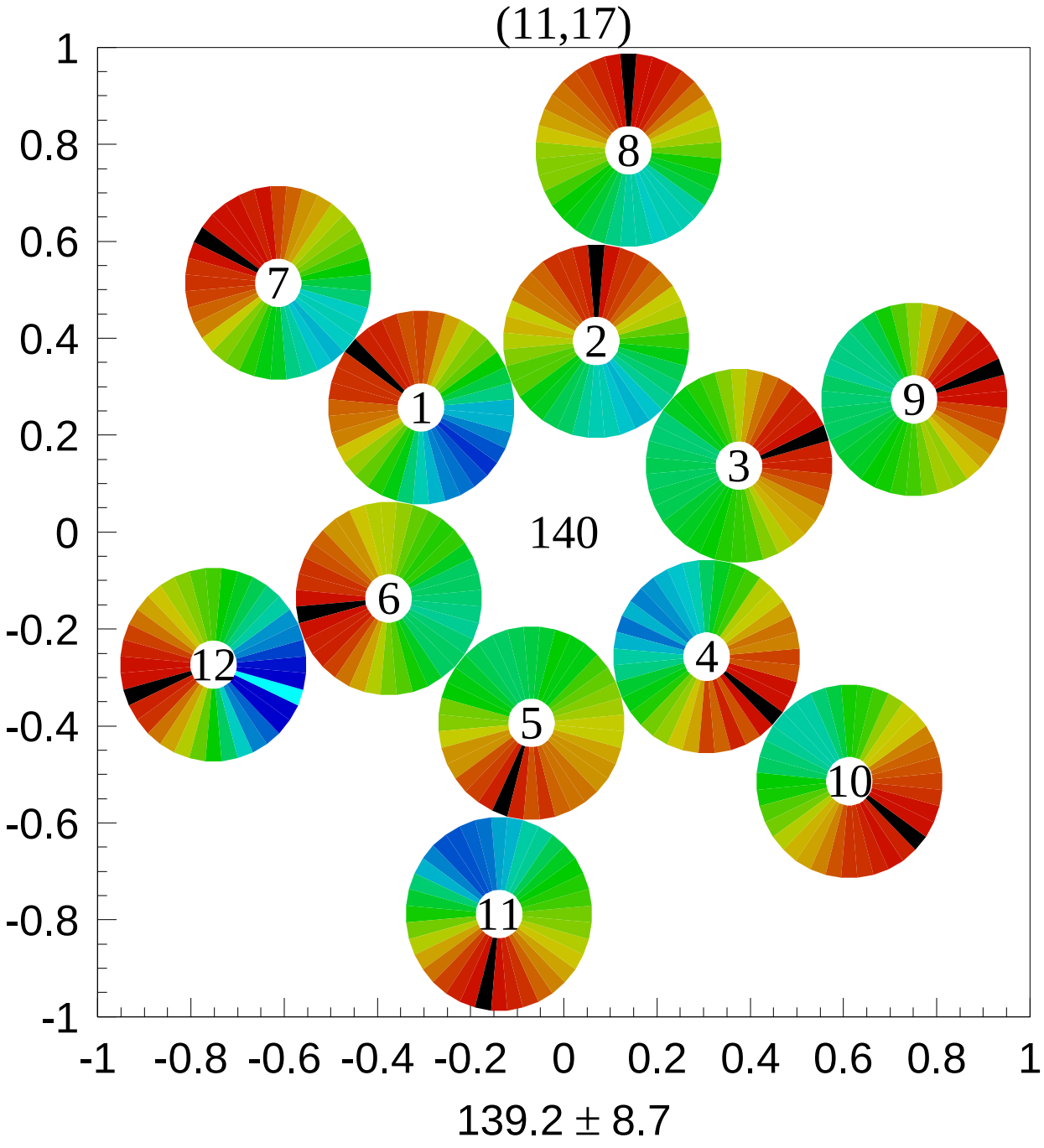

(11,15)
tilted LEDs
120 127 123 122 124 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 124 122 125 128 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

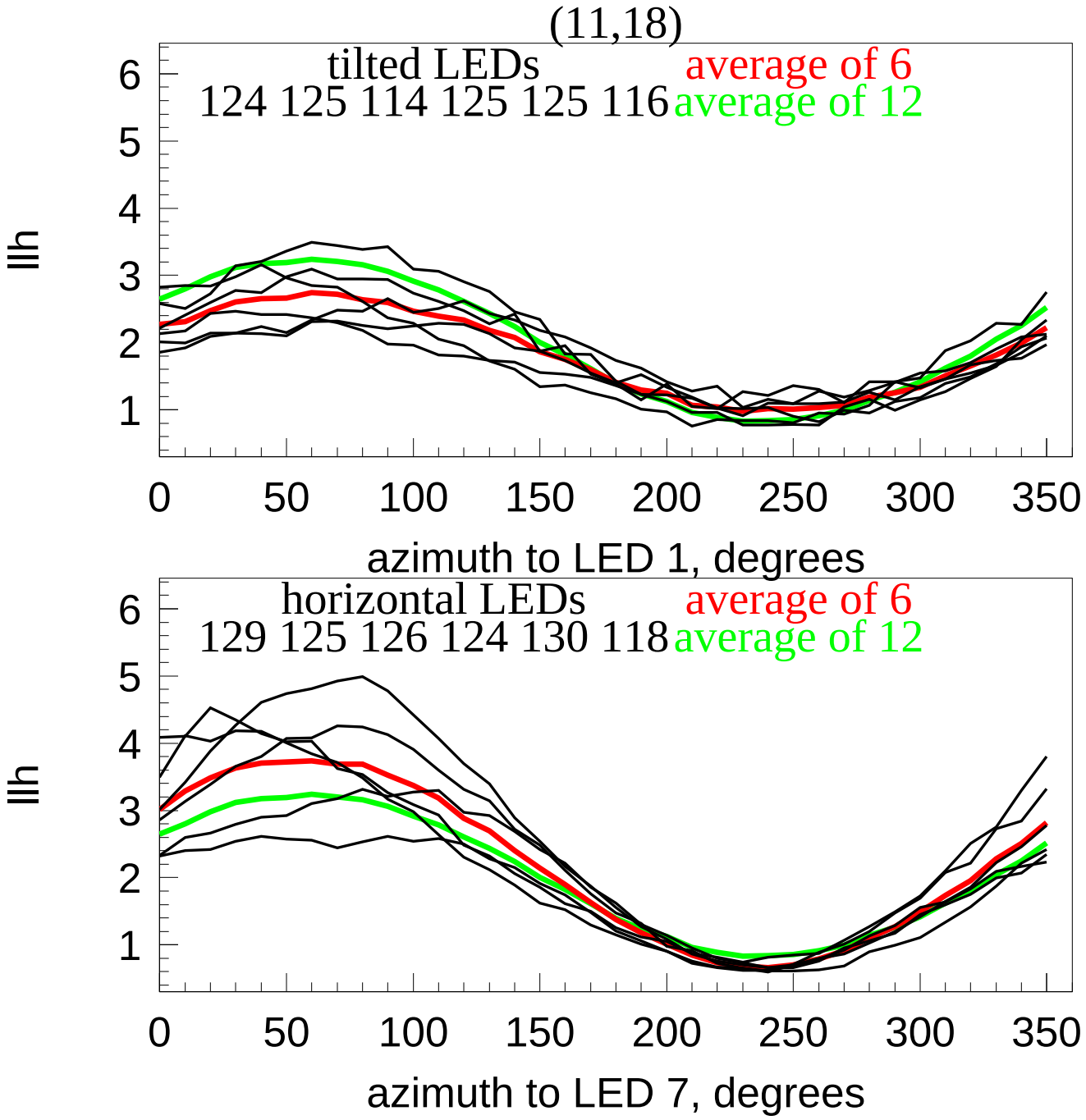

(11,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
101.4 ± 5.1

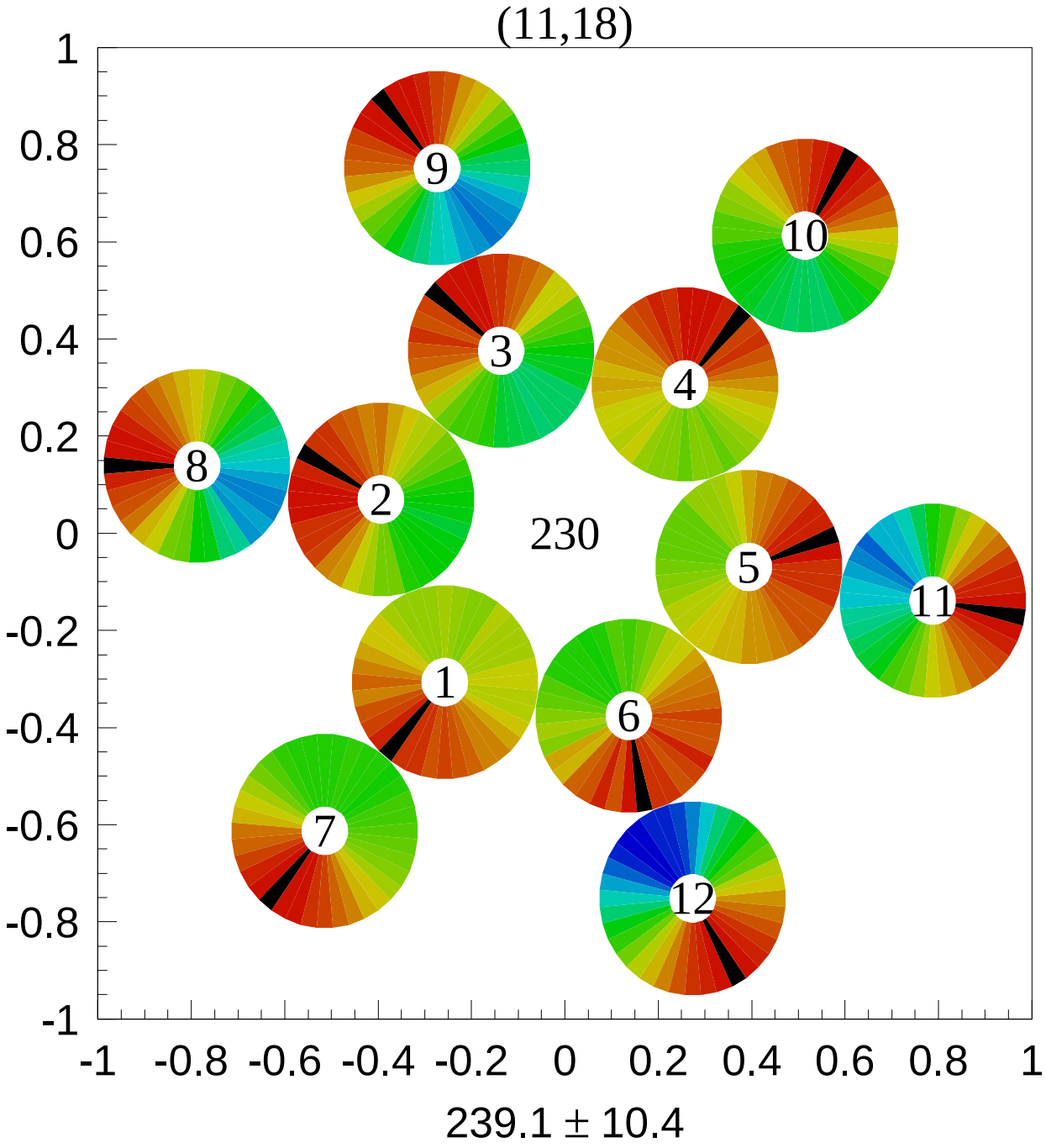

(11,16)
tilted LEDs
117 120 123 124 110 33
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 117 122 125 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

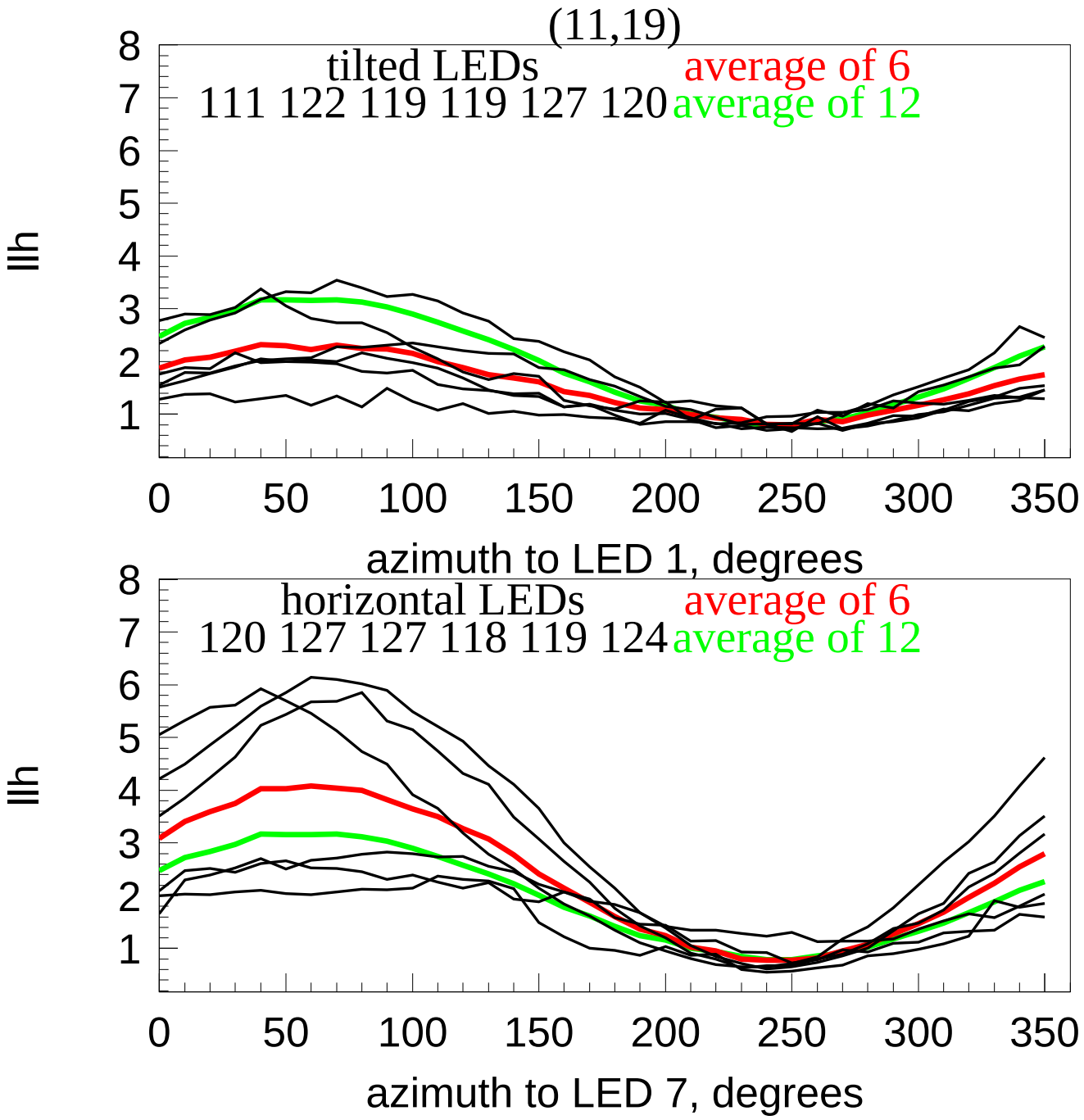

(11,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
51.1 ± 7.4

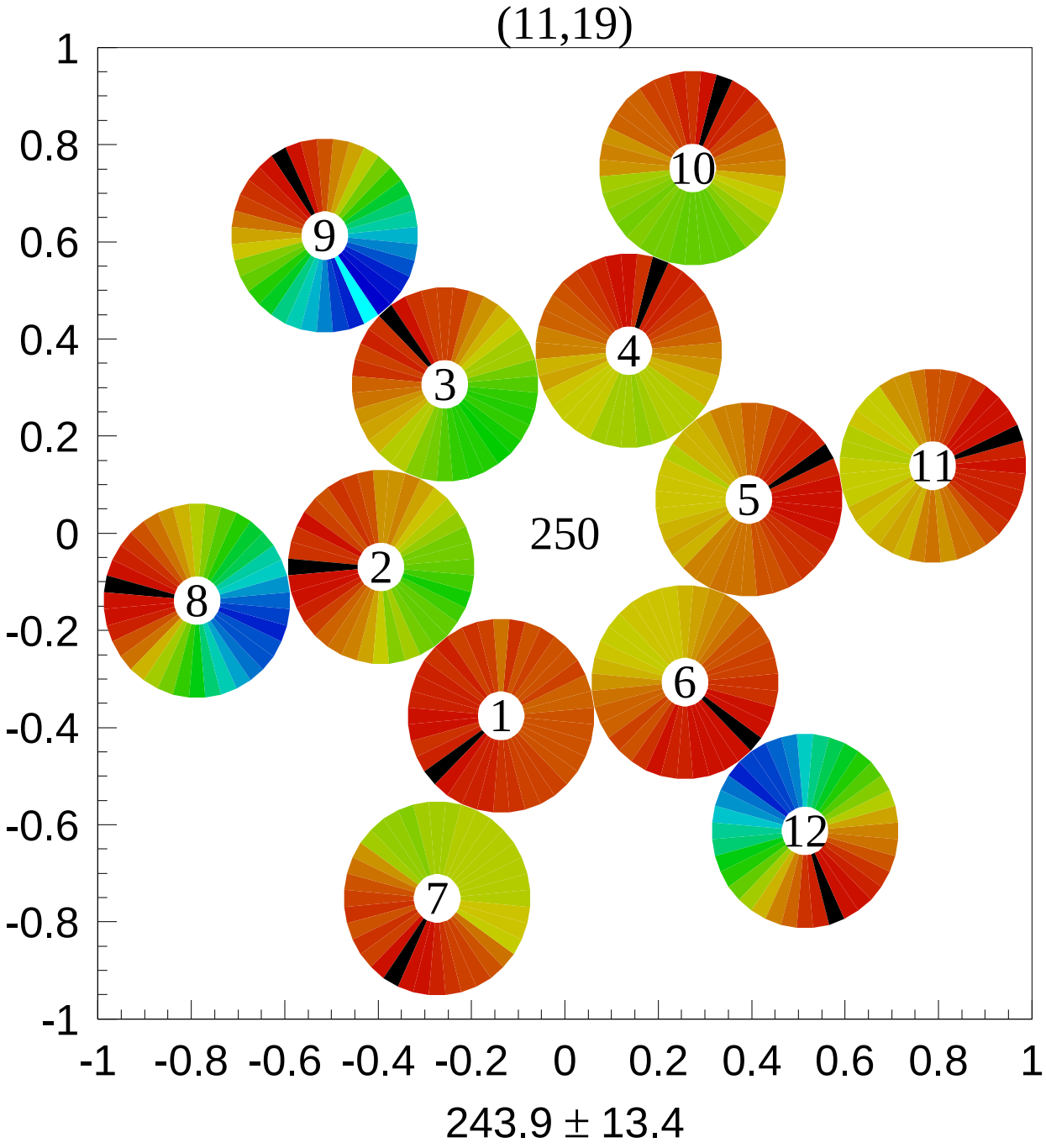

(11,17)
tilted LEDs
130 113 128 124 120 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 116 126 124 127 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

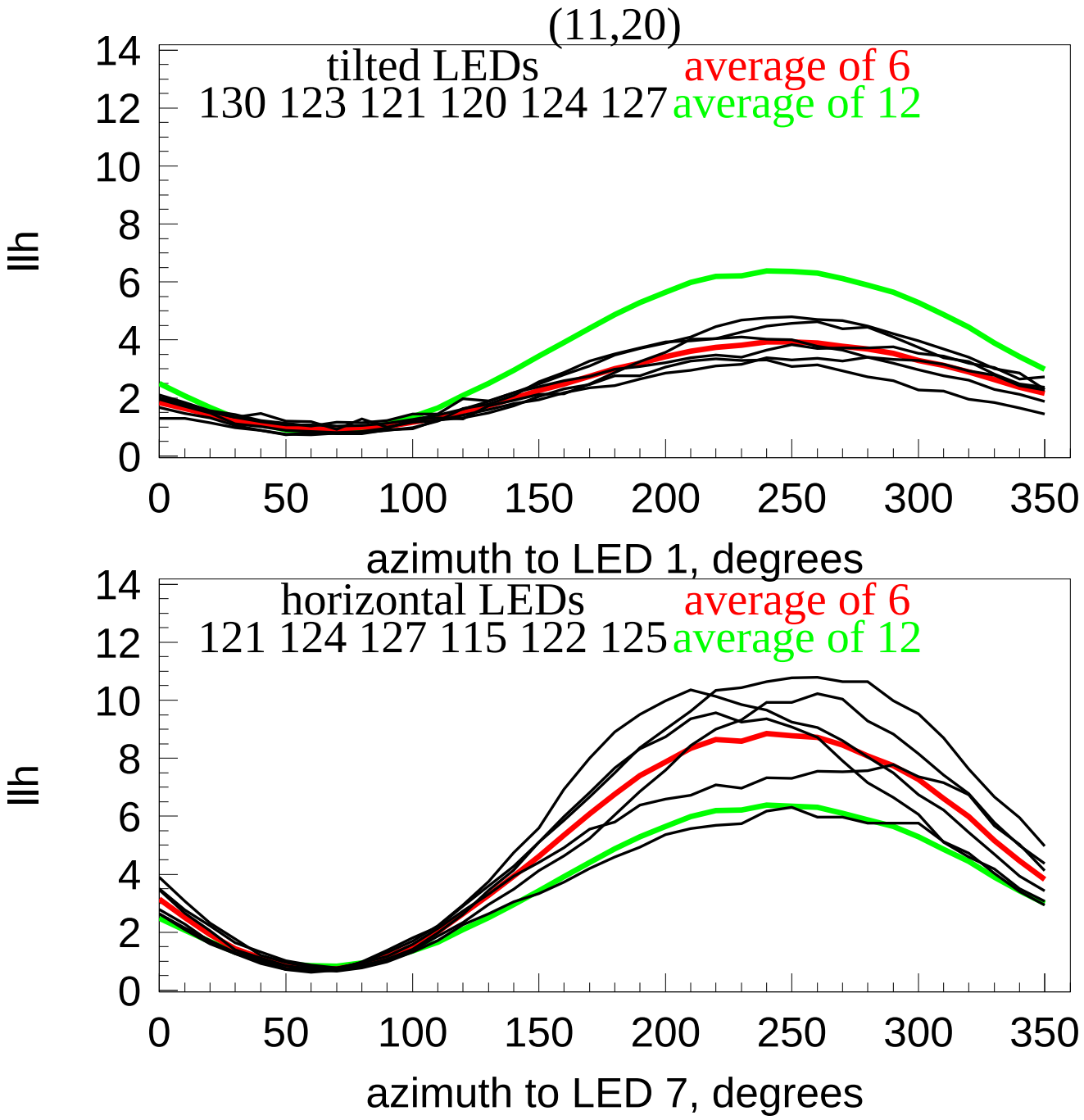

(11,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
139.2 ± 8.7

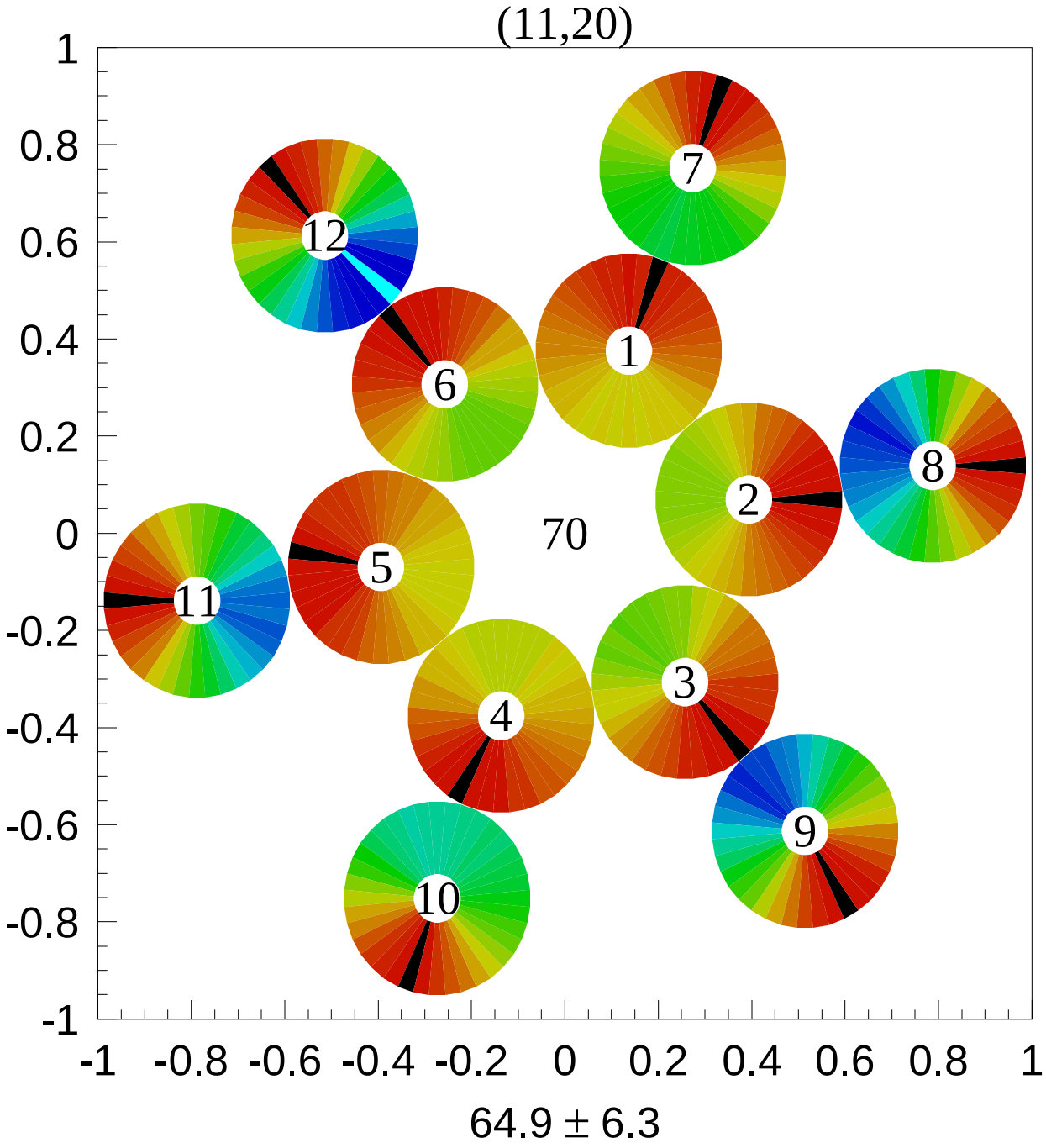

(11,18)
tilted LEDs
124 125 114 125 125 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 125 126 124 130 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

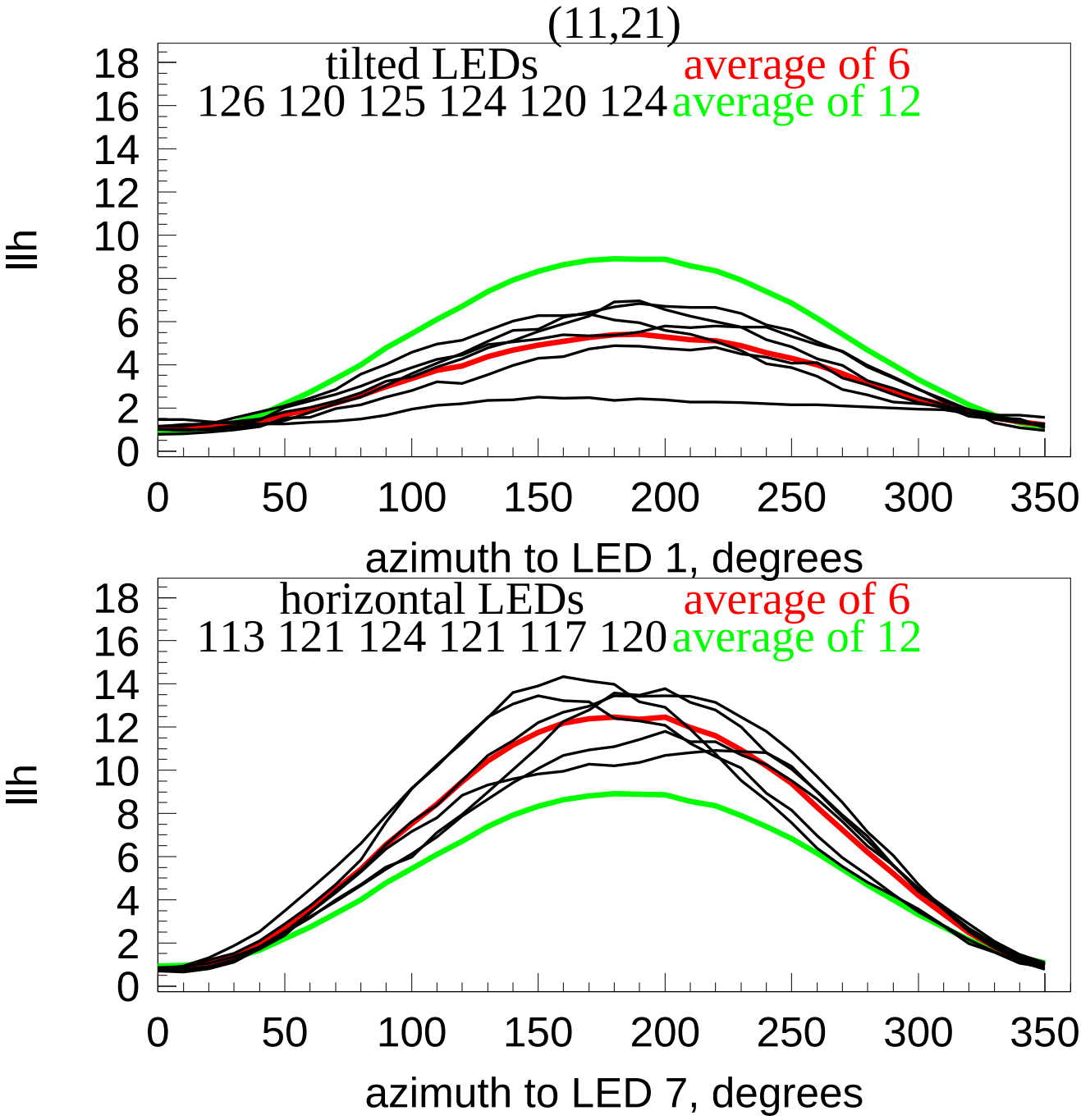

(11,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
239.1 ± 10.4

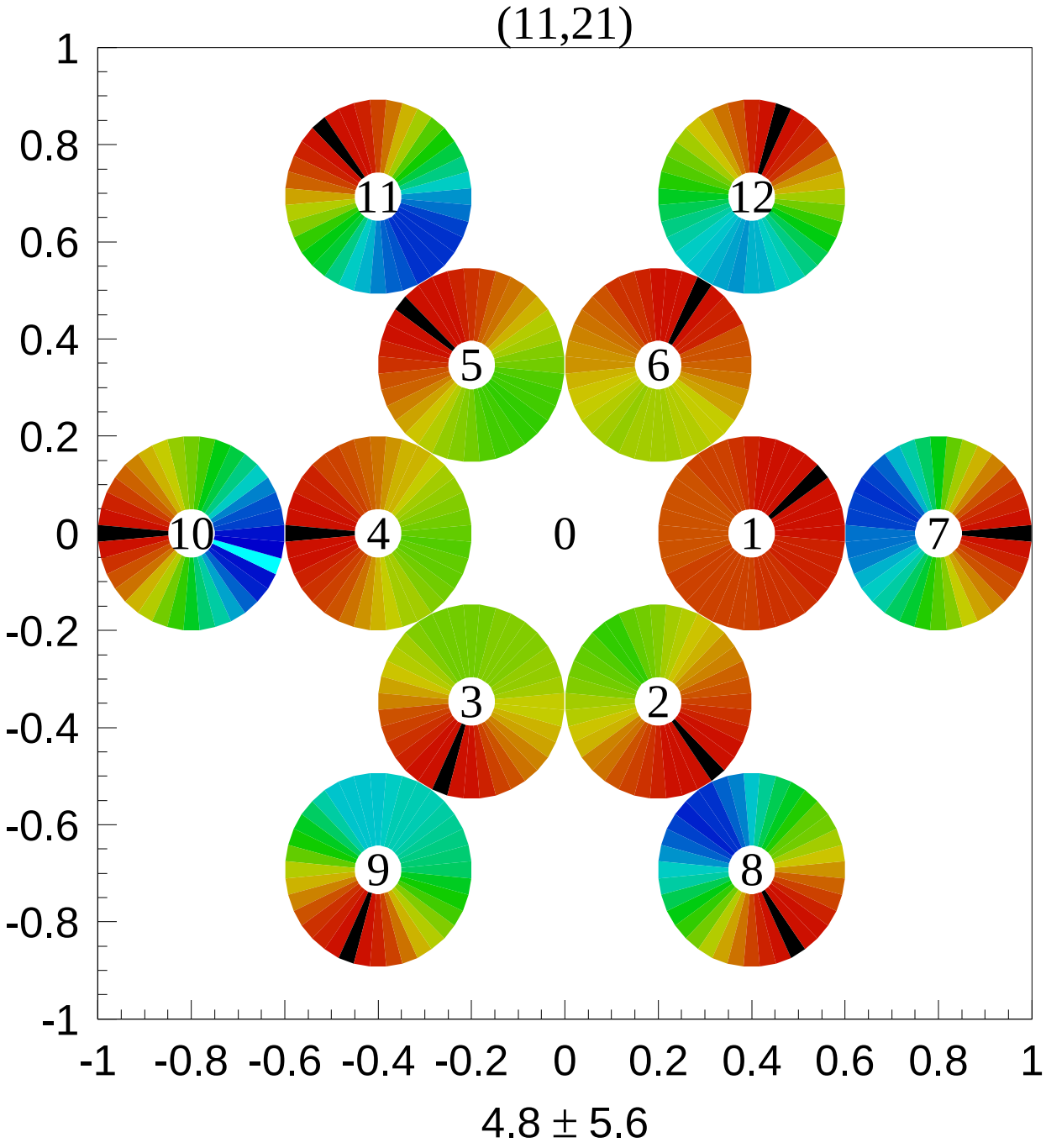

(11,19)
tilted LEDs
111 122 119 119 127 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 127 127 118 119 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

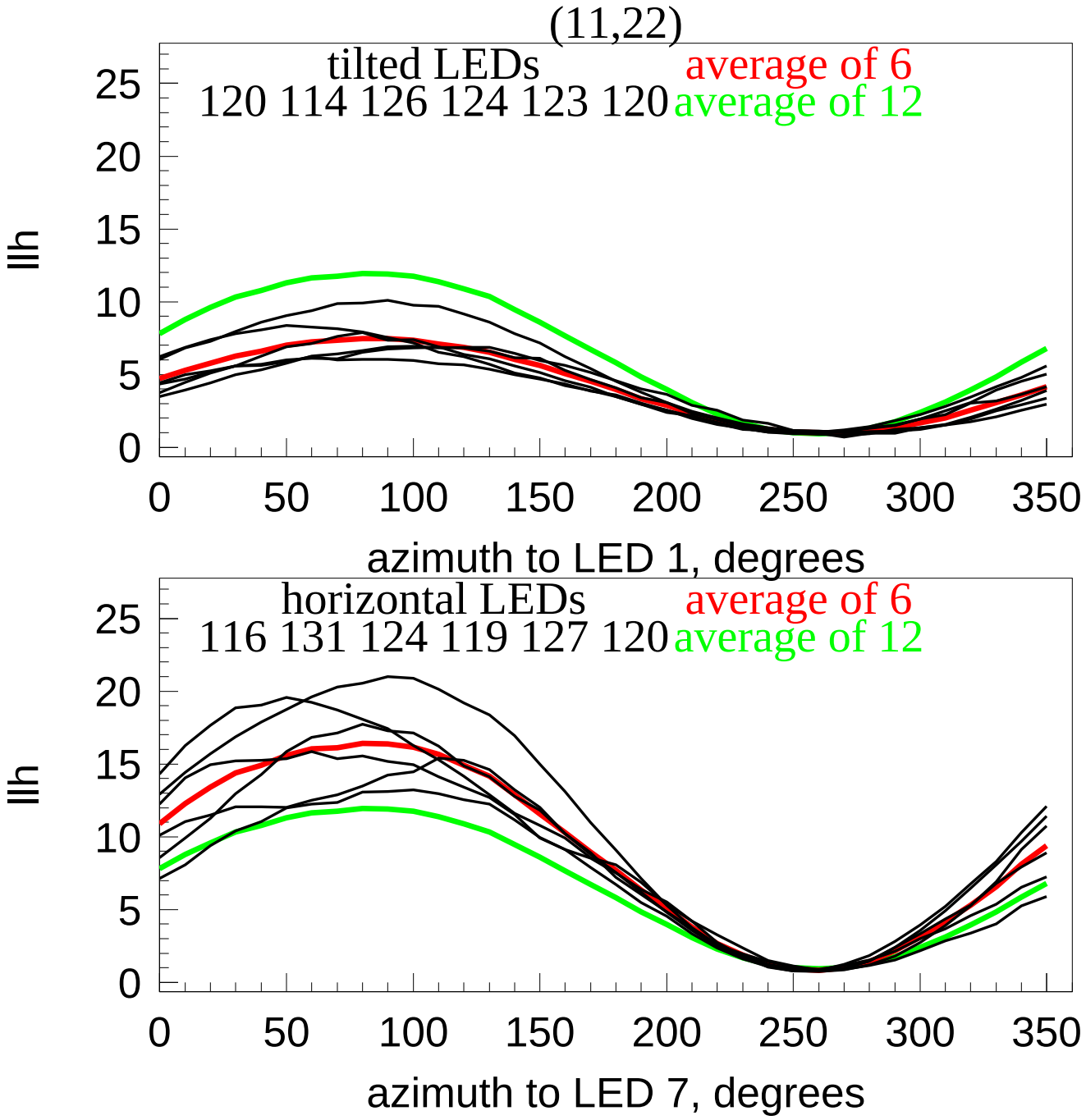

(11,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
243.9 ± 13.4

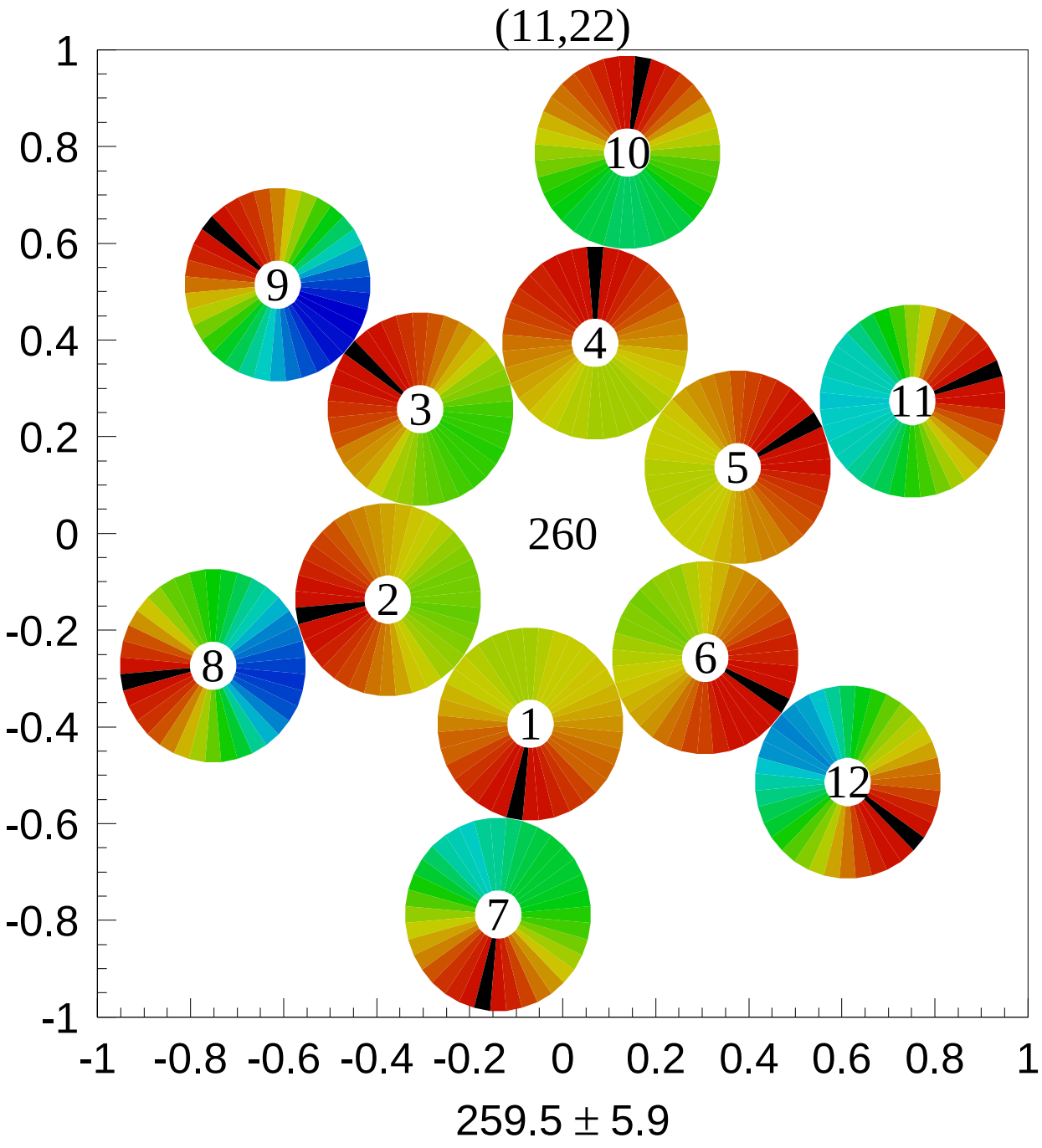

(11,20)
tilted LEDs
130 123 121 120 124 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 127 115 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

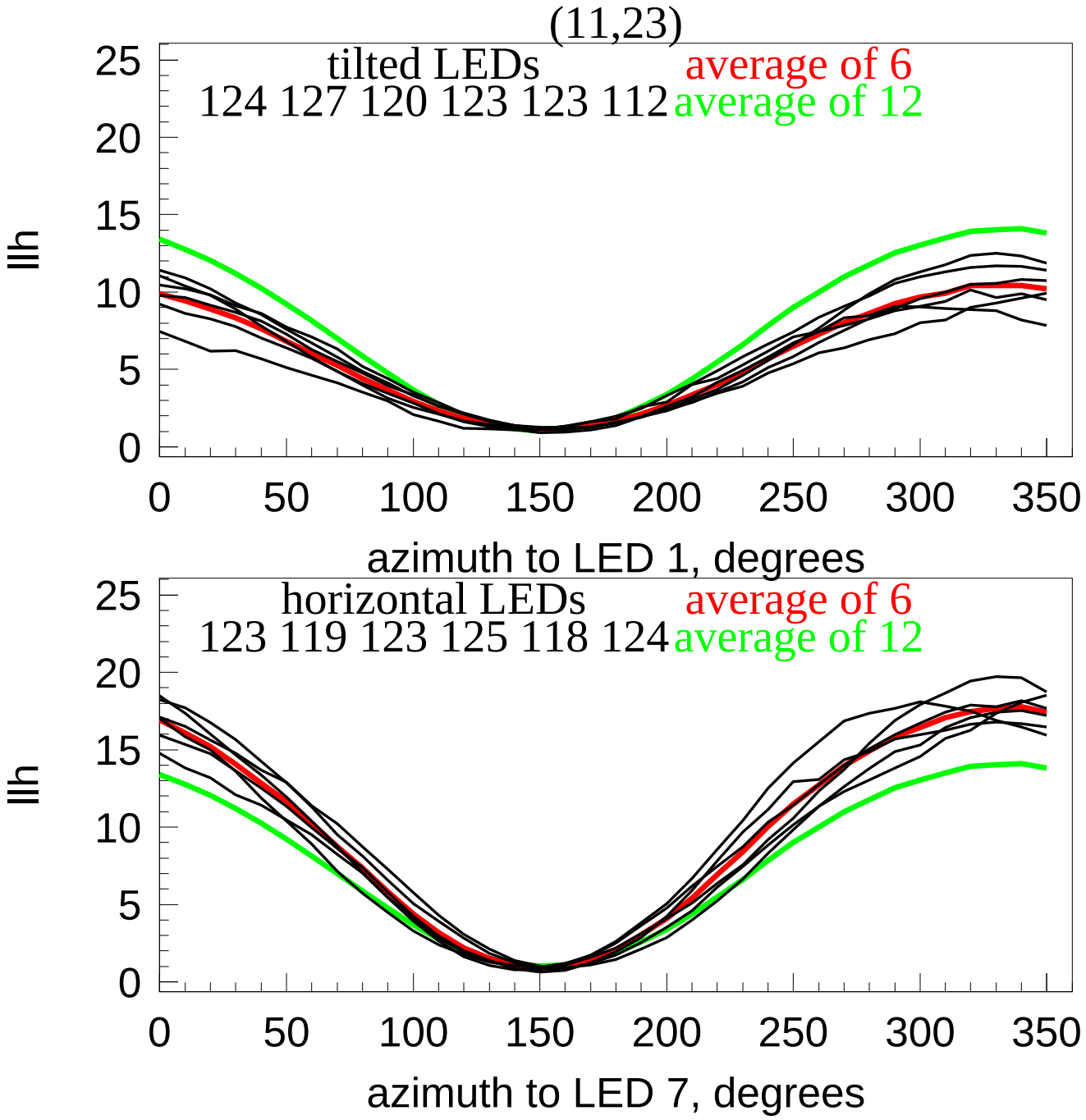

(11,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
64.9 ± 6.3
70
1
2
3
4
5
6
7
8
9
10
11
12

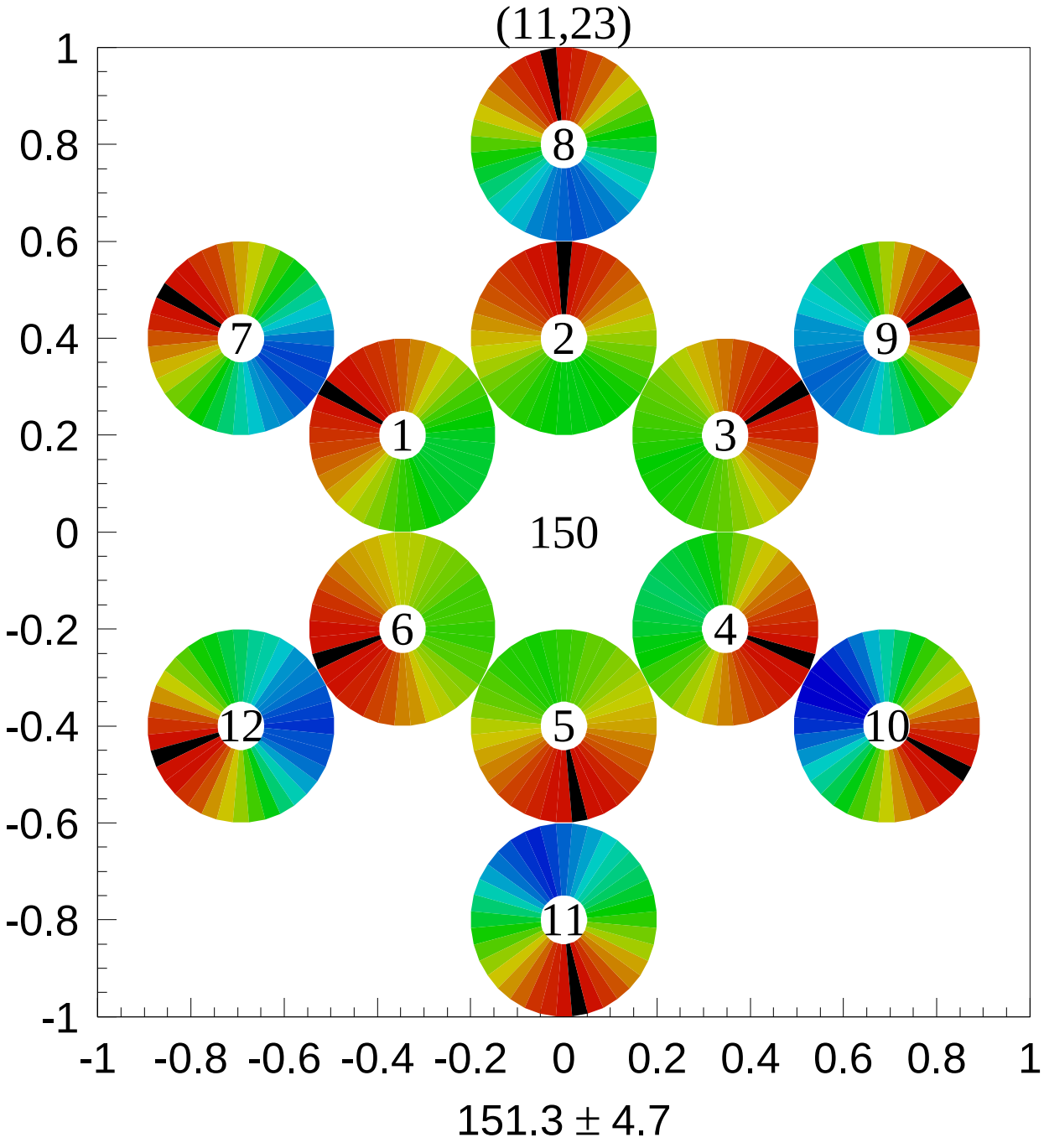

(11,21)
tilted LEDs
126 120 125 124 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 121 124 121 117 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

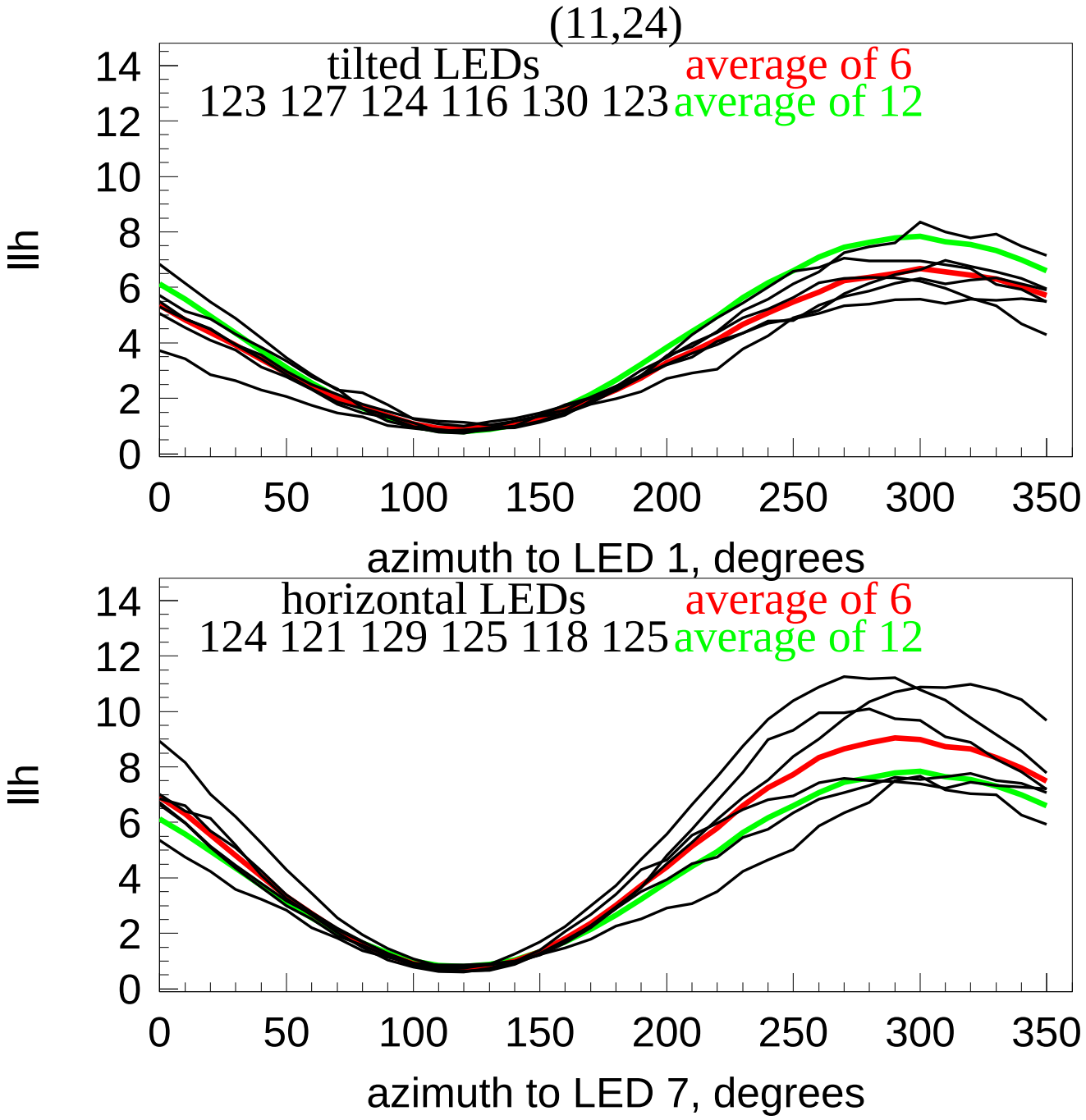

(11,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
4.8 ± 5.6

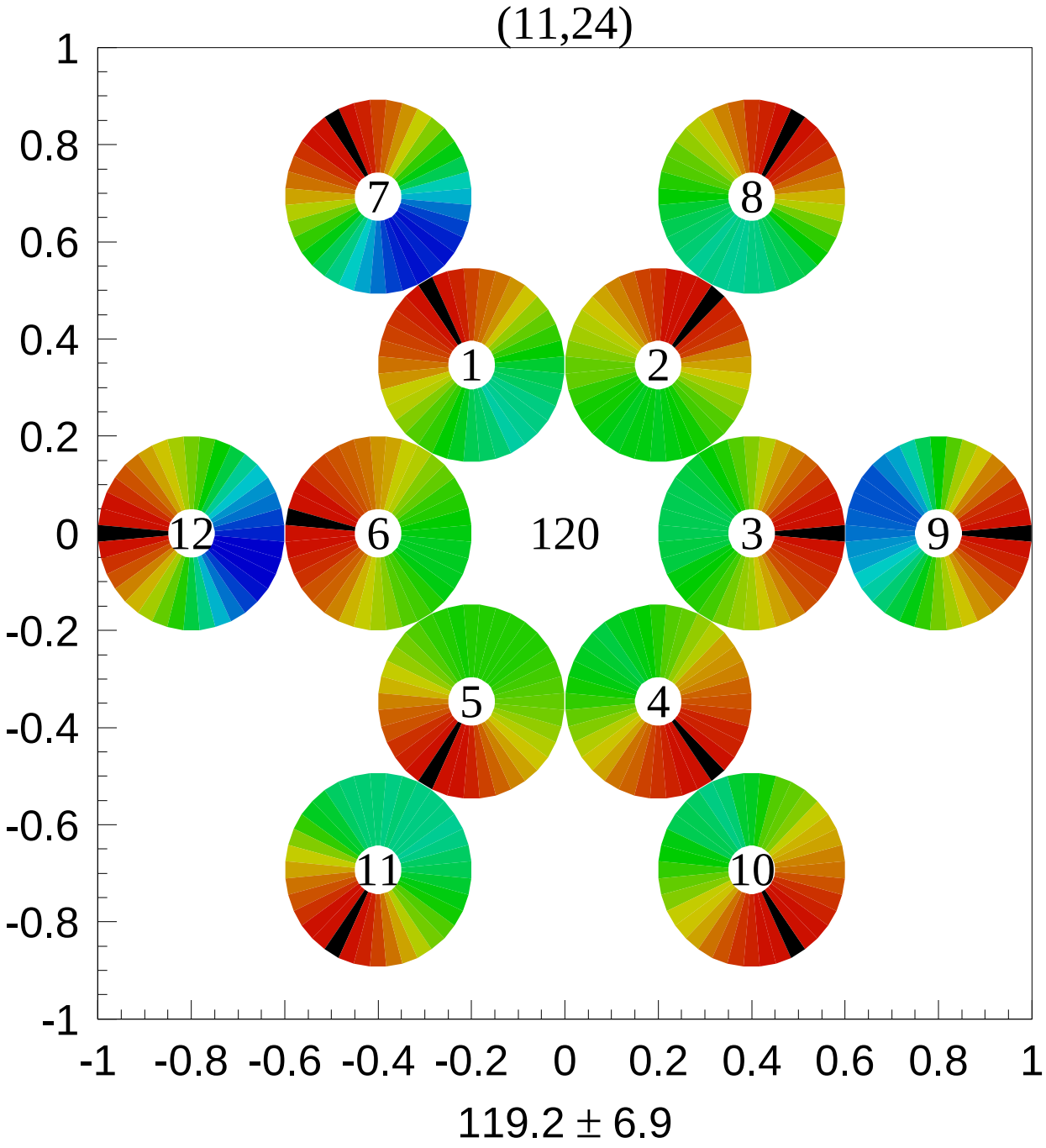

(11,22)
tilted LEDs
120 114 126 124 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 131 124 119 127 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

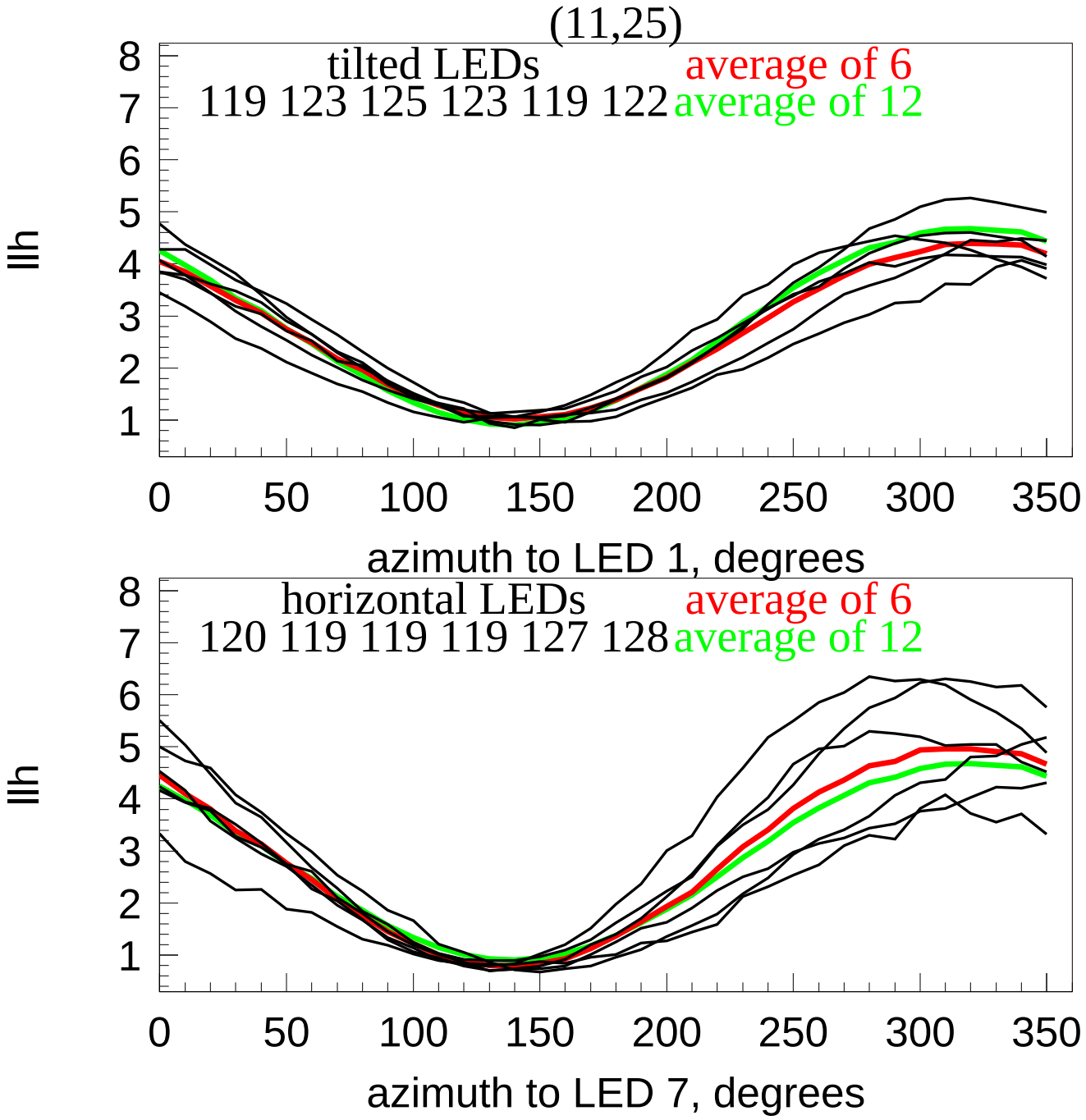

(11,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
259.5 ± 5.9

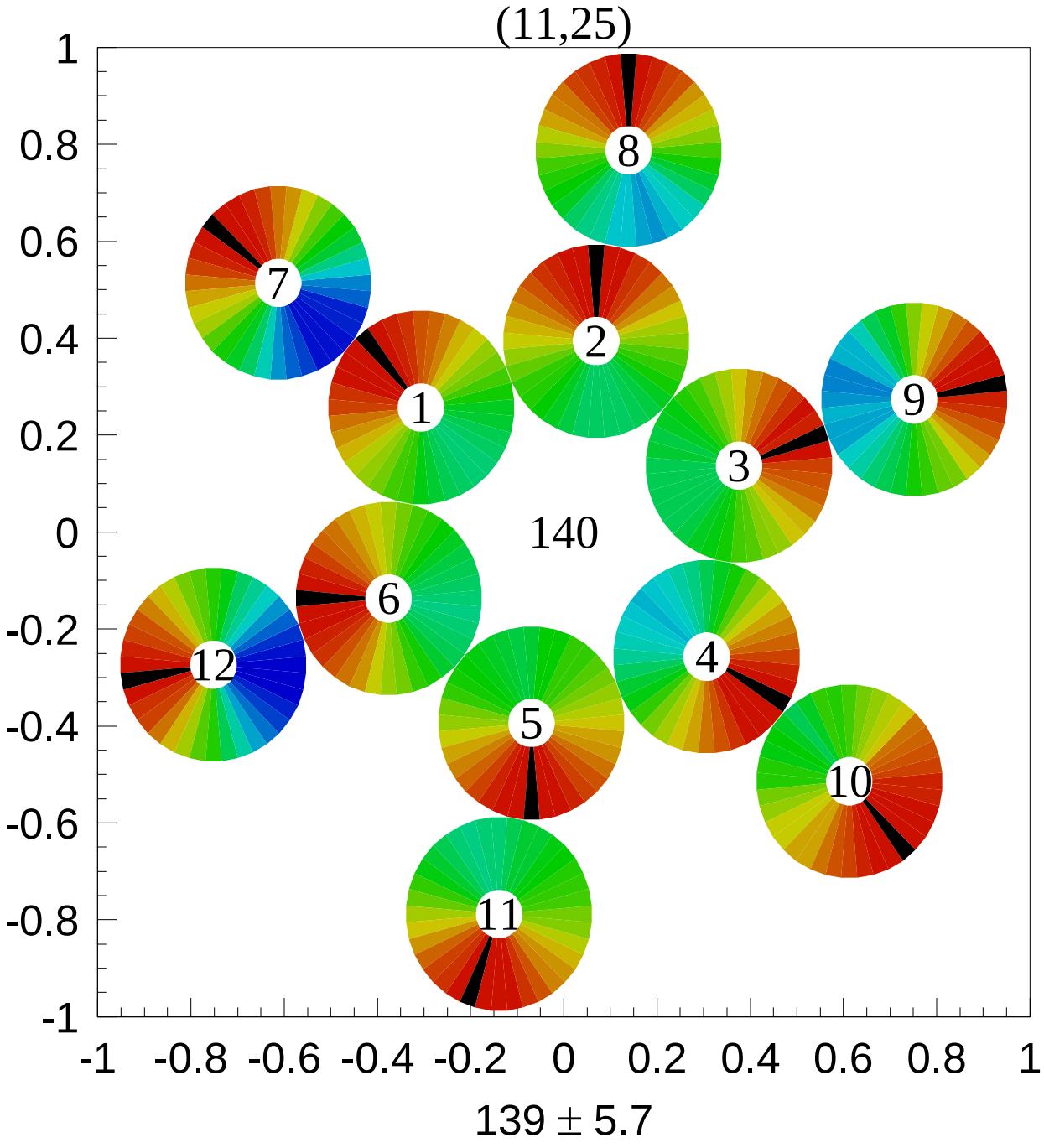

(11,23)
tilted LEDs
124 127 120 123 123 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 123 125 118 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

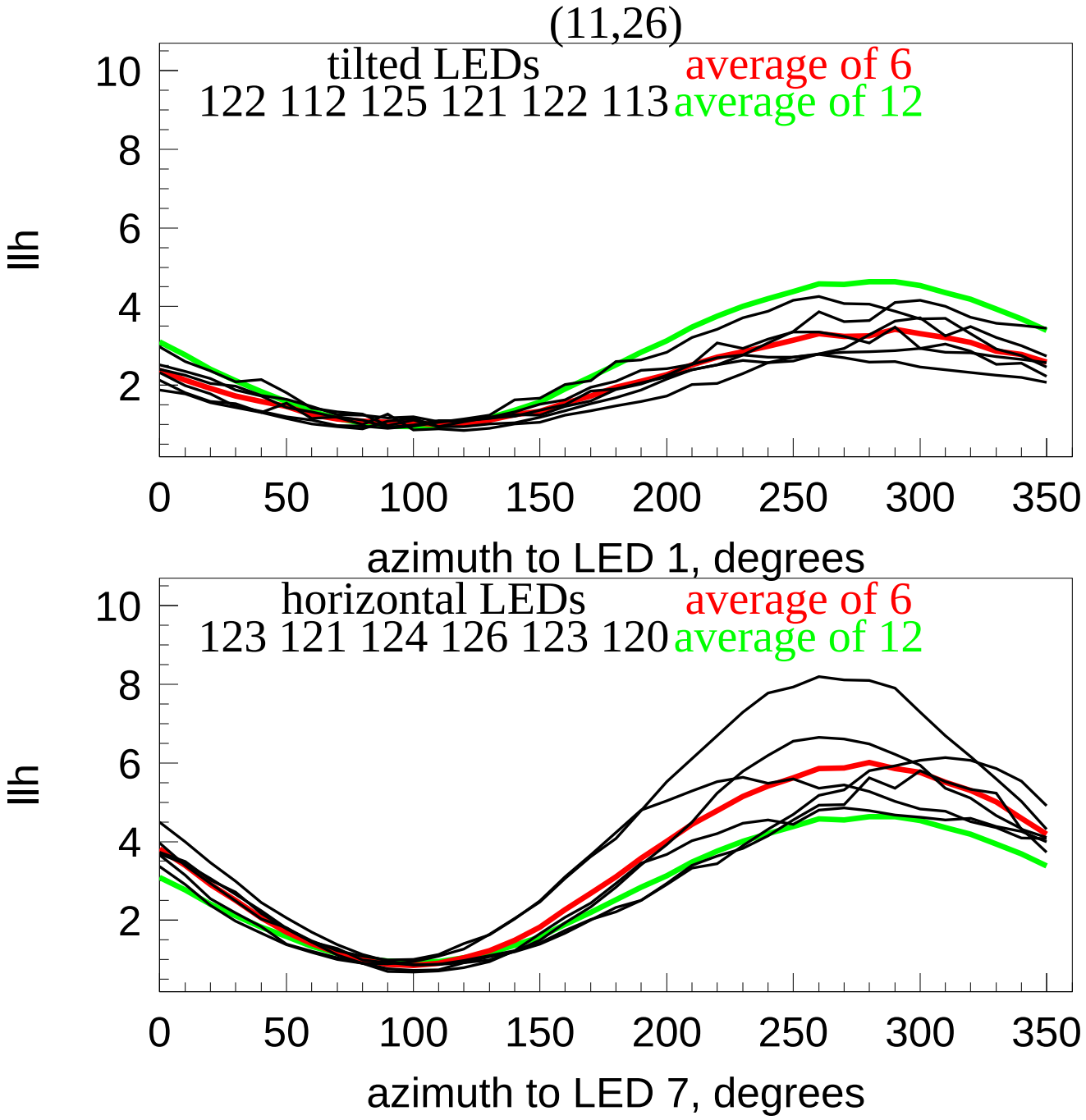

(11,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
151.3 ± 4.7

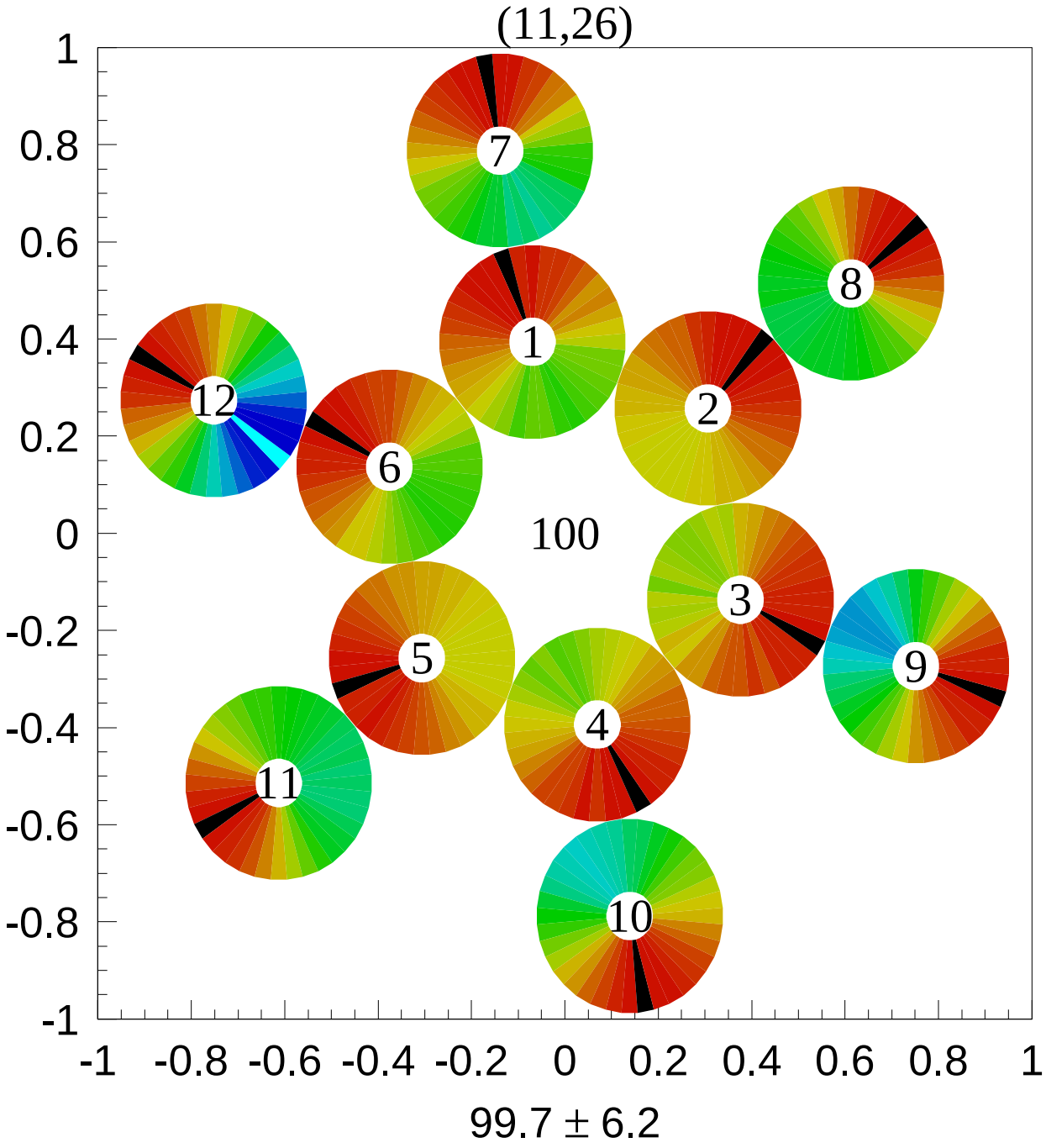

(11,24)
tilted LEDs
123 127 124 116 130 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 129 125 118 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

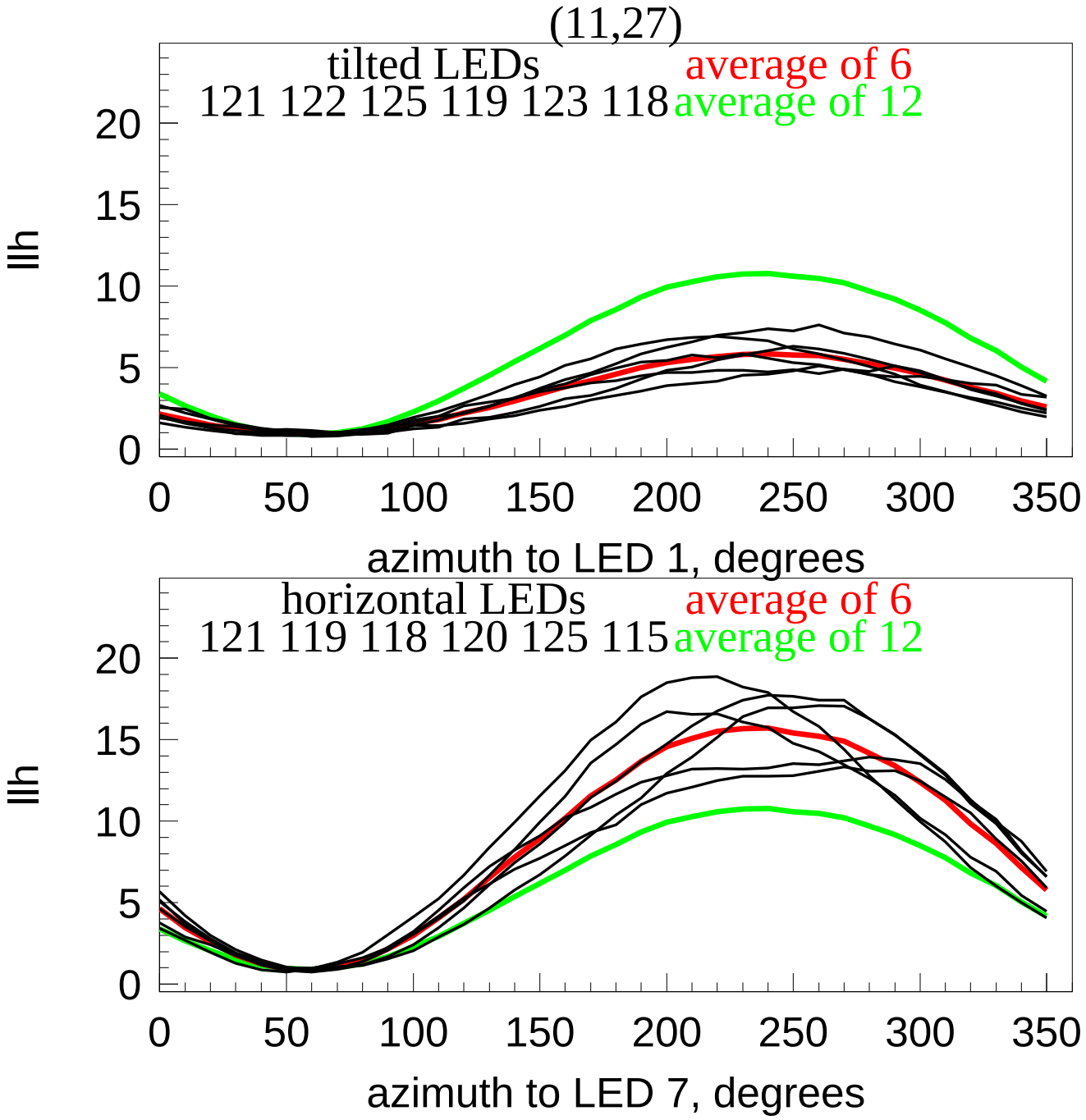

(11,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
119.2 ± 6.9

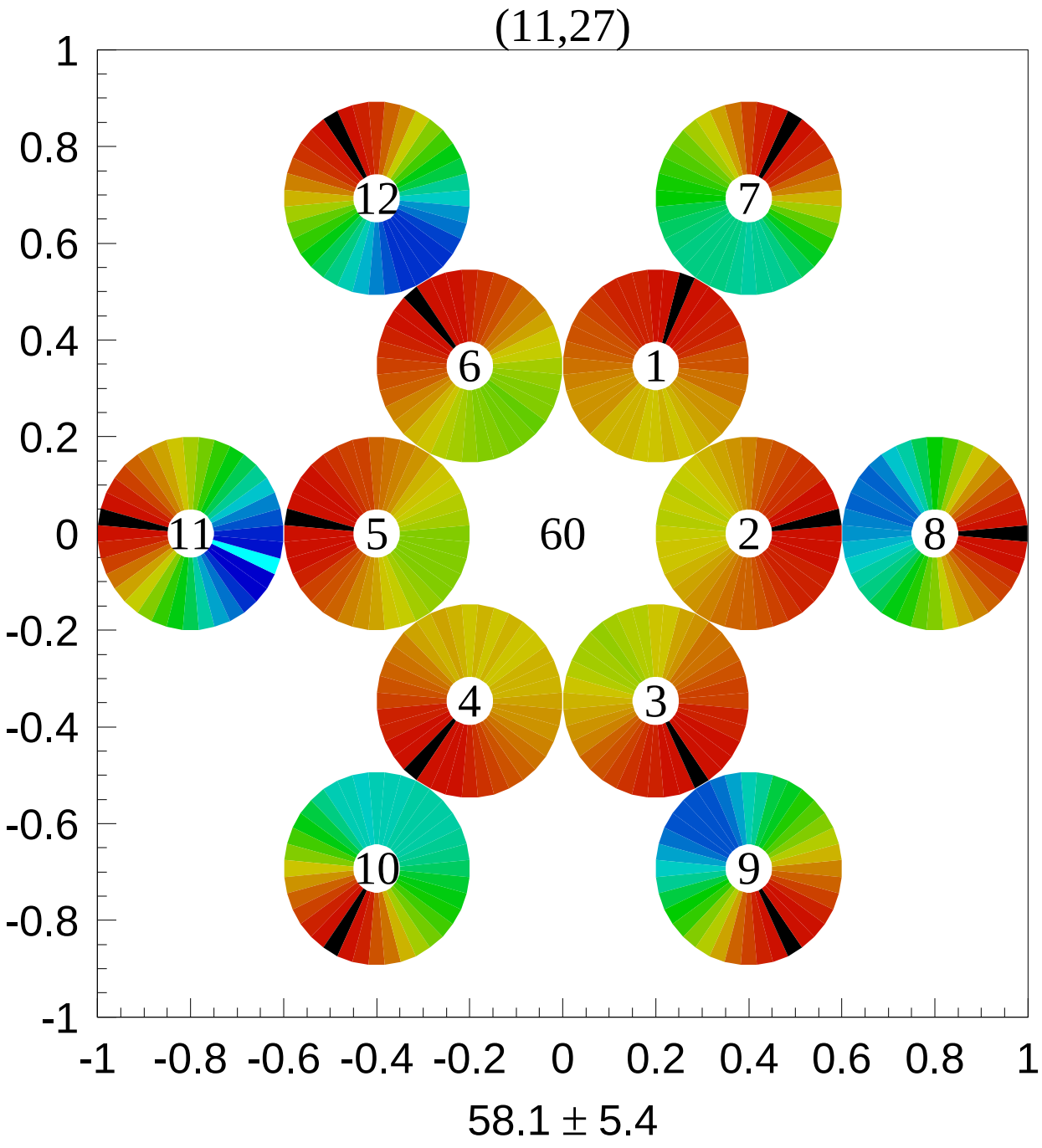

(11,25)
tilted LEDs
119 123 125 123 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 119 119 119 127 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

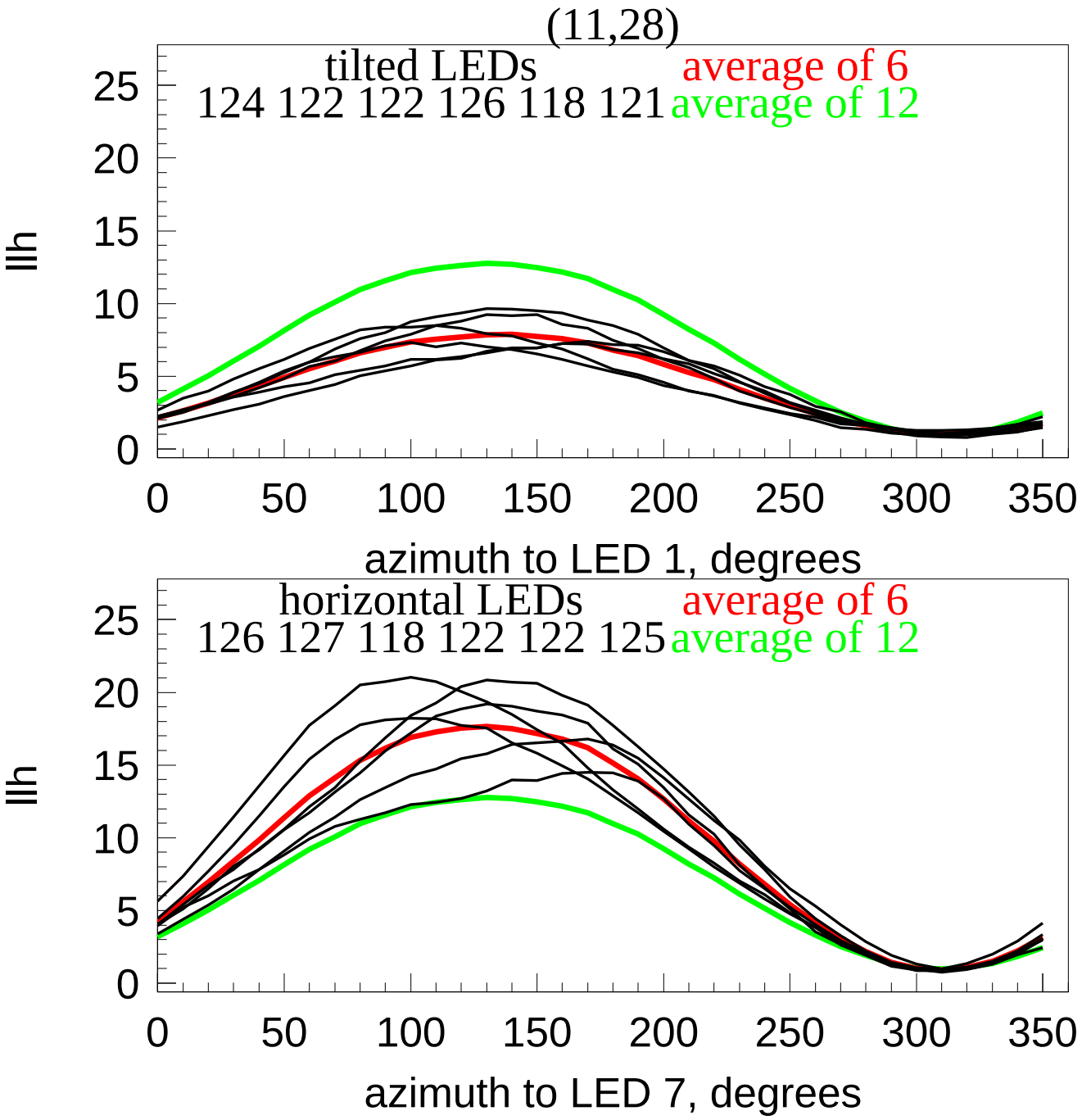

(11,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
139 ± 5.7

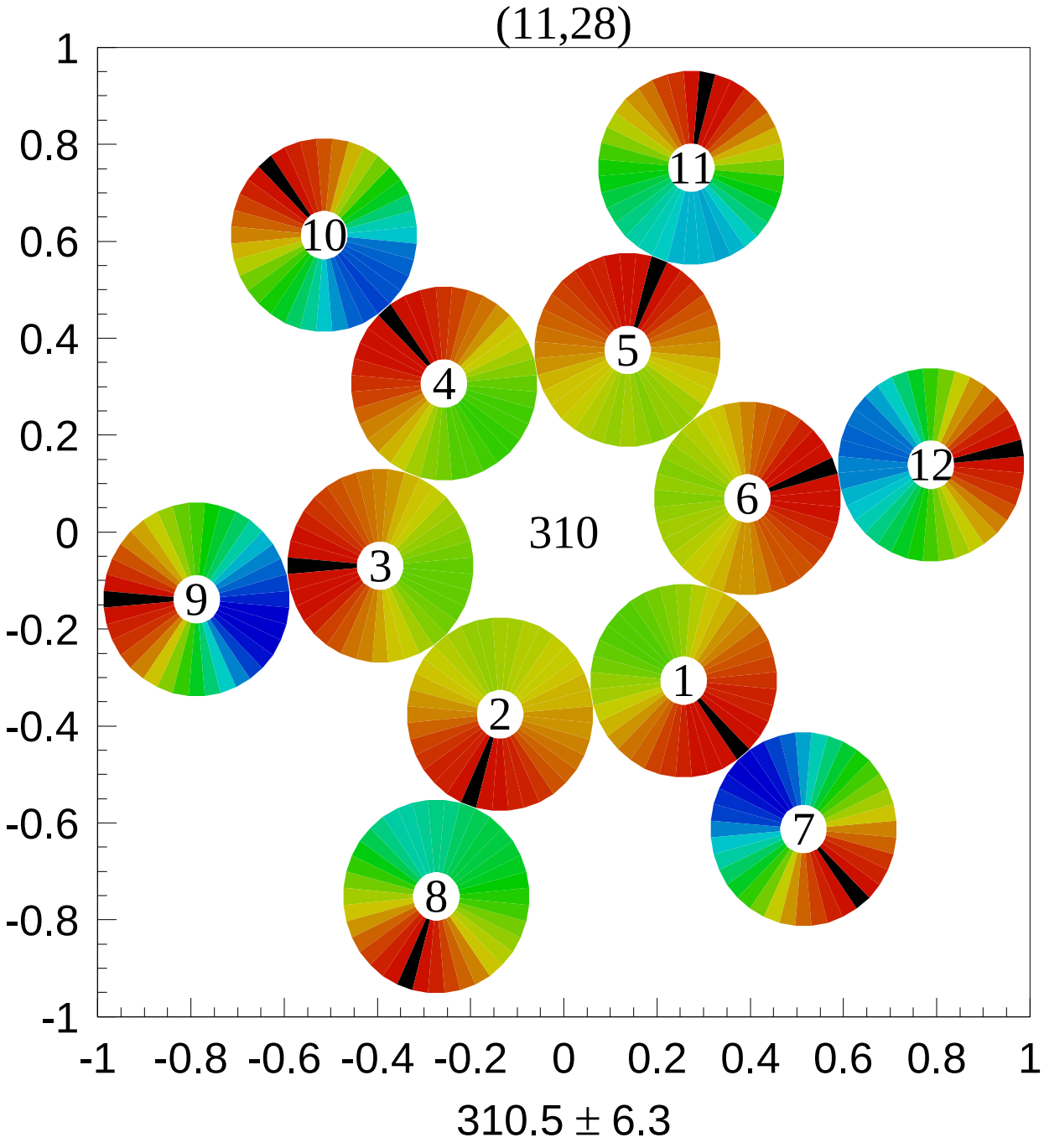

(11,26)
tilted LEDs
122 112 125 121 122 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 124 126 123 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

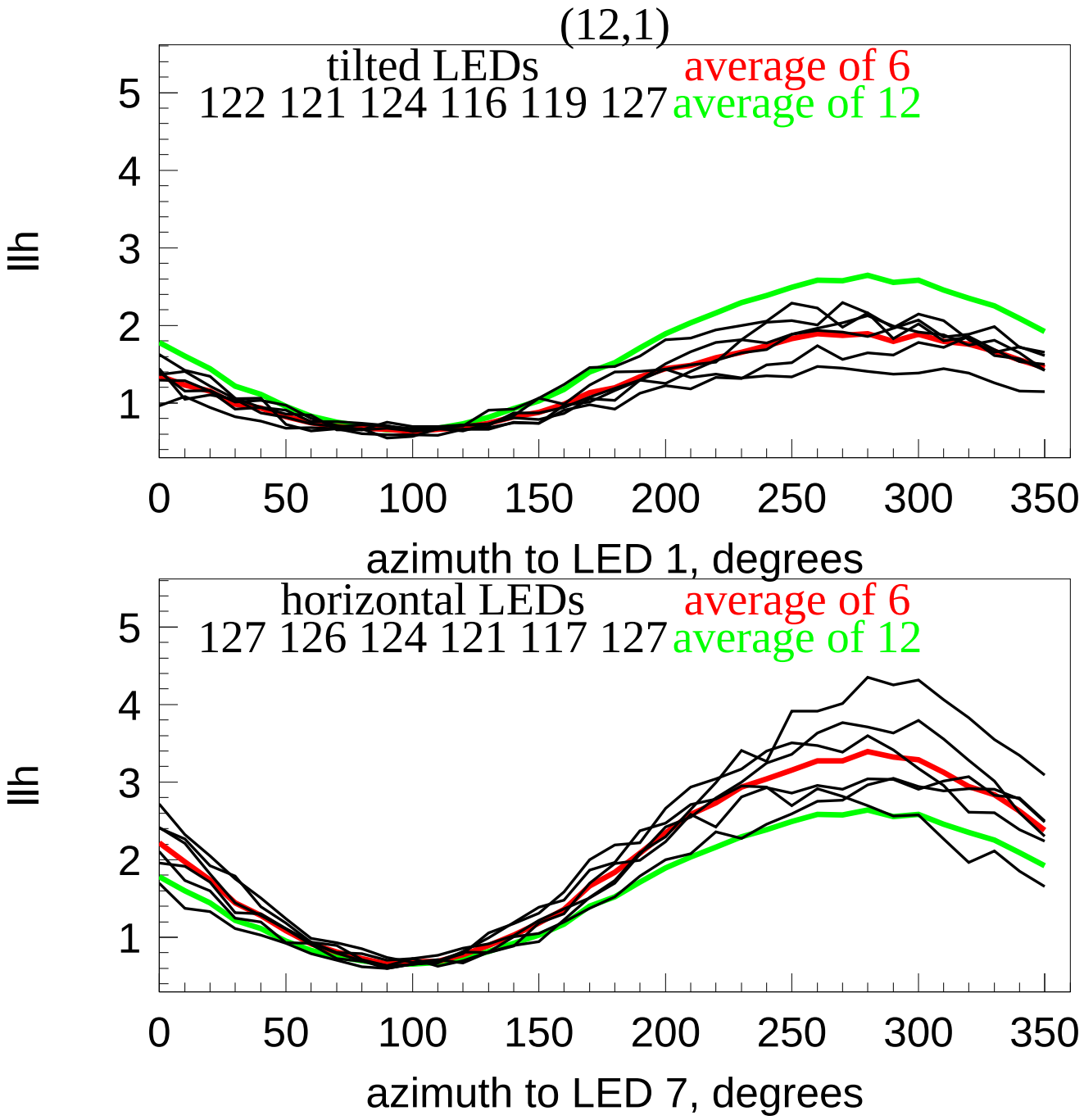

(11,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
99.7 ± 6.2

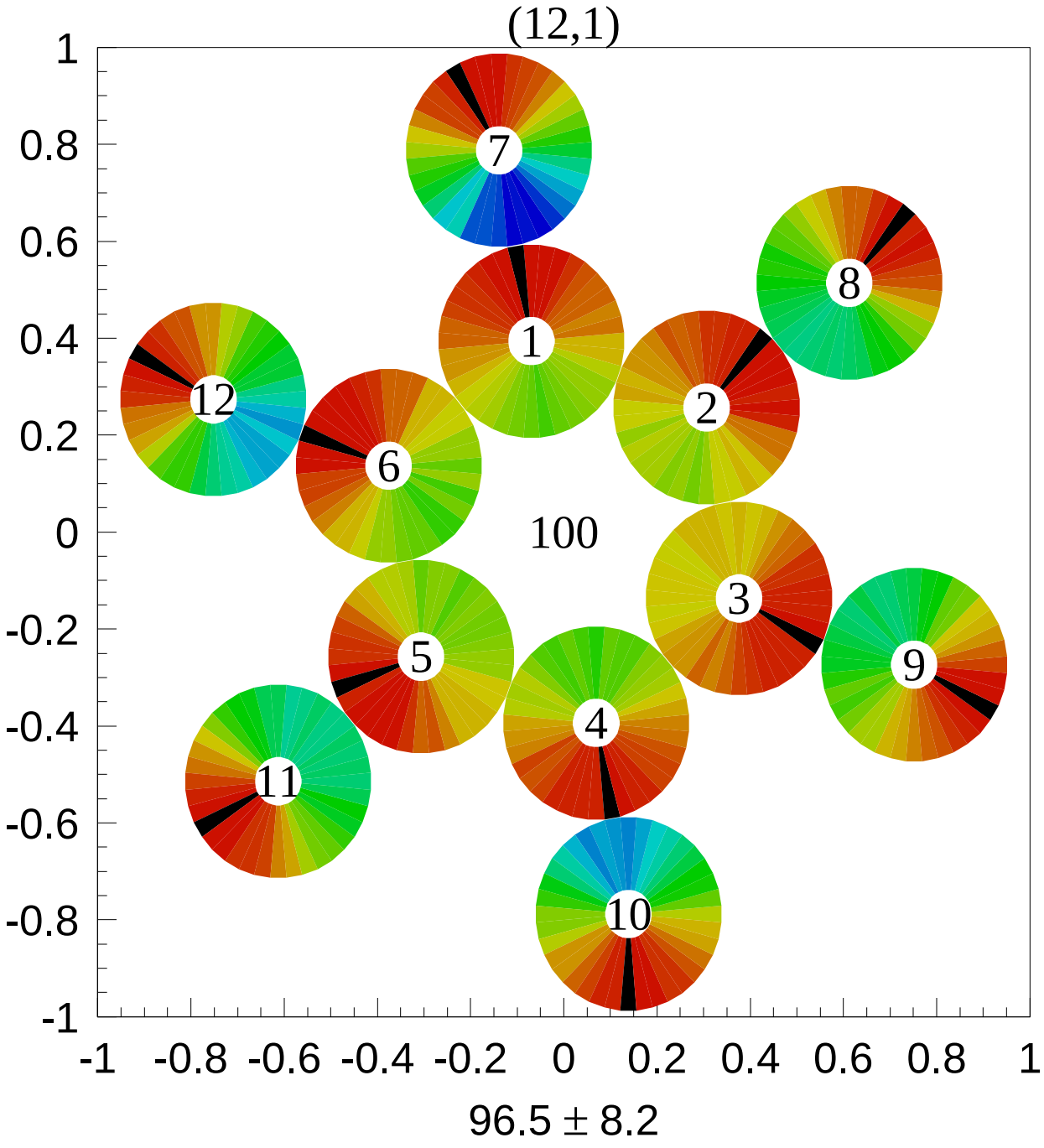

(11,27)
tilted LEDs
121 122 125 119 123 118
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 119 118 120 125 115
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

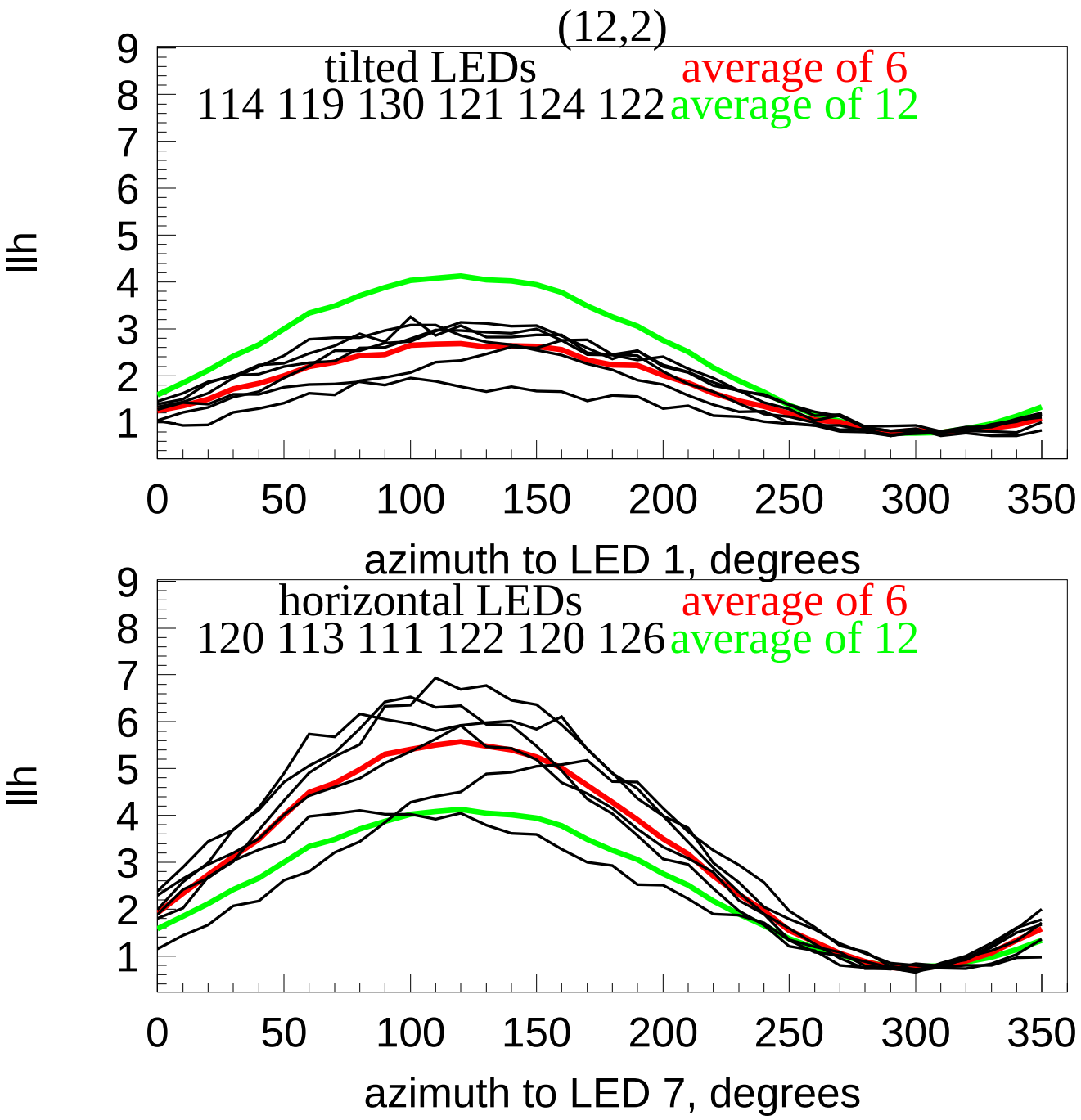

(11,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
58.1 ± 5.4

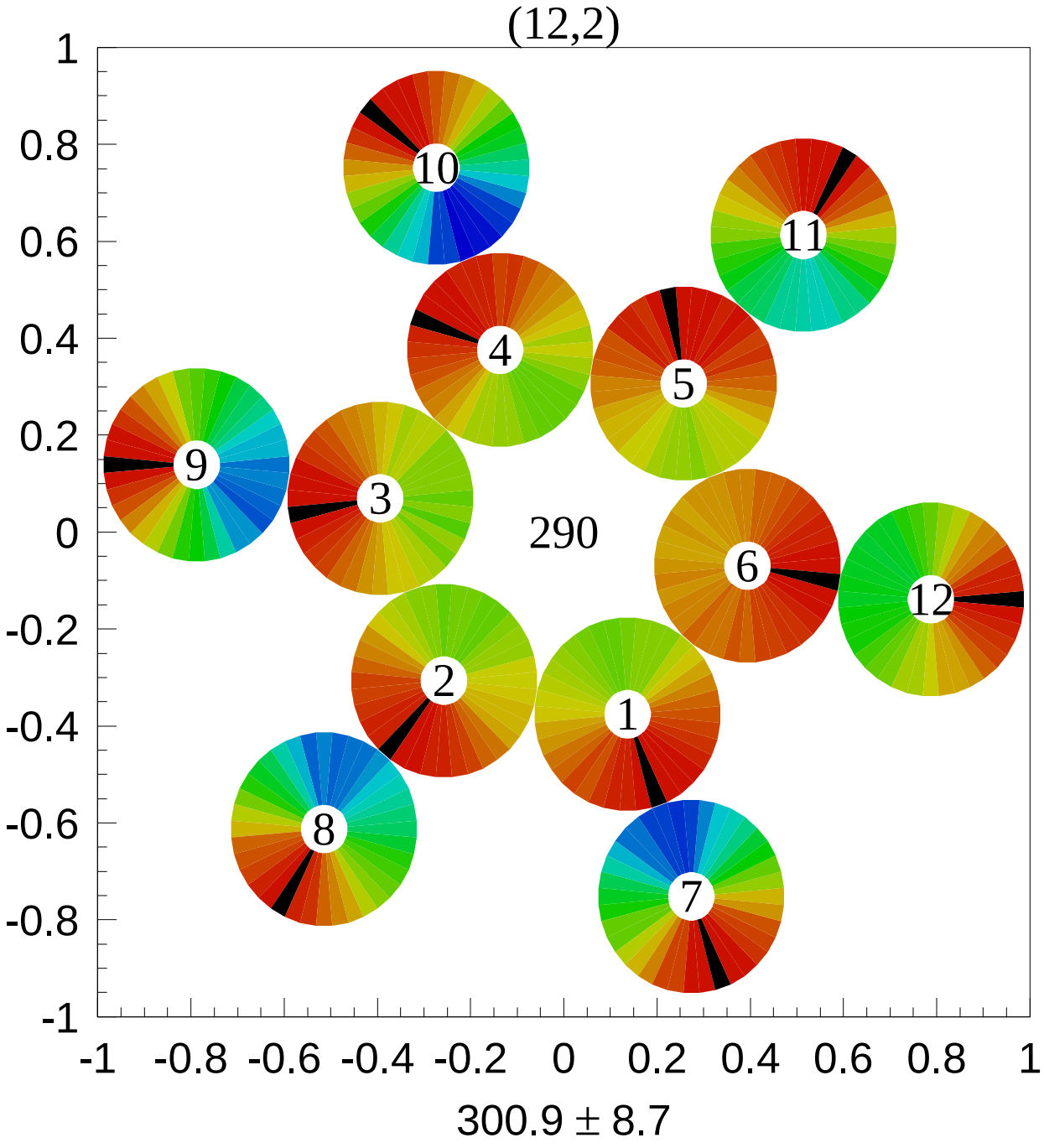

(11,28)
tilted LEDs
124 122 122 126 118 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 127 118 122 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

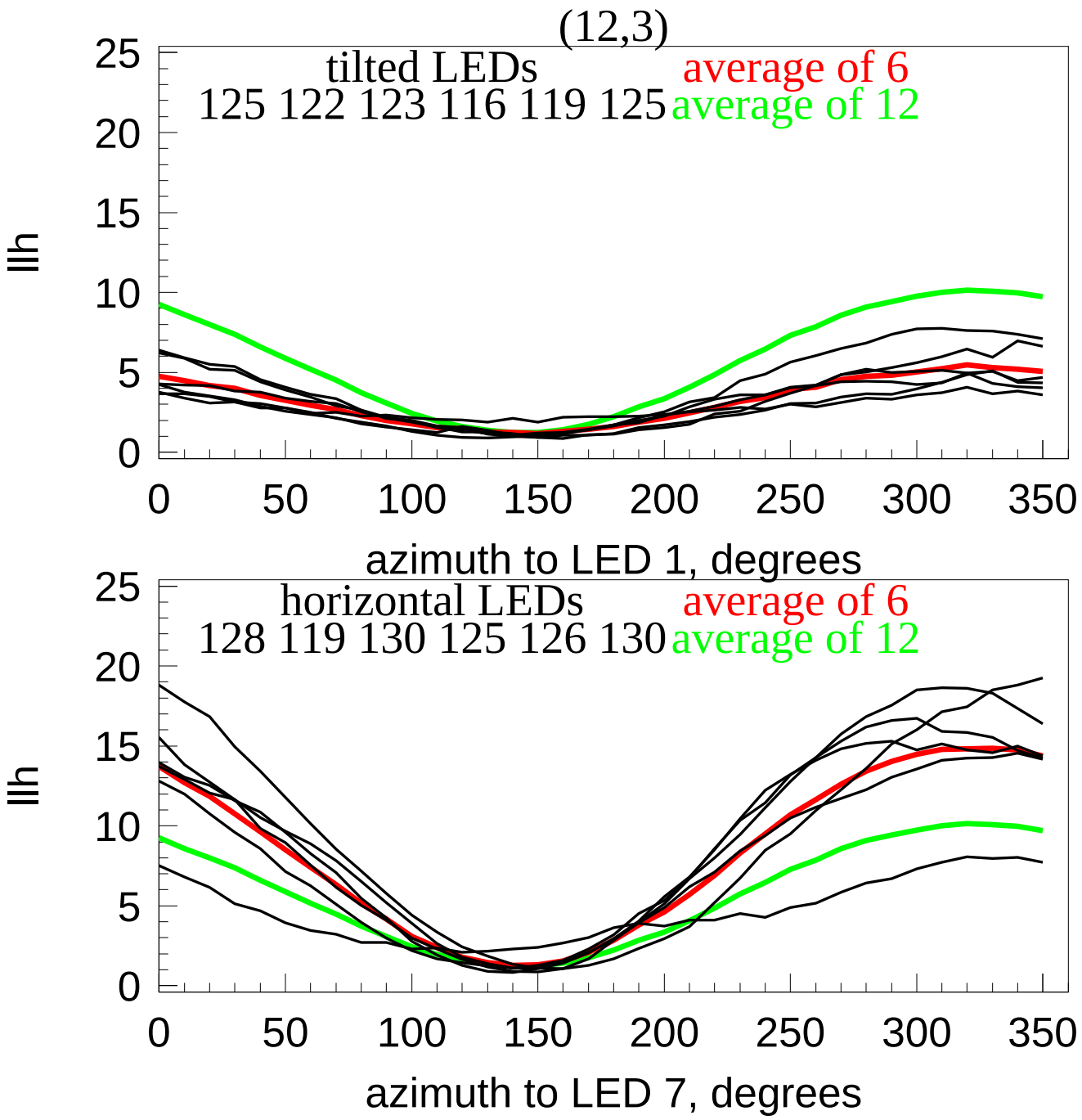

(11,28)
310
310.5 ± 6.3
1
2
3
4
5
6
7
8
9
10
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1

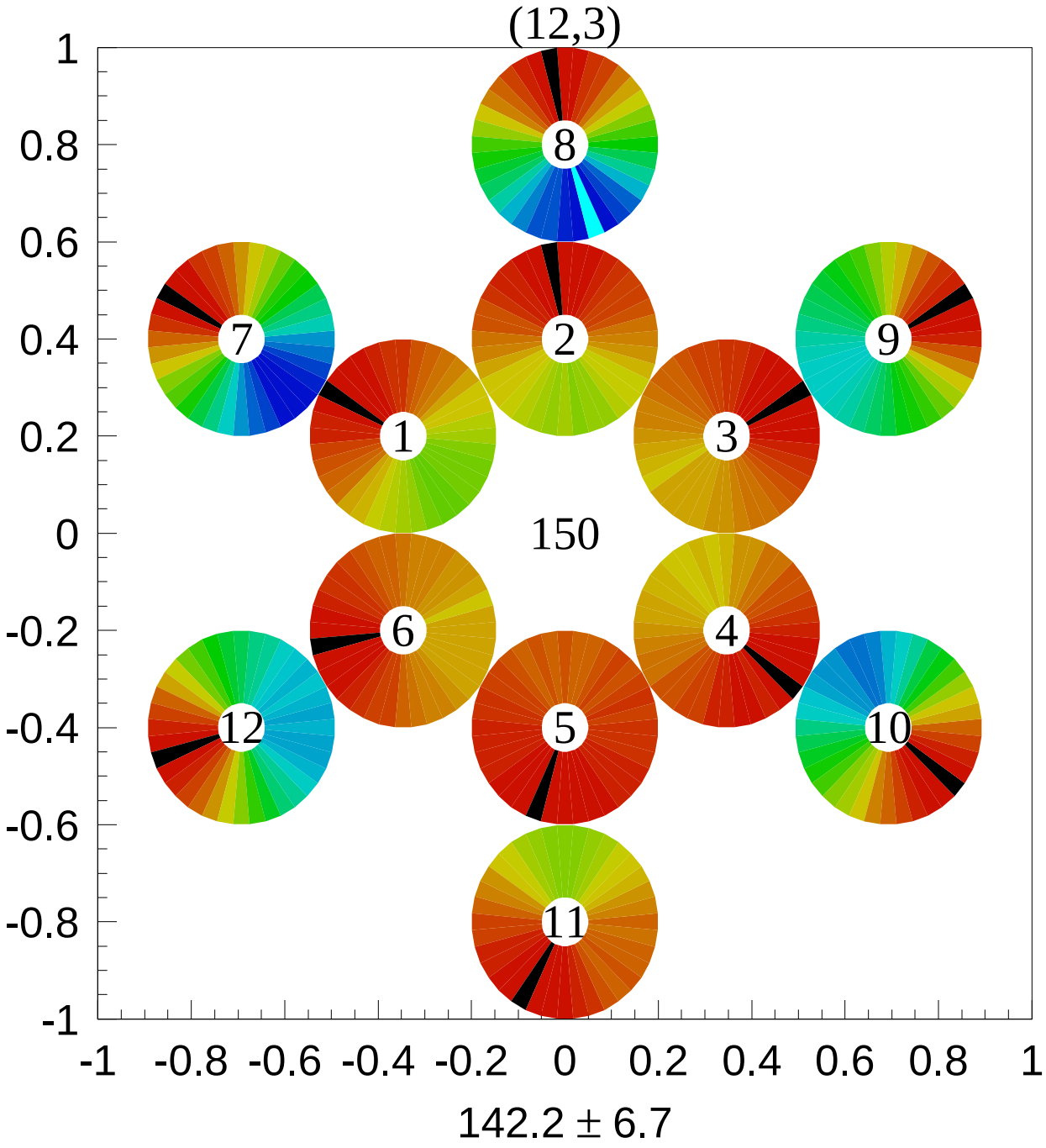

(12,1)
tilted LEDs
122 121 124 116 119 127
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 126 124 121 117 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

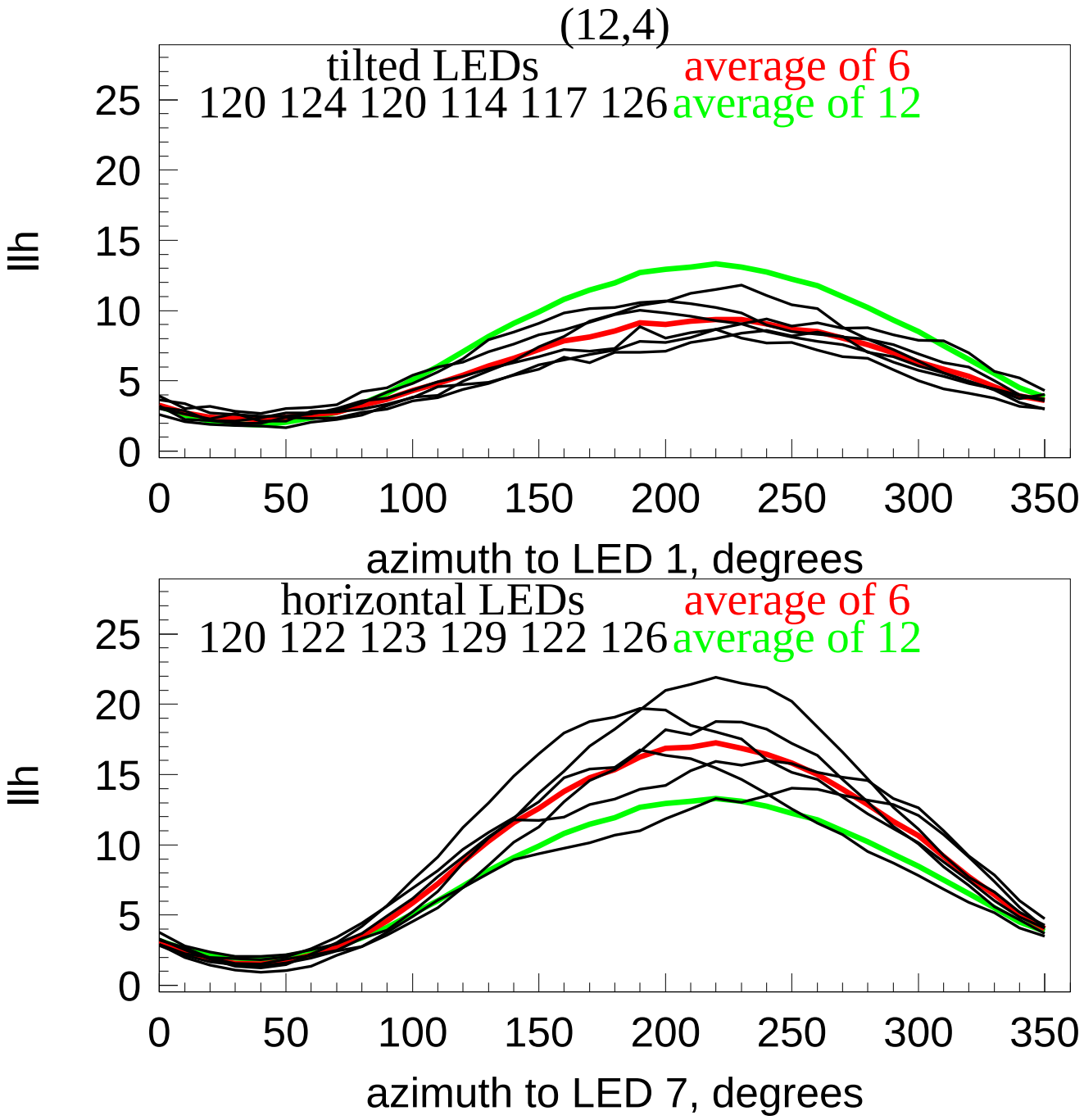

(12,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
96.5 ± 8.2

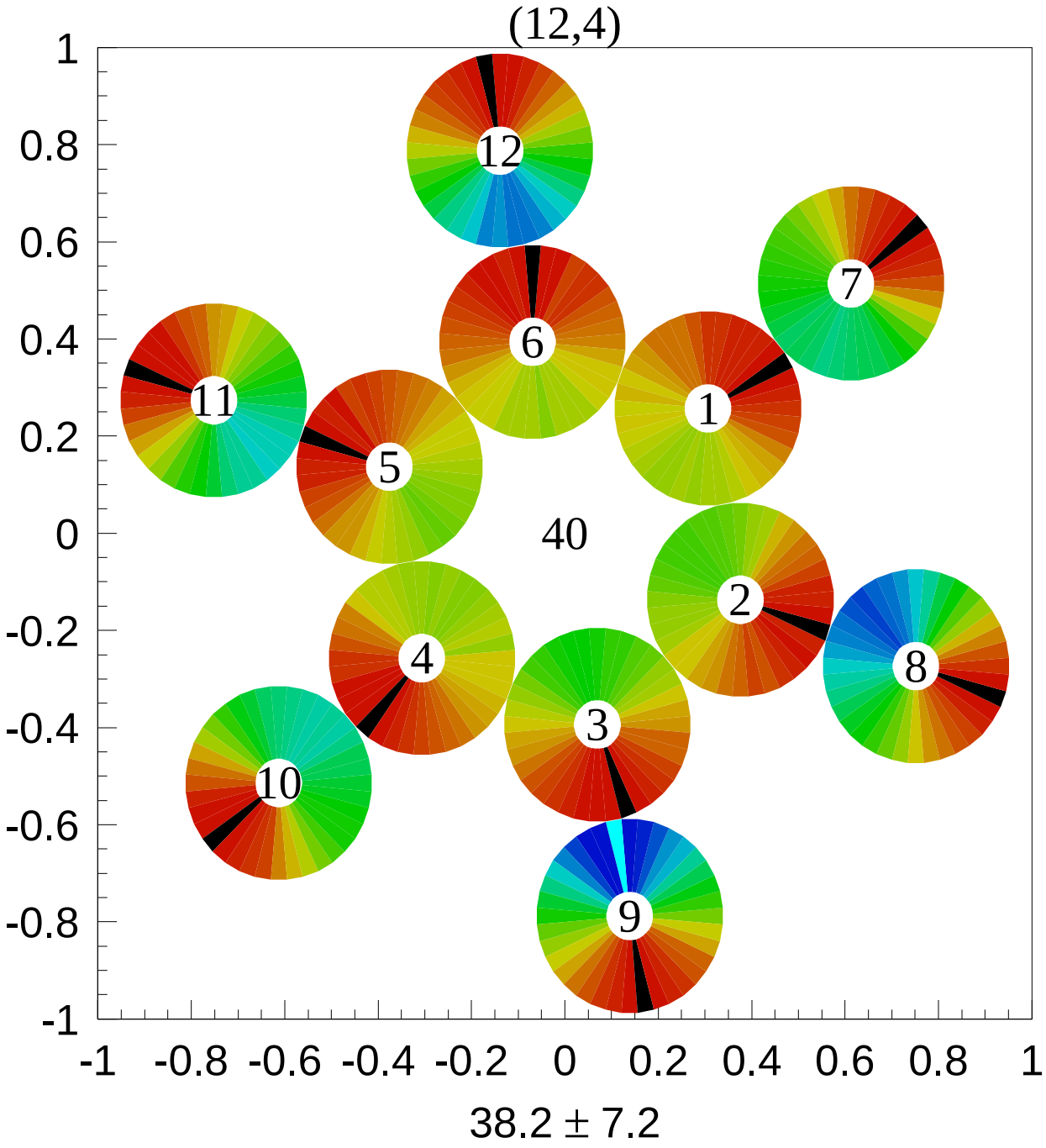

(12,2)
tilted LEDs
114 119 130 121 124 122
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 113 111 122 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

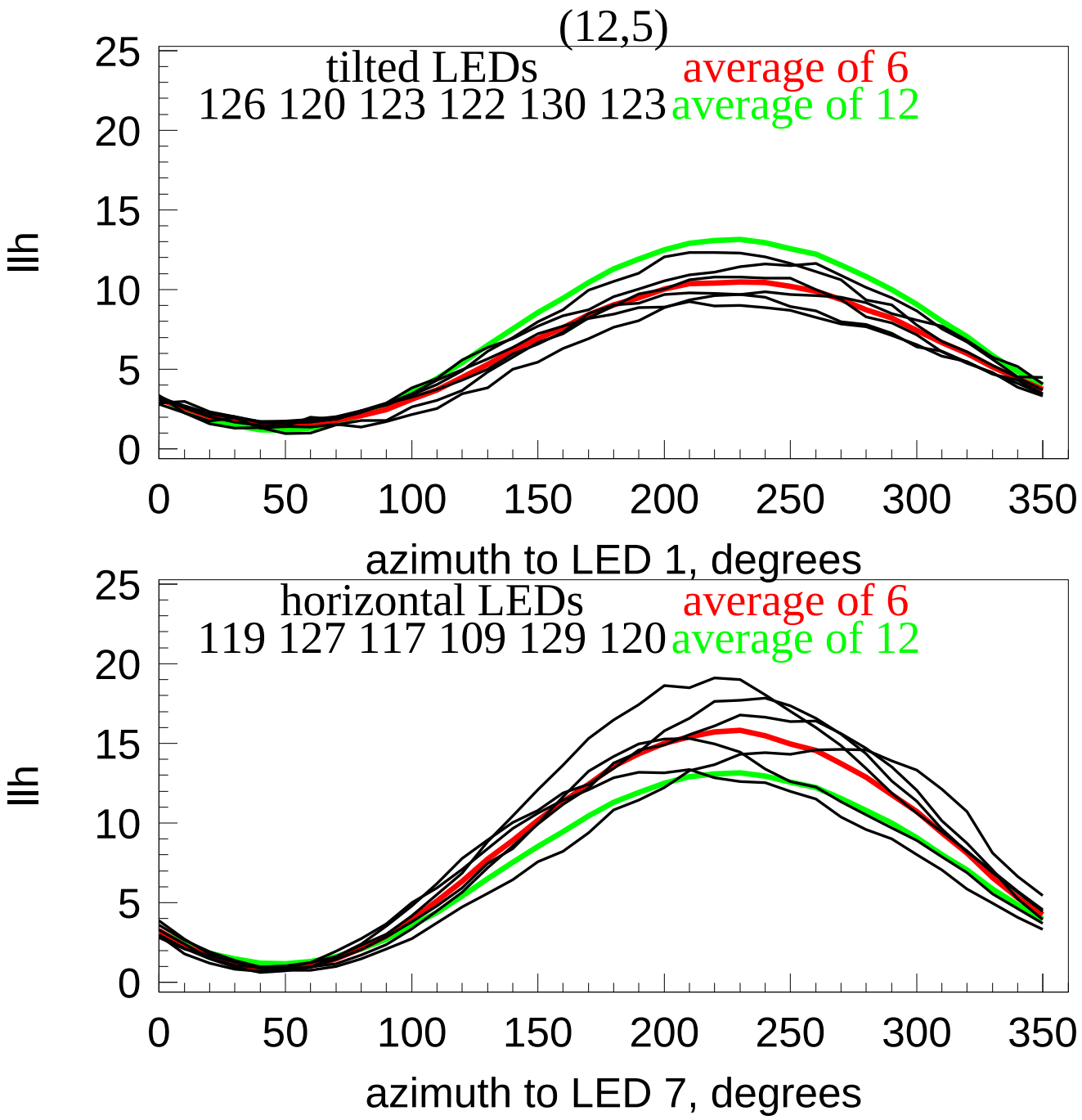

(12,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
300.9 ± 8.7

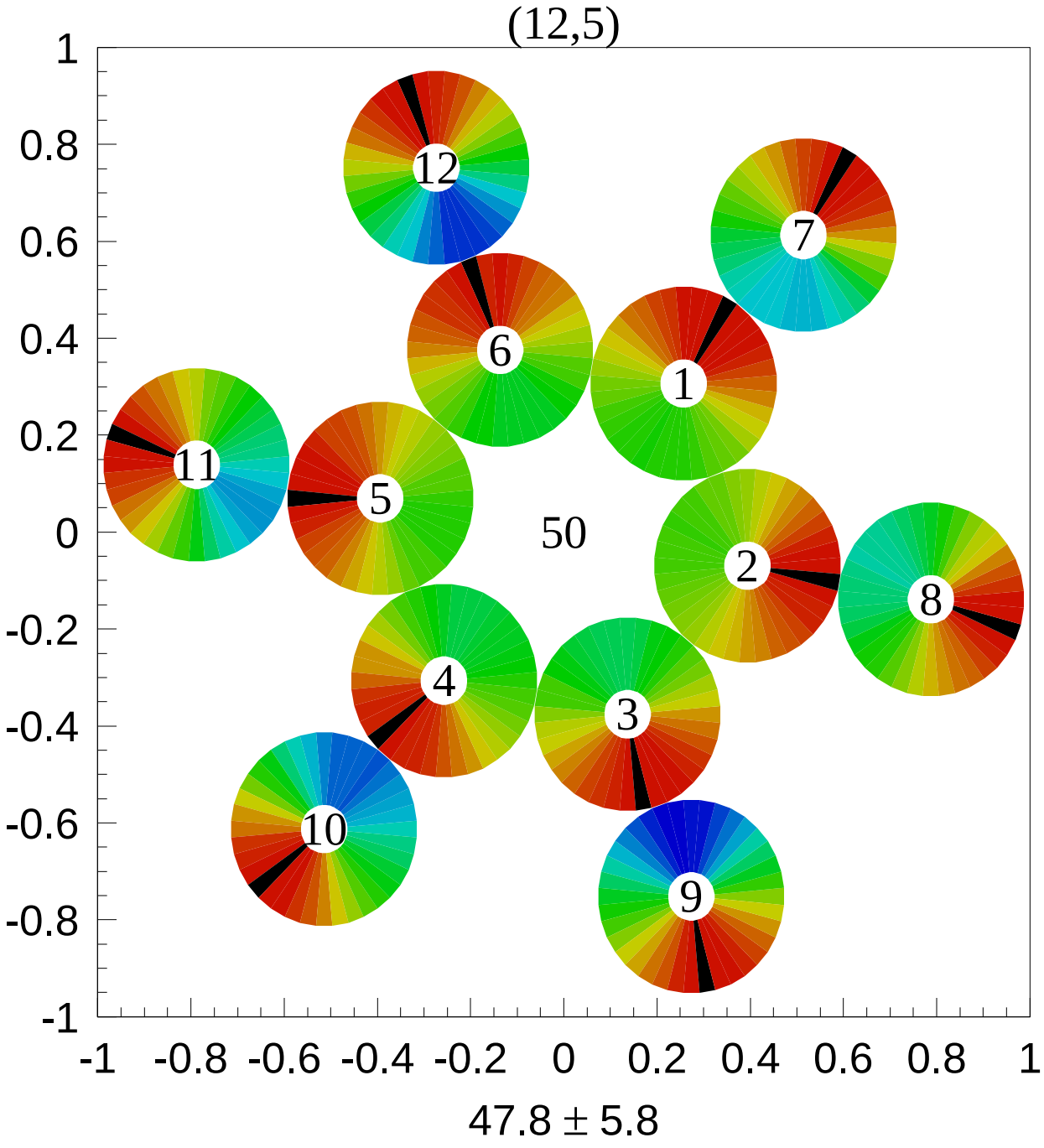

(12,3)
tilted LEDs
125 122 123 116 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 119 130 125 126 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

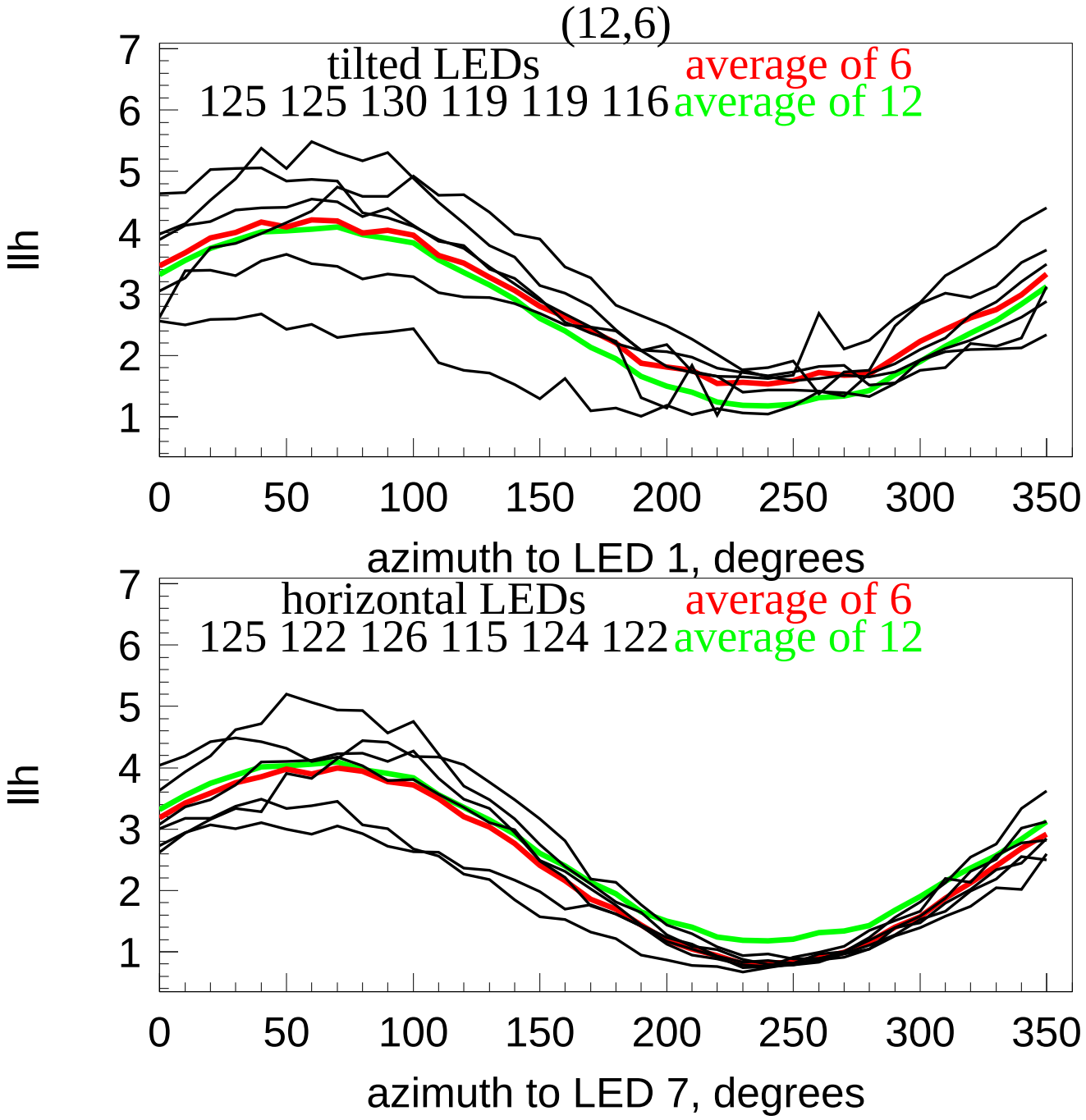

(12,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
142.2 ± 6.7

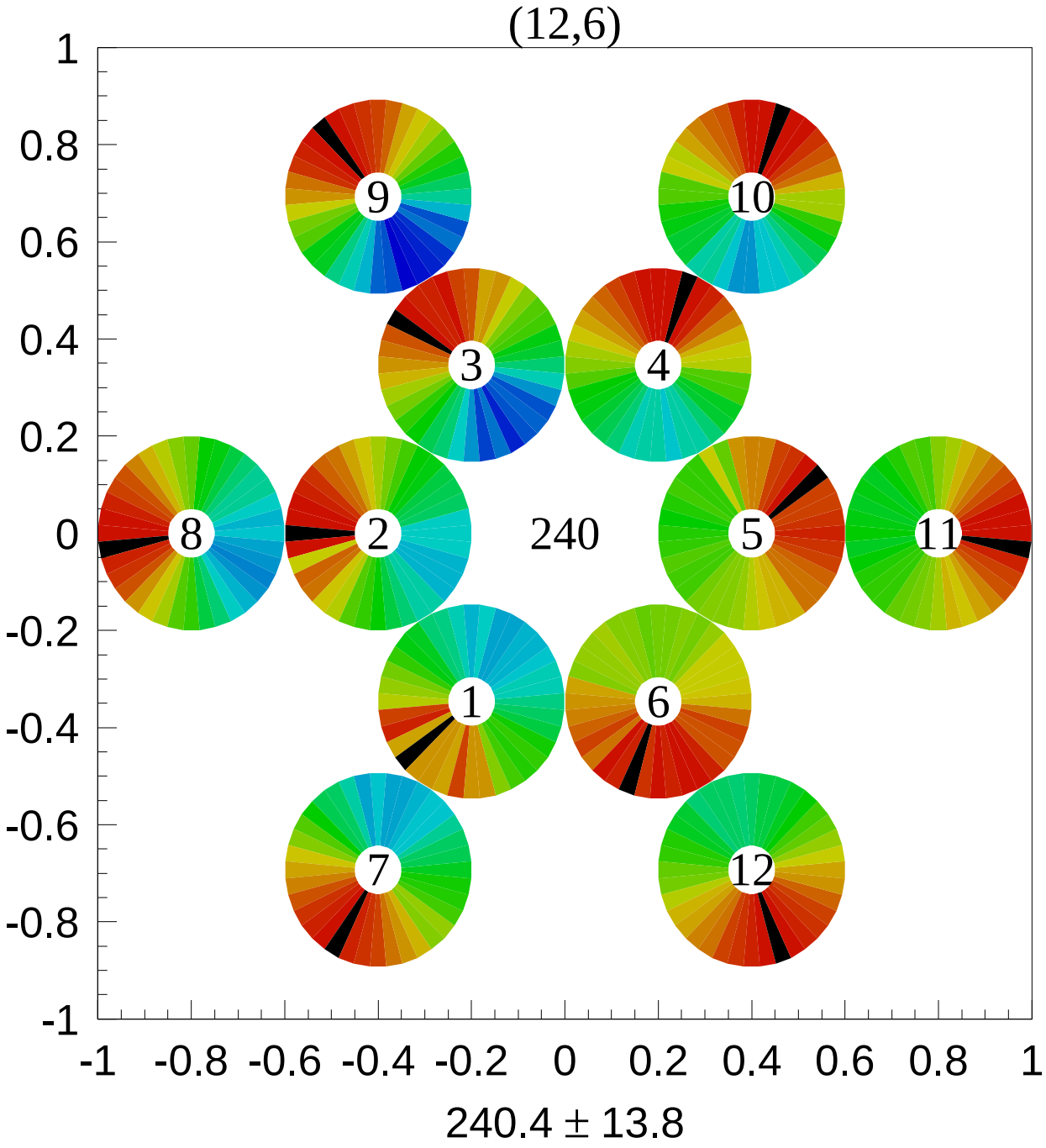

(12,4)
tilted LEDs
120 124 120 114 117 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 123 129 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

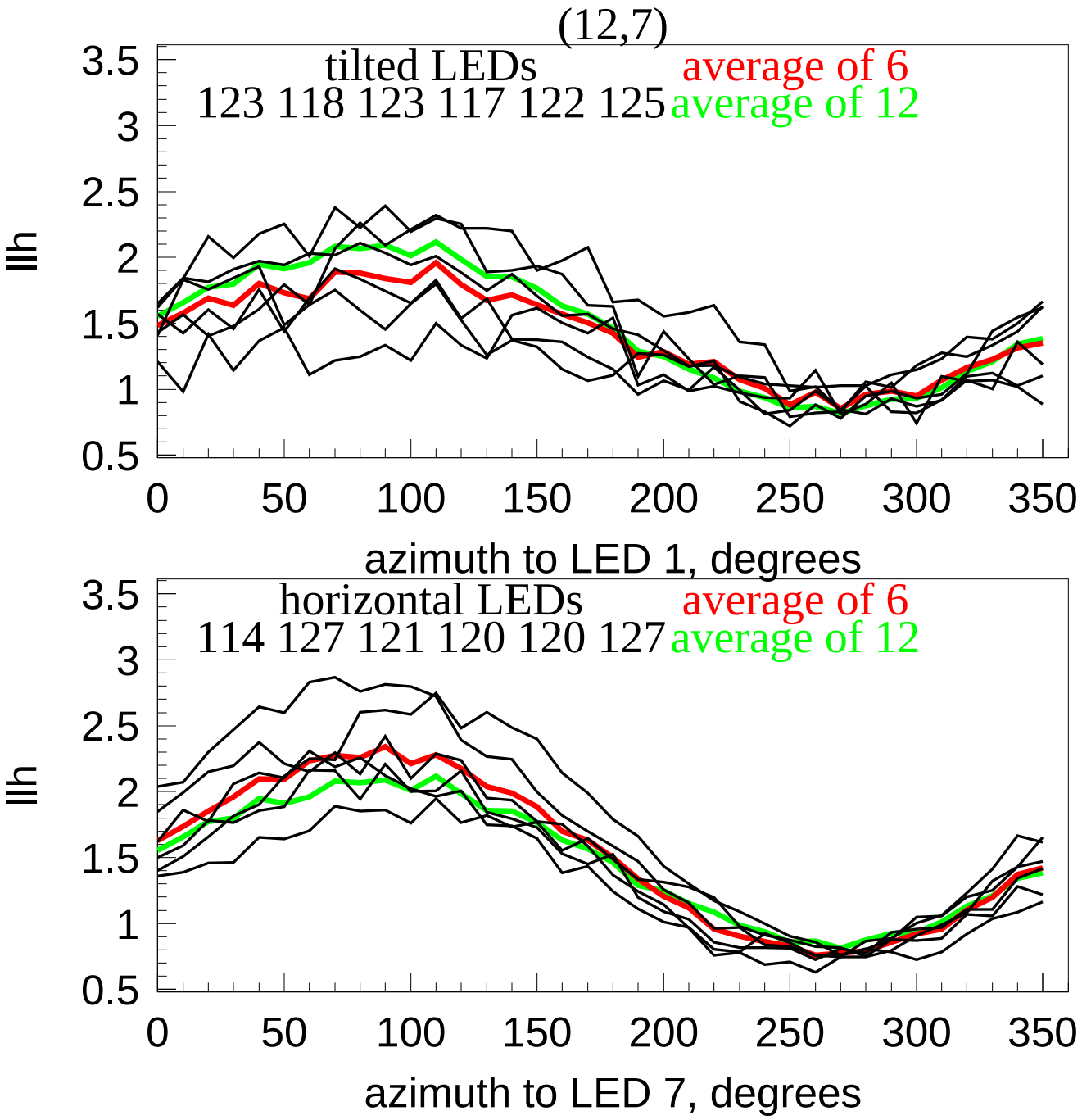

(12,4)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
38.2 ± 7.2

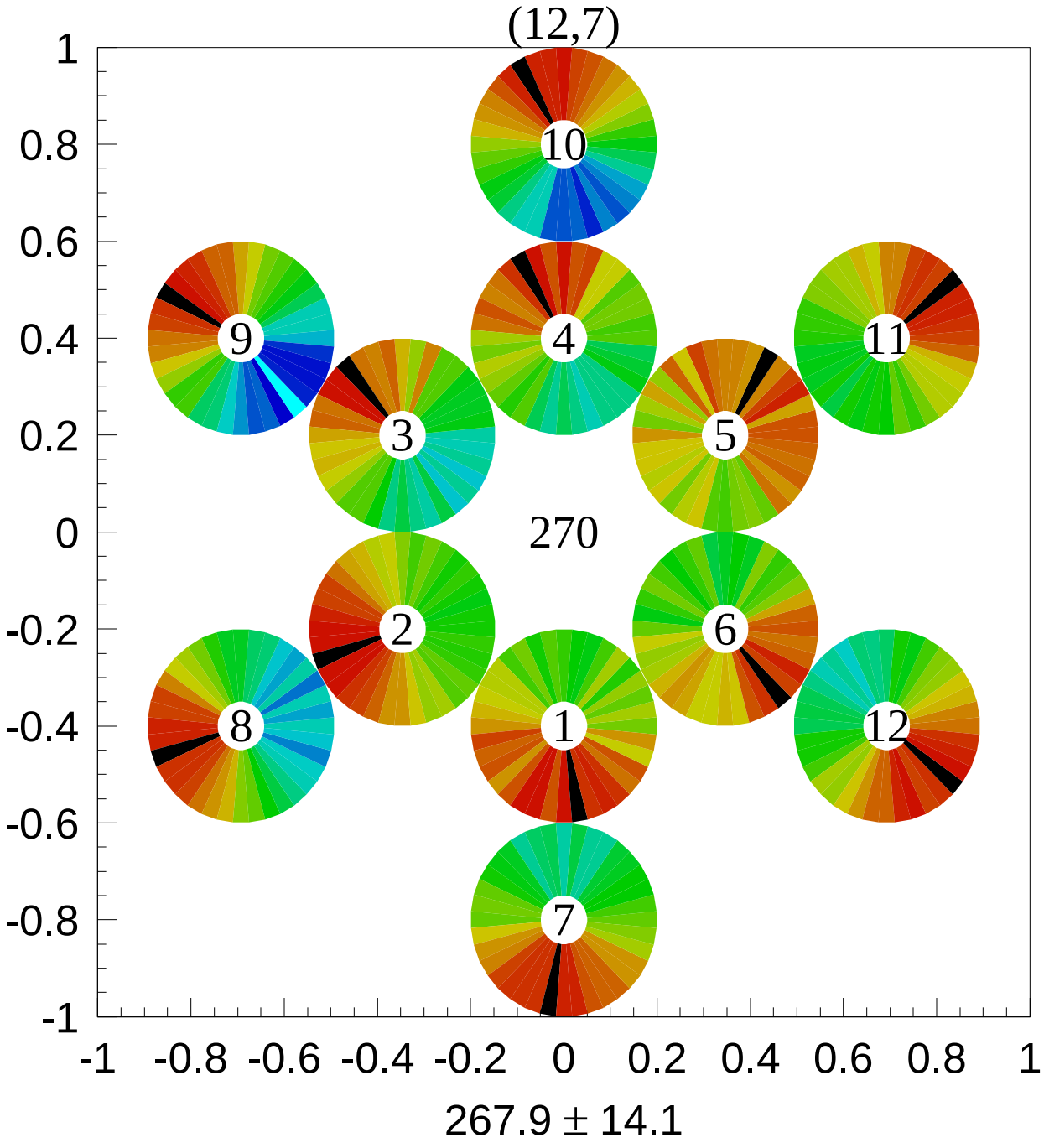

(12,5)
tilted LEDs
126 120 123 122 130 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 127 117 109 129 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

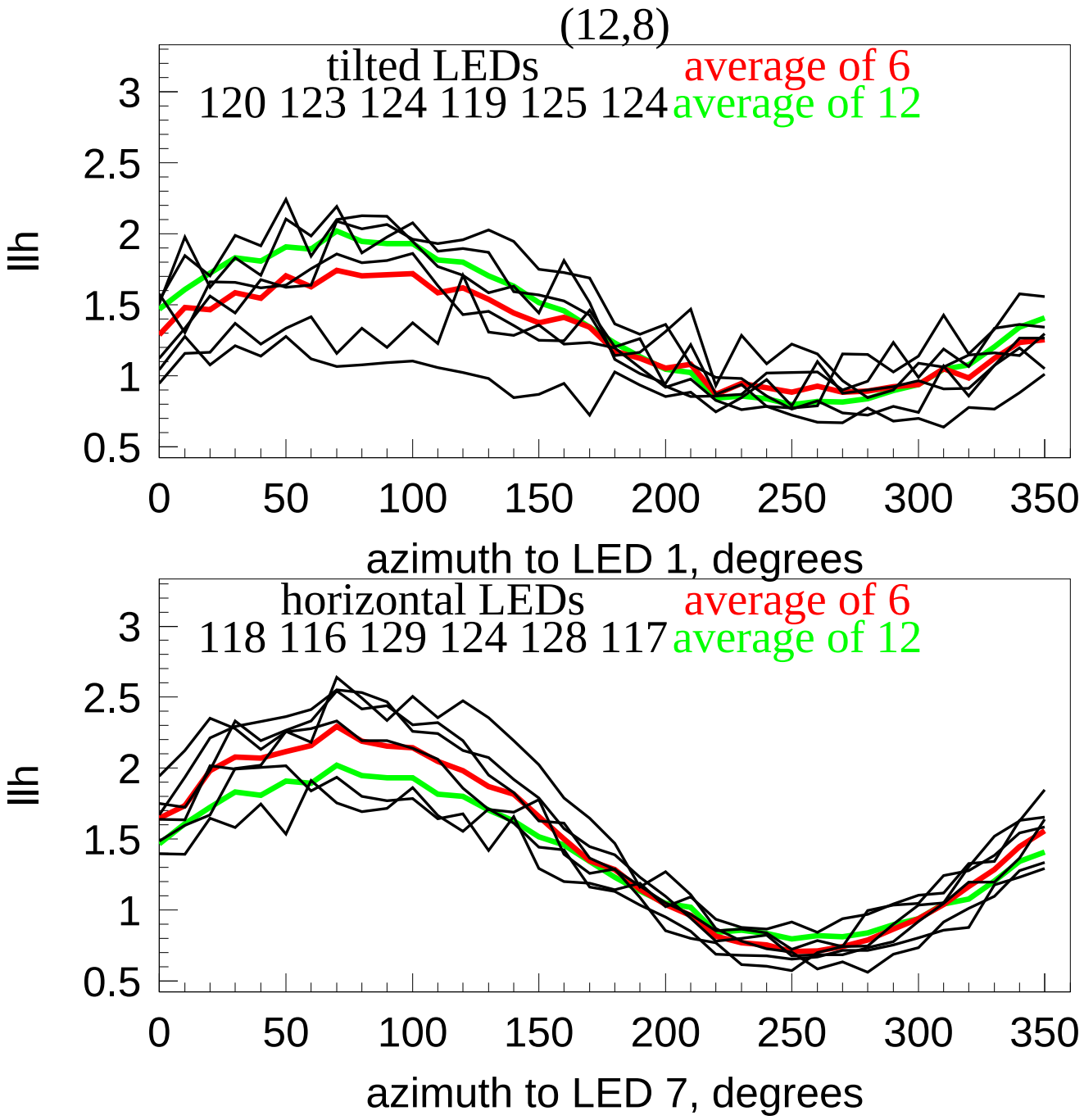

(12,5)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
47.8 ± 5.8

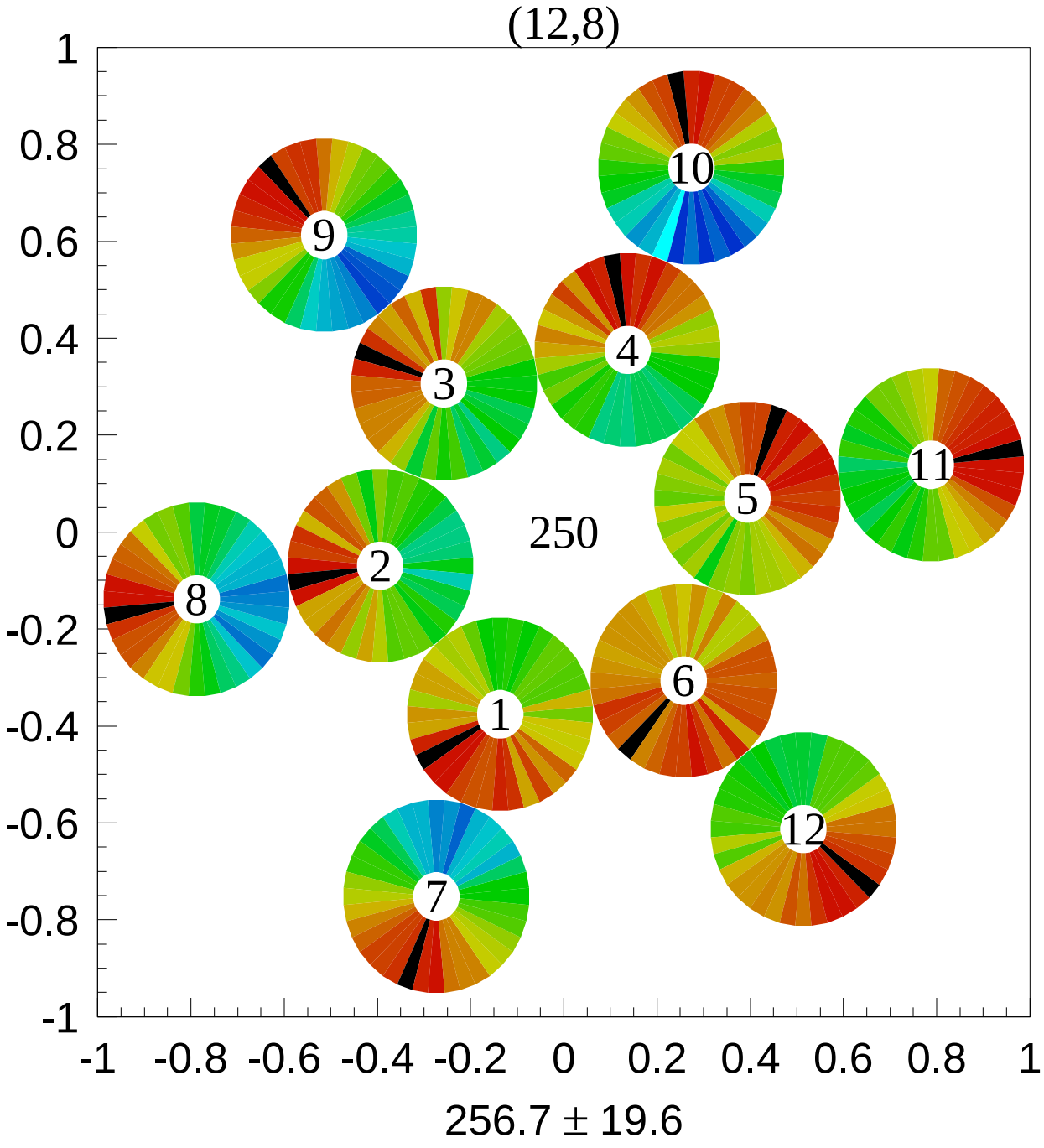

(12,6)
tilted LEDs
125 125 130 119 119 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 126 115 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

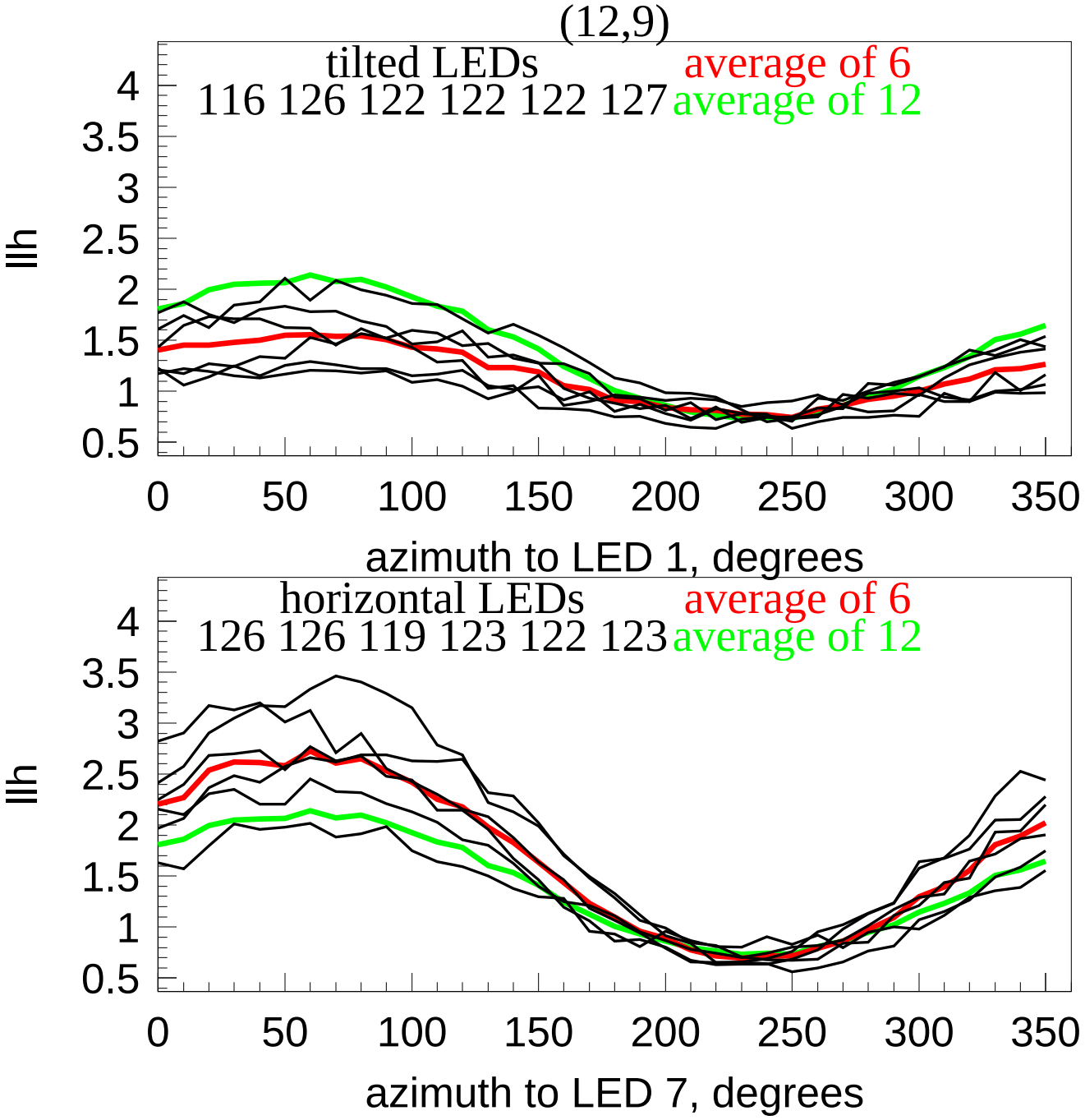

(12,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
240.4 ± 13.8

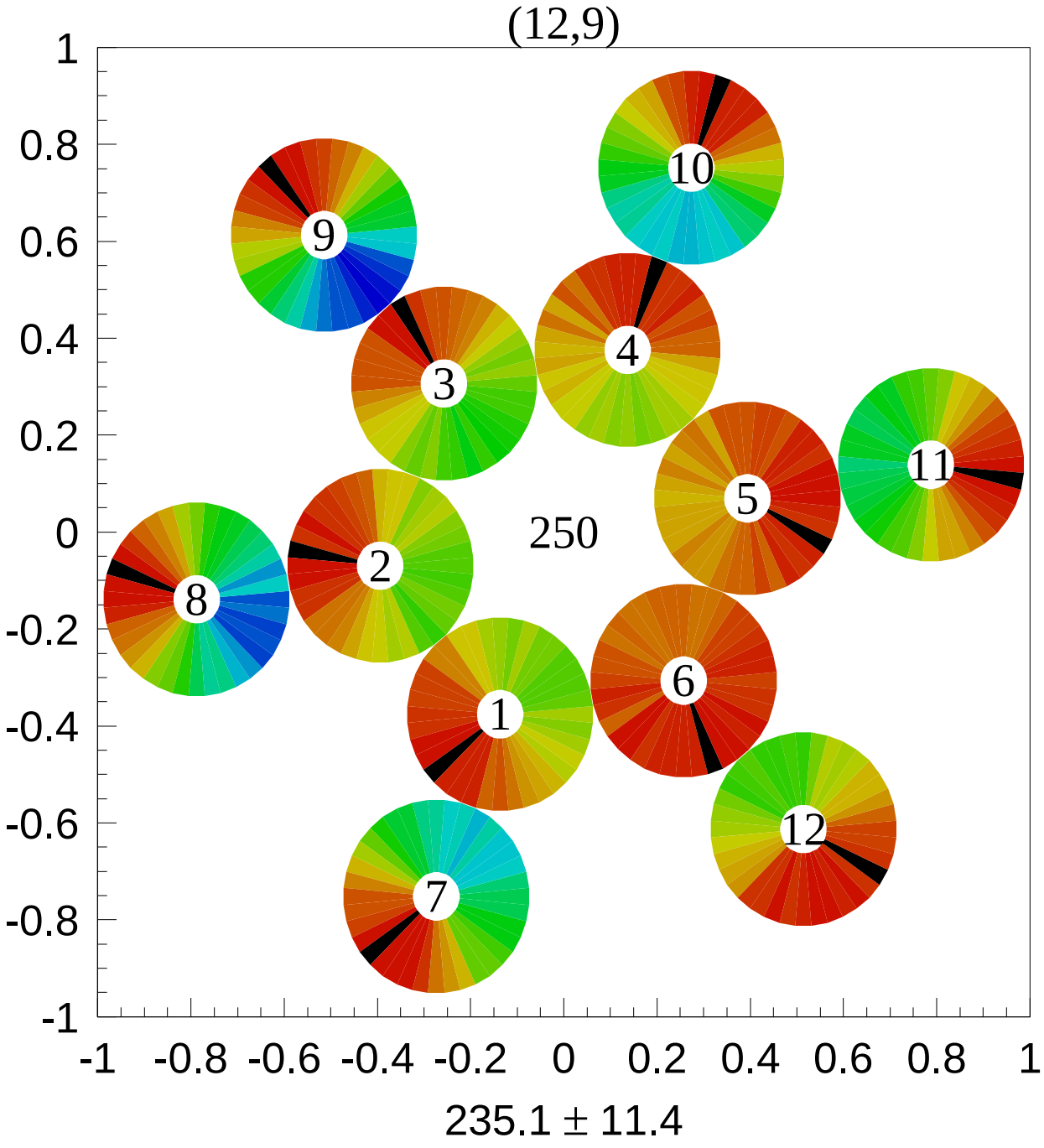

(12,7)
tilted LEDs
123 118 123 117 122 125
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
114 127 121 120 120 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

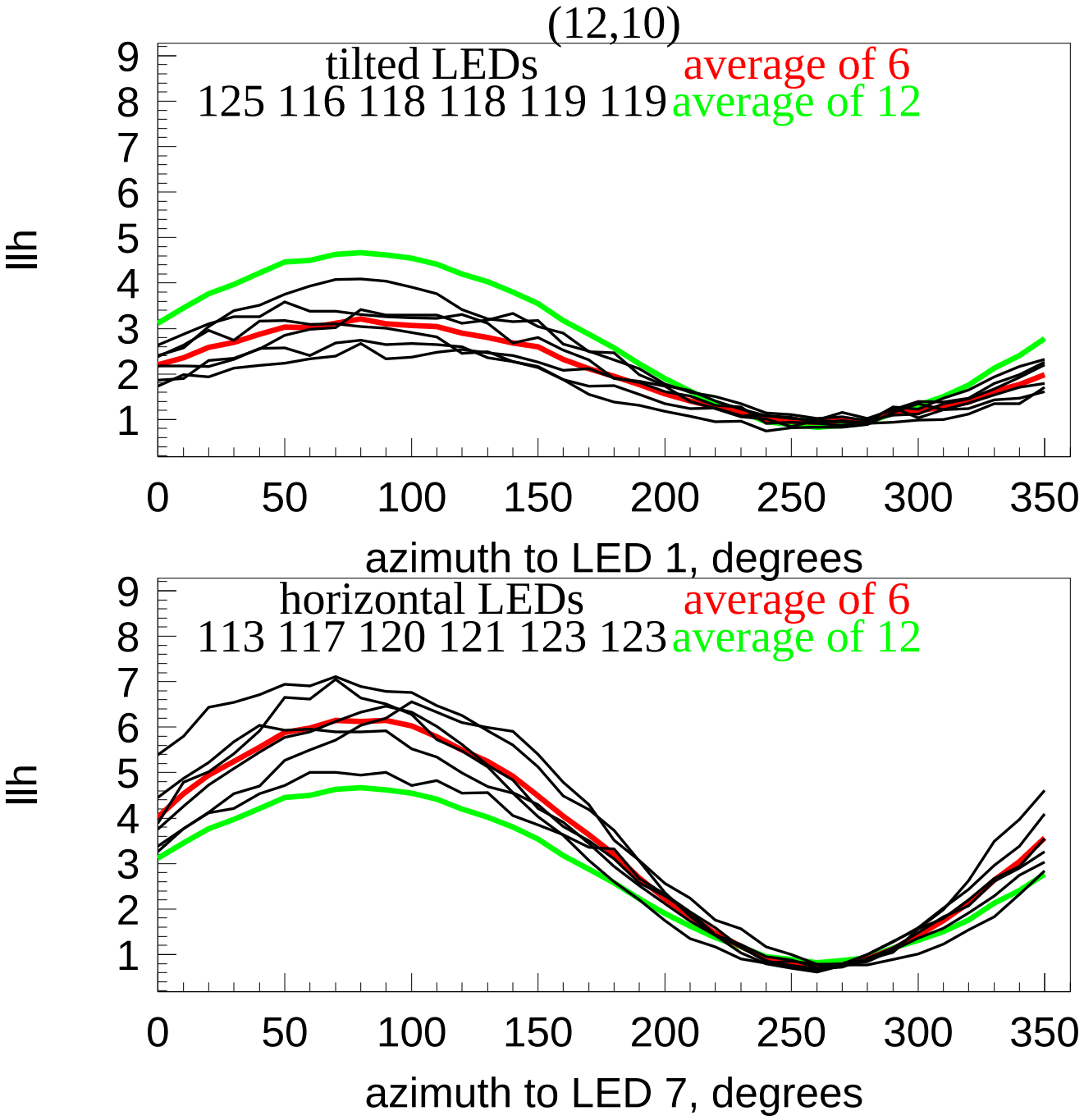

(12,7)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
267.9 ± 14.1

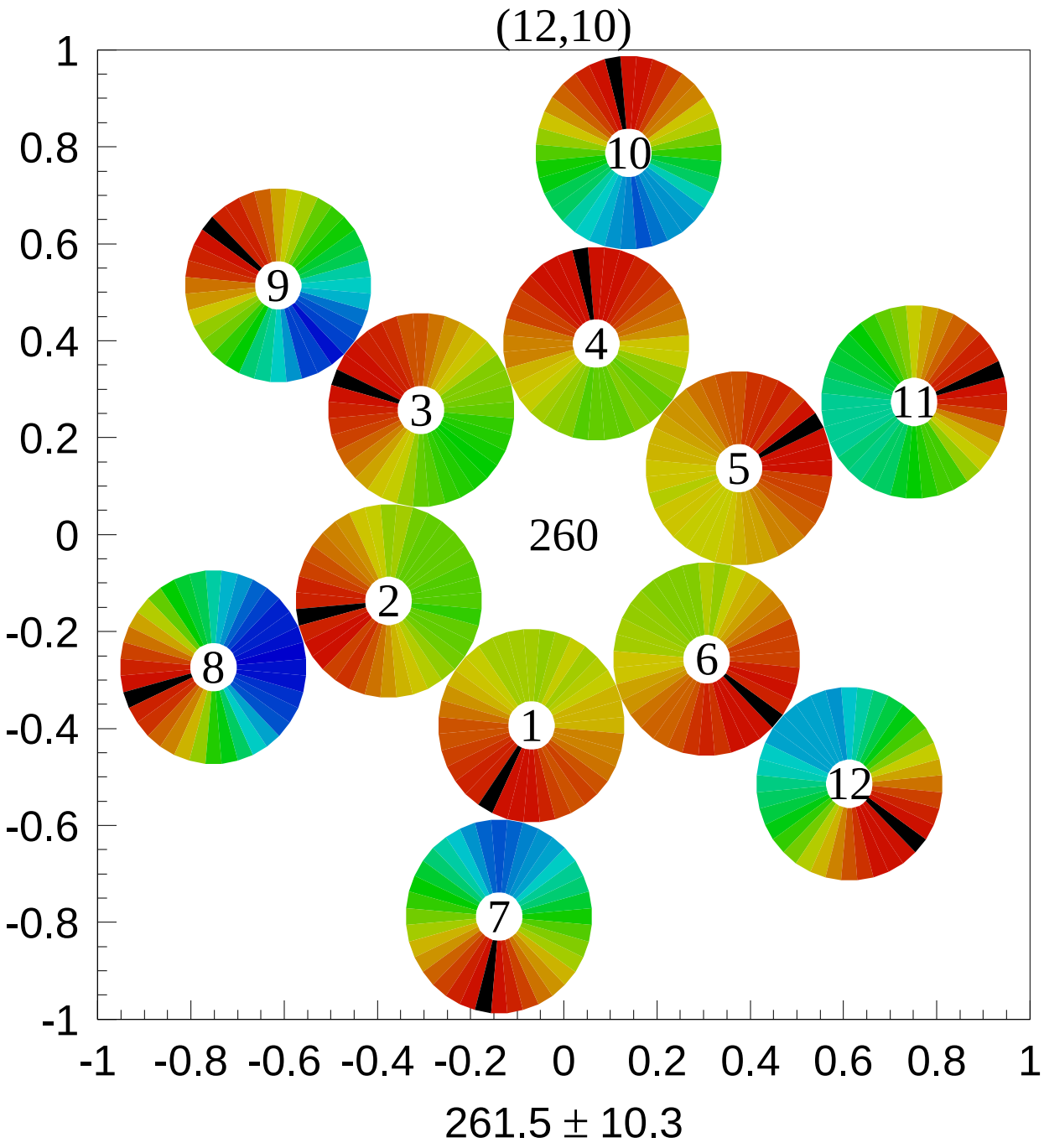

(12,8)
tilted LEDs
120 123 124 119 125 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 116 129 124 128 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

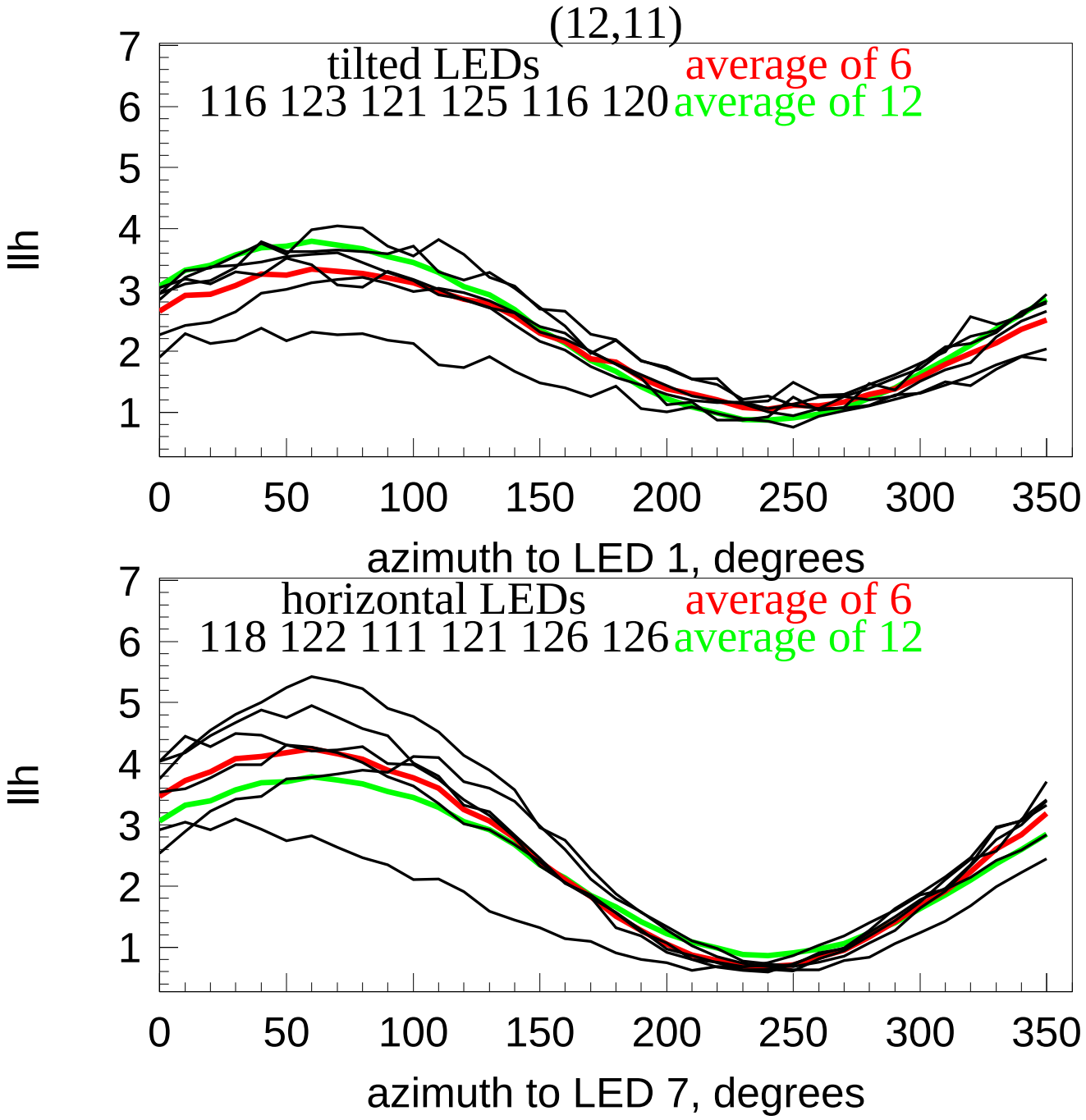

(12,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
256.7 ± 19.6
250
1
2
3
4
5
6
7
8
9
10
11
12

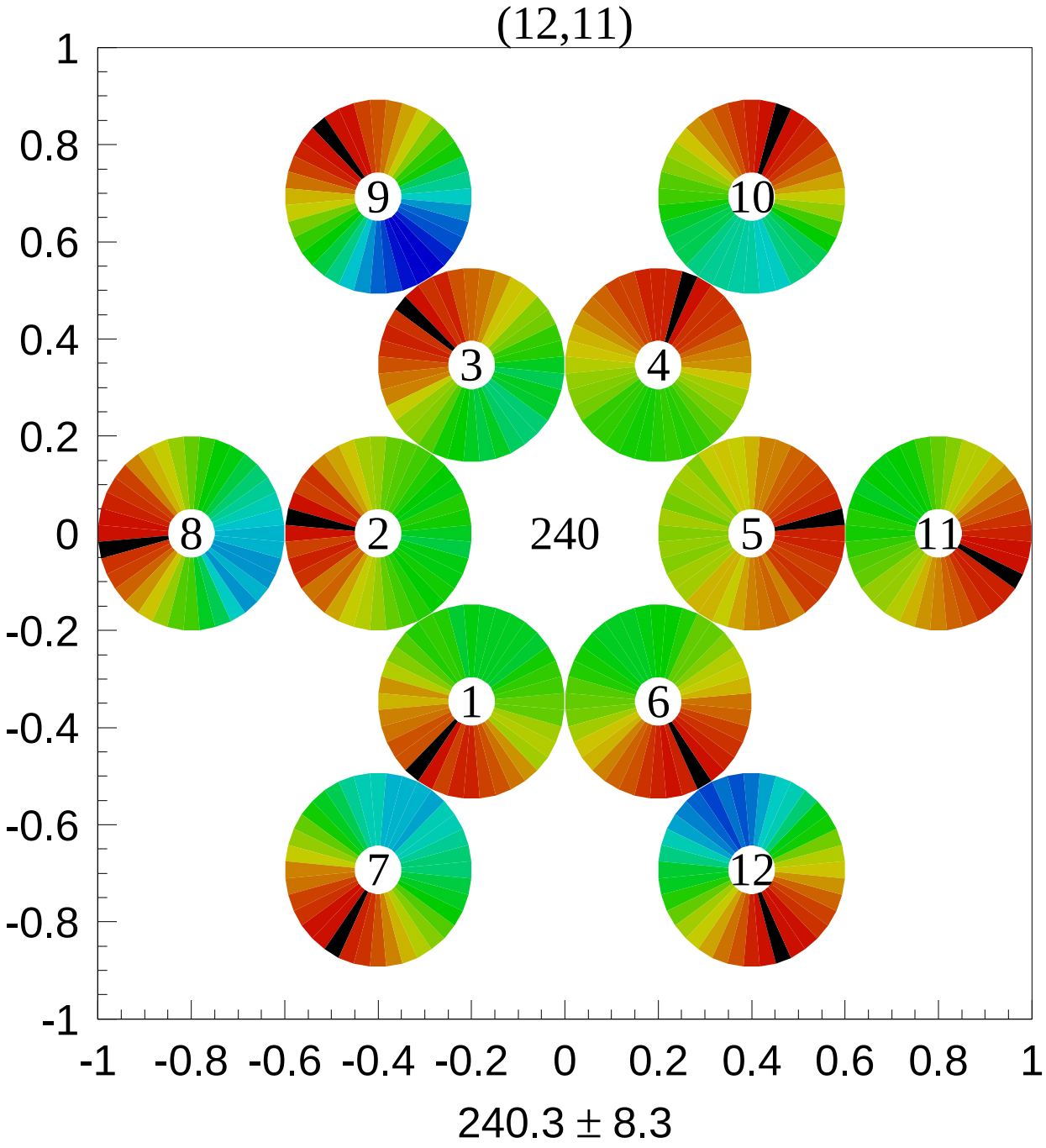

(12,9)
tilted LEDs
116 126 122 122 122 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 119 123 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

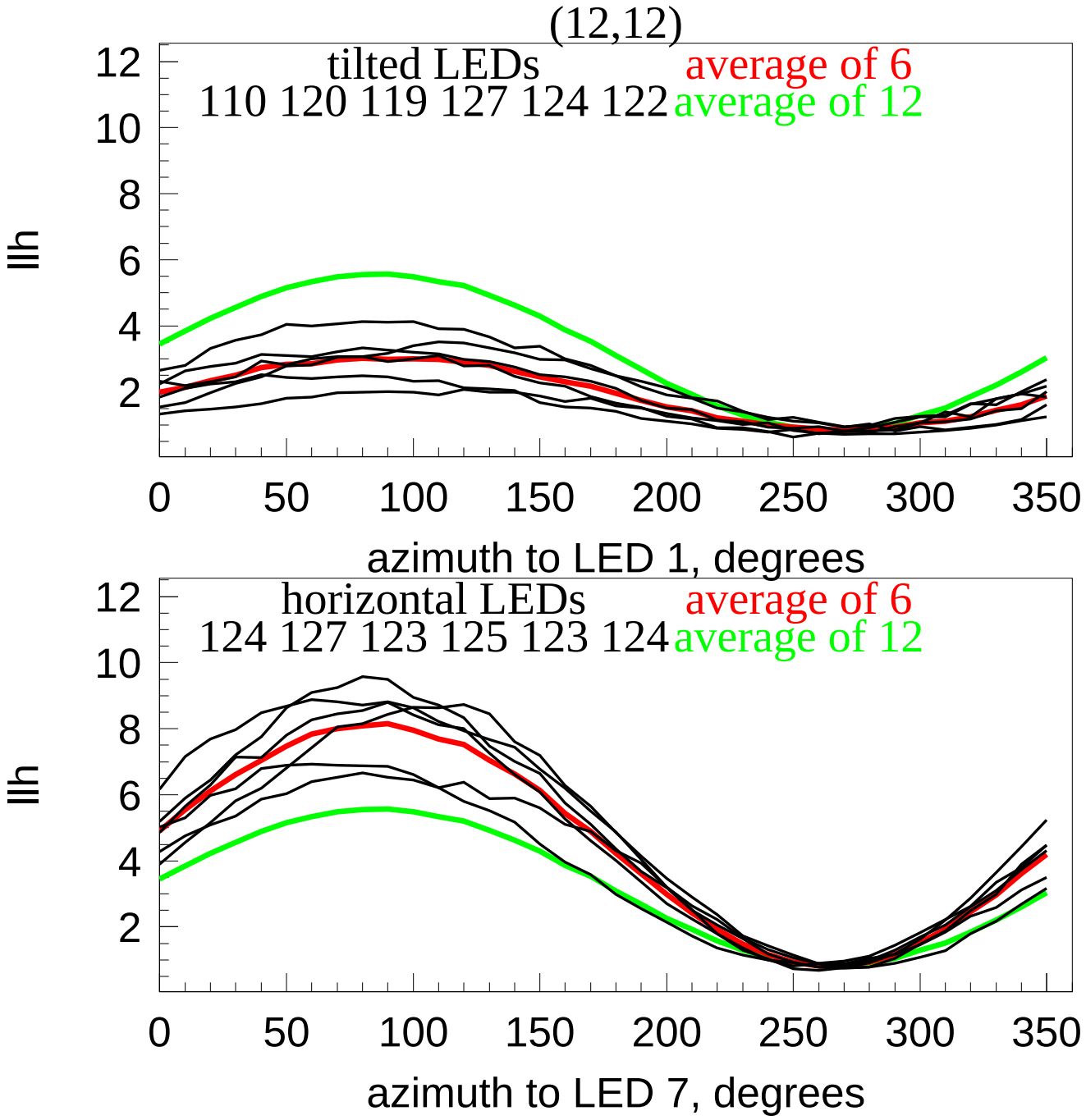

(12,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
235.1 ± 11.4

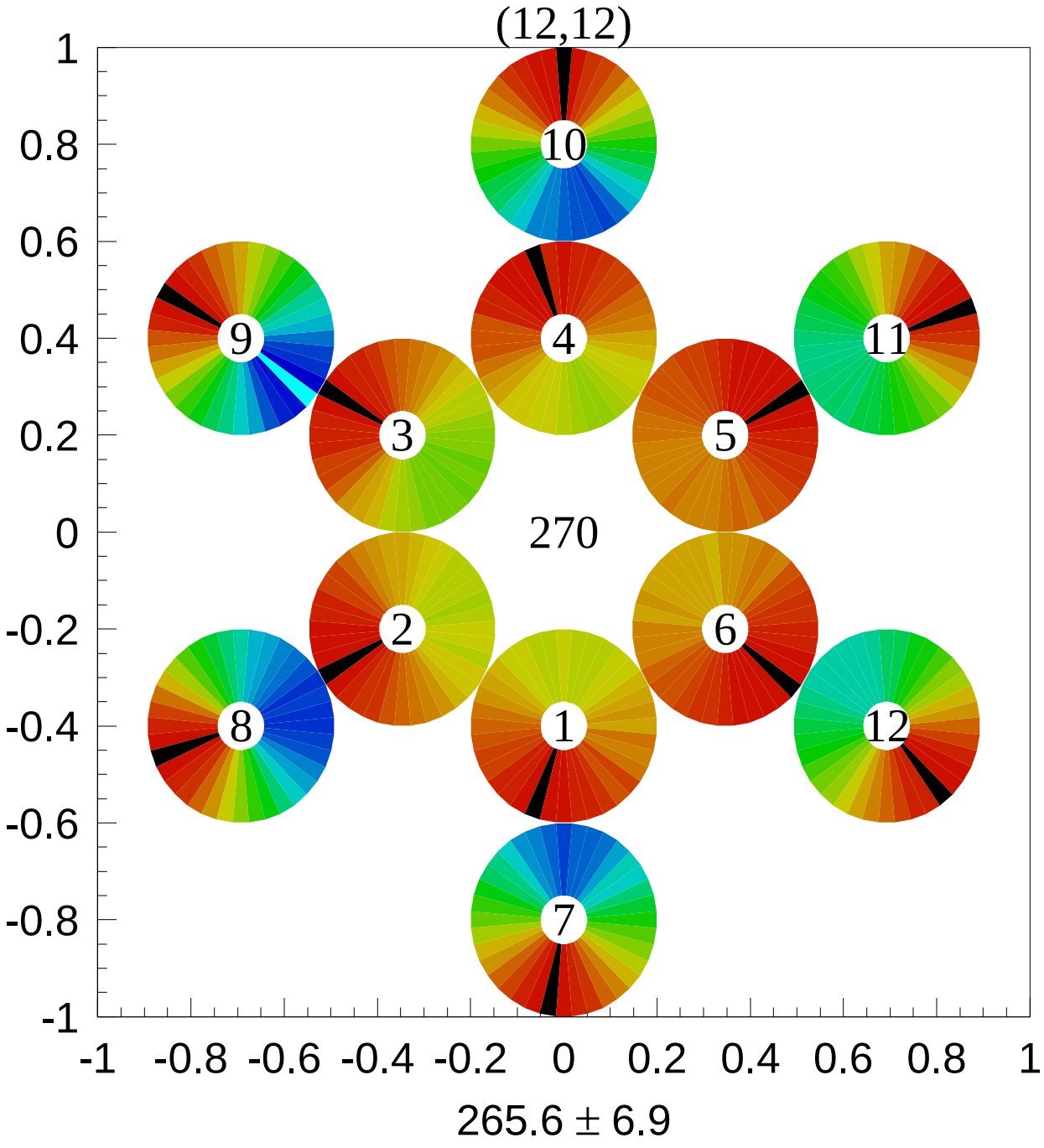

(12,10)
tilted LEDs
125 116 118 118 119 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 117 120 121 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

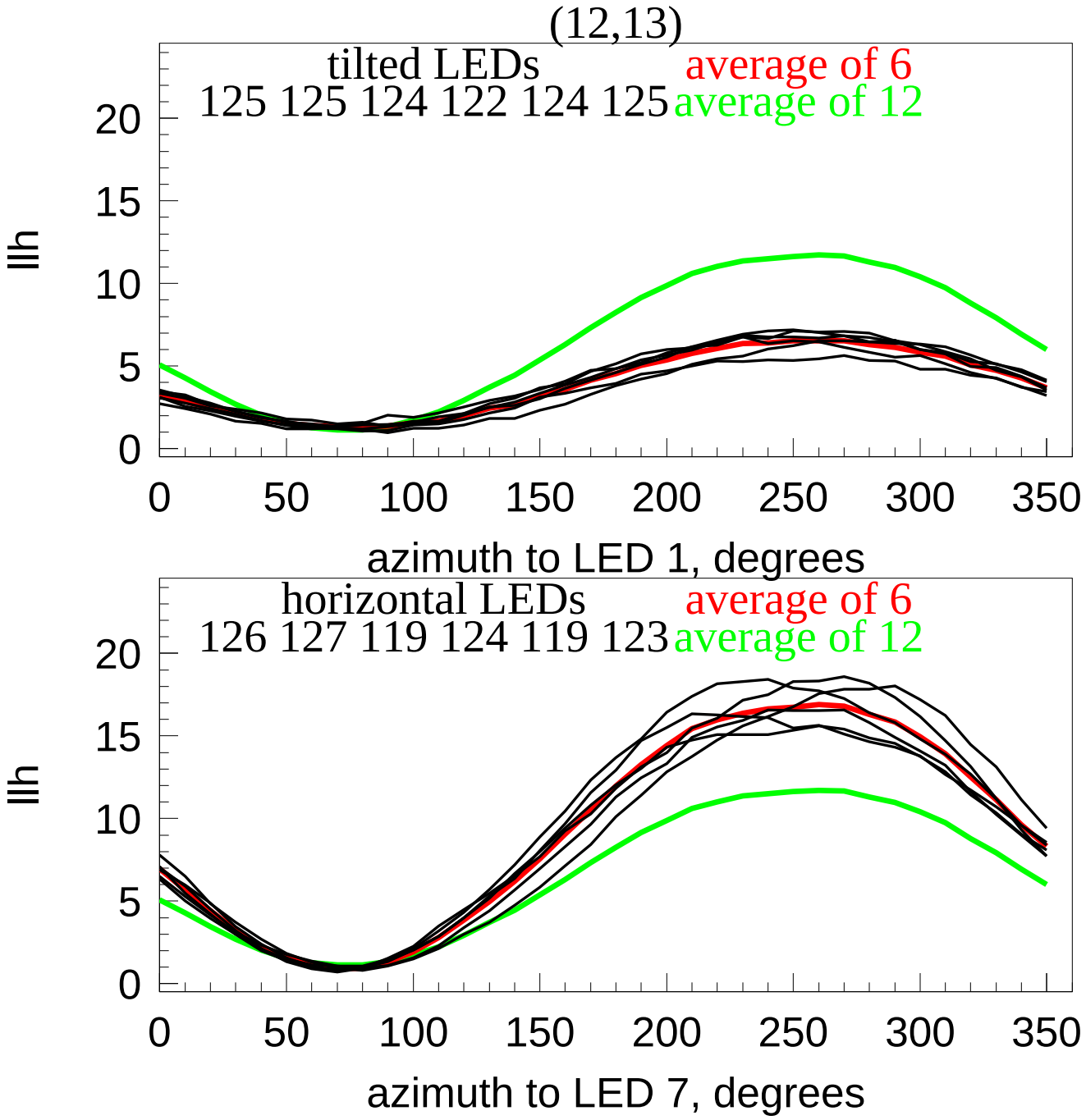

(12,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
261.5 ± 10.3
10
9
4
3
11
5
260
2
8
6
1
12
7

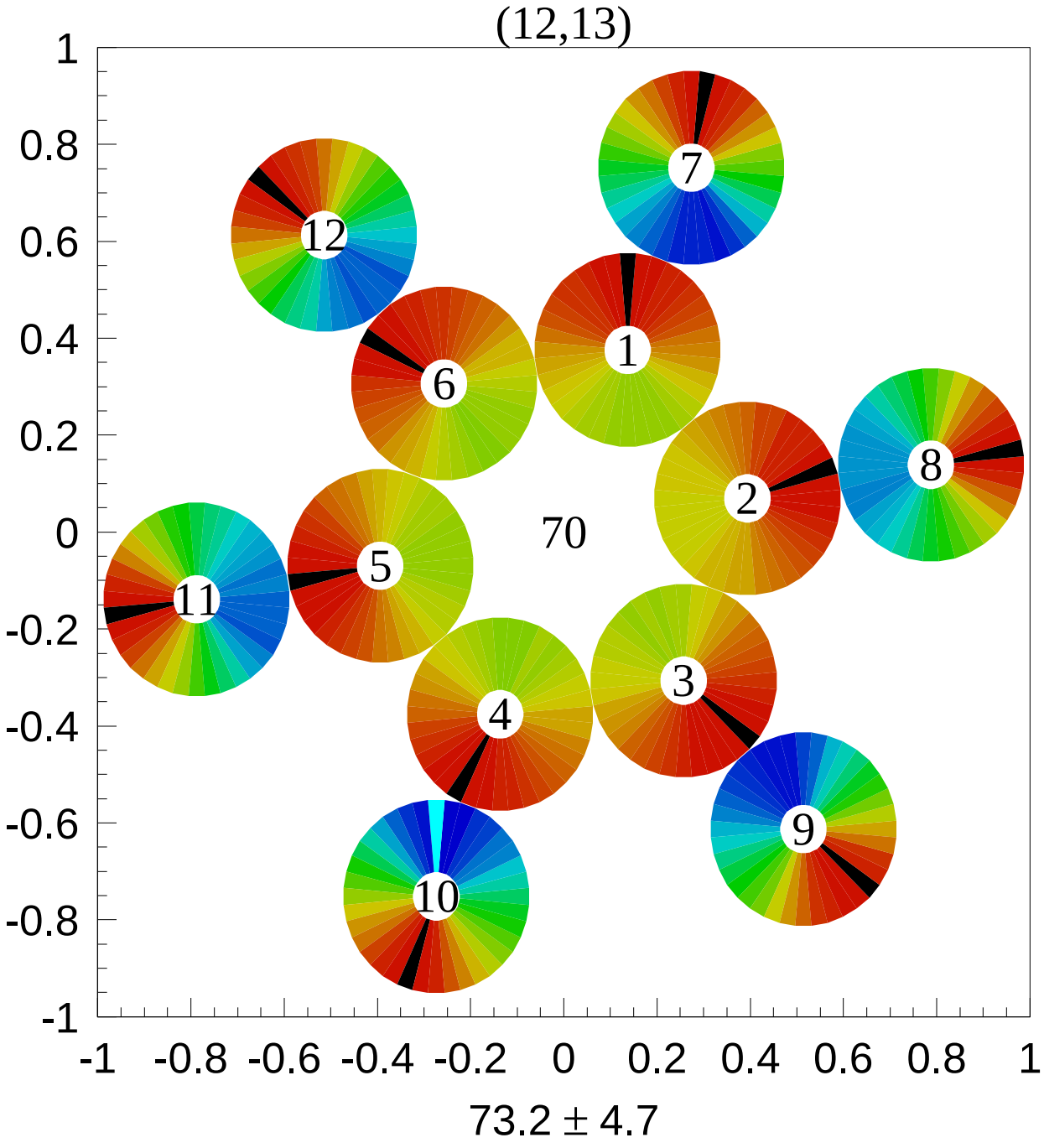

(12,11)
tilted LEDs
116 123 121 125 116 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 122 111 121 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

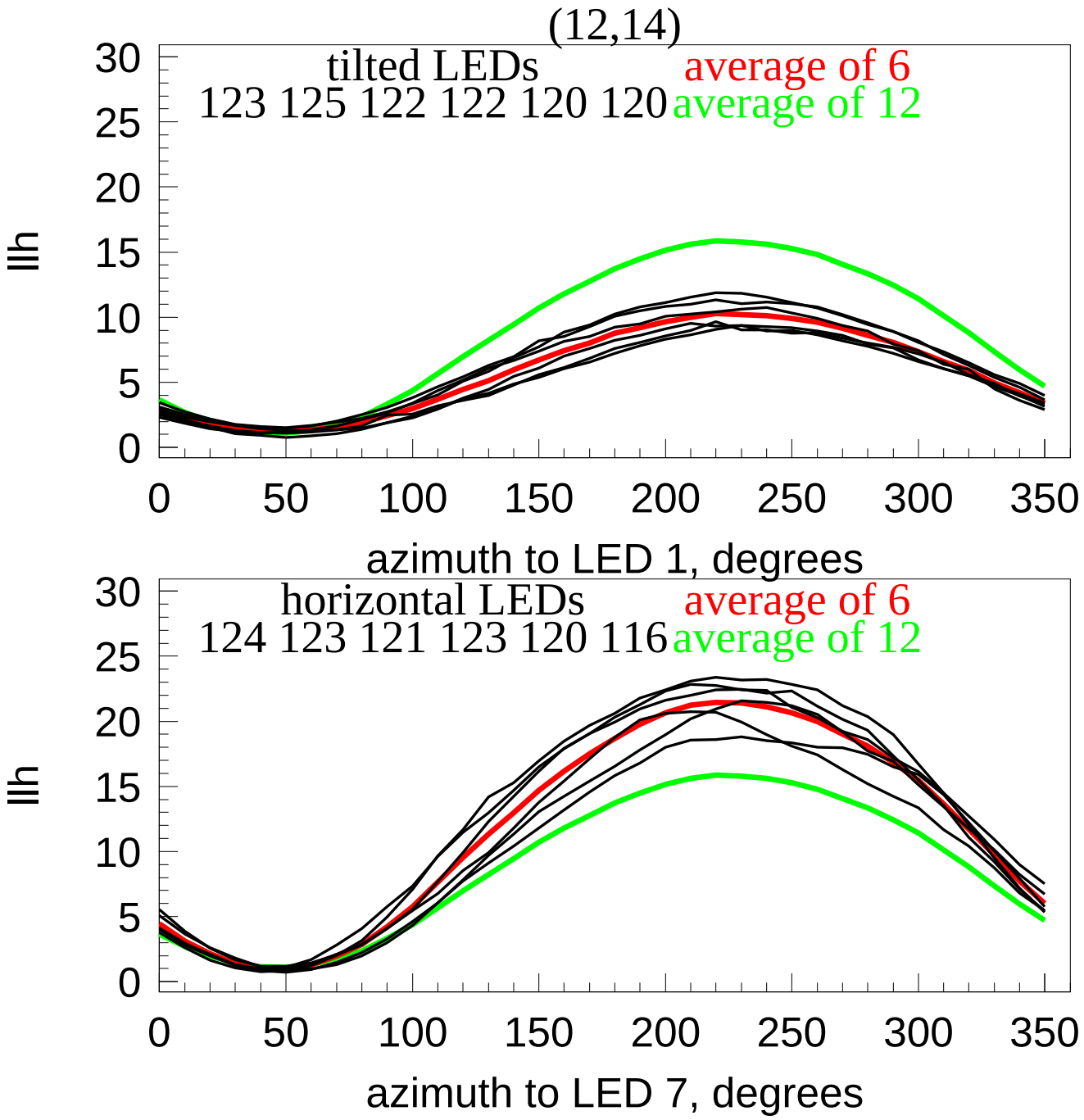

(12,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
240.3 ± 8.3

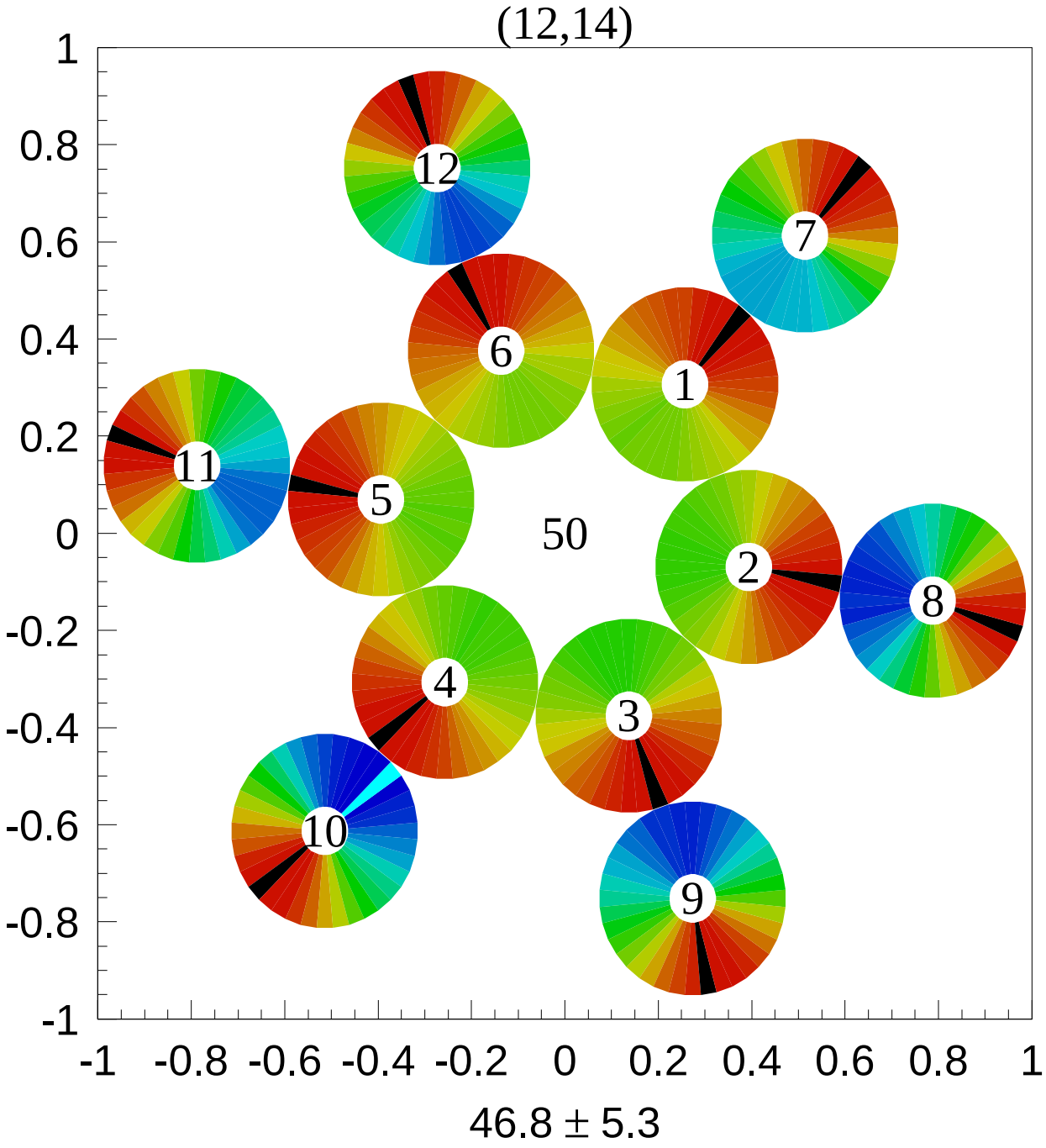

(12,12)
tilted LEDs
110 120 119 127 124 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 127 123 125 123 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

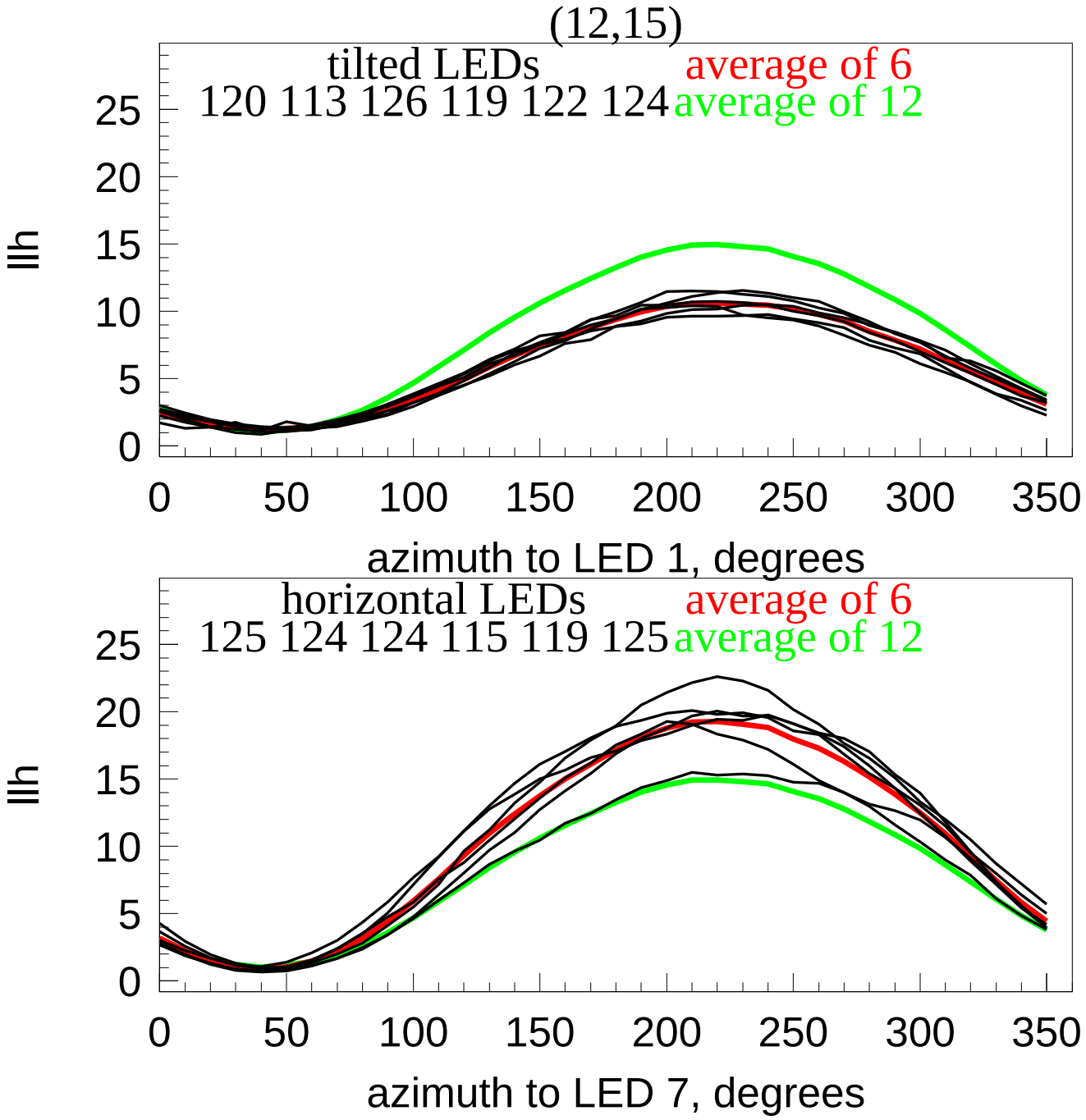

(12,12)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
265.6 ± 6.9

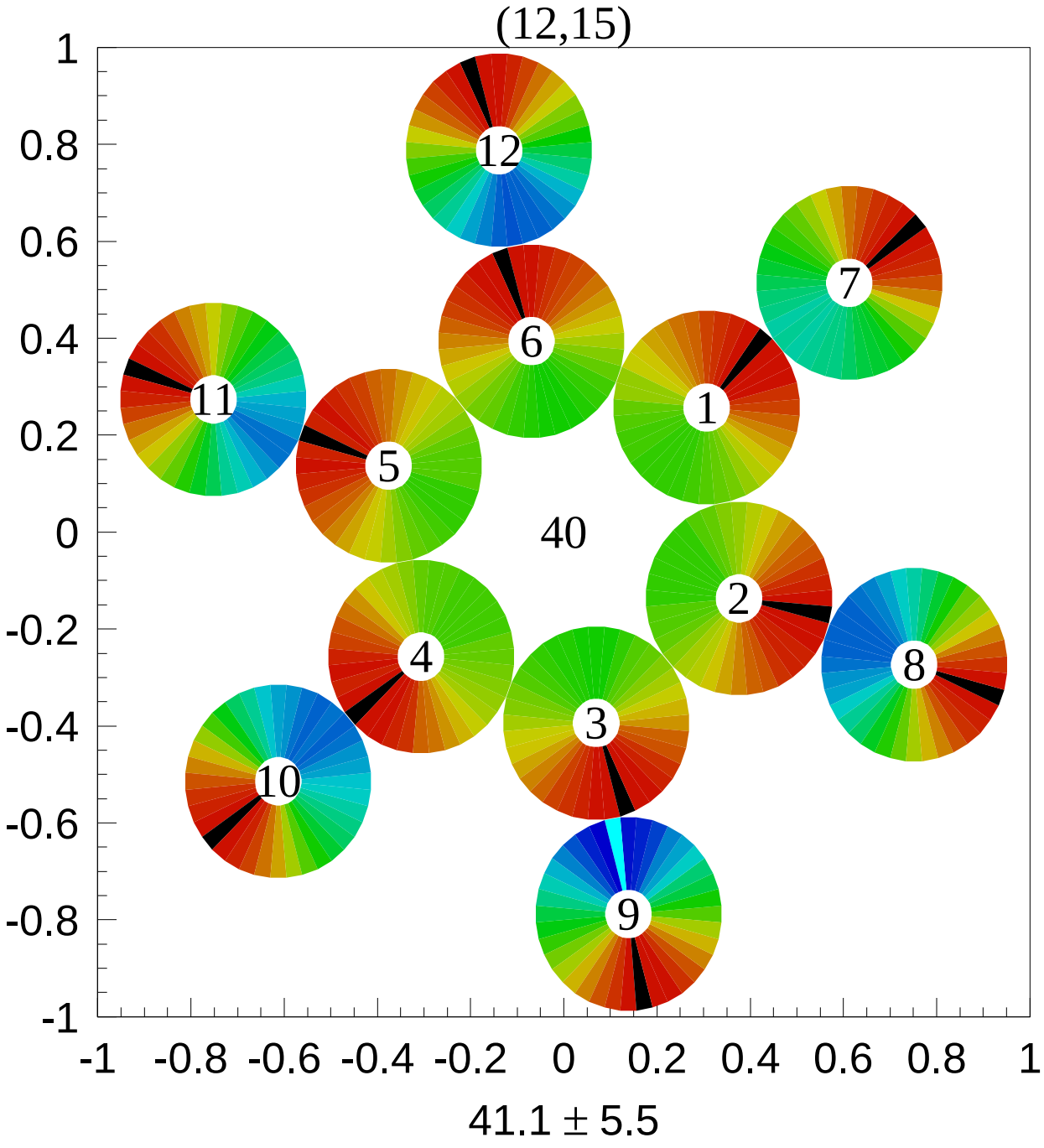

(12,13)
tilted LEDs
125 125 124 122 124 125
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 127 119 124 119 123
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

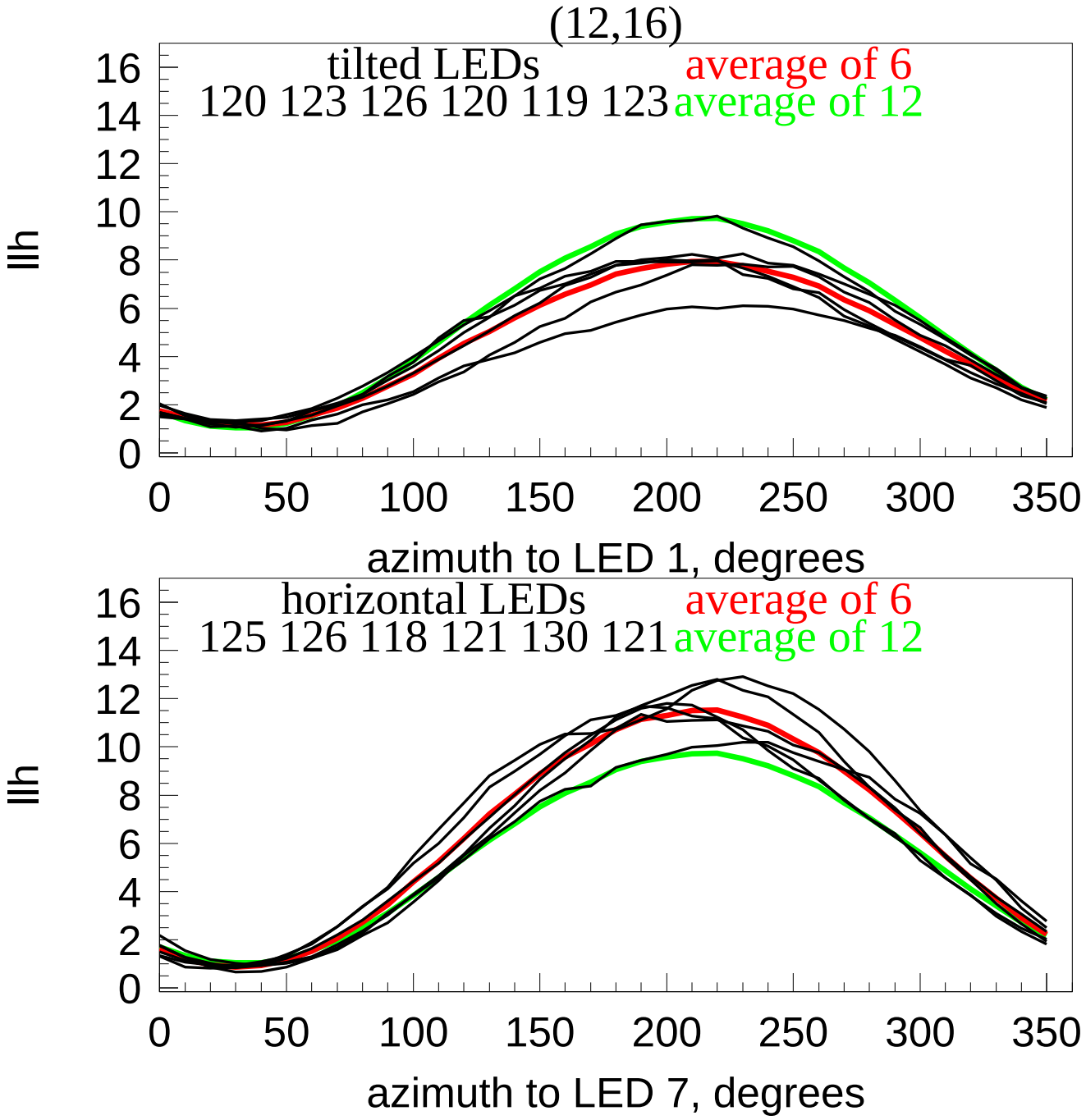

(12,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
1
6
8
2
70
5
11
3
4
9
10
73.2 ± 4.7

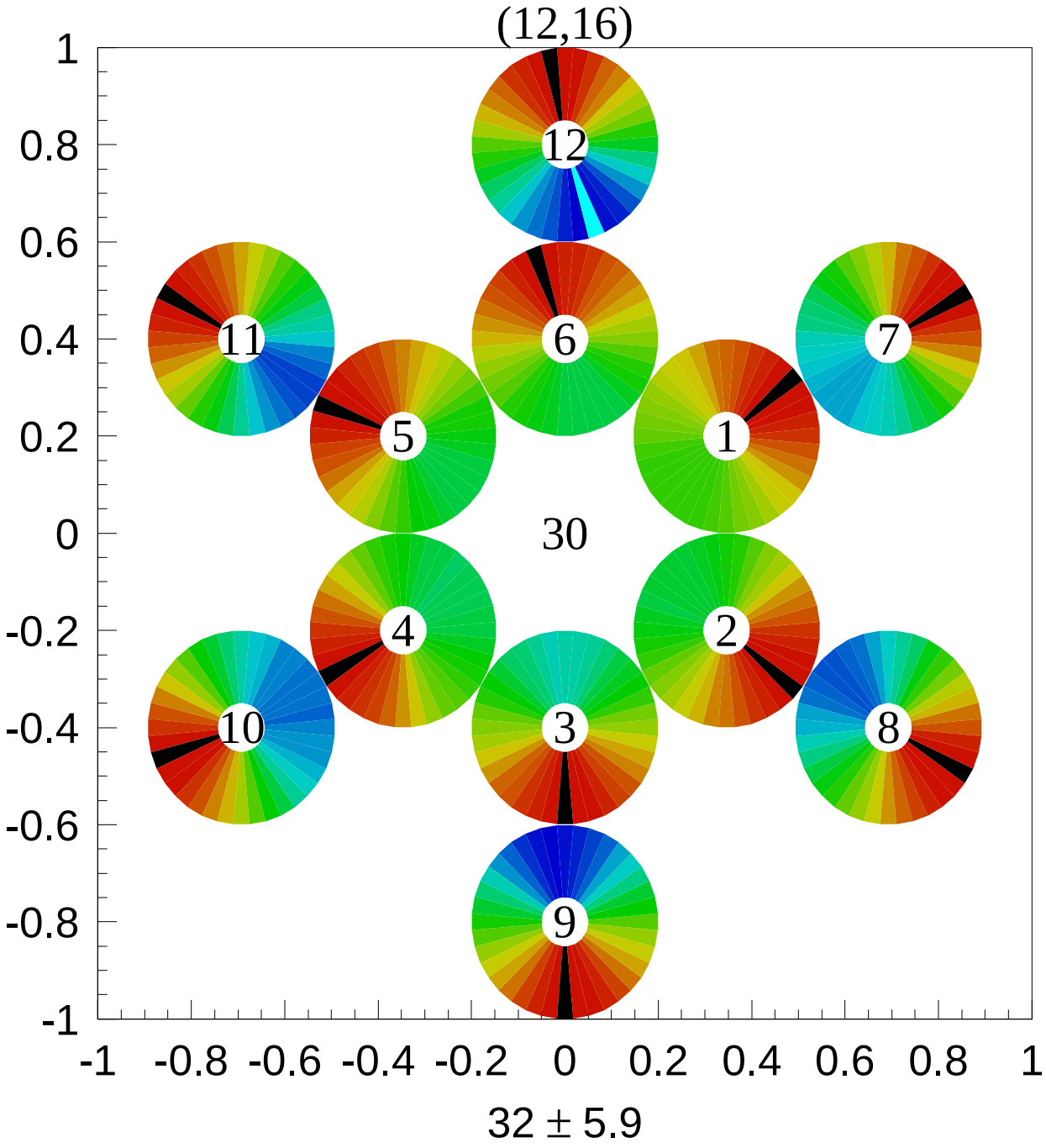

(12,14)
tilted LEDs
123 125 122 122 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 121 123 120 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

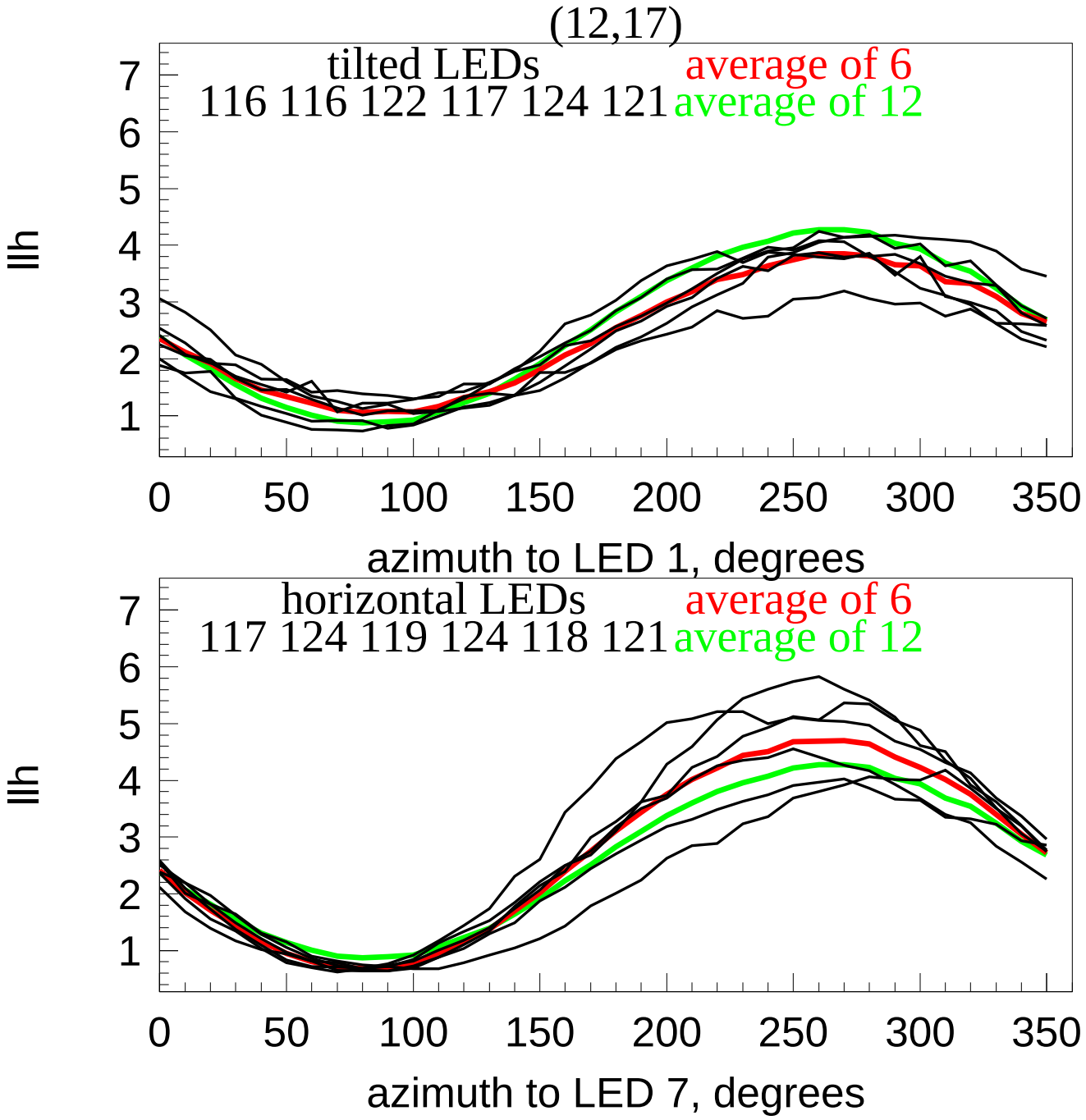

(12,14)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
46.8 ± 5.3

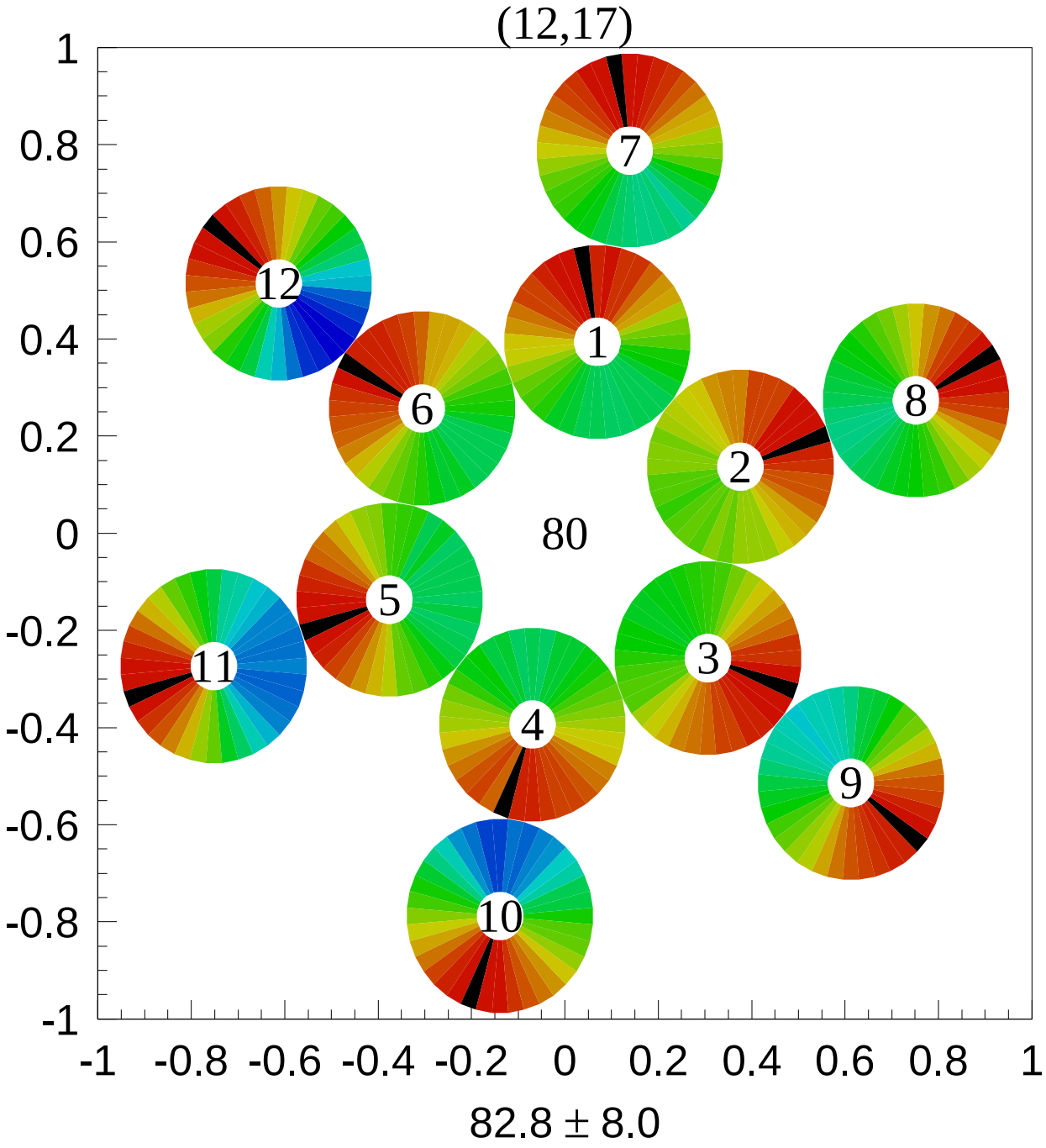

(12,15)
tilted LEDs
120 113 126 119 122 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 124 115 119 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

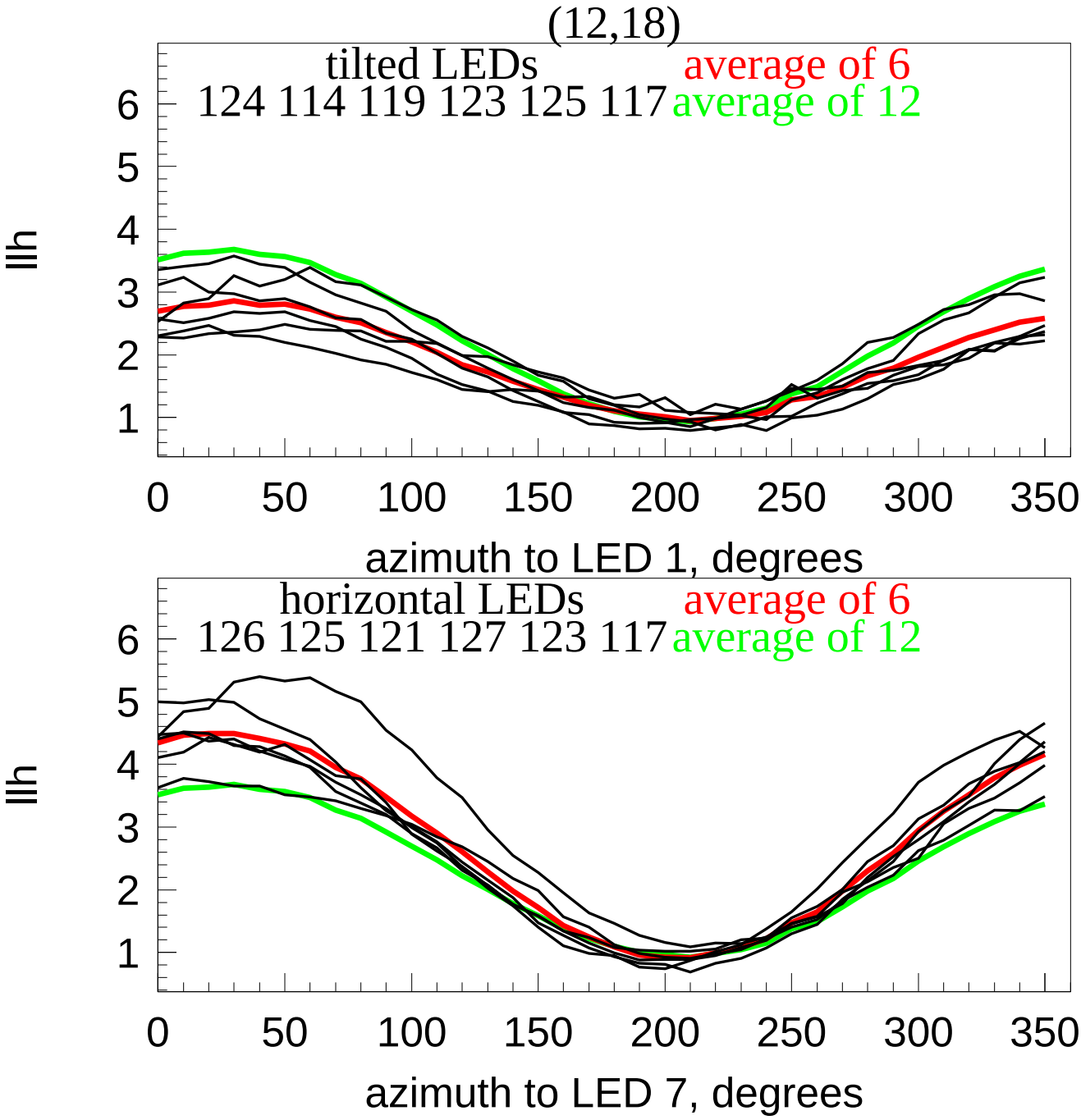

(12,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
7
6
11
1
5
40
2
8
4
3
10
9
41.1 ± 5.5

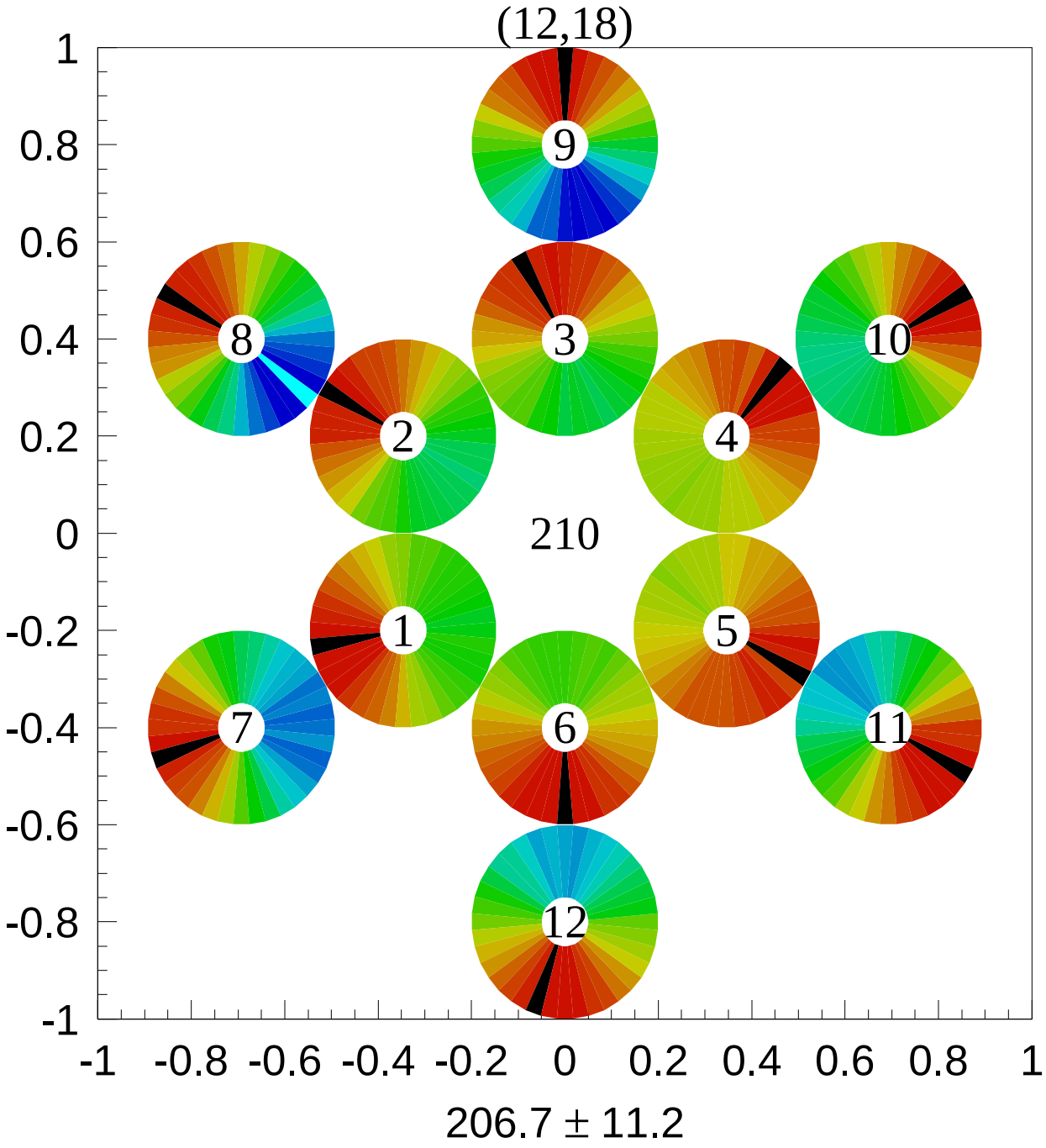

(12,16)
tilted LEDs
120 123 126 120 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 126 118 121 130 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

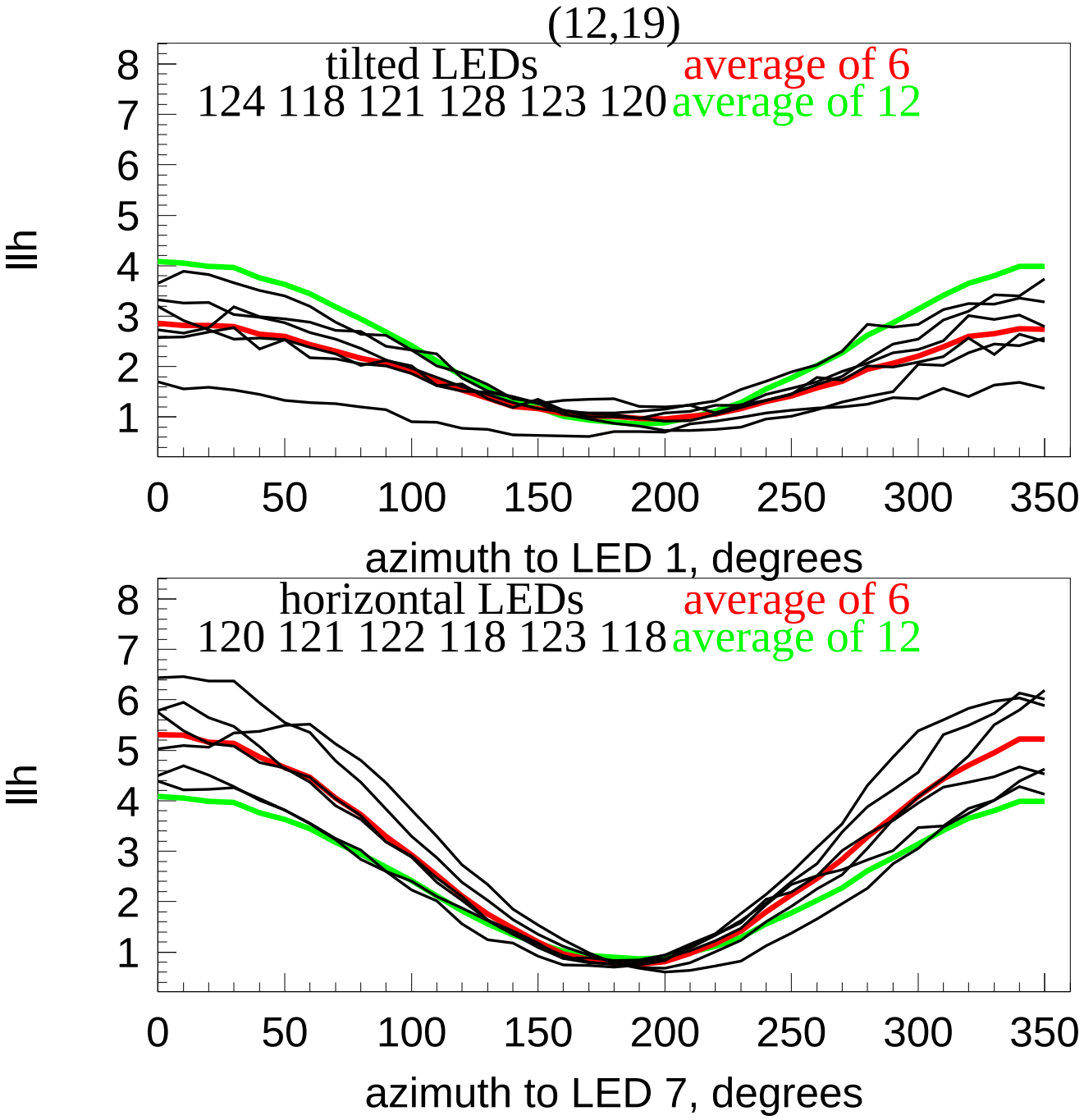

(12,16)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
32 ± 5.9

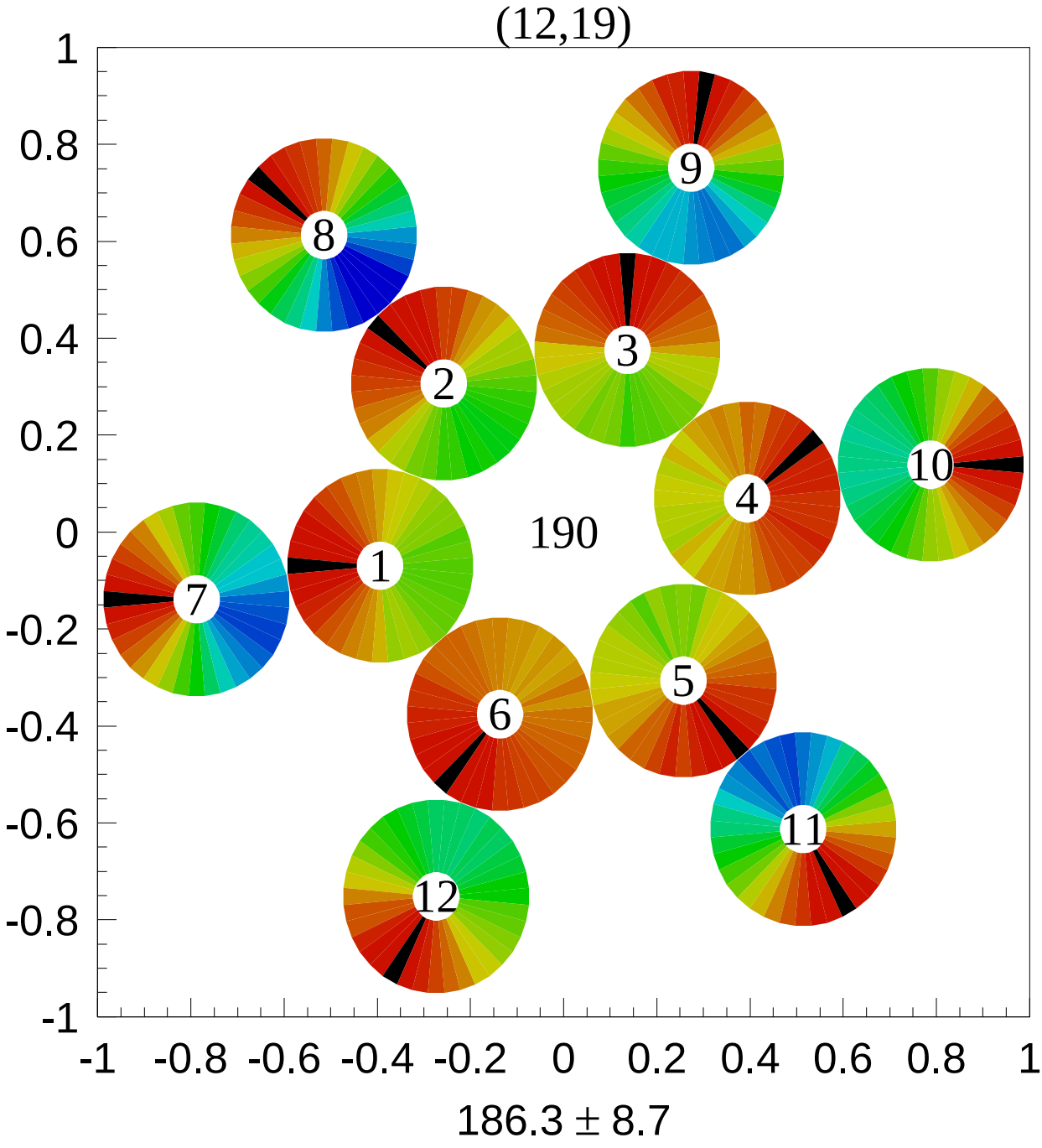

(12,17)
tilted LEDs
116 116 122 117 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 124 119 124 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

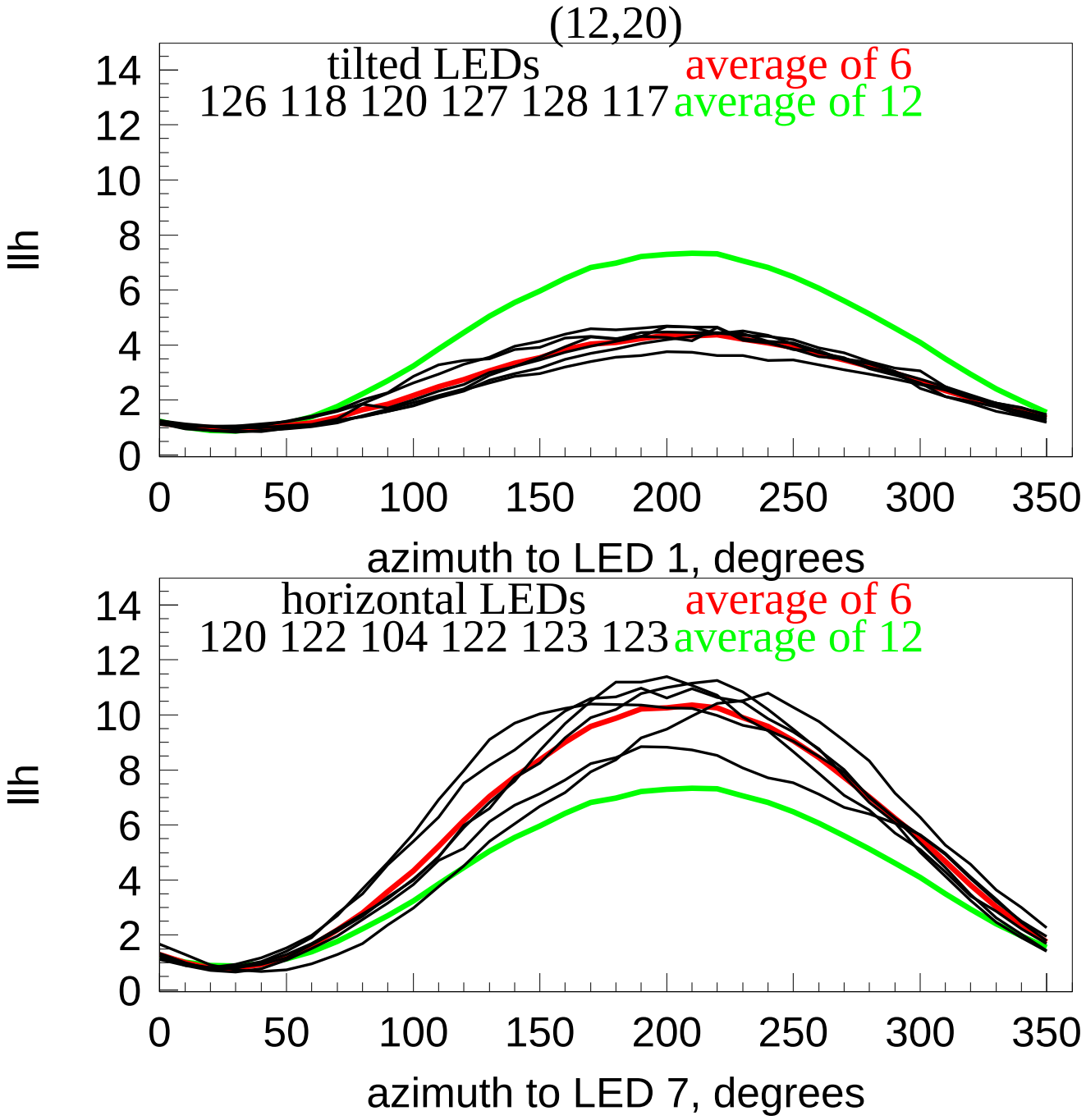

(12,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
82.8 ± 8.0

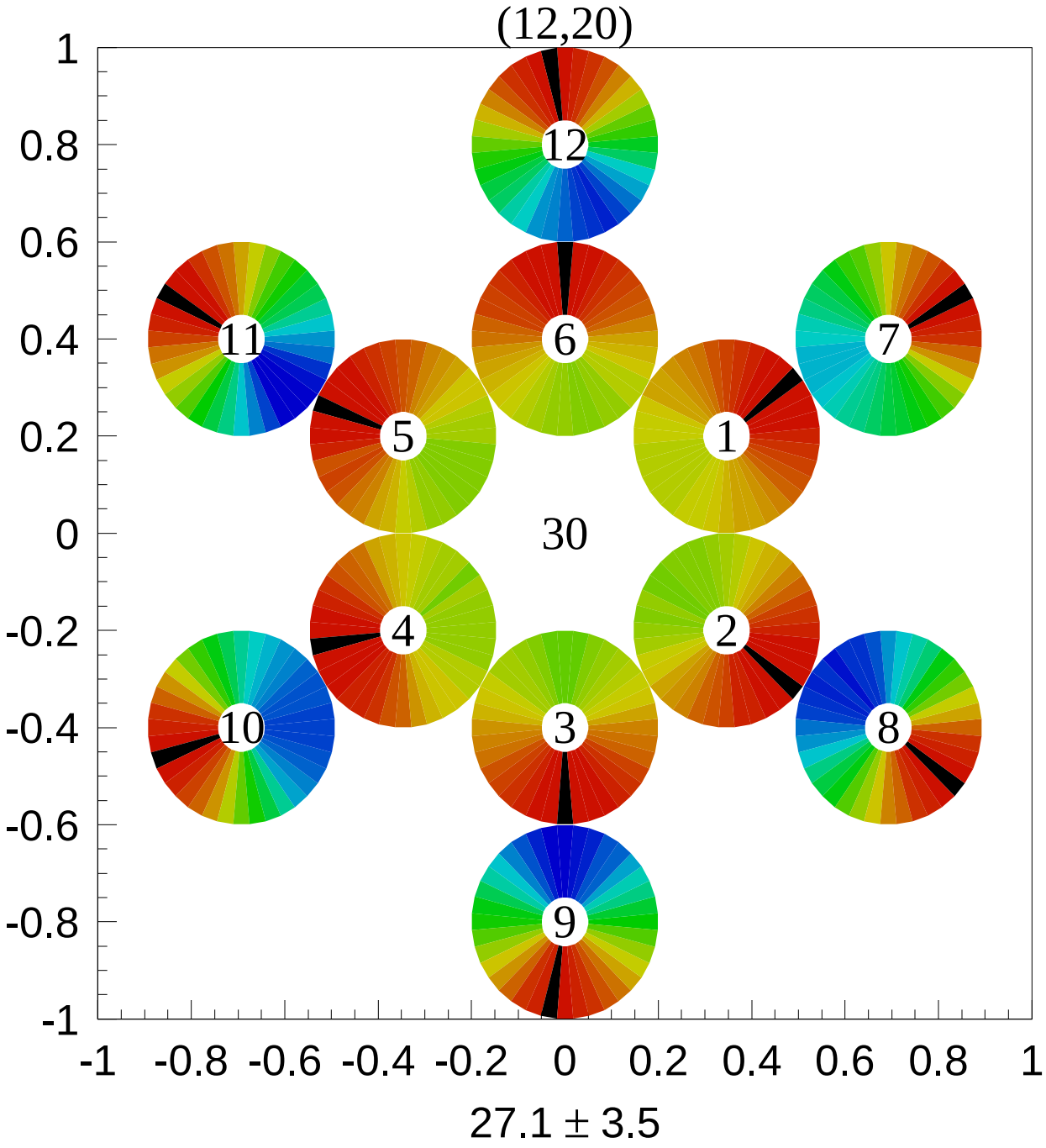

(12,18)
tilted LEDs
124 114 119 123 125 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 125 121 127 123 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

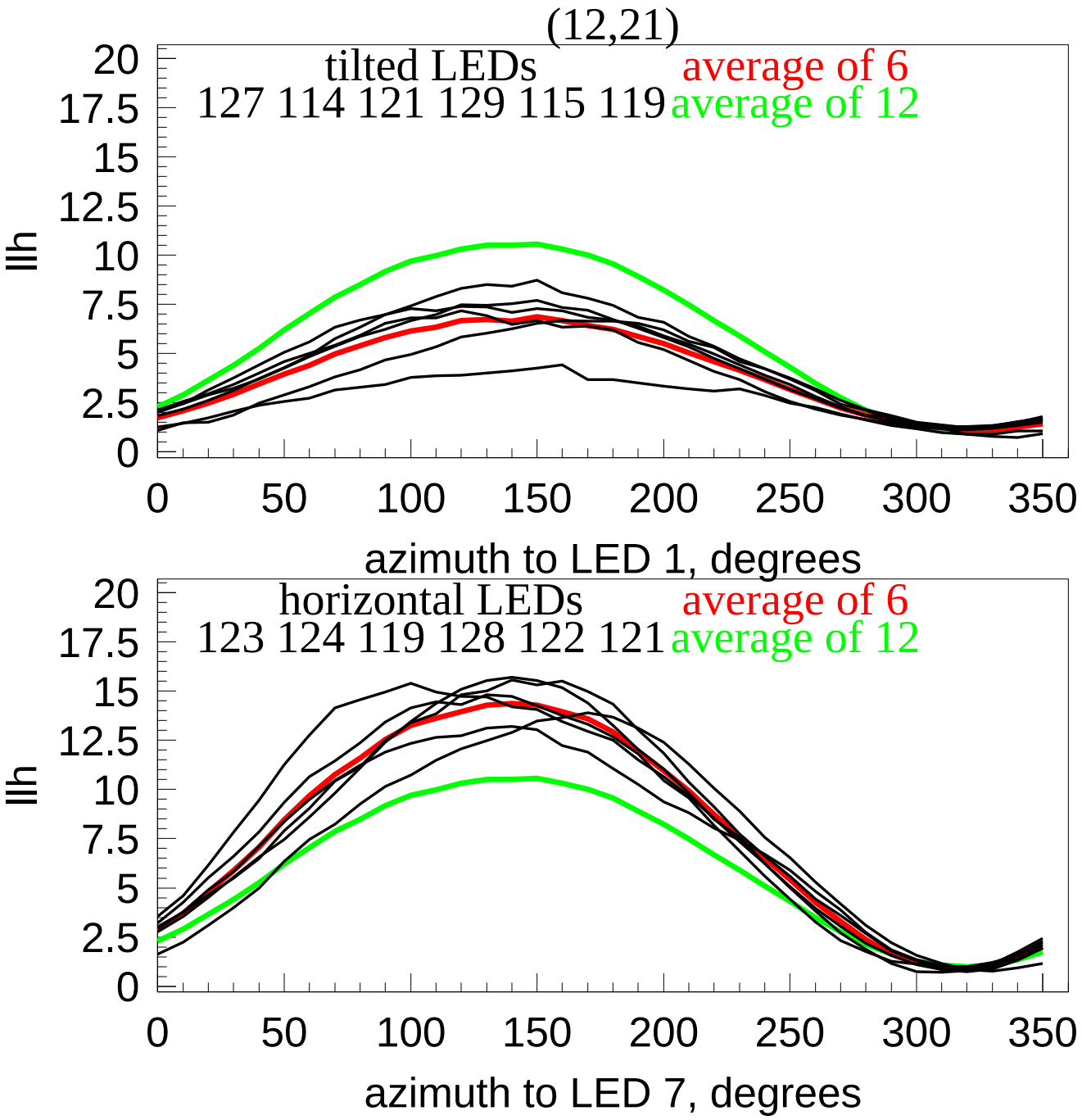

(12,18)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
206.7 ± 11.2

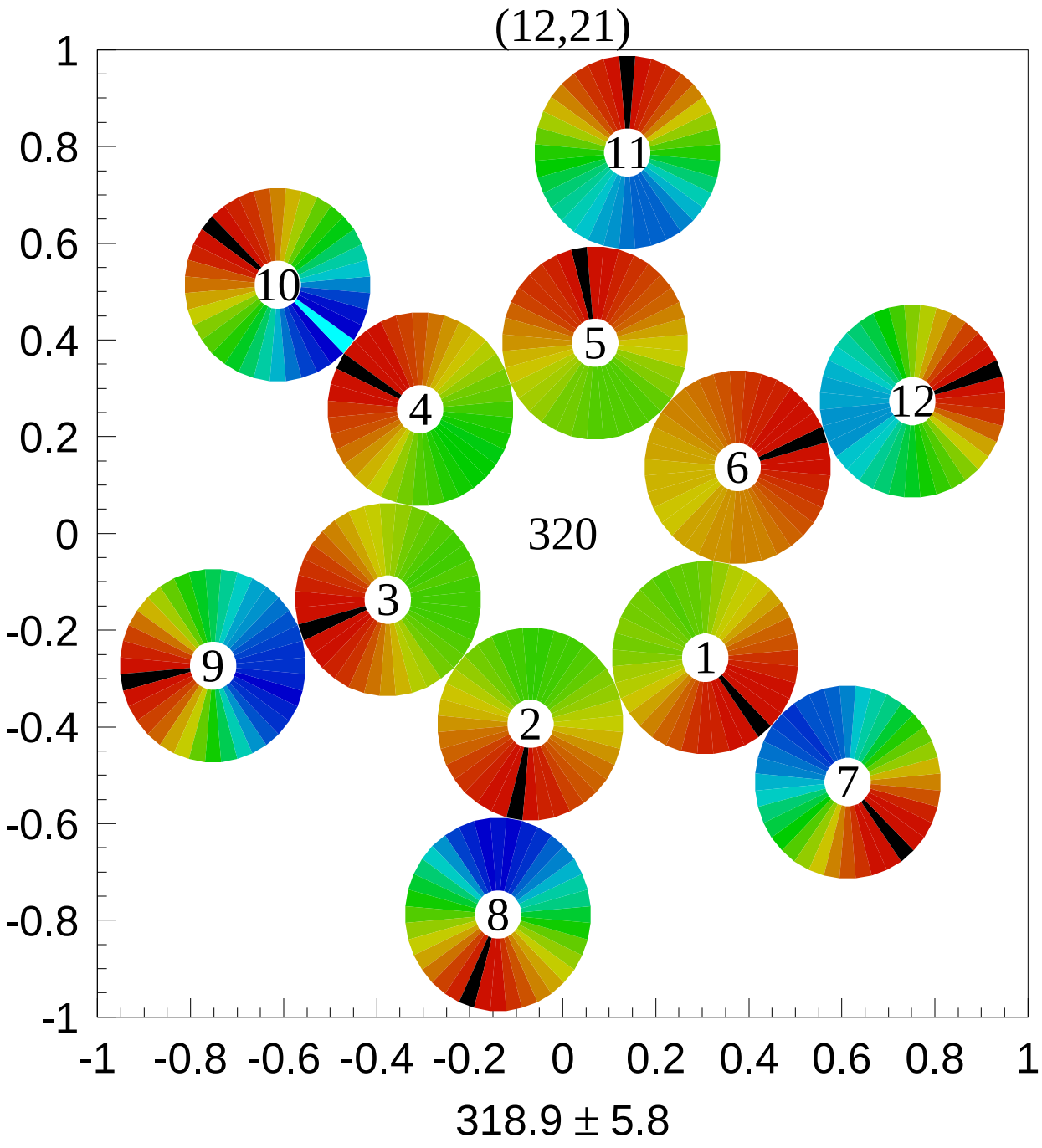

(12,19)
tilted LEDs
124 118 121 128 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 122 118 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

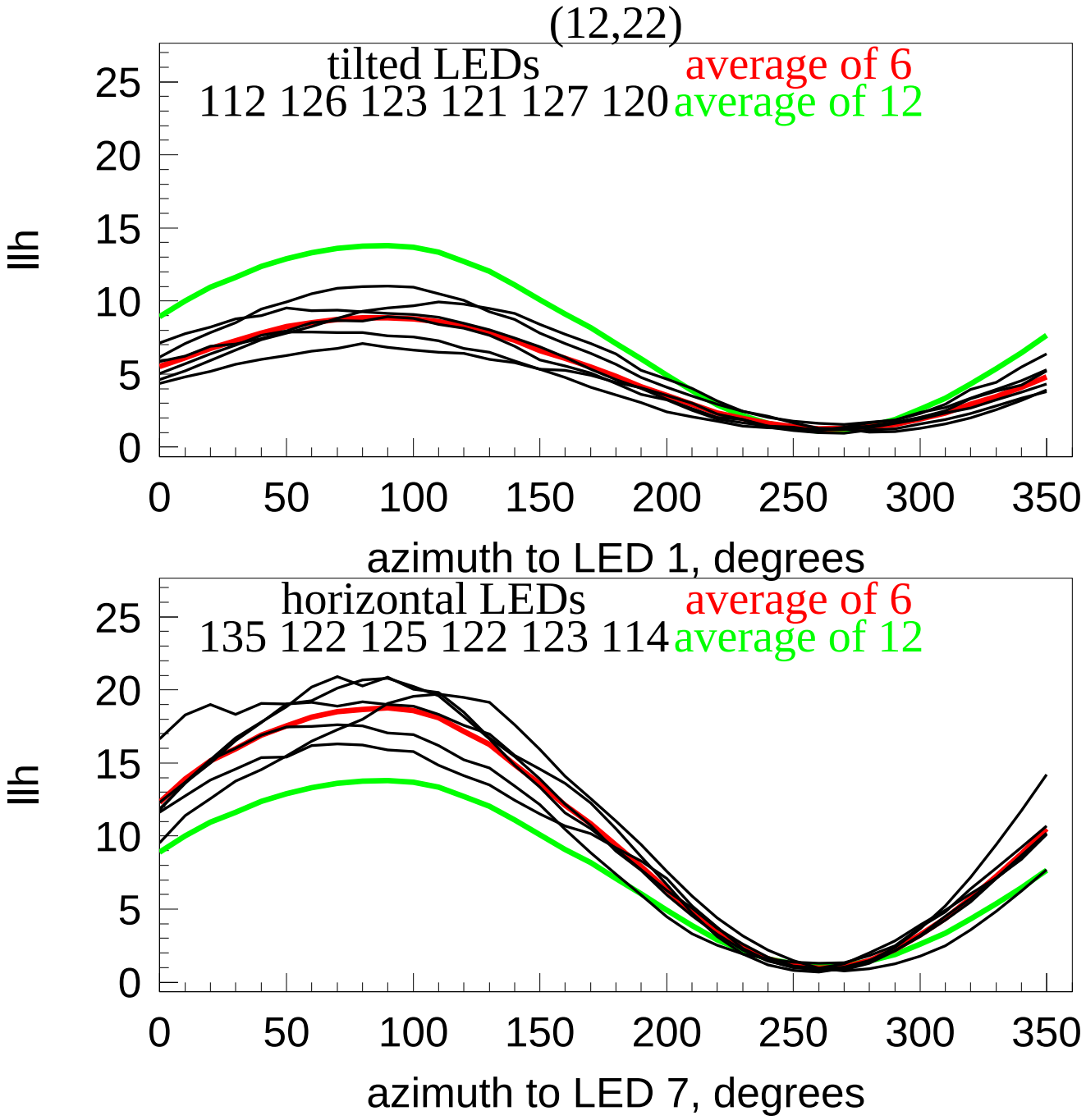

(12,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.3 ± 8.7
190
1
2
3
4
5
6
7
8
9
10
11
12

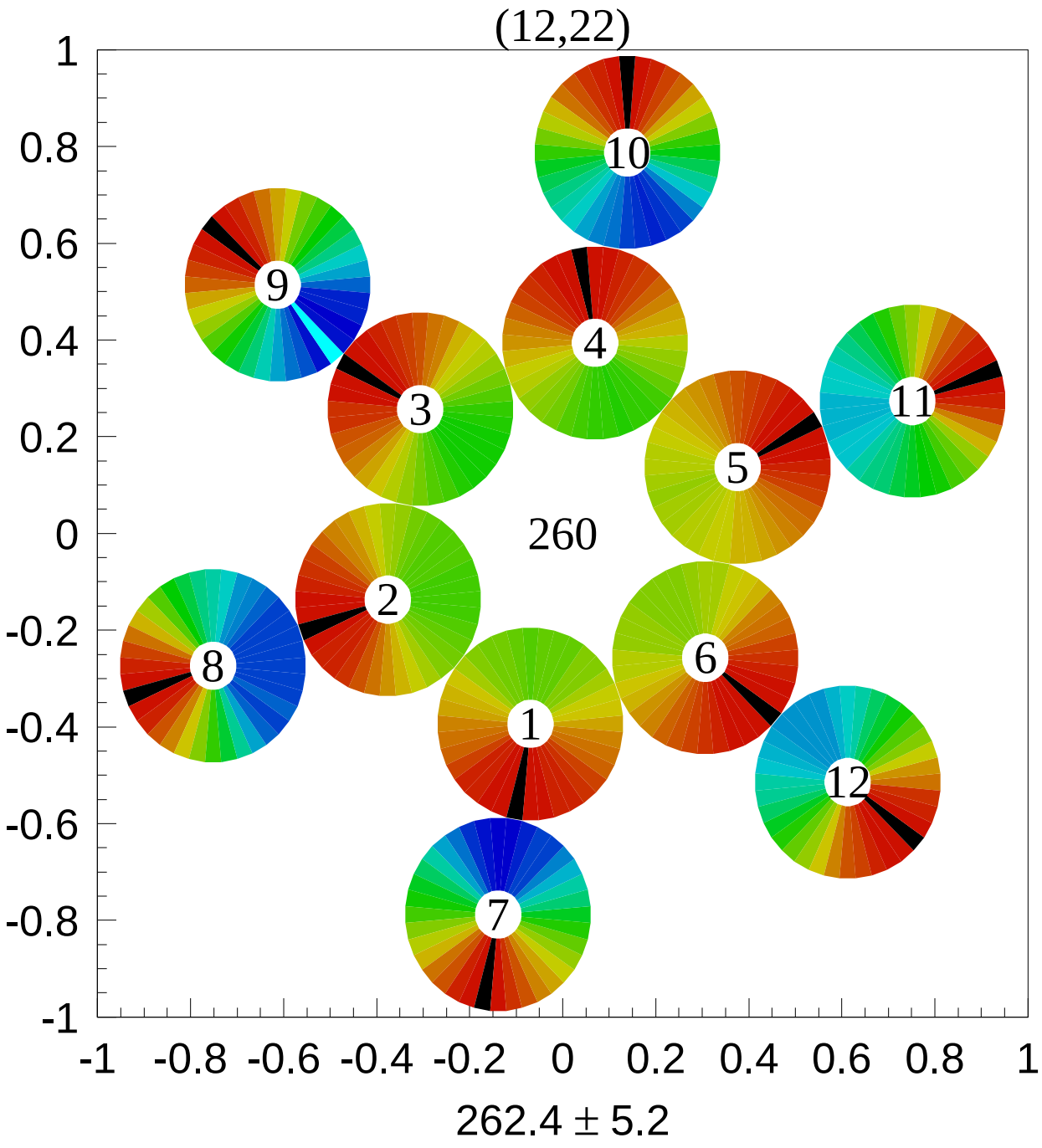

(12,20)
tilted LEDs
126 118 120 127 128 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 104 122 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

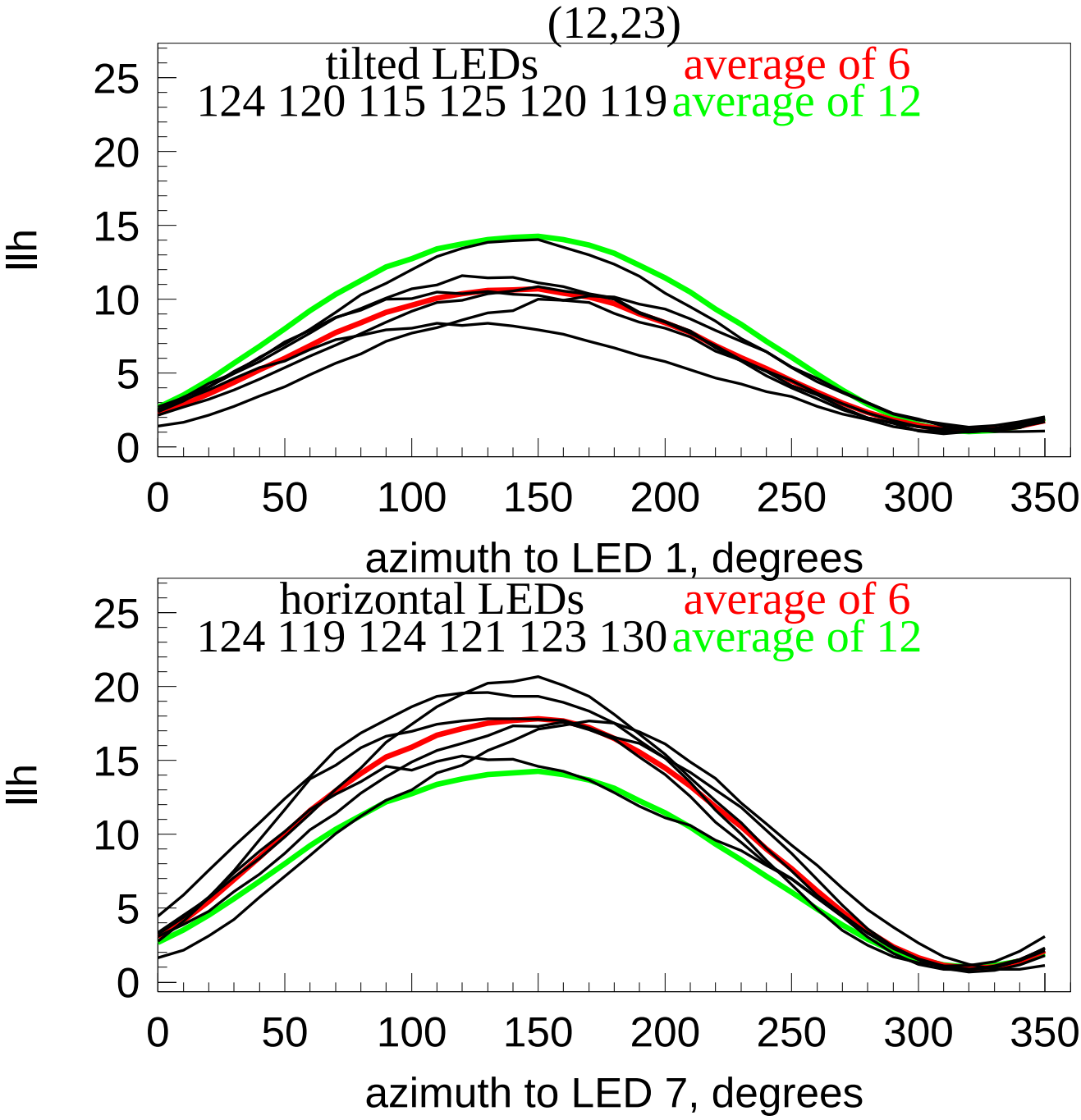

(12,20)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
27.1 ± 3.5

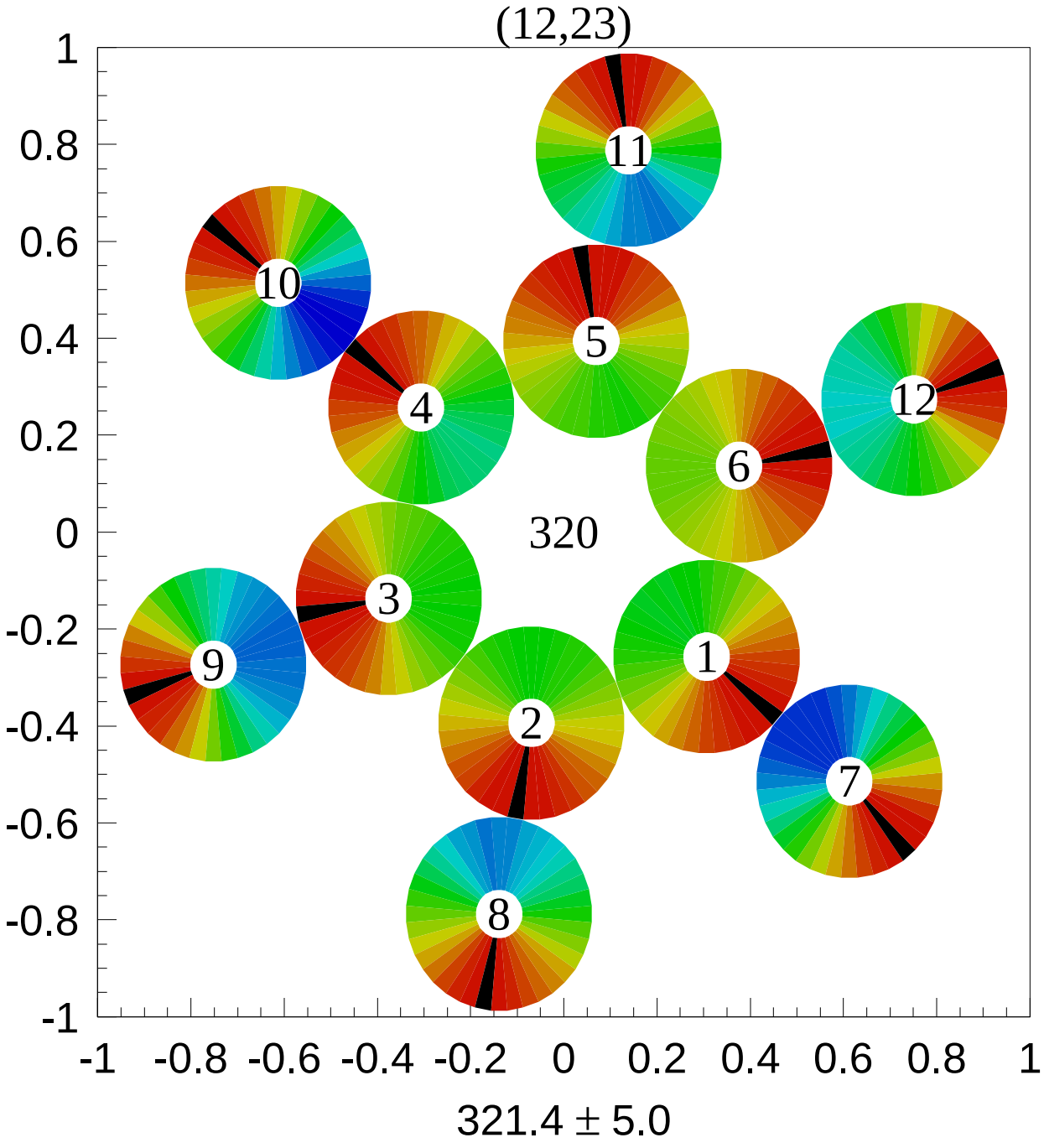

(12,21)
tilted LEDs
127 114 121 129 115 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 124 119 128 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

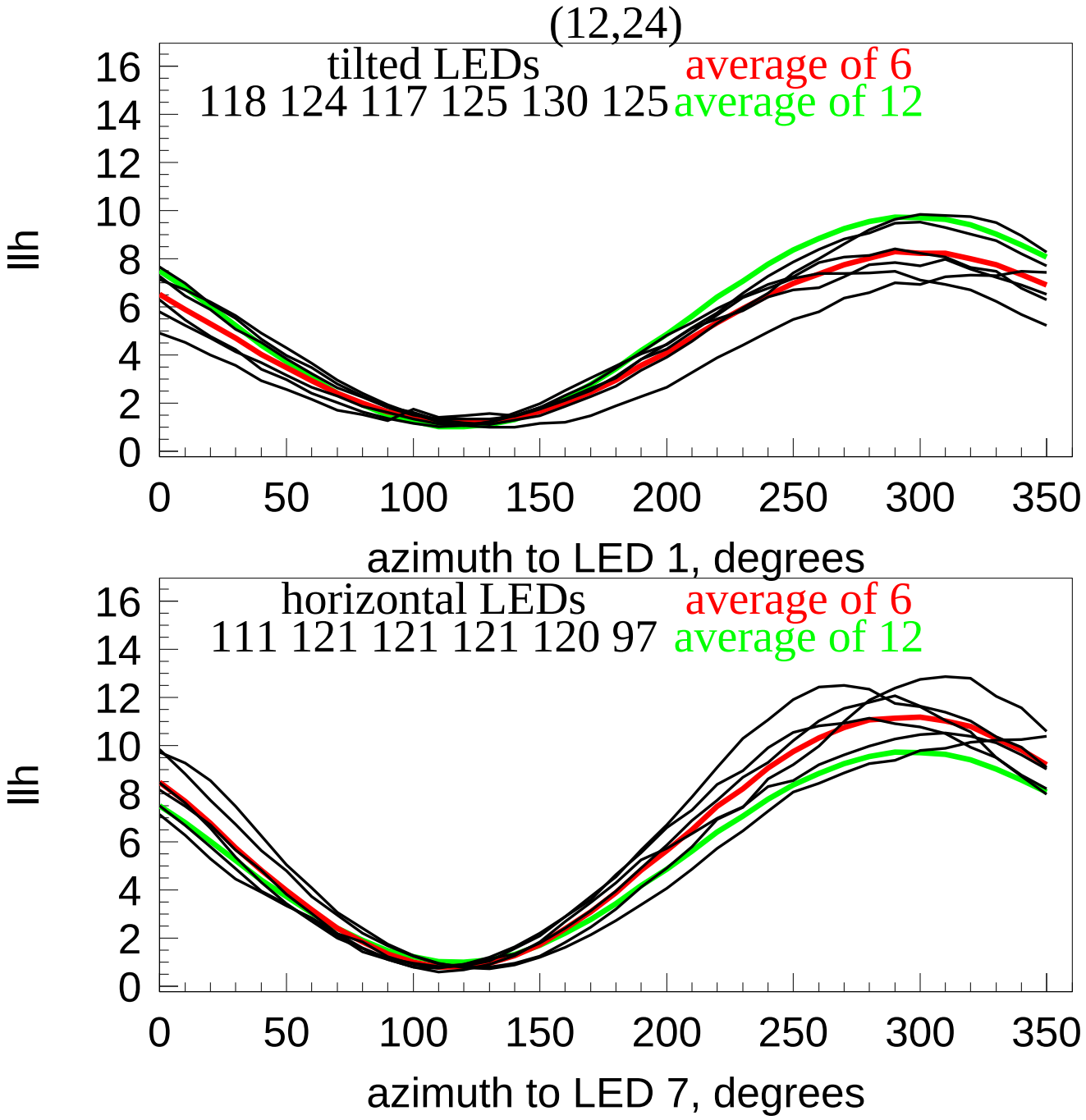

(12,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
318.9 ± 5.8

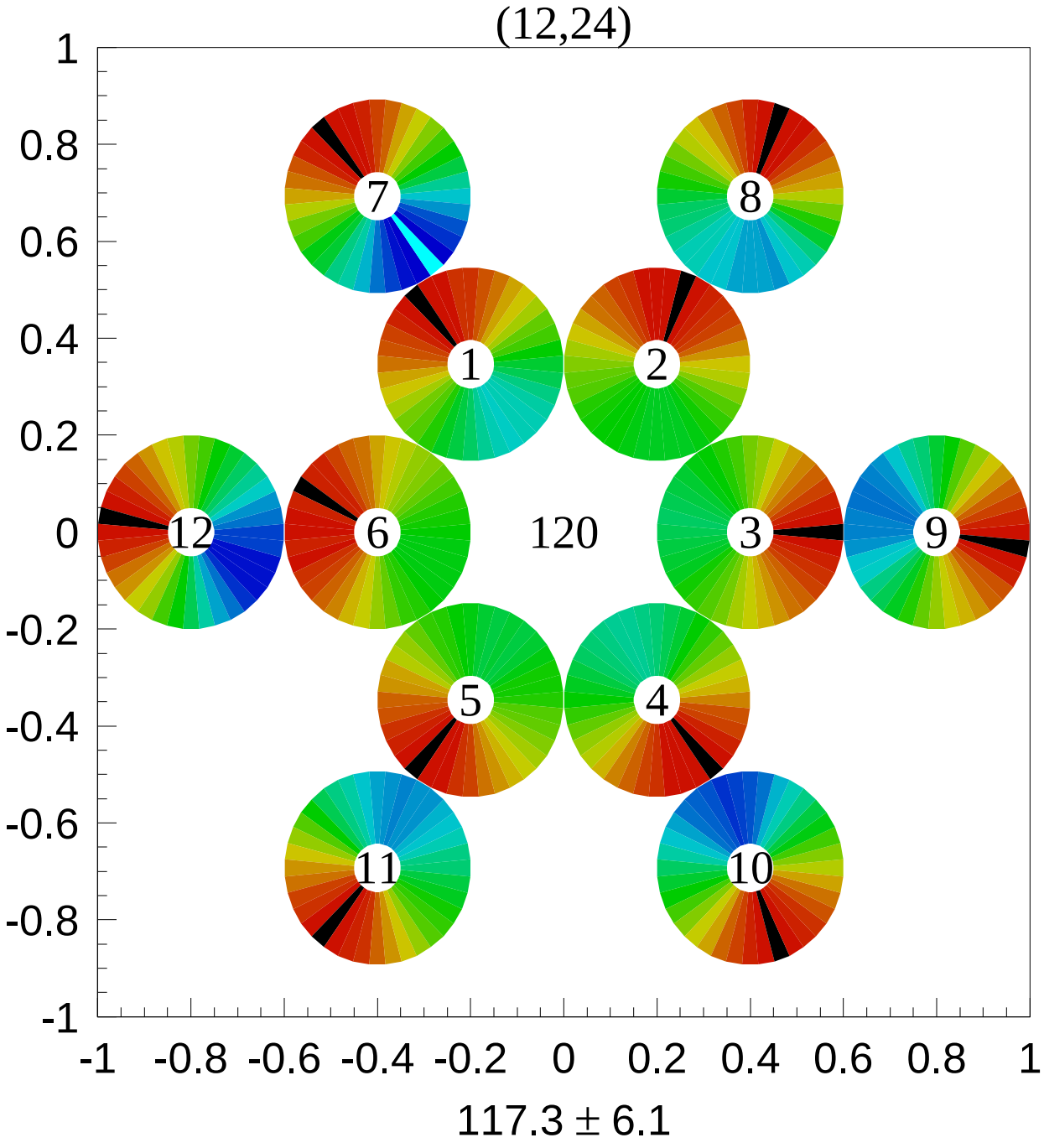

(12,22)
tilted LEDs
112 126 123 121 127 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
135 122 125 122 123 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

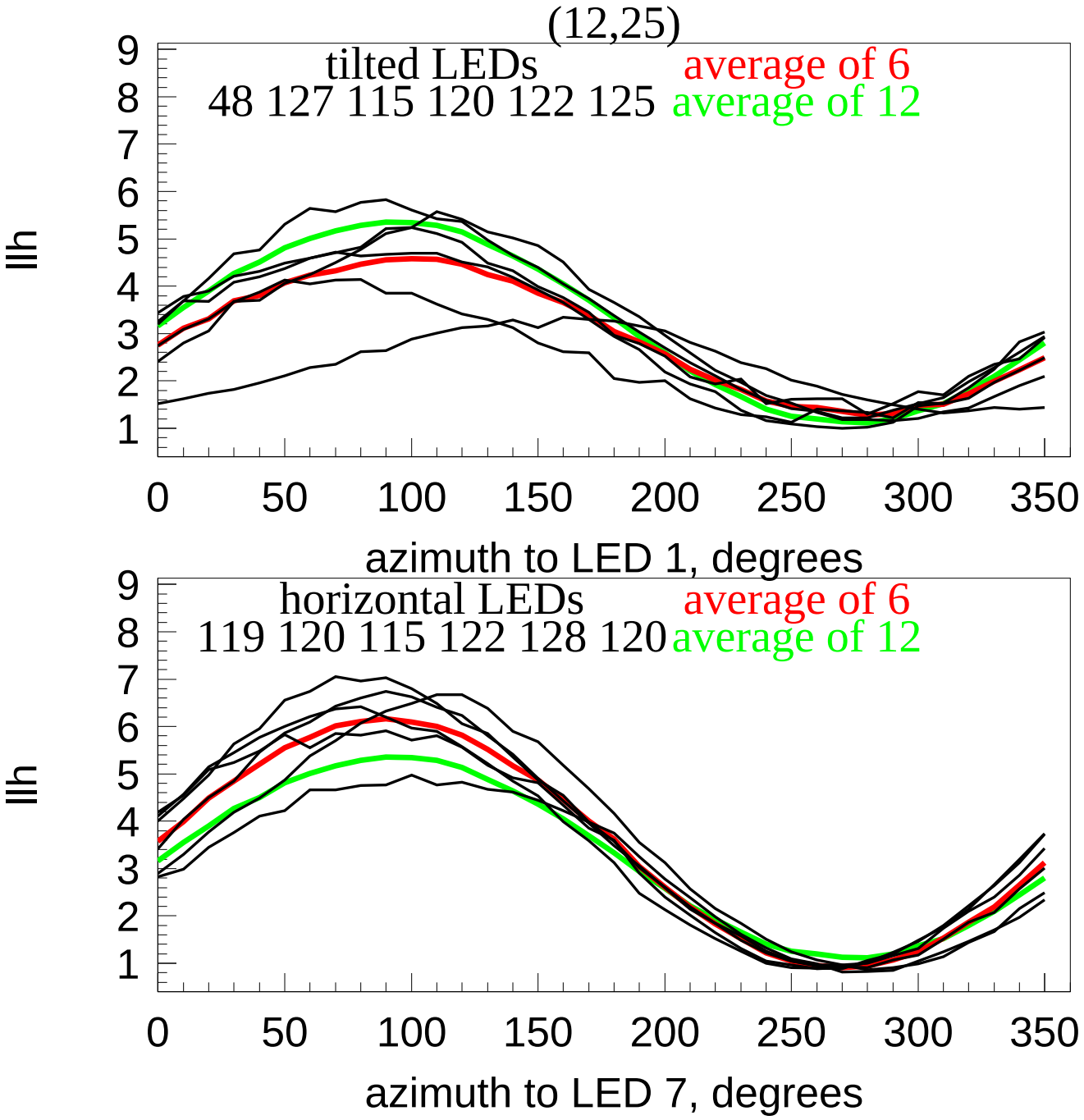

(12,22)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
262.4 ± 5.2

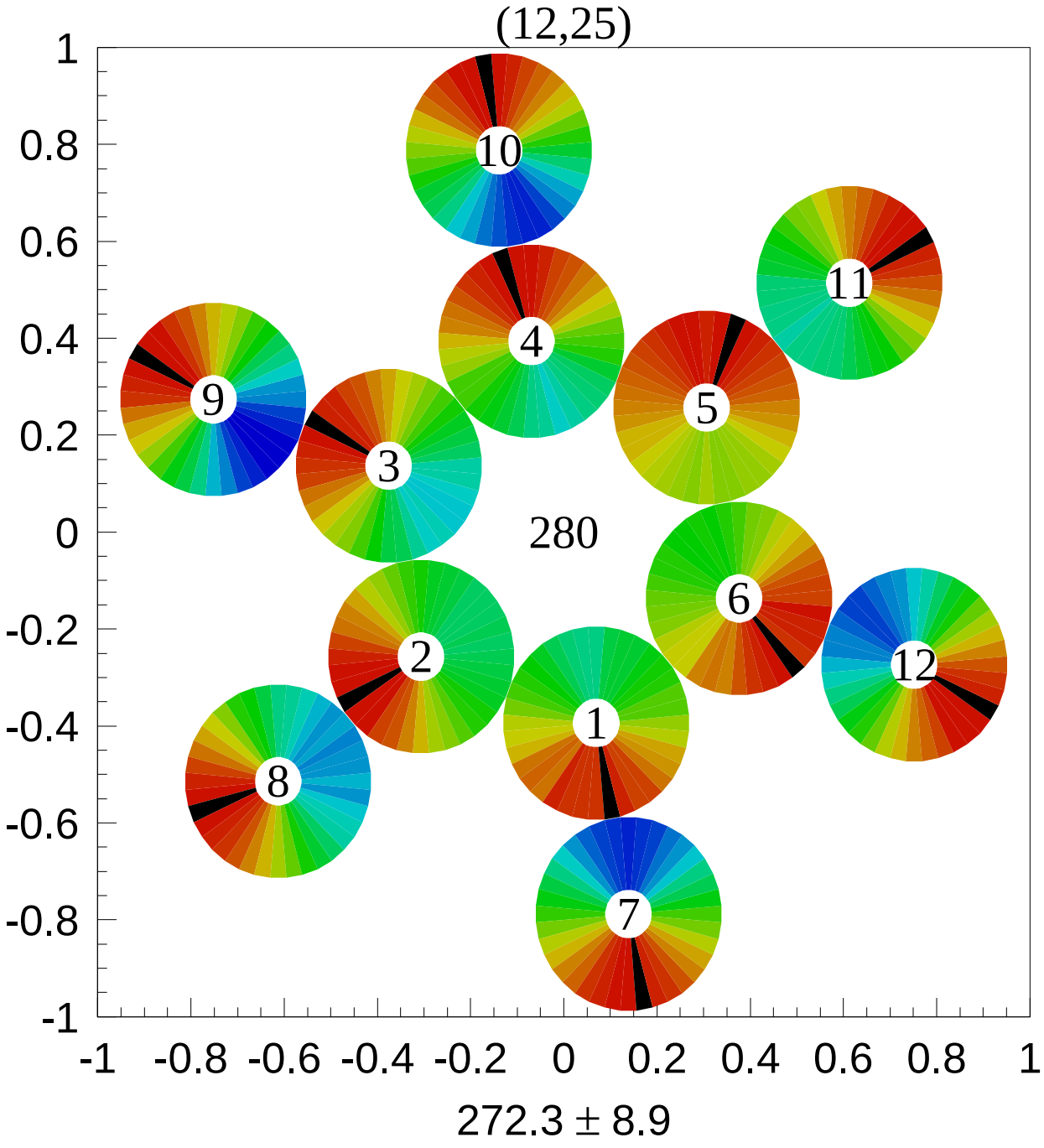

(12,23)
tilted LEDs
124 120 115 125 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 124 121 123 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

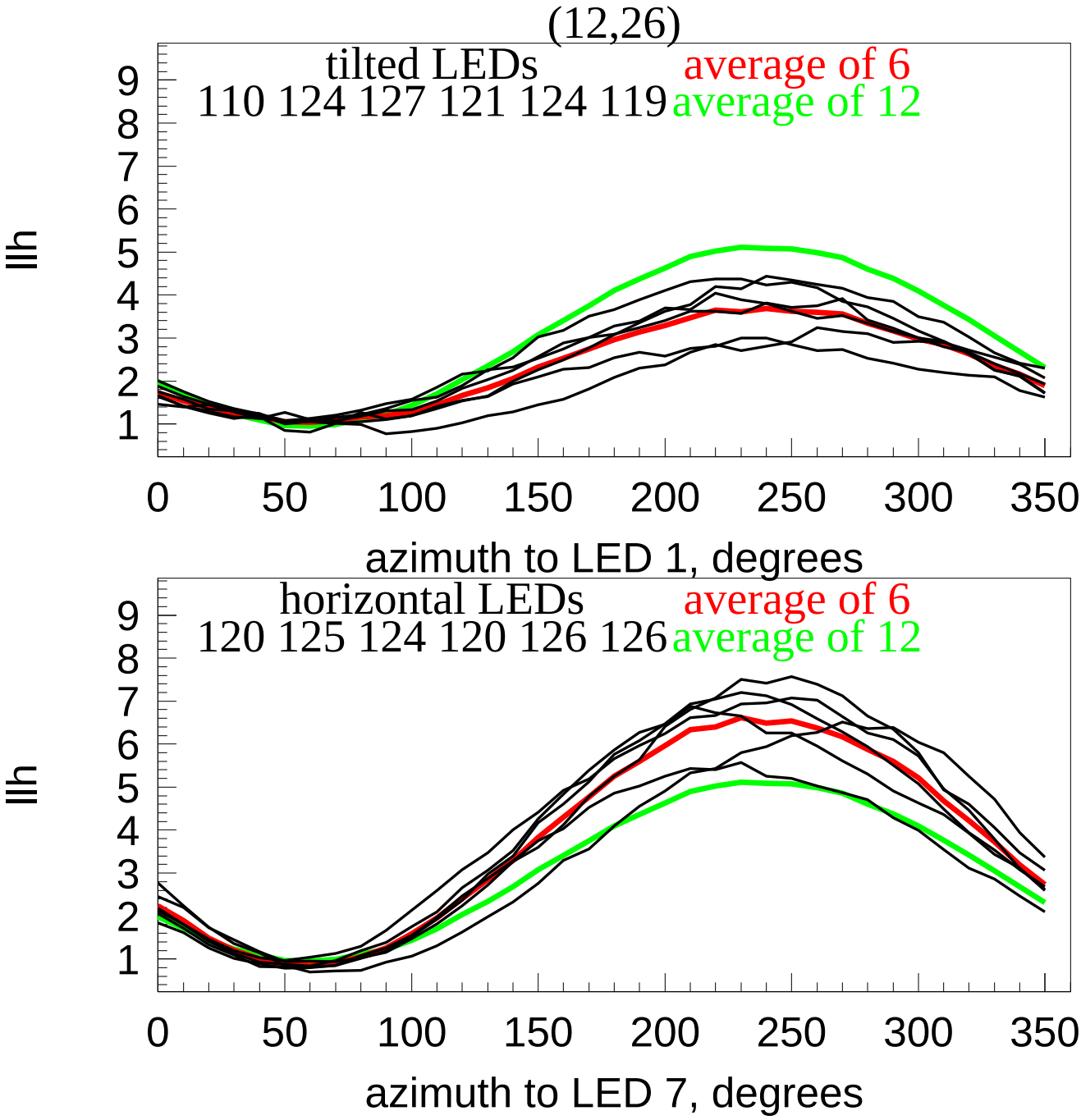

(12,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
321.4 ± 5.0

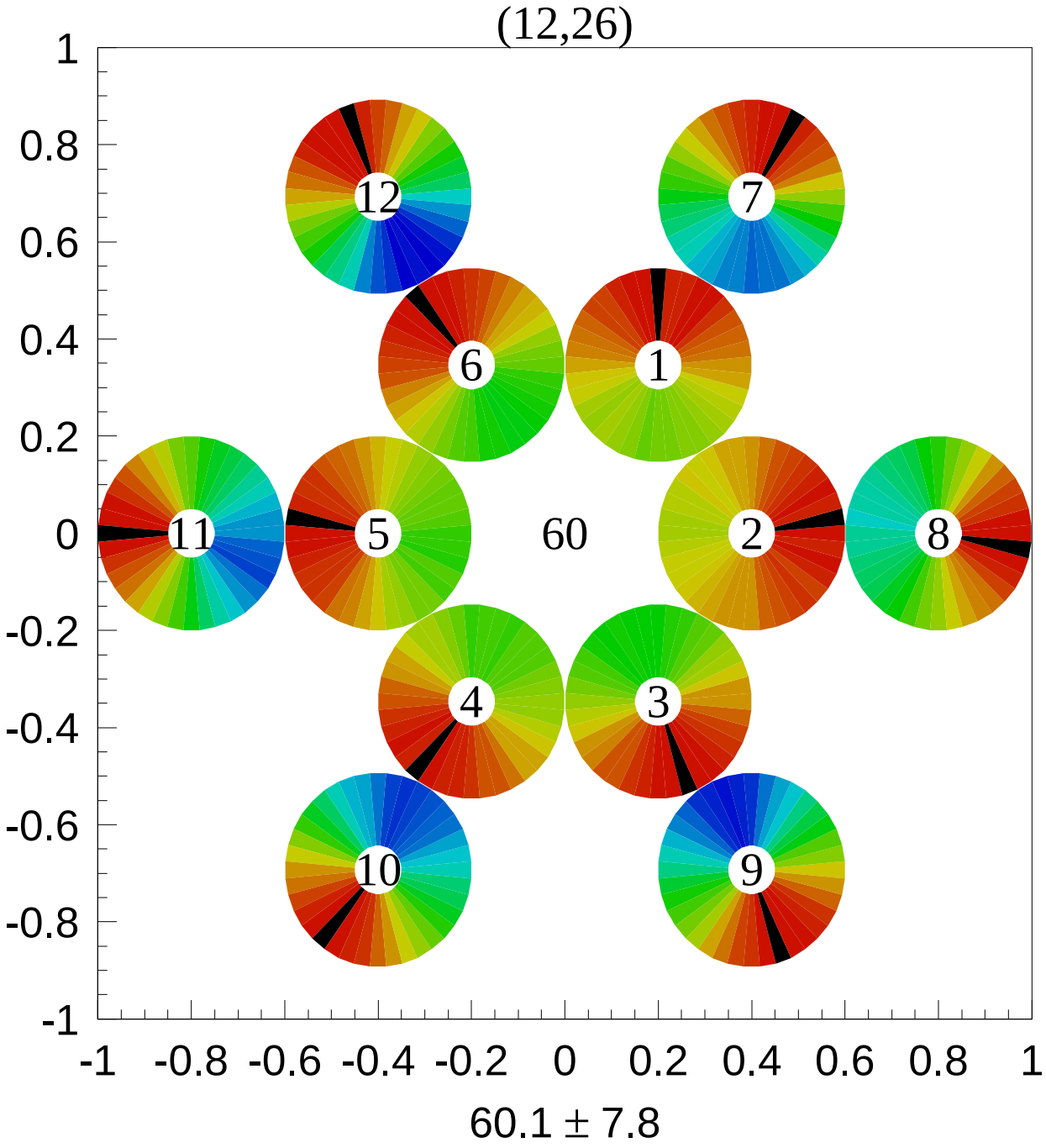

(12,24)
tilted LEDs
118 124 117 125 130 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
111 121 121 121 120 97
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

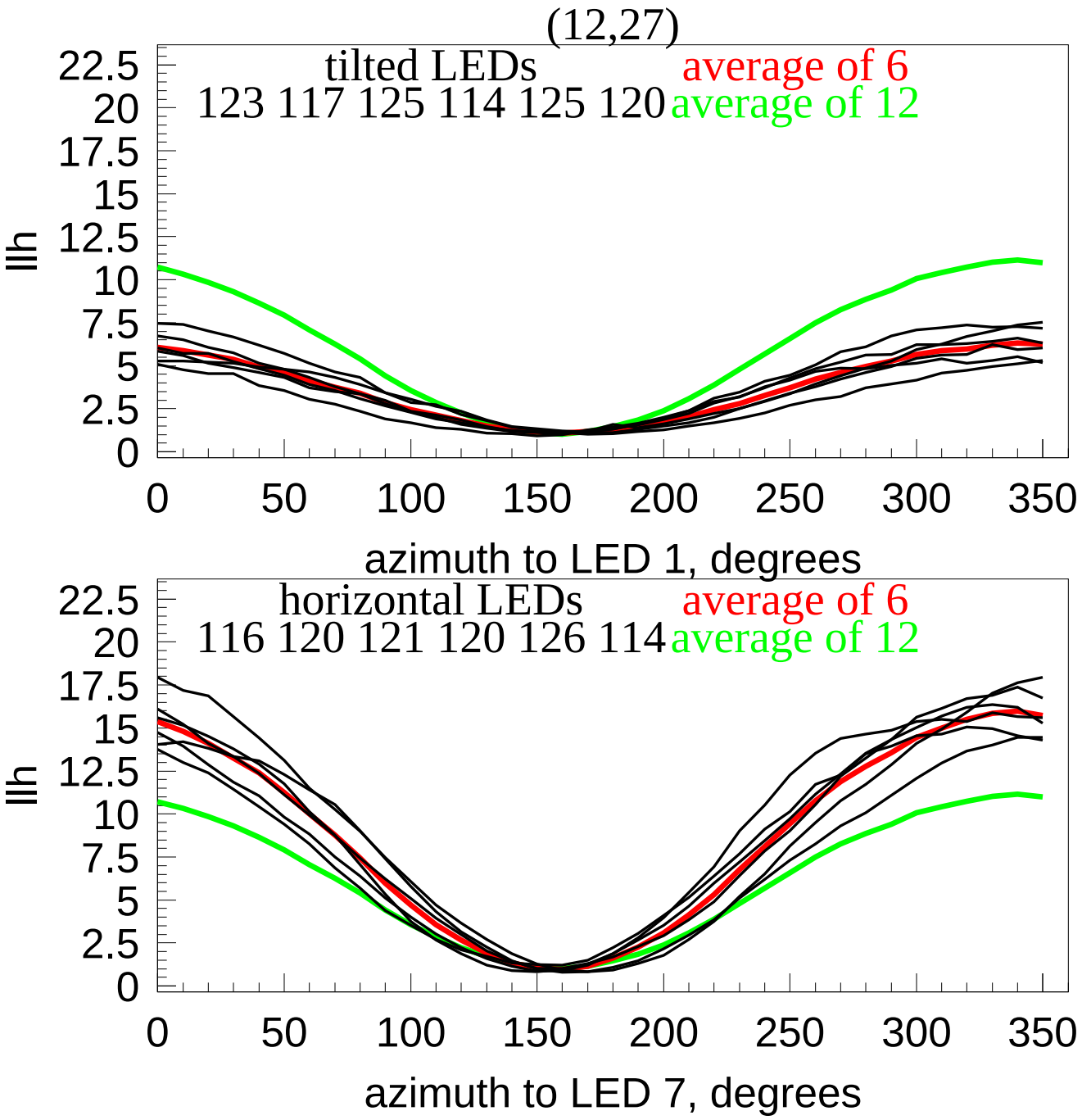

(12,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
117.3 ± 6.1

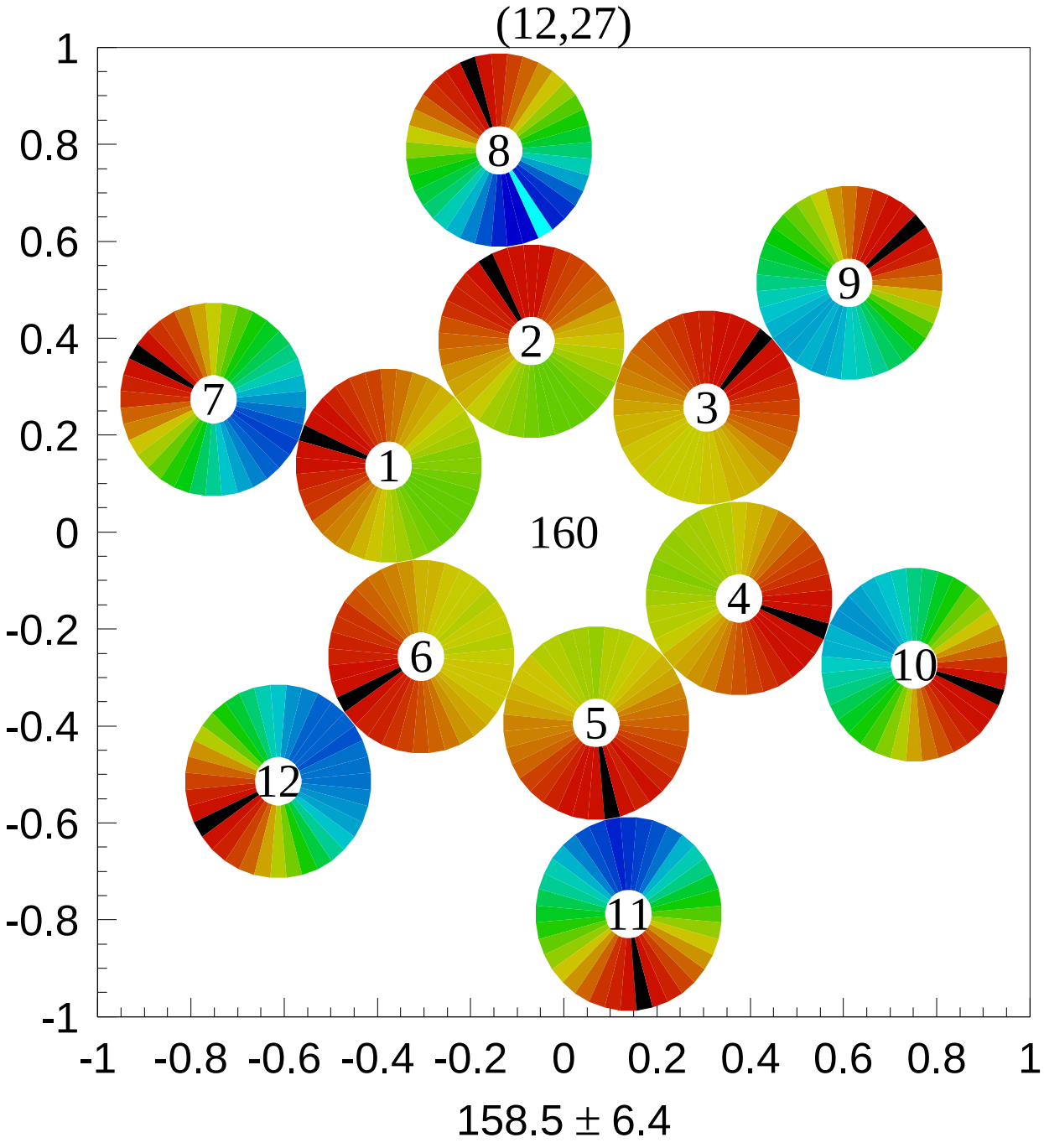

(12,25)
tilted LEDs
48 127 115 120 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 115 122 128 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

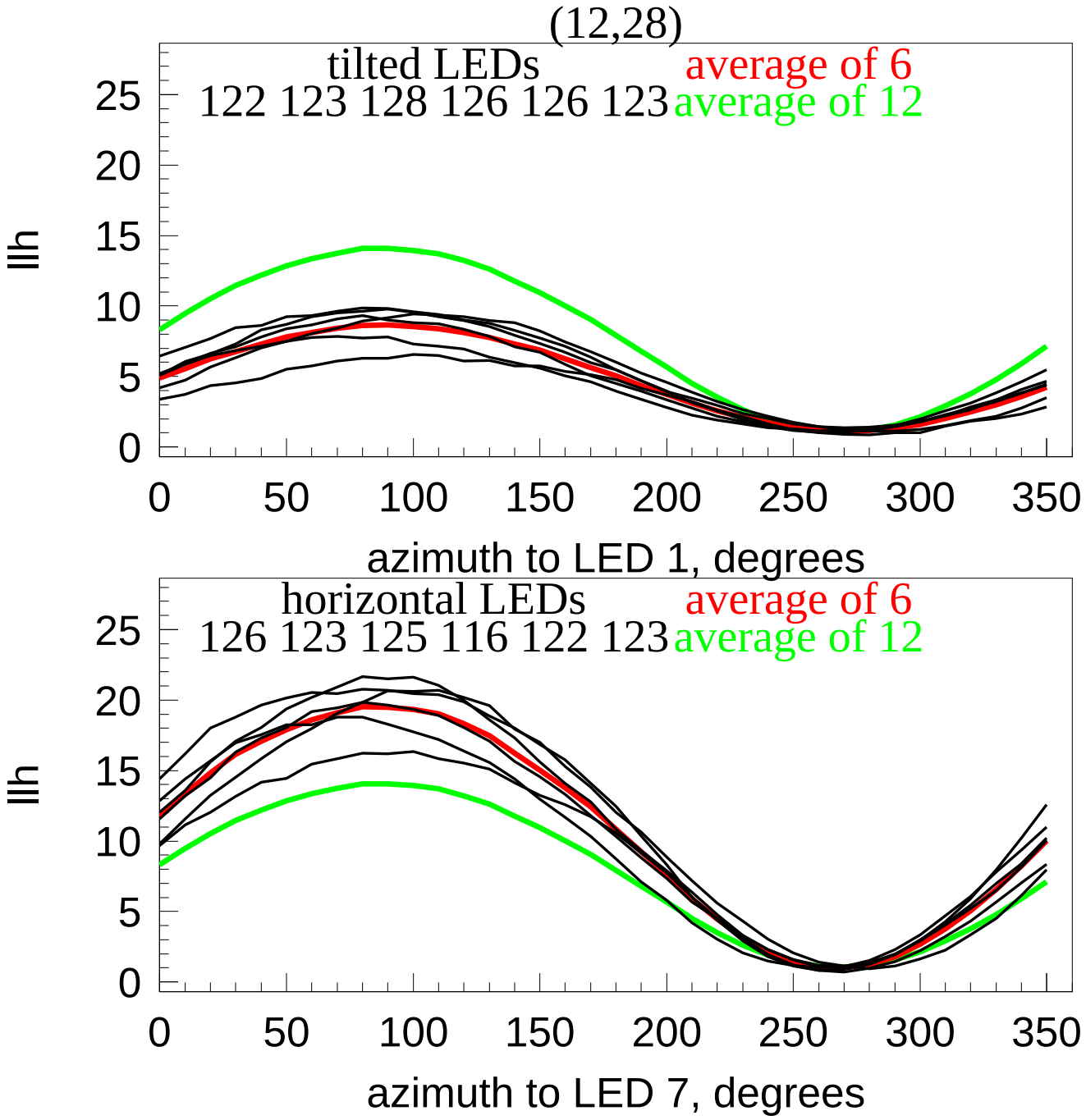

(12,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
272.3 ± 8.9

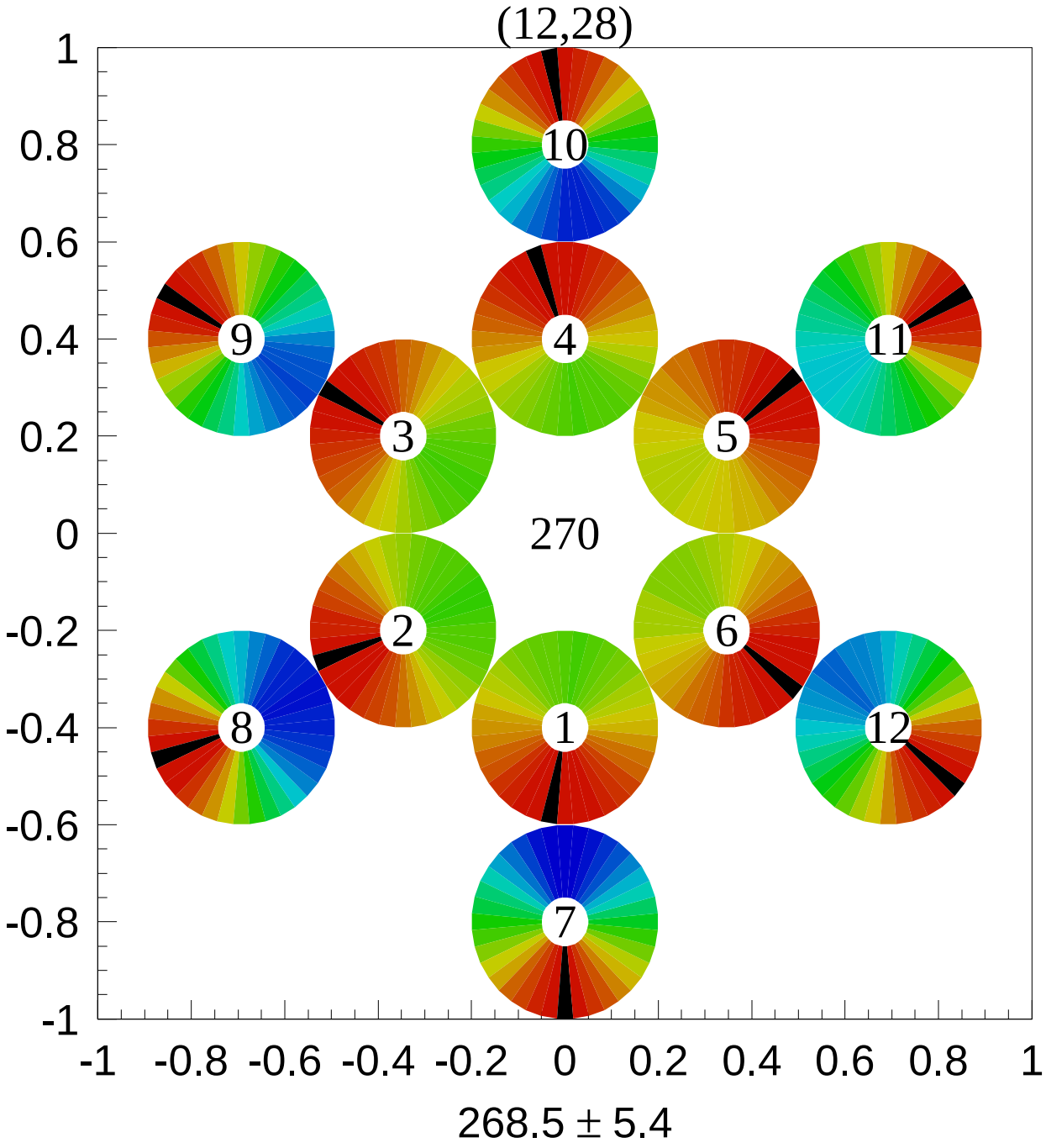

(12,26)
tilted LEDs
110 124 127 121 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 125 124 120 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

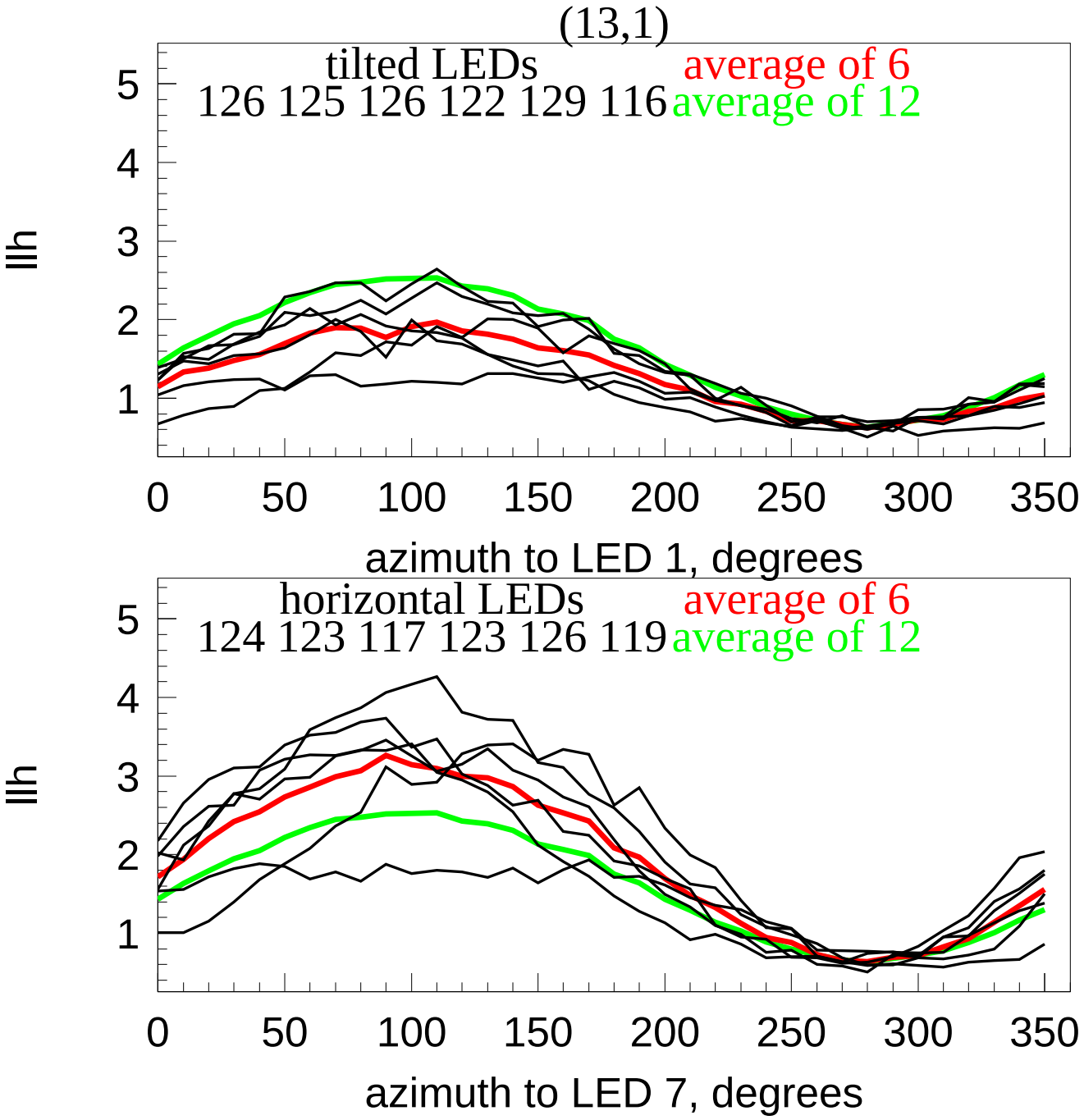

(12,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
60.1 ± 7.8

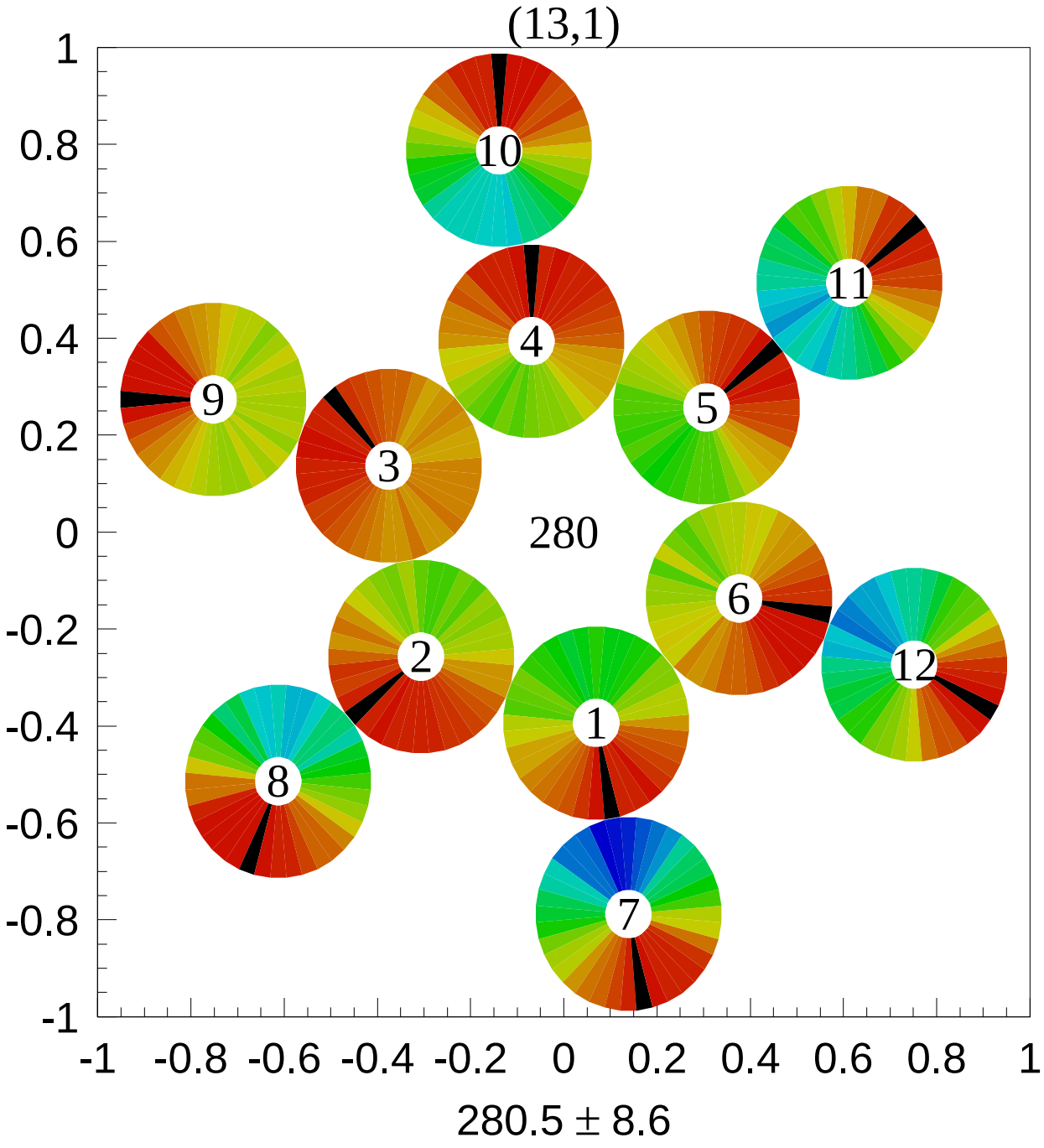

(12,27)
tilted LEDs
123 117 125 114 125 120
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 120 121 120 126 114
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

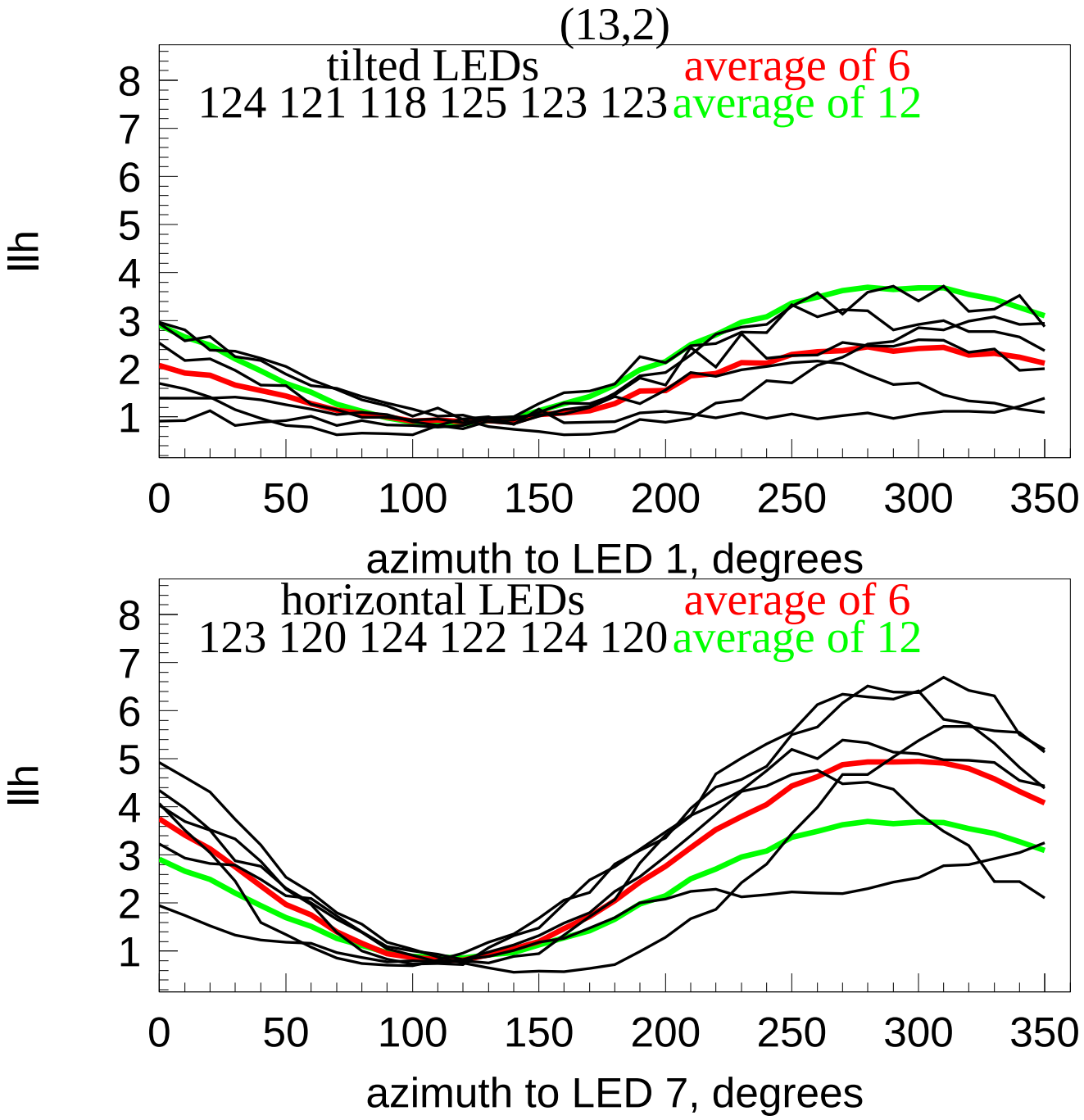

(12,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
2
9
7
3
1
160
4
6
10
5
12
11
158.5 ± 6.4

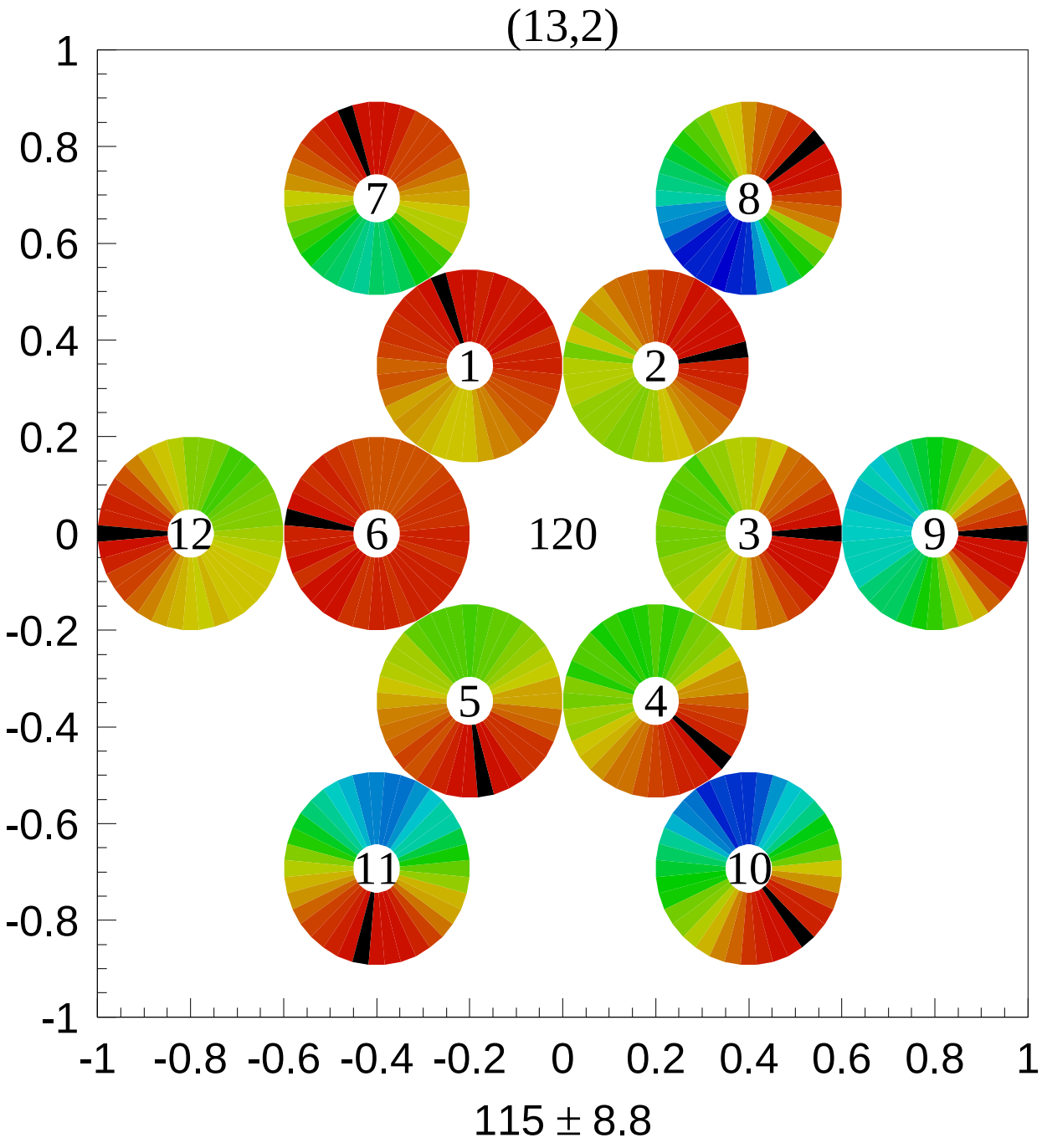

(12,28)
tilted LEDs
122 123 128 126 126 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 123 125 116 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

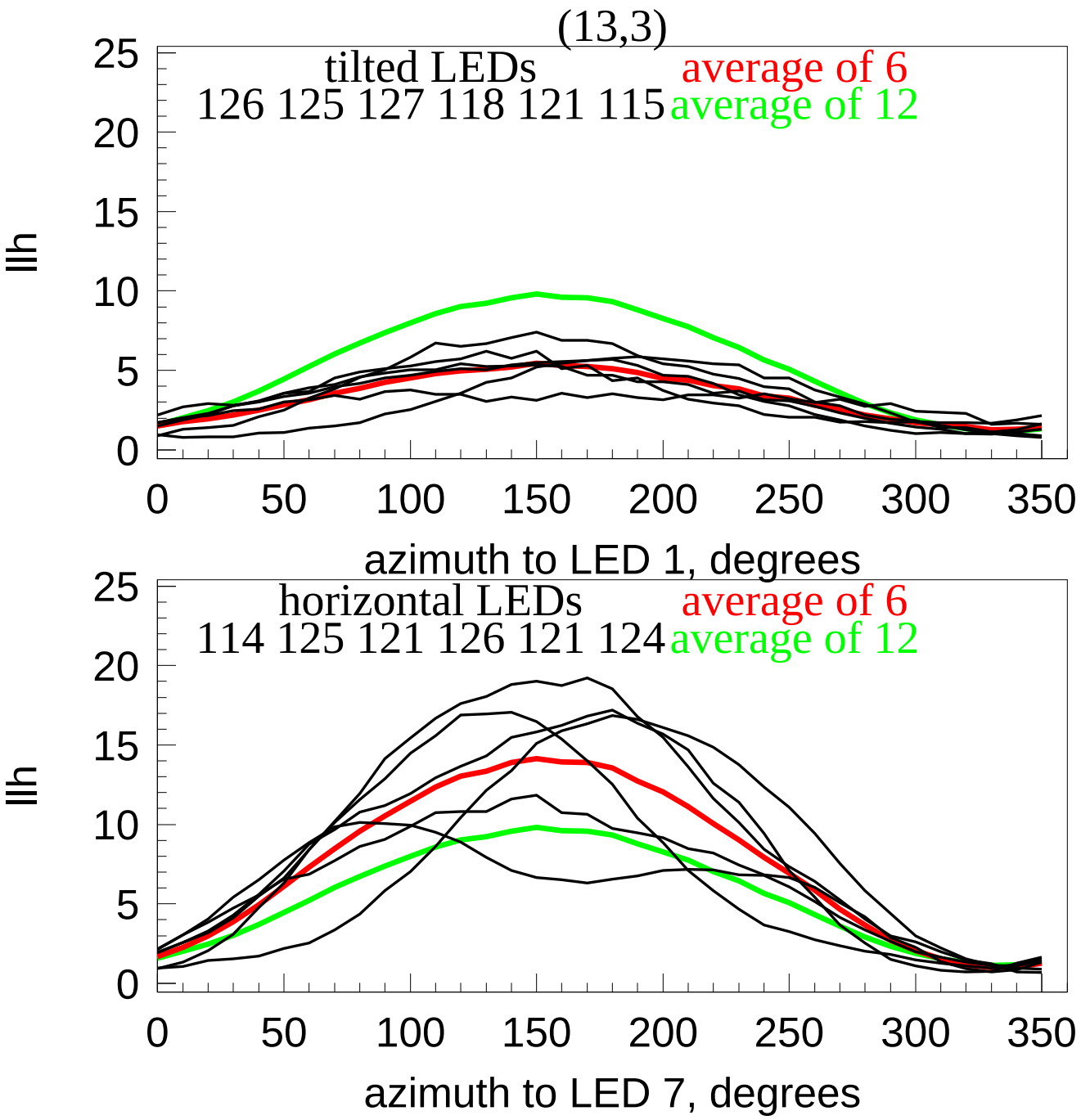

(12,28)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
268.5 ± 5.4

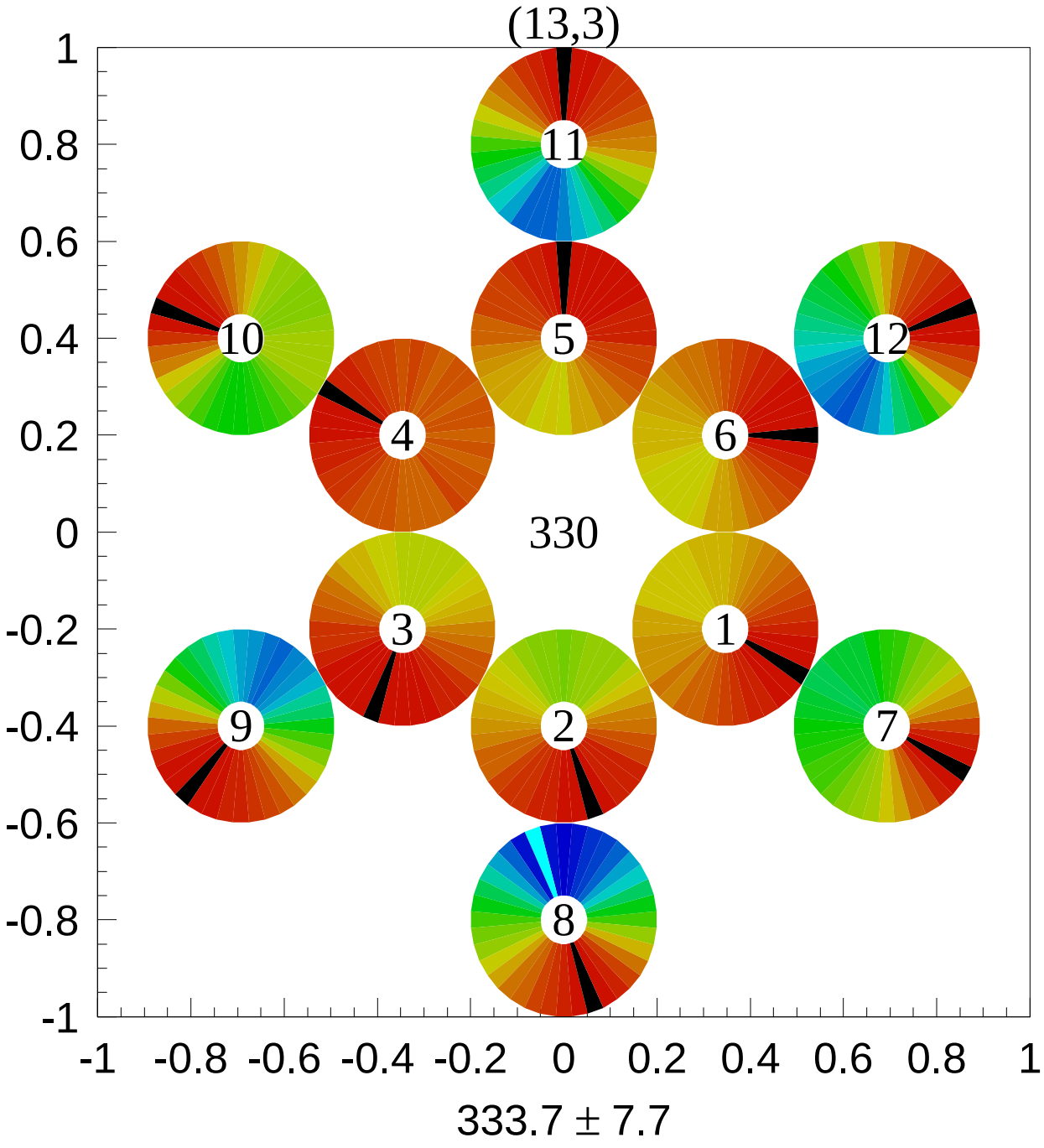

(13,1)
tilted LEDs
126 125 126 122 129 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 117 123 126 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

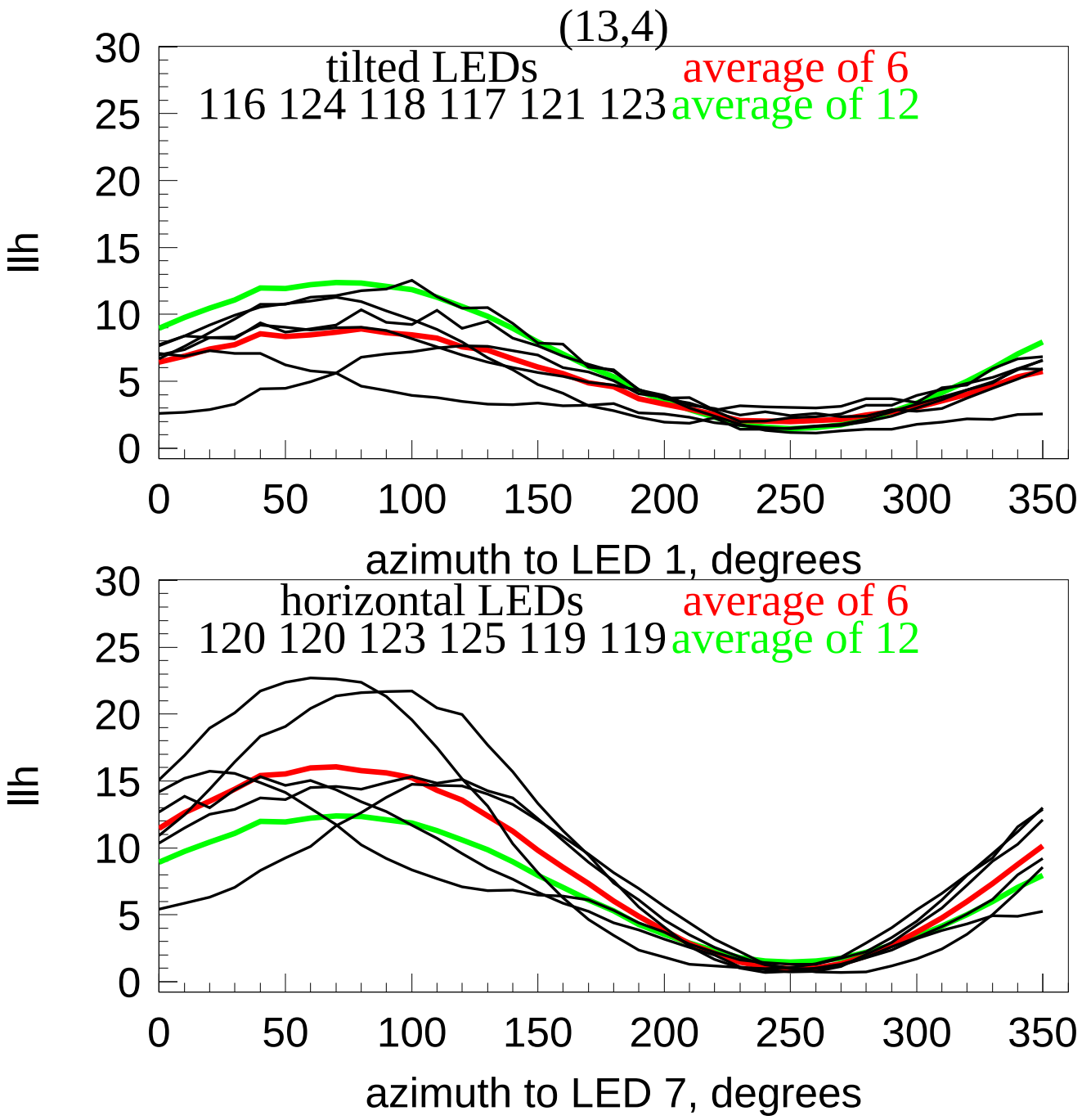

(13,1)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
280.5 ± 8.6

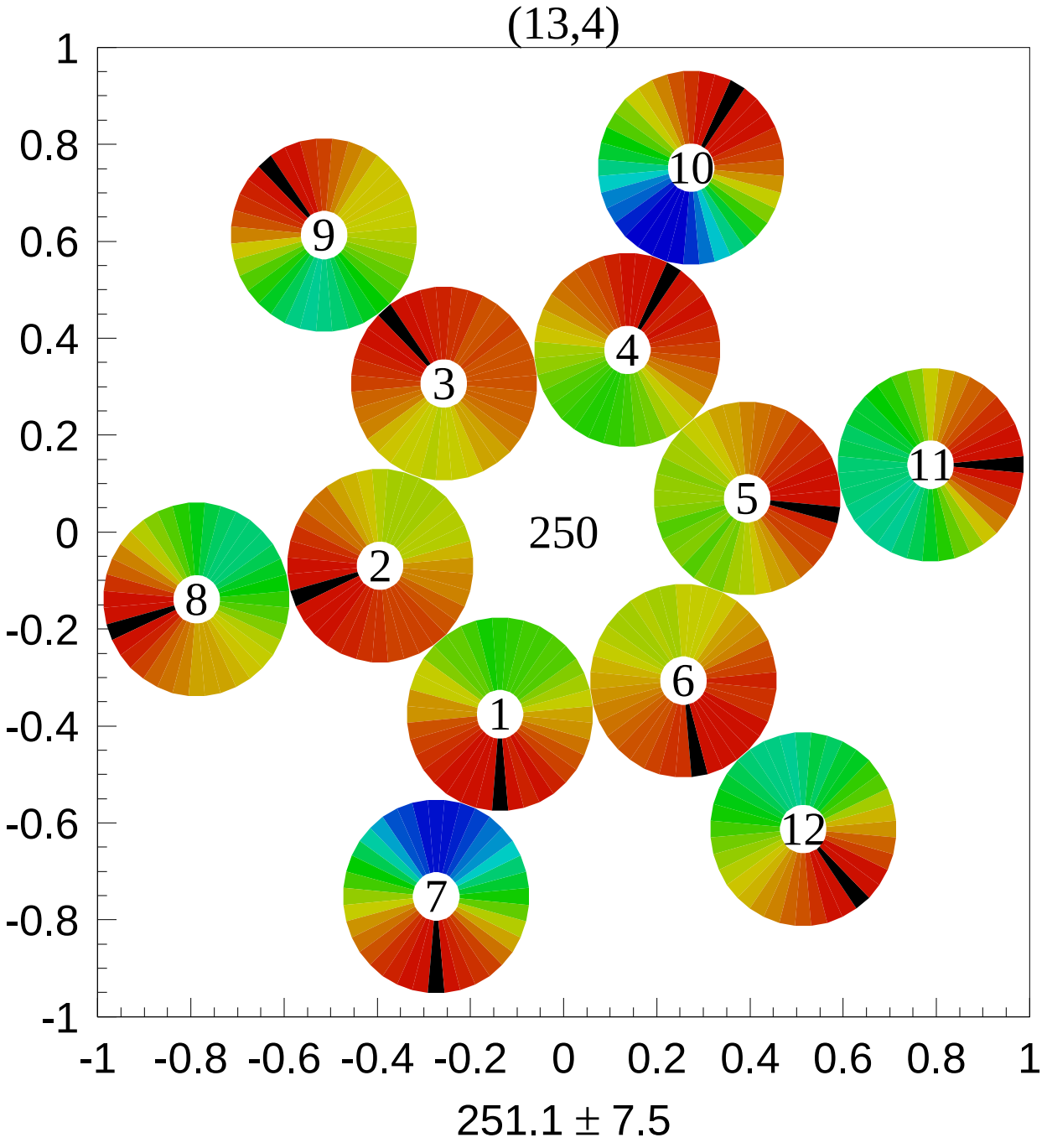

(13,2)
tilted LEDs
124 121 118 125 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 124 122 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

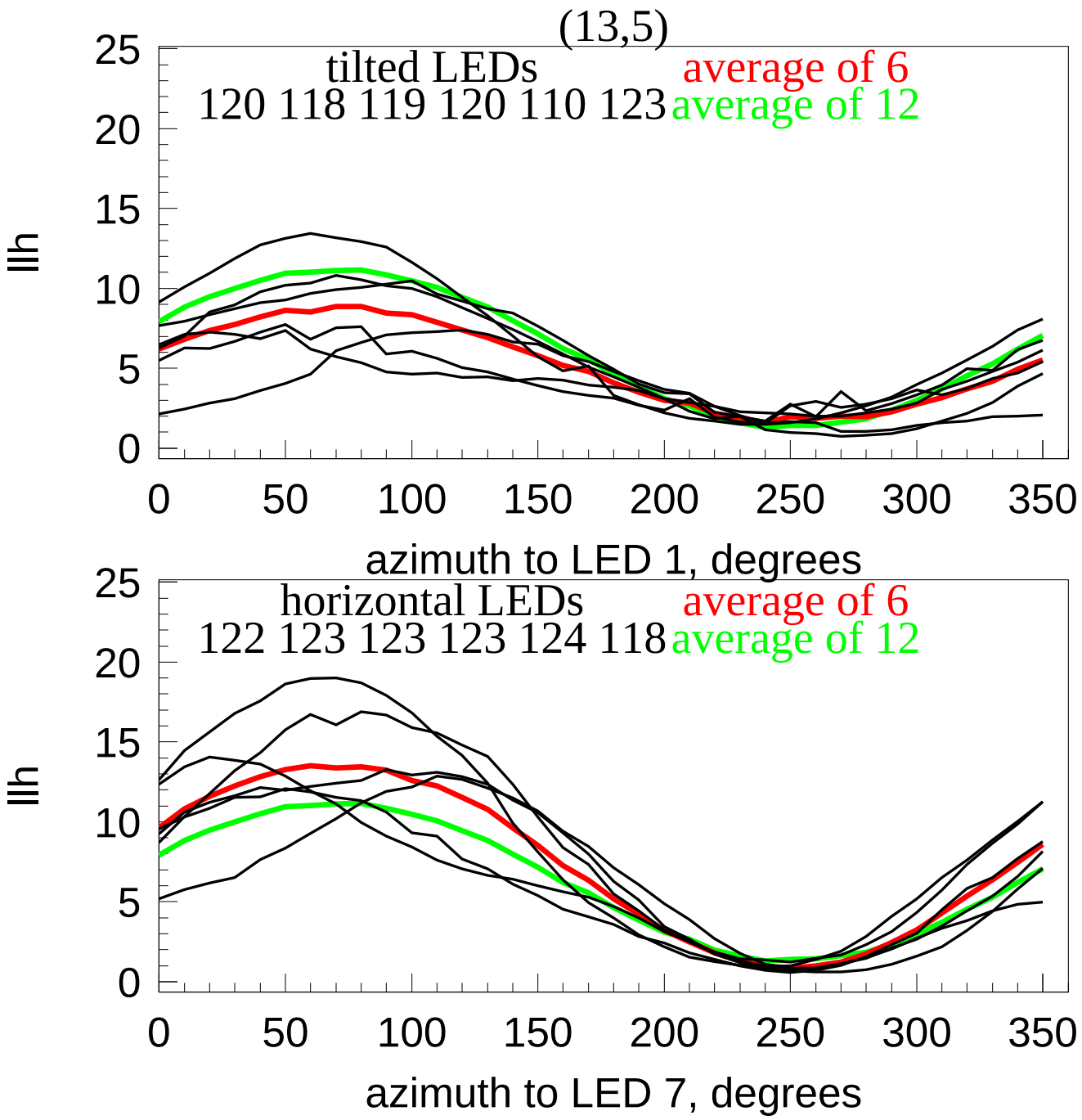

(13,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
115 ± 8.8

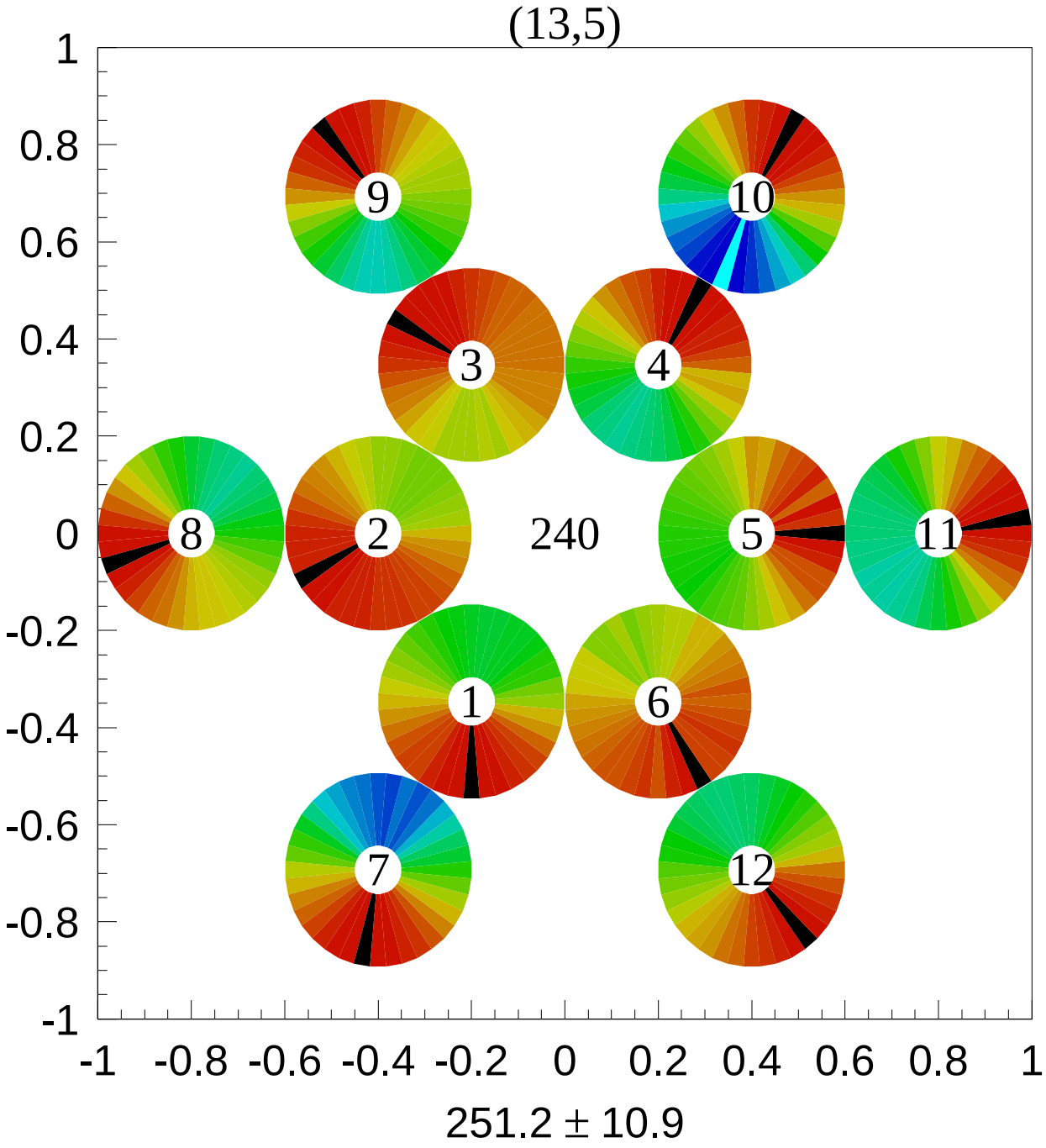

(13,3)
tilted LEDs
126 125 127 118 121 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 125 121 126 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

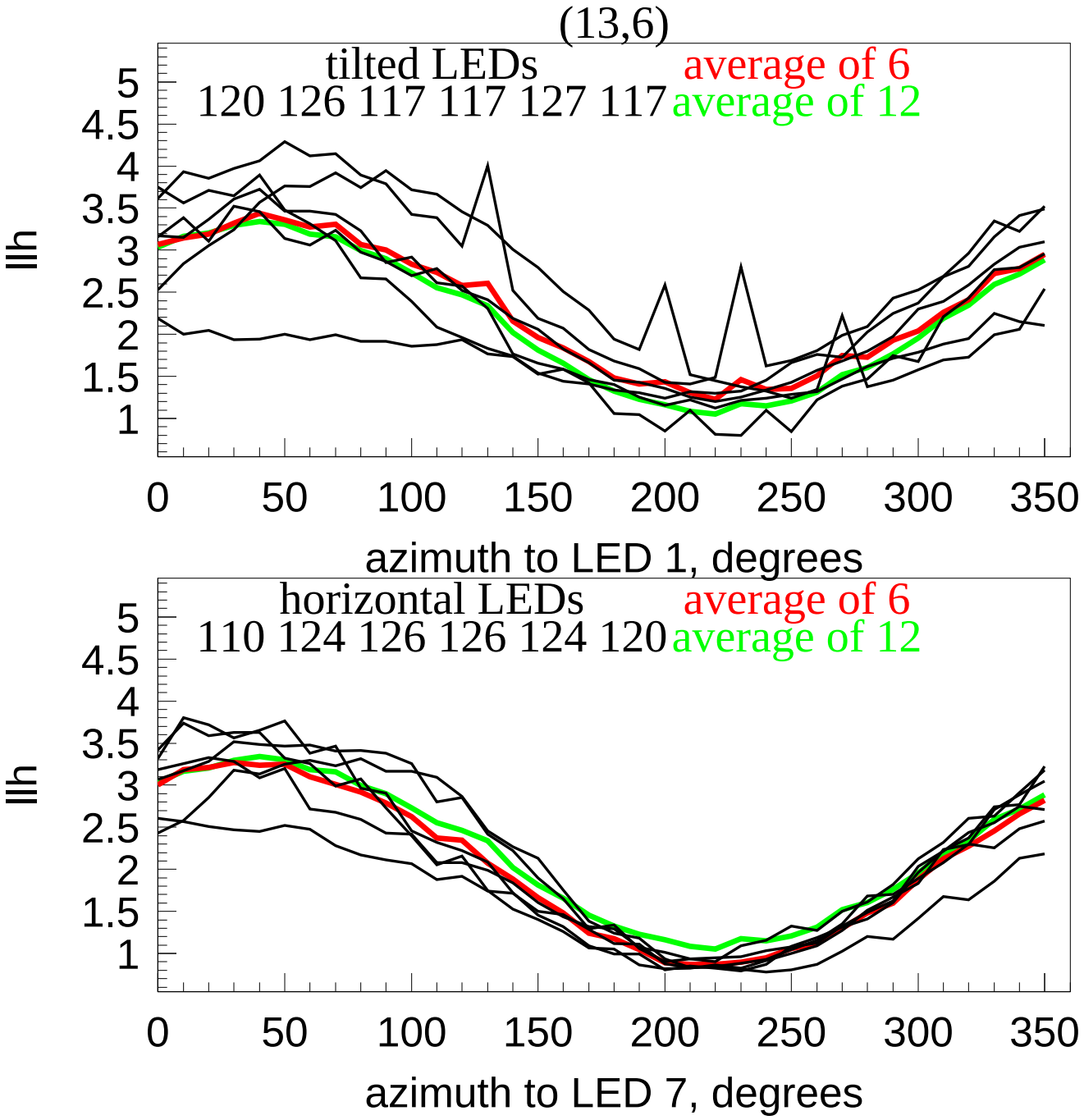

(13,3)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
333.7 ± 7.7

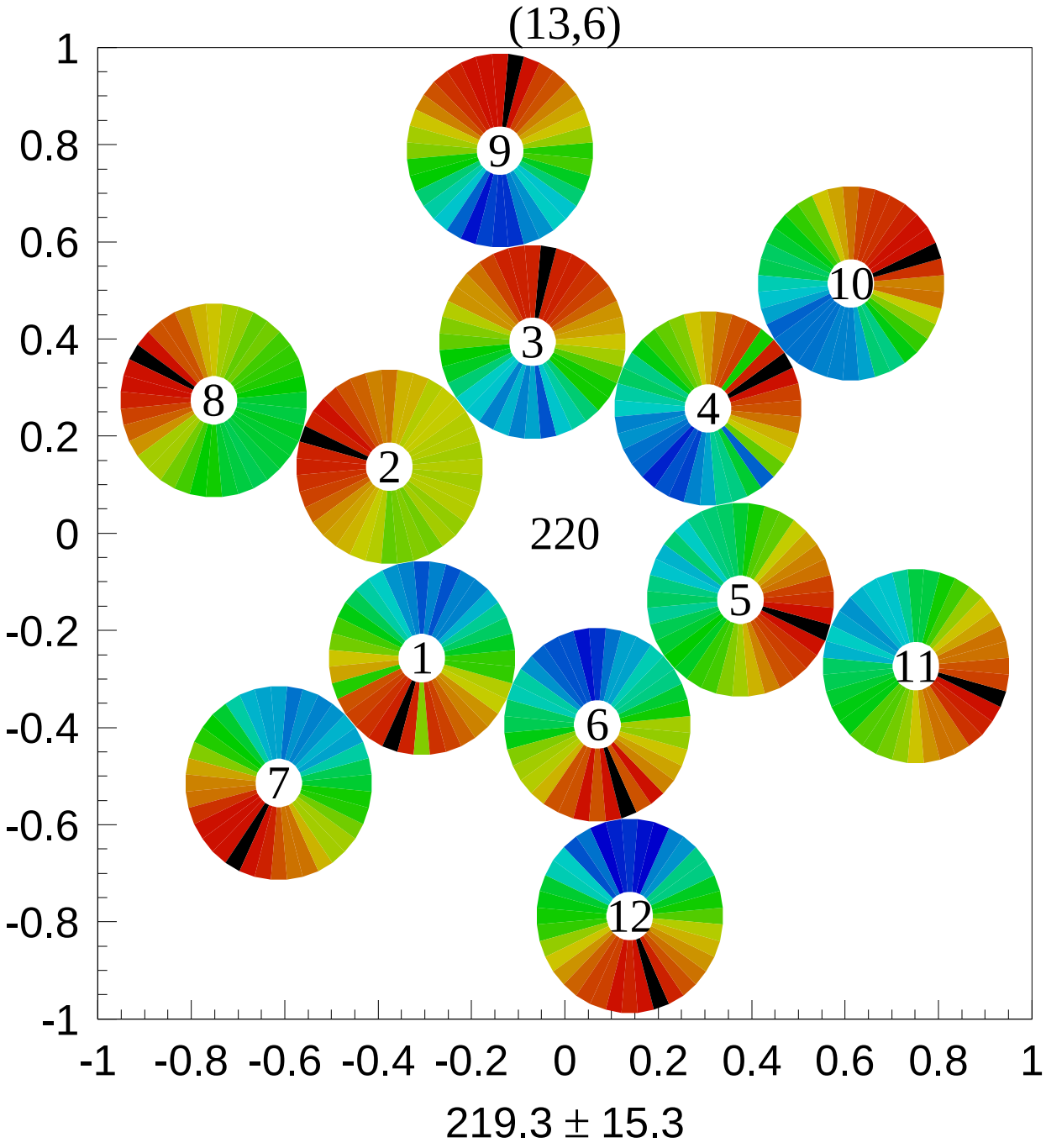

(13,4)
tilted LEDs
116 124 118 117 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 123 125 119 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

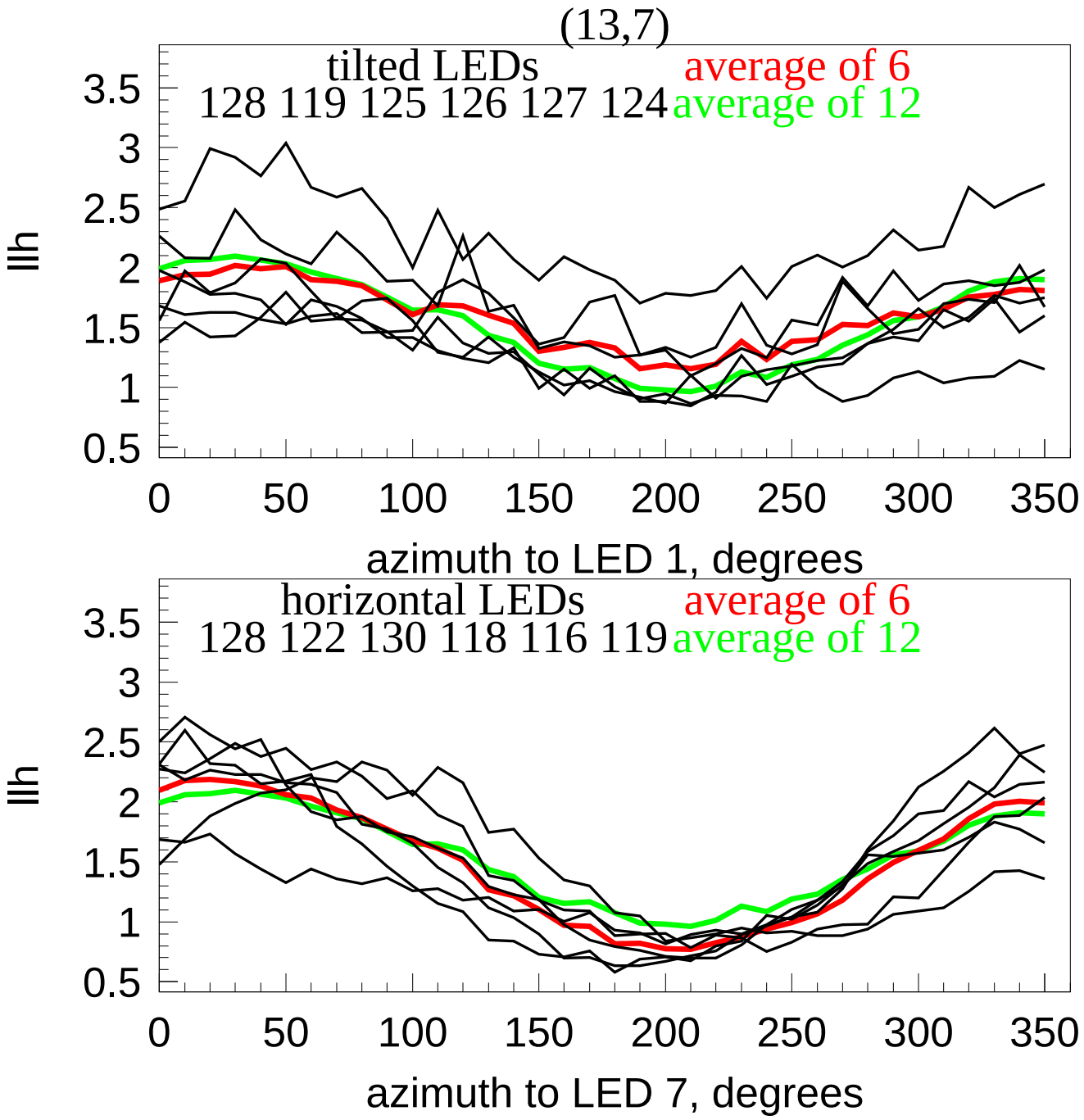

(13,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
251.1 ± 7.5

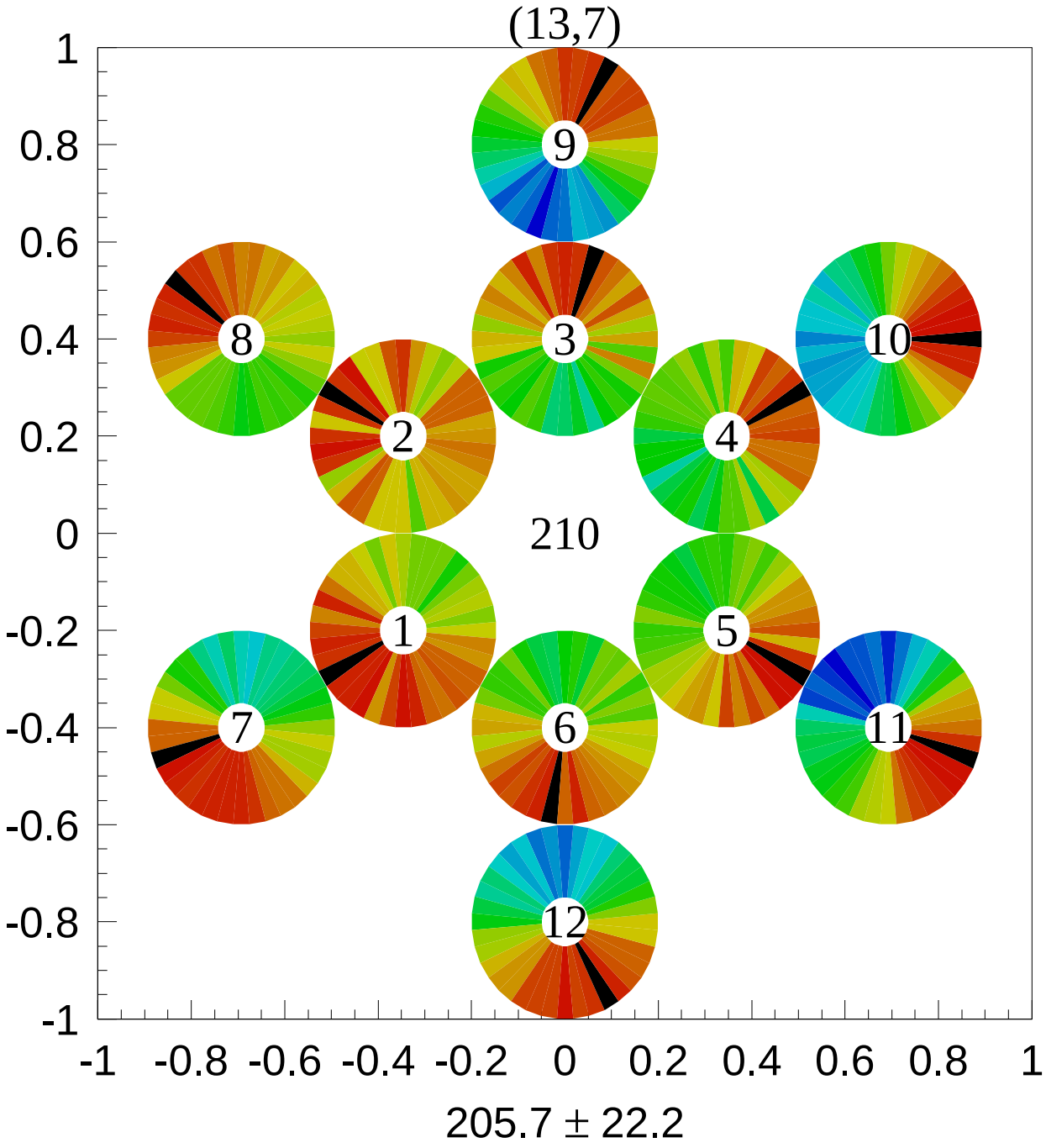

(13,5)
tilted LEDs
120 118 119 120 110 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 123 123 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

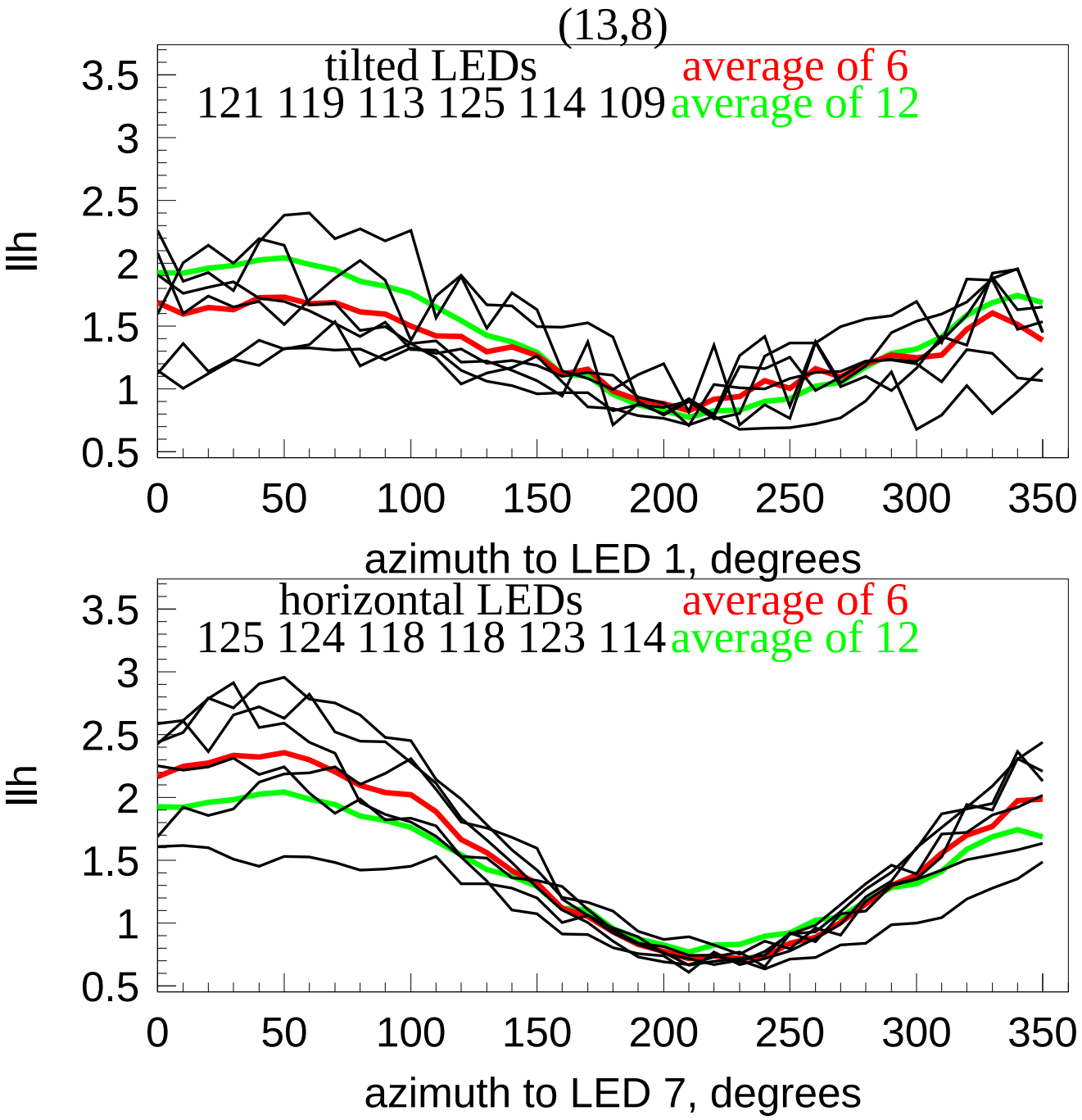

(13,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
251.2 ± 10.9

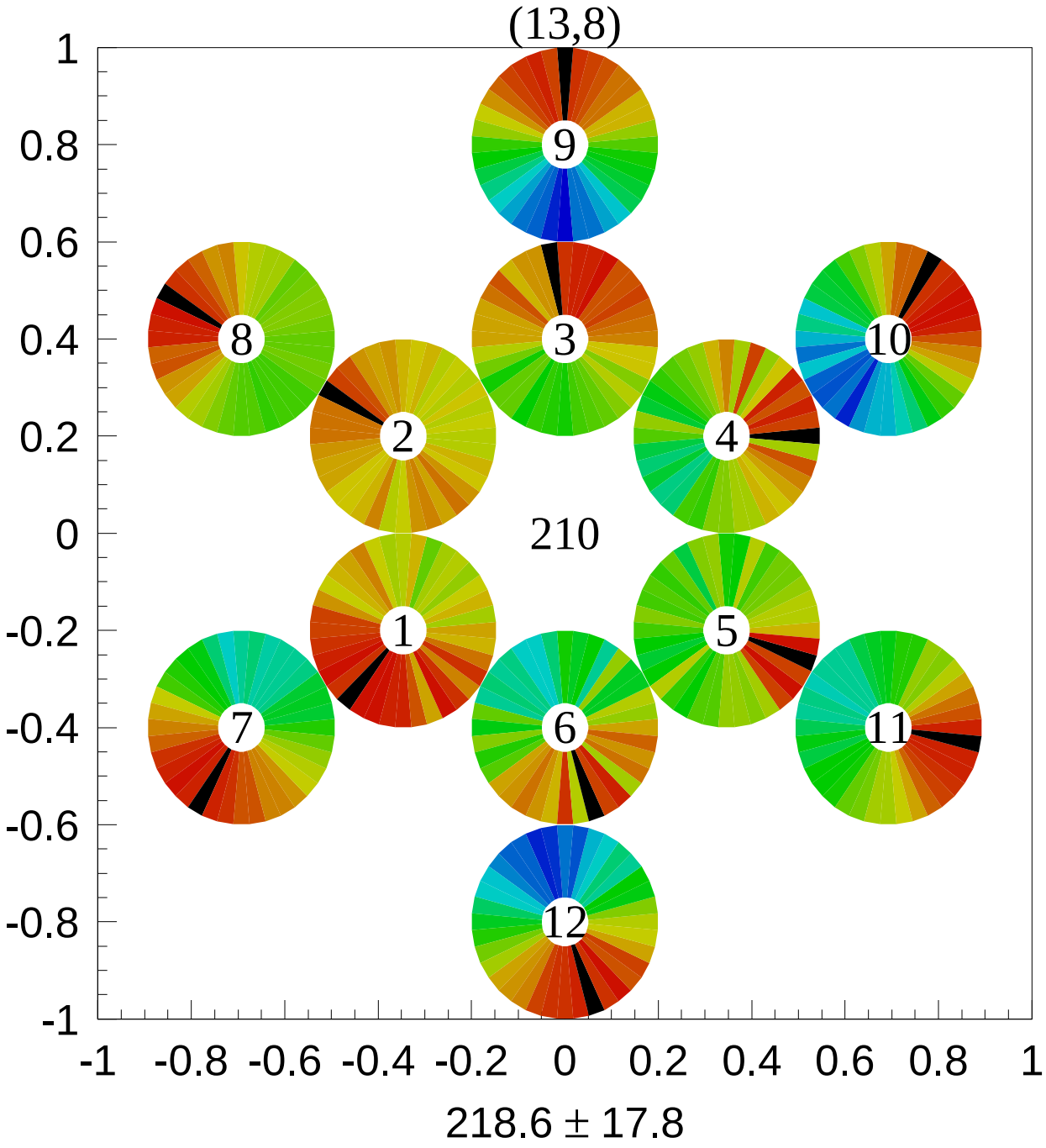

(13,6)
tilted LEDs
120 126 117 117 127 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
110 124 126 126 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

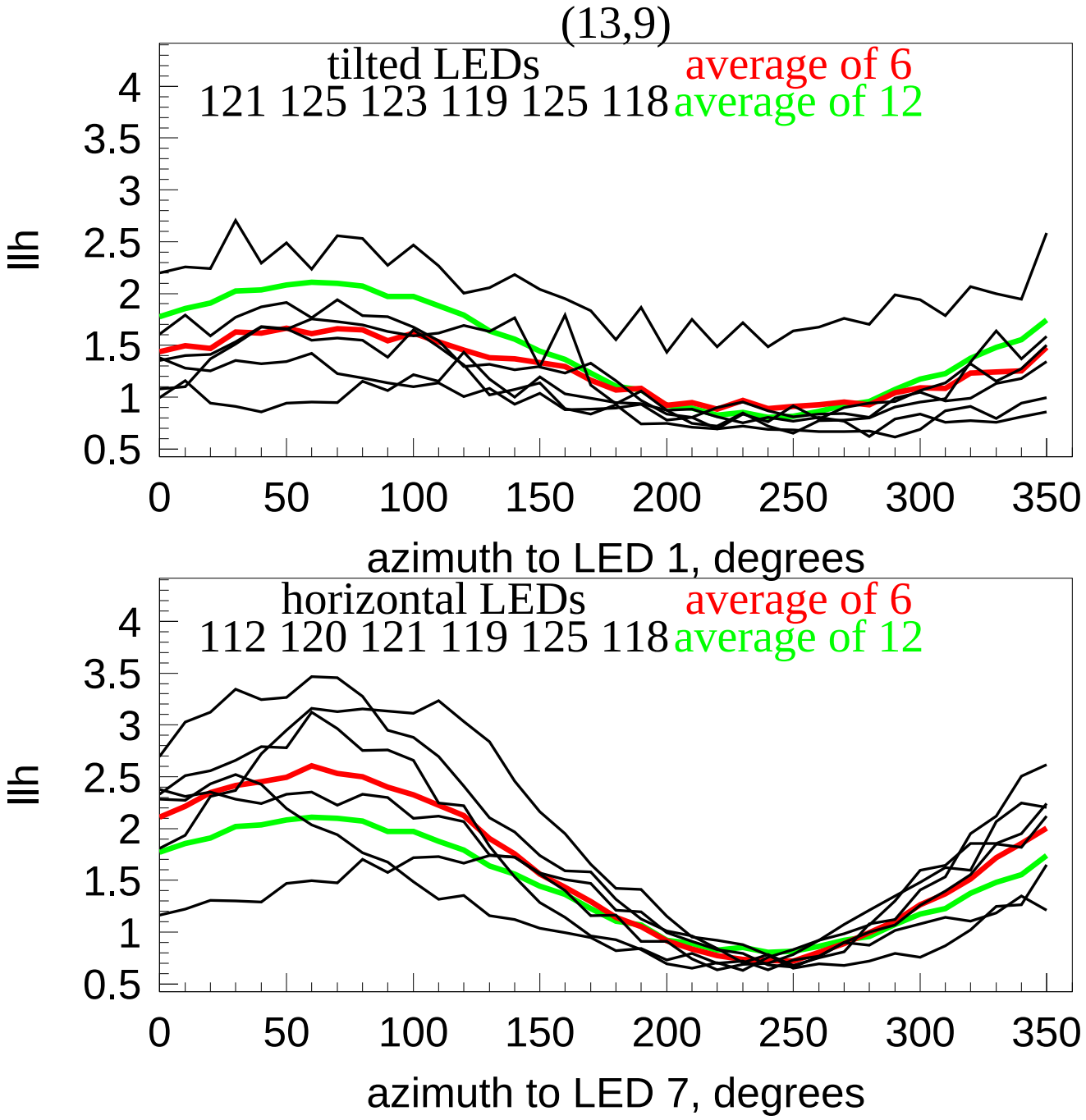

(13,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
219.3 ± 15.3

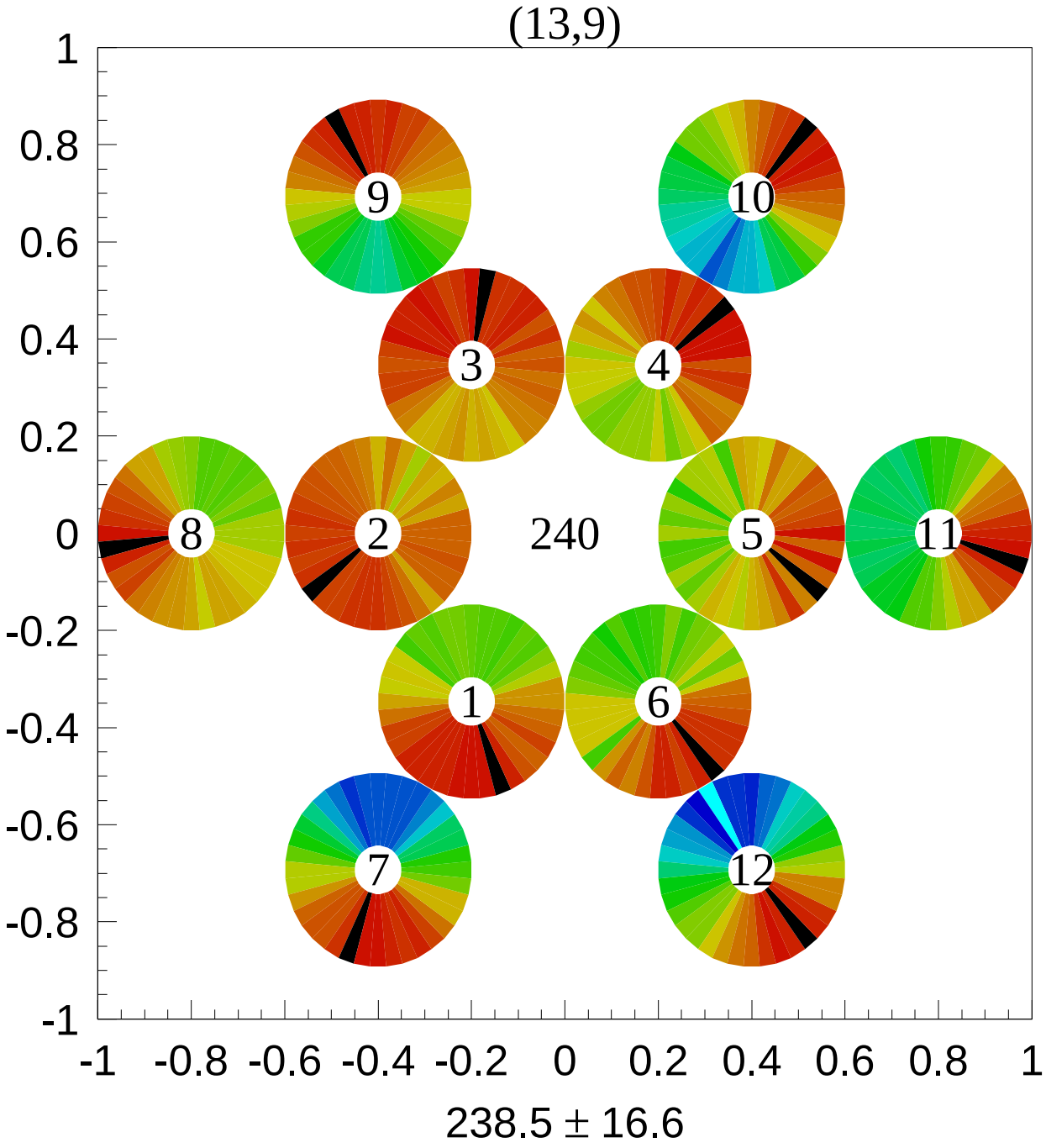

(13,7)
tilted LEDs
128 119 125 126 127 124
average of 6
average of 12
IIh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 122 130 118 116 119
average of 6
average of 12
IIh
azimuth to LED 7, degrees

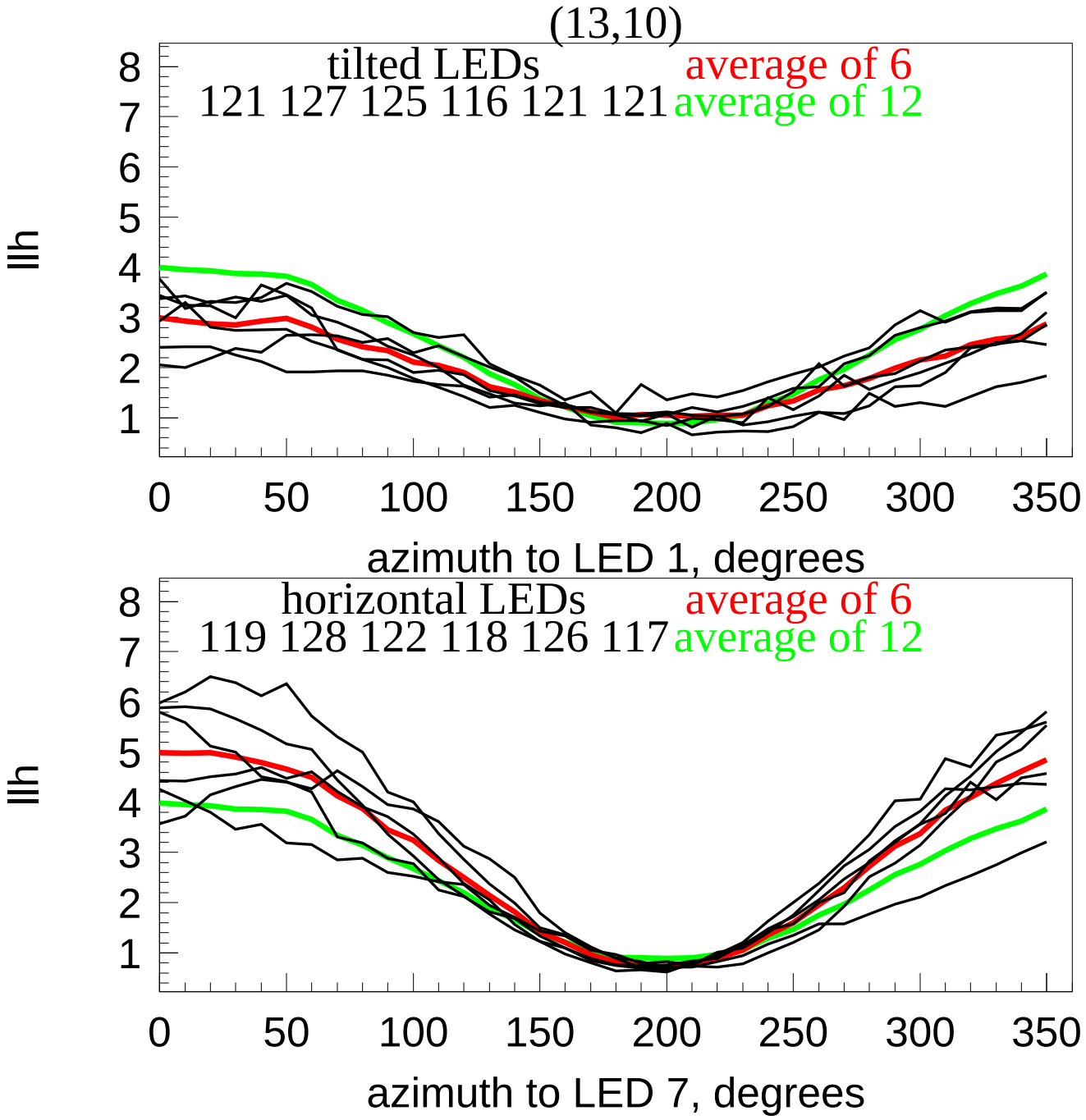

(13,7)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
205.7 ± 22.2

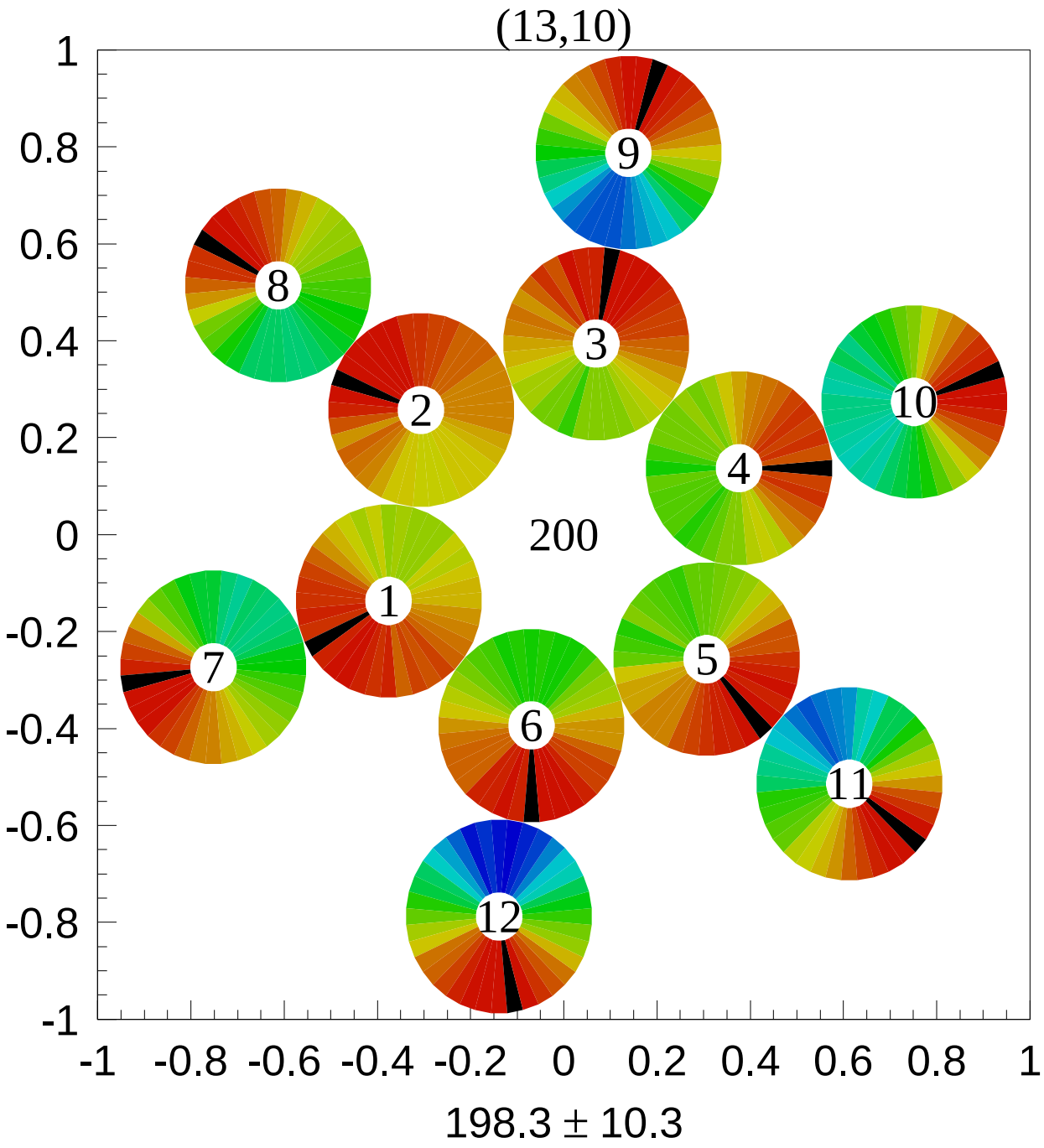

(13,8)
tilted LEDs
121 119 113 125 114 109
average of 6
average of 12
IIh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 124 118 118 123 114
average of 6
average of 12
IIh
azimuth to LED 7, degrees

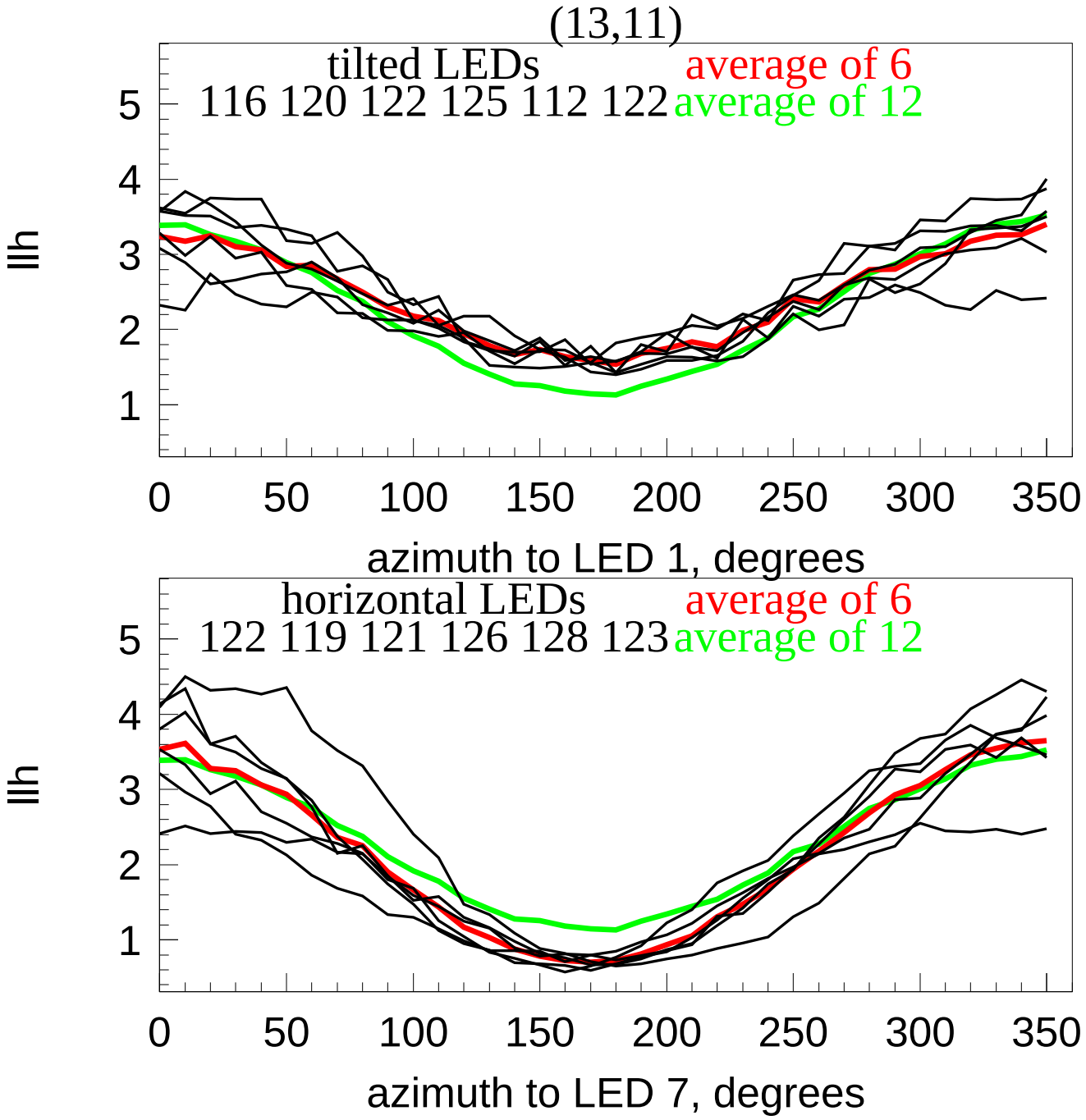

(13,8)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
218.6 ± 17.8

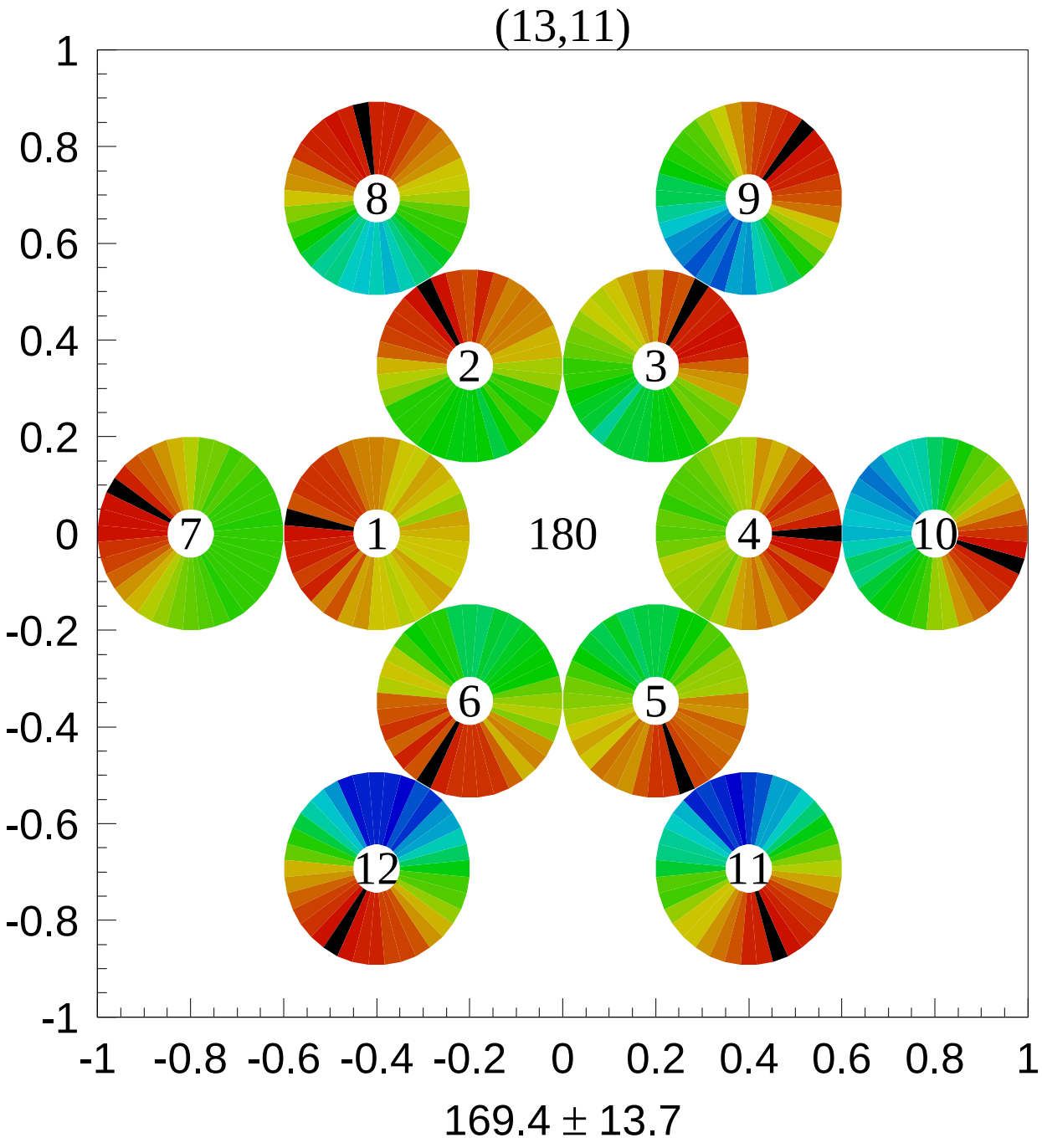

(13,9)
tilted LEDs
121 125 123 119 125 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
112 120 121 119 125 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

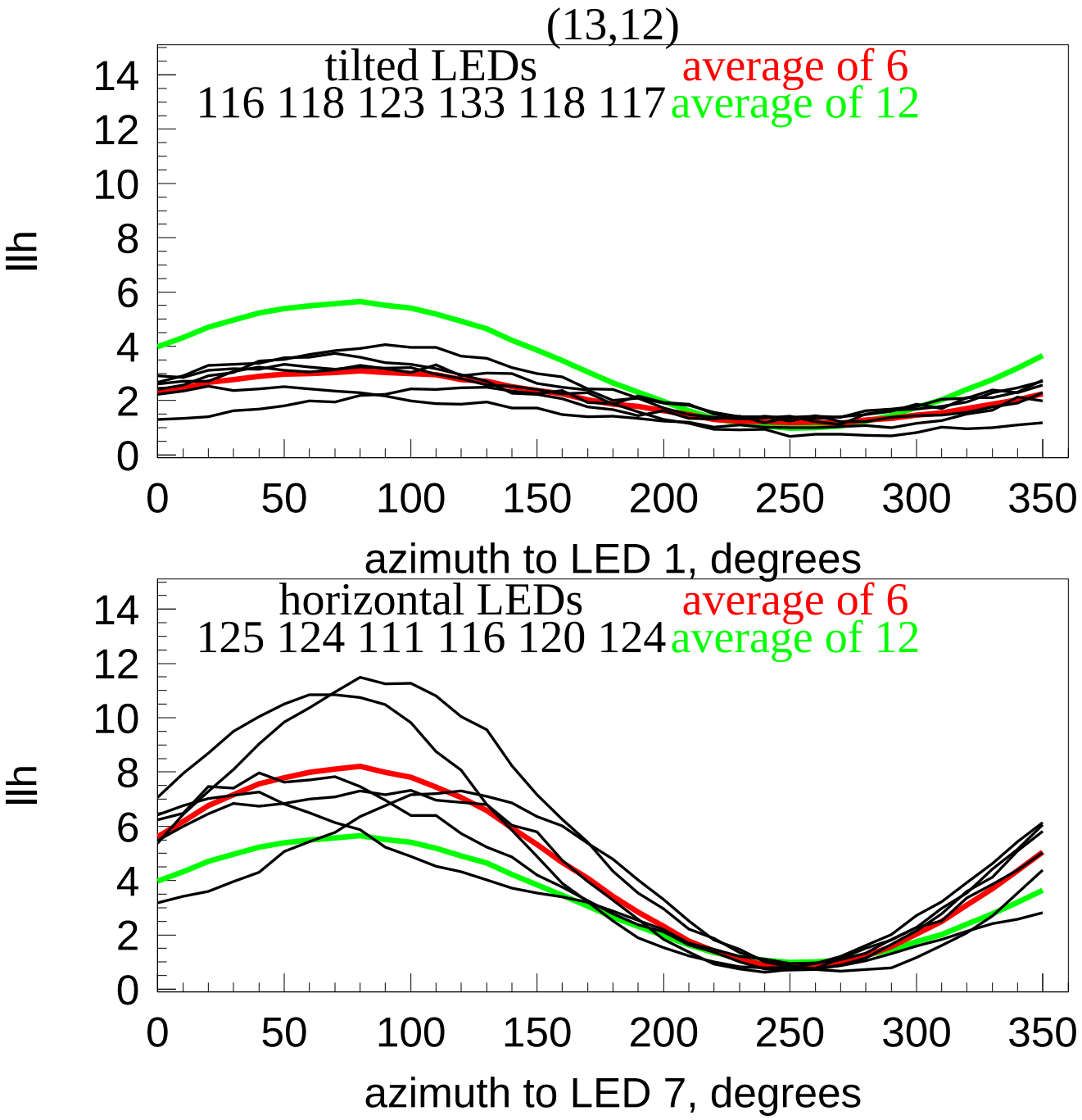

(13,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
238.5 ± 16.6

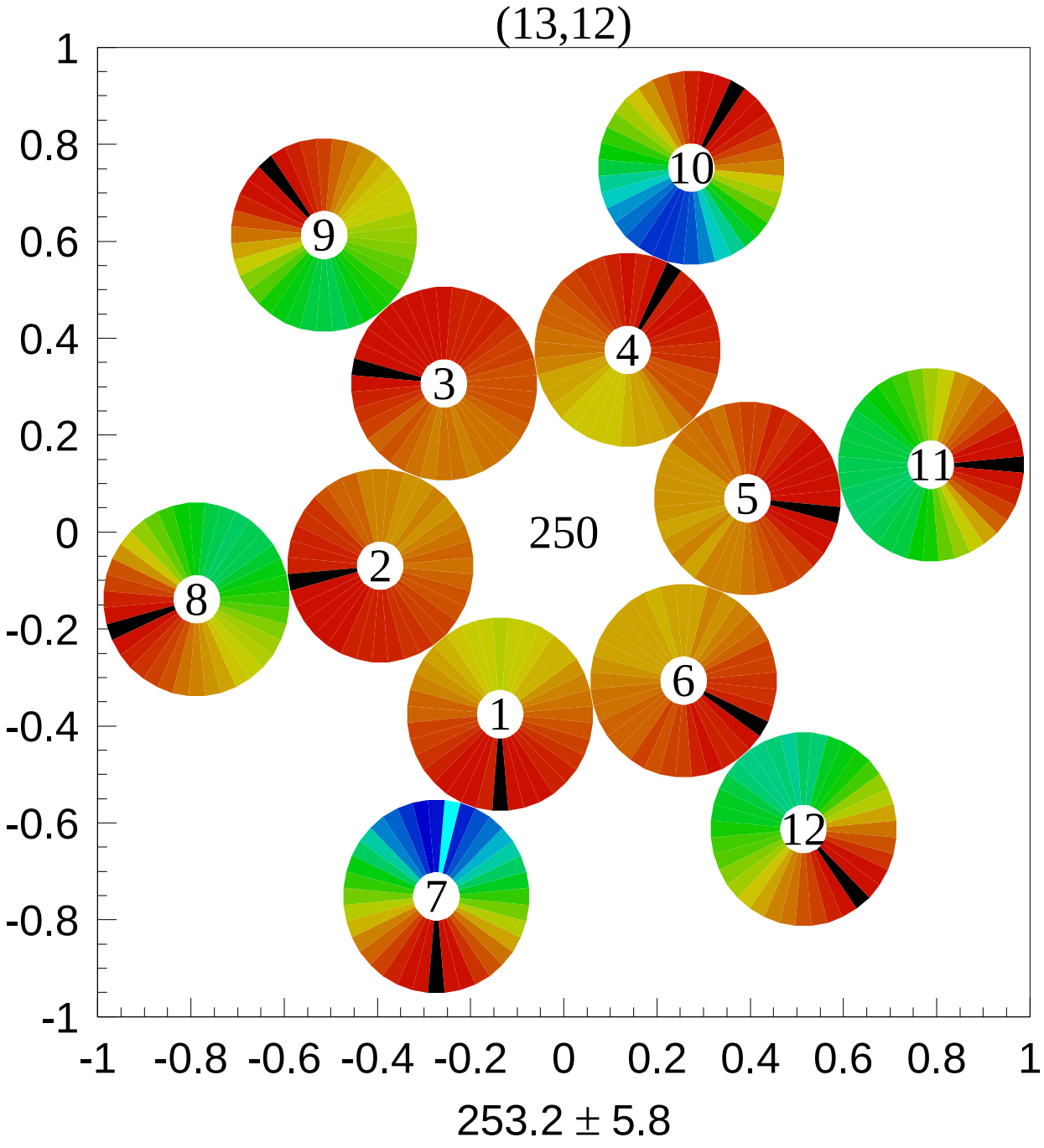

(13,10)
tilted LEDs
121 127 125 116 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 128 122 118 126 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

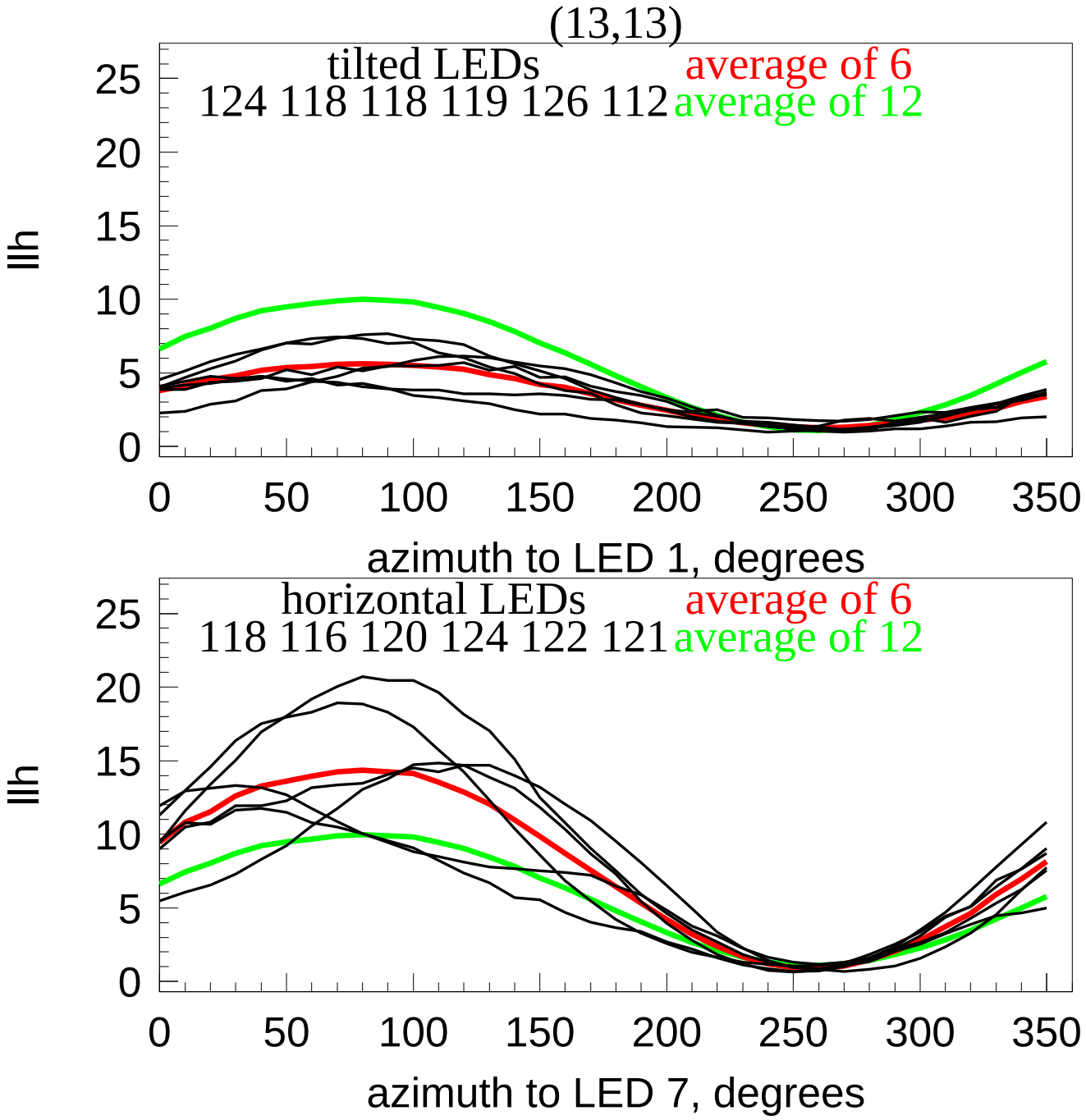

(13,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
198.3 ± 10.3

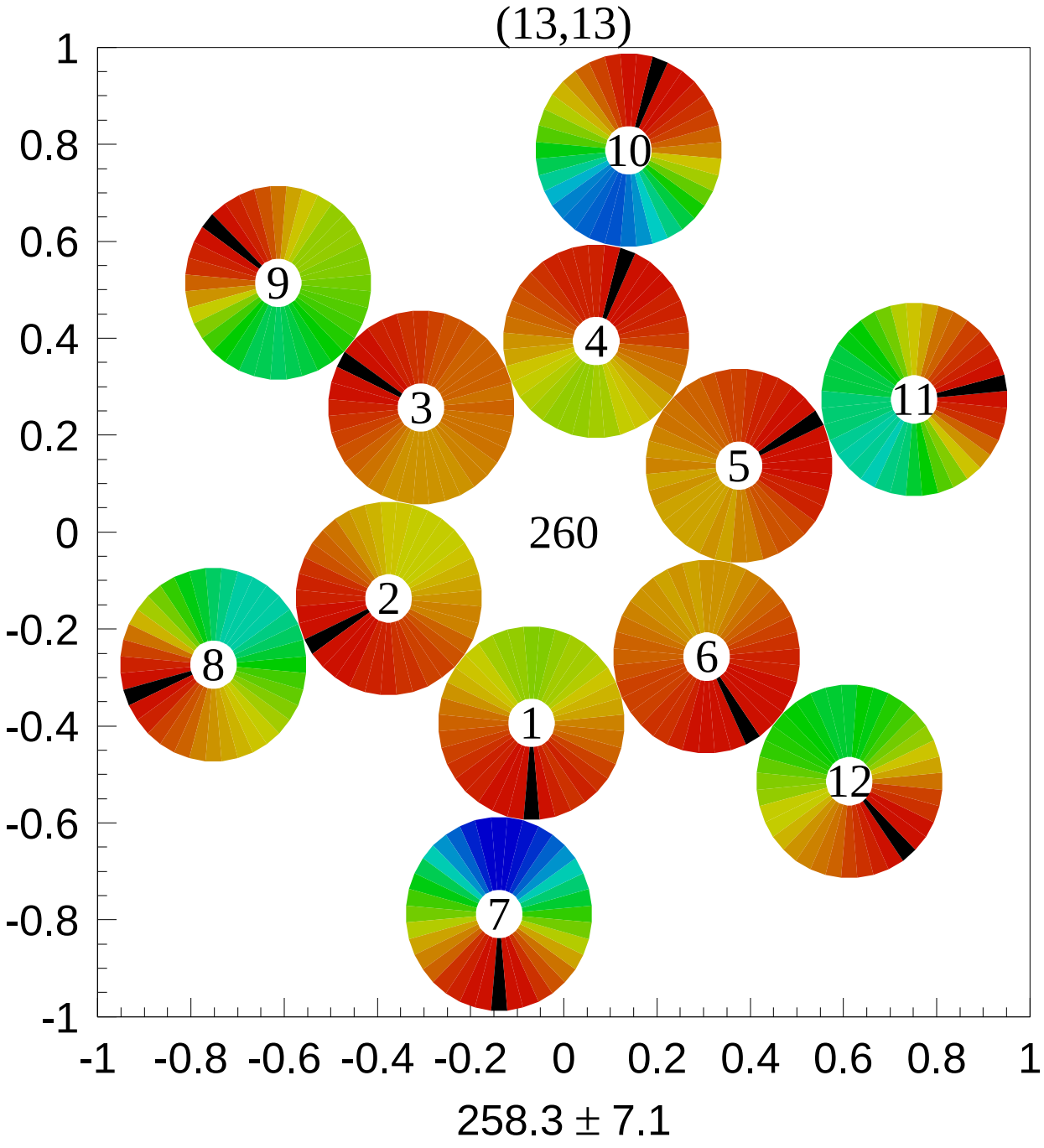

(13,11)
tilted LEDs
116 120 122 125 112 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 121 126 128 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

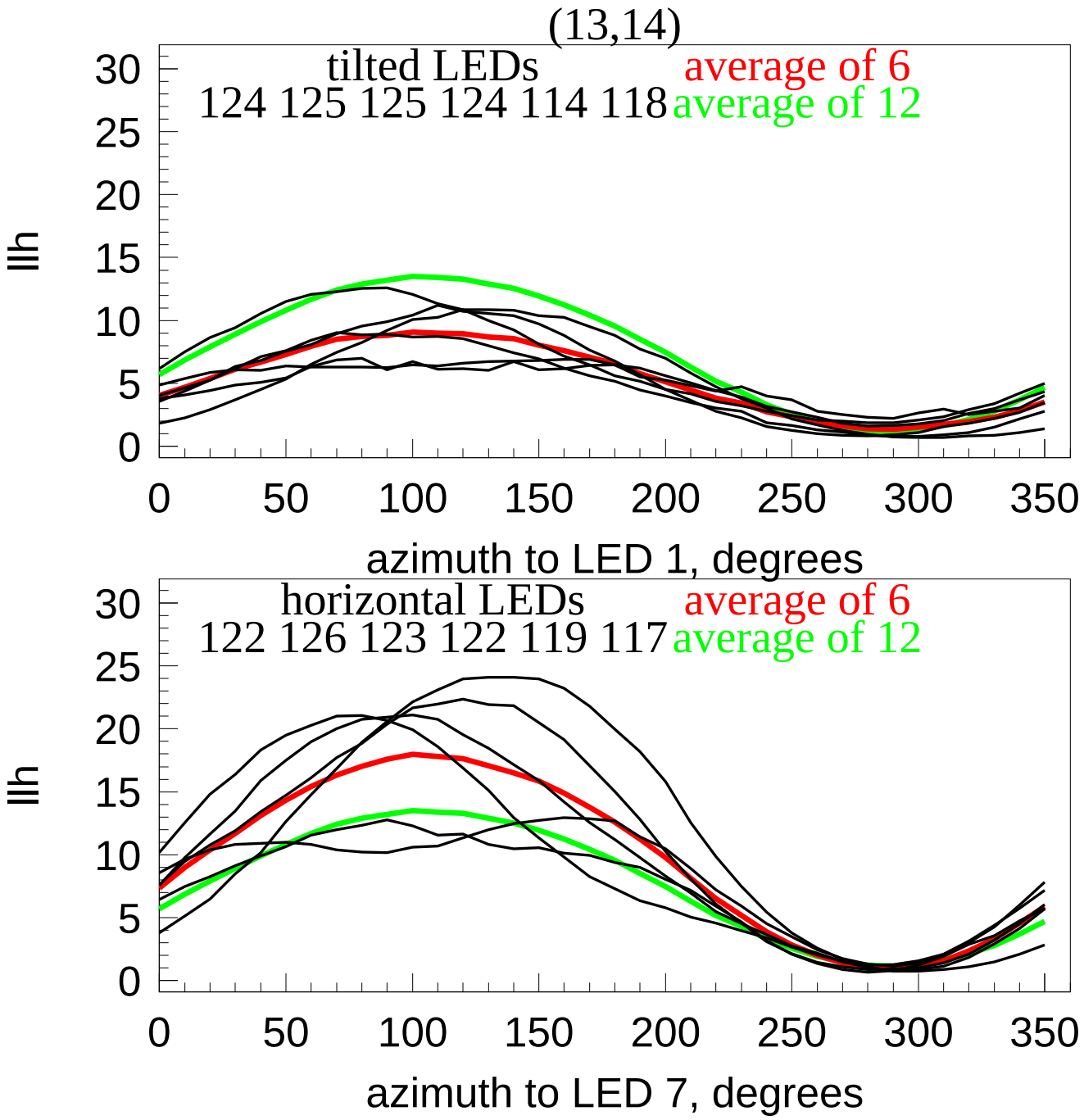

(13,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
169.4 ± 13.7

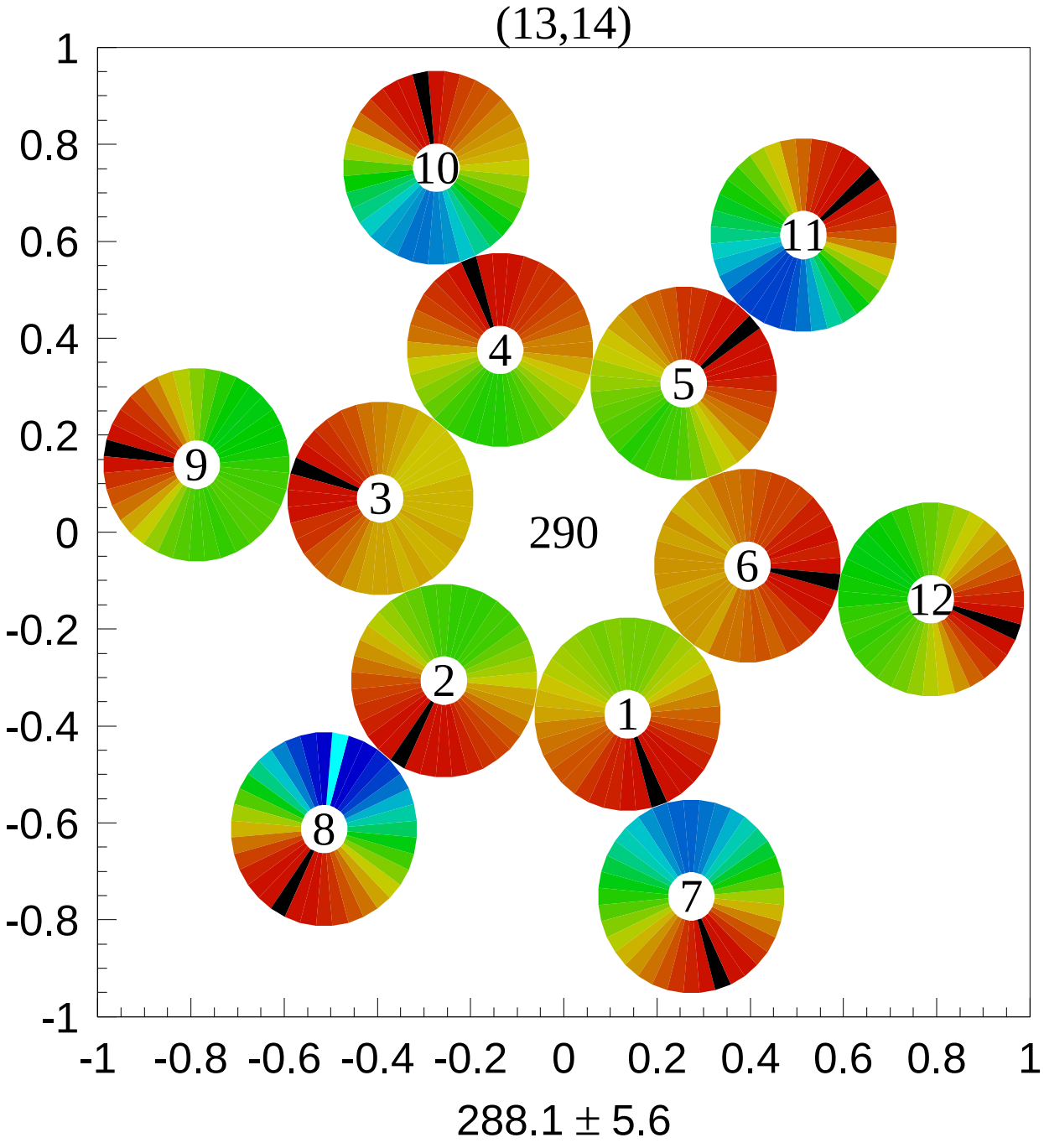

(13,12)
tilted LEDs
116 118 123 133 118 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 111 116 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

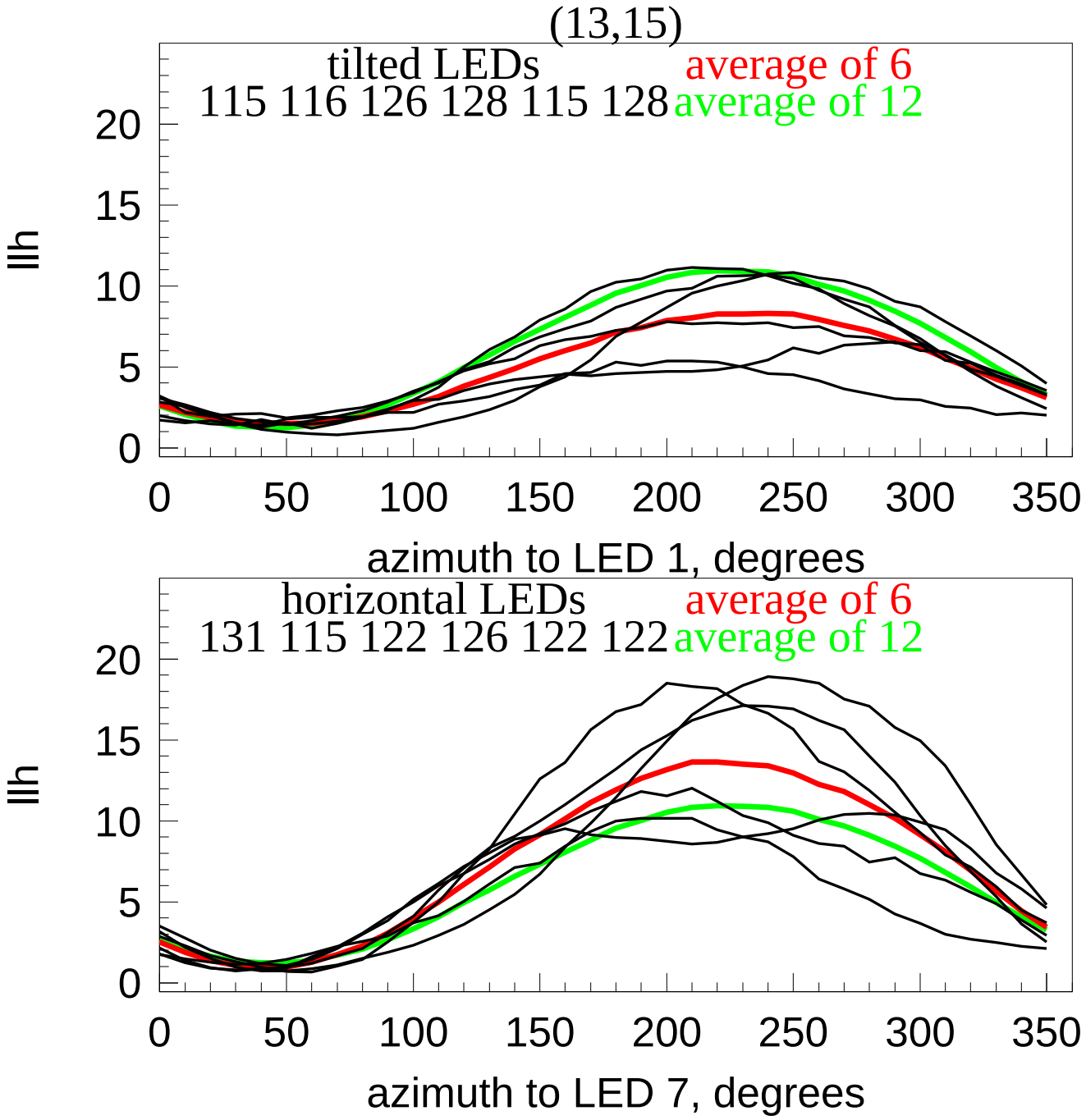

(13,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
253.2 ± 5.8

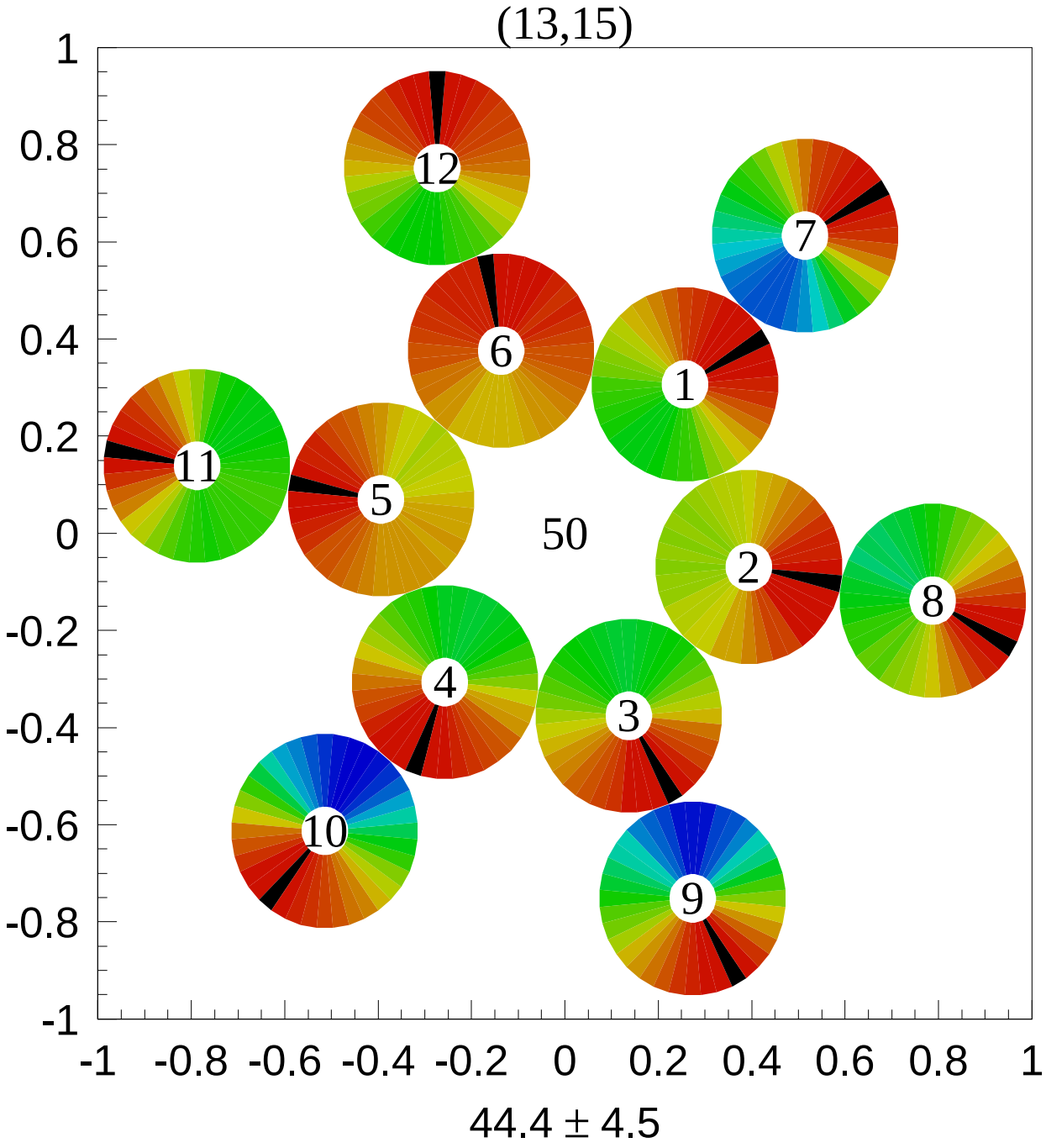

(13,13)
tilted LEDs
124 118 118 119 126 112
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 116 120 124 122 121
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

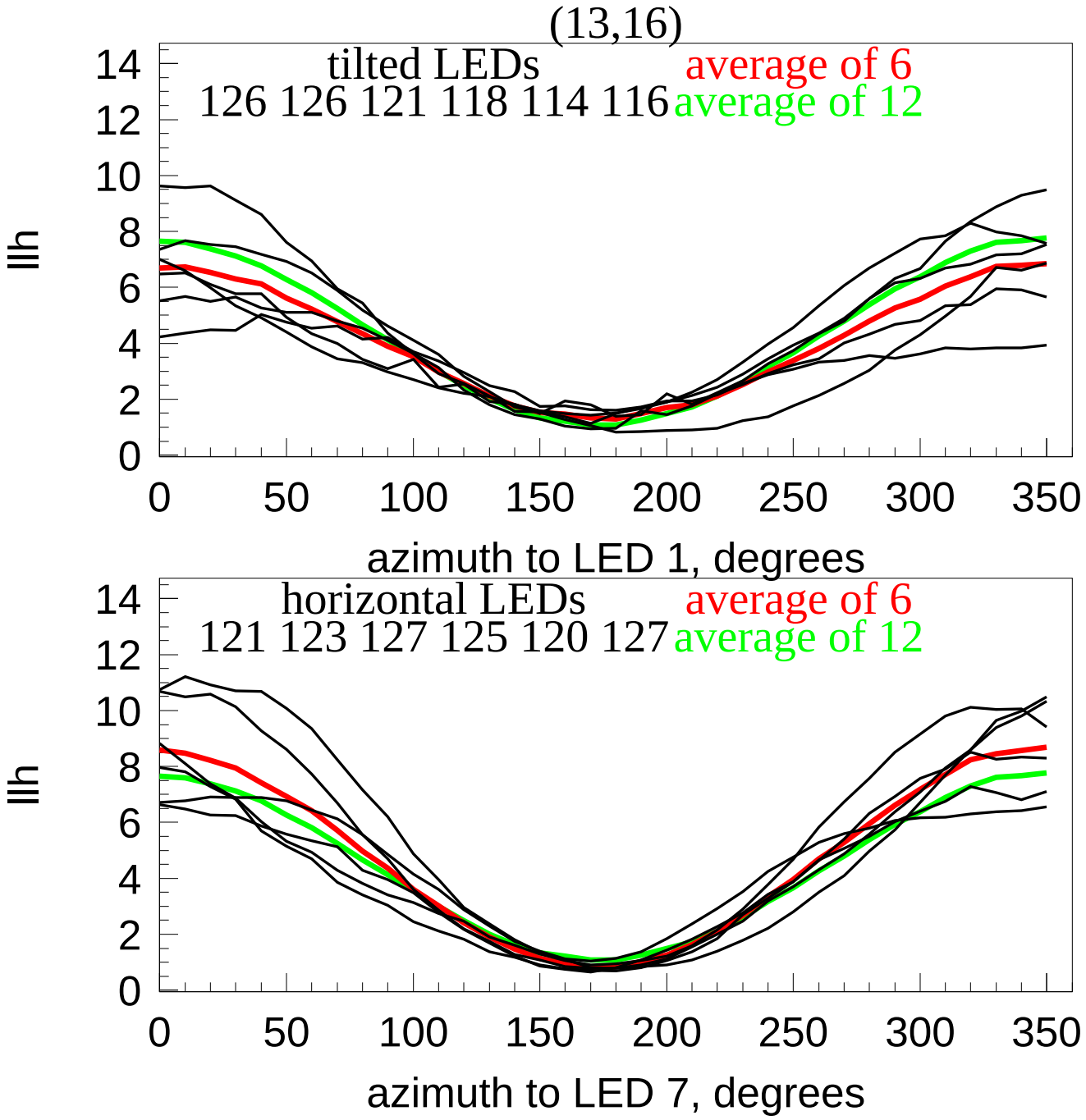

(13,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
258.3 ± 7.1

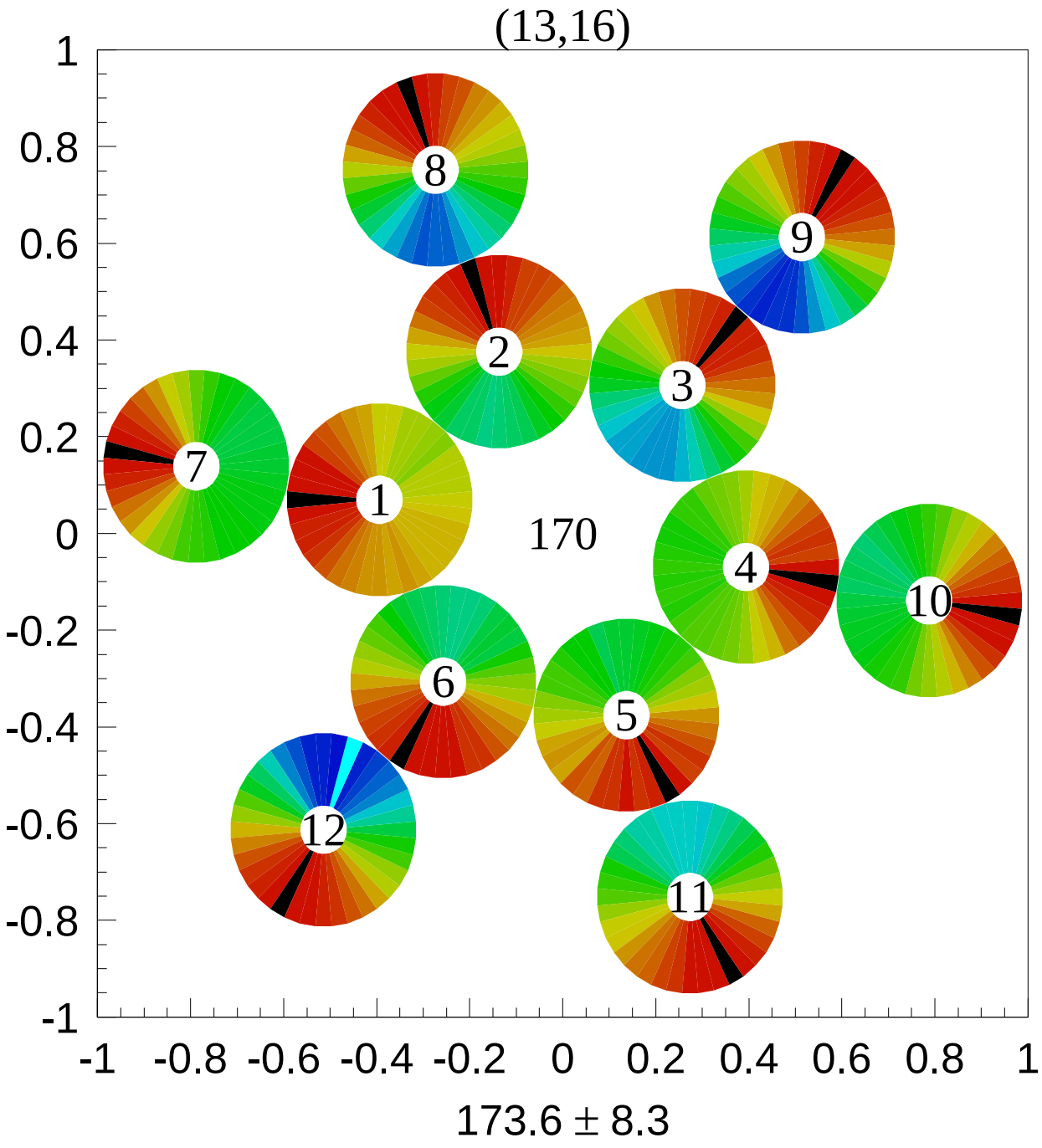

(13,14)
tilted LEDs
124 125 125 124 114 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 126 123 122 119 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

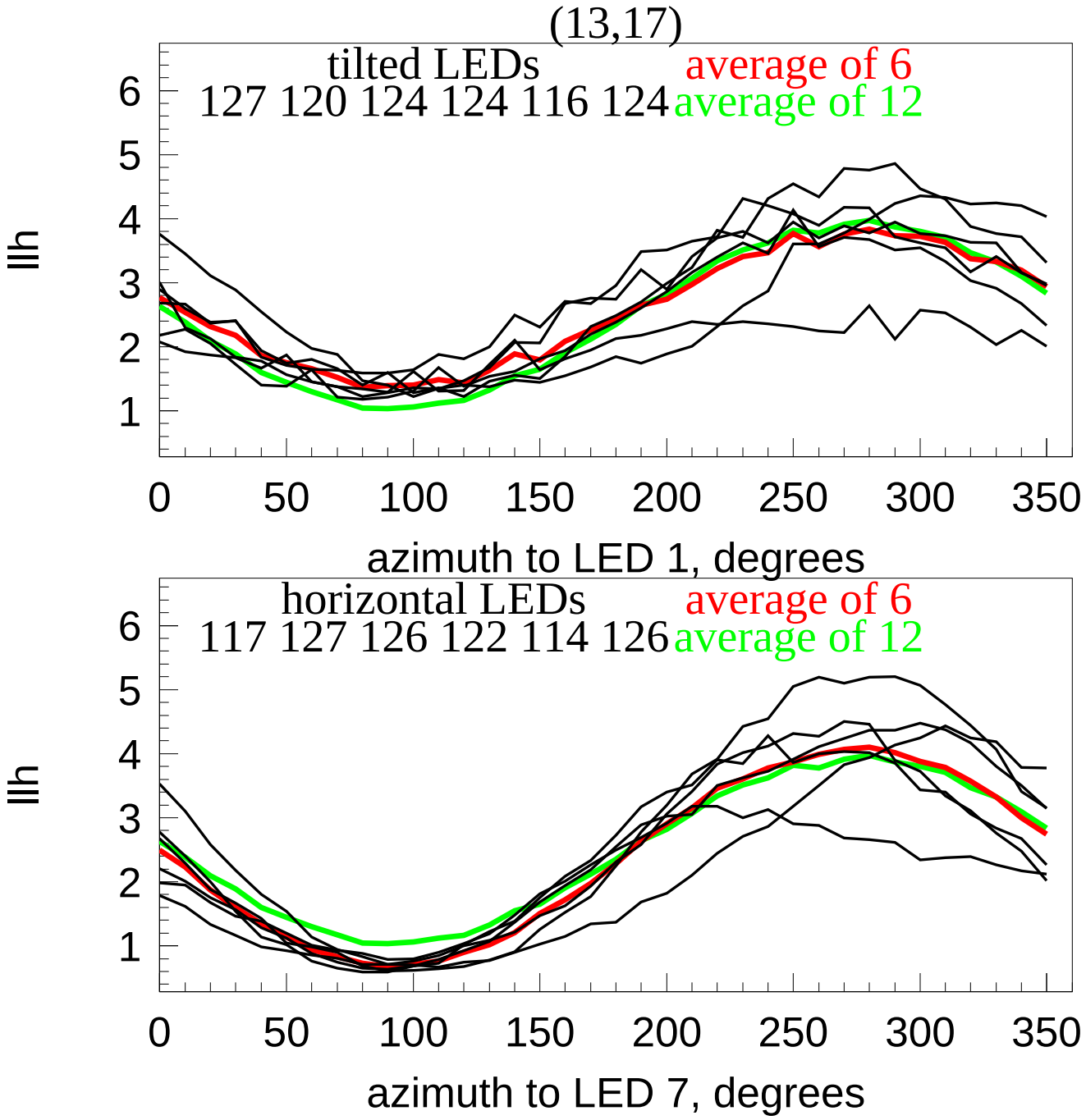

(13,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
288.1 ± 5.6

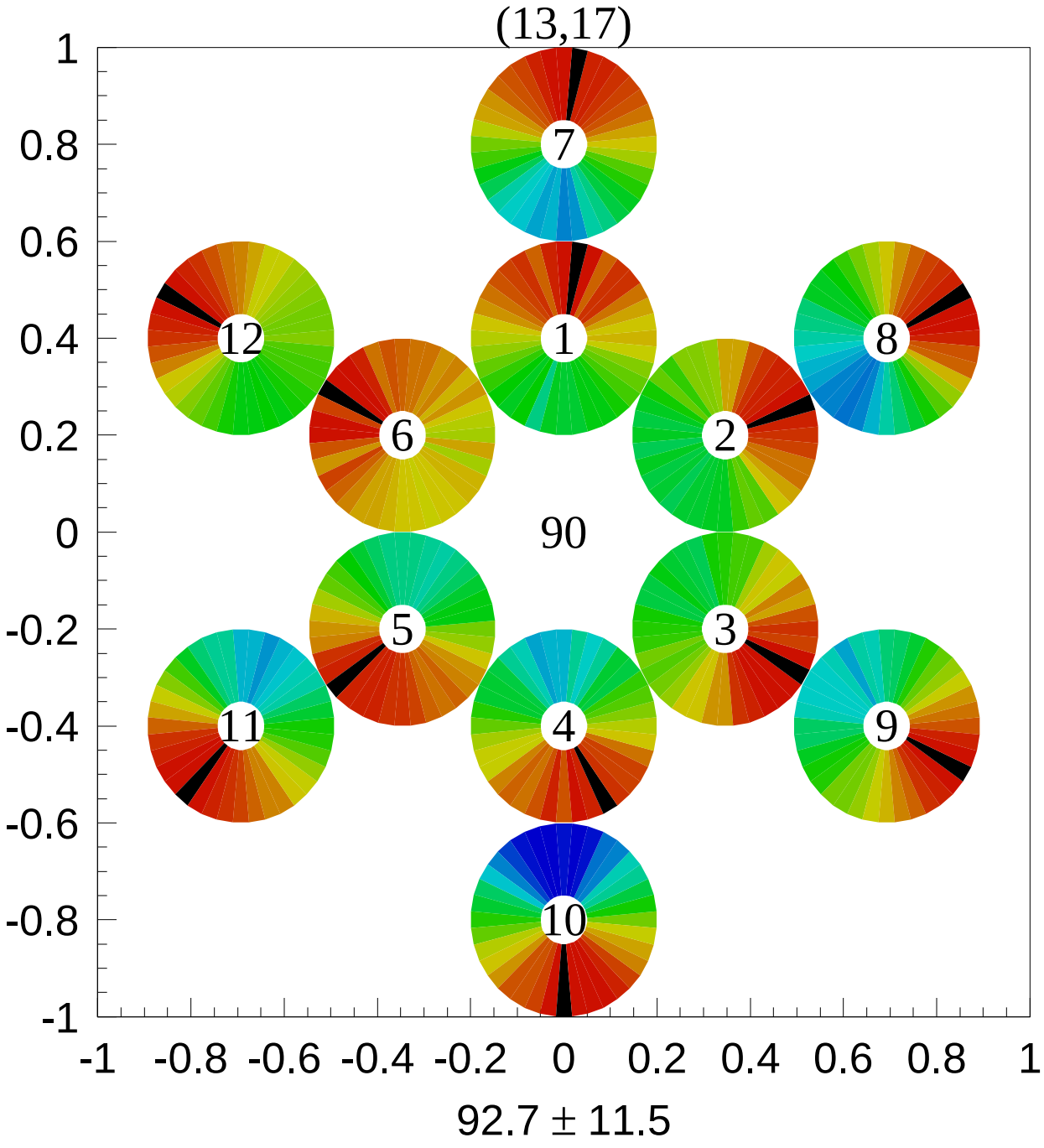

(13,15)
tilted LEDs
115 116 126 128 115 128
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
131 115 122 126 122 122
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

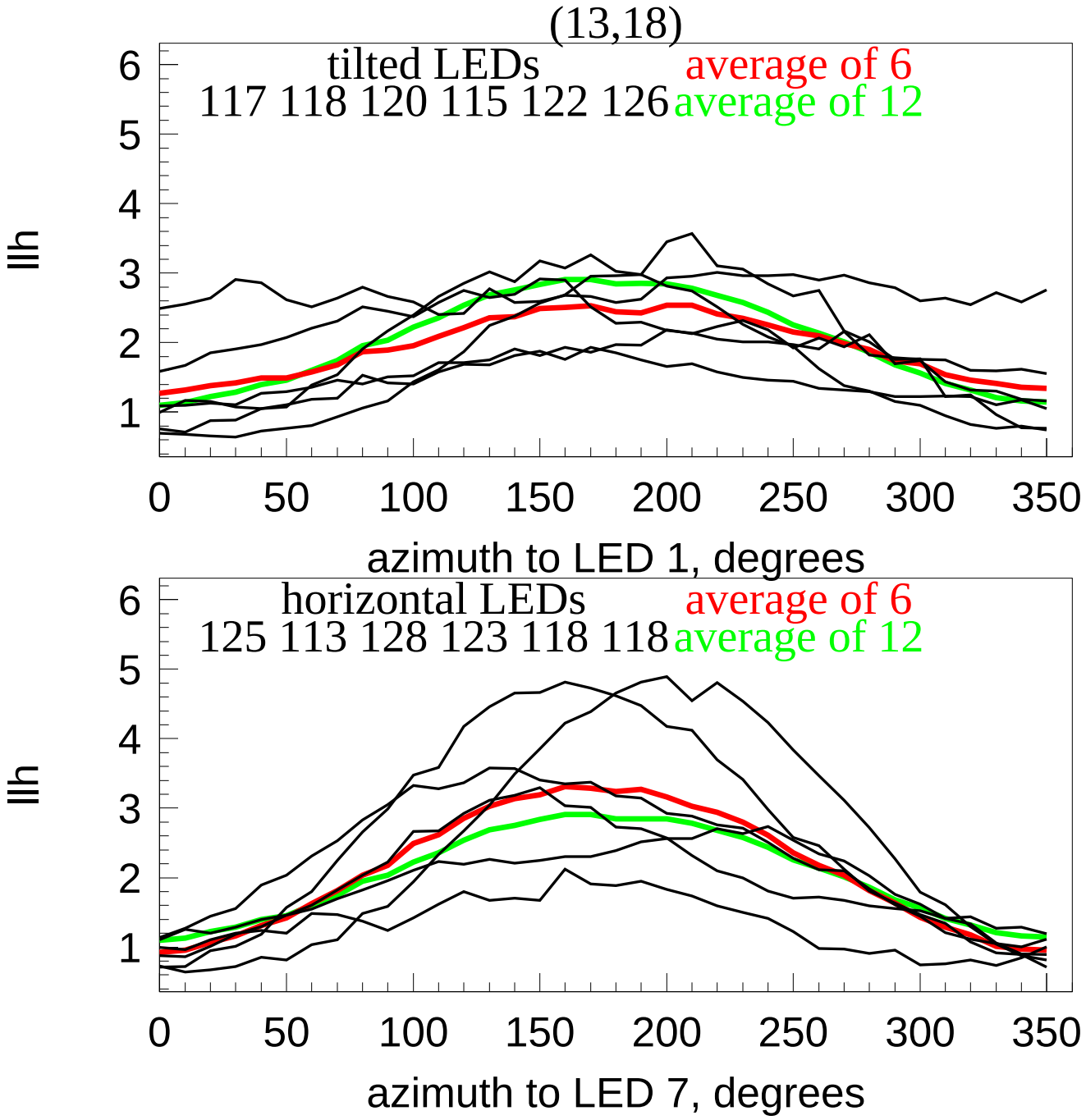

(13,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
44.4 ± 4.5

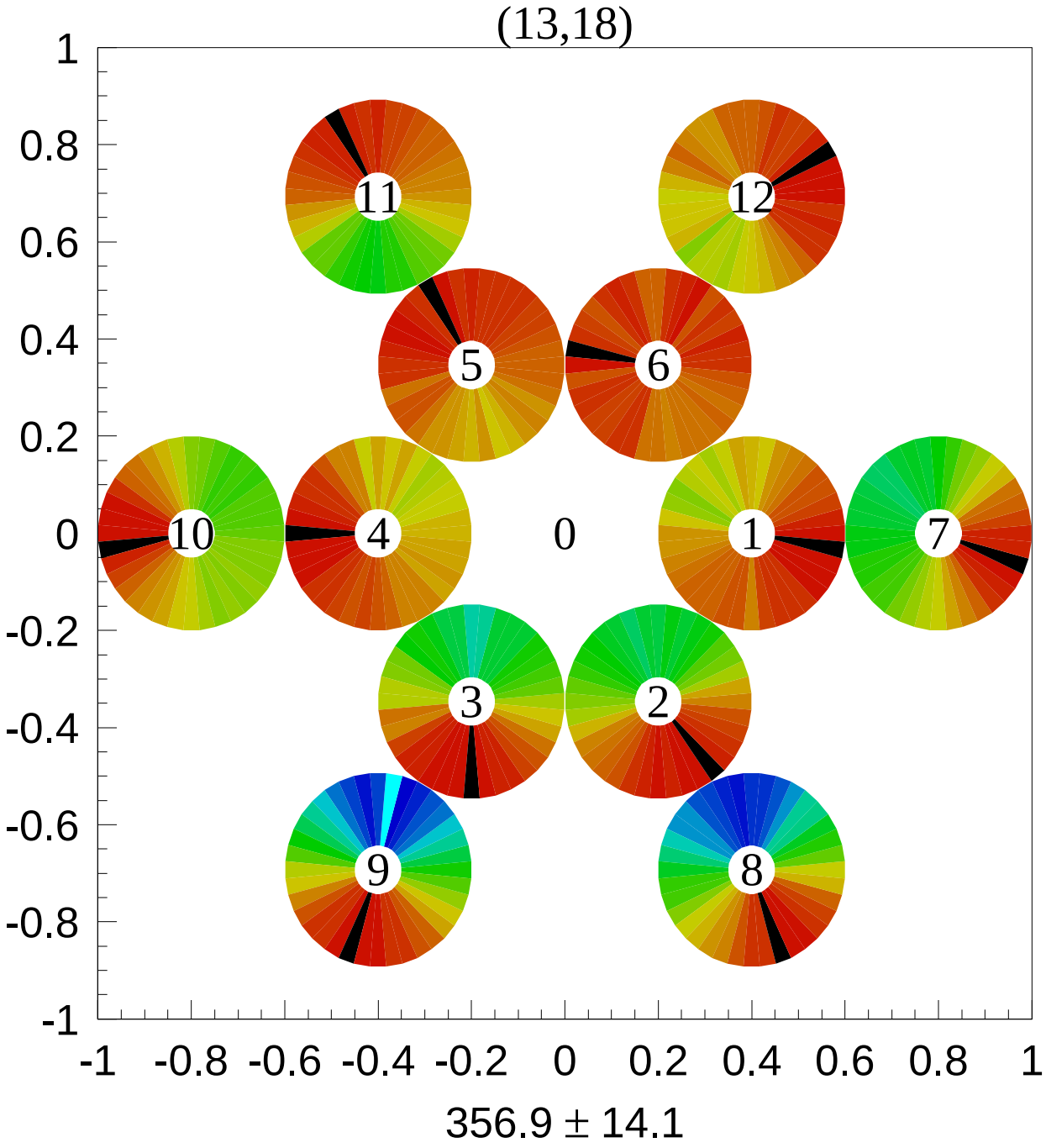

(13,16)
tilted LEDs
126 126 121 118 114 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 127 125 120 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

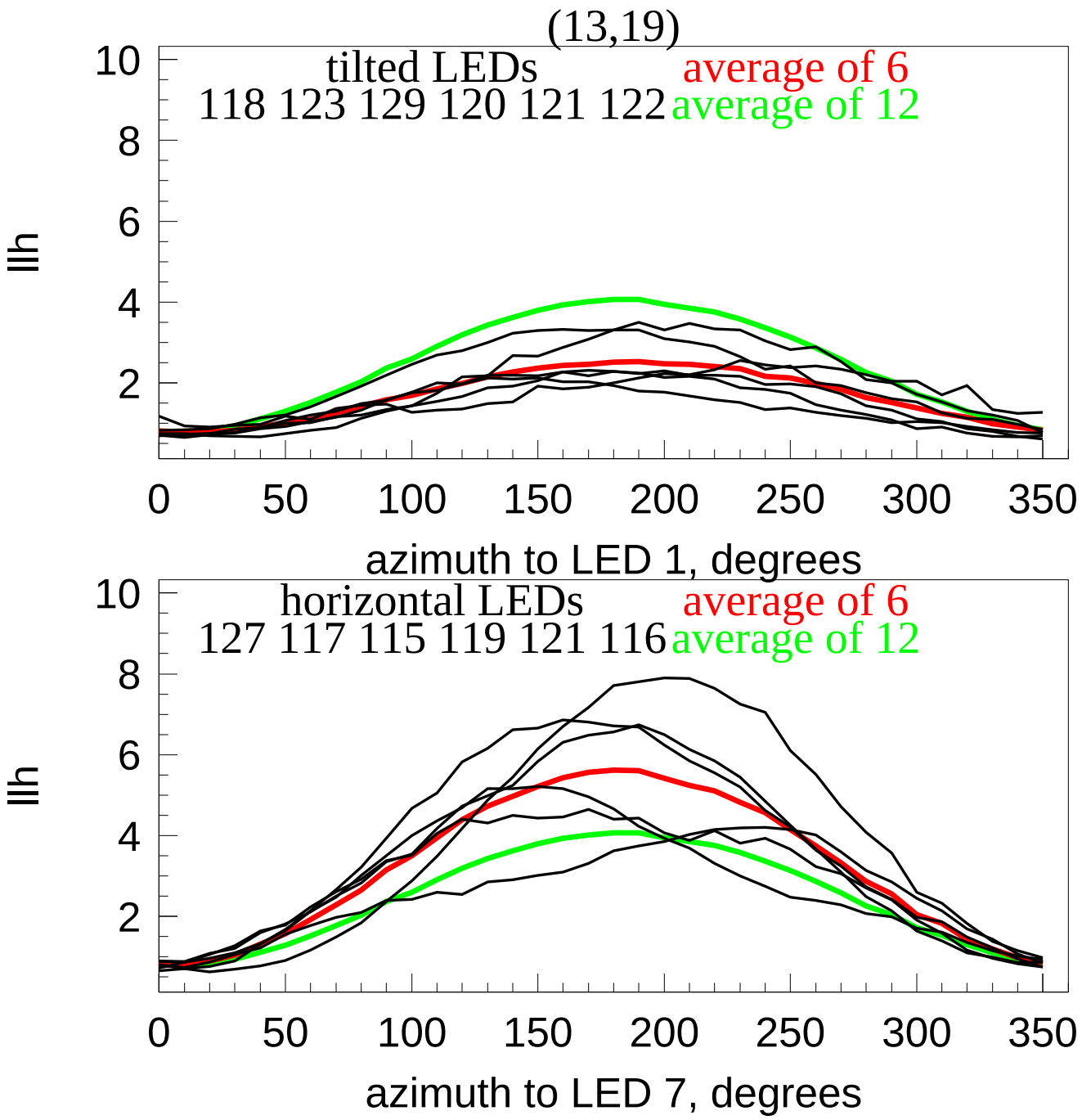

(13,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
173.6 ± 8.3

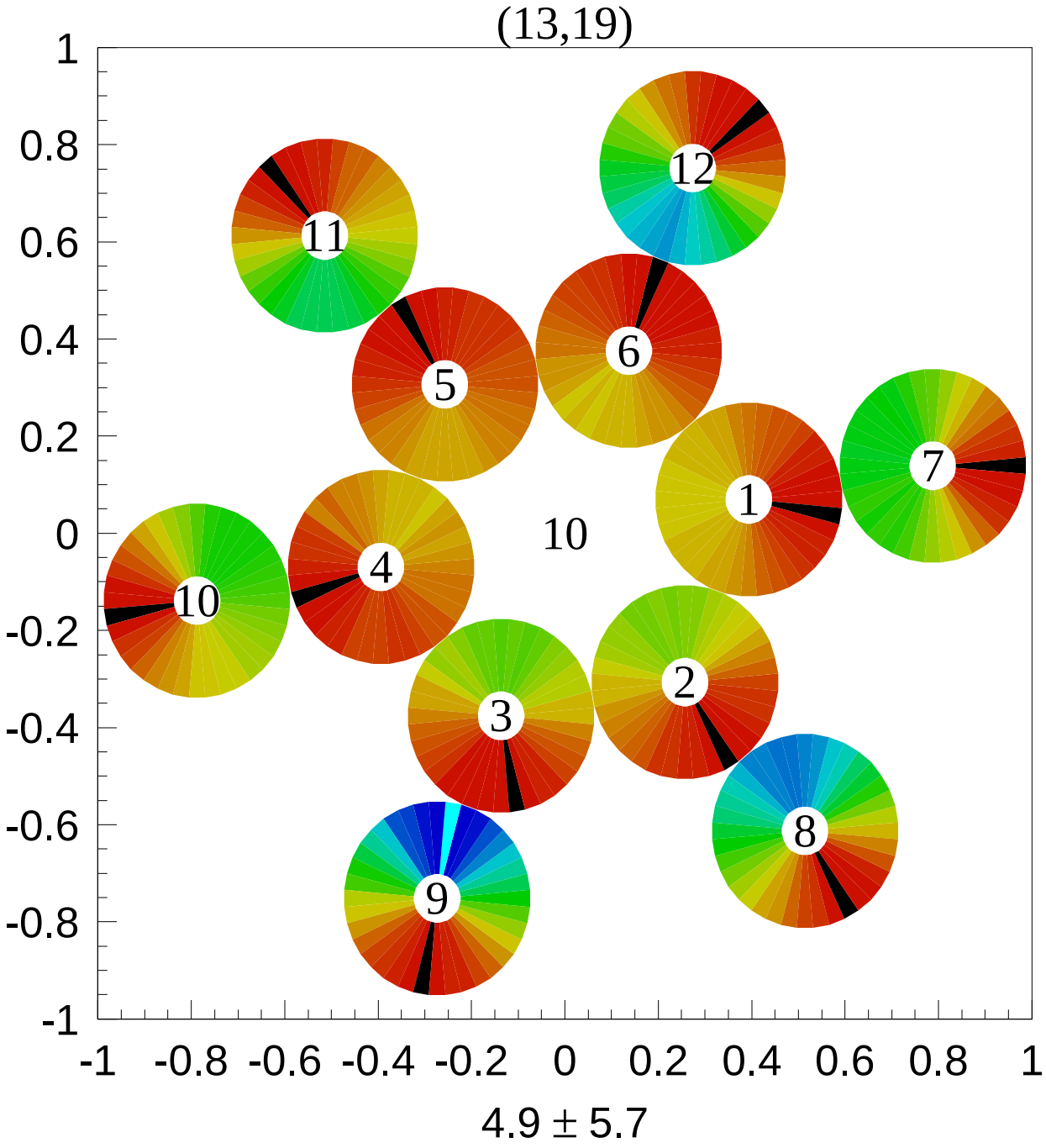

(13,17)
tilted LEDs
127 120 124 124 116 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 127 126 122 114 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

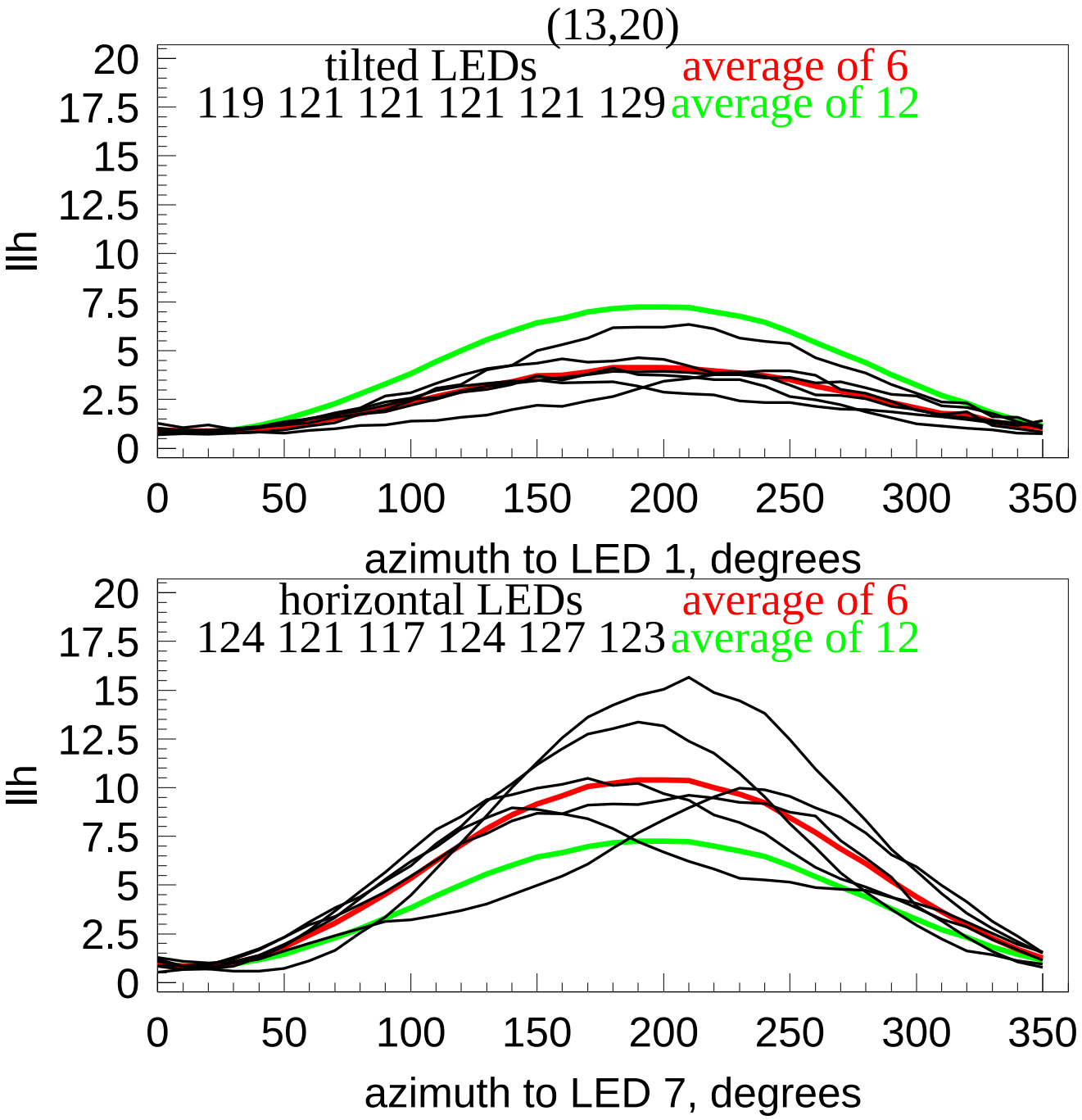

(13,17)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
92.7 ± 11.5

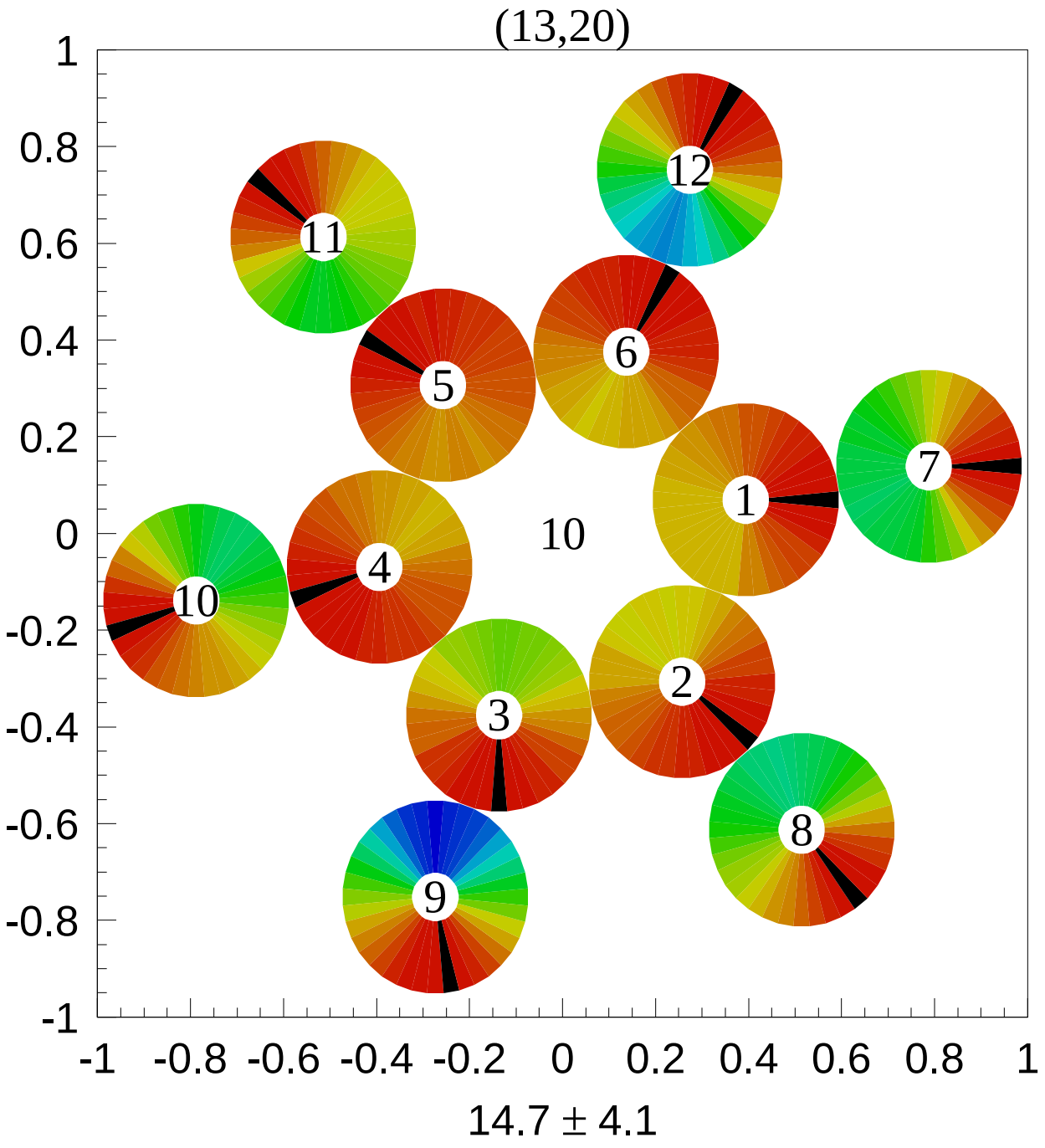

(13,18)
tilted LEDs
117 118 120 115 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 113 128 123 118 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

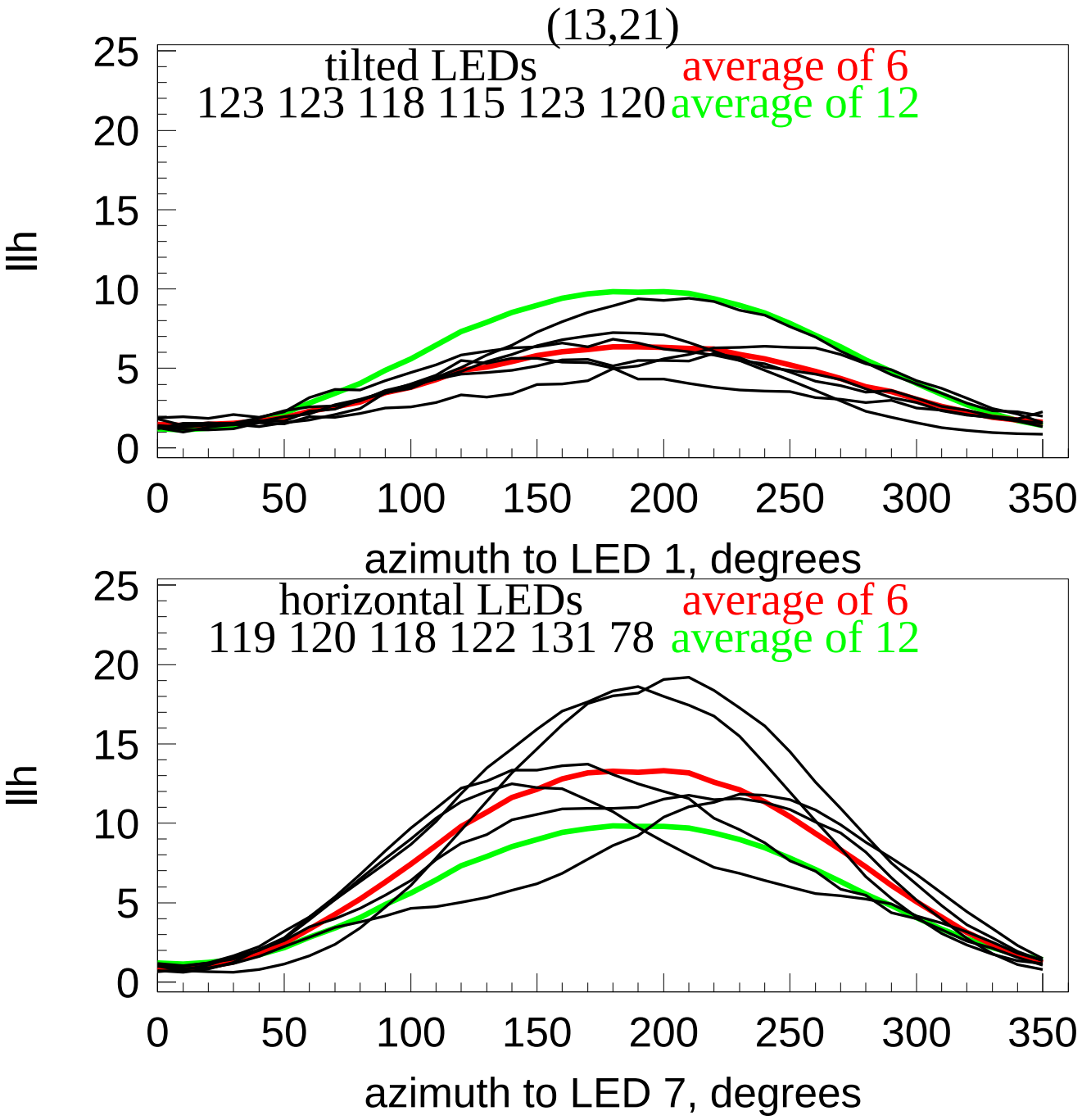

(13,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
356.9 ± 14.1

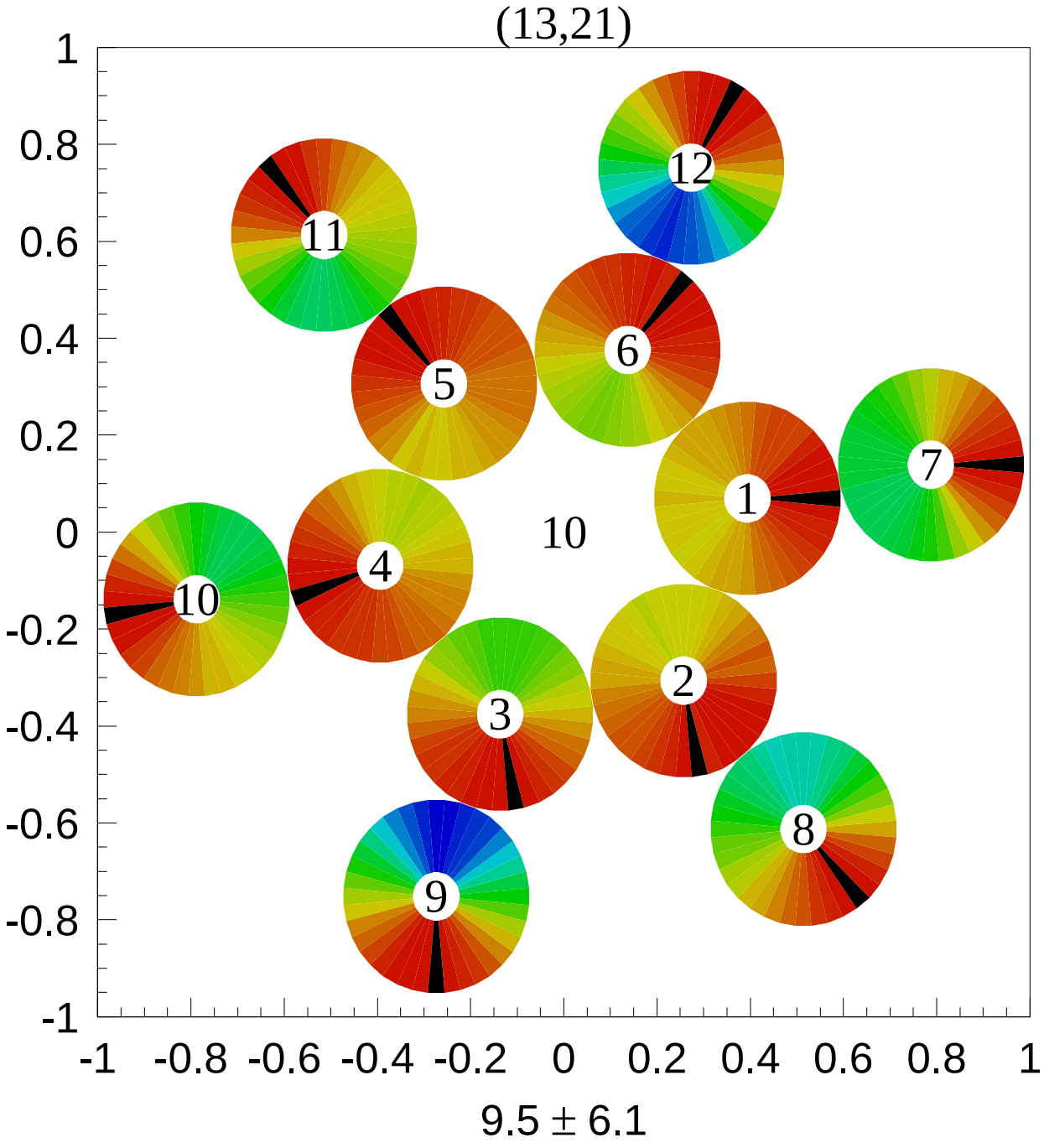

(13,19)
tilted LEDs
118 123 129 120 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 117 115 119 121 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

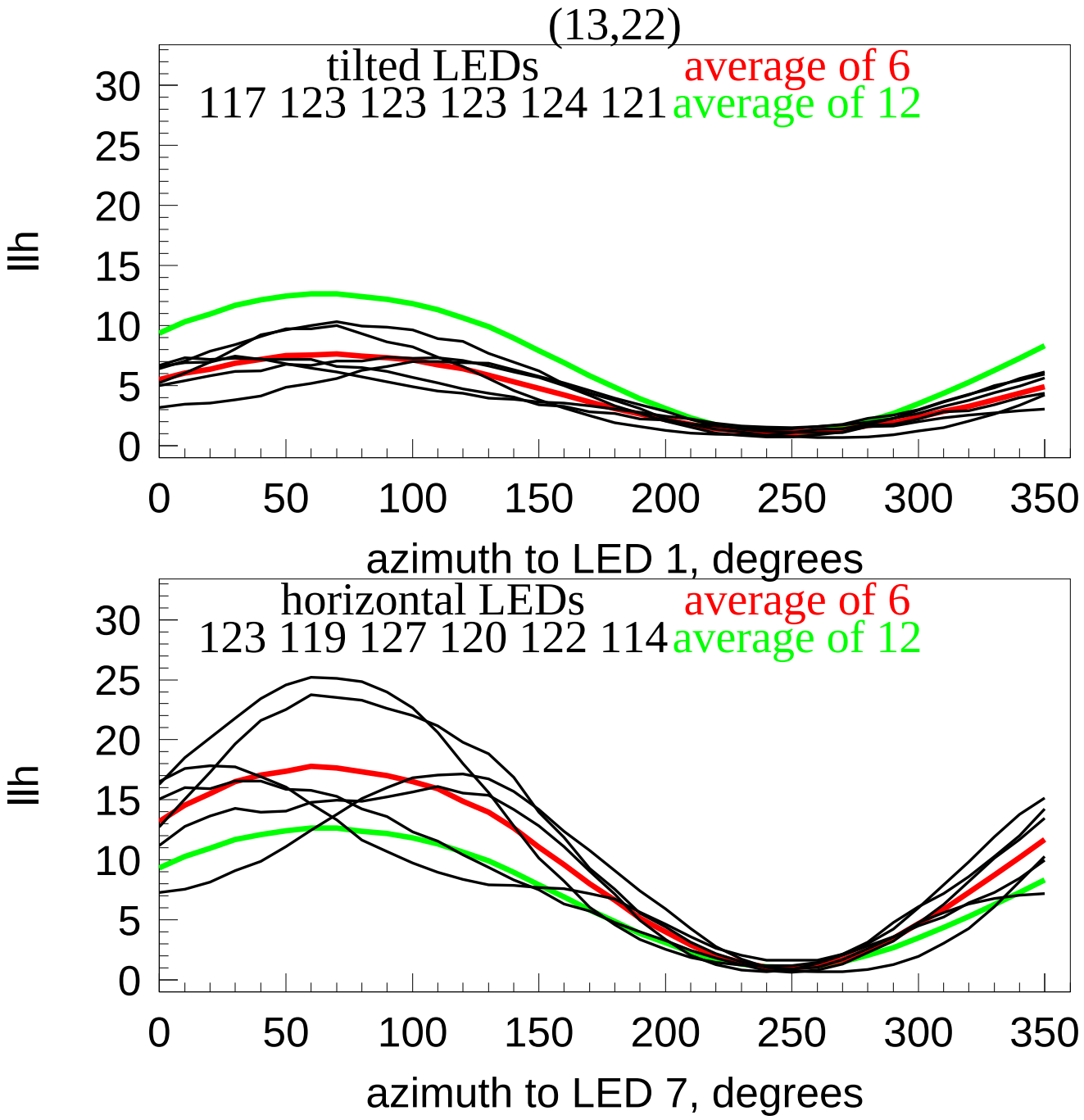

(13,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
4.9 ± 5.7

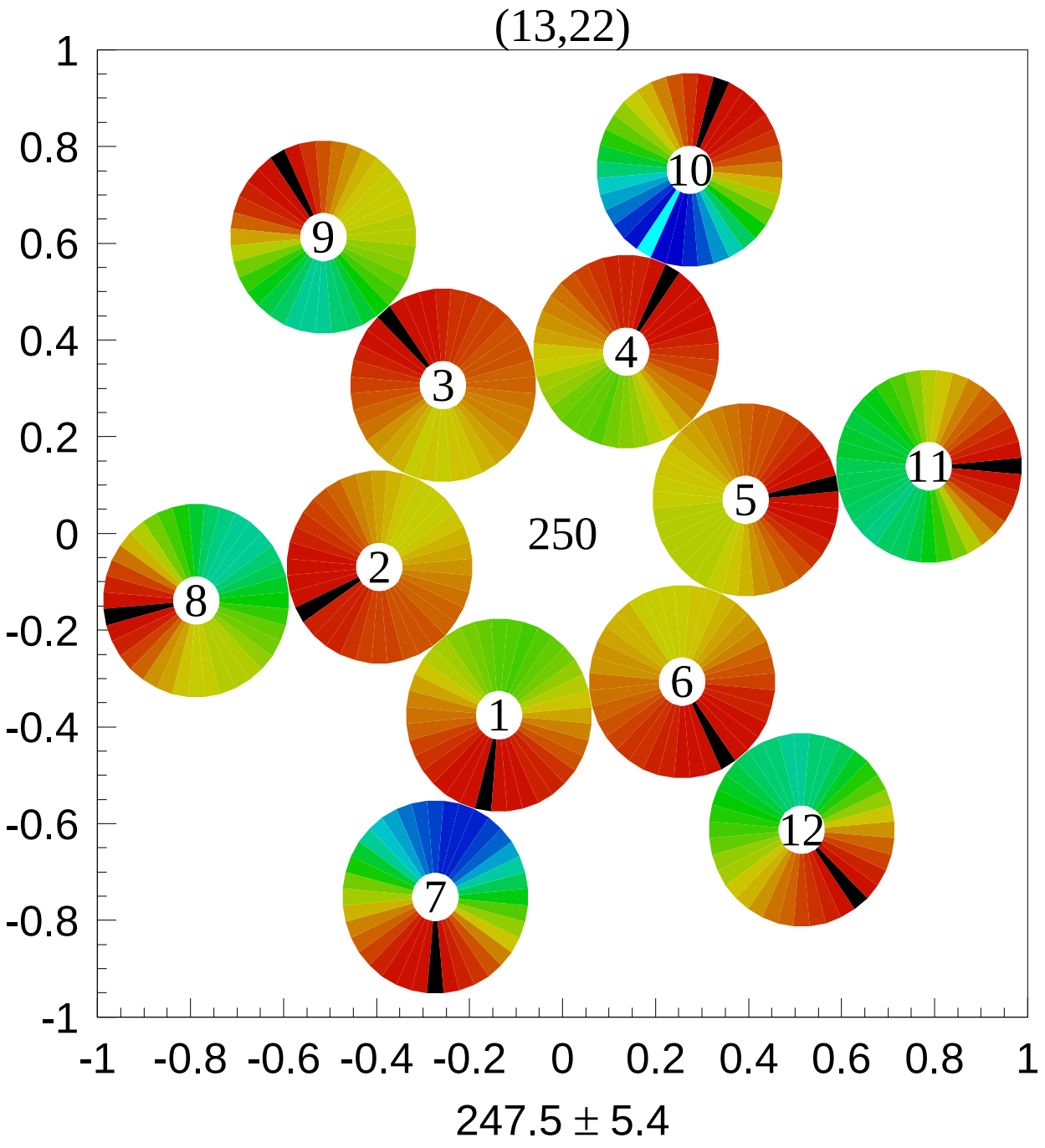

(13,20)
tilted LEDs
119 121 121 121 121 129
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 121 117 124 127 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

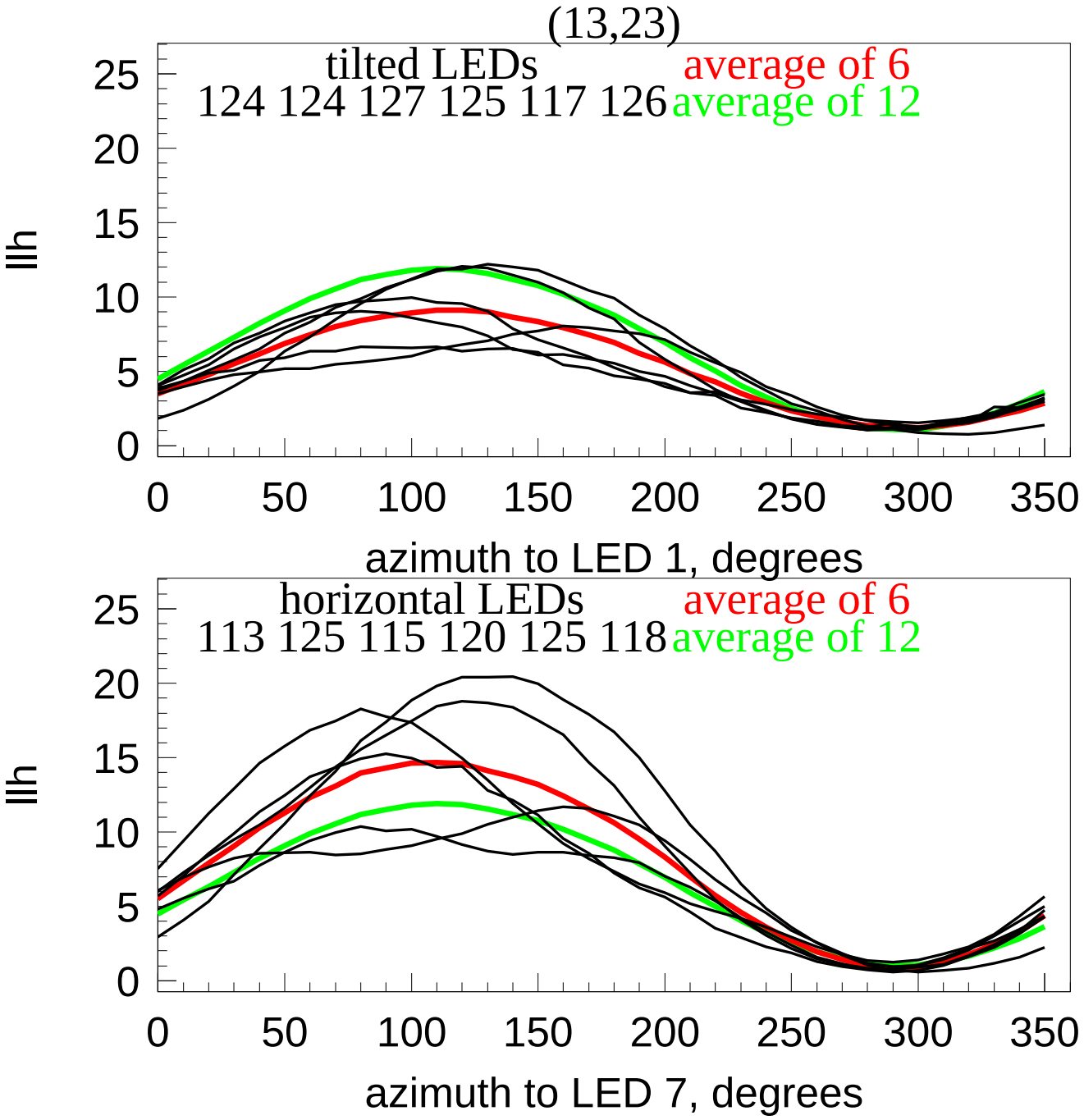

(13,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
14.7 ± 4.1

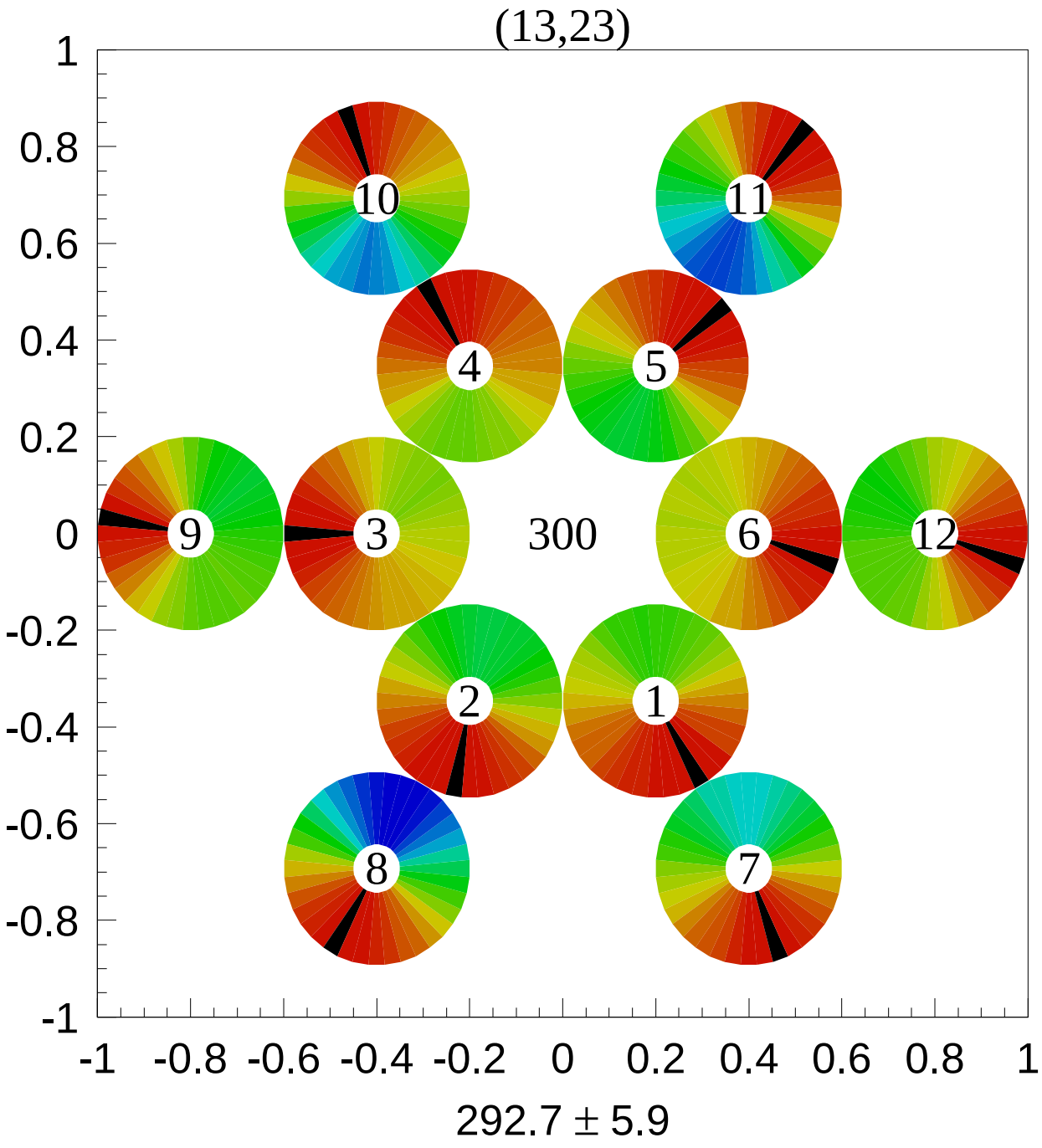

(13,21)
tilted LEDs
123 123 118 115 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 118 122 131 78
average of 6
average of 12
llh
azimuth to LED 7, degrees

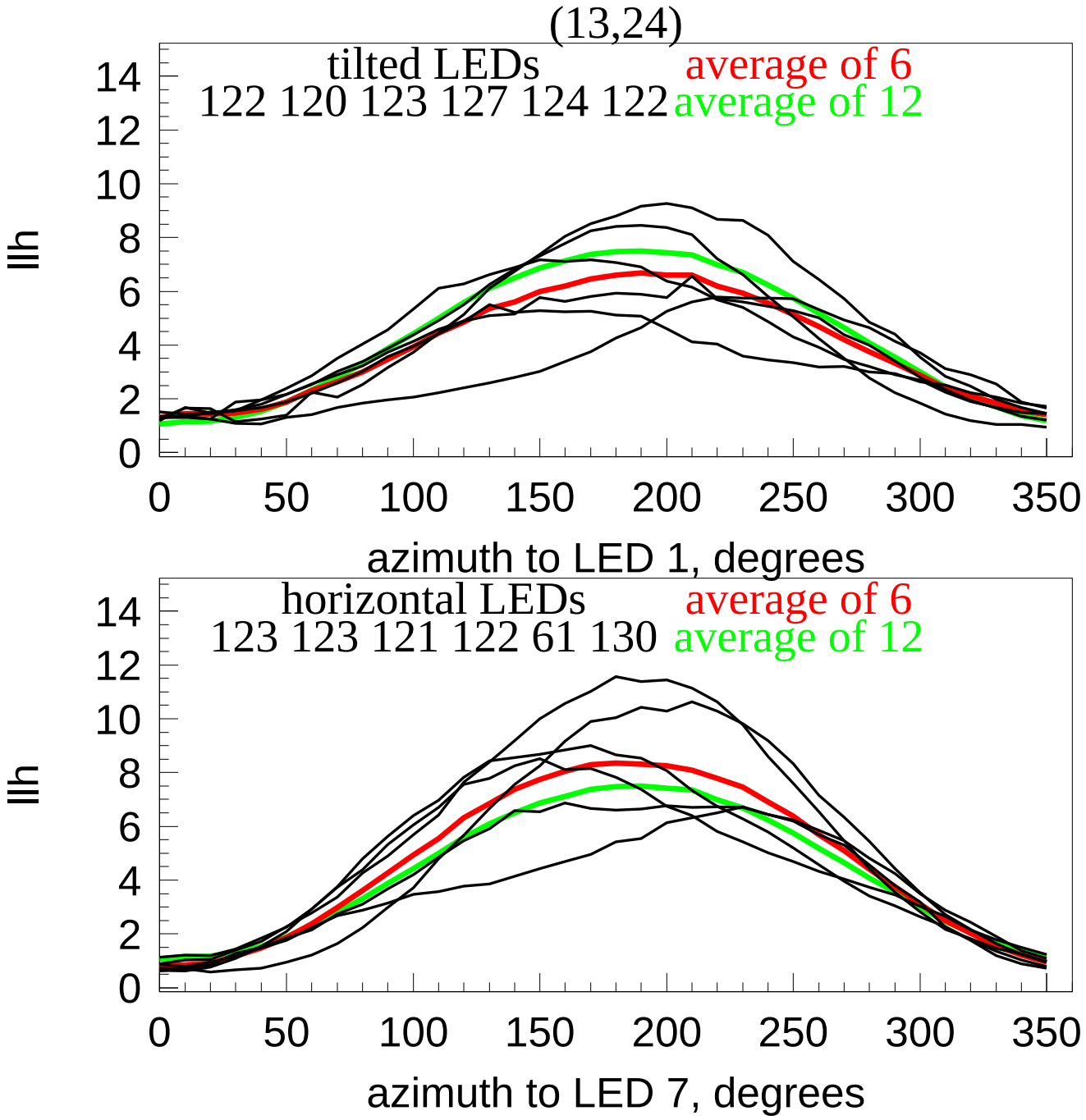

(13,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
9.5 ± 6.1

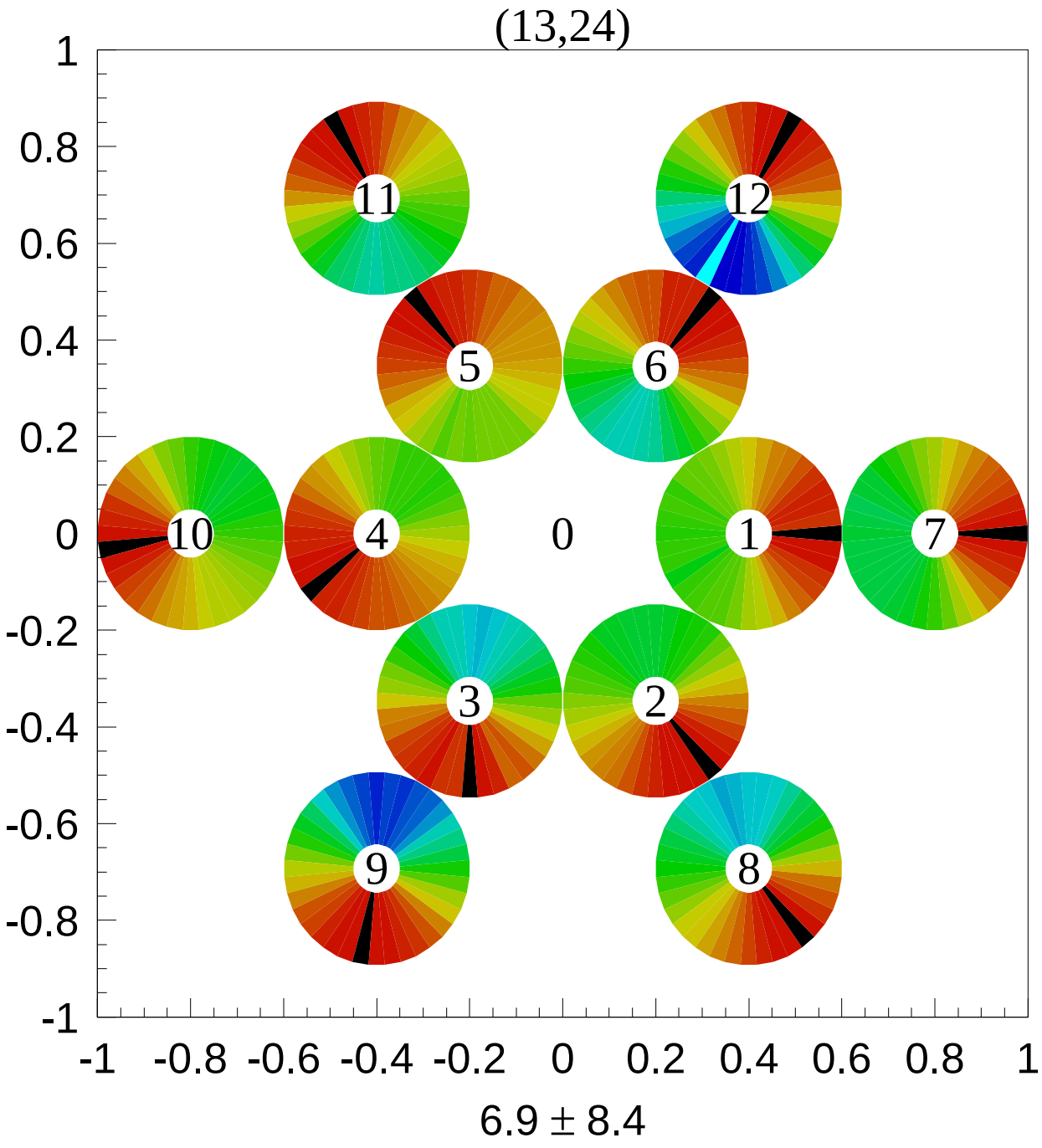

(13,22)
tilted LEDs
117 123 123 123 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 127 120 122 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

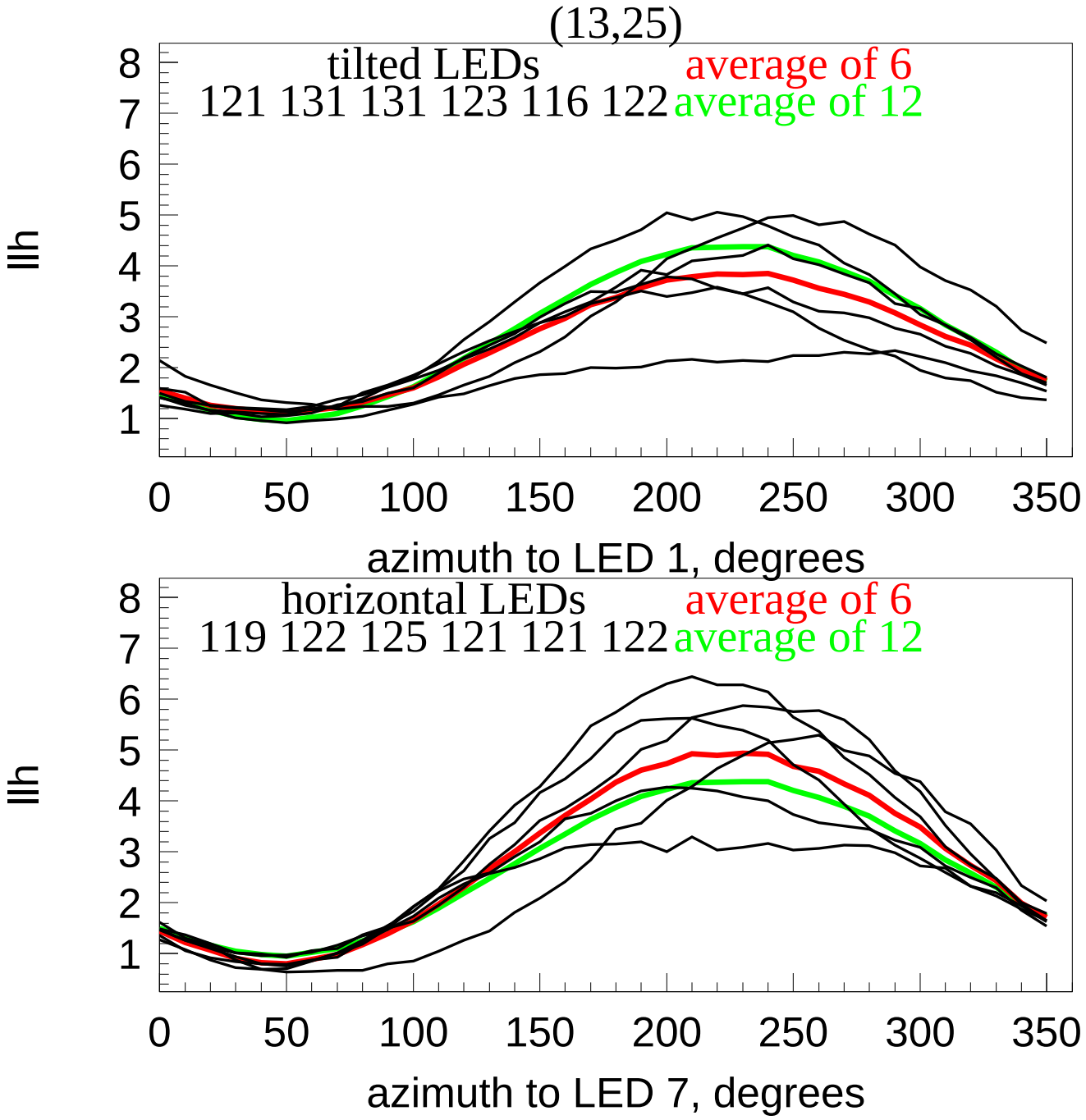

(13,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
247.5 ± 5.4
250
1
2
3
4
5
6
7
8
9
10
11
12

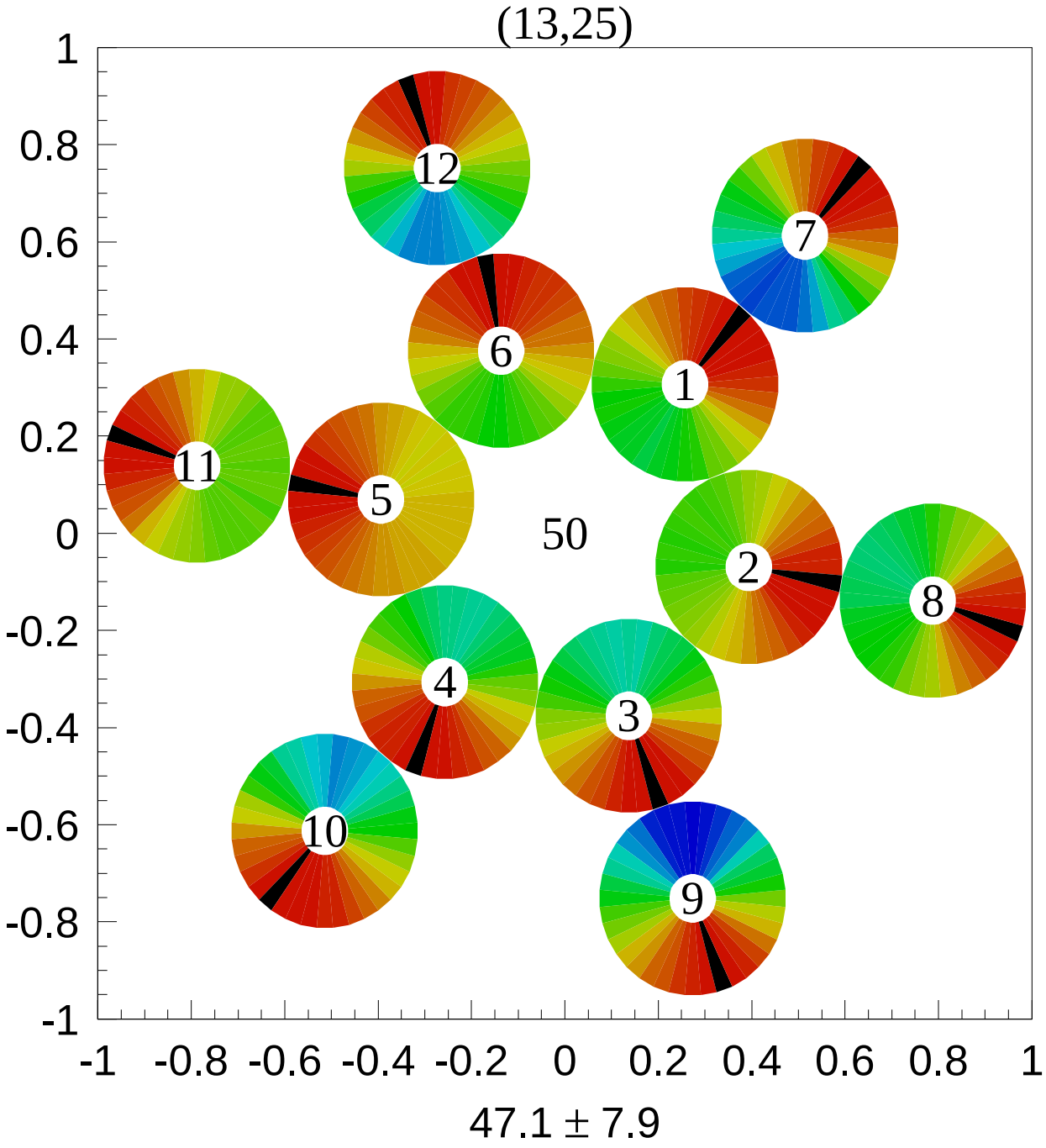

(13,23)
tilted LEDs
124 124 127 125 117 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 125 115 120 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

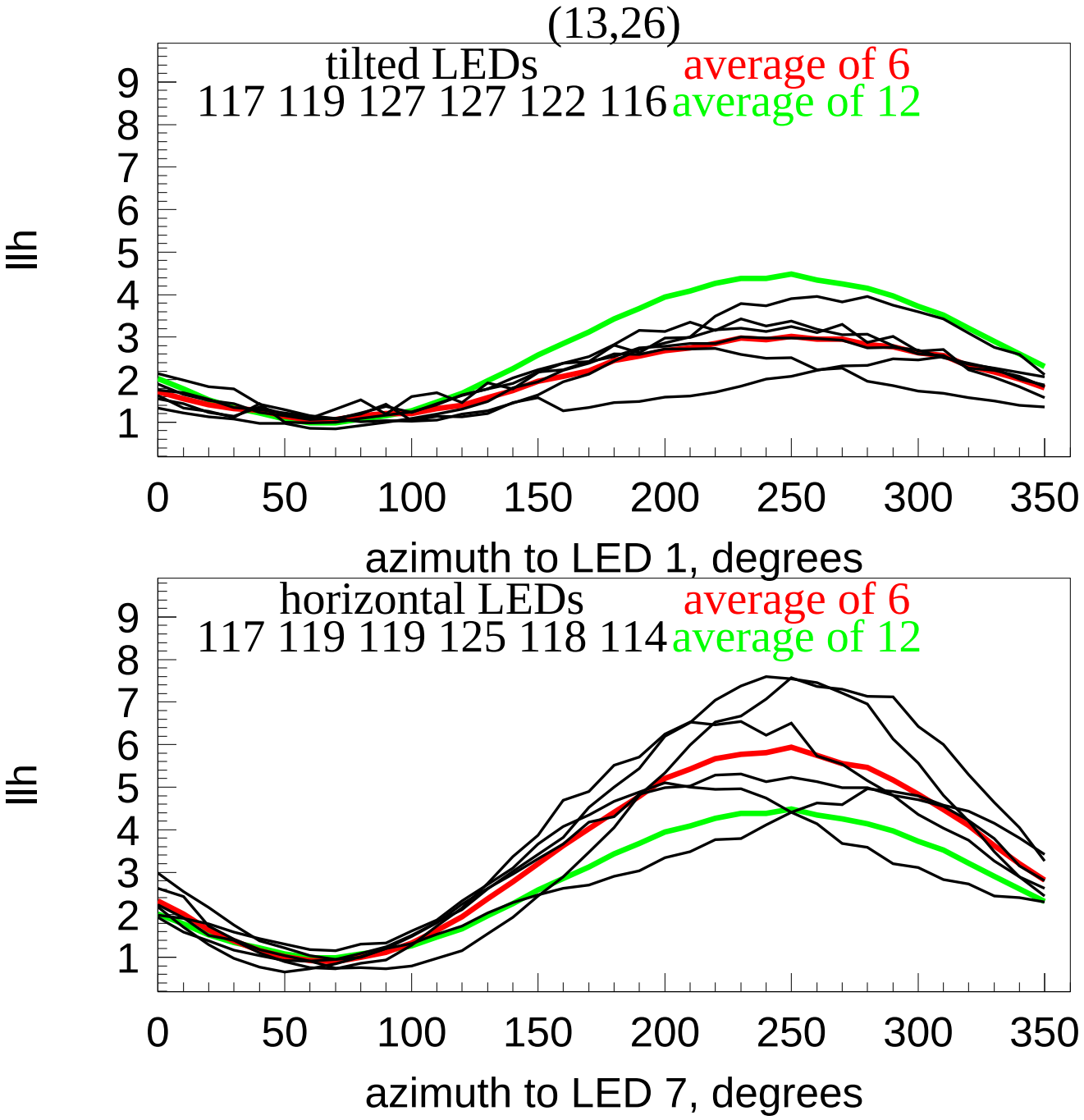

(13,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
292.7 ± 5.9

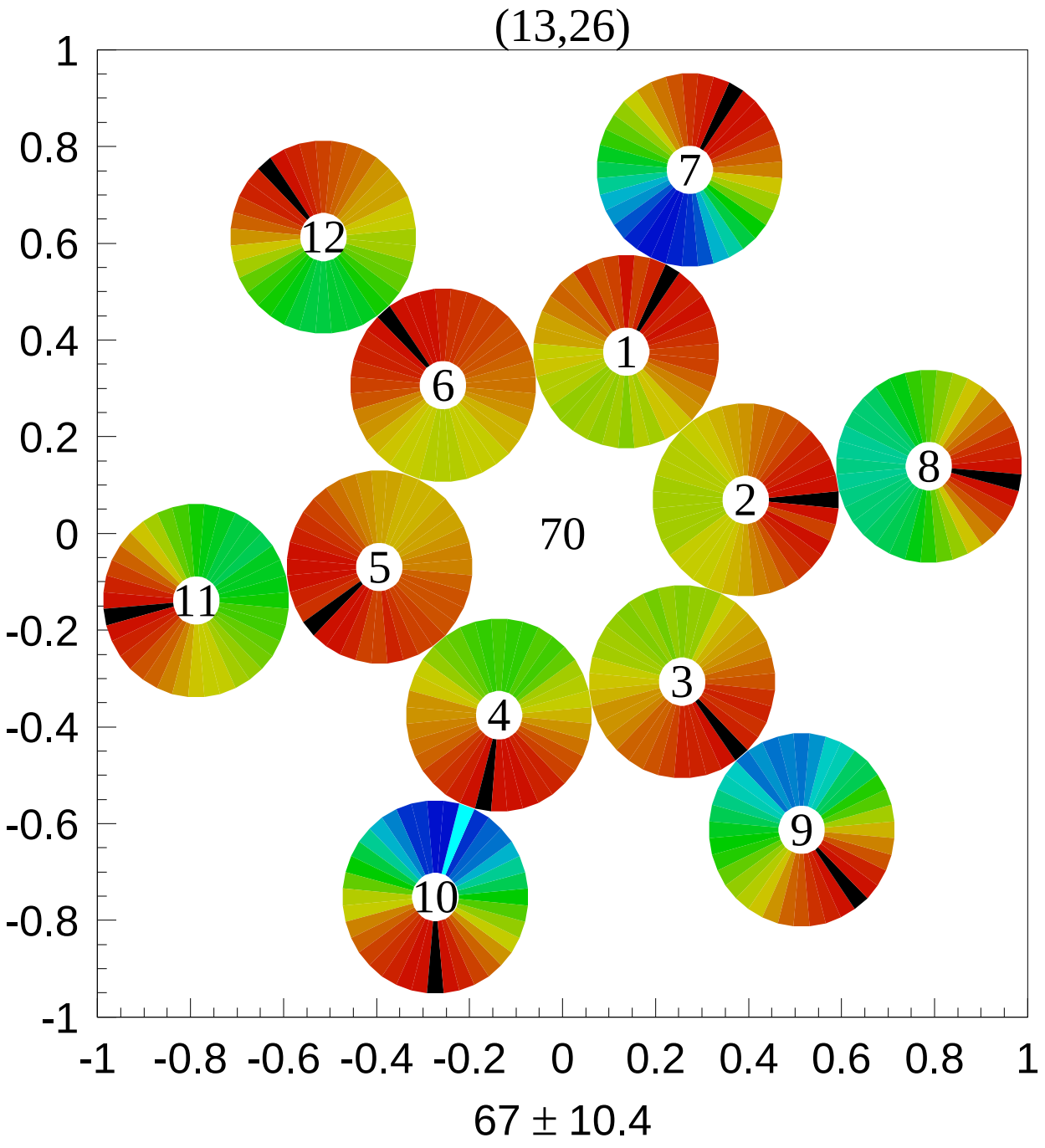

(13,24)
tilted LEDs
122 120 123 127 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 121 122 61 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

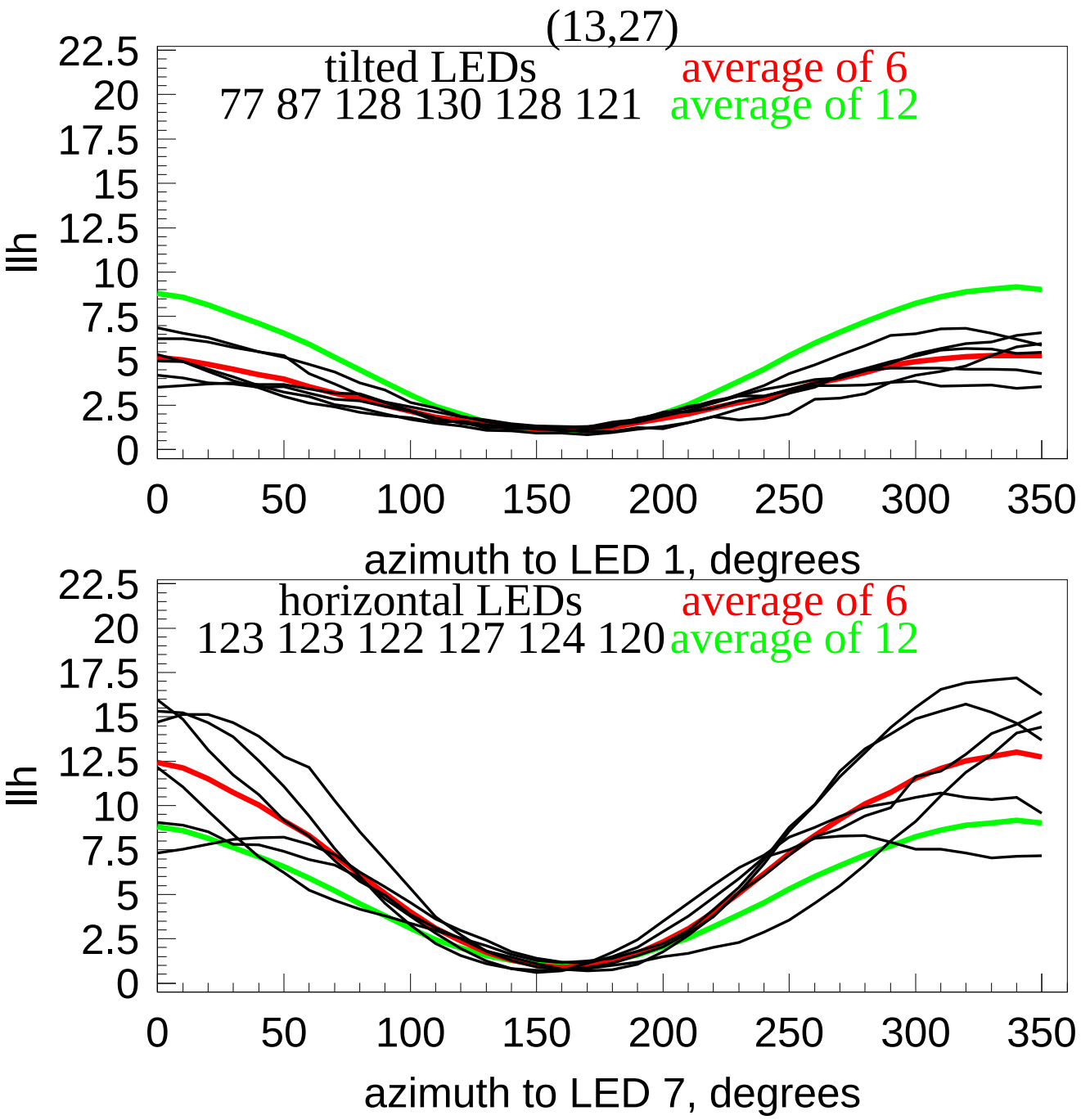

(13,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
6.9 ± 8.4

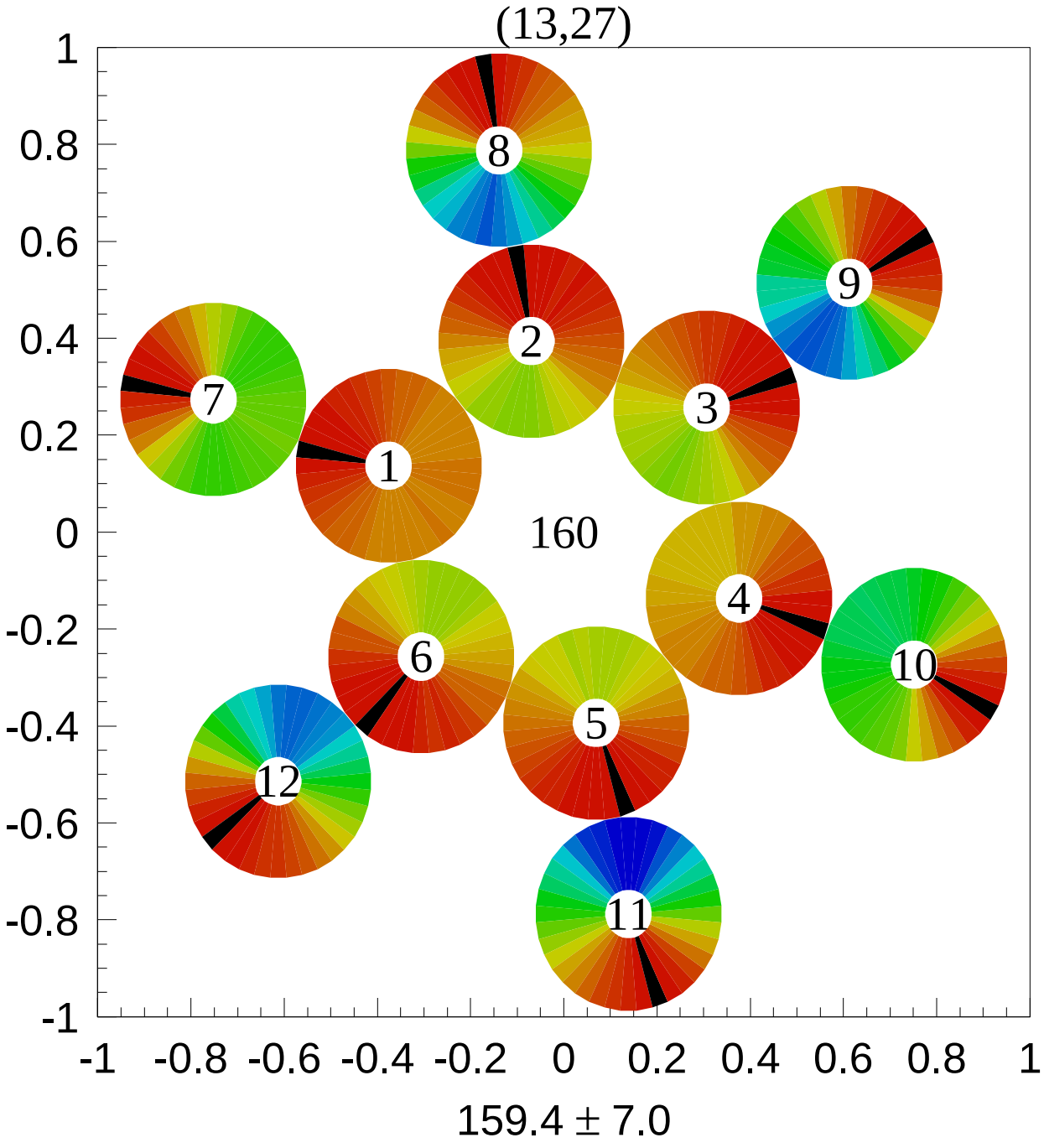

(13,25)
tilted LEDs
121 131 131 123 116 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 125 121 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

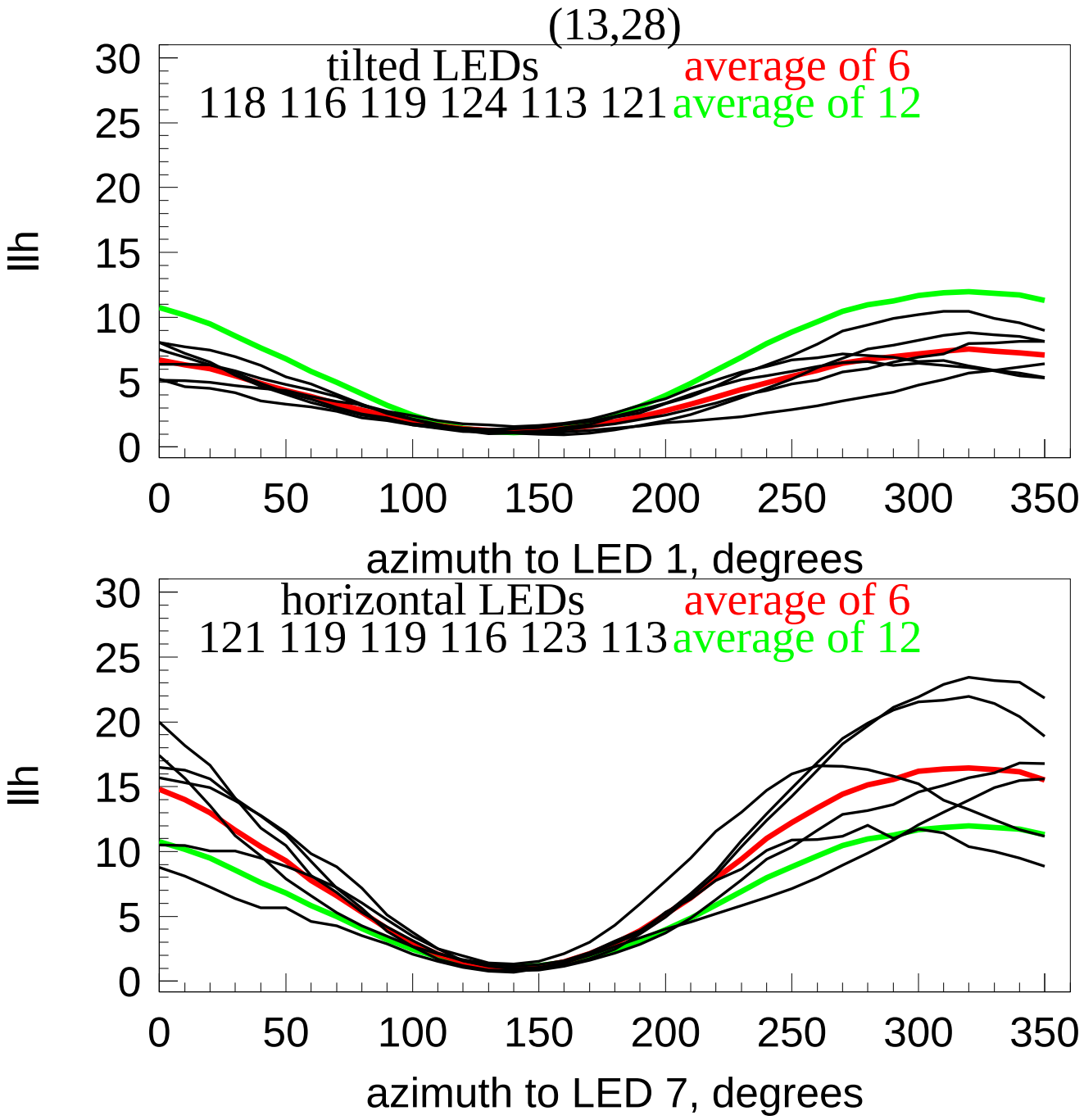

(13,25)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
47.1 ± 7.9

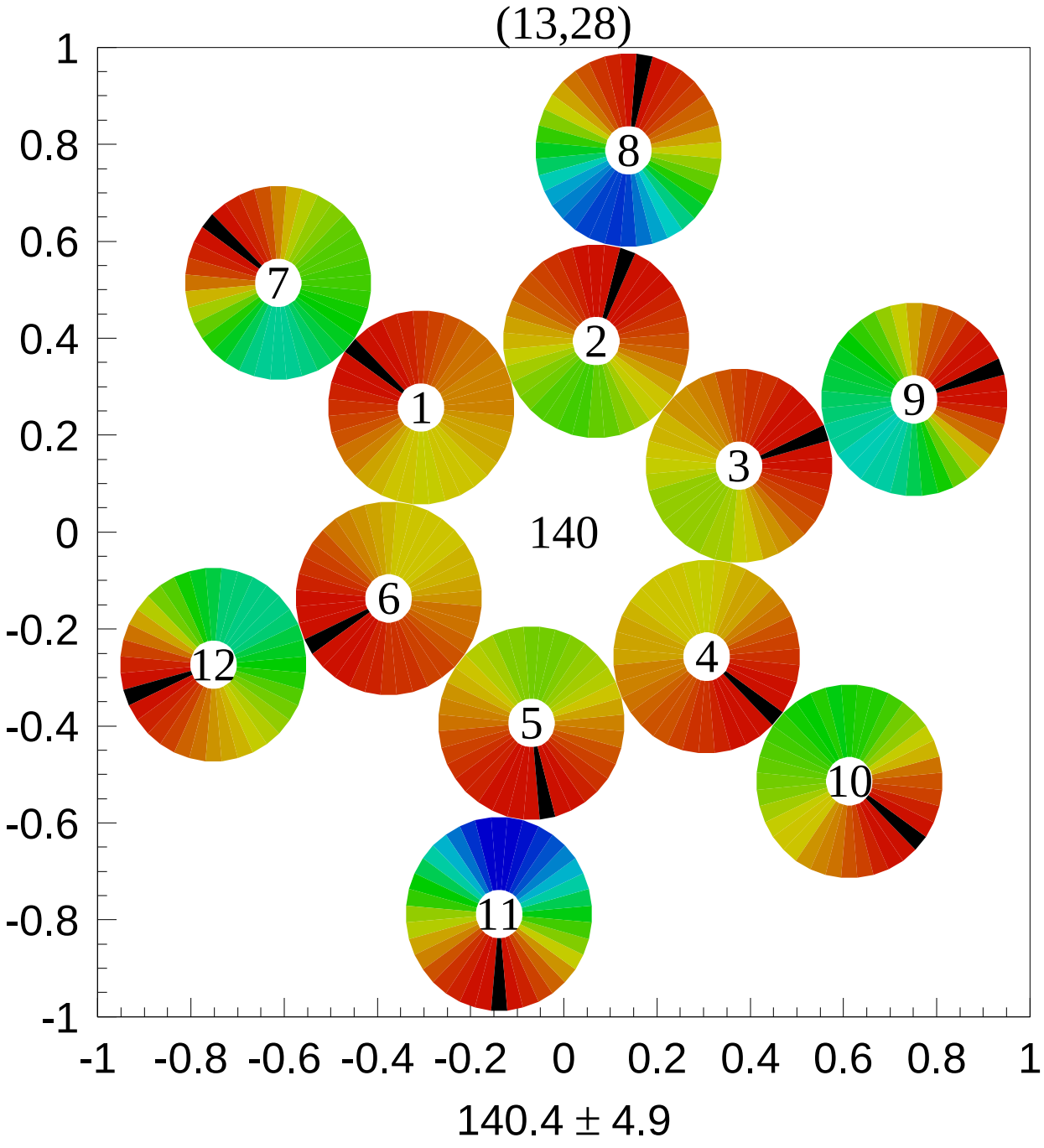

(13,26)
tilted LEDs
117 119 127 127 122 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 119 125 118 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

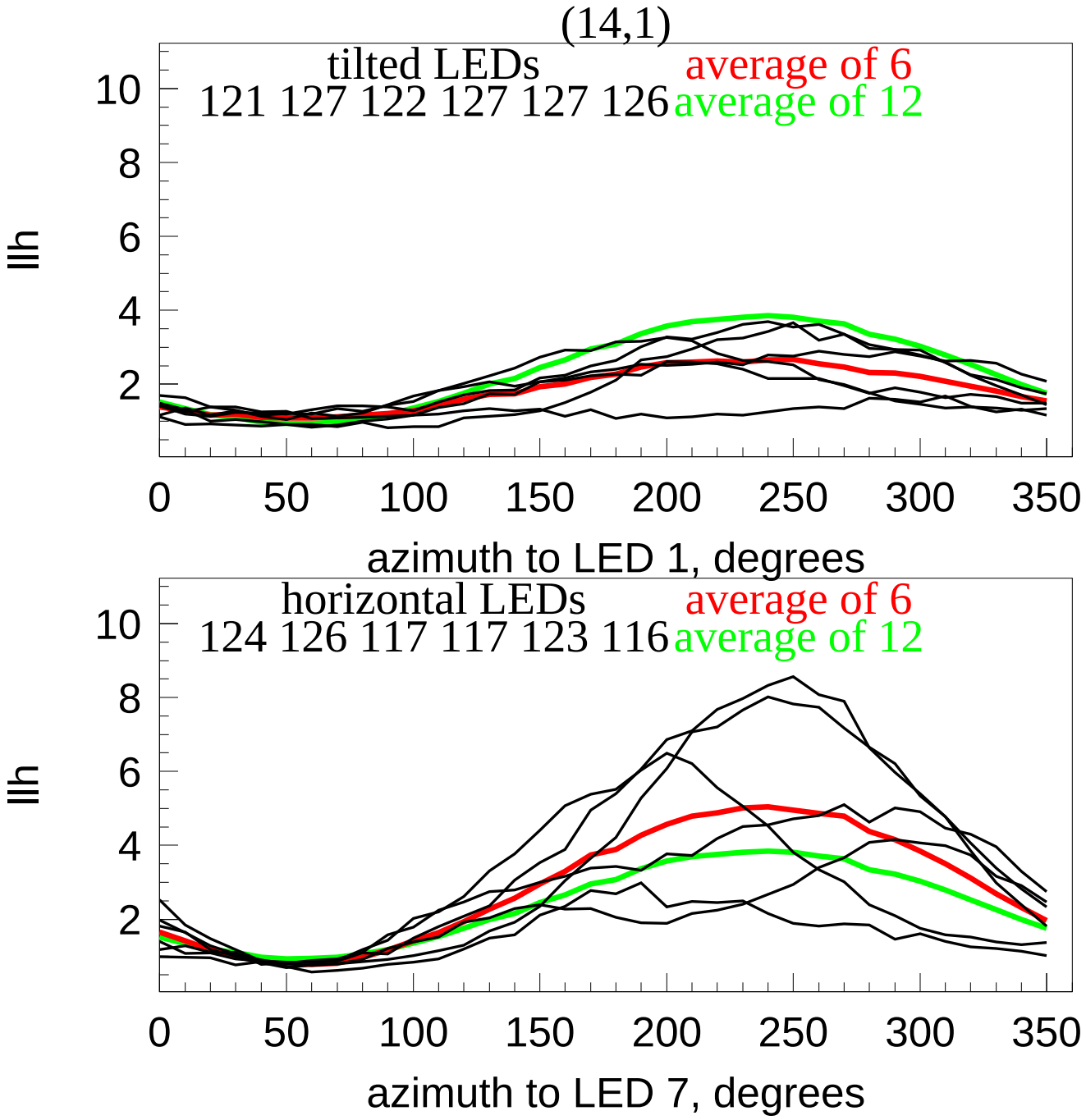

(13,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
70
5
11
3
4
9
10
67 ± 10.4

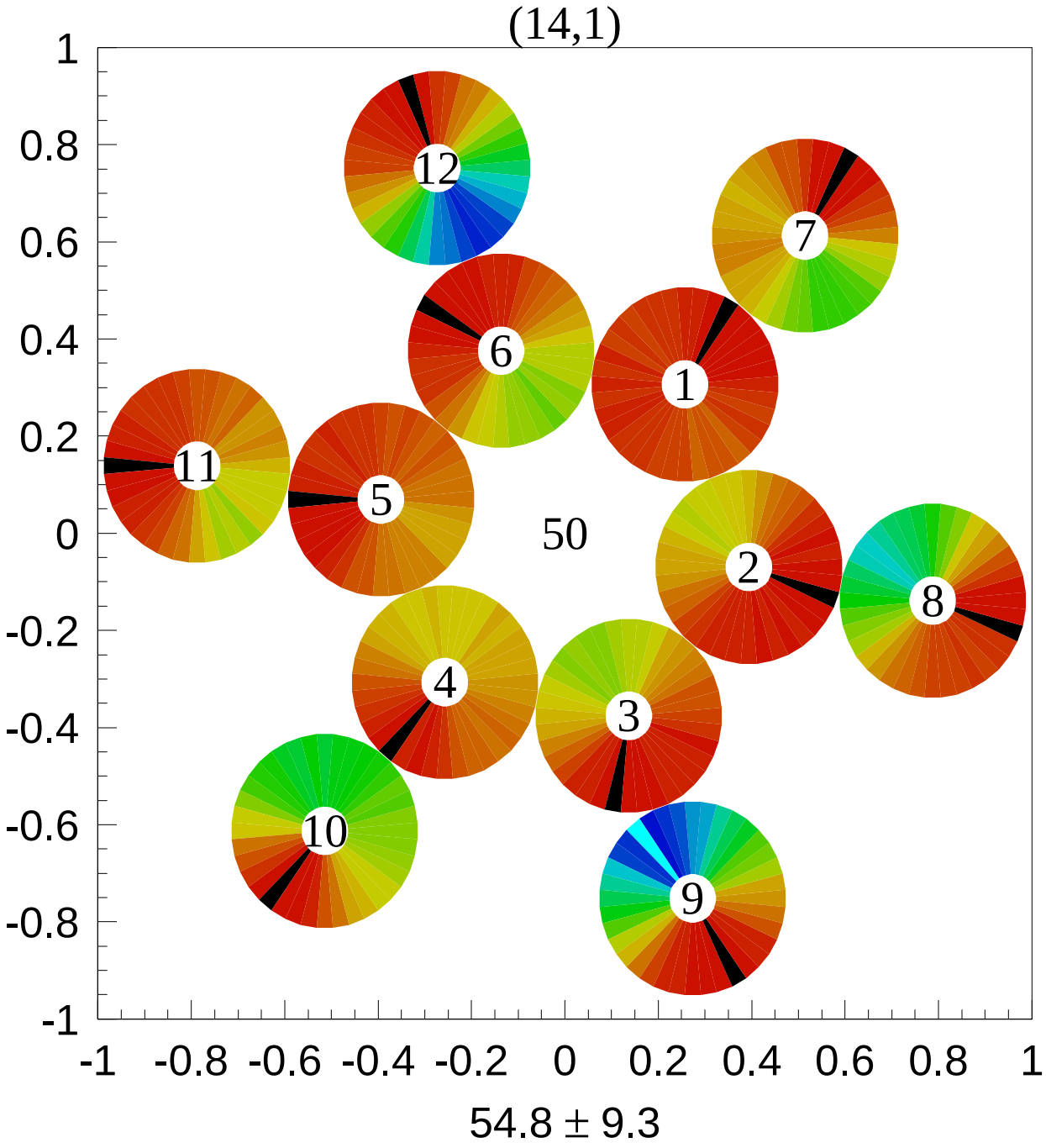

(13,27)
tilted LEDs
77 87 128 130 128 121
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 123 122 127 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

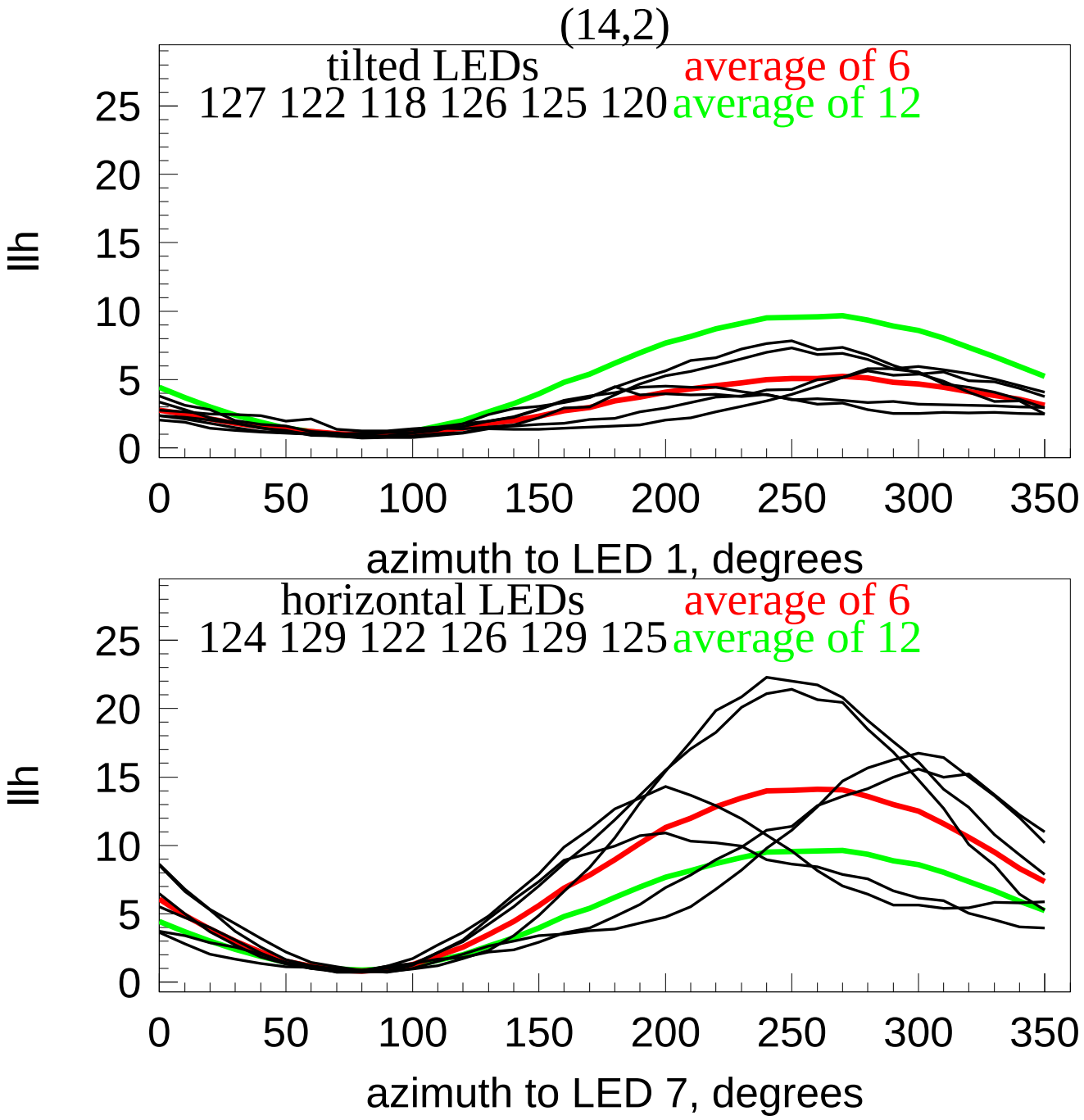

(13,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
159.4 ± 7.0

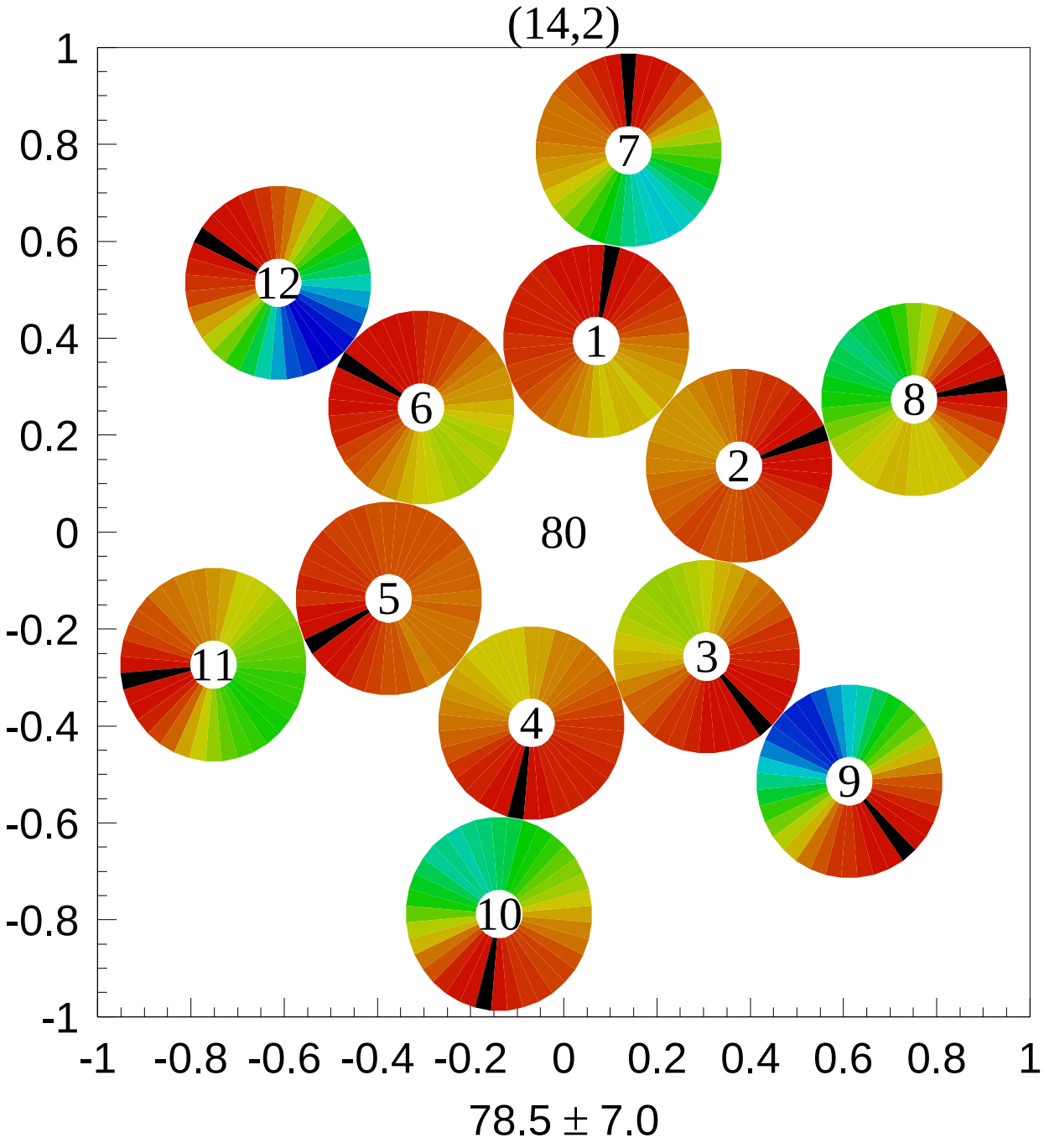

(13,28)
tilted LEDs
118 116 119 124 113 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 119 119 116 123 113
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

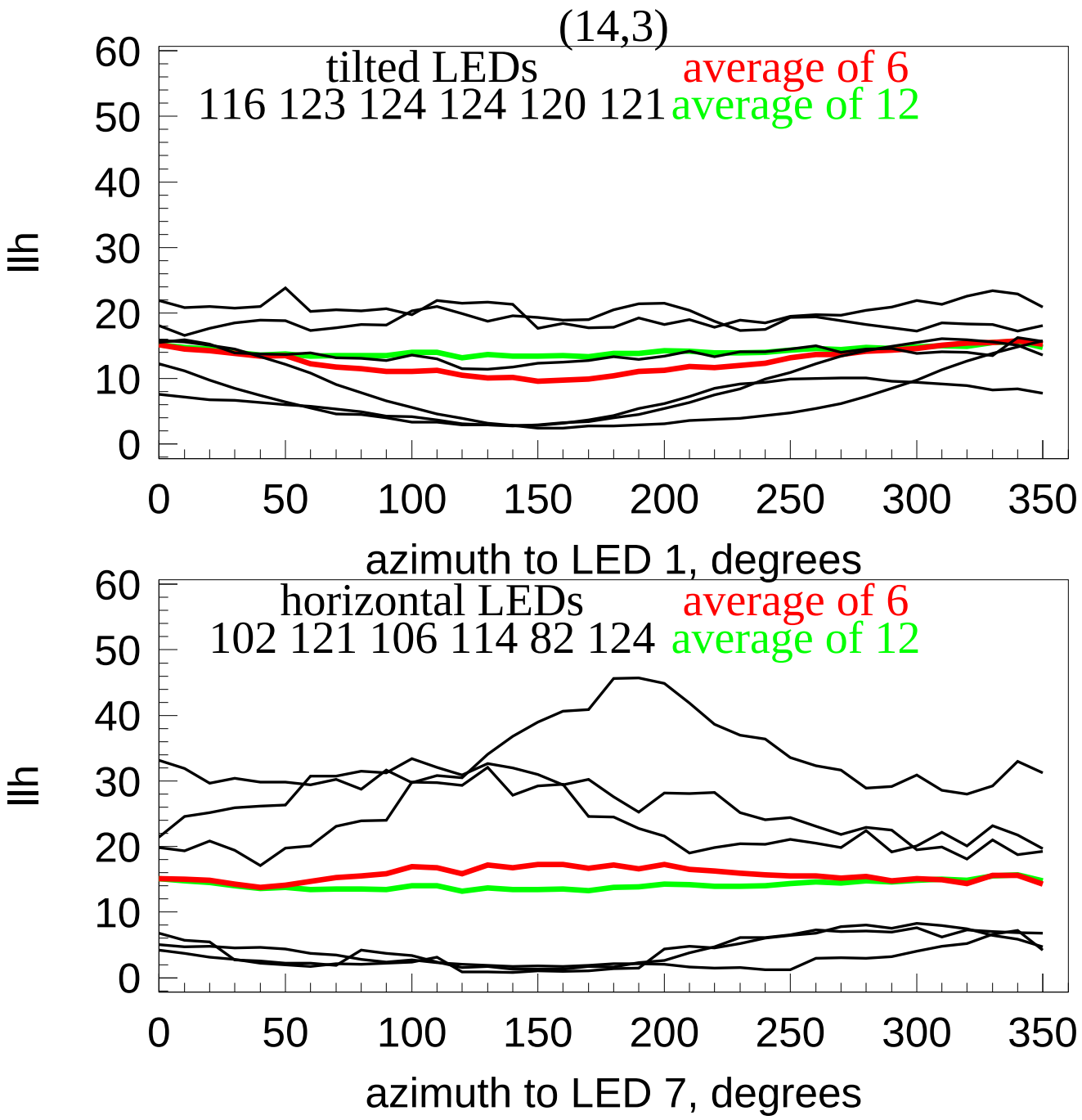

(13,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
140
140.4 ± 4.9
1
2
3
4
5
6
7
8
9
10
11
12

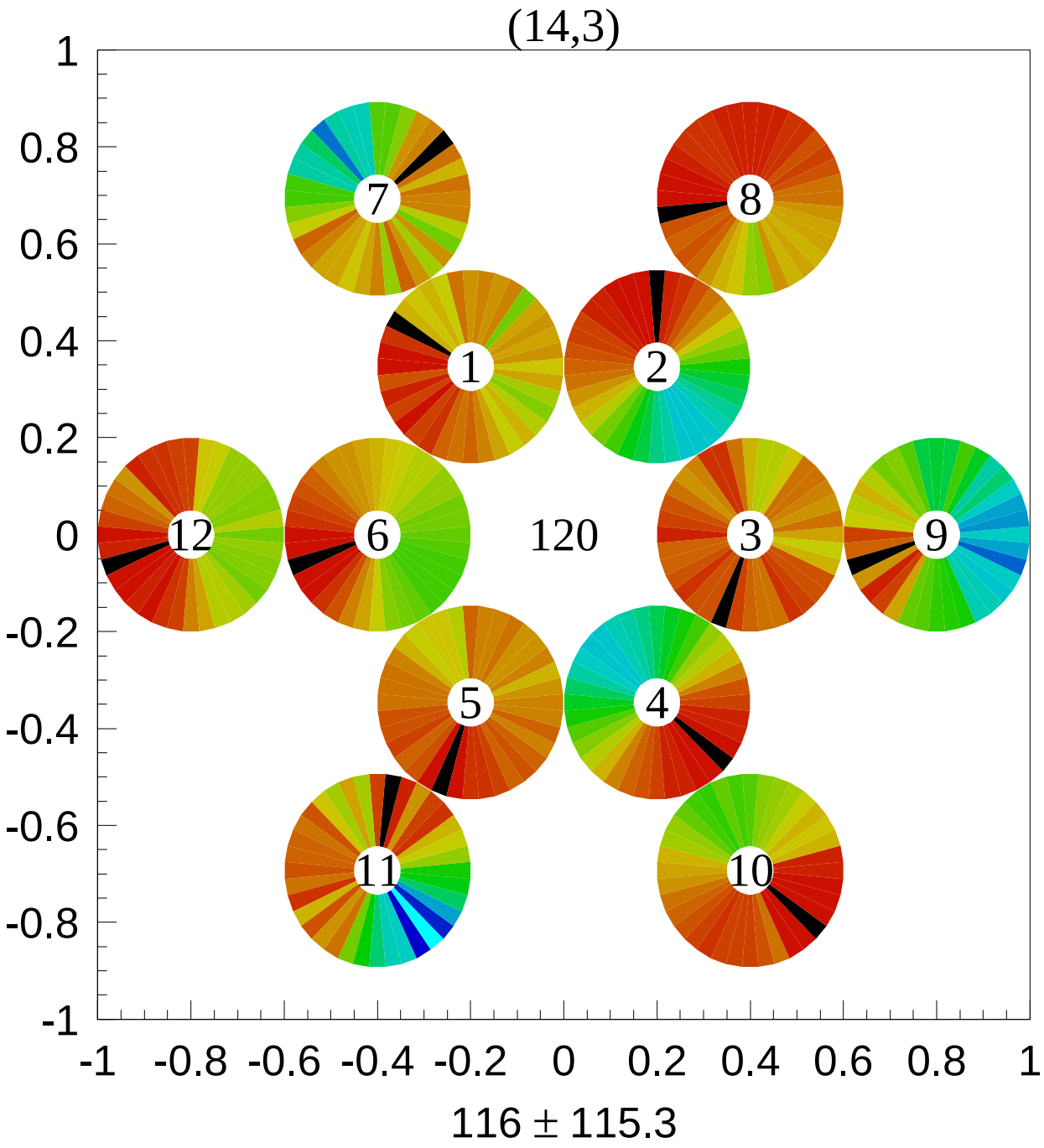

(14,1)
tilted LEDs
121 127 122 127 127 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 126 117 117 123 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

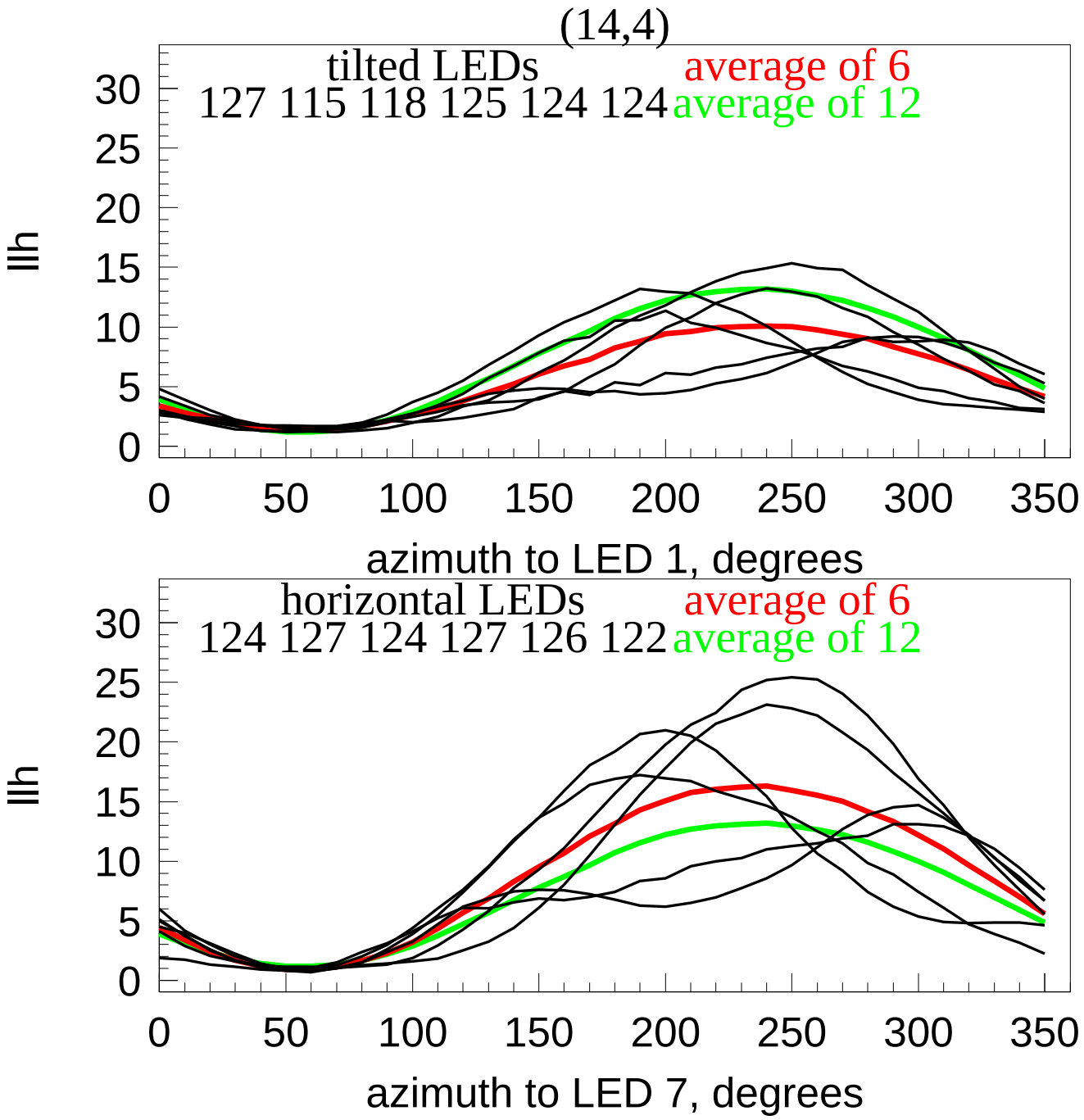

(14,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
54.8 ± 9.3

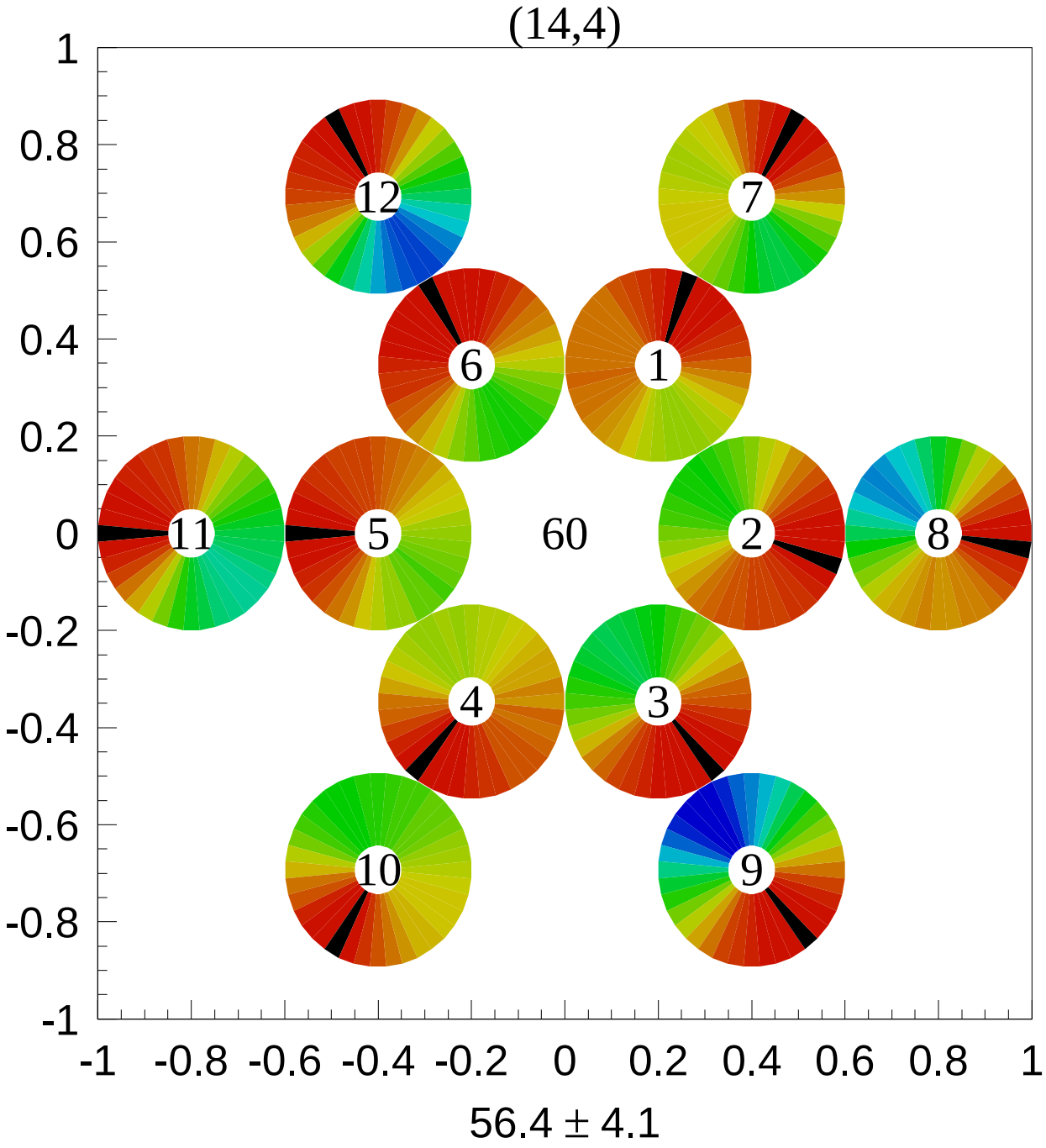

(14,2)
tilted LEDs
127 122 118 126 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 129 122 126 129 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

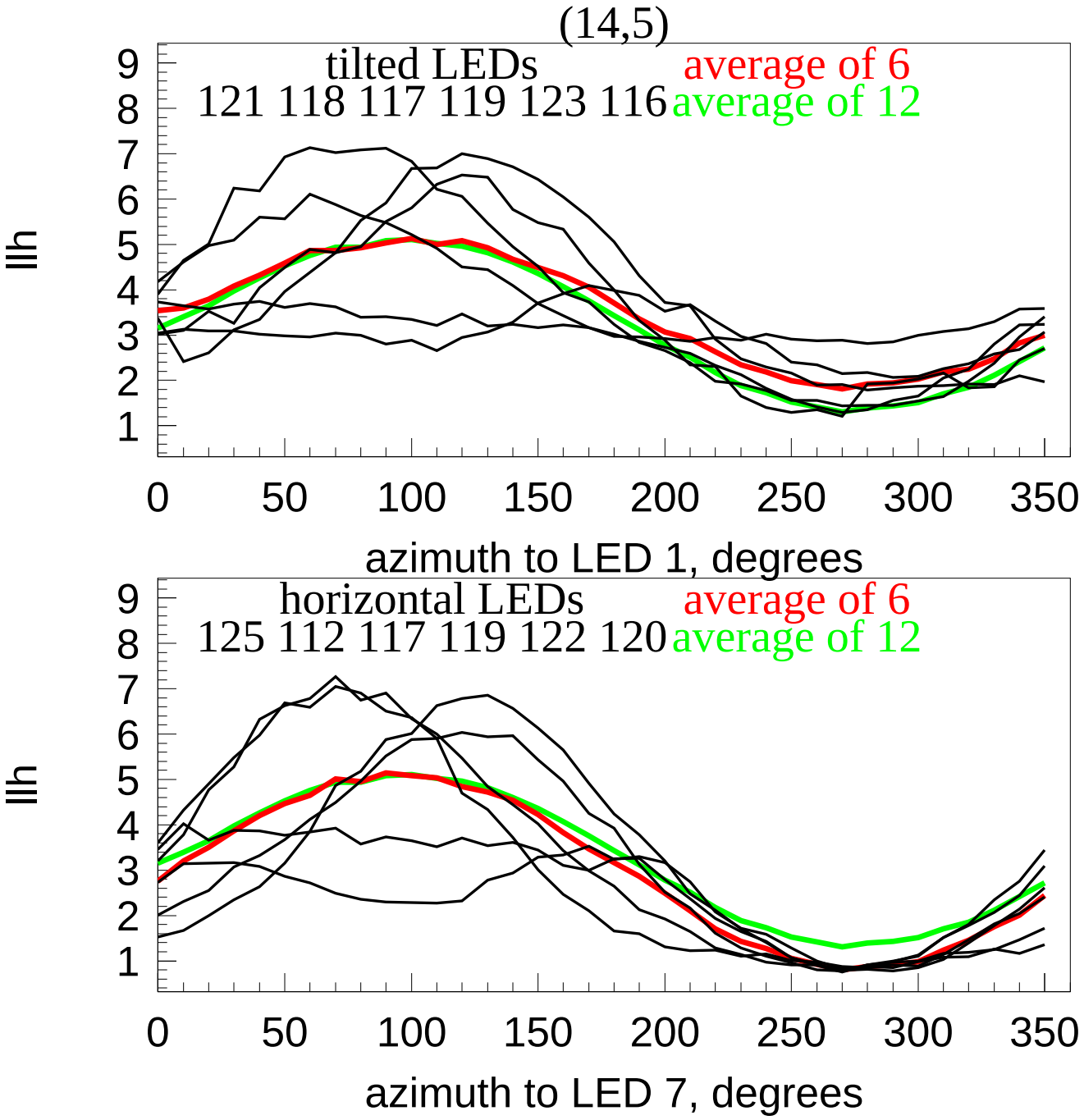

(14,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
78.5 ± 7.0

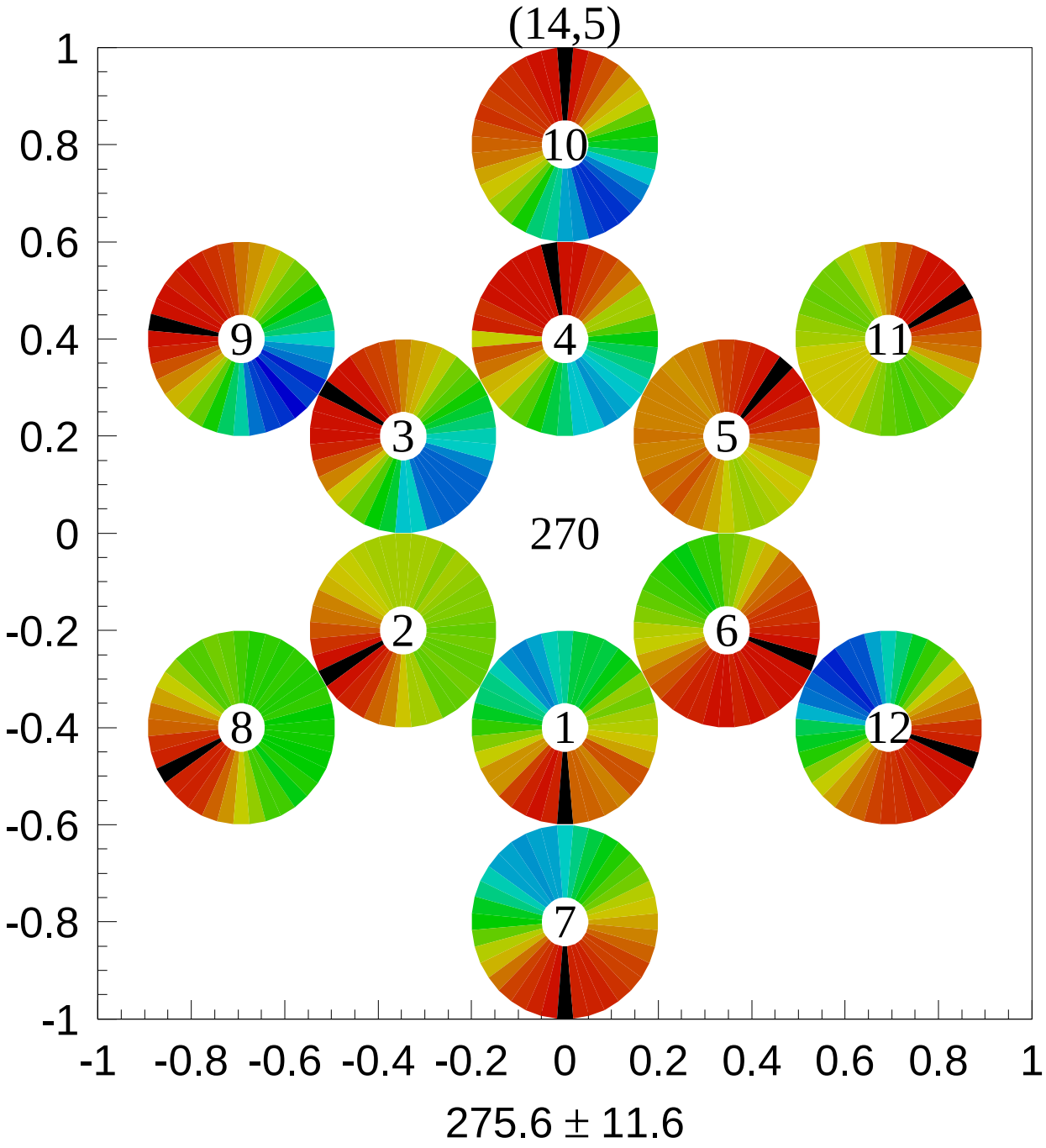

(14,3)
tilted LEDs
116 123 124 124 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
102 121 106 114 82 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

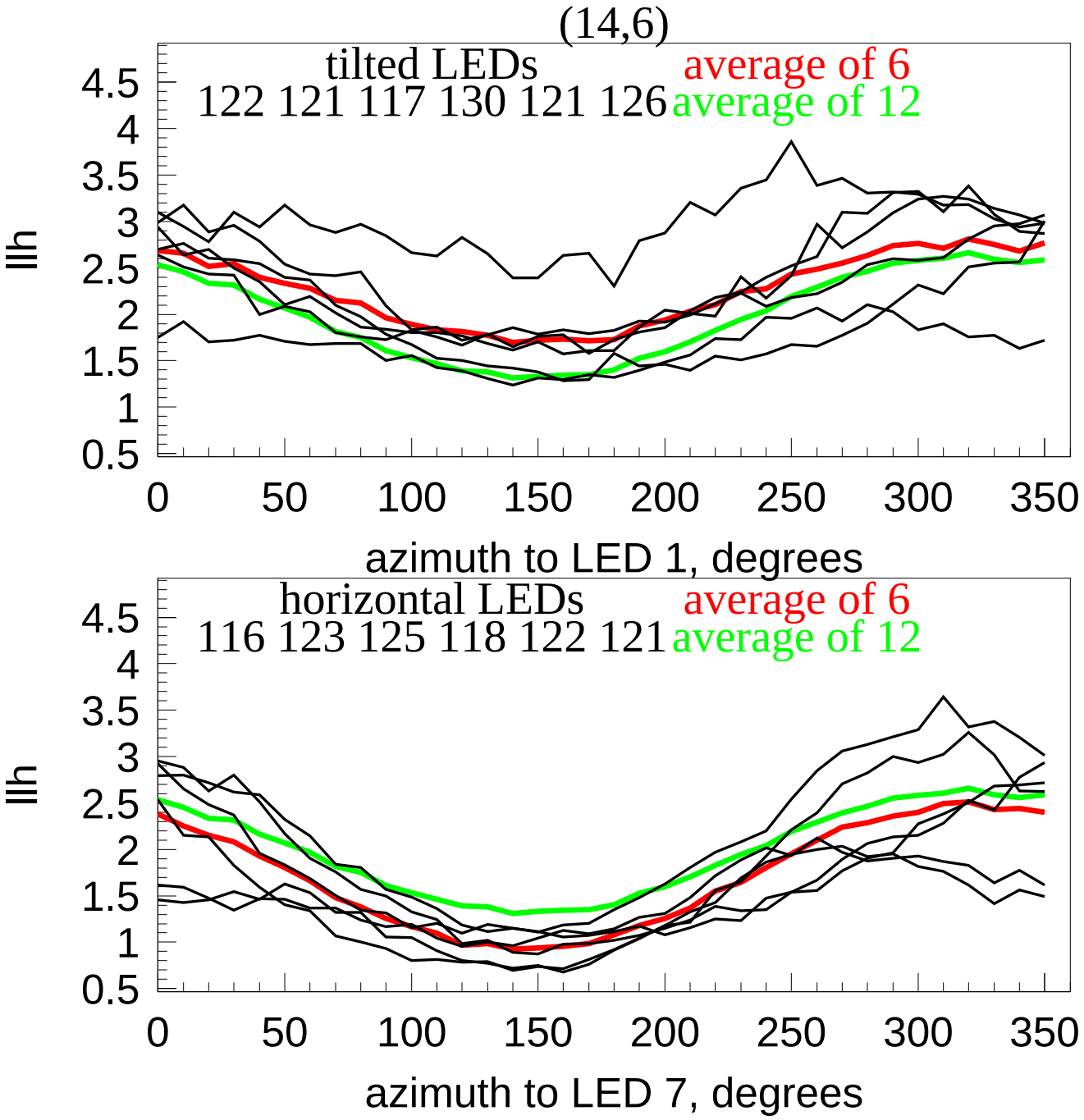

(14,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
116 ± 115.3

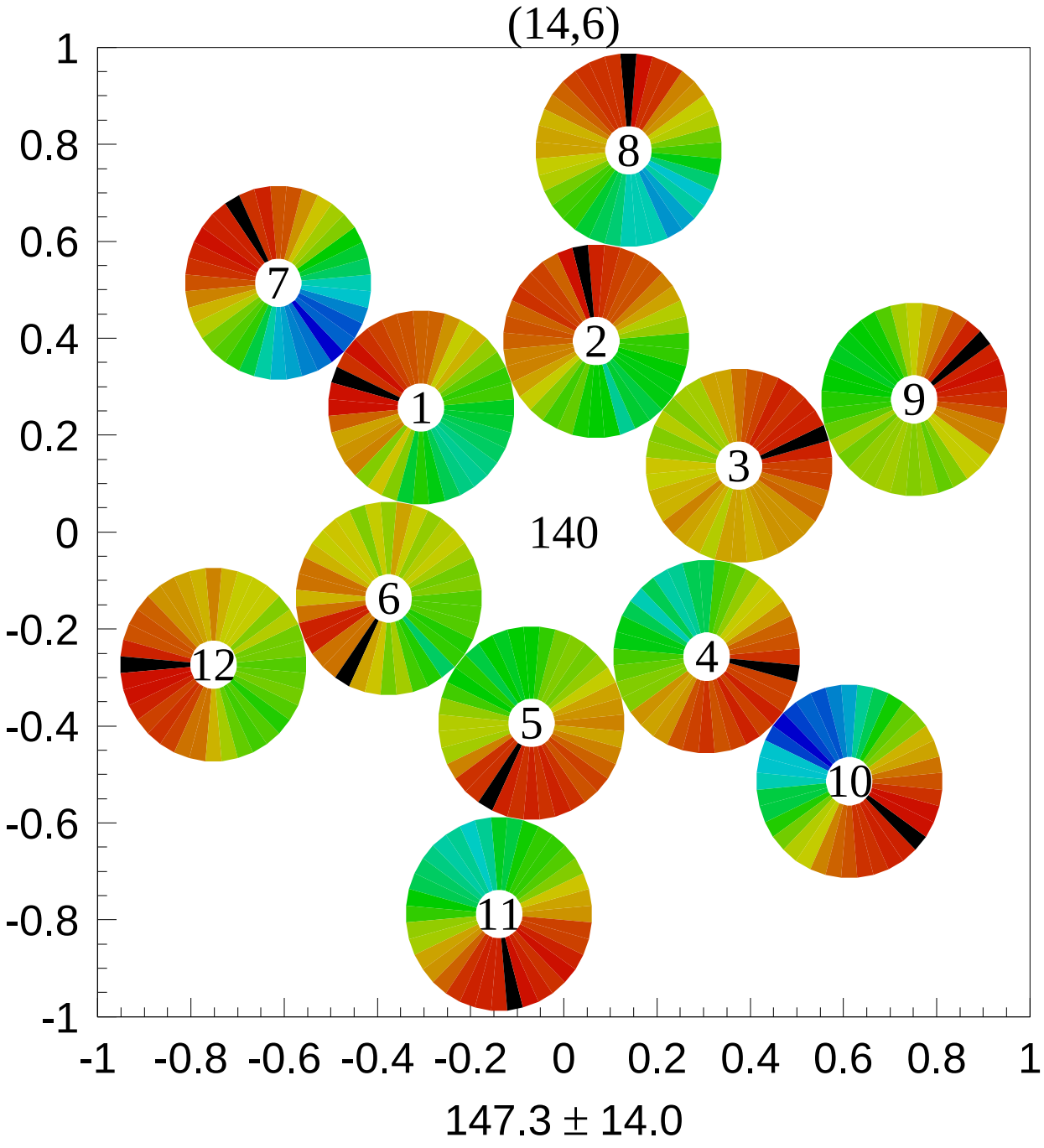

(14,4)
tilted LEDs
127 115 118 125 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 127 124 127 126 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

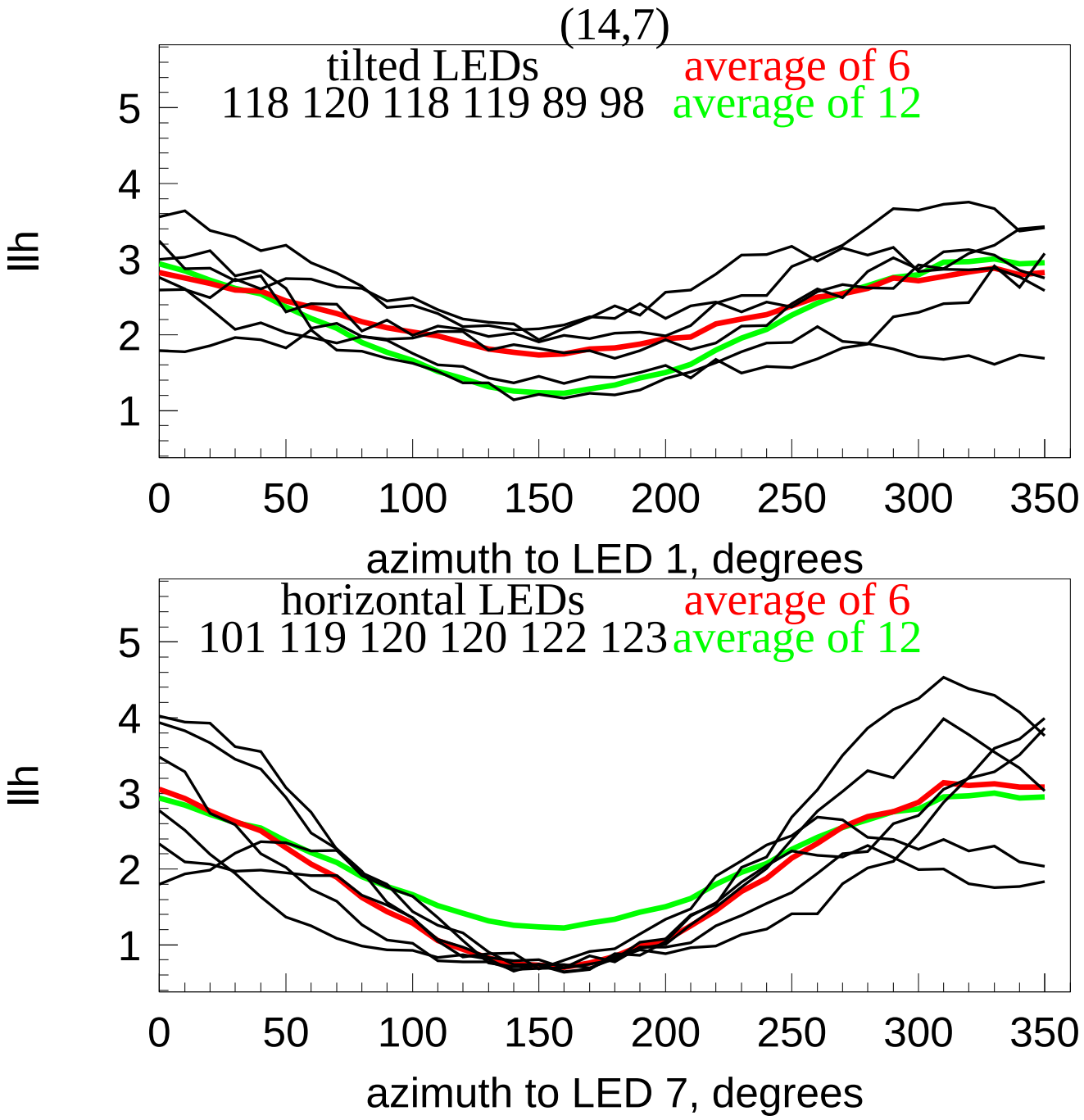

(14,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
56.4 ± 4.1

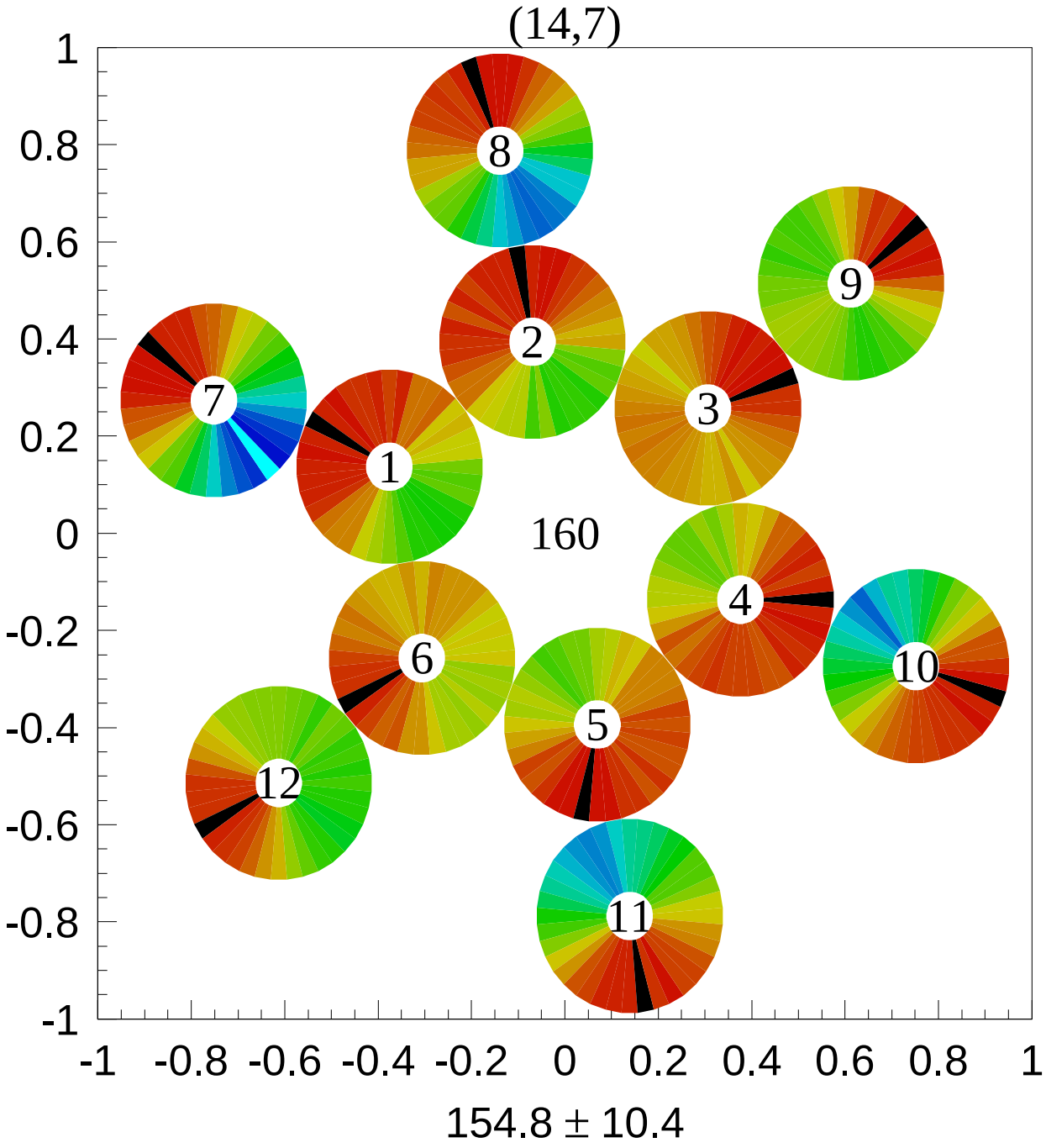

(14,5)
tilted LEDs
121 118 117 119 123 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 112 117 119 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

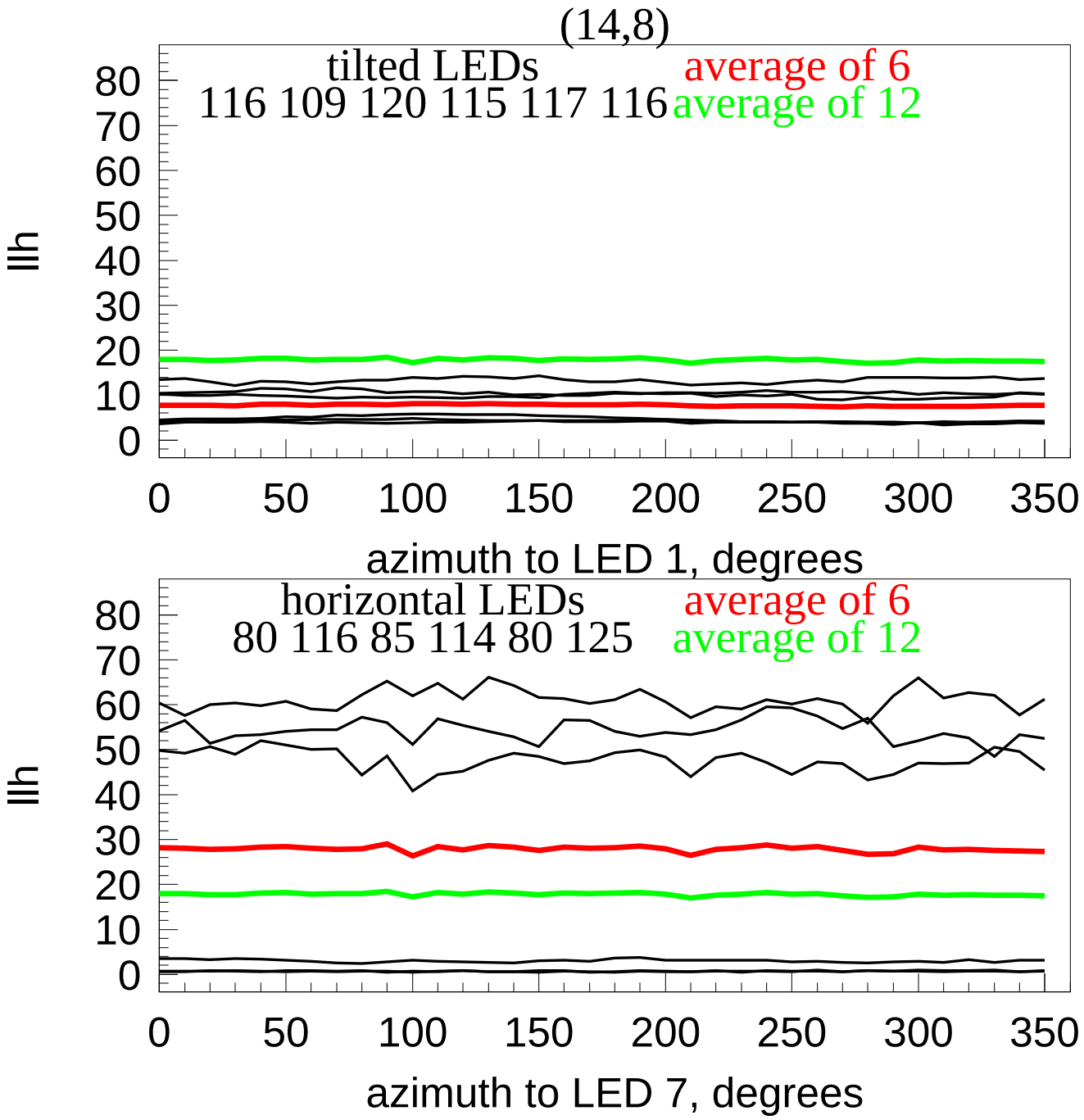

(14,5)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
275.6 ± 11.6

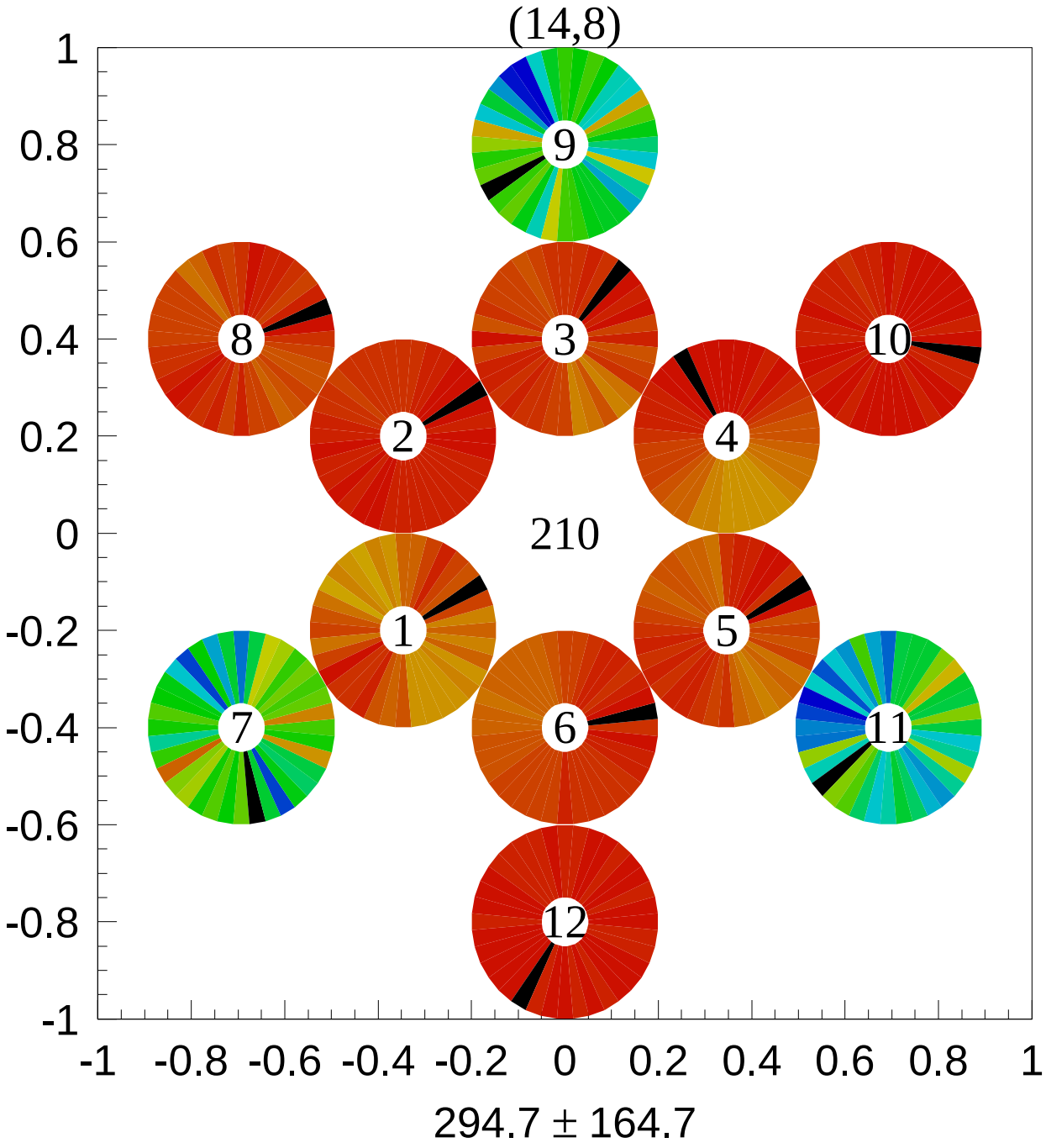

(14,6)
tilted LEDs
122 121 117 130 121 126
average of 6
average of 12
llh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 123 125 118 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

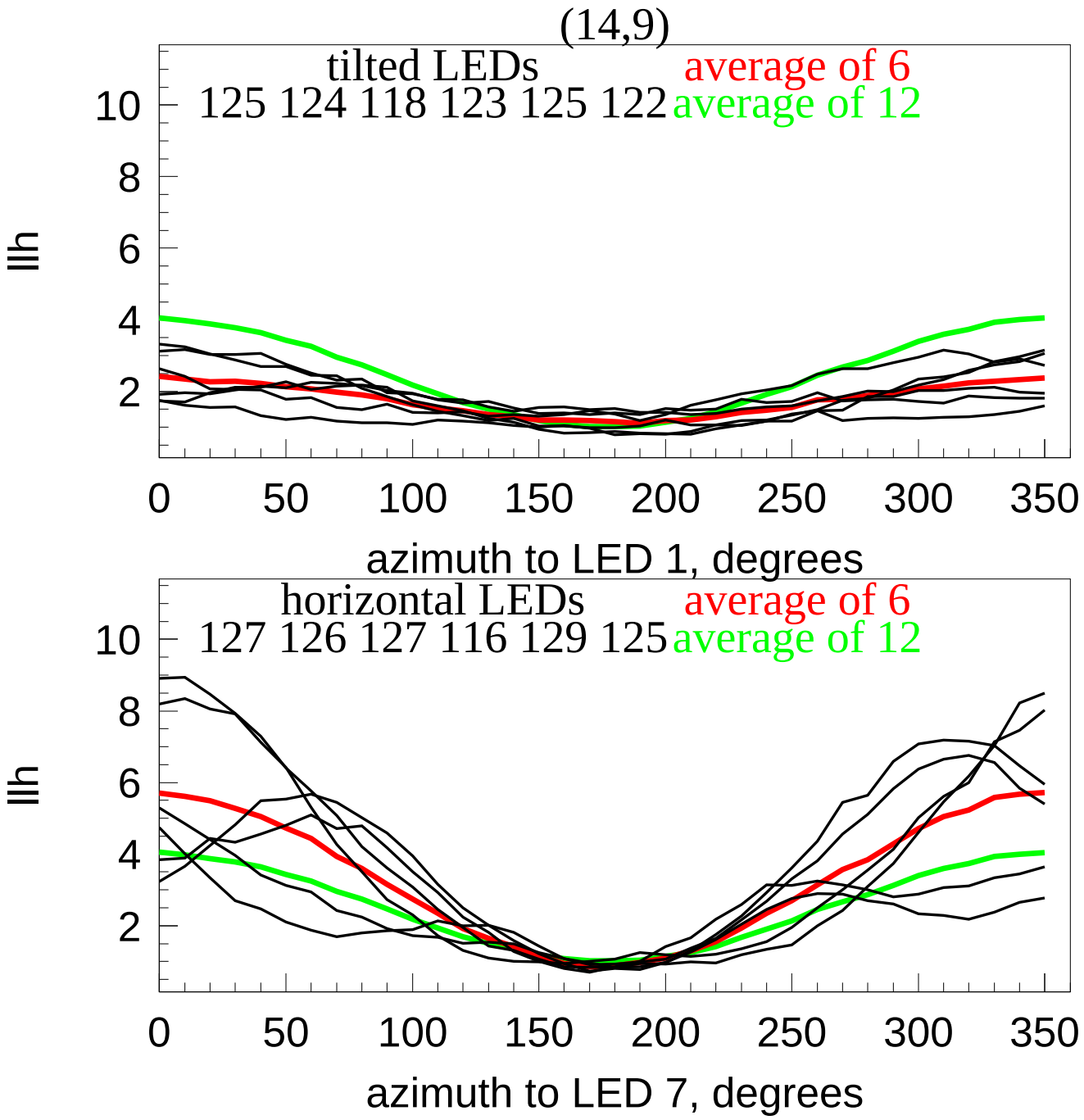

(14,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
147.3 ± 14.0
140
1
2
3
4
5
6
7
8
9
10
11
12

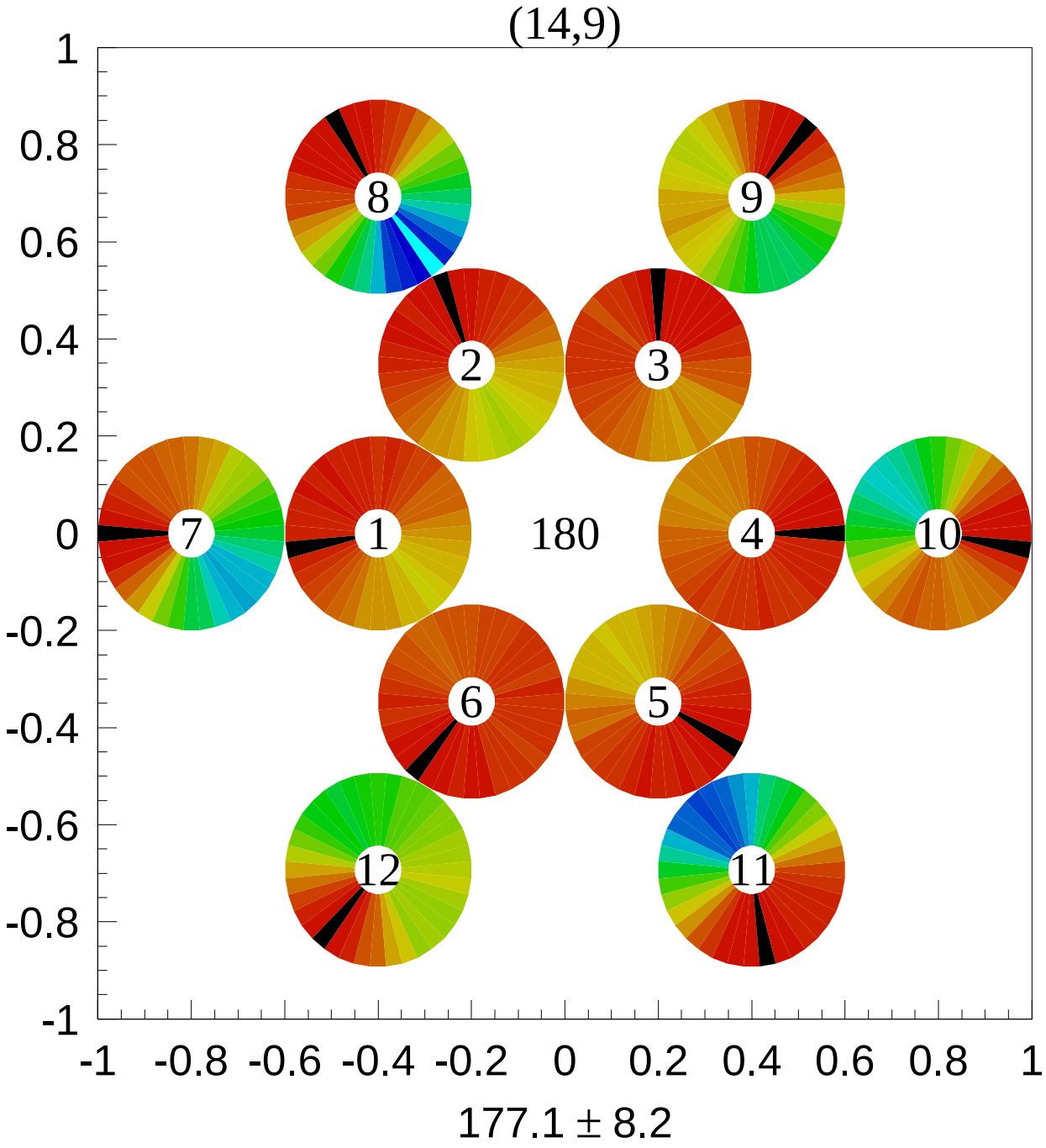

(14,7)
tilted LEDs
118 120 118 119 89 98
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
101 119 120 120 122 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

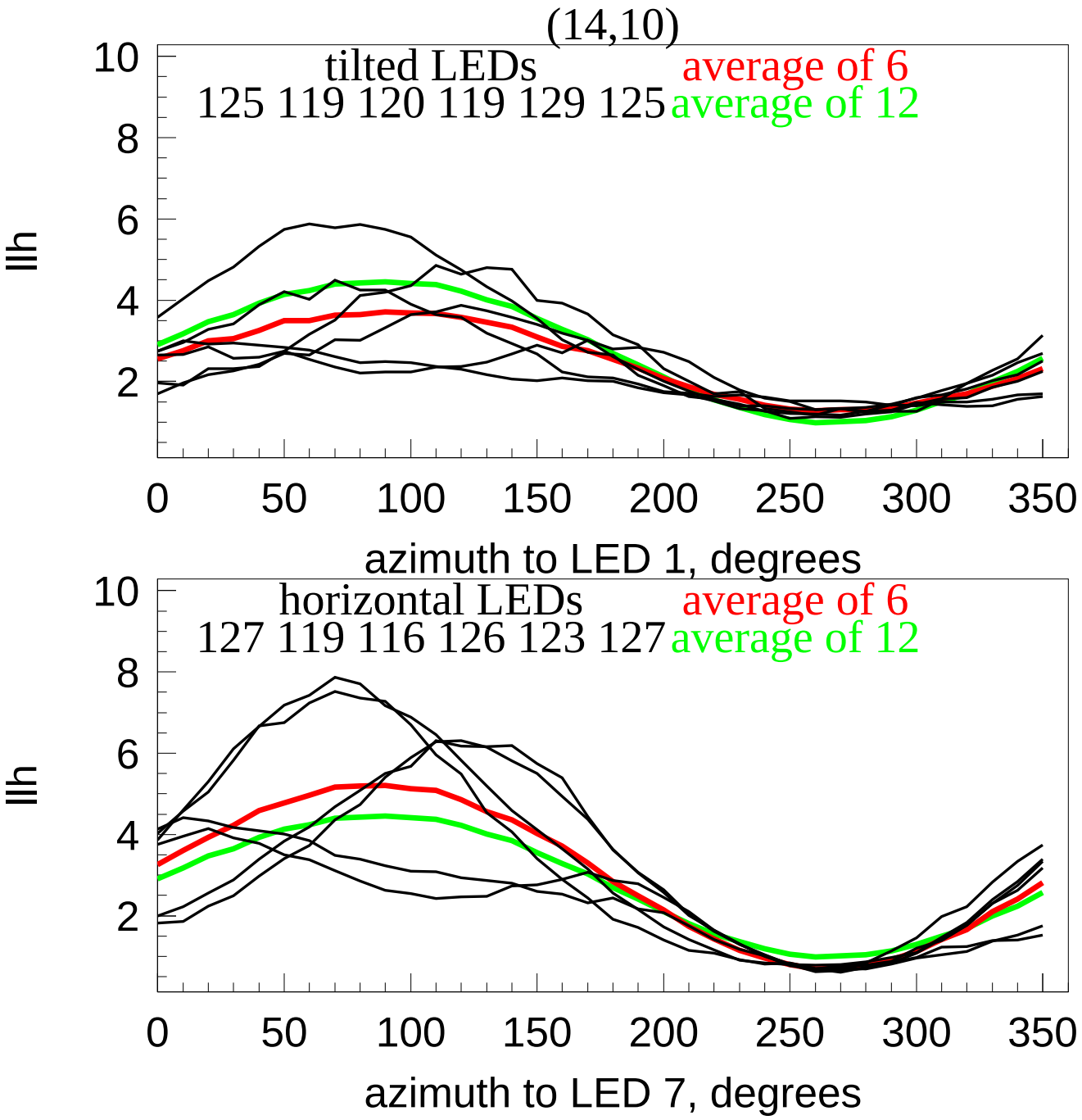

(14,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
10
6
5
12
11
154.8 ± 10.4

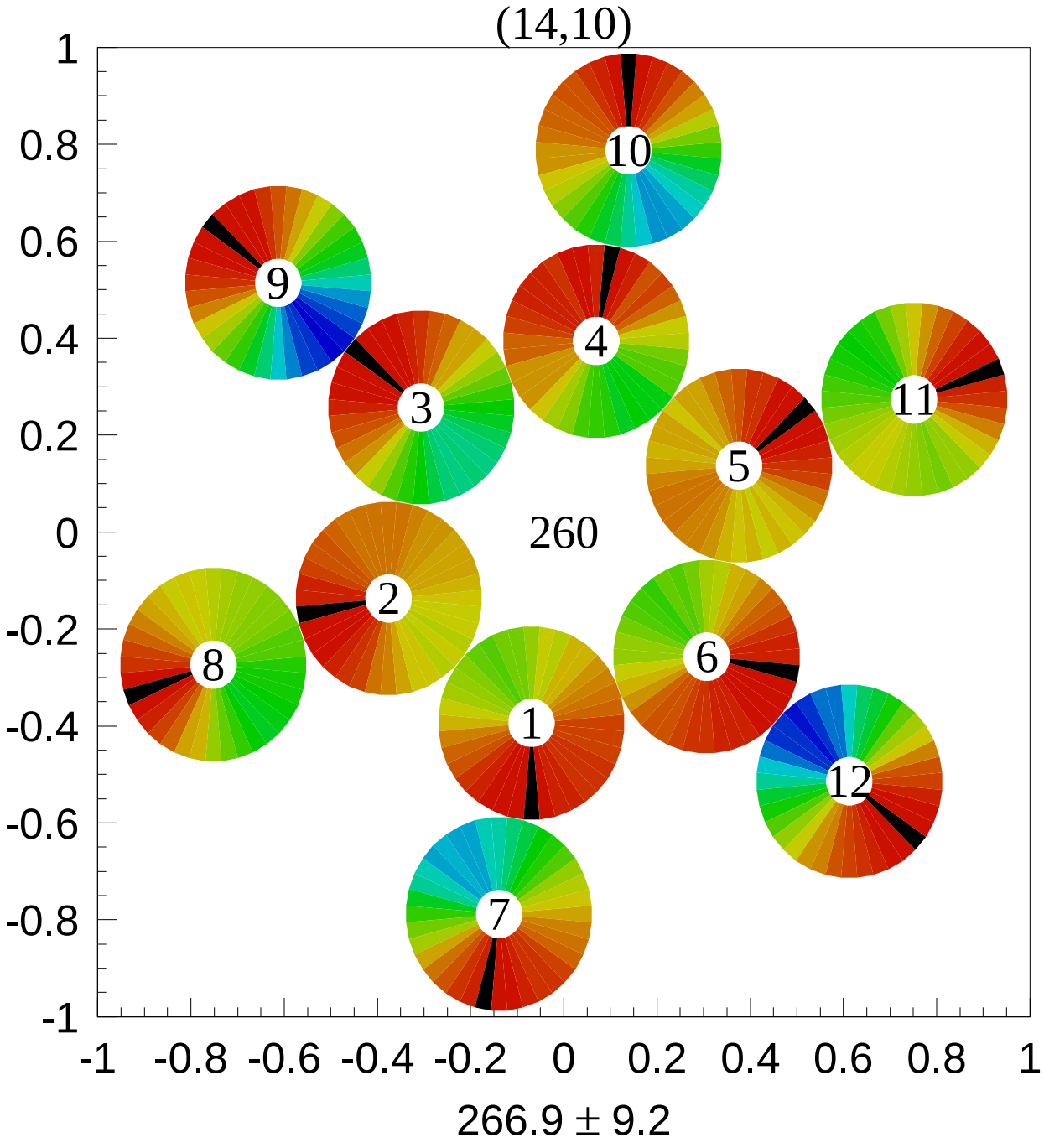

(14,8)
tilted LEDs
116 109 120 115 117 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
80 116 85 114 80 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

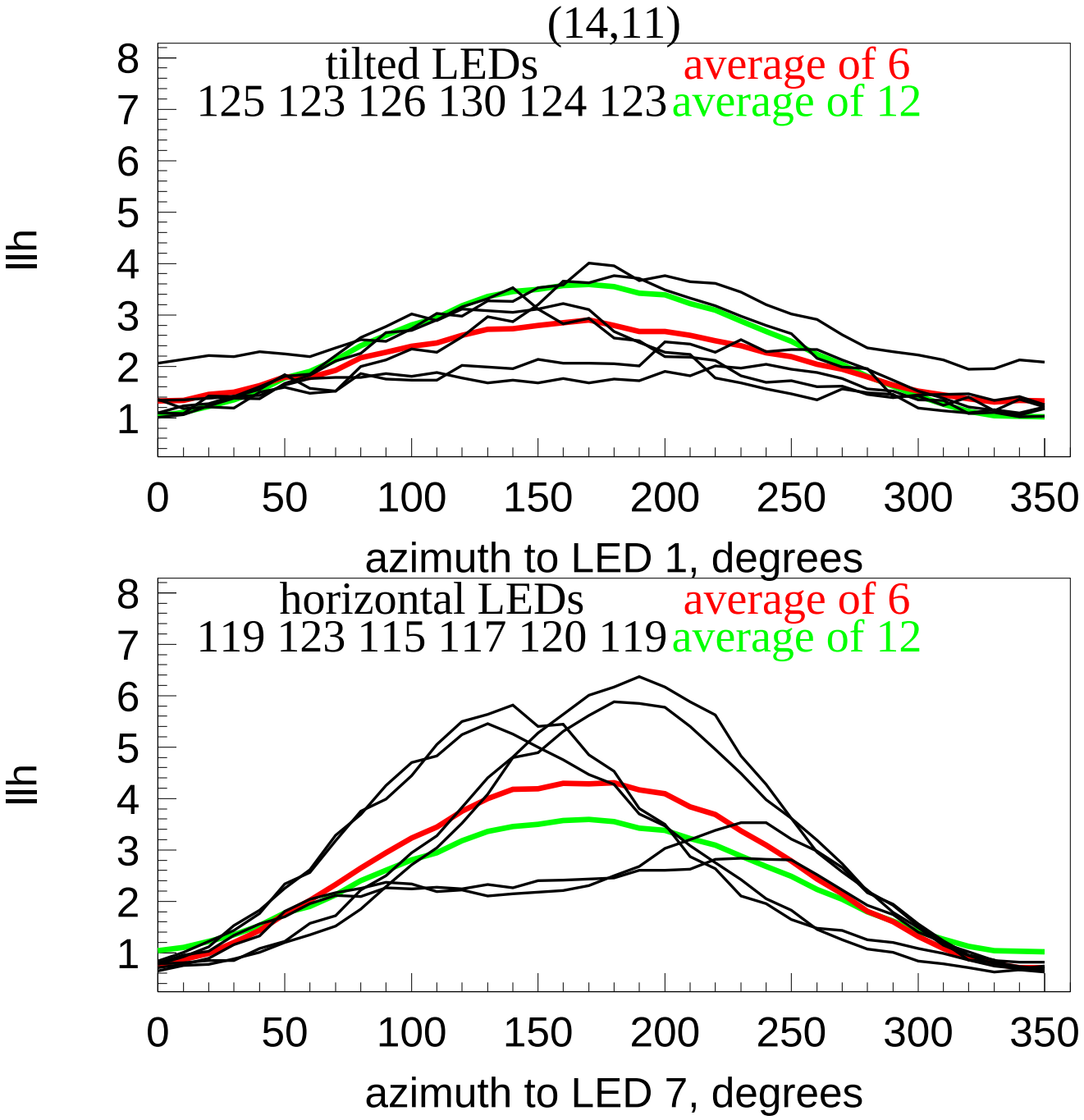

(14,8)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
294.7 ± 164.7

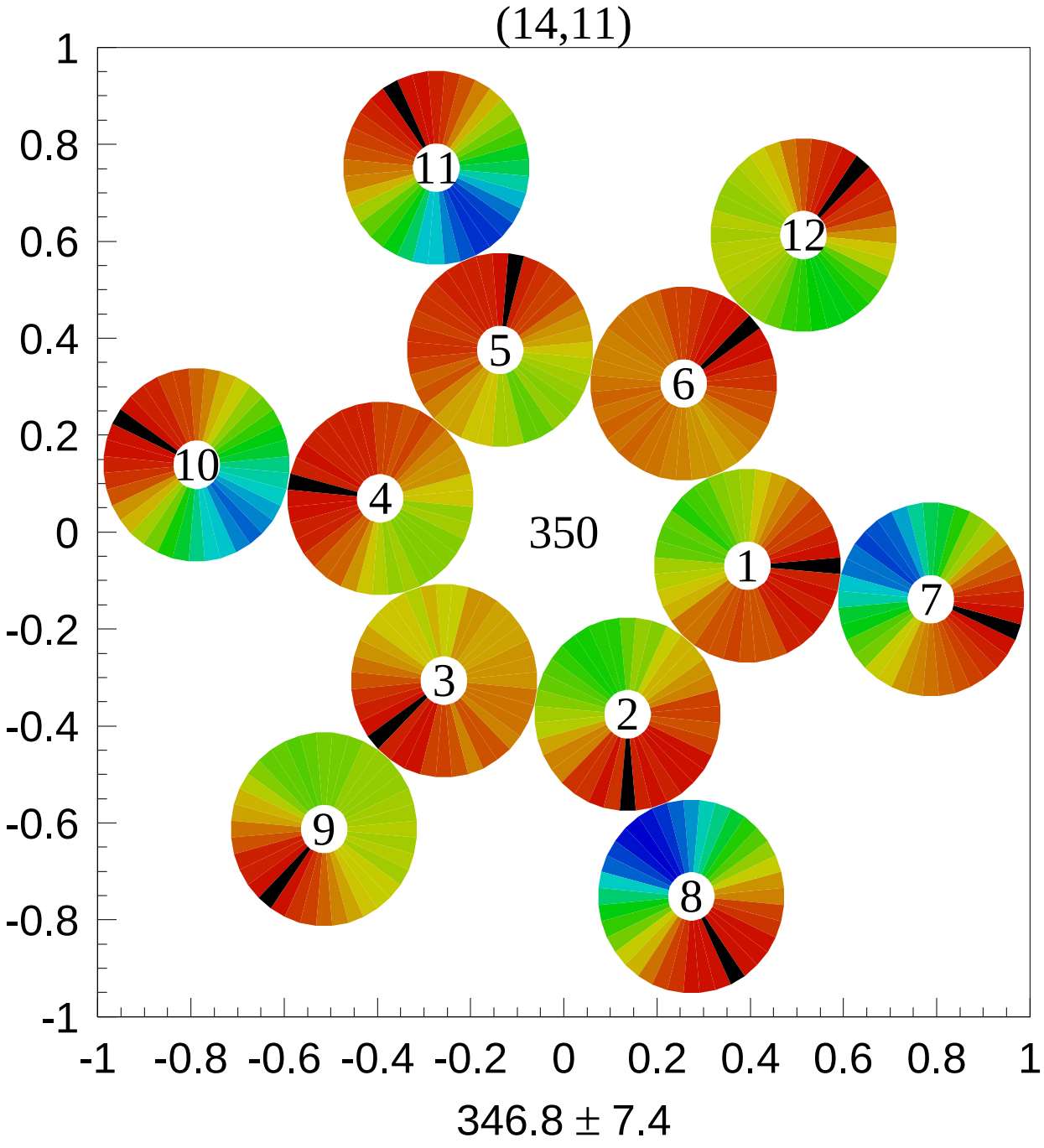

(14,9)
tilted LEDs
125 124 118 123 125 122
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 126 127 116 129 125
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

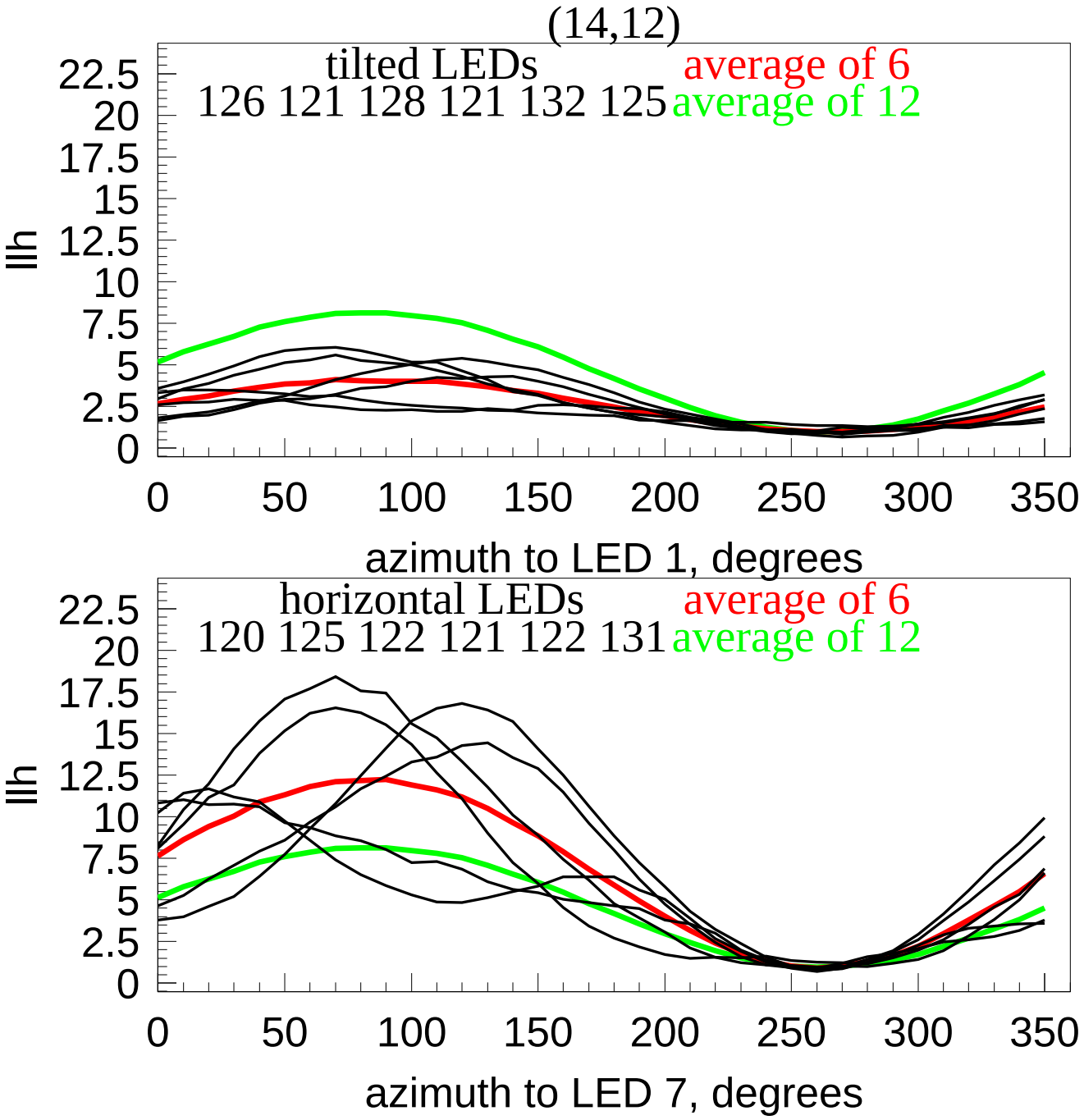

(14,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
177.1 ± 8.2

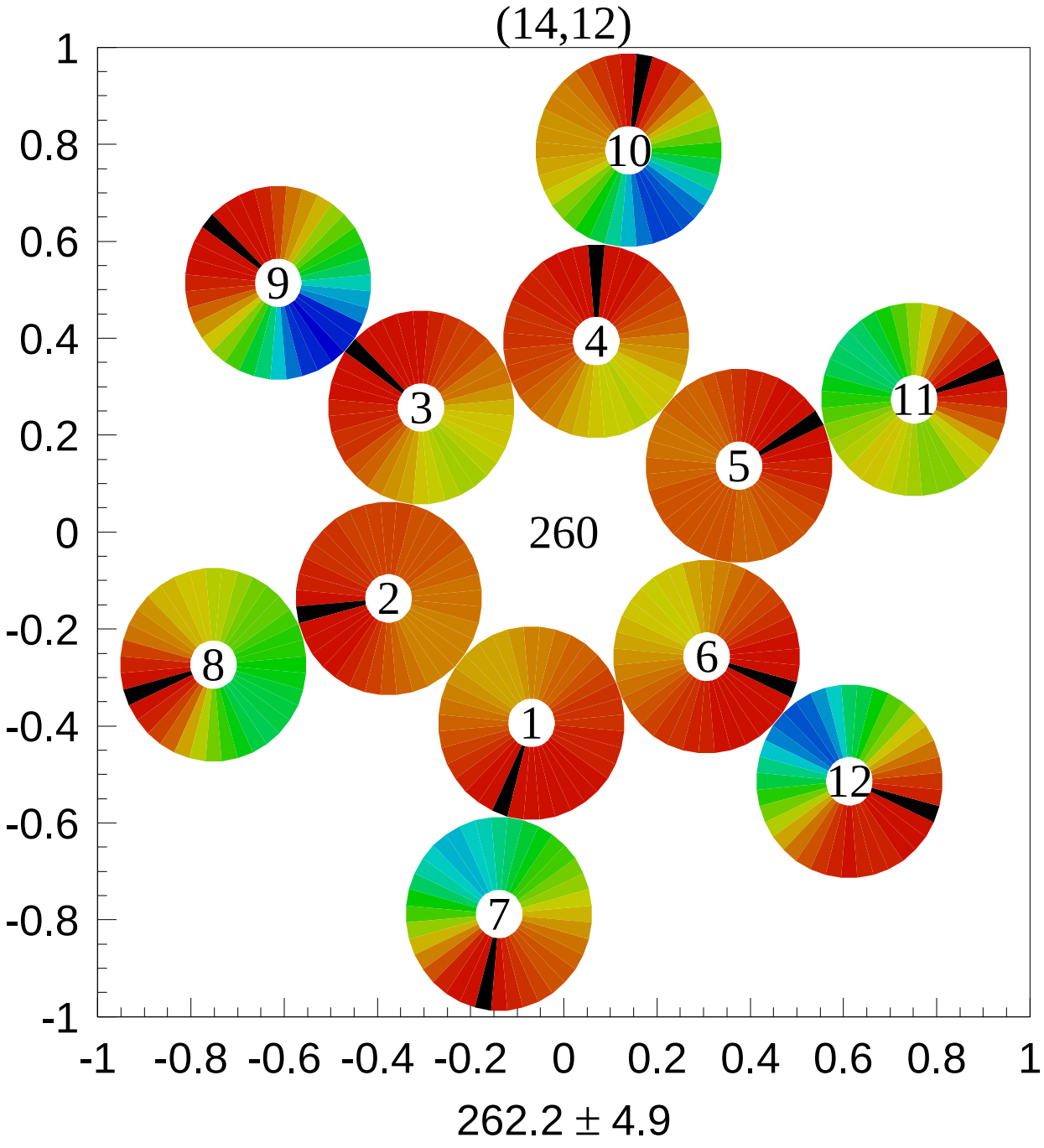

(14,10)
tilted LEDs
125 119 120 119 129 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 119 116 126 123 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

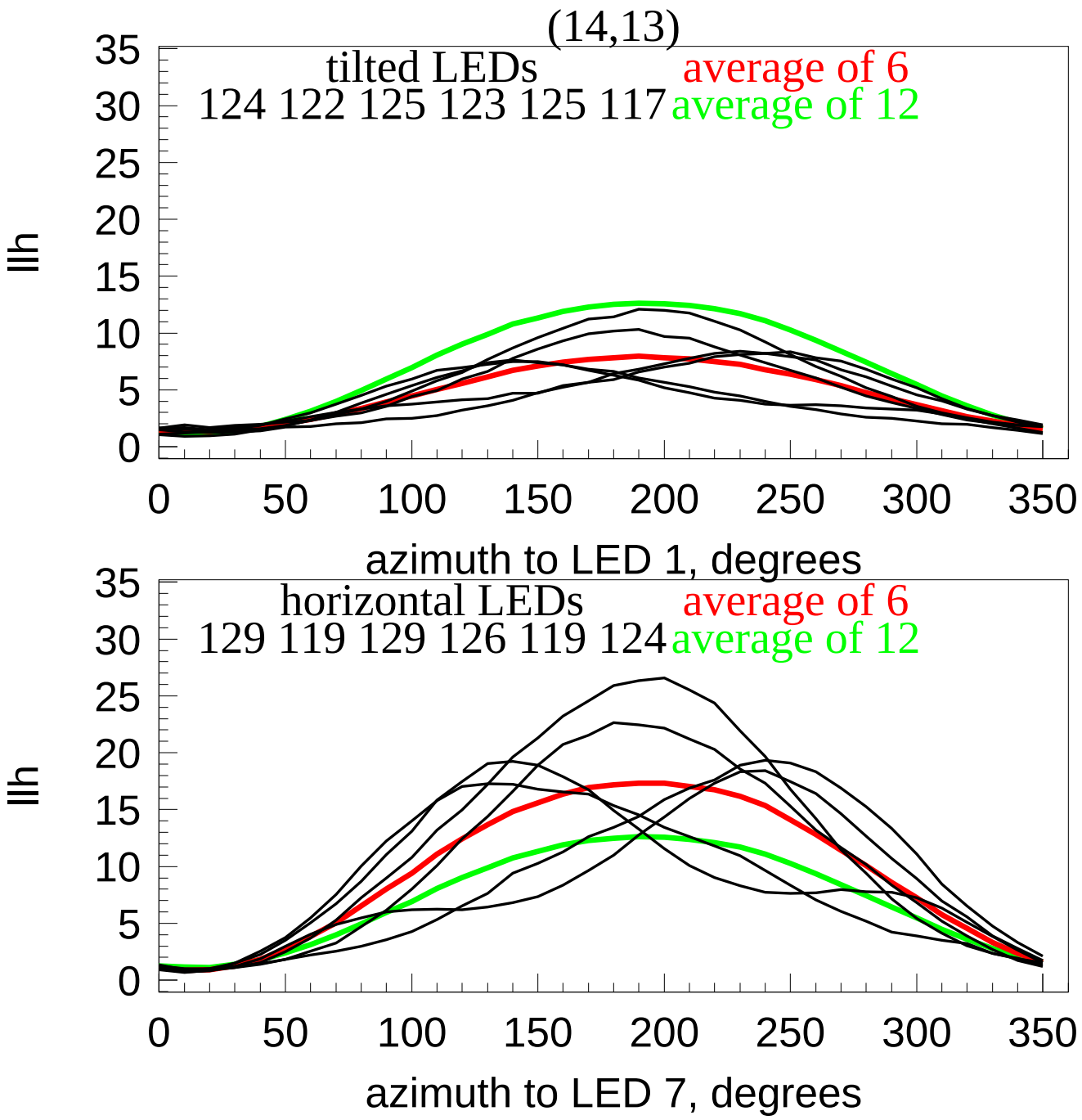

(14,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
266.9 ± 9.2
260
1
2
3
4
5
6
7
8
9
10
11
12

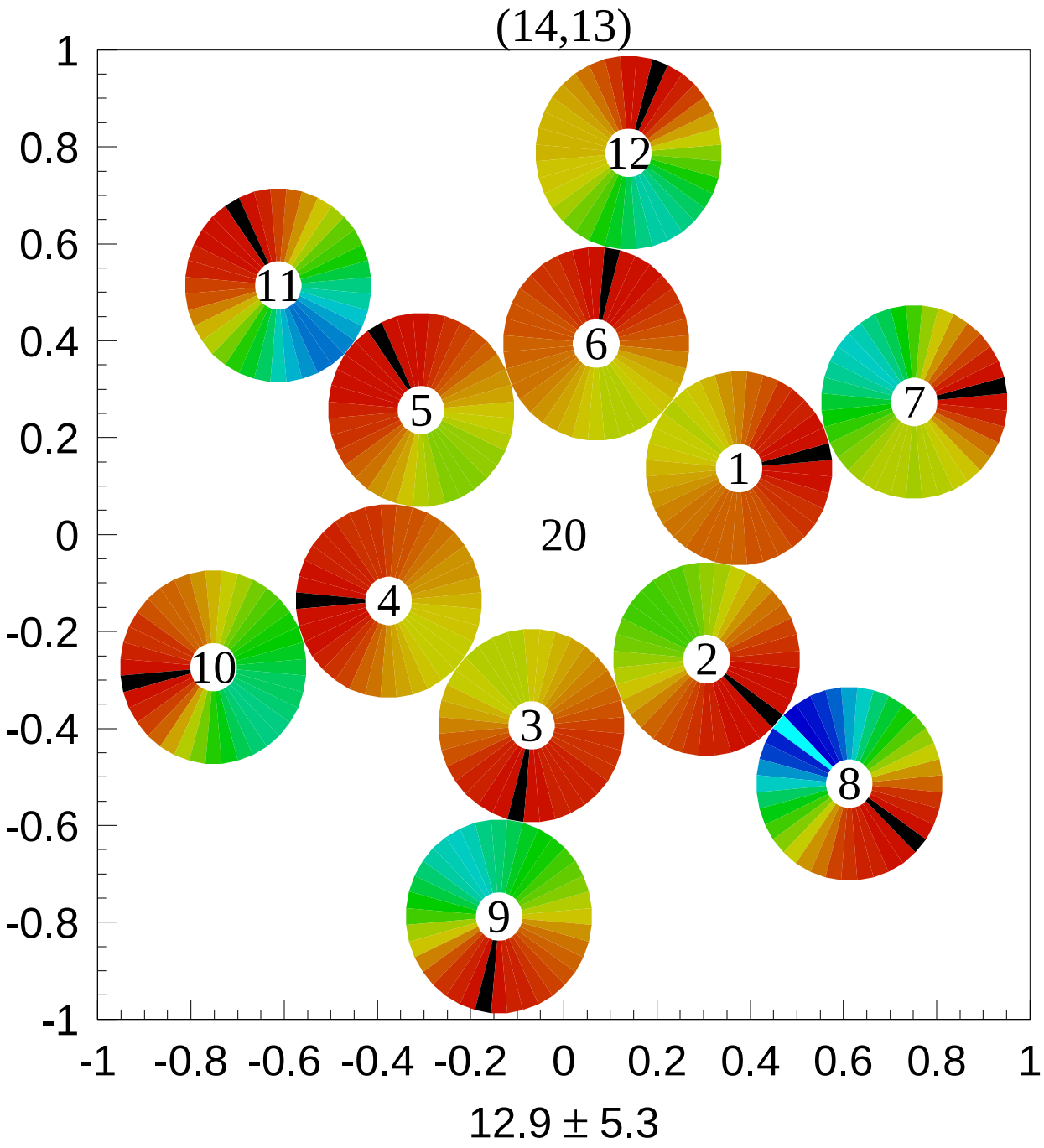

(14,11)
tilted LEDs
125 123 126 130 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 115 117 120 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

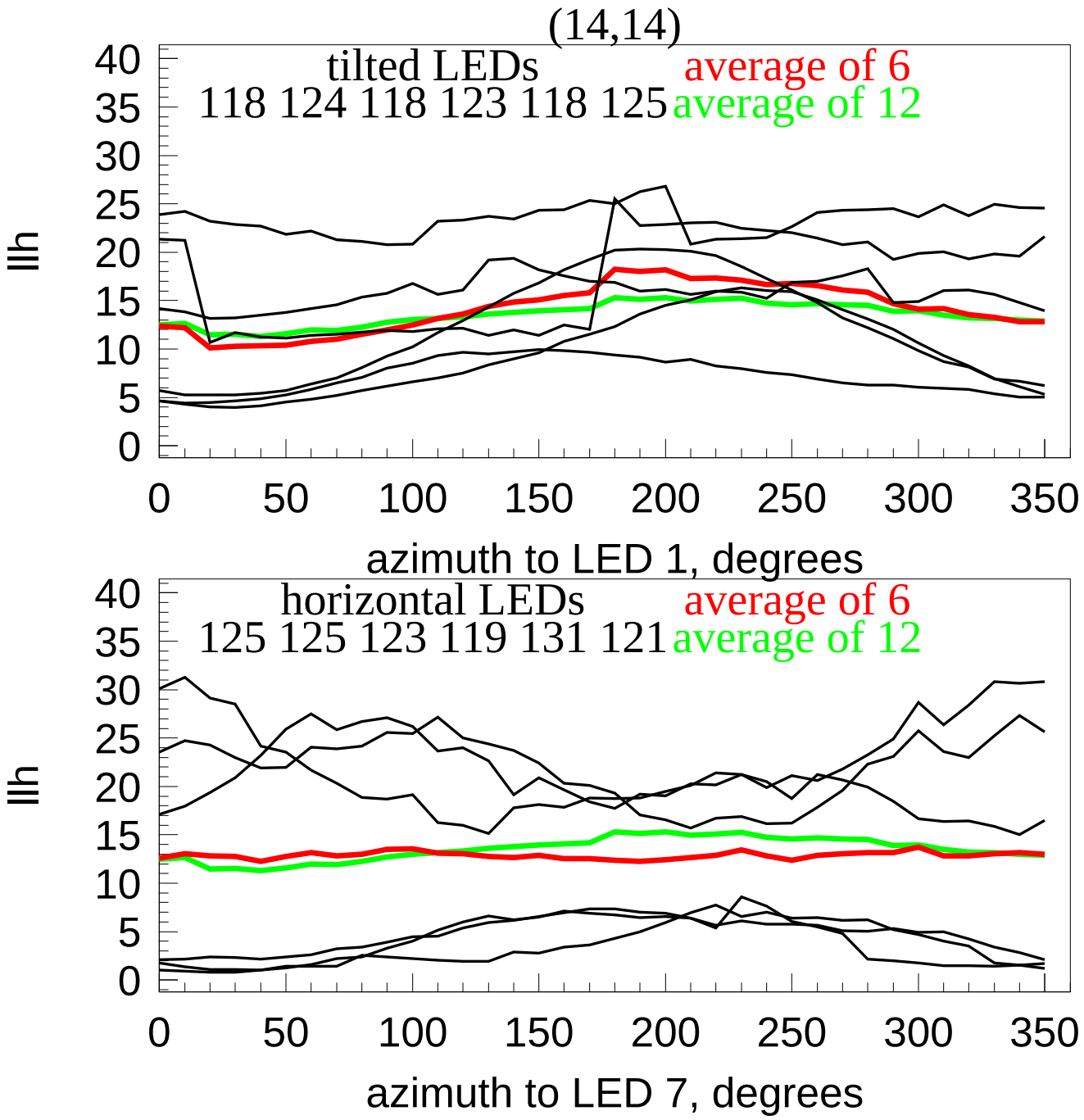

(14,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
346.8 ± 7.4

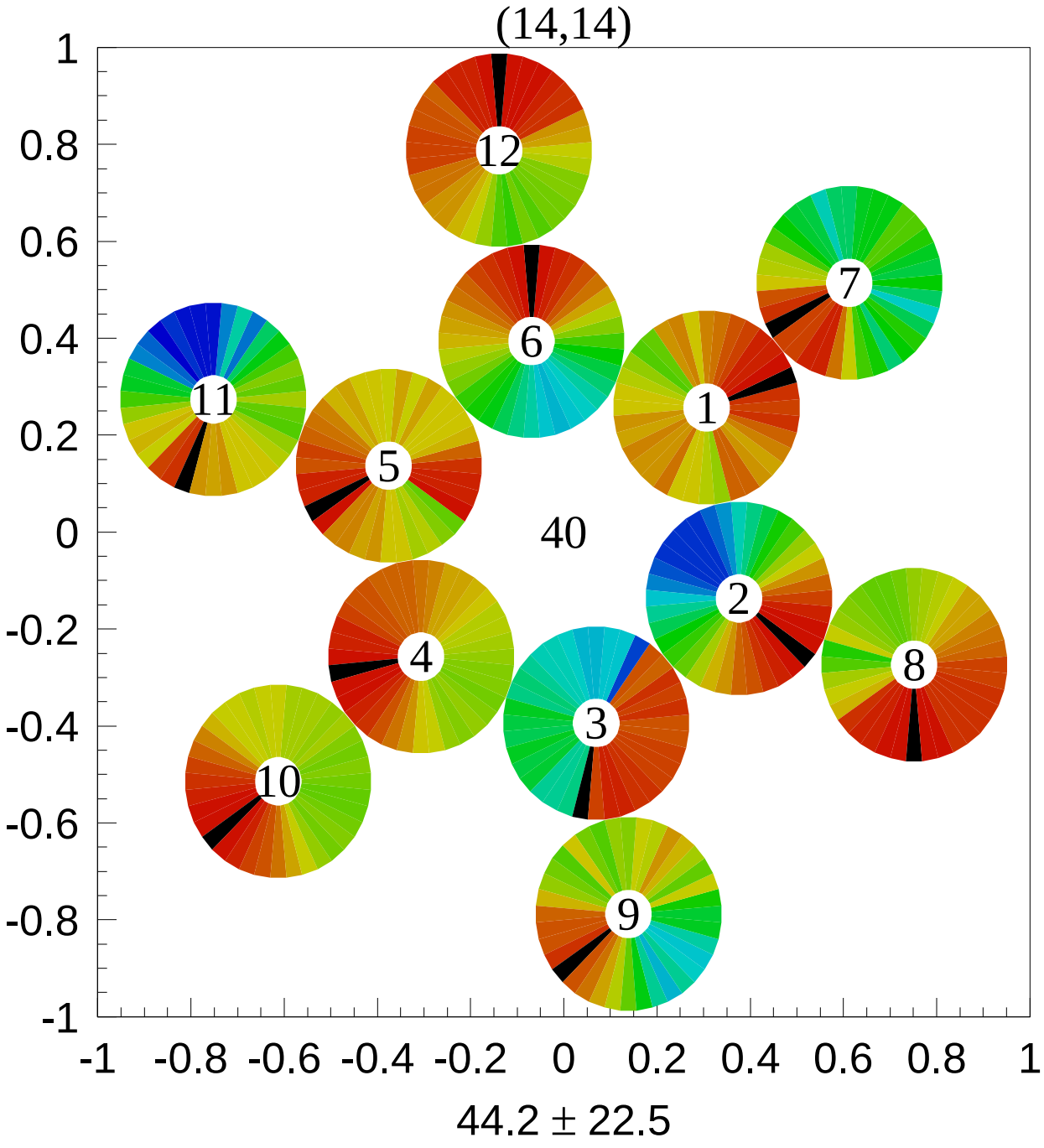

(14,12)
tilted LEDs
126 121 128 121 132 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 125 122 121 122 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

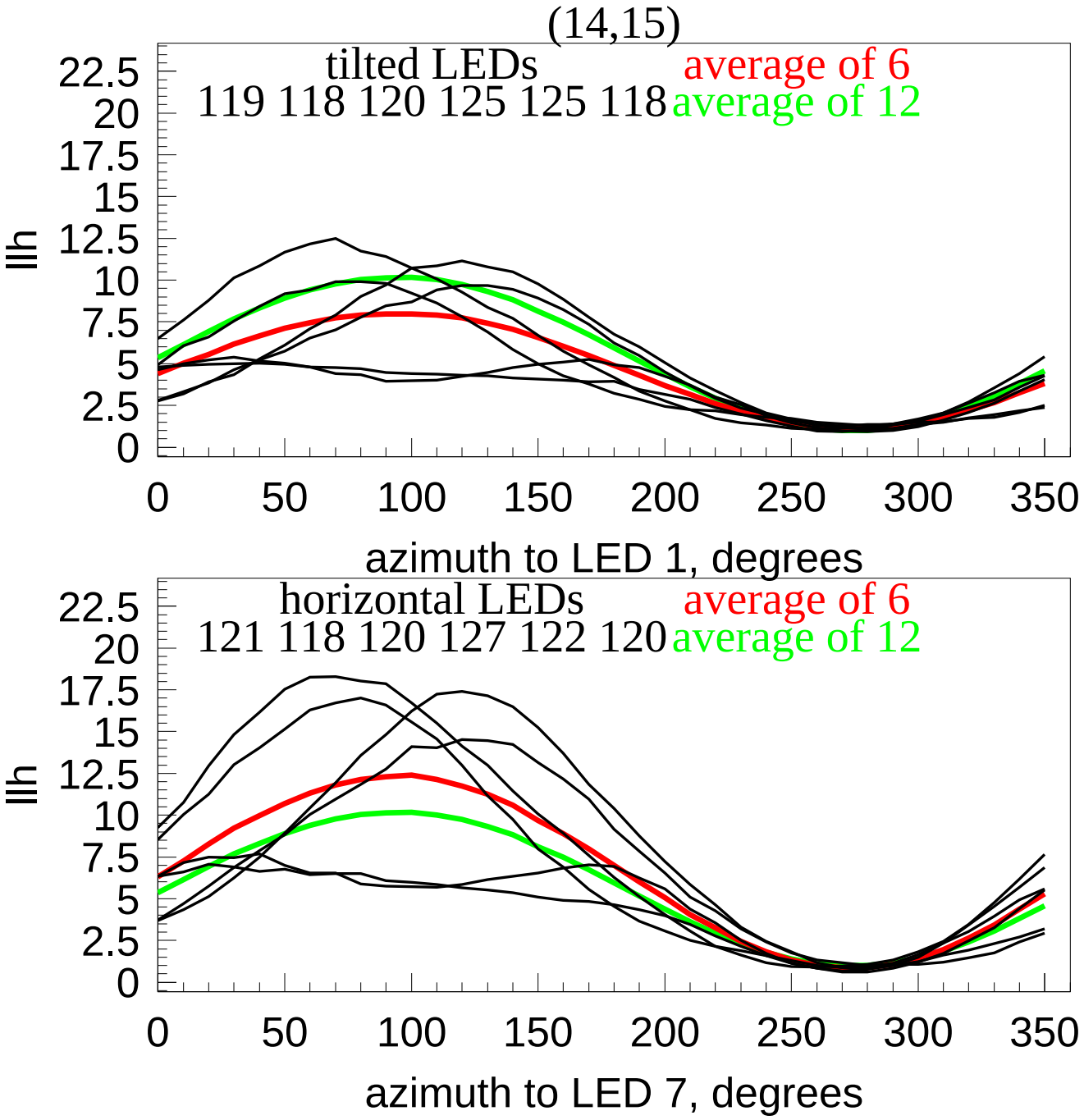

(14,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
262.2 ± 4.9

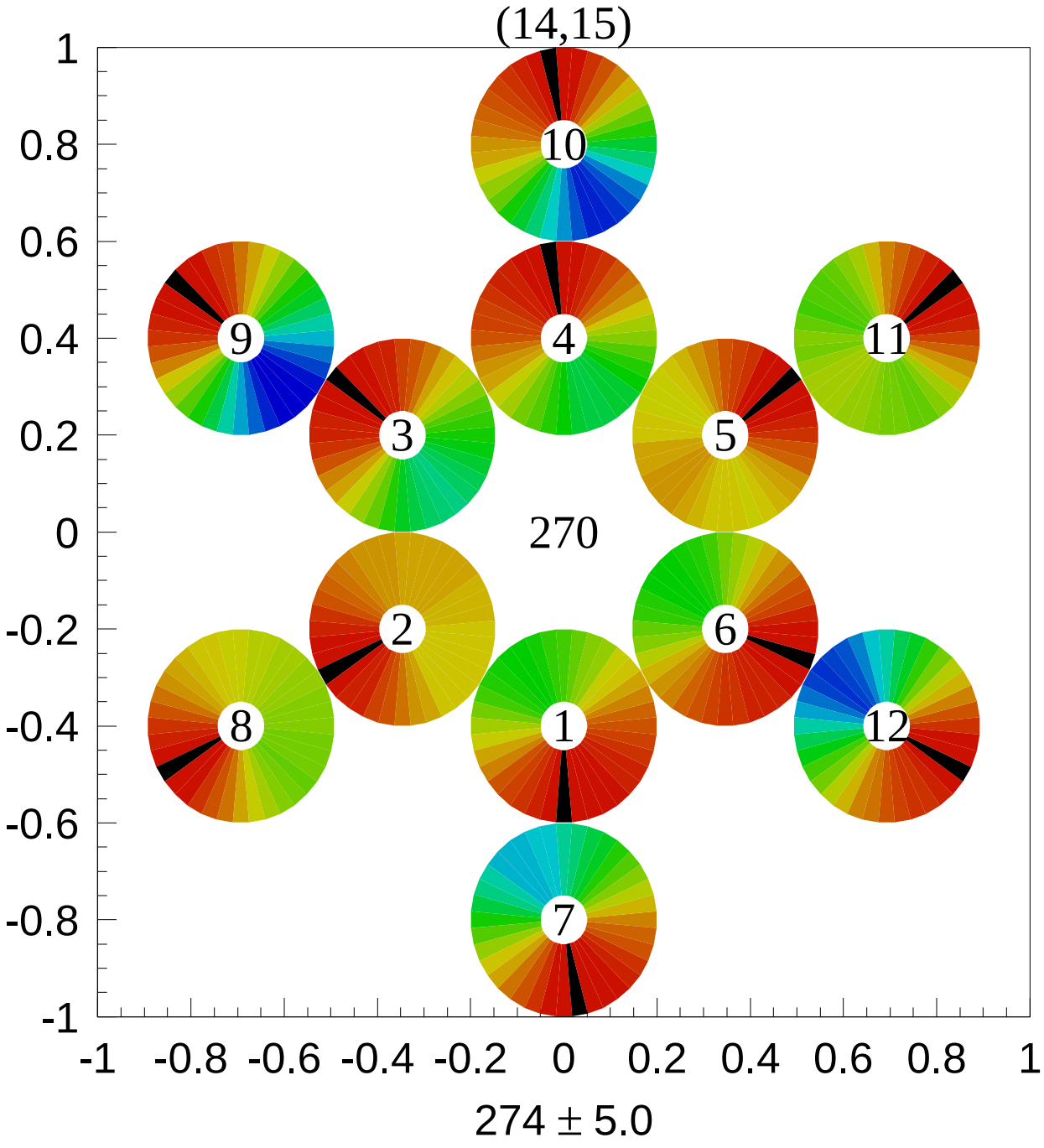

(14,13)
tilted LEDs
124 122 125 123 125 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 119 129 126 119 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

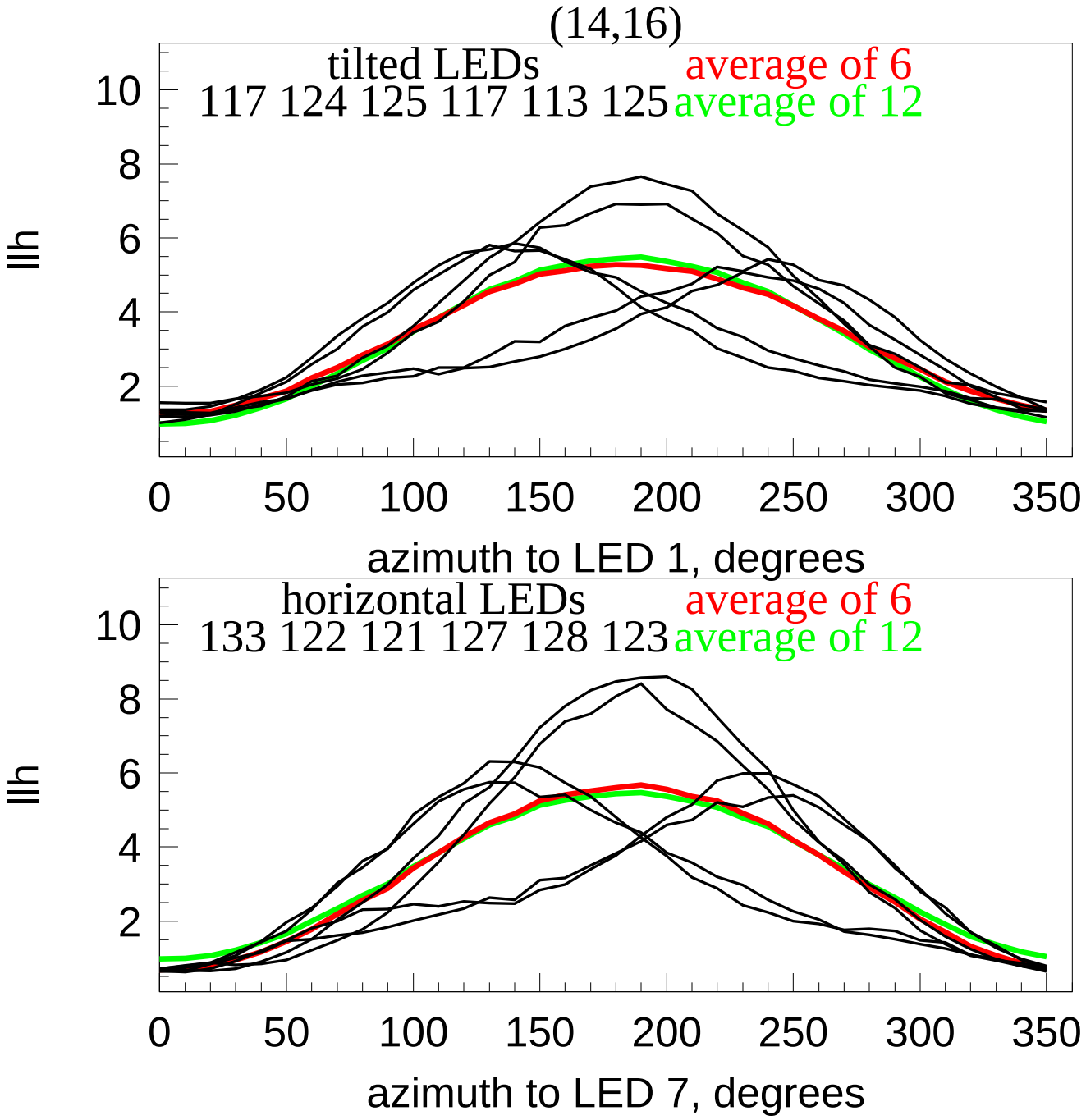

(14,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12.9 ± 5.3
12
11
6
5
7
1
20
4
10
2
3
8
9

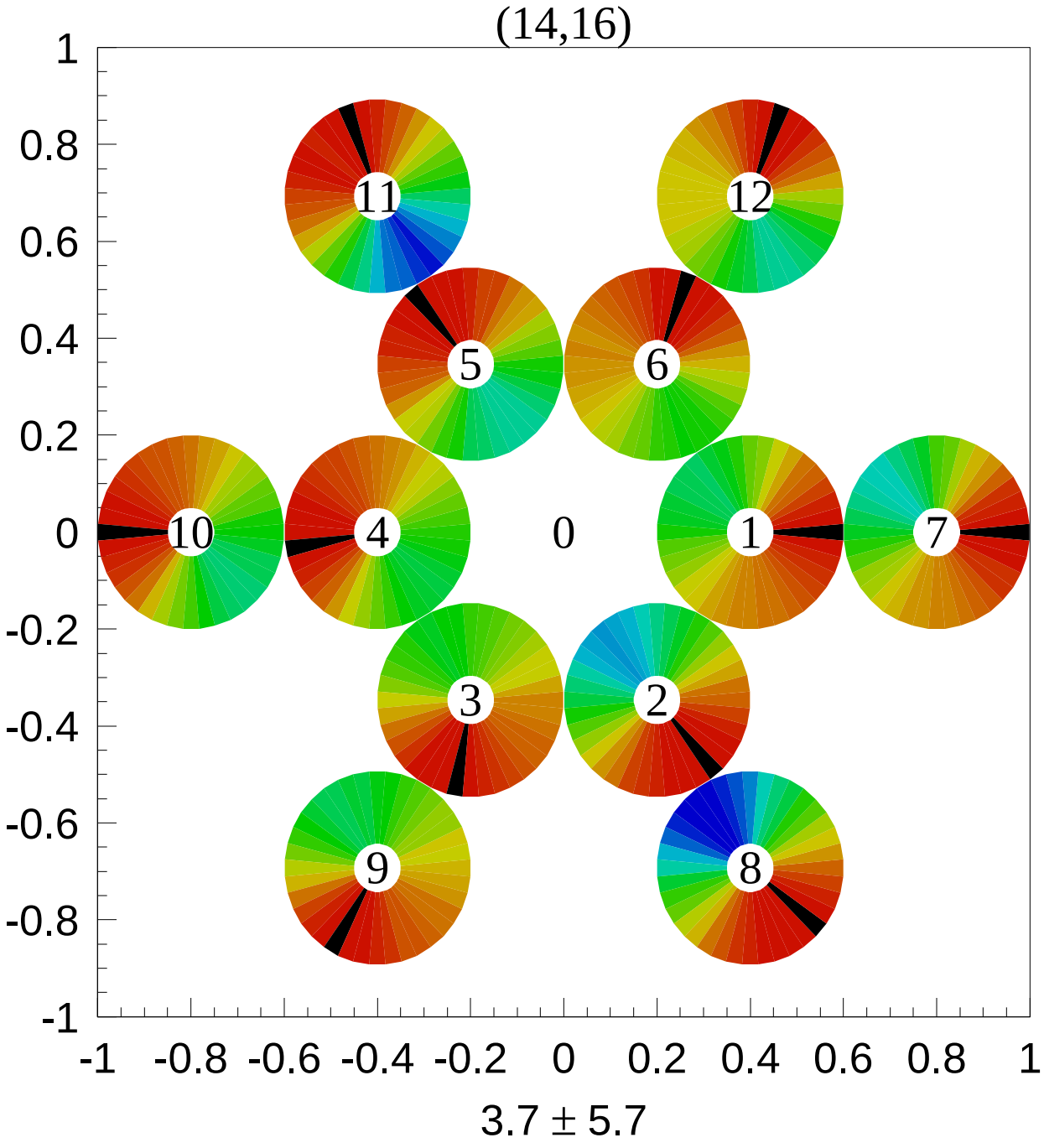

(14,14)
tilted LEDs
118 124 118 123 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 123 119 131 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

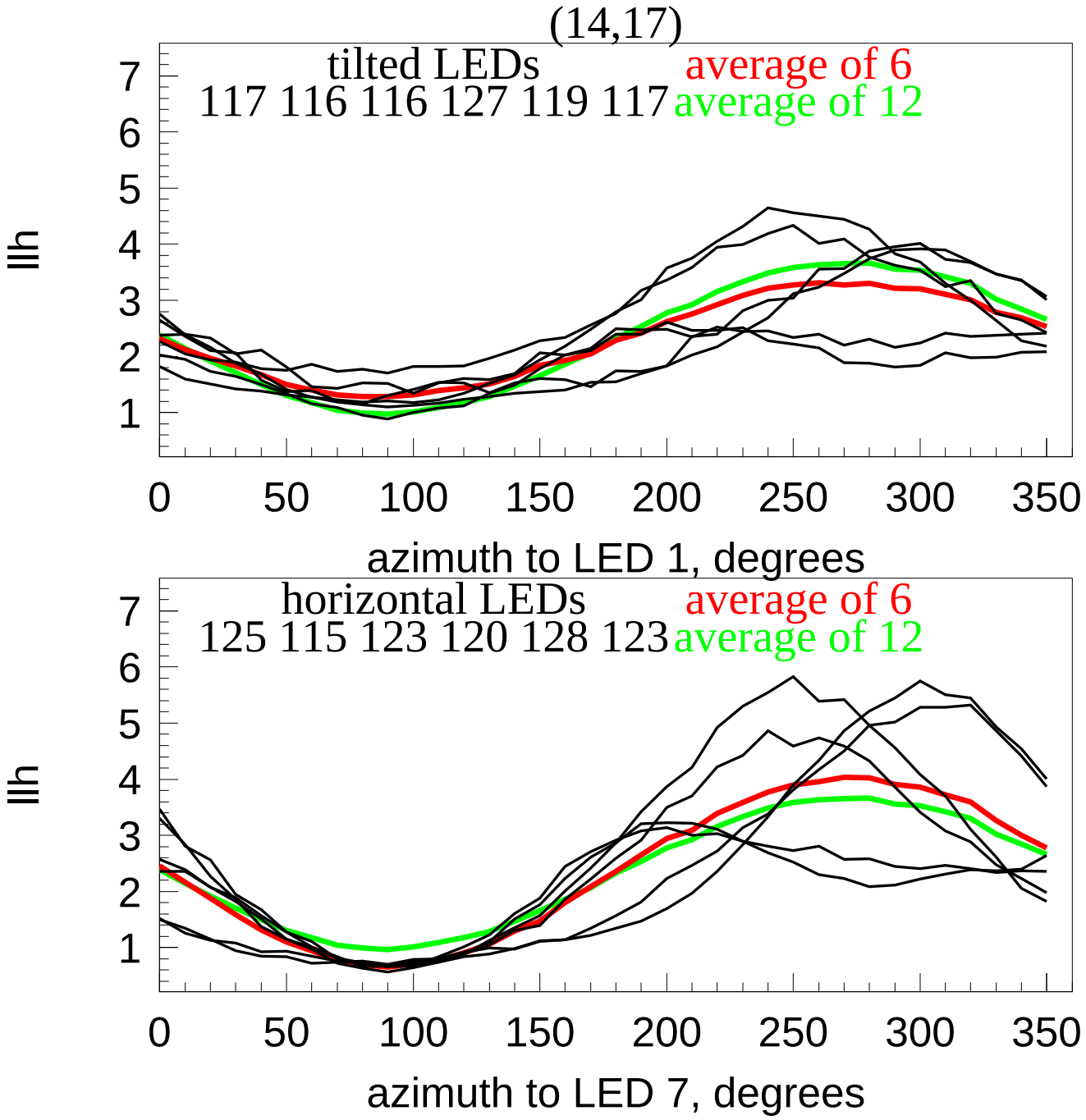

(14,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
44.2 ± 22.5

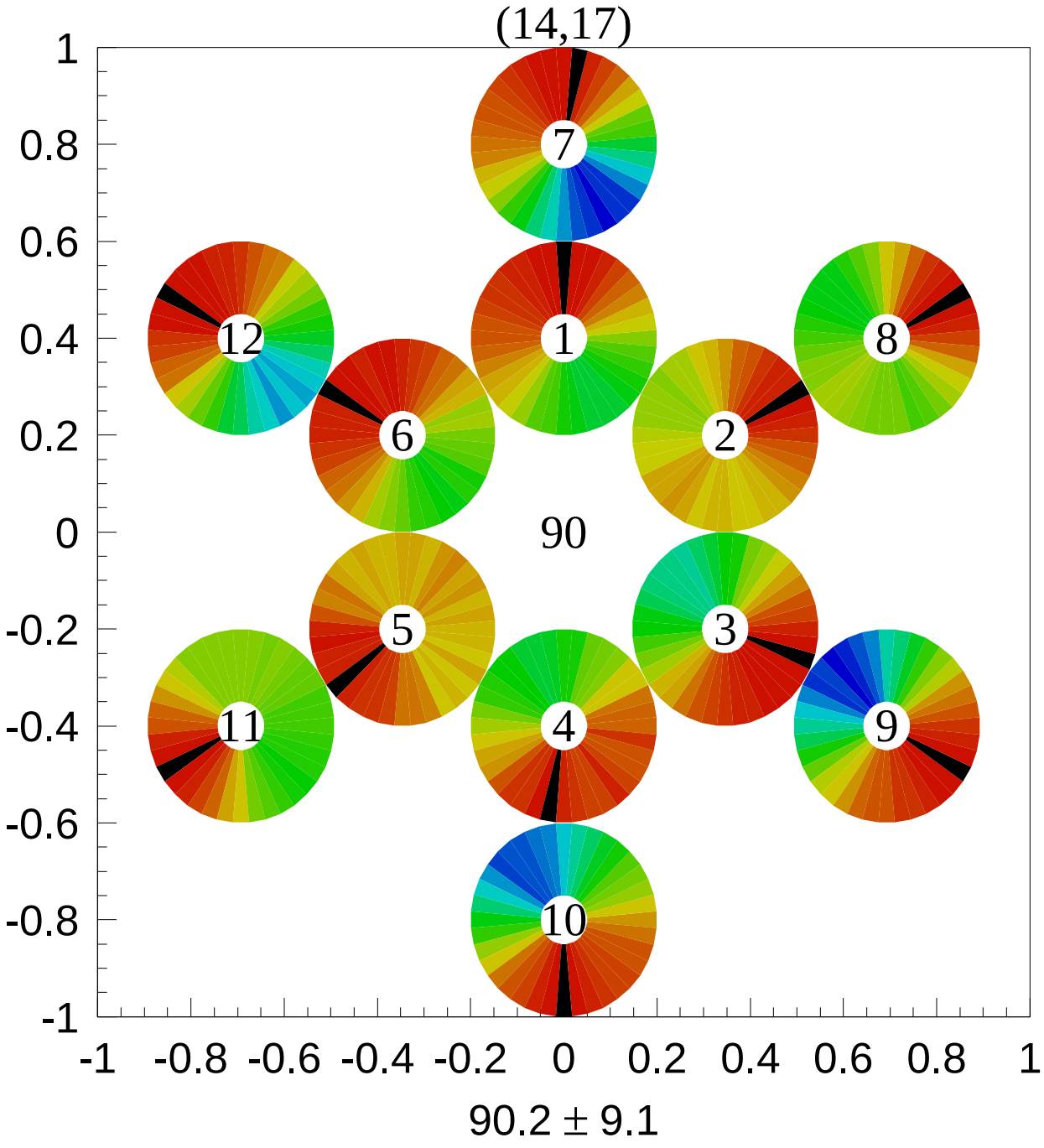

(14,15)
tilted LEDs
119 118 120 125 125 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 118 120 127 122 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

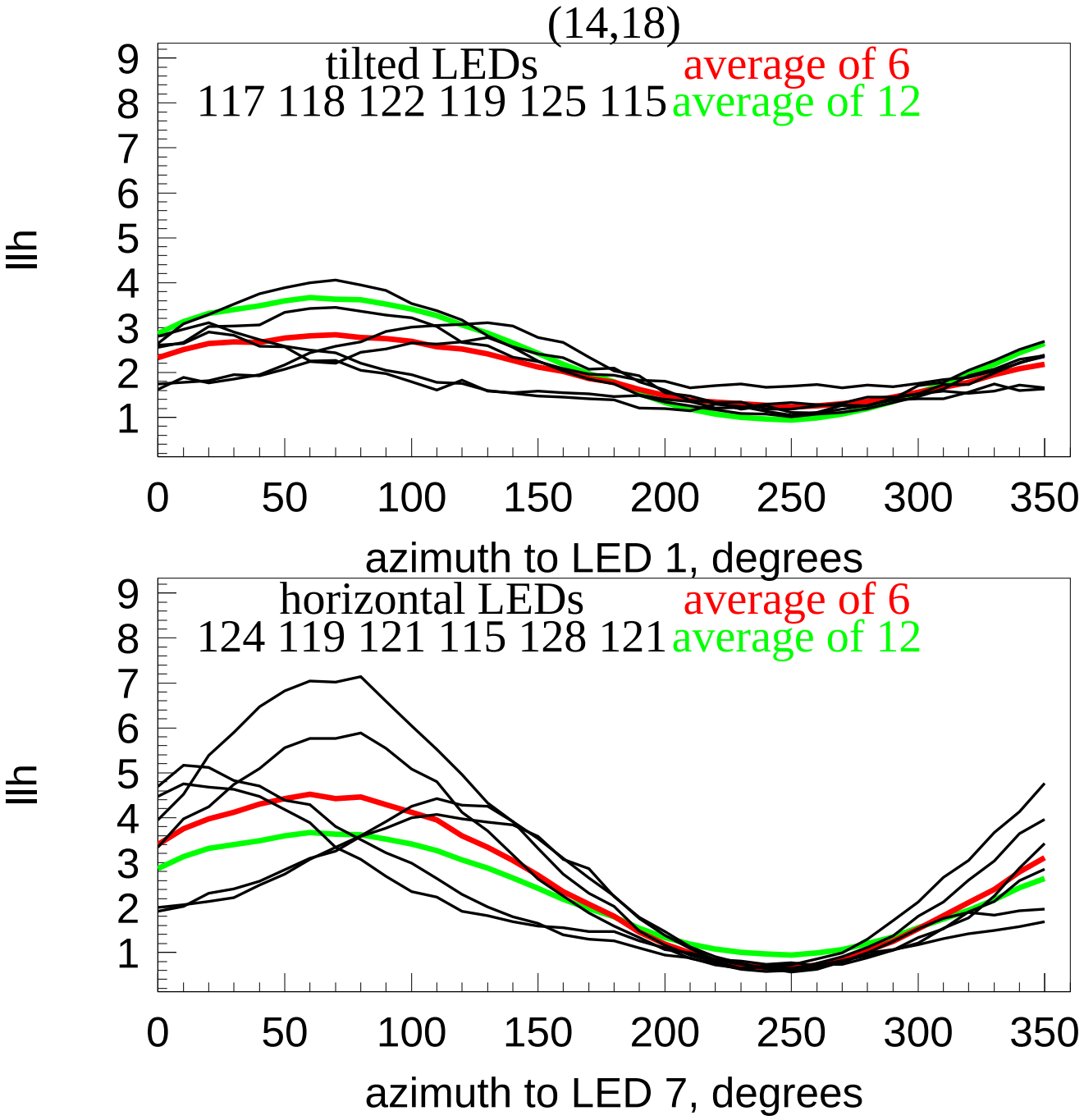

(14,15)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
274 ± 5.0

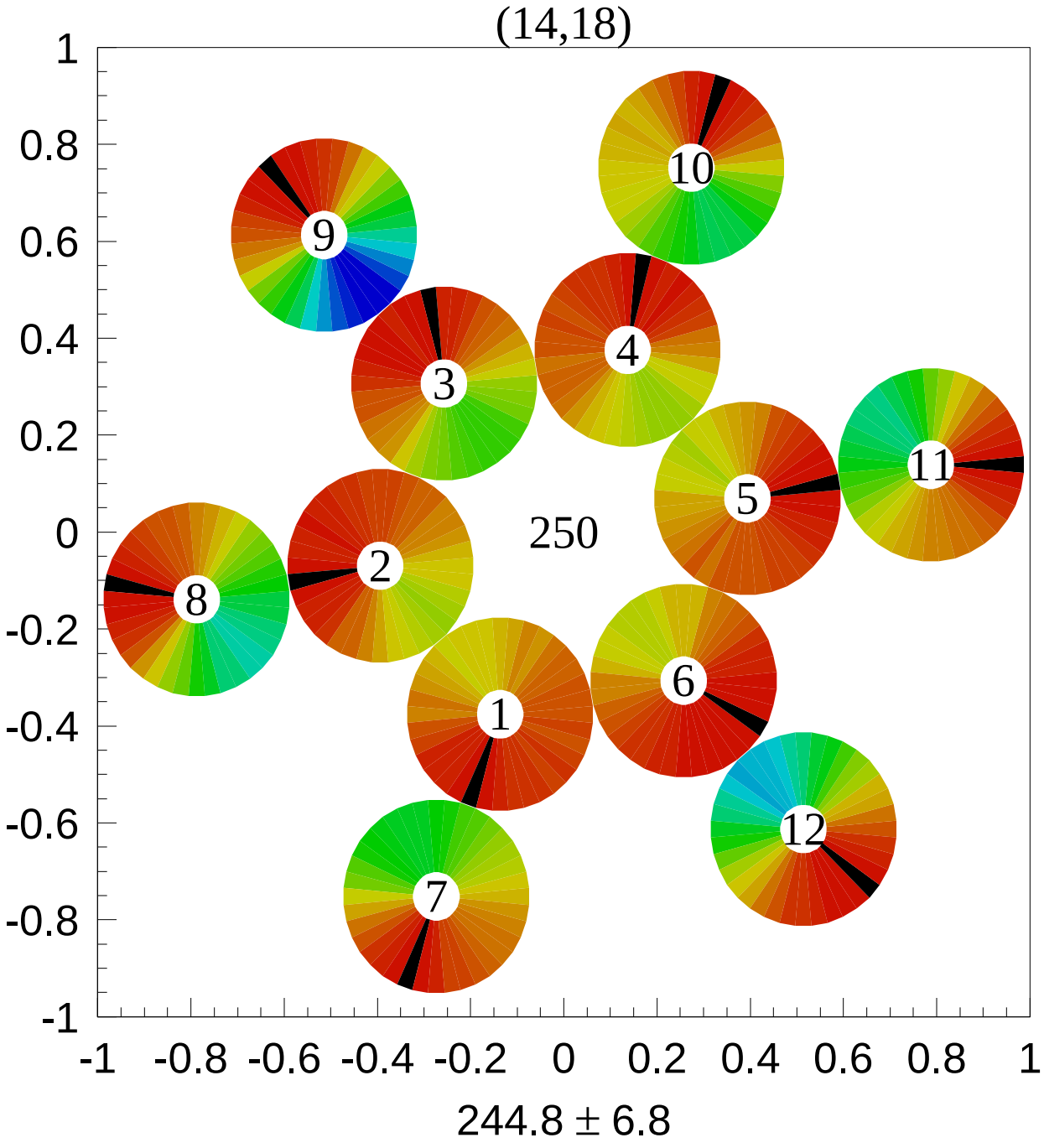

(14,16)
tilted LEDs
117 124 125 117 113 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
133 122 121 127 128 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

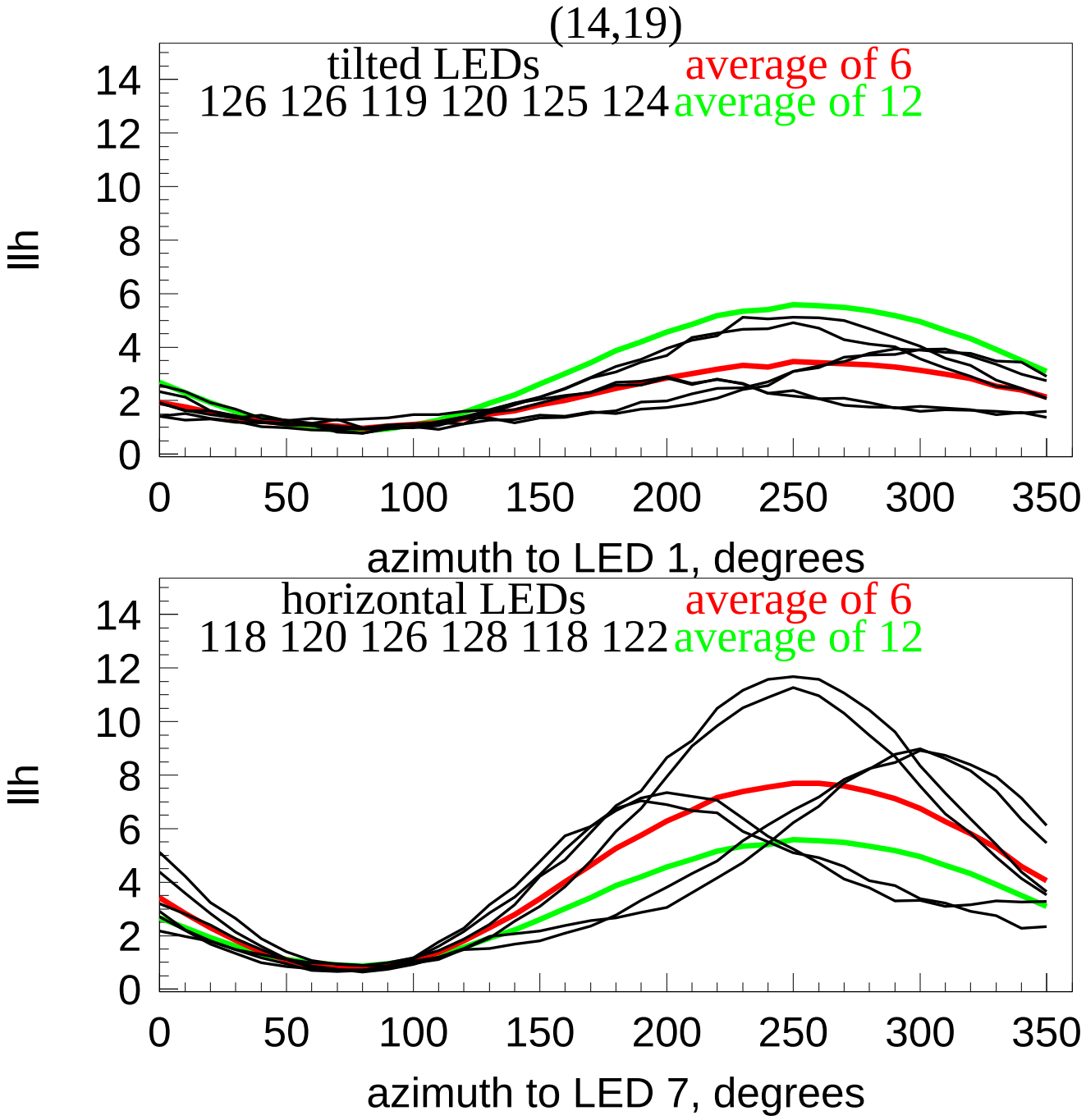

(14,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
3.7 ± 5.7

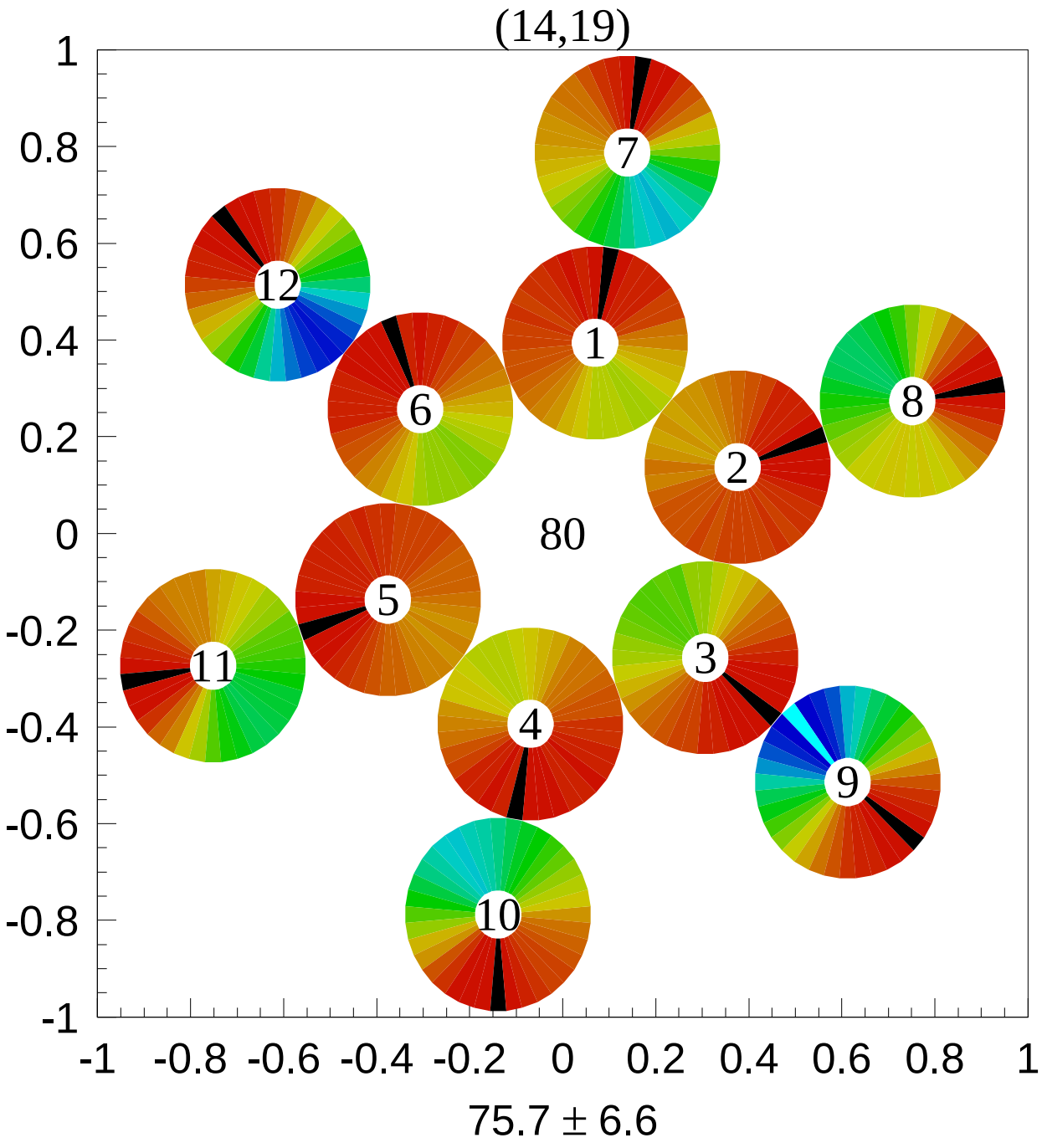

(14,17)
tilted LEDs
117 116 116 127 119 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 115 123 120 128 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

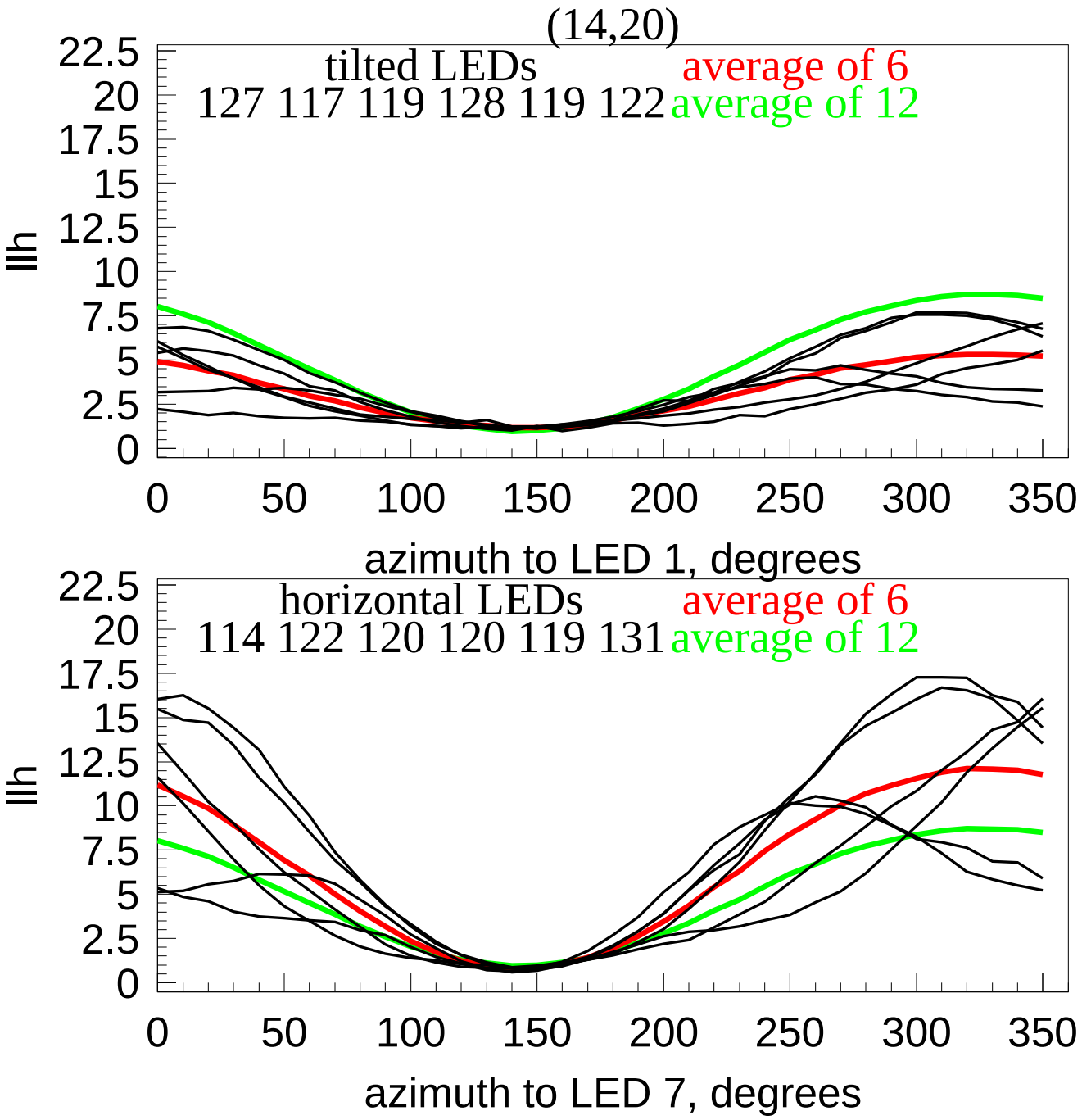

(14,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
90.2 ± 9.1

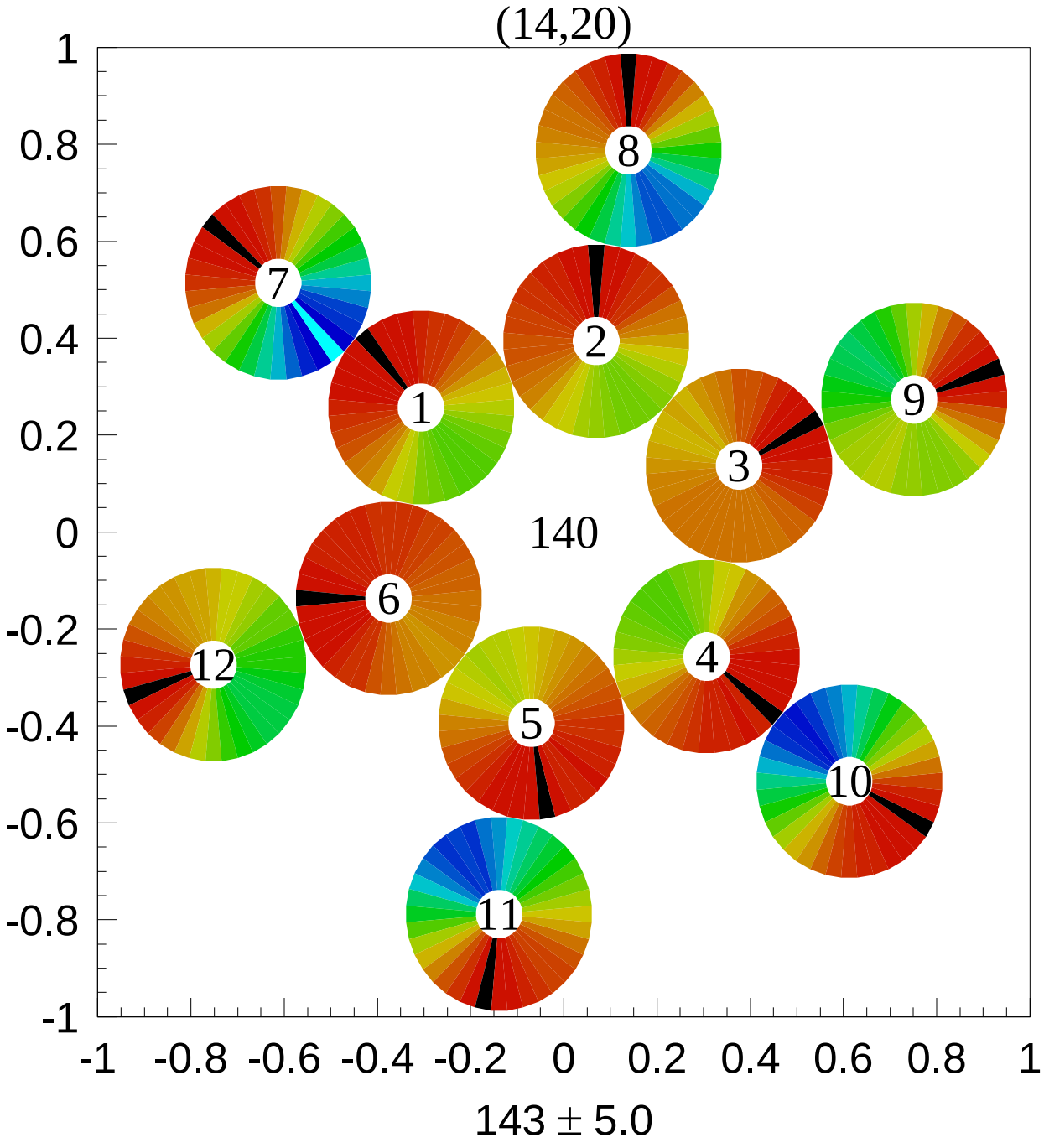

(14,18)
tilted LEDs
117 118 122 119 125 115
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 119 121 115 128 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

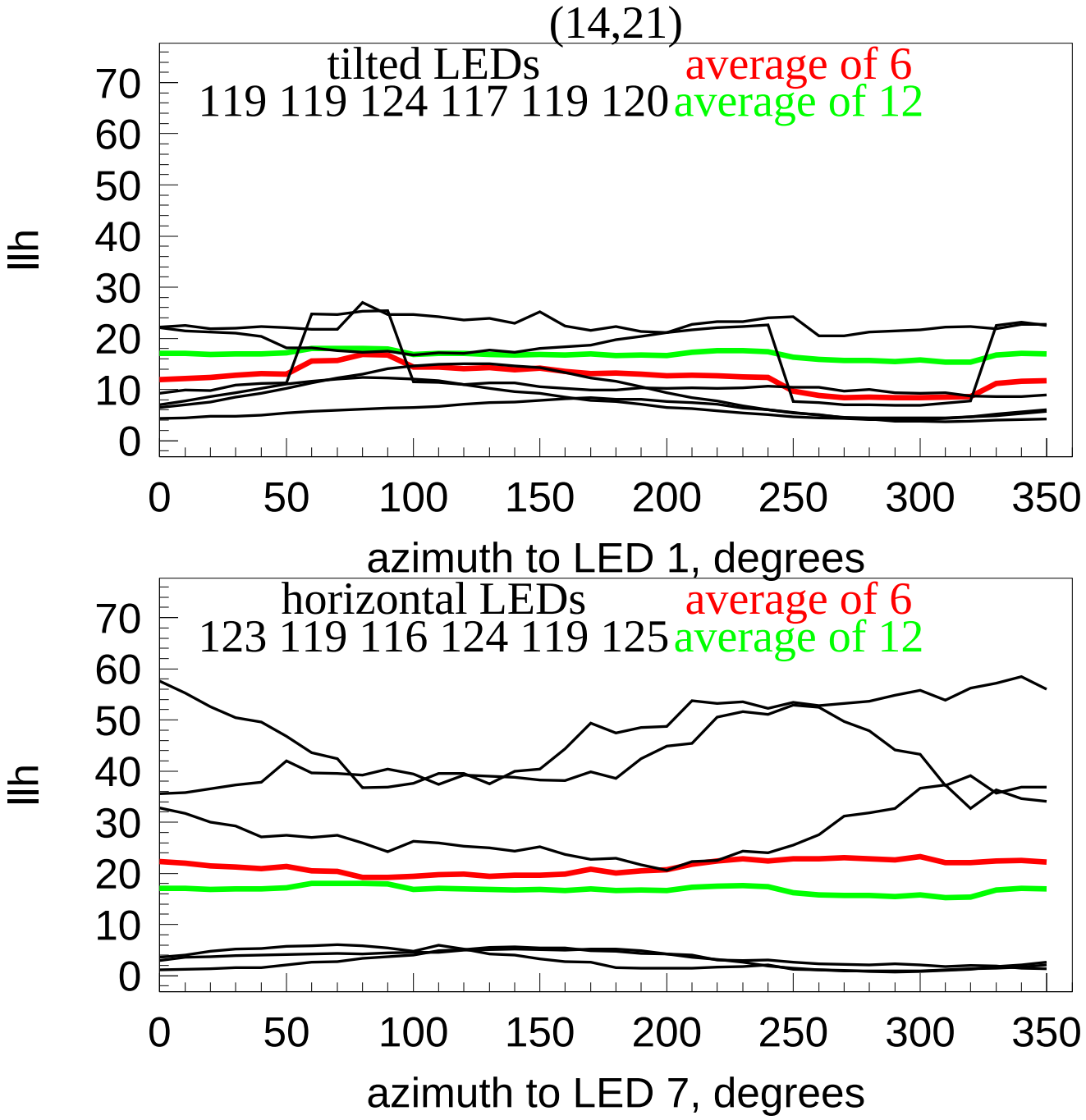

(14,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
6
1
12
7
244.8 ± 6.8

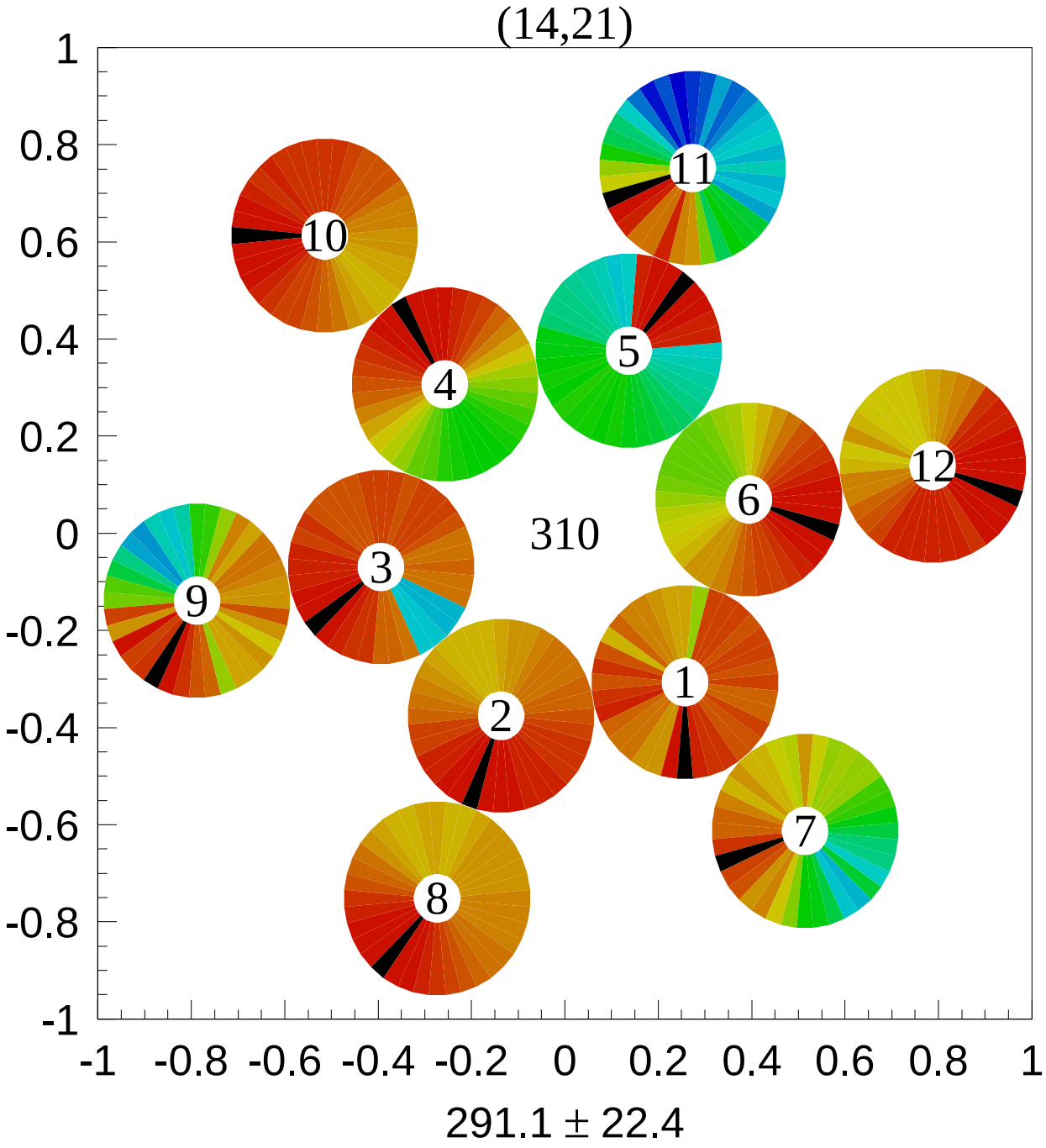

(14,19)
tilted LEDs
126 126 119 120 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 126 128 118 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

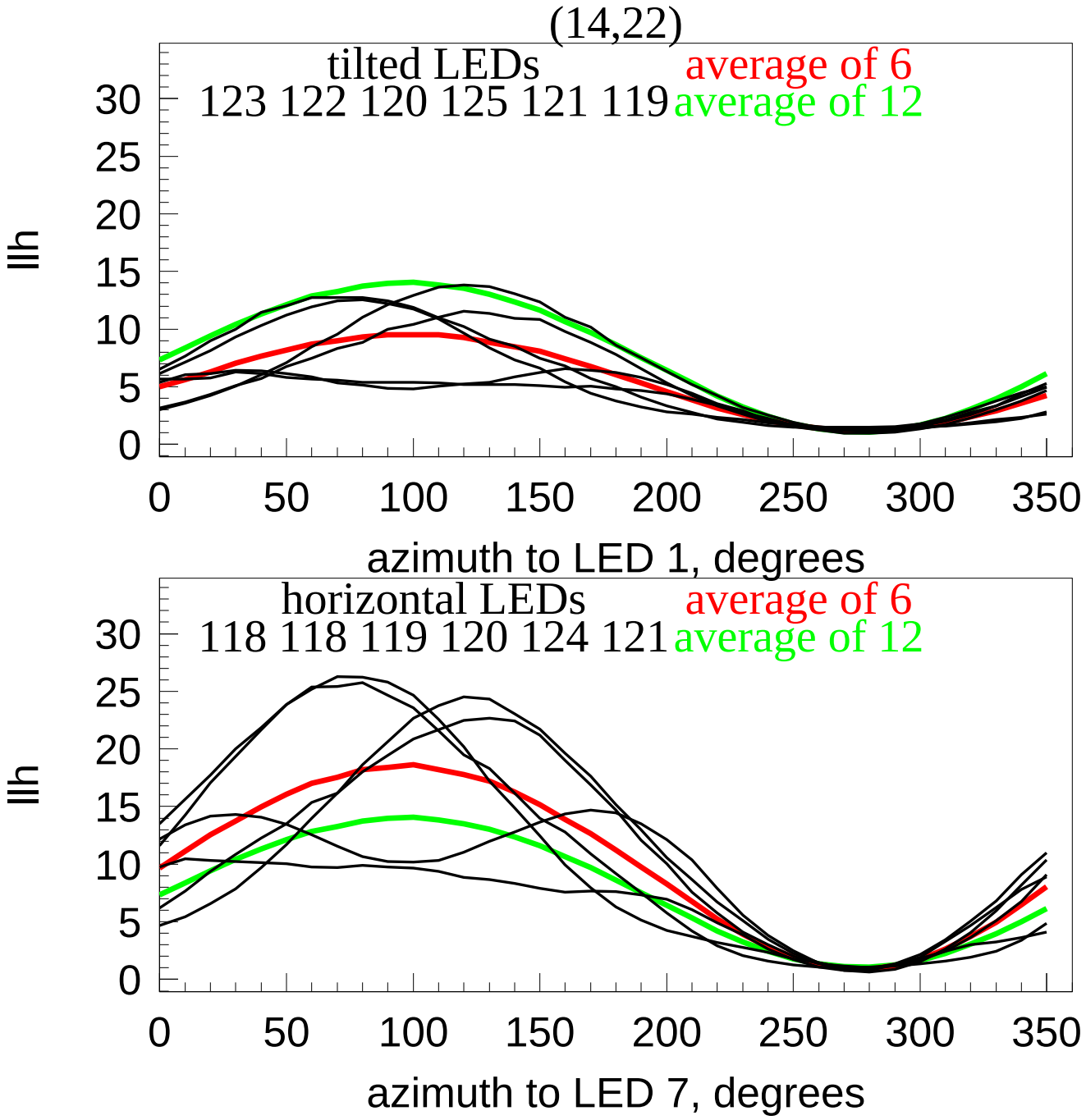

(14,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
75.7 ± 6.6

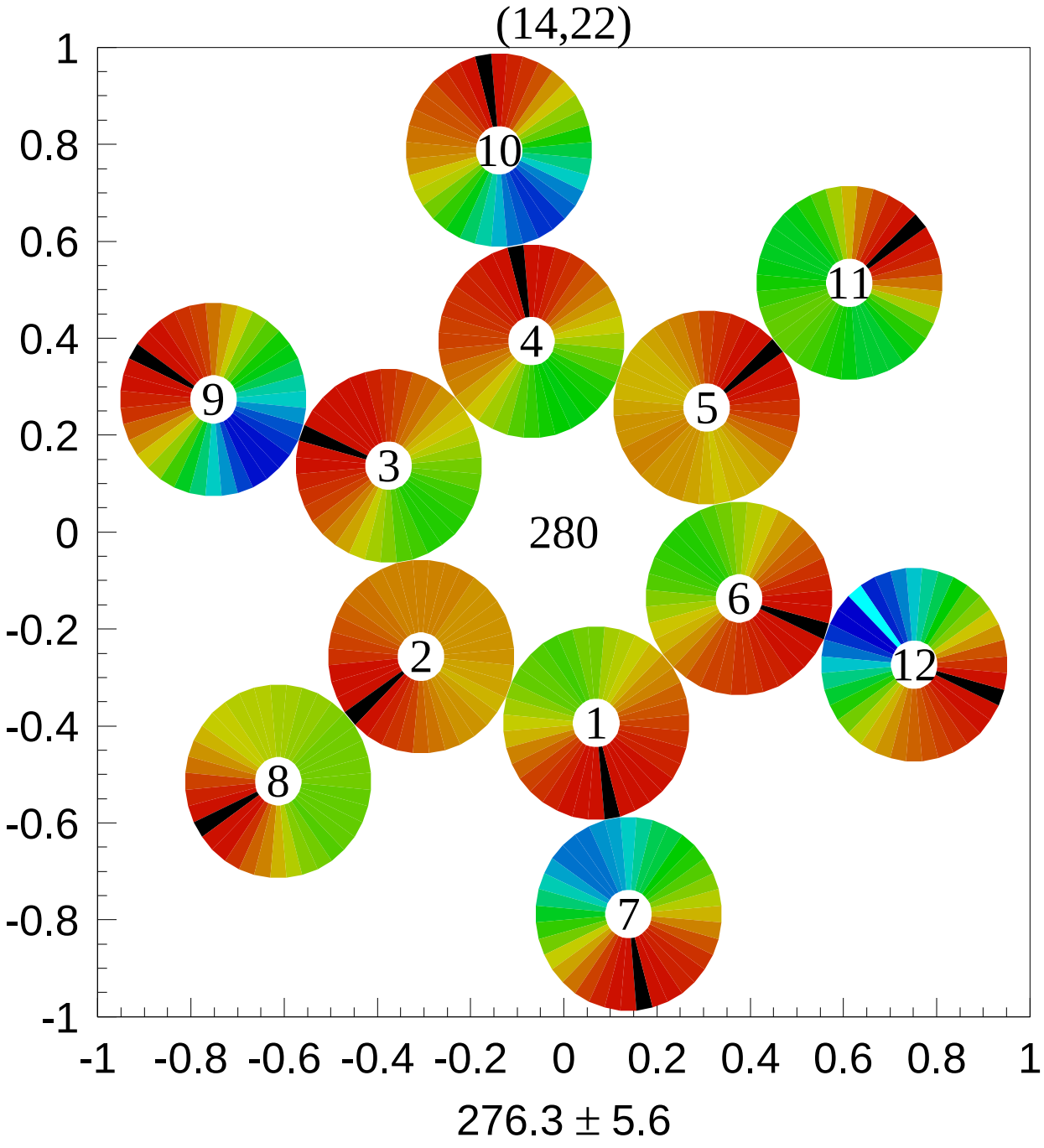

(14,20)
tilted LEDs
127 117 119 128 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 122 120 120 119 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

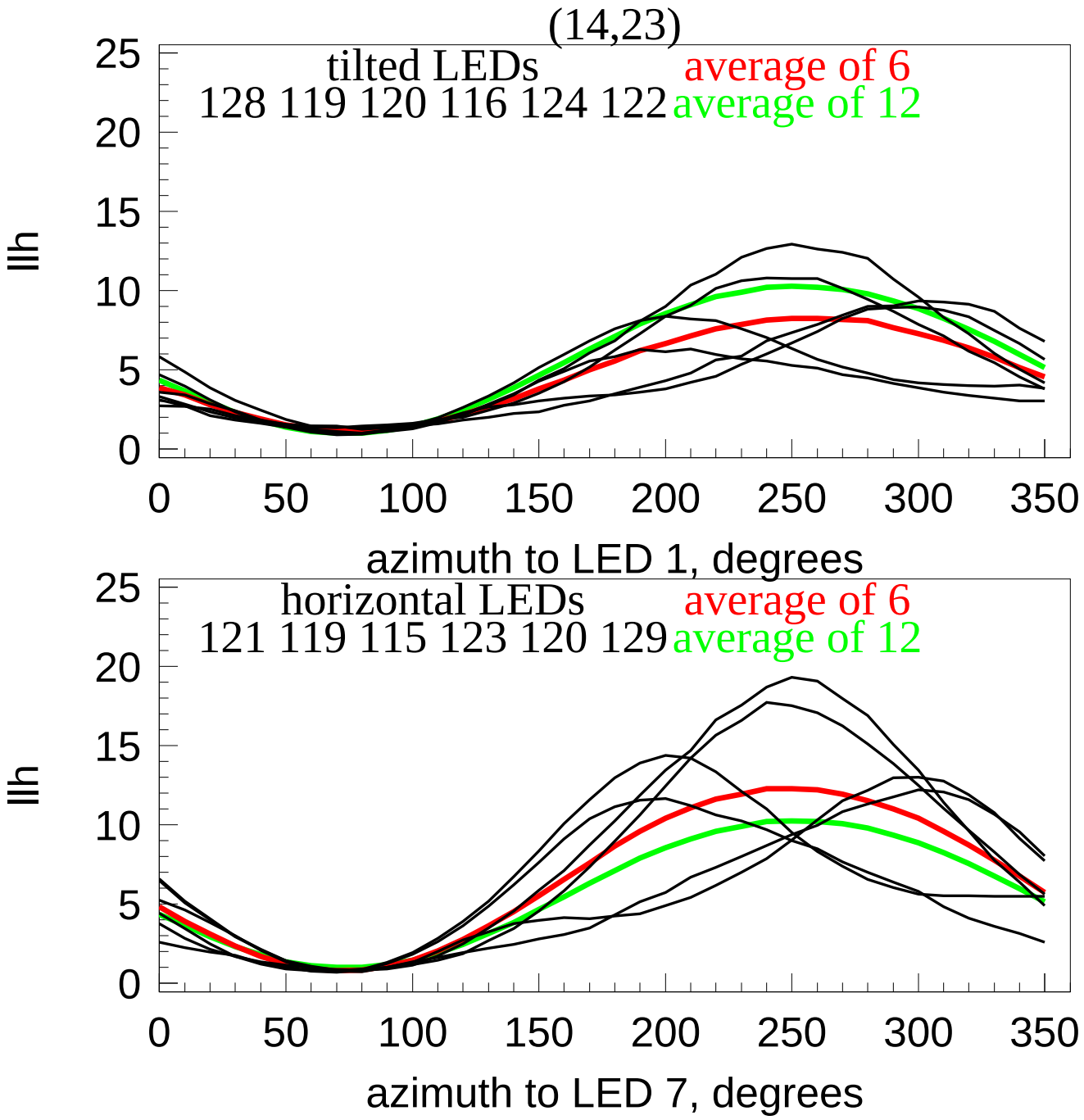

(14,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
143 ± 5.0

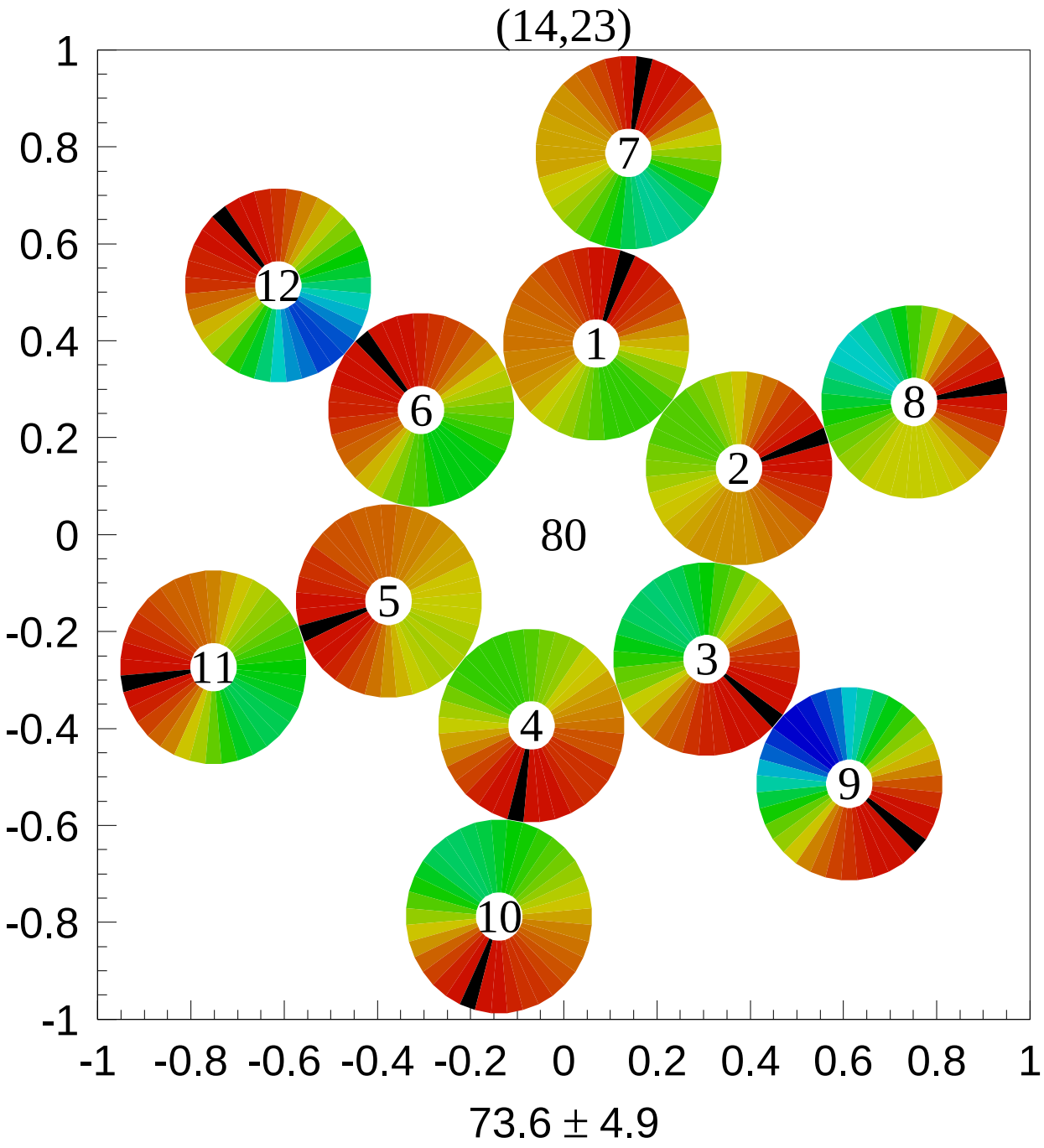

(14,21)
tilted LEDs
119 119 124 117 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 116 124 119 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

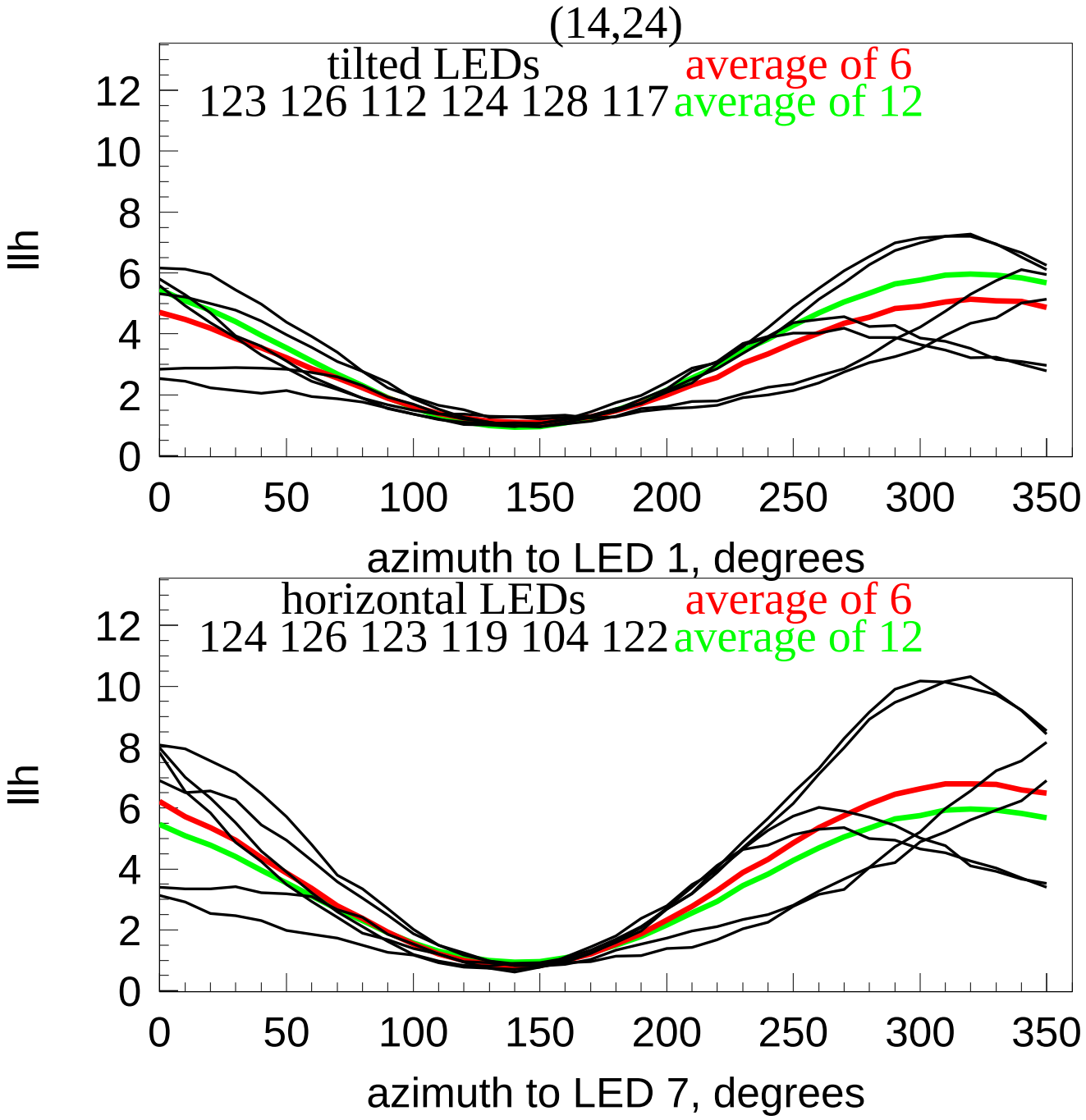

(14,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
291.1 ± 22.4

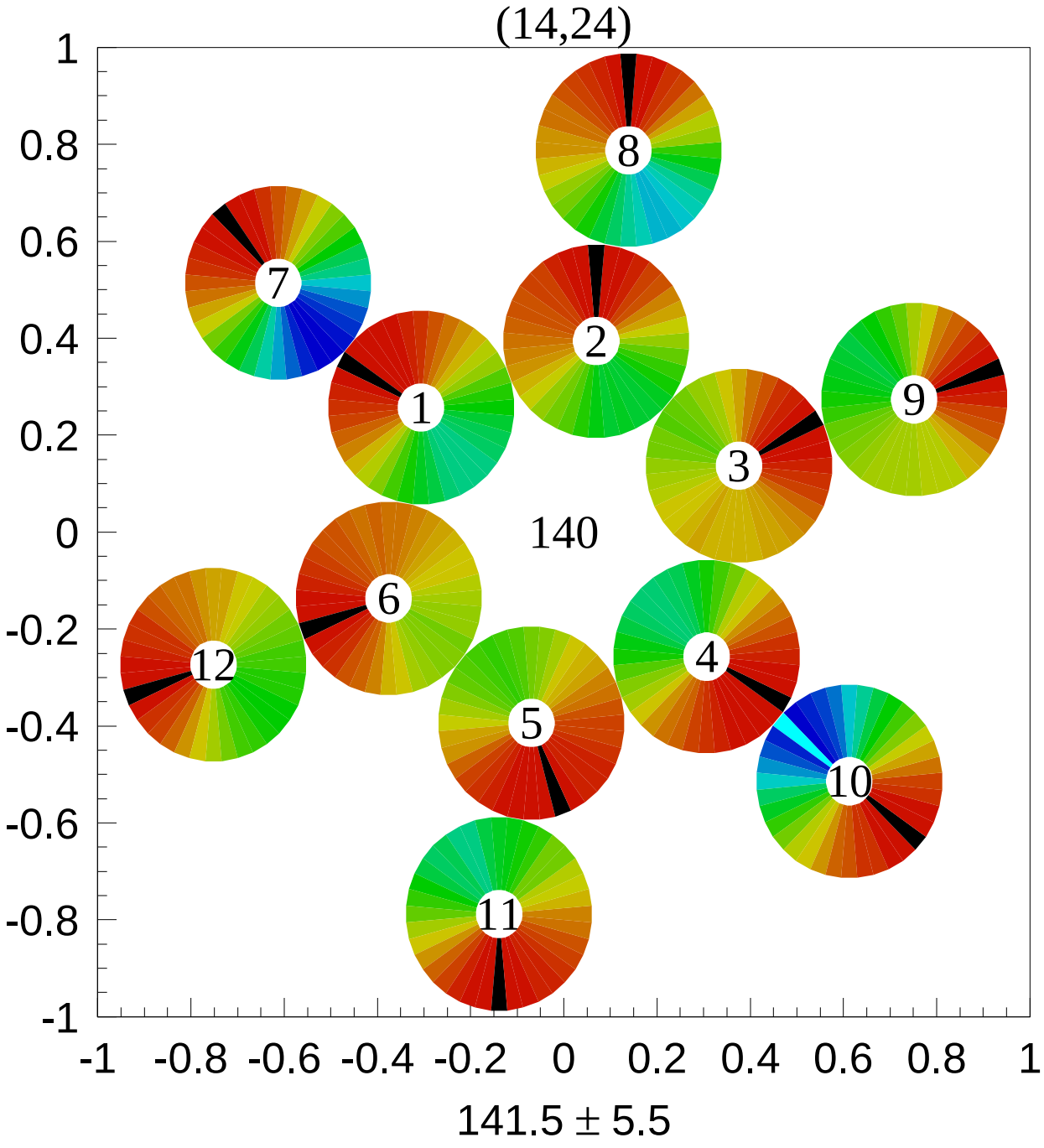

(14,22)
tilted LEDs
123 122 120 125 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 118 119 120 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

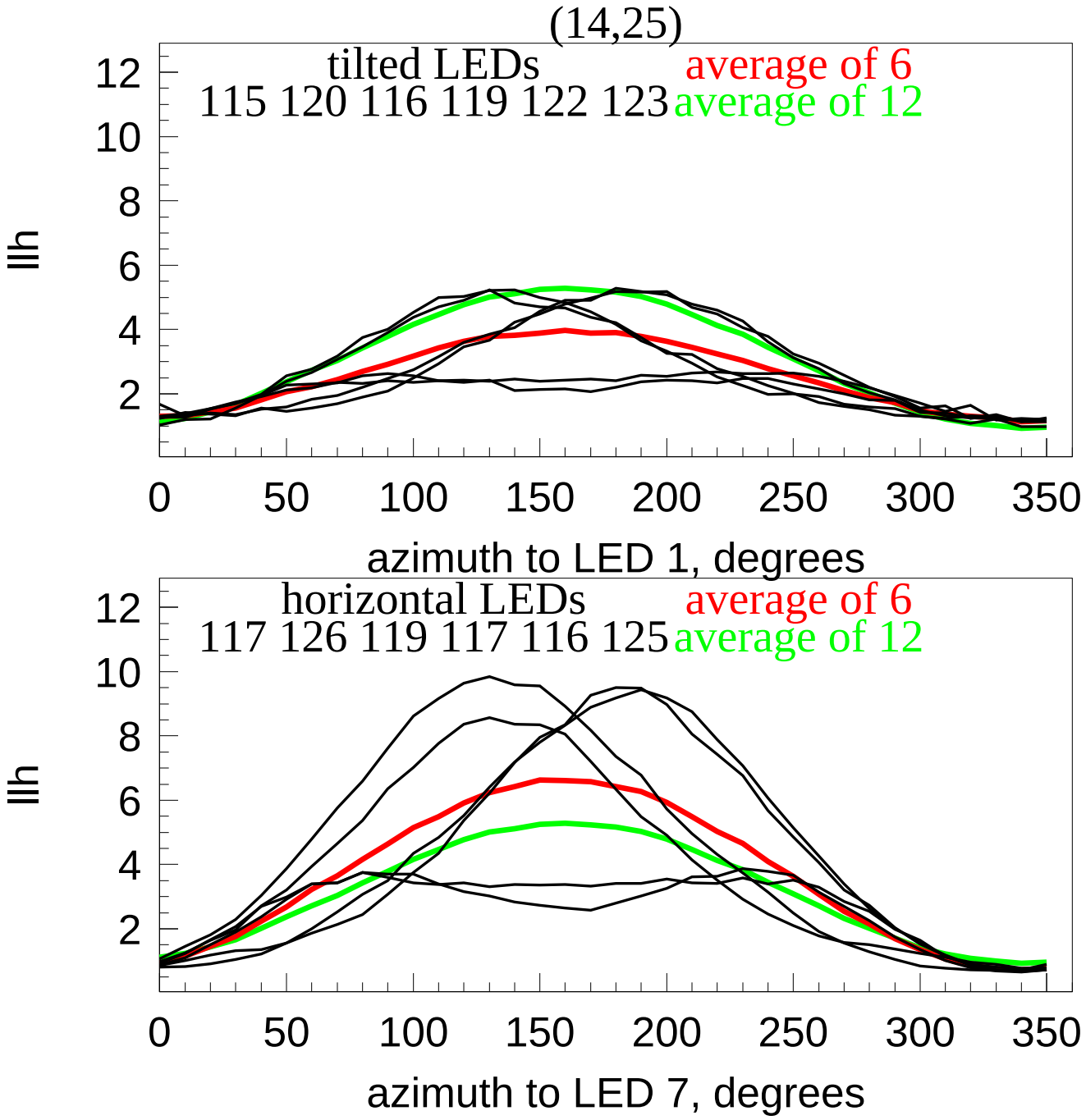

(14,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
276.3 ± 5.6

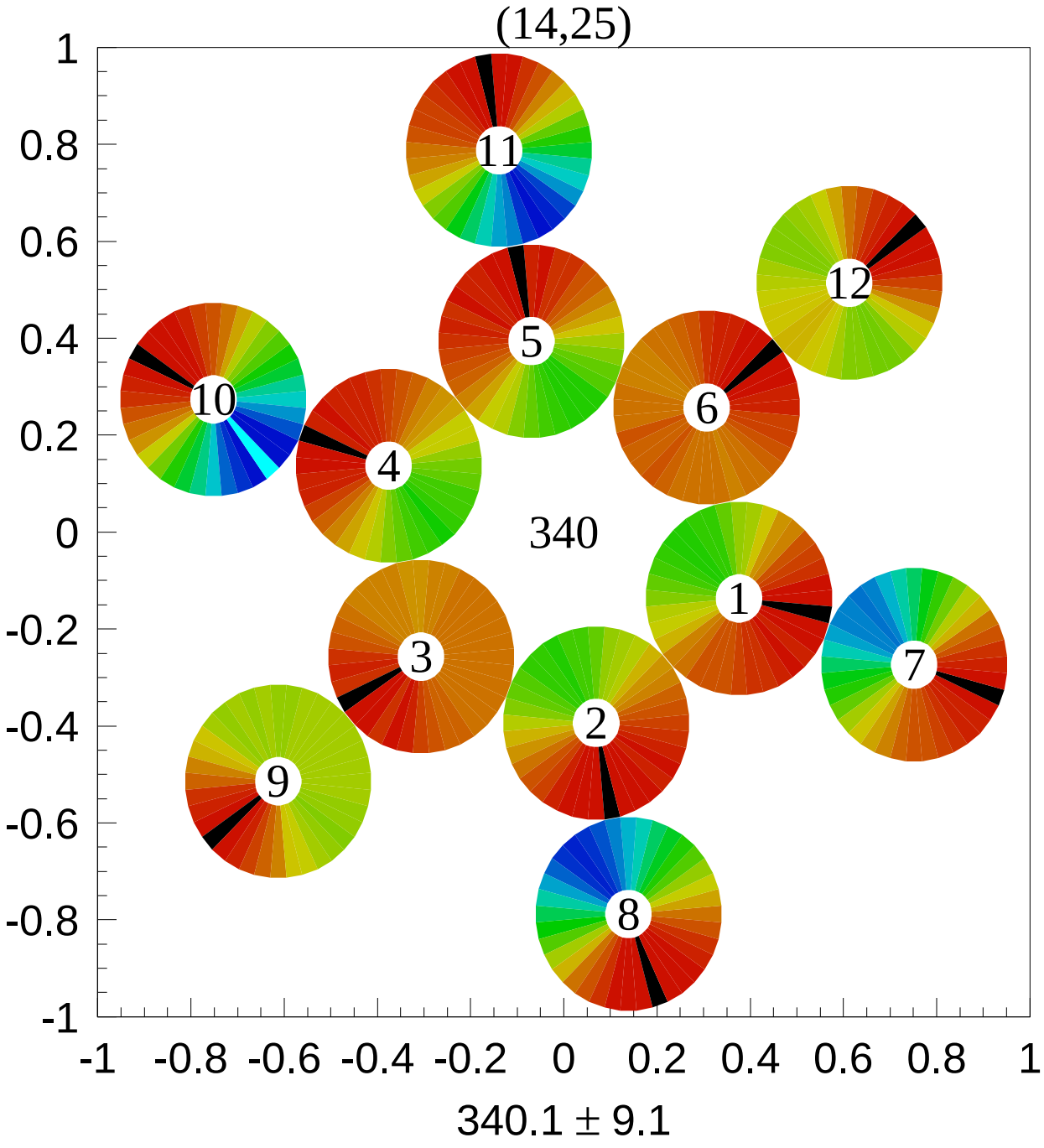

(14,23)
tilted LEDs
128 119 120 116 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 115 123 120 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

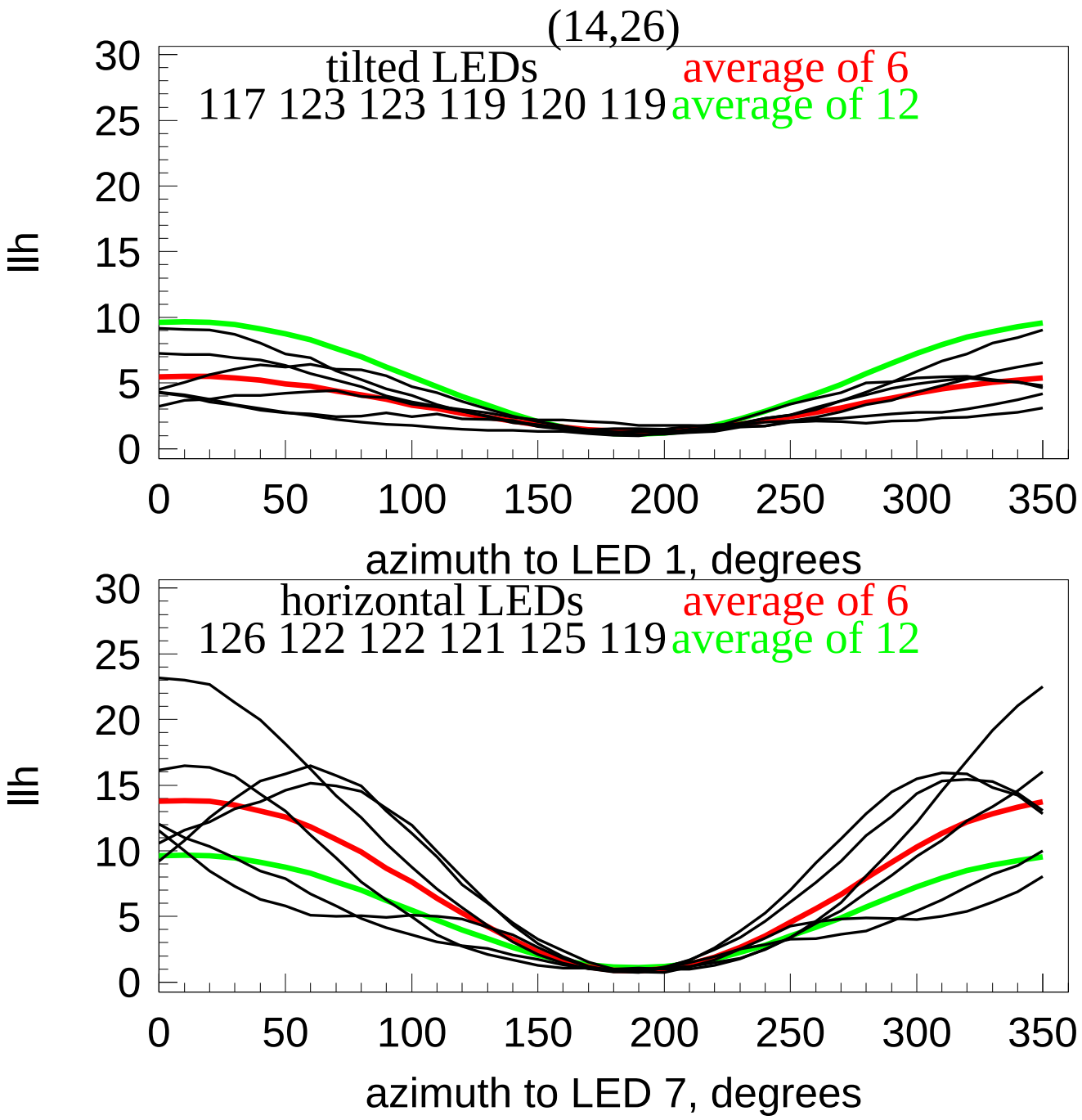

(14,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
73.6 ± 4.9

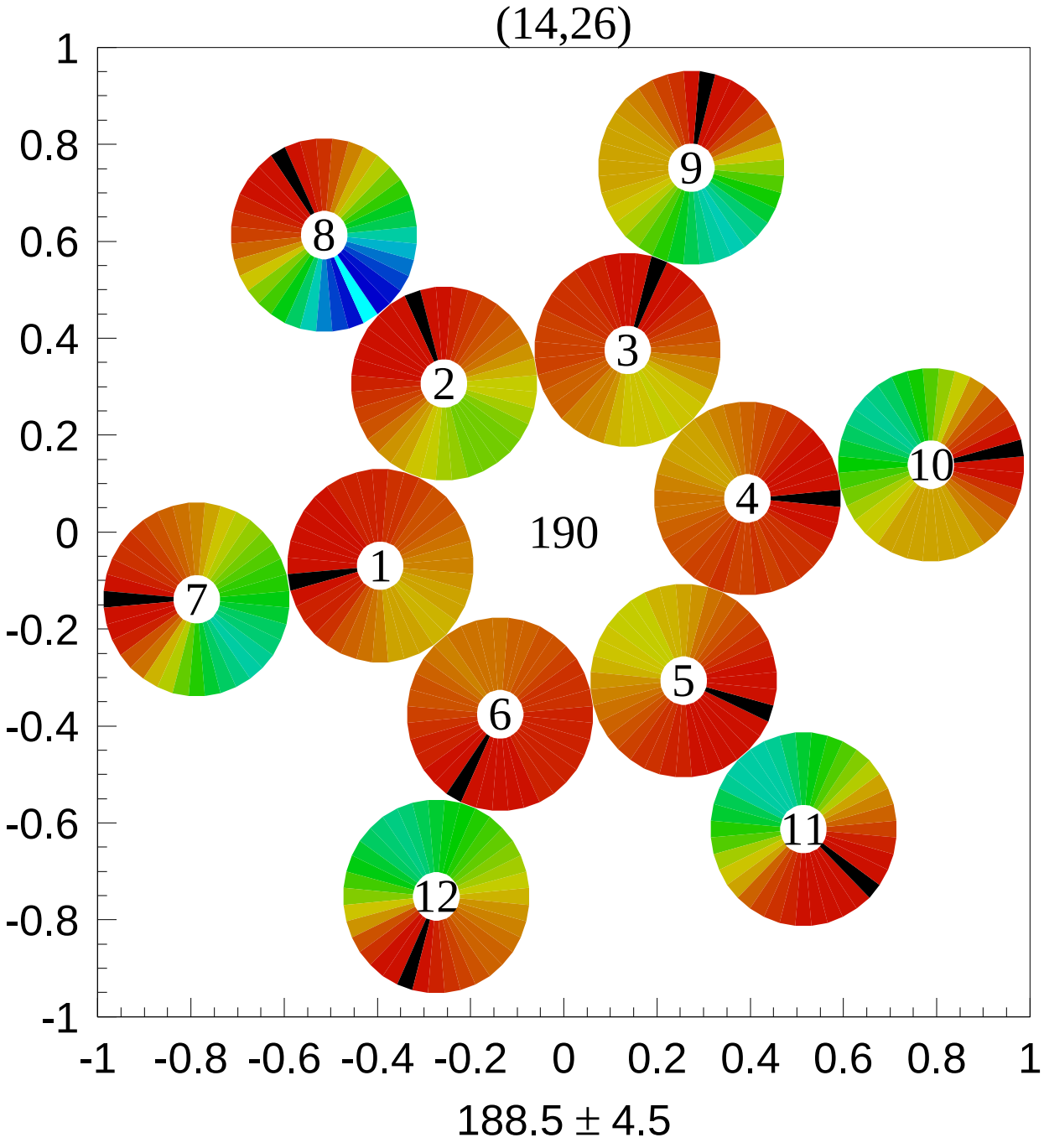

(14,24)
tilted LEDs
123 126 112 124 128 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 126 123 119 104 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

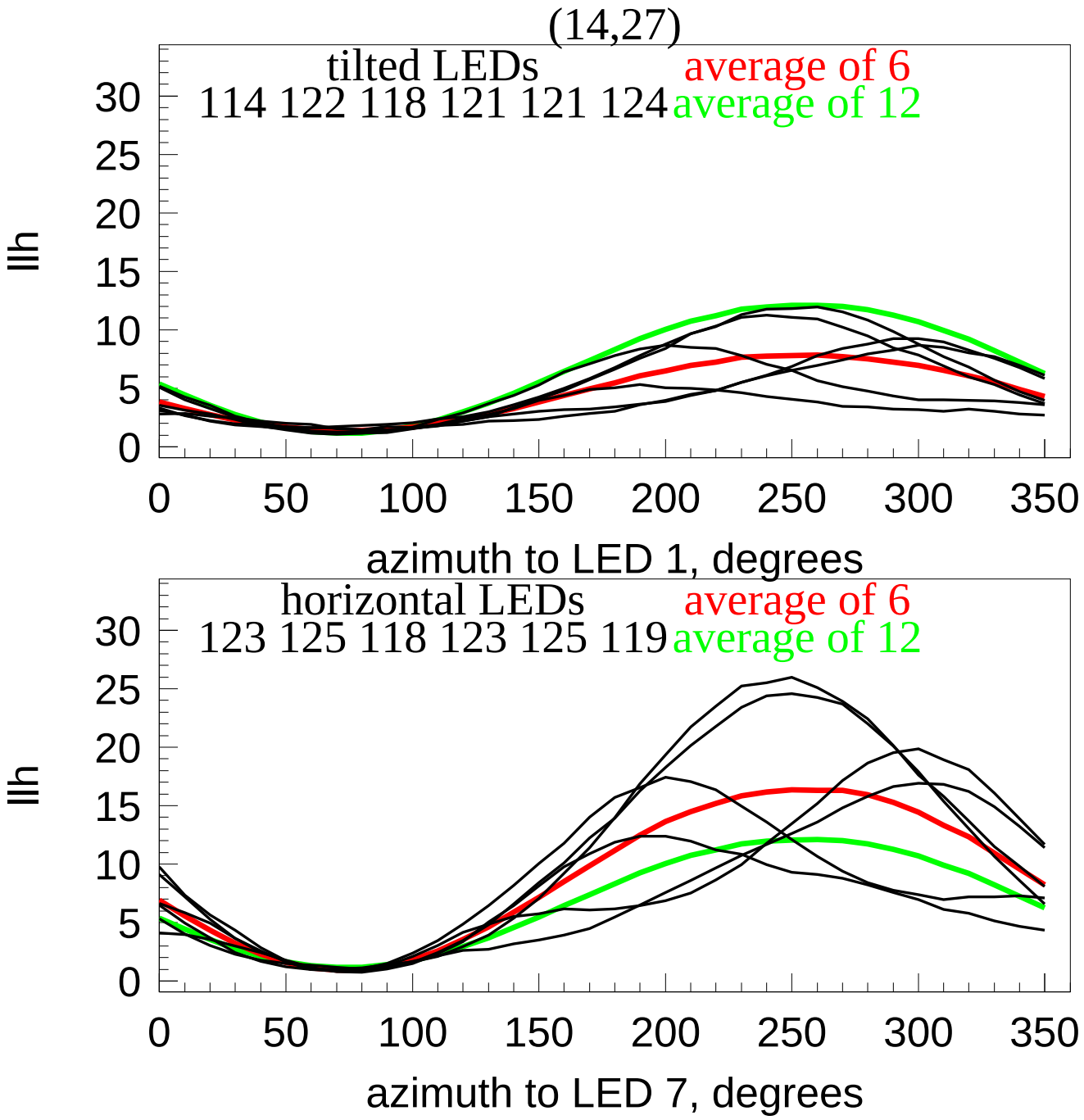

(14,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
141.5 ± 5.5
140
1
2
3
4
5
6
7
8
9
10
11
12

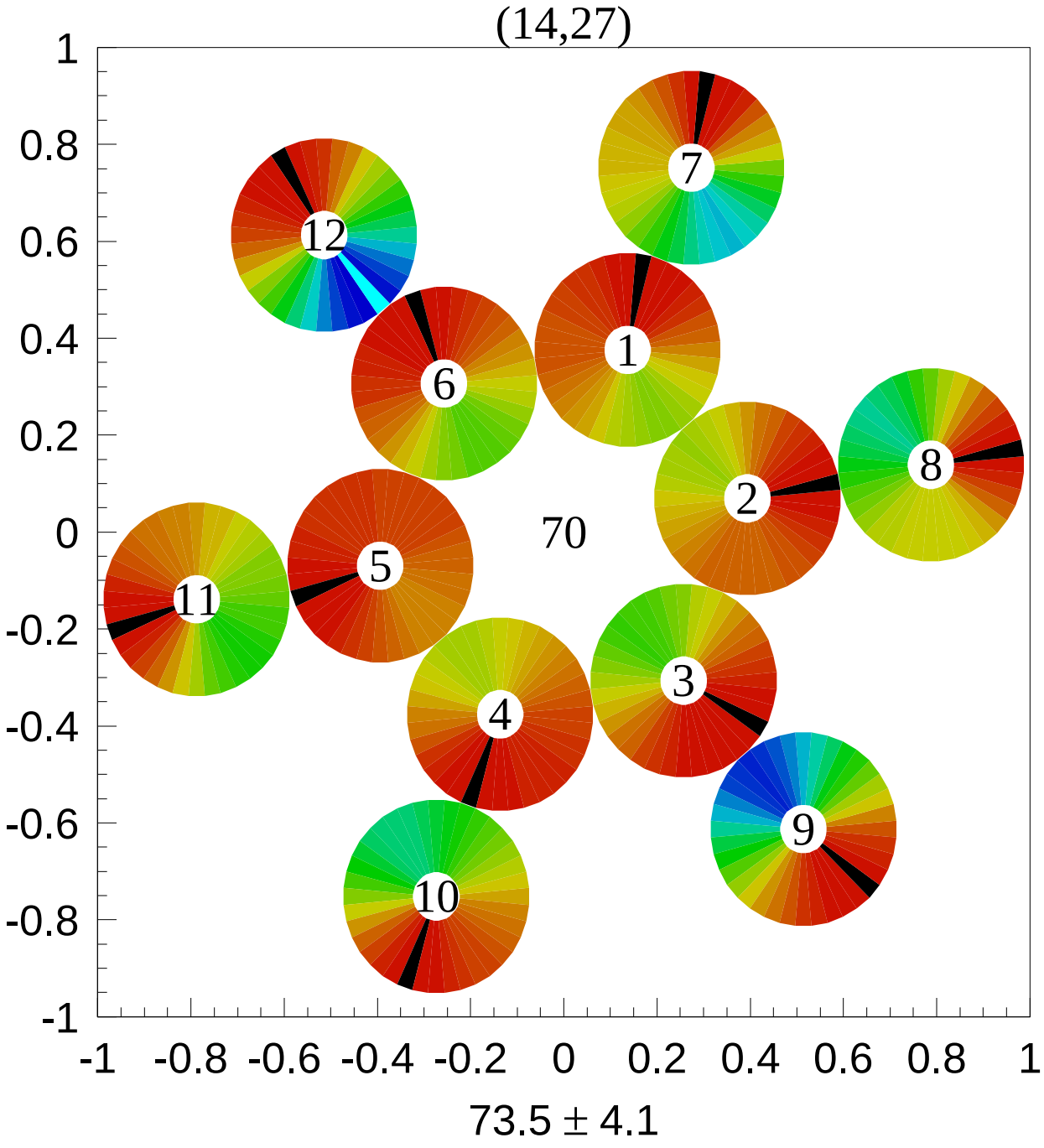

(14,25)
tilted LEDs
115 120 116 119 122 123
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 126 119 117 116 125
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

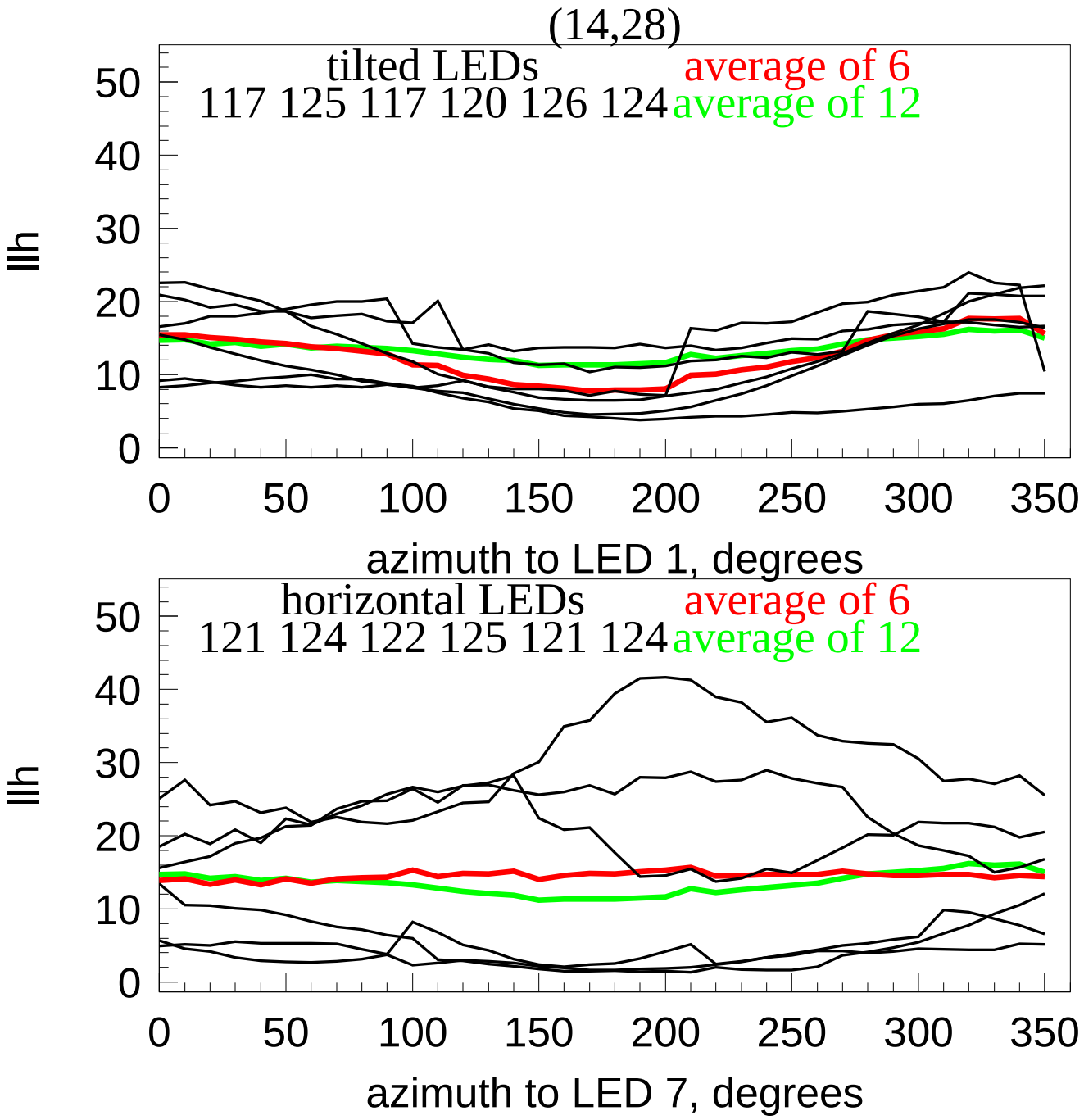

(14,25)
11
12
5
6
10
4
340
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
340.1 ± 9.1

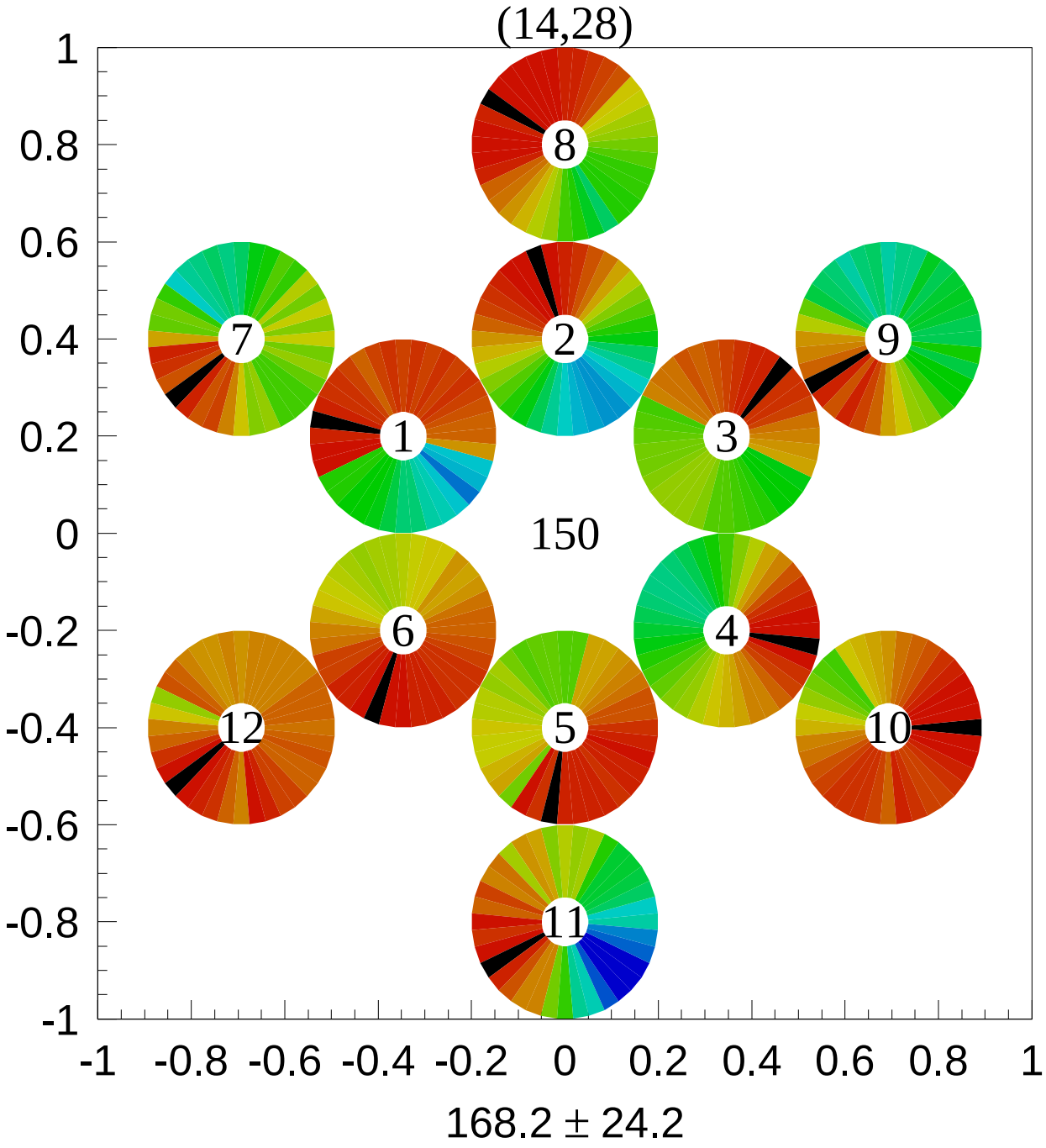

(14,26)
tilted LEDs
117 123 123 119 120 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 122 122 121 125 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

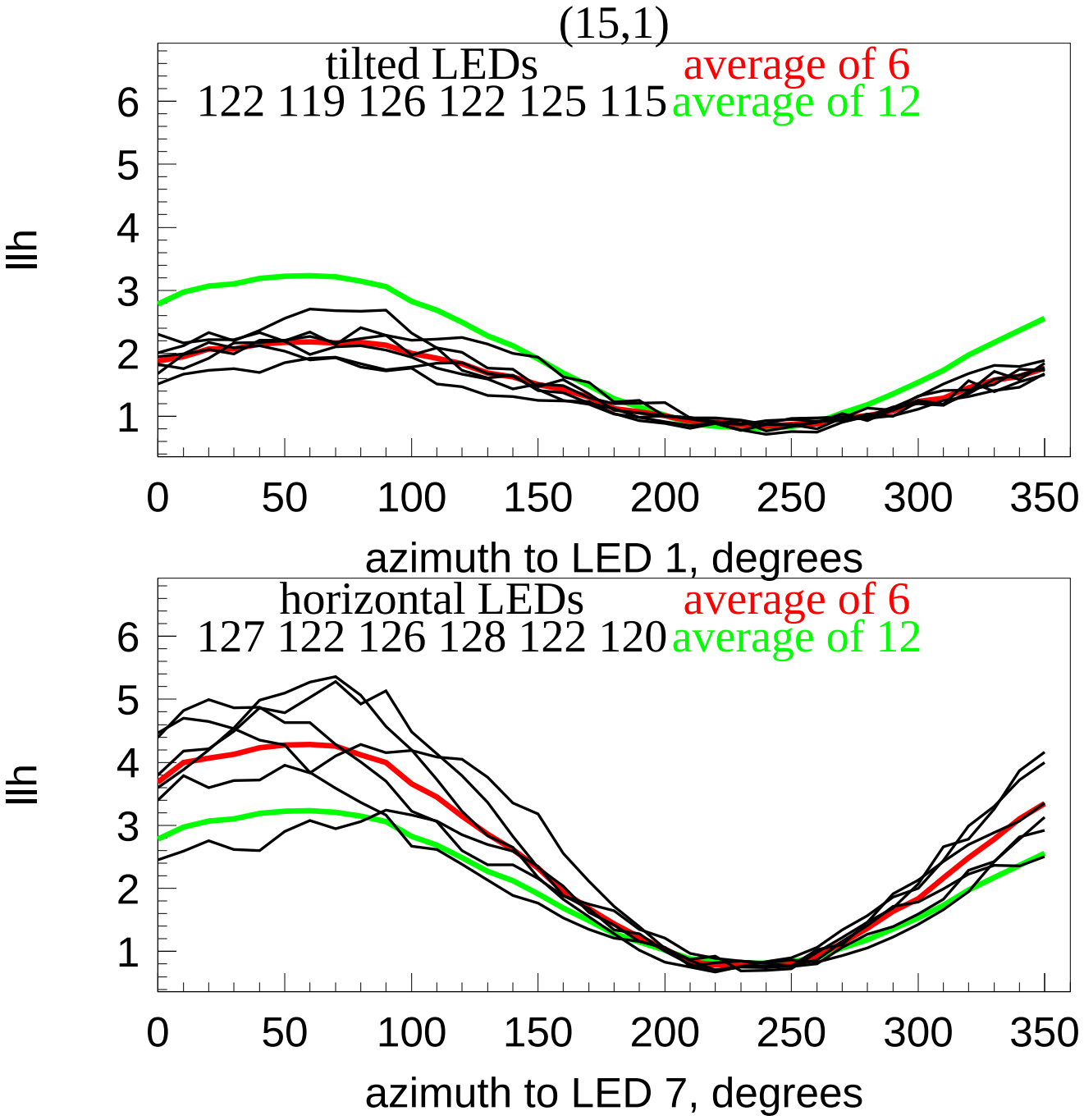

(14,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
188.5 ± 4.5

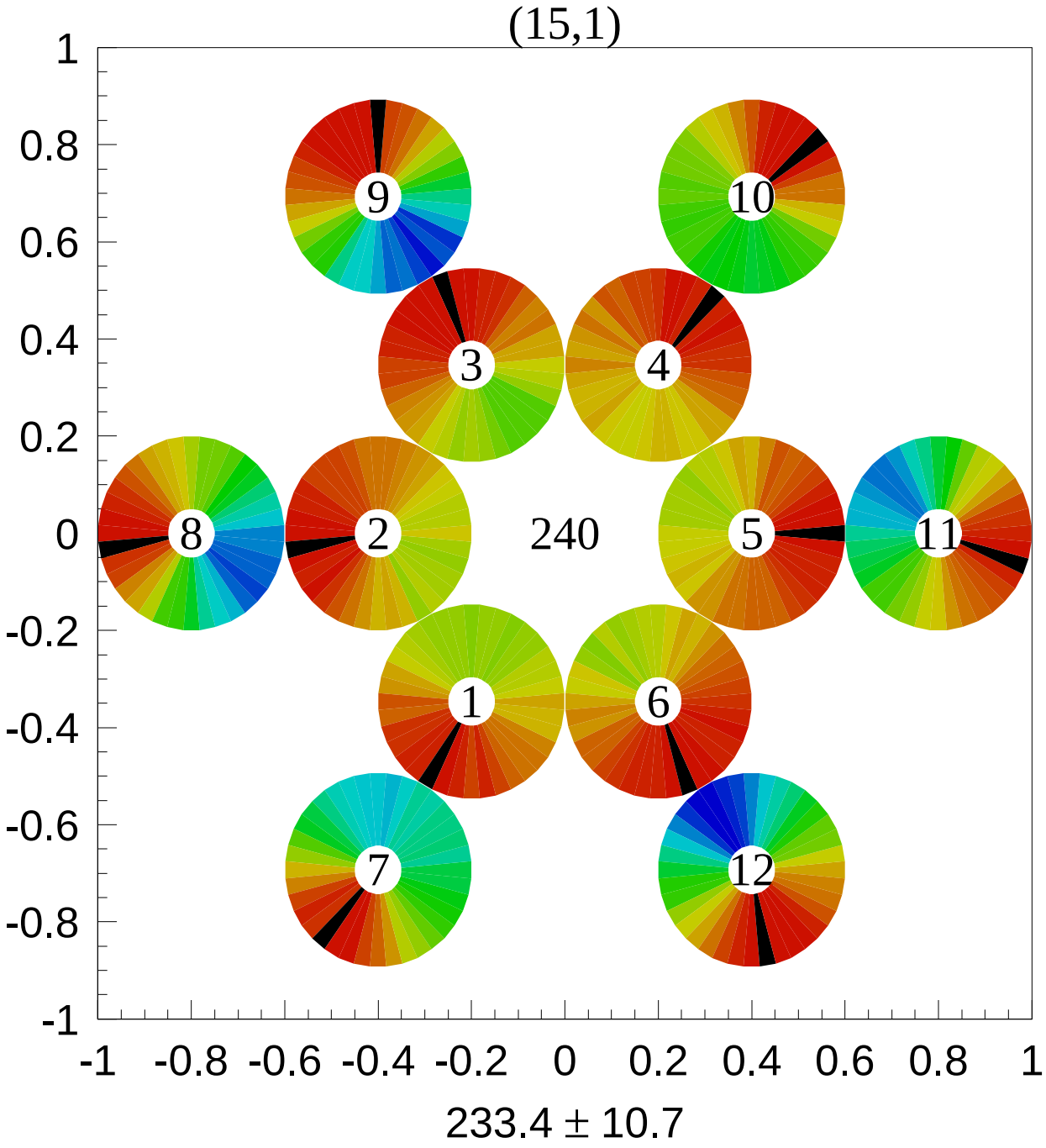

(14,27)
tilted LEDs
114 122 118 121 121 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 125 118 123 125 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

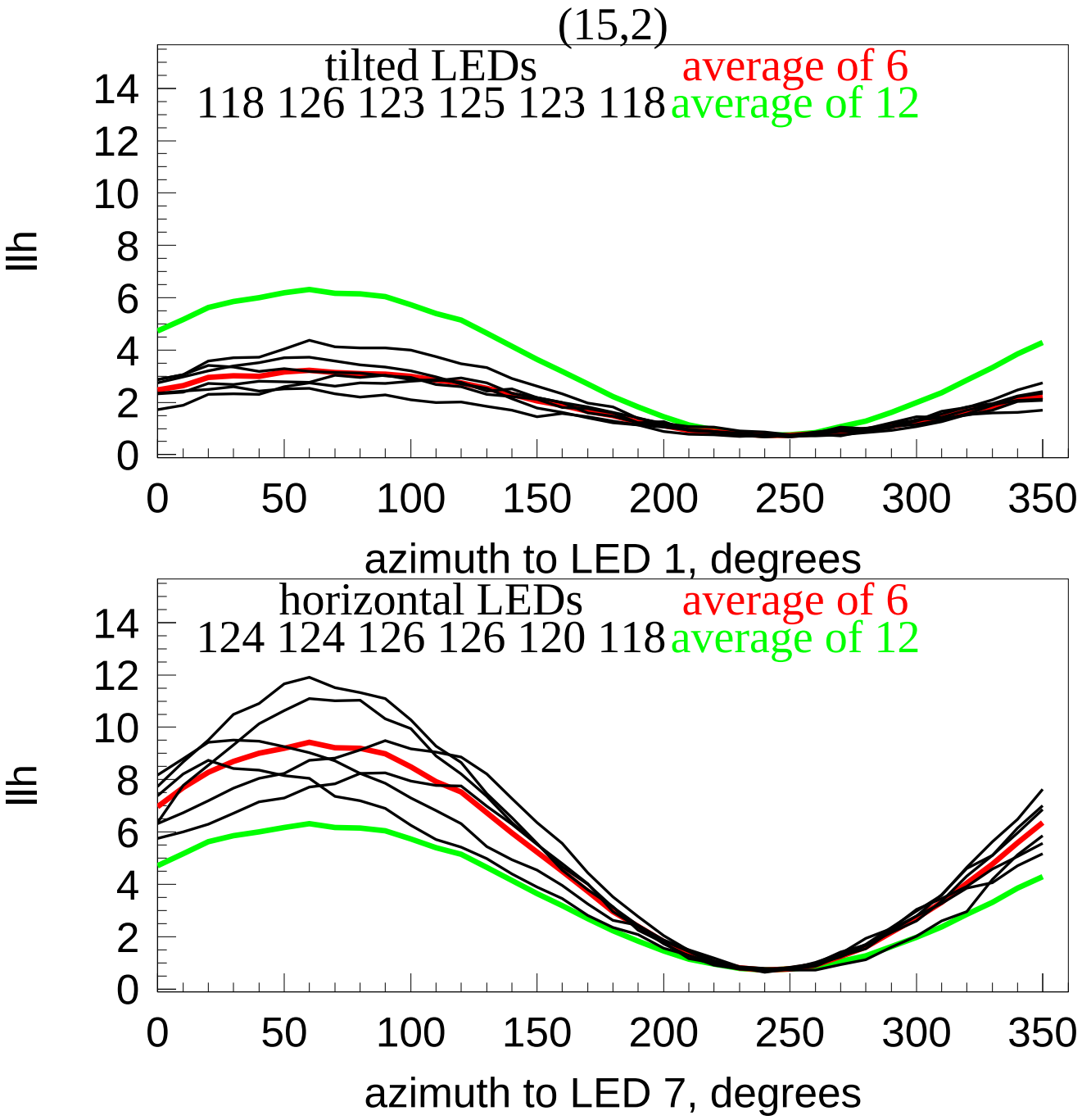

(14,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
70
5
11
4
3
9
10
73.5 ± 4.1

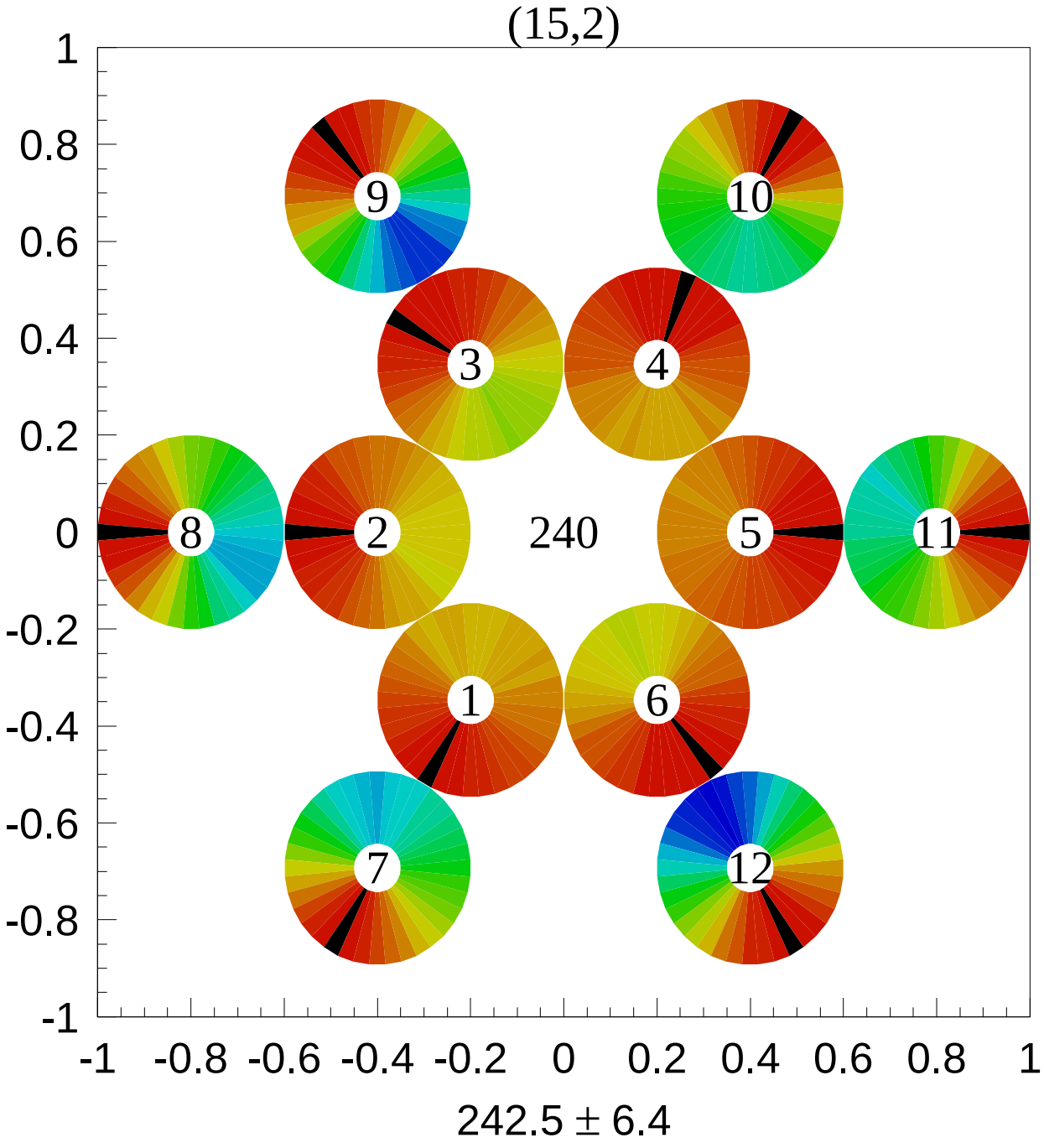

(14,28)
tilted LEDs
117 125 117 120 126 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 122 125 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

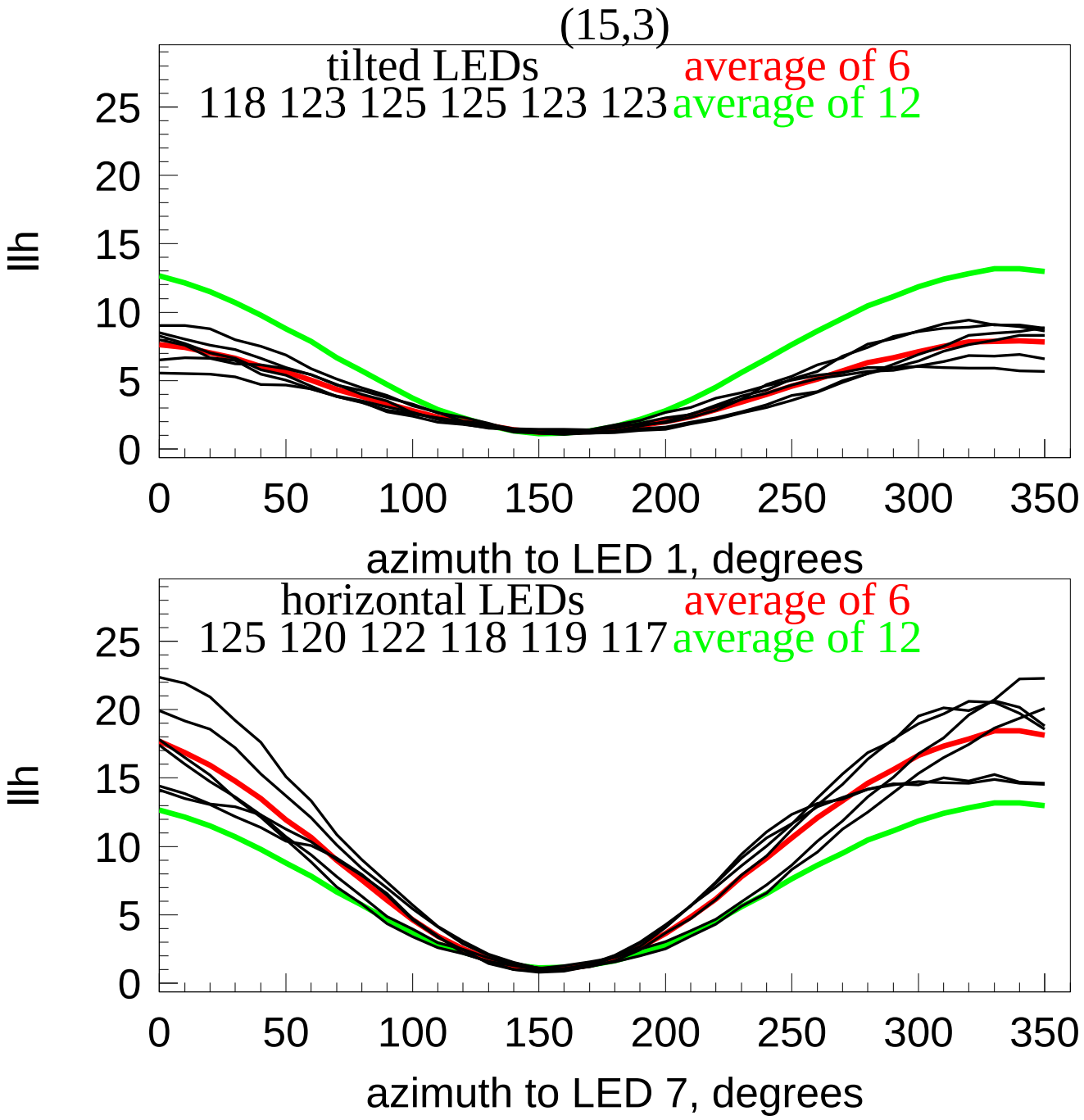

(14,28)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
168.2 ± 24.2

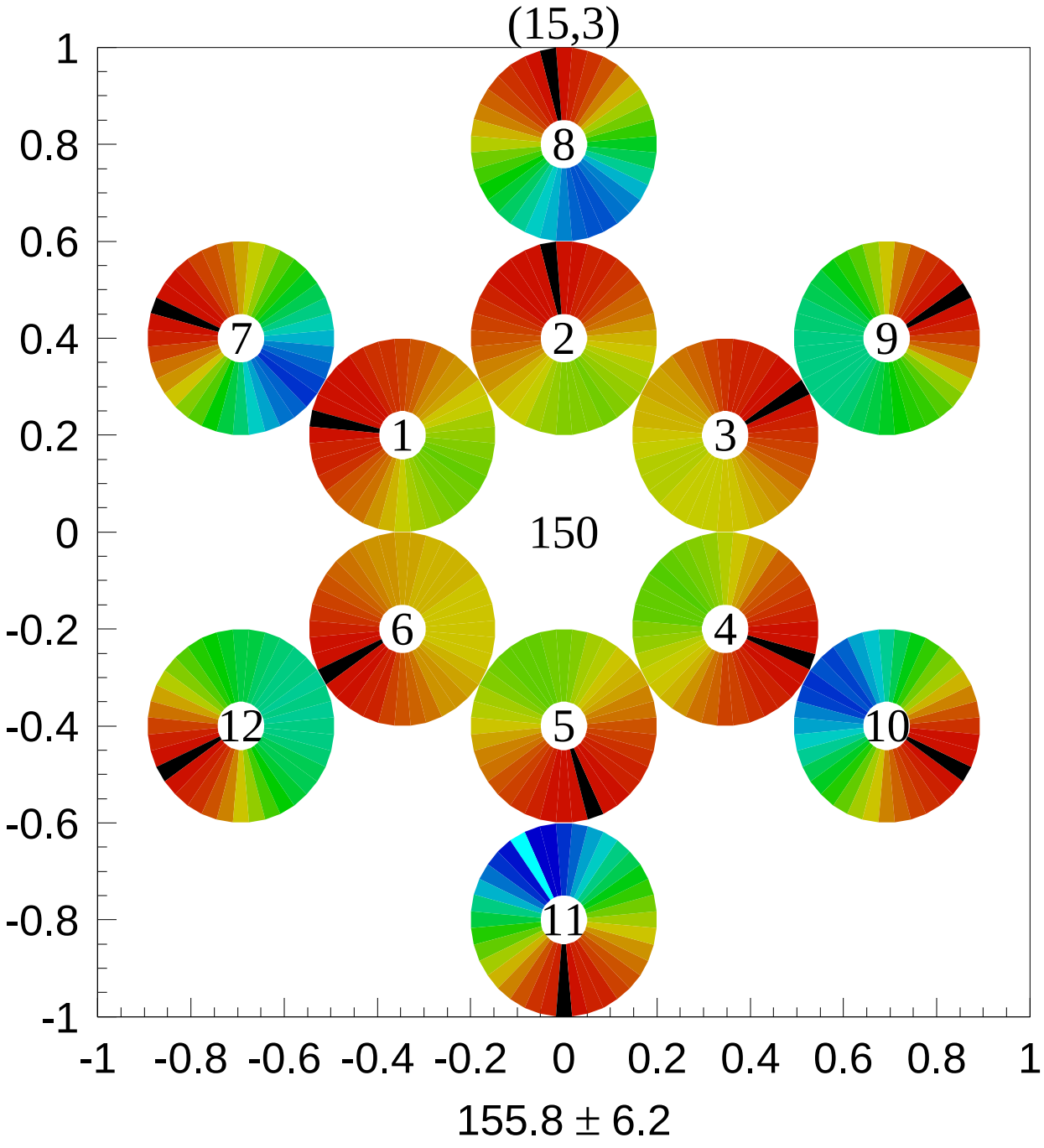

(15,1)
tilted LEDs
122 119 126 122 125 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 126 128 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

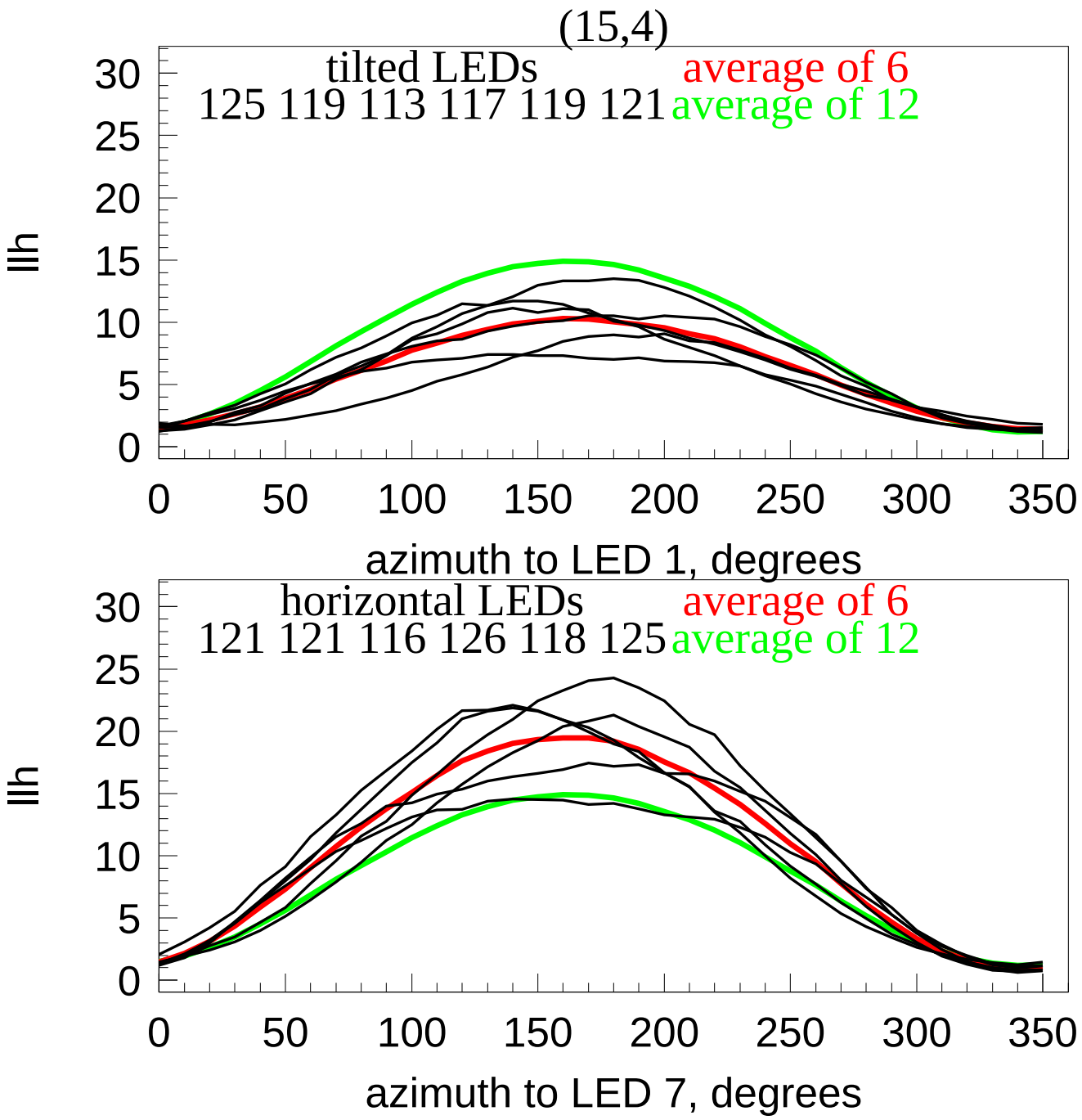

(15,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
233.4 ± 10.7

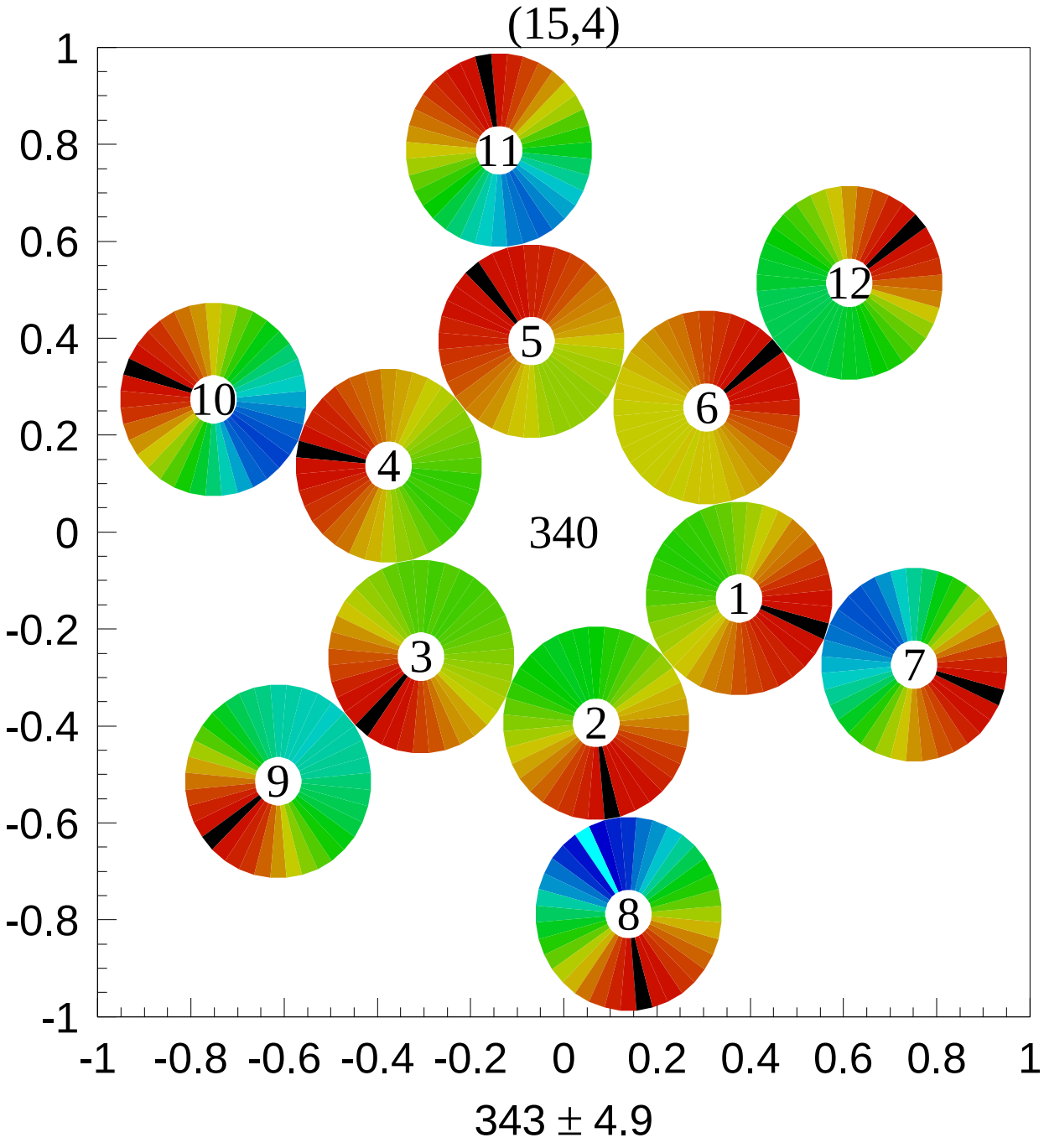

(15,2)
tilted LEDs
118 126 123 125 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 126 126 120 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

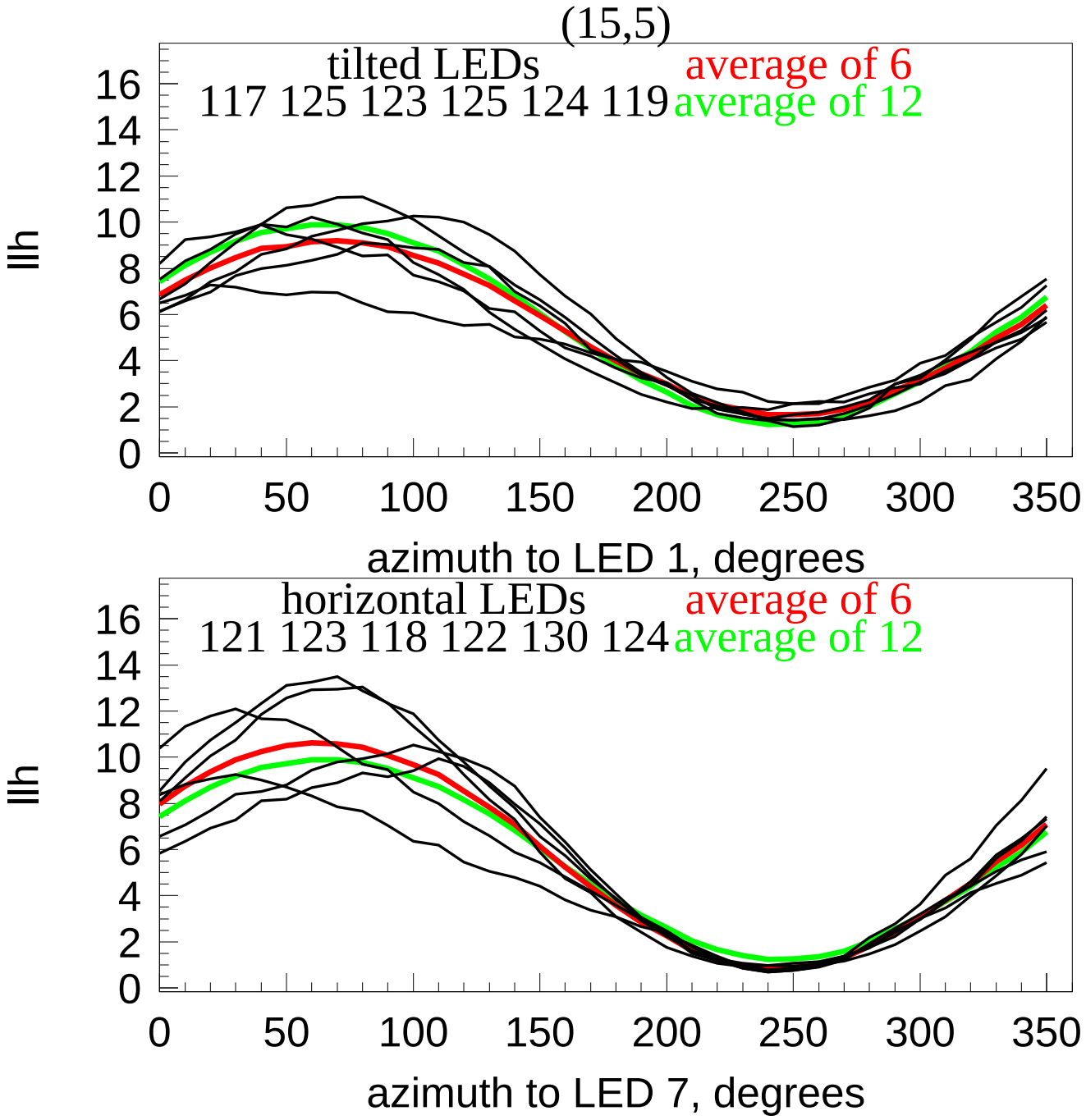

(15,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242.5 ± 6.4

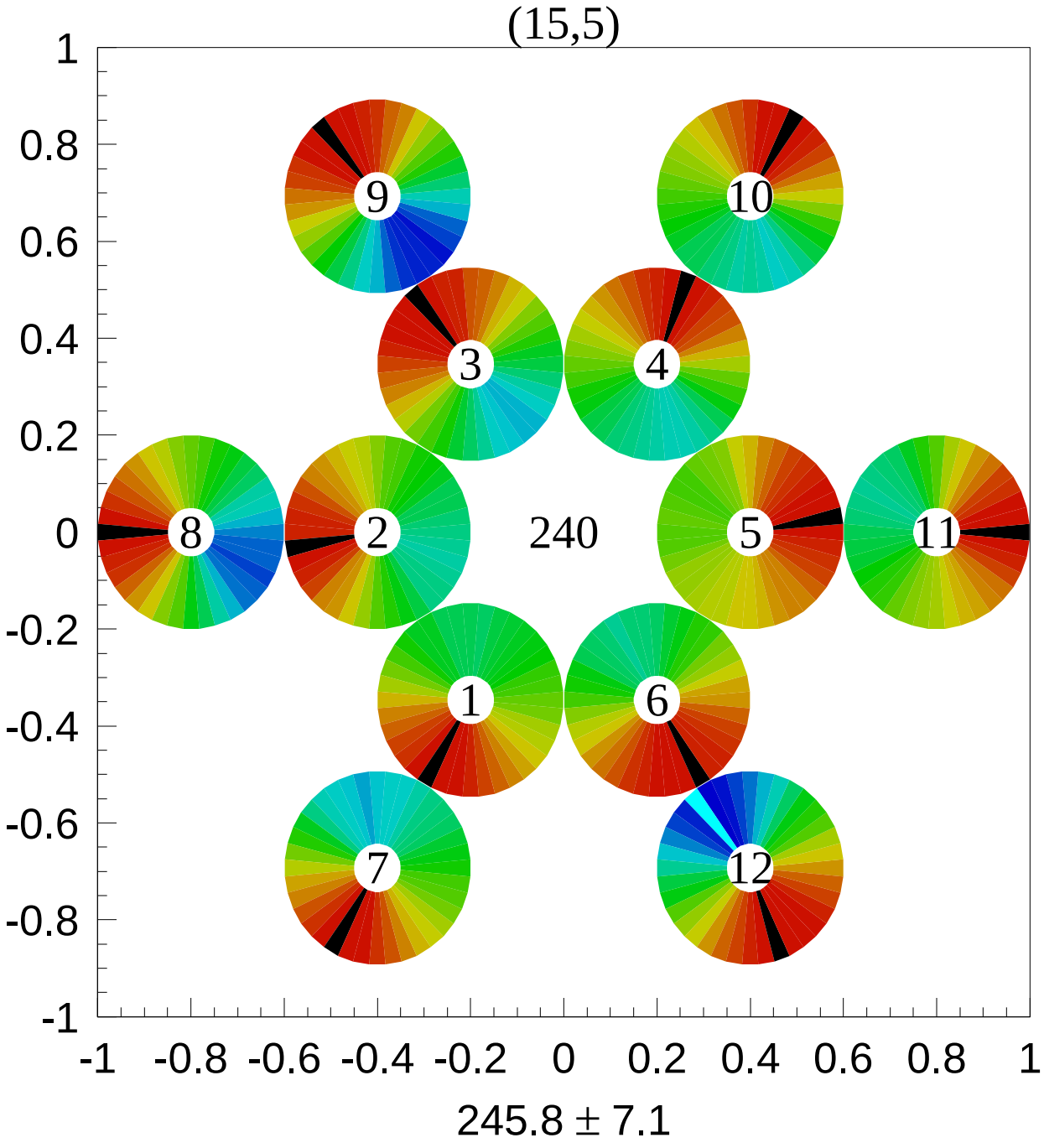

(15,3)
tilted LEDs
118 123 125 125 123 123
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 120 122 118 119 117
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

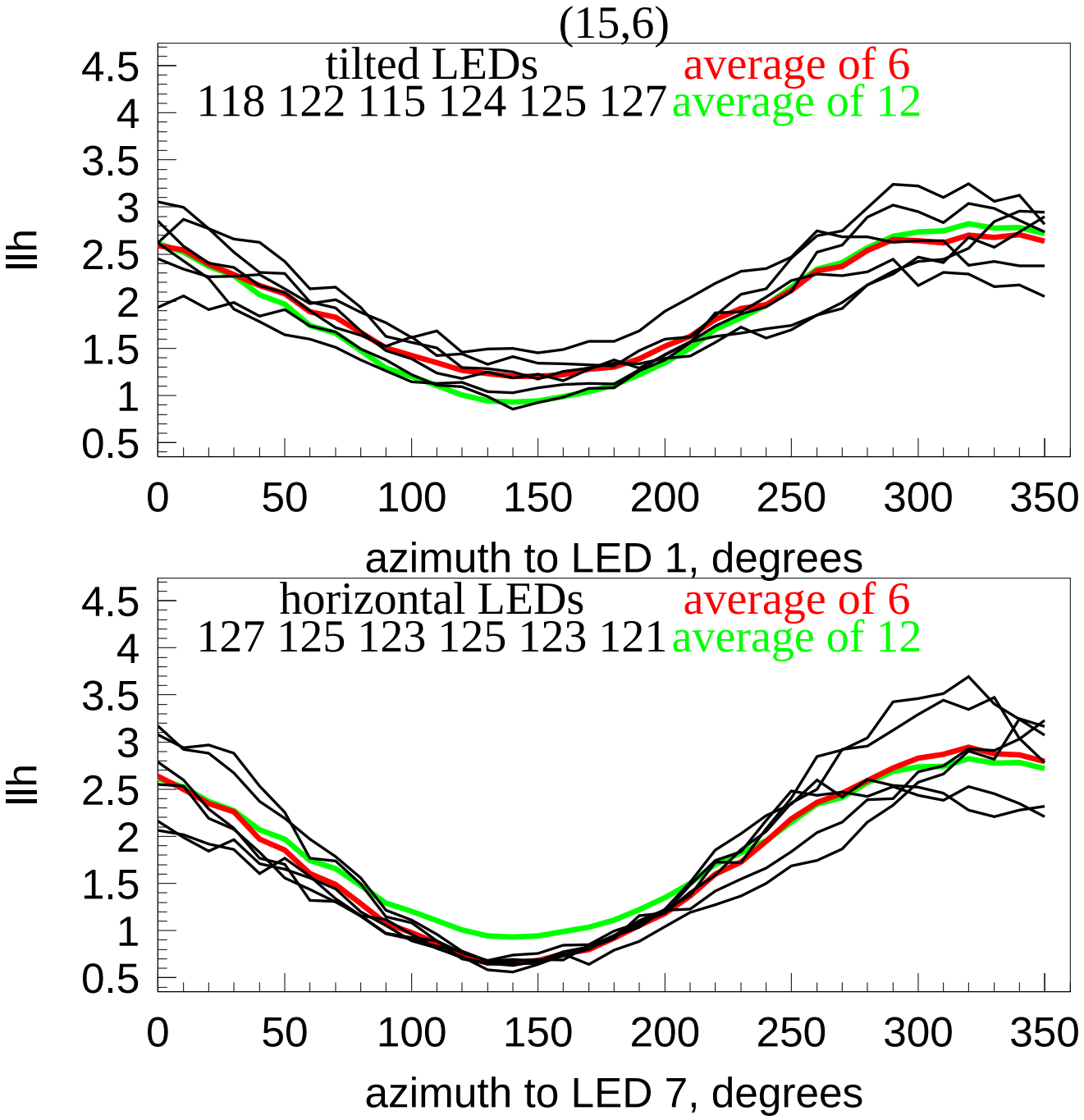

(15,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
155.8 ± 6.2

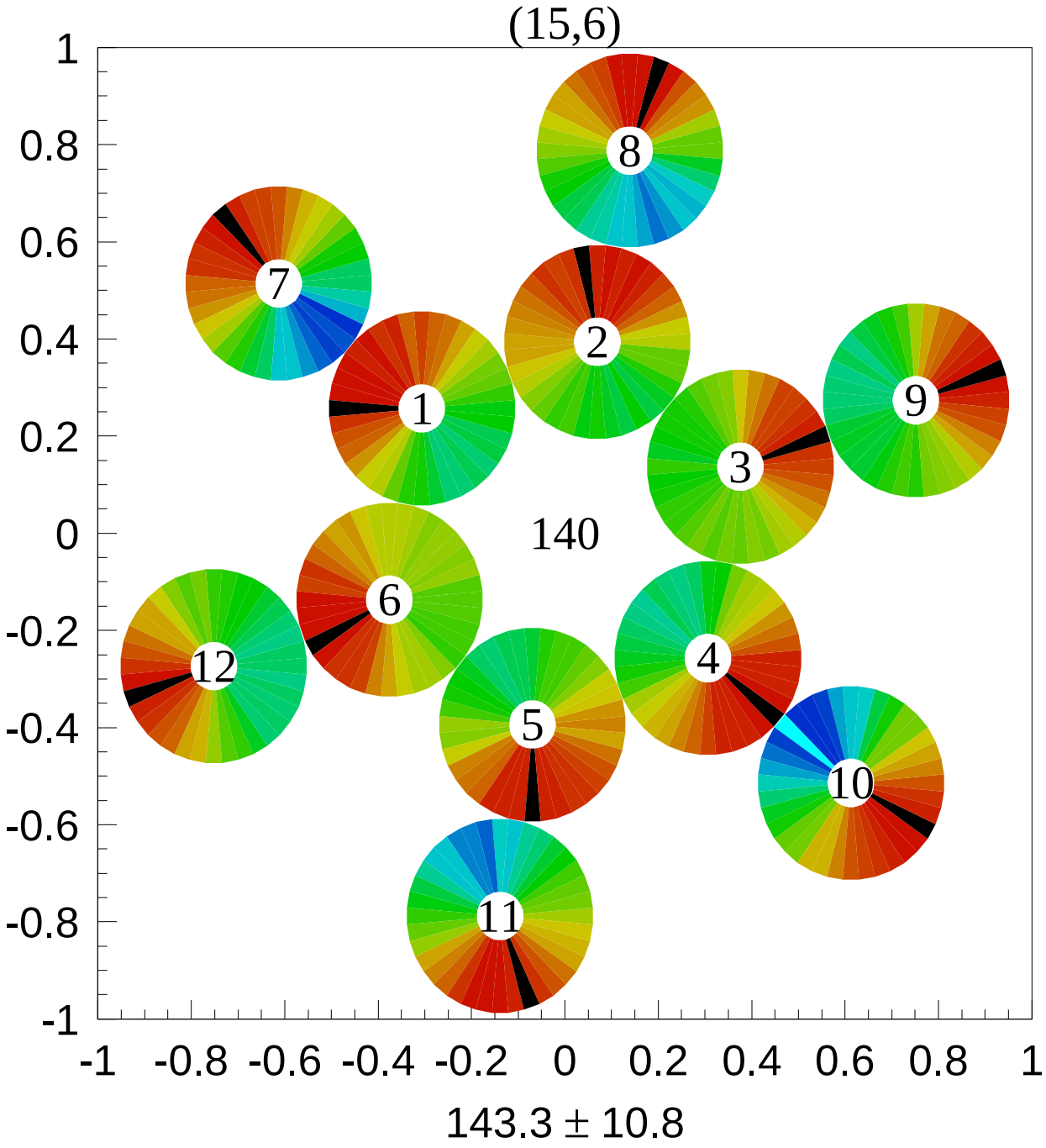

(15,4)
tilted LEDs
125 119 113 117 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 116 126 118 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

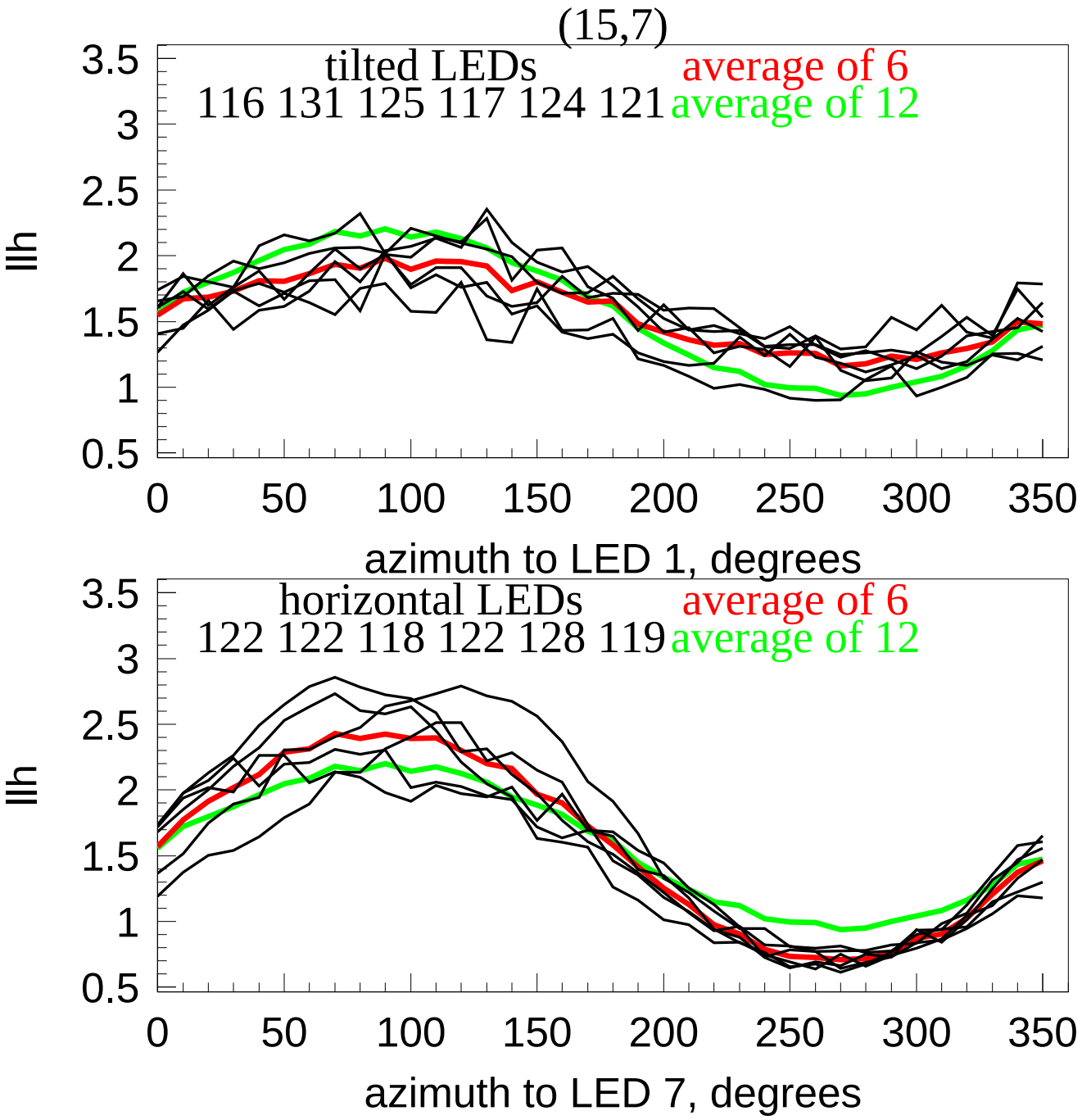

(15,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
343 ± 4.9

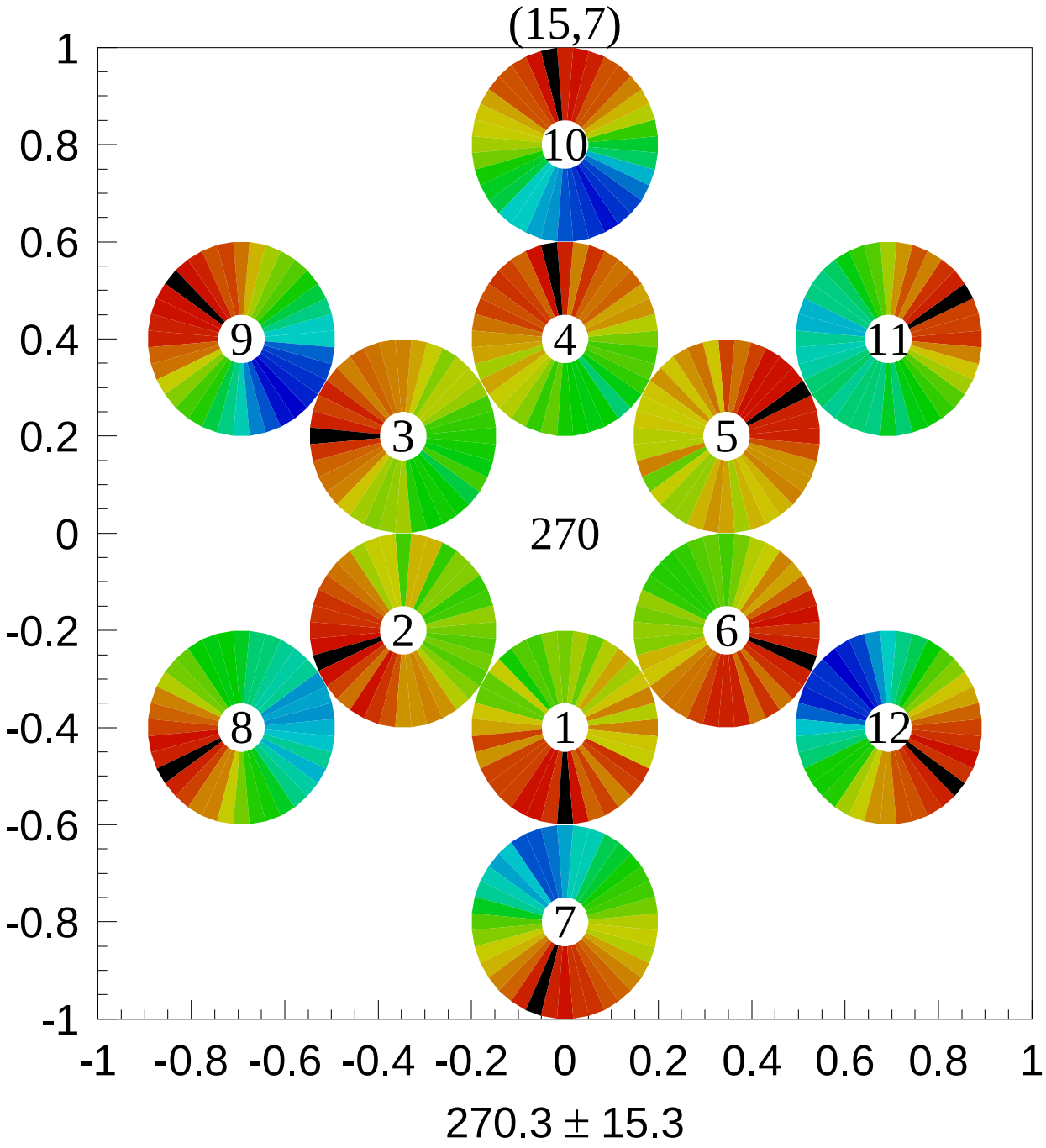

(15,5)
tilted LEDs
117 125 123 125 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 118 122 130 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

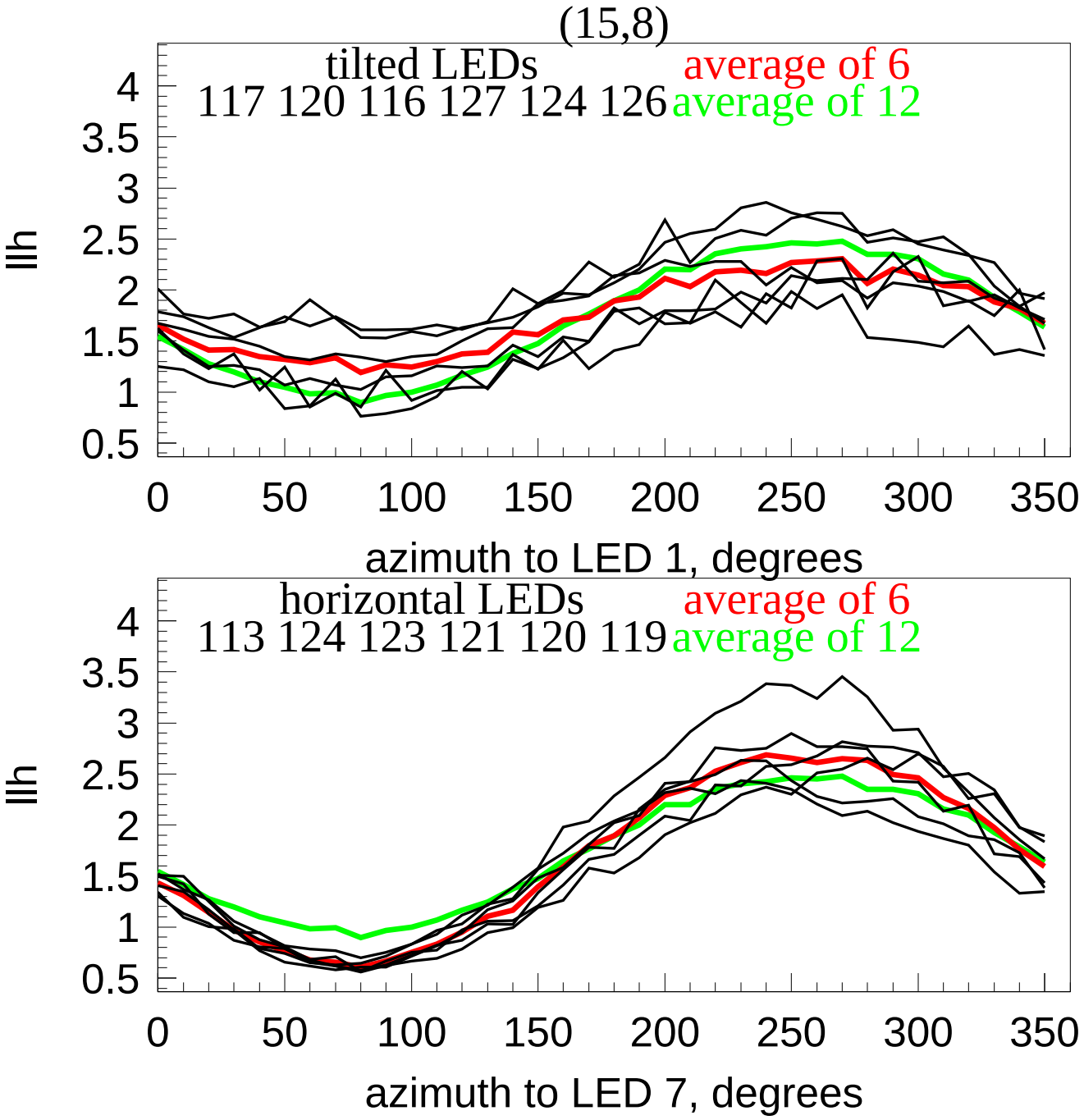

(15,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
245.8 ± 7.1

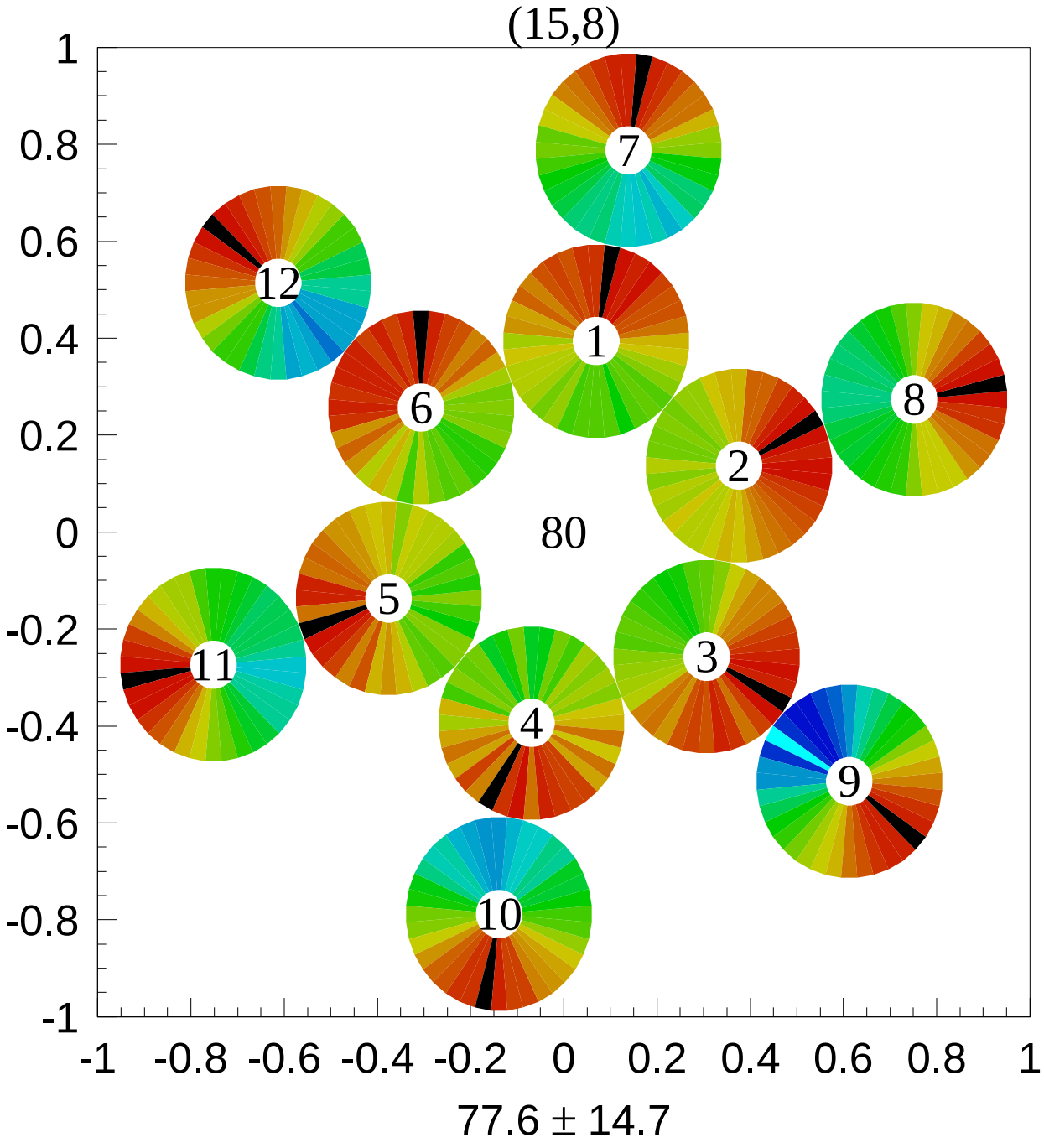

(15,6)
tilted LEDs
118 122 115 124 125 127
average of 6
average of 12
IIh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 125 123 125 123 121
average of 6
average of 12
IIh
azimuth to LED 7, degrees

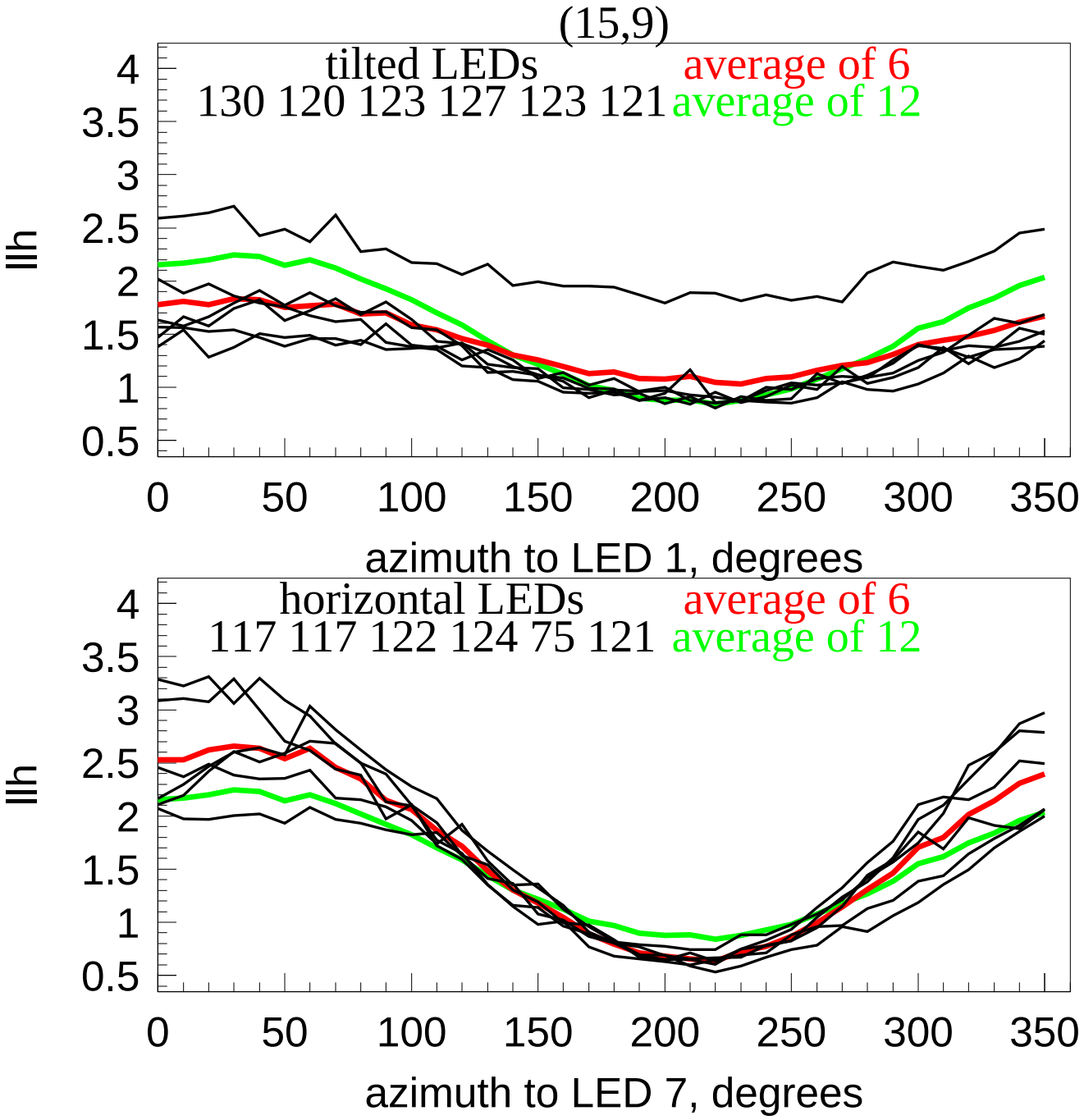

(15,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
143.3 ± 10.8

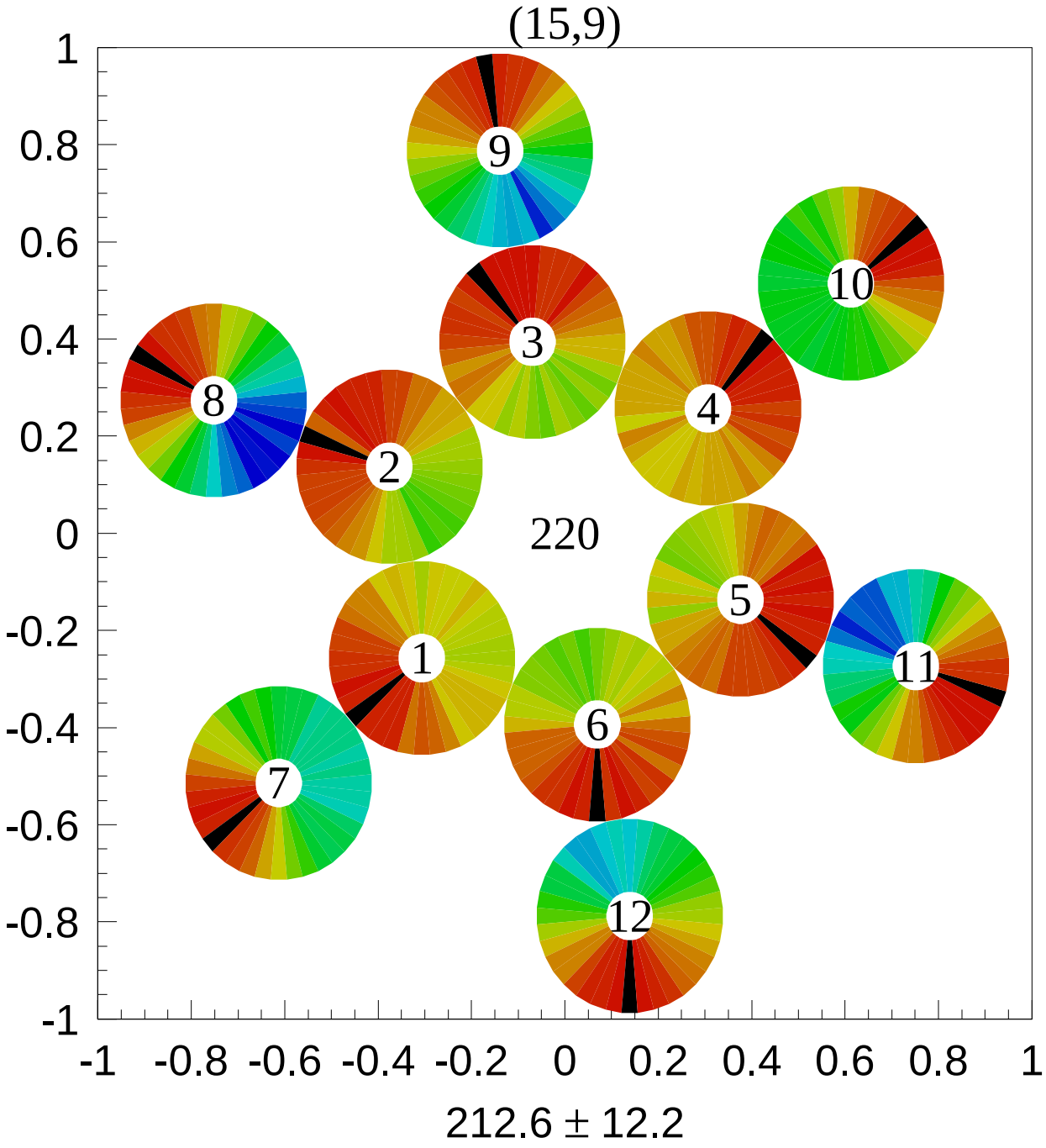

(15,7)
tilted LEDs
116 131 125 117 124 121
average of 6
average of 12
IIh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 122 118 122 128 119
average of 6
average of 12
IIh
azimuth to LED 7, degrees

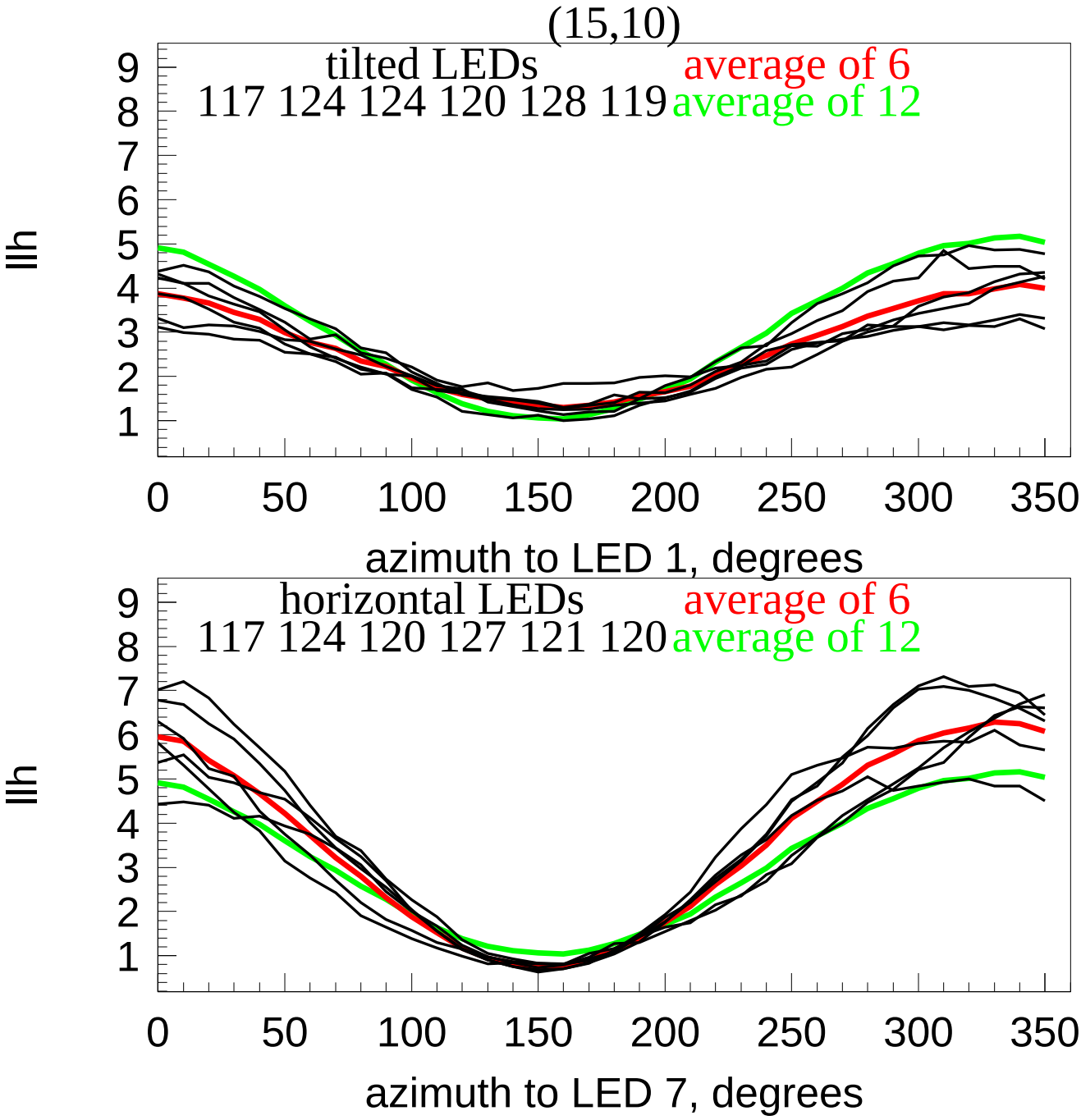

(15,7)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
270.3 ± 15.3

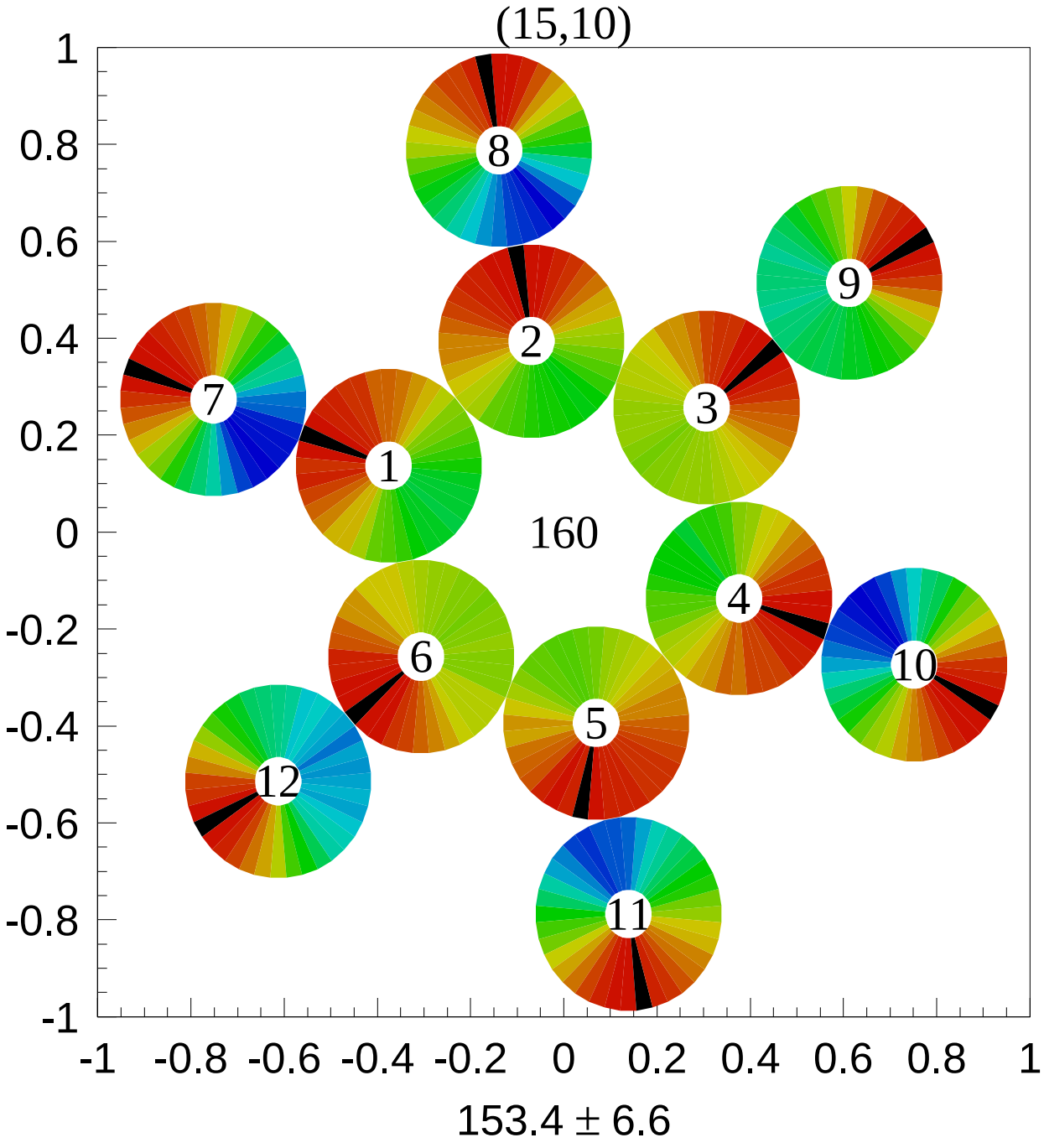

(15,8)
tilted LEDs
117 120 116 127 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 124 123 121 120 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

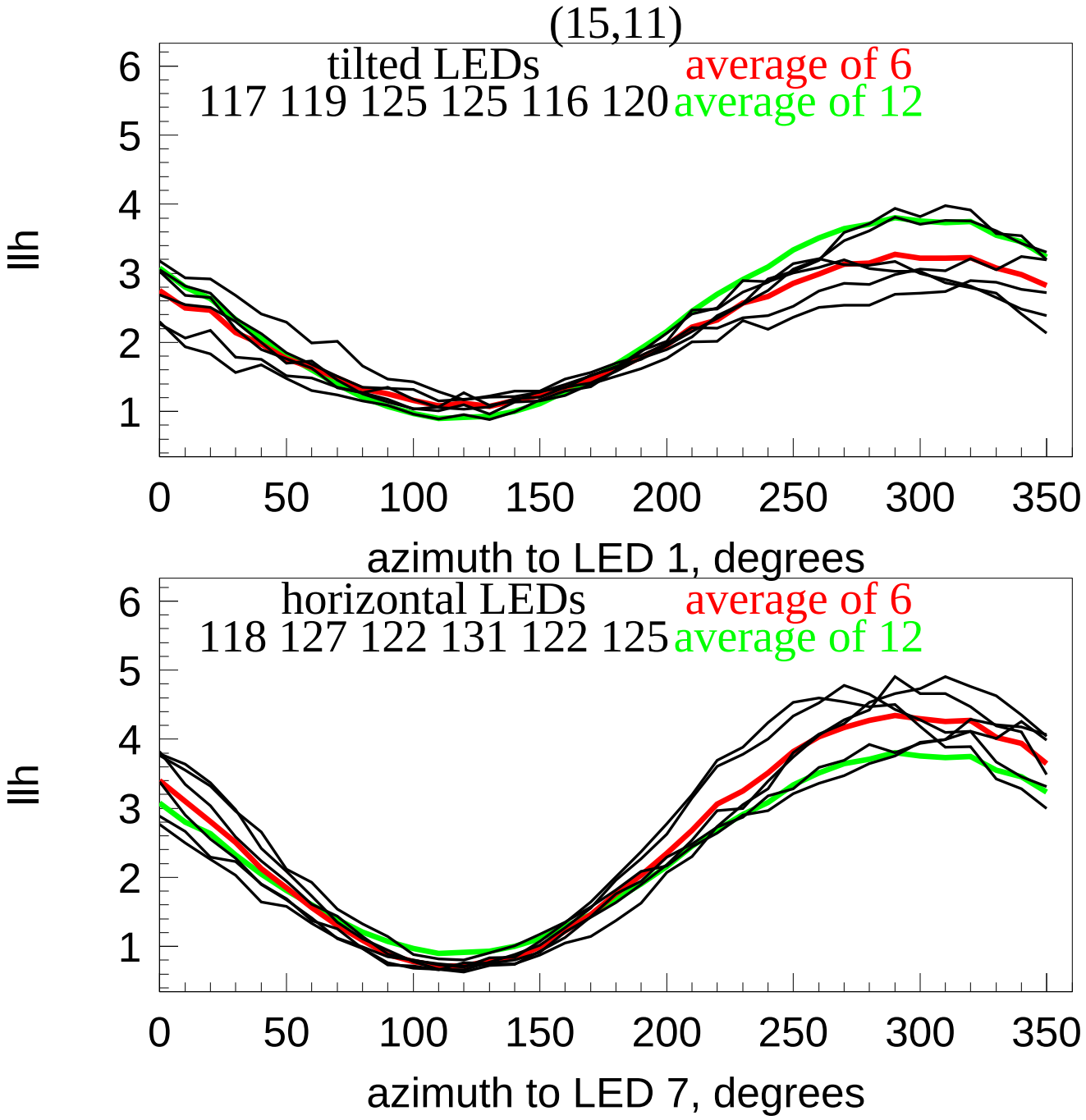

(15,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
77.6 ± 14.7
7
12
1
6
8
2
80
5
11
3
4
9
10

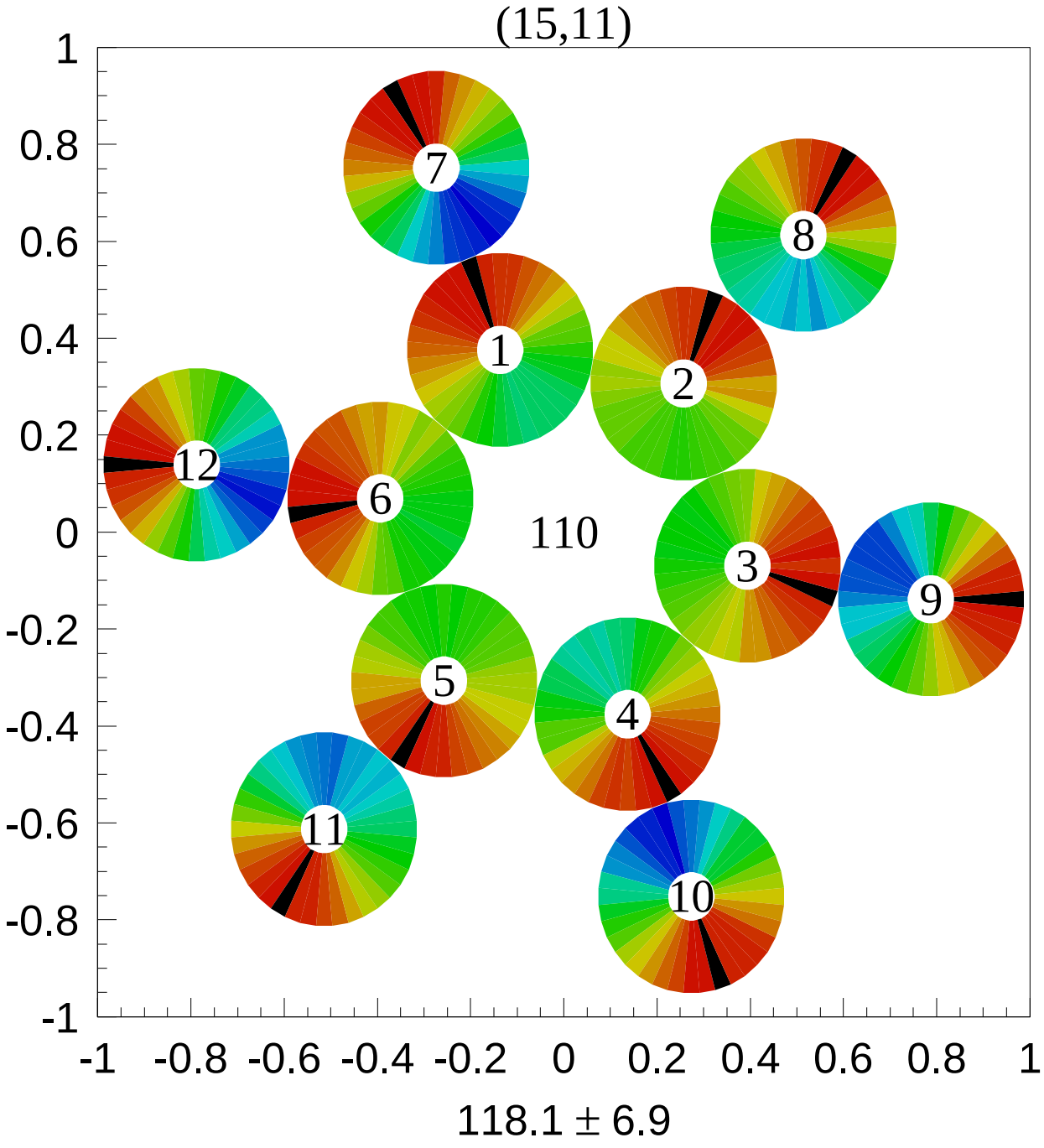

(15,9)
tilted LEDs
130 120 123 127 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 117 122 124 75 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

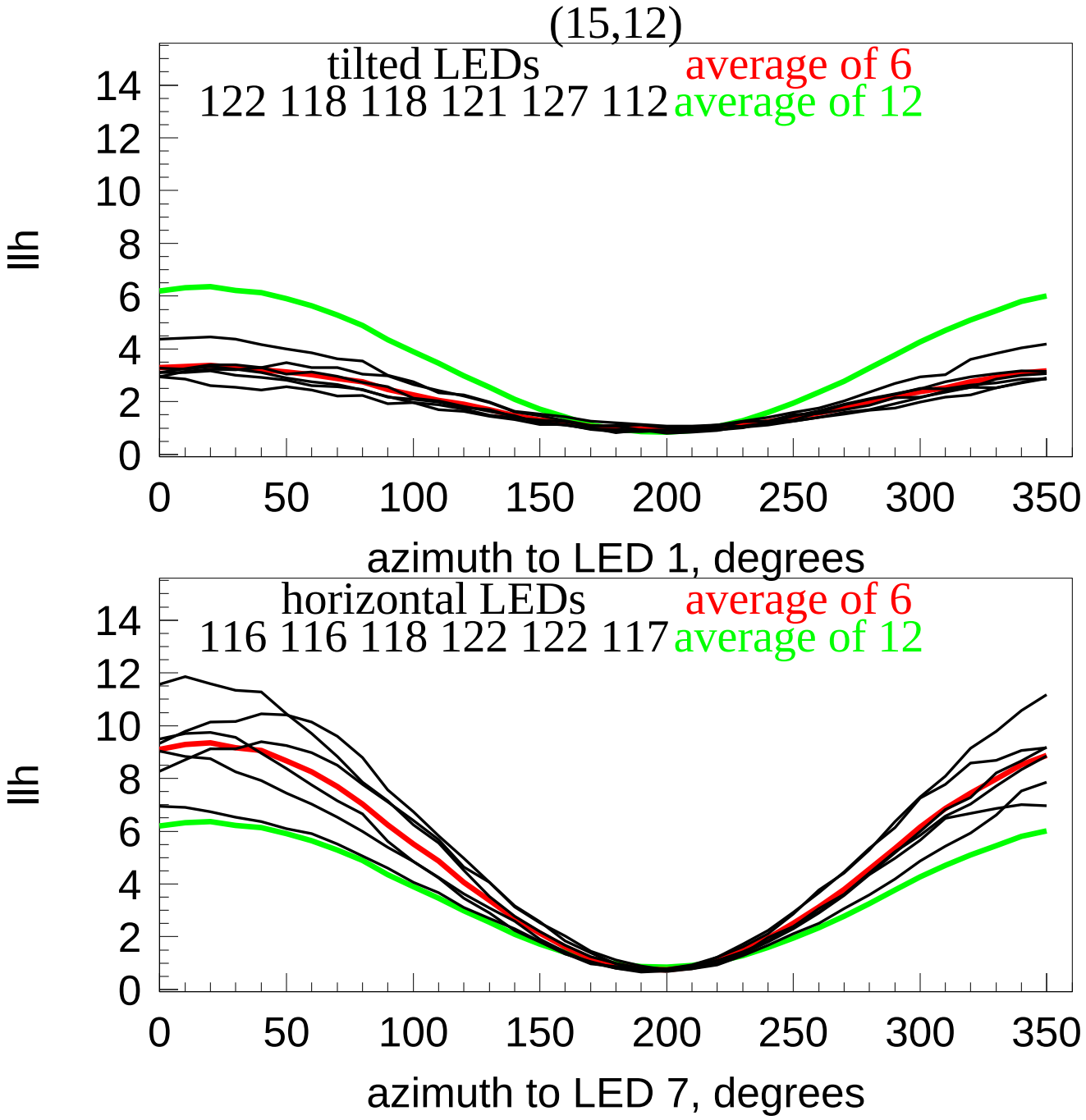

(15,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
212.6 ± 12.2

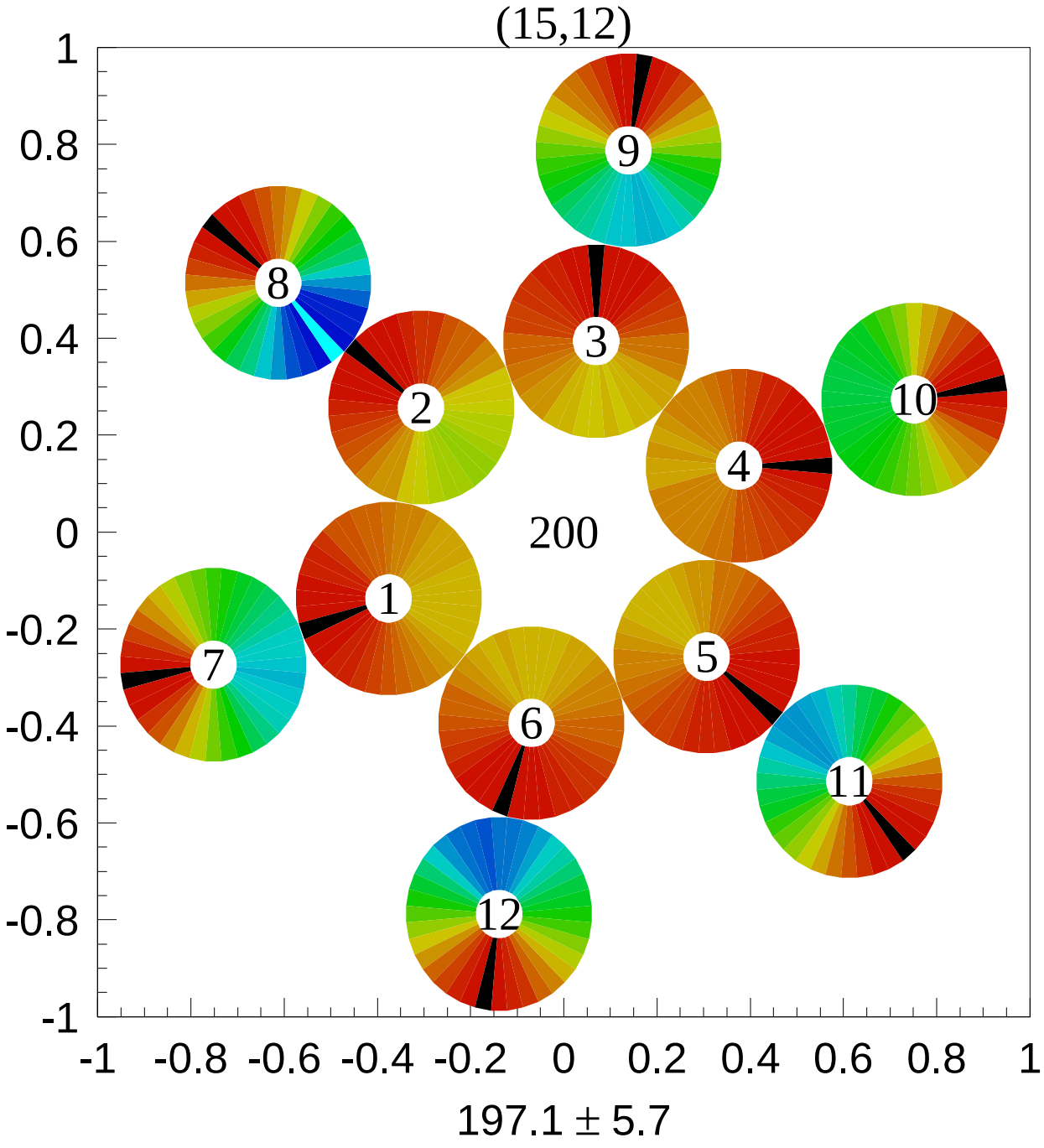

(15,10)
tilted LEDs
117 124 124 120 128 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 124 120 127 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

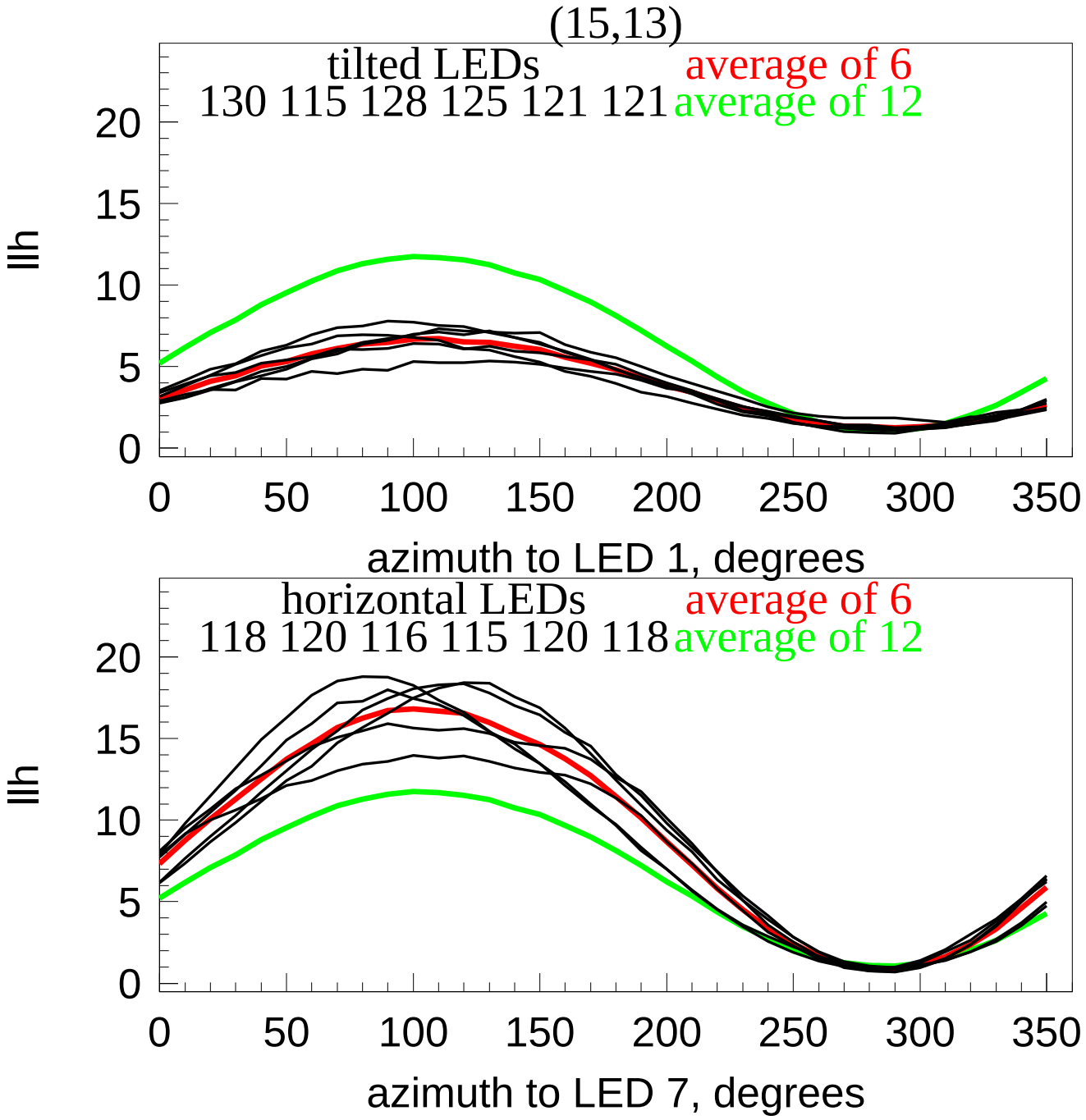

(15,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
153.4 ± 6.6

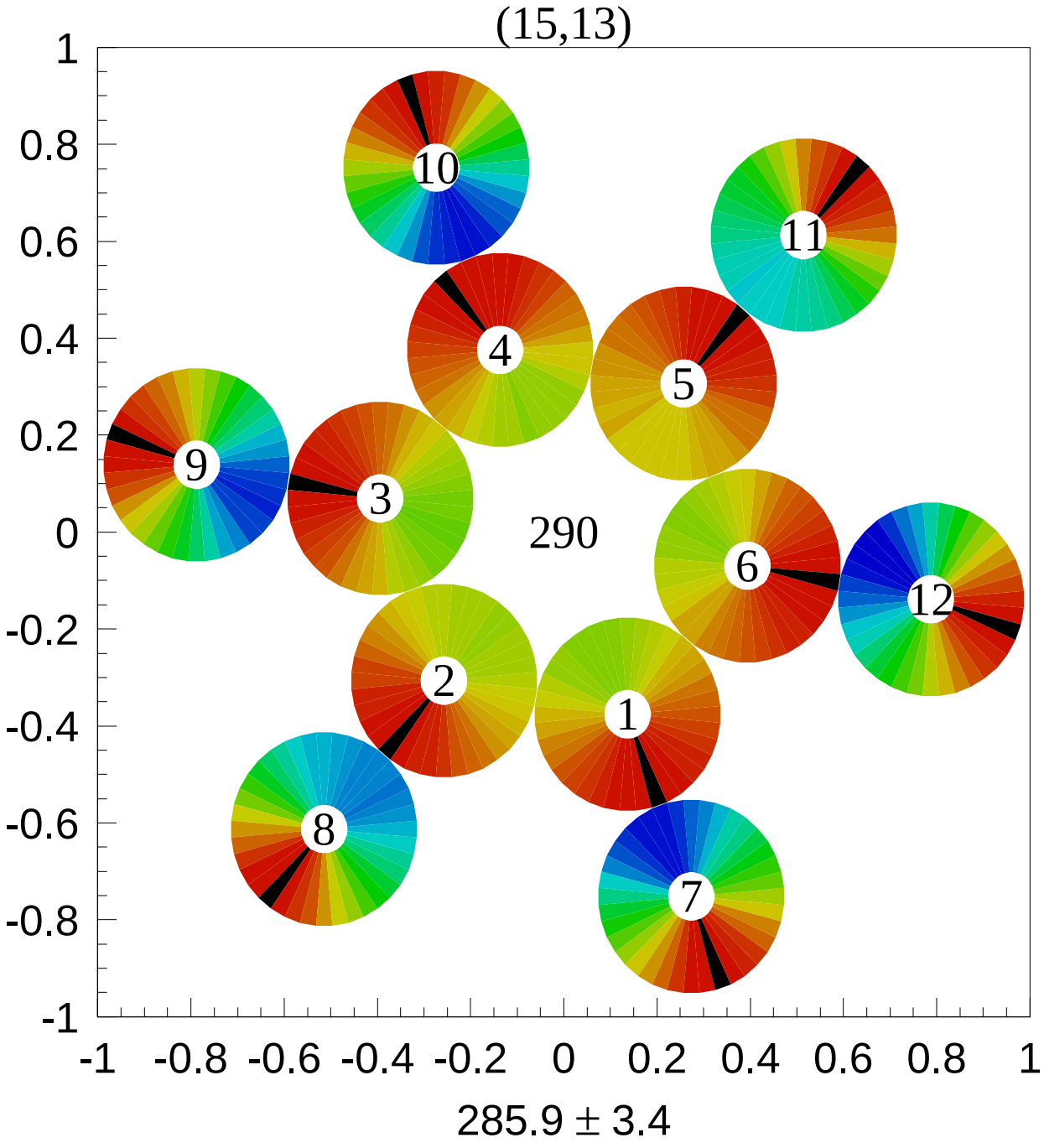

(15,11)
tilted LEDs
117 119 125 125 116 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 127 122 131 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

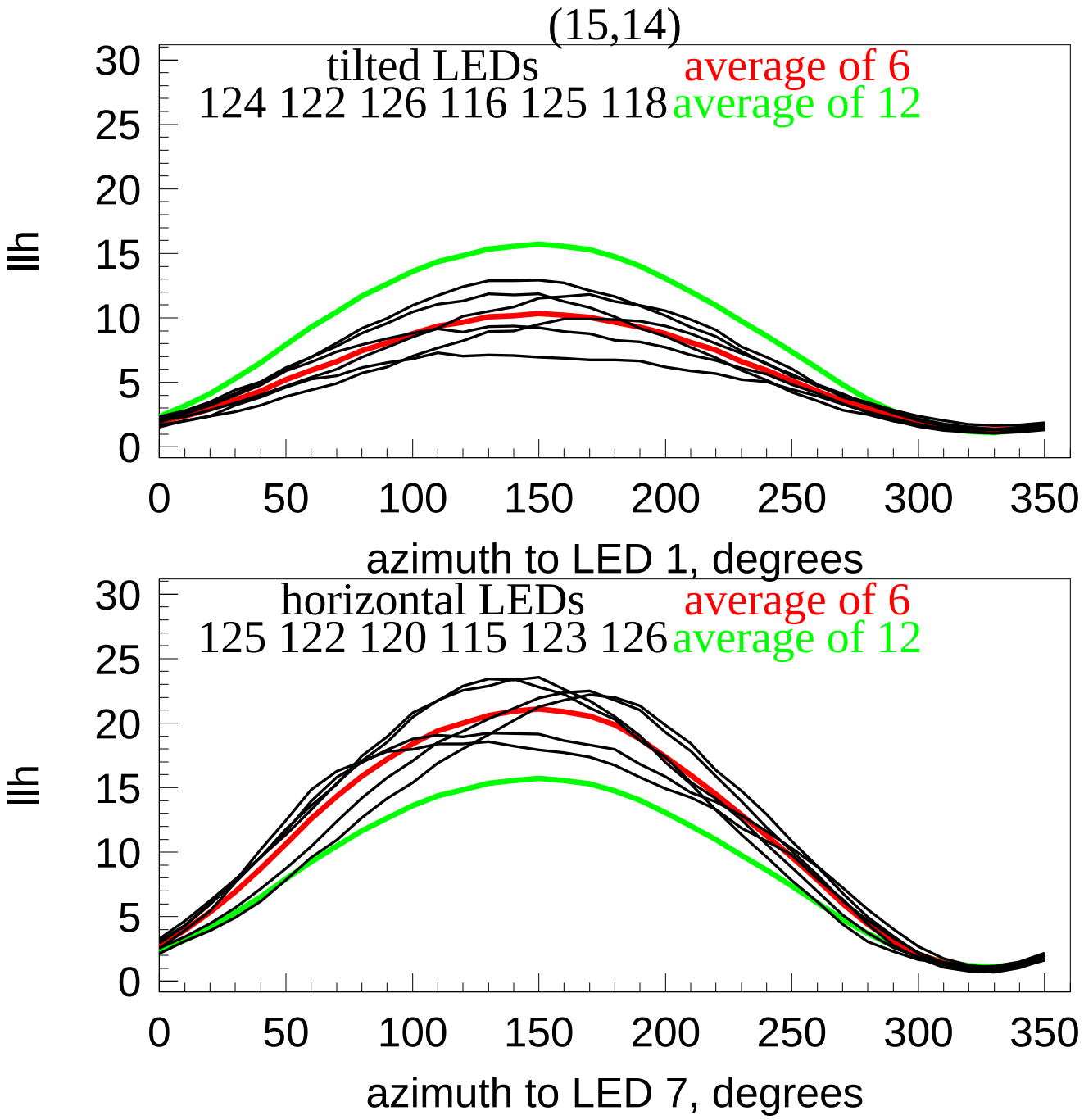

(15,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
118.1 ± 6.9

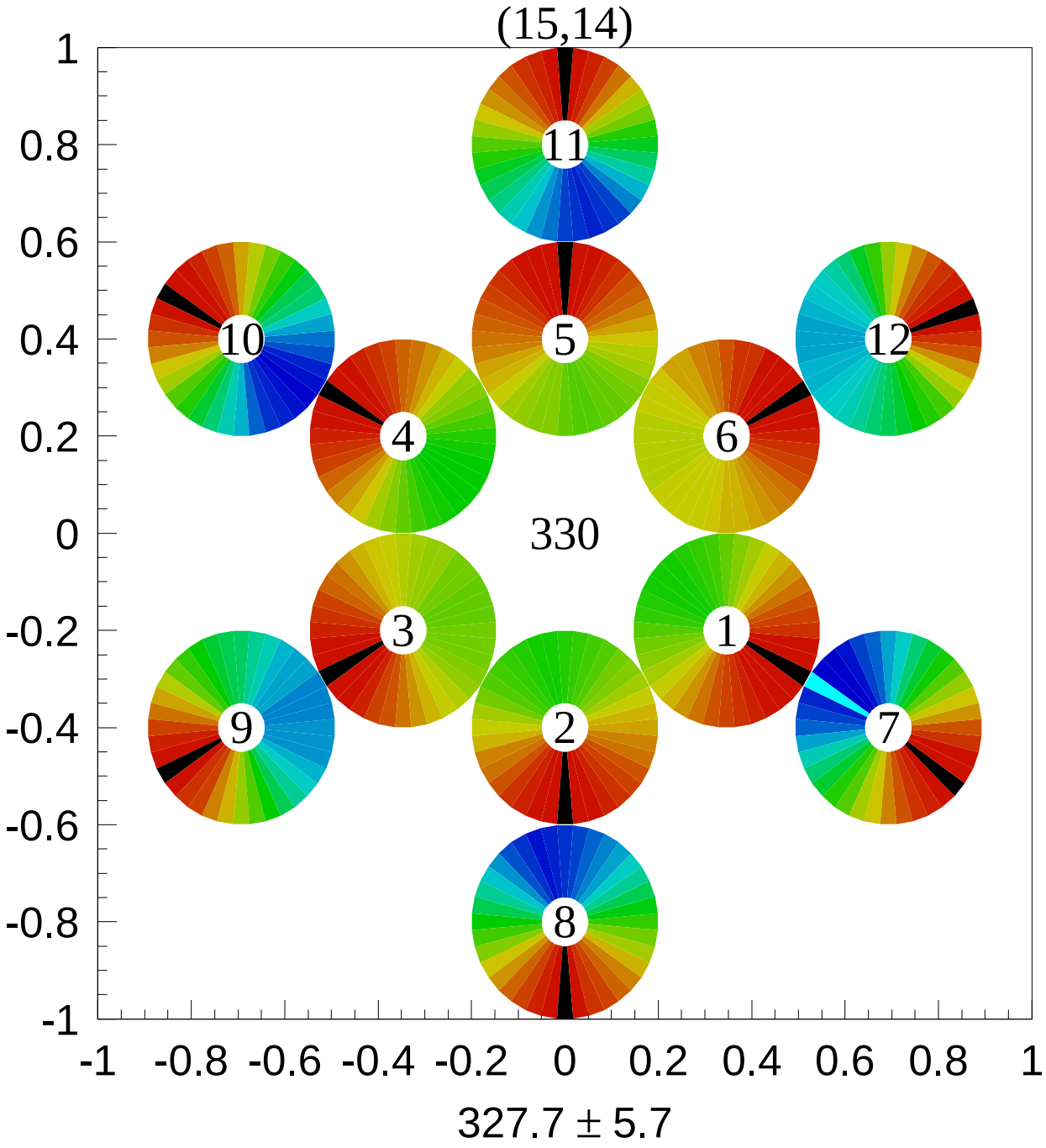

(15,12)
tilted LEDs
122 118 118 121 127 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 116 118 122 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

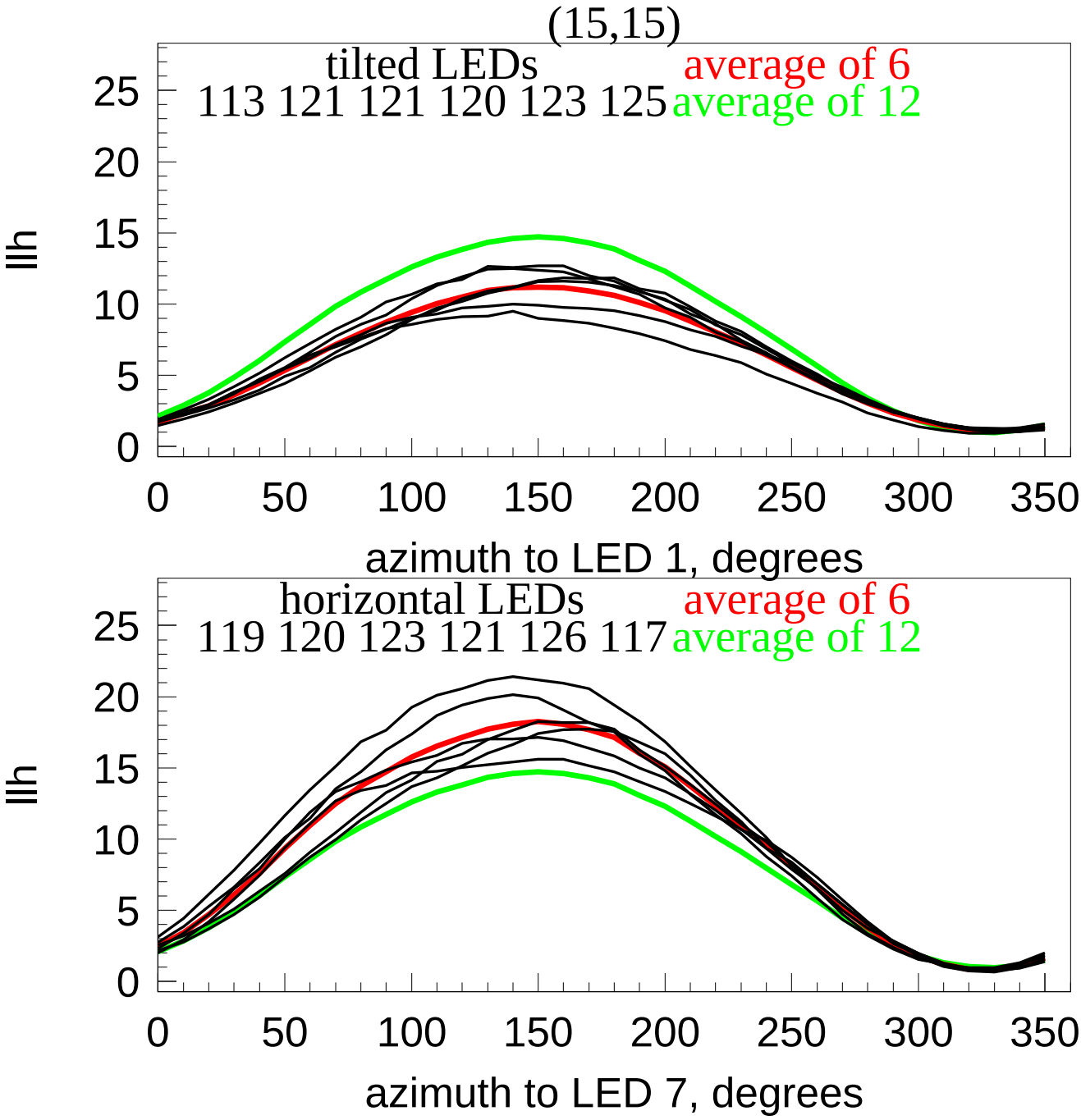

(15,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
197.1 ± 5.7

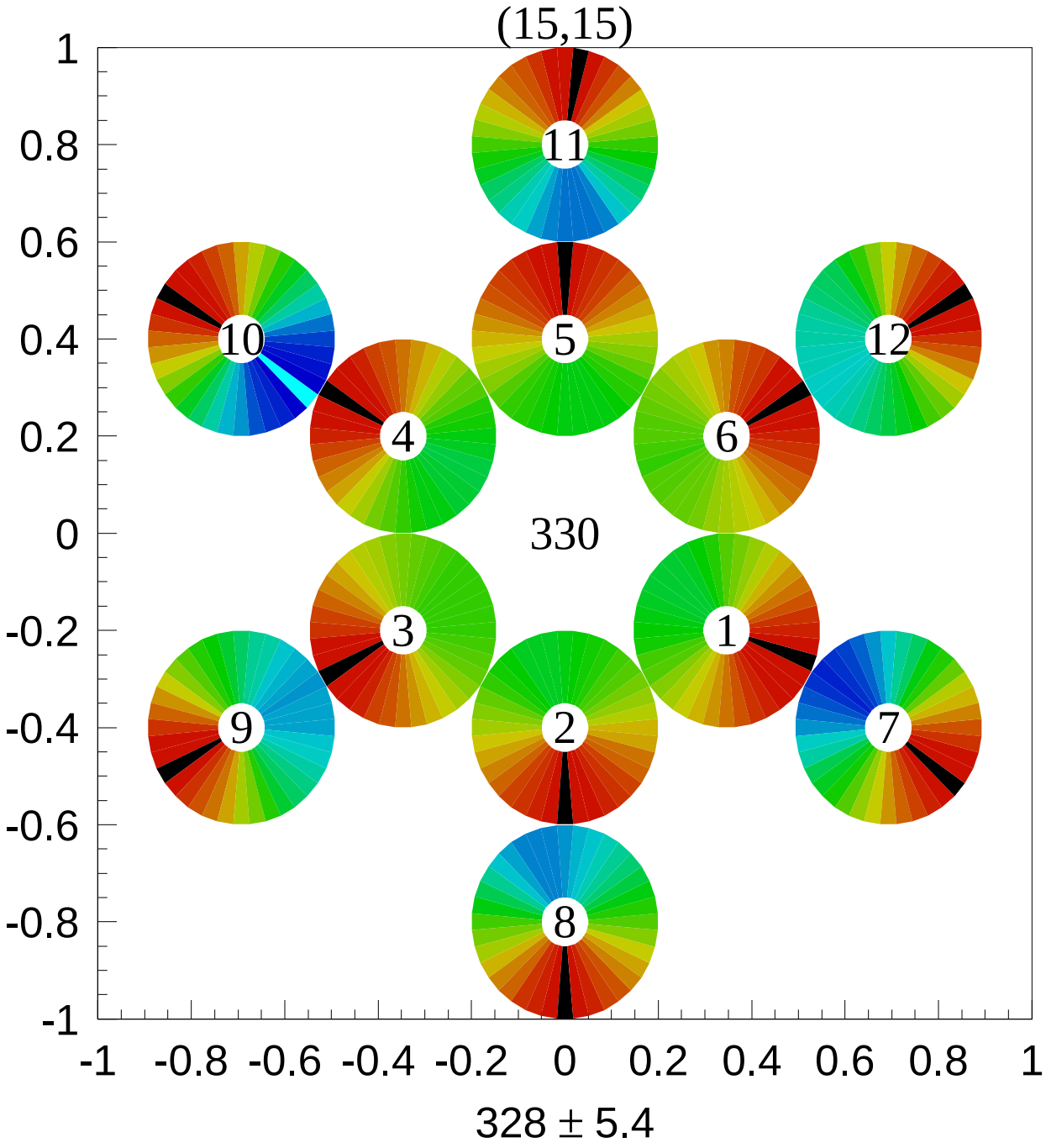

(15,13)
tilted LEDs
130 115 128 125 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 116 115 120 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

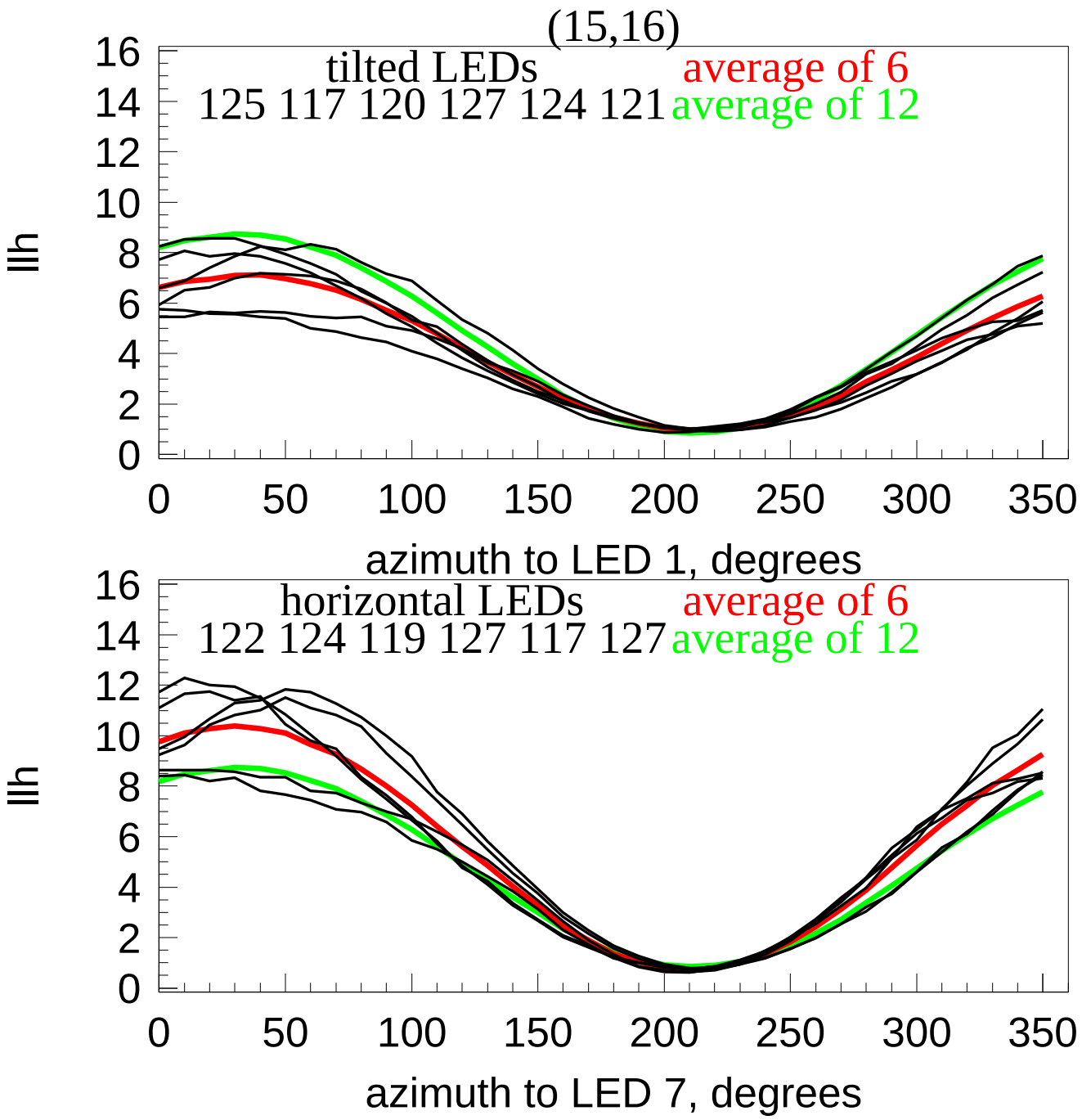

(15,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
285.9 ± 3.4

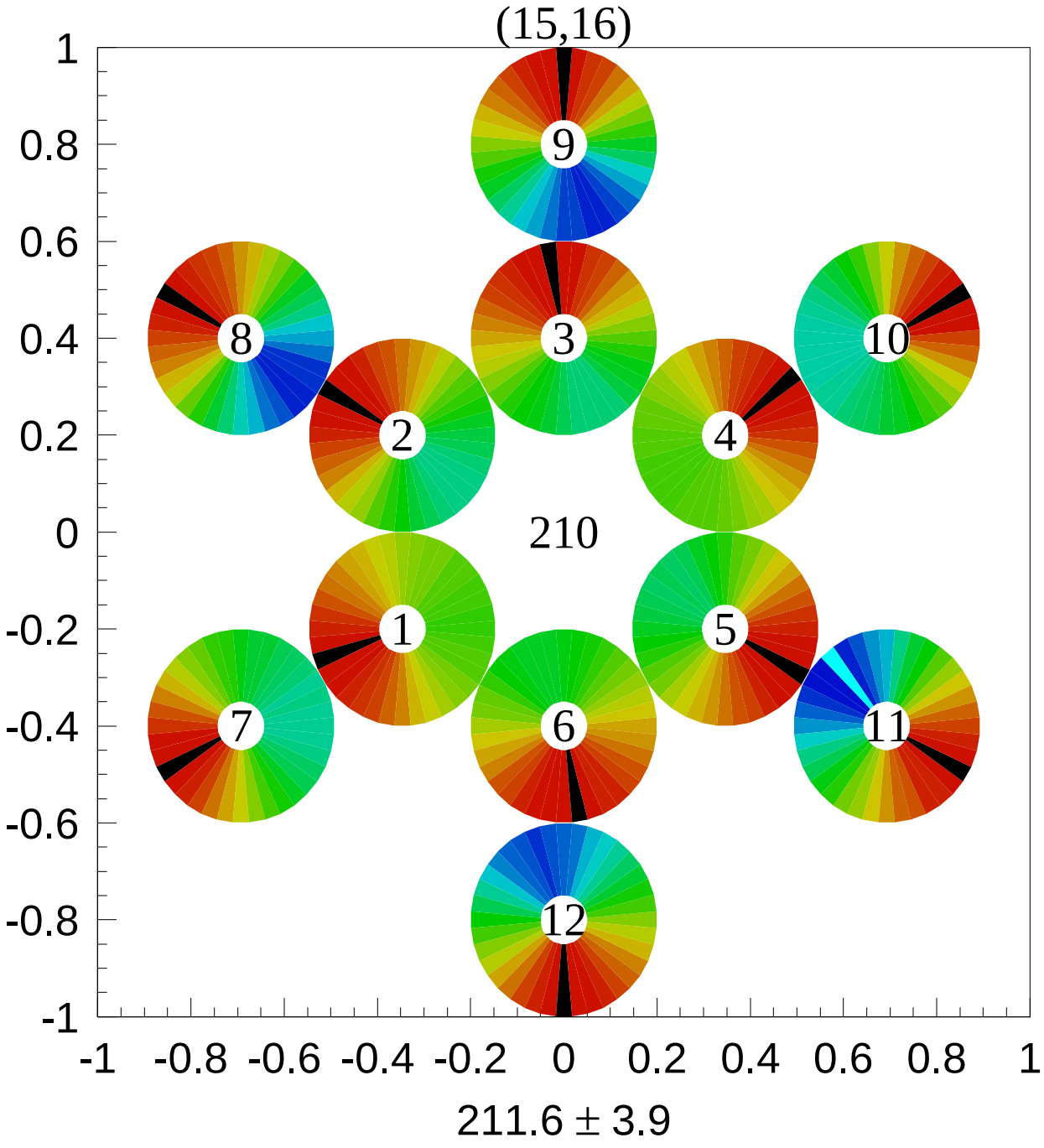

(15,14)
tilted LEDs
124 122 126 116 125 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 122 120 115 123 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

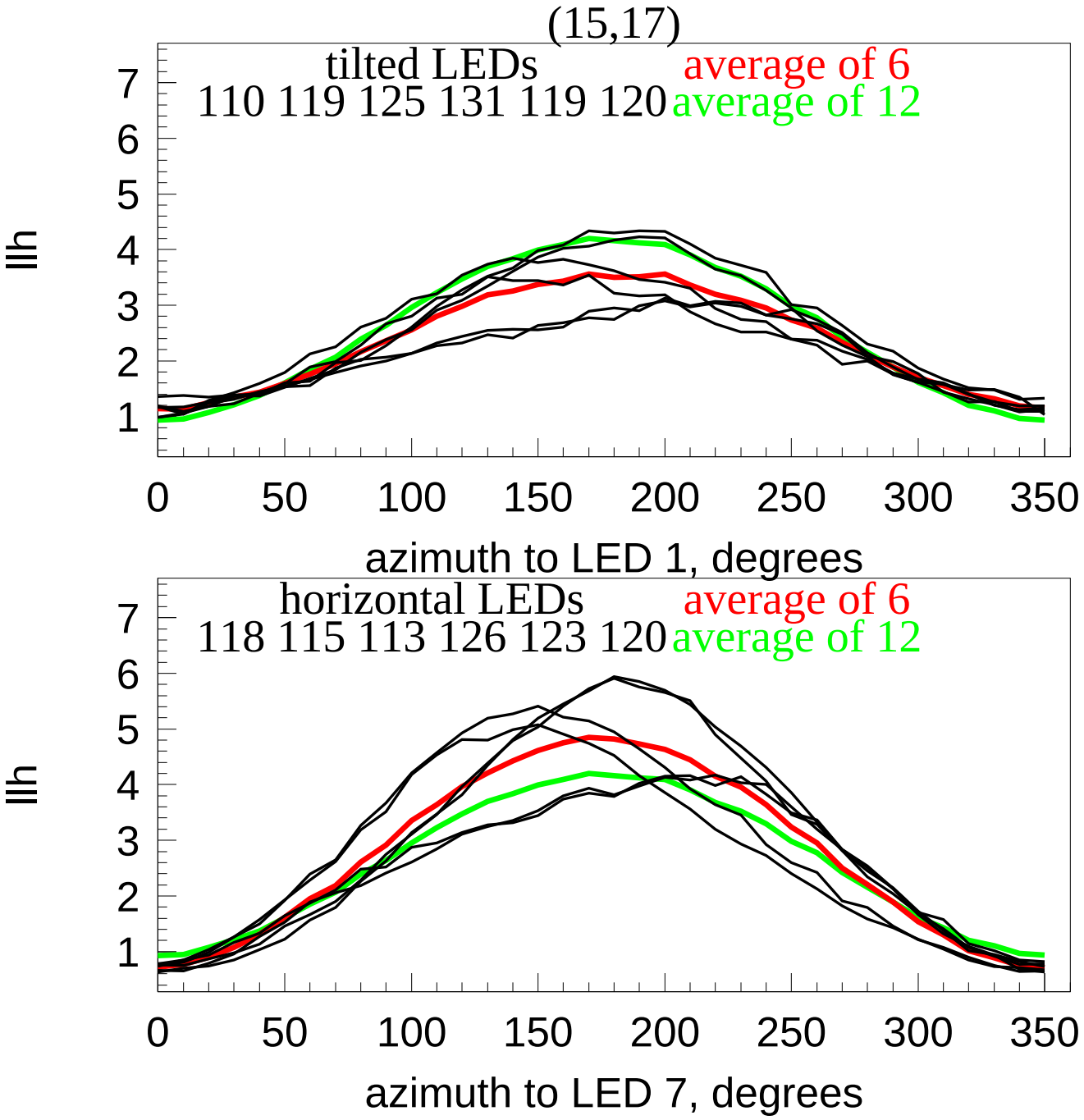

(15,14)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
327.7 ± 5.7

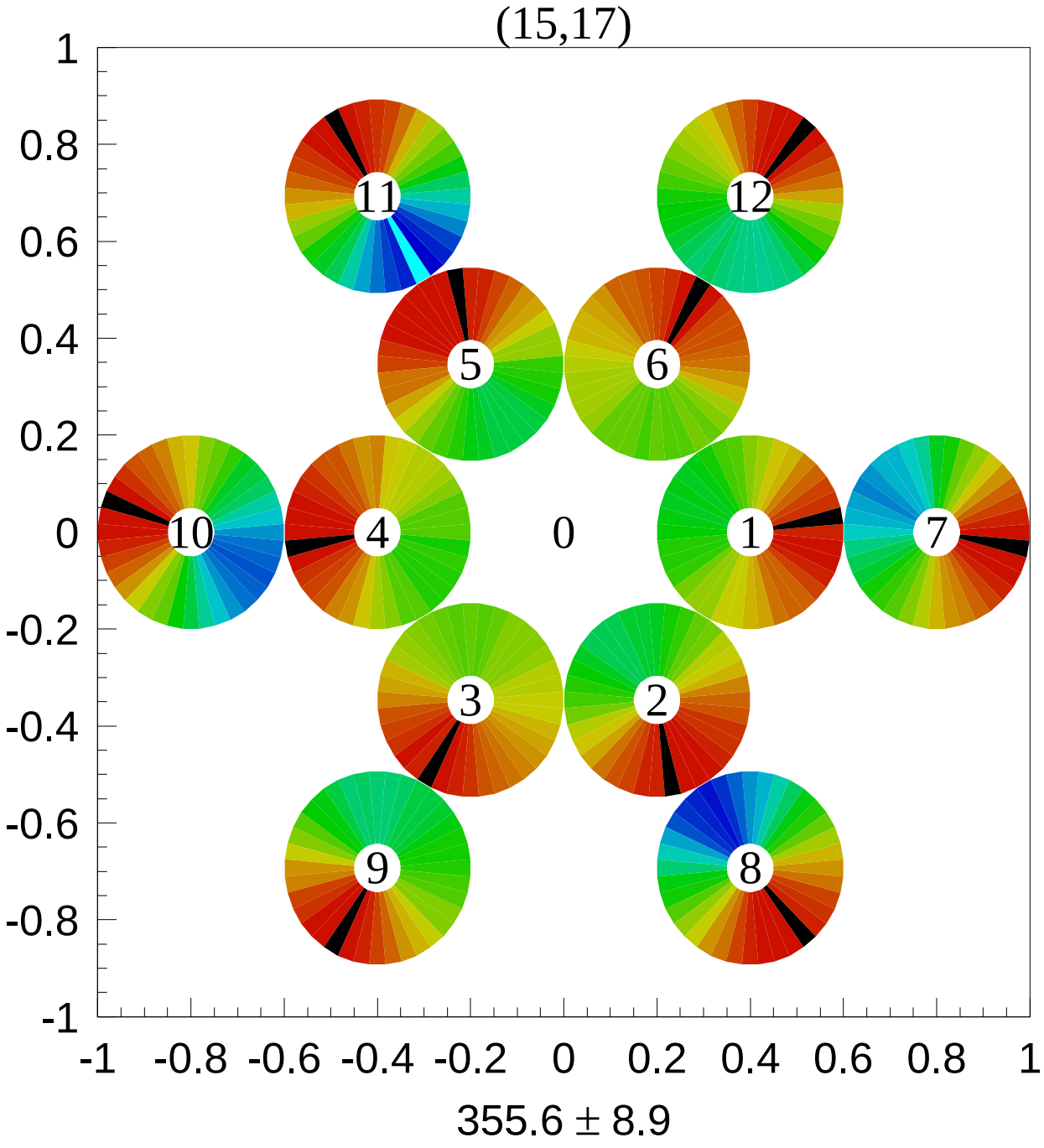

(15,15)
tilted LEDs
113 121 121 120 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 123 121 126 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

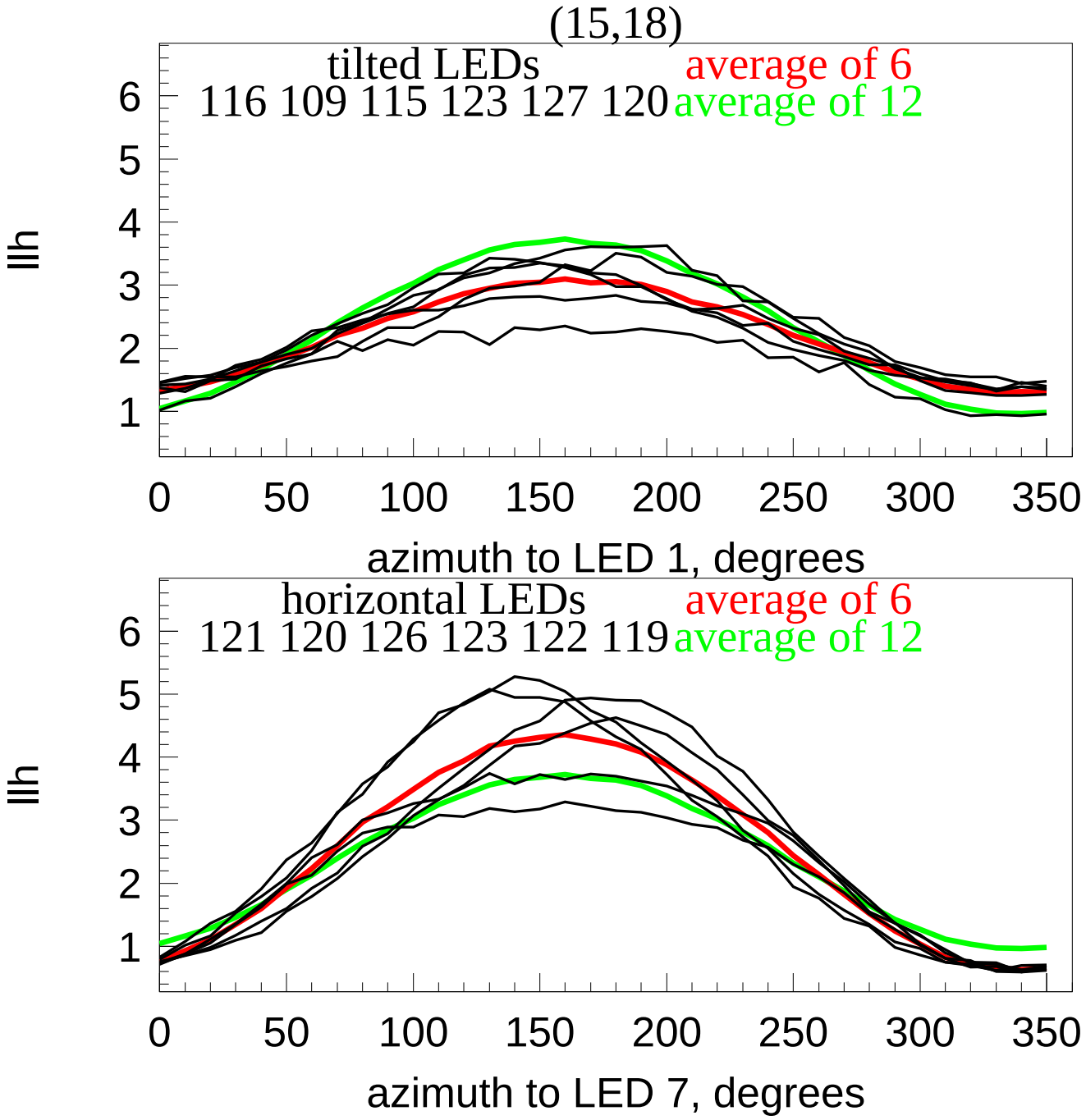

(15,15)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
328 ± 5.4

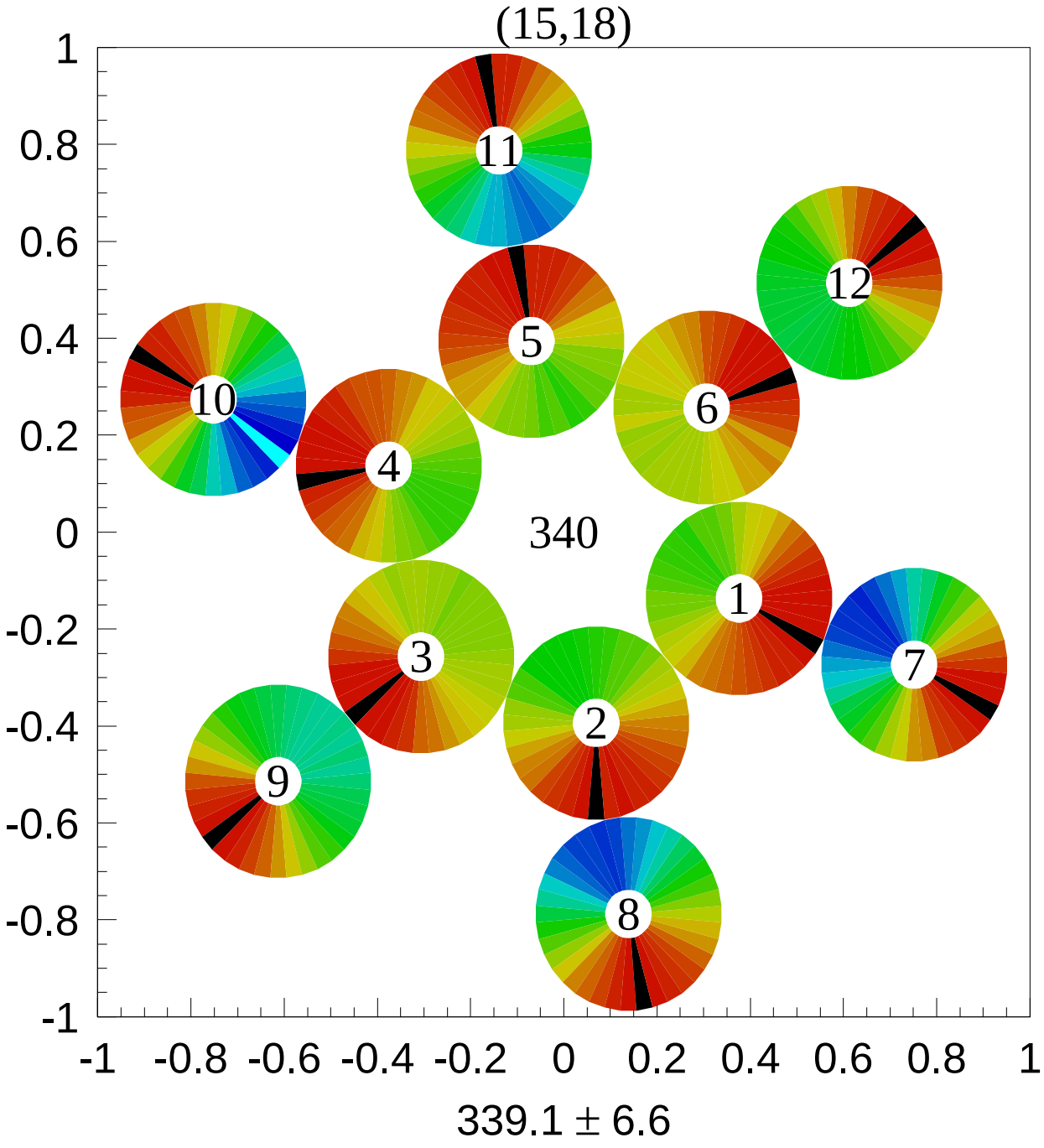

(15,16)
tilted LEDs
125 117 120 127 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 119 127 117 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

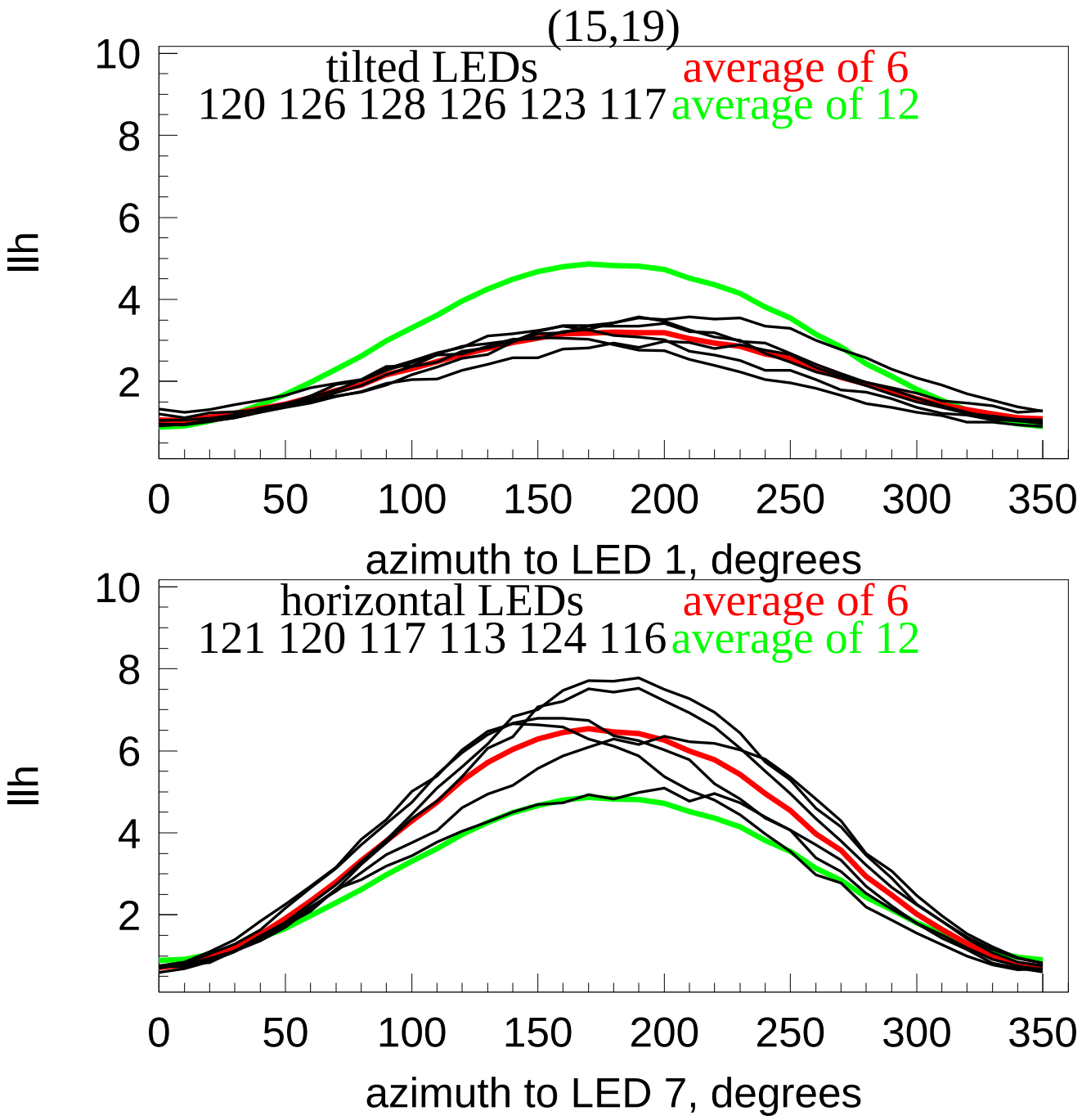

(15,16)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.6 ± 3.9

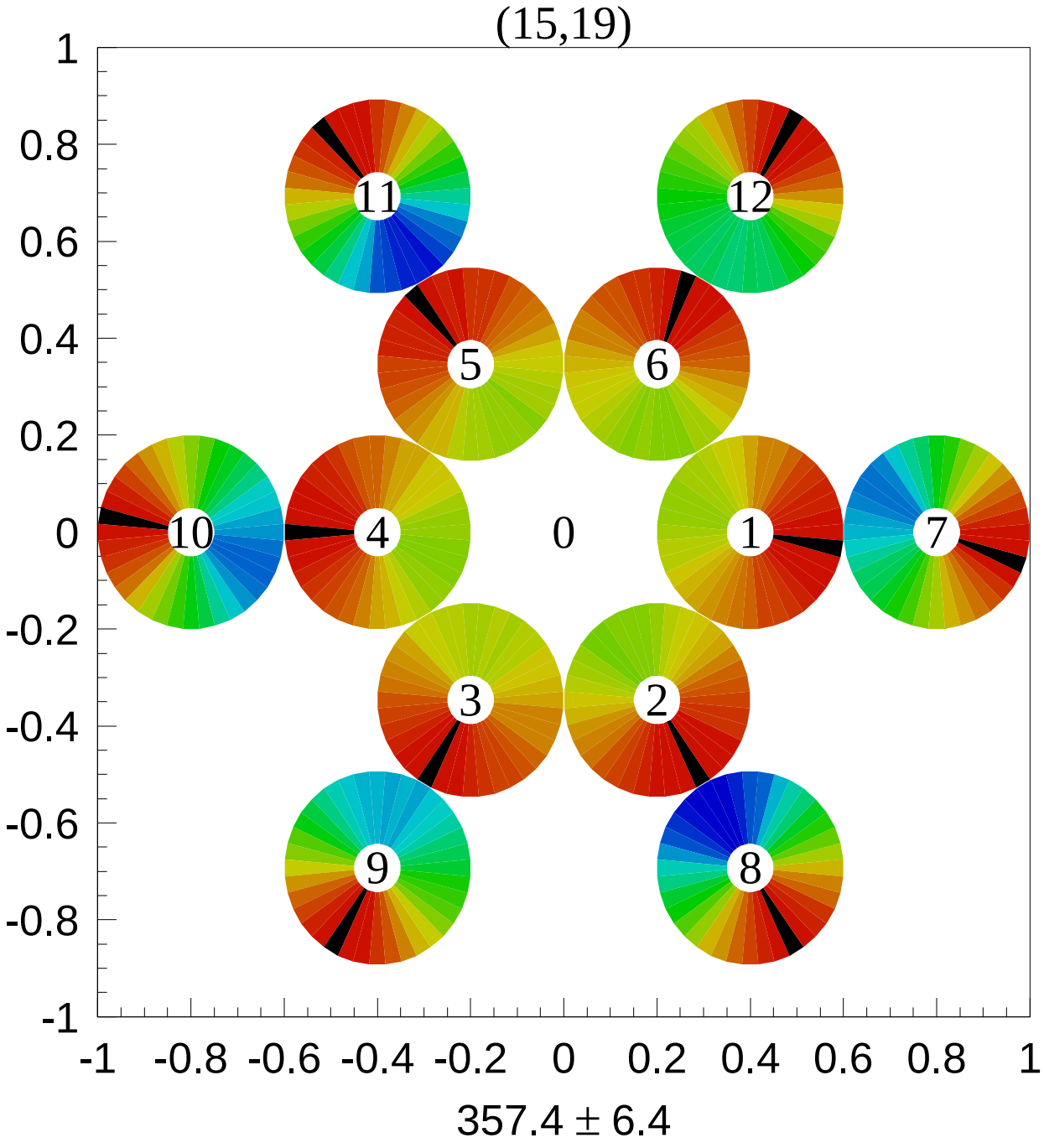

(15,17)
tilted LEDs
110 119 125 131 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 115 113 126 123 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

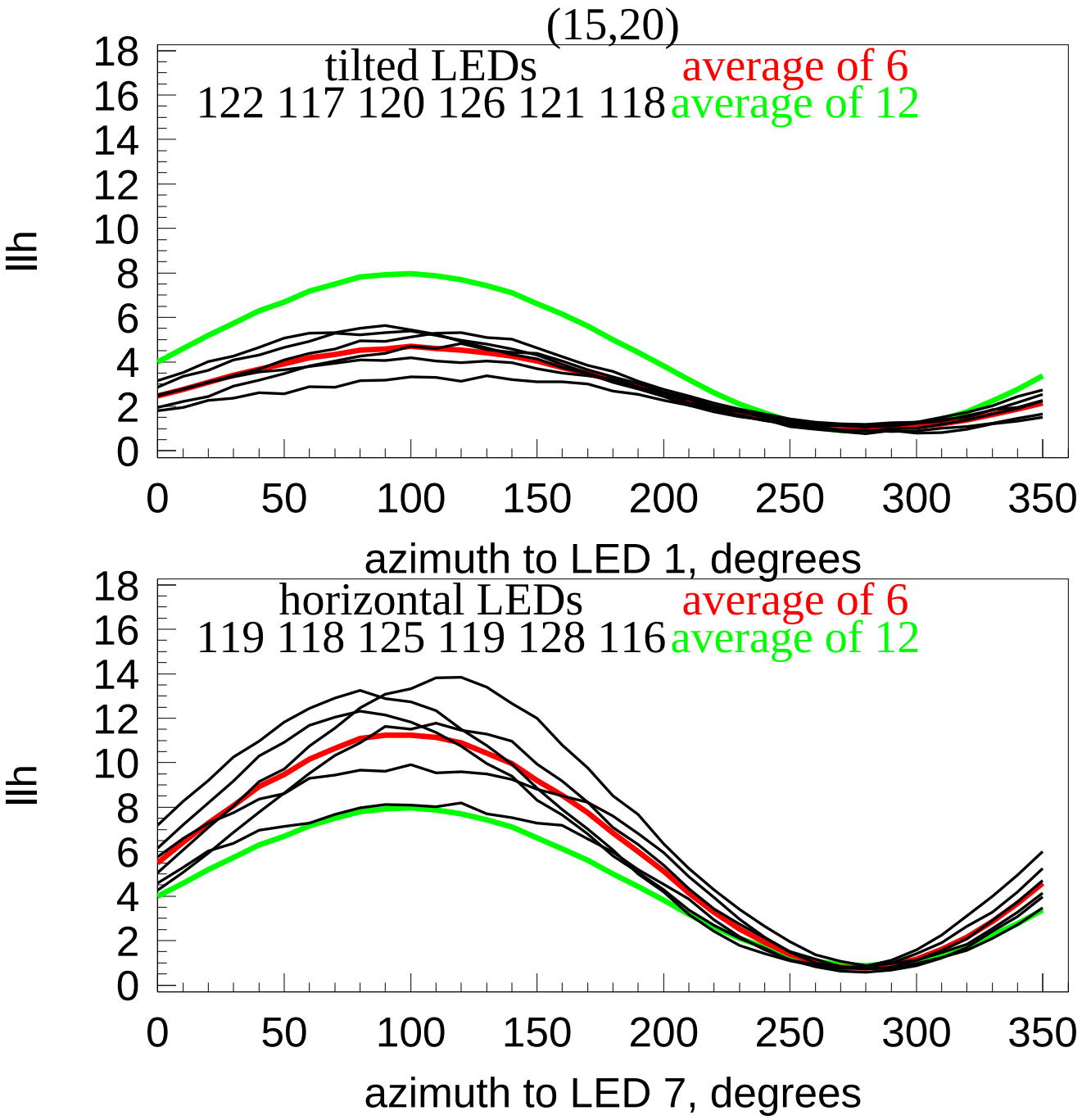

(15,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
355.6 ± 8.9

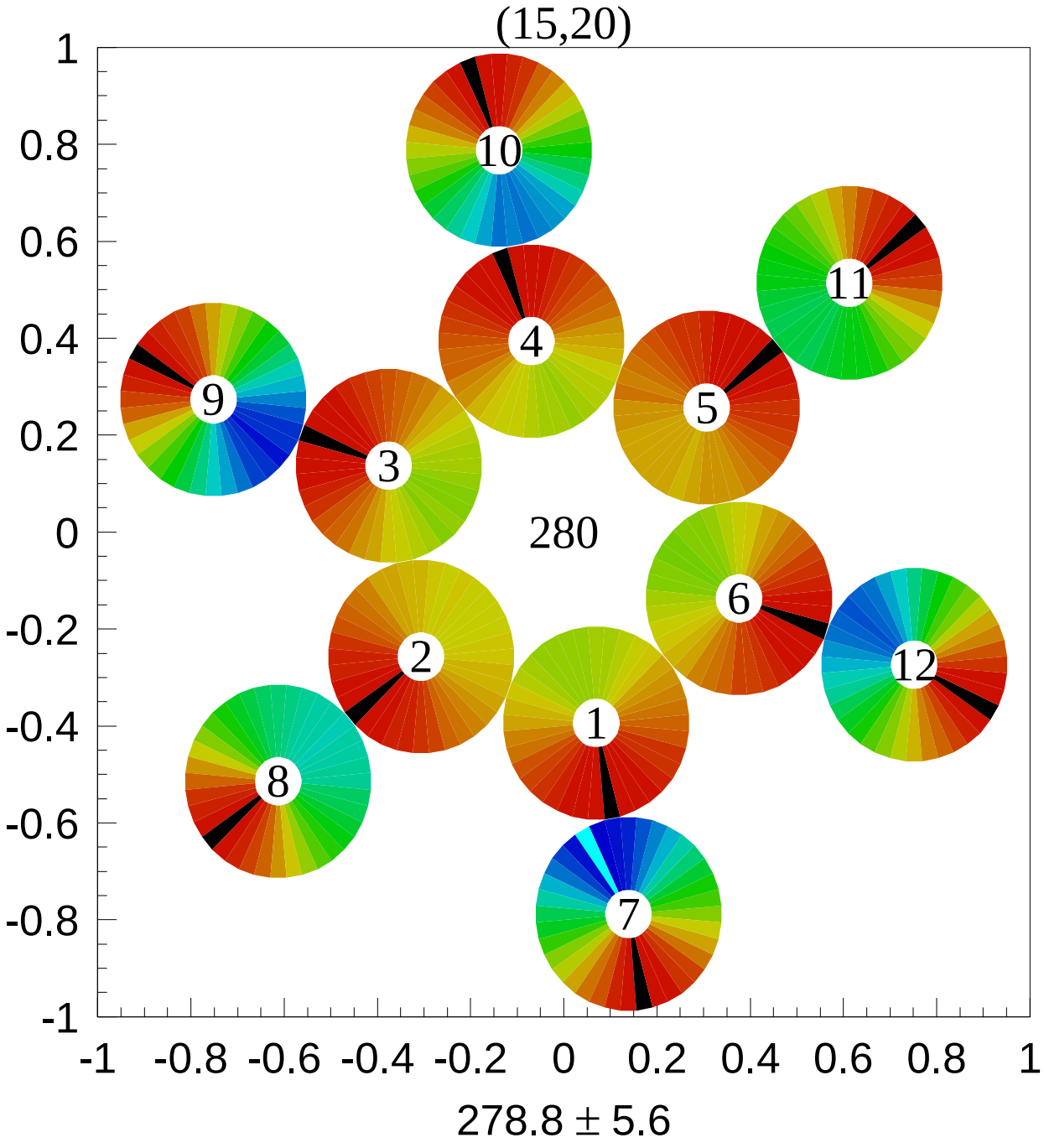

(15,18)
tilted LEDs
116 109 115 123 127 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 126 123 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

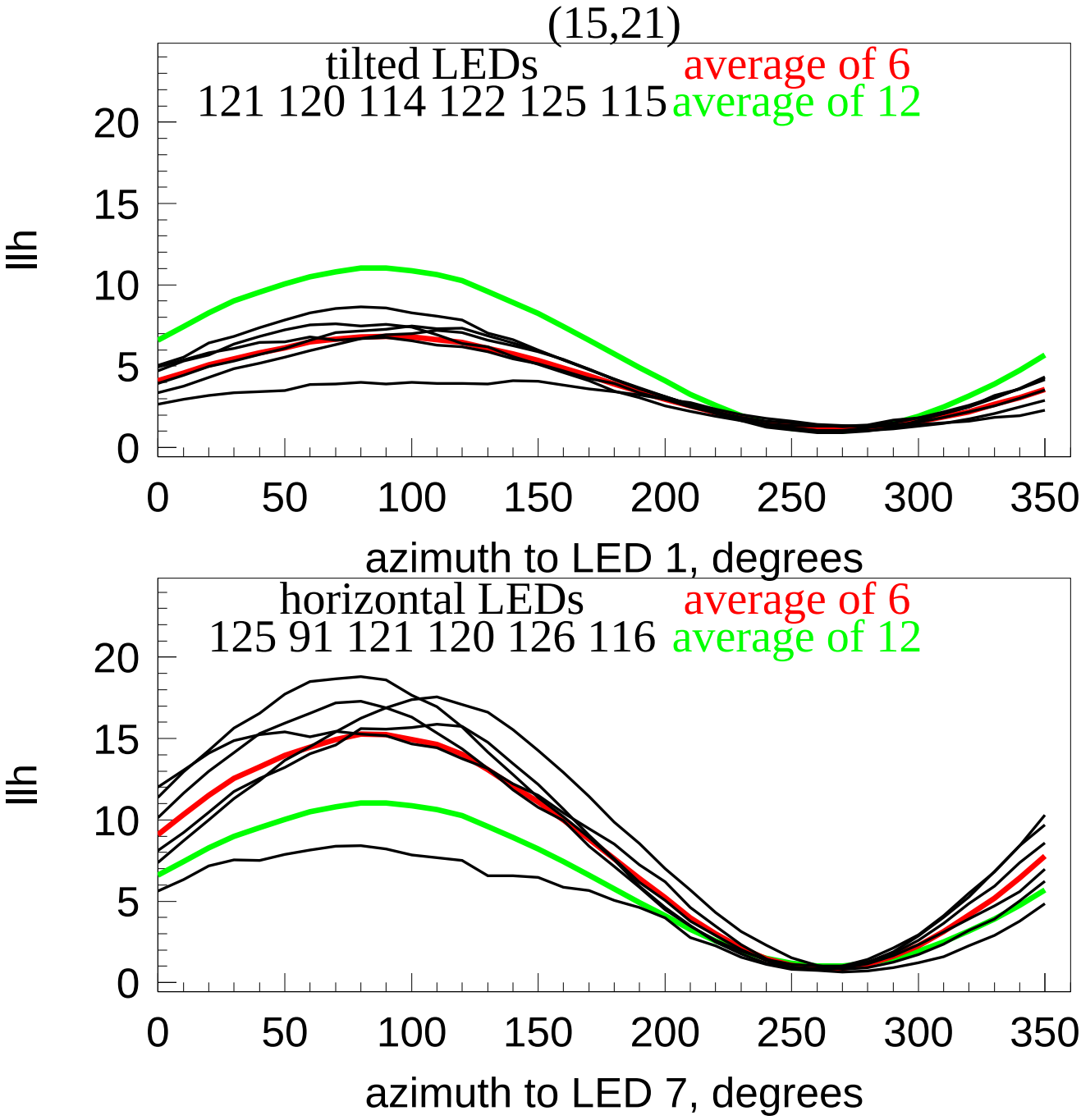

(15,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
339.1 ± 6.6

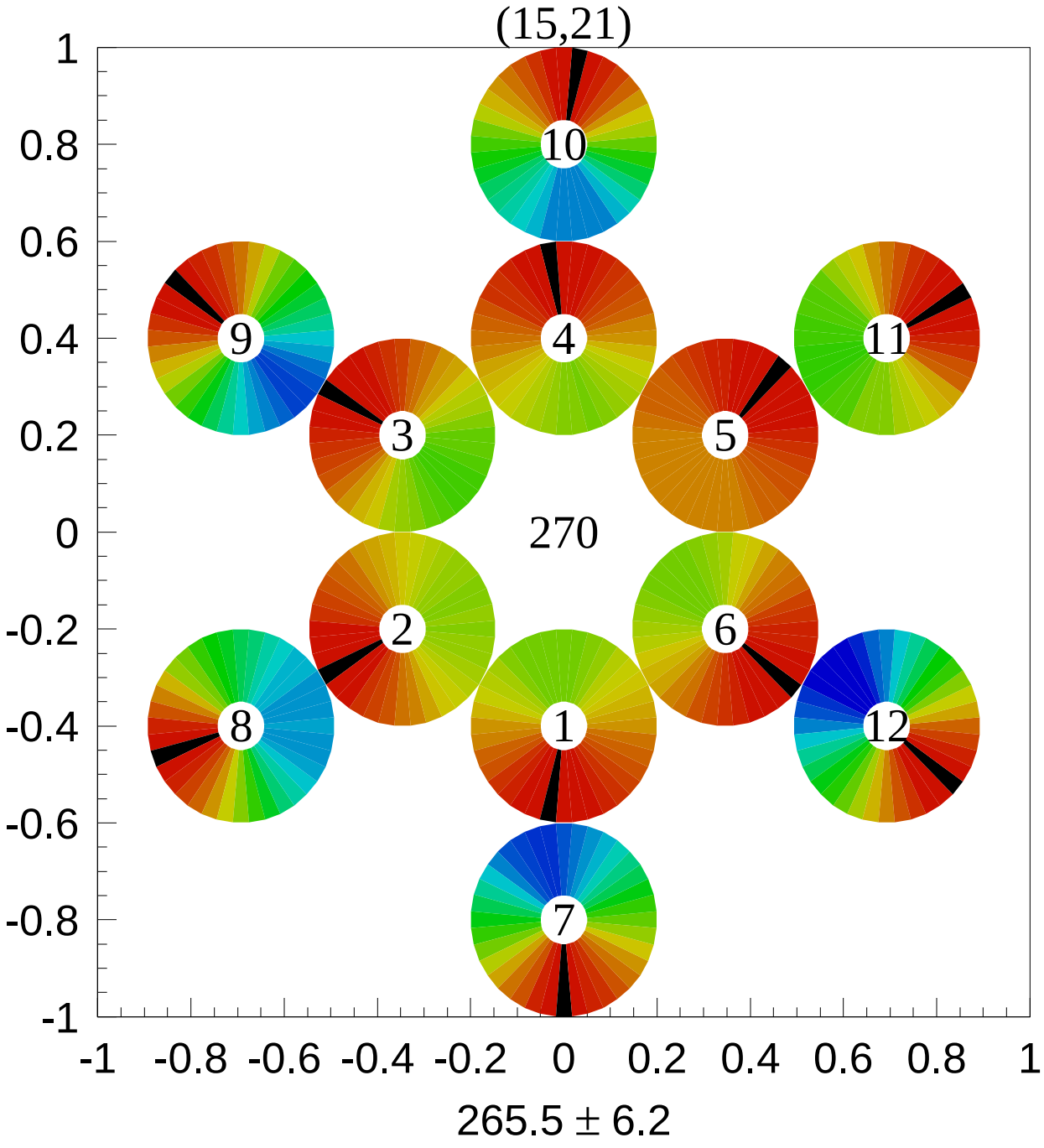

(15,19)
tilted LEDs
120 126 128 126 123 117
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 120 117 113 124 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

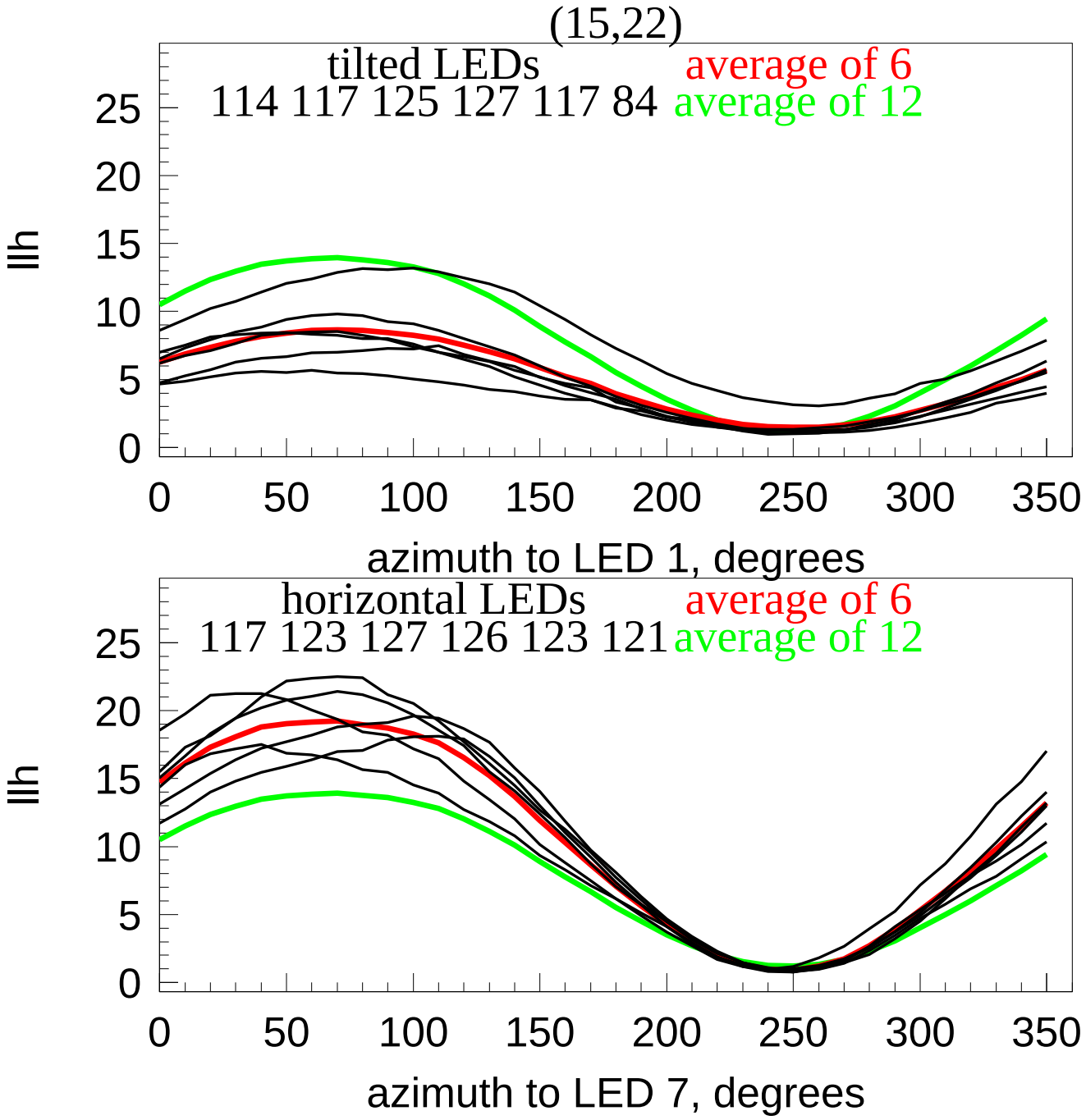

(15,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
357.4 ± 6.4

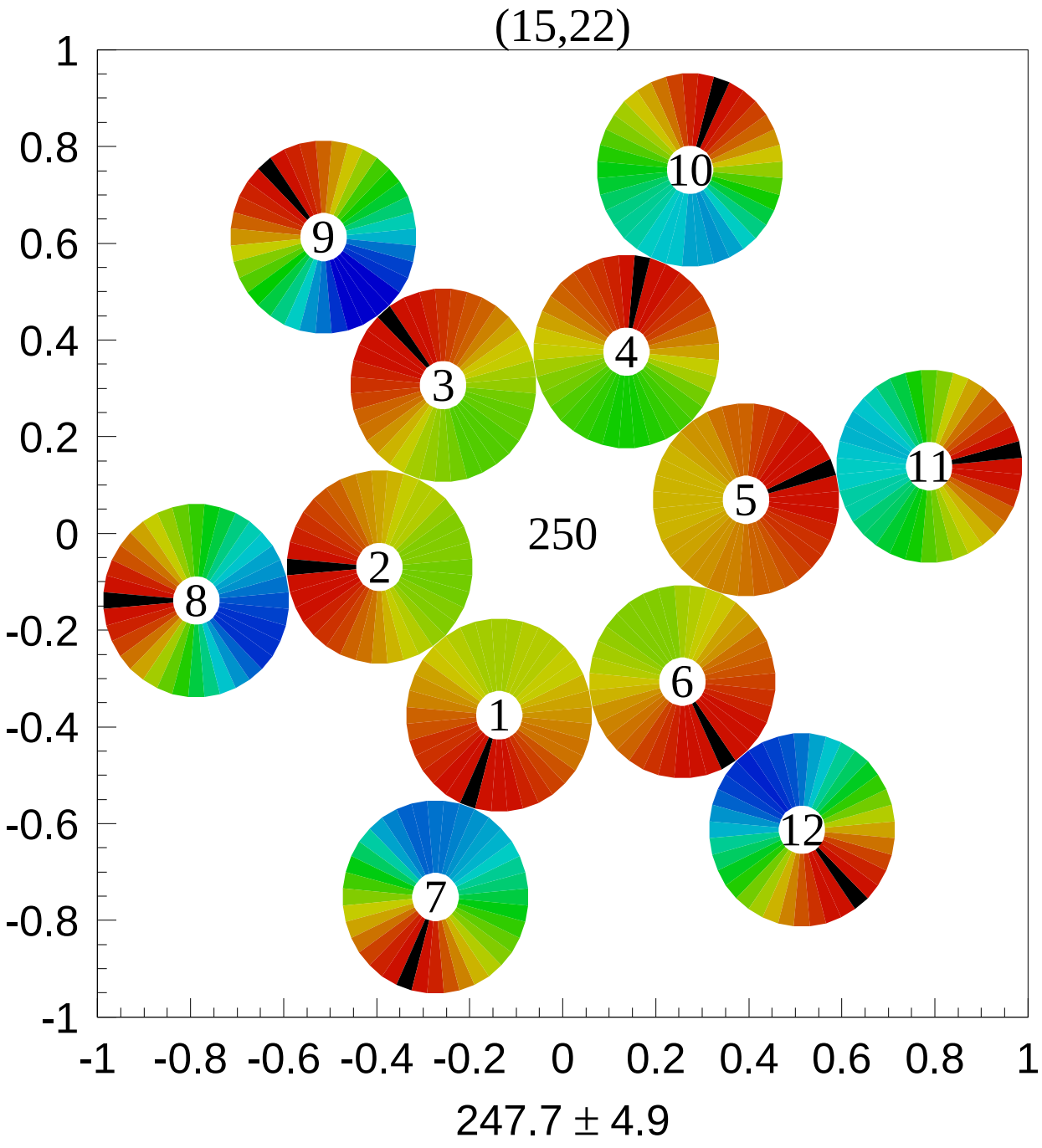

(15,20)
tilted LEDs
122 117 120 126 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 125 119 128 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

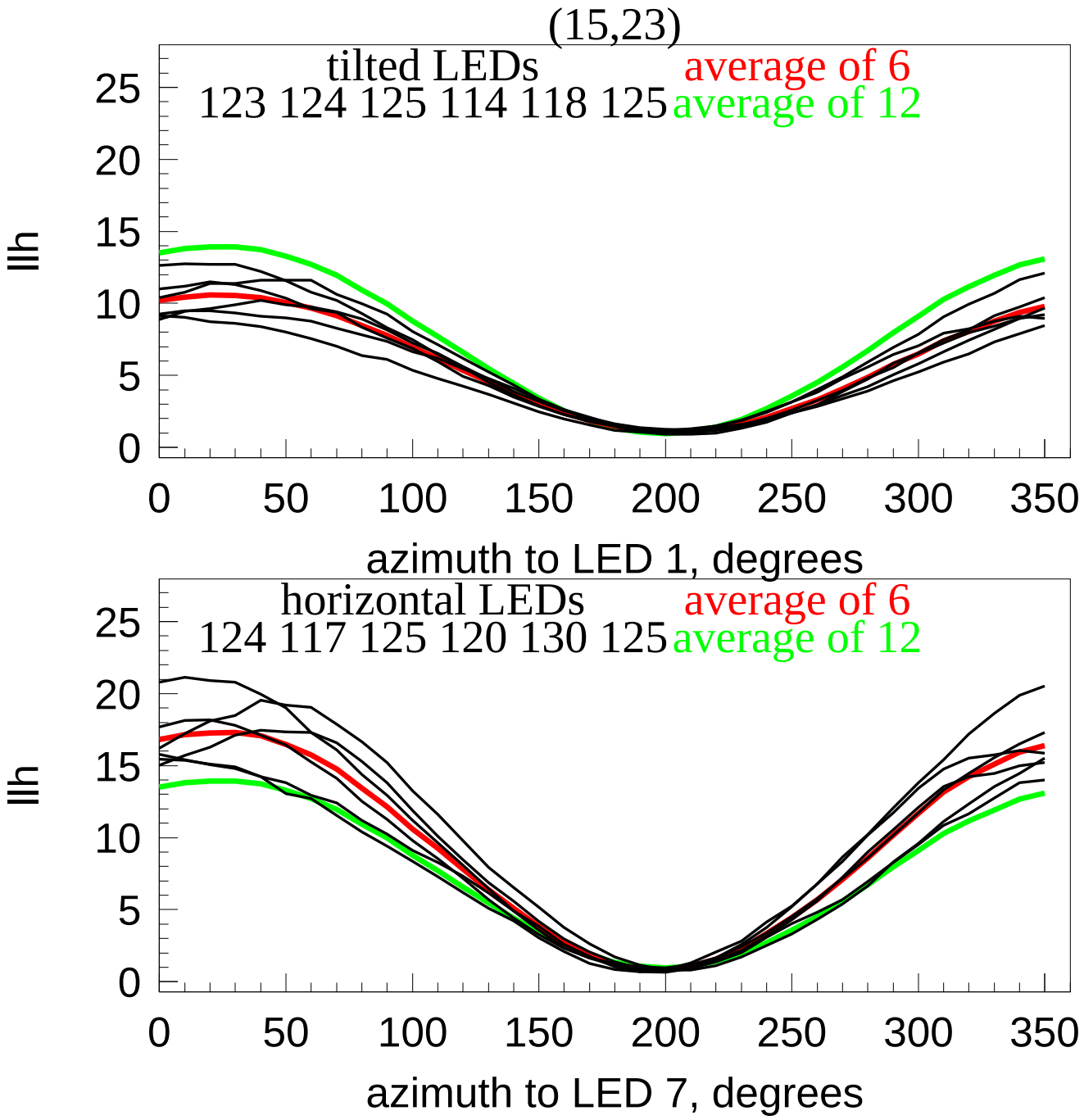

(15,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
278.8 ± 5.6

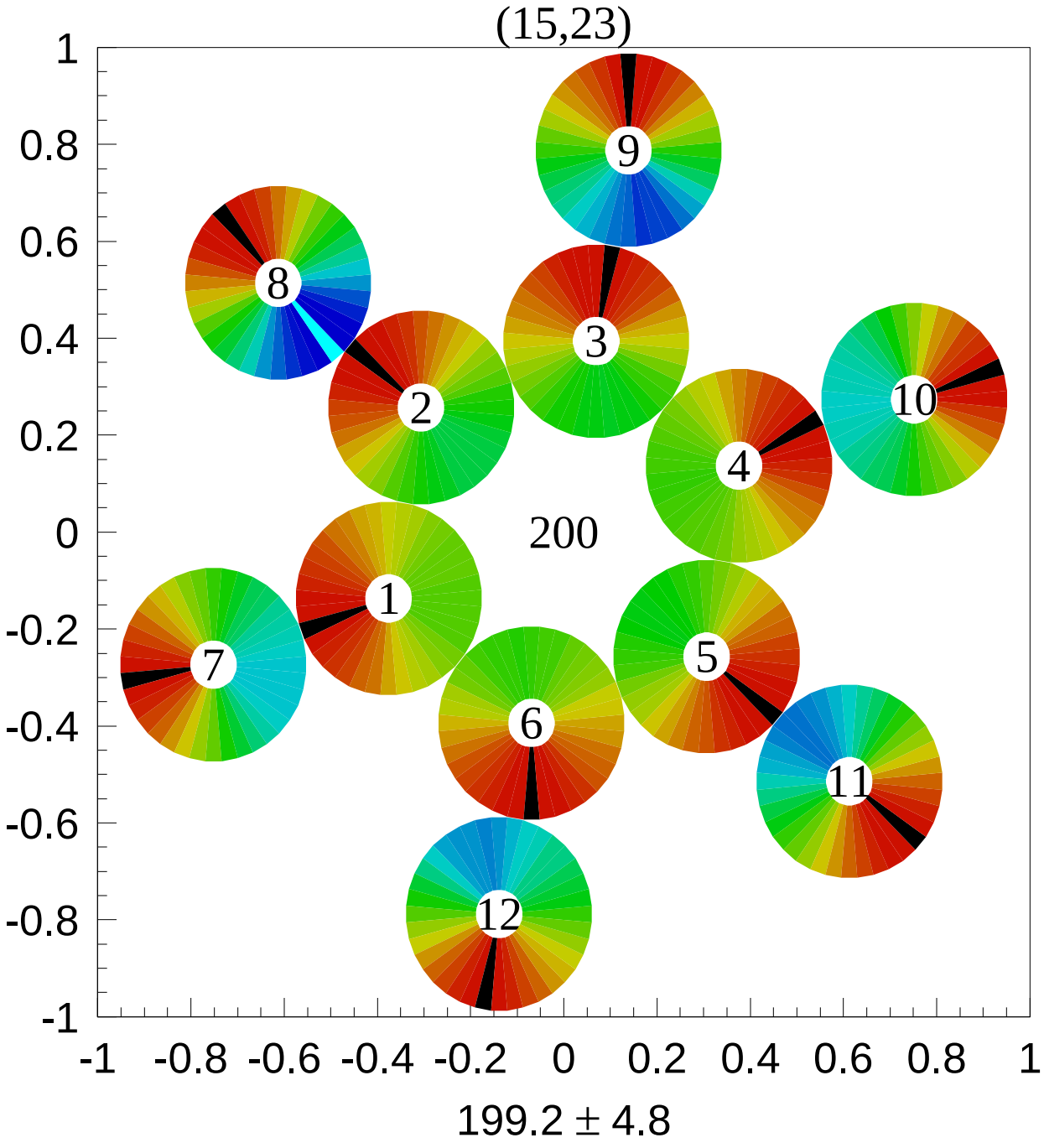

(15,21)
tilted LEDs
121 120 114 122 125 115
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 91 121 120 126 116
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

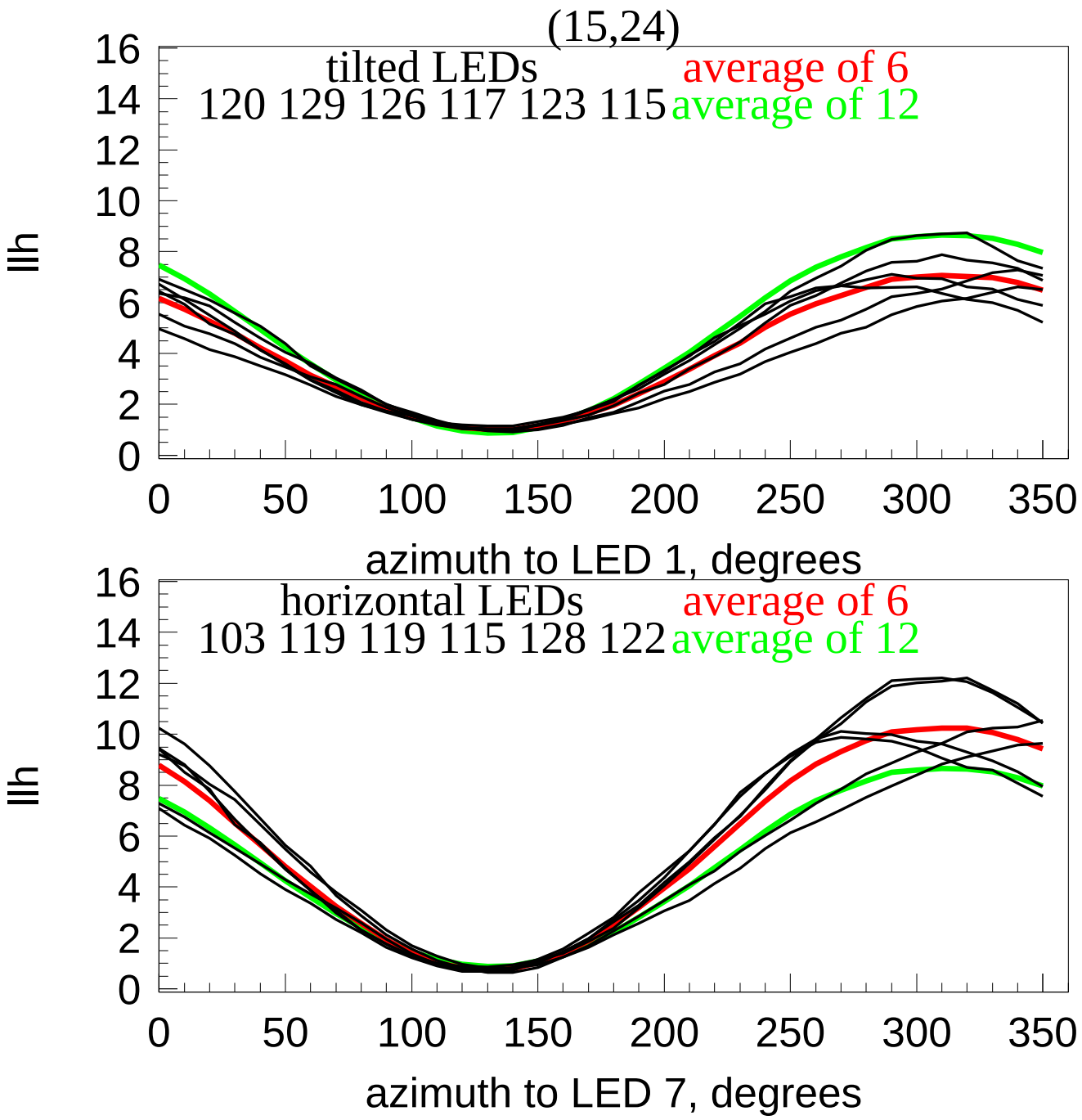

(15,21)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
265.5 ± 6.2

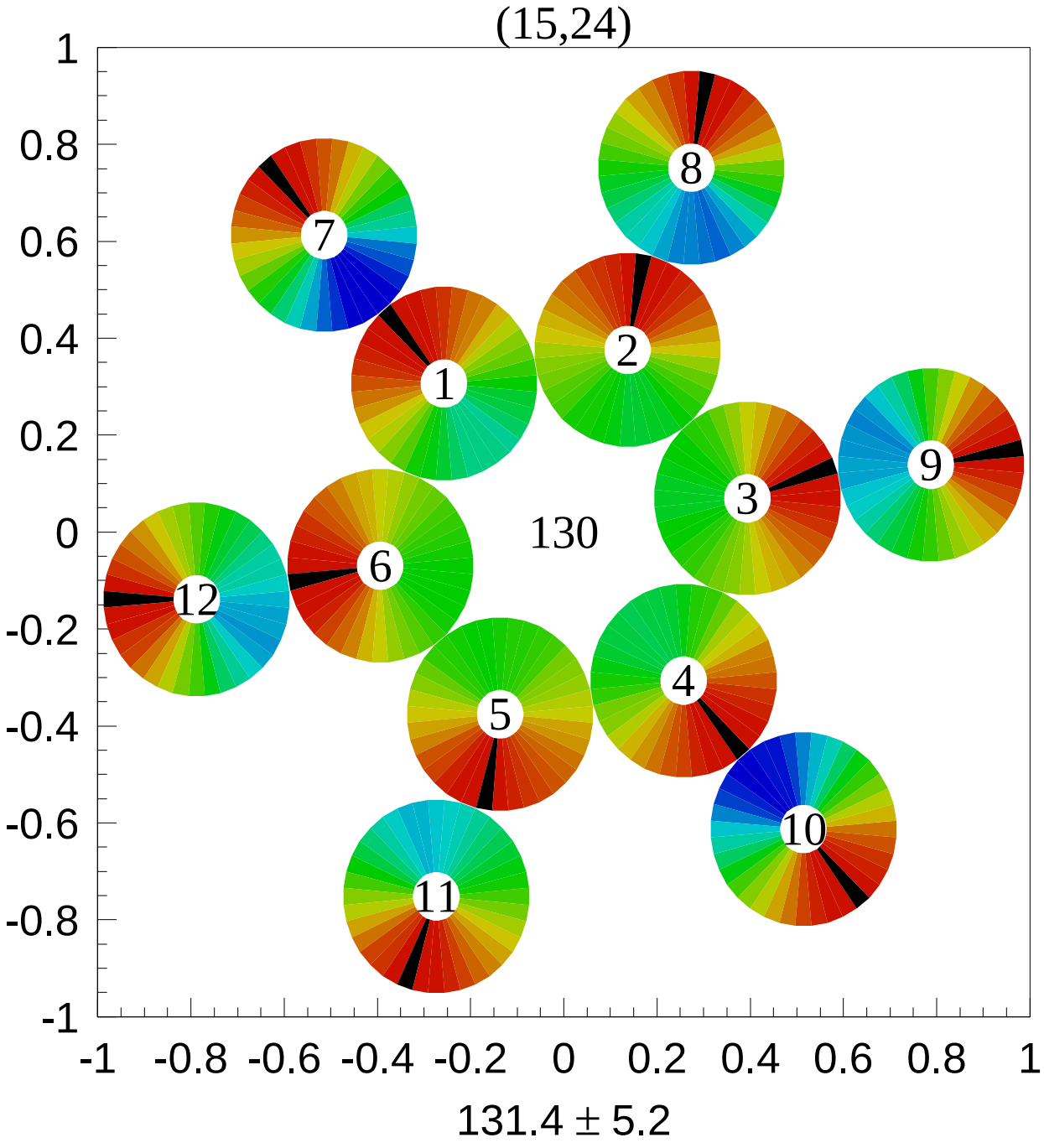

(15,22)
tilted LEDs
114 117 125 127 117 84
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 123 127 126 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

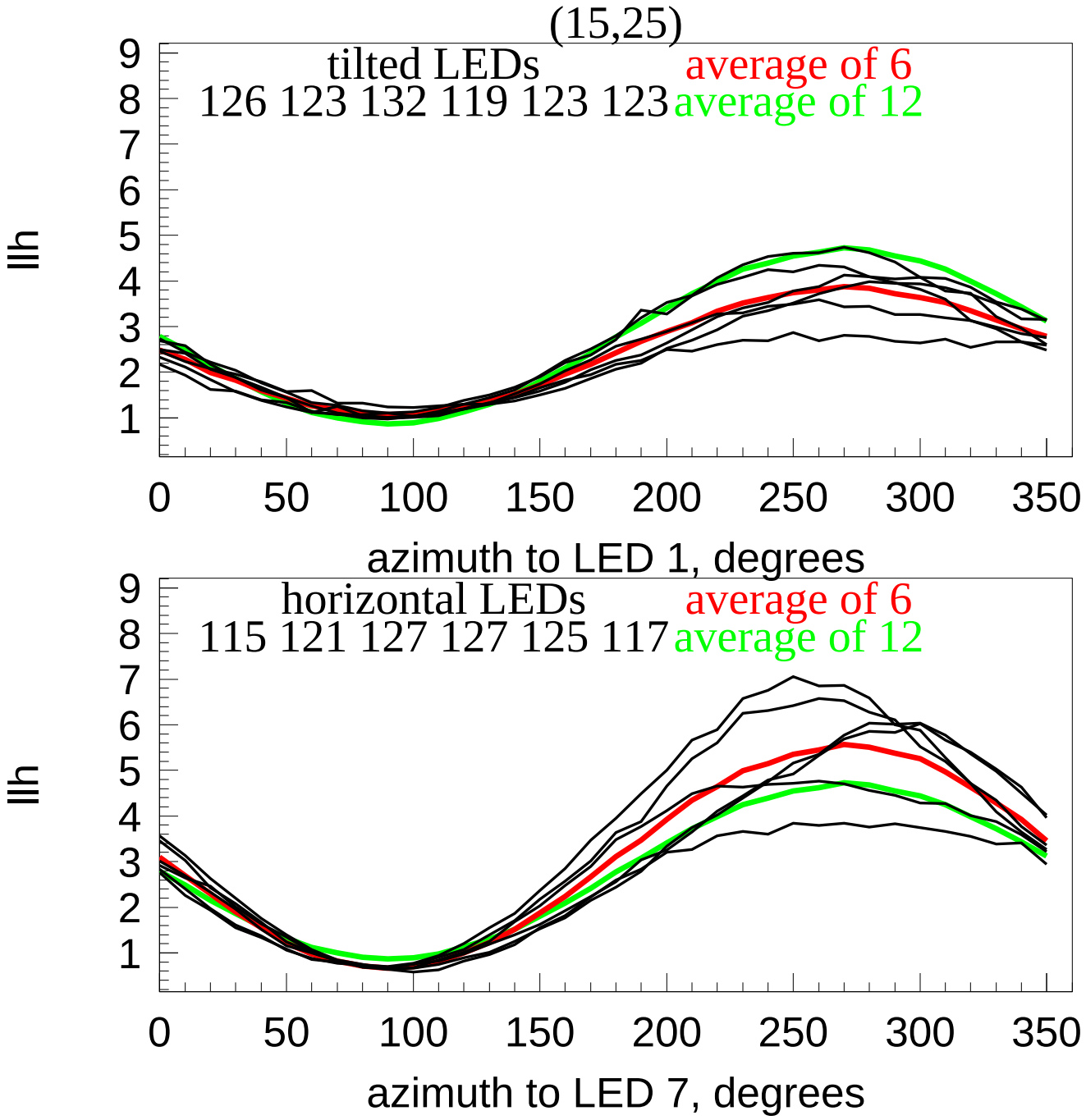

(15,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
247.7 ± 4.9
250
1
2
3
4
5
6
7
8
9
10
11
12

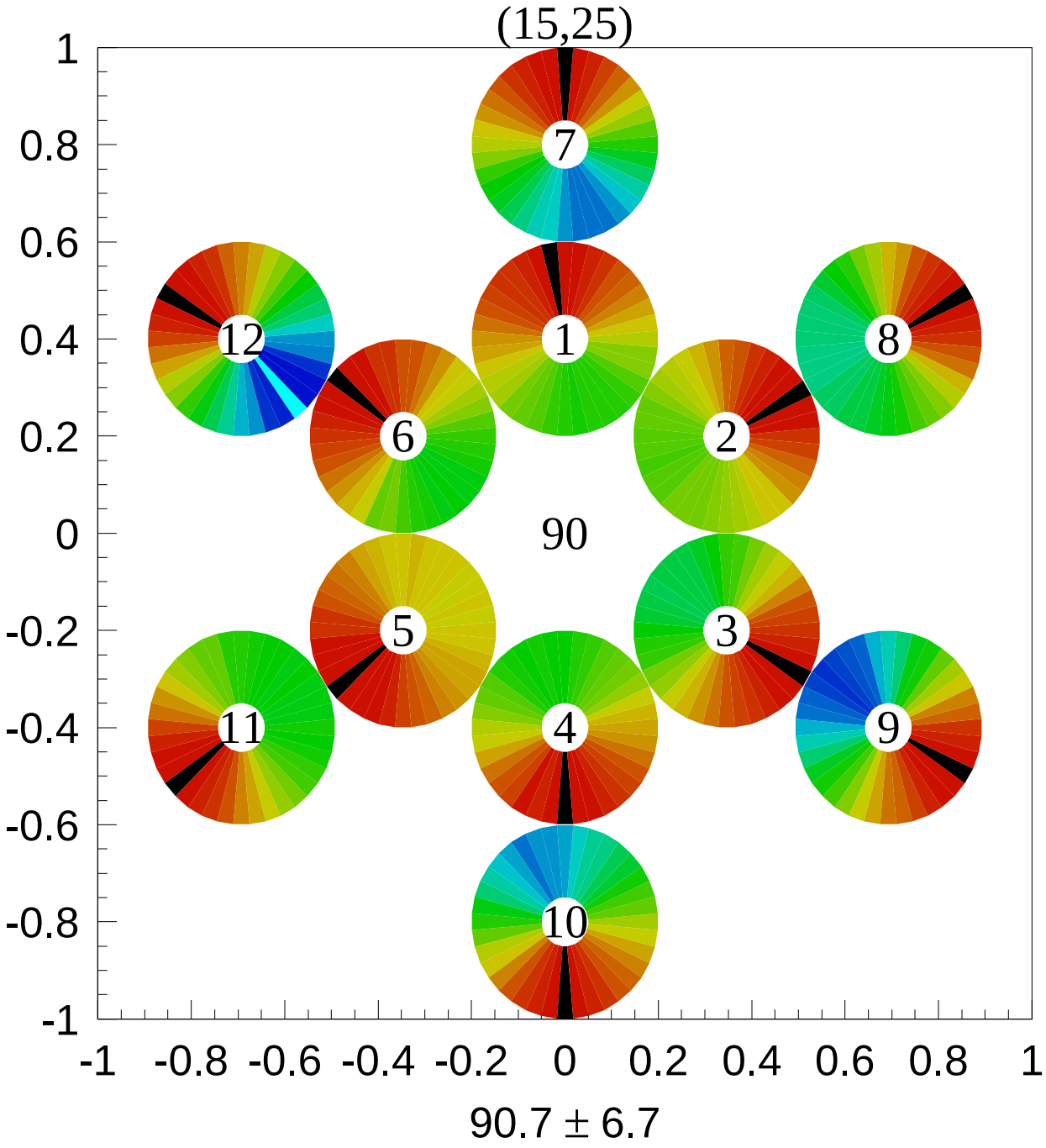

(15,23)
tilted LEDs
123 124 125 114 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 117 125 120 130 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

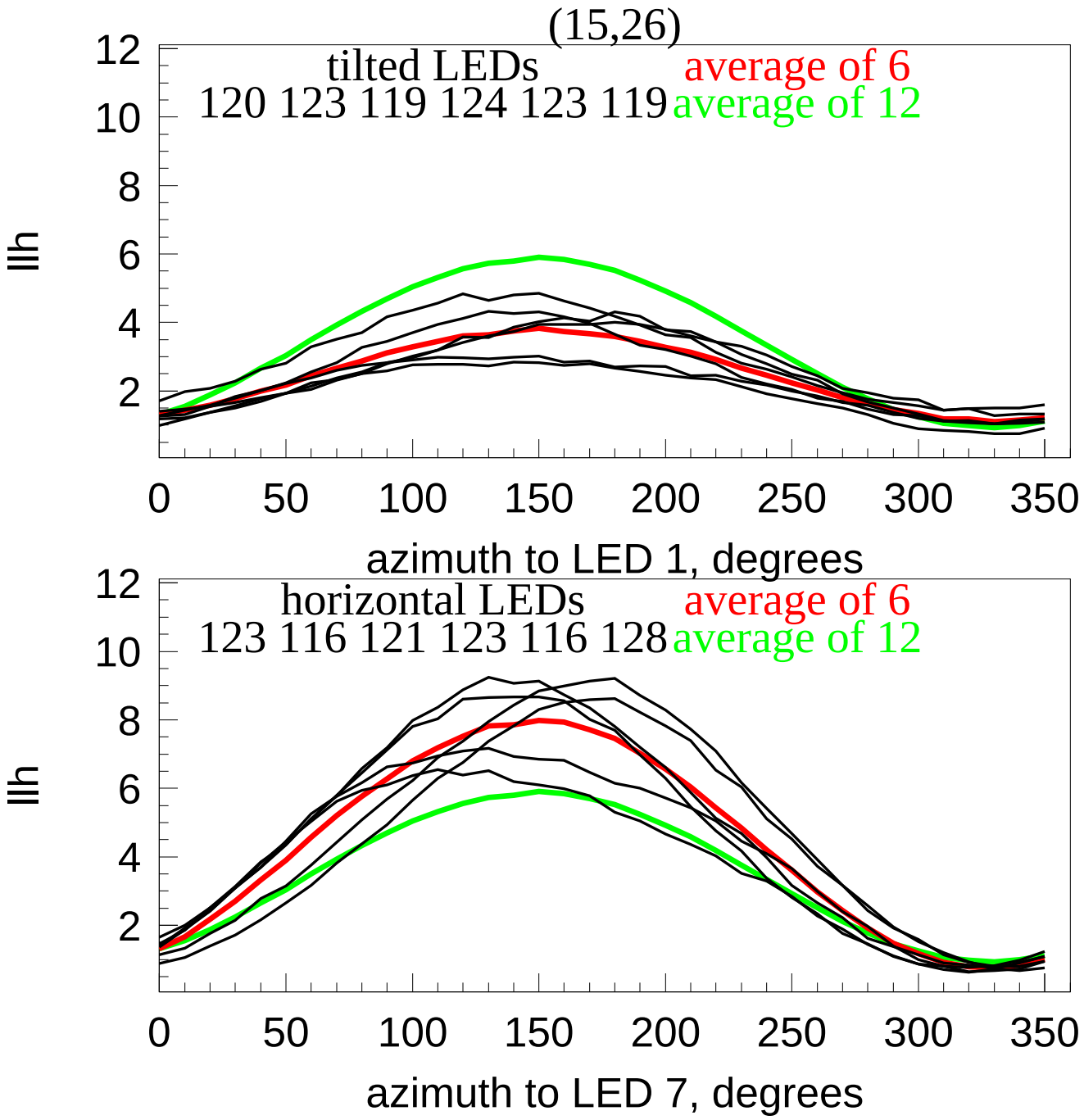

(15,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
199.2 ± 4.8

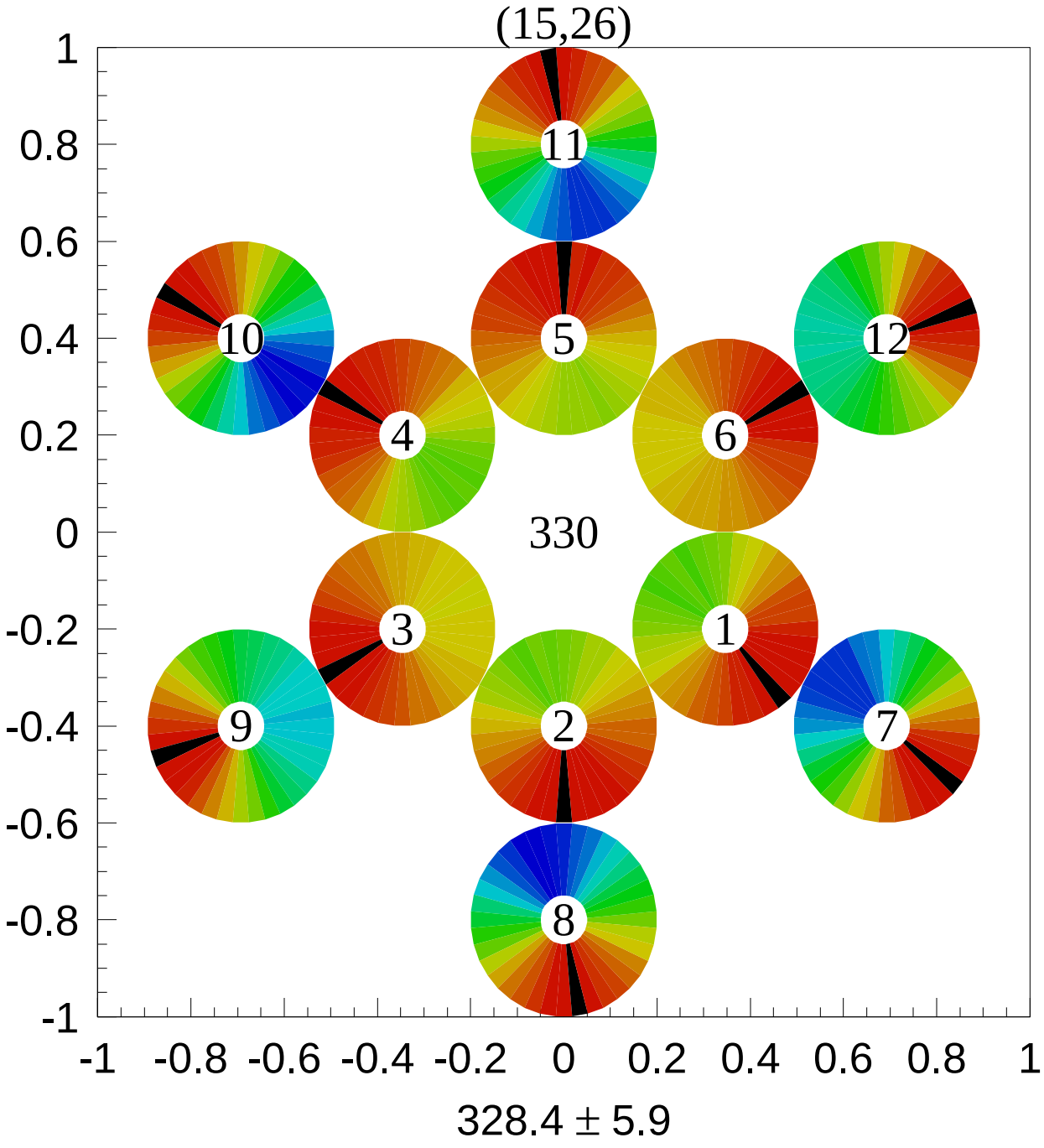

(15,24)
tilted LEDs
120 129 126 117 123 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
103 119 119 115 128 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

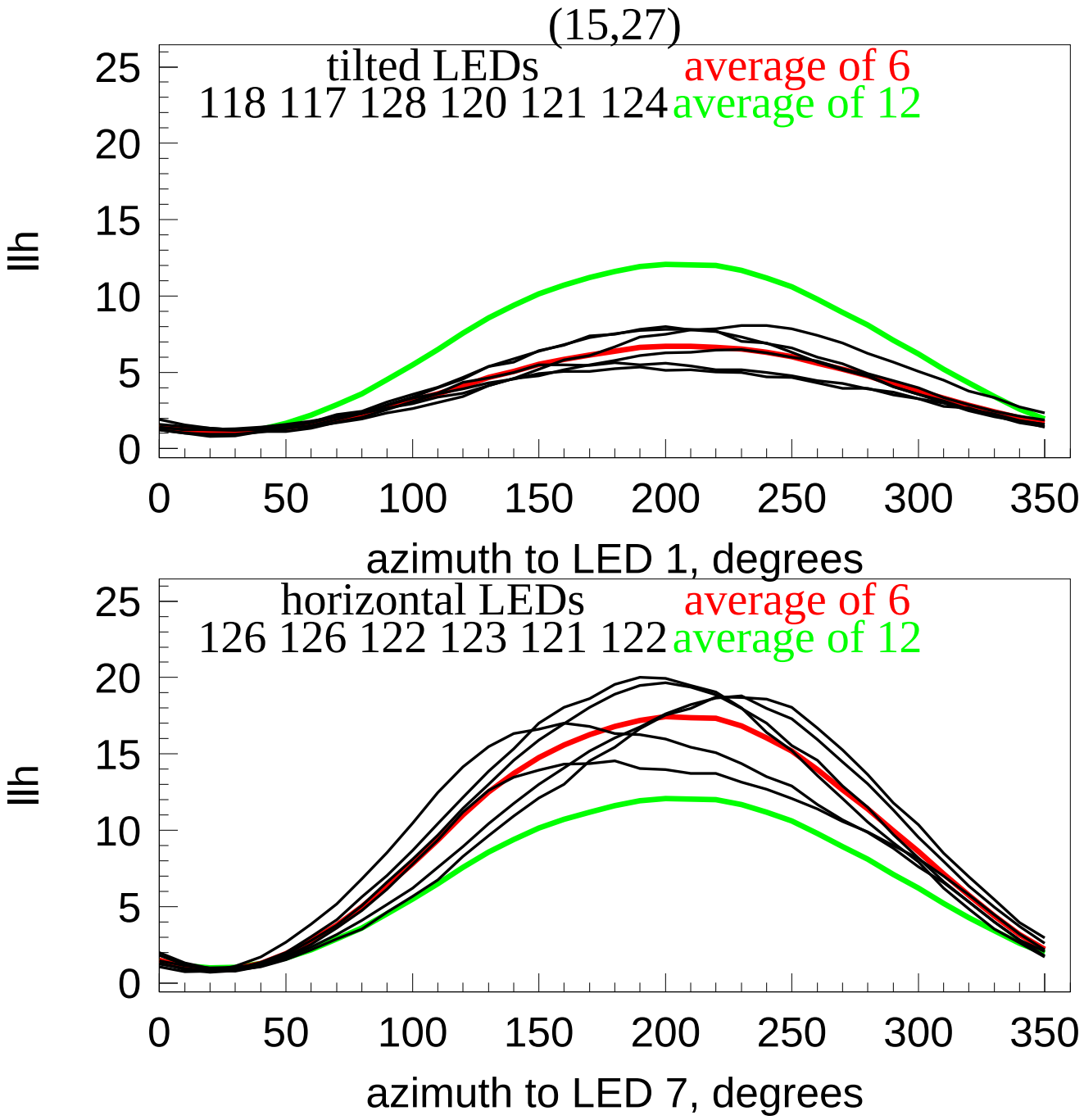

(15,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
131.4 ± 5.2

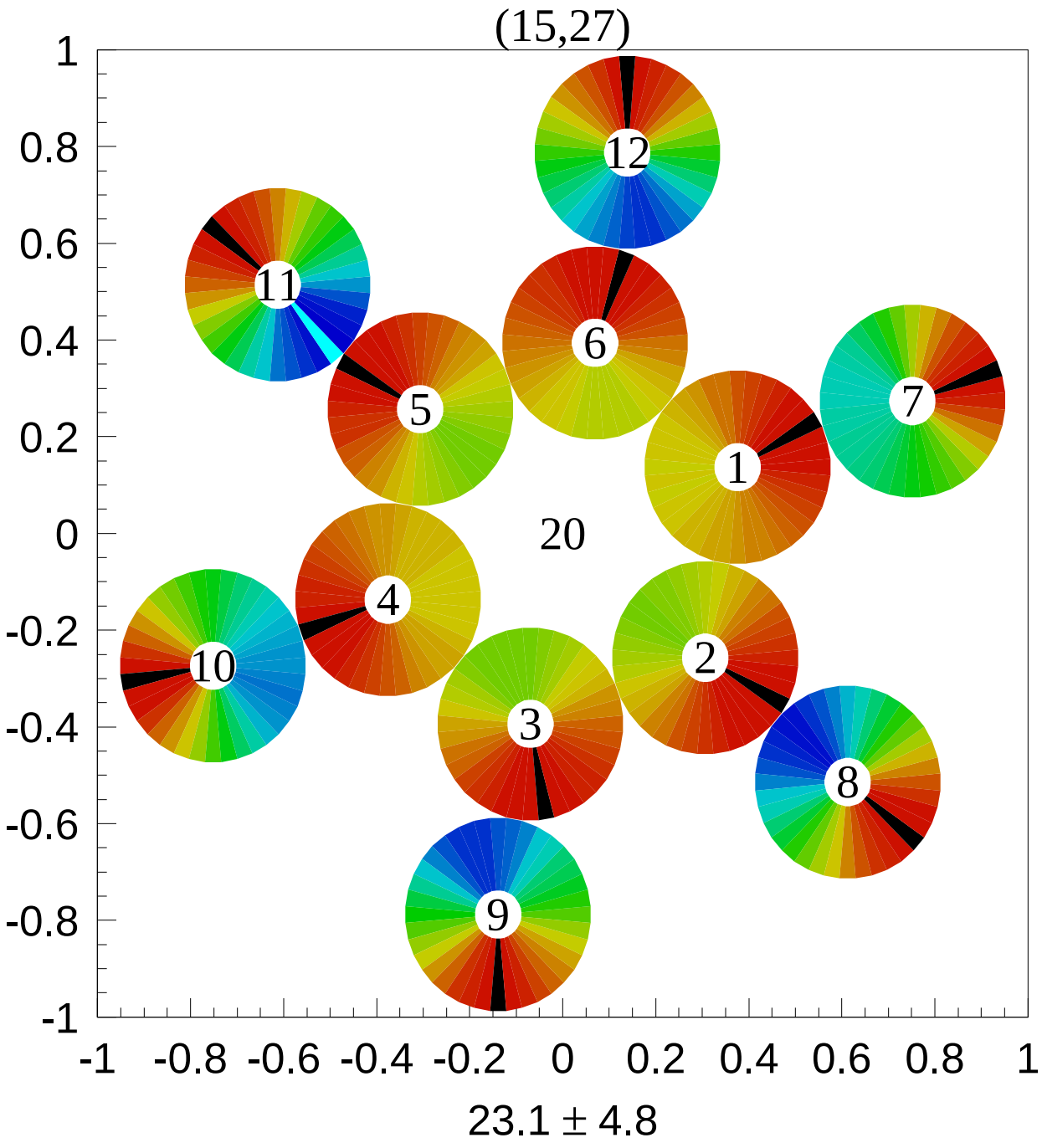

(15,25)
tilted LEDs
126 123 132 119 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 121 127 127 125 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

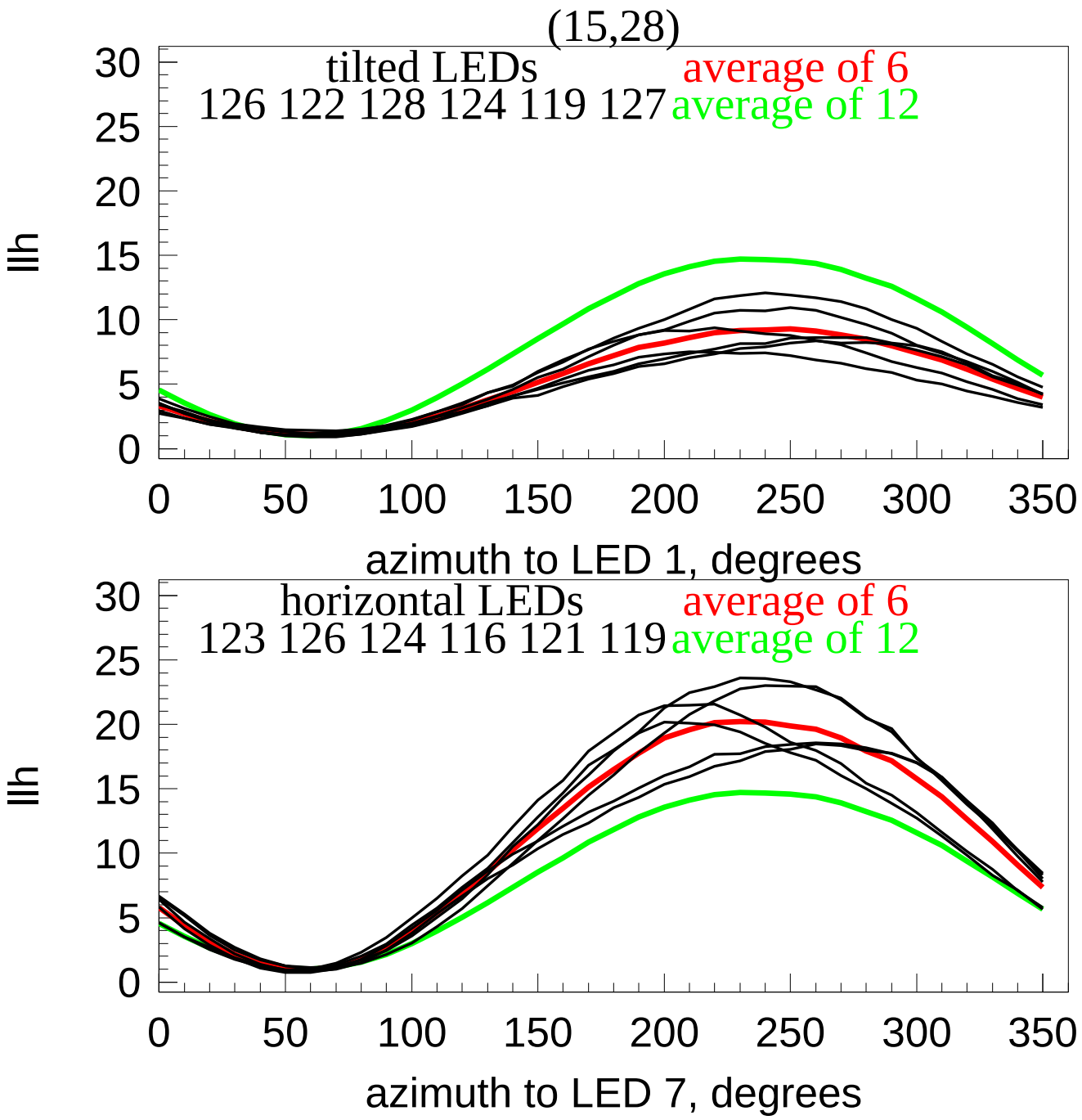

(15,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
90.7 ± 6.7

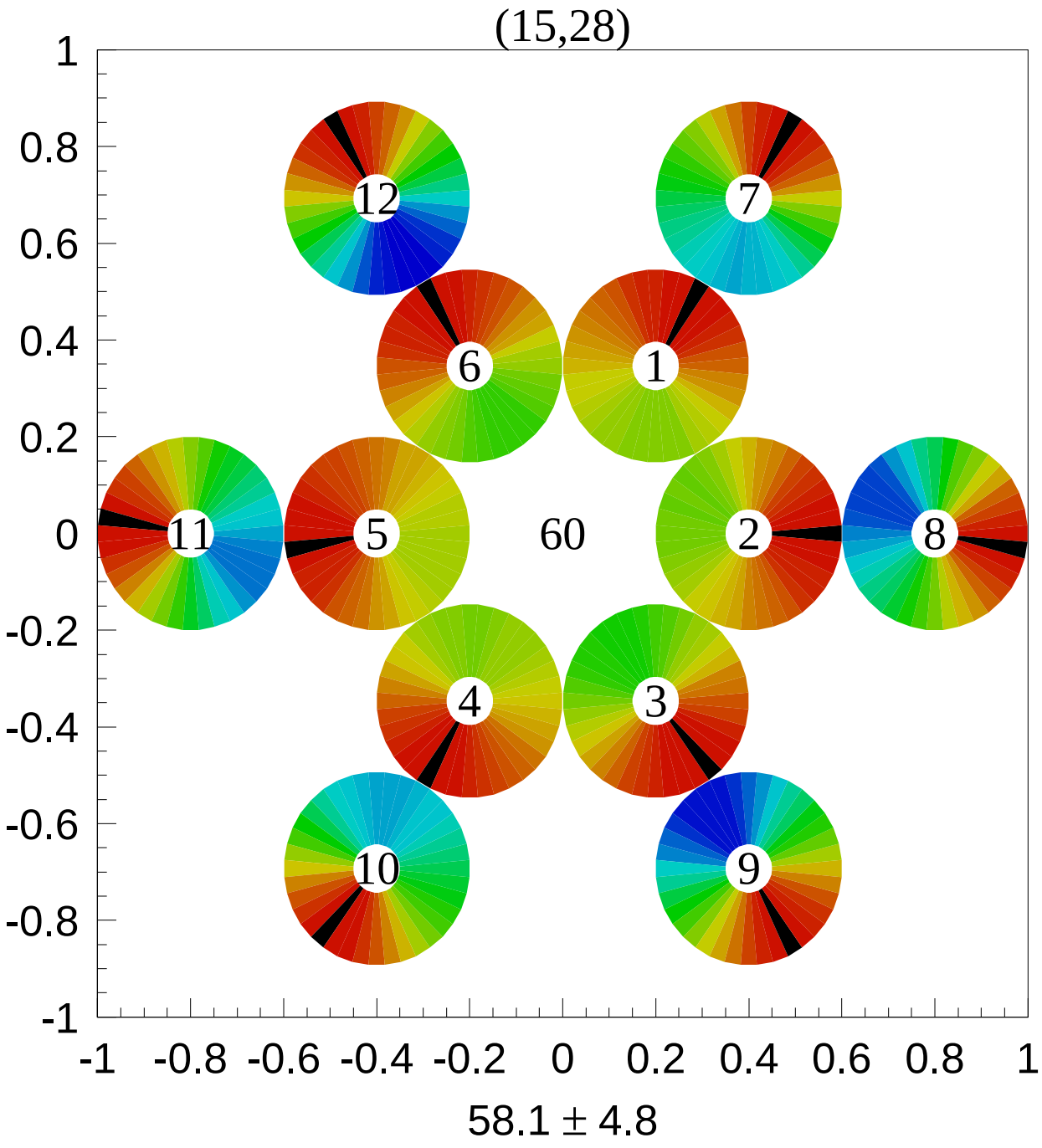

(15,26)
tilted LEDs
120 123 119 124 123 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 116 121 123 116 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

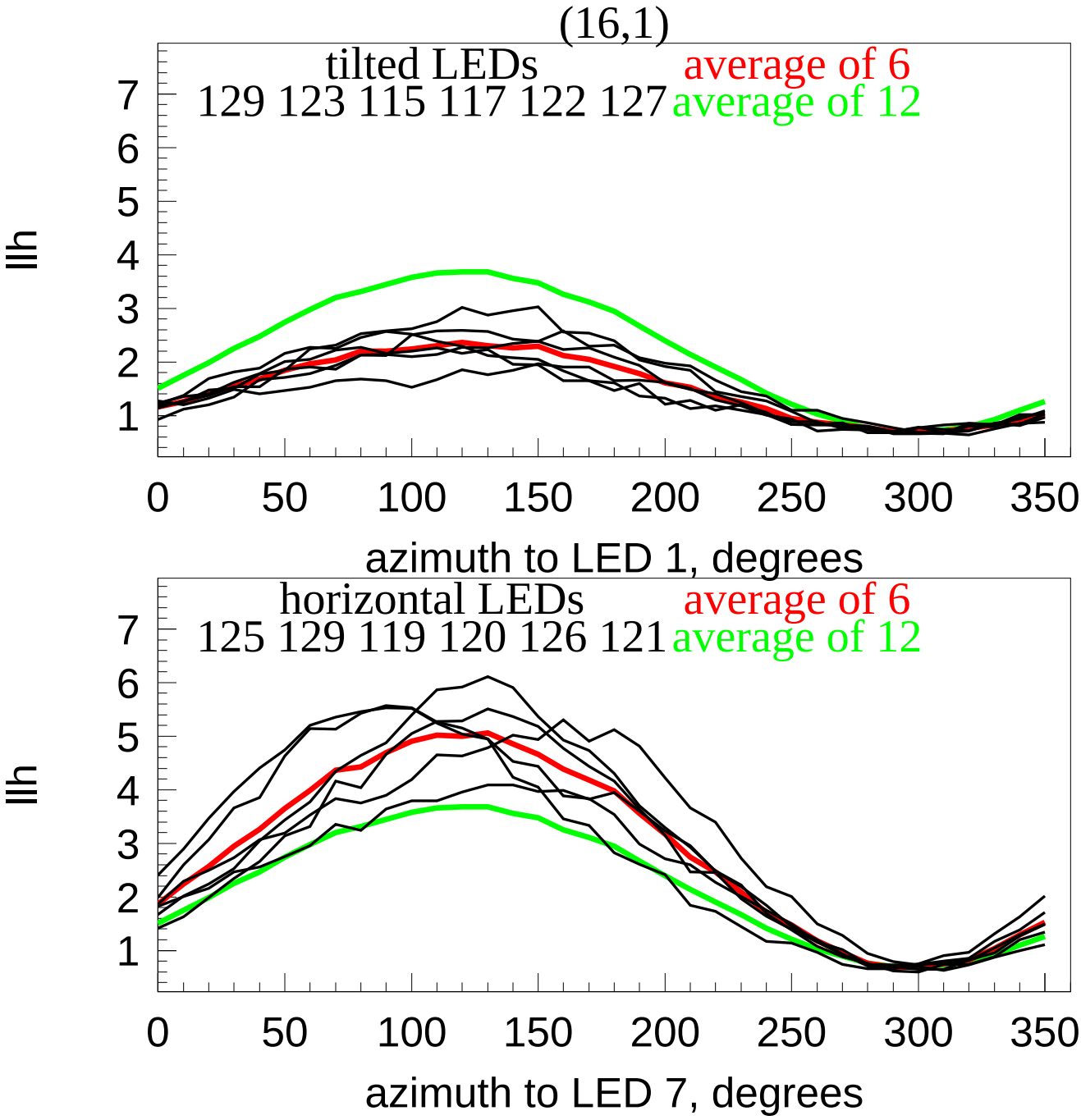

(15,26)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
328.4 ± 5.9

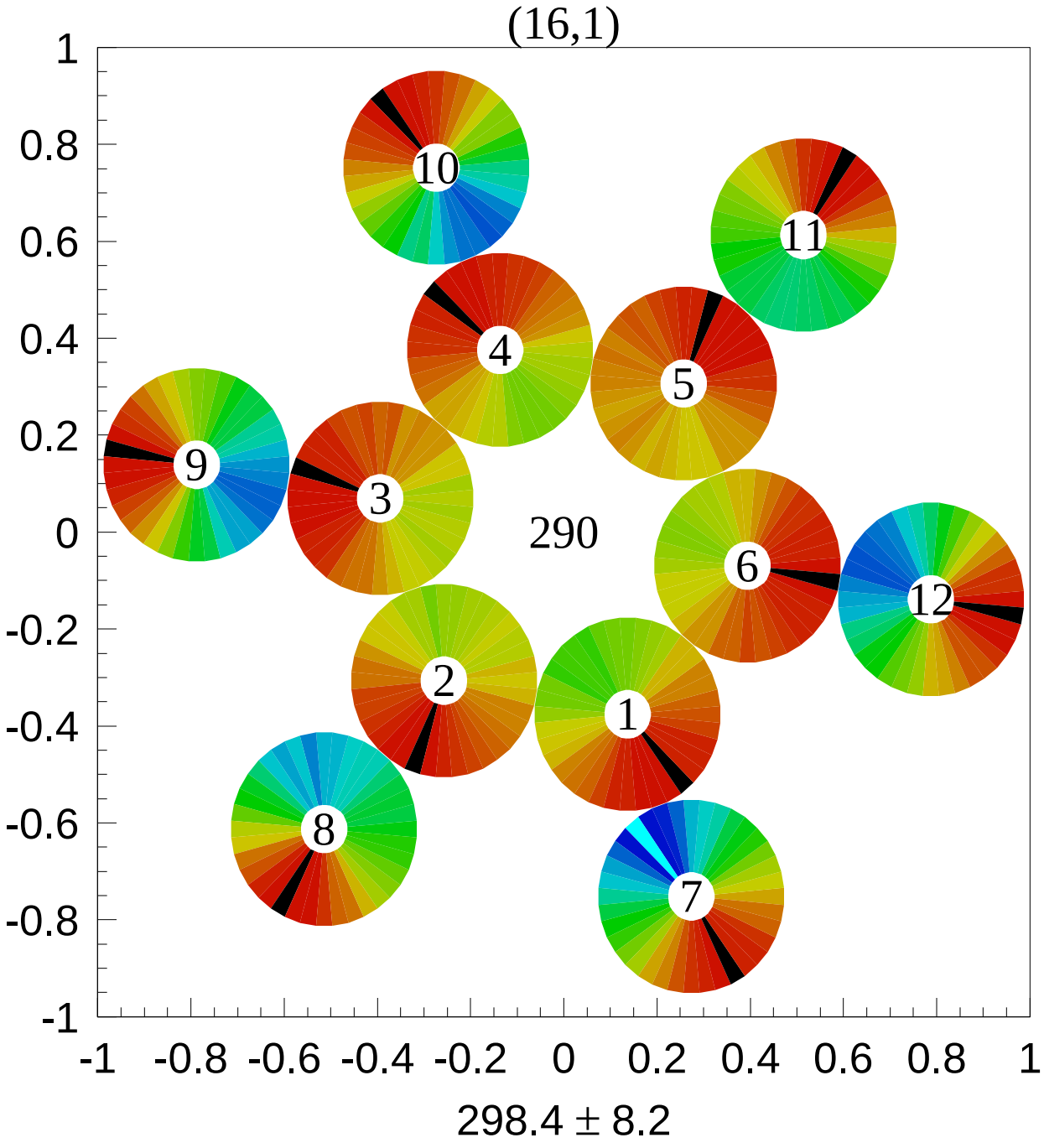

(15,27)
tilted LEDs
118 117 128 120 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 122 123 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

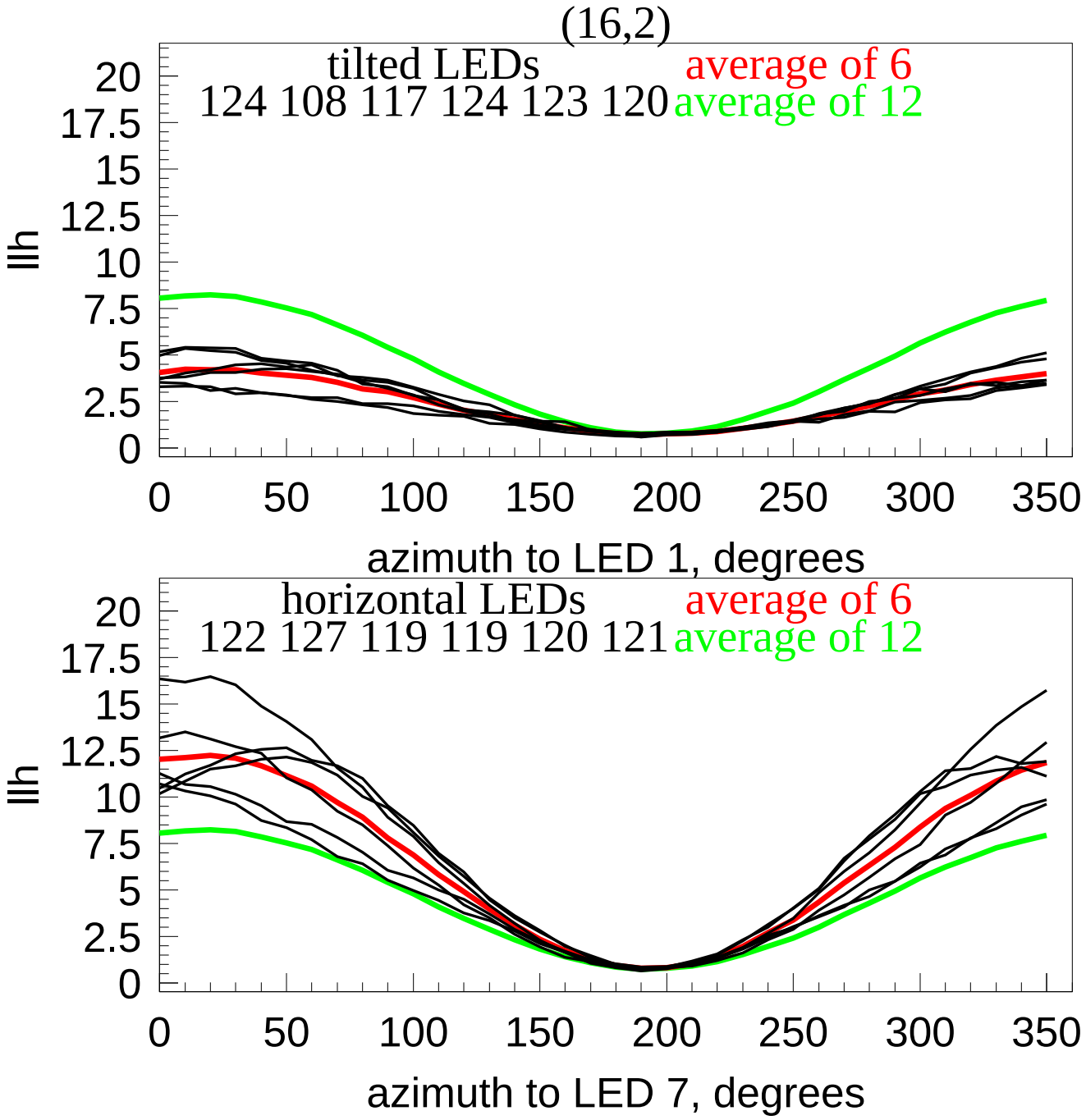

(15,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
23.1 ± 4.8

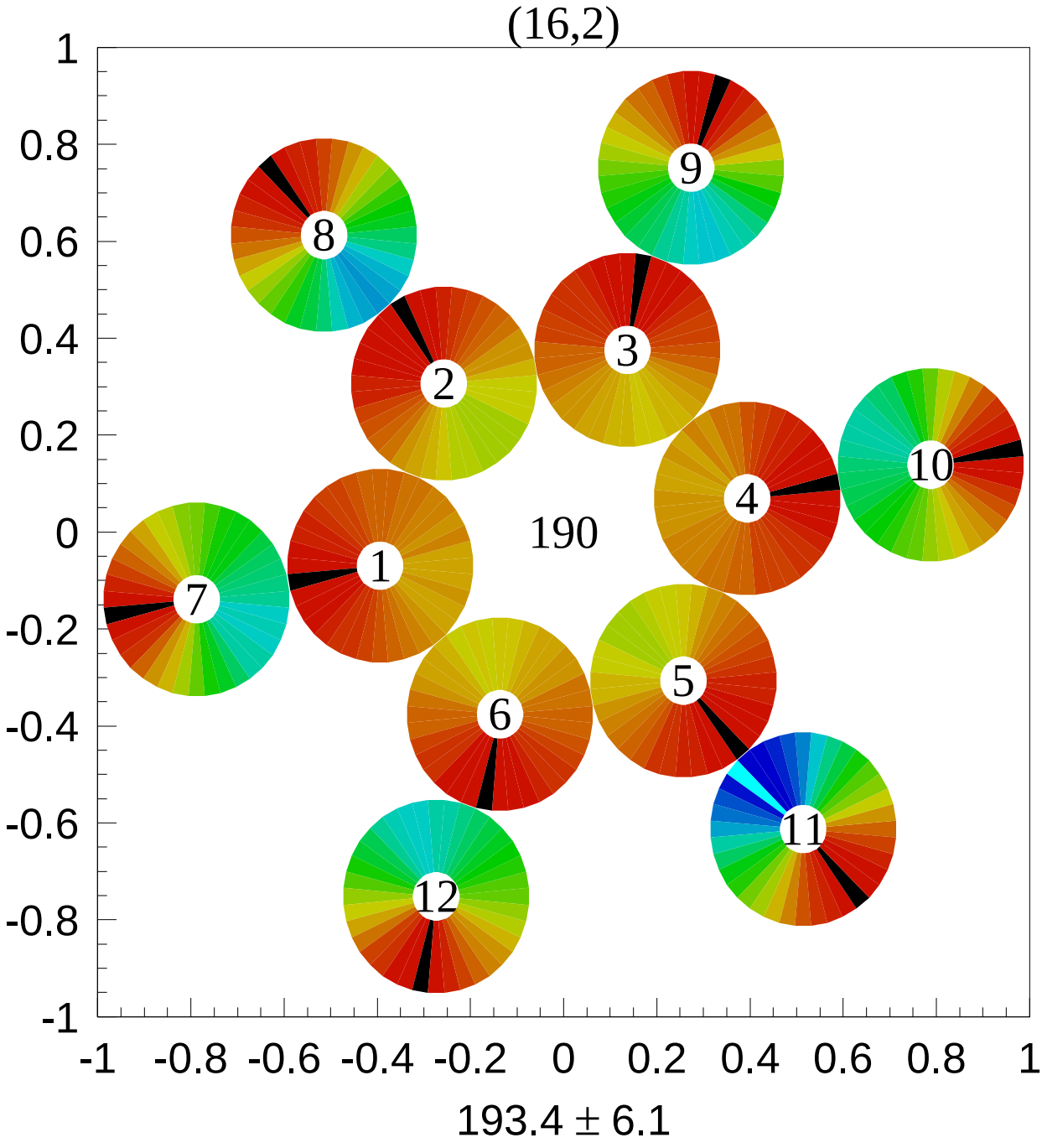

(15,28)
tilted LEDs
126 122 128 124 119 127
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 126 124 116 121 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

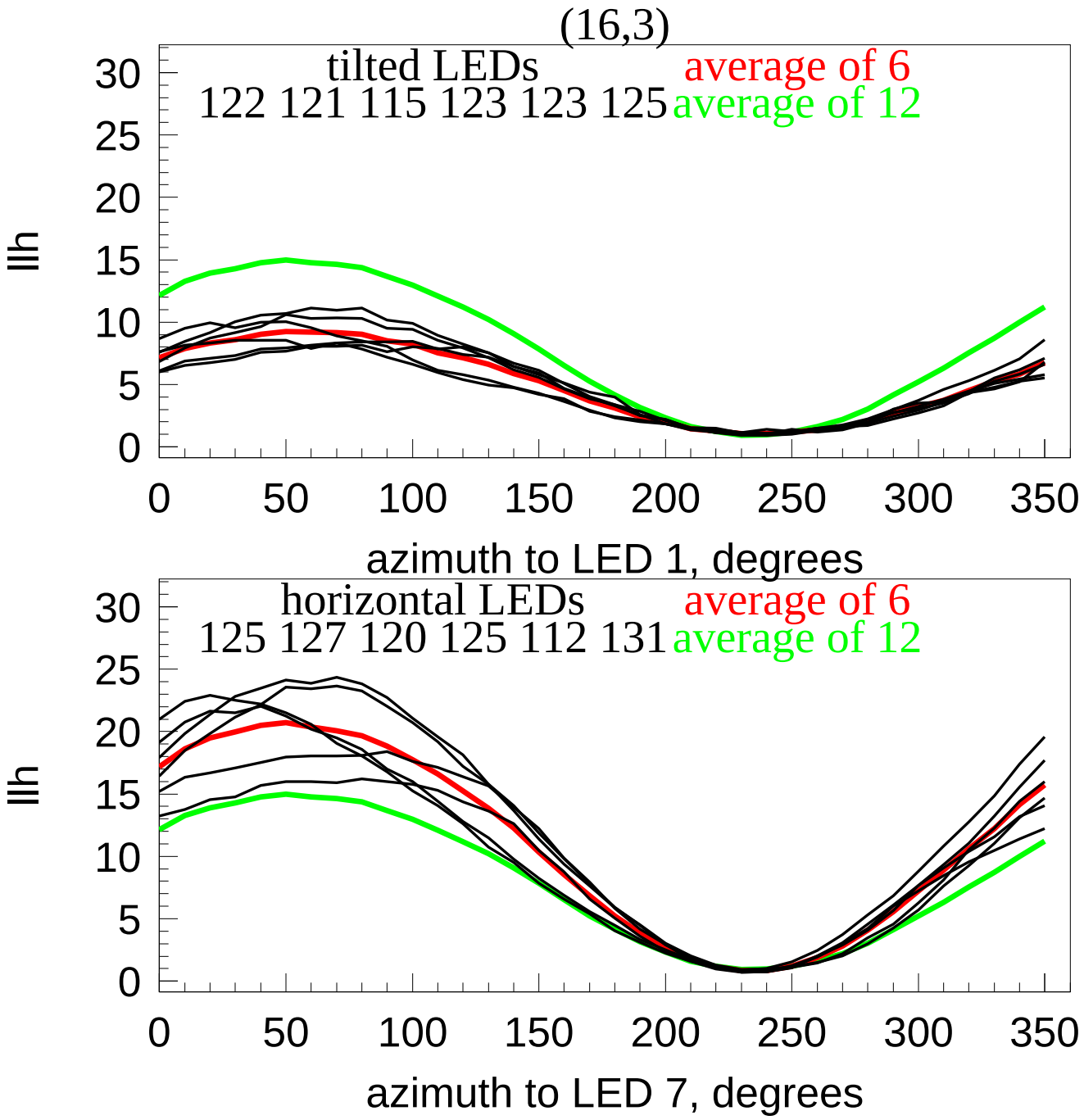

(15,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
58.1 ± 4.8

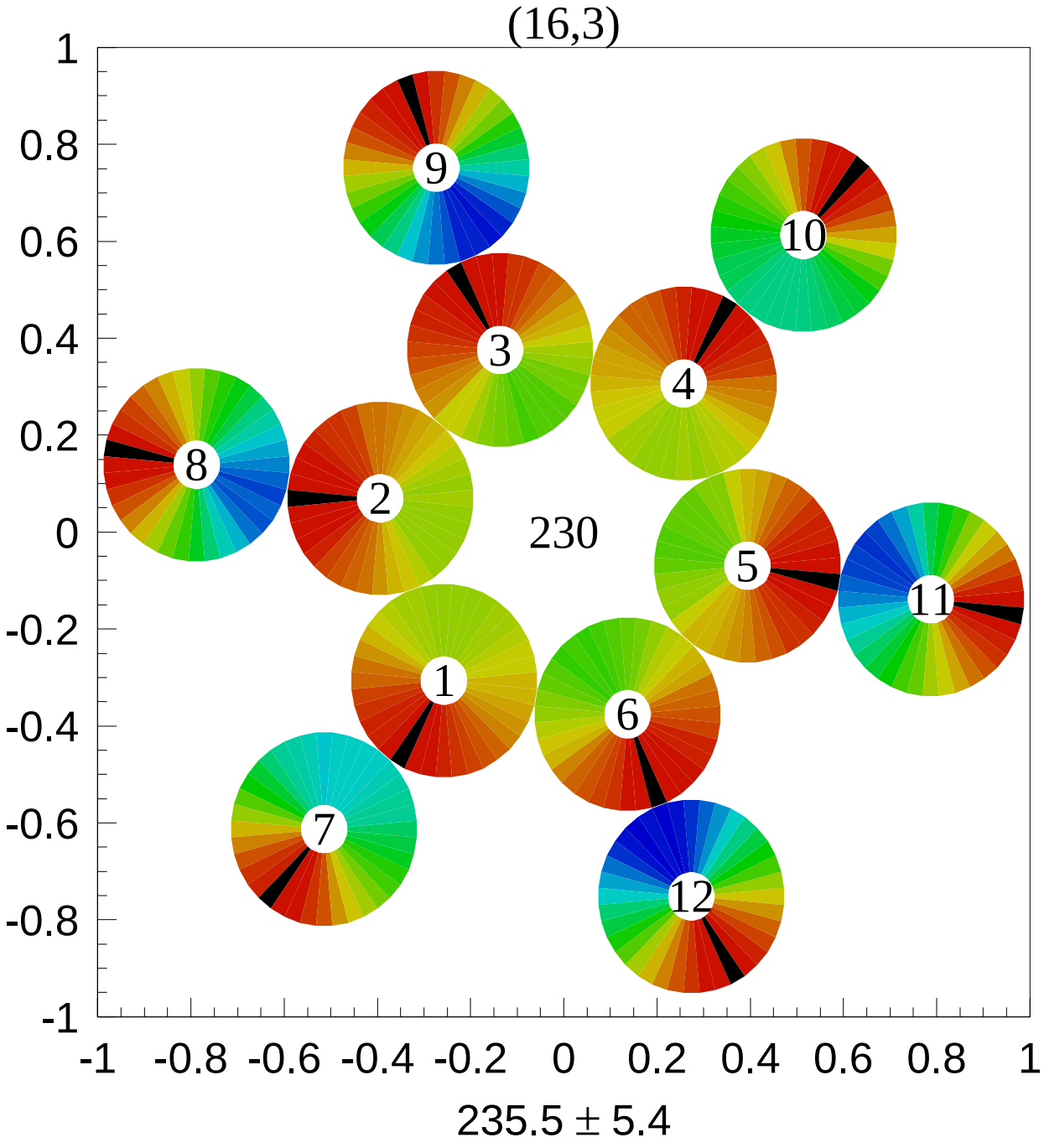

(16,1)
tilted LEDs
129 123 115 117 122 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 129 119 120 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

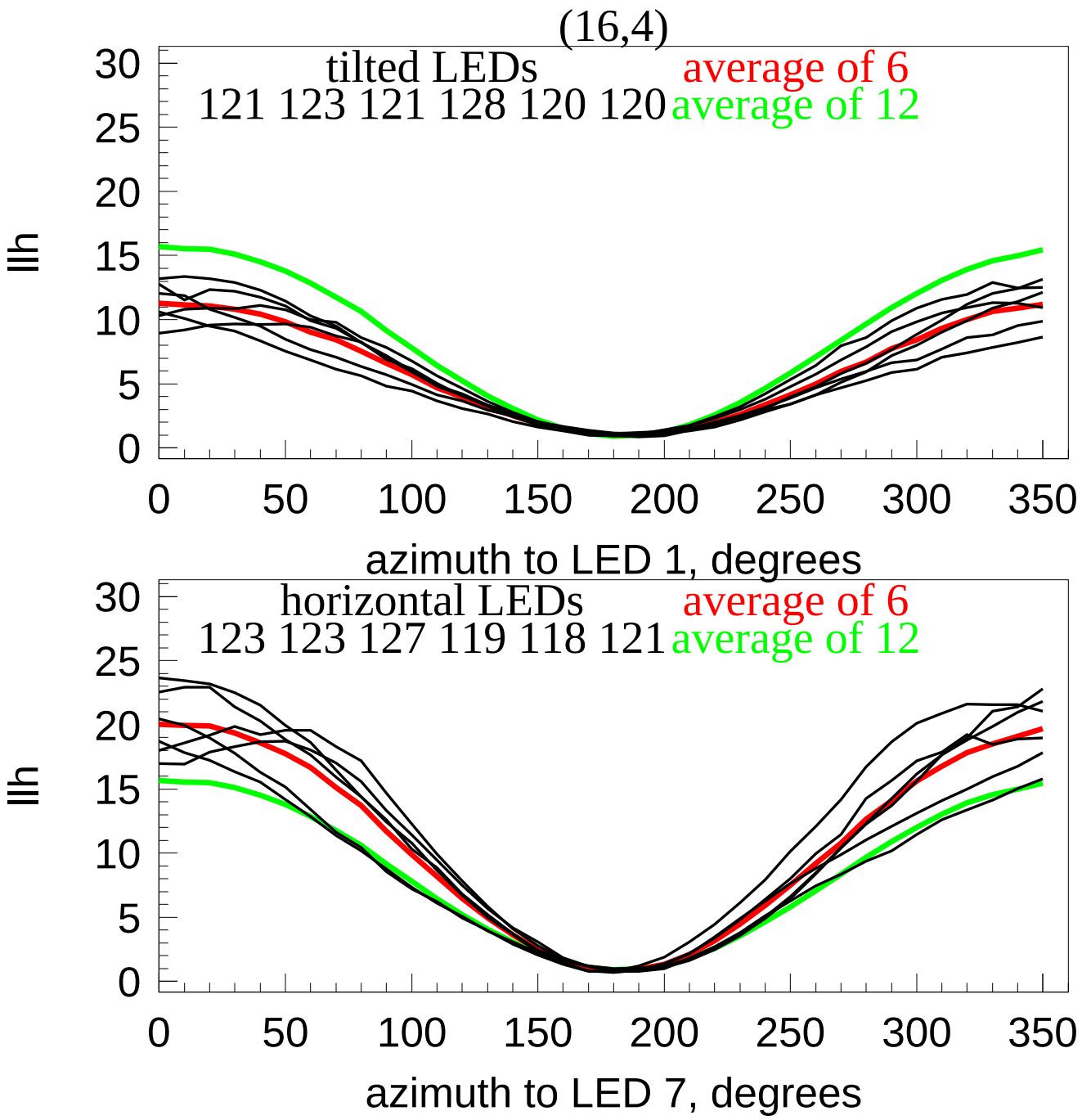

(16,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
298.4 ± 8.2

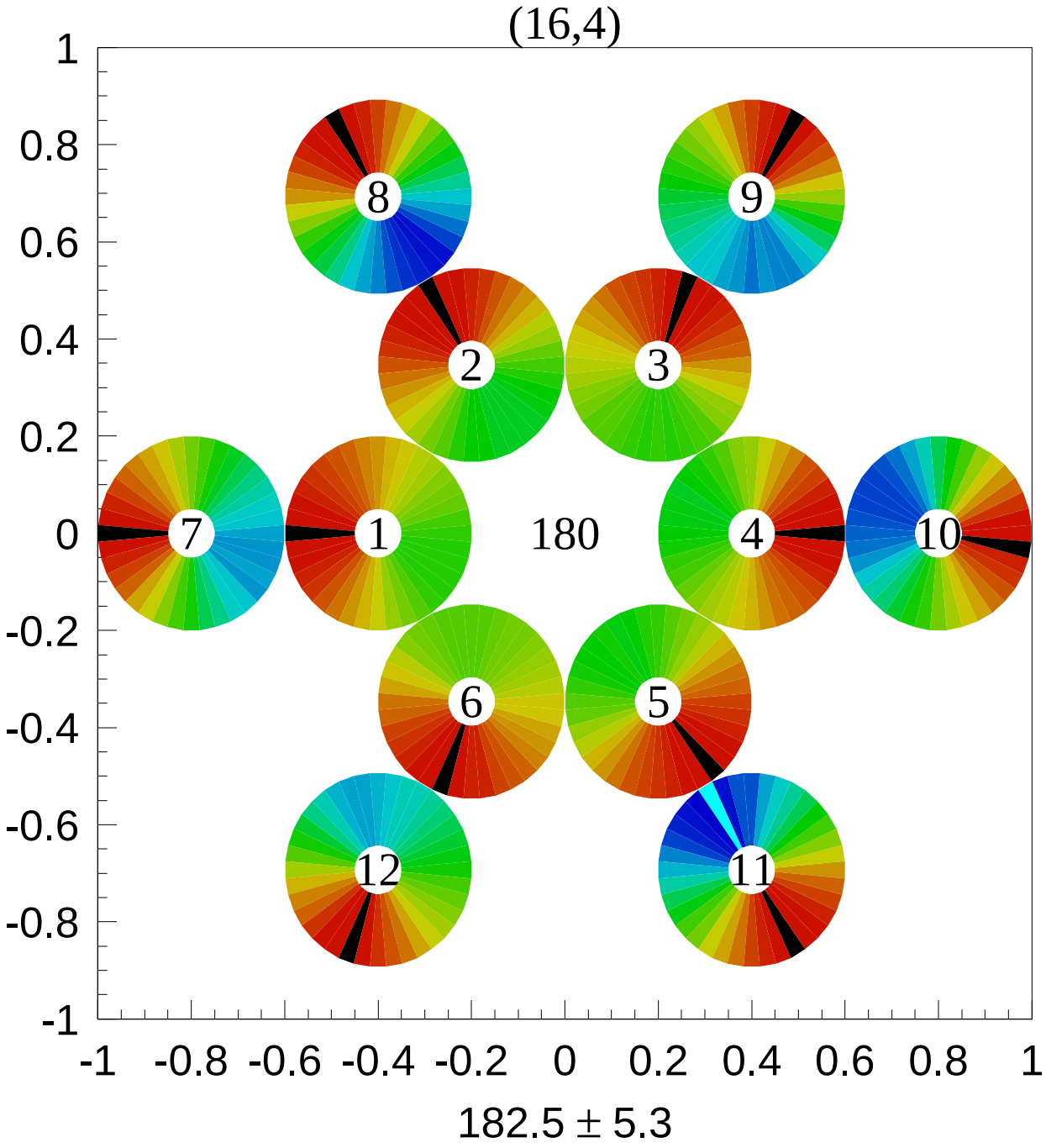

(16,2)
tilted LEDs
124 108 117 124 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 127 119 119 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

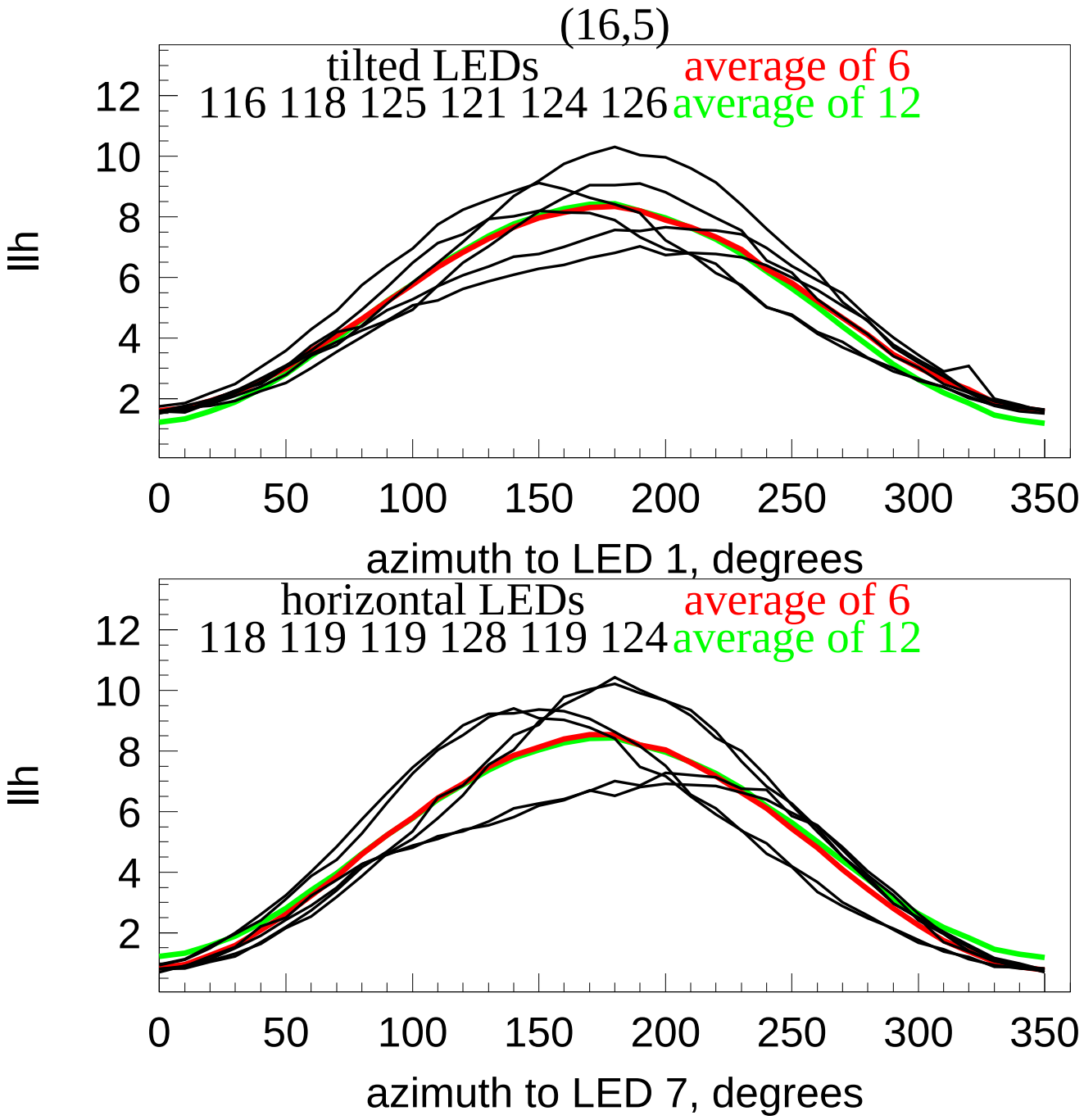

(16,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
193.4 ± 6.1

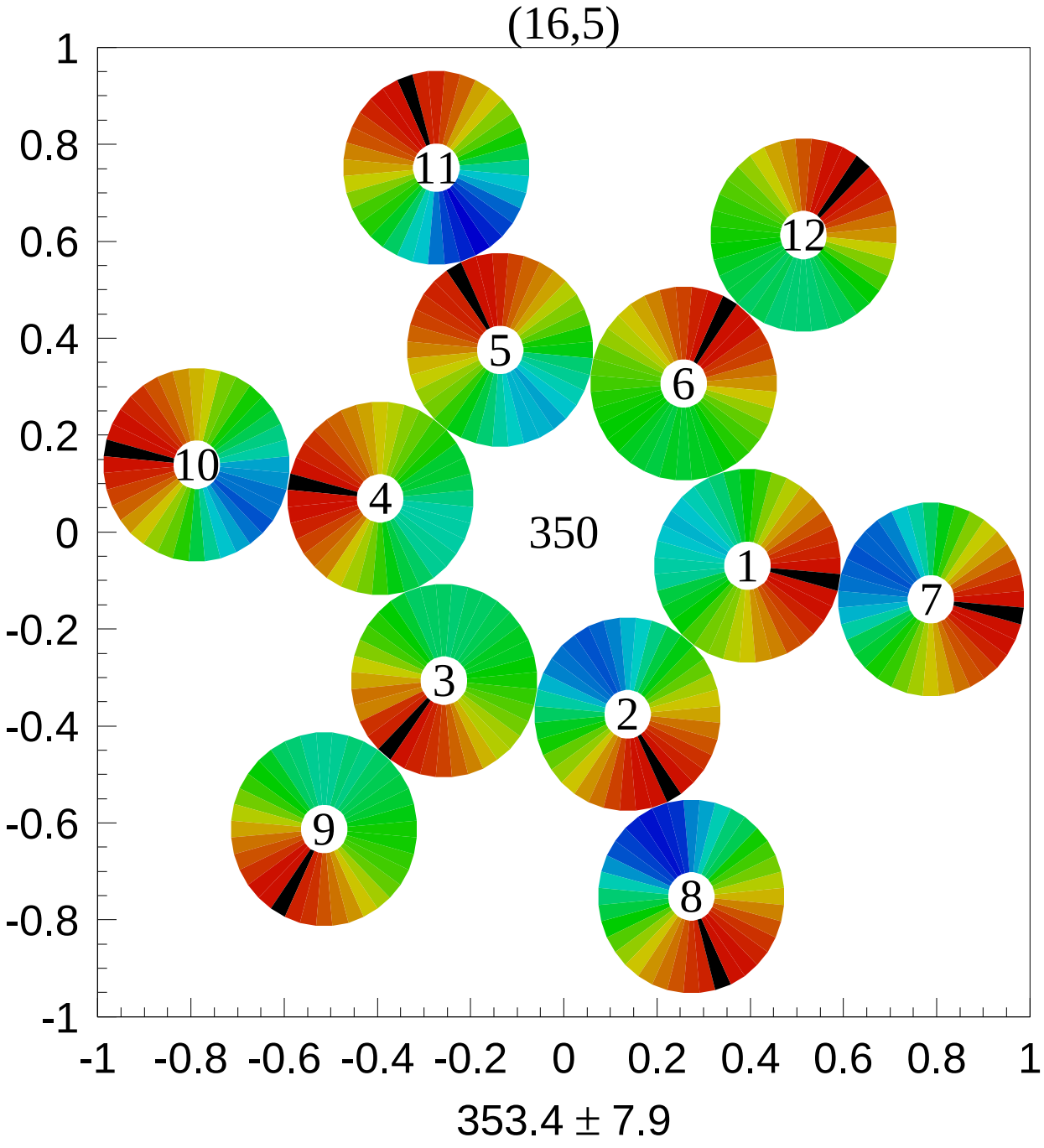

(16,3)
tilted LEDs
122 121 115 123 123 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 127 120 125 112 131
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

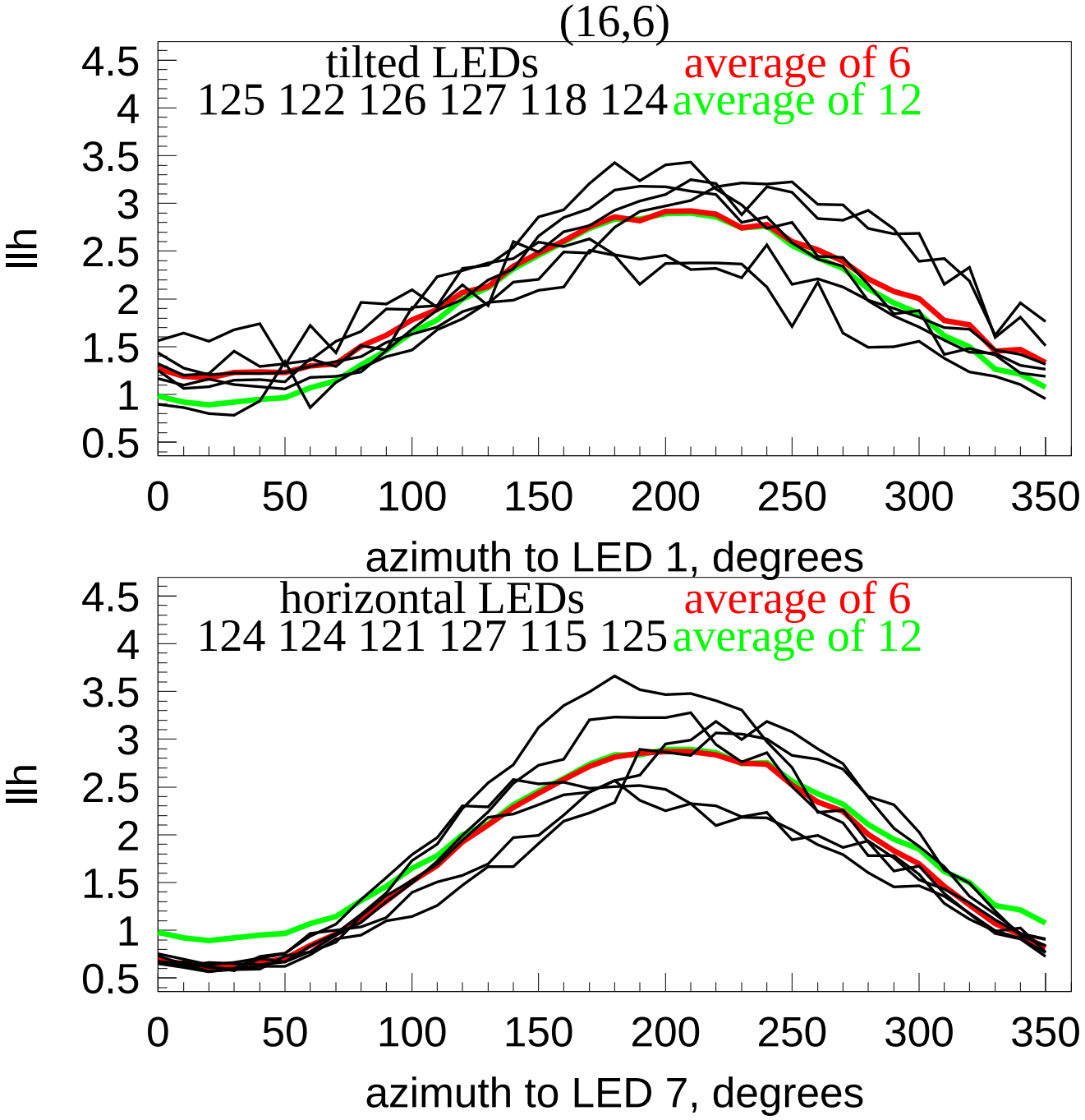

(16,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
235.5 ± 5.4

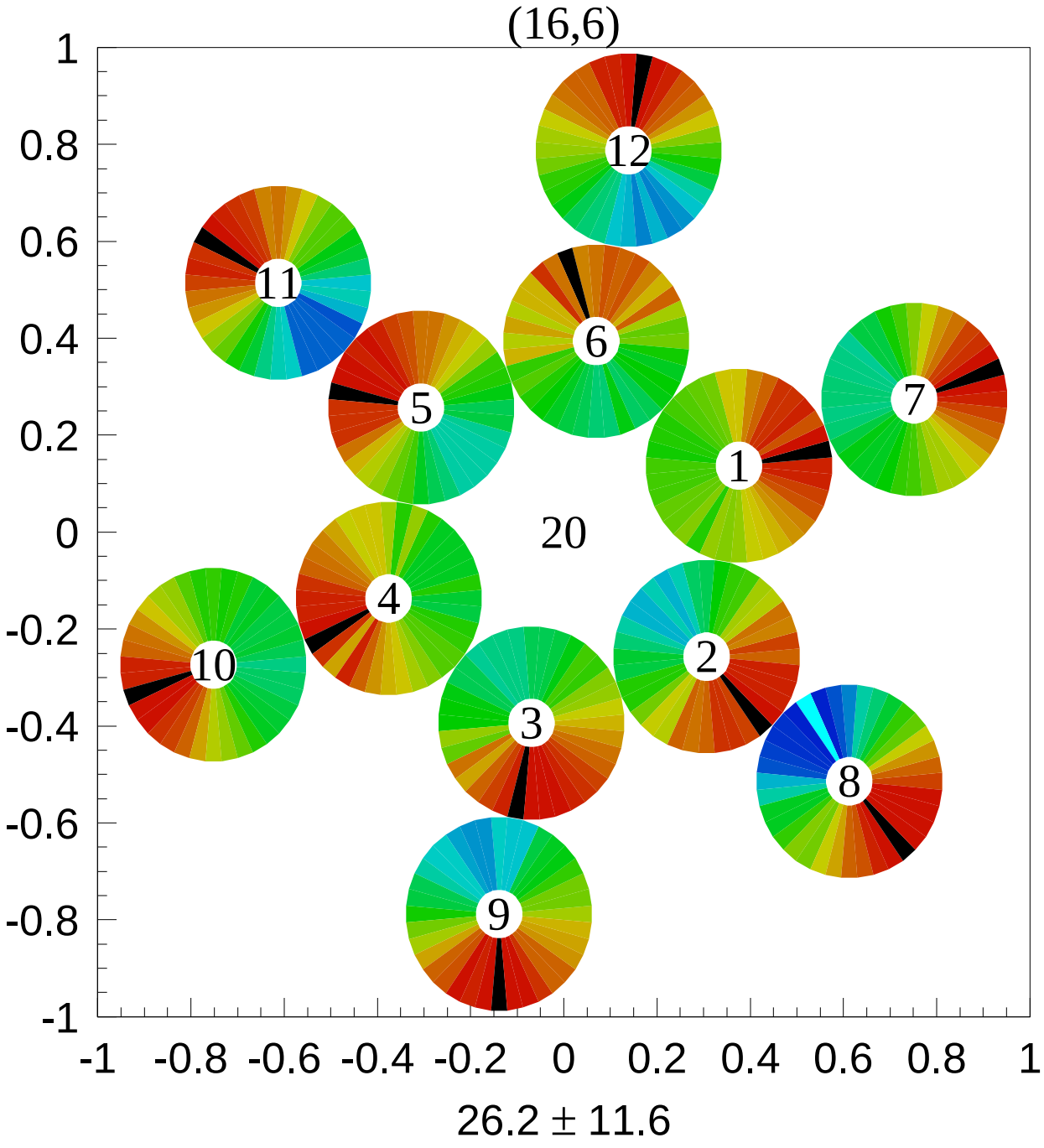

(16,4)
tilted LEDs
121 123 121 128 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 127 119 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

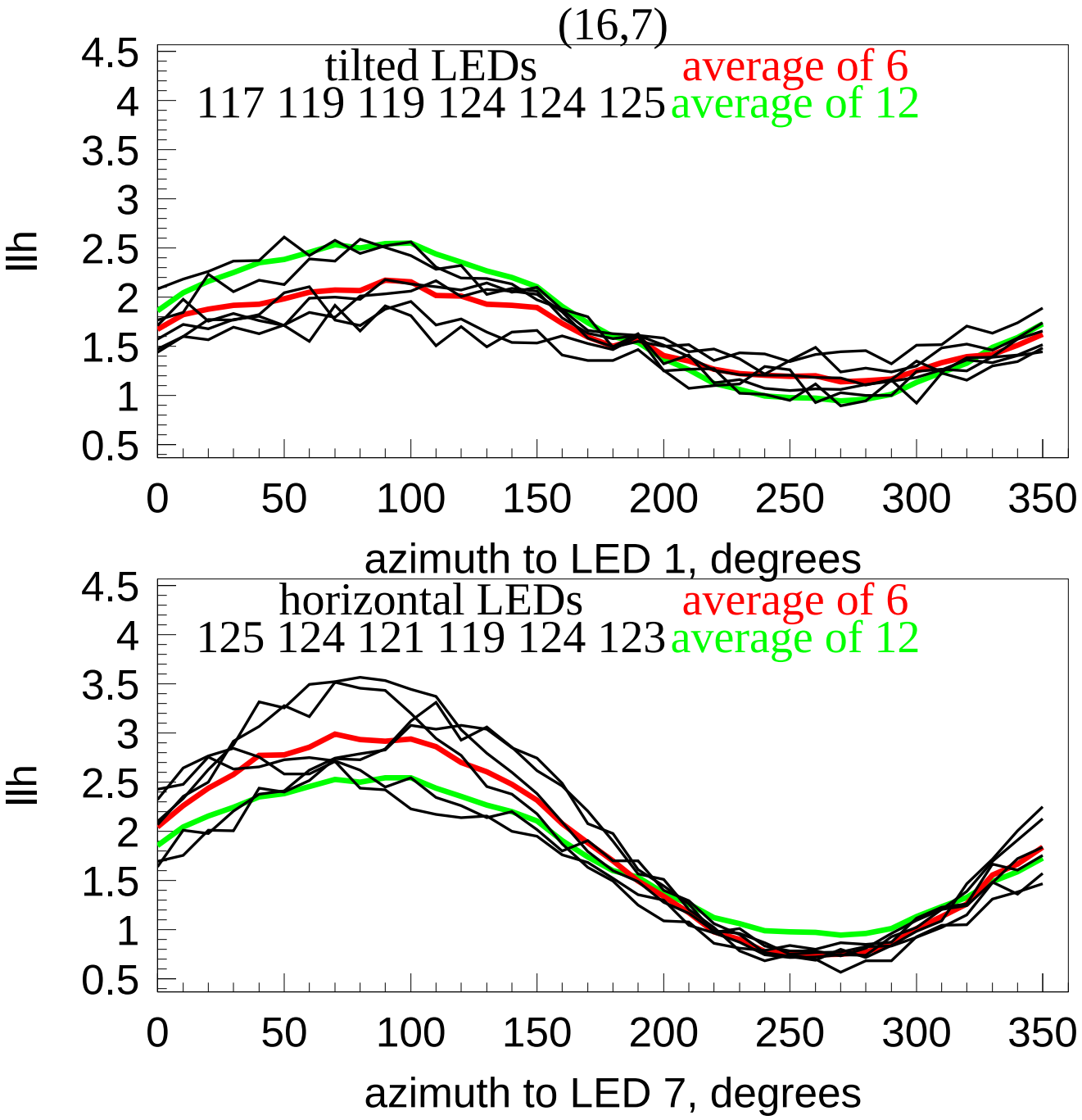

(16,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
182.5 ± 5.3
8
9
2
3
7
1
180
4
10
6
5
12
11

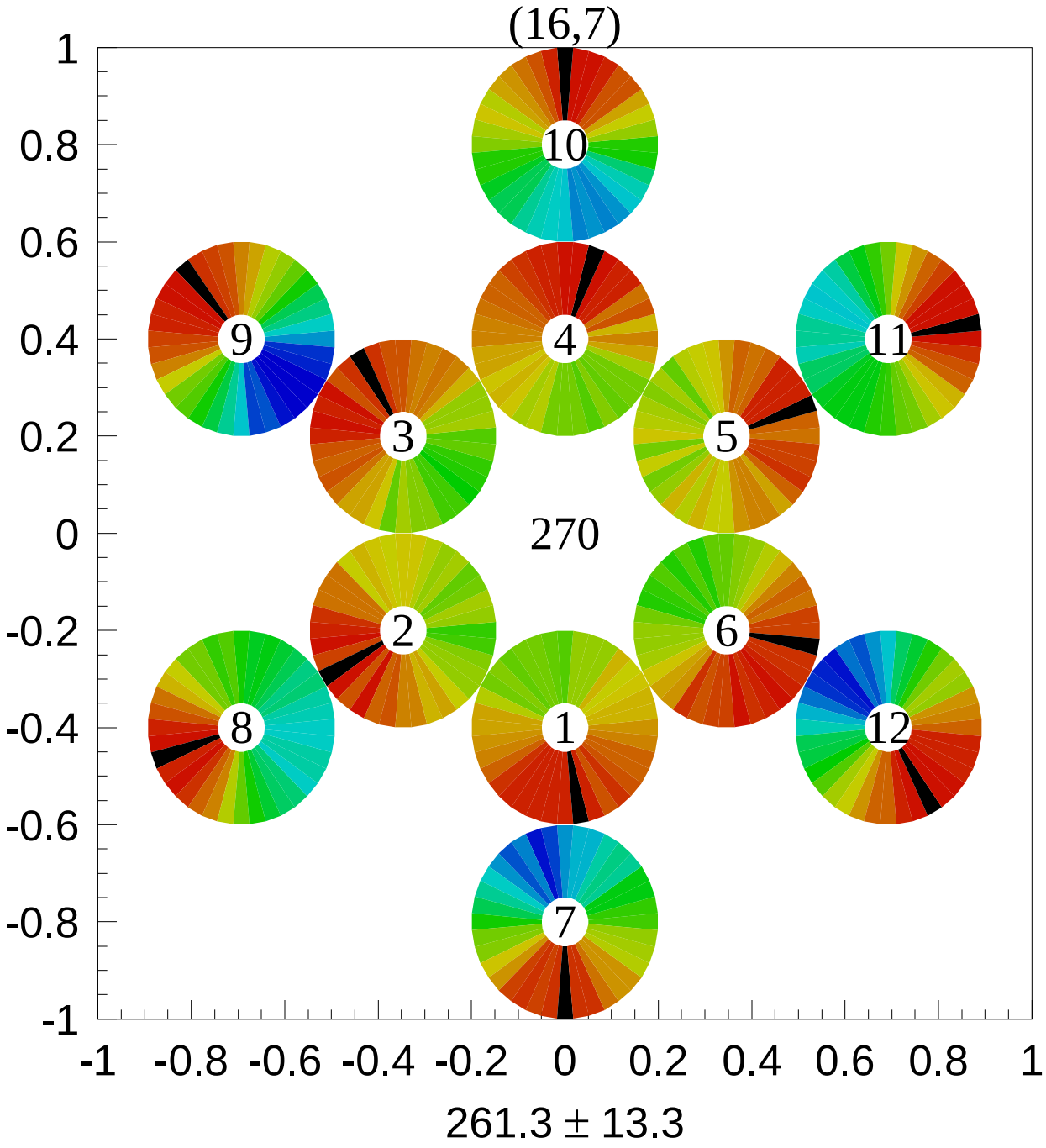

(16,5)
tilted LEDs
116 118 125 121 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 119 119 128 119 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

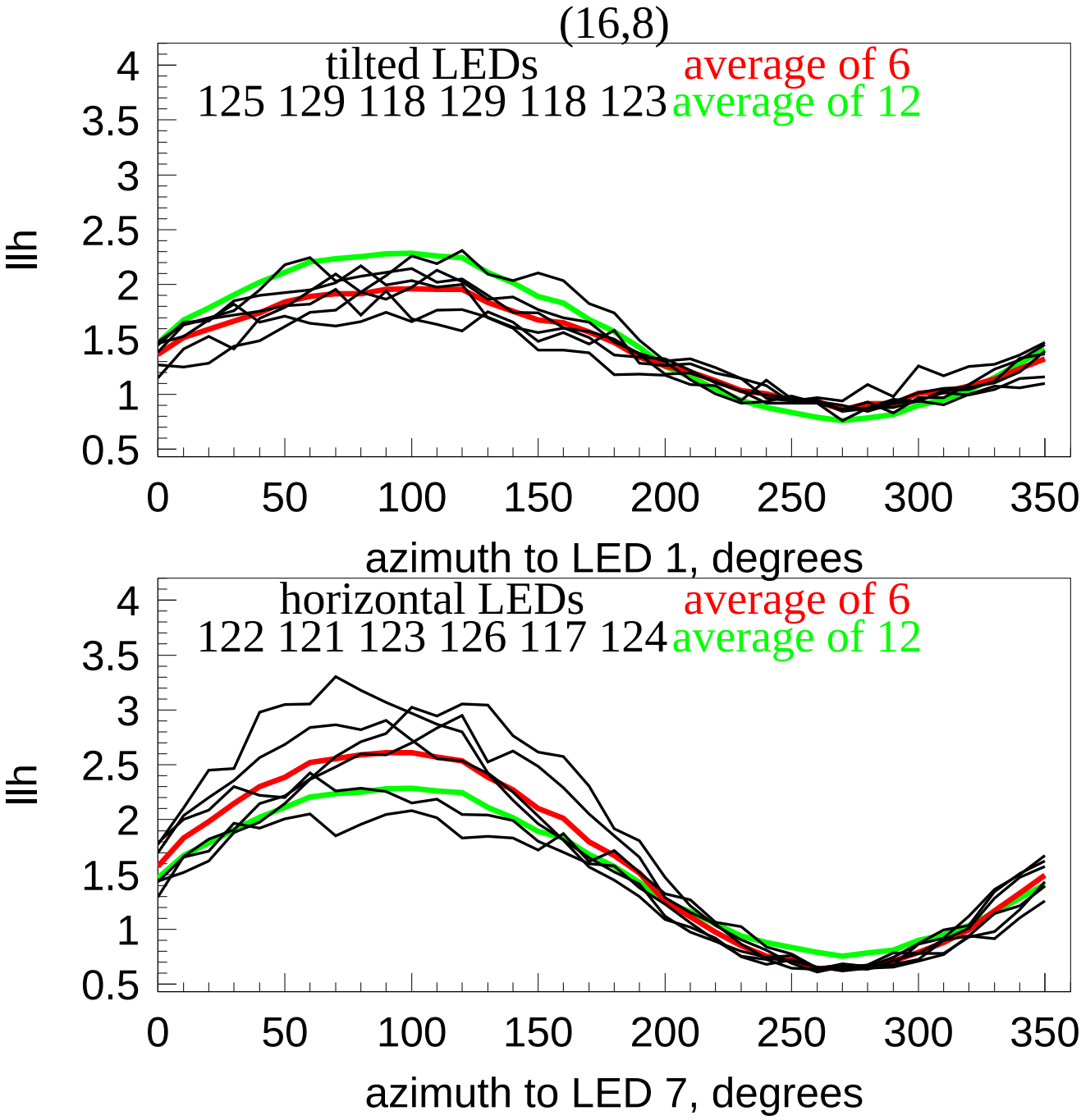

(16,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
353.4 ± 7.9

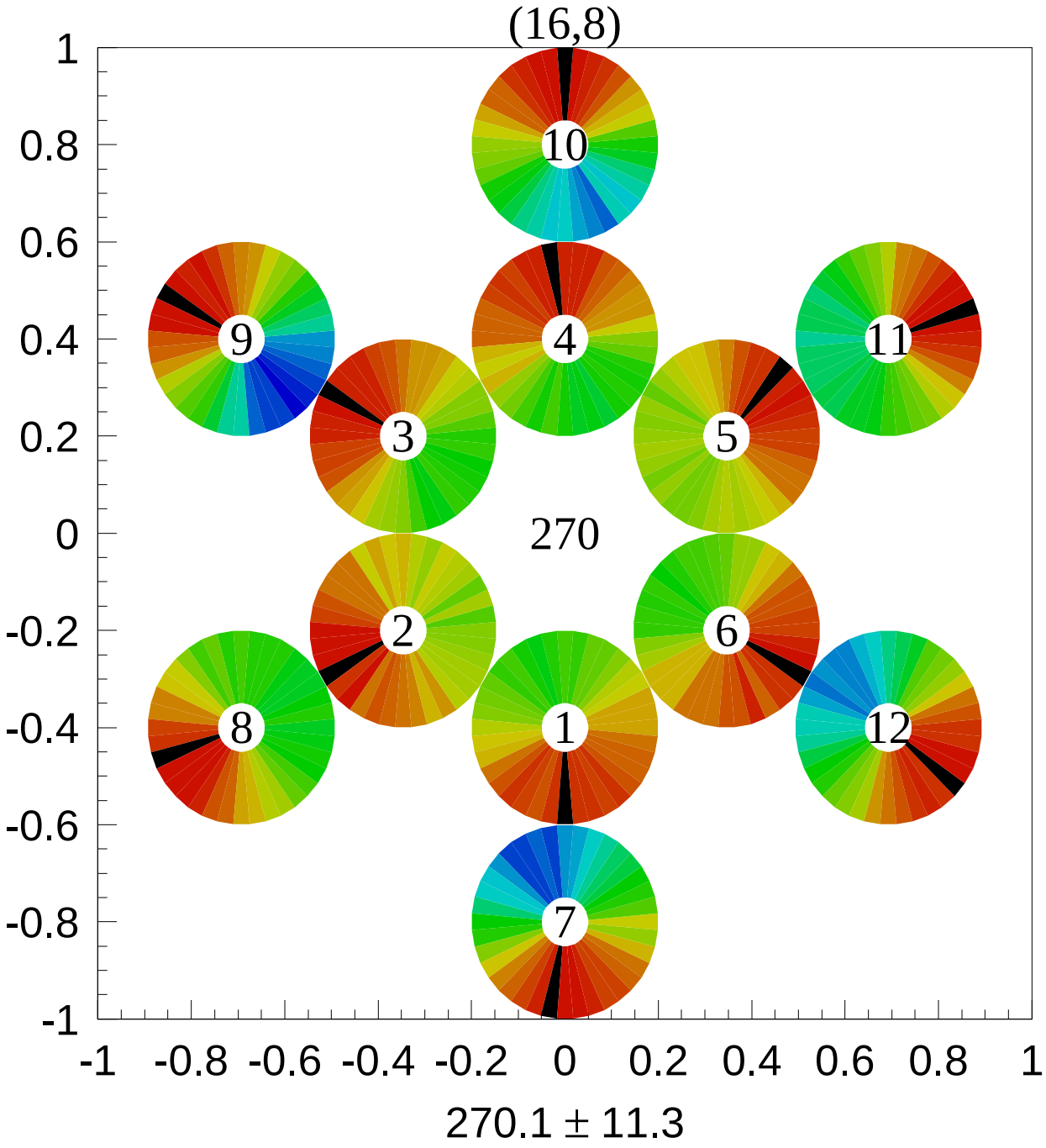

(16,6)
tilted LEDs
125 122 126 127 118 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 121 127 115 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

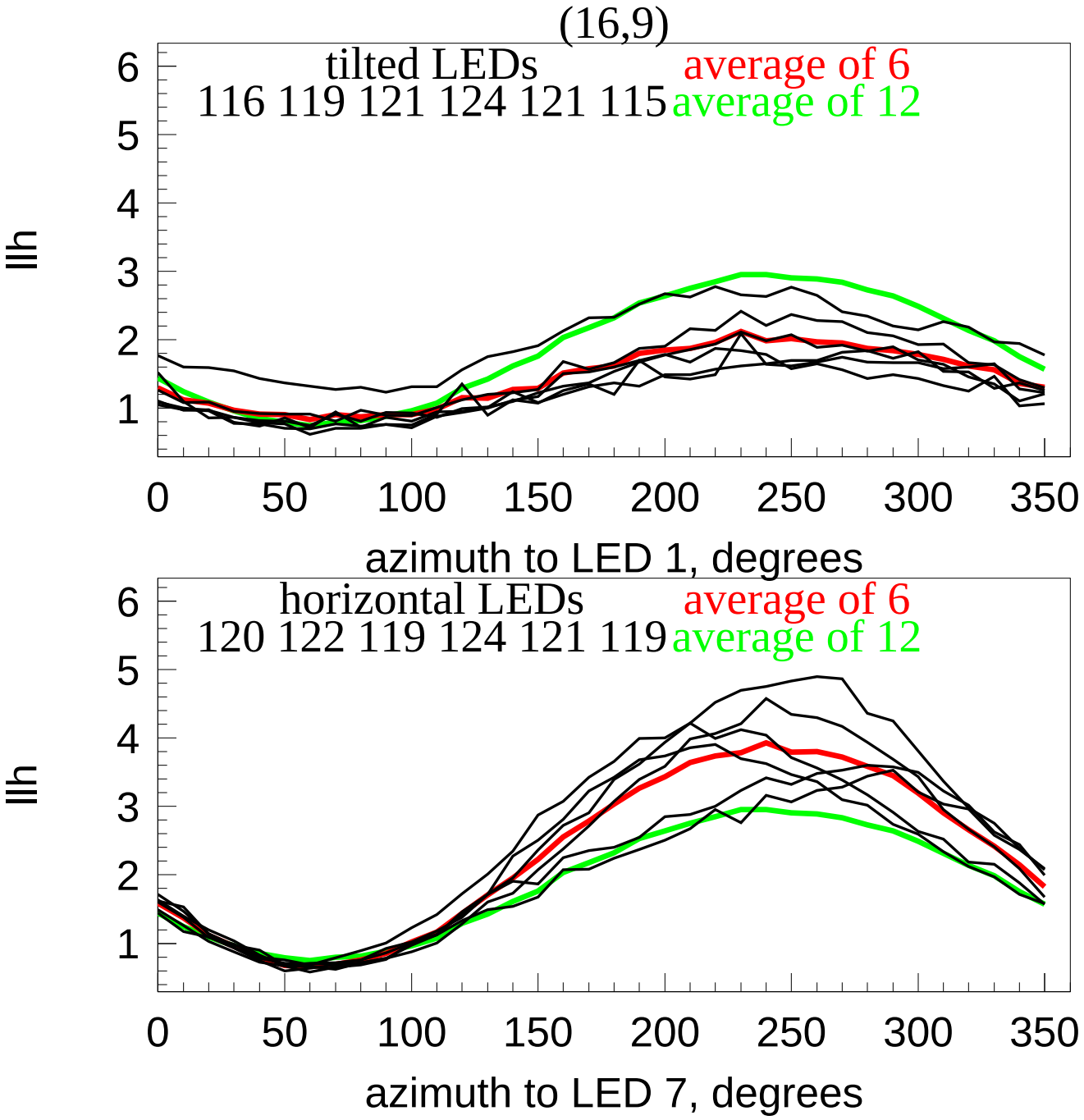

(16,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
26.2 ± 11.6

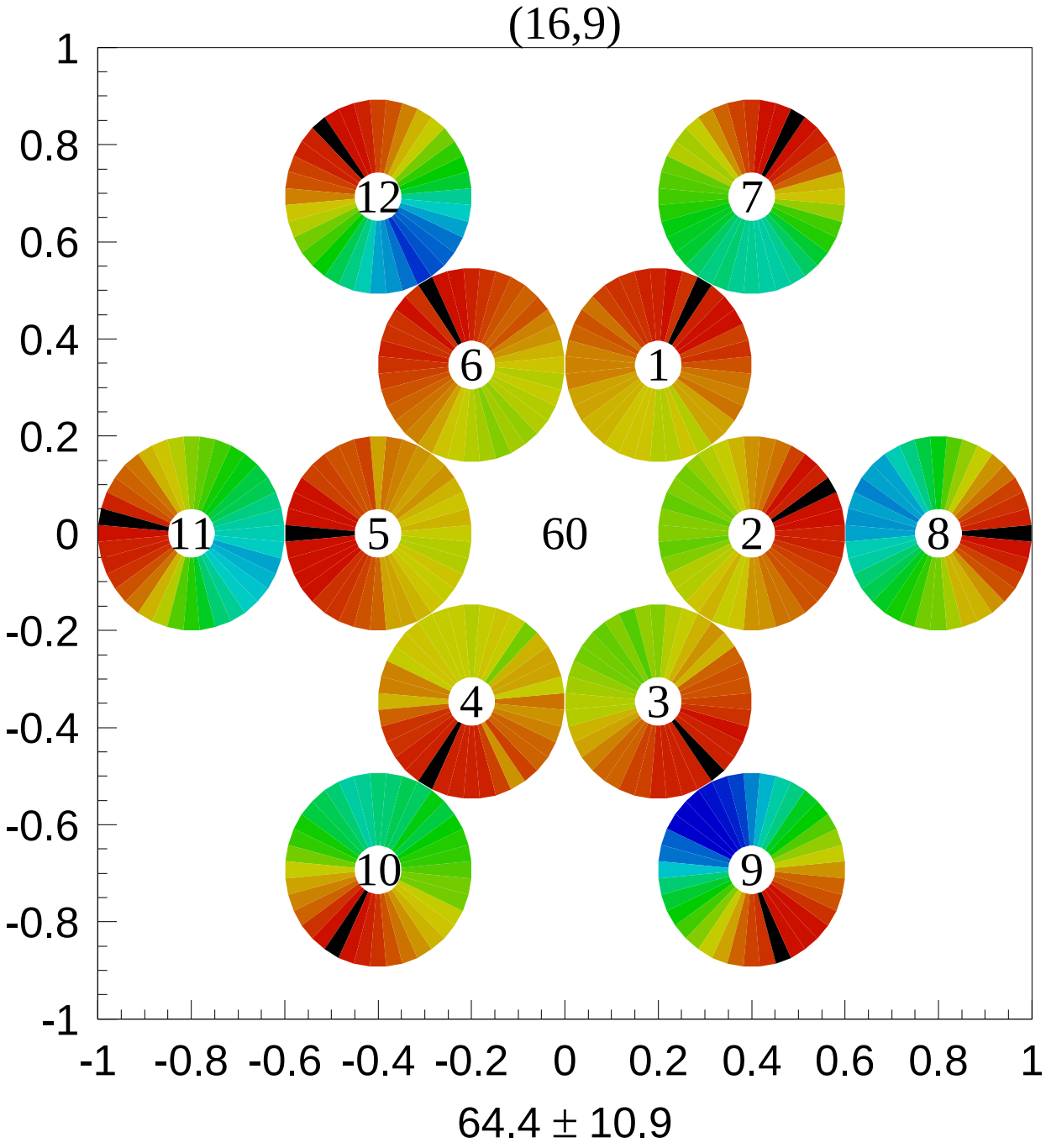

(16,7)
tilted LEDs
117 119 119 124 124 125
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
125 124 121 119 124 123
average of 6
average of 12
IIh
azimuth to LED 7, degrees

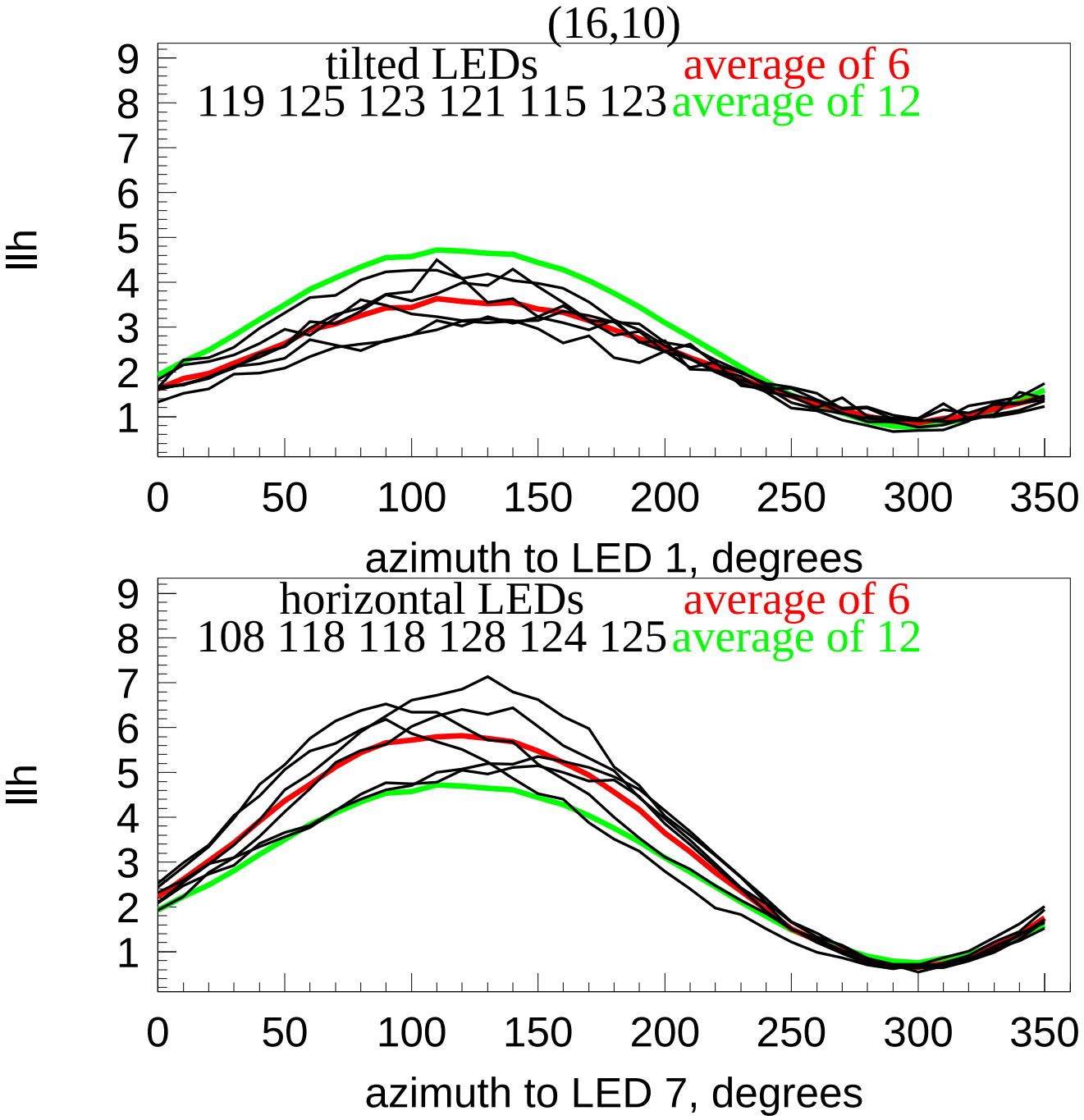

(16,7)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
261.3 ± 13.3

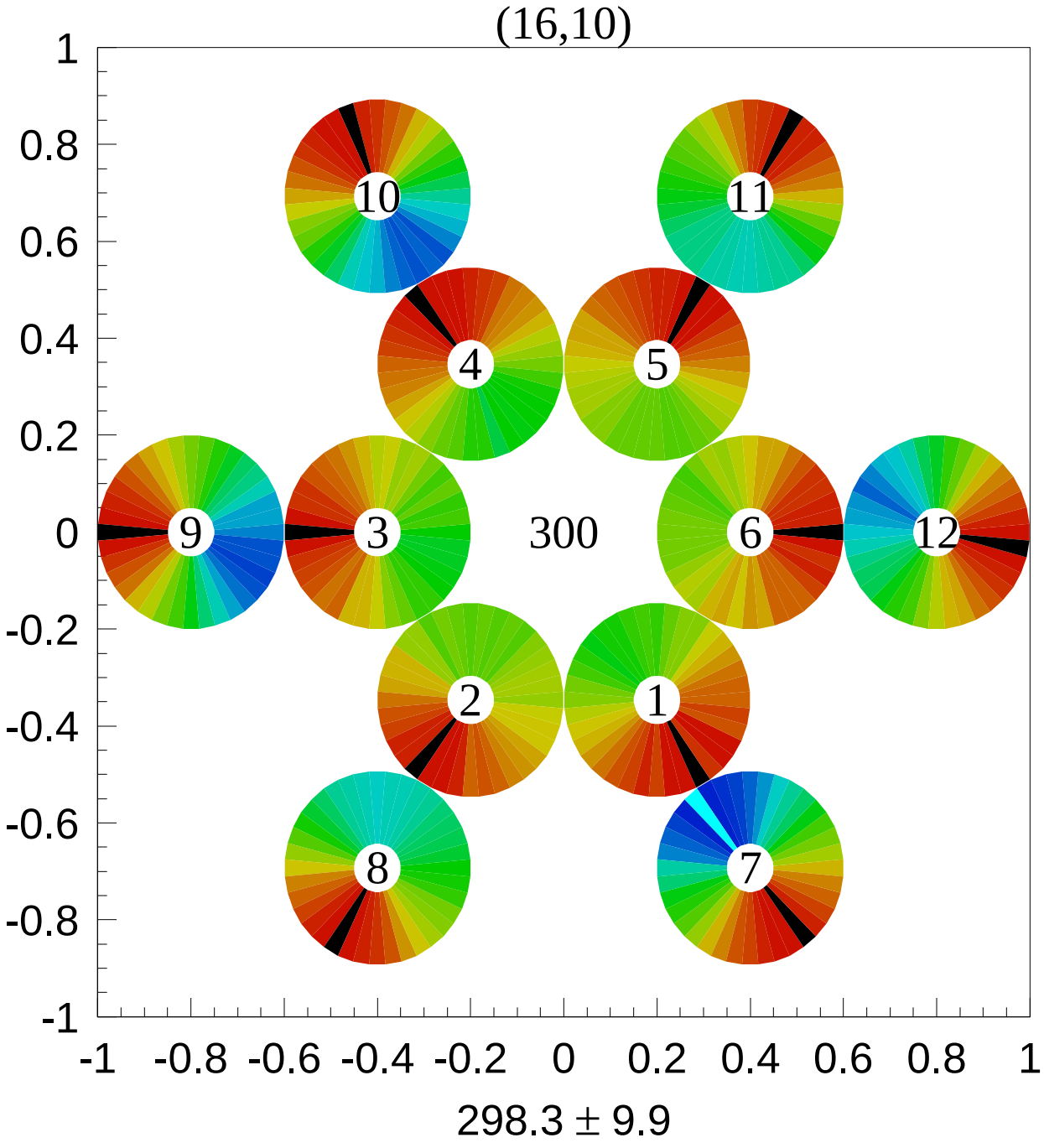

(16,8)
tilted LEDs
125 129 118 129 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 123 126 117 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

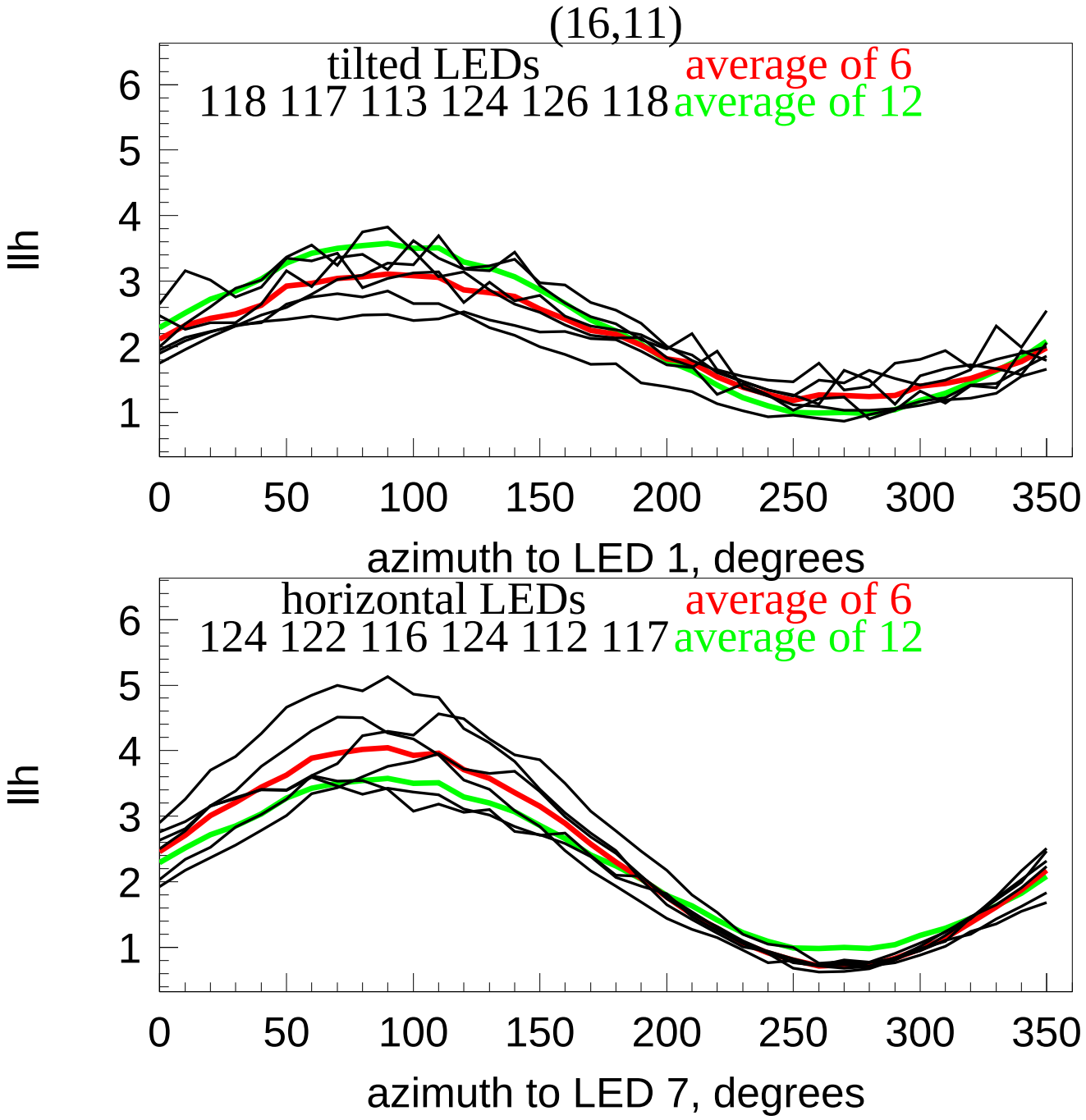

(16,8)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
270.1 ± 11.3

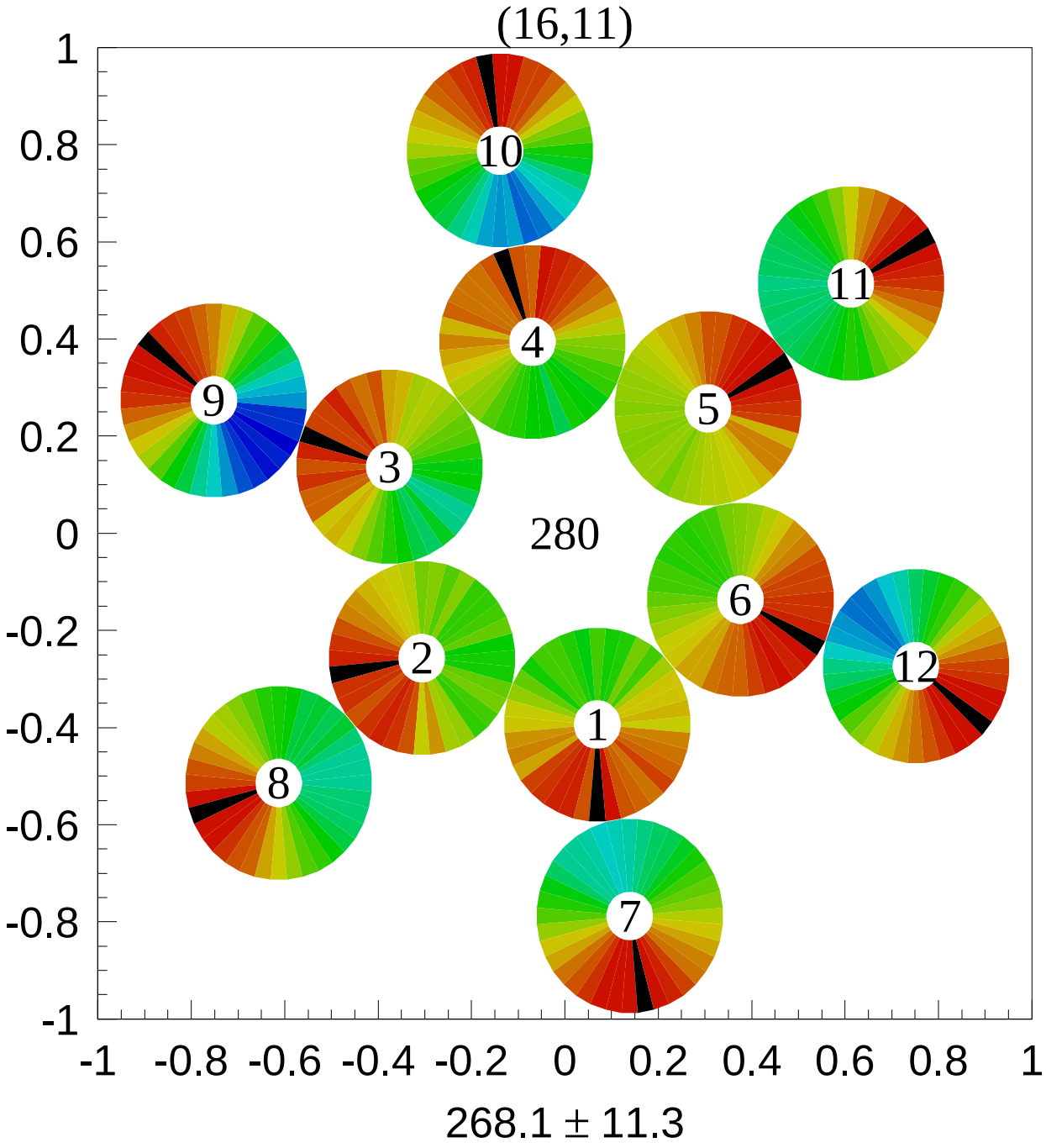

(16,9)
tilted LEDs
116 119 121 124 121 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 119 124 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

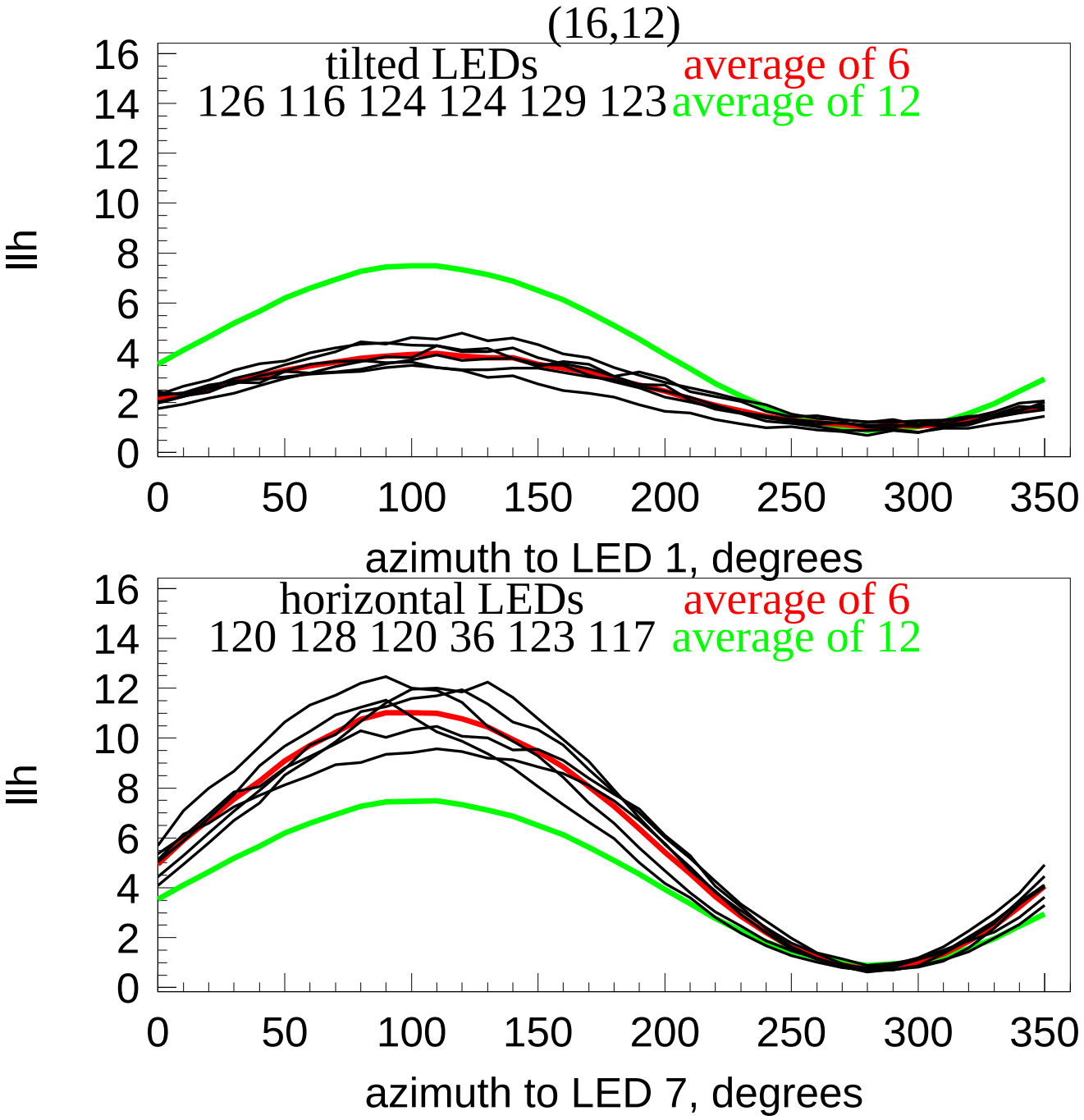

(16,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
64.4 ± 10.9

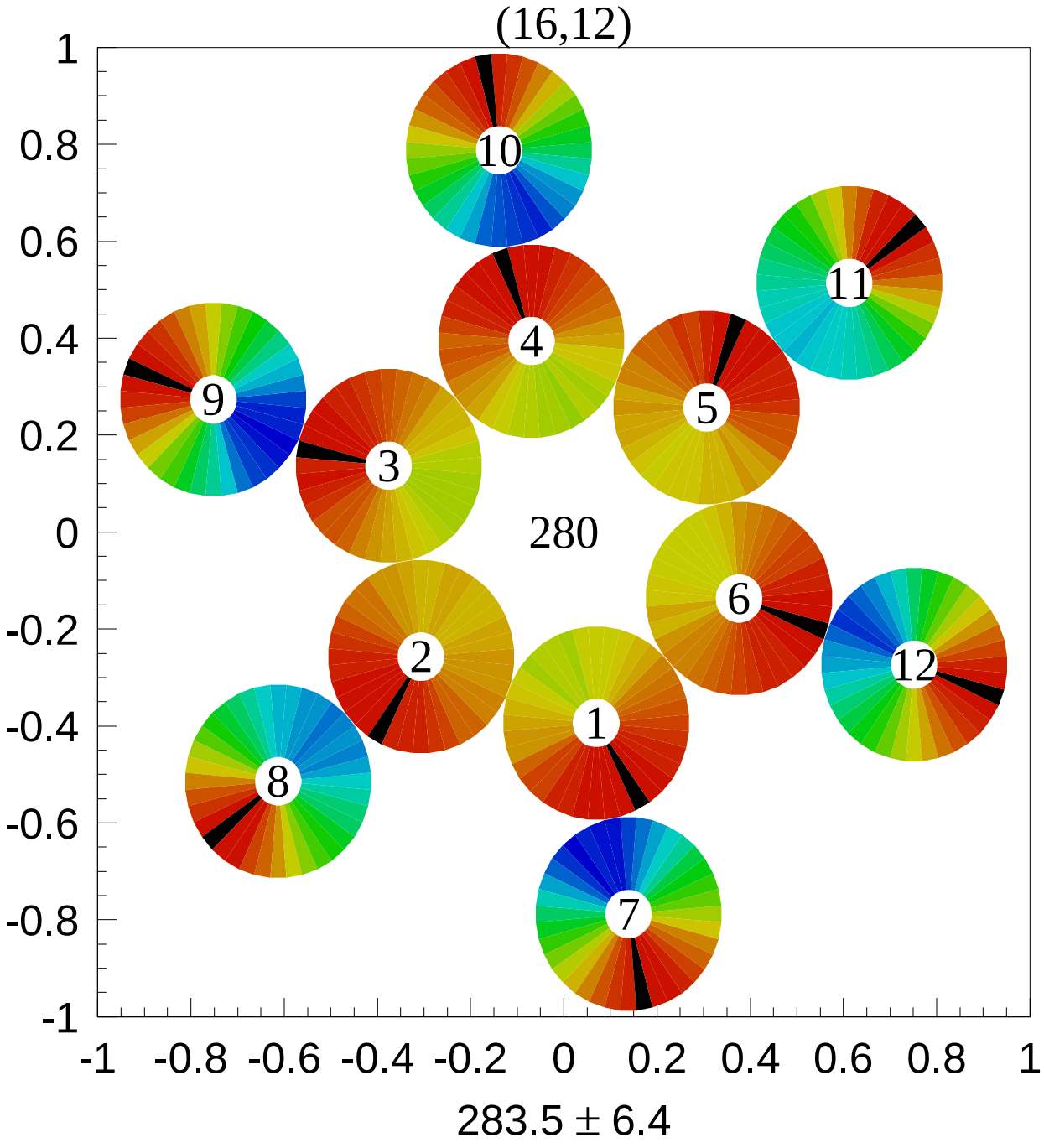

(16,10)
tilted LEDs
119 125 123 121 115 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
108 118 118 128 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

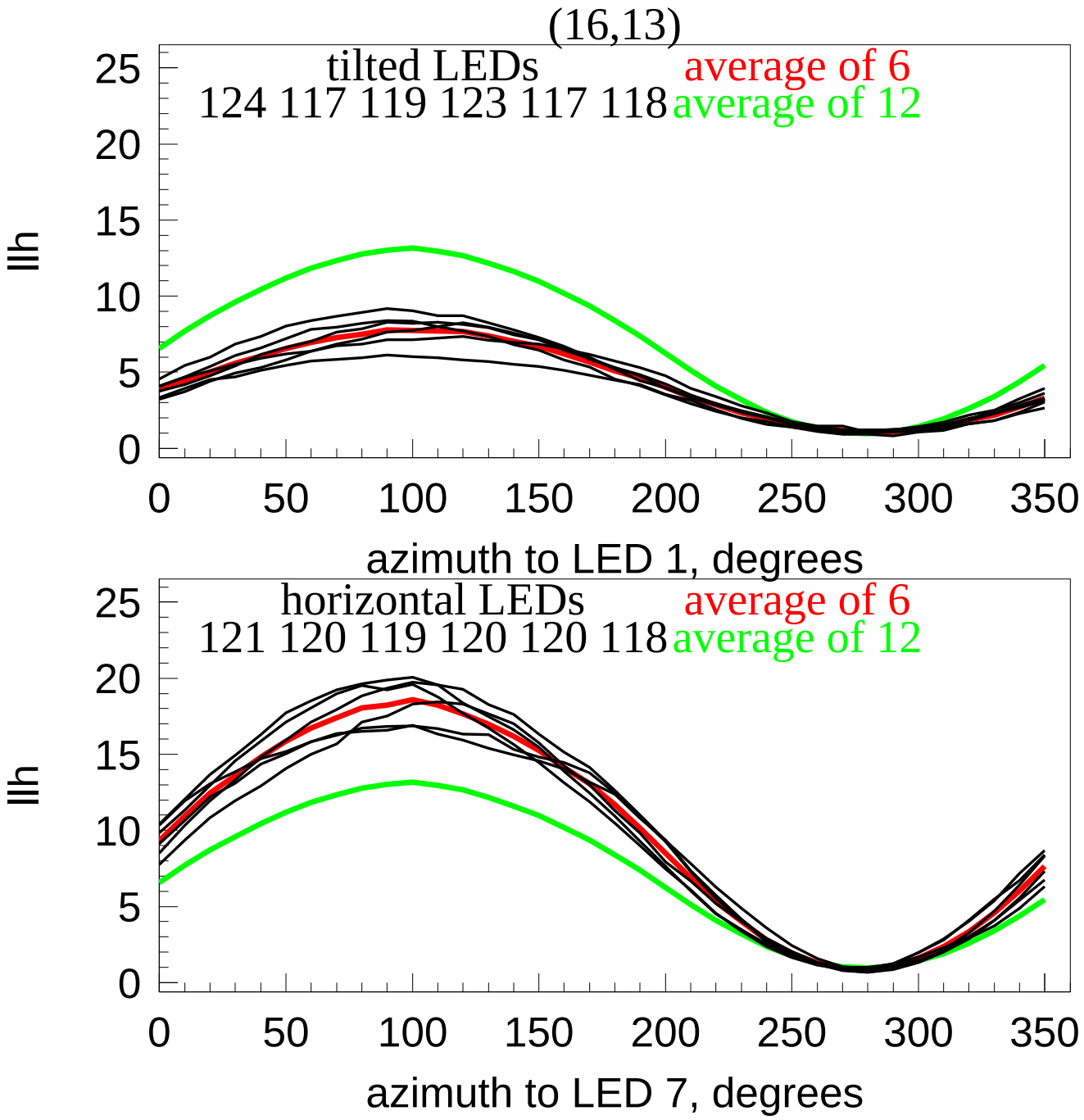

(16,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
298.3 ± 9.9

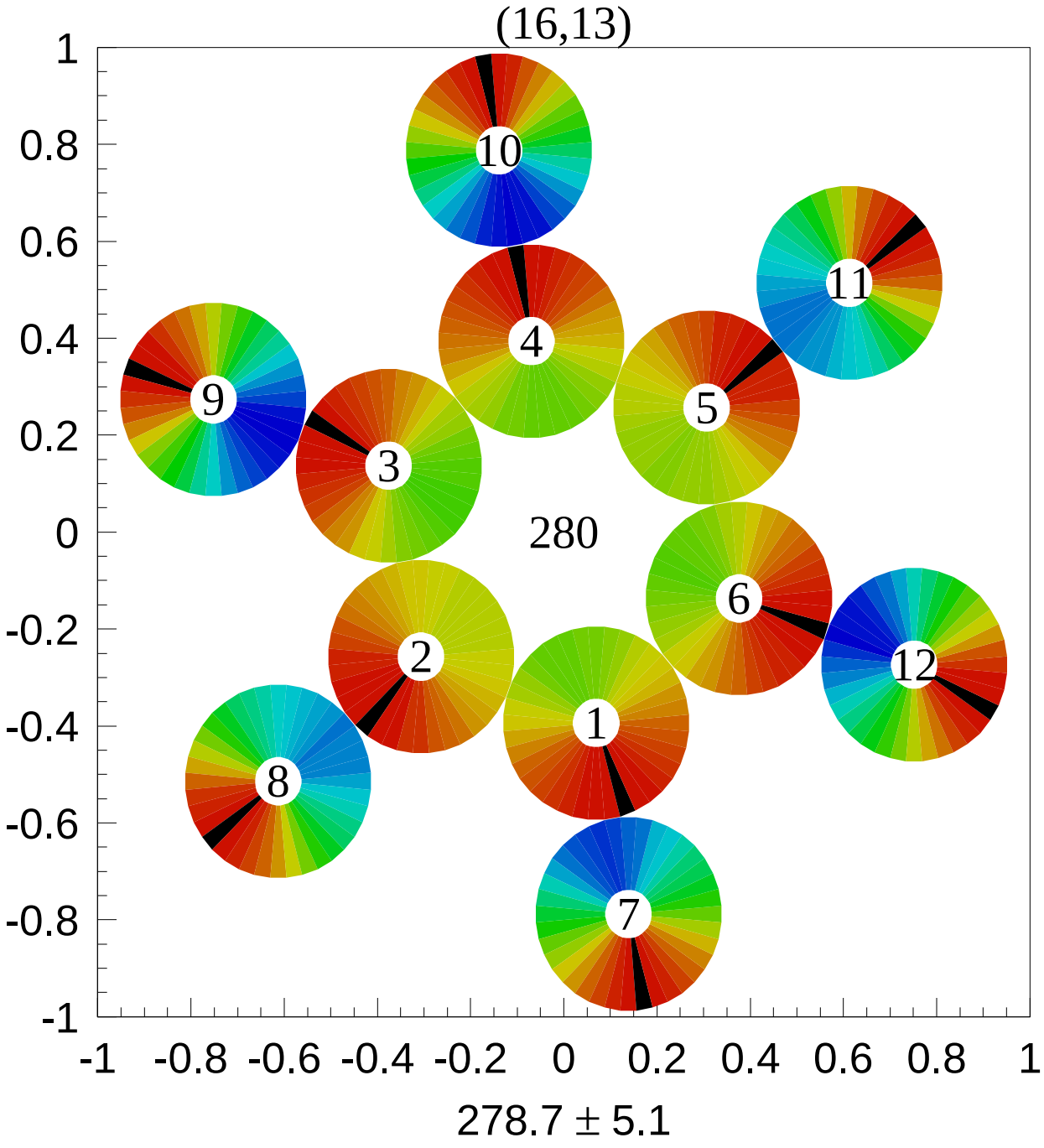

(16,11)
tilted LEDs
118 117 113 124 126 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 122 116 124 112 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

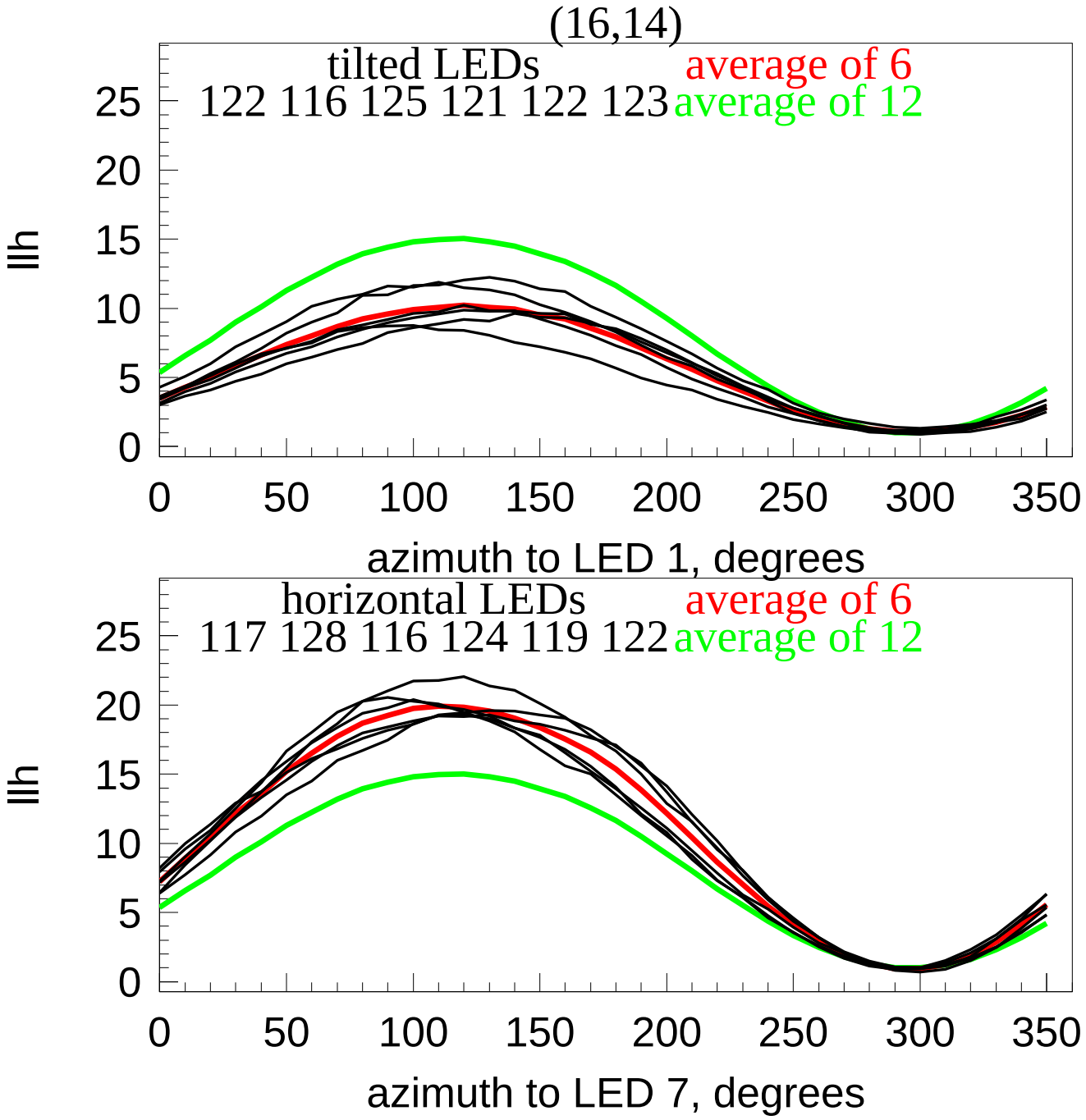

(16,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
268.1 ± 11.3

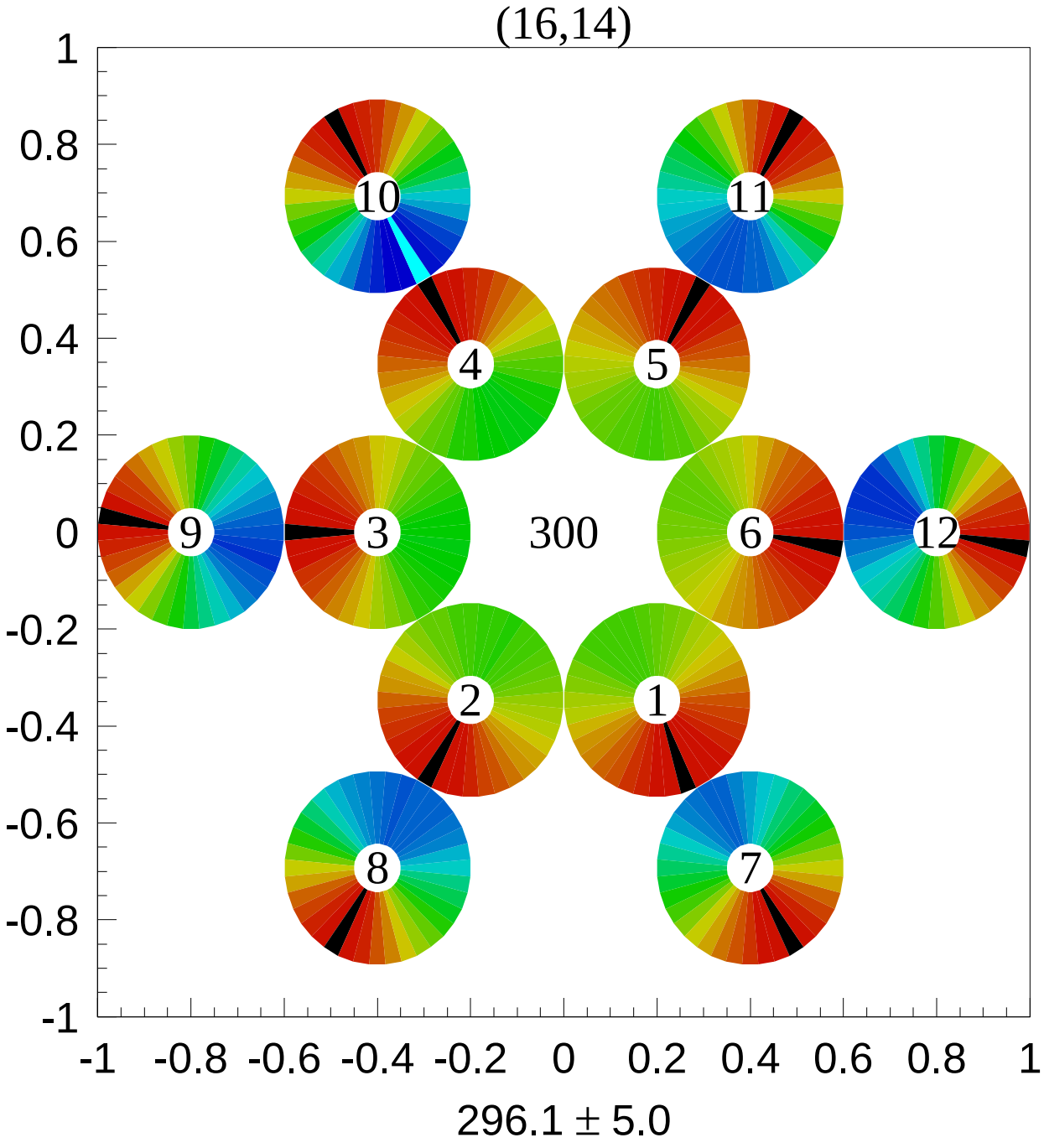

(16,12)
tilted LEDs
126 116 124 124 129 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 128 120 36 123 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

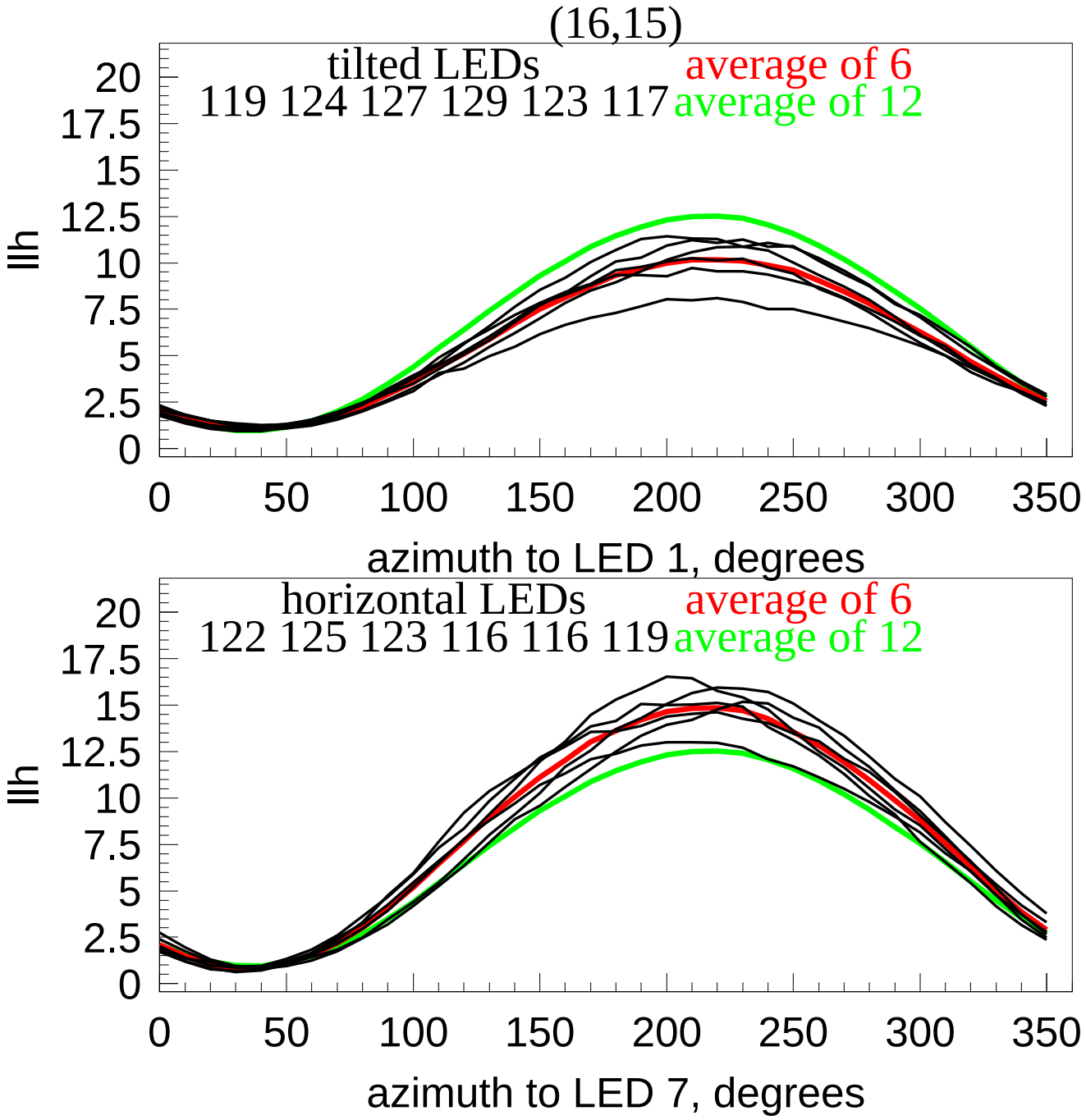

(16,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
283.5 ± 6.4

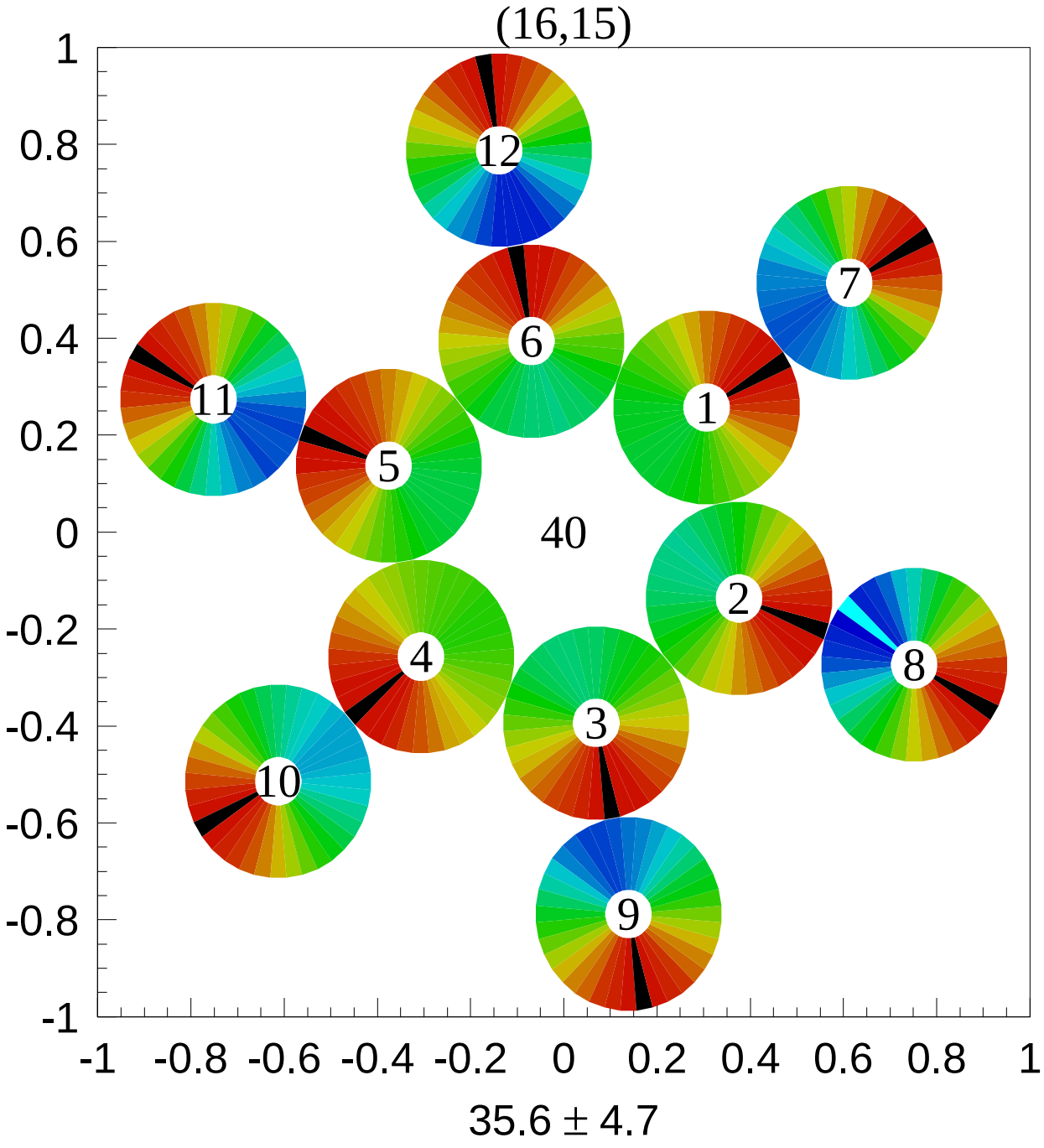

(16,13)
tilted LEDs
124 117 119 123 117 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 119 120 120 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

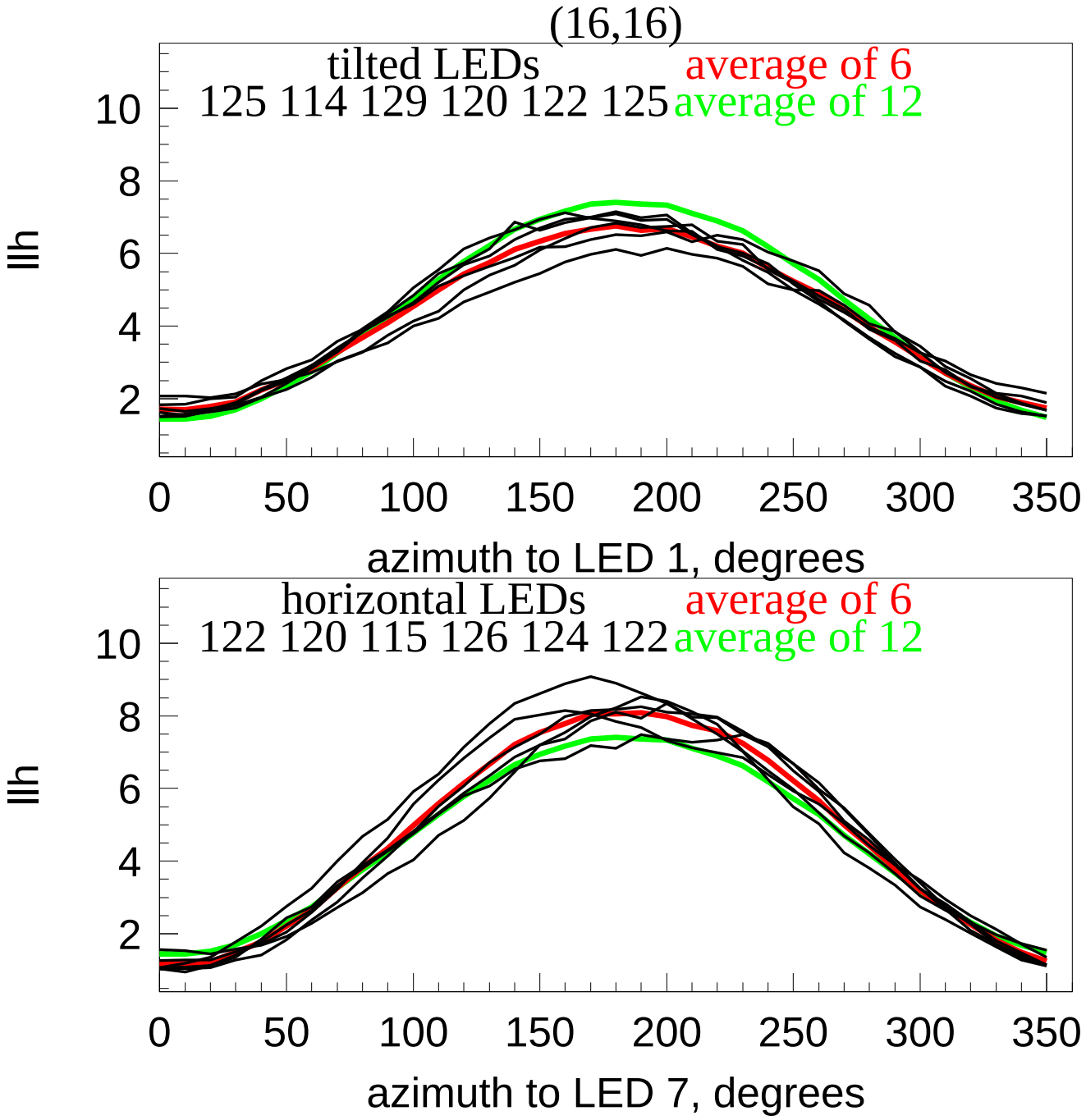

(16,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
278.7 ± 5.1

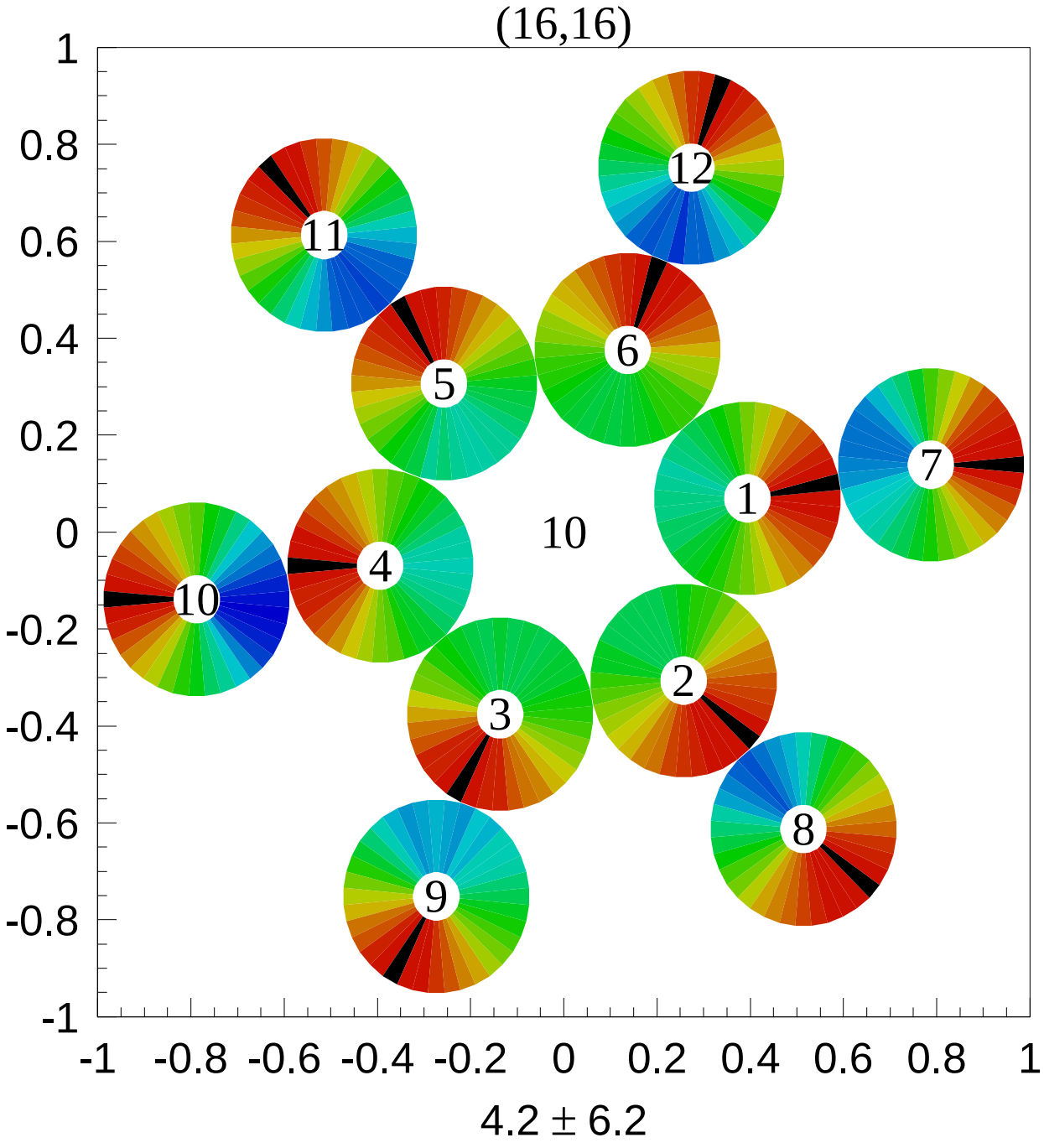

(16,14)
tilted LEDs
122 116 125 121 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 128 116 124 119 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

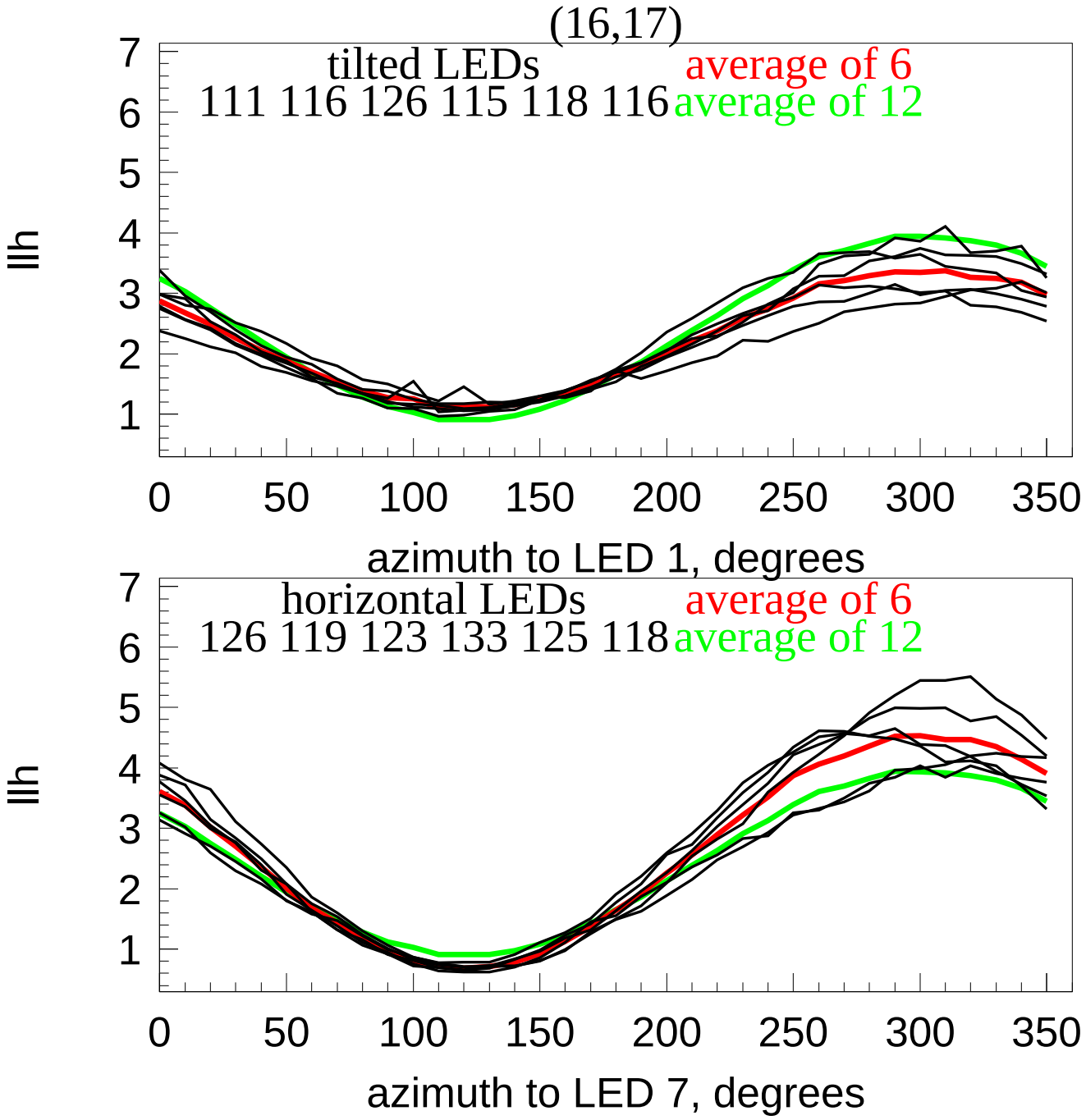

(16,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
296.1 ± 5.0

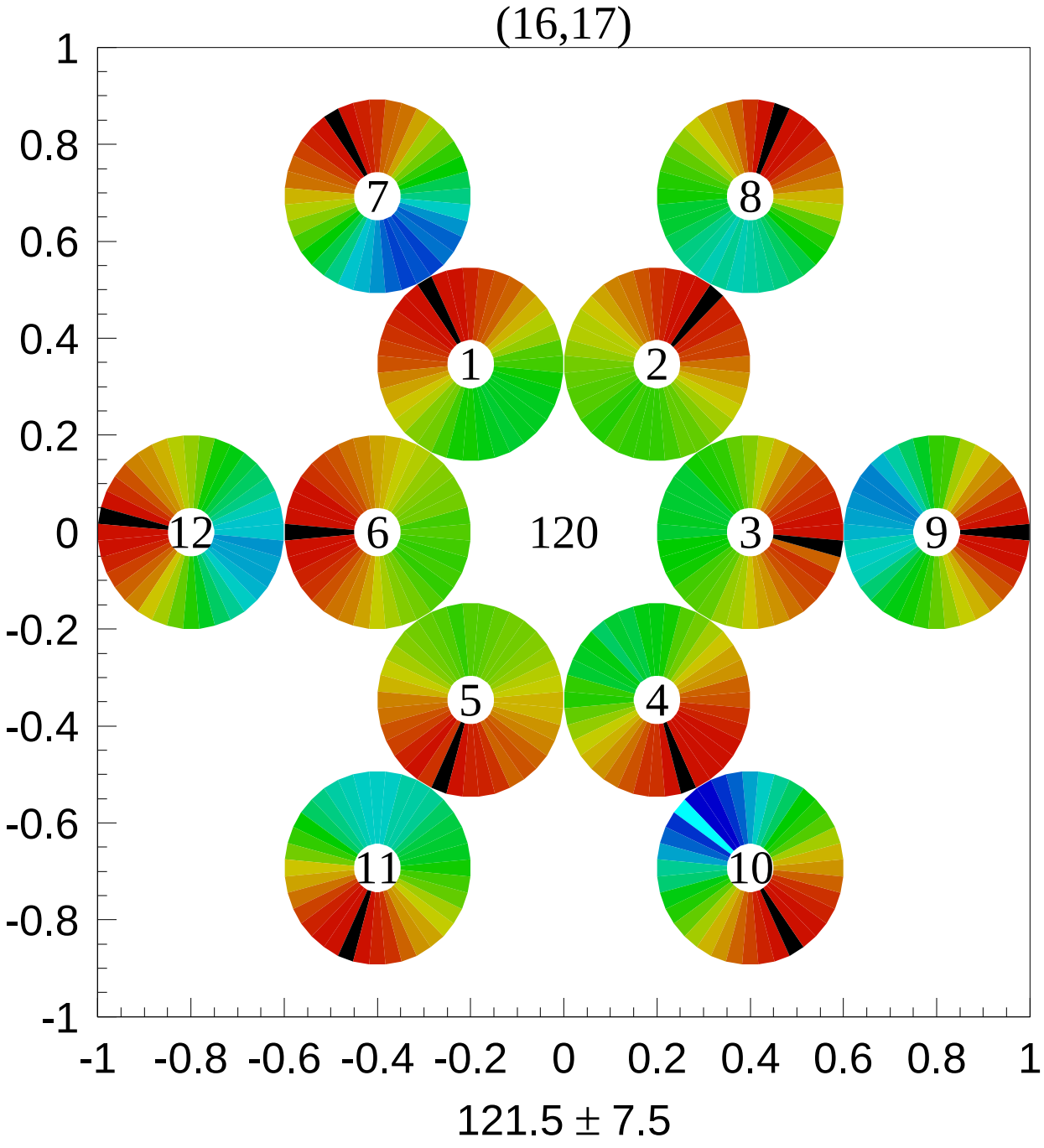

(16,15)
tilted LEDs
119 124 127 129 123 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 123 116 116 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

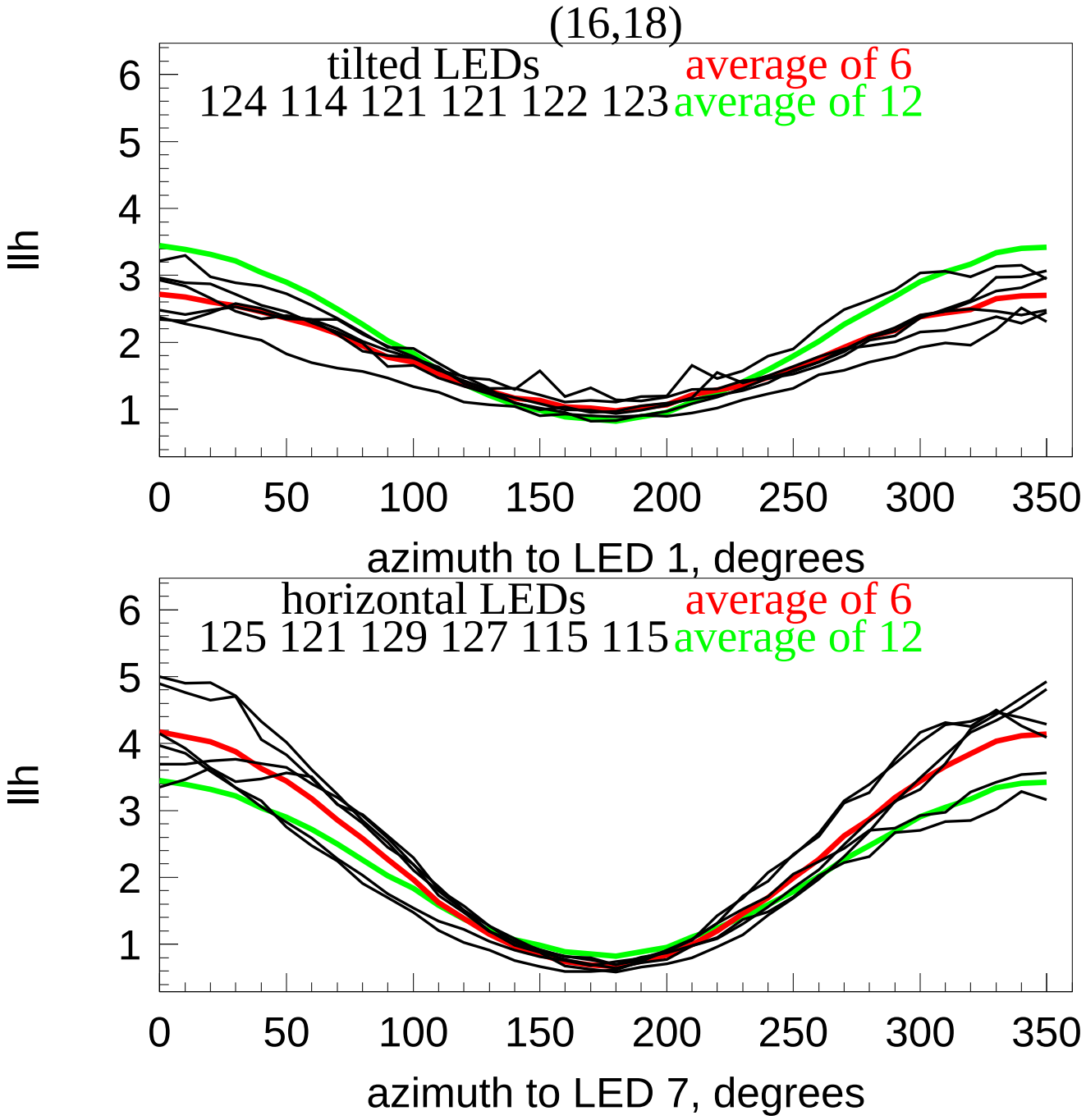

(16,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
35.6 ± 4.7

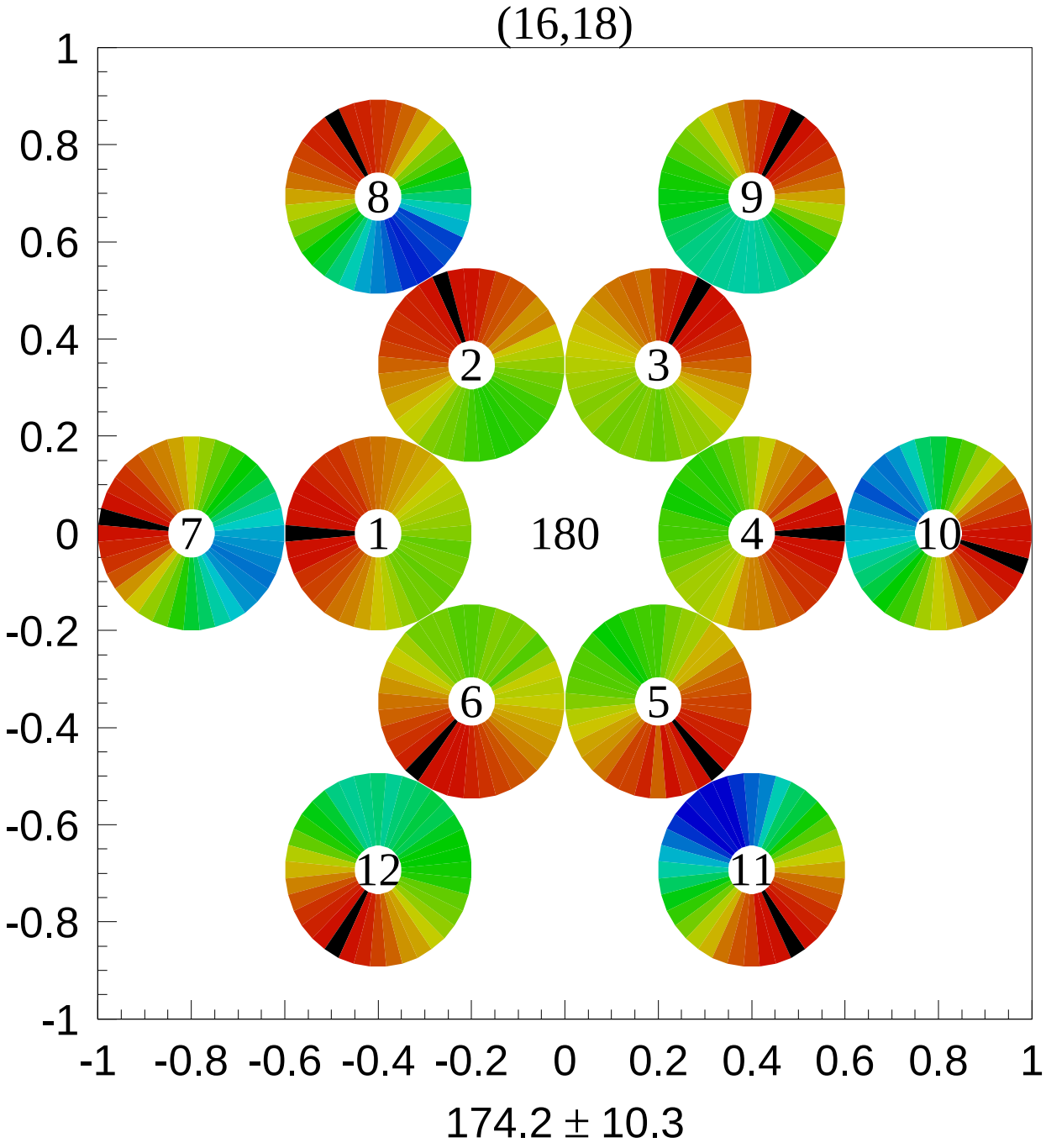

(16,16)
tilted LEDs
125 114 129 120 122 125
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 120 115 126 124 122
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

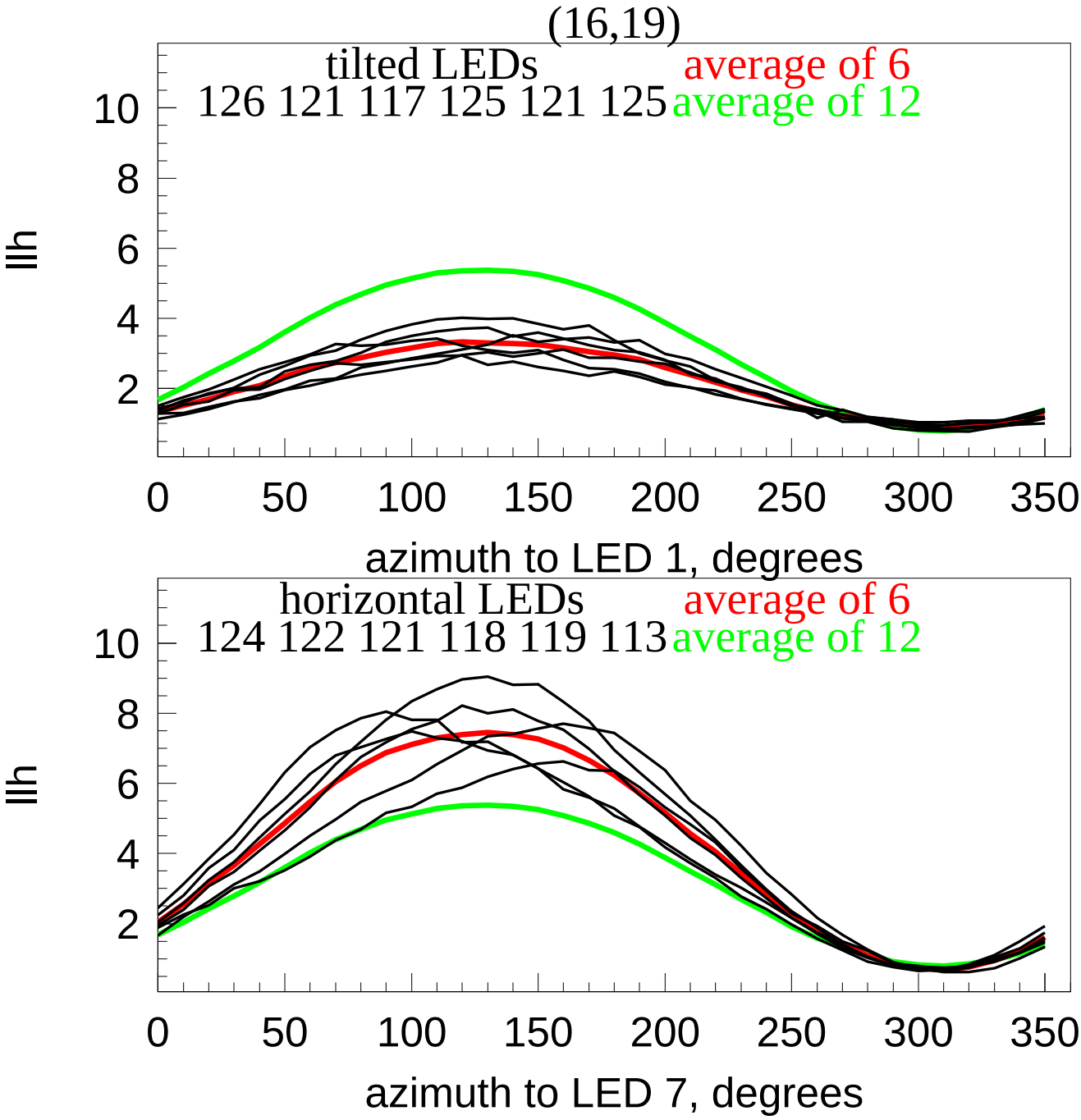

(16,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
4.2 ± 6.2
12
11
6
5
7
1
10
4
10
2
3
8
9

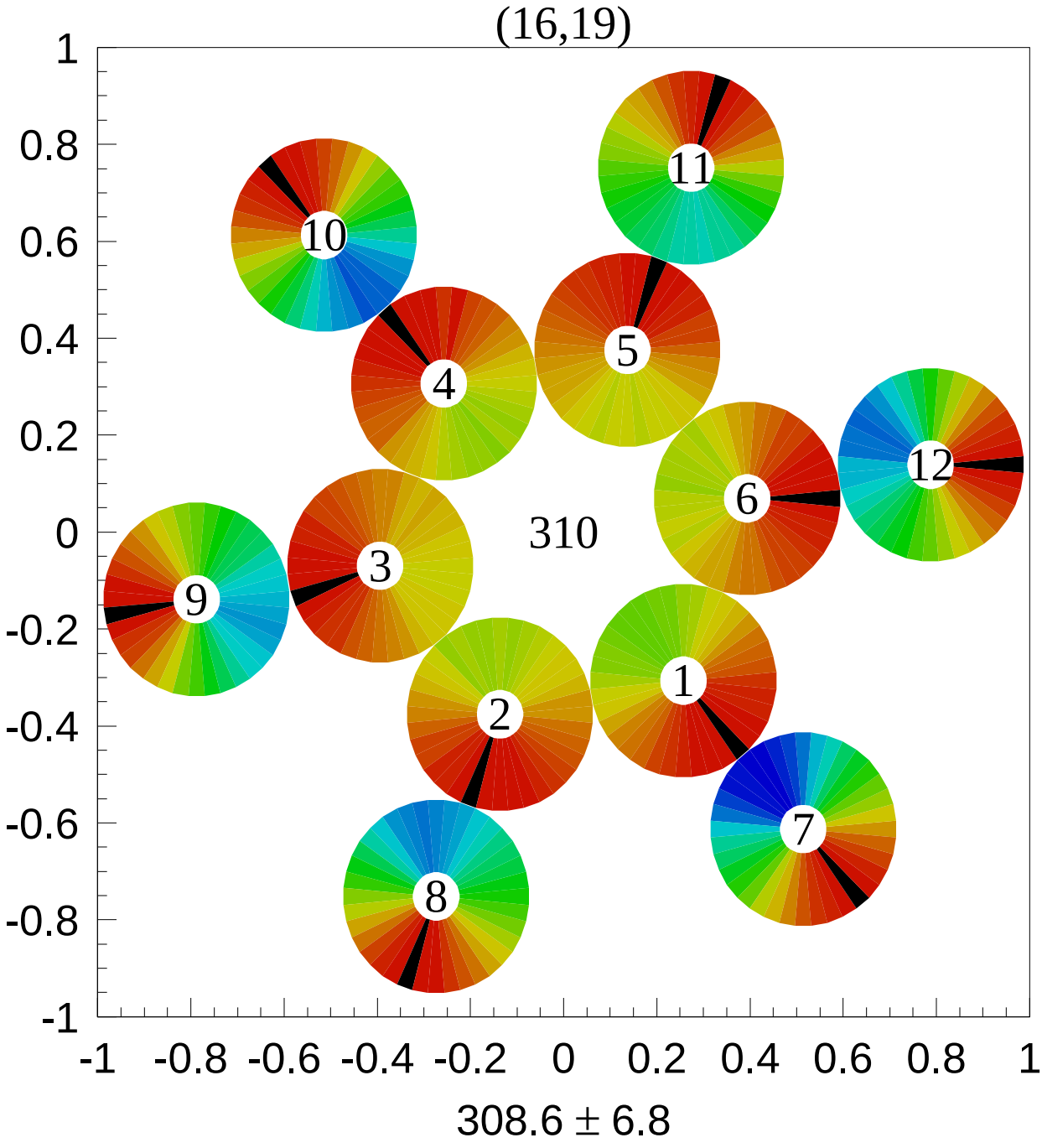

(16,17)
tilted LEDs
111 116 126 115 118 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 123 133 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

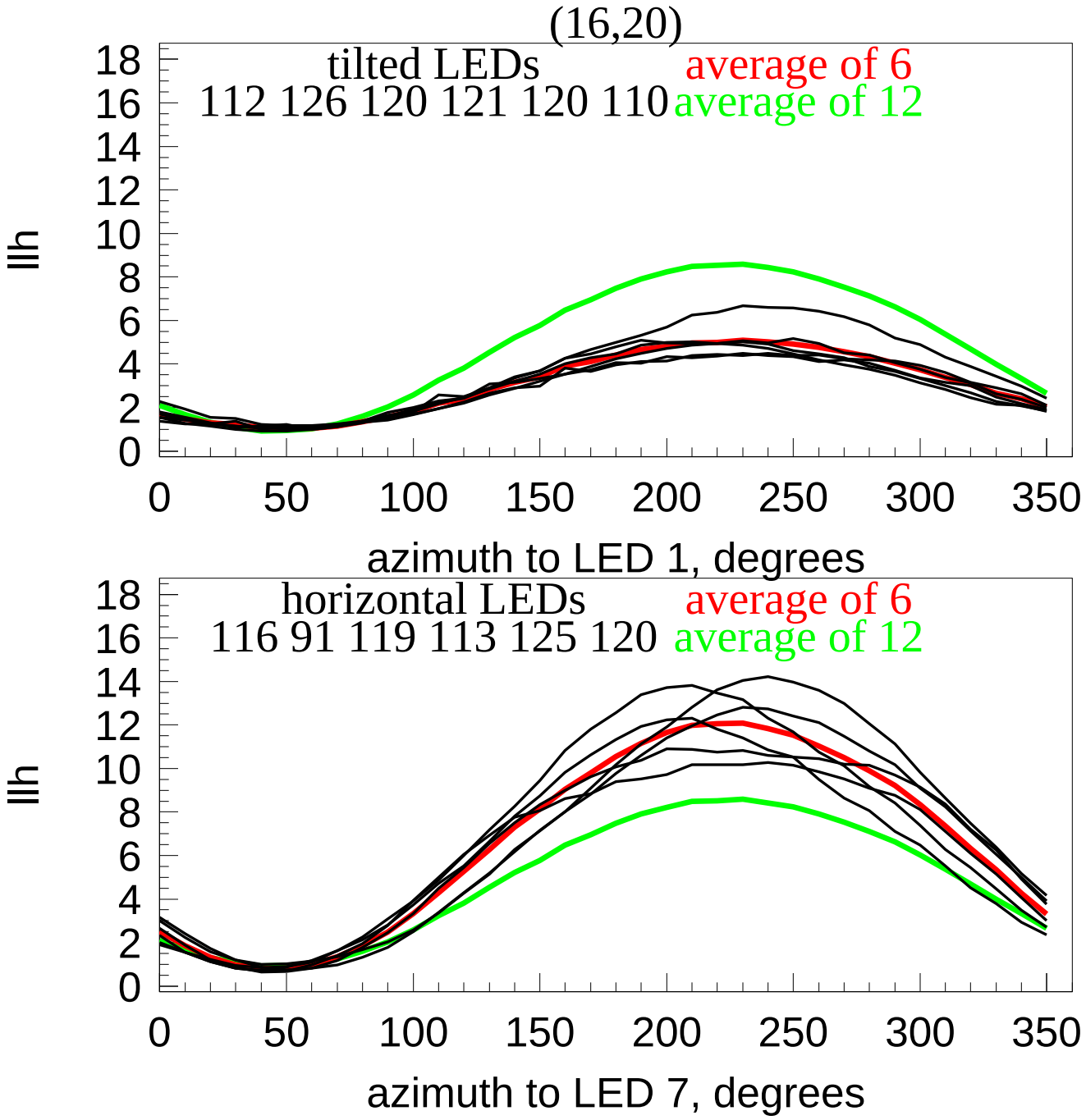

(16,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
121.5 ± 7.5

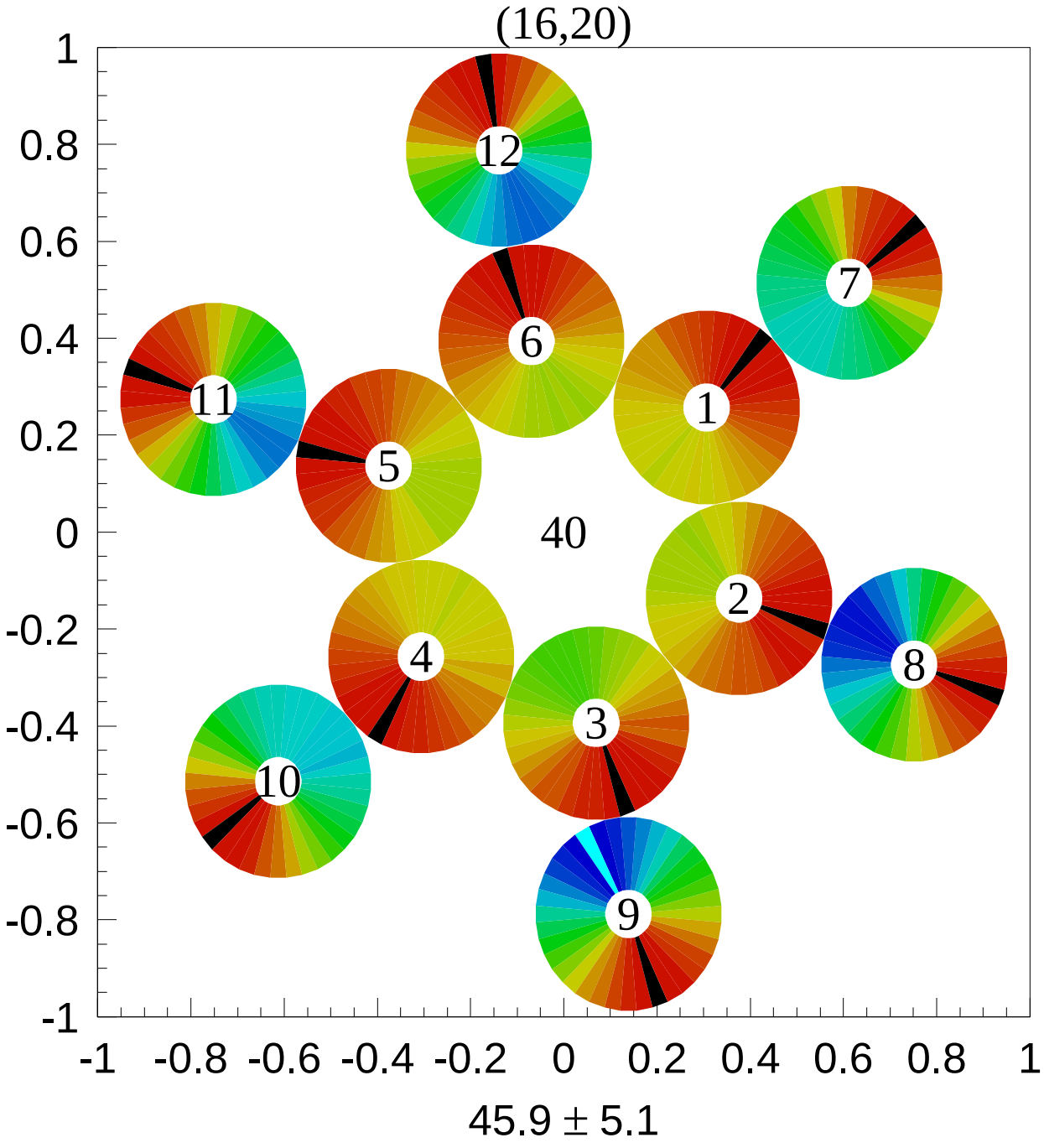

(16,18)
tilted LEDs
124 114 121 121 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 129 127 115 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

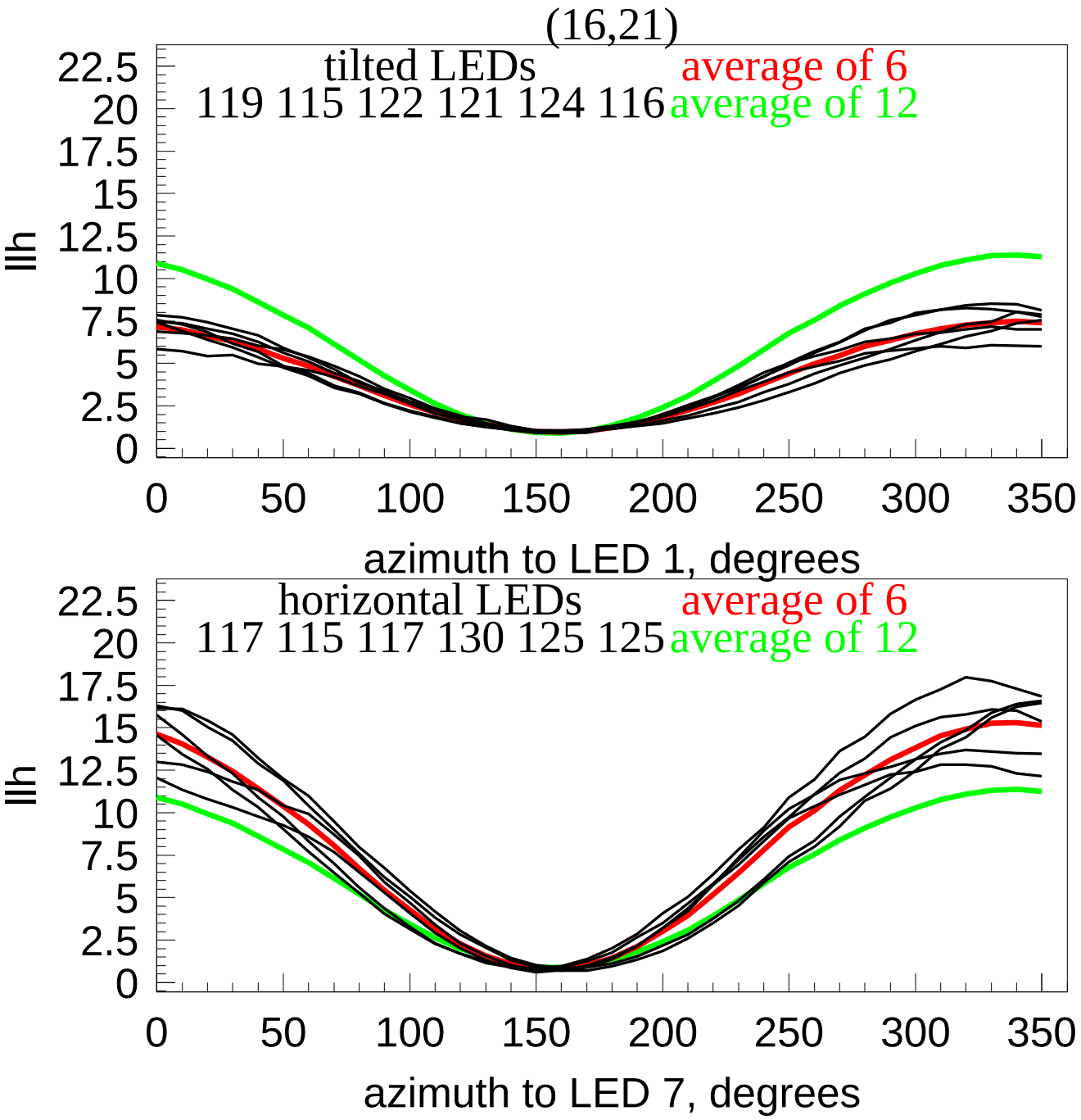

(16,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
174.2 ± 10.3

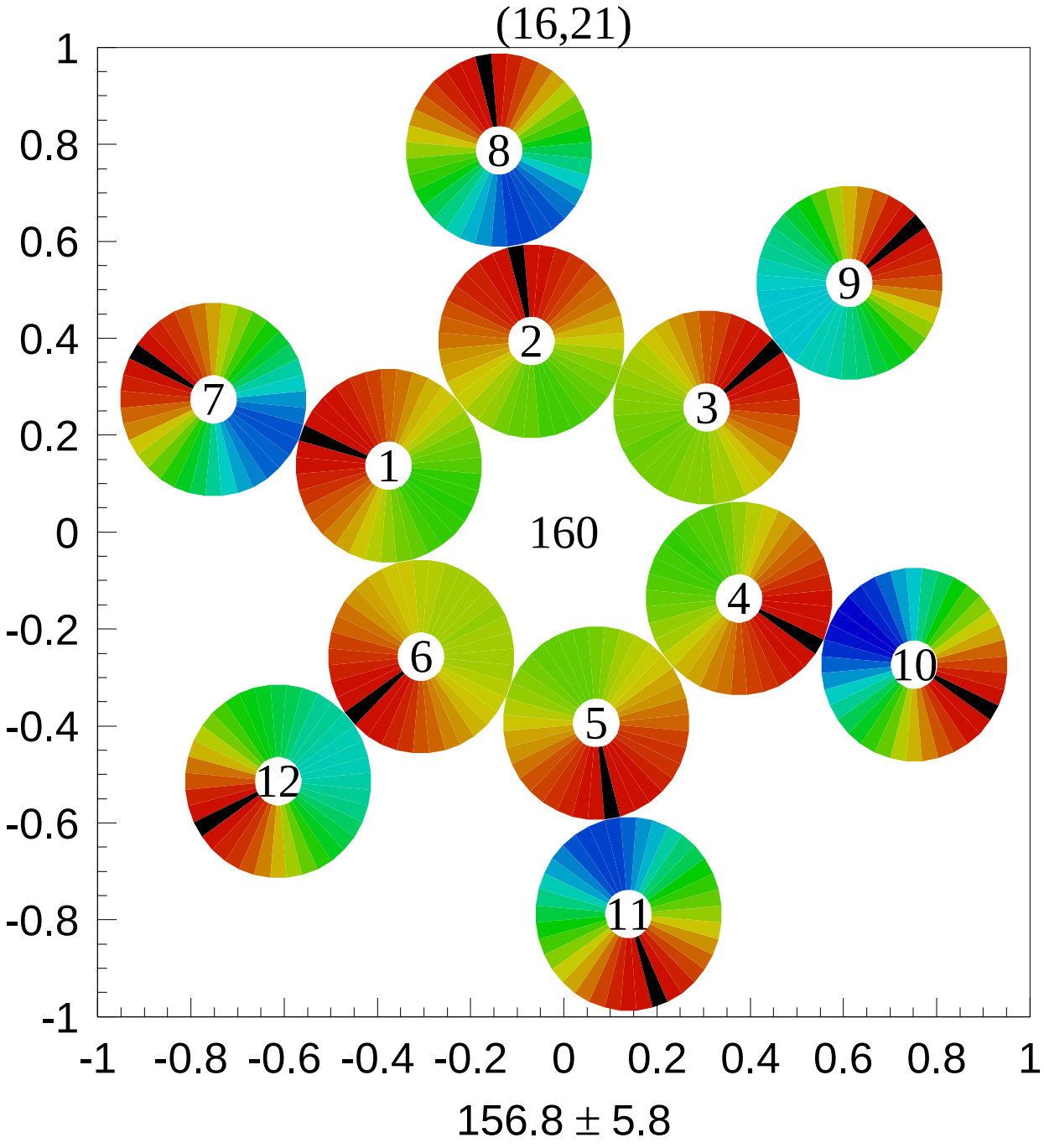

(16,19)
tilted LEDs
126 121 117 125 121 125
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 122 121 118 119 113
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

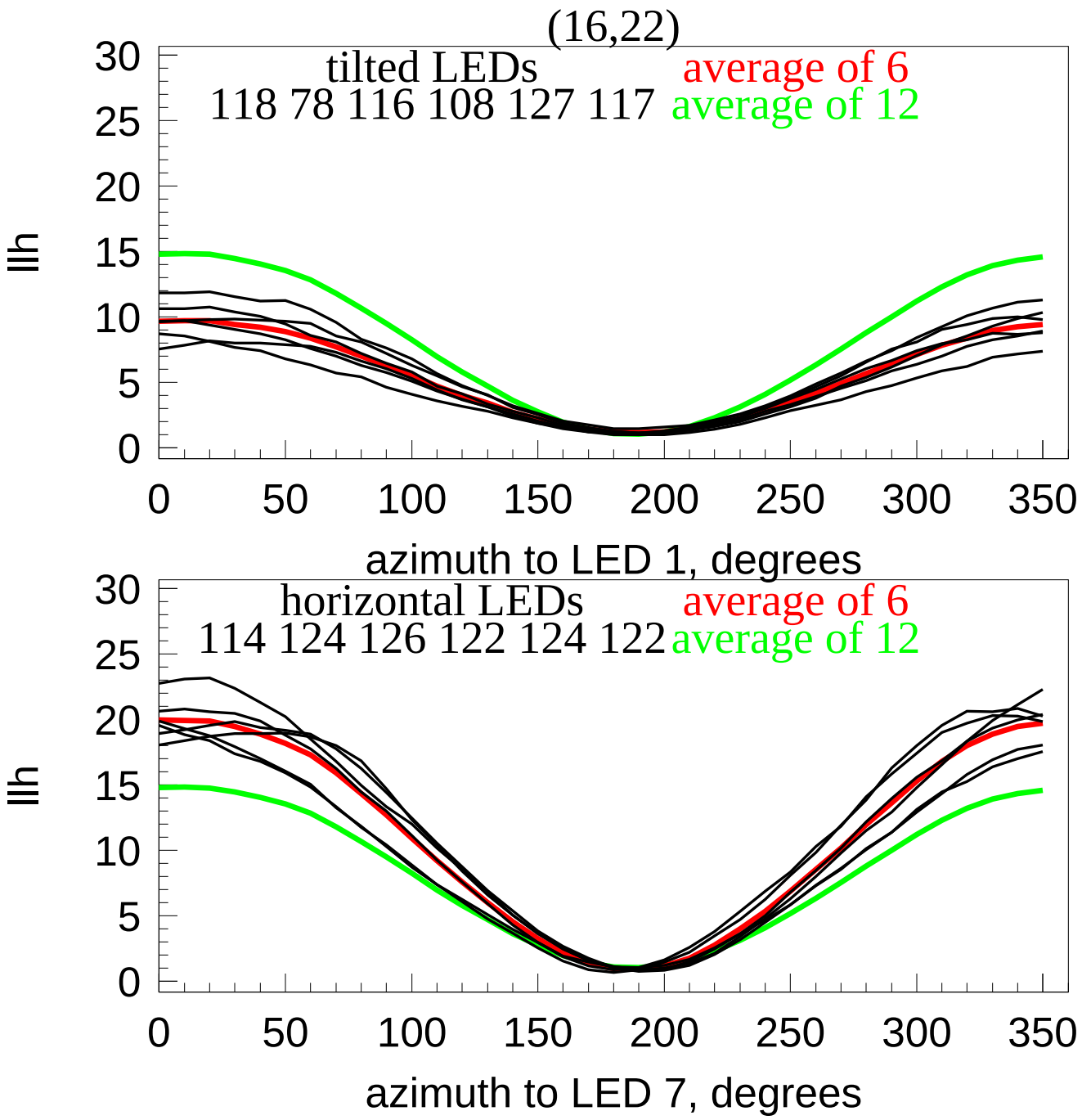

(16,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
308.6 ± 6.8

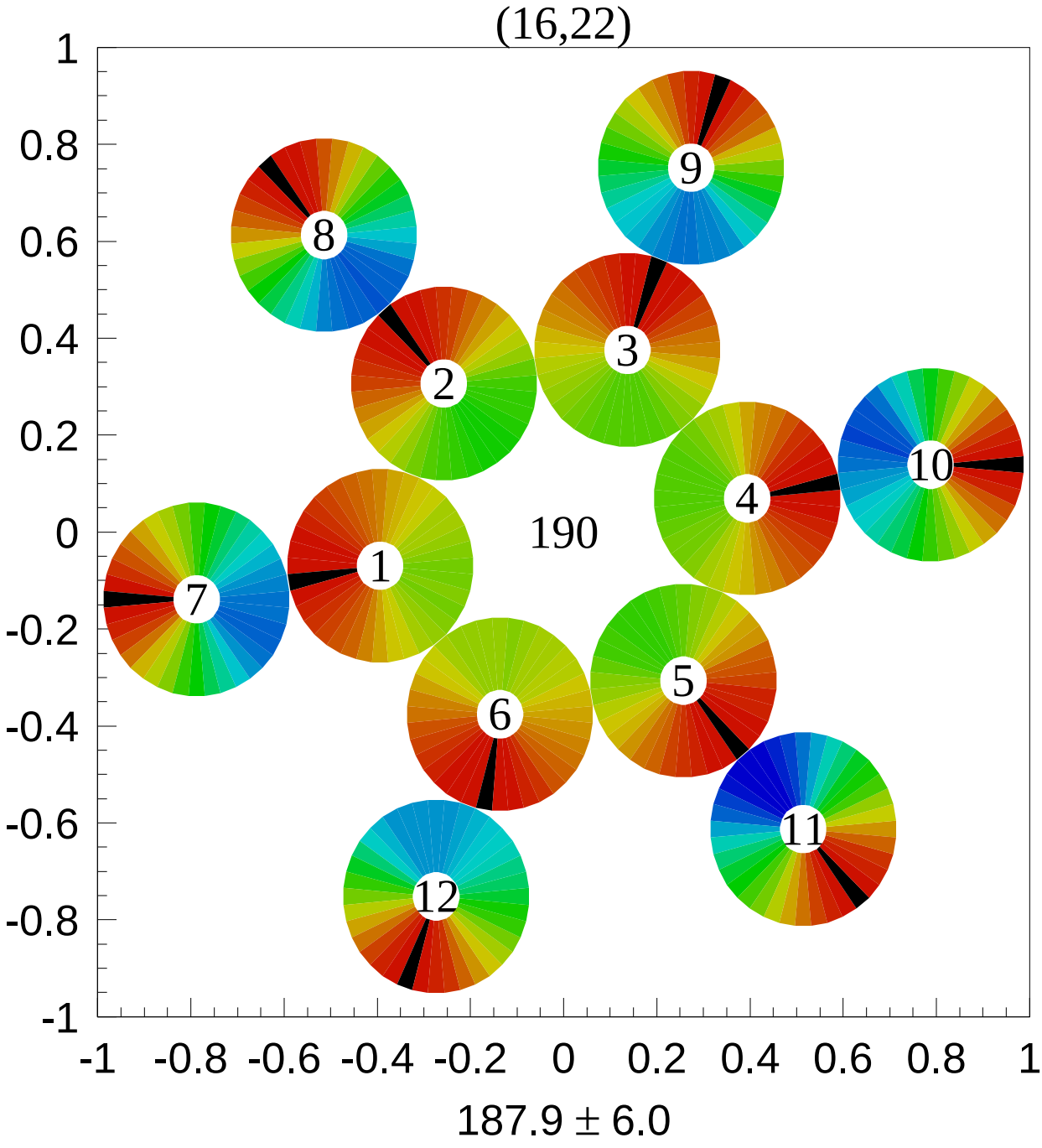

(16,20)
tilted LEDs
112 126 120 121 120 110
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 91 119 113 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

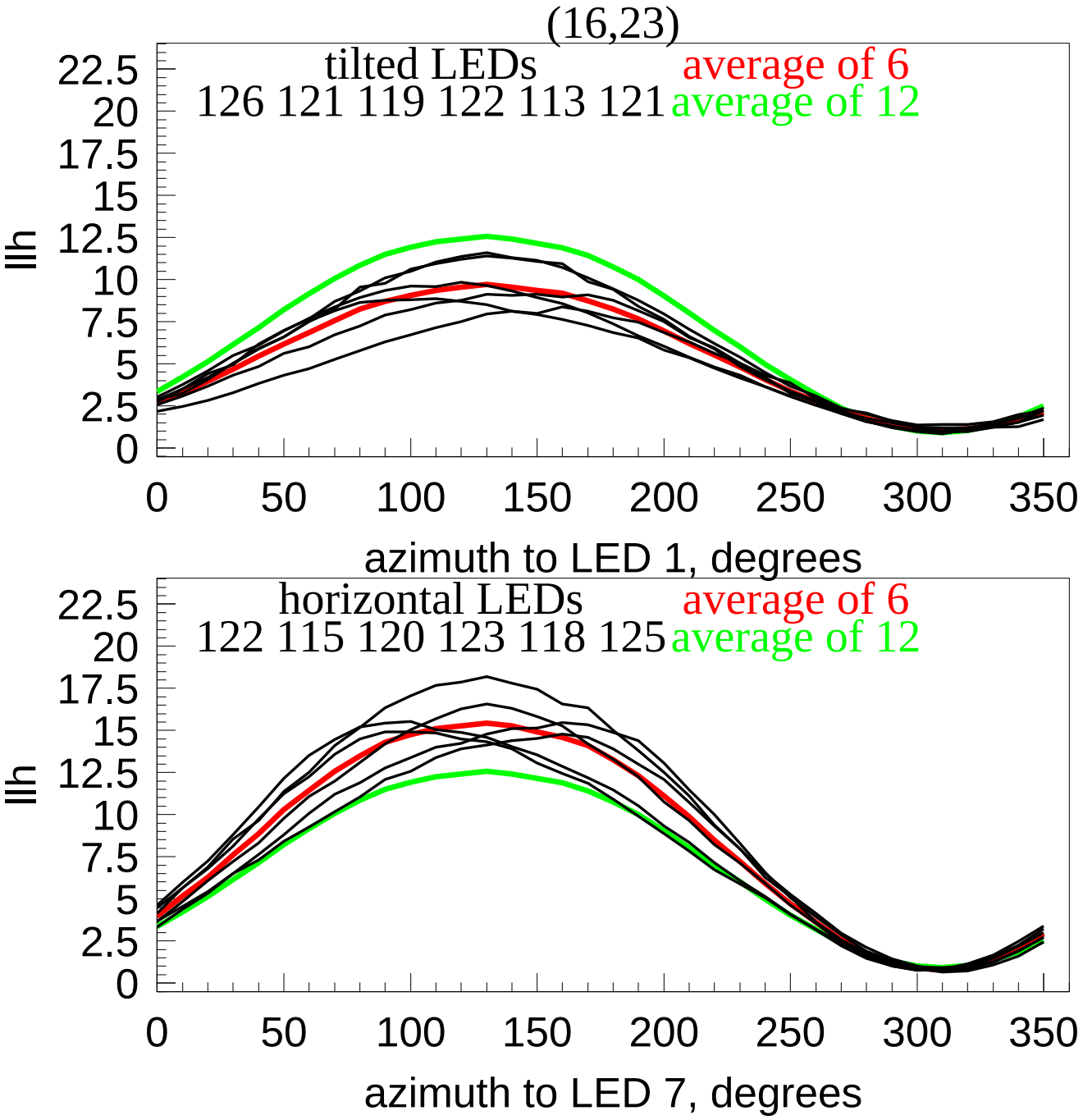

(16,20)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
45.9 ± 5.1

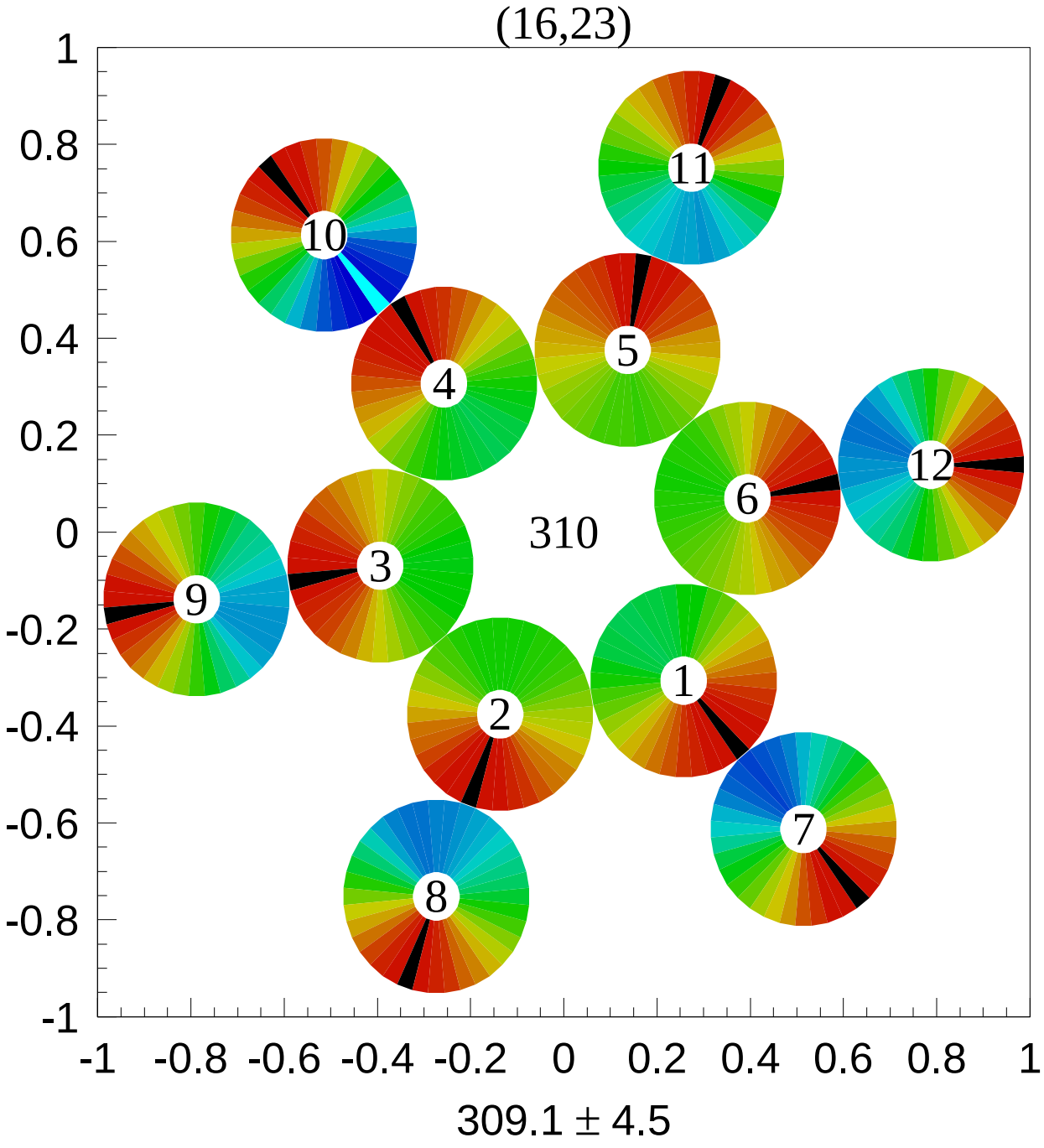

(16,21)
tilted LEDs
119 115 122 121 124 116
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 115 117 130 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

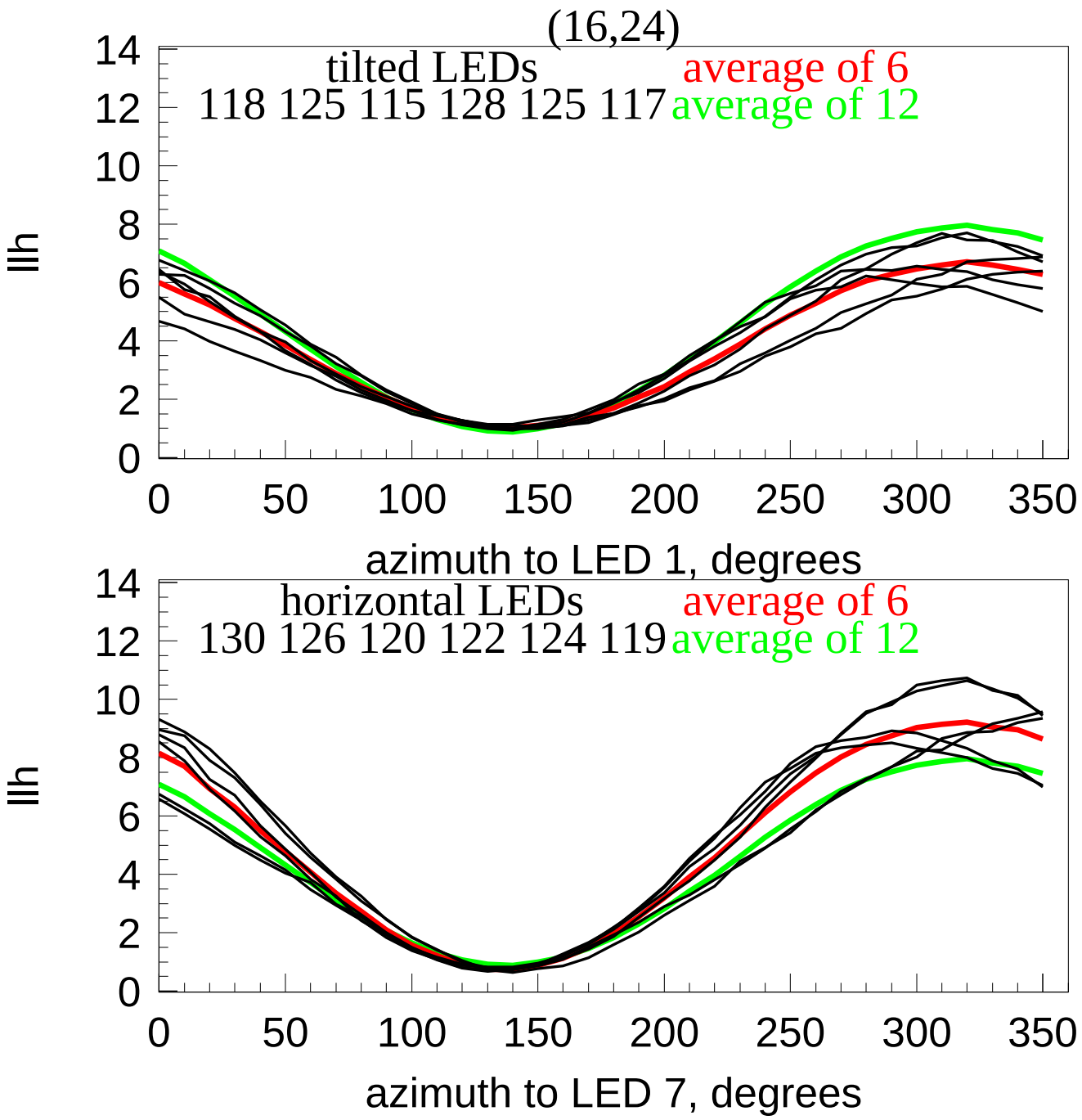

(16,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
156.8 ± 5.8

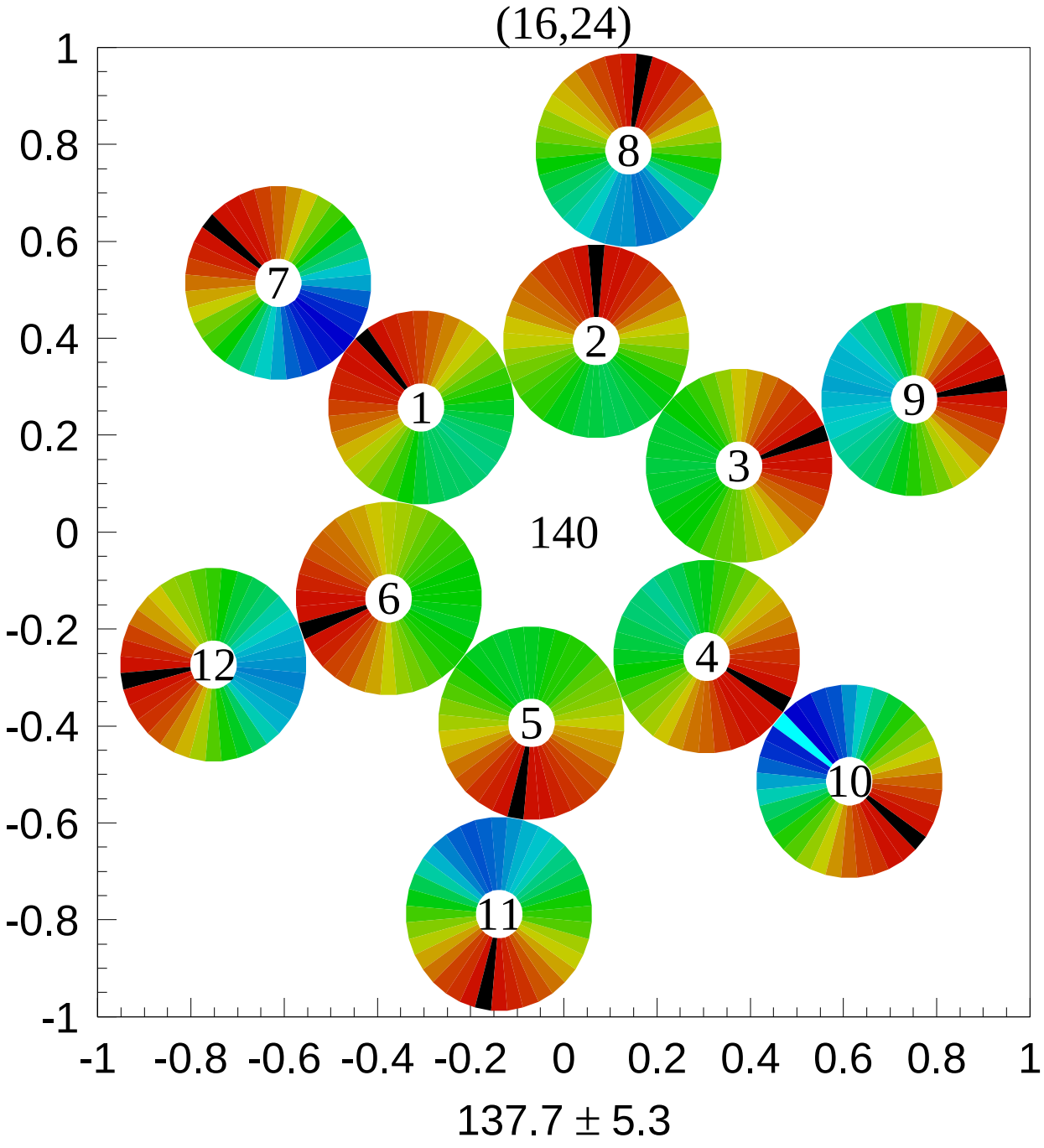

(16,22)
tilted LEDs
118 78 116 108 127 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 124 126 122 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

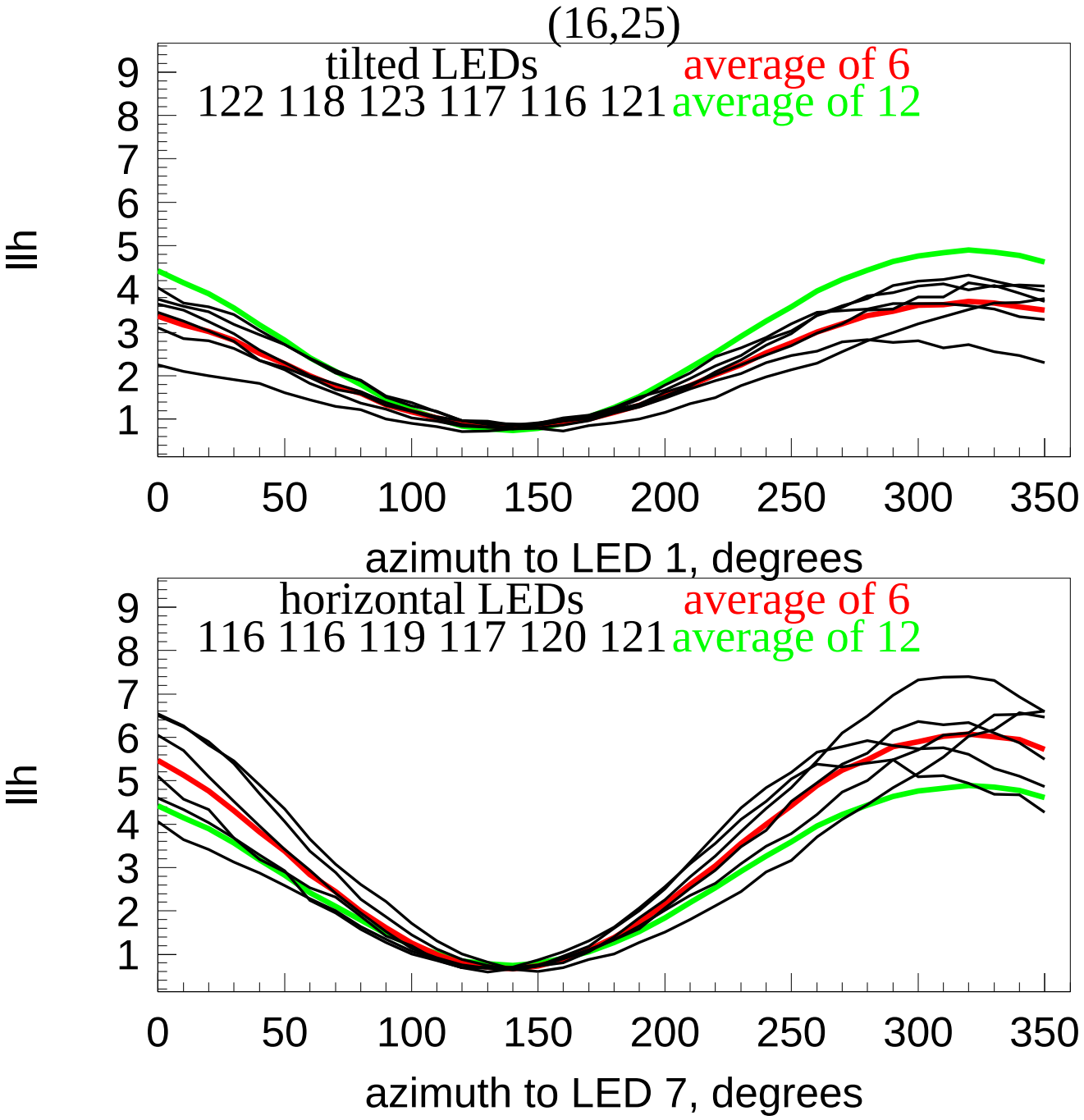

(16,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
187.9 ± 6.0

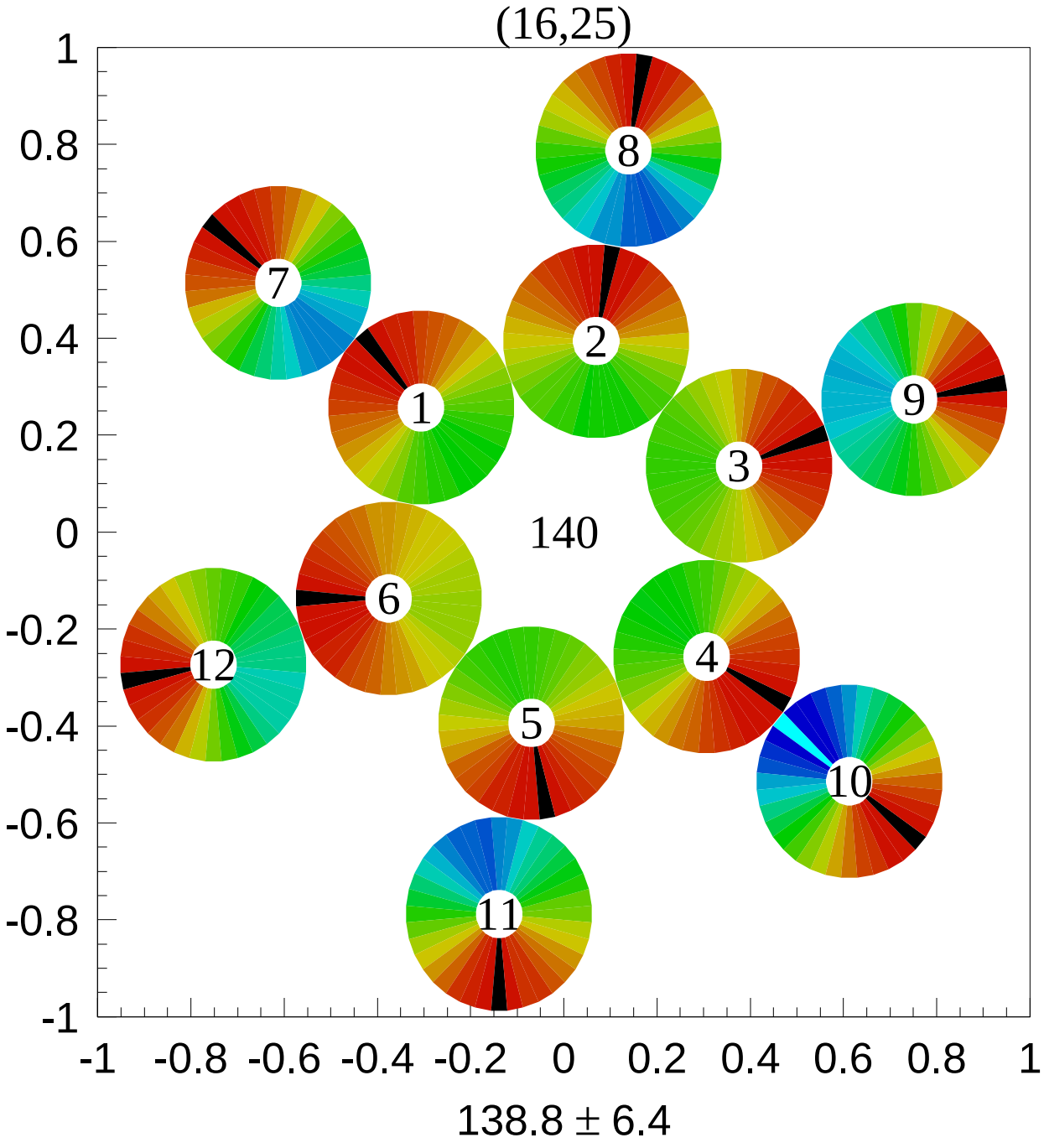

(16,23)
tilted LEDs
126 121 119 122 113 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 115 120 123 118 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

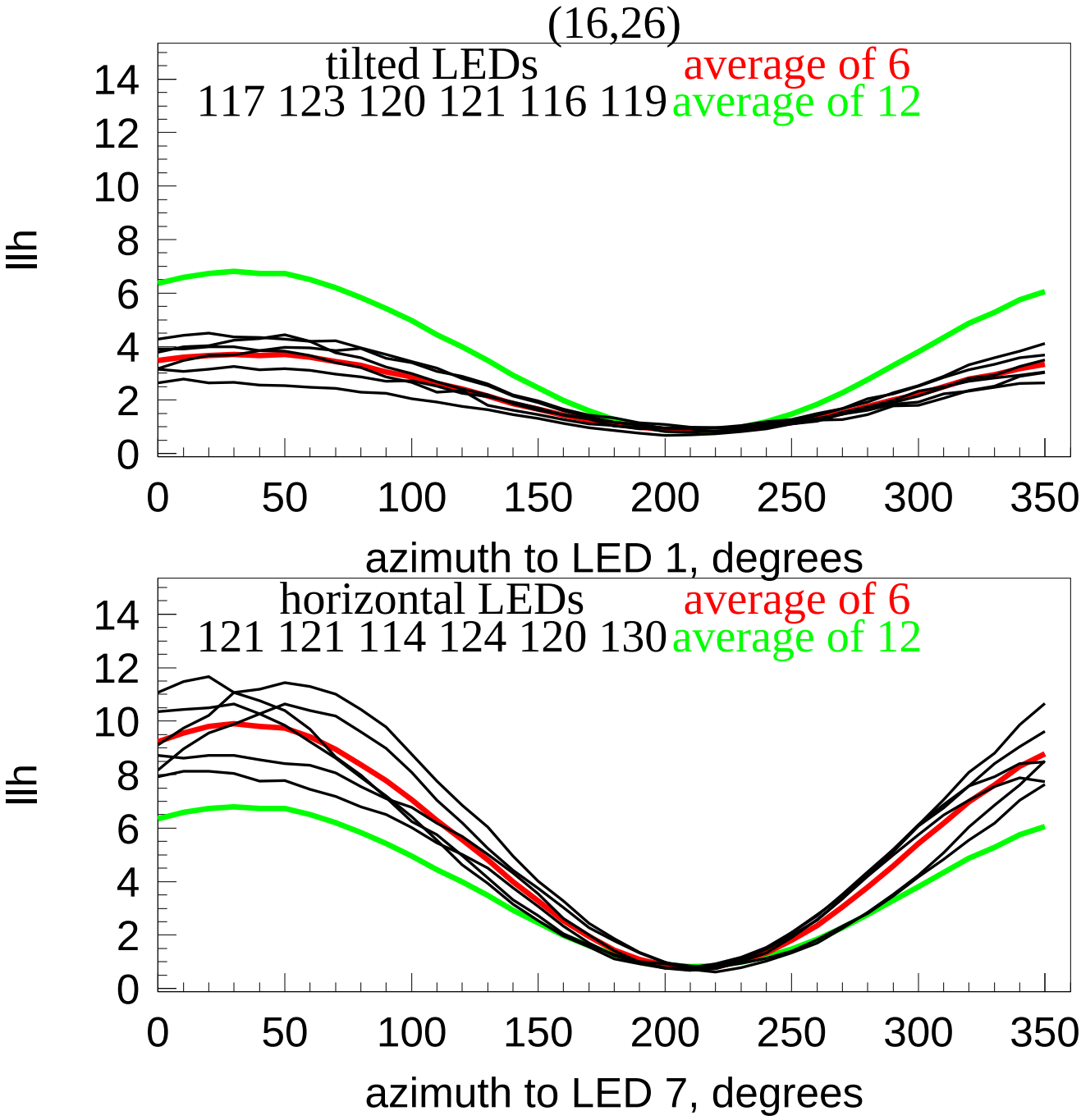

(16,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
1
2
7
8
309.1 ± 4.5

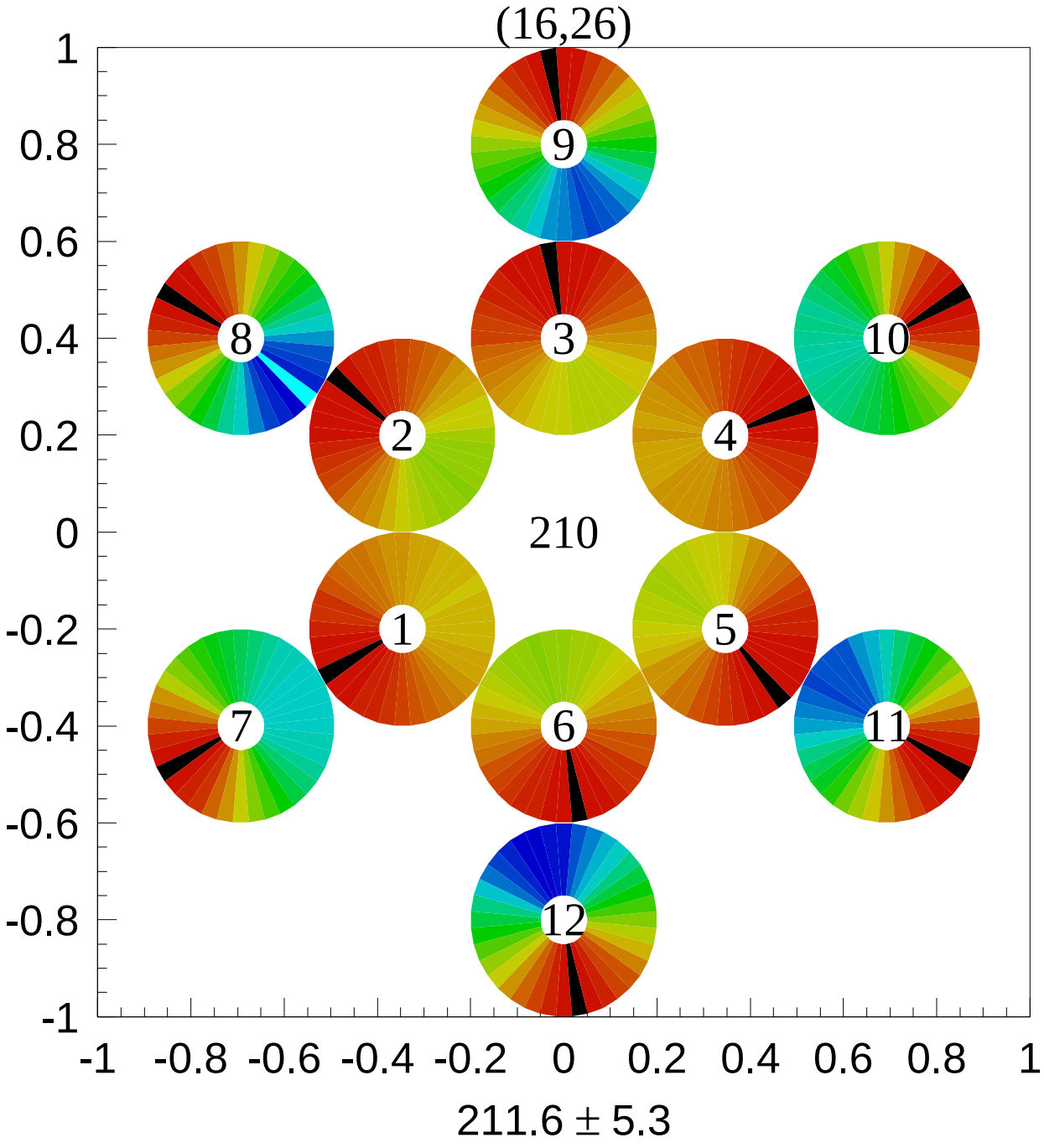

(16,24)
tilted LEDs
118 125 115 128 125 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 126 120 122 124 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

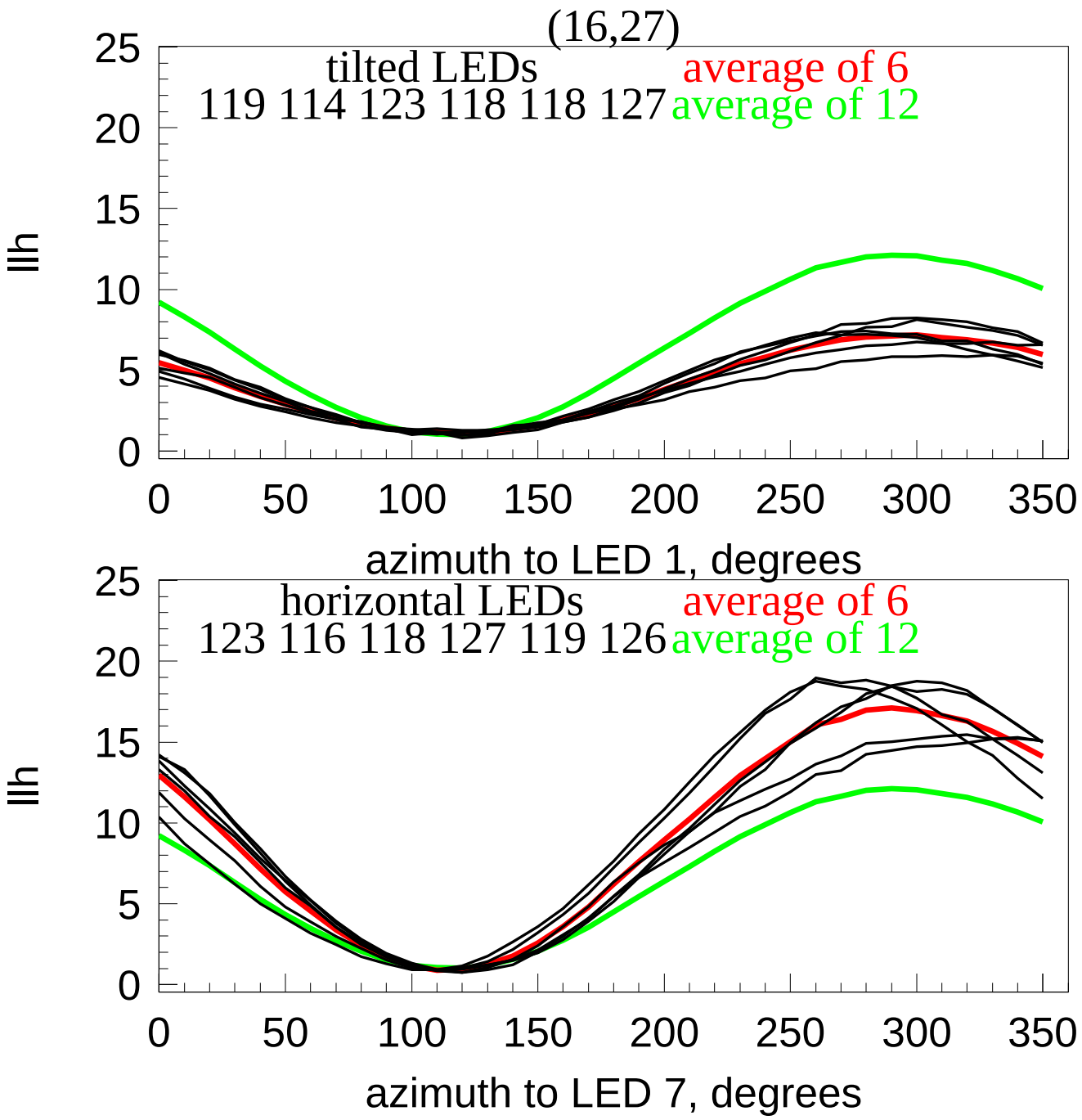

(16,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
137.7 ± 5.3
140
1
2
3
4
5
6
7
8
9
10
11
12

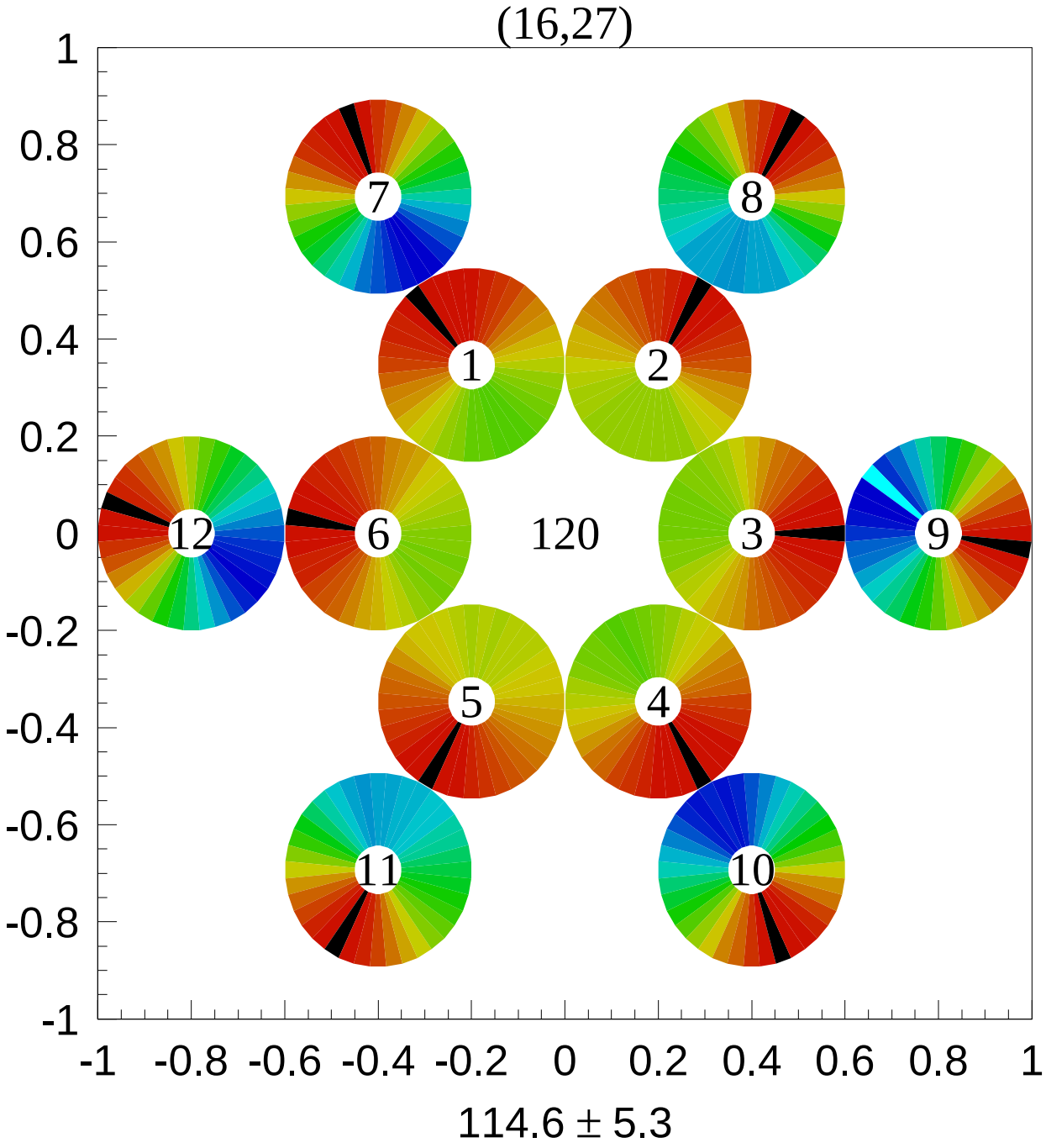

(16,25)
tilted LEDs
122 118 123 117 116 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 116 119 117 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

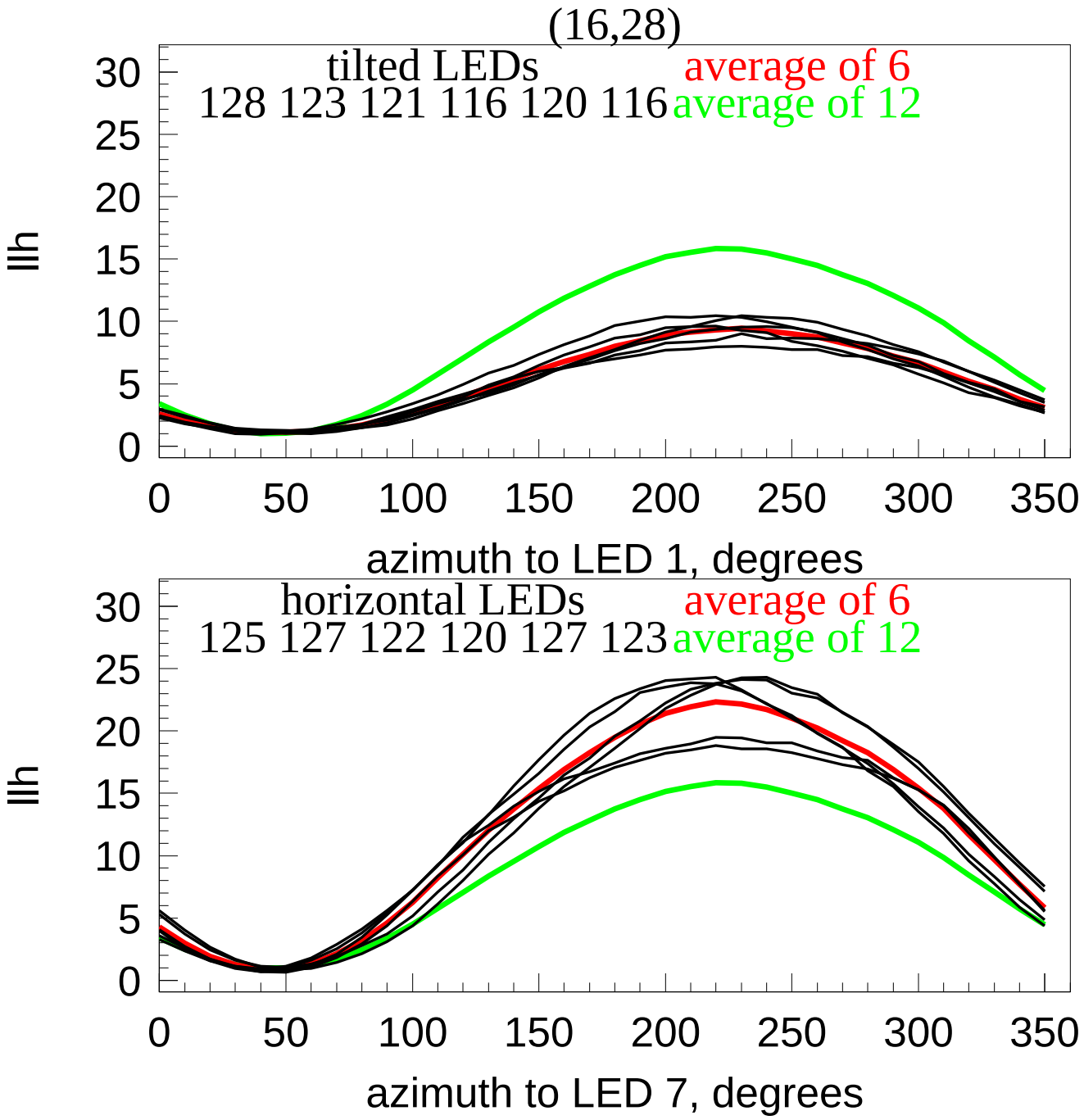

(16,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
138.8 ± 6.4

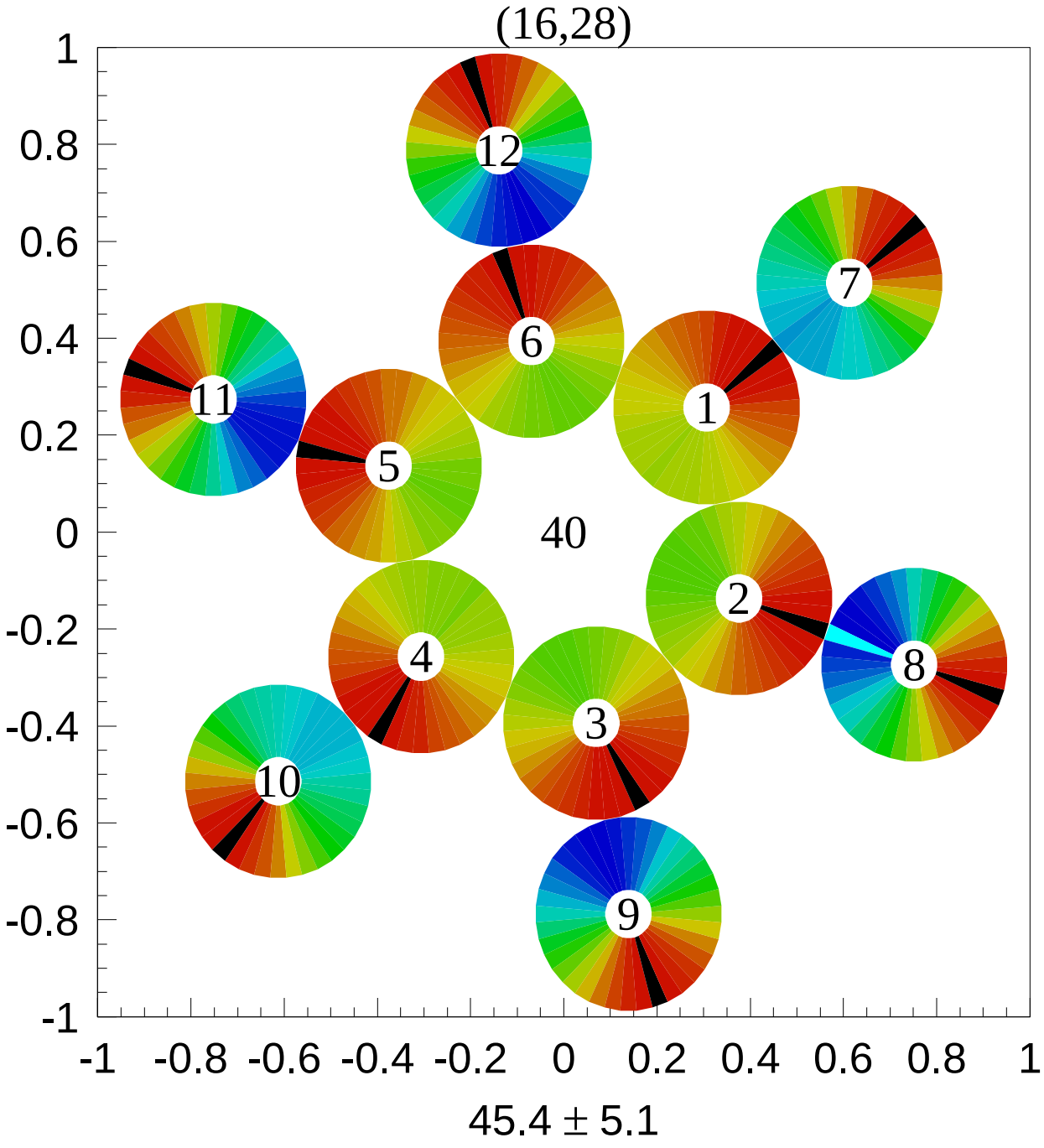

(16,26)
tilted LEDs
117 123 120 121 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 114 124 120 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

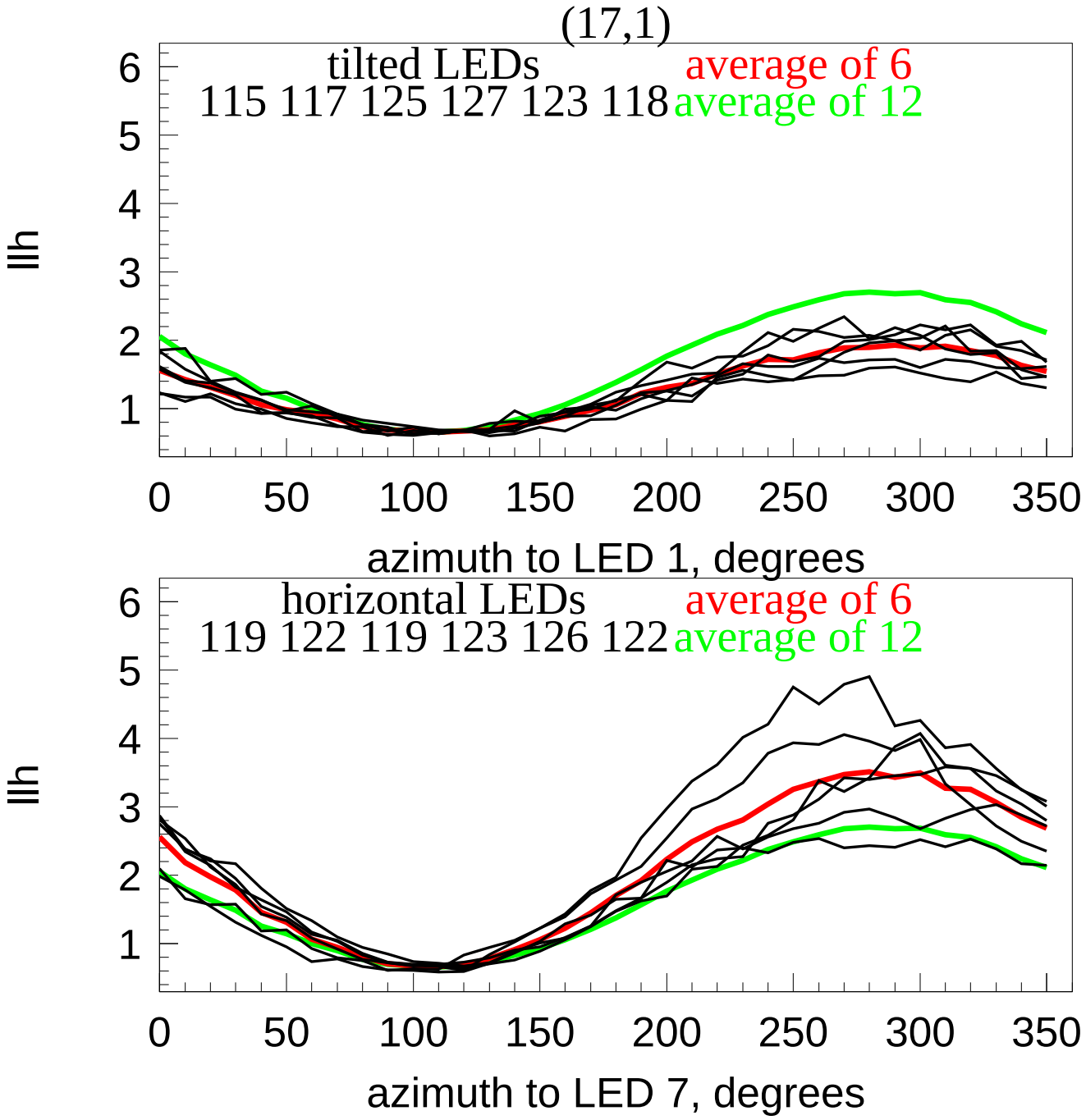

(16,26)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.6 ± 5.3

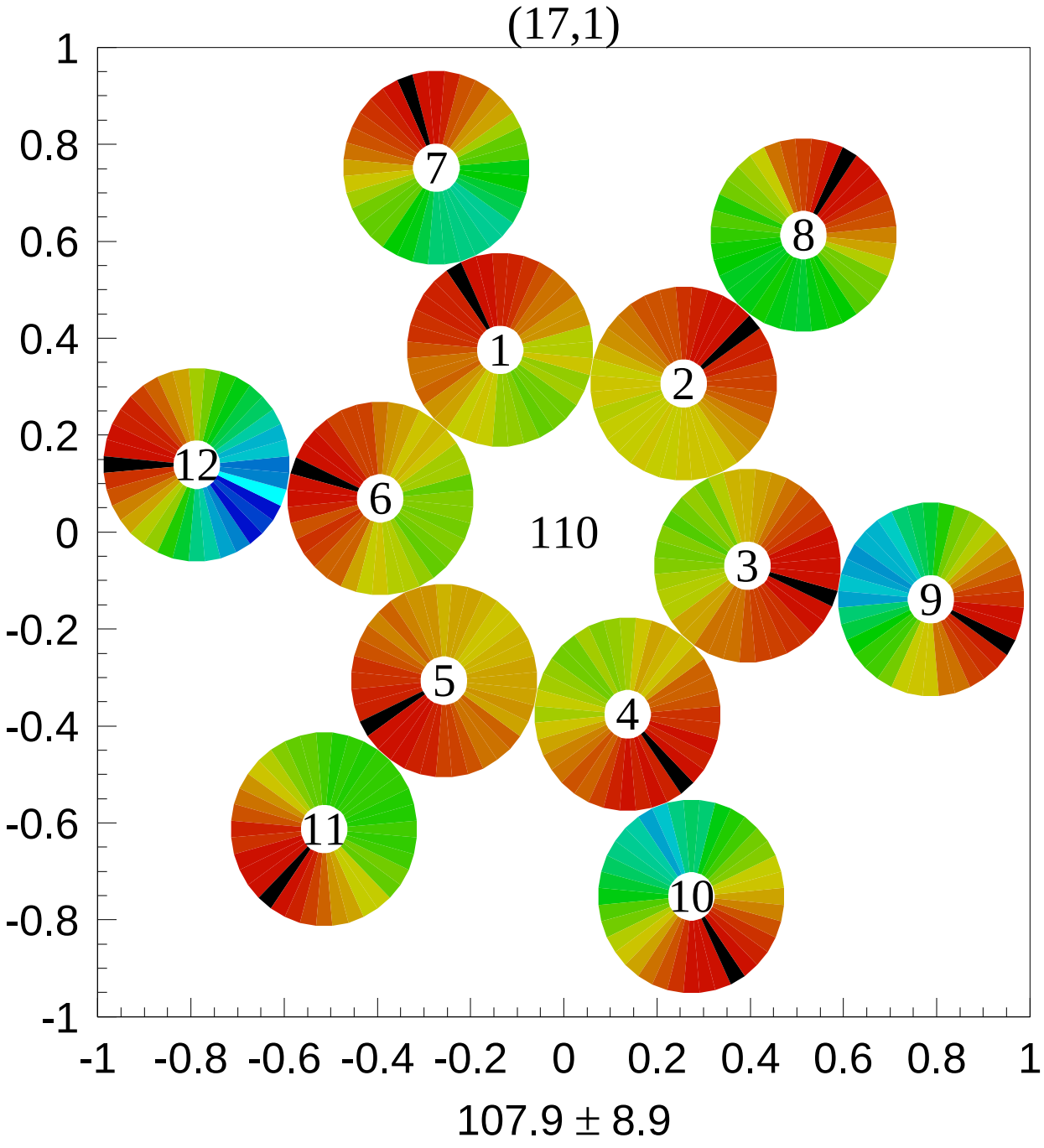

(16,27)
tilted LEDs
119 114 123 118 118 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 116 118 127 119 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

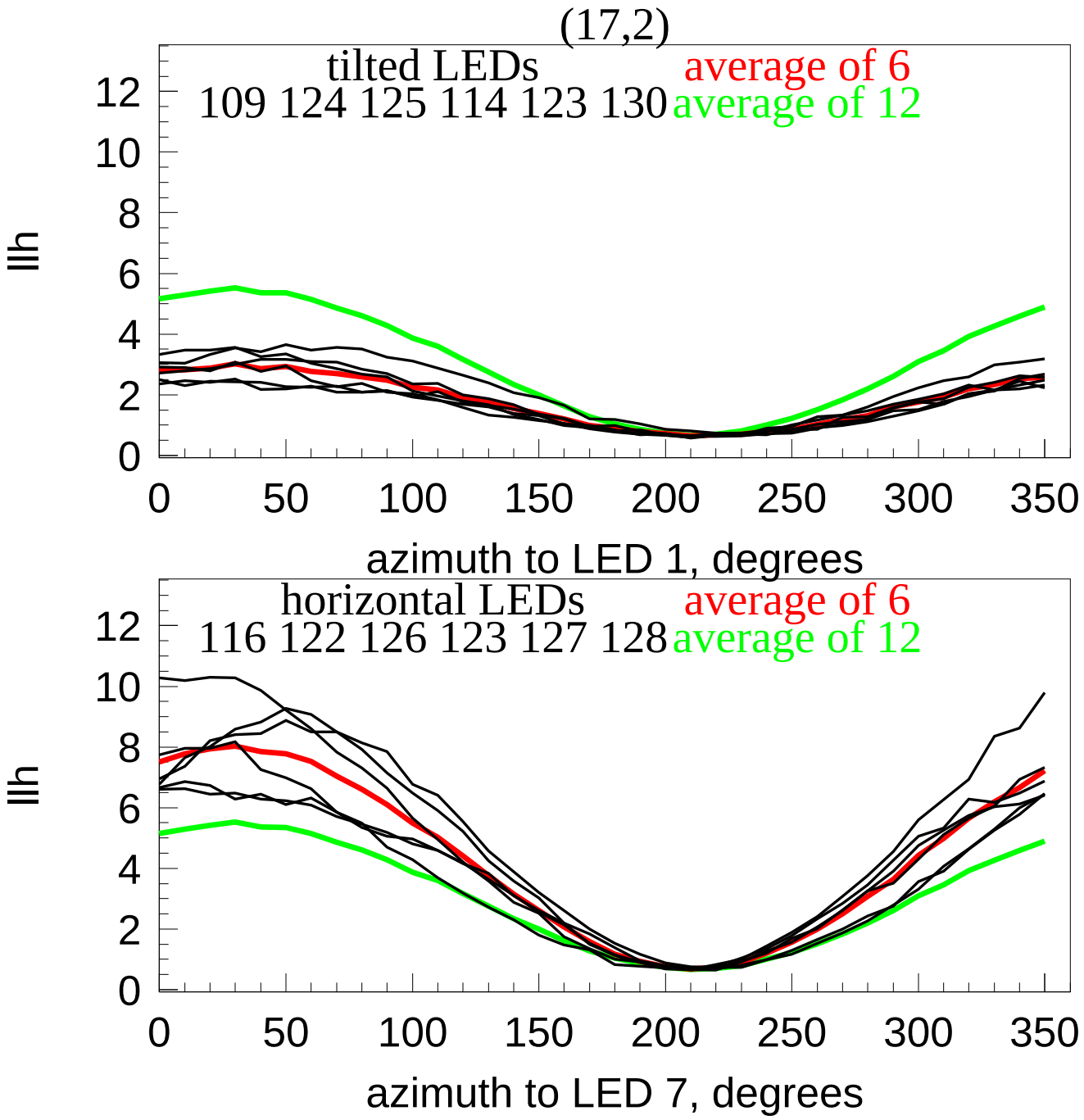

(16,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
114.6 ± 5.3

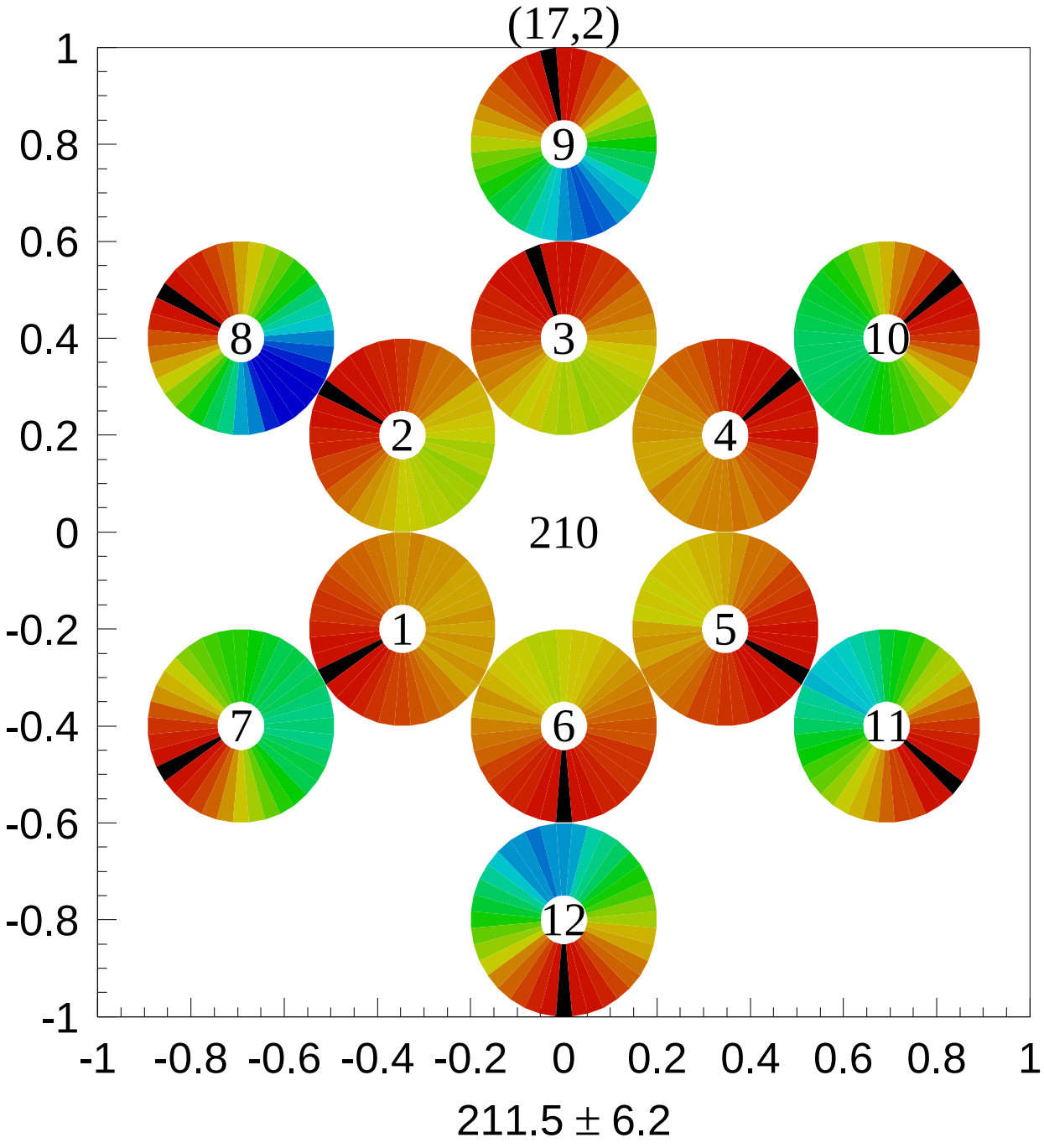

(16,28)
tilted LEDs
128 123 121 116 120 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 127 122 120 127 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

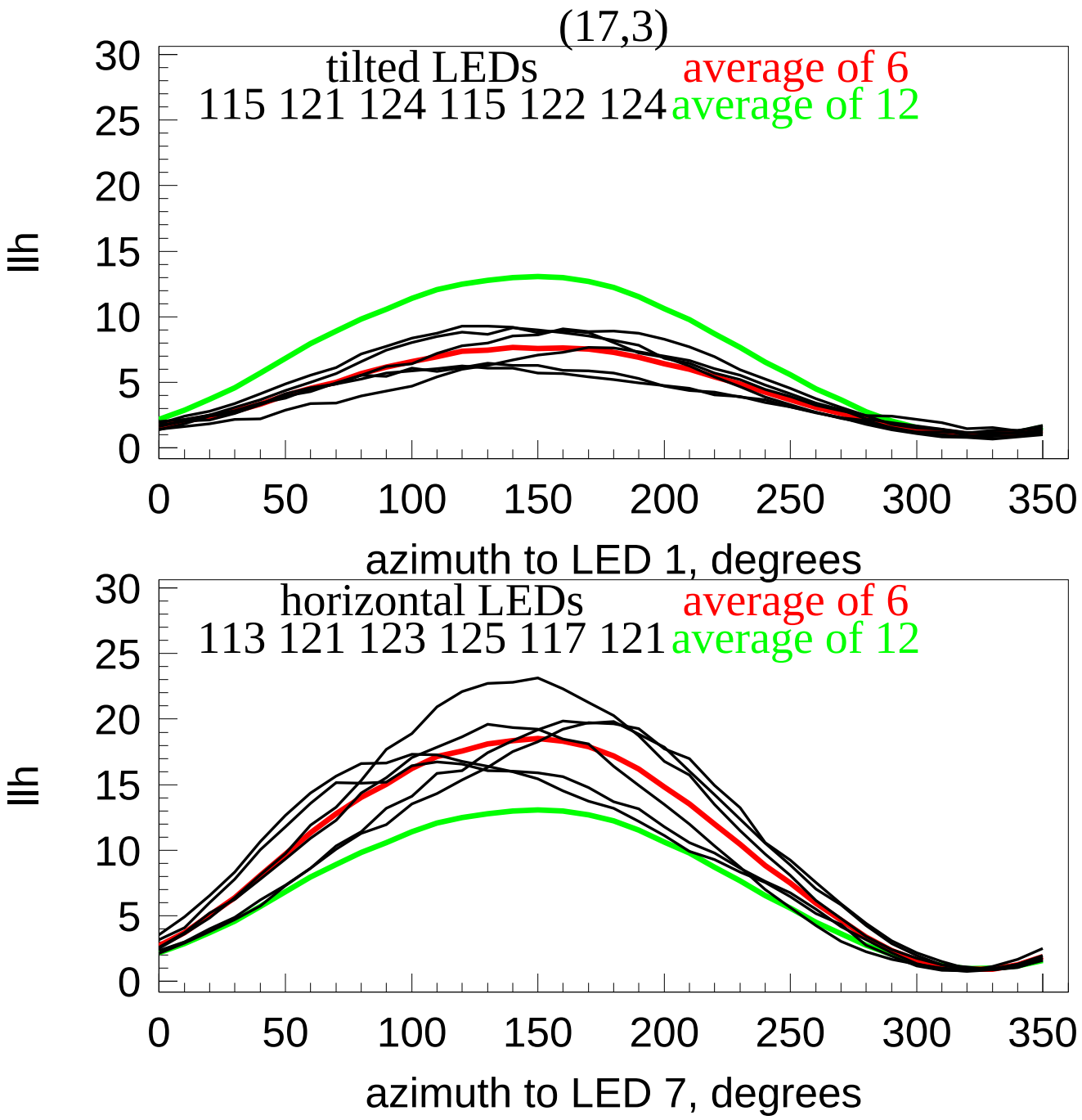

(16,28)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
45.4 ± 5.1

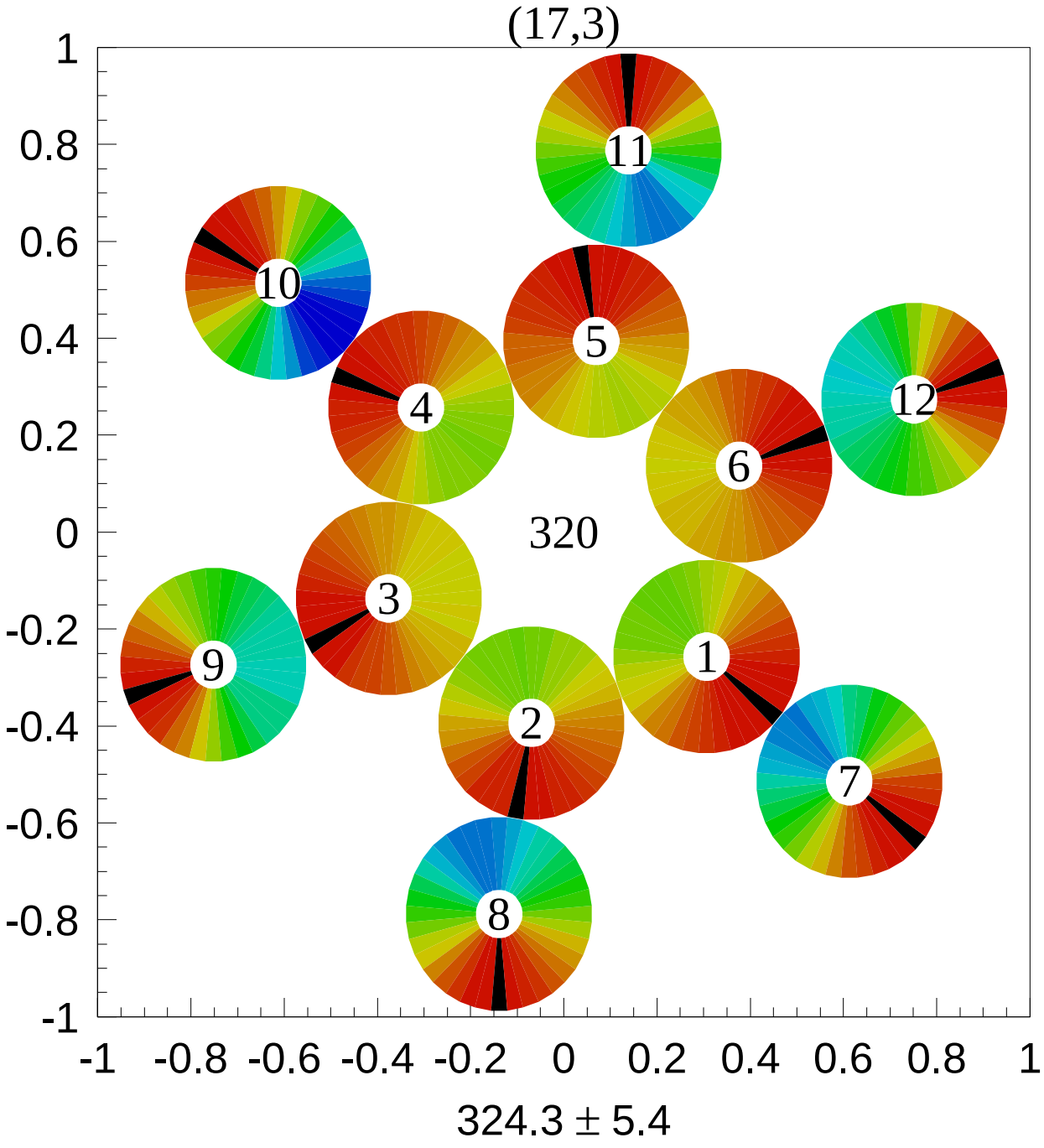

(17,1)
tilted LEDs
115 117 125 127 123 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 122 119 123 126 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

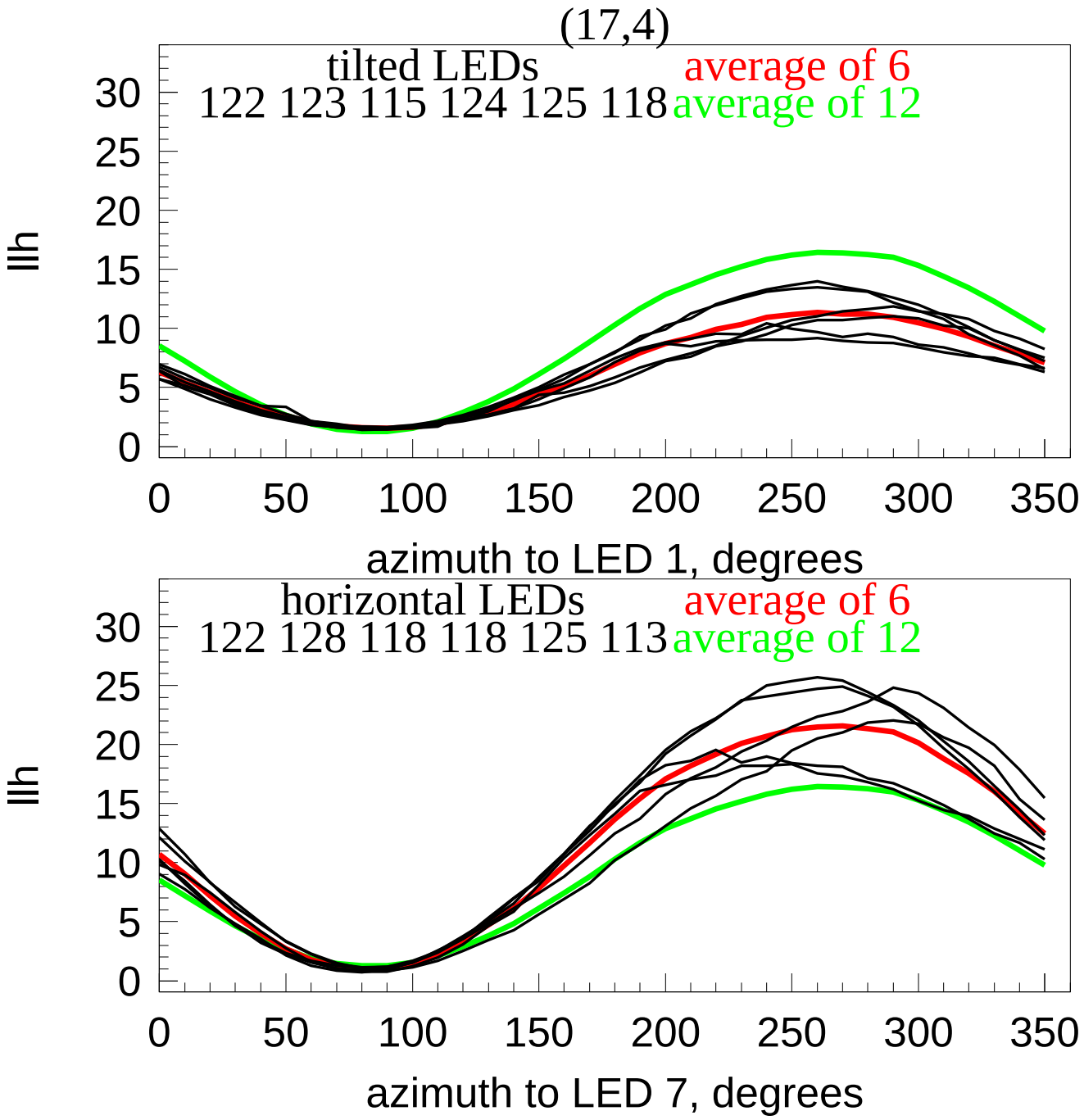

(17,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
107.9 ± 8.9

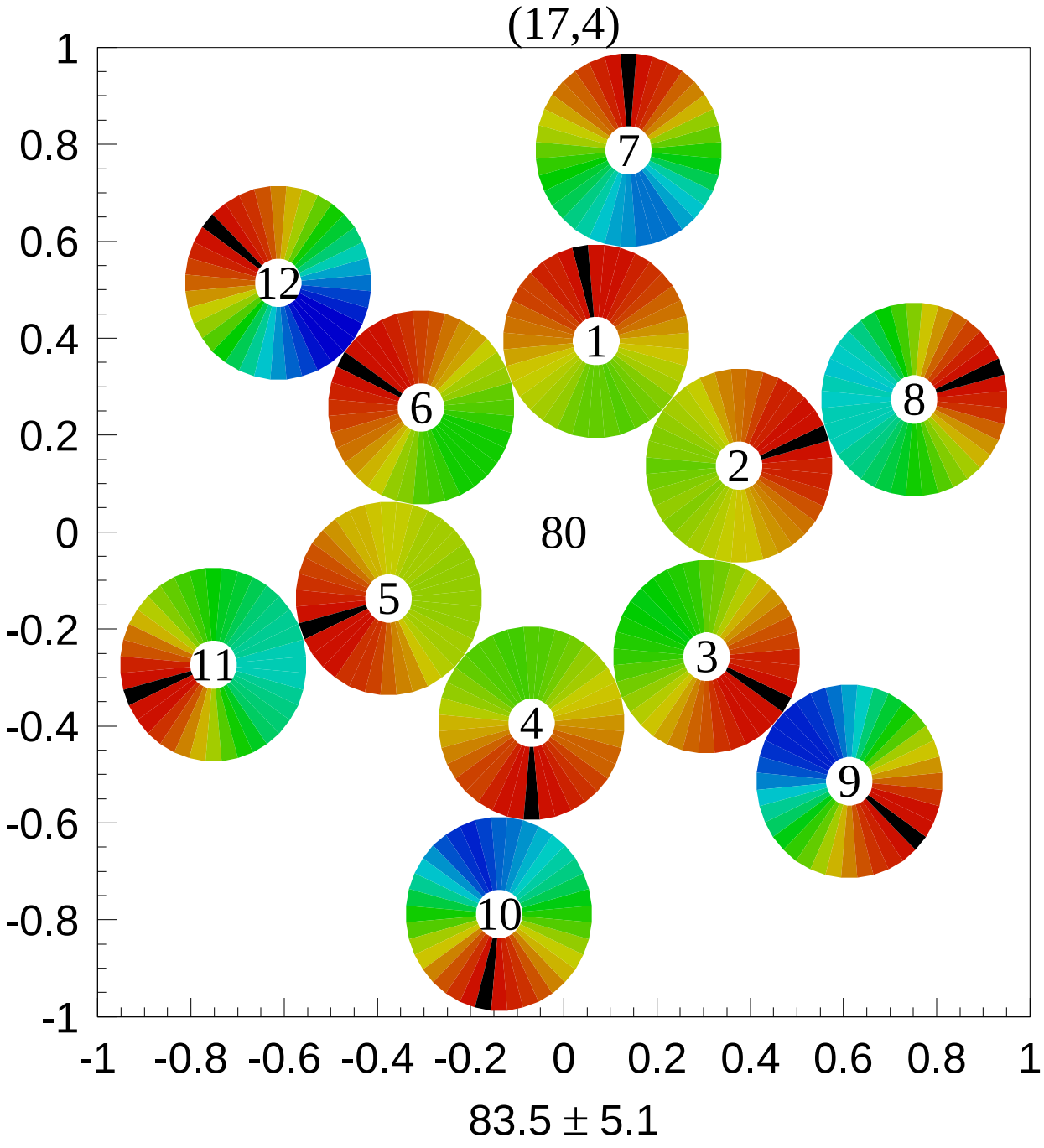

(17,2)
tilted LEDs
109 124 125 114 123 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 122 126 123 127 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

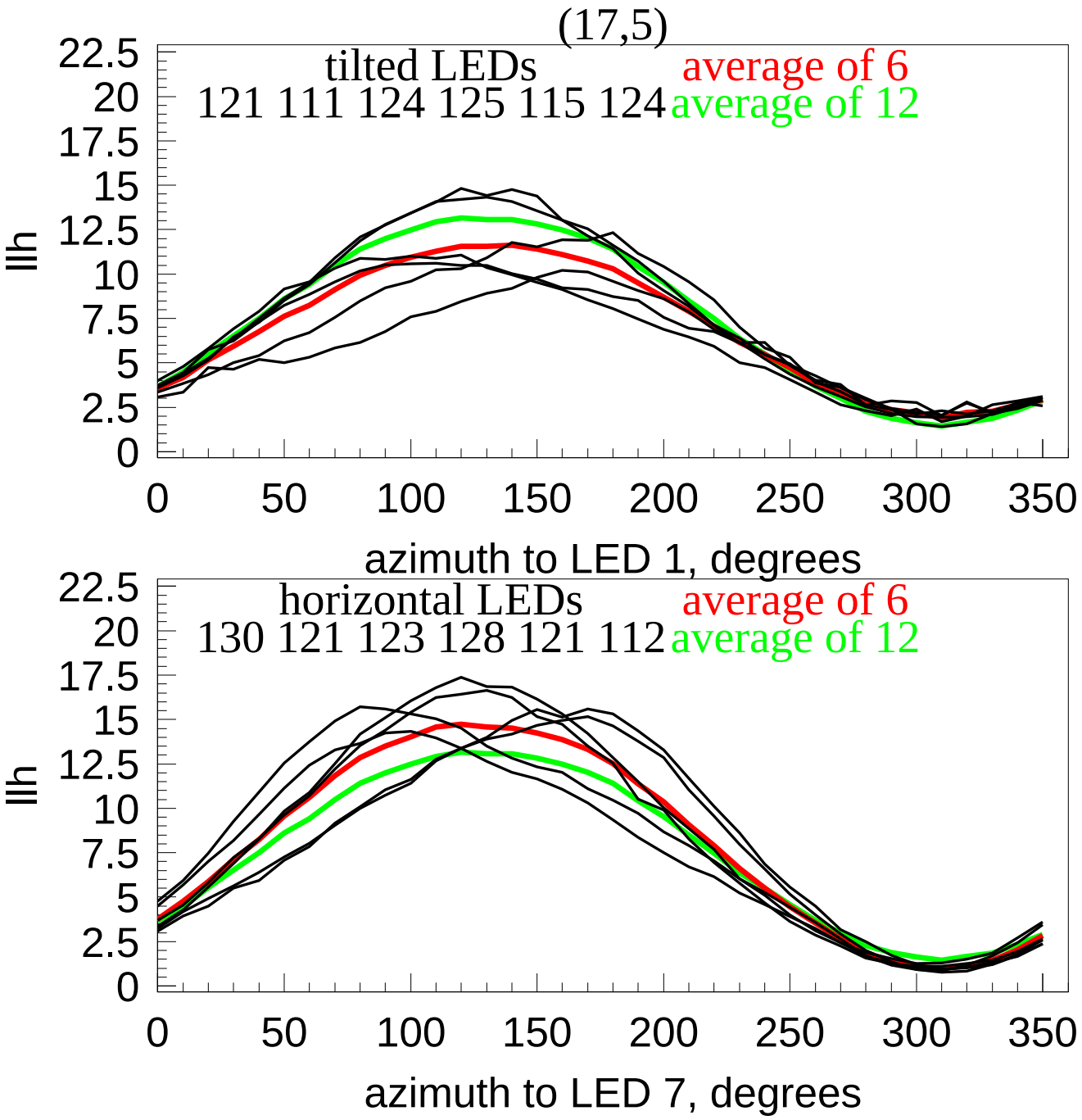

(17,2)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.5 ± 6.2

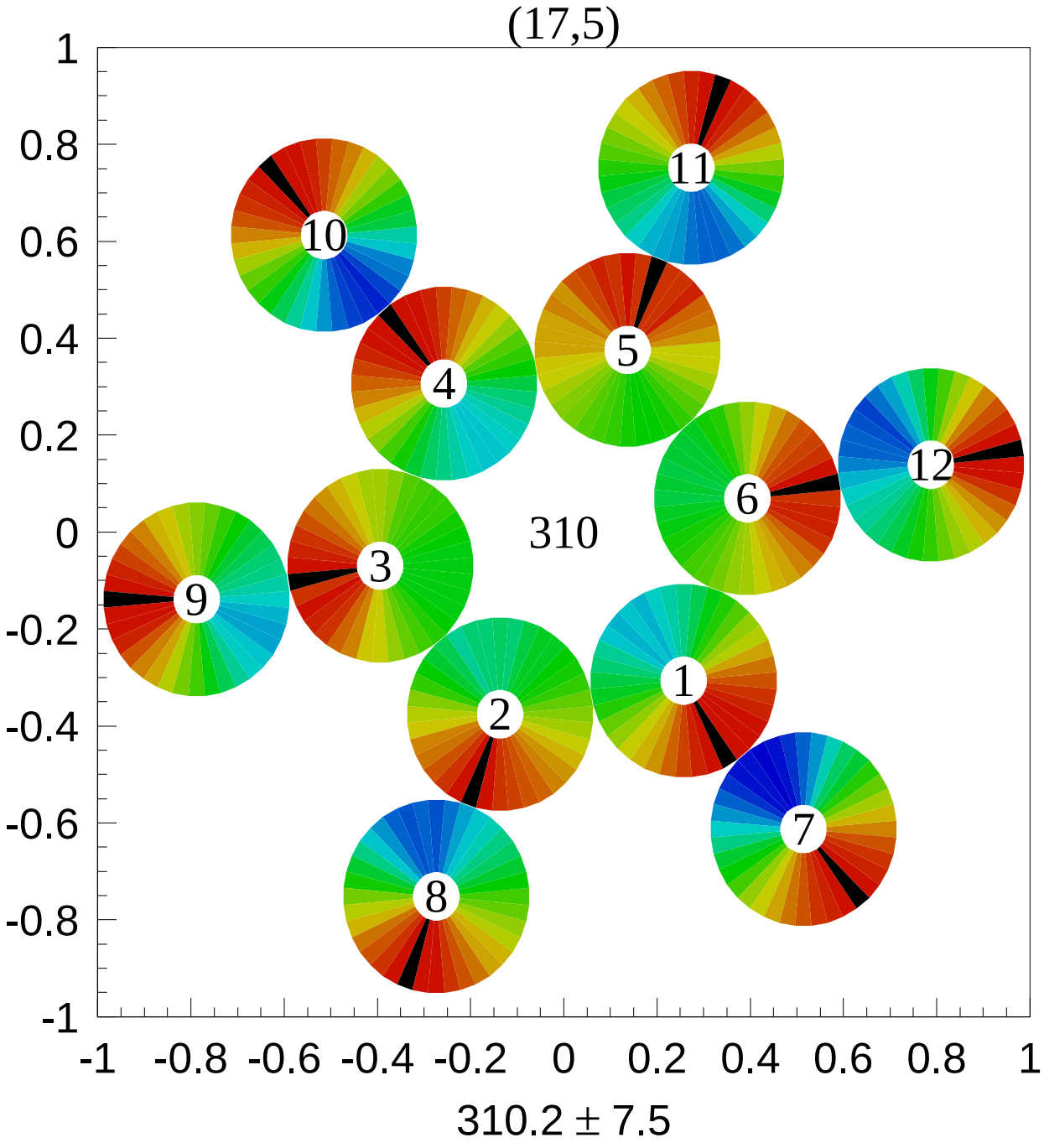

(17,3)
tilted LEDs
115 121 124 115 122 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 121 123 125 117 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

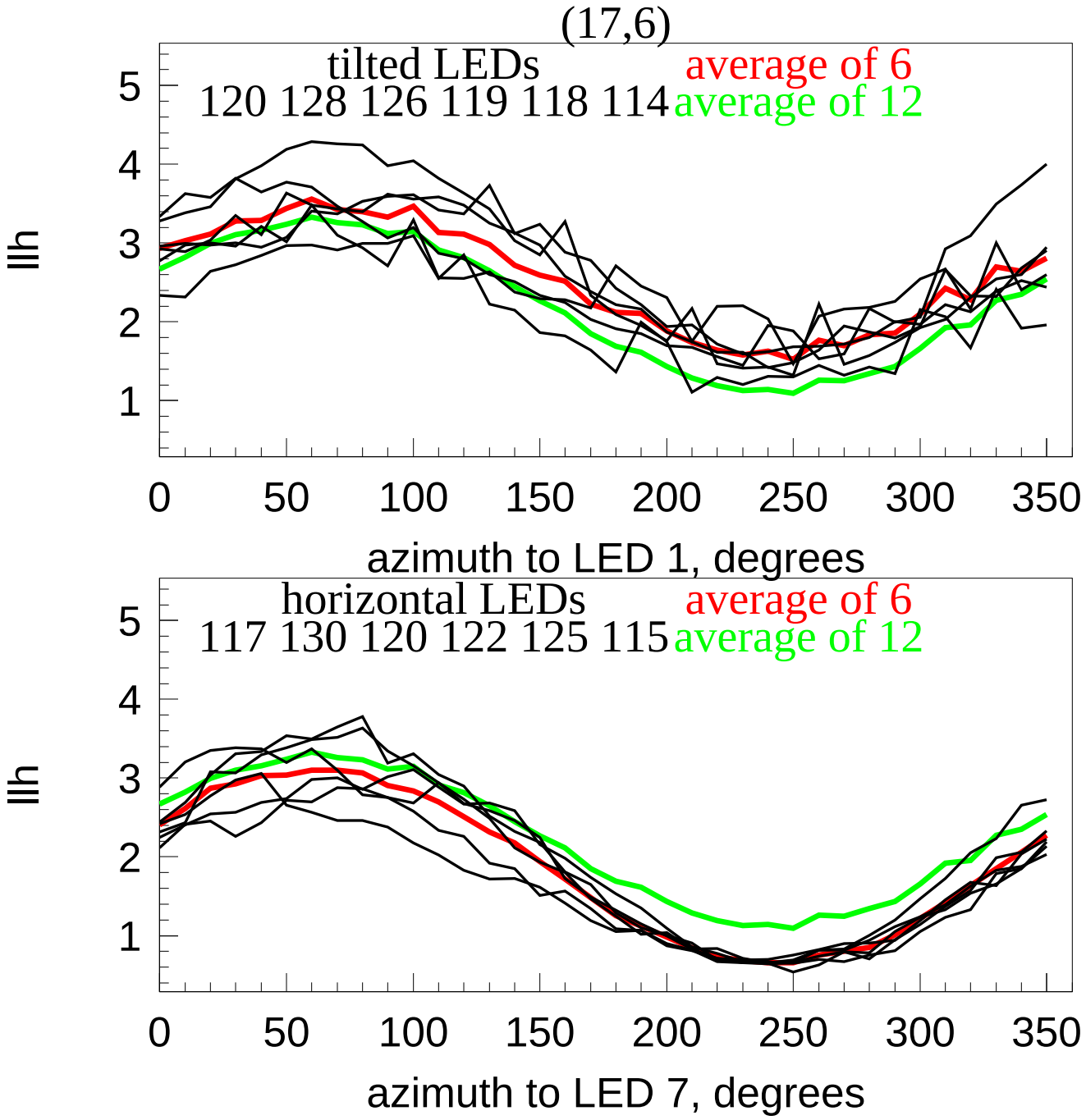

(17,3)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
324.3 ± 5.4

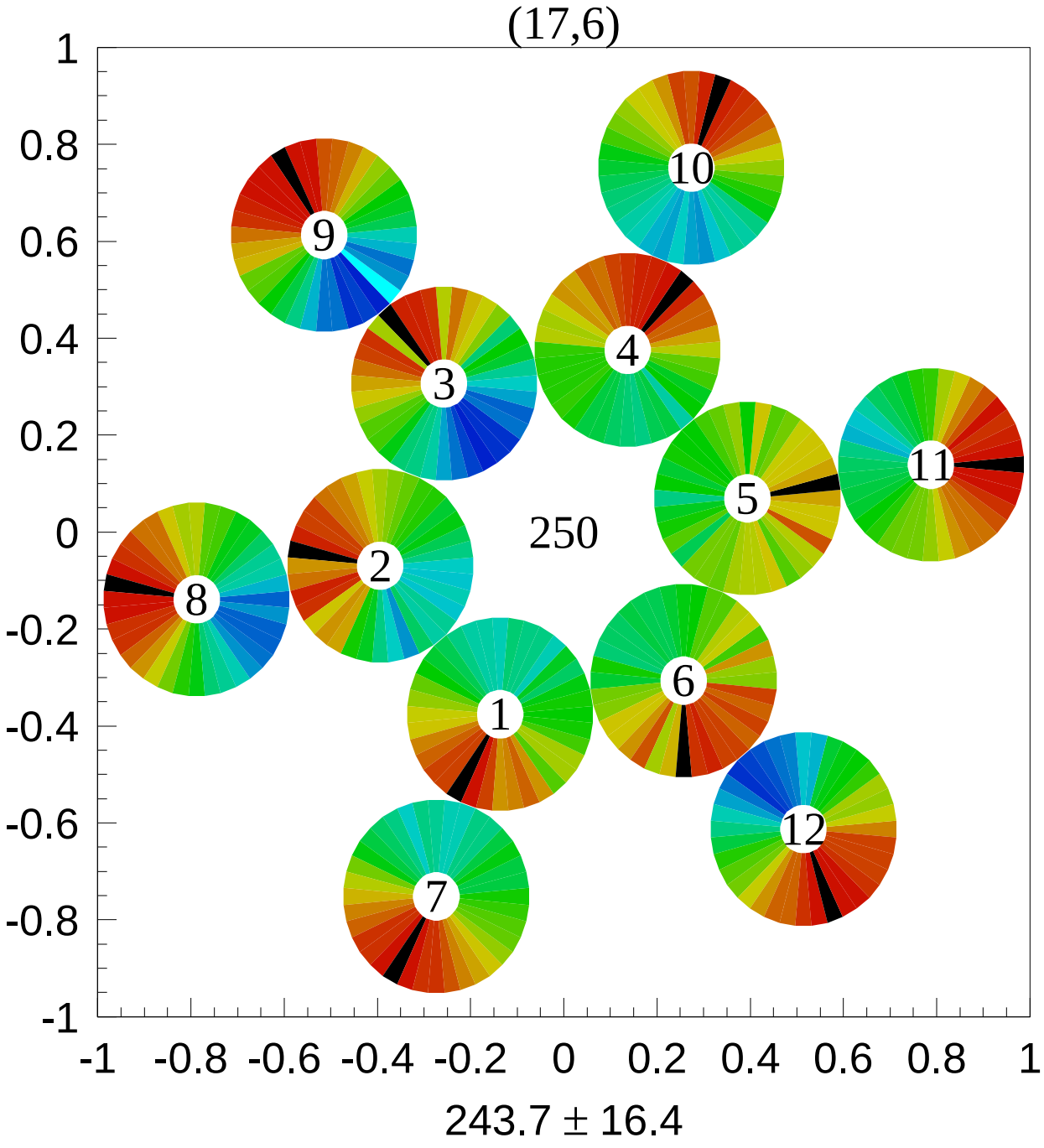

(17,4)
tilted LEDs
122 123 115 124 125 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 128 118 118 125 113
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

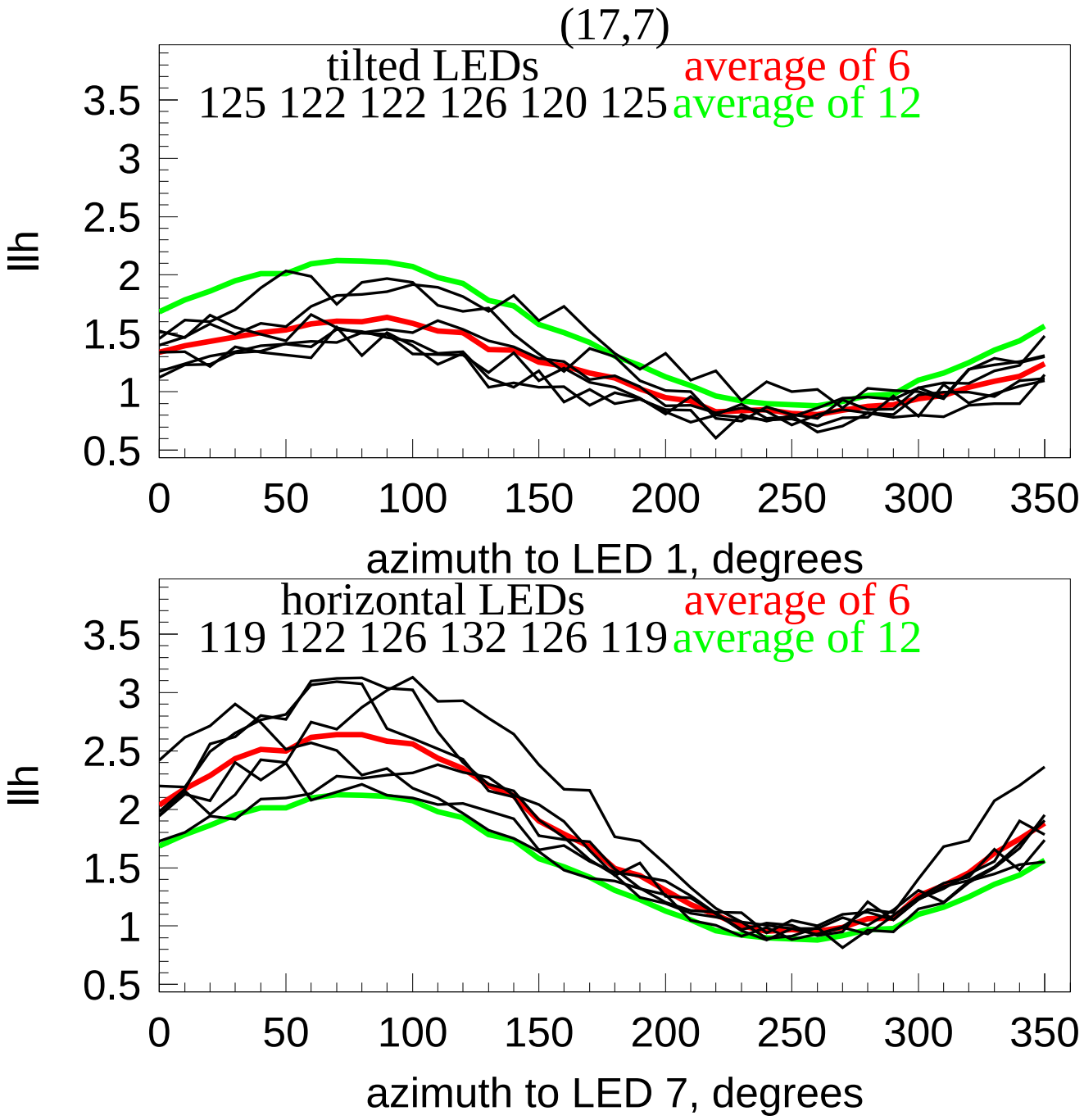

(17,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
83.5 ± 5.1

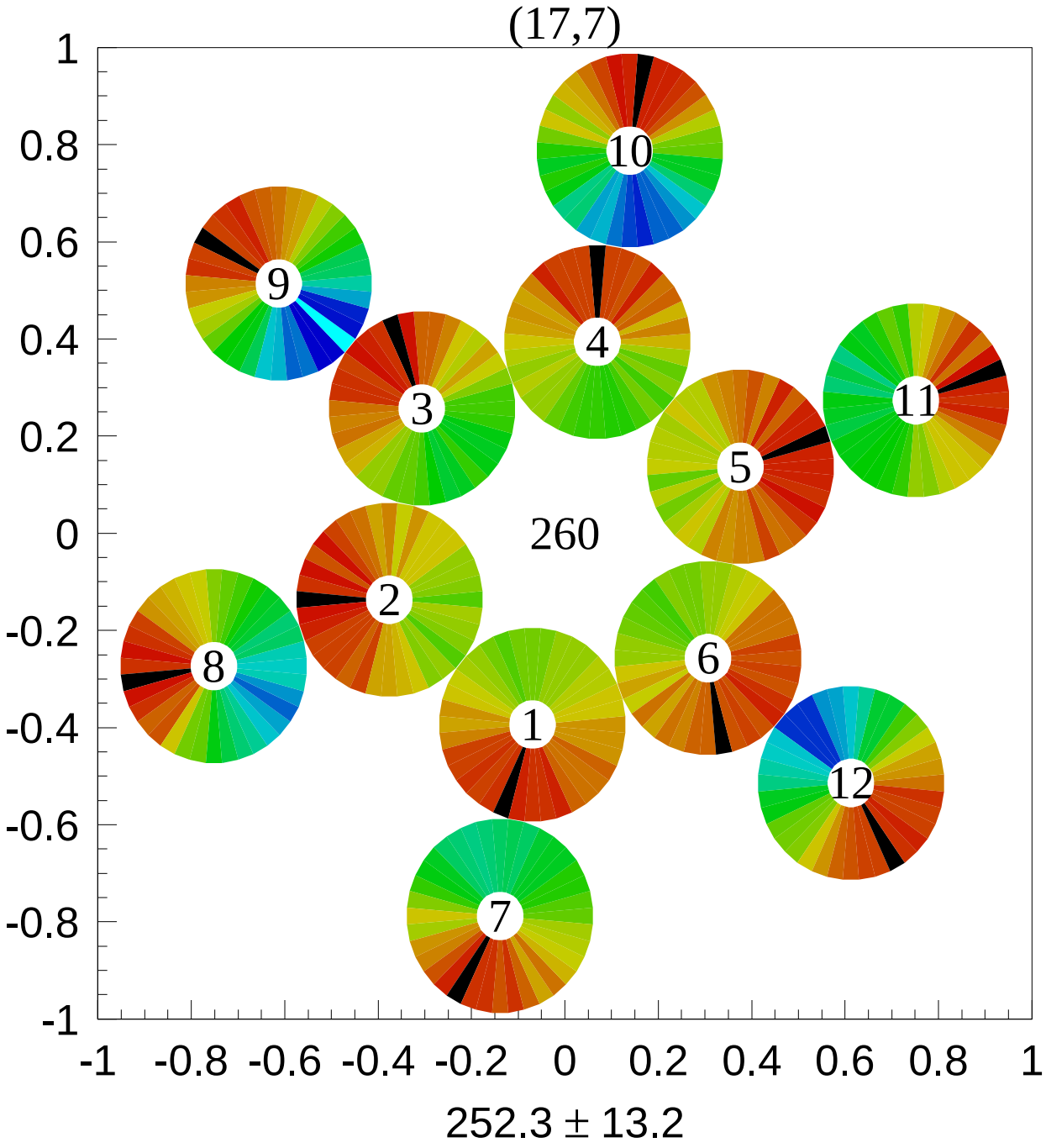

(17,5)
tilted LEDs
121 111 124 125 115 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 121 123 128 121 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

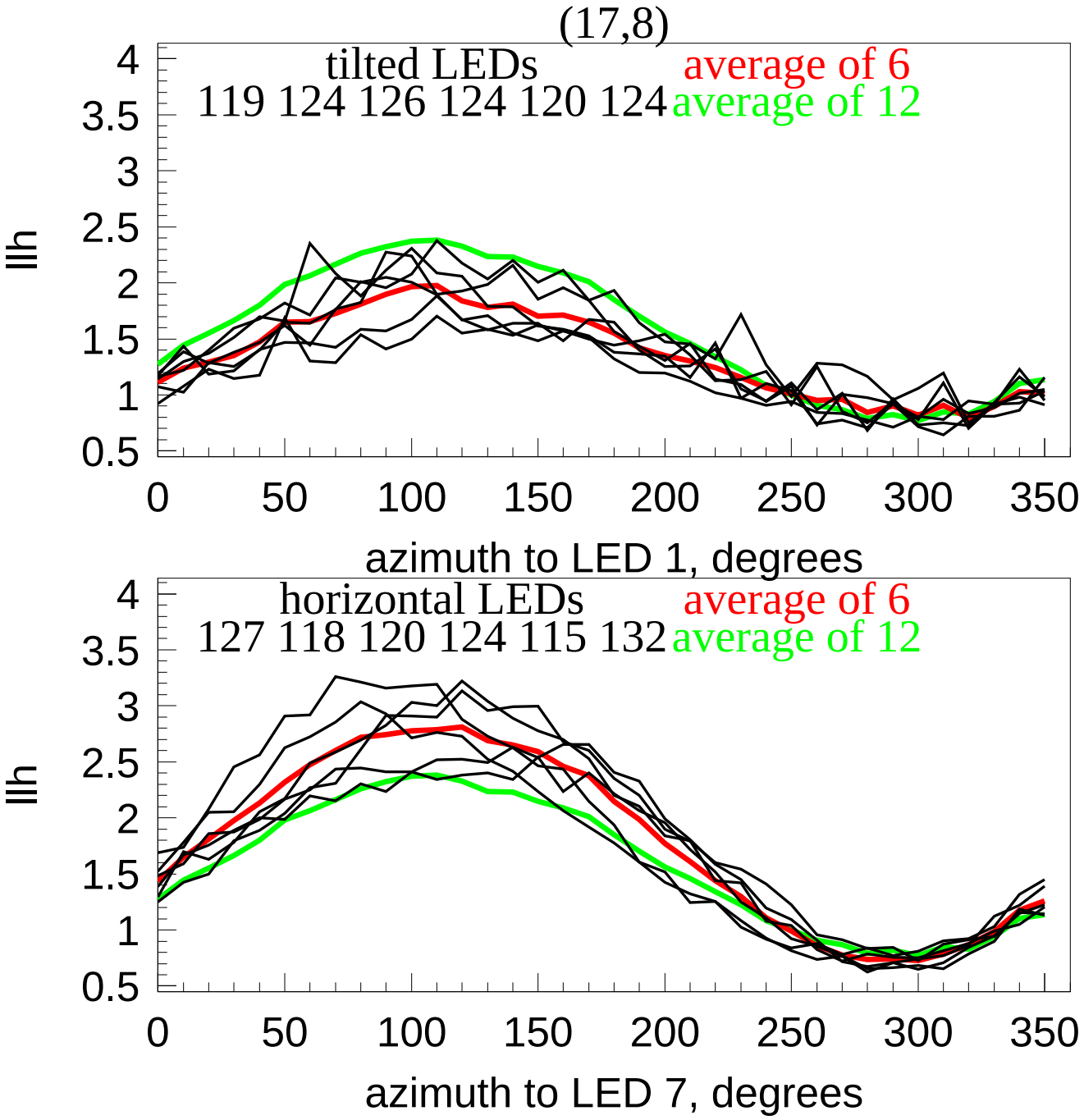

(17,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
310
1
2
3
4
5
6
7
8
9
10
11
12
310.2 ± 7.5

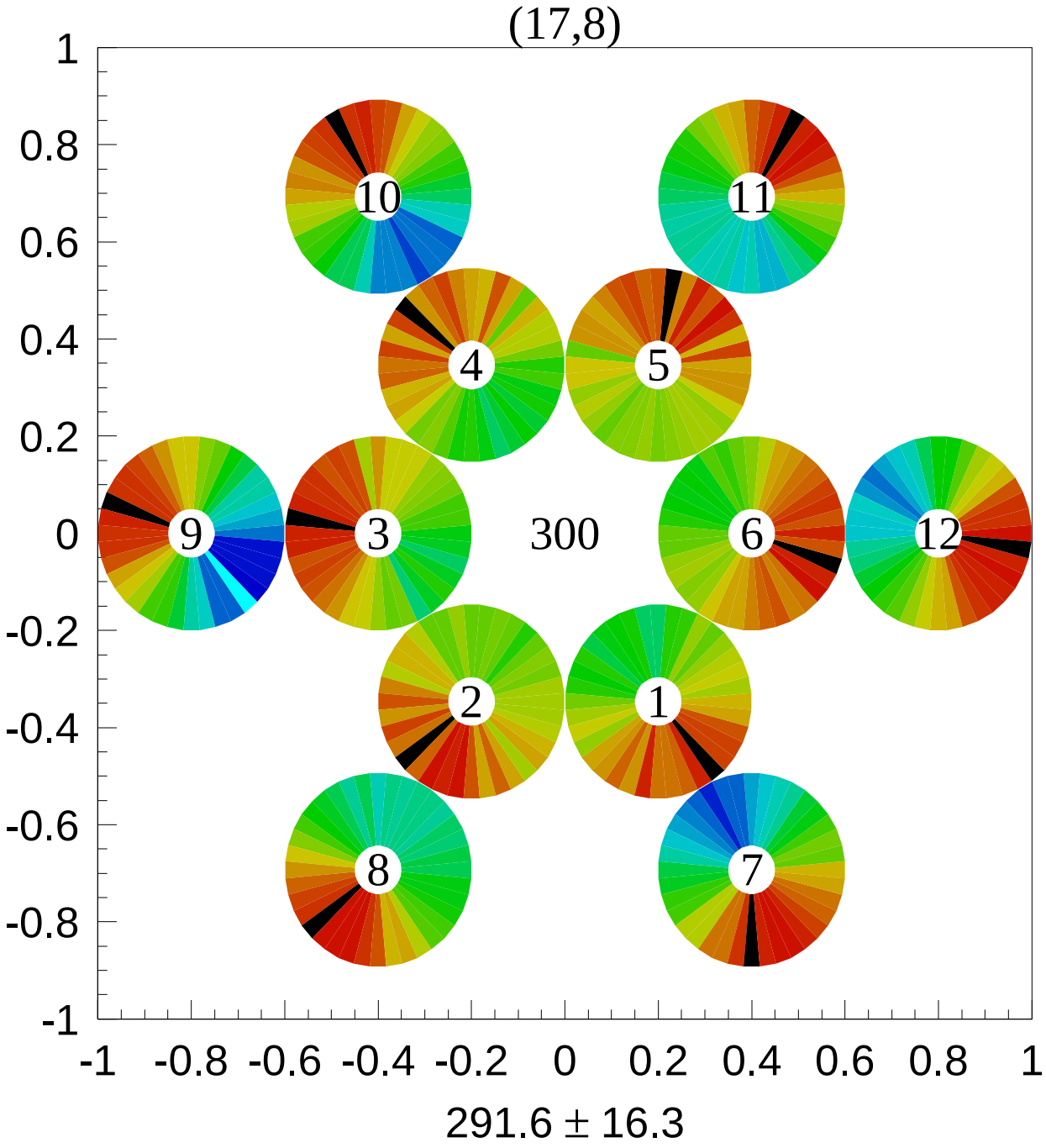

(17,6)
tilted LEDs
120 128 126 119 118 114
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 130 120 122 125 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

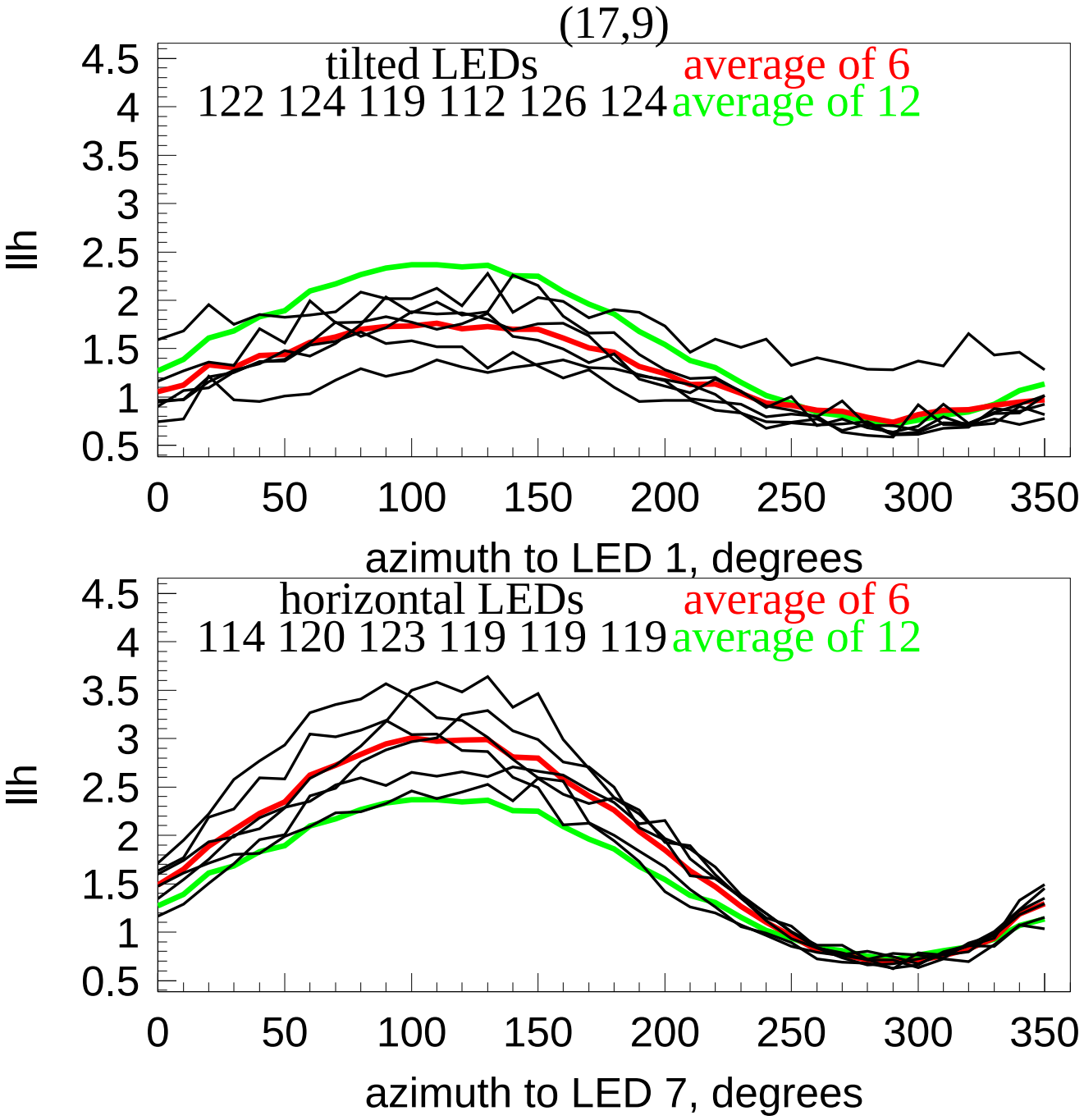

(17,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
243.7 ± 16.4
250
1
2
3
4
5
6
7
8
9
10
11
12

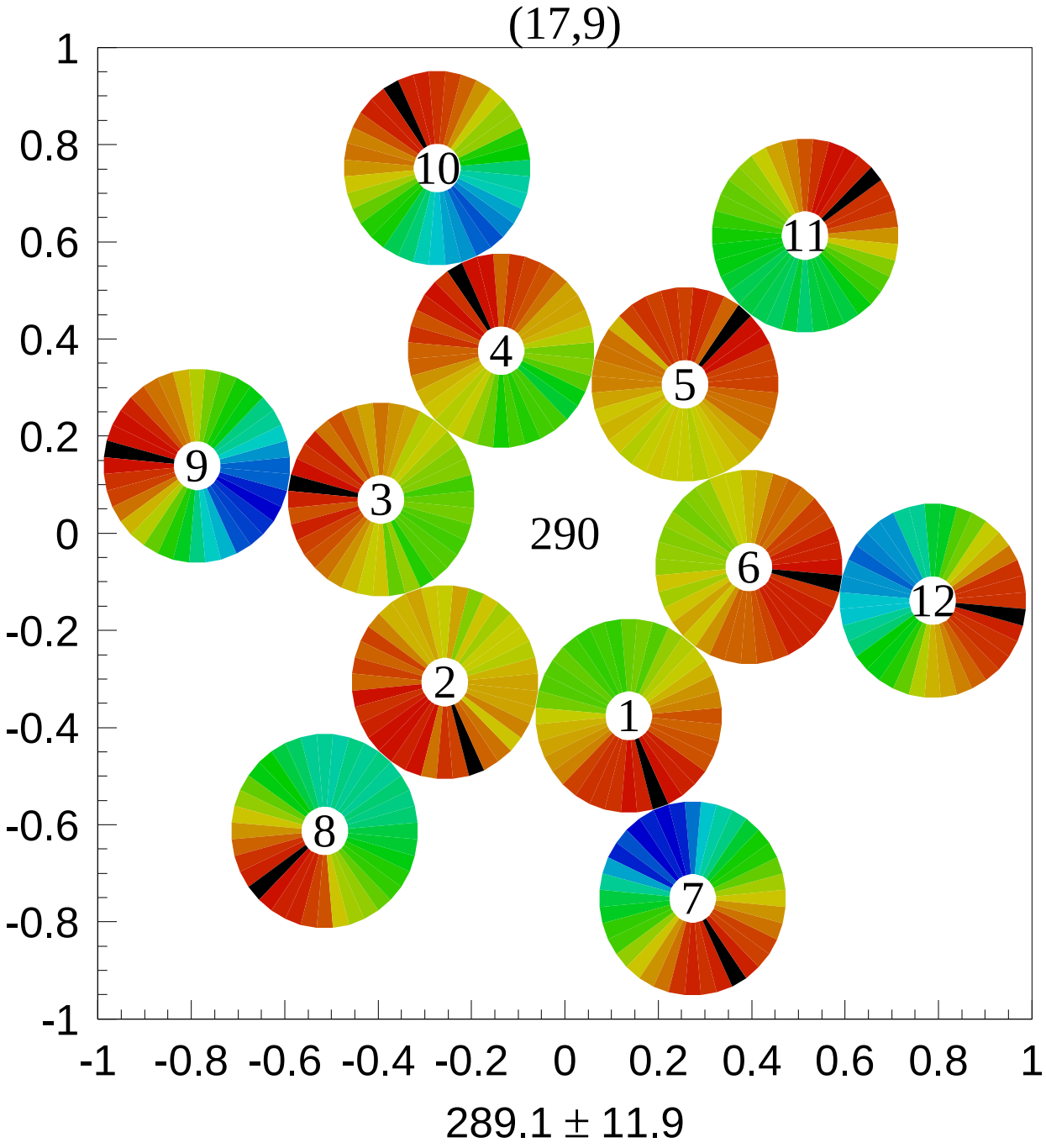

(17,7)
tilted LEDs
125 122 122 126 120 125
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 122 126 132 126 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

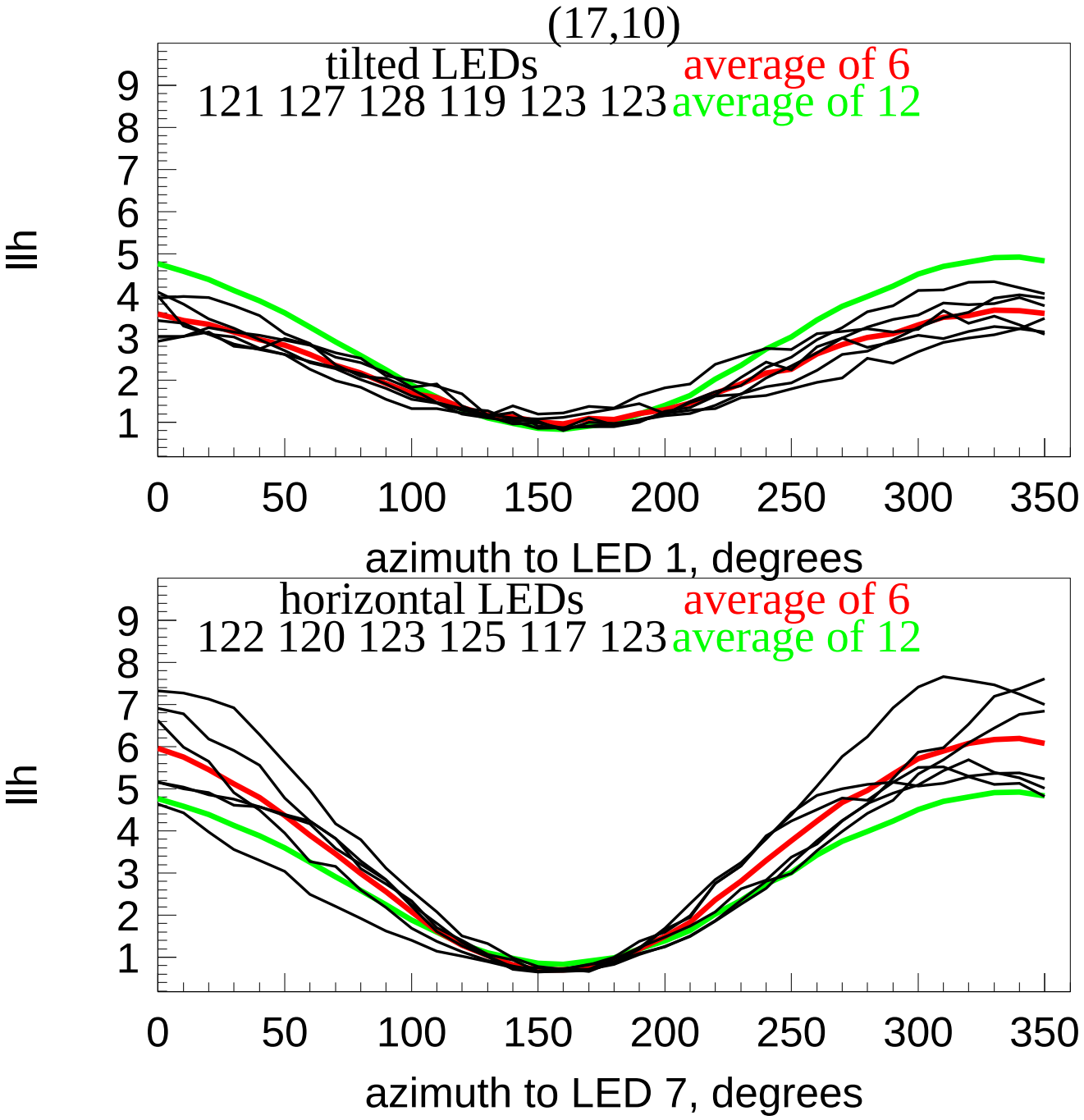

(17,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
252.3 ± 13.2

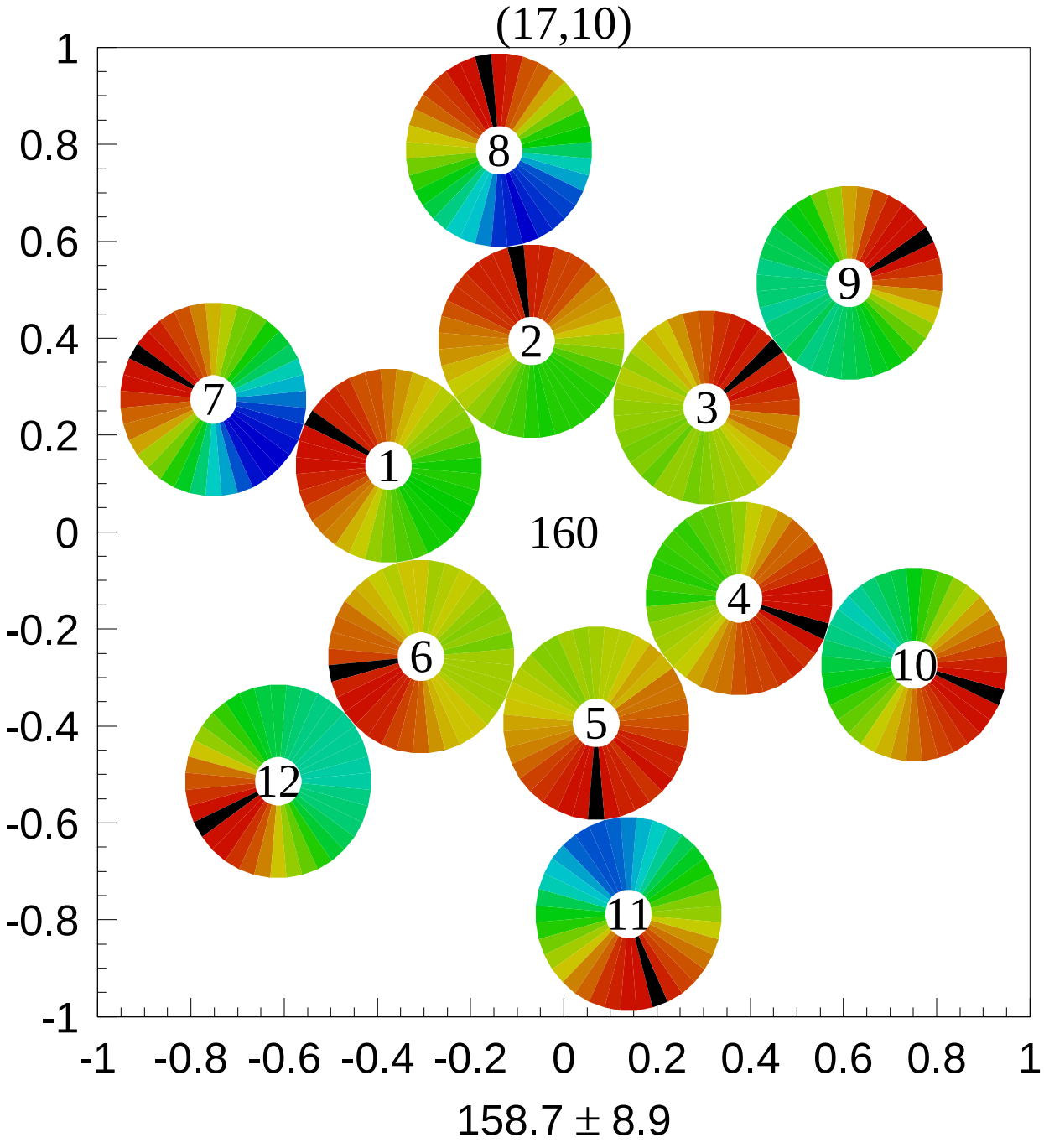

(17,8)
tilted LEDs
119 124 126 124 120 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 118 120 124 115 132
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

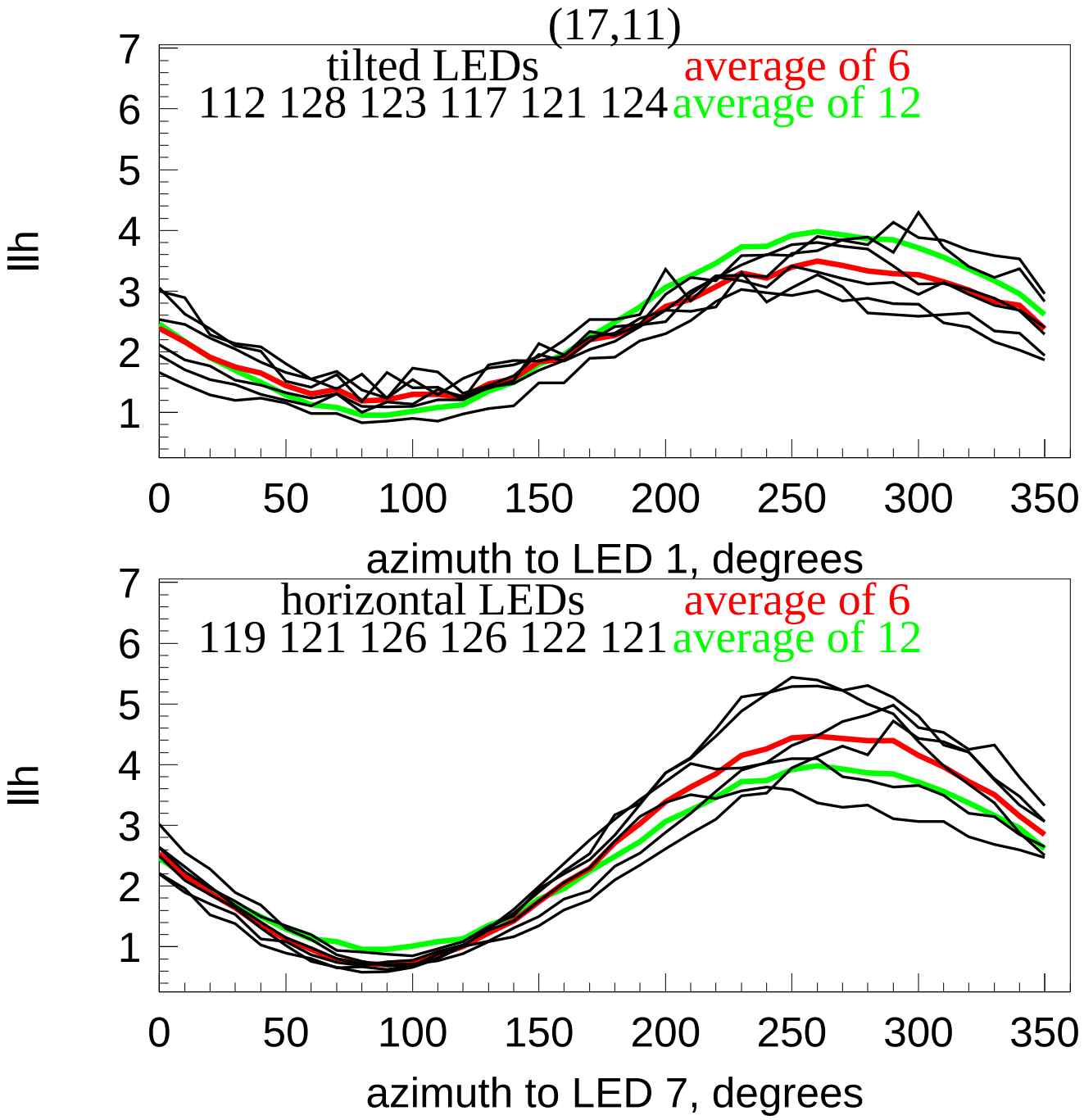

(17,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
291.6 ± 16.3

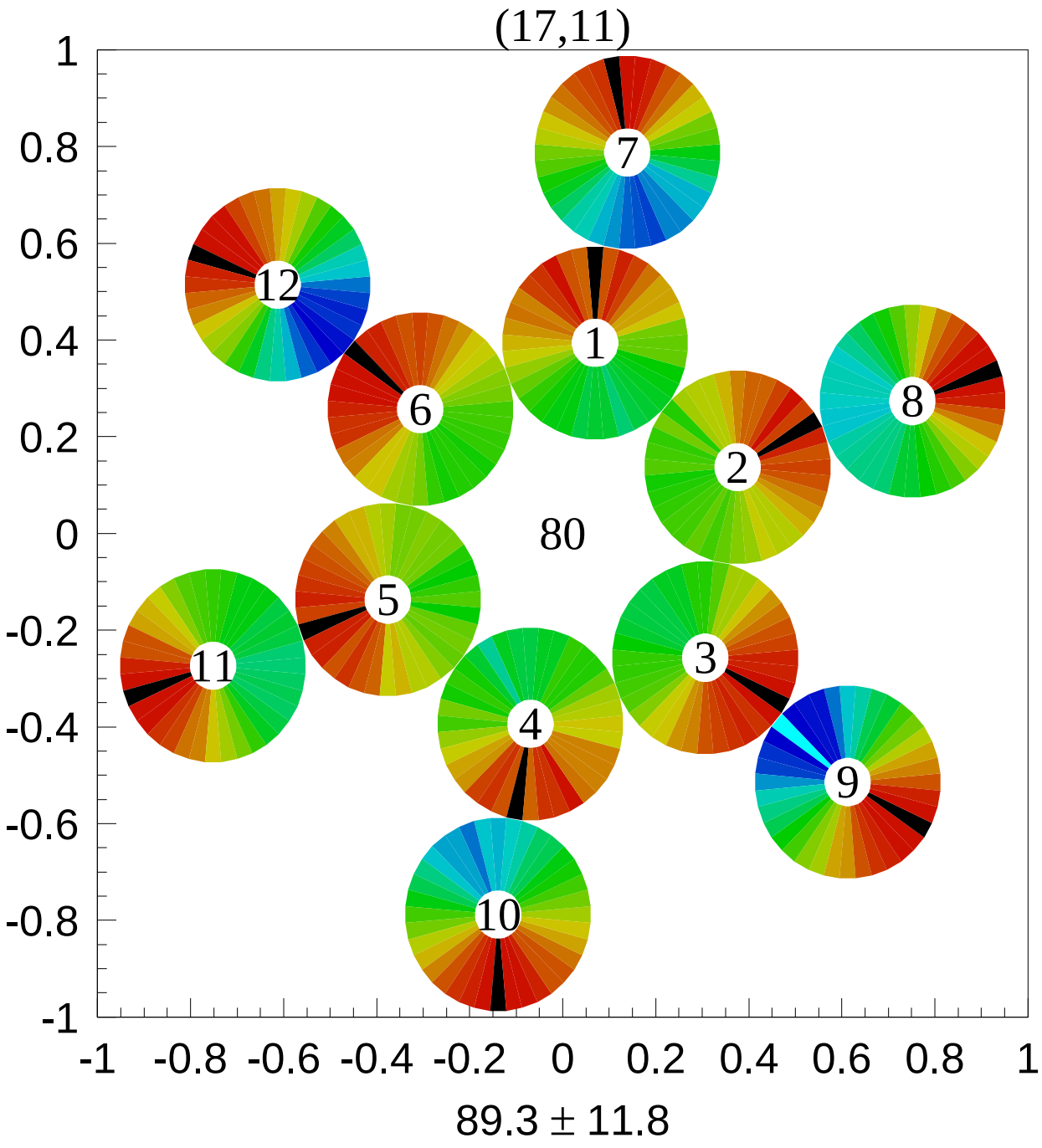

(17,9)
tilted LEDs
122 124 119 112 126 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 120 123 119 119 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

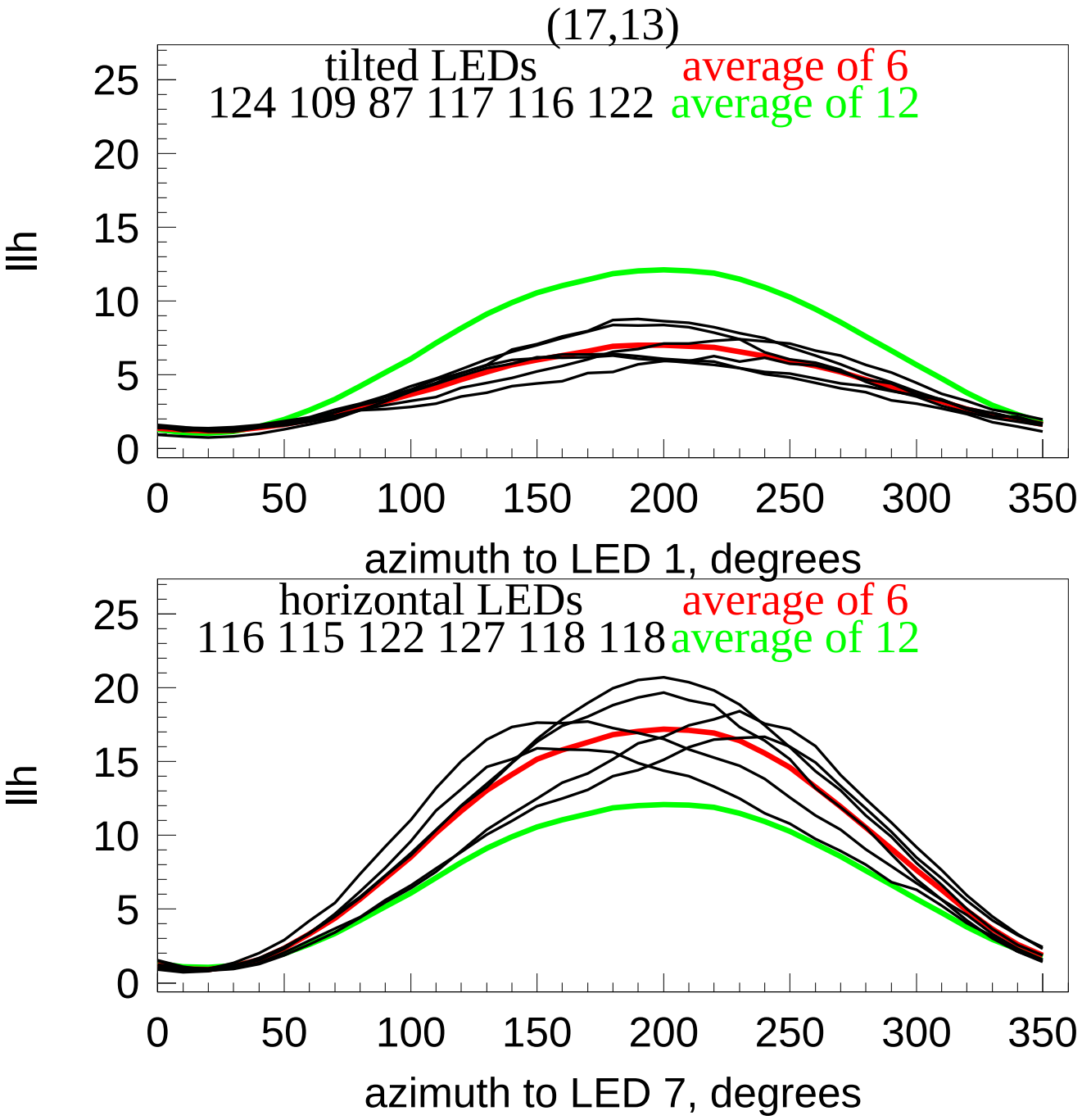

(17,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
289.1 ± 11.9

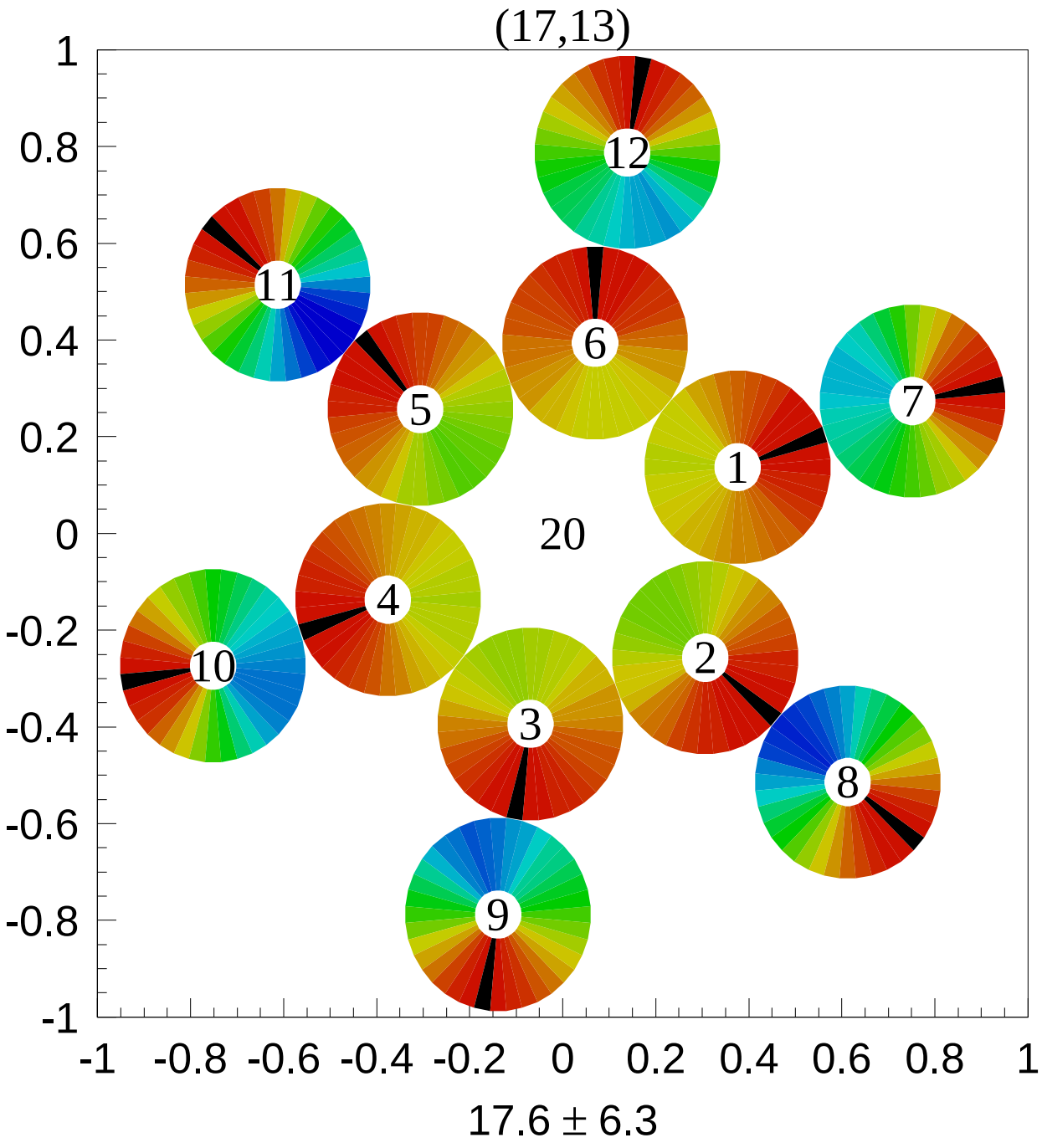

(17,10)
tilted LEDs
121 127 128 119 123 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 120 123 125 117 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

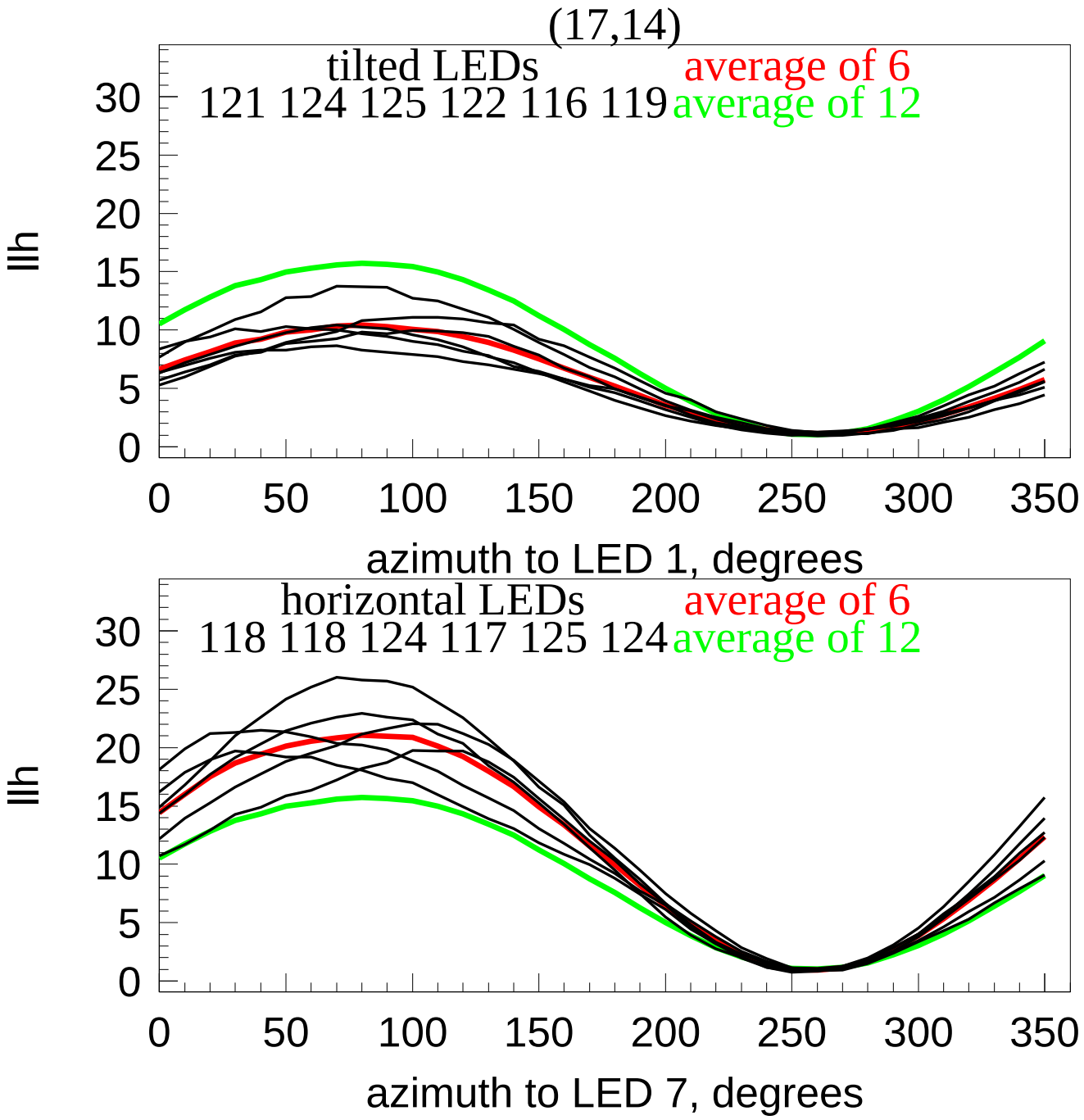

(17,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
3
7
1
160
4
10
6
5
12
11
158.7 ± 8.9

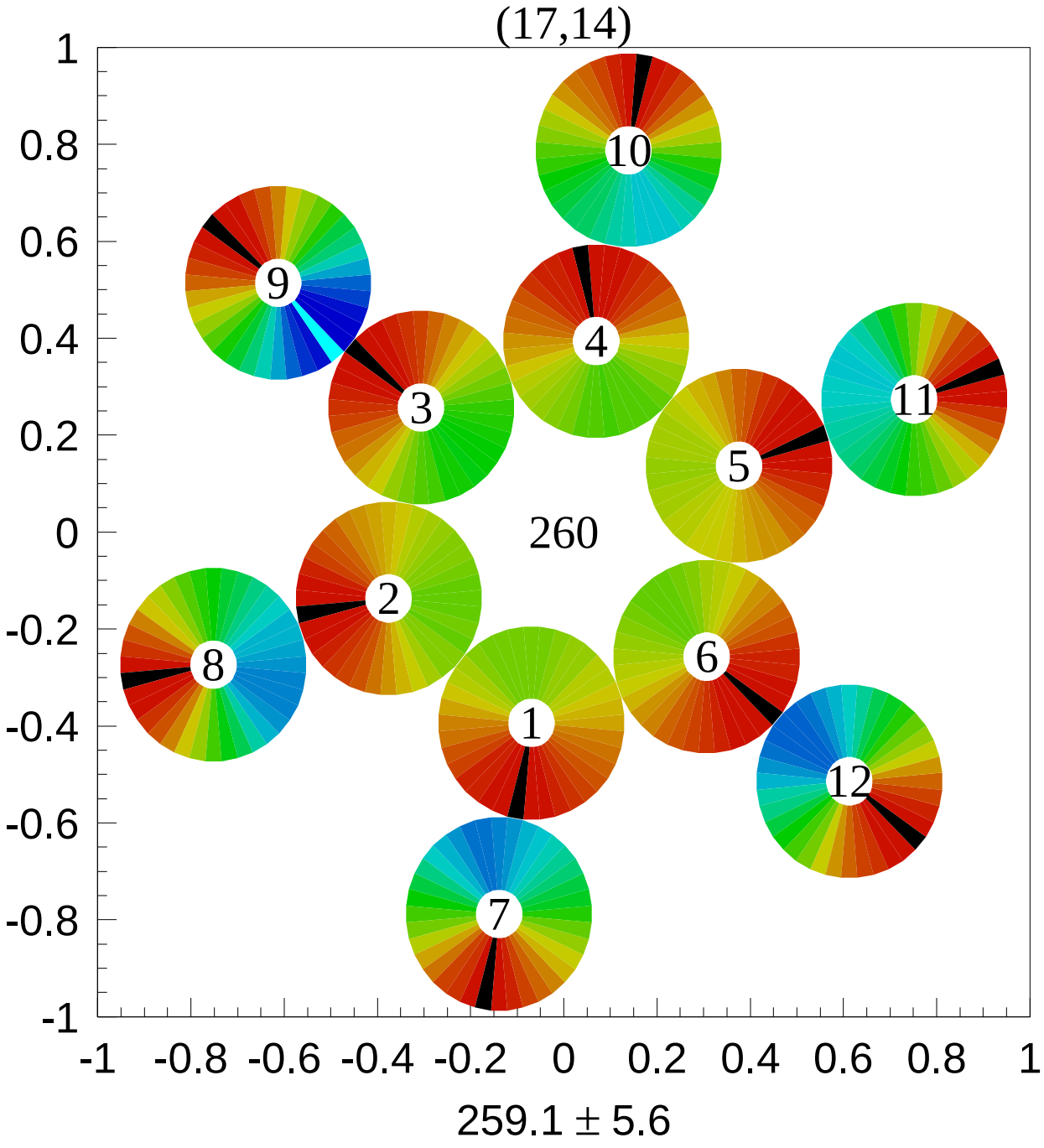

(17,11)
tilted LEDs
112 128 123 117 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 126 126 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

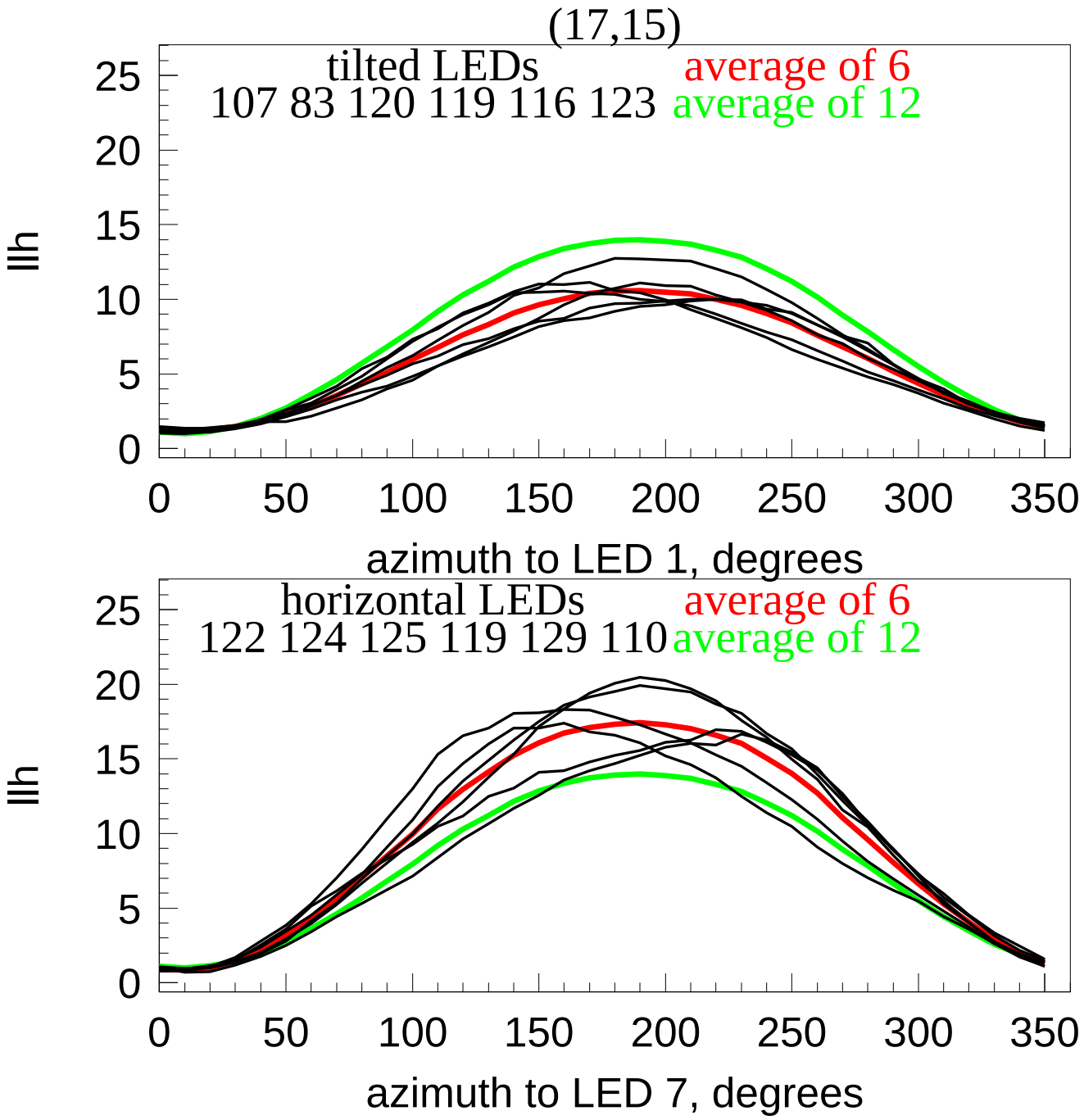

(17,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
89.3 ± 11.8

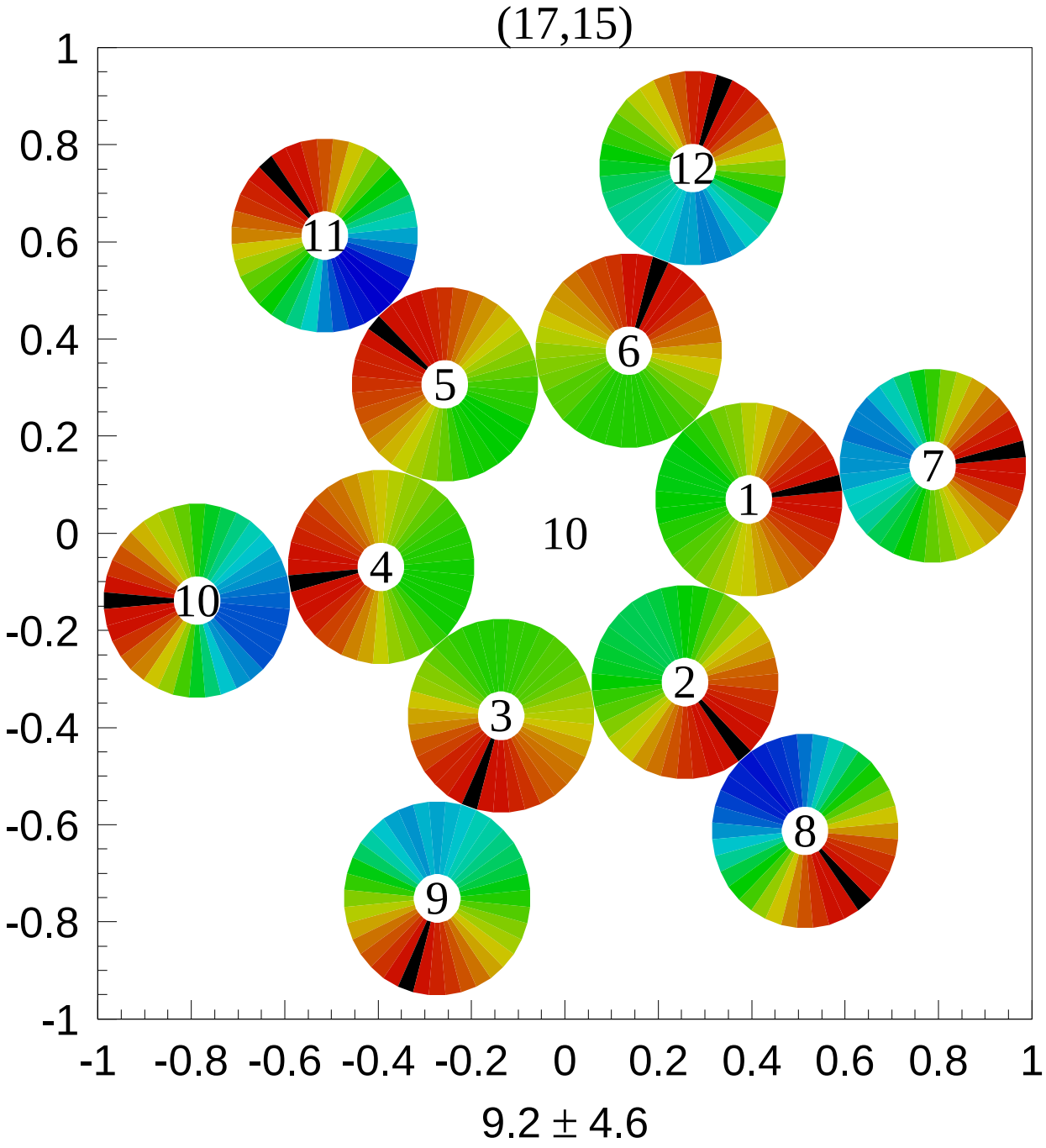

(17,13)
tilted LEDs
124 109 87 117 116 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 115 122 127 118 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

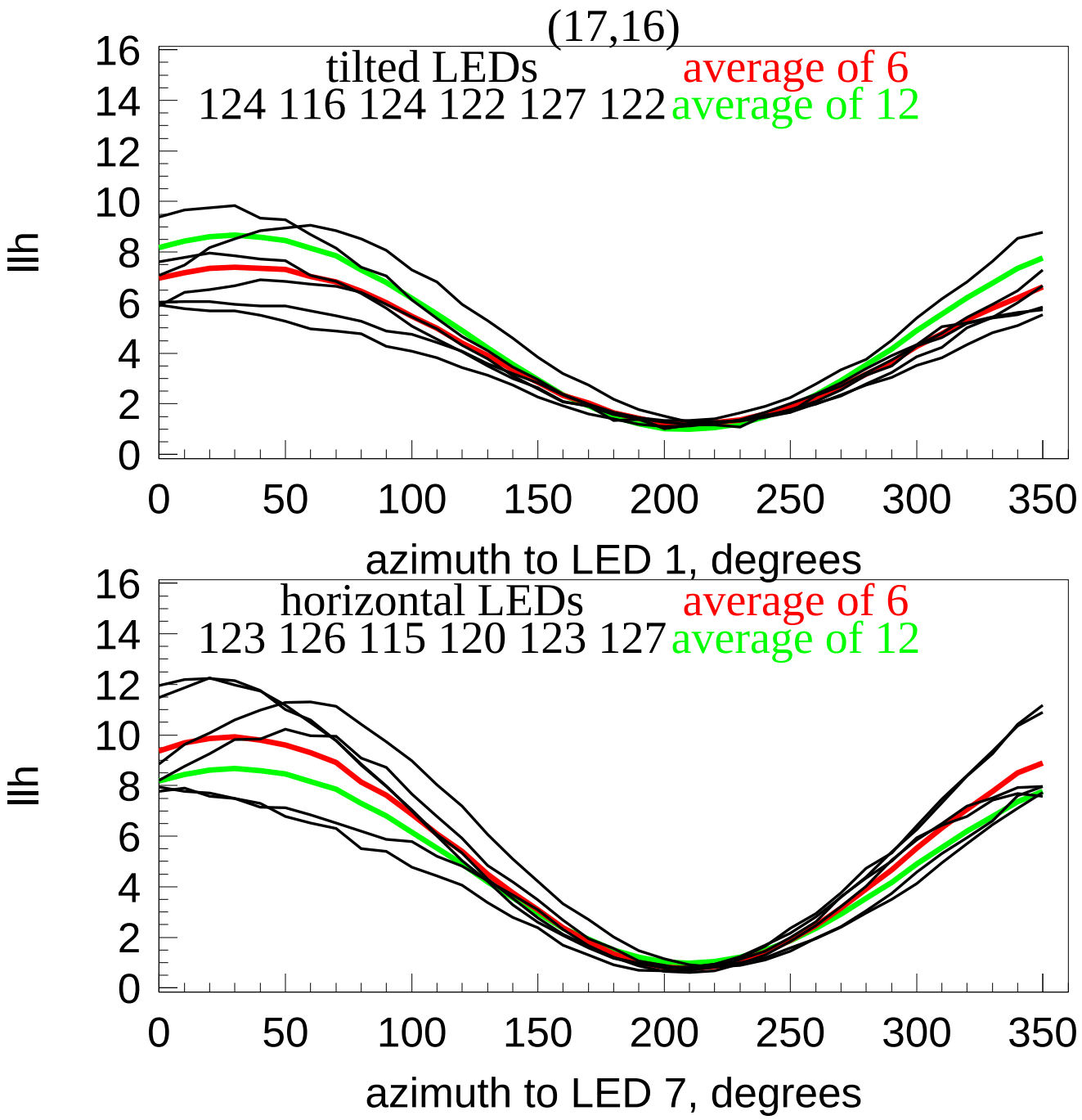

(17,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
17.6 ± 6.3

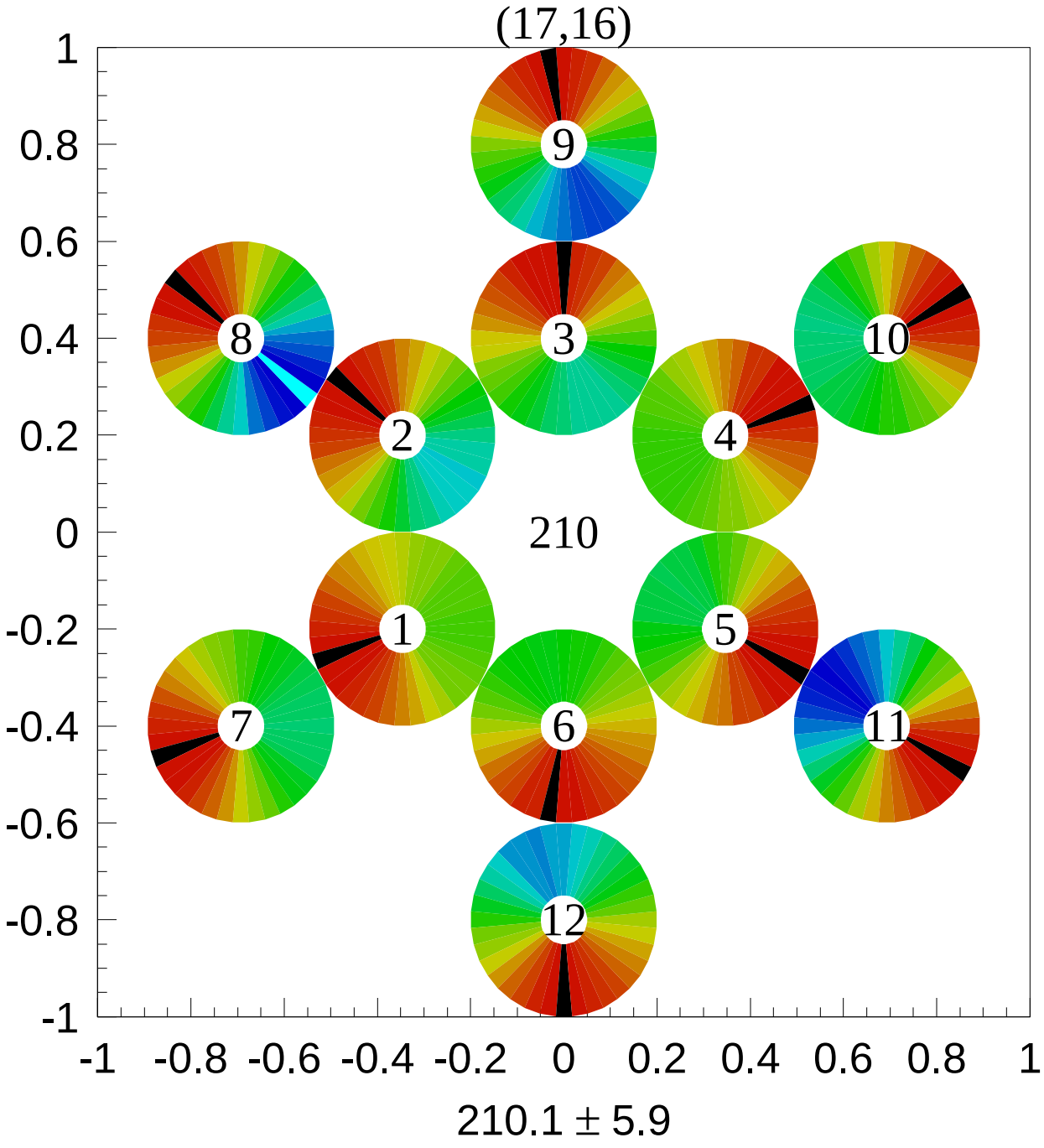

(17,14)
tilted LEDs
121 124 125 122 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 118 124 117 125 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

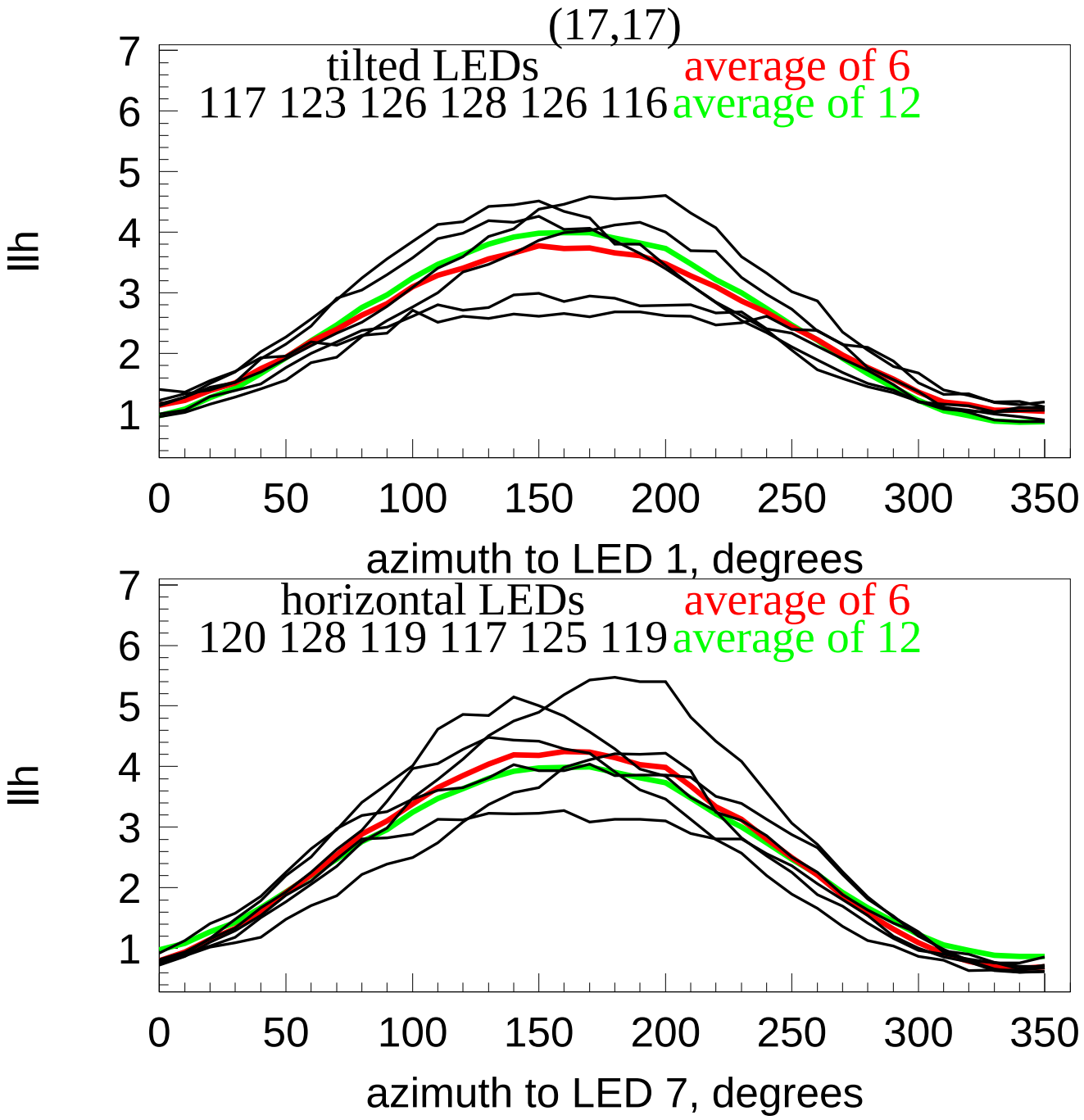

(17,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
259.1 ± 5.6

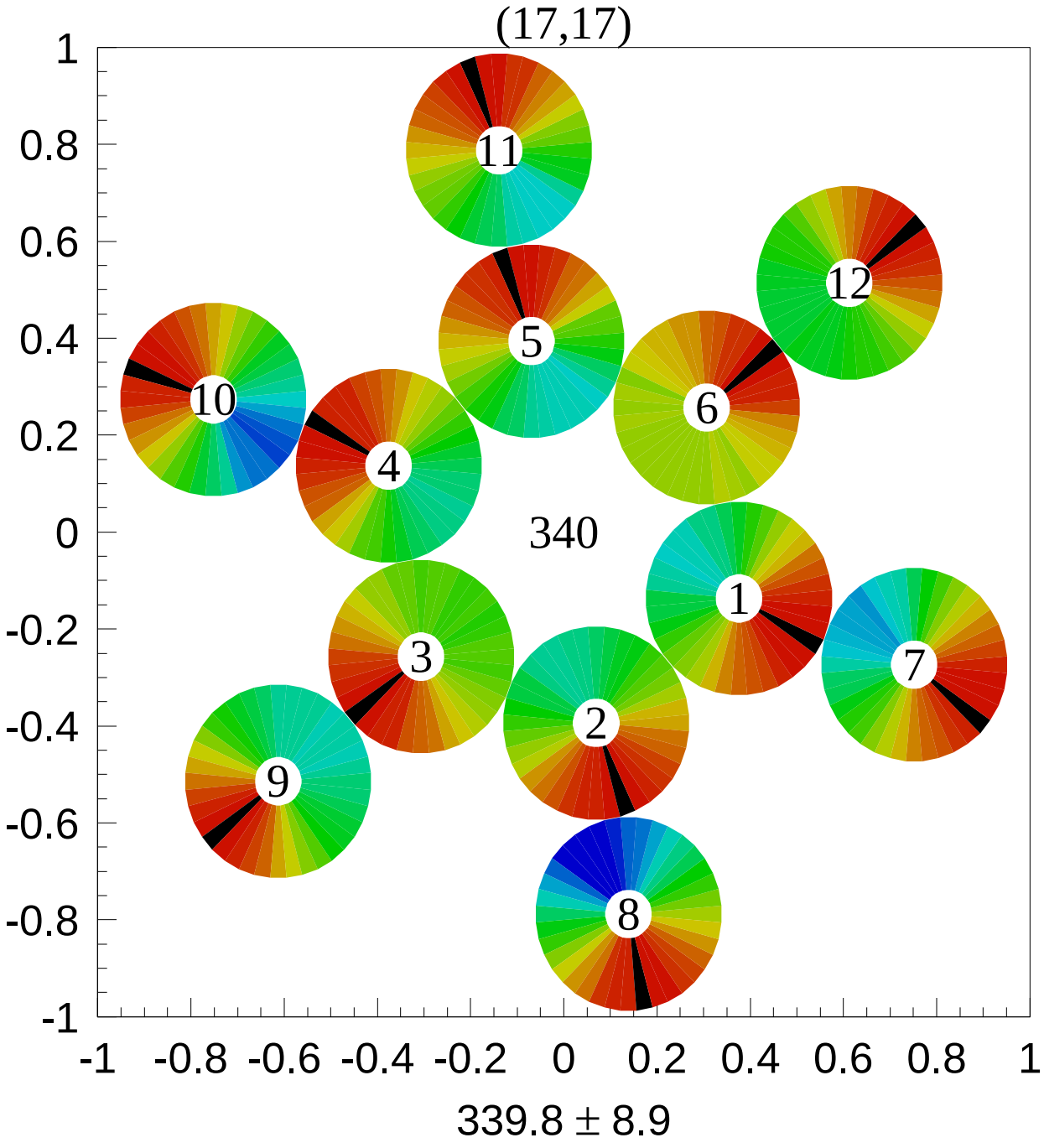

(17,15)
tilted LEDs
107 83 120 119 116 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 125 119 129 110
average of 6
average of 12
llh
azimuth to LED 7, degrees

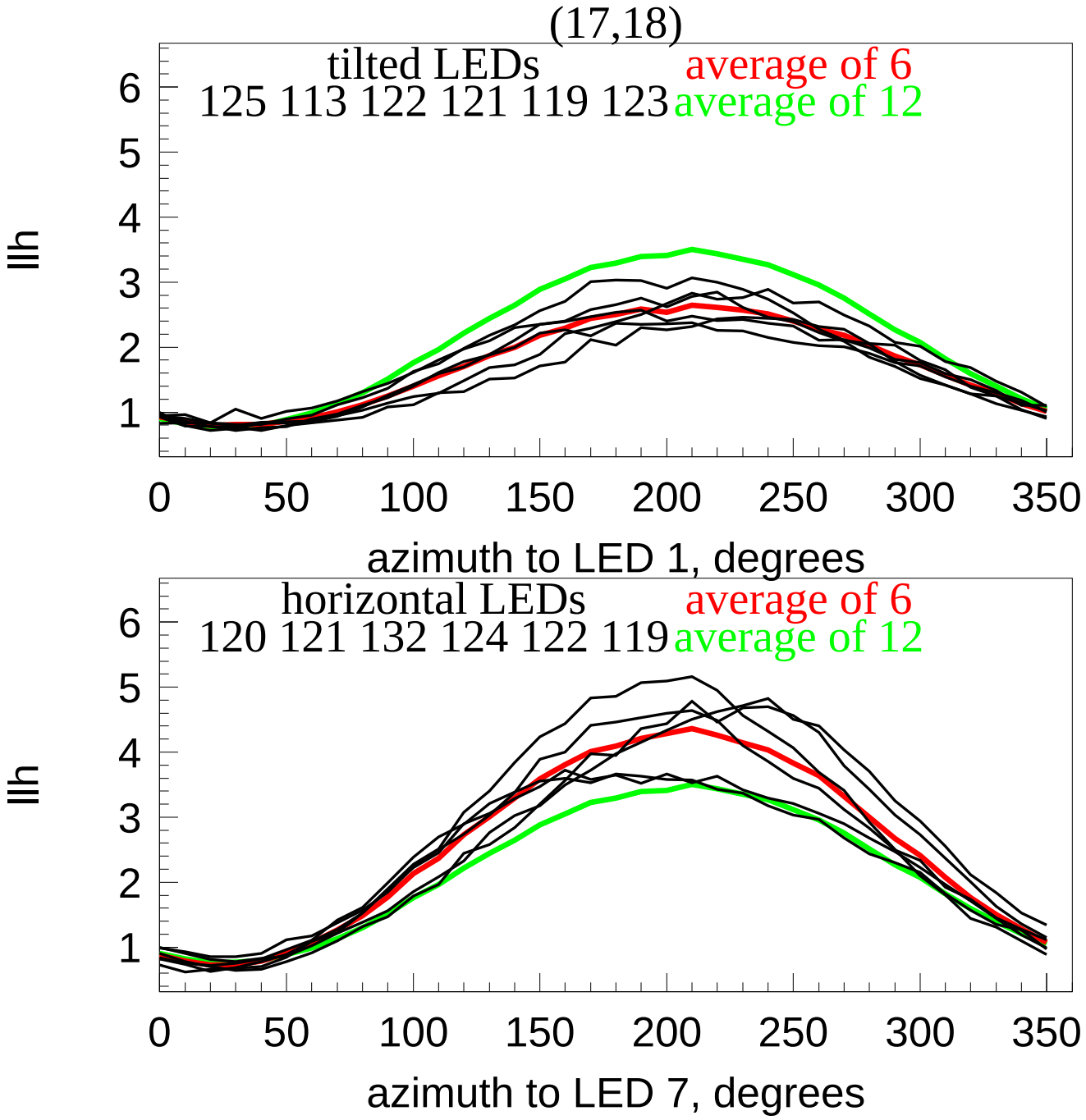

(17,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
9.2 ± 4.6

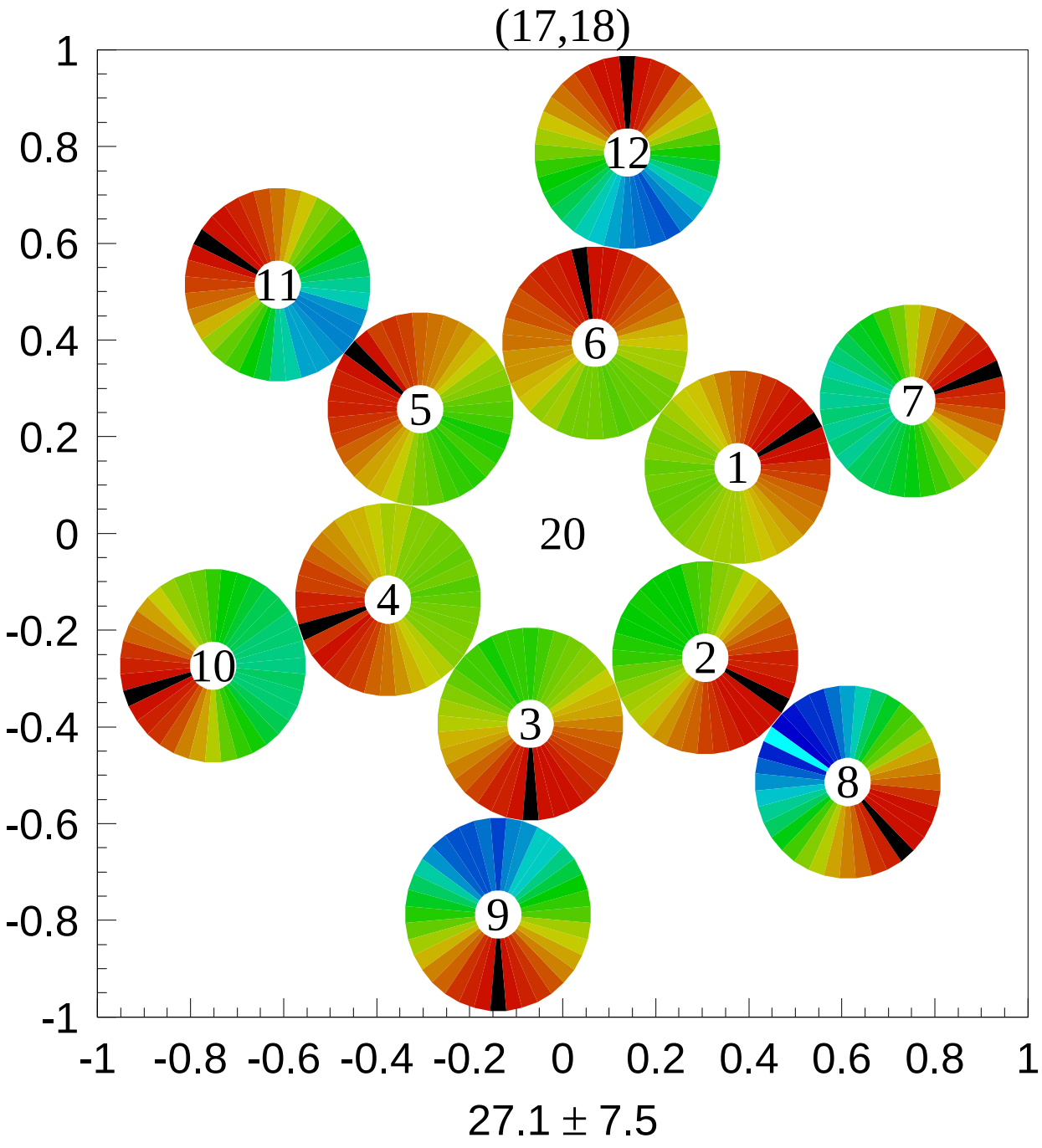

(17,16)
tilted LEDs
124 116 124 122 127 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 126 115 120 123 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

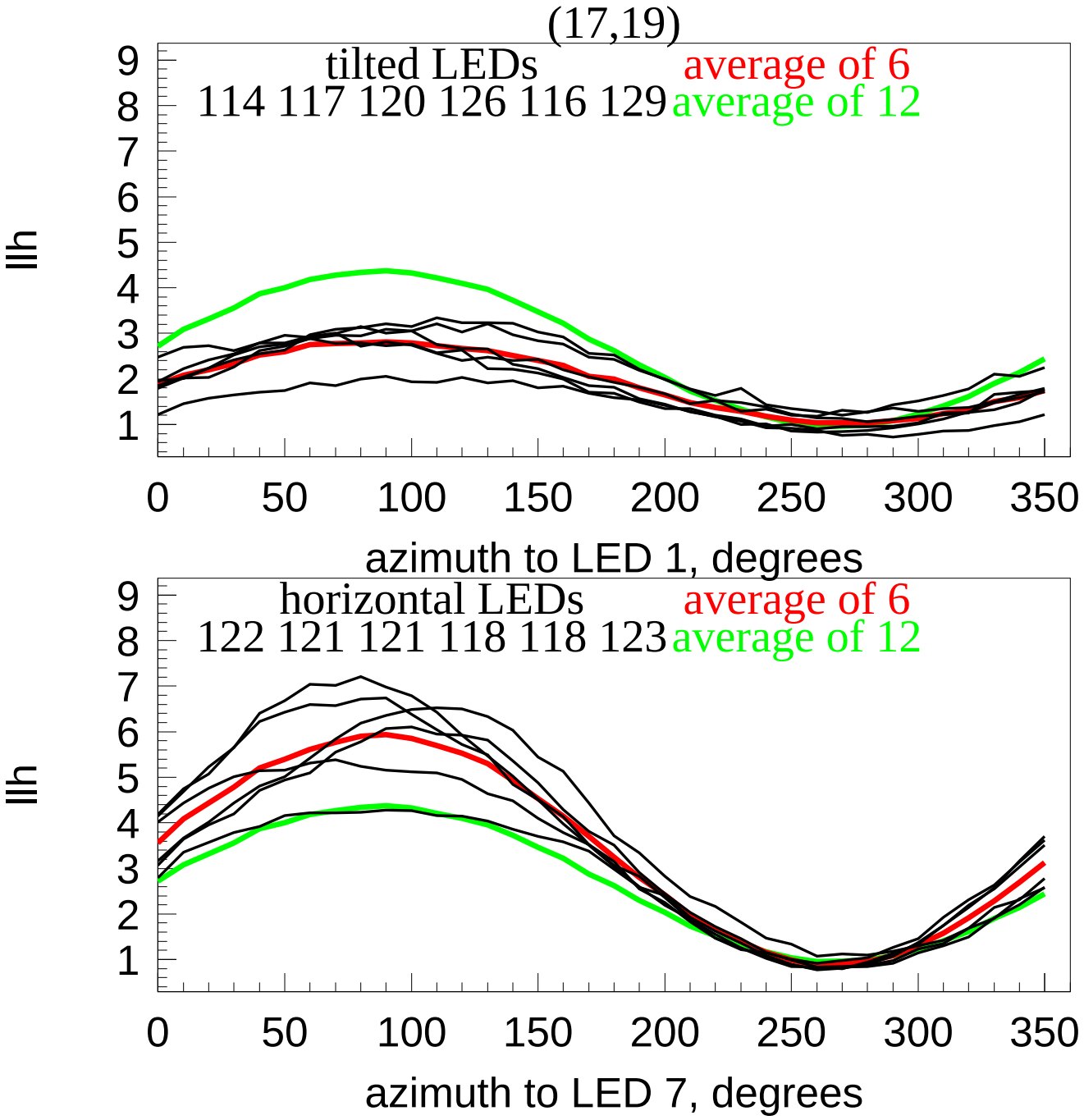

(17,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
10
2
4
210
1
5
7
6
11
12
210.1 ± 5.9

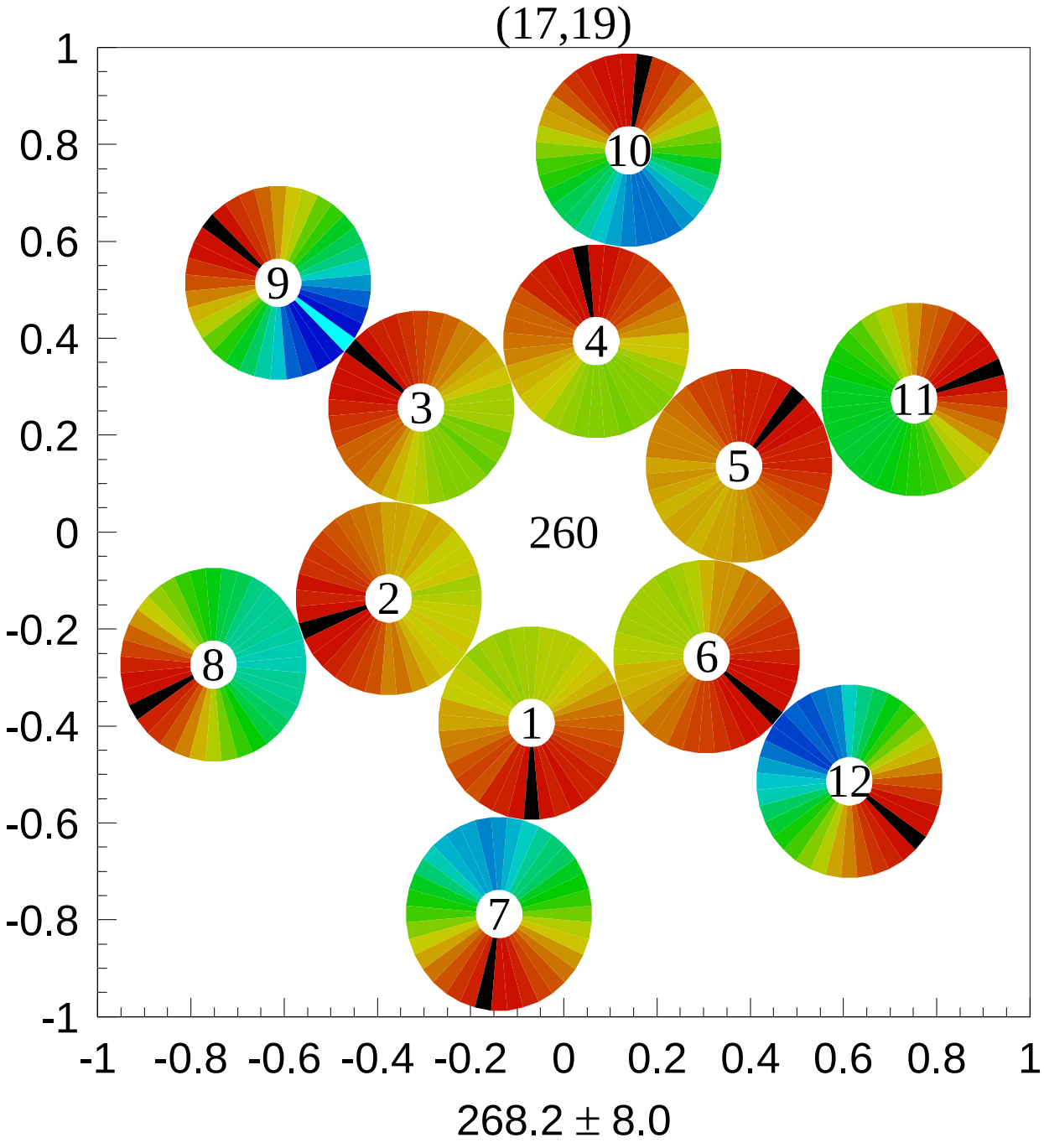

(17,17)
tilted LEDs
117 123 126 128 126 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 128 119 117 125 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

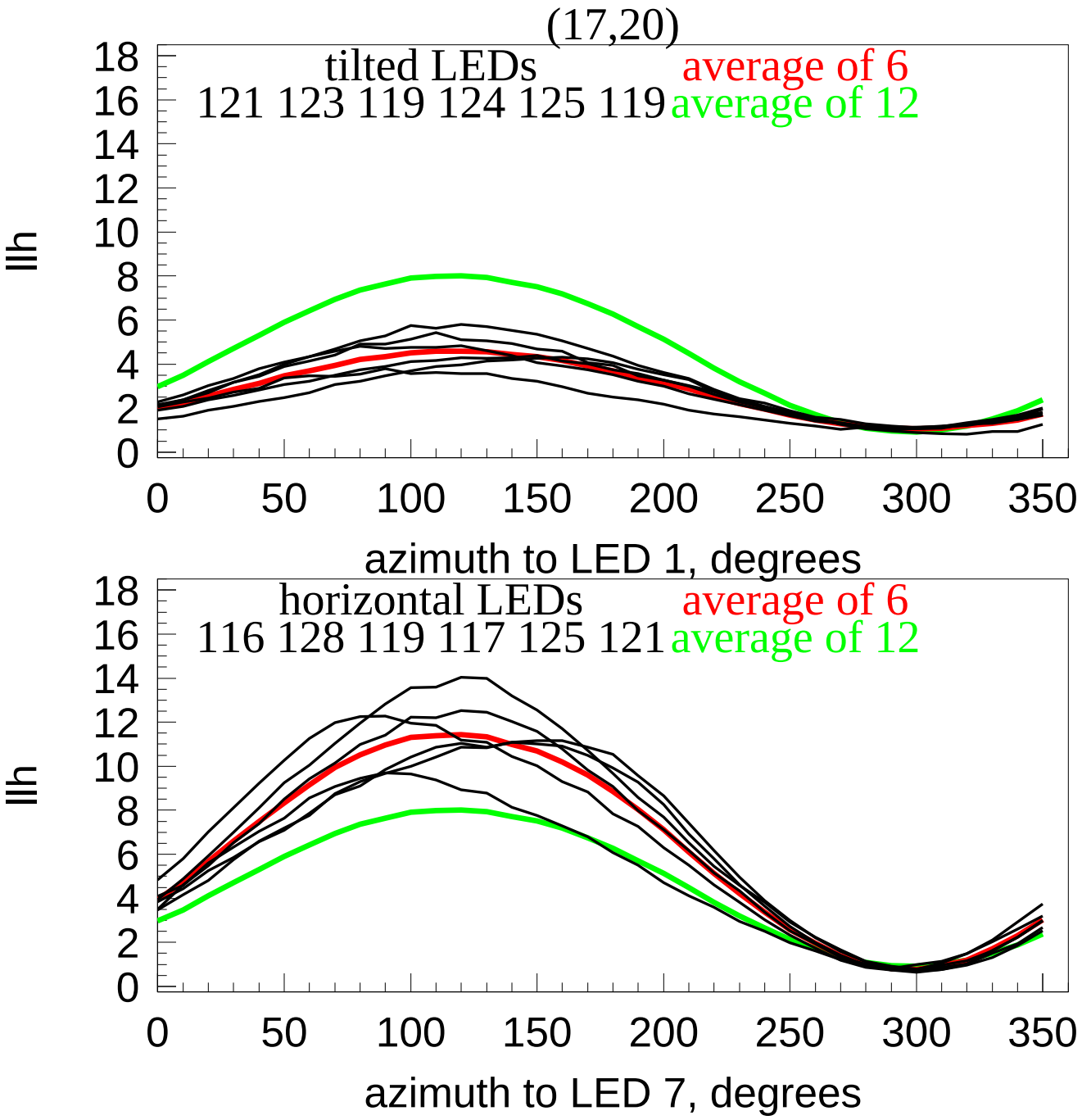

(17,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
339.8 ± 8.9

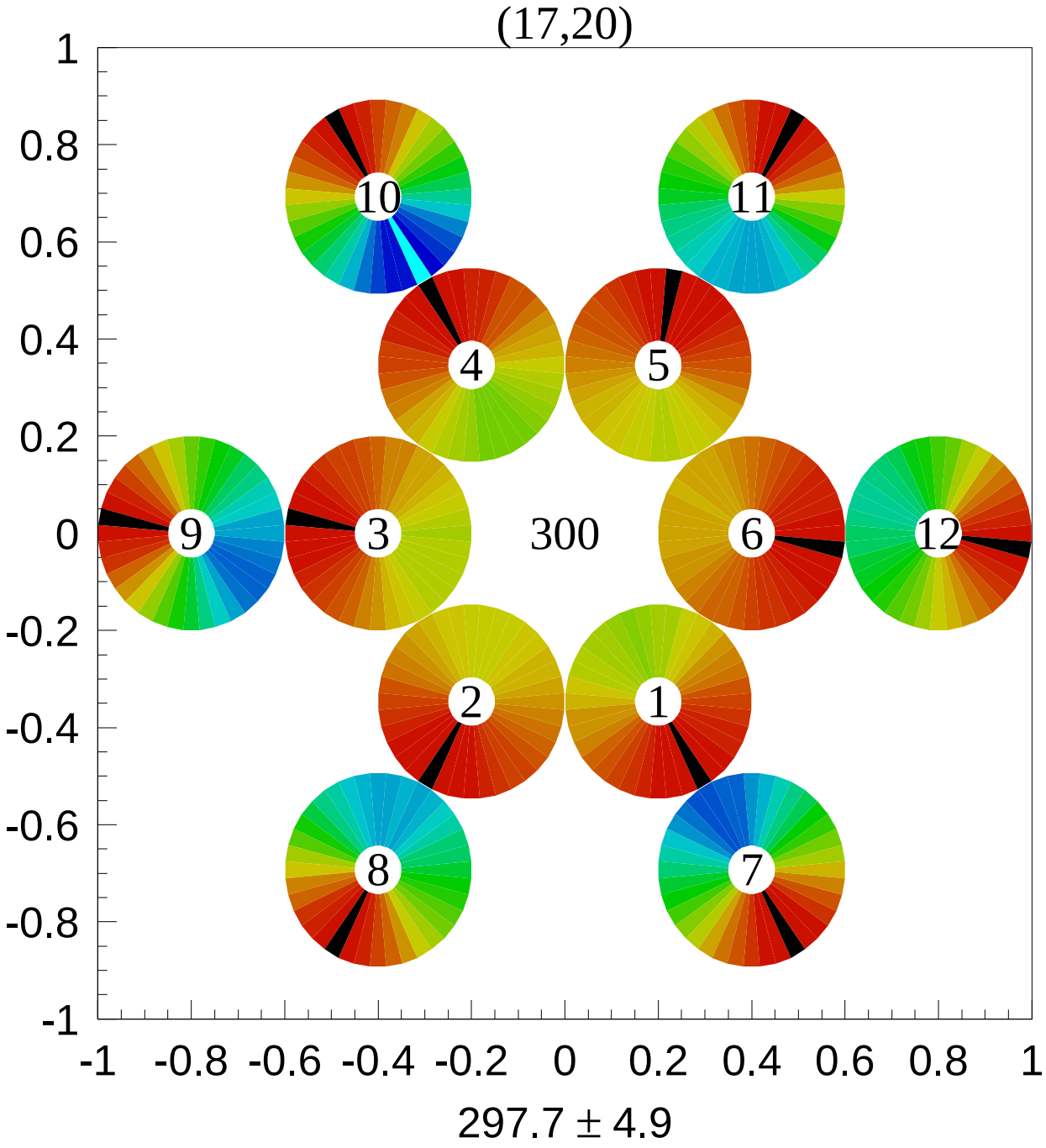

(17,18)
tilted LEDs
125 113 122 121 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 132 124 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

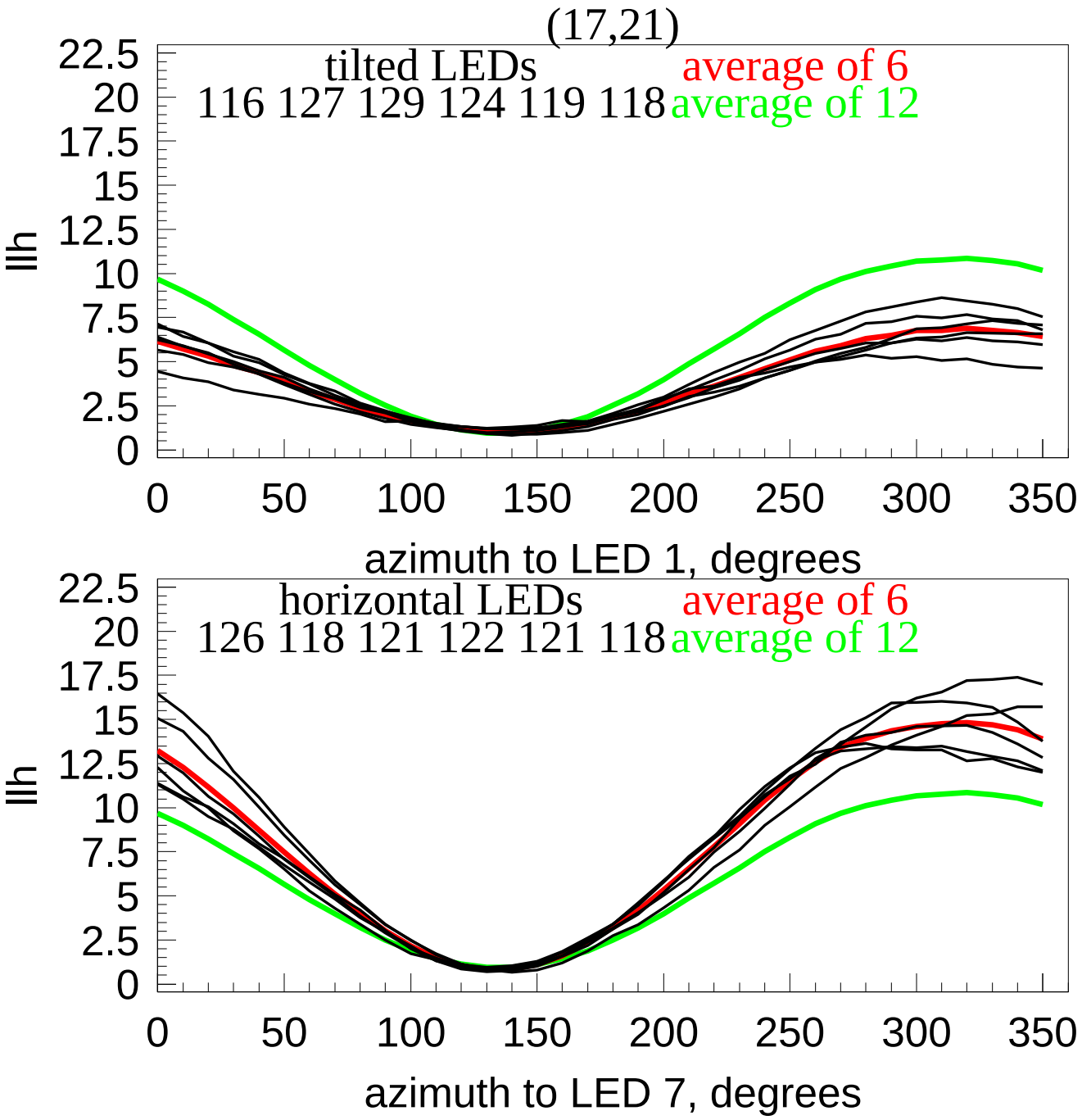

(17,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
27.1 ± 7.5

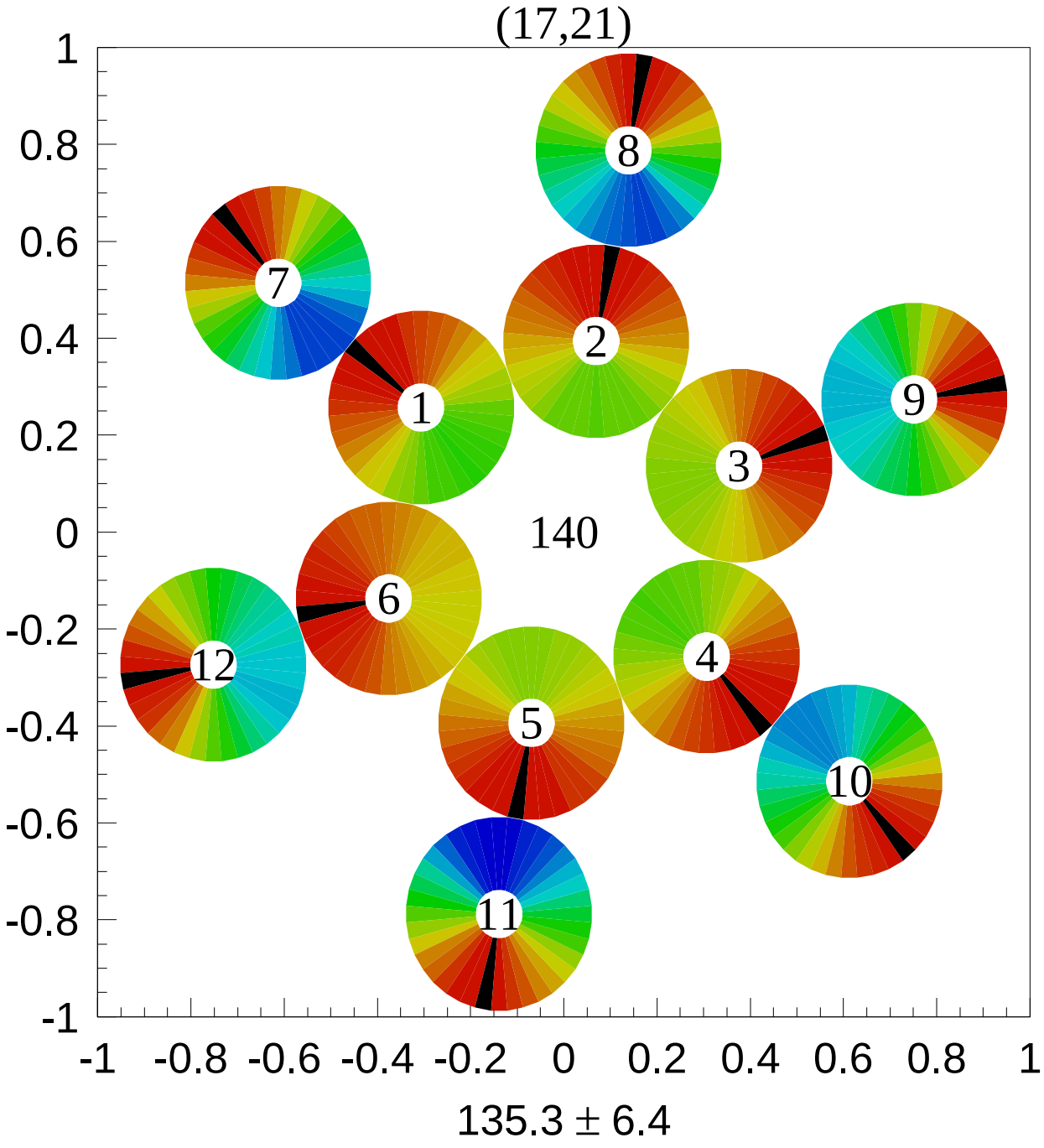

(17,19)
tilted LEDs
114 117 120 126 116 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 121 118 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

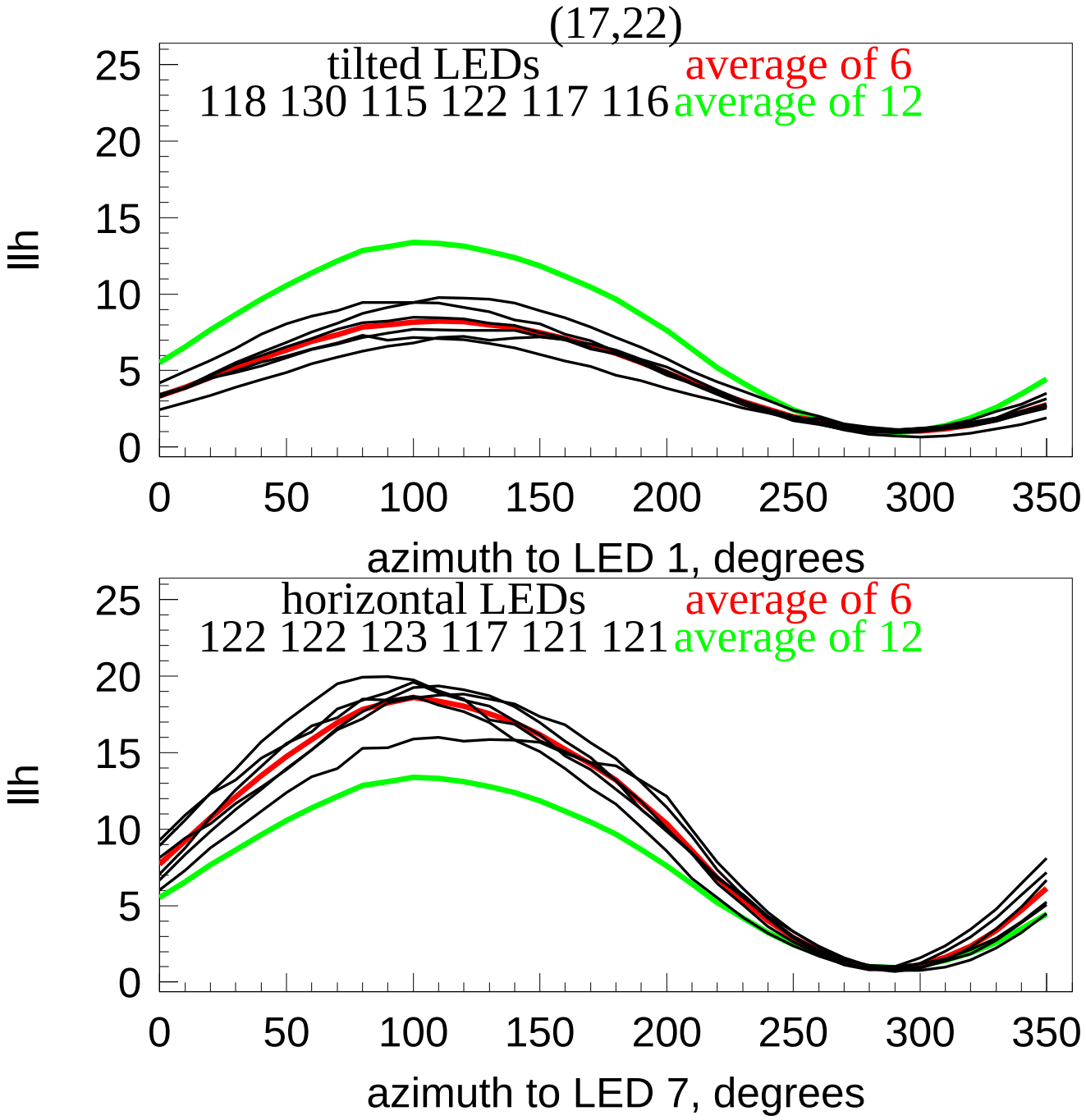

(17,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
268.2 ± 8.0

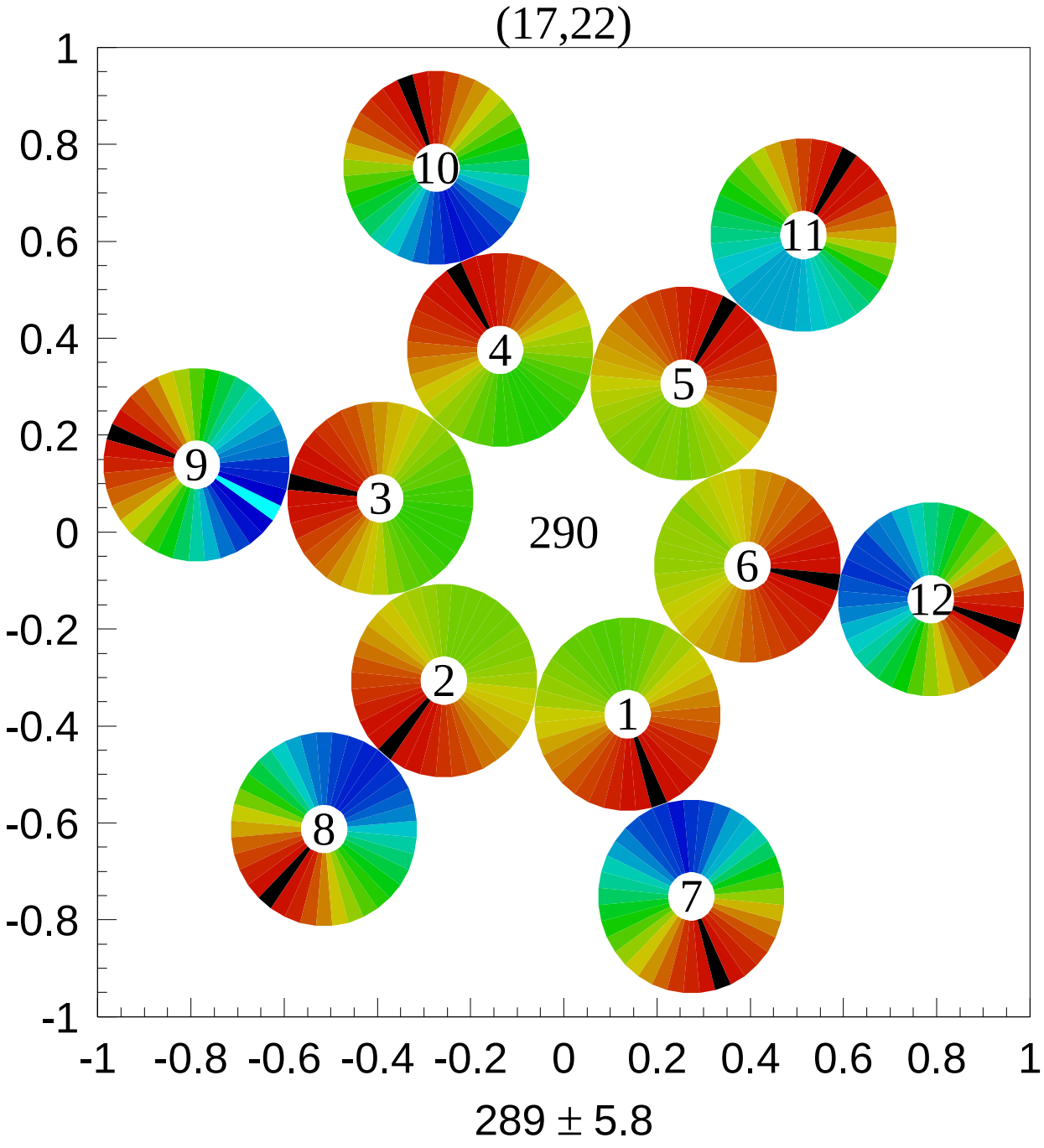

(17,20)
tilted LEDs
121 123 119 124 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 128 119 117 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

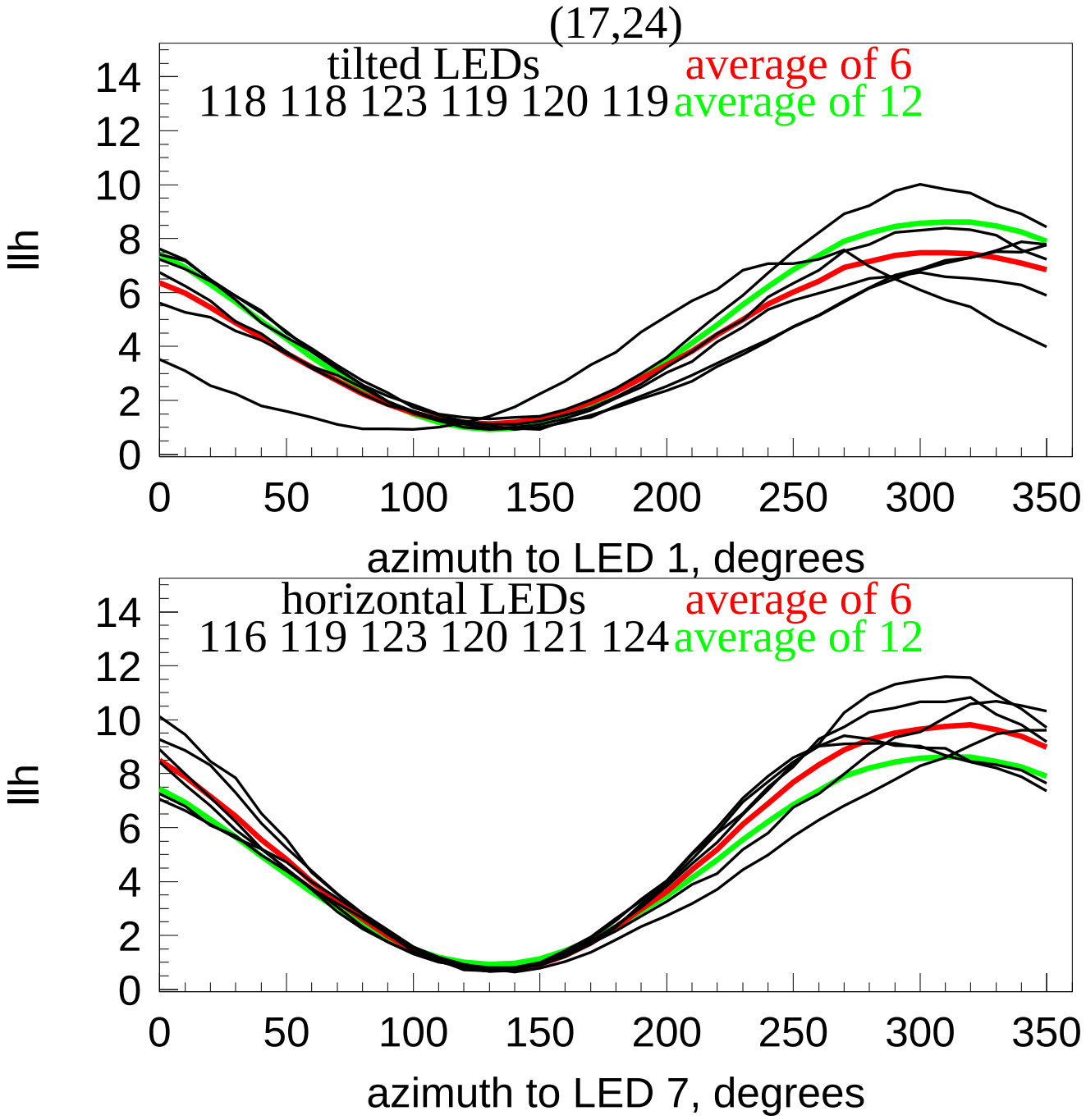

(17,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
297.7 ± 4.9

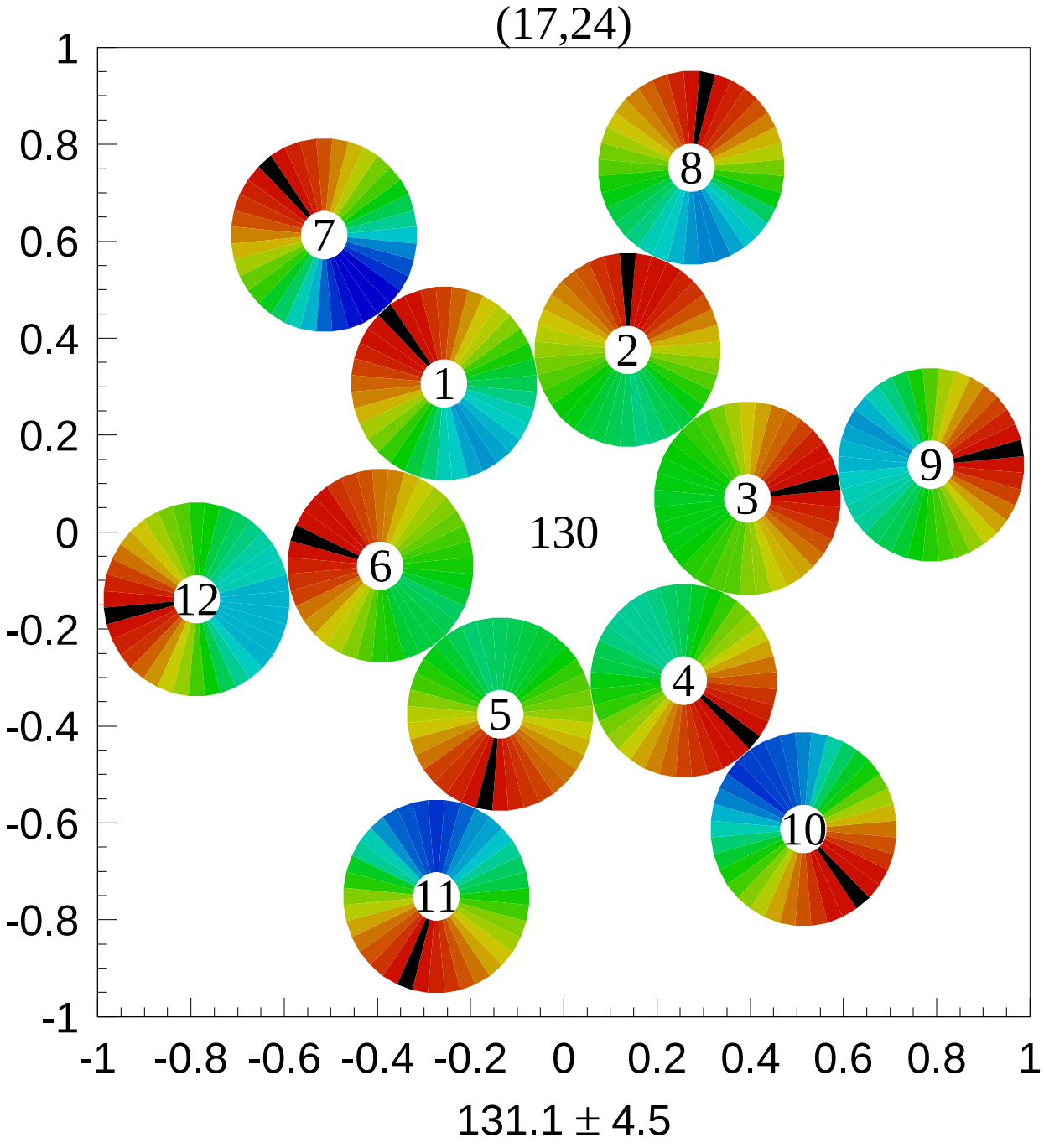

(17,21)
tilted LEDs
116 127 129 124 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 118 121 122 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

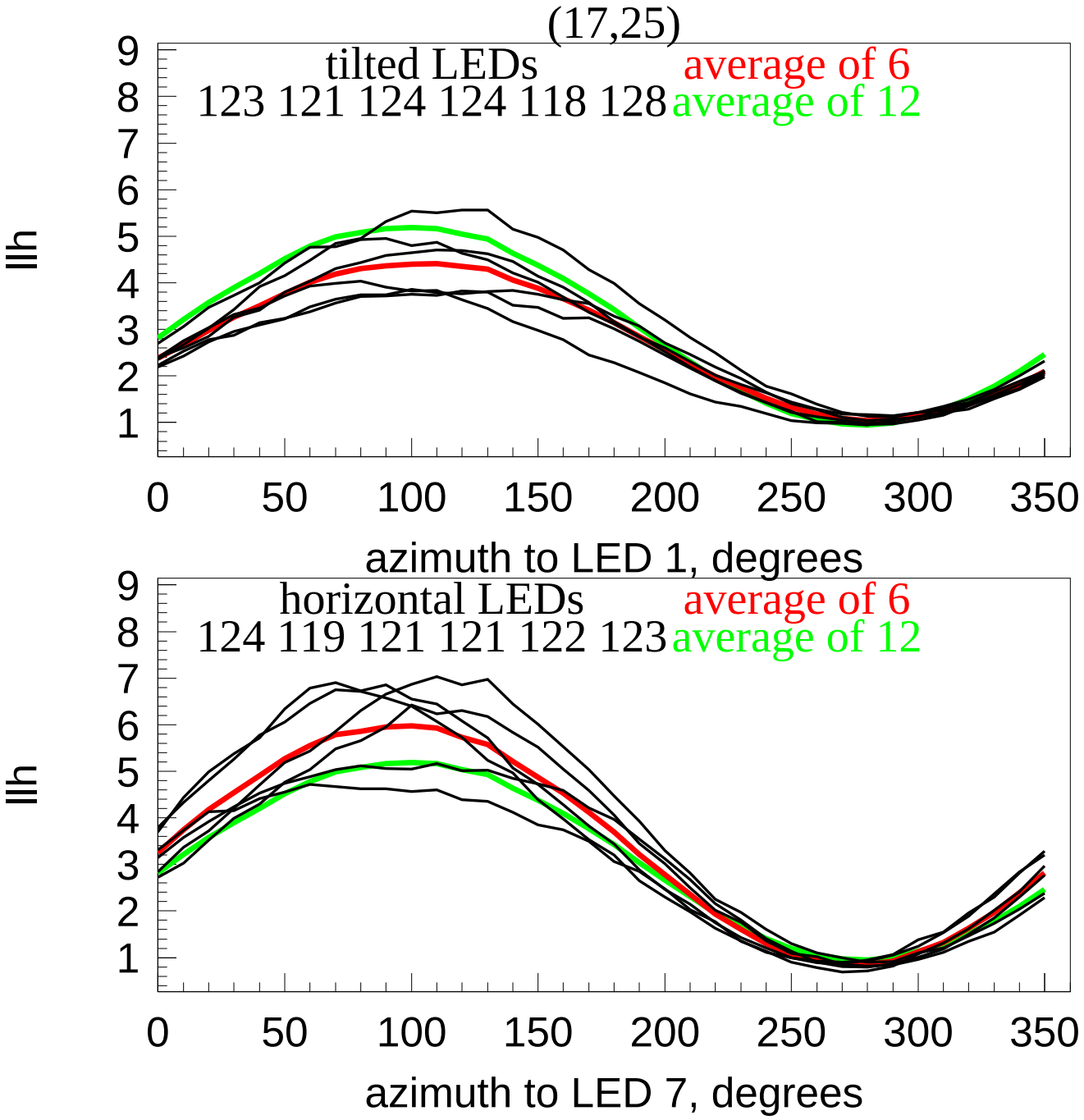

(17,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
135.3 ± 6.4
140
1
2
3
4
5
6
7
8
9
10
11
12

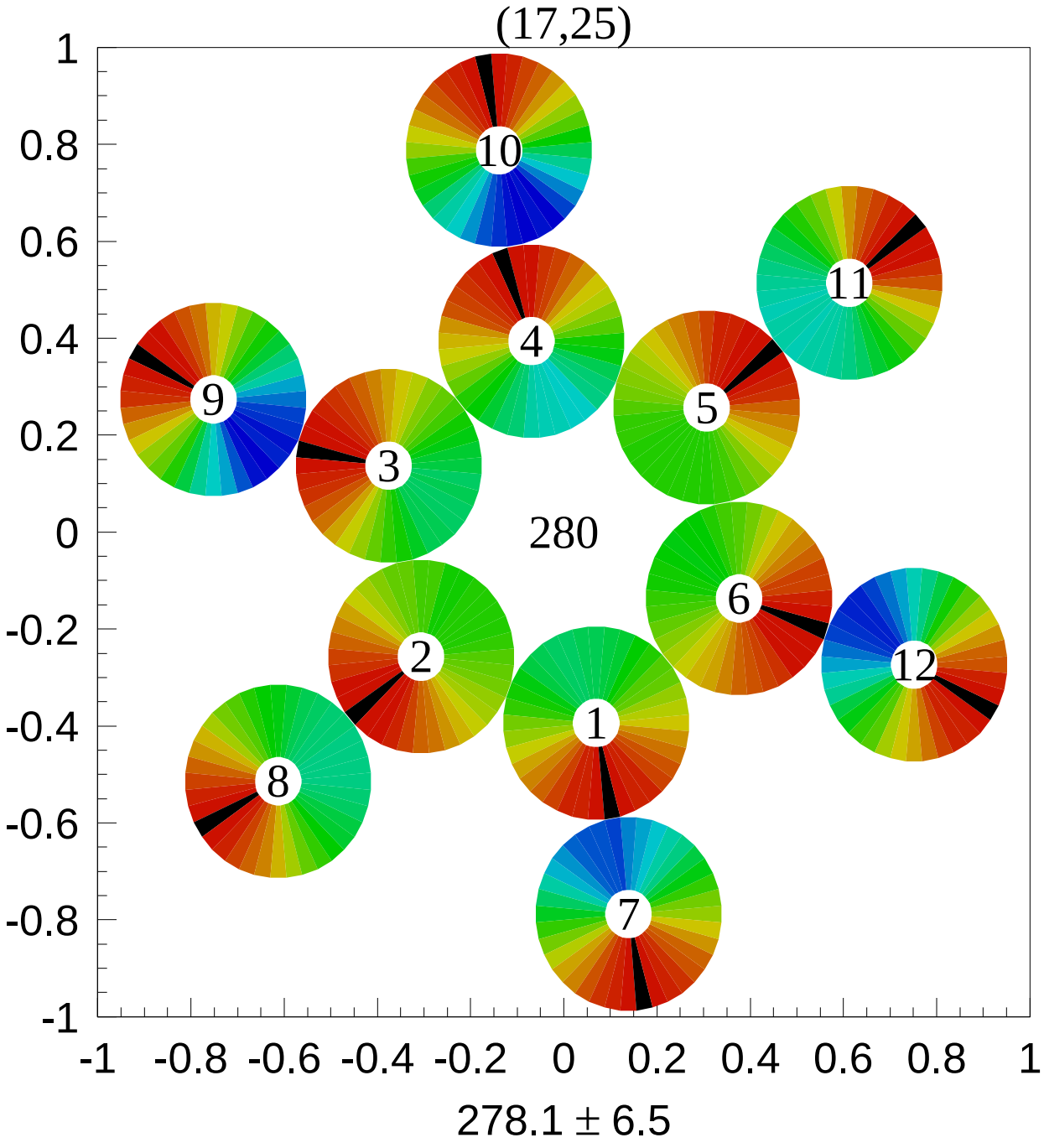

(17,22)
tilted LEDs
118 130 115 122 117 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 123 117 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

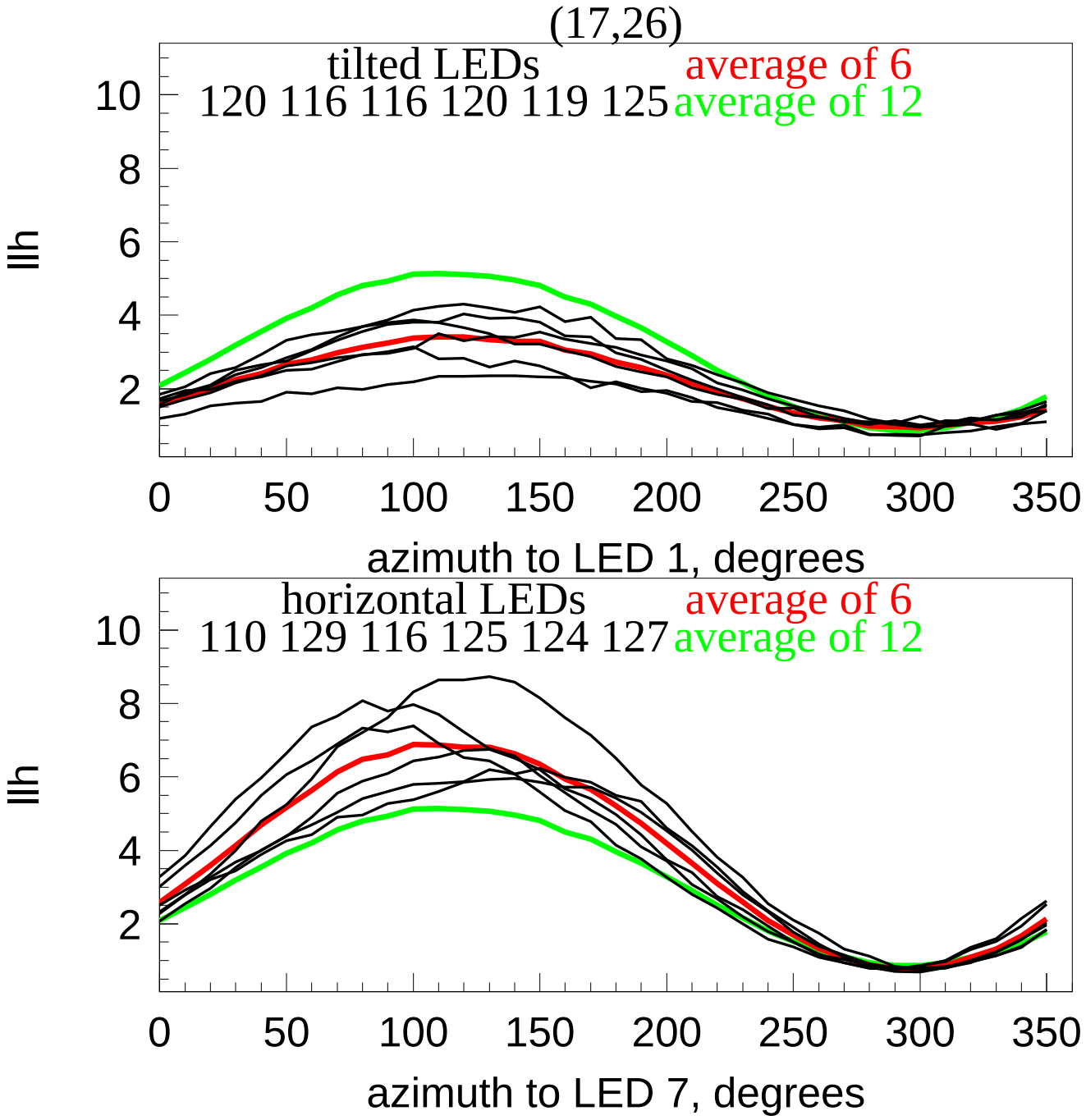

(17,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
289 ± 5.8

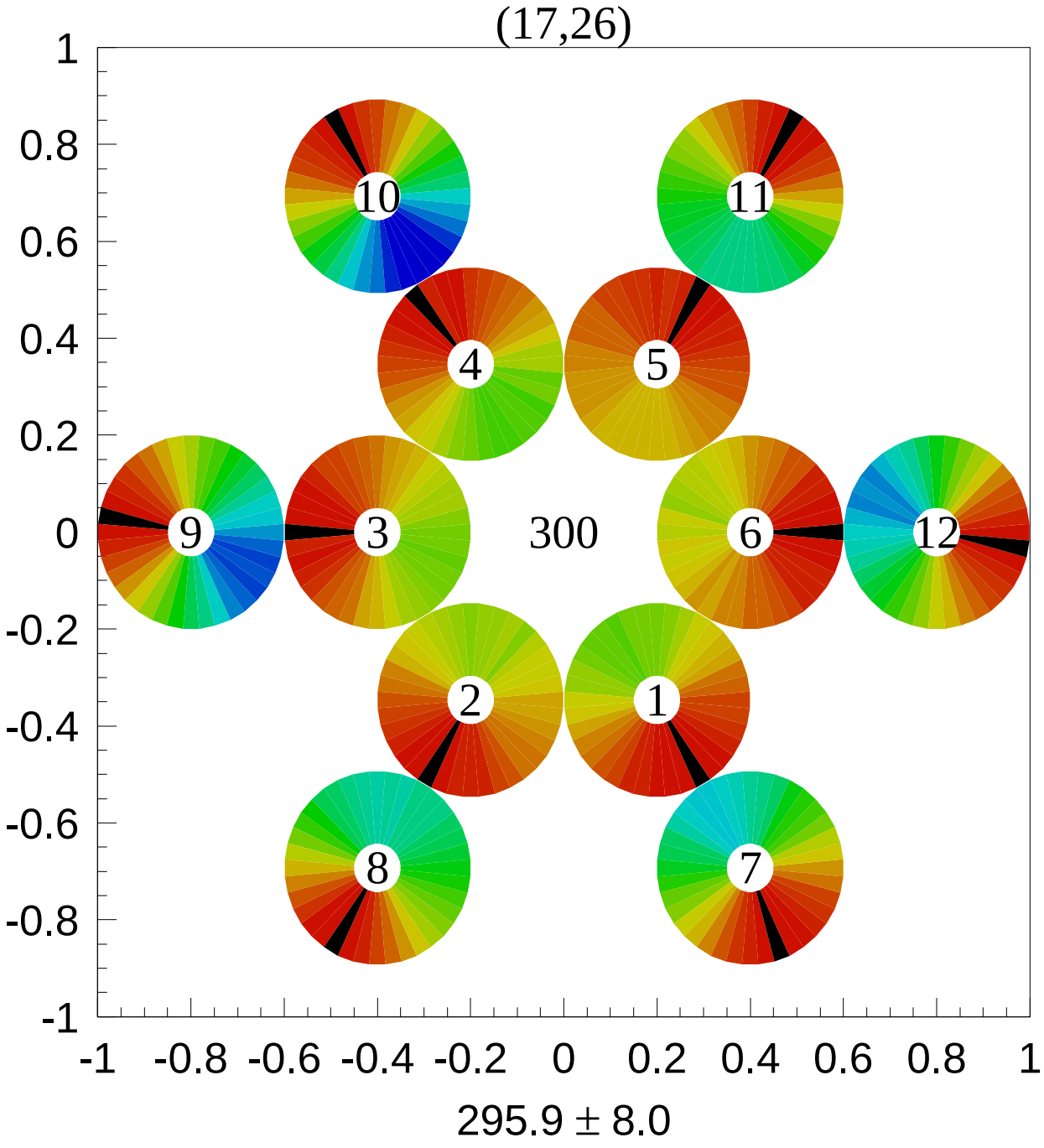

(17,24)
tilted LEDs
118 118 123 119 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 119 123 120 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

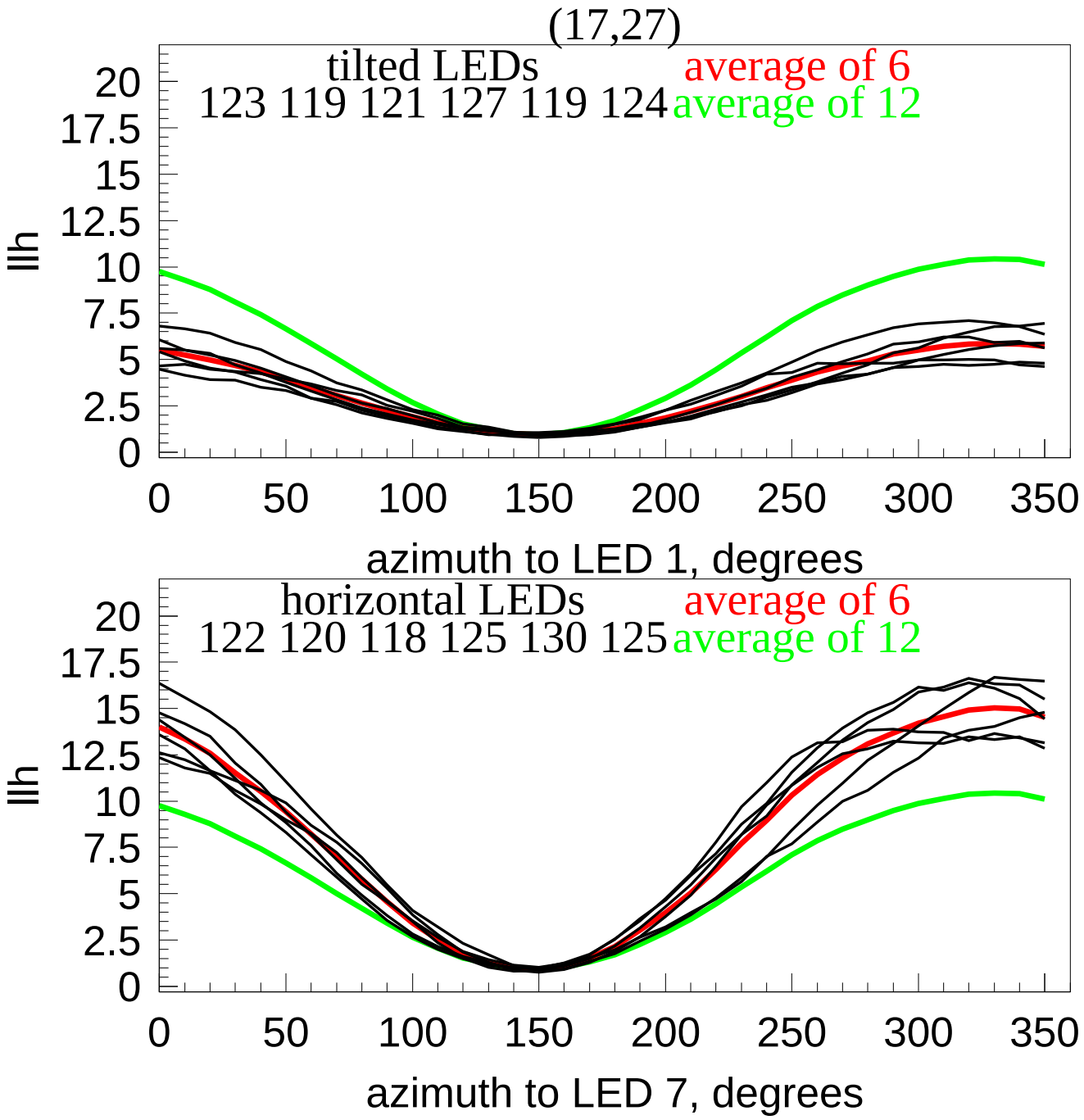

(17,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
131.1 ± 4.5

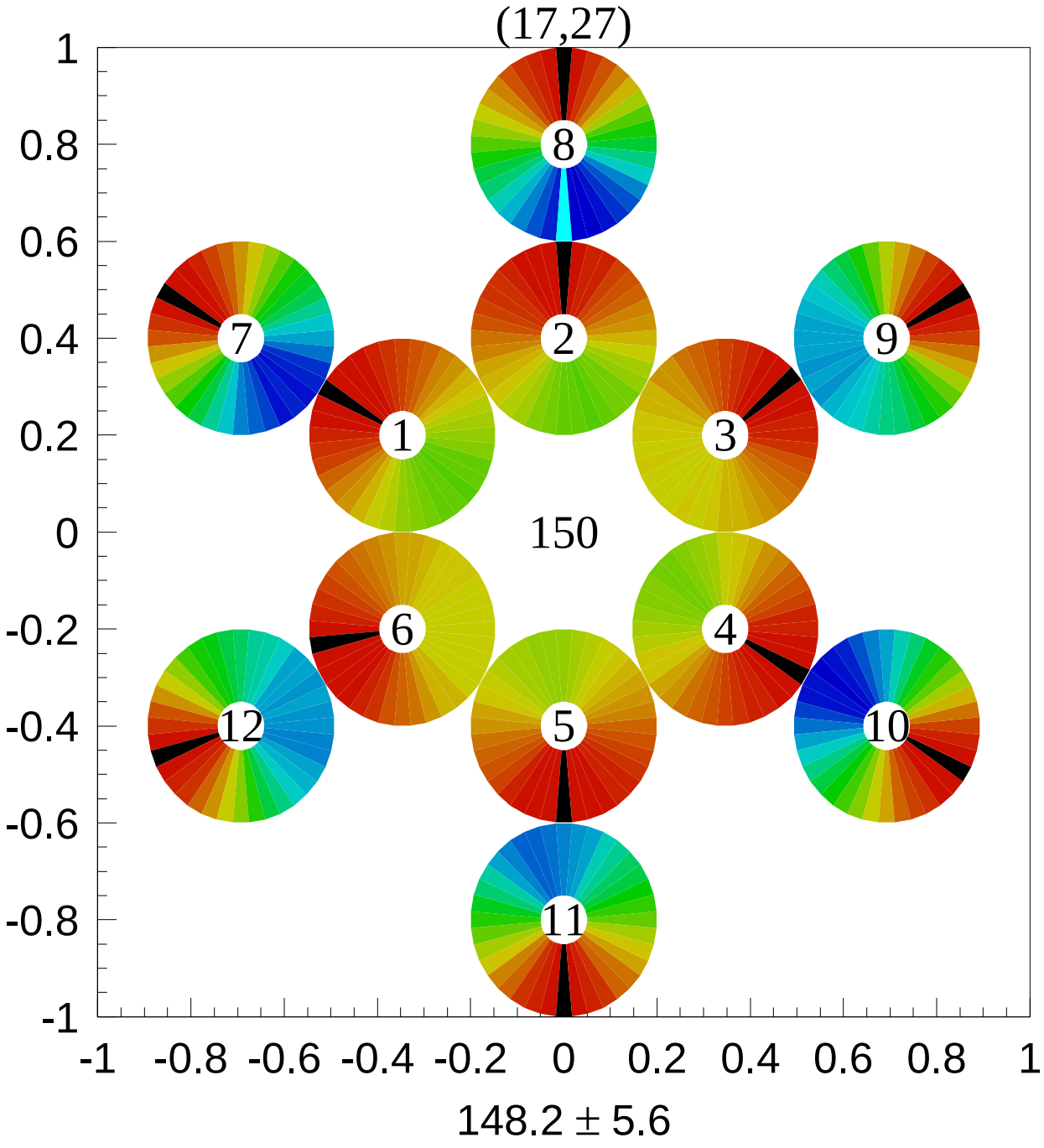

(17,25)
tilted LEDs
123 121 124 124 118 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 121 121 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

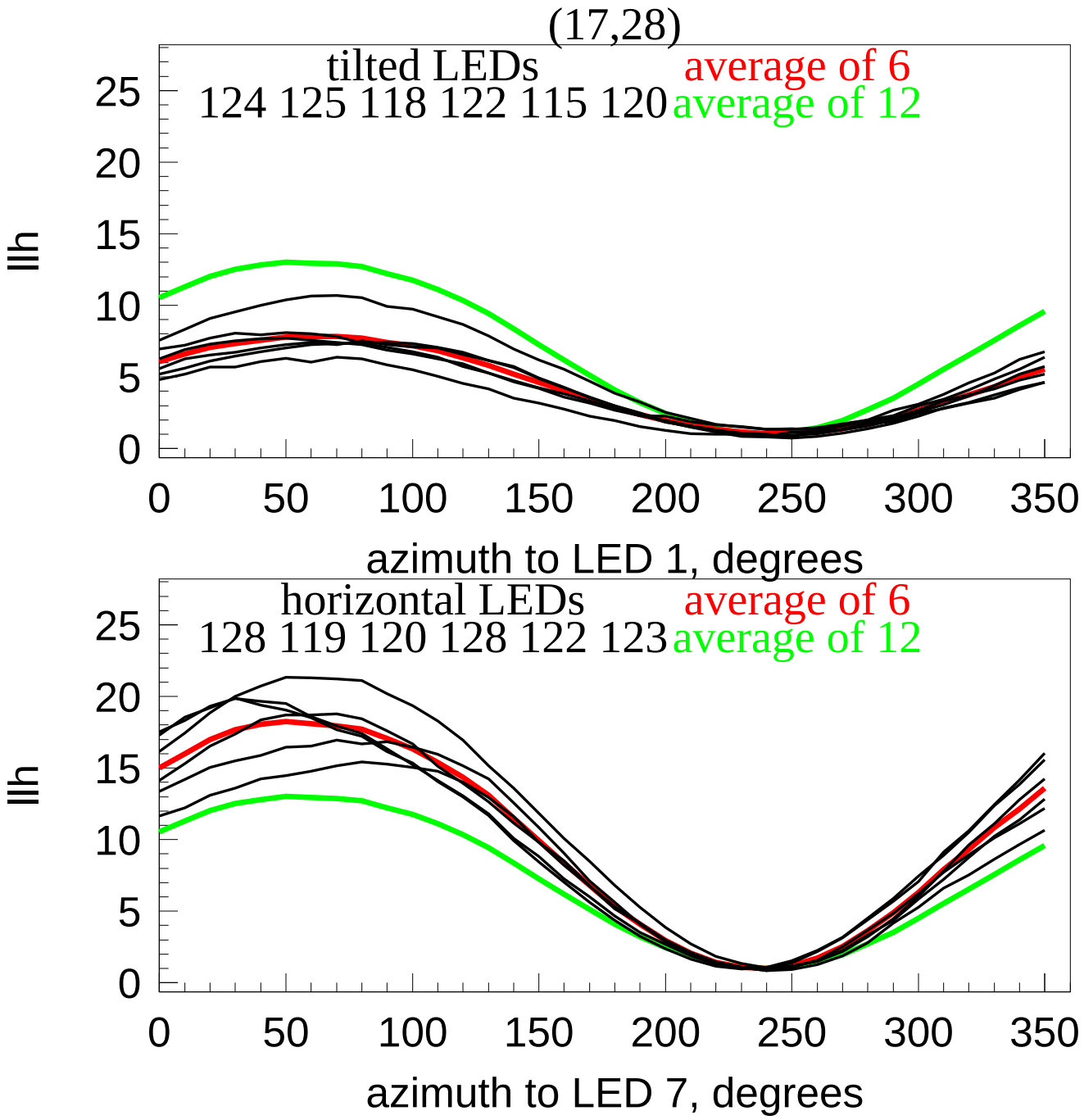

(17,25)
10
4
11
9
5
3
280
6
2
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
278.1 ± 6.5

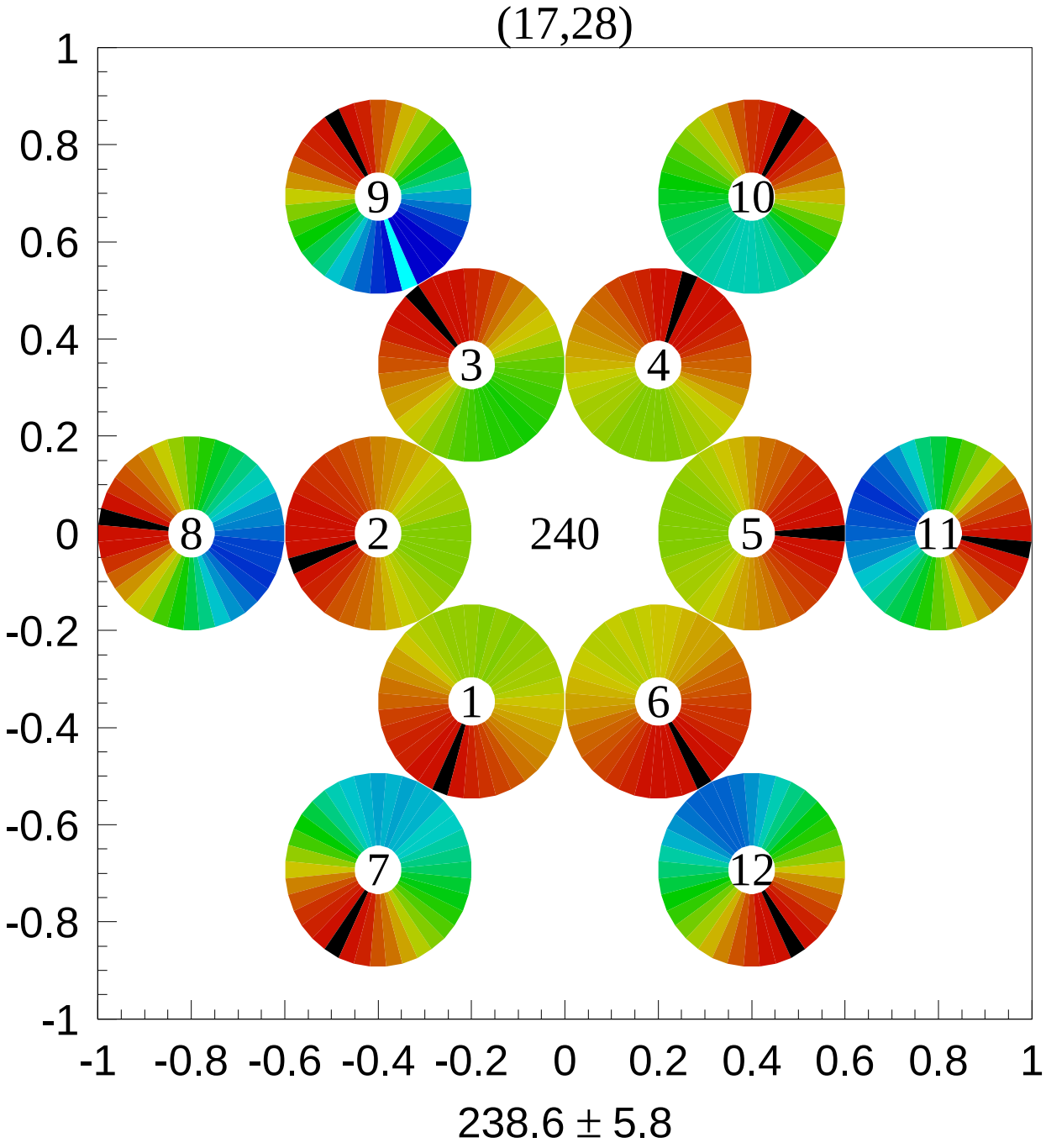

(17,26)
tilted LEDs
120 116 116 120 119 125
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
110 129 116 125 124 127
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

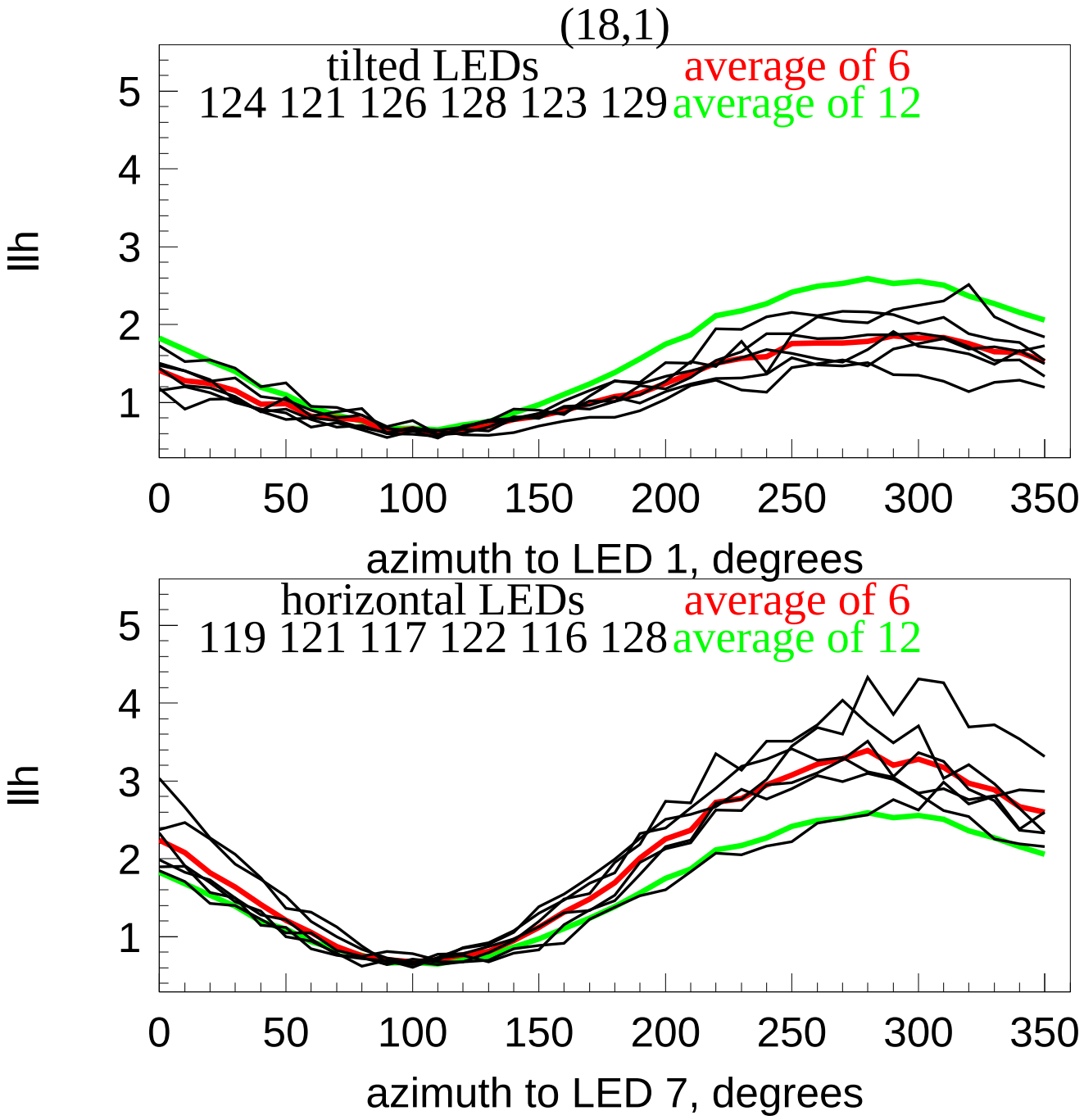

(17,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
295.9 ± 8.0

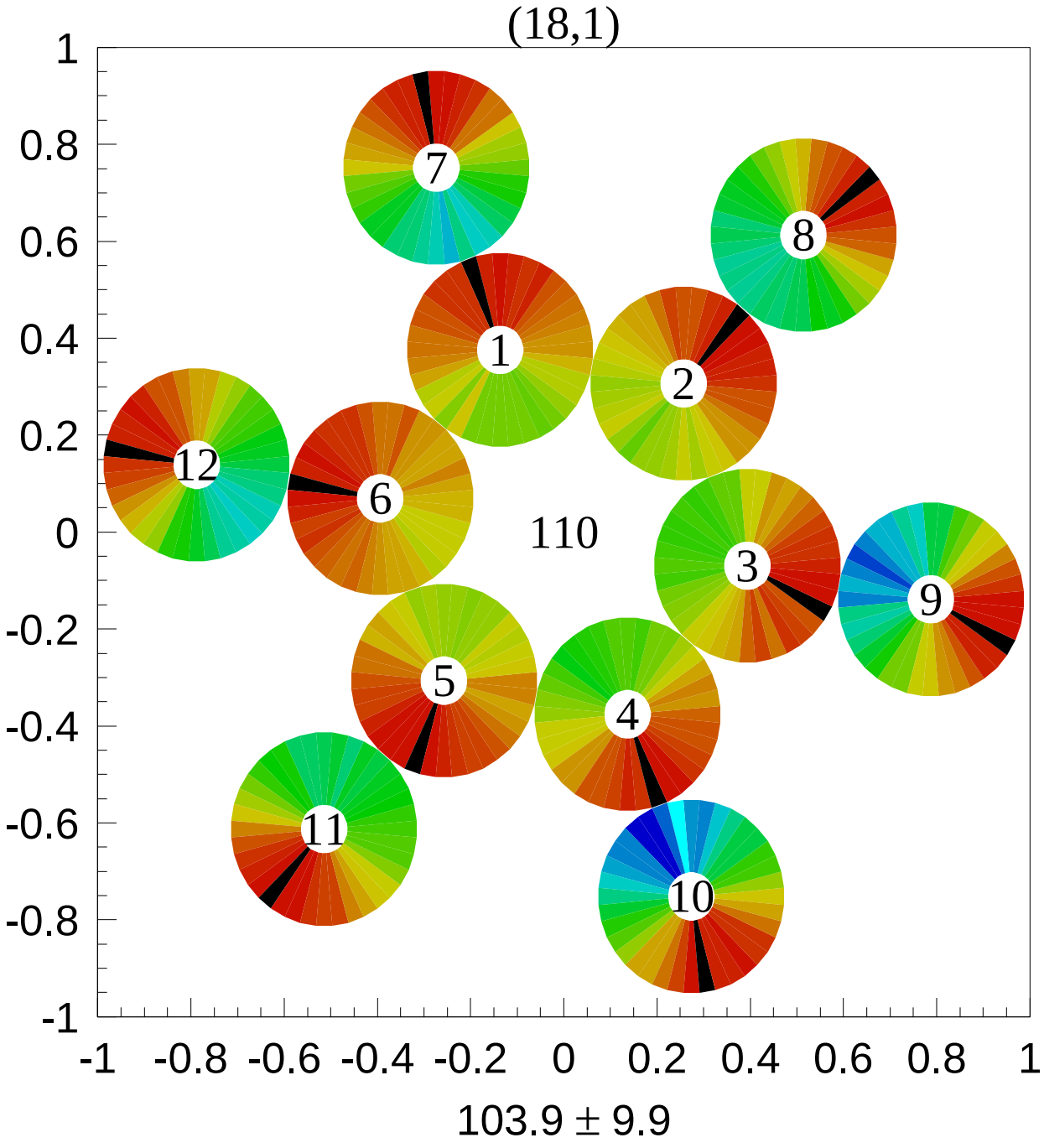

(17,27)
tilted LEDs
123 119 121 127 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 120 118 125 130 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

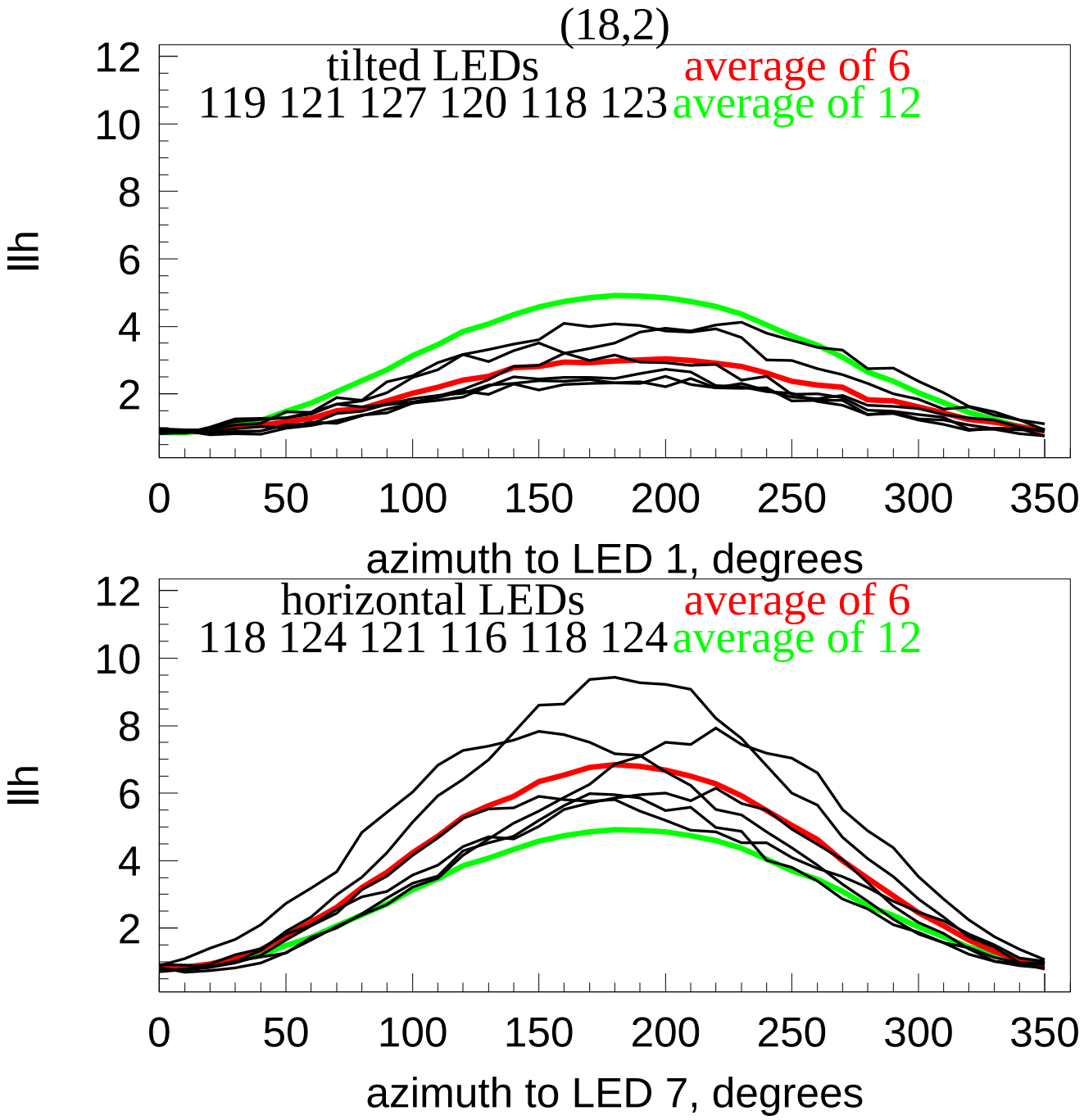

(17,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
148.2 ± 5.6

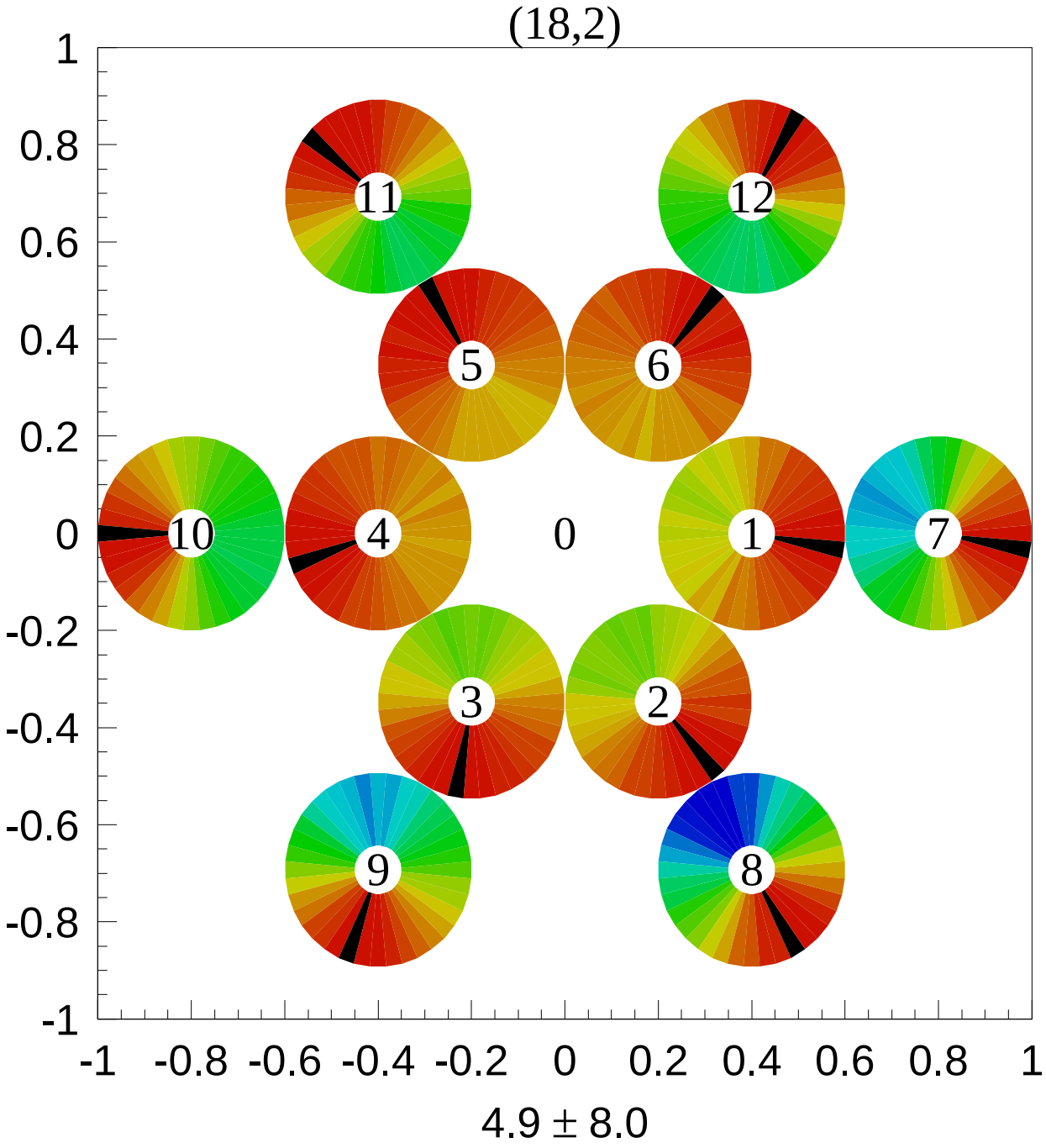

(17,28)
tilted LEDs
124 125 118 122 115 120
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 119 120 128 122 123
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

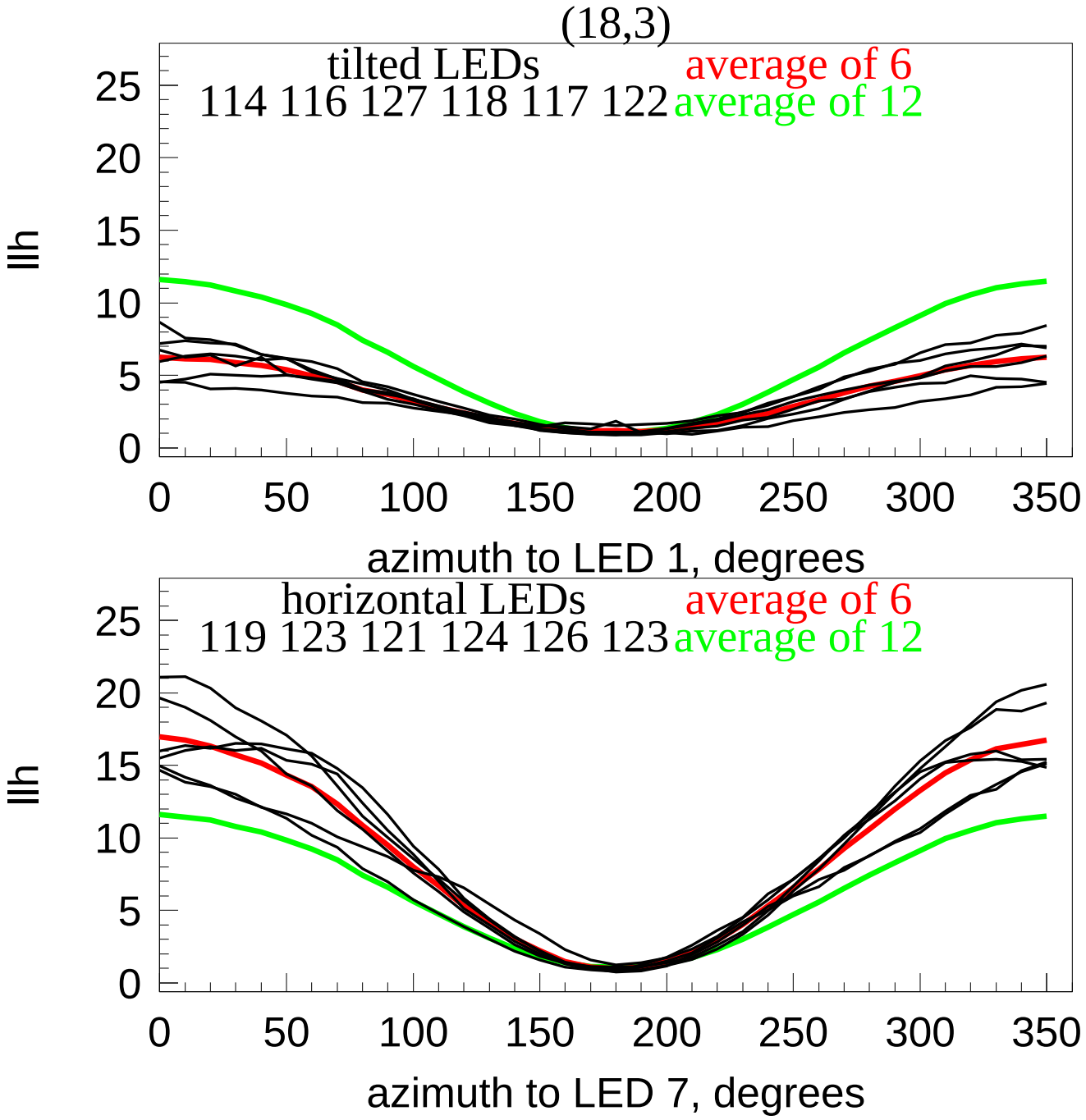

(17,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
238.6 ± 5.8

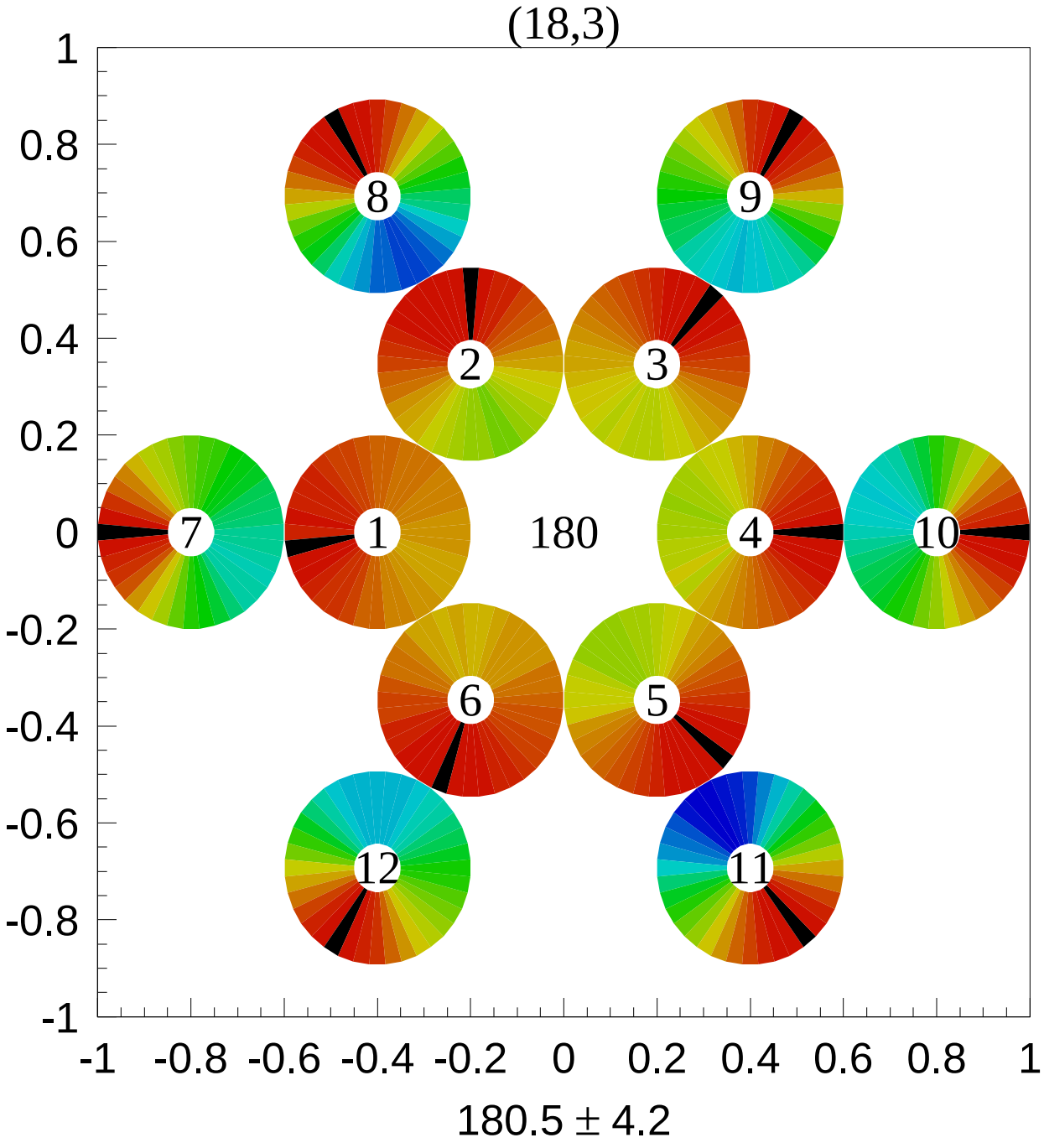

(18,1)
tilted LEDs
124 121 126 128 123 129
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 121 117 122 116 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

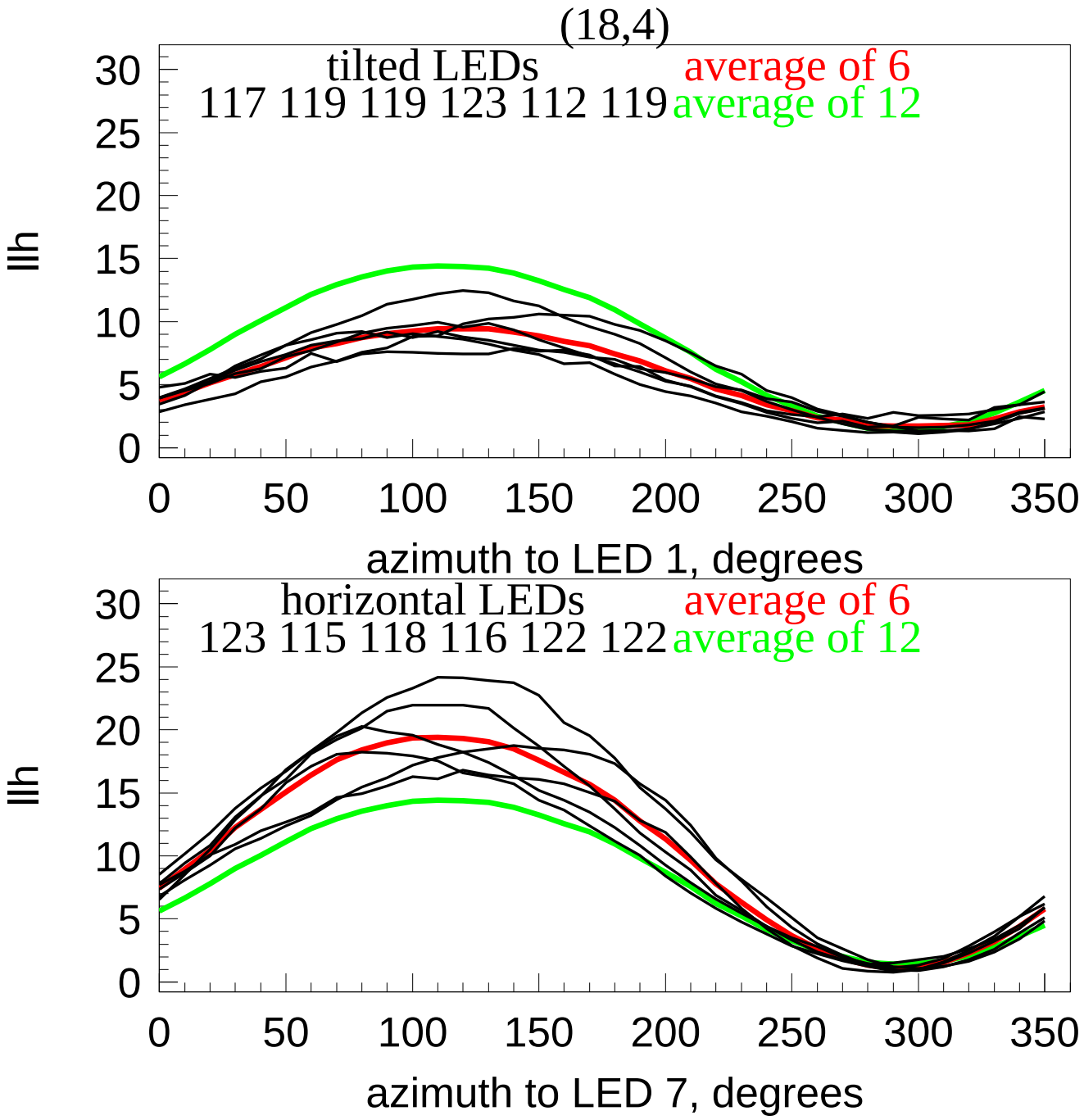

(18,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
103.9 ± 9.9

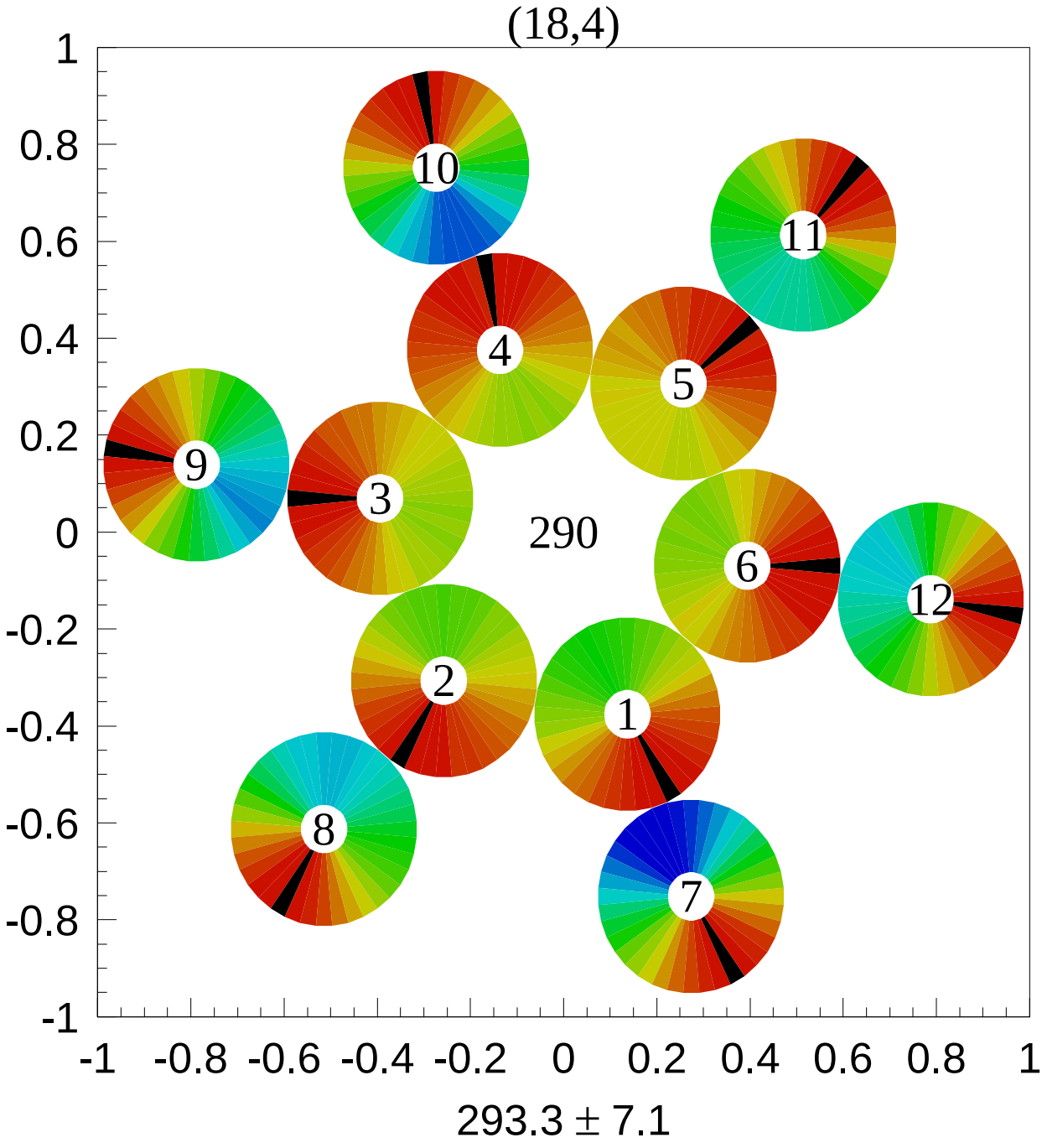

(18,2)
tilted LEDs
119 121 127 120 118 123
average of 6
average of 12
12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 124 121 116 118 124
average of 6
average of 12
12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

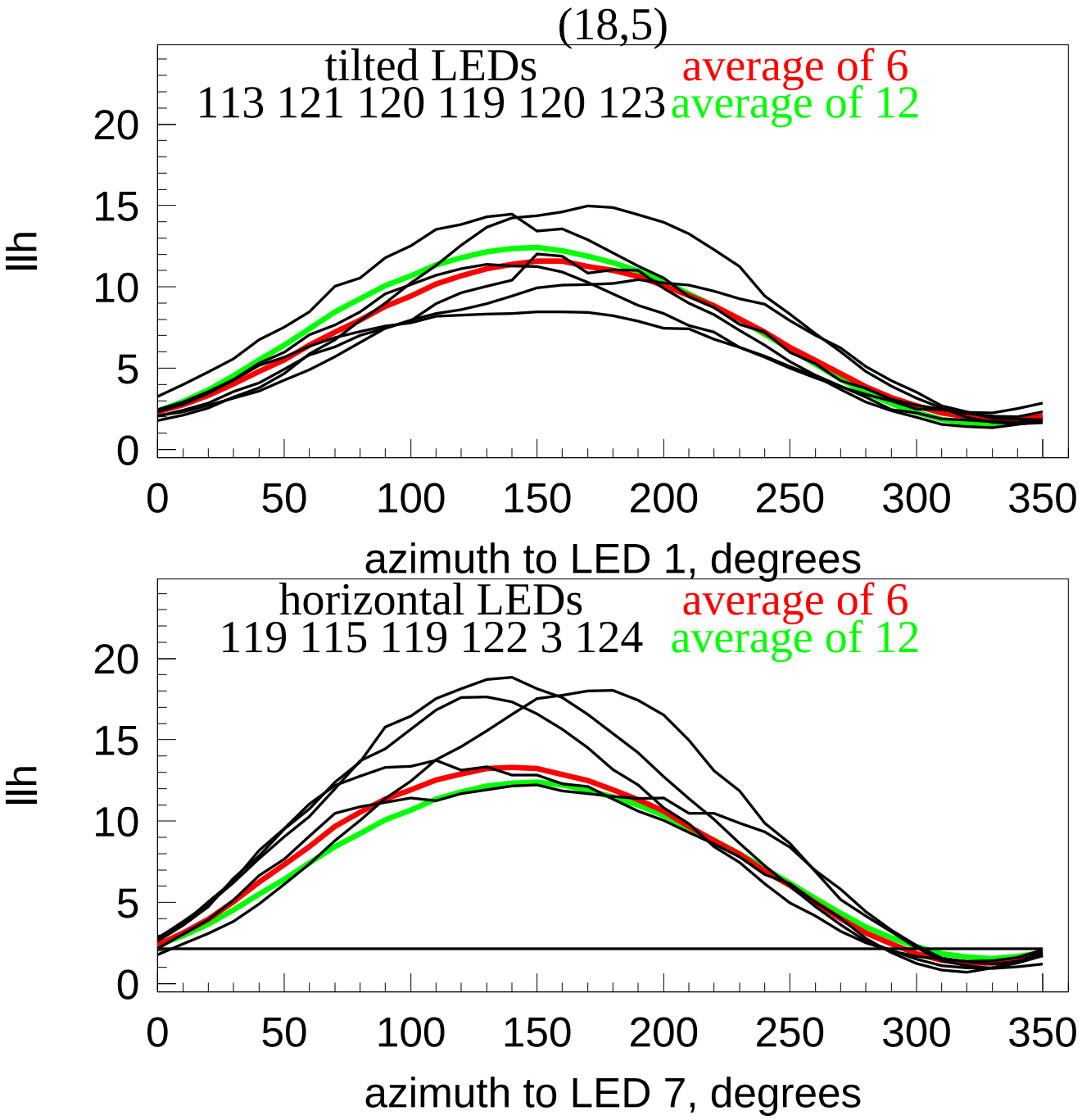

(18,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
4.9 ± 8.0

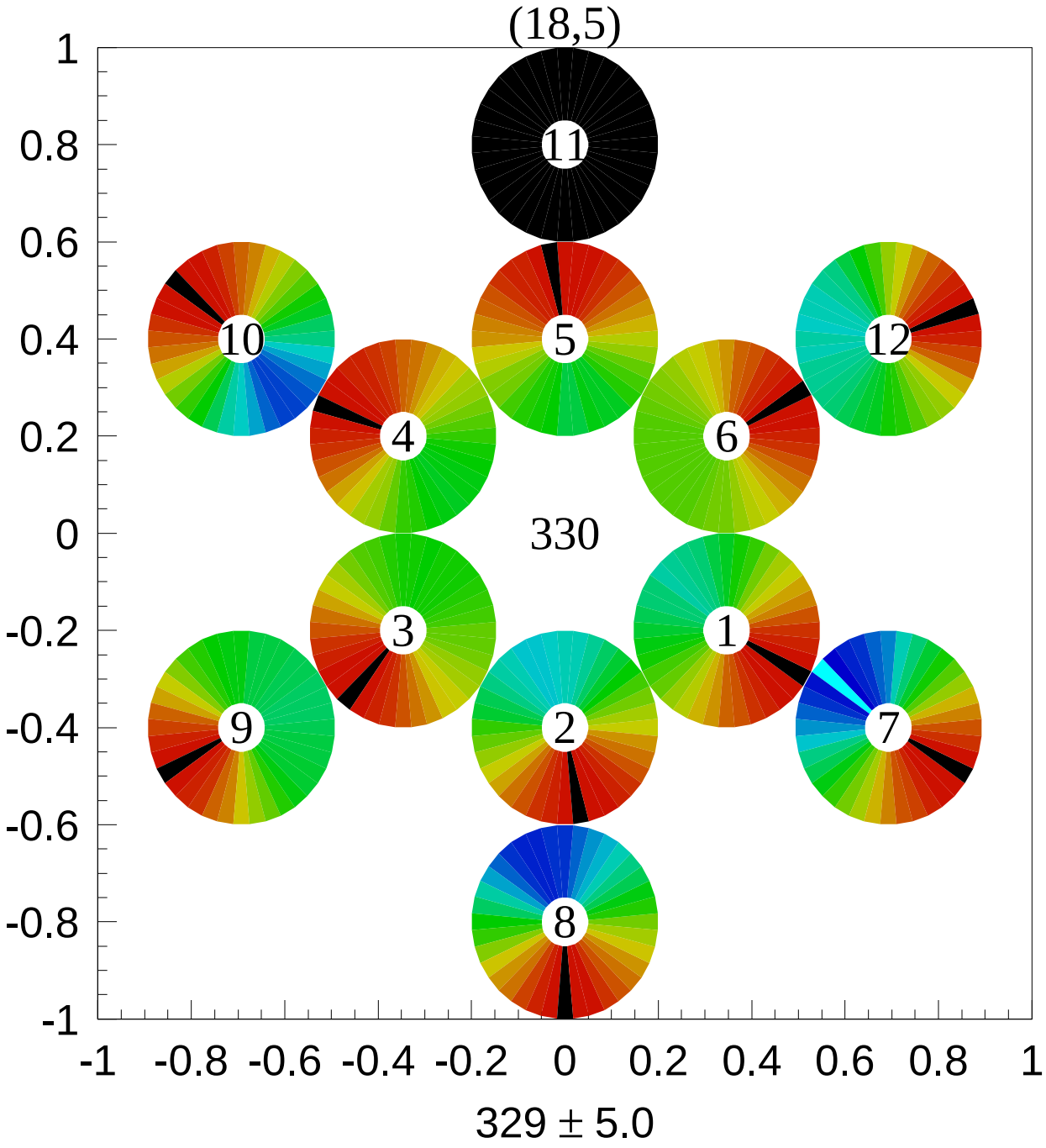

(18,3)
tilted LEDs
114 116 127 118 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 121 124 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

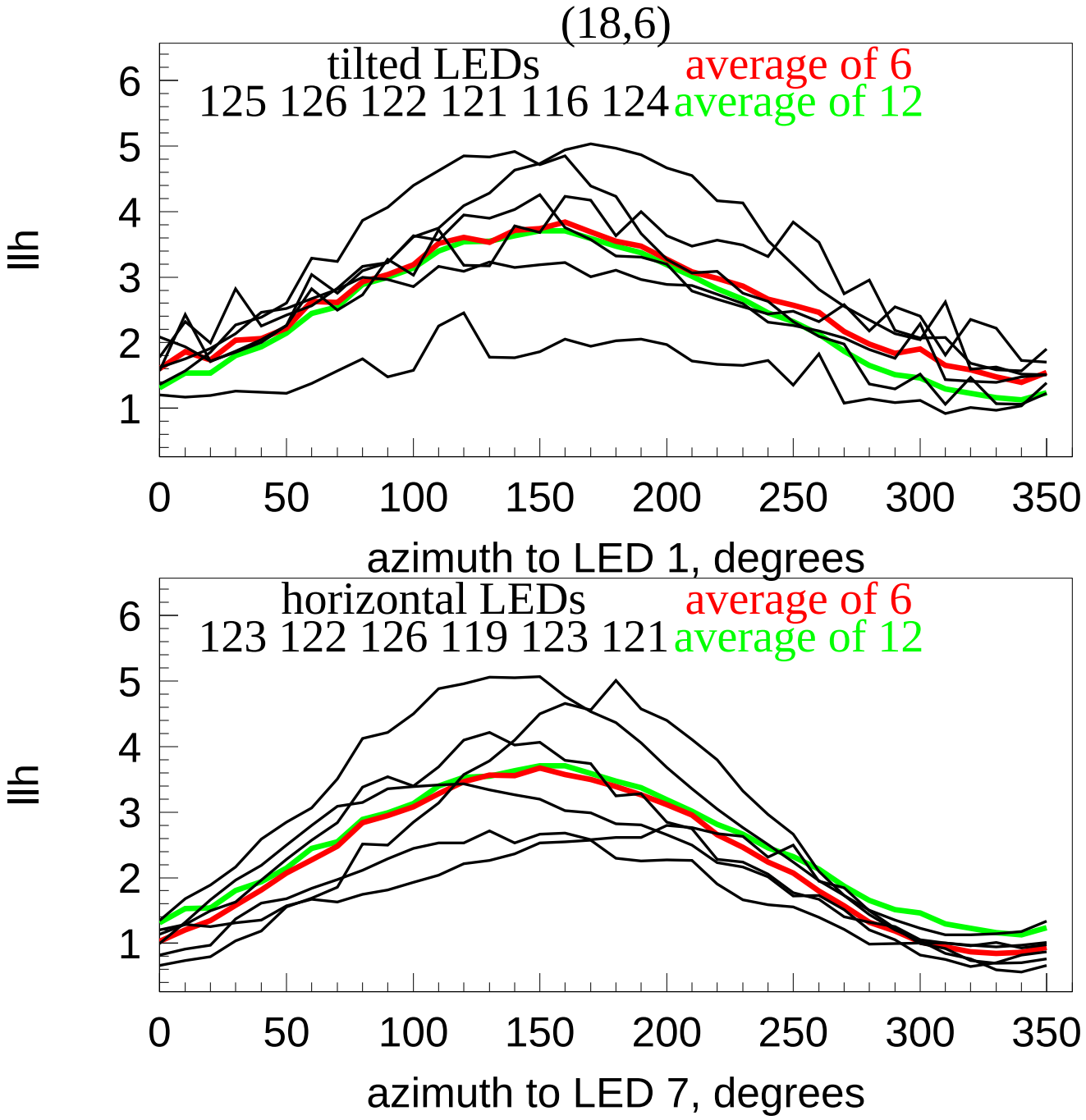

(18,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
180.5 ± 4.2
8
9
2
3
7
1
180
4
10
6
5
12
11

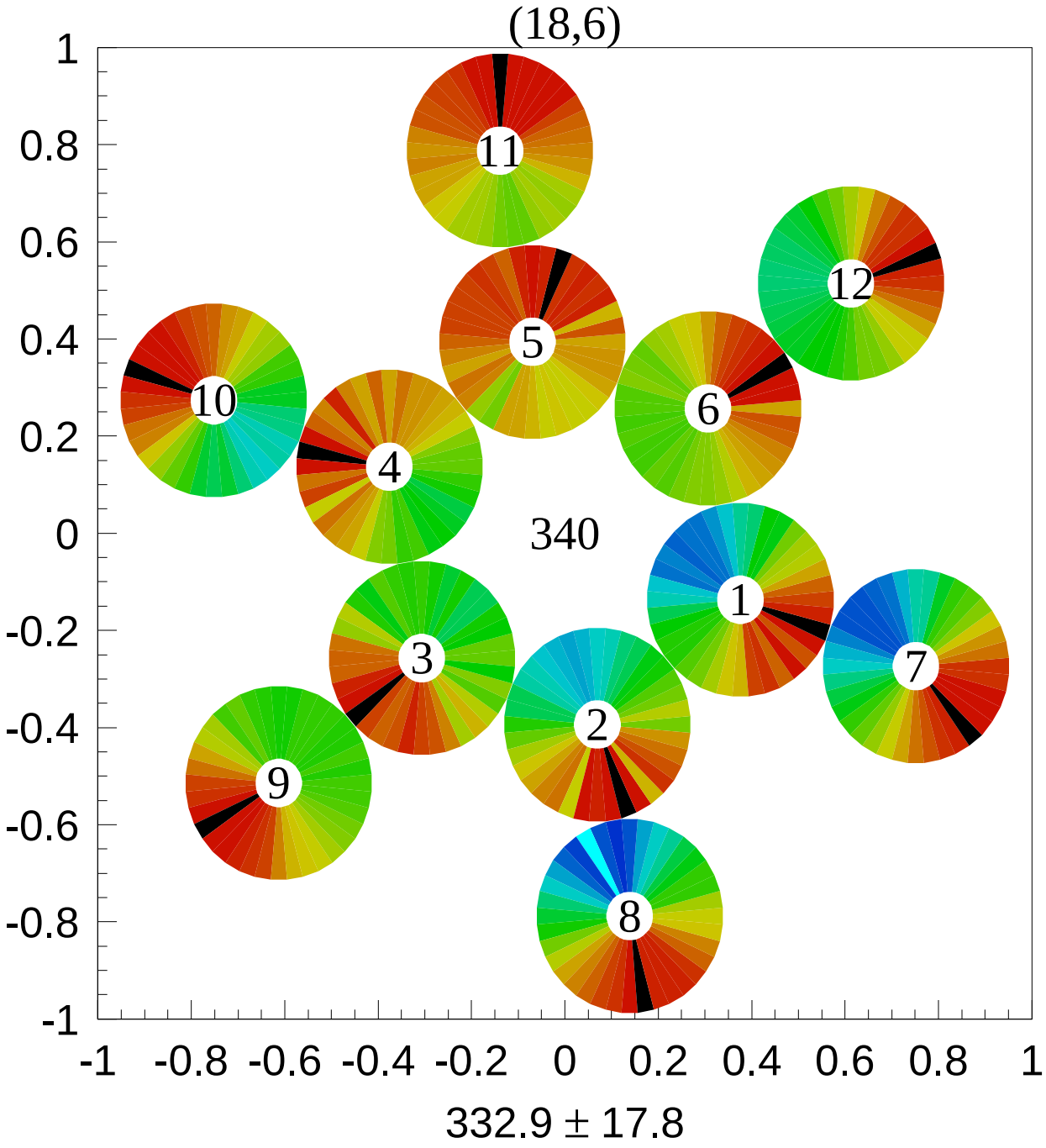

(18,4)
tilted LEDs
117 119 119 123 112 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 115 118 116 122 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

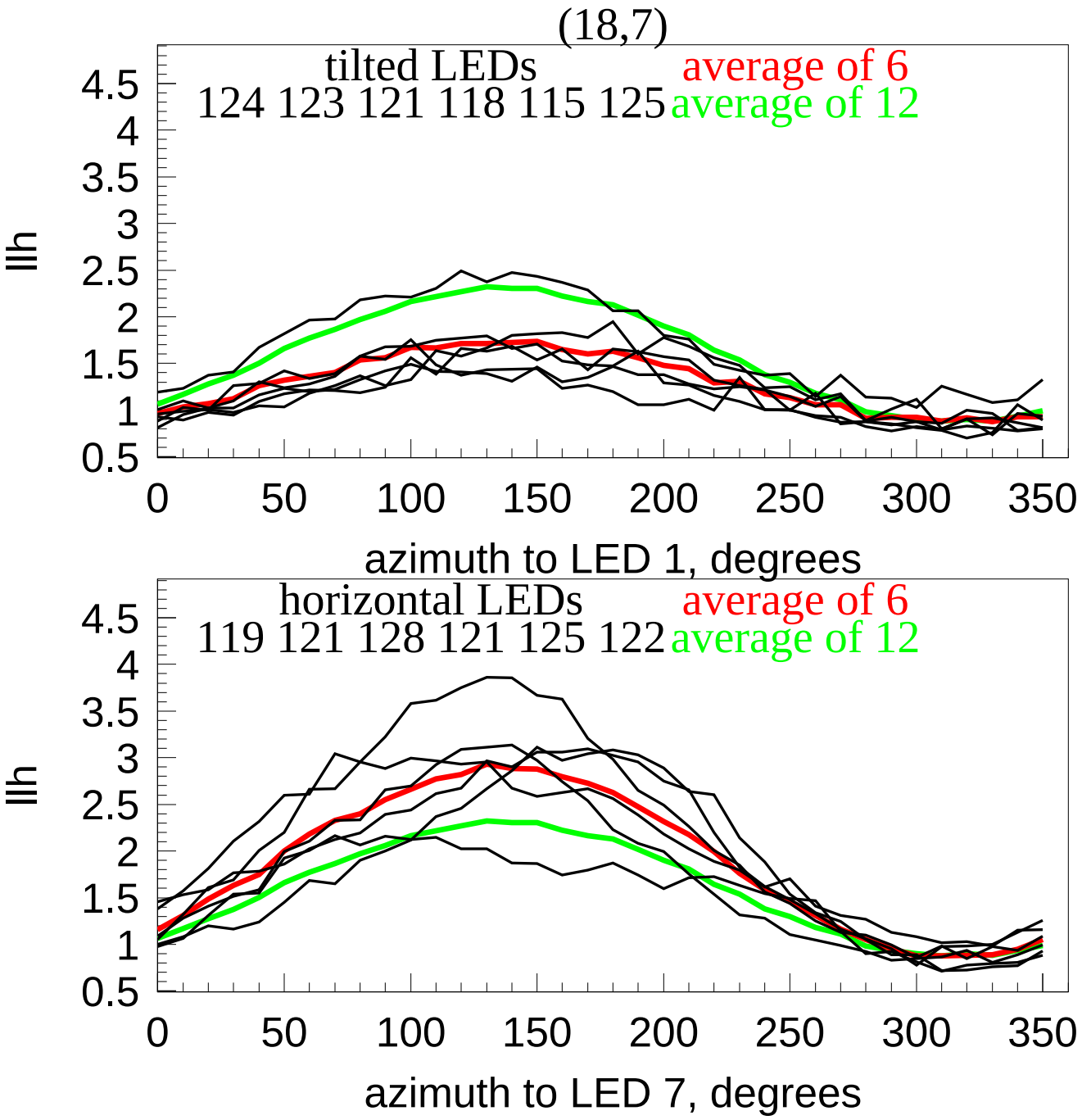

(18,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
293.3 ± 7.1

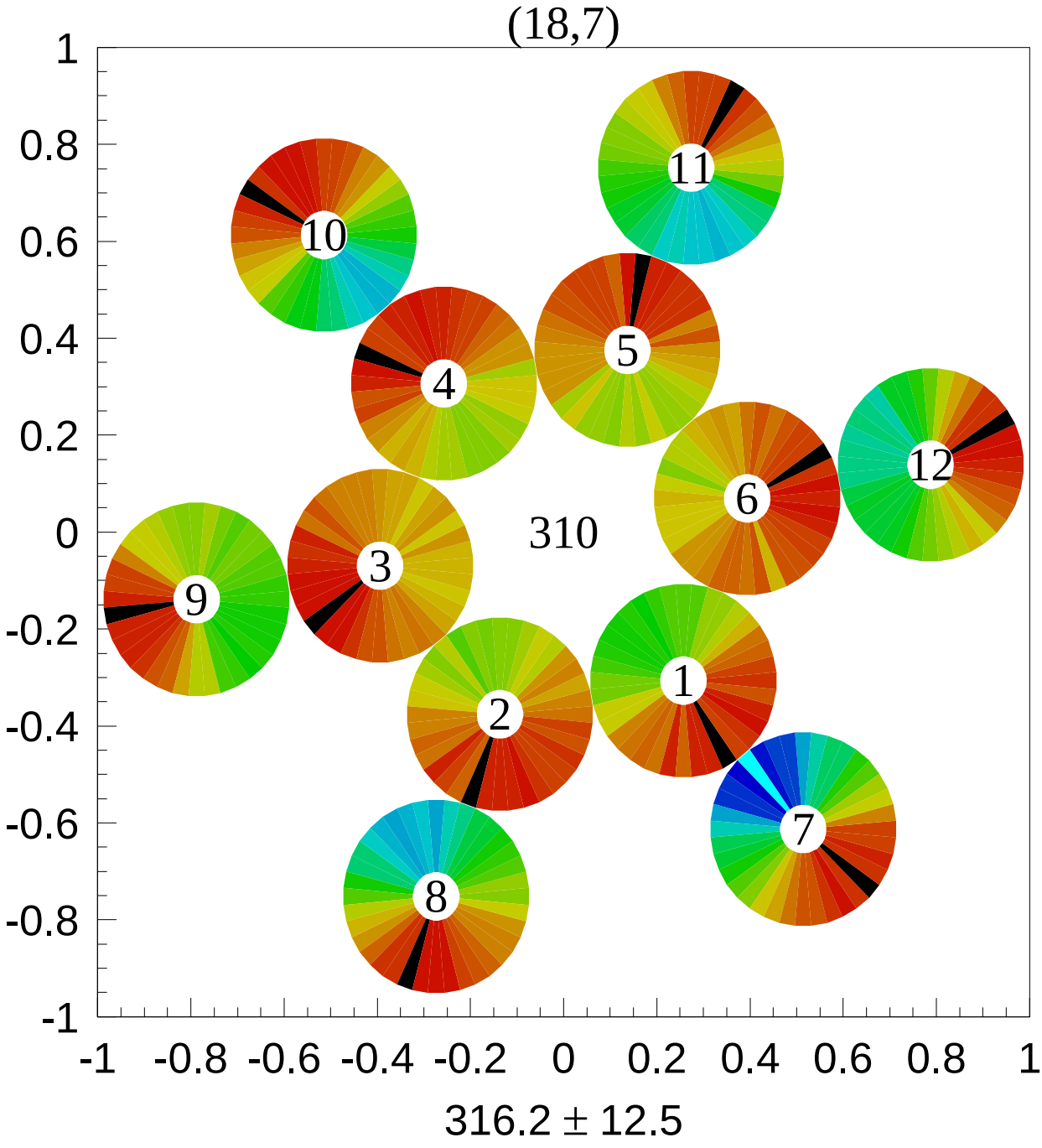

(18,5)
tilted LEDs
113 121 120 119 120 123
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 115 119 122 3 124
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

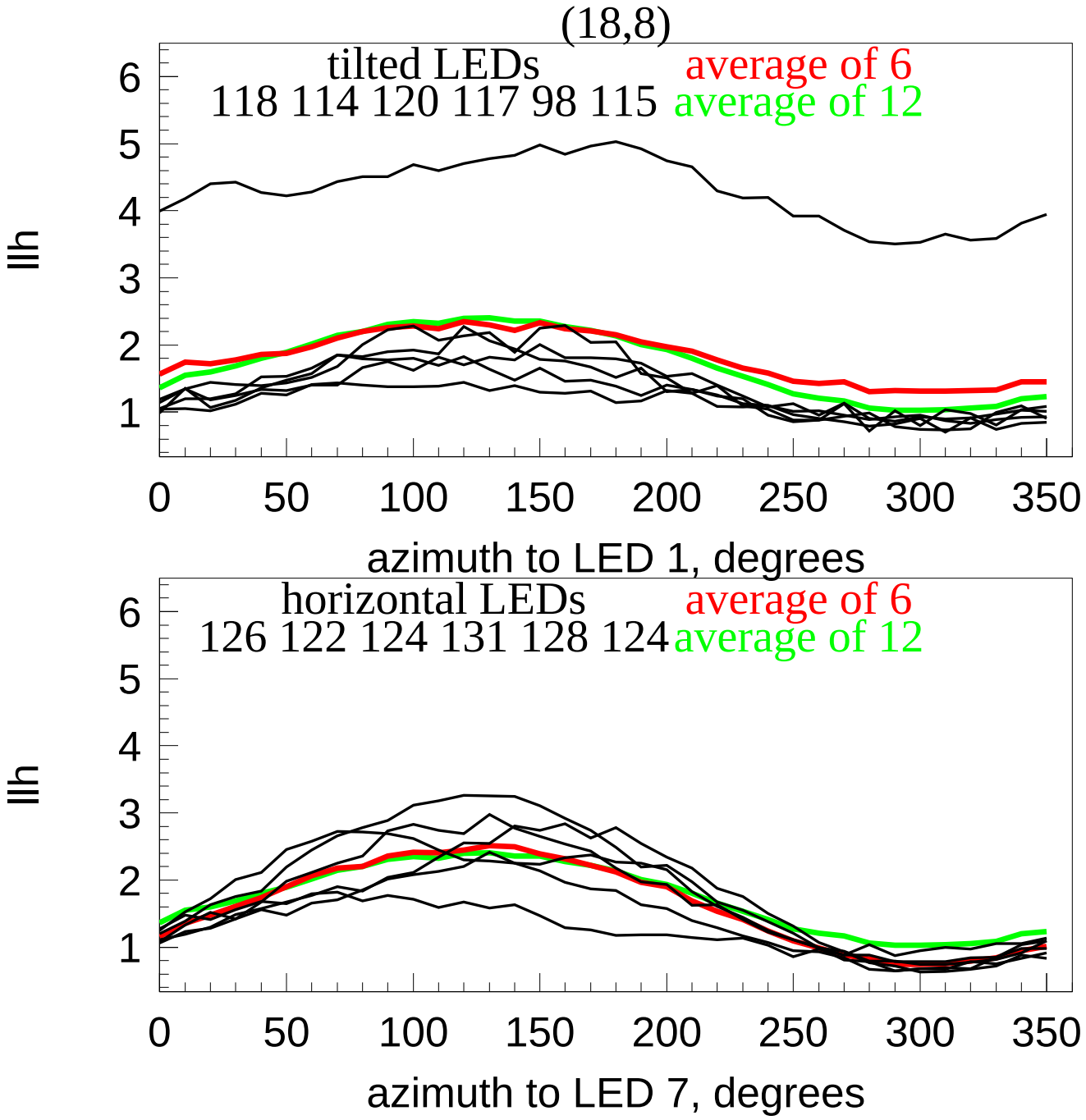

(18,5)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
329 ± 5.0

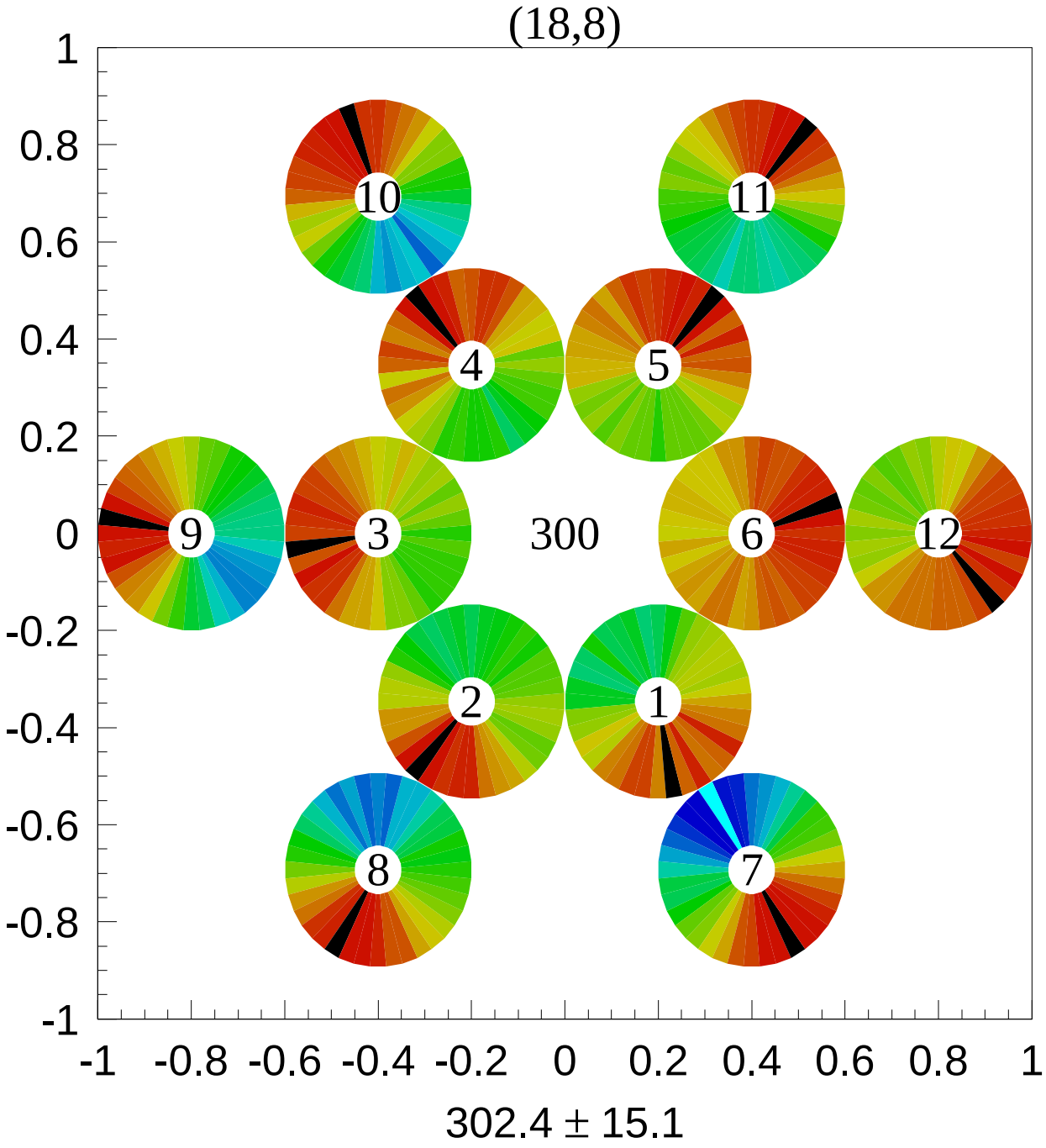

(18,6)
tilted LEDs
125 126 122 121 116 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 126 119 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

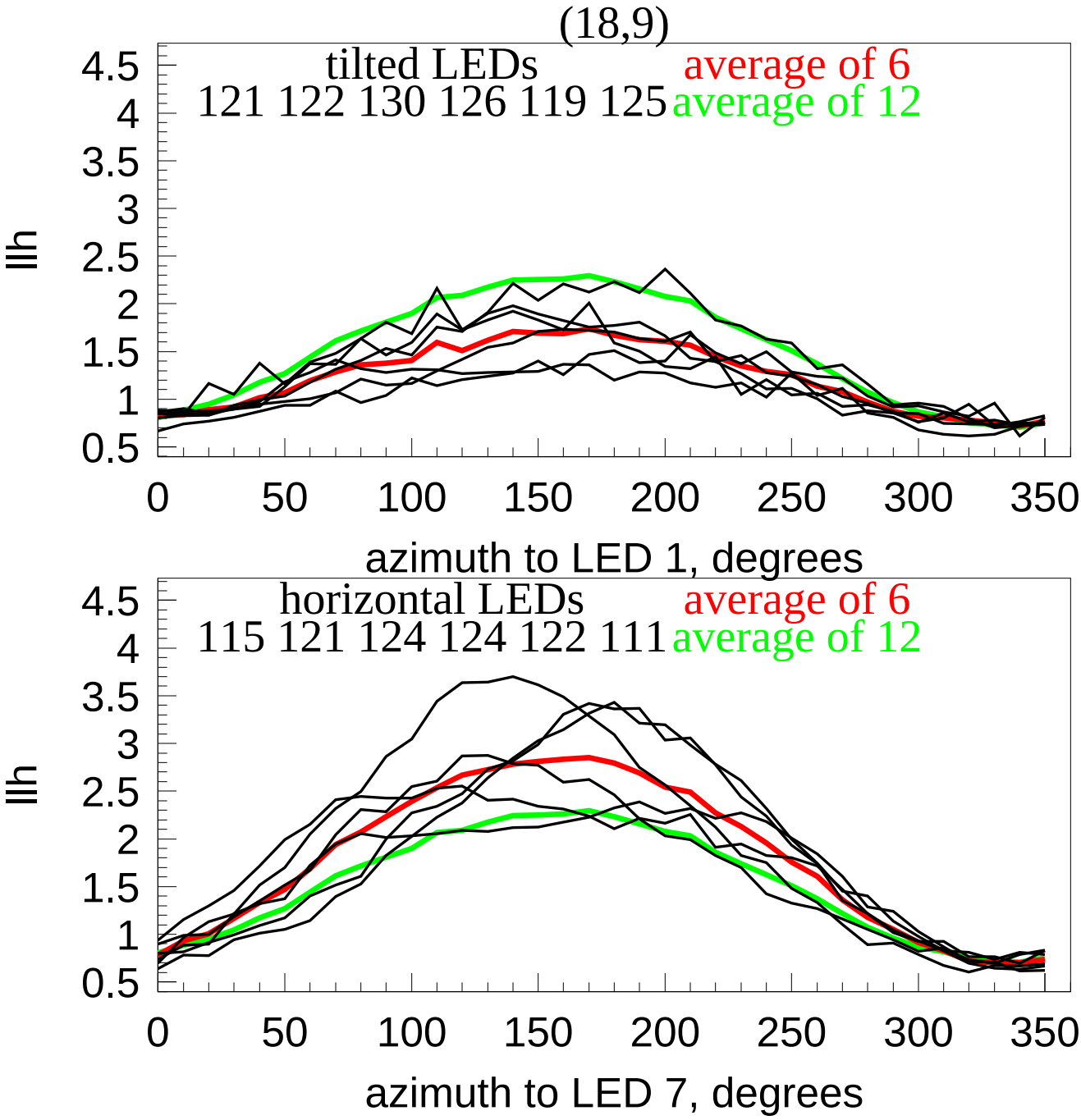

(18,6)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
332.9 ± 17.8

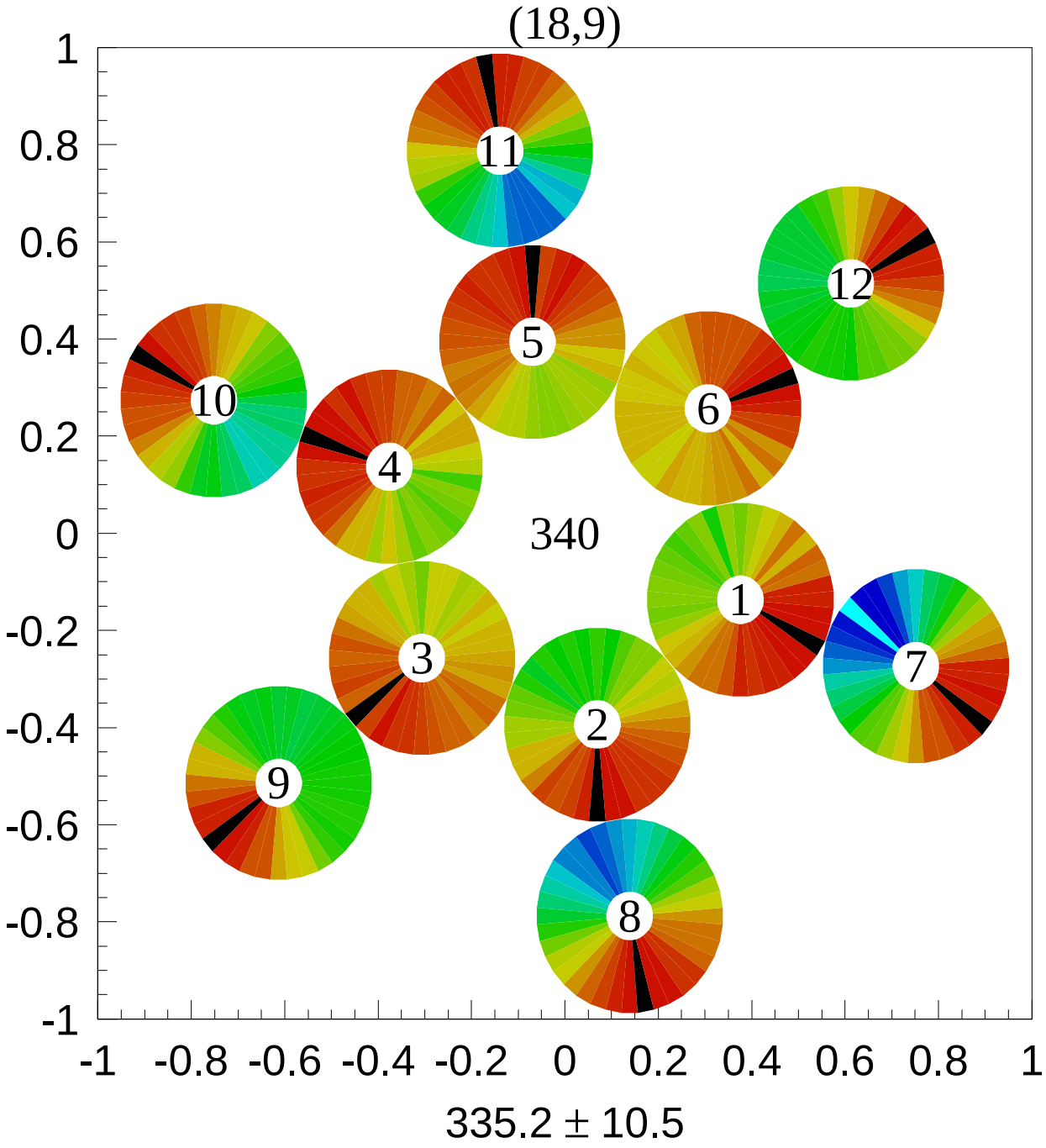

(18,7)
tilted LEDs
124 123 121 118 115 125
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 121 128 121 125 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

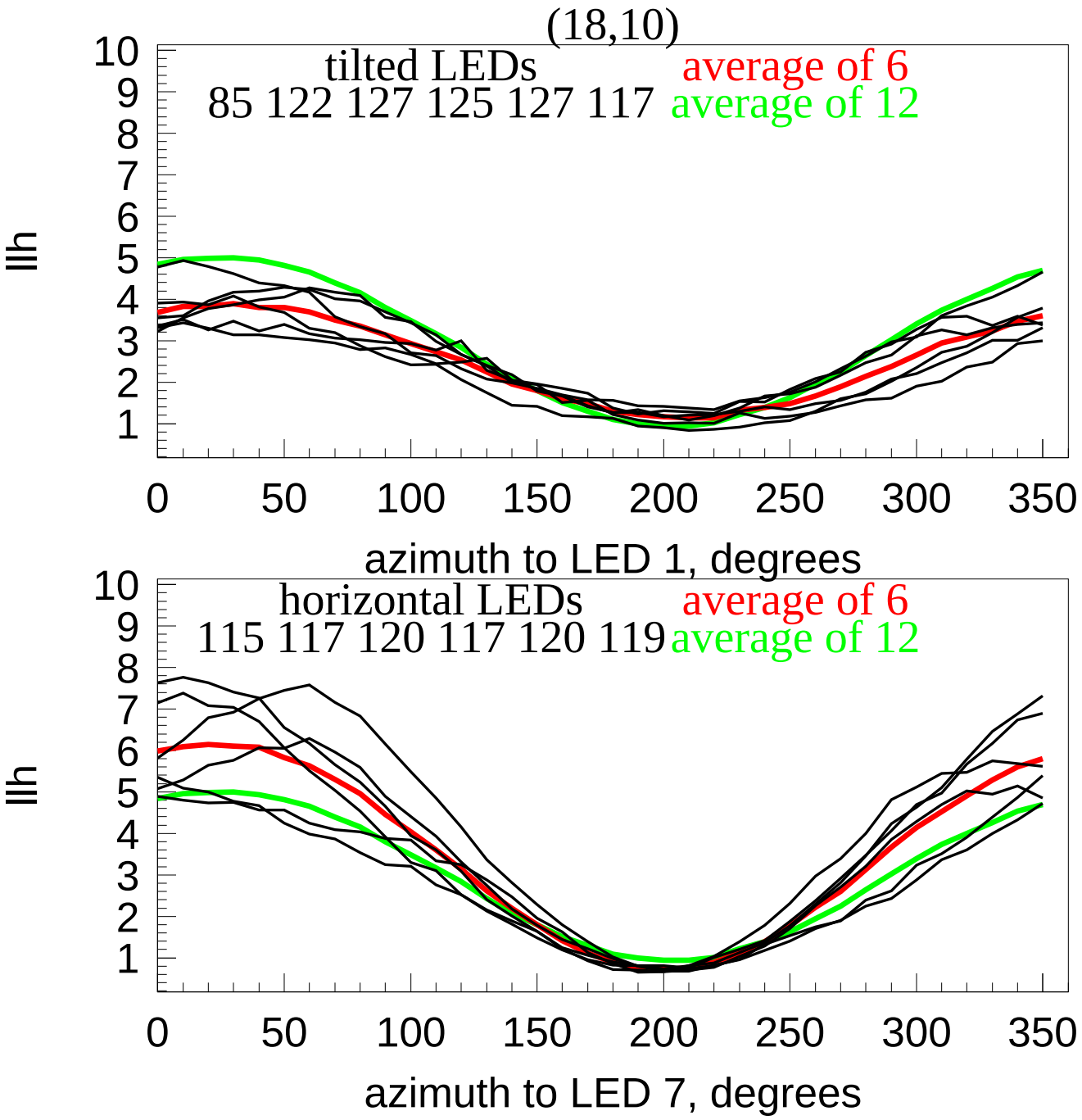

(18,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
316.2 ± 12.5
310
1
2
3
4
5
6
7
8
9
10
11
12

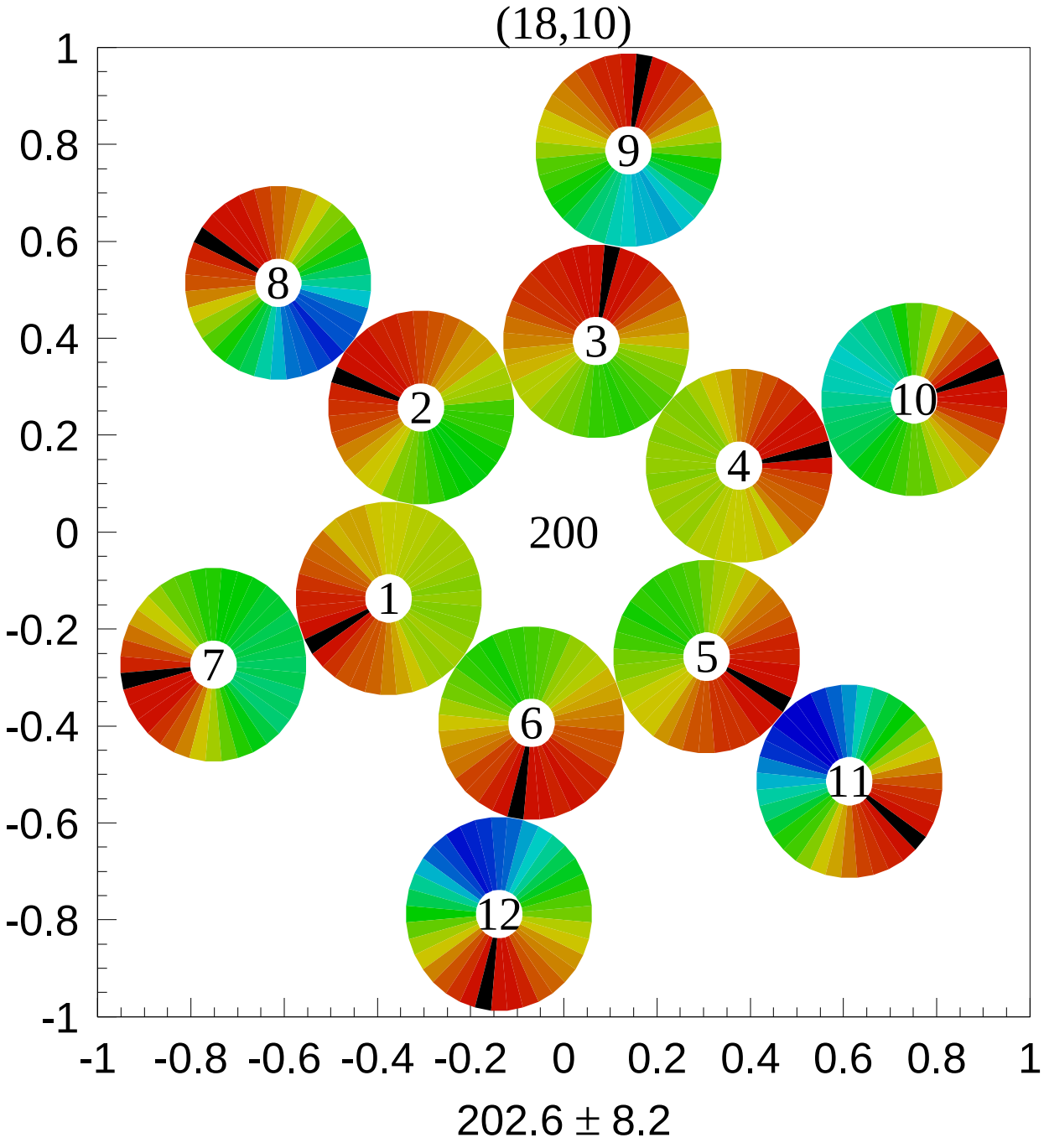

(18,8)
tilted LEDs
118 114 120 117 98 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 122 124 131 128 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

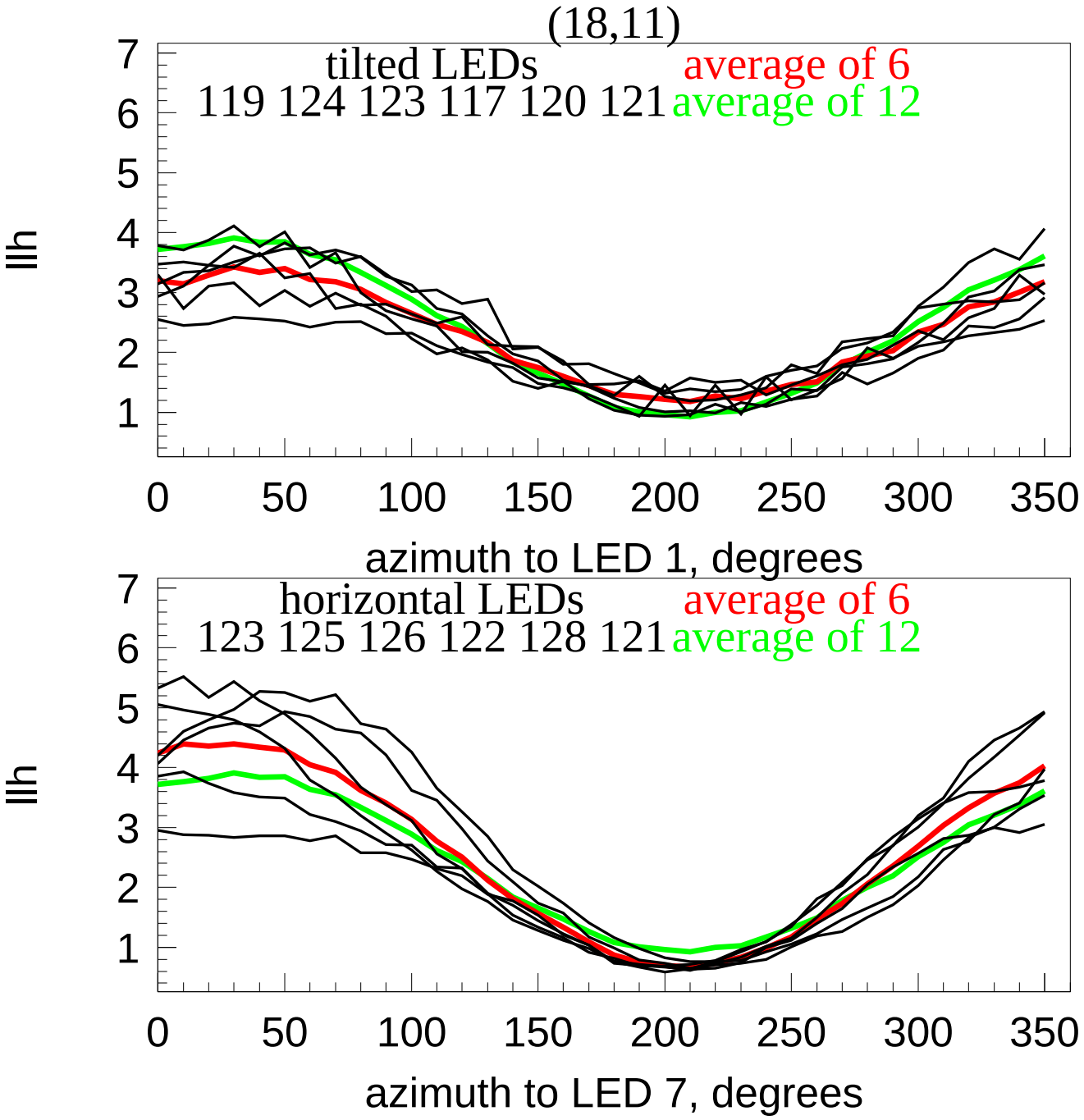

(18,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
302.4 ± 15.1

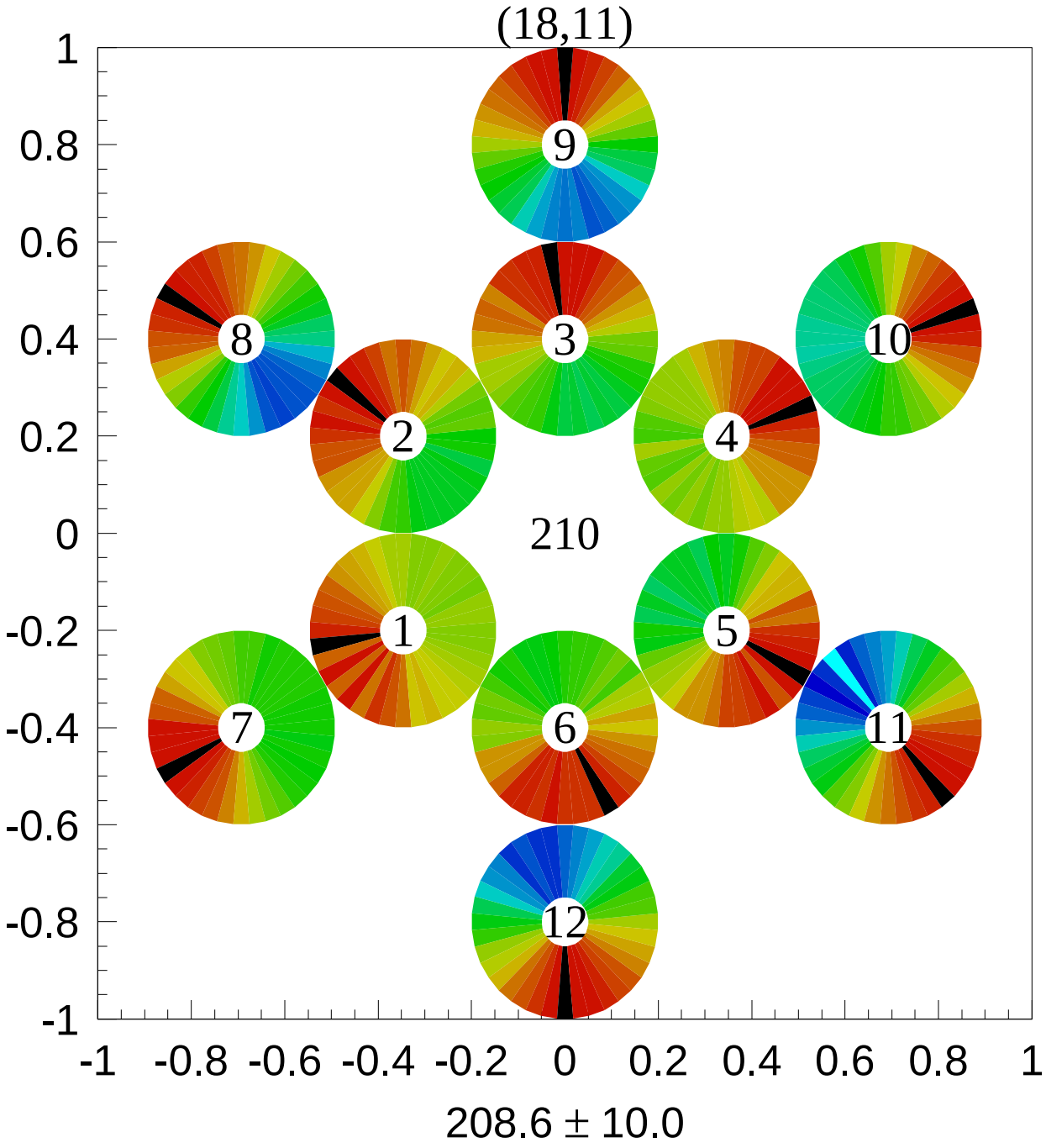

(18,9)
tilted LEDs
121 122 130 126 119 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 121 124 124 122 111
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

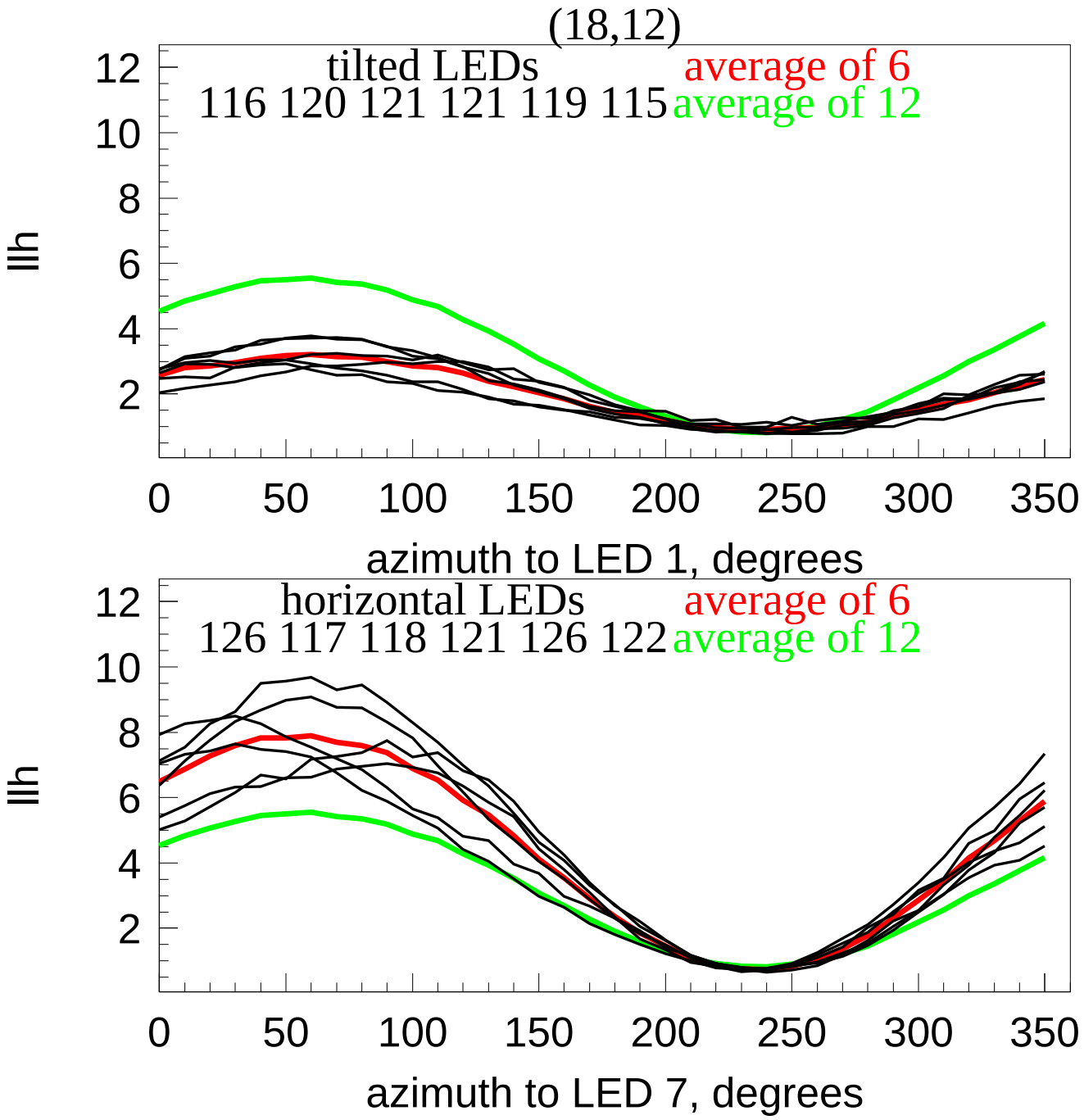

(18,9)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
335.2 ± 10.5

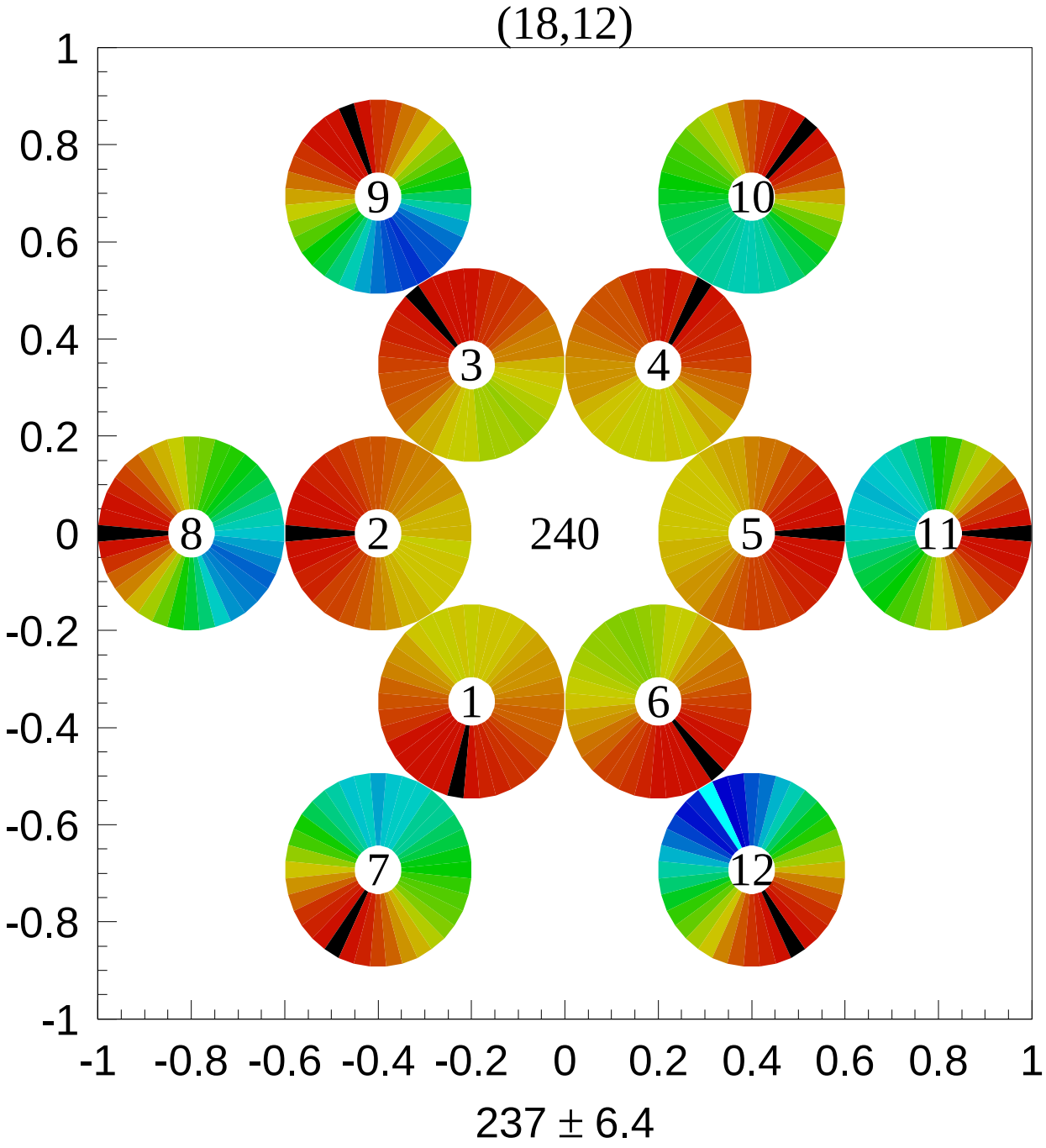

(18,10)
tilted LEDs
85 122 127 125 127 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 117 120 117 120 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

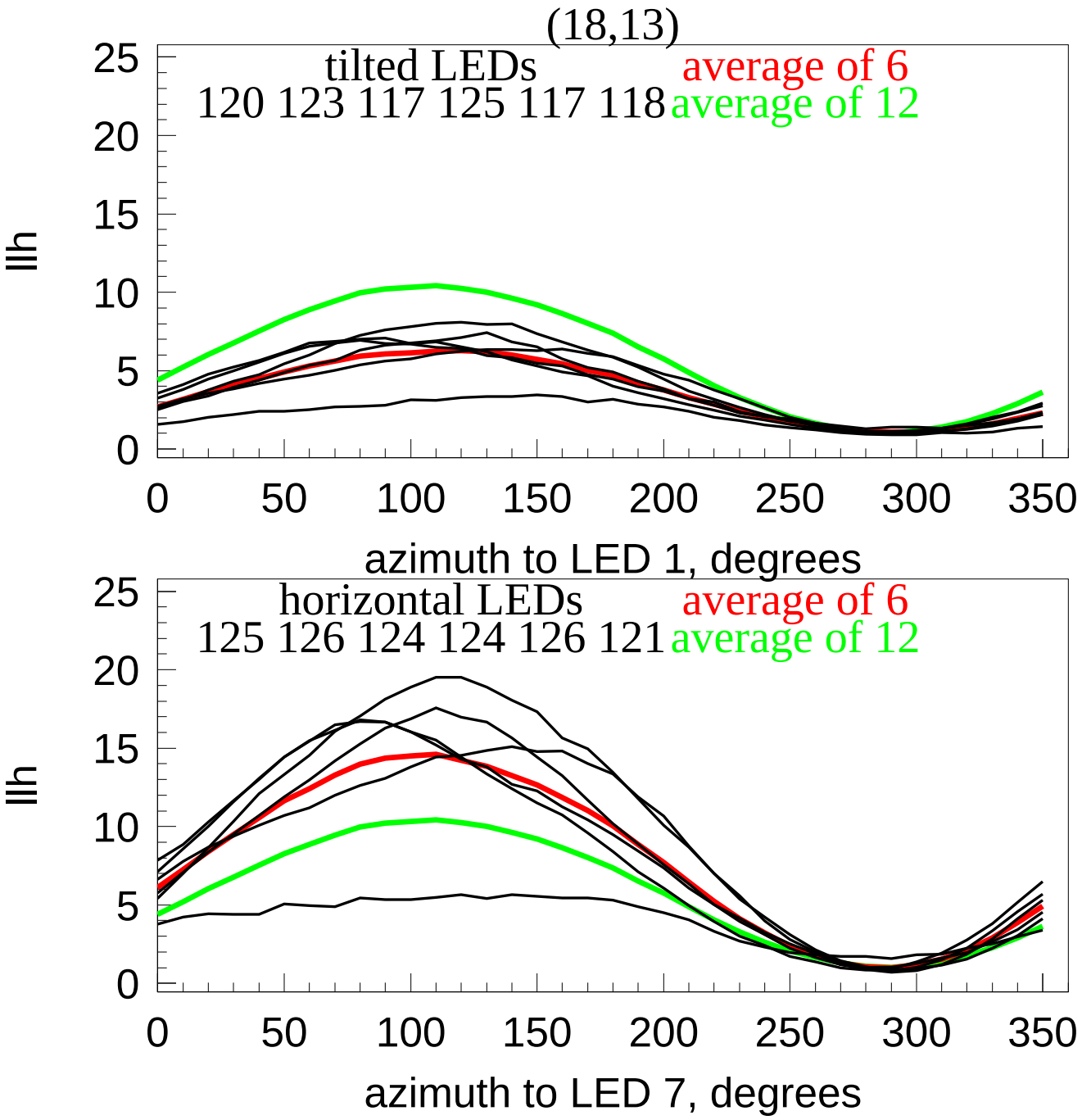

(18,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
202.6 ± 8.2

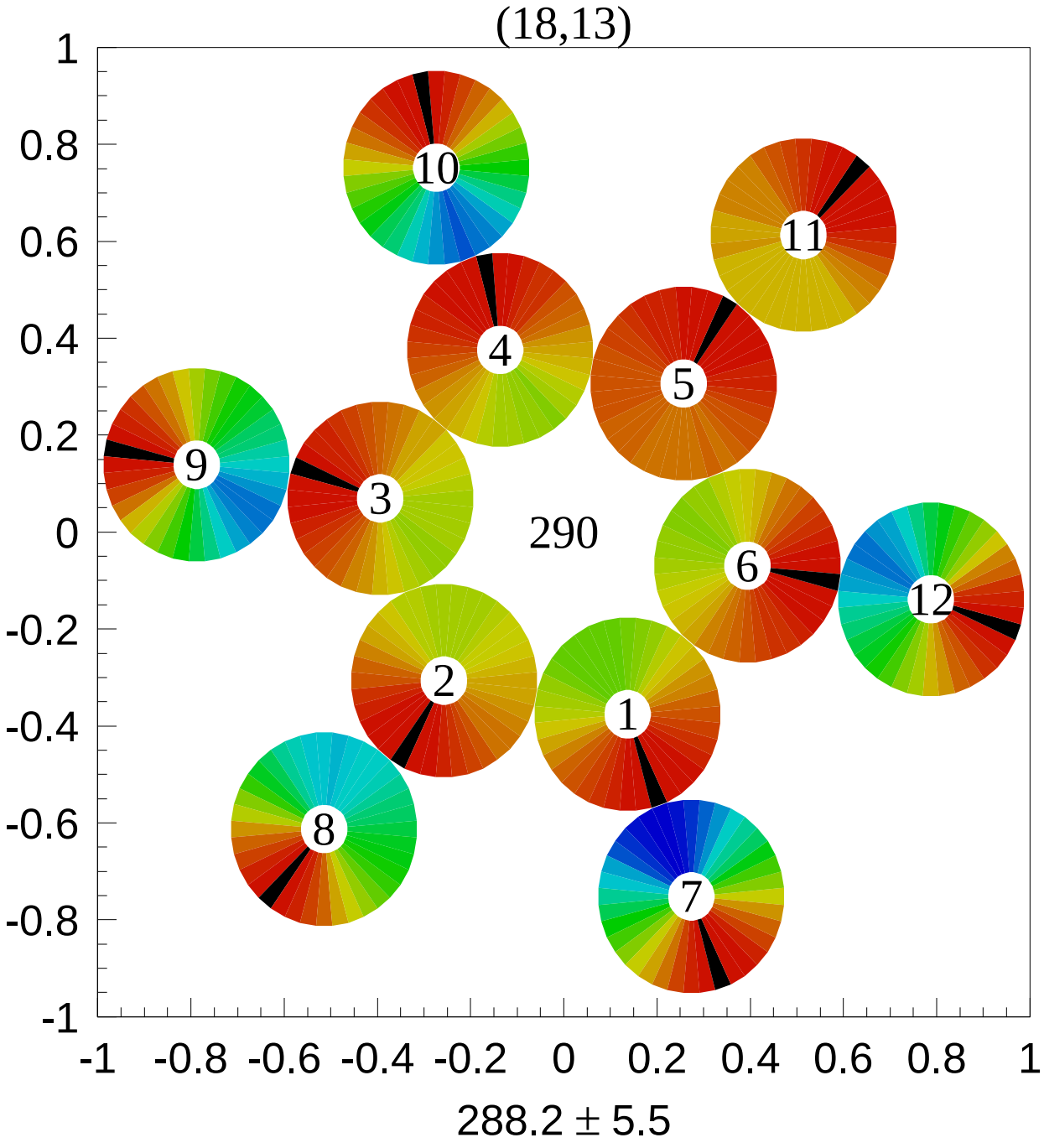

(18,11)
tilted LEDs
119 124 123 117 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 126 122 128 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

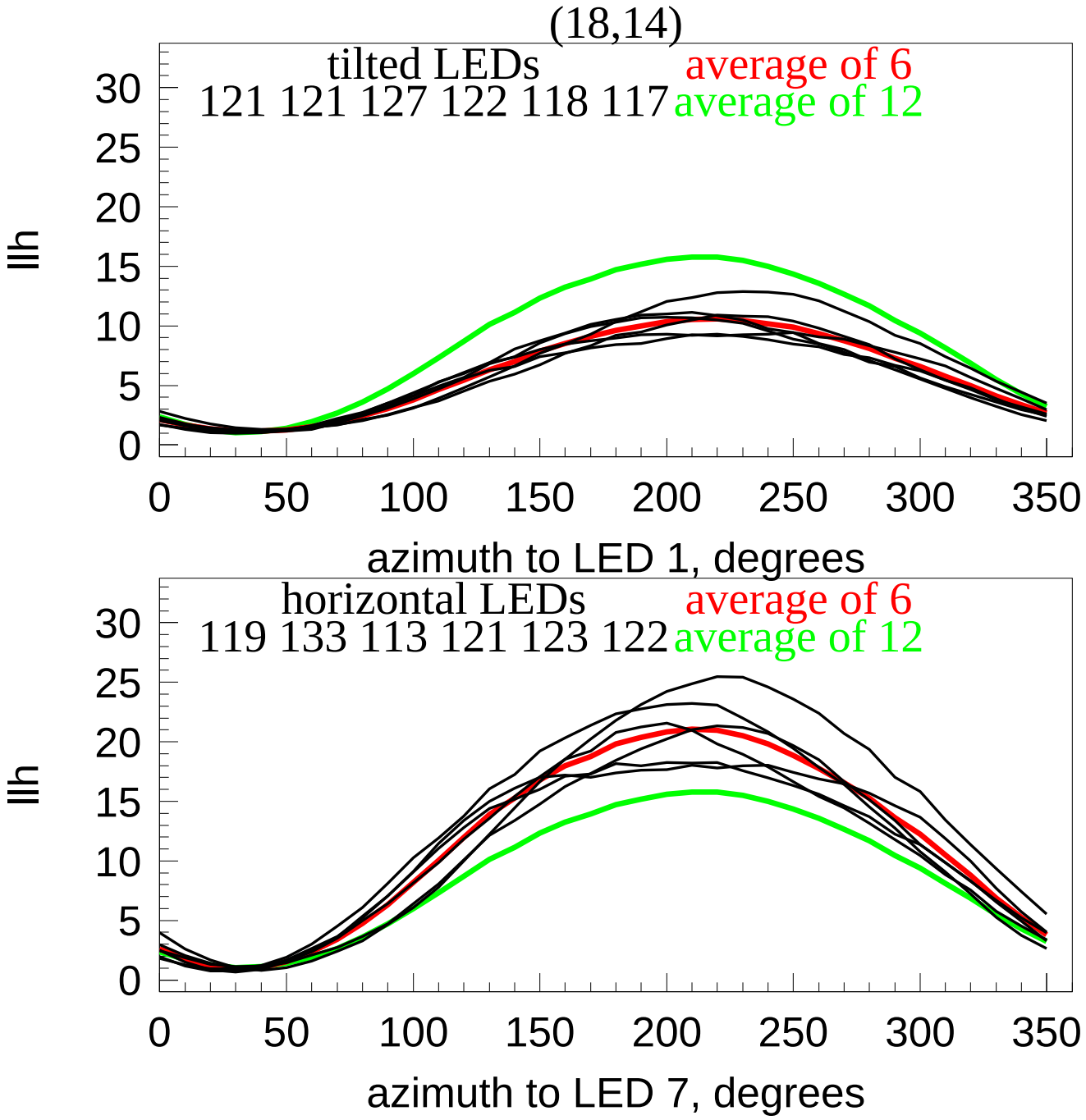

(18,11)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
208.6 ± 10.0

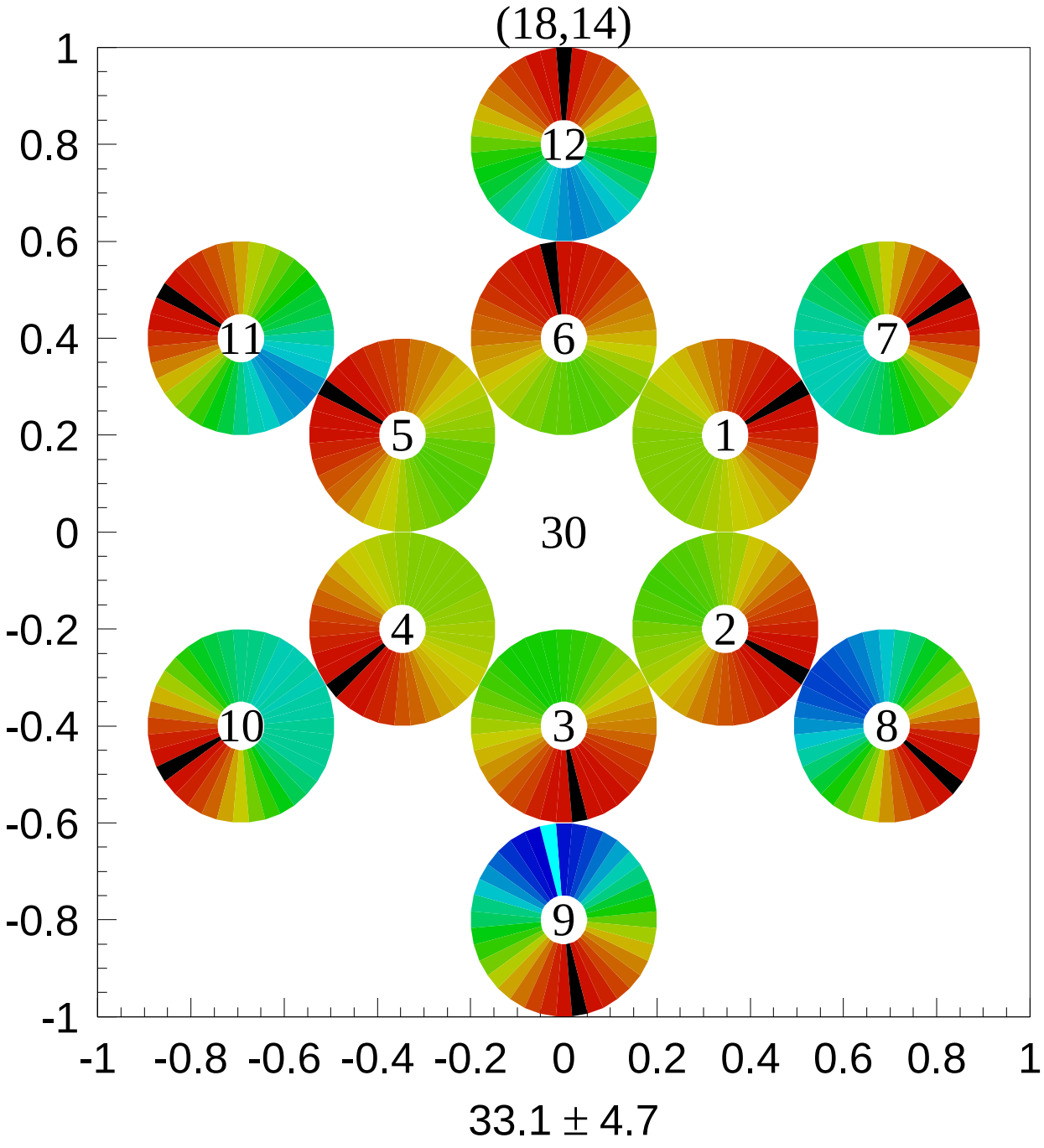

(18,12)
tilted LEDs
116 120 121 121 119 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 117 118 121 126 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

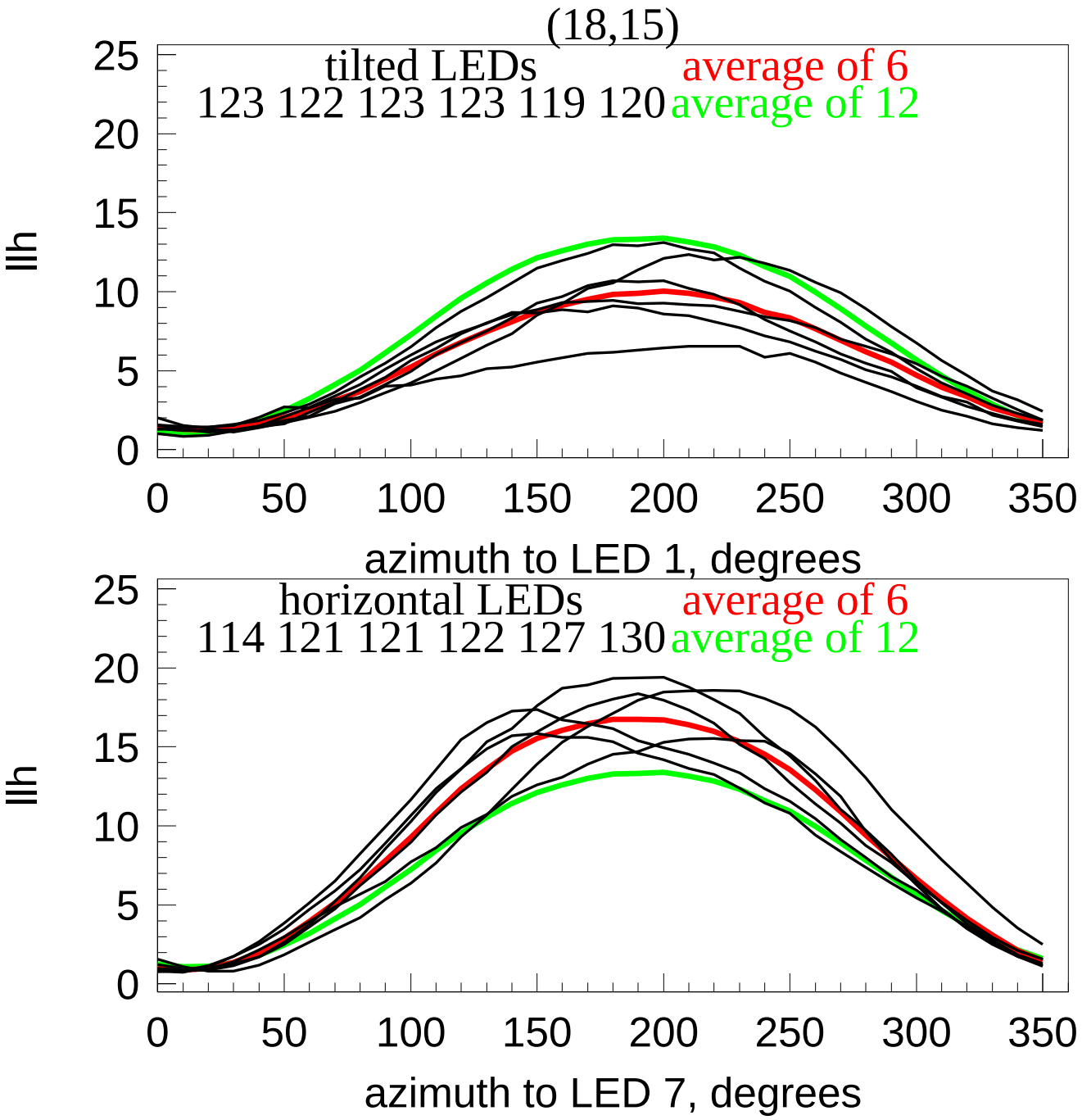

(18,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
237 ± 6.4

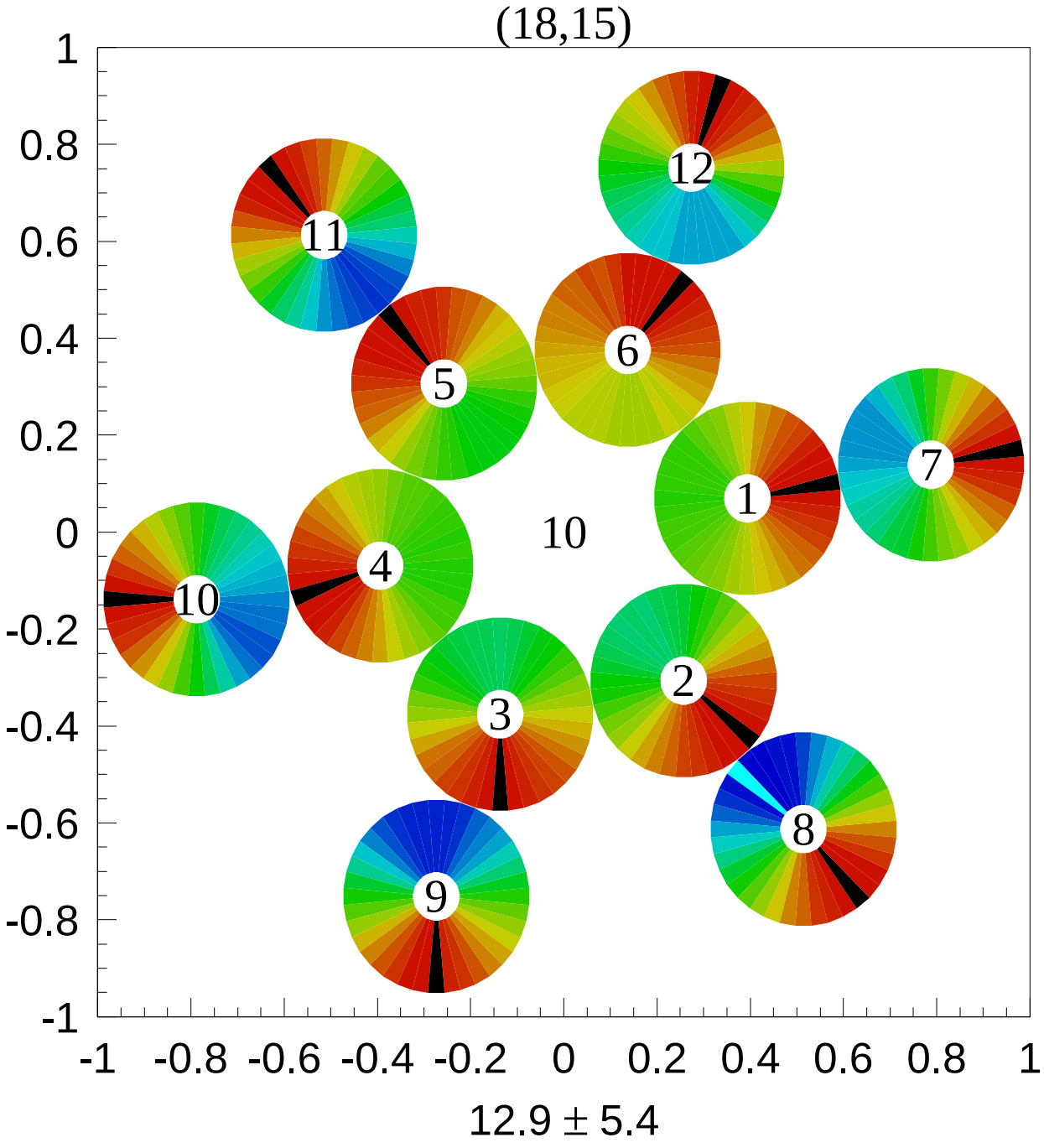

(18,13)
tilted LEDs
120 123 117 125 117 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 126 124 124 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

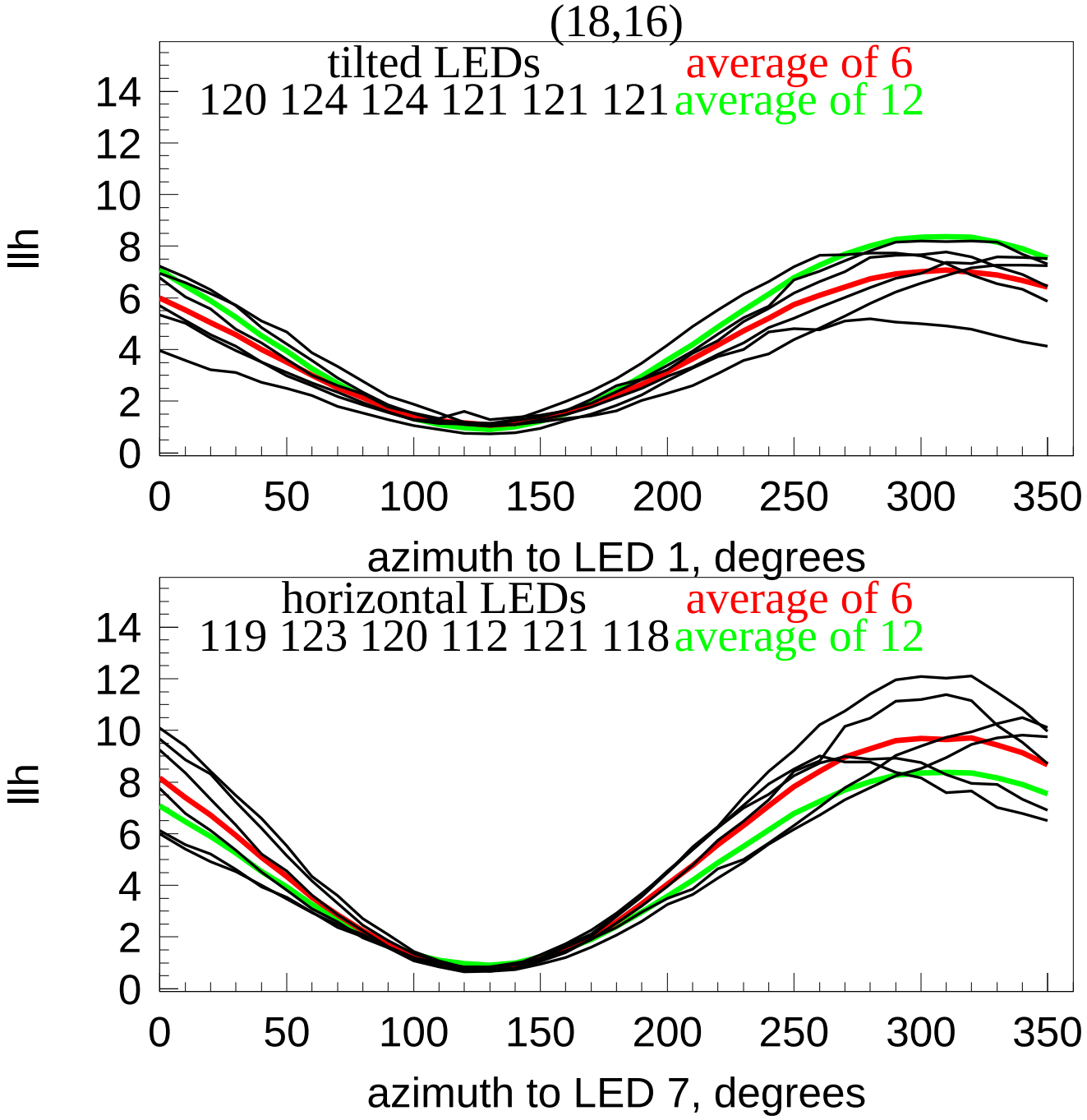

(18,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
288.2 ± 5.5

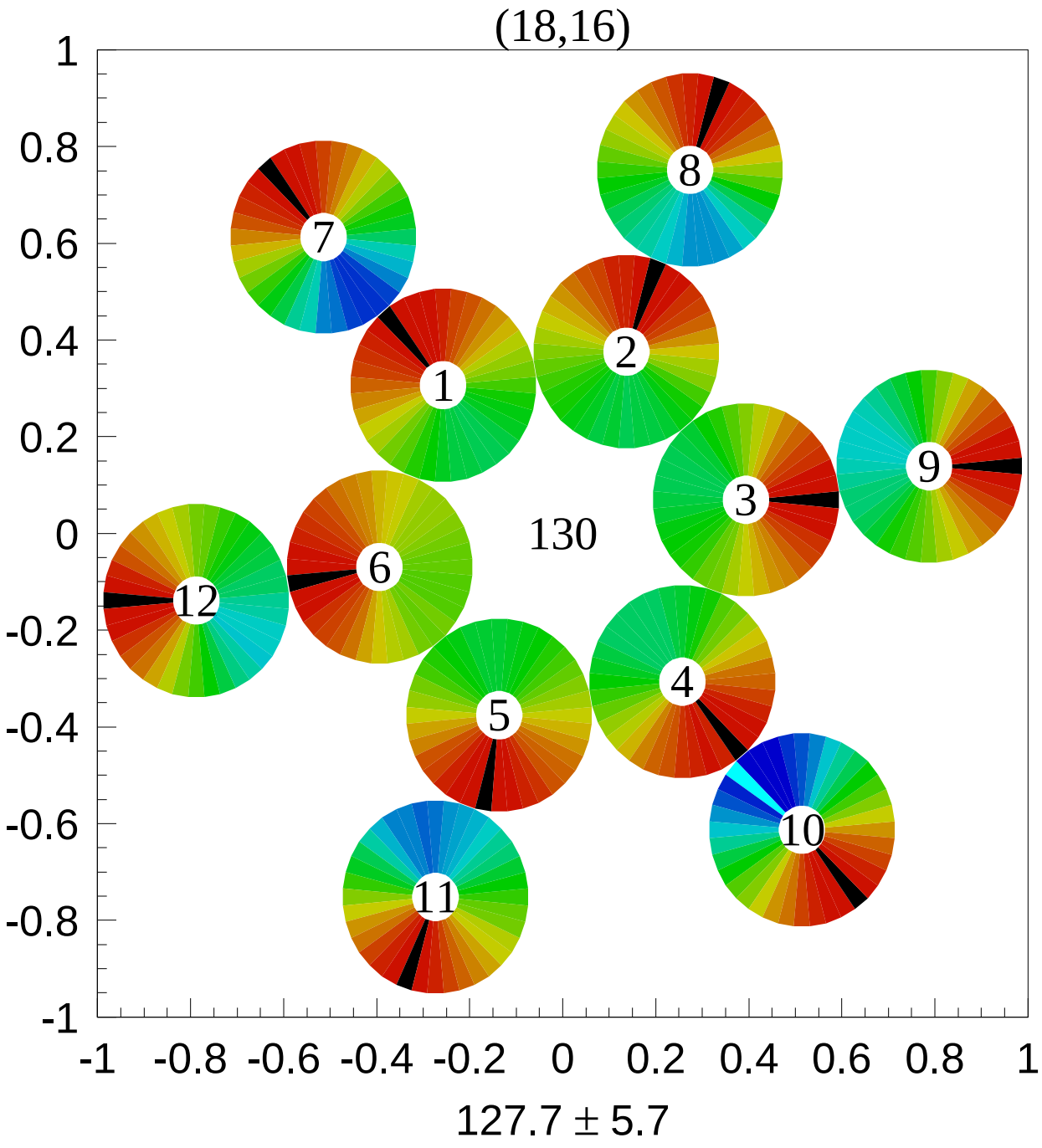

(18,14)
tilted LEDs
121 121 127 122 118 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 133 113 121 123 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

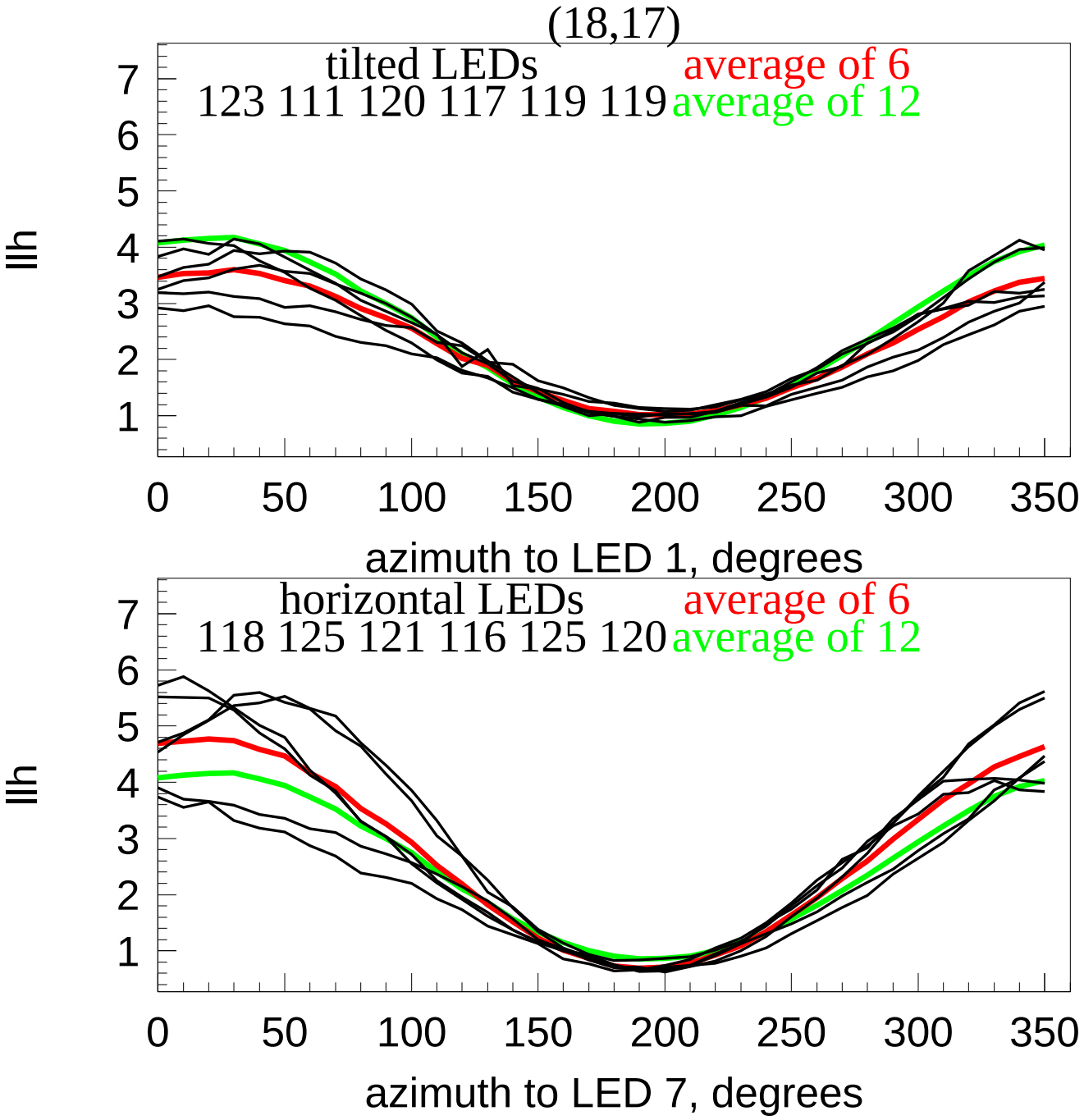

(18,14)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
33.1 ± 4.7

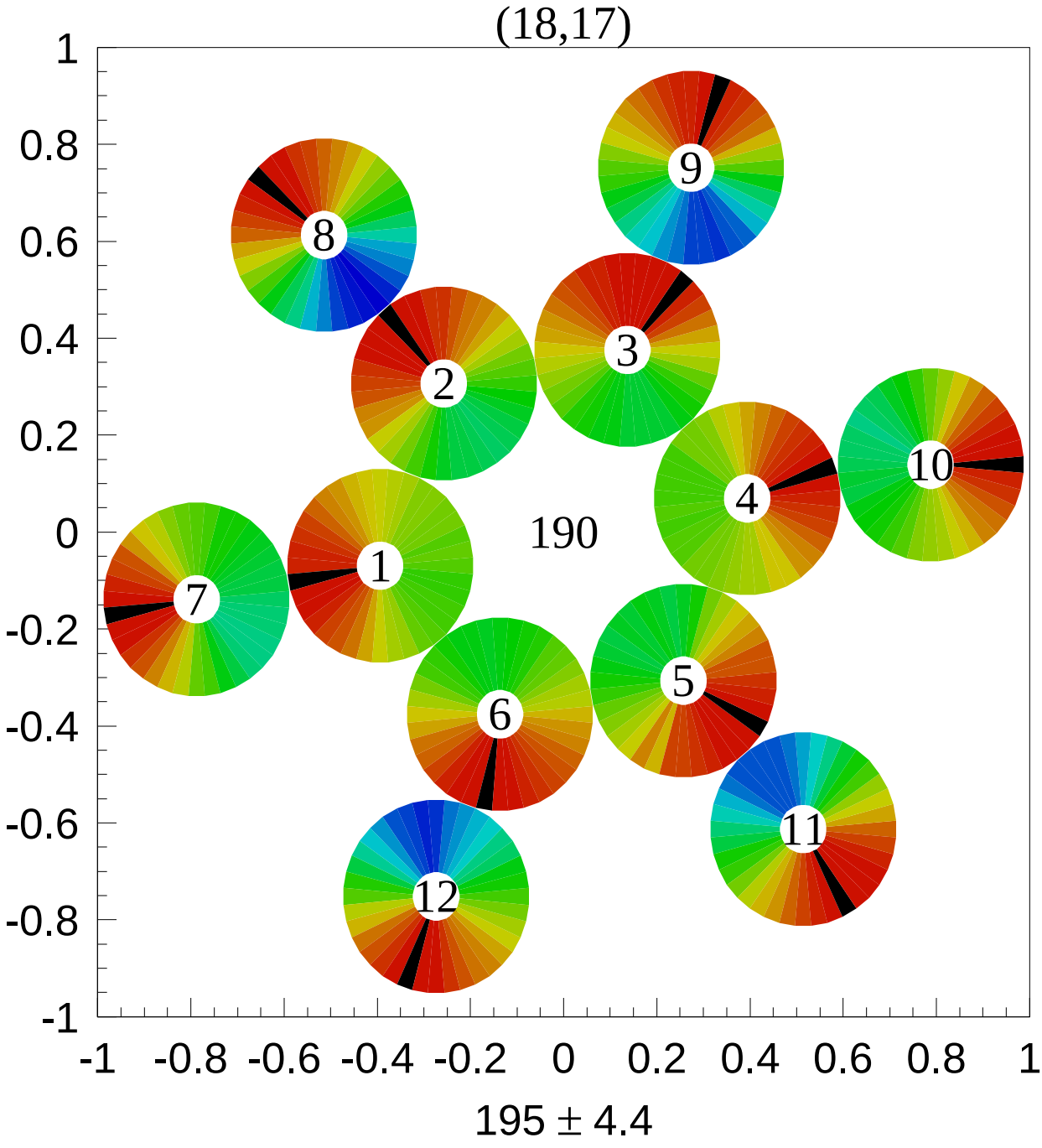

(18,15)
tilted LEDs
123 122 123 123 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 121 121 122 127 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

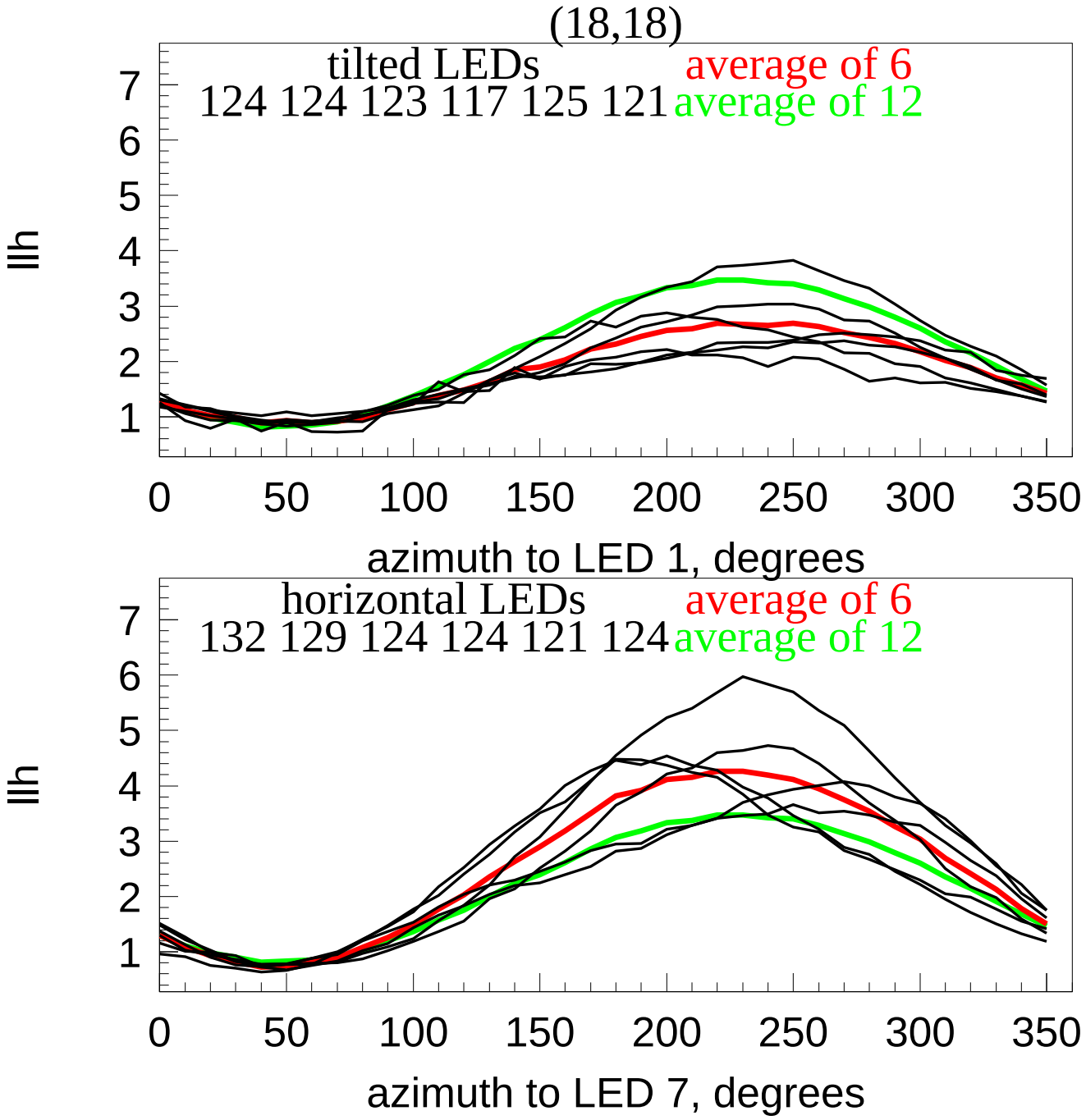

(18,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12.9 ± 5.4
12
11
6
5
7
1
10
4
10
2
3
8
9

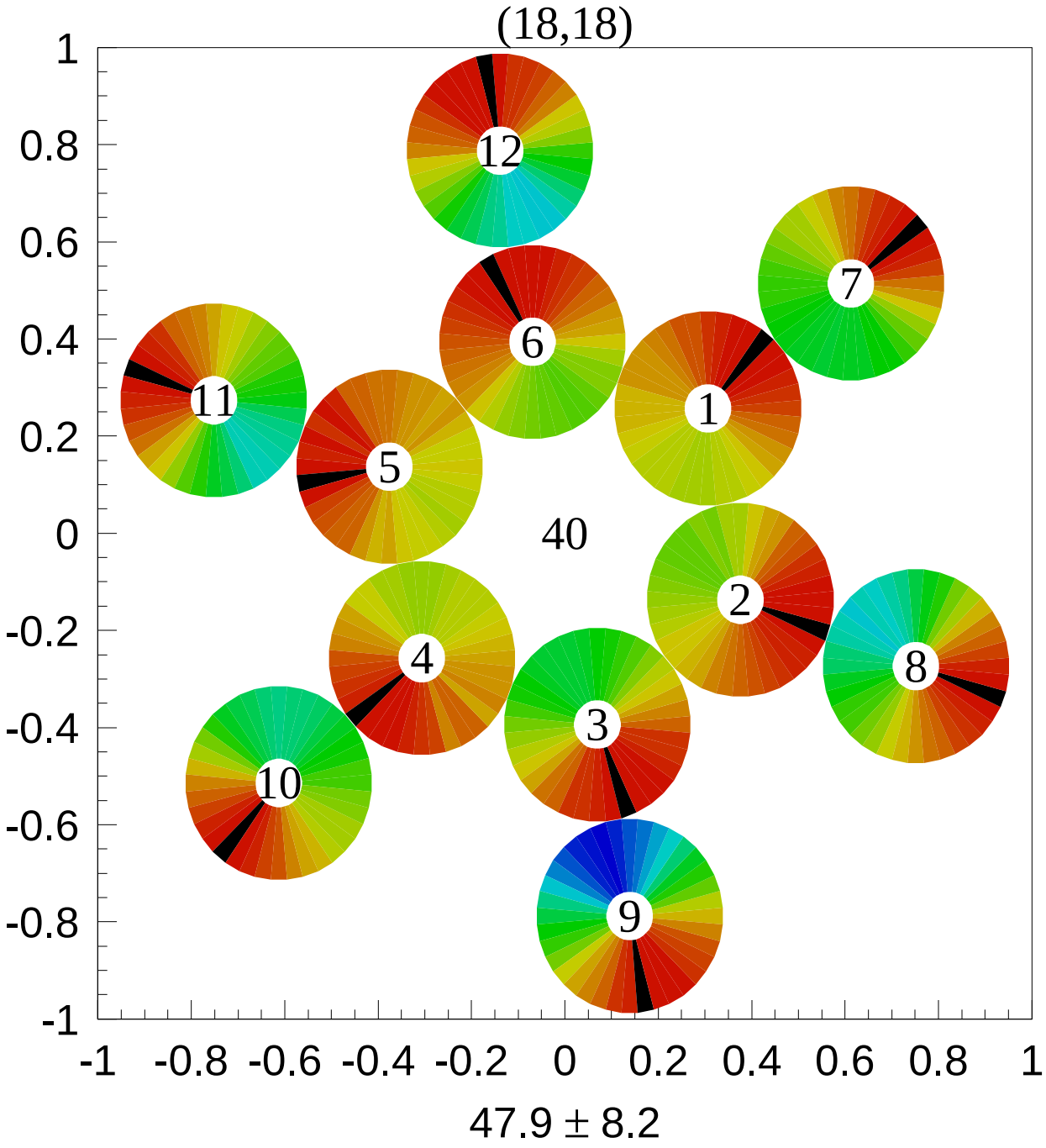

(18,16)
tilted LEDs
120 124 124 121 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 120 112 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

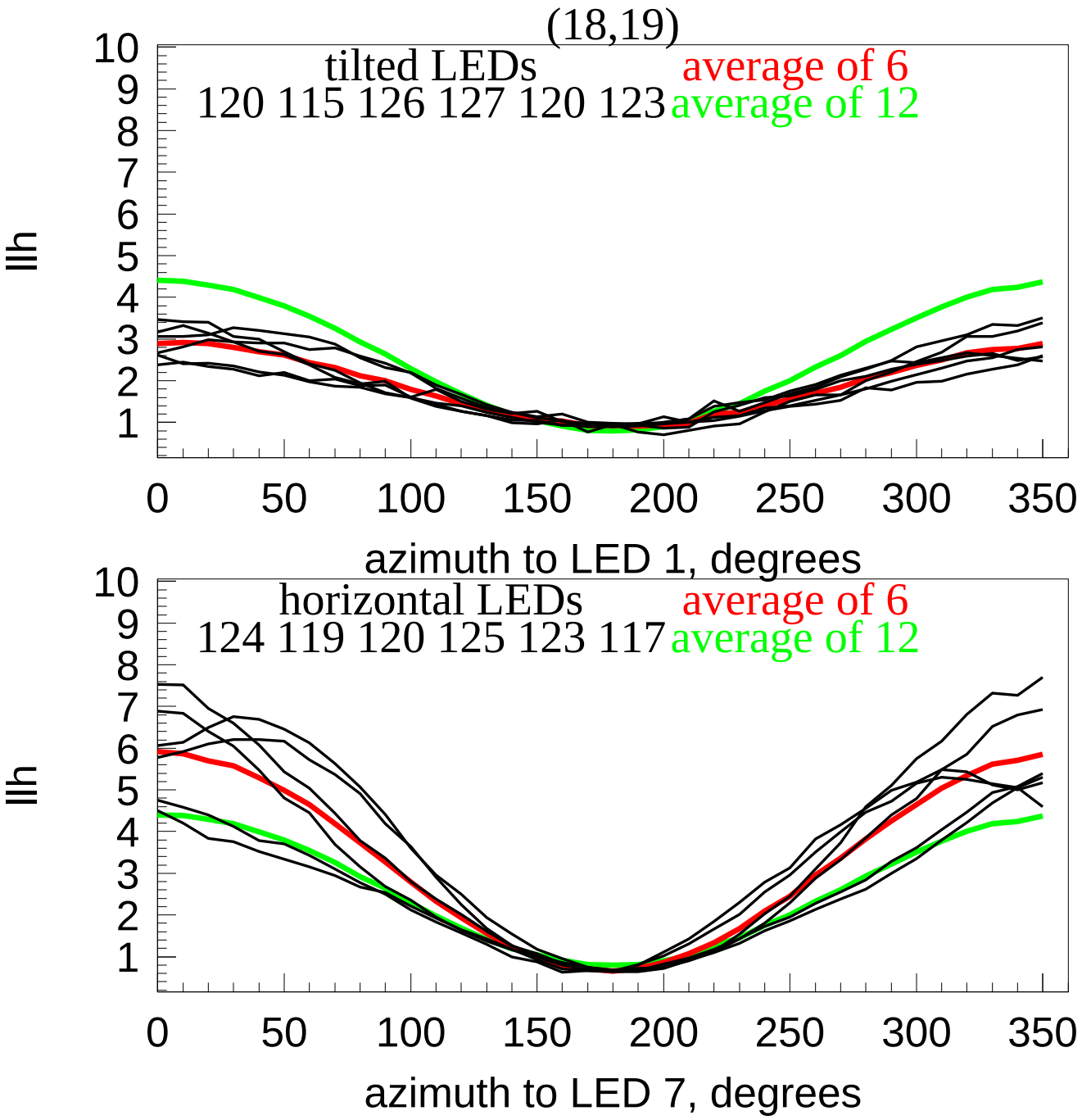

(18,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
127.7 ± 5.7

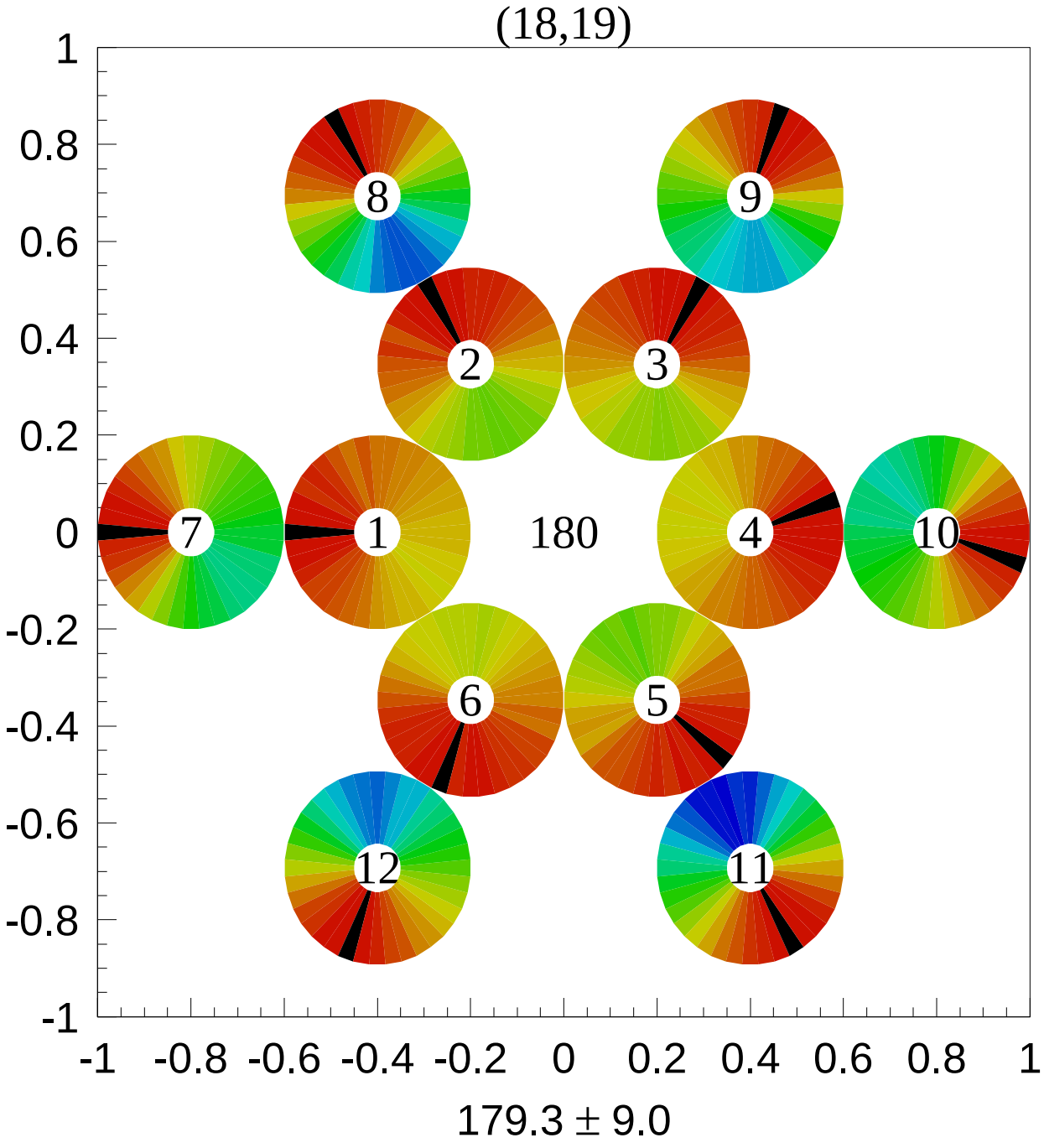

(18,17)
tilted LEDs
123 111 120 117 119 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 125 121 116 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

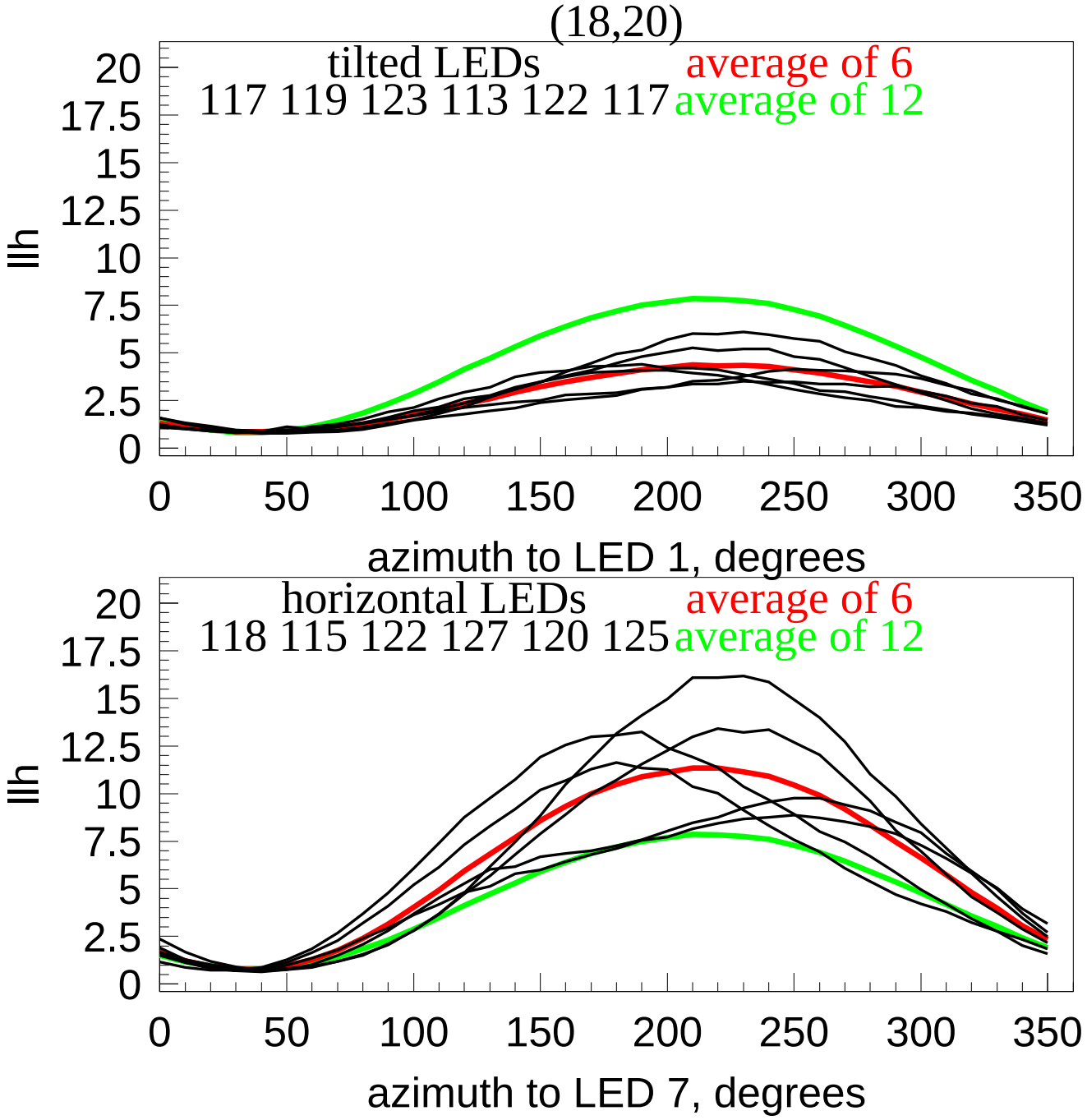

(18,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
195 ± 4.4

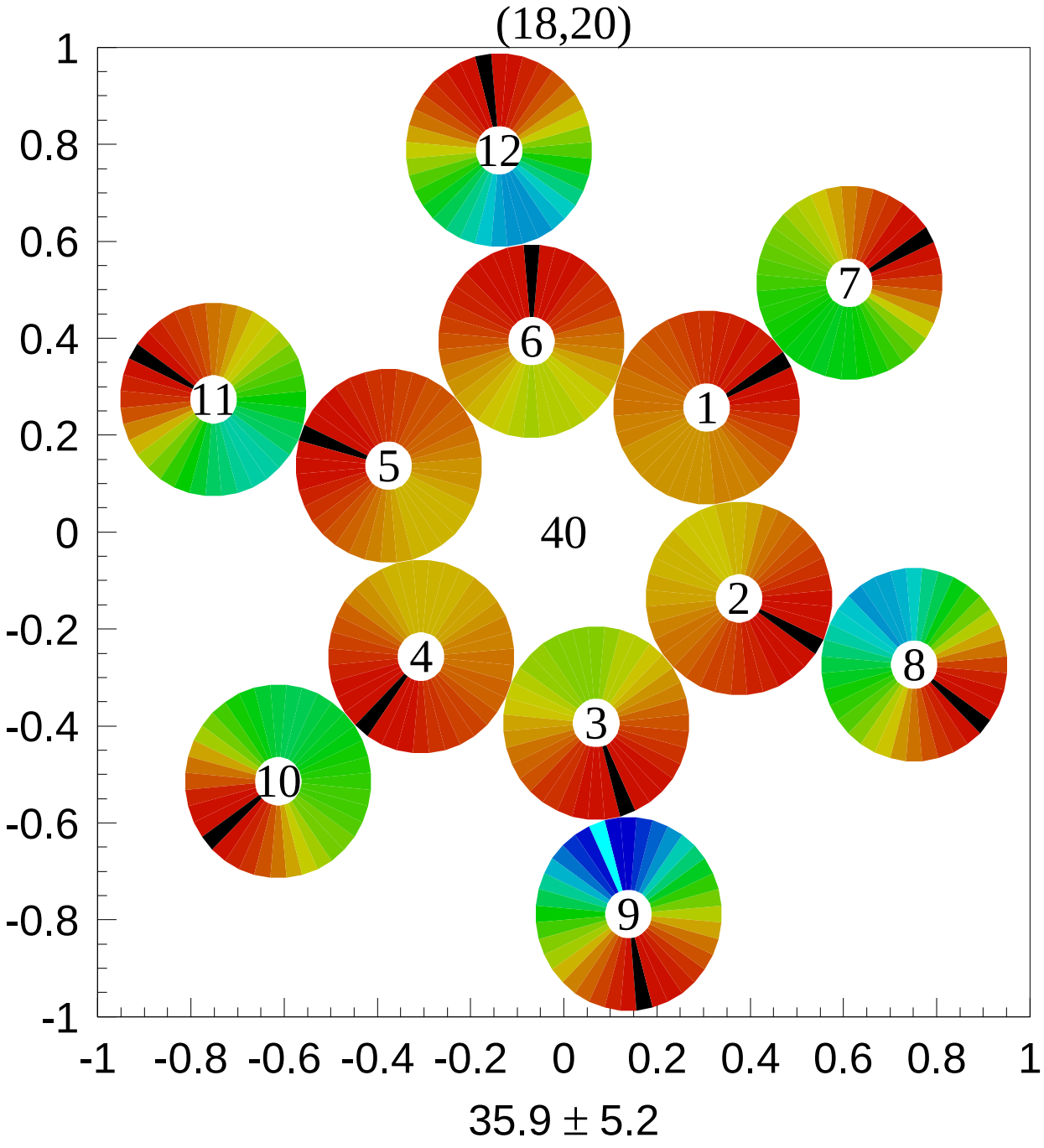

(18,18)
tilted LEDs
124 124 123 117 125 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
132 129 124 124 121 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

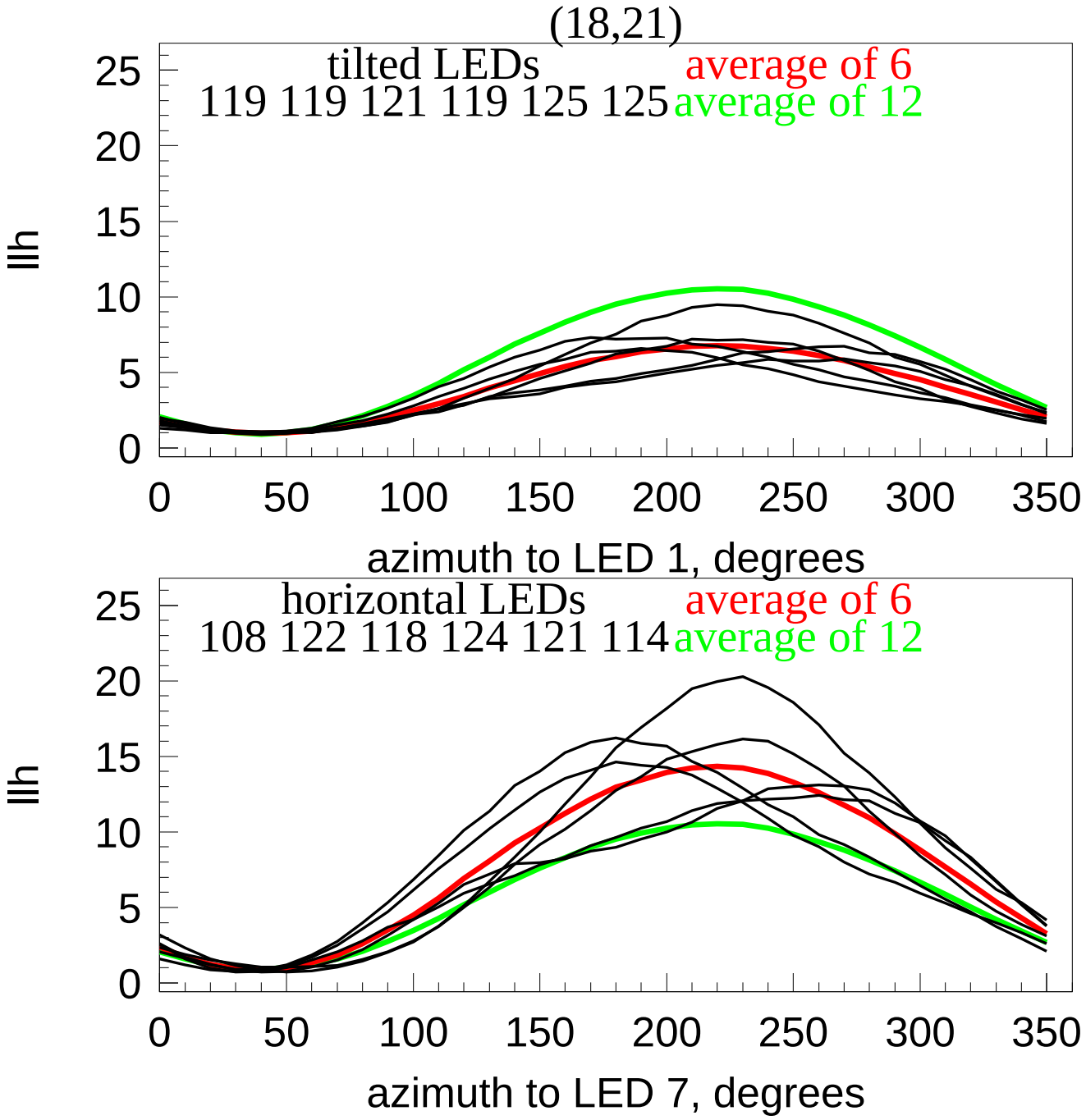

(18,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
47.9 ± 8.2

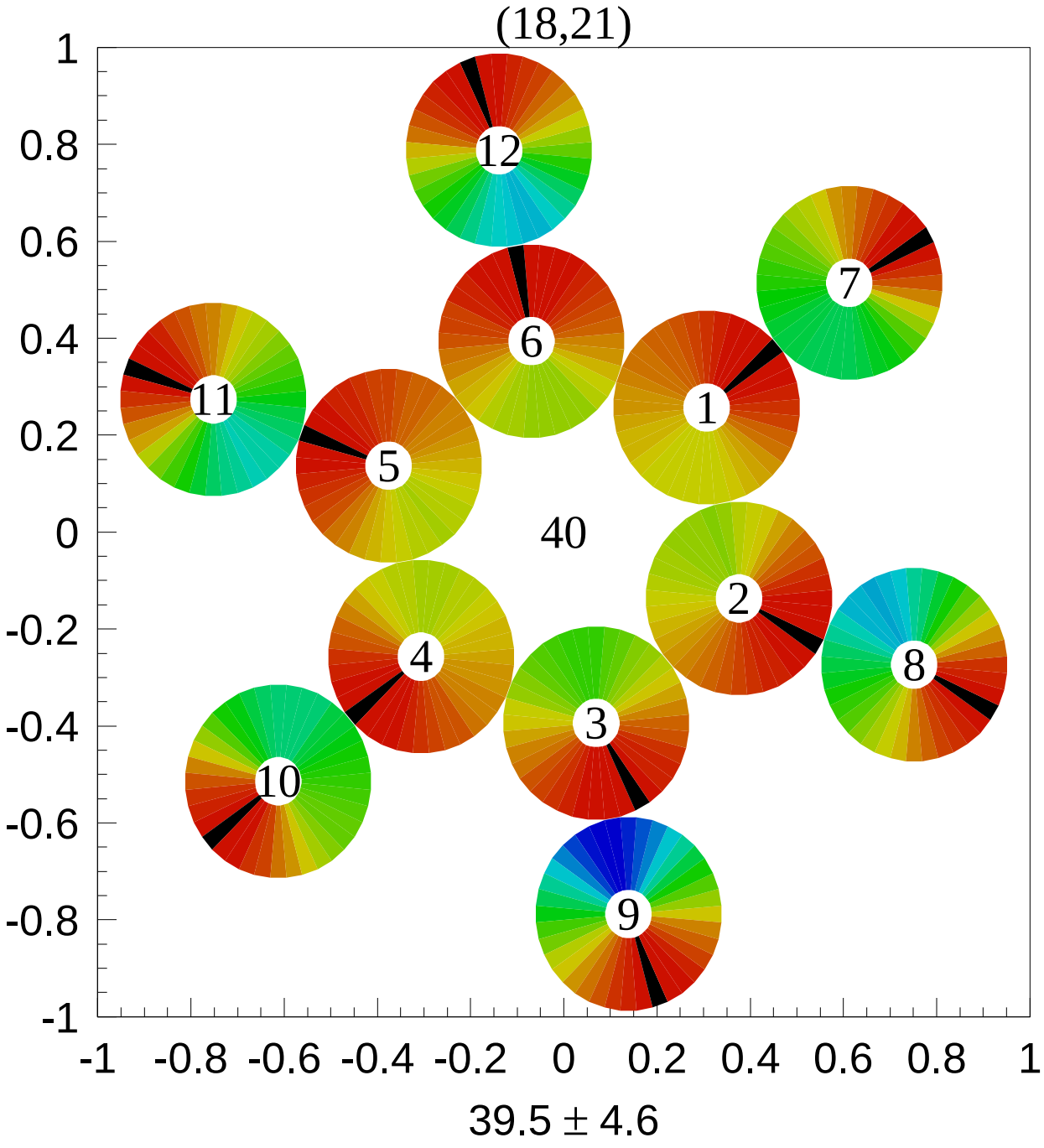

(18,19)
tilted LEDs
120 115 126 127 120 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 119 120 125 123 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

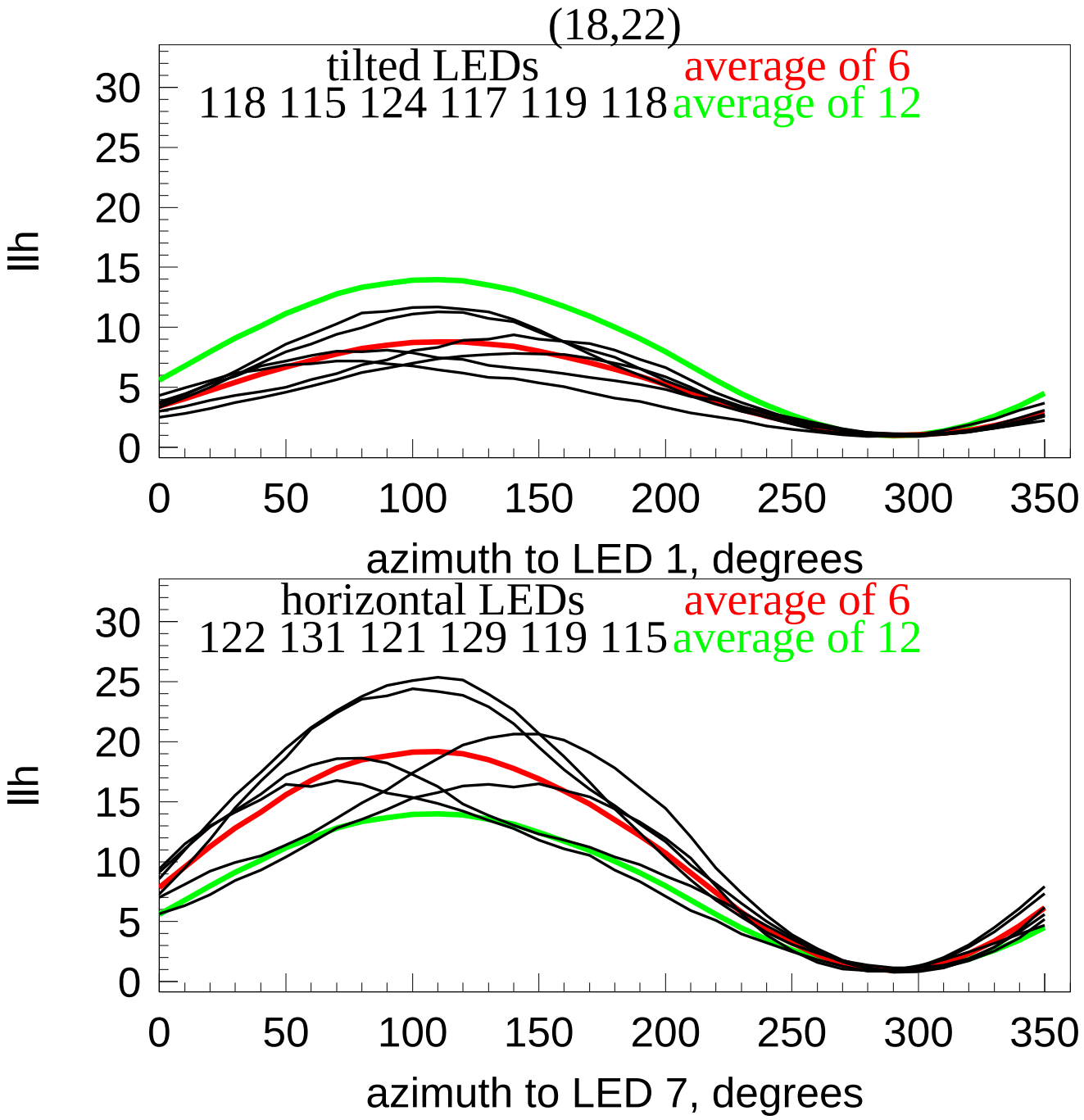

(18,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
179.3 ± 9.0
8
9
2
3
7
1
180
4
10
6
5
12
11

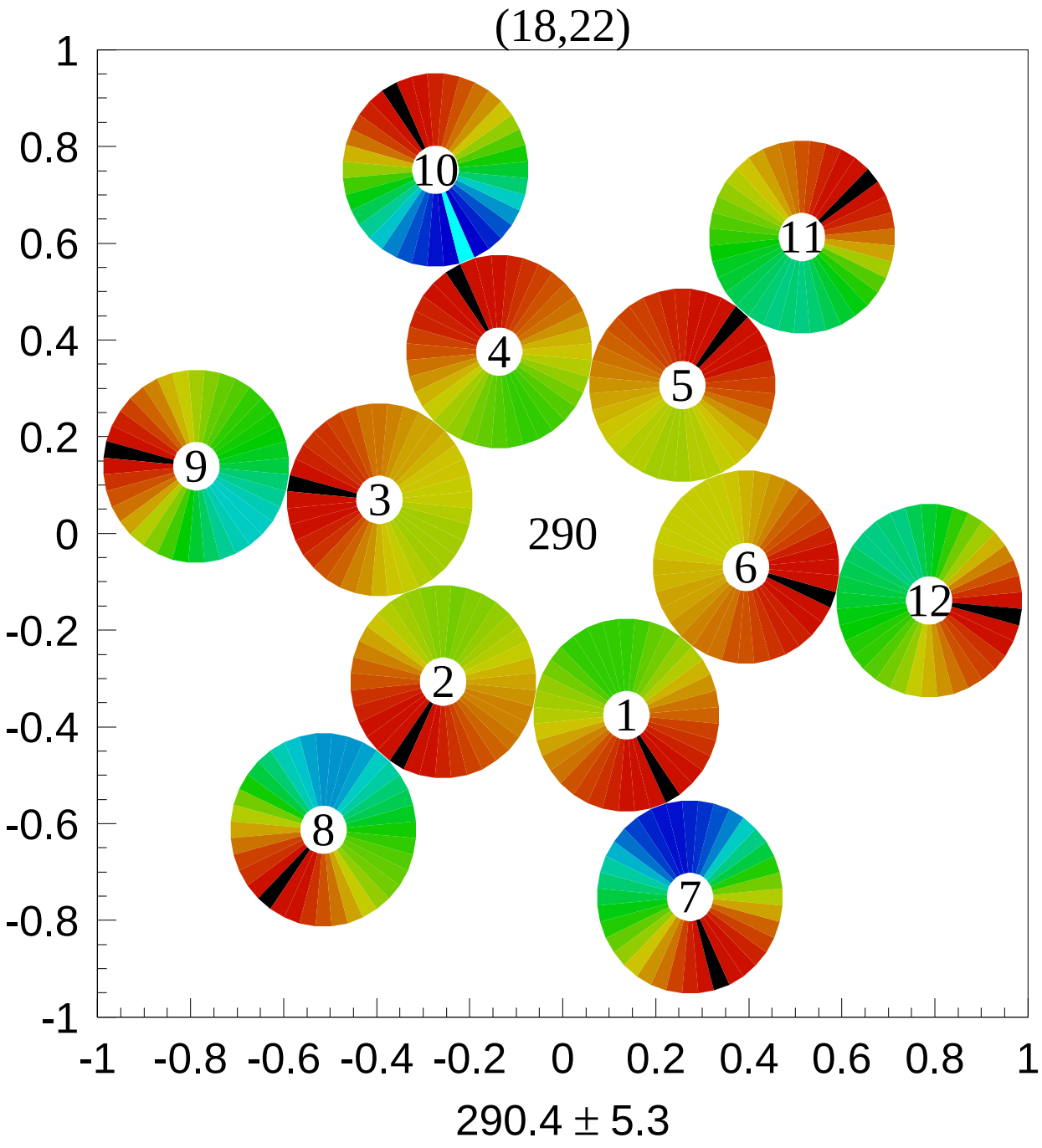

(18,20)
tilted LEDs
117 119 123 113 122 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 115 122 127 120 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

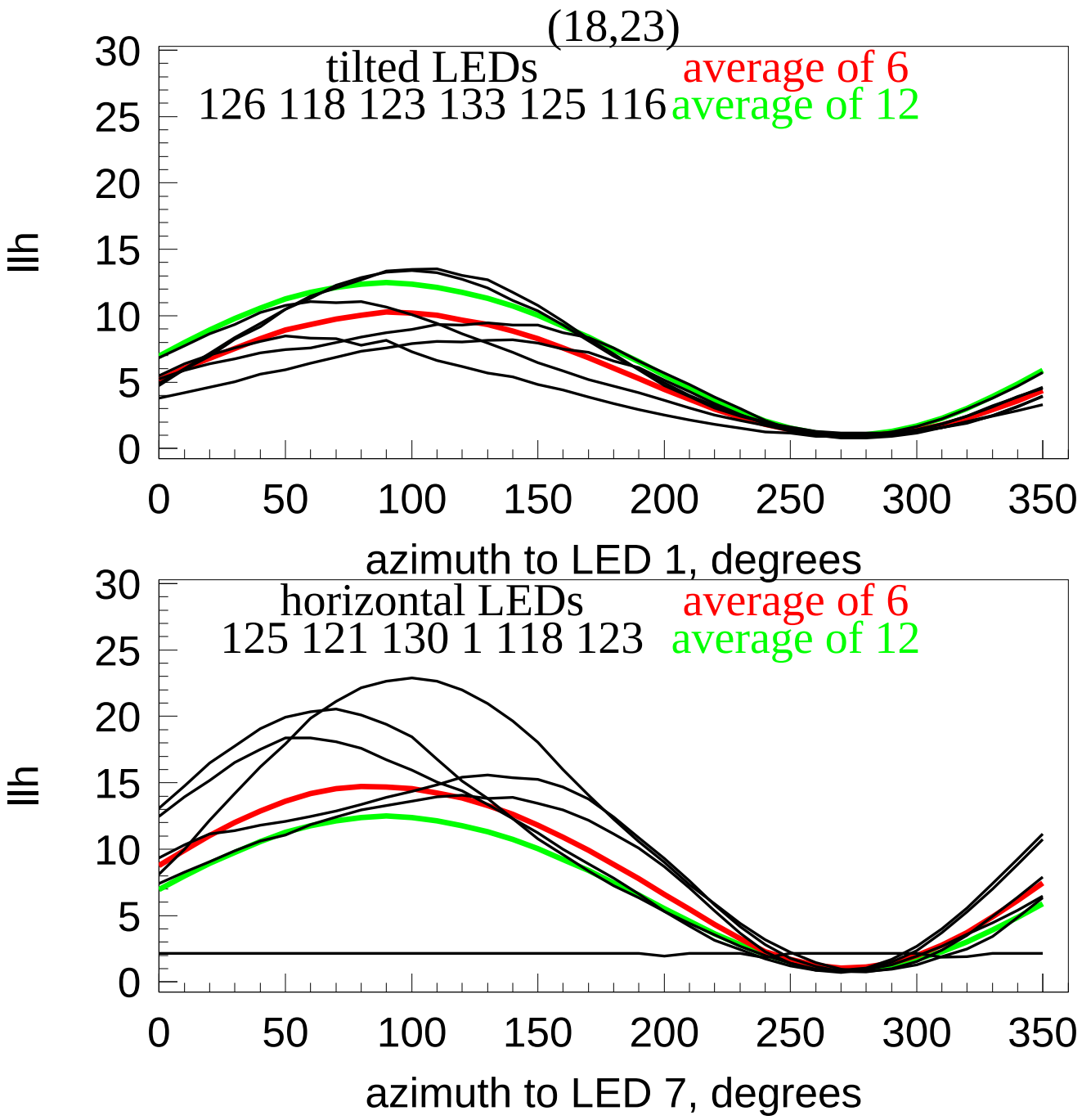

(18,20)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
35.9 ± 5.2

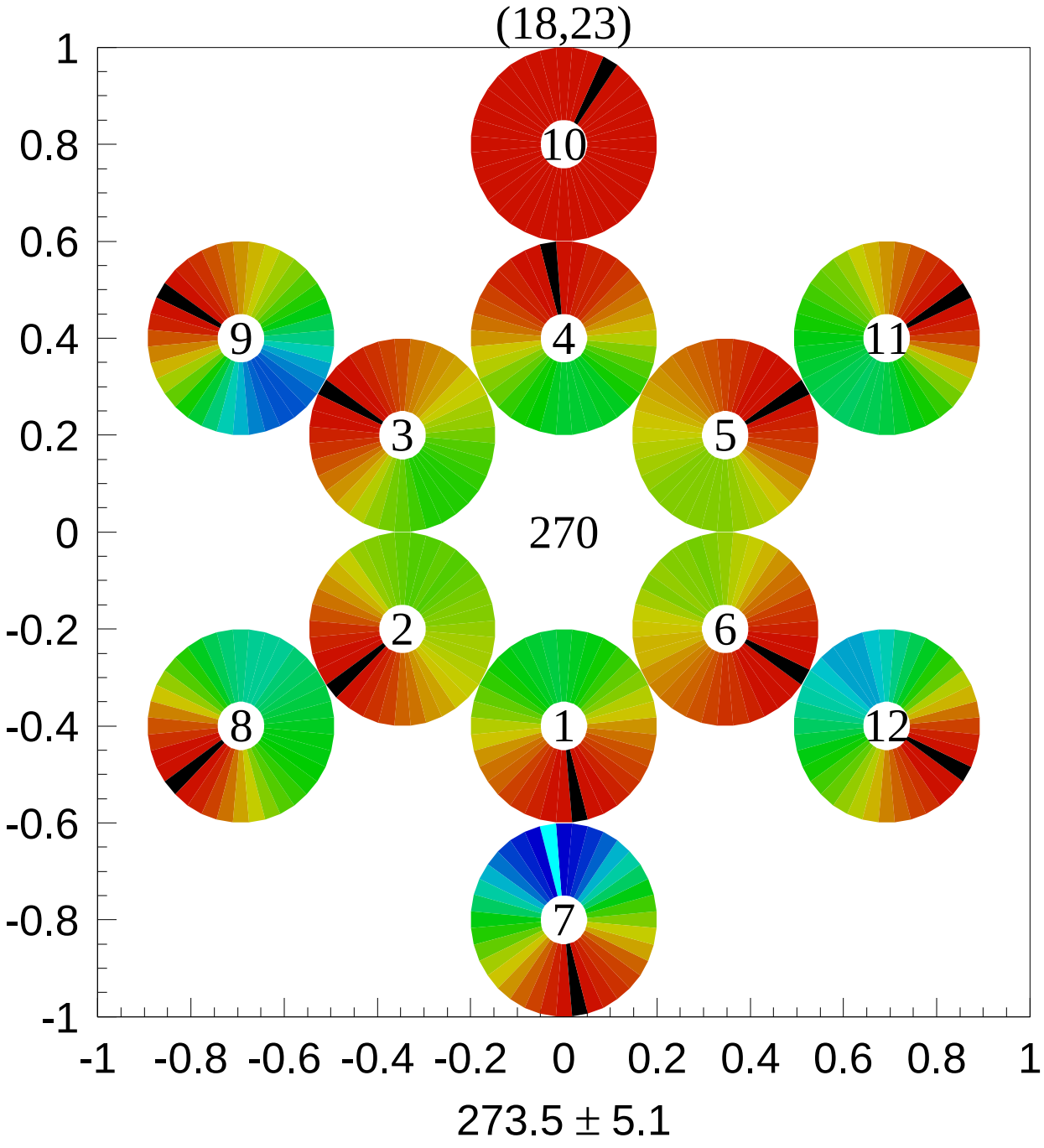

(18,21)
tilted LEDs
119 119 121 119 125 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
108 122 118 124 121 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

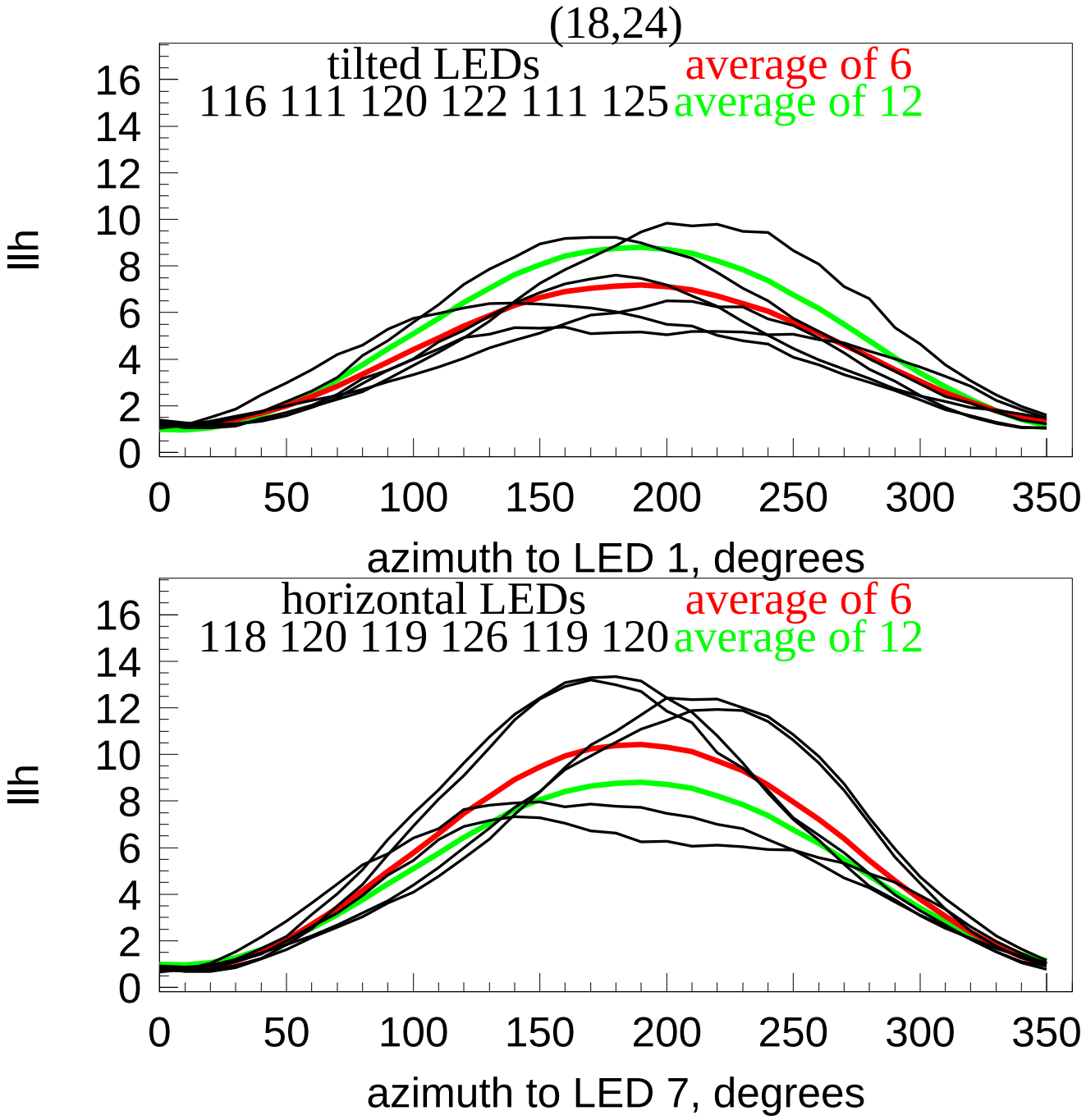

(18,21)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
39.5 ± 4.6

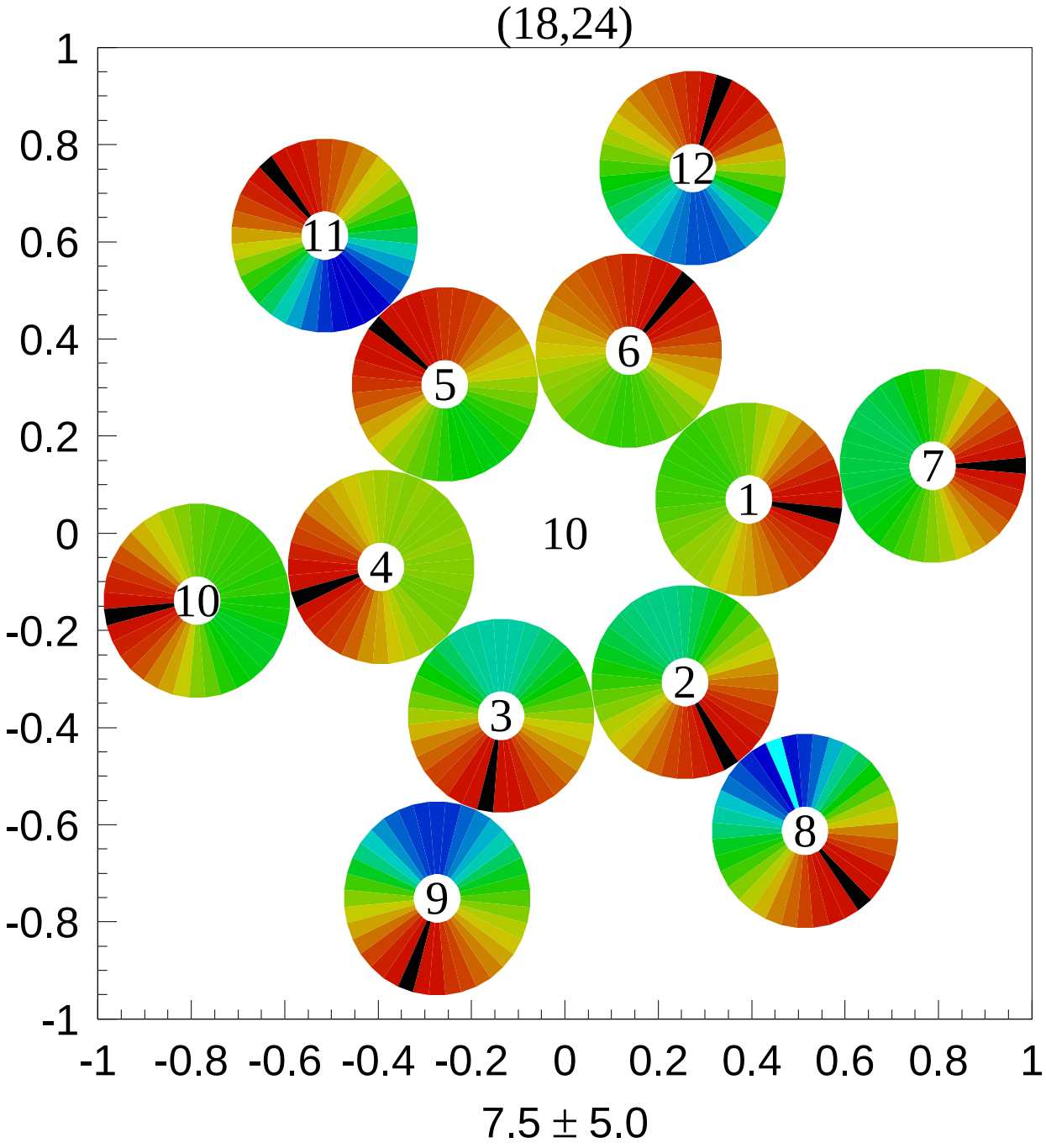

(18,22)
tilted LEDs
118 115 124 117 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 131 121 129 119 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

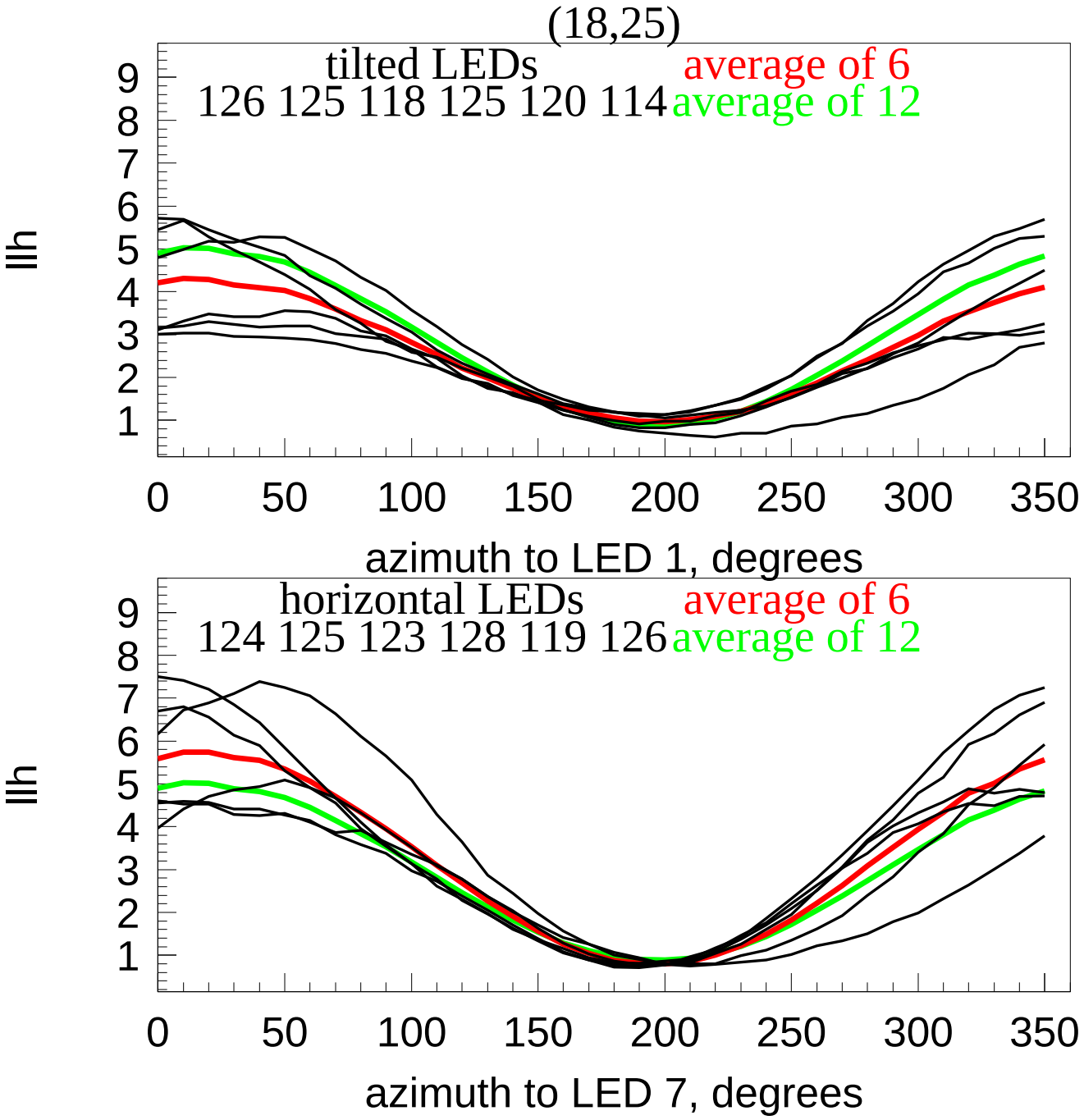

(18,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
290
290.4 ± 5.3
10
11
4
5
9
3
6
12
2
1
8
7

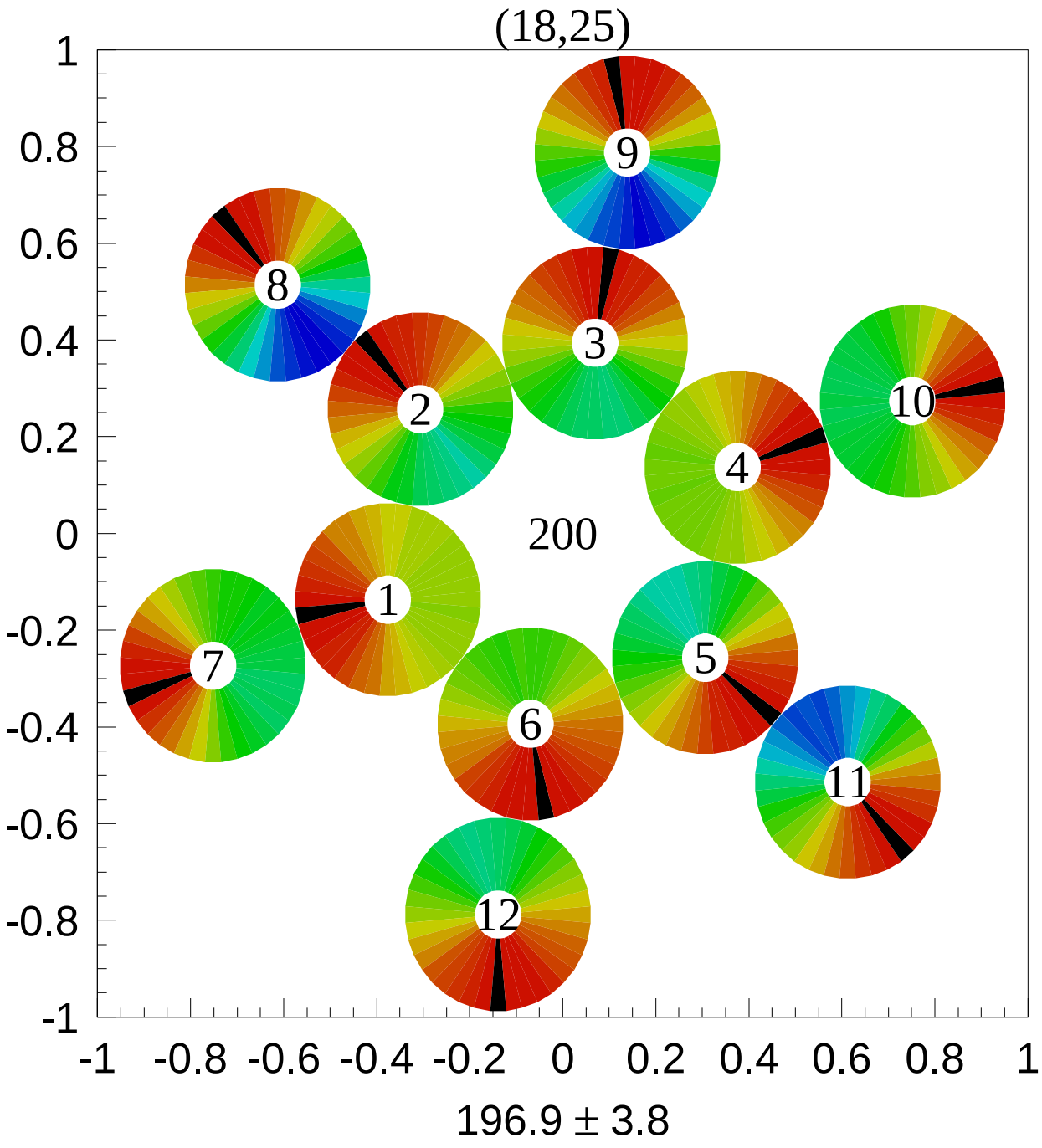

(18,23)
tilted LEDs
126 118 123 133 125 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 130 1 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

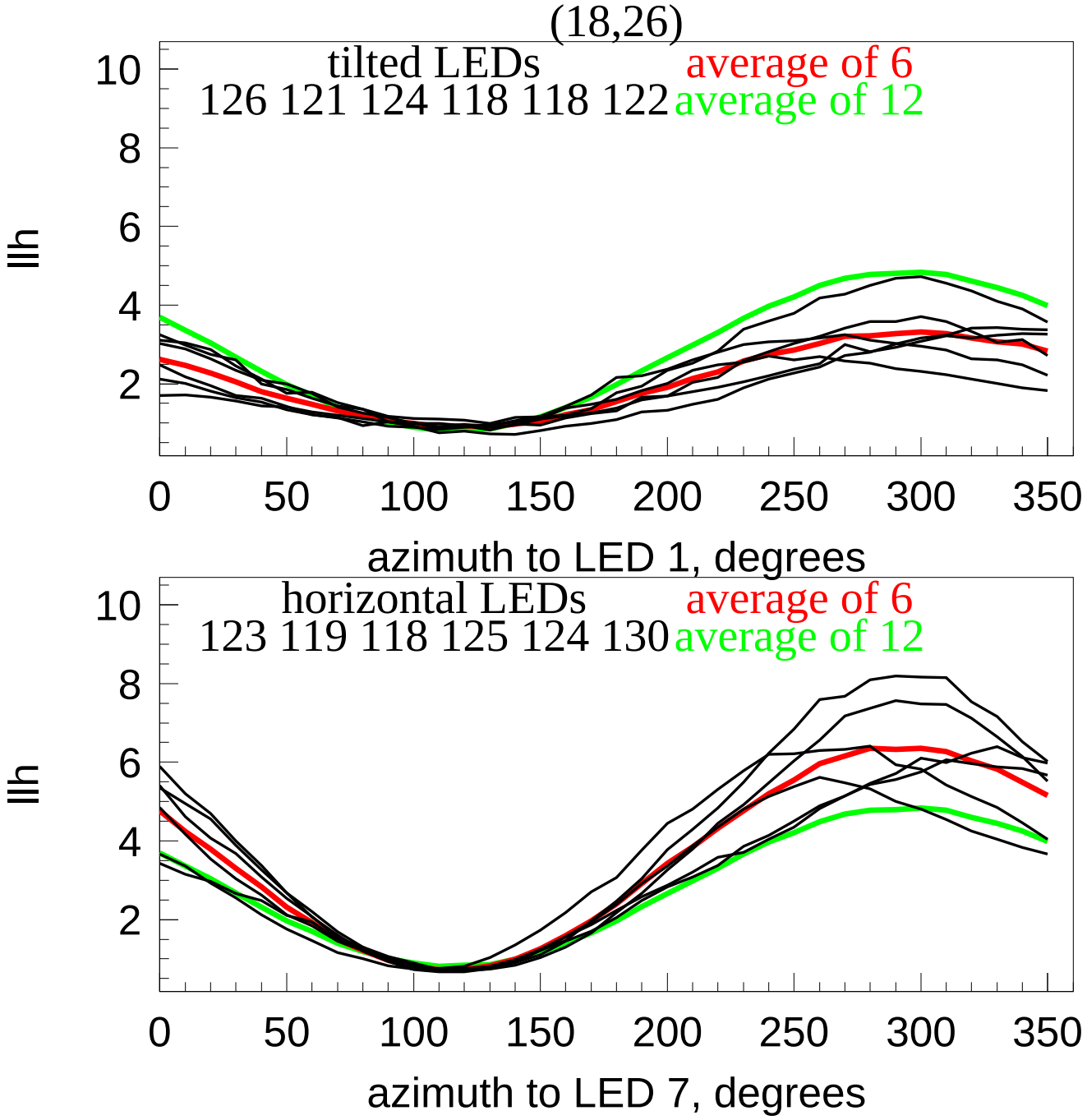

(18,23)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
273.5 ± 5.1

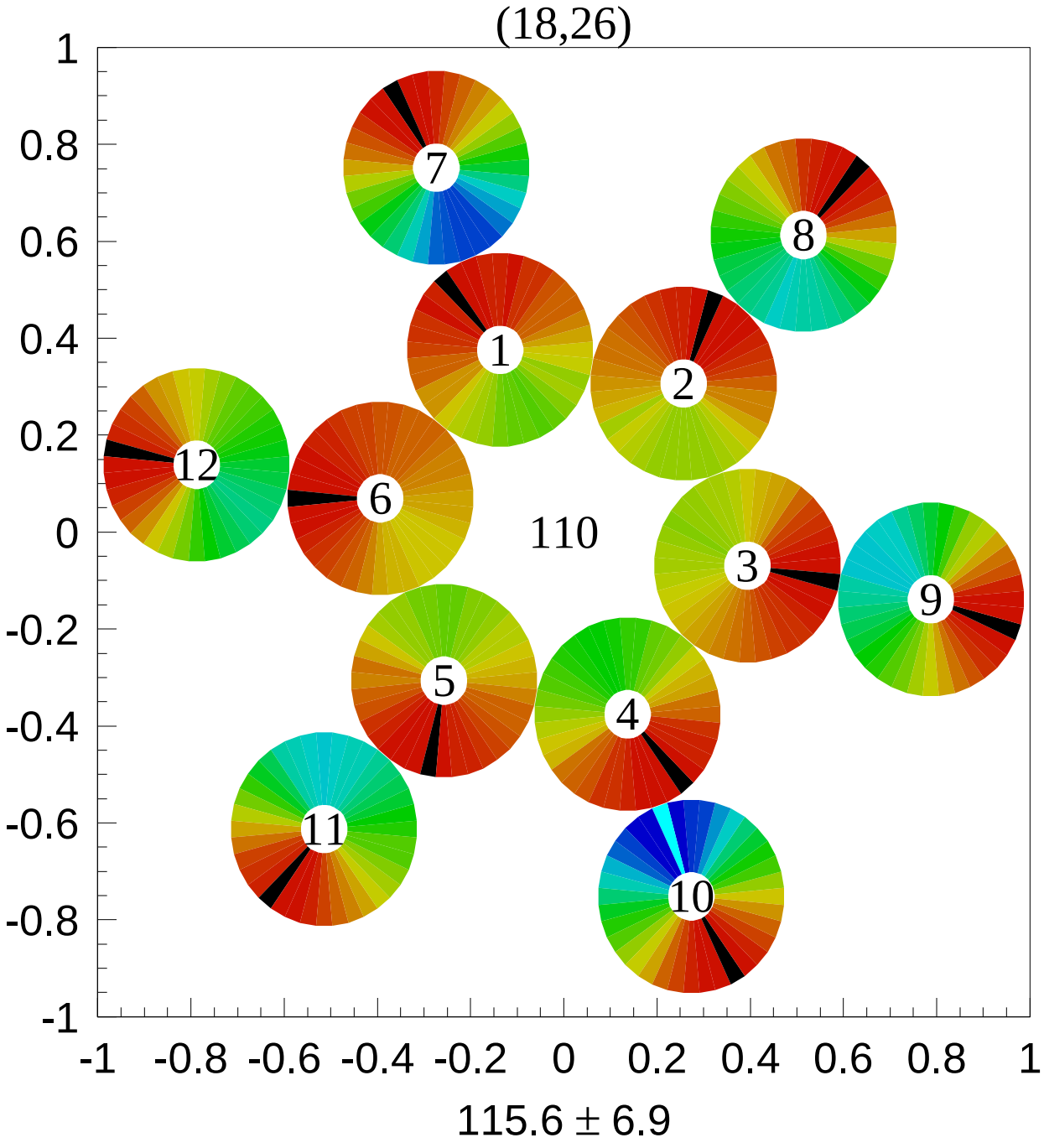

(18,24)
tilted LEDs
116 111 120 122 111 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 119 126 119 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

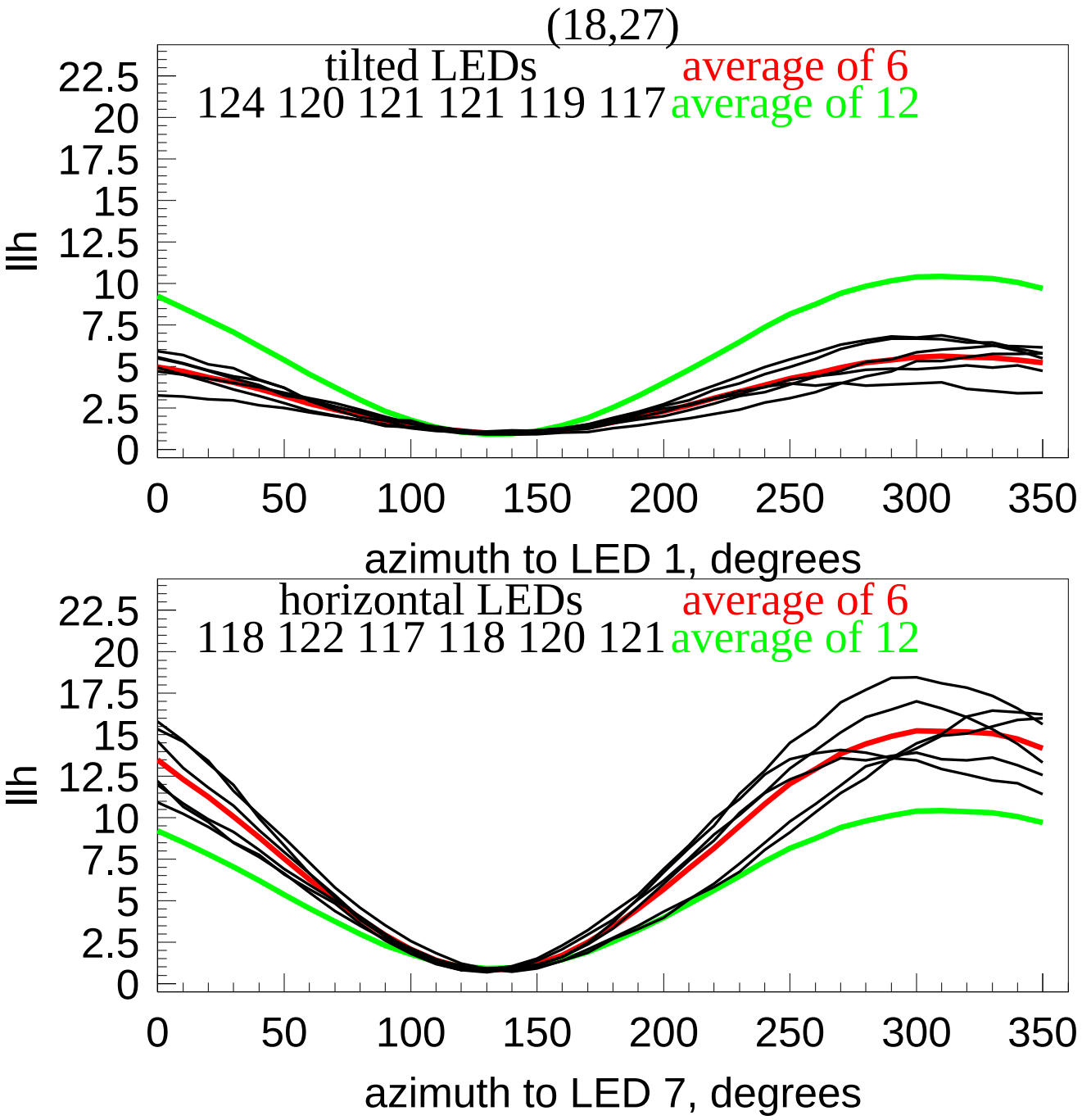

(18,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7.5 ± 5.0
12
11
6
5
7
1
10
4
10
2
3
8
9

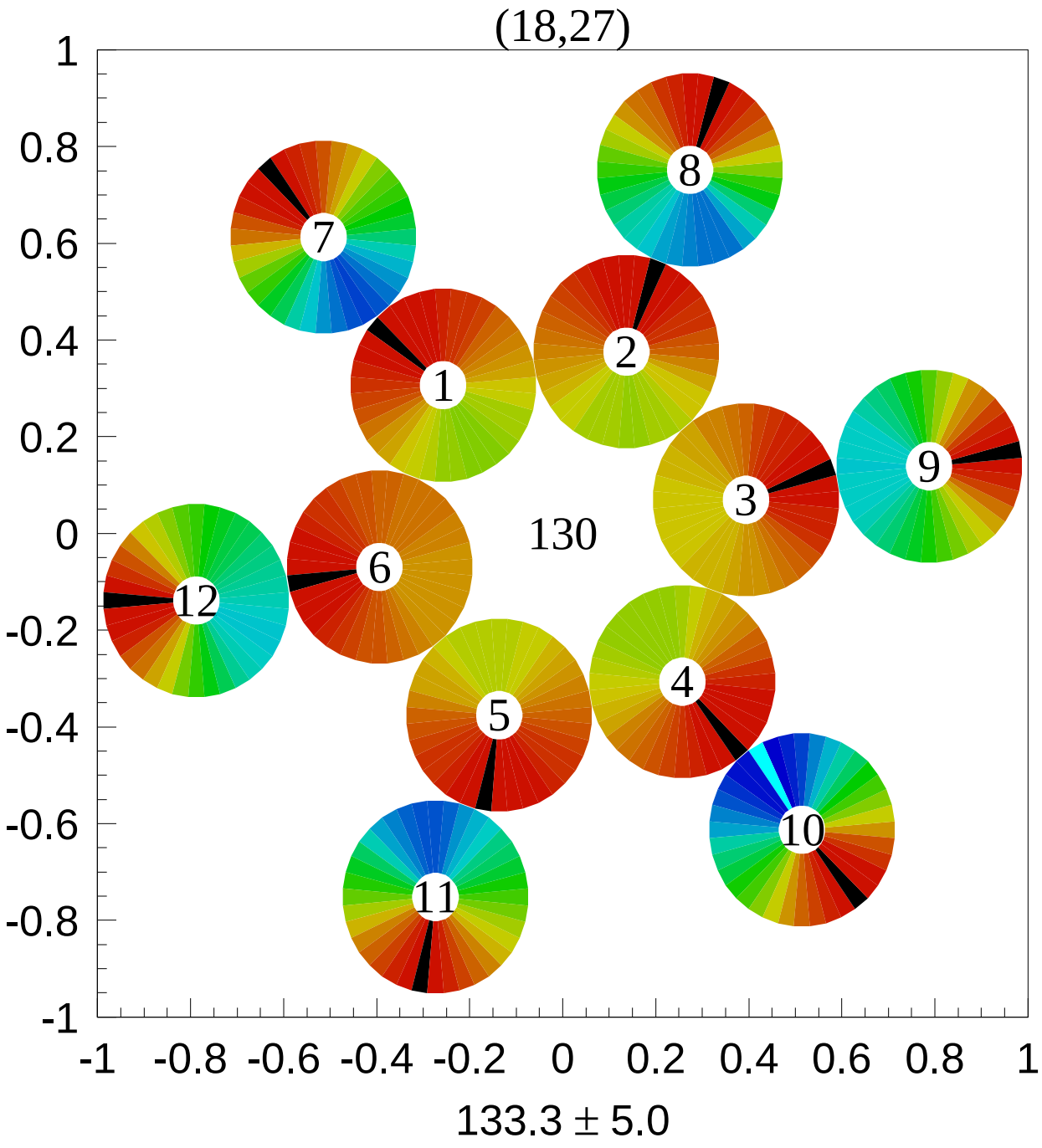

(18,25)
tilted LEDs
126 125 118 125 120 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 123 128 119 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

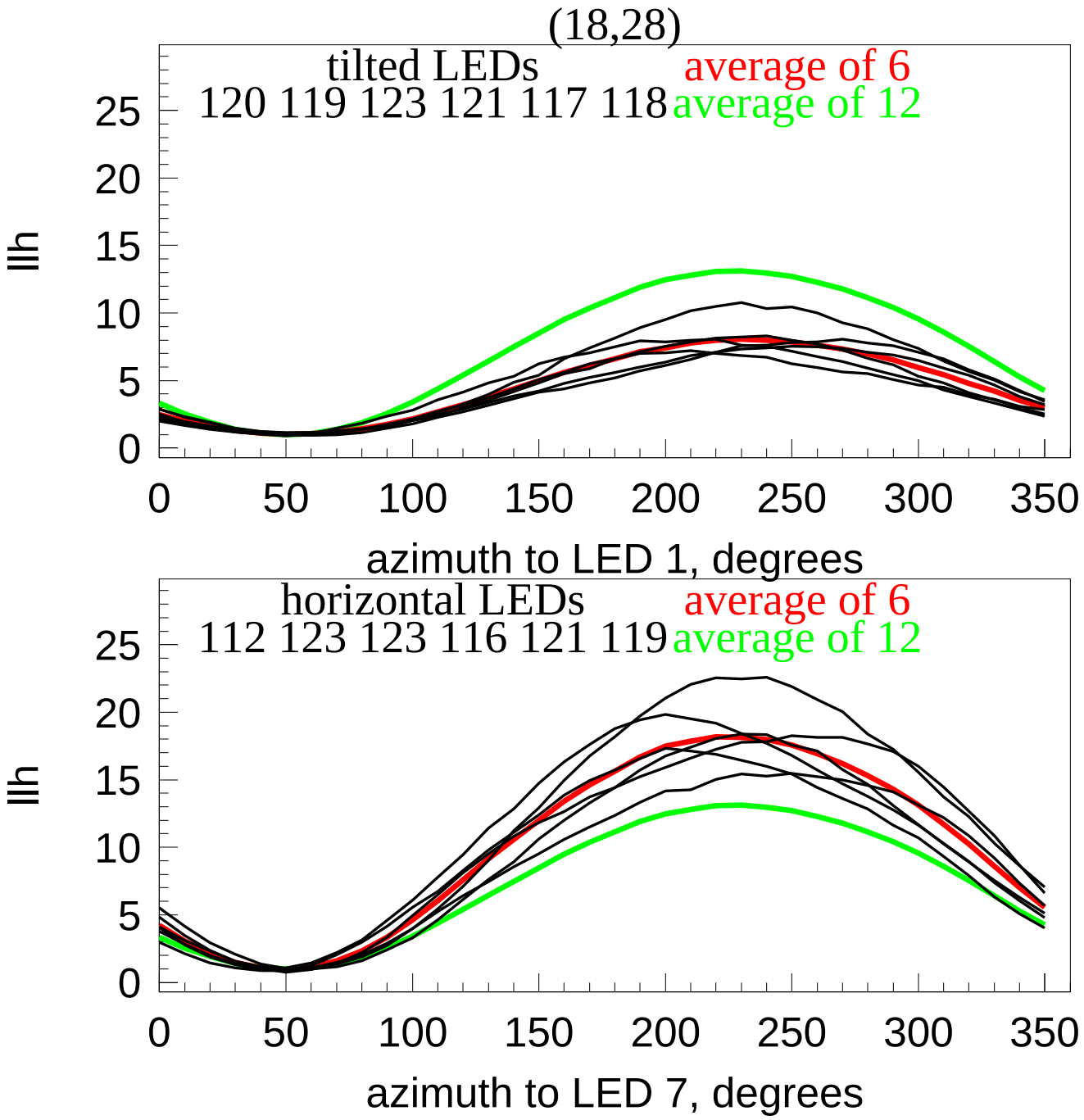

(18,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
196.9 ± 3.8
200
1
2
3
4
5
6
7
8
9
10
11
12

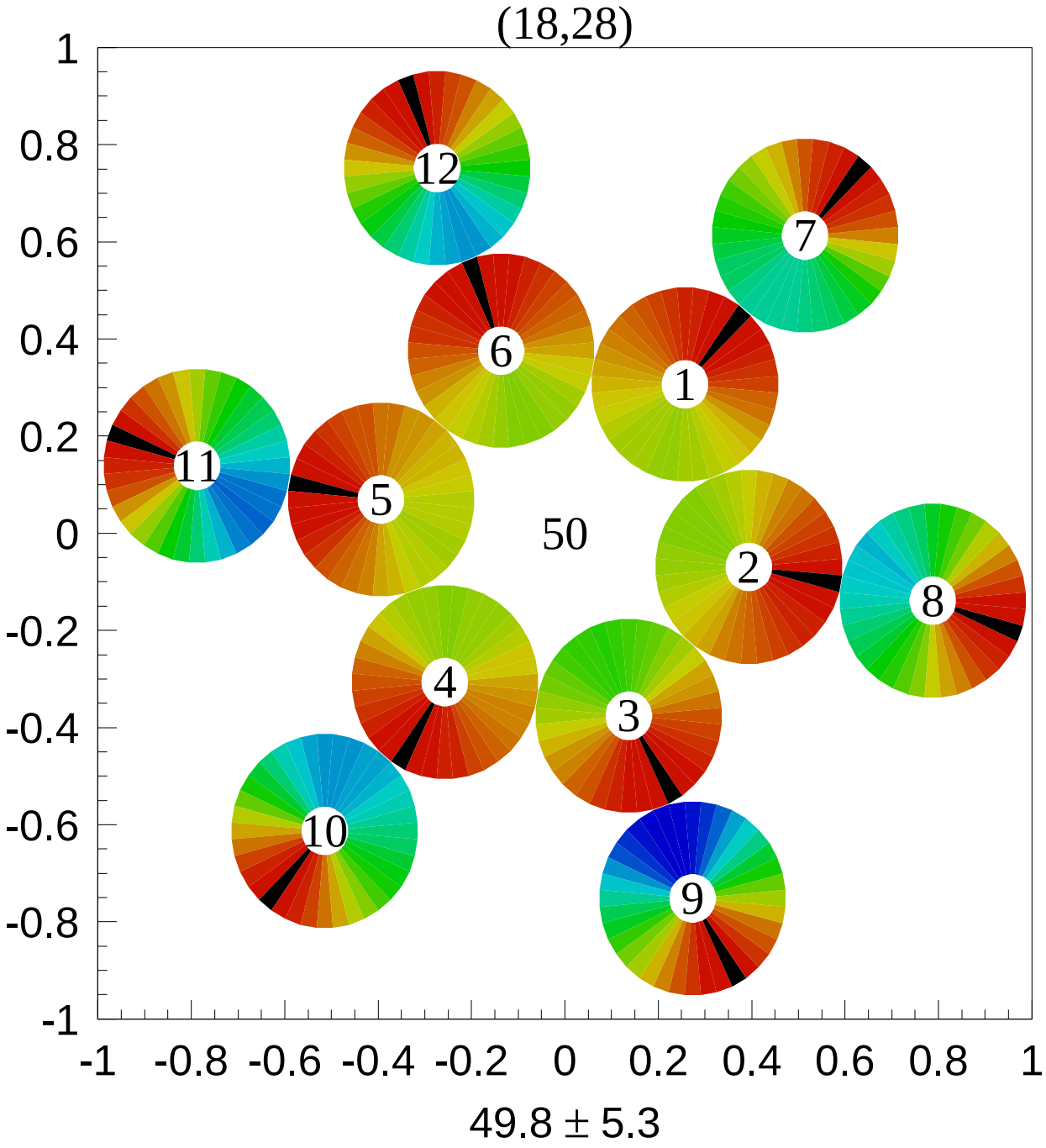

(18,26)
tilted LEDs
126 121 124 118 118 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 119 118 125 124 130
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

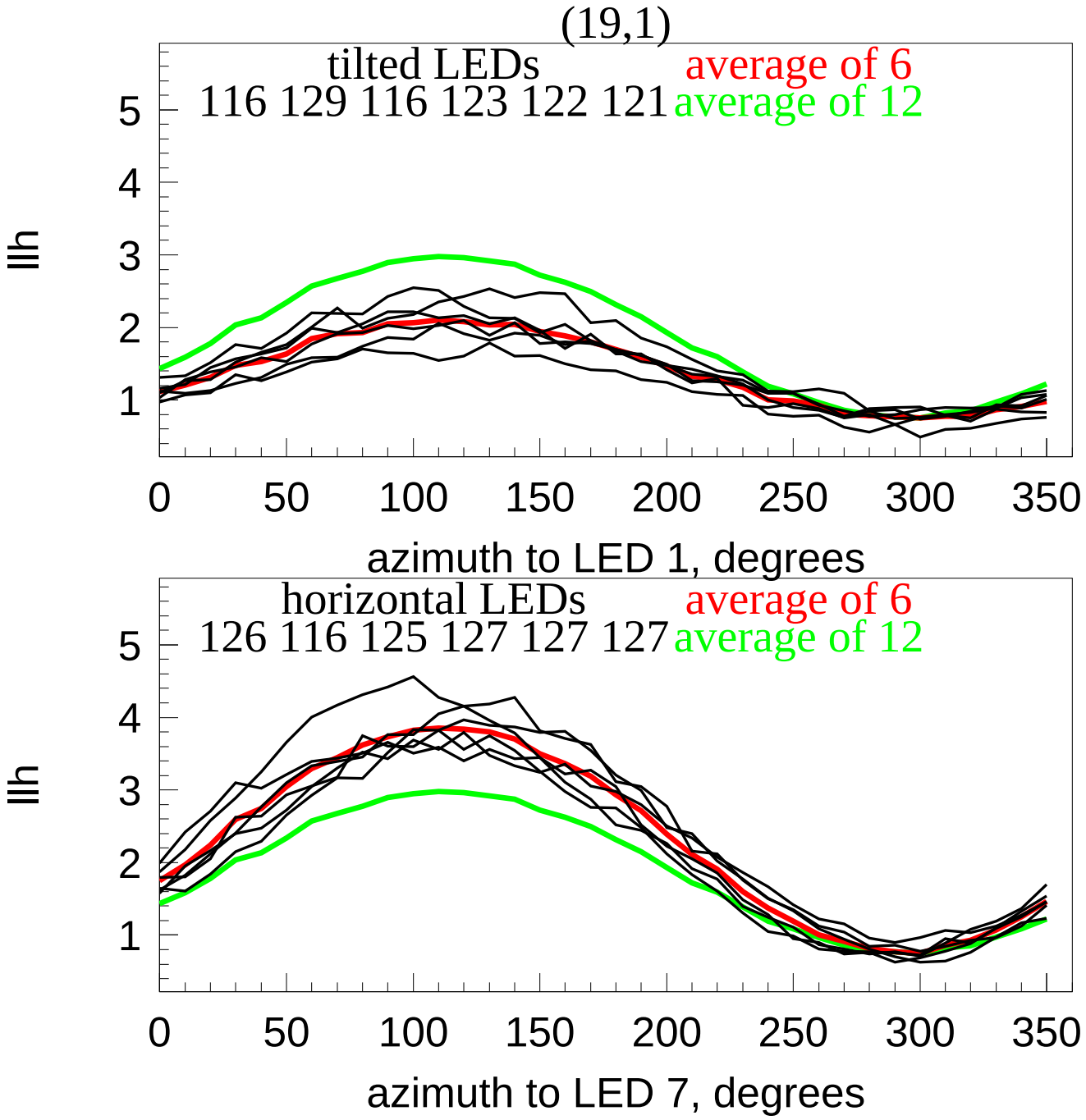

(18,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
115.6 ± 6.9

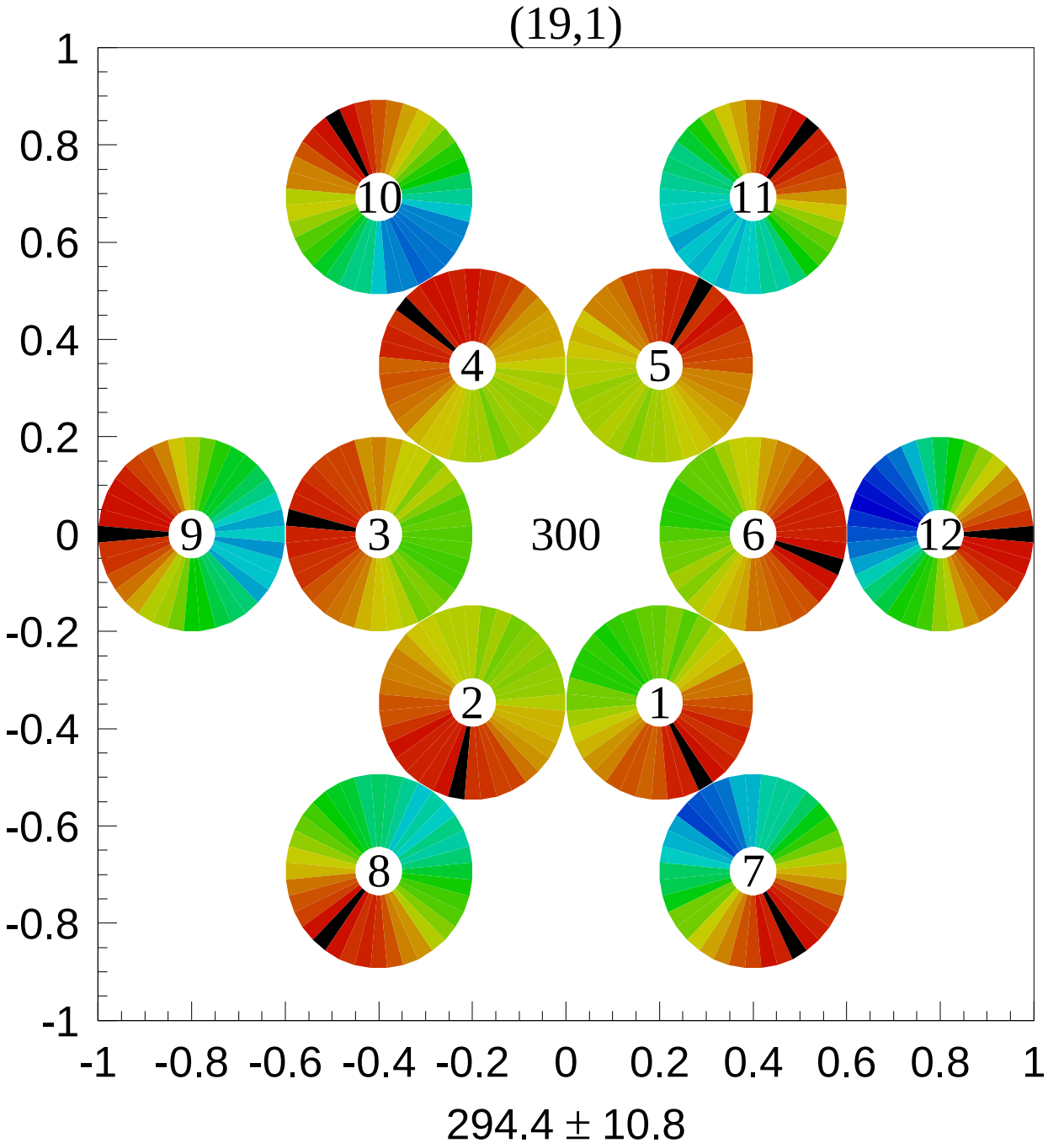

(18,27)
tilted LEDs
124 120 121 121 119 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 122 117 118 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

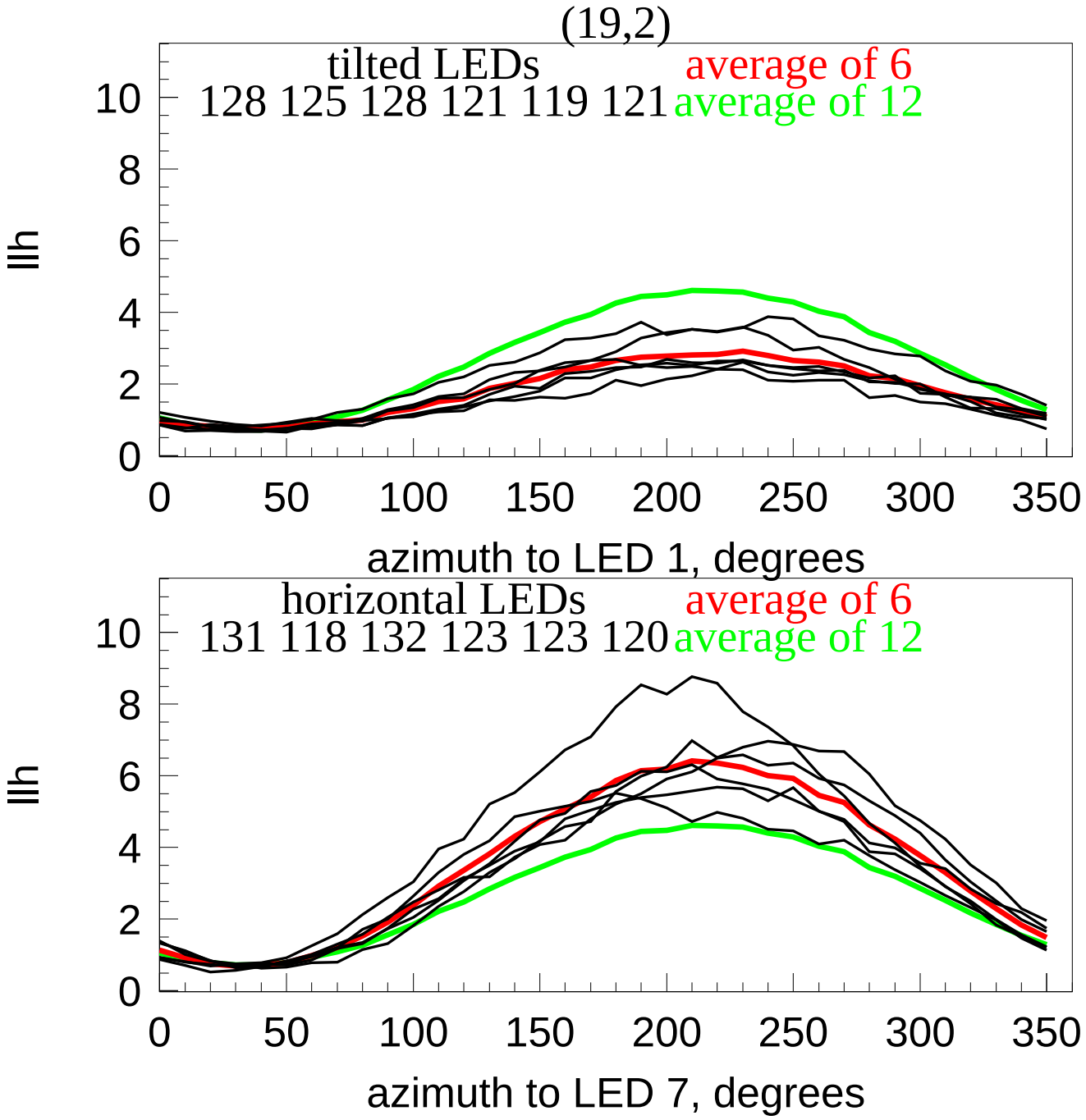

(18,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
133.3 ± 5.0

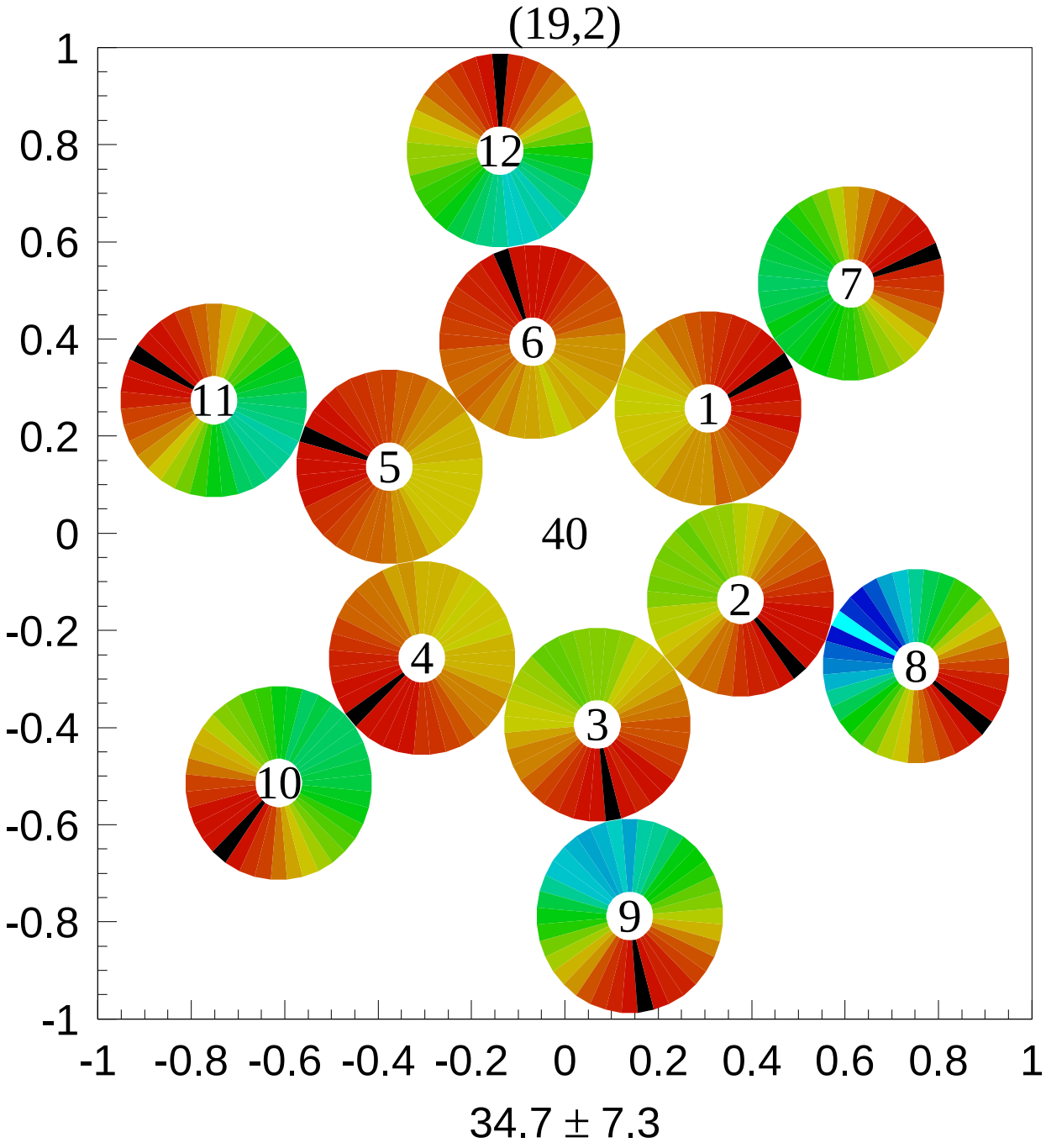

(18,28)
tilted LEDs
120 119 123 121 117 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 123 123 116 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

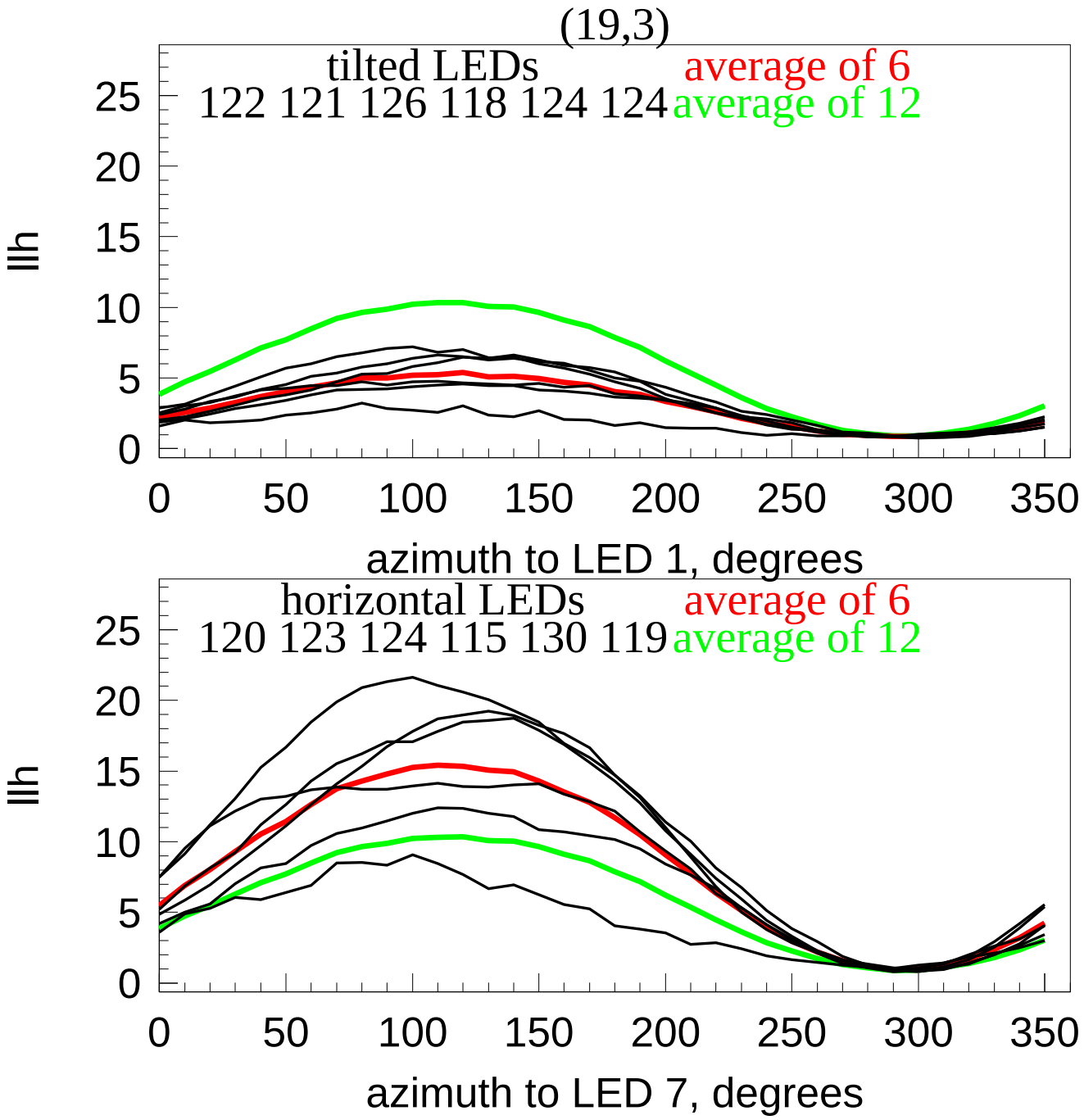

(18,28)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
49.8 ± 5.3

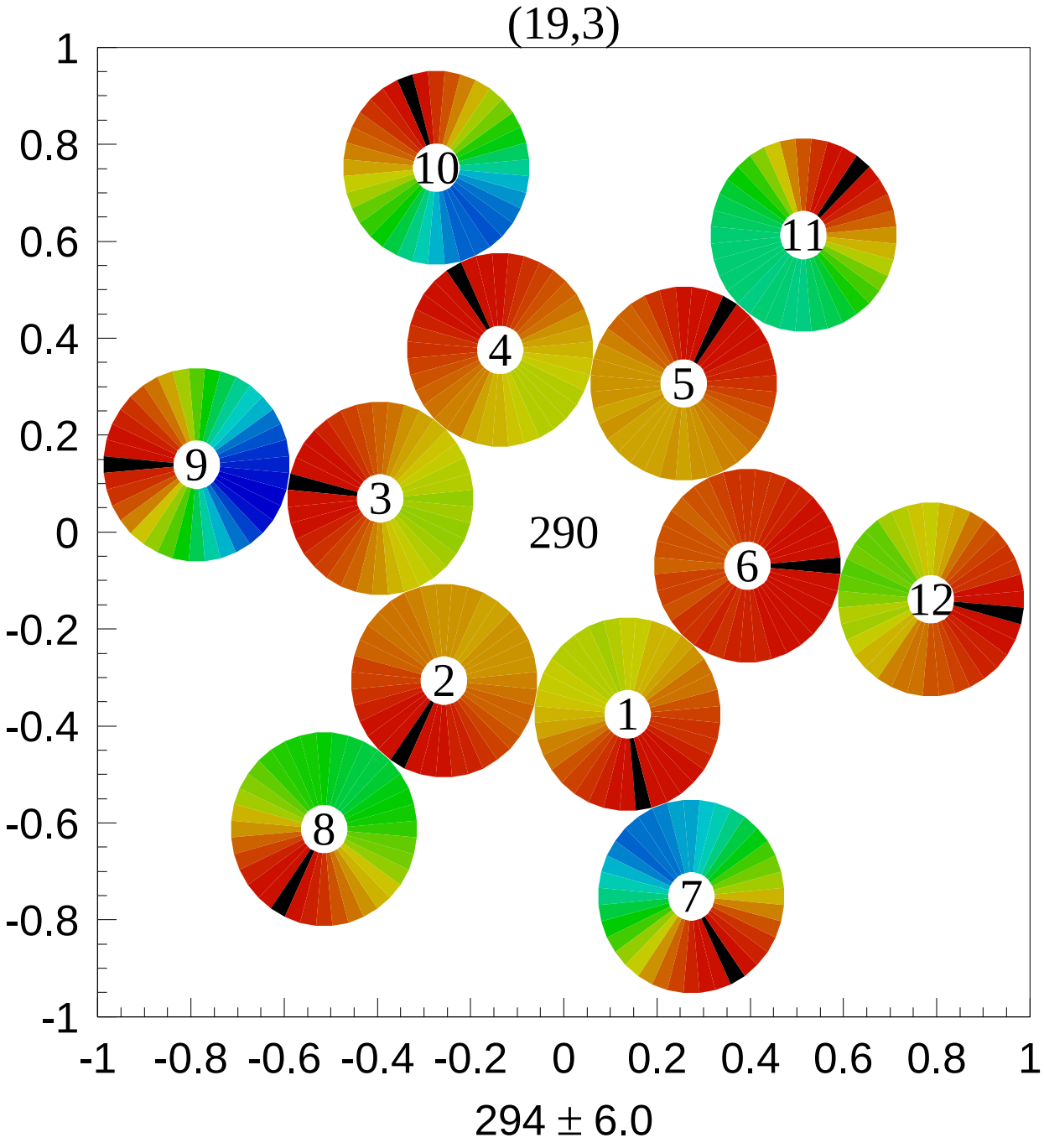

(19,1)
tilted LEDs
116 129 116 123 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 116 125 127 127 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

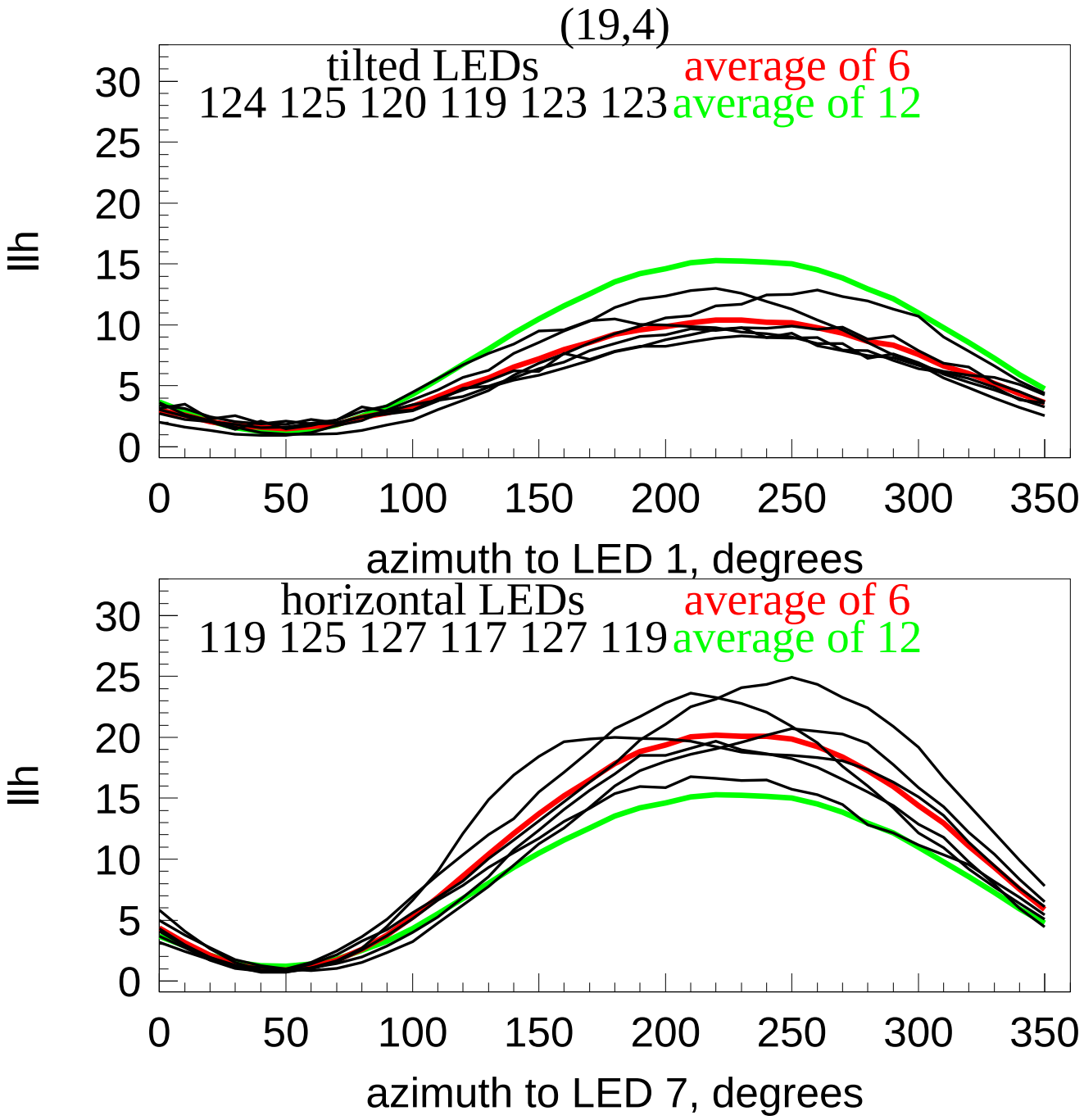

(19,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
294.4 ± 10.8
10
11
4
5
9
3
300
6
12
2
1
8
7

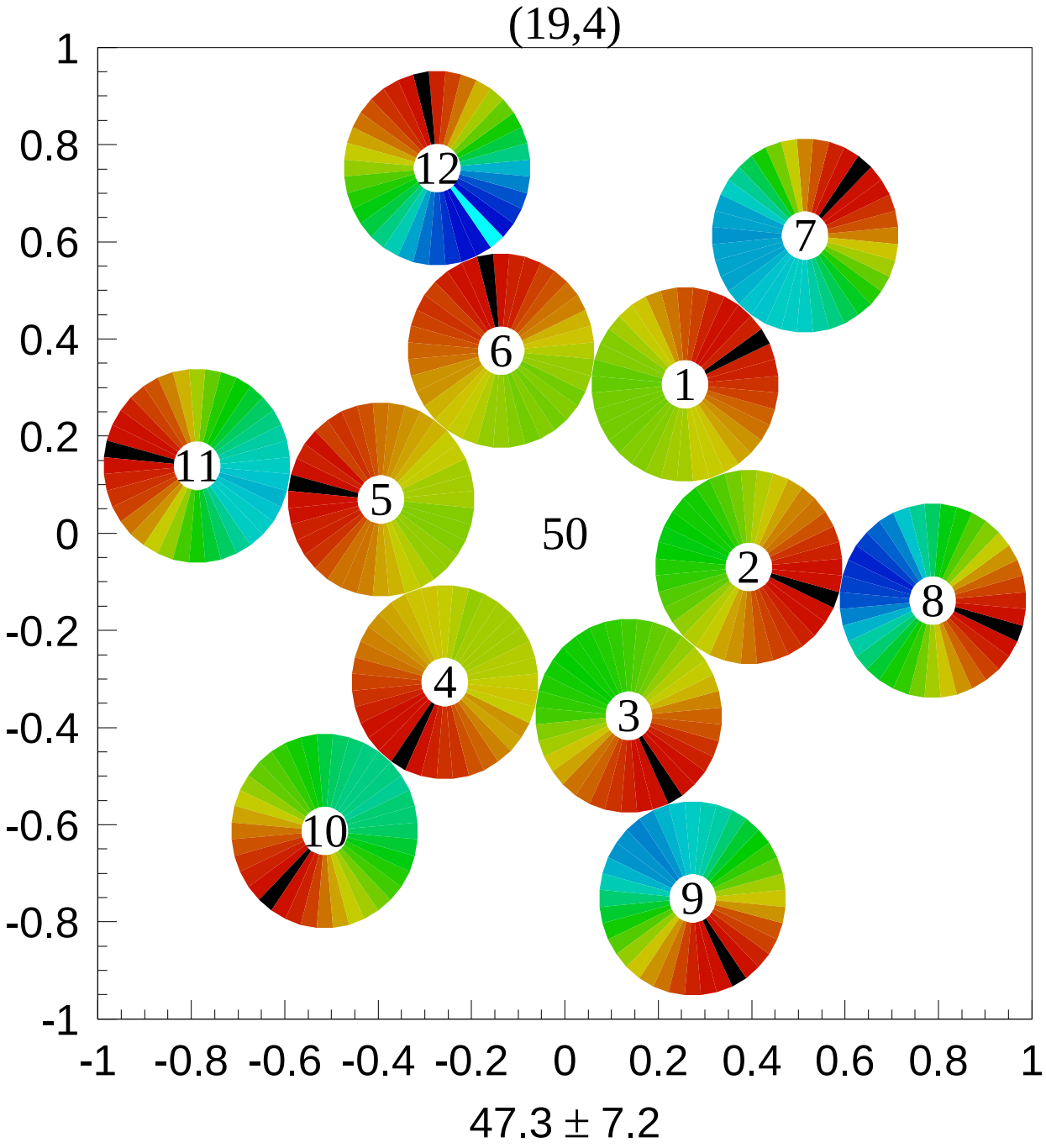

(19,2)
tilted LEDs
128 125 128 121 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 118 132 123 123 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

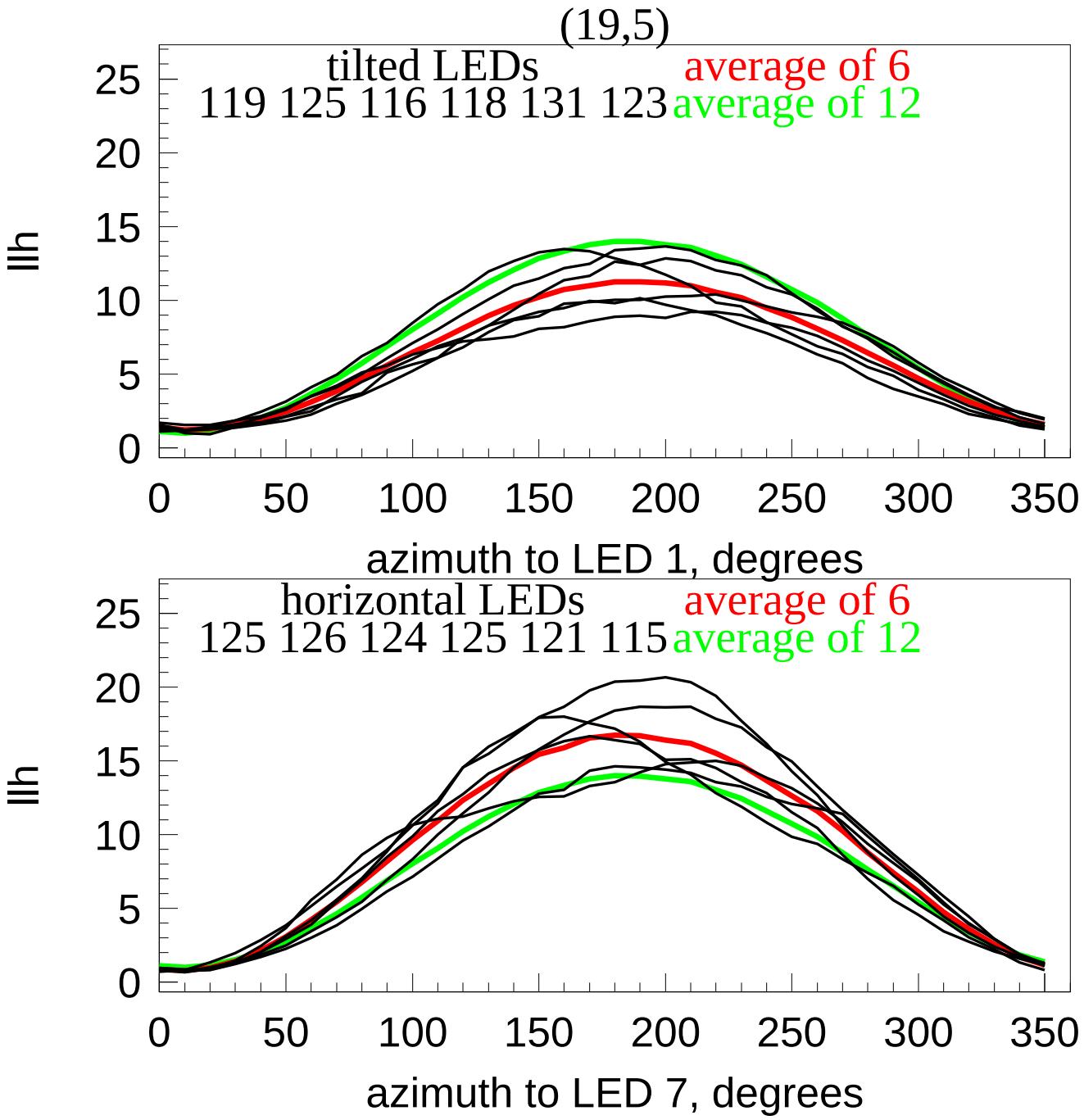

(19,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
34.7 ± 7.3

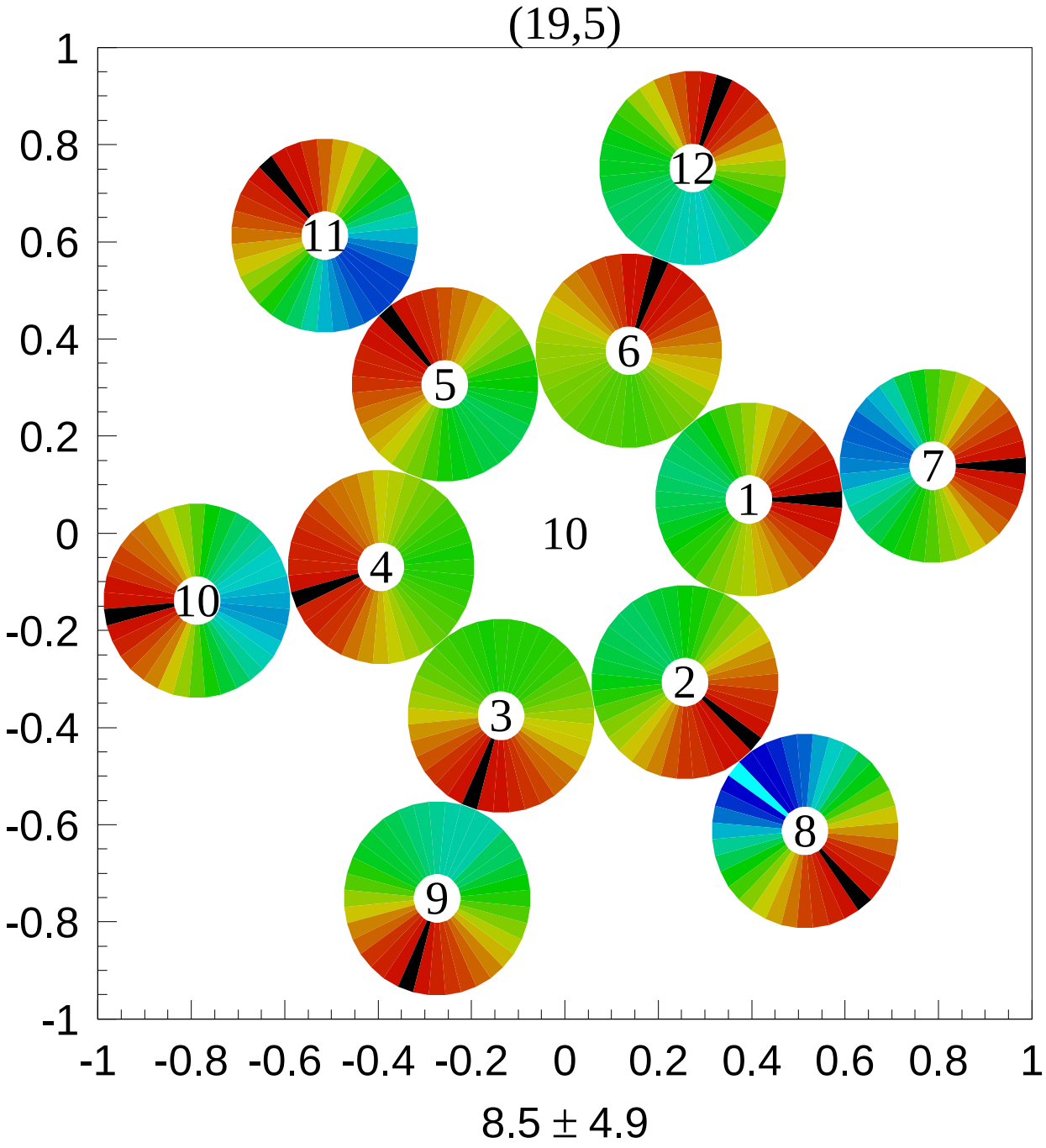

(19,3)
tilted LEDs
122 121 126 118 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 123 124 115 130 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

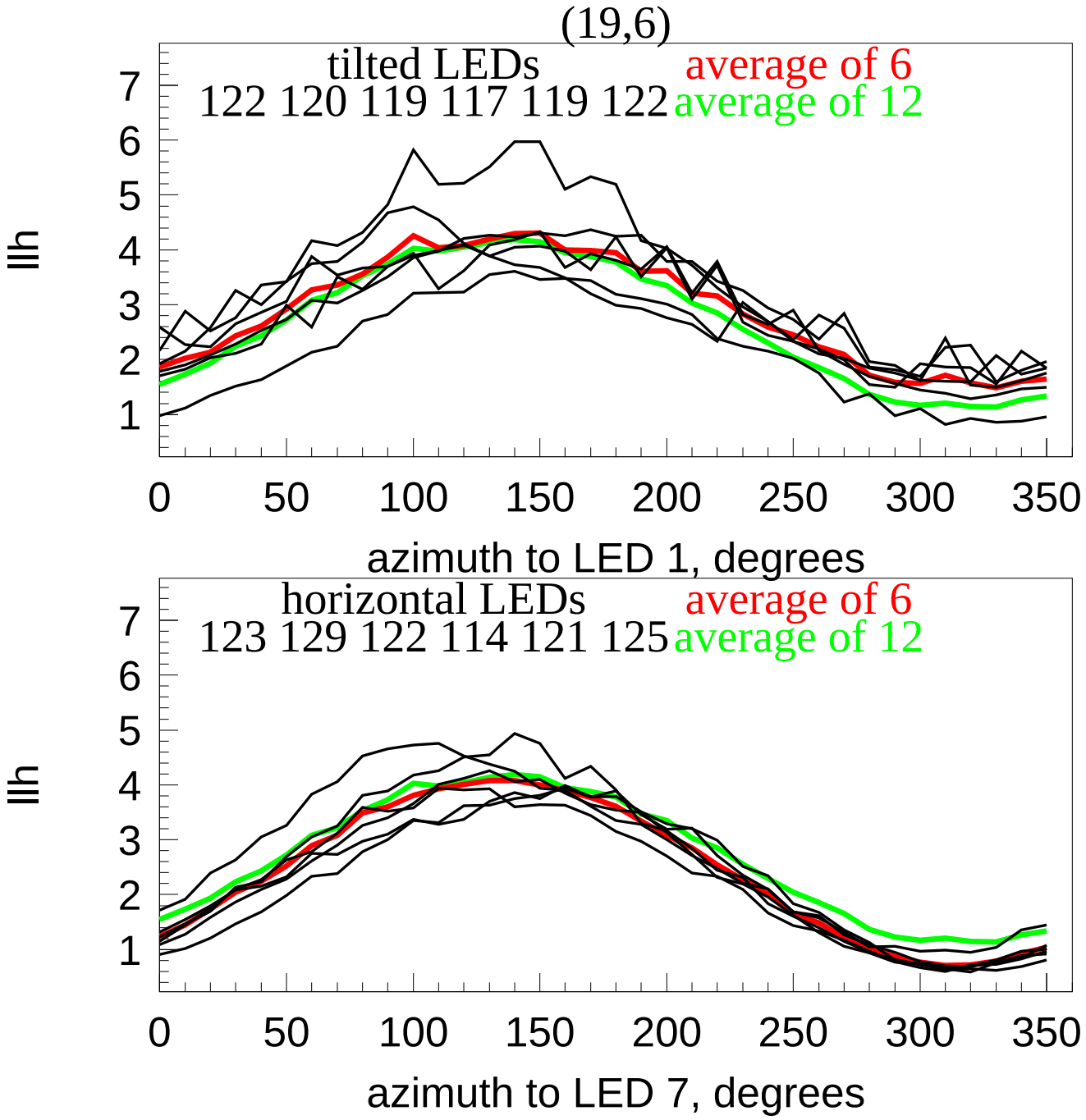

(19,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
294 ± 6.0

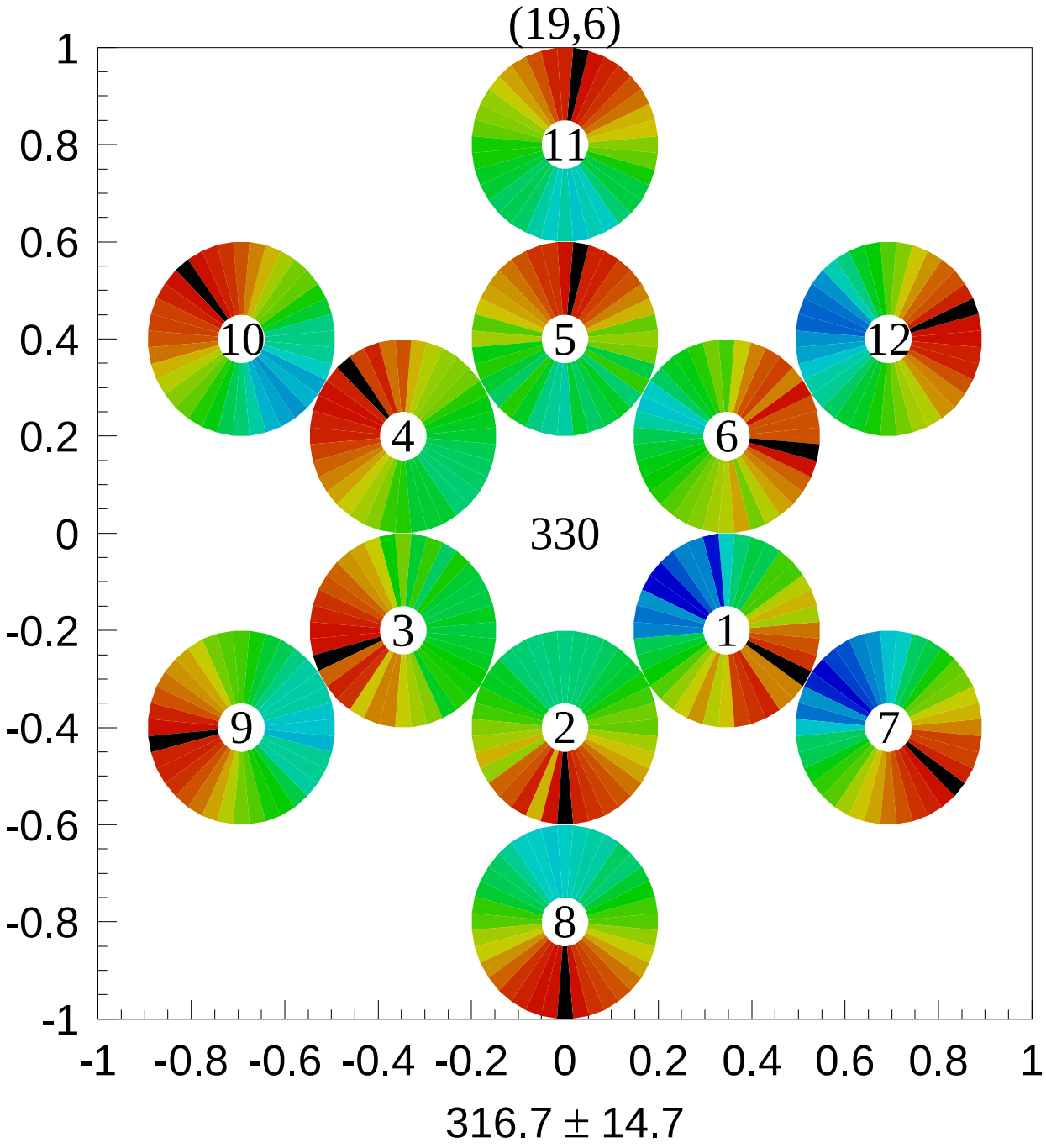

(19,4)
tilted LEDs
124 125 120 119 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 125 127 117 127 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

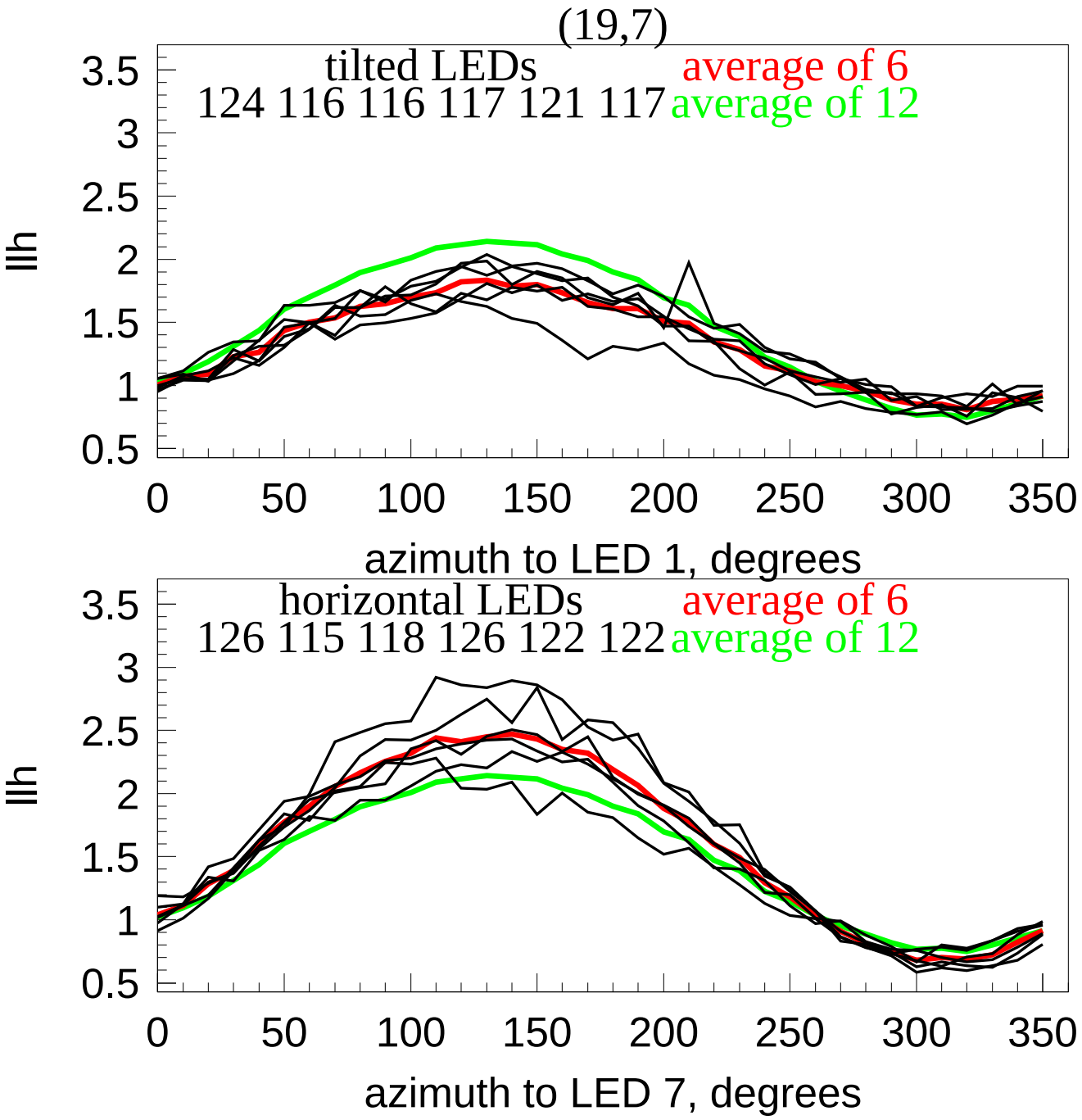

(19,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
47.3 ± 7.2

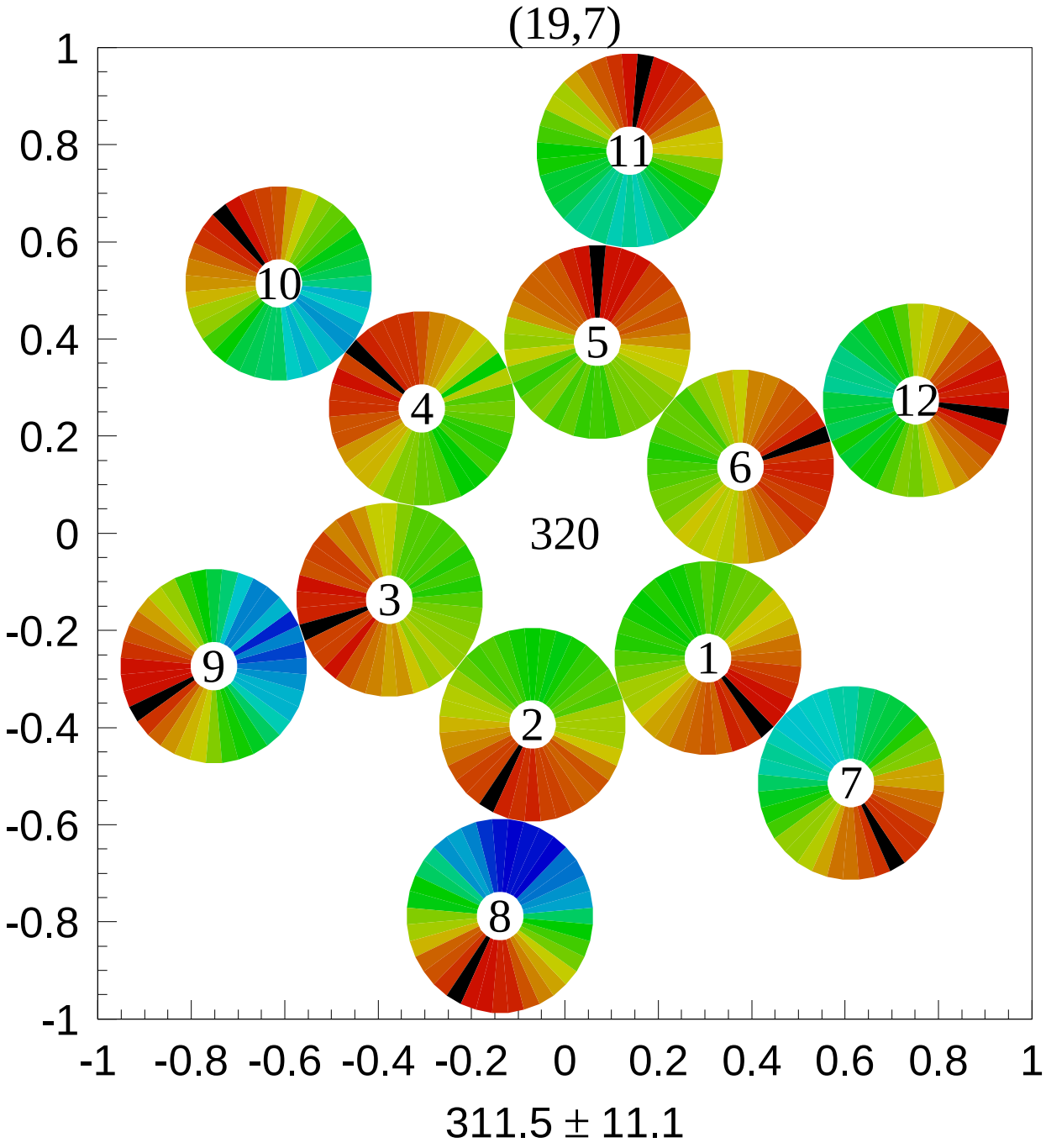

(19,5)
tilted LEDs
119 125 116 118 131 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 126 124 125 121 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

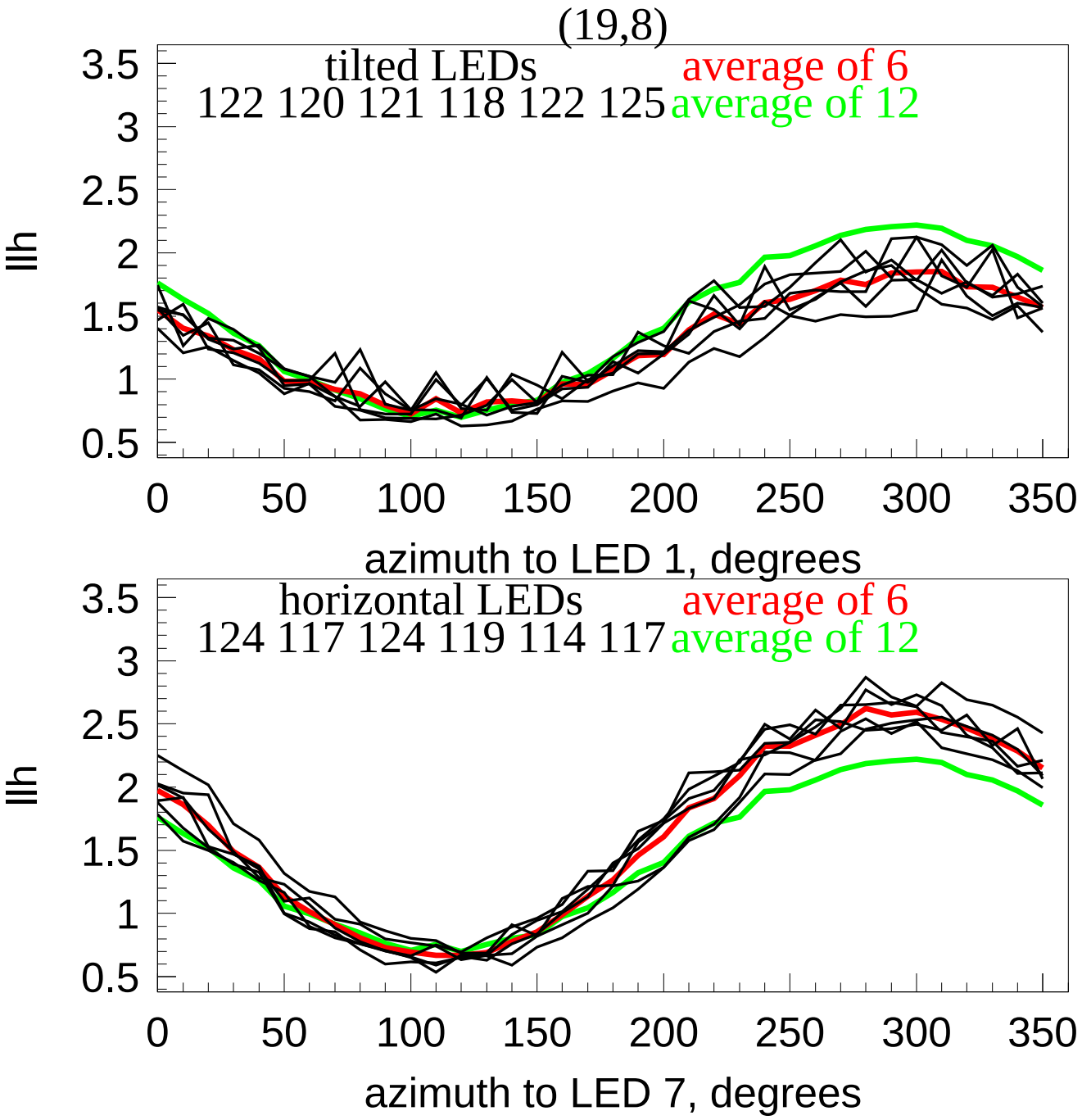

(19,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
8.5 ± 4.9

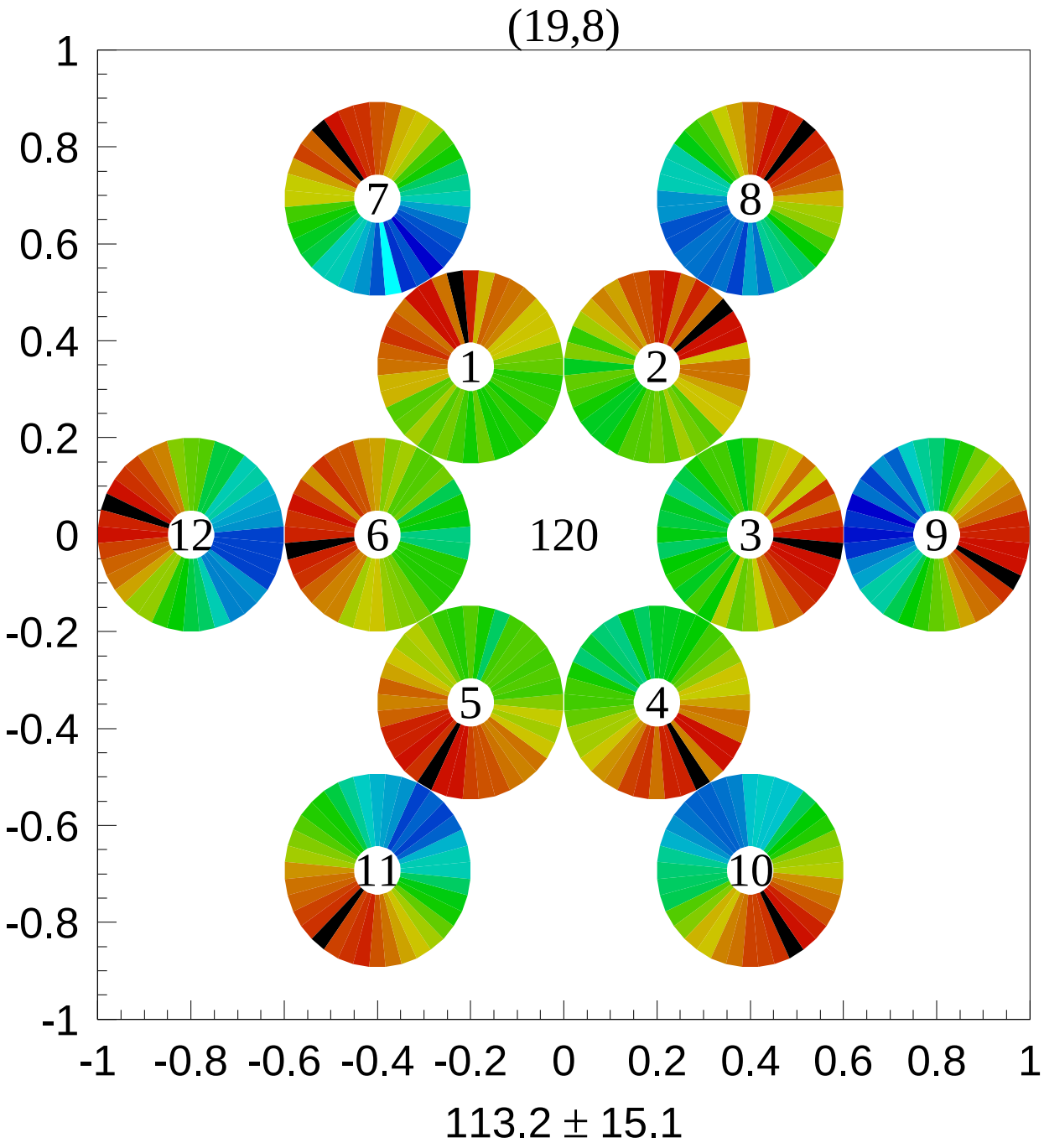

(19,6)
tilted LEDs
122 120 119 117 119 122
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
123 129 122 114 121 125
average of 6
average of 12
IIh
azimuth to LED 7, degrees

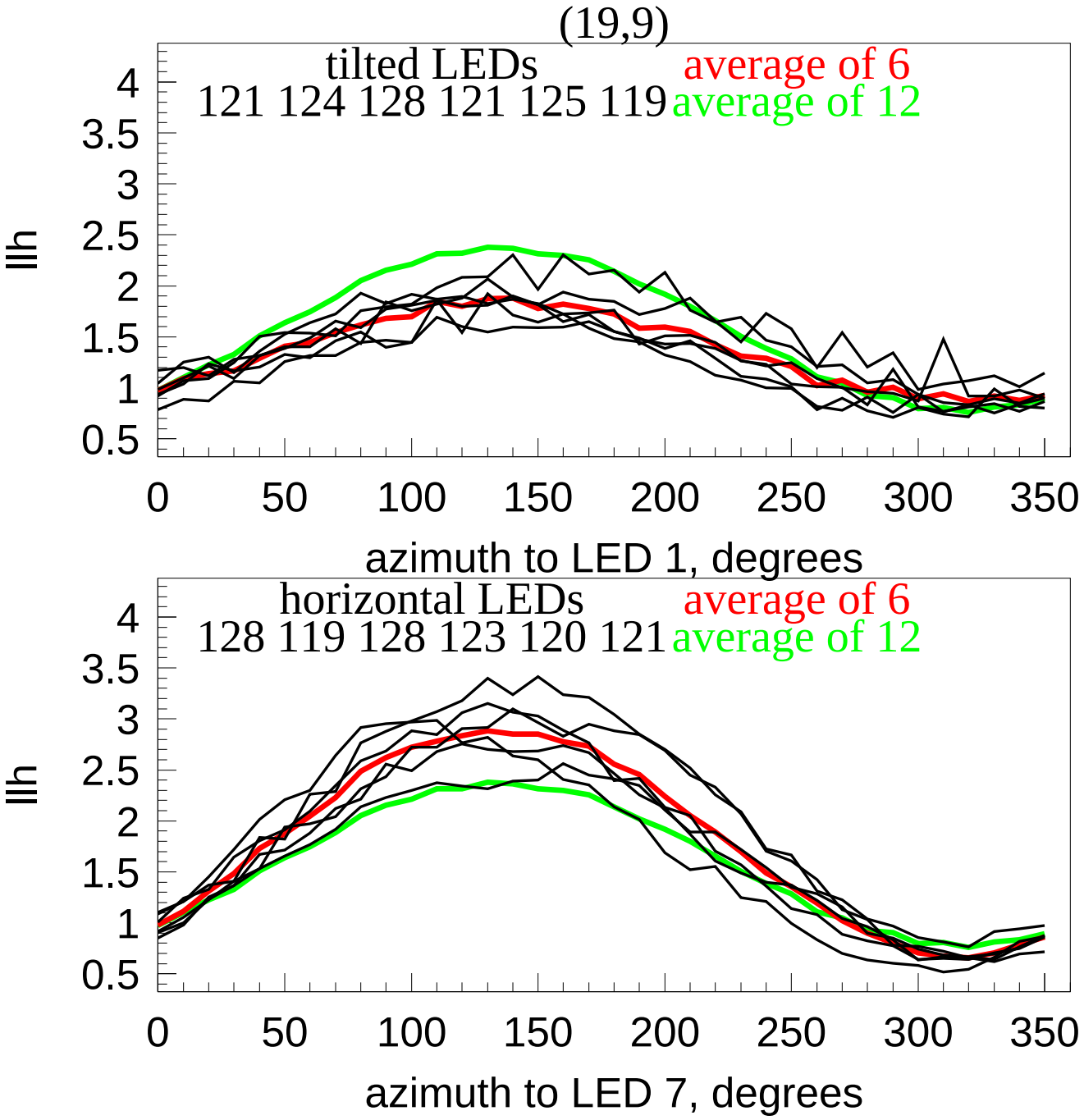

(19,6)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
316.7 ± 14.7

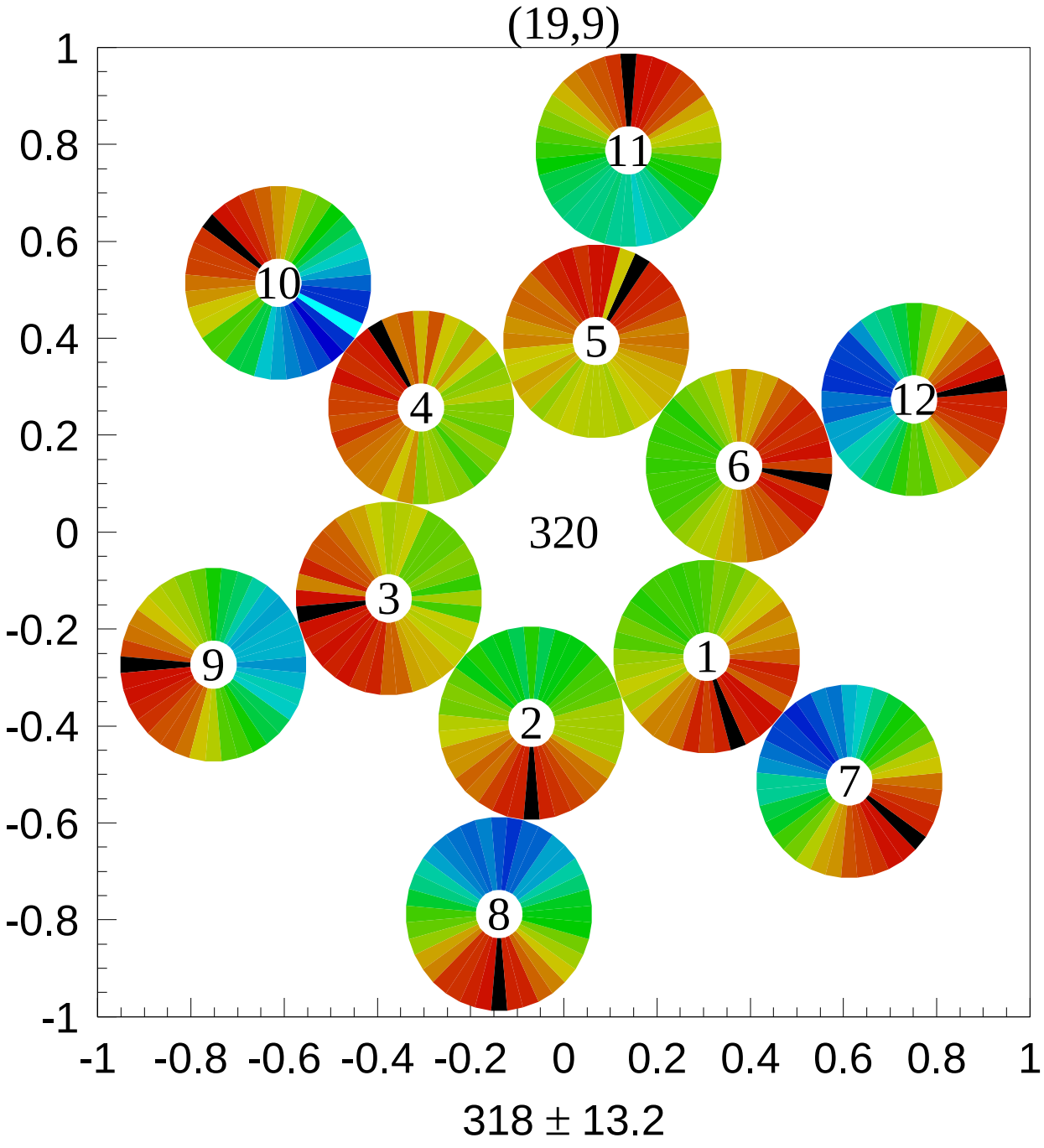

(19,7)
tilted LEDs
124 116 116 117 121 117
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 115 118 126 122 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

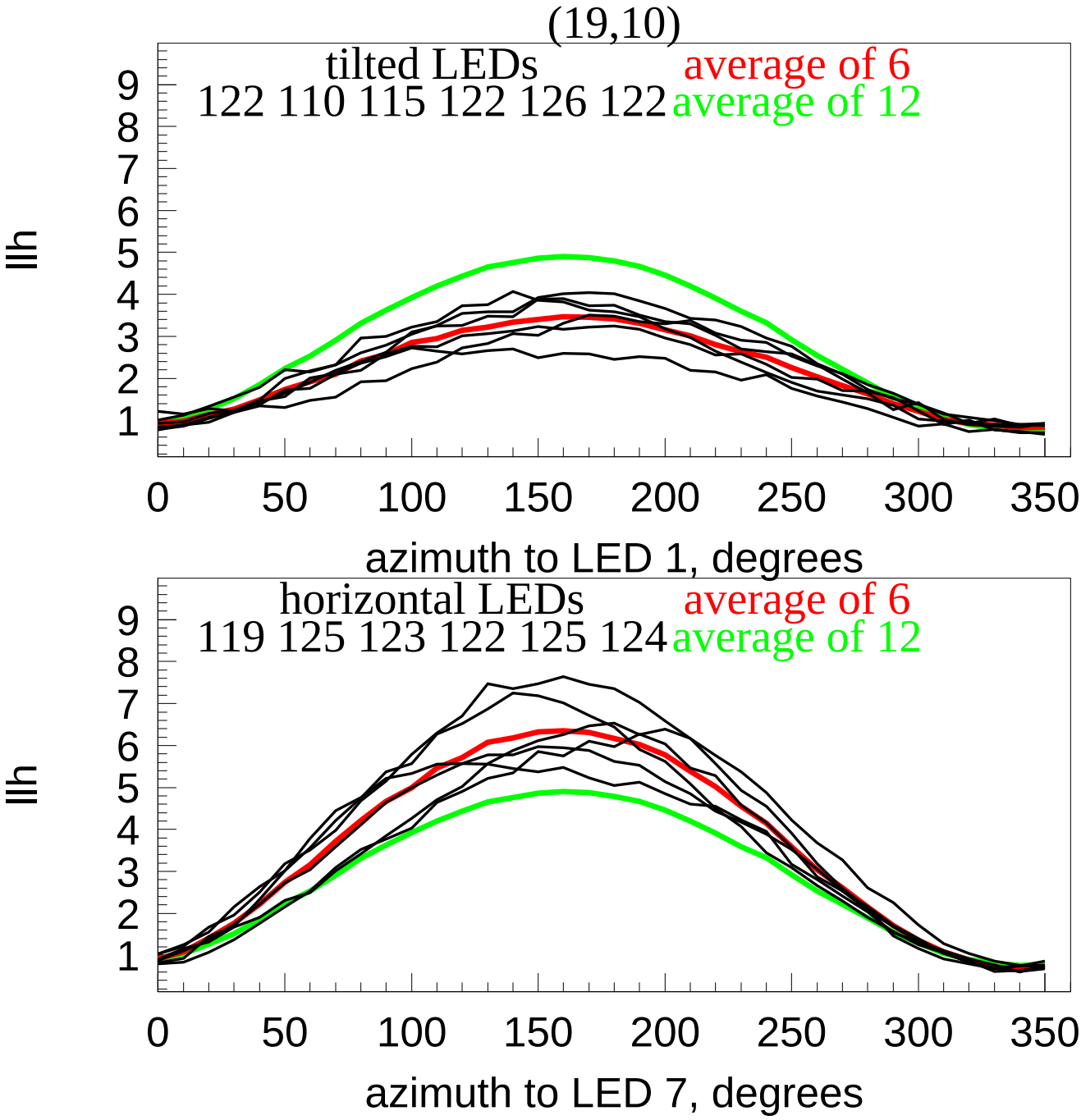

(19,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
311.5 ± 11.1

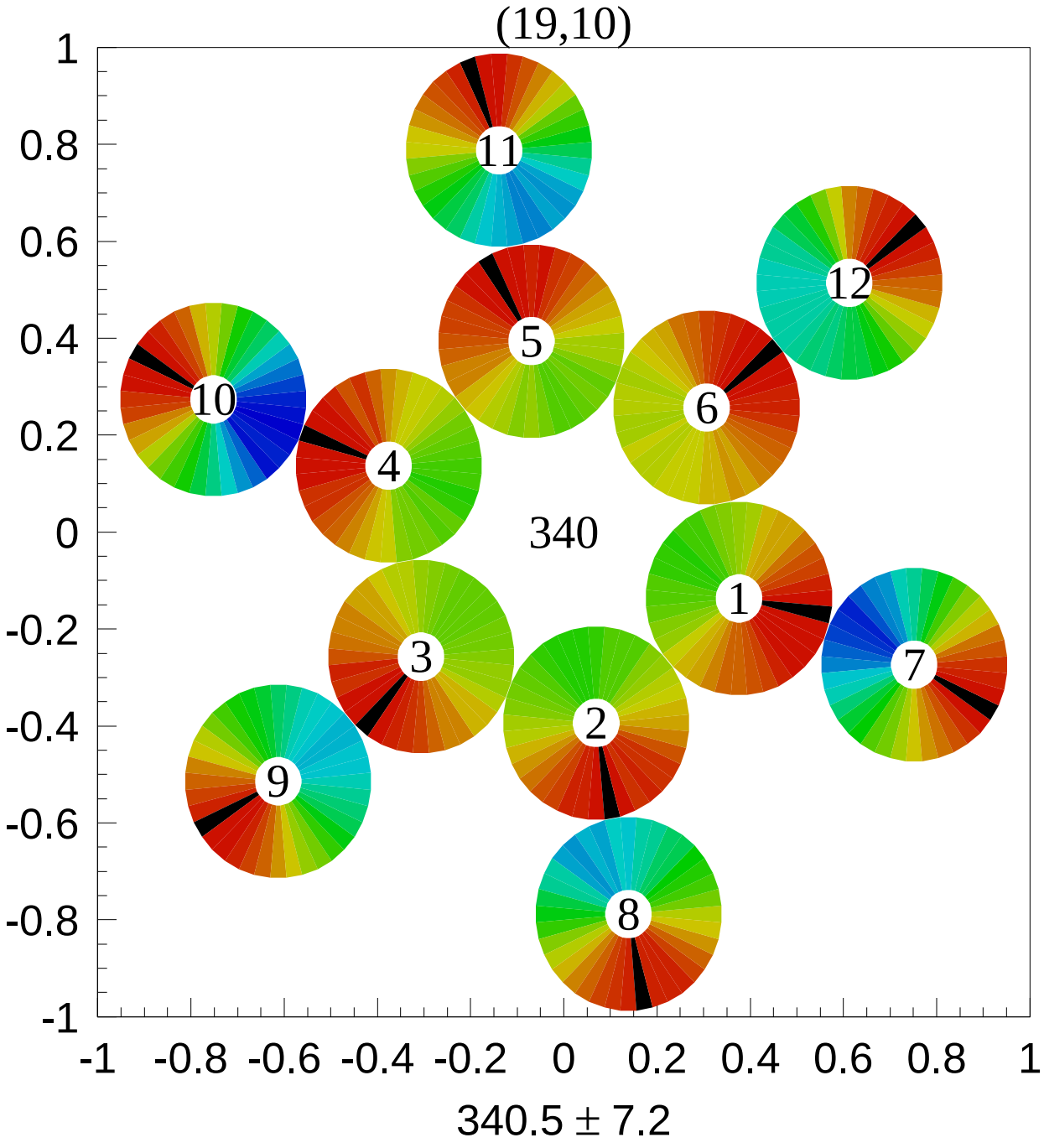

(19,8)
tilted LEDs
122 120 121 118 122 125
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 117 124 119 114 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

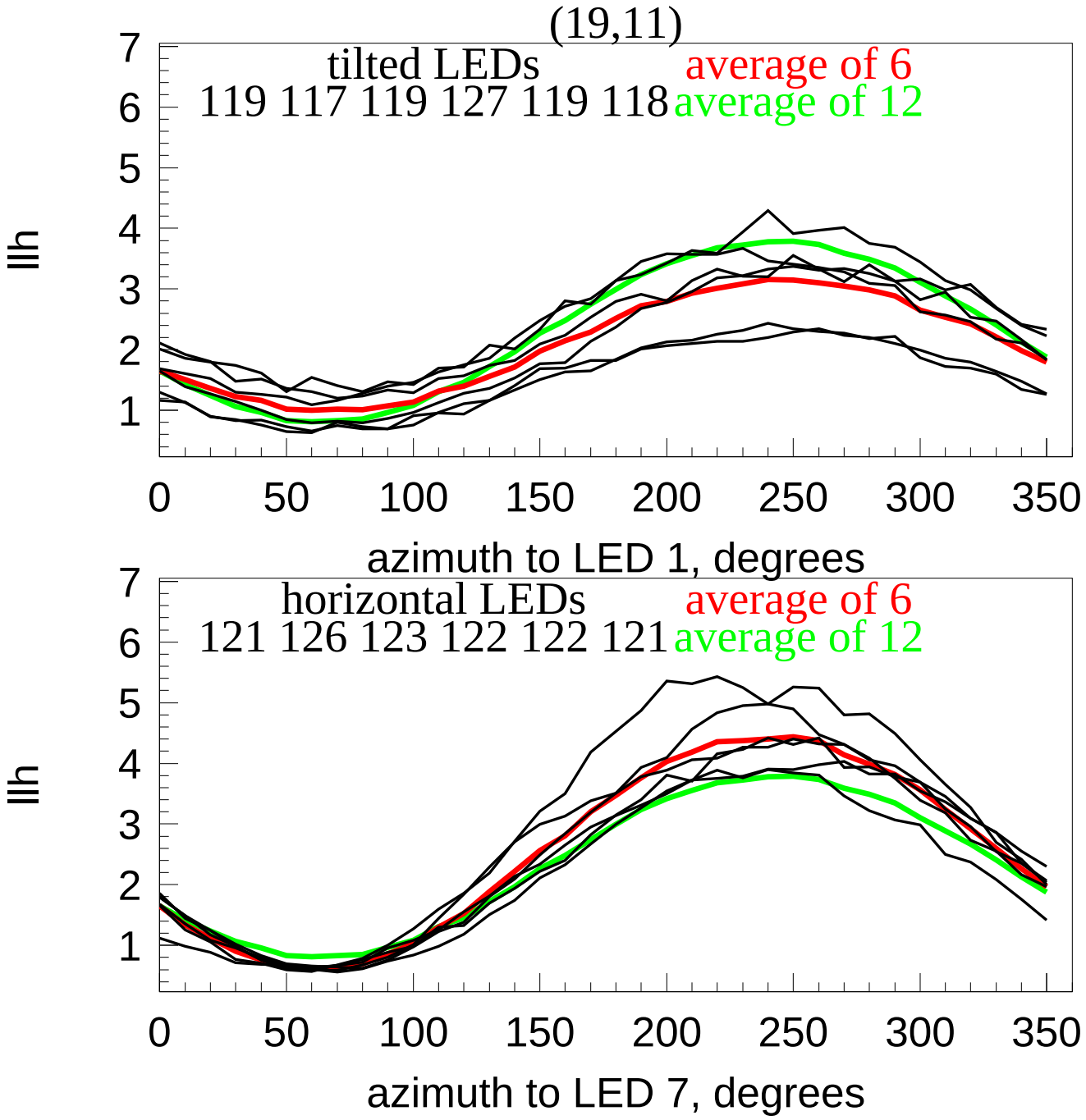

(19,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
113.2 ± 15.1

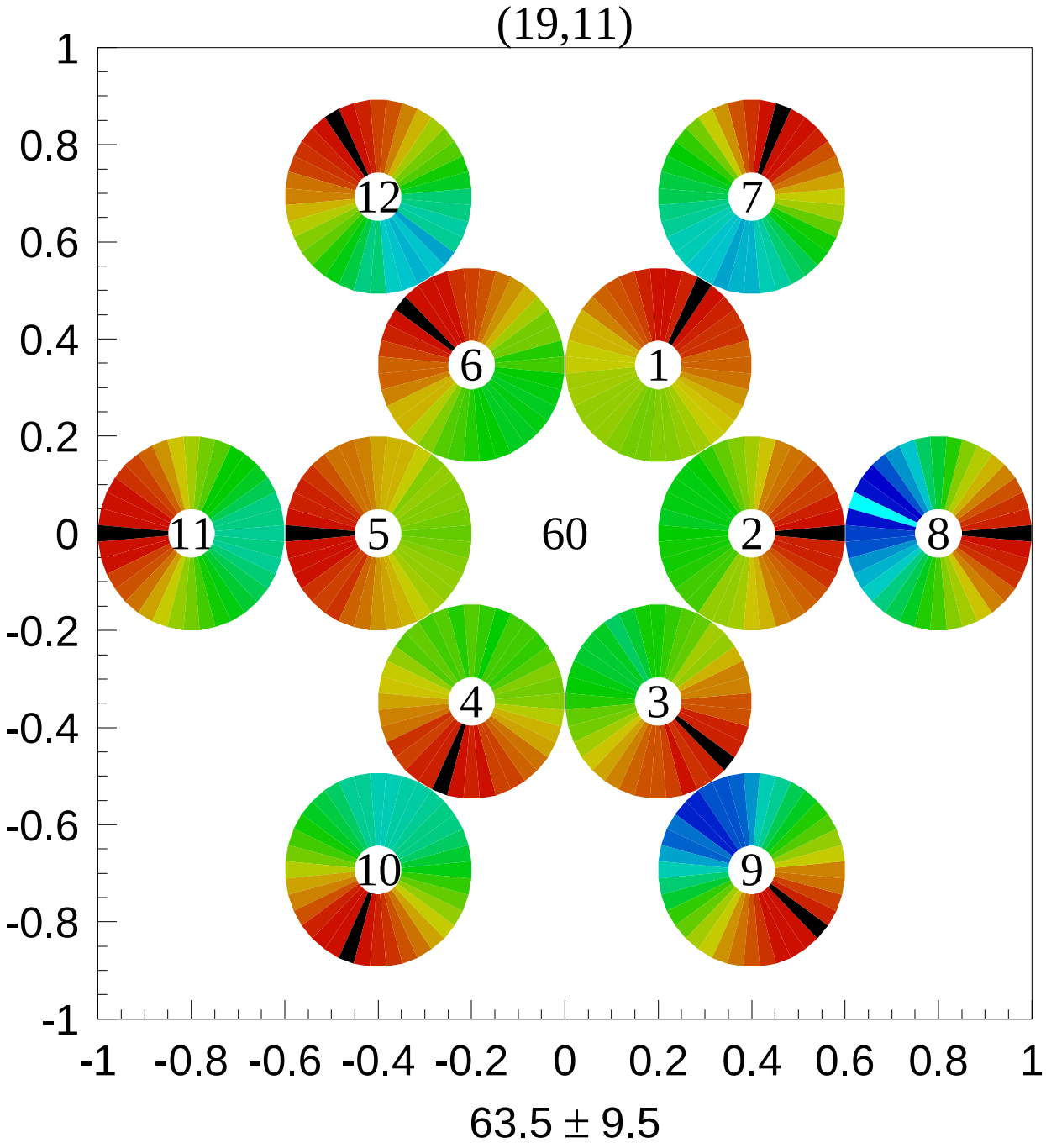

(19,9)
tilted LEDs
121 124 128 121 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 119 128 123 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

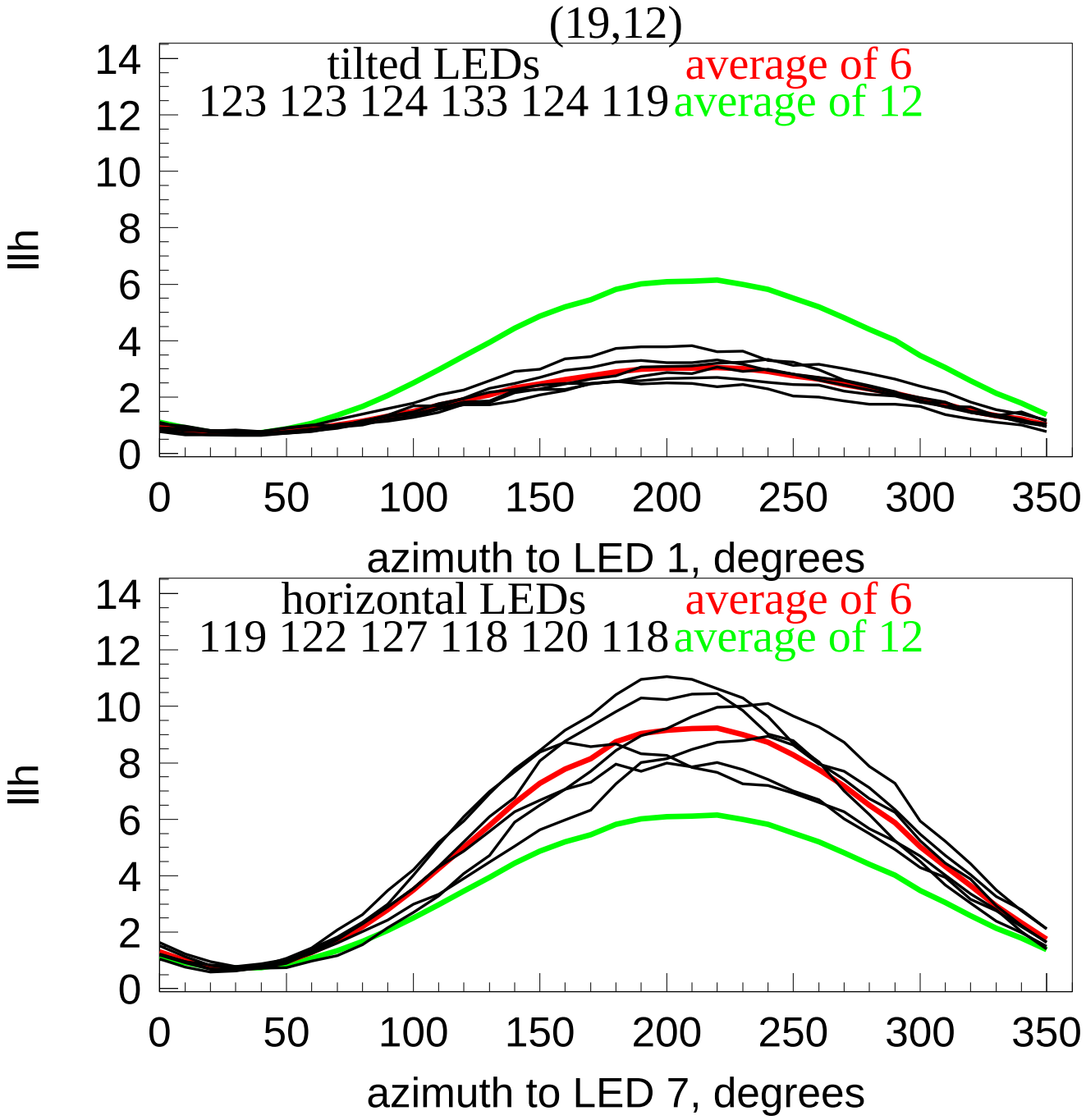

(19,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
318 ± 13.2

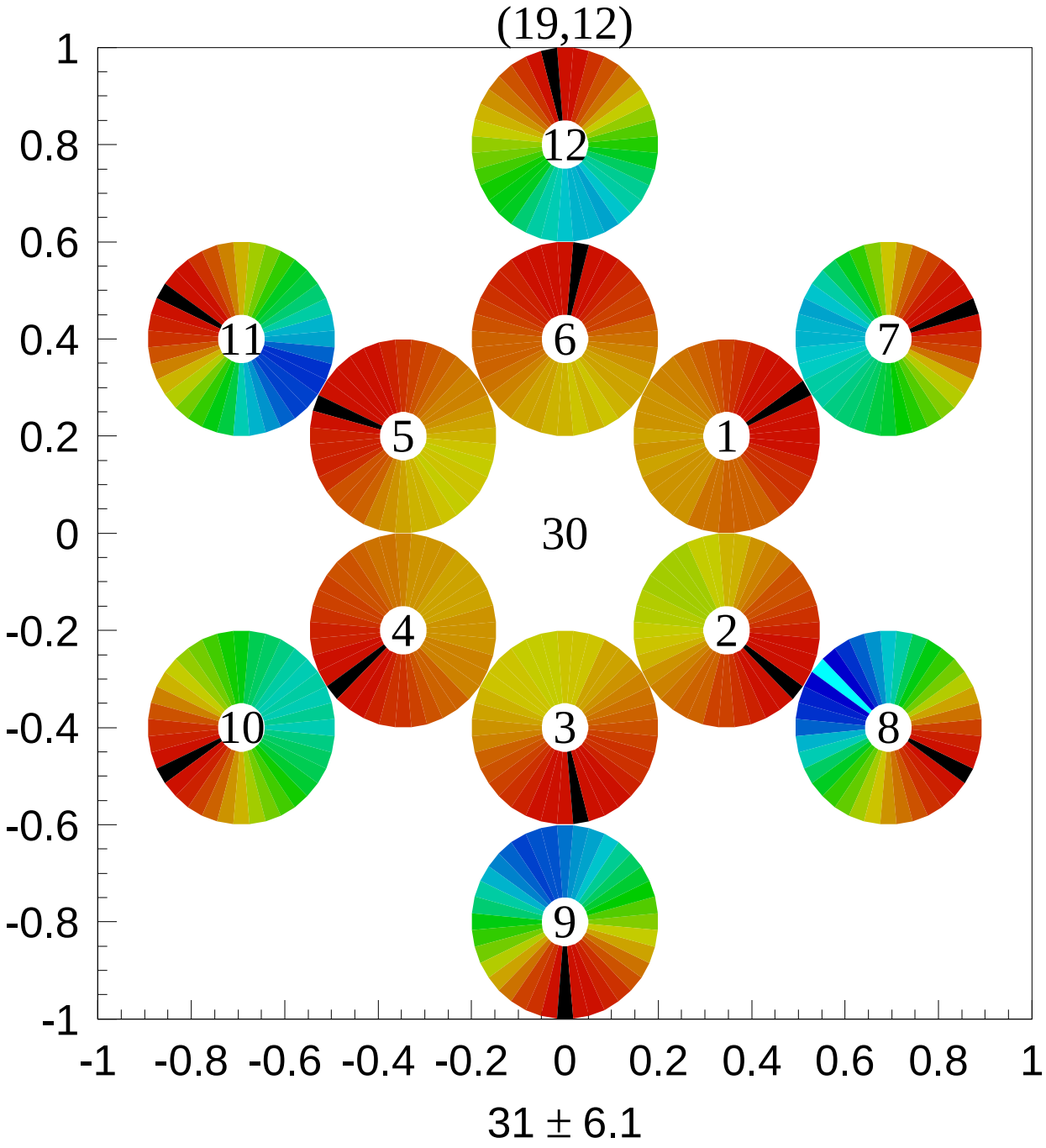

(19,10)
tilted LEDs
122 110 115 122 126 122
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 125 123 122 125 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

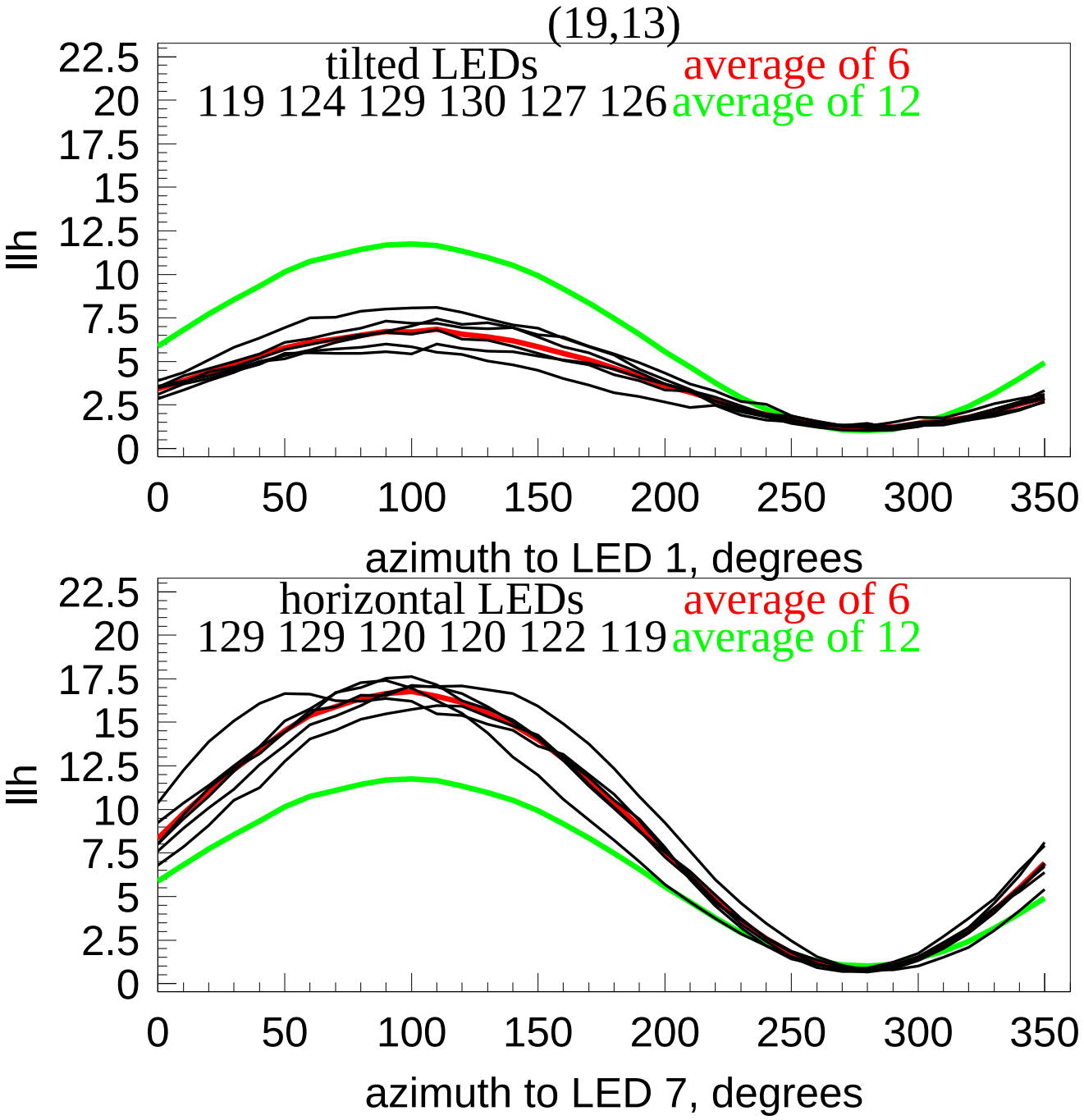

(19,10)
11
12
5
6
10
4
340
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
340.5 ± 7.2

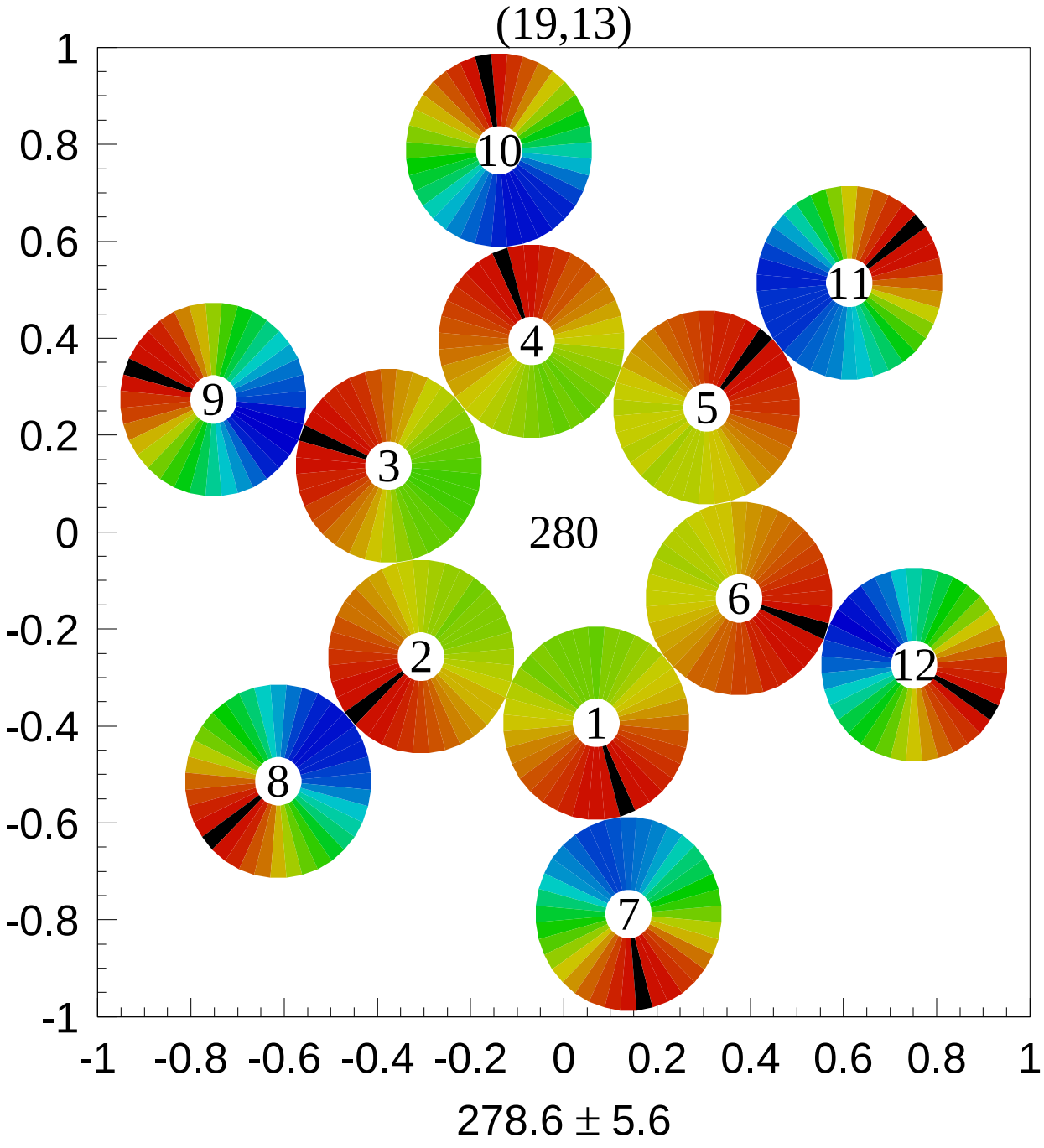

(19,11)
tilted LEDs
119 117 119 127 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 126 123 122 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

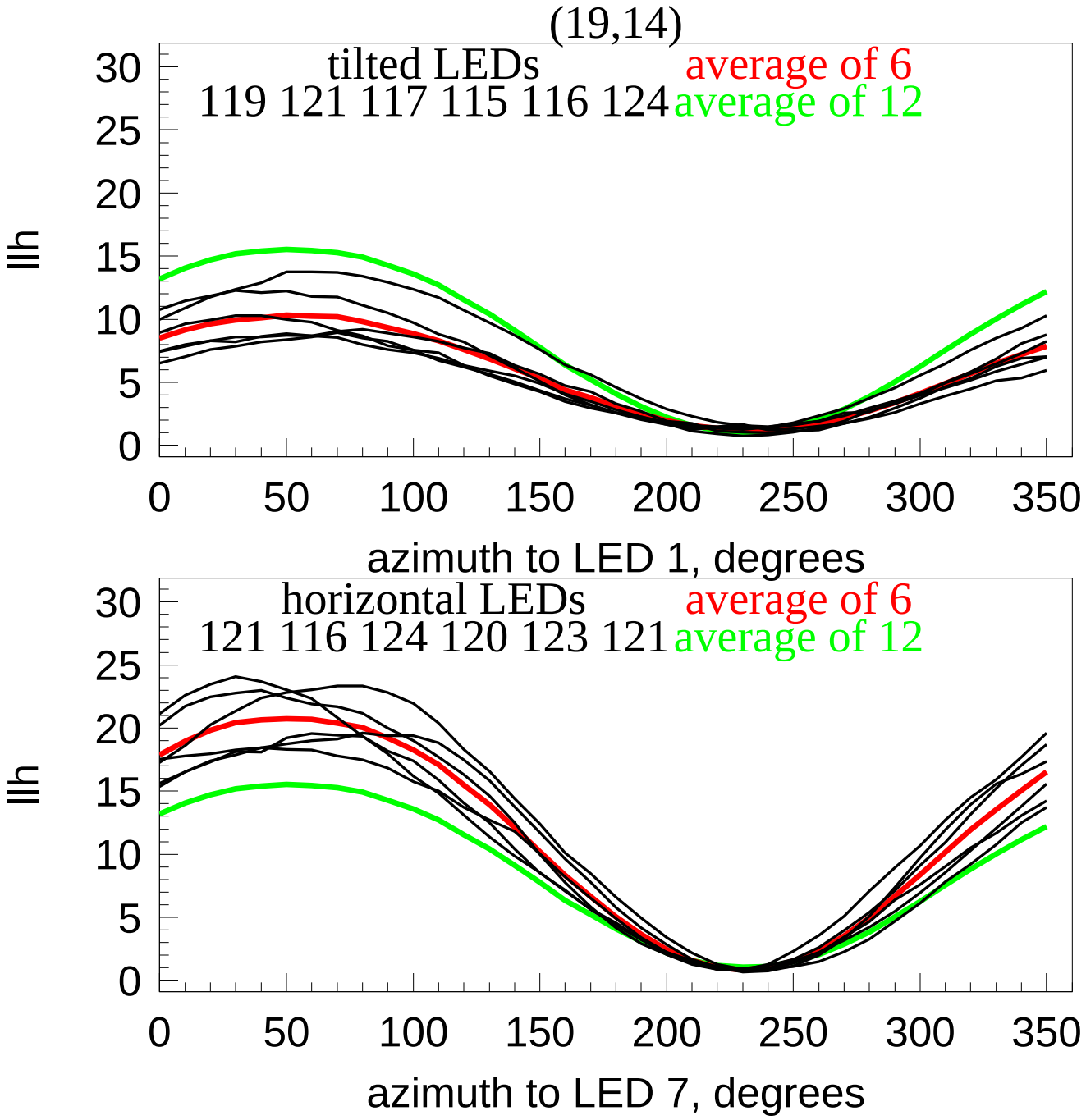

(19,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
63.5 ± 9.5
12
7
6
1
11
5
60
2
8
4
3
10
9

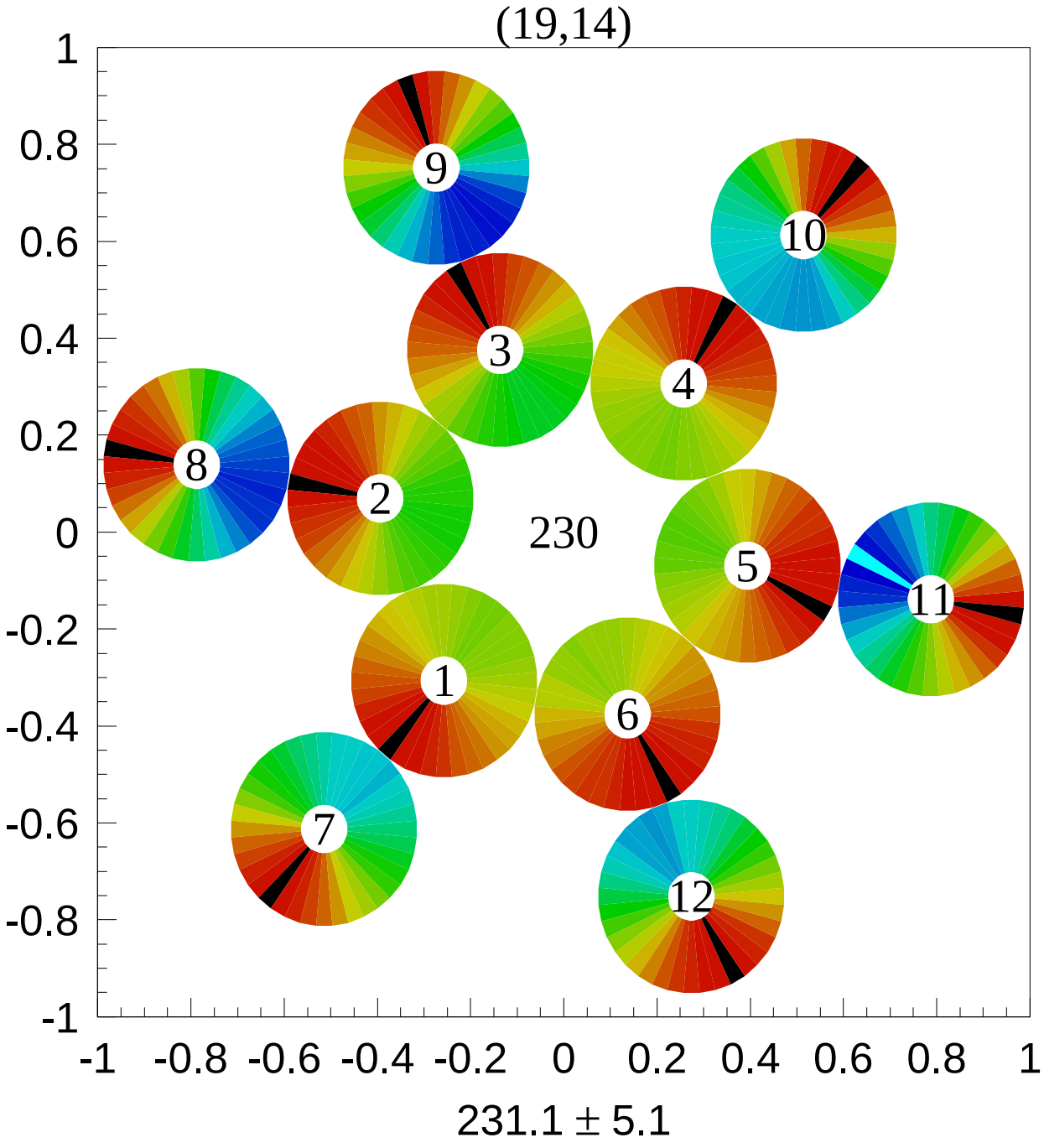

(19,12)
tilted LEDs
123 123 124 133 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 127 118 120 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

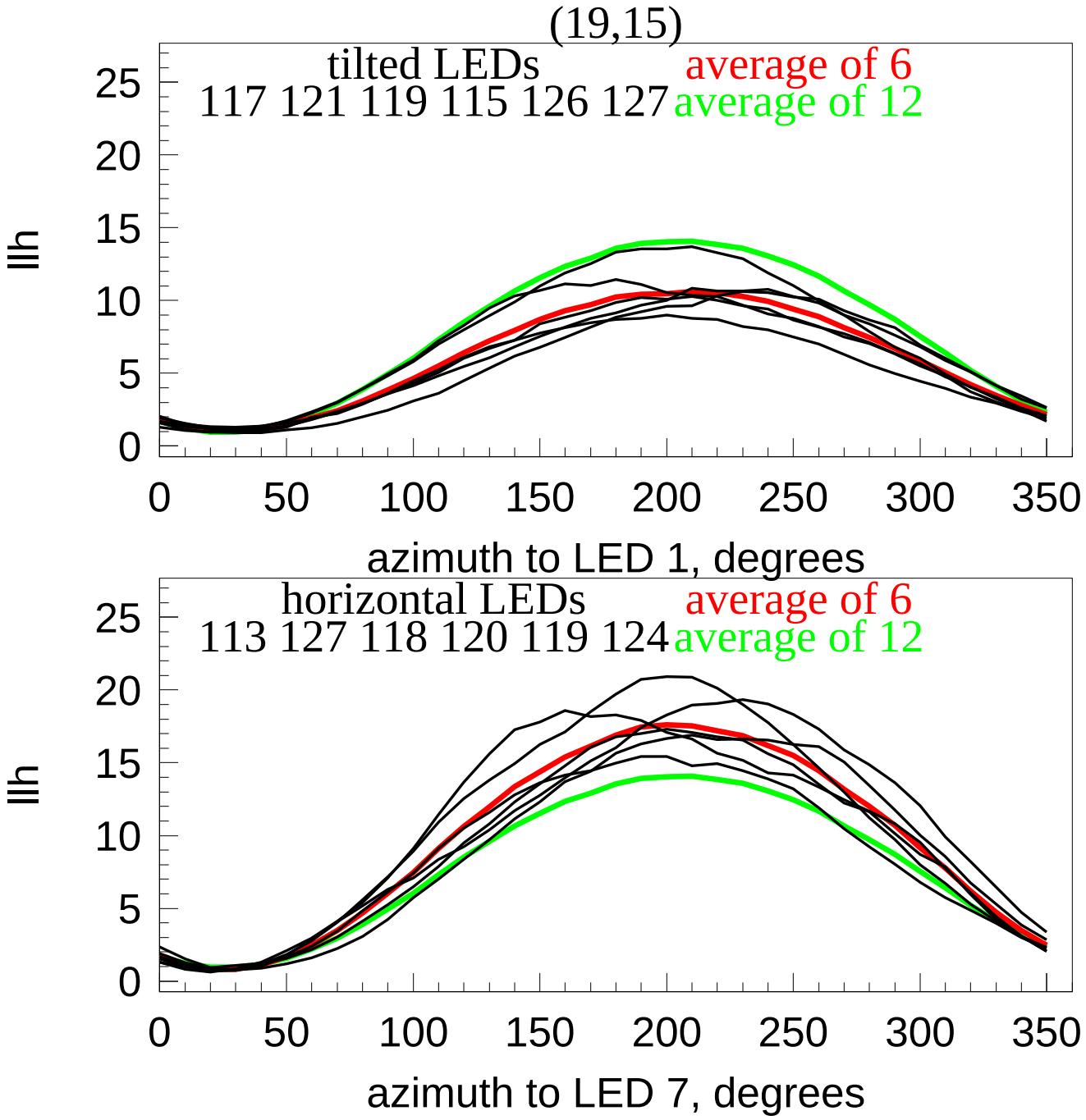

(19,12)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
31 ± 6.1

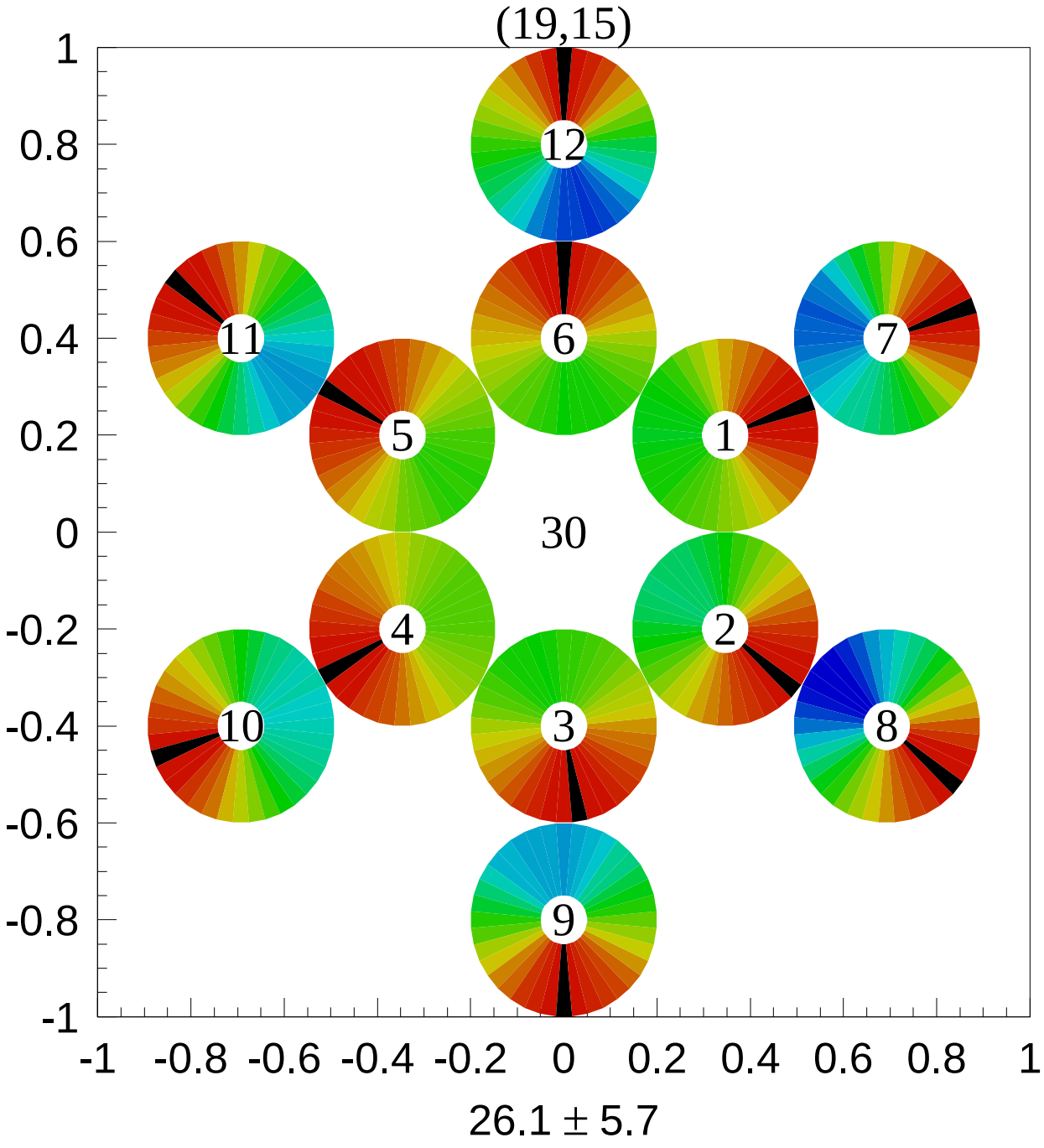

(19,13)
tilted LEDs
119 124 129 130 127 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 129 120 120 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

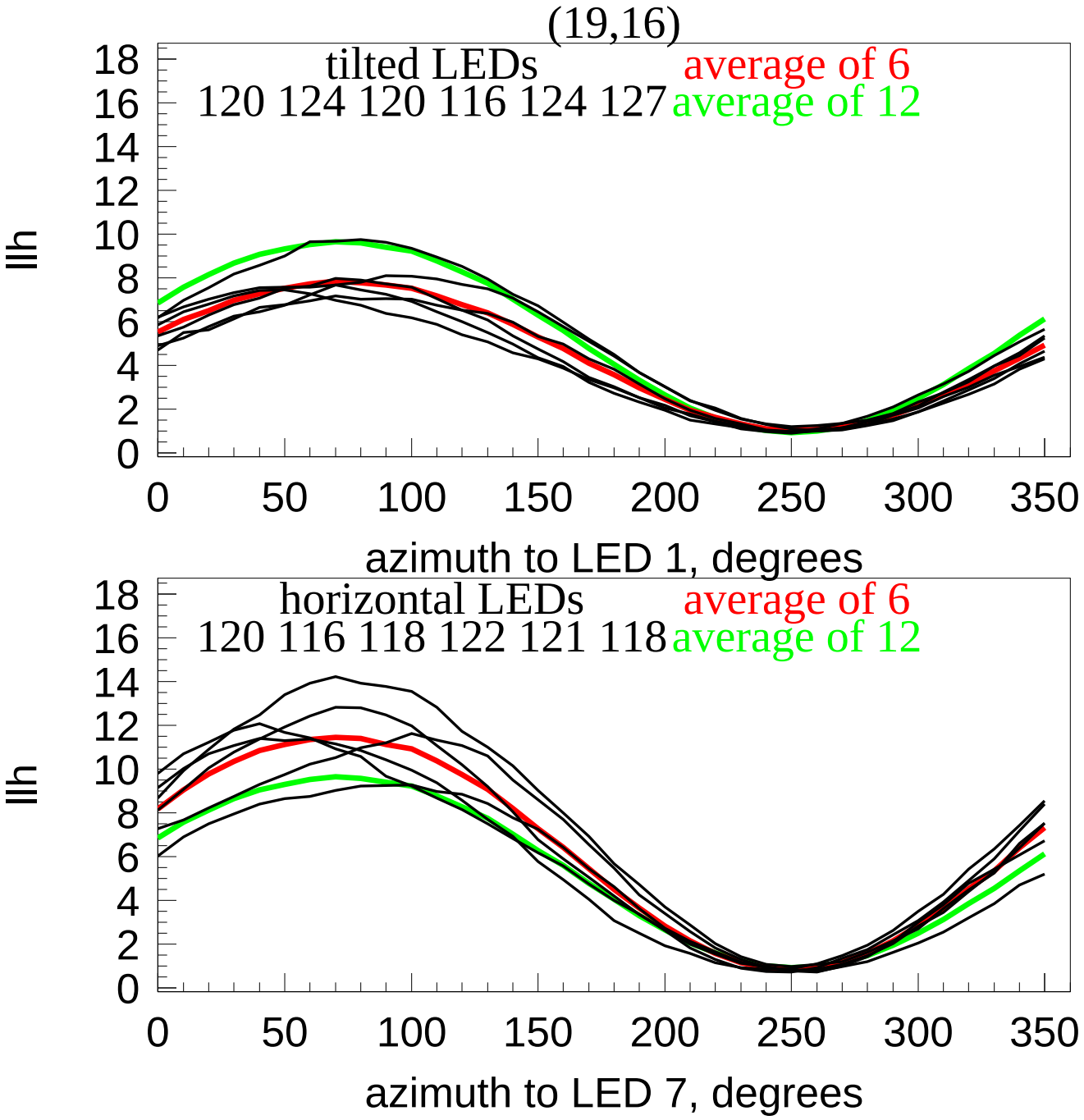

(19,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
278.6 ± 5.6

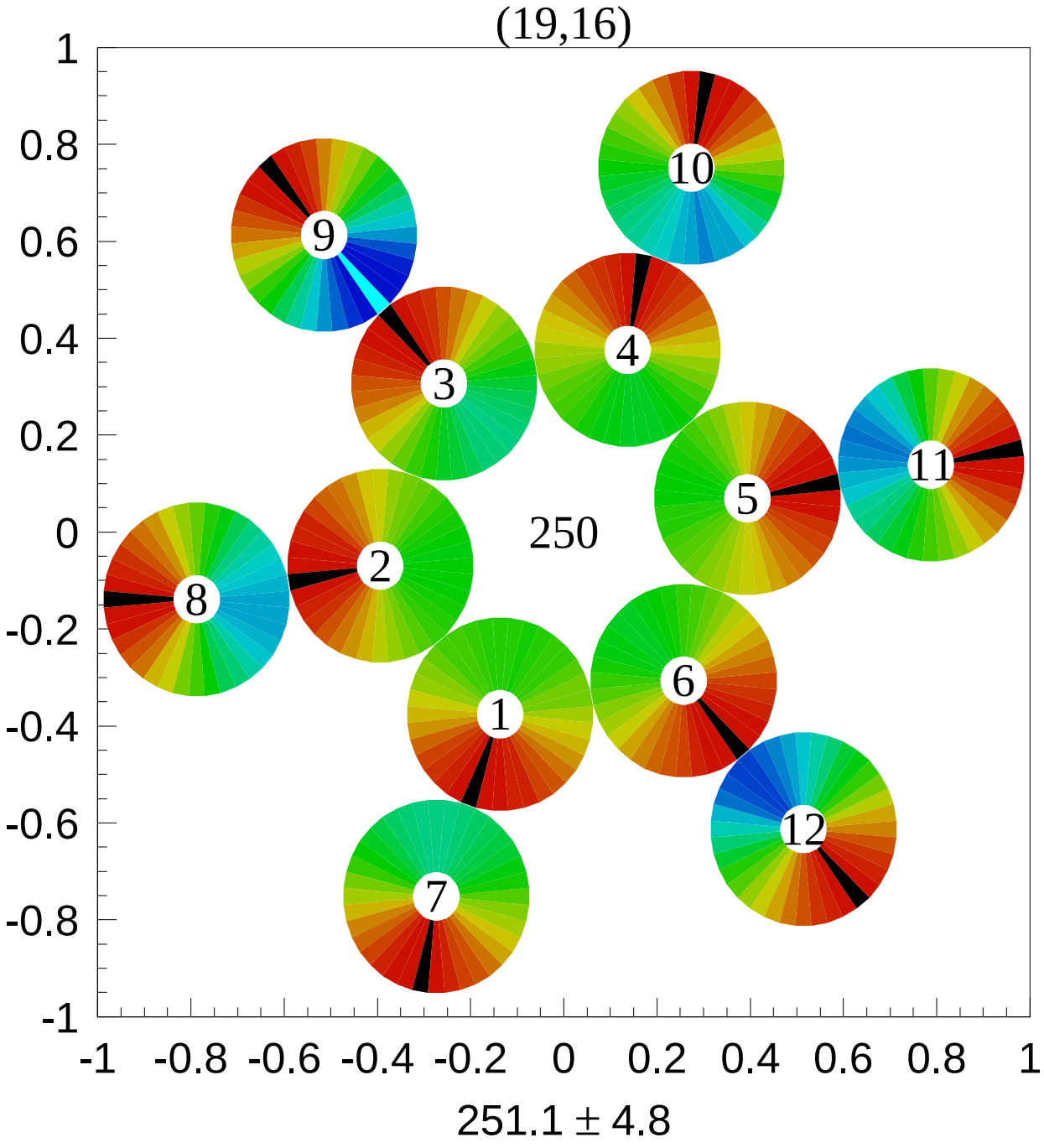

(19,14)
tilted LEDs
119 121 117 115 116 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 116 124 120 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

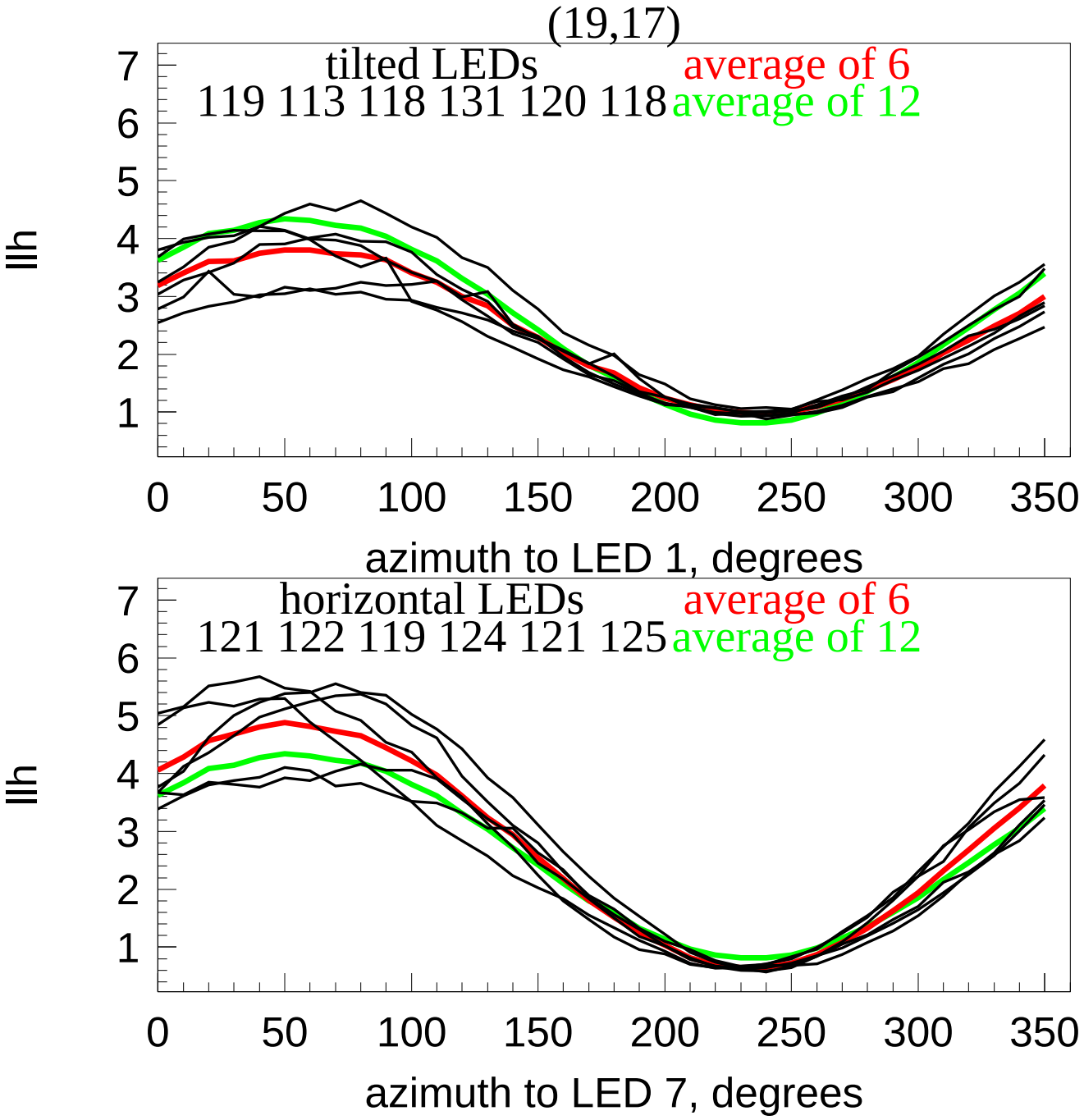

(19,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.1 ± 5.1

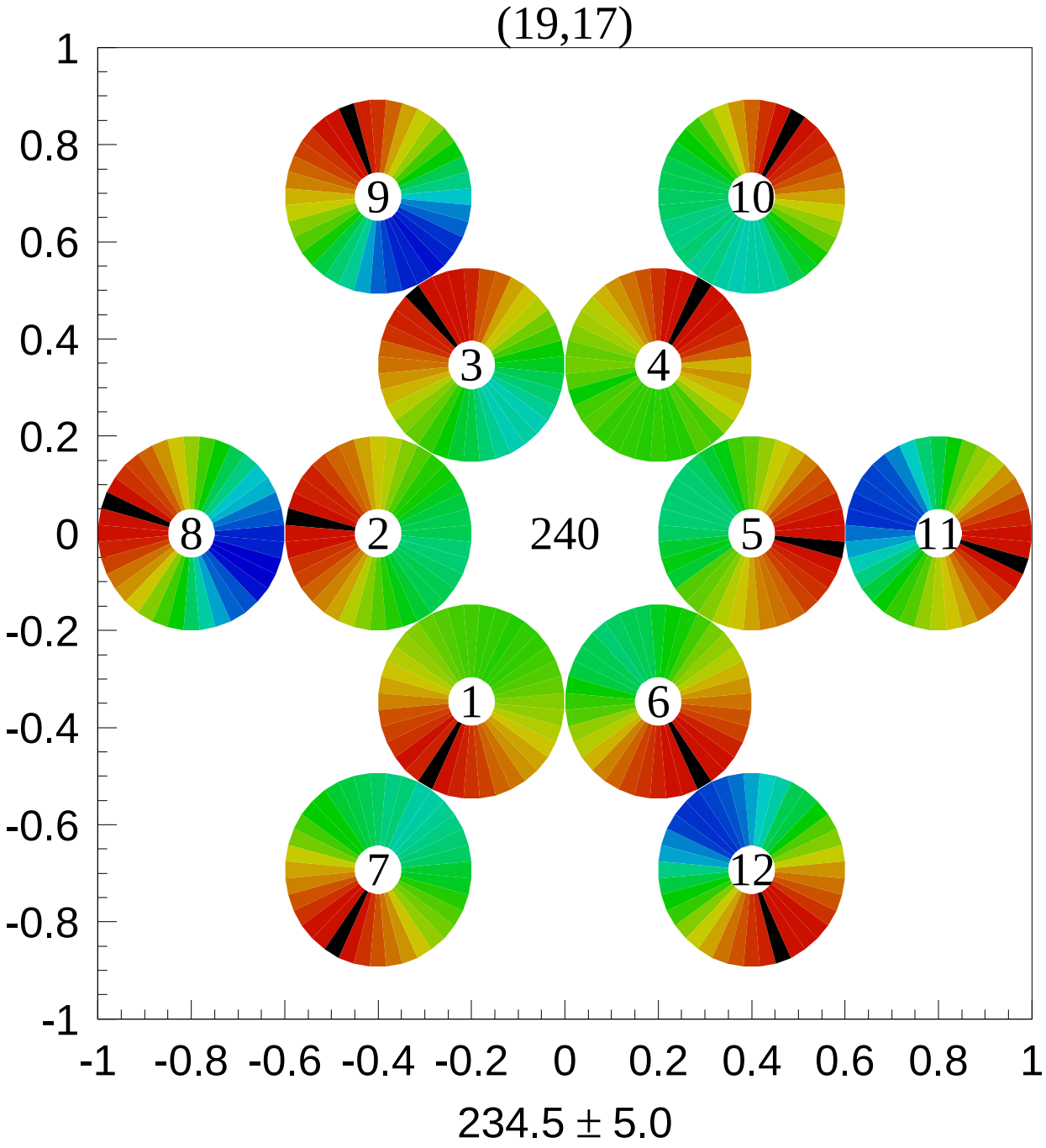

(19,15)
tilted LEDs
117 121 119 115 126 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 127 118 120 119 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

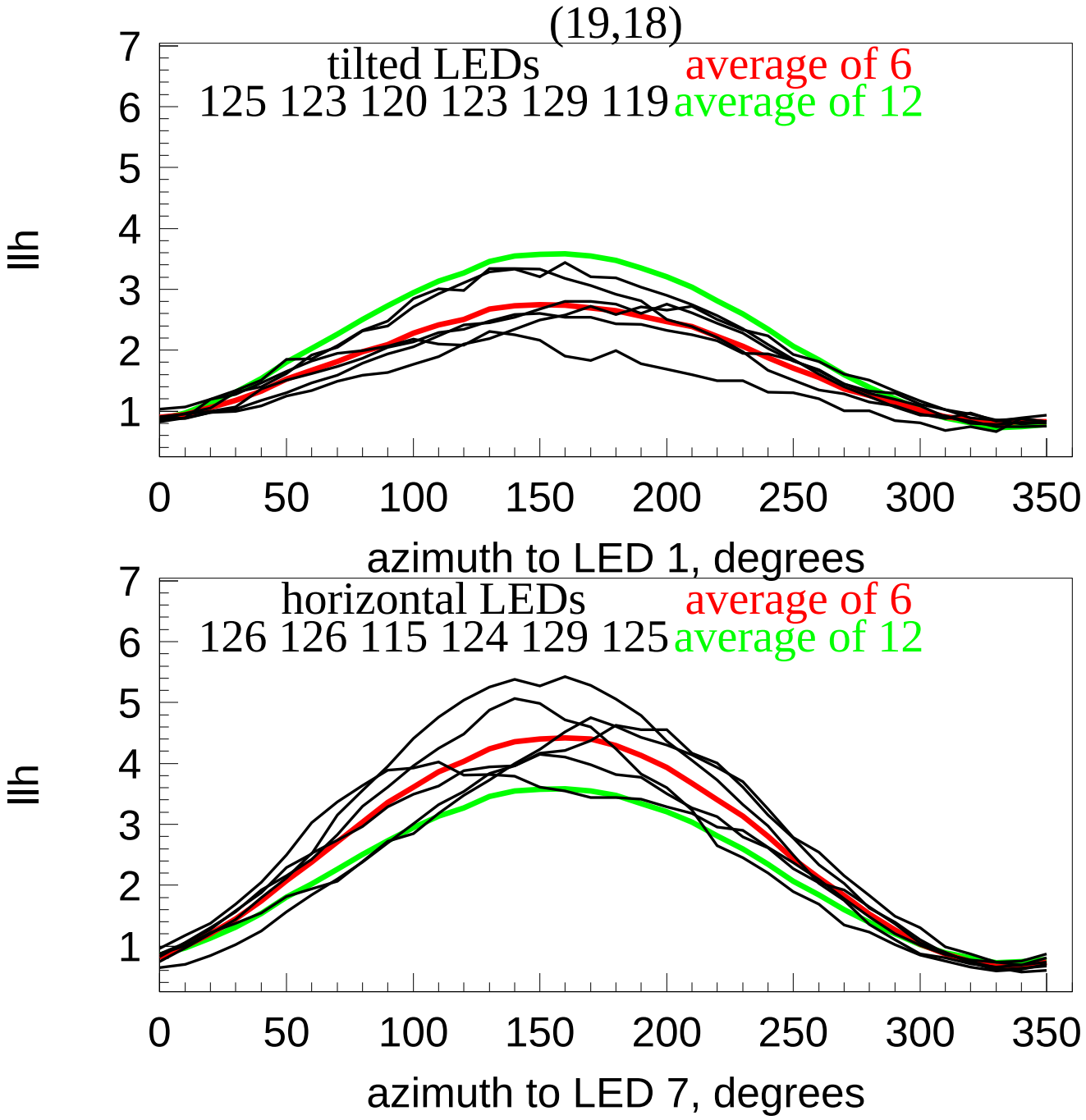

(19,15)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
26.1 ± 5.7

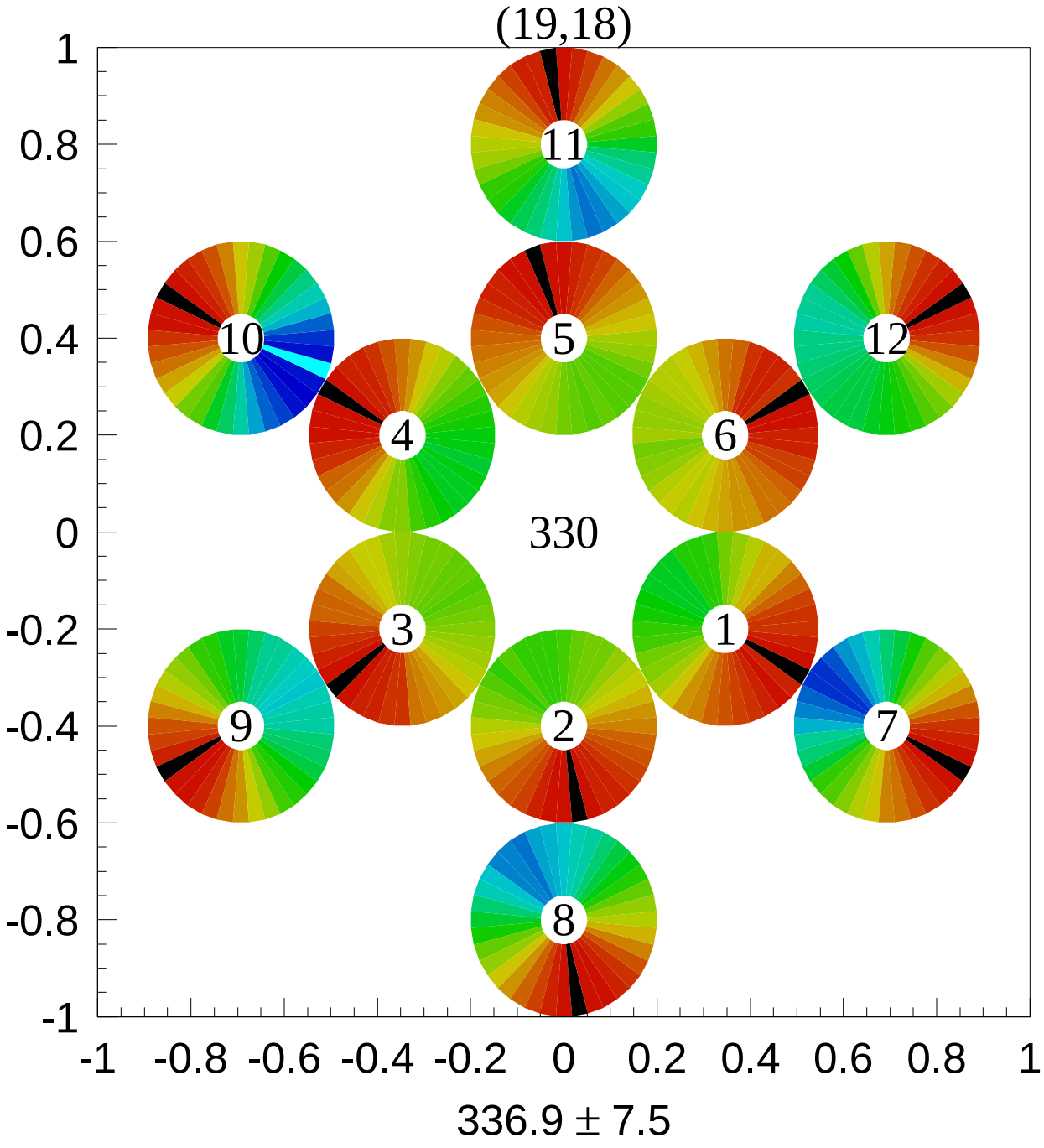

(19,16)
tilted LEDs
120 124 120 116 124 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 116 118 122 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

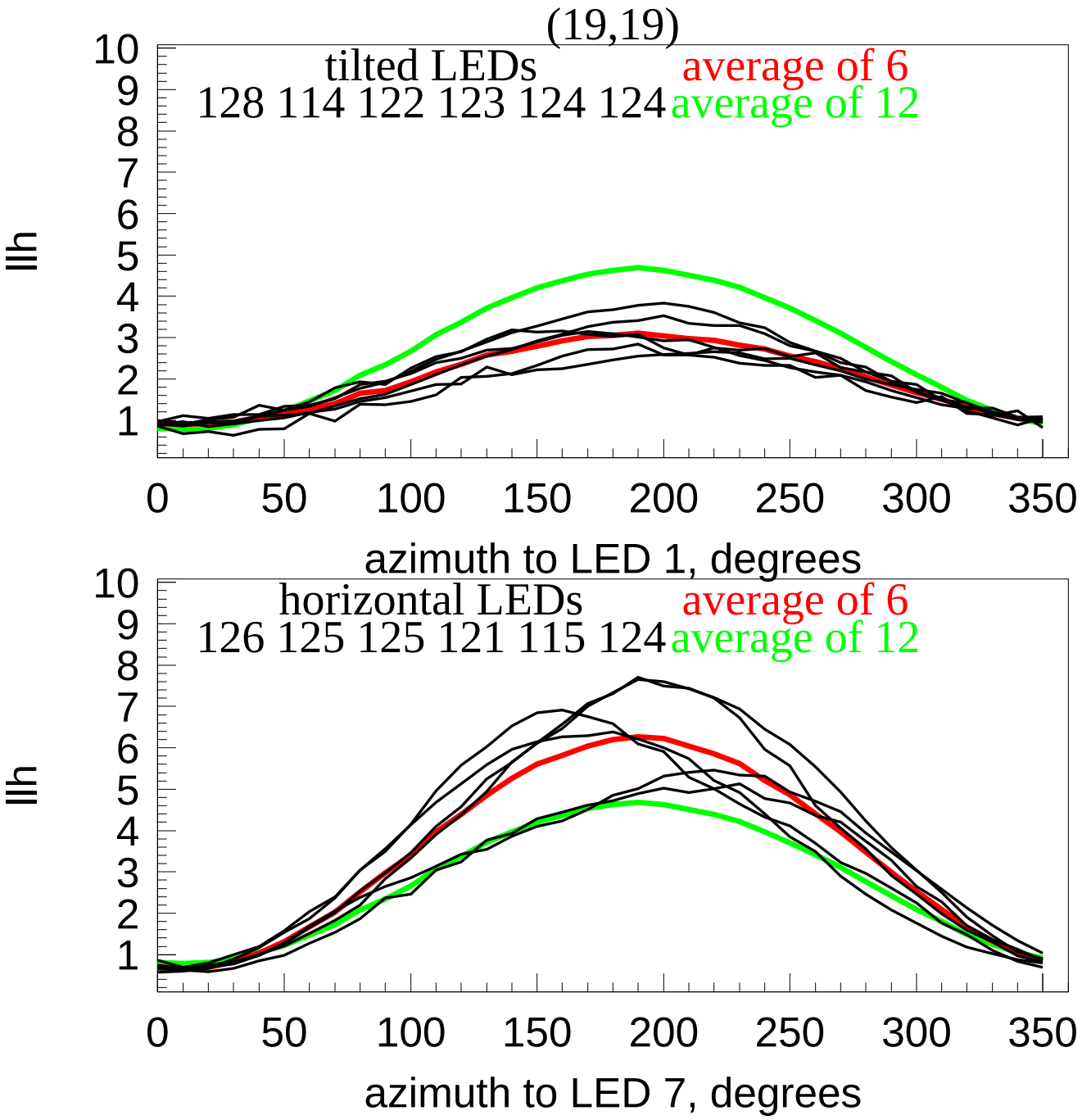

(19,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
251.1 ± 4.8

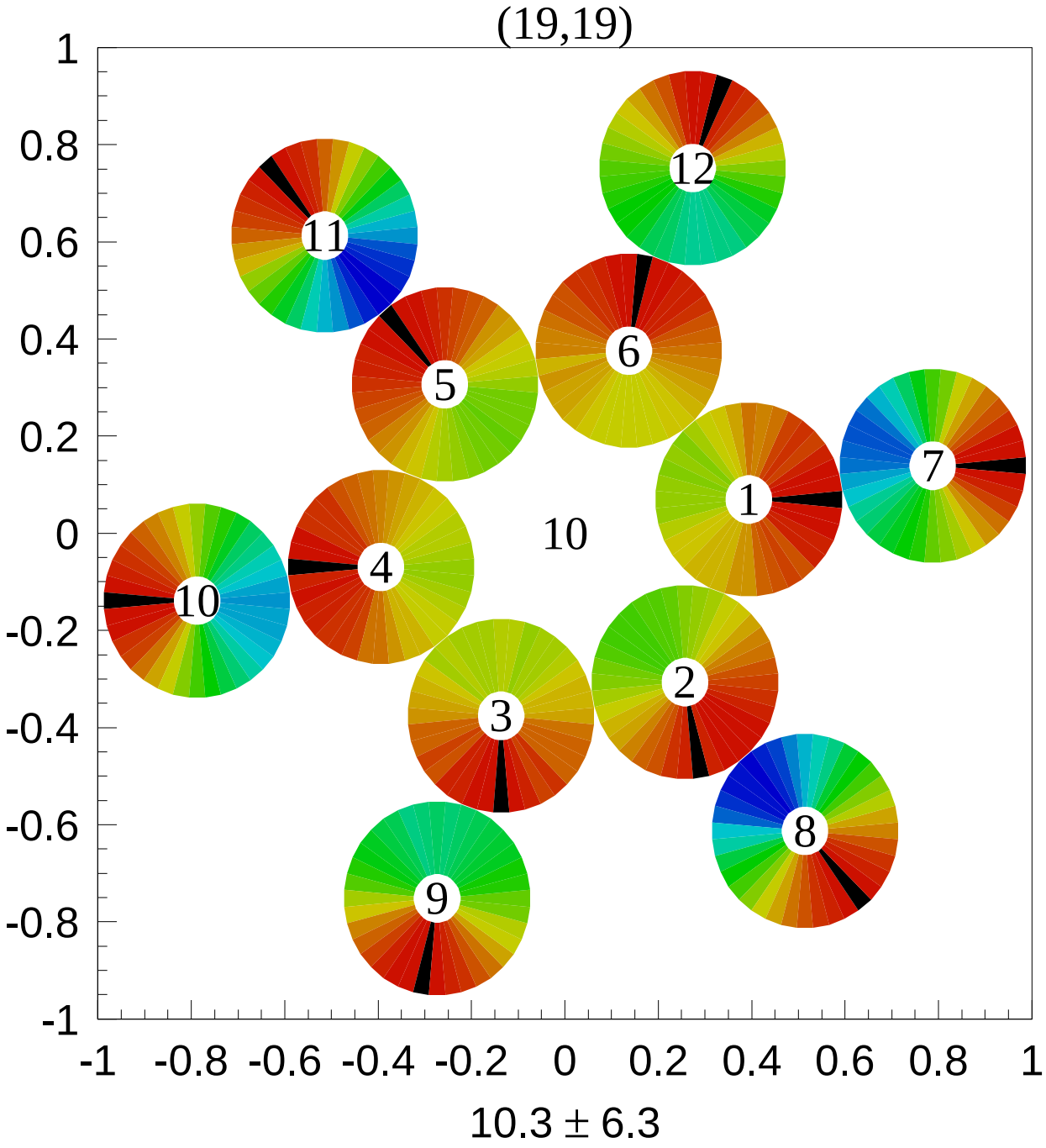

(19,17)
tilted LEDs
119 113 118 131 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 119 124 121 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

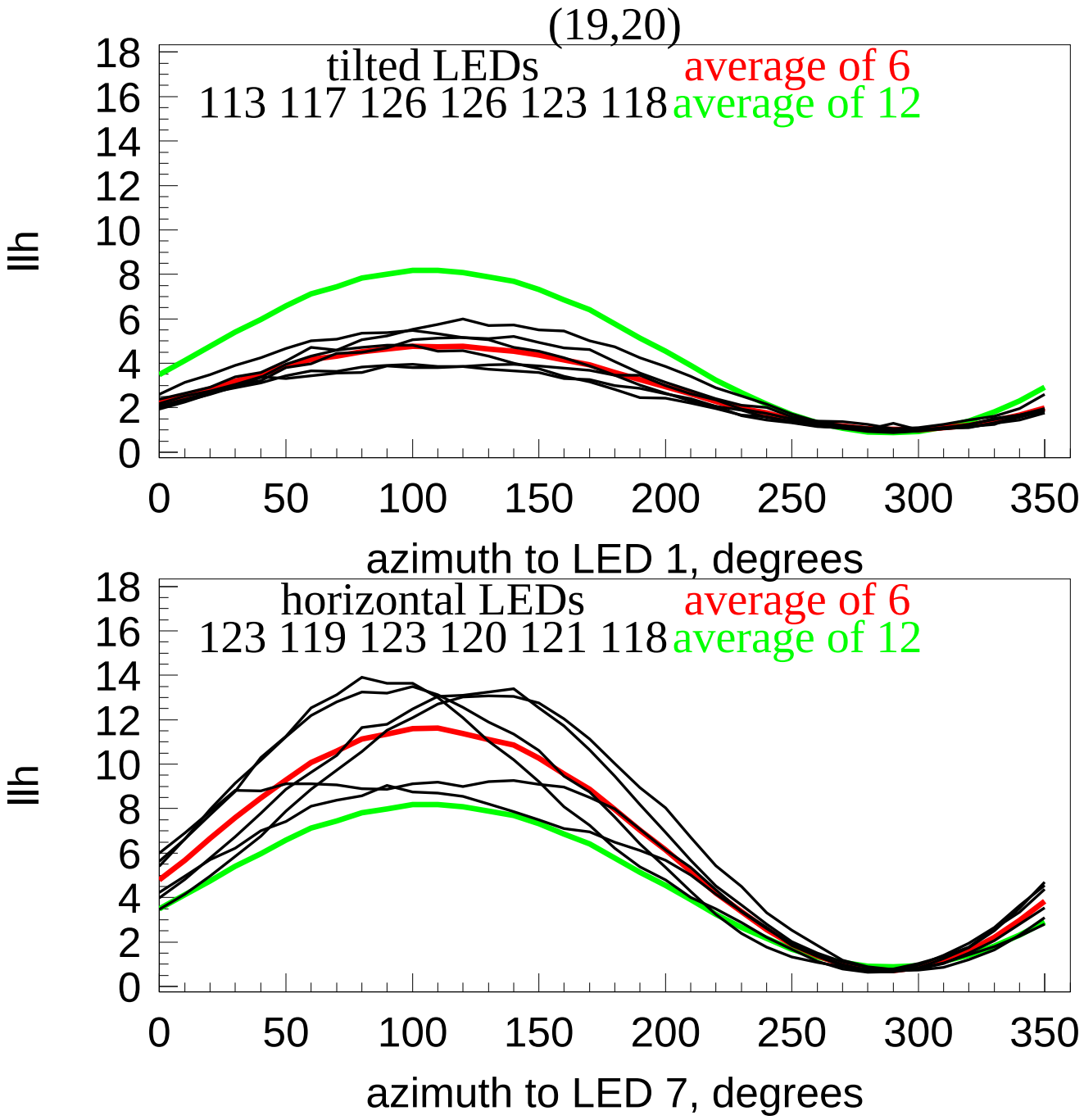

(19,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
234.5 ± 5.0

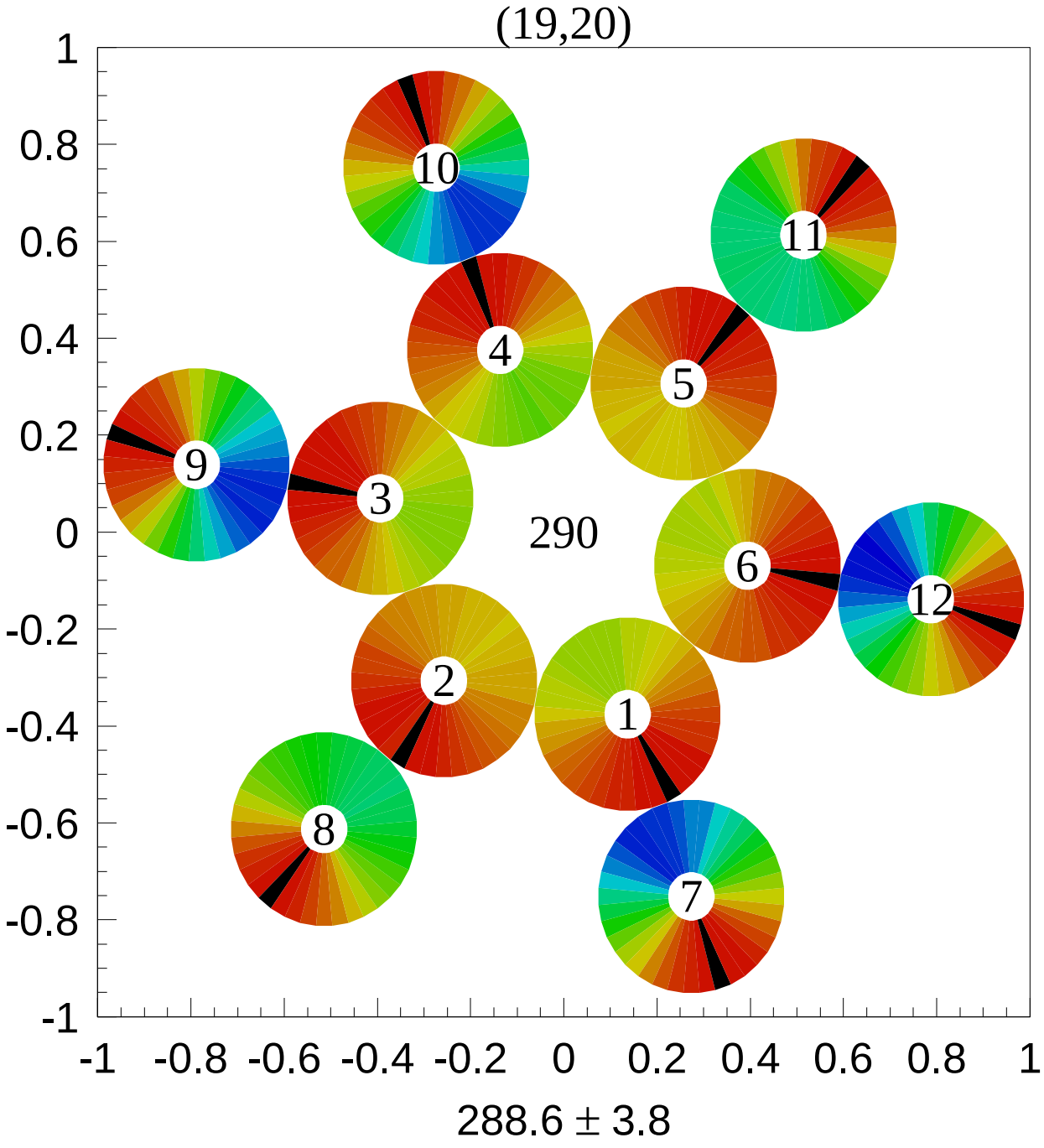

(19,18)
tilted LEDs
125 123 120 123 129 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 115 124 129 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

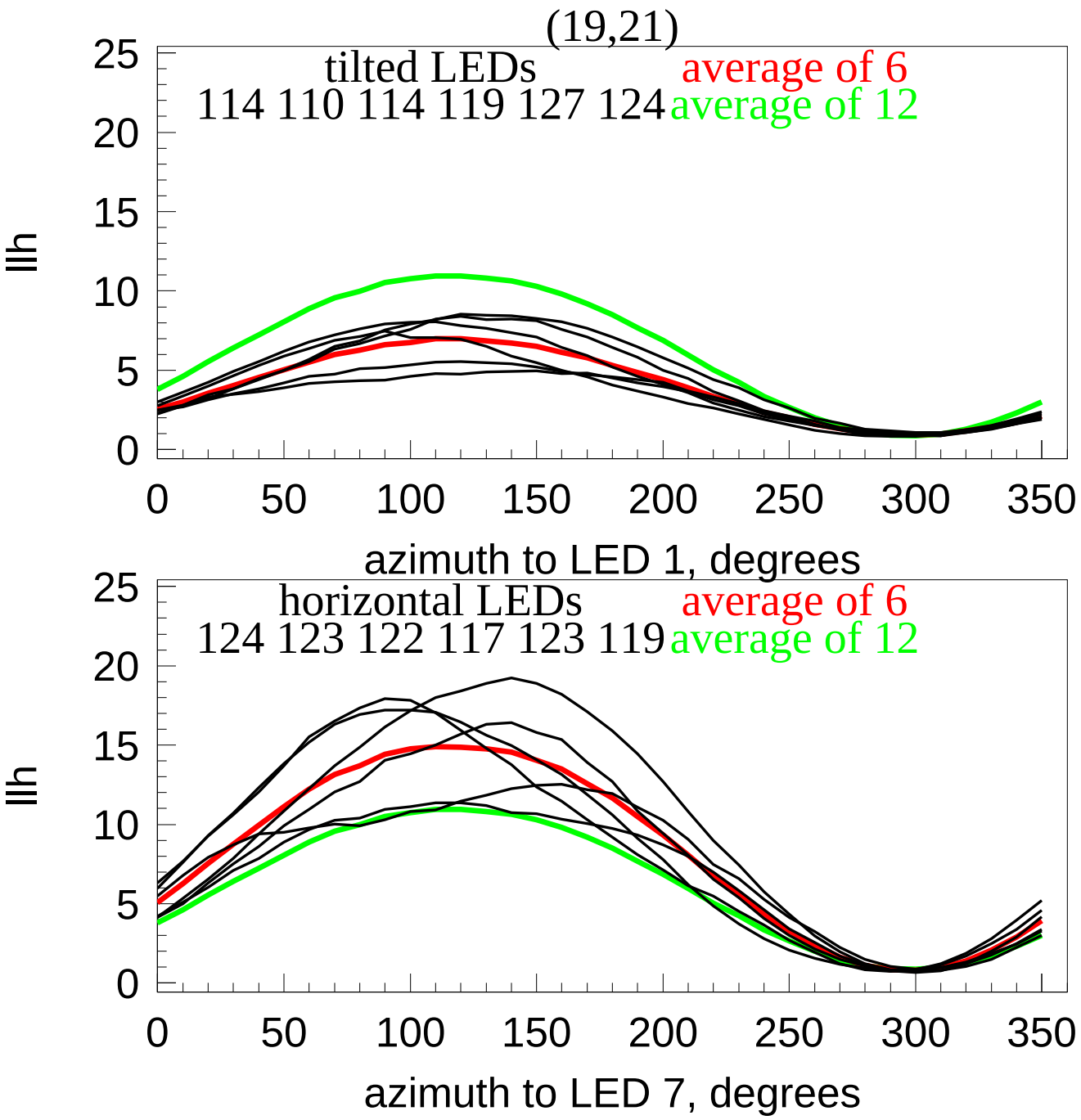

(19,18)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
336.9 ± 7.5

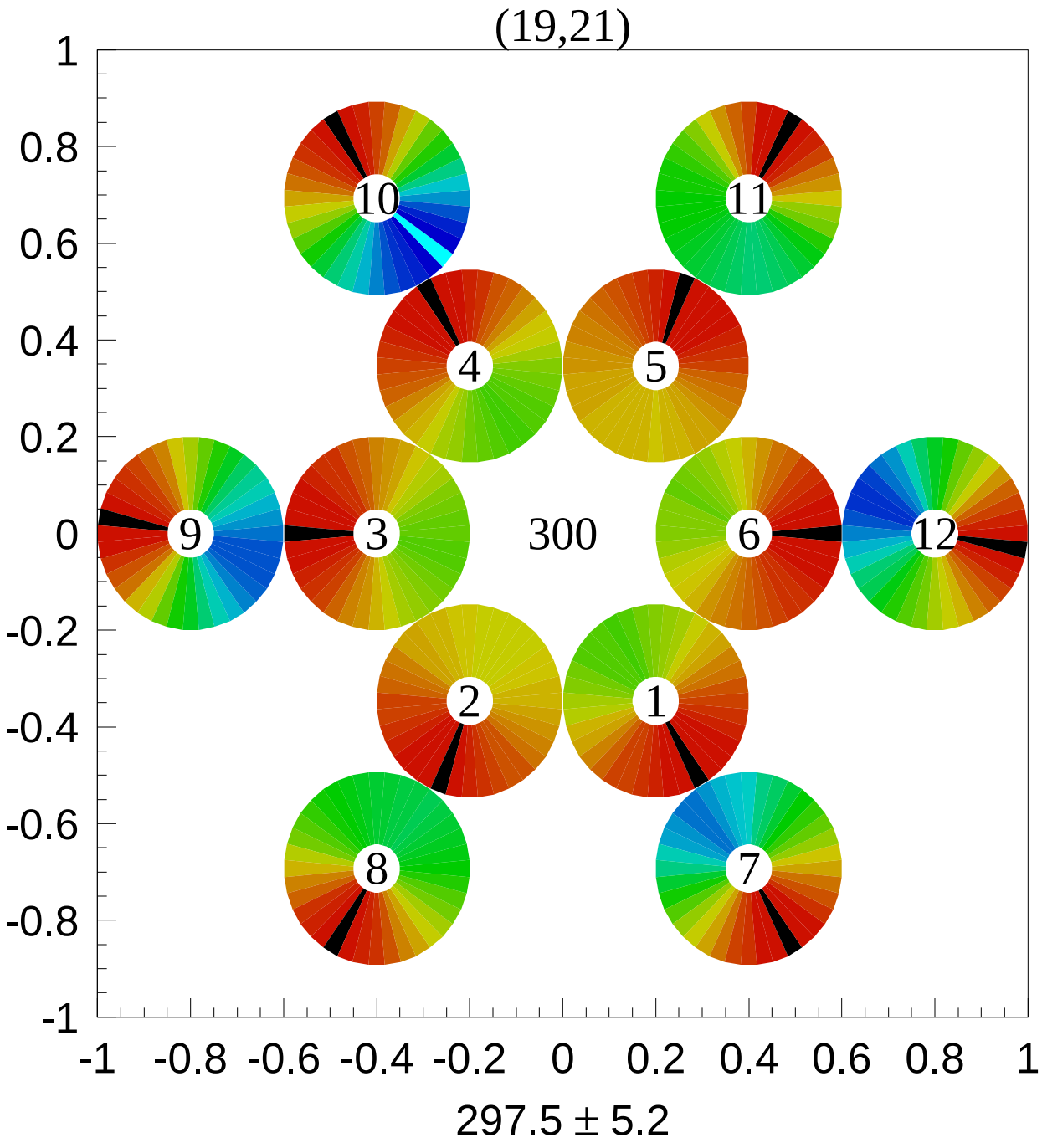

(19,19)
tilted LEDs
128 114 122 123 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 125 125 121 115 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

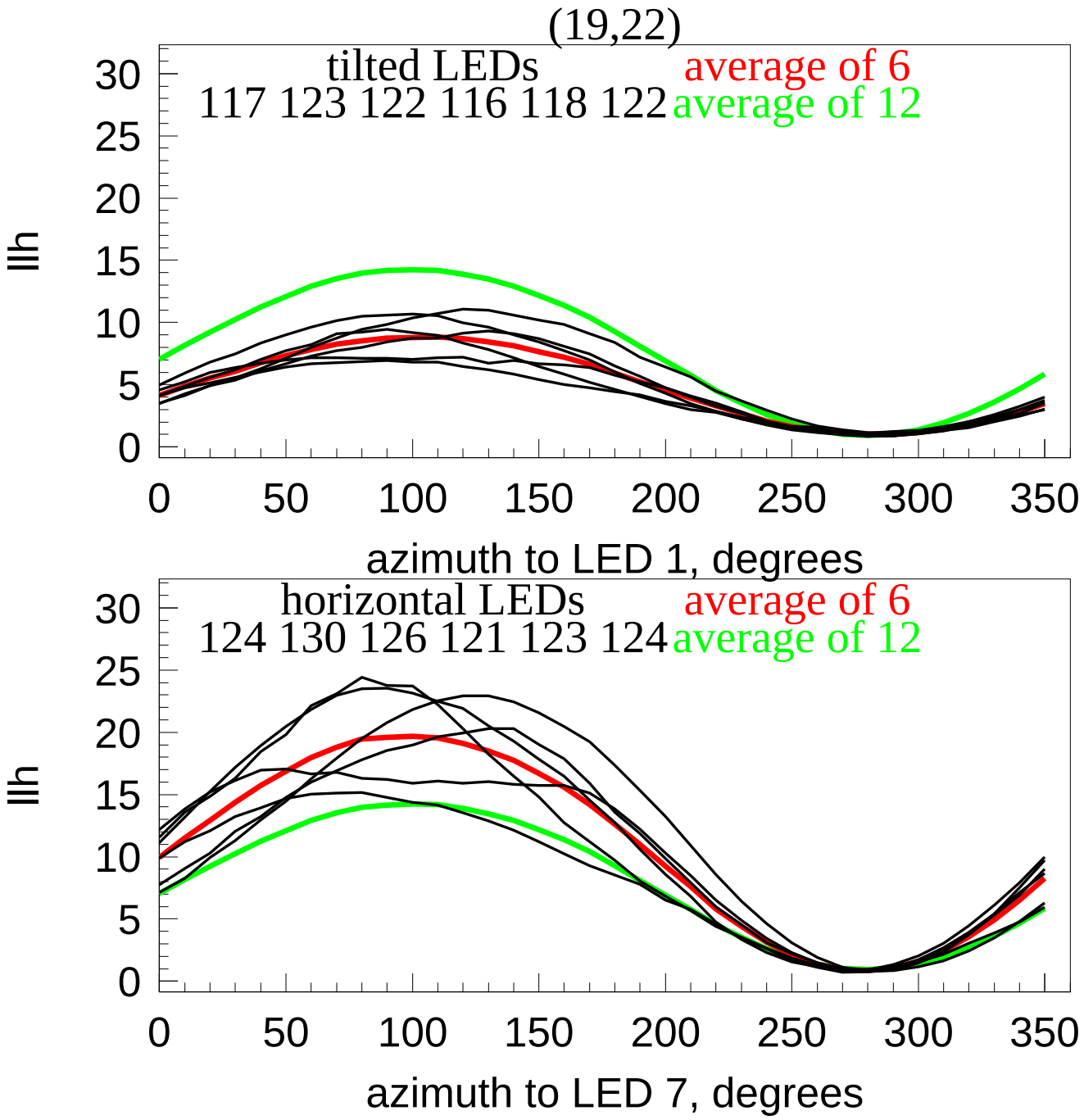

(19,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10.3 ± 6.3
12
11
6
5
7
1
10
4
10
2
3
8
9

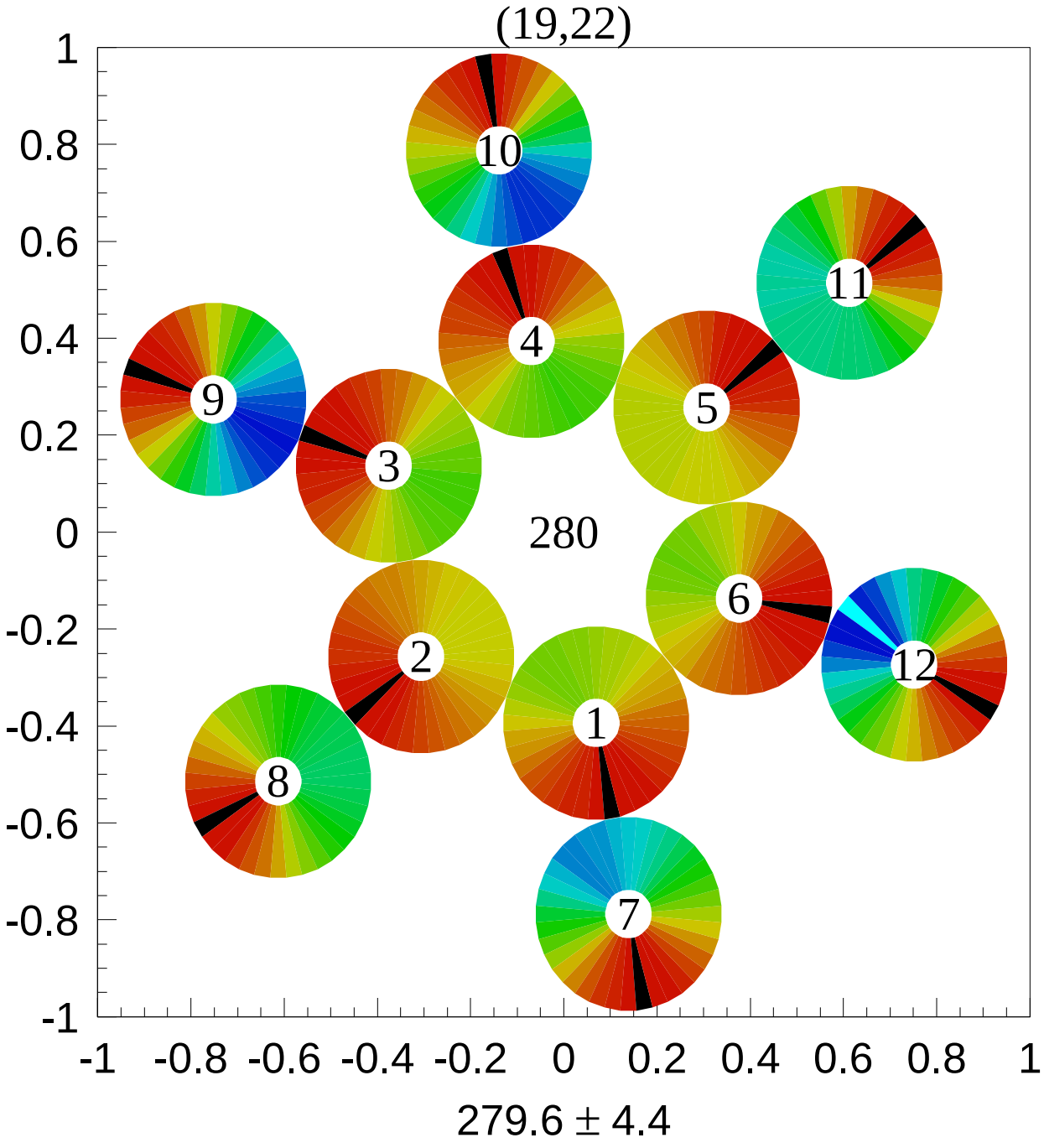

(19,20)
tilted LEDs
113 117 126 126 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 123 120 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

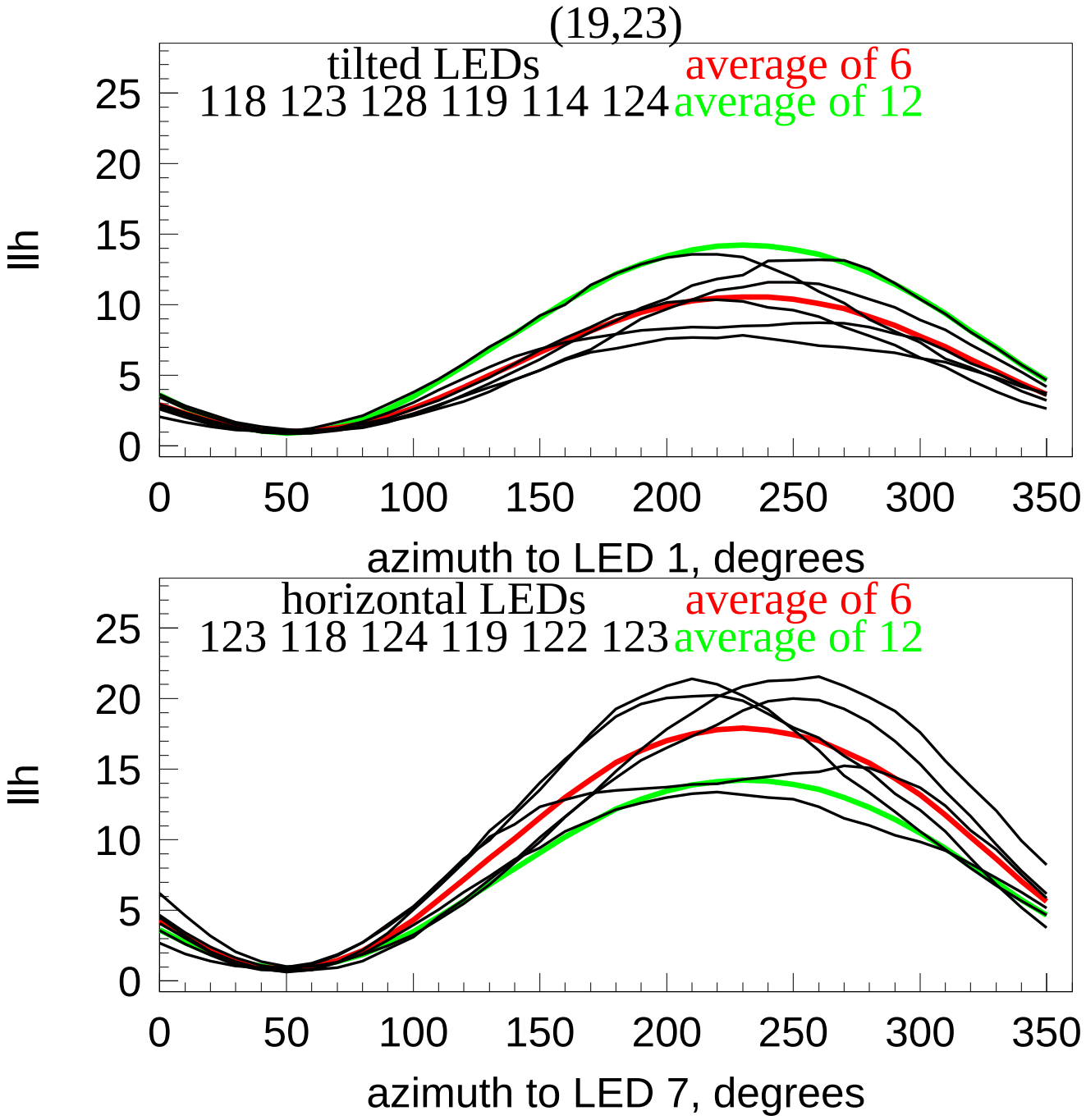

(19,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
288.6 ± 3.8

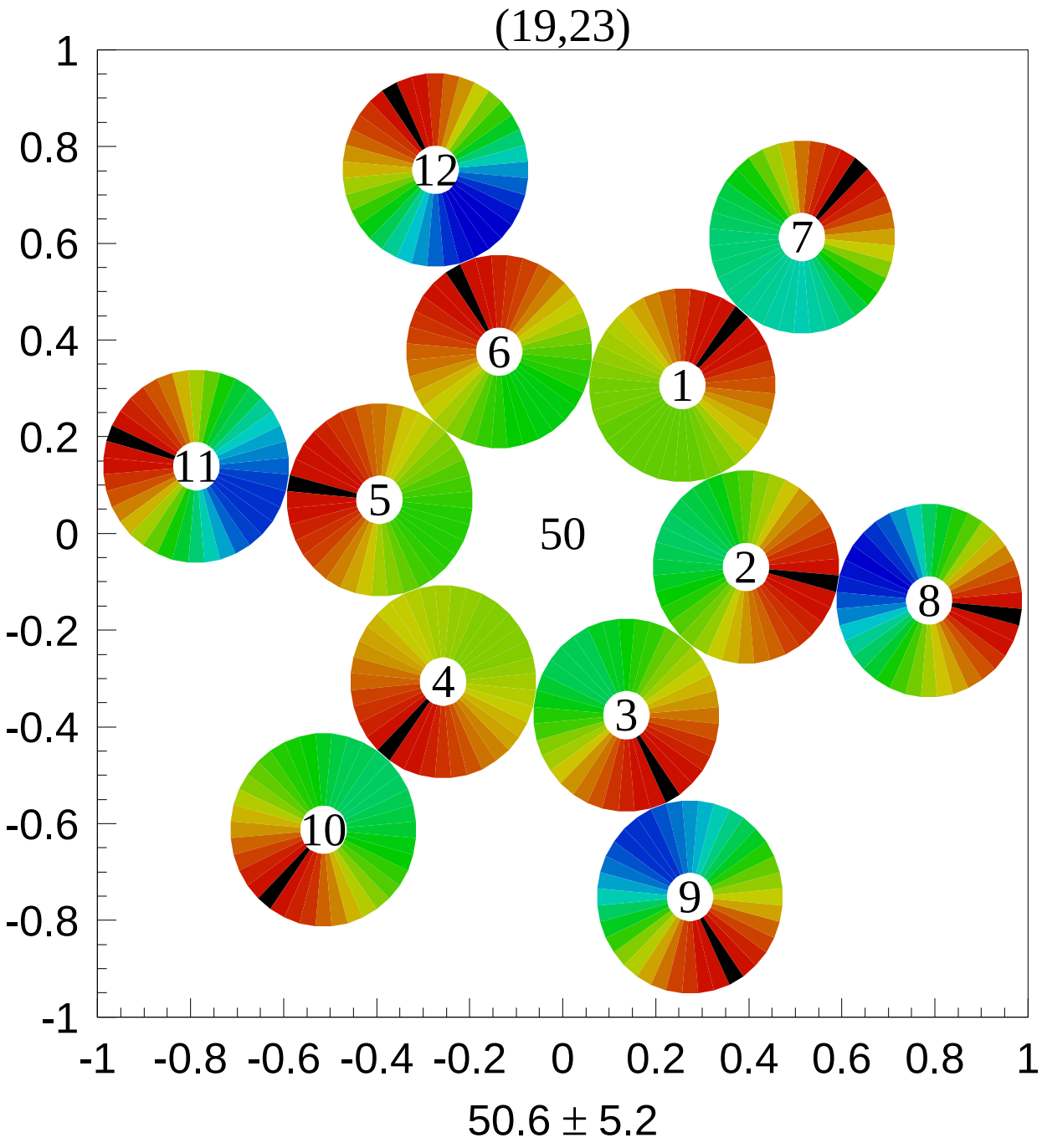

(19,21)
tilted LEDs
114 110 114 119 127 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 122 117 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

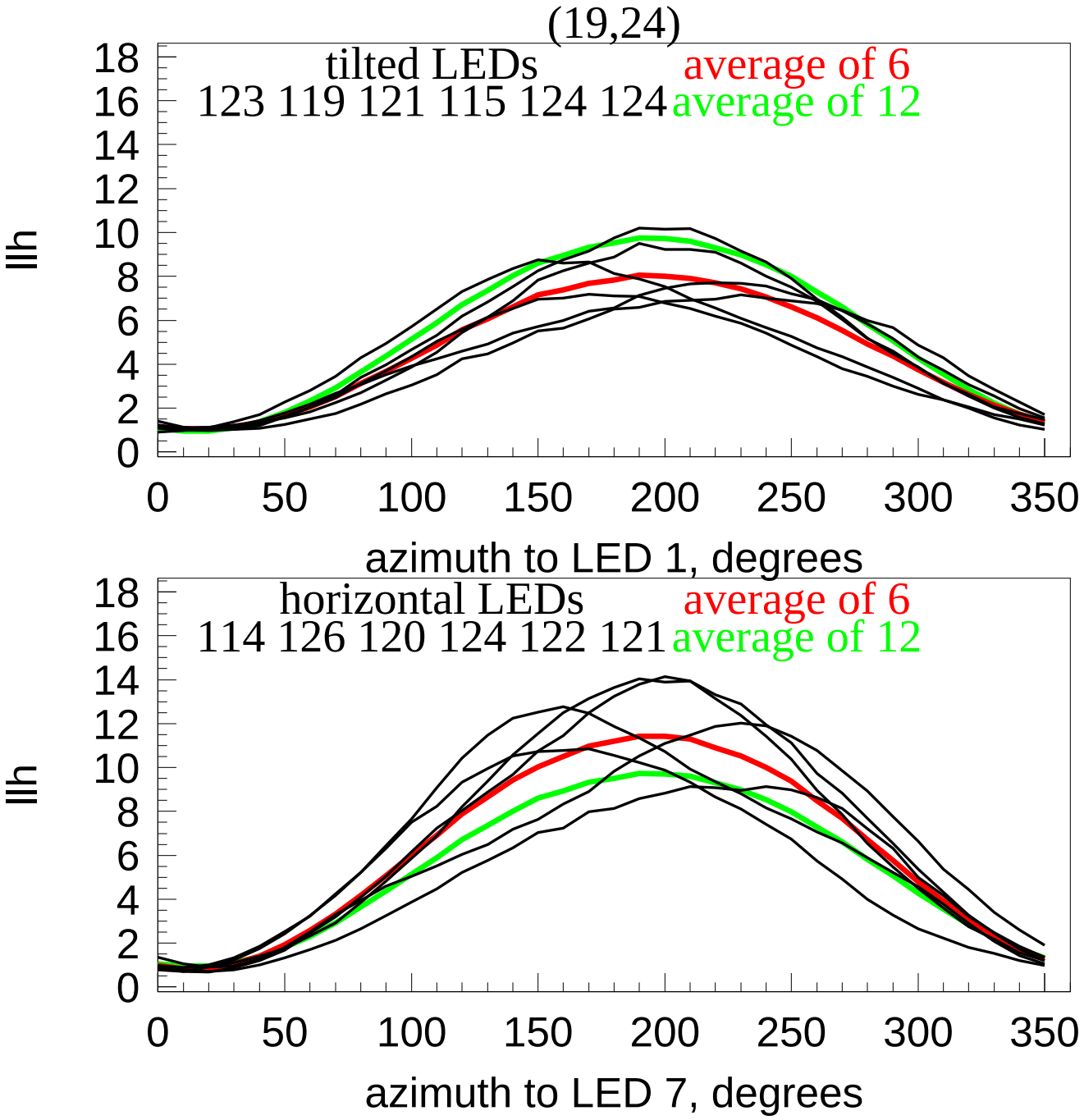

(19,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
297.5 ± 5.2

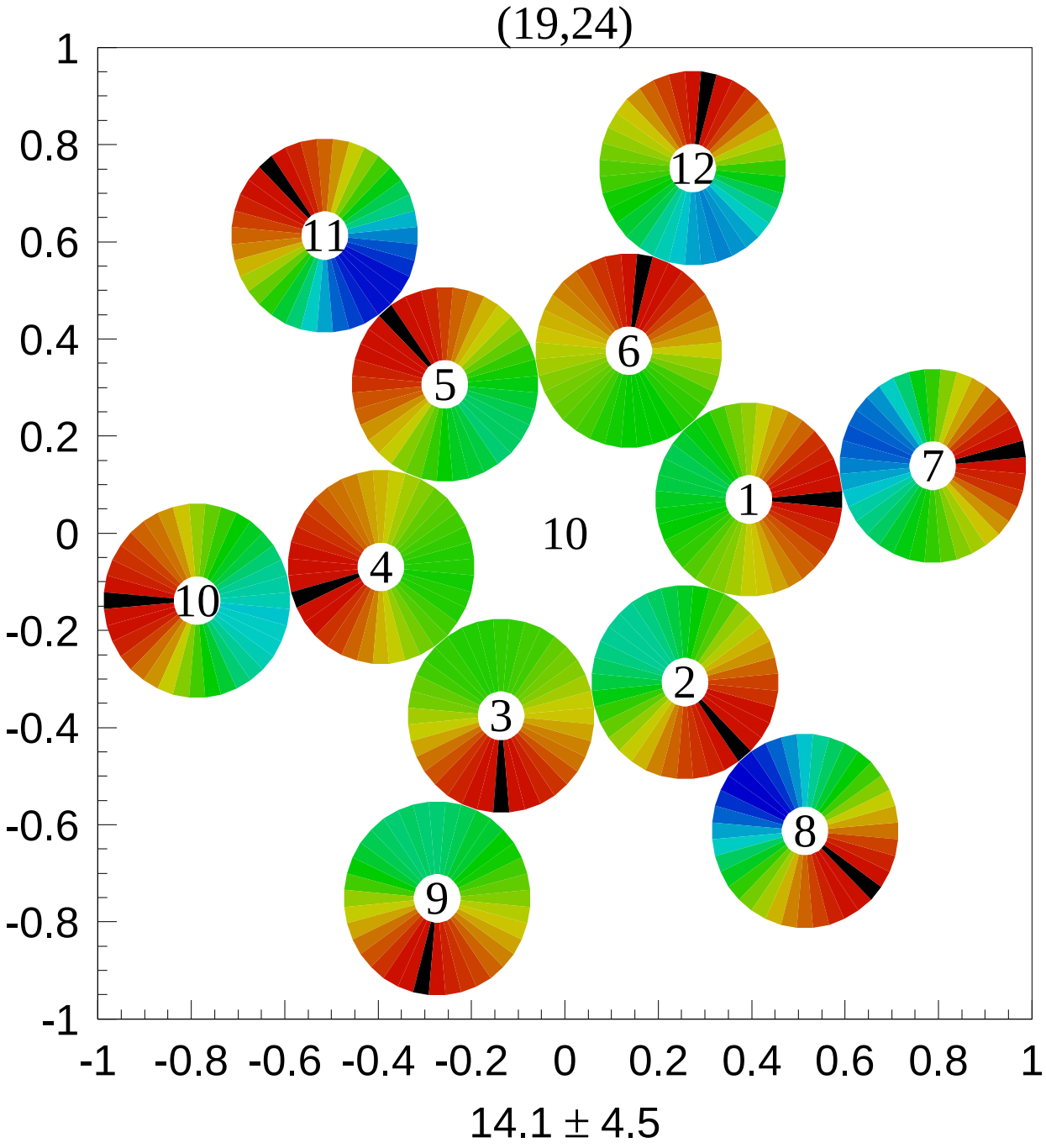

(19,22)
tilted LEDs
117 123 122 116 118 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 130 126 121 123 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

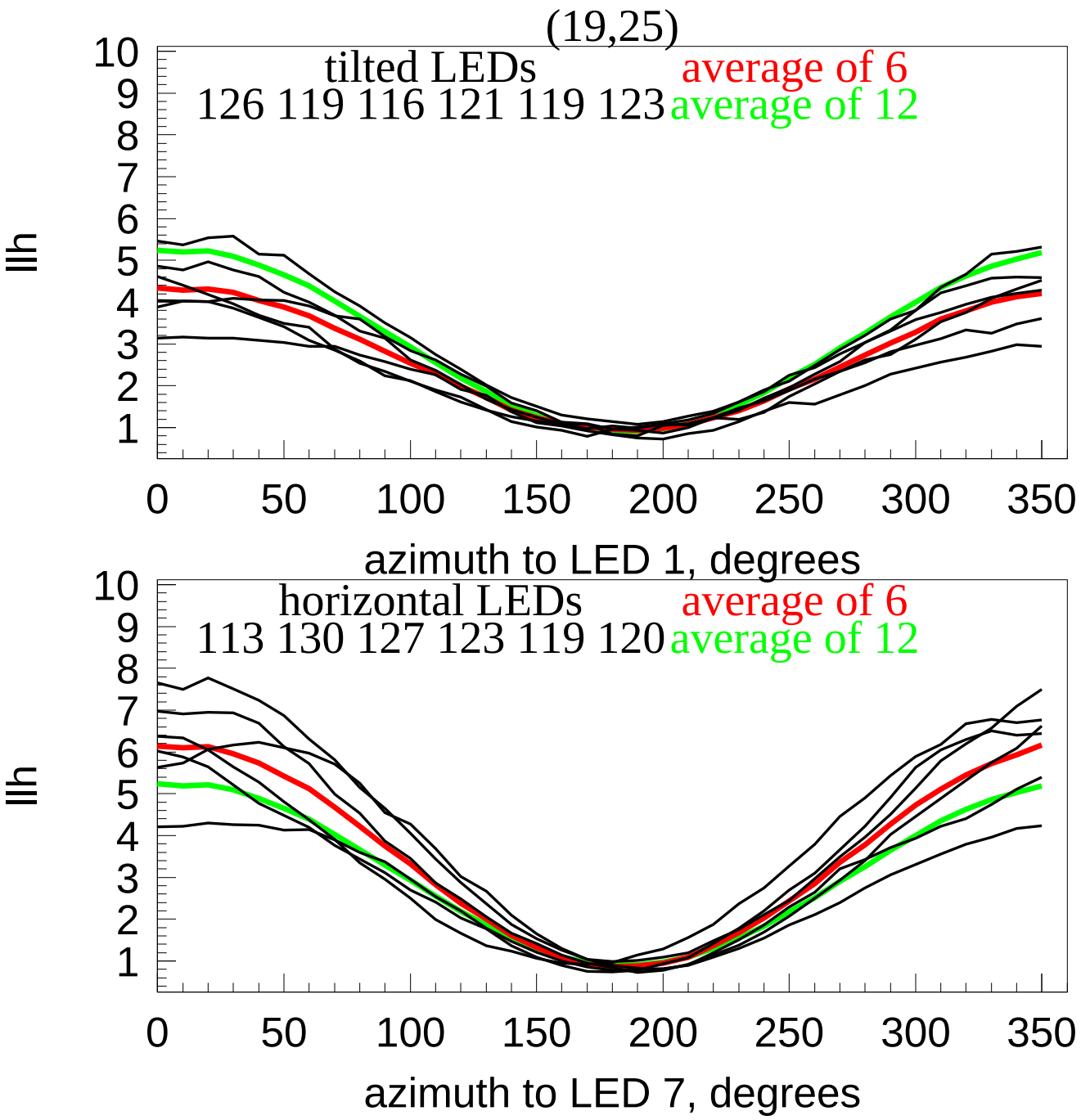

(19,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
279.6 ± 4.4

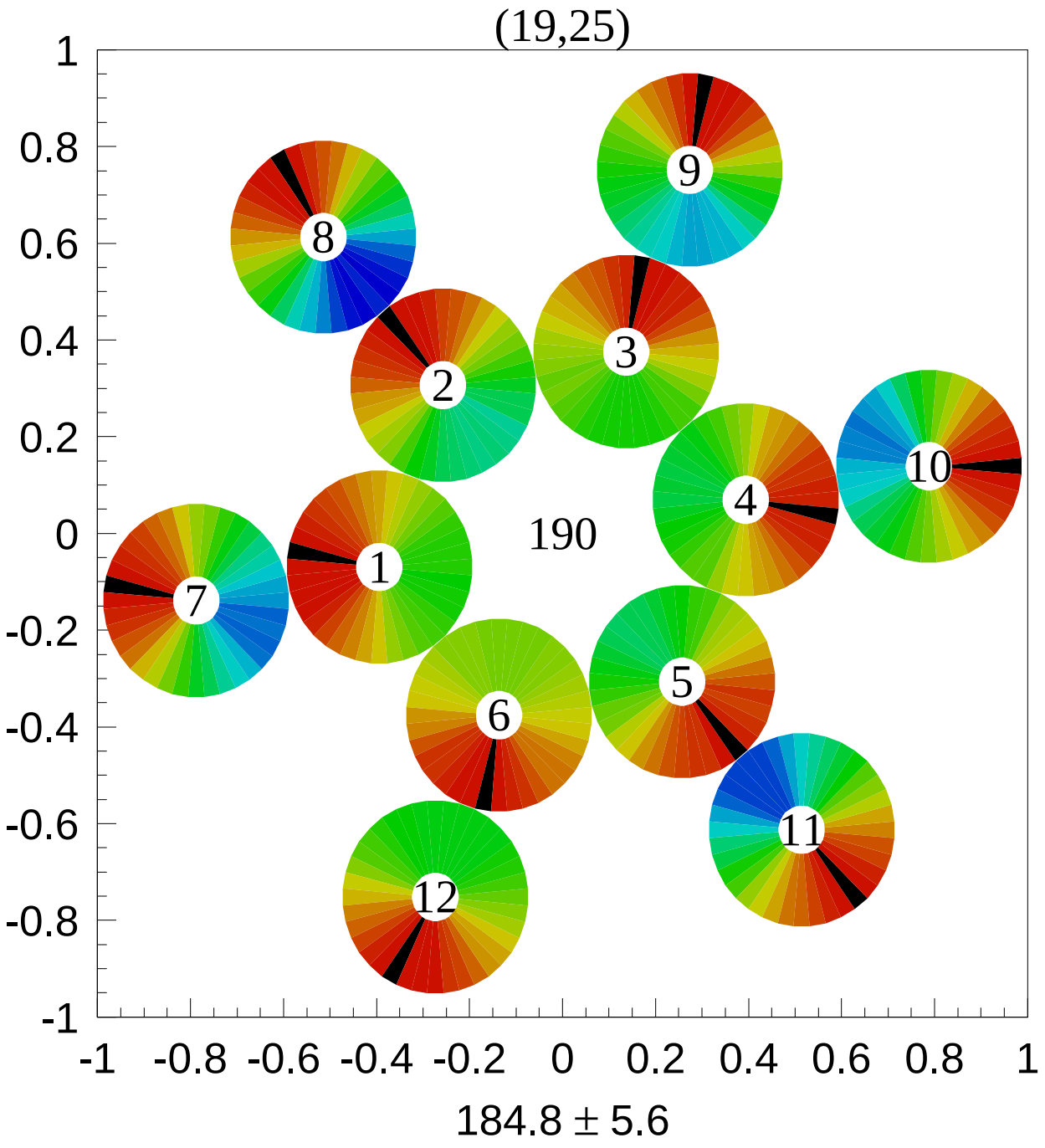

(19,23)
tilted LEDs
118 123 128 119 114 124
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 118 124 119 122 123
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

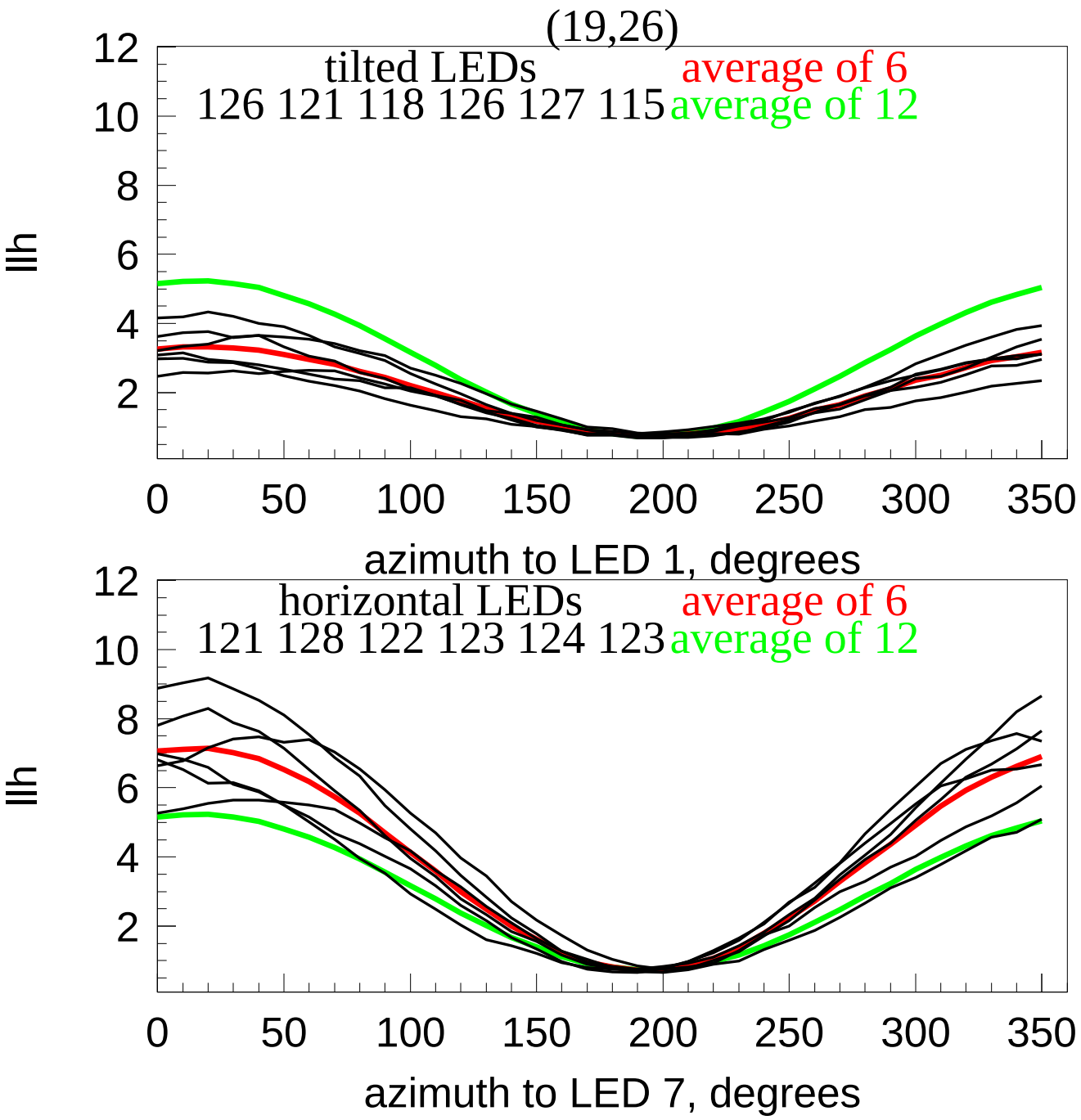

(19,23)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
50.6 ± 5.2

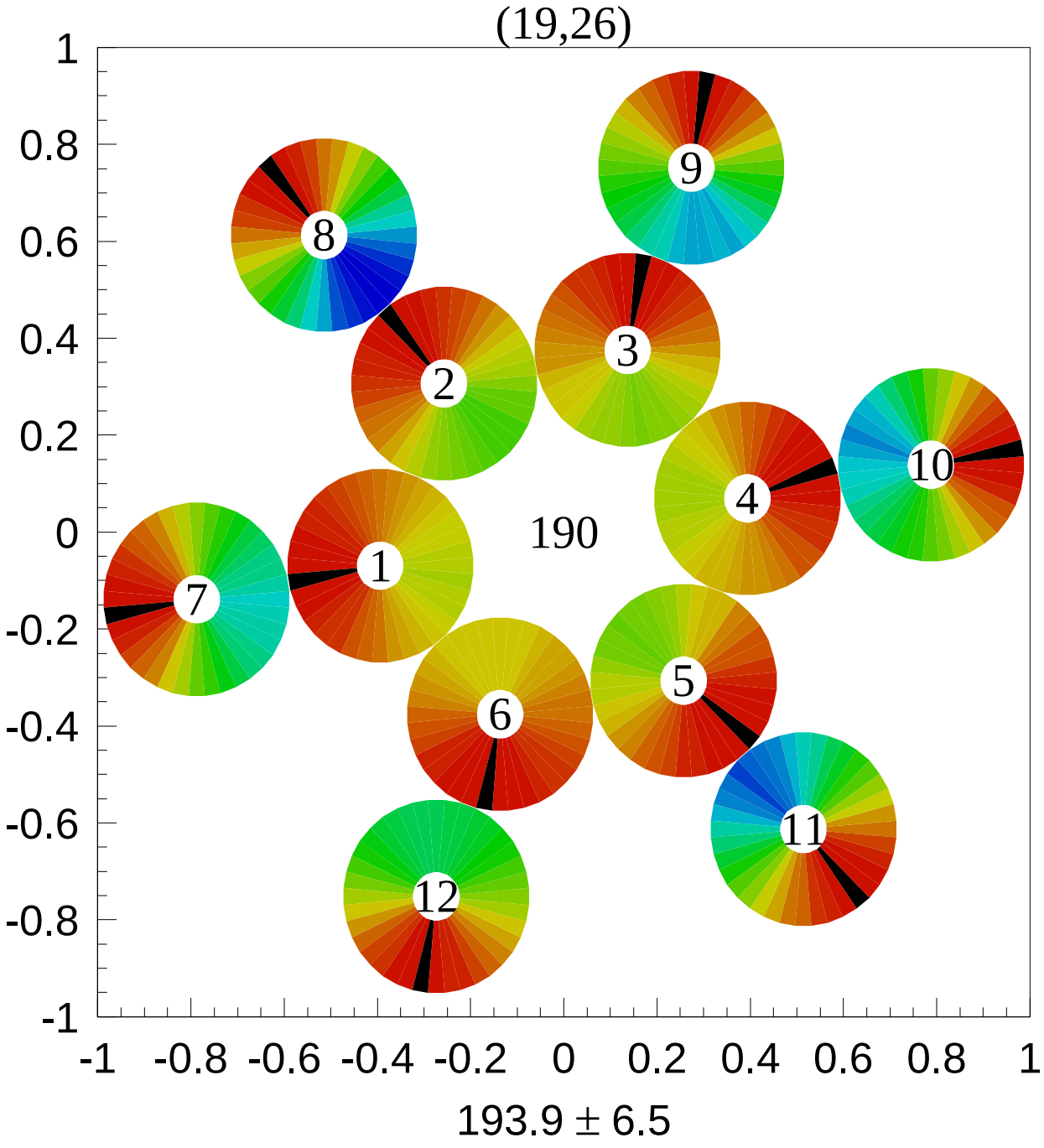

(19,24)
tilted LEDs
123 119 121 115 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 126 120 124 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

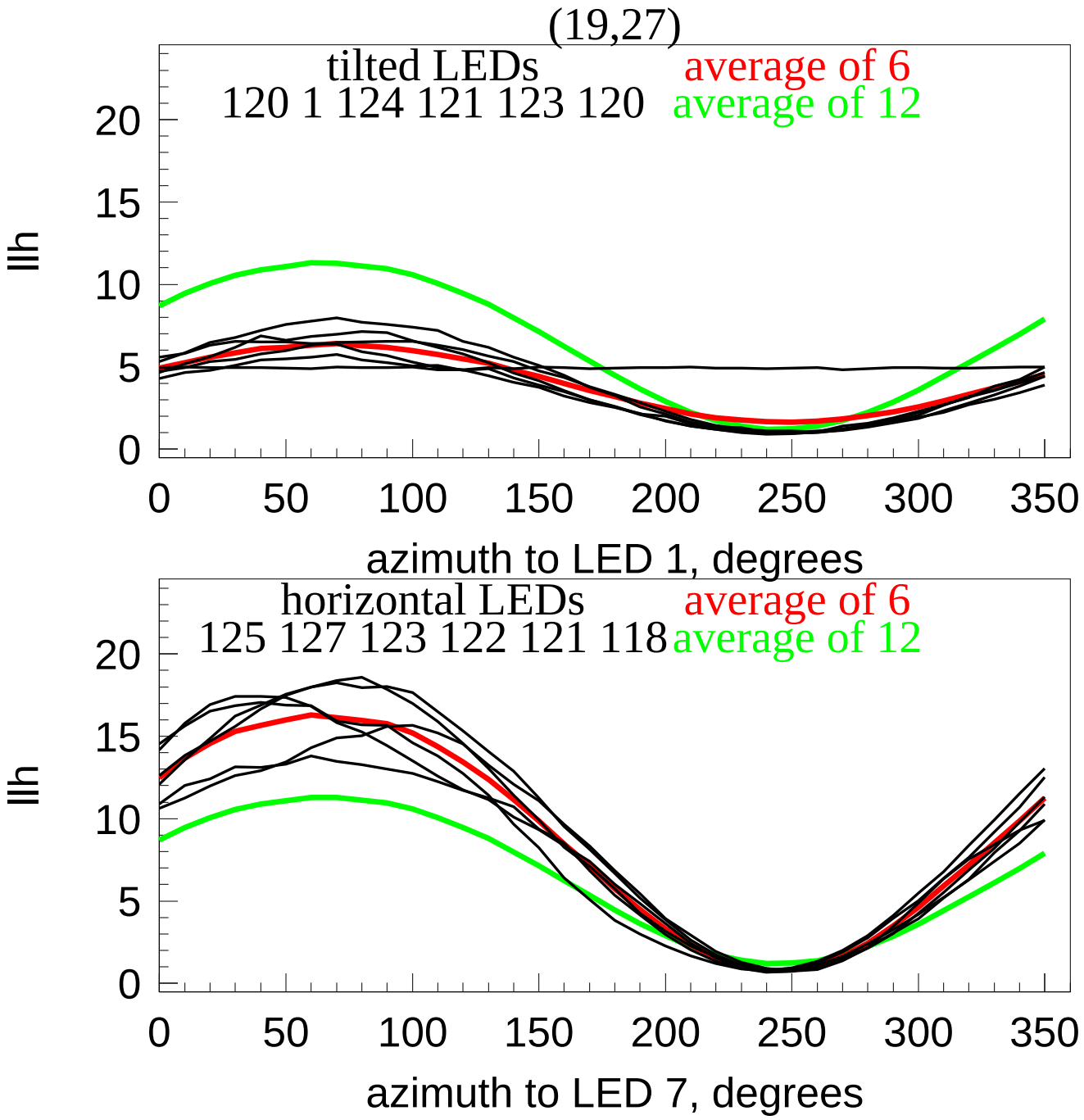

(19,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
14.1 ± 4.5
12
11
6
5
7
1
10
4
10
2
3
8
9

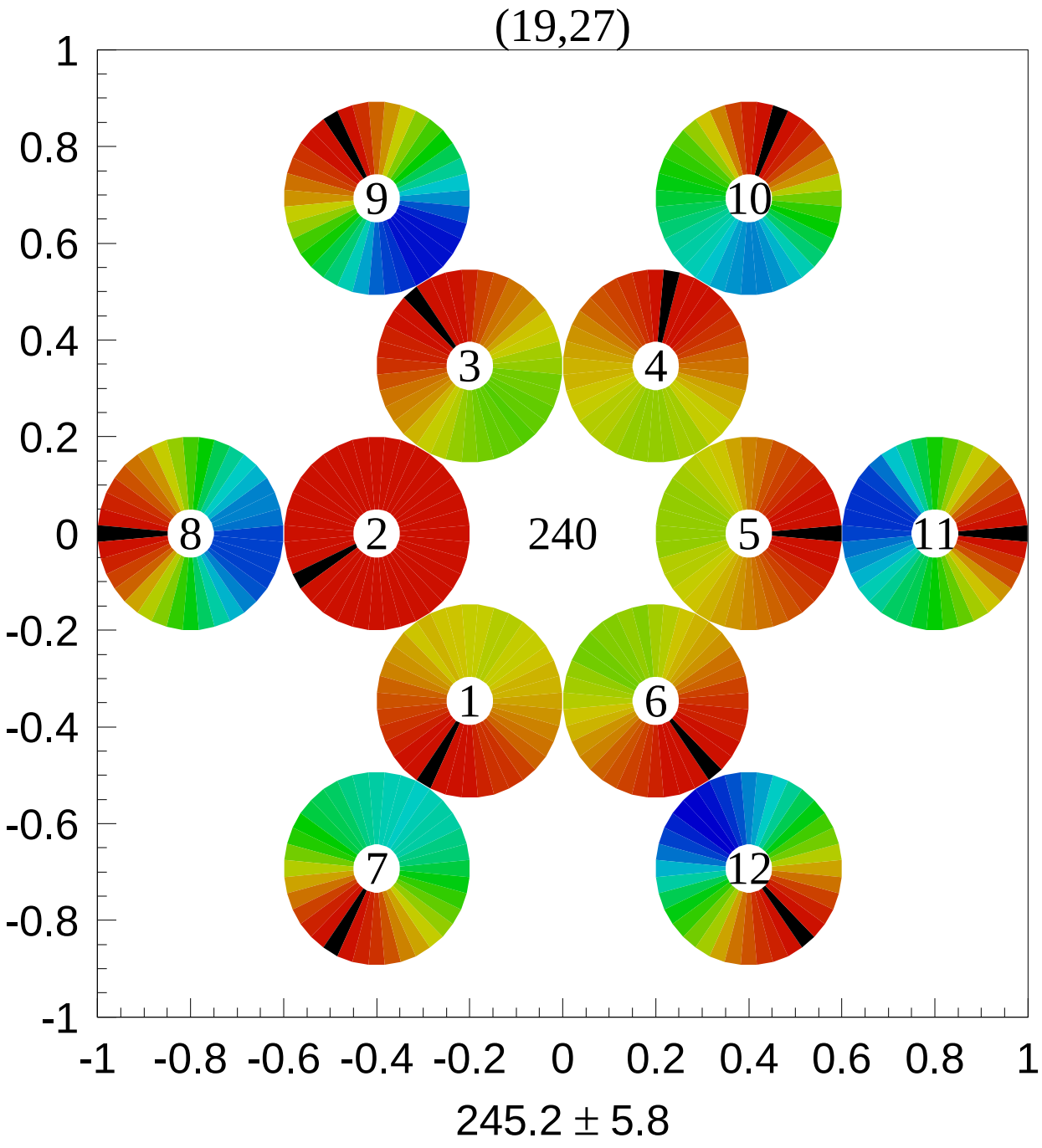

(19,25)
tilted LEDs
126 119 116 121 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 130 127 123 119 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

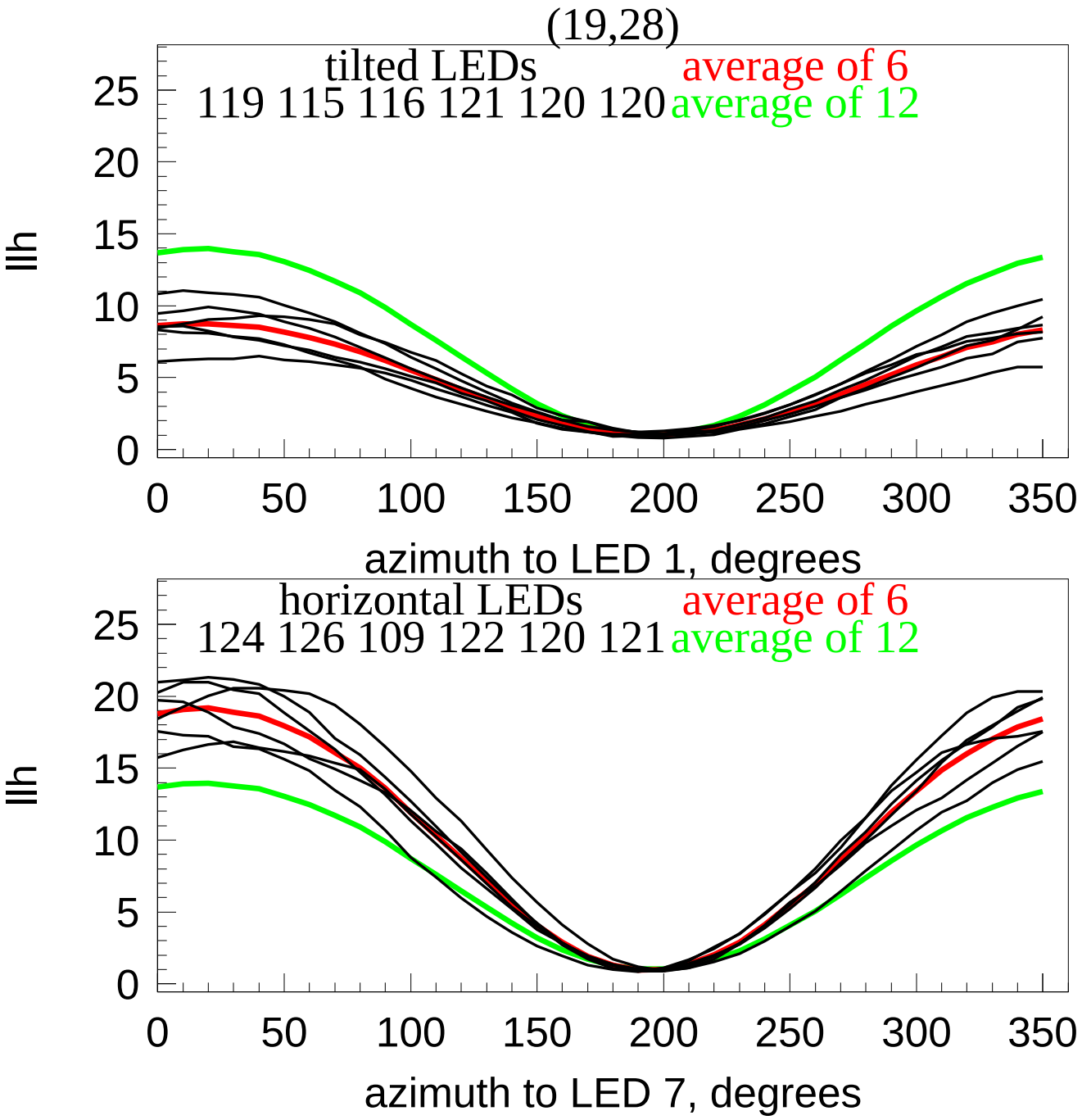

(19,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
184.8 ± 5.6
190
1
2
3
4
5
6
7
8
9
10
11
12

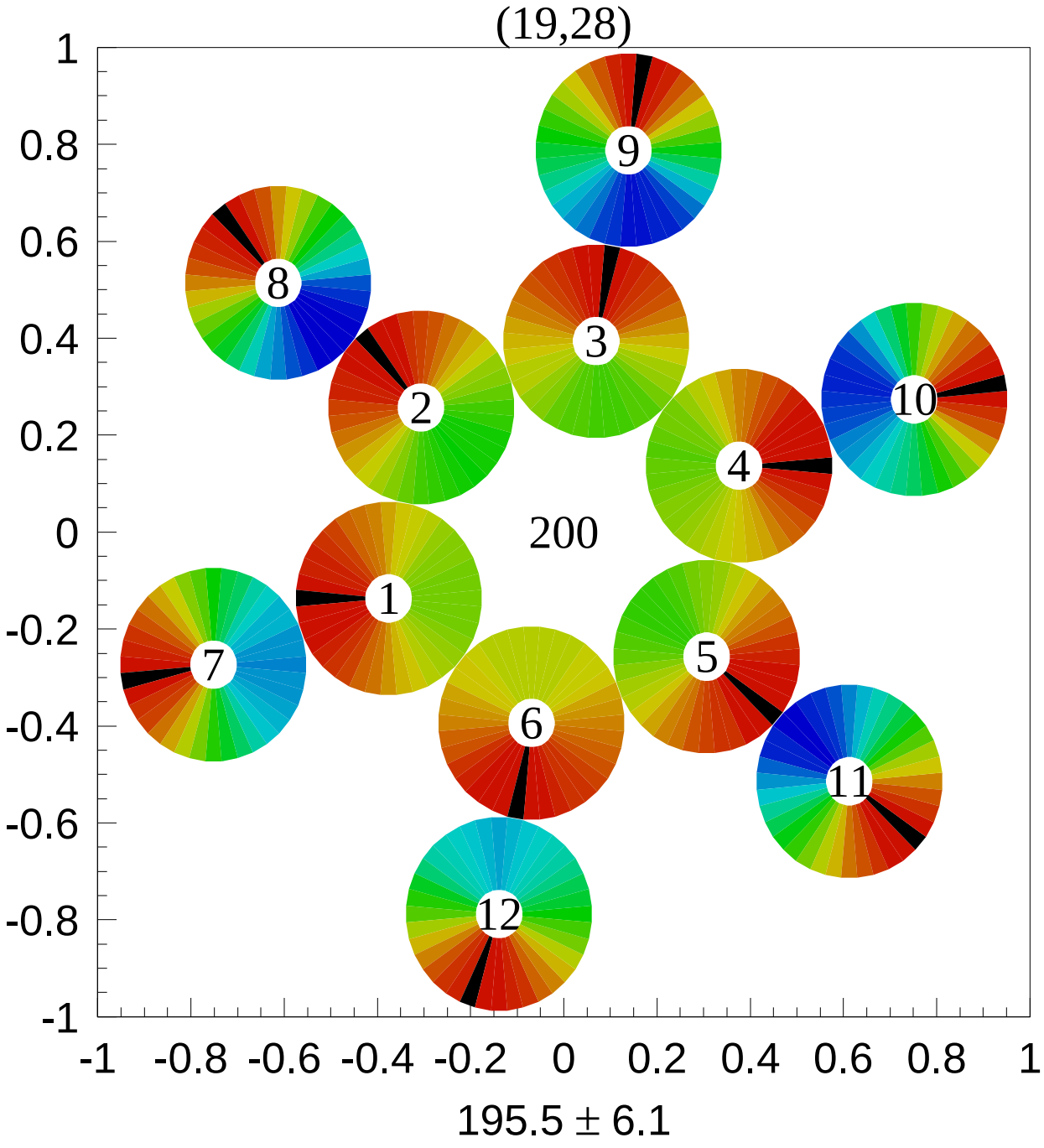

(19,26)
tilted LEDs
126 121 118 126 127 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 128 122 123 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

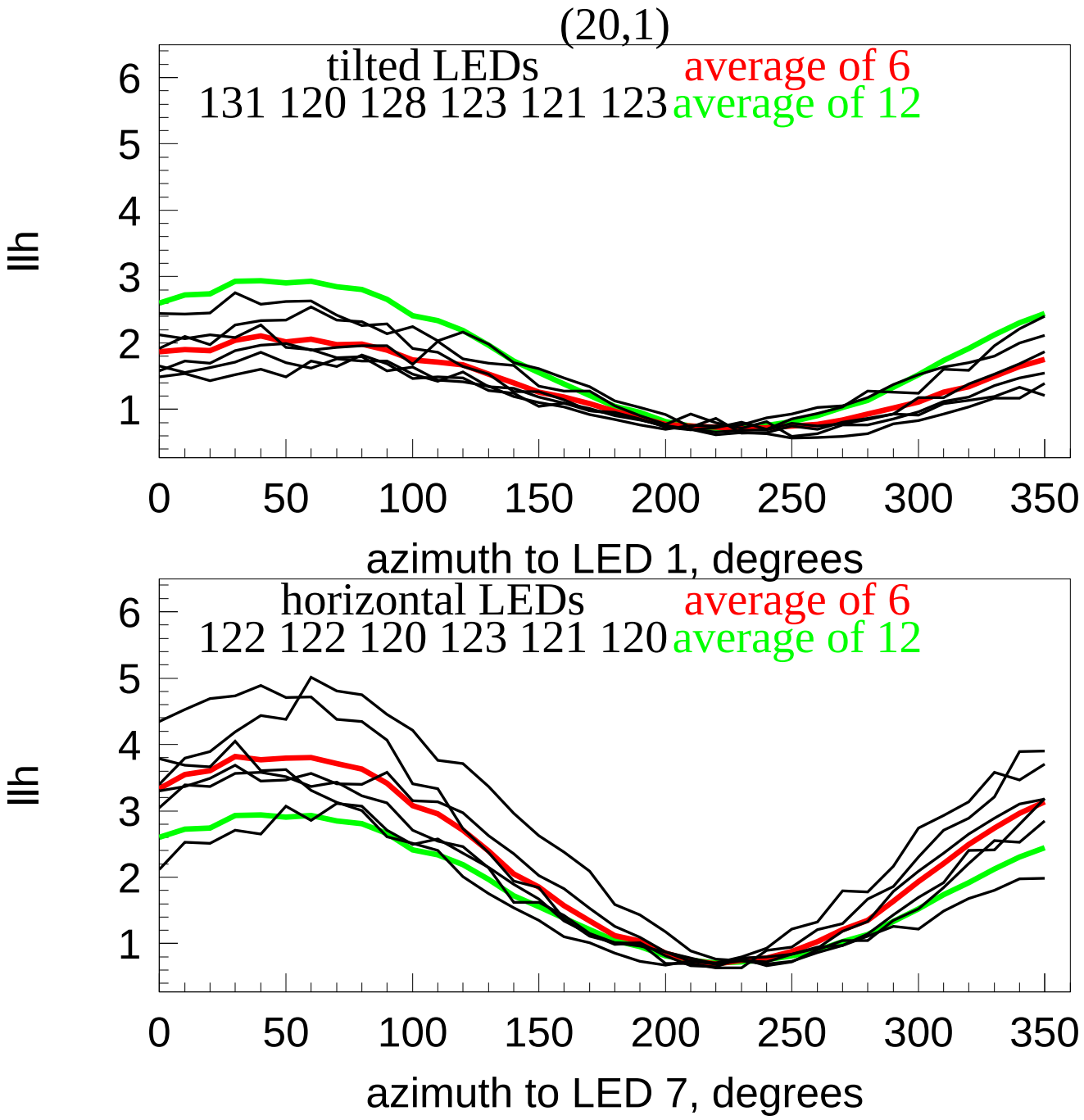

(19,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
193.9 ± 6.5

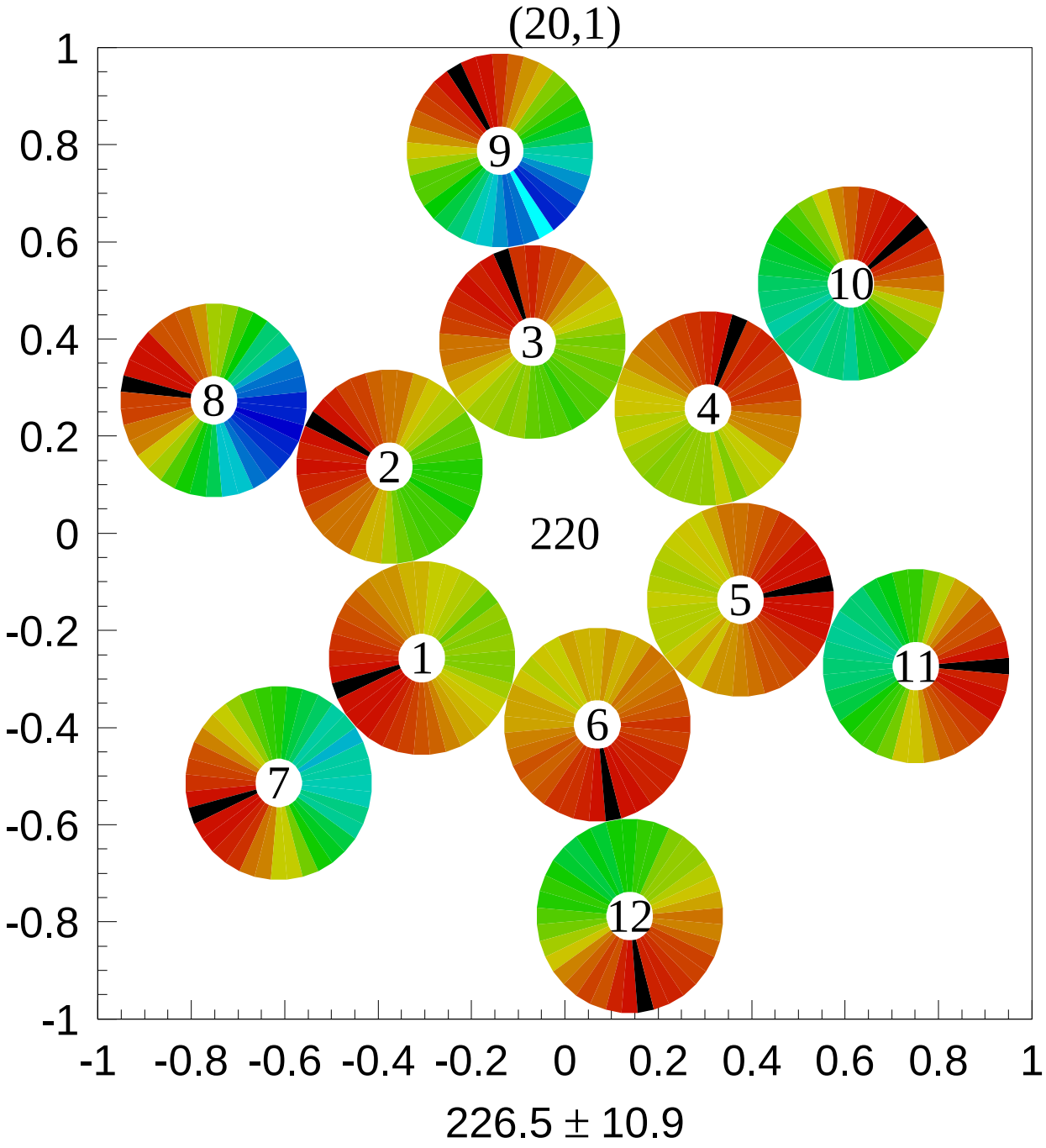

(19,27)
tilted LEDs
120 1 124 121 123 120
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 127 123 122 121 118
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

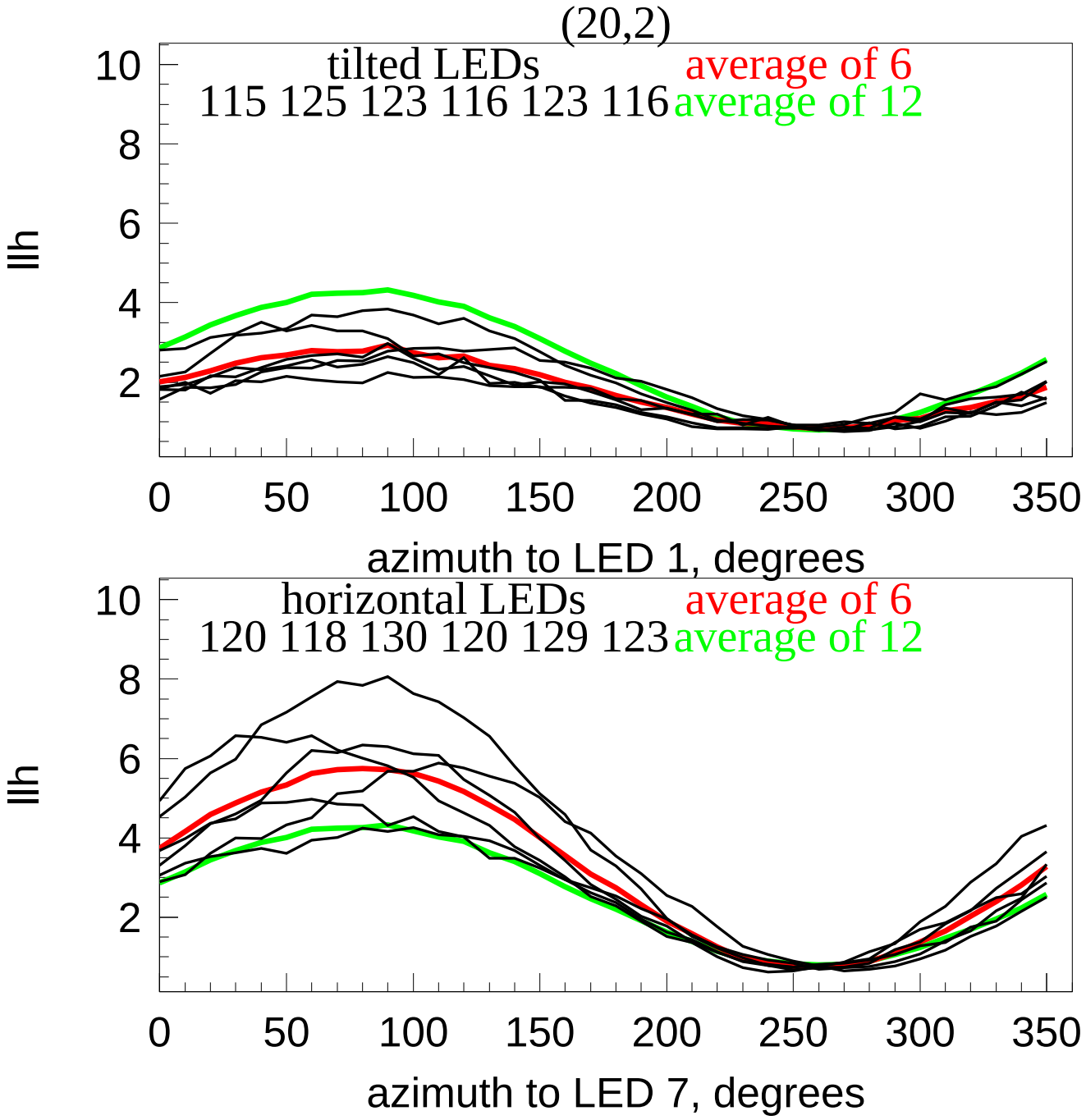

(19,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
245.2 ± 5.8

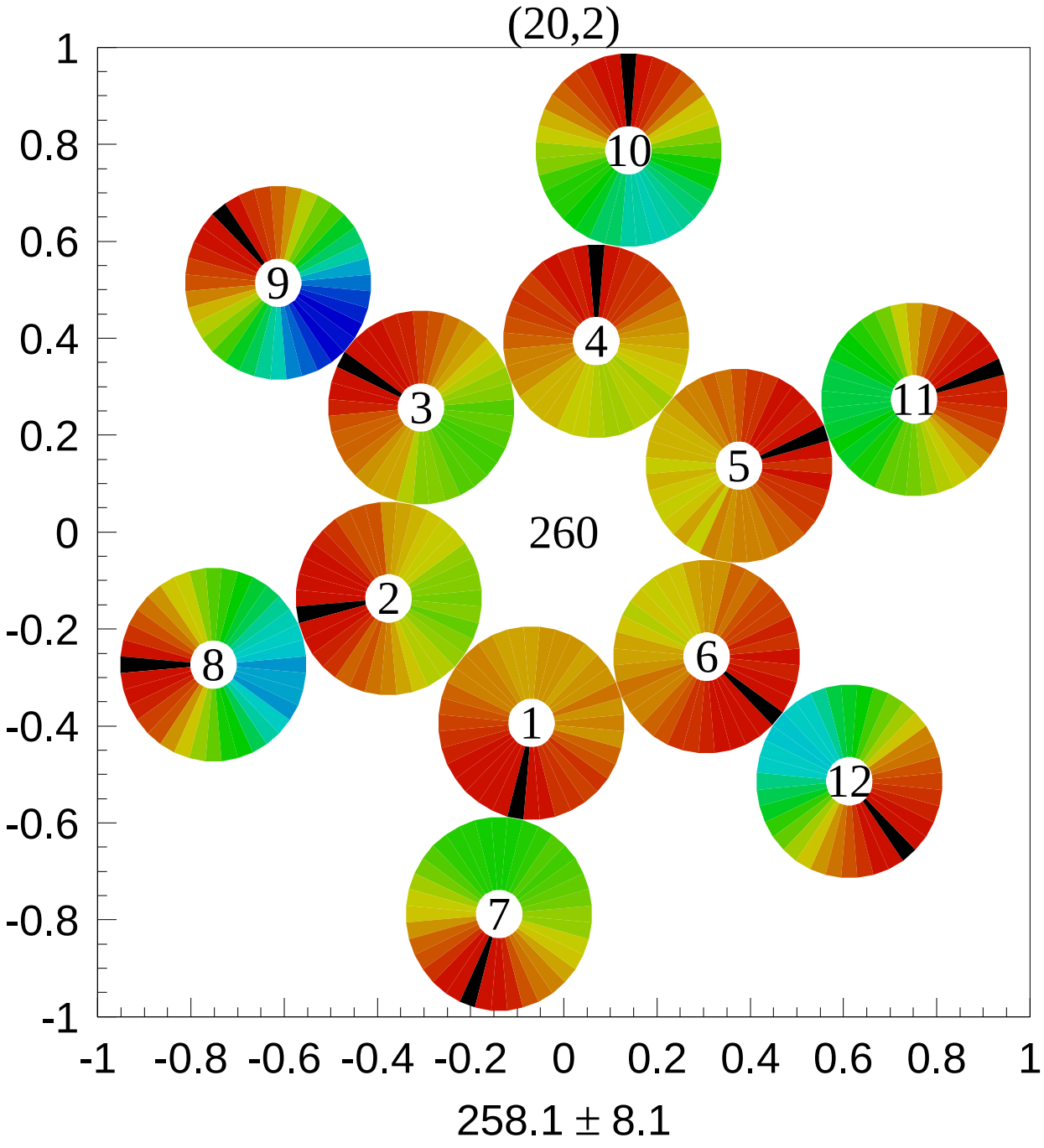

(19,28)
tilted LEDs
119 115 116 121 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 126 109 122 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

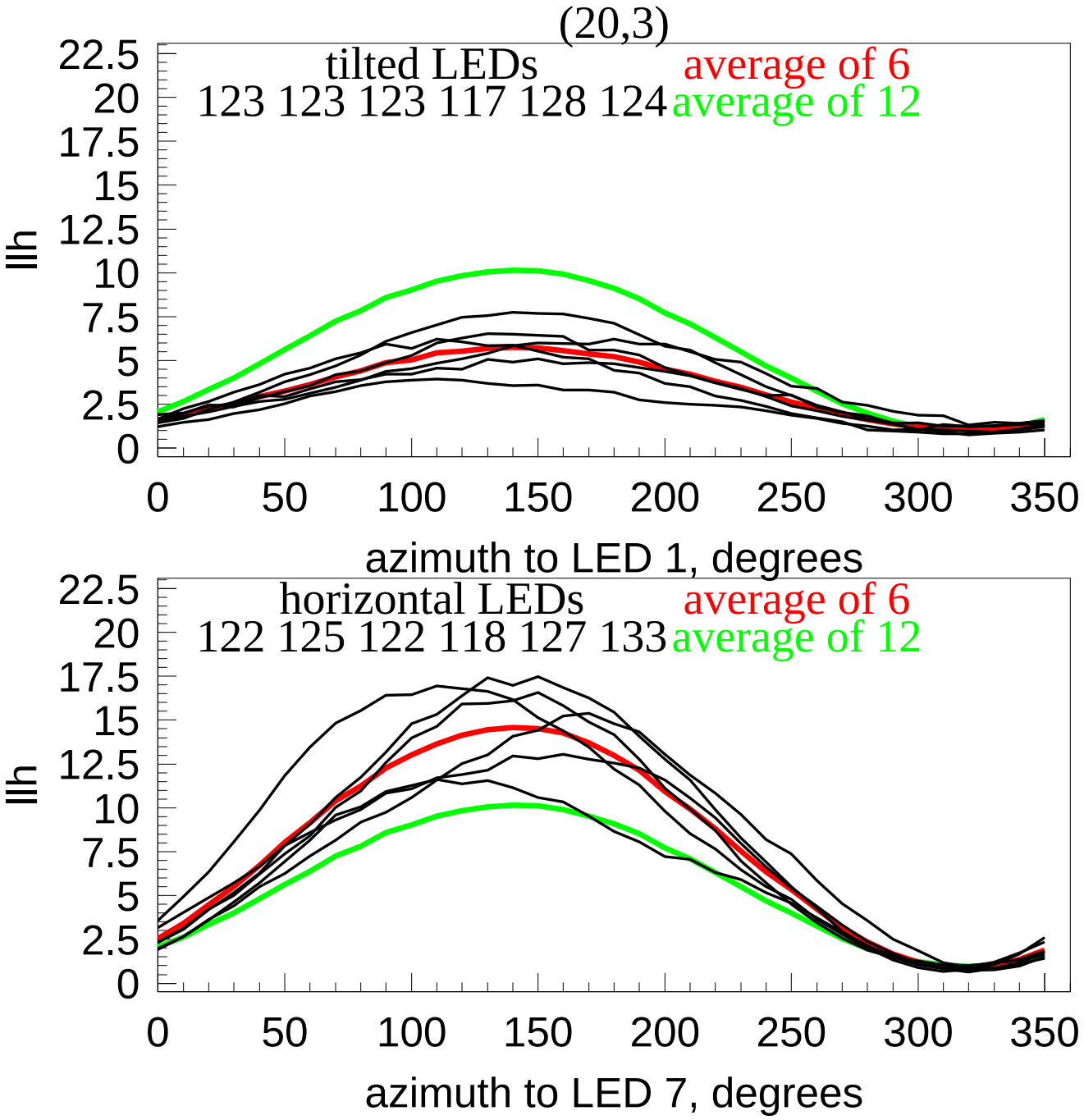

(19,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
195.5 ± 6.1

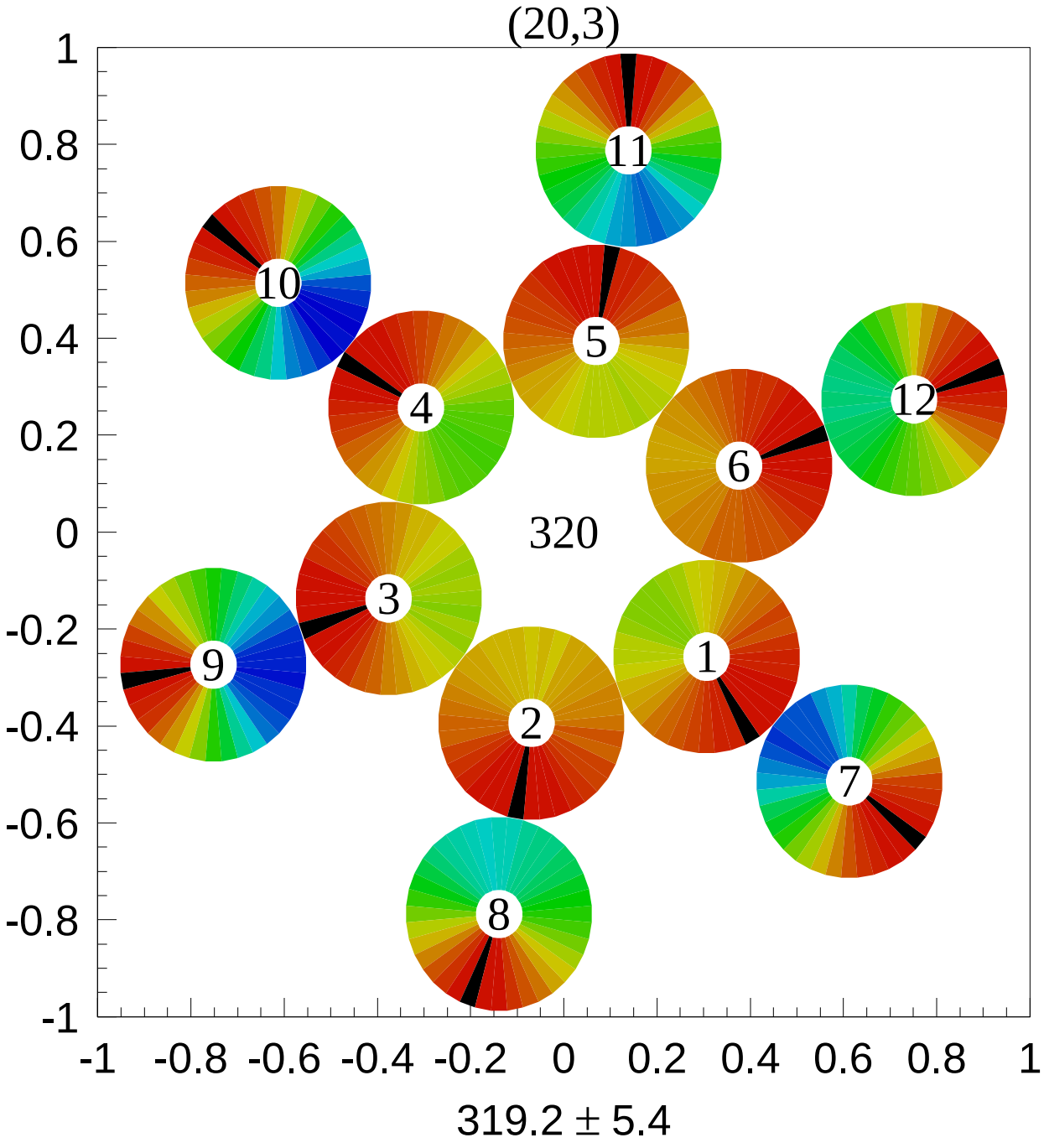

(20,1)
tilted LEDs
131 120 128 123 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 120 123 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

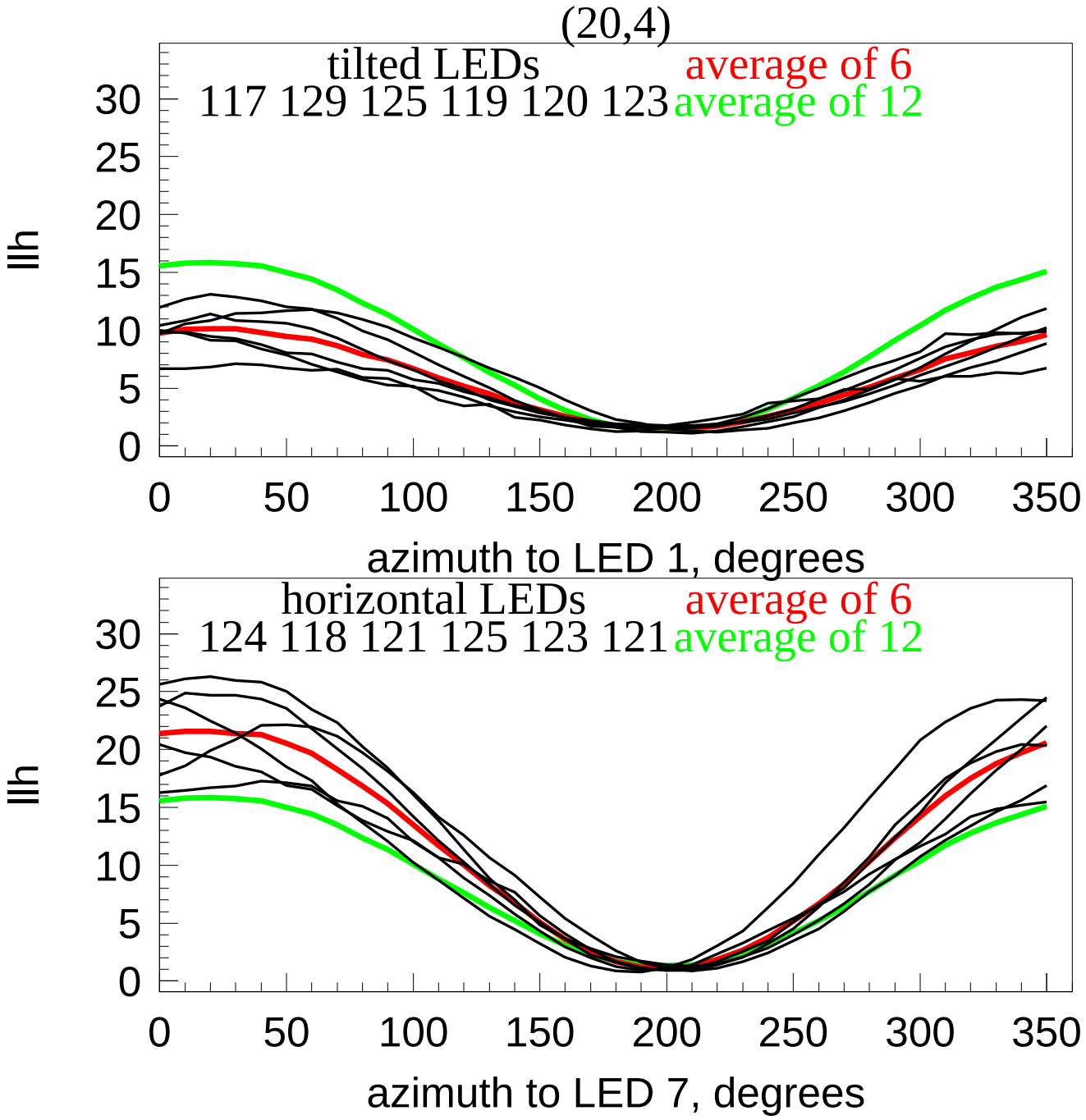

(20,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
226.5 ± 10.9

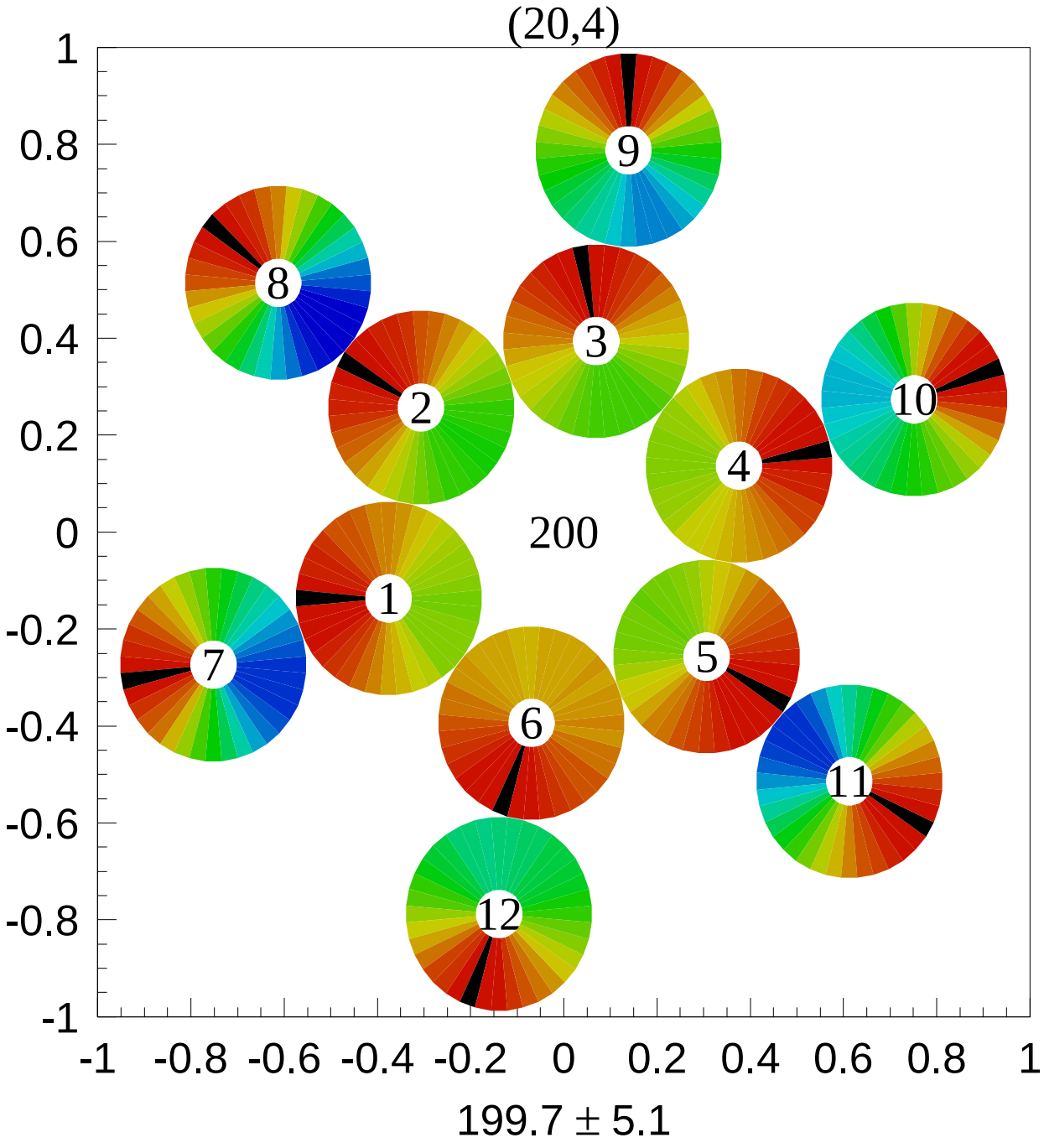

(20,2)
tilted LEDs
115 125 123 116 123 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 118 130 120 129 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

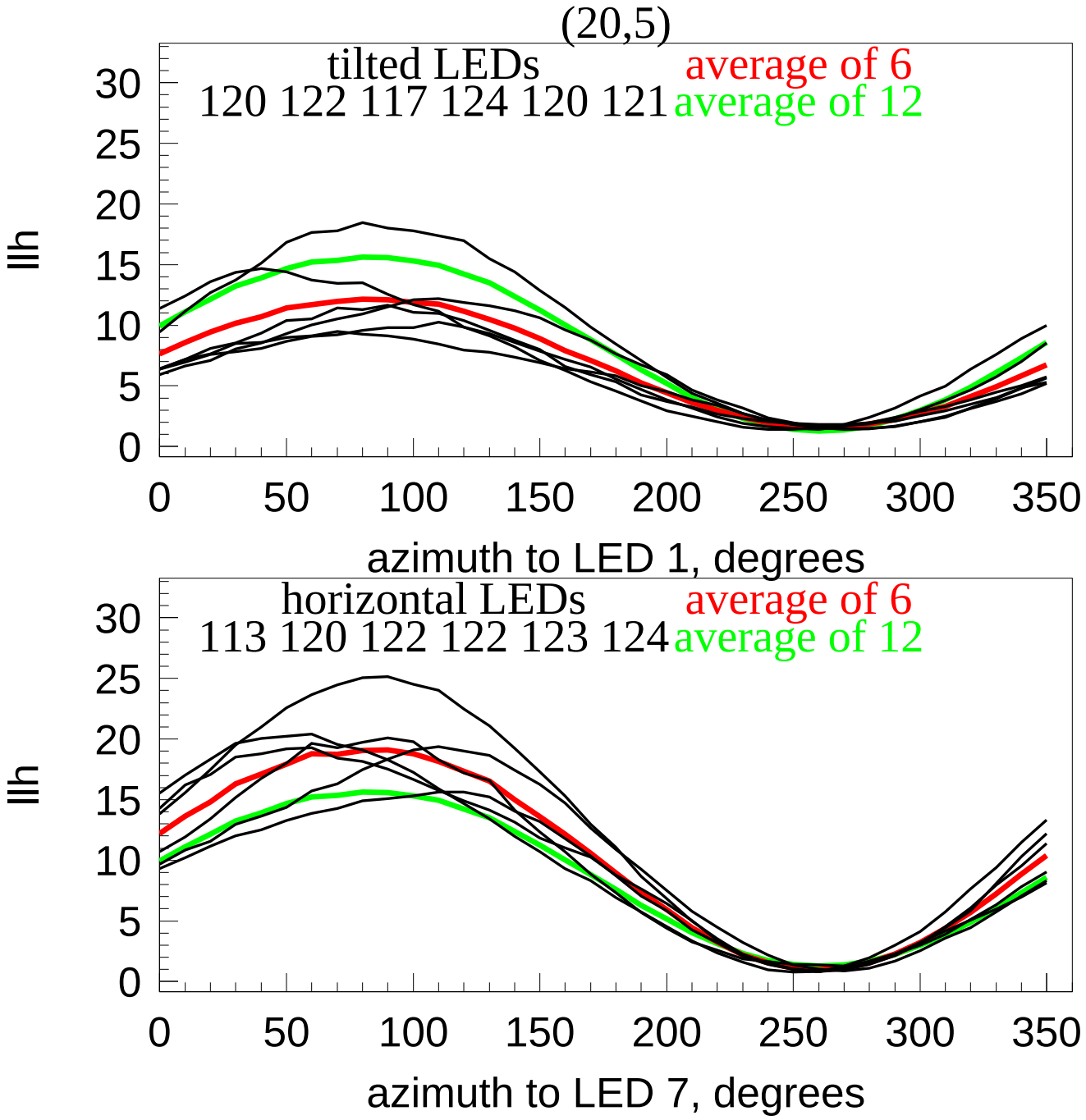

(20,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
258.1 ± 8.1

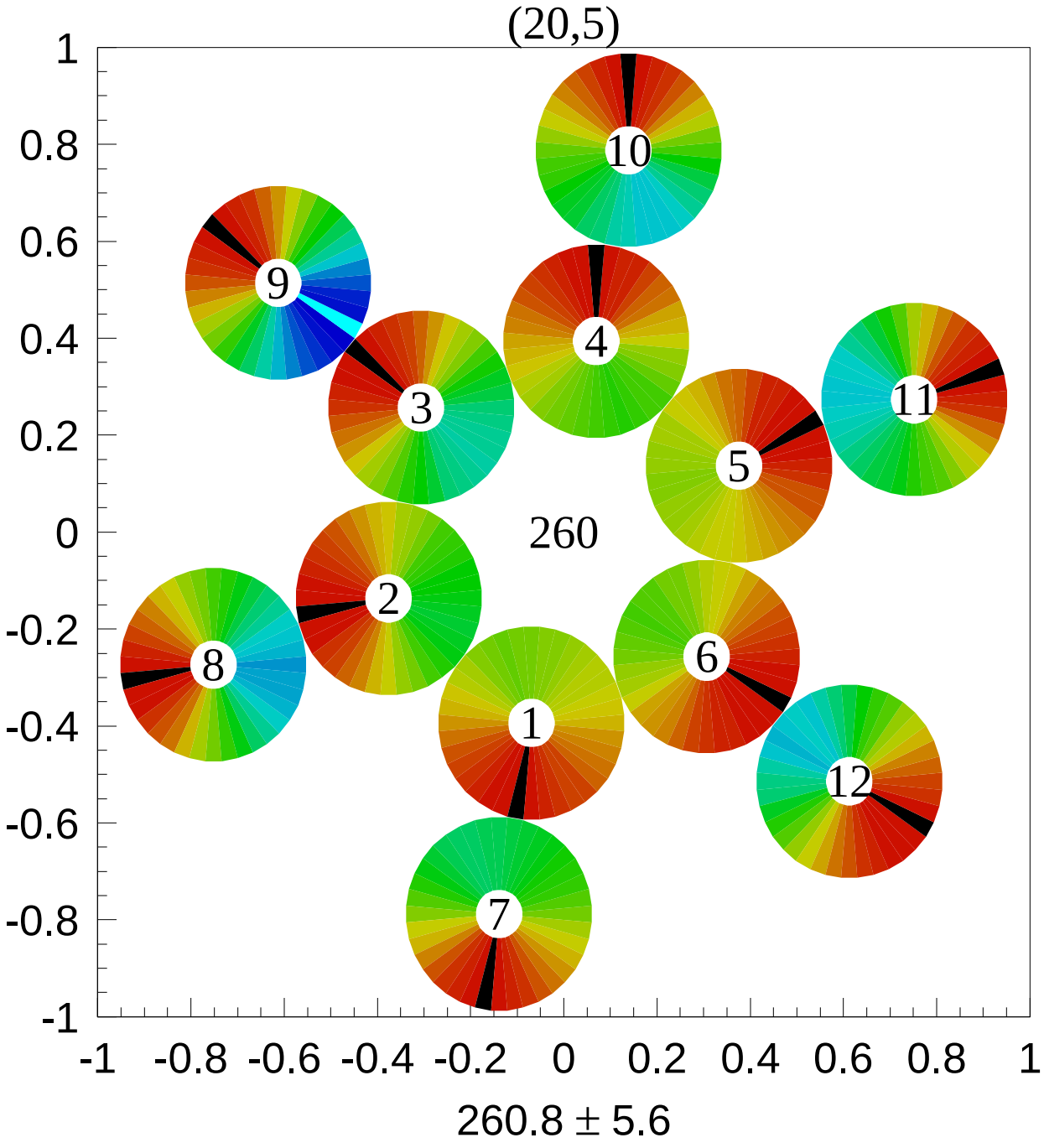

(20,3)
tilted LEDs
123 123 123 117 128 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 122 118 127 133
average of 6
average of 12
llh
azimuth to LED 7, degrees

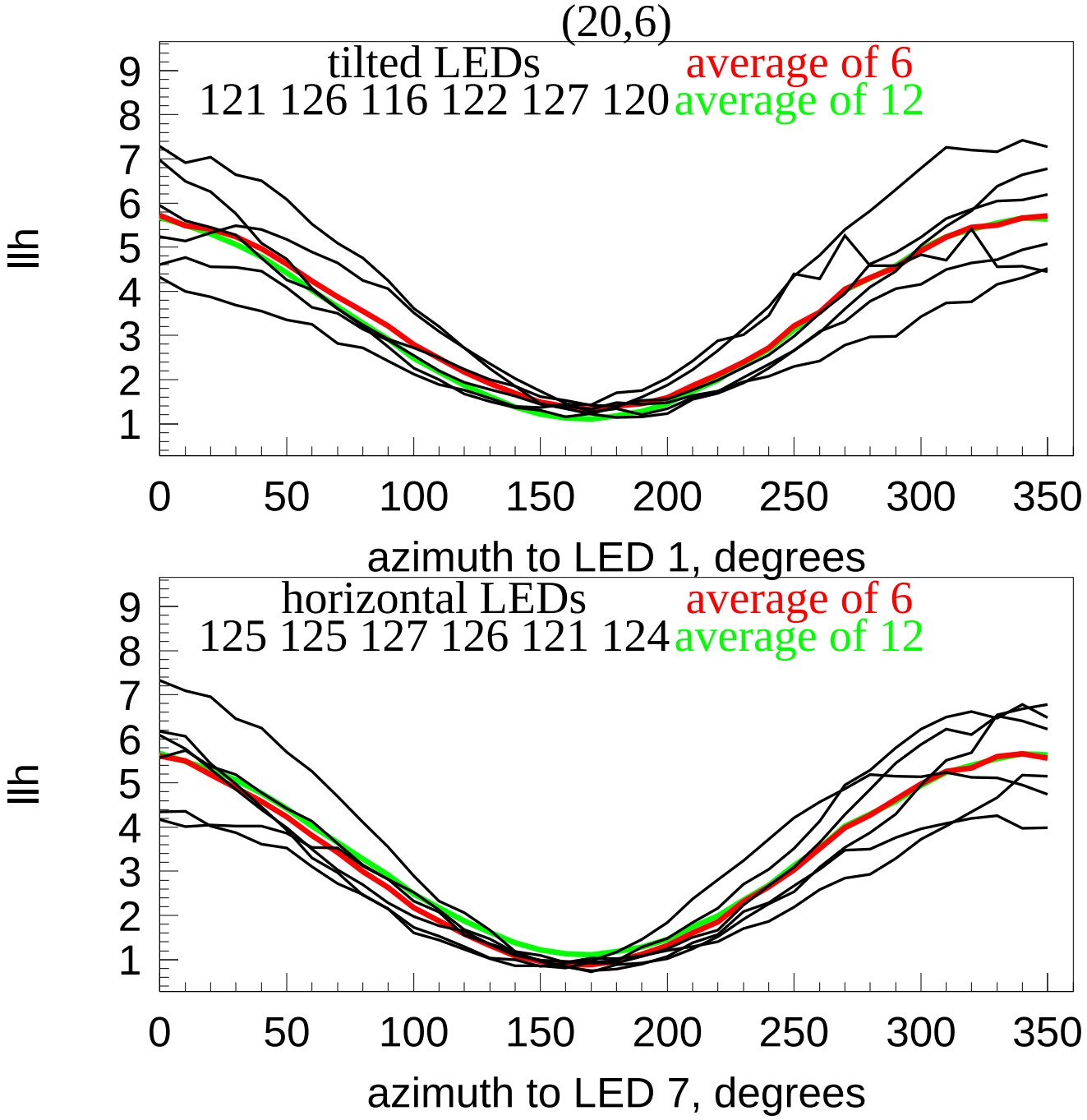

(20,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
319.2 ± 5.4

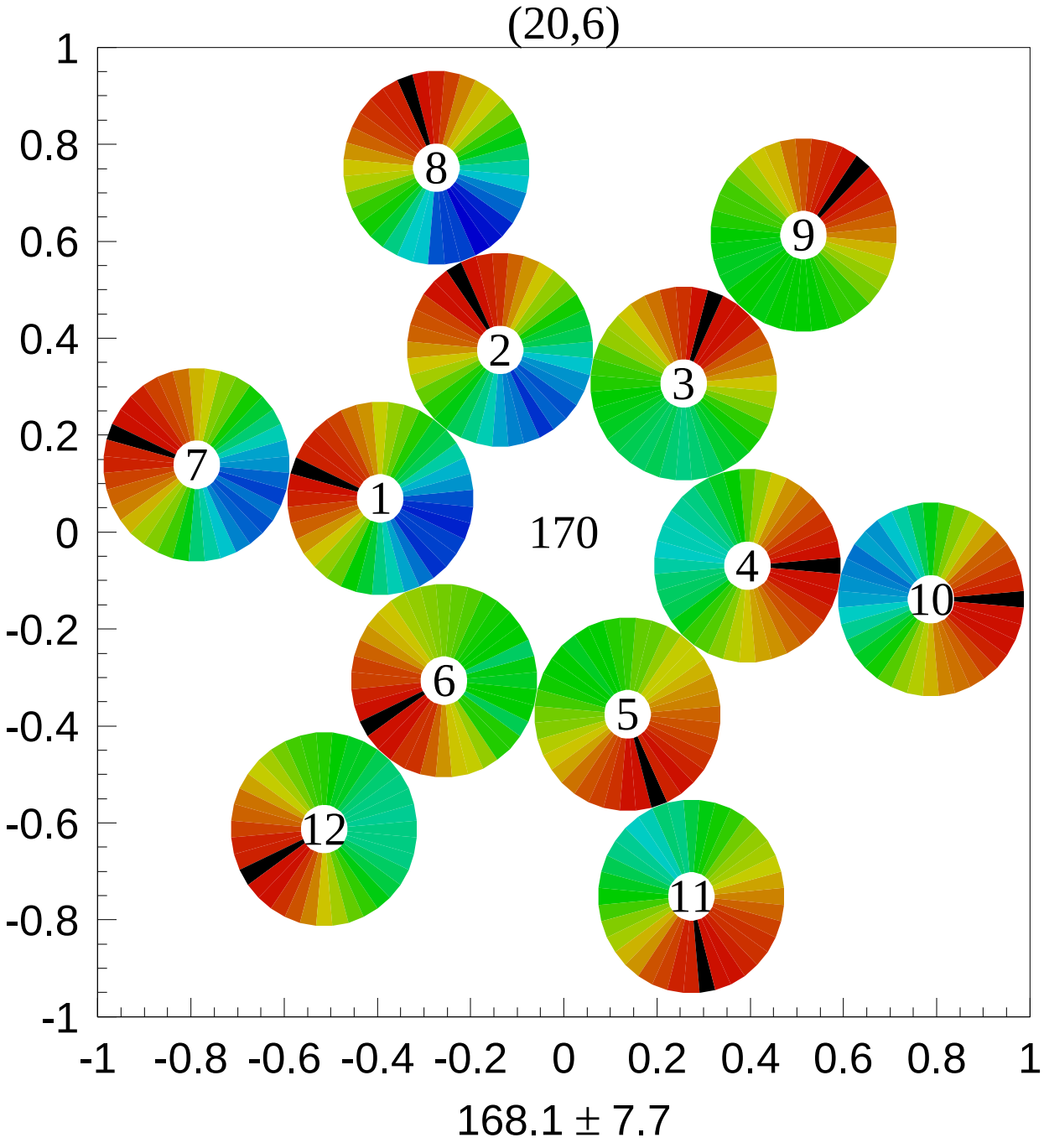

(20,4)
tilted LEDs
117 129 125 119 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 118 121 125 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

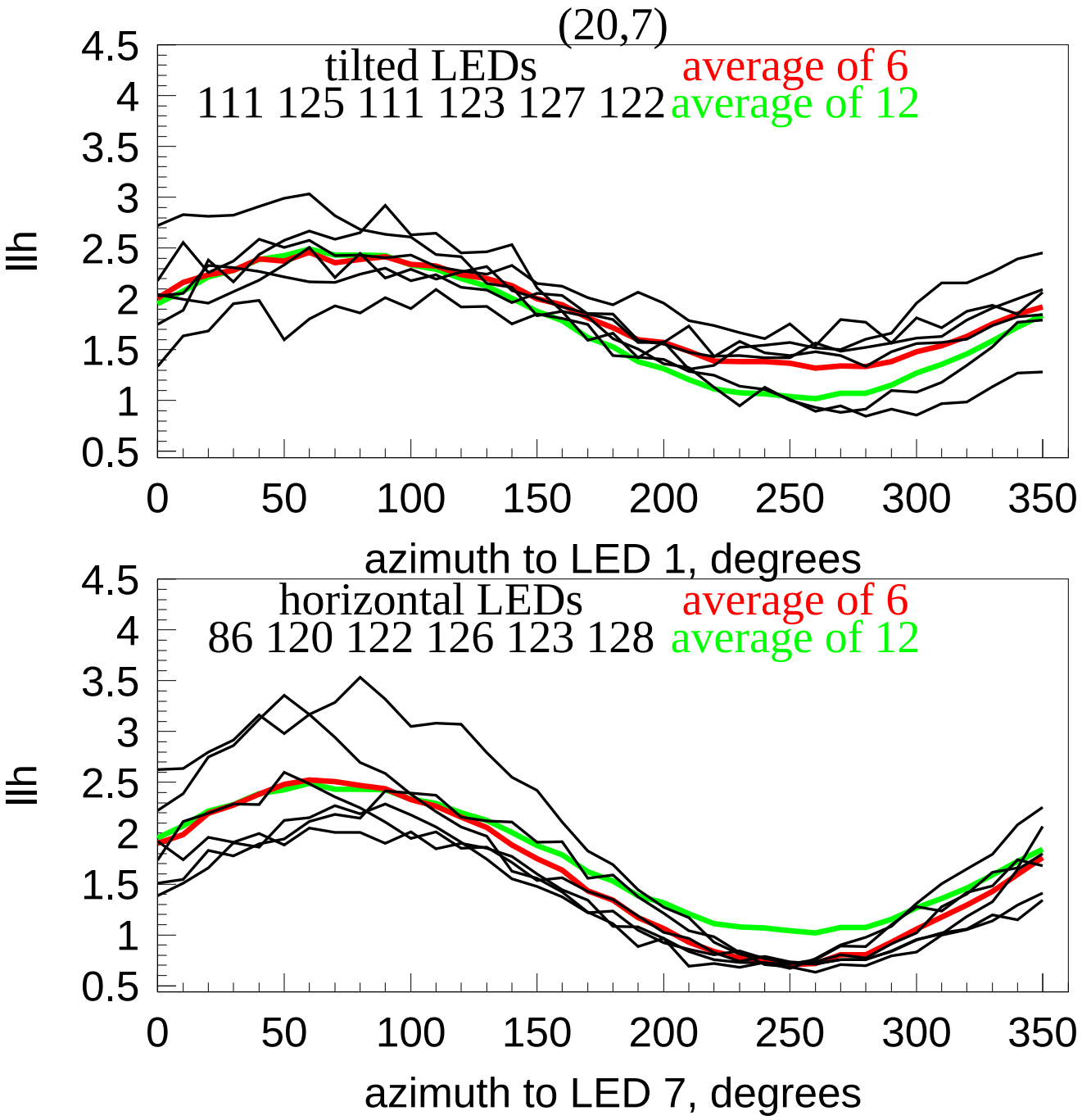

(20,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
200
1
2
3
4
5
6
7
8
9
10
11
12
199.7 ± 5.1

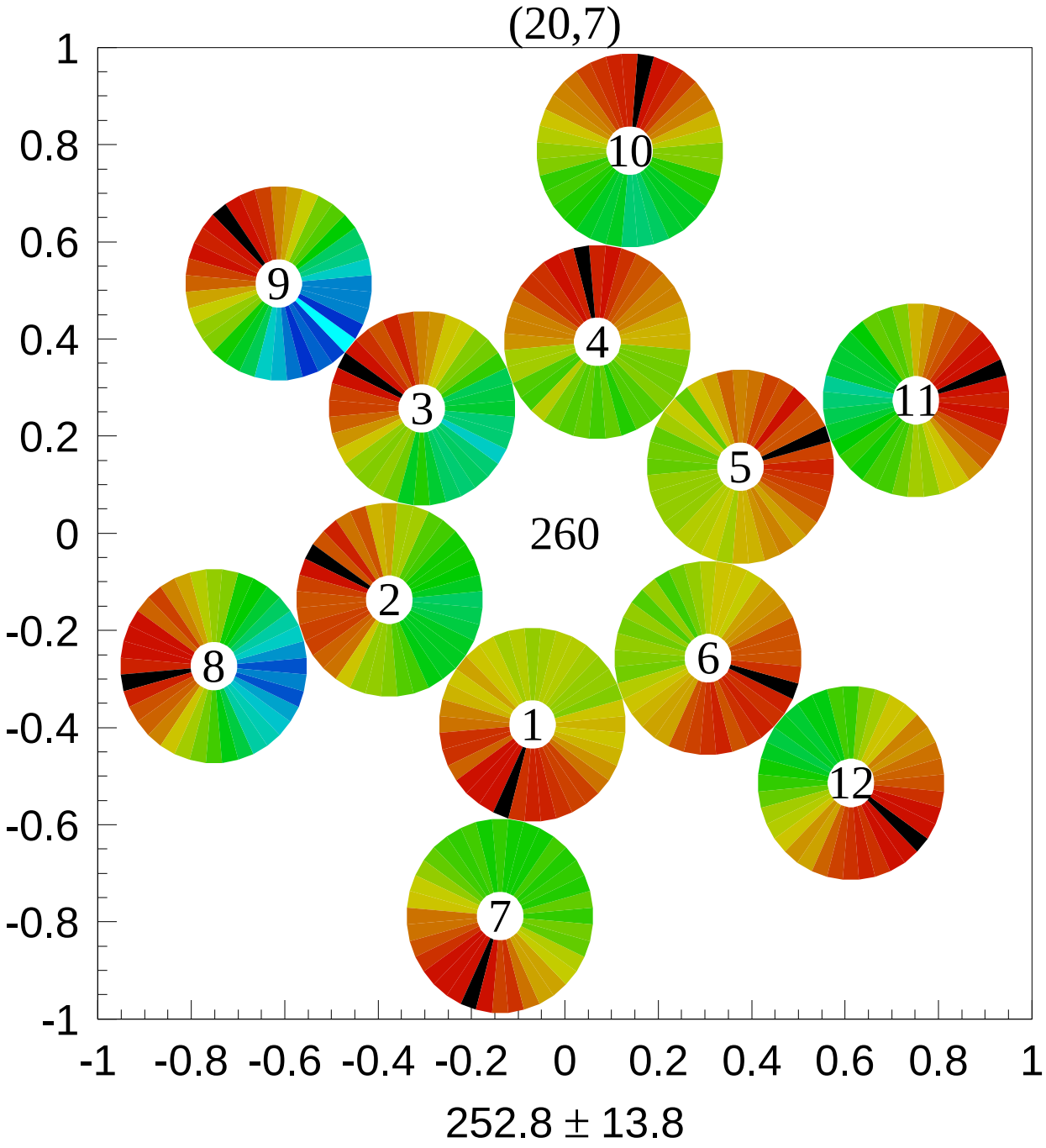

(20,5)
tilted LEDs
120 122 117 124 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 120 122 122 123 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

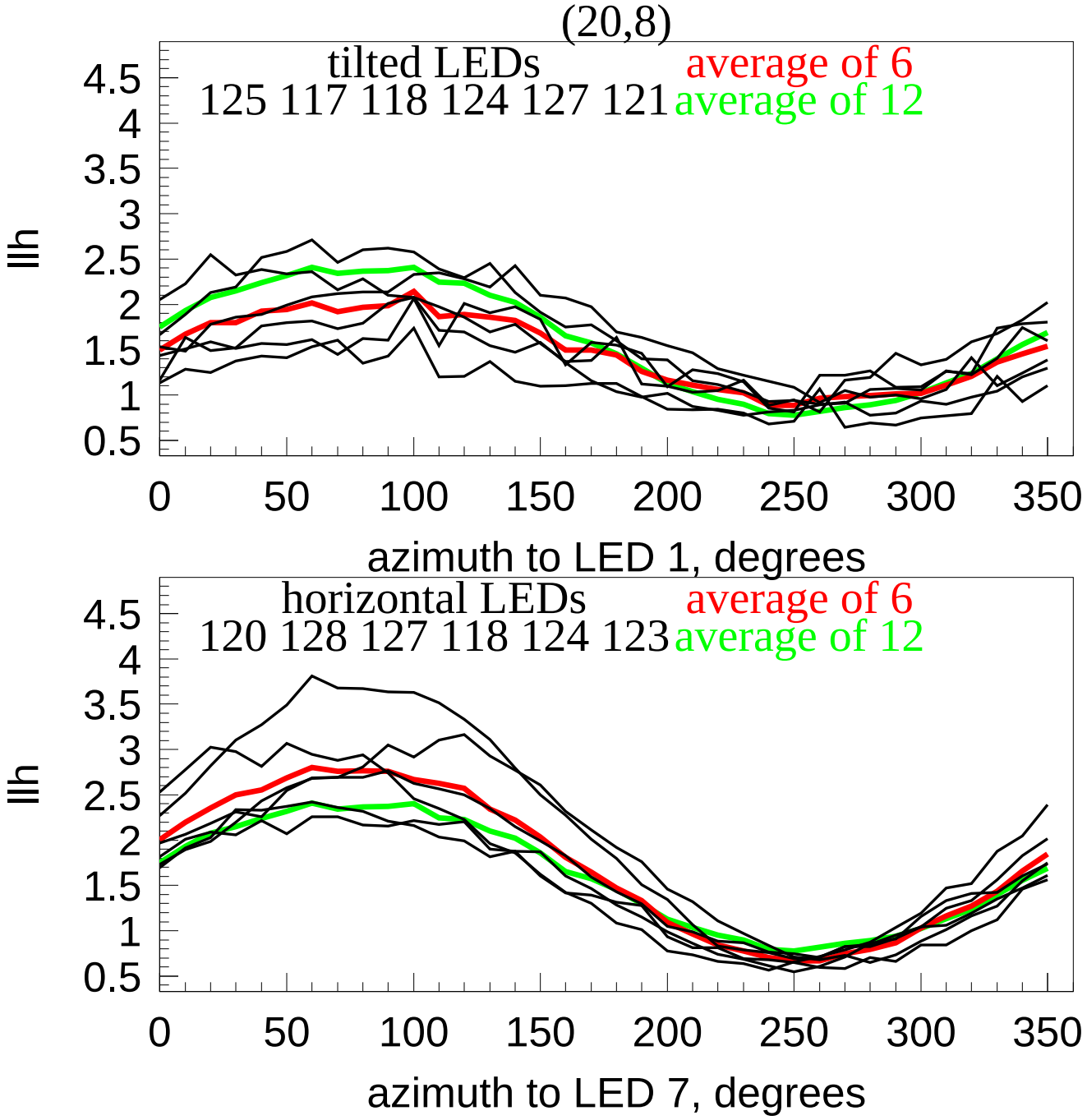

(20,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
260
260.8 ± 5.6
1
2
3
4
5
6
7
8
9
10
11
12

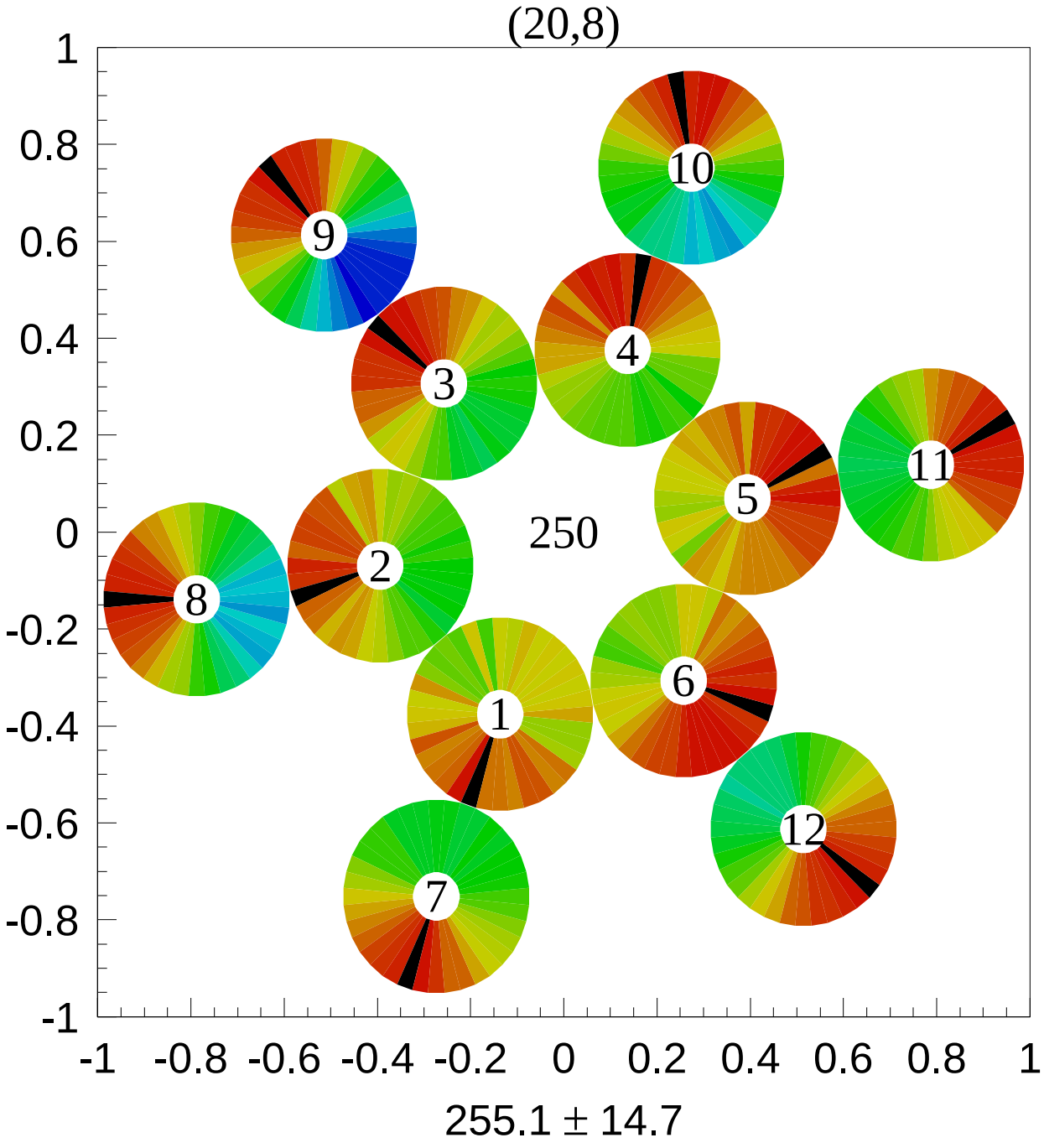

(20,6)
tilted LEDs
121 126 116 122 127 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 127 126 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

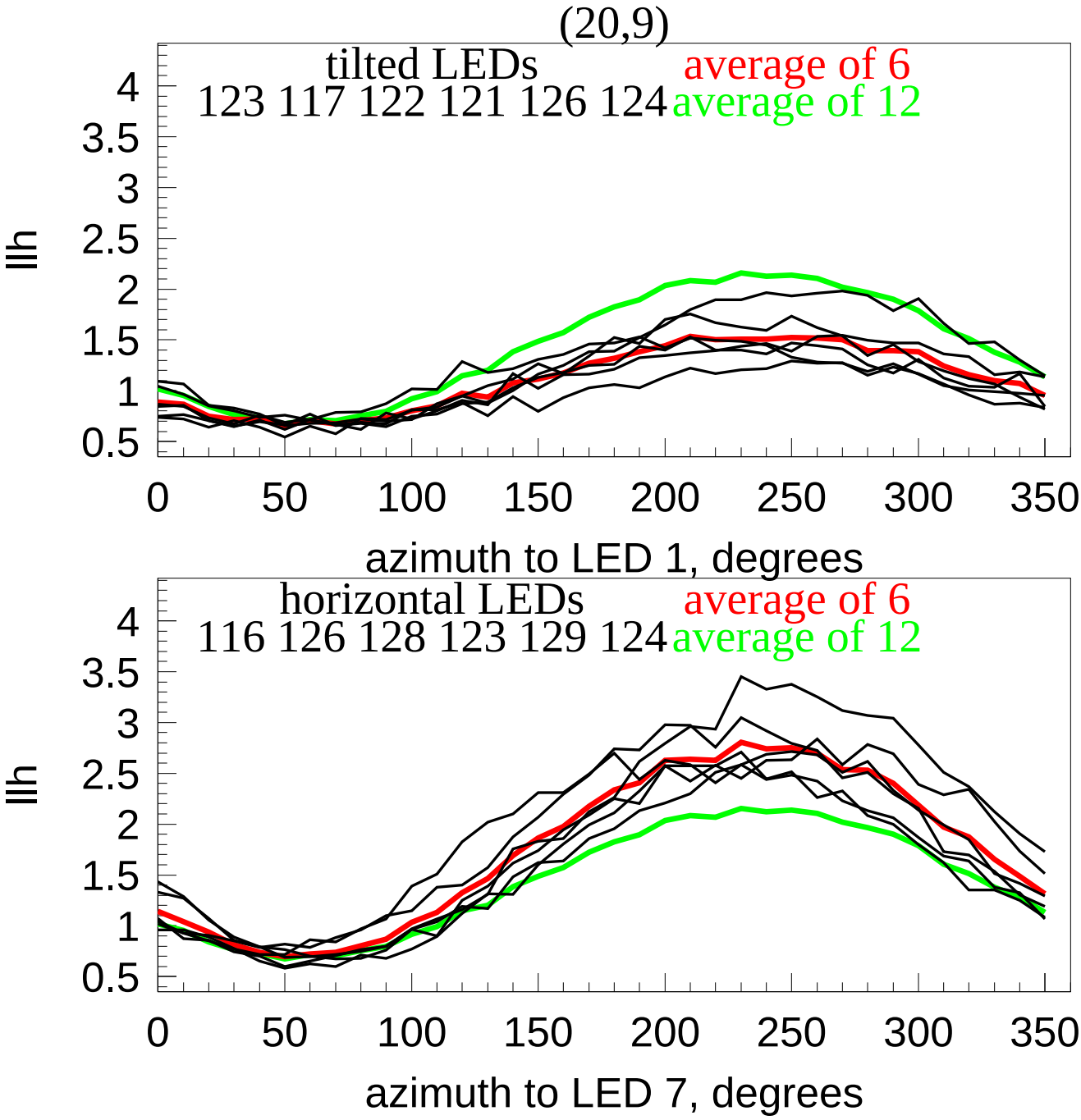

(20,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
168.1 ± 7.7

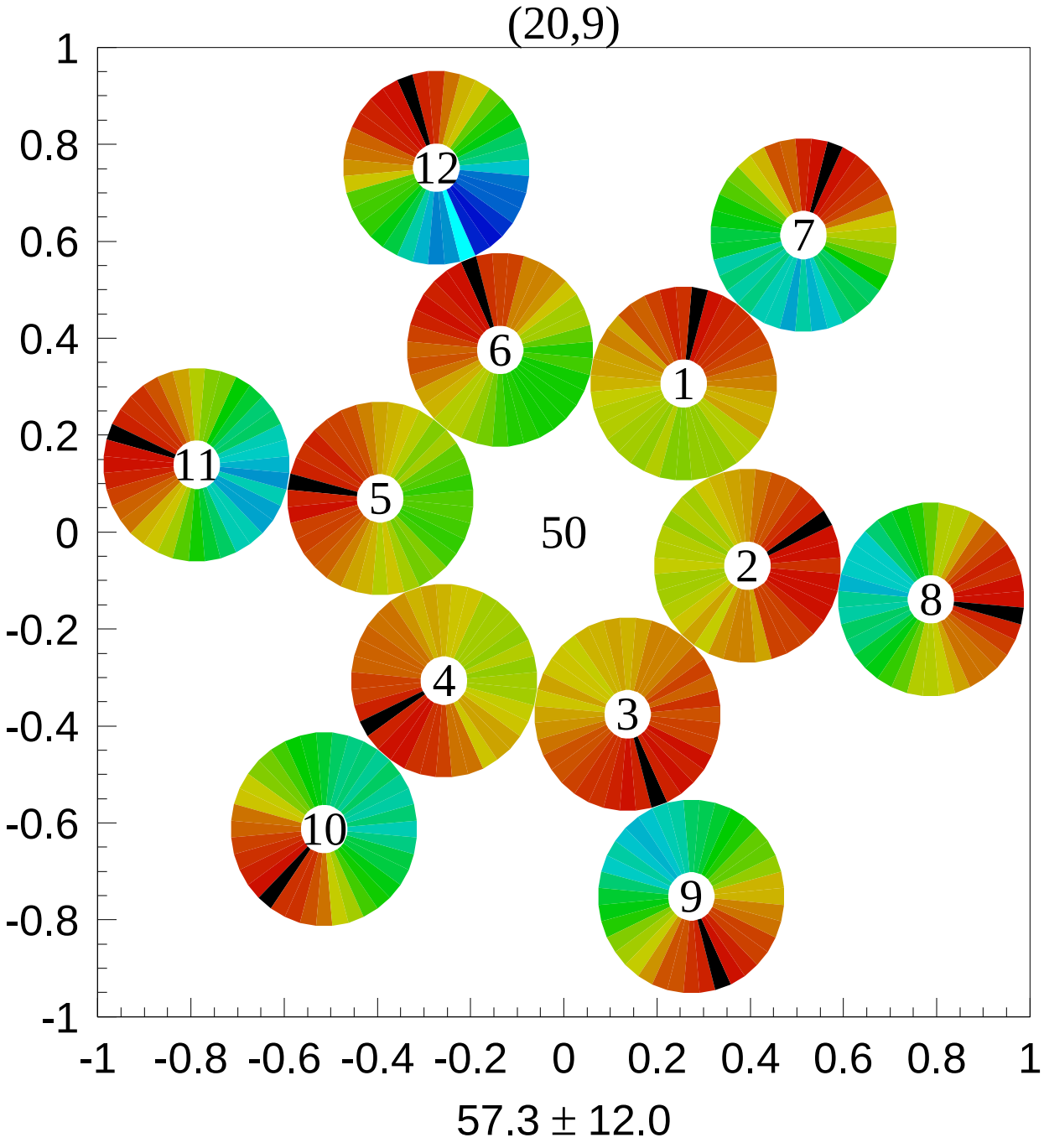

(20,7)
tilted LEDs
111 125 111 123 127 122
average of 6
average of 12
IIh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
86 120 122 126 123 128
average of 6
average of 12
IIh
azimuth to LED 7, degrees

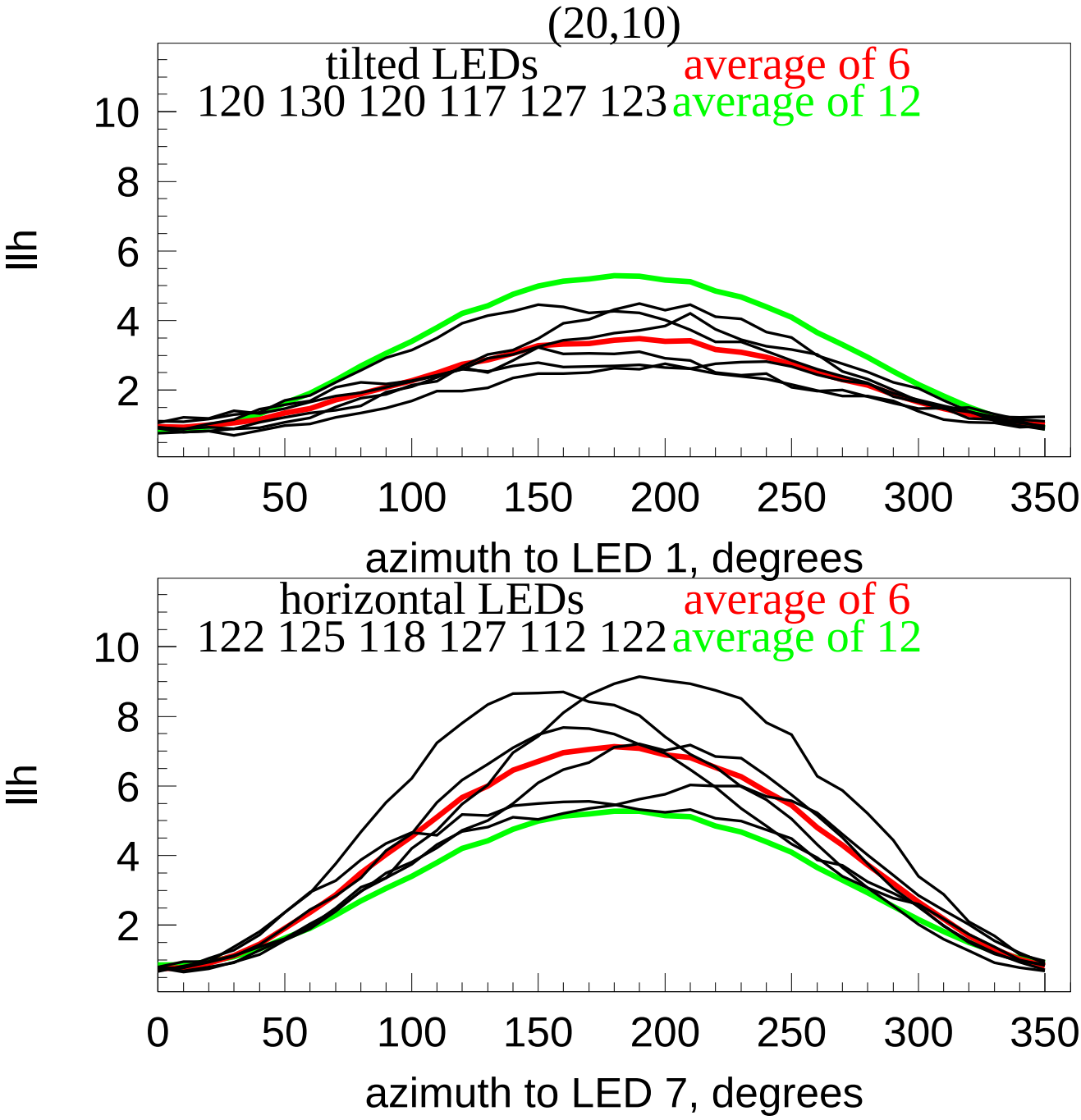

(20,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
252.8 ± 13.8

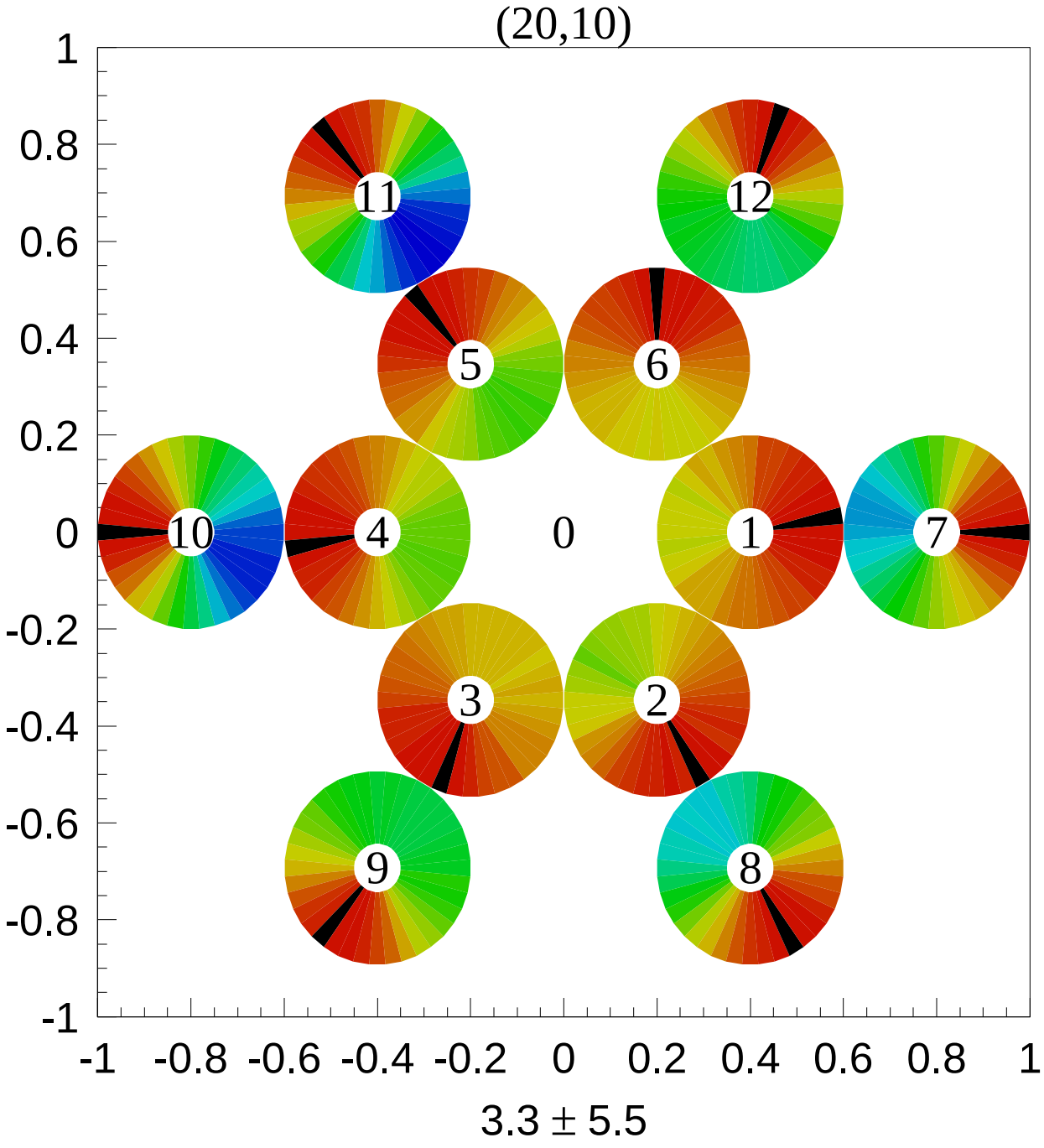

(20,8)
tilted LEDs
125 117 118 124 127 121
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 128 127 118 124 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

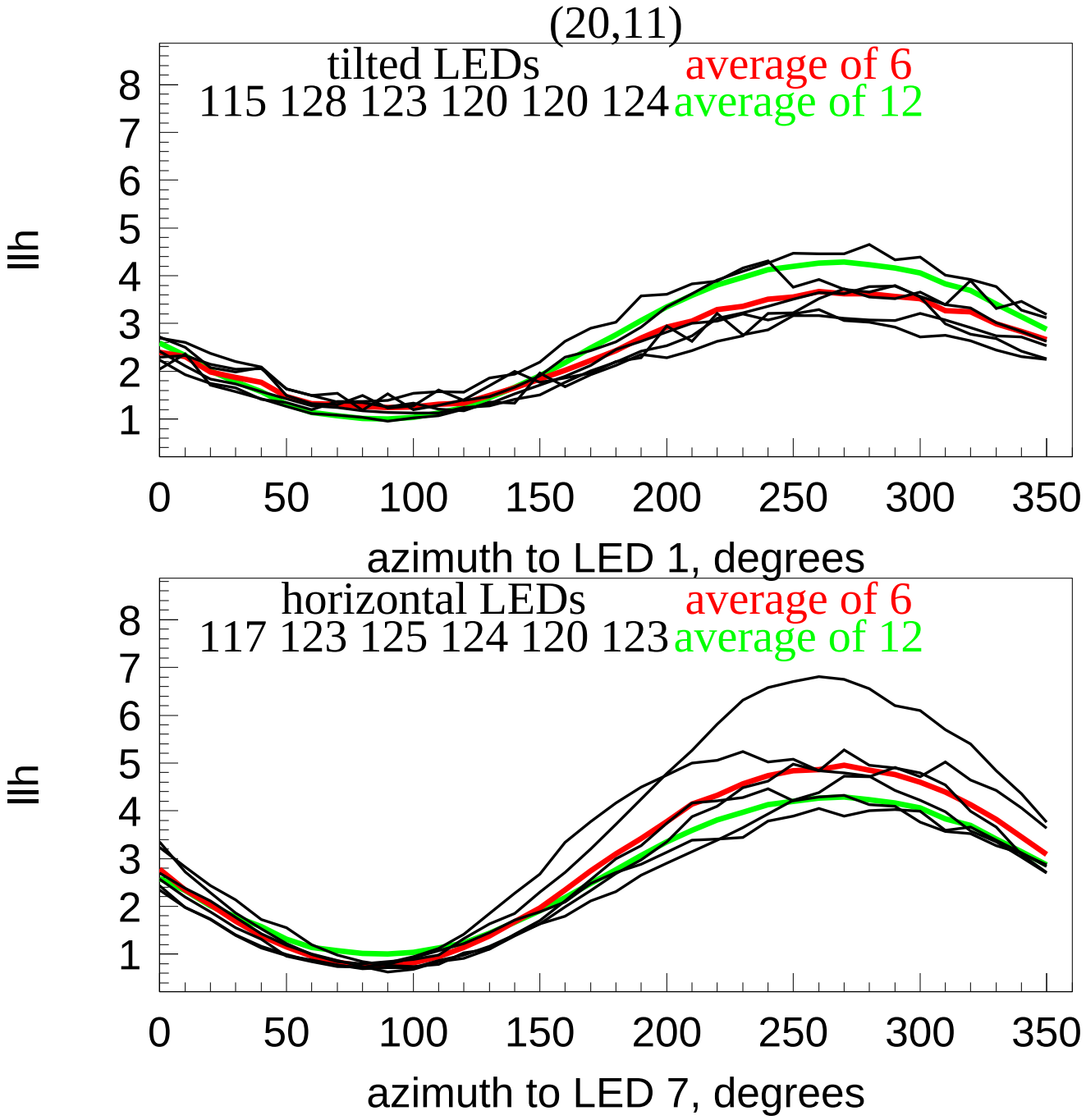

(20,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
255.1 ± 14.7

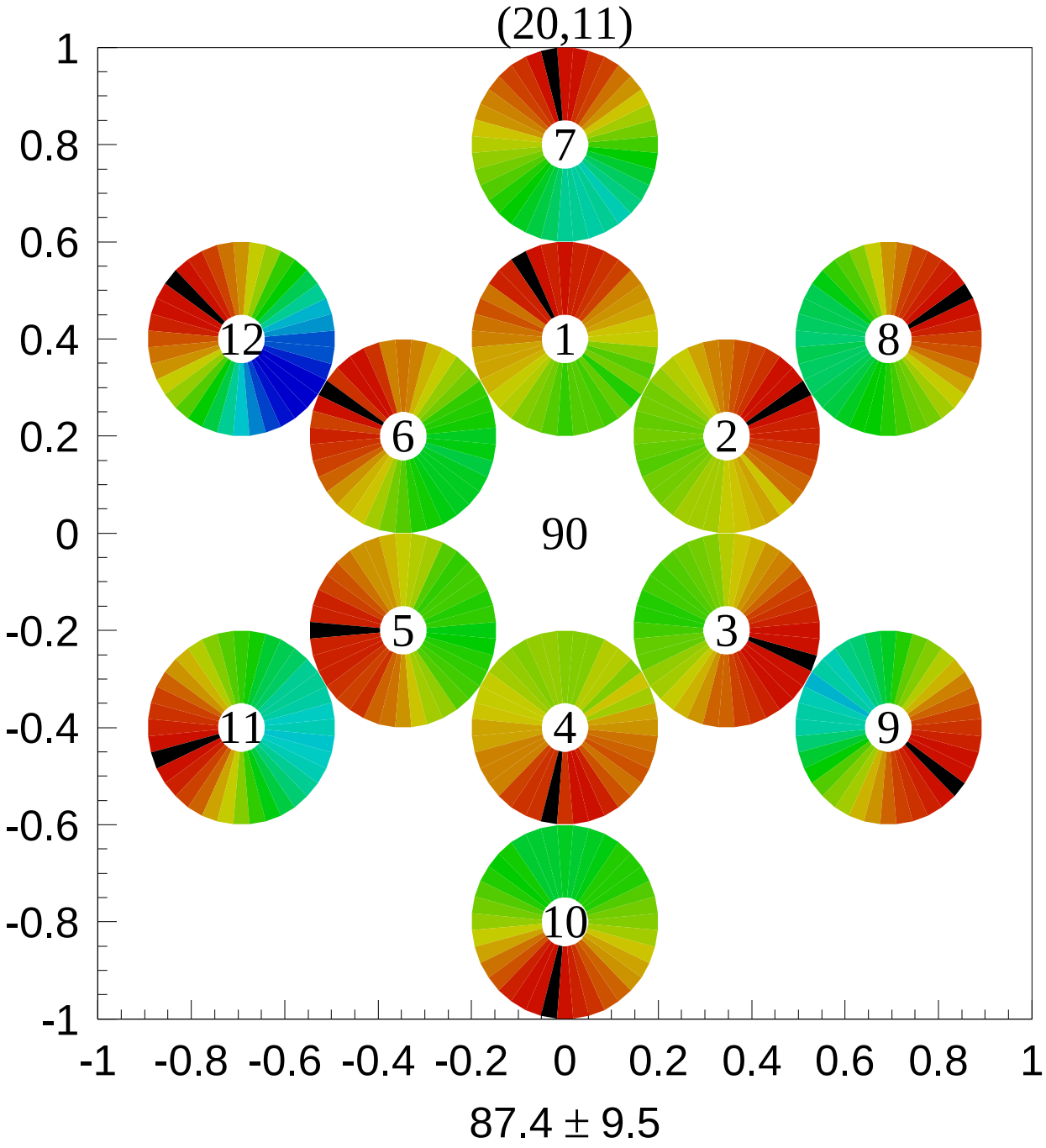

(20,9)
tilted LEDs
123 117 122 121 126 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 126 128 123 129 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

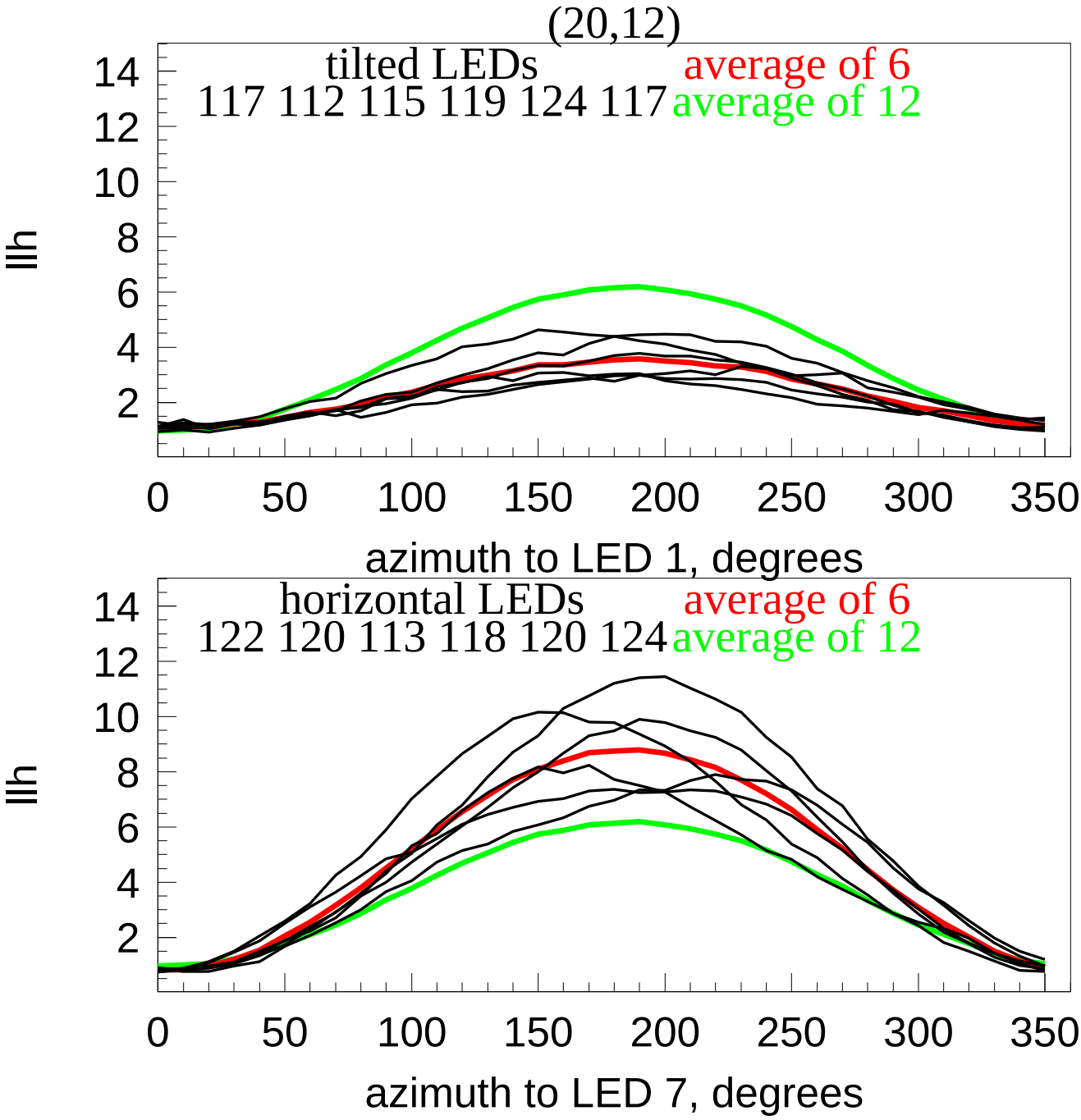

(20,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
57.3 ± 12.0

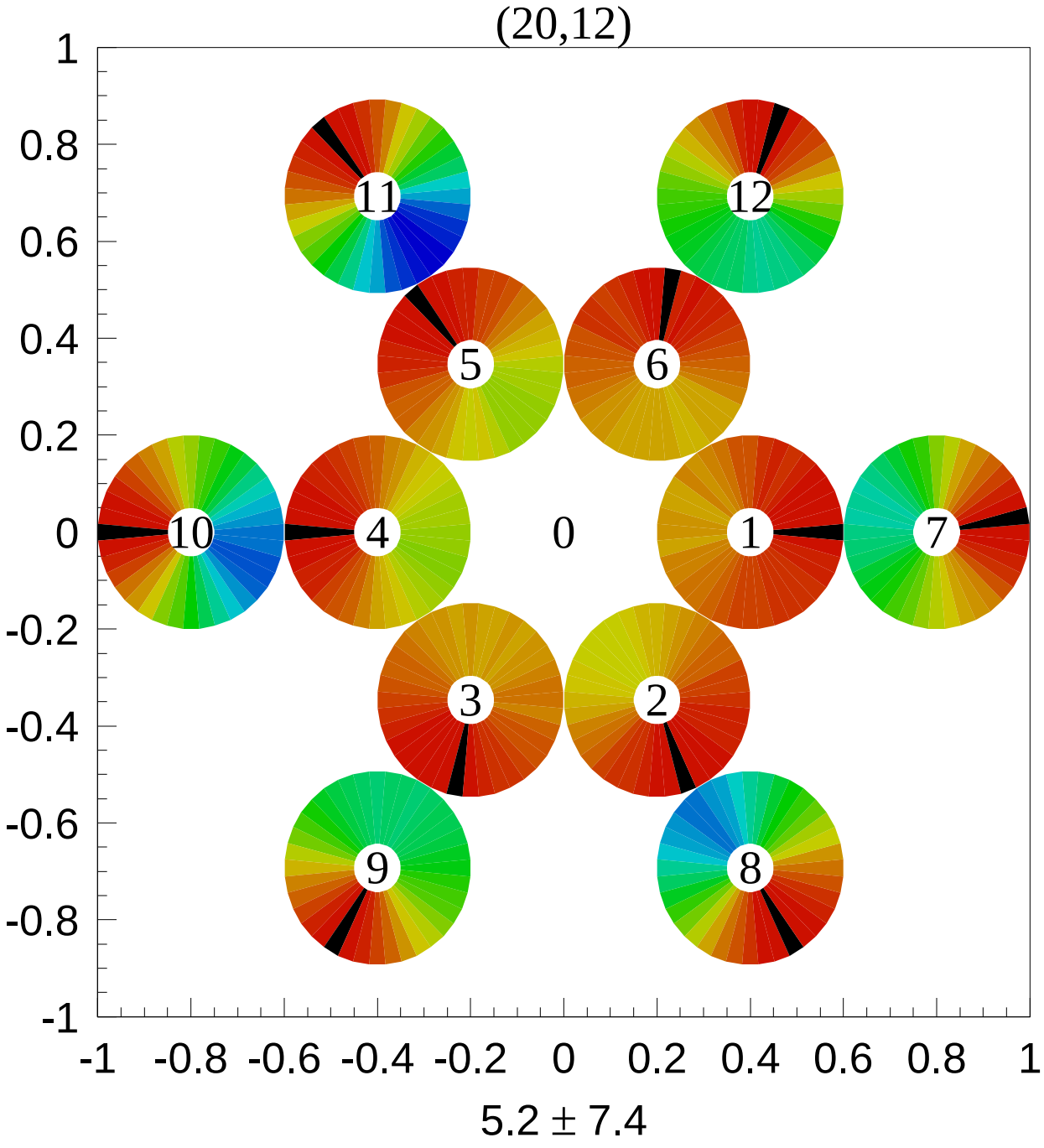

(20,10)
tilted LEDs
120 130 120 117 127 123
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 125 118 127 112 122
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

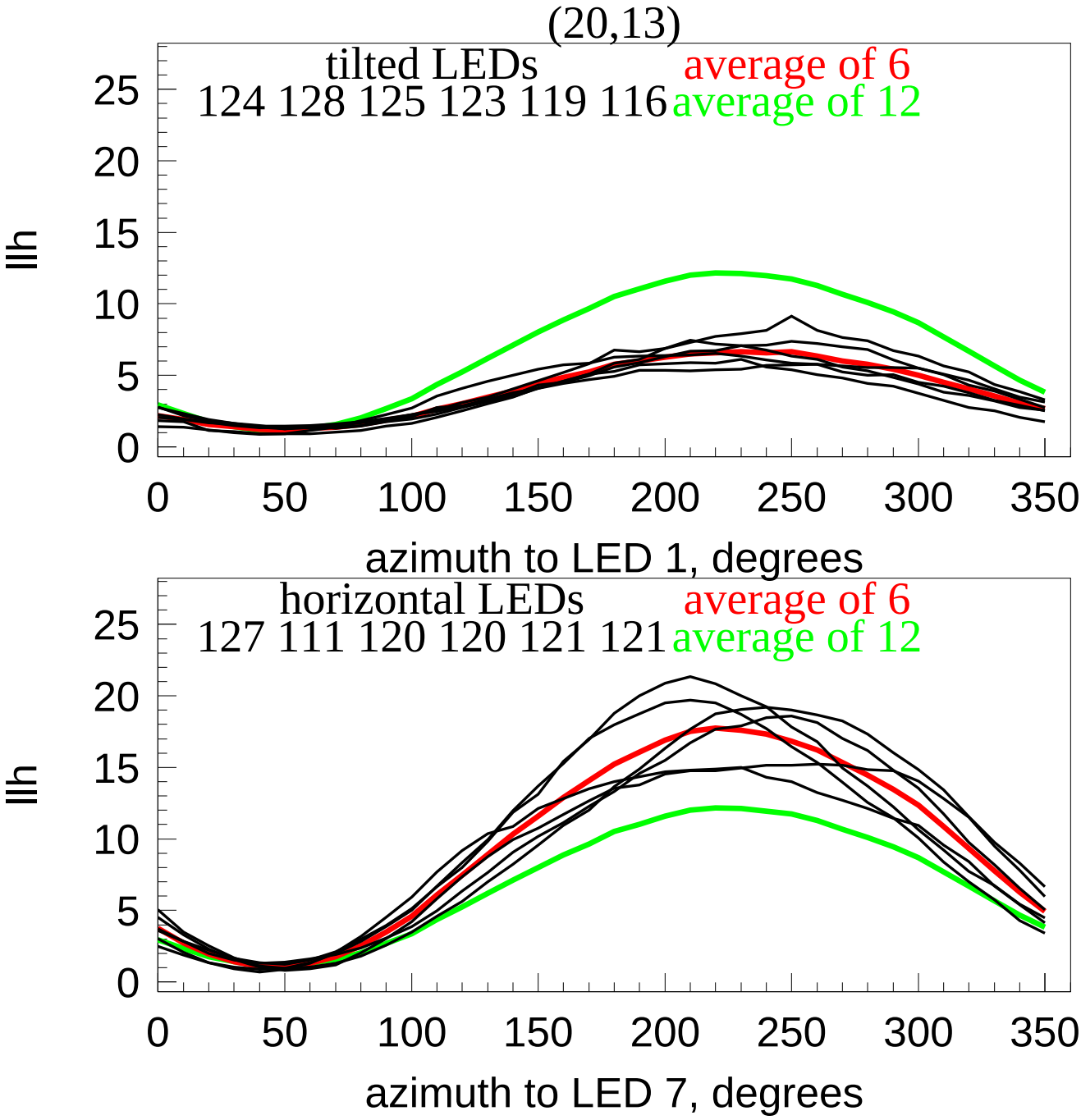

(20,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
3.3 ± 5.5

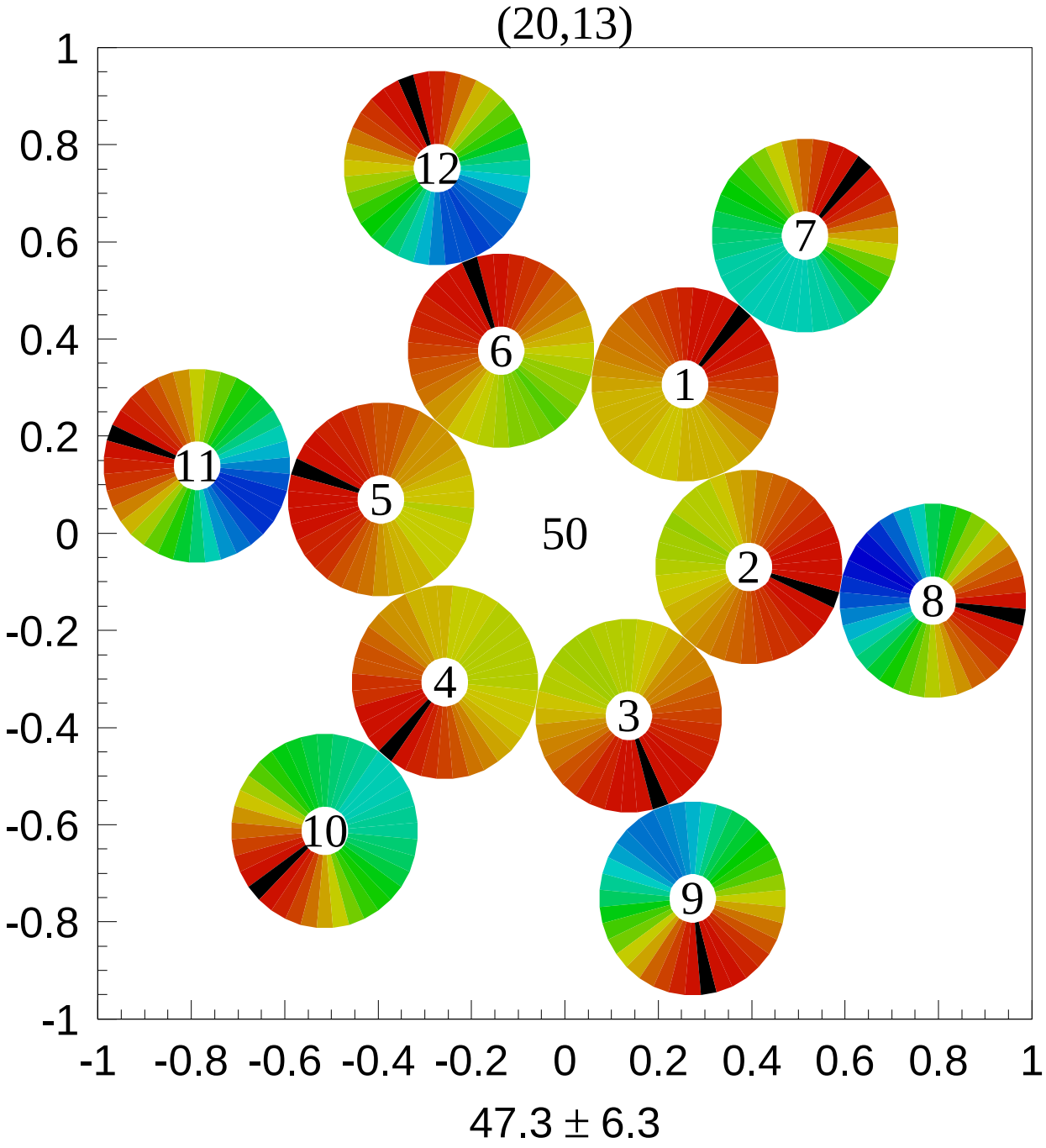

(20,11)
tilted LEDs
115 128 123 120 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 123 125 124 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

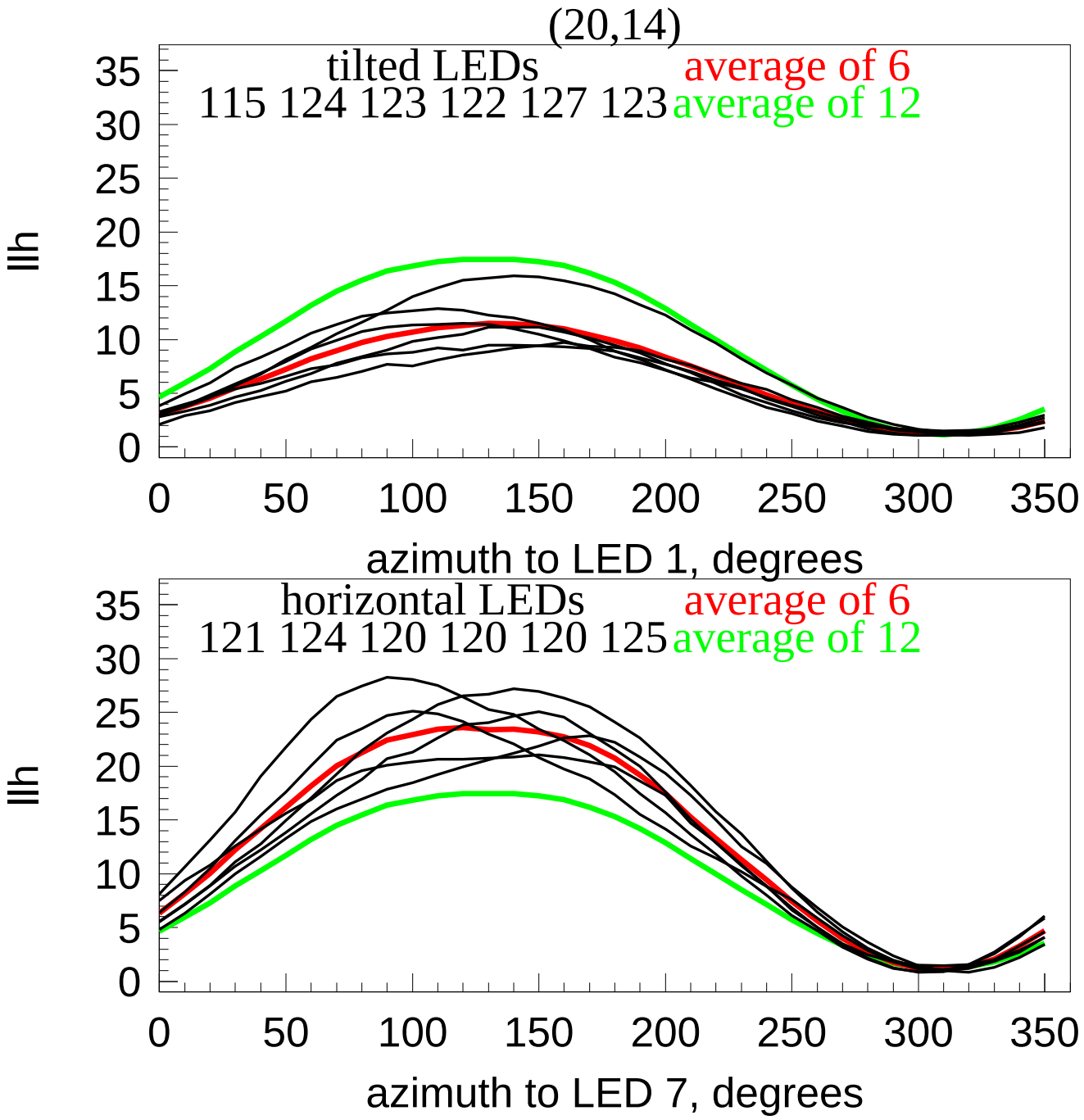

(20,11)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
87.4 ± 9.5

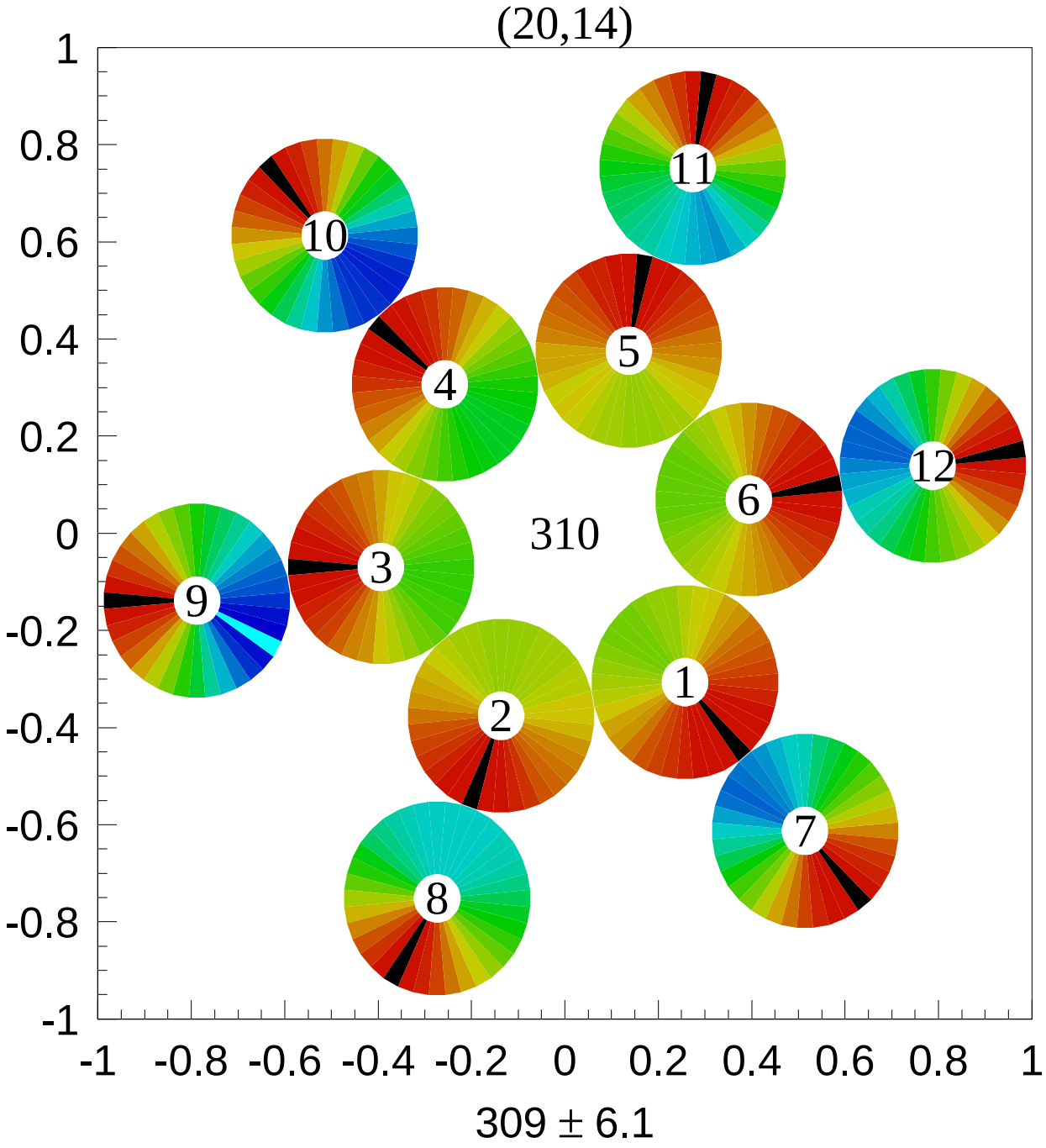

(20,12)
tilted LEDs
117 112 115 119 124 117
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 120 113 118 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

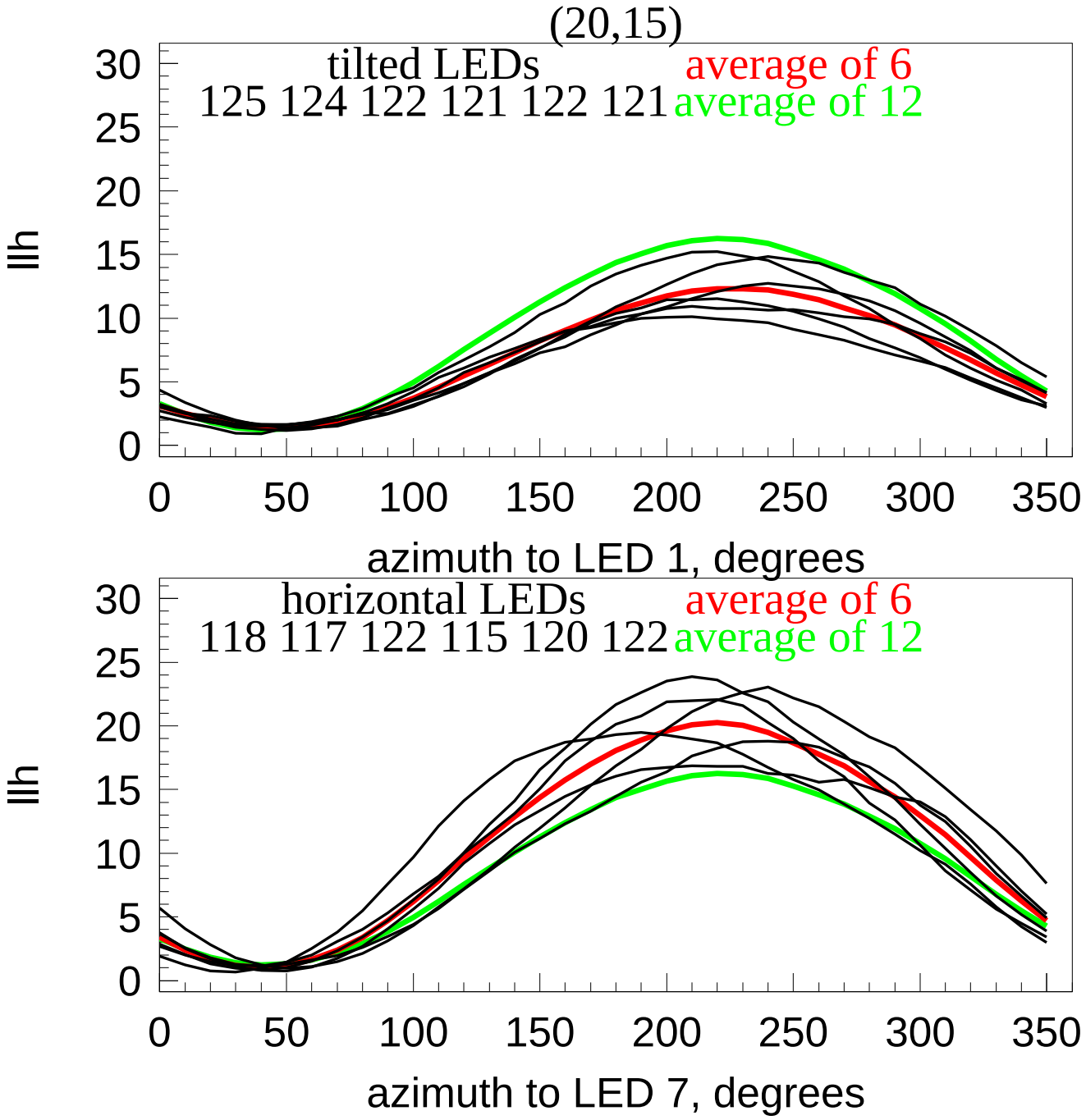

(20,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
5.2 ± 7.4

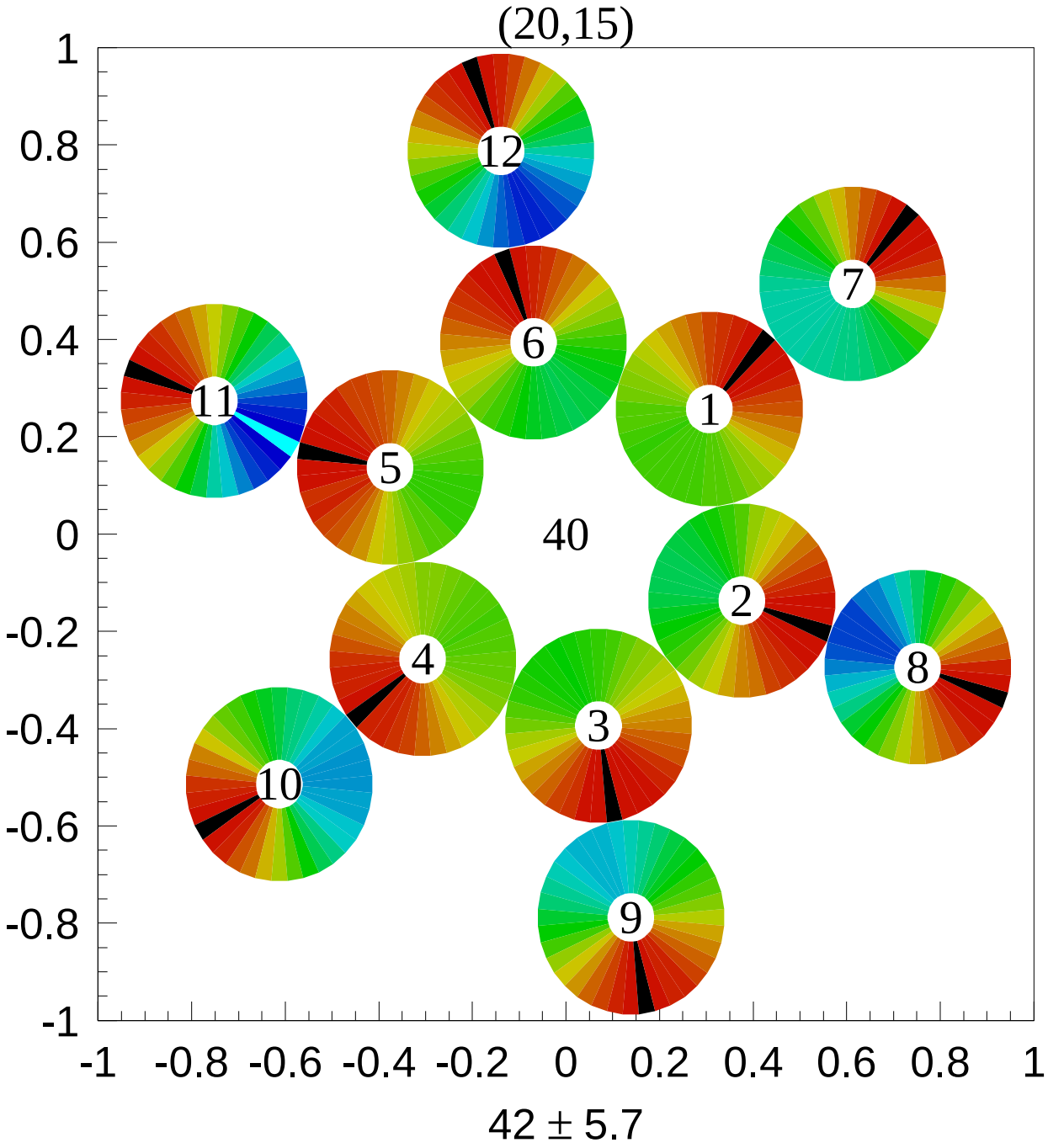

(20,13)
tilted LEDs
124 128 125 123 119 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 111 120 120 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

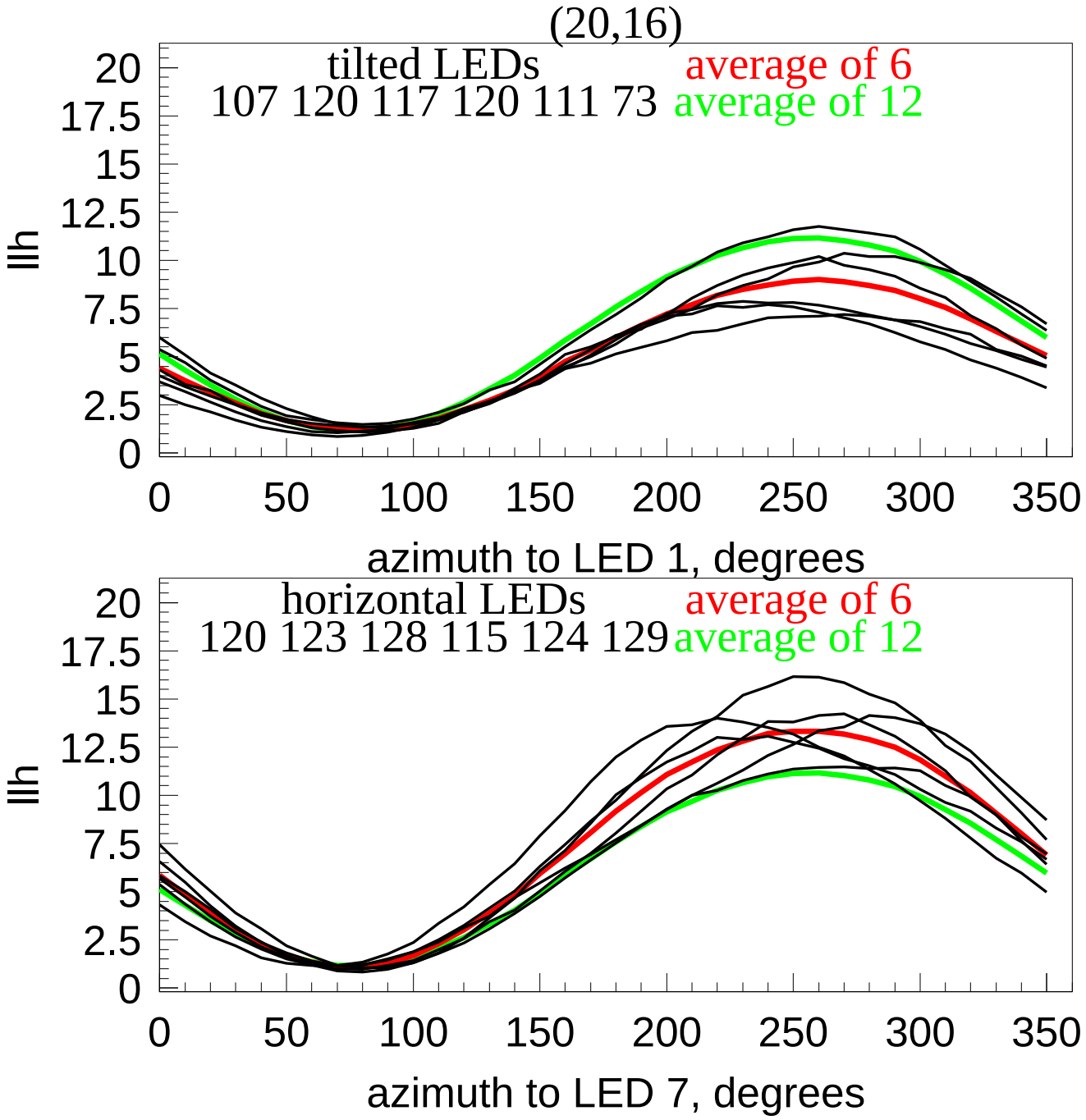

(20,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
47.3 ± 6.3

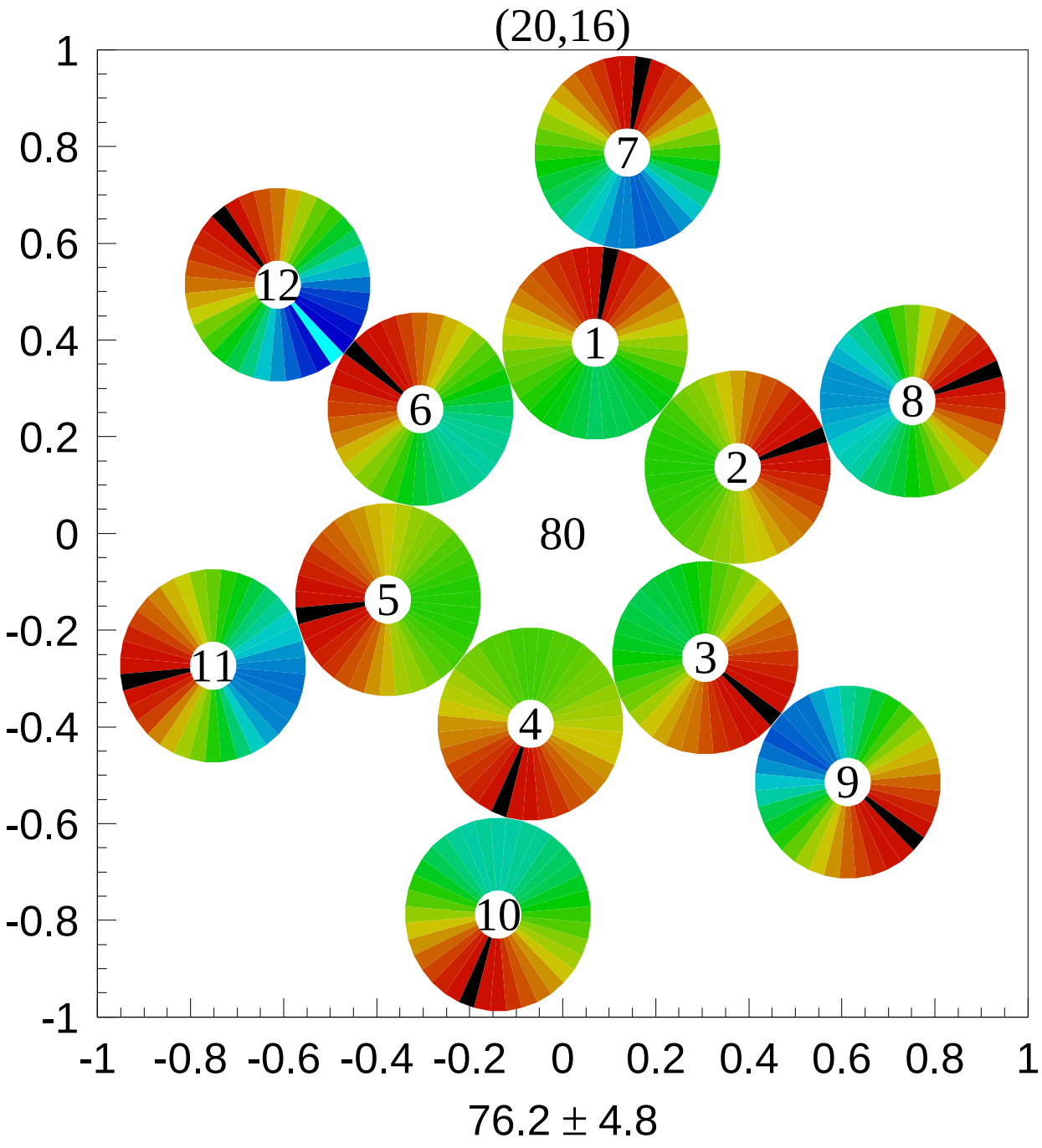

(20,14)
tilted LEDs
115 124 123 122 127 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 120 120 120 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

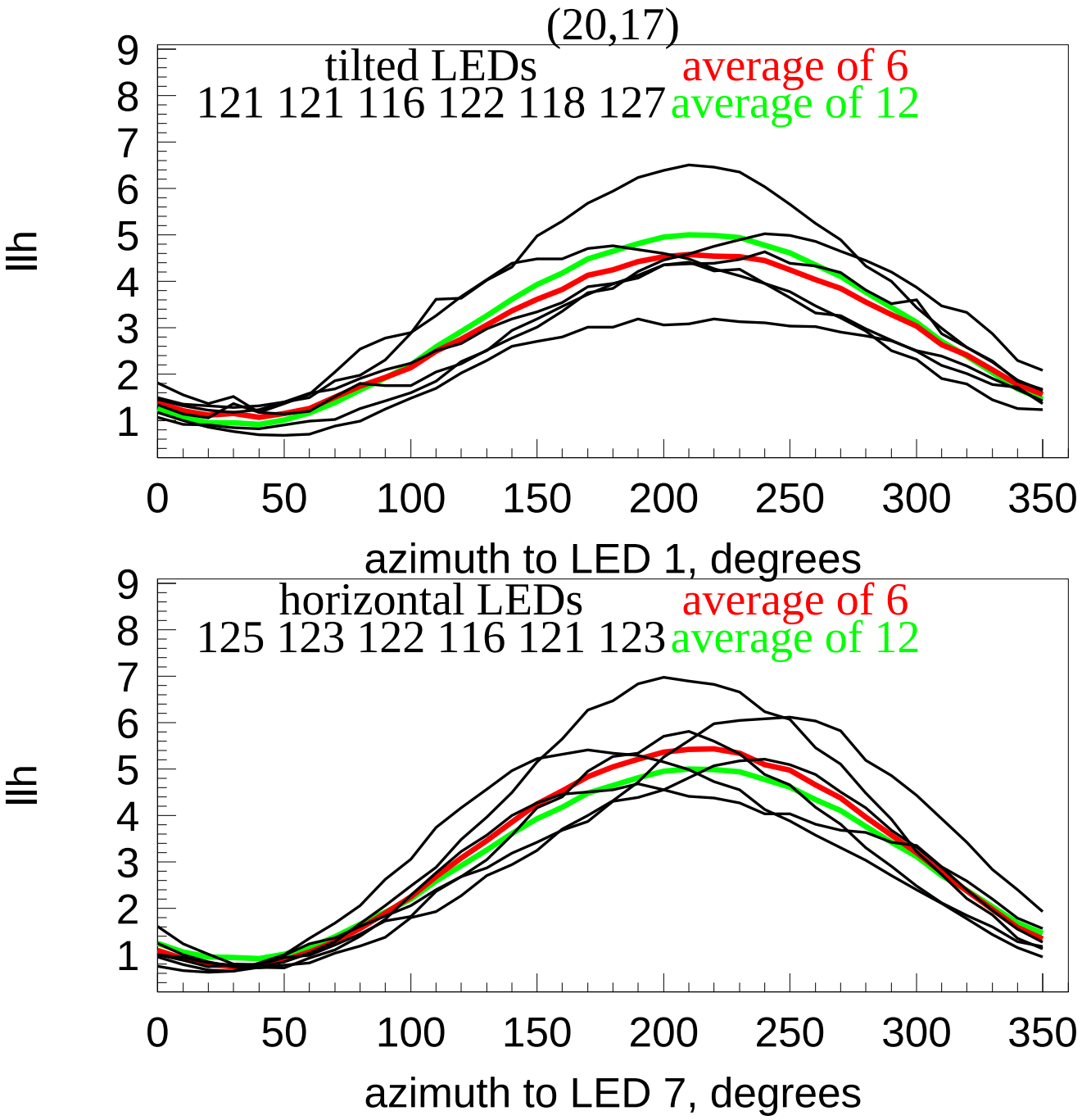

(20,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
309 ± 6.1

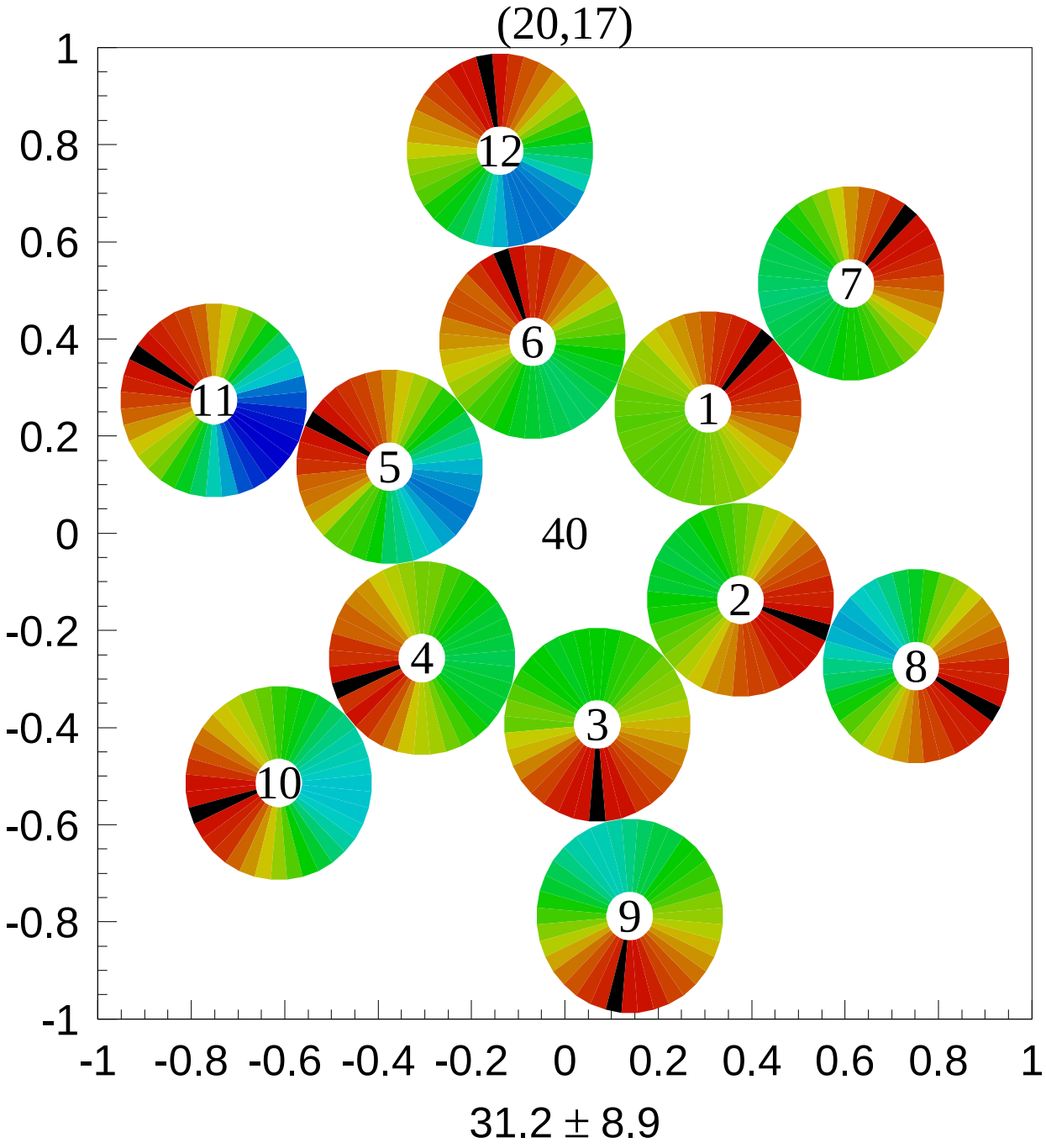

(20,15)
tilted LEDs
125 124 122 121 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 117 122 115 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

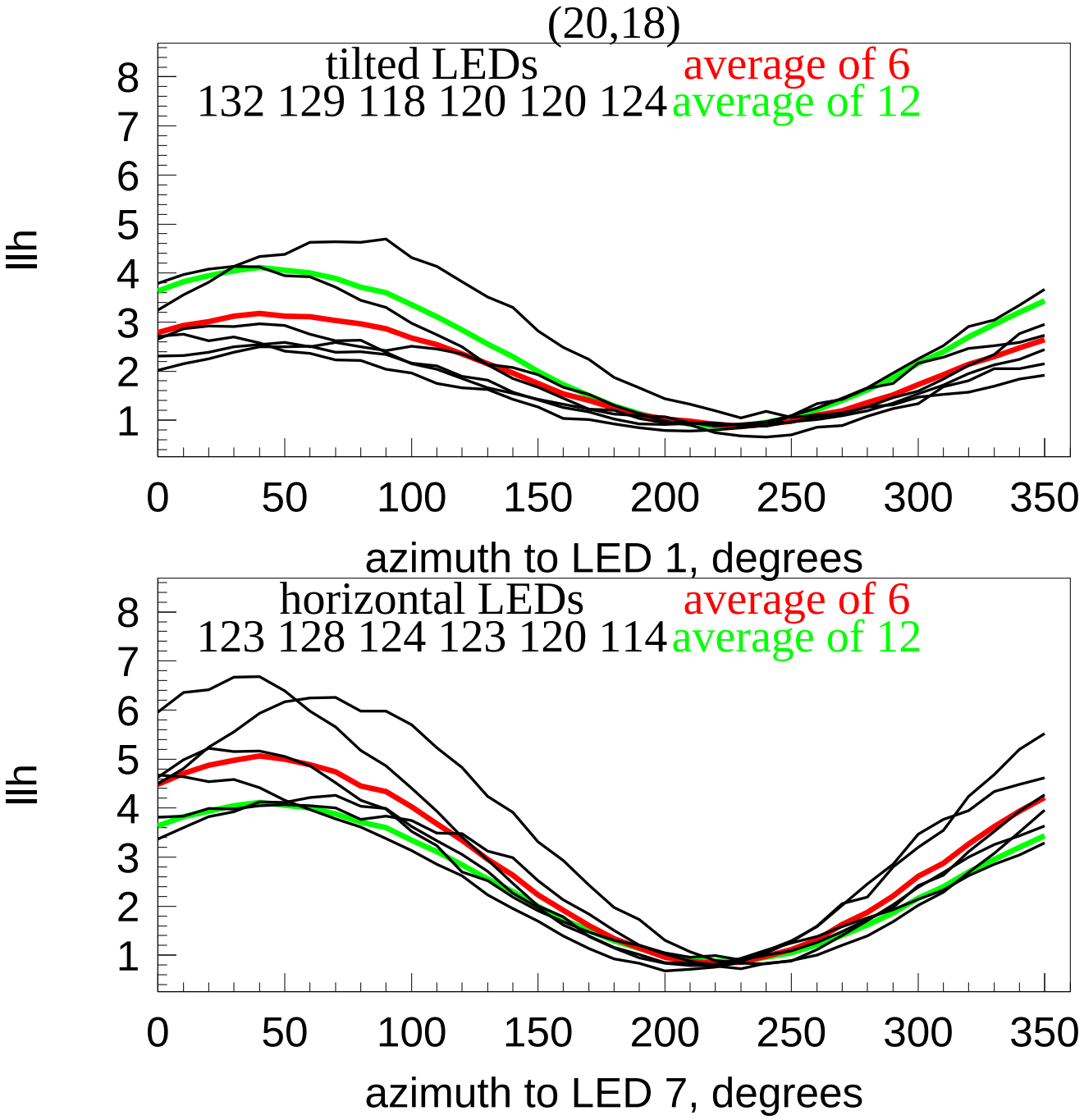

(20,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
42 ± 5.7

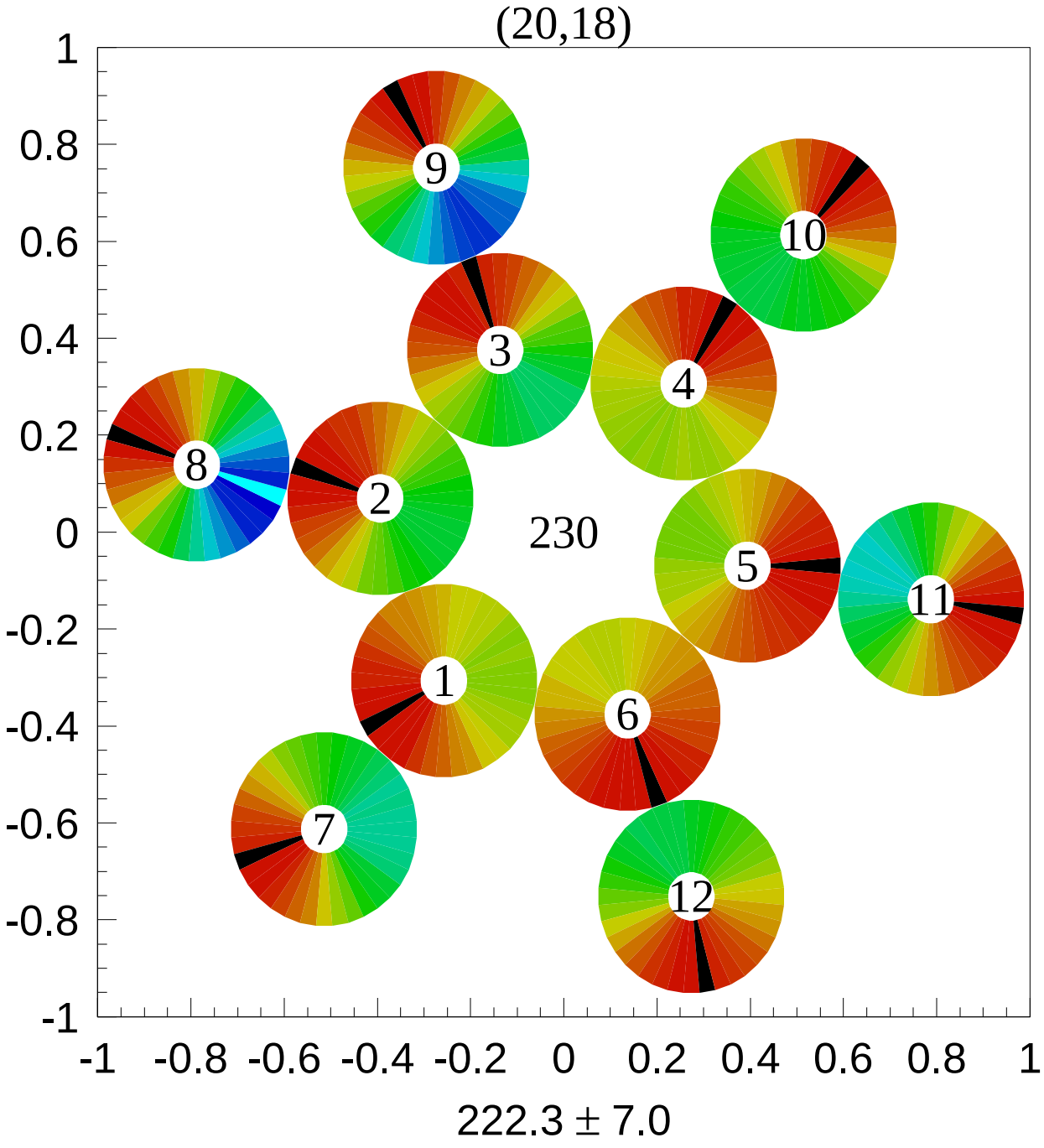

(20,16)
tilted LEDs
107 120 117 120 111 73
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 123 128 115 124 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

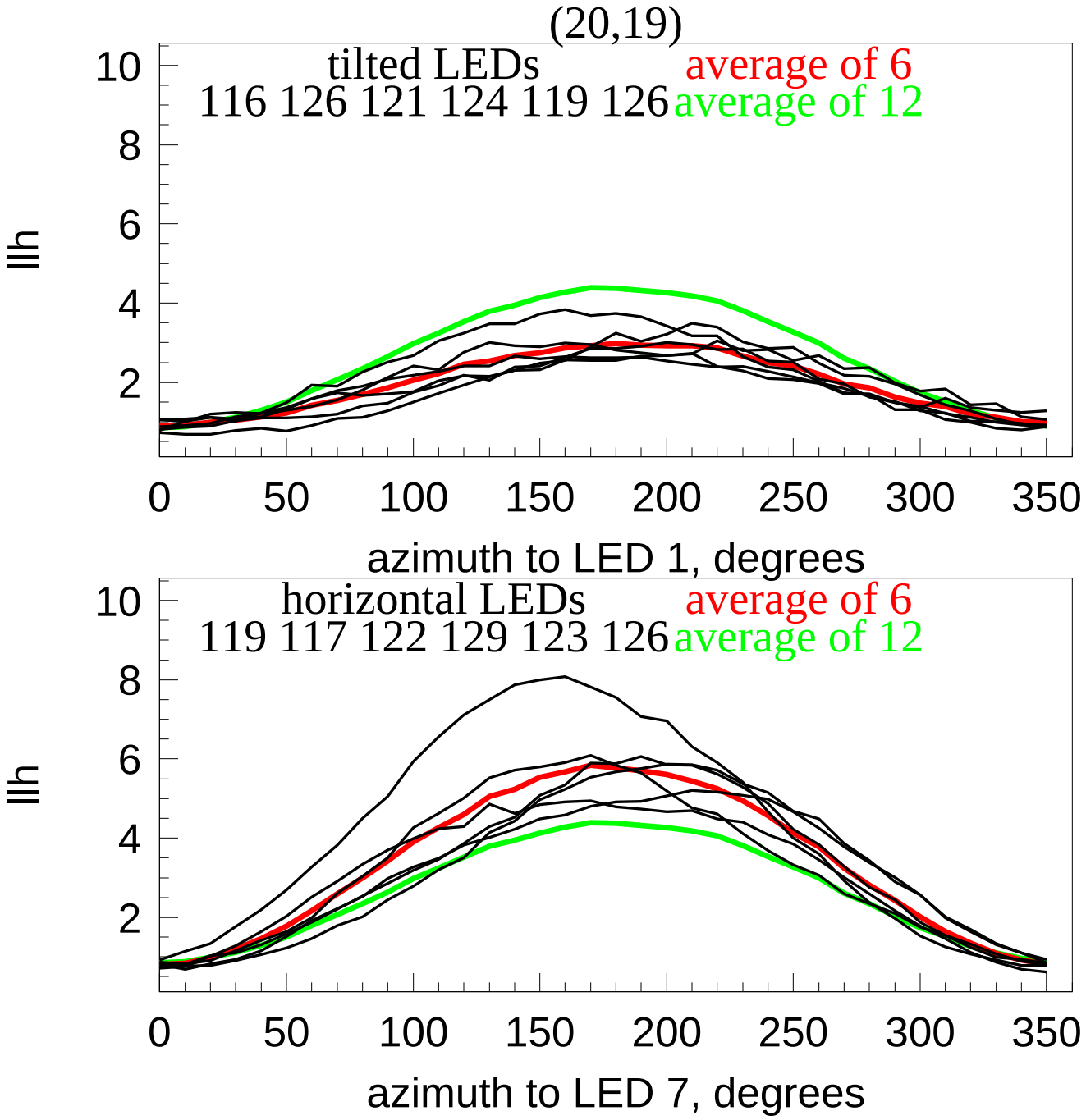

(20,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
76.2 ± 4.8

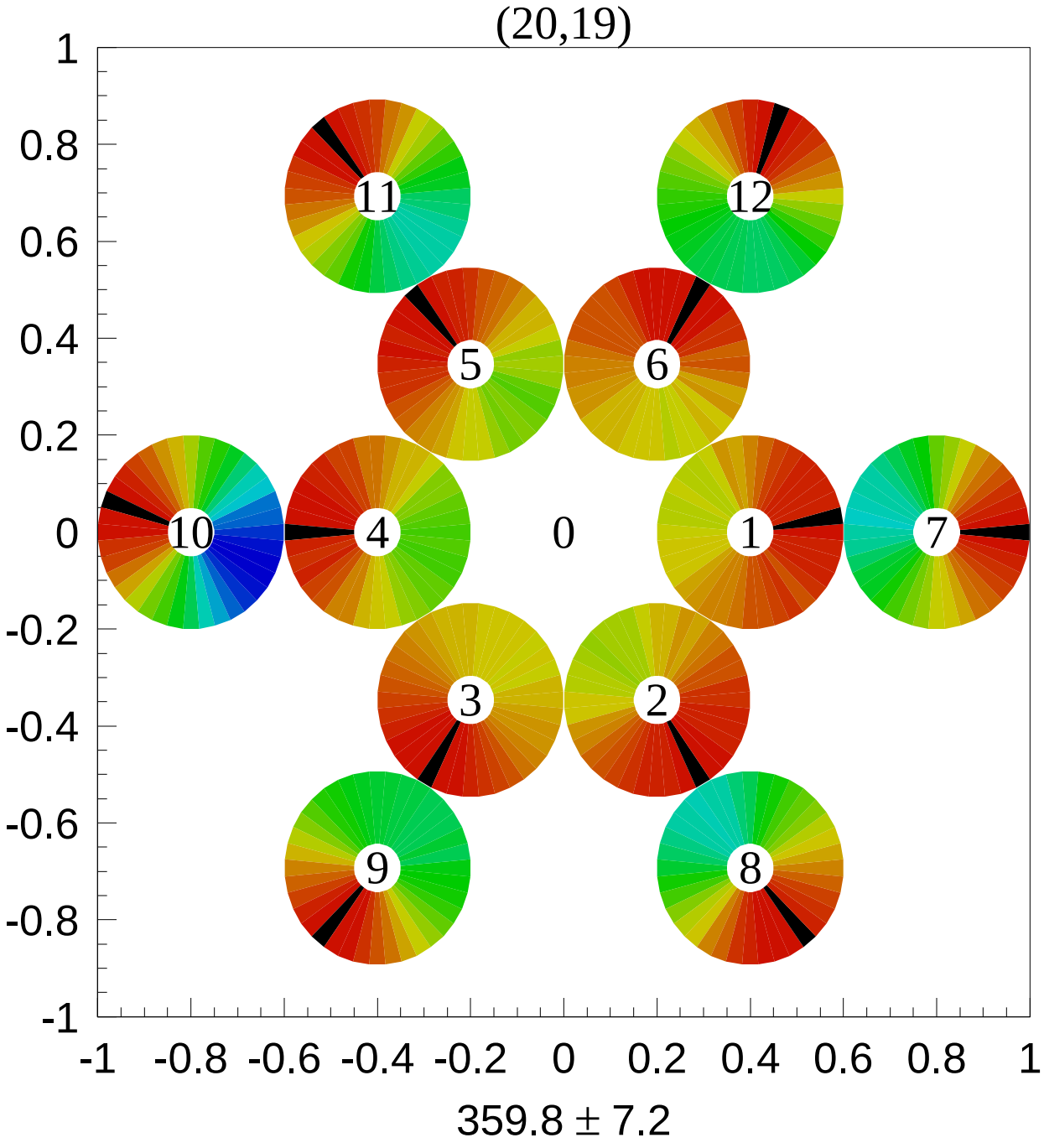

(20,17)
tilted LEDs
121 121 116 122 118 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 122 116 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

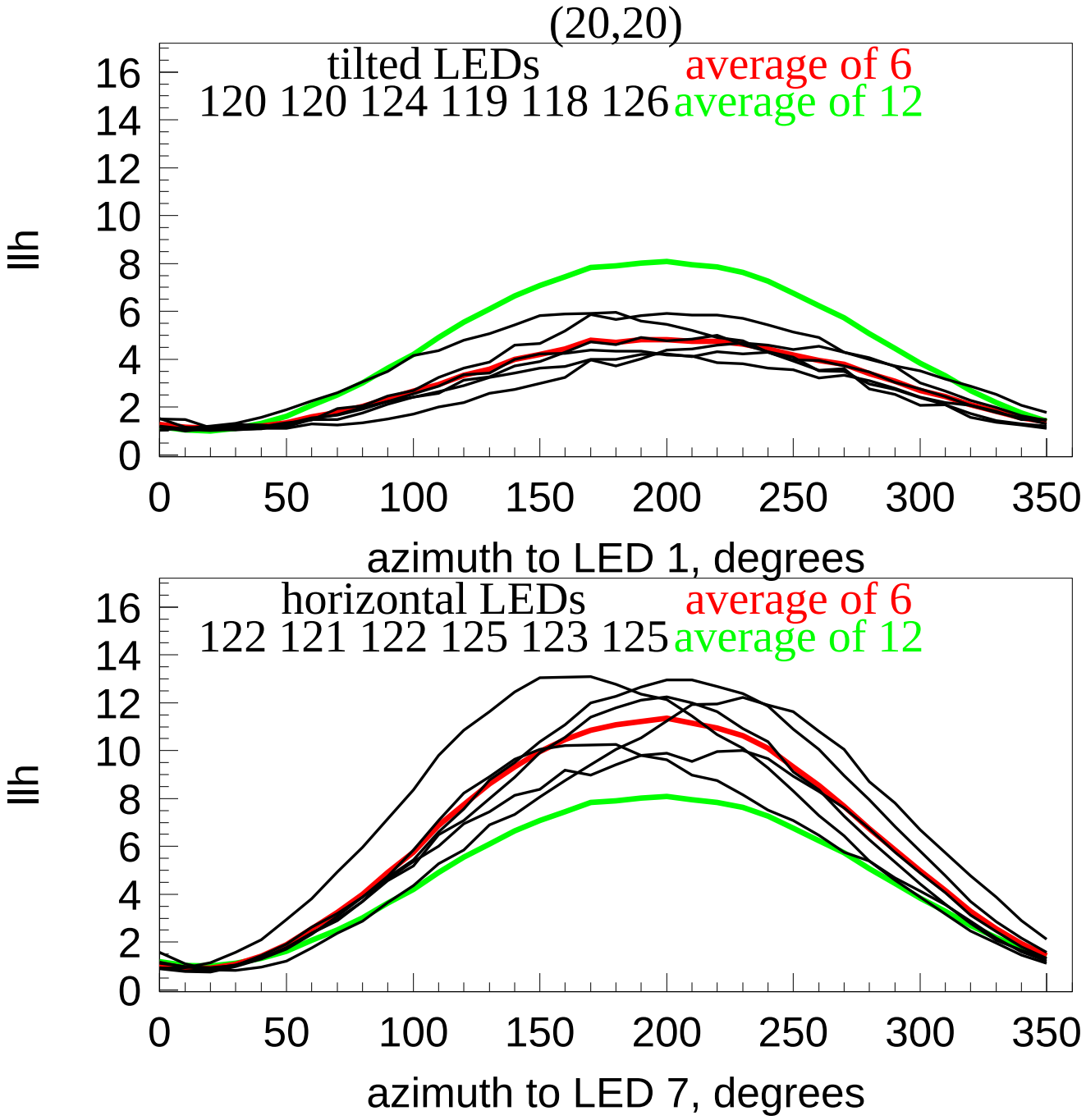

(20,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
31.2 ± 8.9

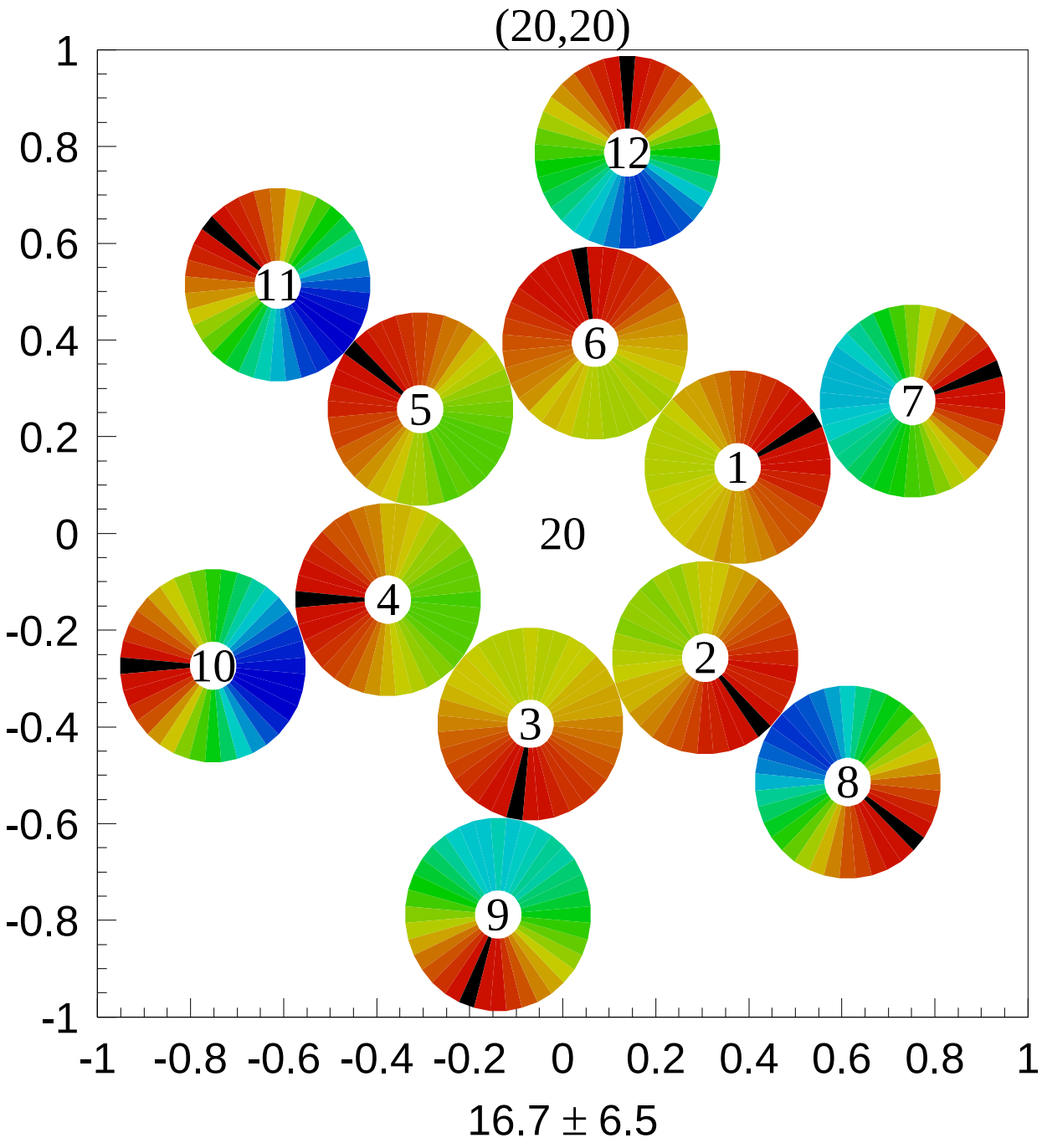

(20,18)
tilted LEDs
132 129 118 120 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 128 124 123 120 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

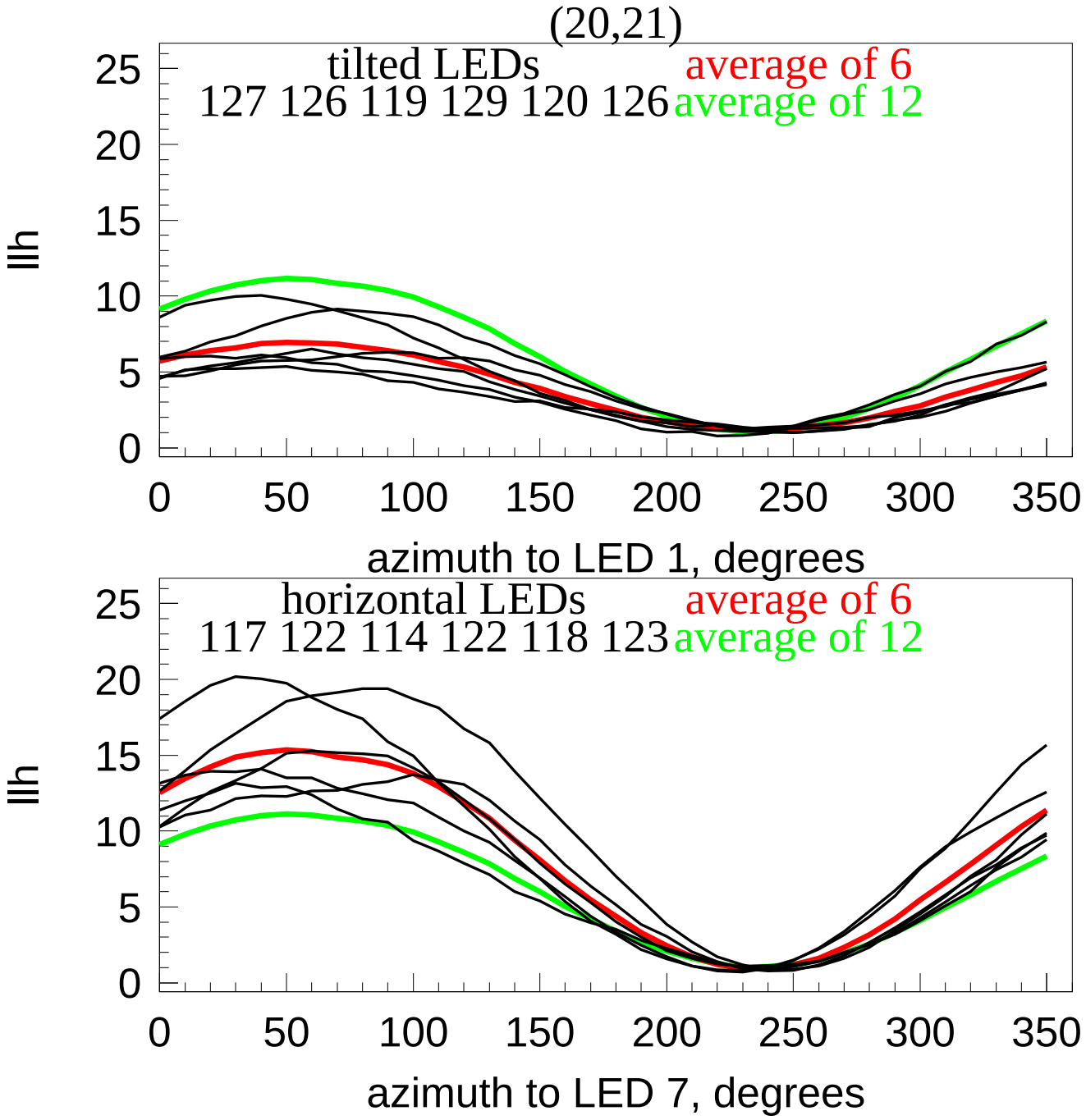

(20,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
222.3 ± 7.0

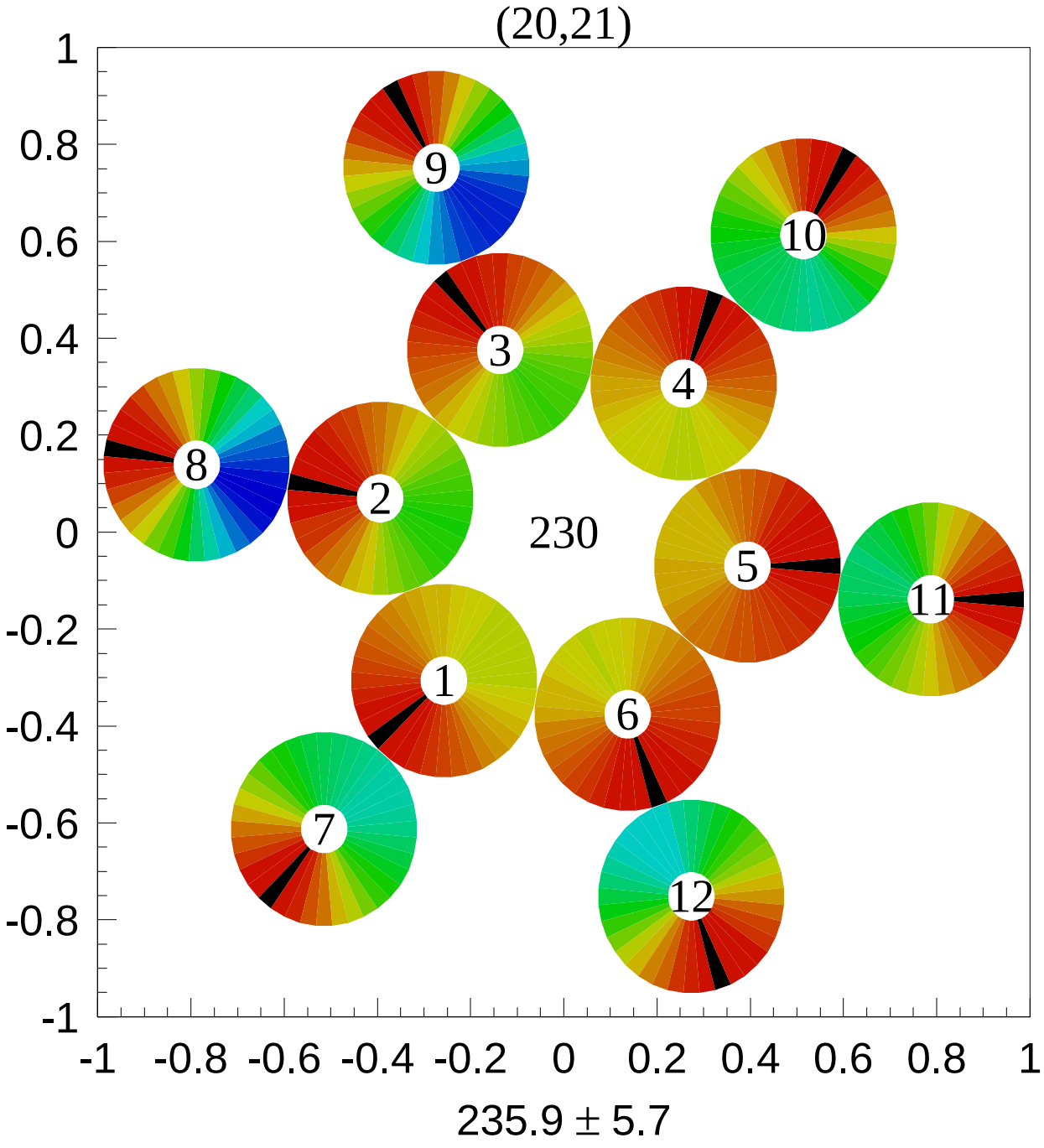

(20,19)
tilted LEDs
116 126 121 124 119 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 117 122 129 123 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

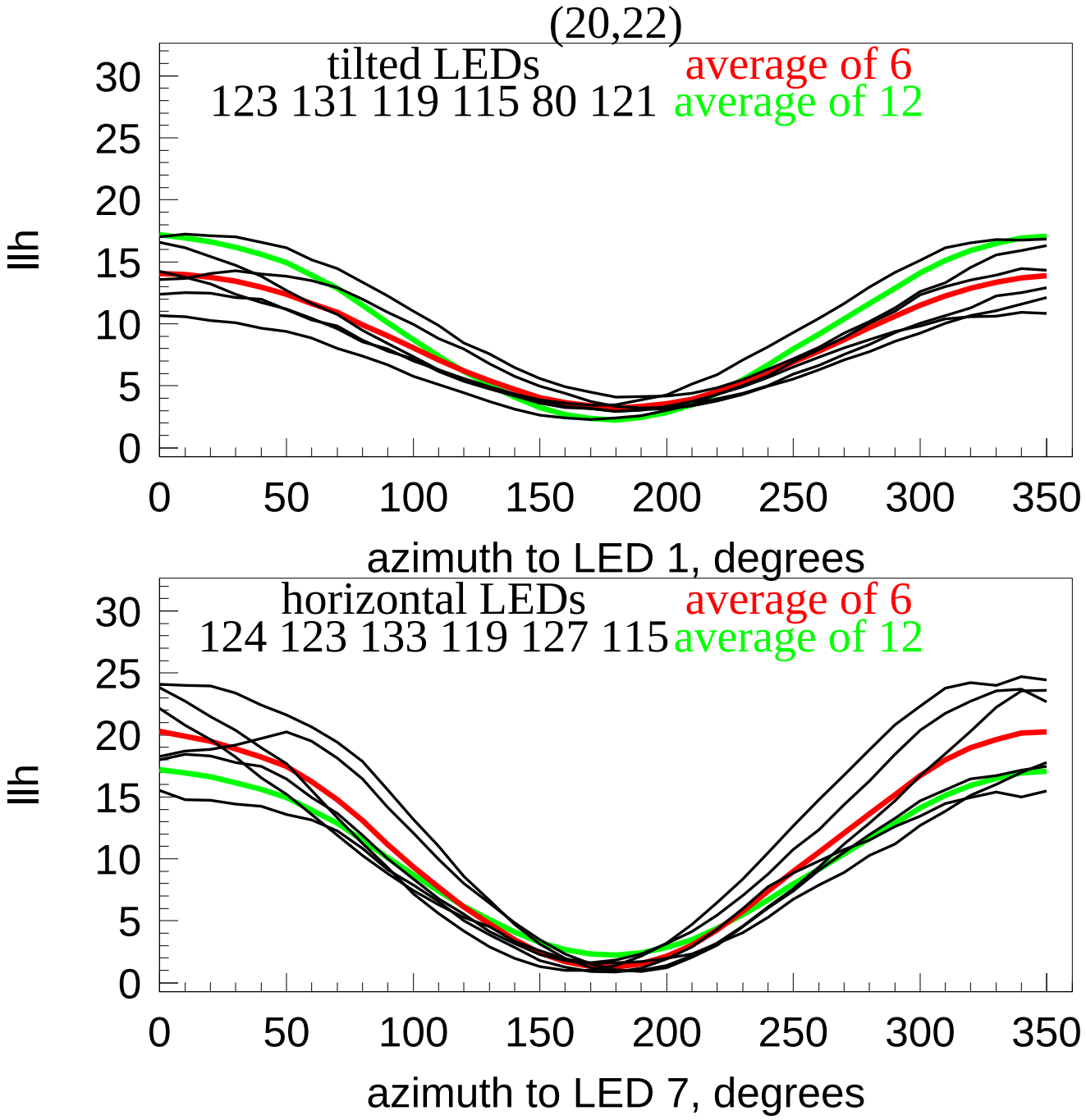

(20,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.8 ± 7.2

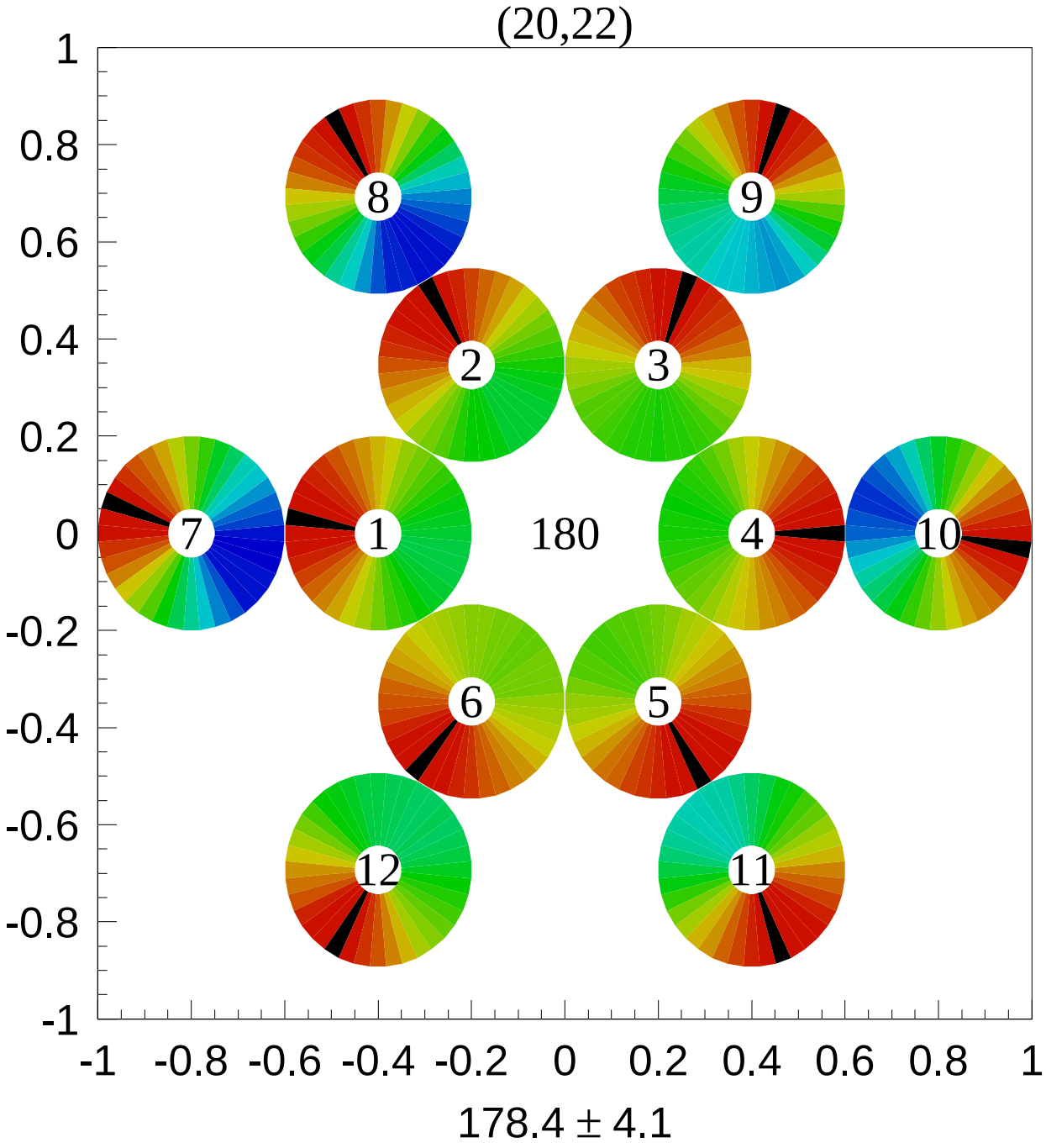

(20,20)
tilted LEDs
120 120 124 119 118 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 122 125 123 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

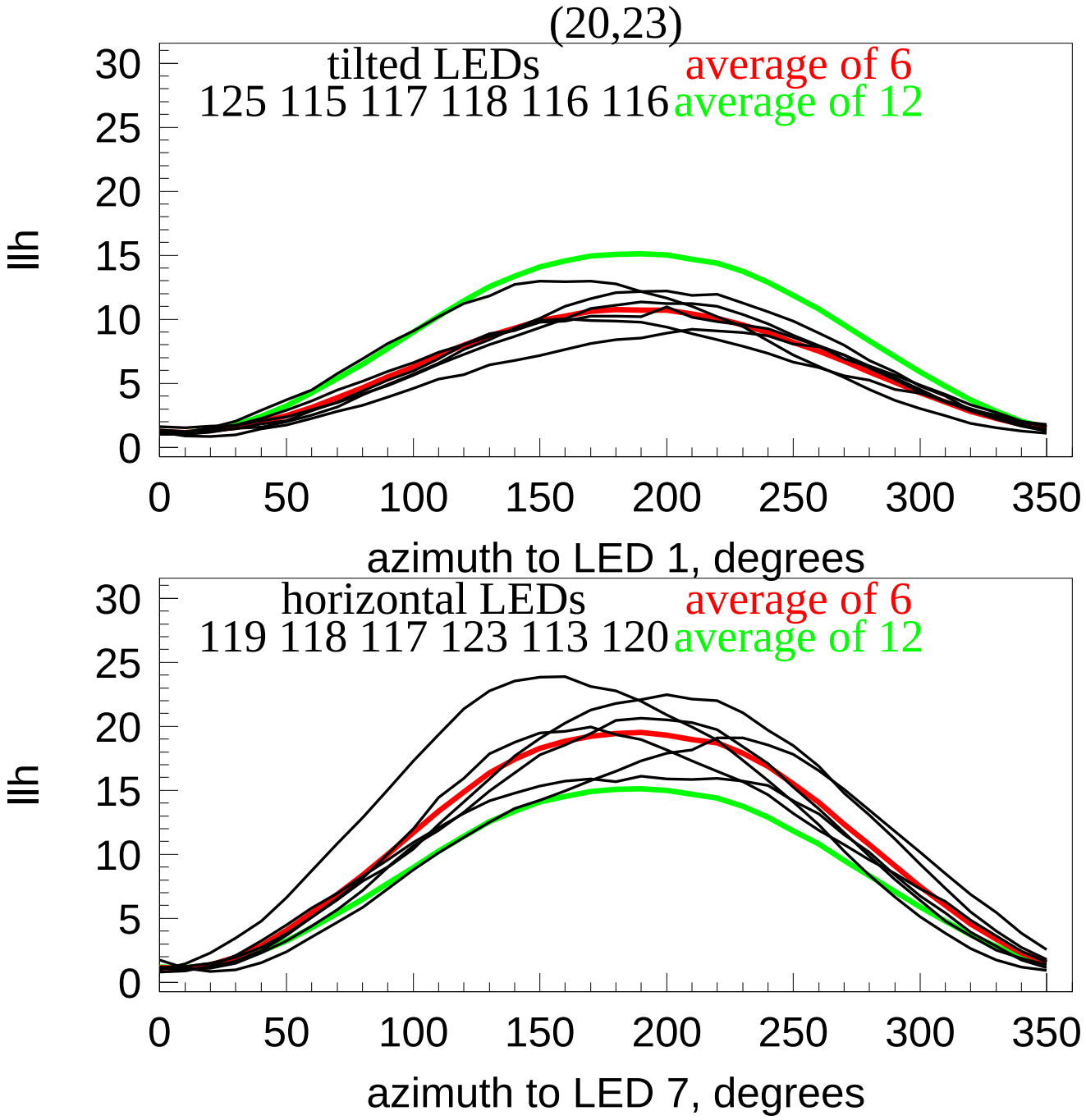

(20,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
11
6
5
7
1
20
4
10
2
3
8
9
16.7 ± 6.5

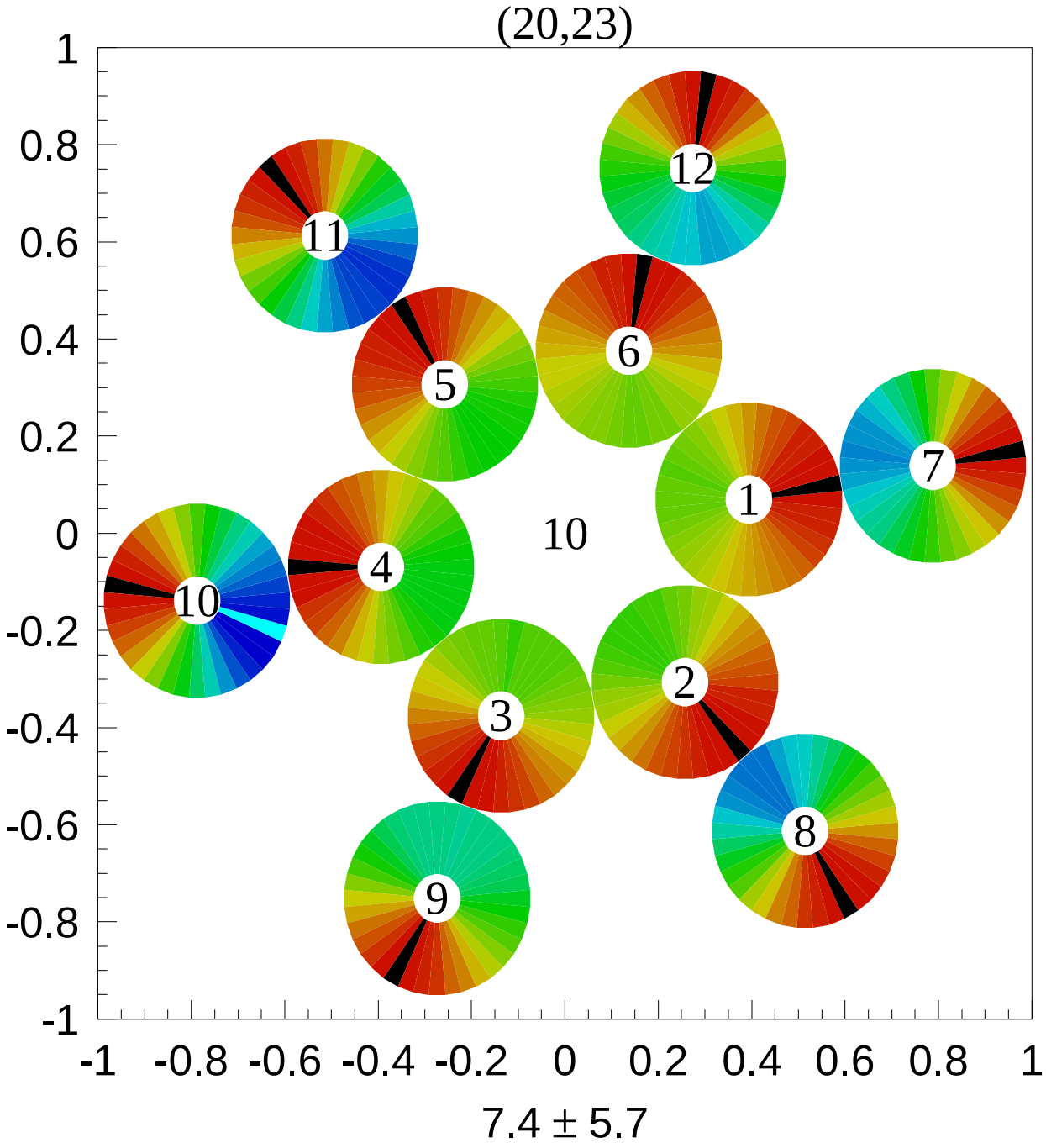

(20,21)
tilted LEDs
127 126 119 129 120 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 114 122 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

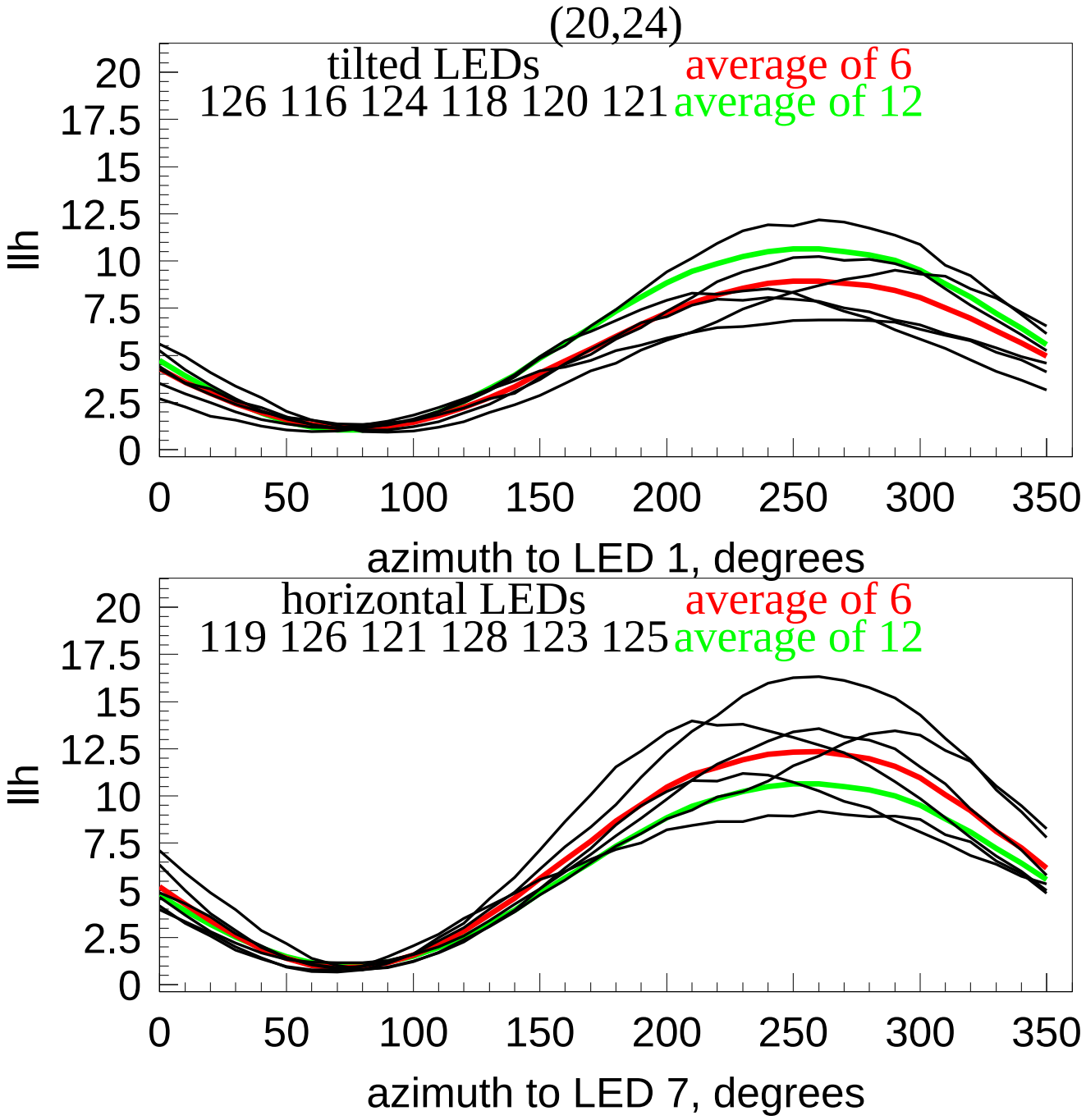

(20,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
235.9 ± 5.7

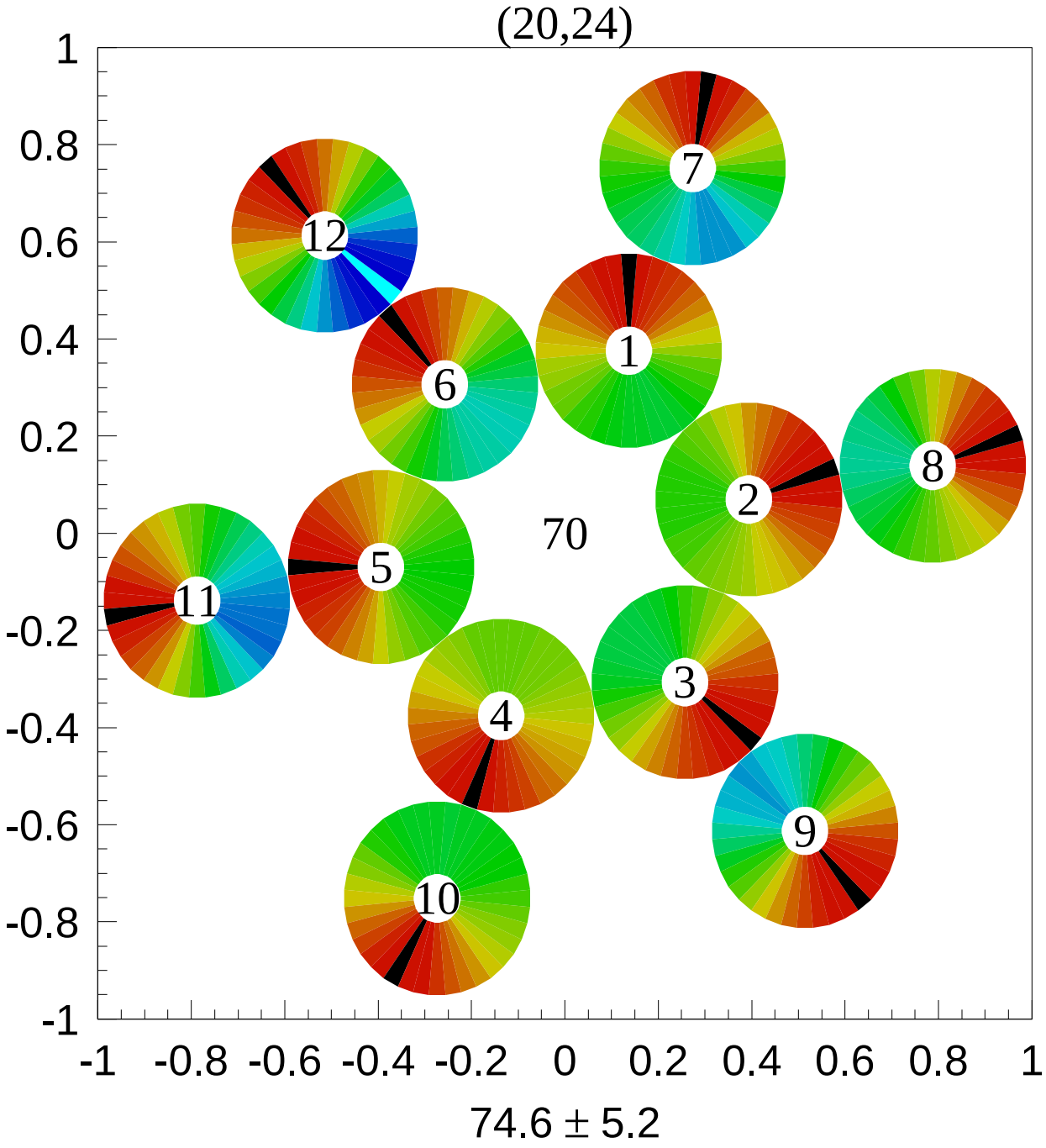

(20,22)
tilted LEDs
123 131 119 115 80 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 133 119 127 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

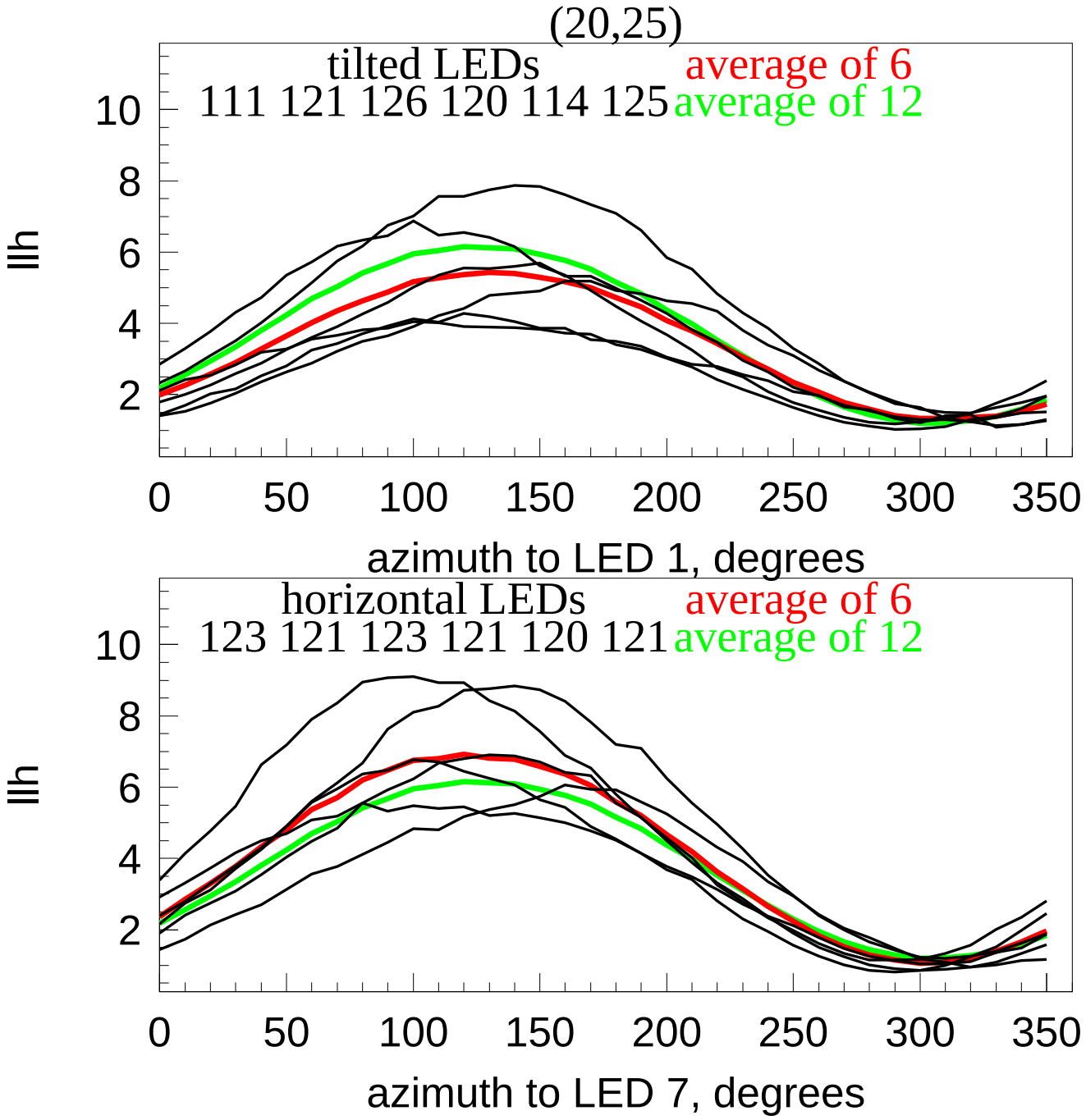

(20,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
178.4 ± 4.1

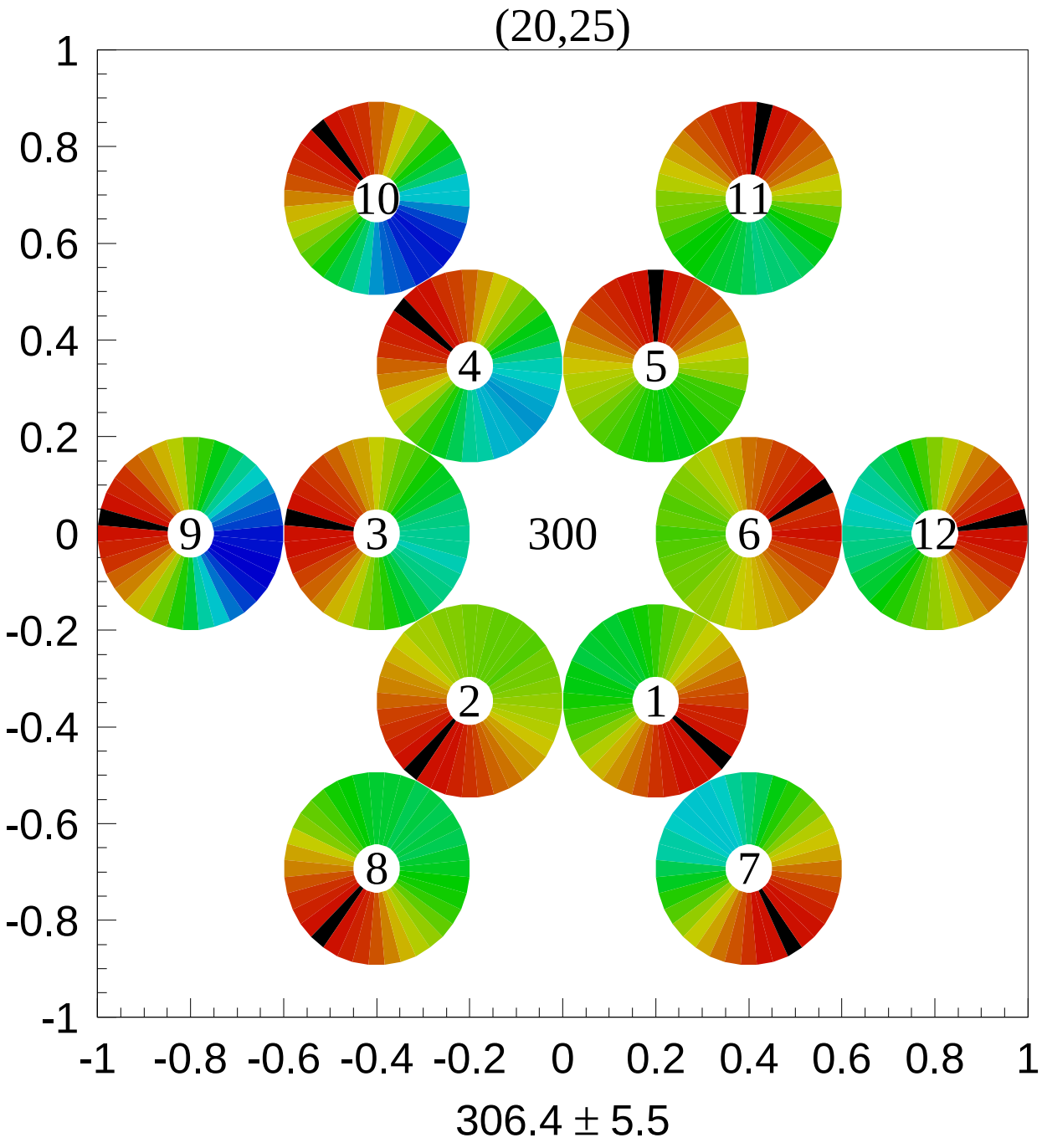

(20,23)
tilted LEDs
125 115 117 118 116 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 117 123 113 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

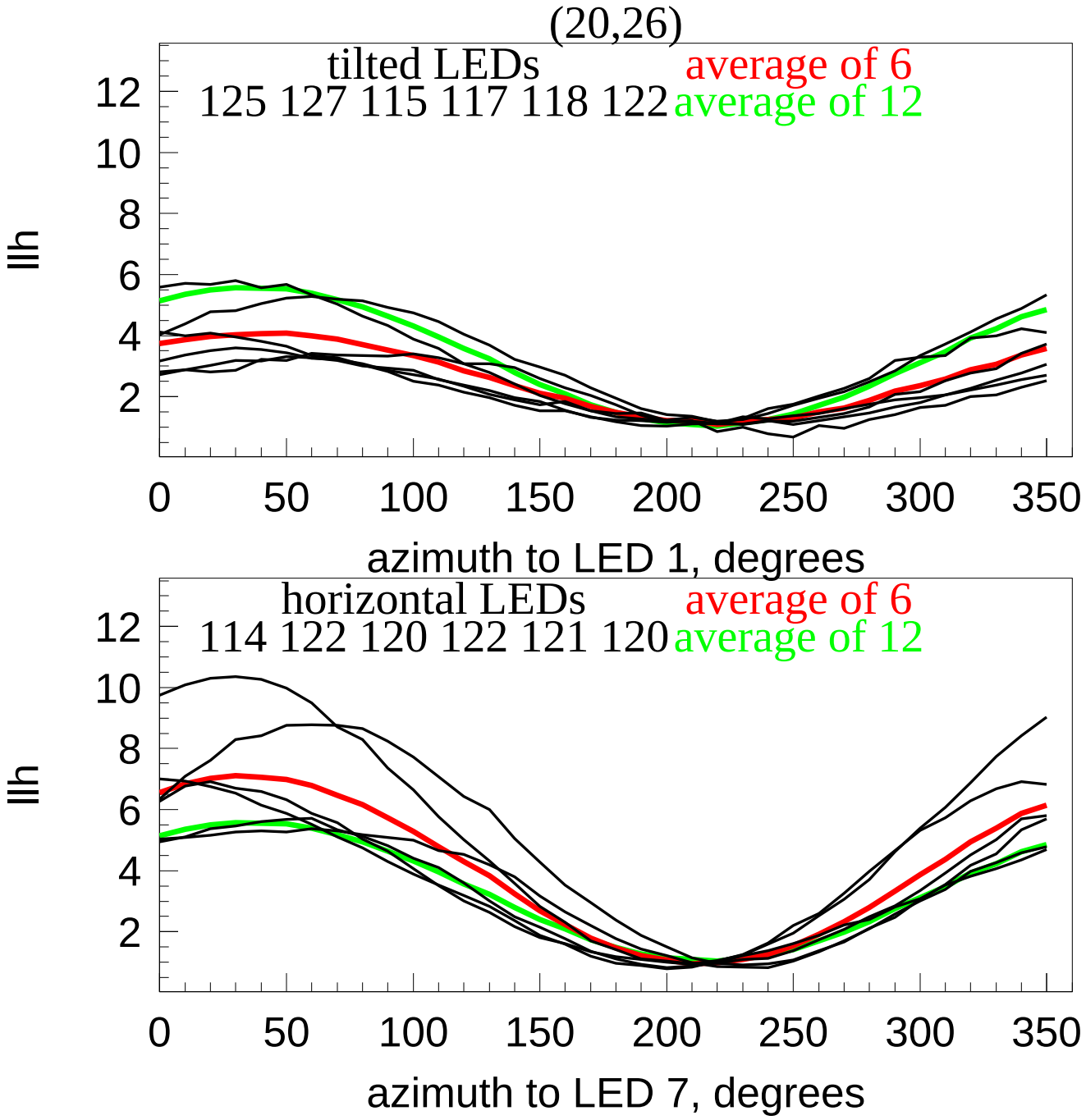

(20,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
7.4 ± 5.7

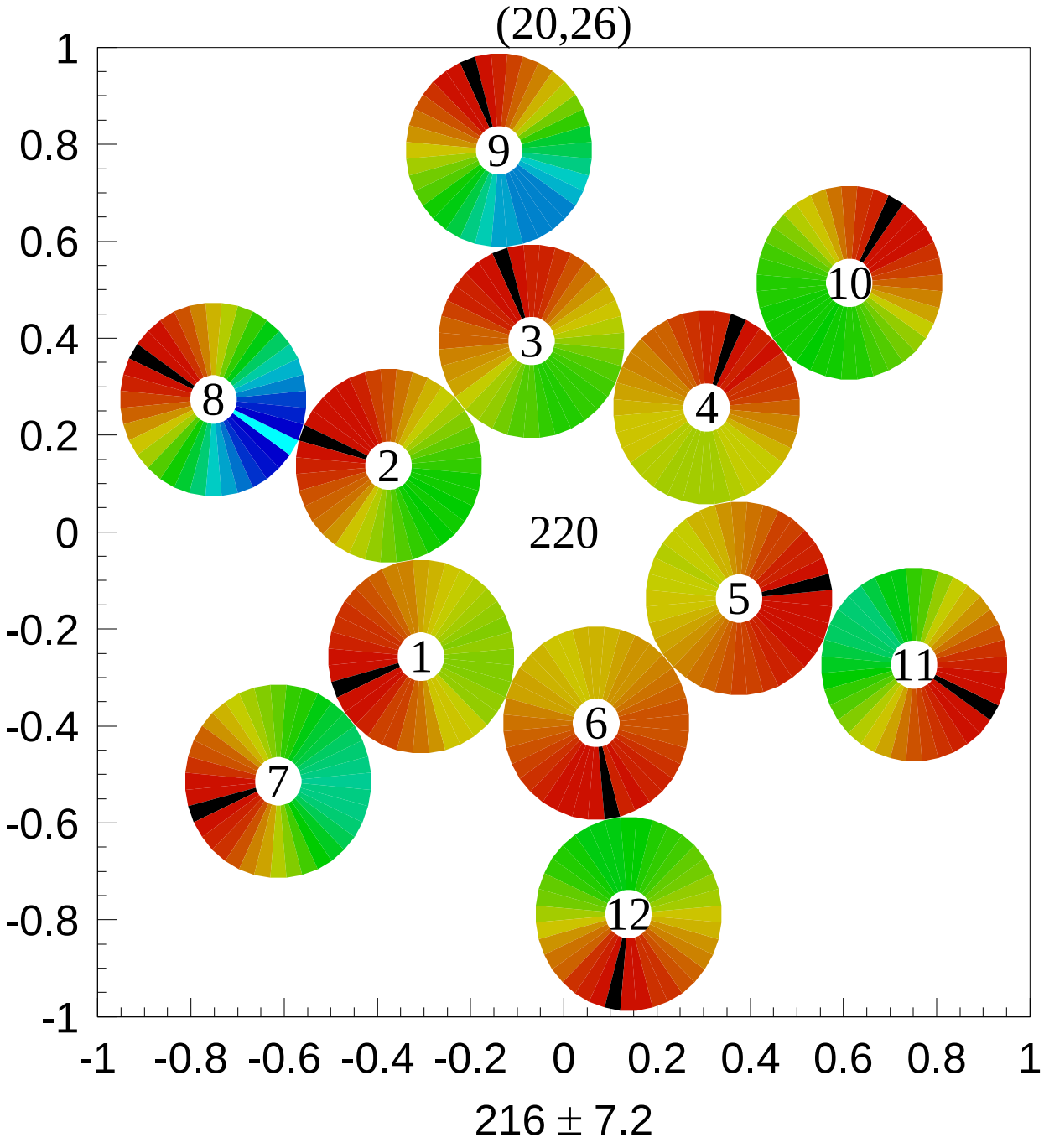

(20,24)
tilted LEDs
126 116 124 118 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 121 128 123 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

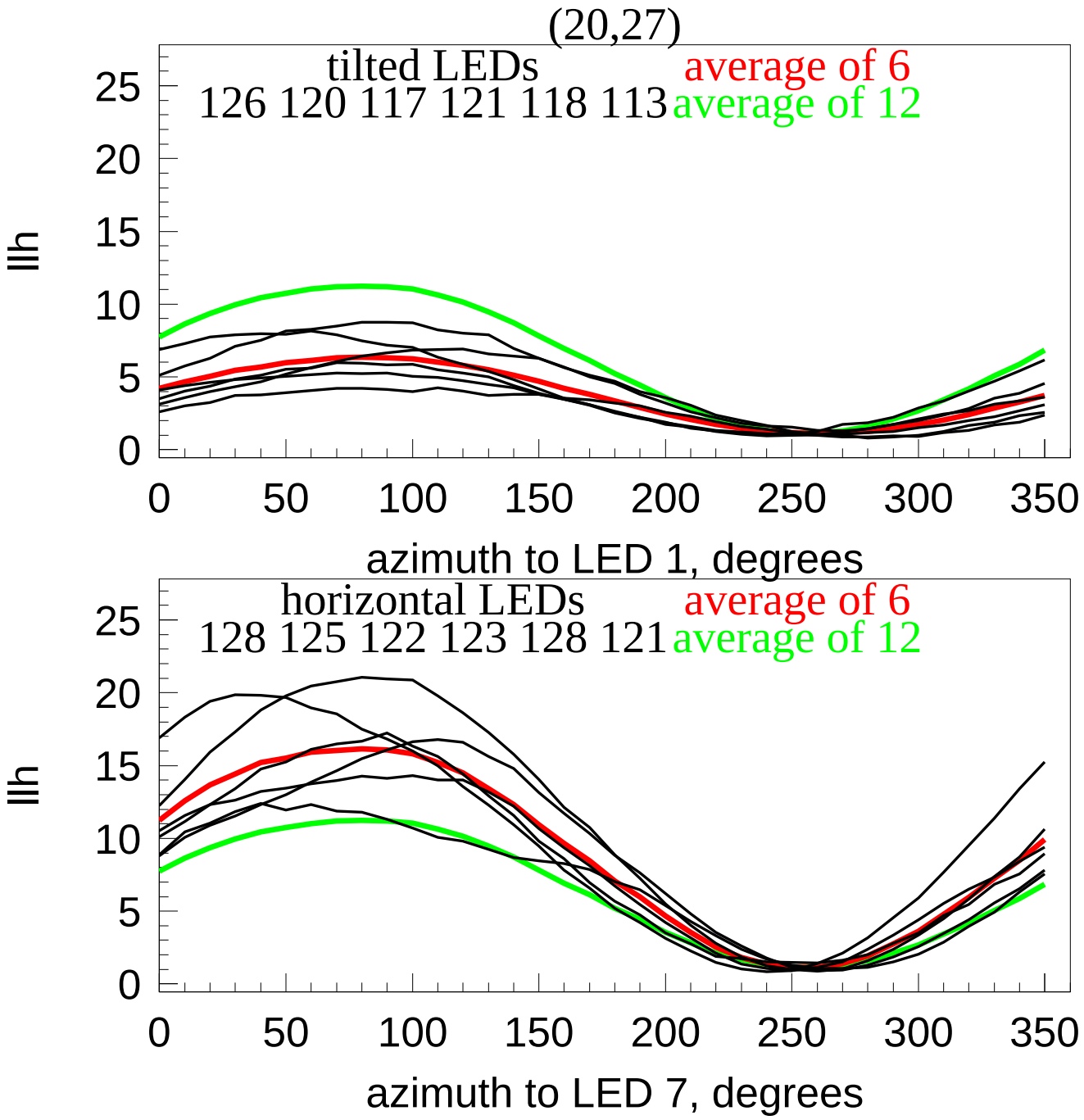

(20,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
74.6 ± 5.2

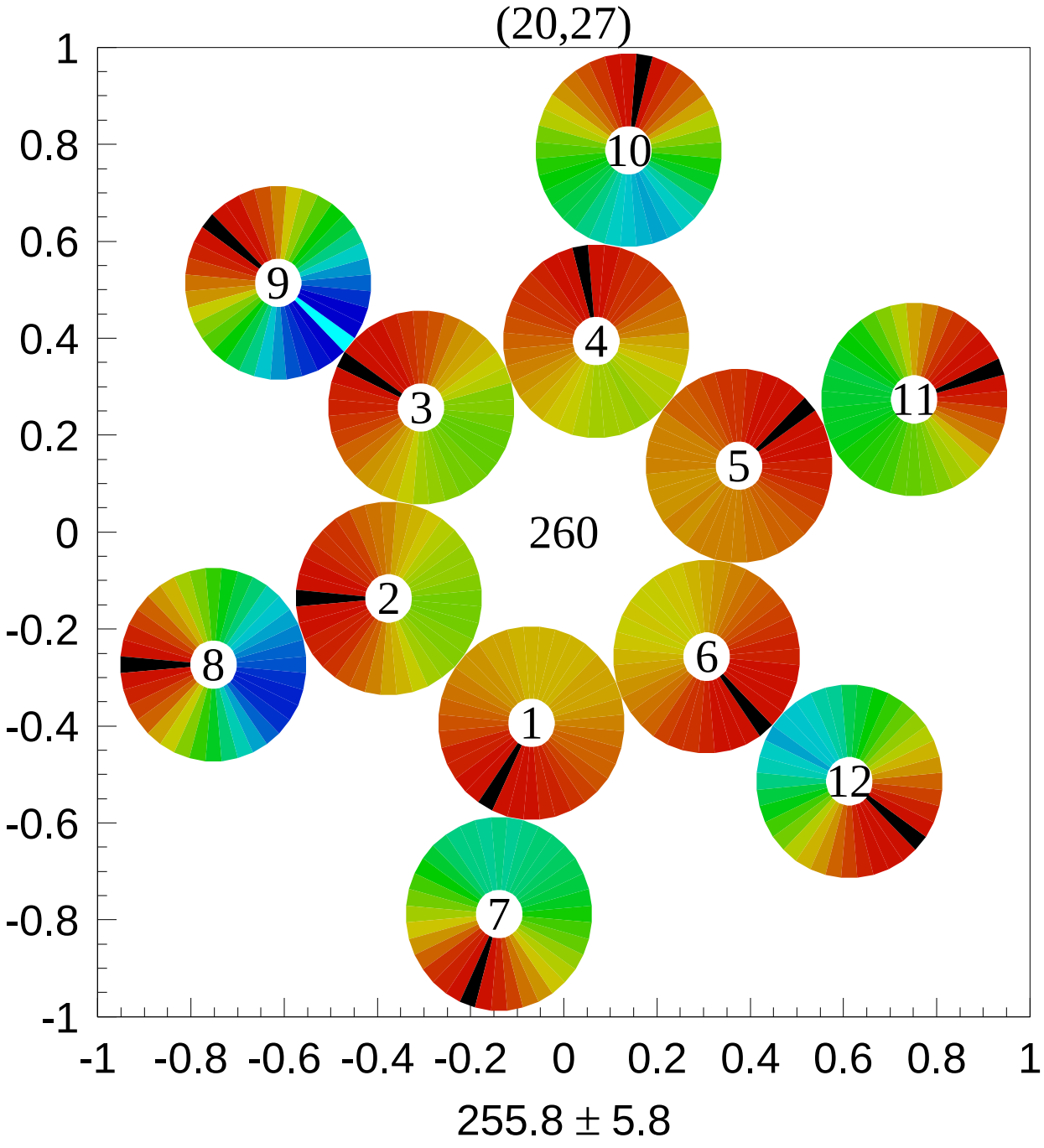

(20,25)
tilted LEDs
111 121 126 120 114 125
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 121 123 121 120 121
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

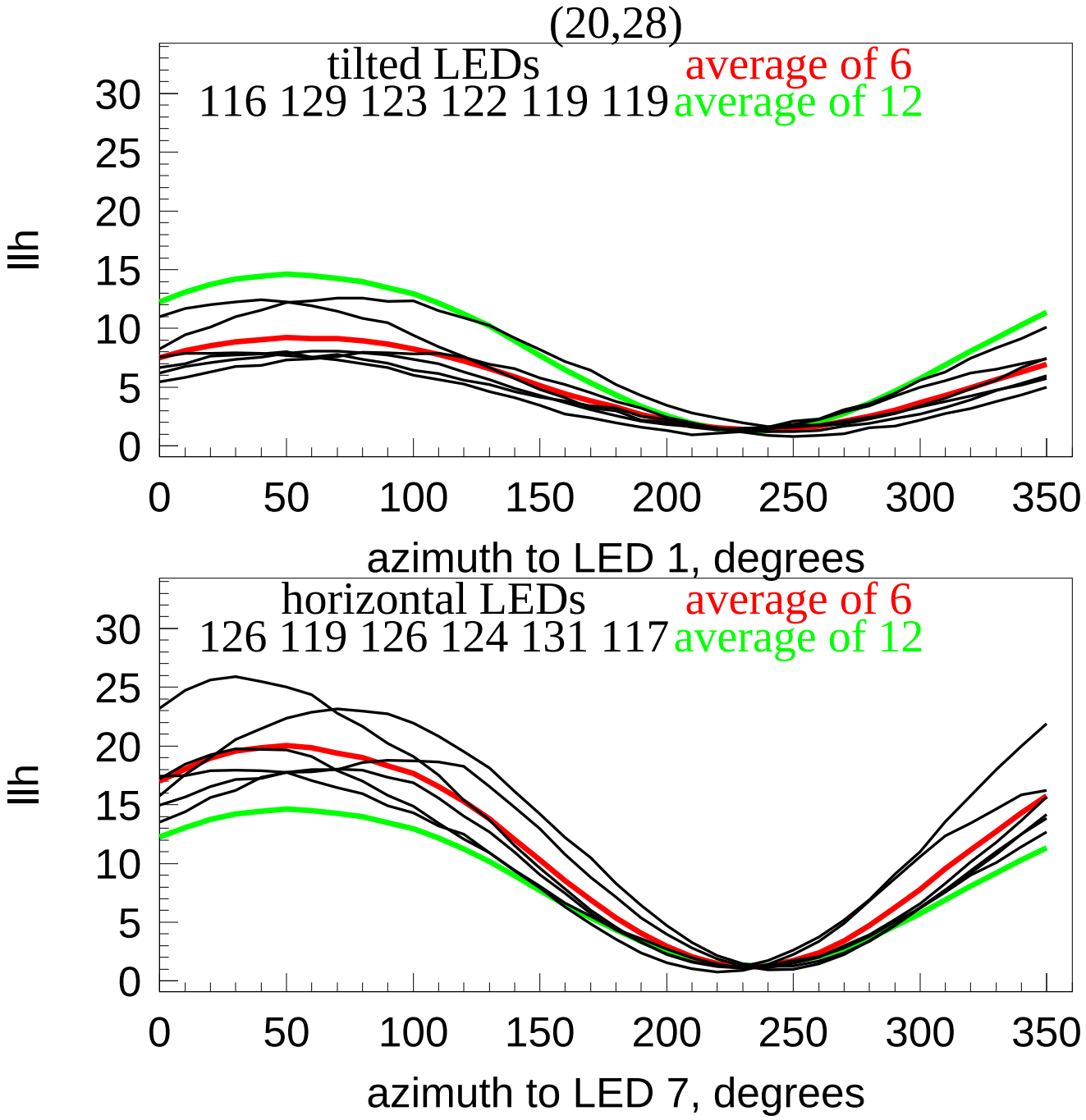

(20,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
306.4 ± 5.5

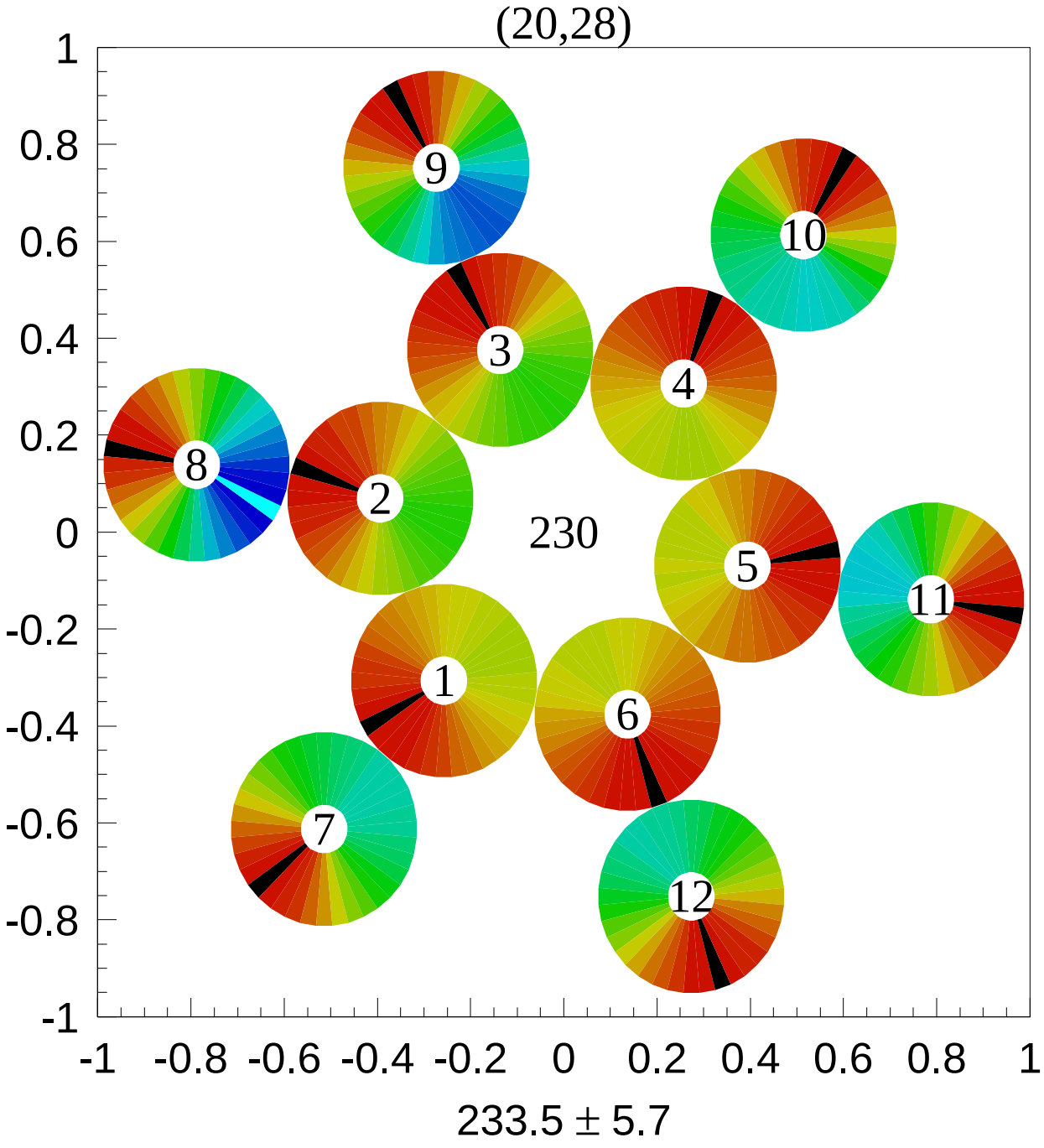

(20,26)
tilted LEDs
125 127 115 117 118 122
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
114 122 120 122 121 120
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

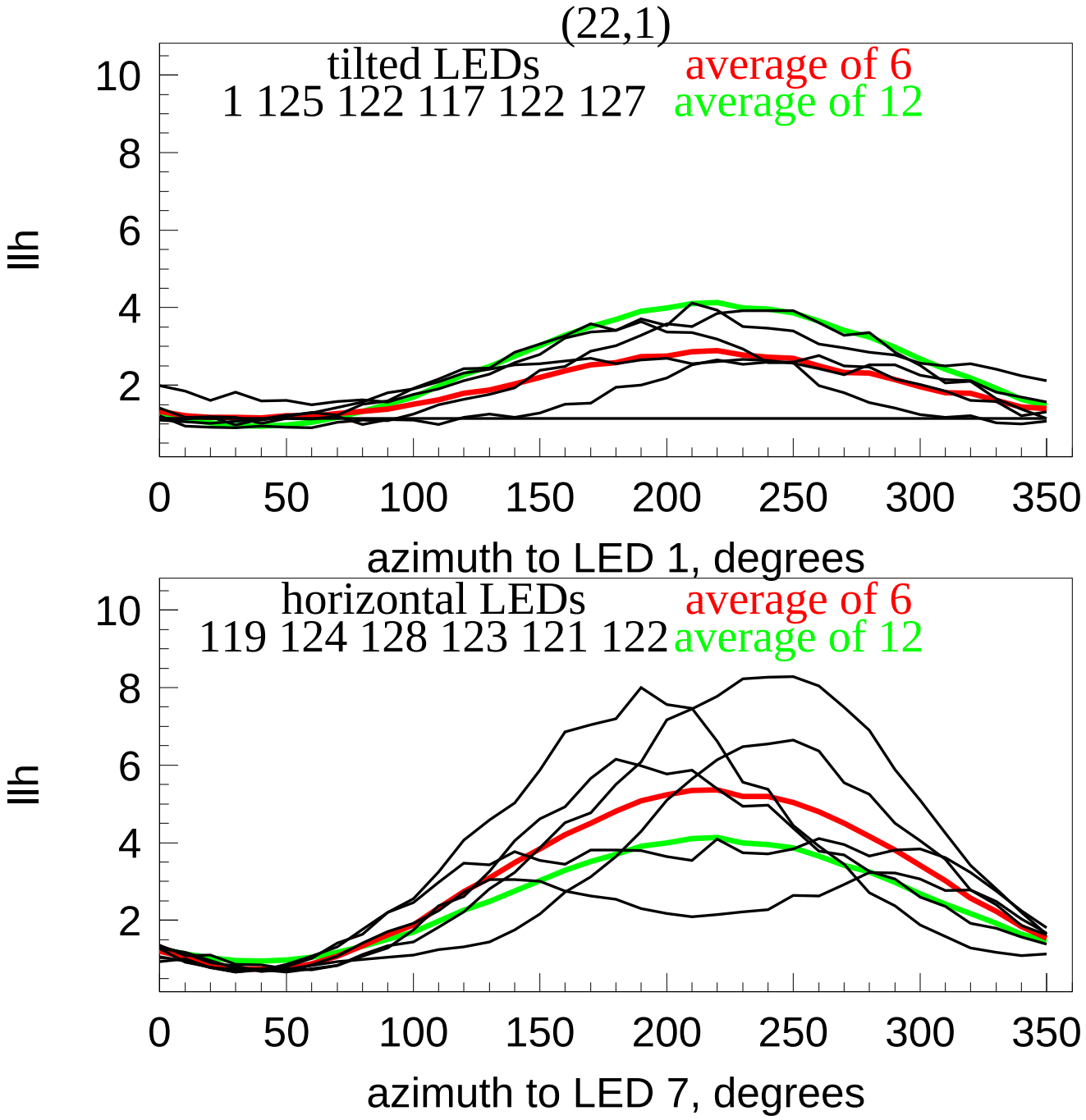

(20,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
216 ± 7.2

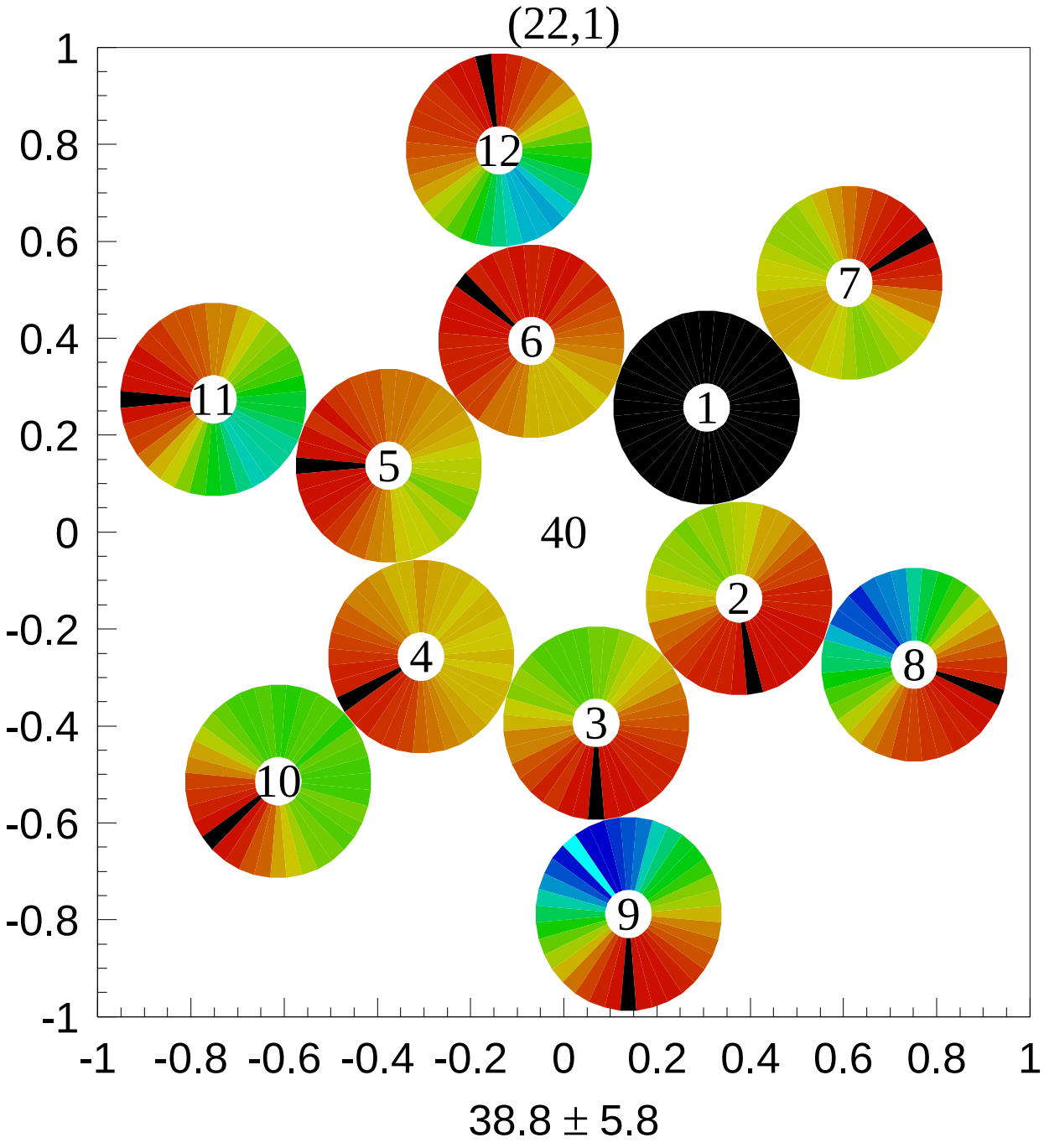

(20,27)
tilted LEDs
126 120 117 121 118 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 125 122 123 128 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

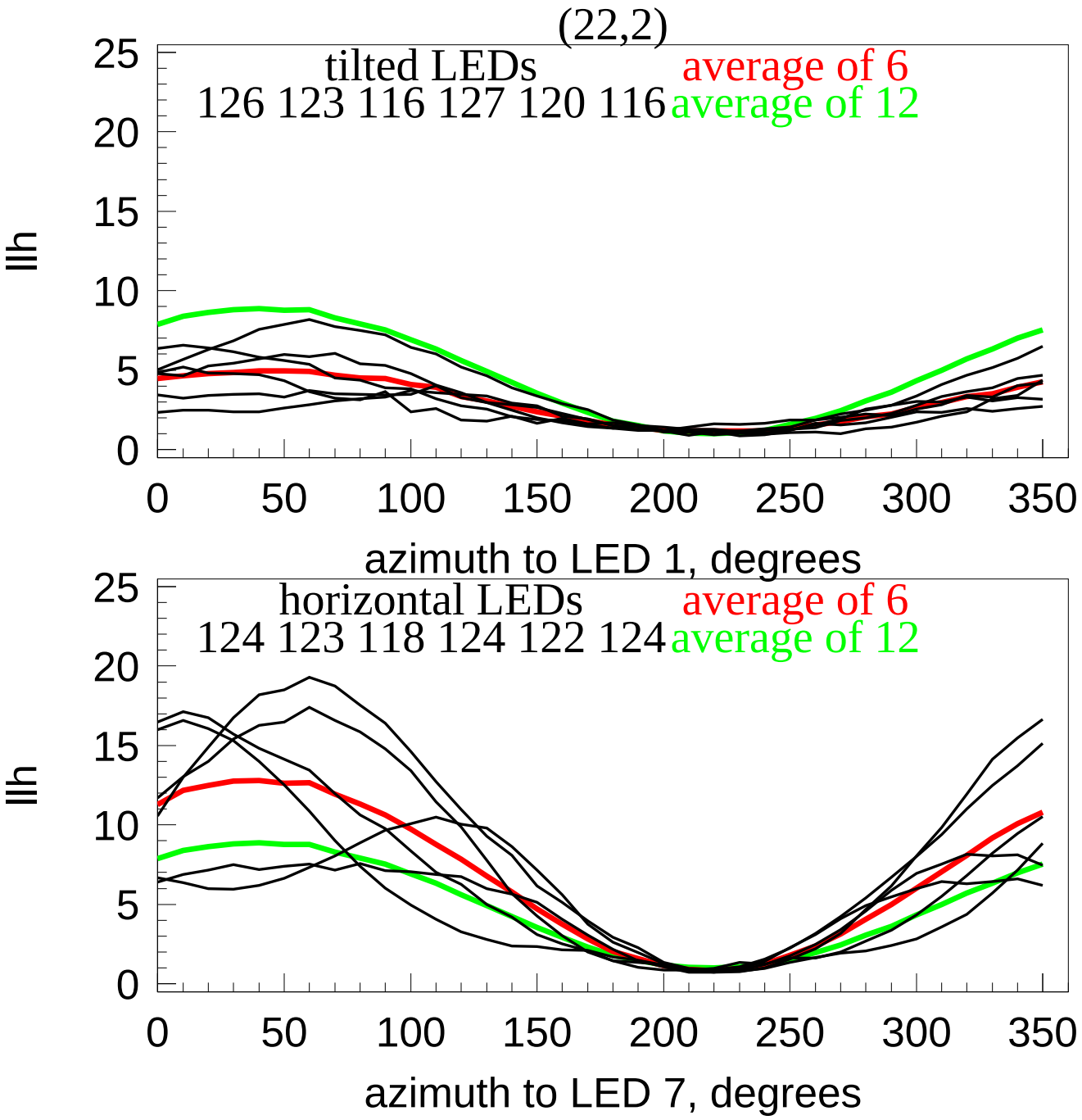

(20,27)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
255.8 ± 5.8

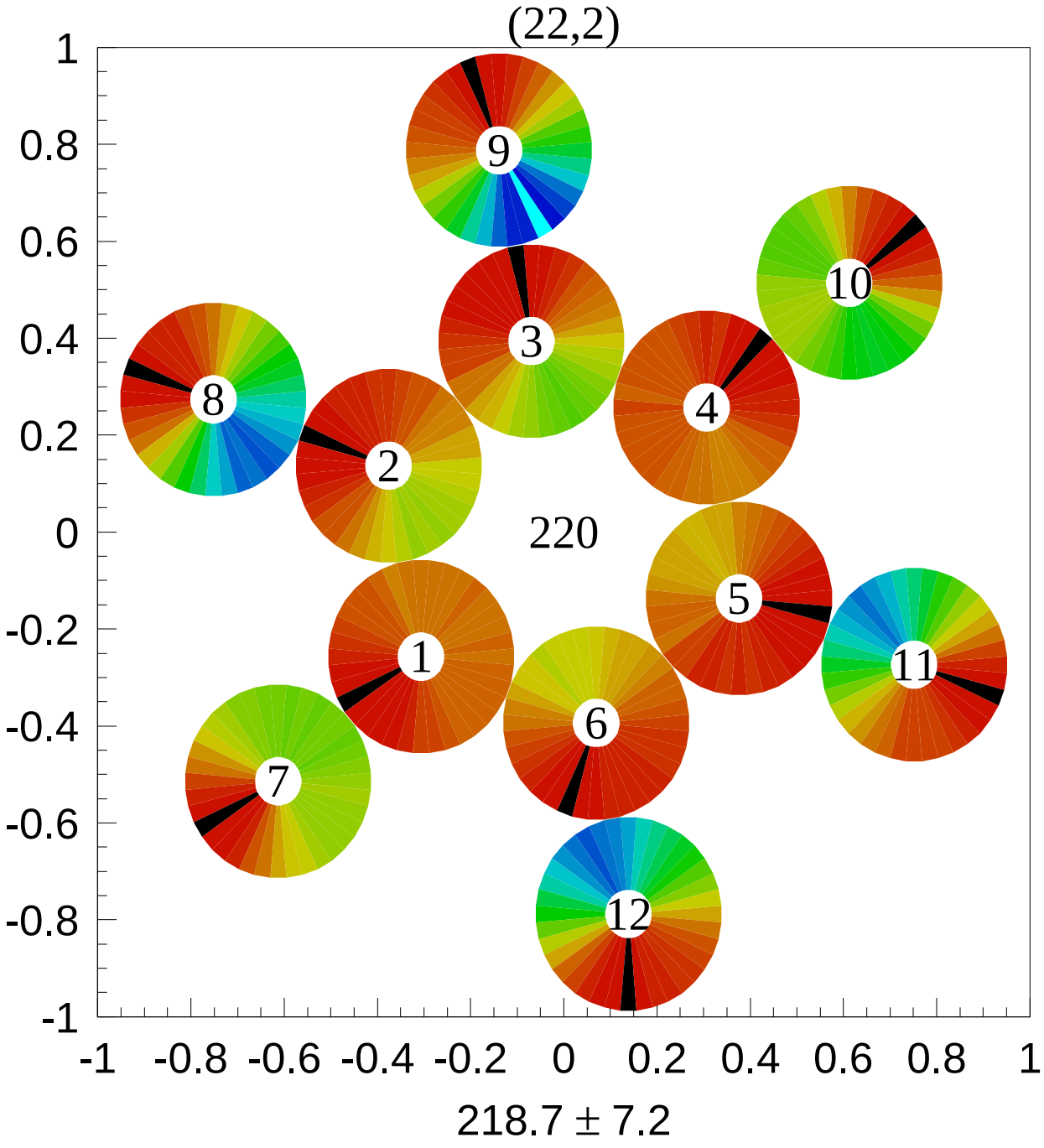

(20,28)
tilted LEDs
116 129 123 122 119 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 126 124 131 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

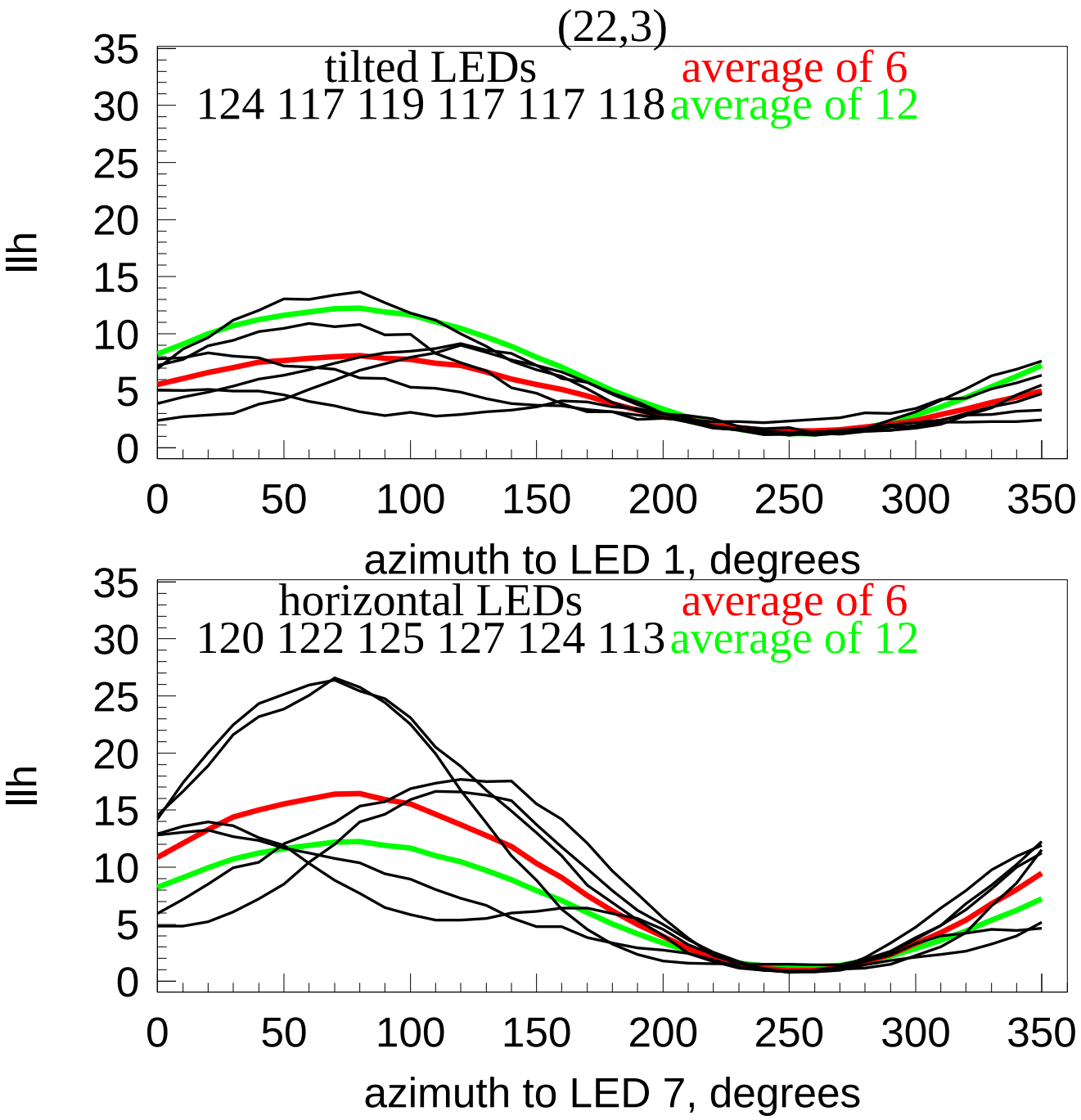

(20,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
233.5 ± 5.7

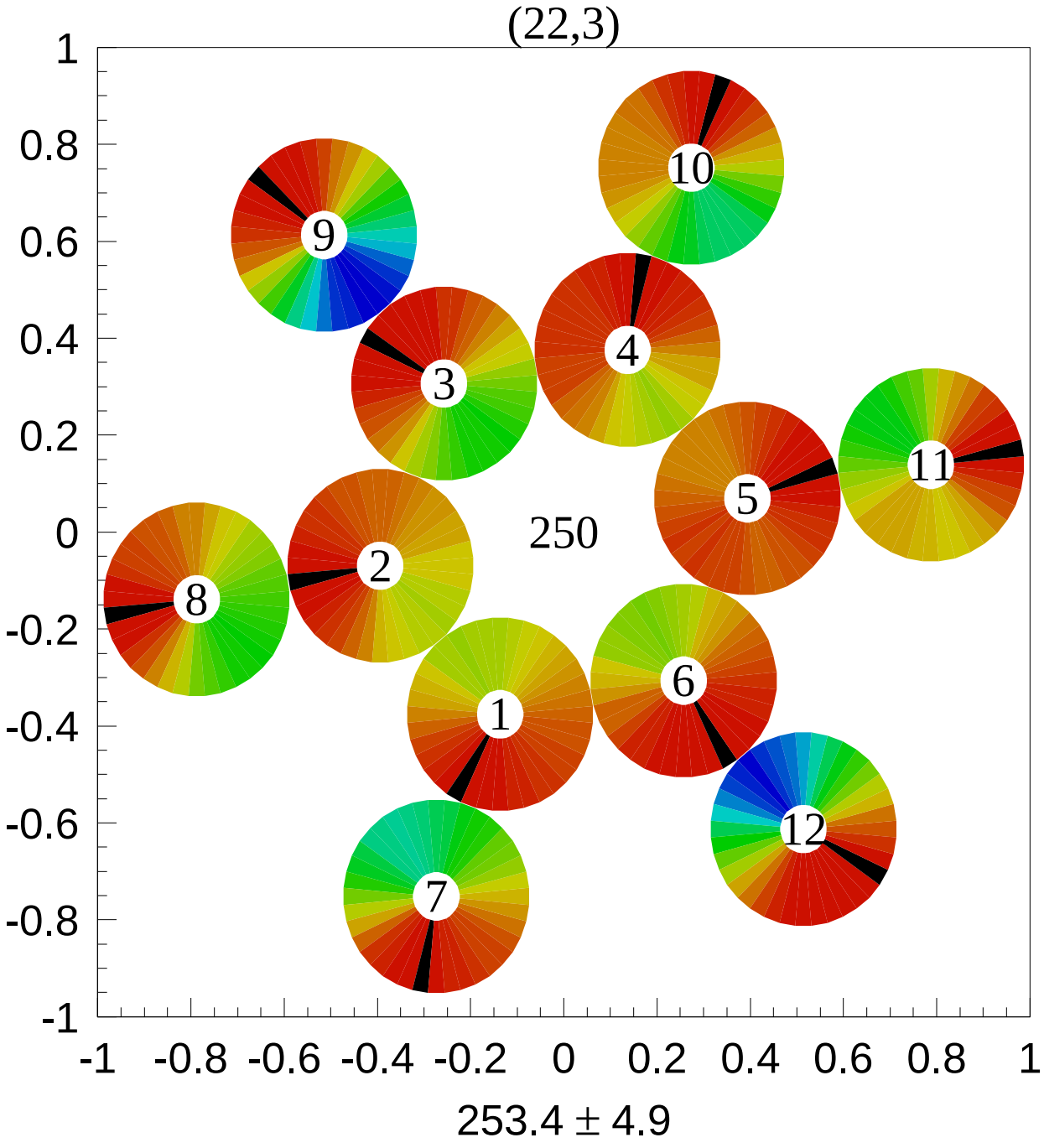

(22,1)
tilted LEDs
1 125 122 117 122 127
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 124 128 123 121 122
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

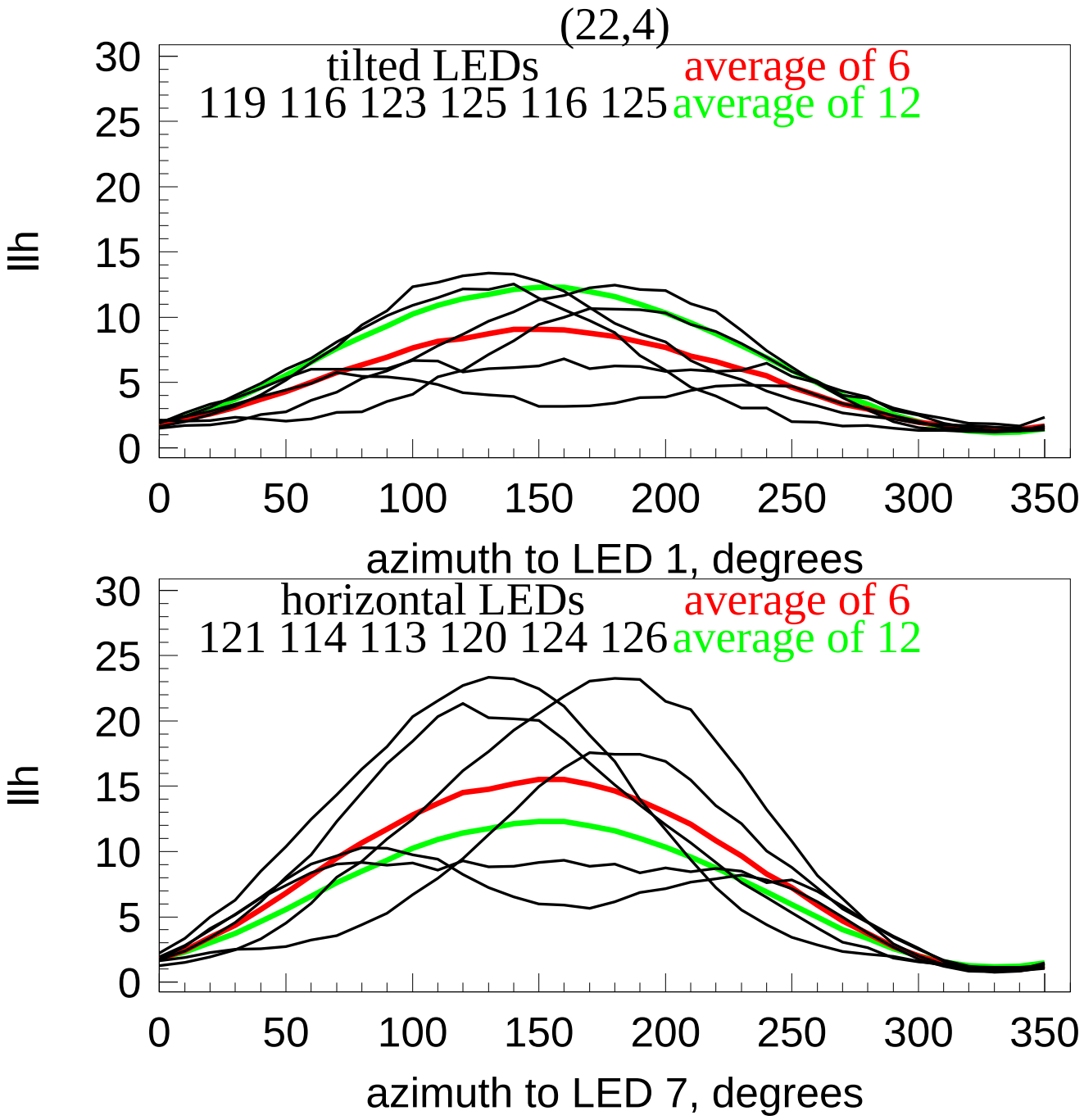

(22,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
38.8 ± 5.8

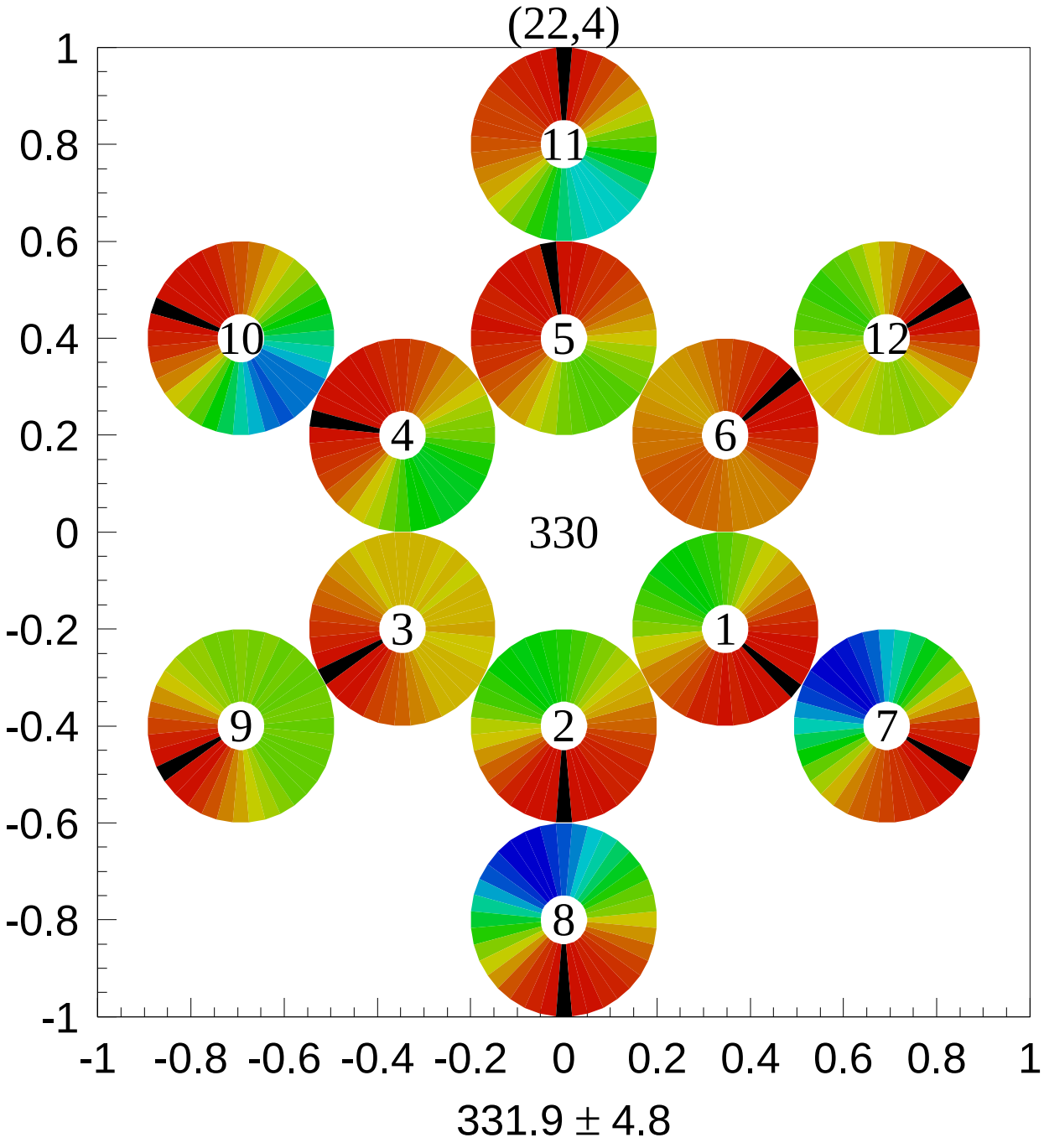

(22,2)
tilted LEDs
126 123 116 127 120 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 118 124 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

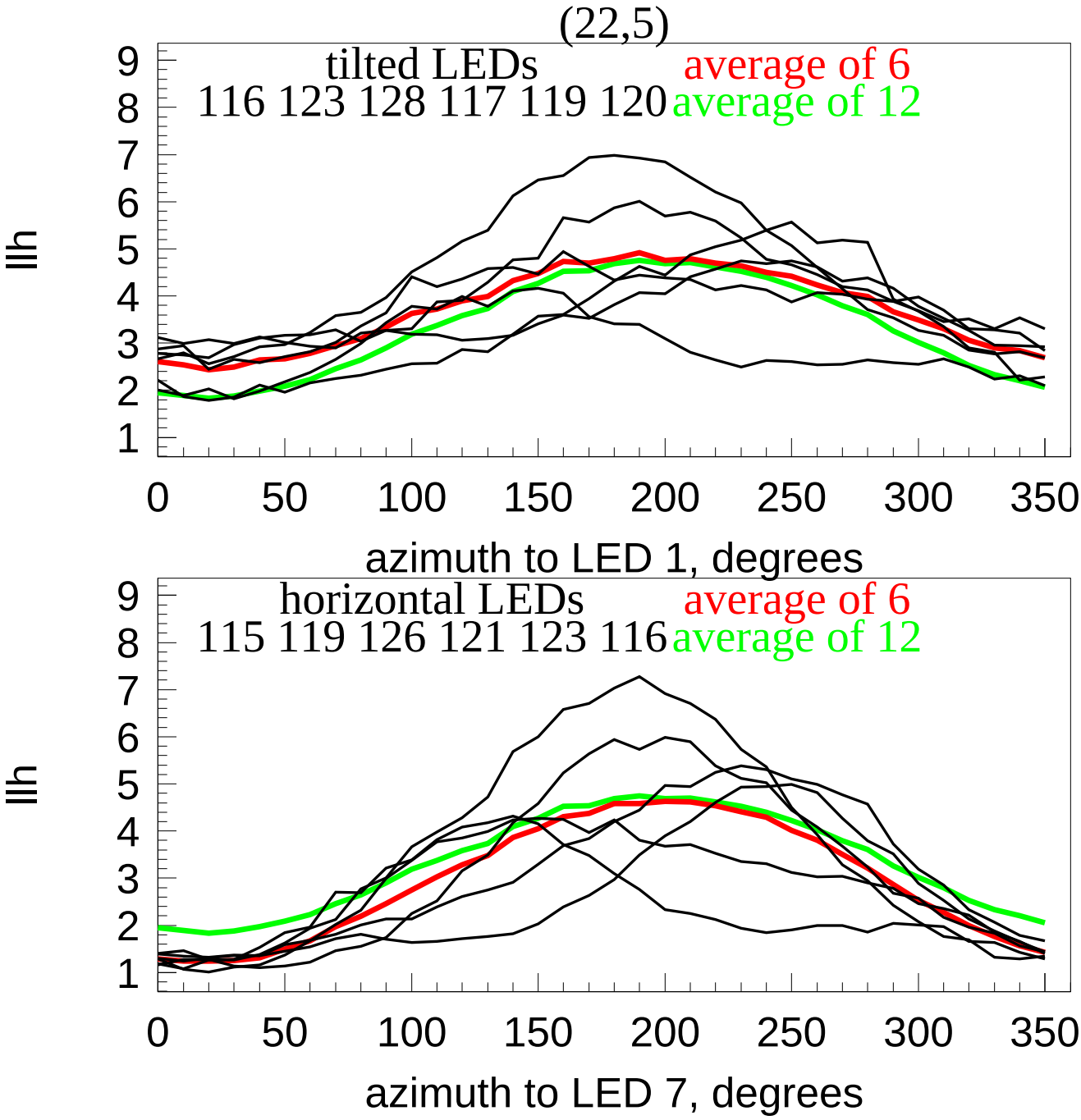

(22,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
218.7 ± 7.2

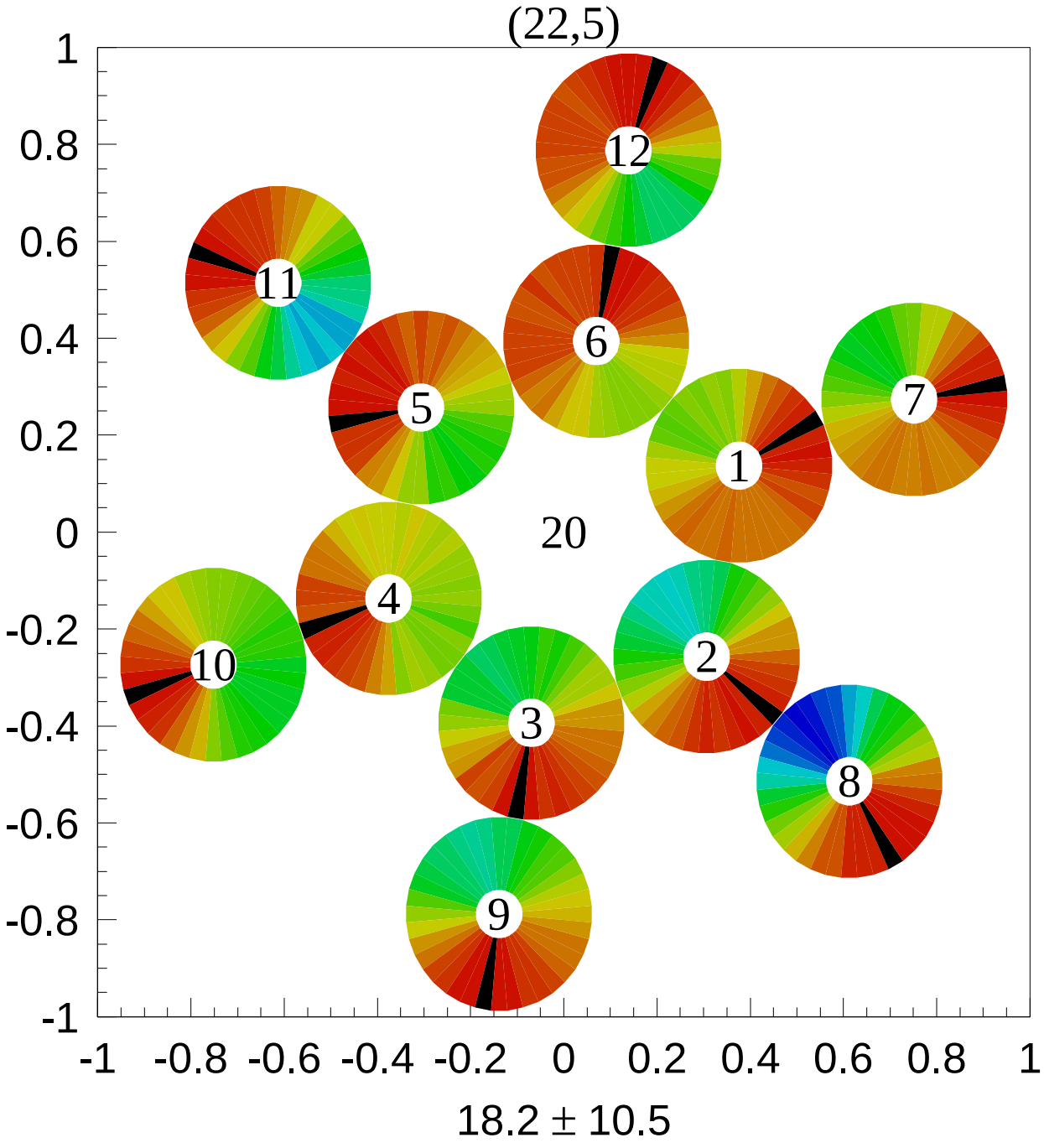

(22,3)
tilted LEDs
124 117 119 117 117 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 125 127 124 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

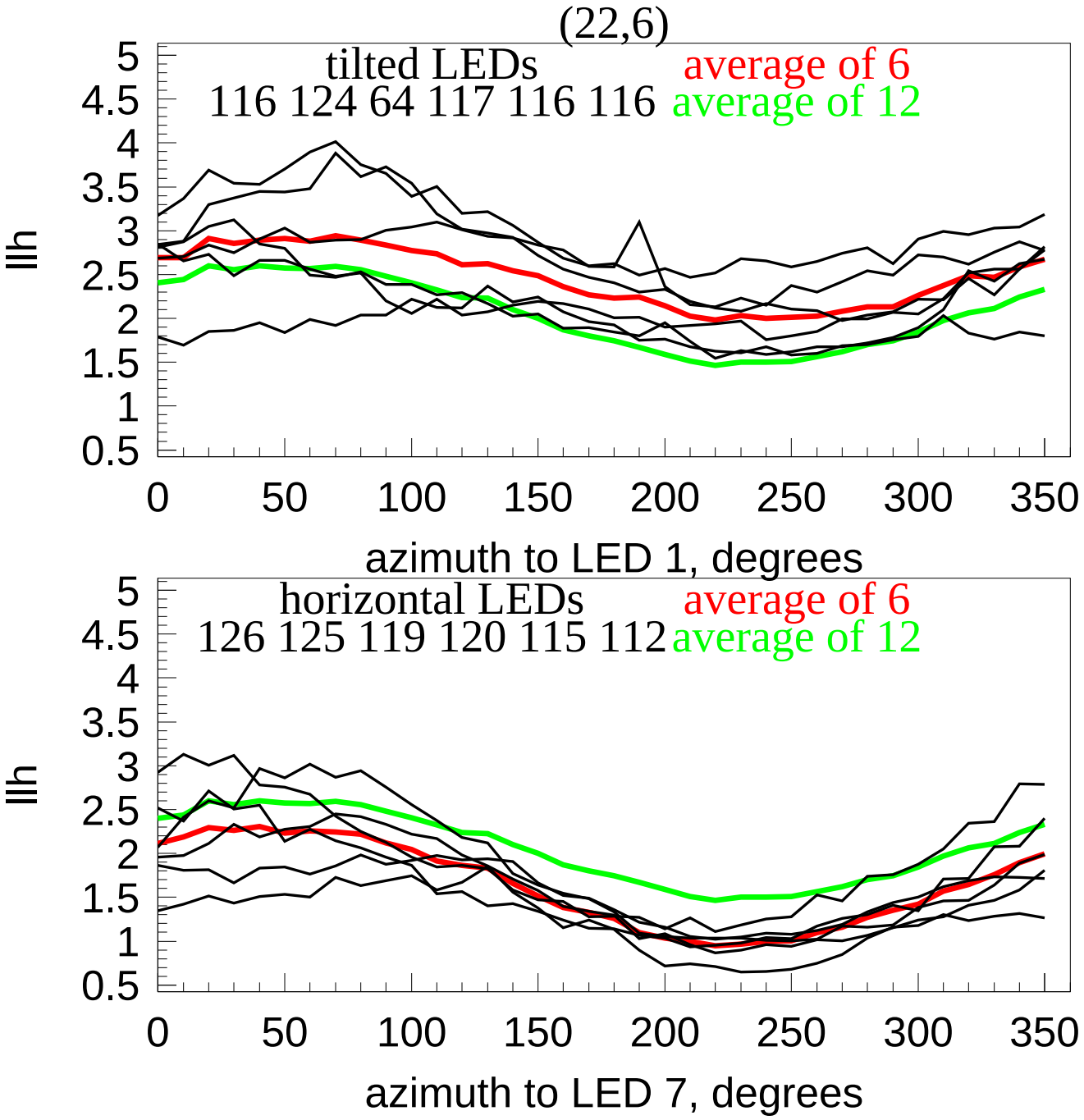

(22,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
6
1
12
7
253.4 ± 4.9

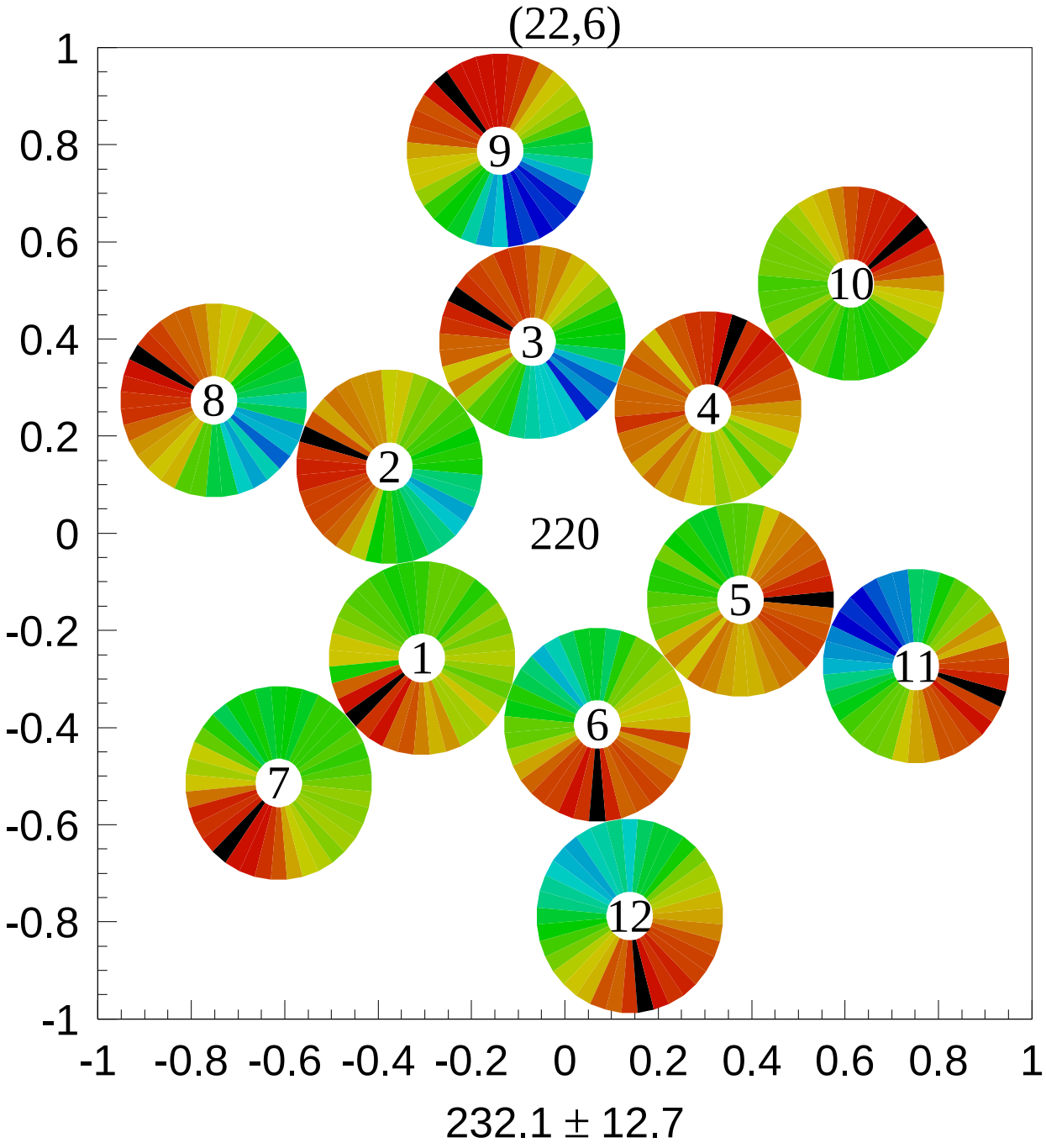

(22,4)
tilted LEDs
119 116 123 125 116 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 114 113 120 124 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

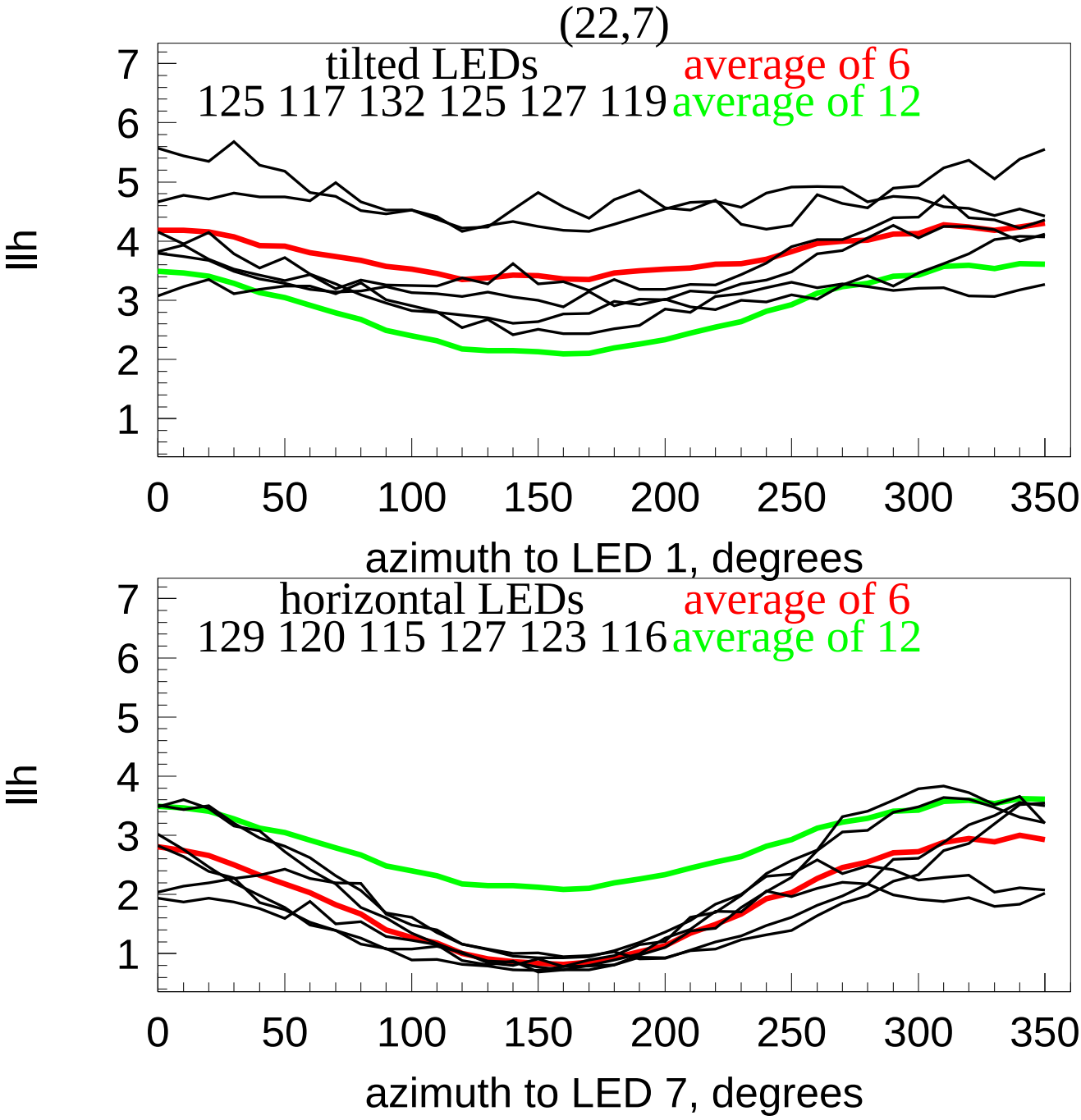

(22,4)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
331.9 ± 4.8

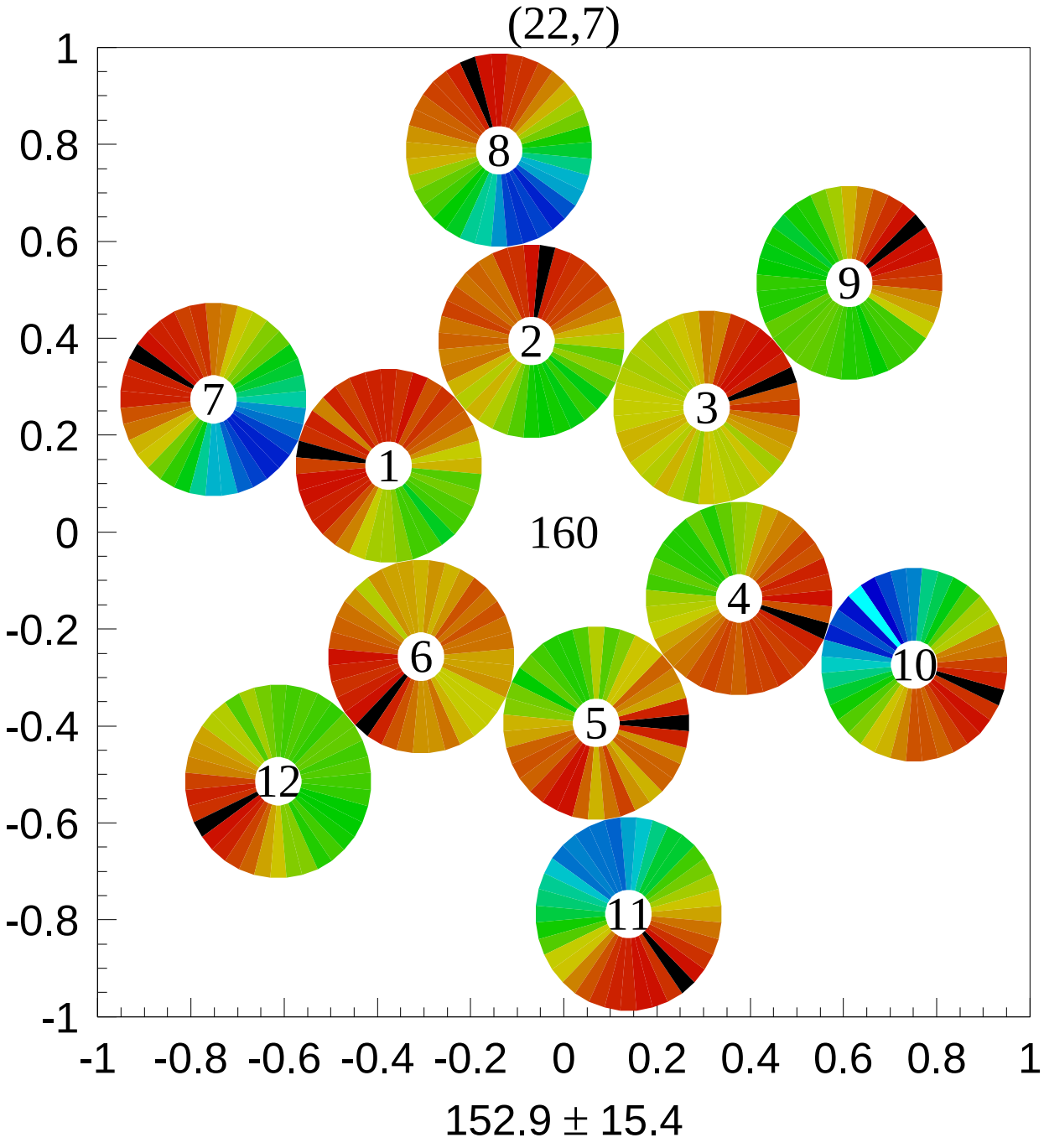

(22,5)
tilted LEDs
116 123 128 117 119 120
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
115 119 126 121 123 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

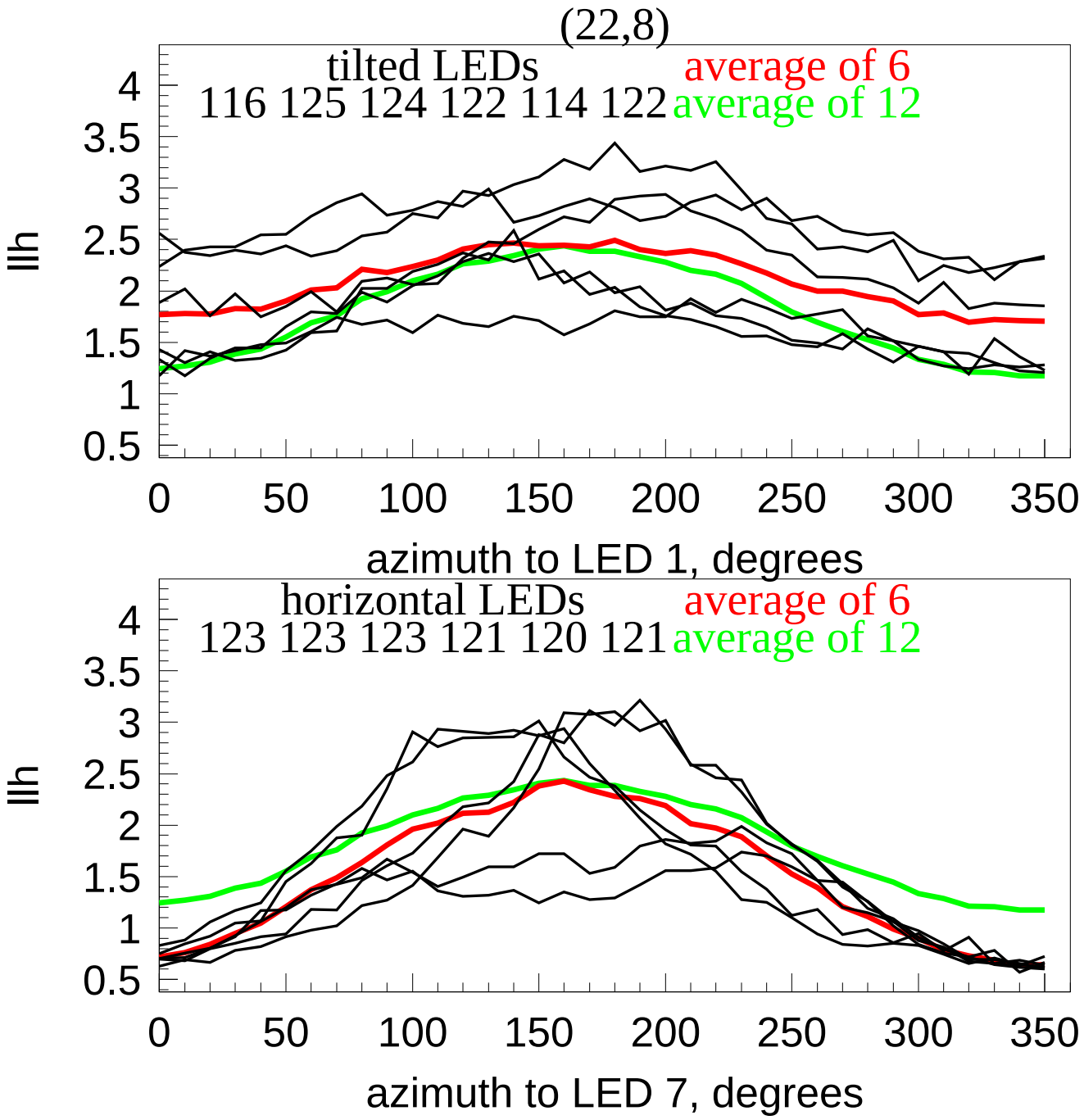

(22,5)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
18.2 ± 10.5

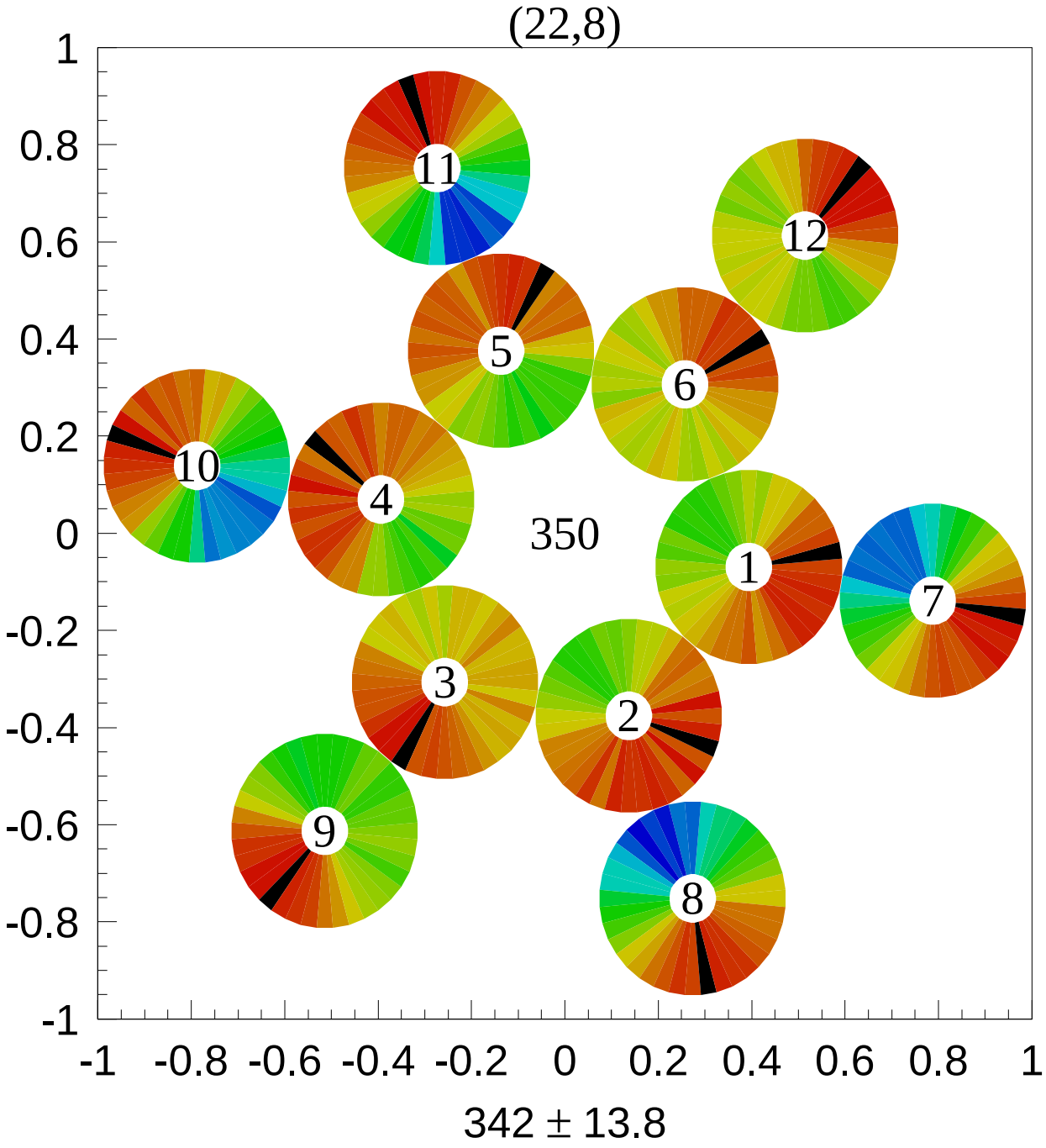

(22,6)
tilted LEDs
116 124 64 117 116 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 125 119 120 115 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

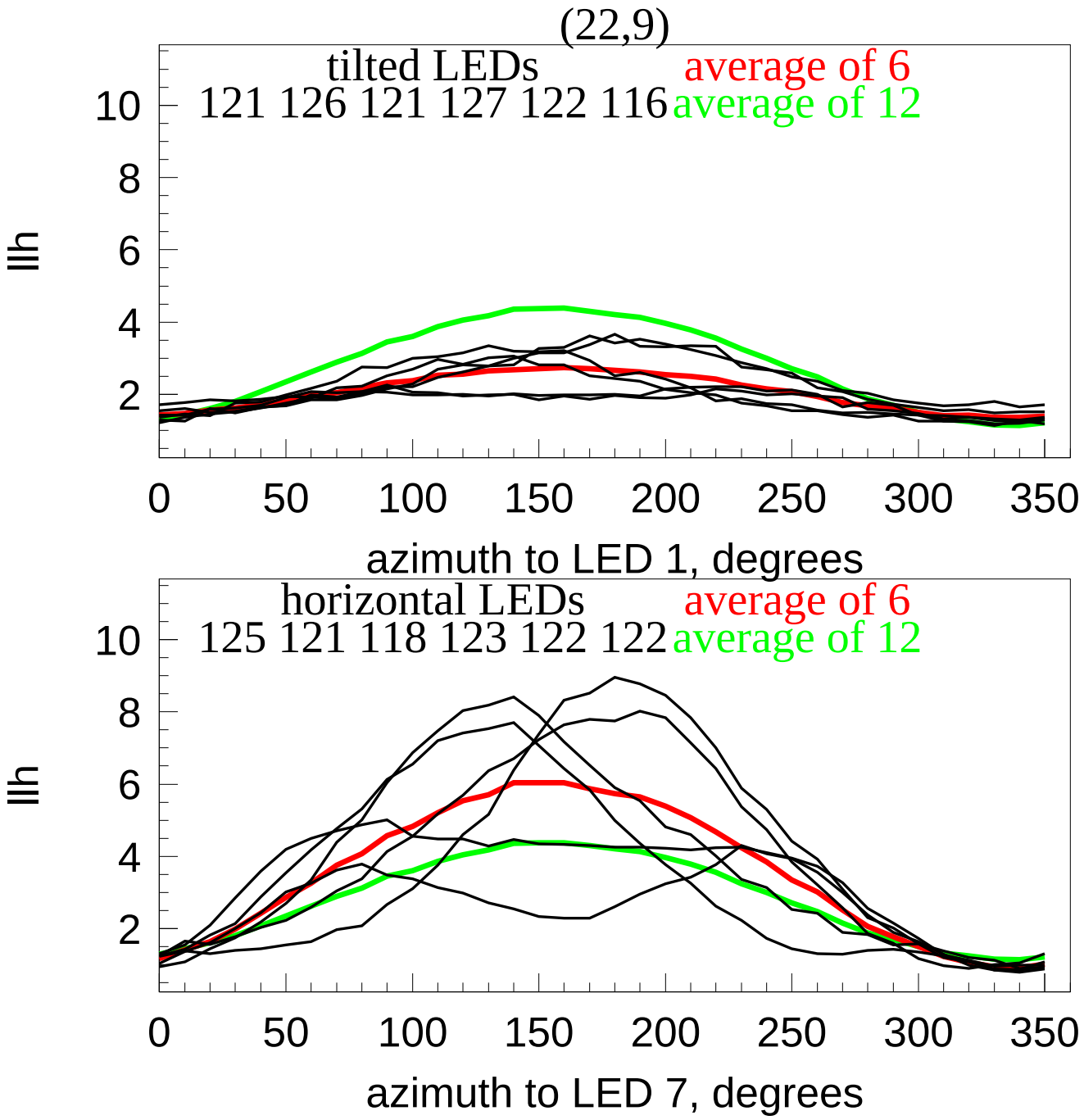

(22,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
232.1 ± 12.7

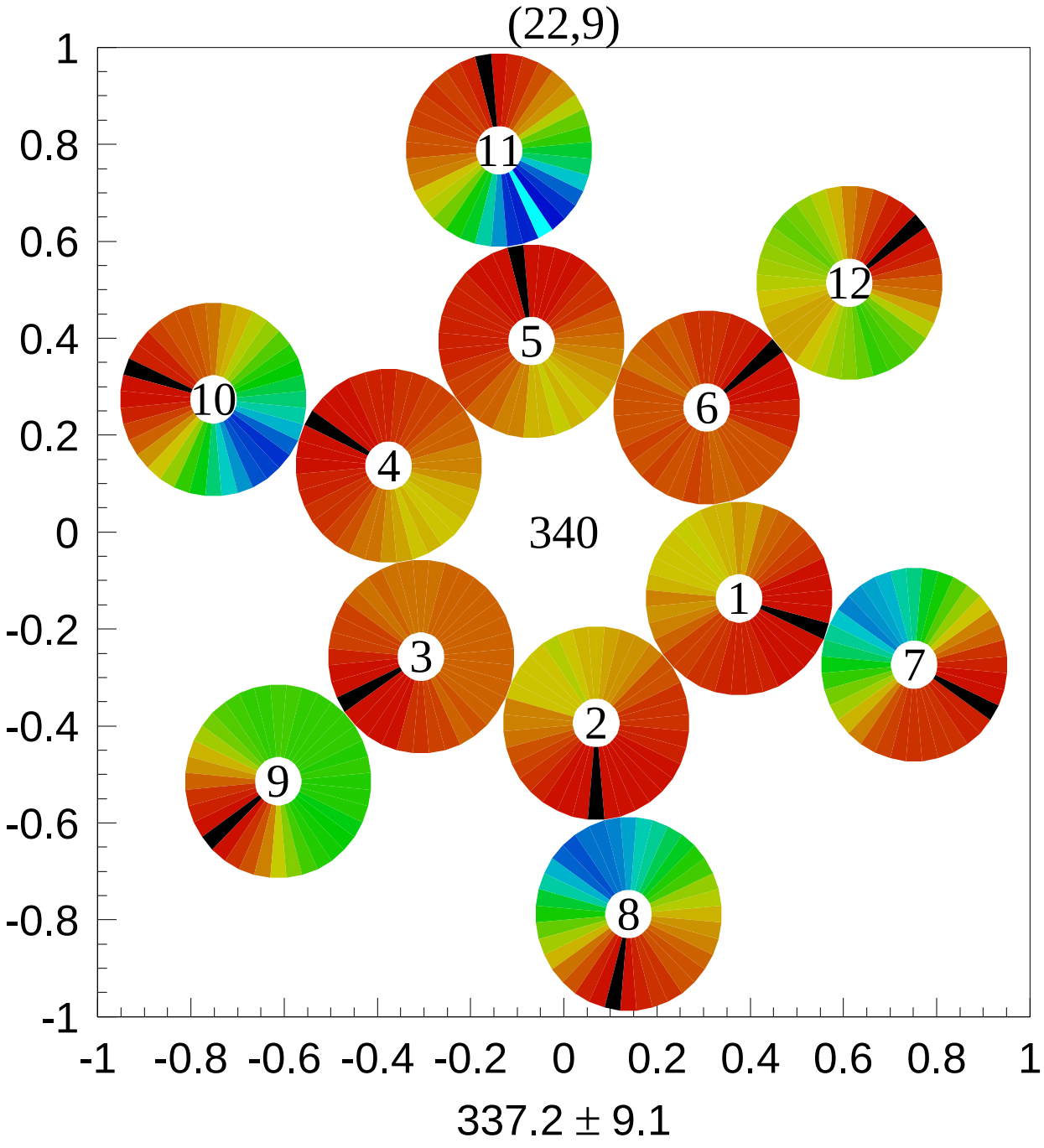

(22,7)
tilted LEDs
125 117 132 125 127 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 120 115 127 123 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

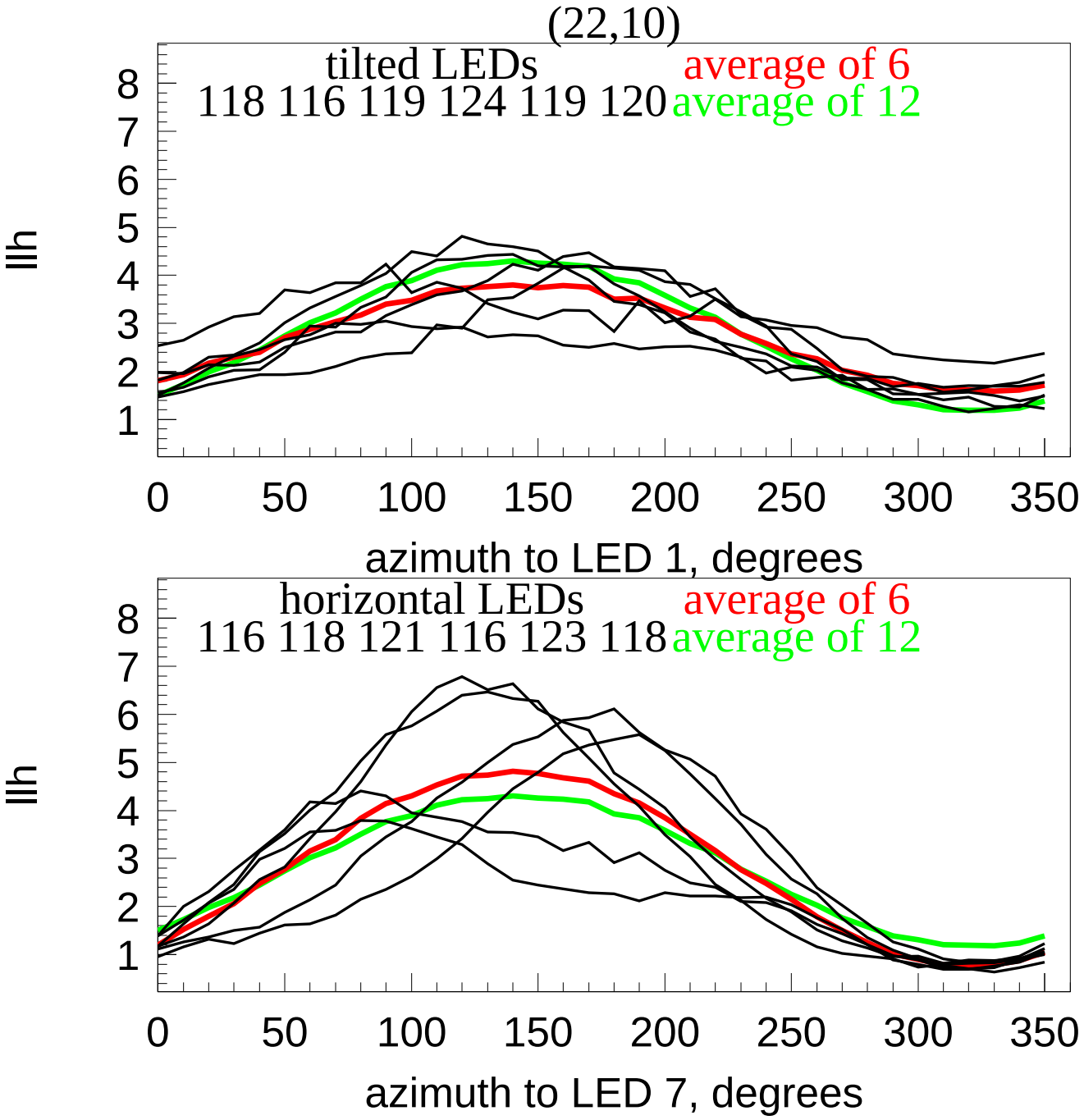

(22,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
152.9 ± 15.4

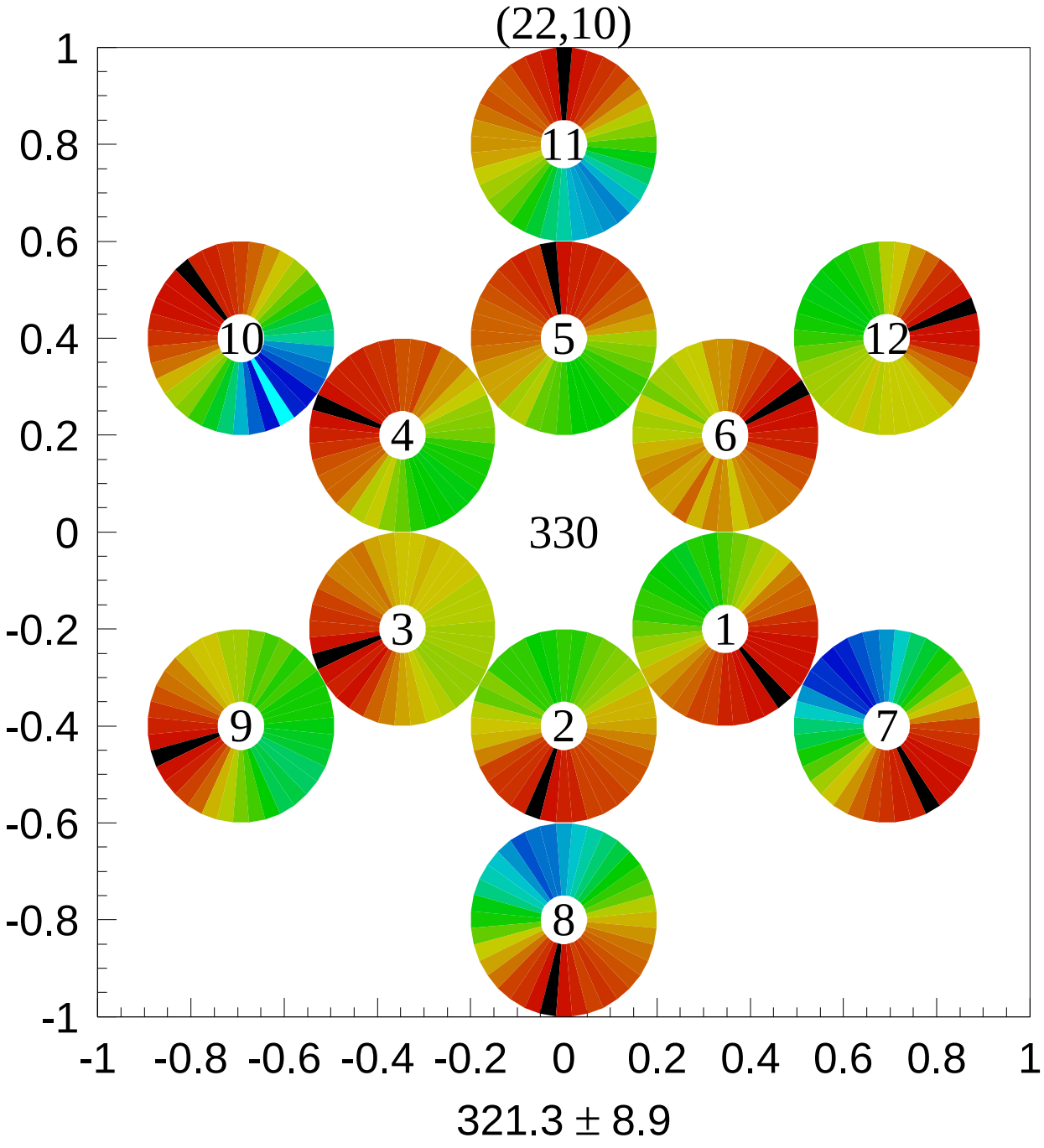

(22,8)
tilted LEDs
116 125 124 122 114 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 123 121 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

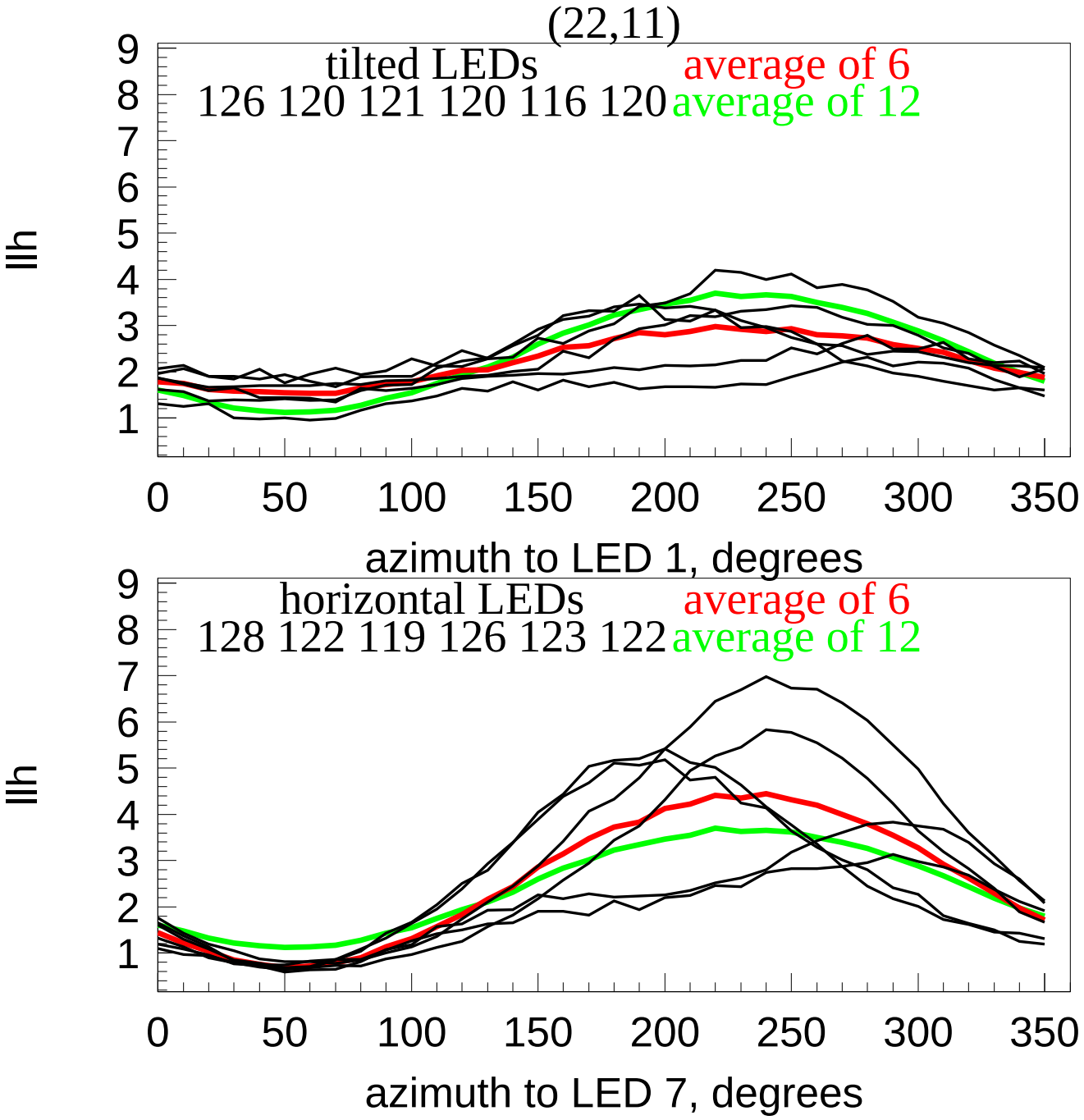

(22,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
342 ± 13.8

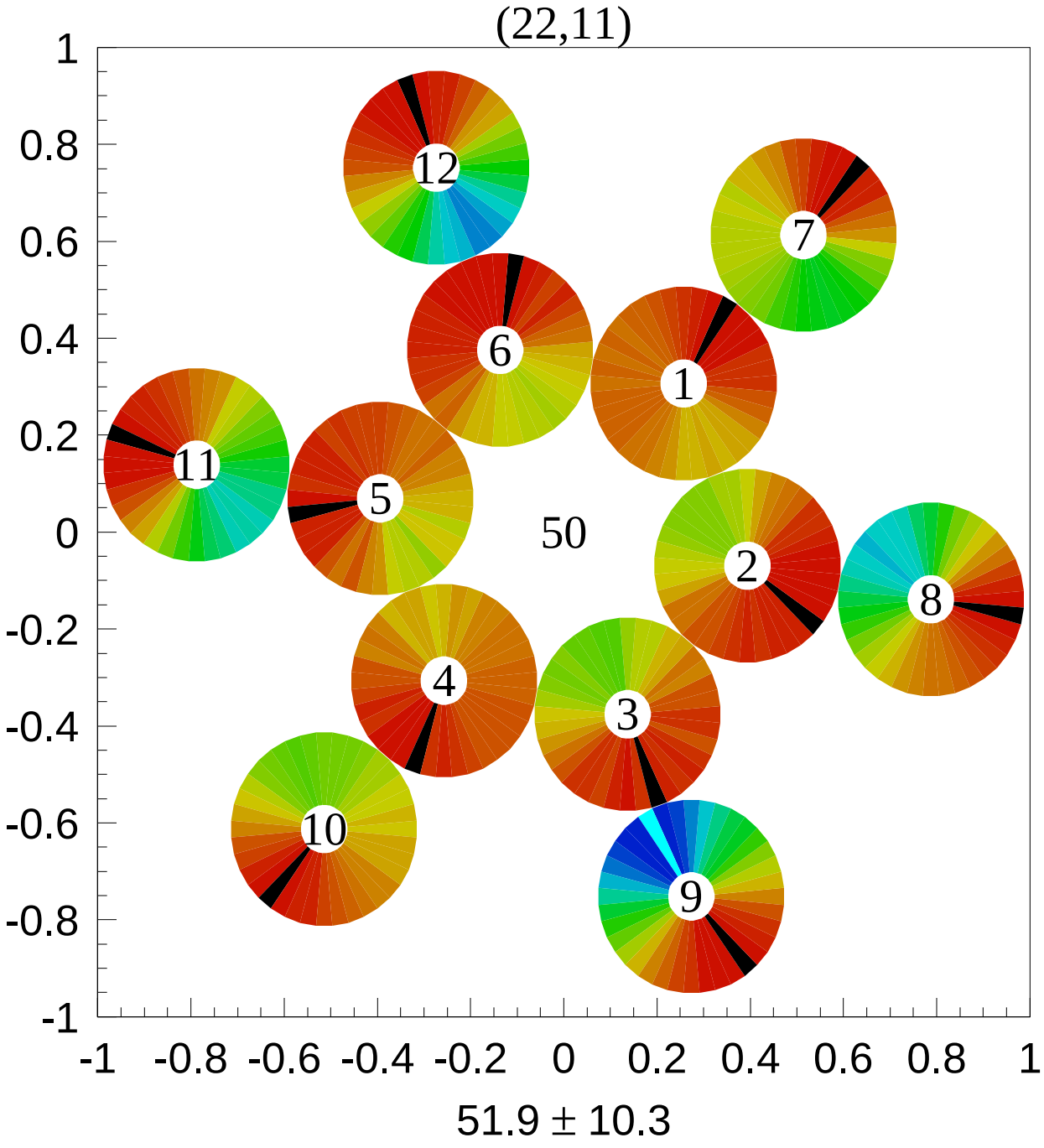

(22,9)
tilted LEDs
121 126 121 127 122 116
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 121 118 123 122 122
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

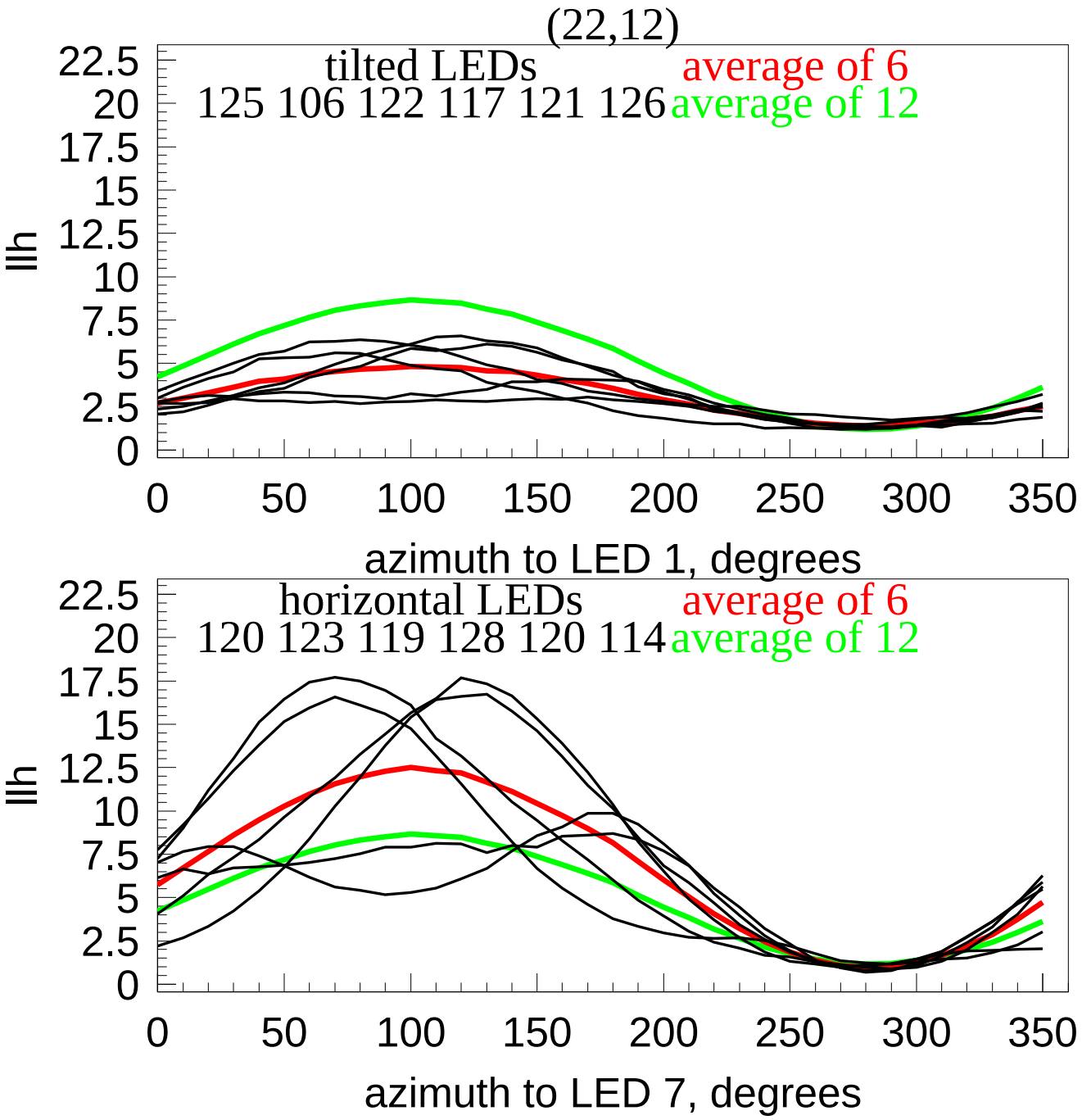

(22,9)
11
12
5
6
10
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
337.2 ± 9.1

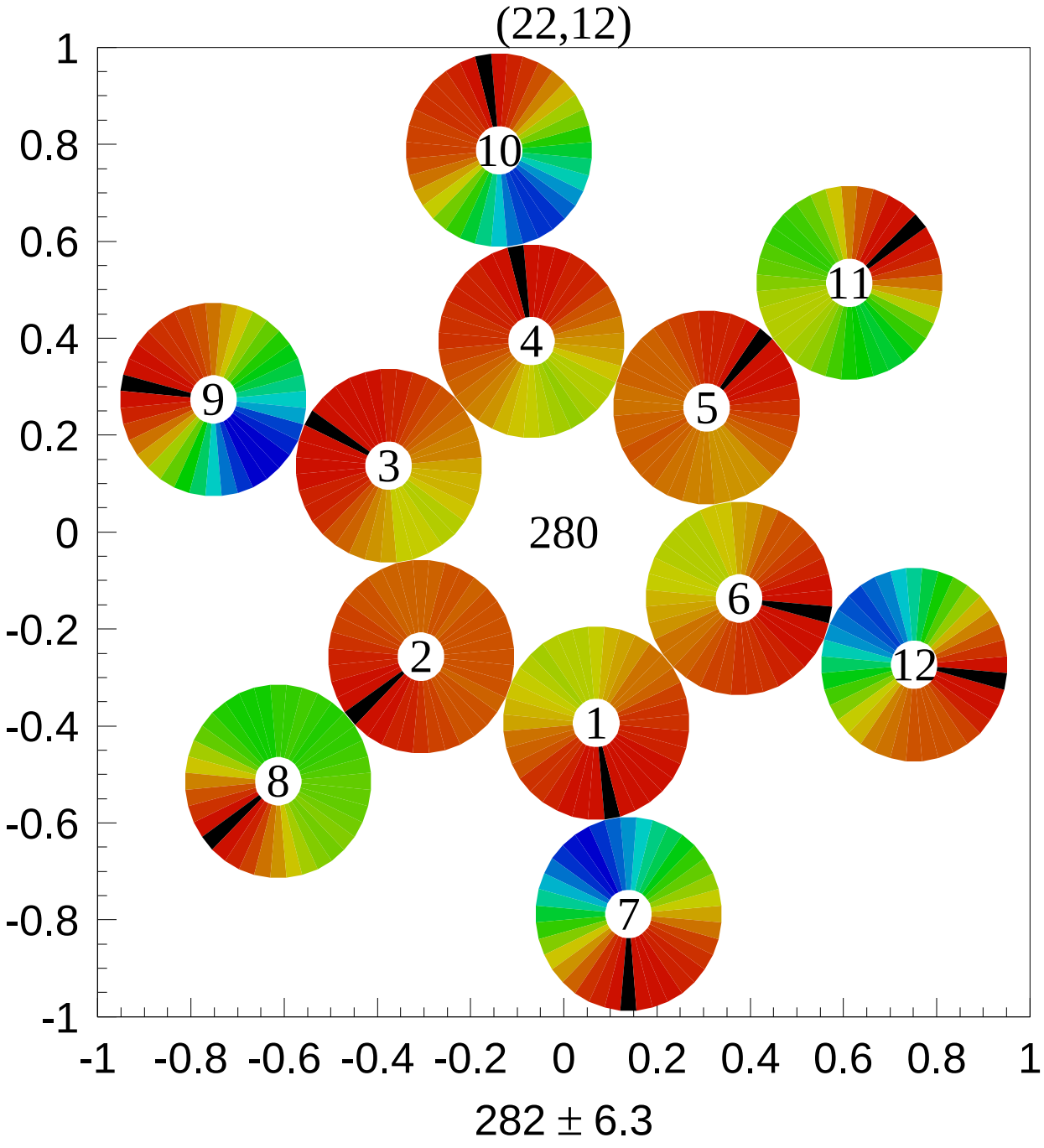

(22,10)
tilted LEDs
118 116 119 124 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 118 121 116 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

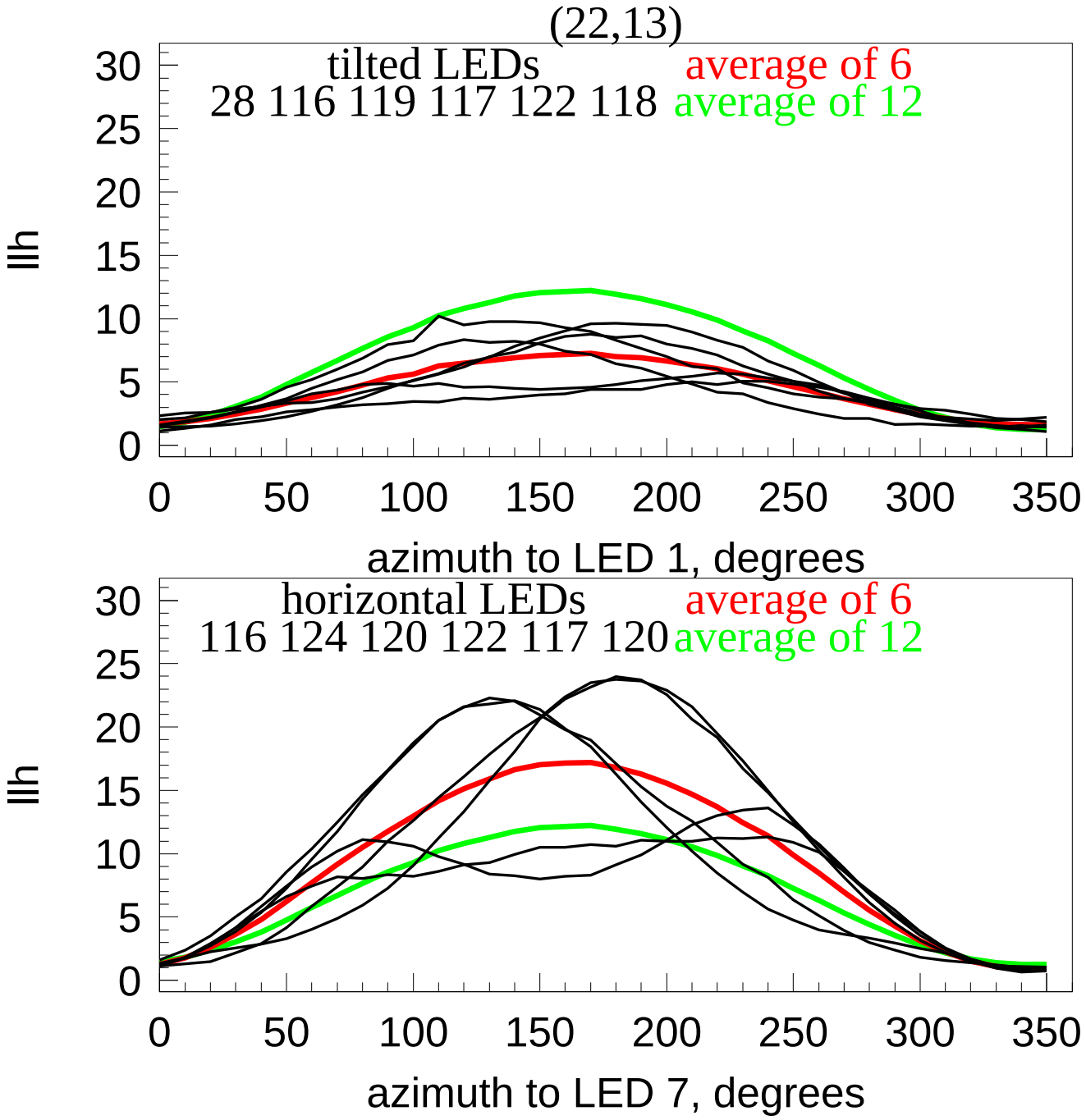

(22,10)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
321.3 ± 8.9

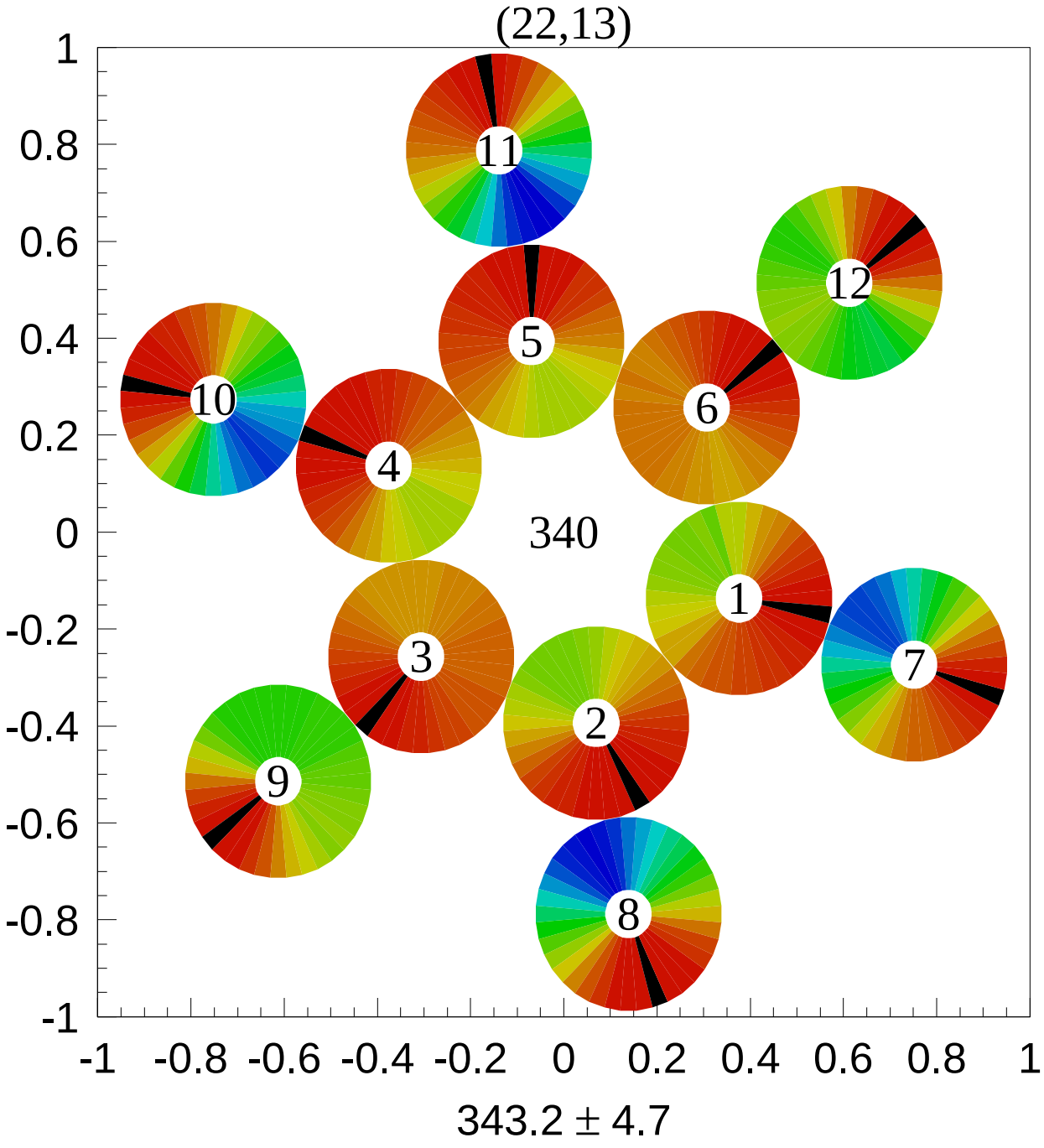

(22,11)
tilted LEDs
126 120 121 120 116 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 122 119 126 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

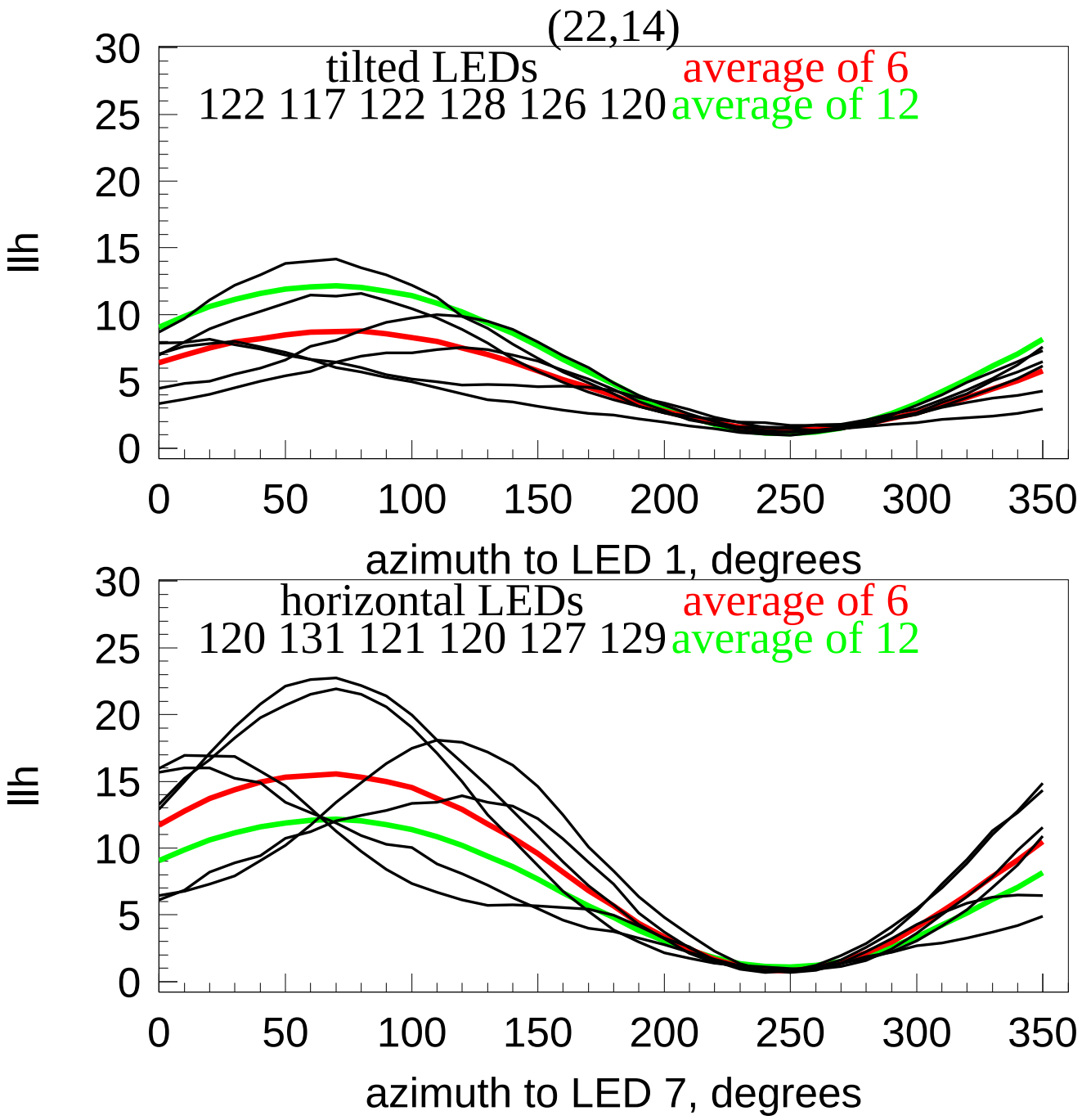

(22,11)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
51.9 ± 10.3

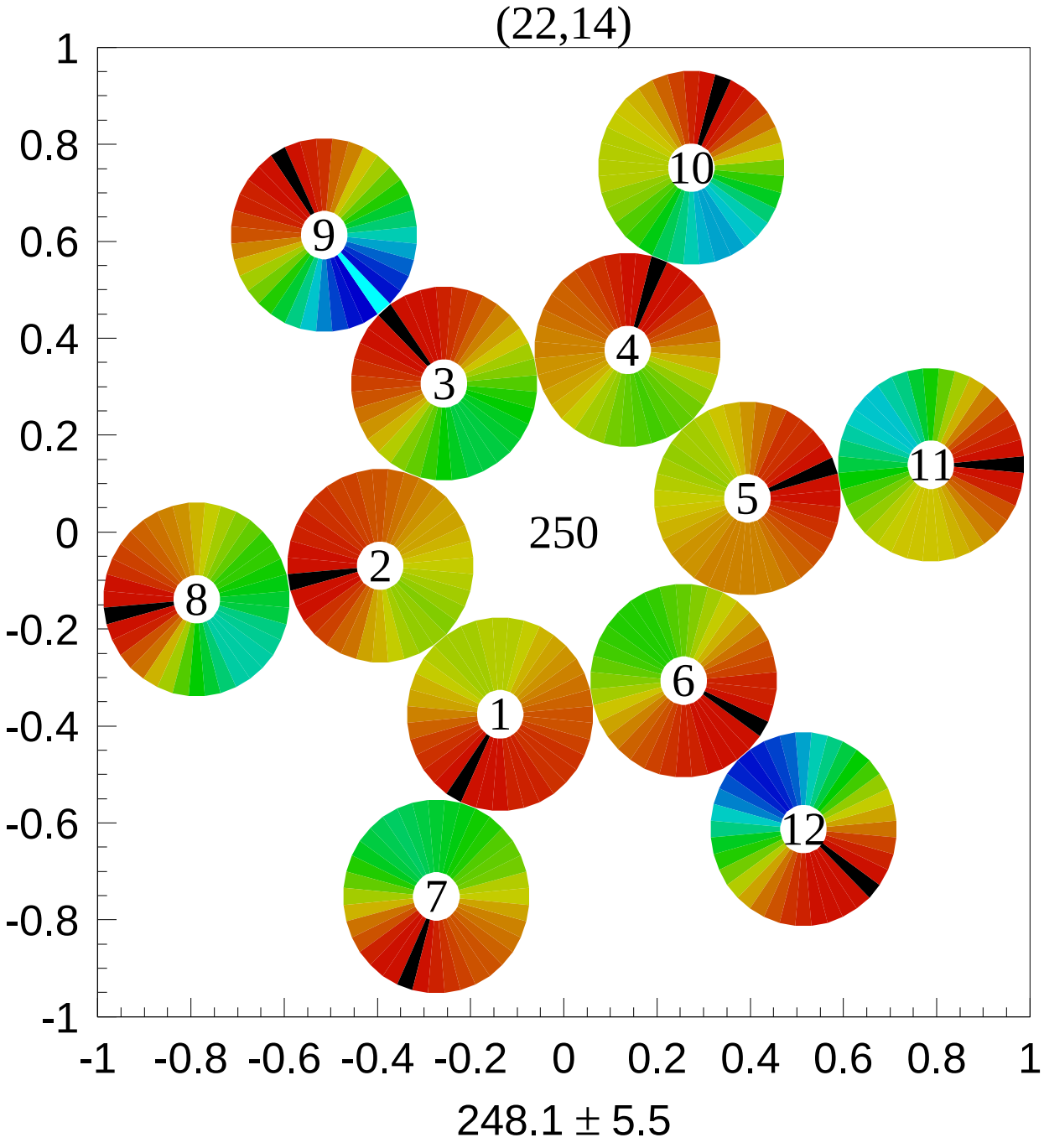

(22,12)
tilted LEDs
125 106 122 117 121 126
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 123 119 128 120 114
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

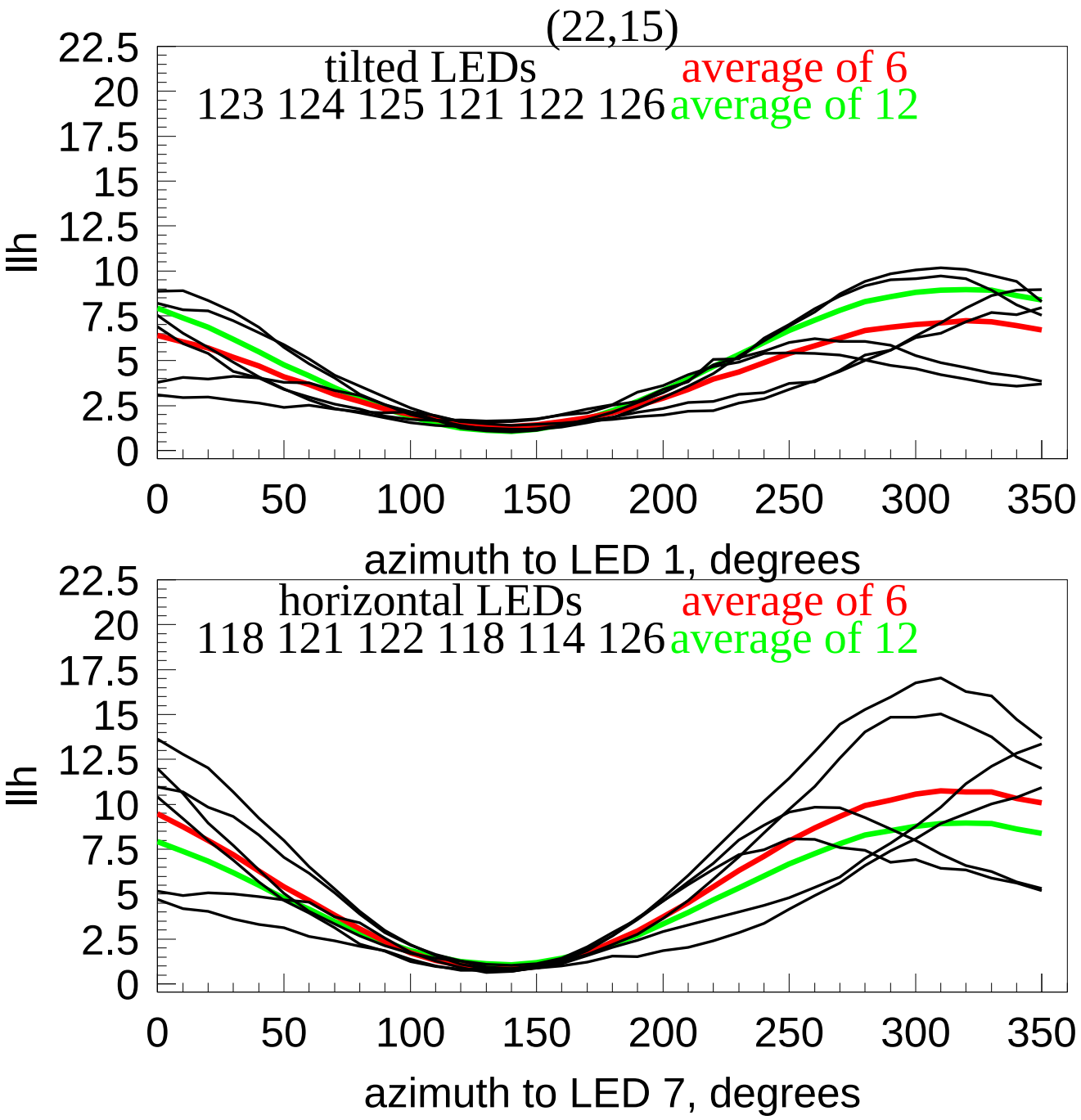

(22,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
282 ± 6.3

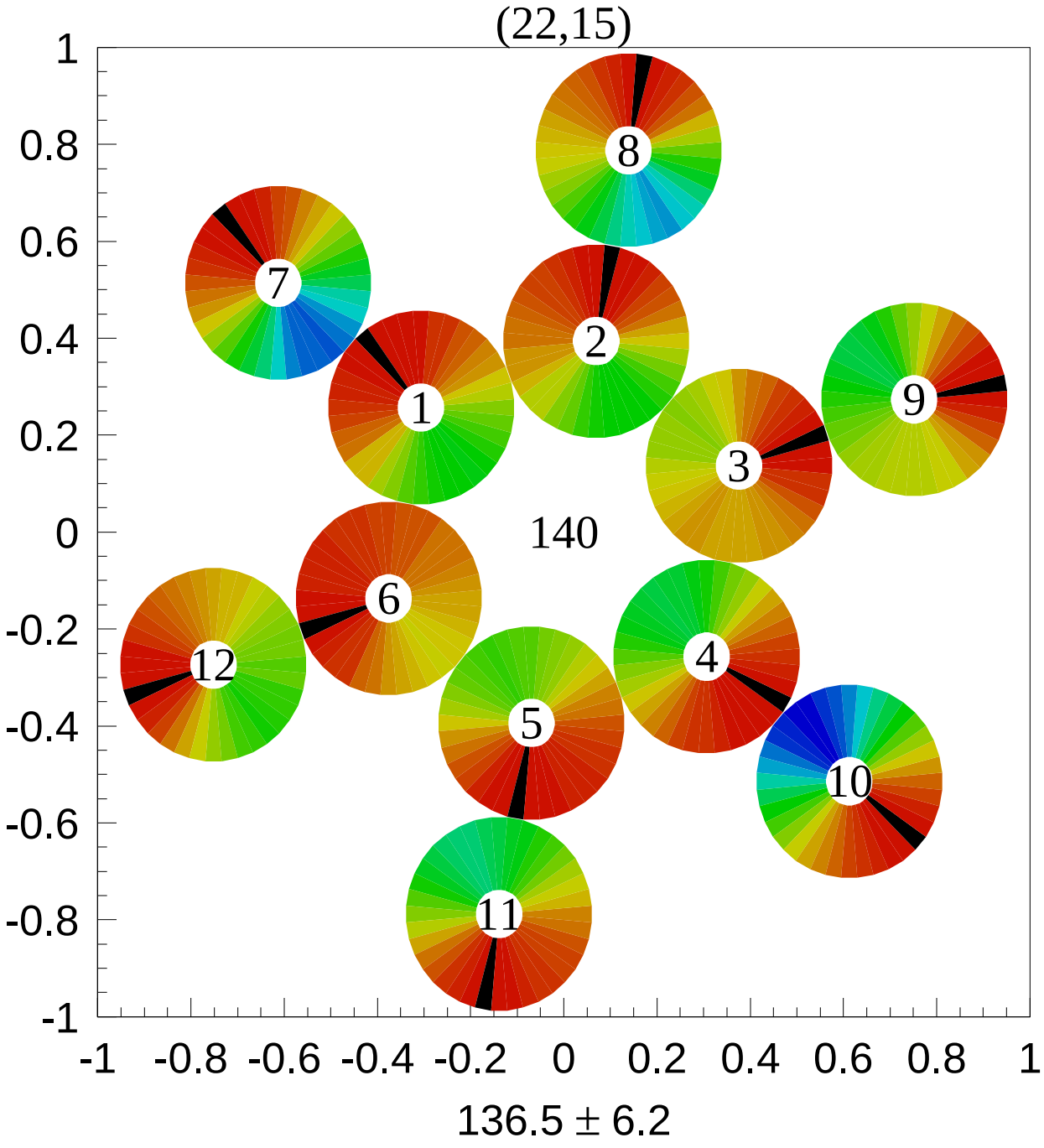

(22,13)
tilted LEDs
28 116 119 117 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 124 120 122 117 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

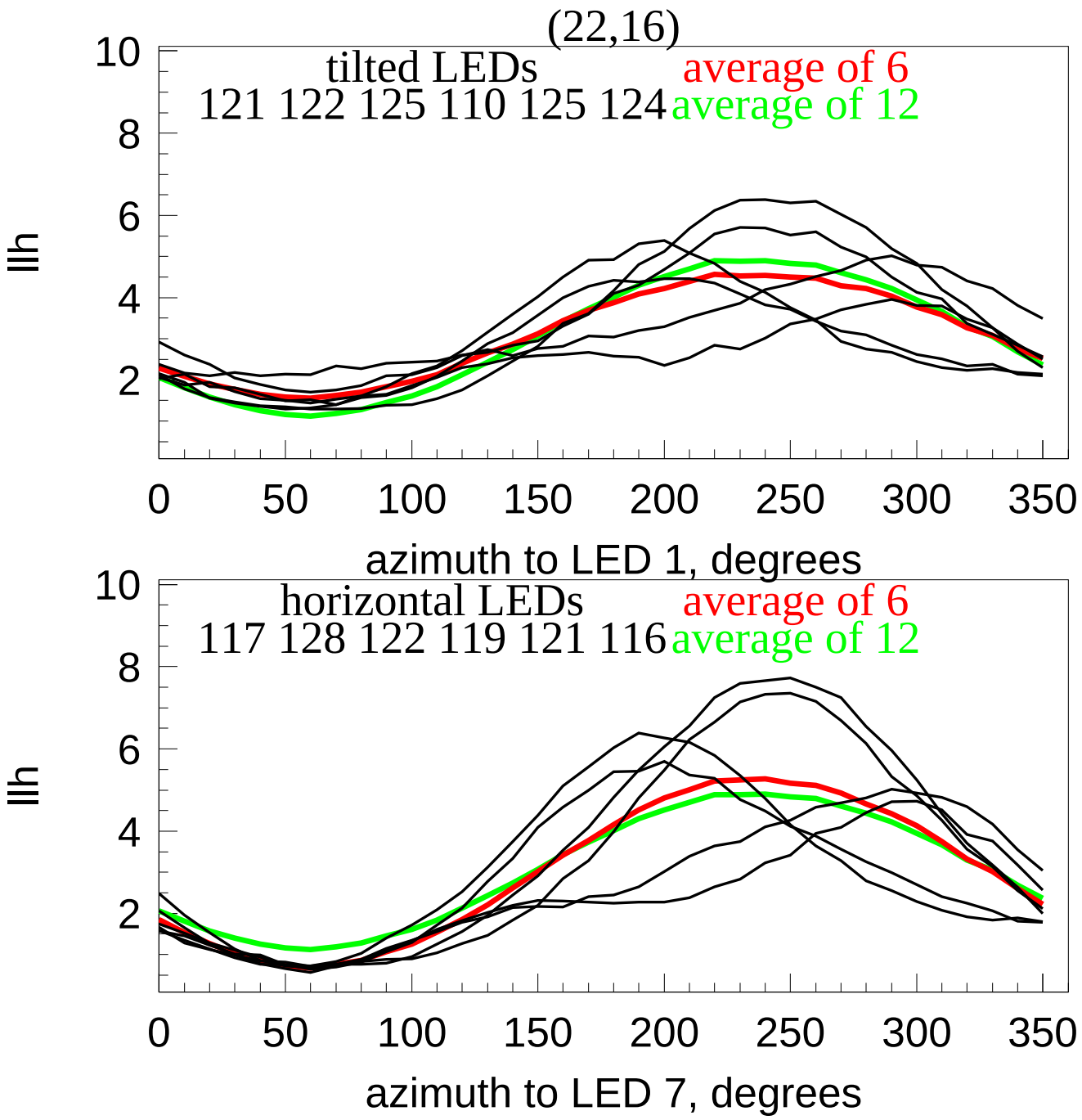

(22,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
340
1
7
3
2
9
8
343.2 ± 4.7

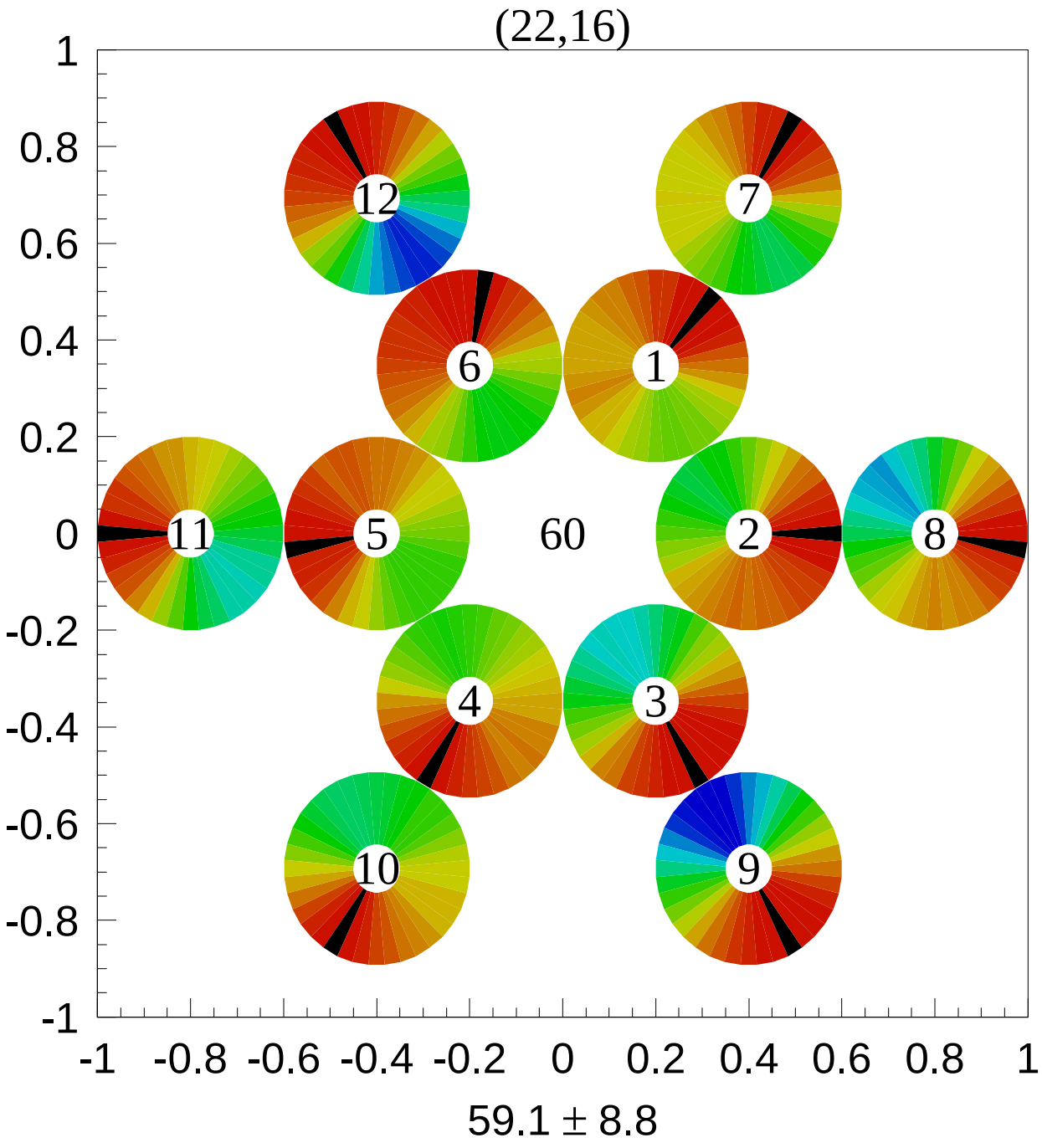

(22,14)
tilted LEDs
122 117 122 128 126 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 131 121 120 127 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

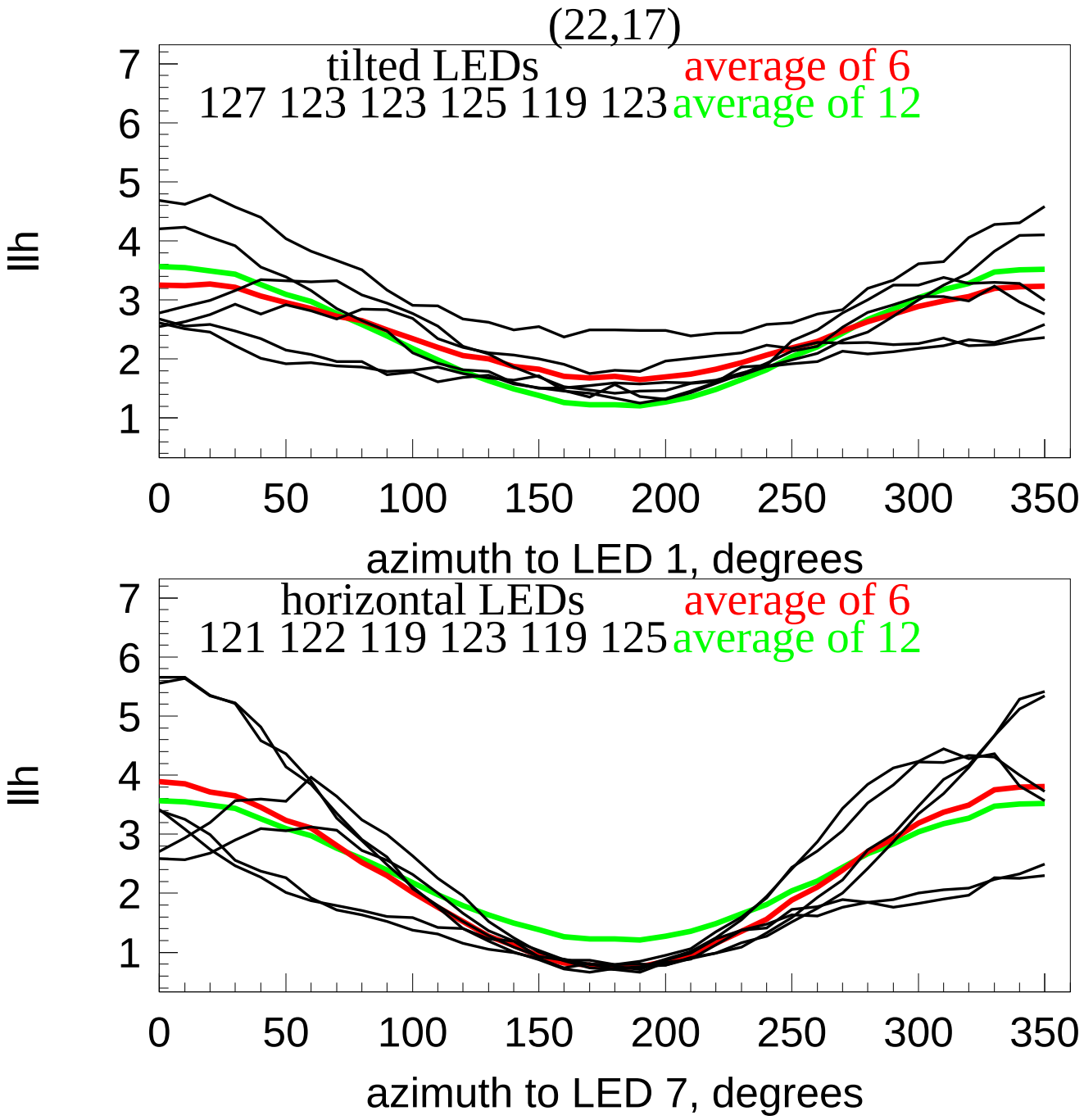

(22,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
6
1
12
7
248.1 ± 5.5

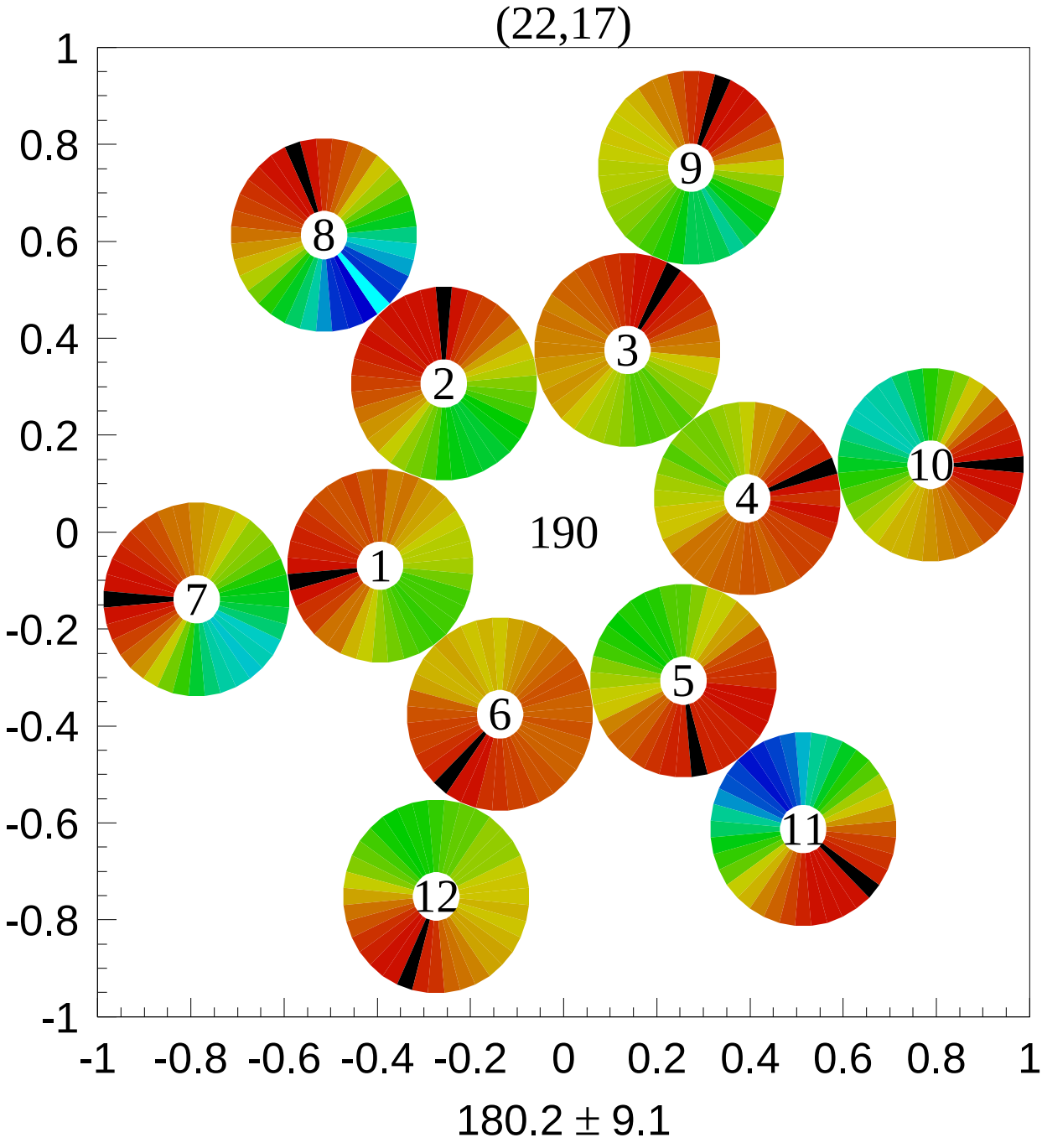

(22,15)
tilted LEDs
123 124 125 121 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 122 118 114 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

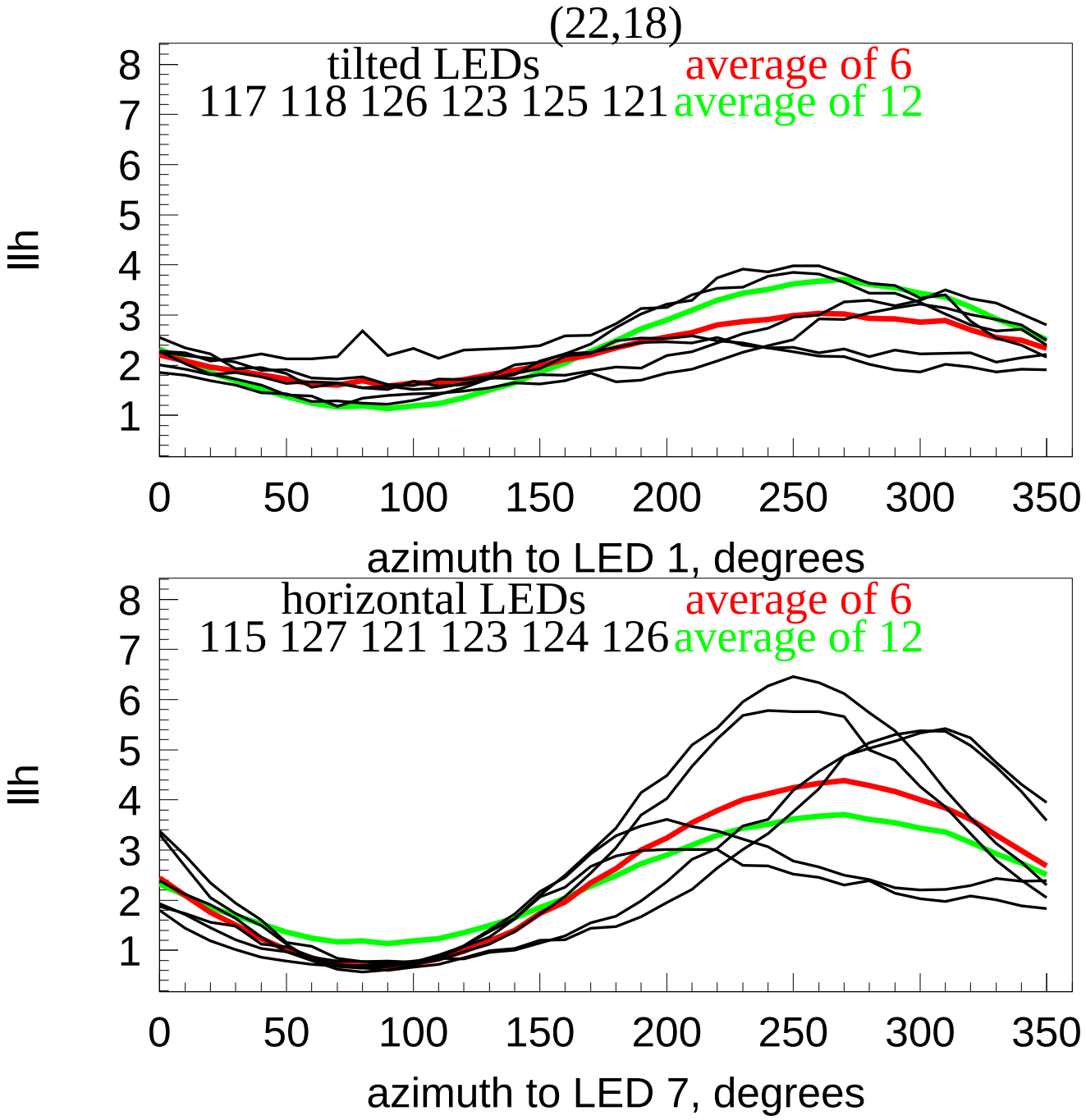

(22,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
136.5 ± 6.2

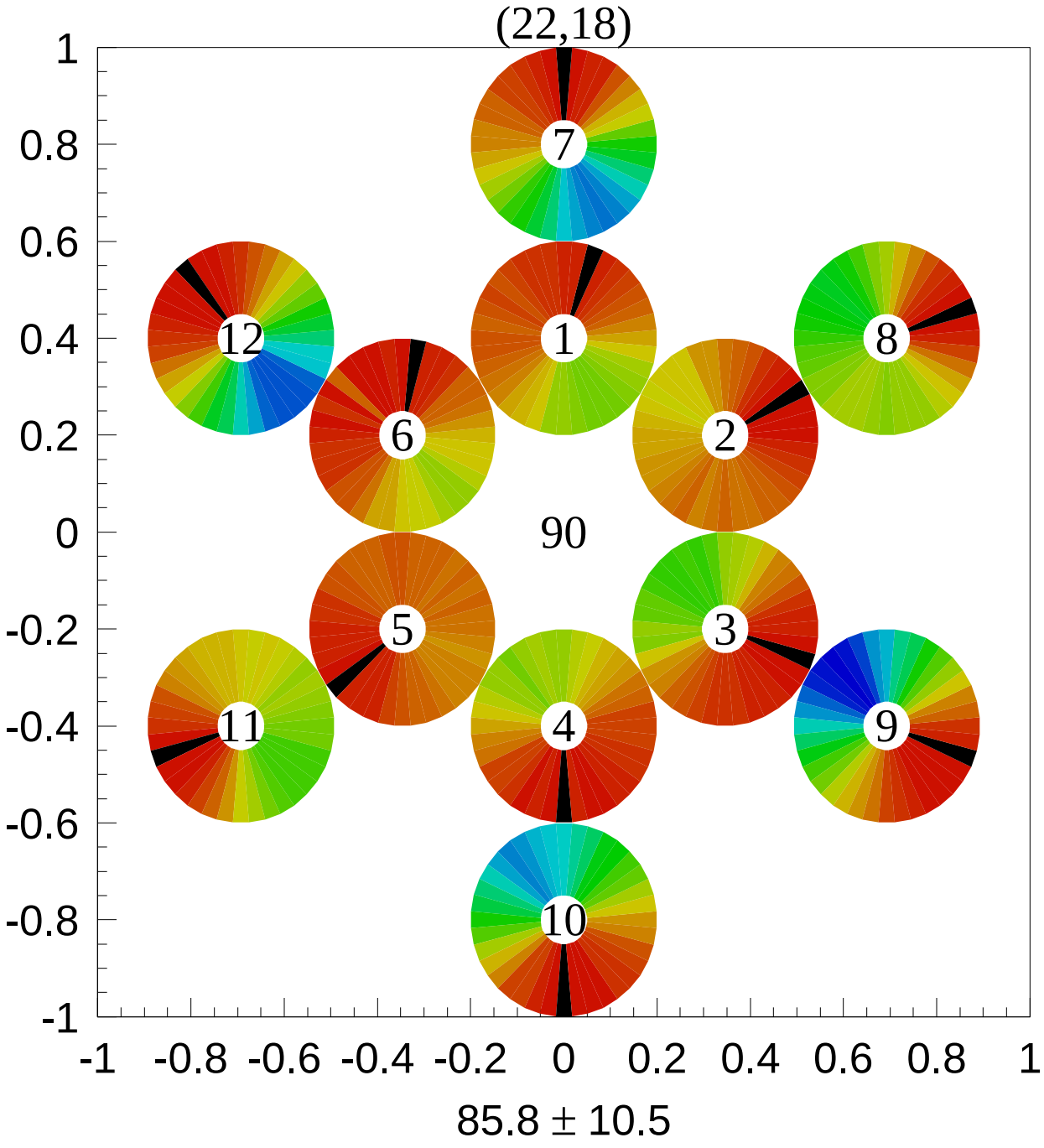

(22,16)
tilted LEDs
121 122 125 110 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 128 122 119 121 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

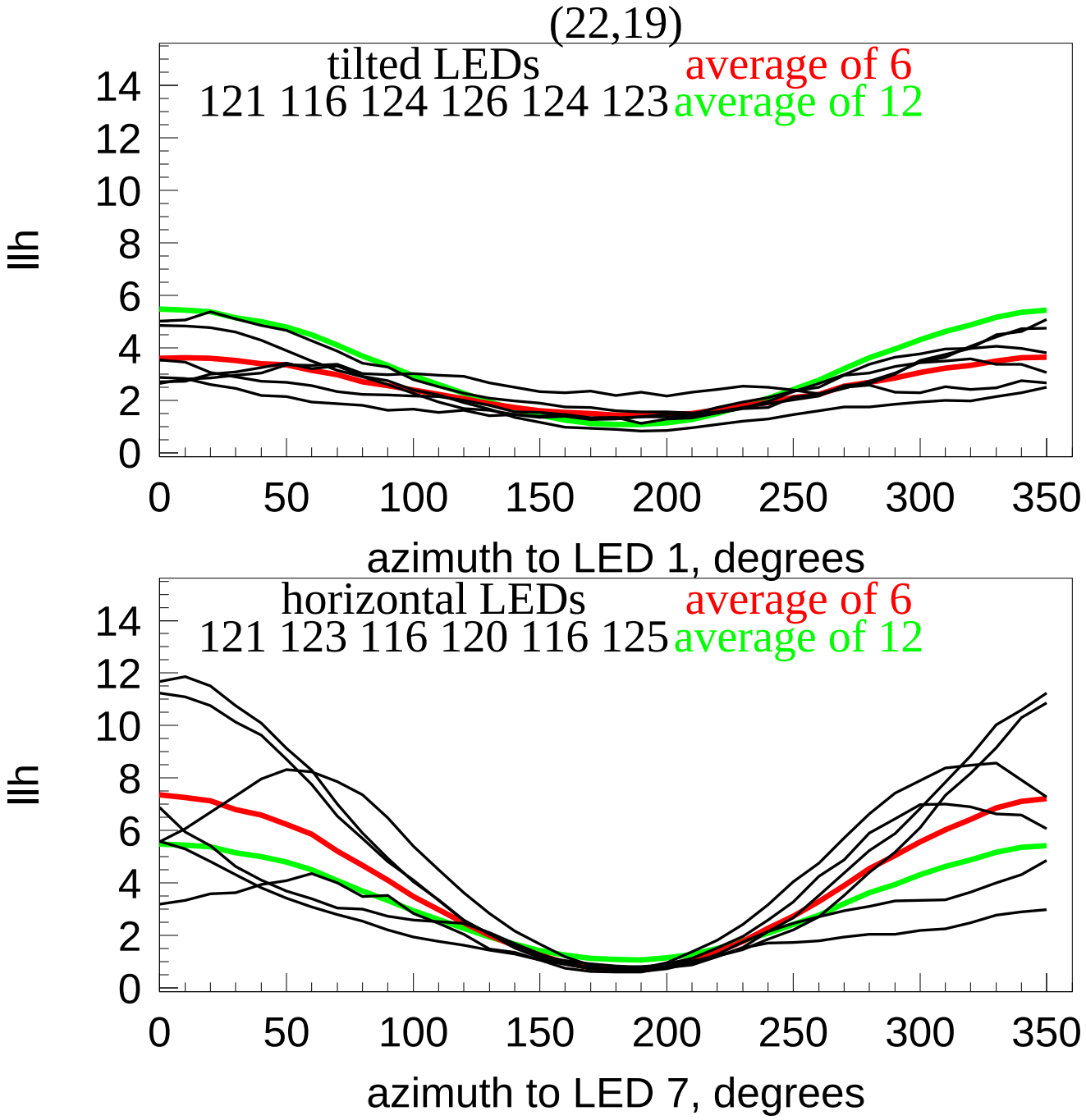

(22,16)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
59.1 ± 8.8

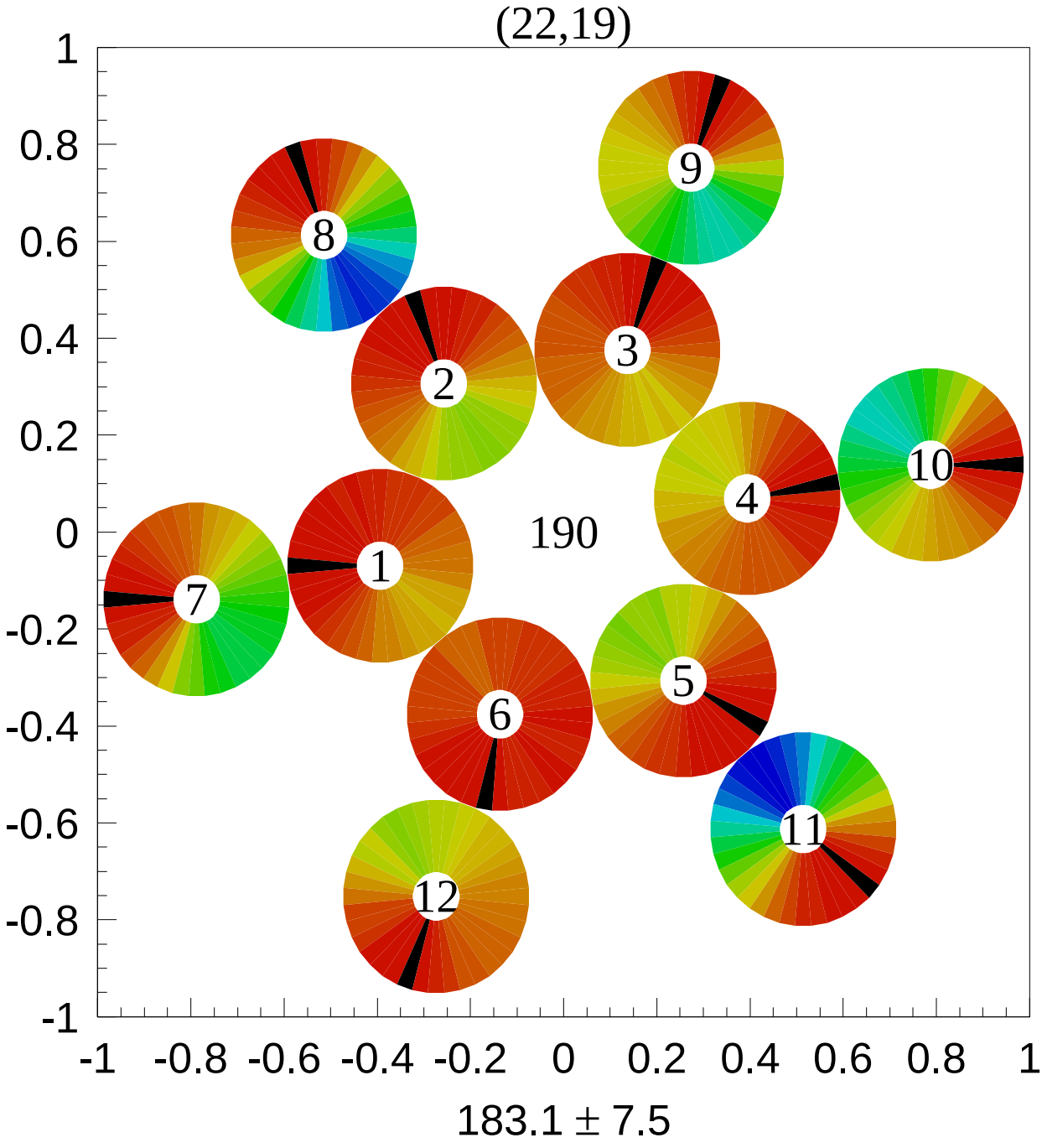

(22,17)
tilted LEDs
127 123 123 125 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 119 123 119 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

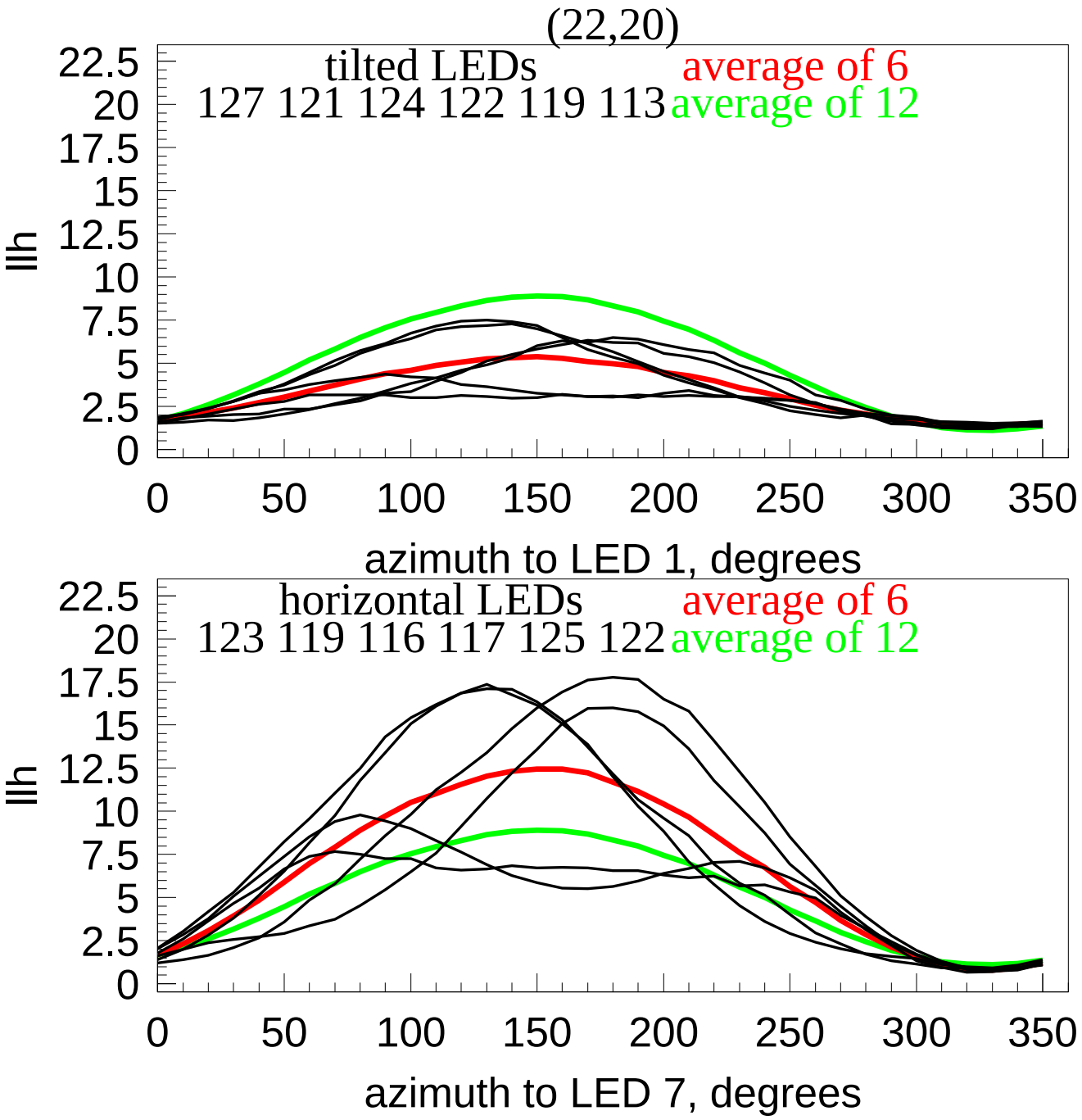

(22,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
180.2 ± 9.1
190
1
2
3
4
5
6
7
8
9
10
11
12

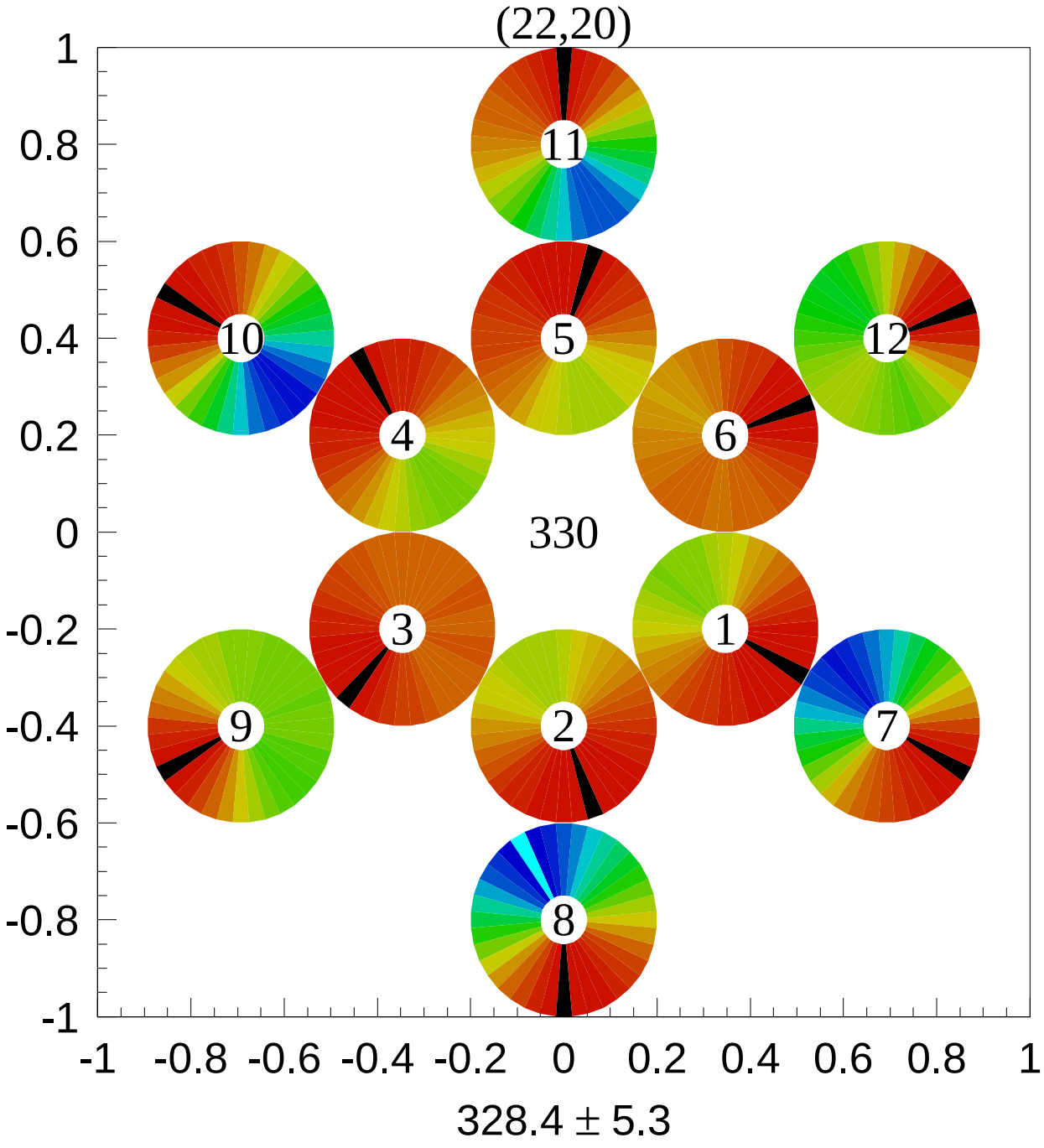

(22,18)
tilted LEDs
117 118 126 123 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 127 121 123 124 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

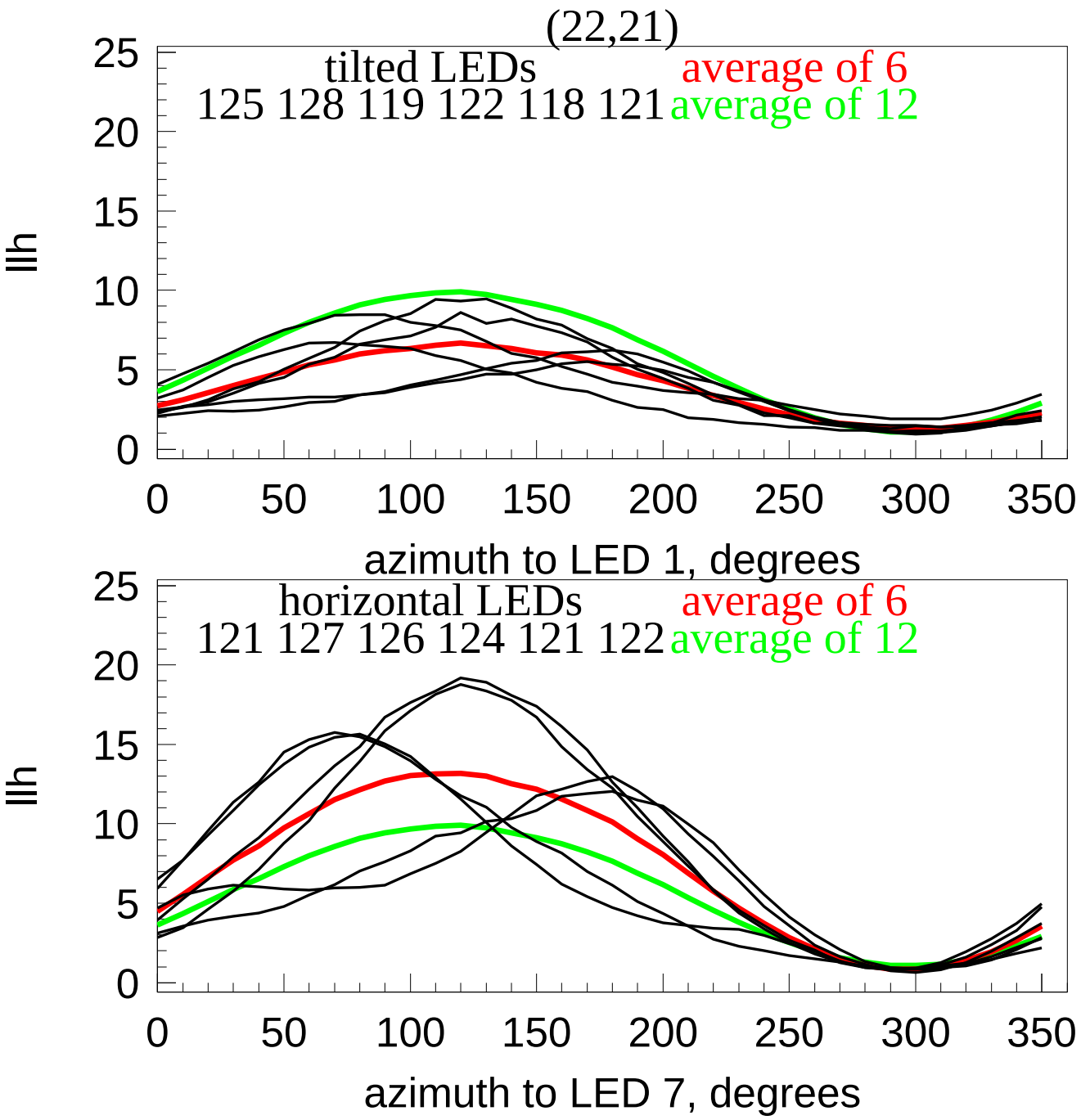

(22,18)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
85.8 ± 10.5

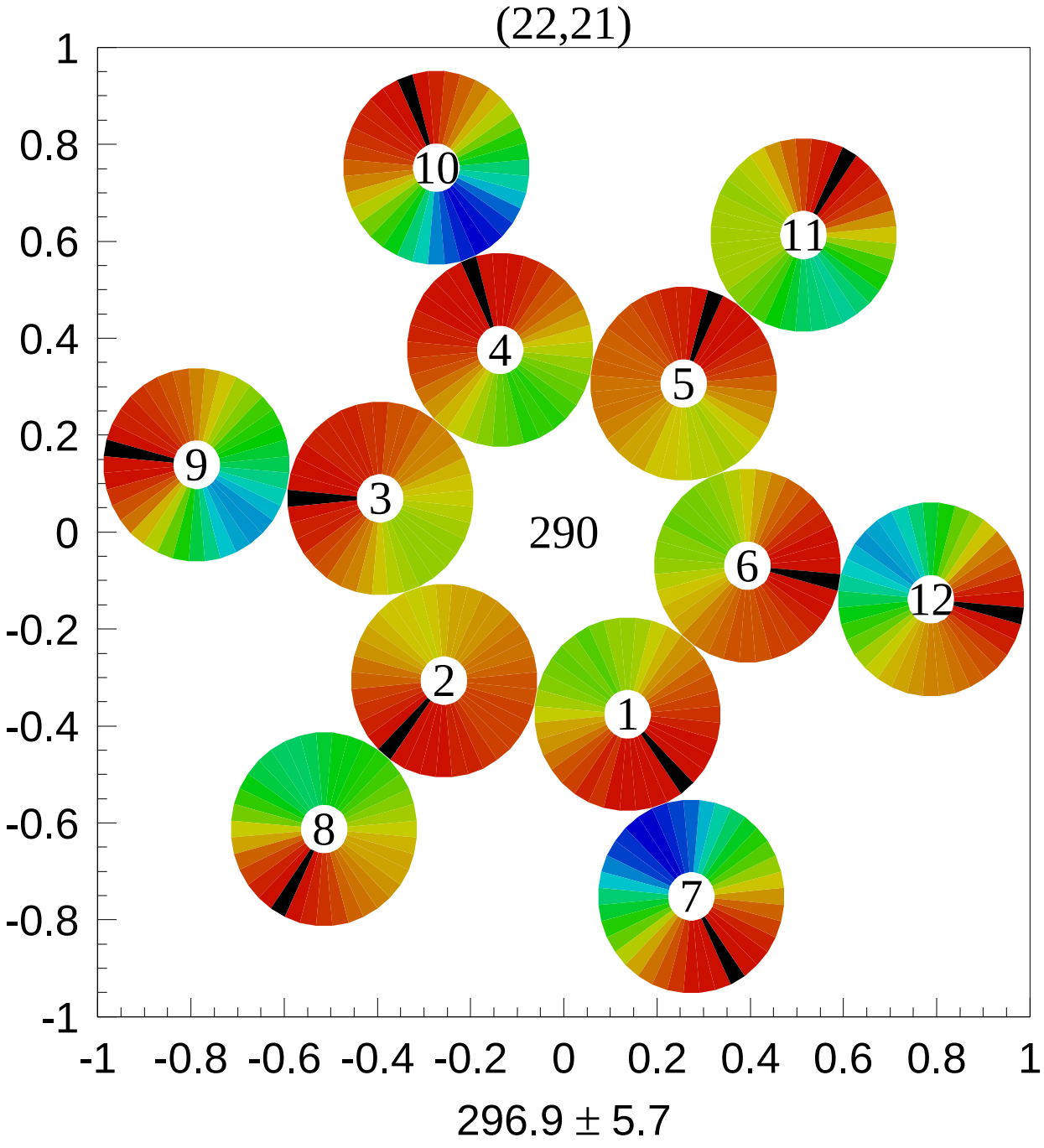

(22,19)
tilted LEDs
121 116 124 126 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 116 120 116 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

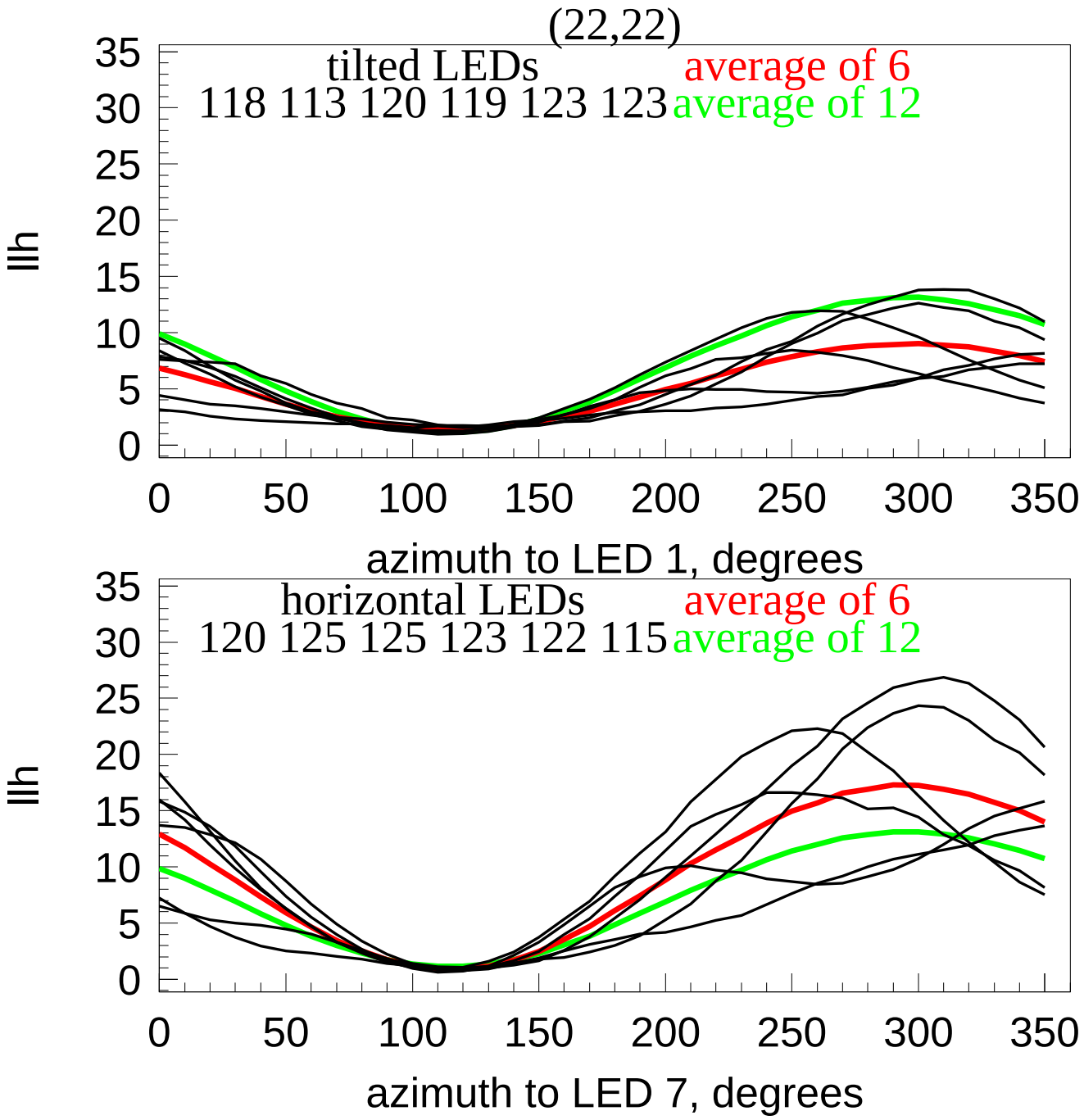

(22,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
183.1 ± 7.5

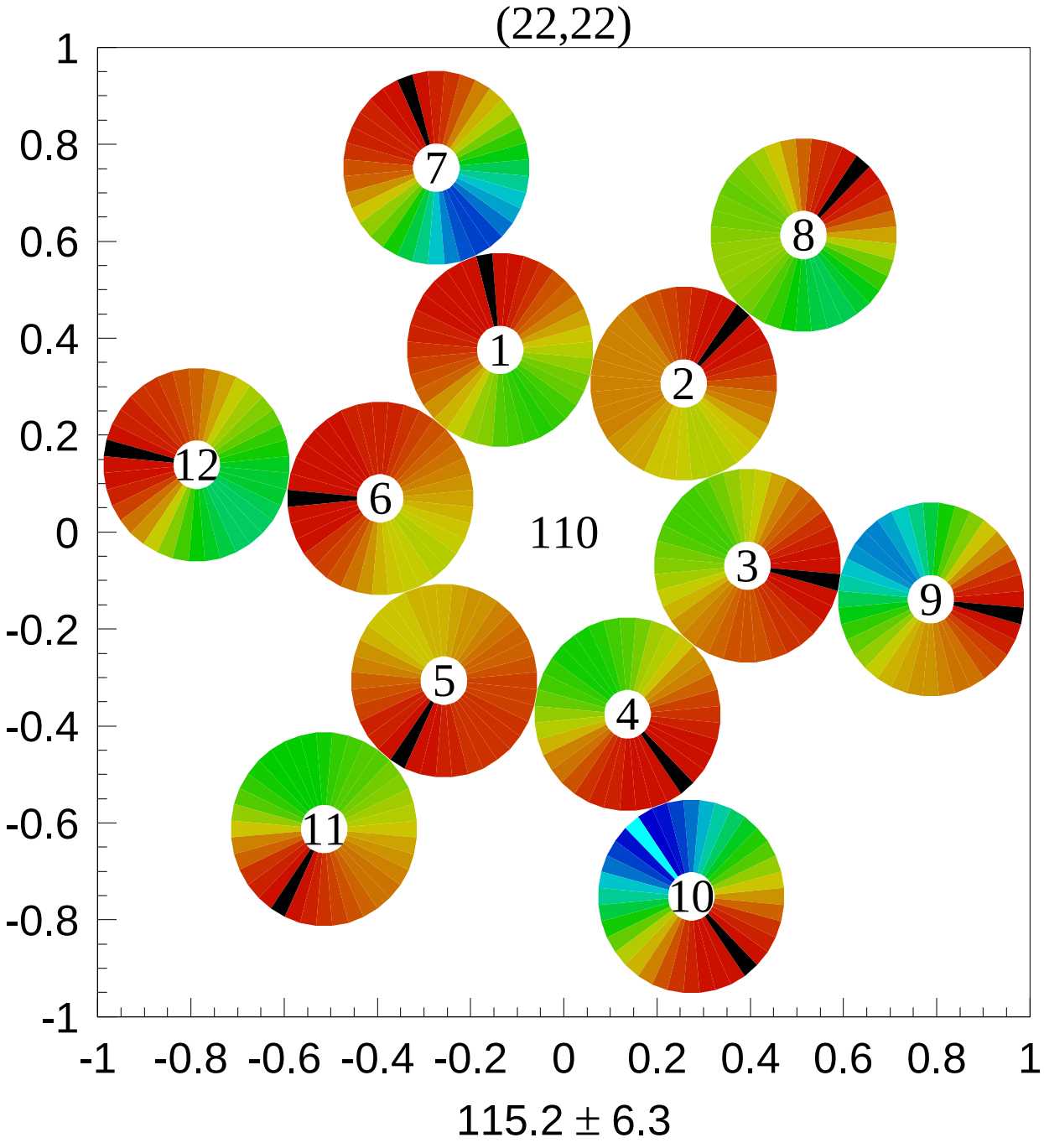

(22,20)
tilted LEDs
127 121 124 122 119 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 116 117 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

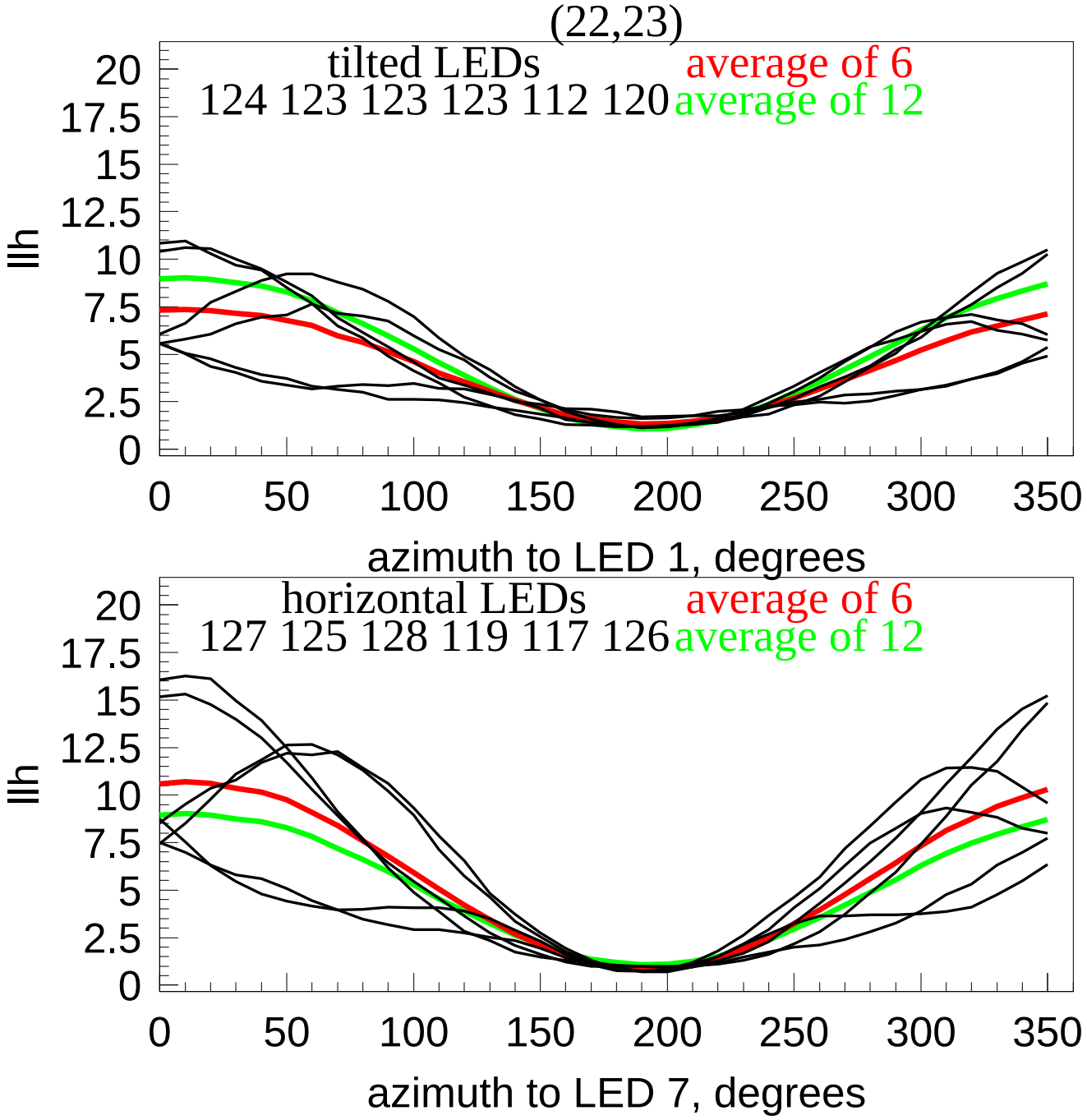

(22,20)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
328.4 ± 5.3

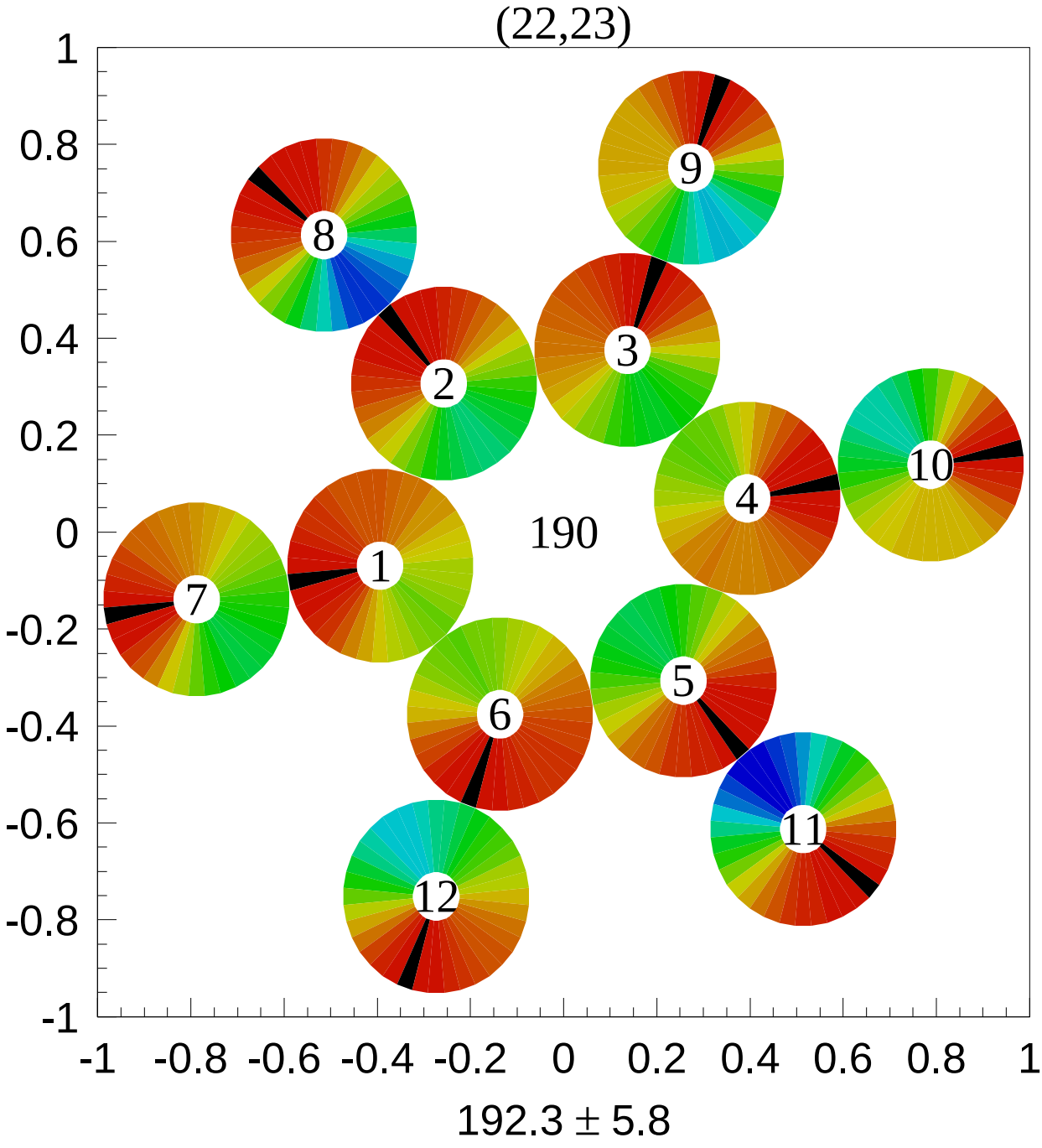

(22,21)
tilted LEDs
125 128 119 122 118 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 127 126 124 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

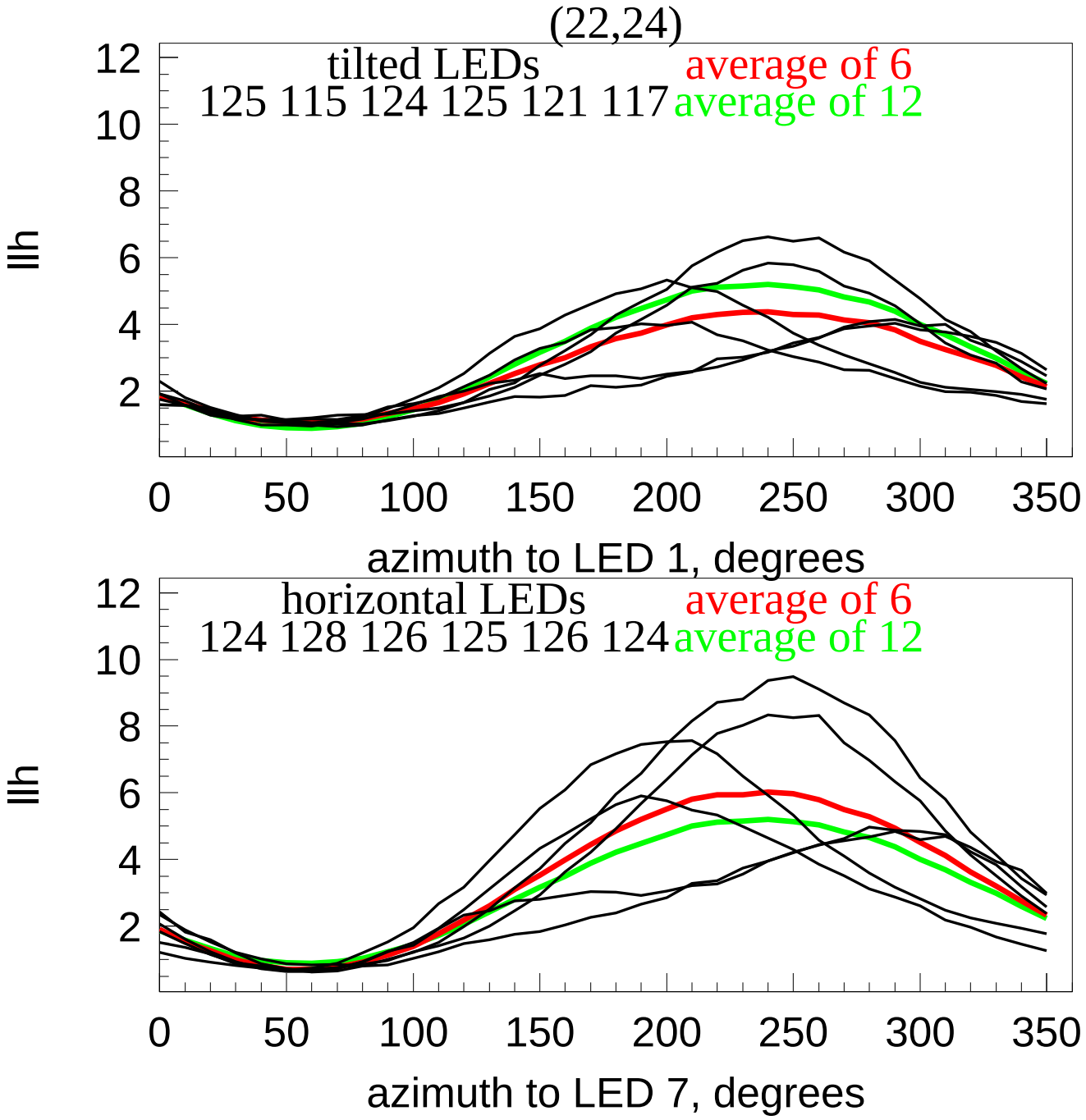

(22,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
296.9 ± 5.7

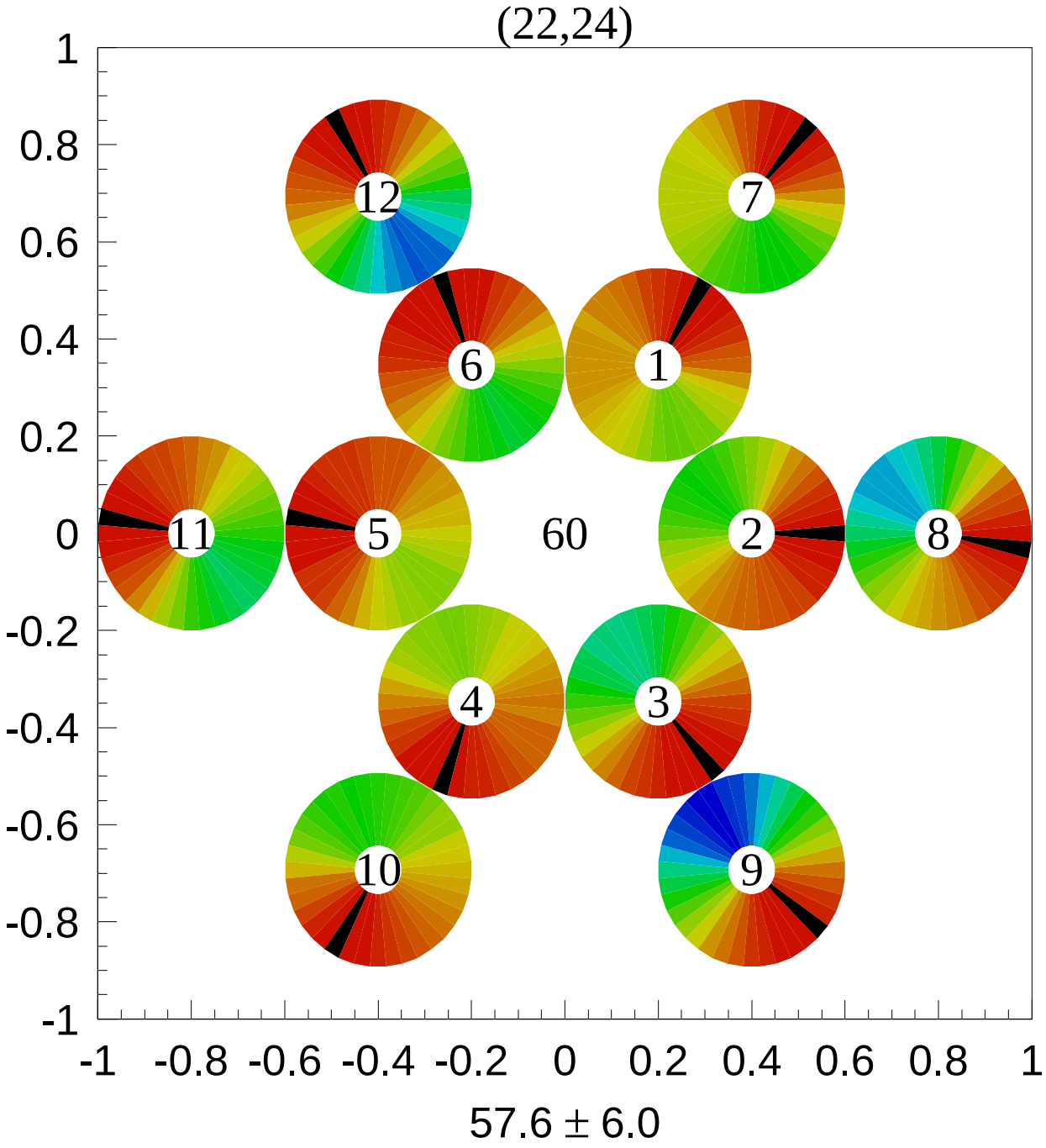

(22,22)
tilted LEDs
118 113 120 119 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 125 125 123 122 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

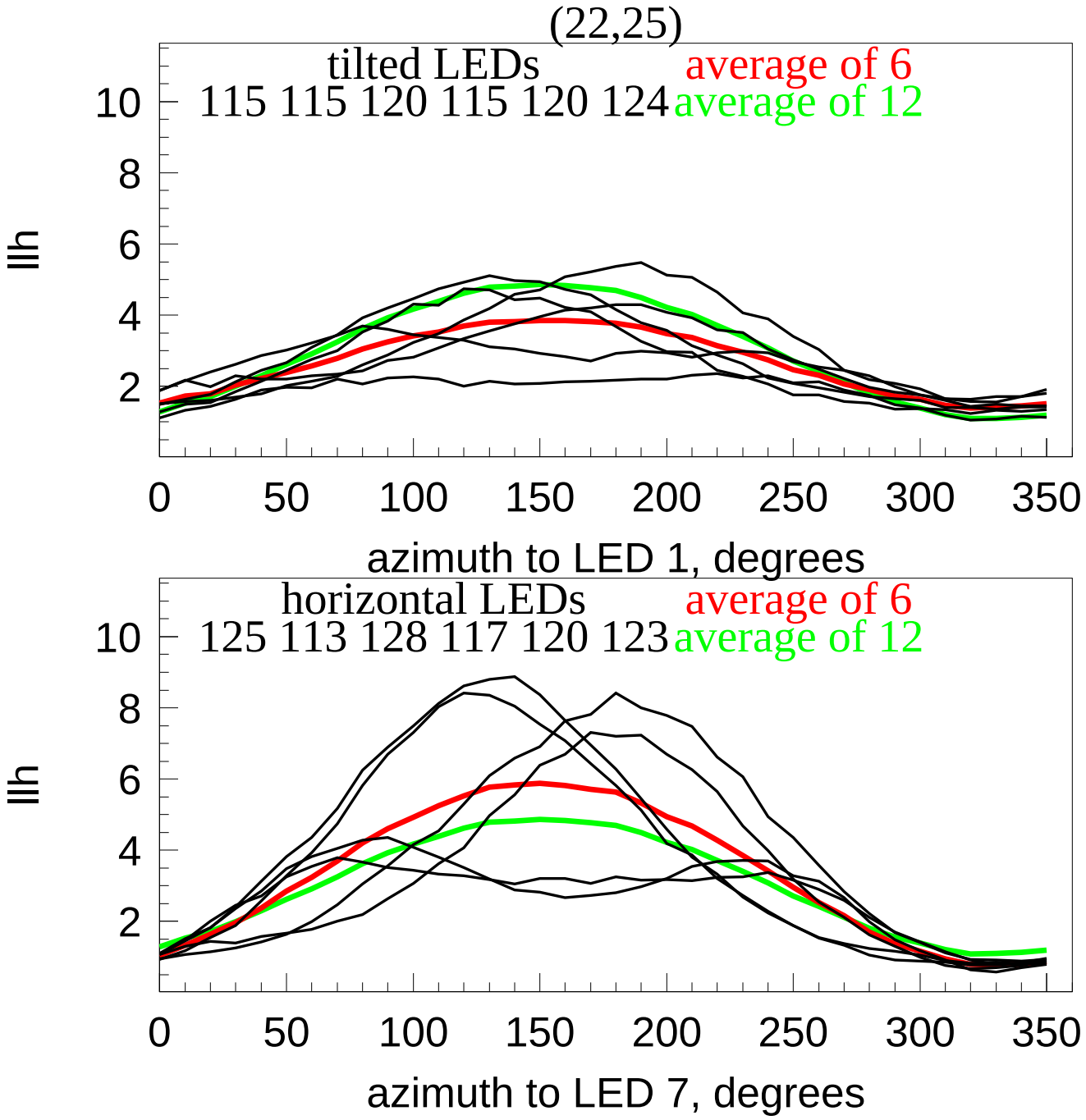

(22,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
115.2 ± 6.3

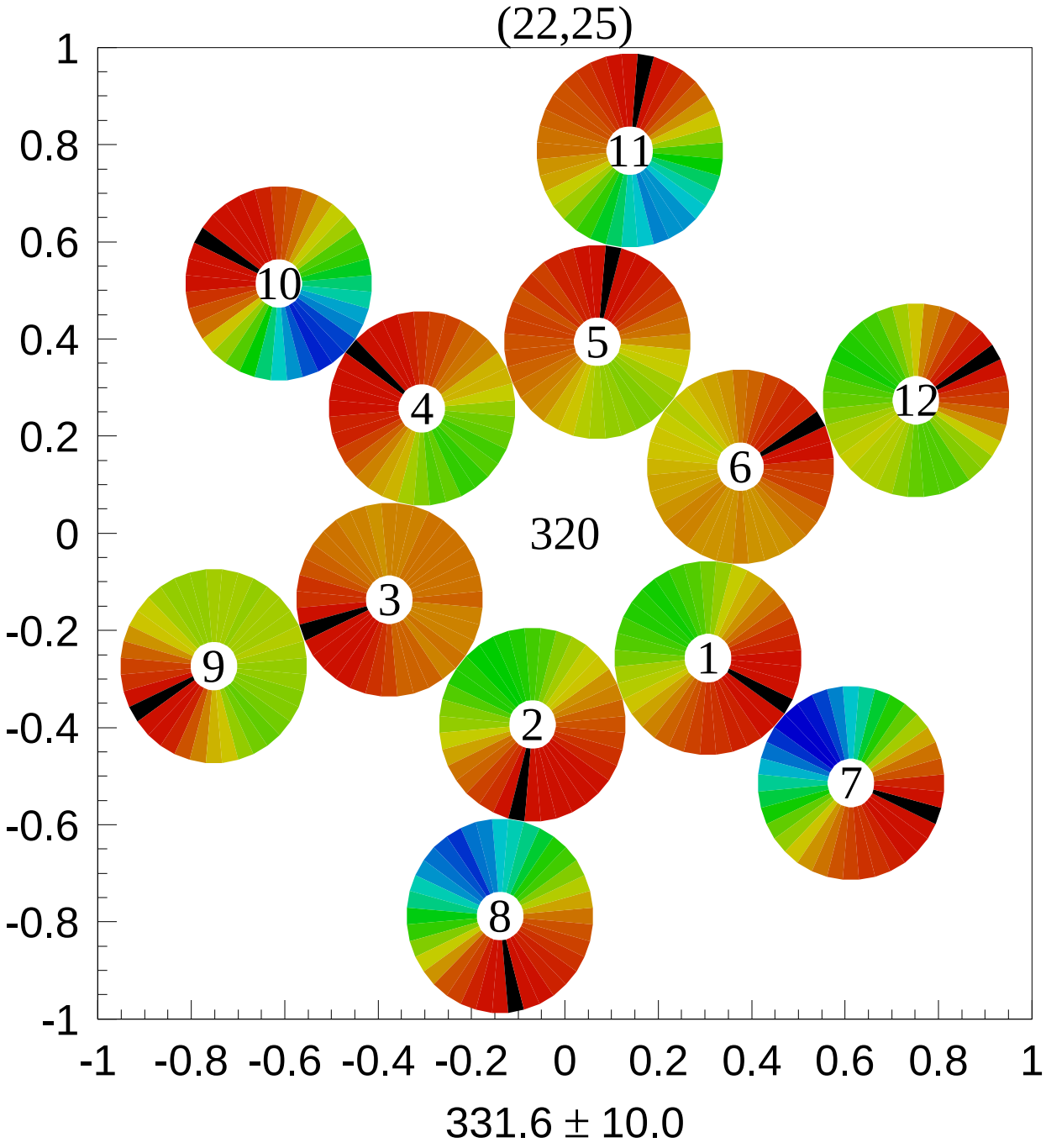

(22,23)
tilted LEDs
124 123 123 123 112 120
average of 6
average of 12
llh
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 125 128 119 117 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

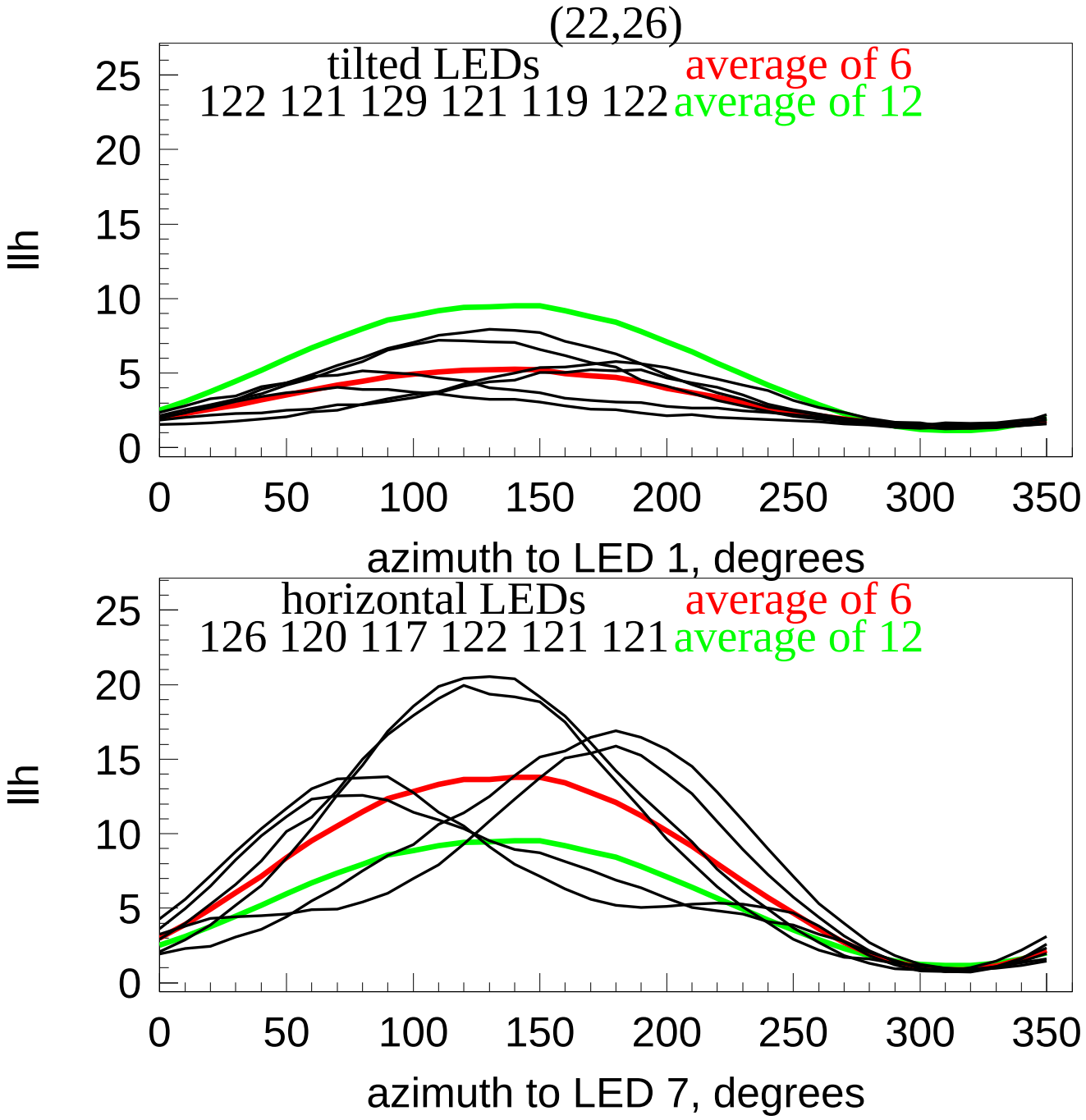

(22,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
192.3 ± 5.8
190
1
2
3
4
5
6
7
8
9
10
11
12

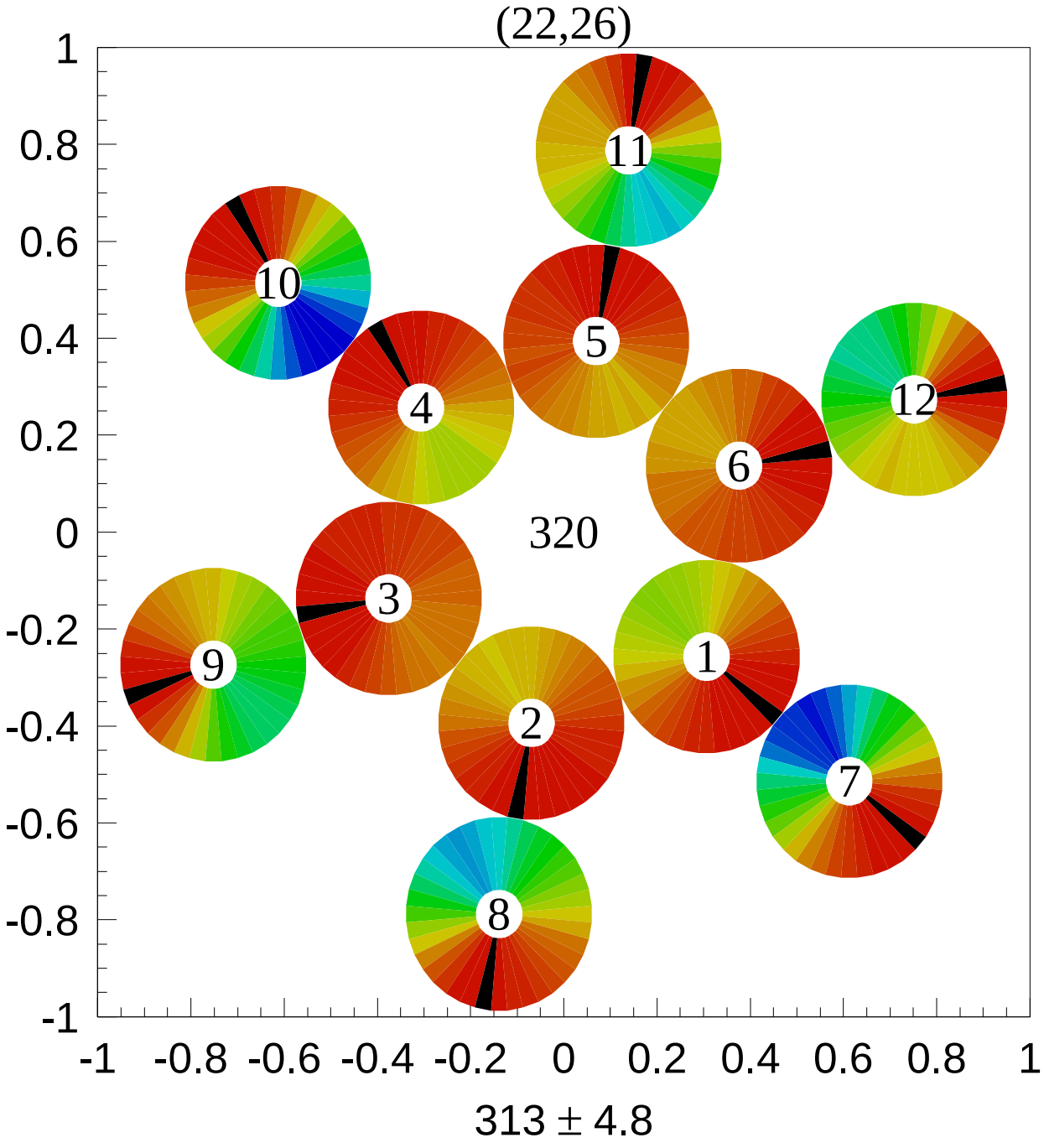

(22,24)
tilted LEDs
125 115 124 125 121 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 128 126 125 126 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

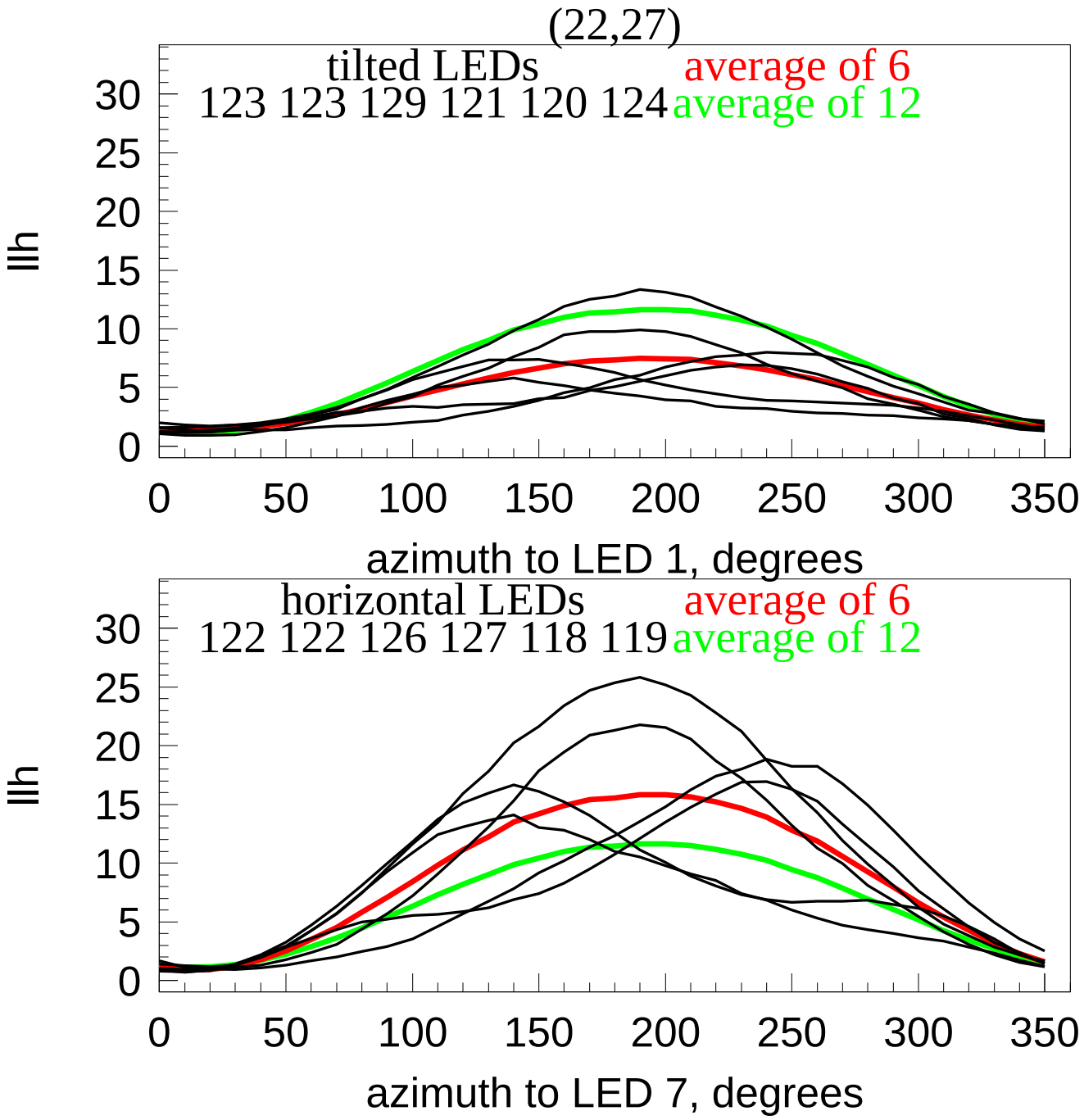

(22,24)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
57.6 ± 6.0

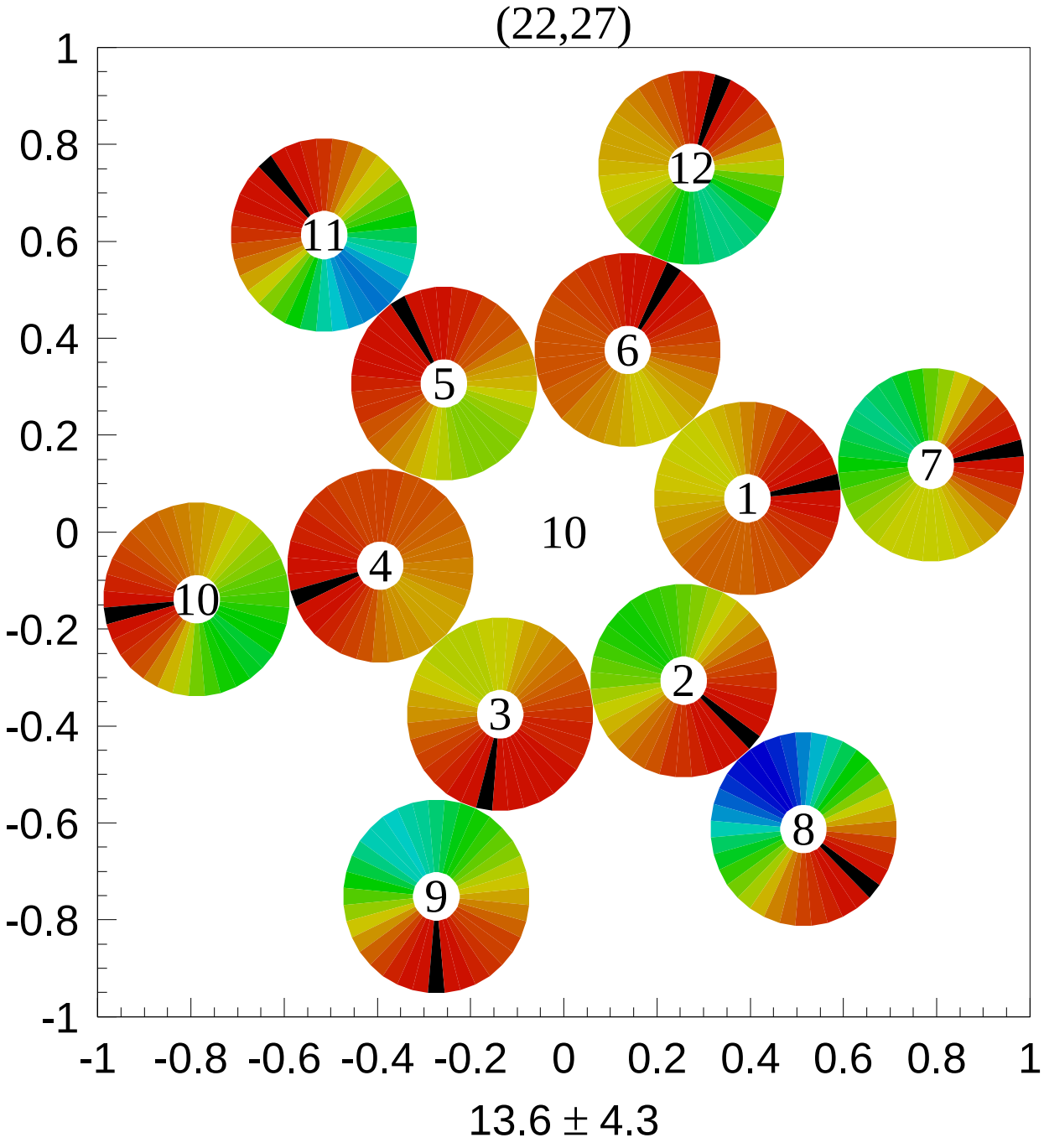

(22,25)
tilted LEDs
115 115 120 115 120 124
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 113 128 117 120 123
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

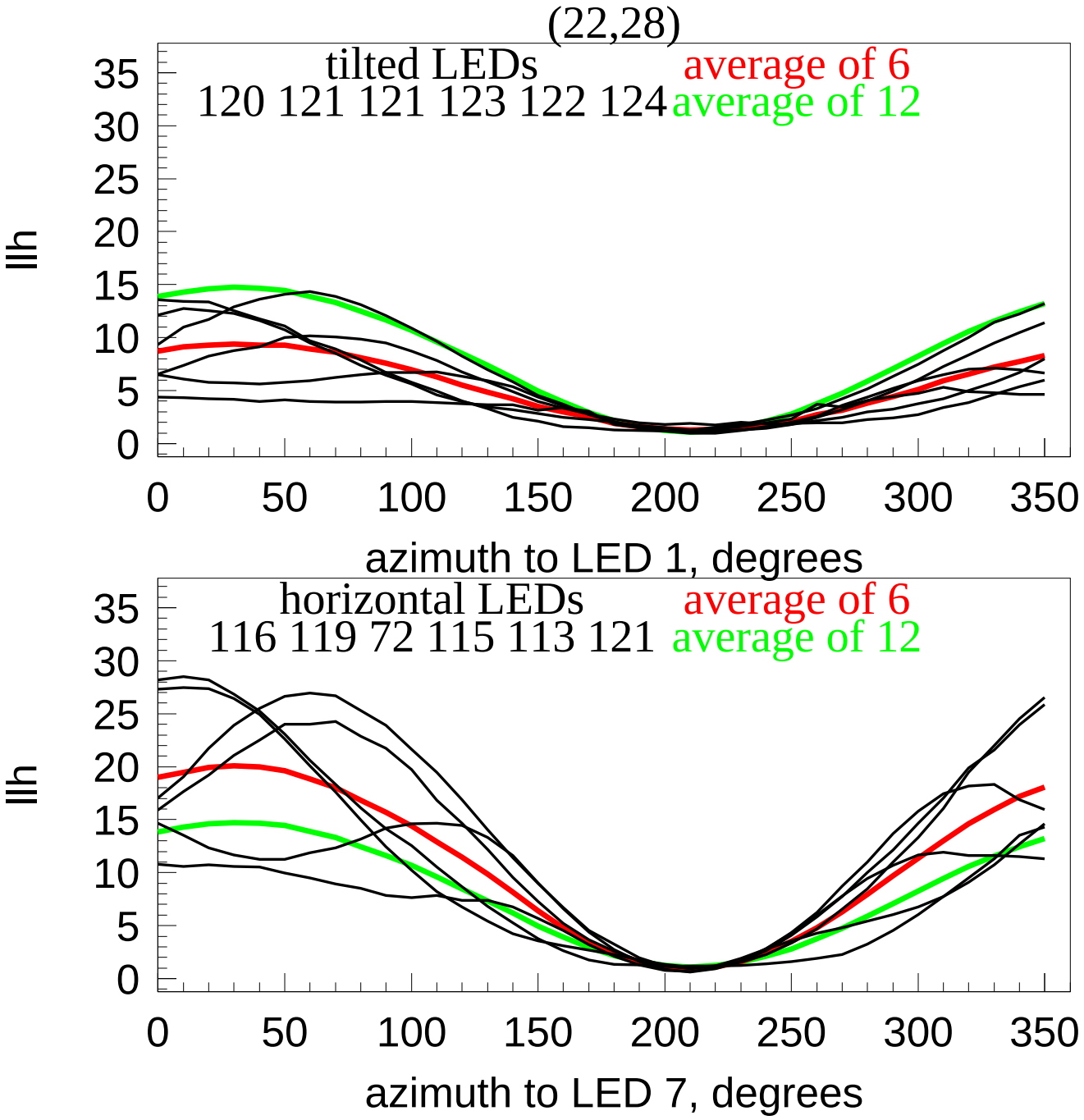

(22,25)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
331.6 ± 10.0

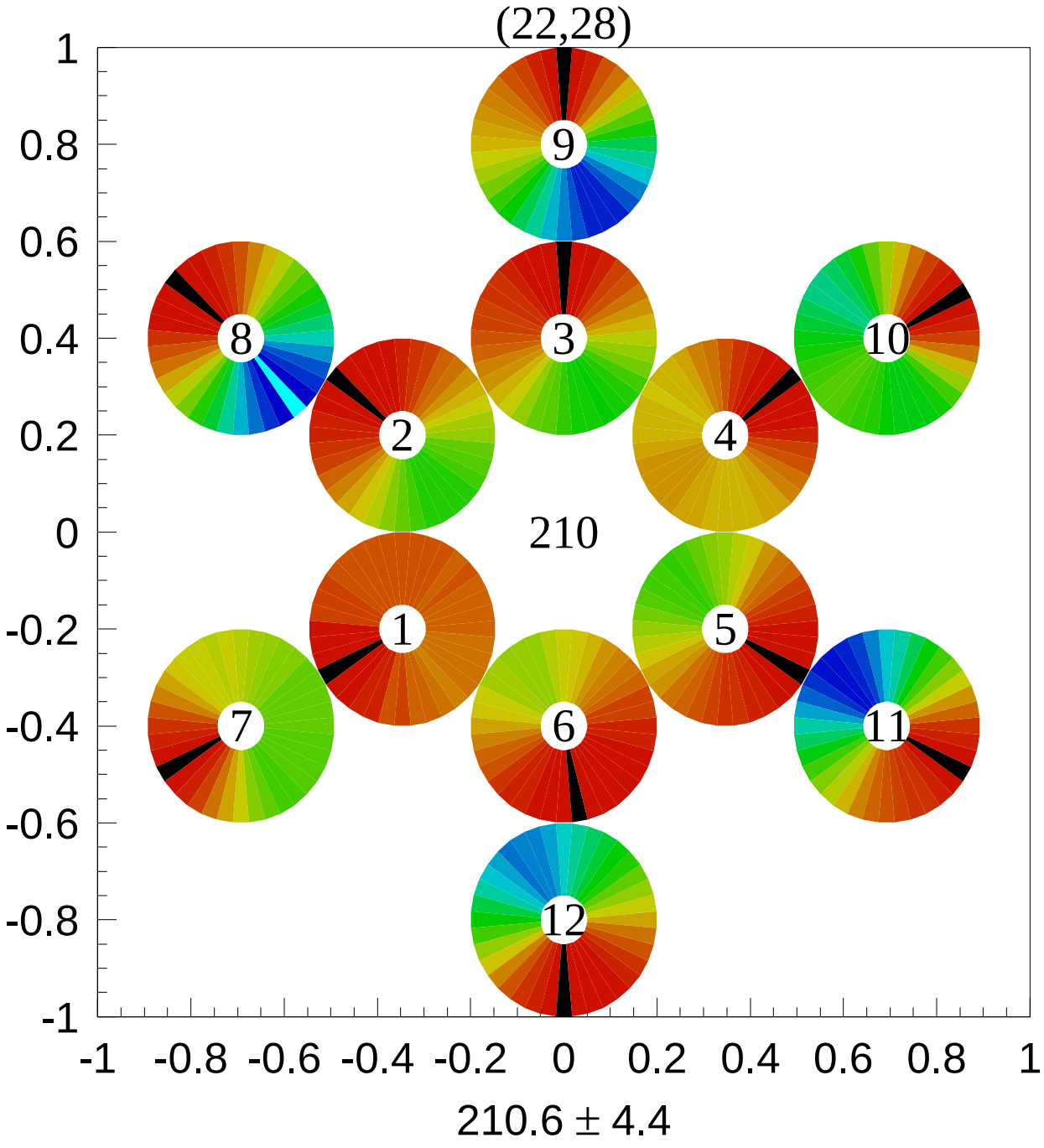

(22,26)
tilted LEDs
122 121 129 121 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 117 122 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

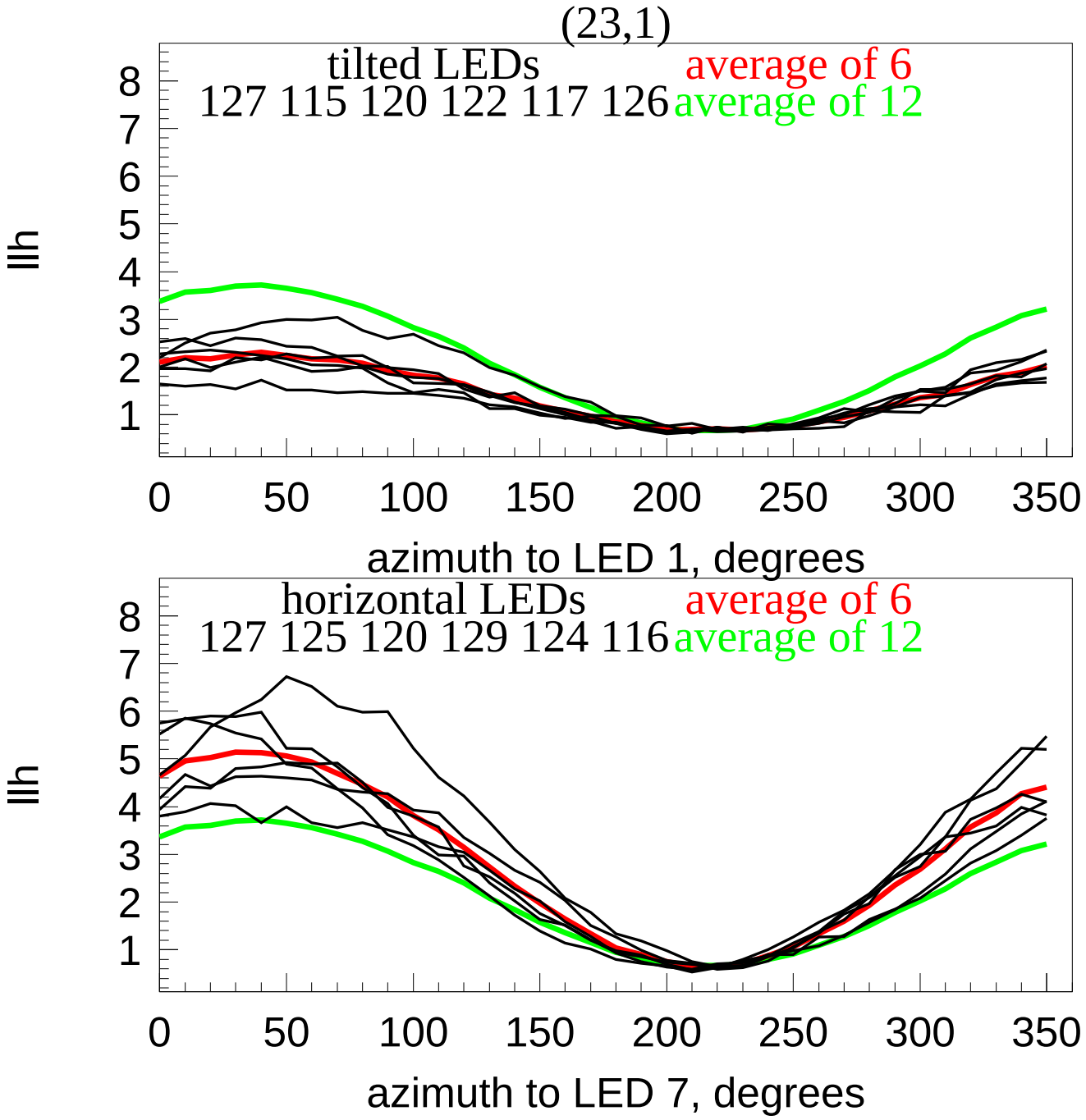

(22,26)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
313 ± 4.8

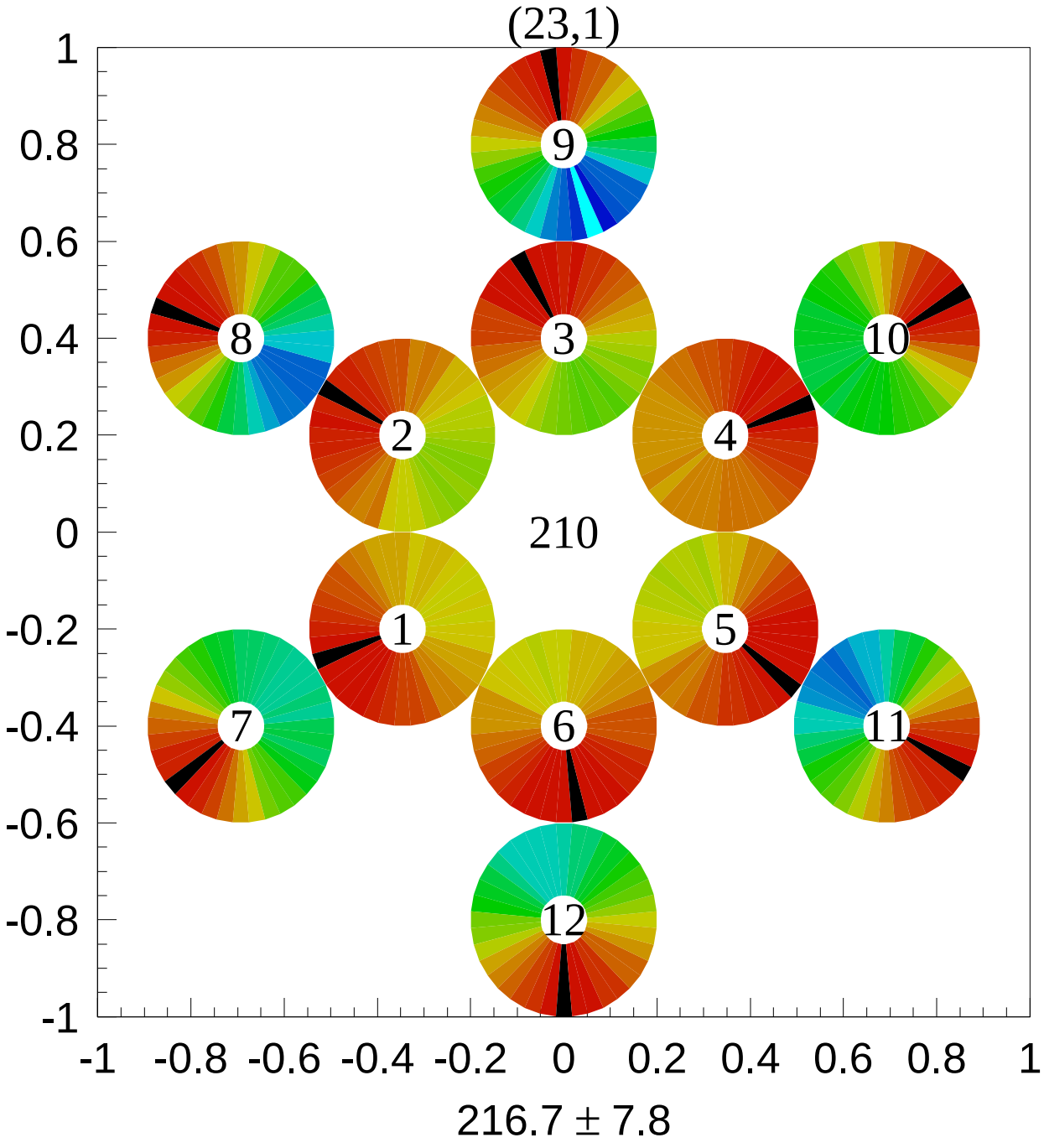

(22,27)
tilted LEDs
123 123 129 121 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 126 127 118 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

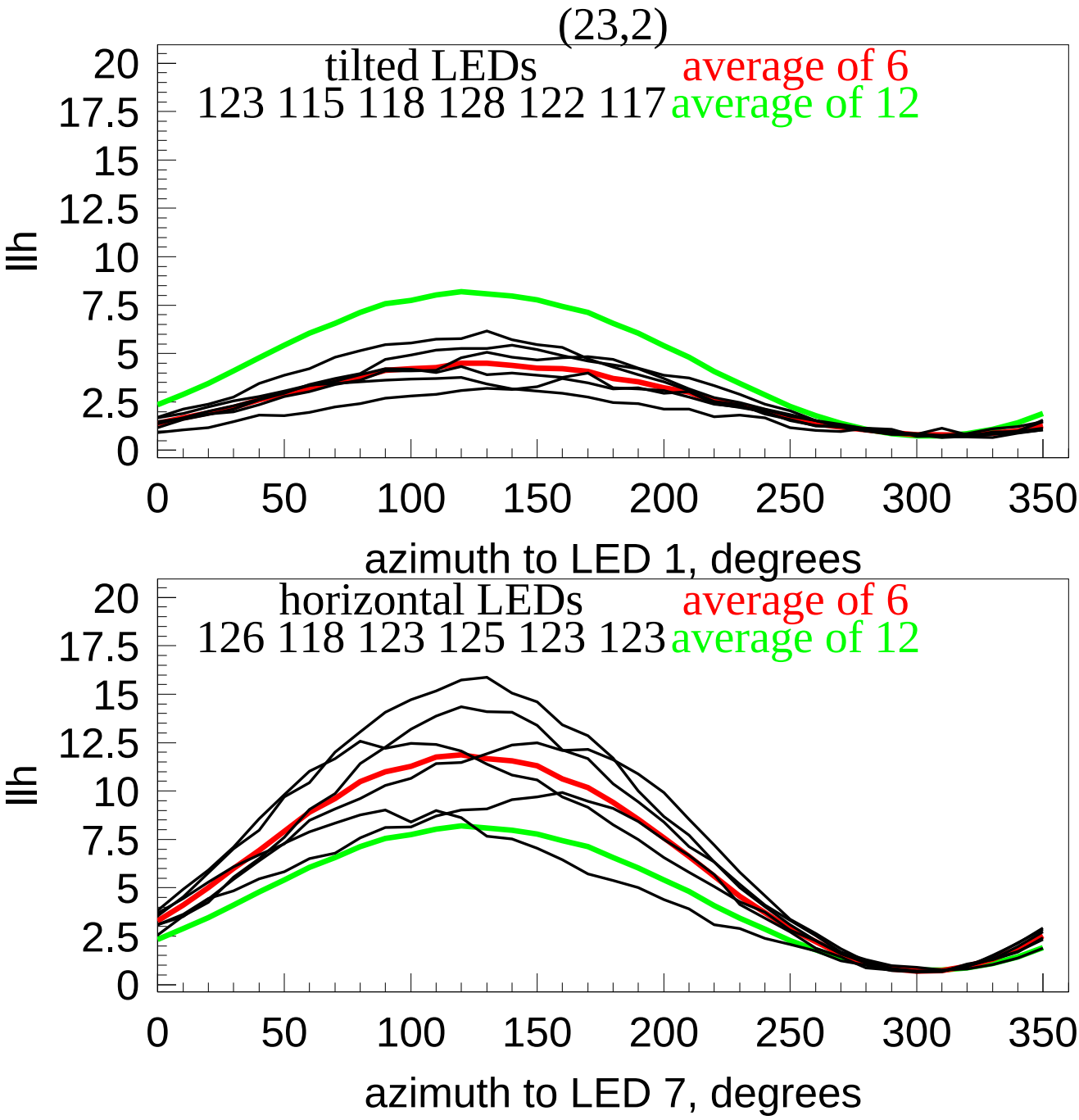

(22,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
13.6 ± 4.3

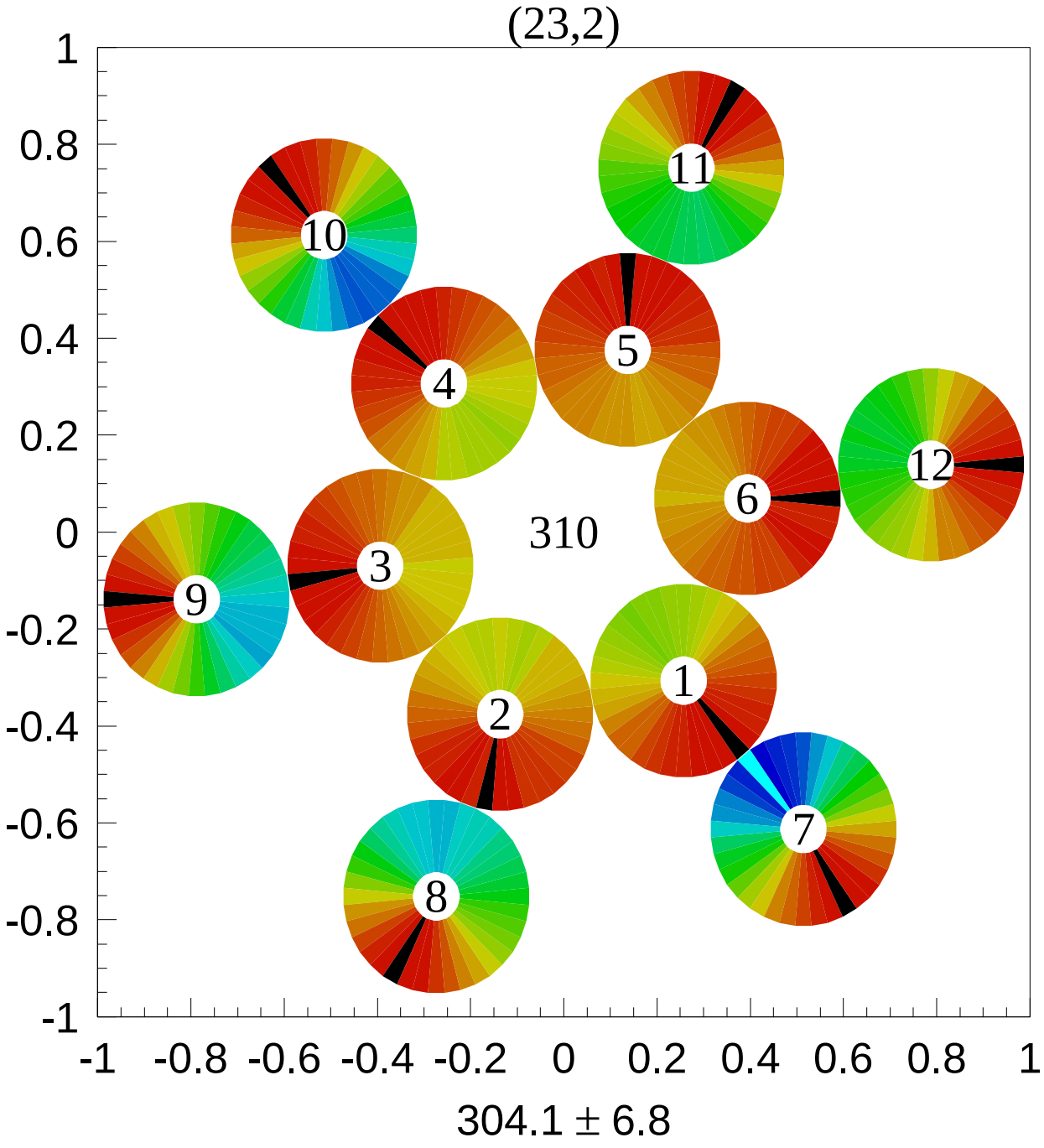

(22,28)
tilted LEDs
120 121 121 123 122 124
average of 6
average of 12
llh
0
5
10
15
20
25
30
35
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 119 72 115 113 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

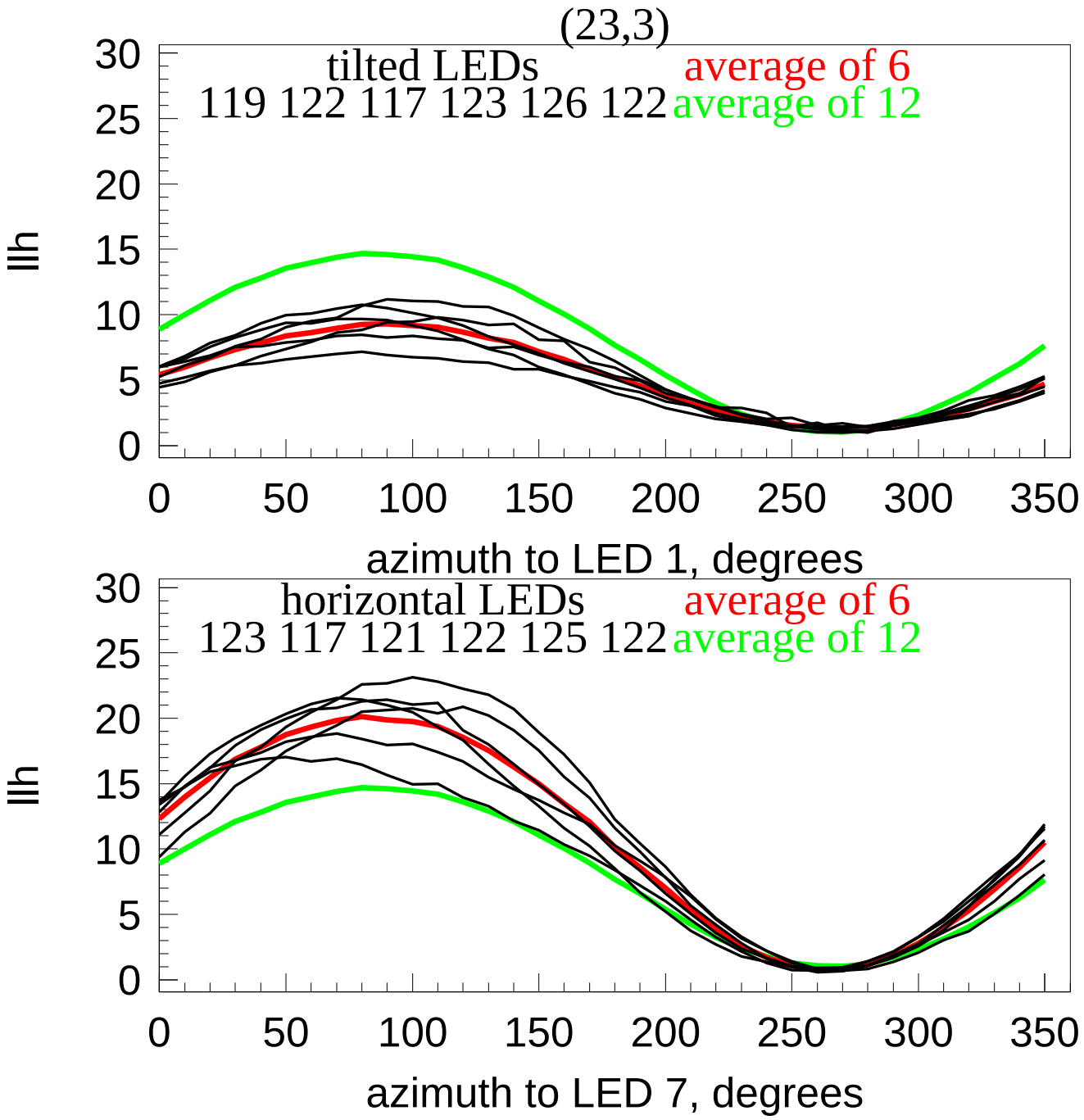

(22,28)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
210.6 ± 4.4

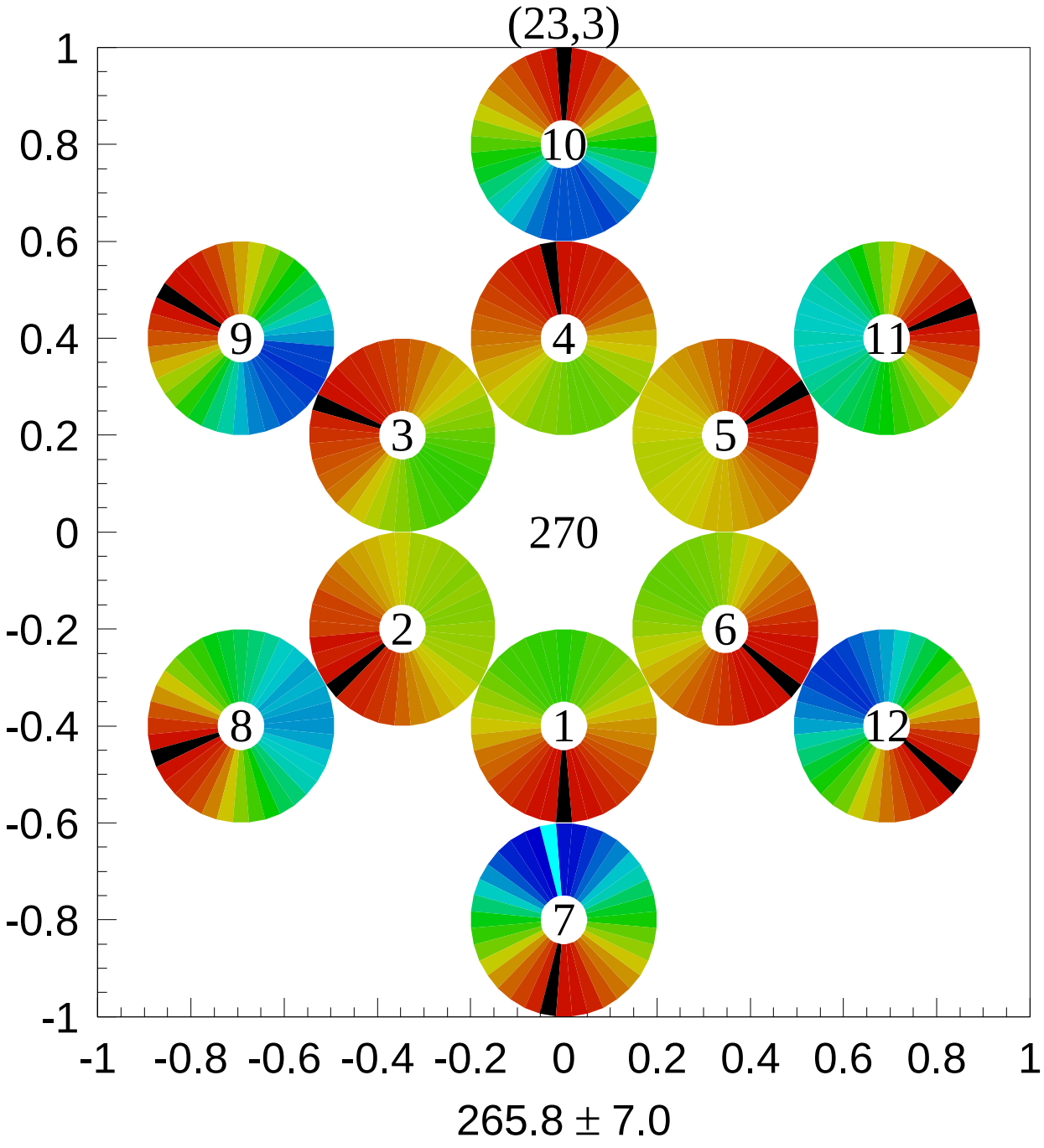

(23,1)
tilted LEDs
127 115 120 122 117 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 125 120 129 124 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

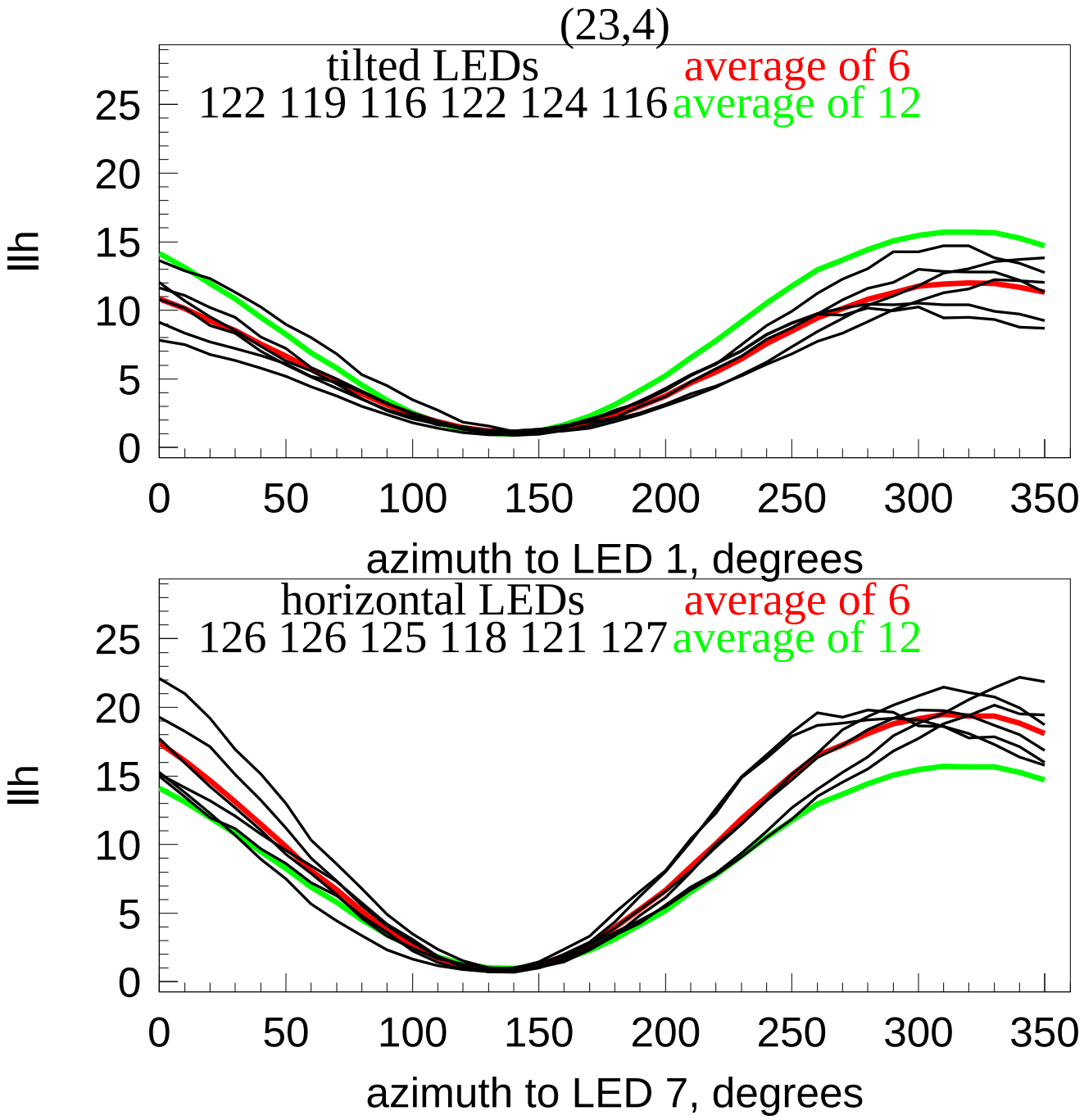

(23,1)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
216.7 ± 7.8

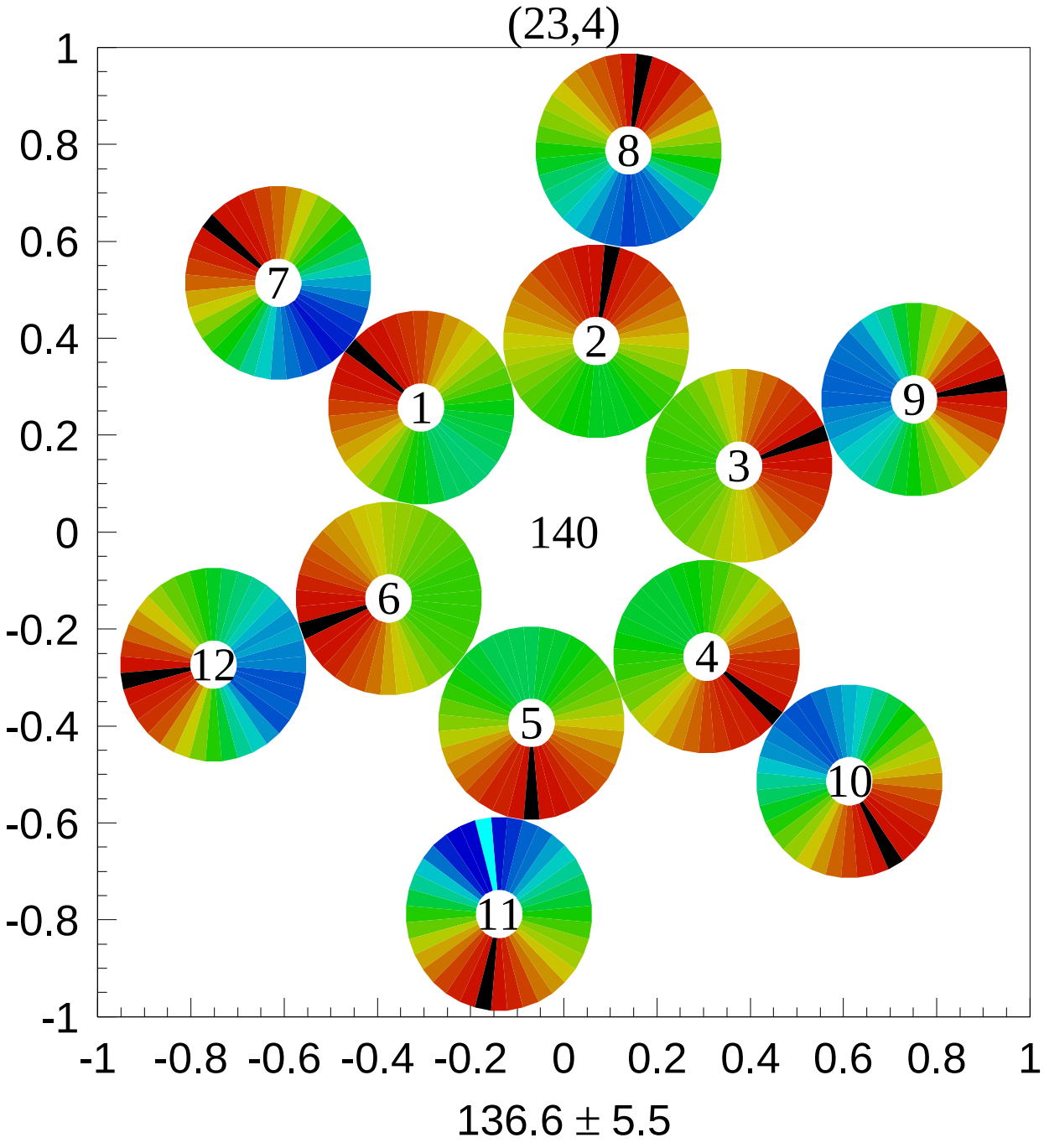

(23,2)
tilted LEDs
123 115 118 128 122 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 118 123 125 123 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

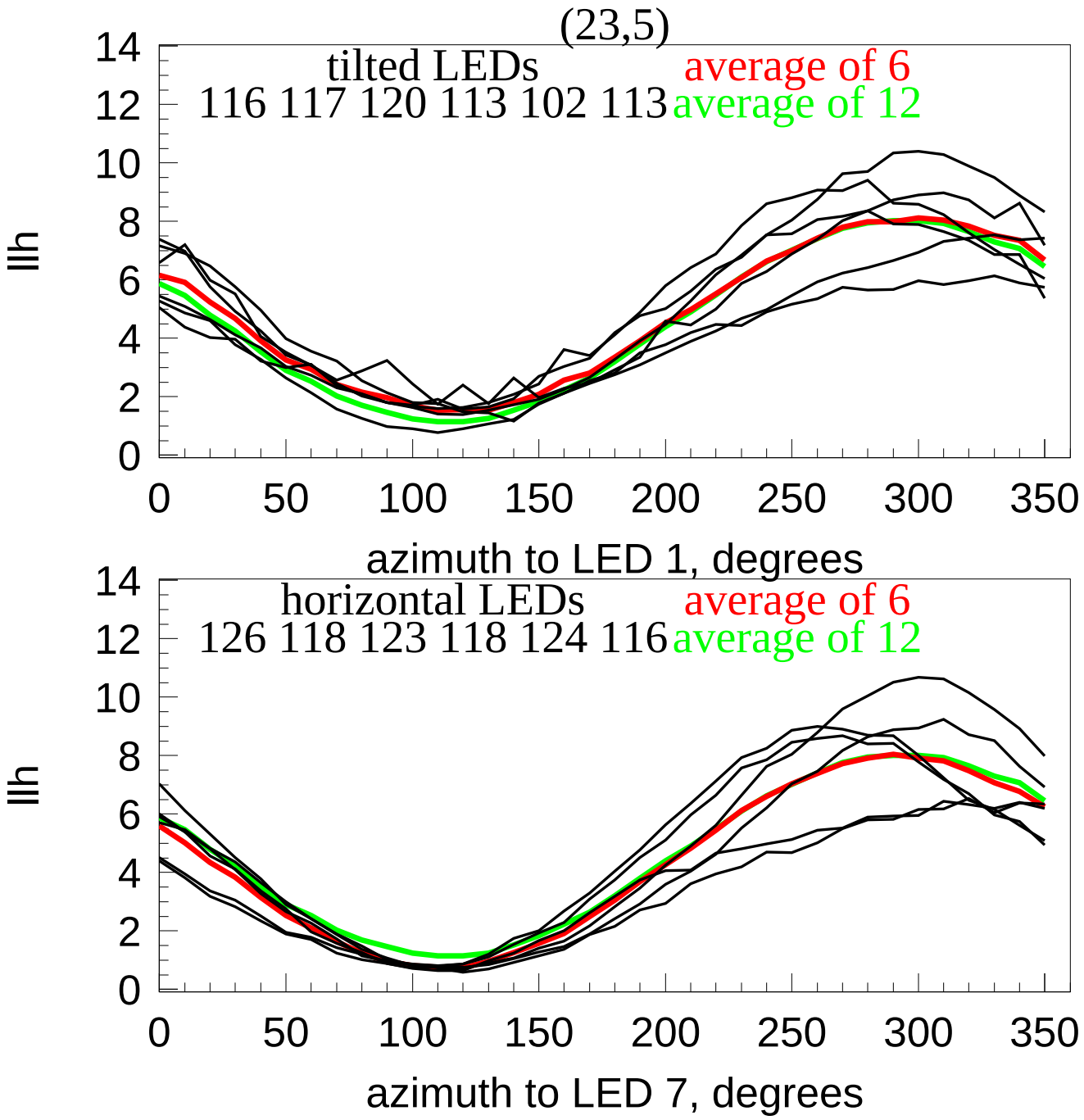

(23,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
304.1 ± 6.8

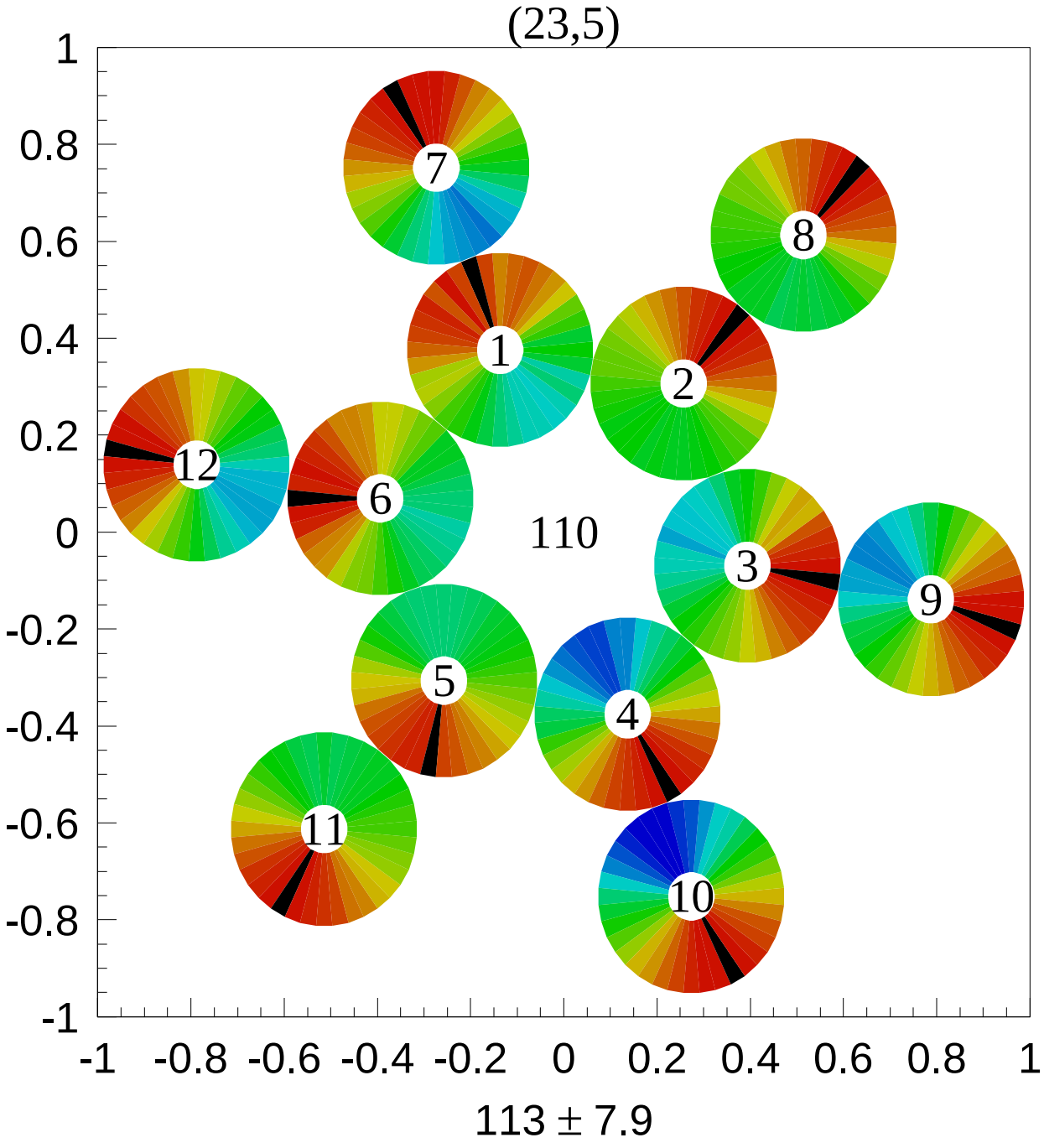

(23,3)
tilted LEDs
119 122 117 123 126 122
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
123 117 121 122 125 122
average of 6
average of 12
IIh
azimuth to LED 7, degrees

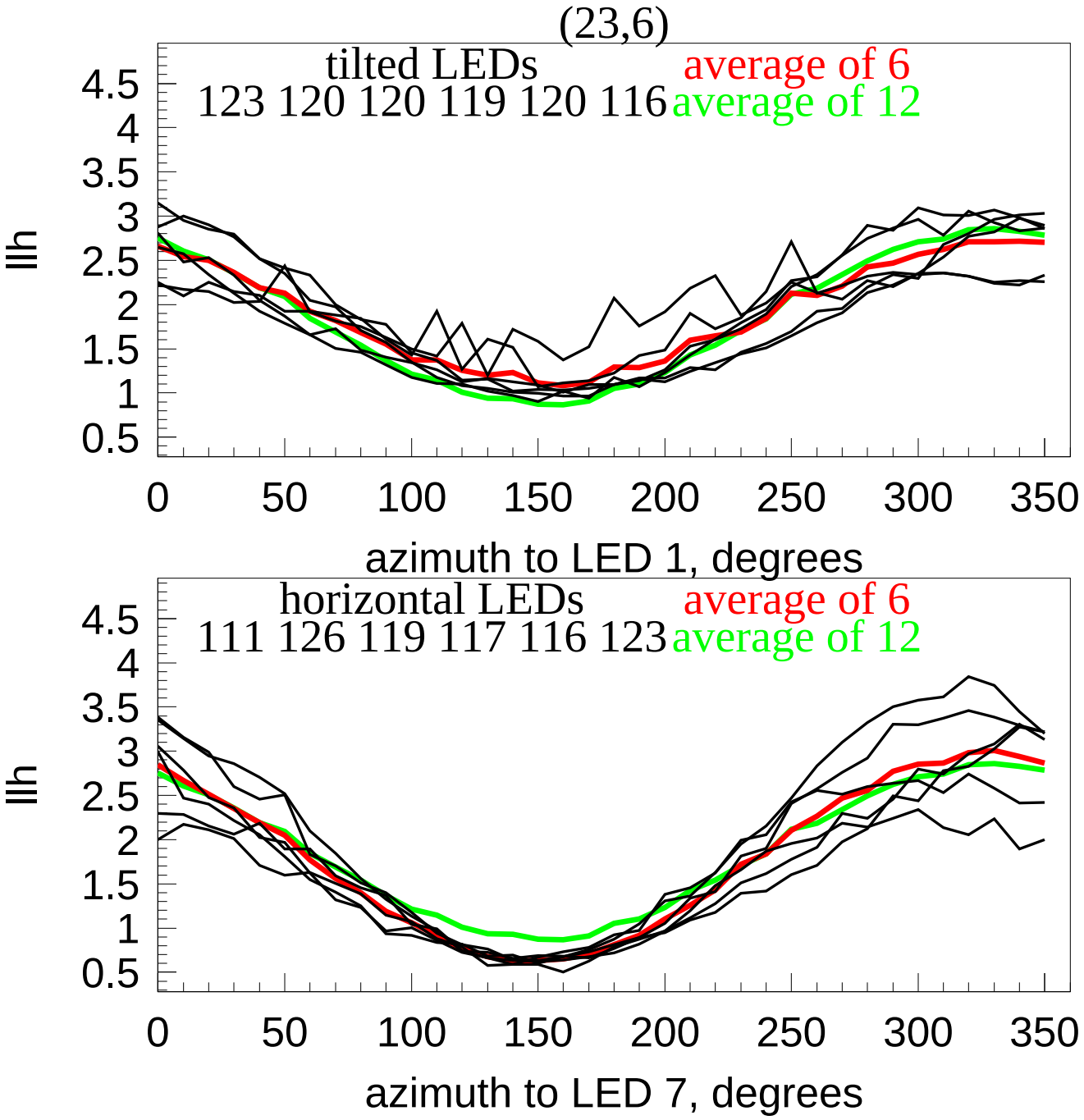

(23,3)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
265.8 ± 7.0

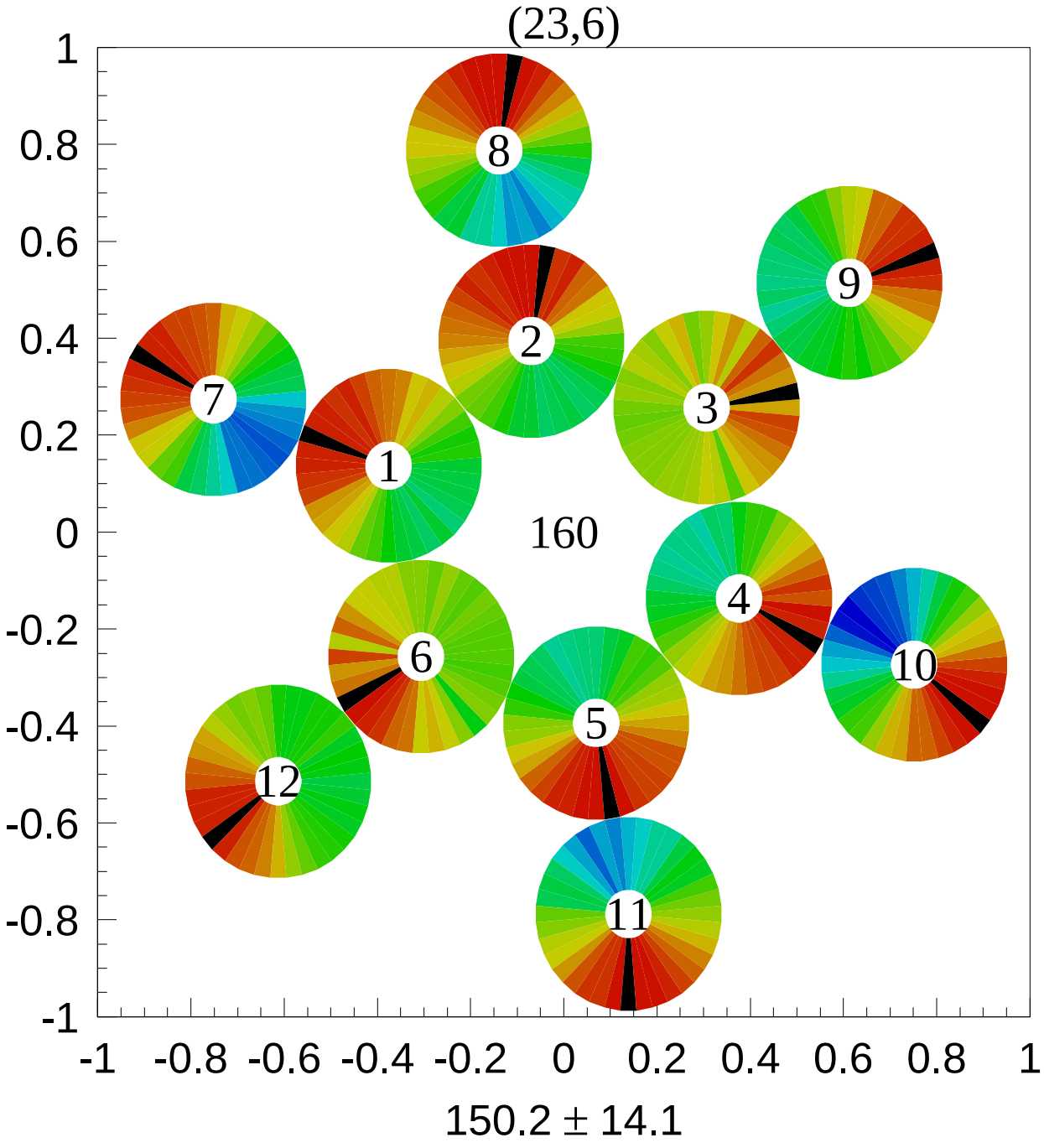

(23,4)
tilted LEDs
122 119 116 122 124 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 125 118 121 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

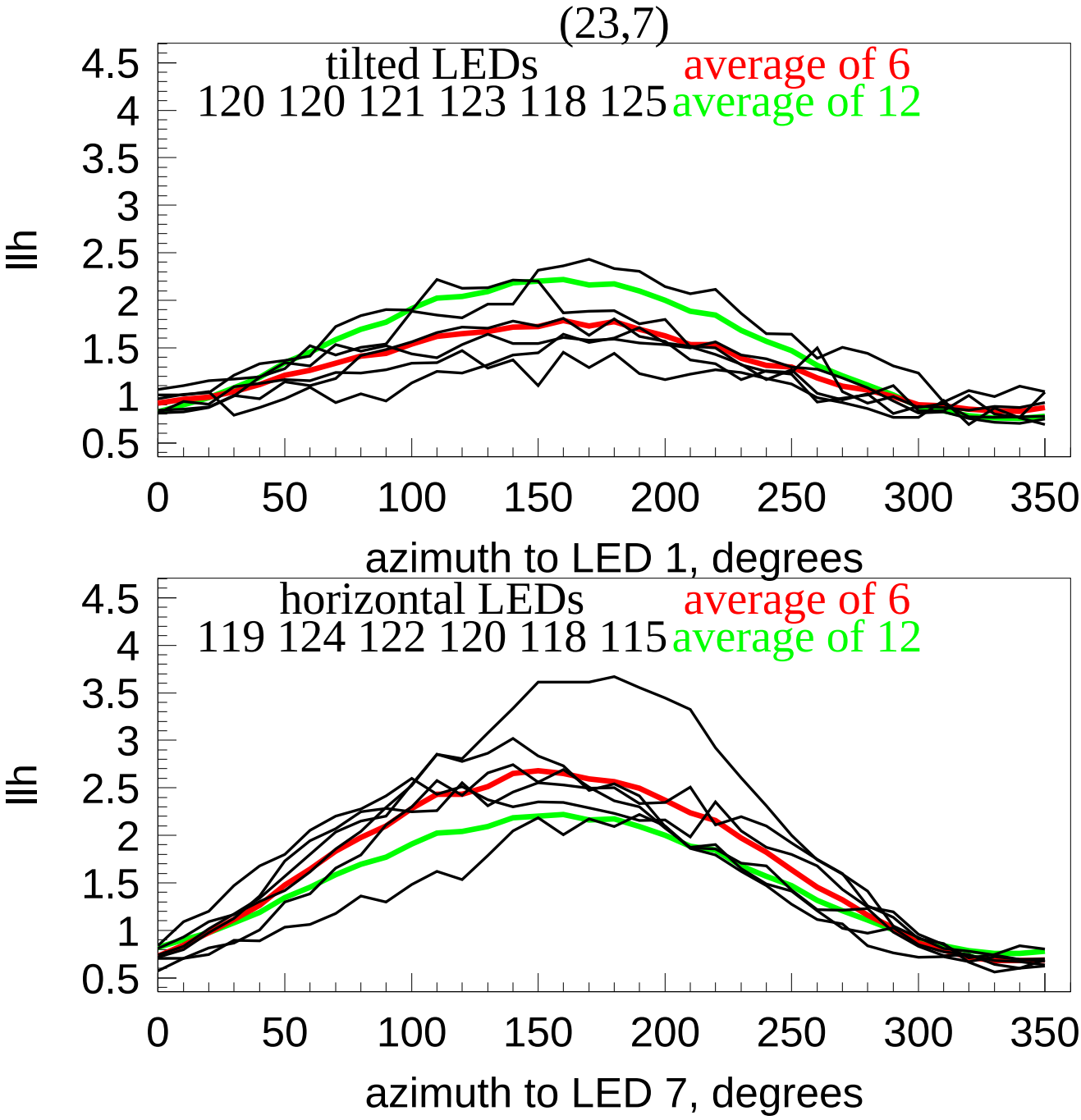

(23,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
136.6 ± 5.5
140
1
2
3
4
5
6
7
8
9
10
11
12

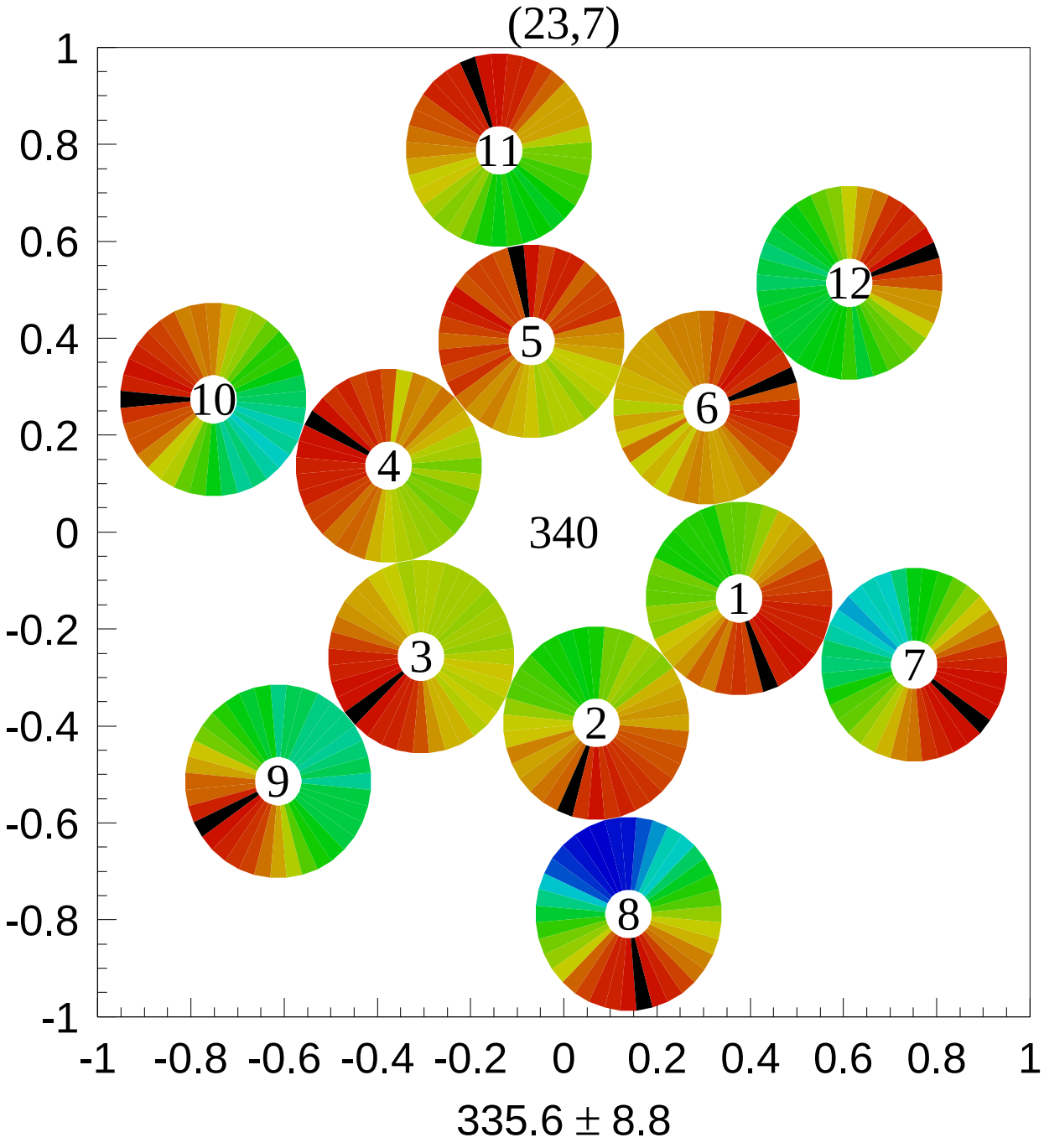

(23,5)
tilted LEDs
116 117 120 113 102 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 118 123 118 124 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

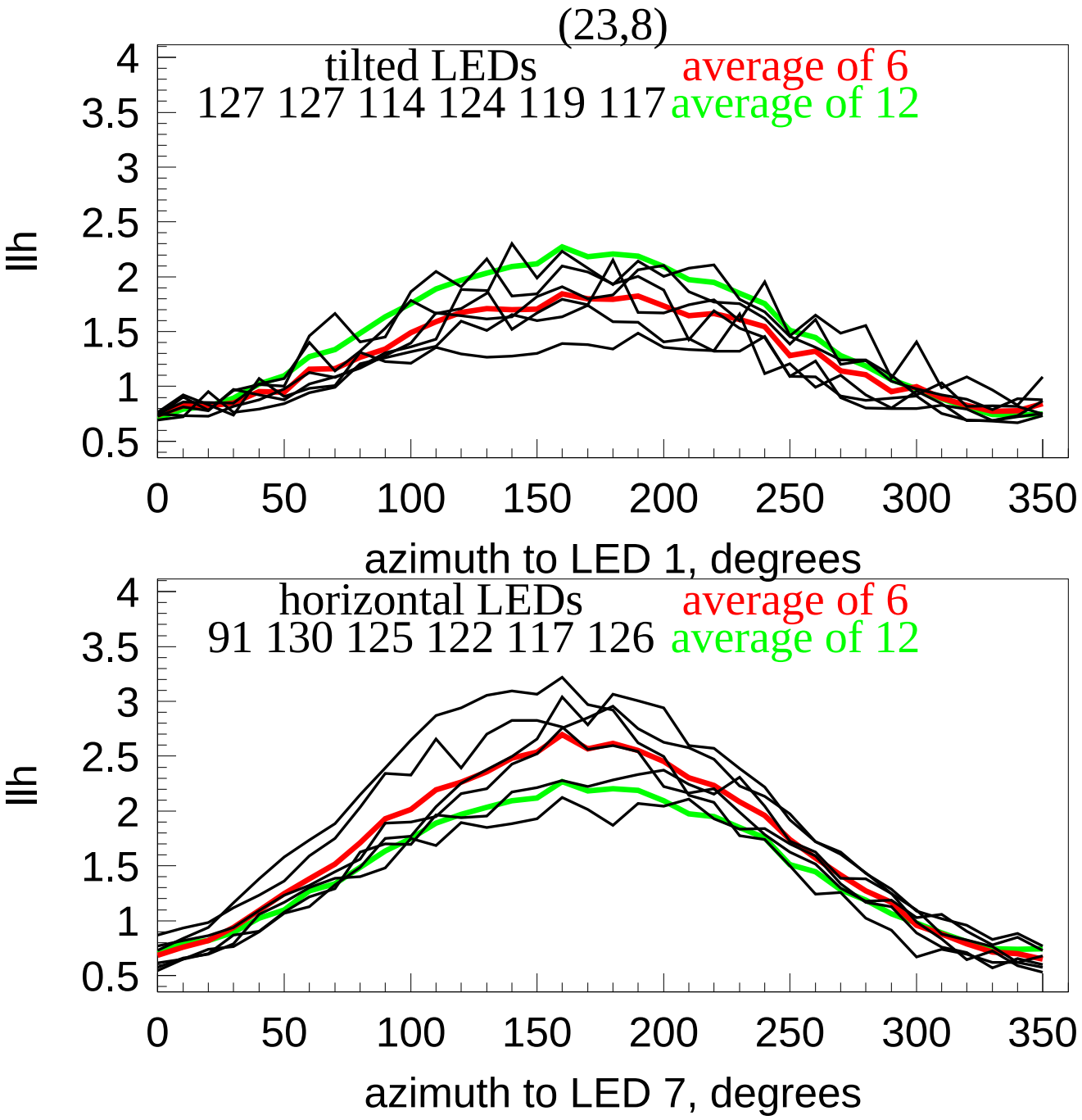

(23,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
113 ± 7.9

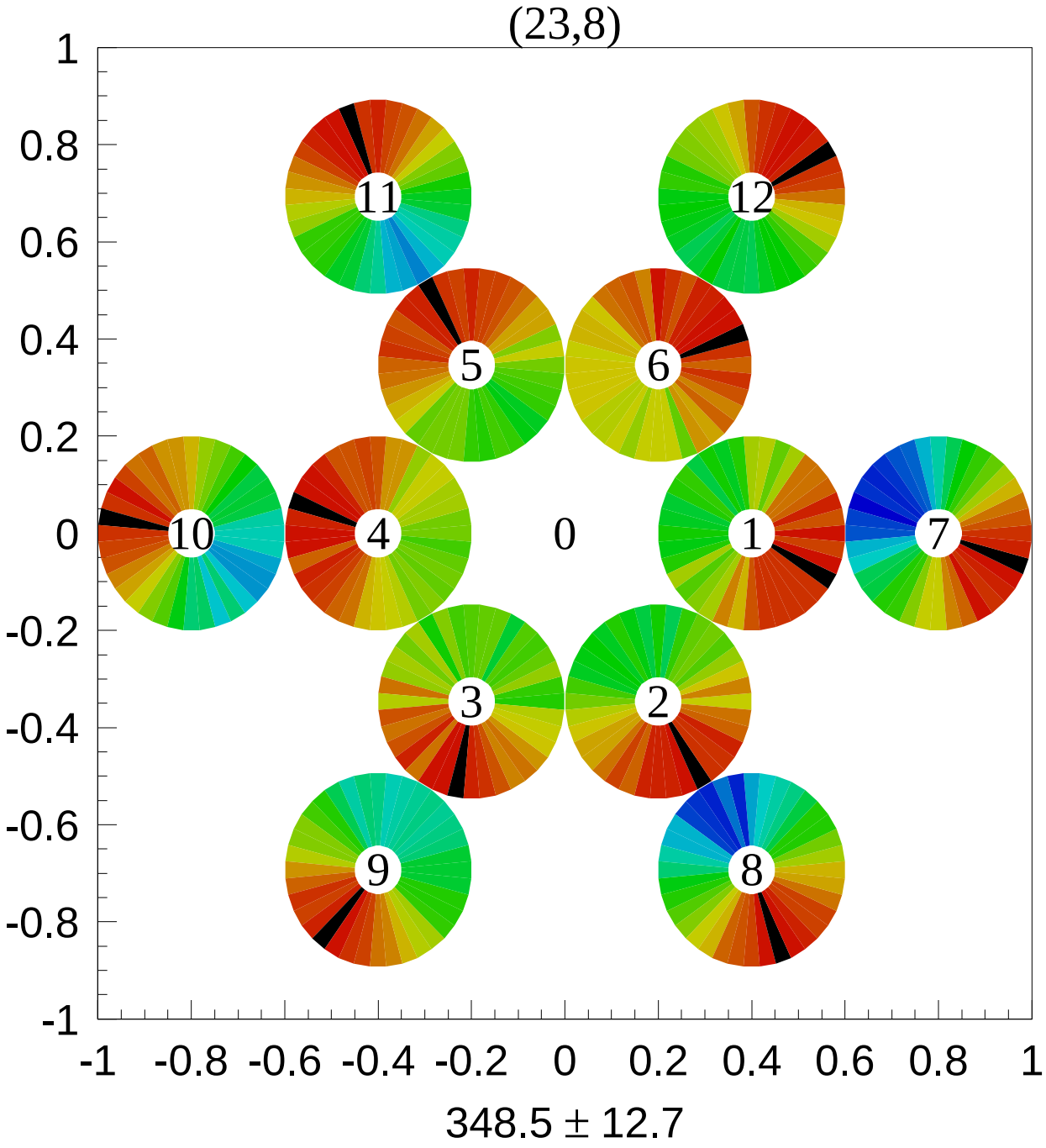

(23,6)
tilted LEDs
123 120 120 119 120 116
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
111 126 119 117 116 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

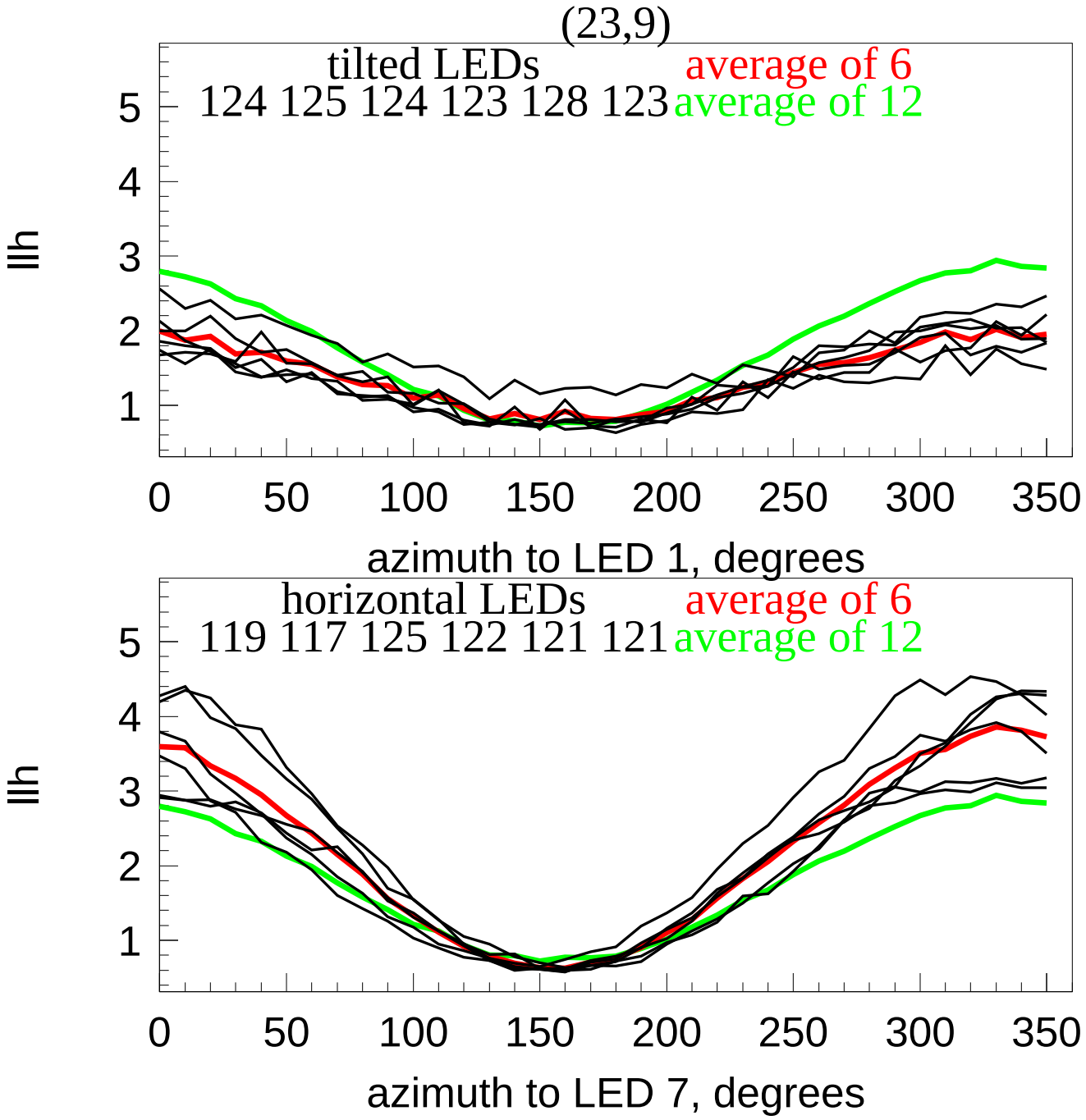

(23,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
150.2 ± 14.1

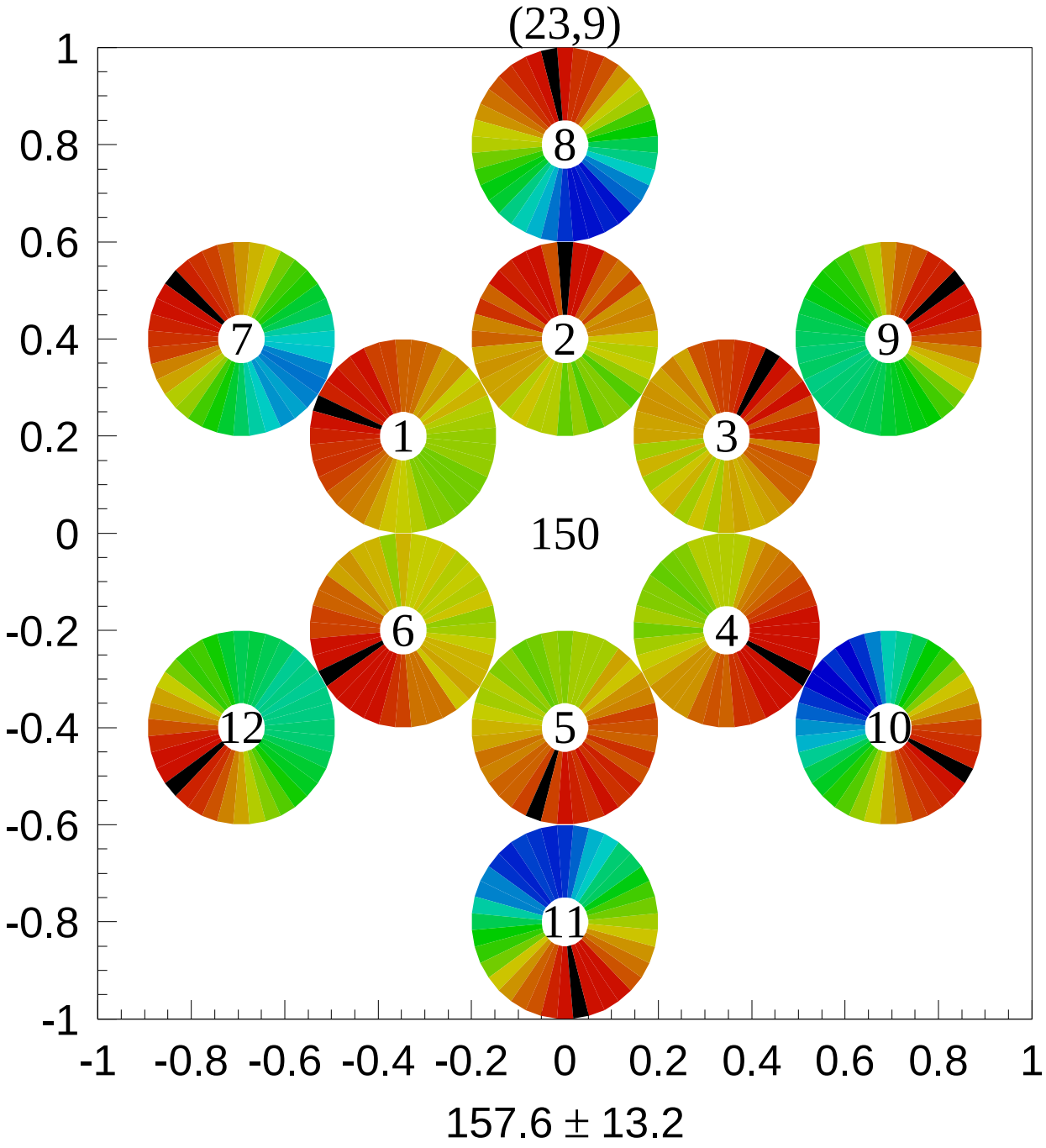

(23,7)
tilted LEDs
120 120 121 123 118 125
average of 6
average of 12
llh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 124 122 120 118 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

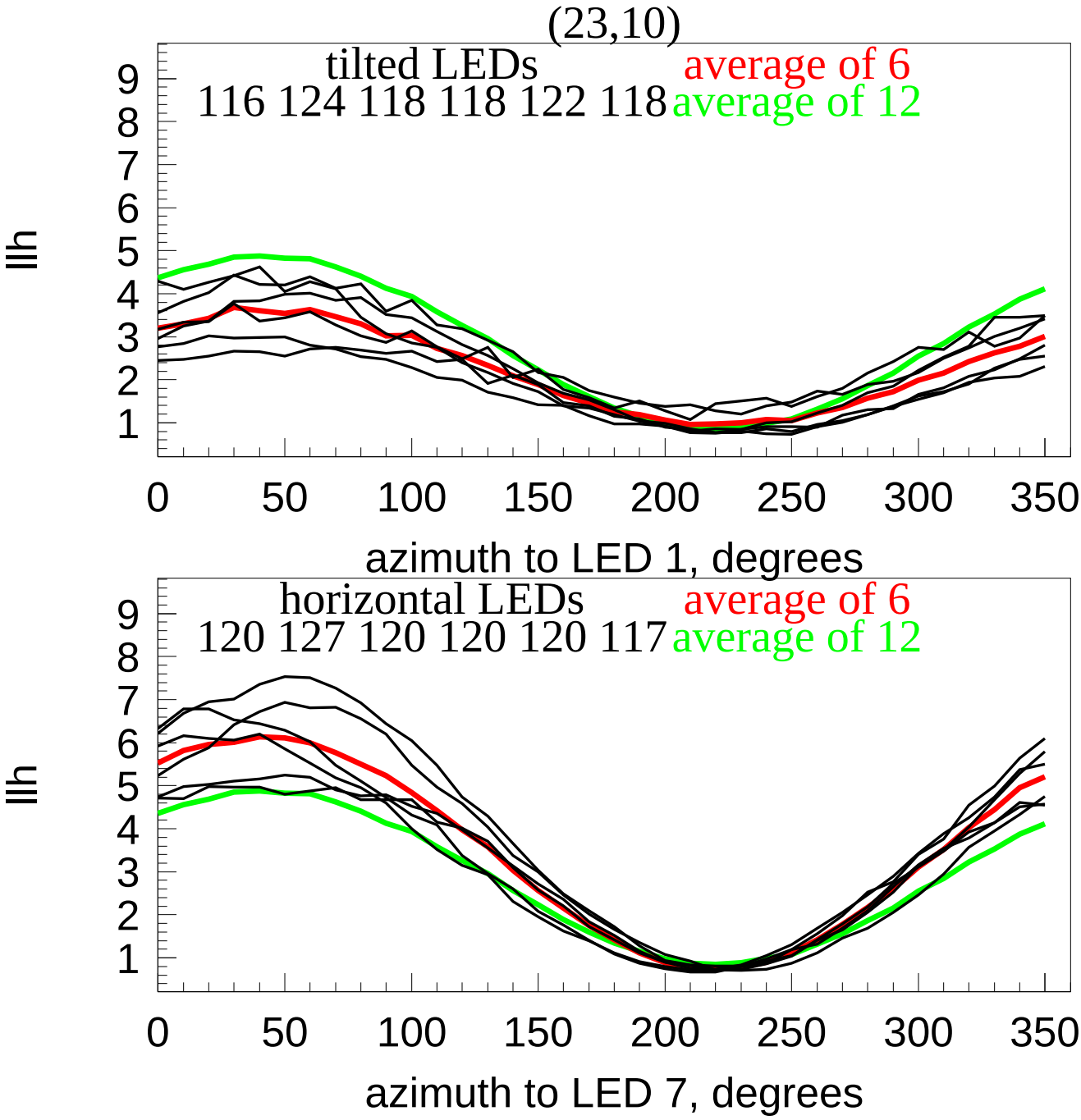

(23,7)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
335.6 ± 8.8

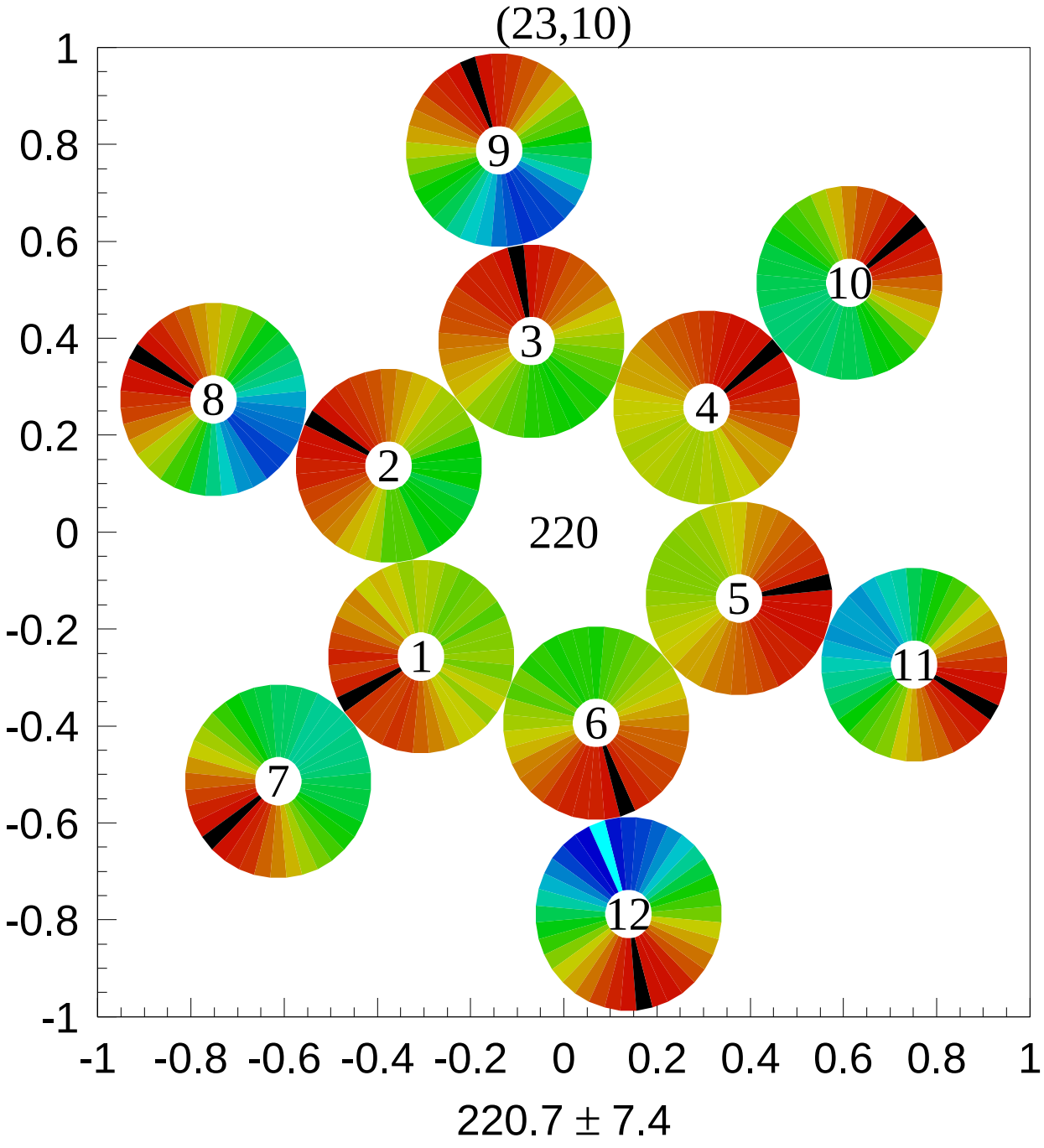

(23,8)
tilted LEDs
127 127 114 124 119 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
91 130 125 122 117 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

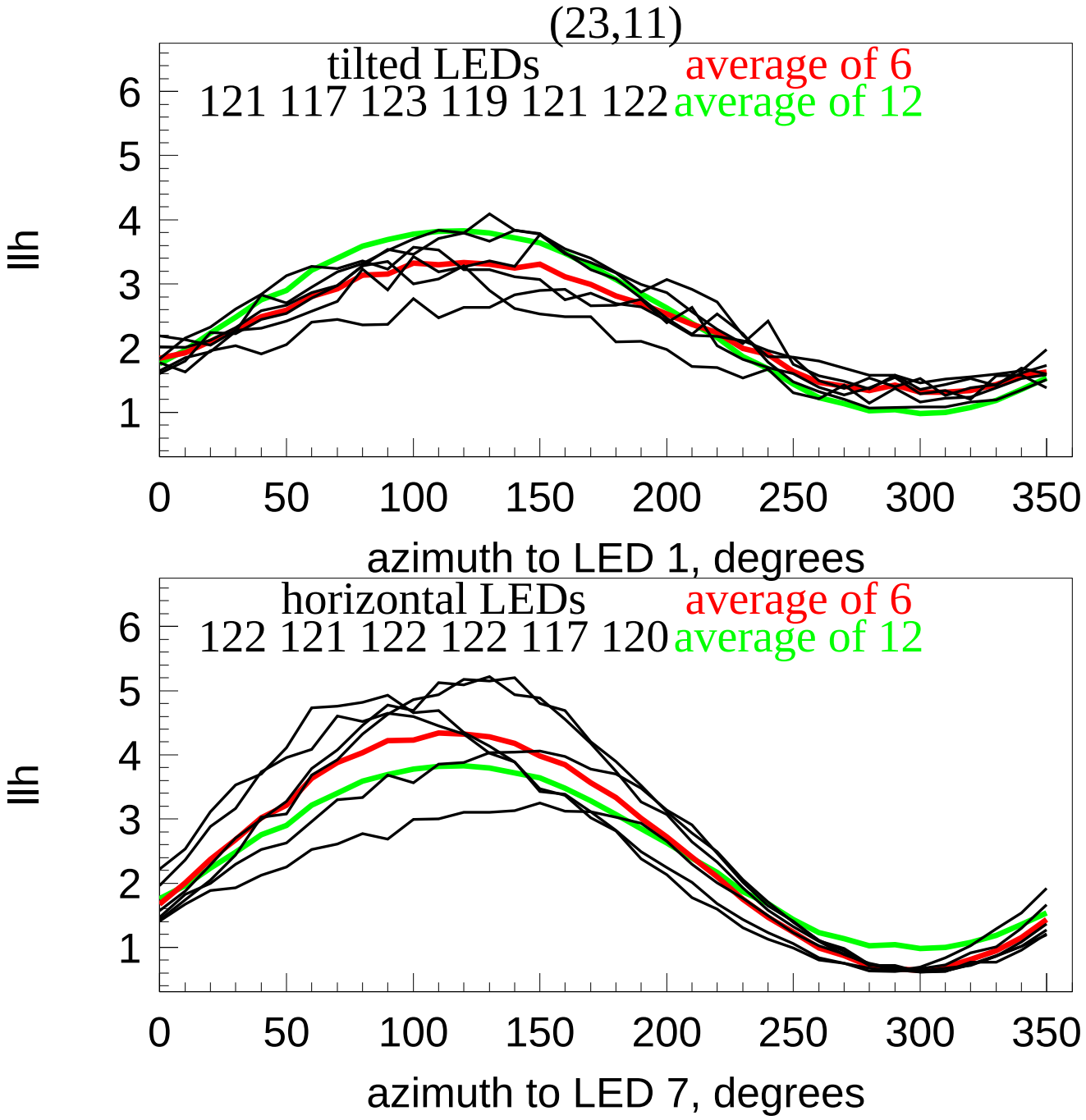

(23,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
348.5 ± 12.7

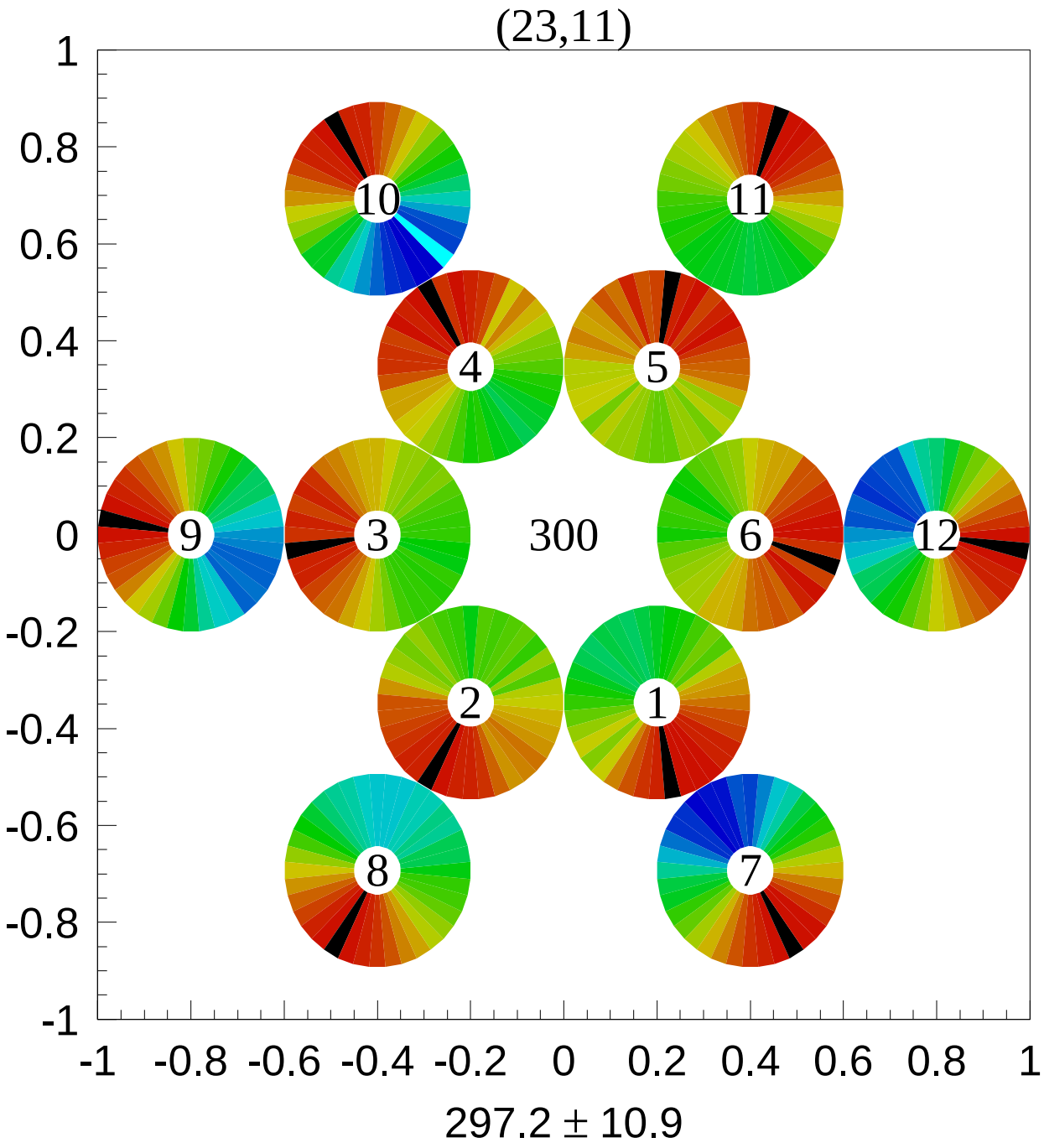

(23,9)
tilted LEDs
124 125 124 123 128 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 117 125 122 121 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

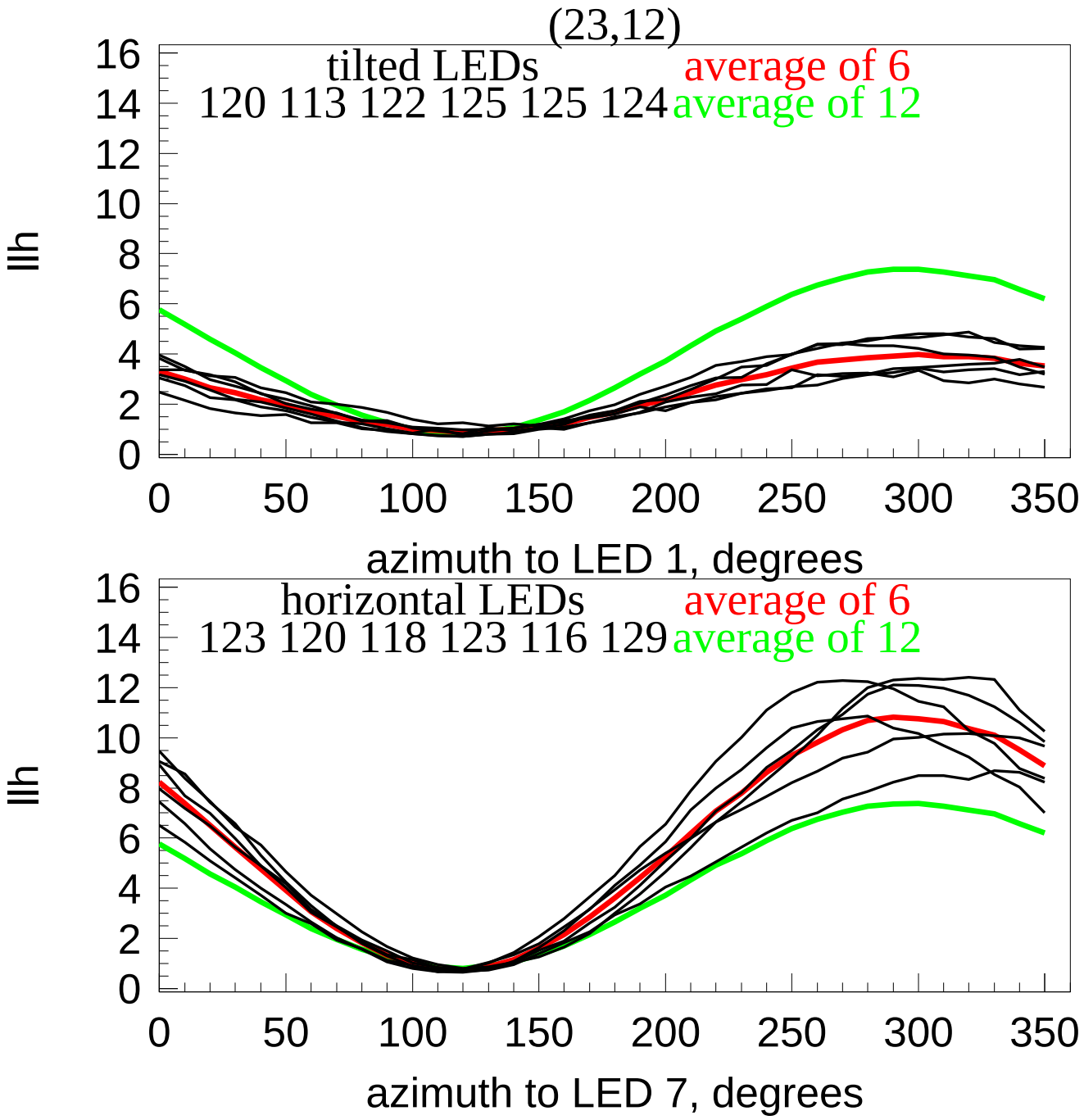

(23,9)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
157.6 ± 13.2

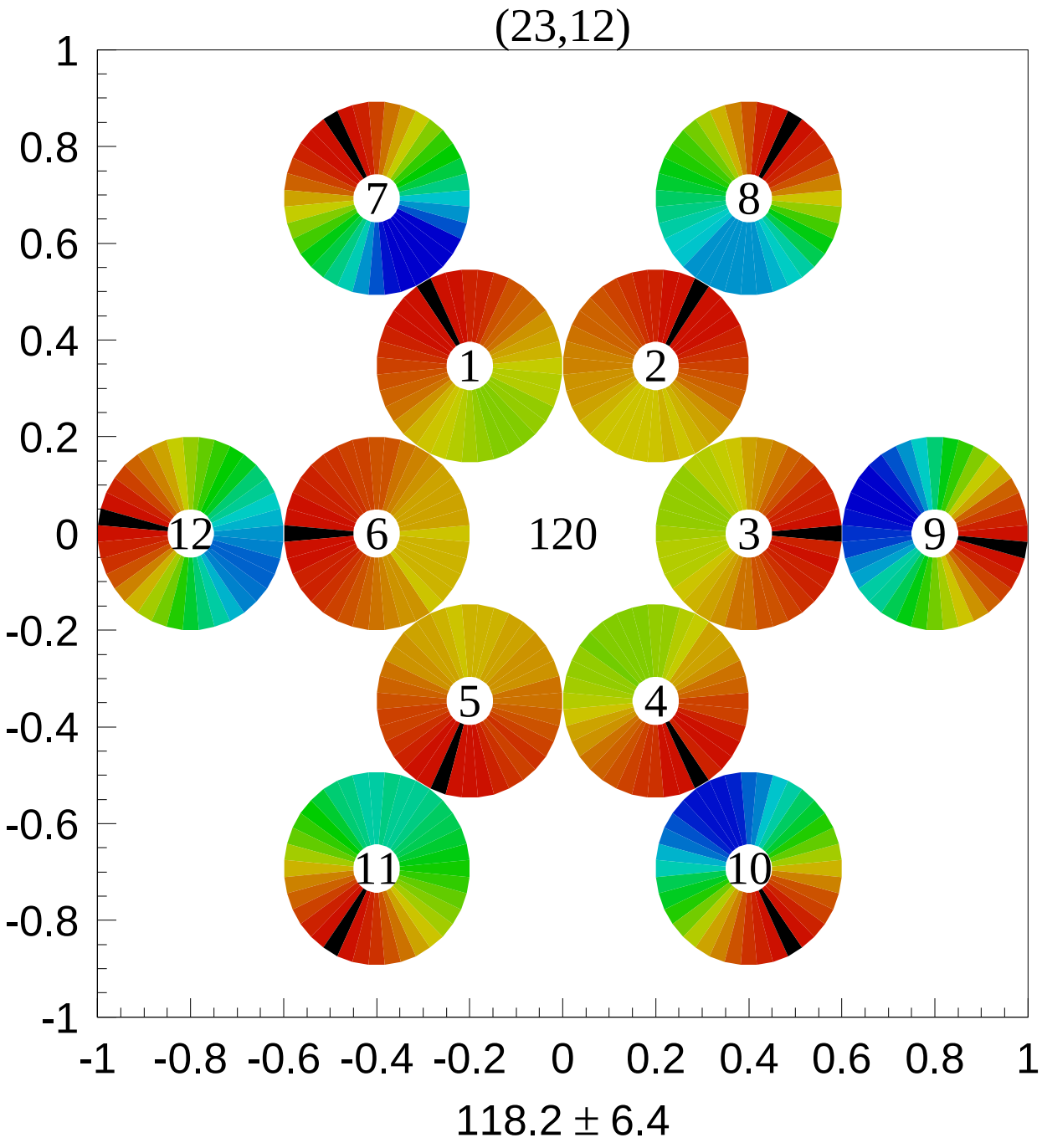

(23,10)
tilted LEDs
116 124 118 118 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 127 120 120 120 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

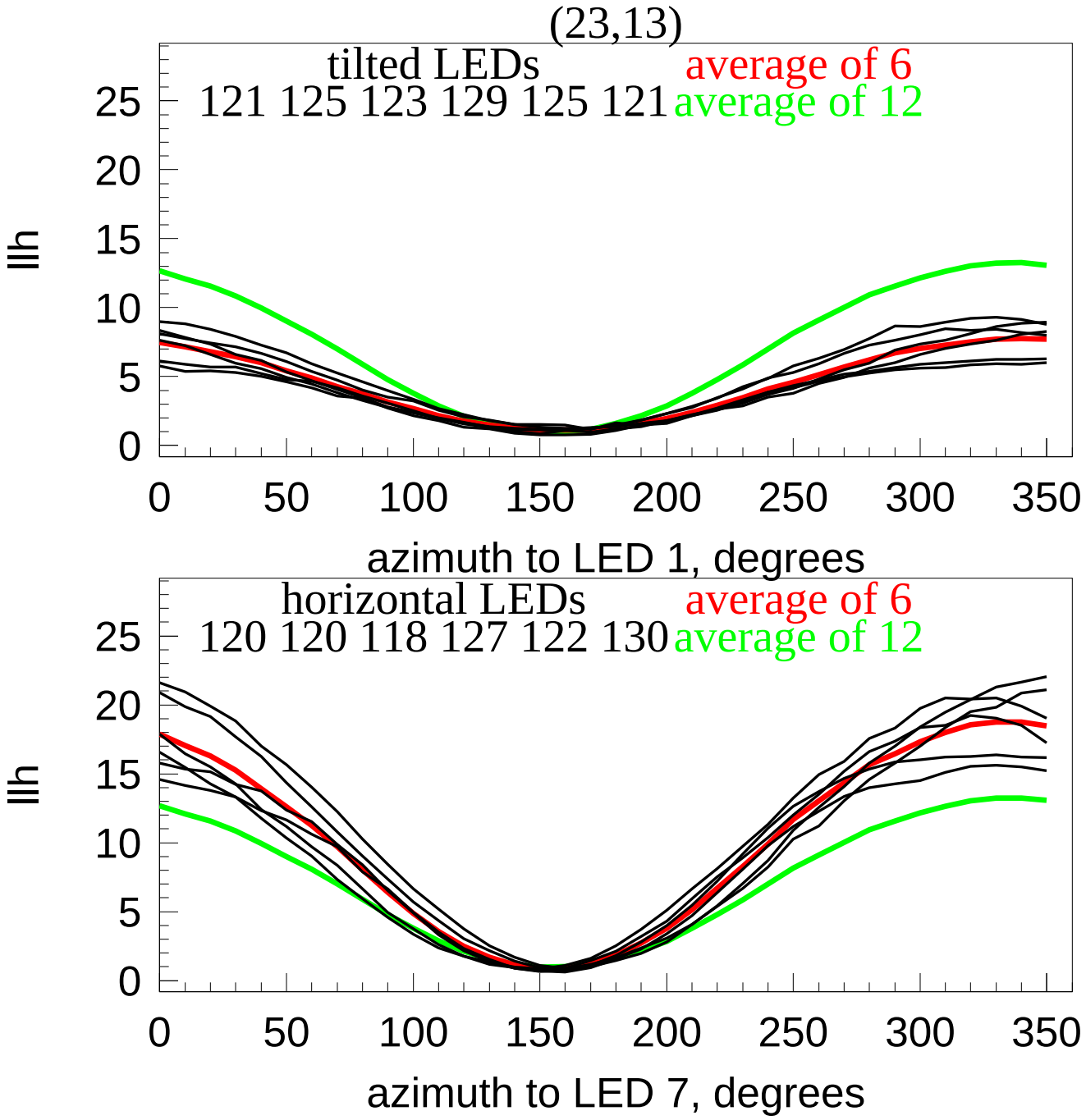

(23,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
220.7 ± 7.4

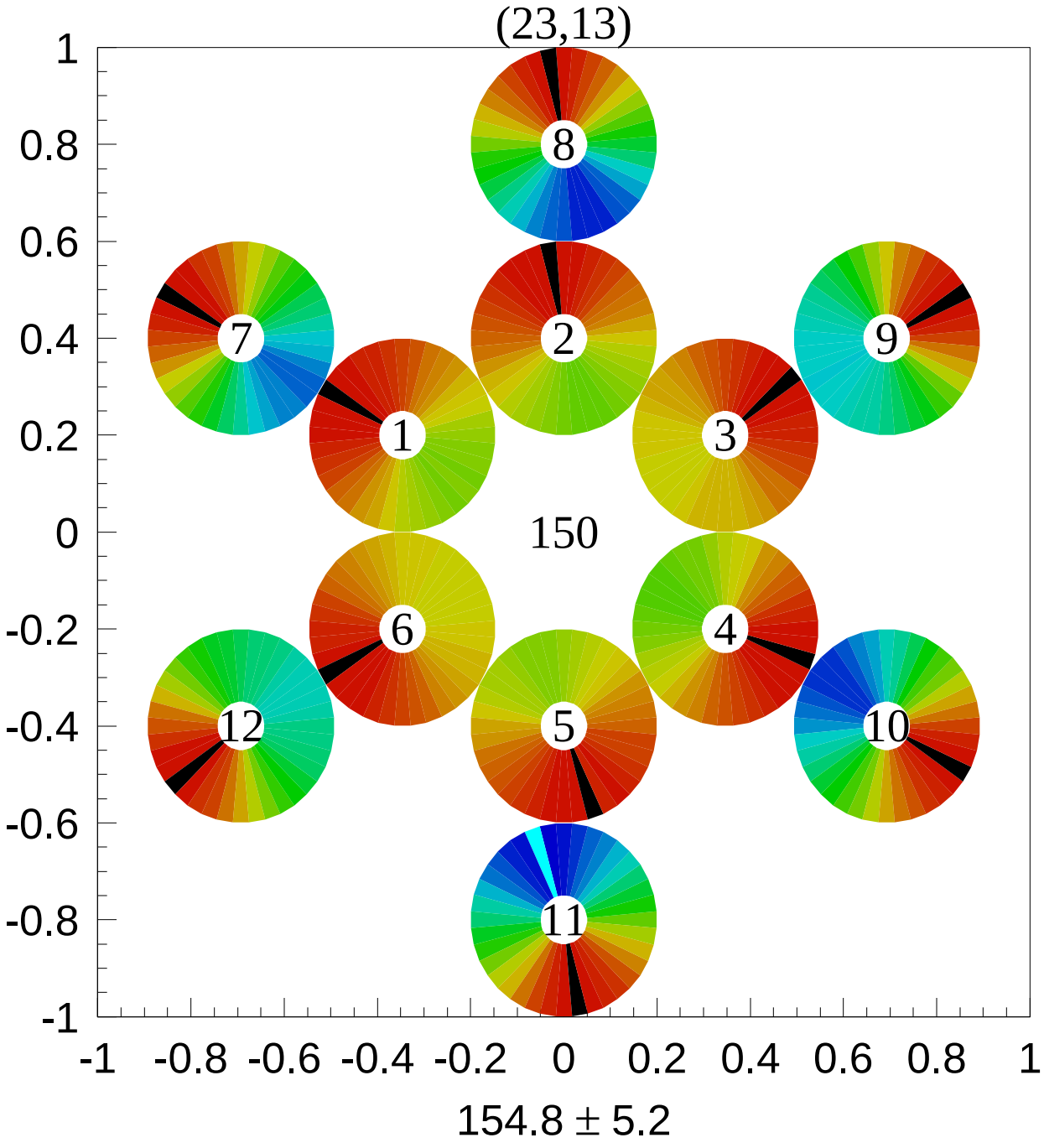

(23,11)
tilted LEDs
121 117 123 119 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 122 122 117 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

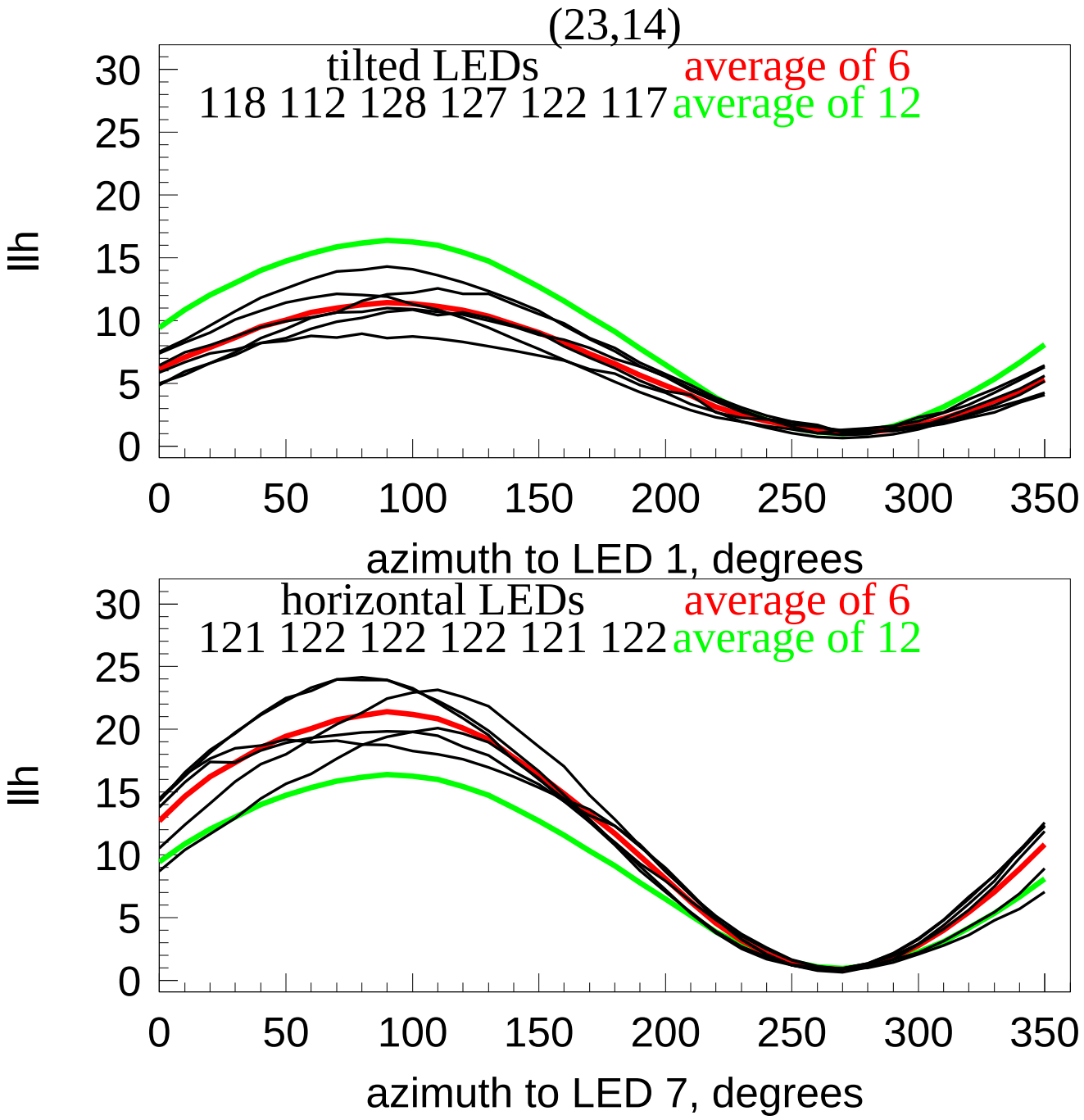

(23,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
297.2 ± 10.9

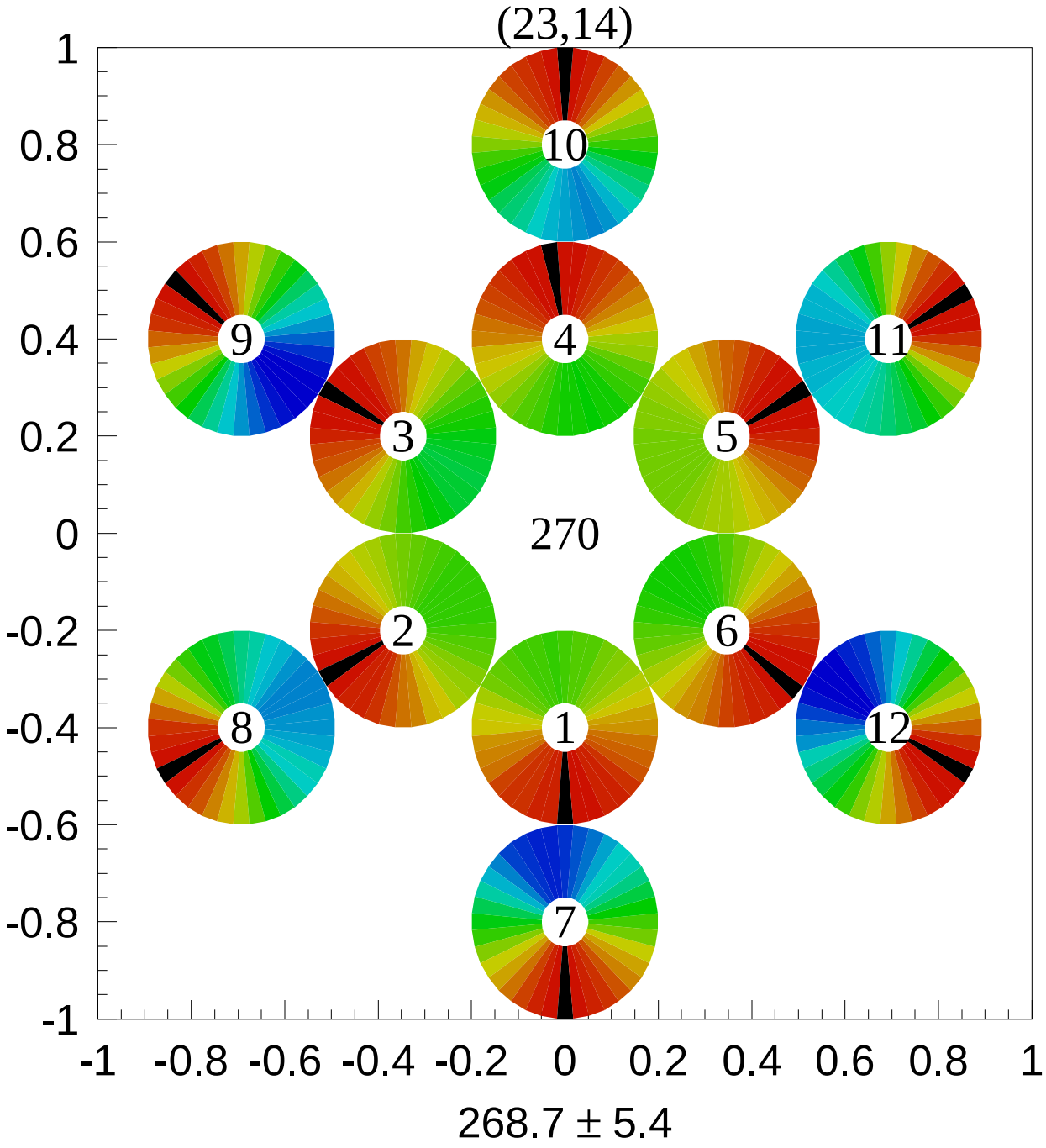

(23,12)
tilted LEDs
120 113 122 125 125 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 120 118 123 116 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

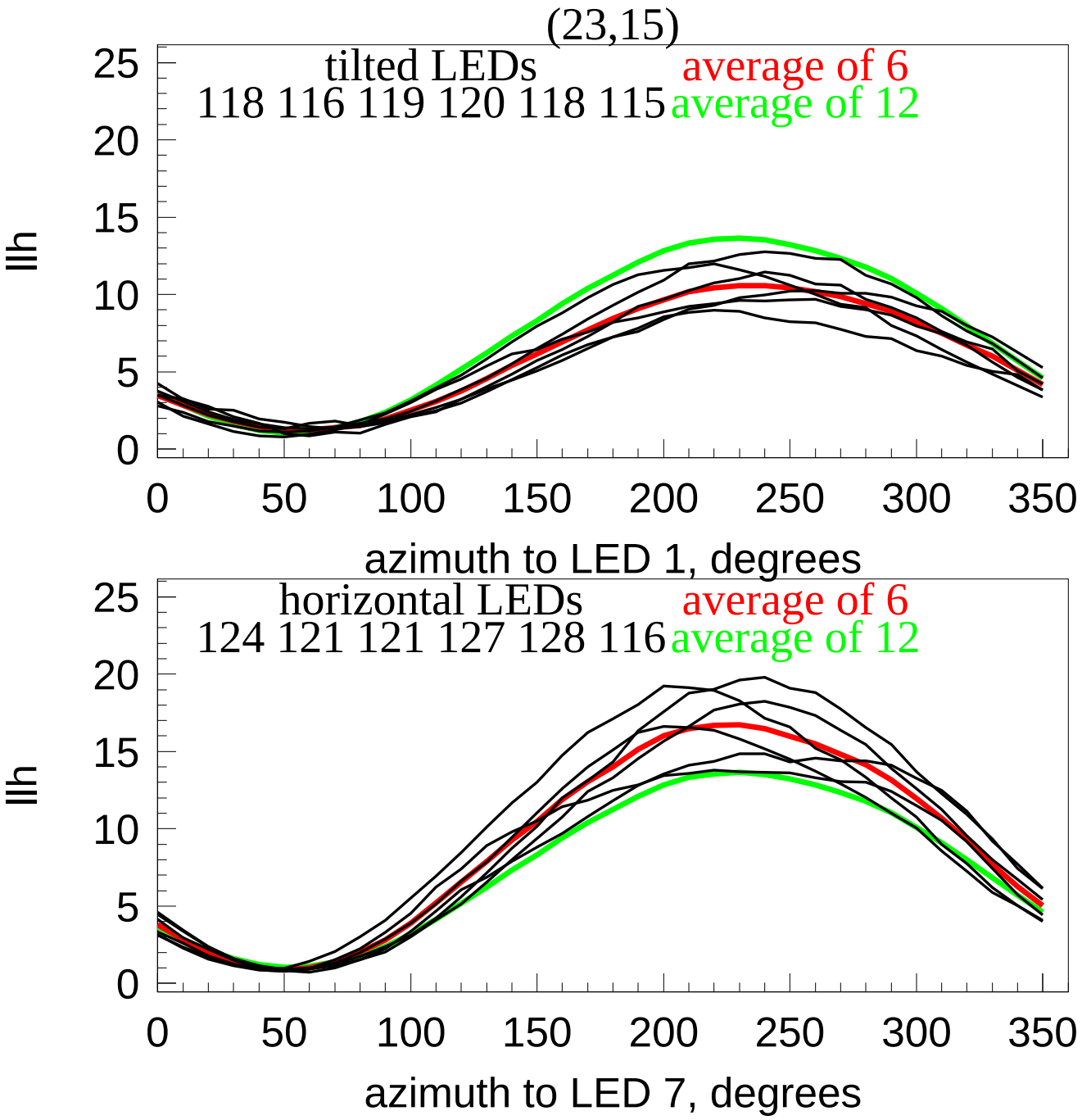

(23,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
118.2 ± 6.4

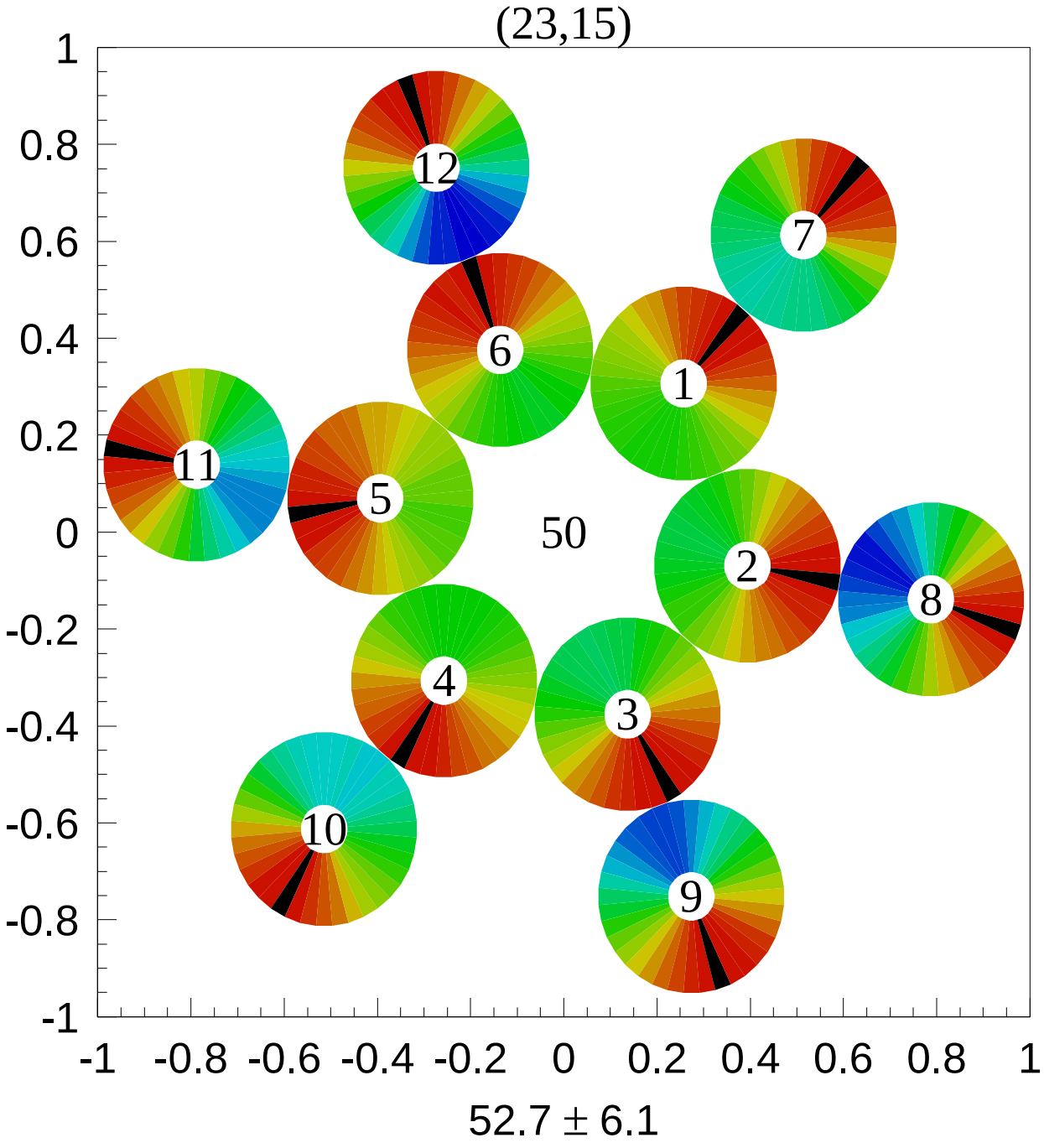

(23,13)
tilted LEDs
121 125 123 129 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 118 127 122 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

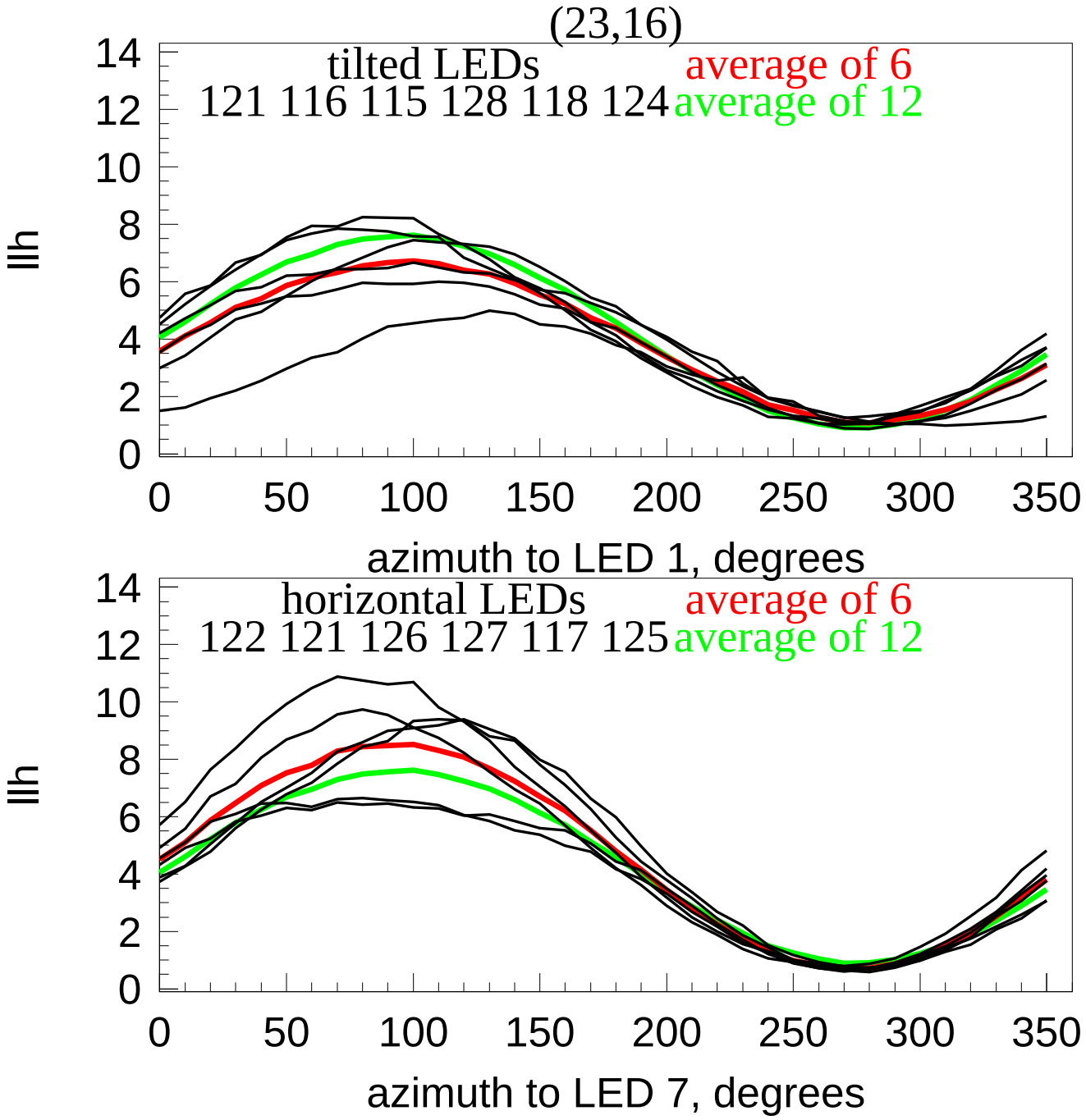

(23,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
154.8 ± 5.2

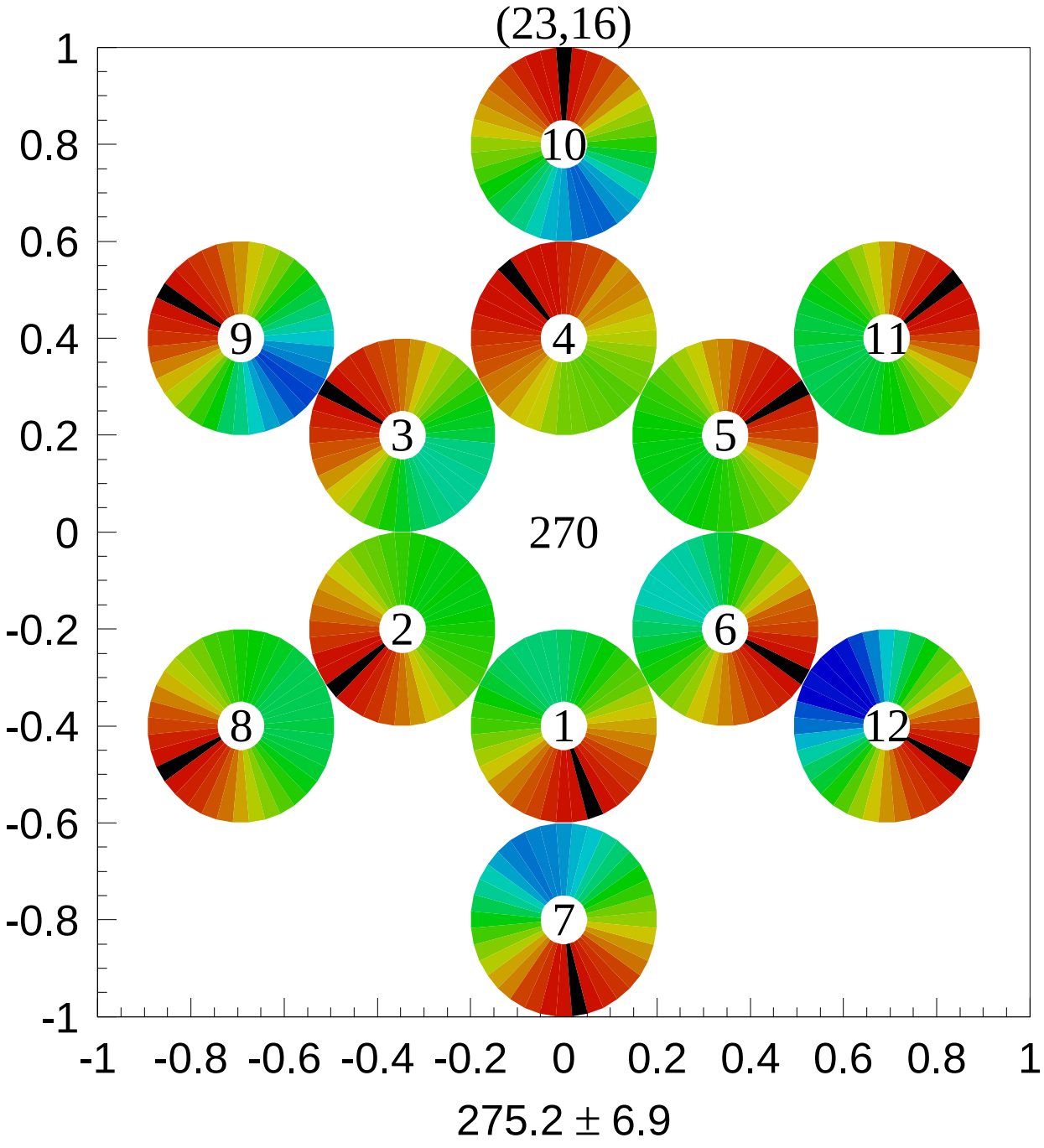

(23,14)
tilted LEDs
118 112 128 127 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 122 122 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

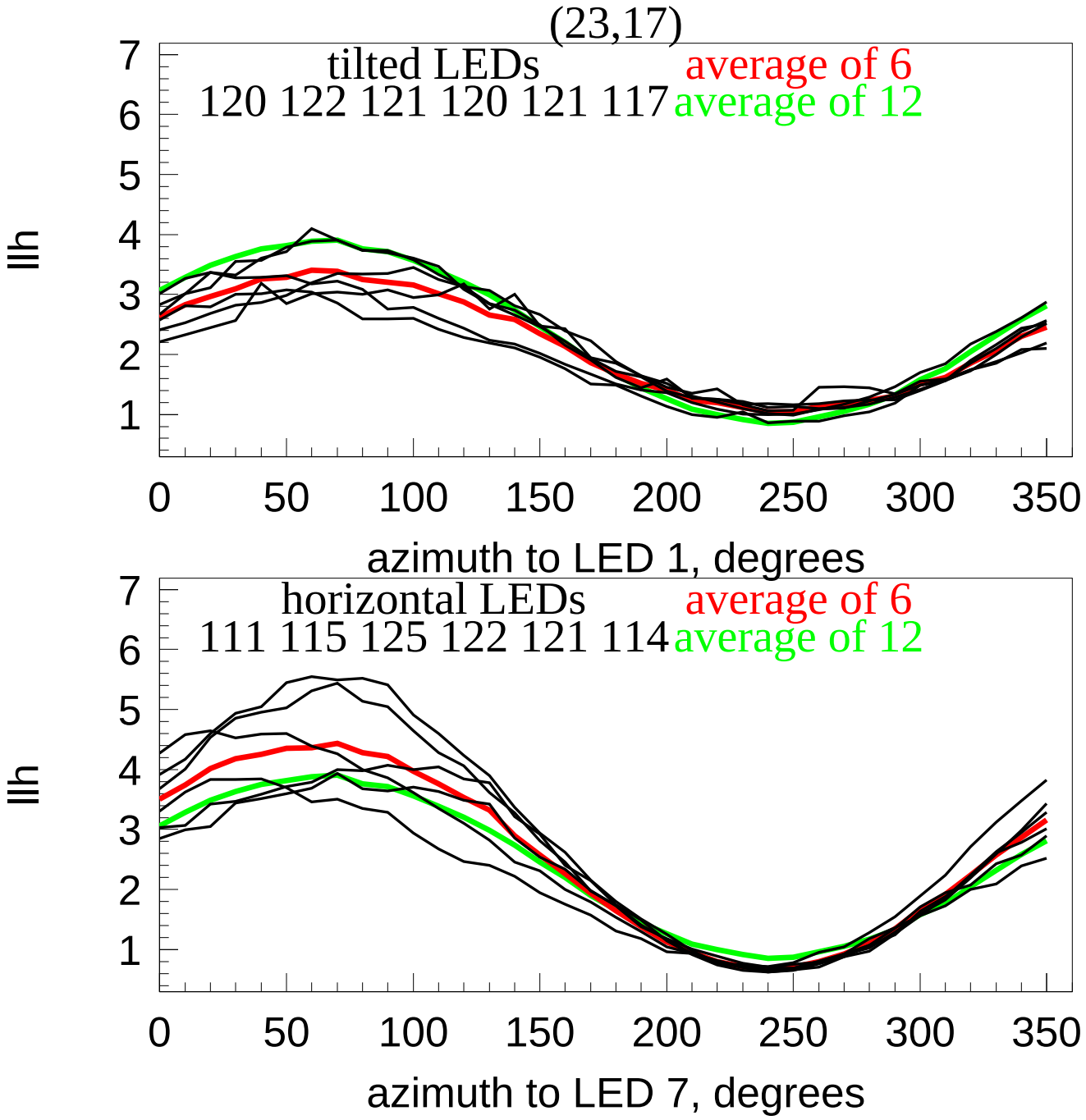

(23,14)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
268.7 ± 5.4

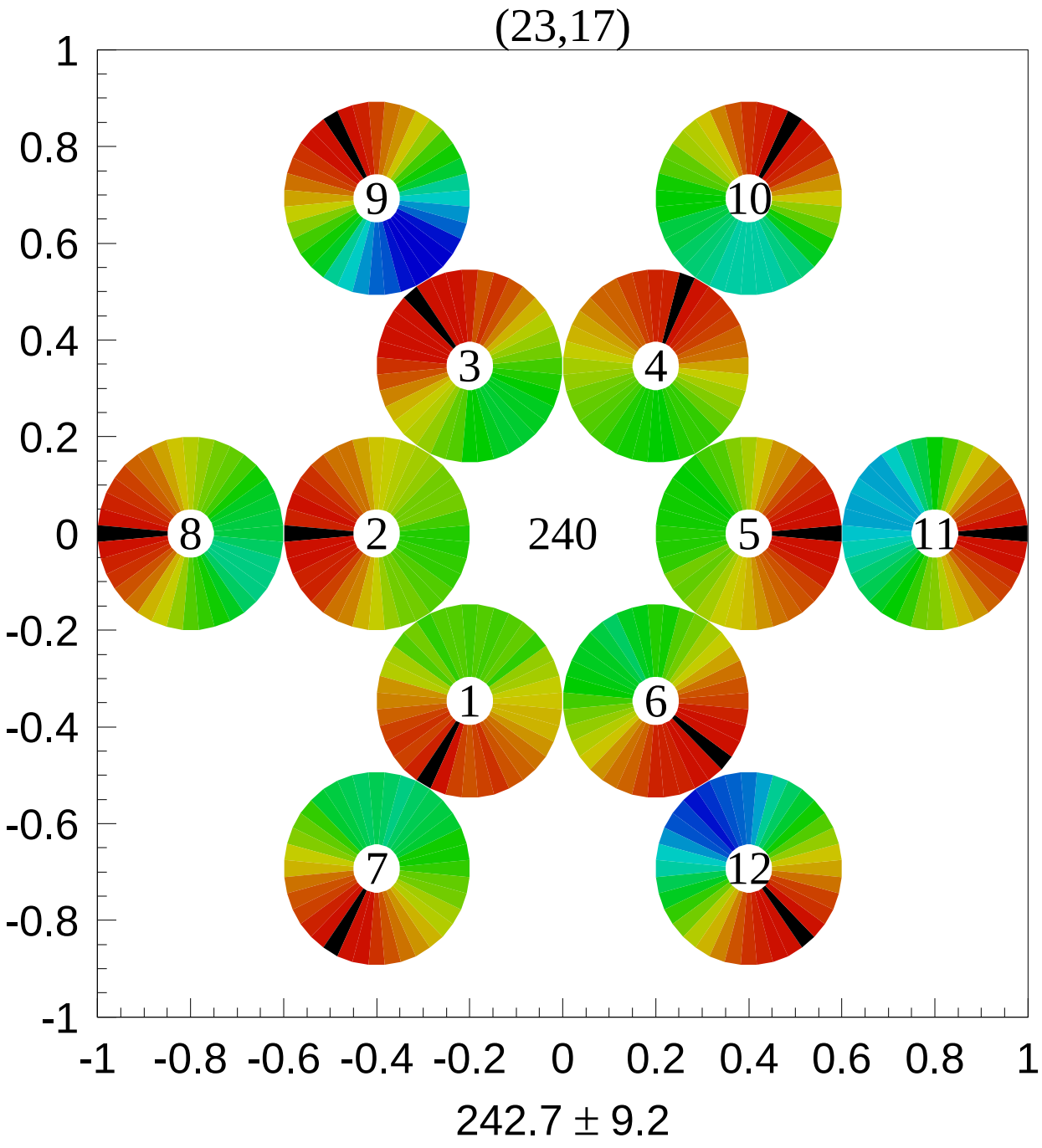

(23,15)
tilted LEDs
118 116 119 120 118 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 121 127 128 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

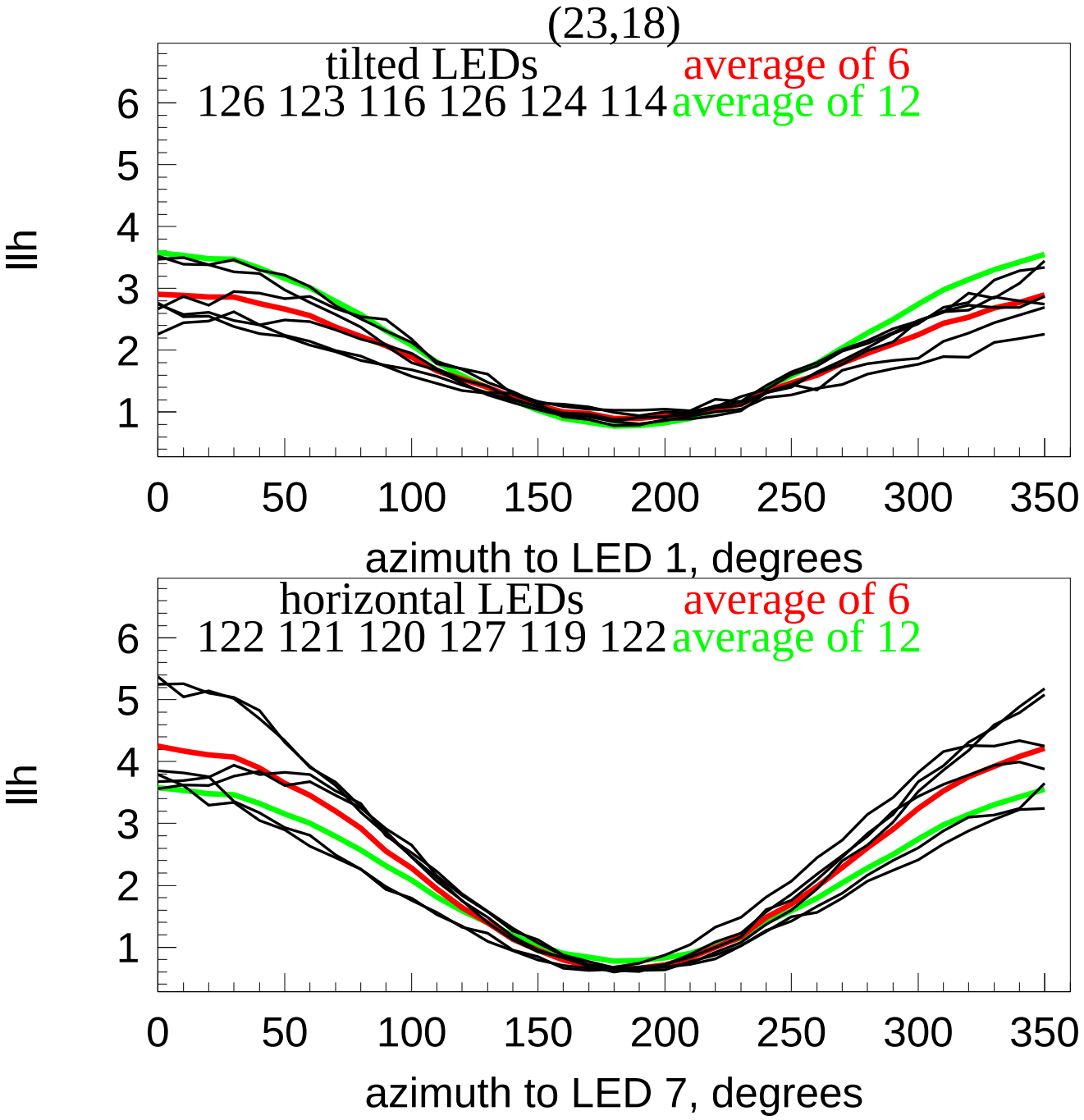

(23,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
52.7 ± 6.1

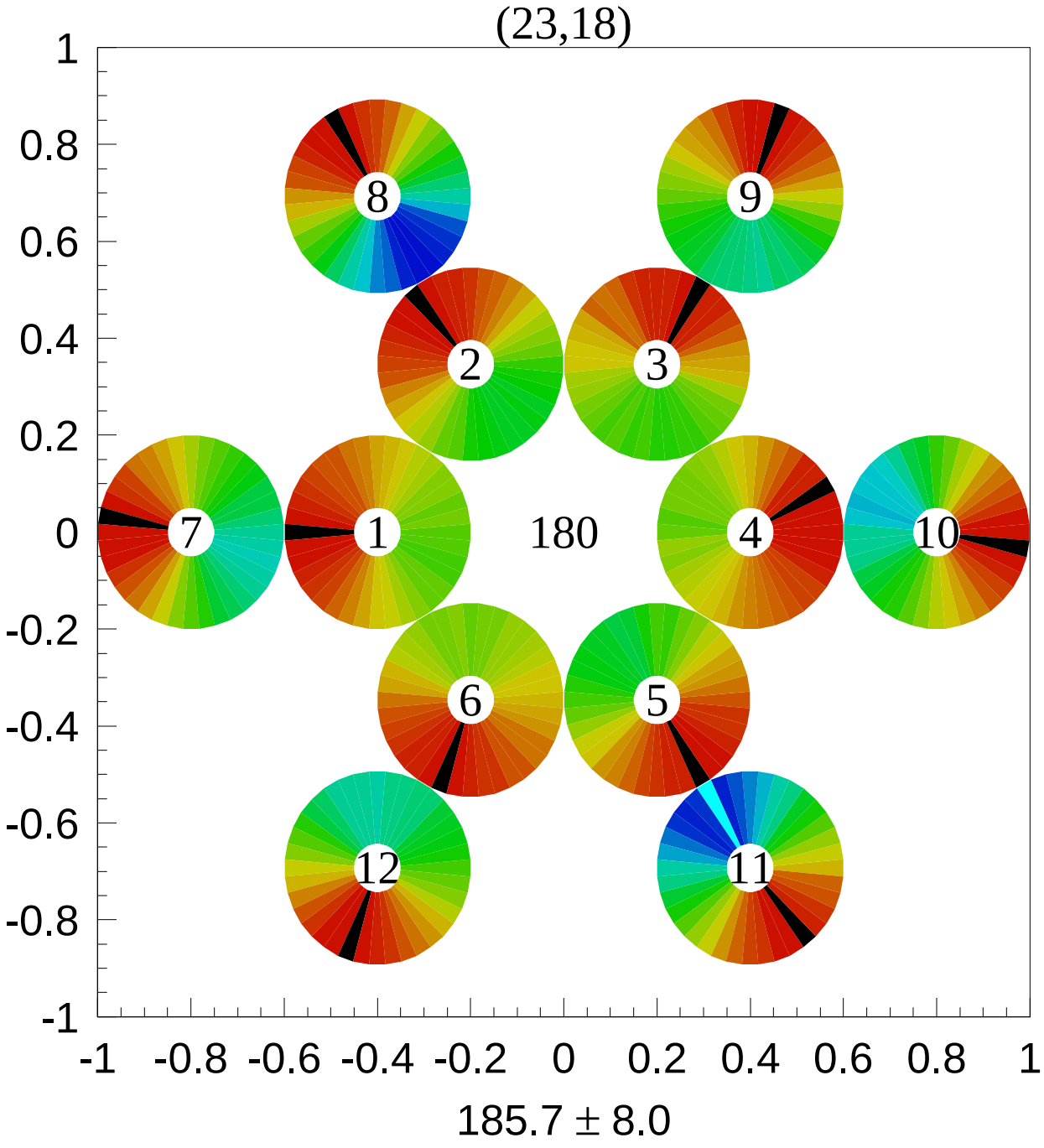

(23,16)
tilted LEDs
121 116 115 128 118 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 126 127 117 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

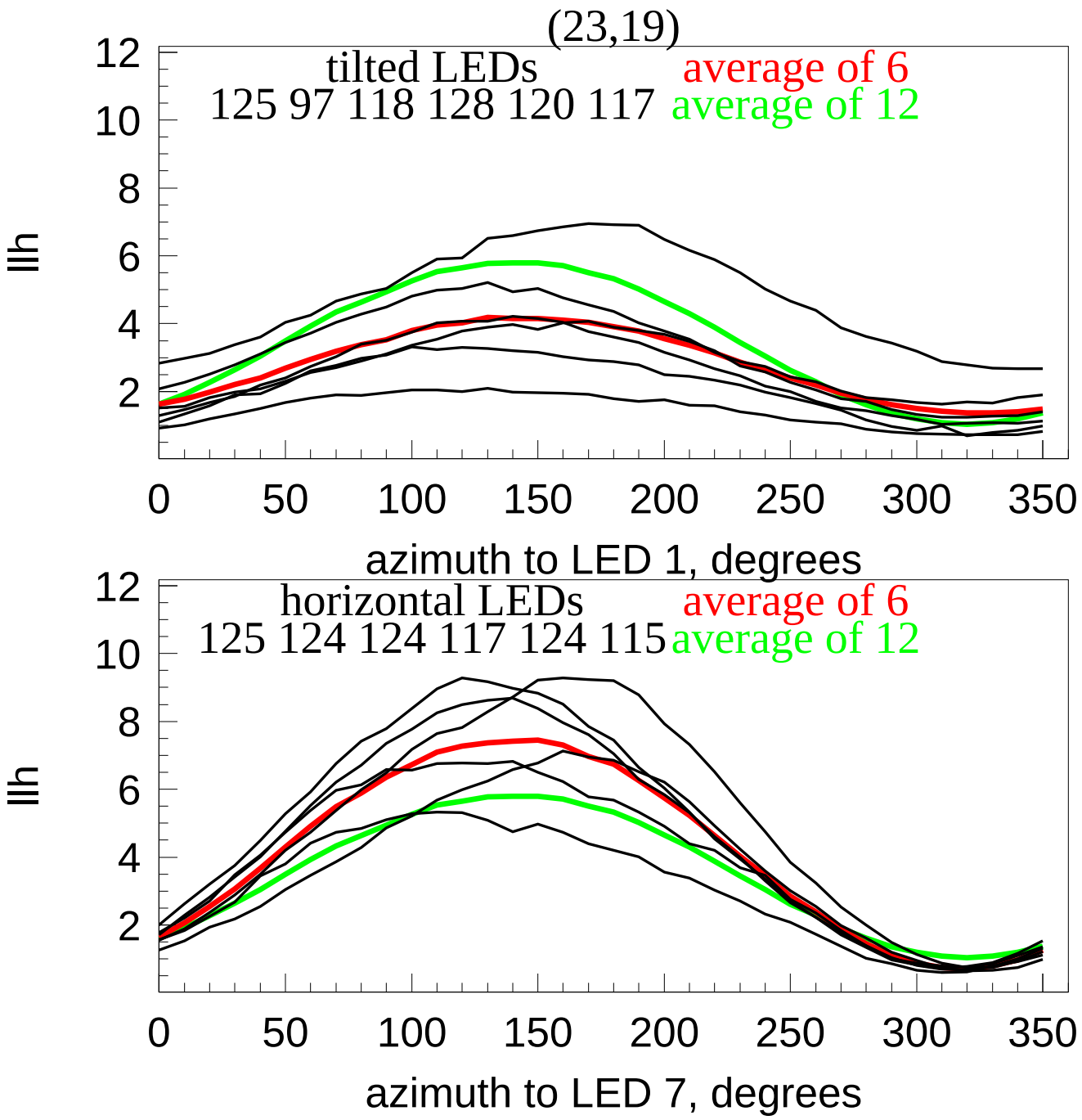

(23,16)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
275.2 ± 6.9

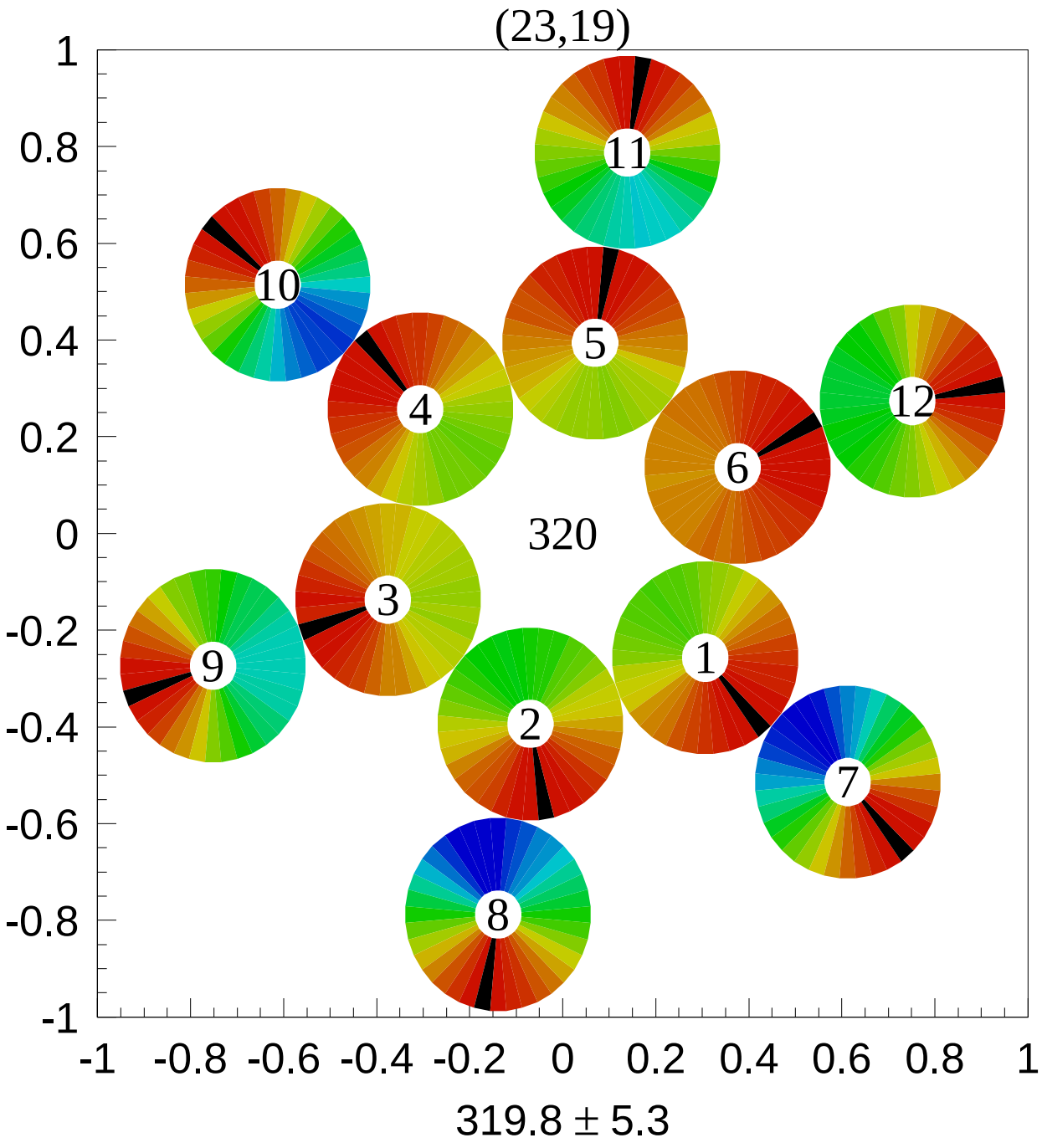

(23,17)
tilted LEDs
120 122 121 120 121 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 115 125 122 121 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

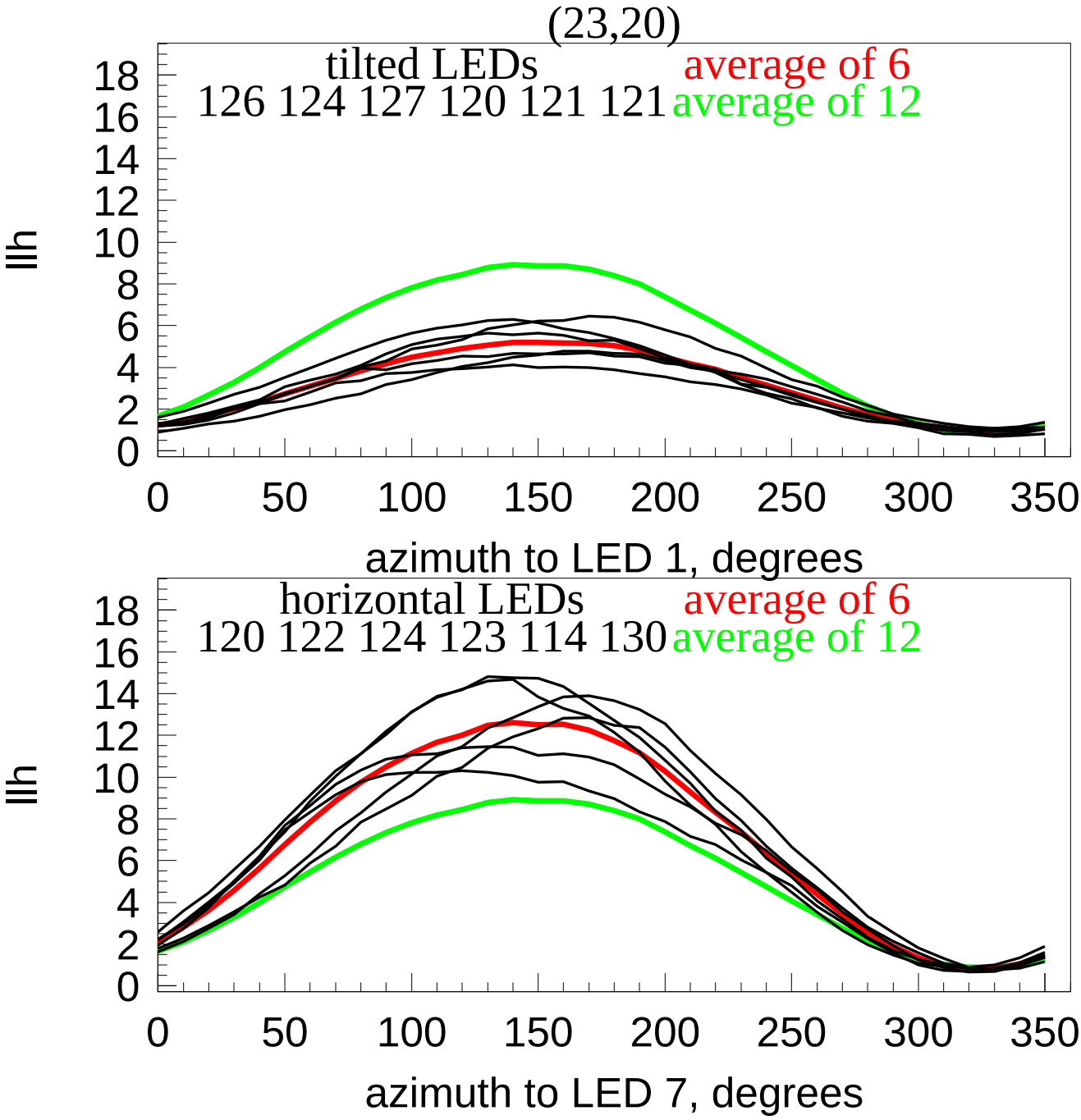

(23,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242.7 ± 9.2

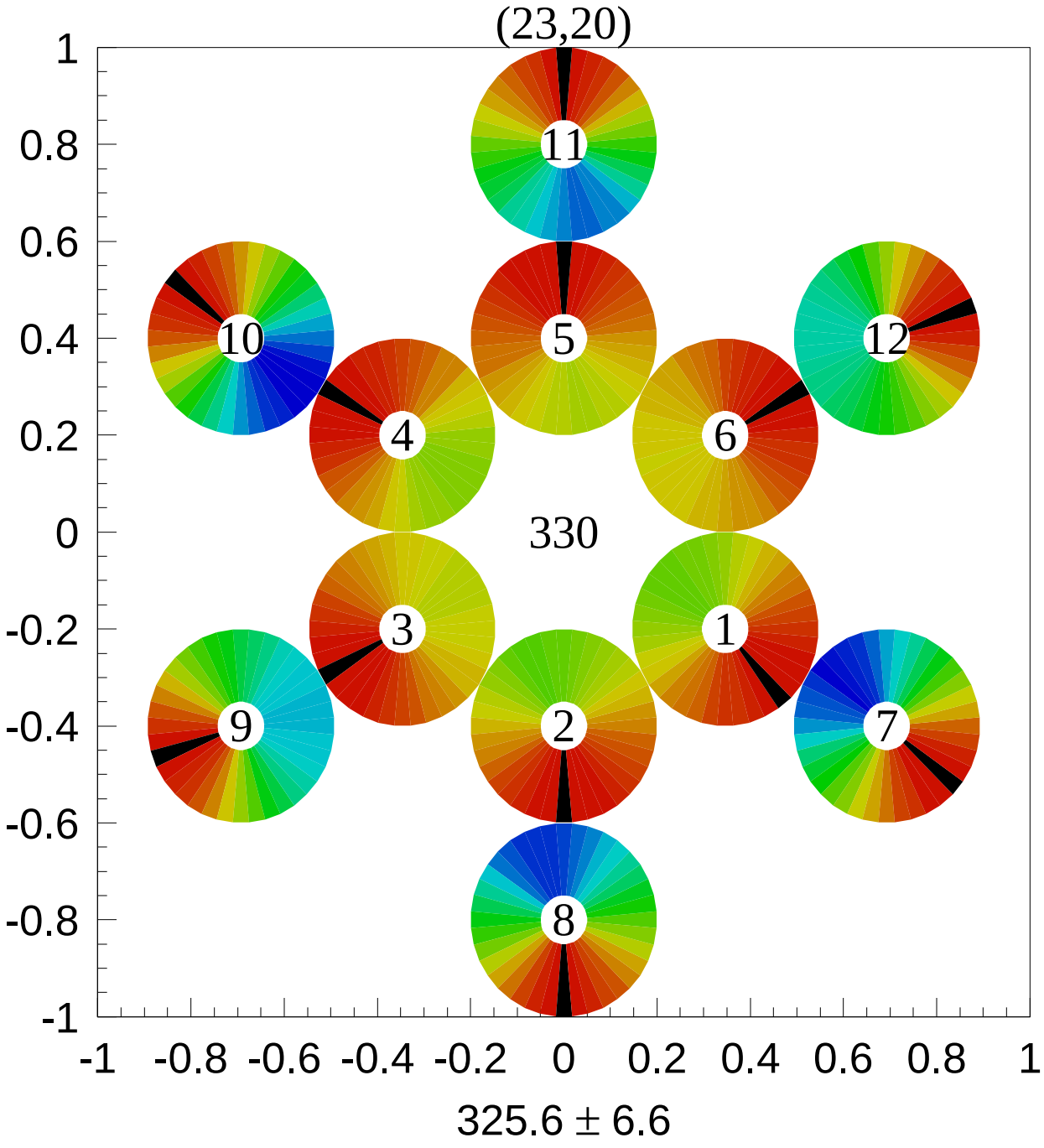

(23,18)
tilted LEDs
126 123 116 126 124 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 120 127 119 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

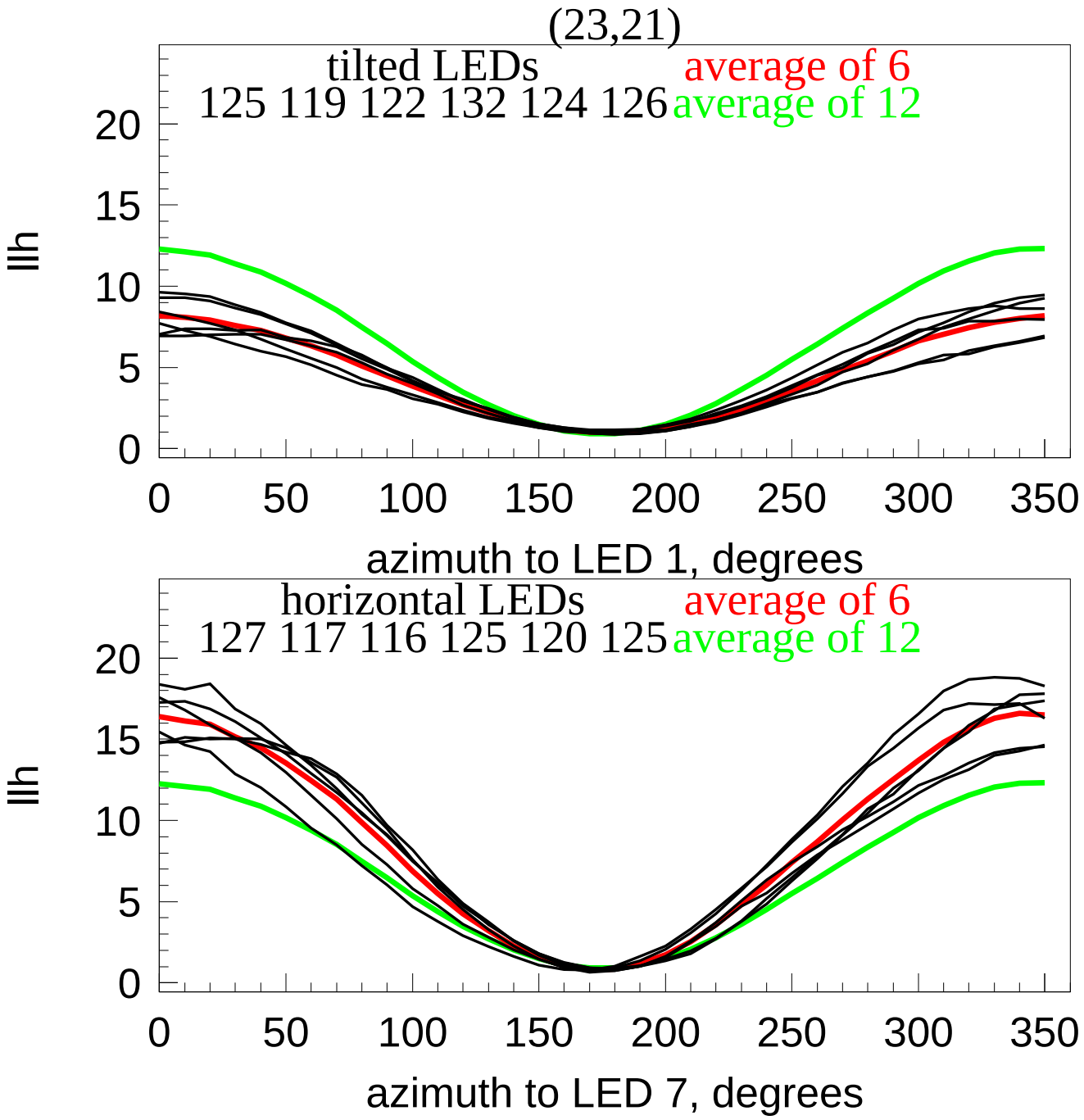

(23,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
185.7 ± 8.0
8
9
2
3
7
1
180
4
10
6
5
12
11

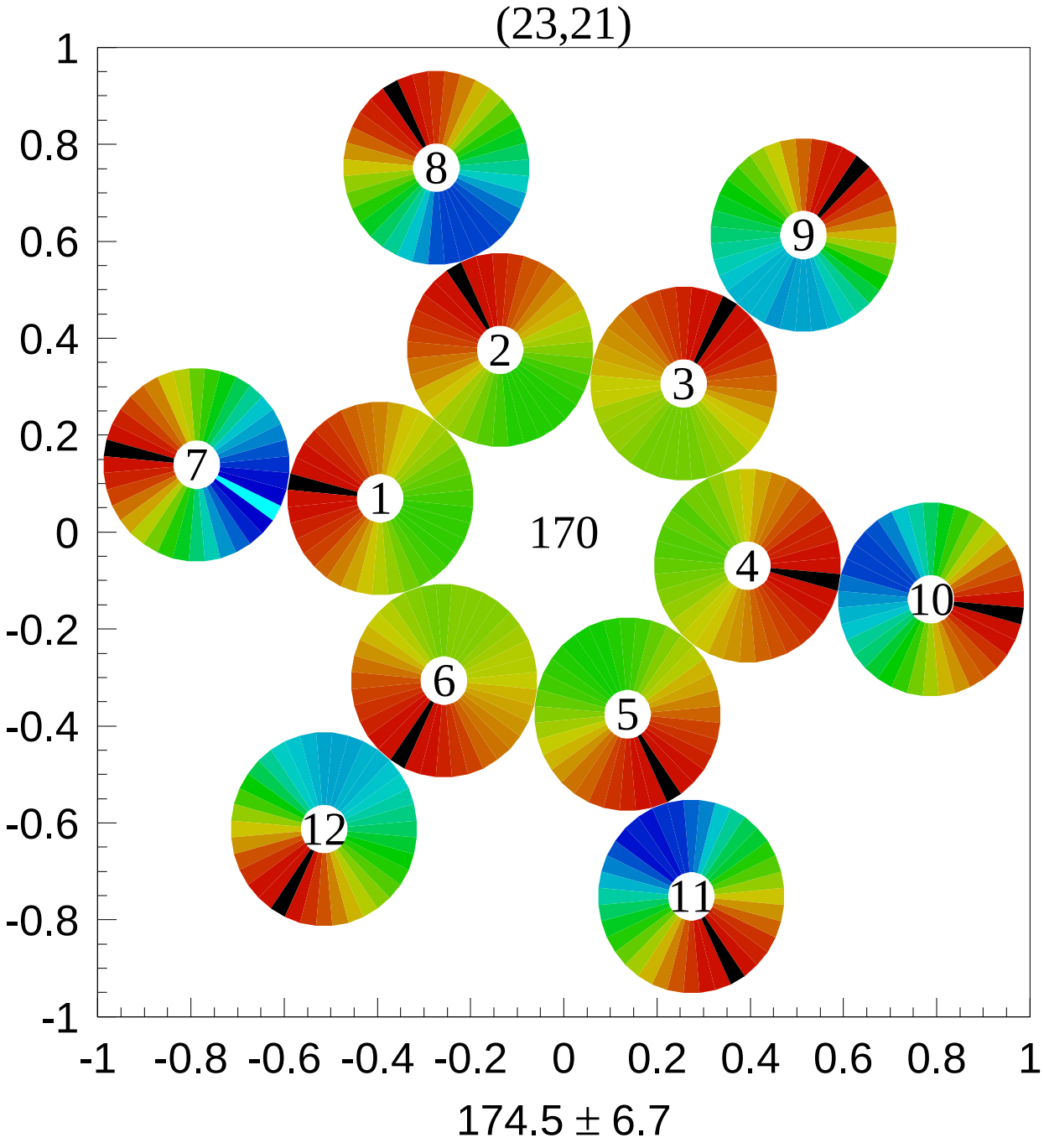

(23,19)
tilted LEDs
125 97 118 128 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 124 117 124 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

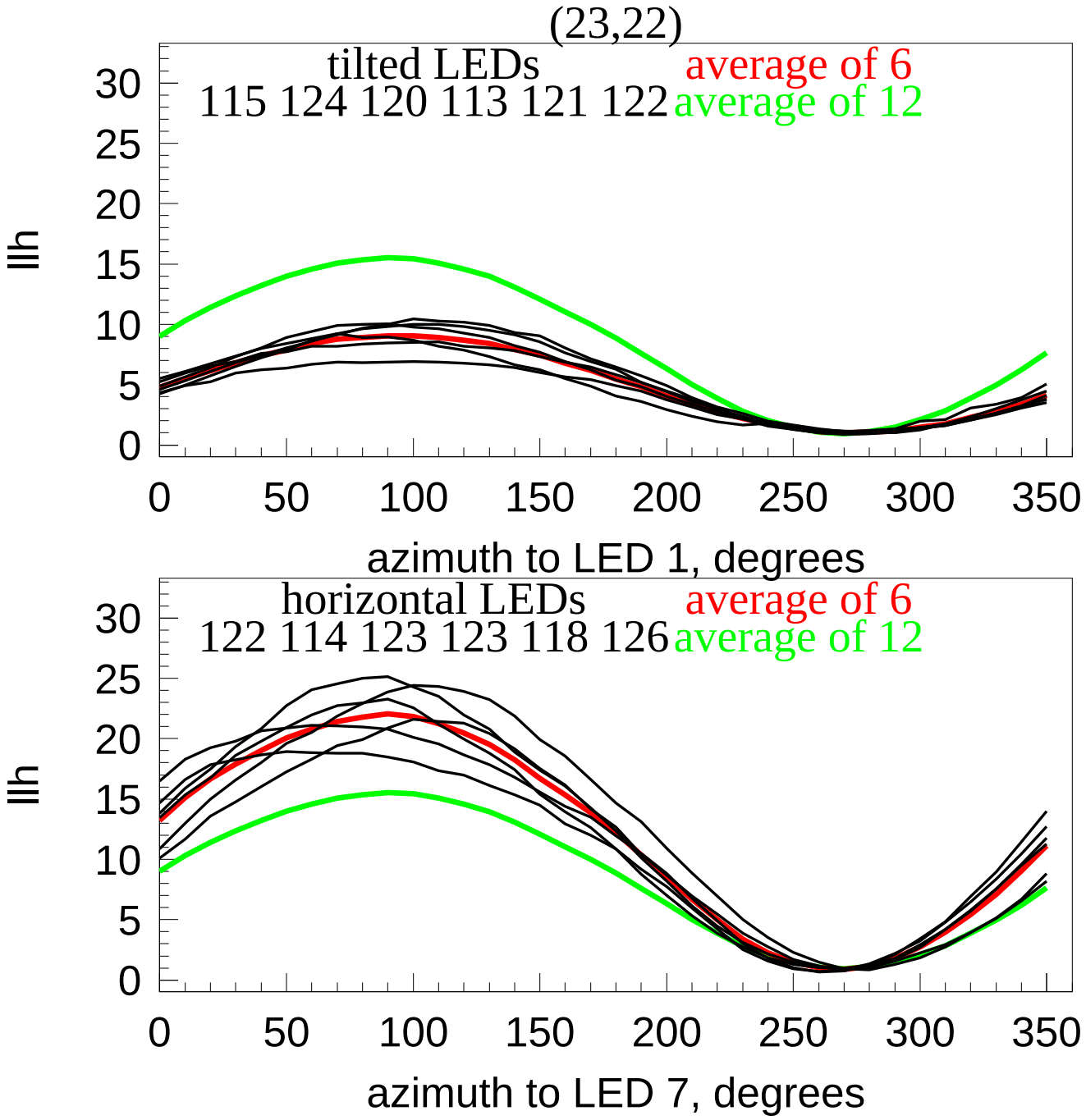

(23,19)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
319.8 ± 5.3

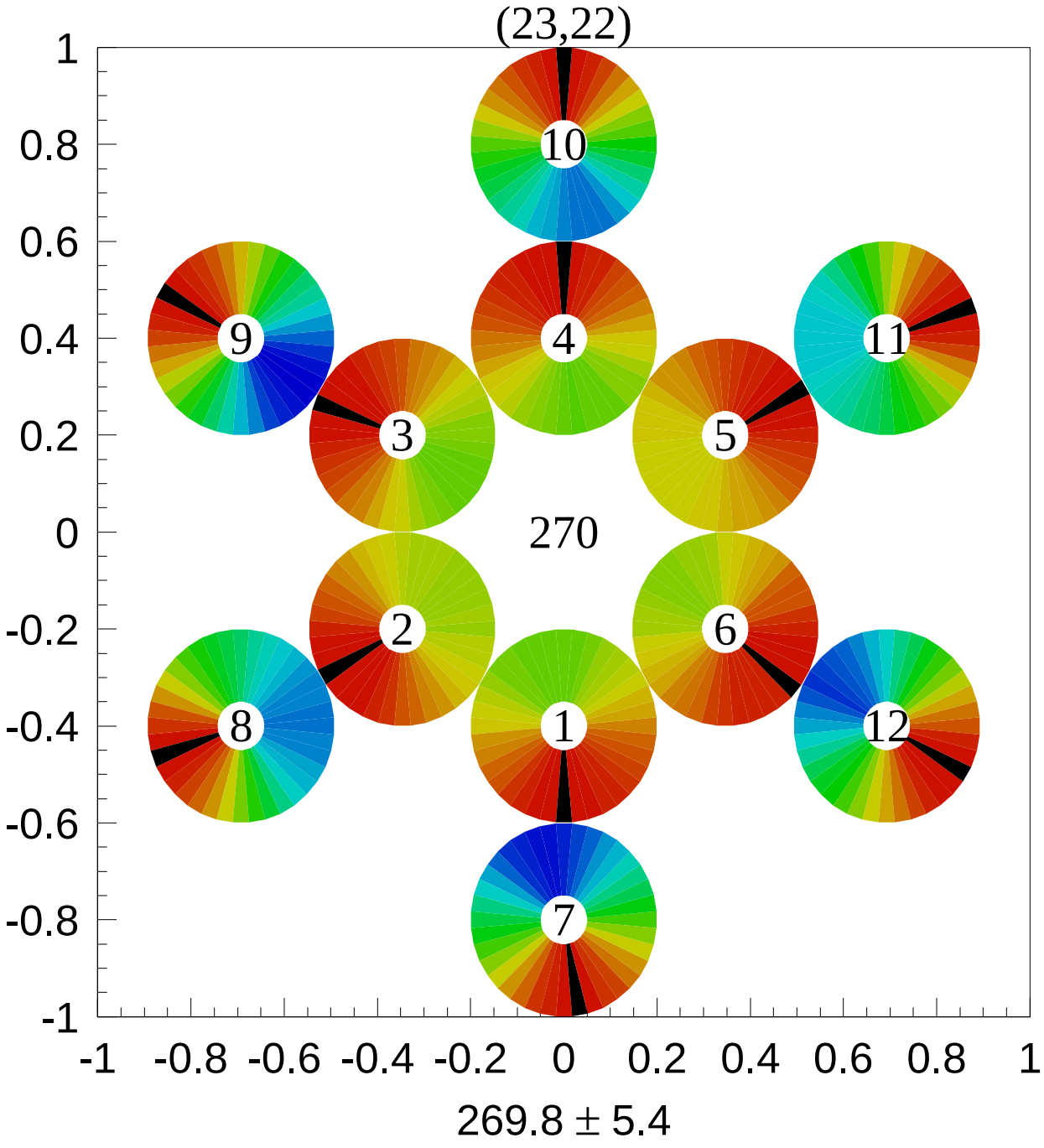

(23,20)
tilted LEDs
126 124 127 120 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 124 123 114 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

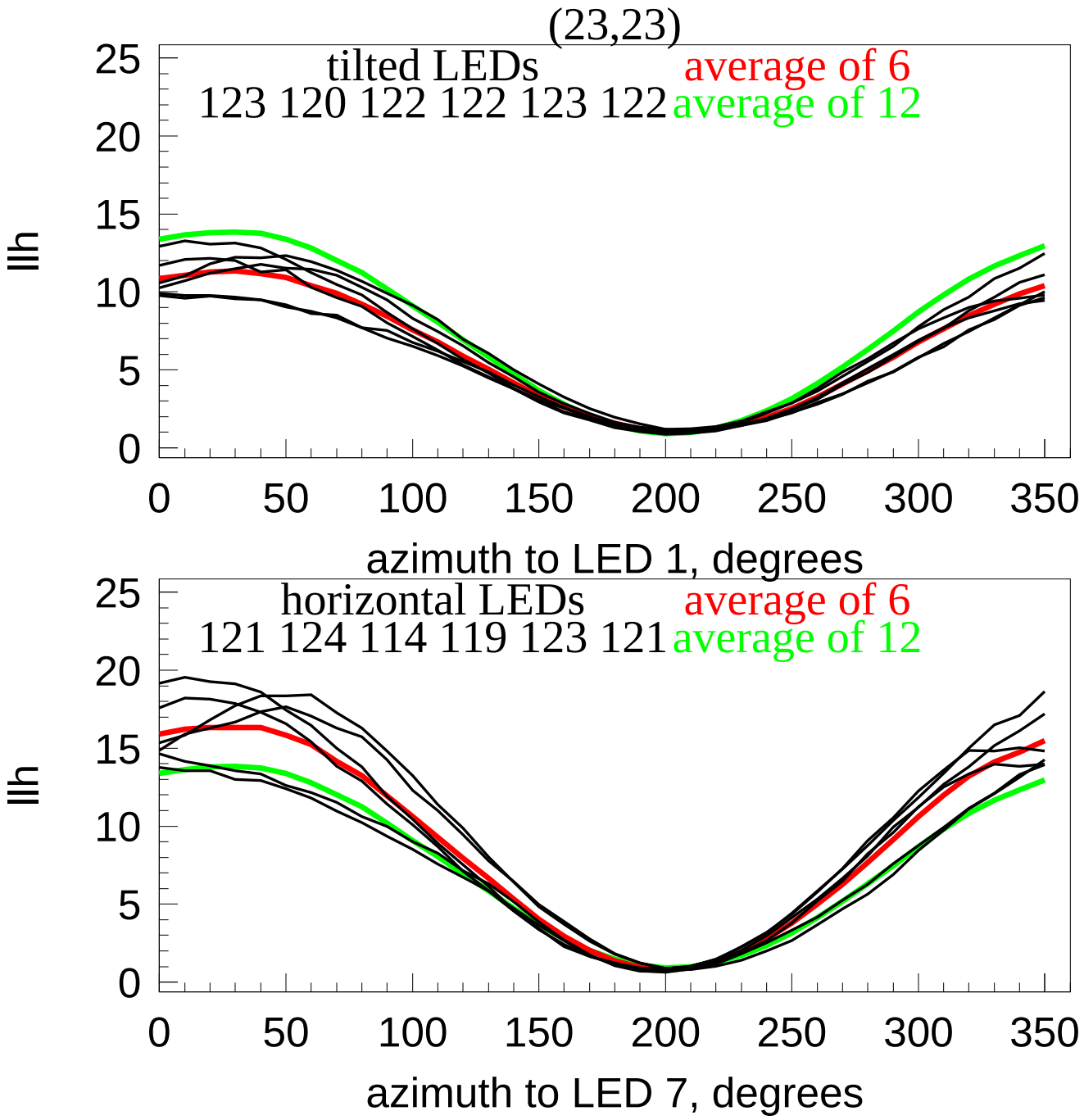

(23,20)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
325.6 ± 6.6

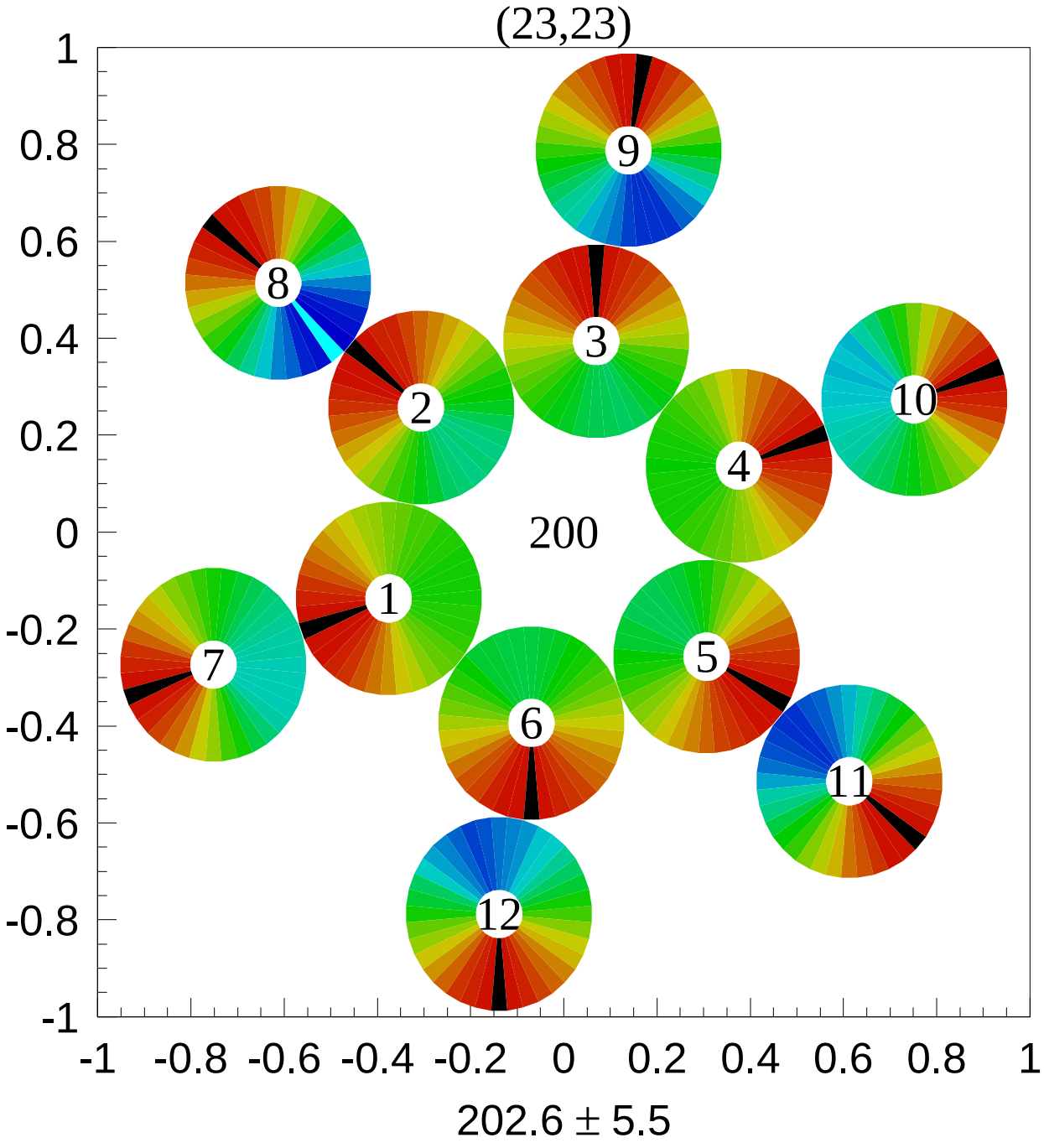

(23,21)
tilted LEDs
125 119 122 132 124 126
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 117 116 125 120 125
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

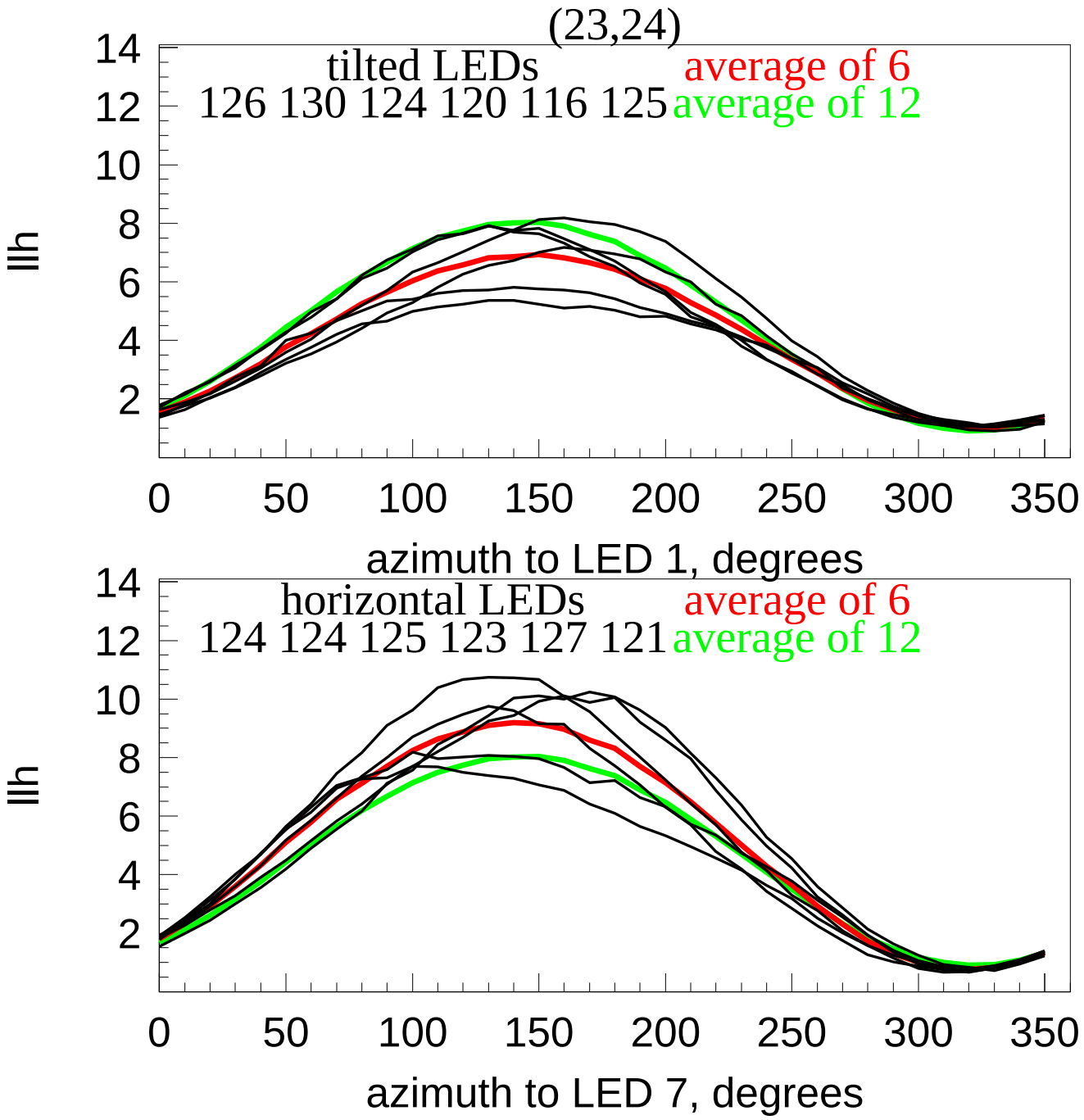

(23,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
174.5 ± 6.7

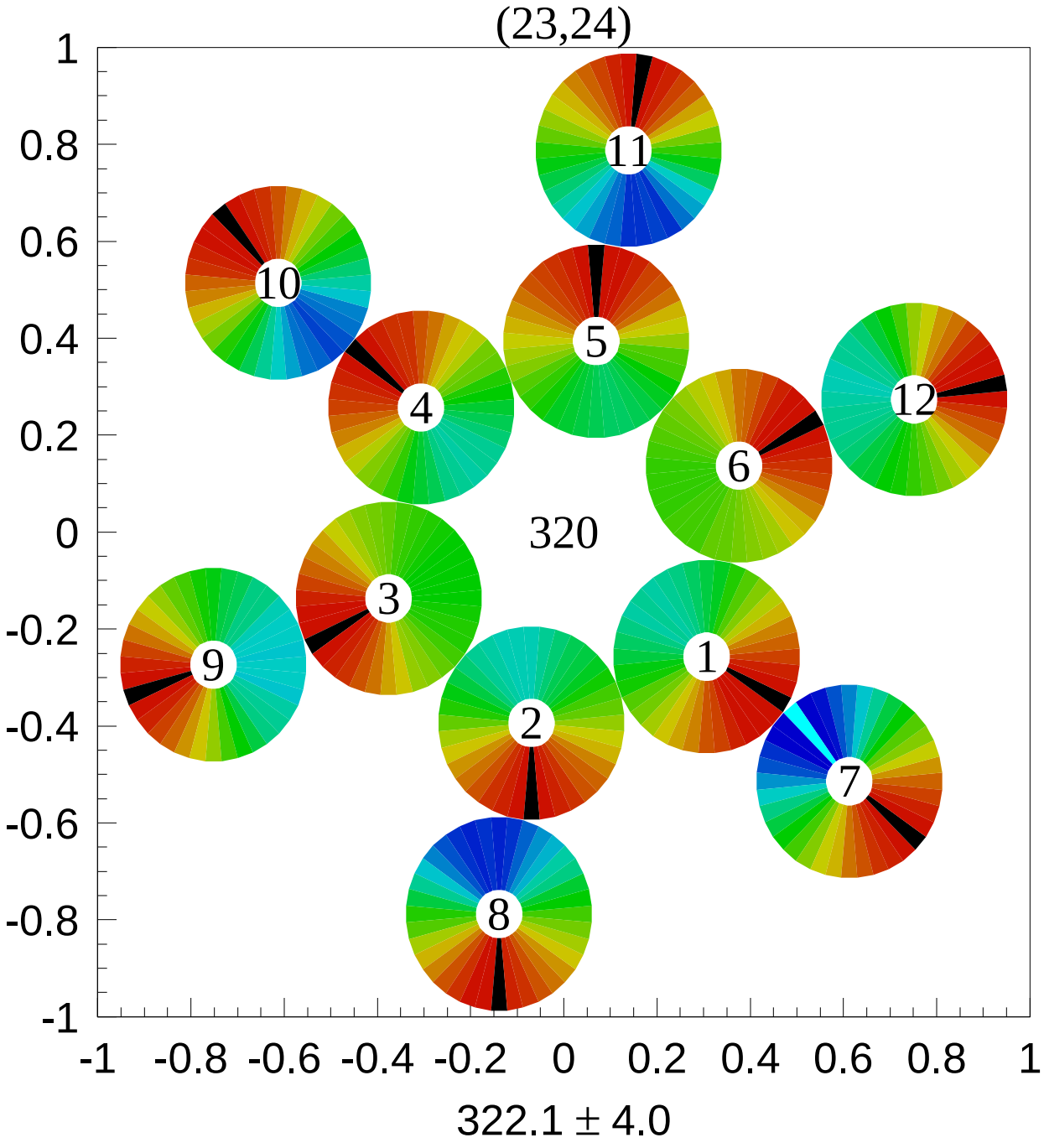

(23,22)
tilted LEDs
115 124 120 113 121 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 114 123 123 118 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

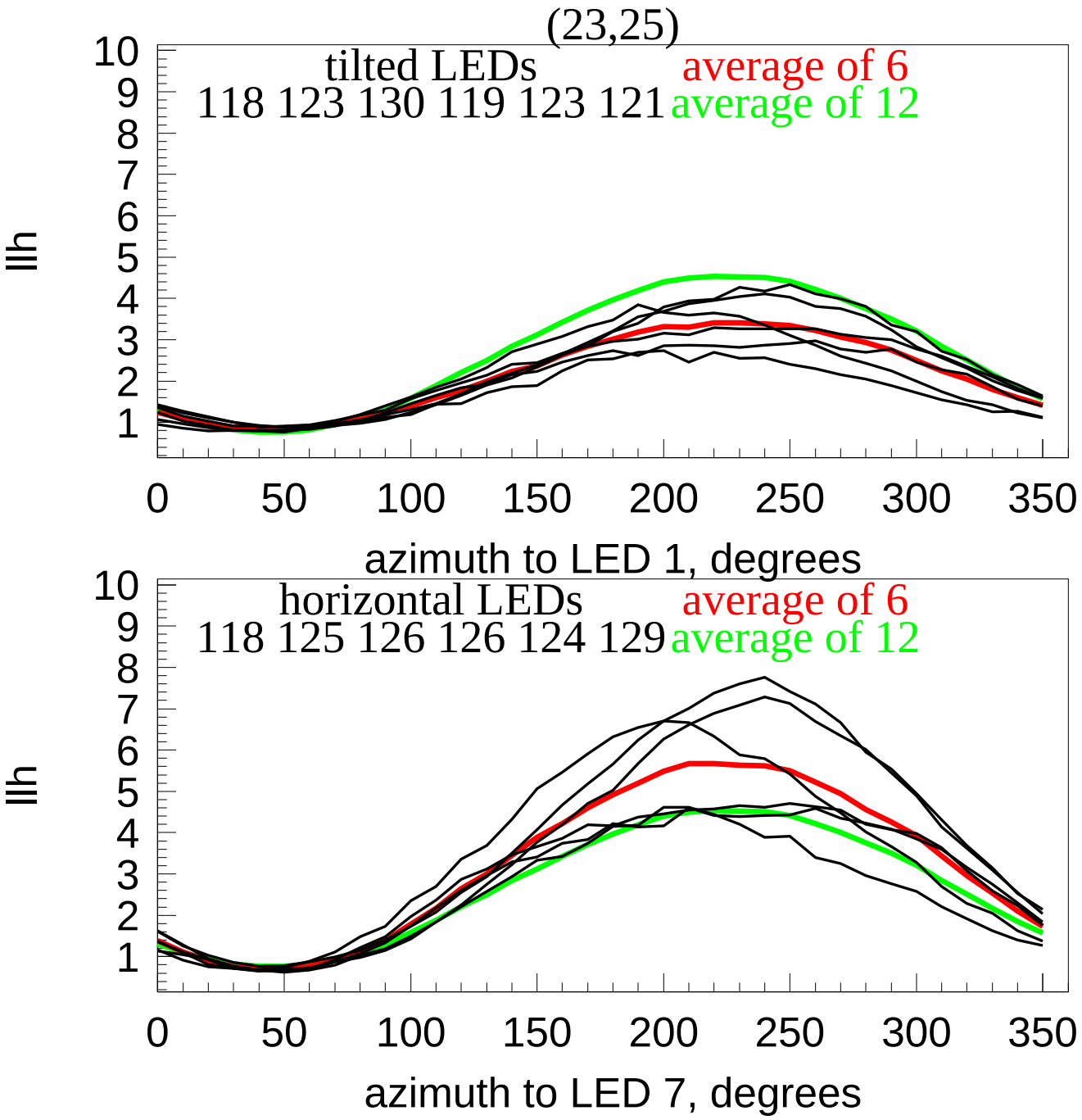

(23,22)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
269.8 ± 5.4

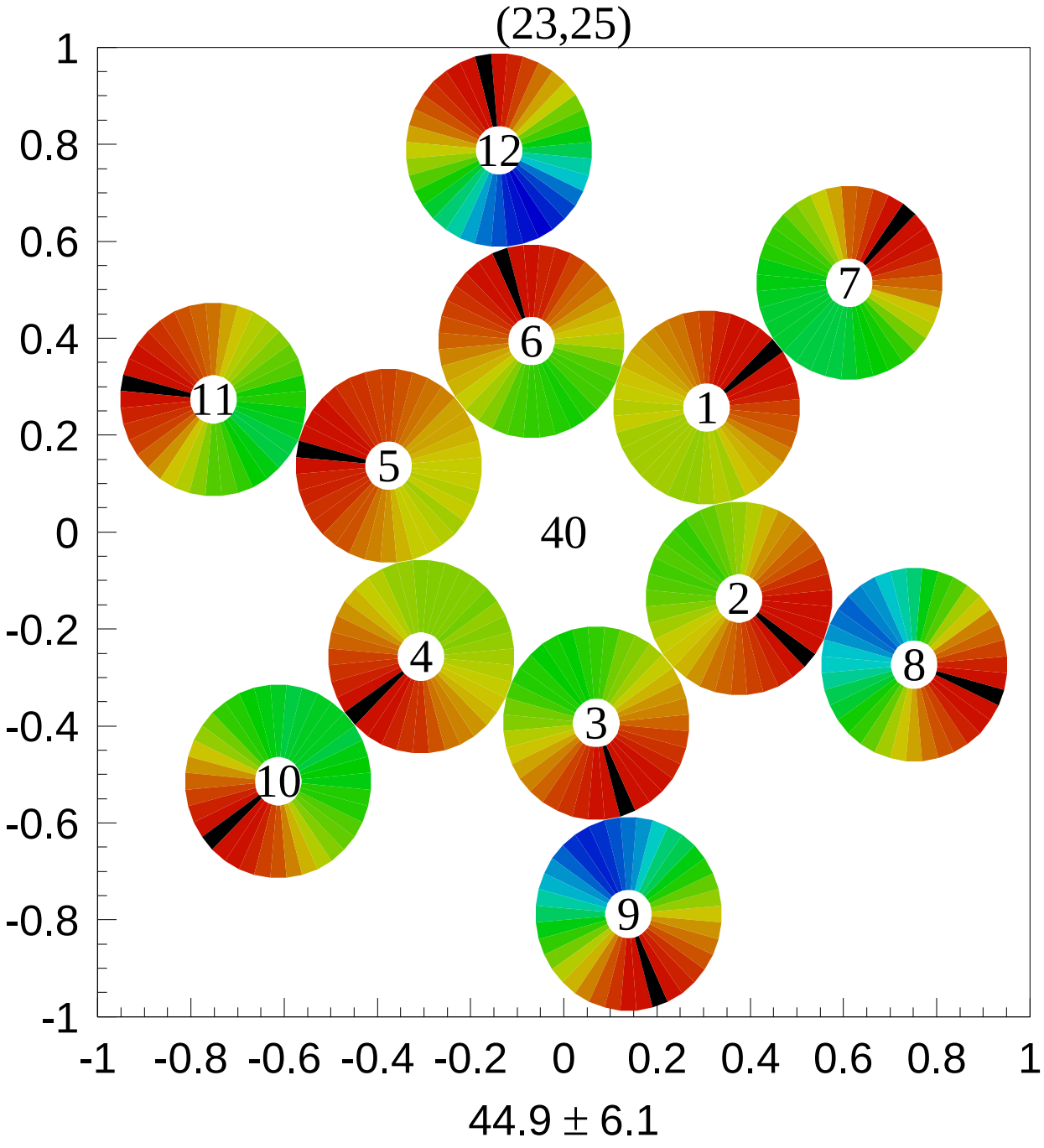

(23,23)
tilted LEDs
123 120 122 122 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 114 119 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

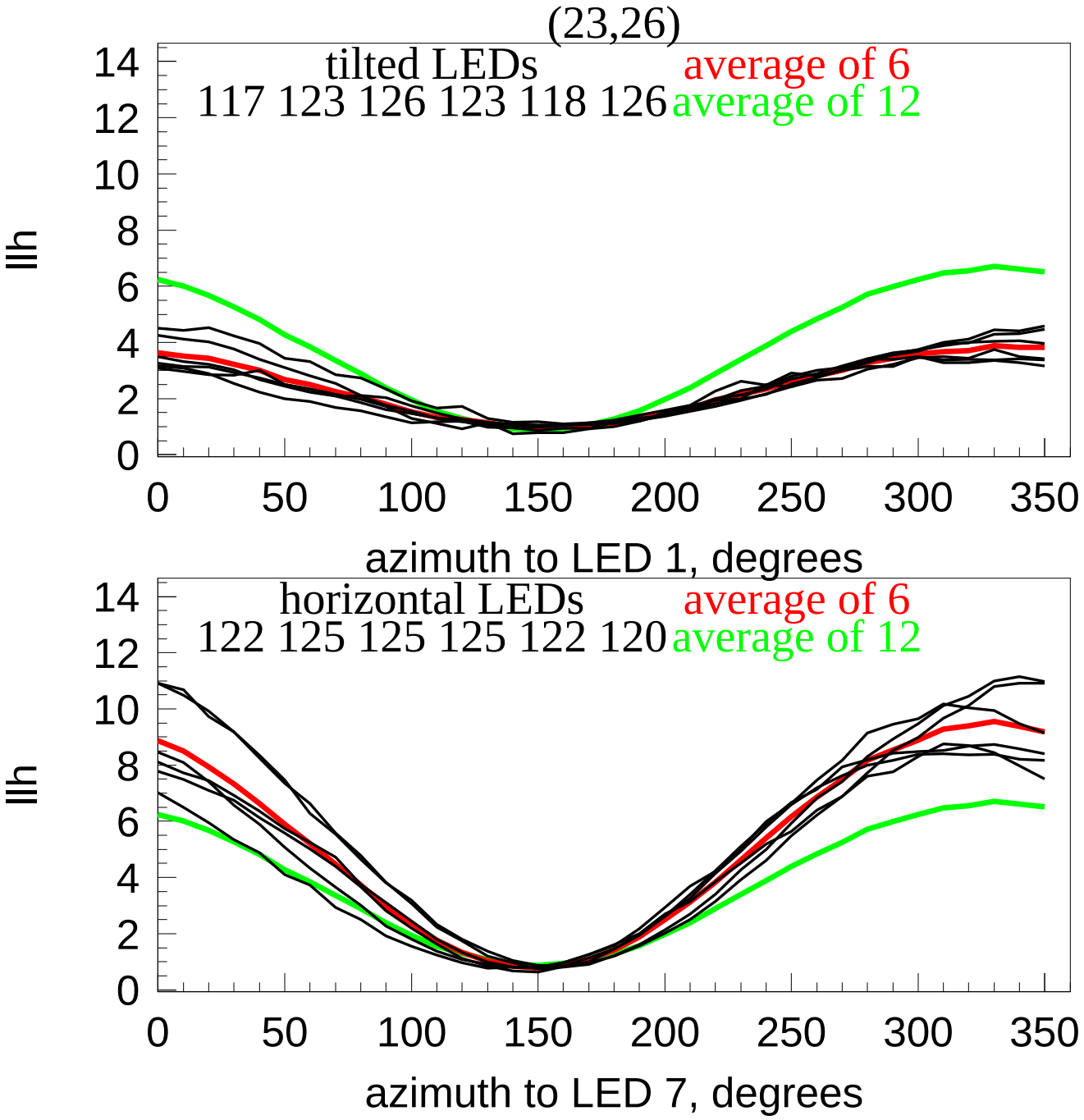

(23,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
202.6 ± 5.5

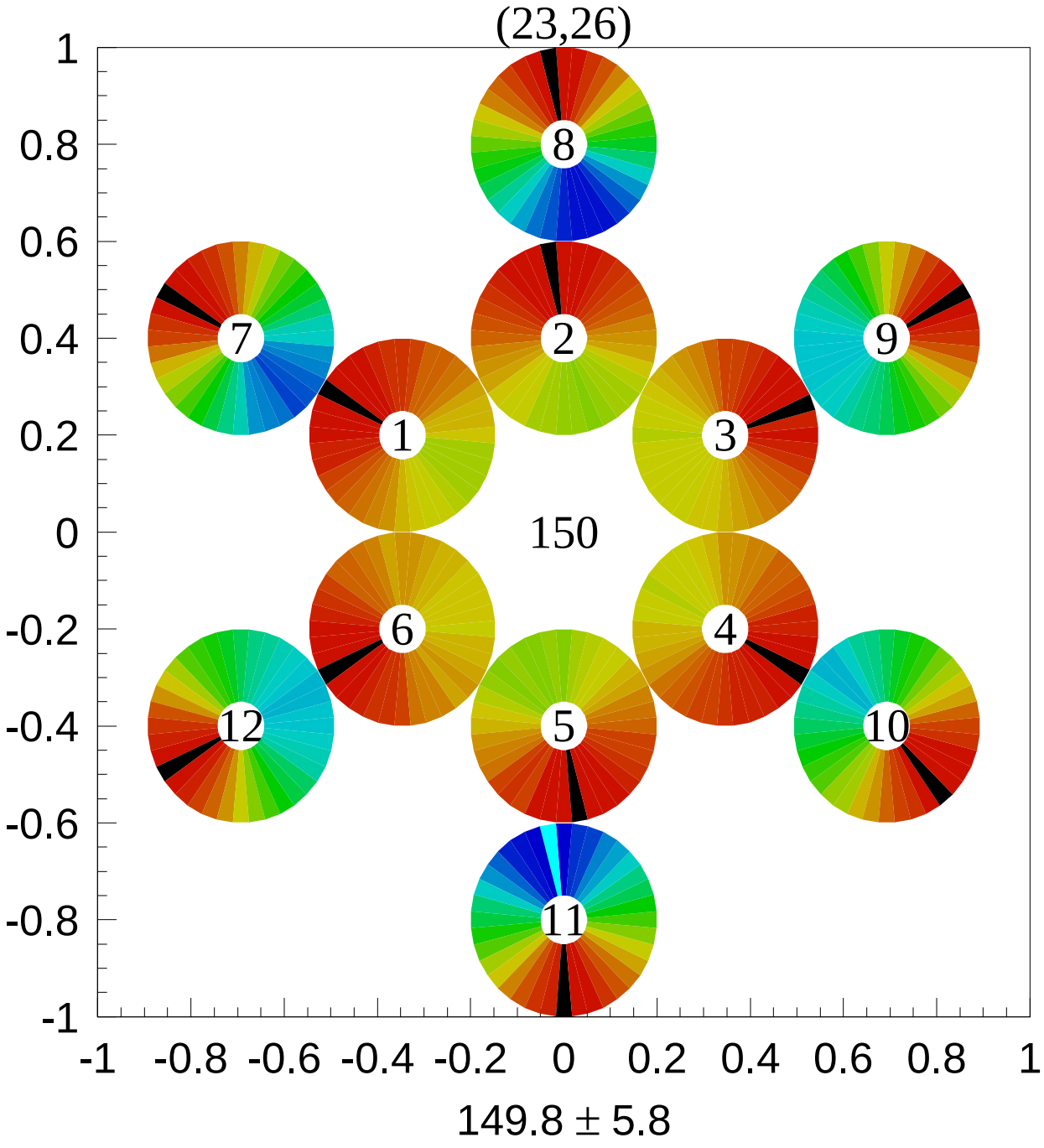

(23,24)
tilted LEDs
126 130 124 120 116 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 125 123 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

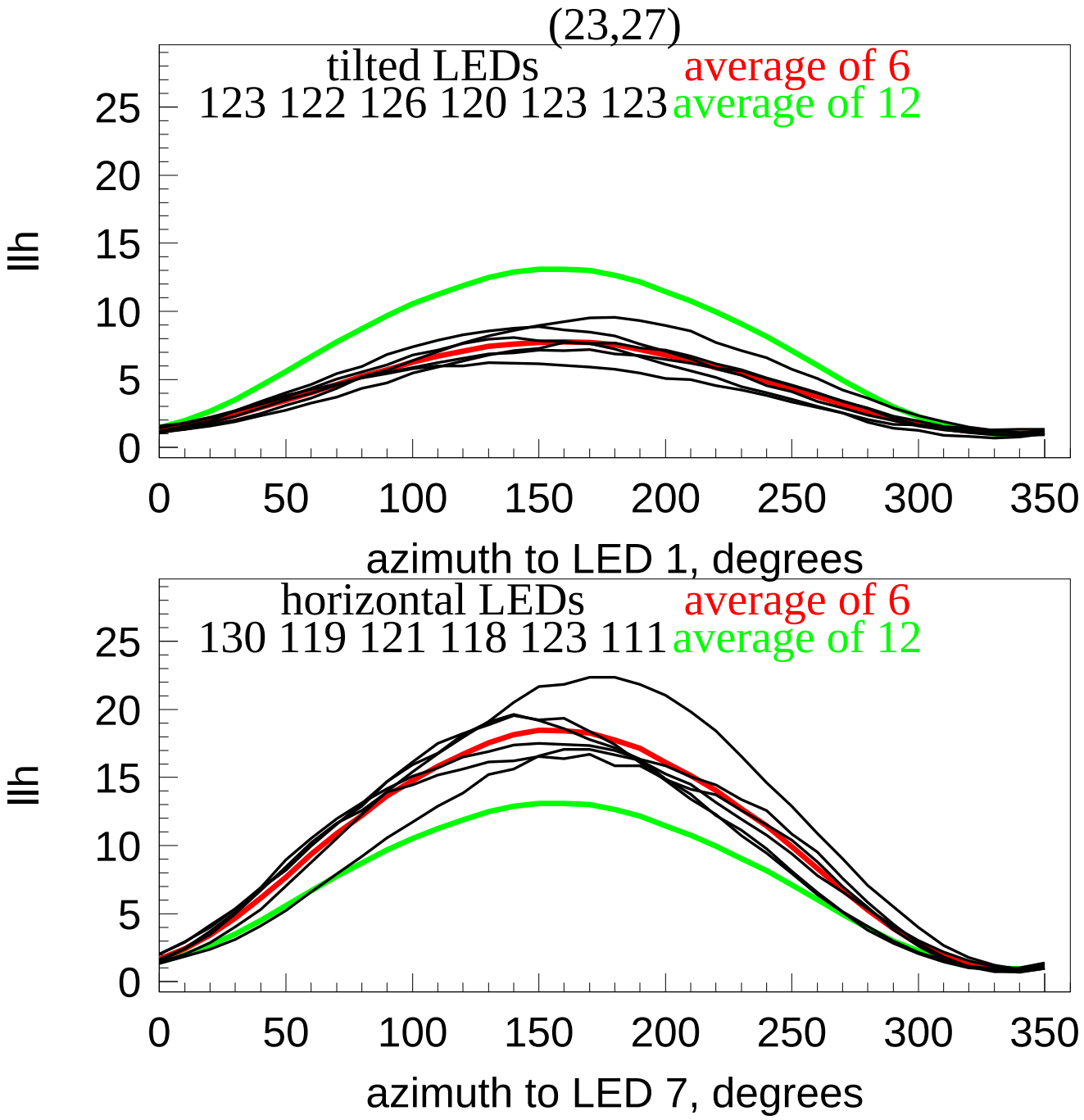

(23,24)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
322.1 ± 4.0

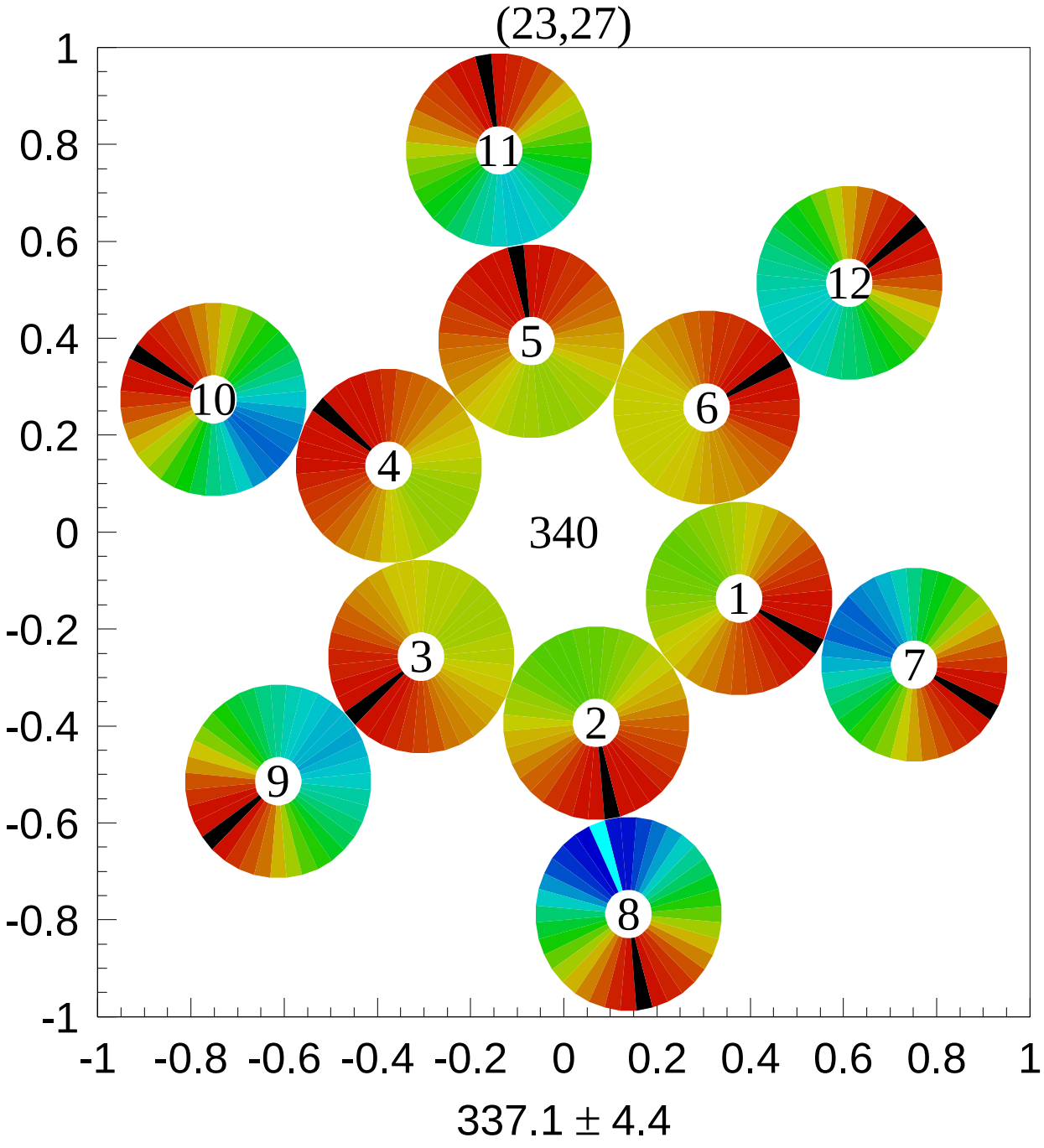

(23,25)
tilted LEDs
118 123 130 119 123 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 125 126 126 124 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

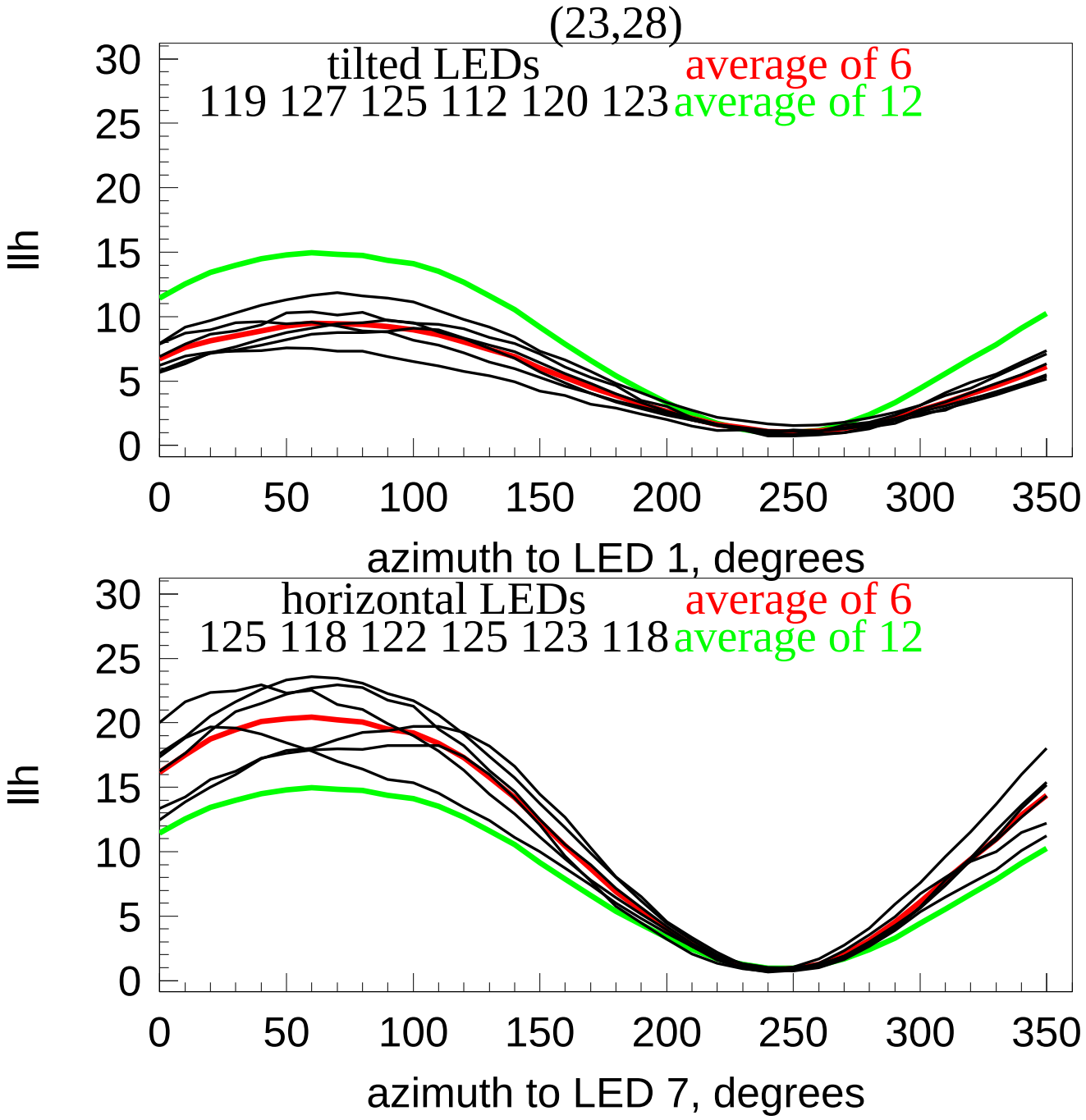

(23,25)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
44.9 ± 6.1

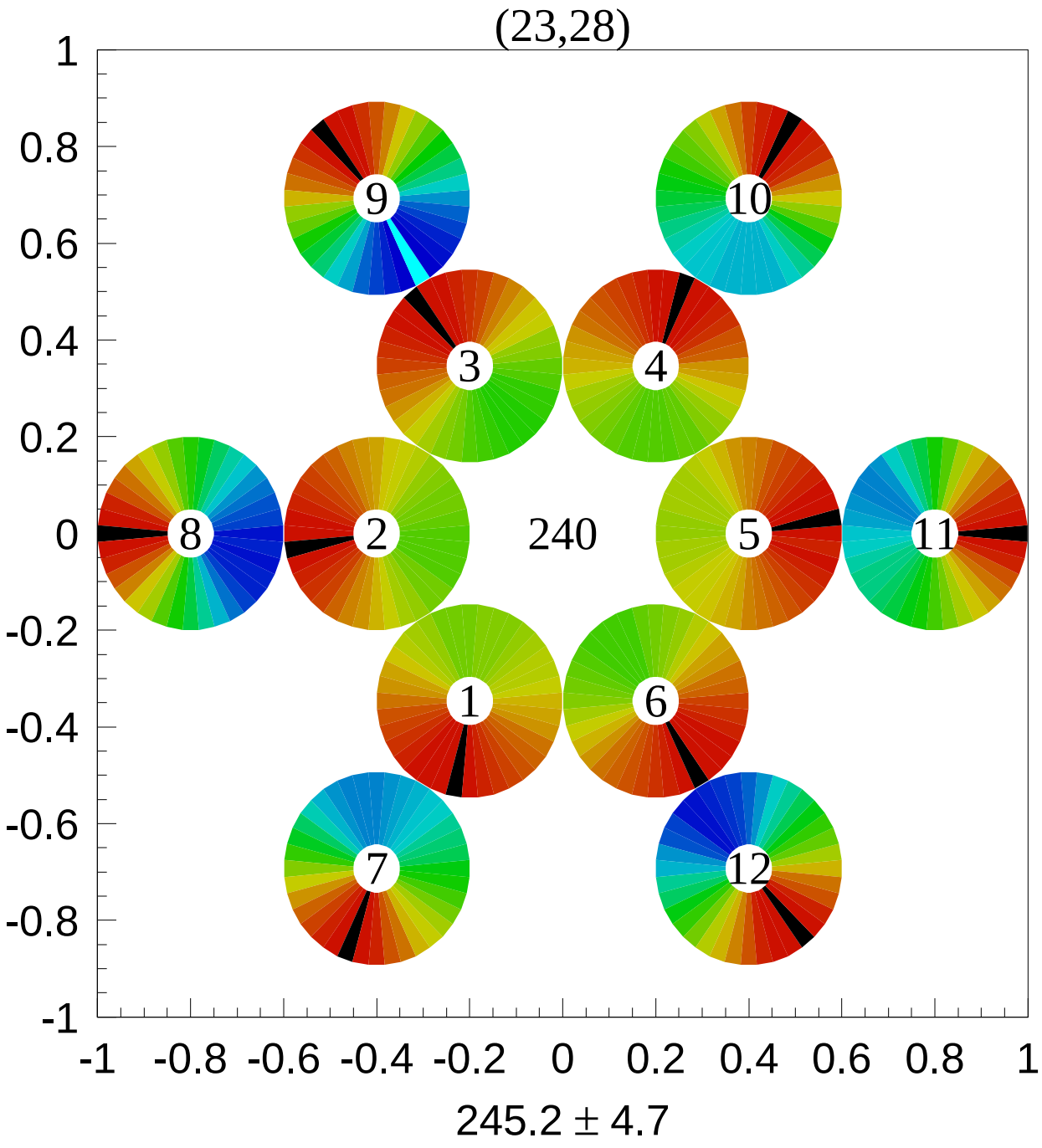

(23,26)
tilted LEDs
117 123 126 123 118 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 125 125 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

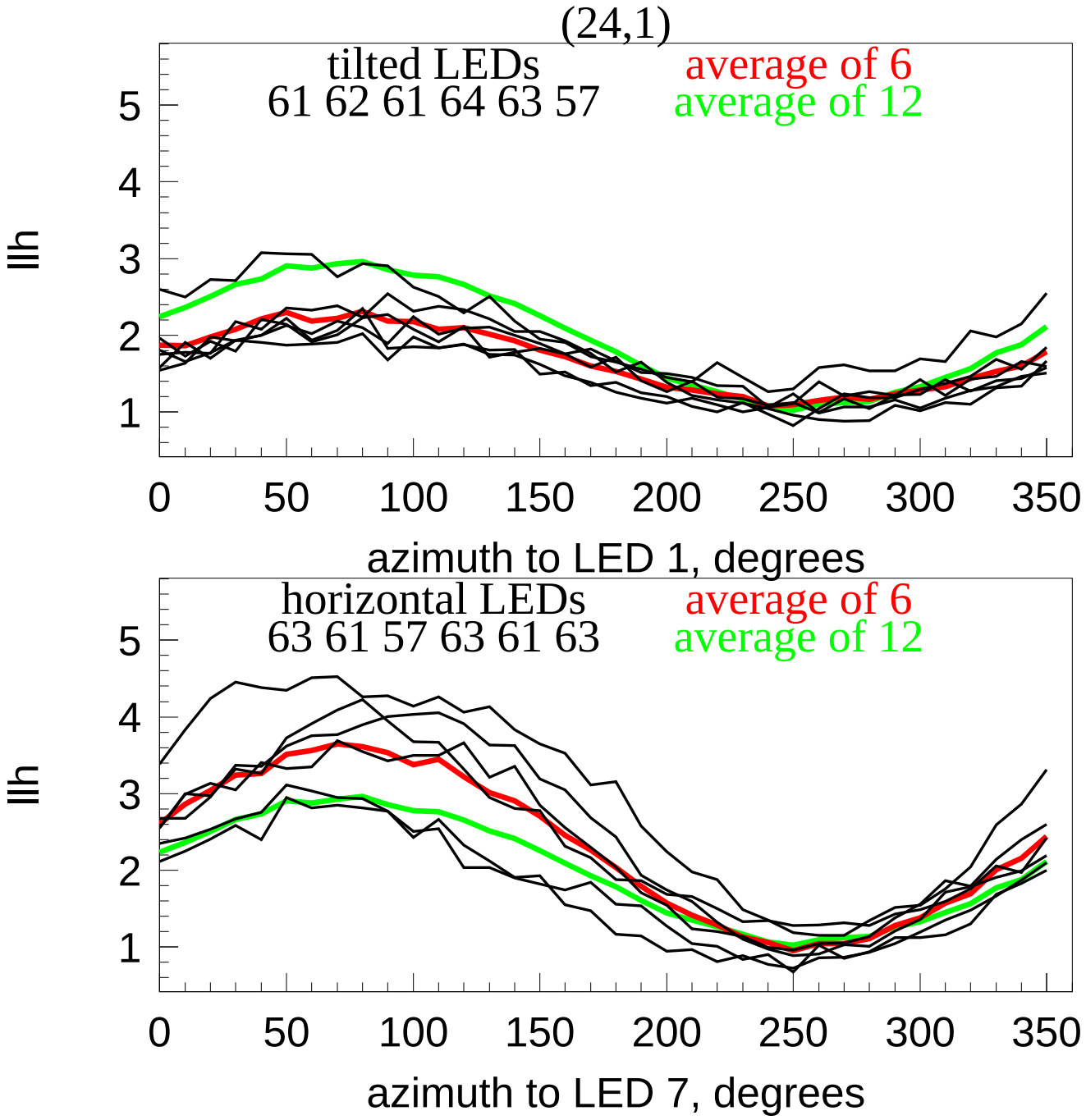

(23,26)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
149.8 ± 5.8

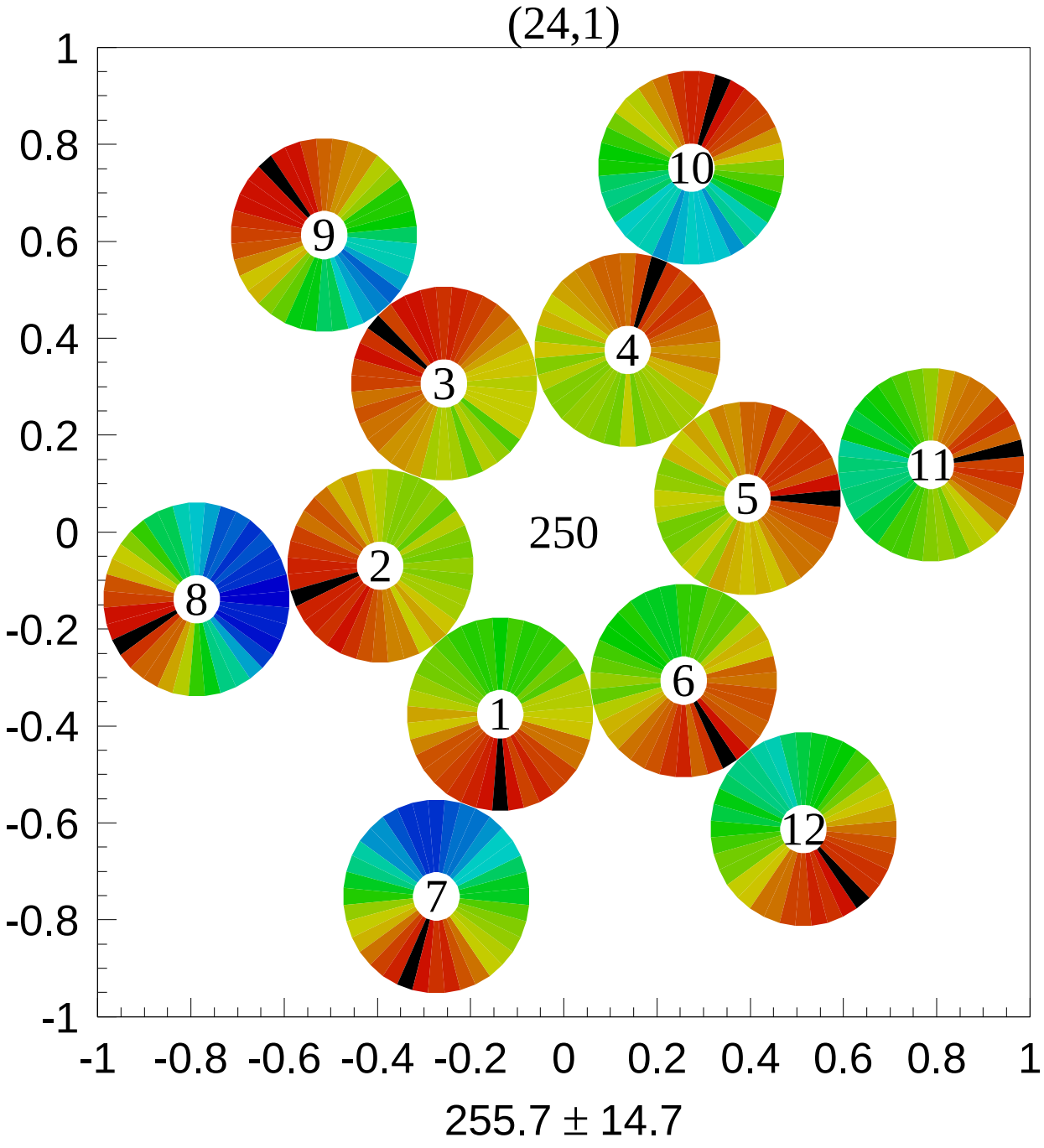

(23,27)
tilted LEDs
123 122 126 120 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 119 121 118 123 111
average of 6
average of 12
llh
azimuth to LED 7, degrees

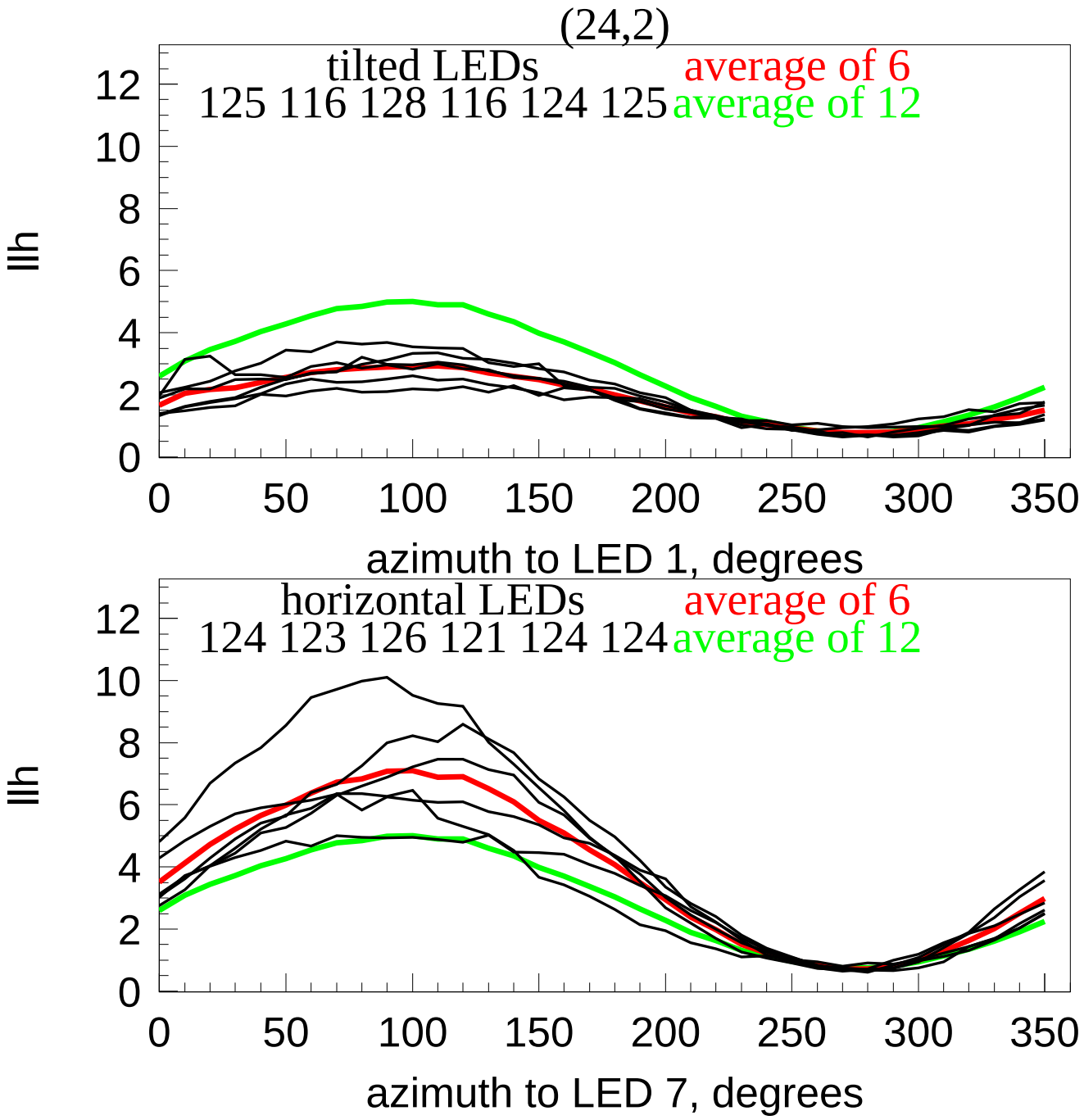

(23,27)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
337.1 ± 4.4

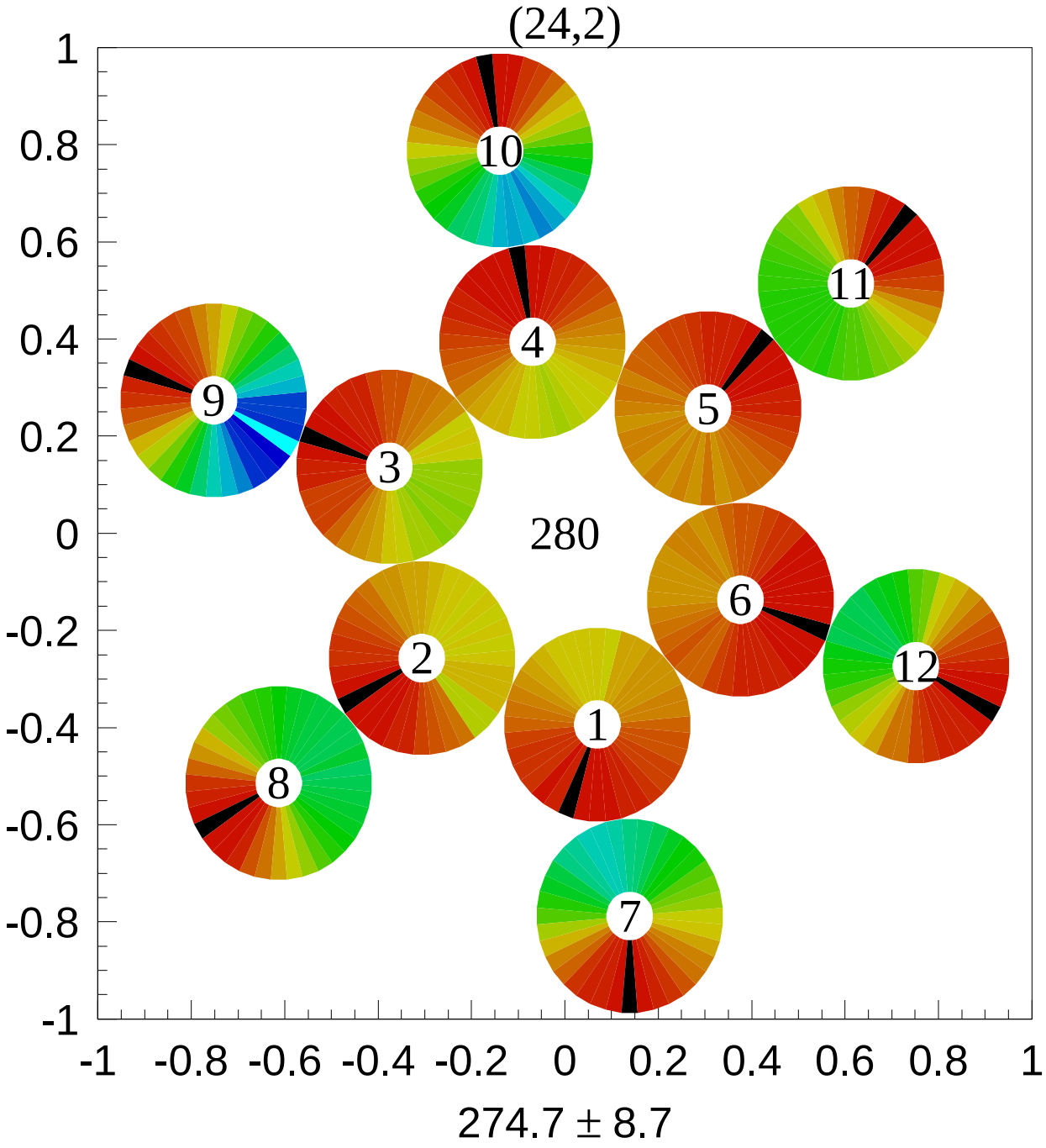

(23,28)
tilted LEDs
119 127 125 112 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 118 122 125 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

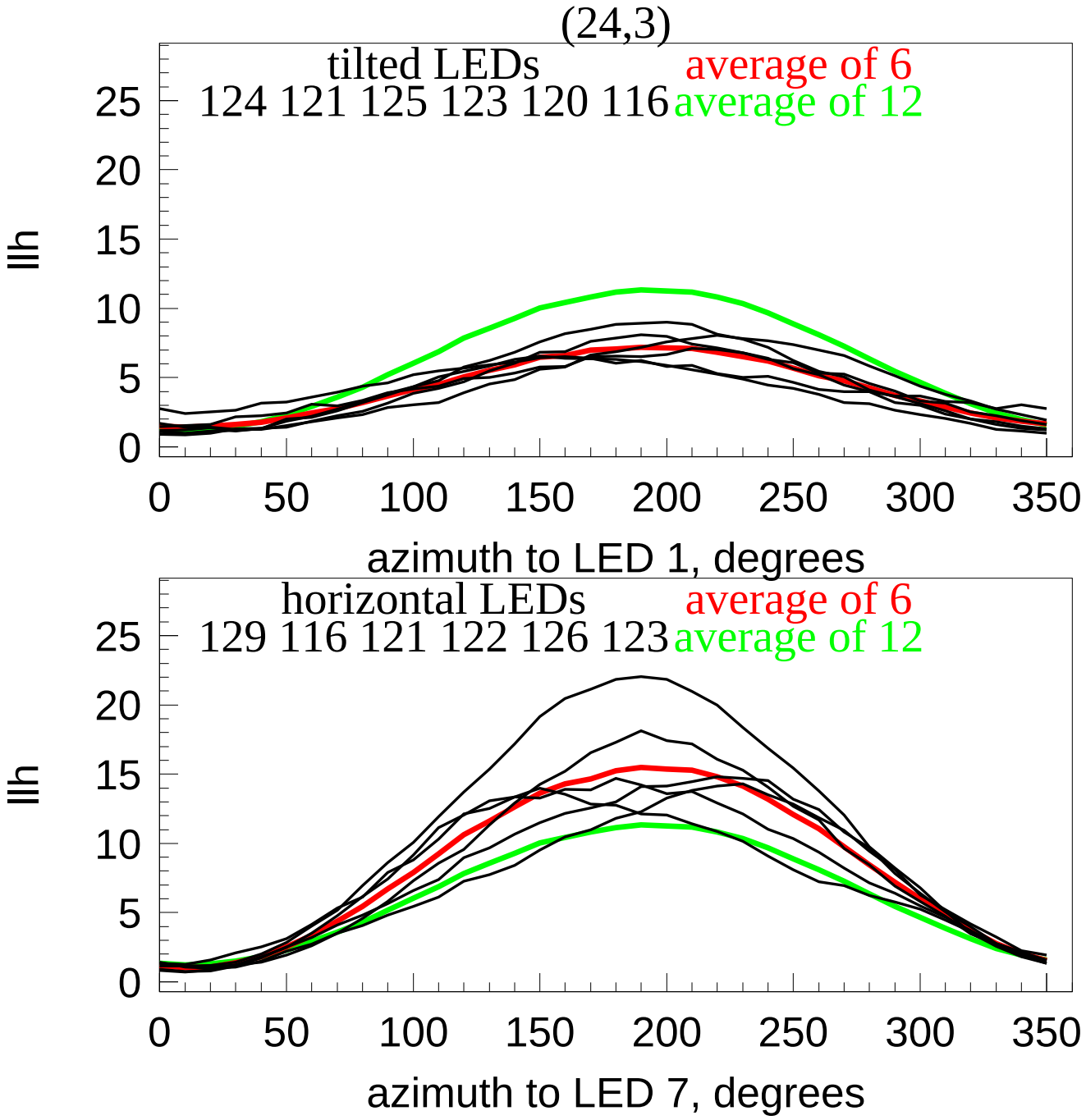

(23,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
245.2 ± 4.7

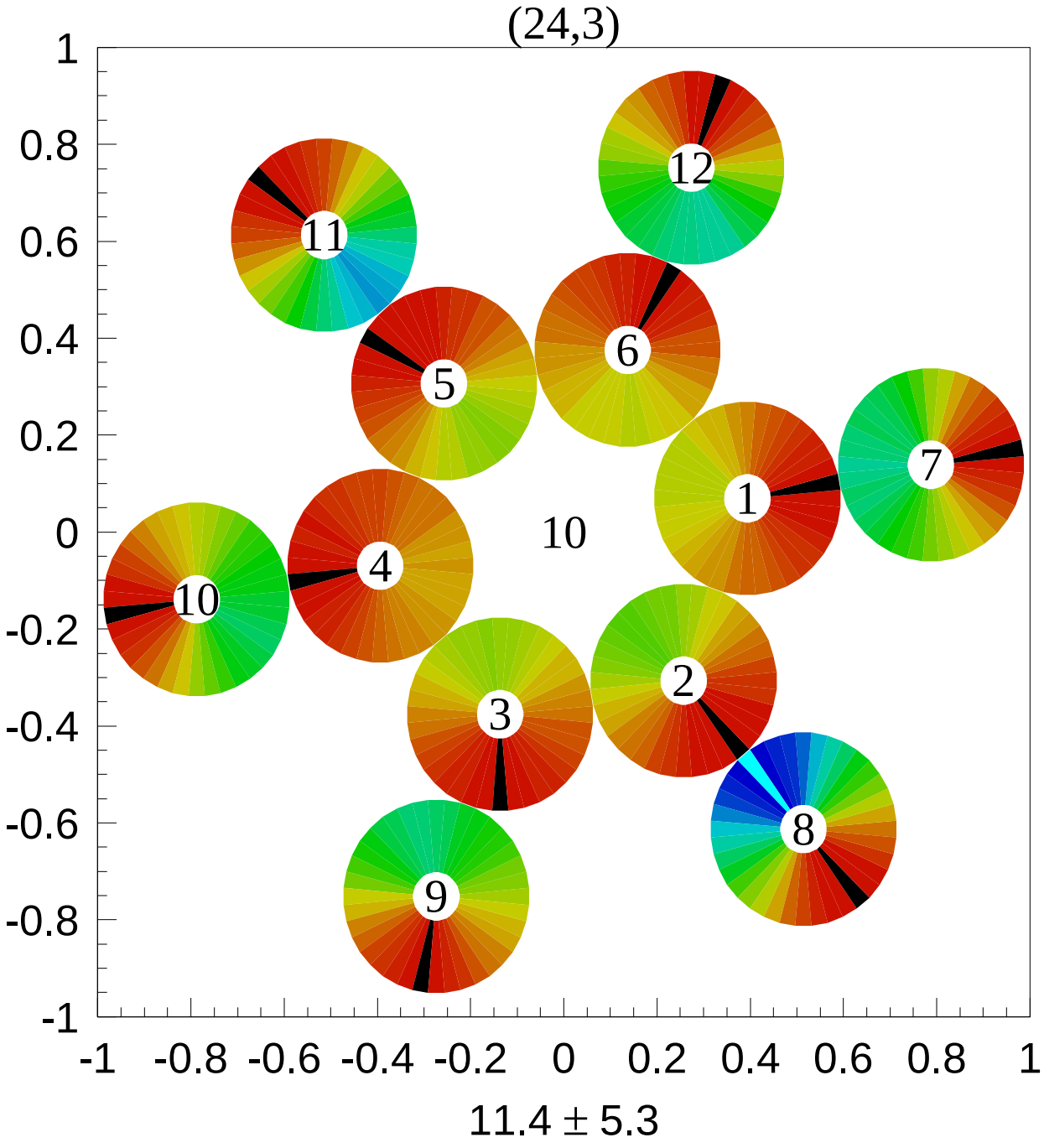

(24,1)
tilted LEDs
61 62 61 64 63 57
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
63 61 57 63 61 63
average of 6
average of 12
IIh
azimuth to LED 7, degrees

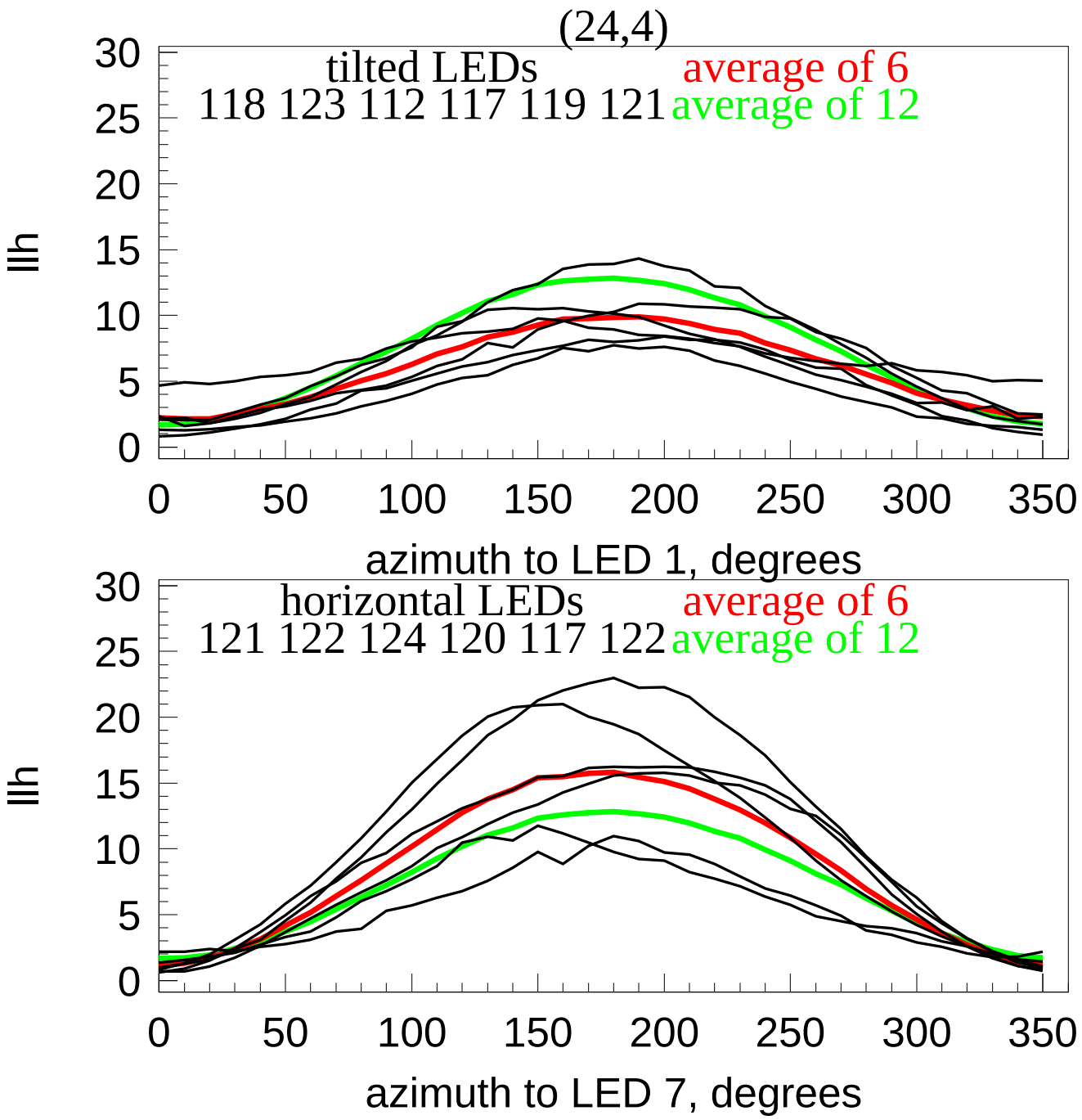

(24,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
255.7 ± 14.7
250
1
2
3
4
5
6
7
8
9
10
11
12

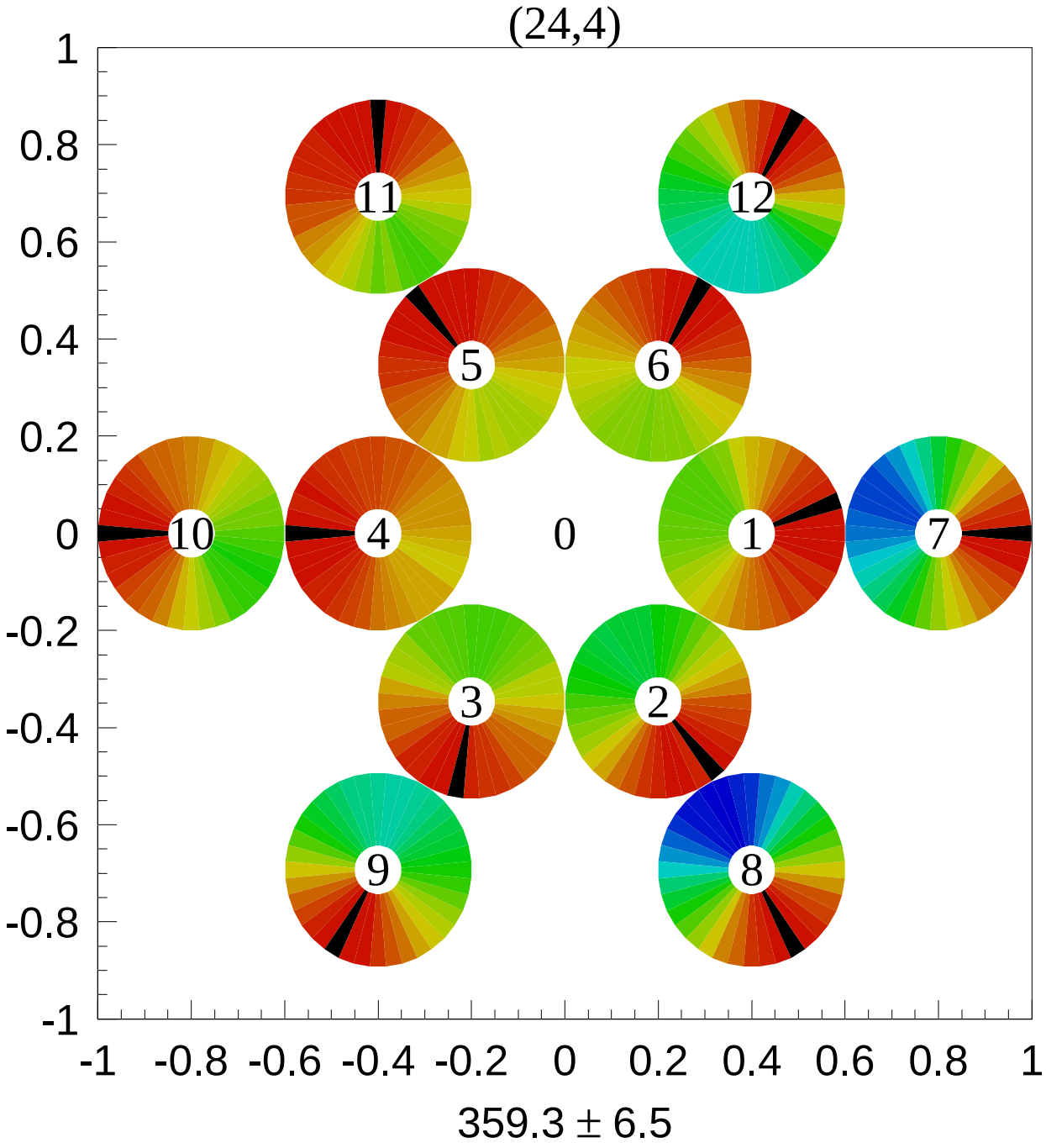

(24,2)
tilted LEDs
125 116 128 116 124 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 123 126 121 124 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

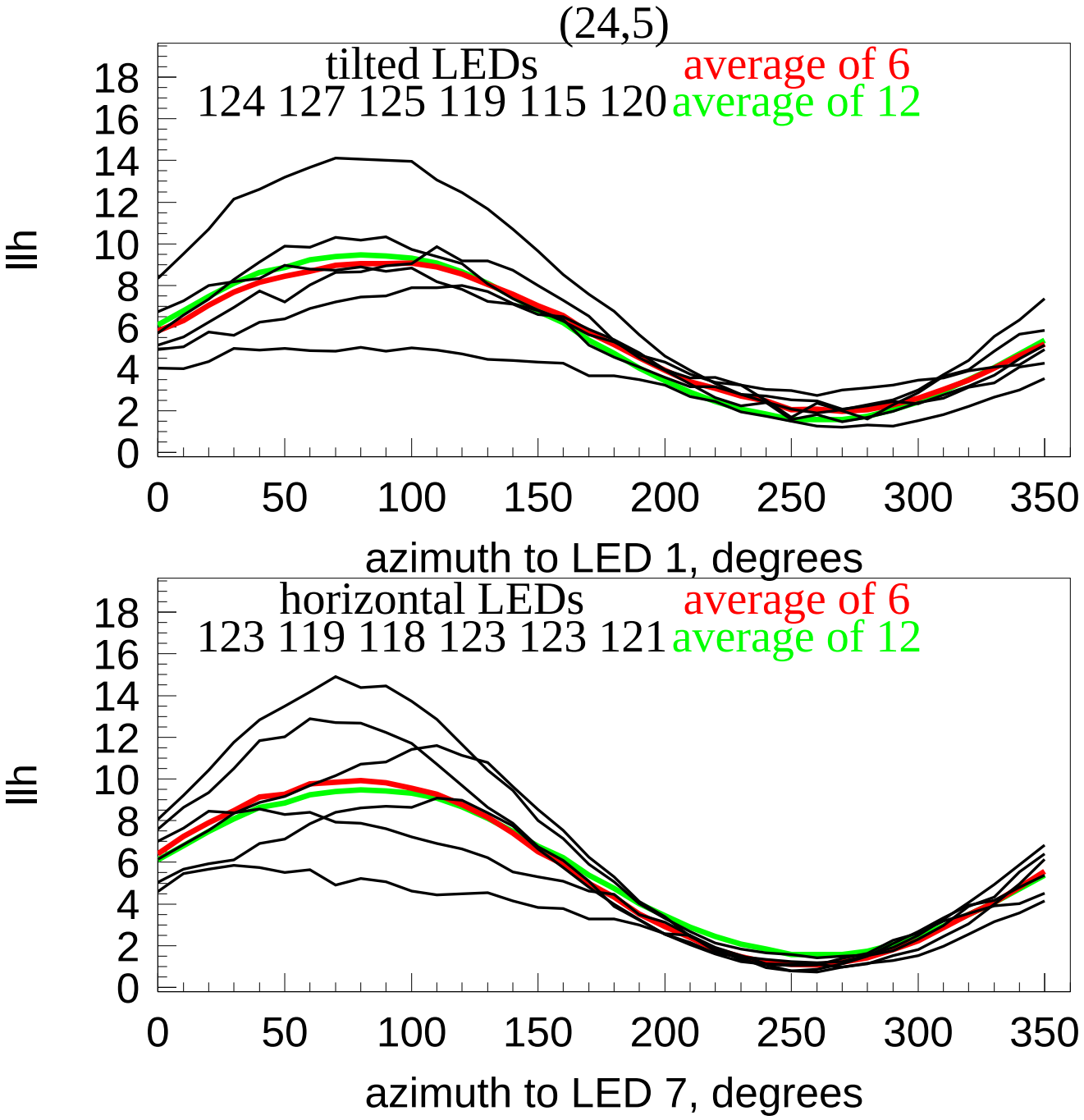

(24,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
274.7 ± 8.7

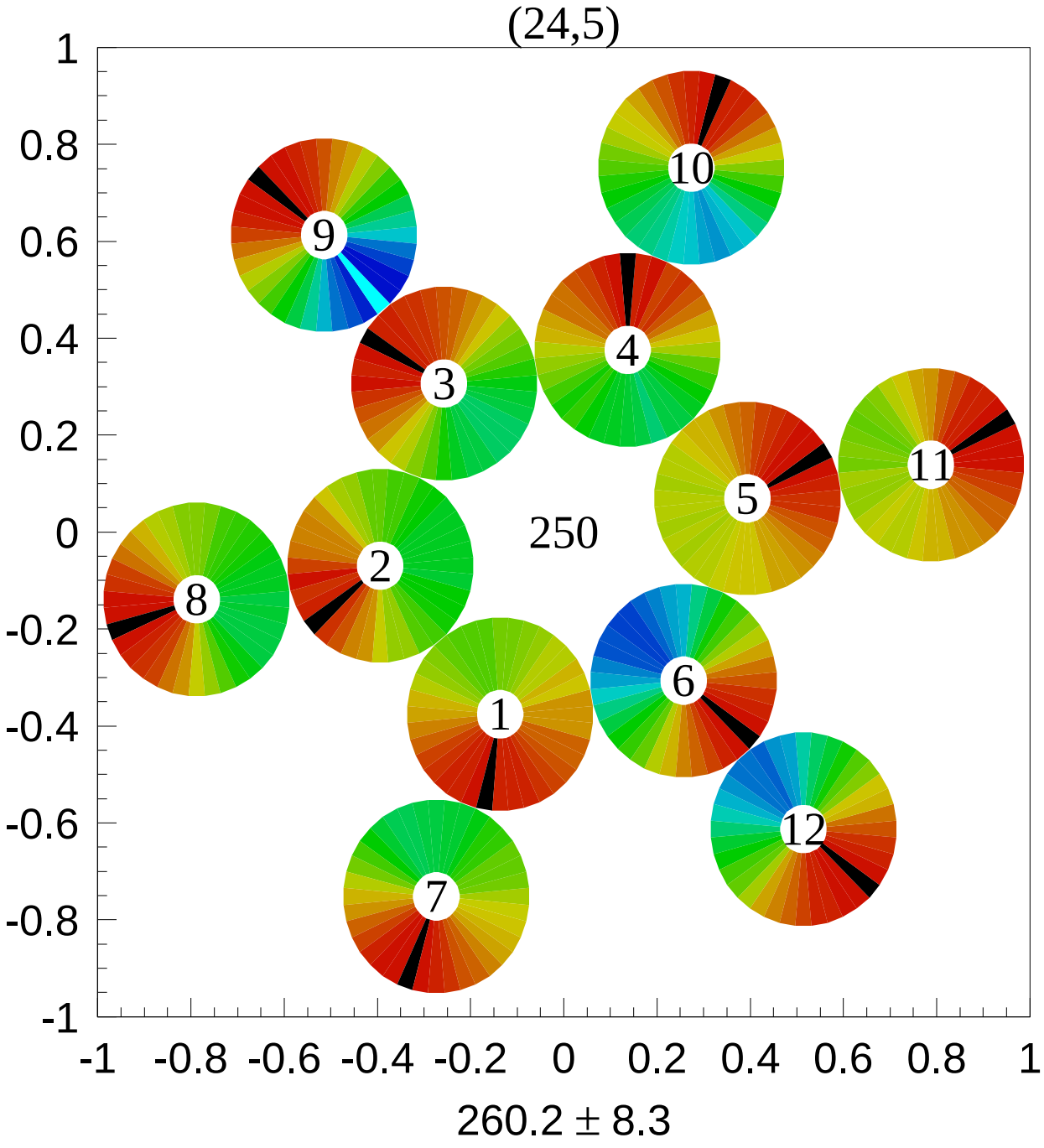

(24,3)
tilted LEDs
124 121 125 123 120 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 116 121 122 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

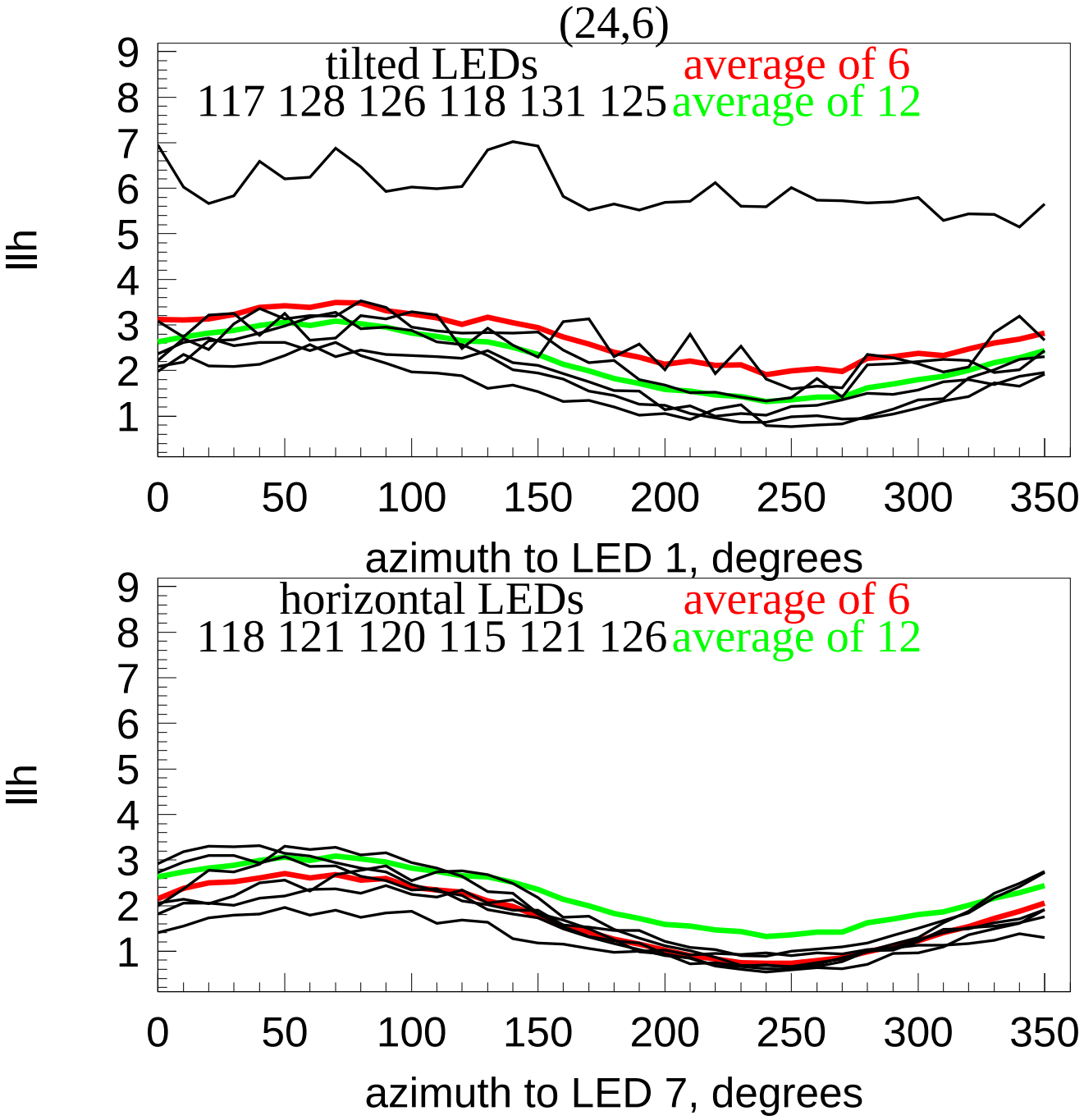

(24,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11.4 ± 5.3
12
11
6
5
7
1
10
4
10
2
3
8
9

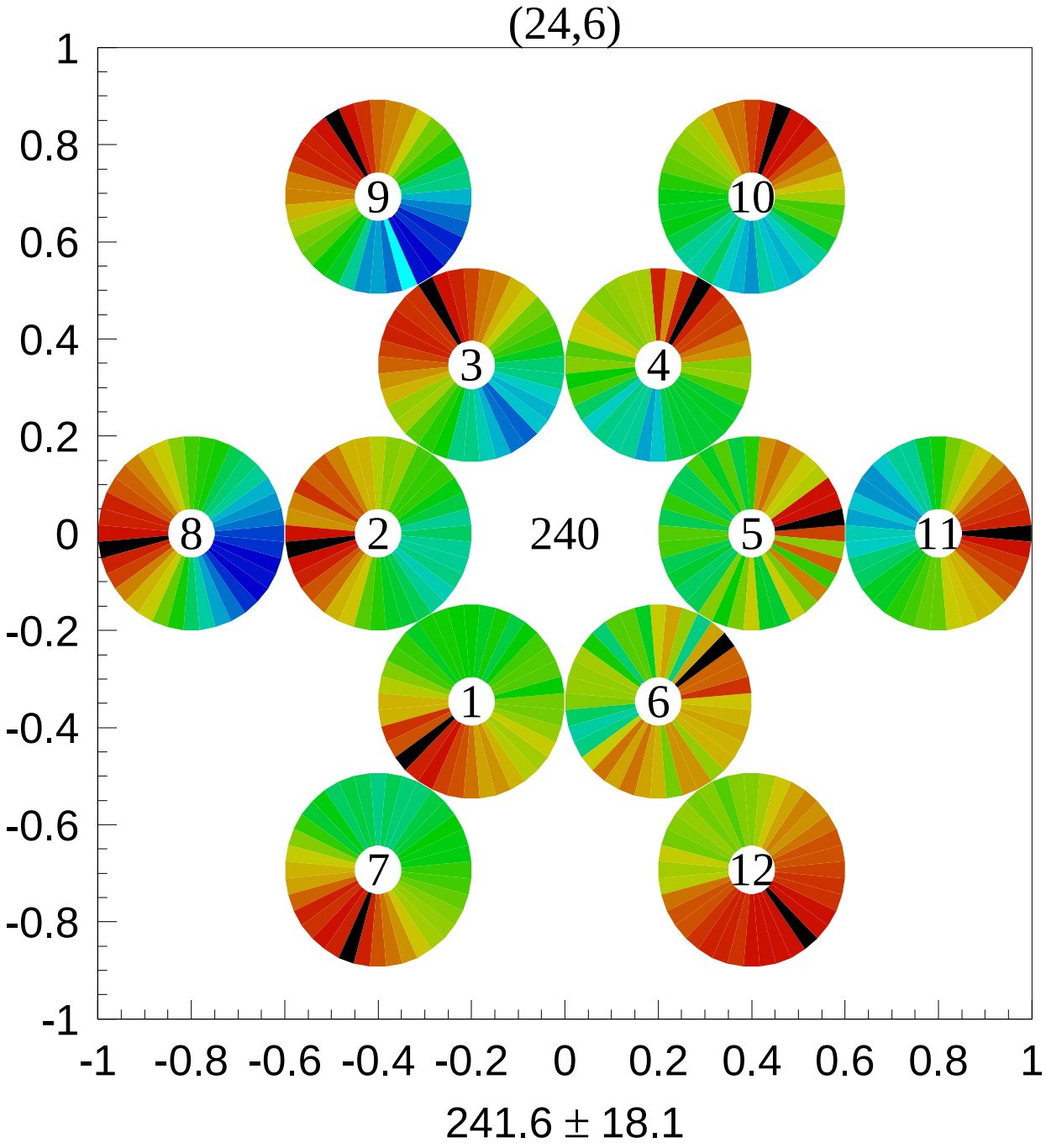

(24,4)
tilted LEDs
118 123 112 117 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 124 120 117 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

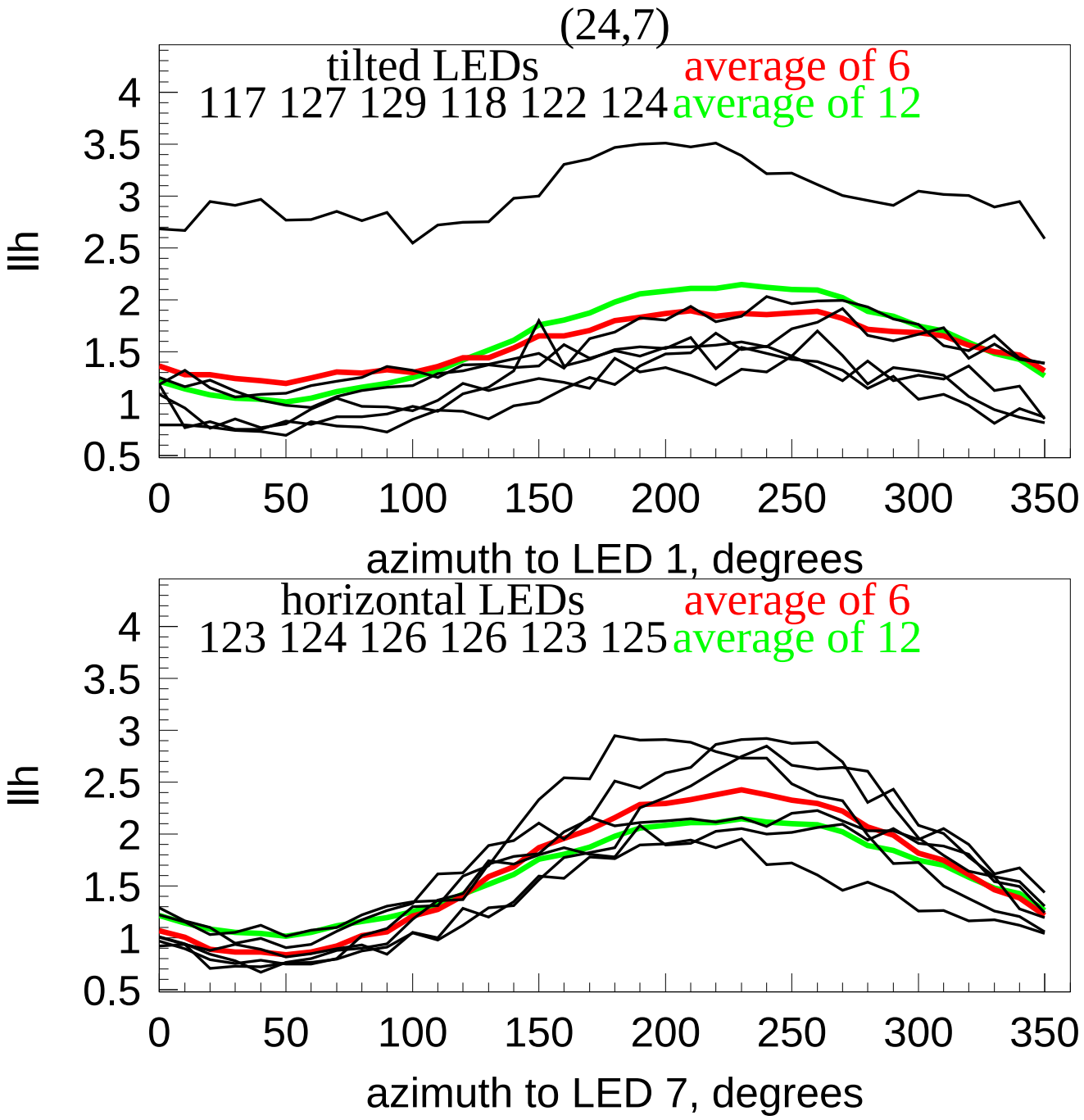

(24,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.3 ± 6.5

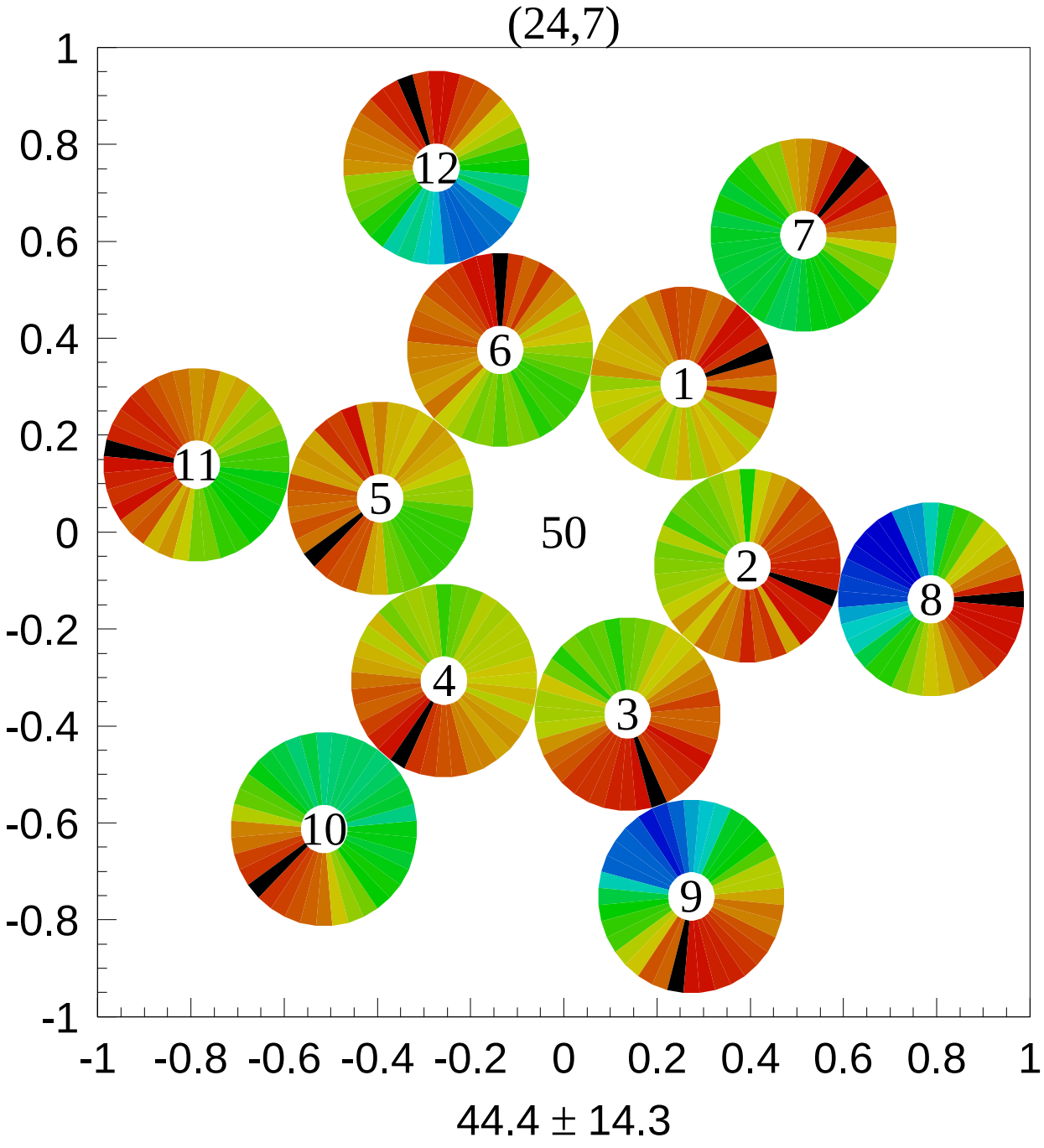

(24,5)
tilted LEDs
124 127 125 119 115 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 118 123 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

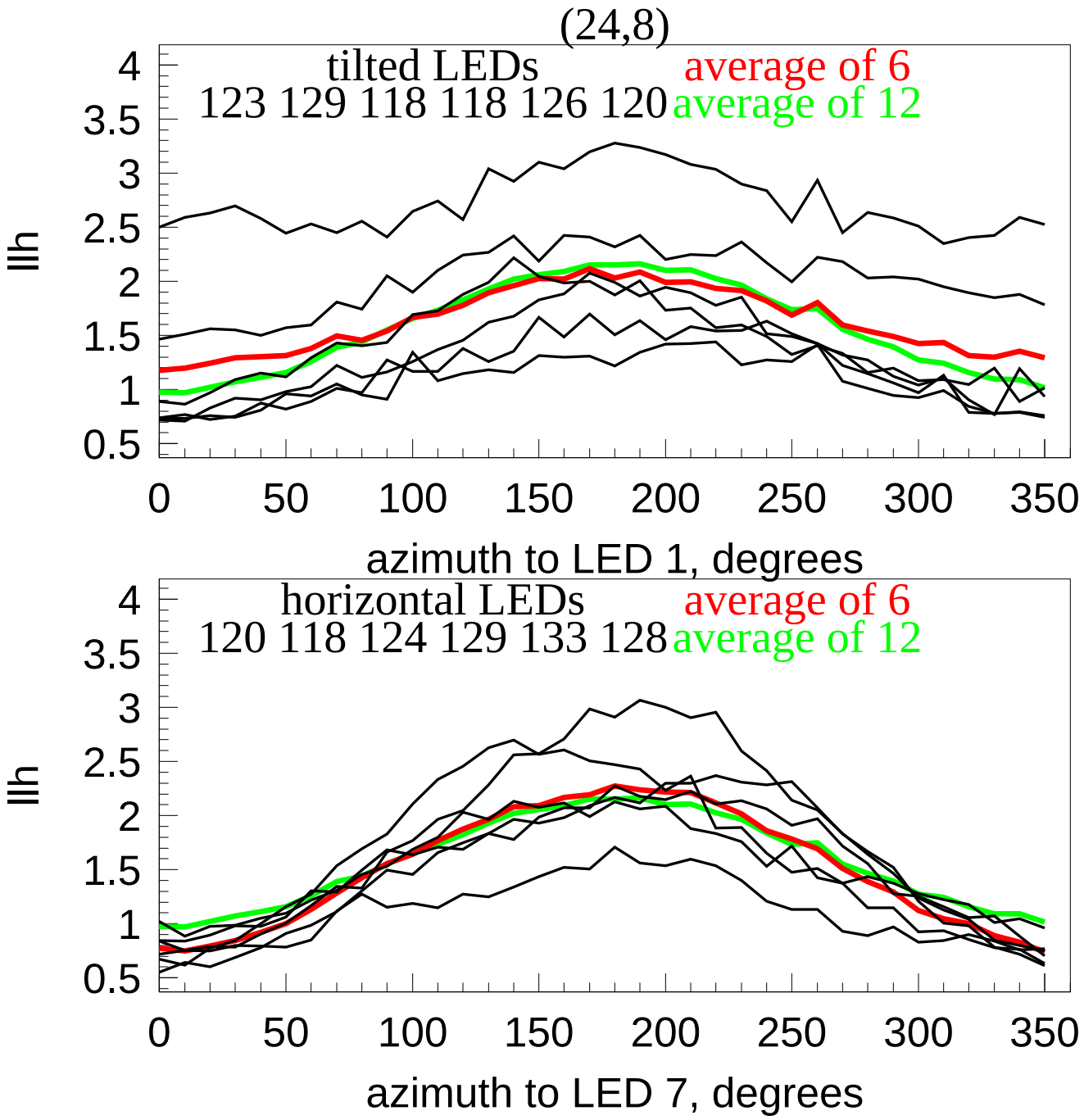

(24,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
260.2 ± 8.3

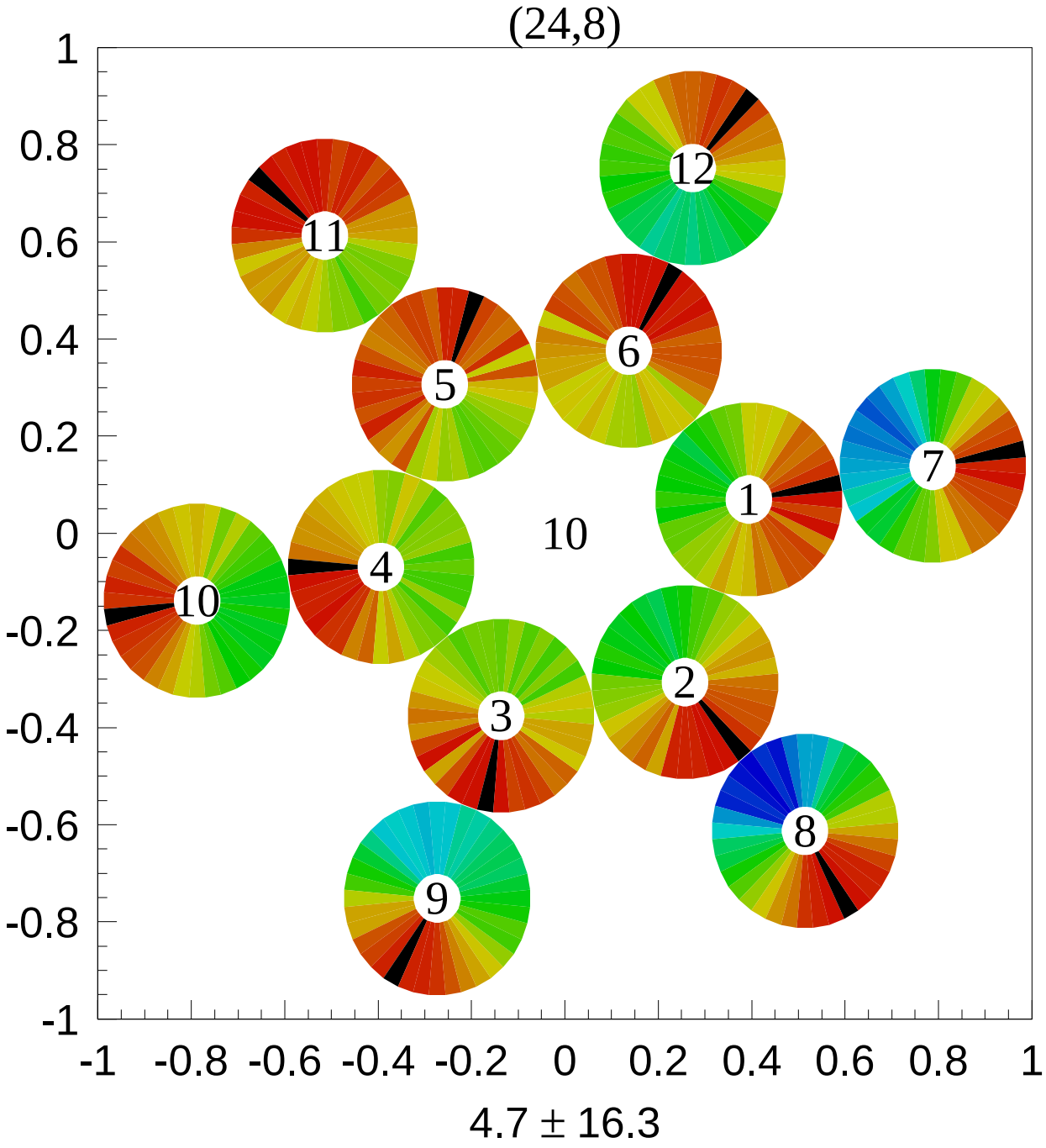

(24,6)
tilted LEDs
117 128 126 118 131 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 120 115 121 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

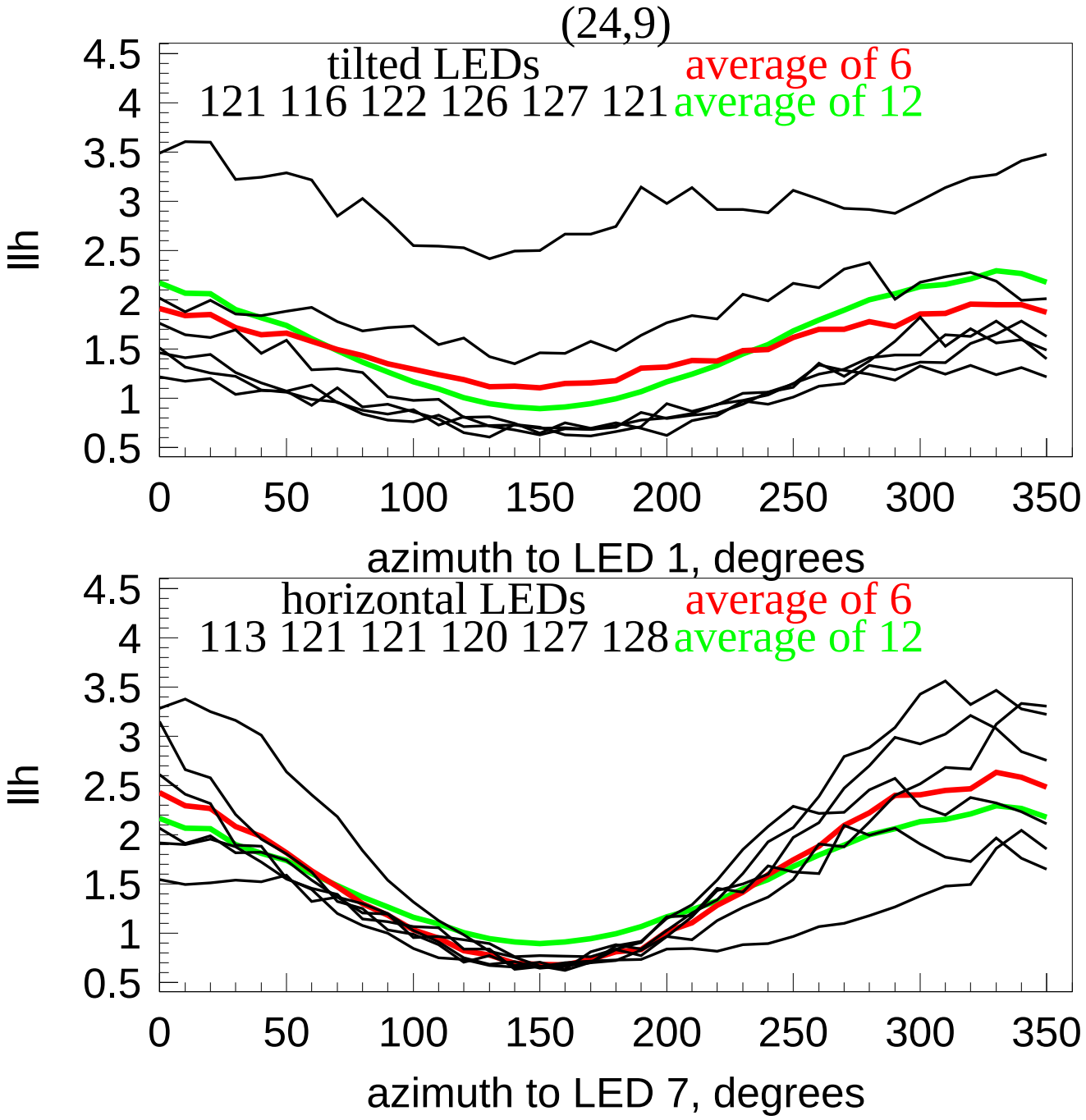

(24,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
241.6 ± 18.1

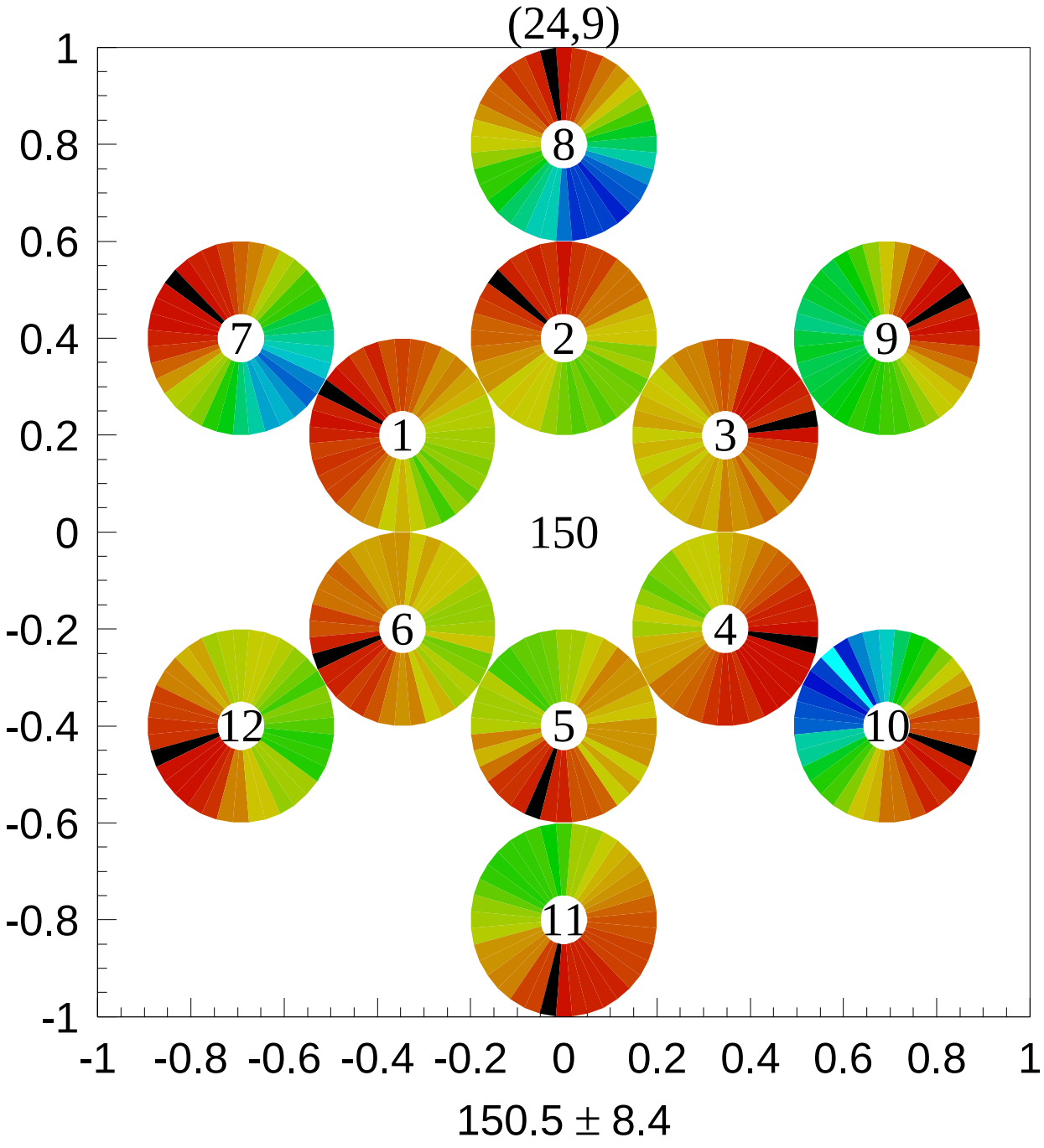

(24,7)
tilted LEDs
117 127 129 118 122 124
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
123 124 126 126 123 125
average of 6
average of 12
IIh
azimuth to LED 7, degrees

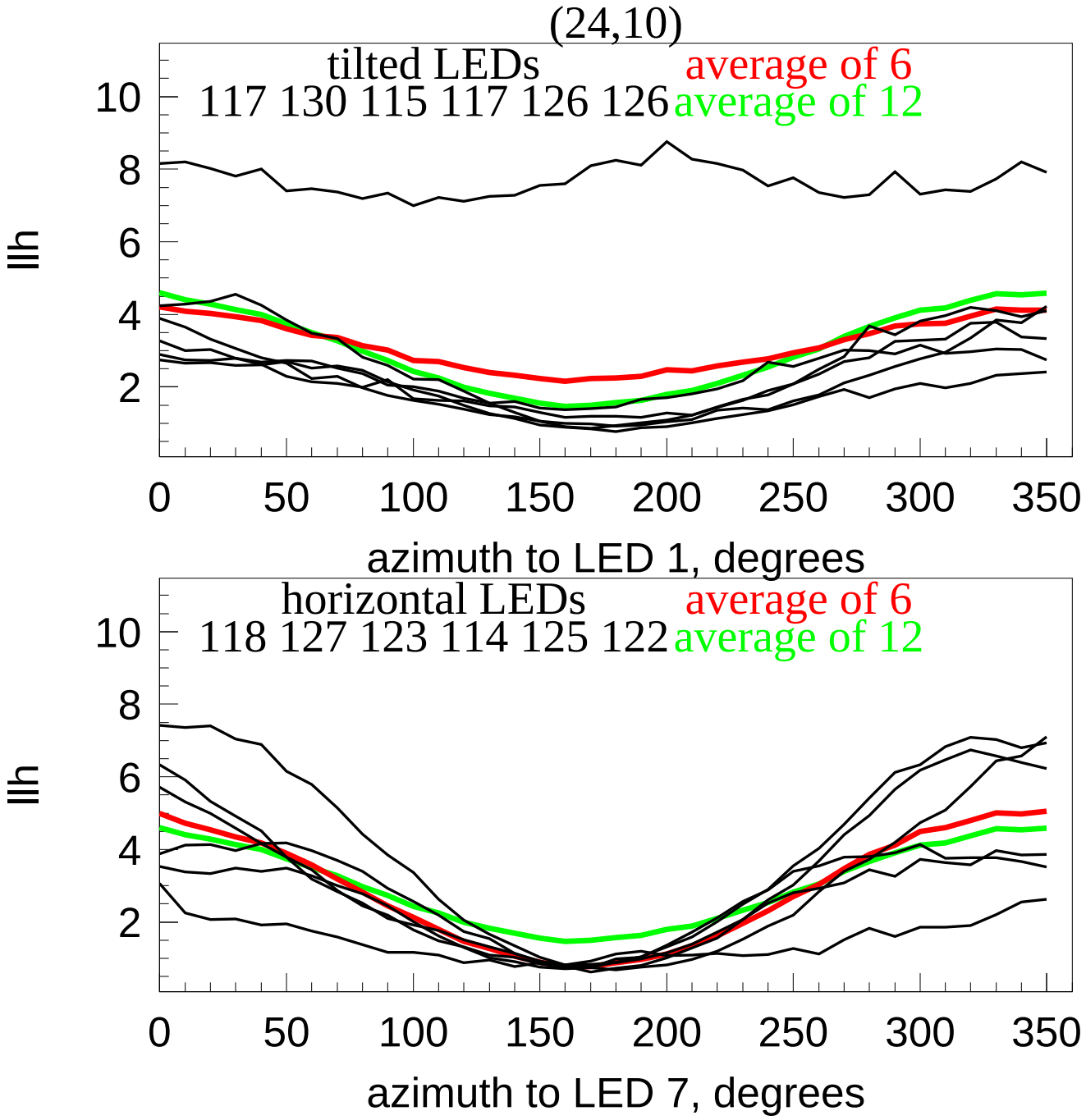

(24,7)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
44.4 ± 14.3

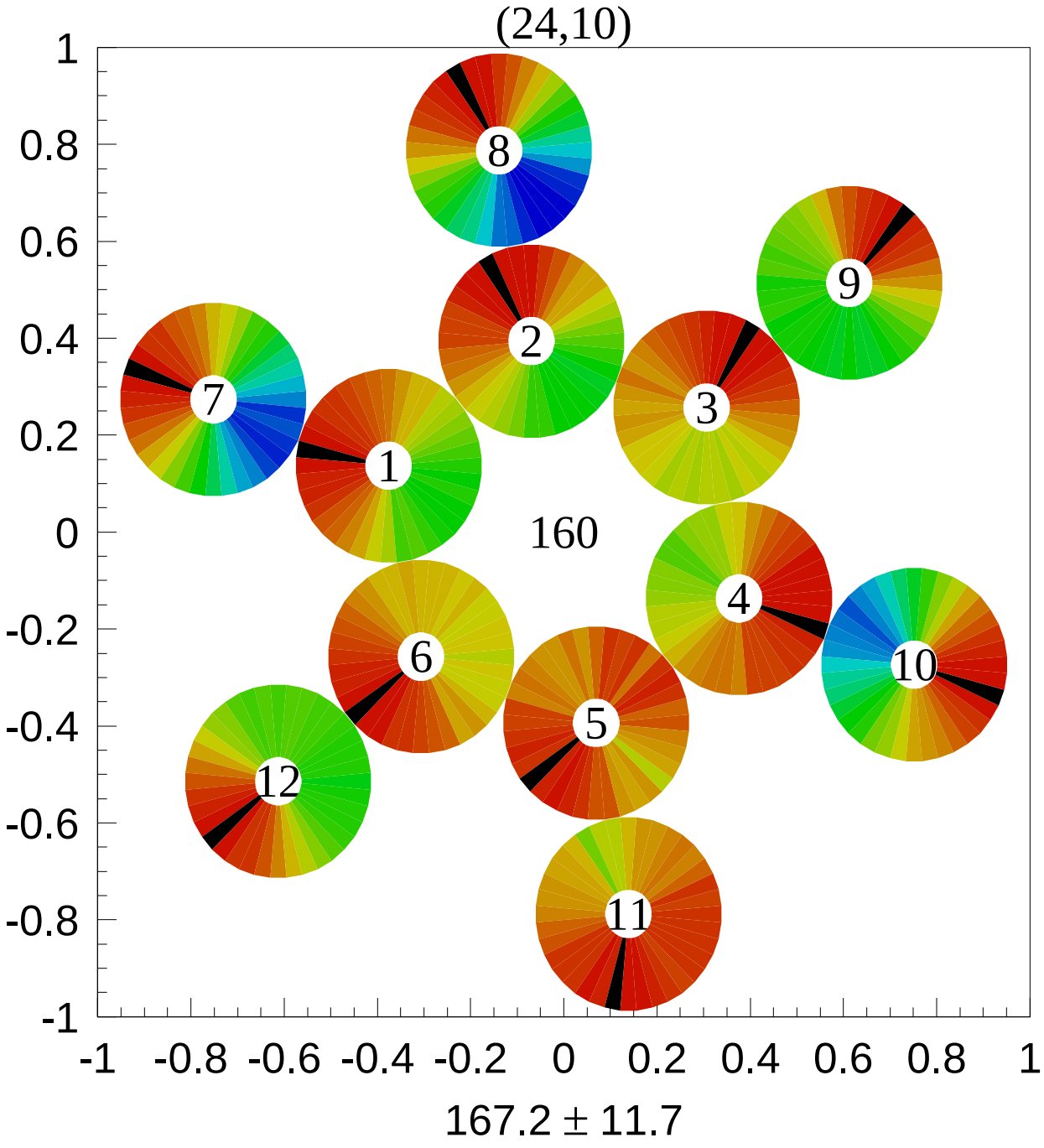

(24,8)
tilted LEDs
123 129 118 118 126 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 118 124 129 133 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

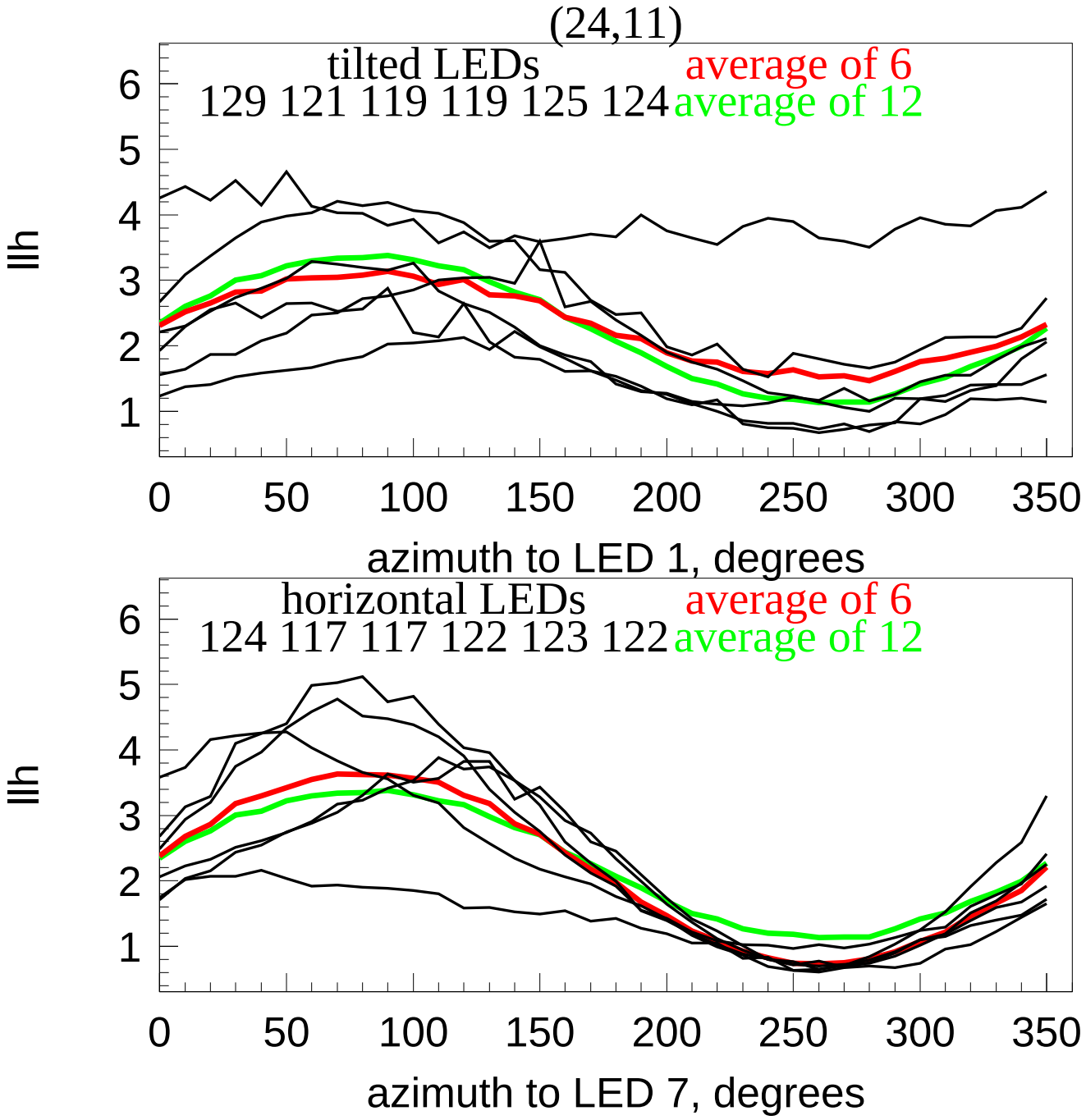

(24,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
4.7 ± 16.3

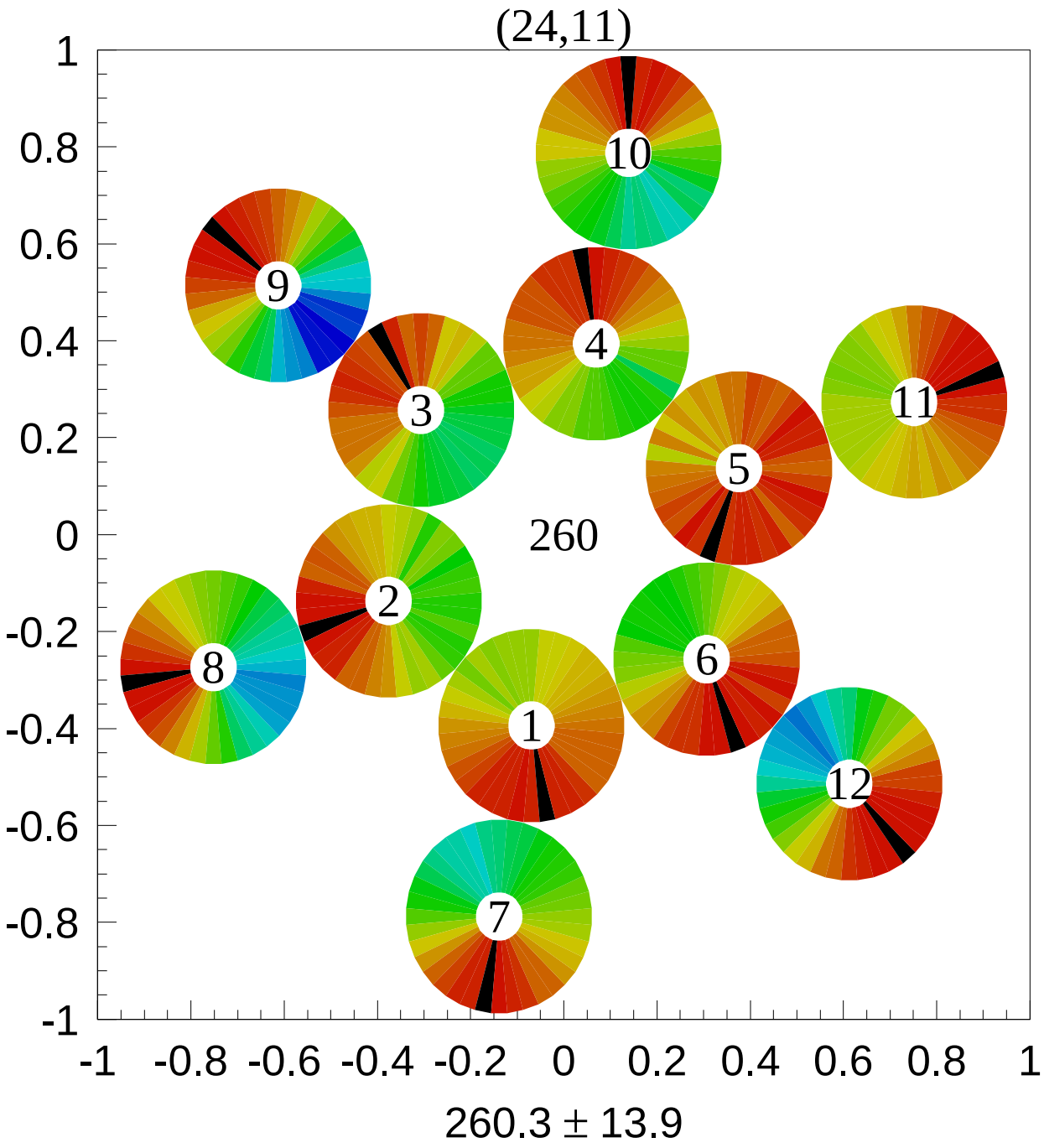

(24,9)
tilted LEDs
121 116 122 126 127 121
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
113 121 121 120 127 128
average of 6
average of 12
IIh
azimuth to LED 7, degrees

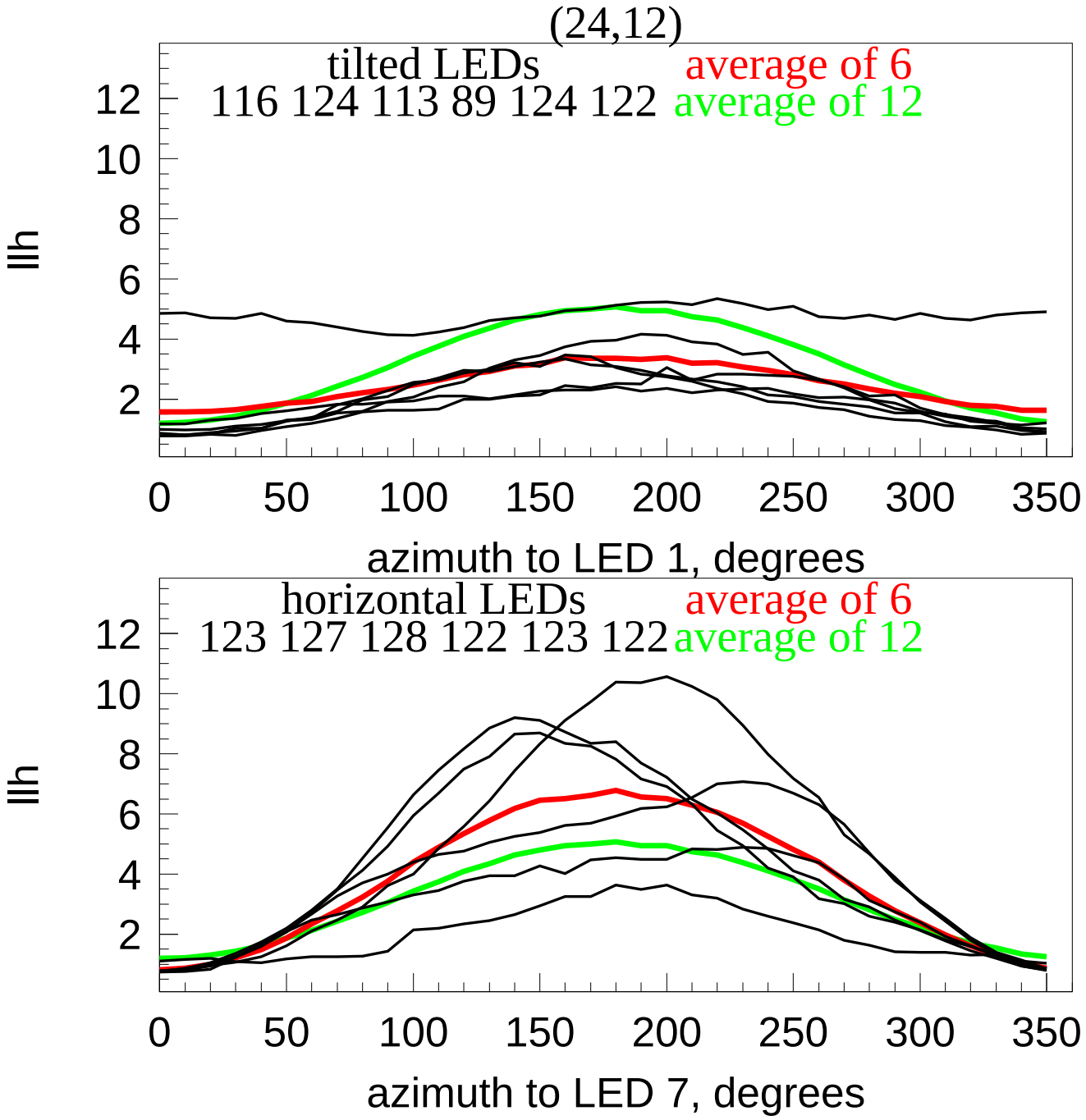

(24,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
150.5 ± 8.4

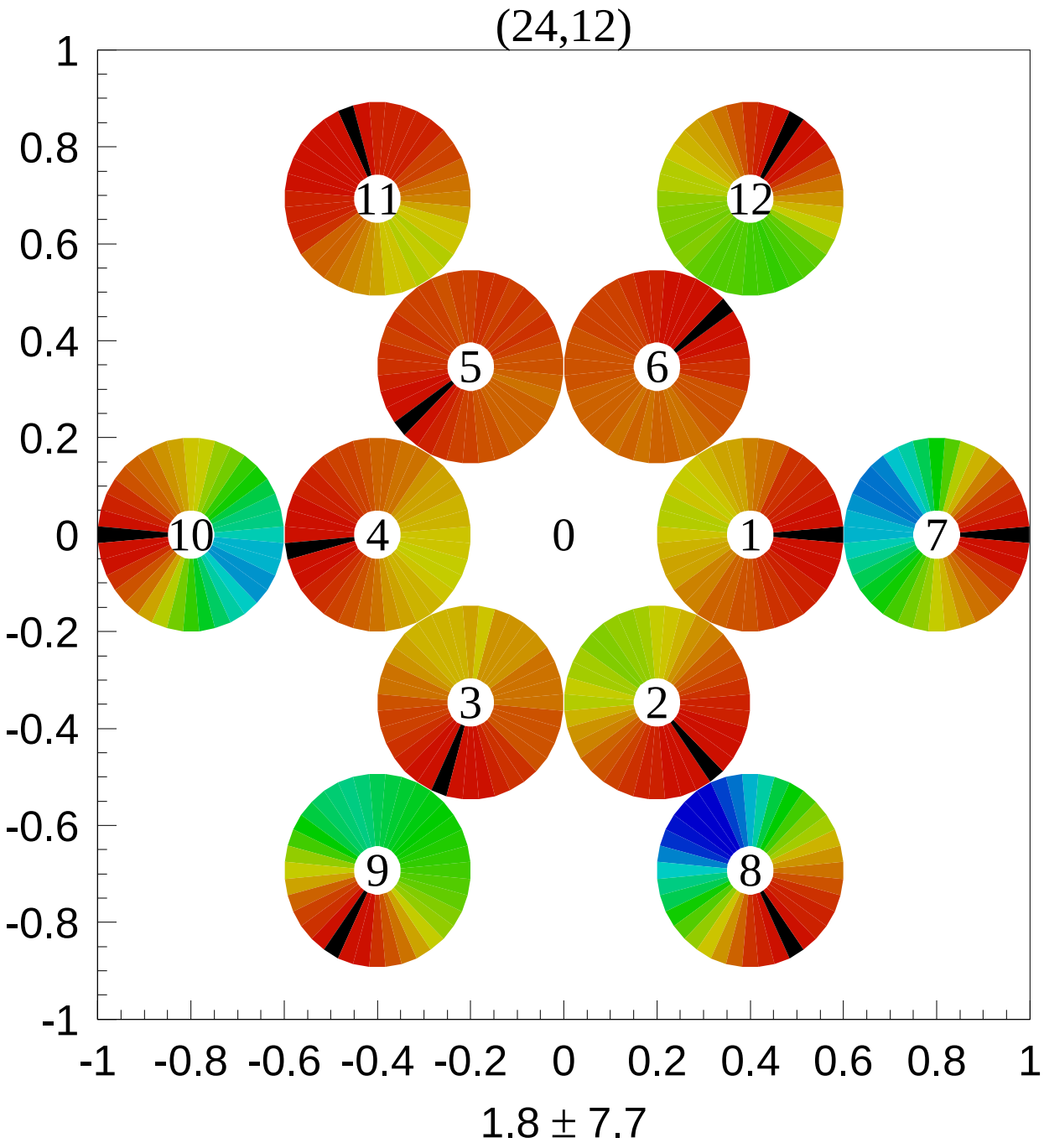

(24,10)
tilted LEDs
117 130 115 117 126 126
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 127 123 114 125 122
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

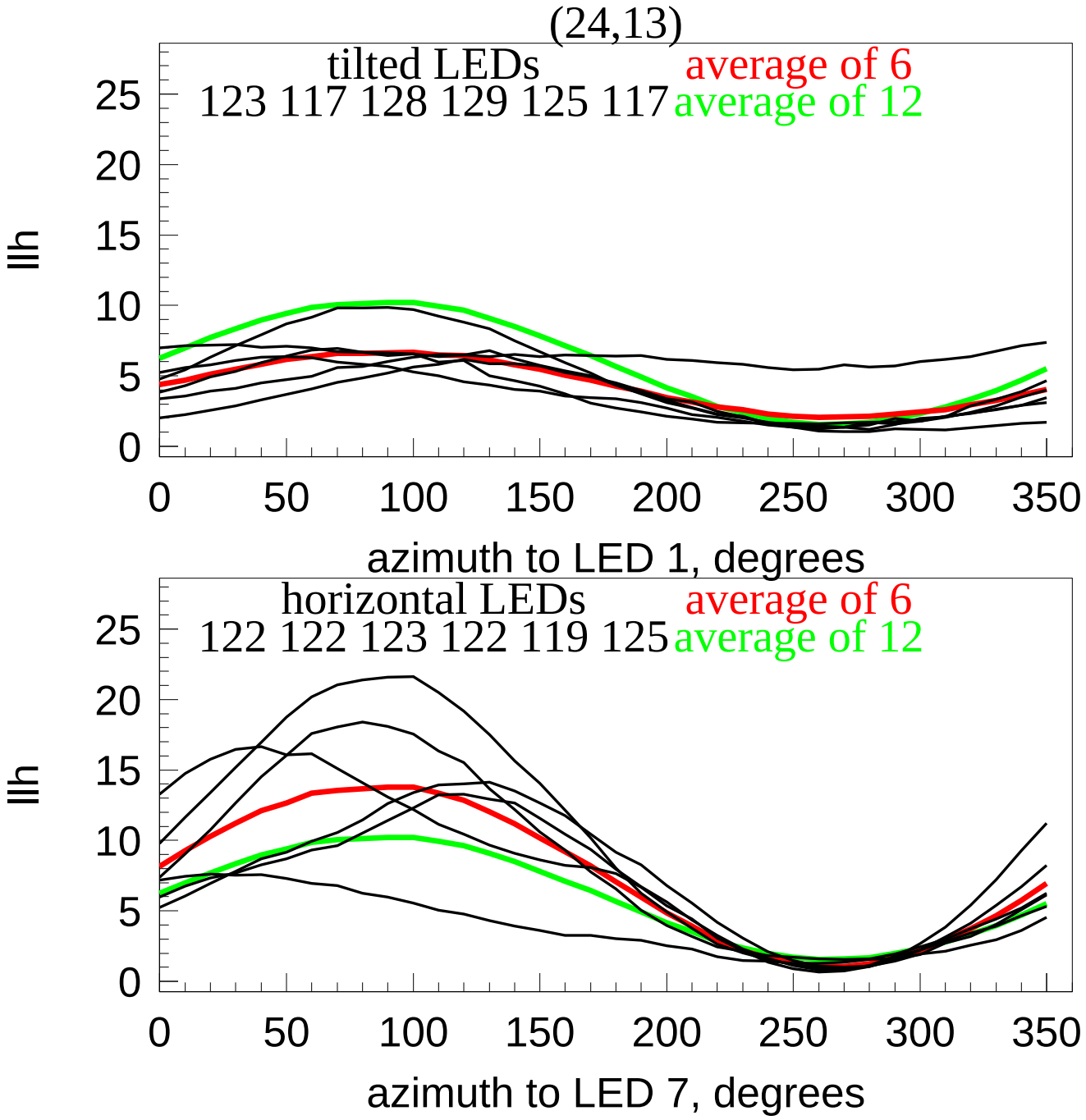

(24,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
167.2 ± 11.7

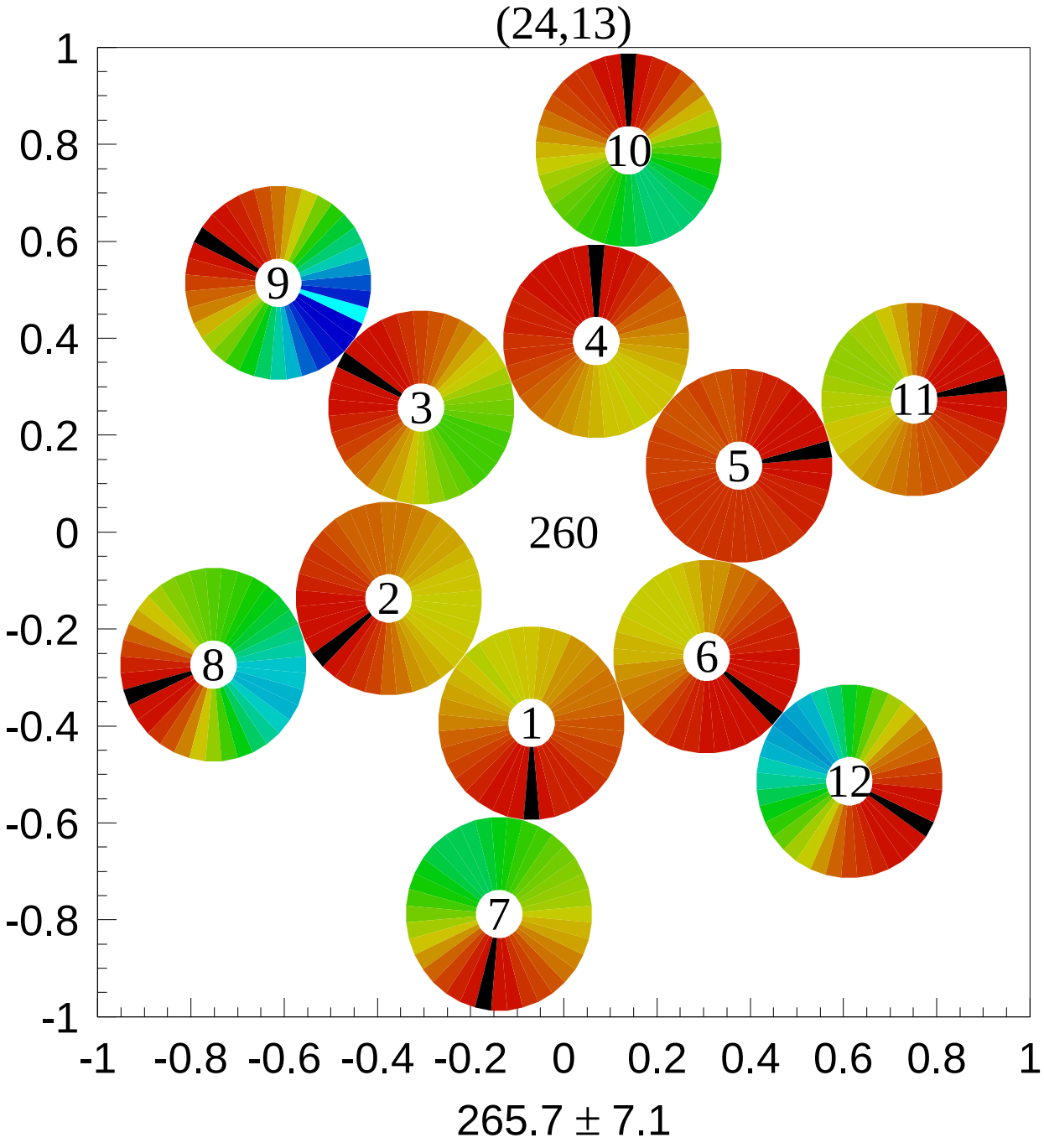

(24,11)
tilted LEDs
129 121 119 119 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 117 117 122 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

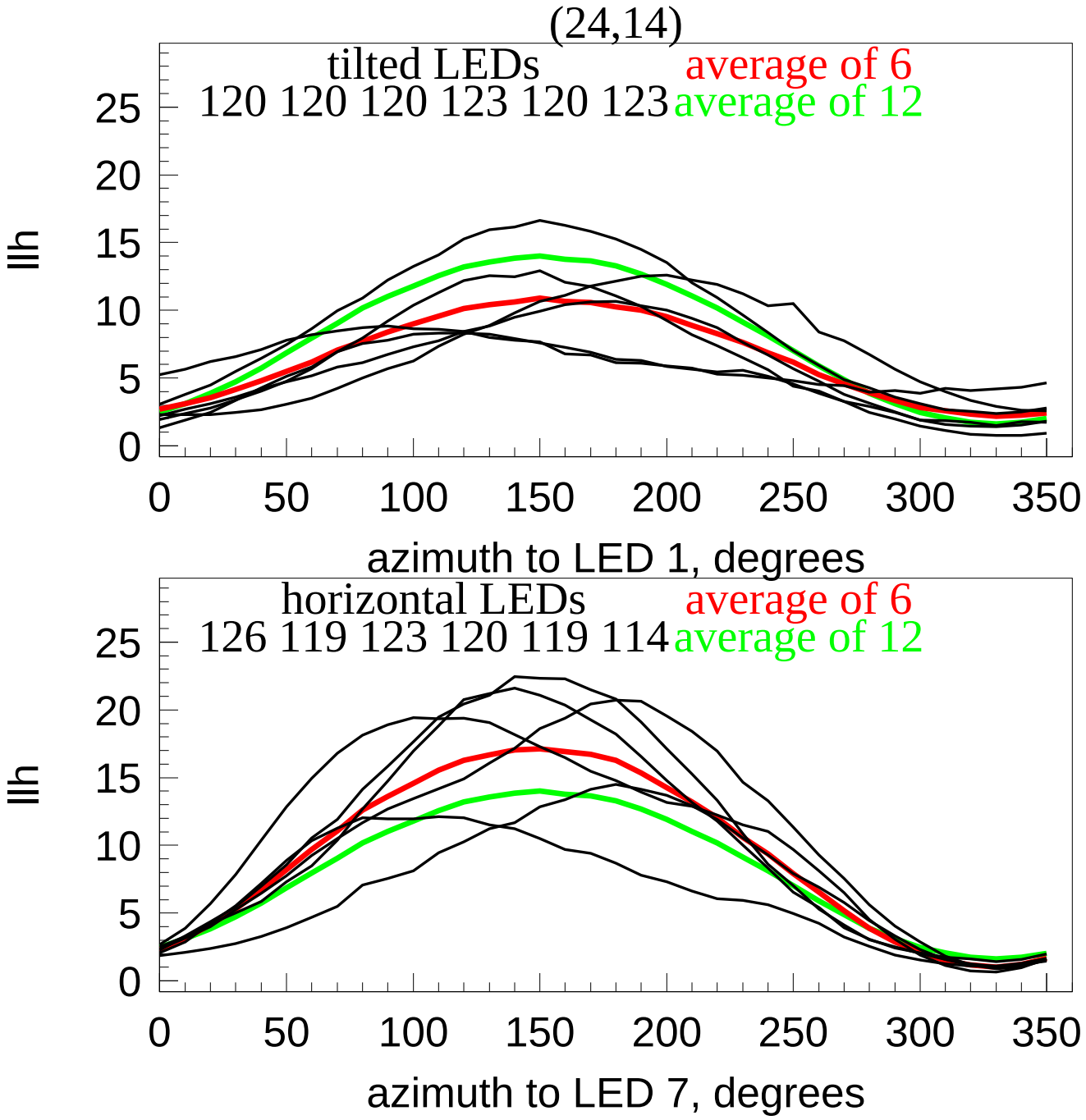

(24,11)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
260.3 ± 13.9

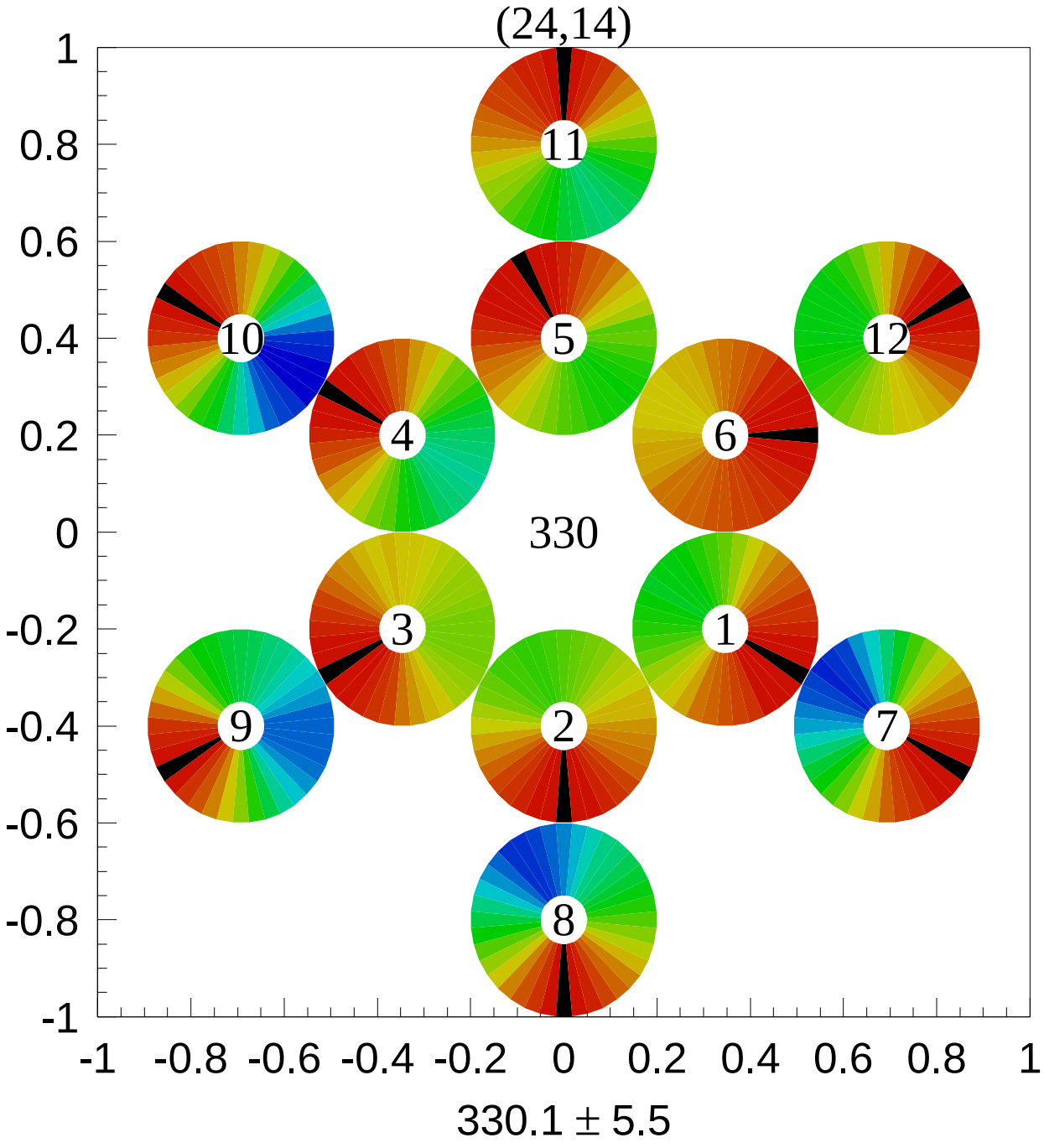

(24,12)
tilted LEDs
116 124 113 89 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 127 128 122 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

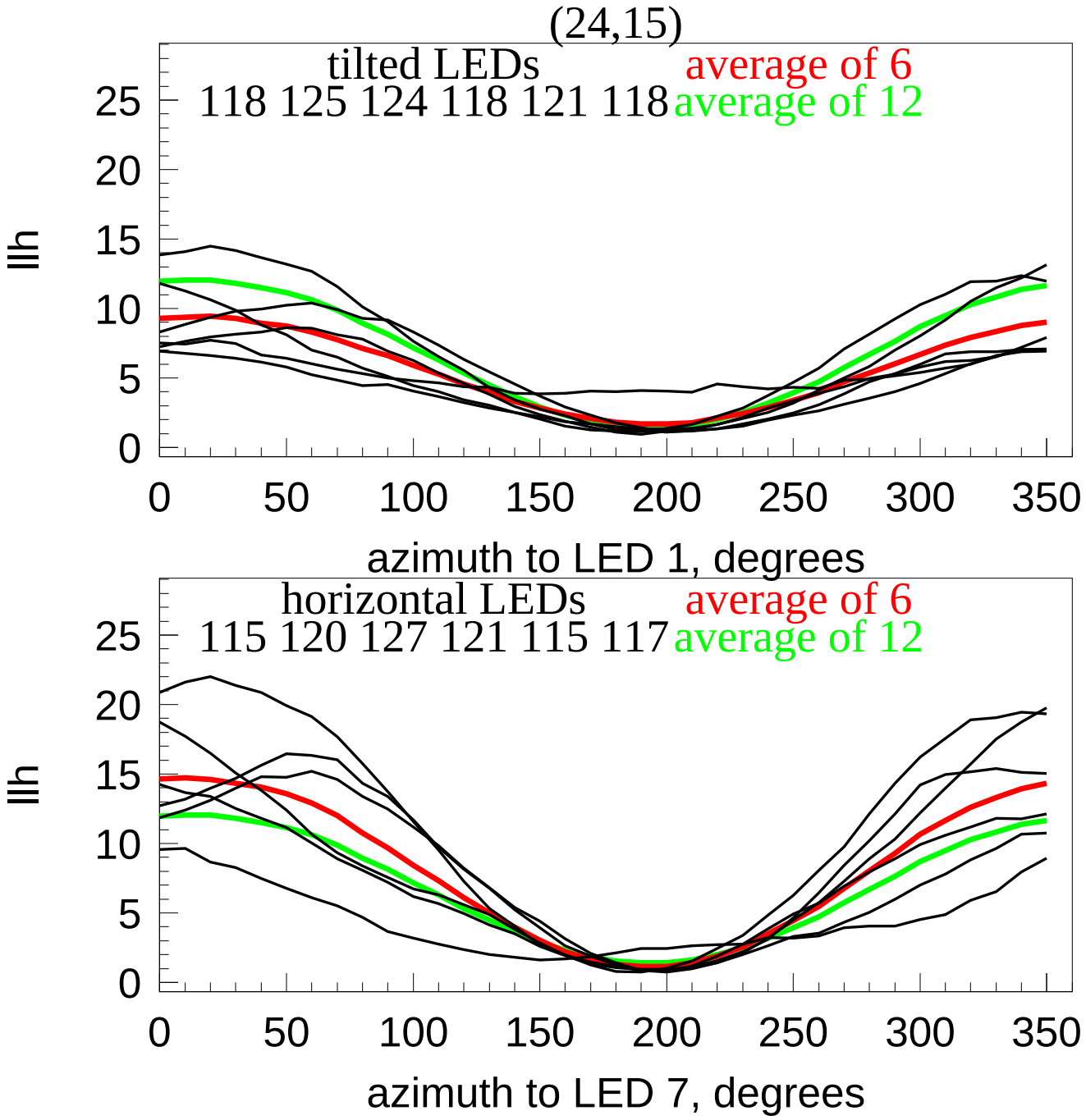

(24,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
1.8 ± 7.7

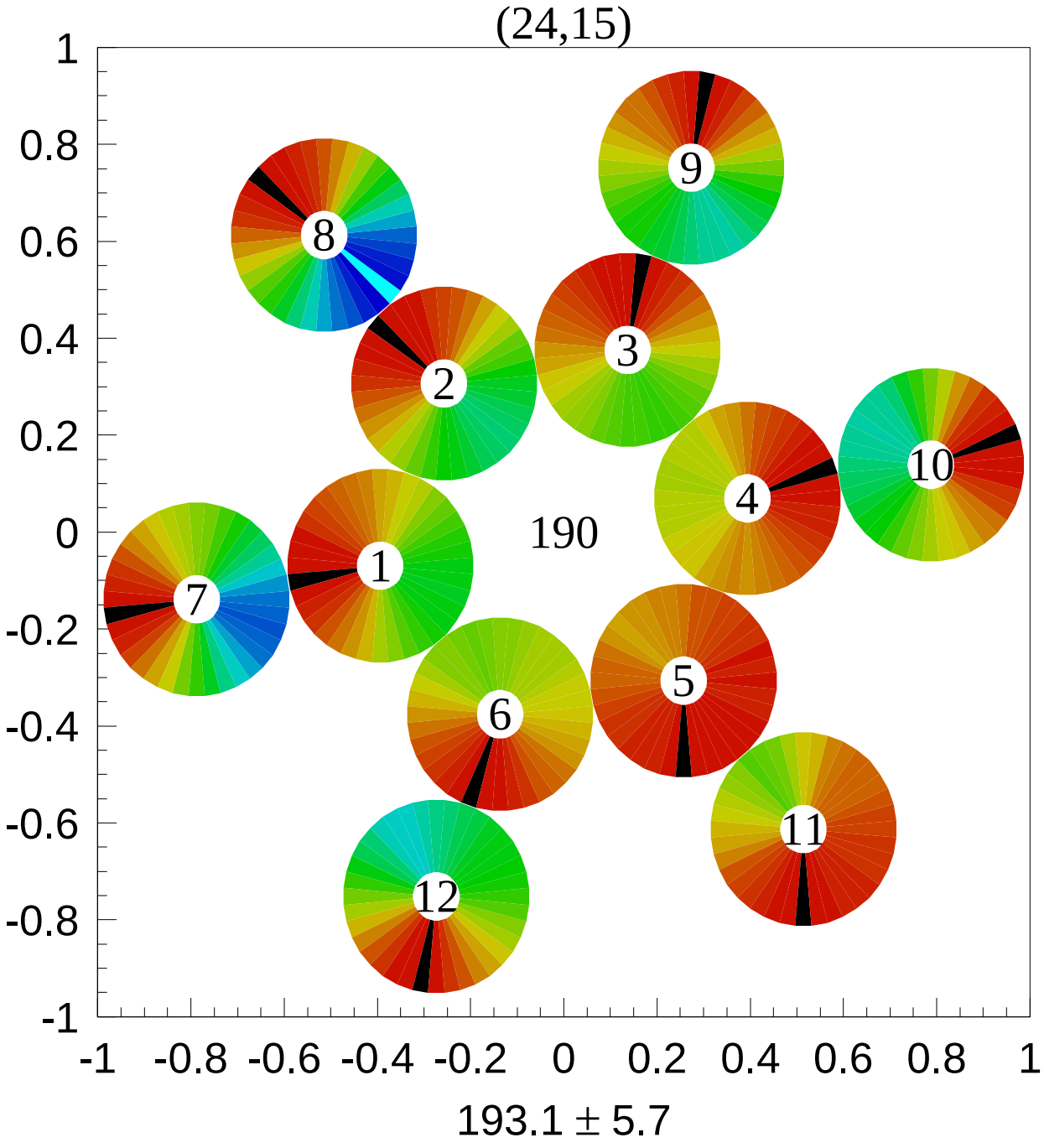

(24,13)
tilted LEDs
123 117 128 129 125 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 123 122 119 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

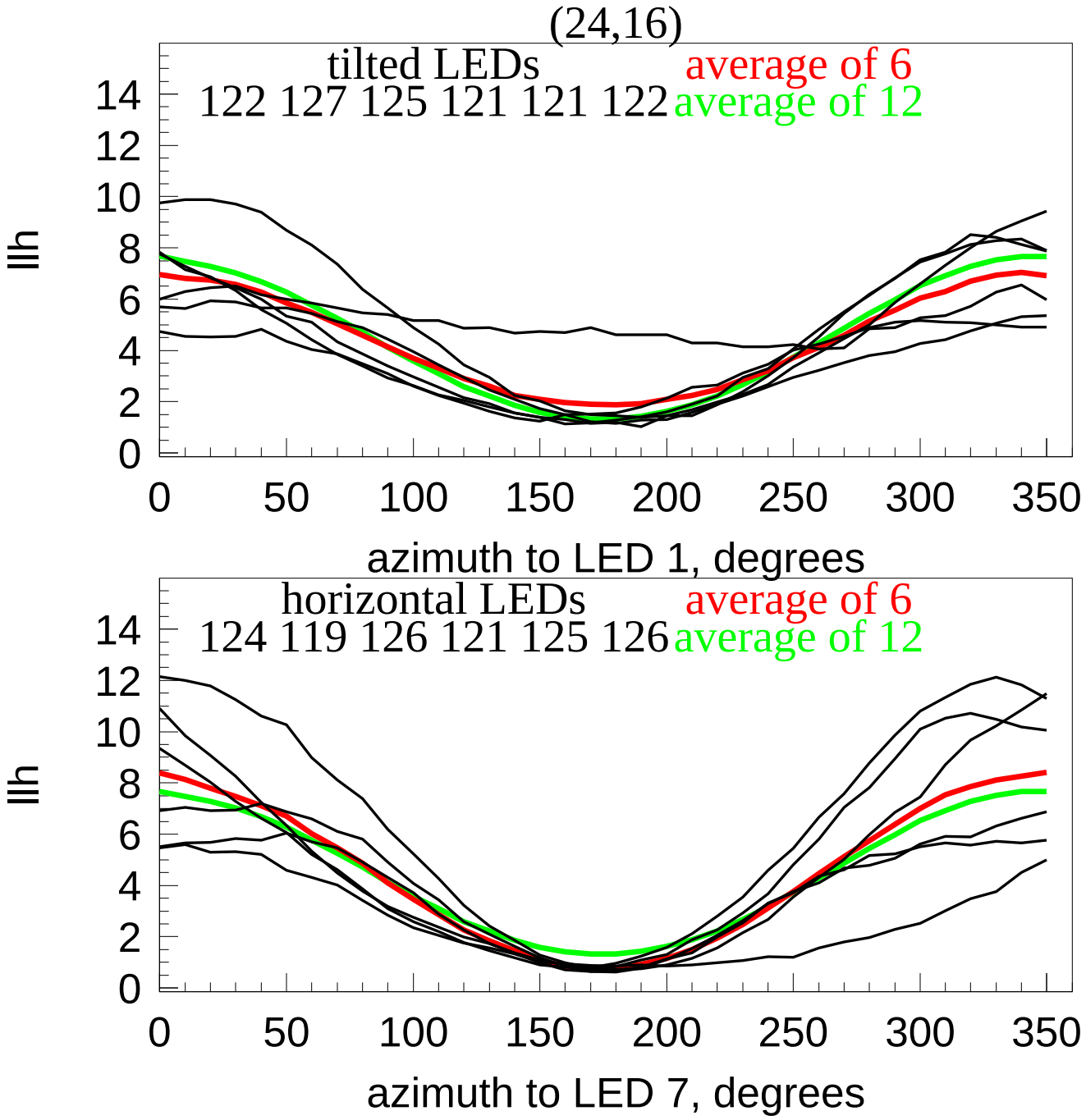

(24,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
265.7 ± 7.1

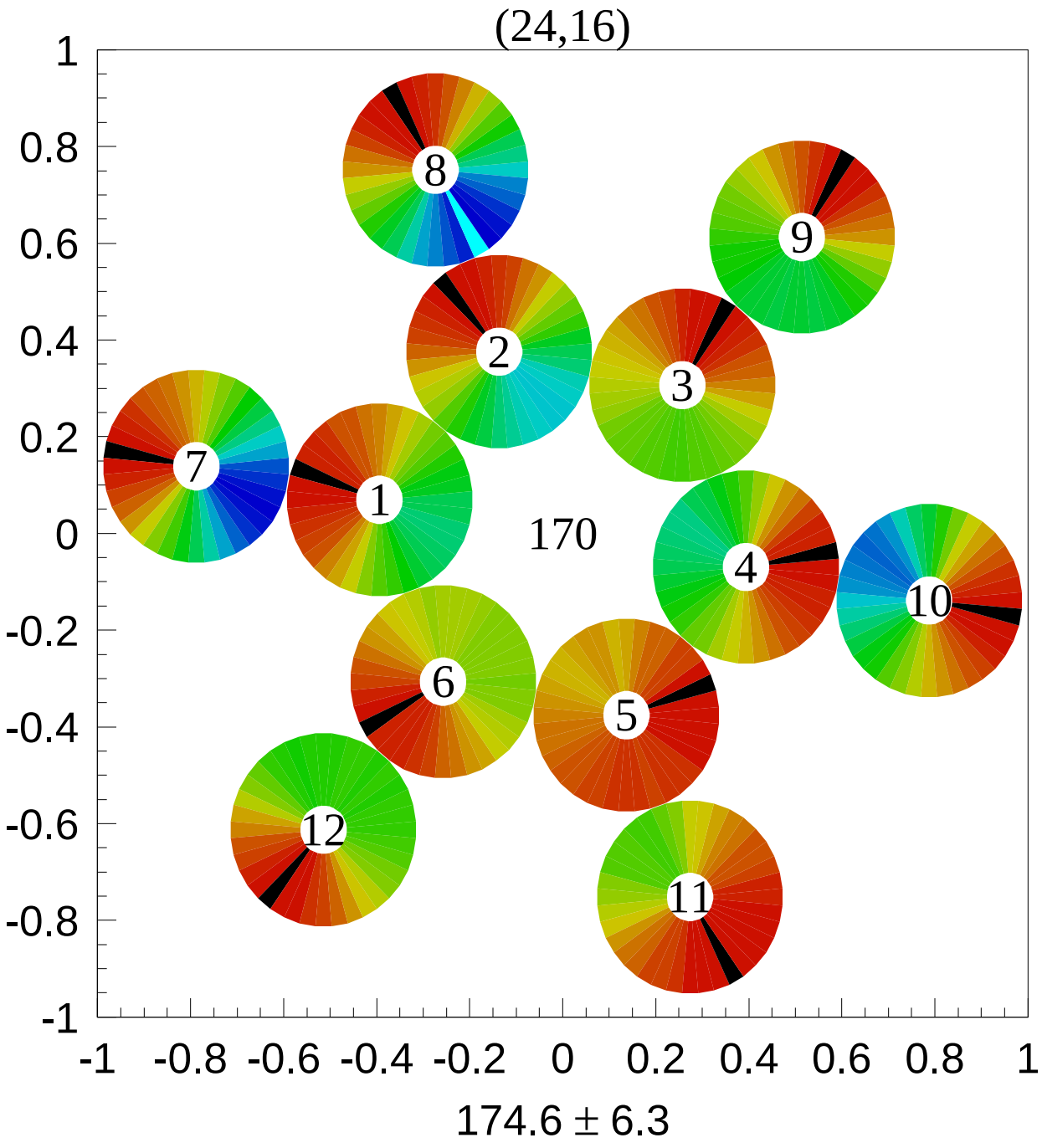

(24,14)
tilted LEDs
120 120 120 123 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 123 120 119 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

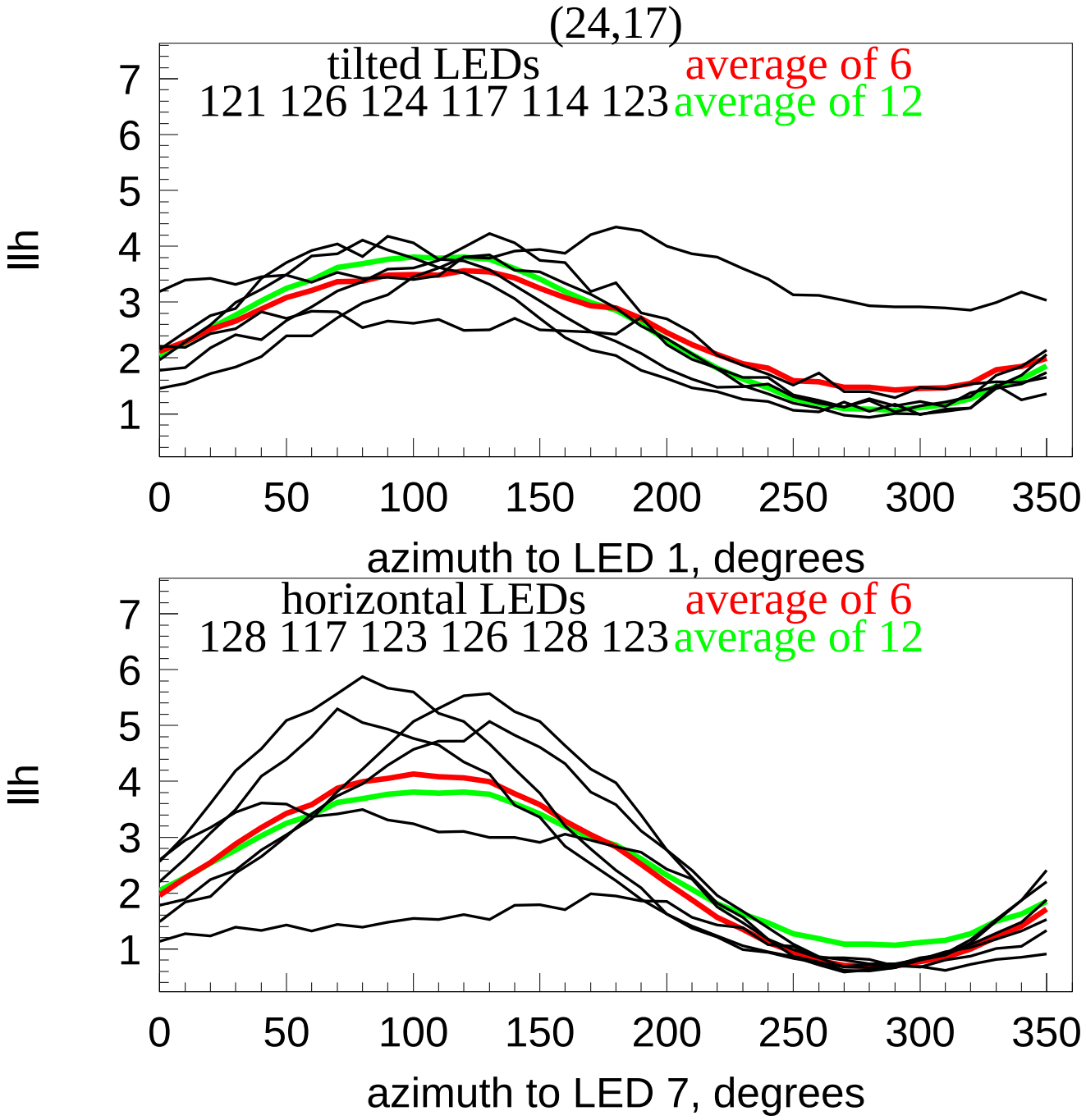

(24,14)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
330.1 ± 5.5

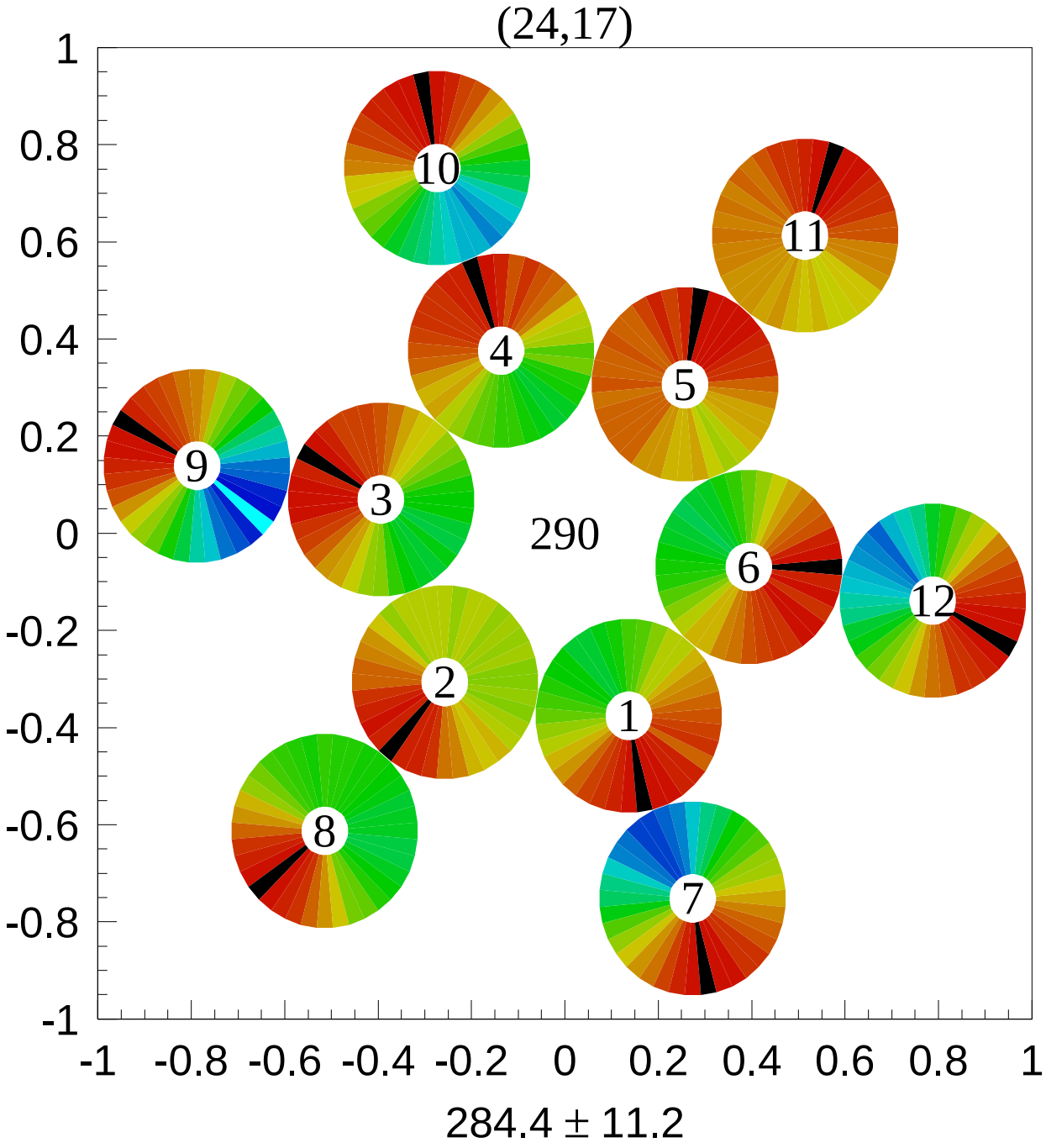

(24,15)
tilted LEDs
118 125 124 118 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 120 127 121 115 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

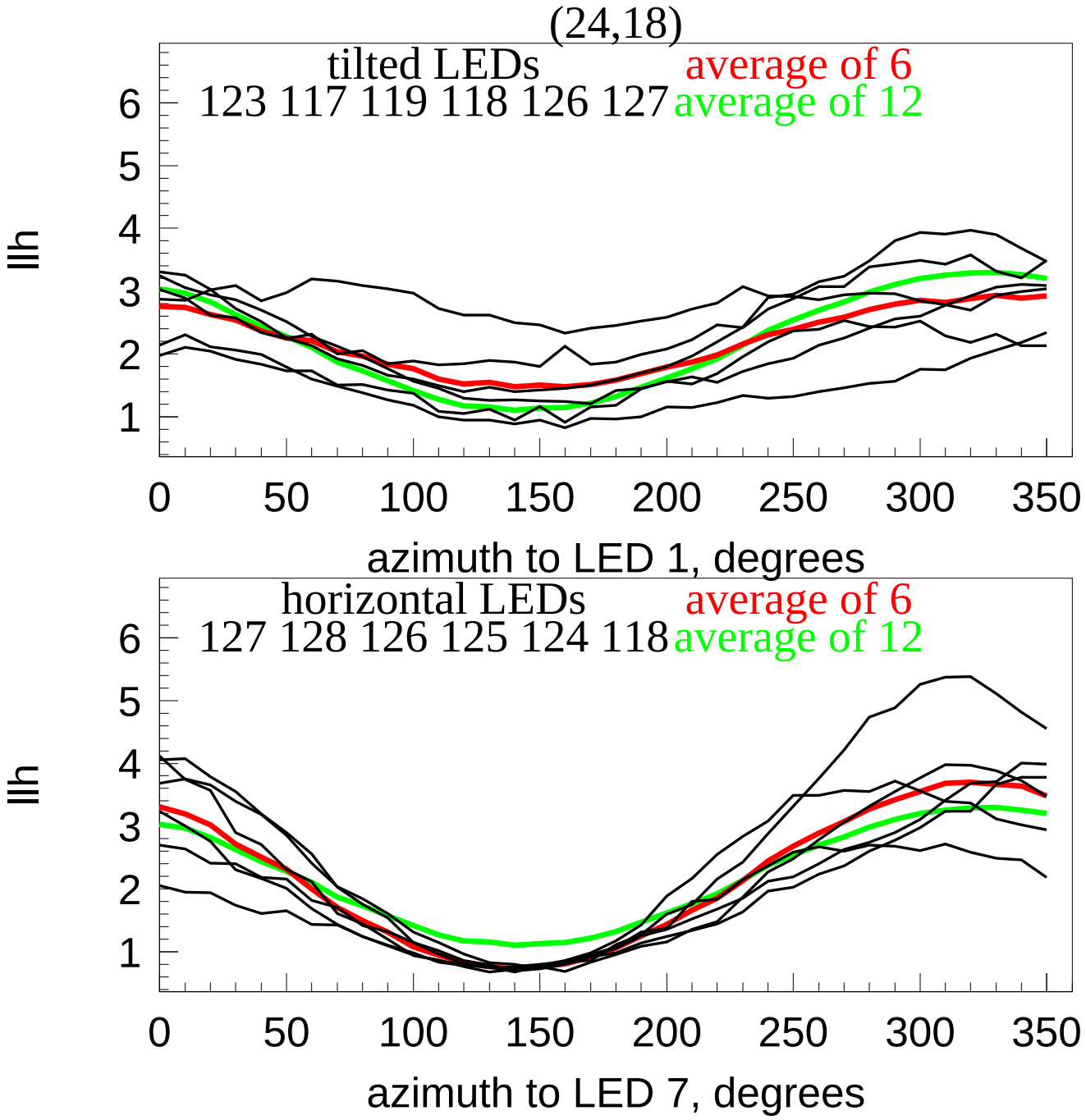

(24,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
193.1 ± 5.7
190
1
2
3
4
5
6
7
8
9
10
11
12

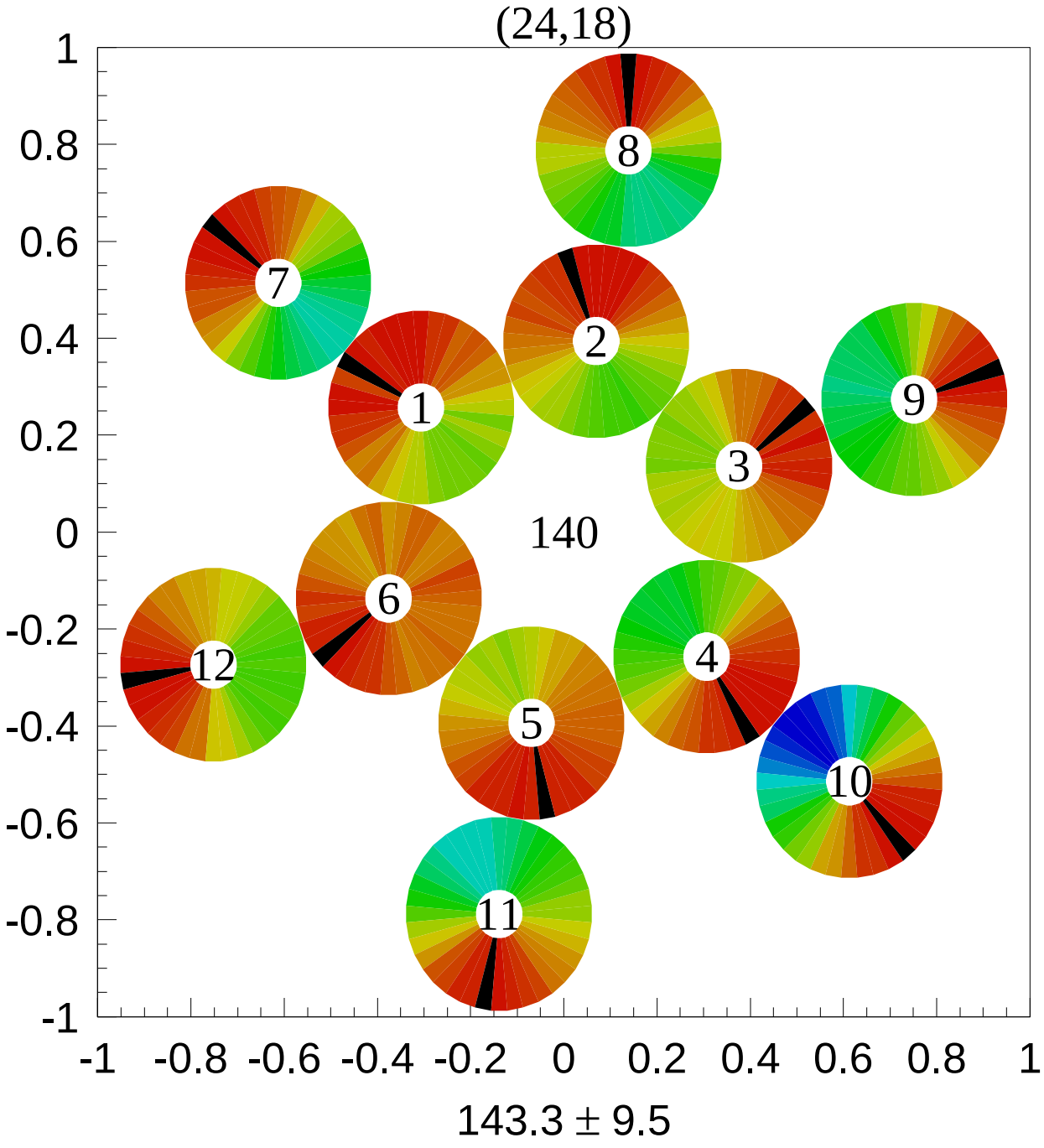

(24,16)
tilted LEDs
122 127 125 121 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 126 121 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

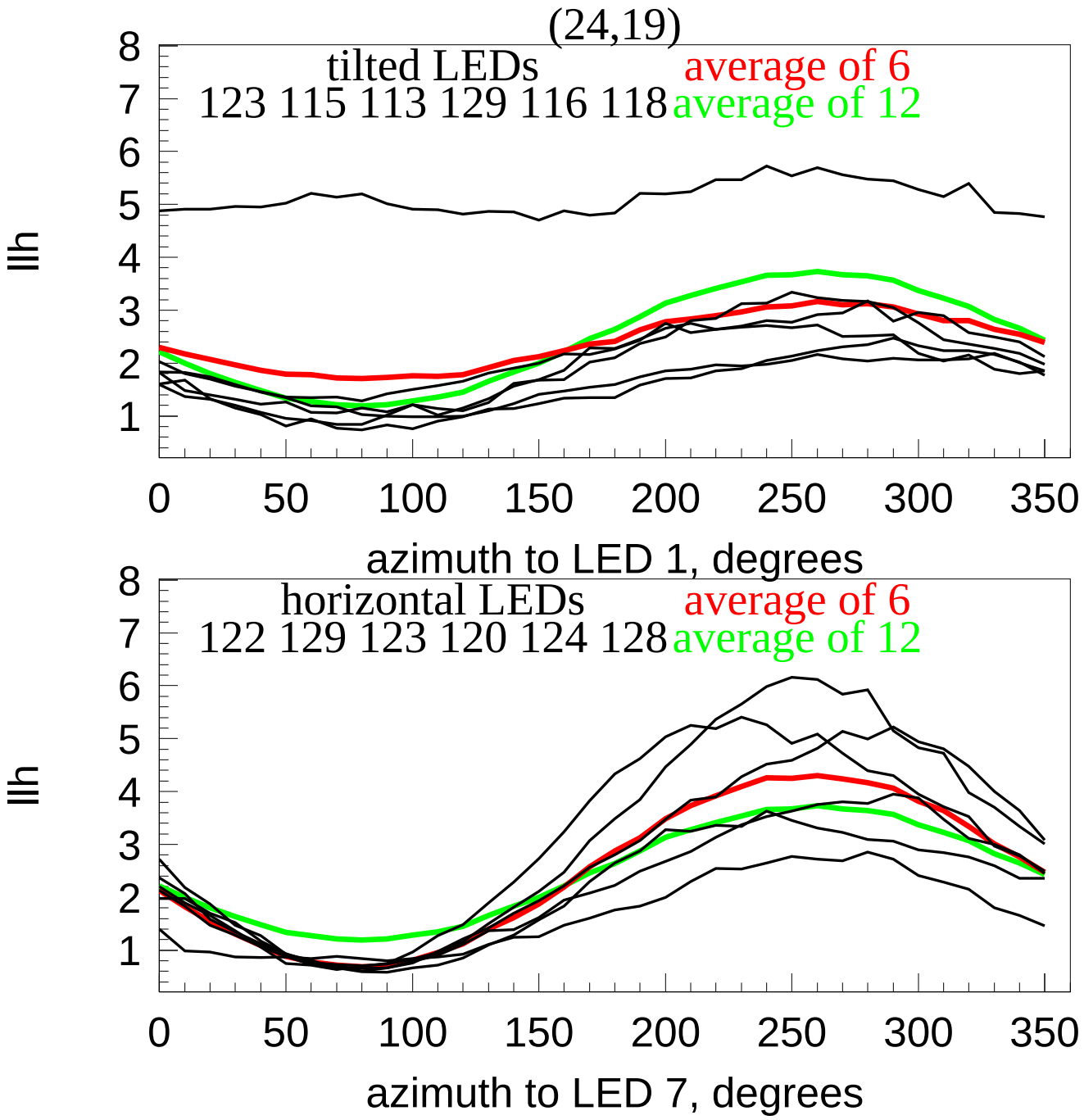

(24,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
174.6 ± 6.3

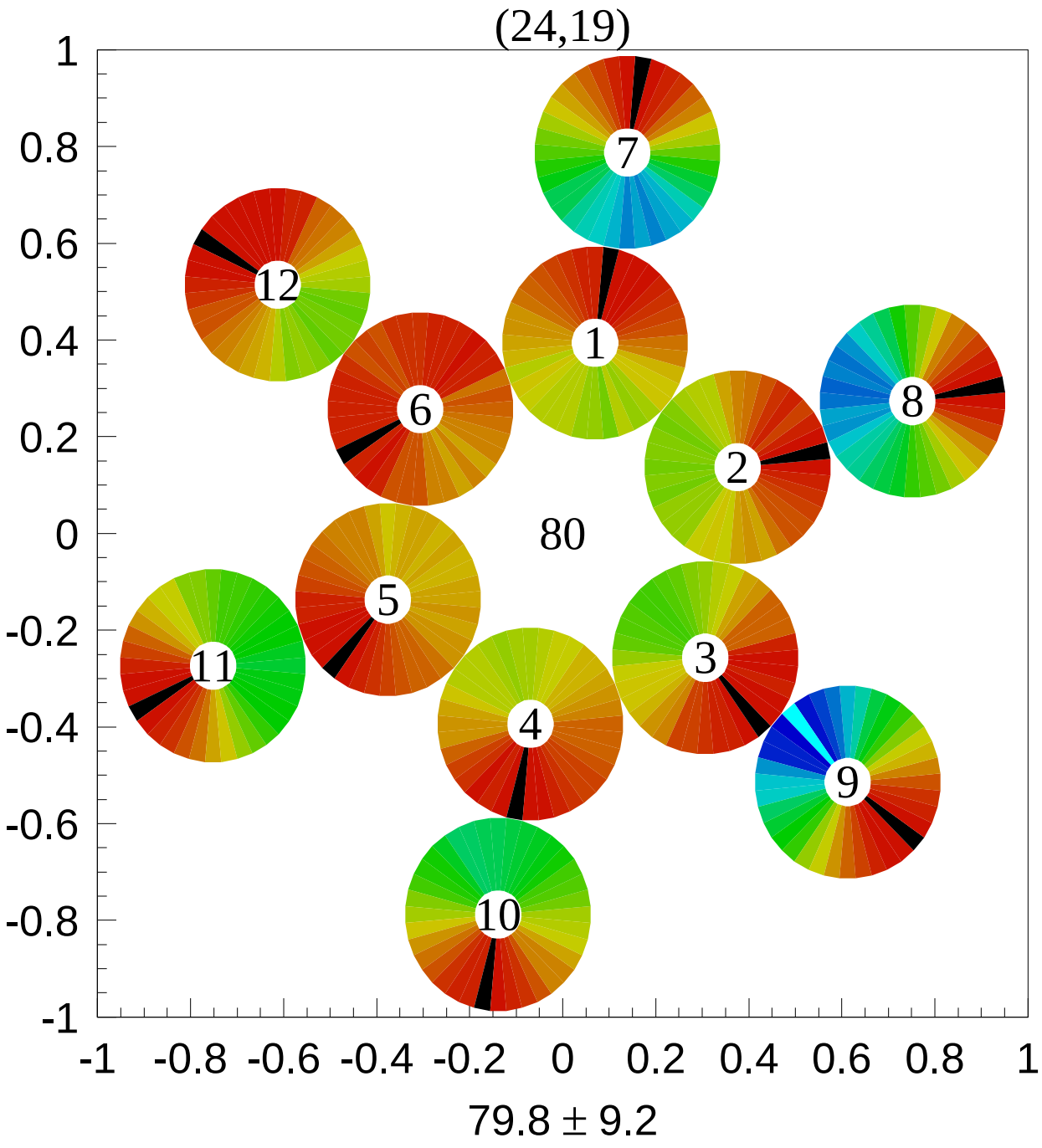

(24,17)
tilted LEDs
121 126 124 117 114 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 117 123 126 128 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

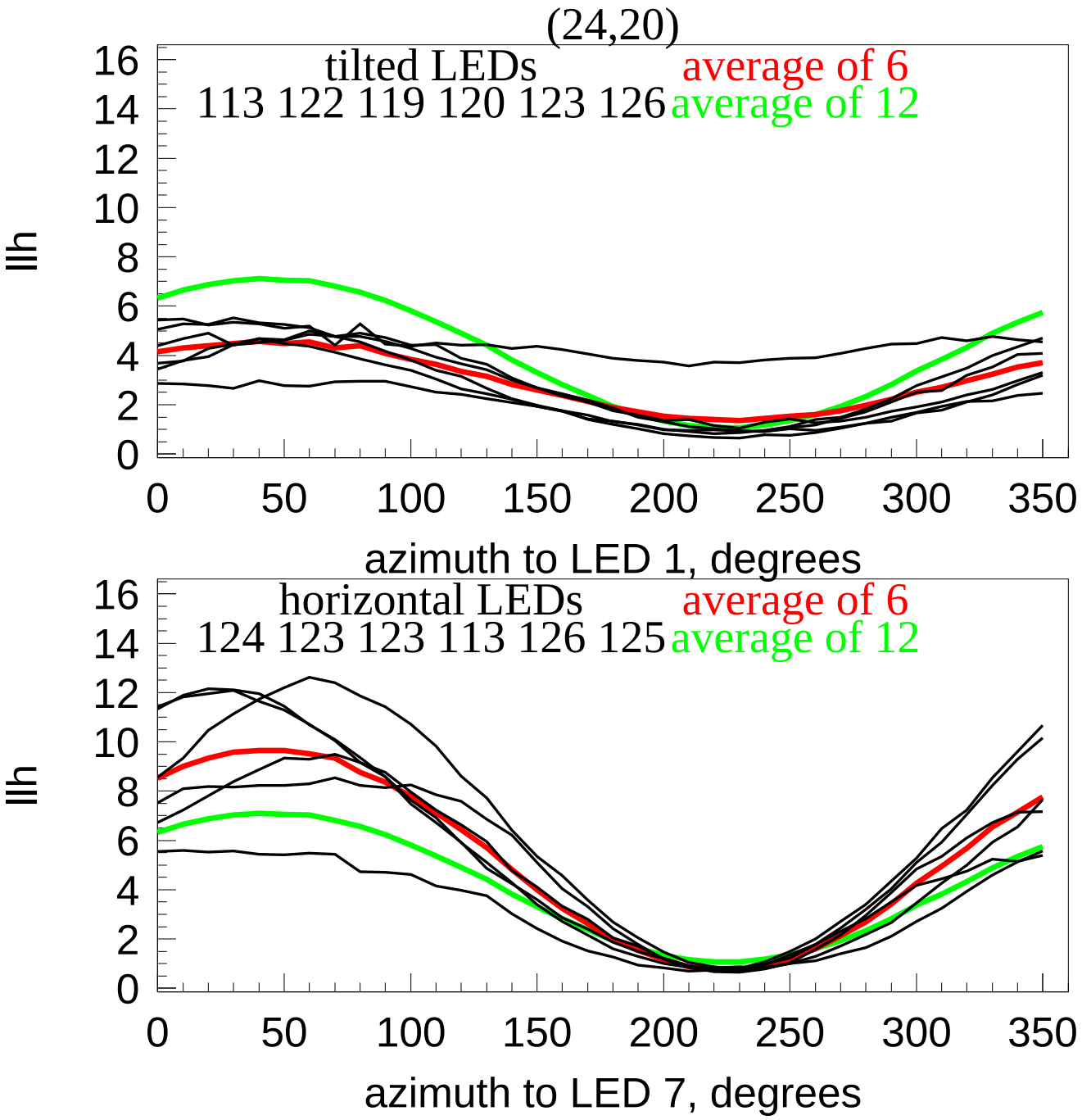

(24,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
284.4 ± 11.2

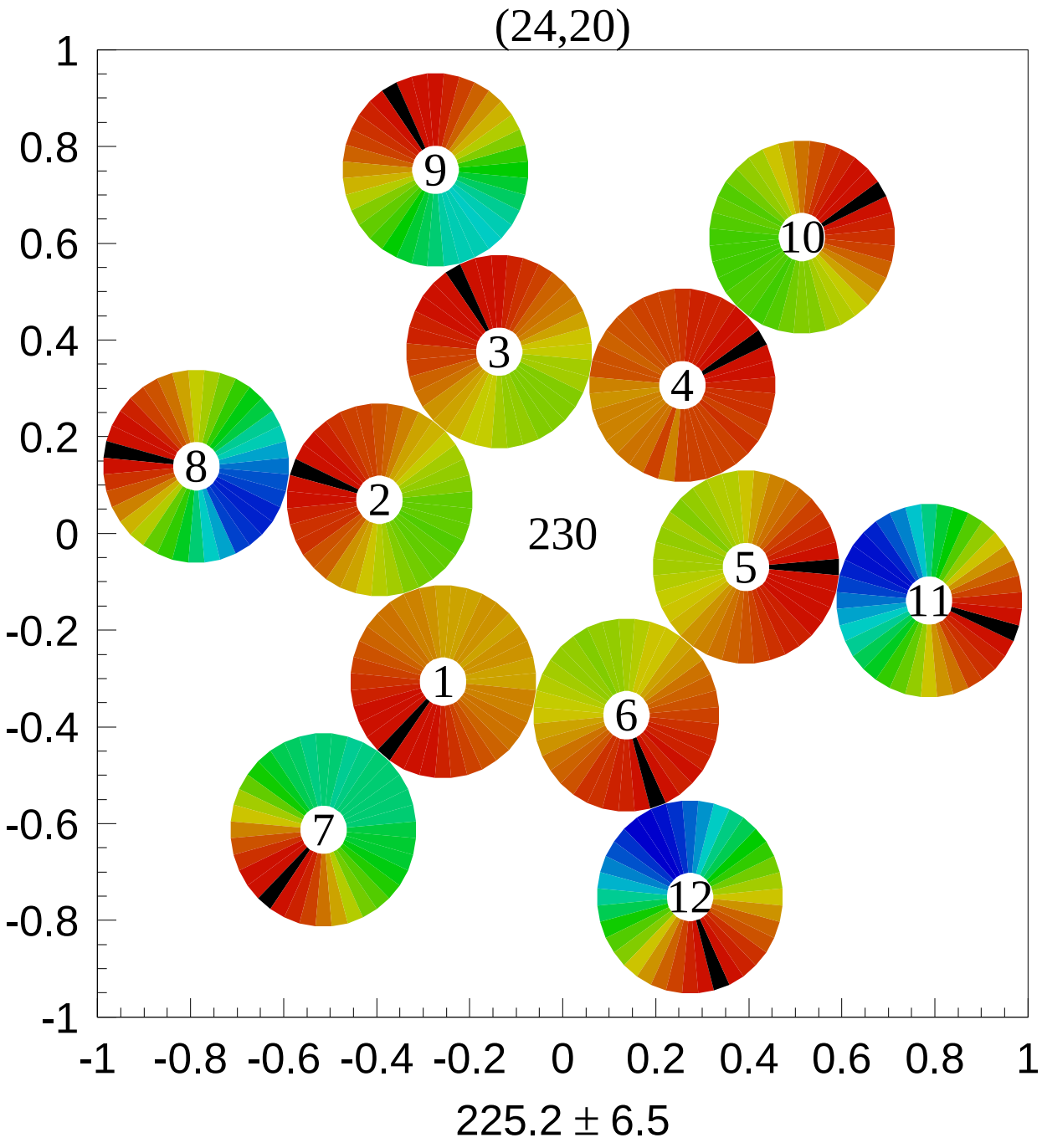

(24,18)
tilted LEDs
123 117 119 118 126 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 128 126 125 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

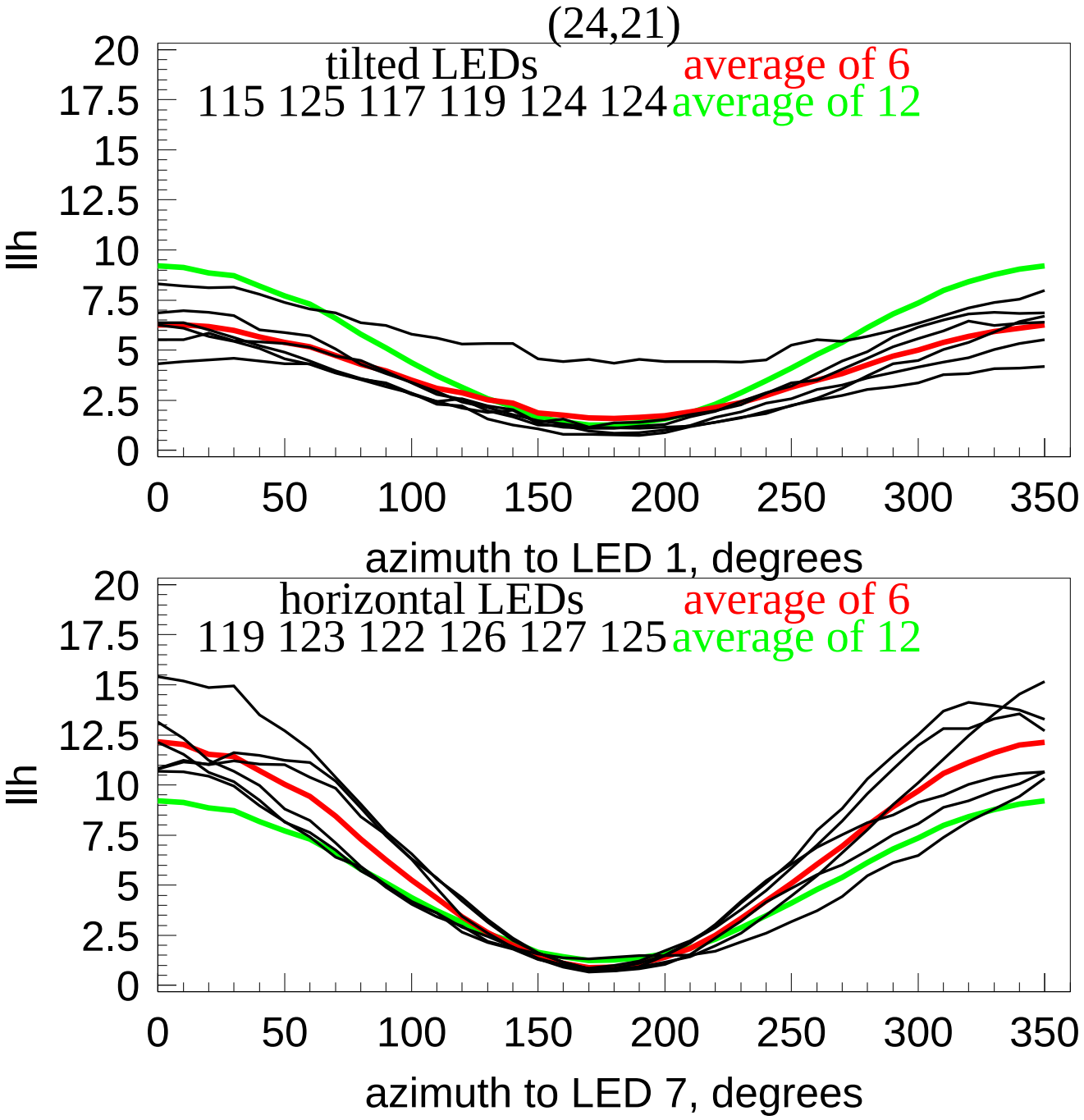

(24,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
143.3 ± 9.5

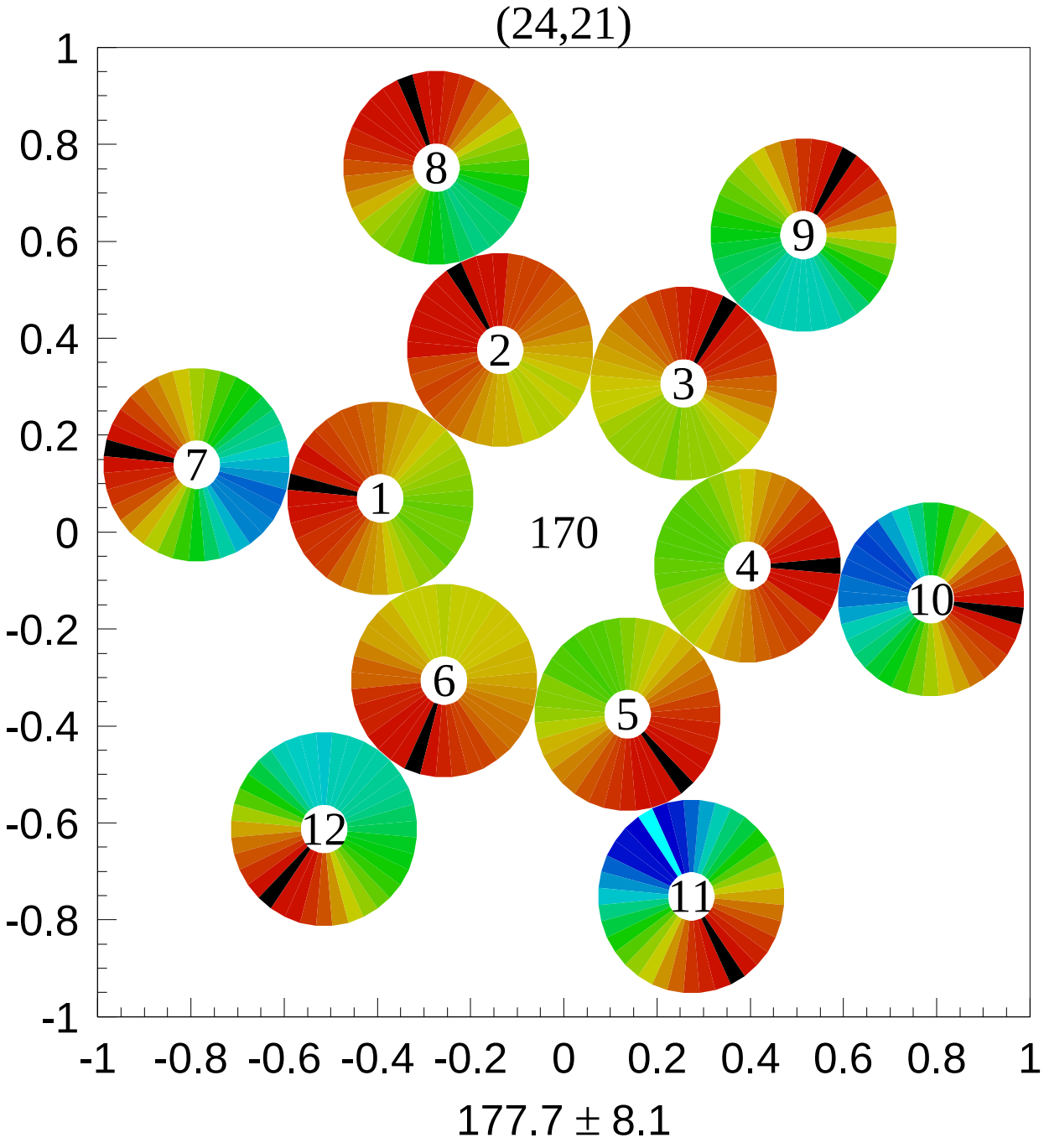

(24,19)
tilted LEDs
123 115 113 129 116 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 129 123 120 124 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

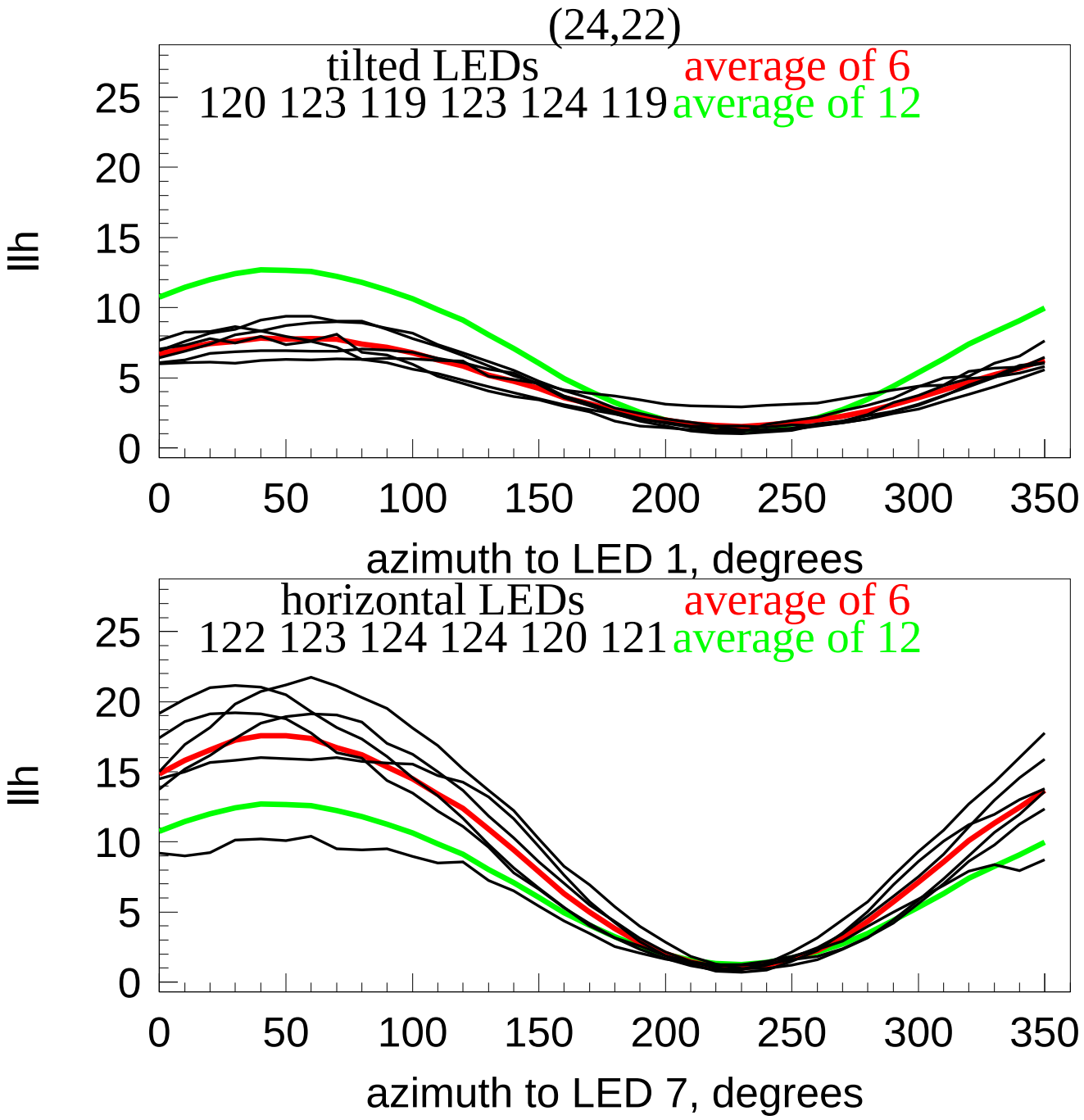

(24,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
79.8 ± 9.2

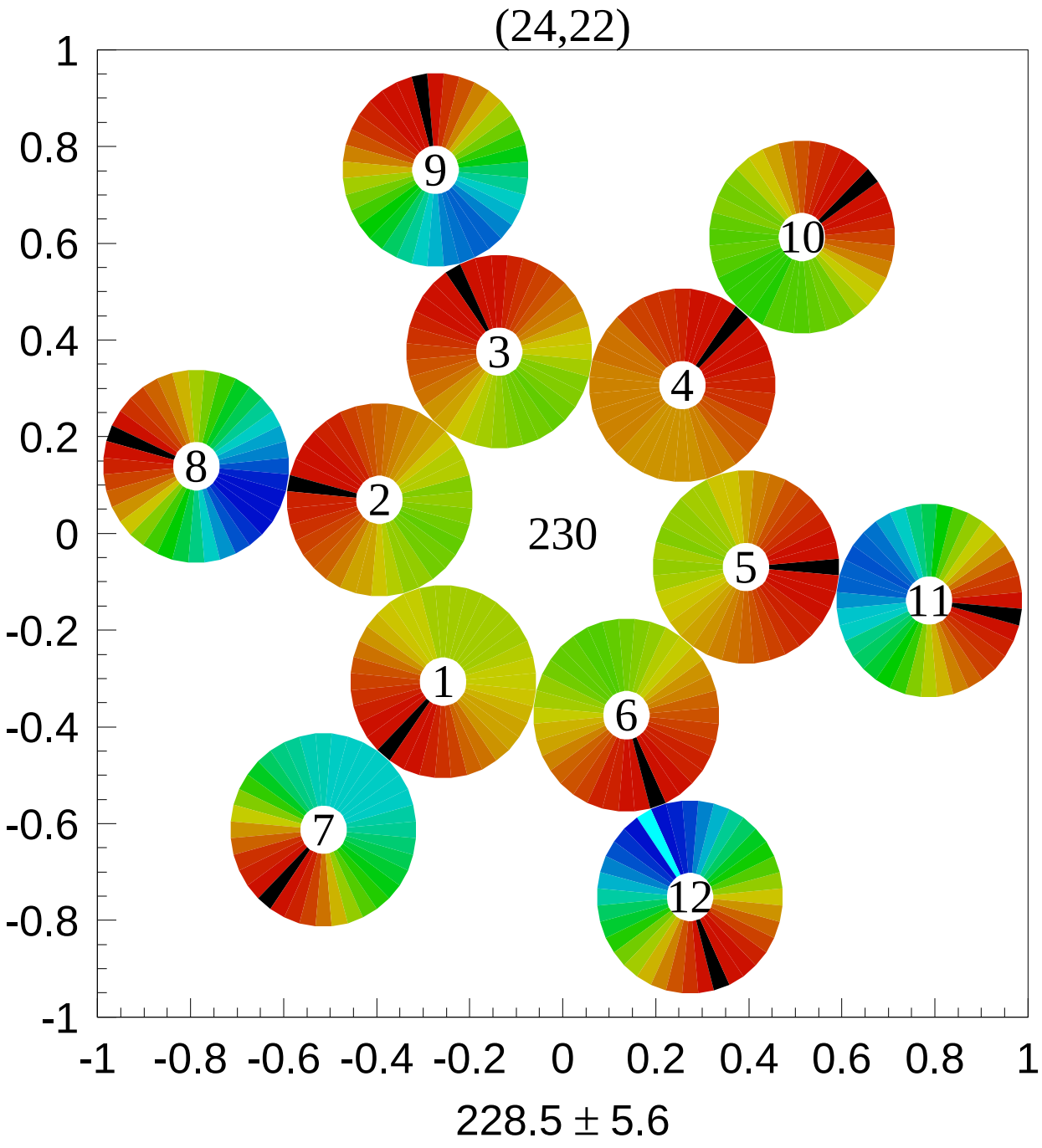

(24,20)
tilted LEDs
113 122 119 120 123 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 123 113 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

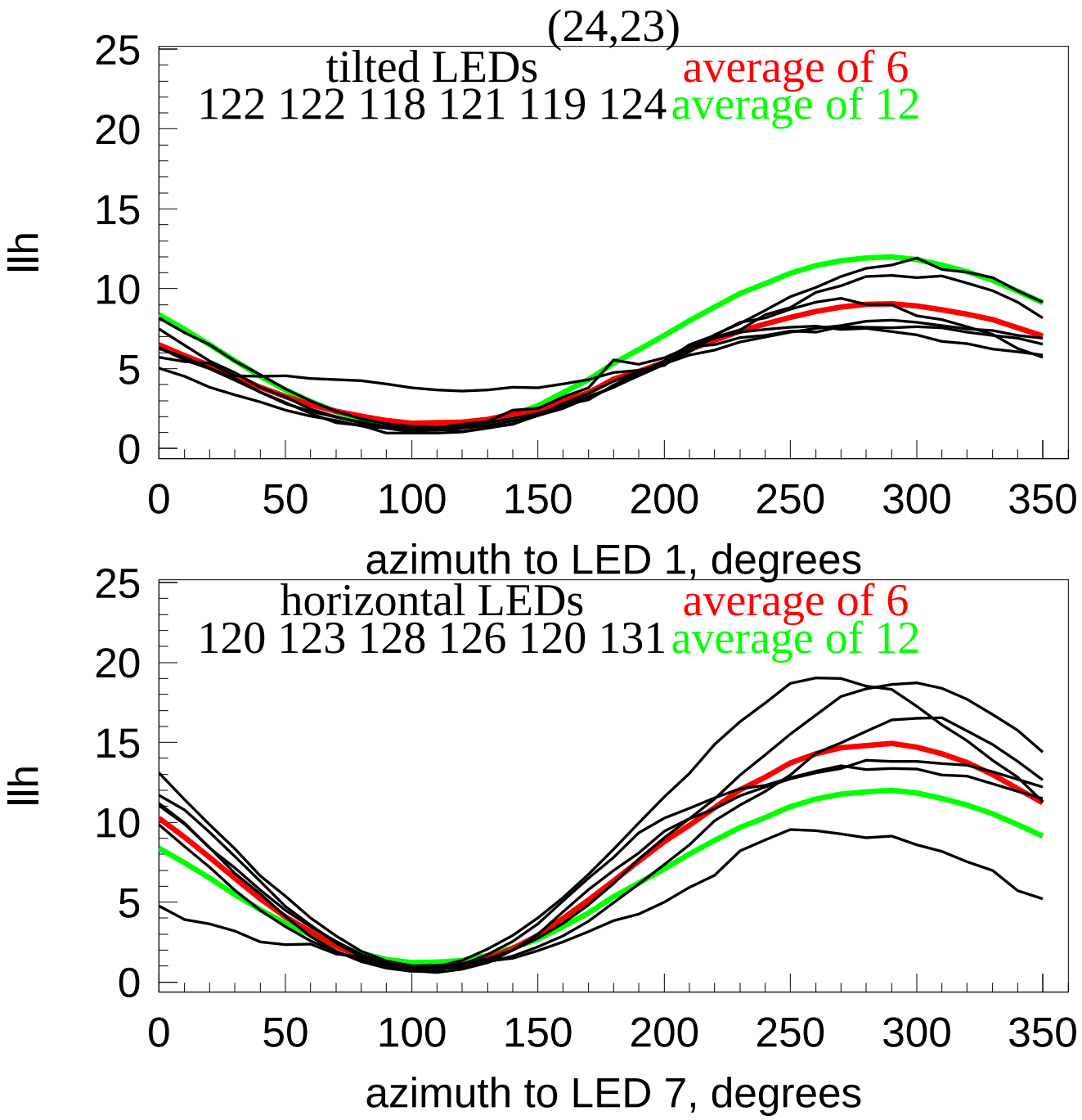

(24,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
225.2 ± 6.5

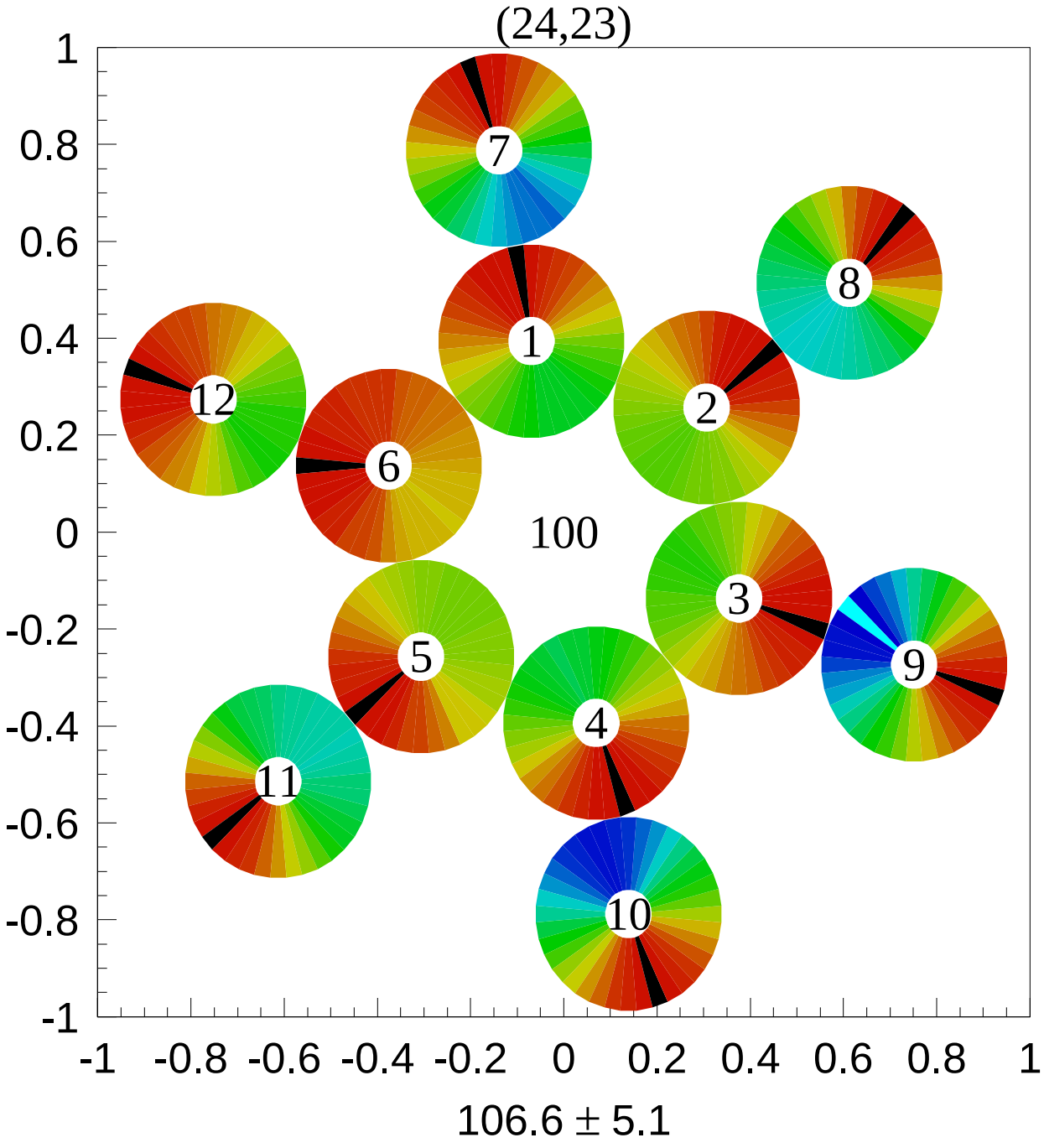

(24,21)
tilted LEDs
115 125 117 119 124 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 123 122 126 127 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

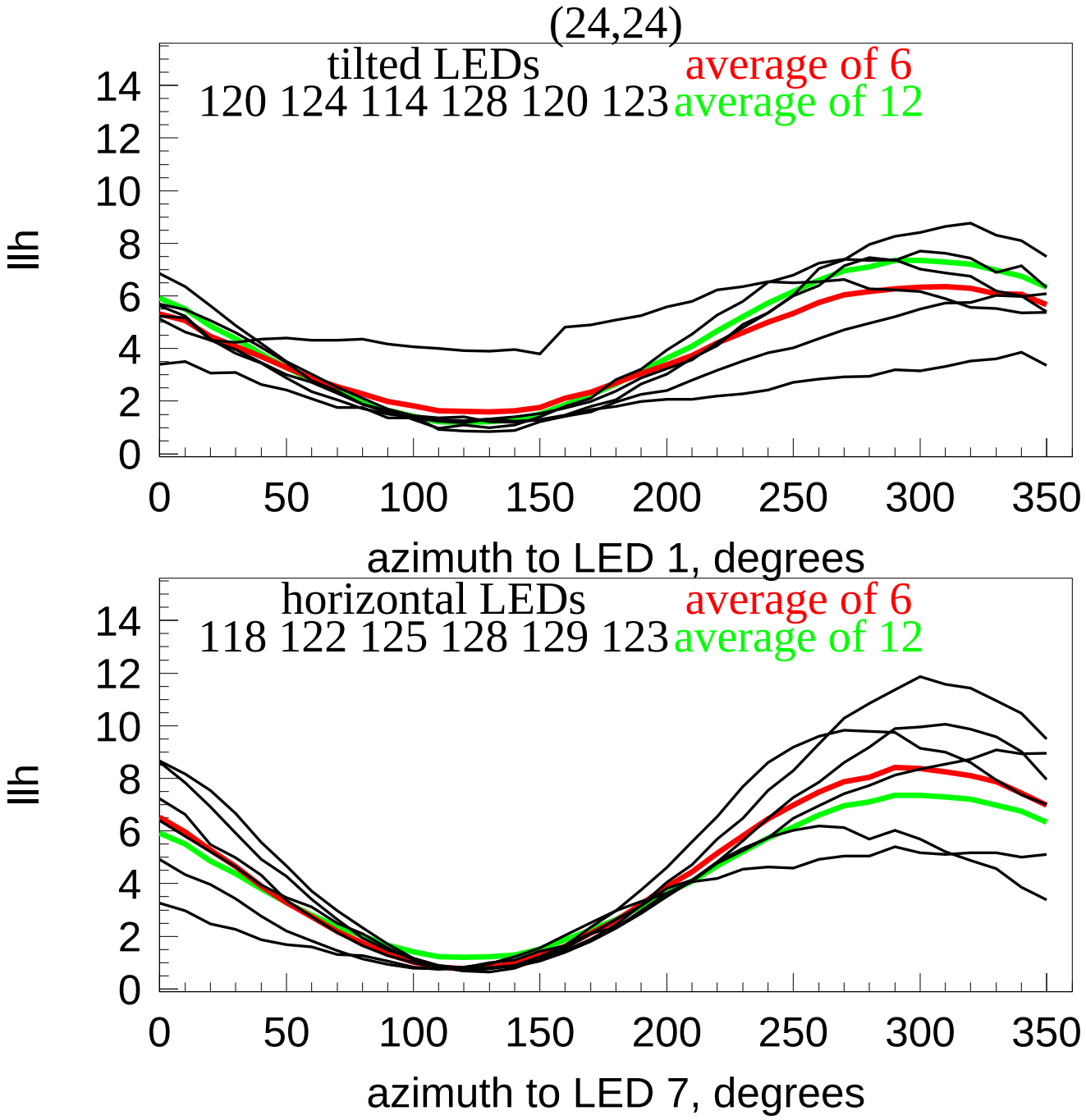

(24,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
177.7 ± 8.1

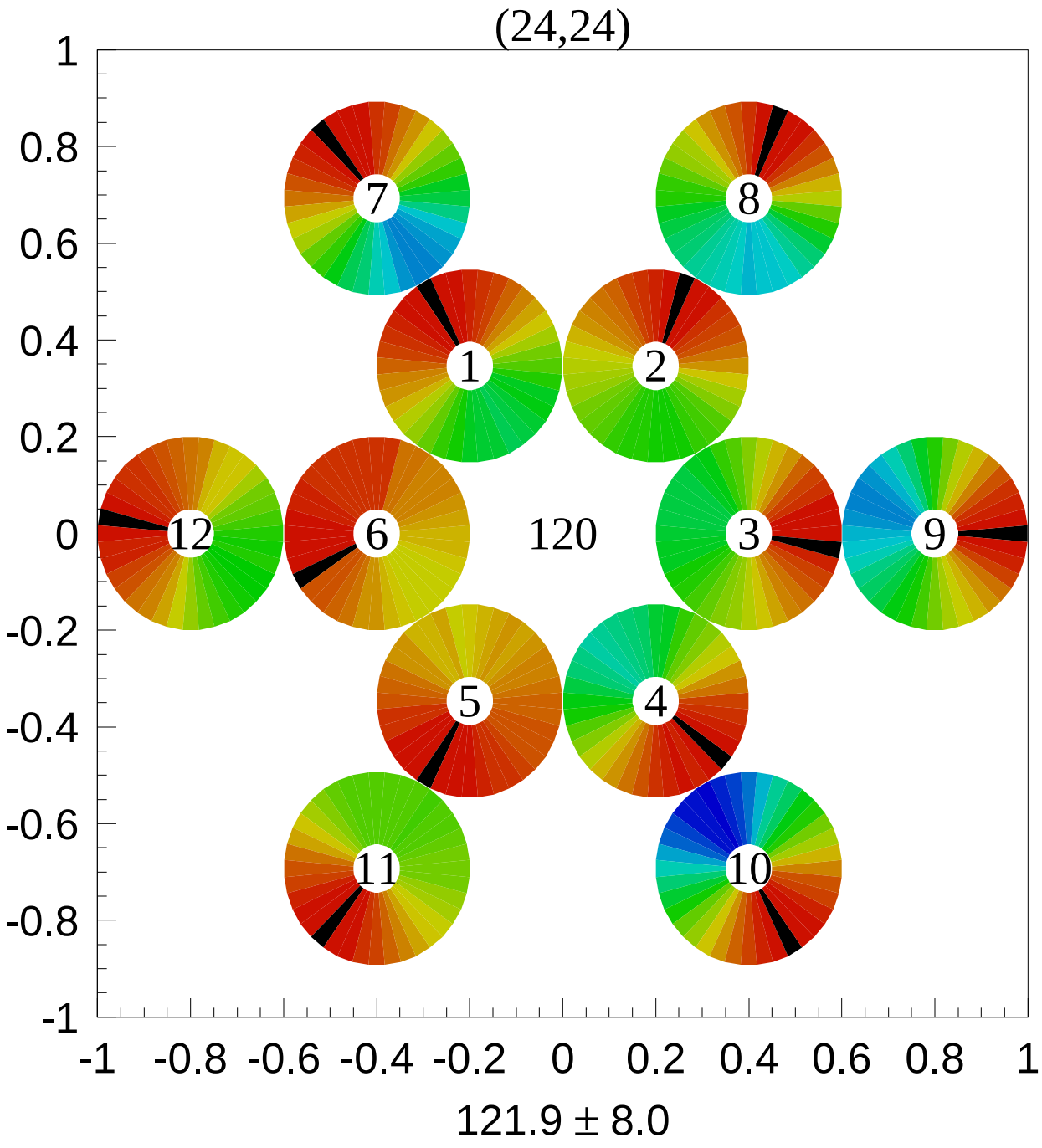

(24,22)
tilted LEDs
120 123 119 123 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 124 124 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

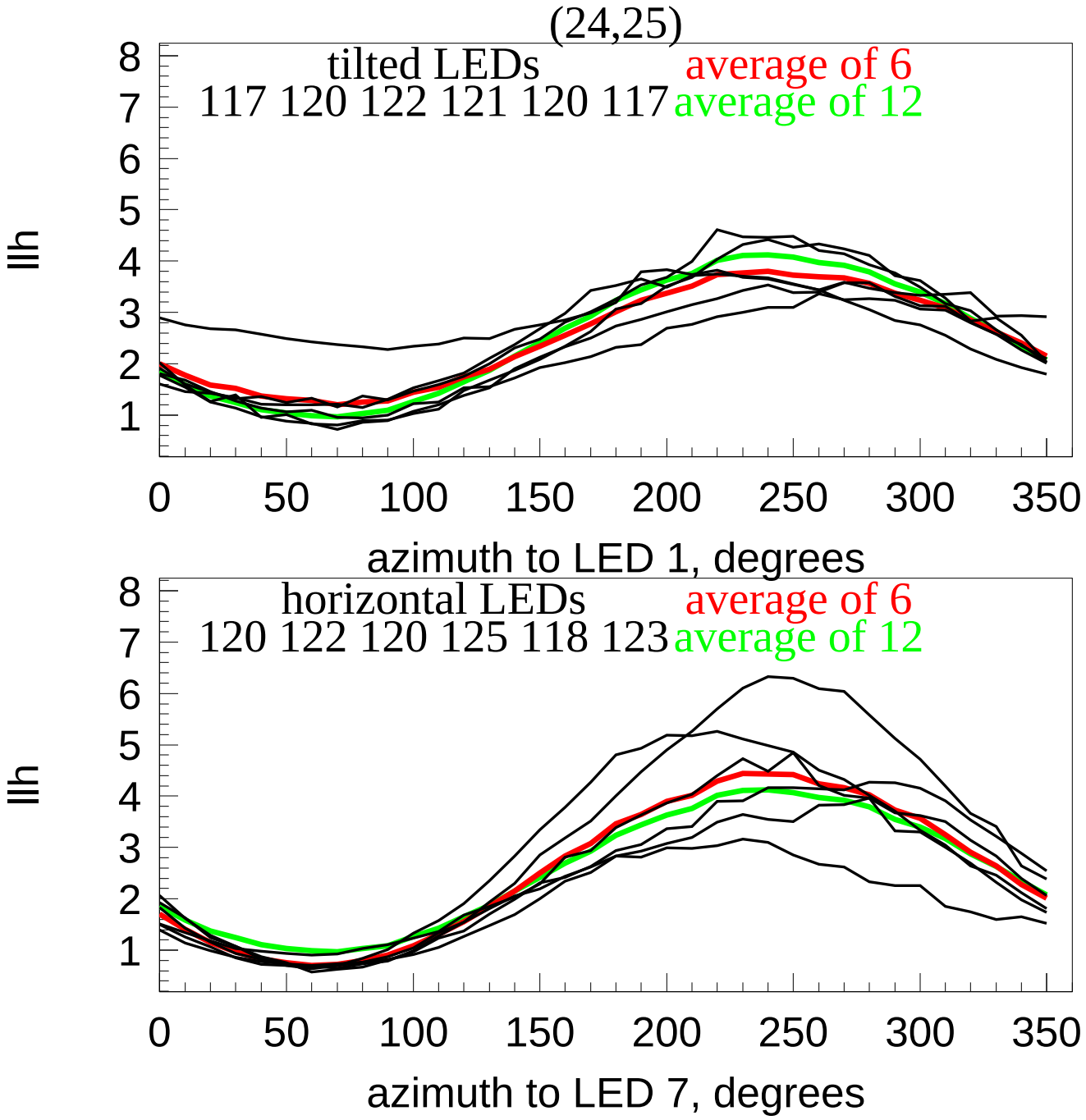

(24,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
228.5 ± 5.6

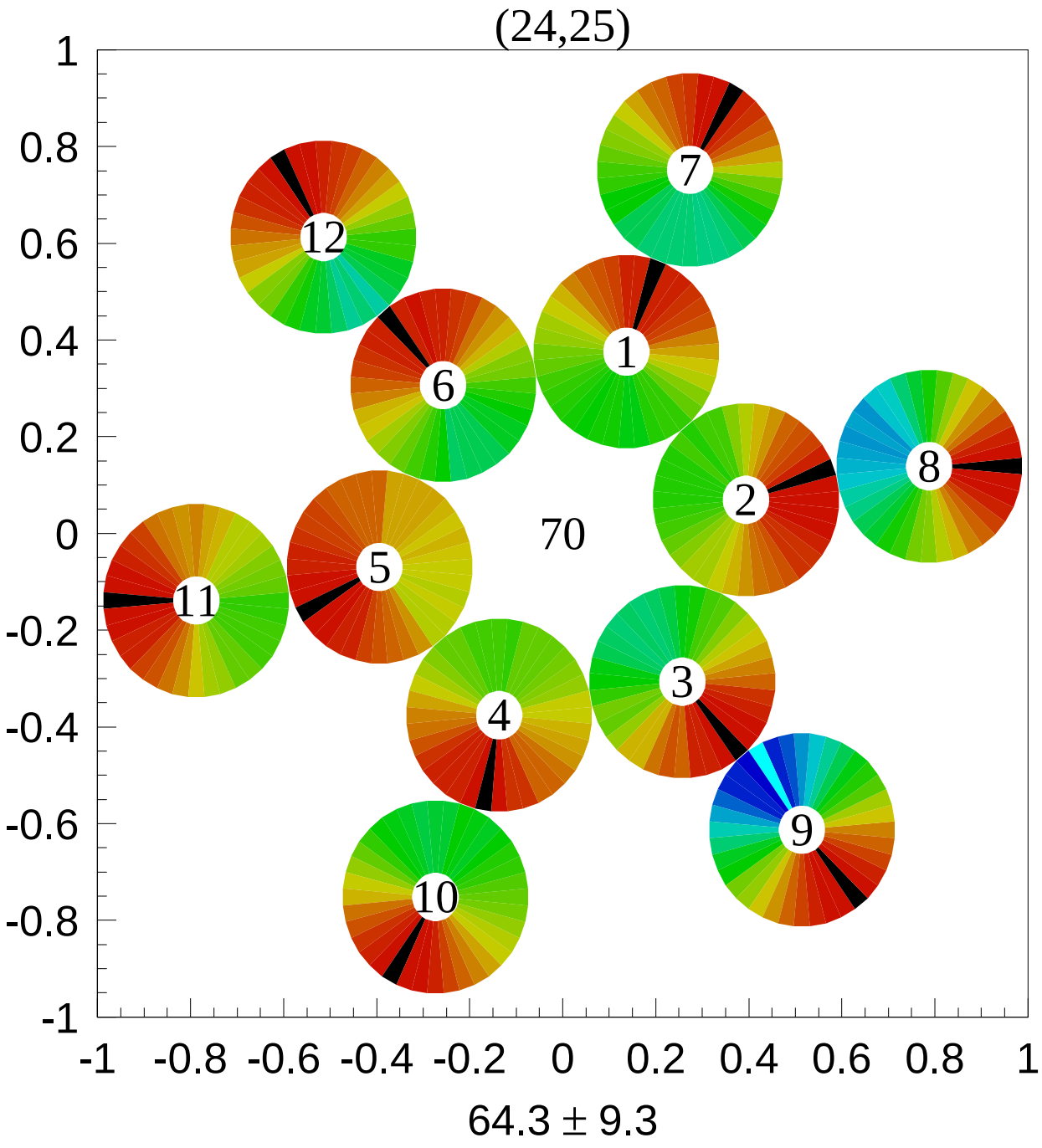

(24,23)
tilted LEDs
122 122 118 121 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 123 128 126 120 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

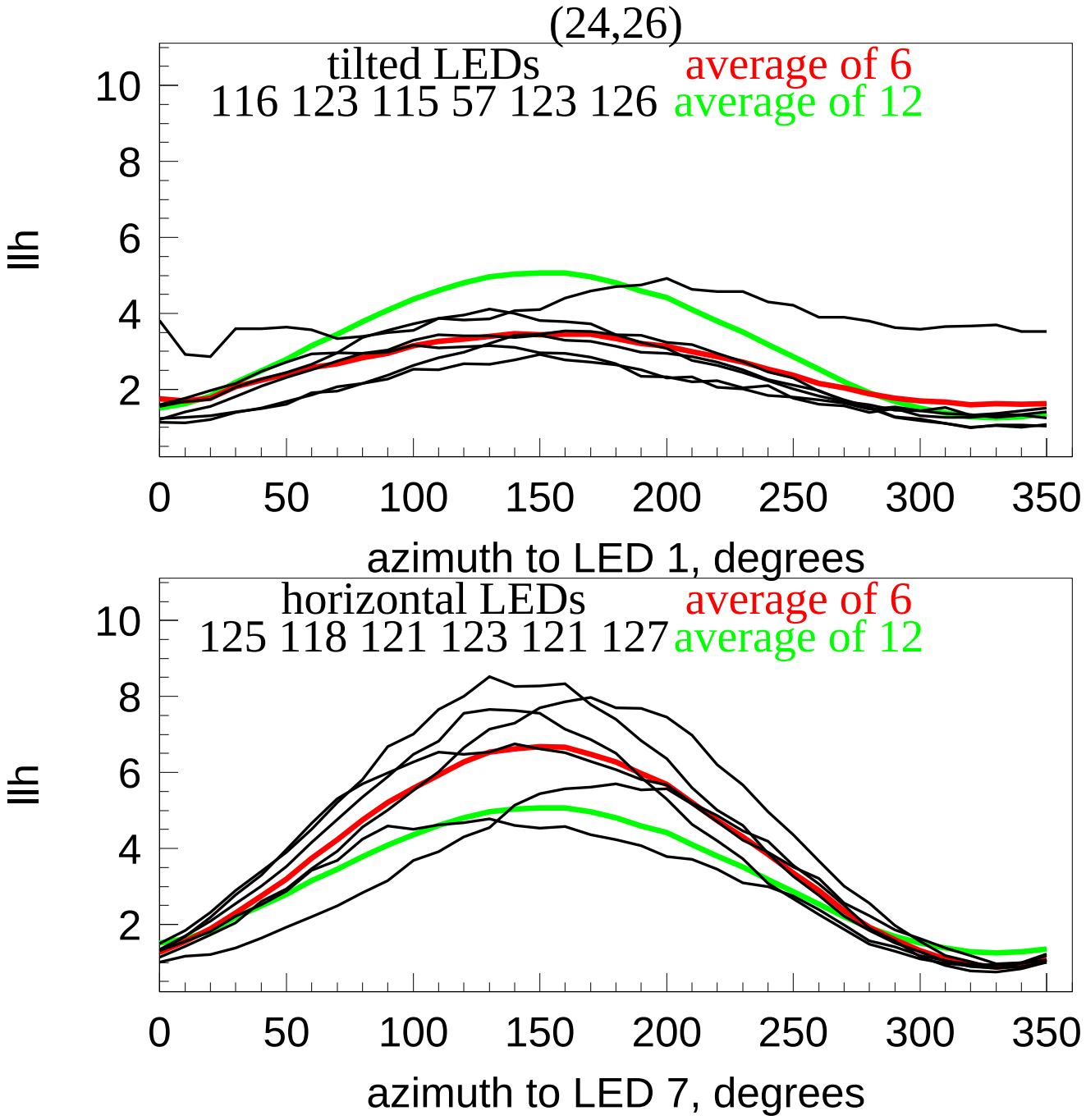

(24,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
106.6 ± 5.1

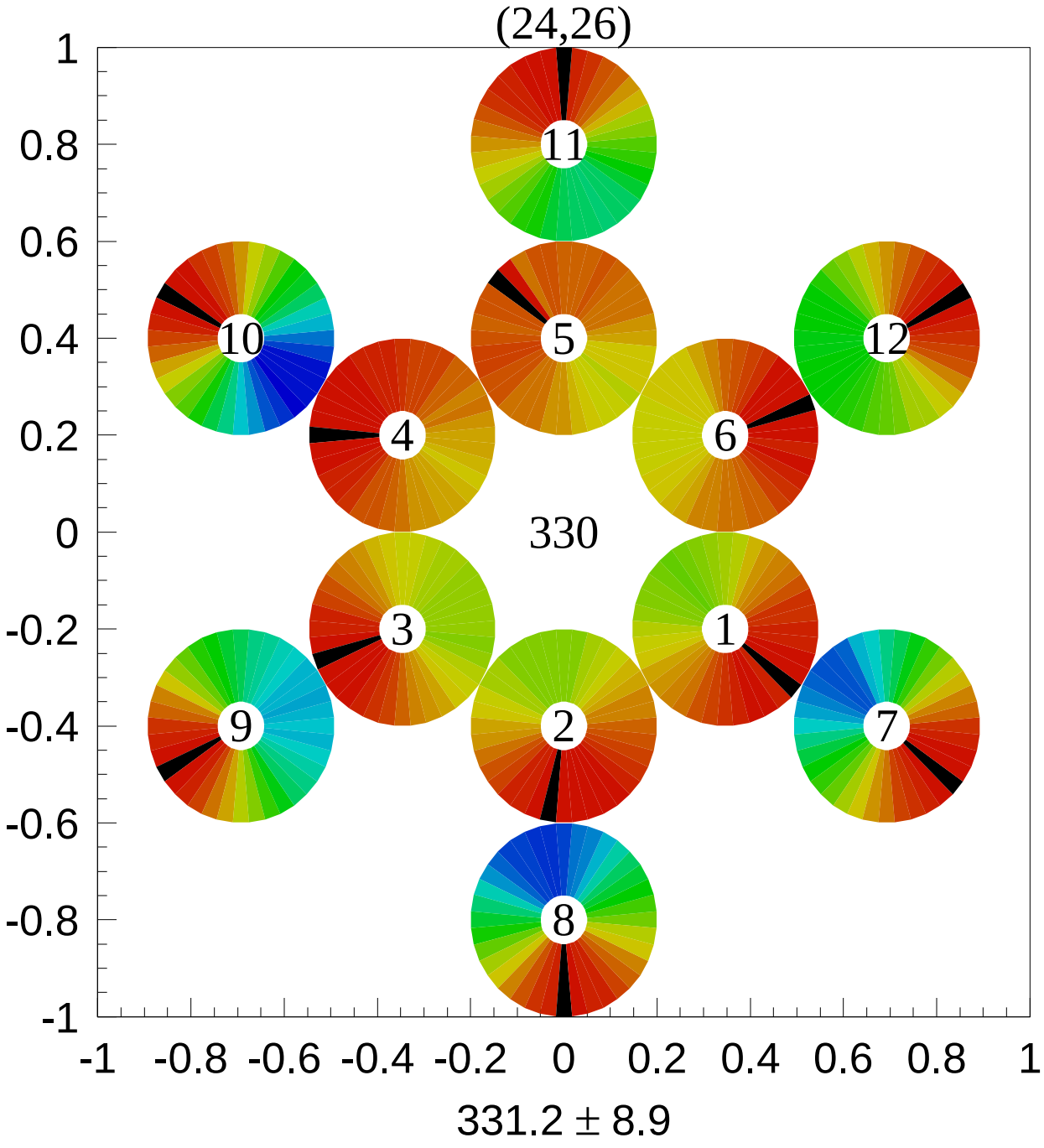

(24,24)
tilted LEDs
120 124 114 128 120 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 122 125 128 129 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

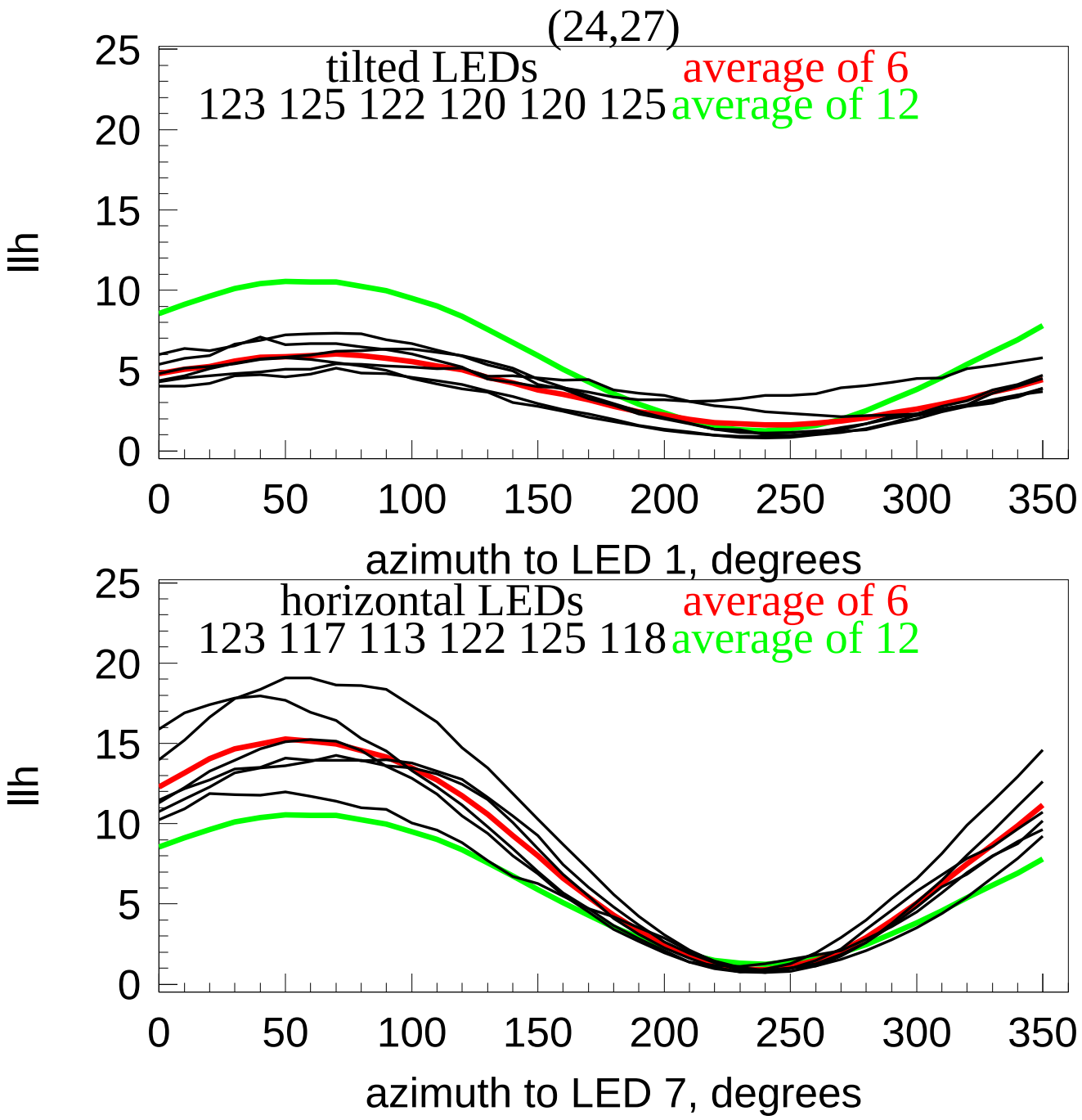

(24,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
121.9 ± 8.0

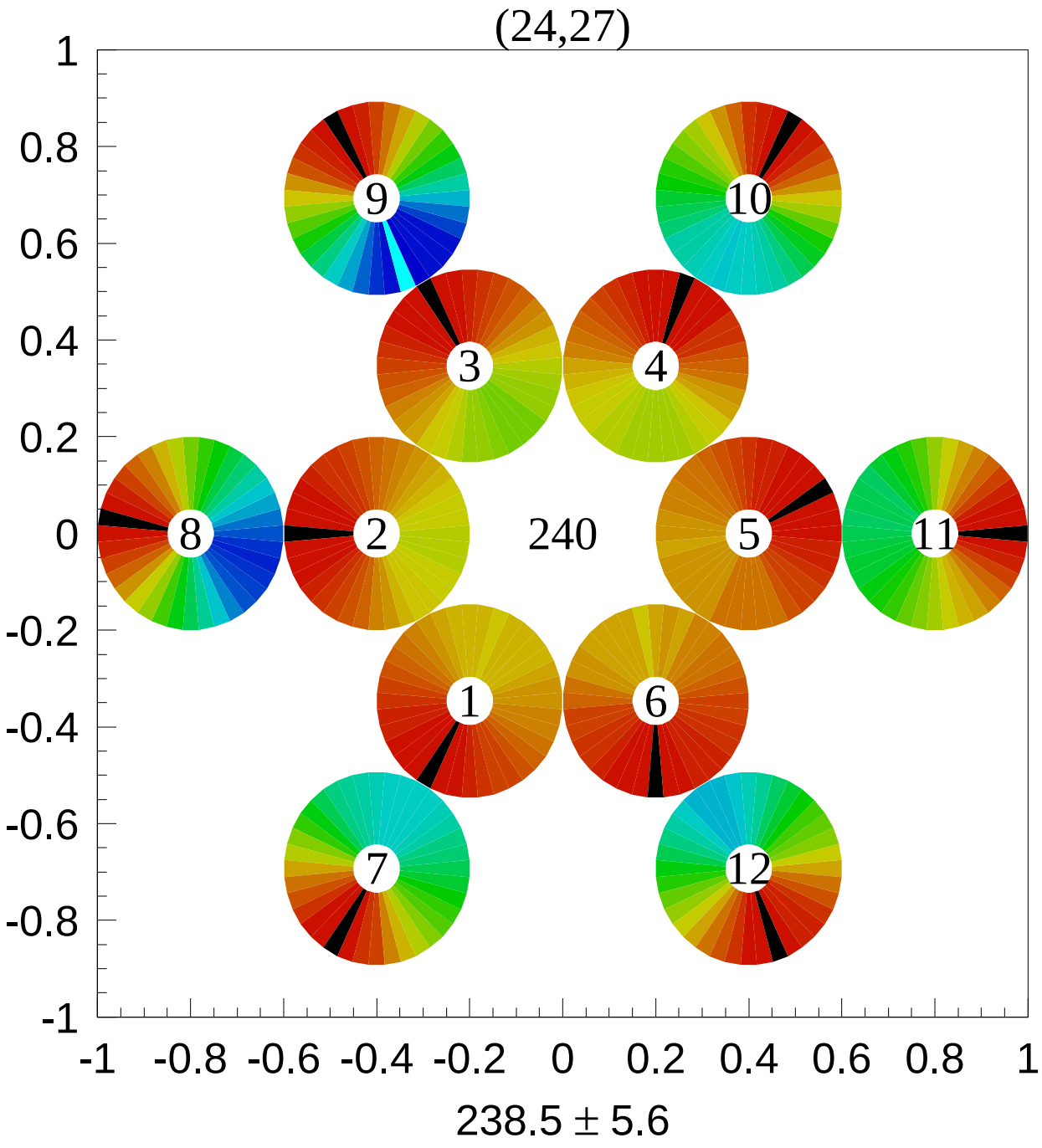

(24,25)
tilted LEDs
117 120 122 121 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 120 125 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

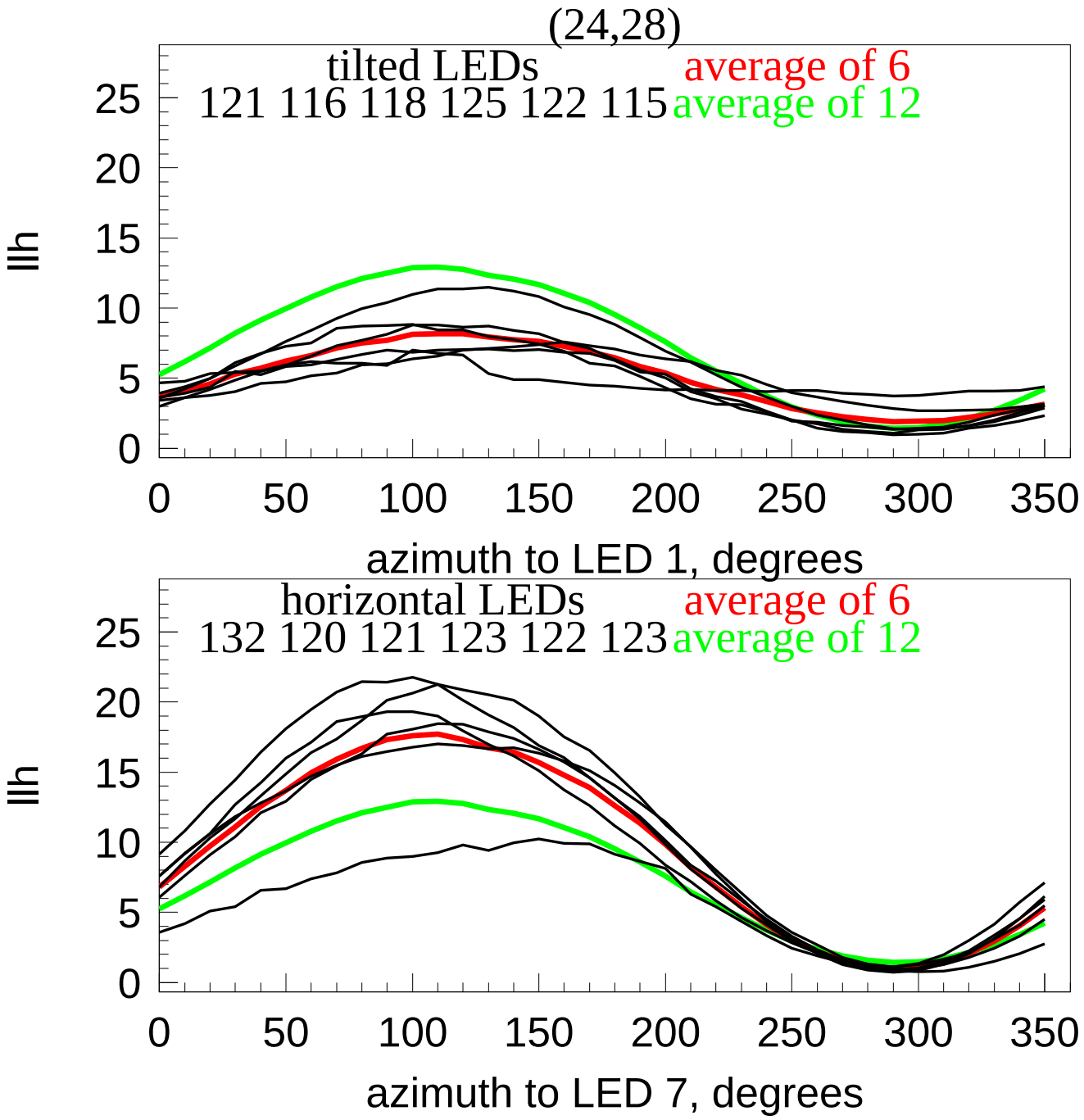

(24,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
70
1
2
3
4
5
6
7
8
9
10
11
12
64.3 ± 9.3

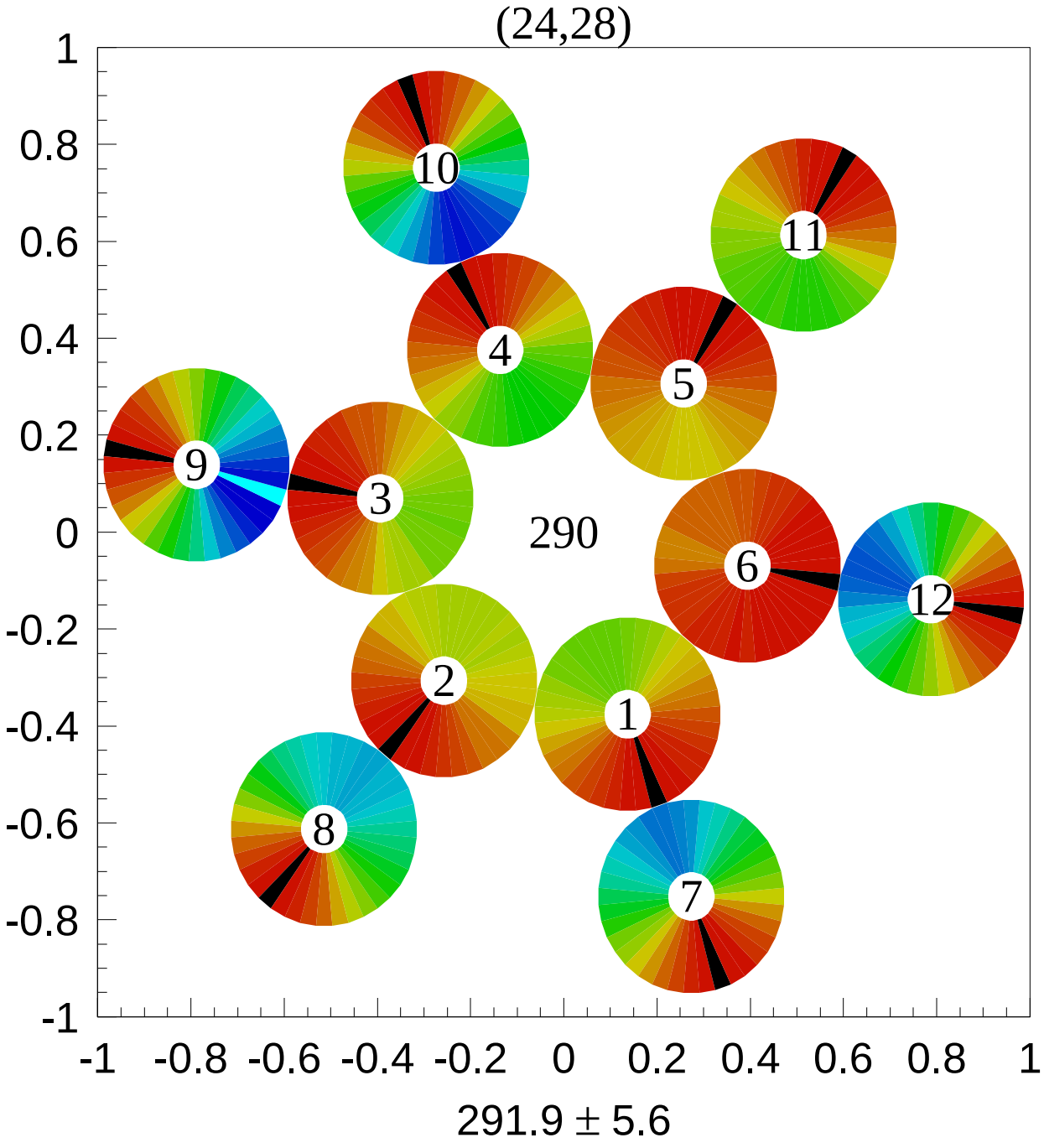

(24,26)
tilted LEDs
116 123 115 57 123 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 118 121 123 121 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

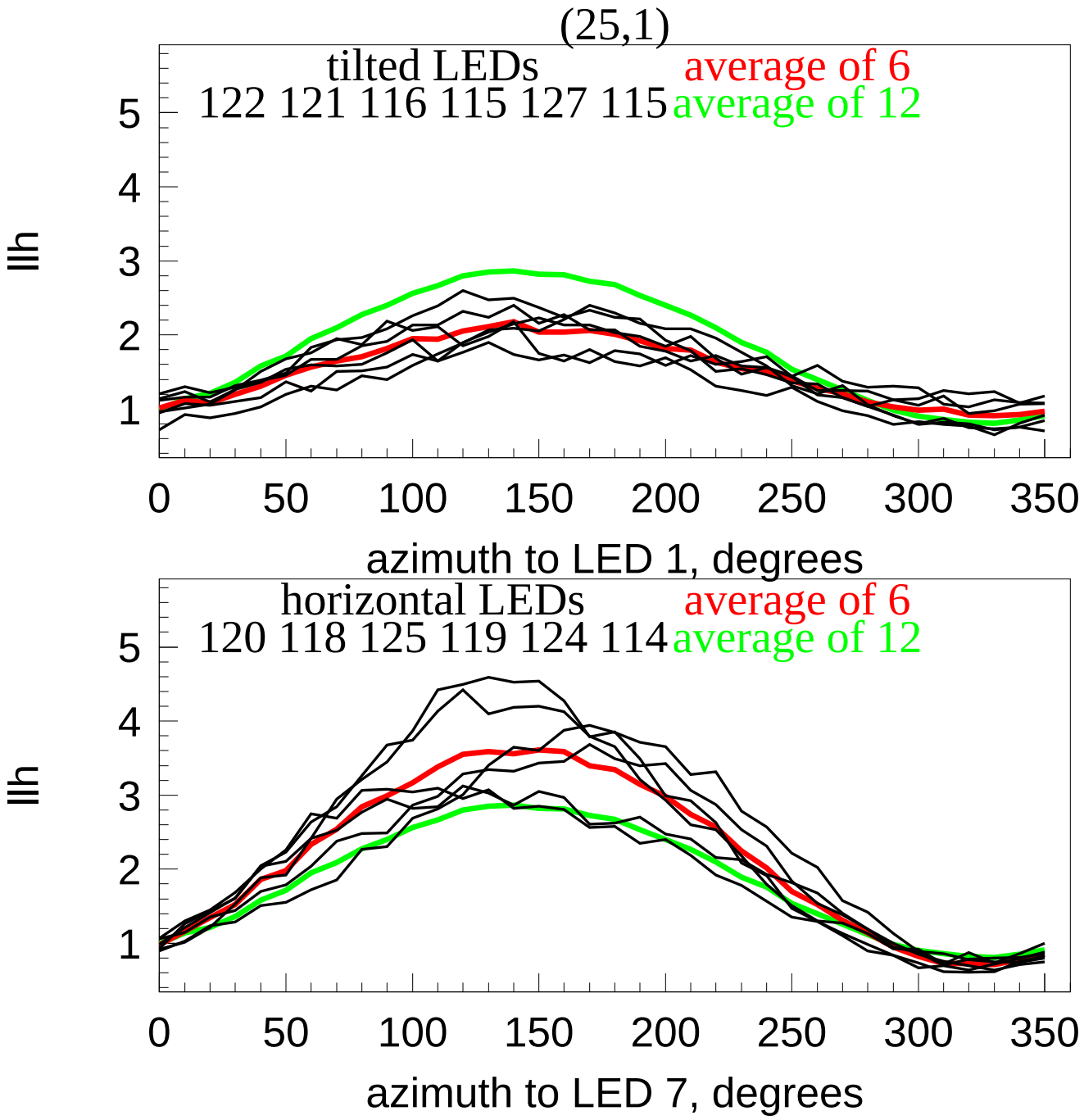

(24,26)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
331.2 ± 8.9

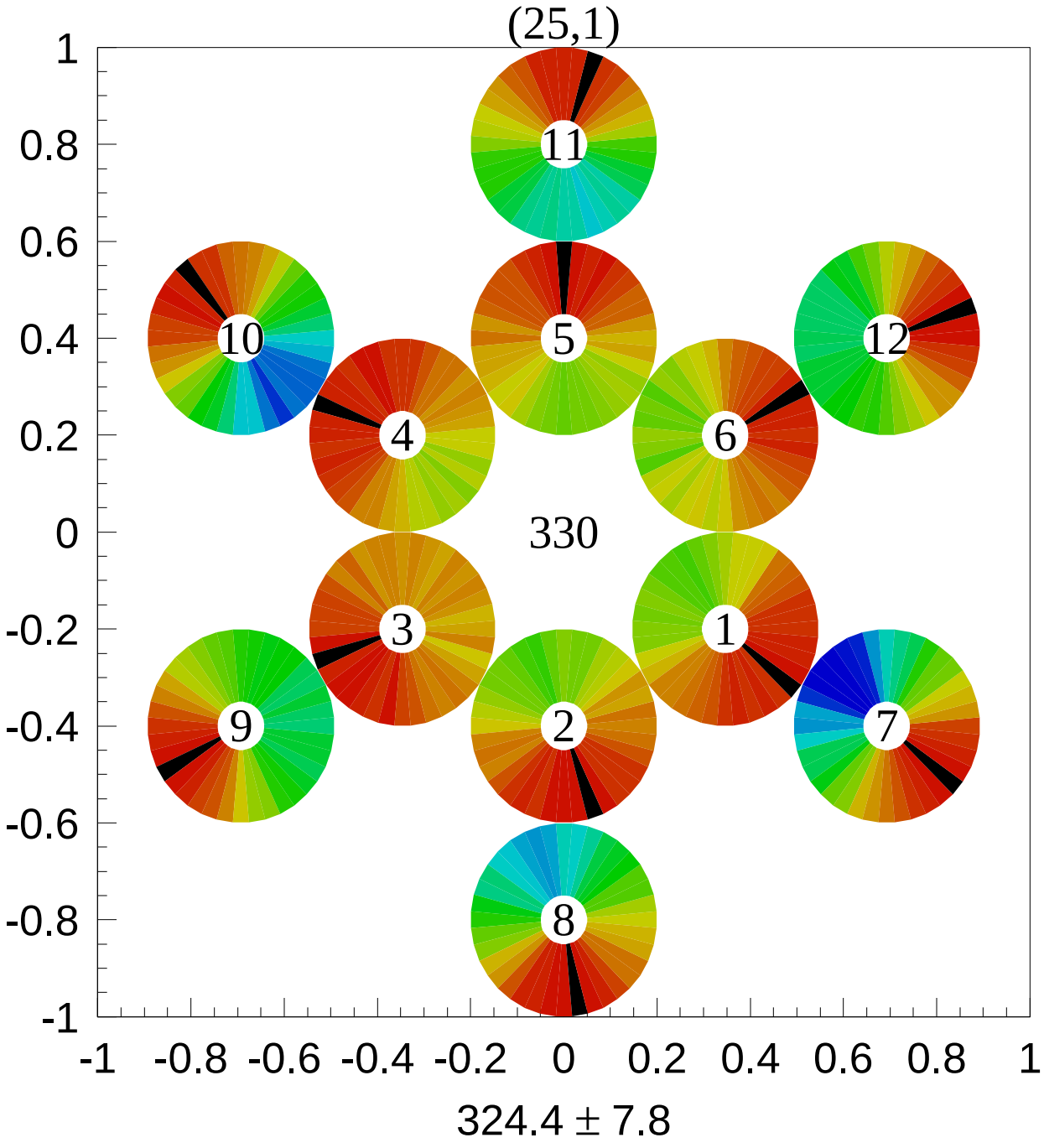

(24,27)
tilted LEDs
123 125 122 120 120 125
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 117 113 122 125 118
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

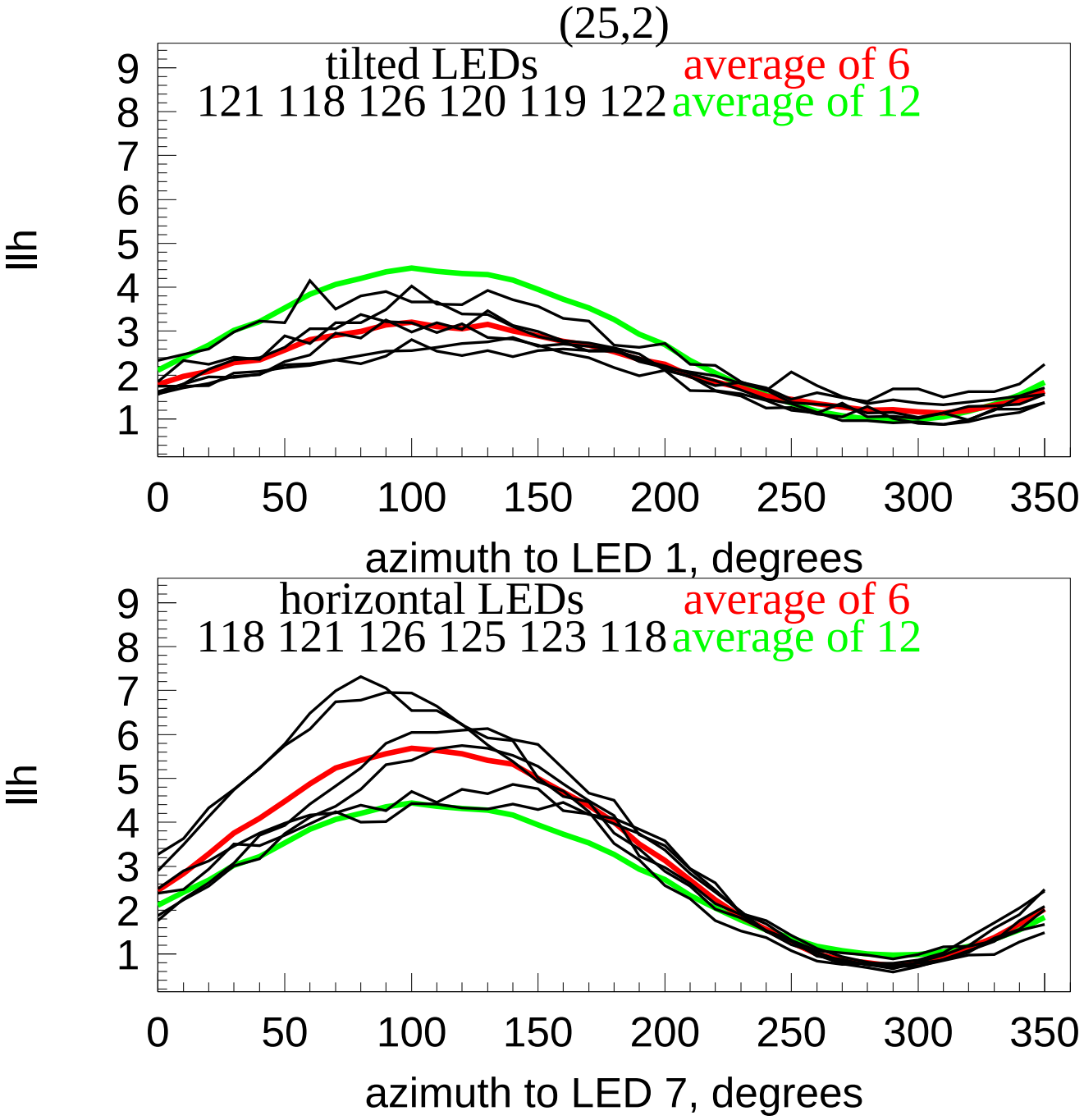

(24,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
238.5 ± 5.6

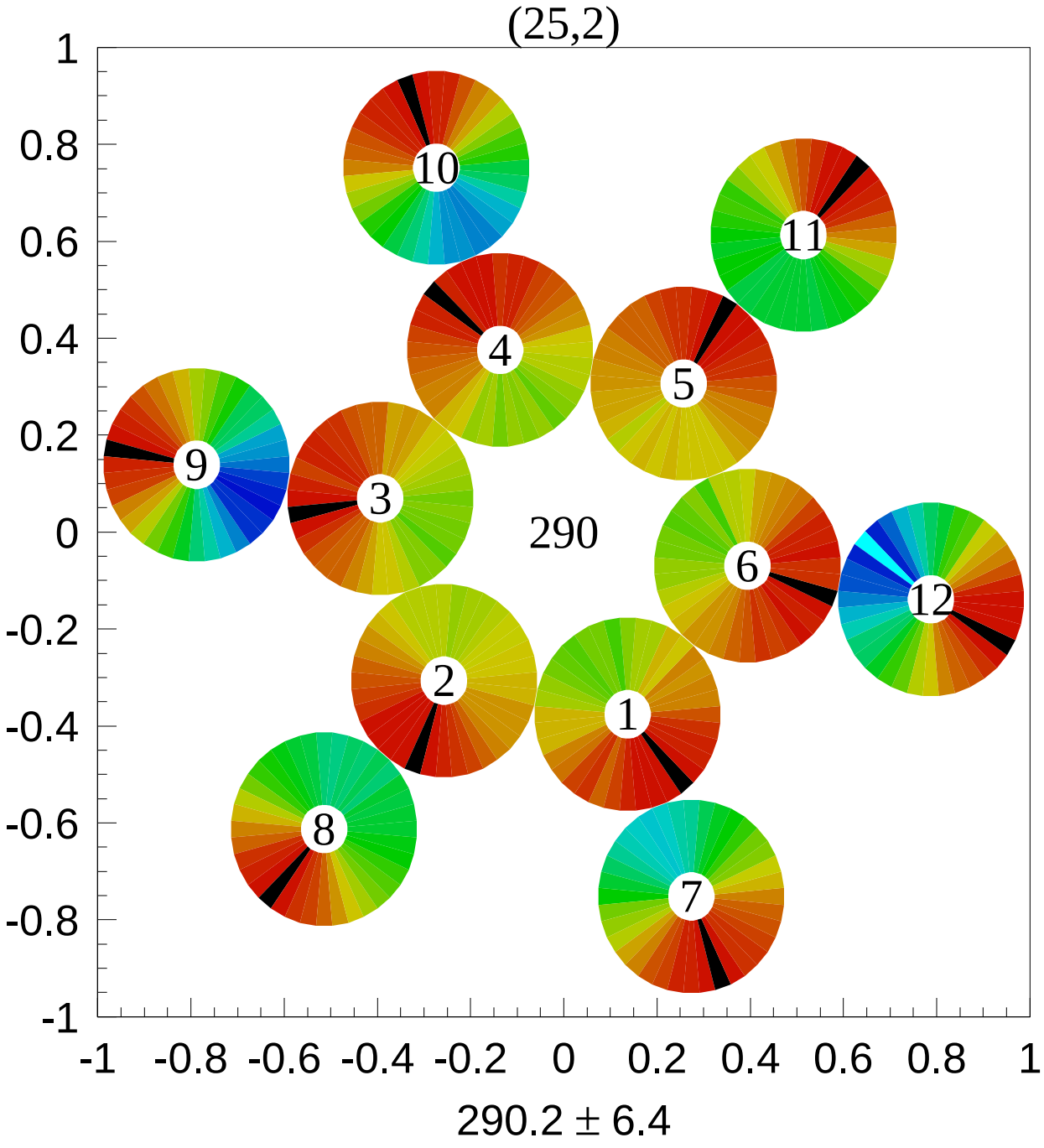

(24,28)
tilted LEDs
121 116 118 125 122 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
132 120 121 123 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

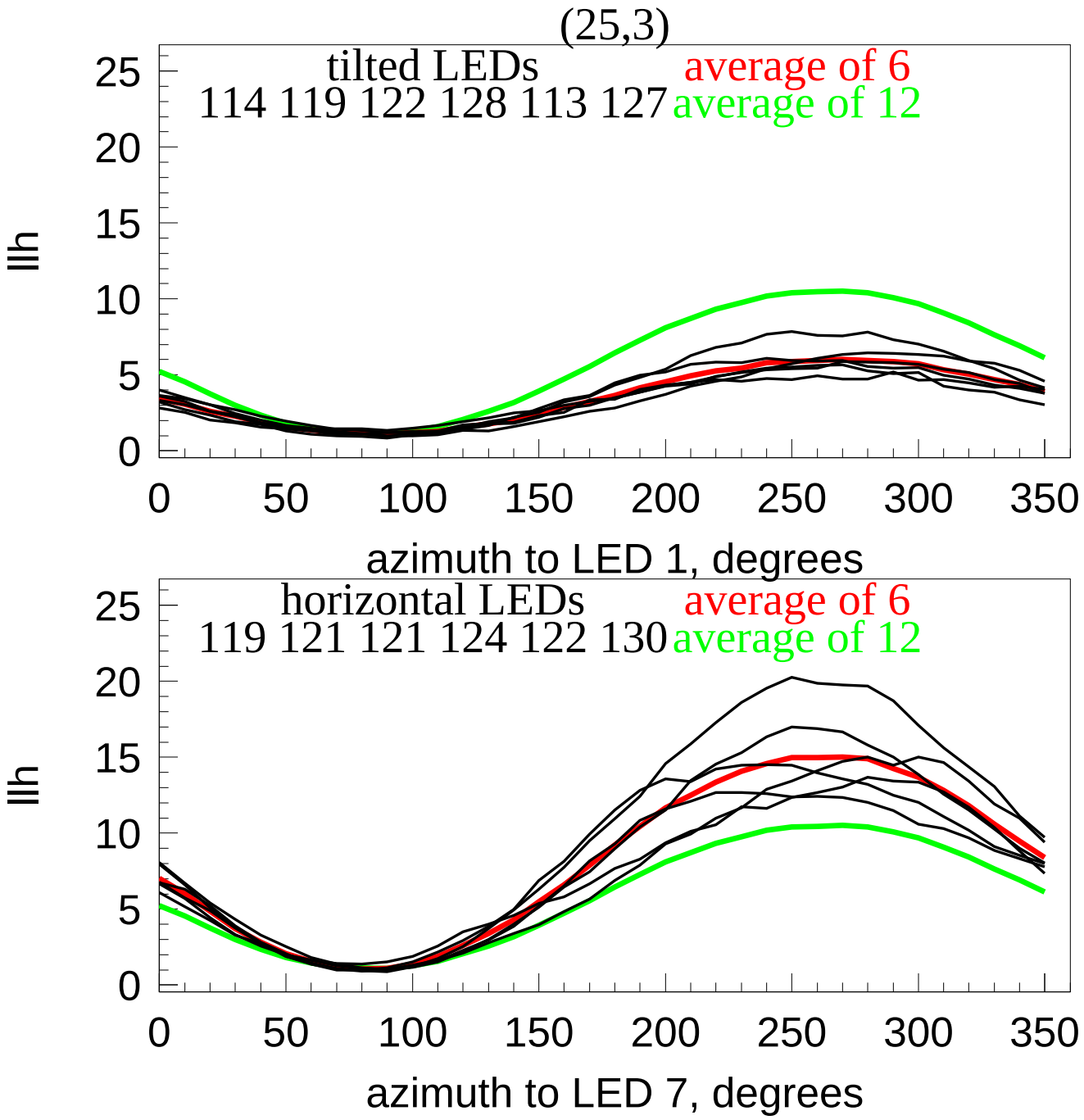

(24,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
291.9 ± 5.6

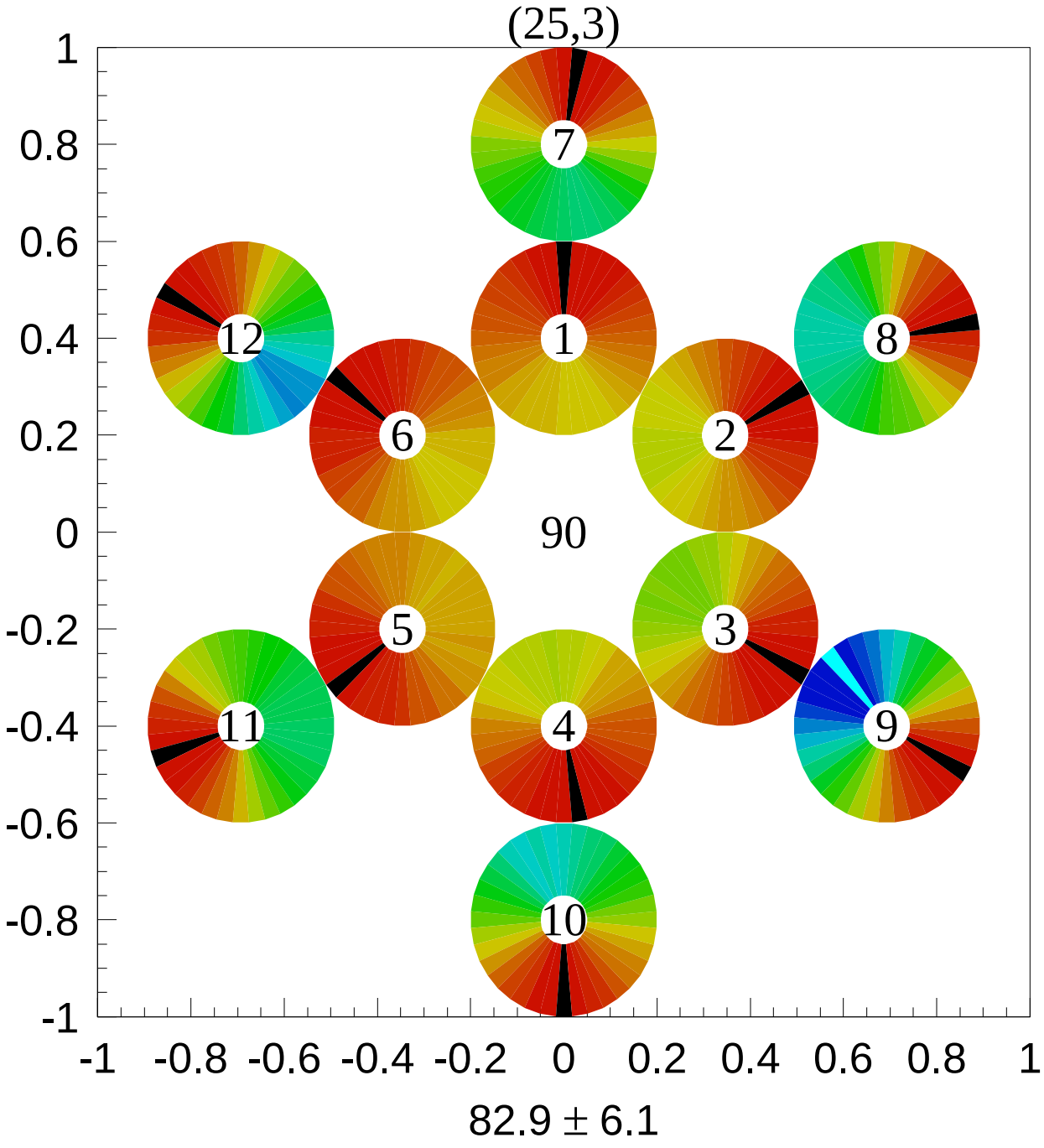

(25,1)
tilted LEDs
122 121 116 115 127 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 118 125 119 124 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

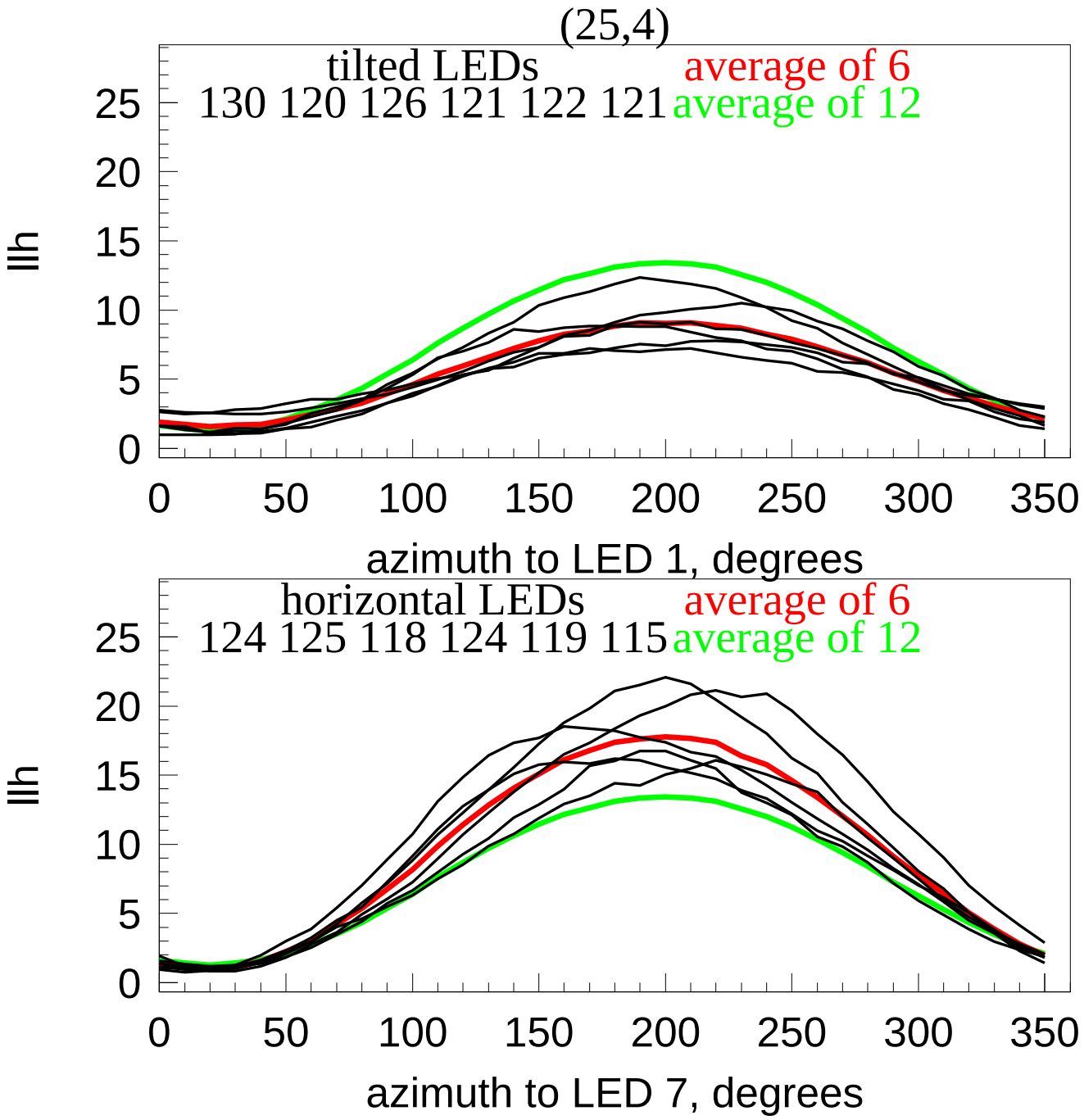

(25,1)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
324.4 ± 7.8

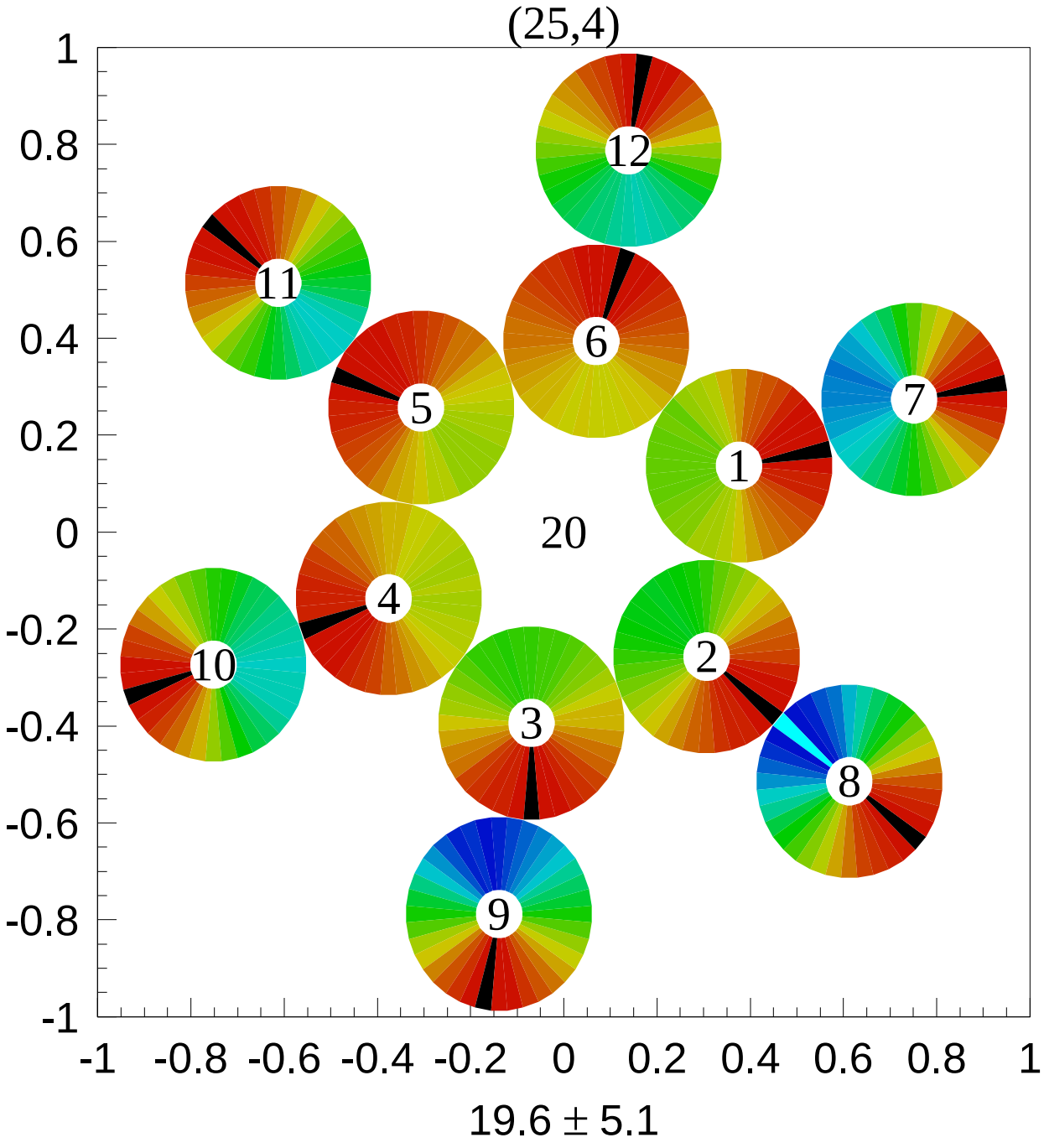

(25,2)
tilted LEDs
121 118 126 120 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 126 125 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

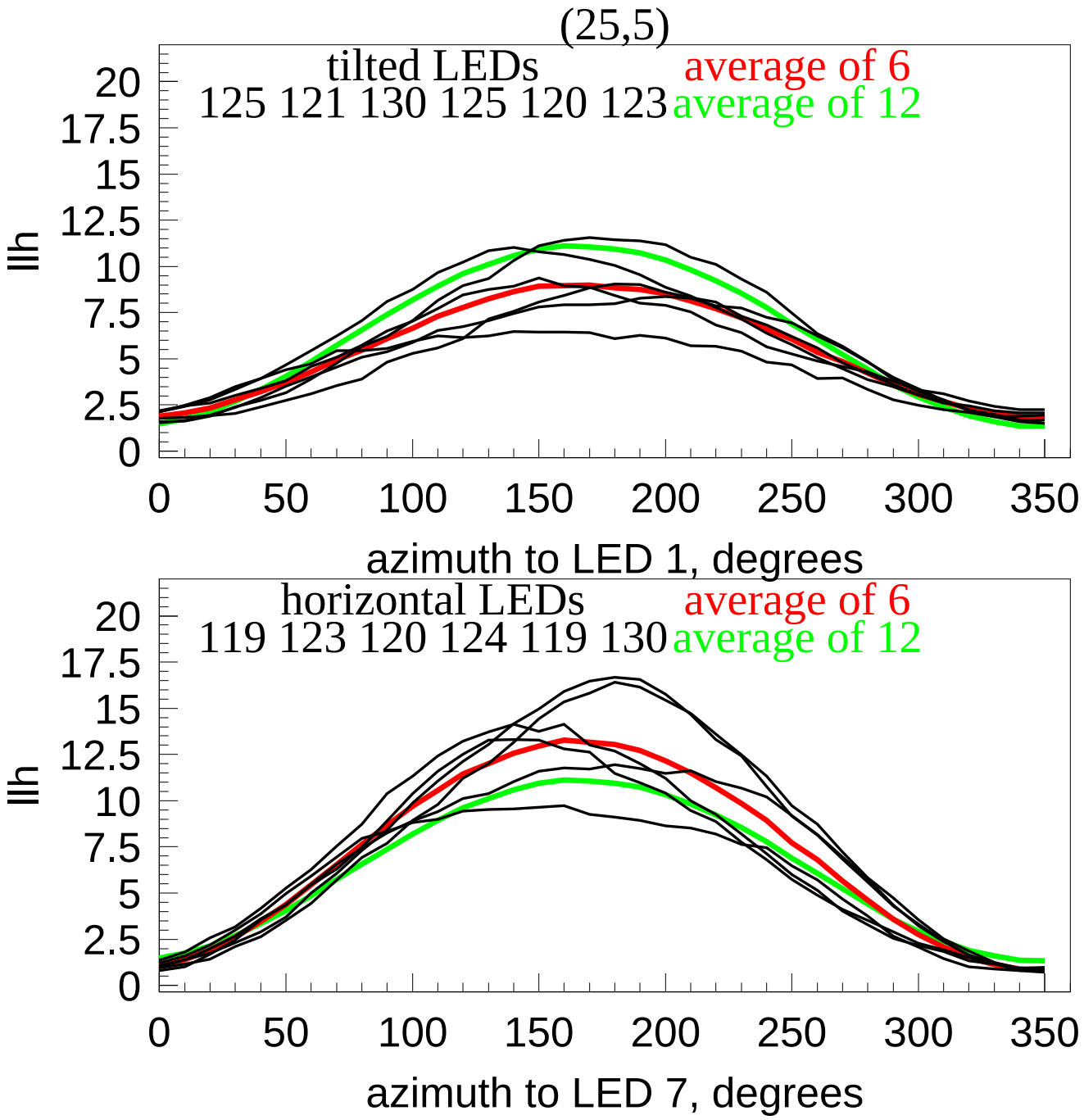

(25,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
290
290.2 ± 6.4
1
2
3
4
5
6
7
8
9
10
11
12

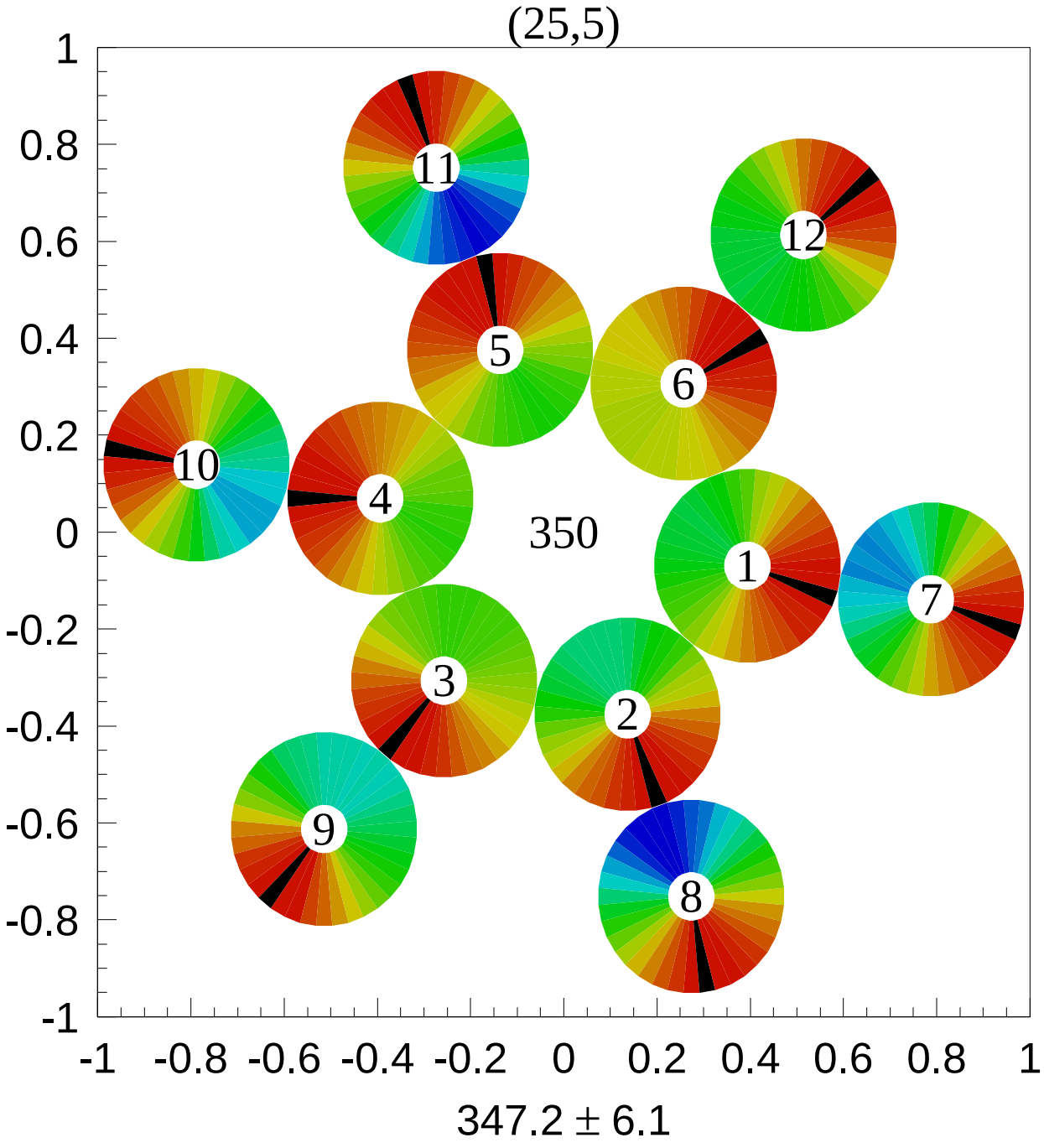

(25,3)
tilted LEDs
114 119 122 128 113 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 121 124 122 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

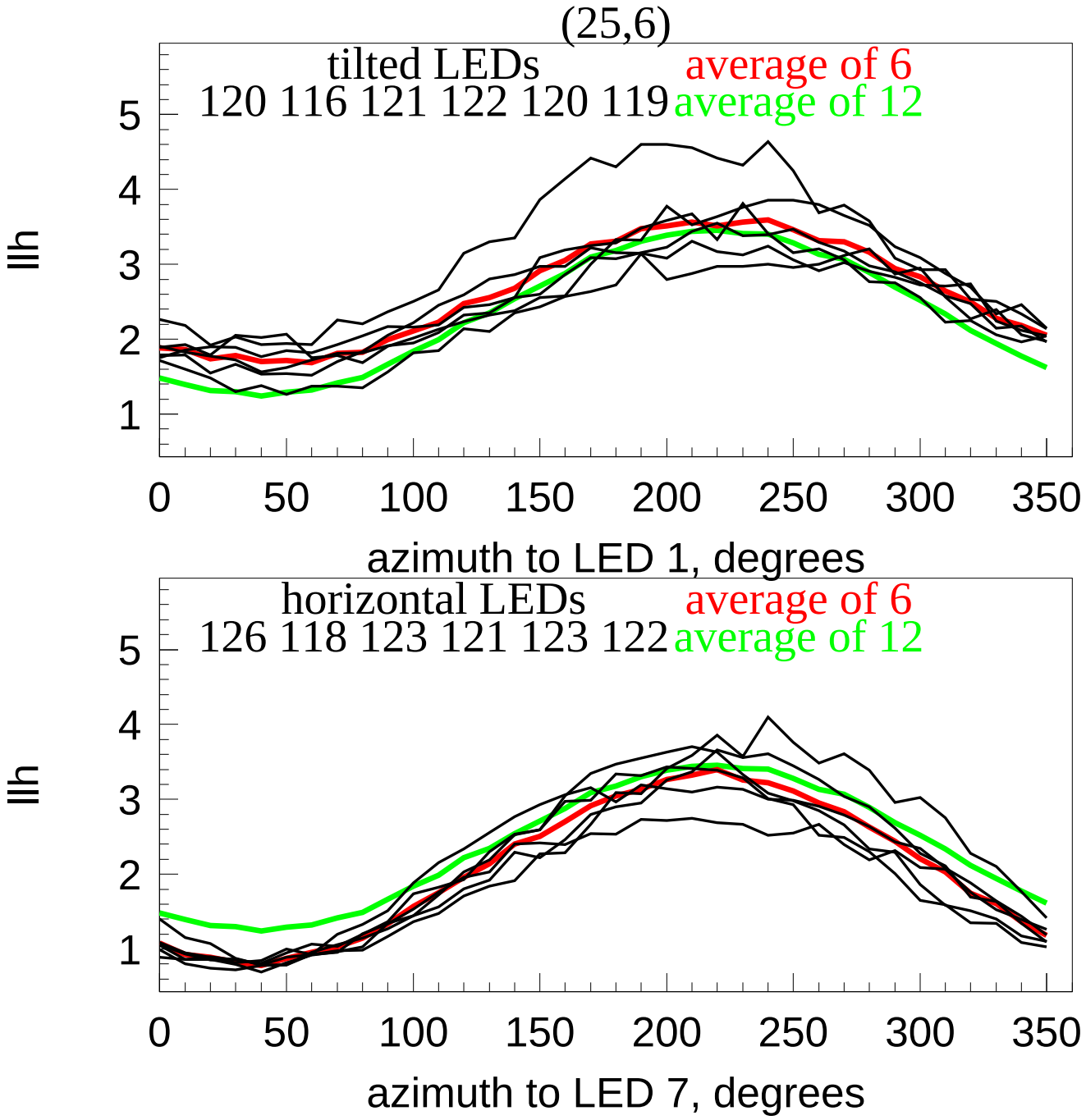

(25,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
82.9 ± 6.1

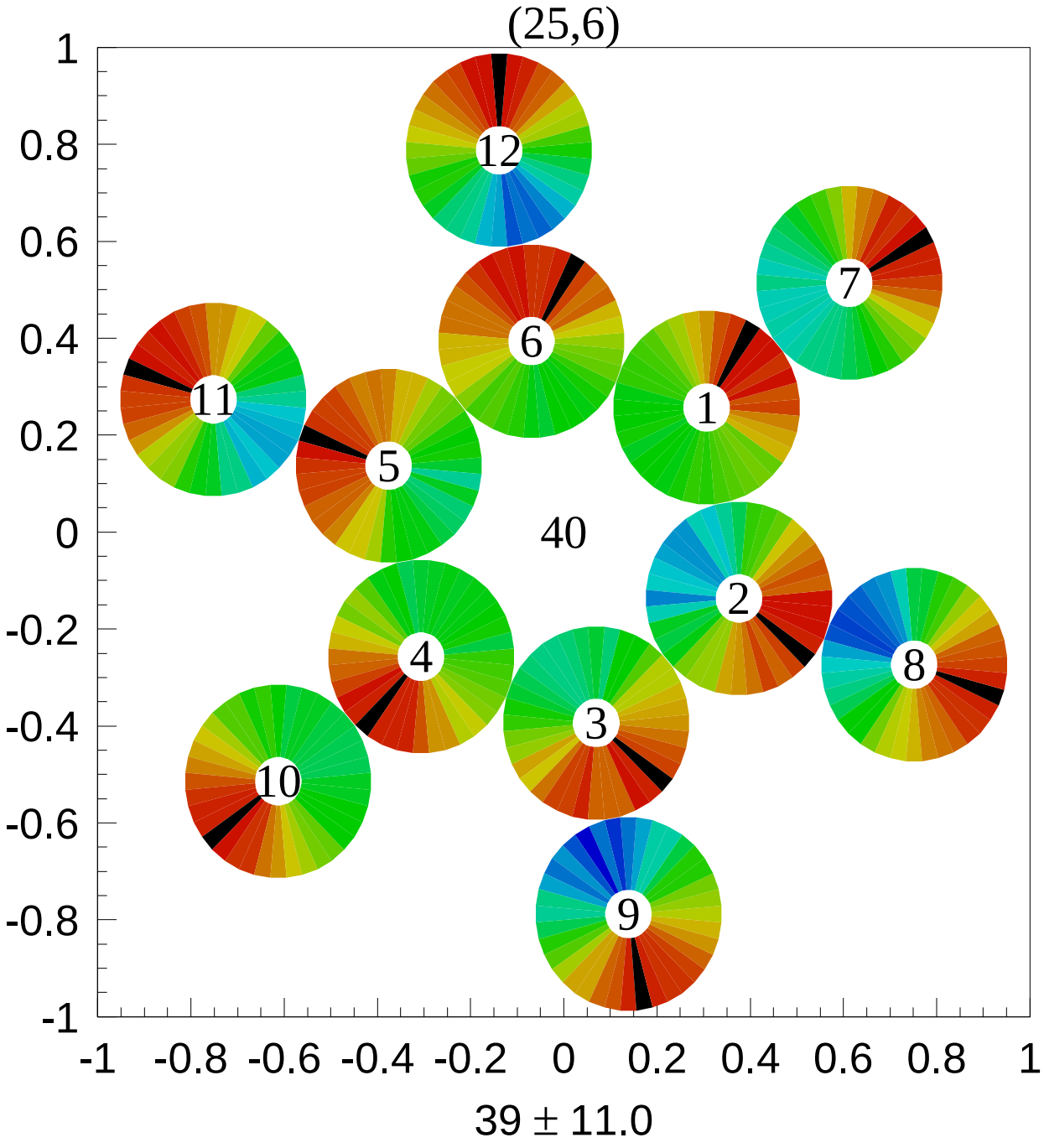

(25,4)
tilted LEDs
130 120 126 121 122 121
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 125 118 124 119 115
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

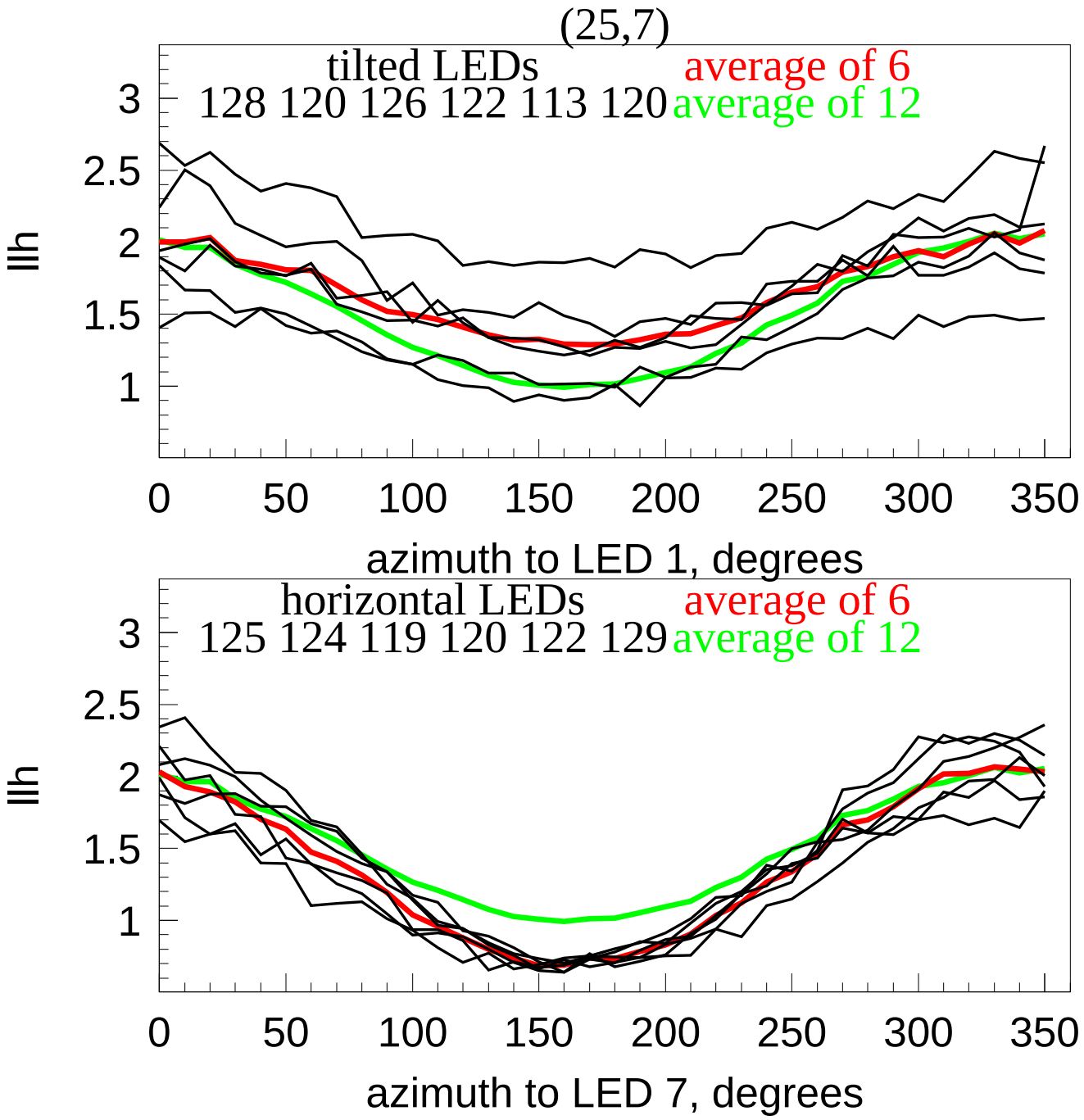

(25,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
19.6 ± 5.1

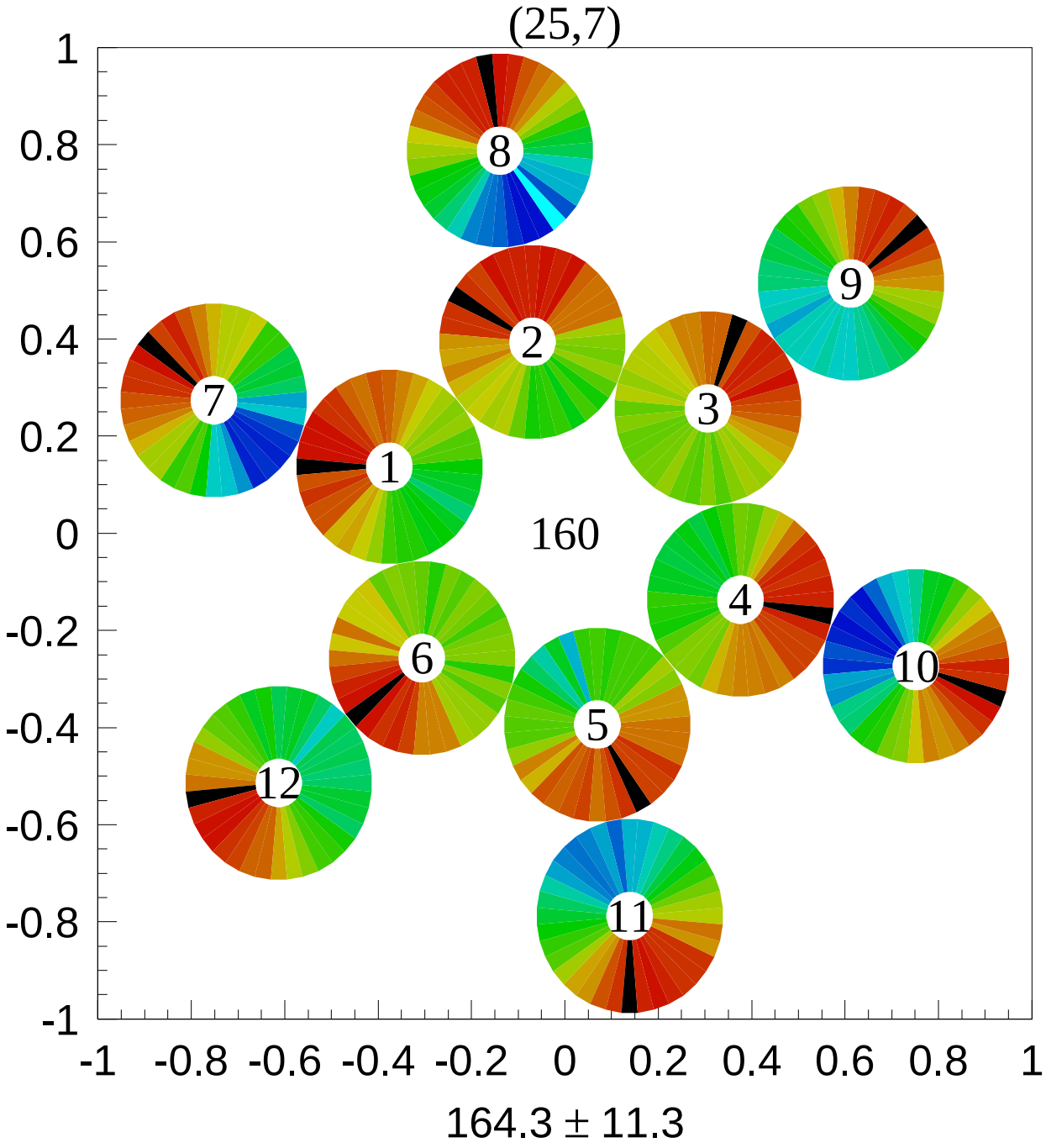

(25,5)
tilted LEDs
125 121 130 125 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 120 124 119 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

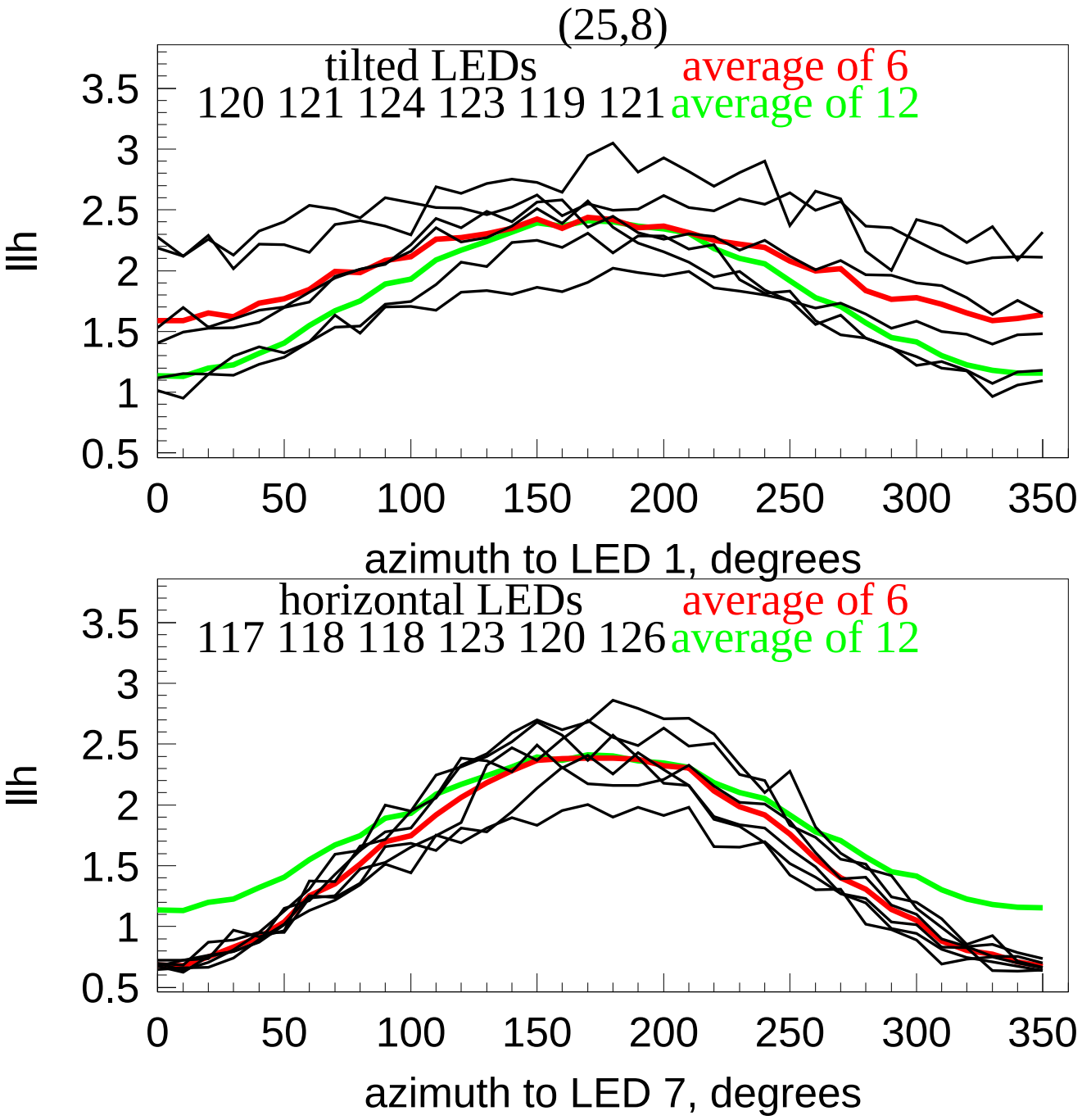

(25,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
347.2 ± 6.1

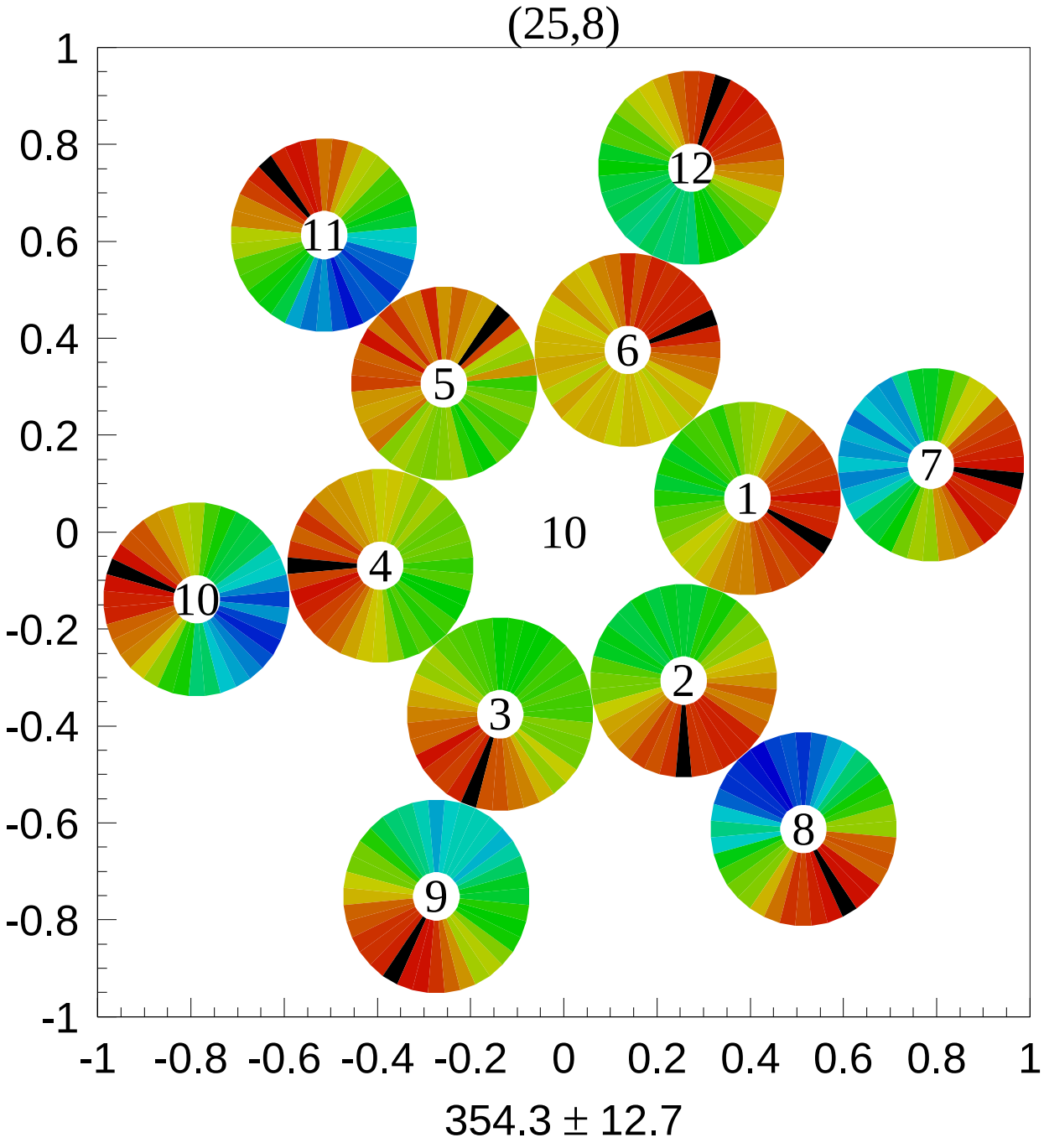

(25,6)
tilted LEDs
120 116 121 122 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 118 123 121 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

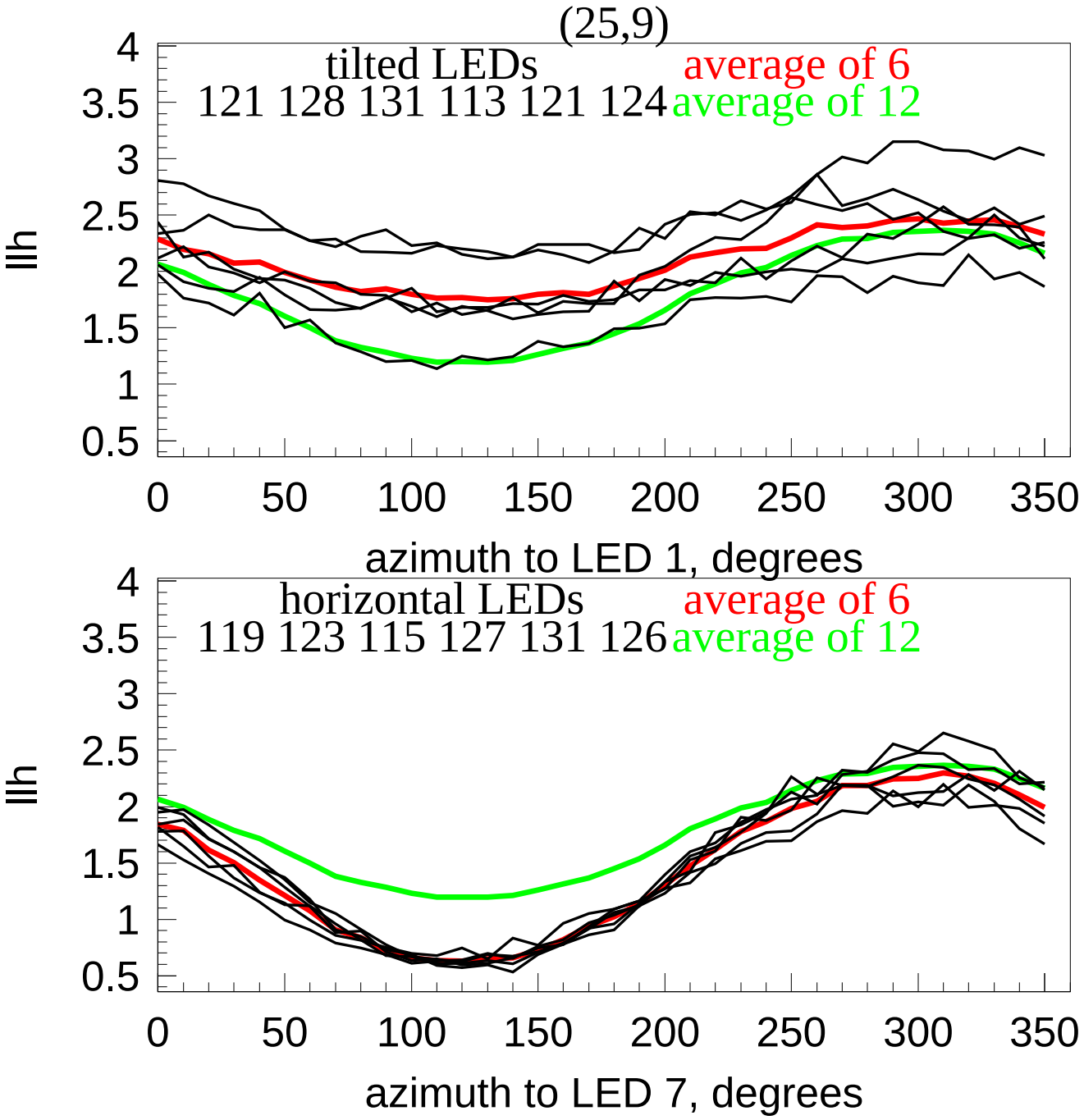

(25,6)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
39 ± 11.0

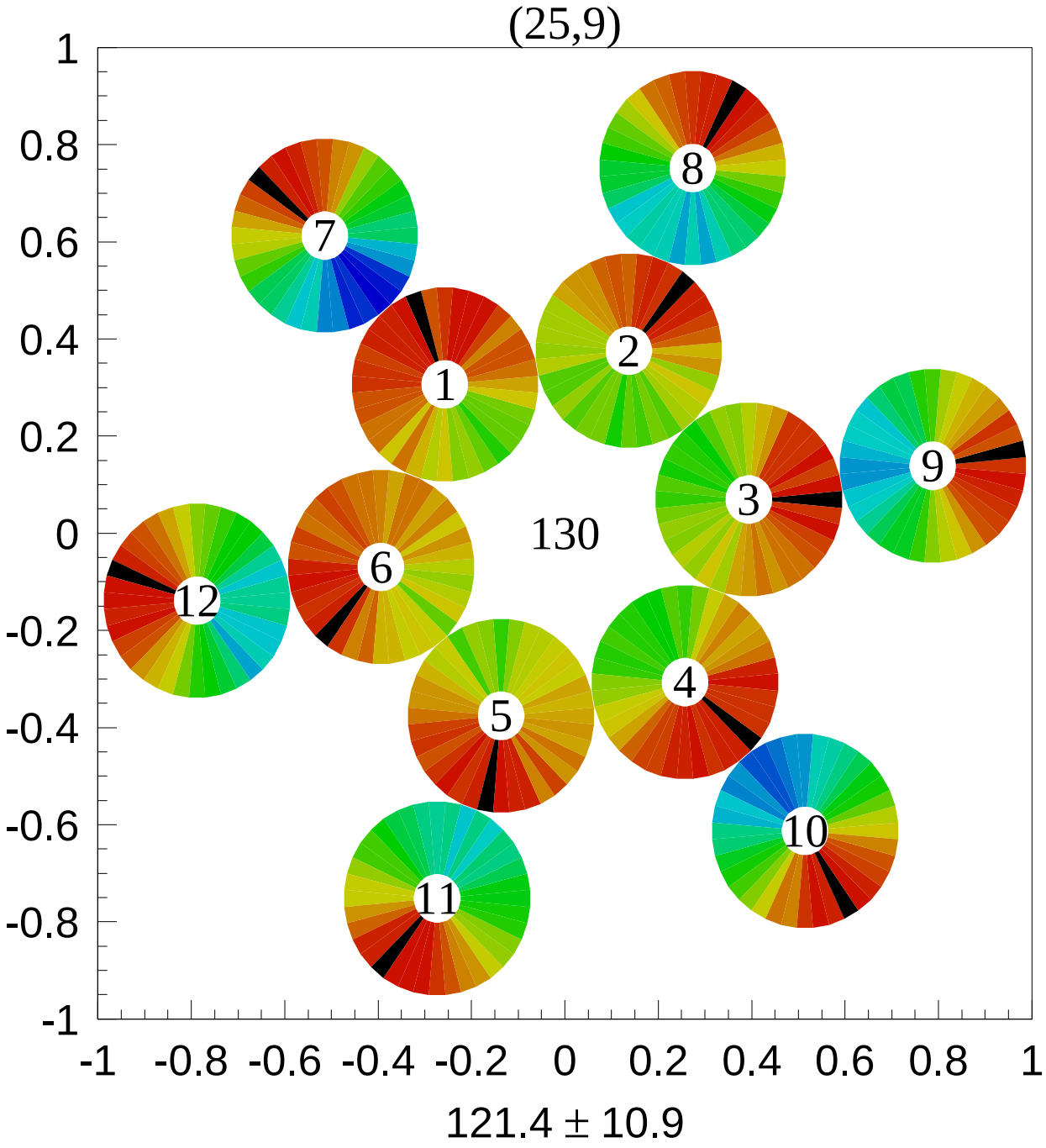

(25,7)
tilted LEDs
128 120 126 122 113 120
average of 6
average of 12
llh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 124 119 120 122 129
average of 6
average of 12
llh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

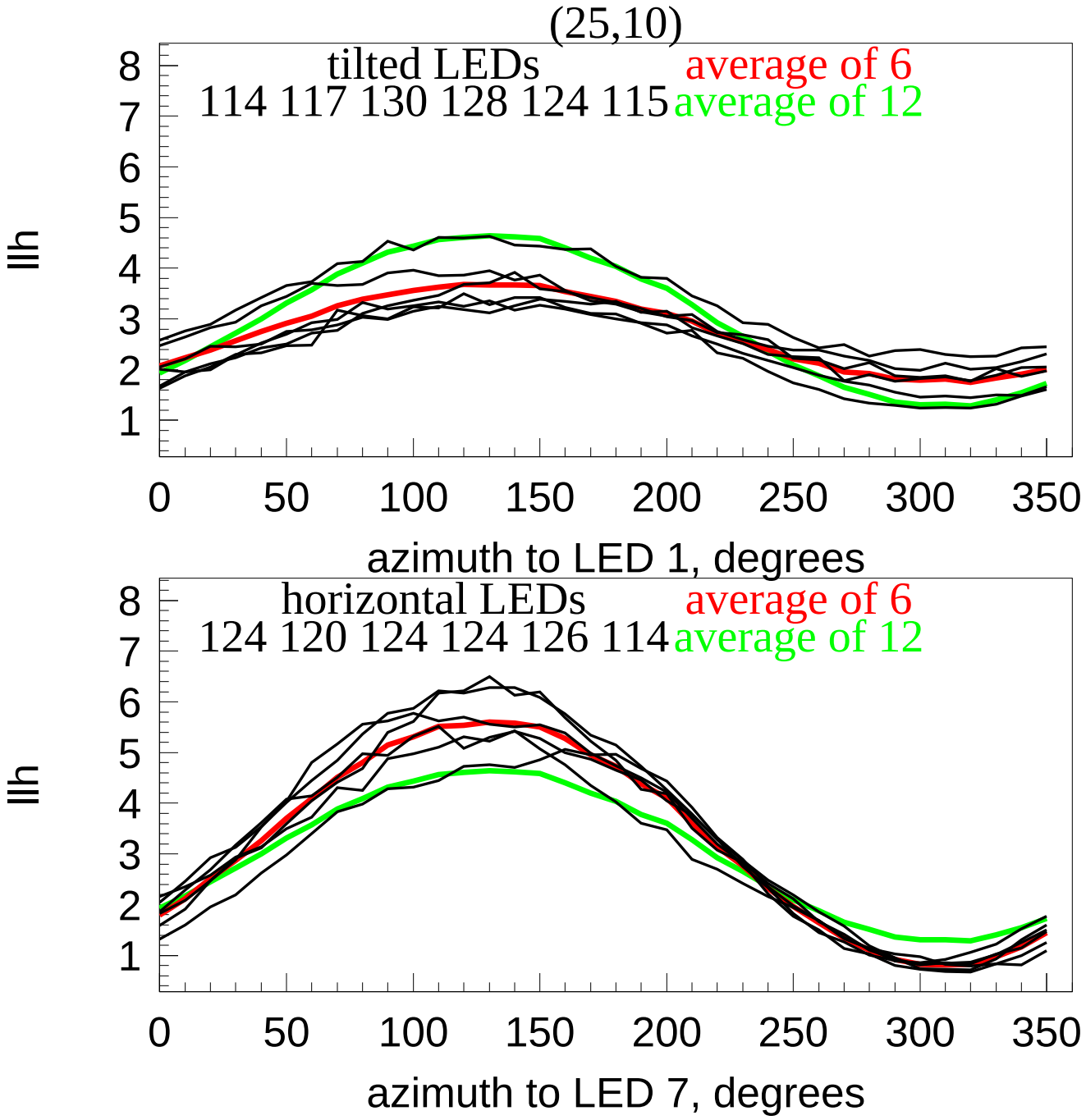

(25,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
164.3 ± 11.3

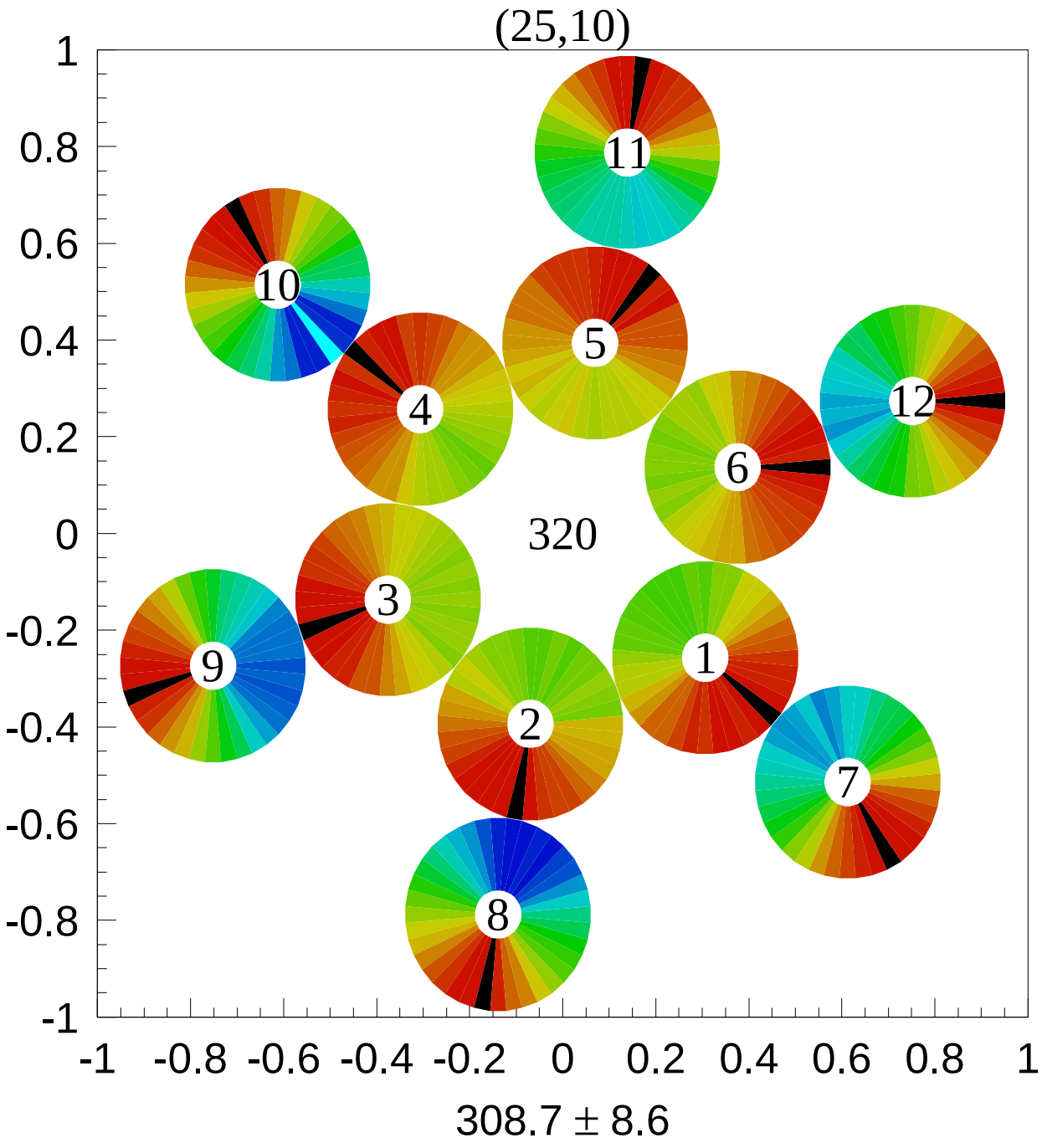

(25,8)
tilted LEDs
120 121 124 123 119 121
average of 6
average of 12
IIh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 118 118 123 120 126
average of 6
average of 12
IIh
azimuth to LED 7, degrees

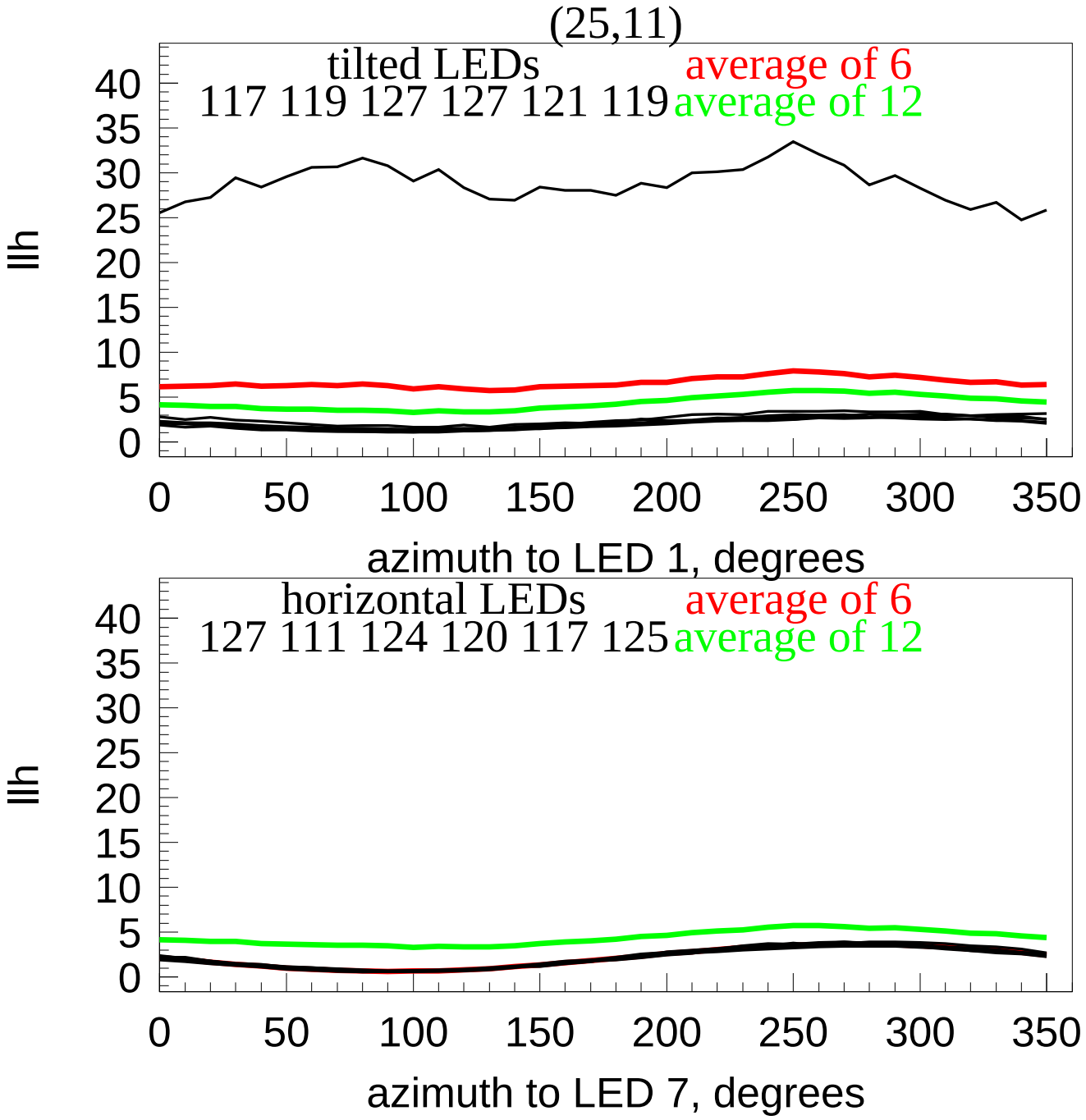

(25,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
354.3 ± 12.7

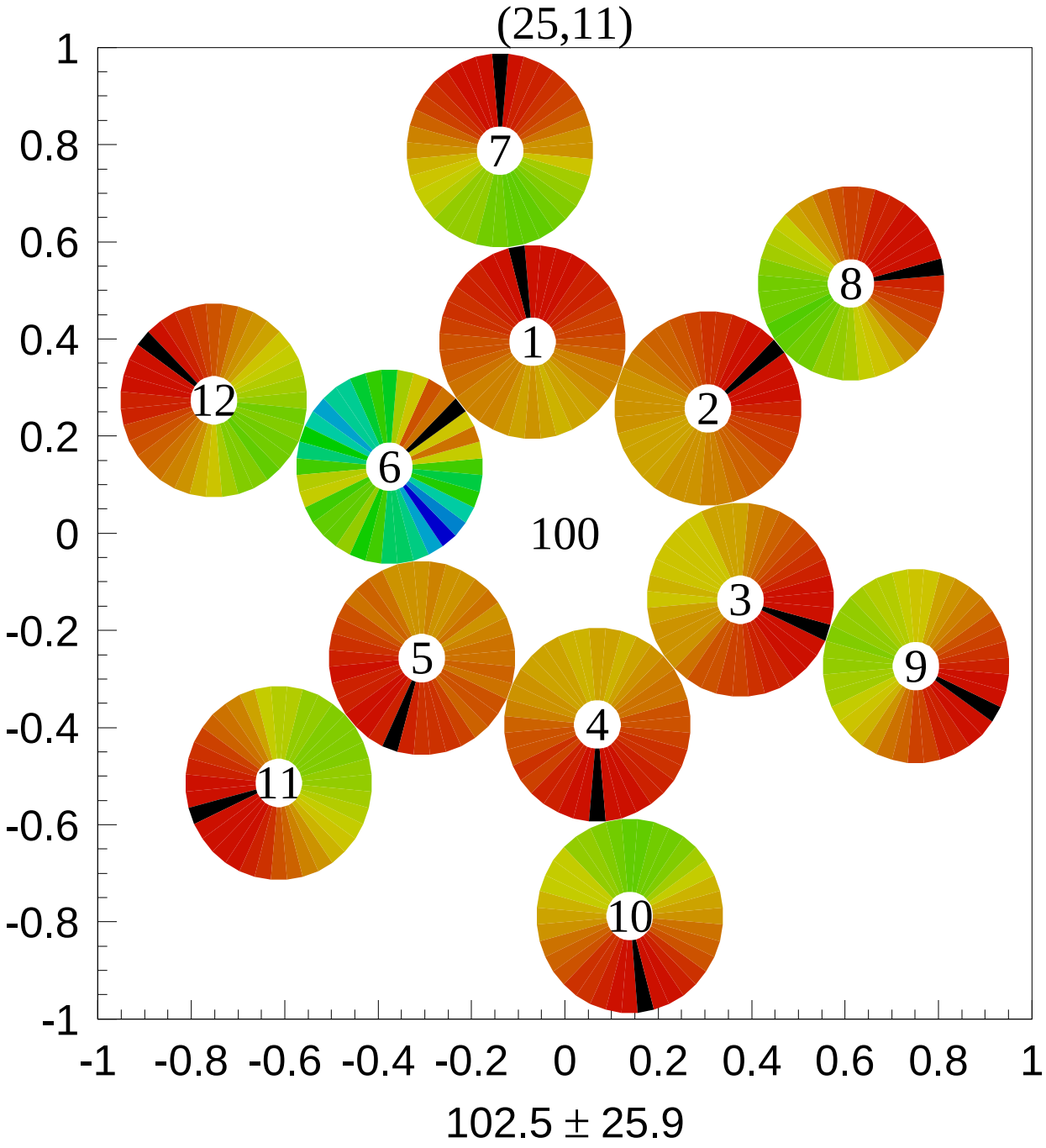

(25,9)
tilted LEDs
121 128 131 113 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 115 127 131 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

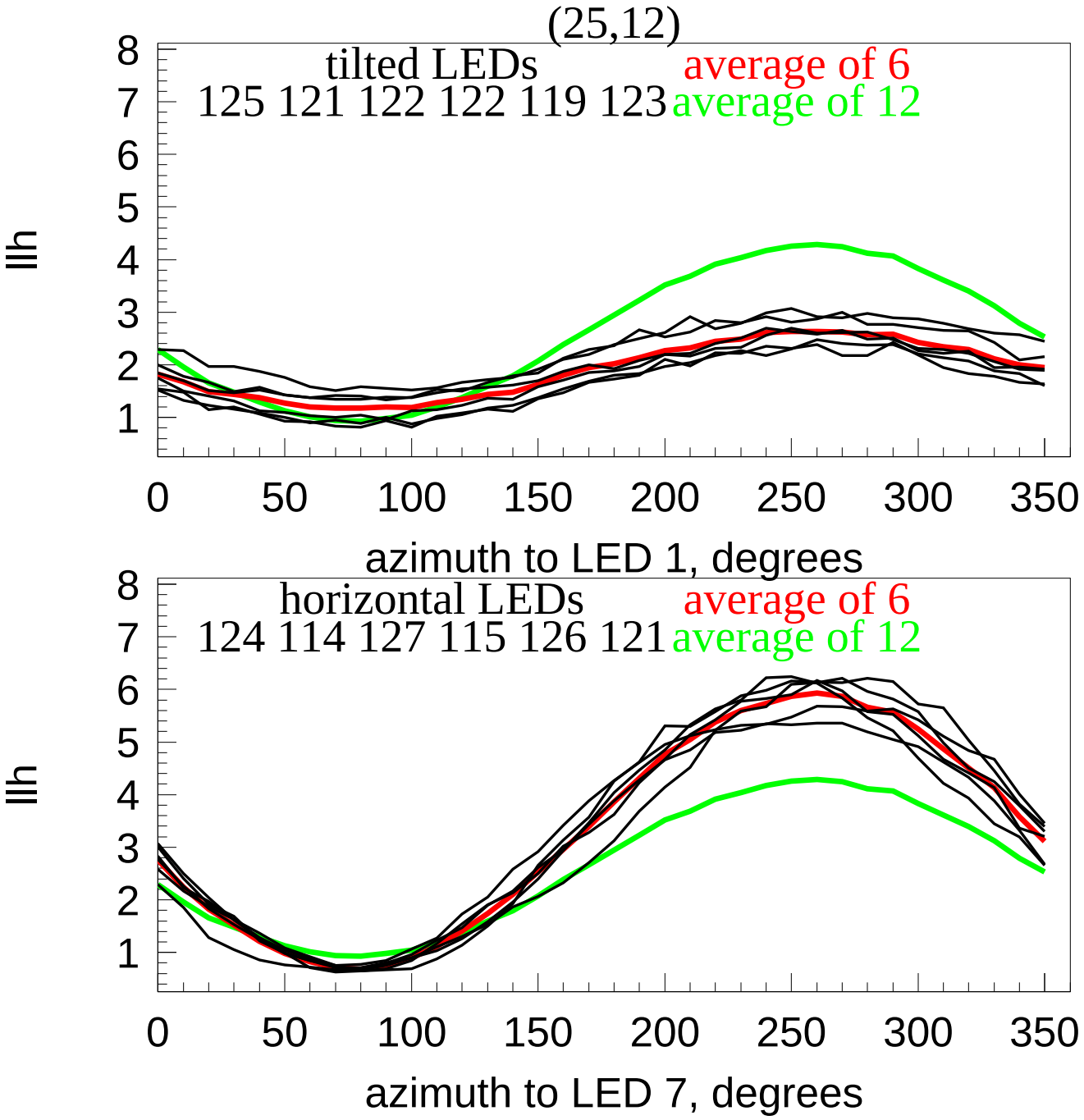

(25,9)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
121.4 ± 10.9

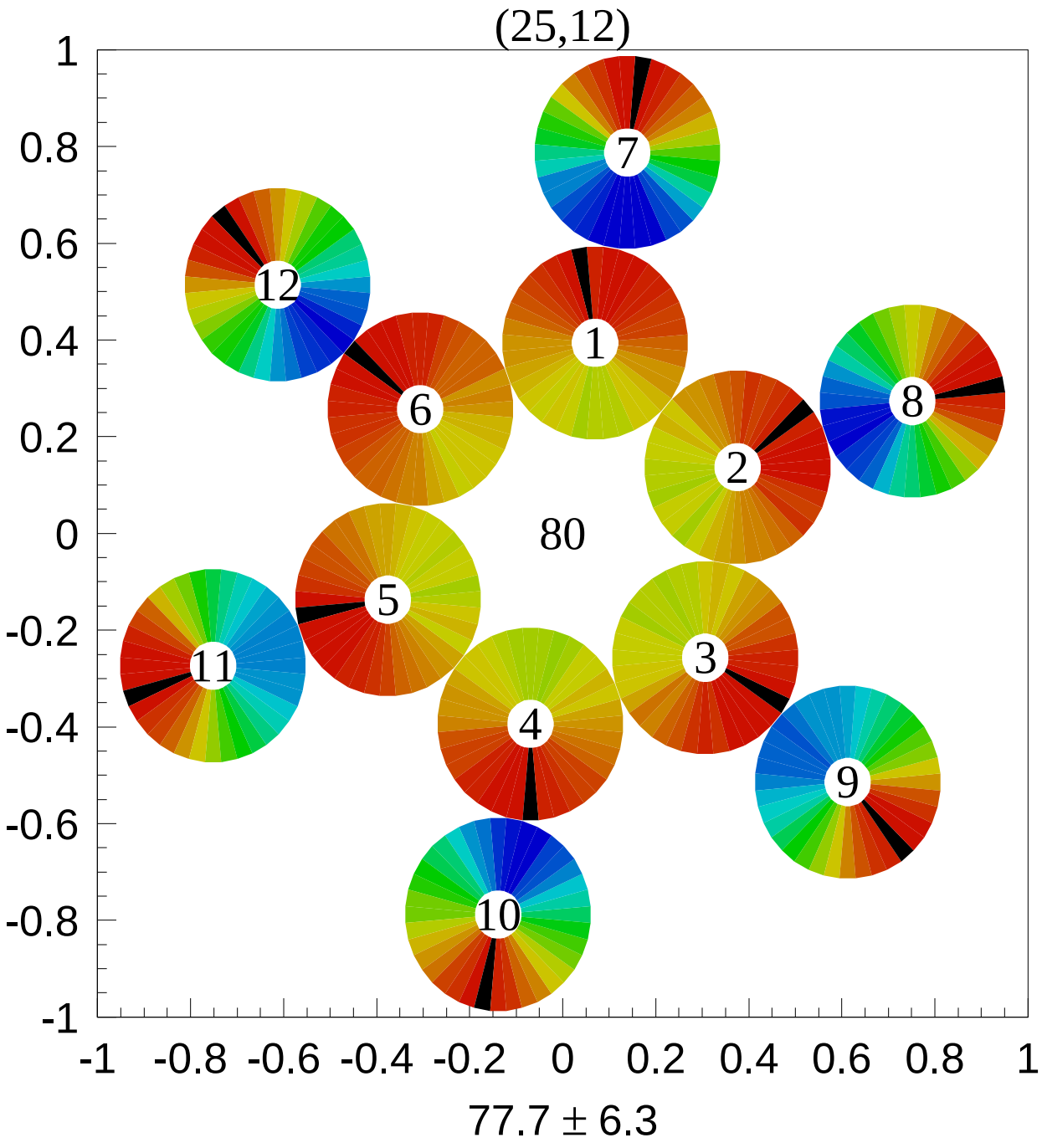

(25,10)
tilted LEDs
114 117 130 128 124 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 120 124 124 126 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

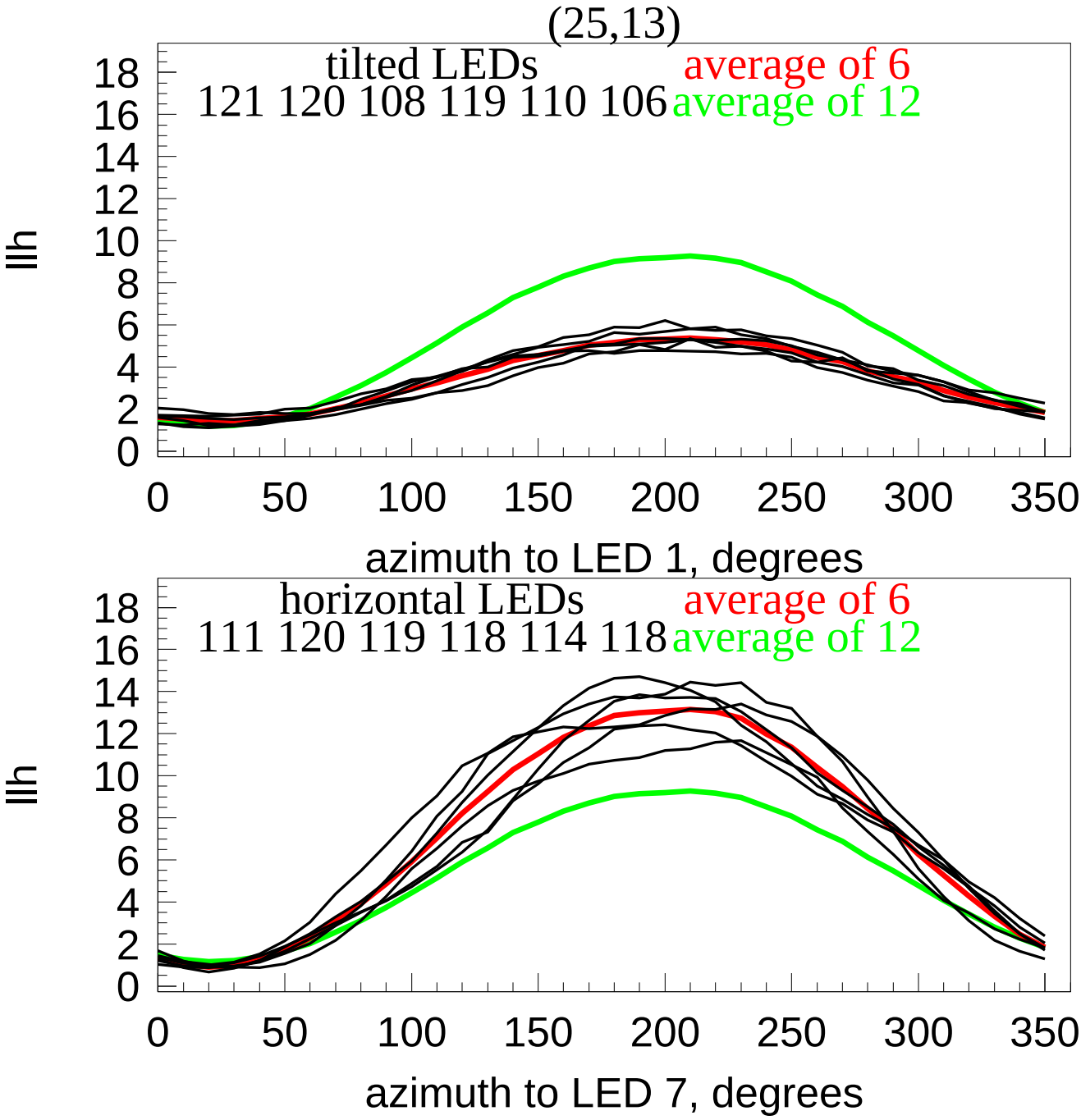

(25,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
308.7 ± 8.6

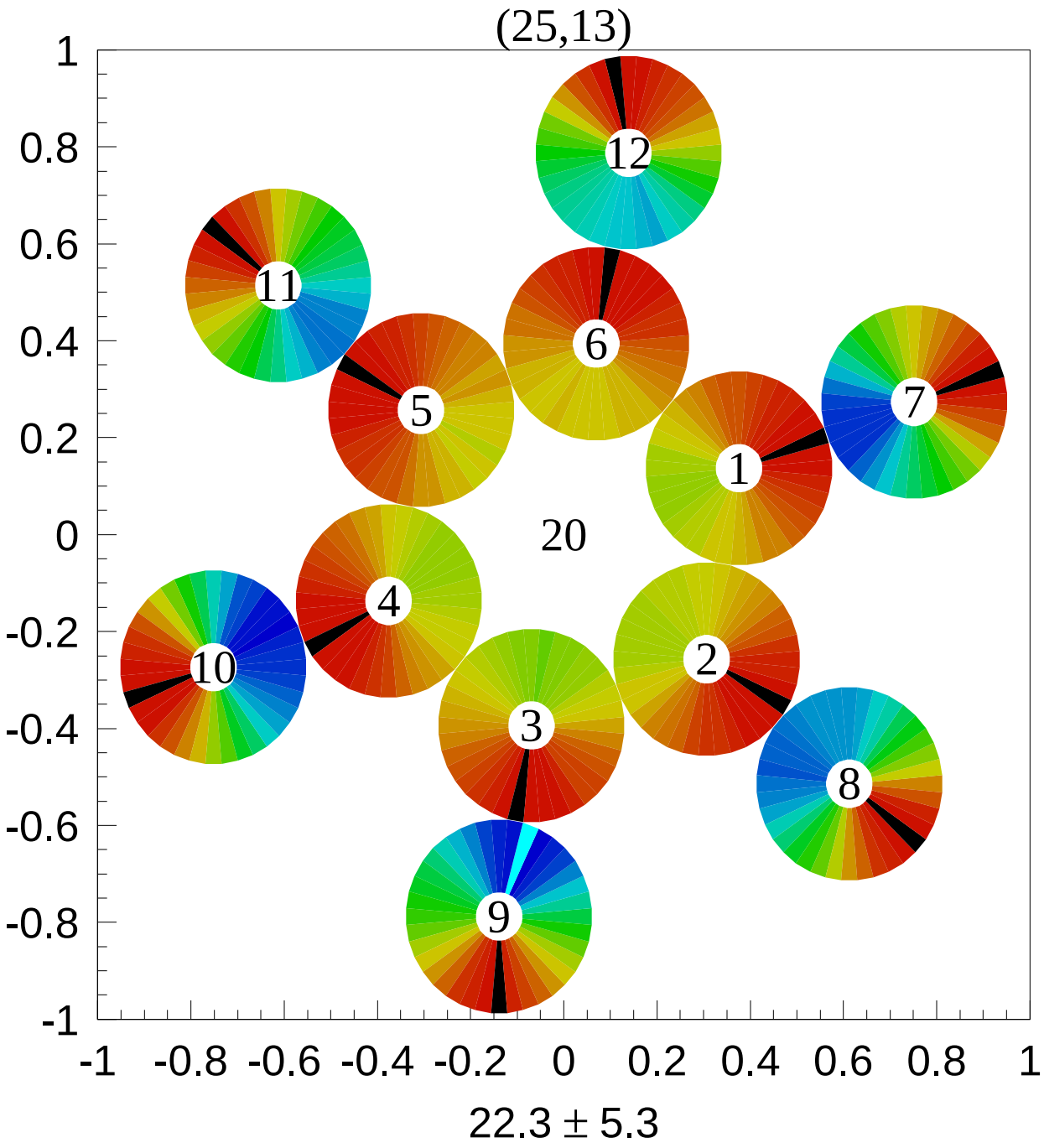

(25,11)
tilted LEDs
117 119 127 127 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 111 124 120 117 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

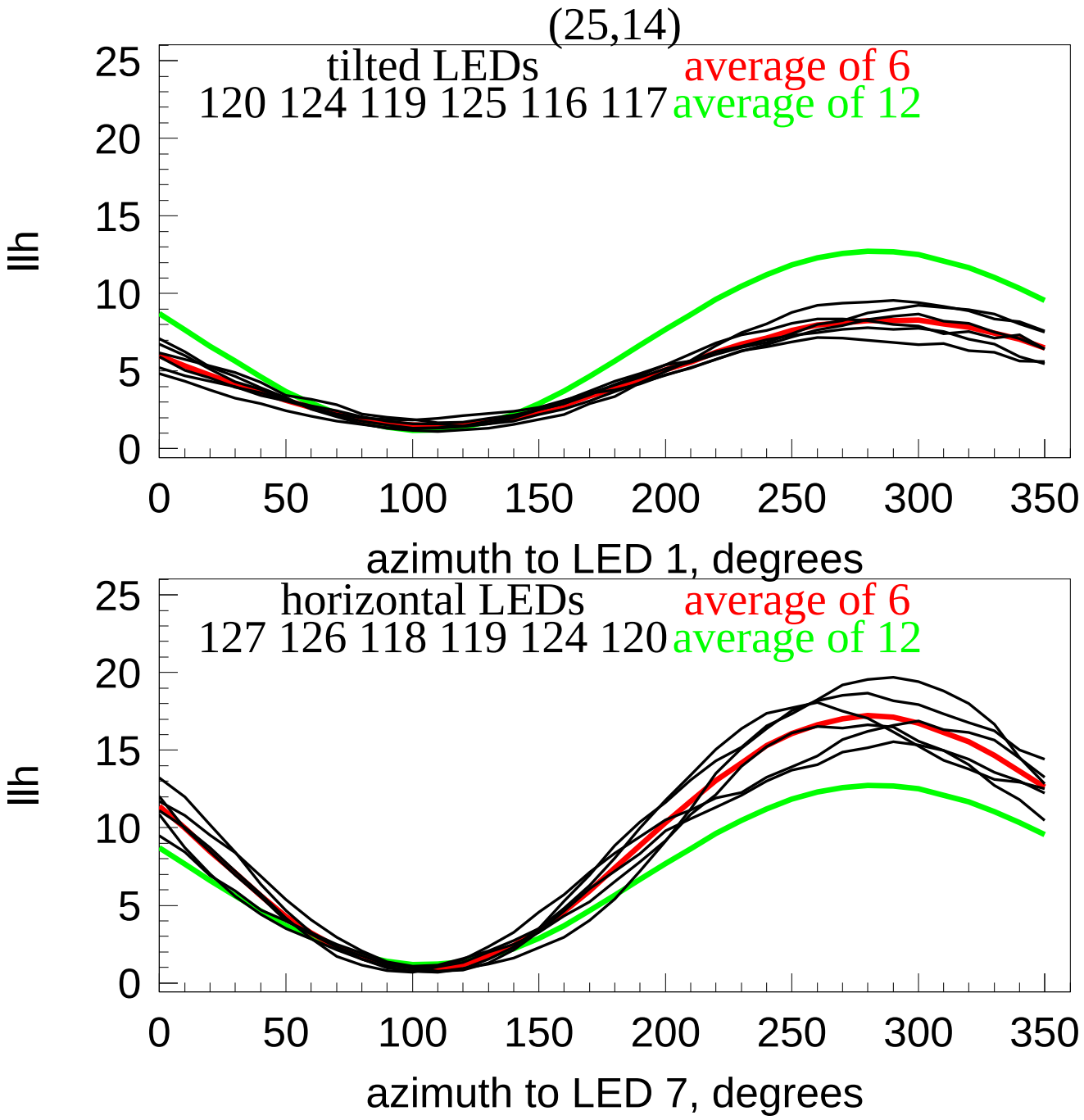

(25,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
102.5 ± 25.9
7
1
8
12
2
6
100
3
5
9
4
11
10

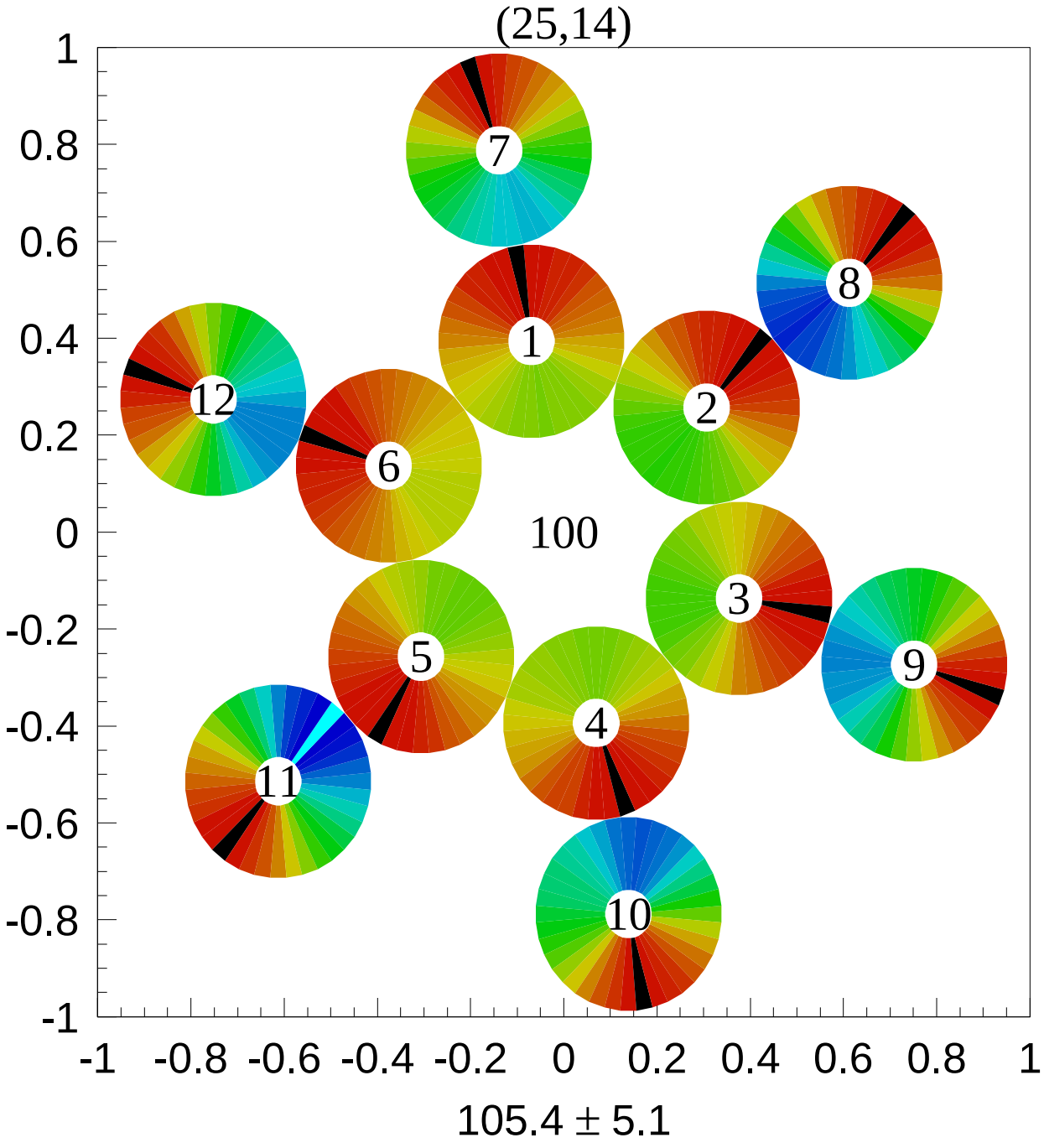

(25,12)
tilted LEDs
125 121 122 122 119 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 114 127 115 126 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

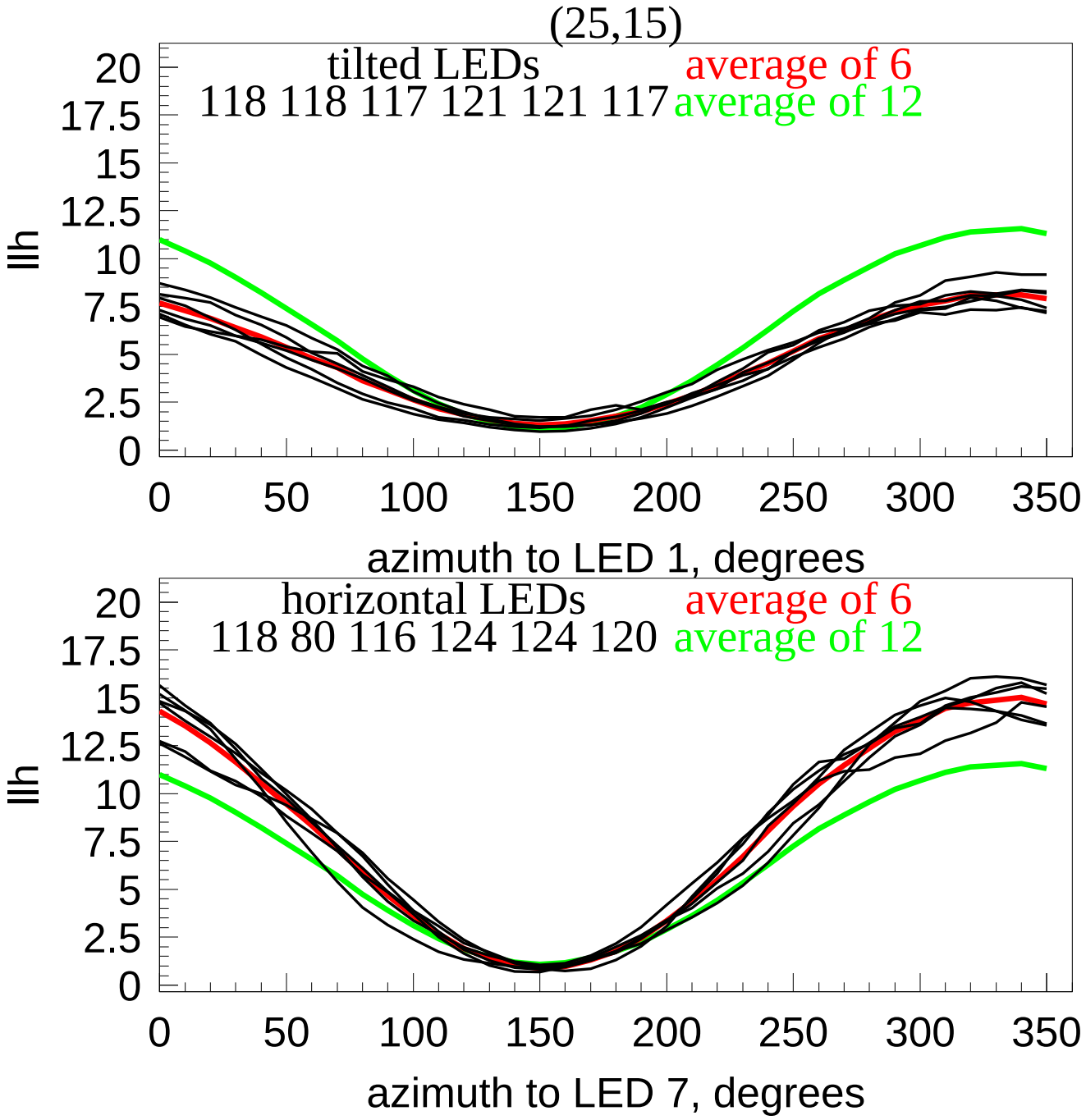

(25,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
77.7 ± 6.3
7
12
1
6
8
2
80
5
11
3
4
9
10

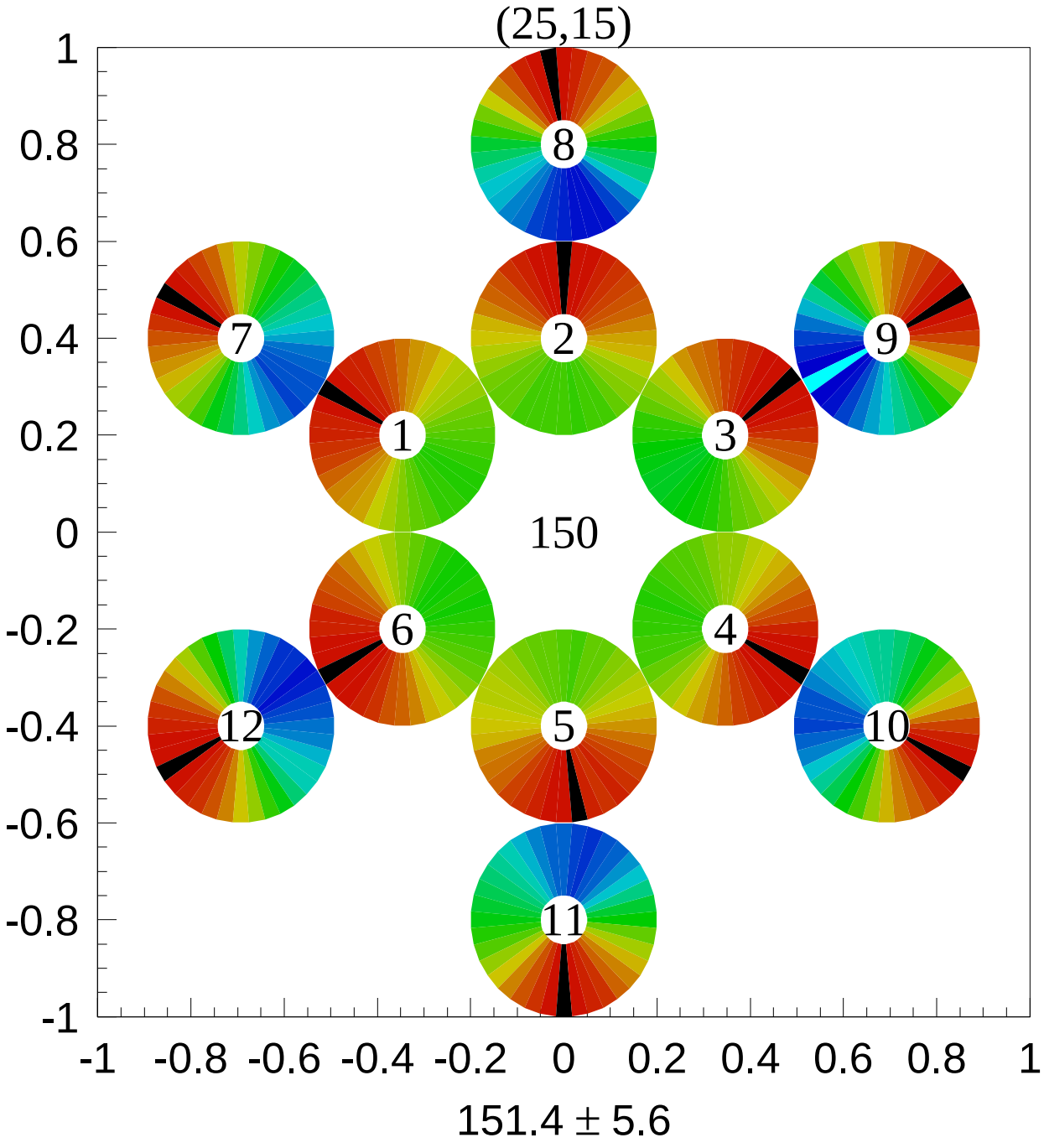

(25,13)
tilted LEDs
121 120 108 119 110 106
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 120 119 118 114 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

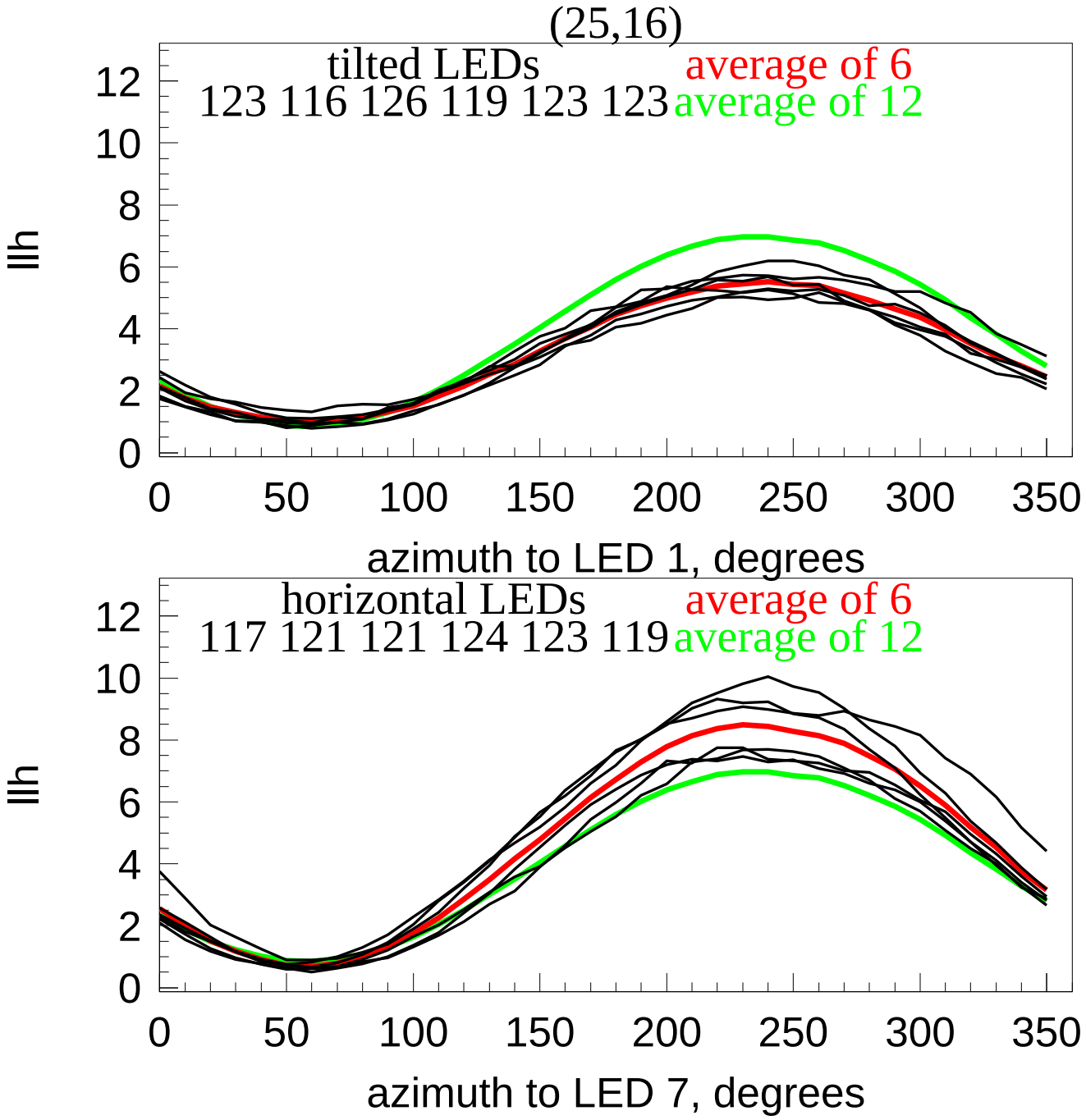

(25,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
22.3 ± 5.3

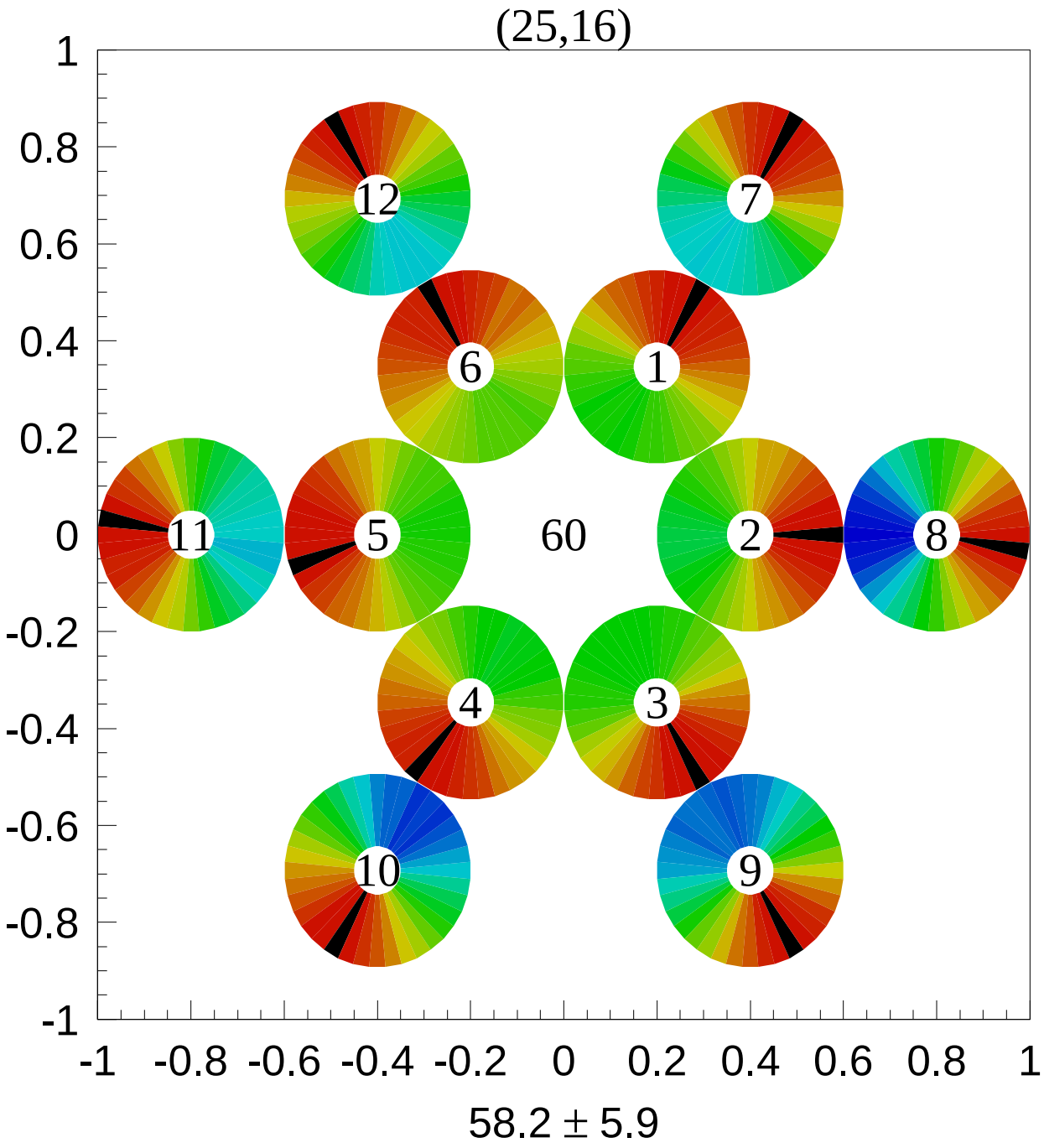

(25,14)
tilted LEDs
120 124 119 125 116 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 126 118 119 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

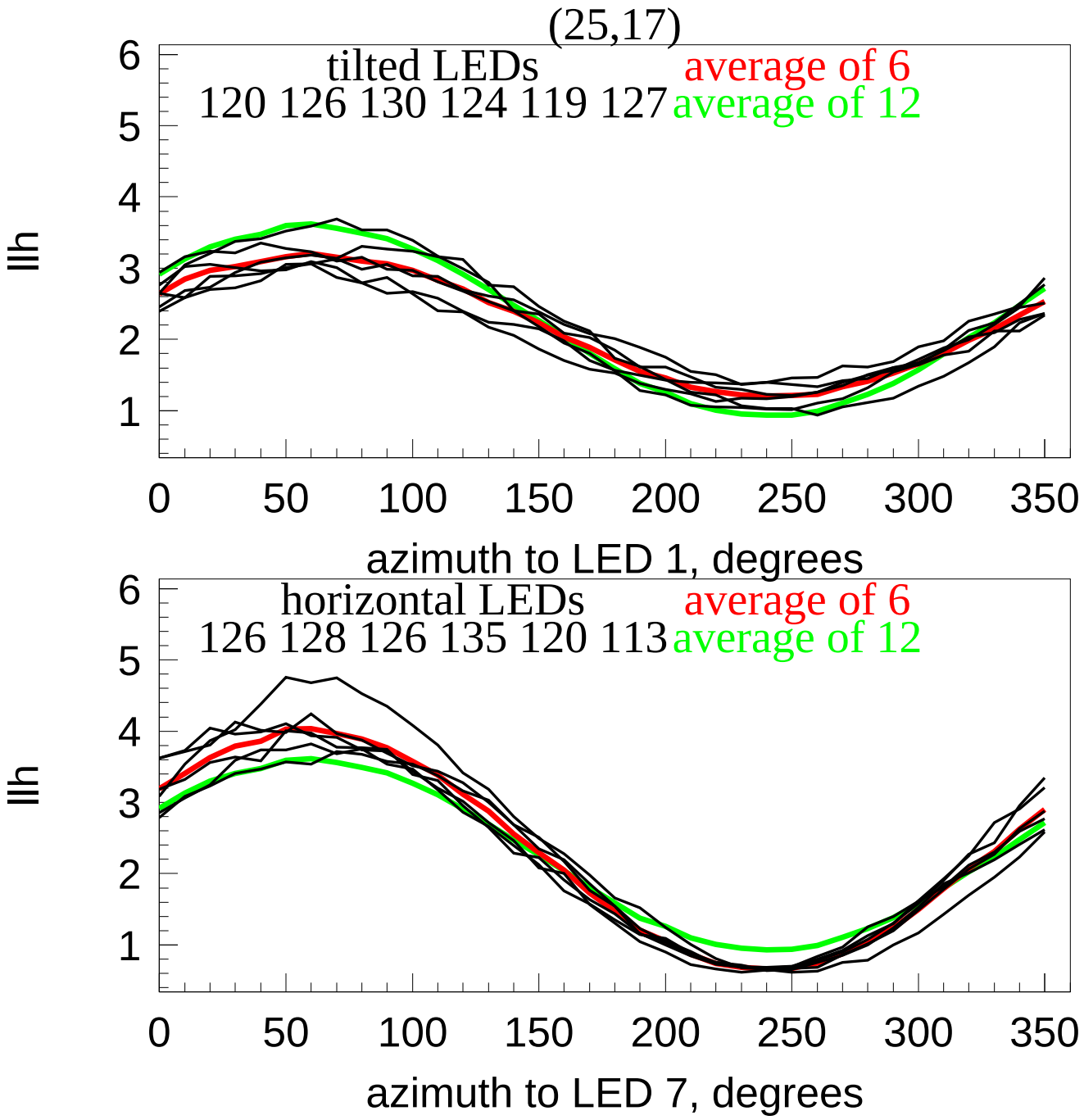

(25,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
1
8
12
2
6
100
3
5
9
4
11
10
105.4 ± 5.1

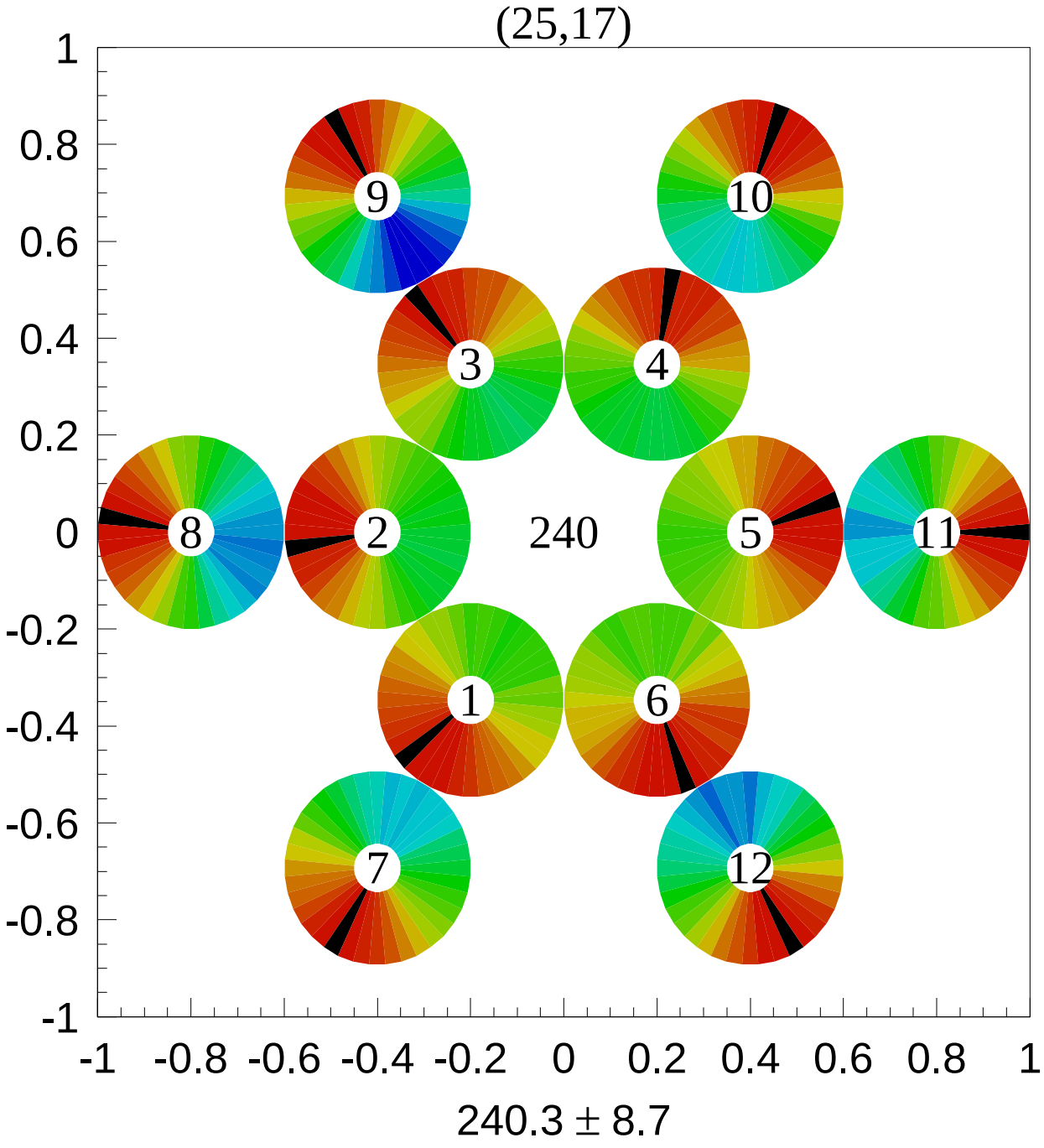

(25,15)
tilted LEDs
118 118 117 121 121 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 80 116 124 124 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

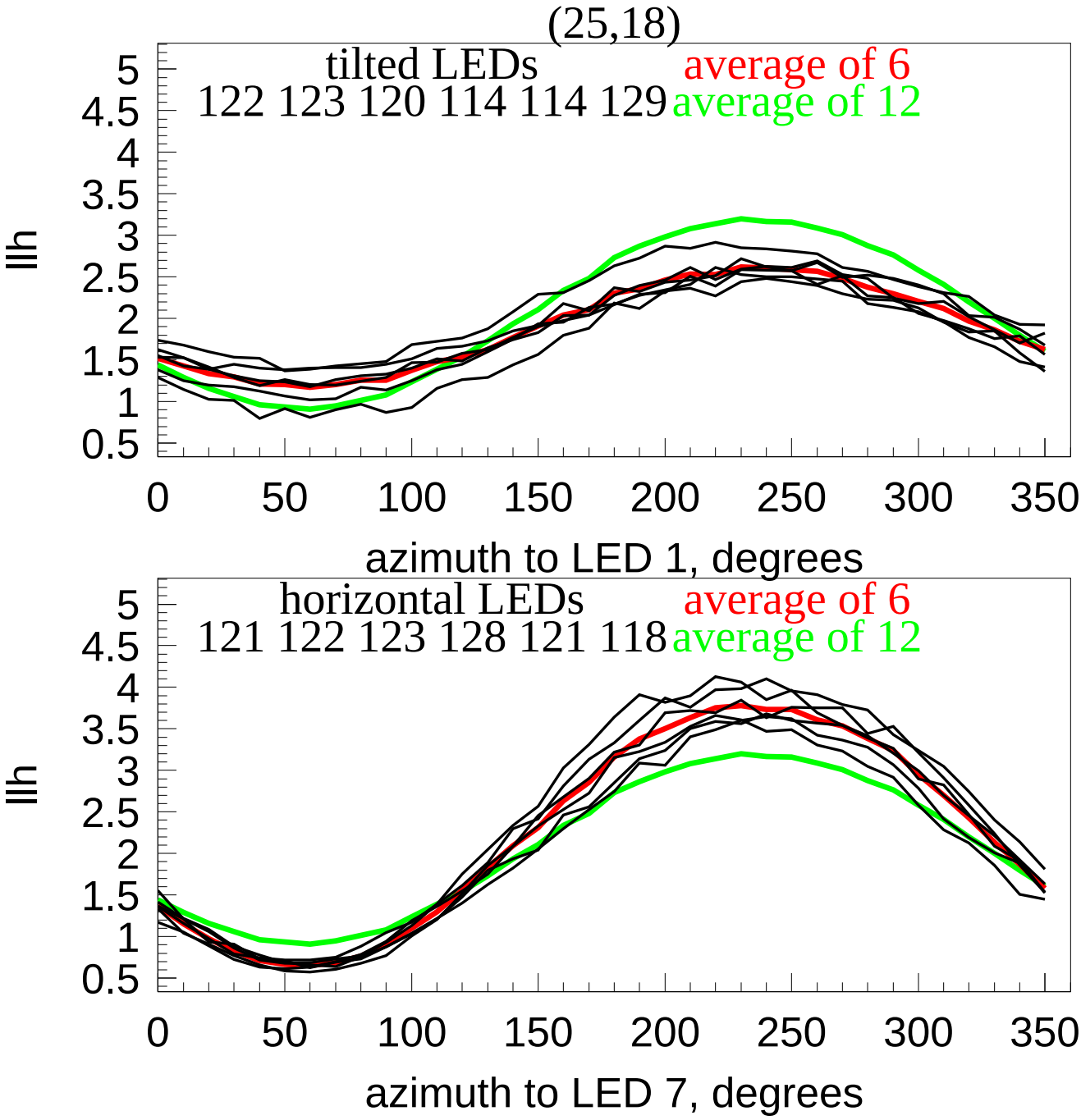

(25,15)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
151.4 ± 5.6

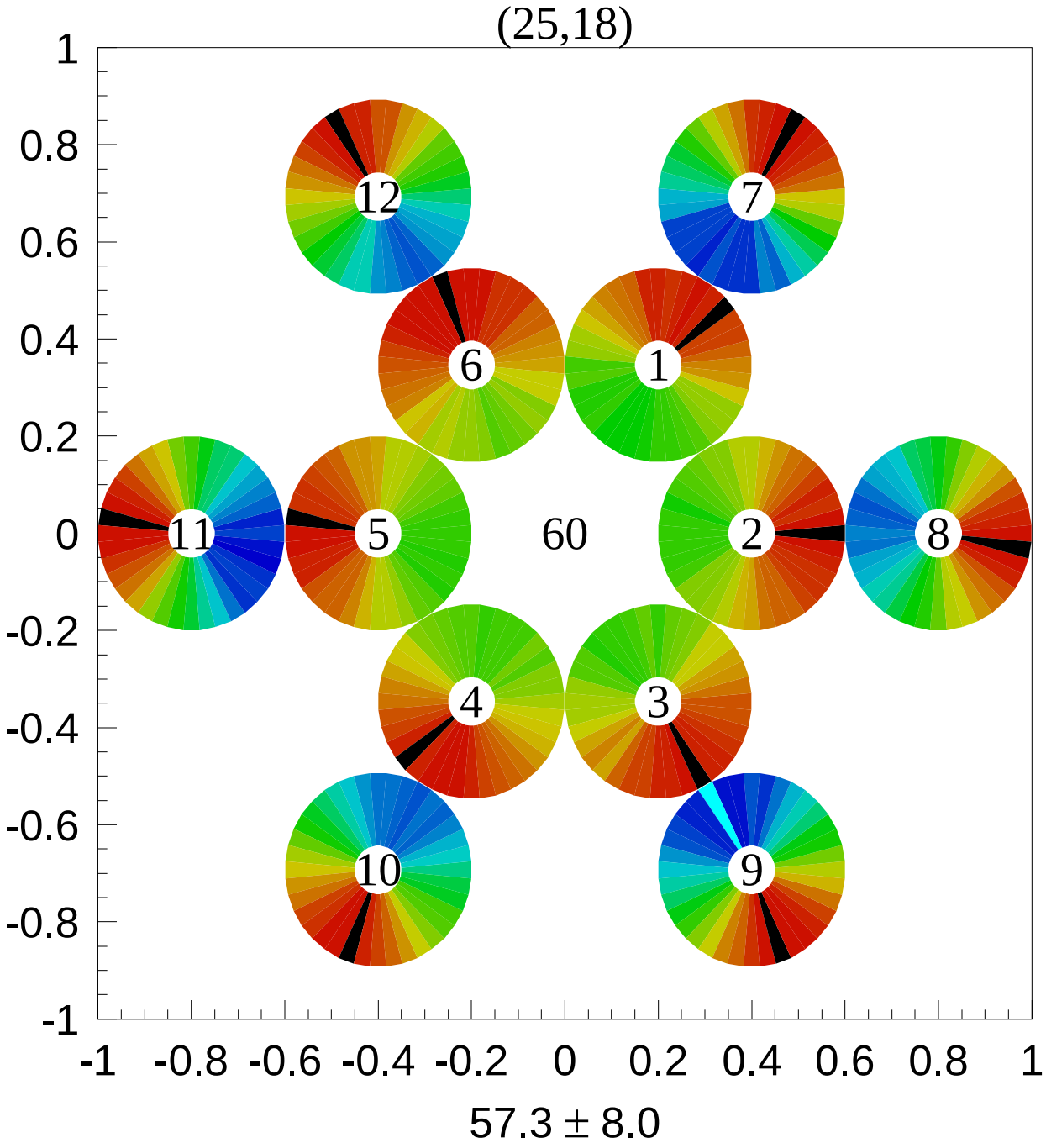

(25,16)
tilted LEDs
123 116 126 119 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 121 121 124 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

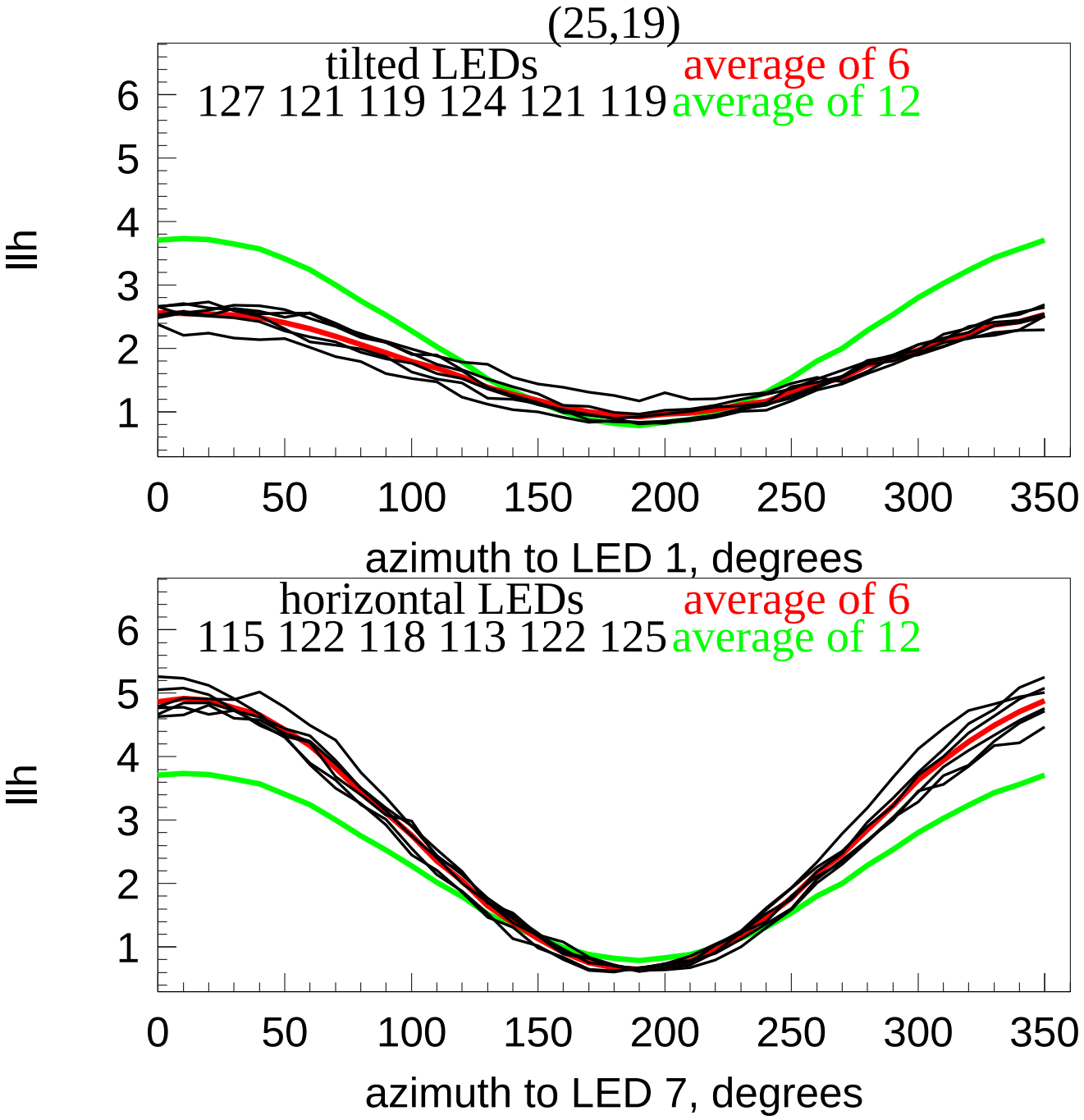

(25,16)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
58.2 ± 5.9

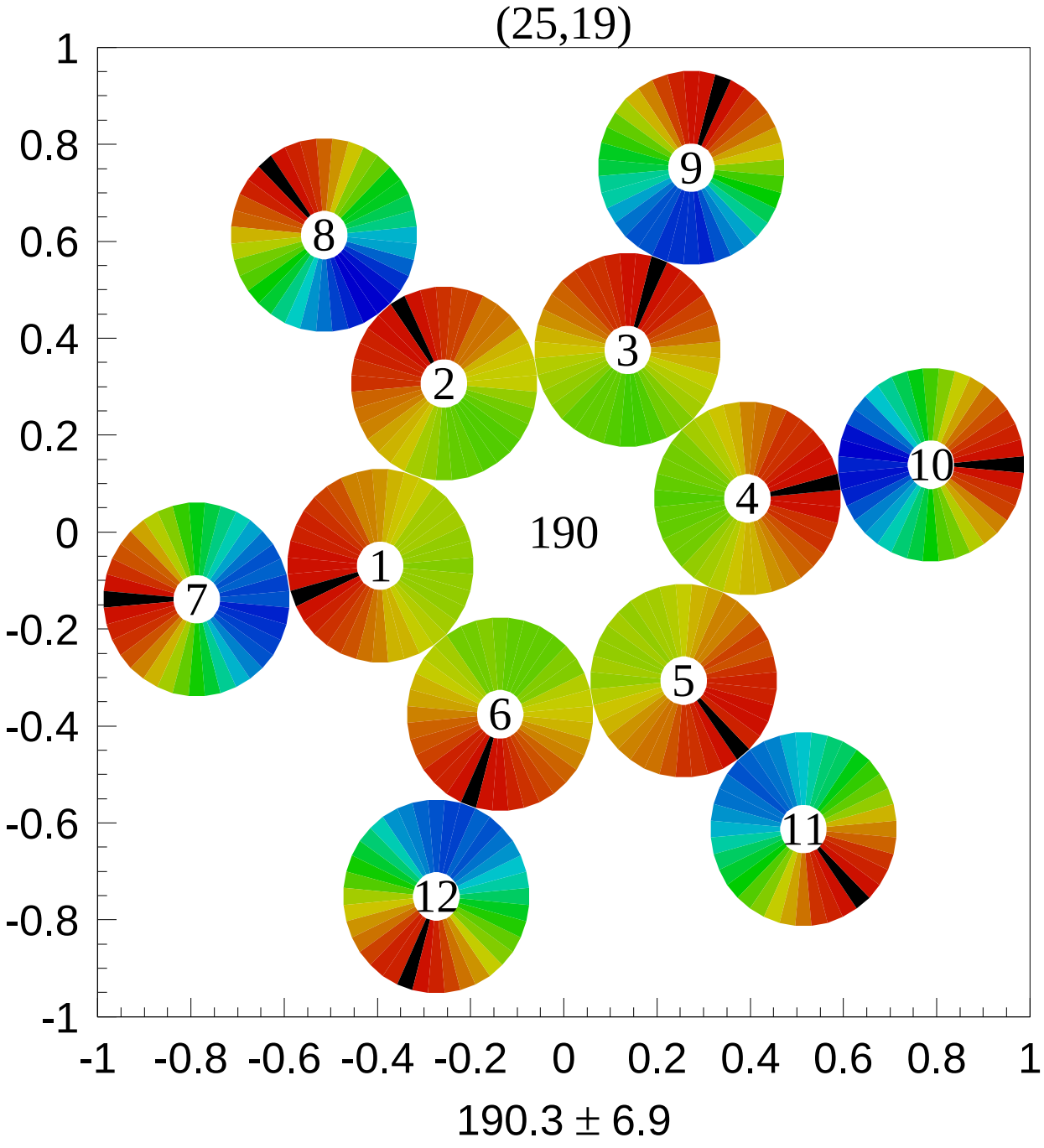

(25,17)
tilted LEDs
120 126 130 124 119 127
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 128 126 135 120 113
average of 6
average of 12
Ilh
azimuth to LED 7, degrees
0
50
100
150
200
250
300
350
1
2
3
4
5
6

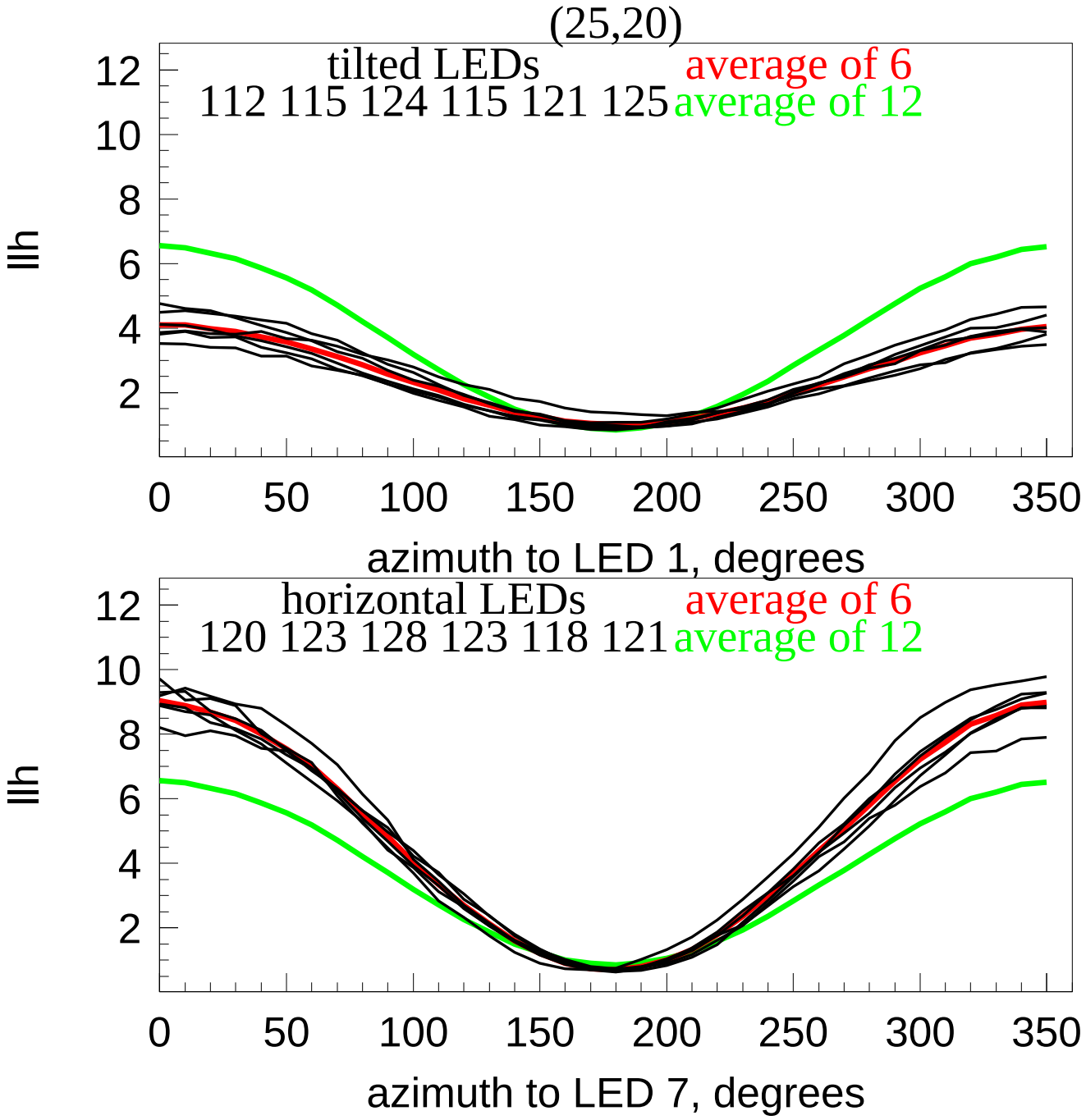

(25,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
240.3 ± 8.7

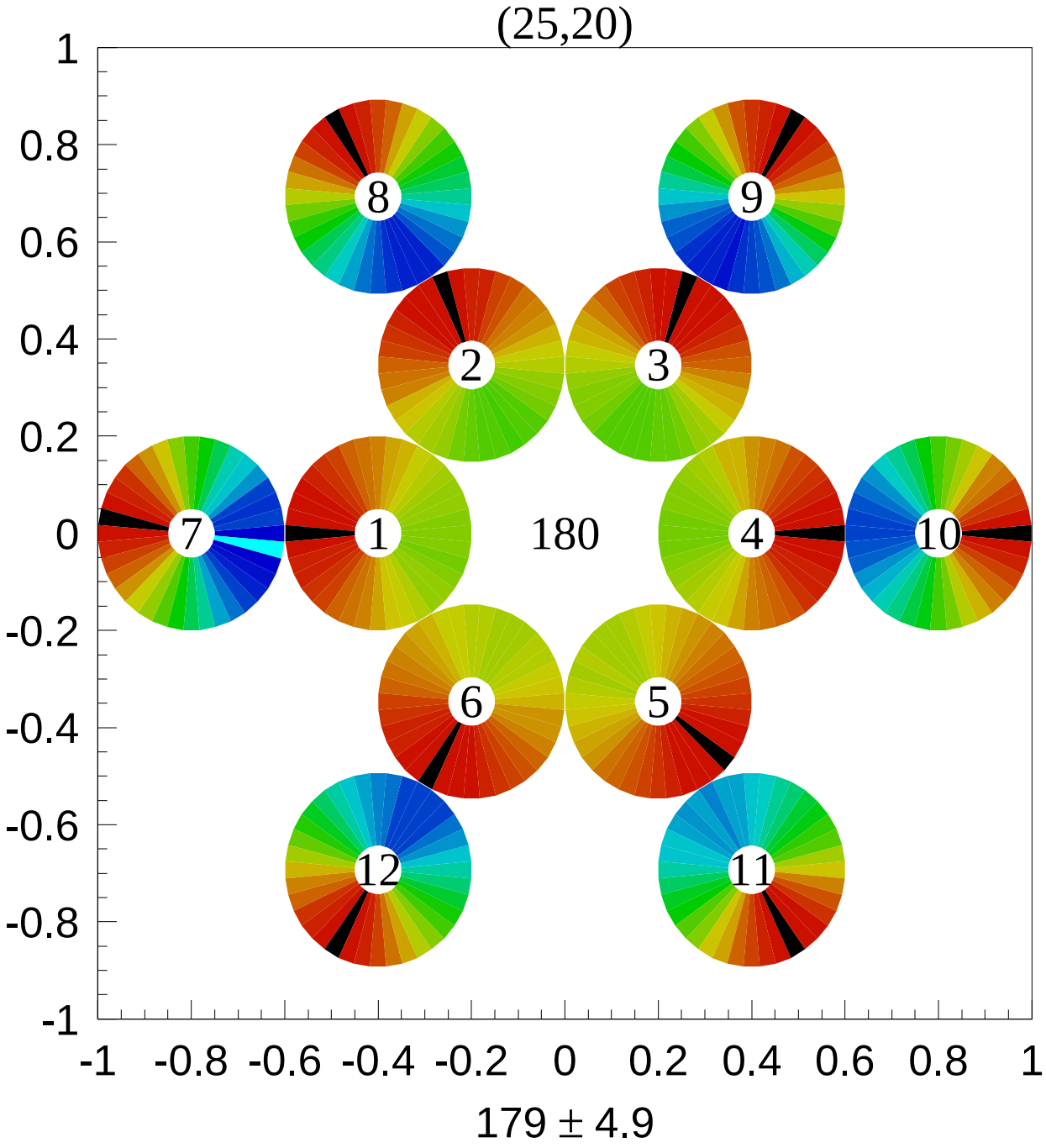

(25,18)
tilted LEDs
122 123 120 114 114 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 123 128 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

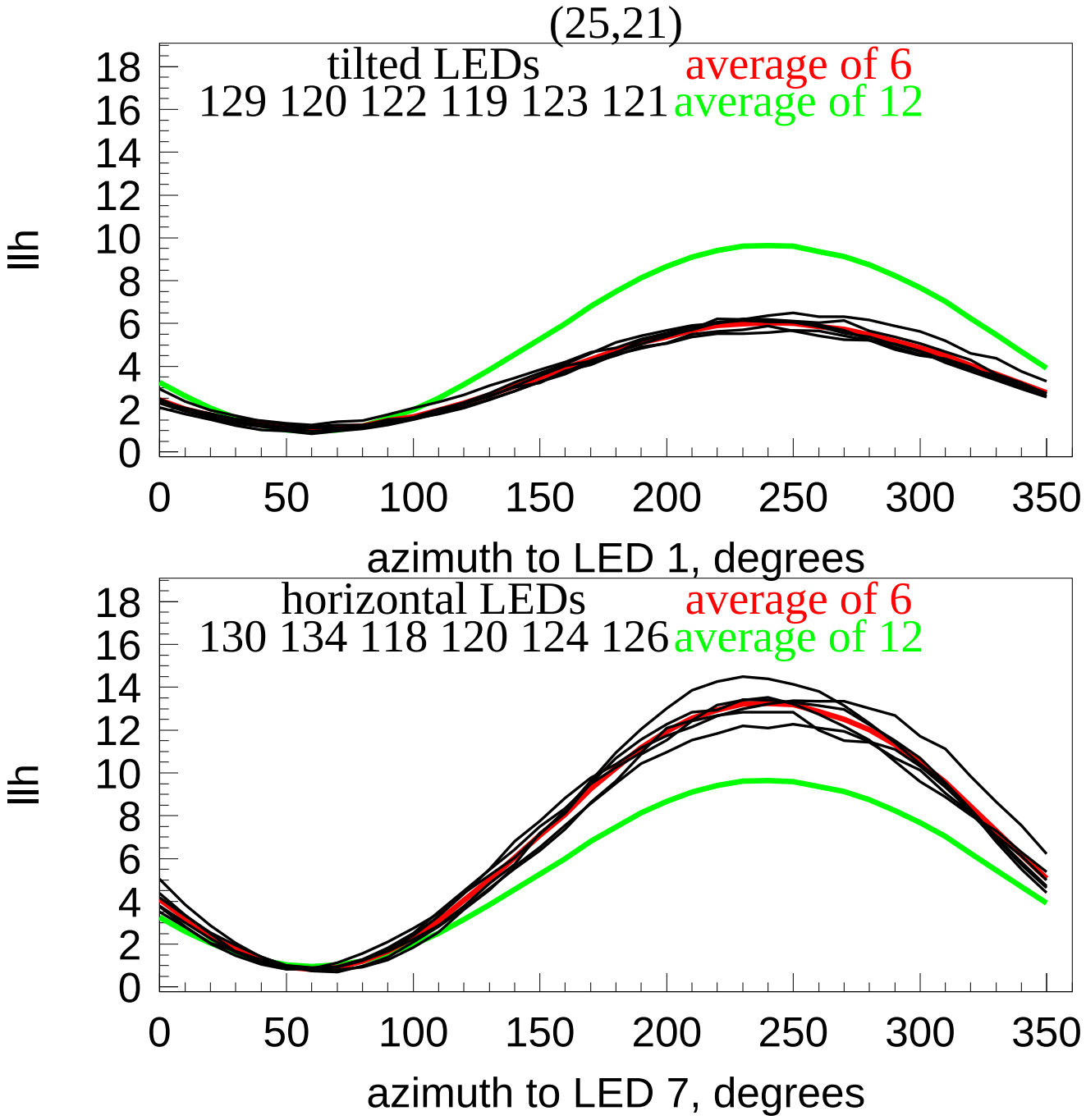

(25,18)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
57.3 ± 8.0

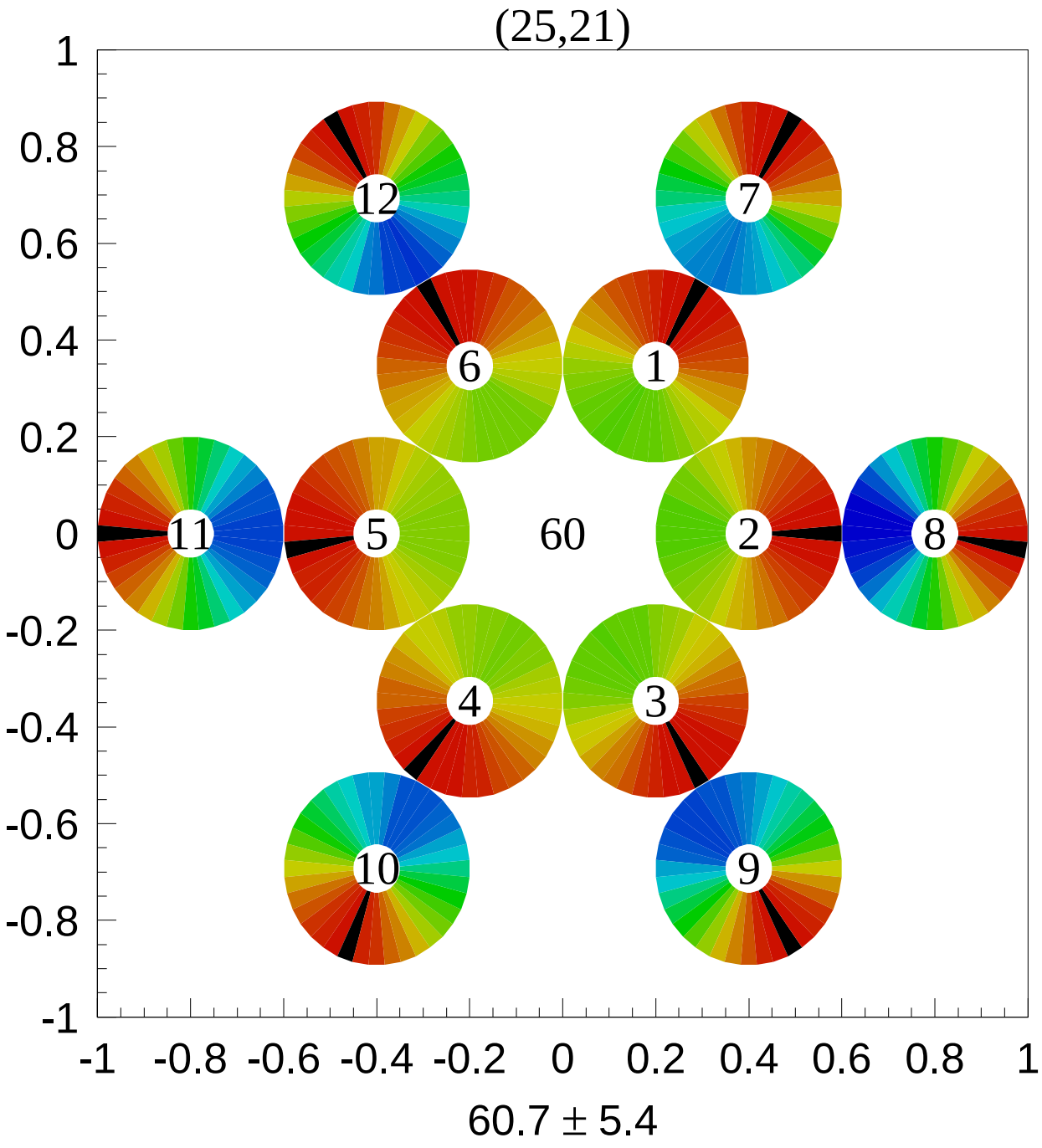

(25,19)
tilted LEDs
127 121 119 124 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 122 118 113 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

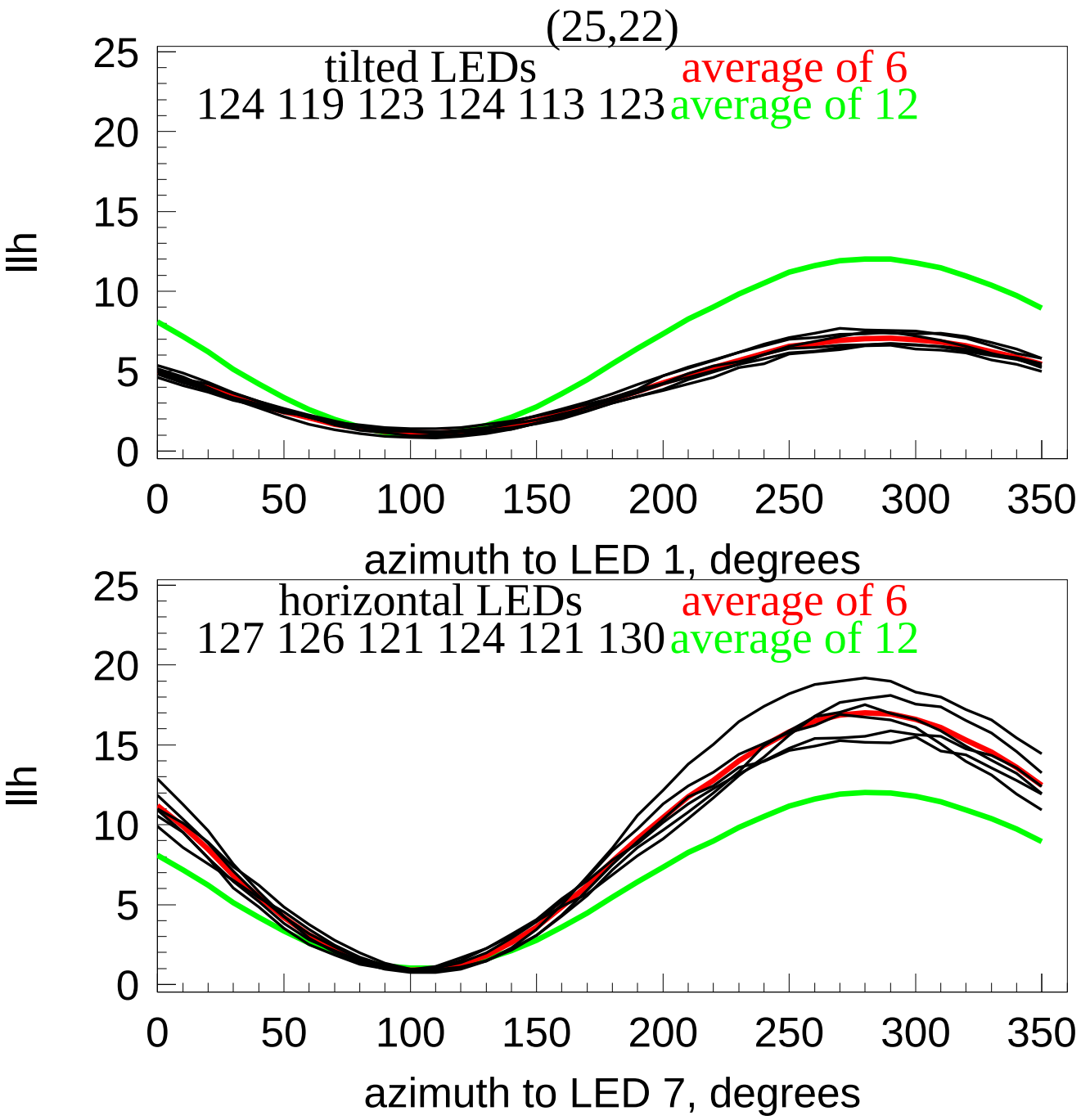

(25,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
190.3 ± 6.9
1
2
3
4
5
6
7
8
9
10
11
12

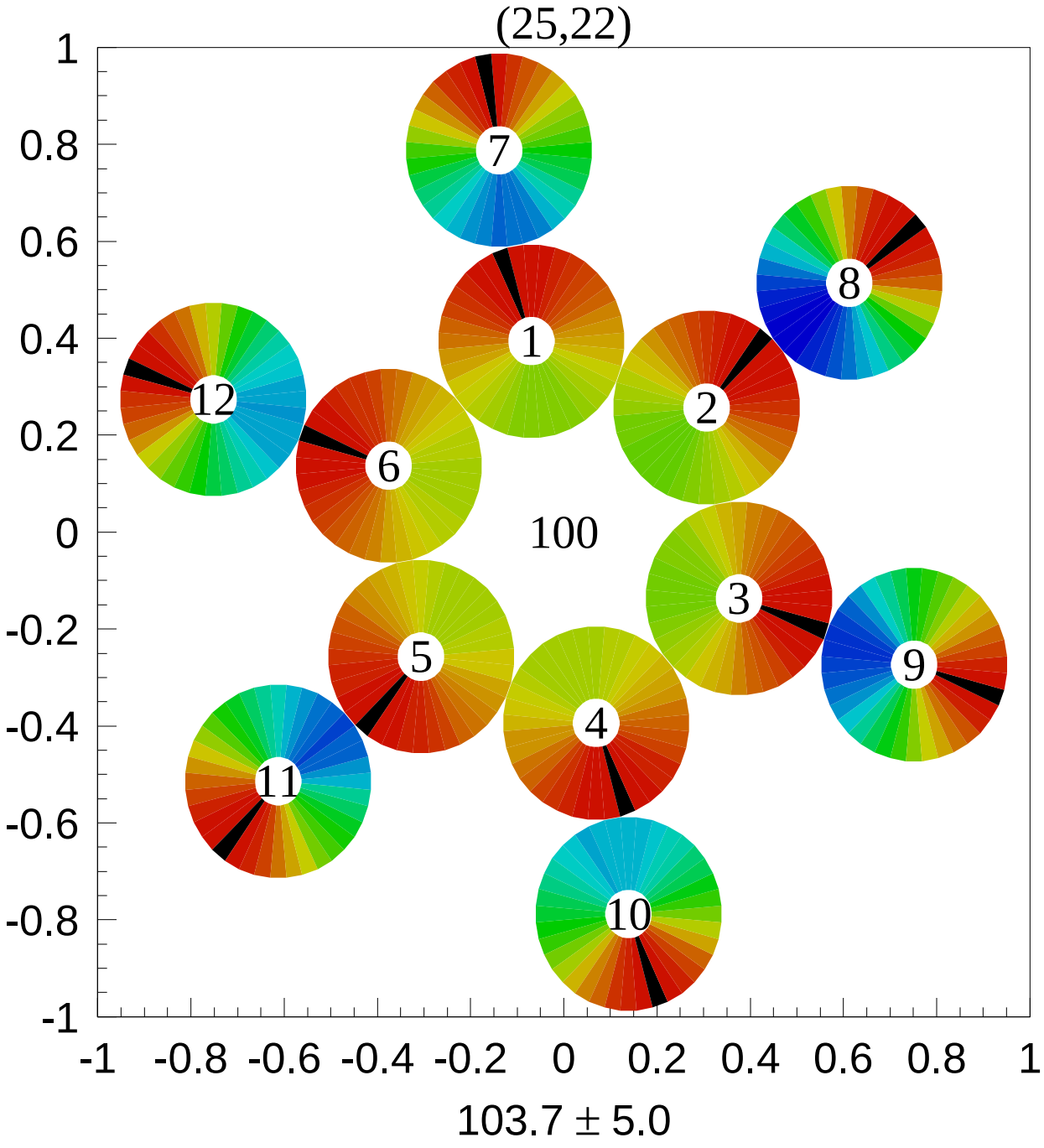

(25,20)
tilted LEDs
112 115 124 115 121 125
average of 6
average of 12
12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 123 128 123 118 121
average of 6
average of 12
12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

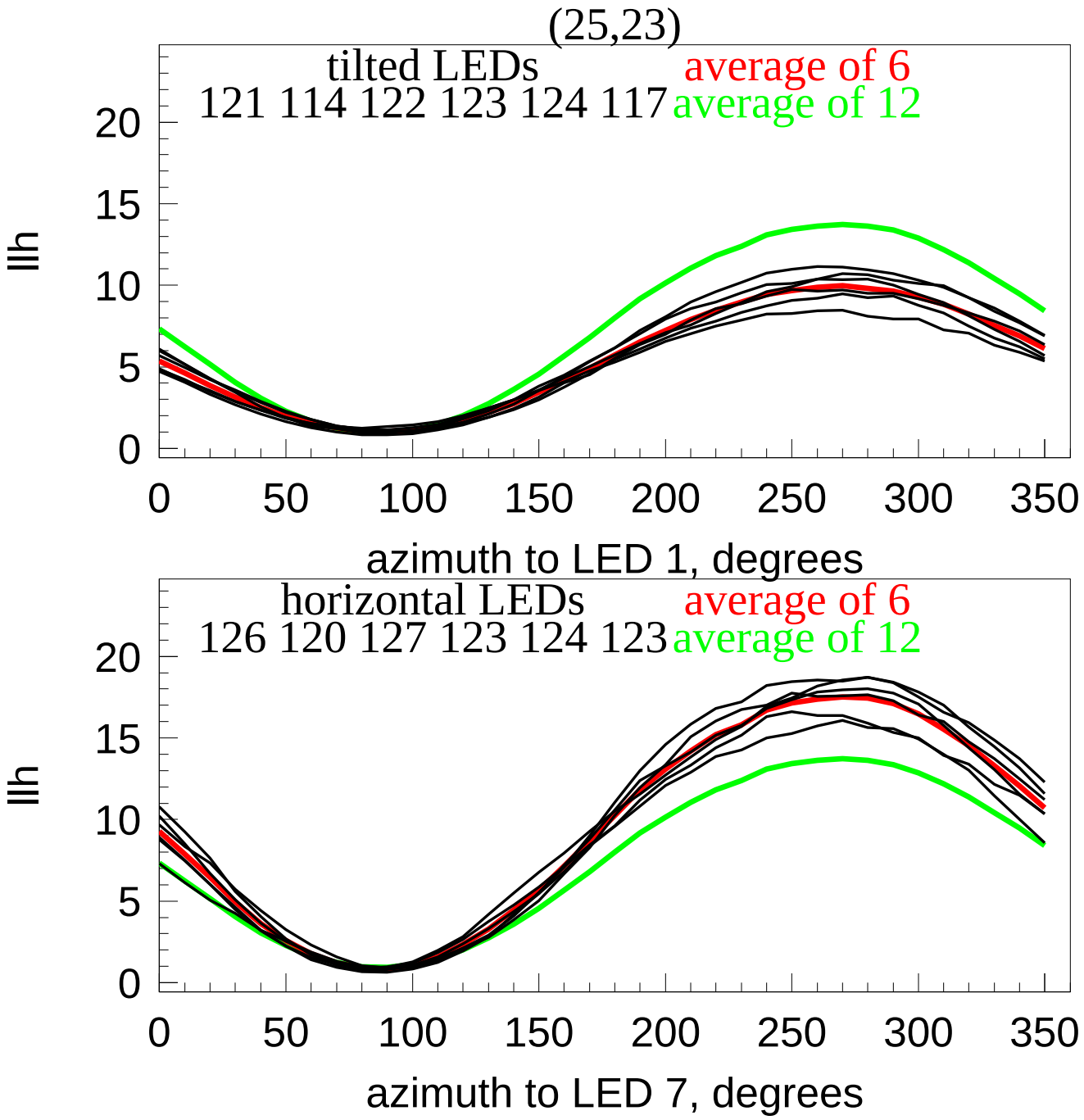

(25,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
179 ± 4.9

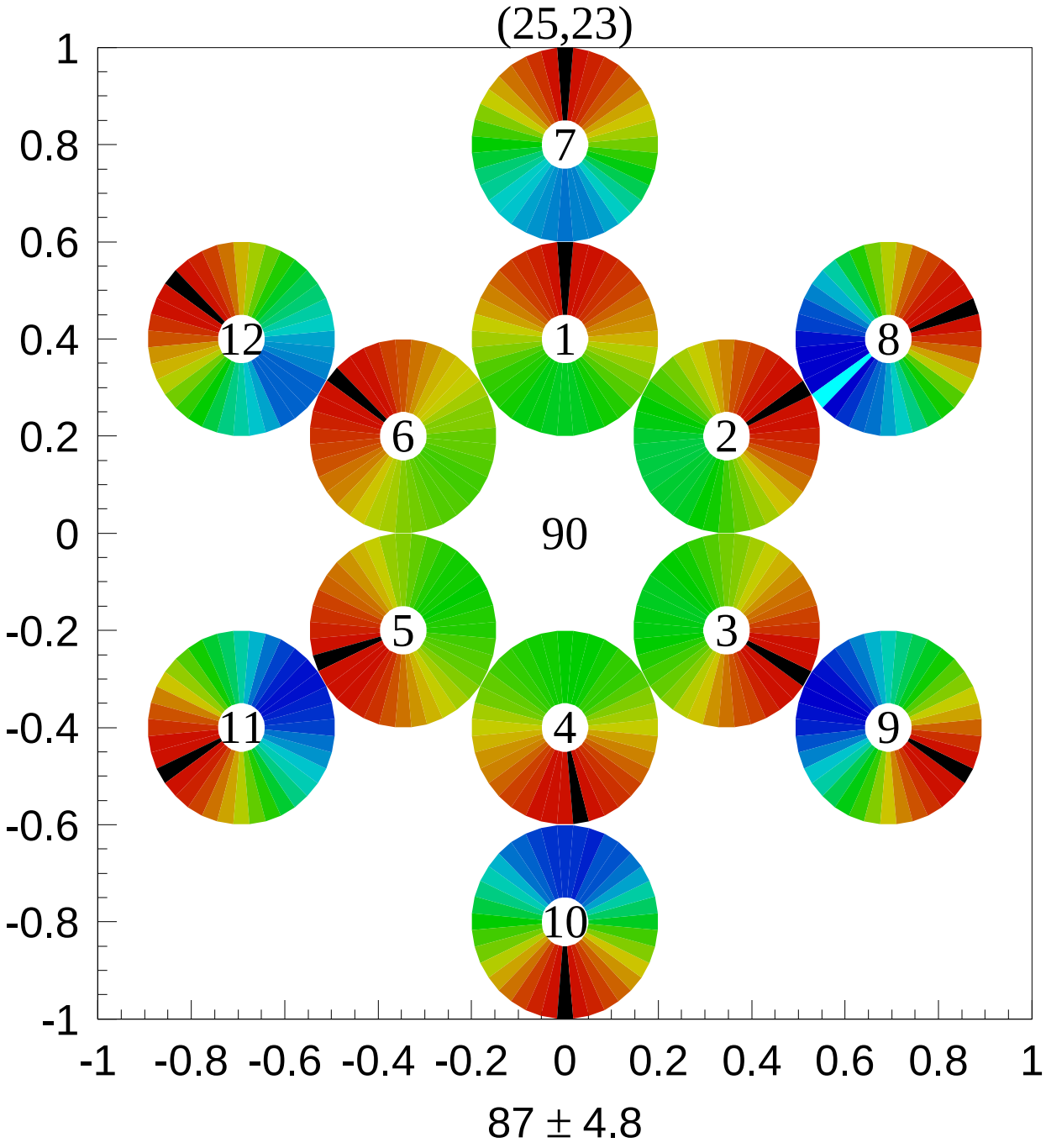

(25,21)
tilted LEDs
129 120 122 119 123 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
130 134 118 120 124 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

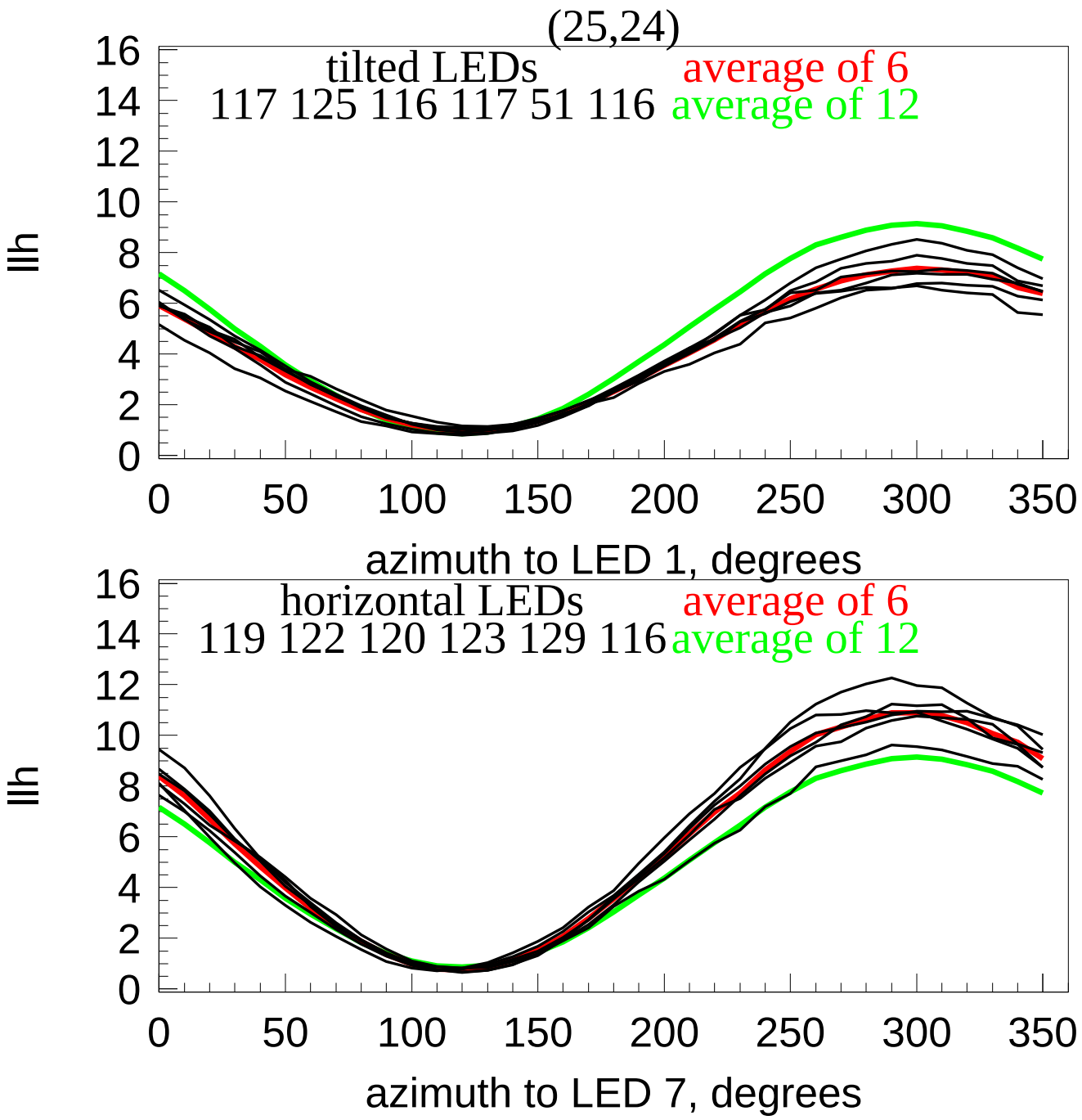

(25,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
60.7 ± 5.4

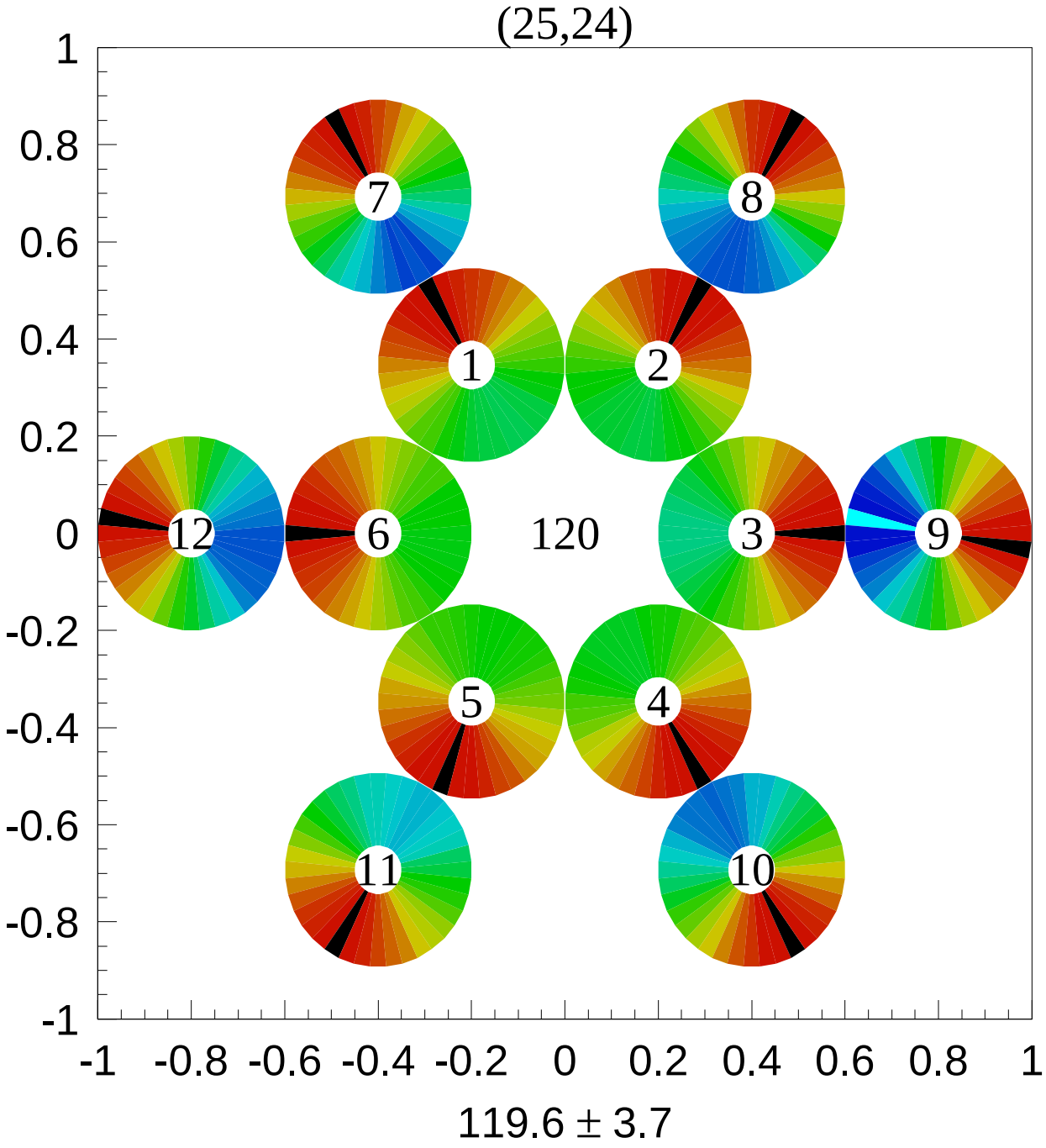

(25,22)
tilted LEDs
124 119 123 124 113 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 126 121 124 121 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

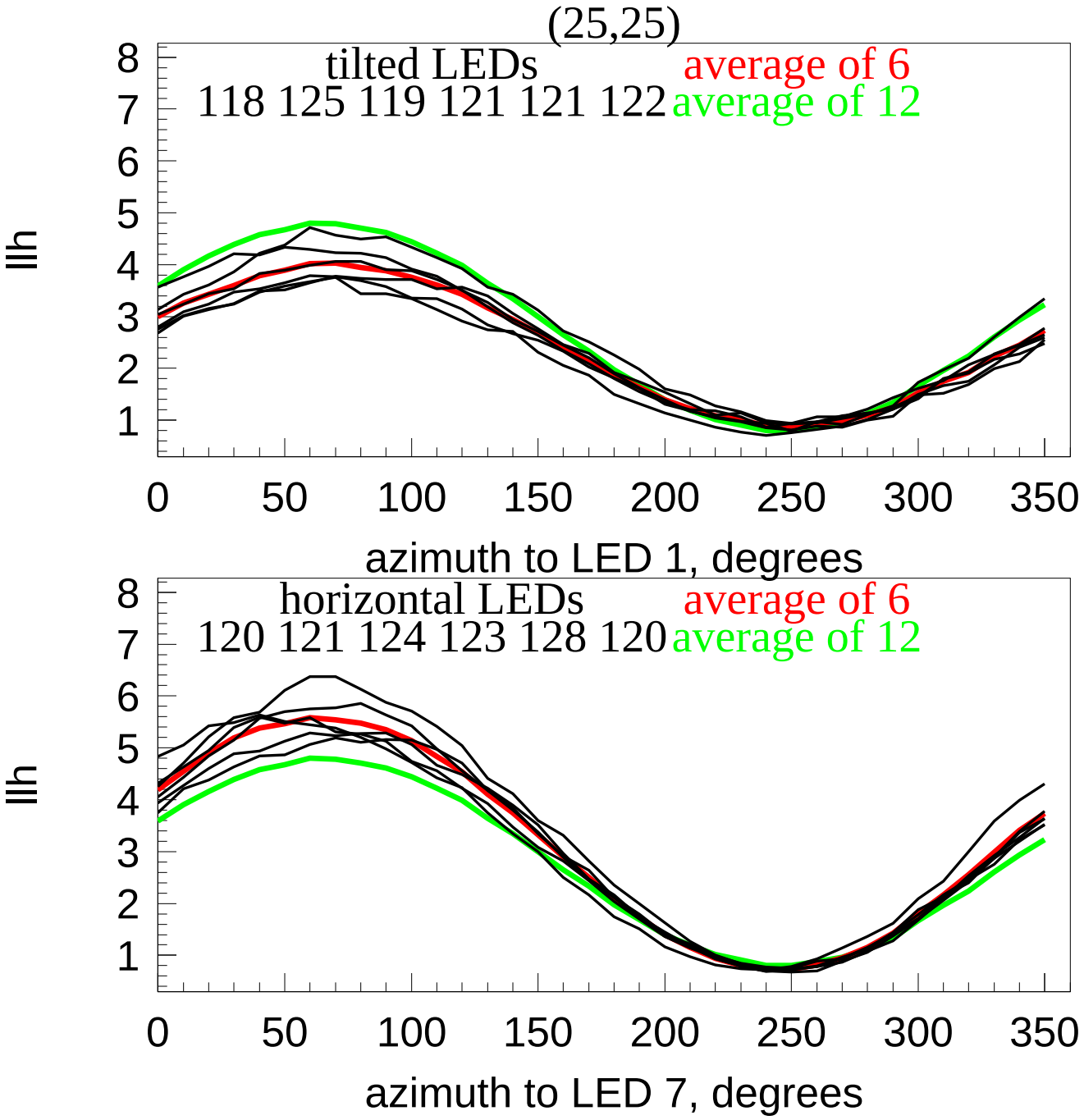

(25,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
103.7 ± 5.0

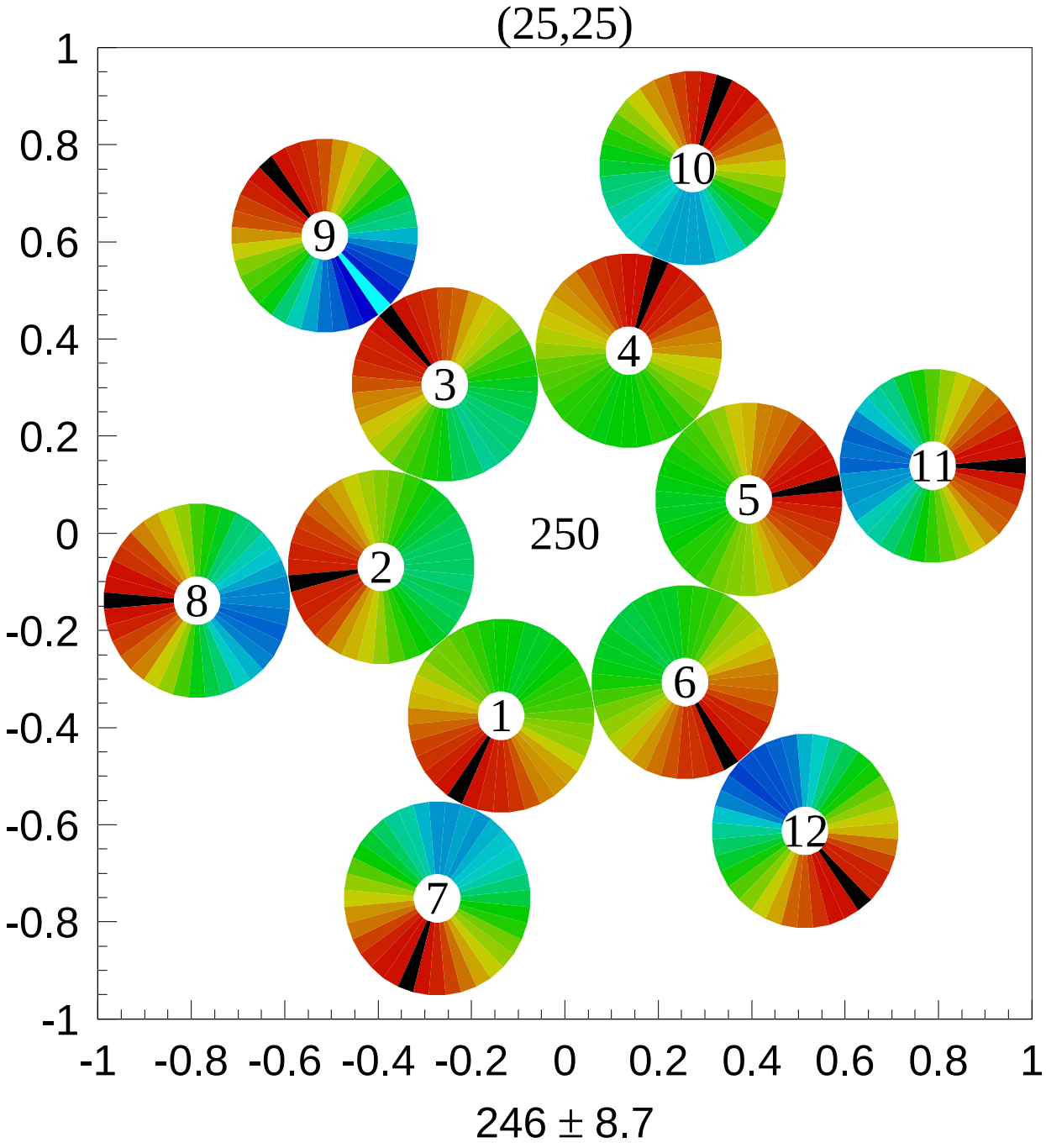

(25,23)
tilted LEDs
121 114 122 123 124 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 127 123 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

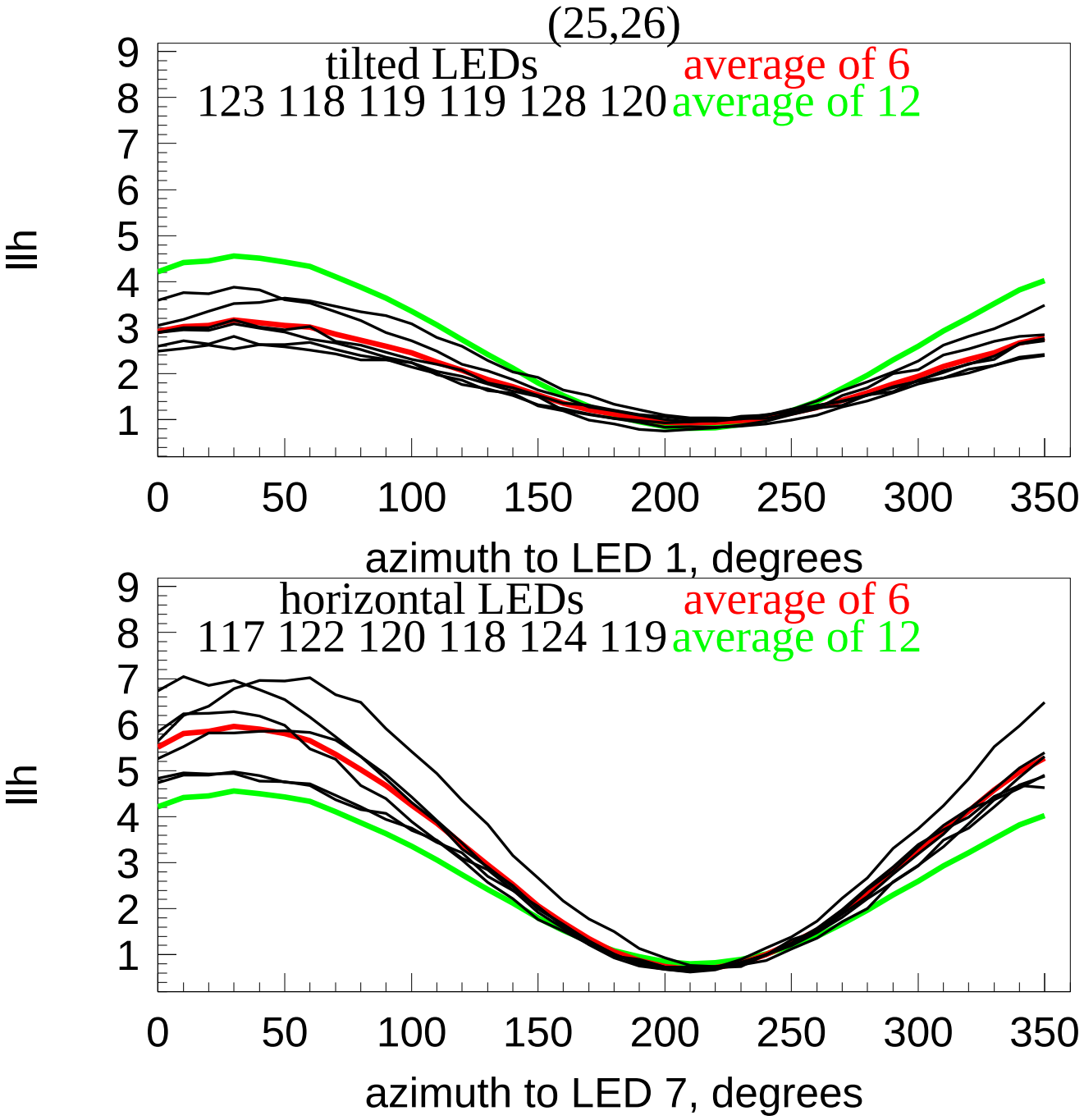

(25,23)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
87 ± 4.8

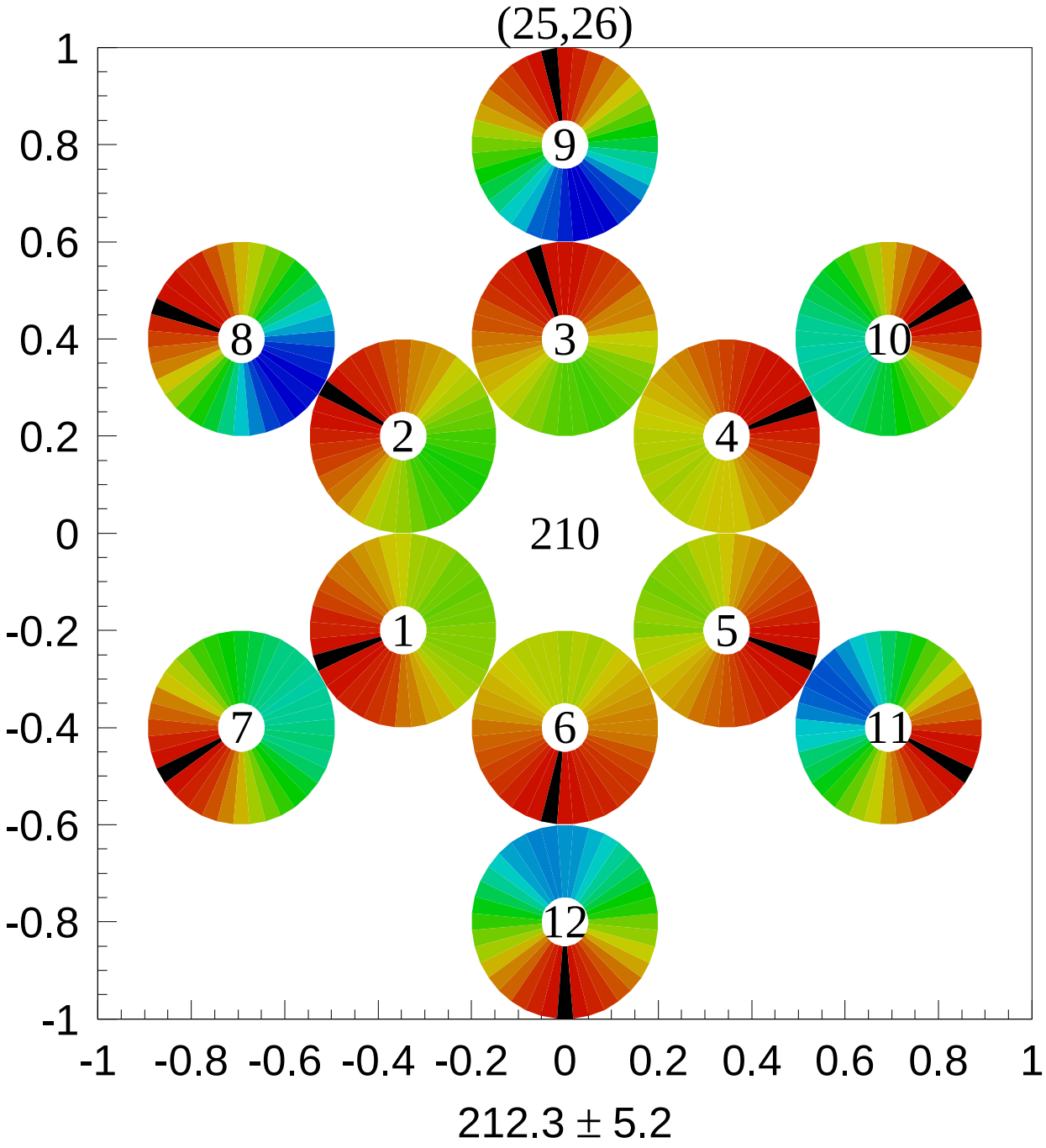

(25,24)
tilted LEDs
117 125 116 117 51 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 120 123 129 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

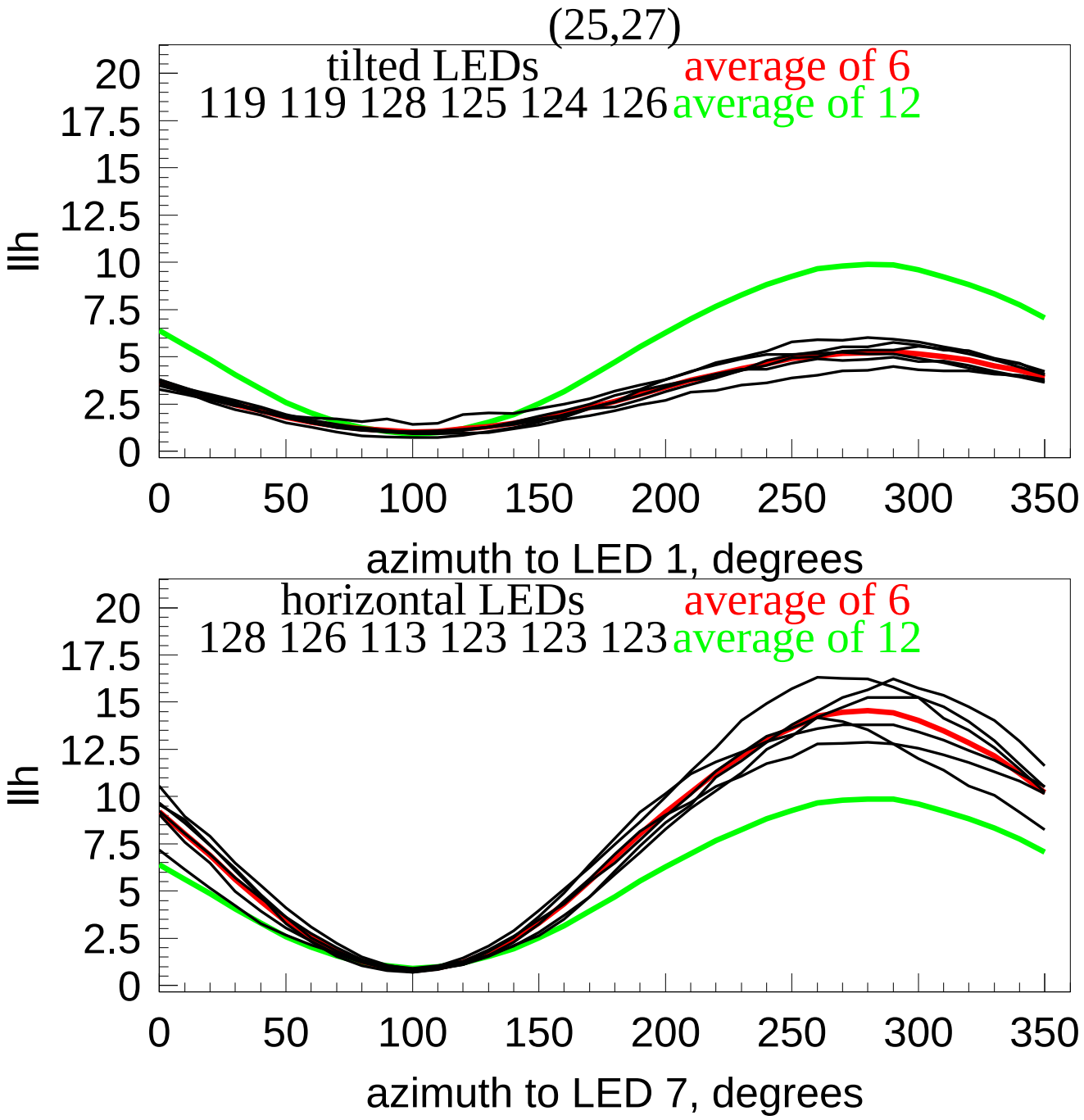

(25,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
119.6 ± 3.7

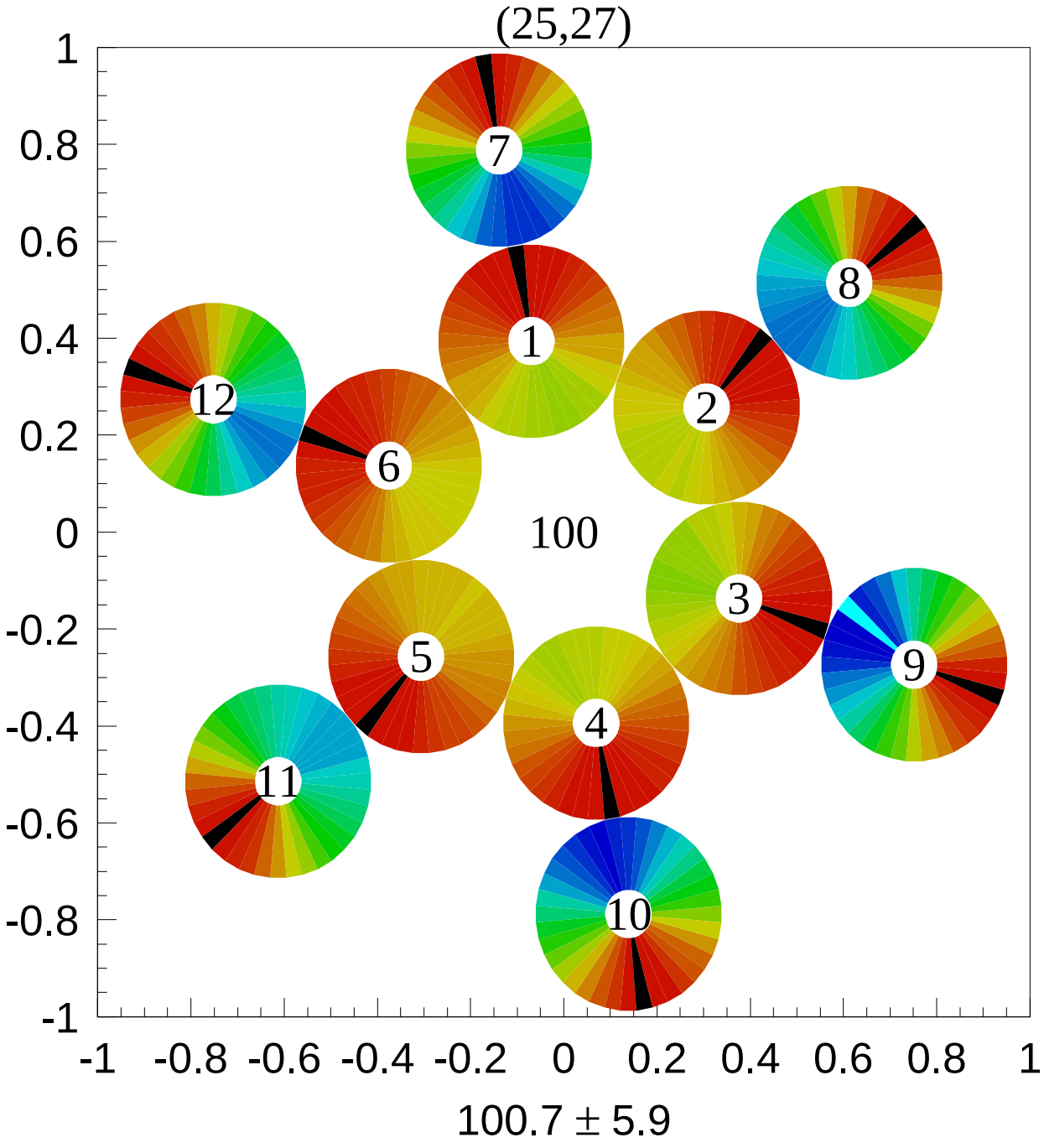

(25,25)
tilted LEDs
118 125 119 121 121 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 121 124 123 128 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

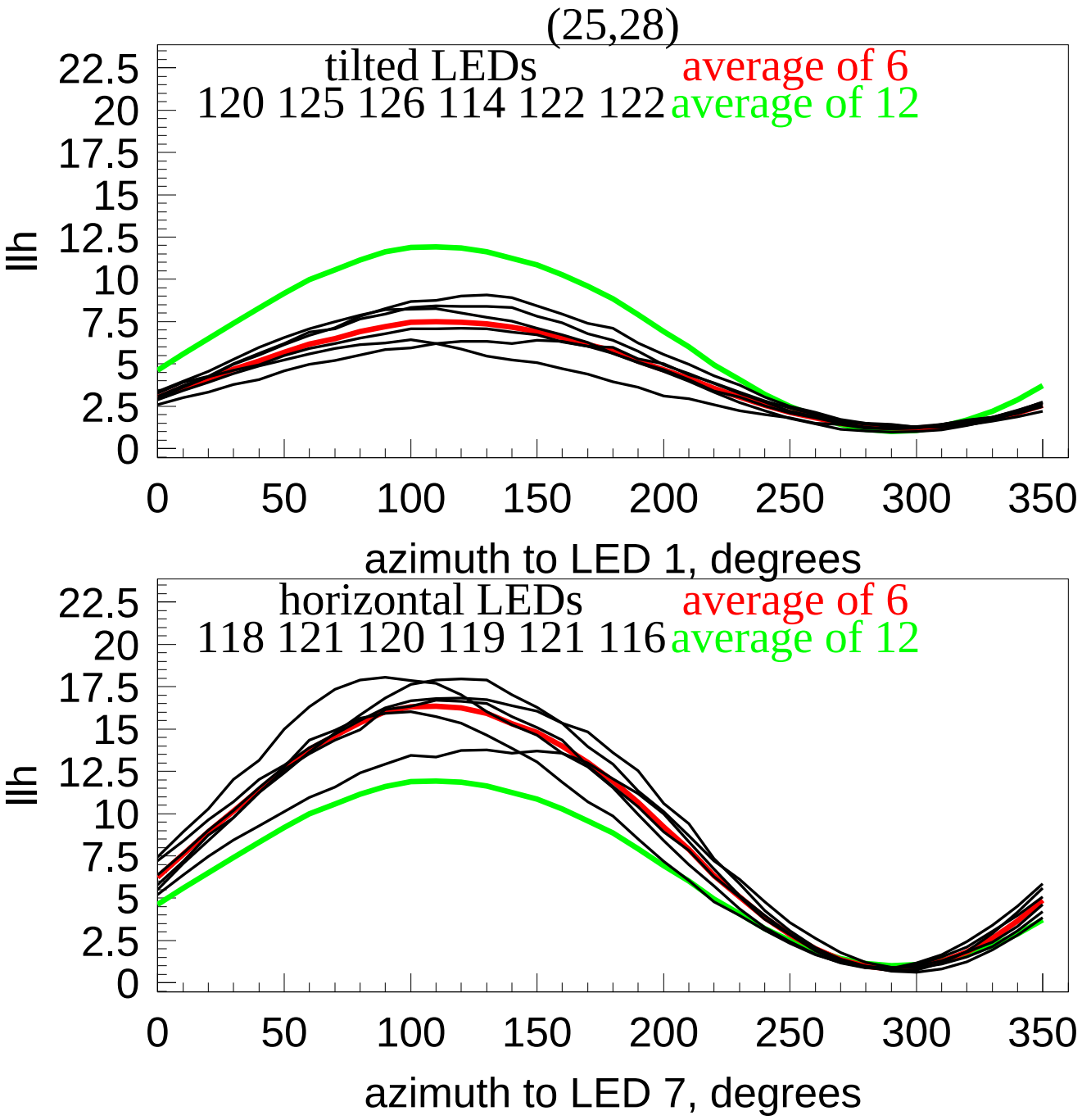

(25,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
246 ± 8.7
250
1
2
3
4
5
6
7
8
9
10
11
12

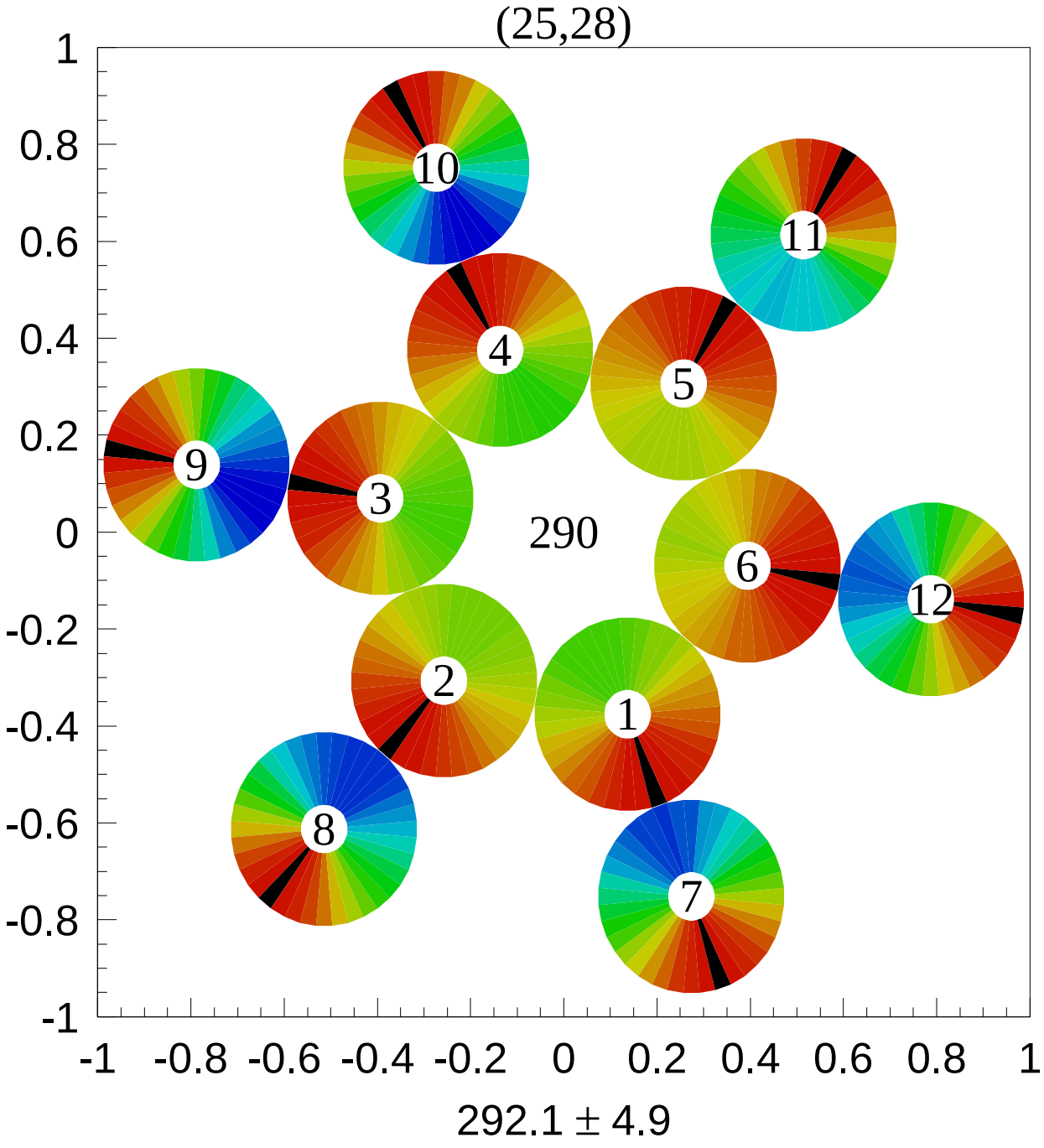

(25,26)
tilted LEDs
123 118 119 119 128 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 120 118 124 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

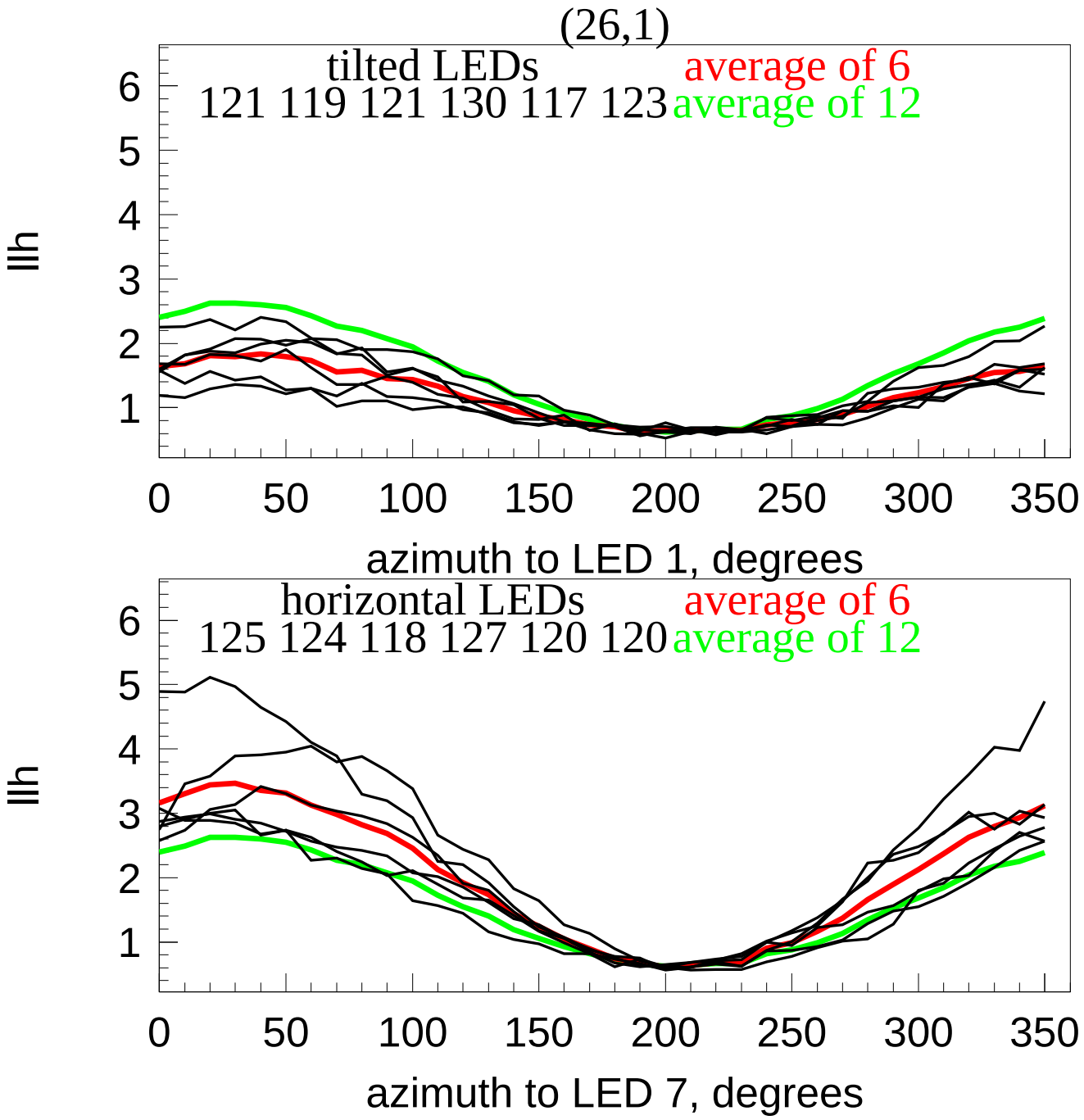

(25,26)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
212.3 ± 5.2

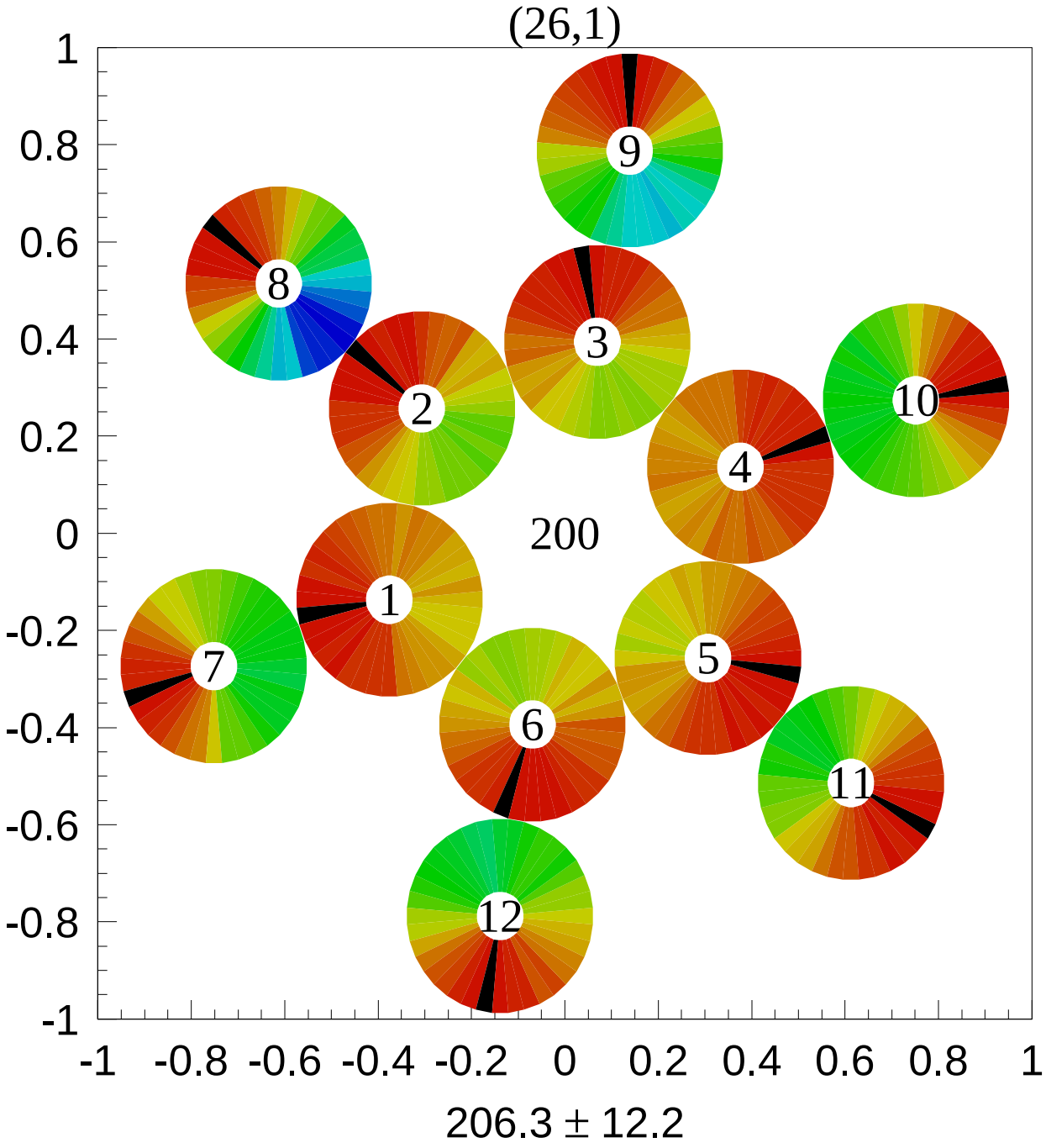

(25,27)
tilted LEDs
119 119 128 125 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 126 113 123 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

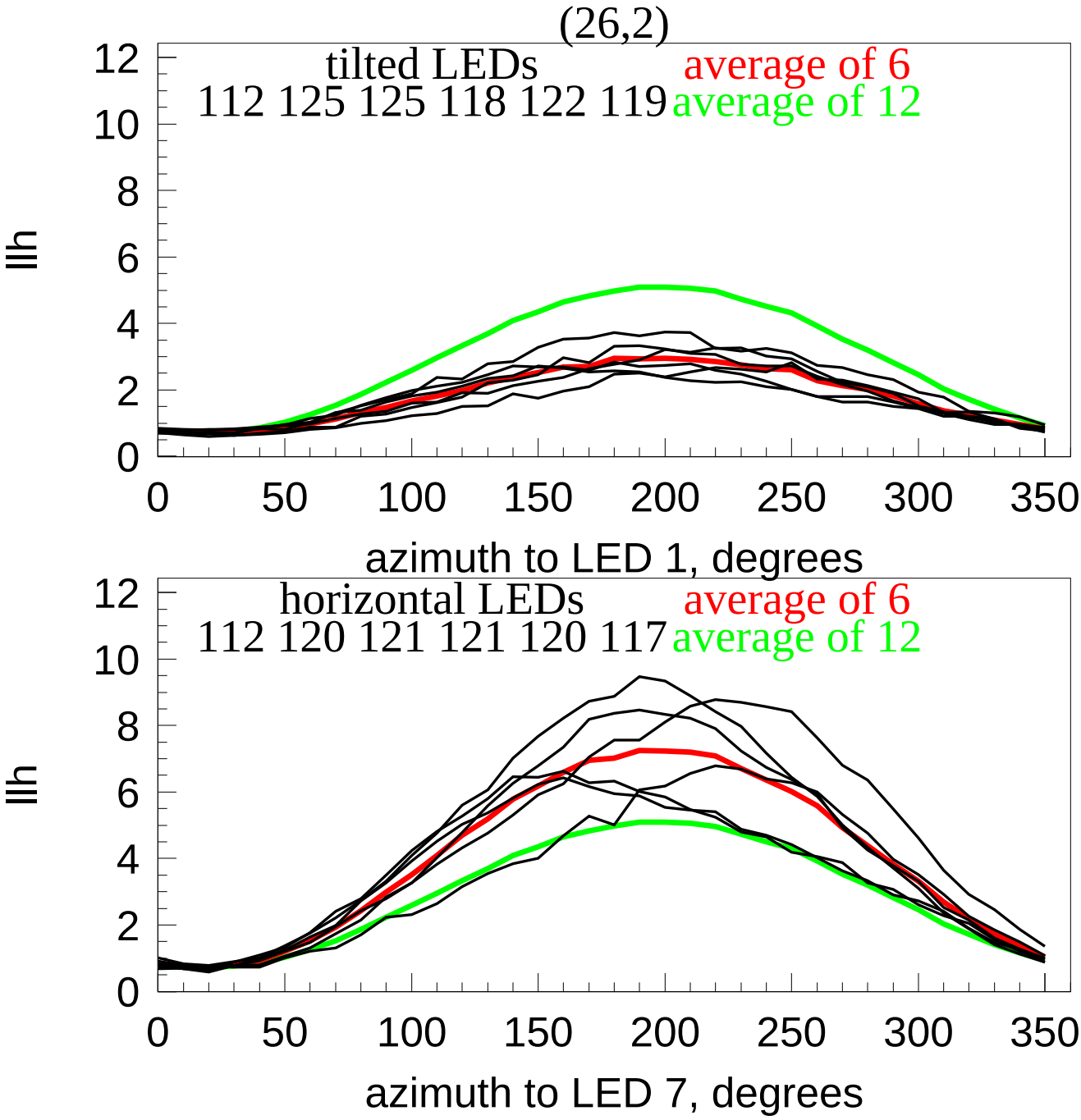

(25,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
100.7 ± 5.9

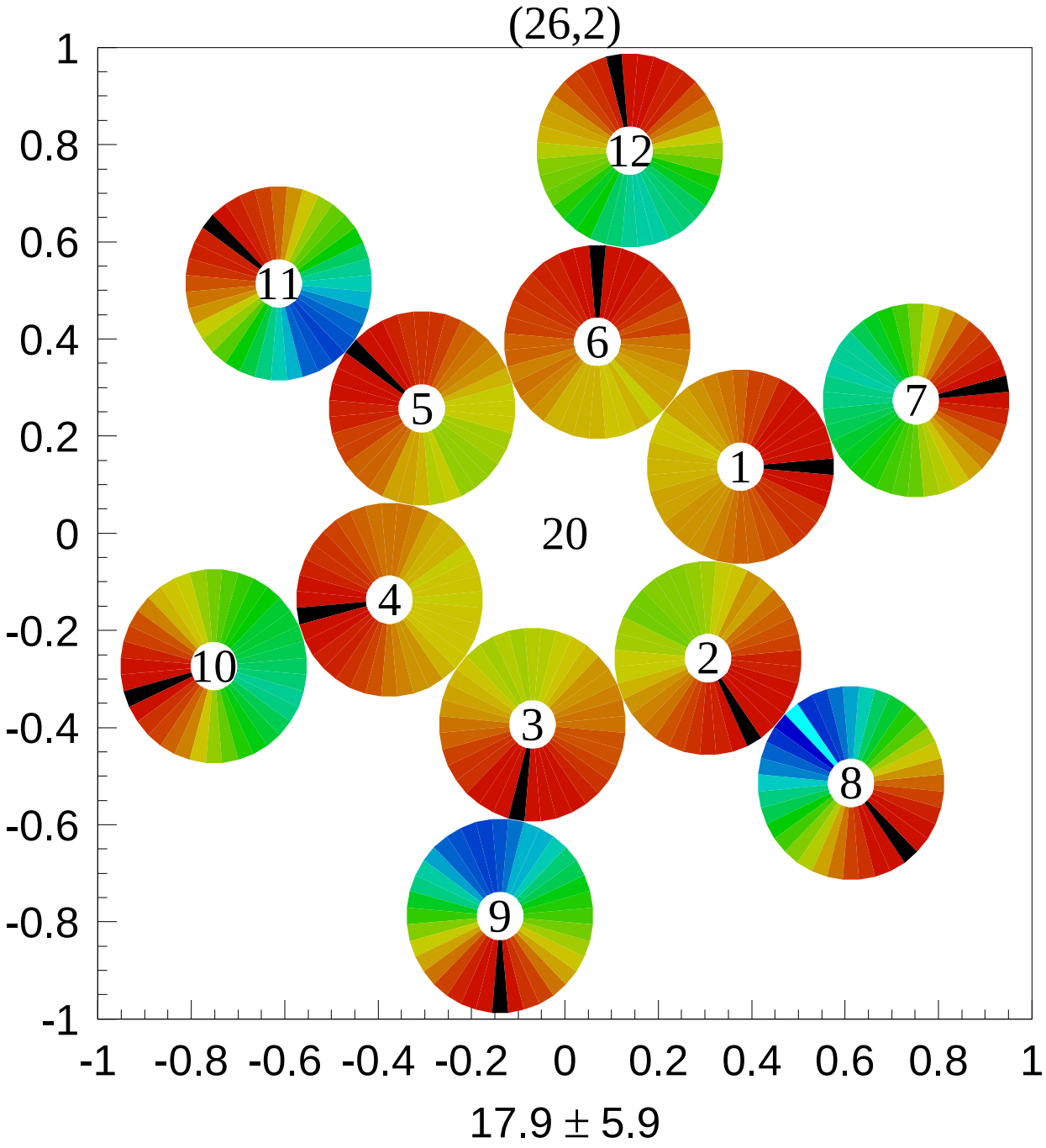

(25,28)
tilted LEDs
120 125 126 114 122 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 120 119 121 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

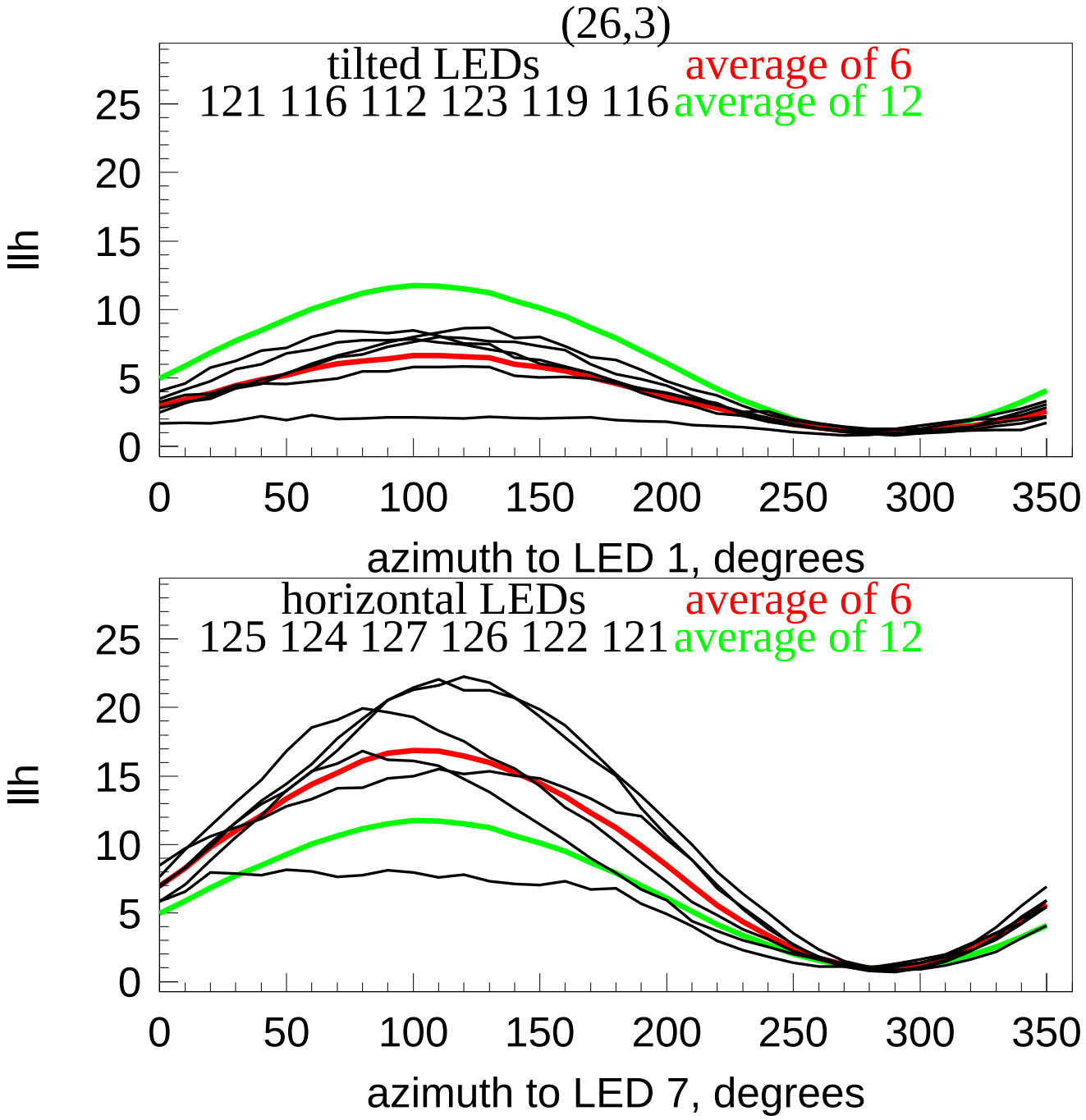

(25,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
292.1 ± 4.9

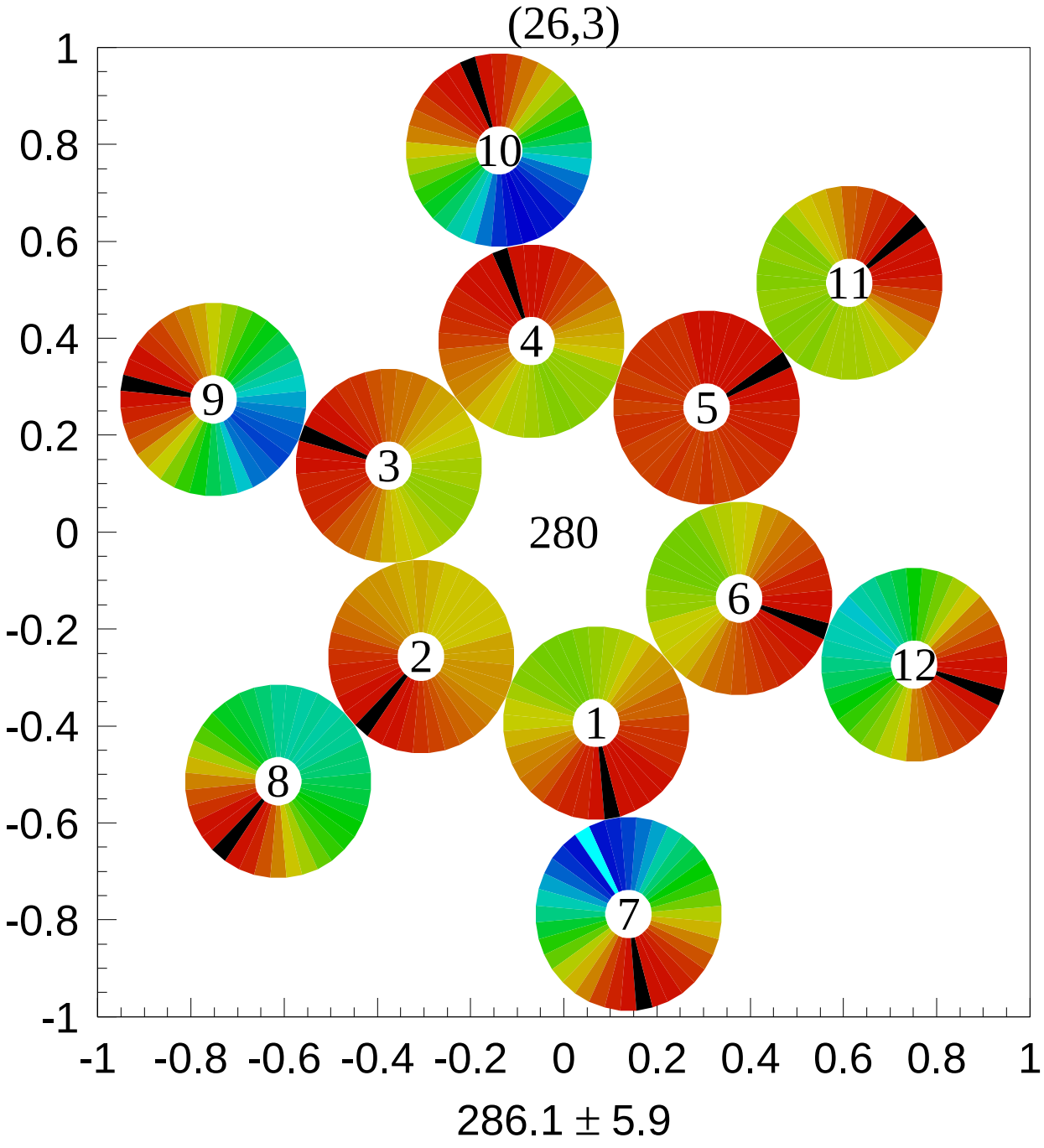

(26,1)
tilted LEDs
121 119 121 130 117 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 118 127 120 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

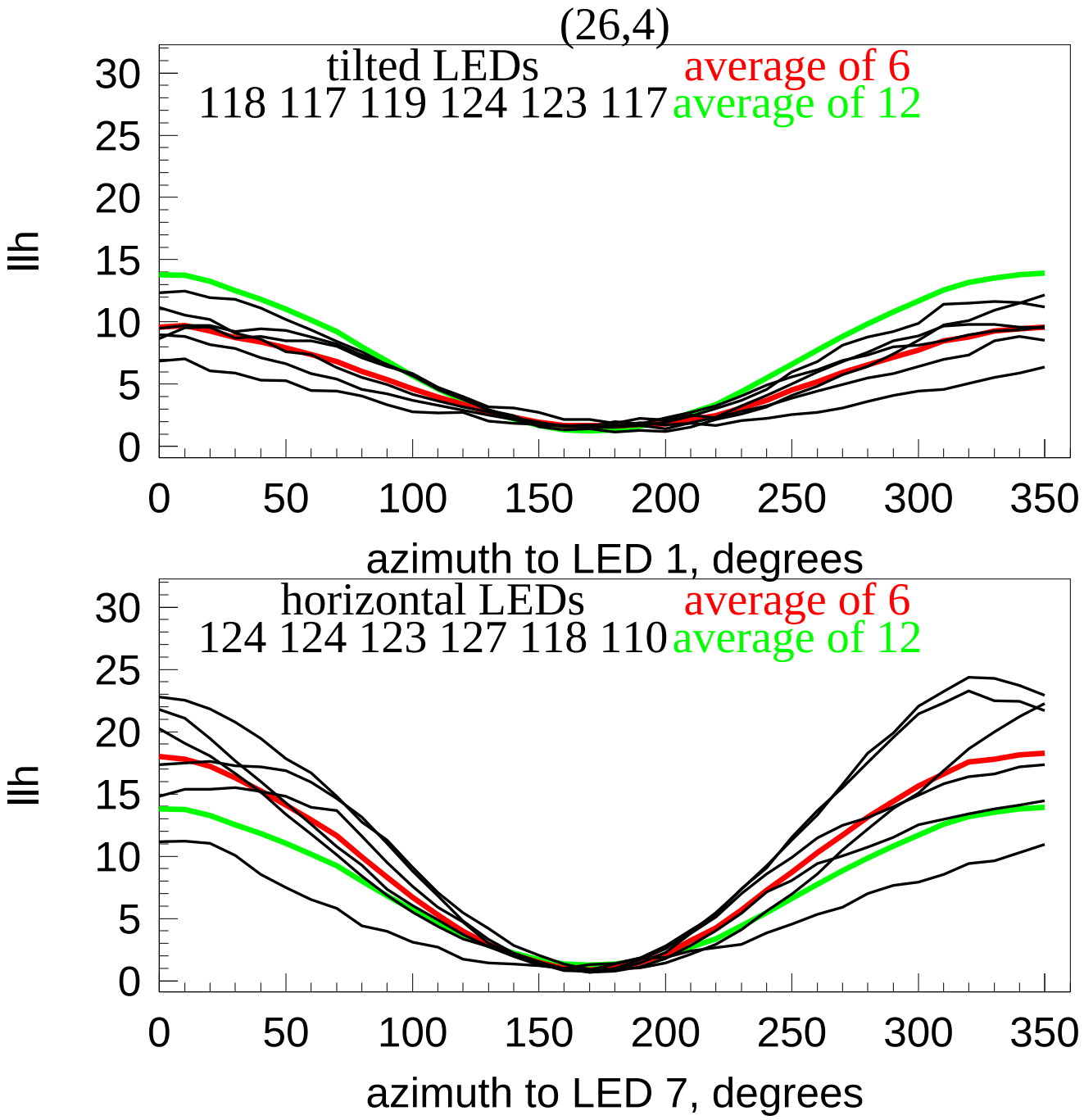

(26,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
206.3 ± 12.2

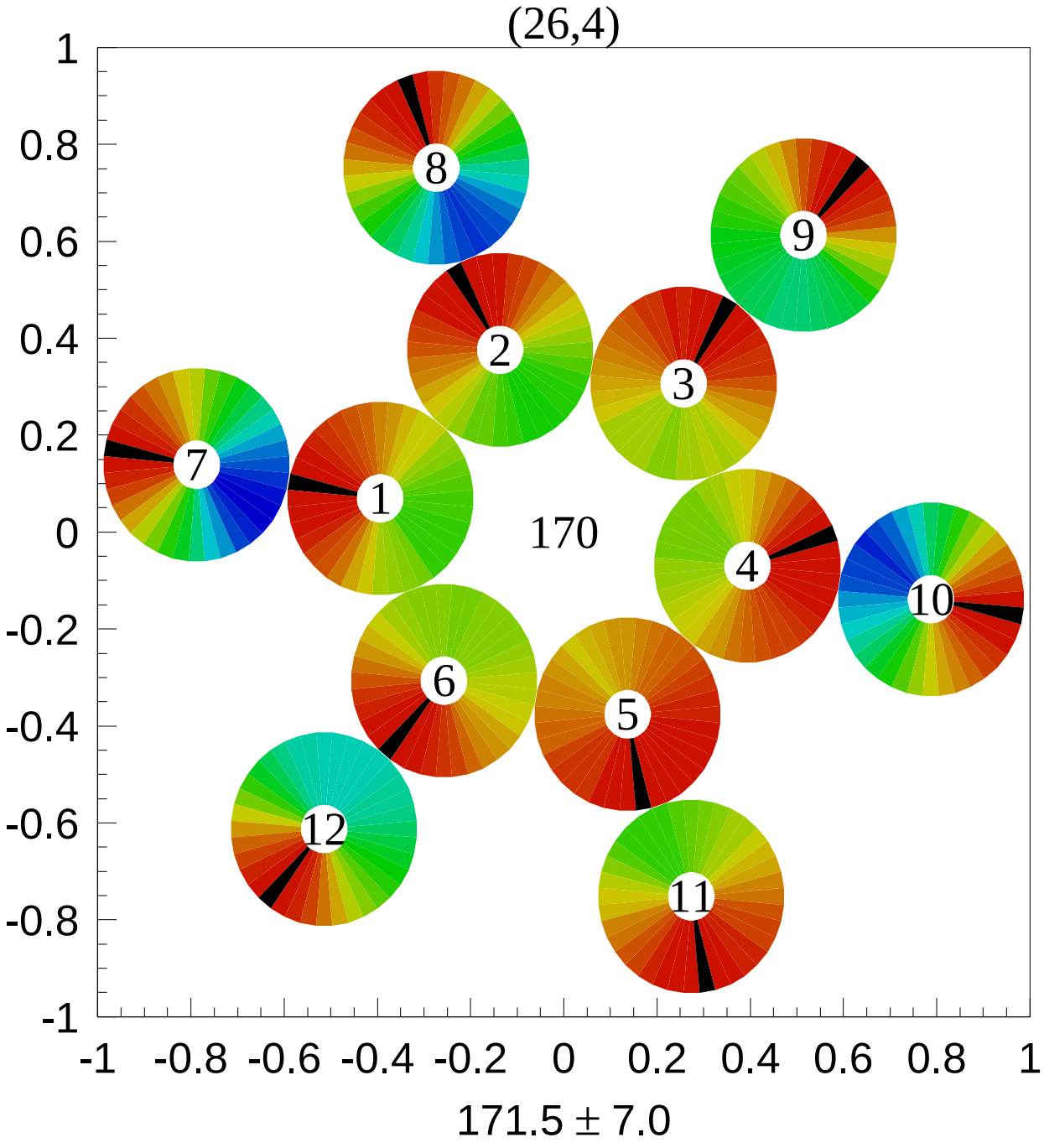

(26,2)
tilted LEDs
112 125 125 118 122 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
112 120 121 121 120 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

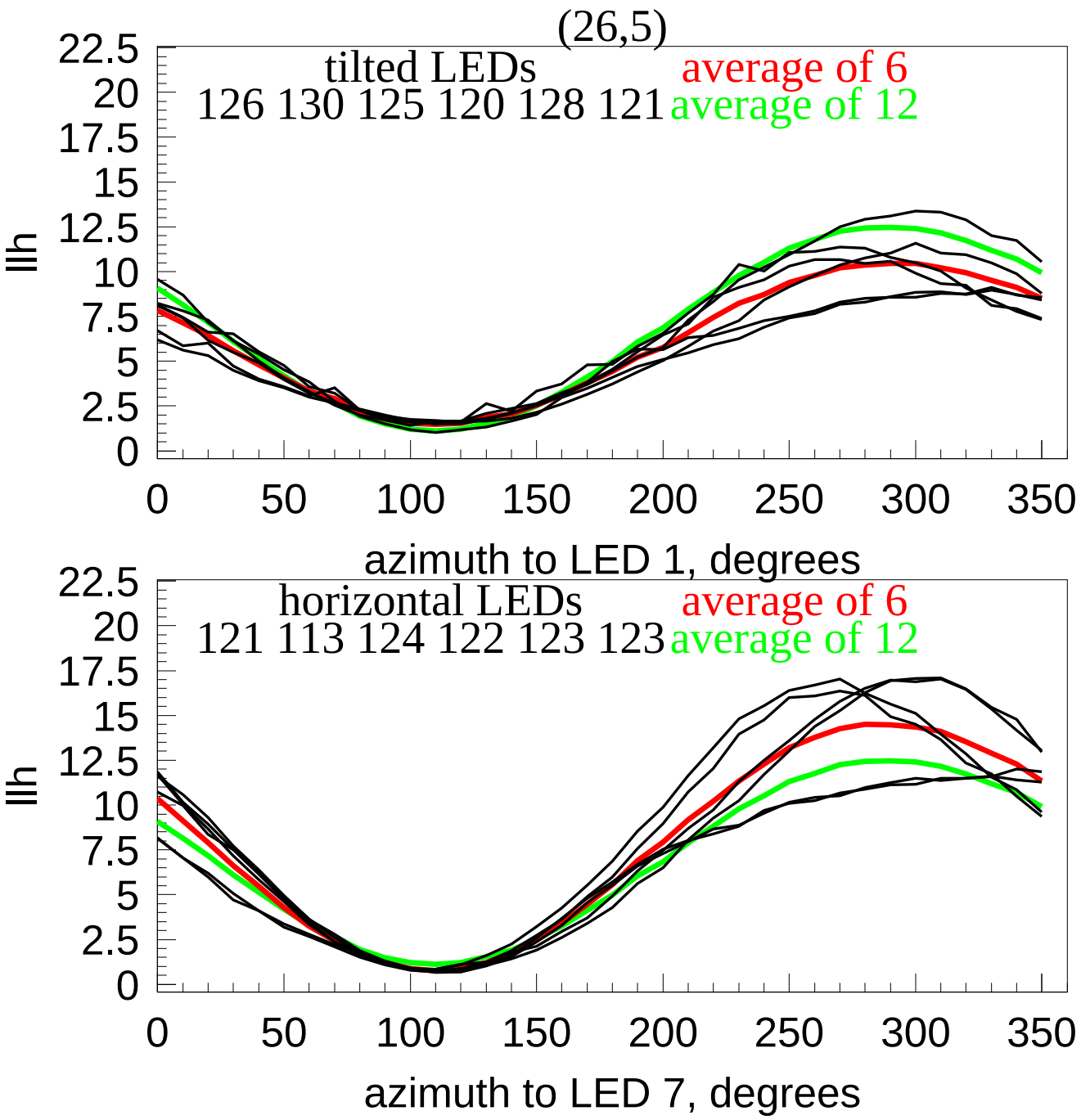

(26,2)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
17.9 ± 5.9

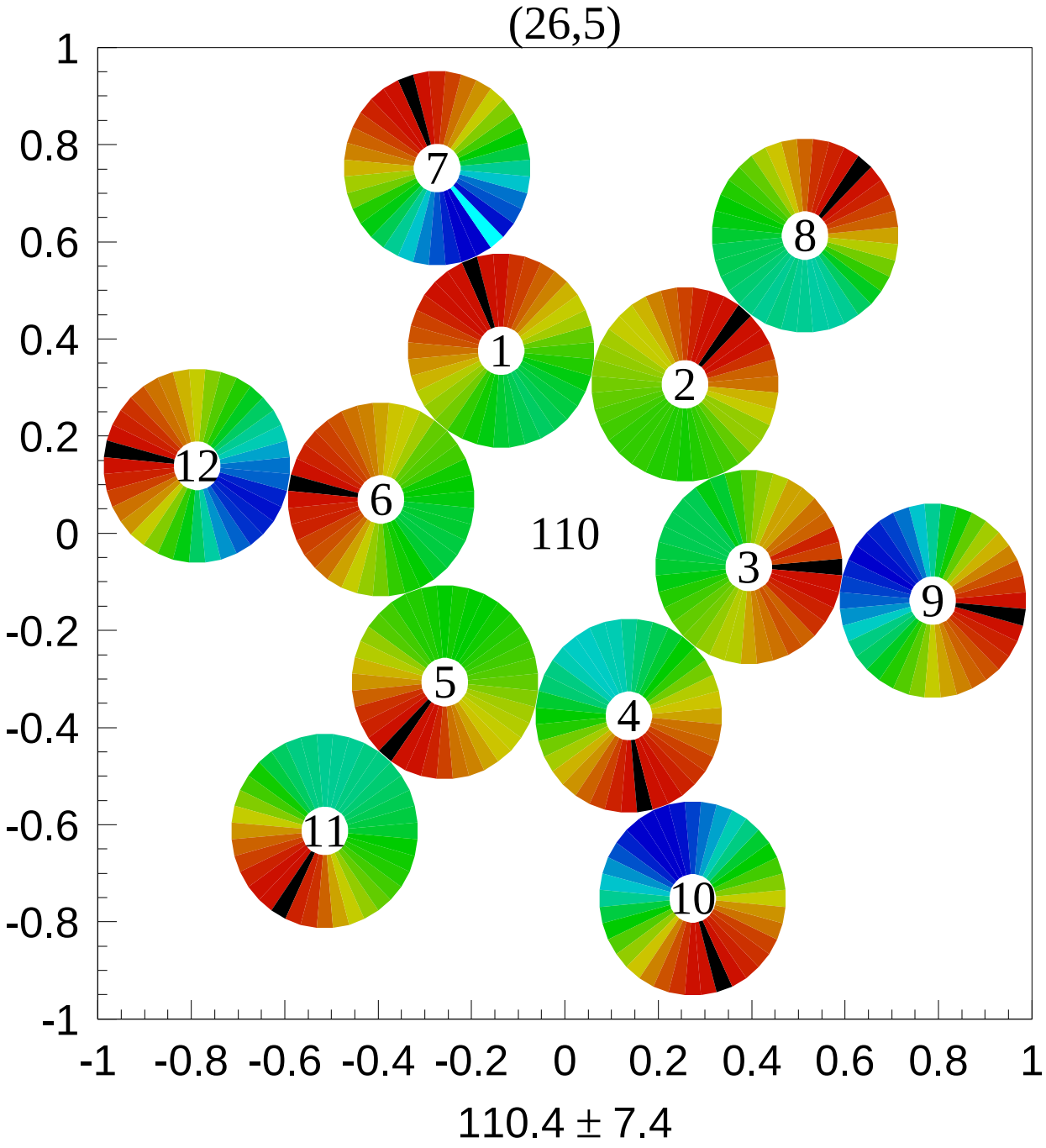

(26,3)
tilted LEDs
121 116 112 123 119 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 127 126 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

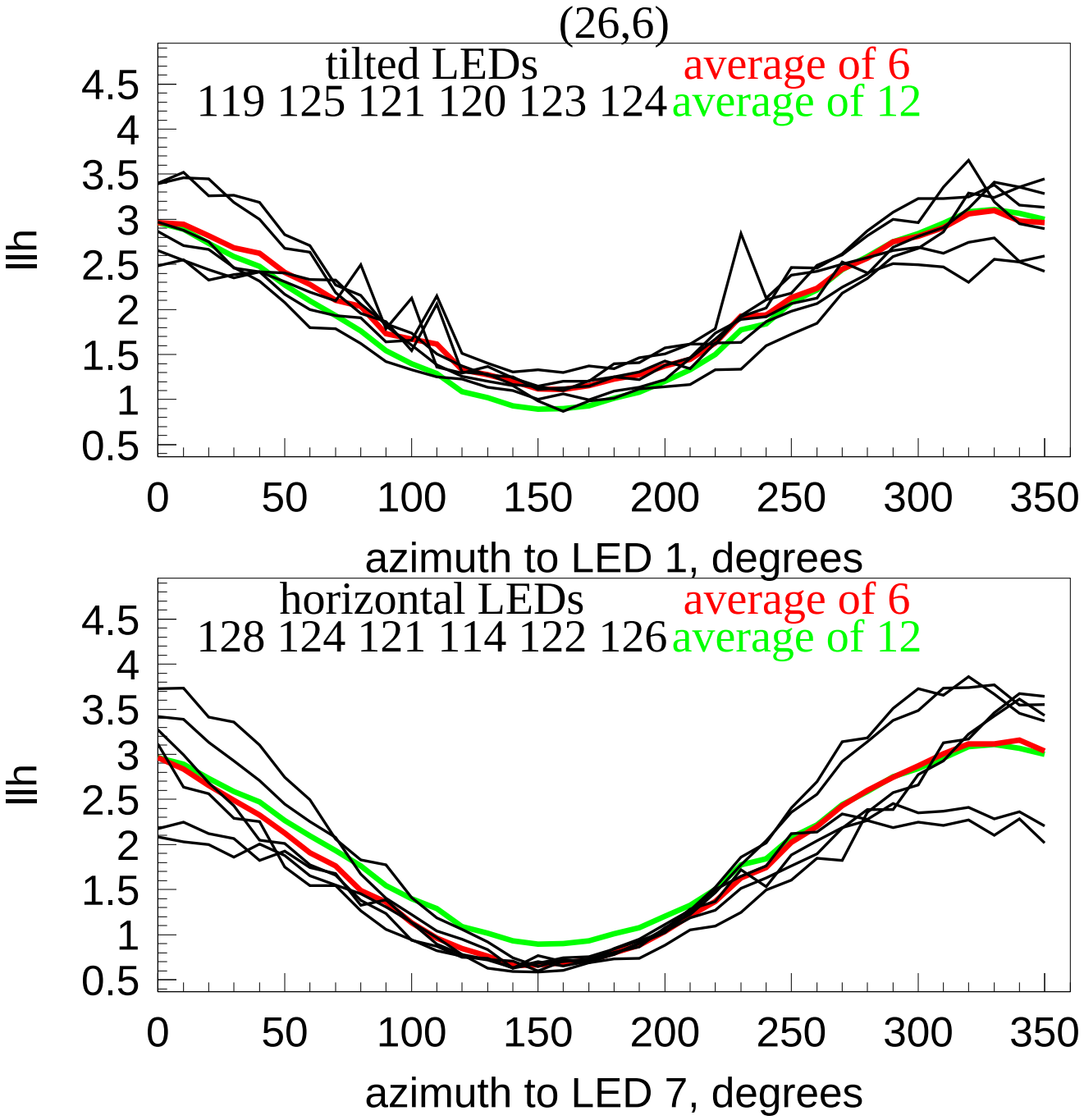

(26,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
286.1 ± 5.9

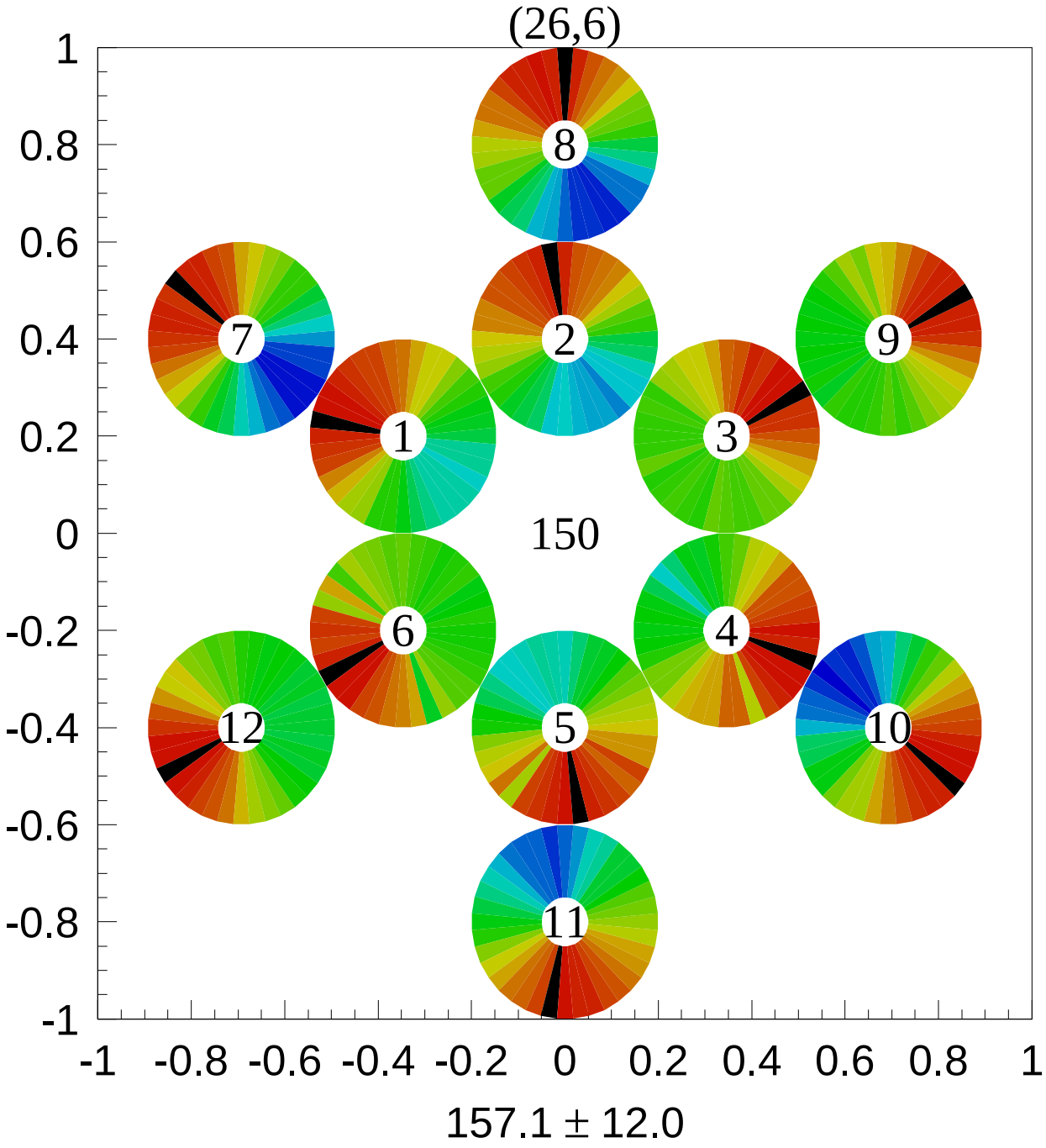

(26,4)
tilted LEDs
118 117 119 124 123 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 124 123 127 118 110
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

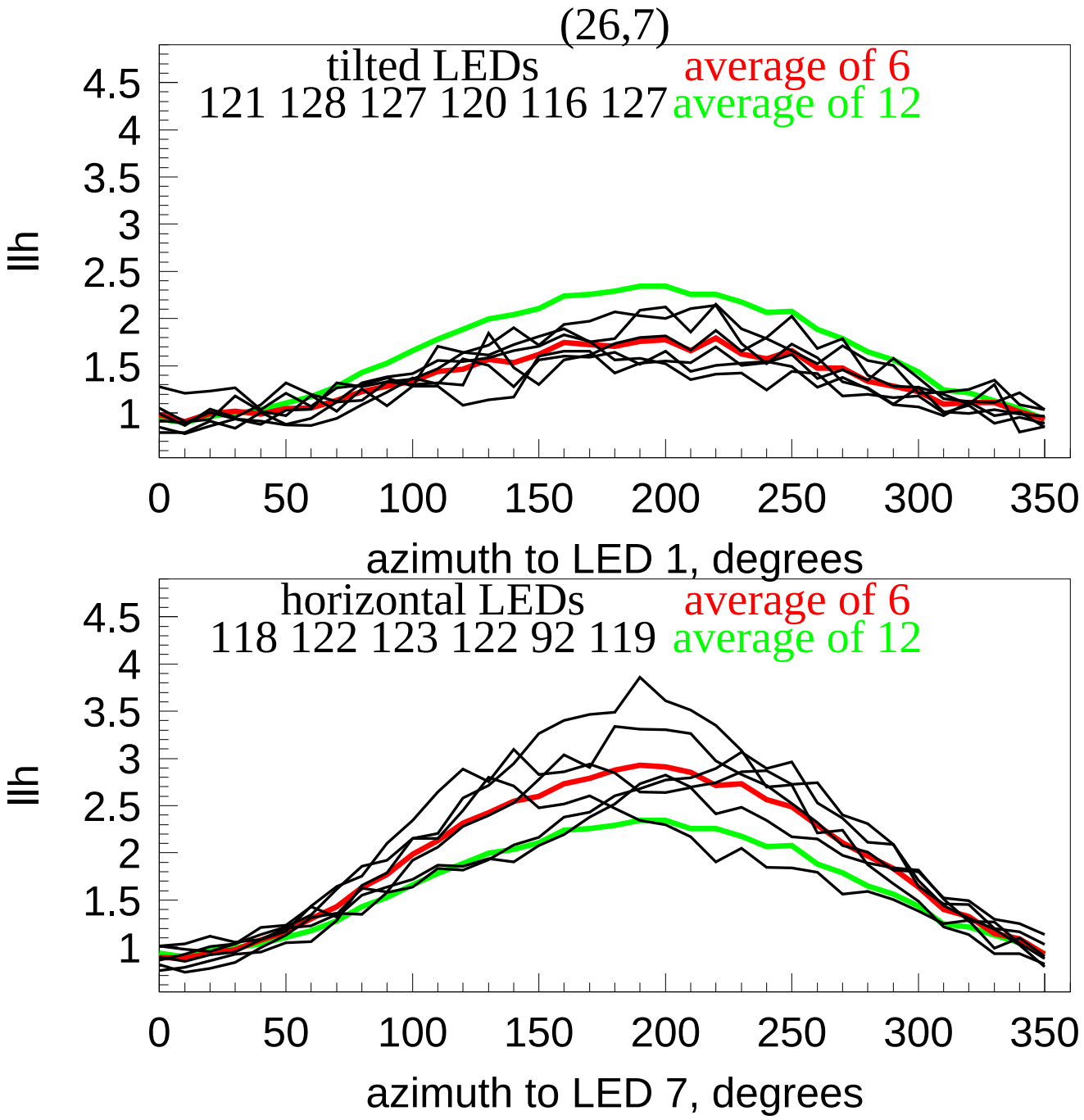

(26,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
171.5 ± 7.0

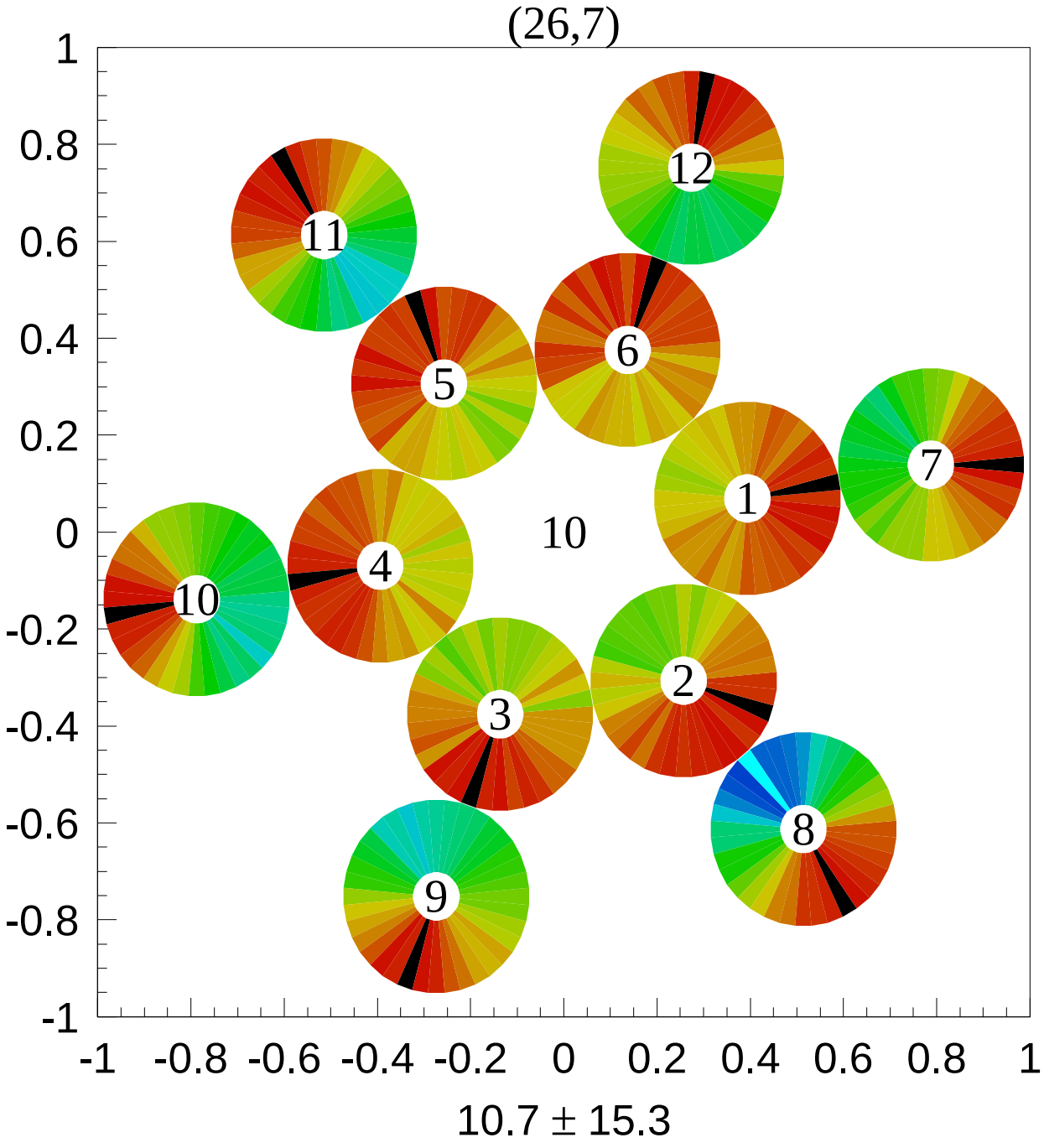

(26,5)
tilted LEDs
126 130 125 120 128 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 113 124 122 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

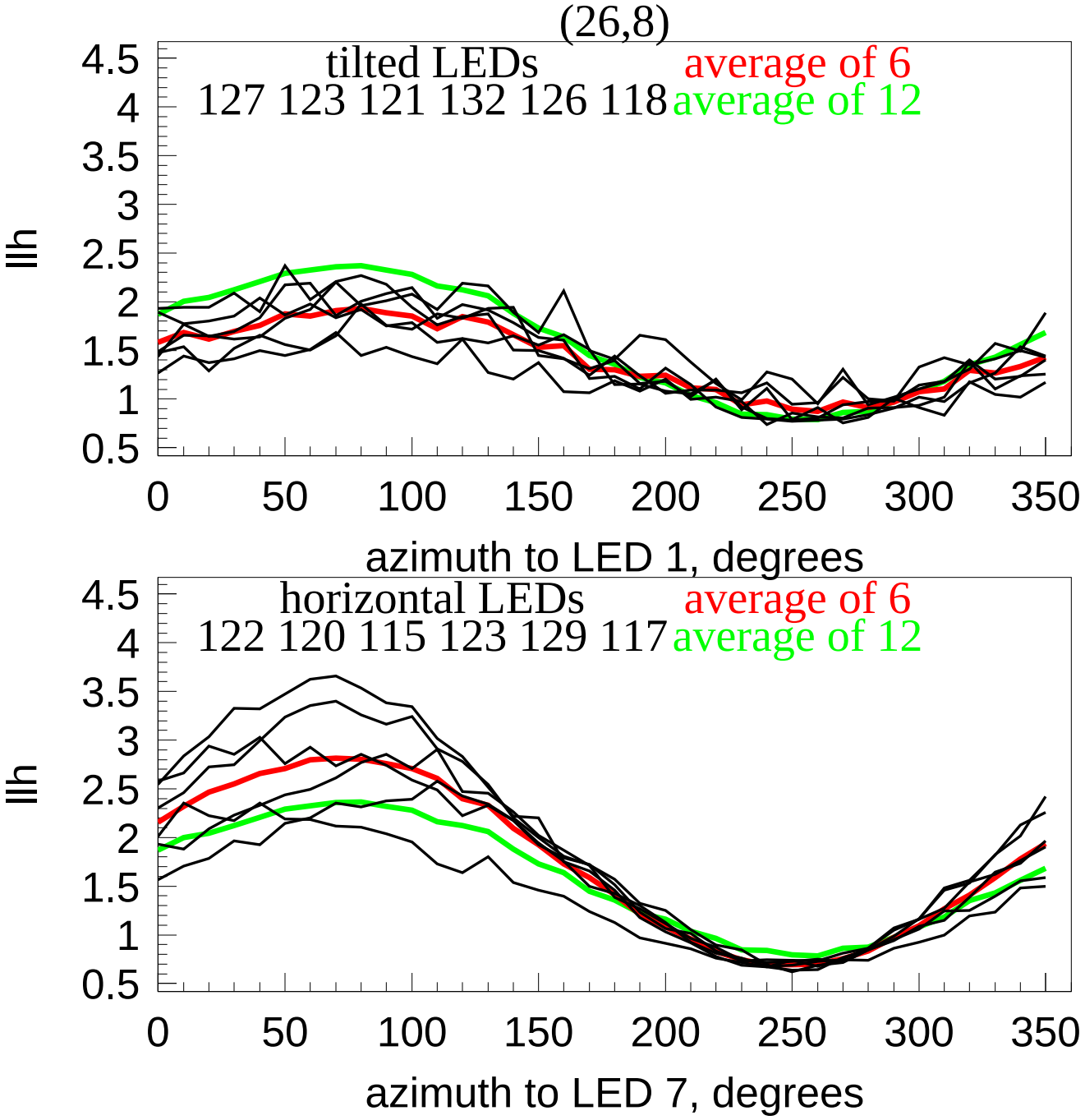

(26,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
110.4 ± 7.4

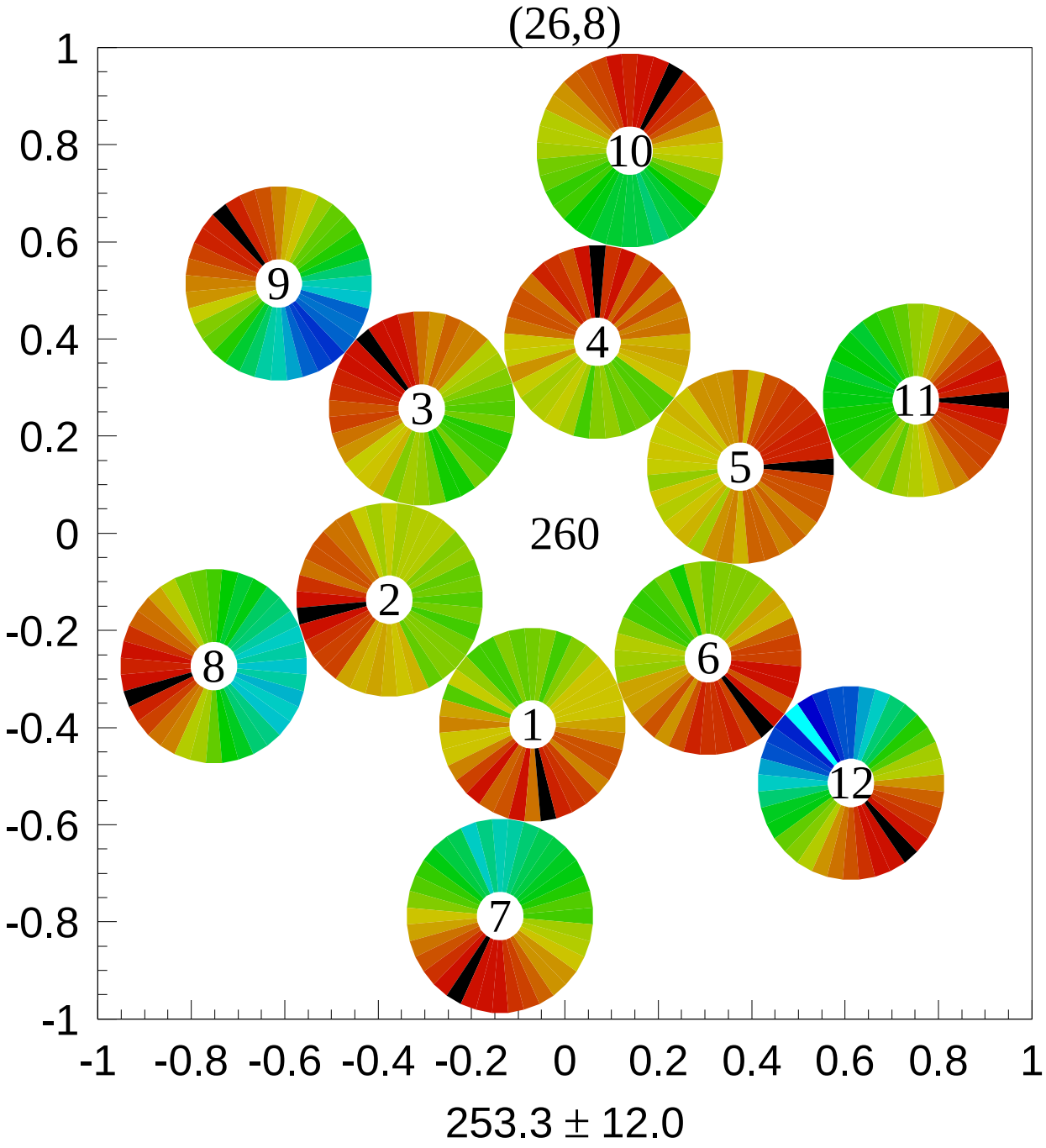

(26,6)
tilted LEDs
119 125 121 120 123 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 124 121 114 122 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

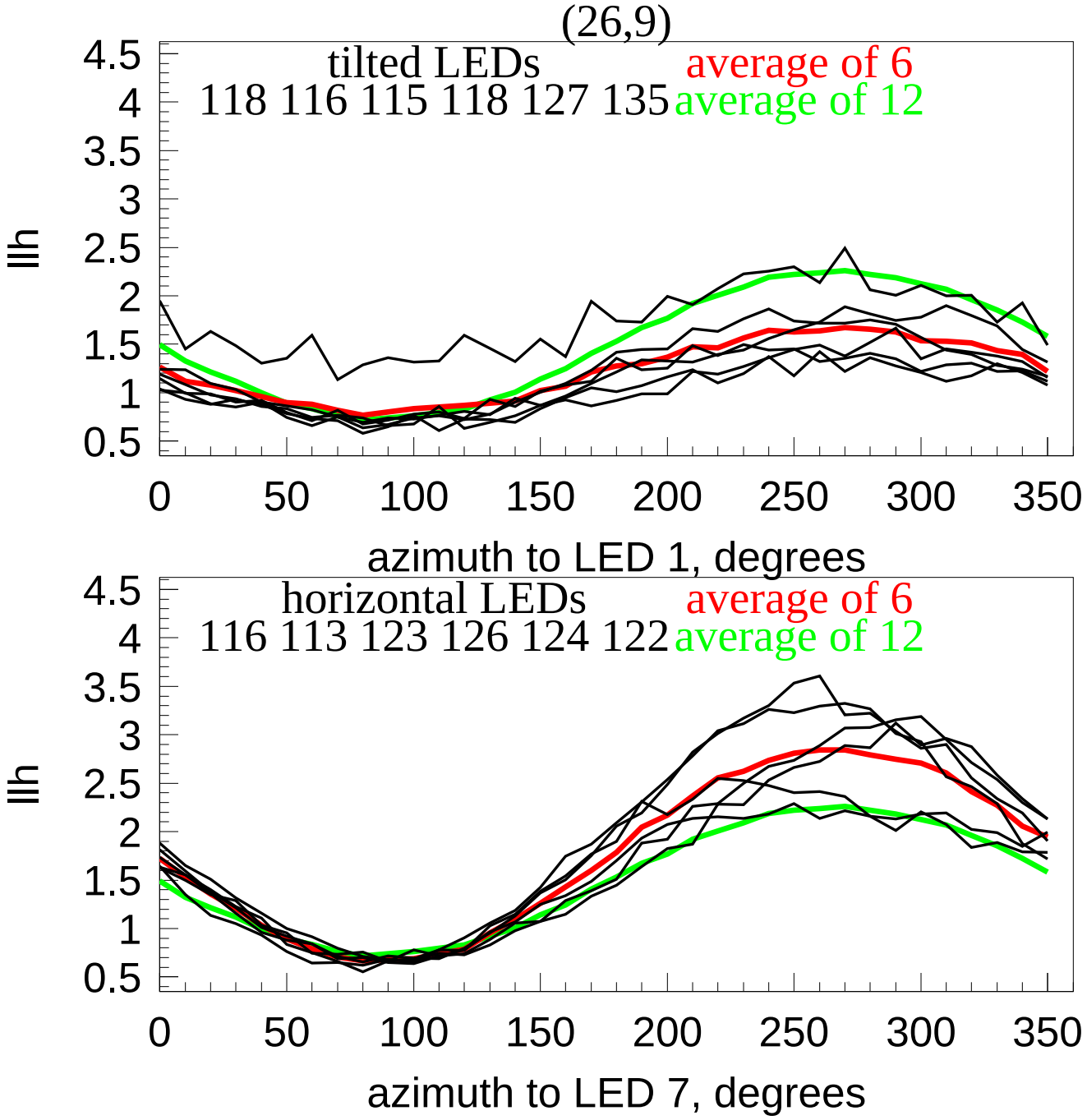

(26,6)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
157.1 ± 12.0

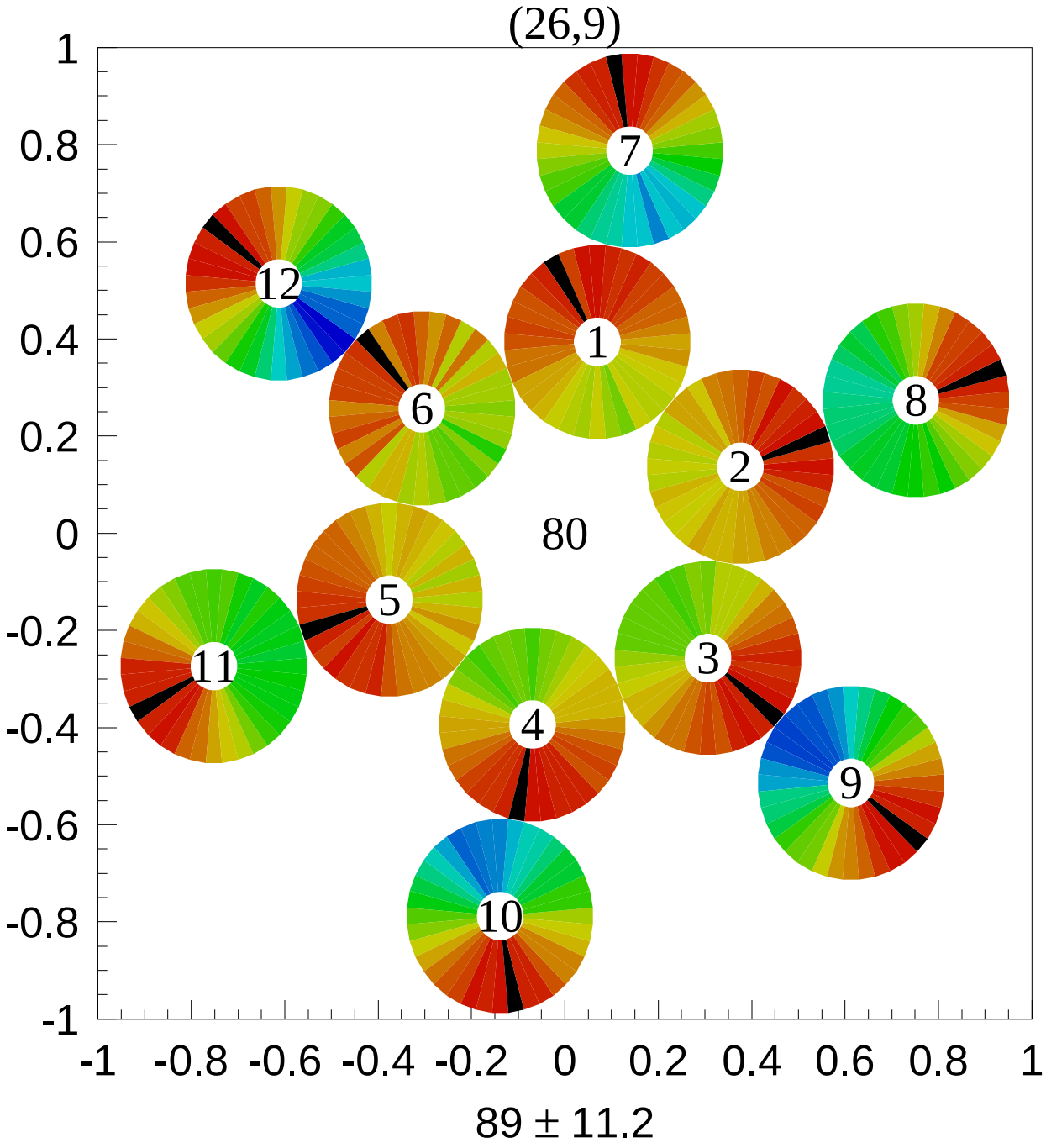

(26,7)
tilted LEDs
121 128 127 120 116 127
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 122 123 122 92 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

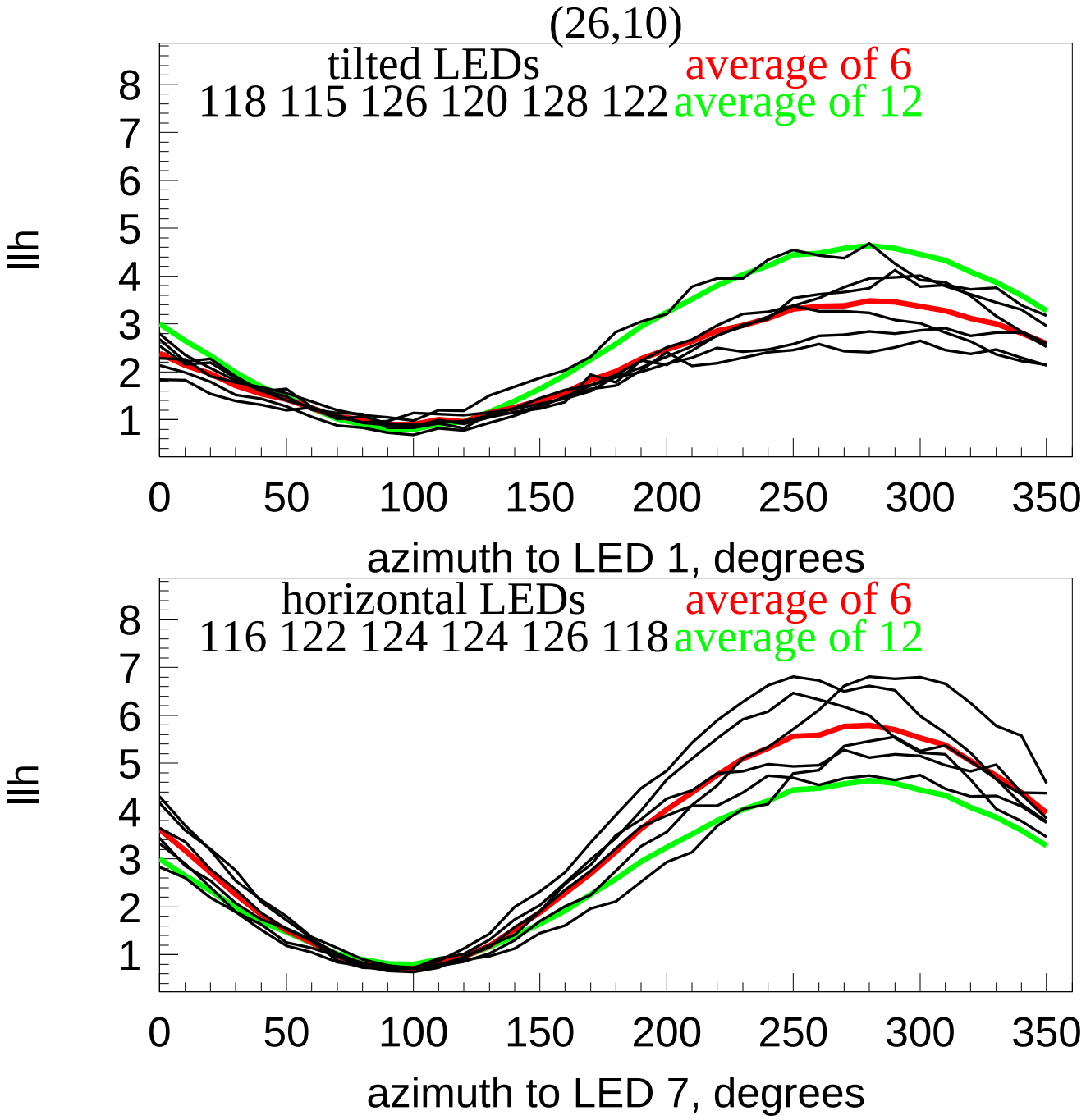

(26,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10.7 ± 15.3
12
11
6
5
7
1
10
4
10
2
3
8
9

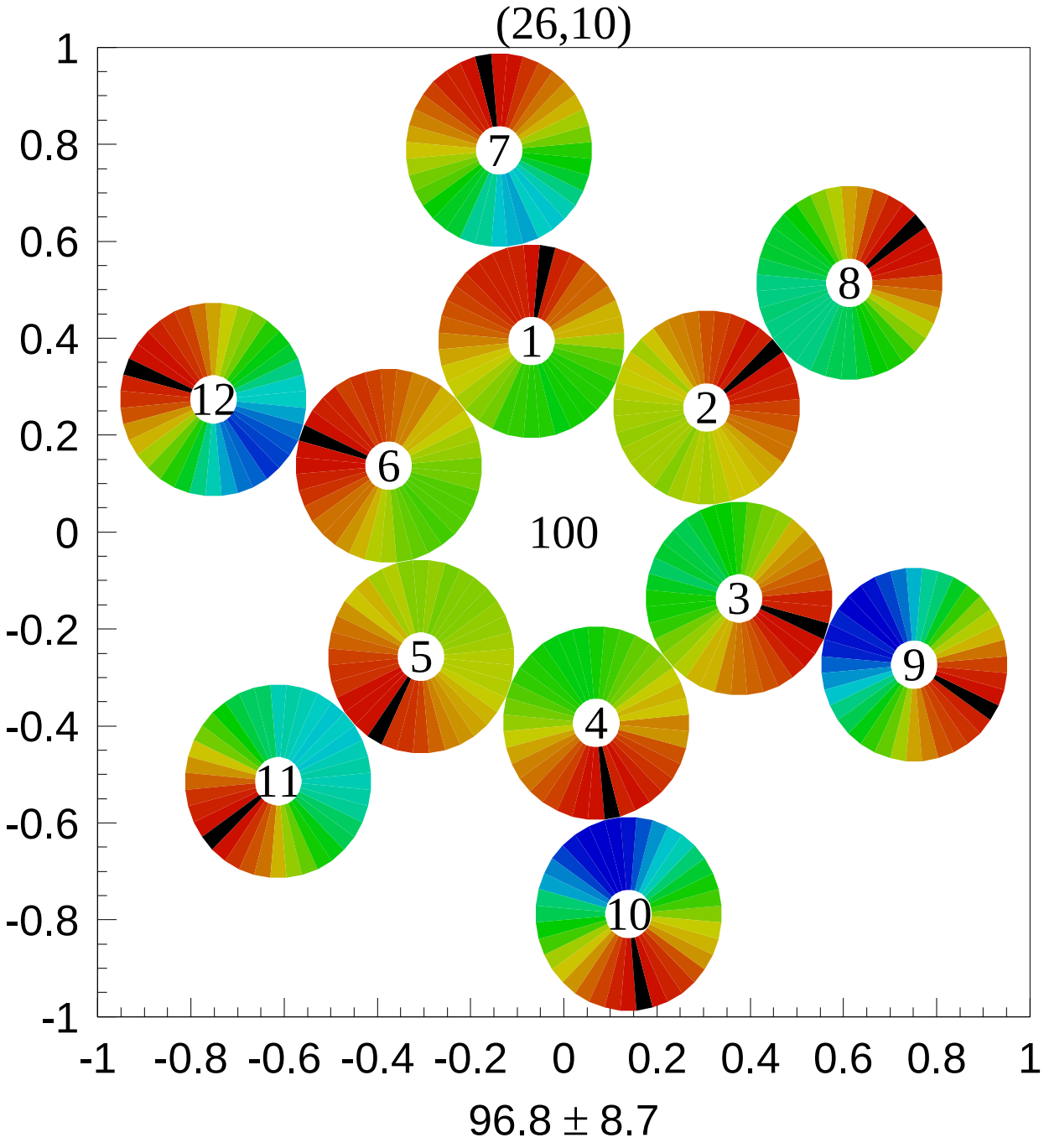

(26,8)
tilted LEDs
127 123 121 132 126 118
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 120 115 123 129 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

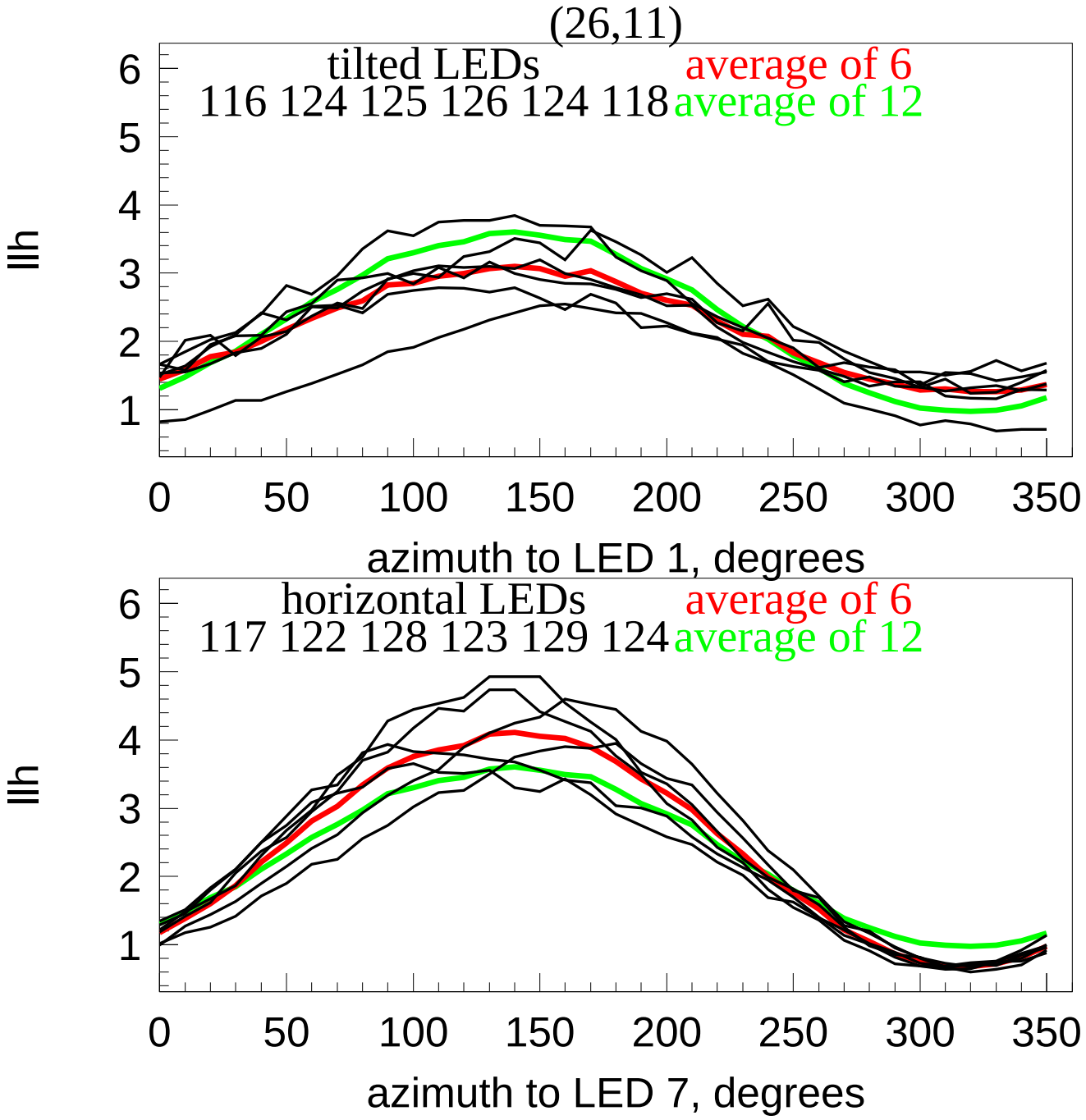

(26,8)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
253.3 ± 12.0

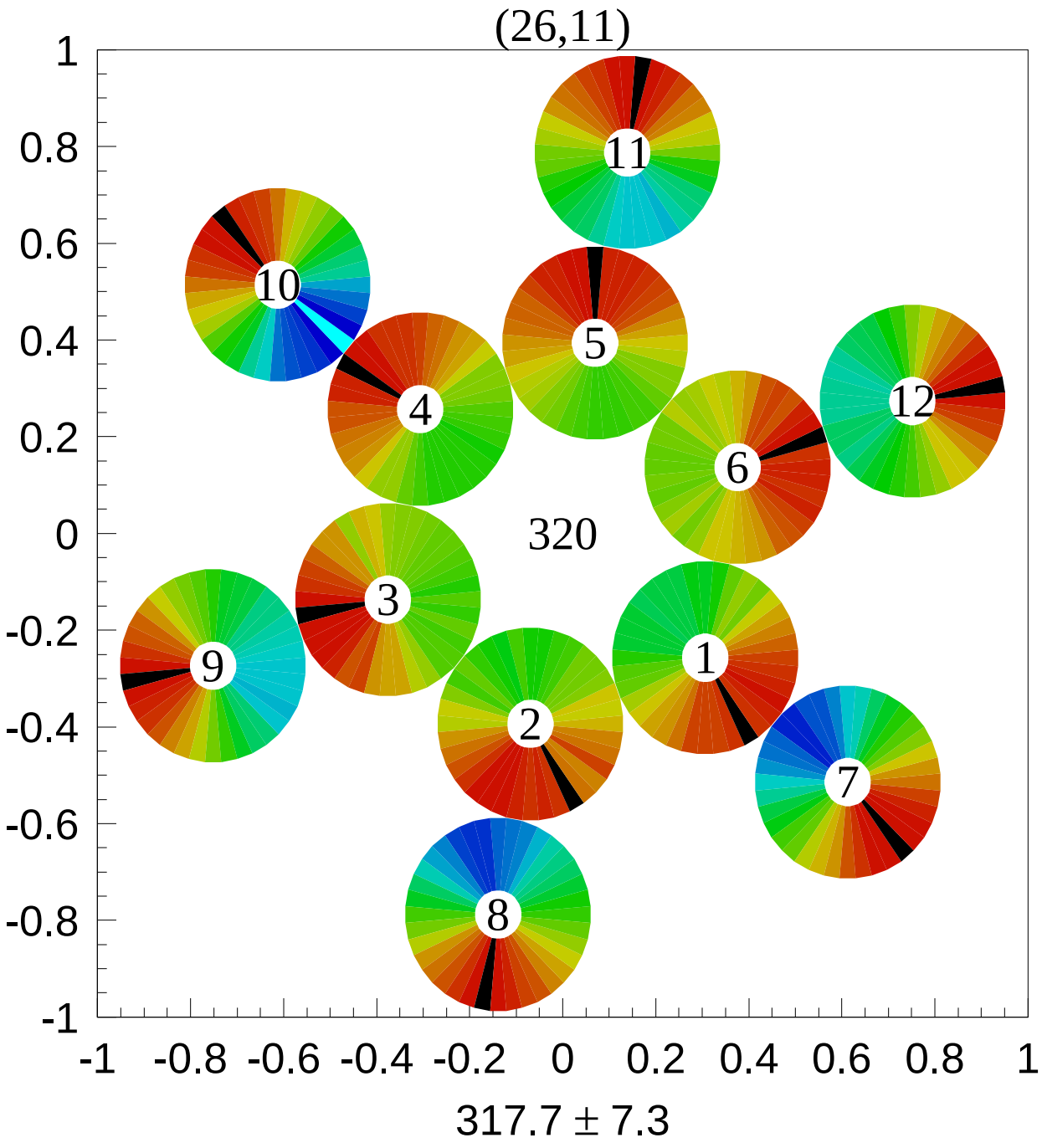

(26,9)
tilted LEDs
118 116 115 118 127 135
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 113 123 126 124 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

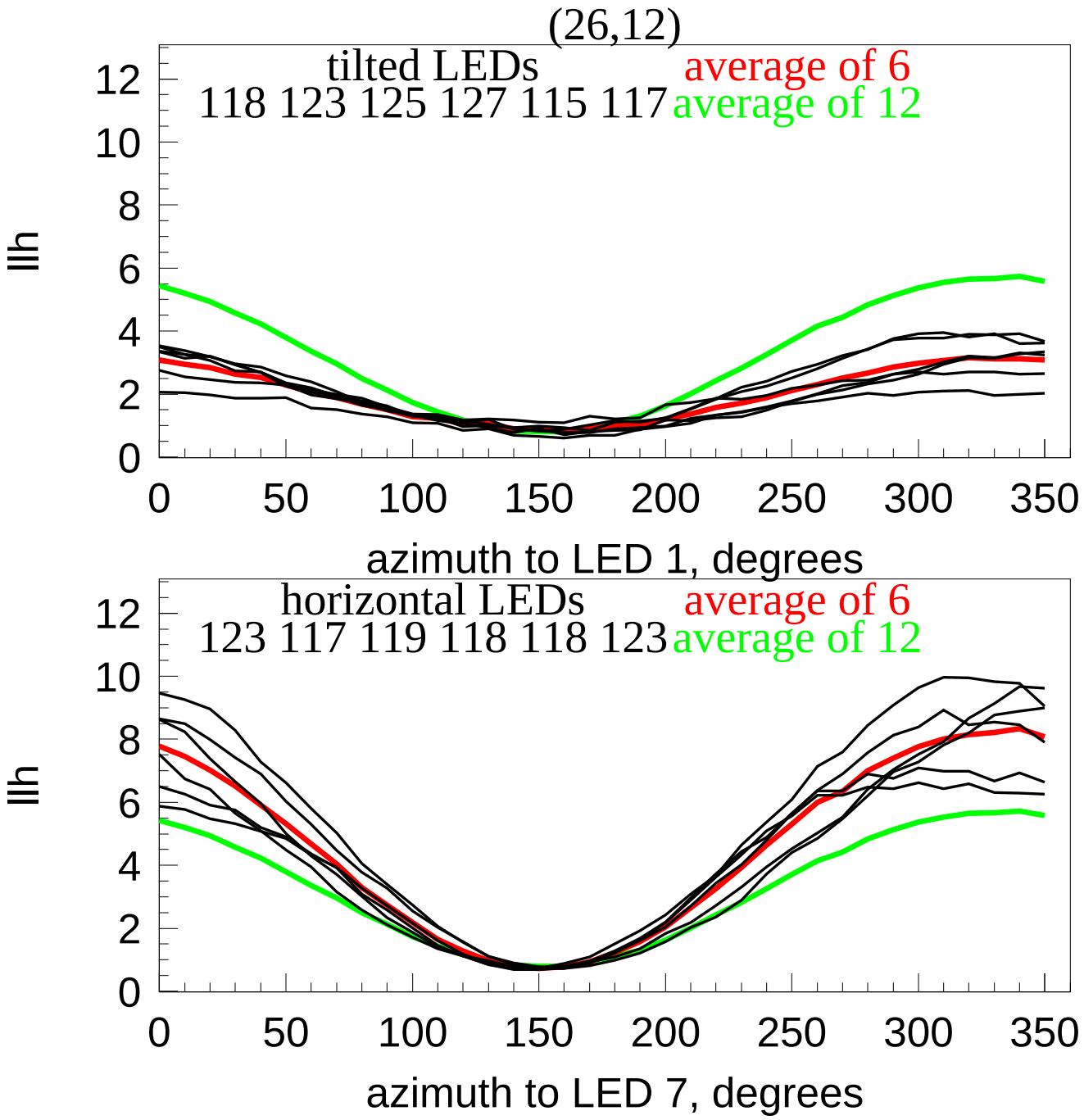

(26,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
89 ± 11.2

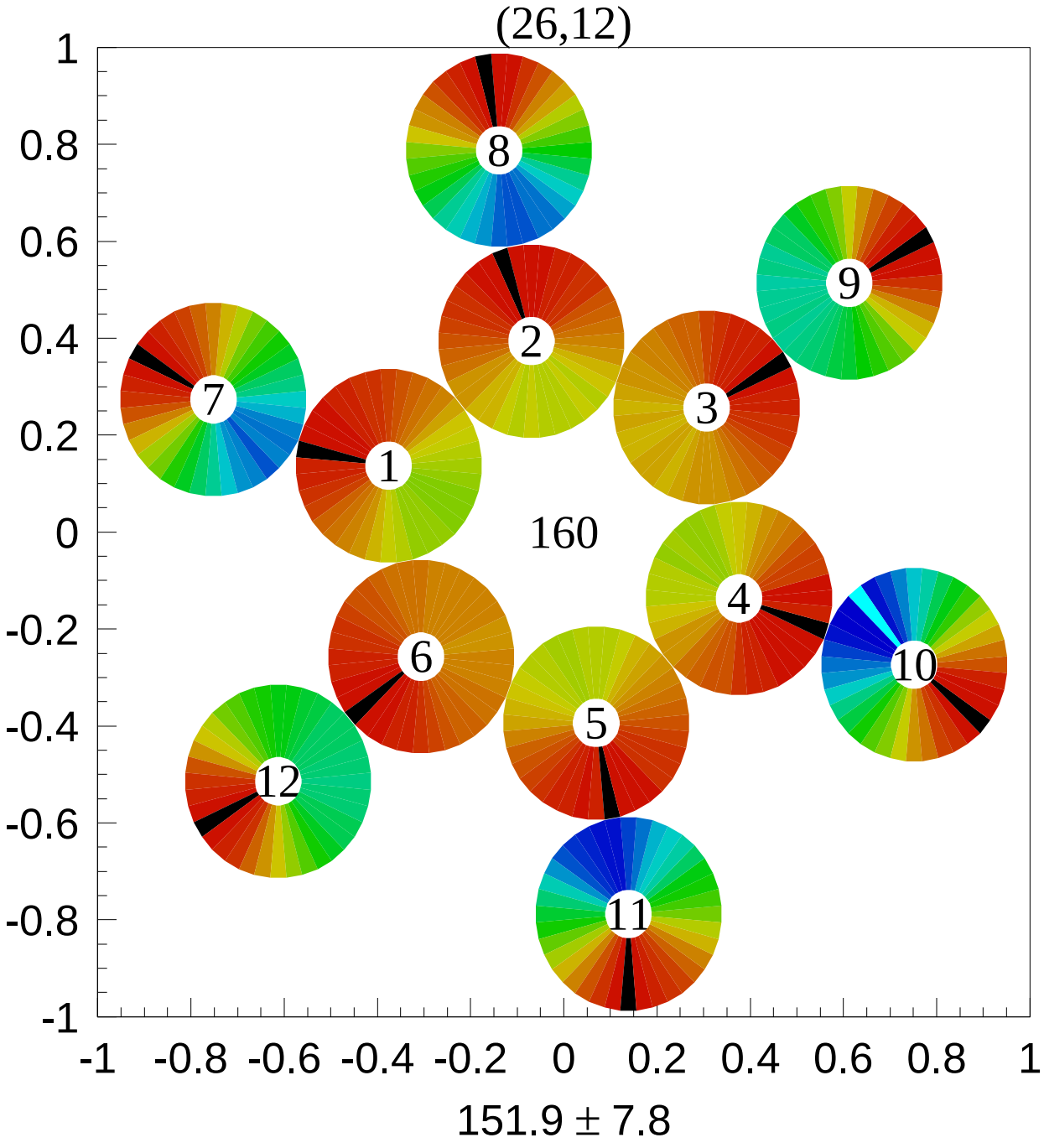

(26,10)
tilted LEDs
118 115 126 120 128 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 122 124 124 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

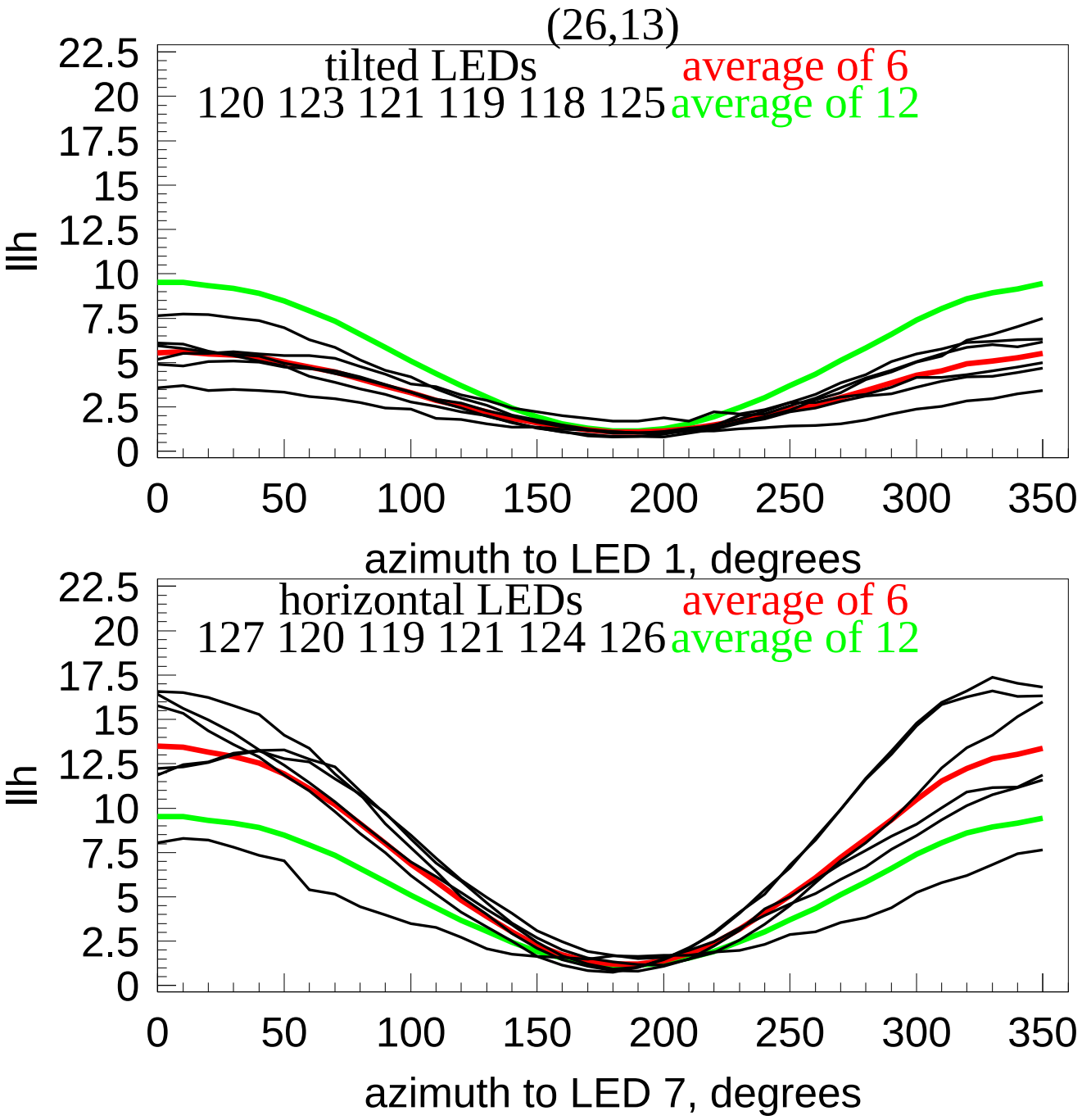

(26,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
96.8 ± 8.7

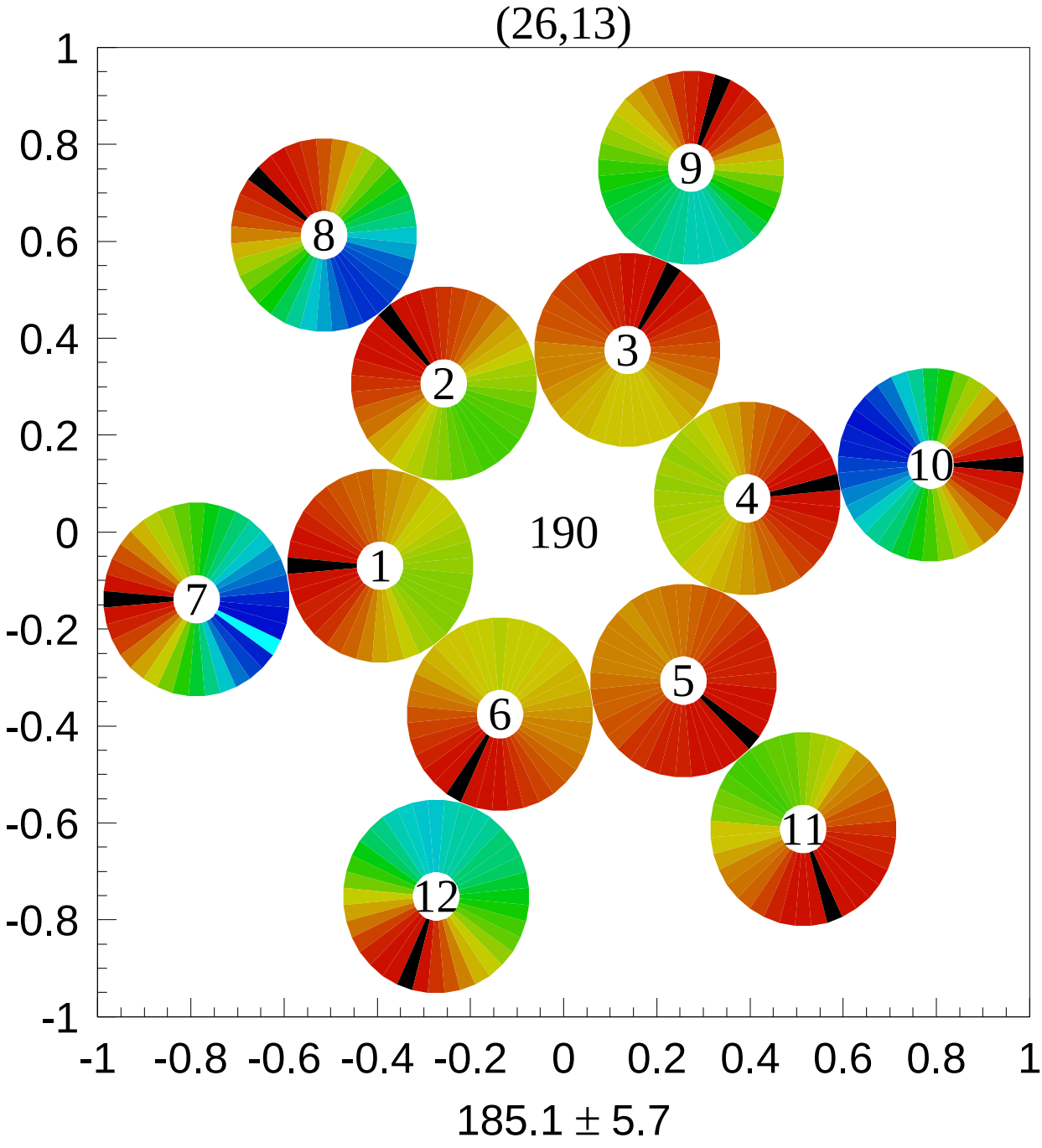

(26,11)
tilted LEDs
116 124 125 126 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 128 123 129 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

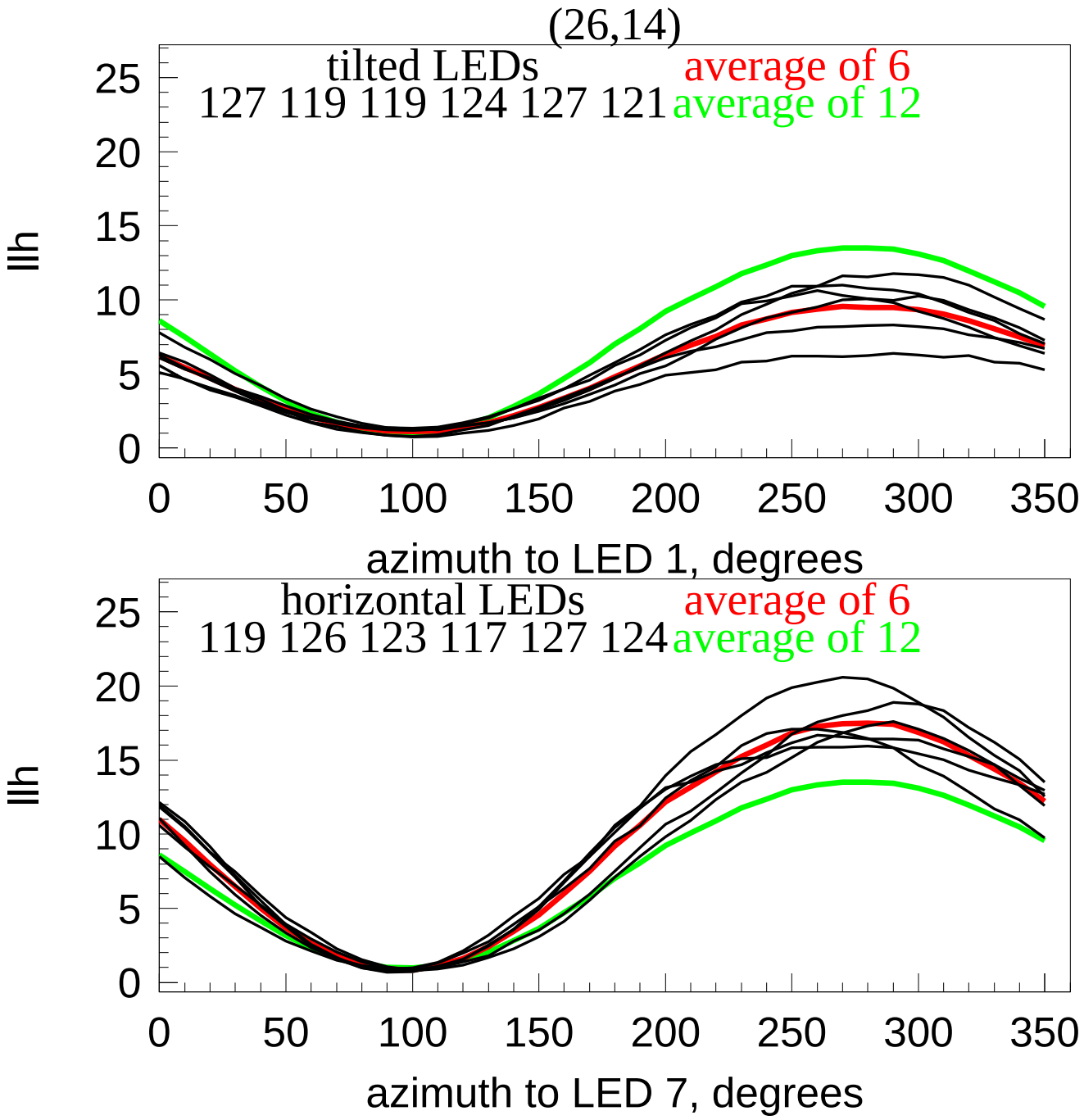

(26,11)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
317.7 ± 7.3

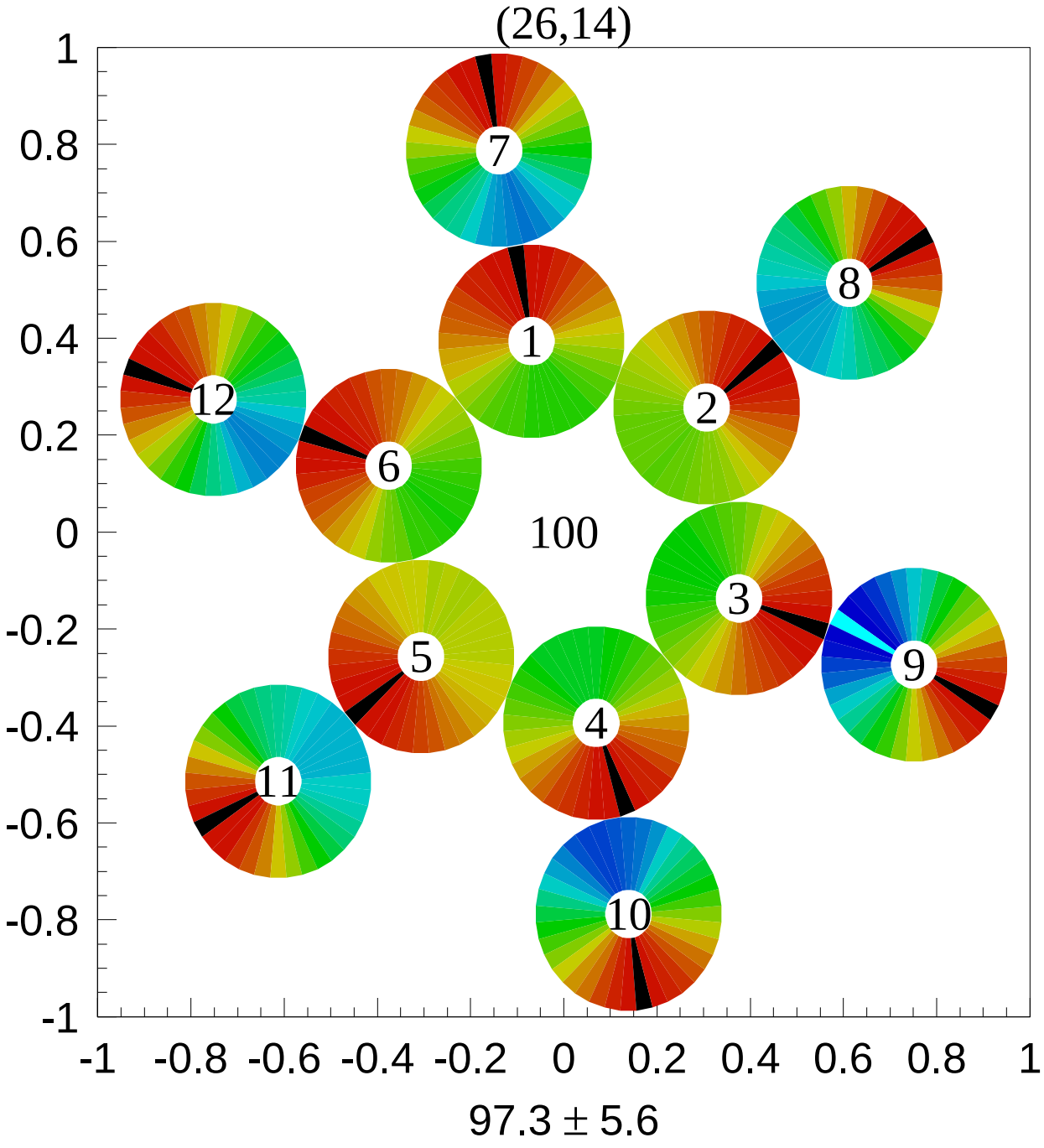

(26,12)
tilted LEDs
118 123 125 127 115 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 117 119 118 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

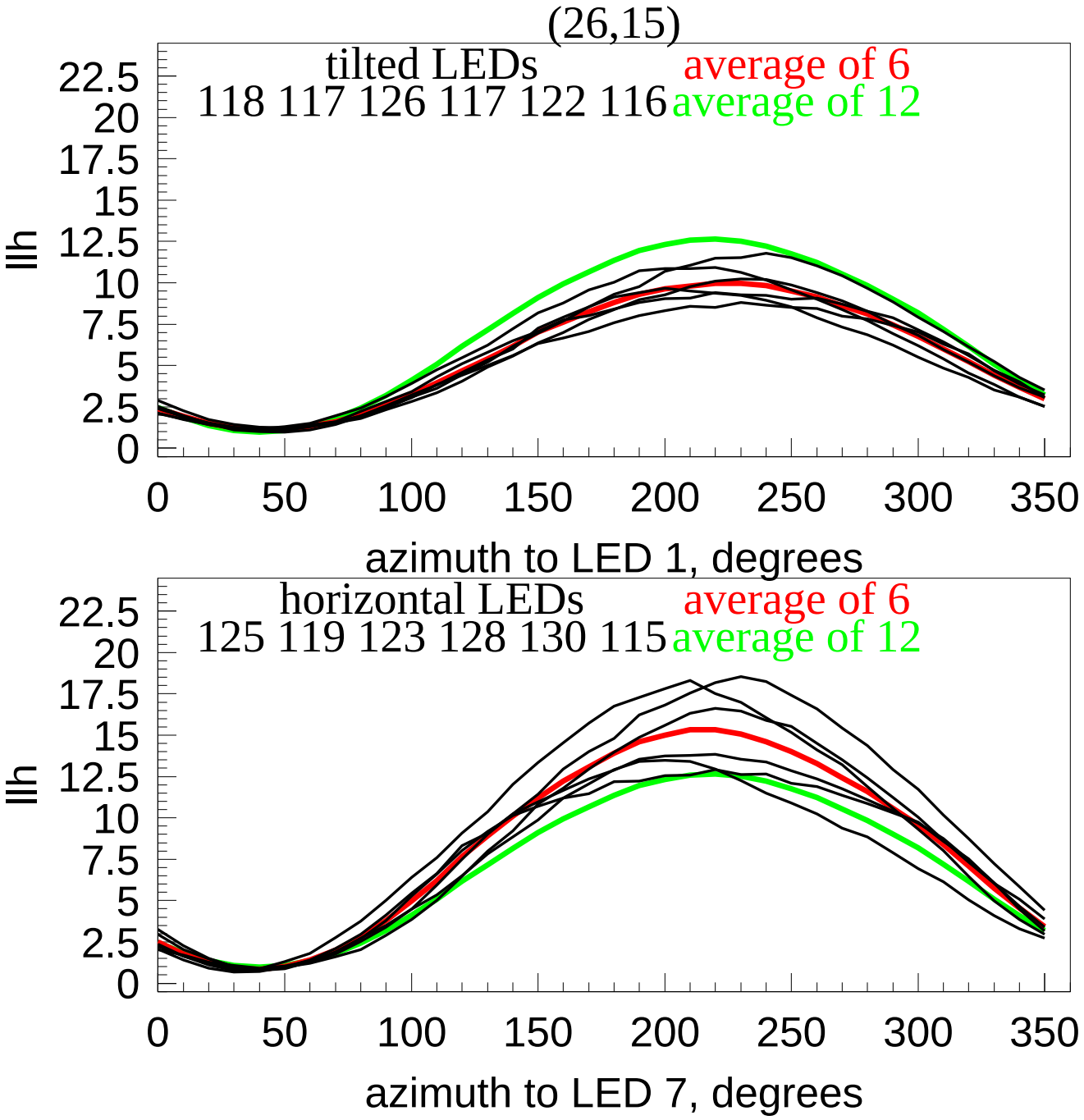

(26,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
151.9 ± 7.8

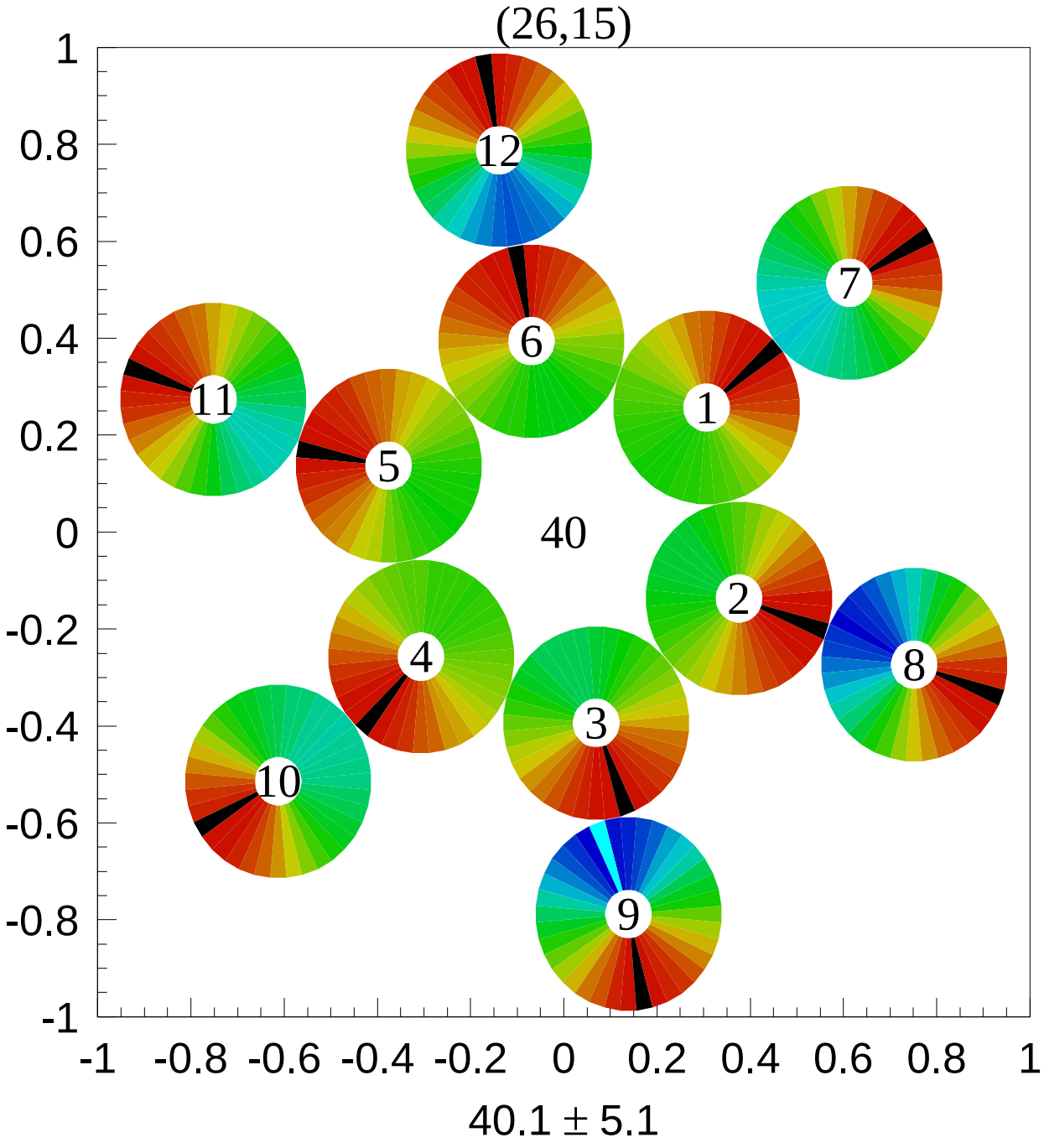

(26,13)
tilted LEDs
120 123 121 119 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 120 119 121 124 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

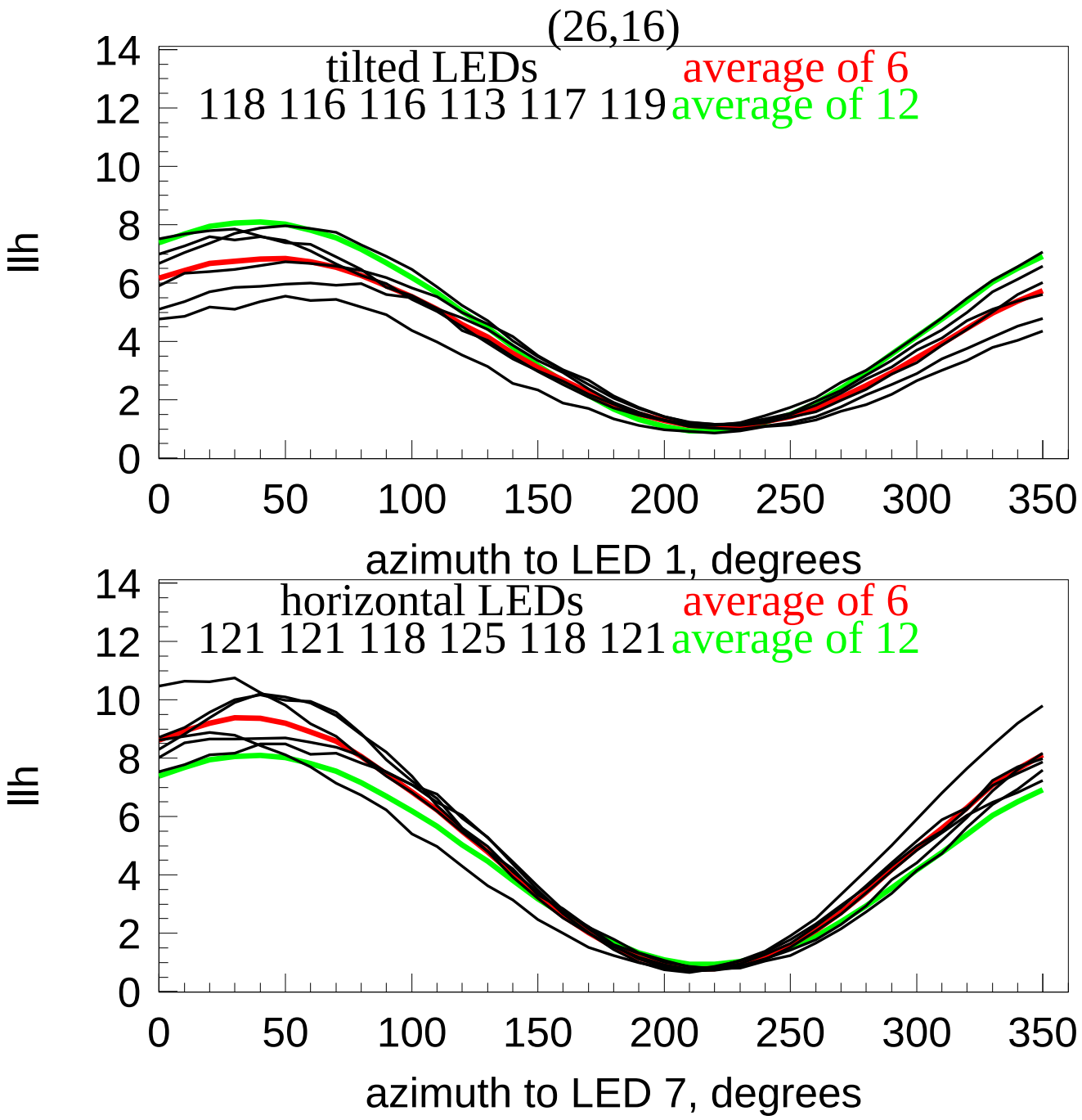

(26,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
185.1 ± 5.7
190
1
2
3
4
5
6
7
8
9
10
11
12

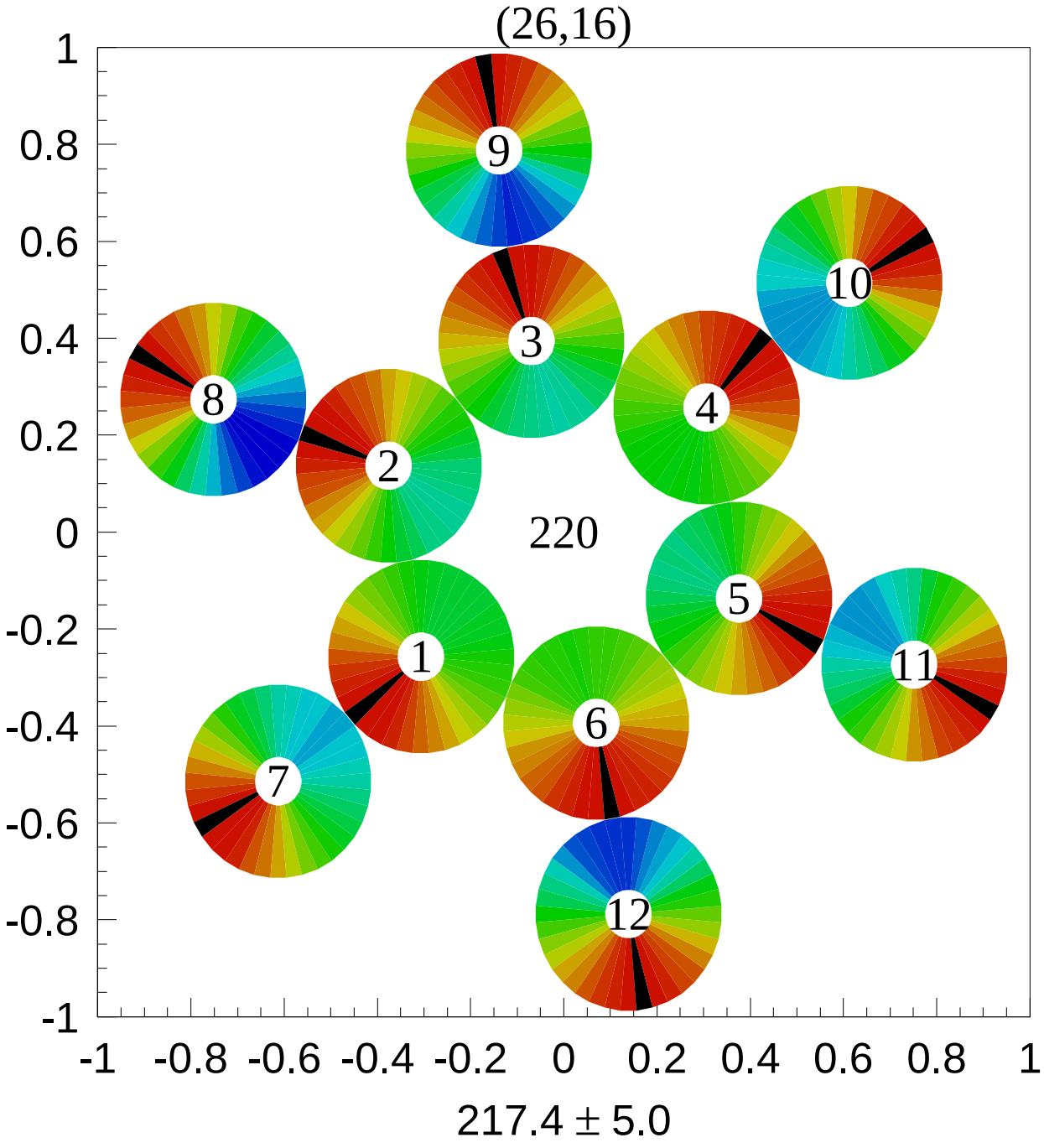

(26,14)
tilted LEDs
127 119 119 124 127 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 123 117 127 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

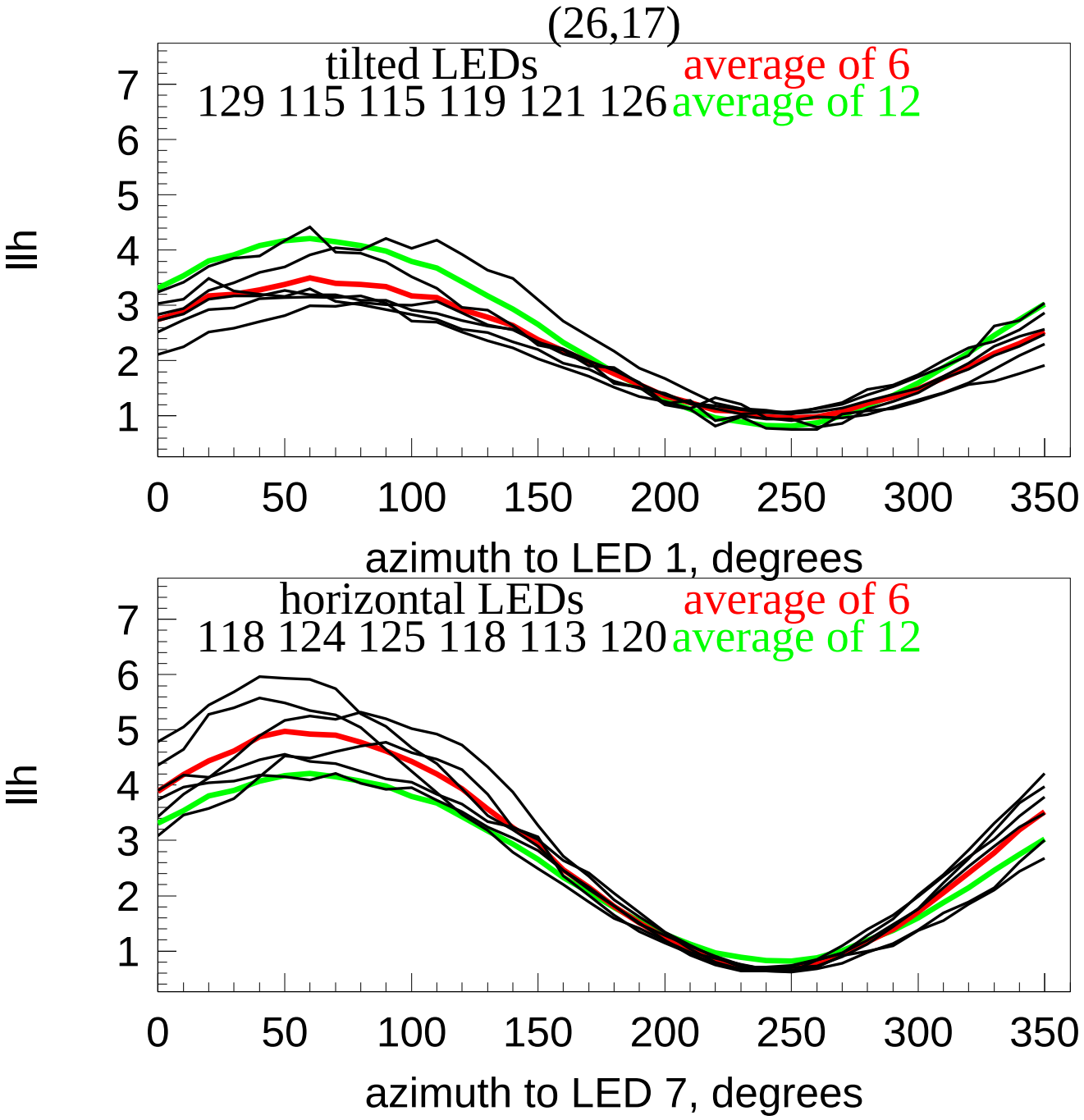

(26,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
97.3 ± 5.6

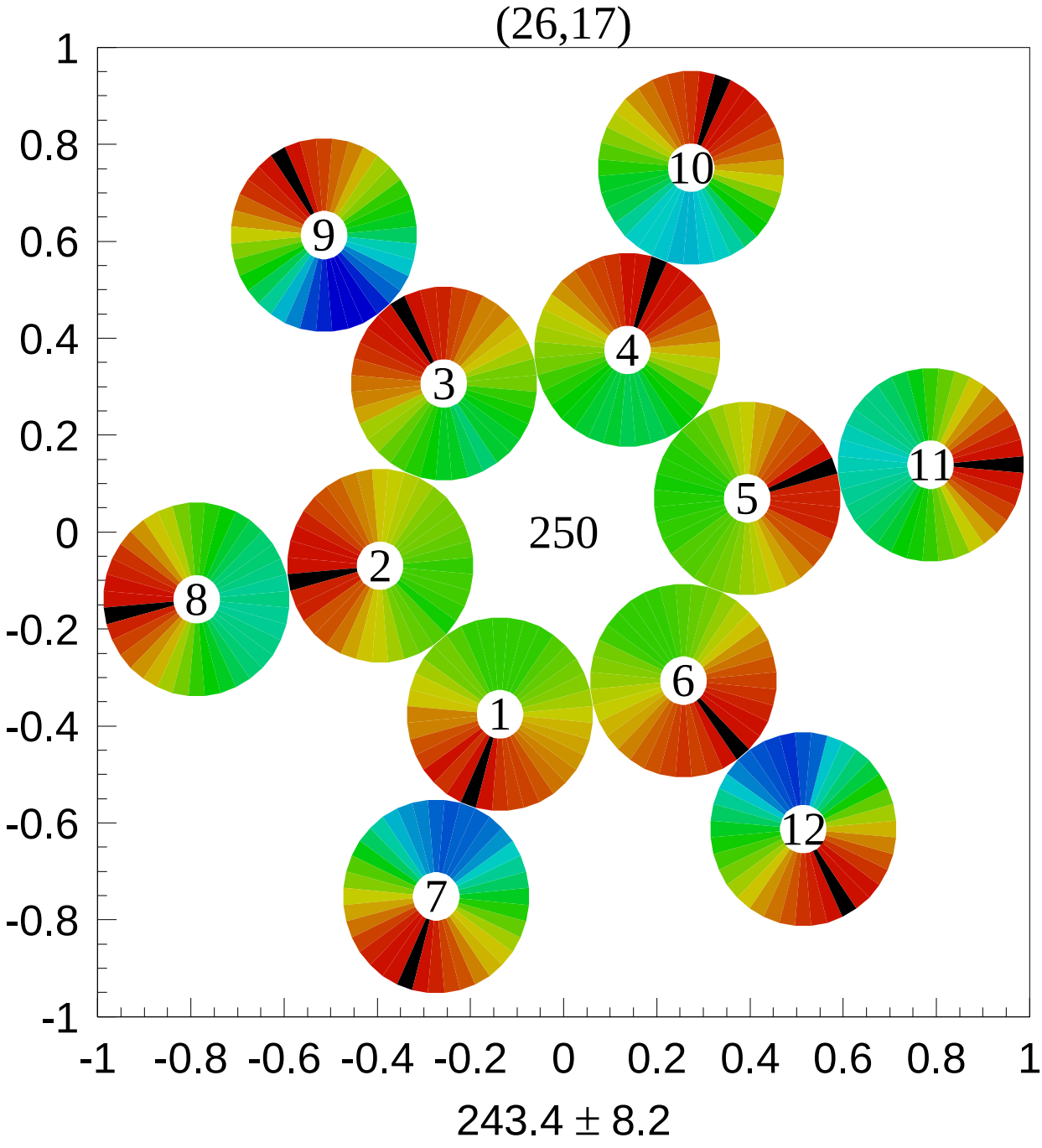

(26,15)
tilted LEDs
118 117 126 117 122 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 119 123 128 130 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

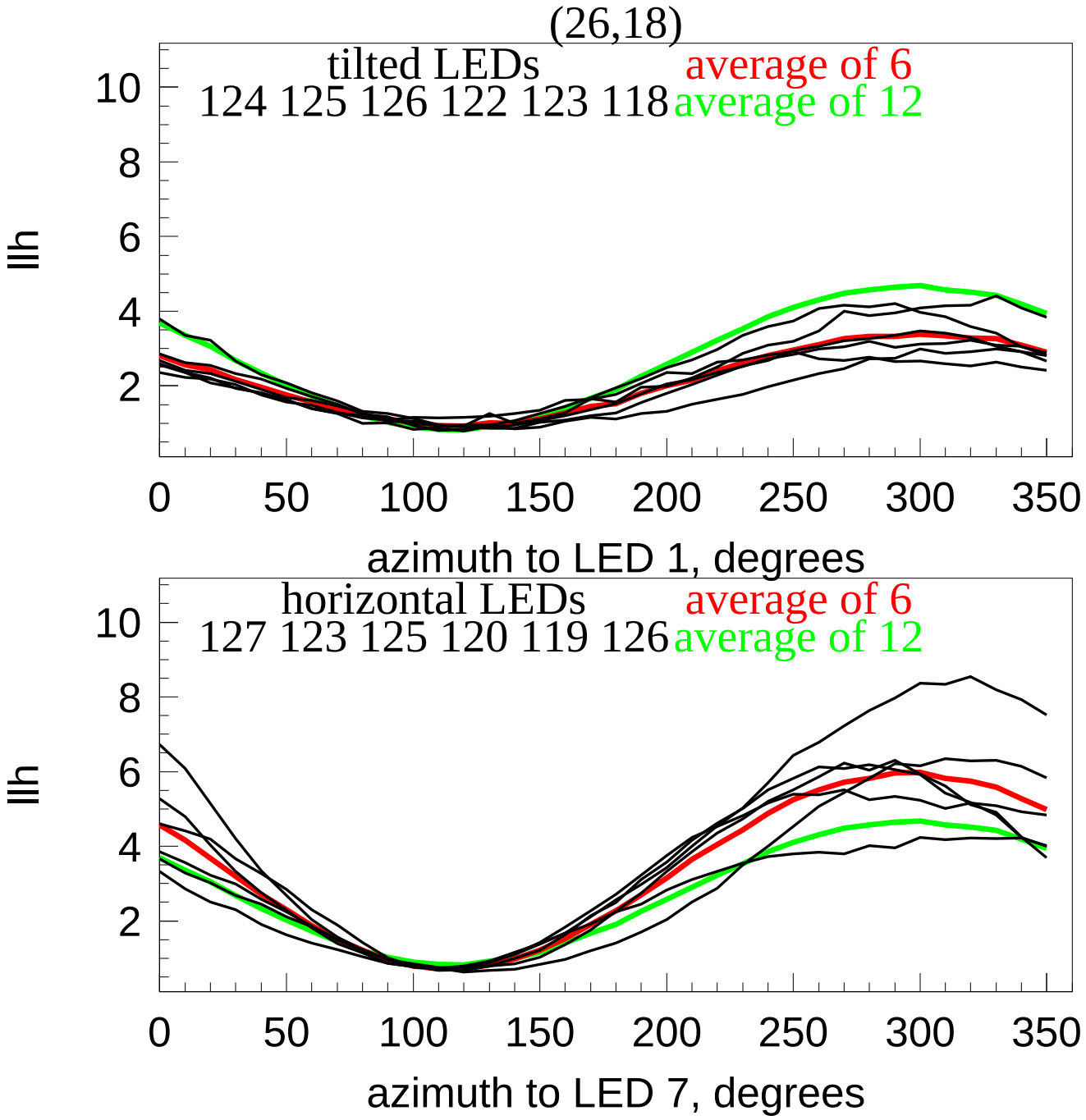

(26,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
7
6
11
1
5
40
2
8
4
3
10
9
40.1 ± 5.1

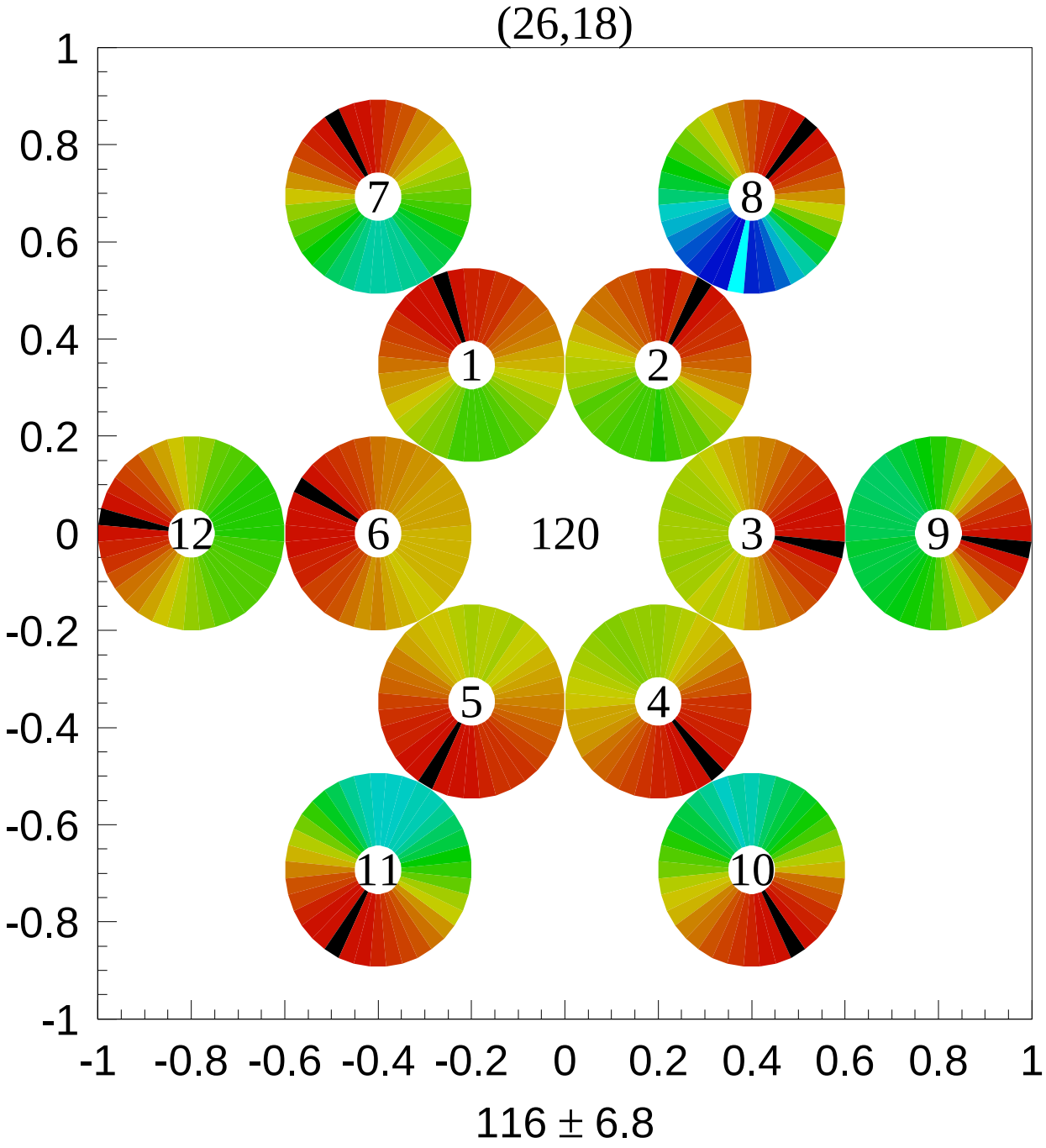

(26,16)
tilted LEDs
118 116 116 113 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 118 125 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

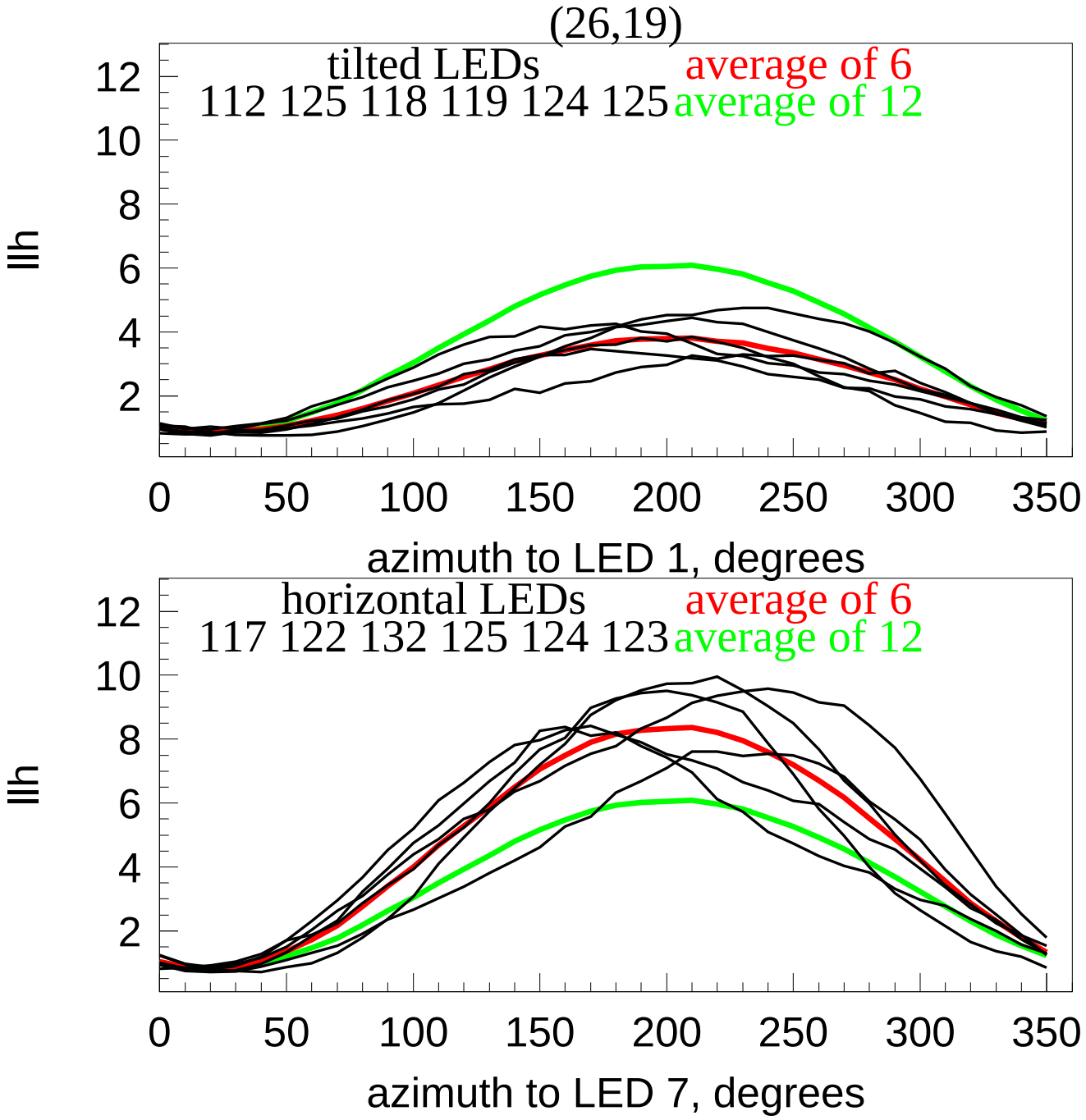

(26,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
217.4 ± 5.0

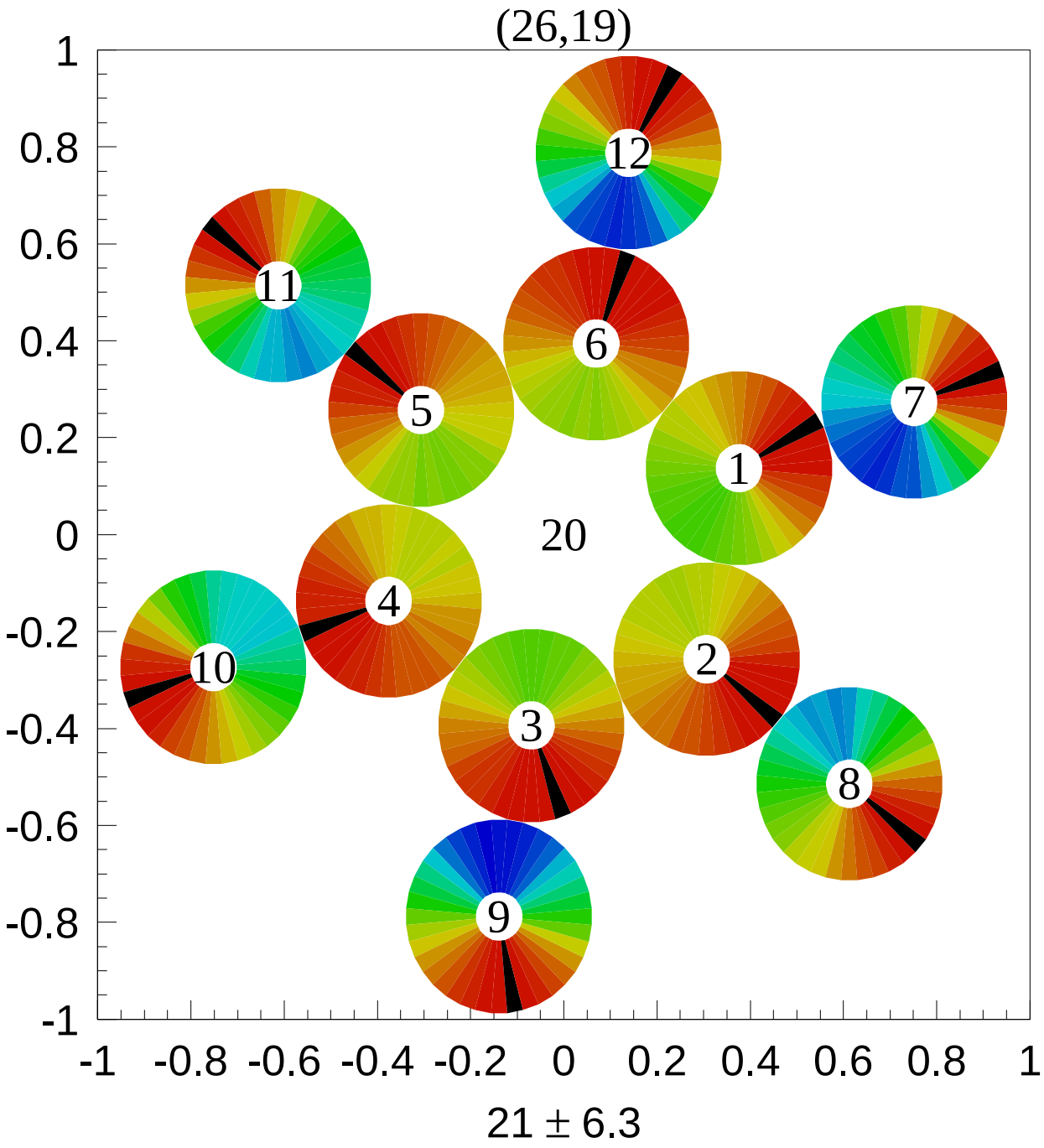

(26,17)
tilted LEDs
129 115 115 119 121 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 124 125 118 113 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

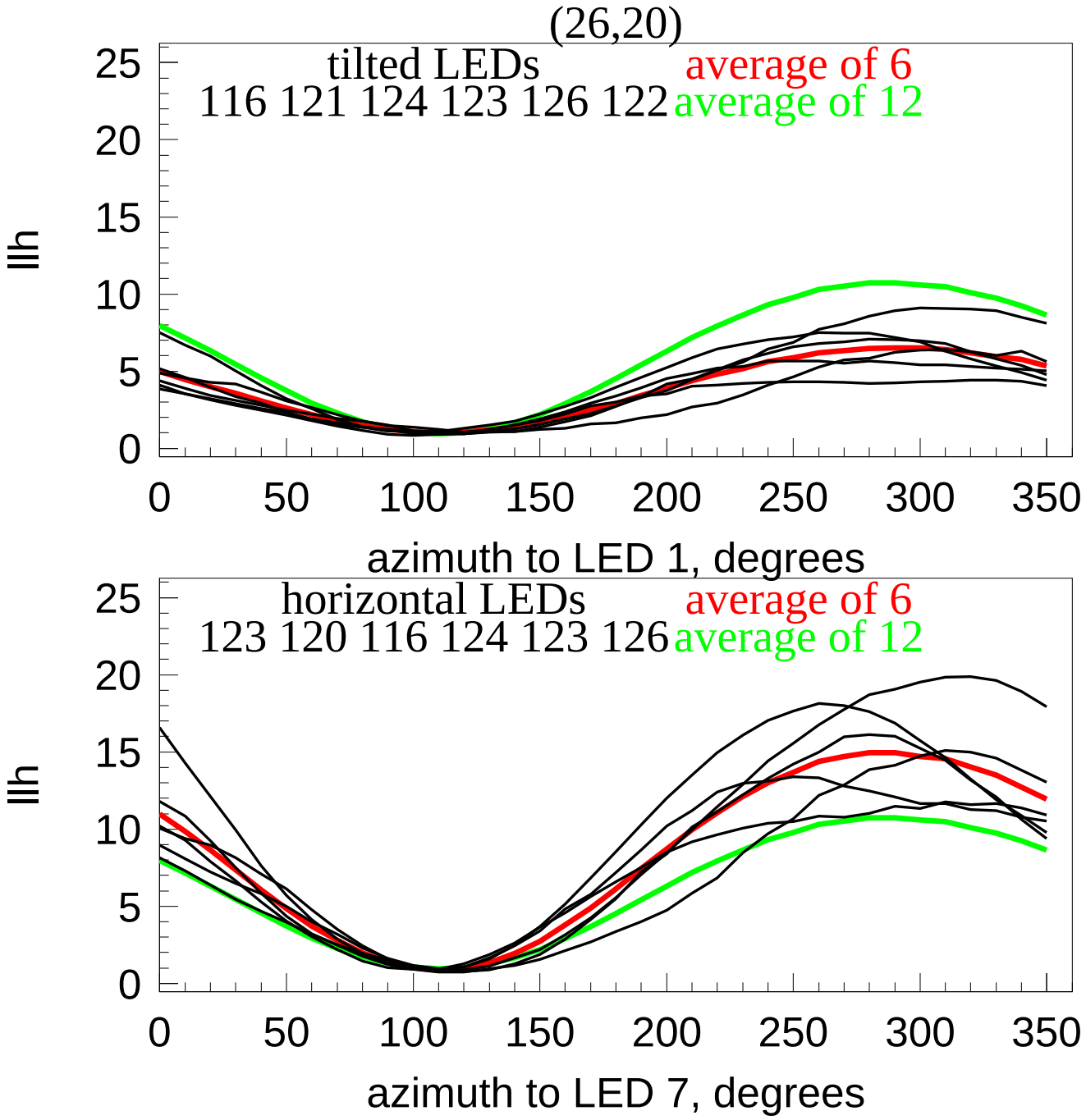

(26,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
243.4 ± 8.2

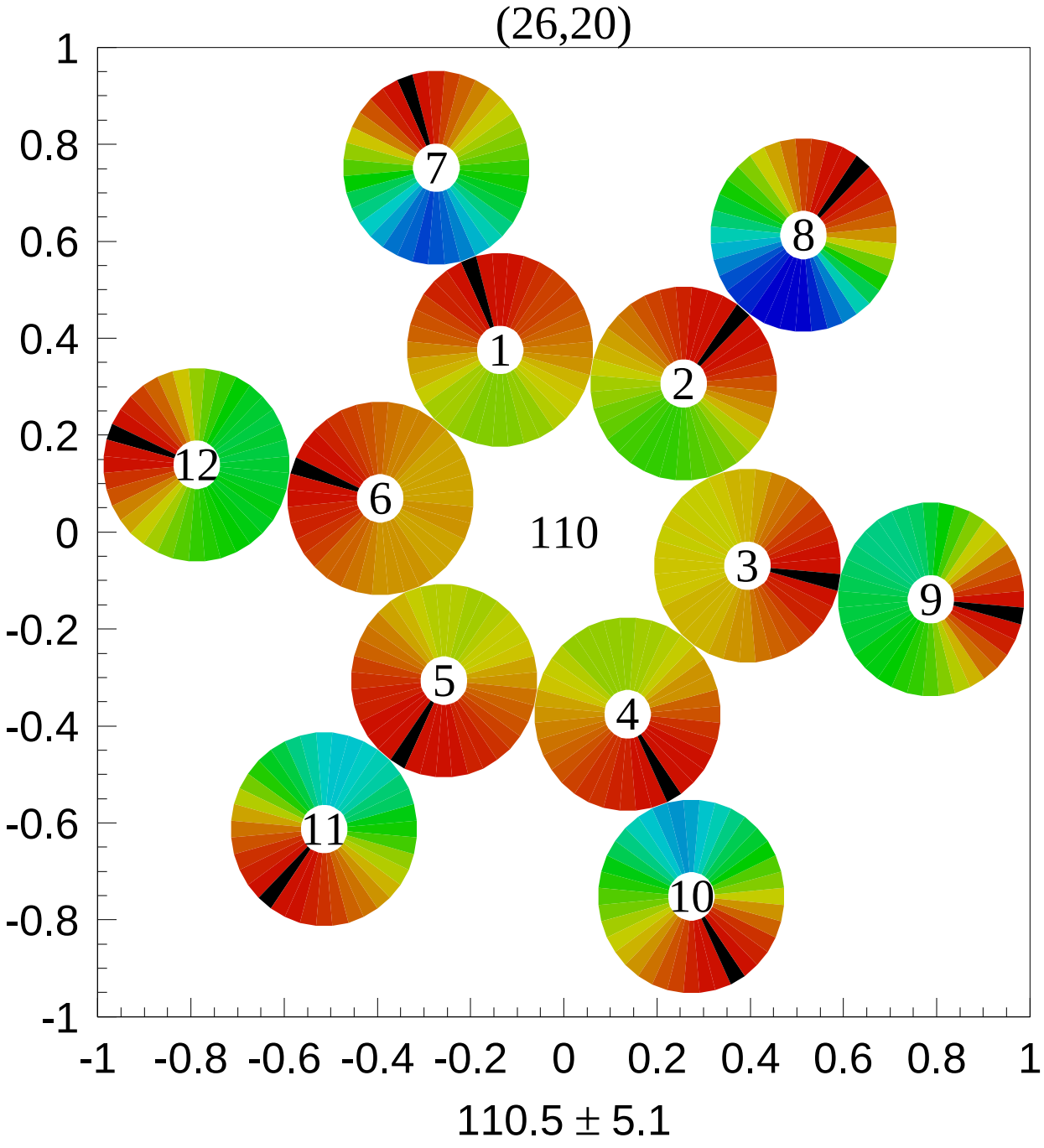

(26,18)
tilted LEDs
124 125 126 122 123 118
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 123 125 120 119 126
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

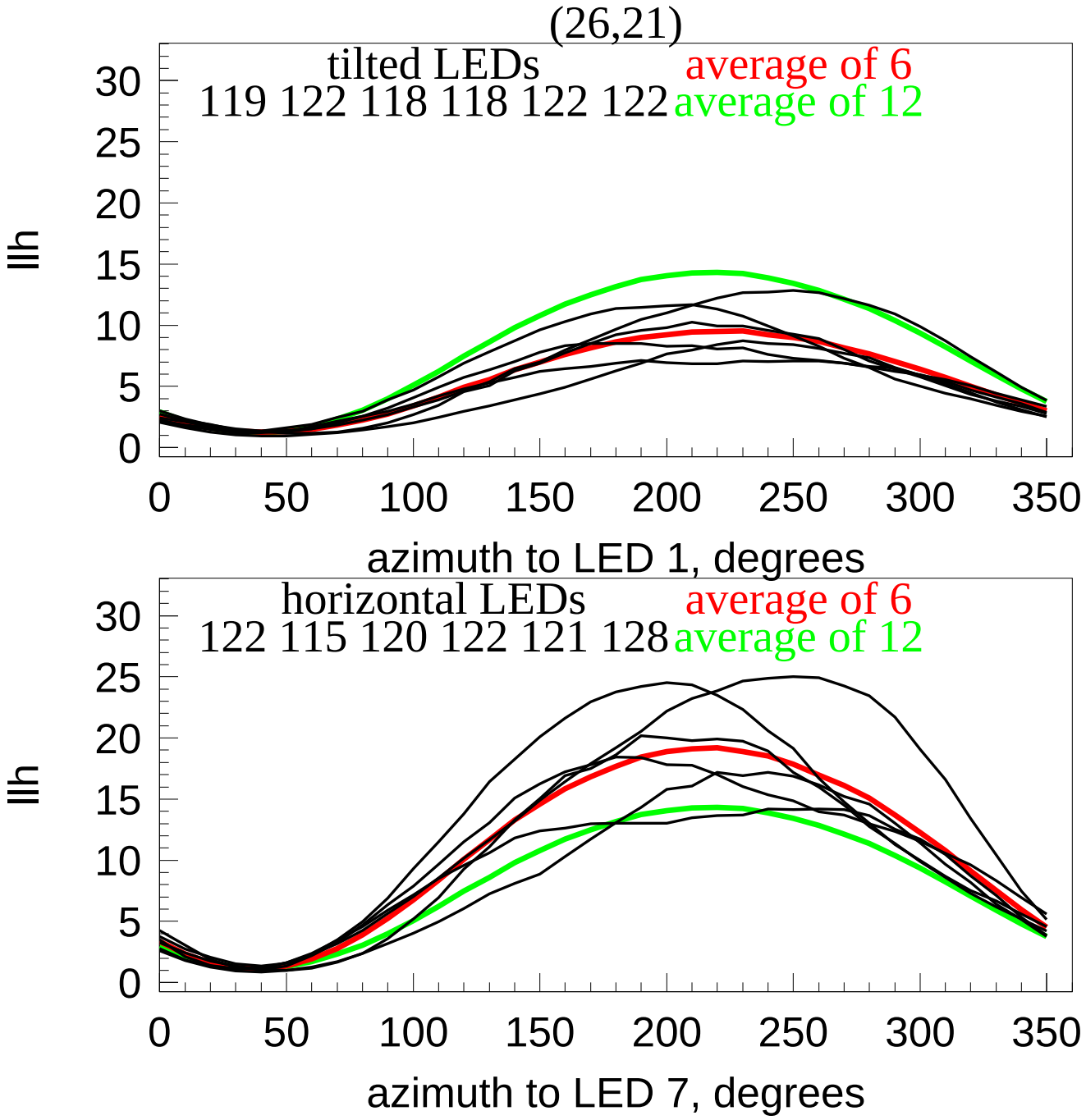

(26,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
116 ± 6.8

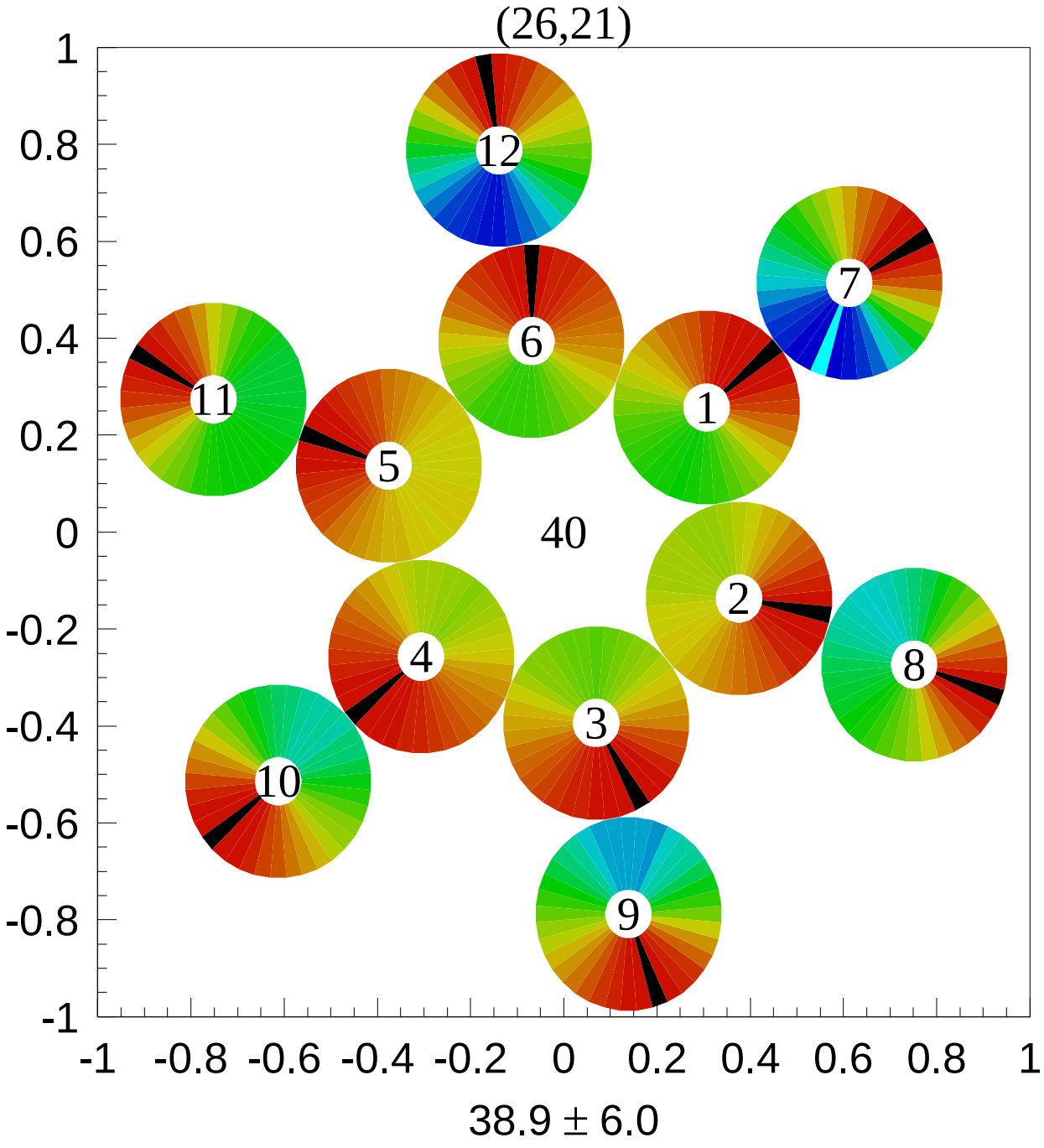

(26,19)
tilted LEDs
112 125 118 119 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 132 125 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

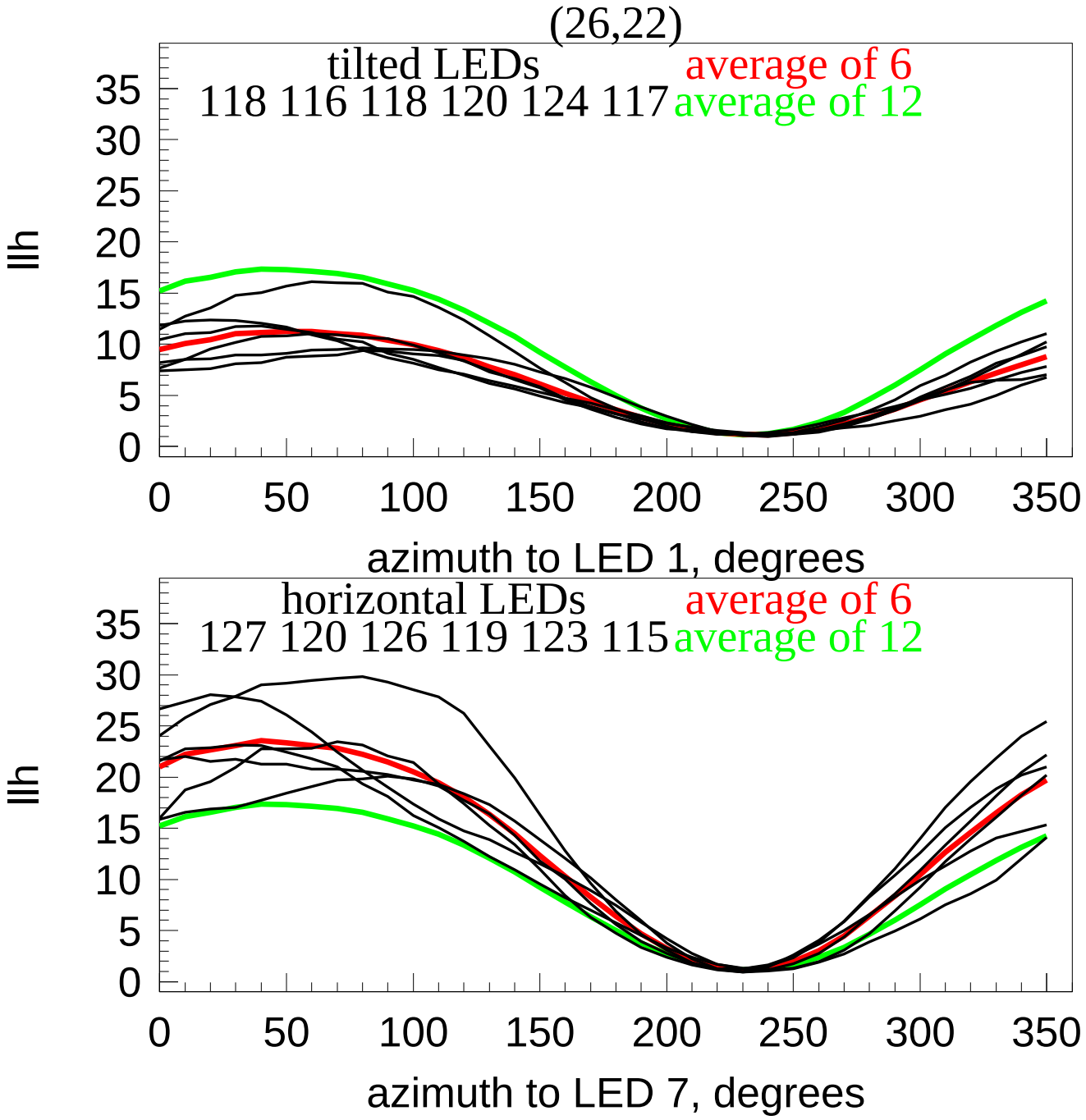

(26,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
21 ± 6.3

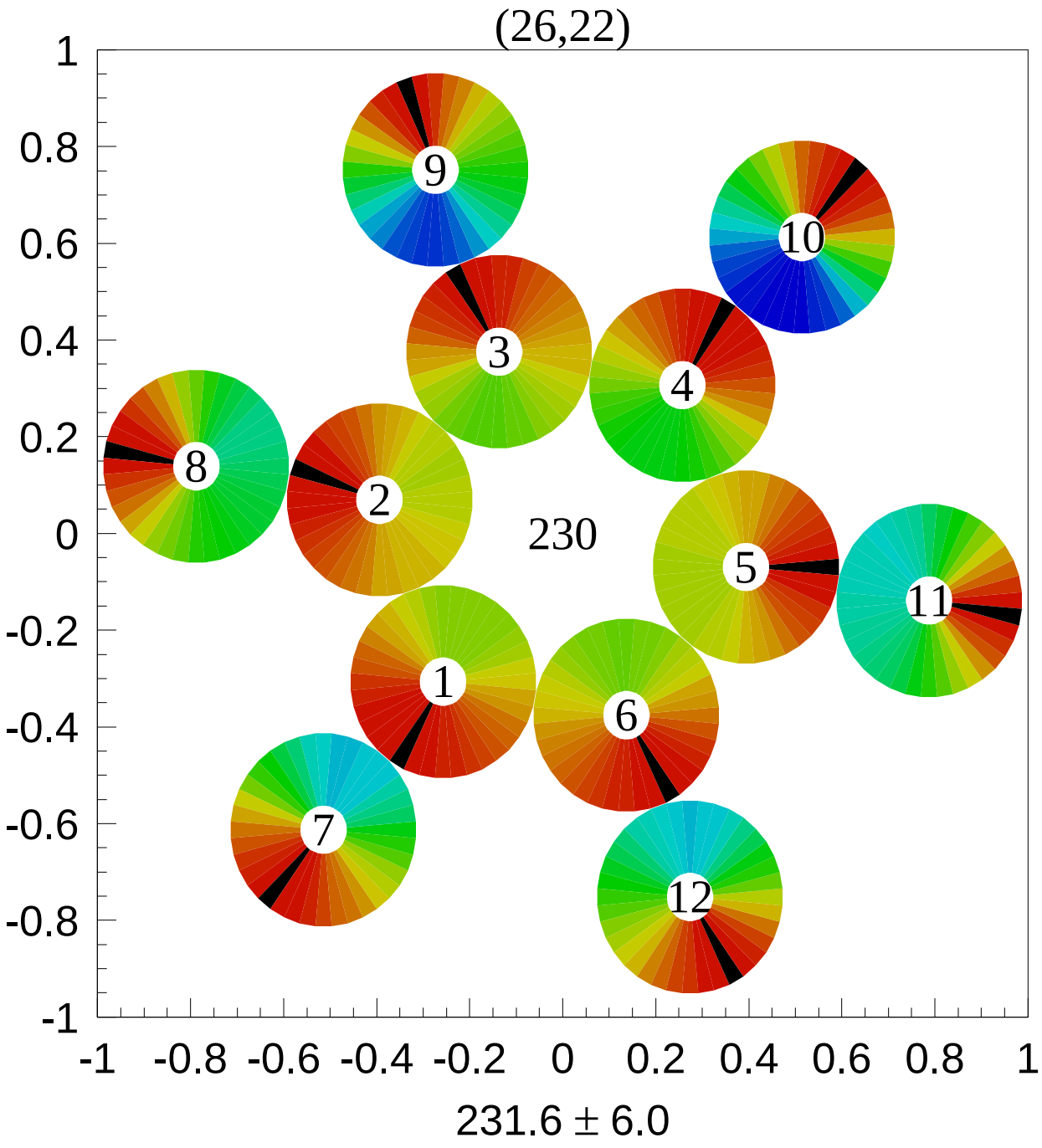

(26,20)
tilted LEDs
116 121 124 123 126 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 116 124 123 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

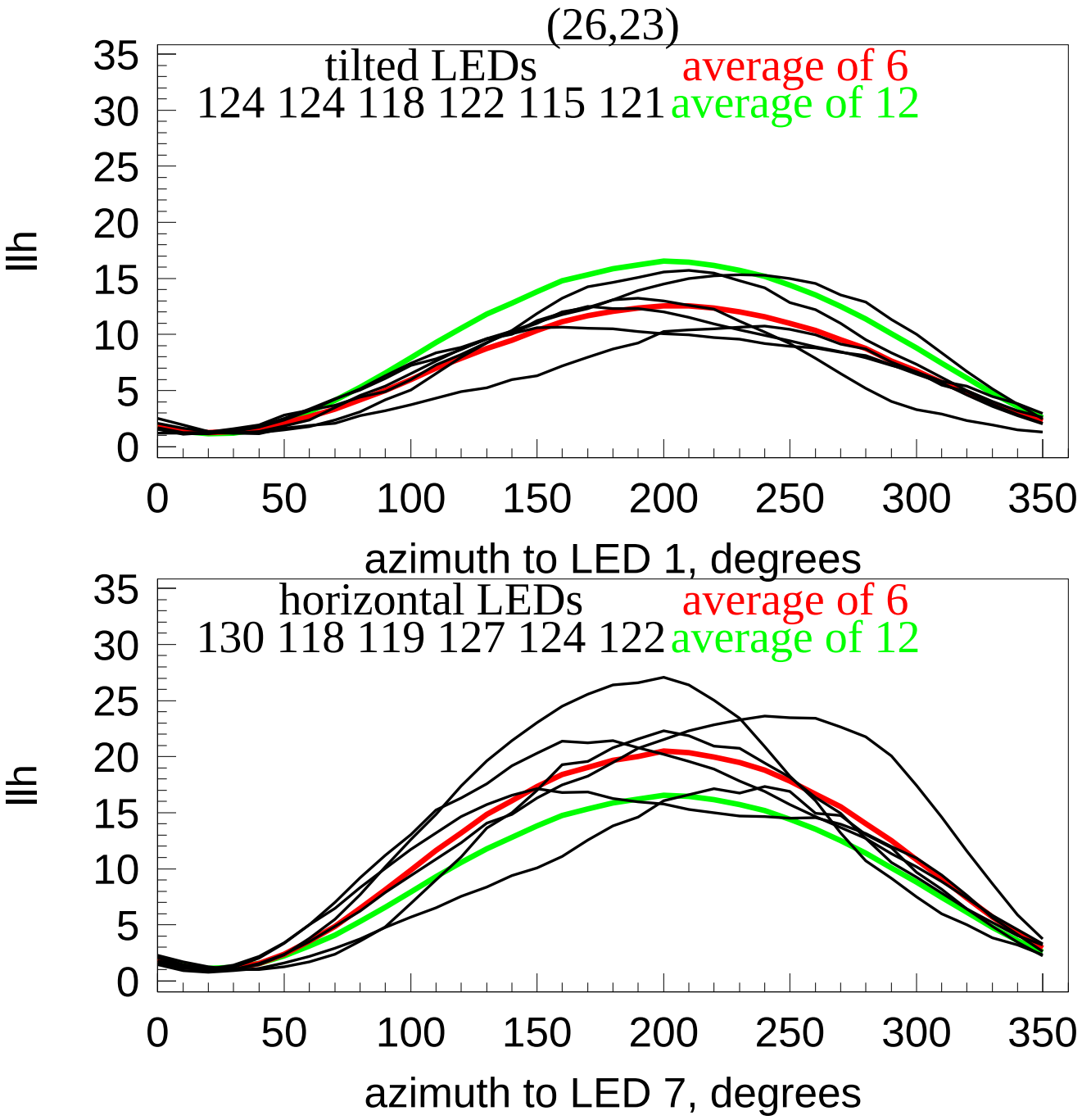

(26,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
110
7
8
1
2
12
6
3
9
5
4
11
10
110.5 ± 5.1

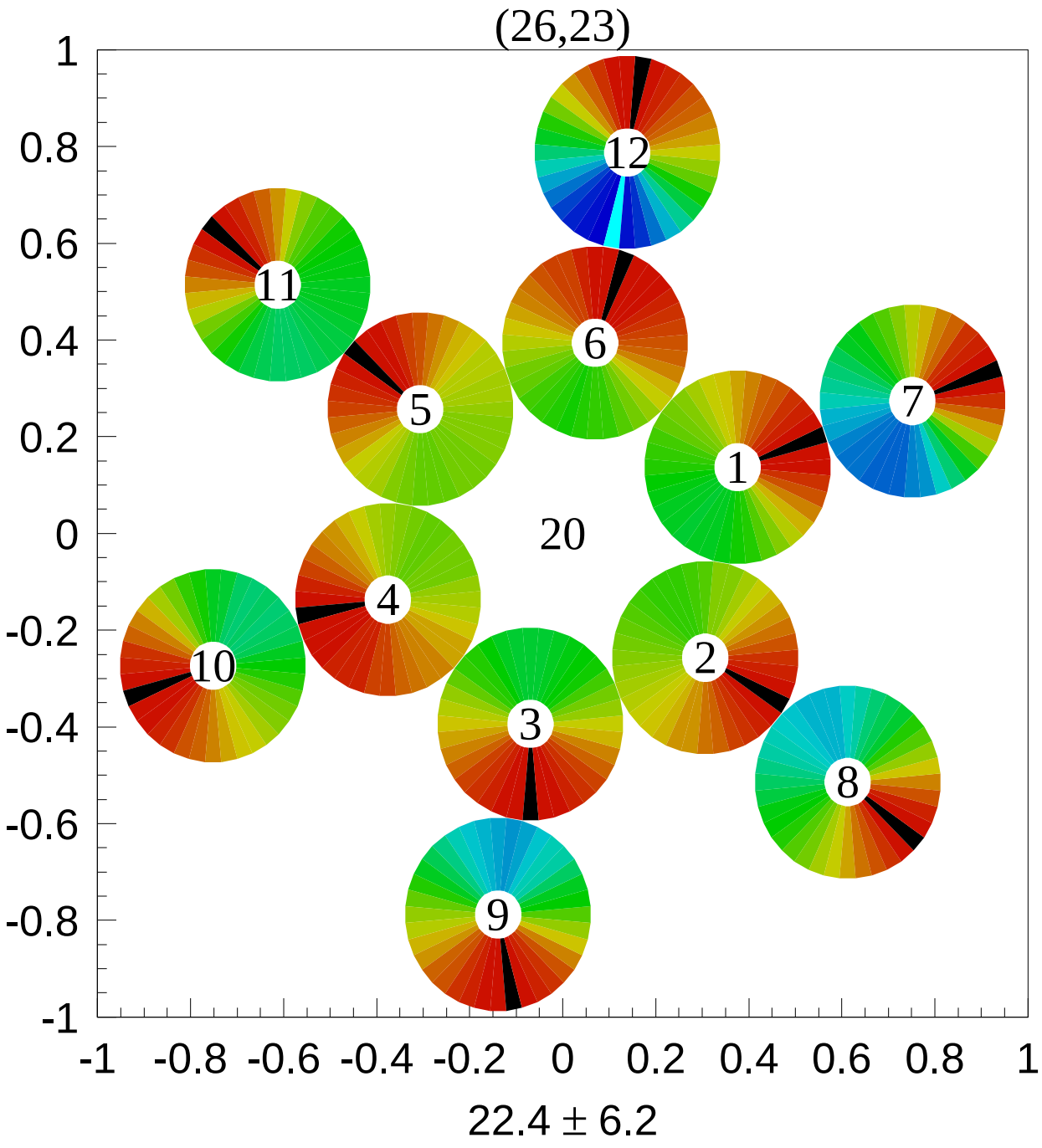

(26,21)
tilted LEDs
119 122 118 118 122 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 115 120 122 121 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

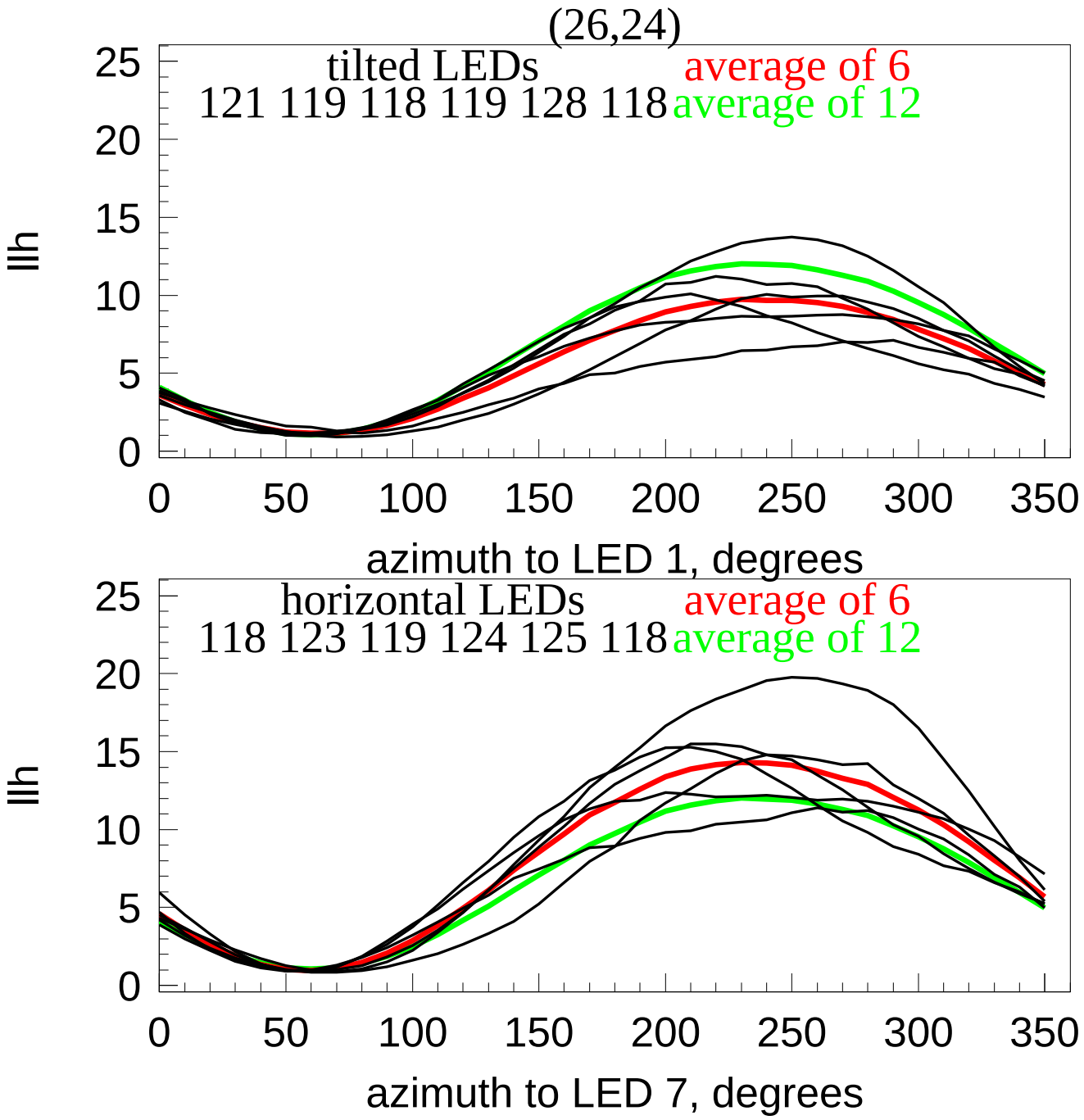

(26,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
38.9 ± 6.0

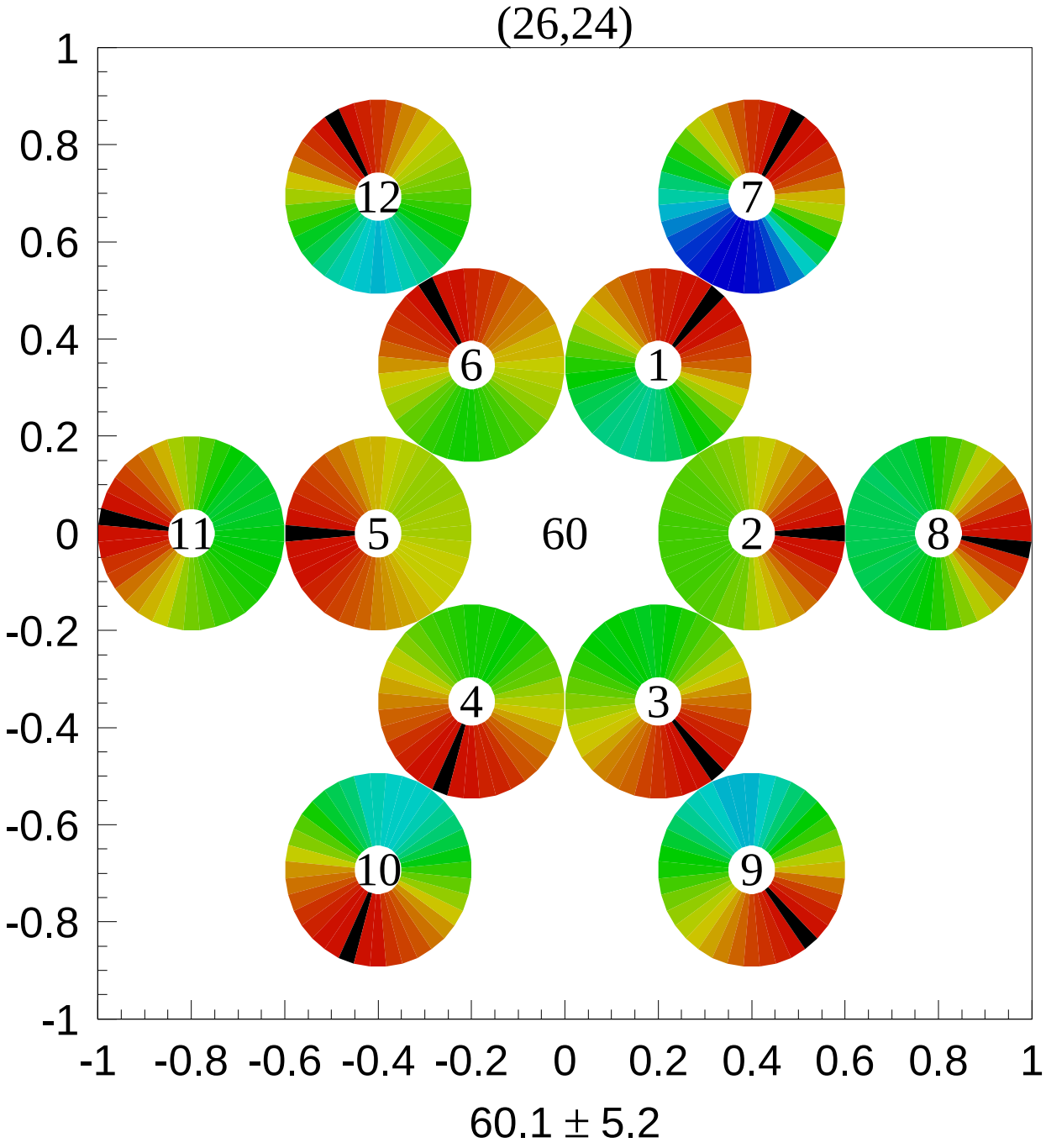

(26,22)
tilted LEDs
118 116 118 120 124 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 120 126 119 123 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

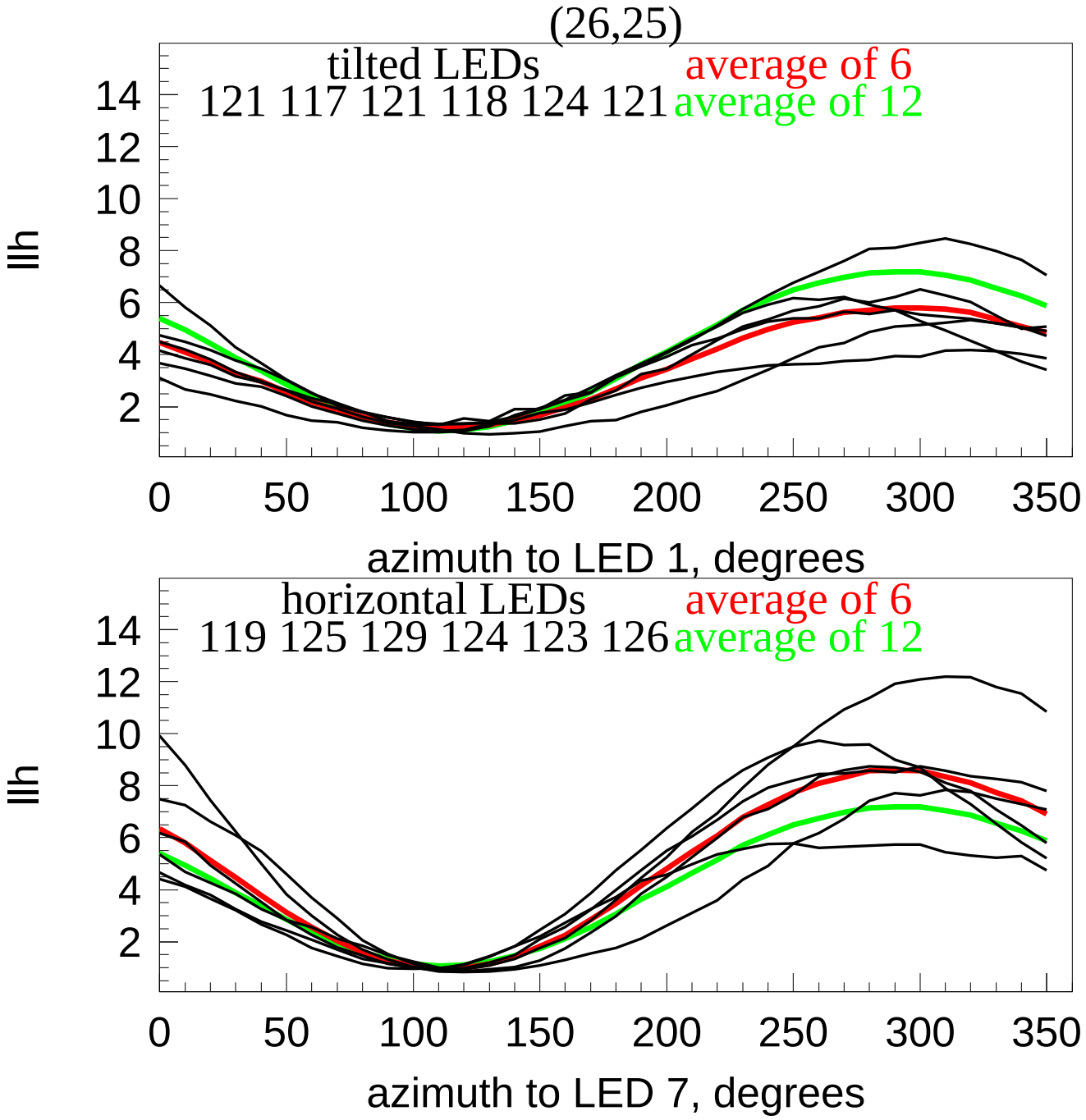

(26,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.6 ± 6.0

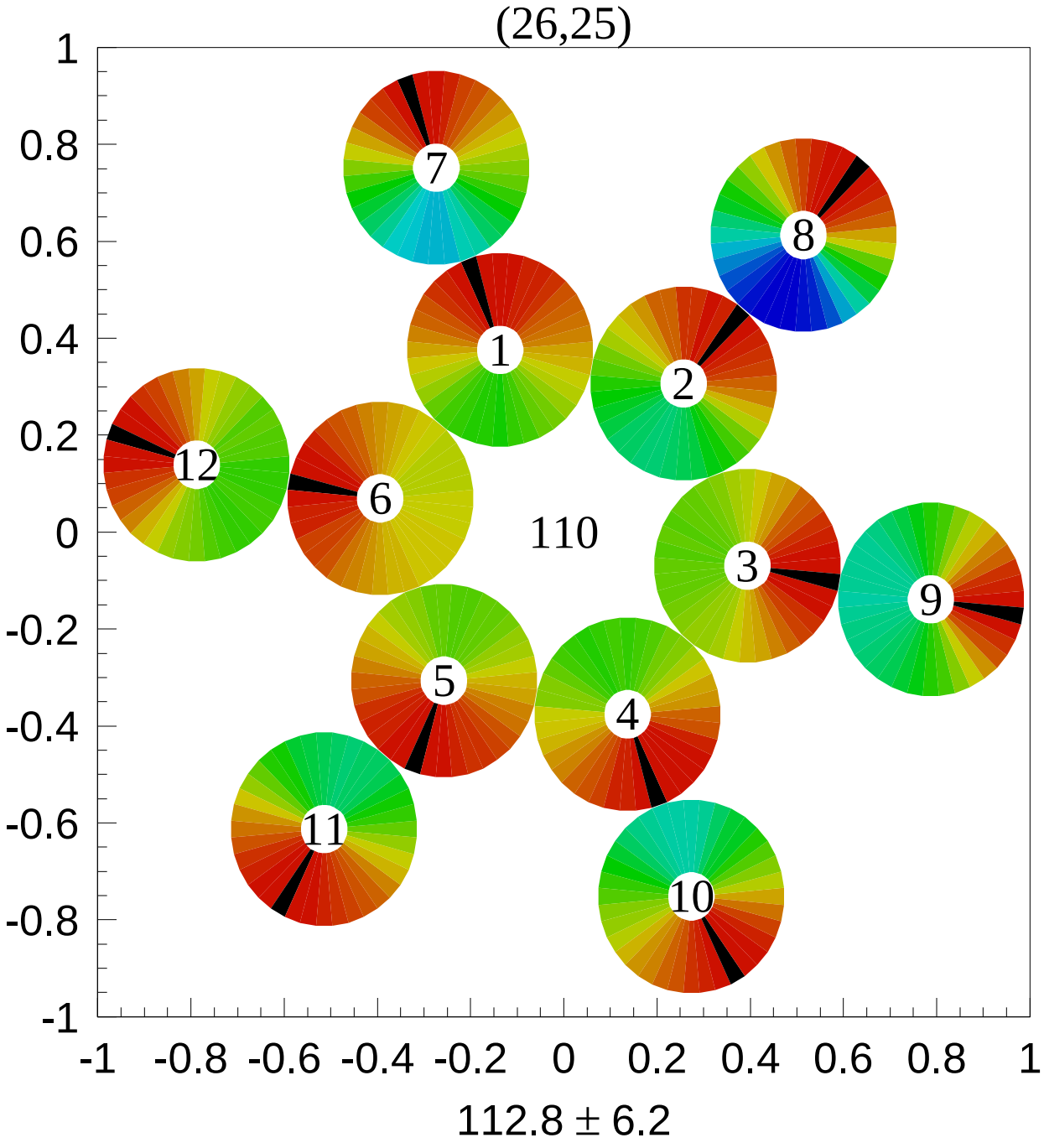

(26,23)
tilted LEDs
124 124 118 122 115 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 118 119 127 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

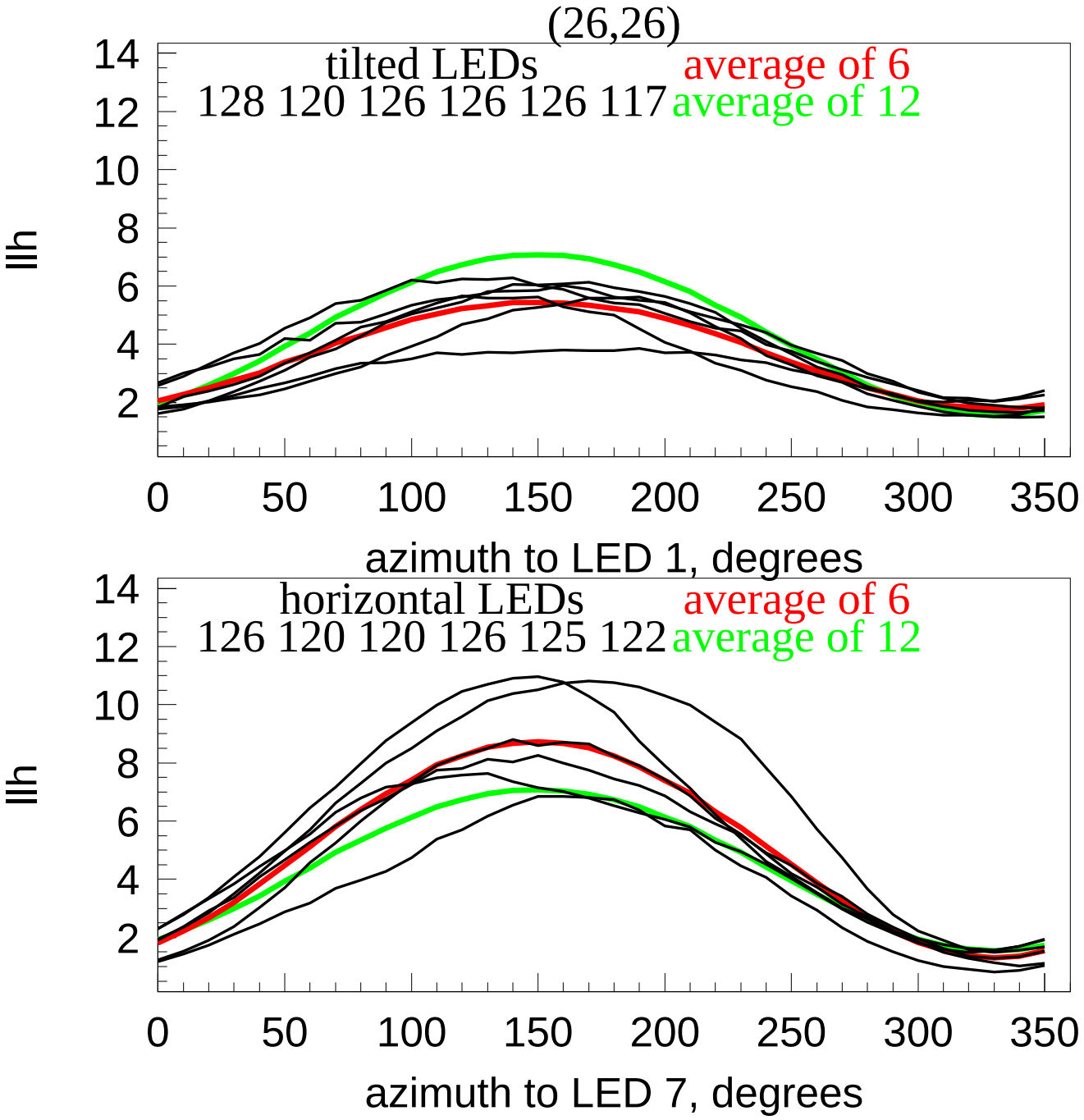

(26,23)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
22.4 ± 6.2

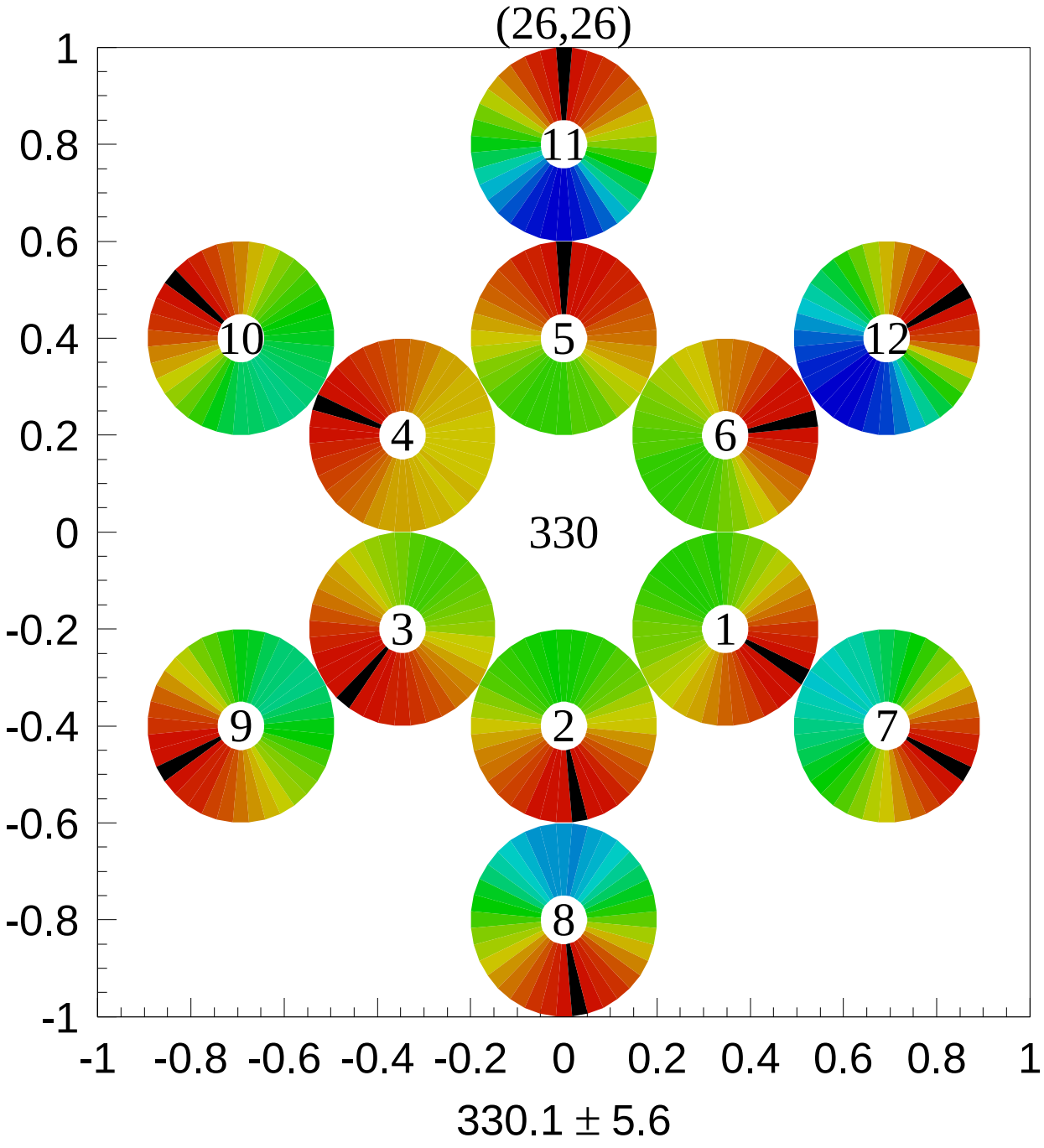

(26,24)
tilted LEDs
121 119 118 119 128 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 123 119 124 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

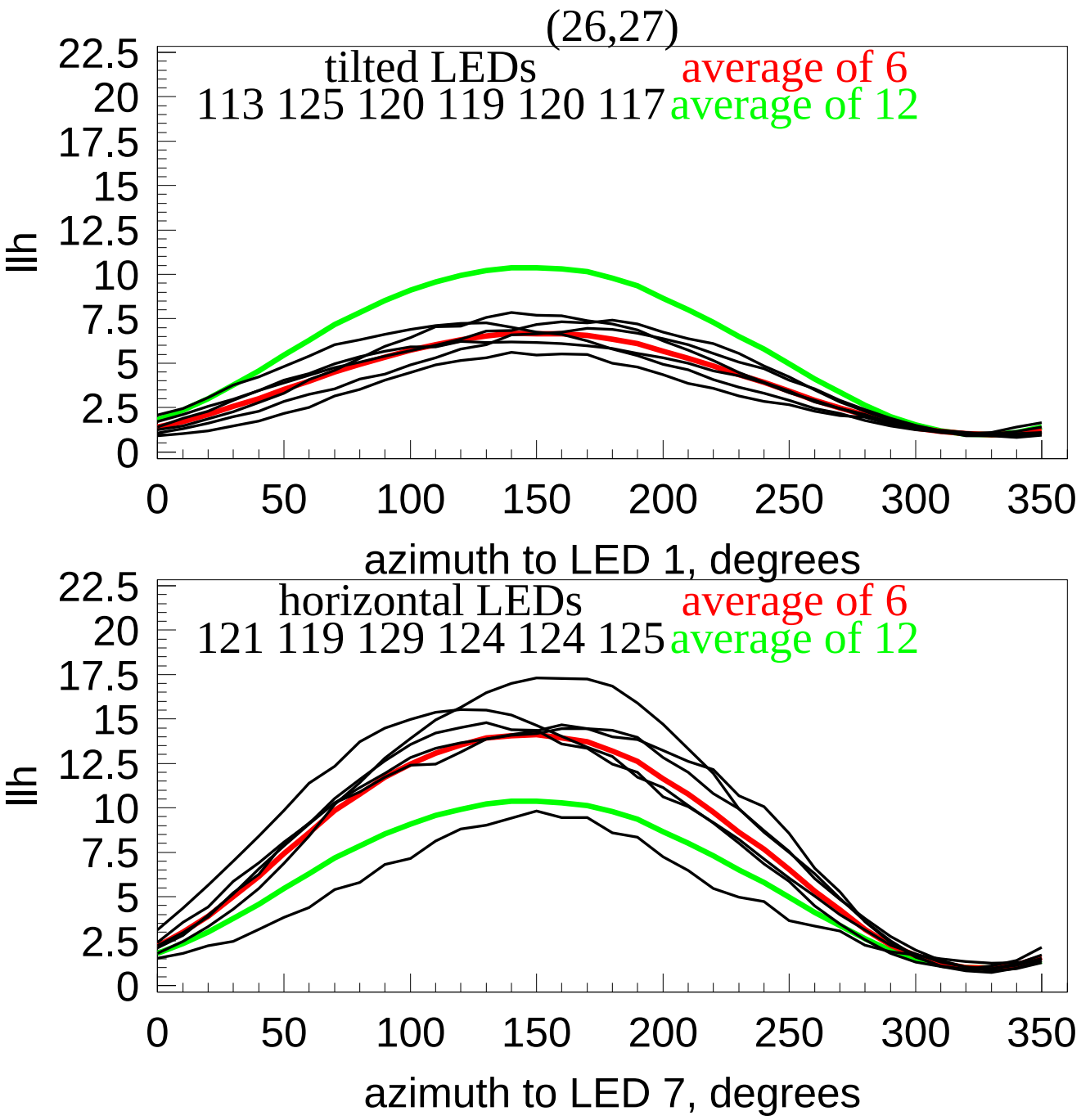

(26,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
60.1 ± 5.2

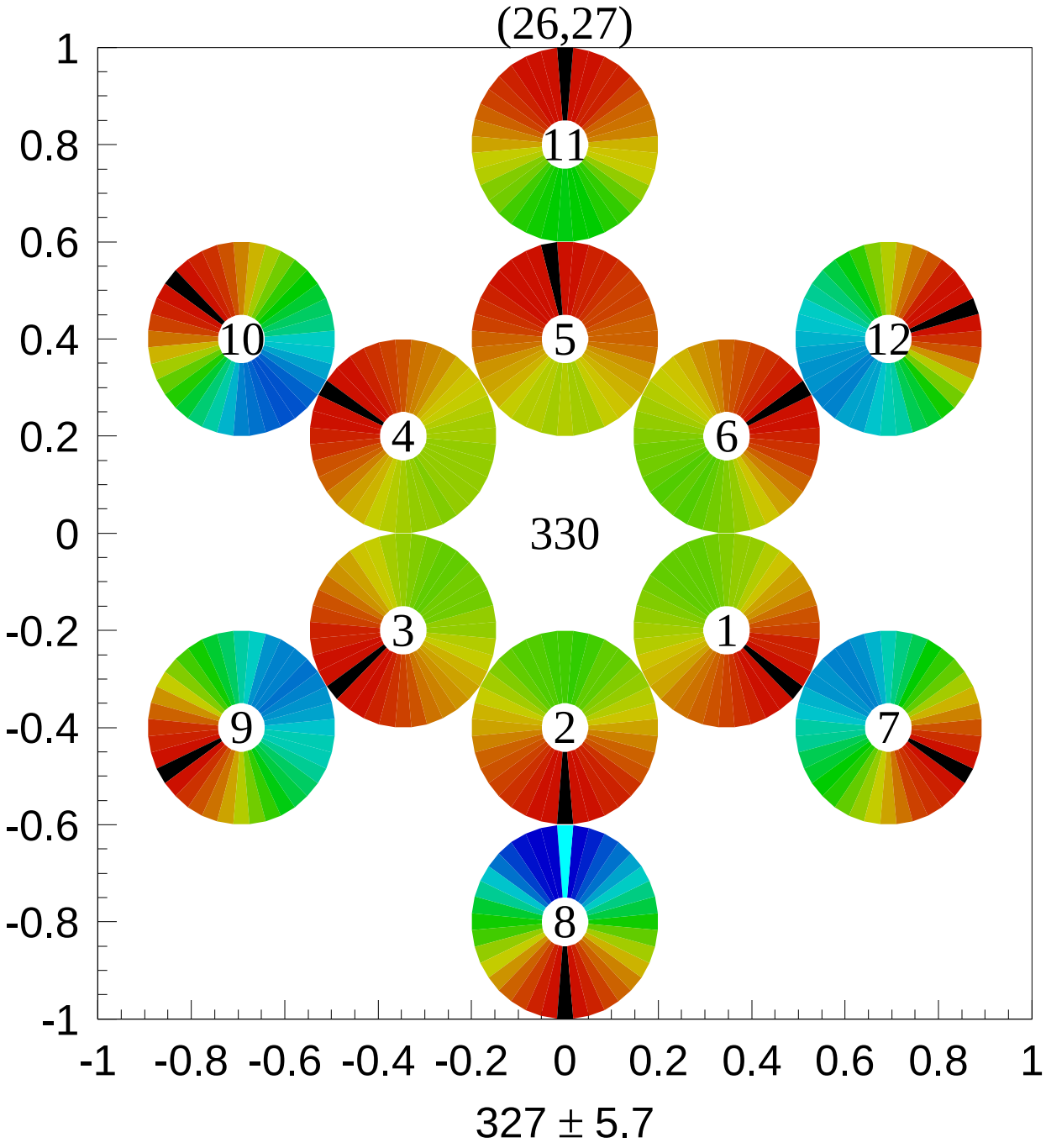

(26,25)
tilted LEDs
121 117 121 118 124 121
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 125 129 124 123 126
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

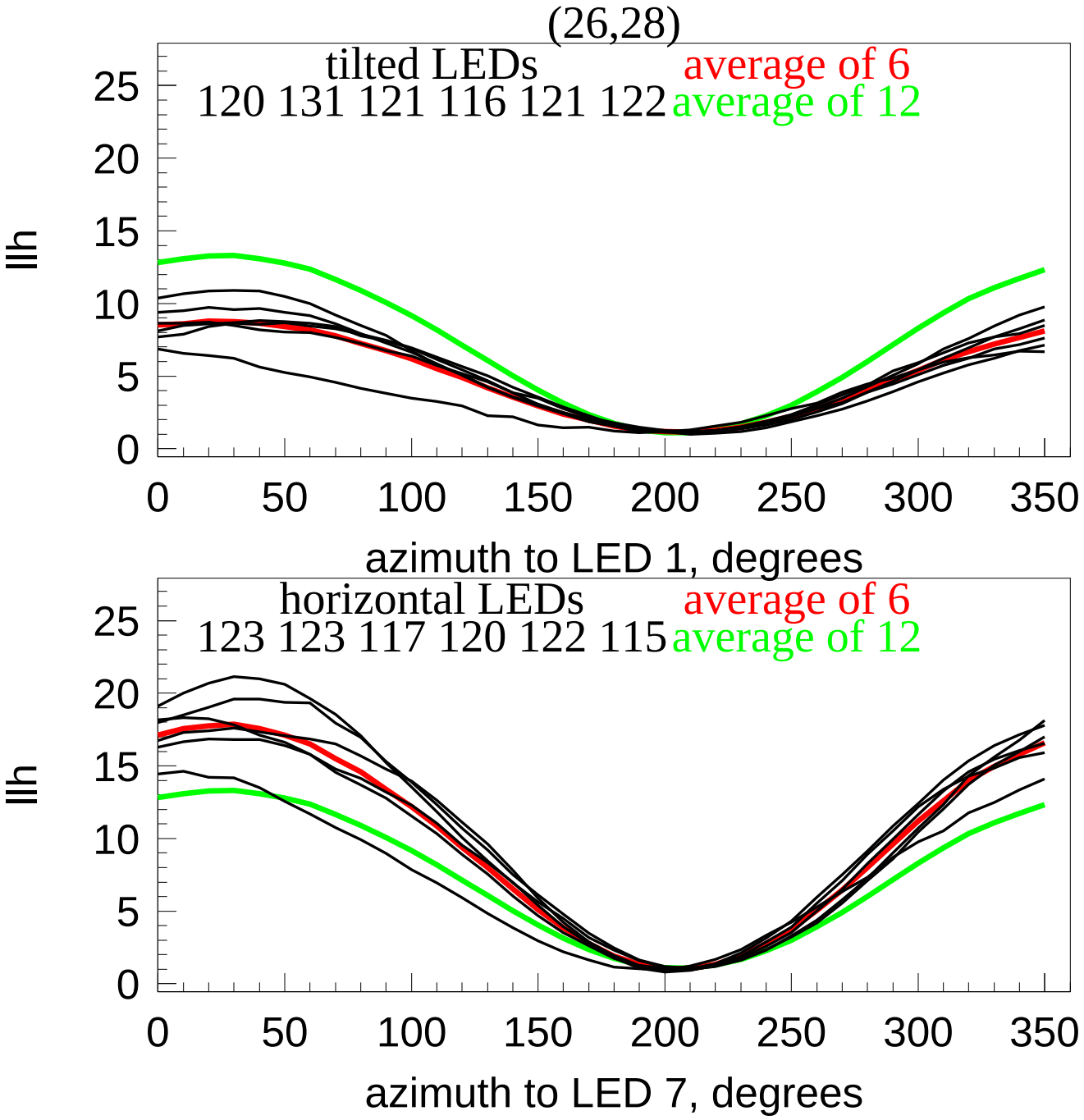

(26,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112.8 ± 6.2

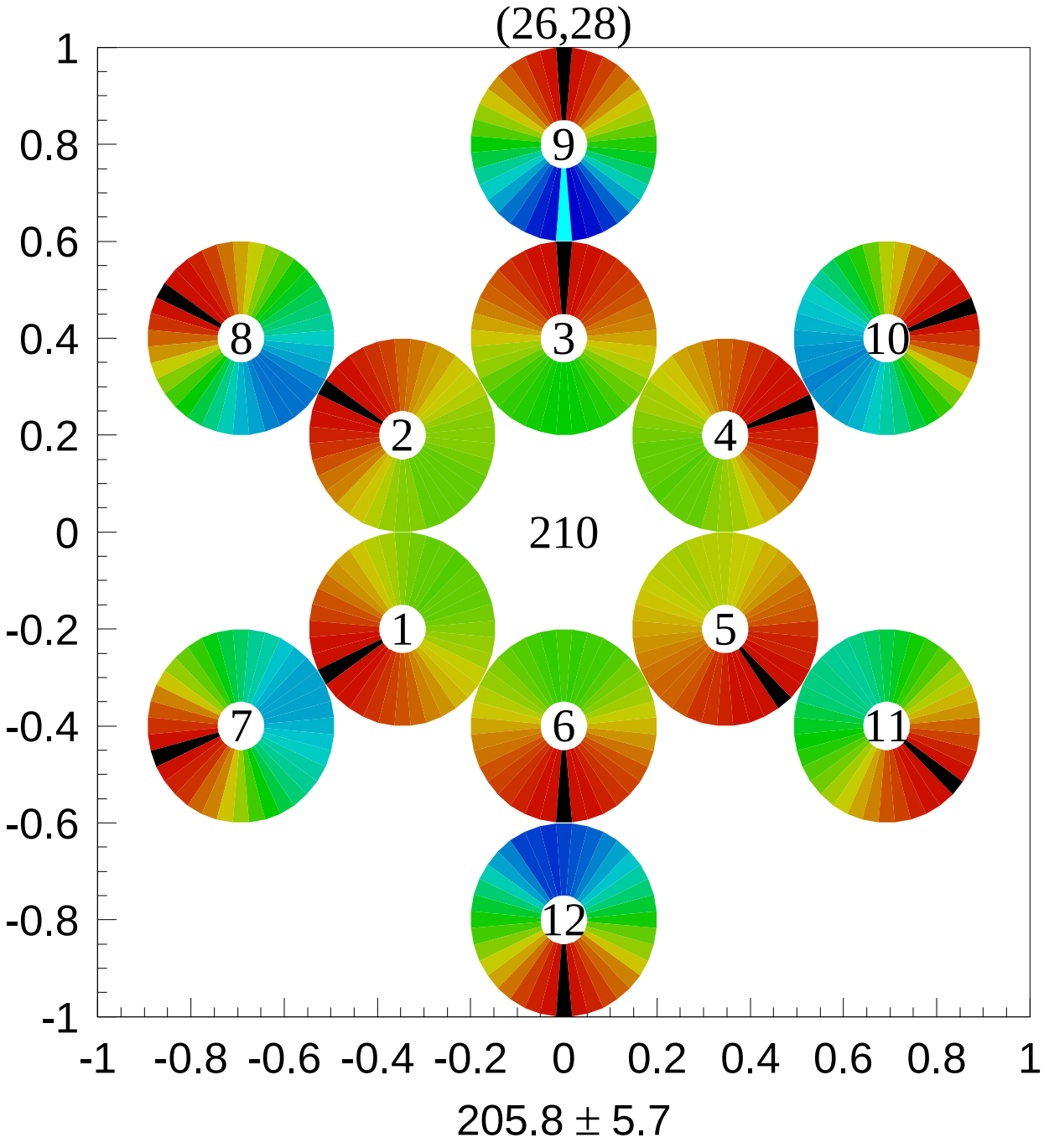

(26,26)
tilted LEDs
128 120 126 126 126 117
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 120 120 126 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

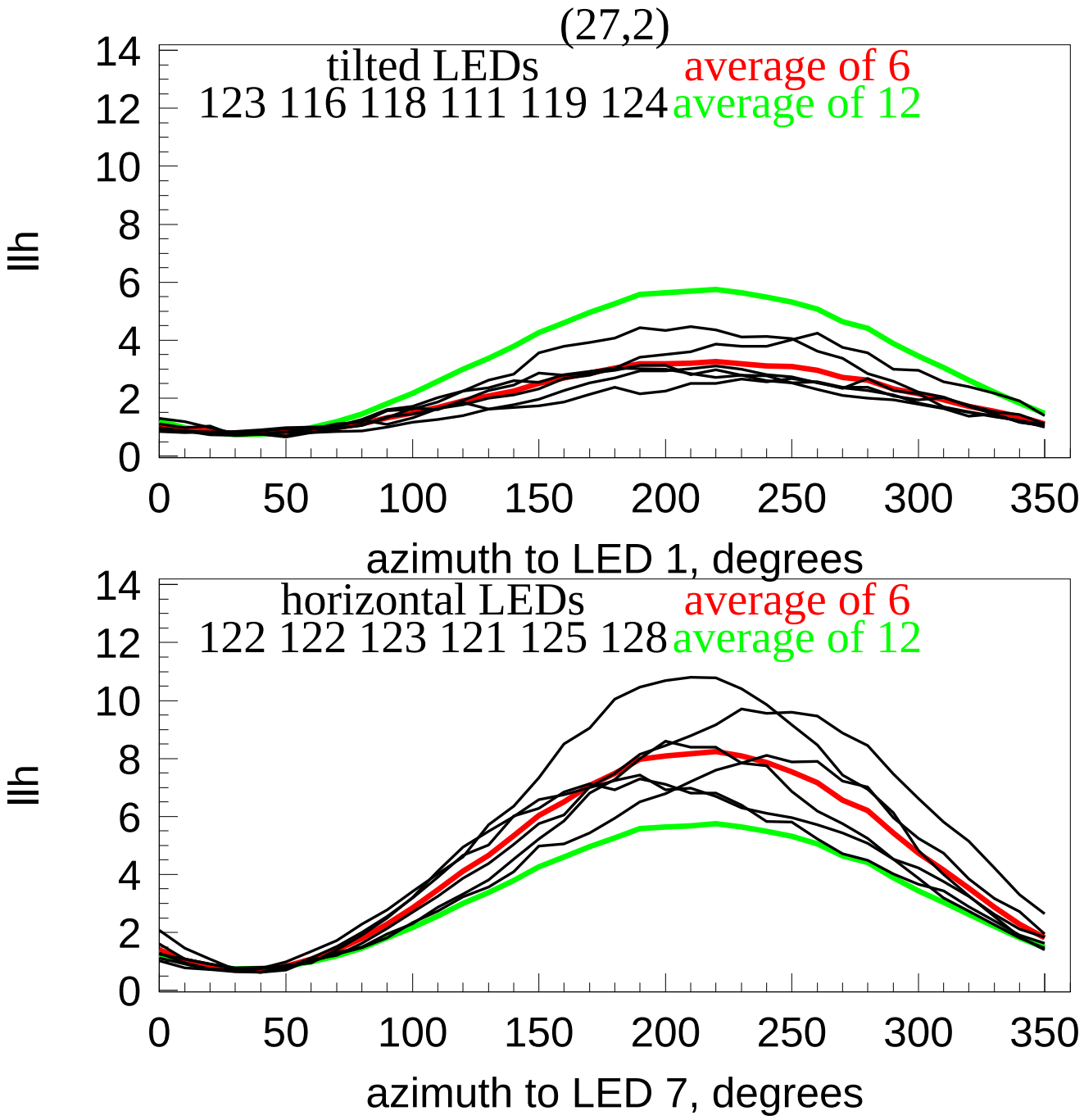

(26,26)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
330.1 ± 5.6

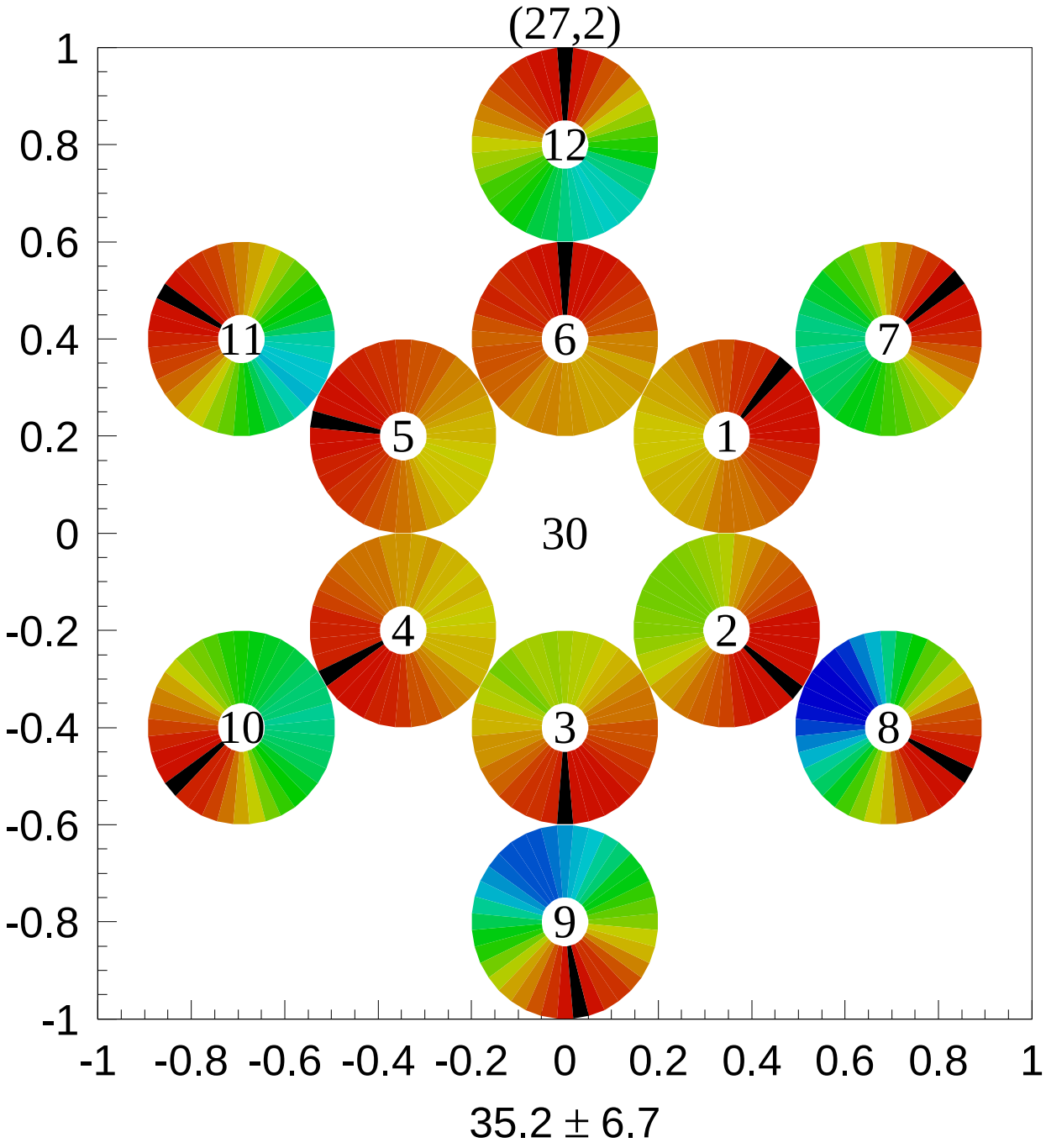

(26,27)
tilted LEDs
113 125 120 119 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 129 124 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

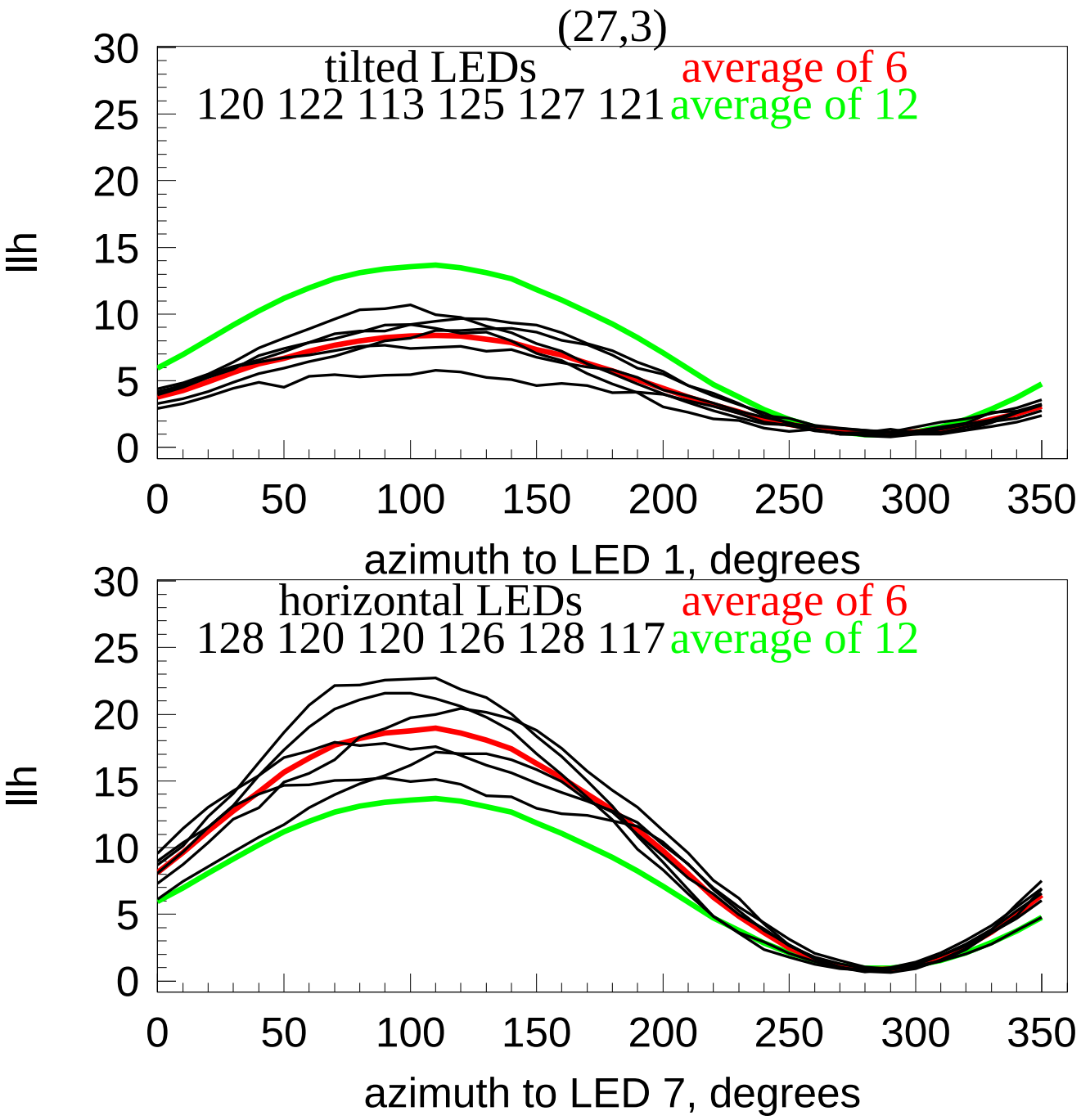

(26,27)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
327 ± 5.7

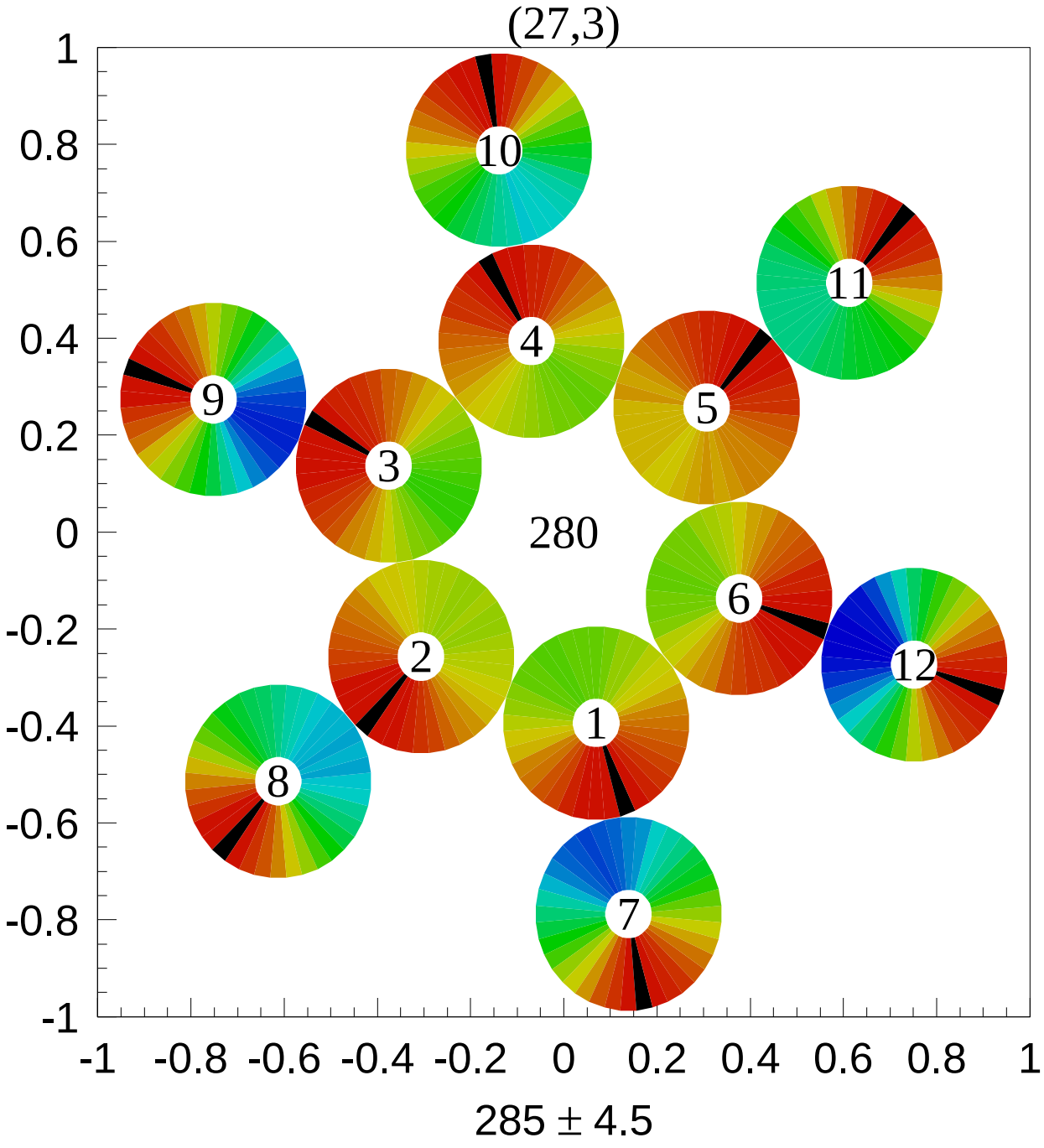

(26,28)
tilted LEDs
120 131 121 116 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 117 120 122 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

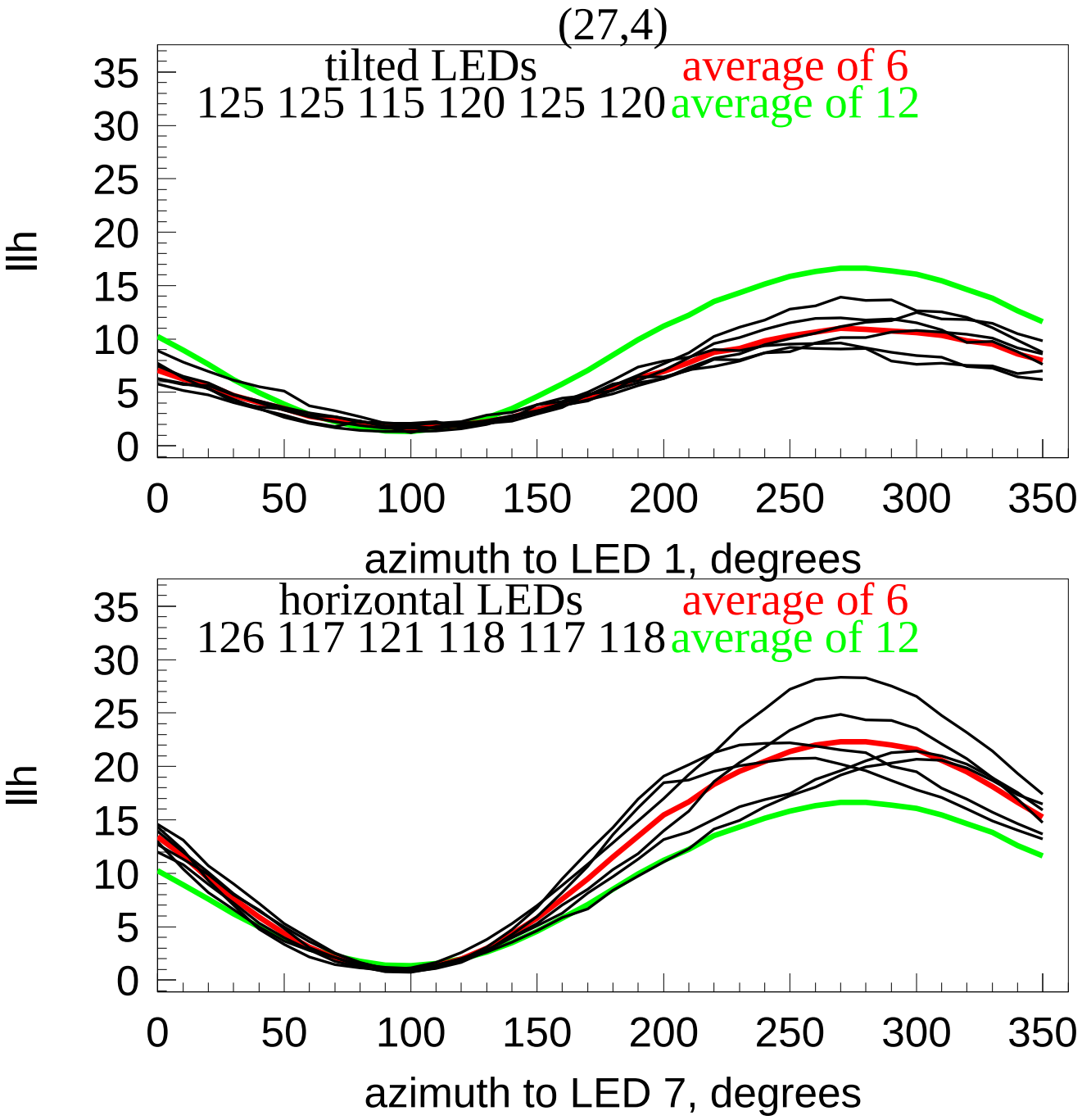

(26,28)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
205.8 ± 5.7

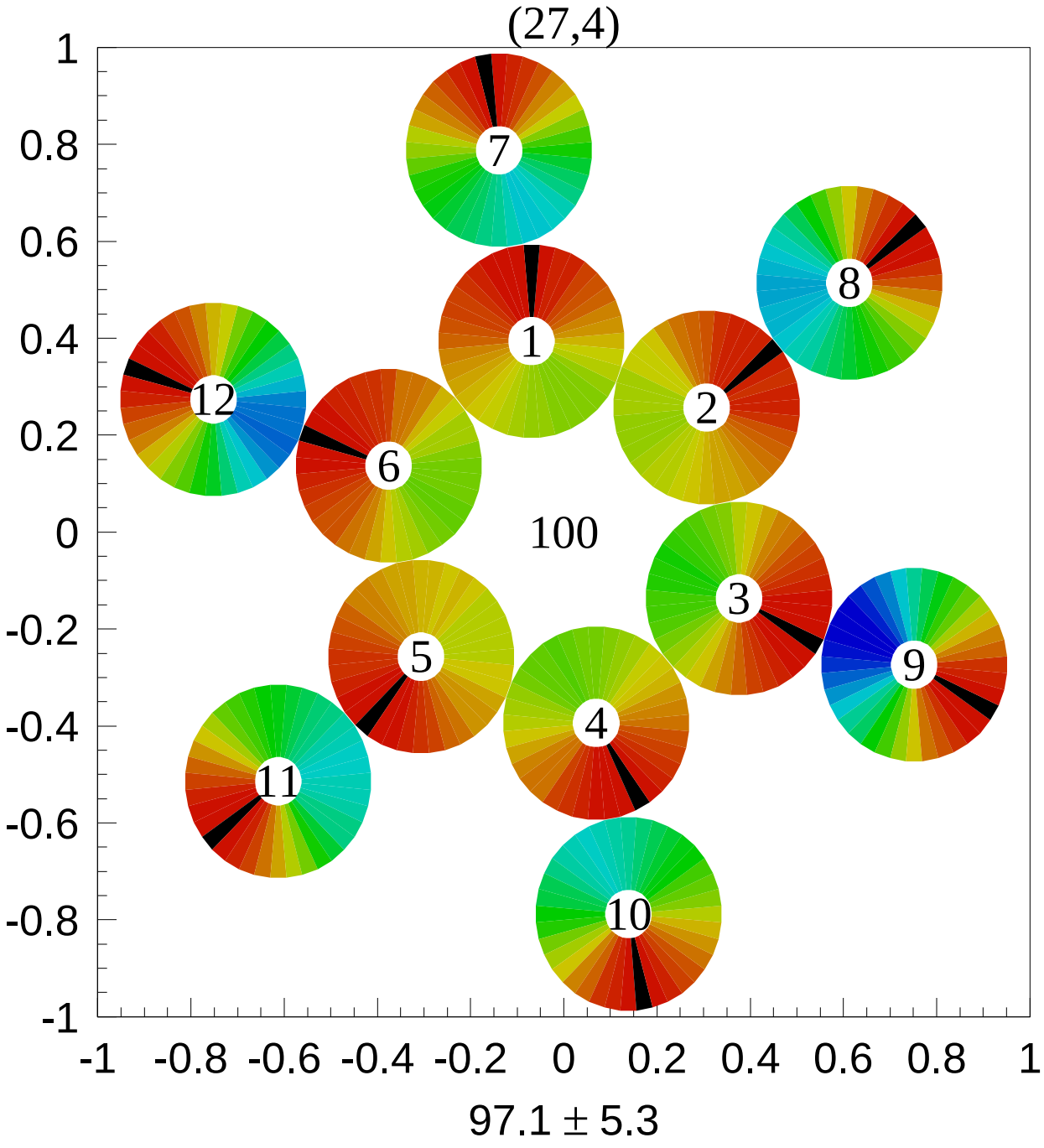

(27,2)
tilted LEDs
123 116 118 111 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 123 121 125 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

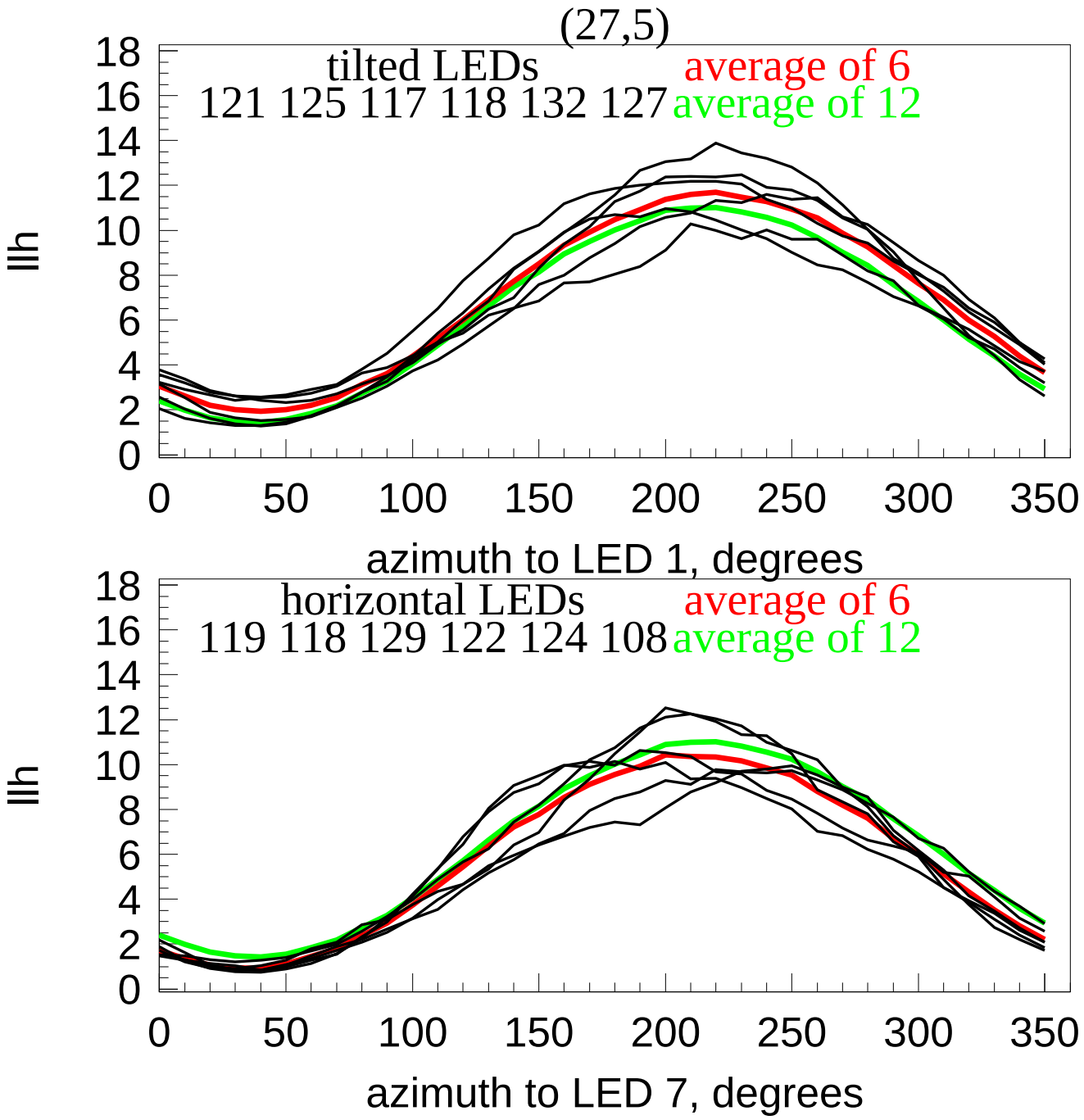

(27,2)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
35.2 ± 6.7

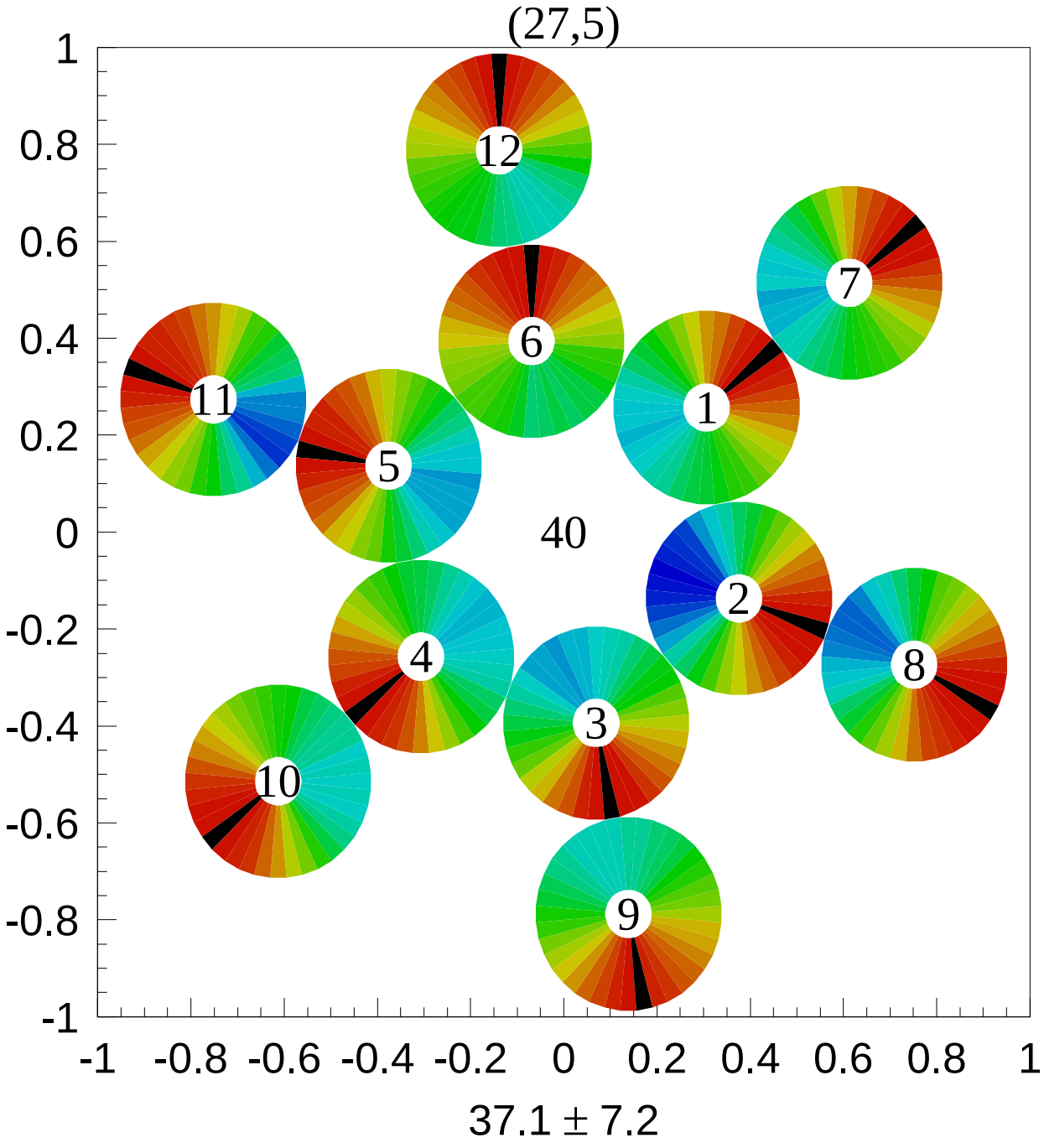

(27,3)
tilted LEDs
120 122 113 125 127 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 120 120 126 128 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

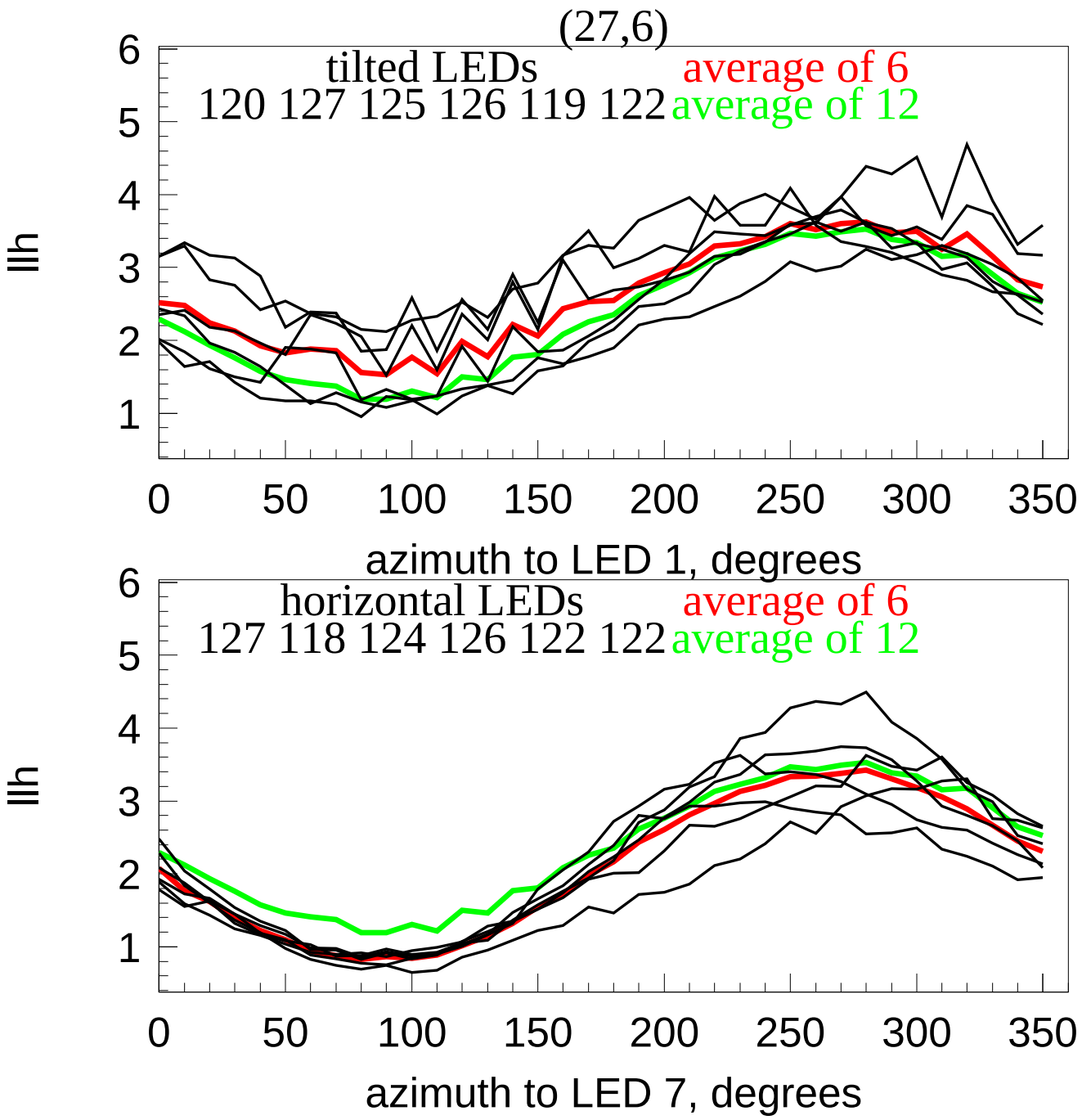

(27,3)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
285 ± 4.5

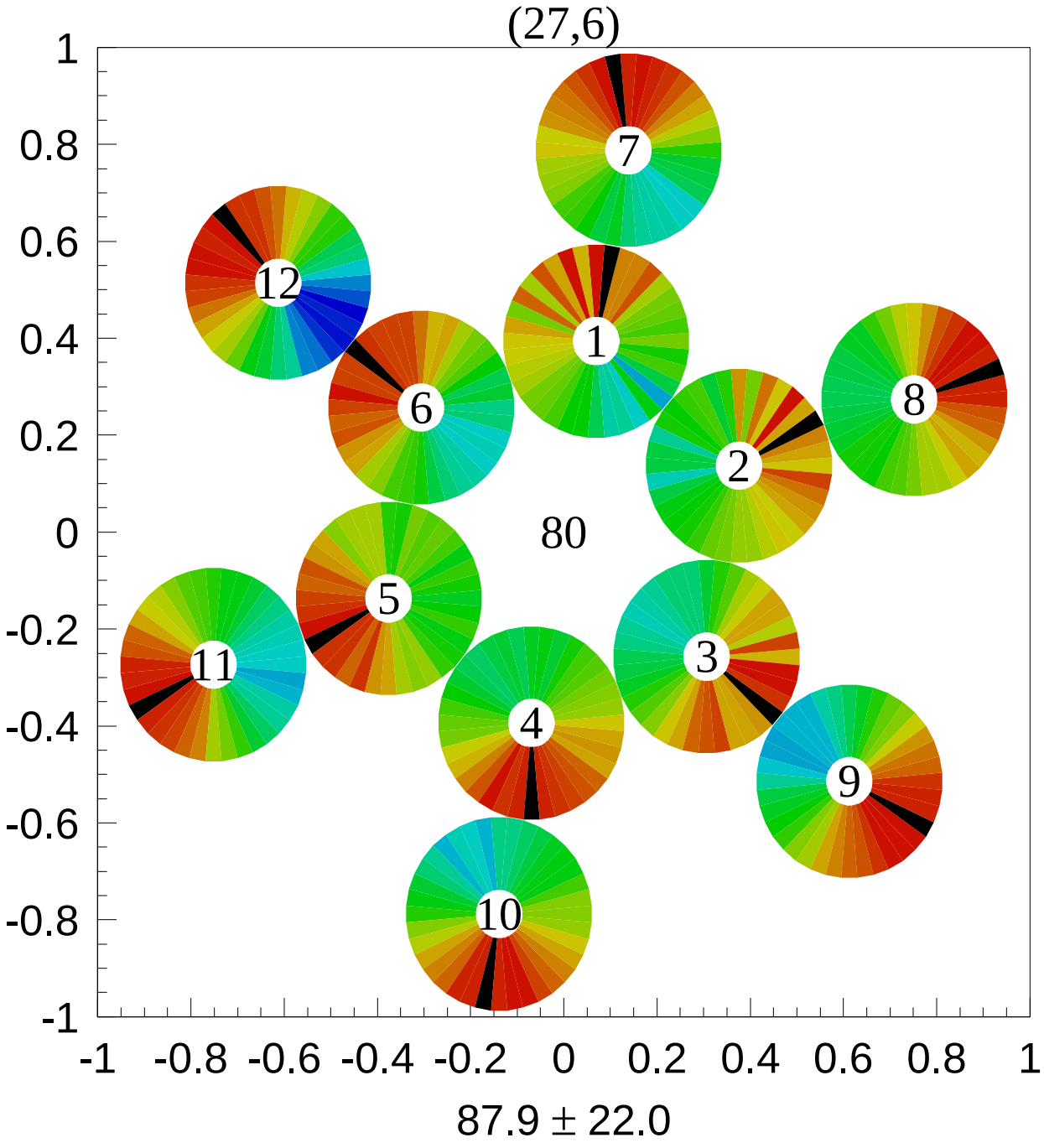

(27,4)
tilted LEDs
125 125 115 120 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 117 121 118 117 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

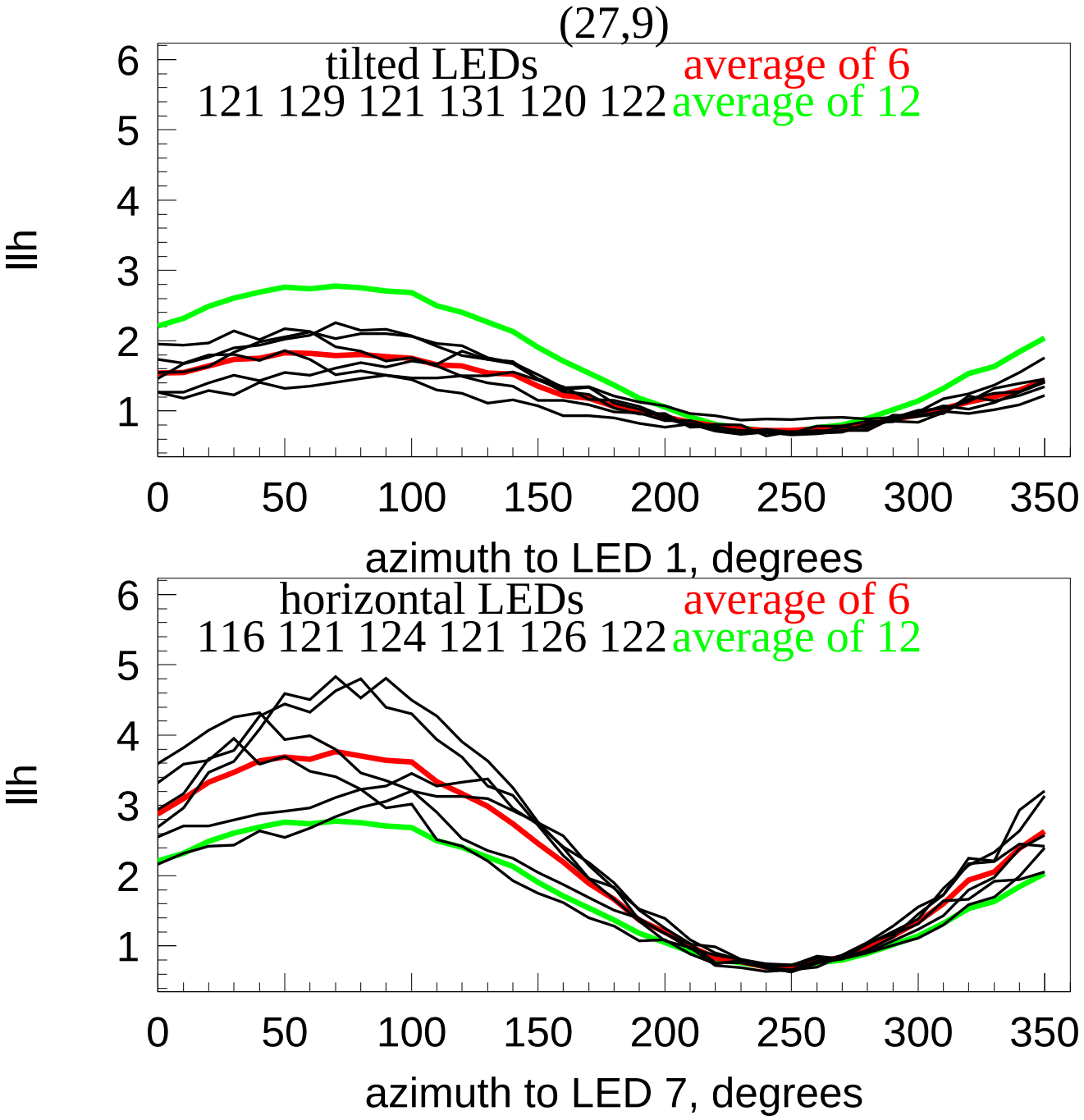

(27,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
97.1 ± 5.3

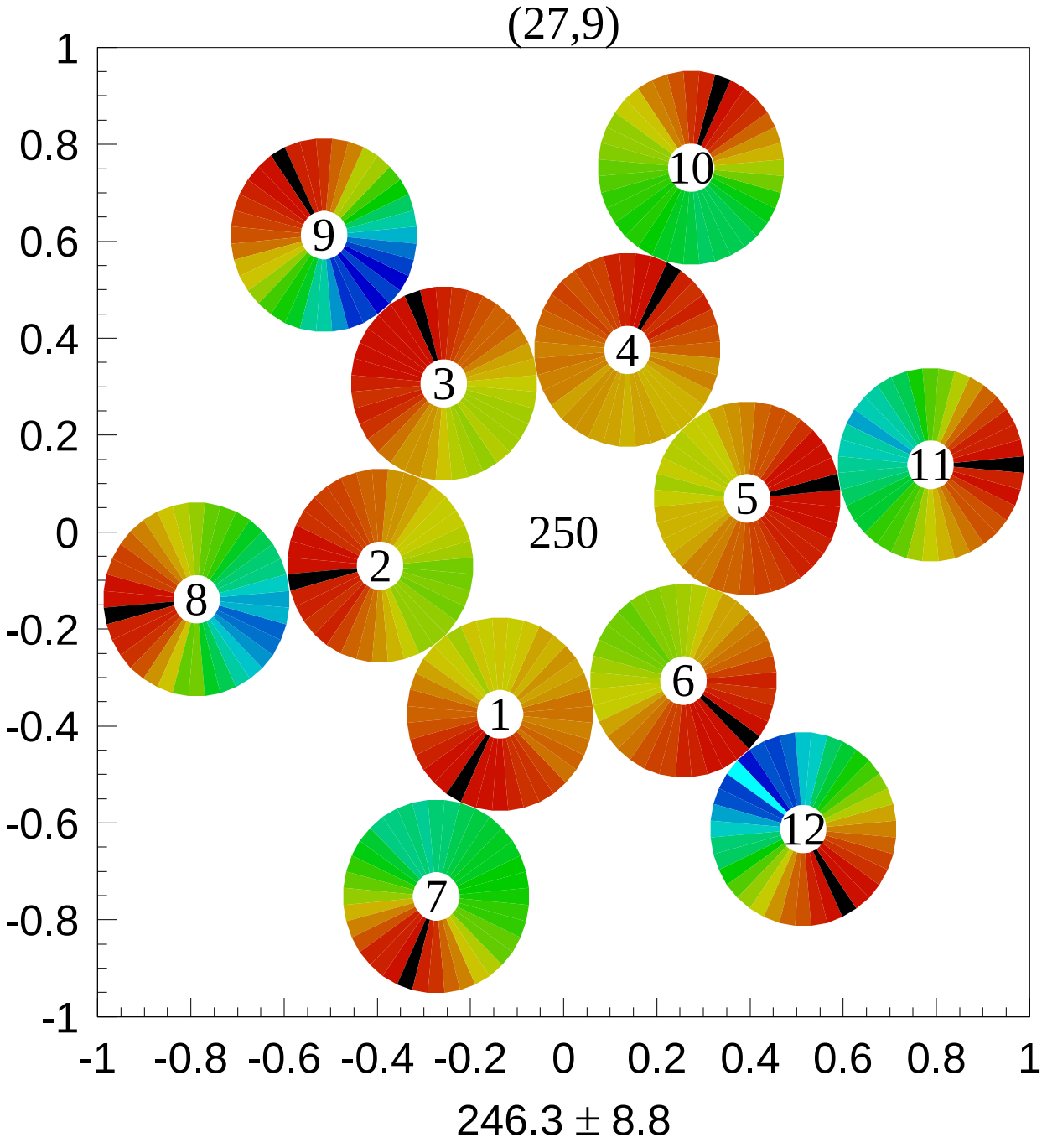

(27,5)
tilted LEDs
121 125 117 118 132 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 129 122 124 108
average of 6
average of 12
llh
azimuth to LED 7, degrees

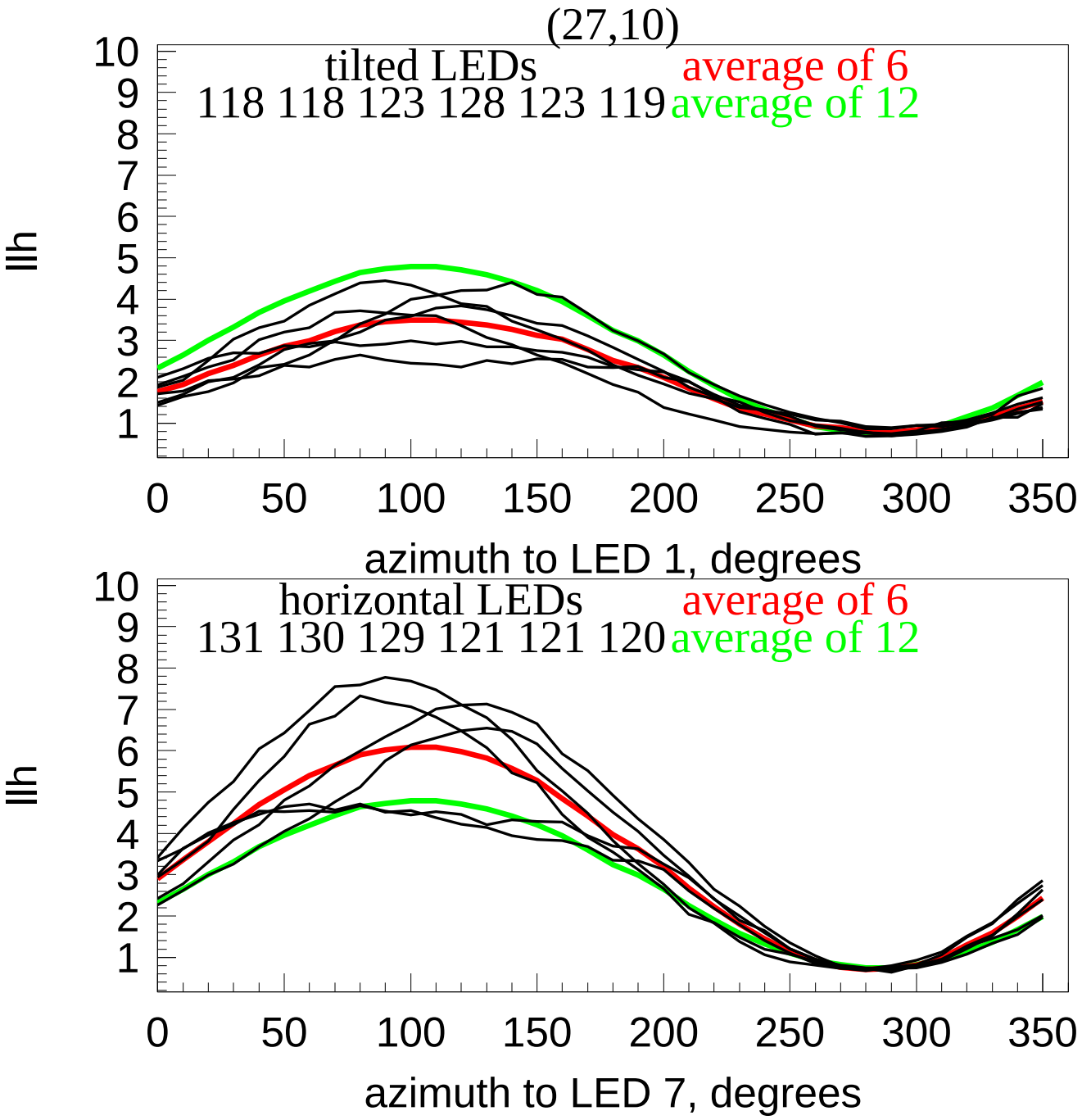

(27,5)
12
6
7
11
1
5
40
2
4
8
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
37.1 ± 7.2

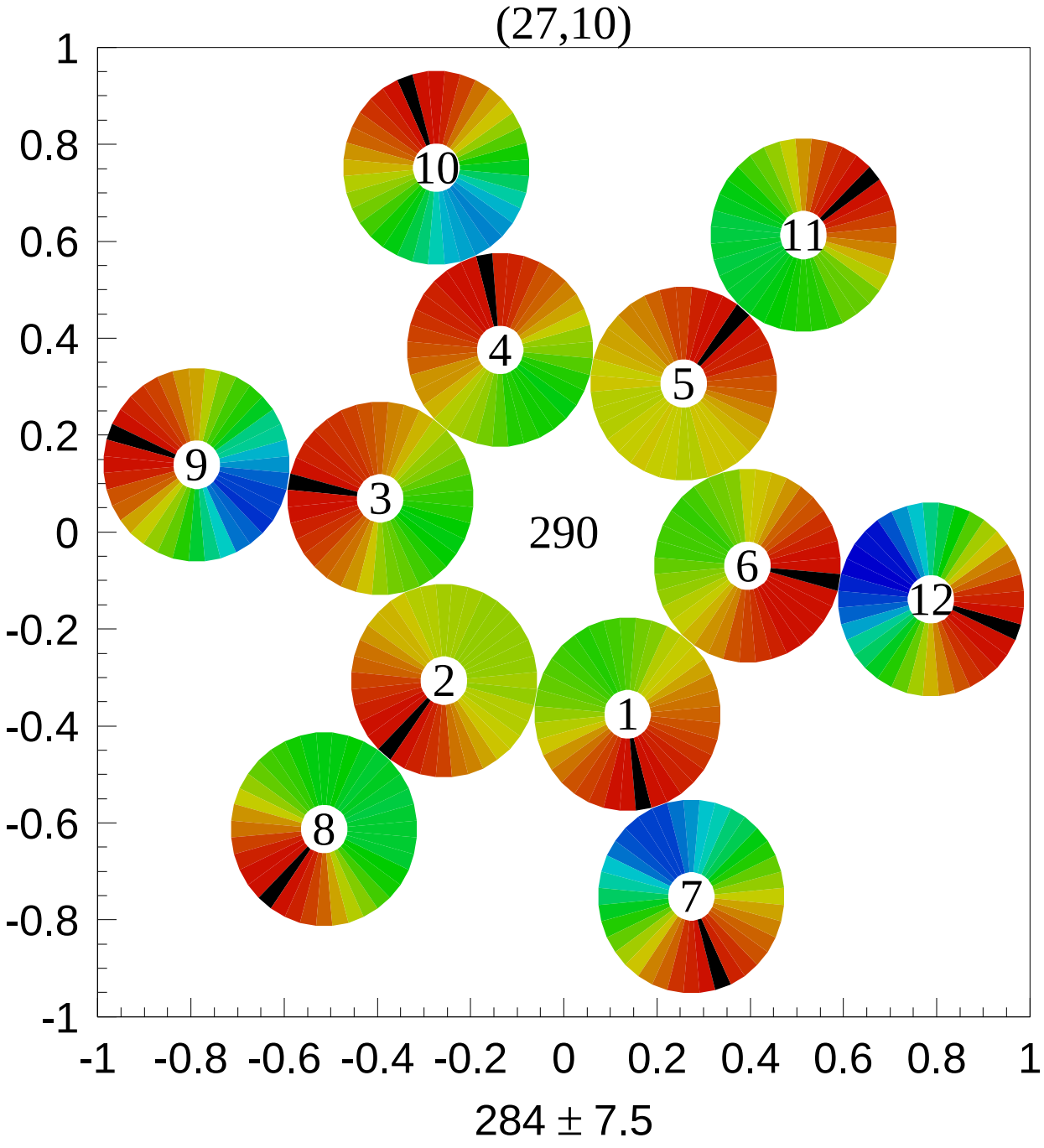

(27,6)
tilted LEDs
120 127 125 126 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 118 124 126 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

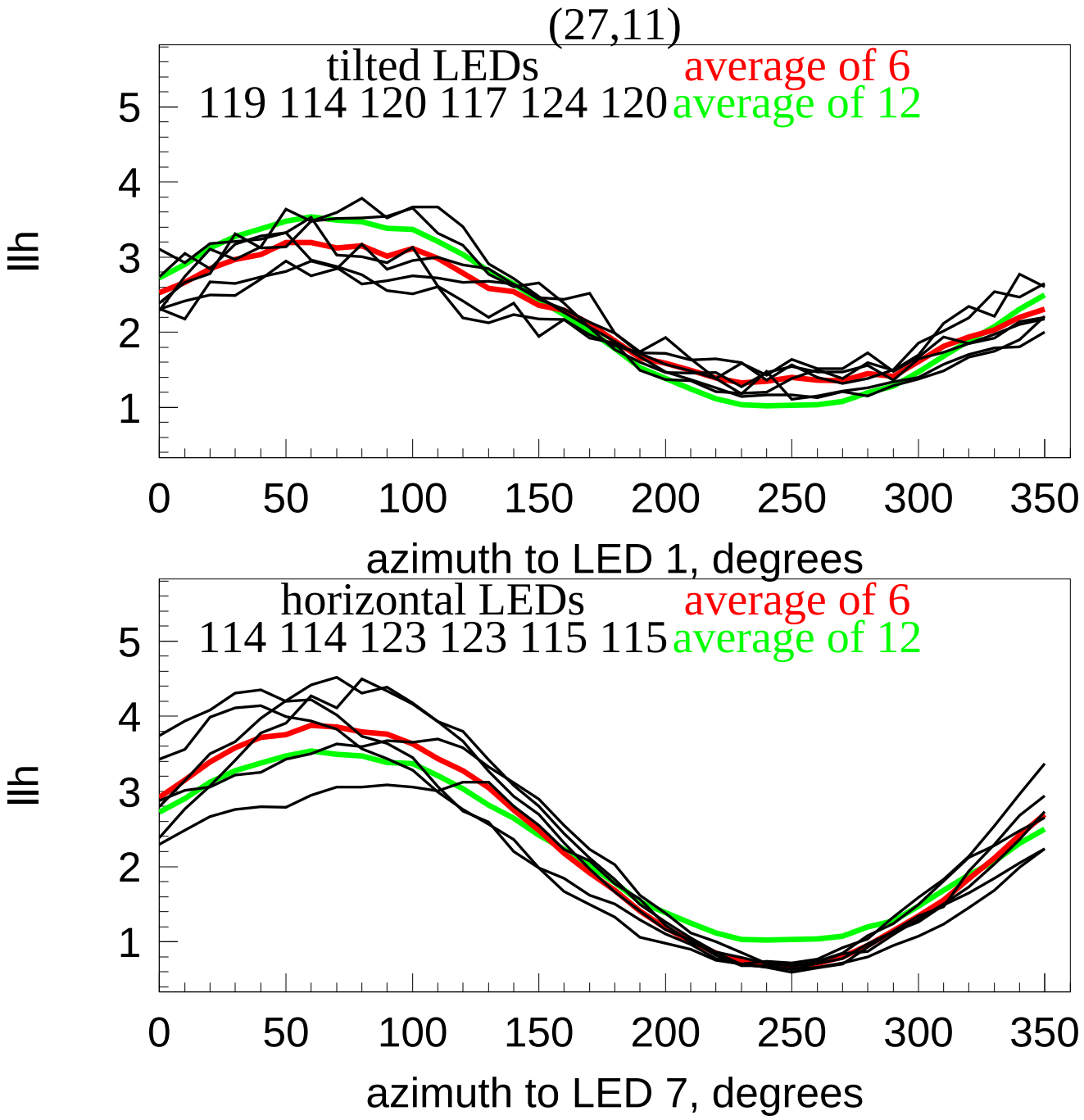

(27,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
87.9 ± 22.0

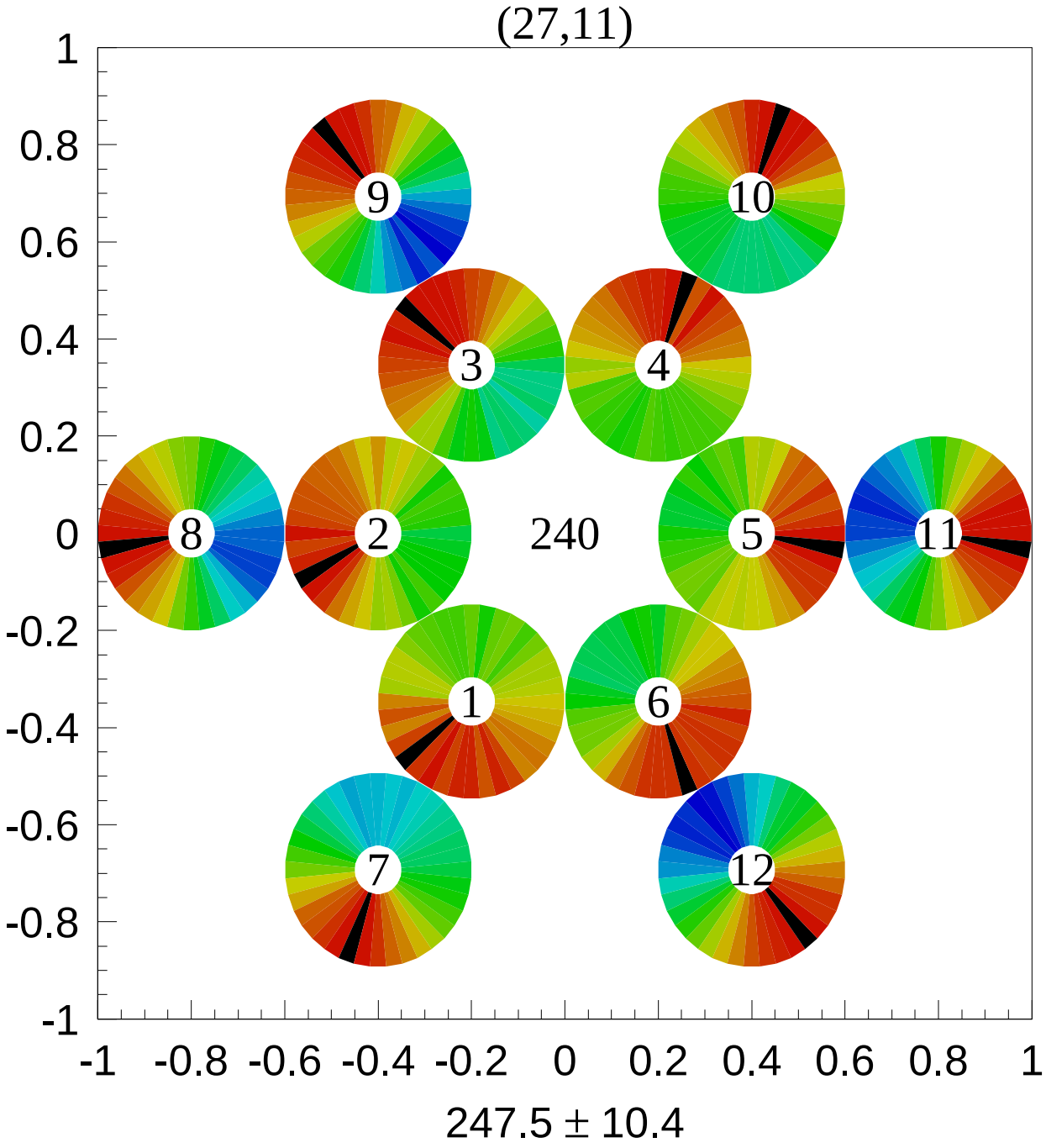

(27,9)
tilted LEDs
121 129 121 131 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 121 124 121 126 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

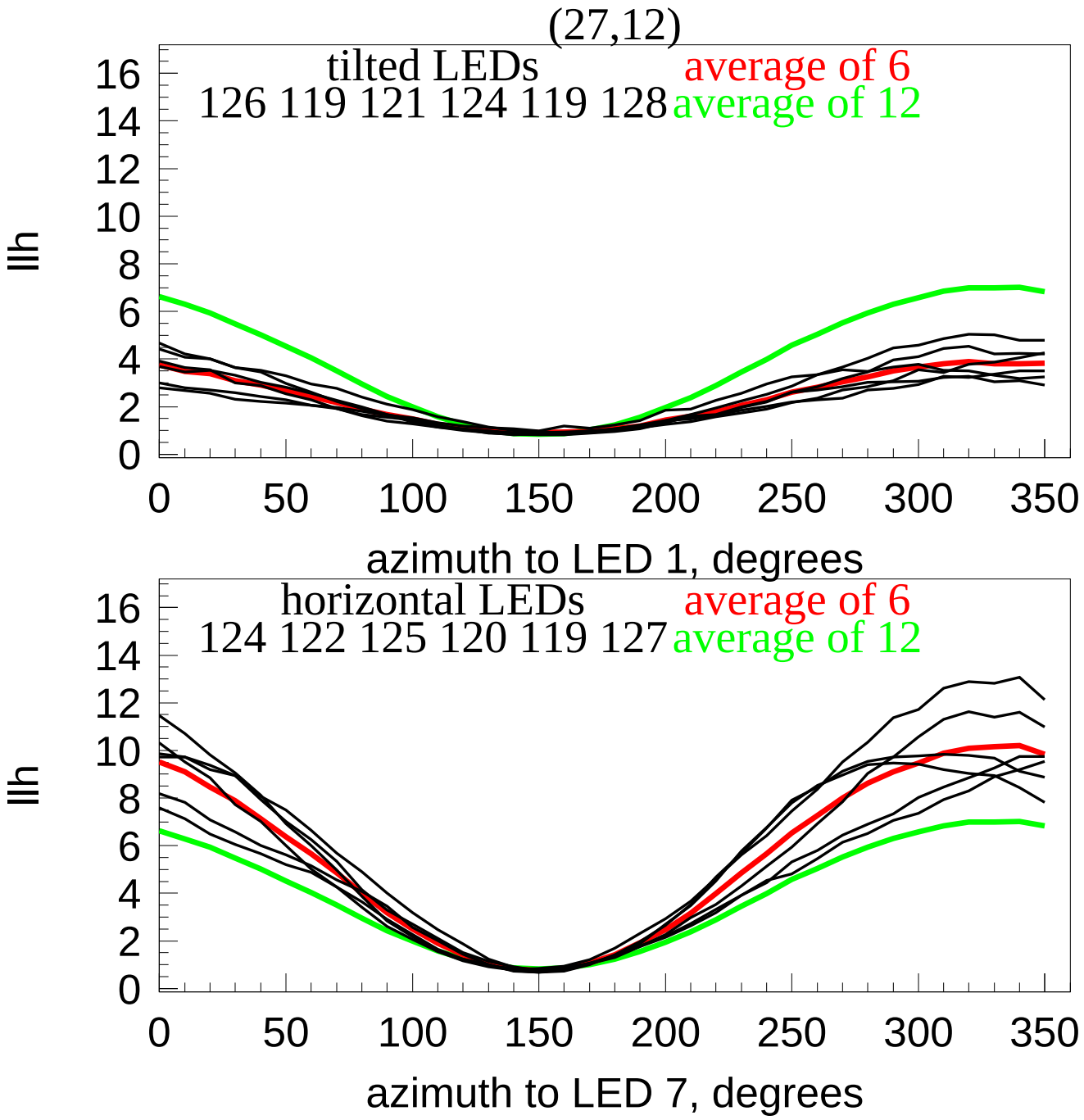

(27,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
246.3 ± 8.8
250
1
2
3
4
5
6
7
8
9
10
11
12

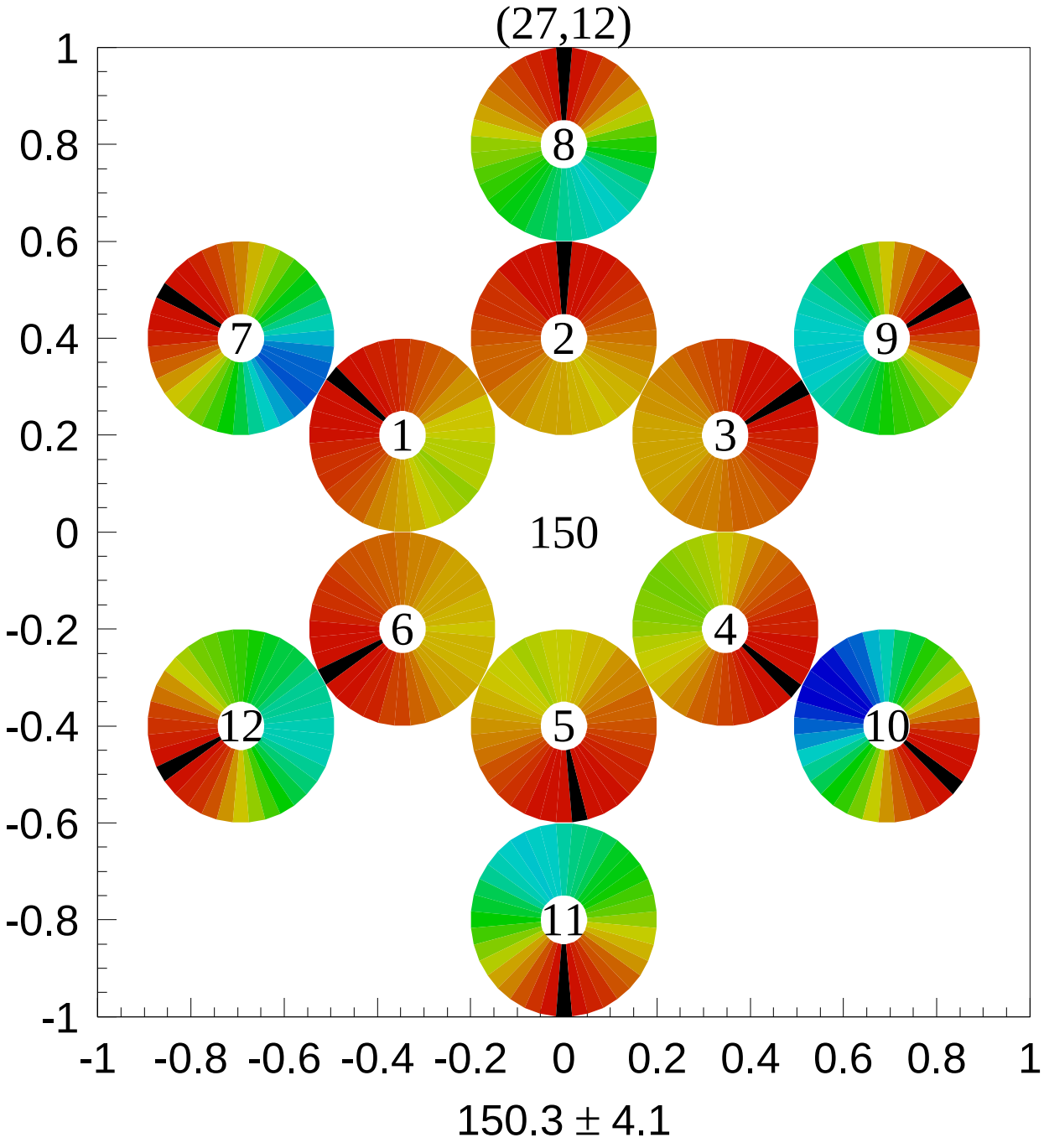

(27,10)
tilted LEDs
118 118 123 128 123 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
131 130 129 121 121 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

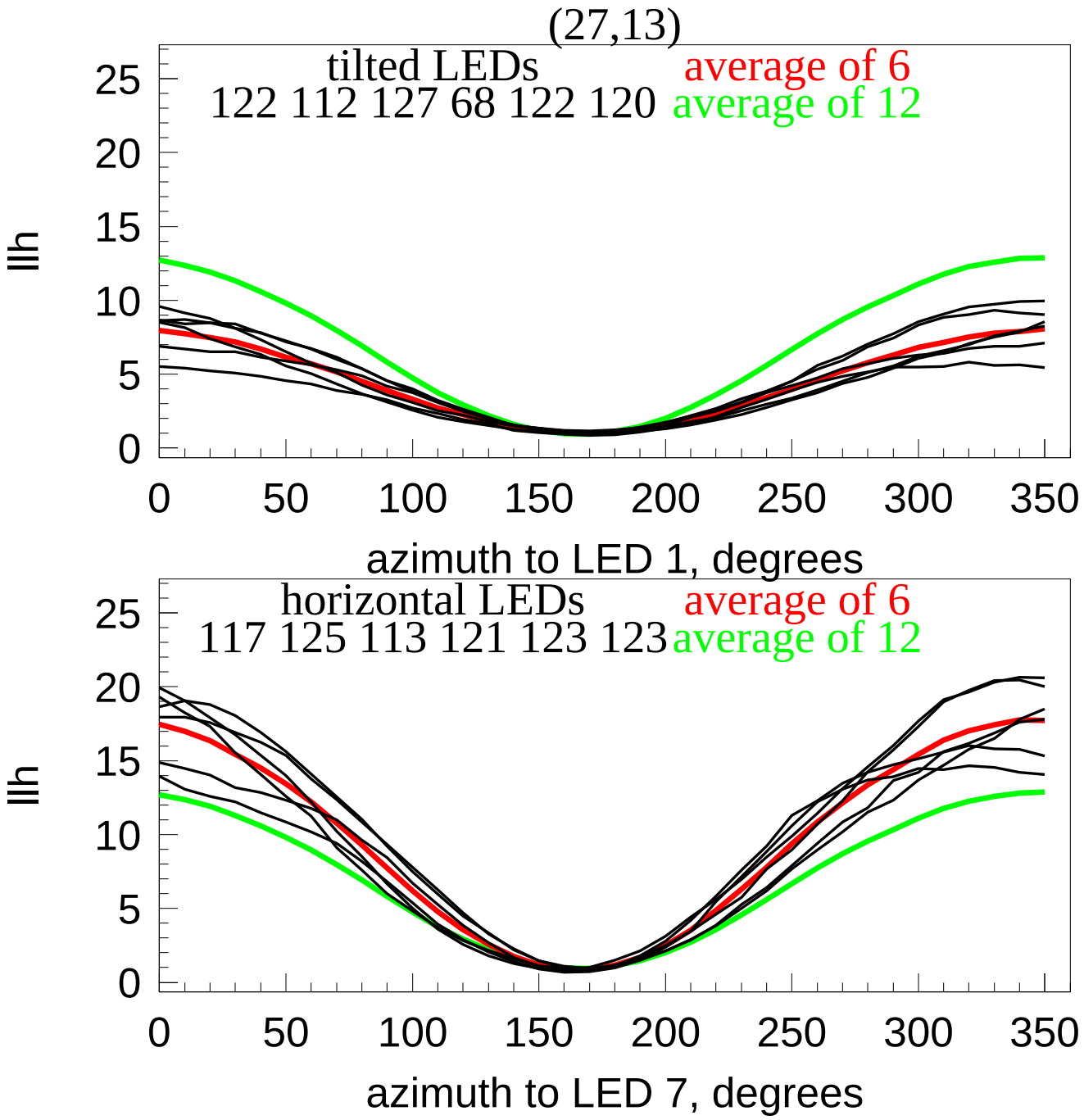

(27,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
284 ± 7.5

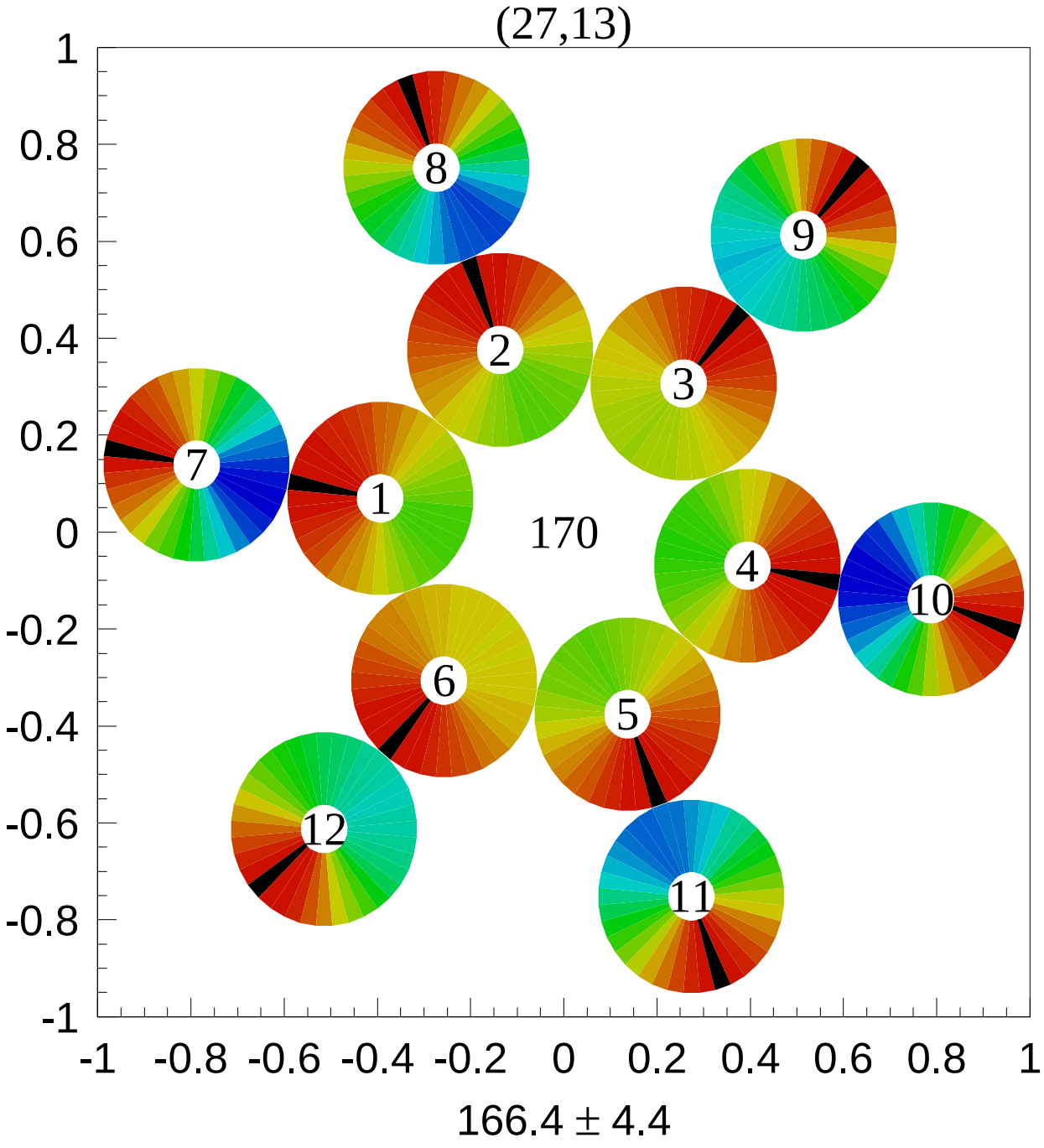

(27,11)
tilted LEDs
119 114 120 117 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 114 123 123 115 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

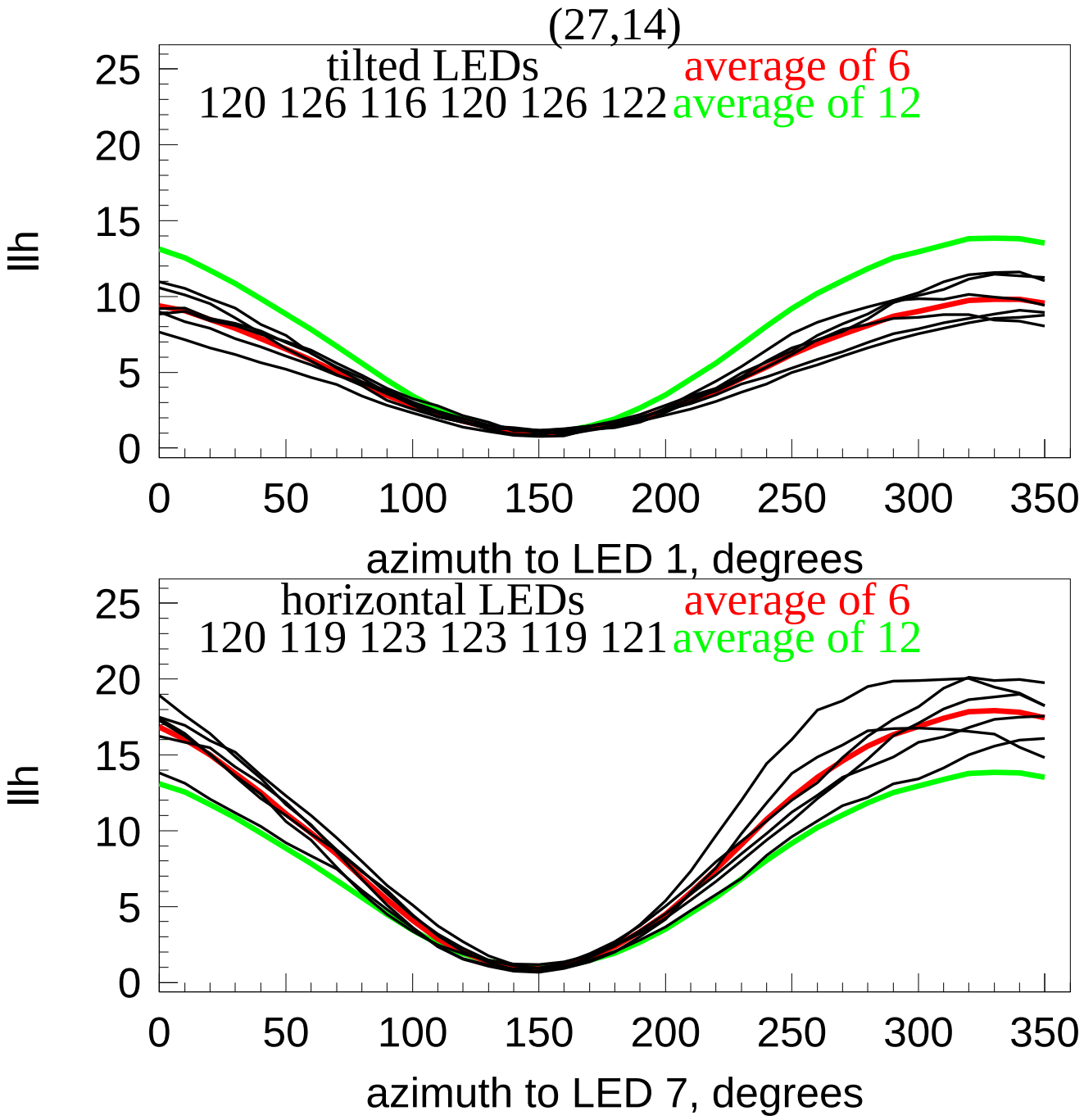

(27,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
247.5 ± 10.4
9
10
3
4
8
2
240
5
11
1
6
7
12

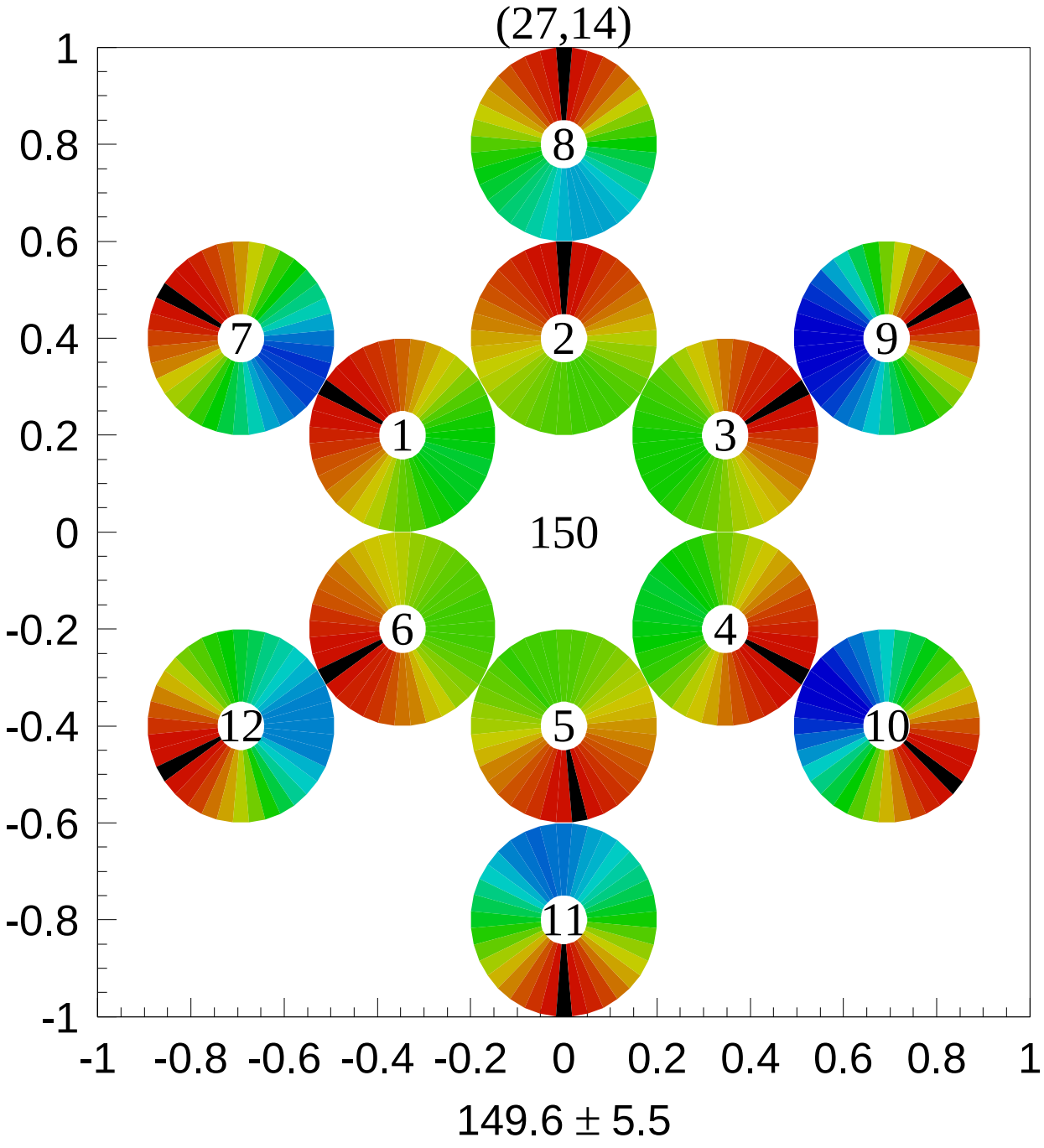

(27,12)
tilted LEDs
126 119 121 124 119 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 125 120 119 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

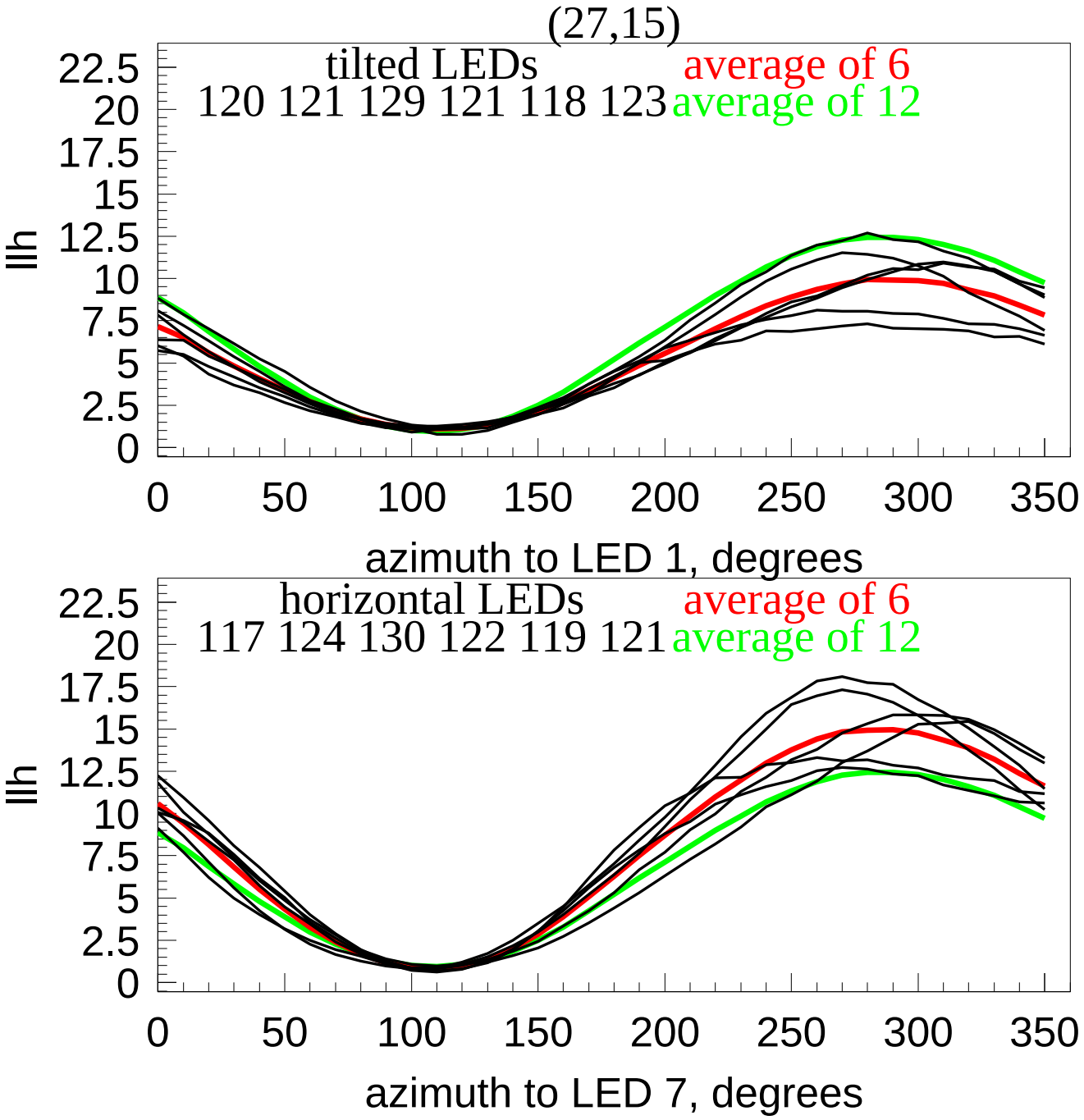

(27,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
150.3 ± 4.1

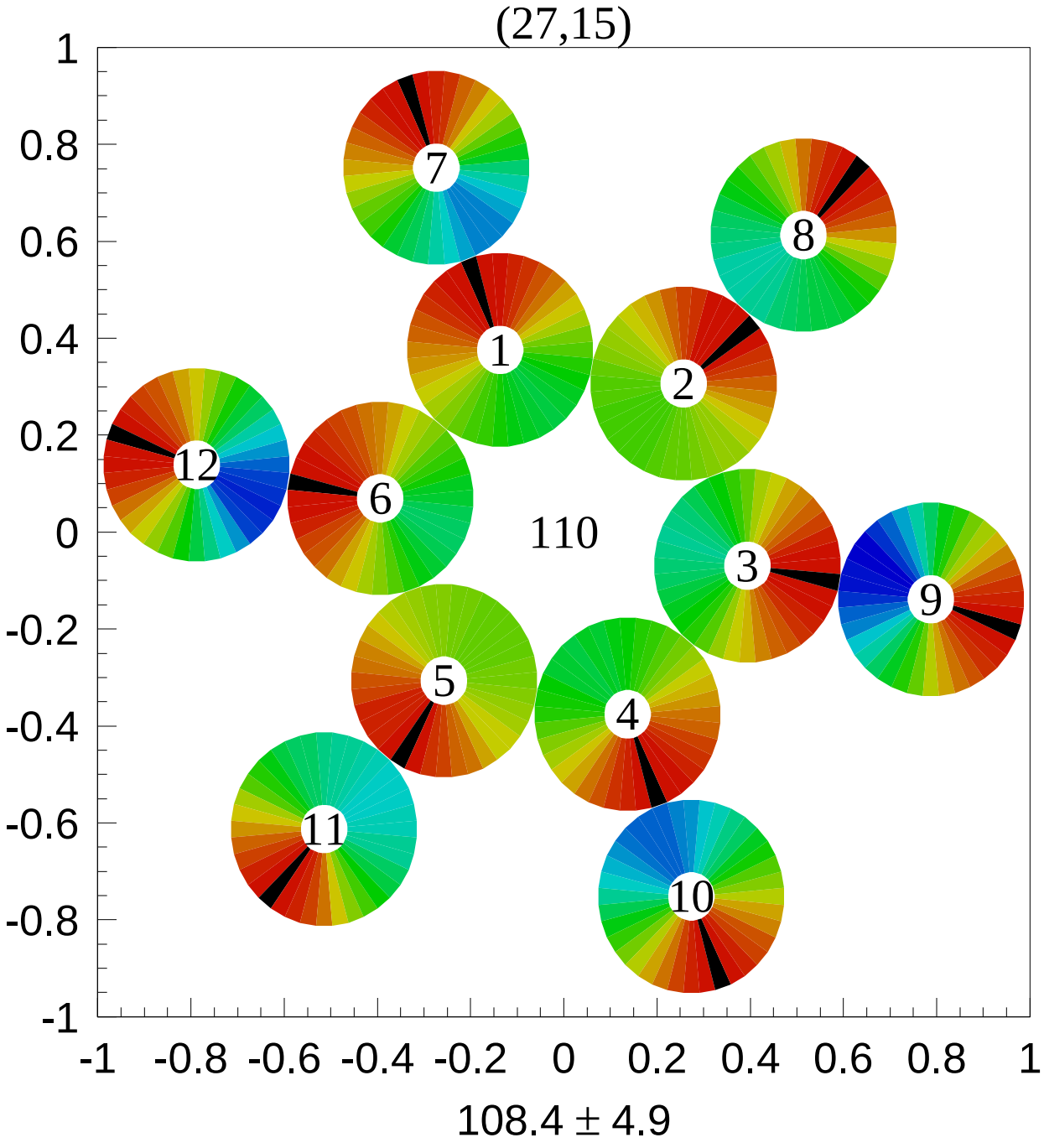

(27,13)
tilted LEDs
122 112 127 68 122 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 125 113 121 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

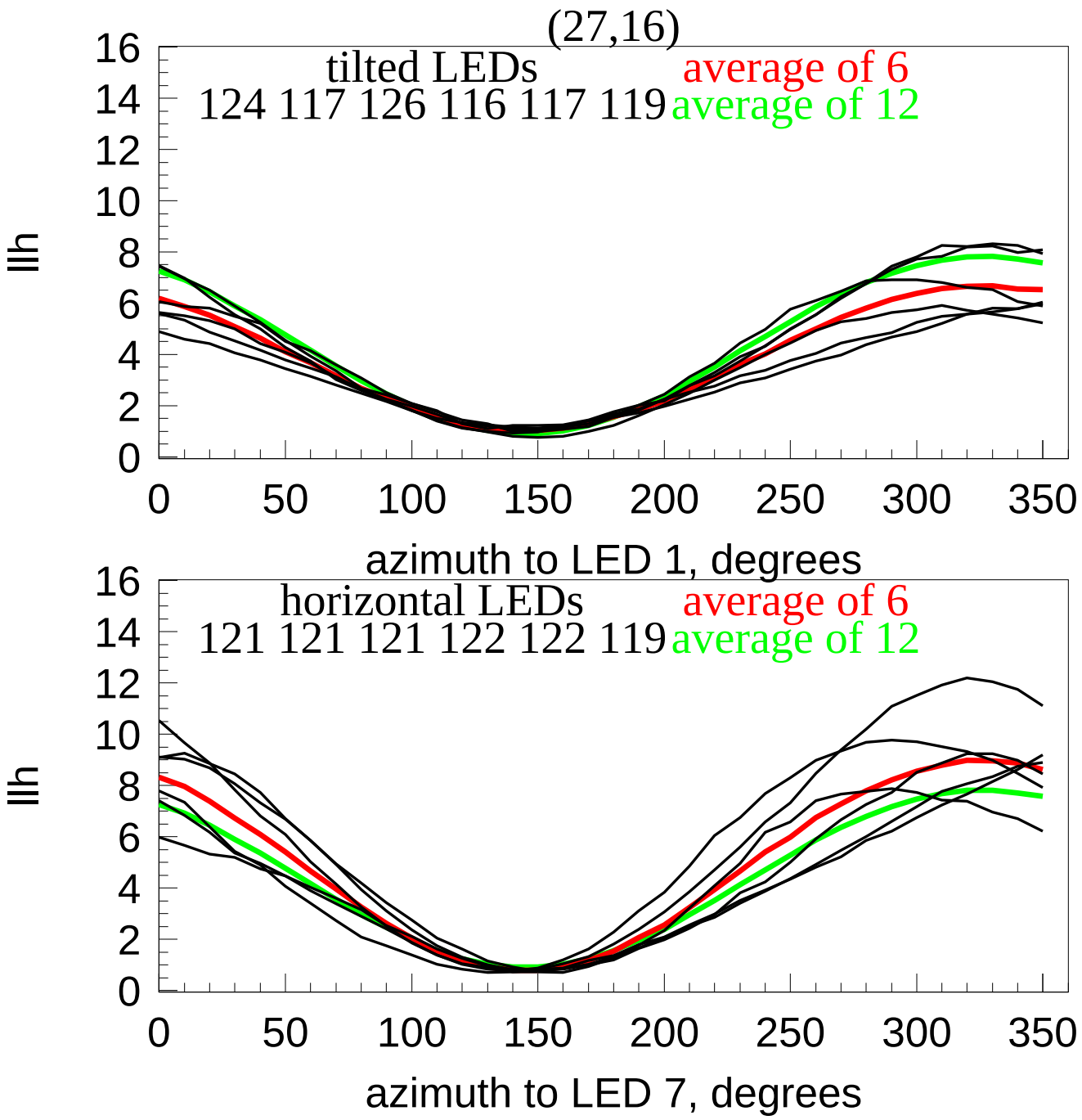

(27,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
166.4 ± 4.4

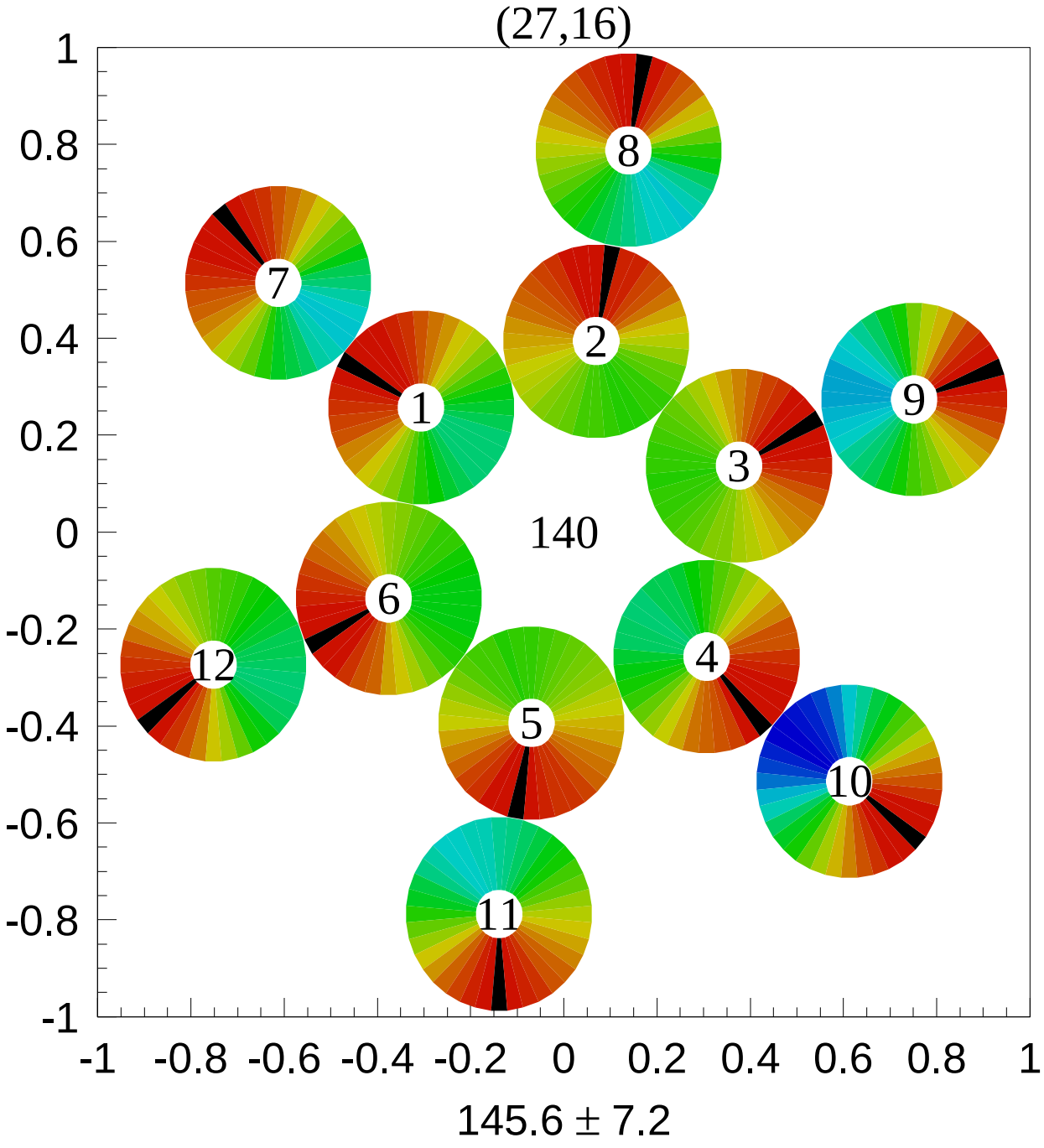

(27,14)
tilted LEDs
120 126 116 120 126 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 119 123 123 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

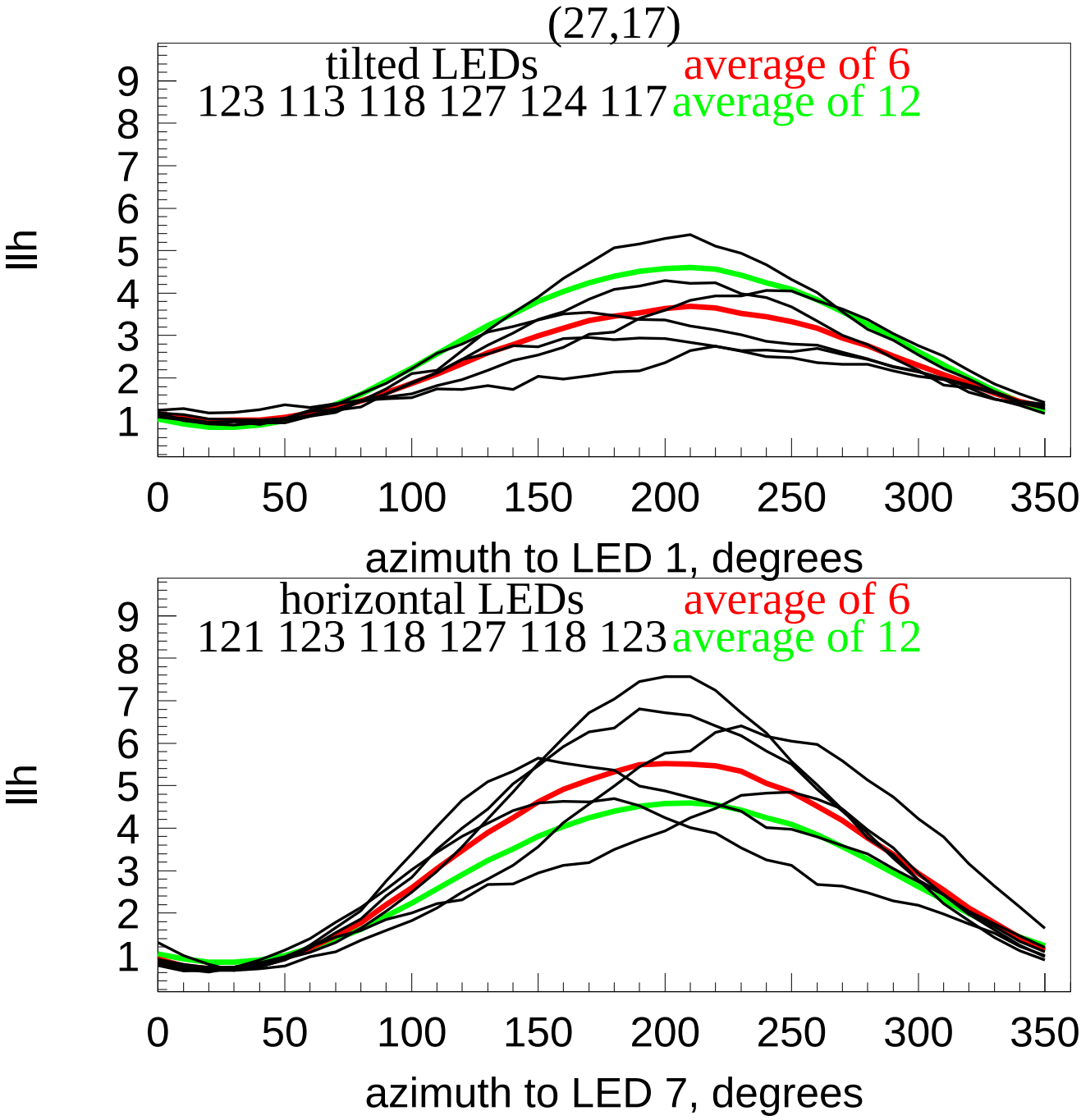

(27,14)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
149.6 ± 5.5

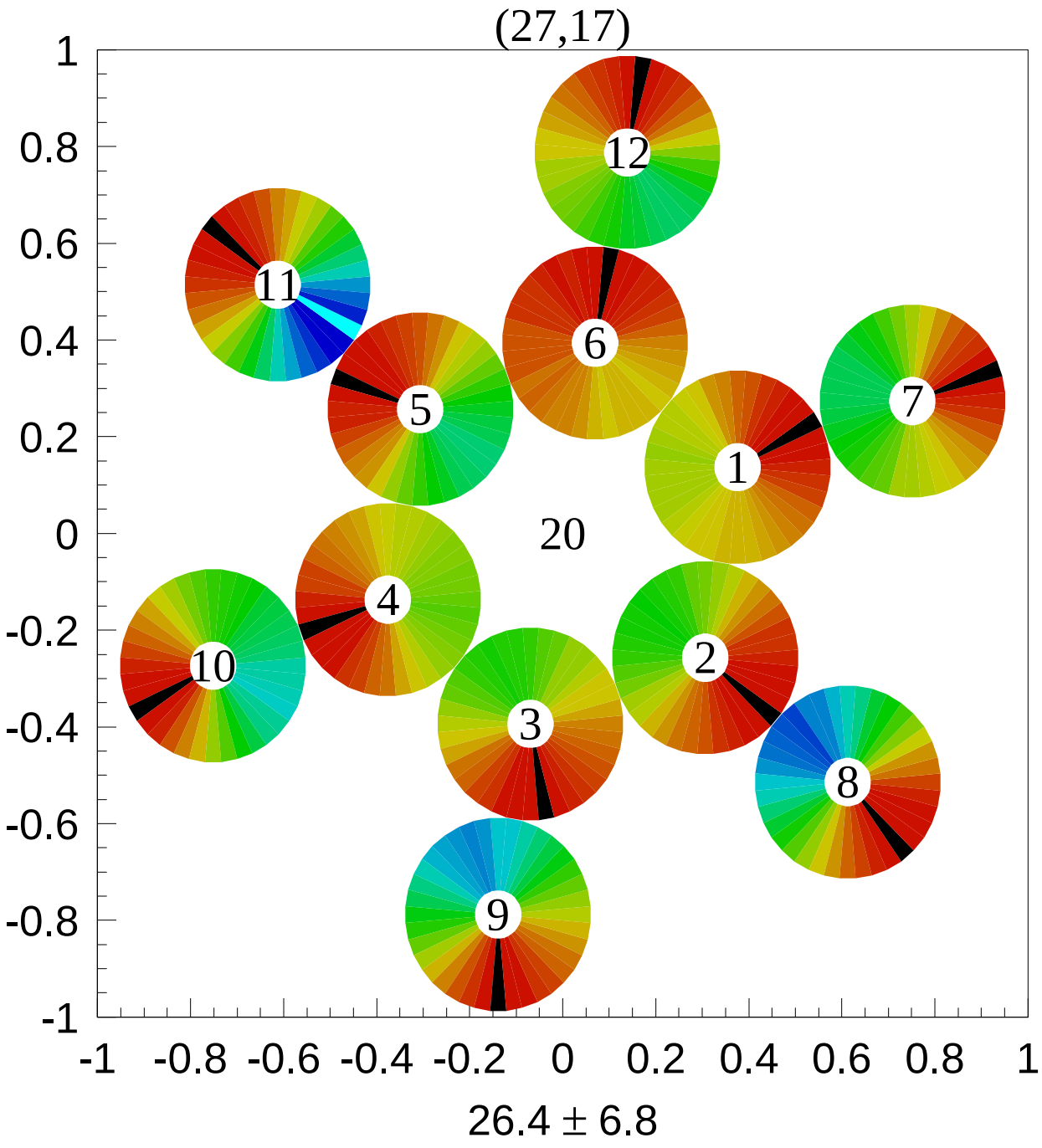

(27,15)
tilted LEDs
120 121 129 121 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 124 130 122 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

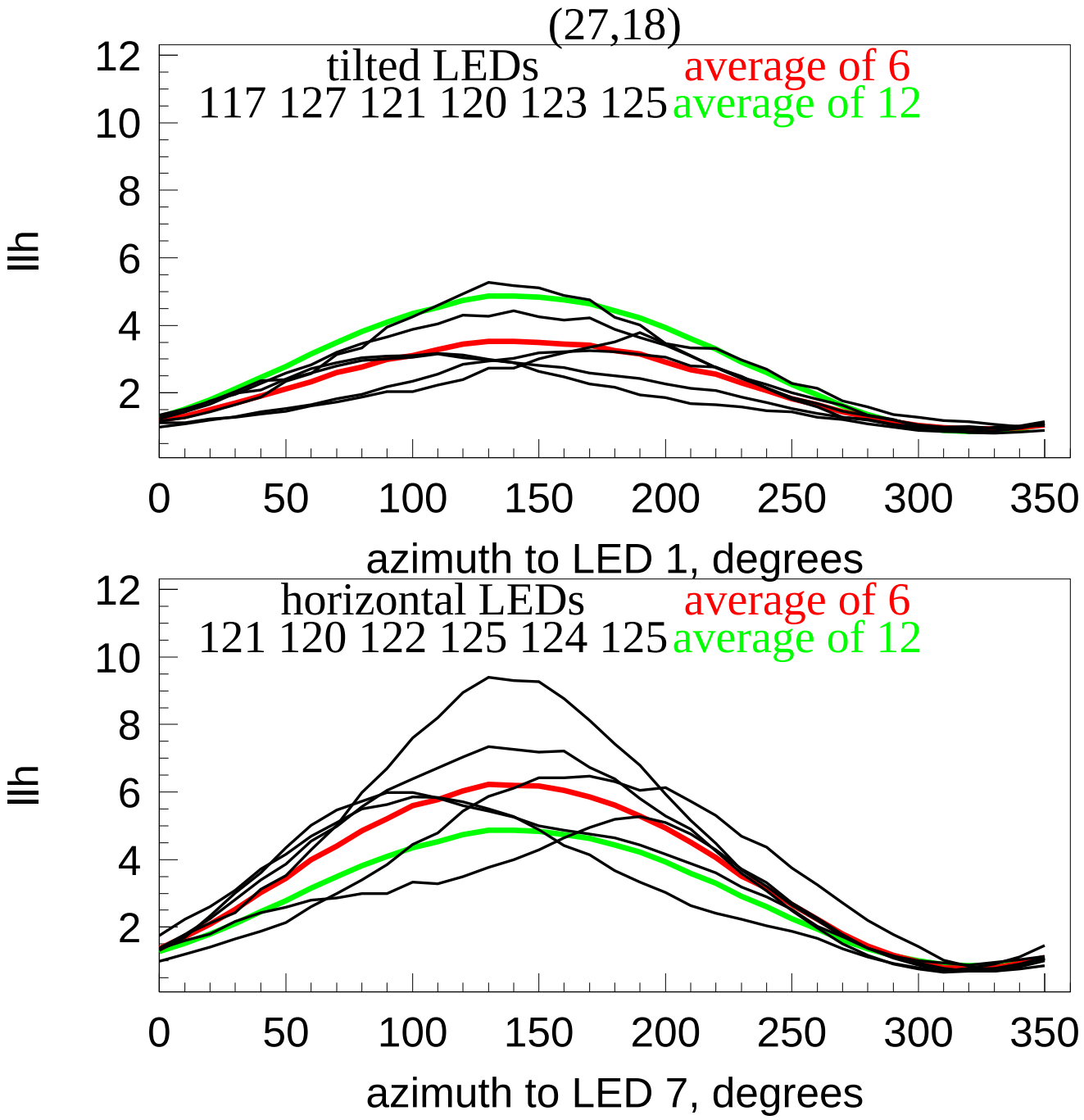

(27,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
108.4 ± 4.9

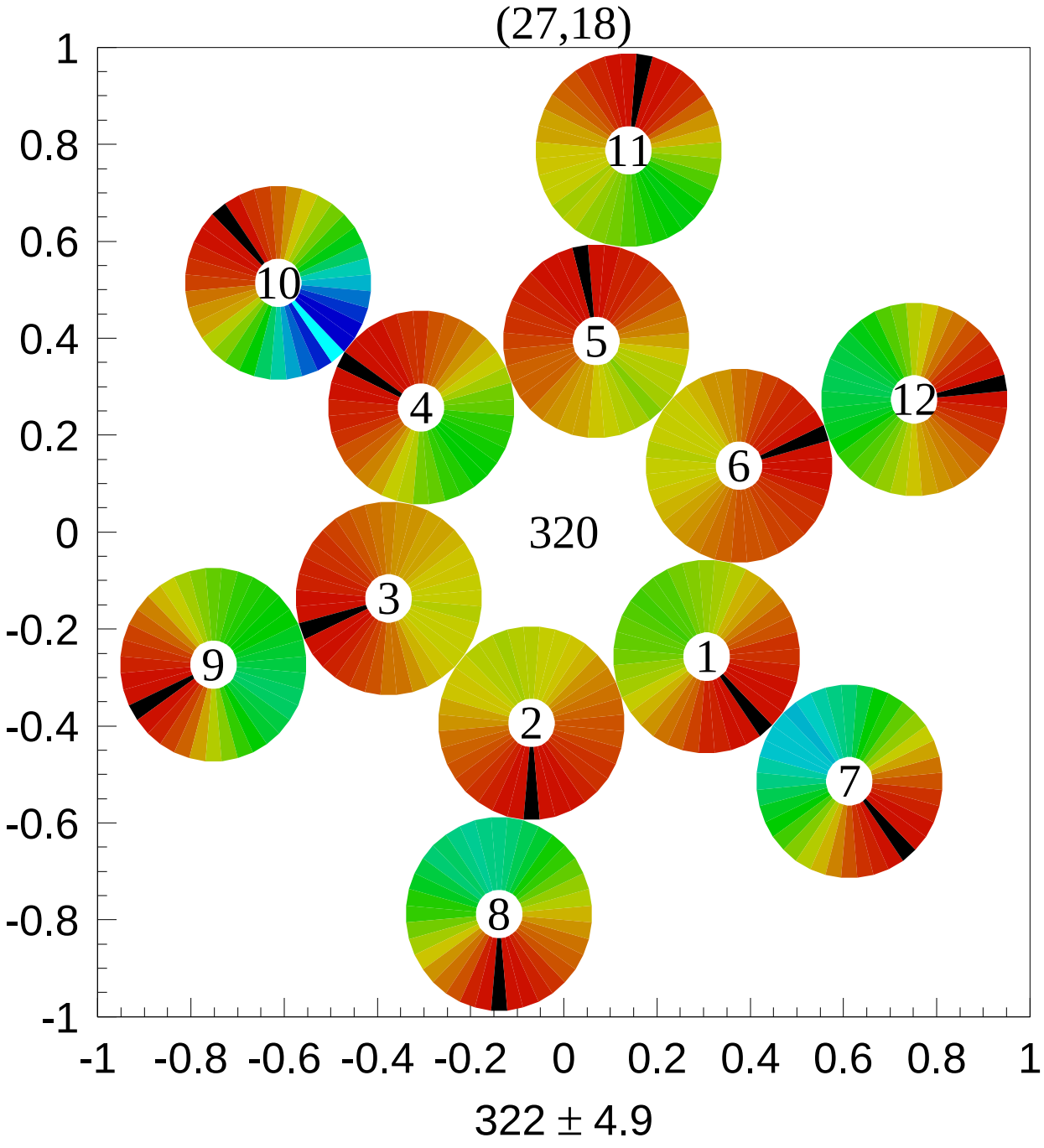

(27,16)
tilted LEDs
124 117 126 116 117 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 121 121 122 122 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

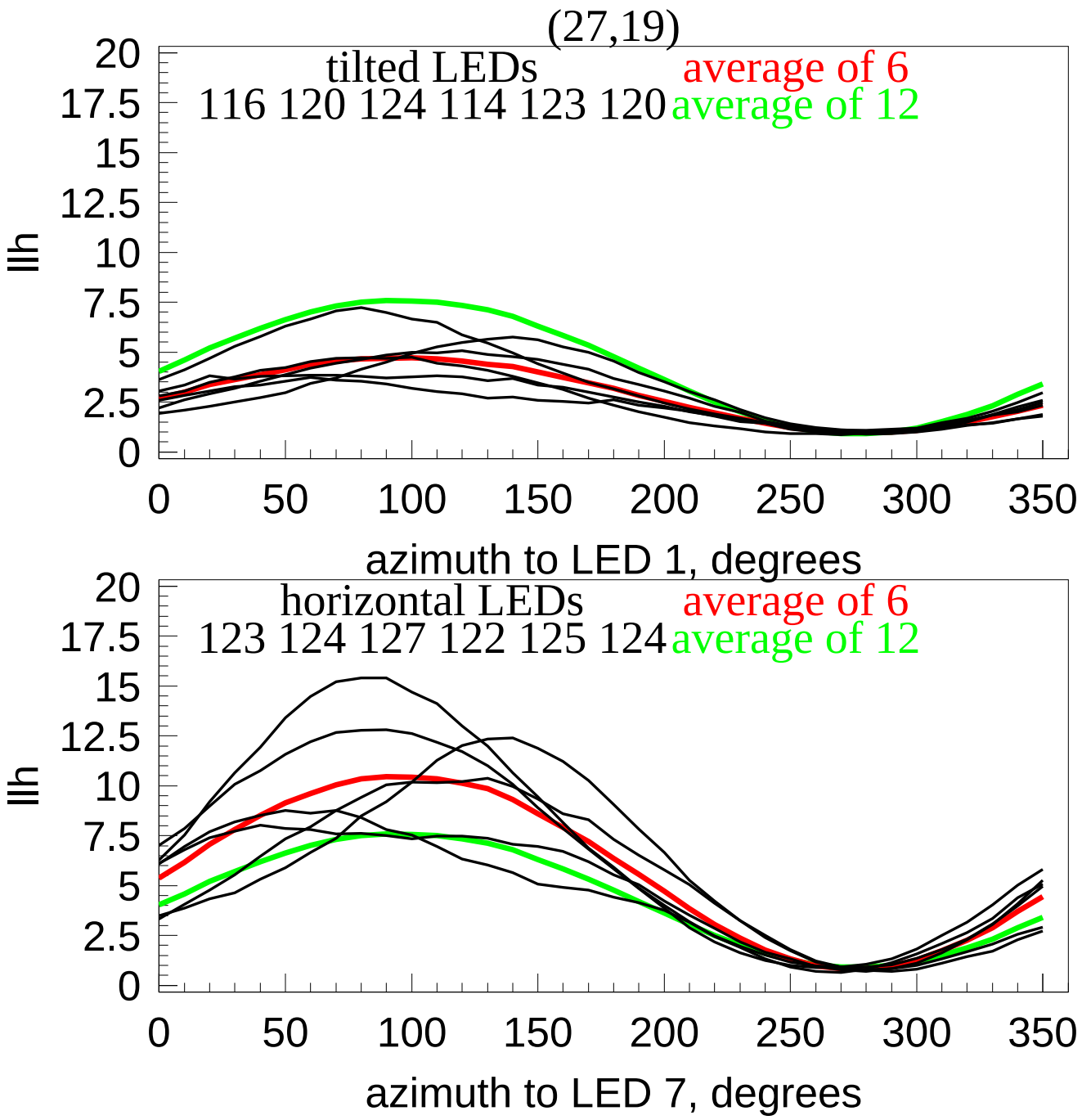

(27,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
145.6 ± 7.2
140
1
2
3
4
5
6
7
8
9
10
11
12

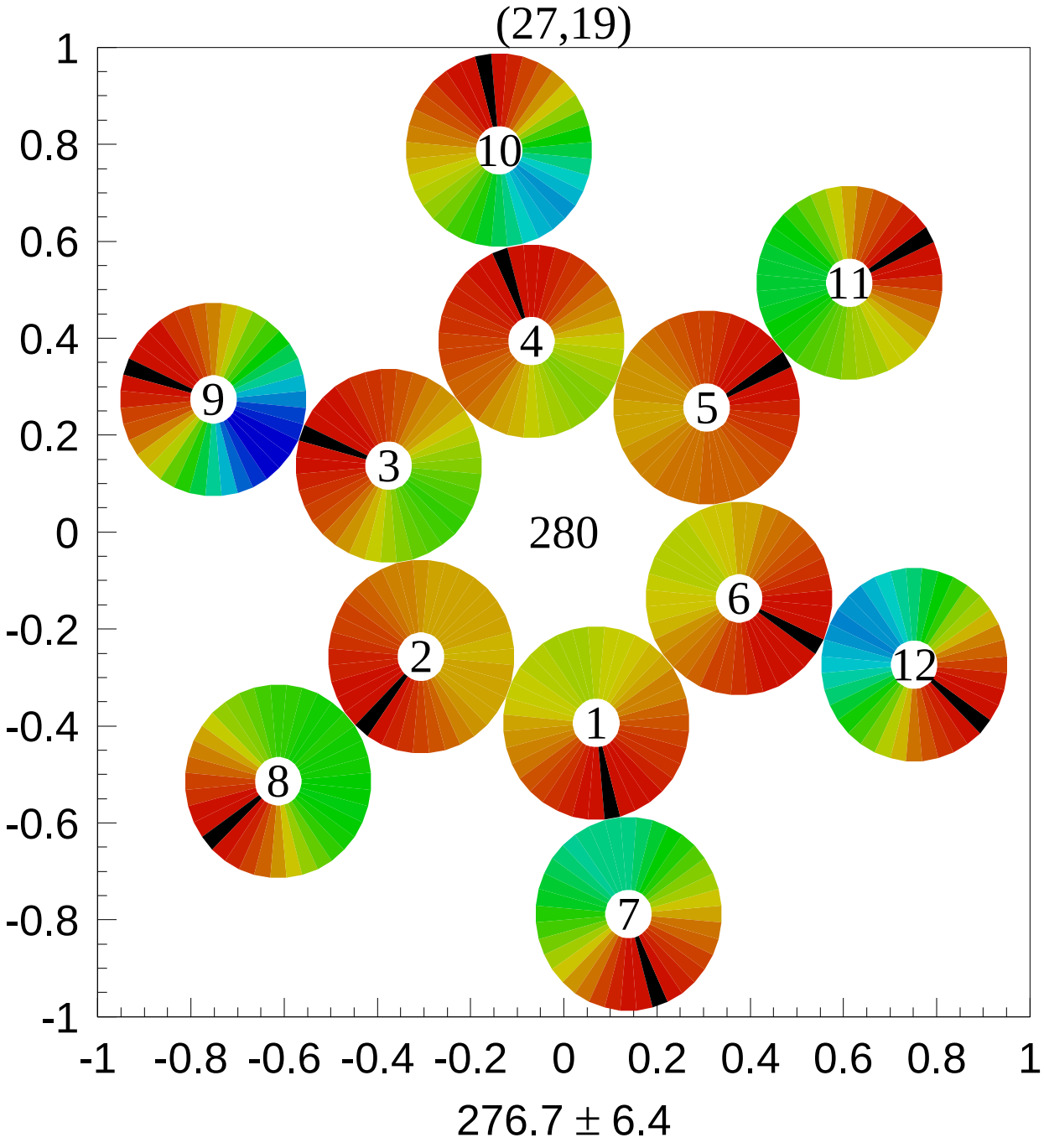

(27,17)
tilted LEDs
123 113 118 127 124 117
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 123 118 127 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

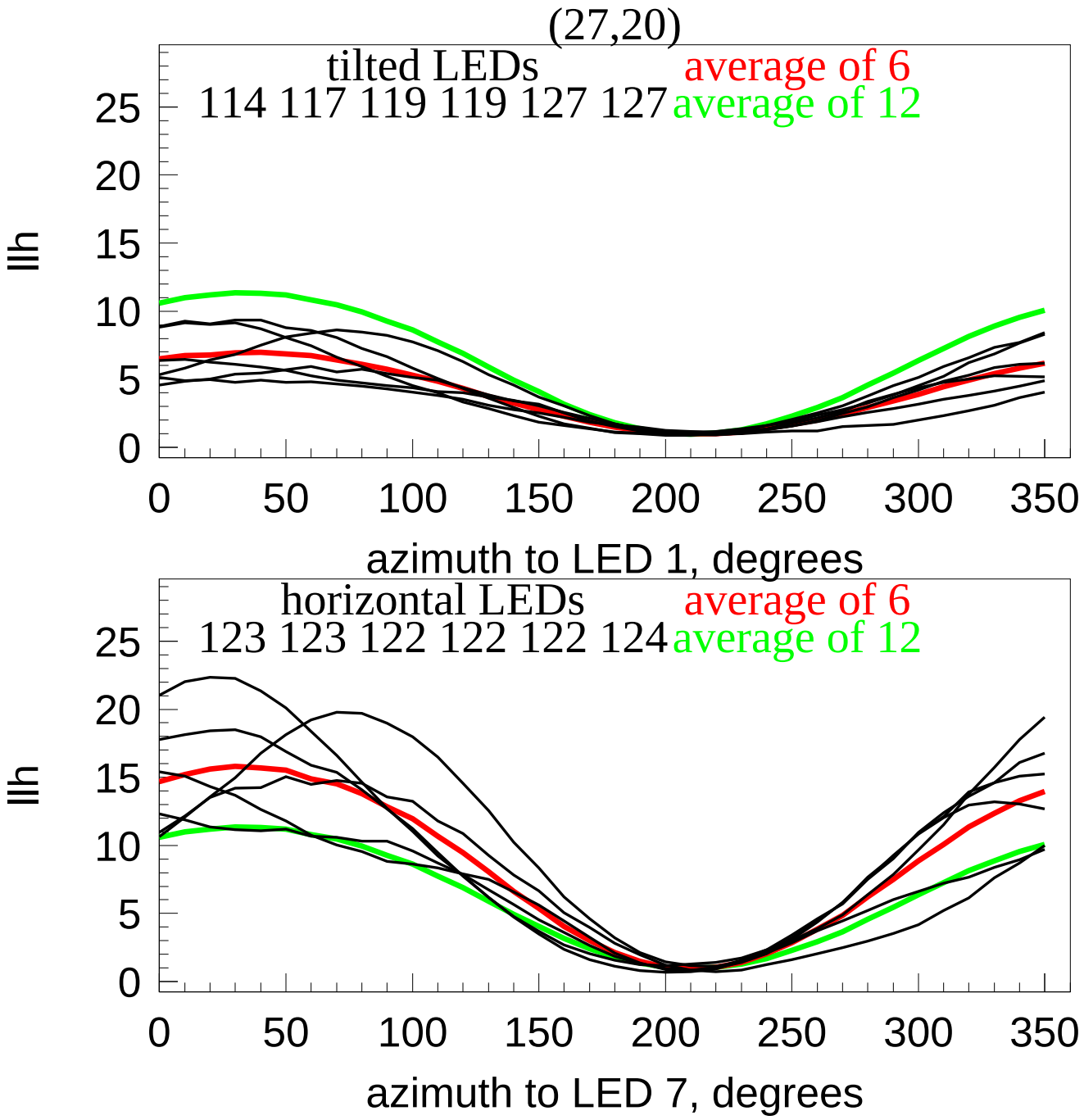

(27,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
26.4 ± 6.8

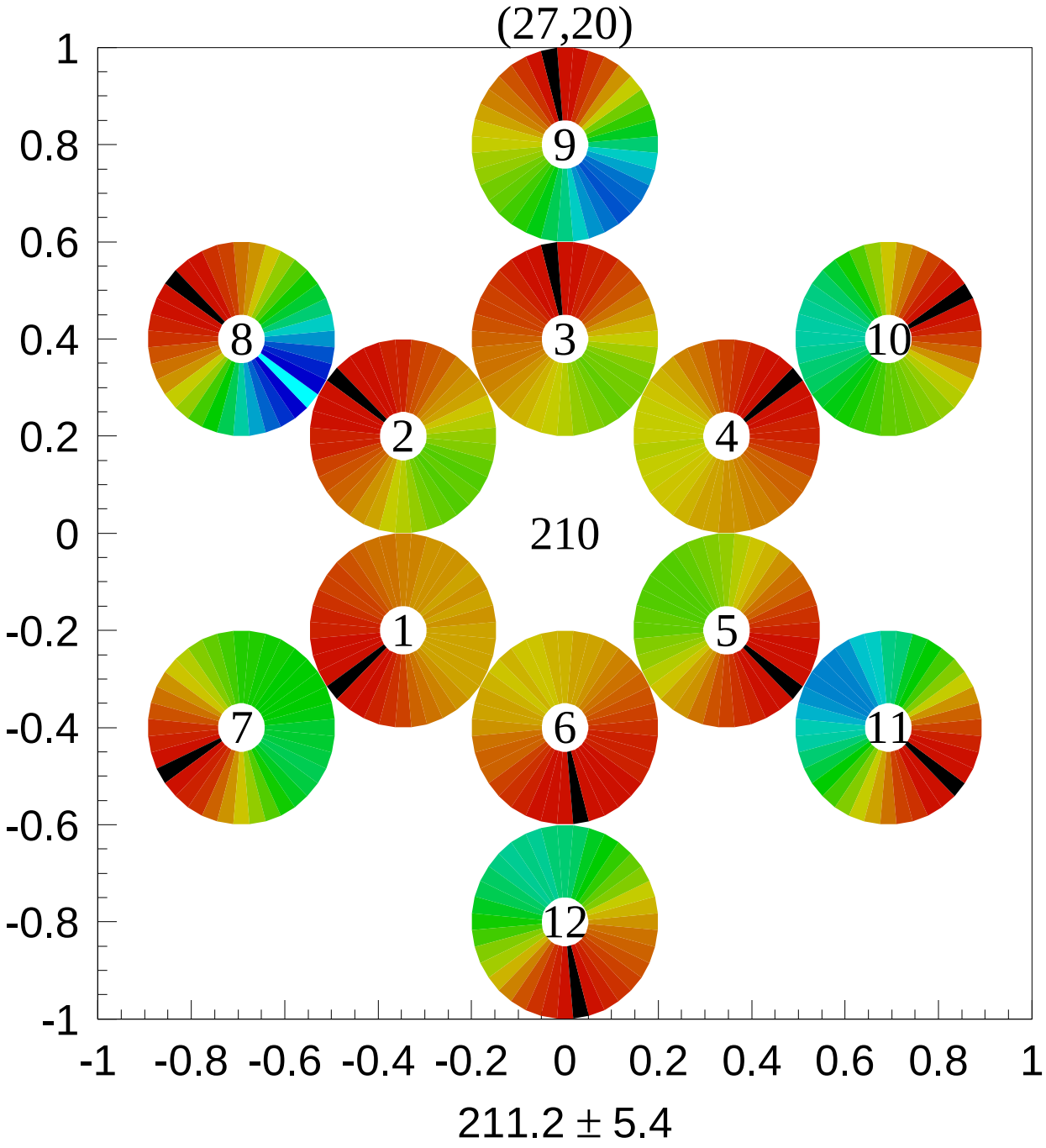

(27,18)
tilted LEDs
117 127 121 120 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 122 125 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

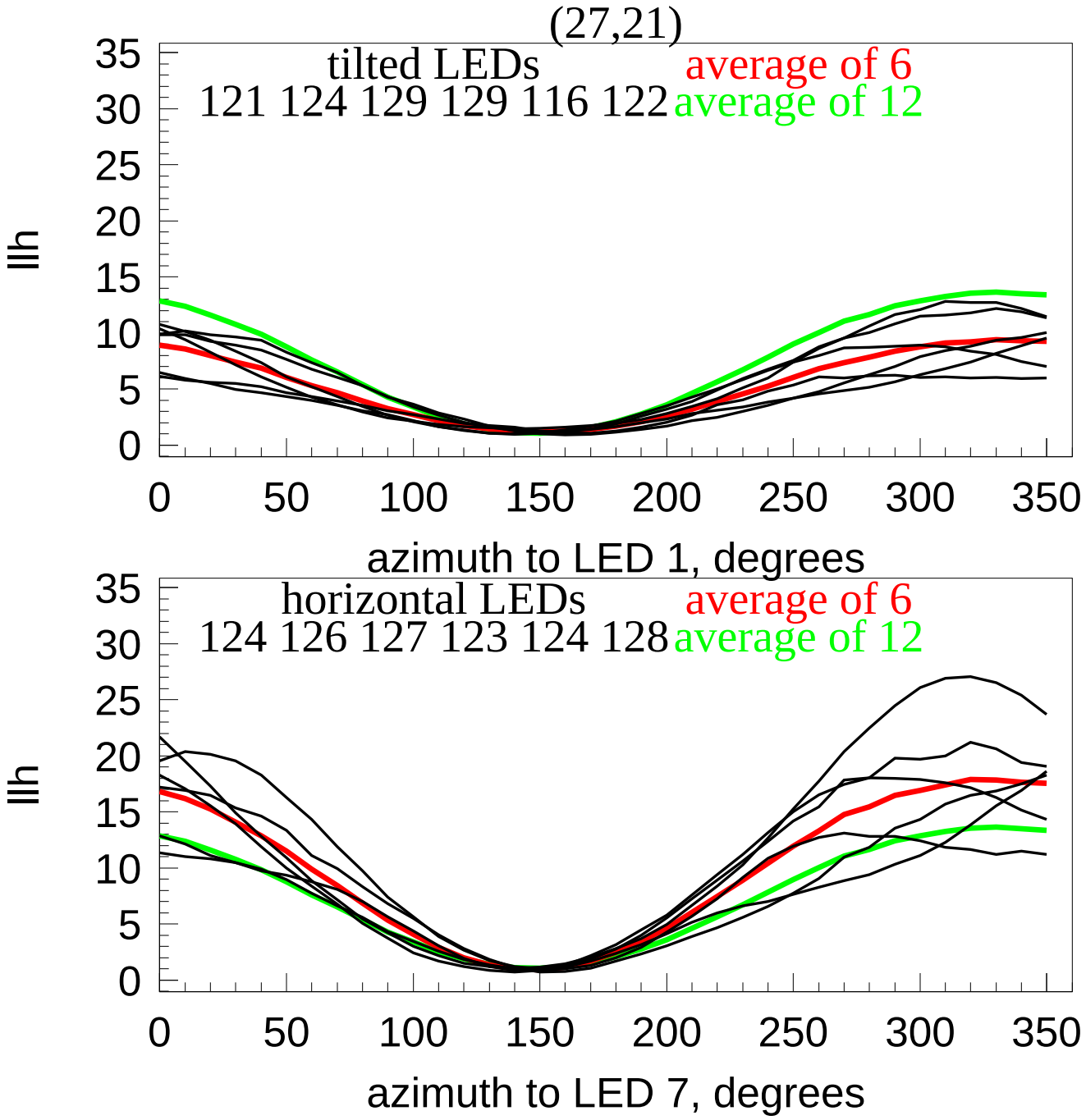

(27,18)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
322 ± 4.9

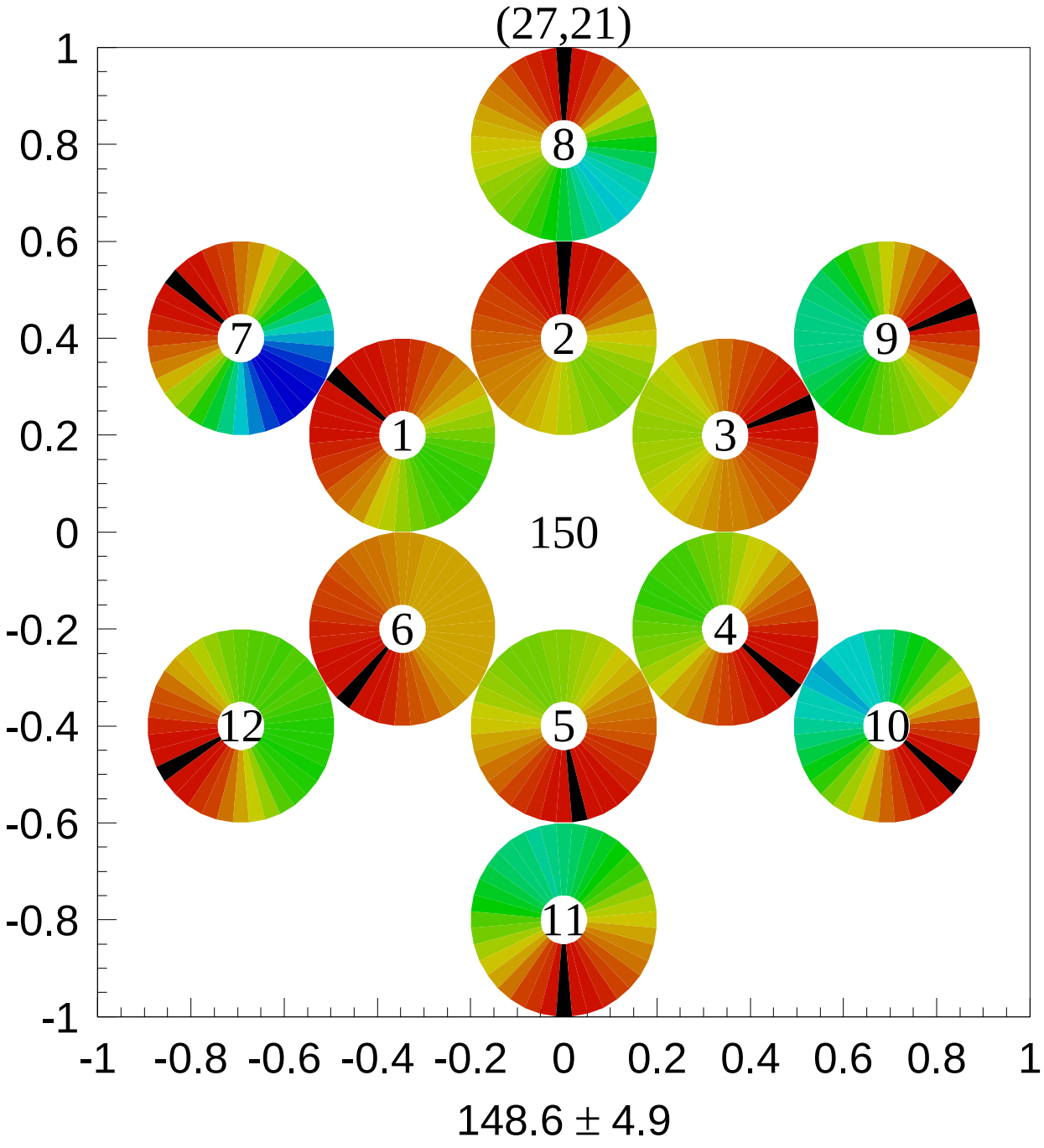

(27,19)
tilted LEDs
116 120 124 114 123 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 124 127 122 125 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

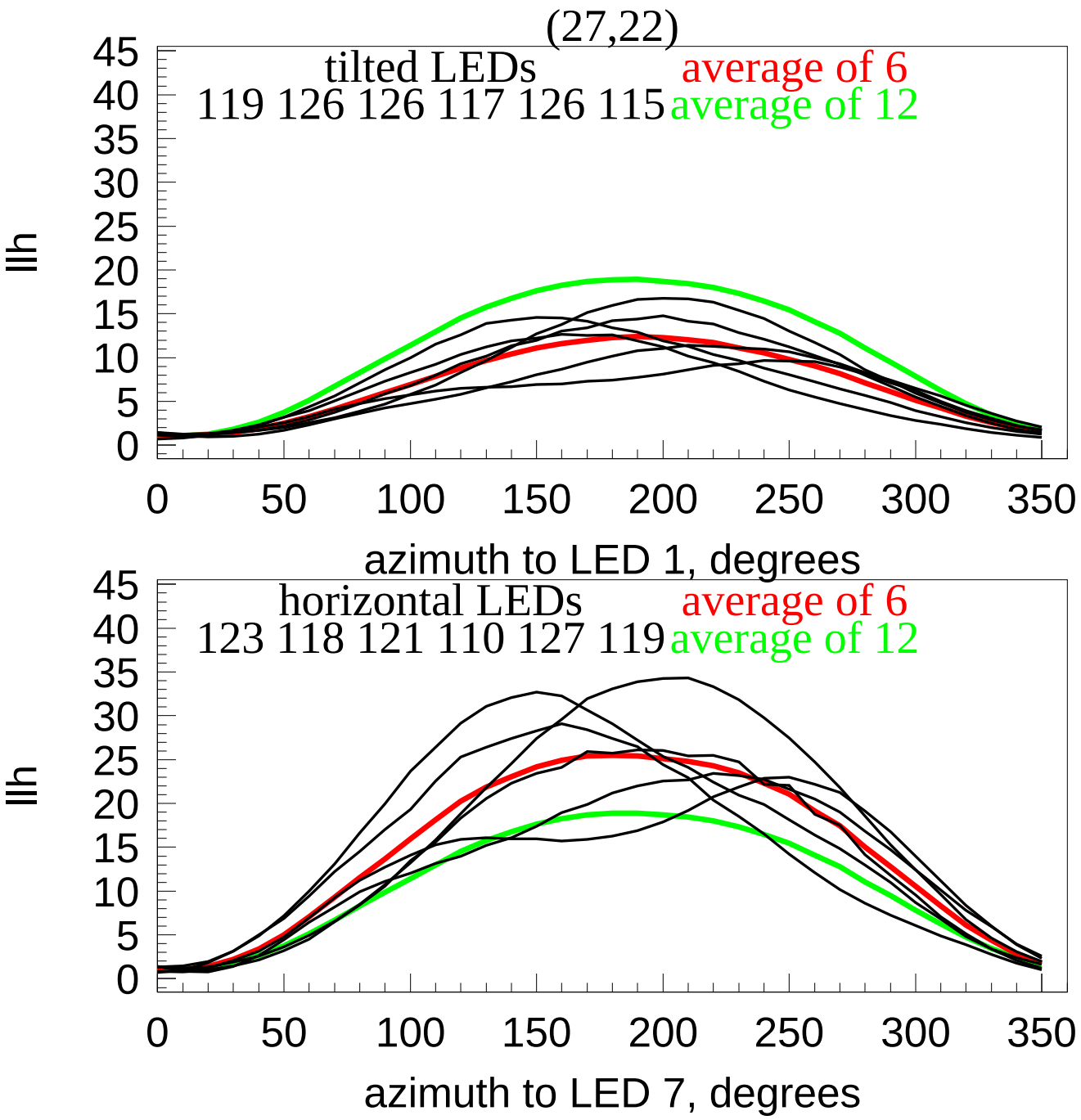

(27,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
276.7 ± 6.4

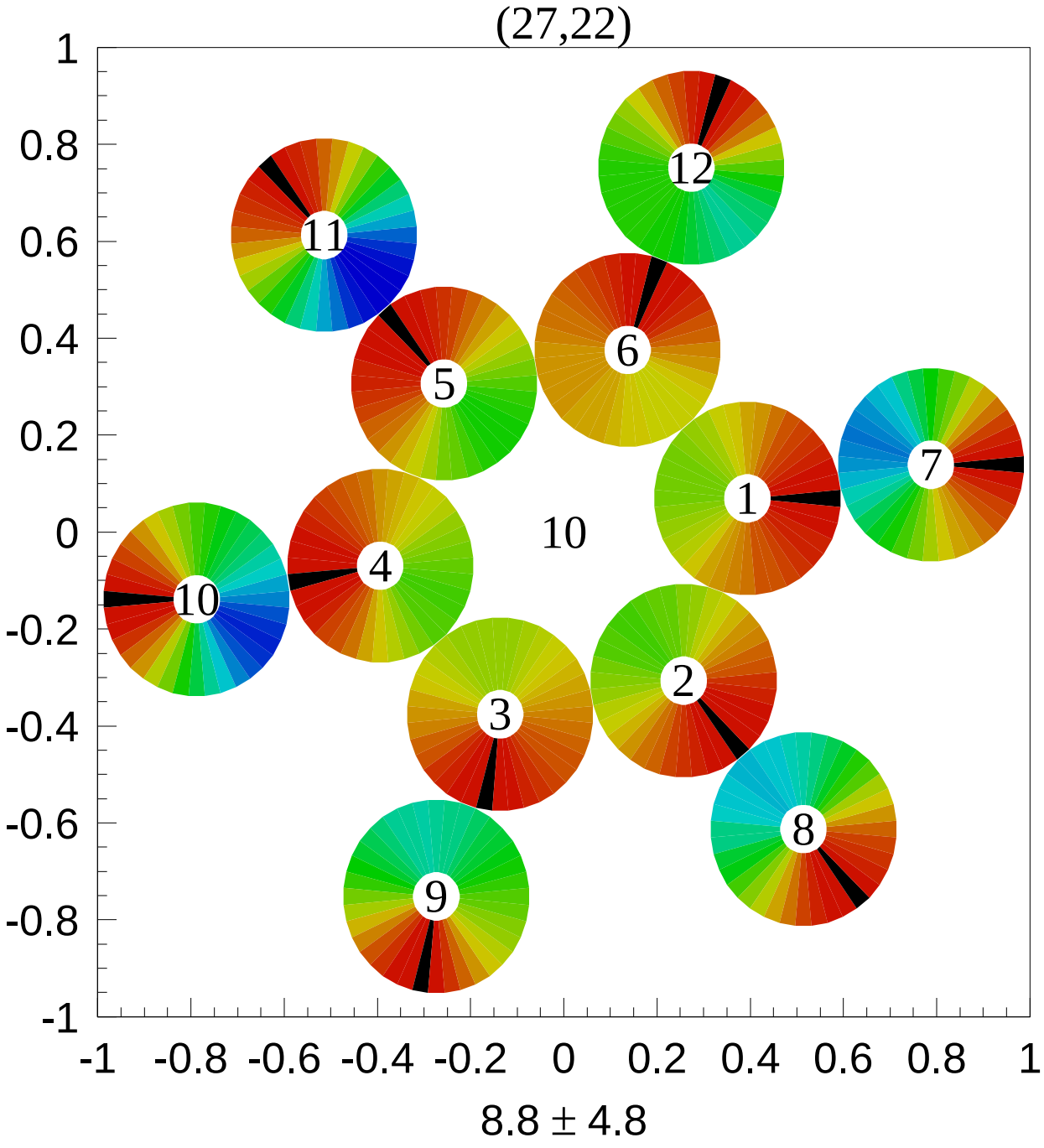

(27,20)
tilted LEDs
114 117 119 119 127 127
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 123 122 122 122 124
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

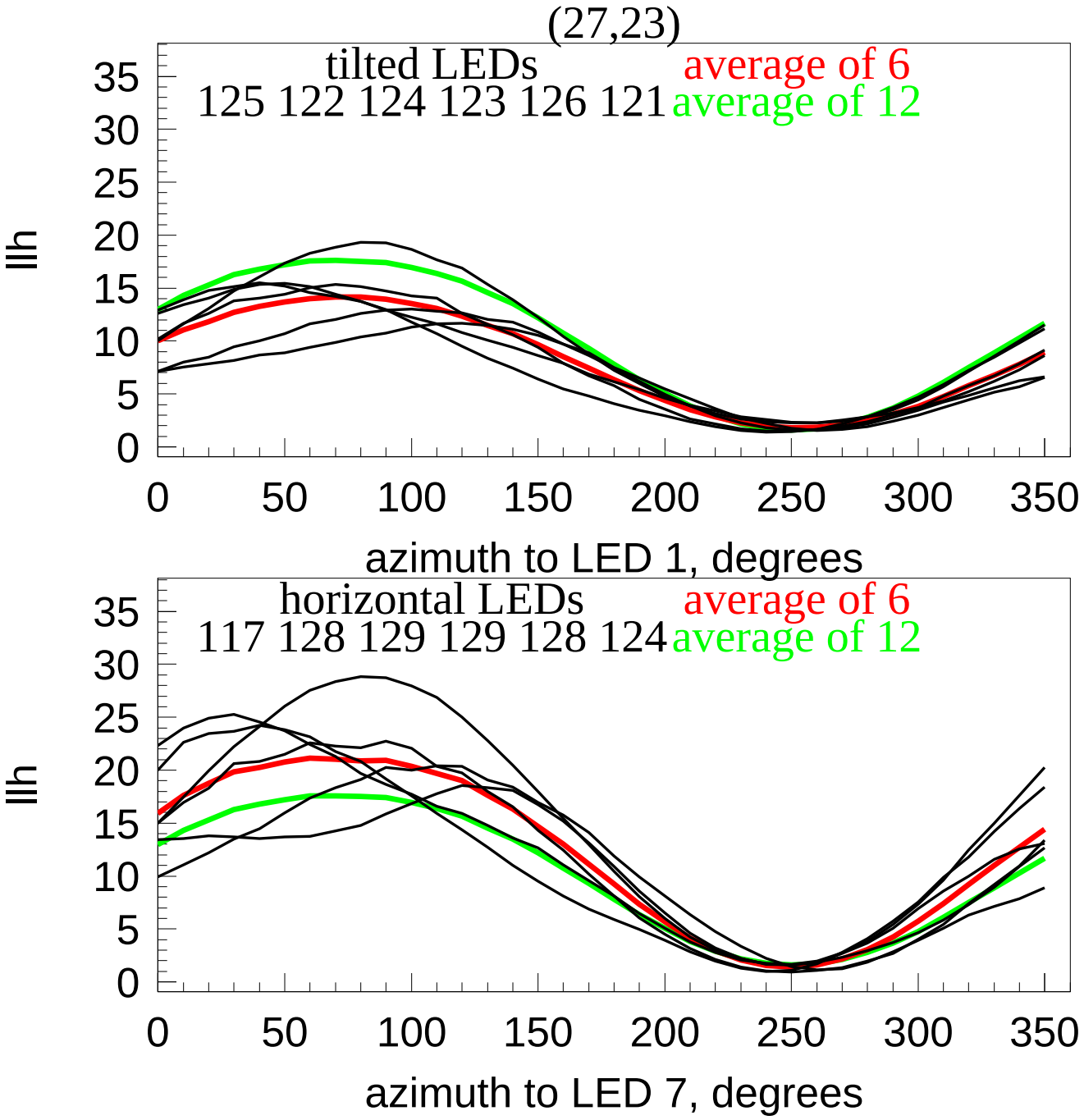

(27,20)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.2 ± 5.4

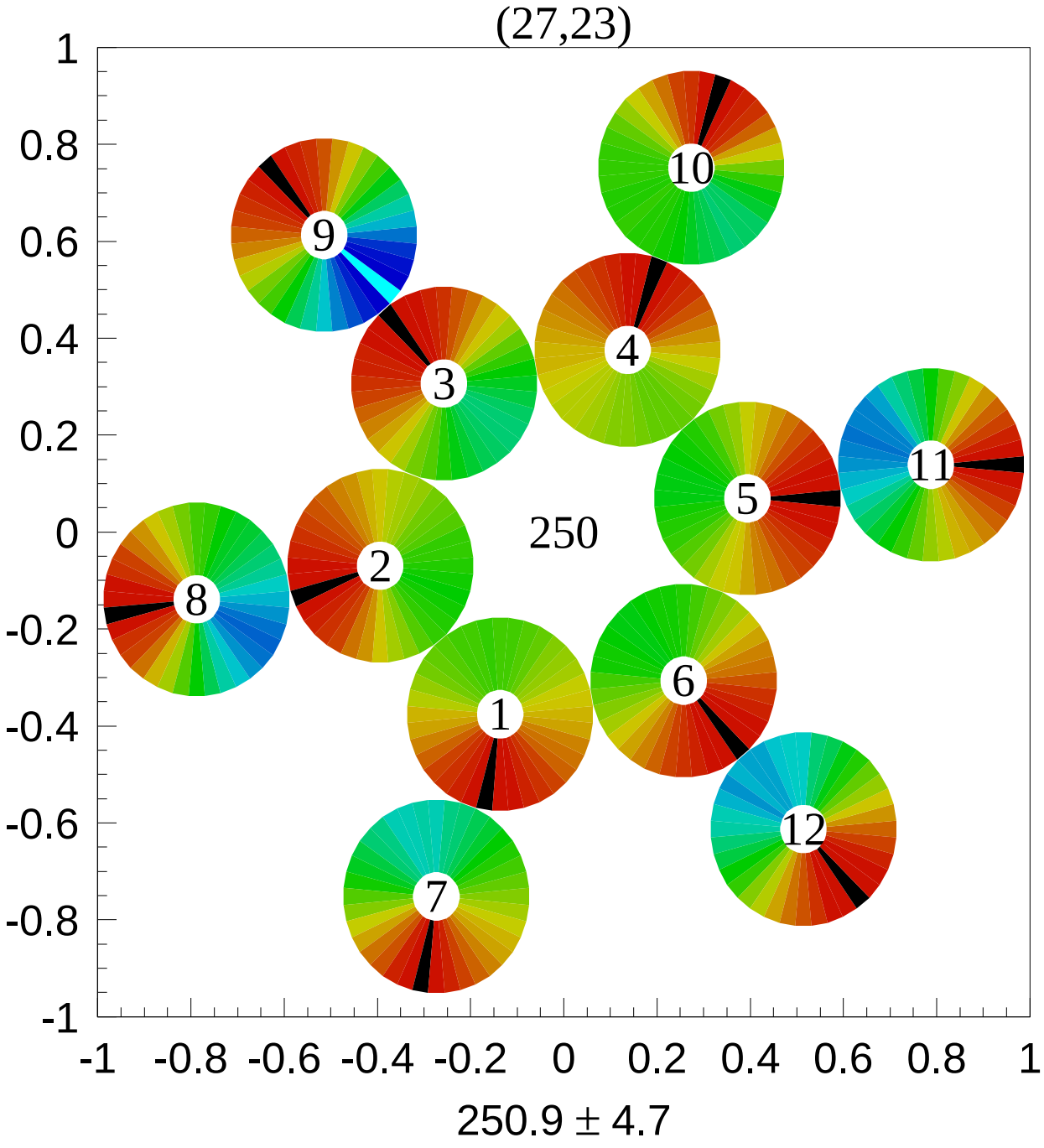

(27,21)
tilted LEDs
121 124 129 129 116 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 126 127 123 124 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

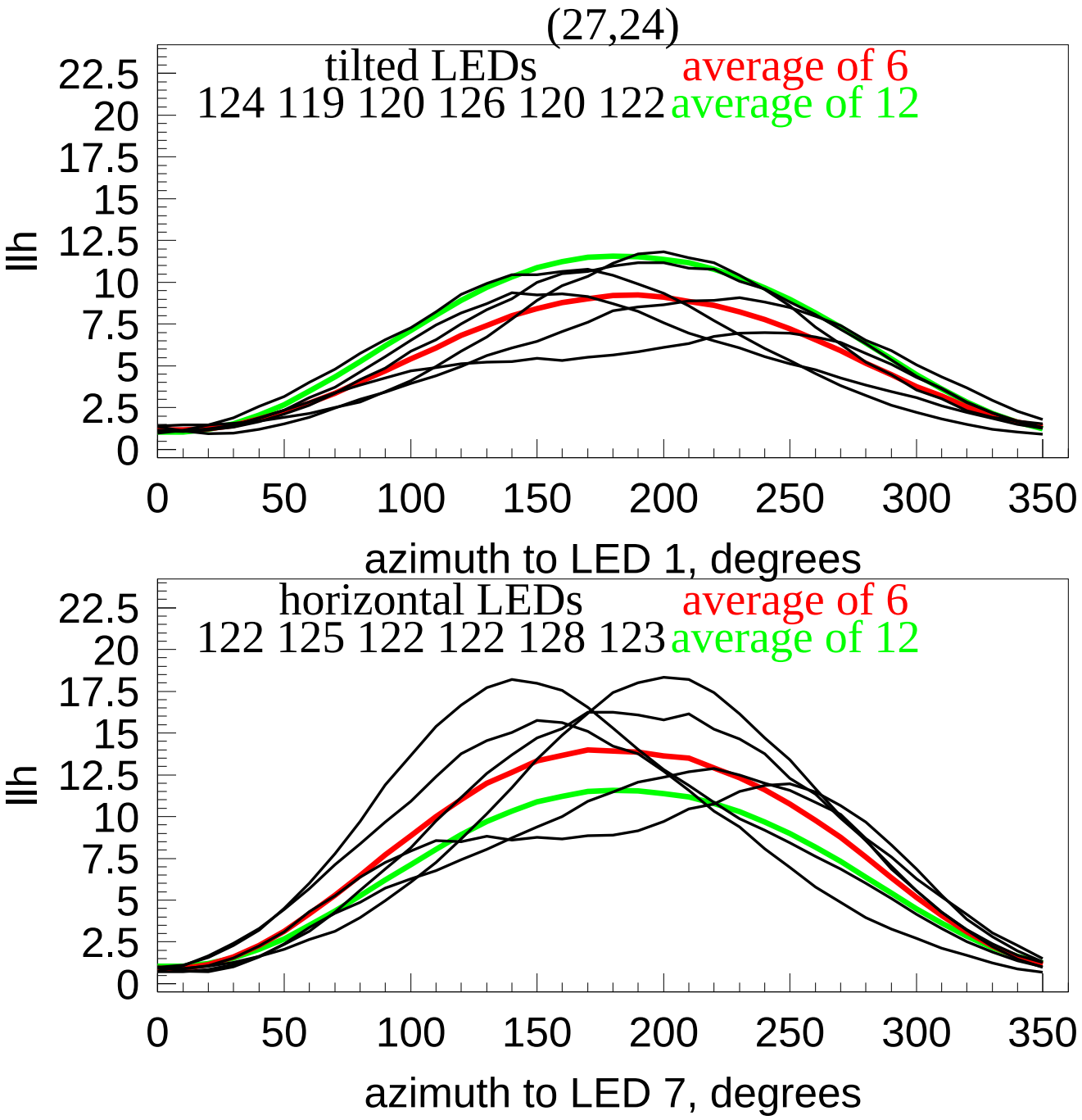

(27,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
148.6 ± 4.9

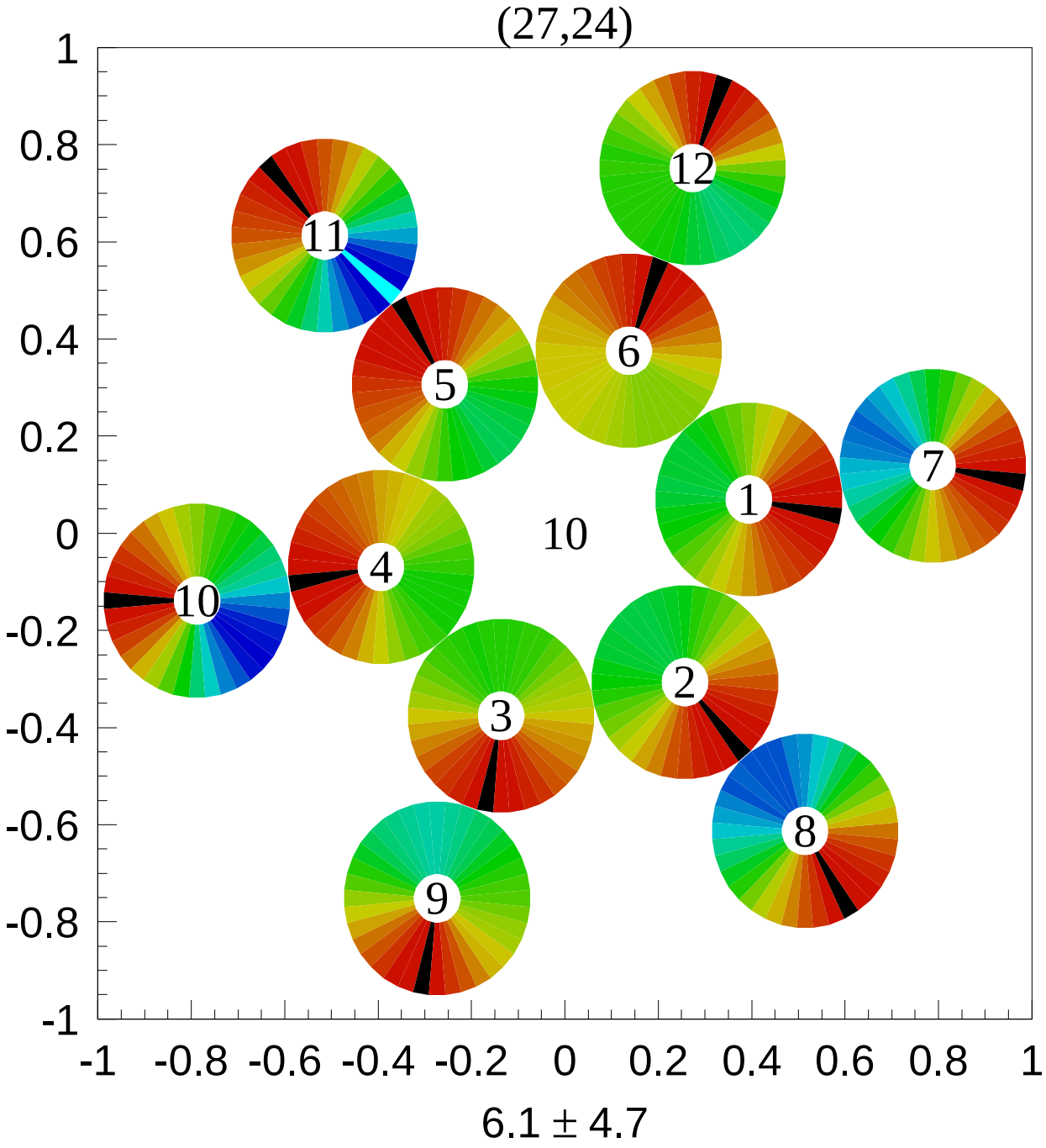

(27,22)
tilted LEDs
119 126 126 117 126 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 121 110 127 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

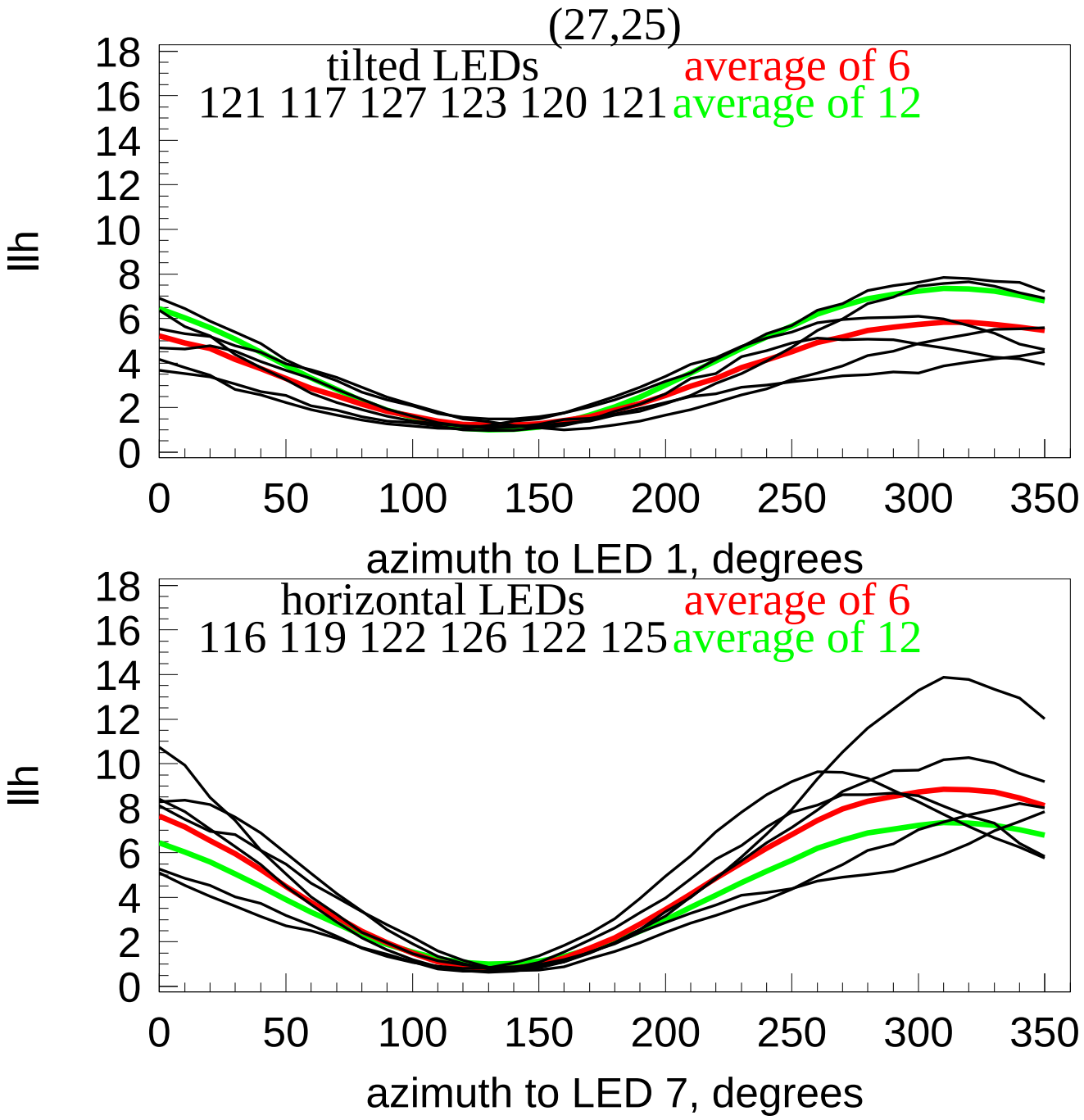

(27,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
8.8 ± 4.8

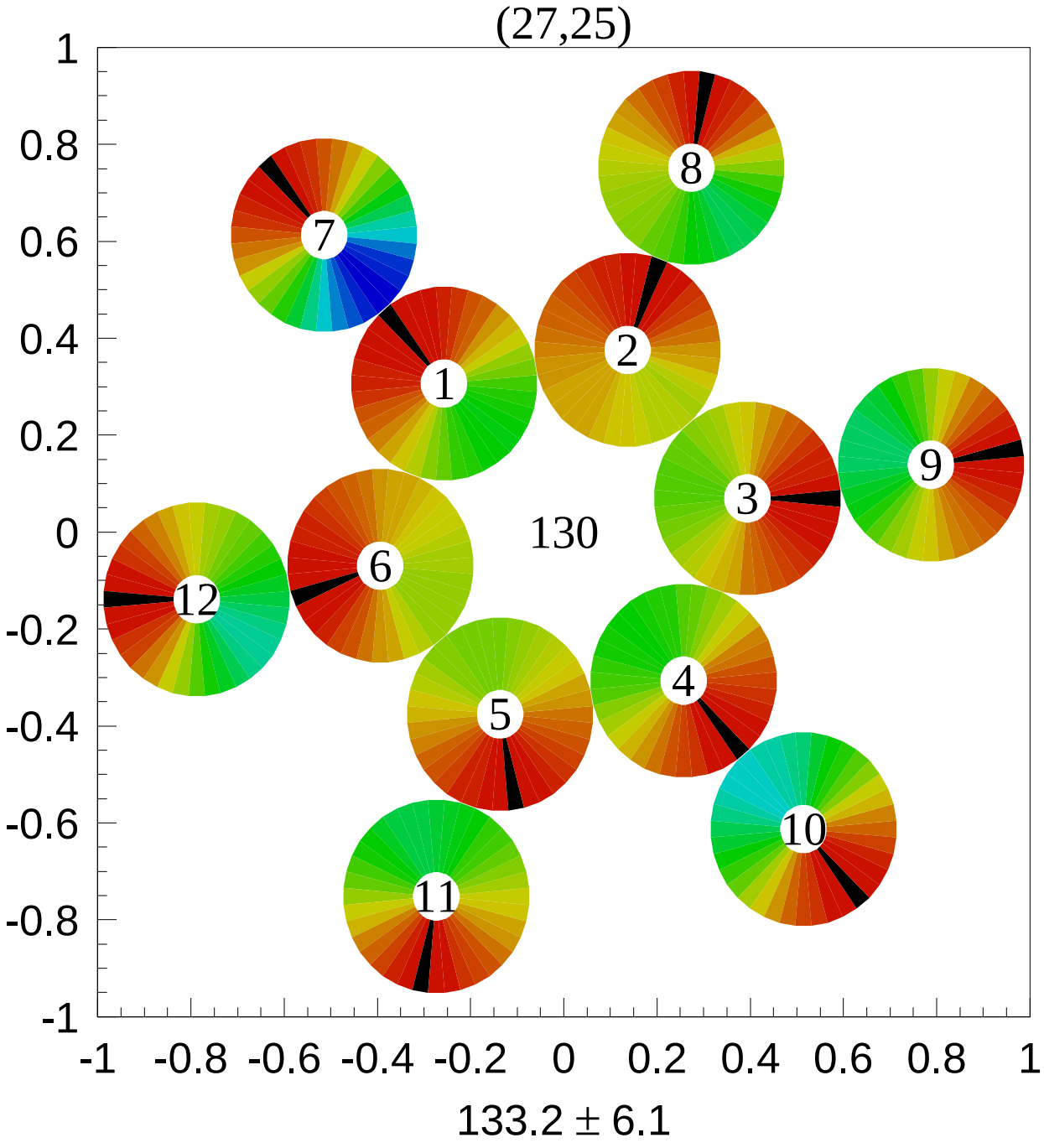

(27,23)
tilted LEDs
125 122 124 123 126 121
average of 6
average of 12
llh
0
5
10
15
20
25
30
35
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 128 129 129 128 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

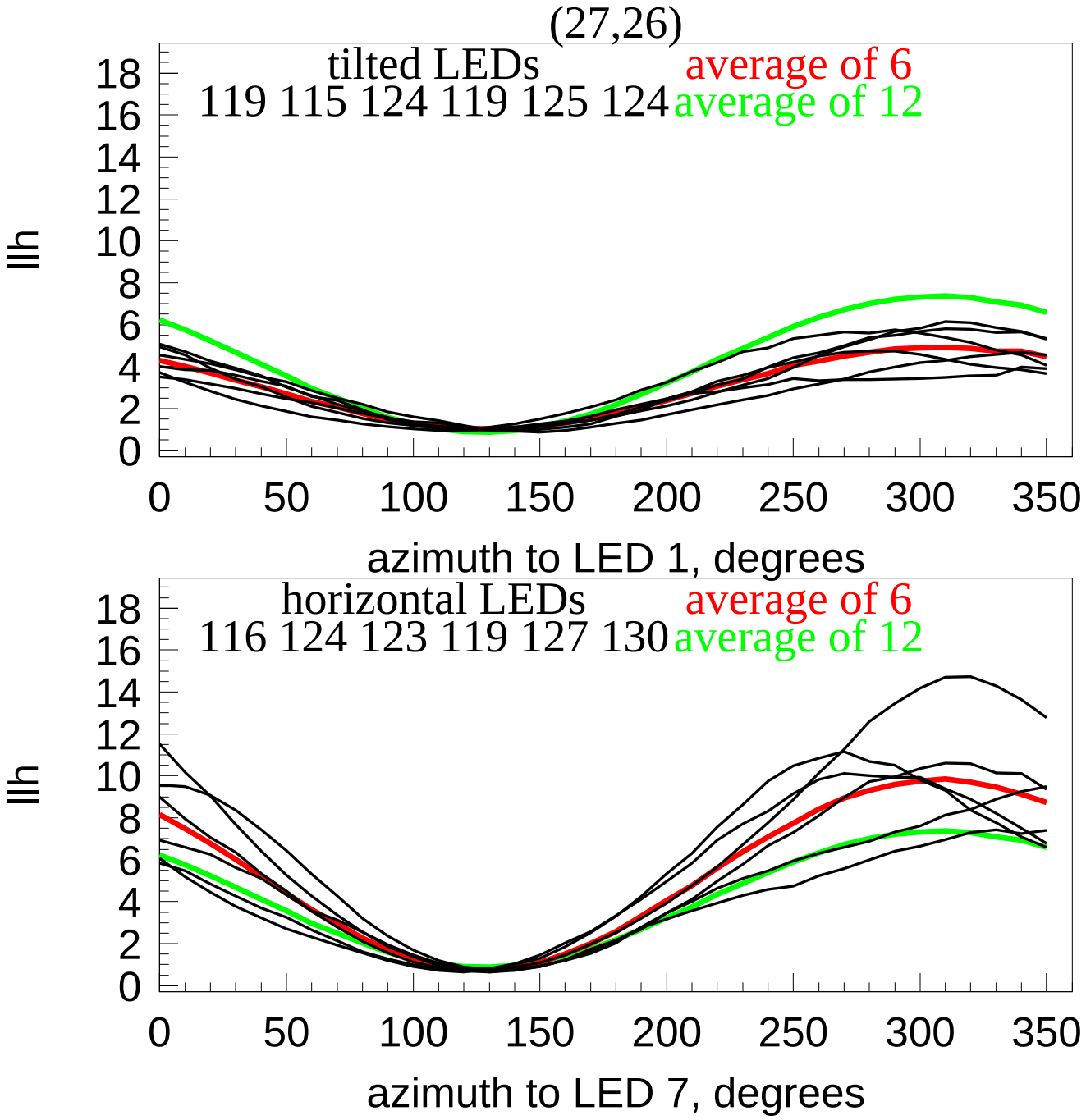

(27,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
250.9 ± 4.7
1
2
3
4
5
6
7
8
9
10
11
12

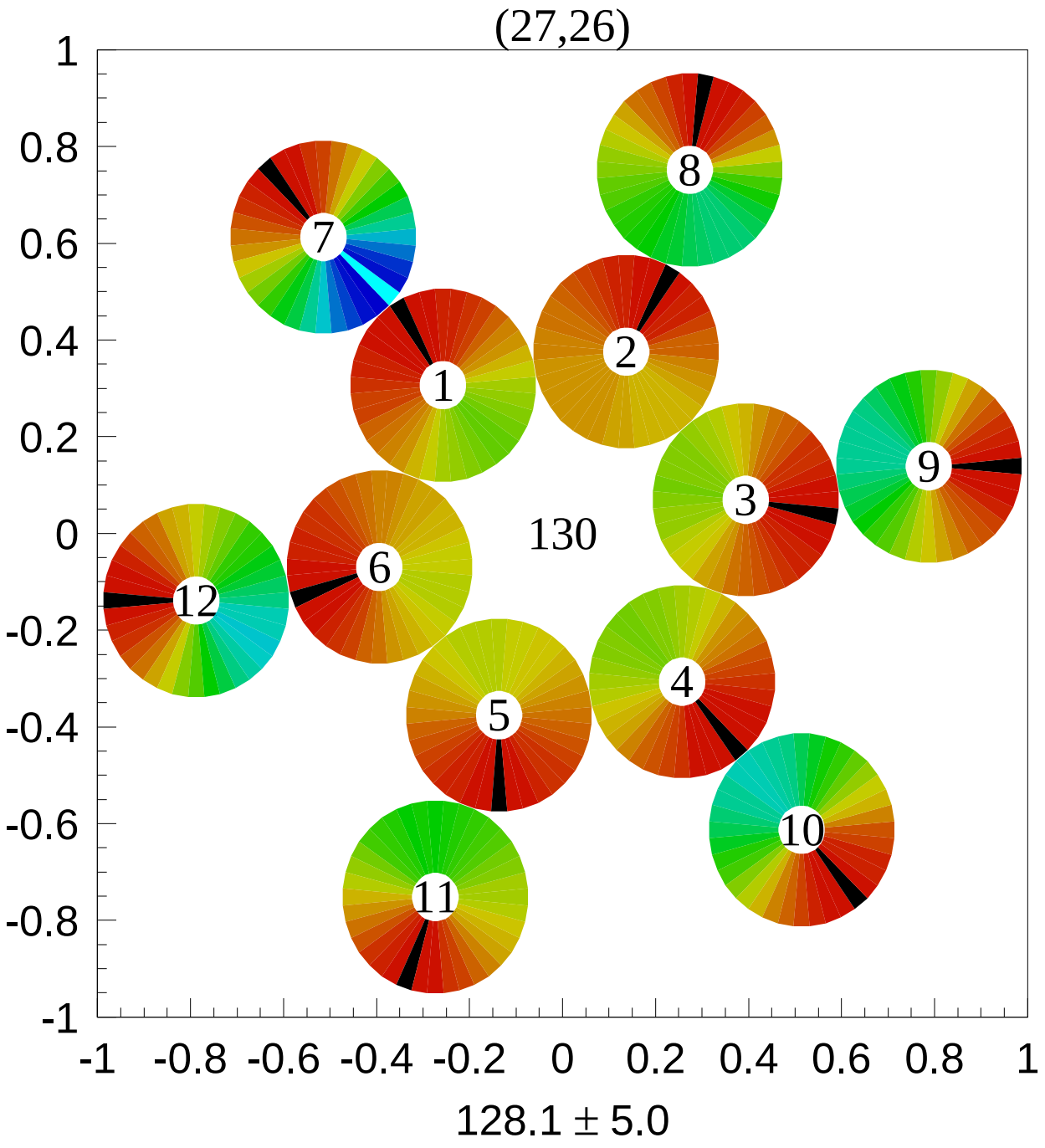

(27,24)
tilted LEDs
124 119 120 126 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 122 122 128 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

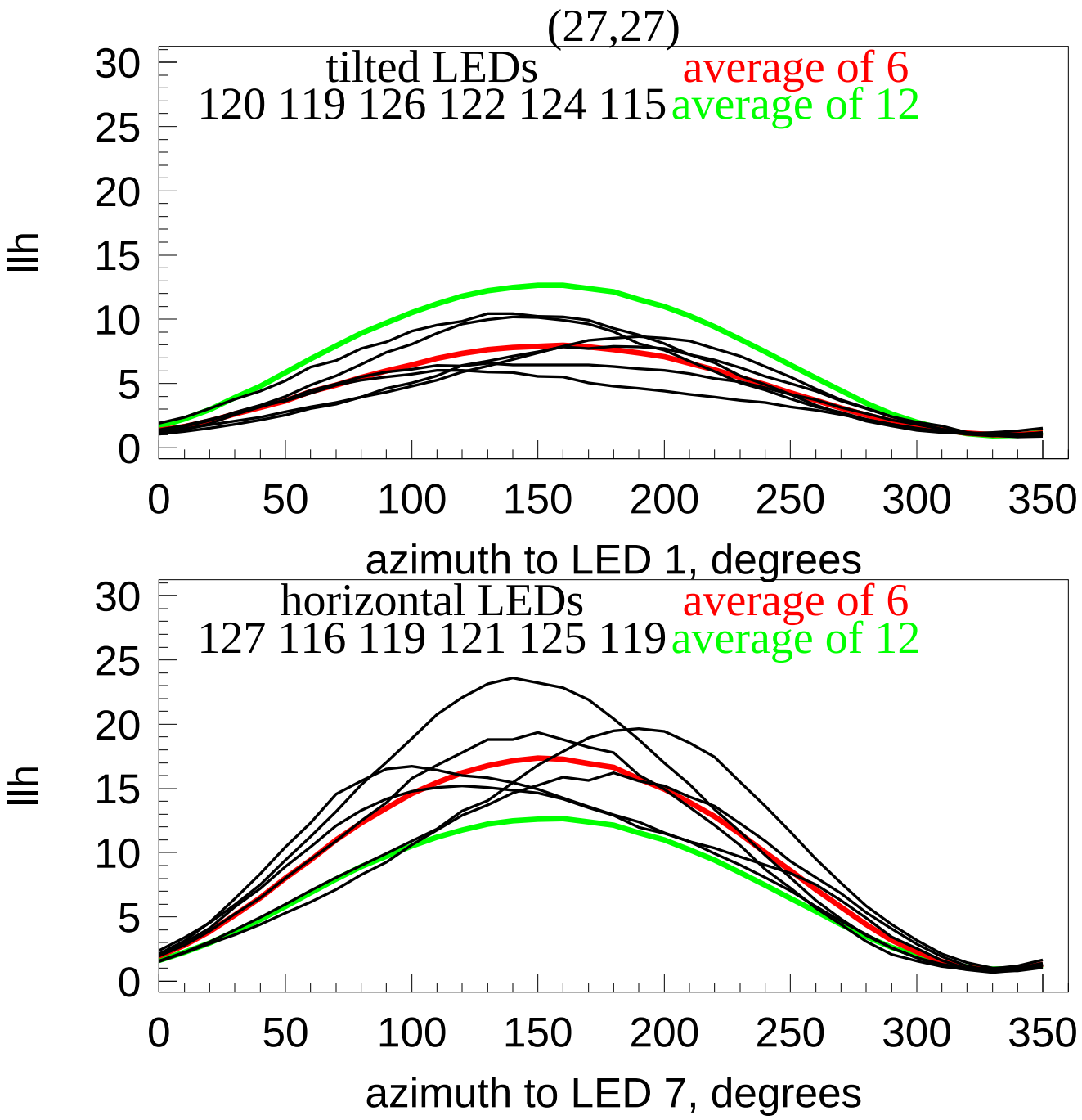

(27,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
6.1 ± 4.7
12
11
6
5
7
1
10
4
10
2
3
8
9

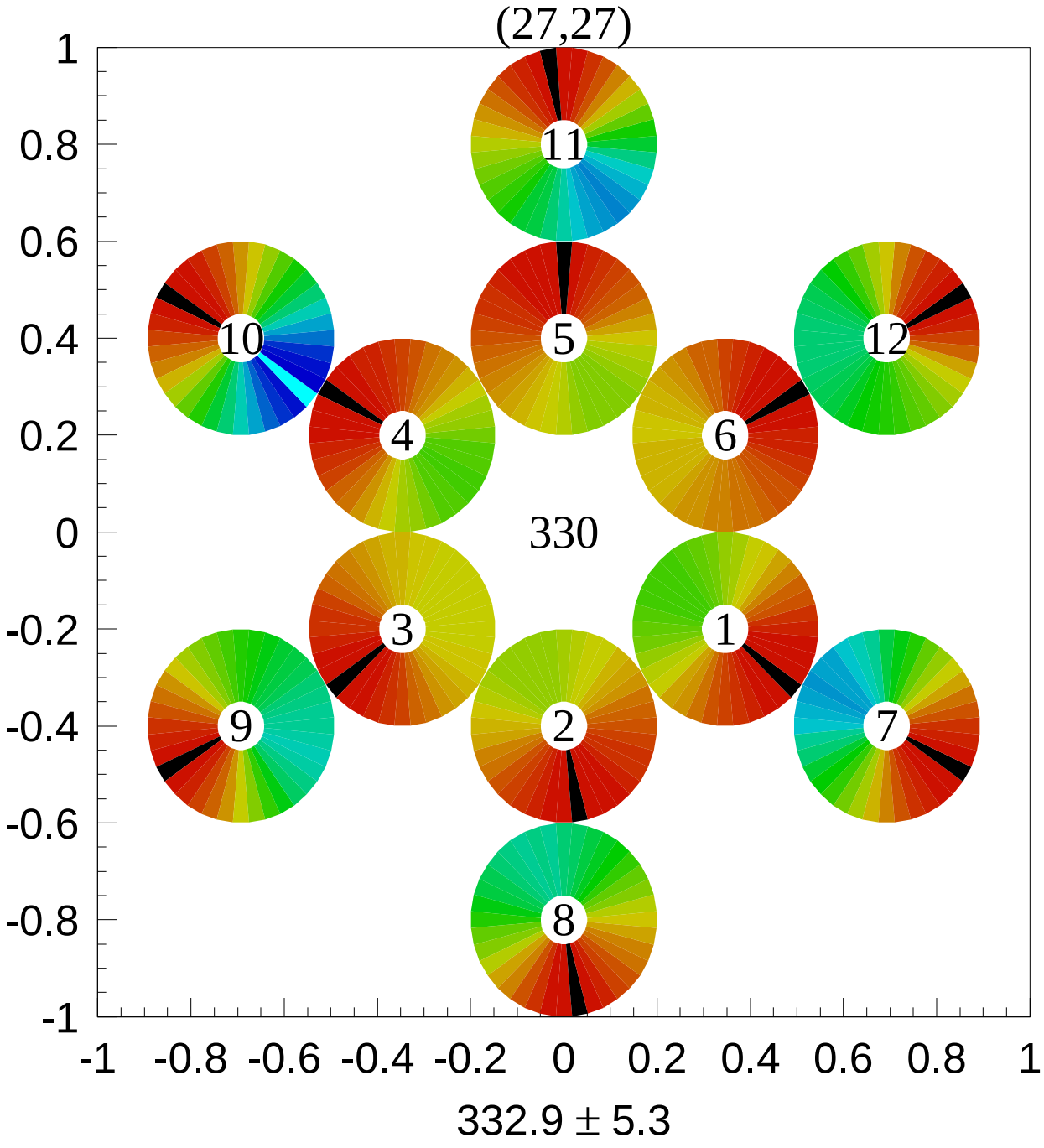

(27,25)
tilted LEDs
121 117 127 123 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 119 122 126 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

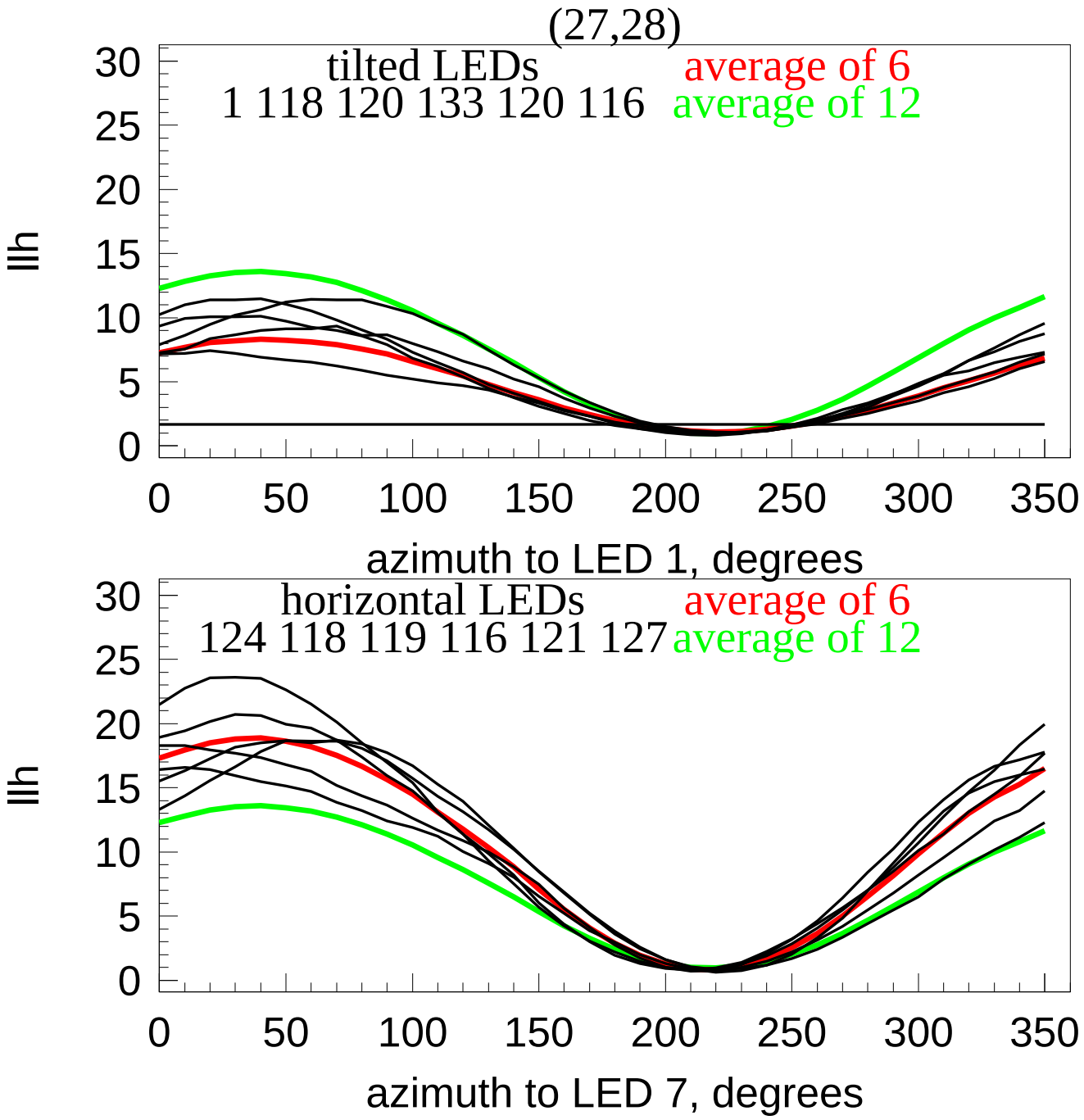

(27,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
133.2 ± 6.1

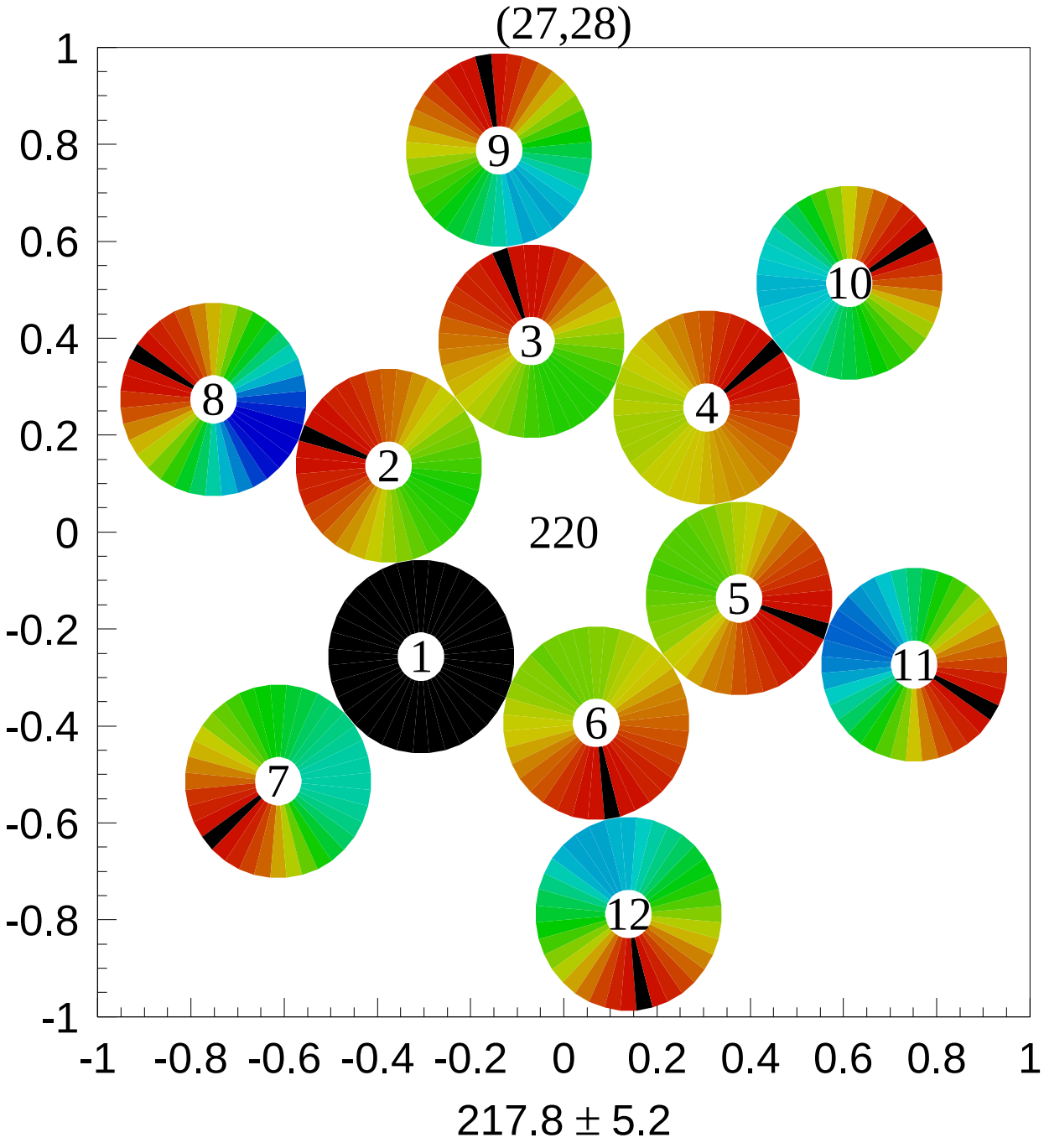

(27,26)
tilted LEDs
119 115 124 119 125 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 124 123 119 127 130
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

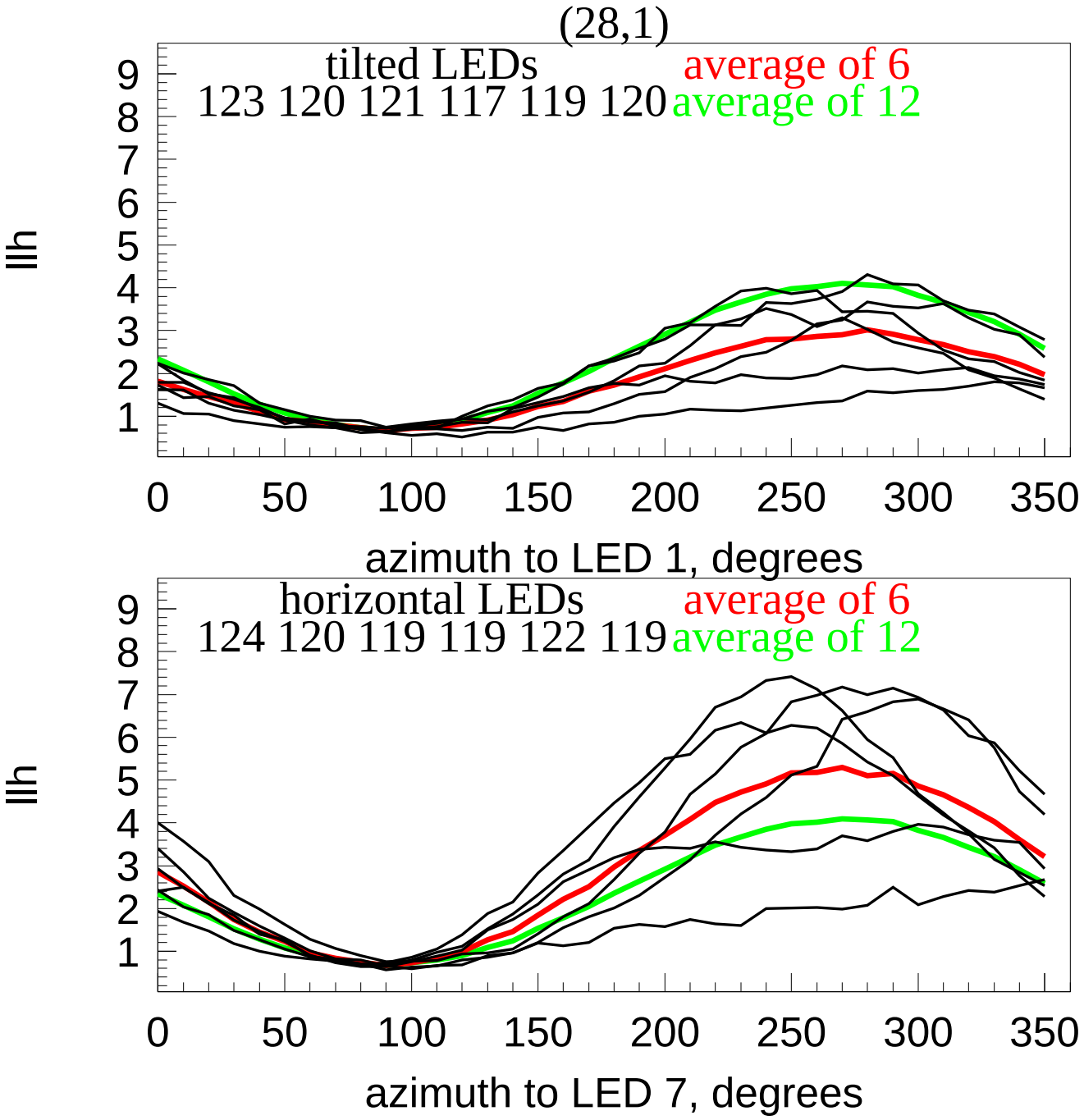

(27,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
128.1 ± 5.0
130
1
2
3
4
5
6
7
8
9
10
11
12

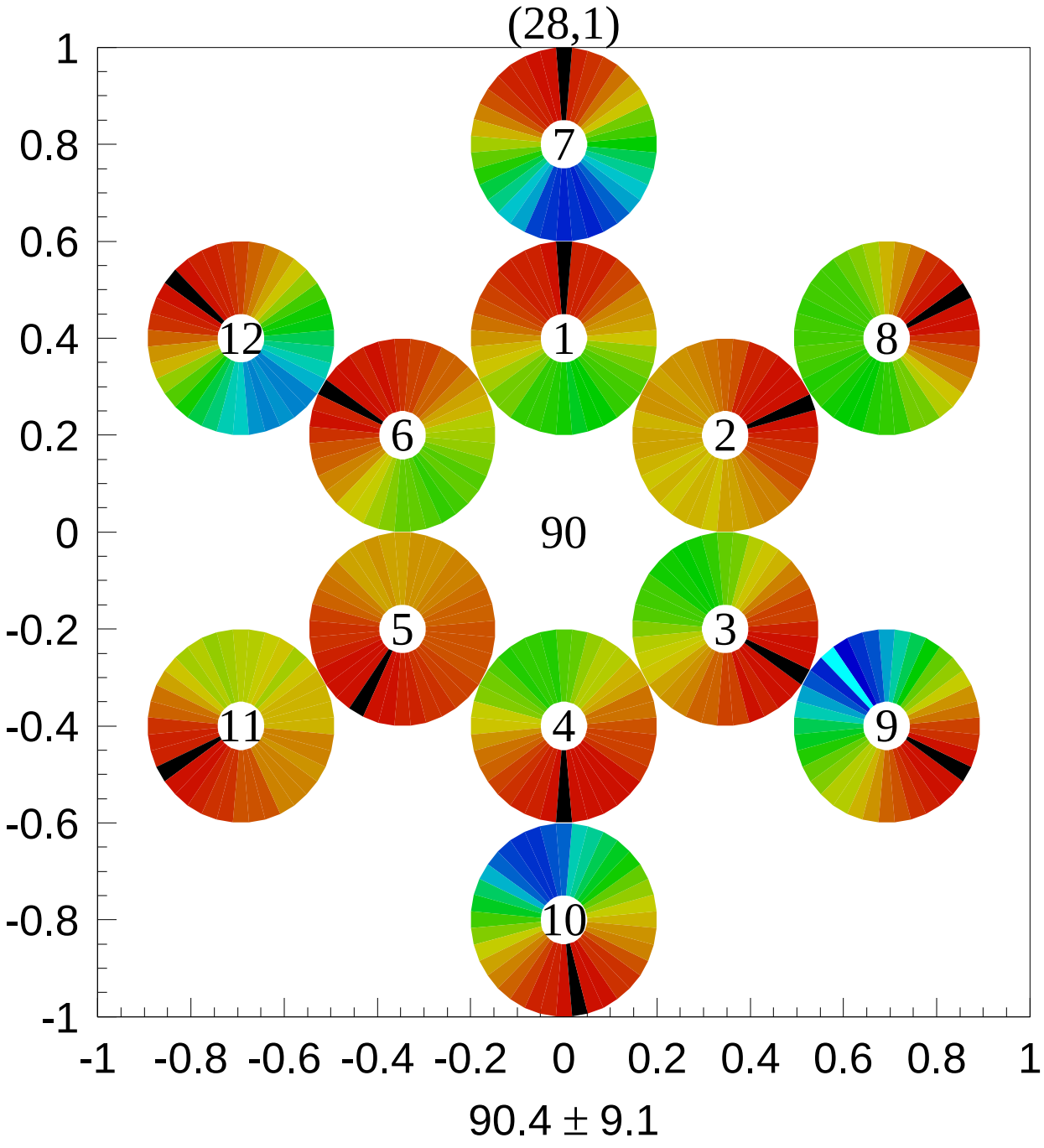

(27,27)
tilted LEDs
120 119 126 122 124 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 116 119 121 125 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

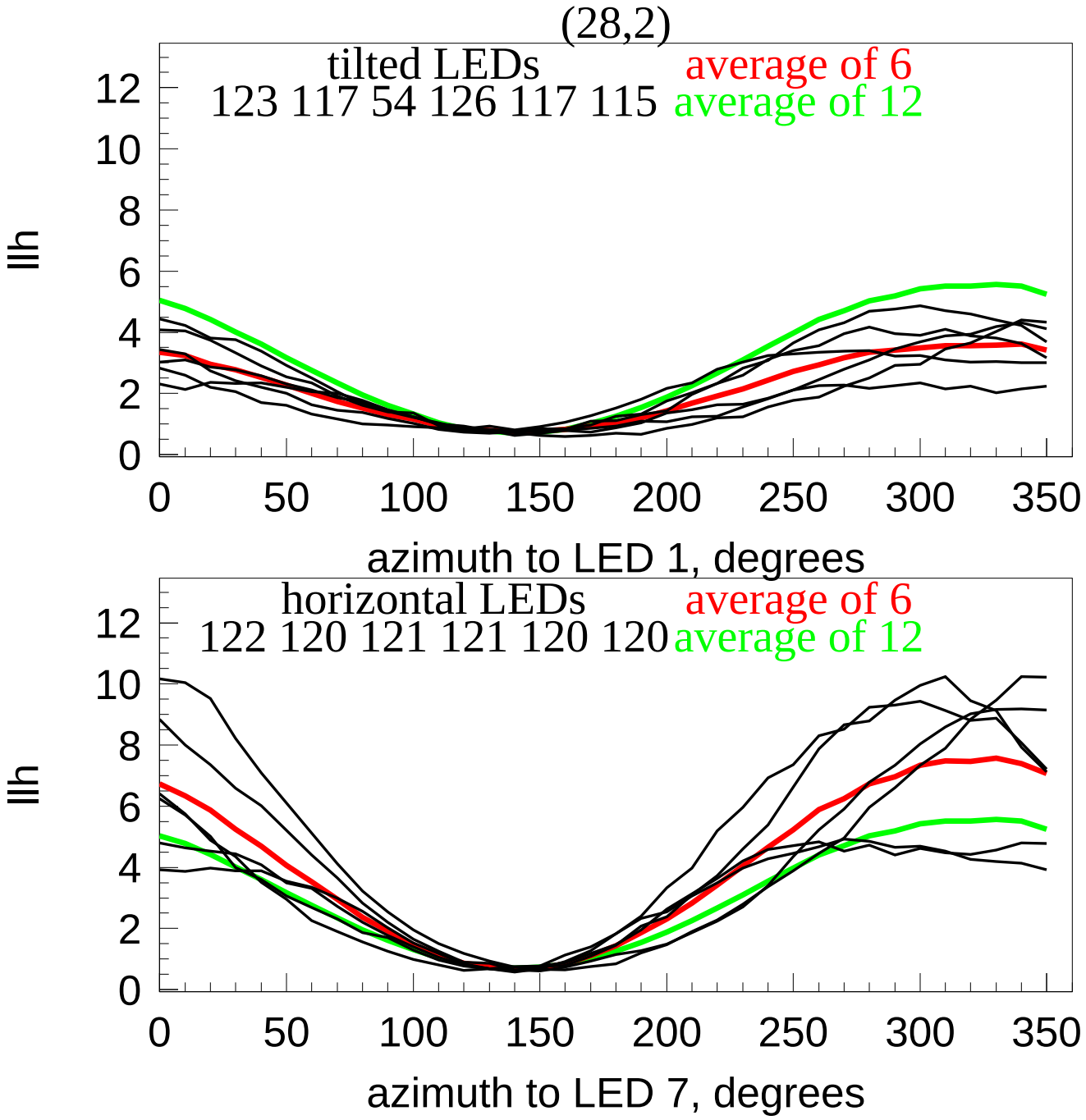

(27,27)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
332.9 ± 5.3

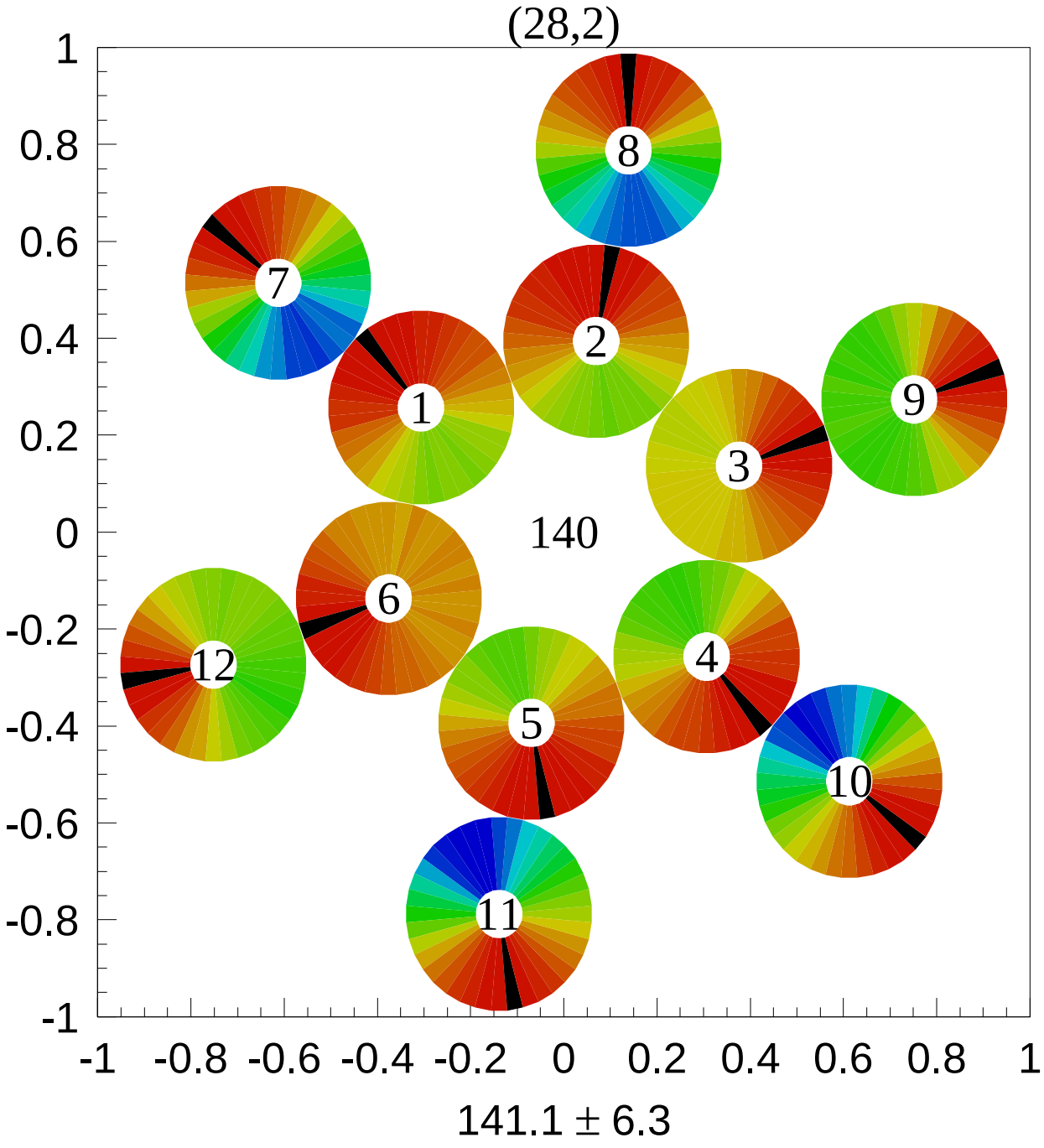

(27,28)
tilted LEDs
1 118 120 133 120 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 118 119 116 121 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

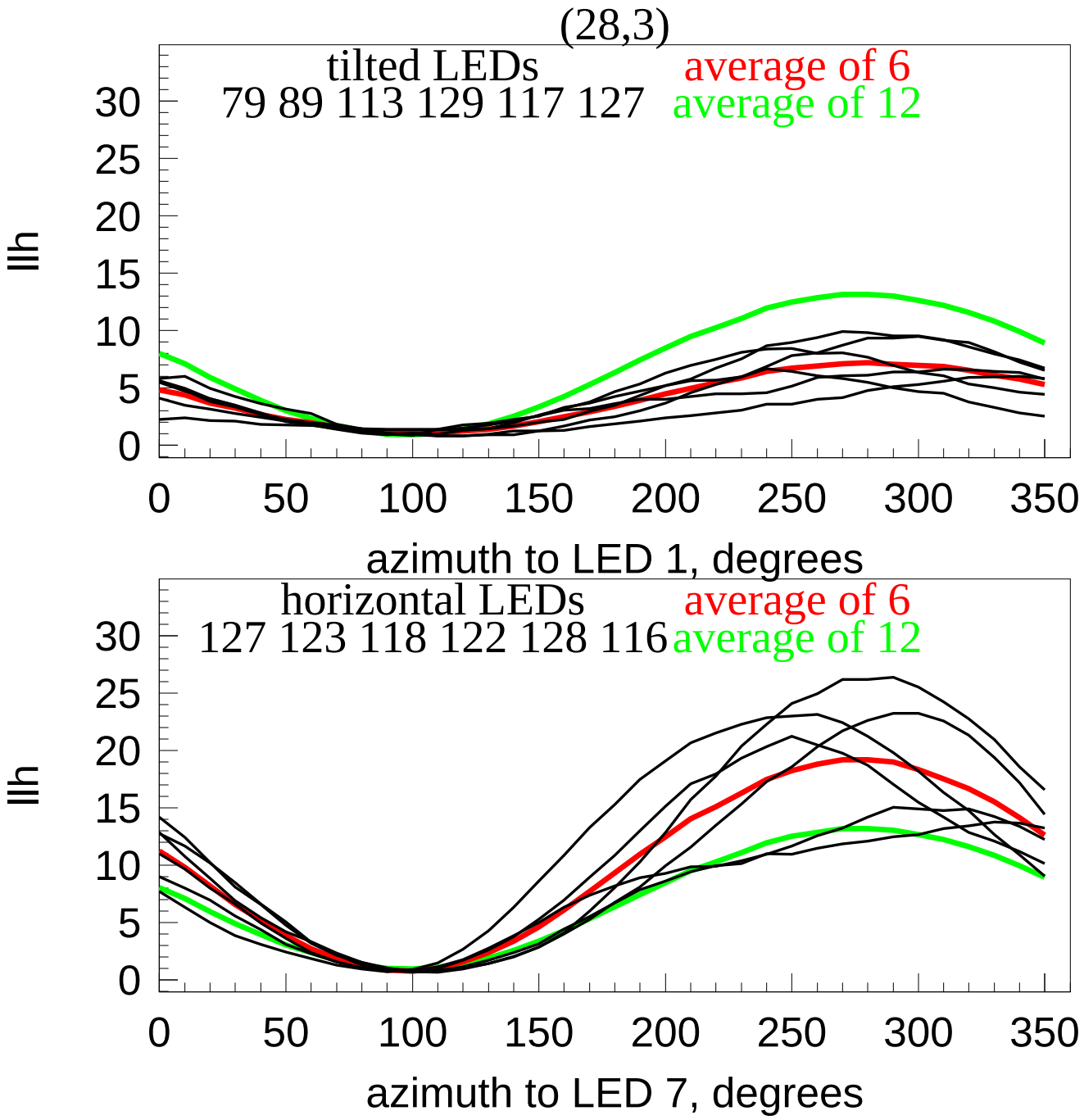

(27,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
217.8 ± 5.2

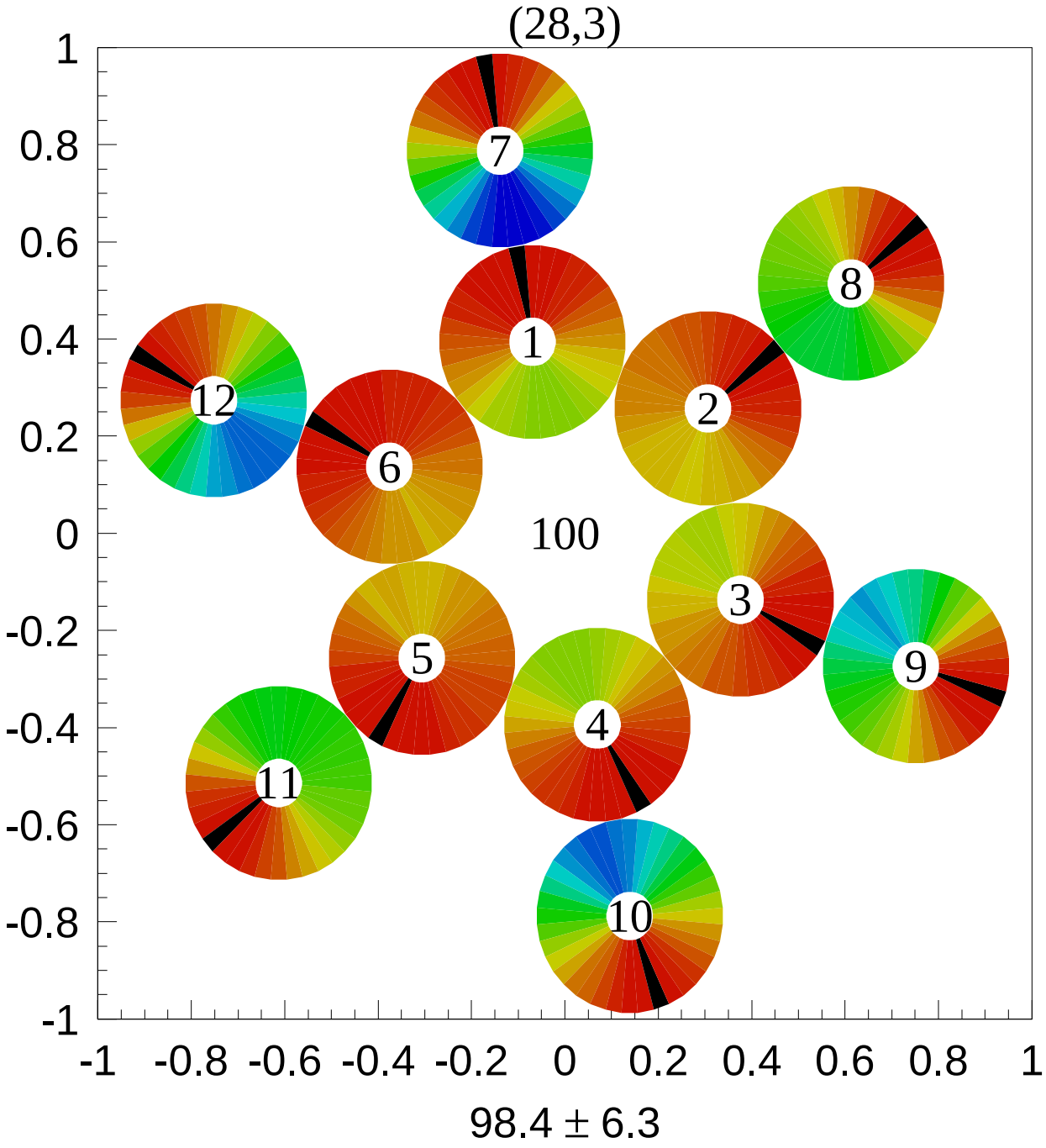

(28,1)
tilted LEDs
123 120 121 117 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 120 119 119 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

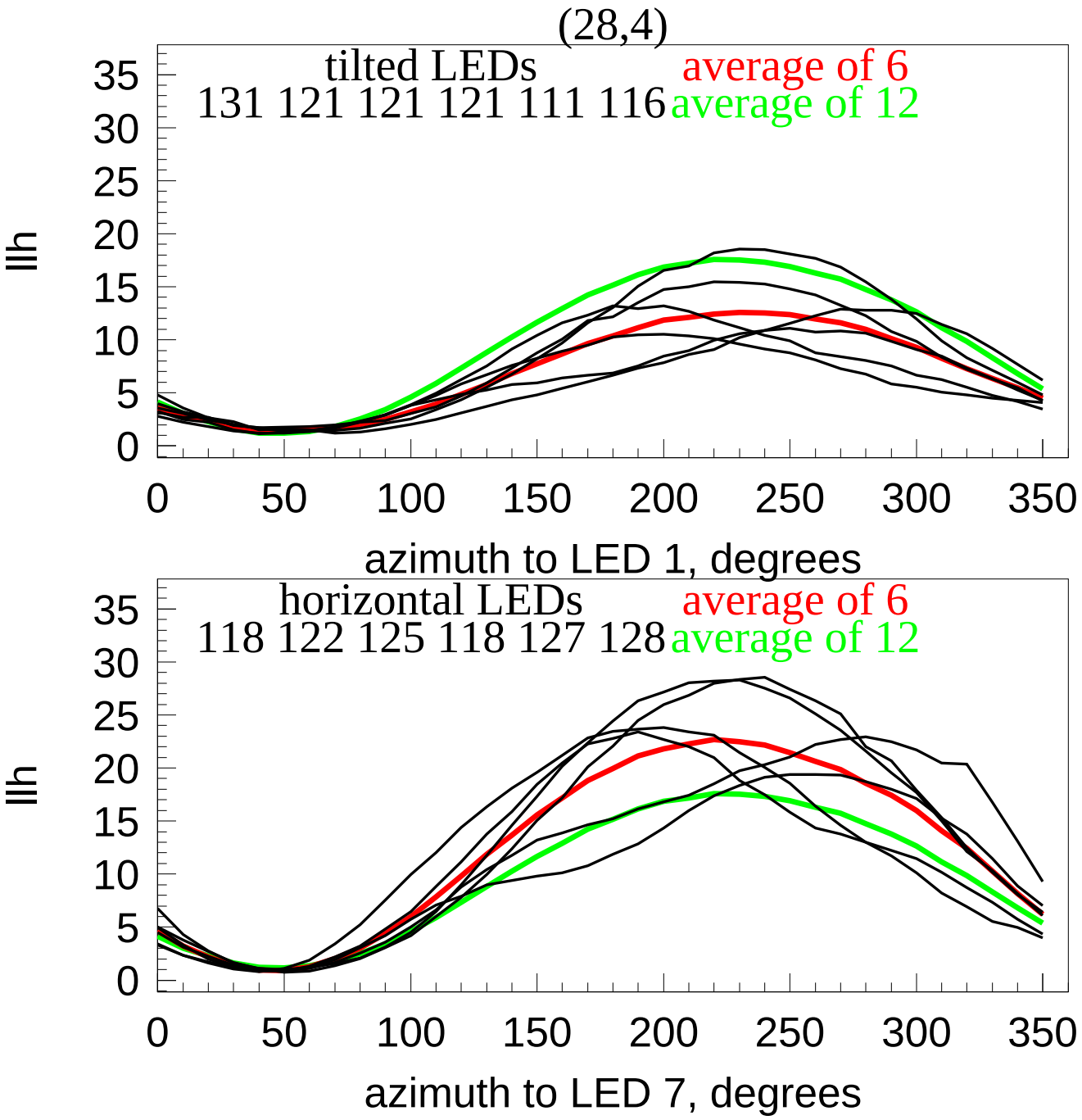

(28,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
90.4 ± 9.1

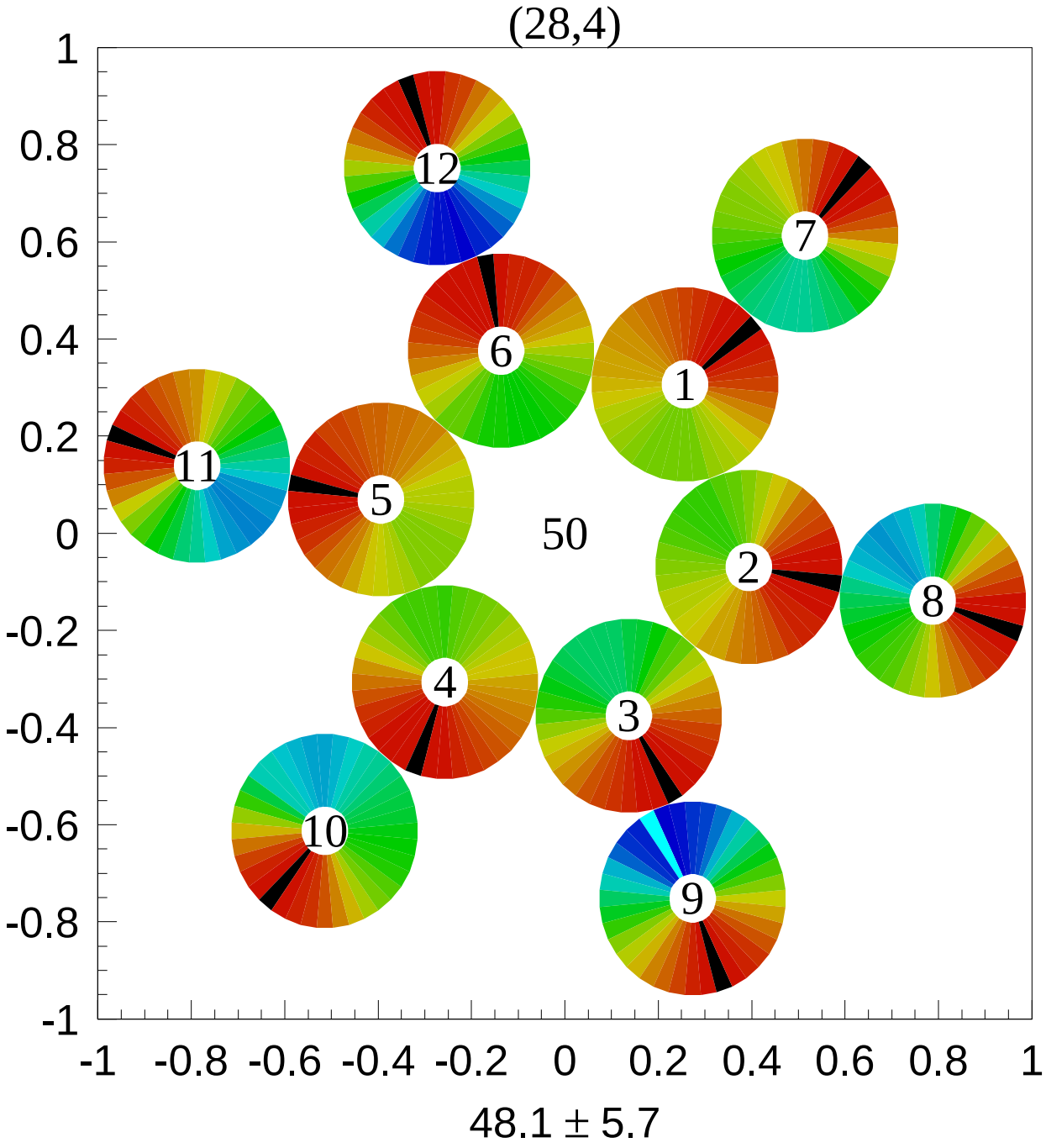

(28,2)
tilted LEDs
123 117 54 126 117 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 120 121 121 120 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

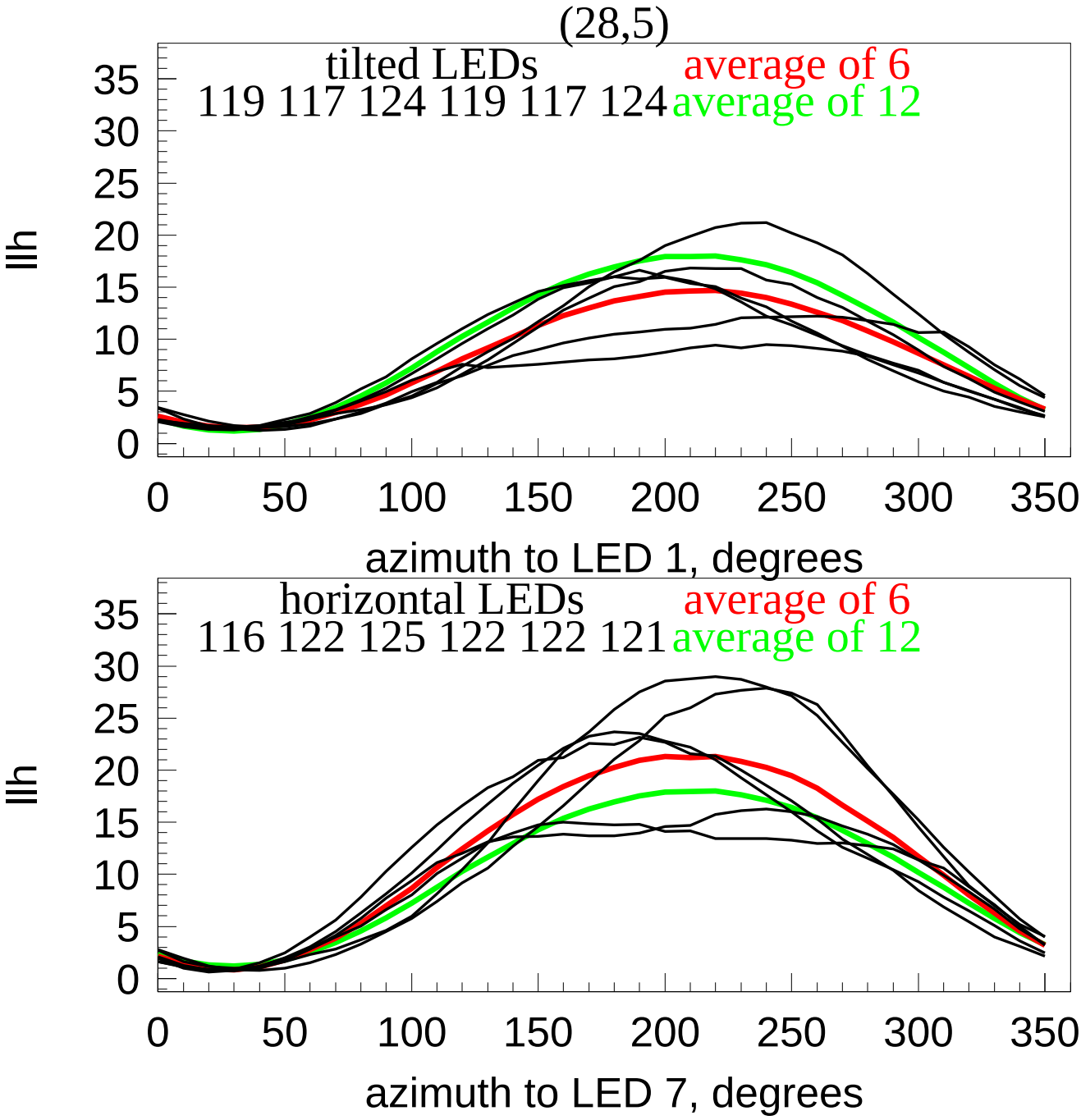

(28,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
141.1 ± 6.3

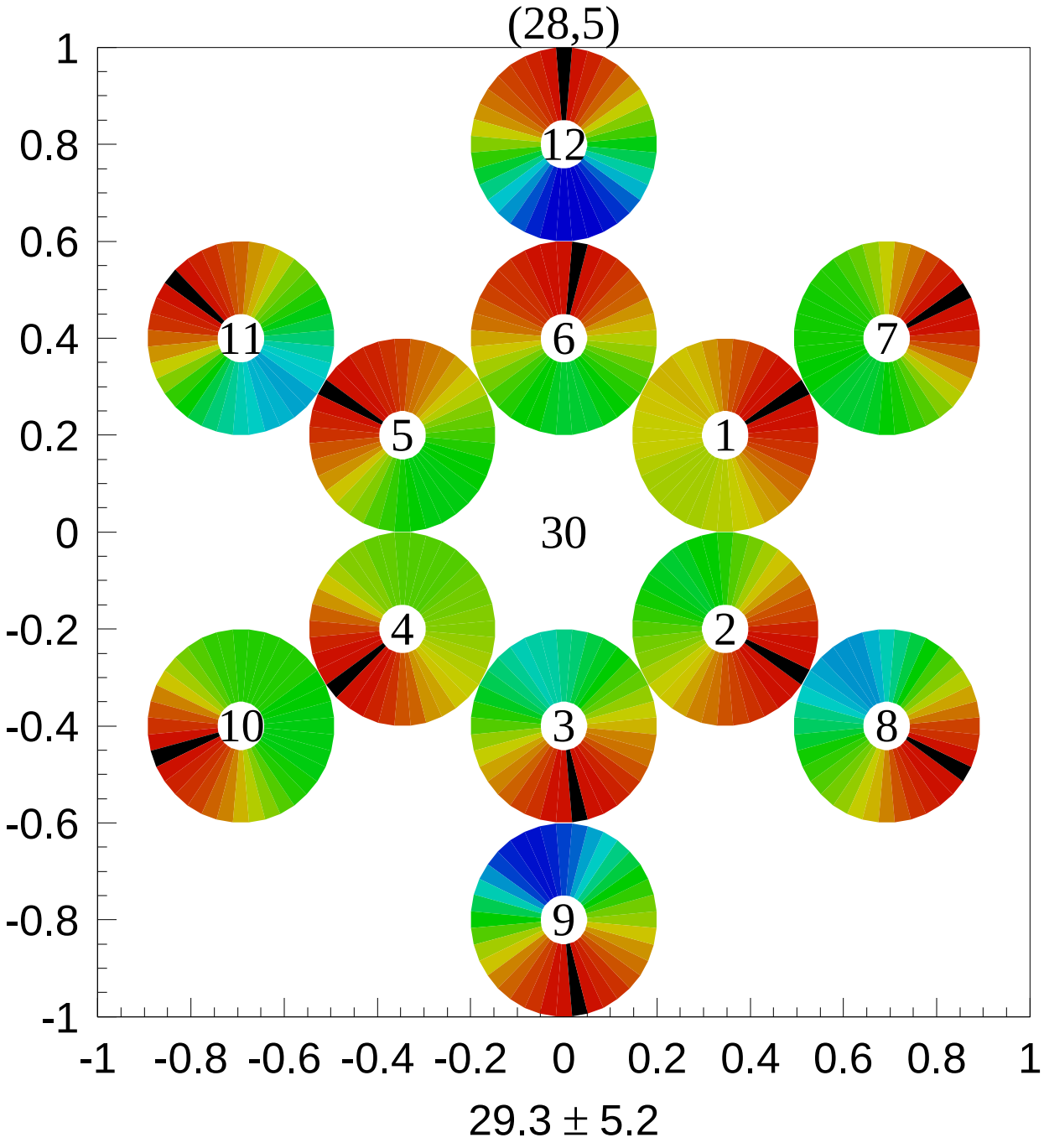

(28,3)
tilted LEDs
79 89 113 129 117 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 123 118 122 128 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

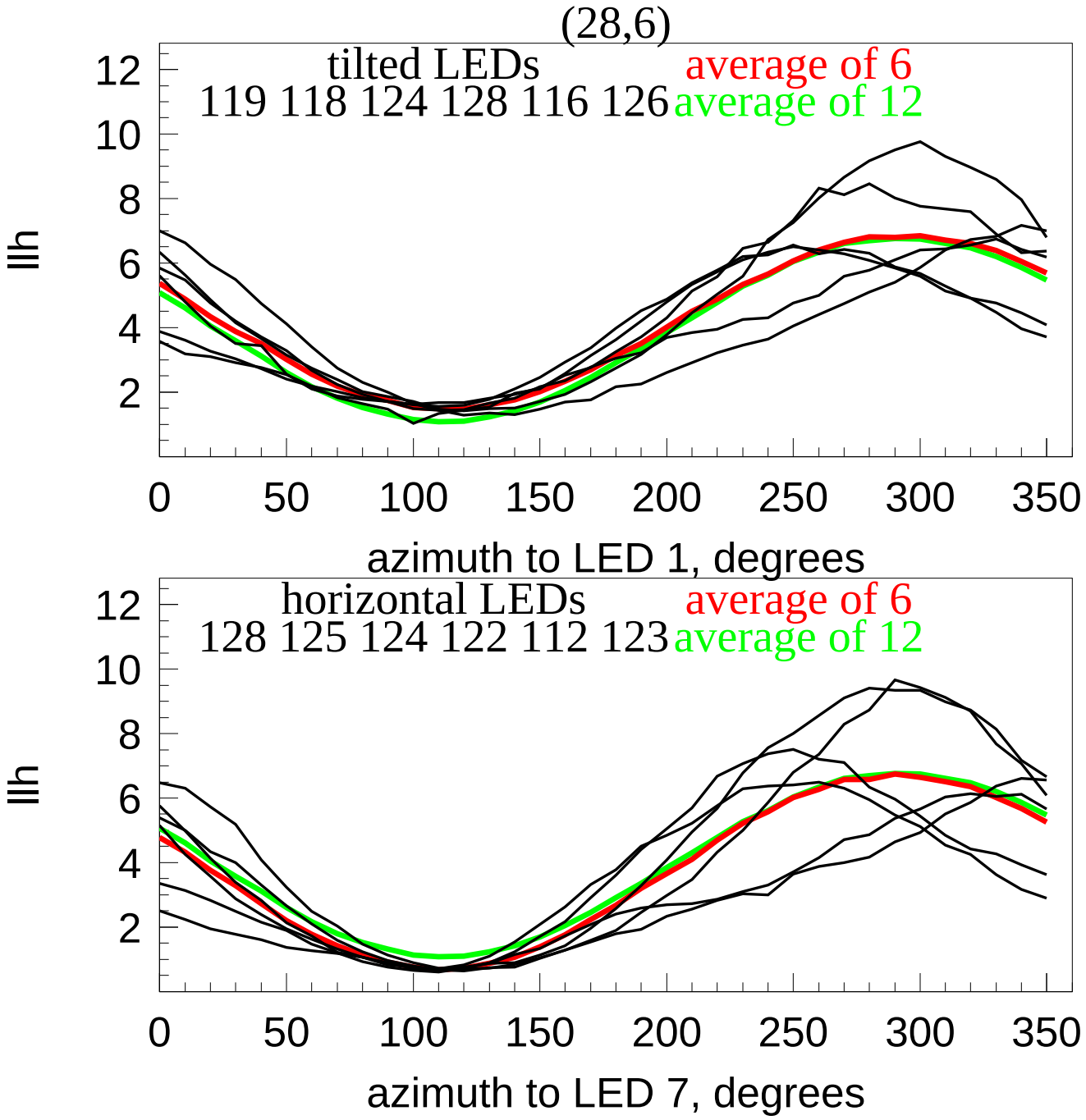

(28,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
98.4 ± 6.3

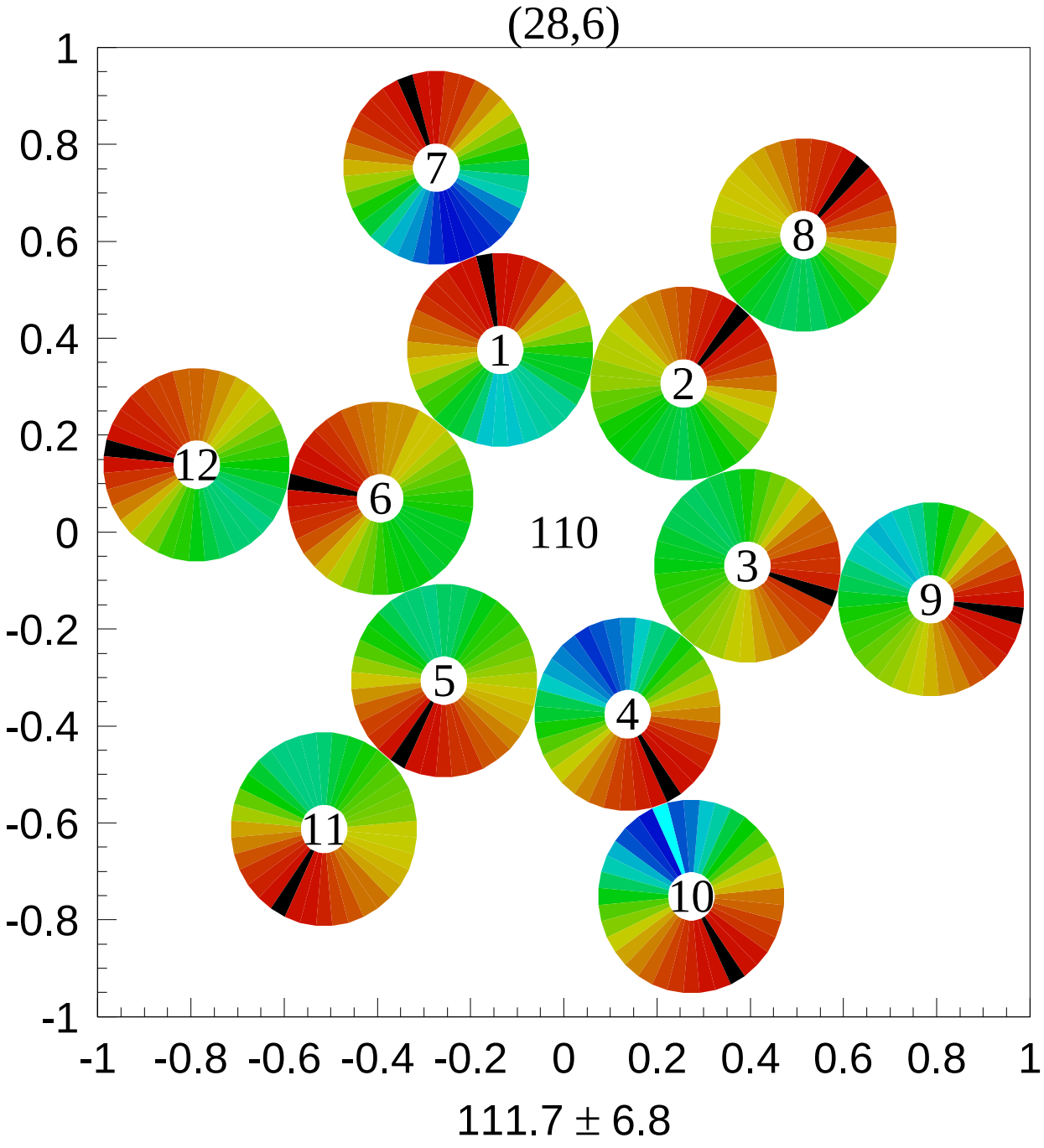

(28,4)
tilted LEDs
131 121 121 121 111 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 122 125 118 127 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

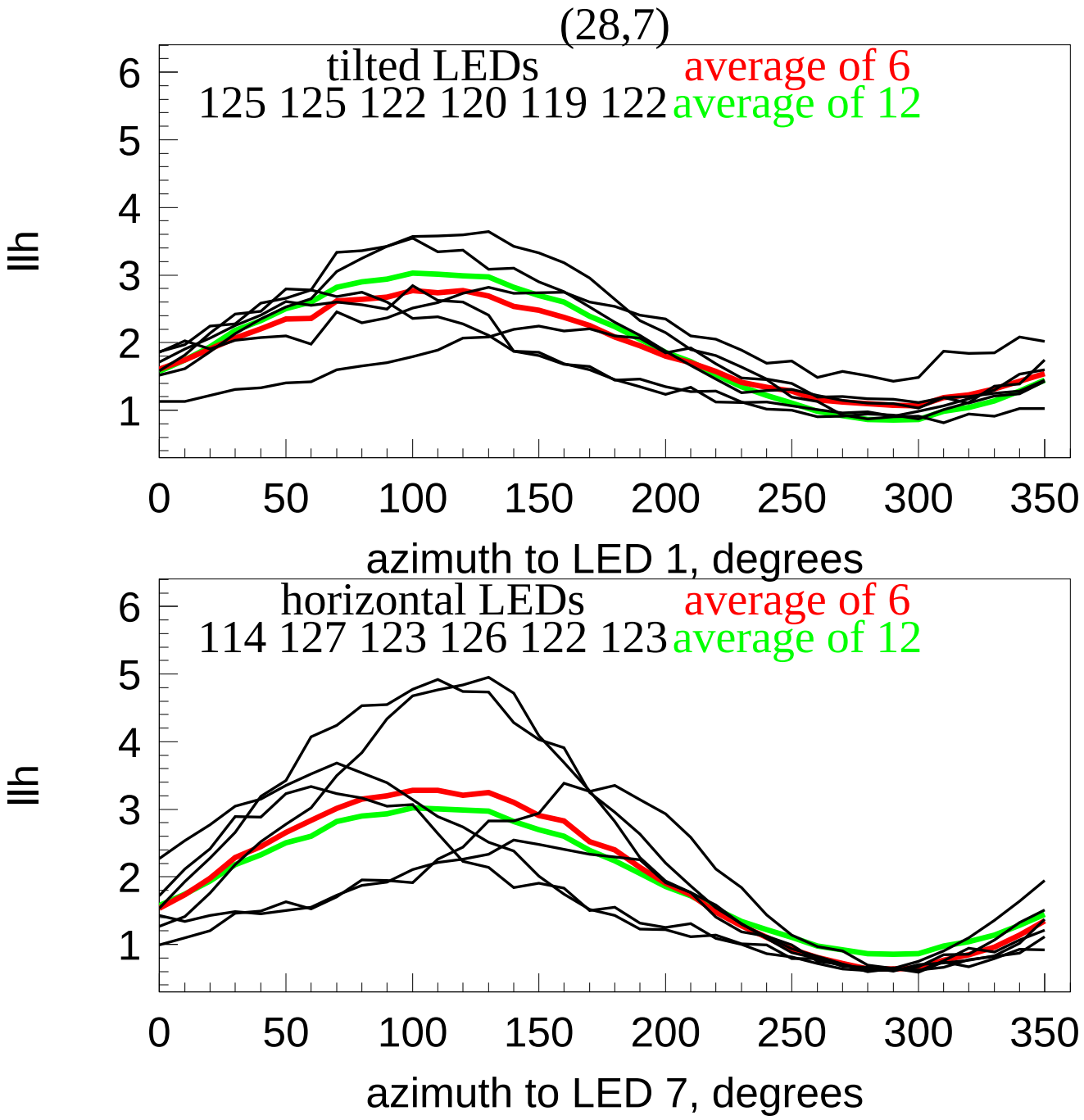

(28,4)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
48.1 ± 5.7

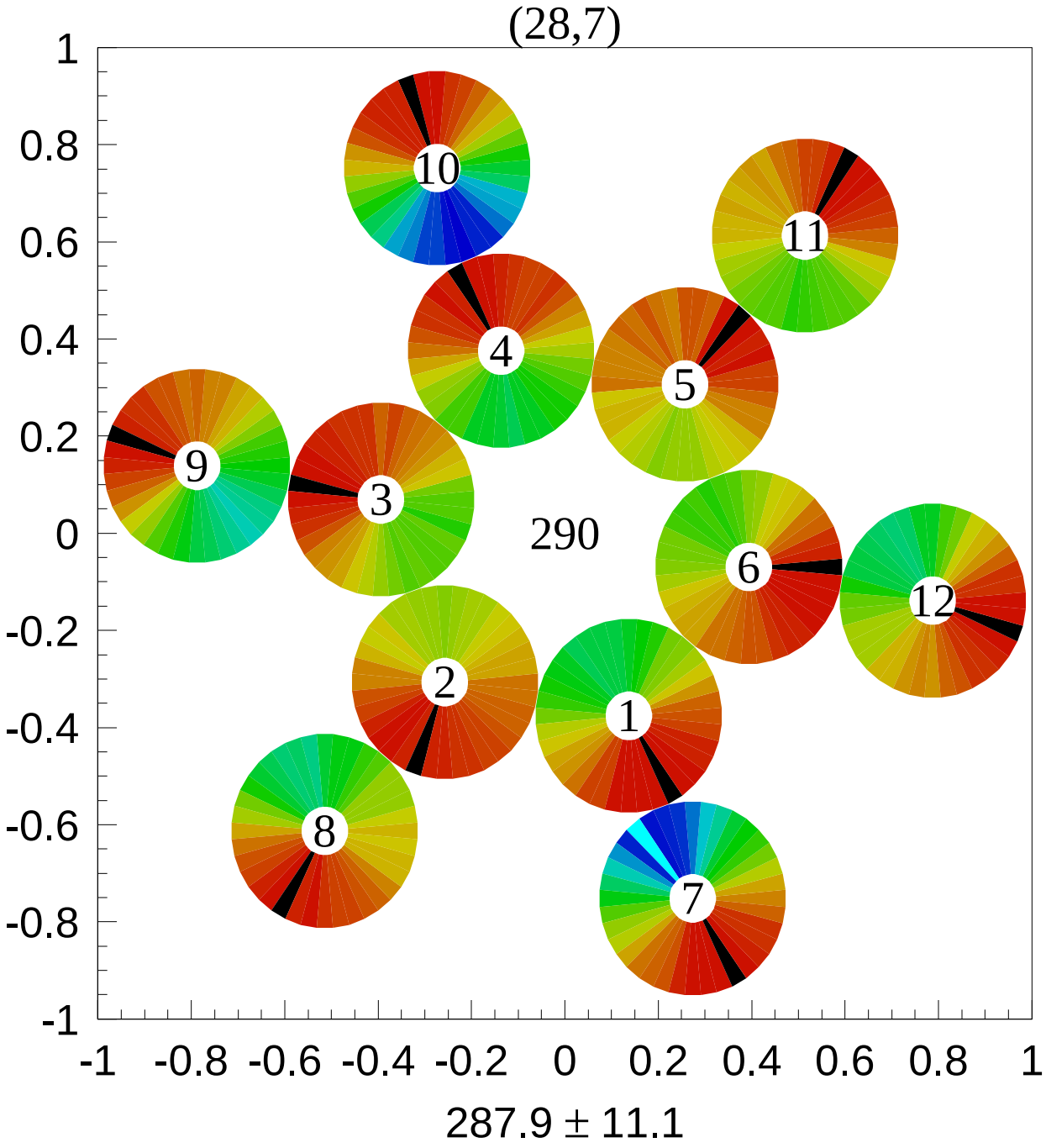

(28,5)
tilted LEDs
119 117 124 119 117 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 122 125 122 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

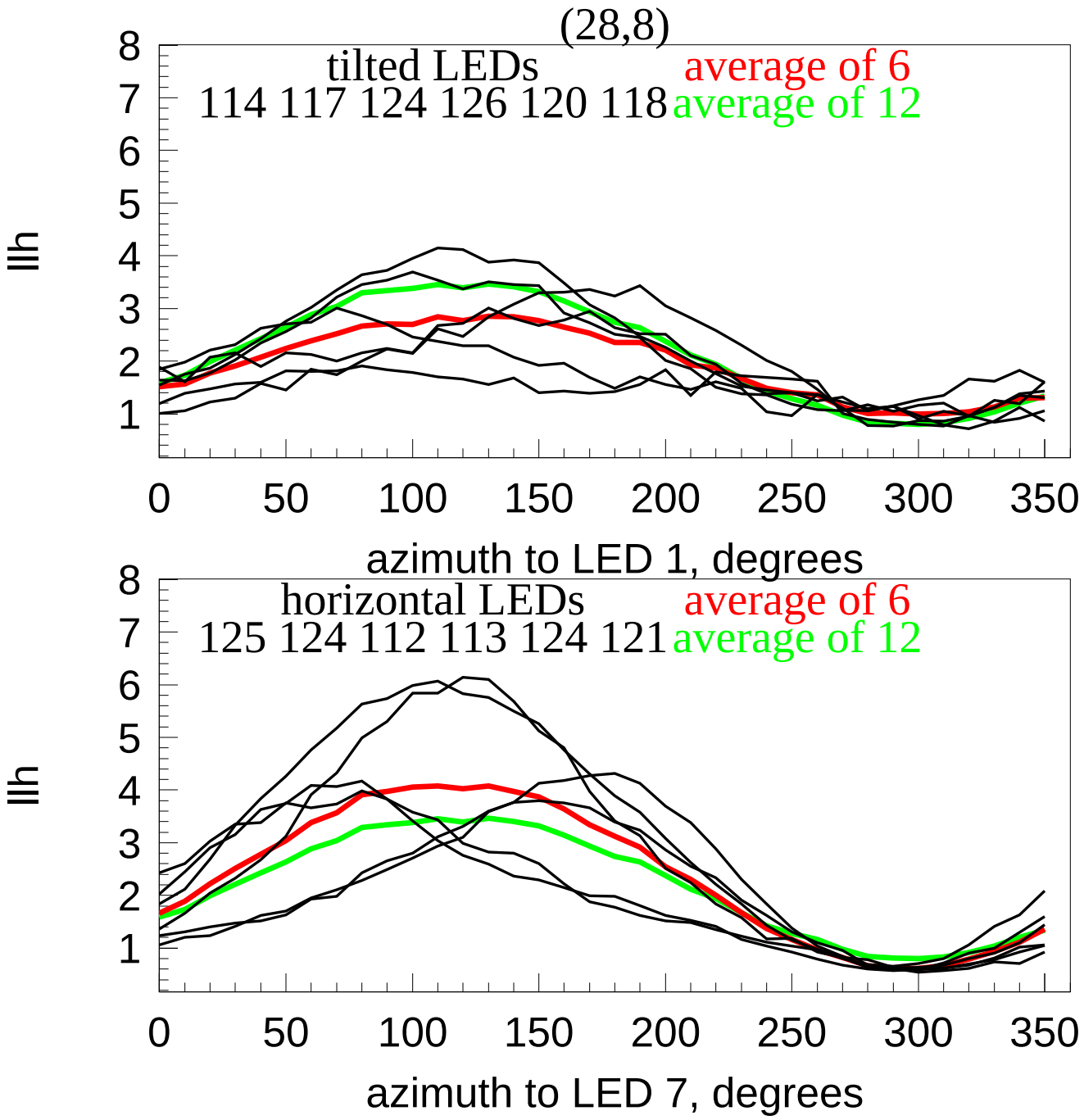

(28,5)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
29.3 ± 5.2

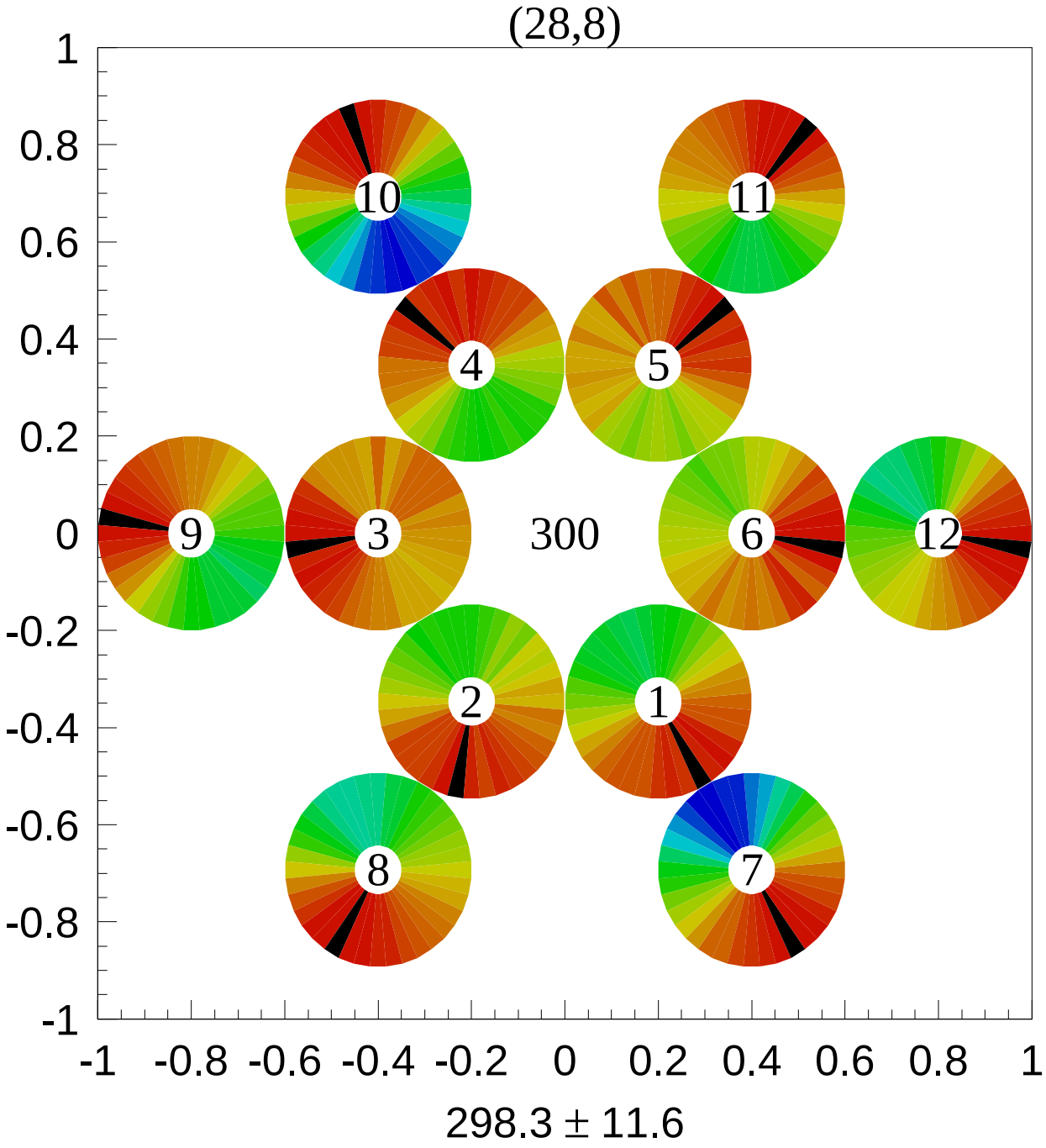

(28,6)
tilted LEDs
119 118 124 128 116 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 125 124 122 112 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

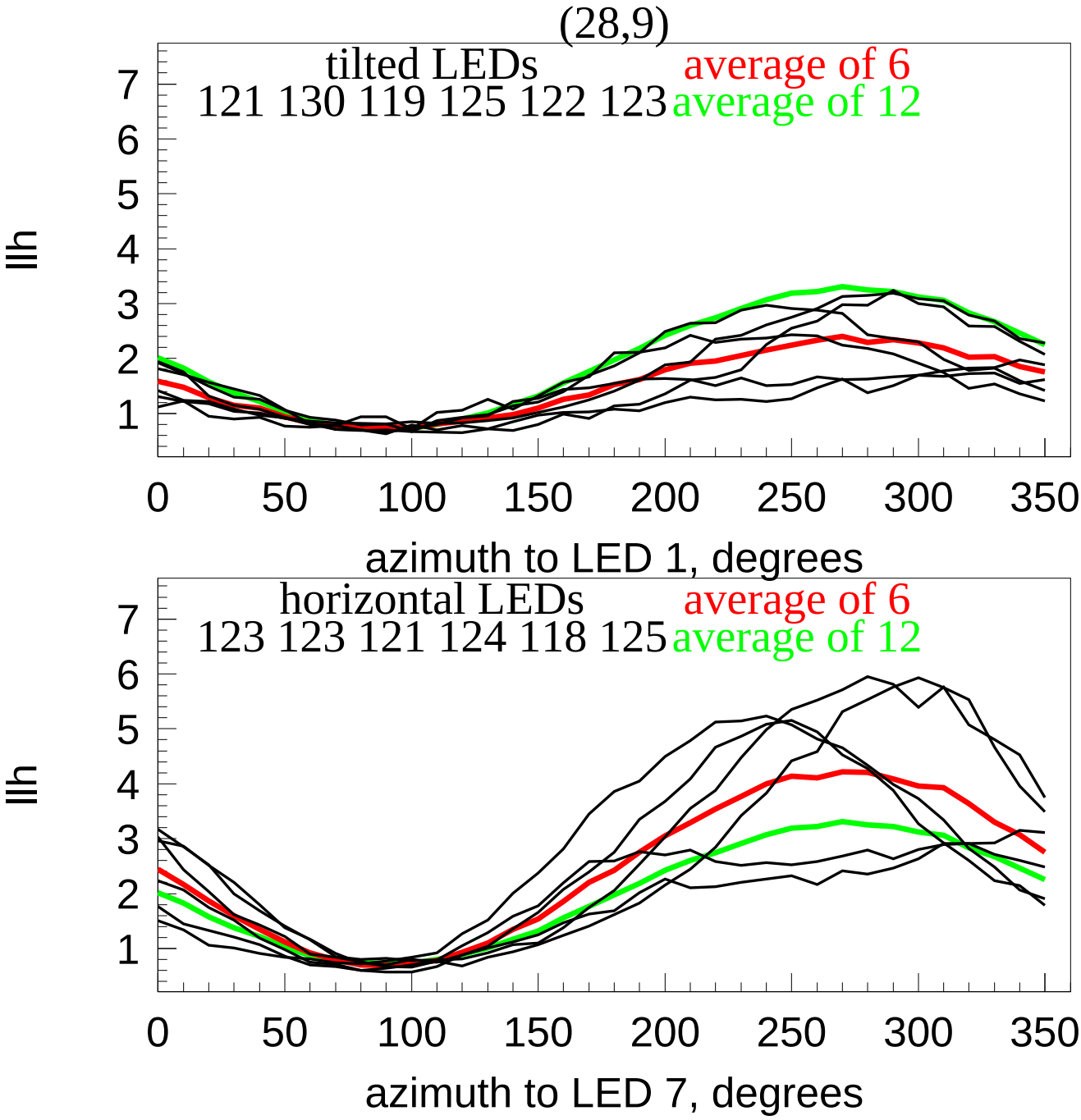

(28,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
111.7 ± 6.8

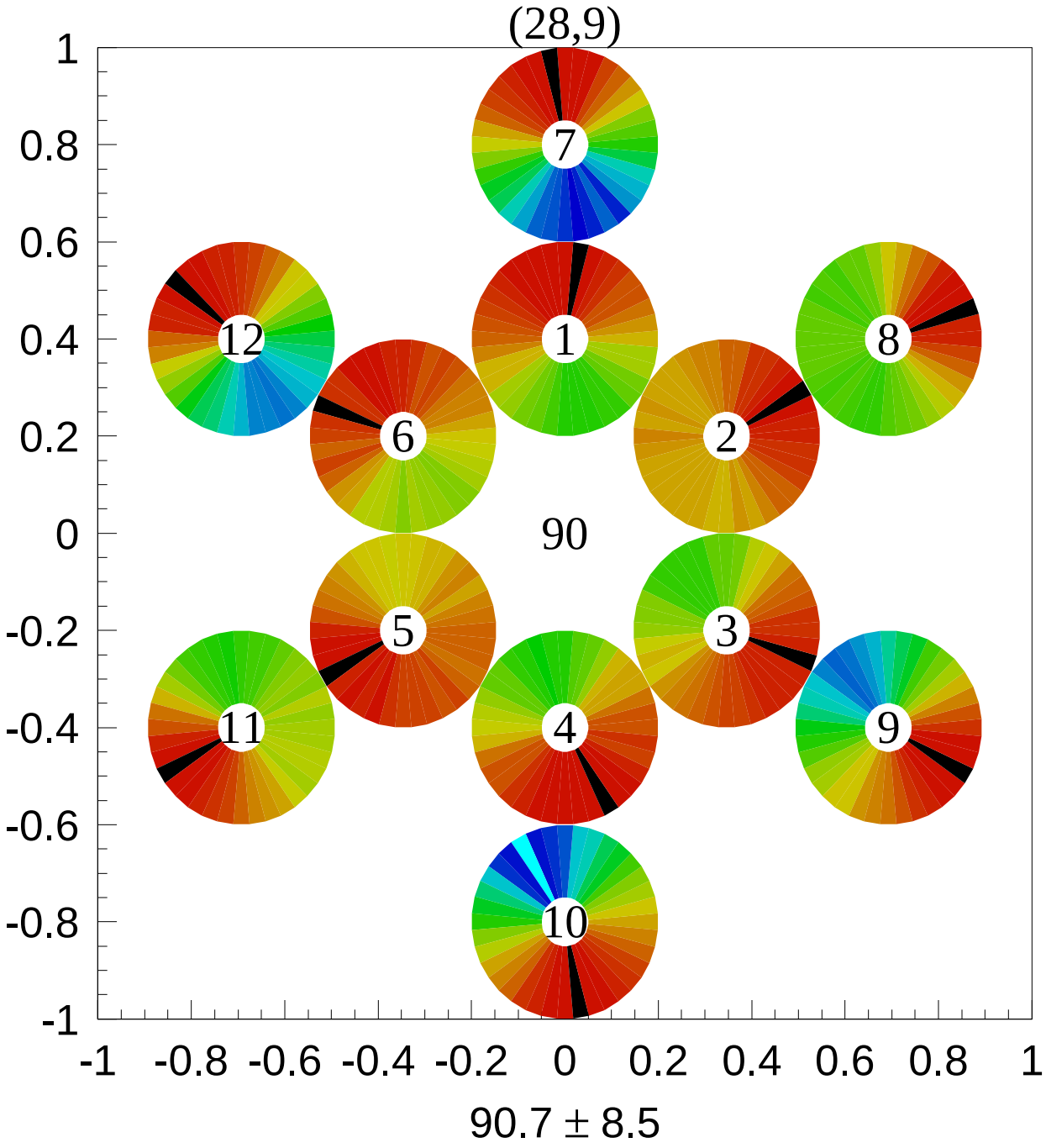

(28,7)
tilted LEDs
125 125 122 120 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 127 123 126 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

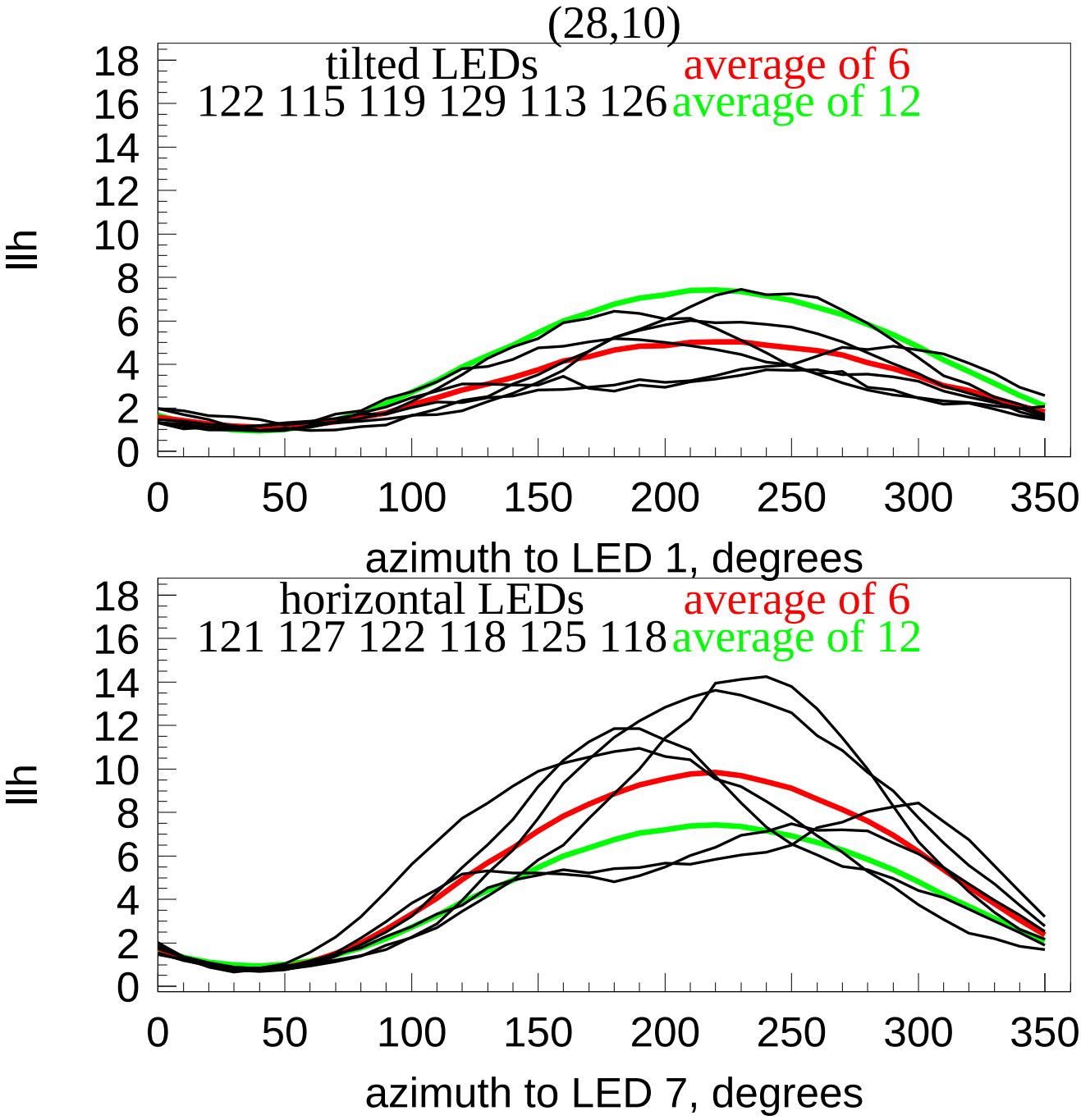

(28,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
287.9 ± 11.1

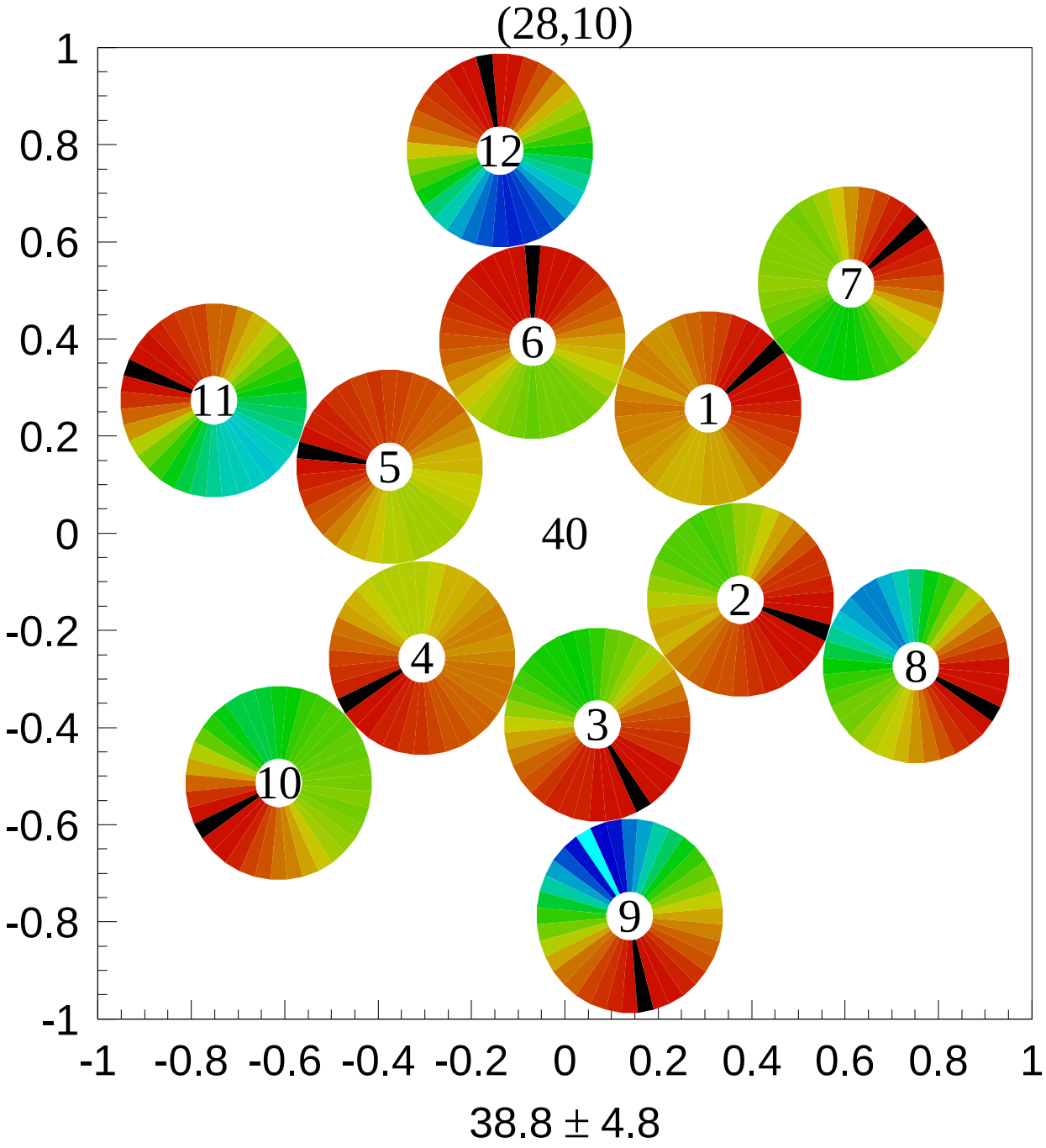

(28,8)
tilted LEDs
114 117 124 126 120 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 124 112 113 124 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

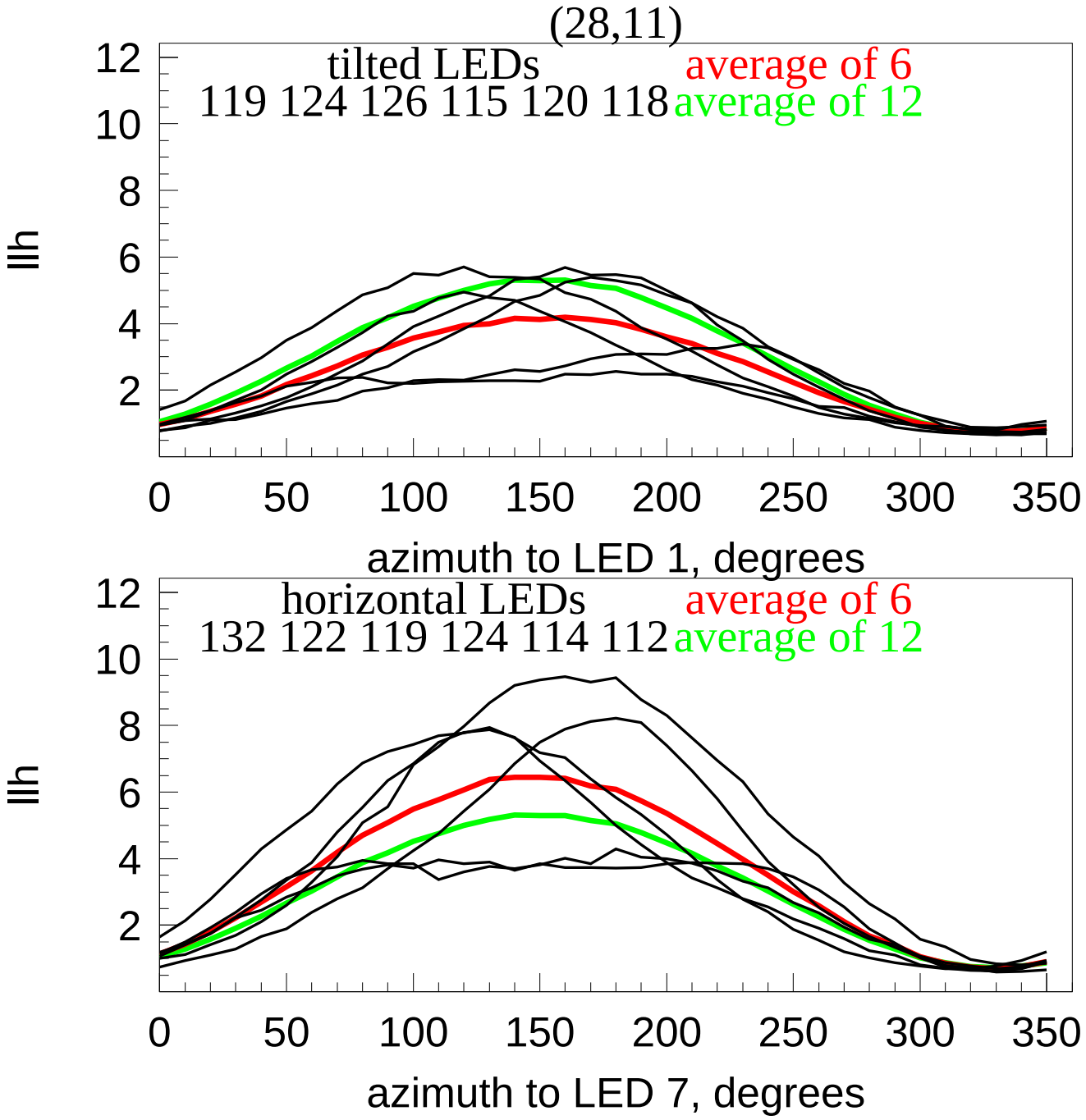

(28,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
298.3 ± 11.6

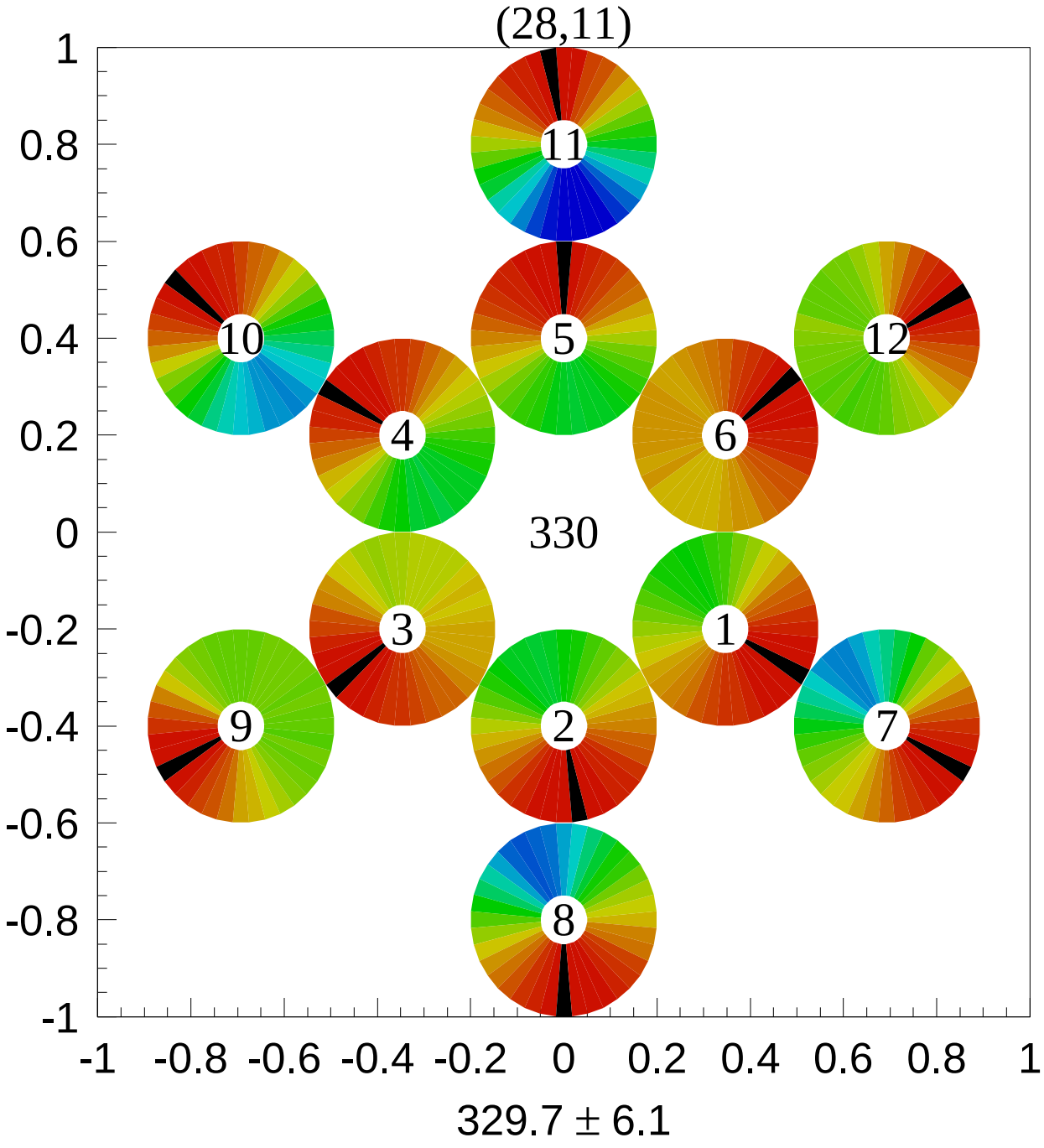

(28,9)
tilted LEDs
121 130 119 125 122 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 123 121 124 118 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

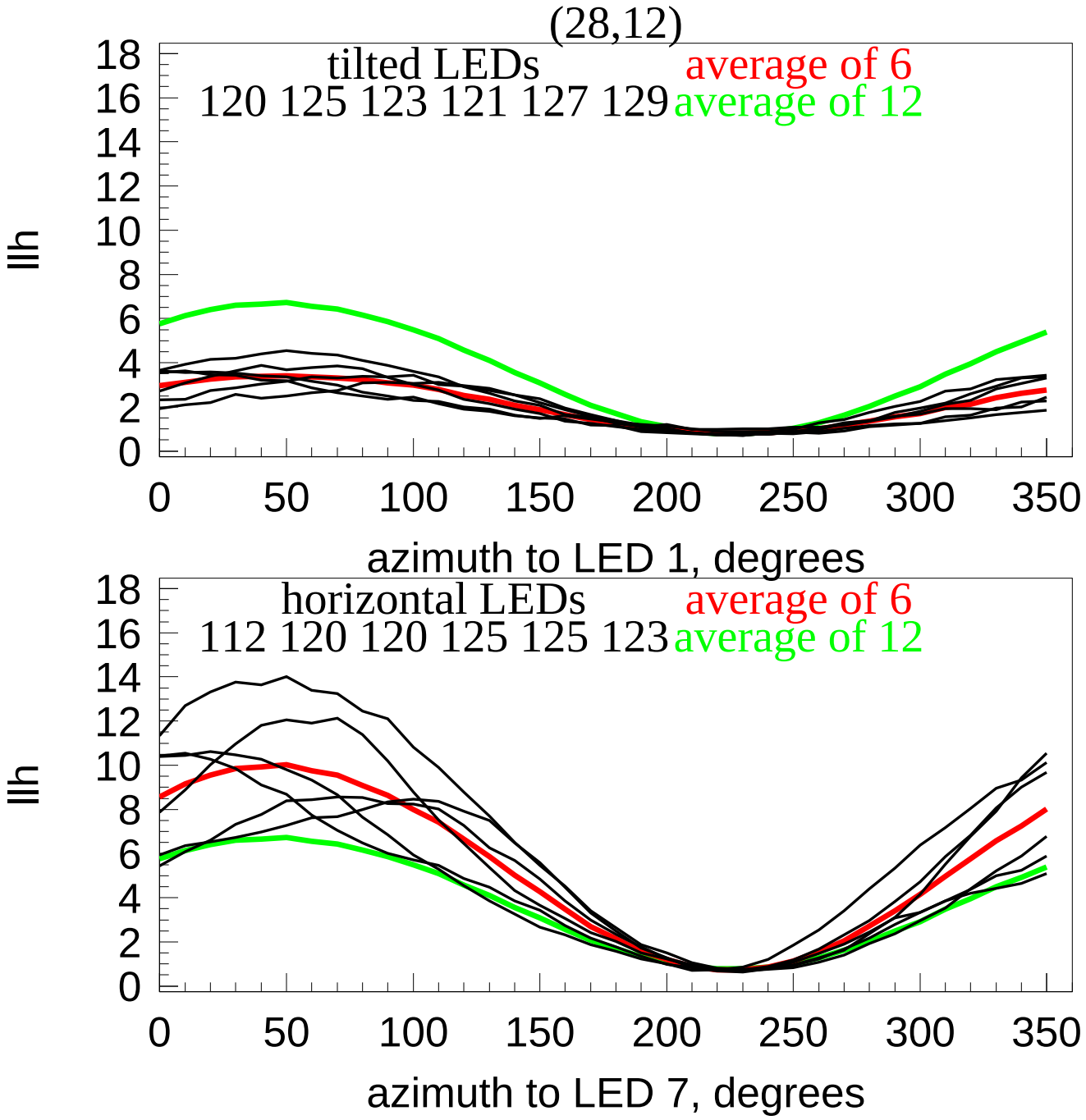

(28,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
90.7 ± 8.5

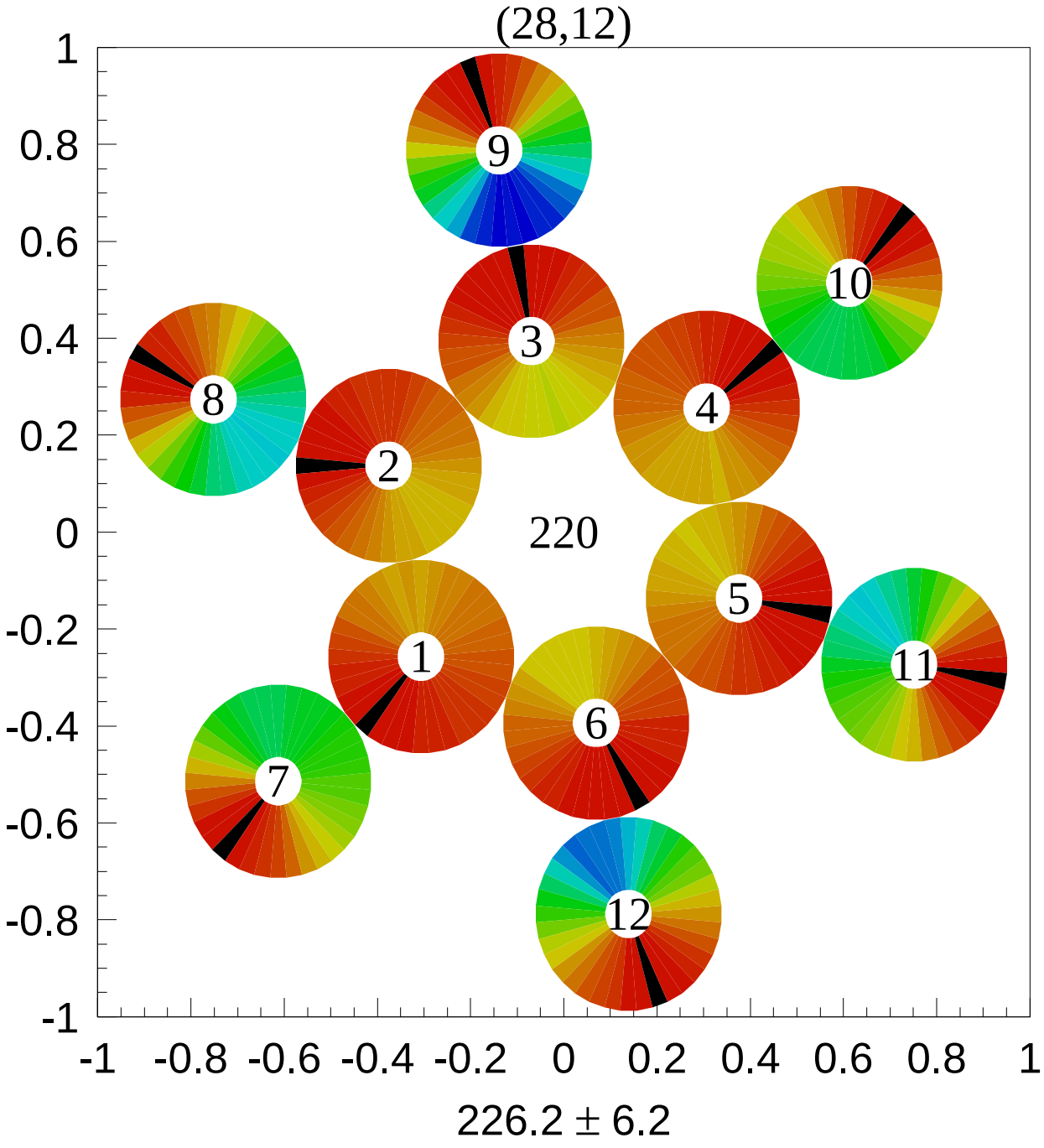

(28,10)
tilted LEDs
122 115 119 129 113 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 127 122 118 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

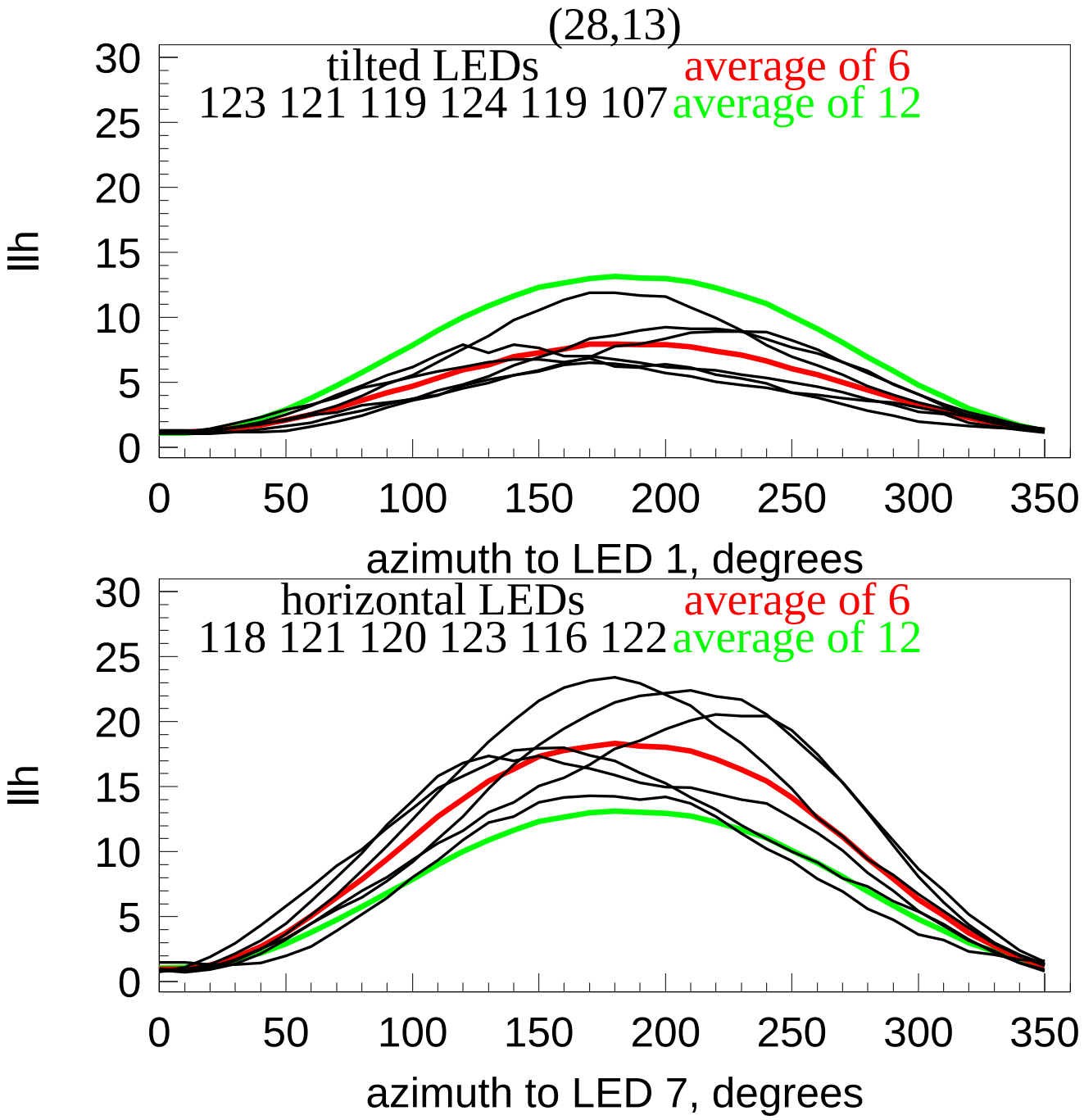

(28,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
7
6
11
1
5
40
2
8
4
3
10
9
38.8 ± 4.8

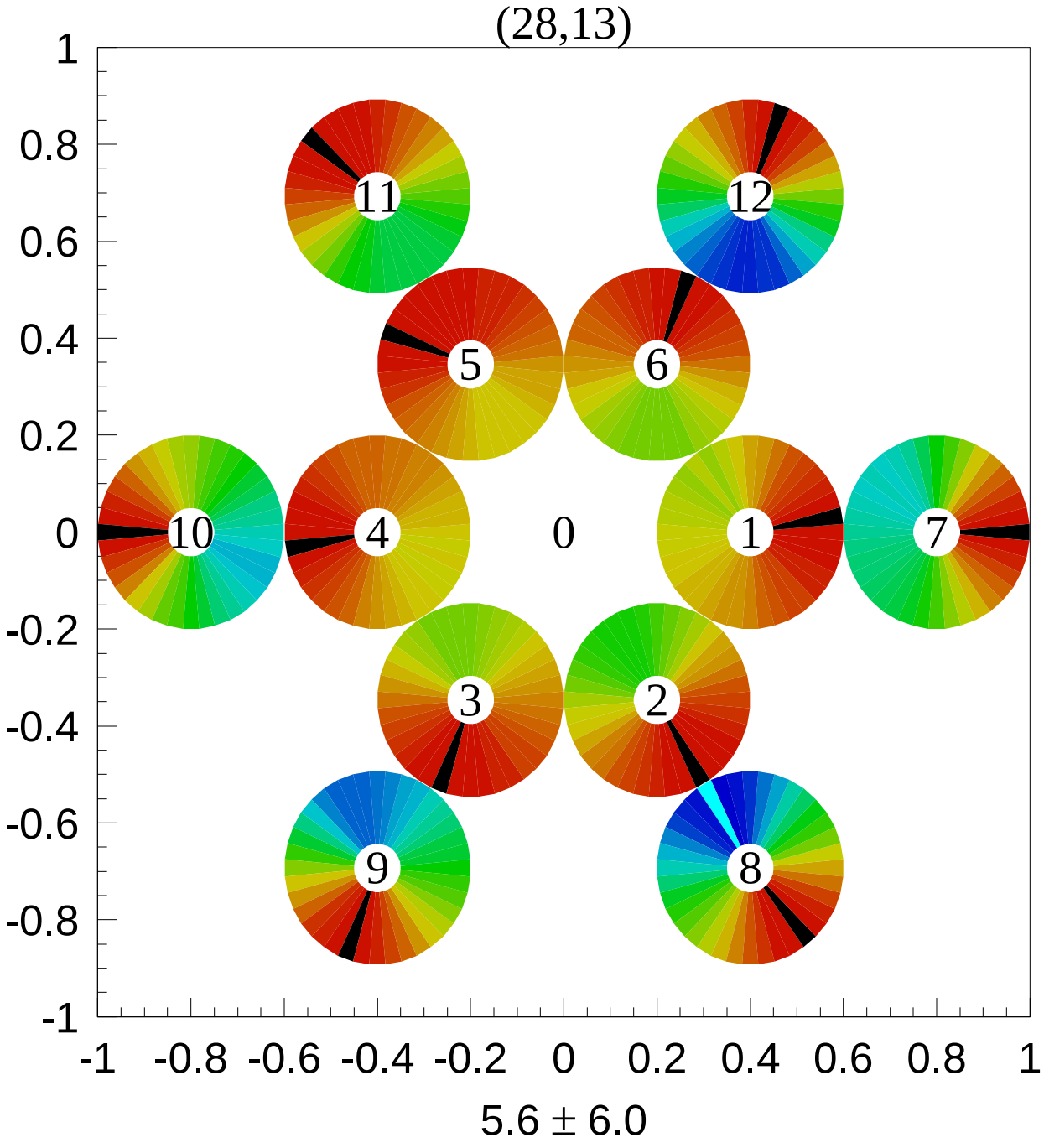

(28,11)
tilted LEDs
119 124 126 115 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
132 122 119 124 114 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

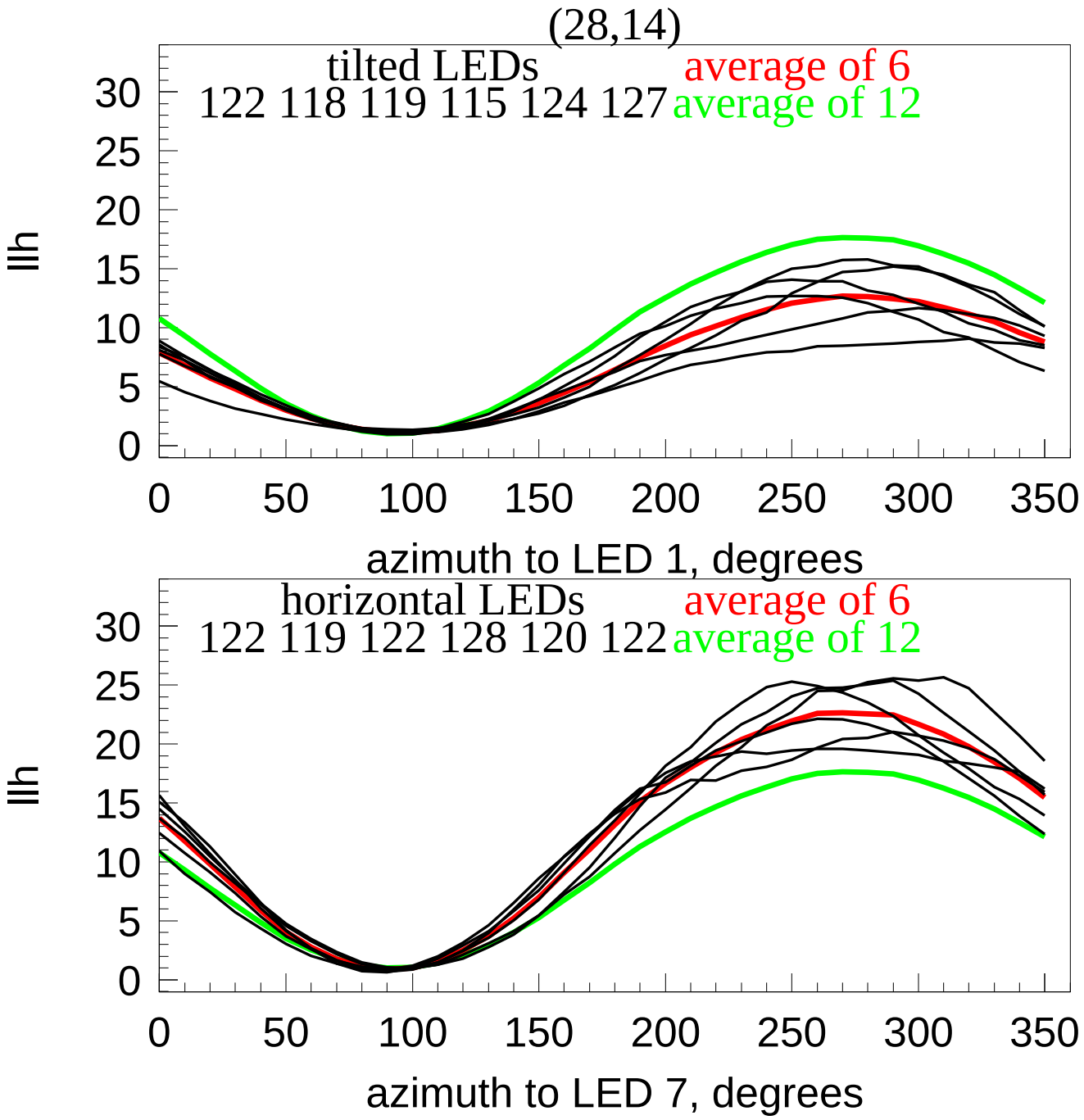

(28,11)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
329.7 ± 6.1

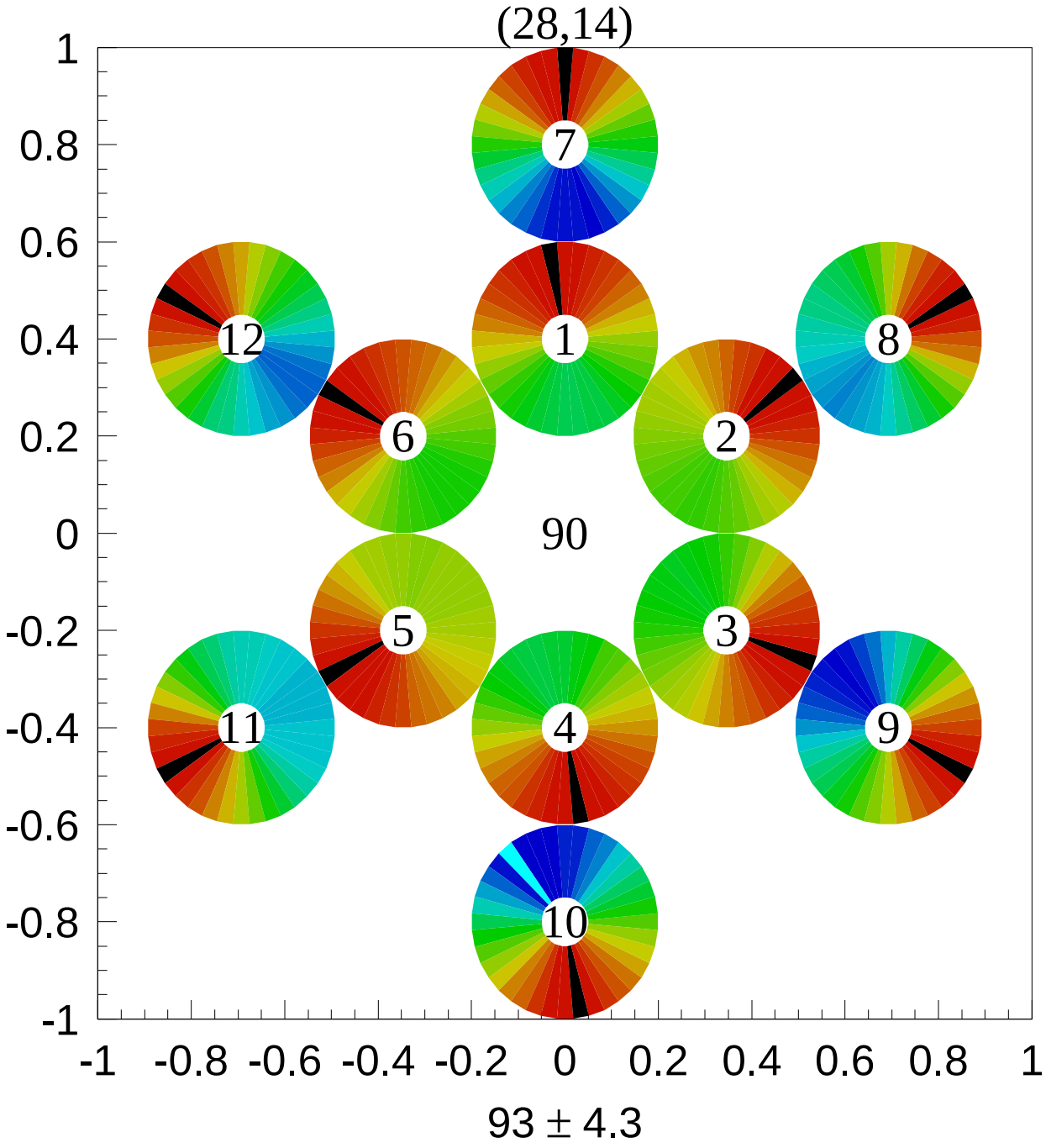

(28,12)
tilted LEDs
120 125 123 121 127 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 120 120 125 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

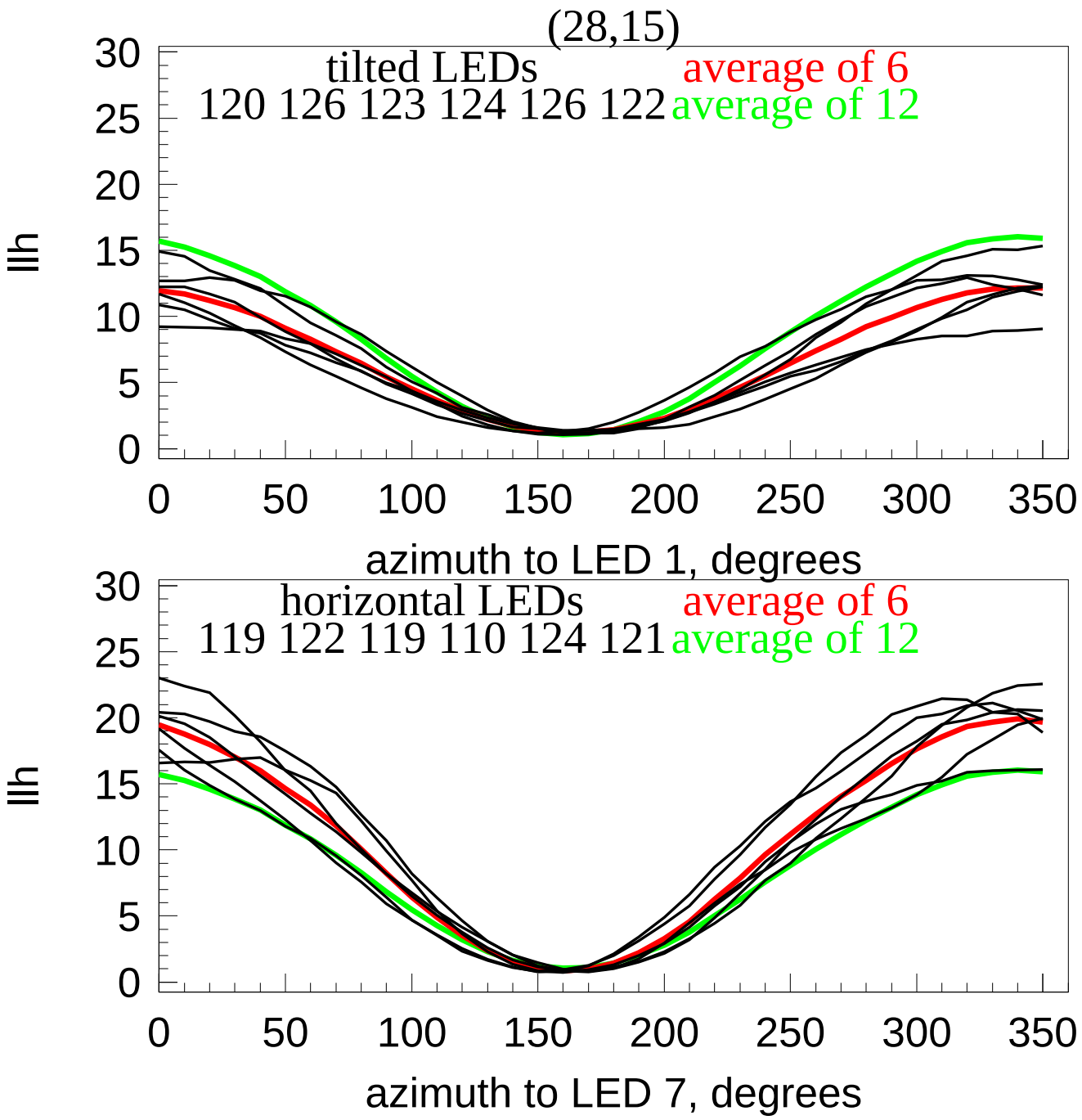

(28,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
226.2 ± 6.2

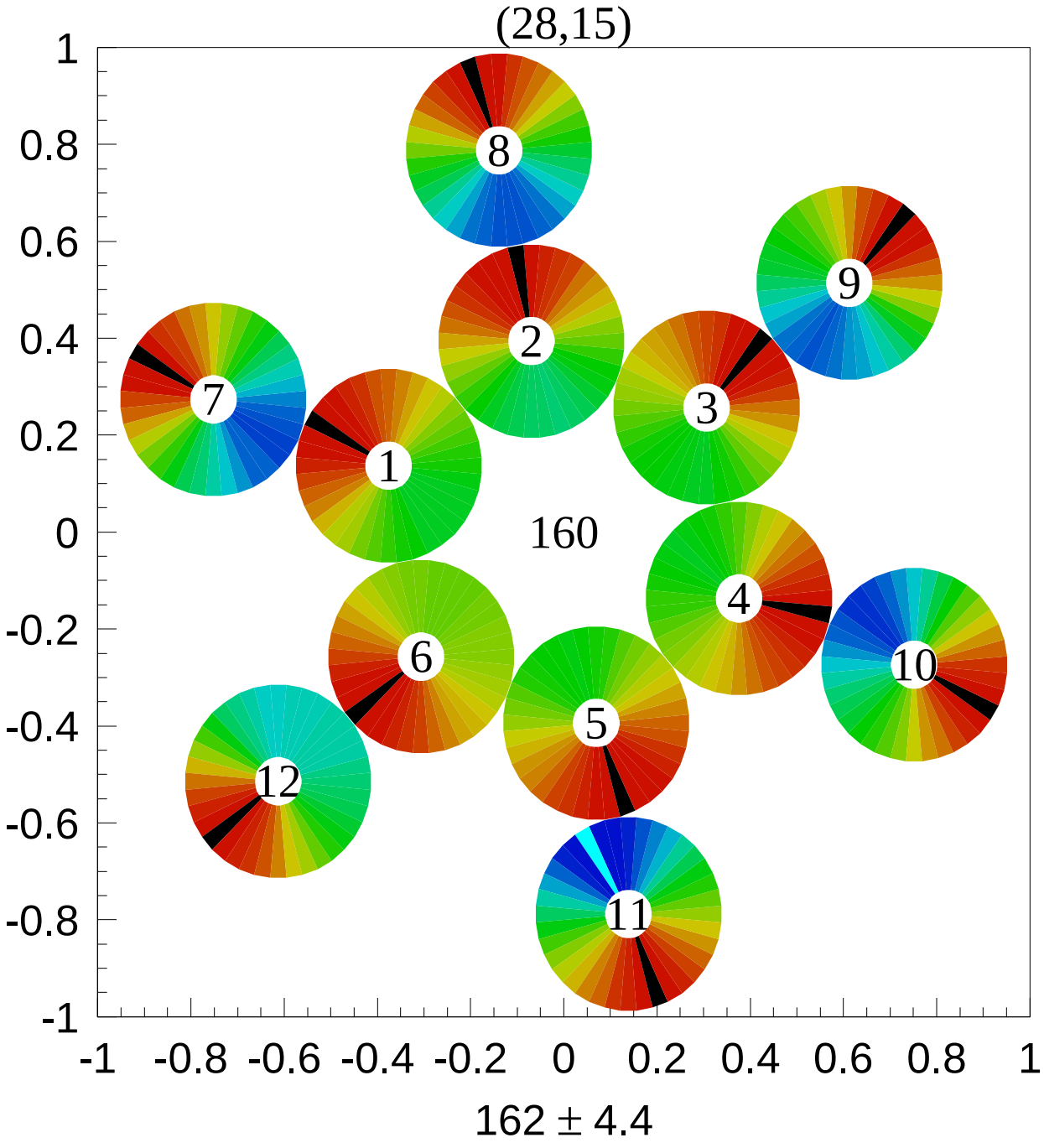

(28,13)
tilted LEDs
123 121 119 124 119 107
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 120 123 116 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

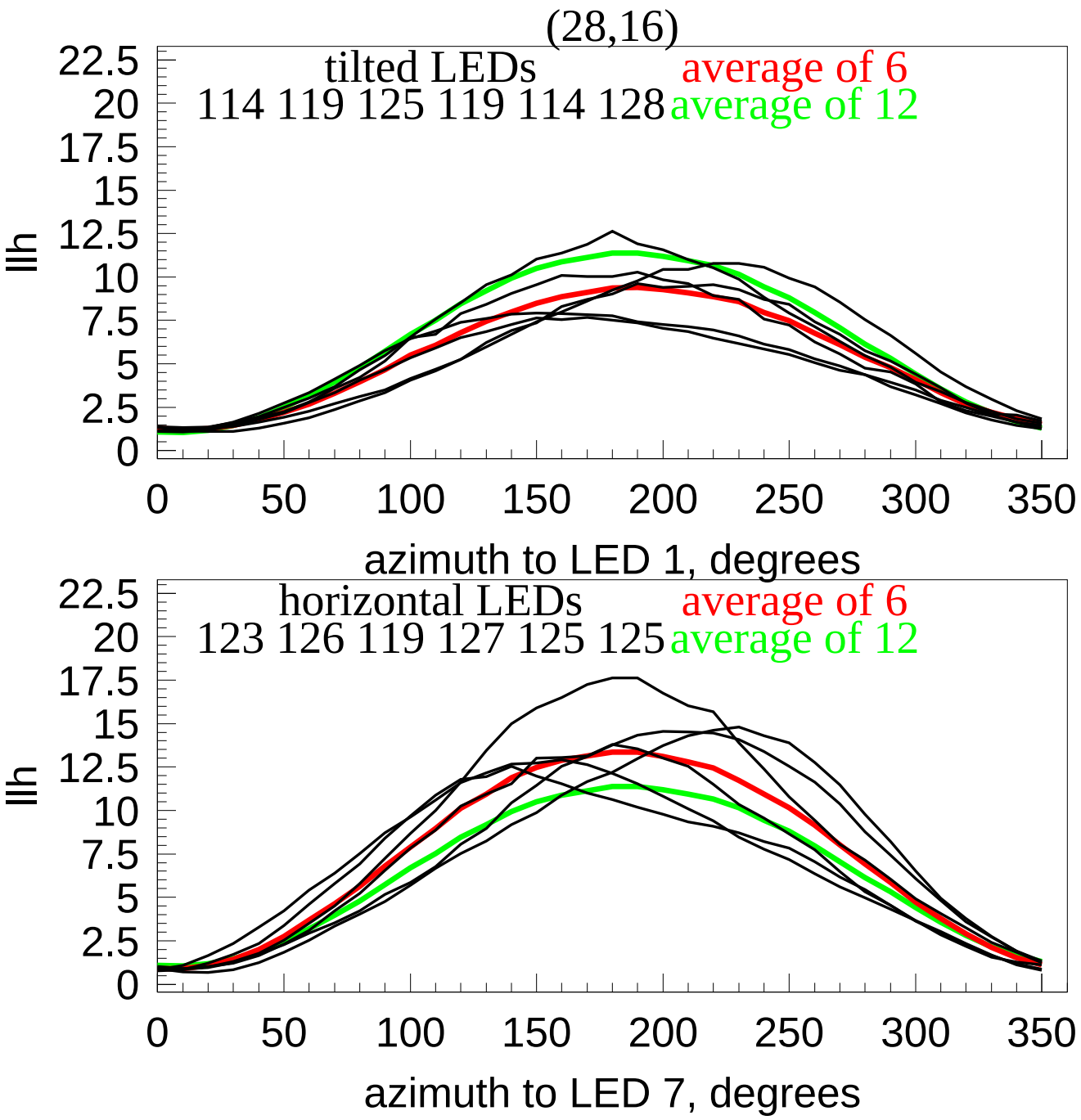

(28,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
5.6 ± 6.0

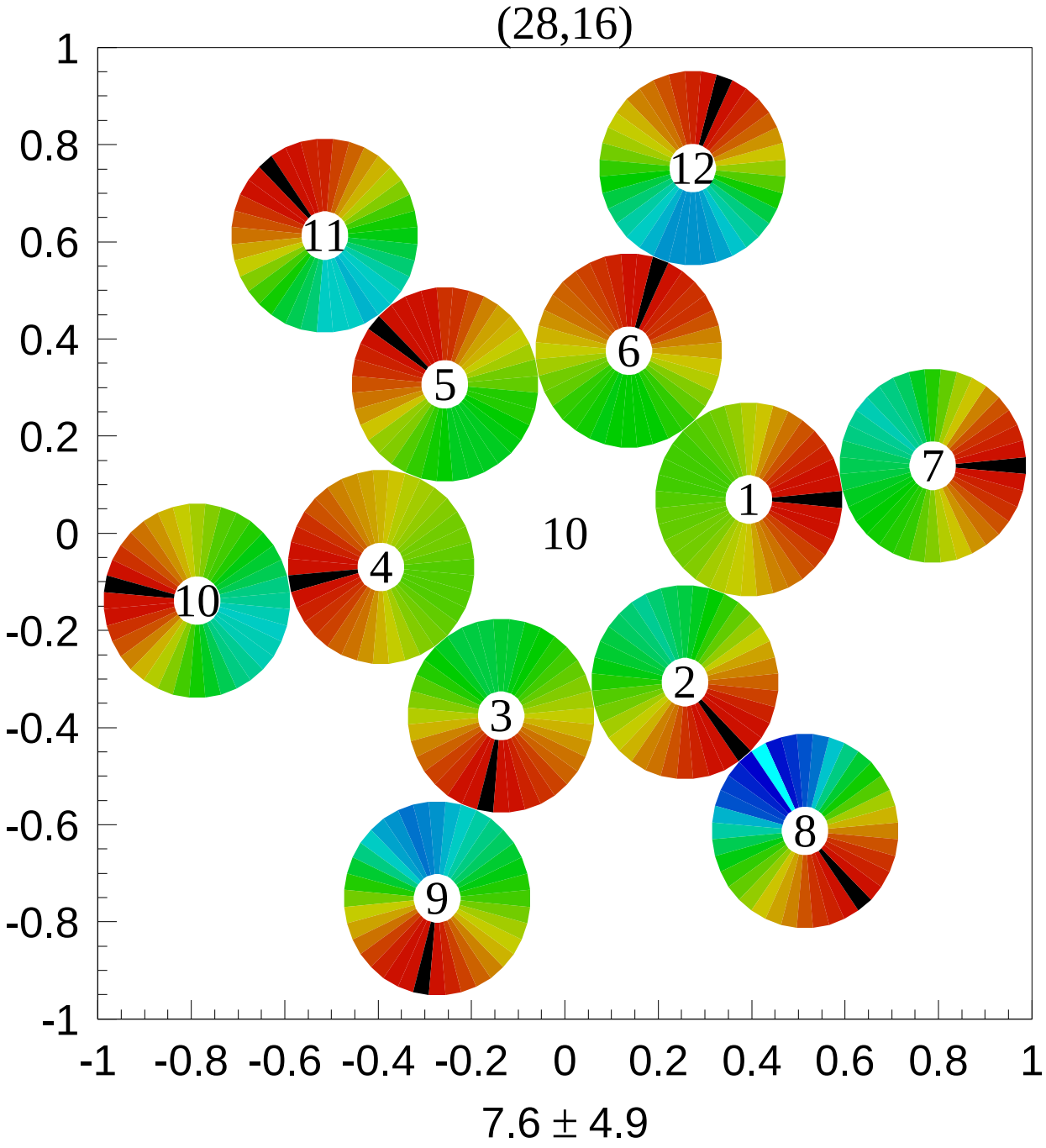

(28,14)
tilted LEDs
122 118 119 115 124 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 122 128 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

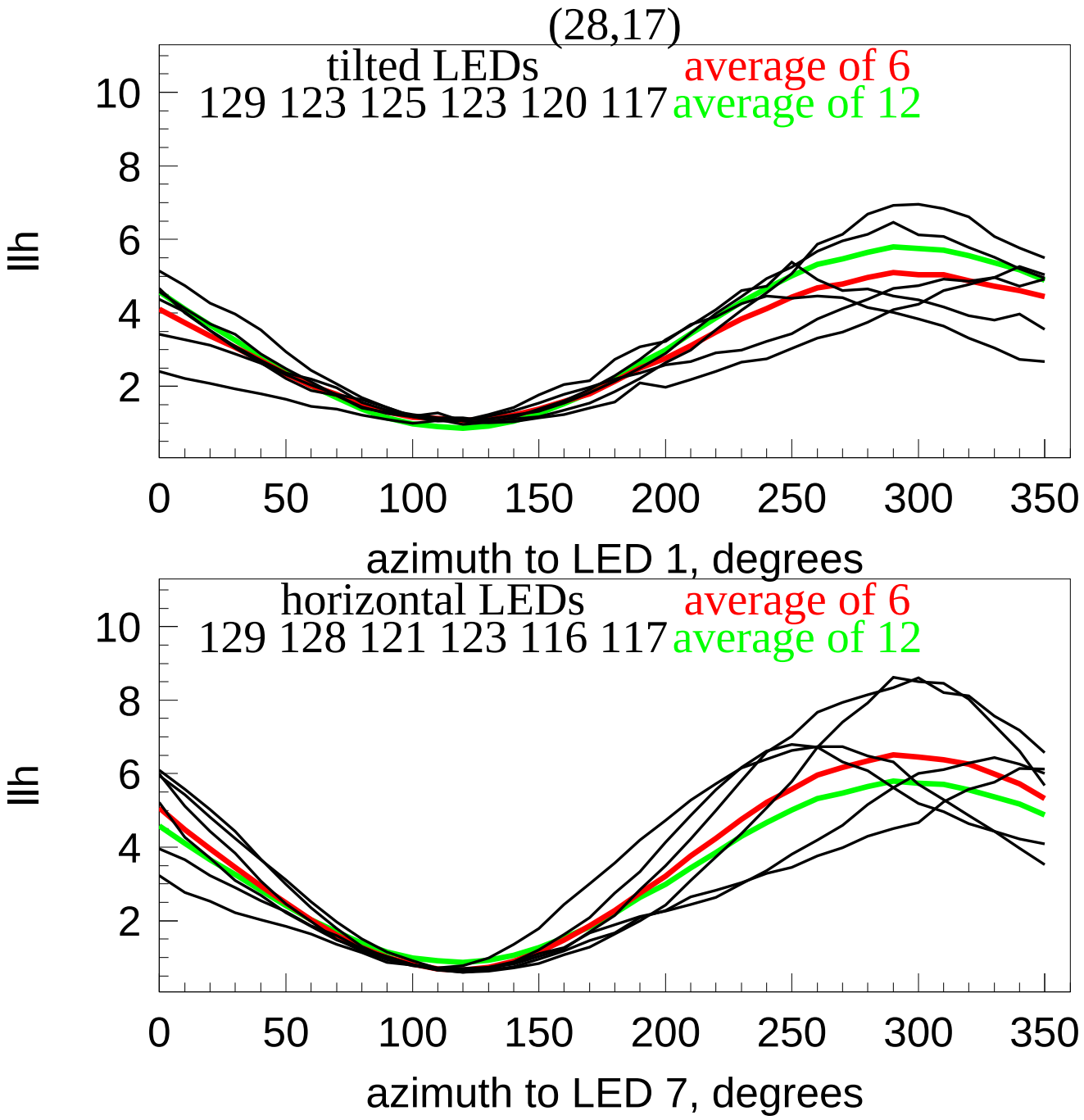

(28,14)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
93 ± 4.3

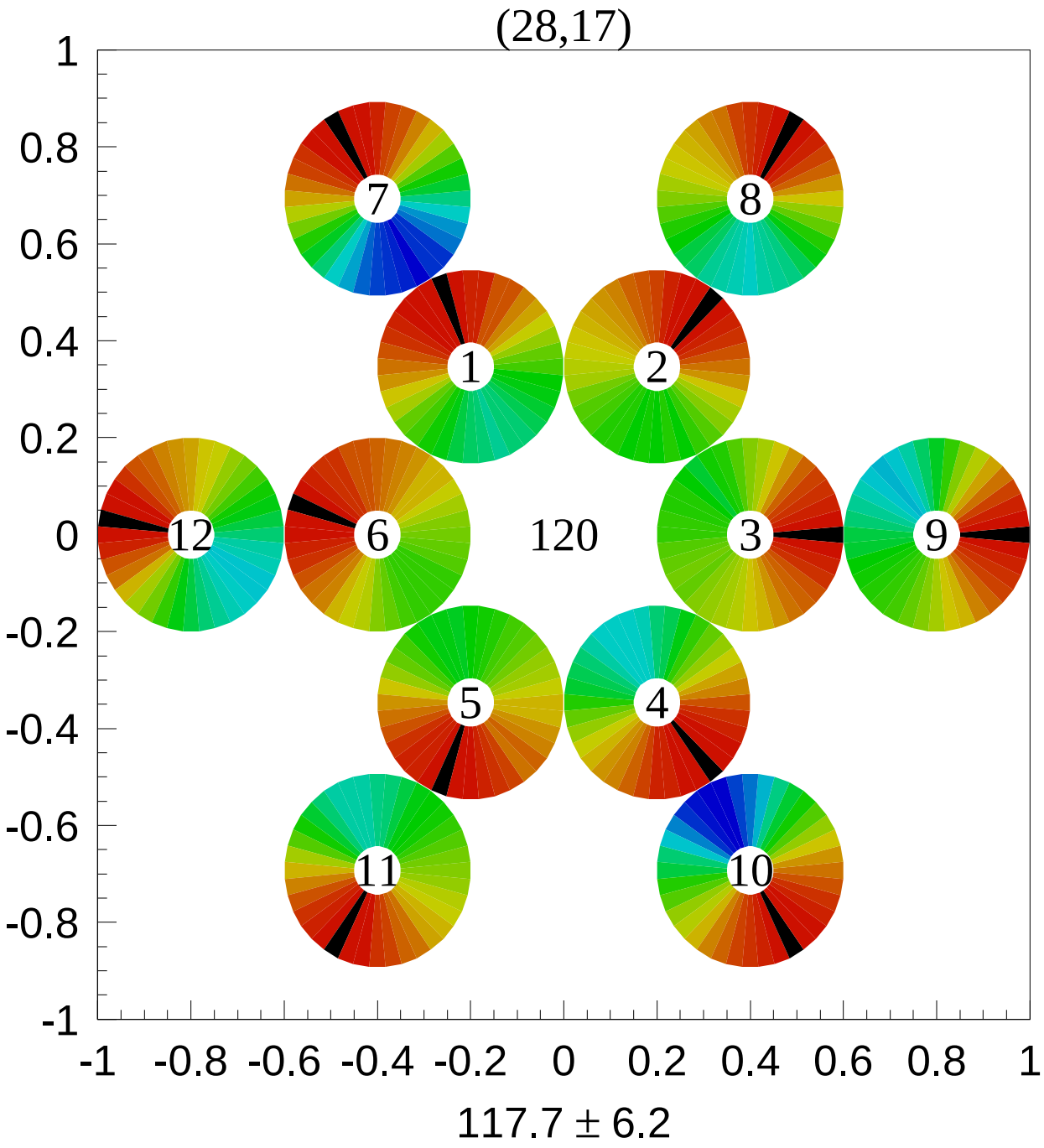

(28,15)
tilted LEDs
120 126 123 124 126 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 119 110 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

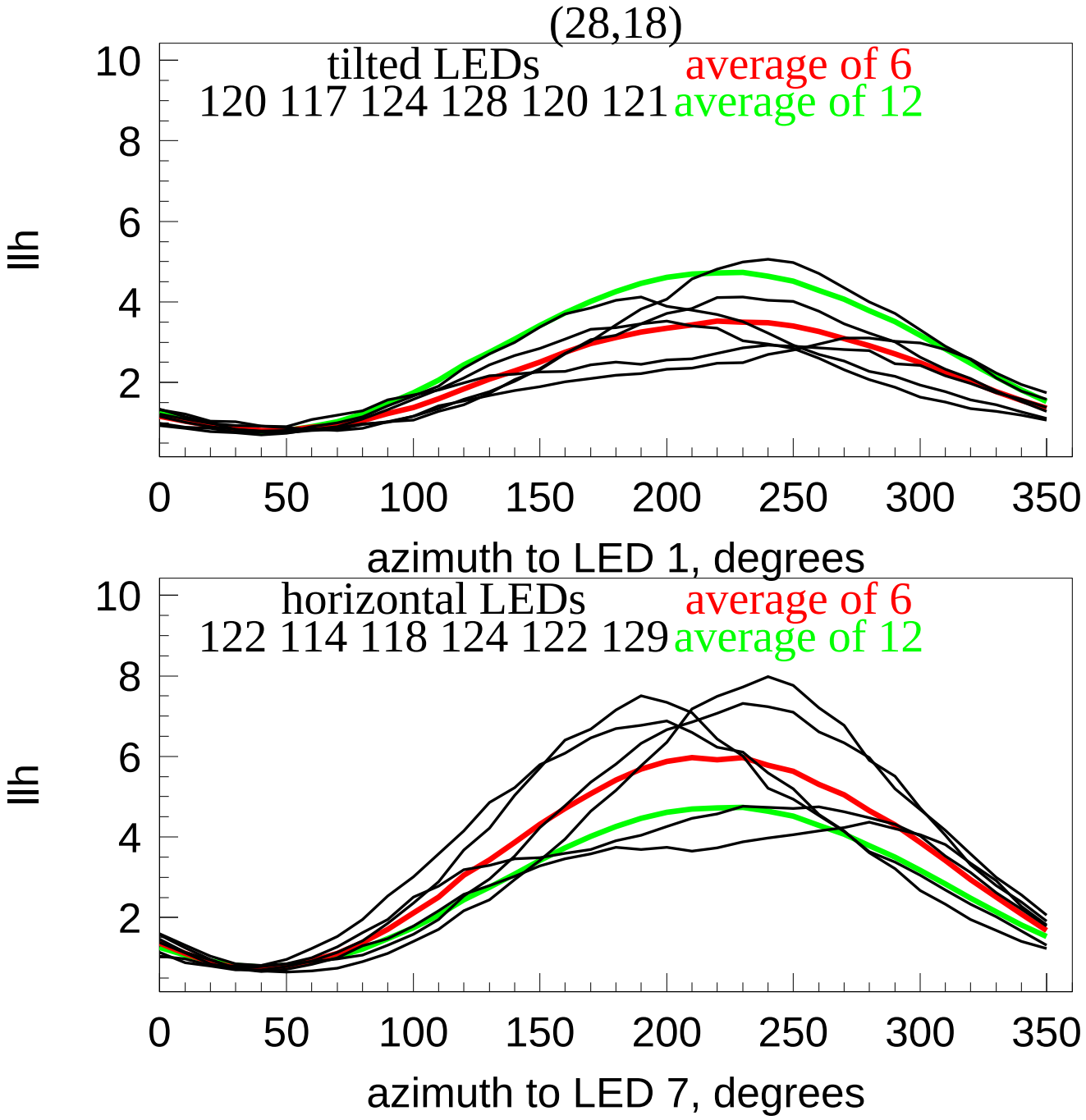

(28,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
10
6
5
12
11
162 ± 4.4

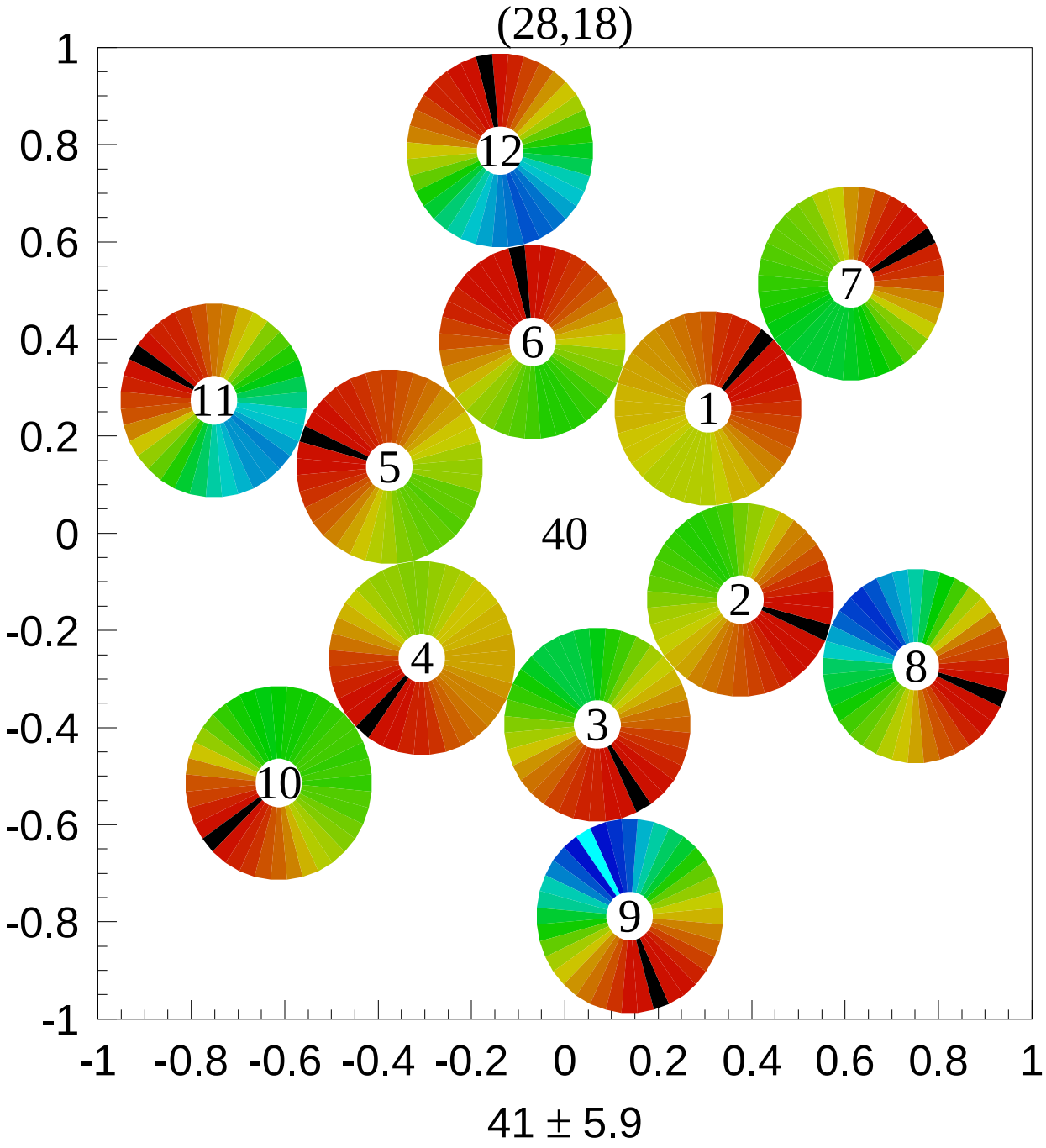

(28,16)
tilted LEDs
114 119 125 119 114 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 126 119 127 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

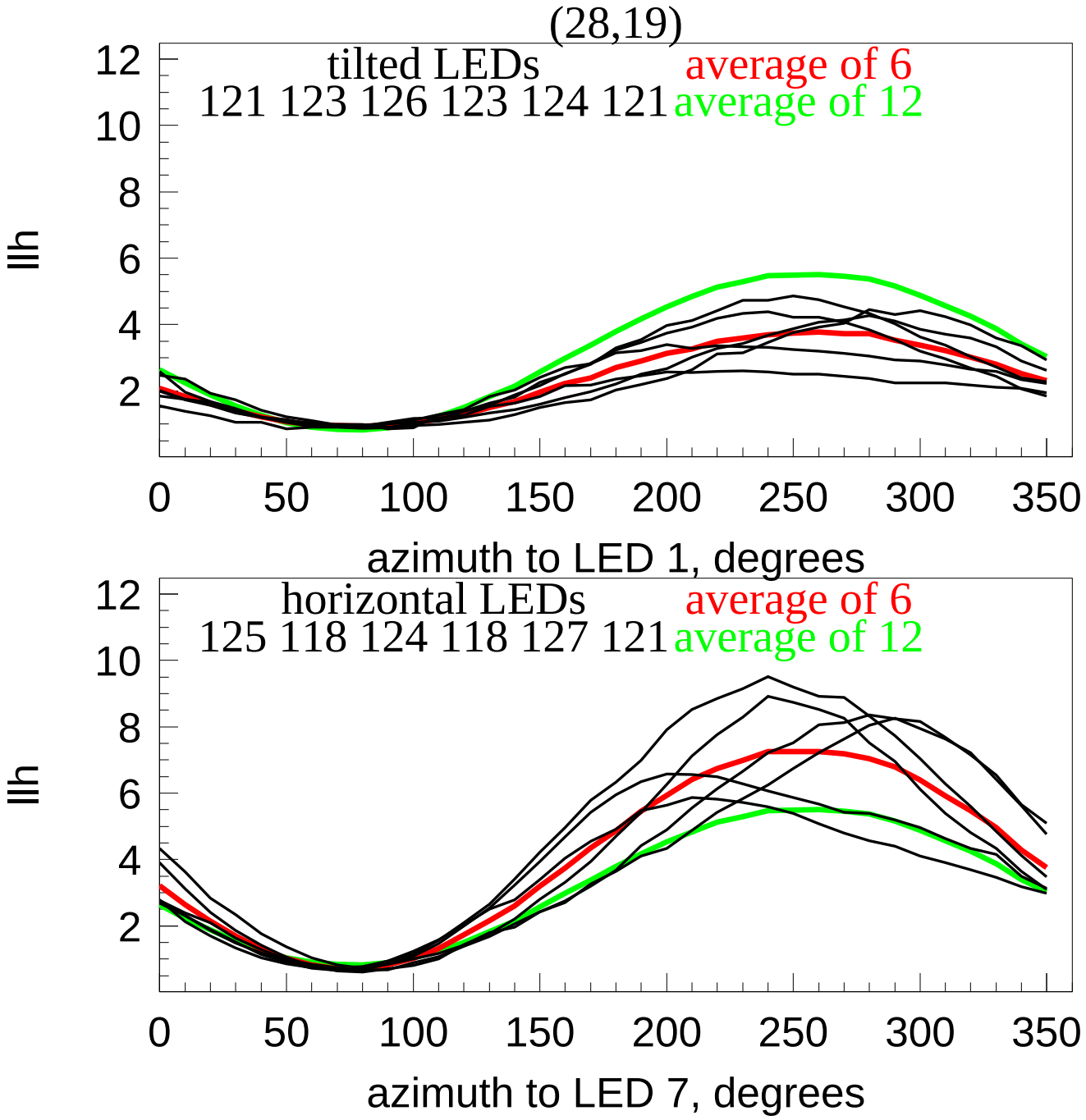

(28,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
7.6 ± 4.9

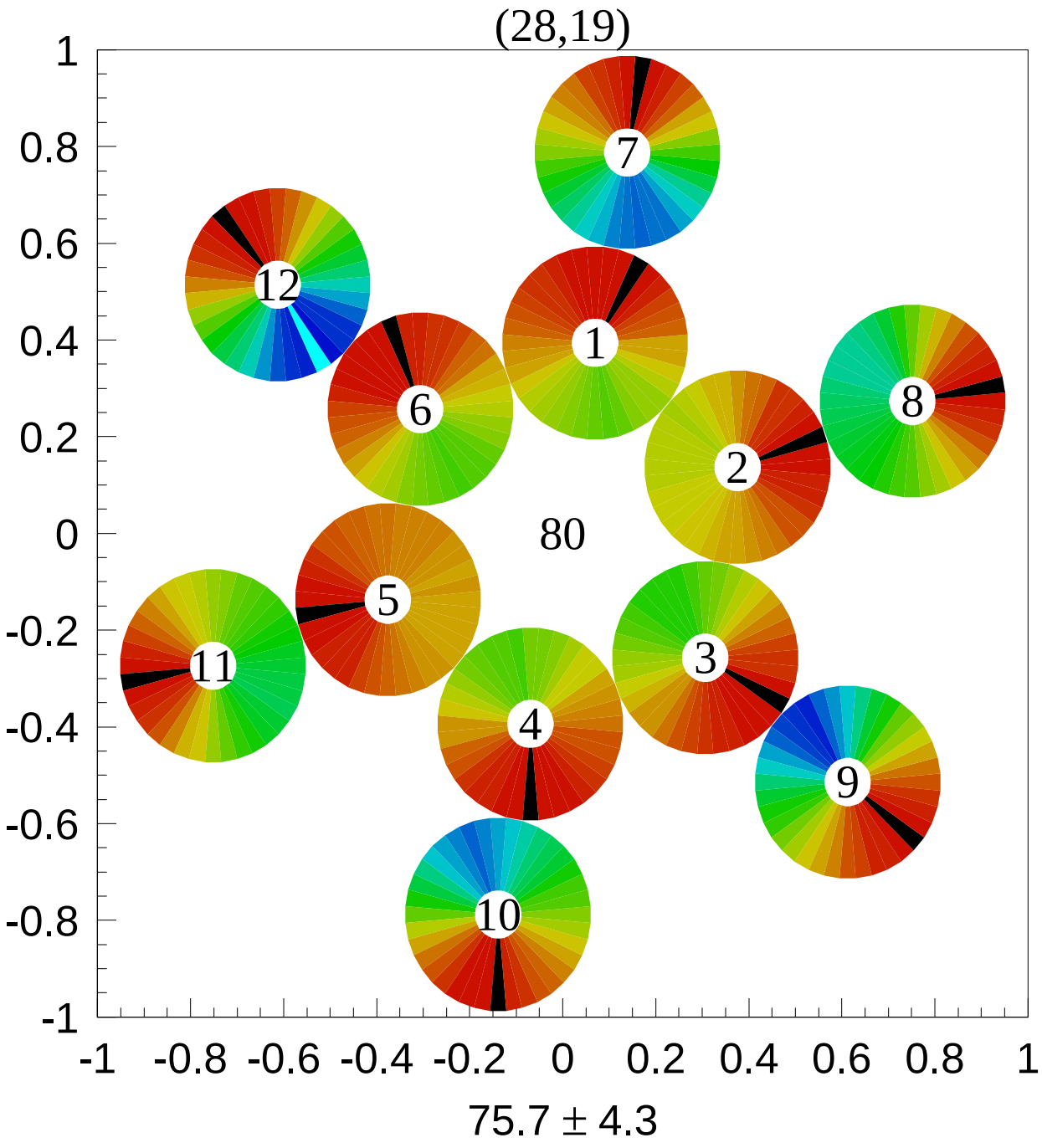

(28,17)
tilted LEDs
129 123 125 123 120 117
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
129 128 121 123 116 117
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

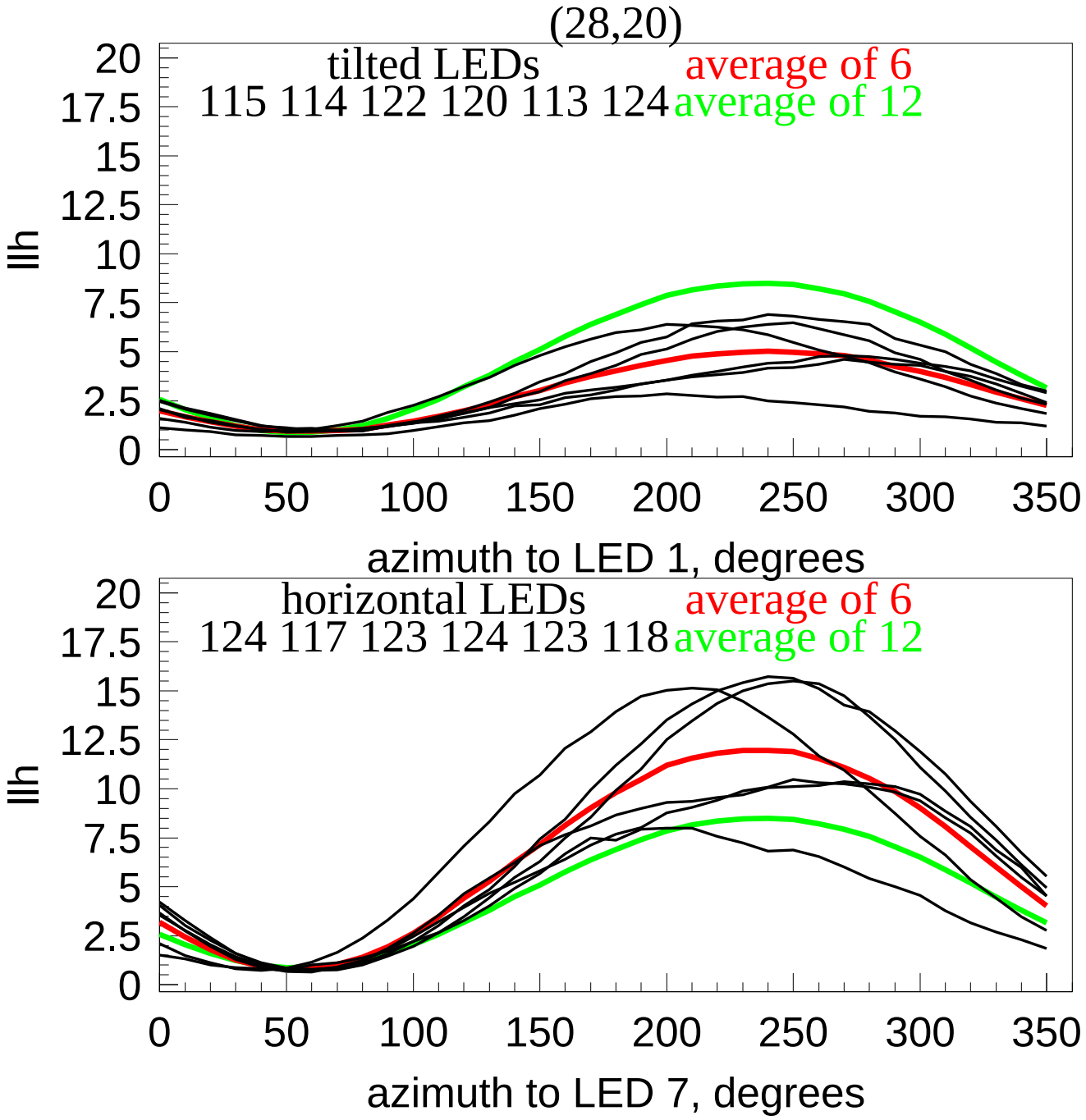

(28,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
117.7 ± 6.2

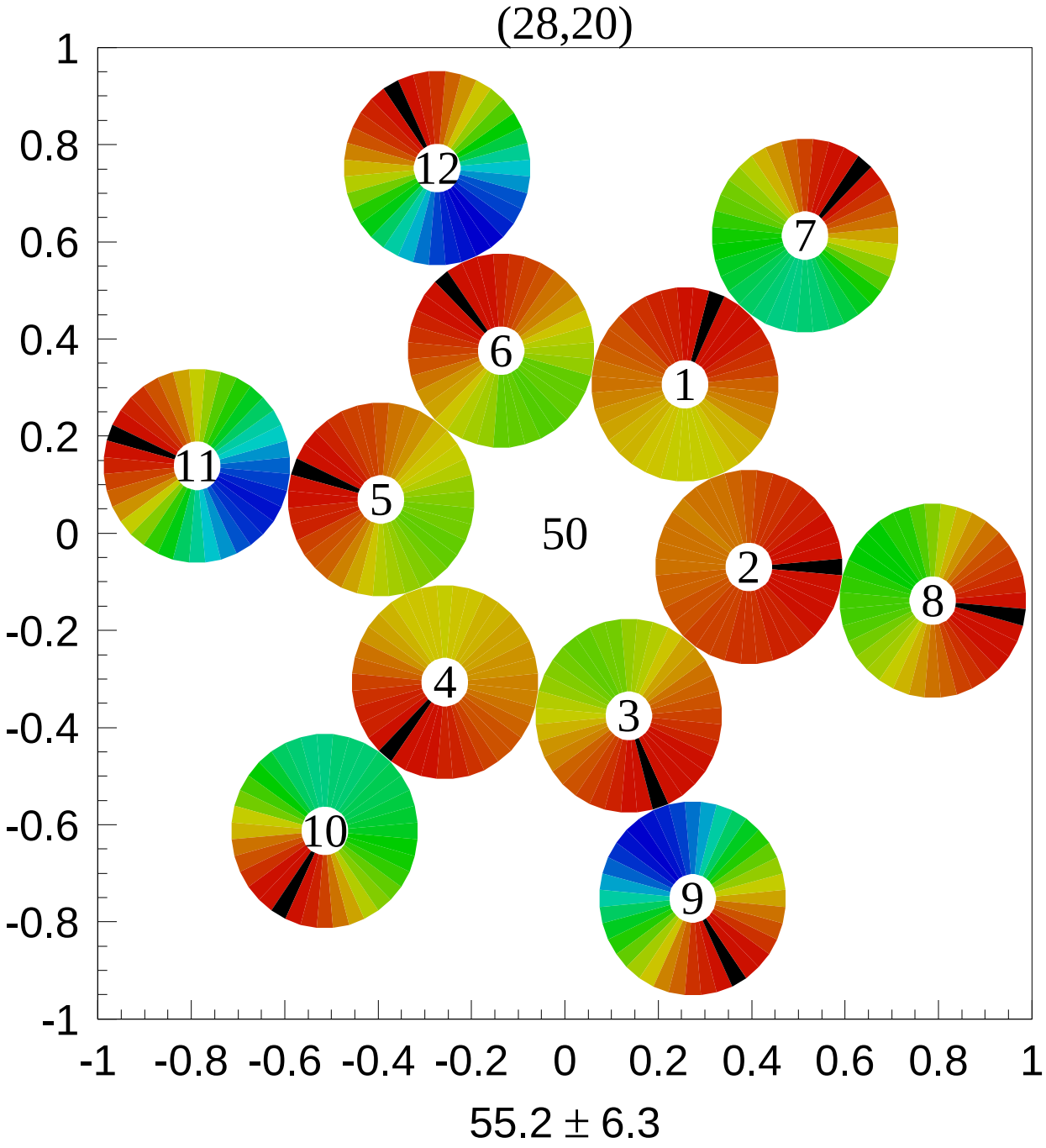

(28,18)
tilted LEDs
120 117 124 128 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 114 118 124 122 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

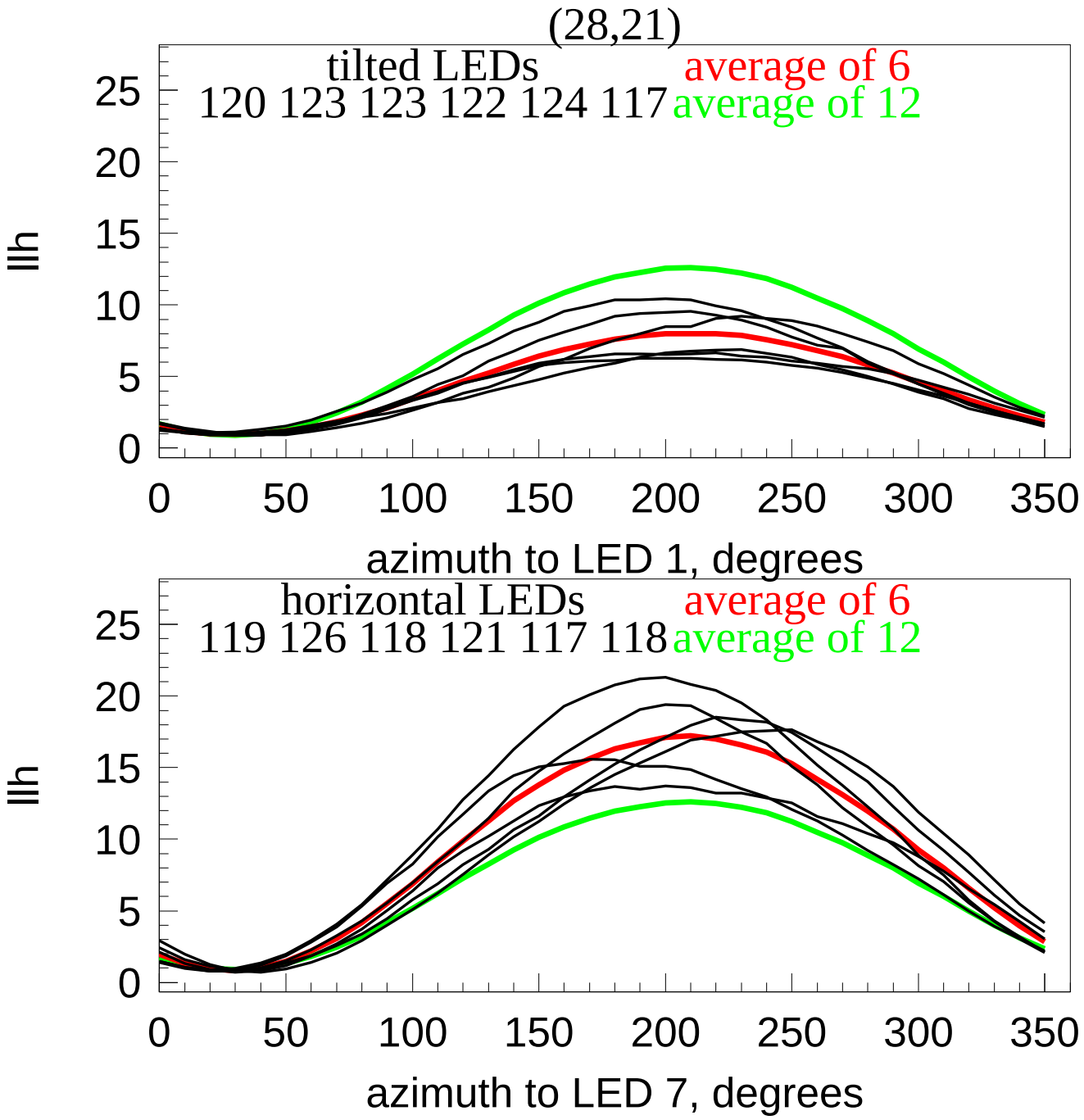

(28,18)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
41 ± 5.9

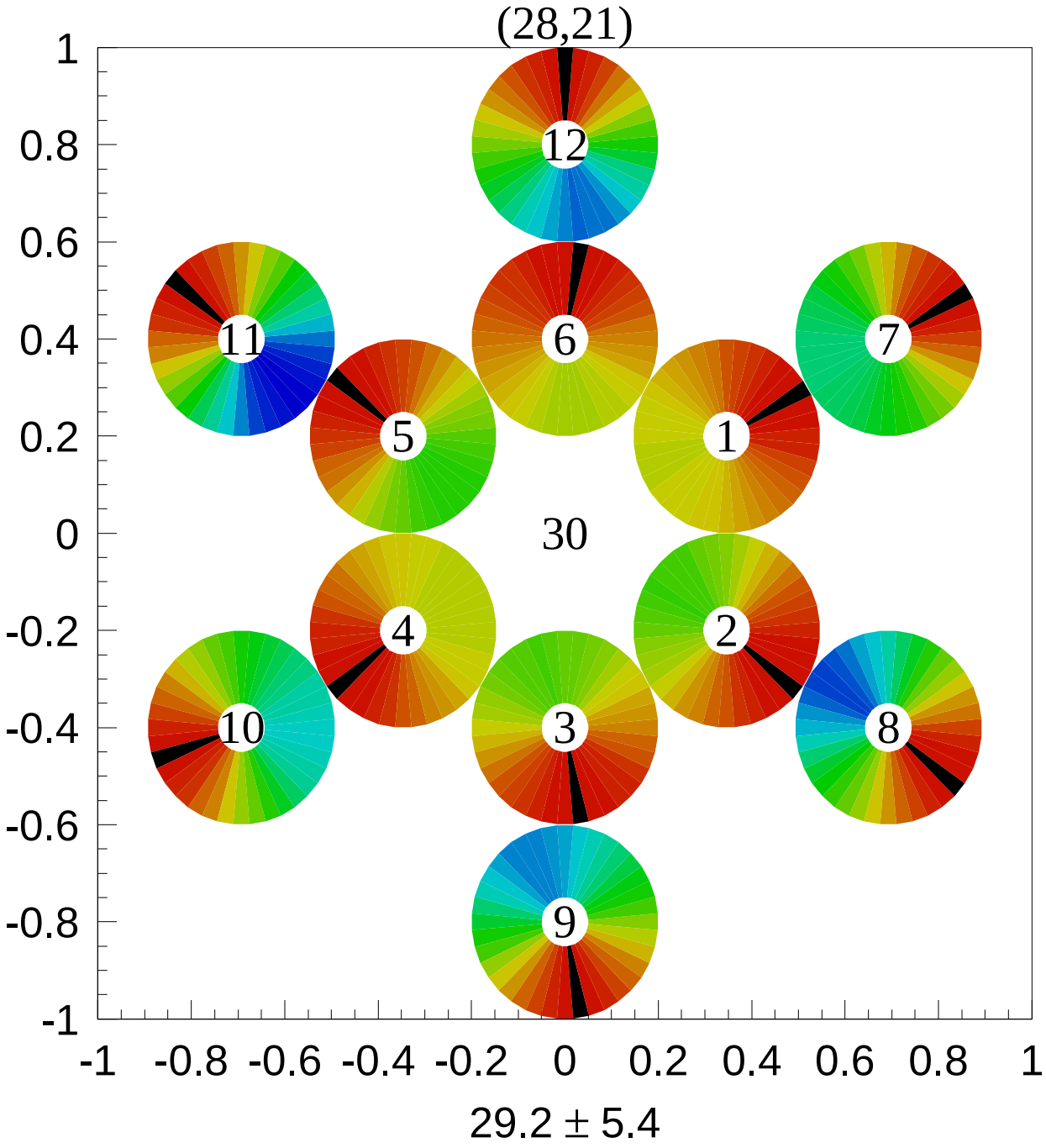

(28,19)
tilted LEDs
121 123 126 123 124 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 118 124 118 127 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

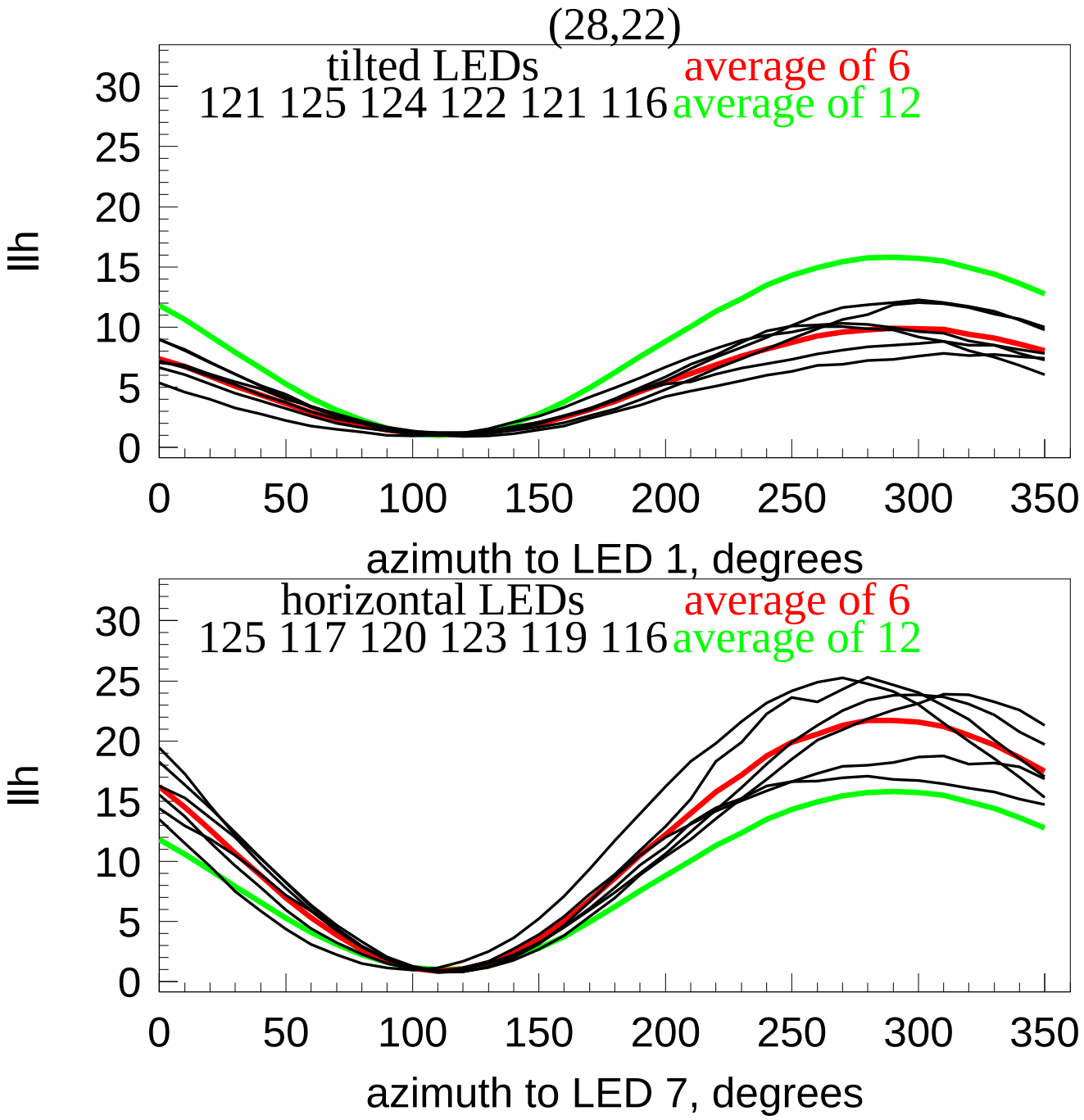

(28,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
75.7 ± 4.3

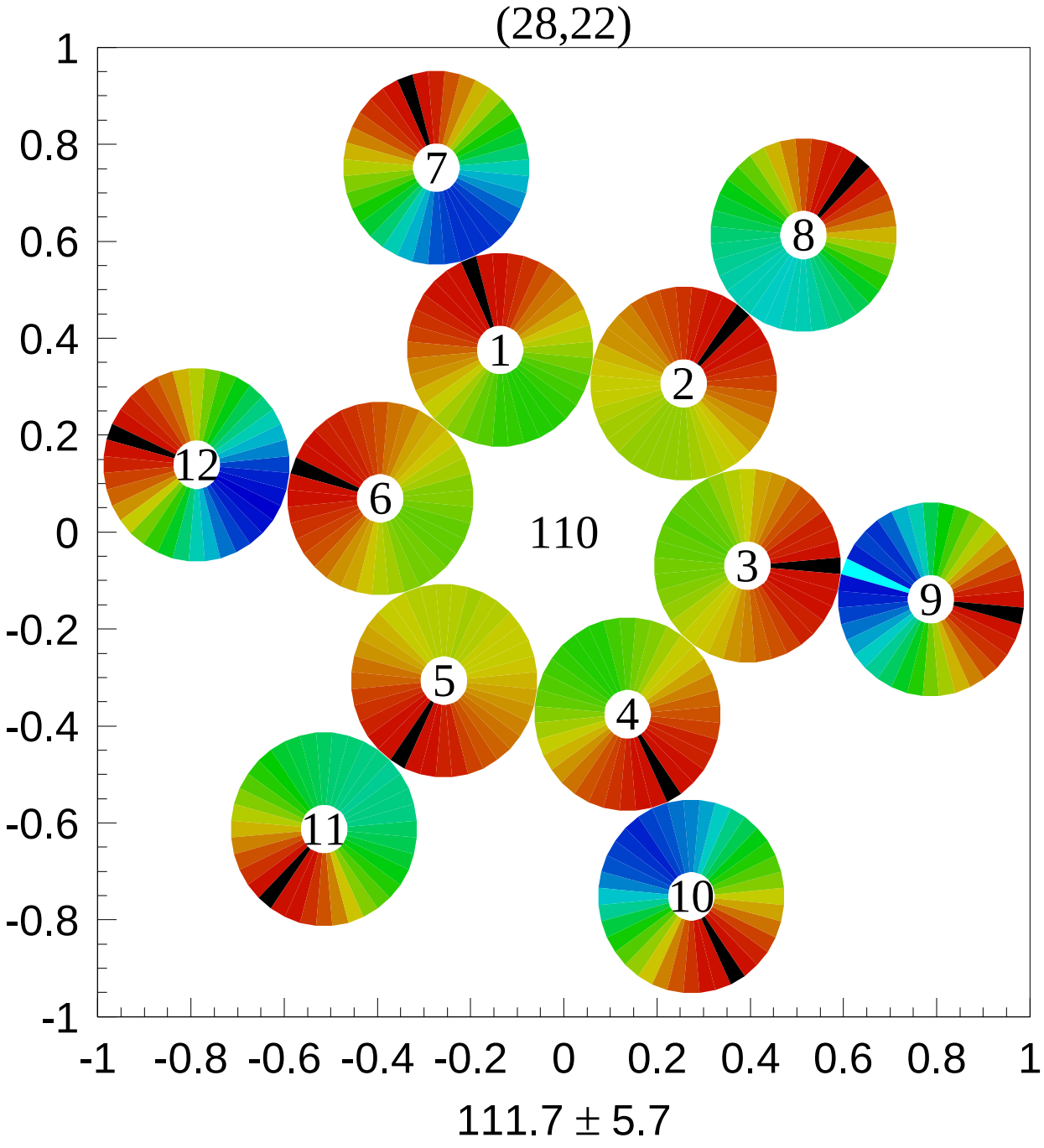

(28,20)
tilted LEDs
115 114 122 120 113 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 117 123 124 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

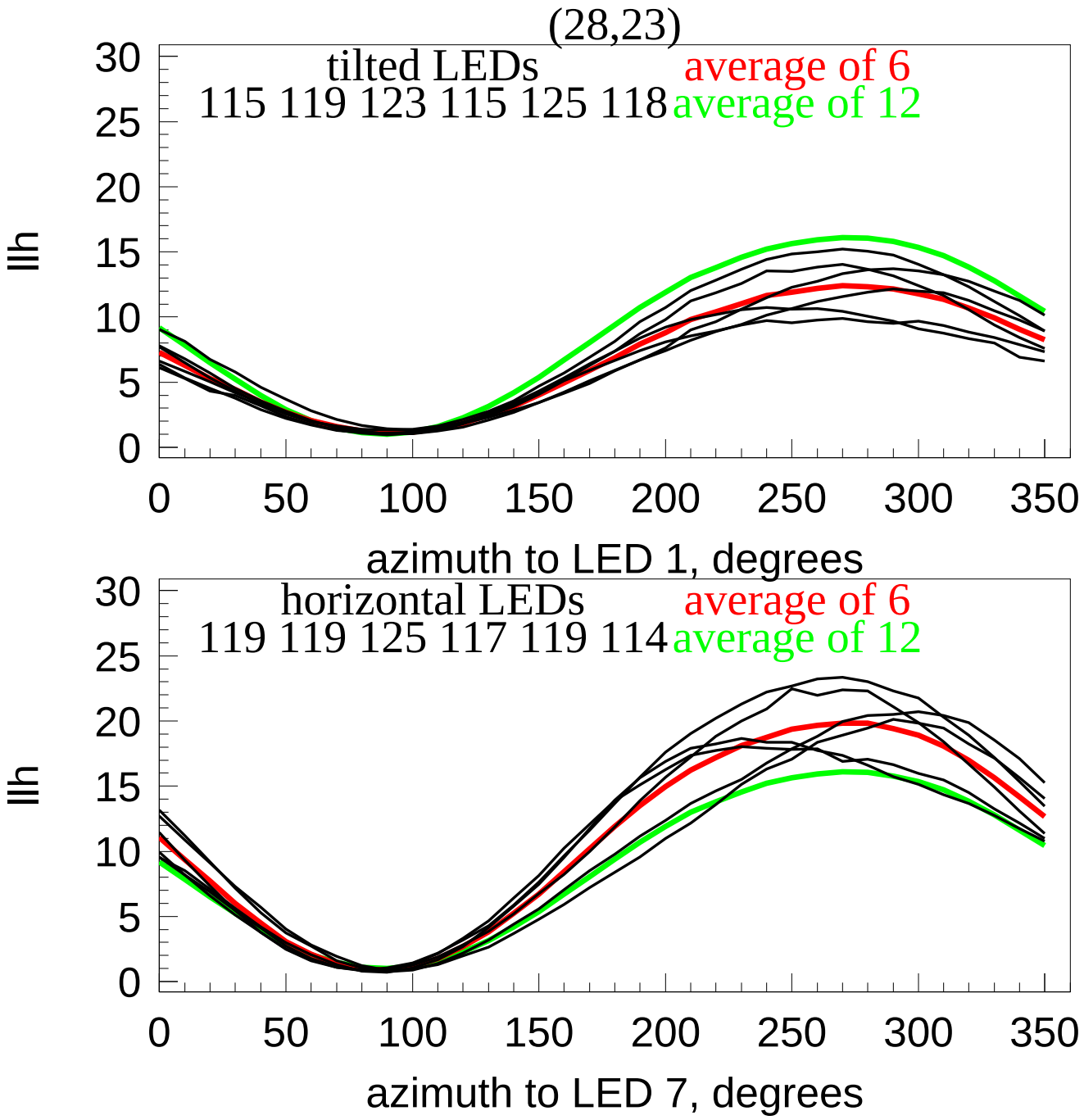

(28,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
55.2 ± 6.3

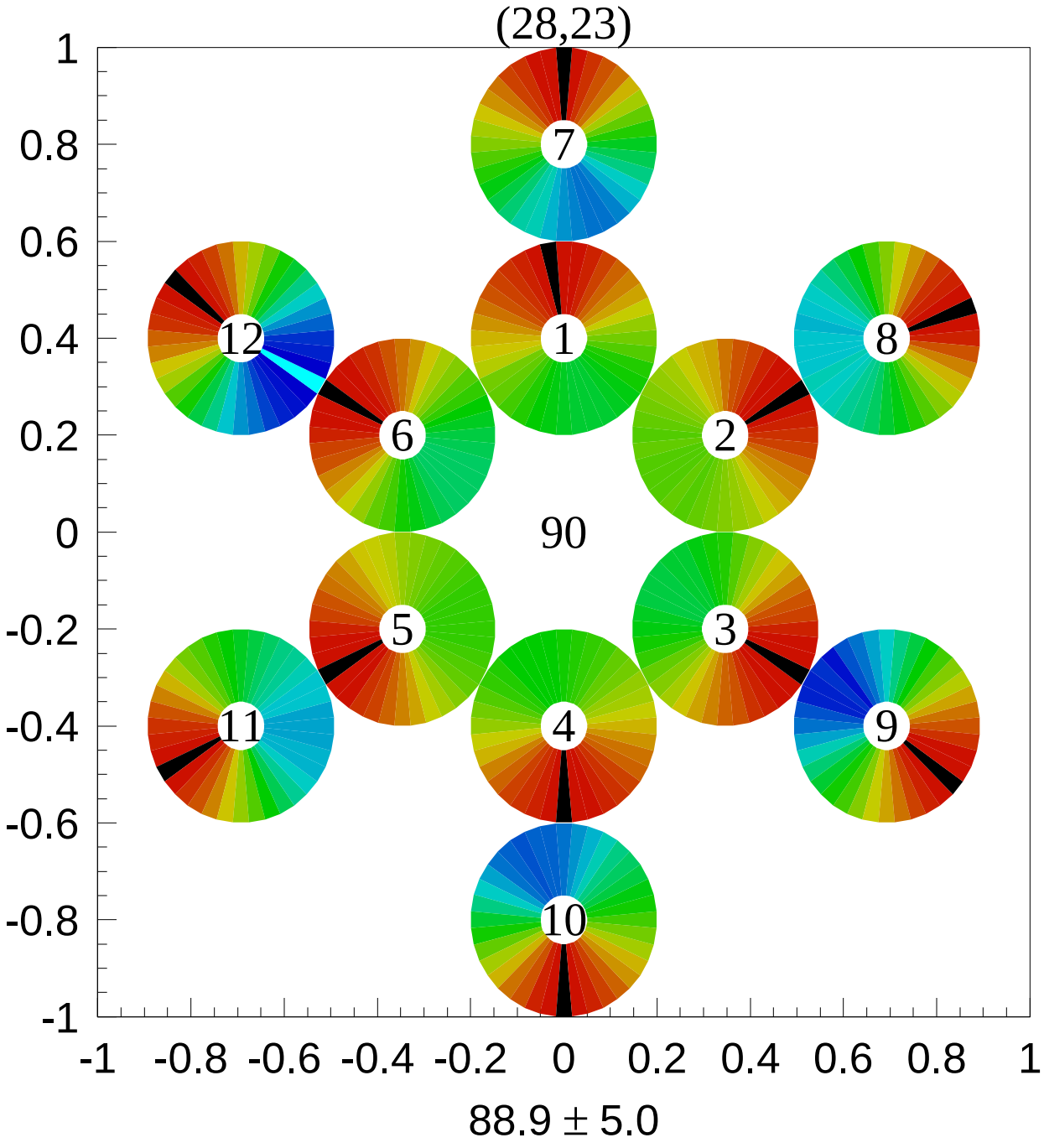

(28,21)
tilted LEDs
120 123 123 122 124 117
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 126 118 121 117 118
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

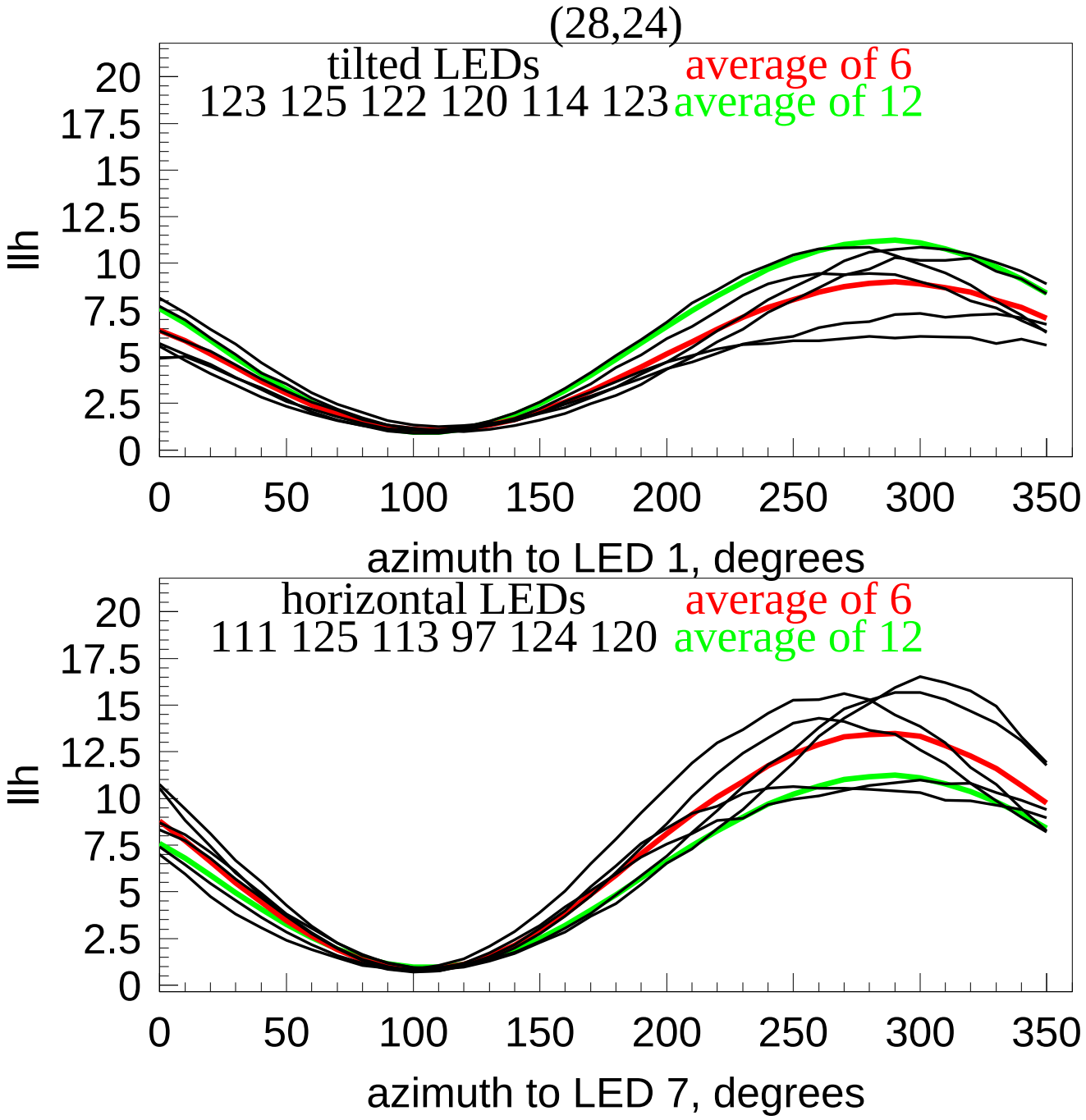

(28,21)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
29.2 ± 5.4

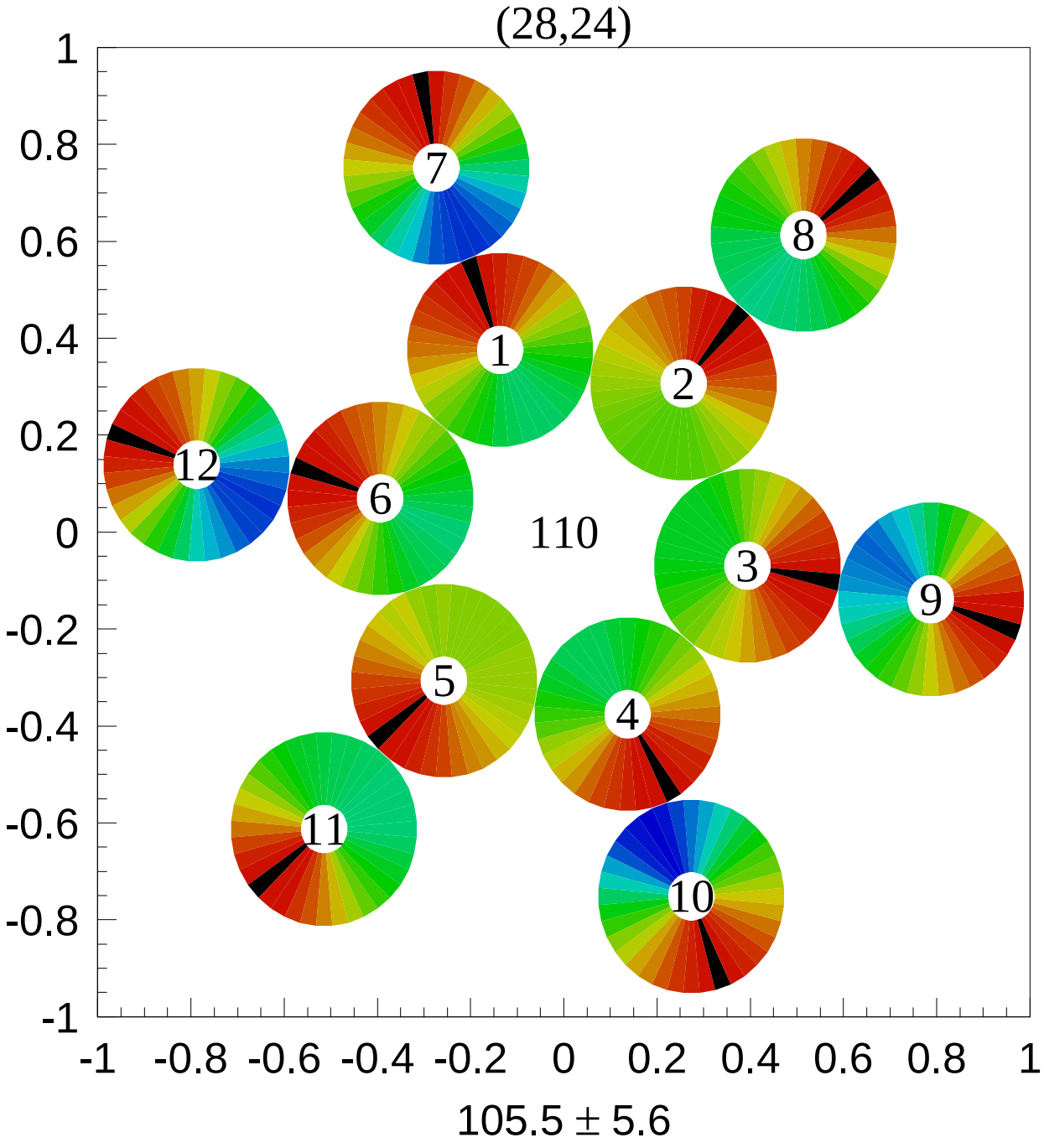

(28,22)
tilted LEDs
121 125 124 122 121 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 117 120 123 119 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

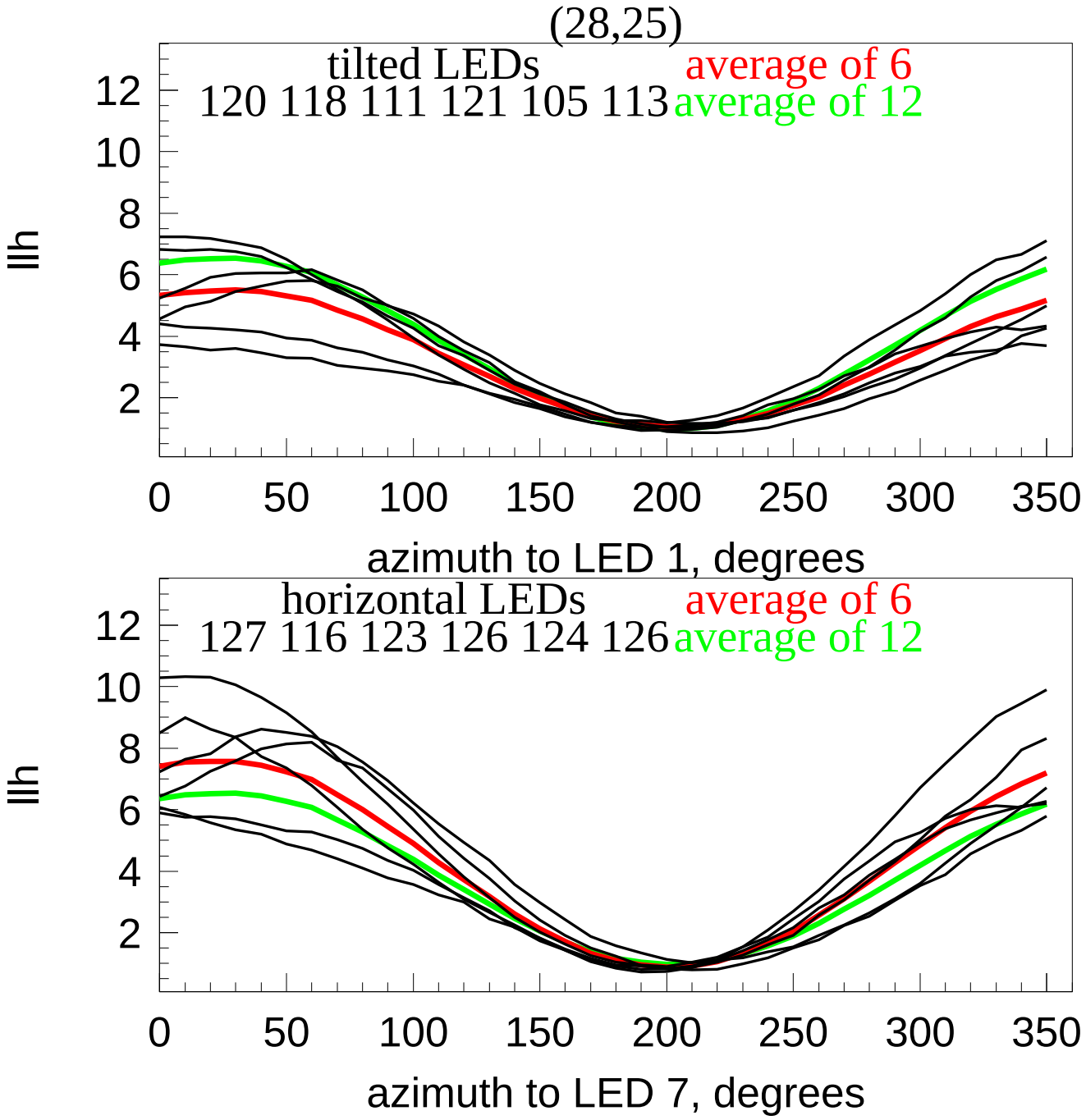

(28,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
111.7 ± 5.7

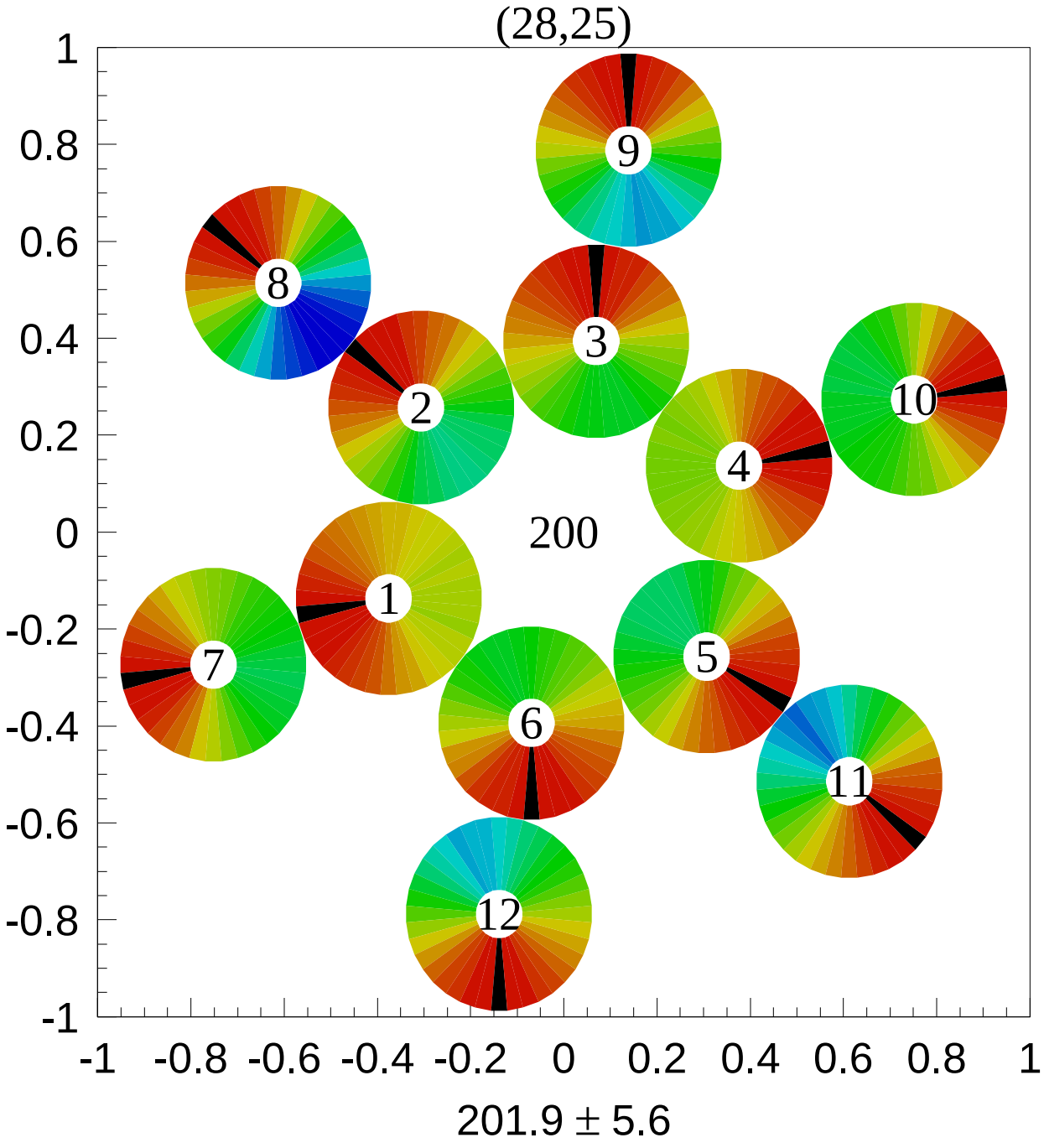

(28,23)
tilted LEDs
115 119 123 115 125 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 119 125 117 119 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

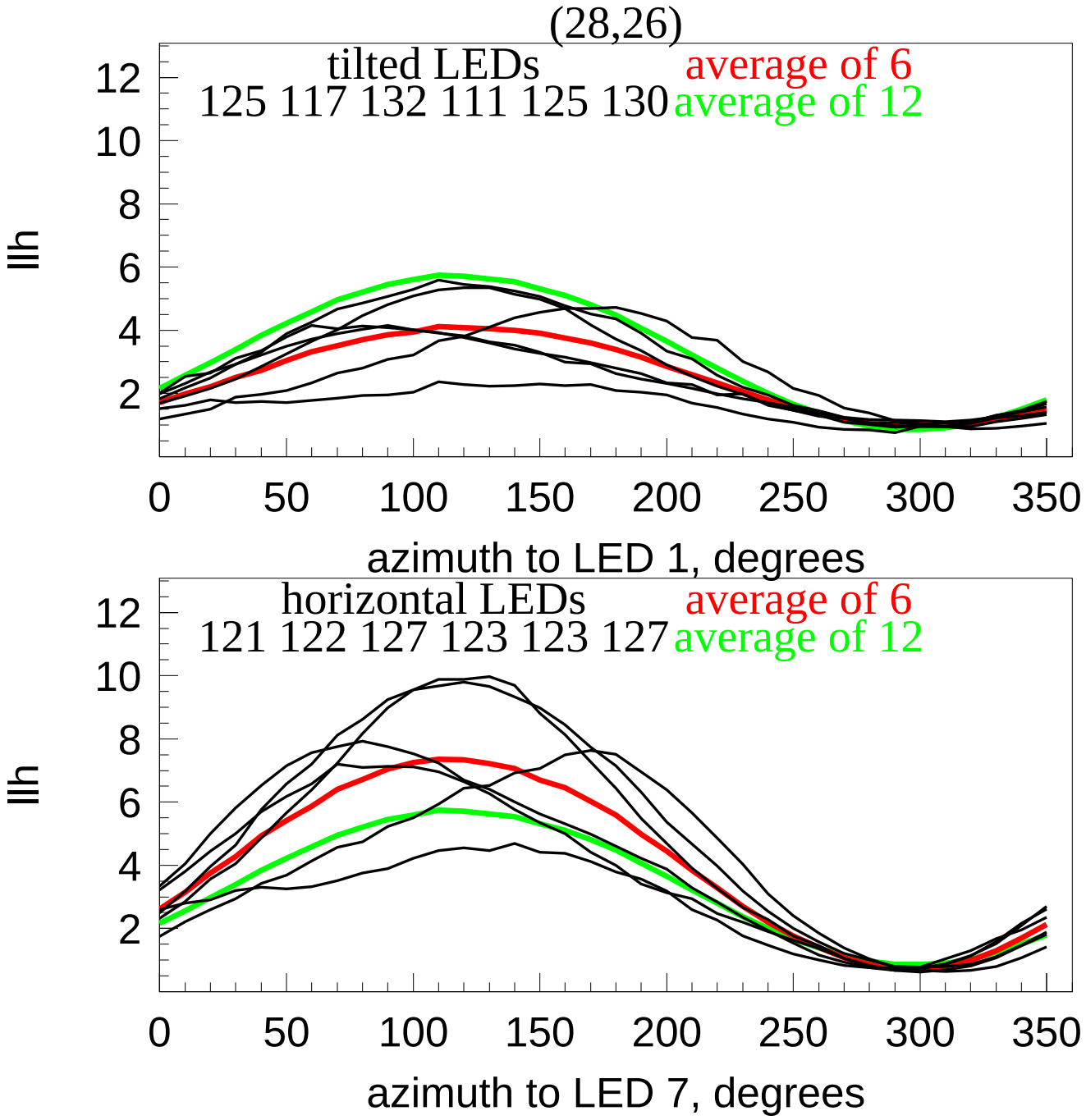

(28,23)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
88.9 ± 5.0

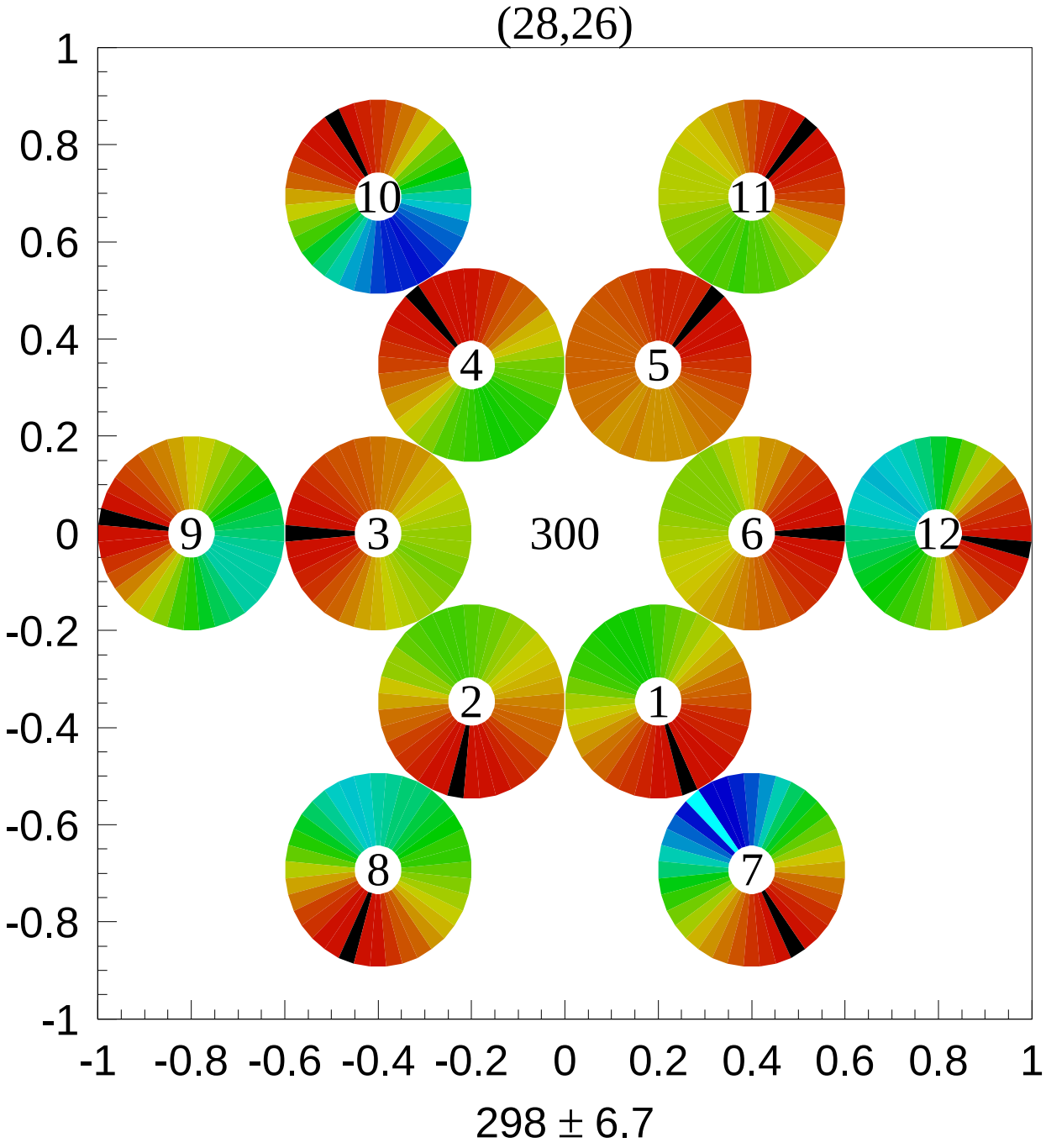

(28,24)
tilted LEDs
123 125 122 120 114 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 125 113 97 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

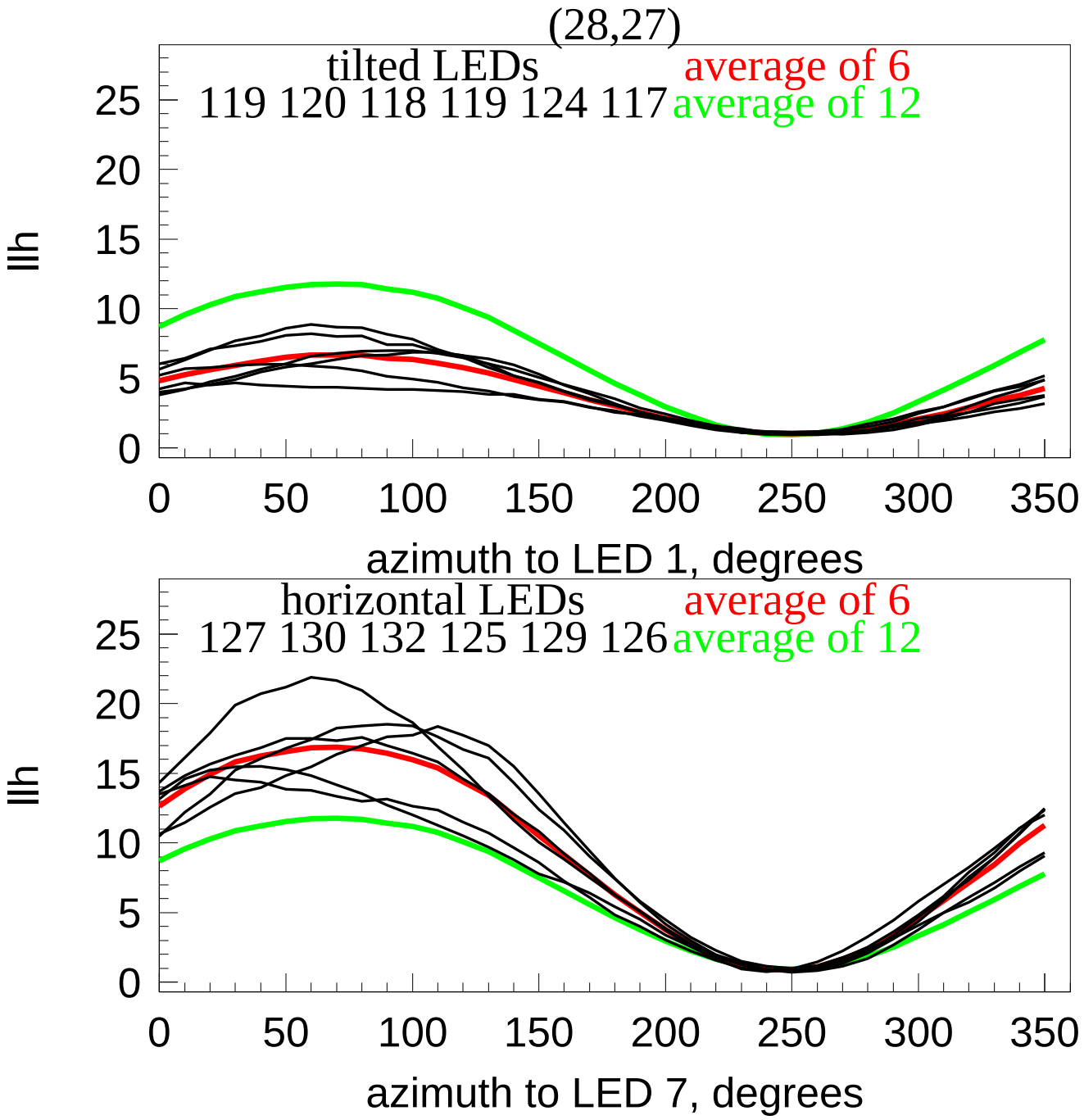

(28,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
105.5 ± 5.6

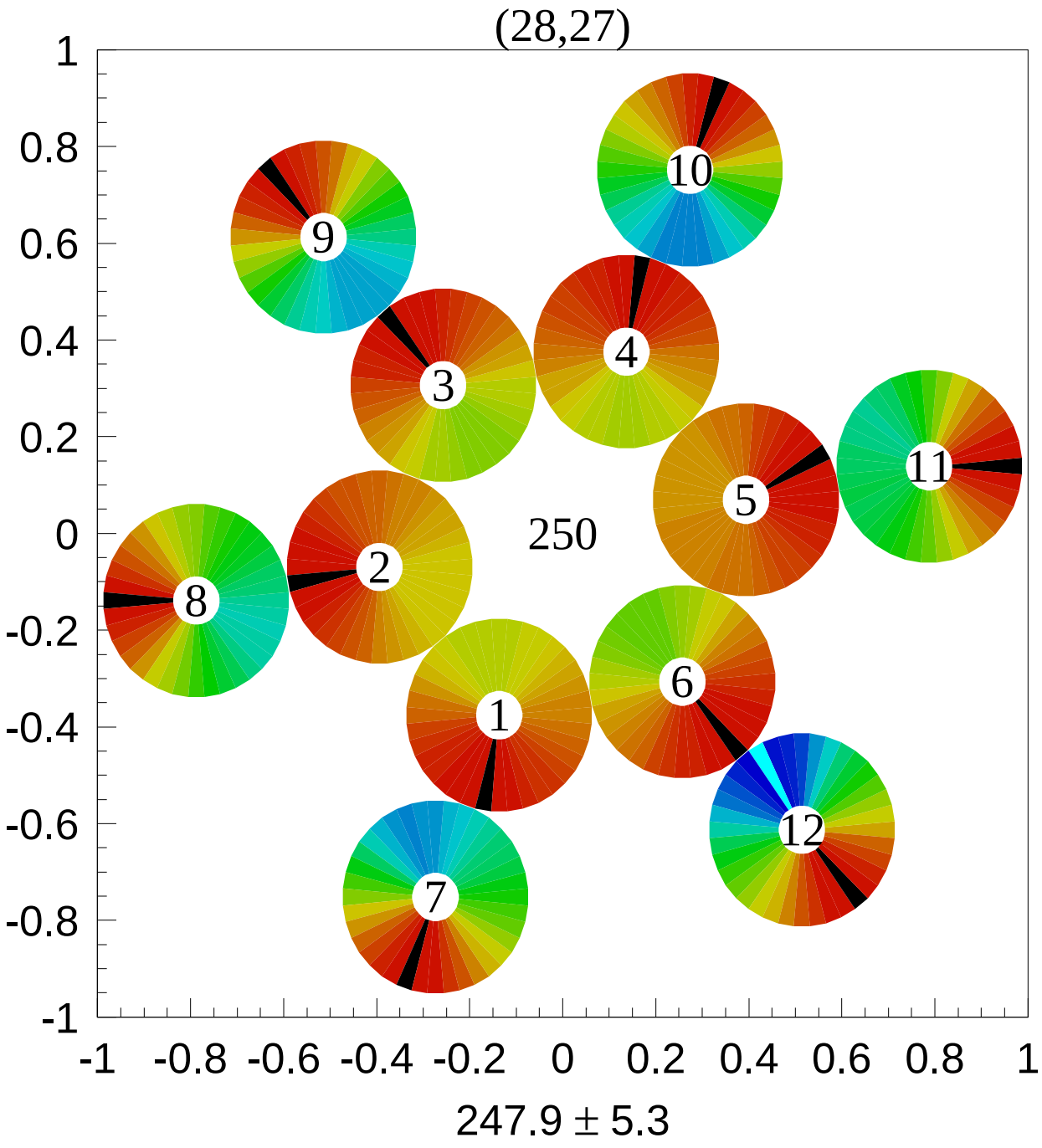

(28,25)
tilted LEDs
120 118 111 121 105 113
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 116 123 126 124 126
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

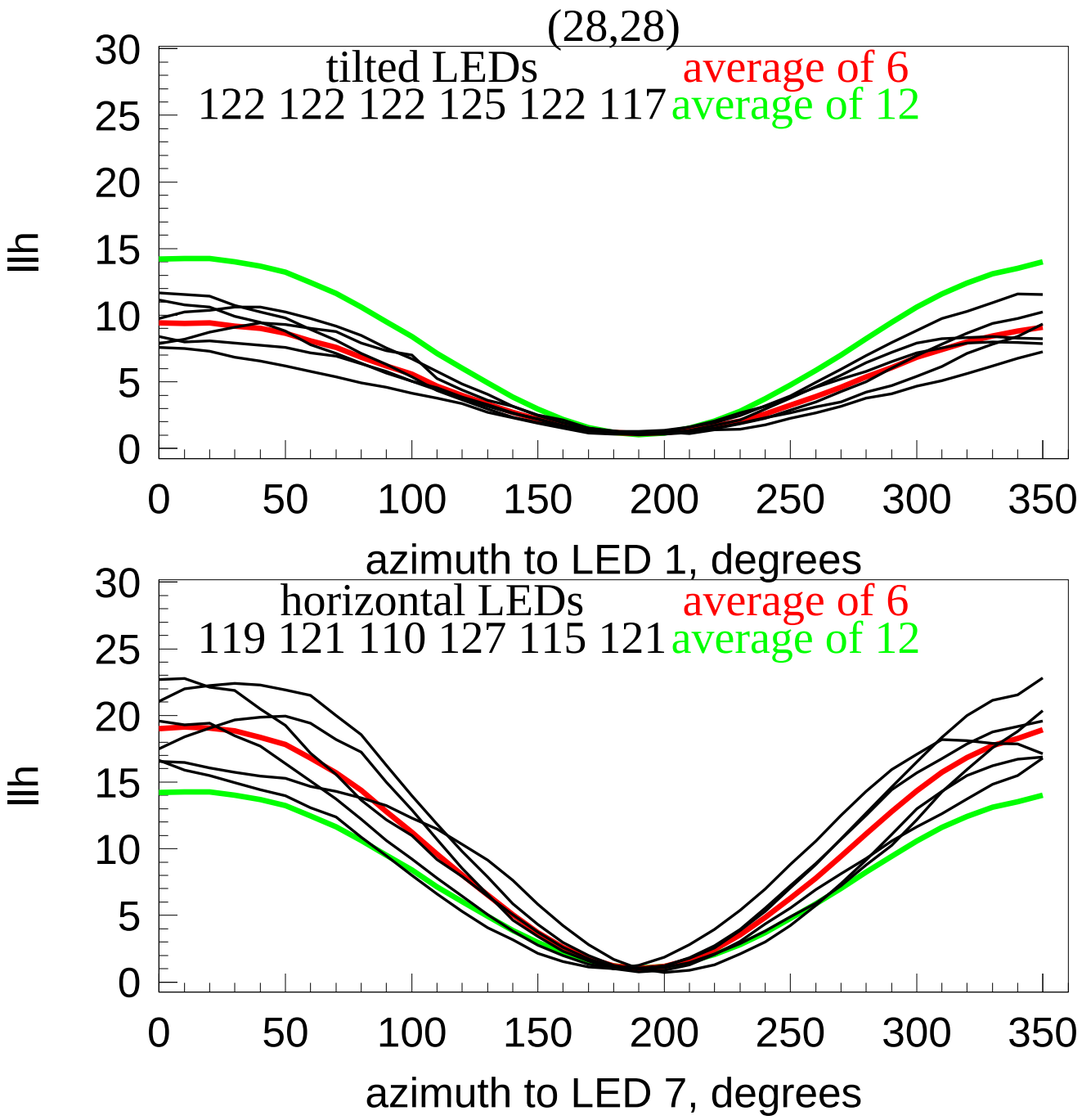

(28,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
200
1
2
3
4
5
6
7
8
9
10
11
12
201.9 ± 5.6

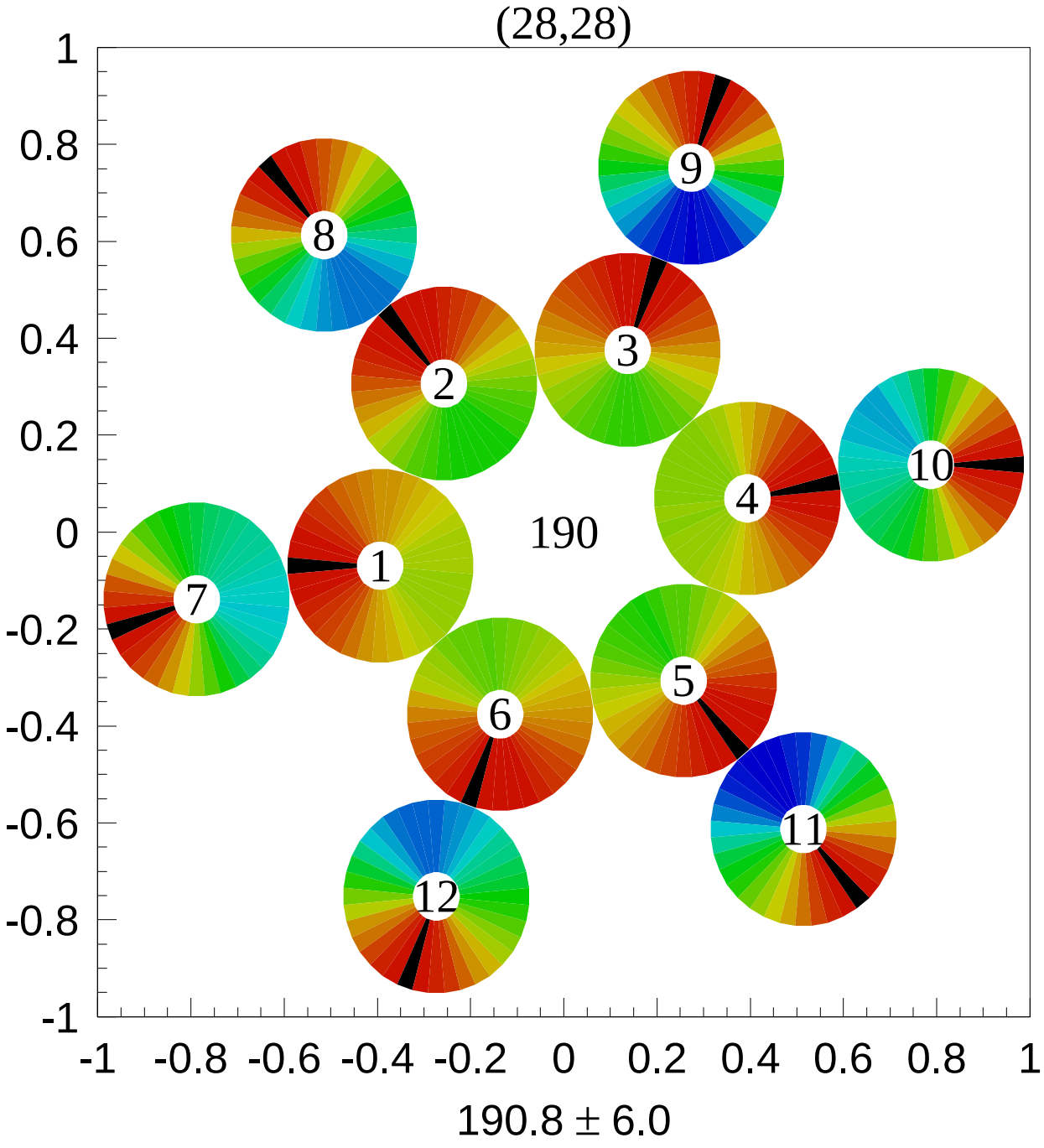

(28,26)
tilted LEDs
125 117 132 111 125 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 127 123 123 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

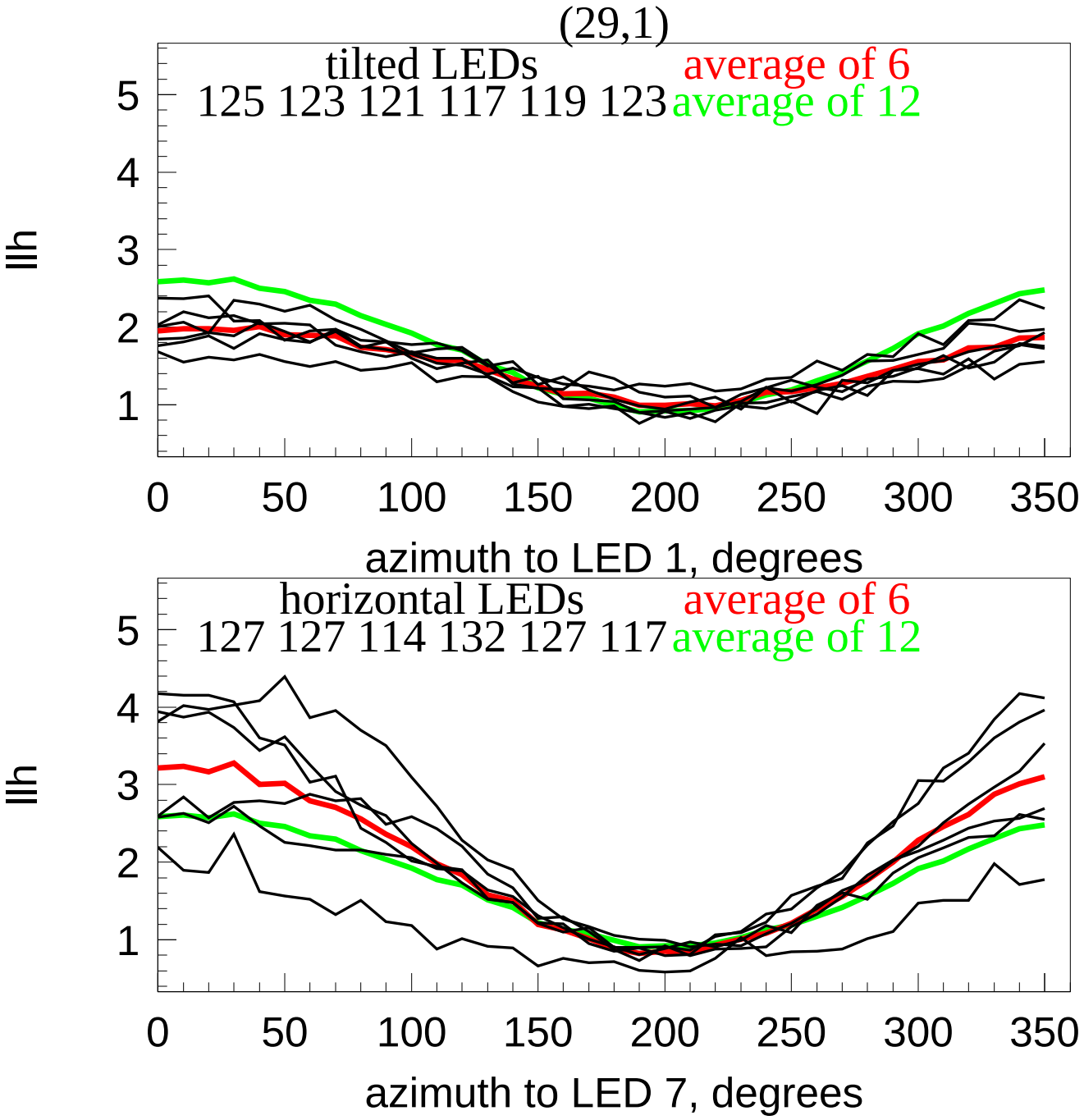

(28,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
298 ± 6.7

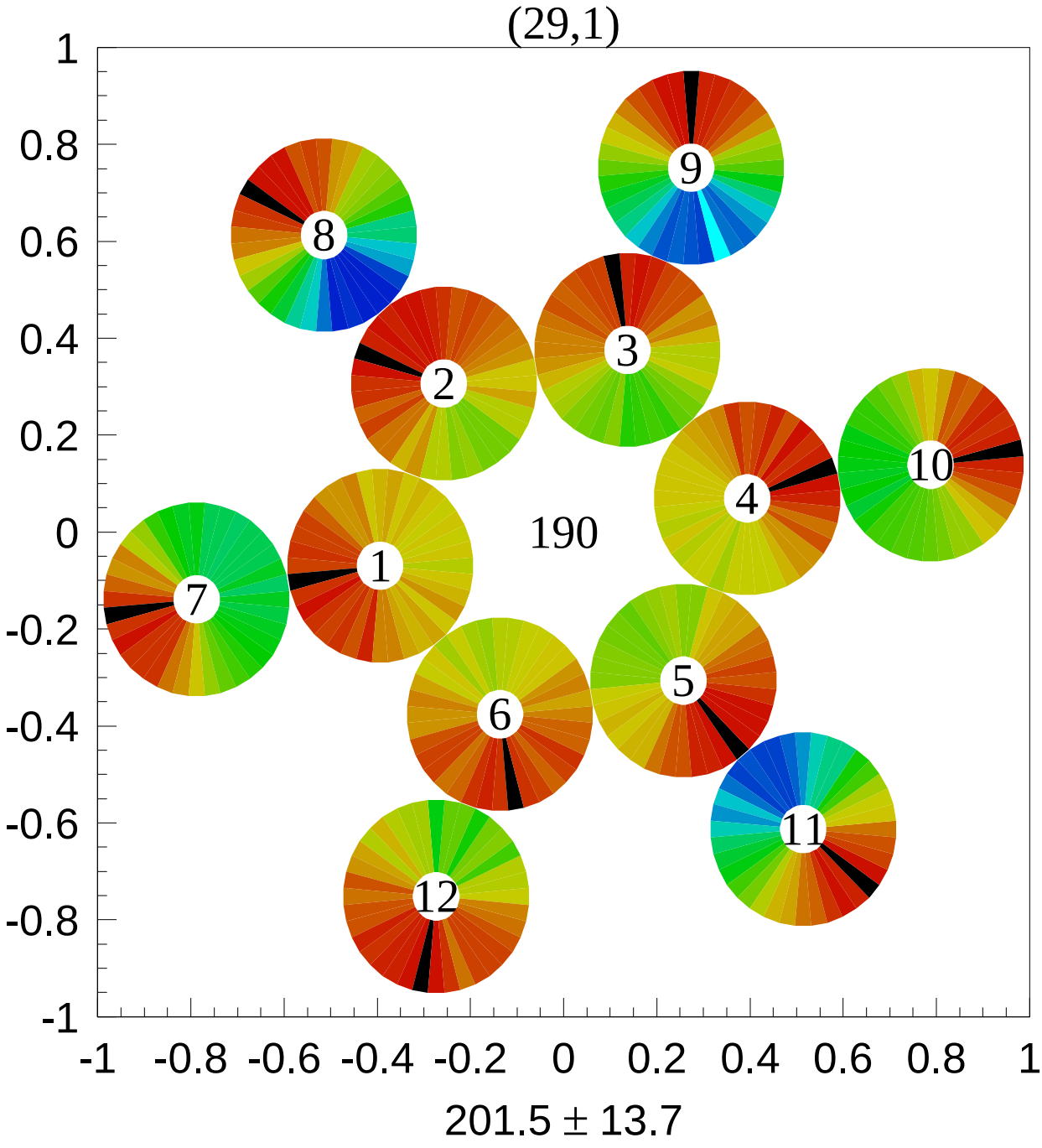

(28,27)
tilted LEDs
119 120 118 119 124 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 130 132 125 129 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

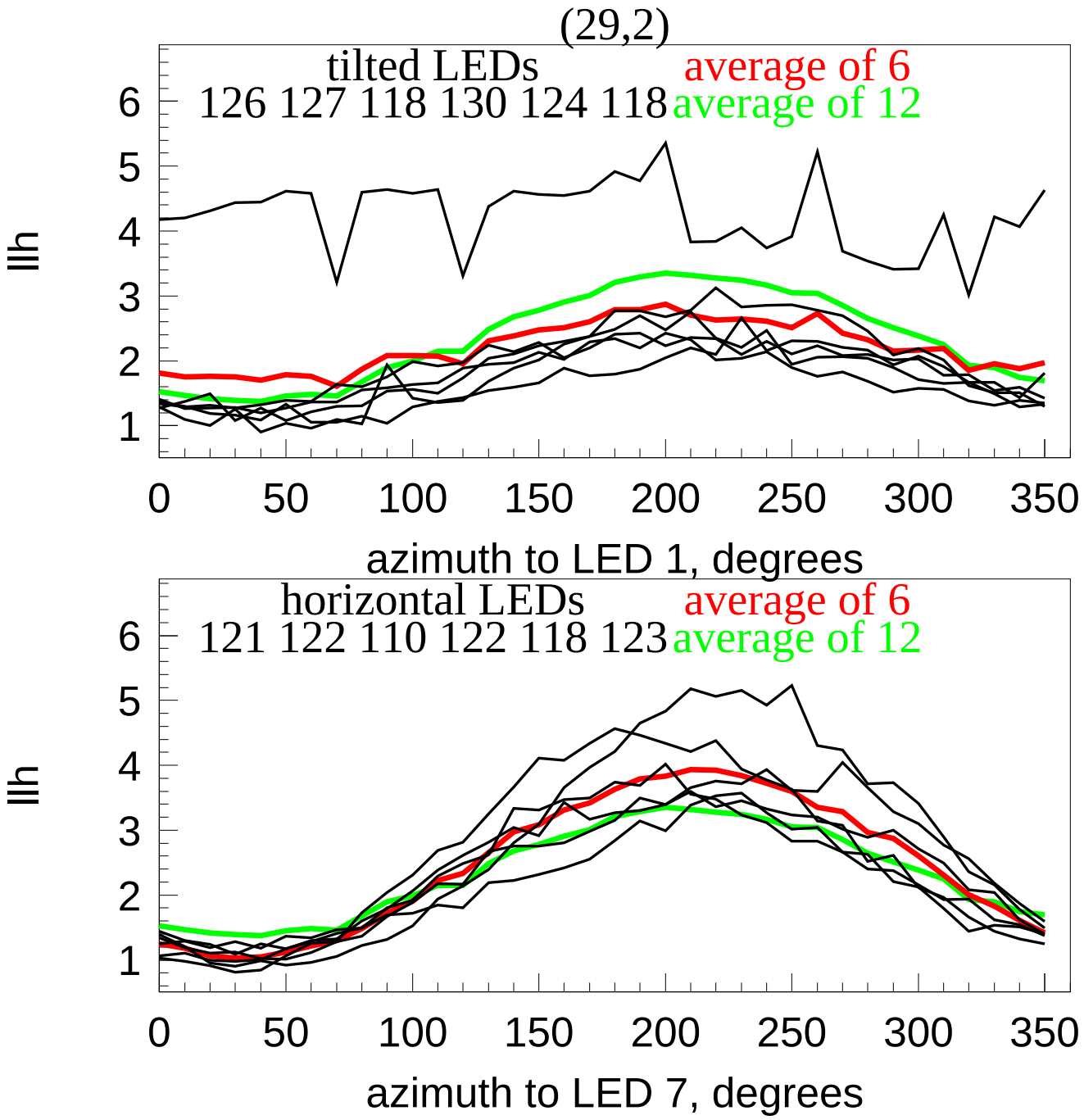

(28,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
1
6
12
7
247.9 ± 5.3

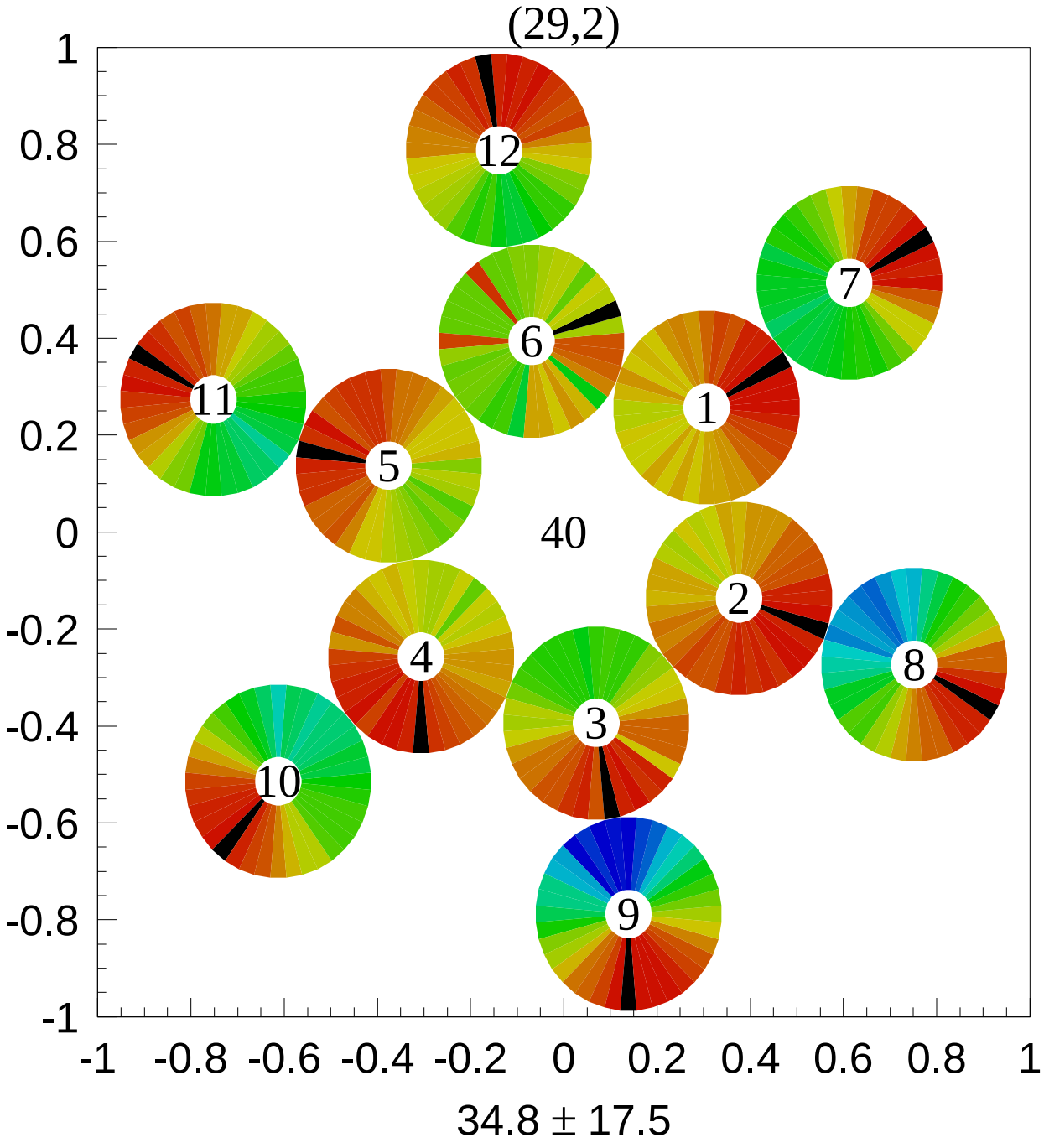

(28,28)
tilted LEDs
122 122 122 125 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 110 127 115 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

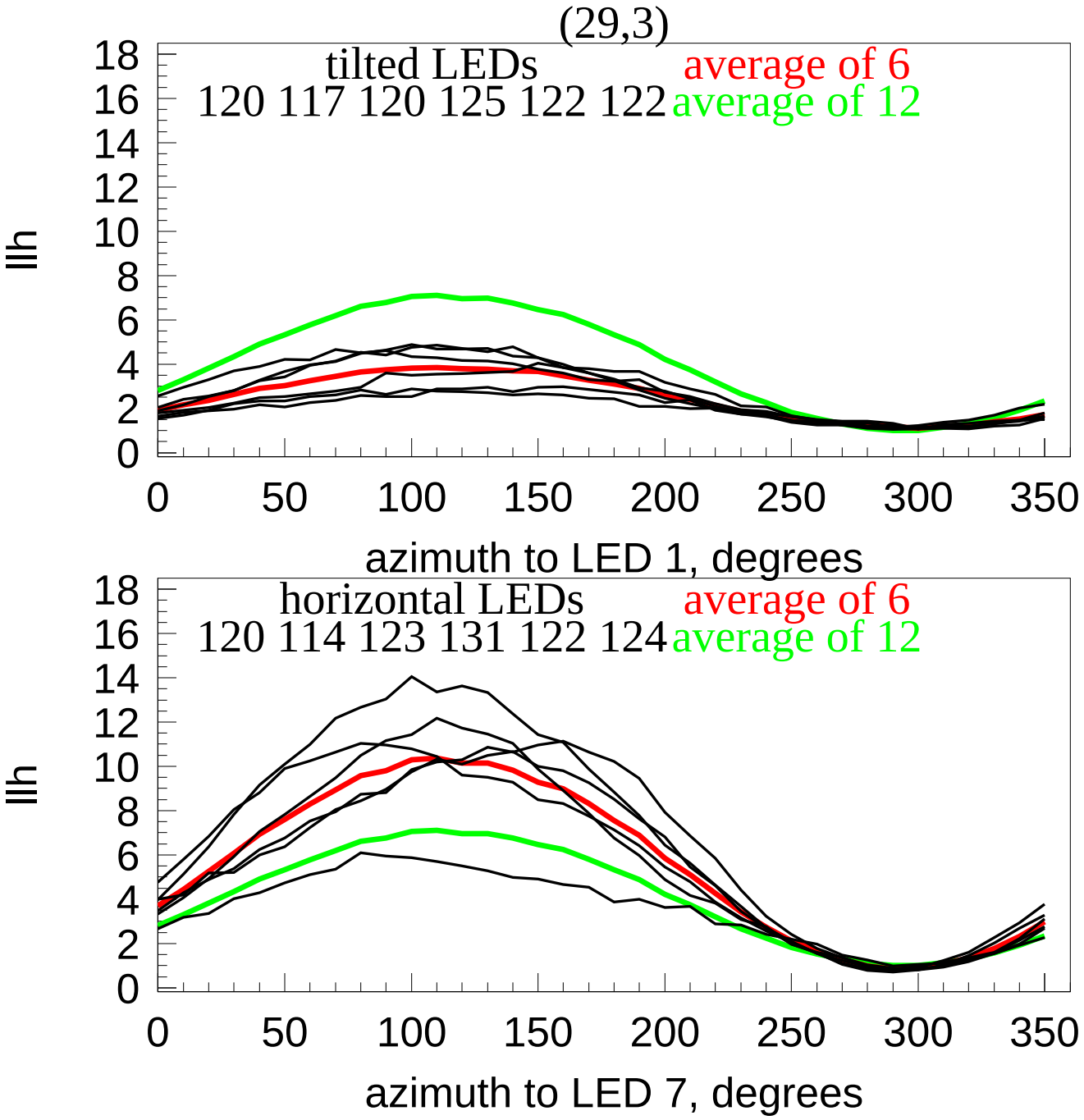

(28,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
190.8 ± 6.0

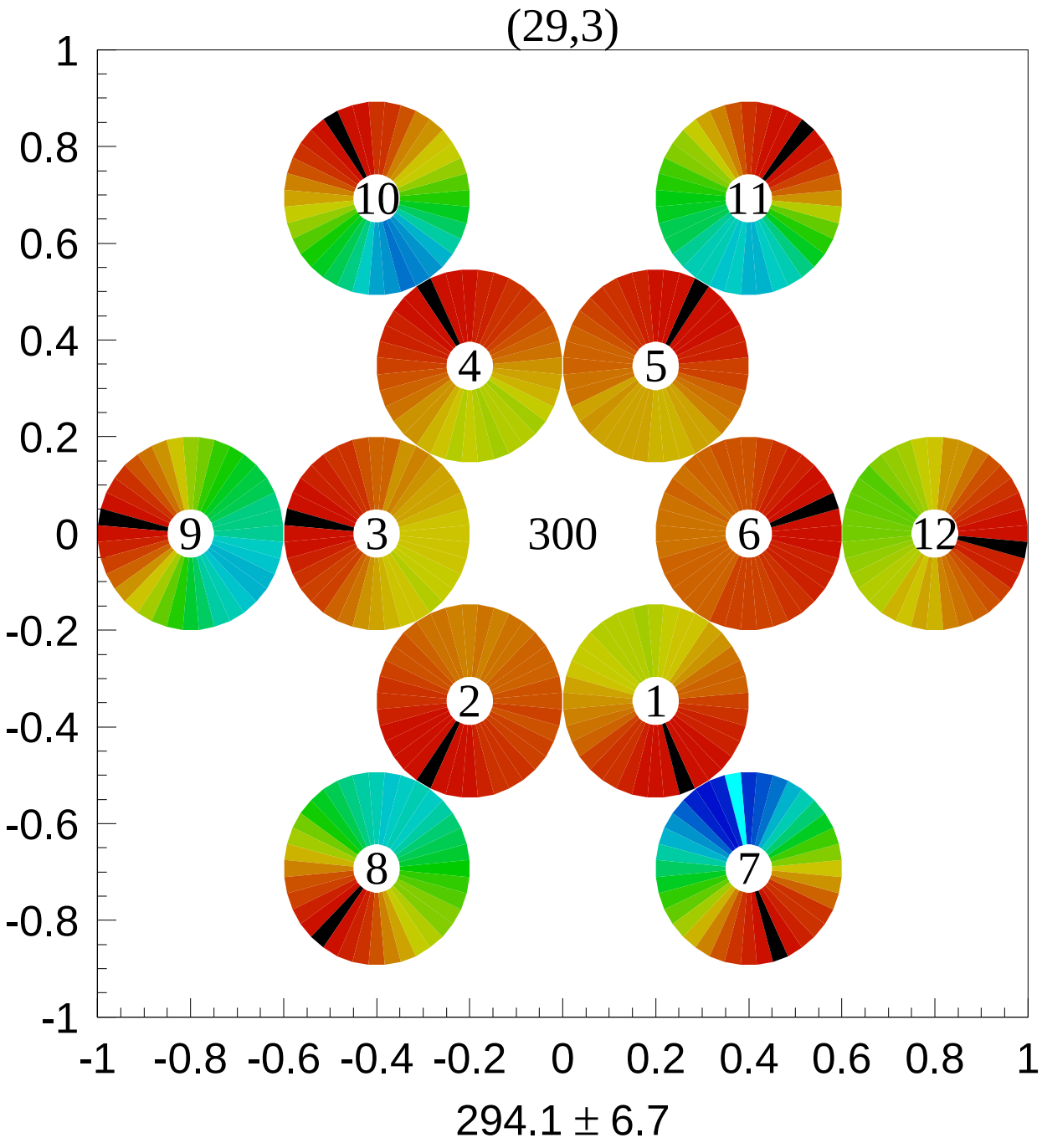

(29,1)
tilted LEDs
125 123 121 117 119 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 127 114 132 127 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

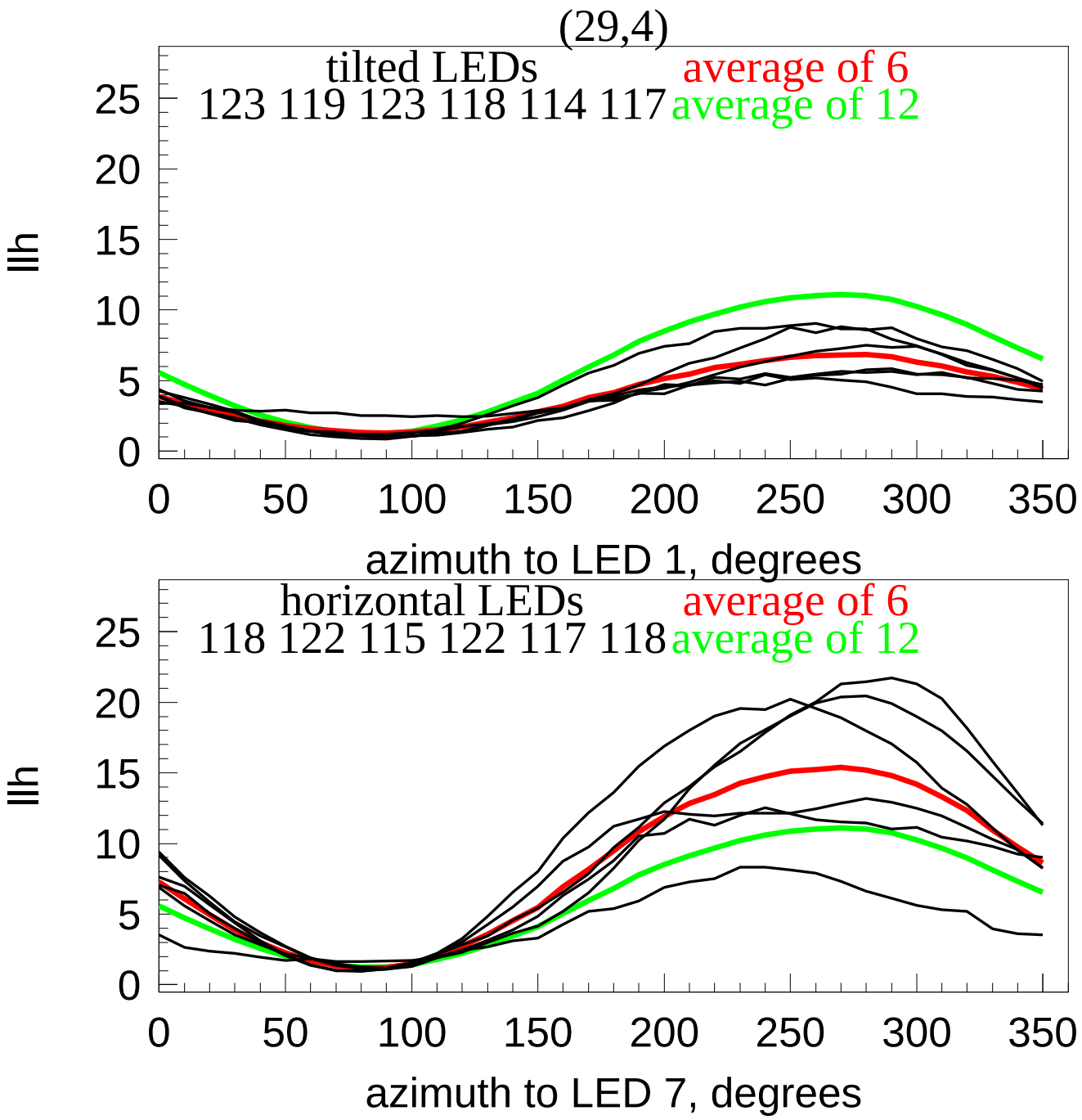

(29,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
201.5 ± 13.7

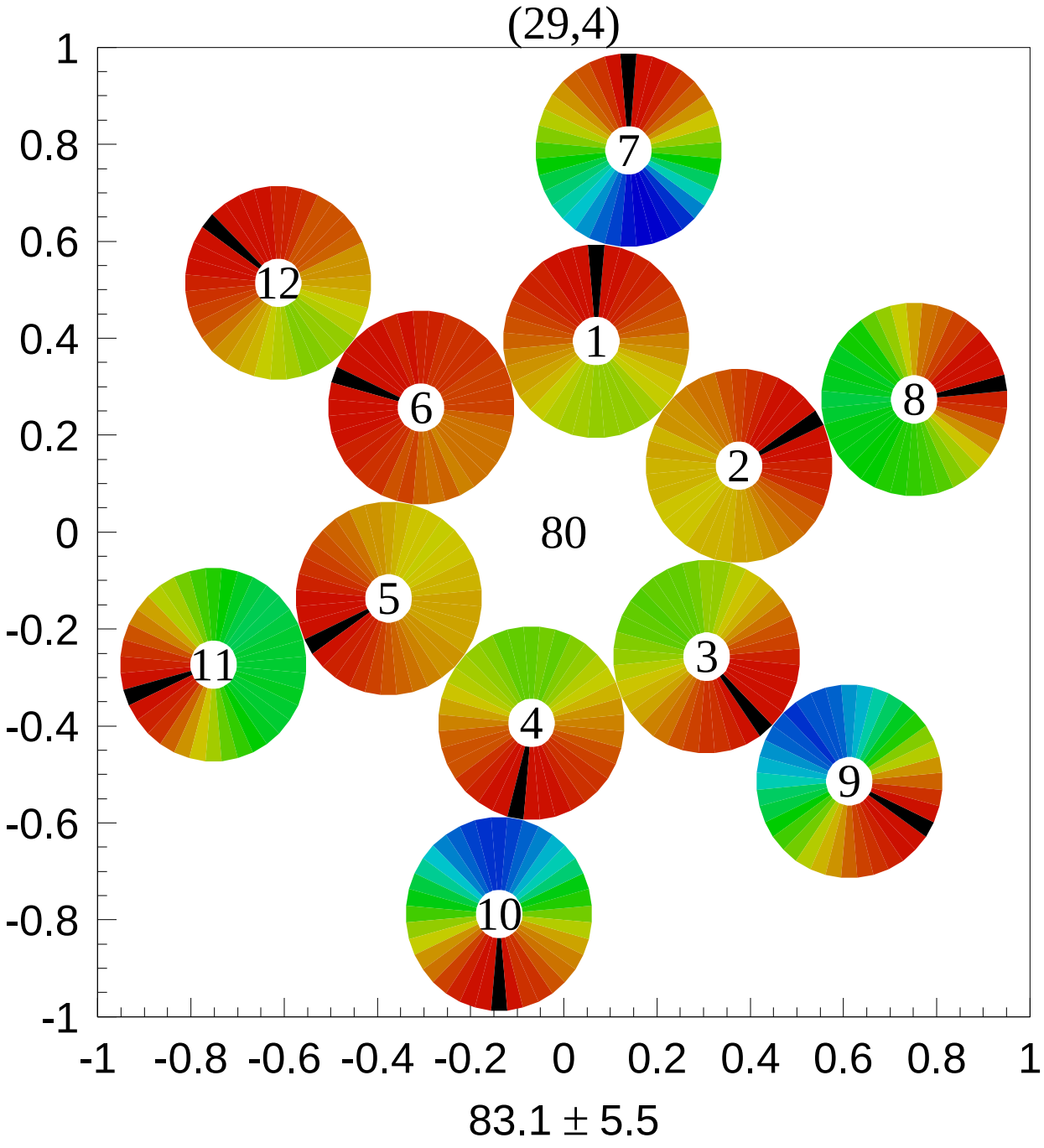

(29,2)
tilted LEDs
126 127 118 130 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 110 122 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

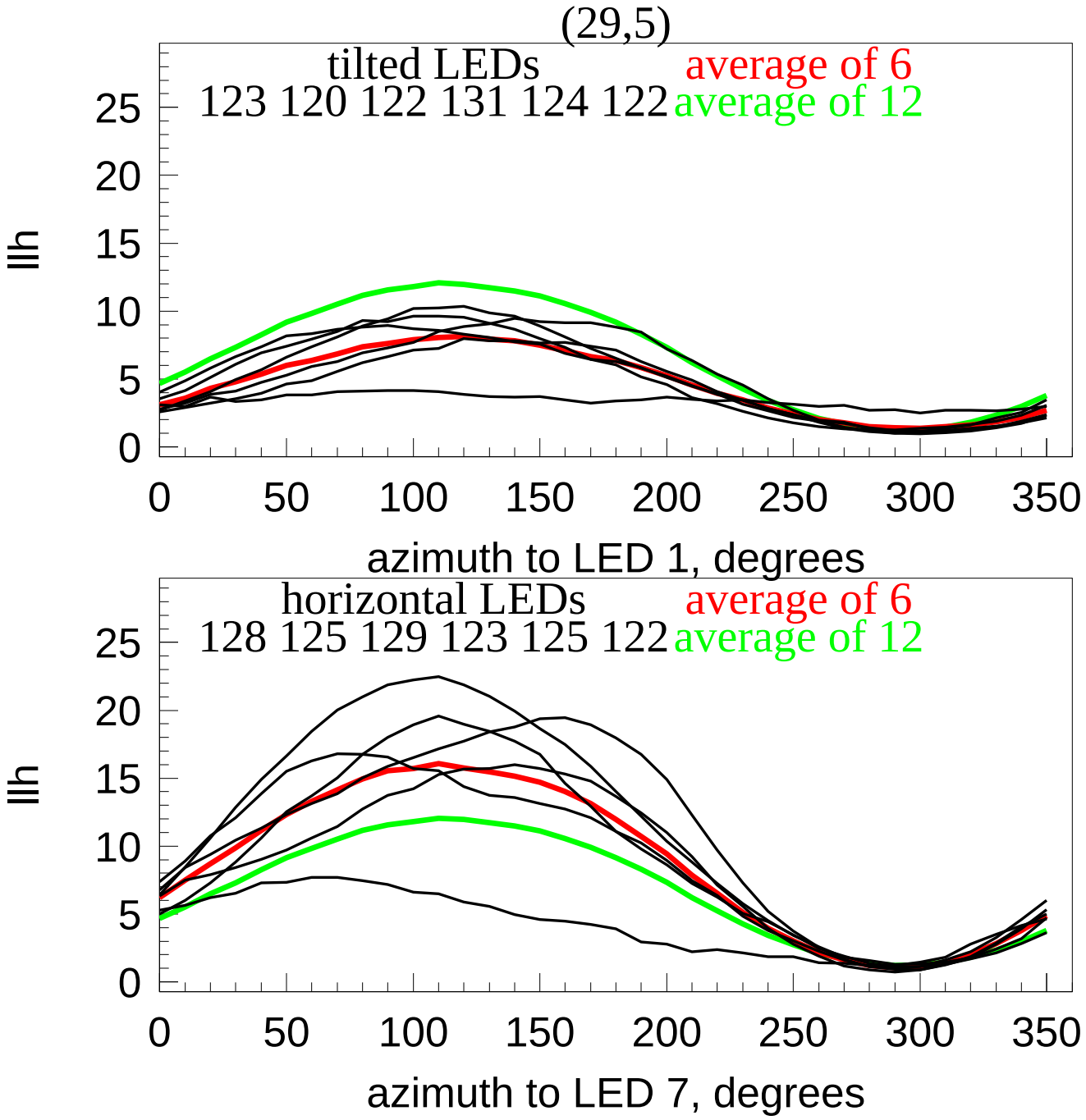

(29,2)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
34.8 ± 17.5

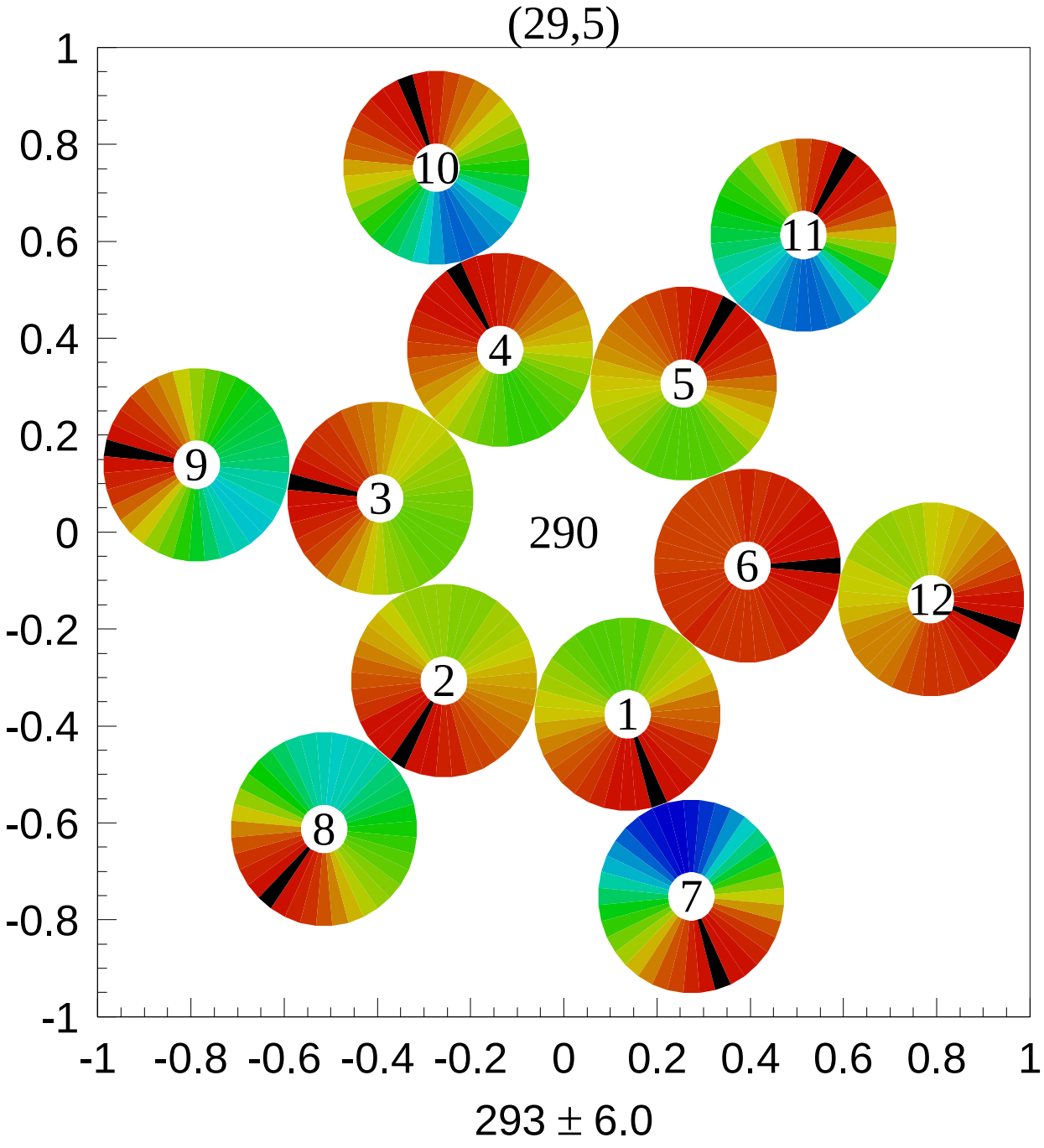

(29,3)
tilted LEDs
120 117 120 125 122 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 114 123 131 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

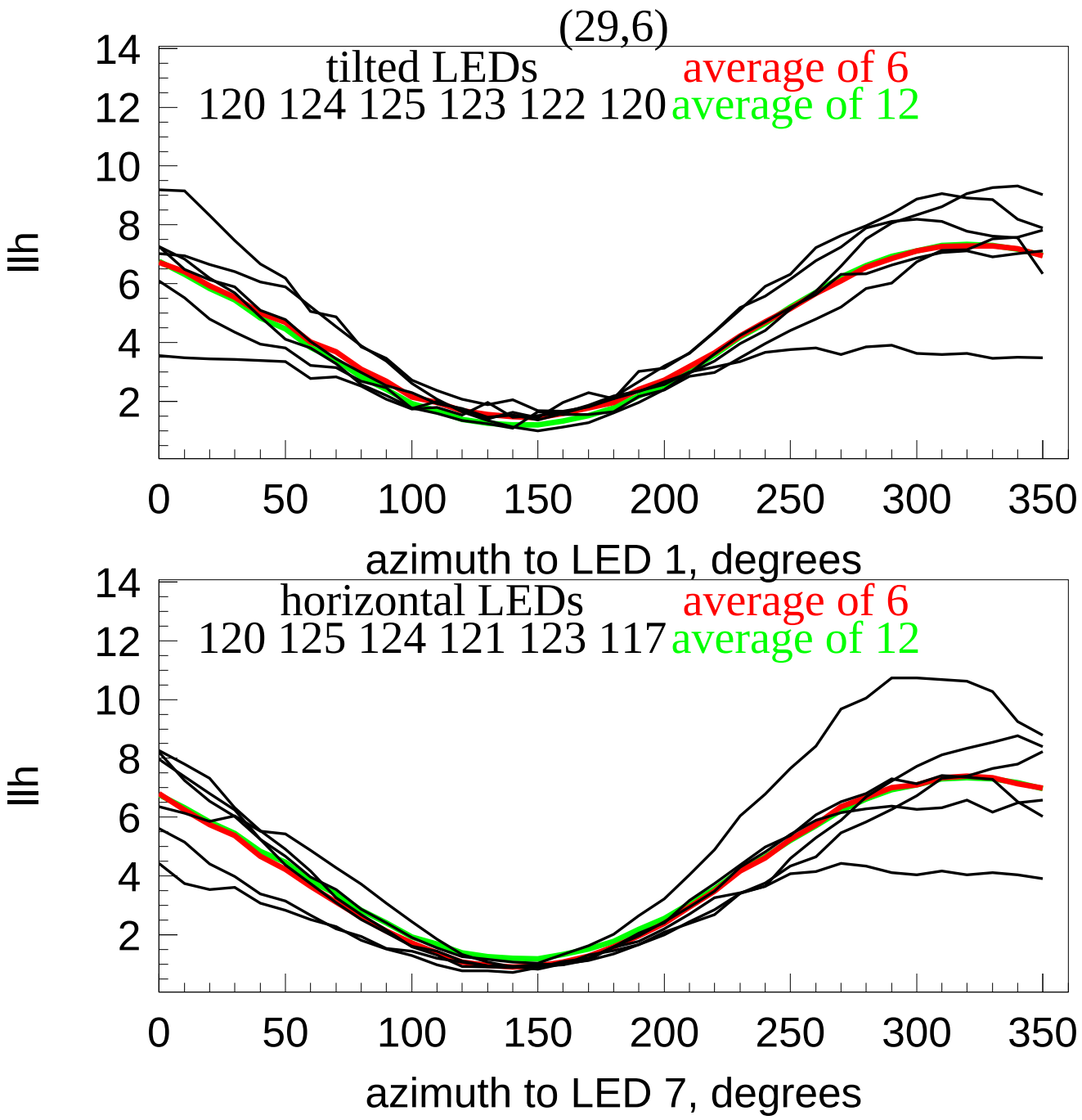

(29,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
294.1 ± 6.7

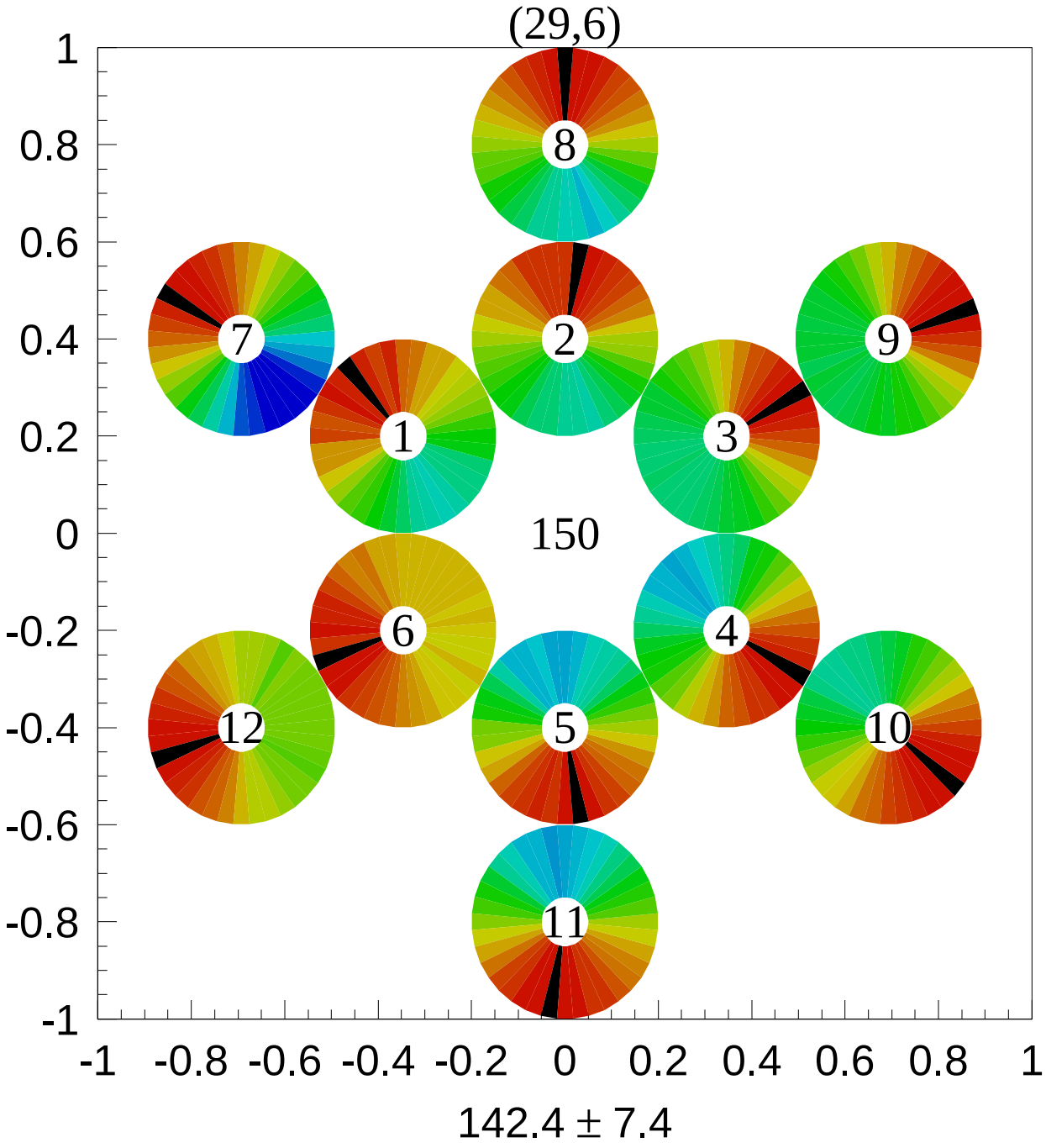

(29,4)
tilted LEDs
123 119 123 118 114 117
average of 6
average of 12
Ilh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 122 115 122 117 118
average of 6
average of 12
Ilh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

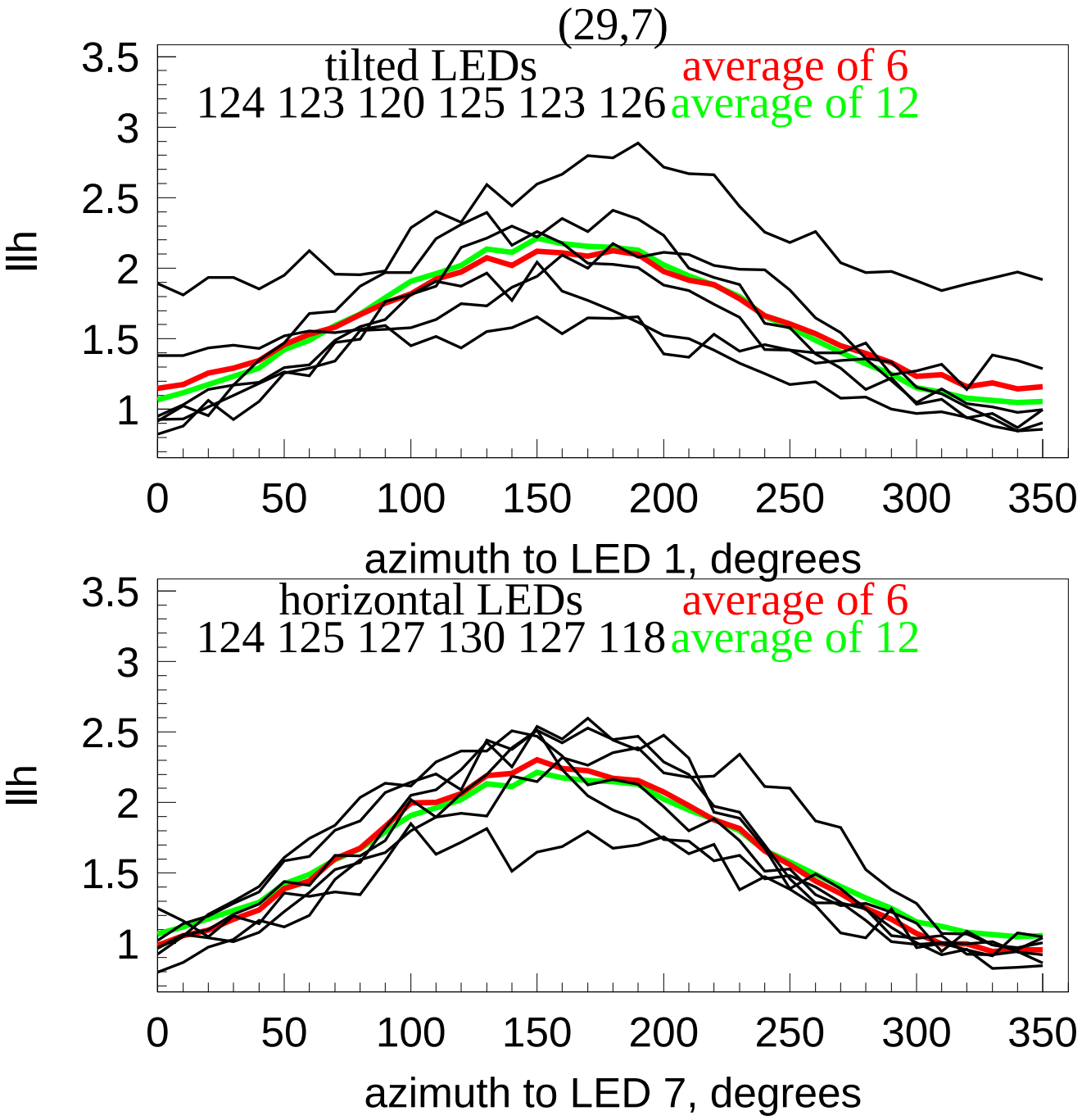

(29,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
83.1 ± 5.5

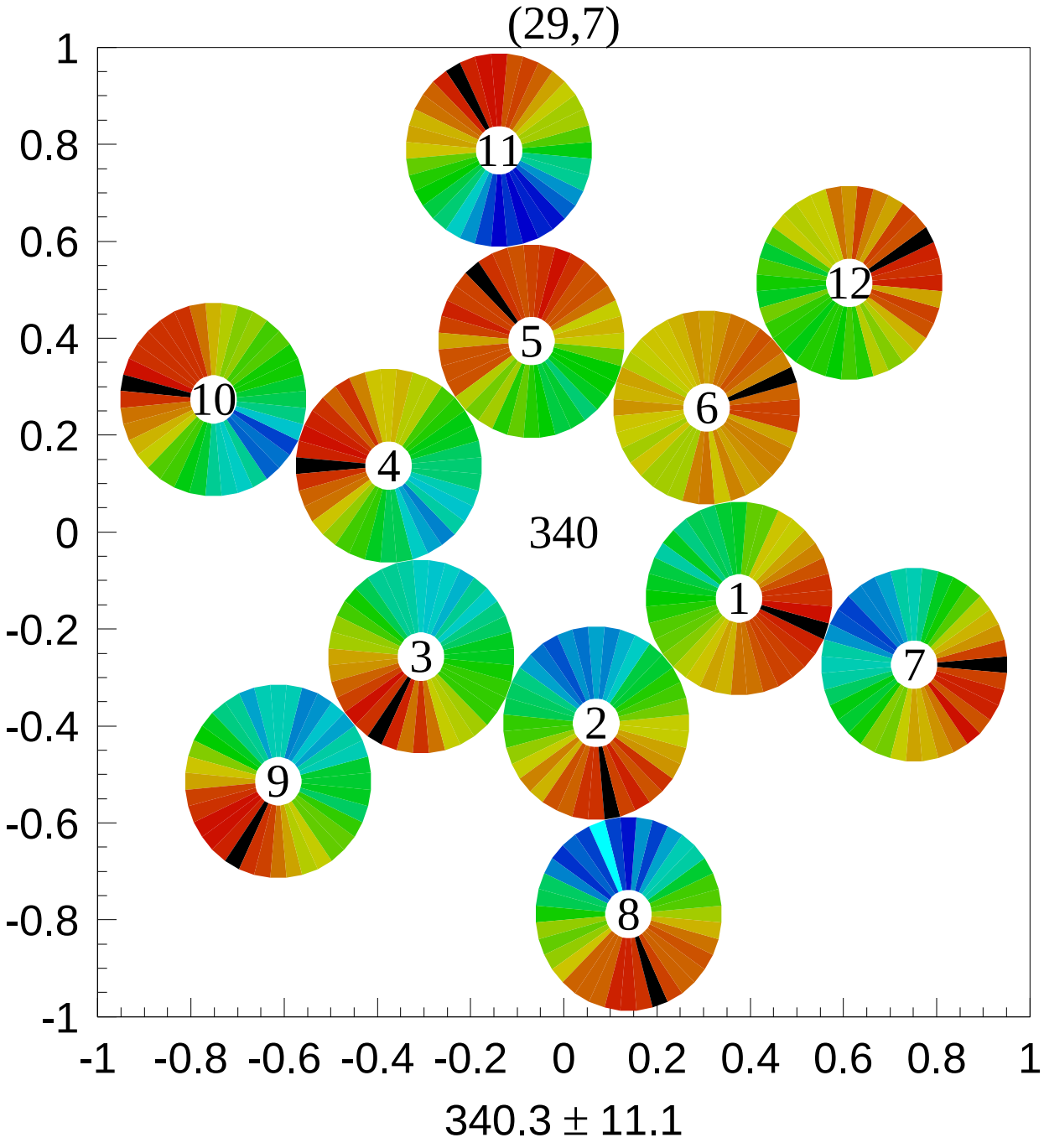

(29,5)
tilted LEDs
123 120 122 131 124 122
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 125 129 123 125 122
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

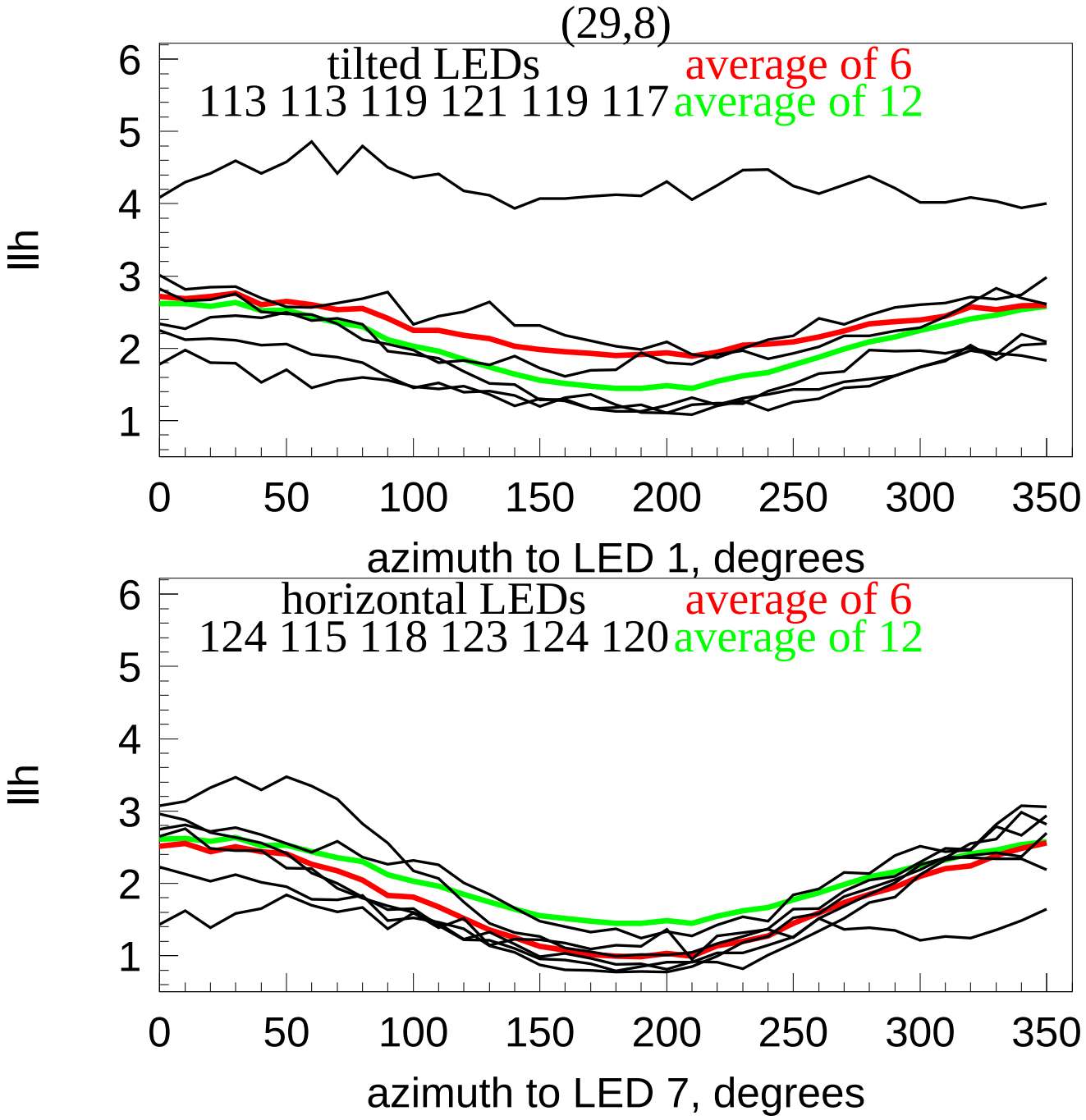

(29,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
293 ± 6.0

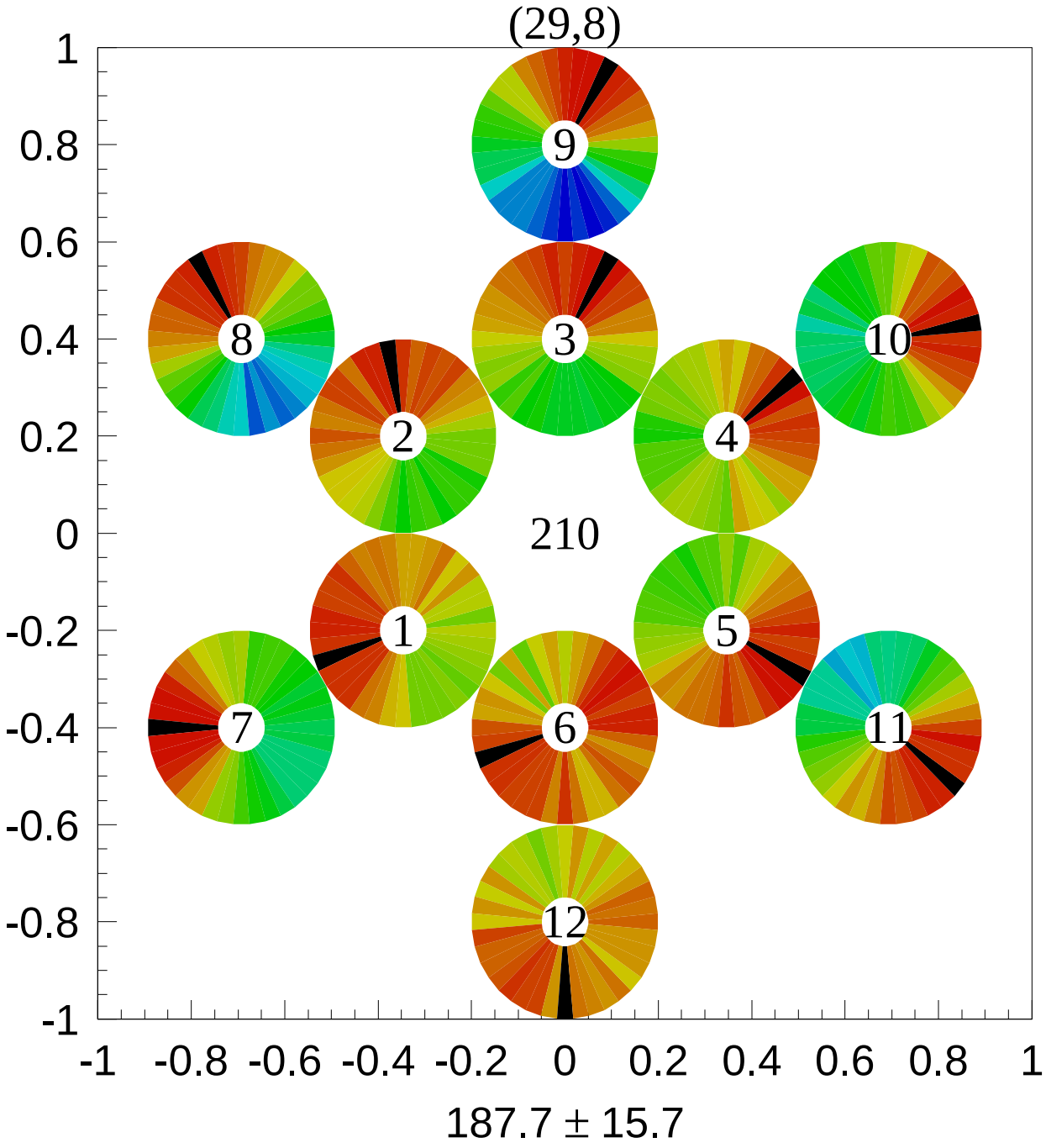

(29,6)
tilted LEDs
120 124 125 123 122 120
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 125 124 121 123 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

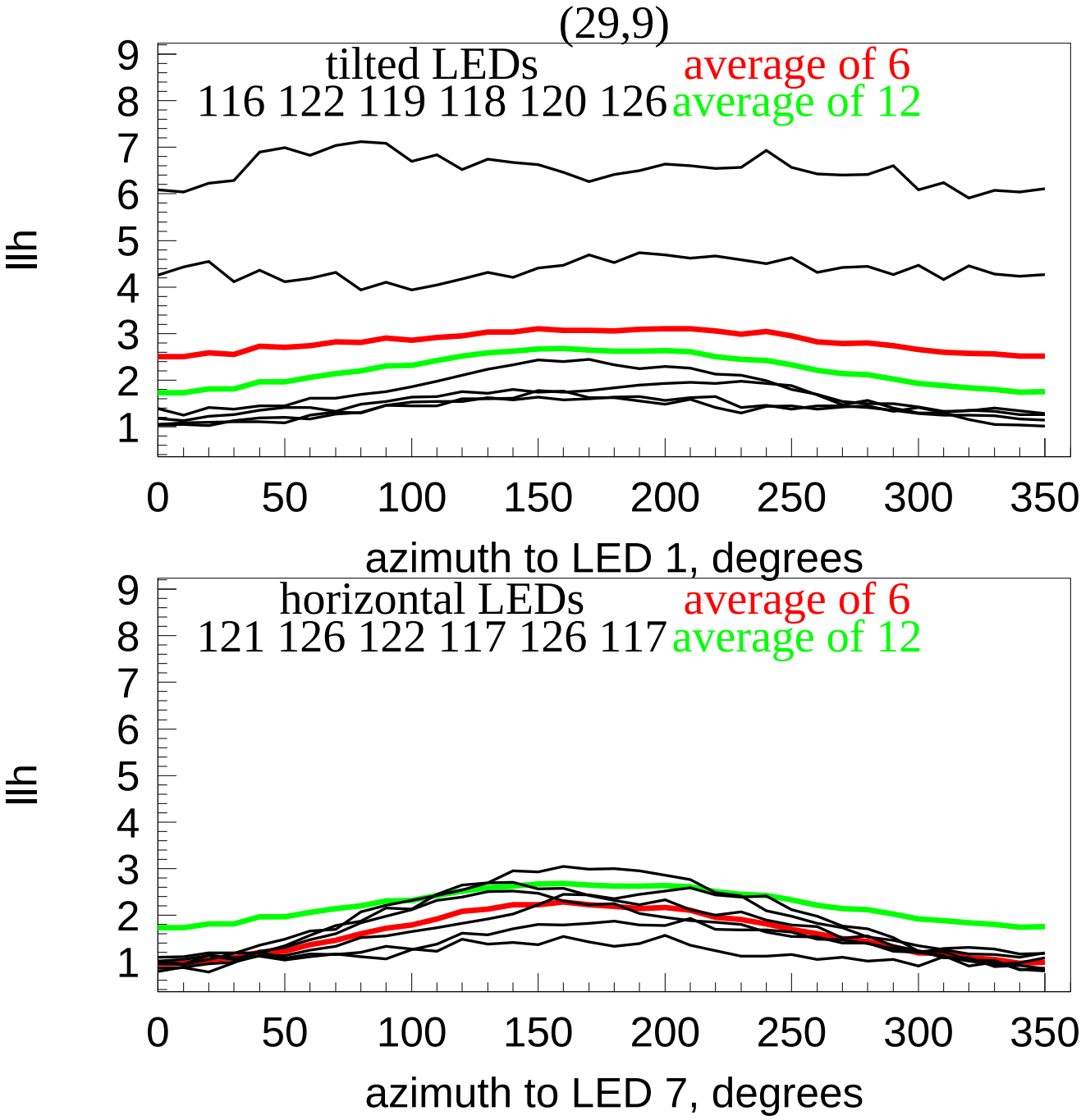

(29,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
142.4 ± 7.4

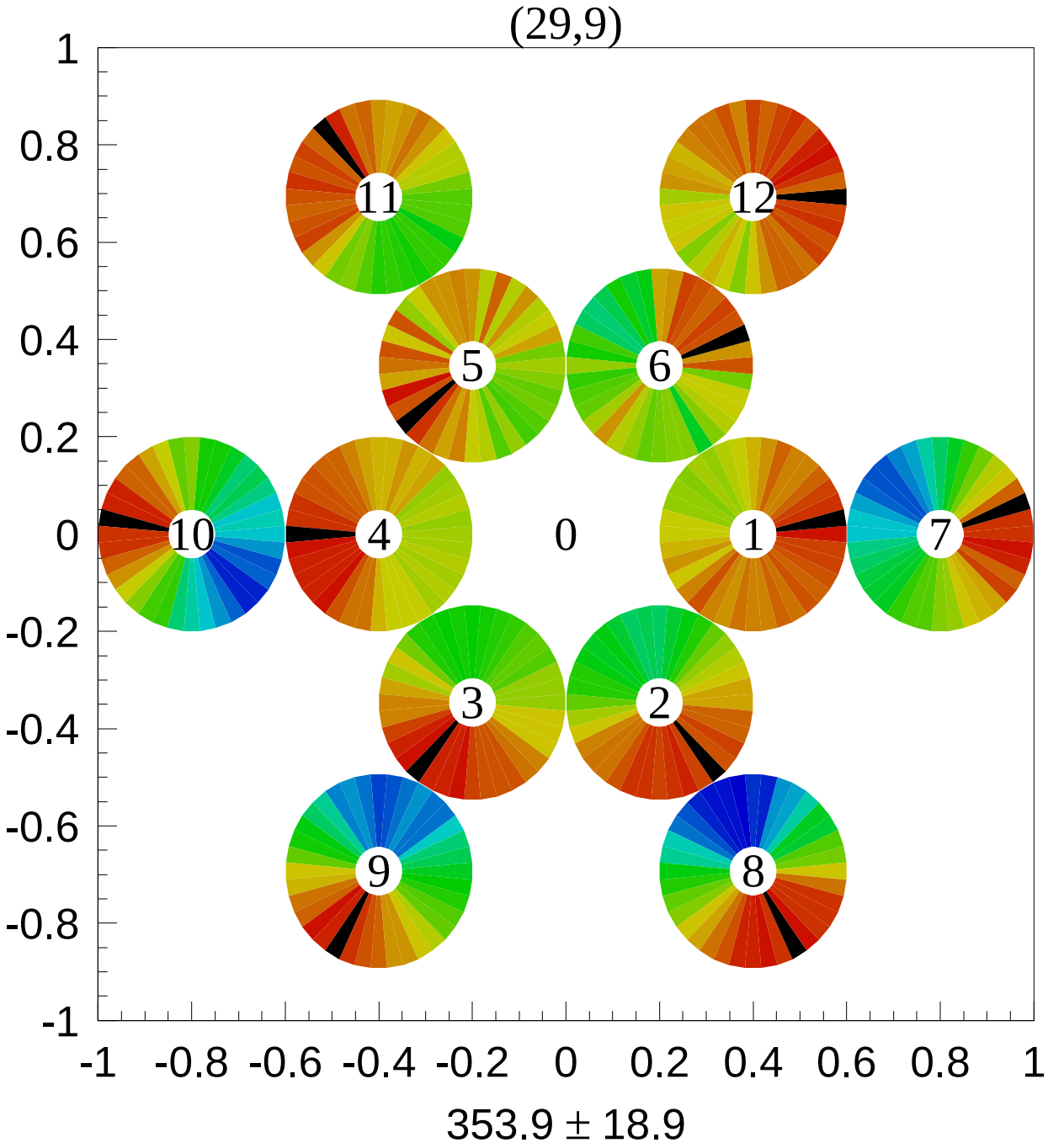

(29,7)
tilted LEDs
124 123 120 125 123 126
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 125 127 130 127 118
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

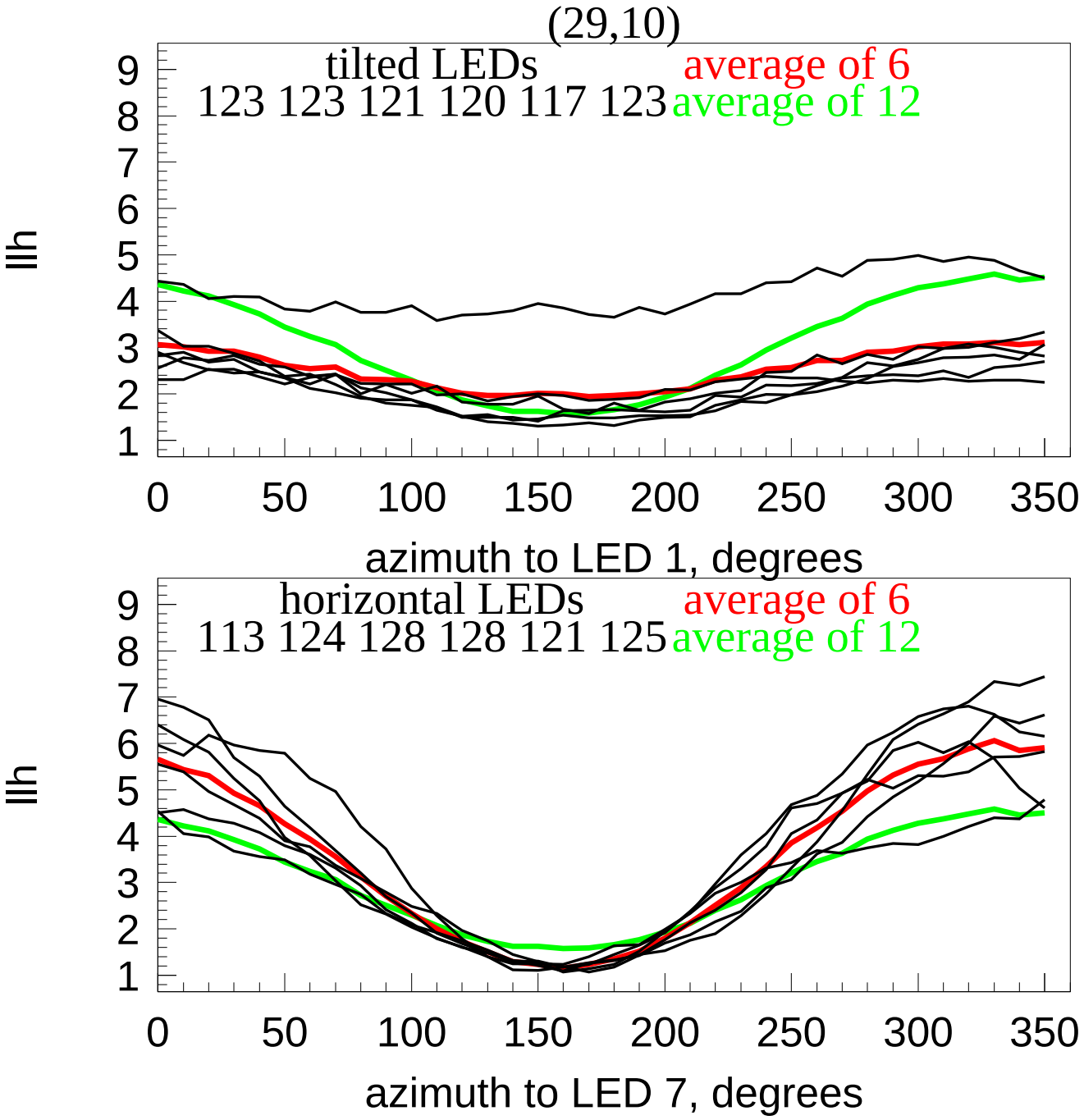

(29,7)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
340.3 ± 11.1

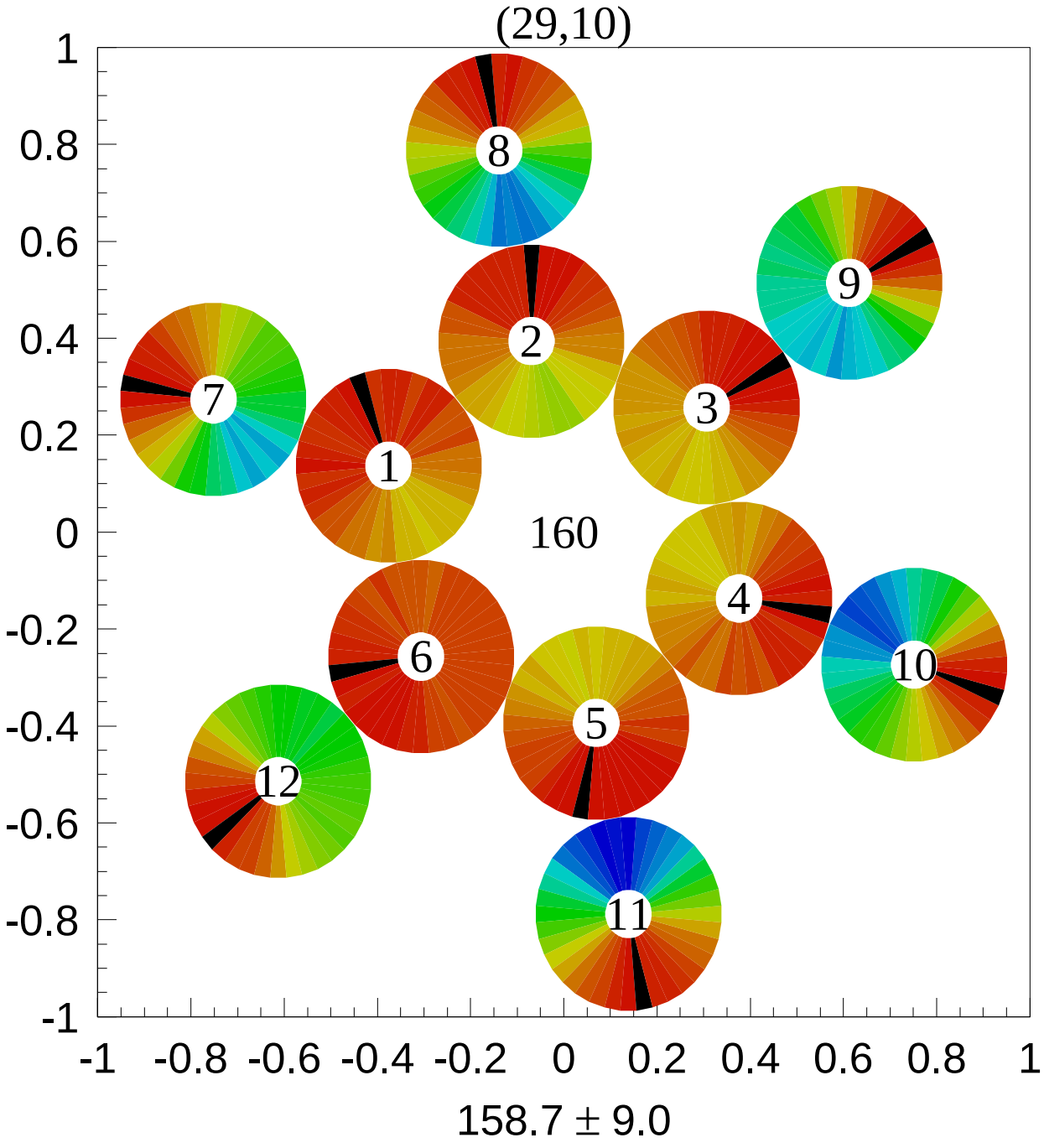

(29,8)
tilted LEDs
113 113 119 121 119 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 115 118 123 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

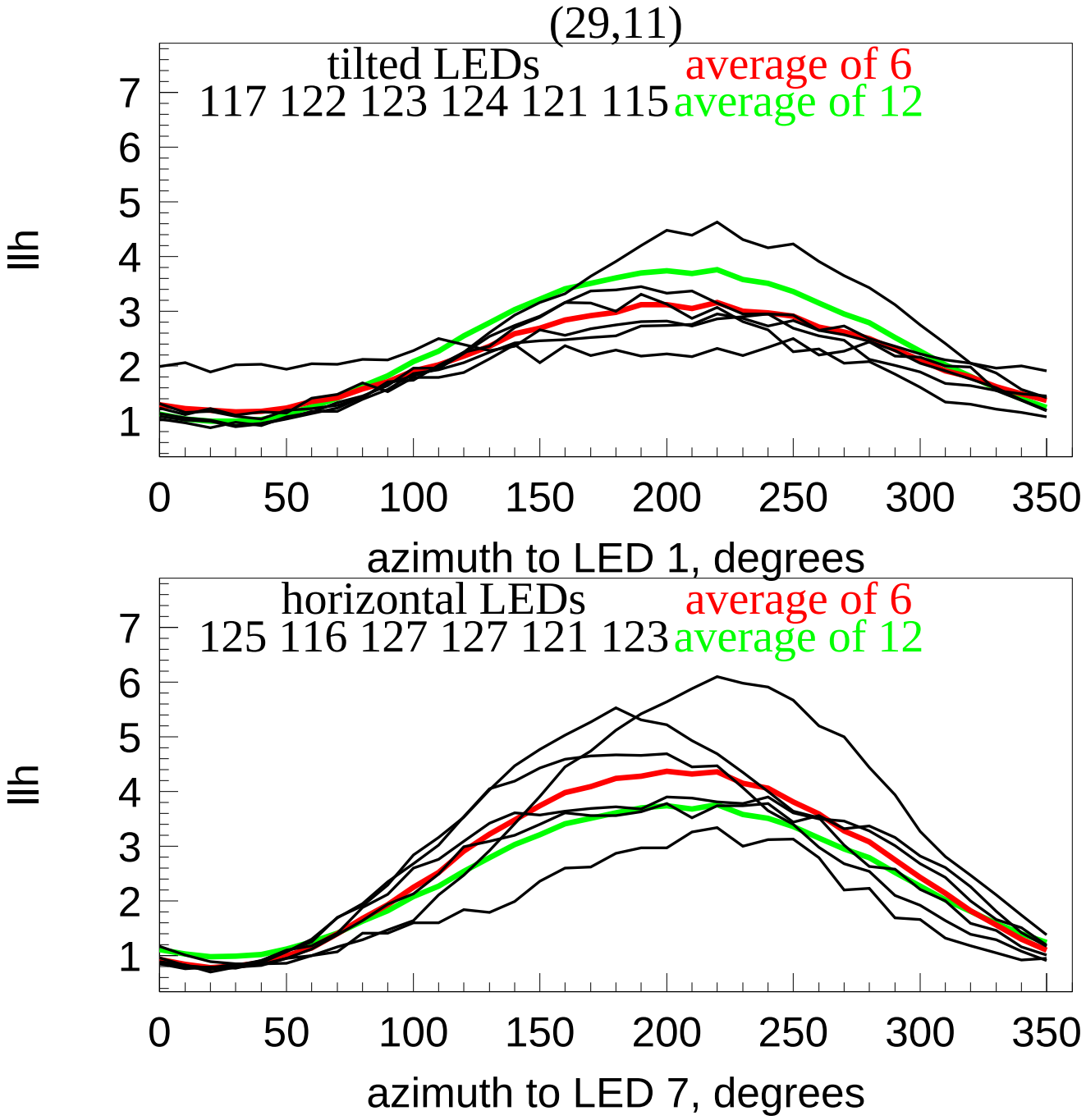

(29,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
10
2
4
210
1
5
7
6
11
12
187.7 ± 15.7

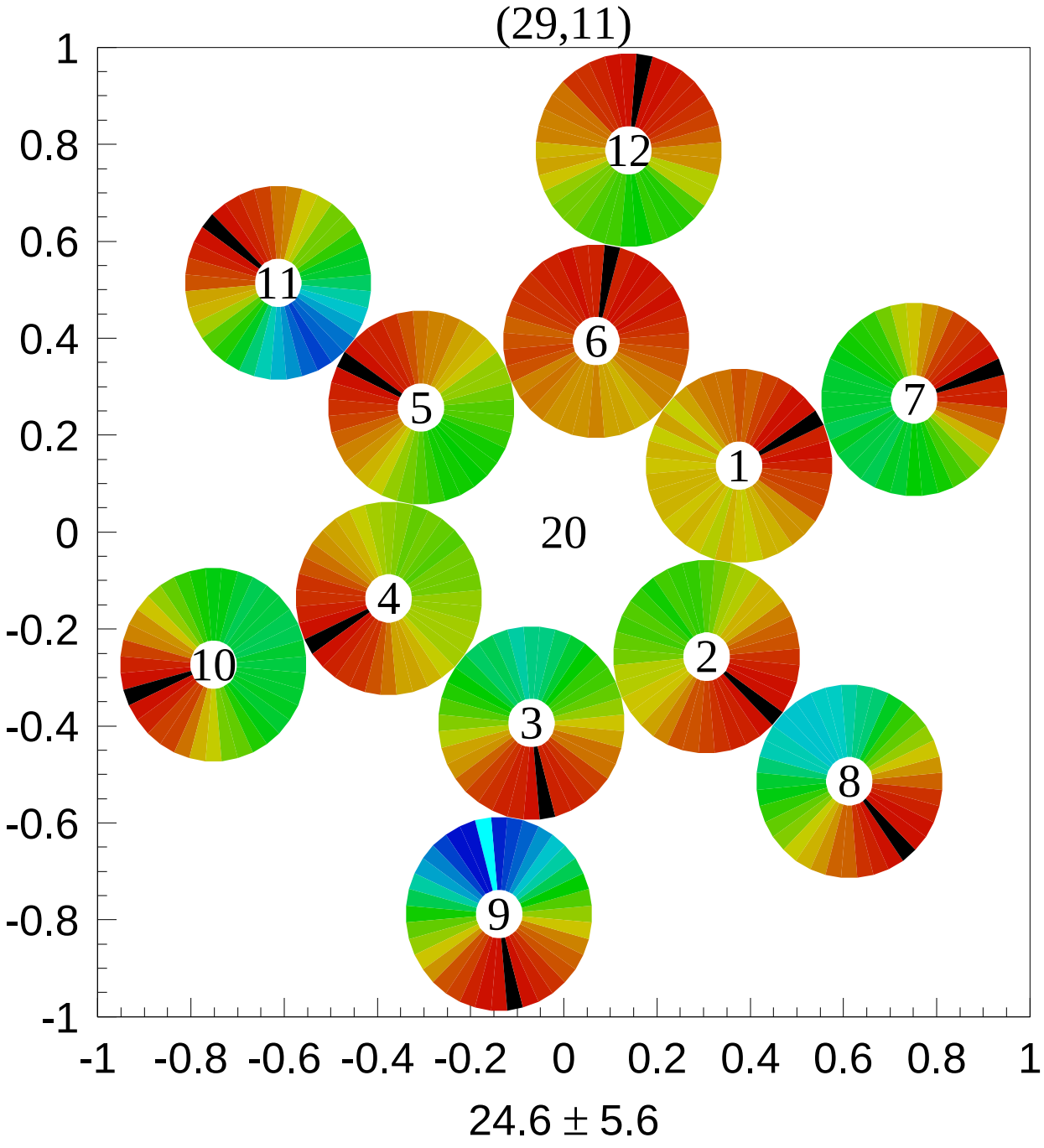

(29,9)
tilted LEDs
116 122 119 118 120 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 126 122 117 126 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

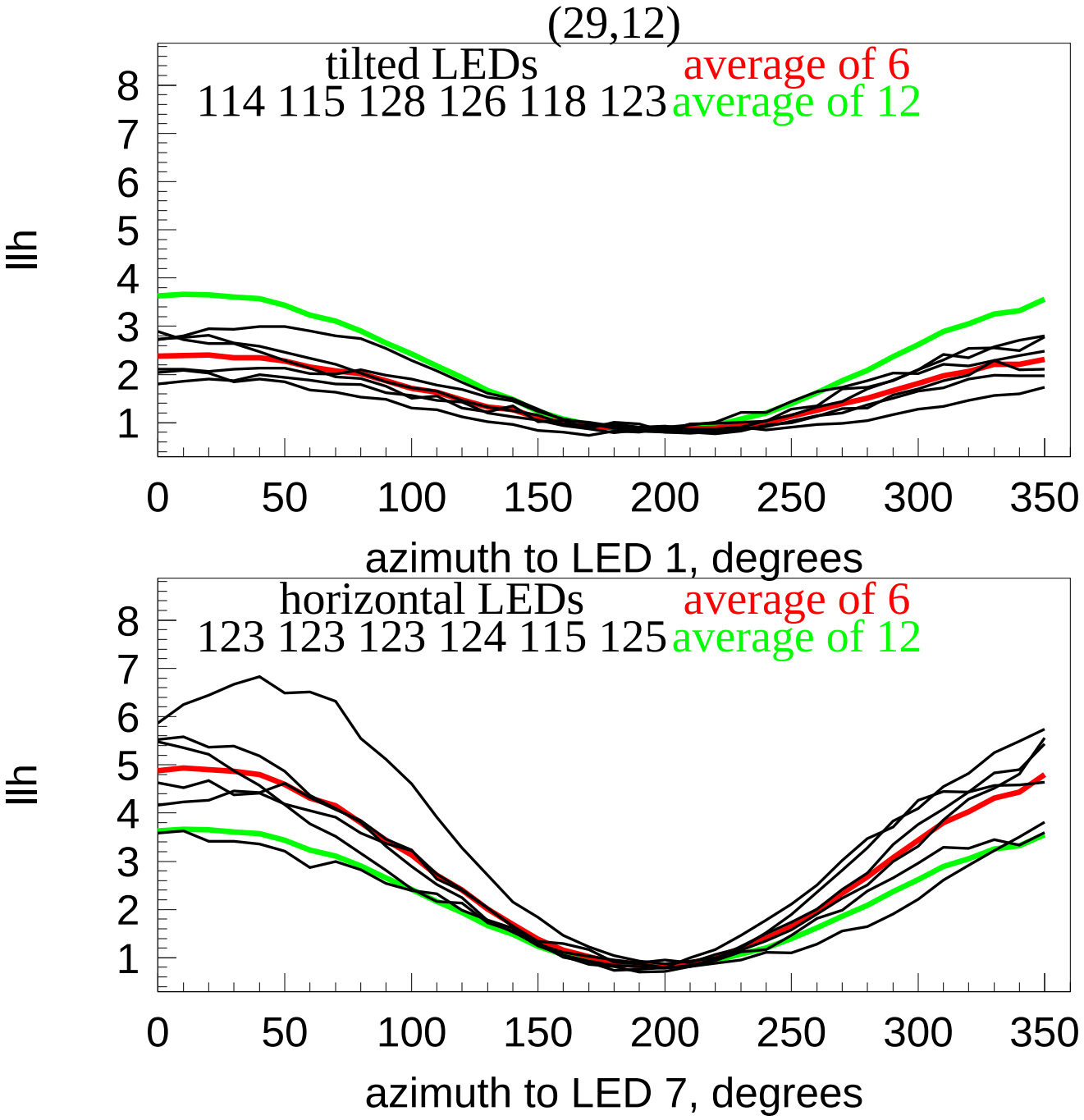

(29,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
353.9 ± 18.9

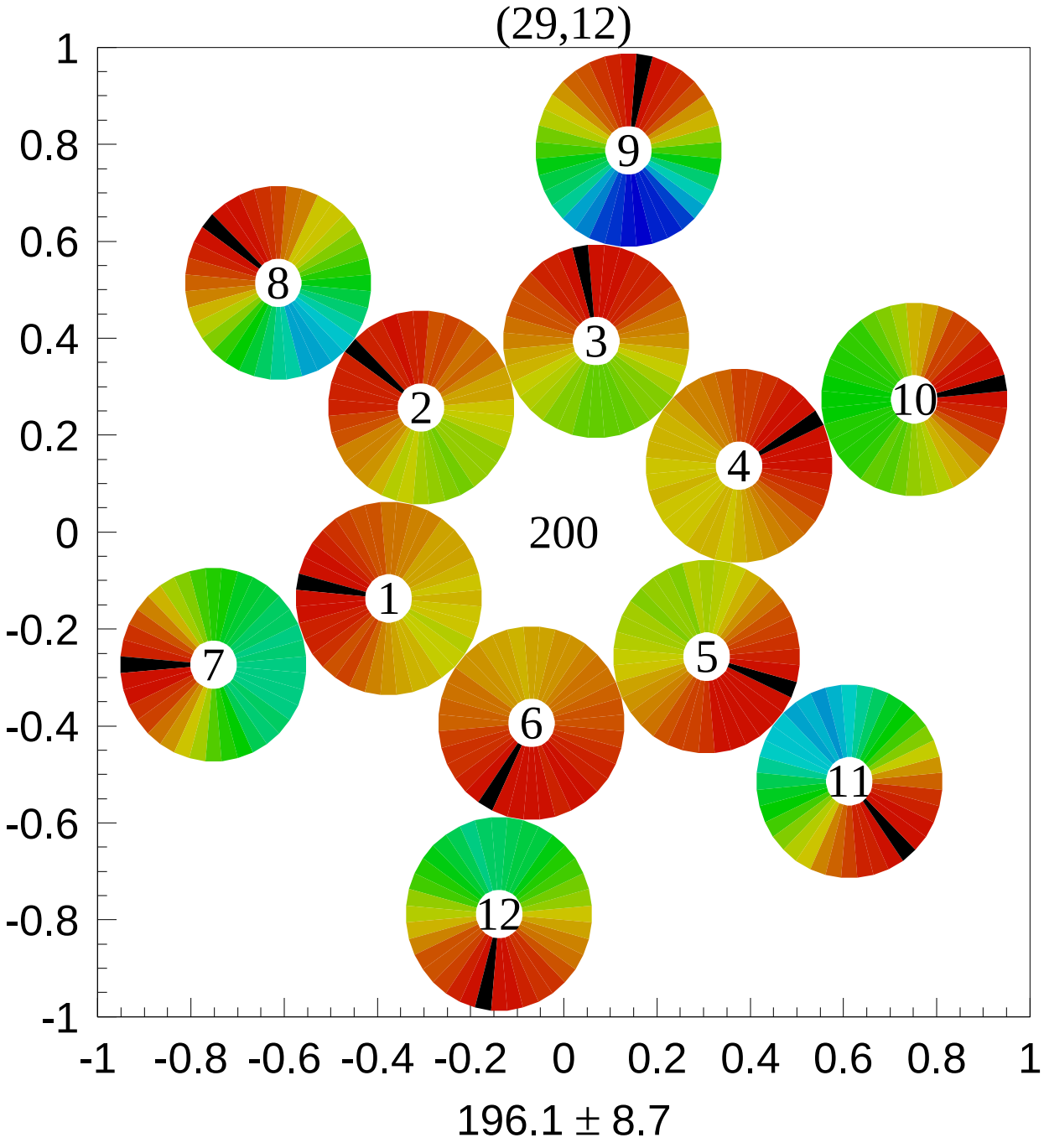

(29,10)
tilted LEDs
123 123 121 120 117 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 124 128 128 121 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

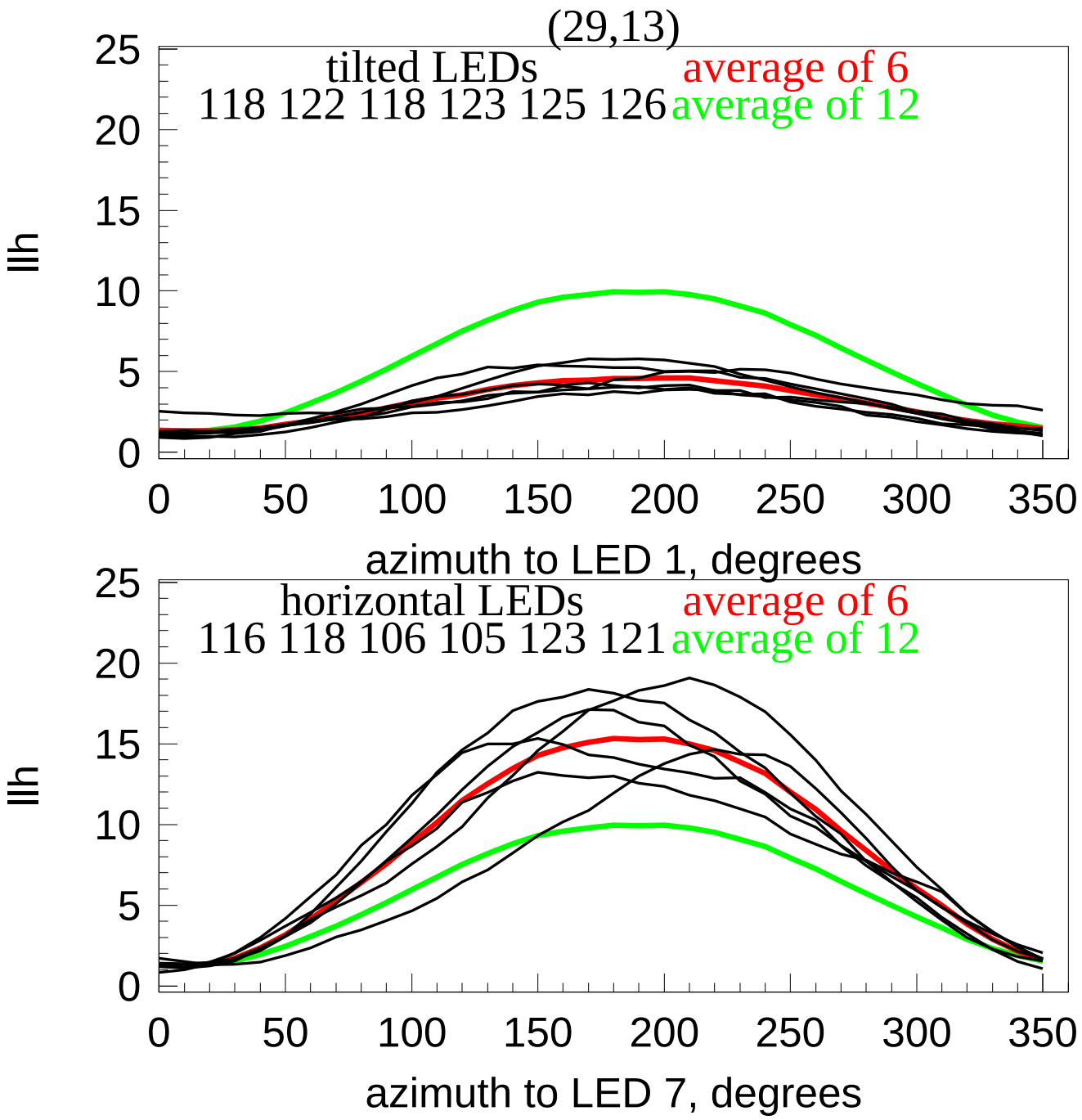

(29,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
158.7 ± 9.0

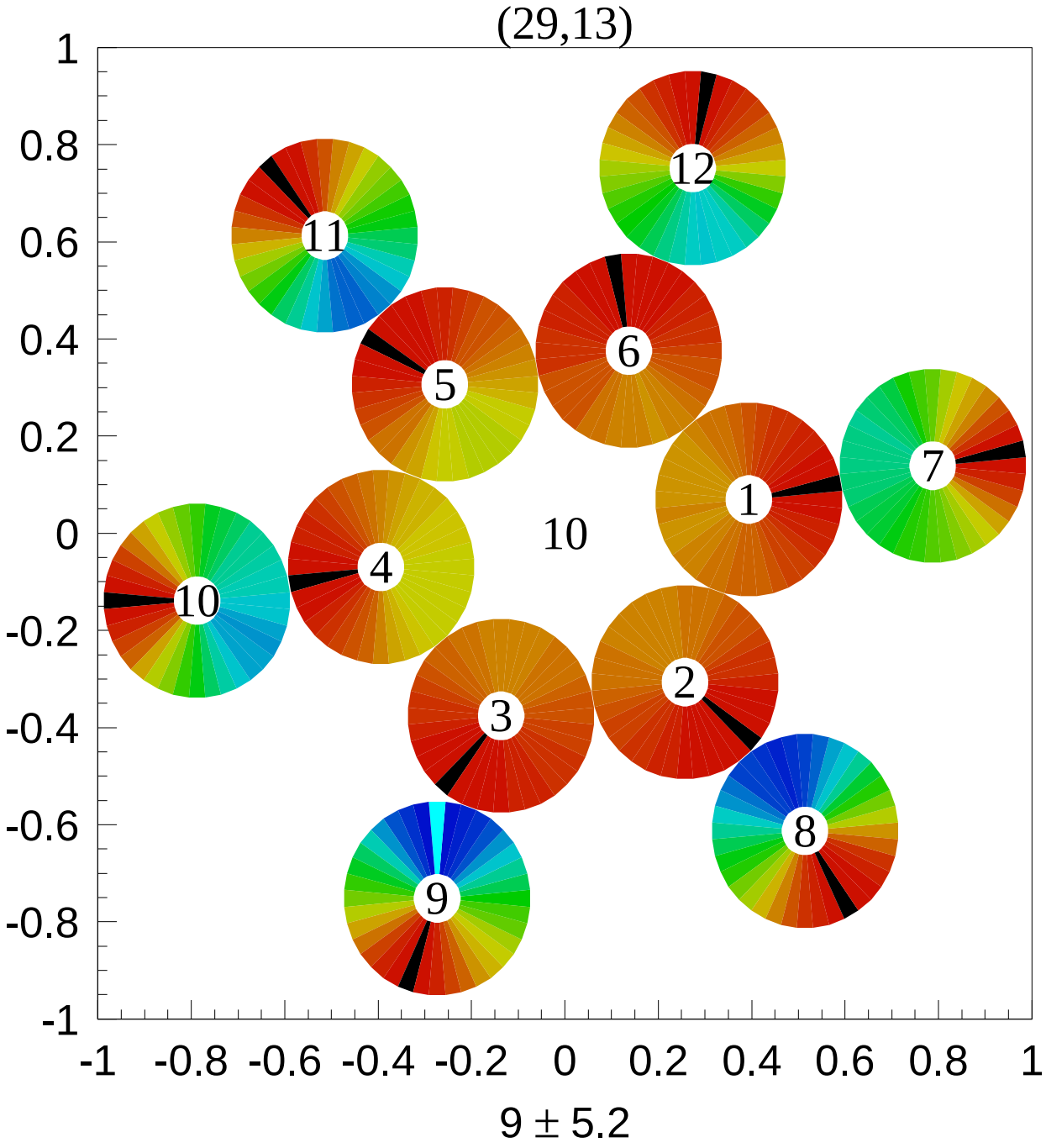

(29,11)
tilted LEDs
117 122 123 124 121 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 116 127 127 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

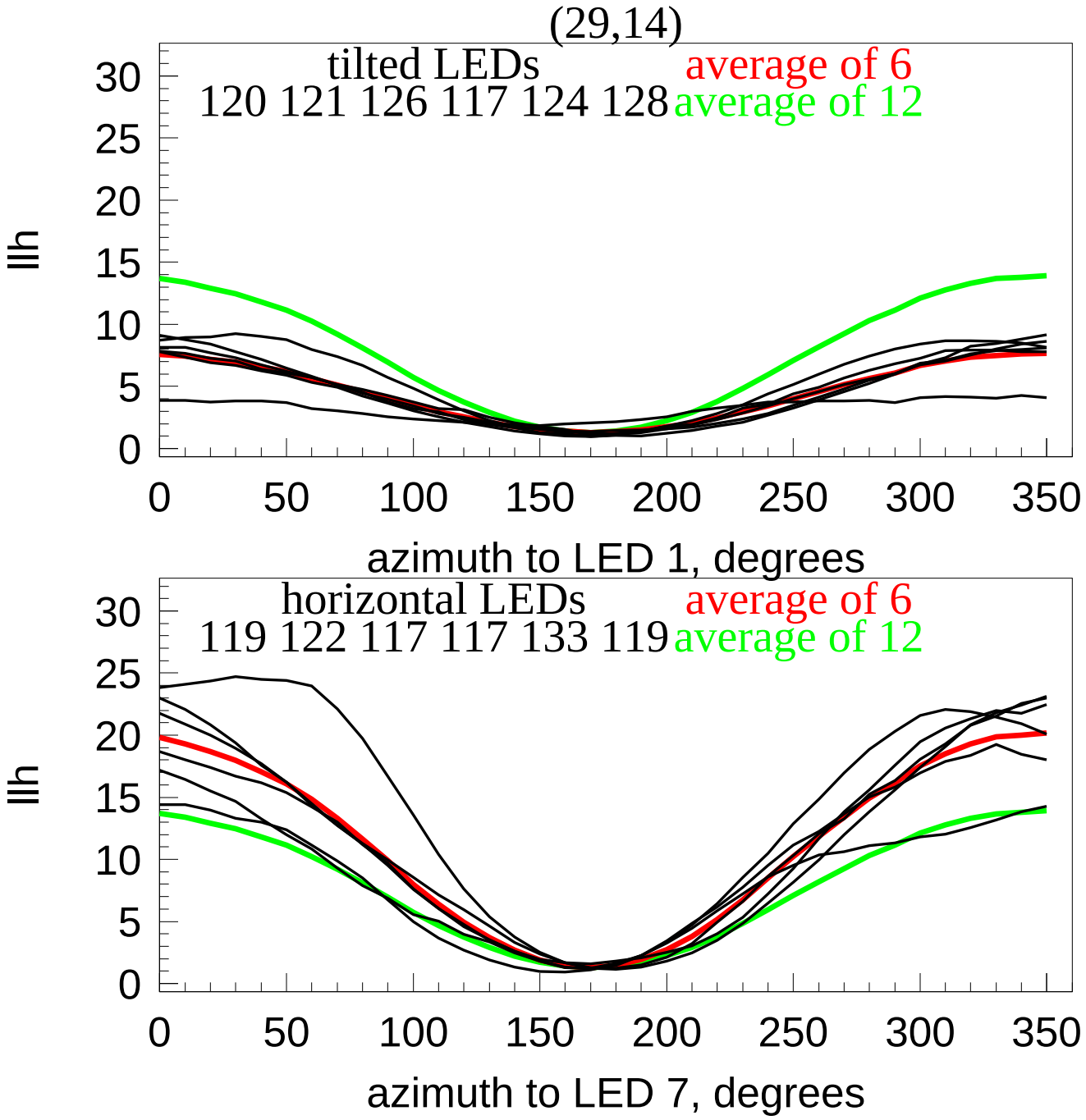

(29,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
24.6 ± 5.6

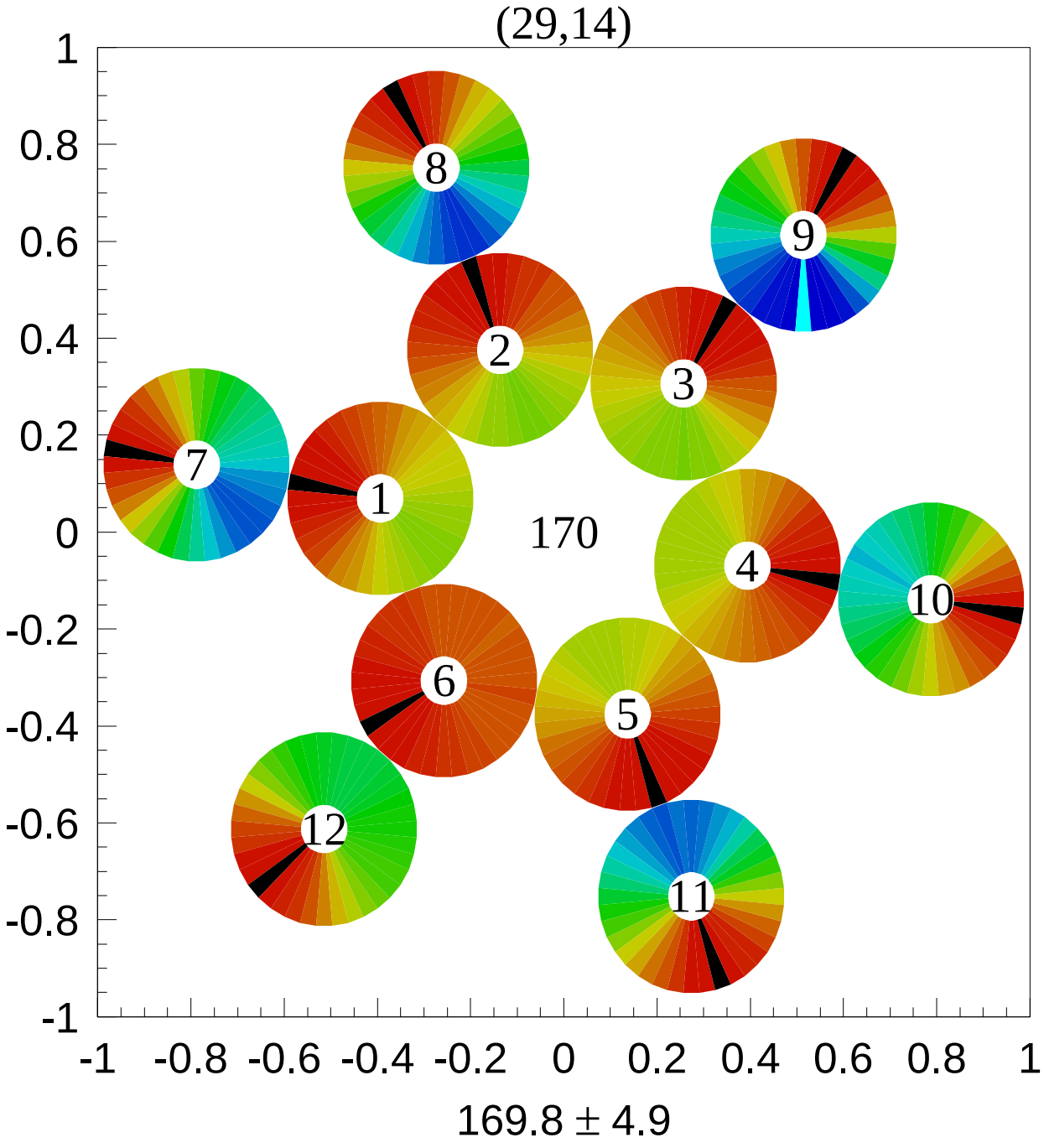

(29,12)
tilted LEDs
114 115 128 126 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 123 124 115 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

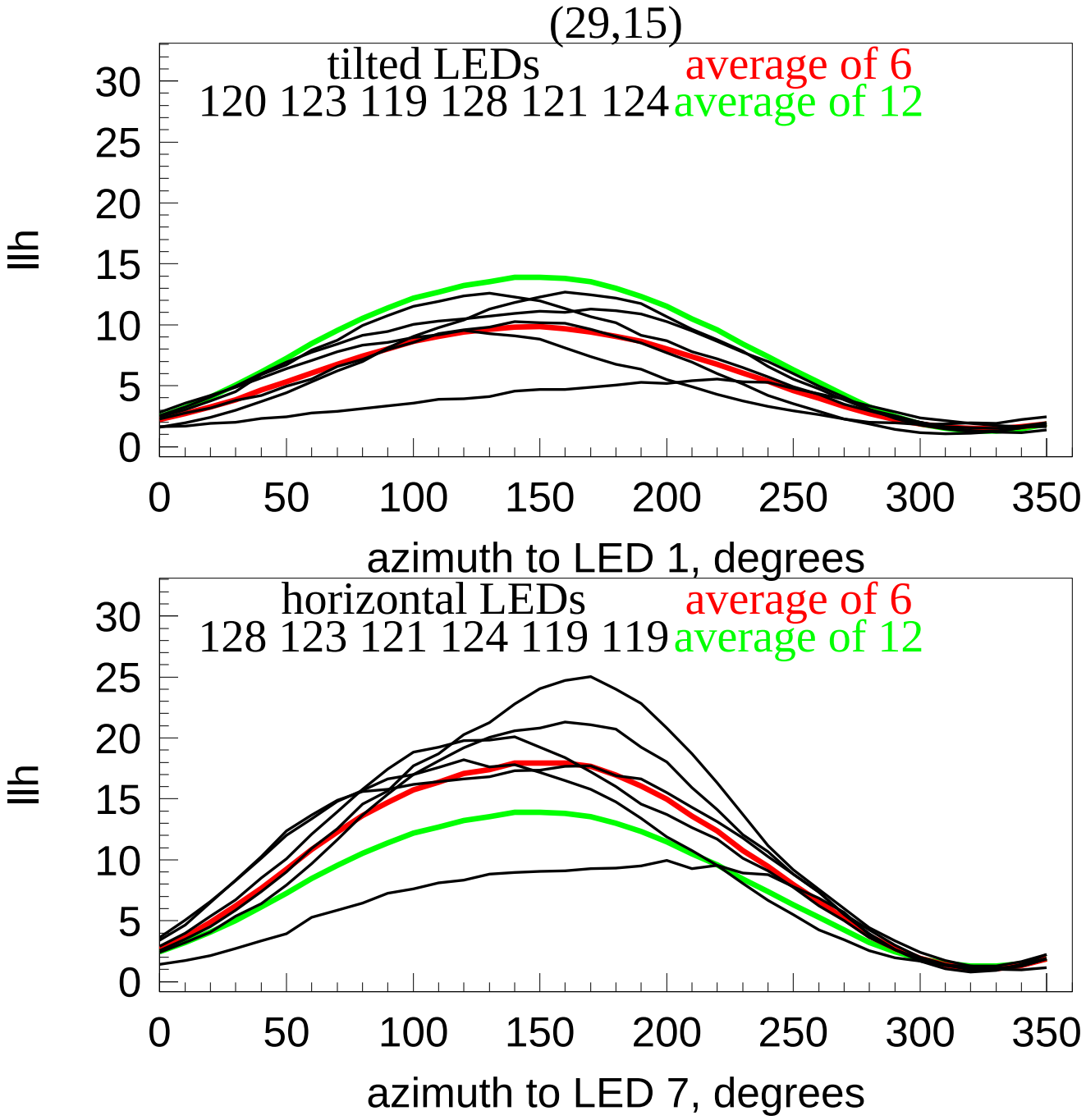

(29,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
196.1 ± 8.7

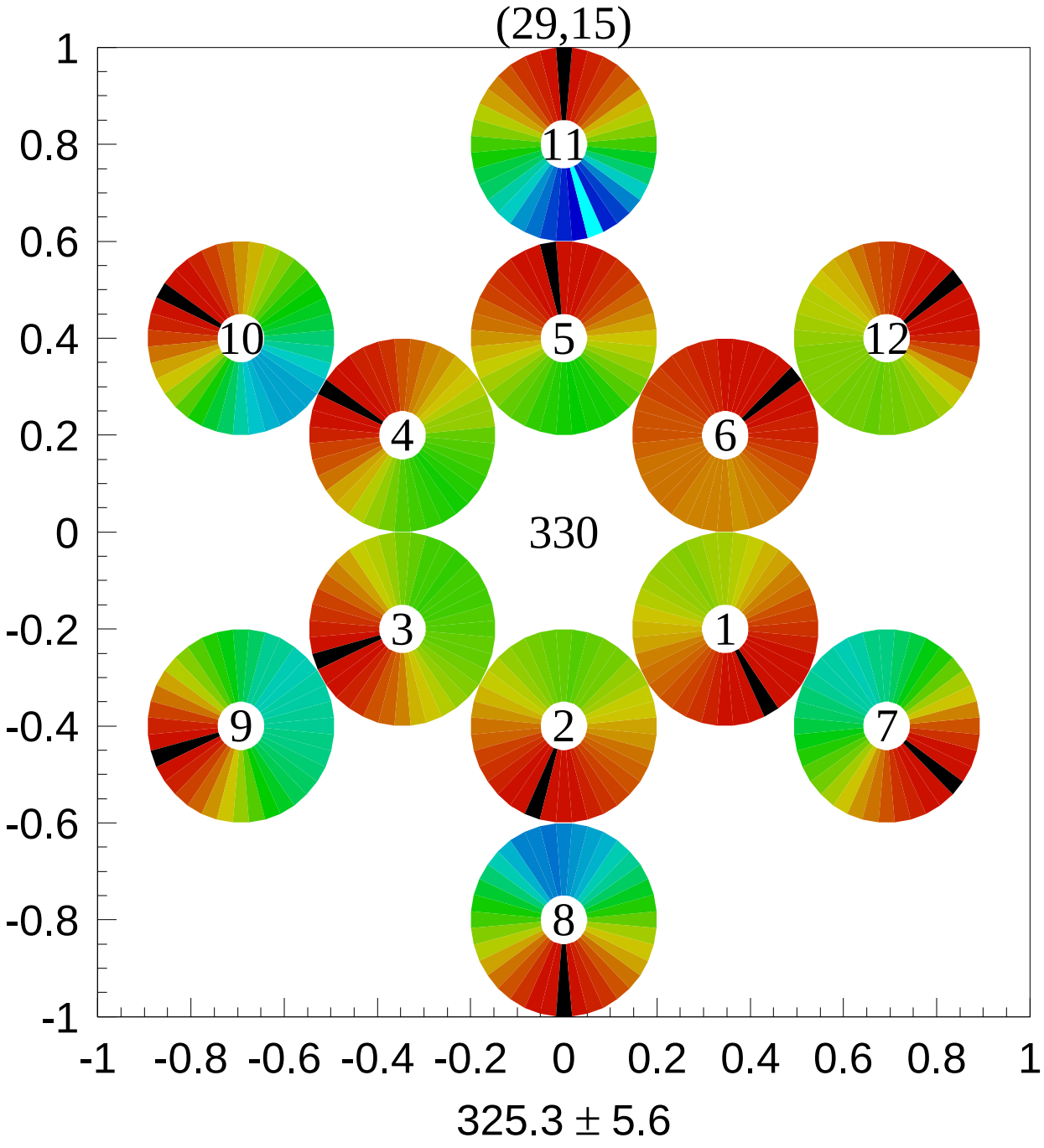

(29,13)
tilted LEDs
118 122 118 123 125 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 118 106 105 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

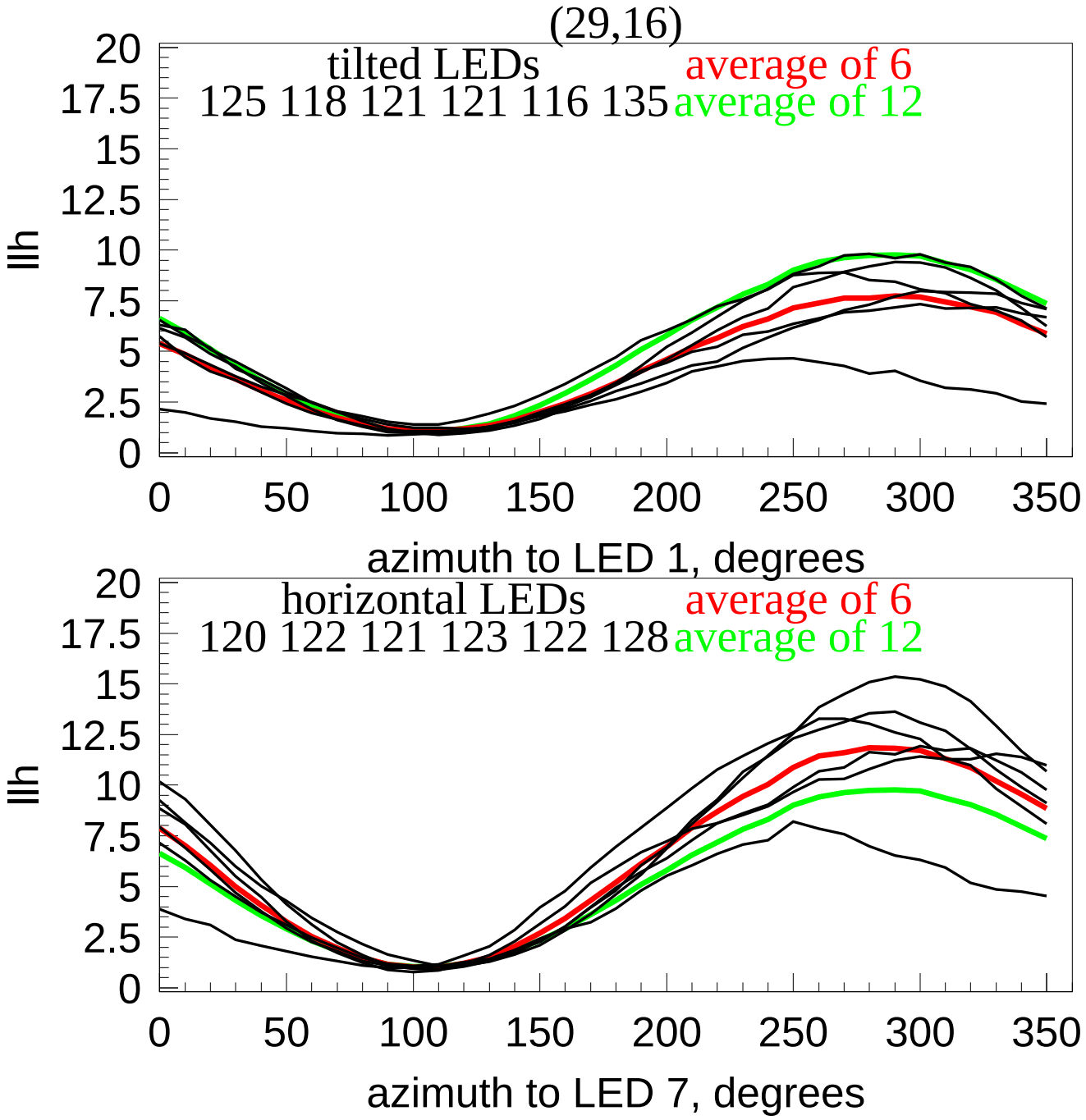

(29,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
9 ± 5.2

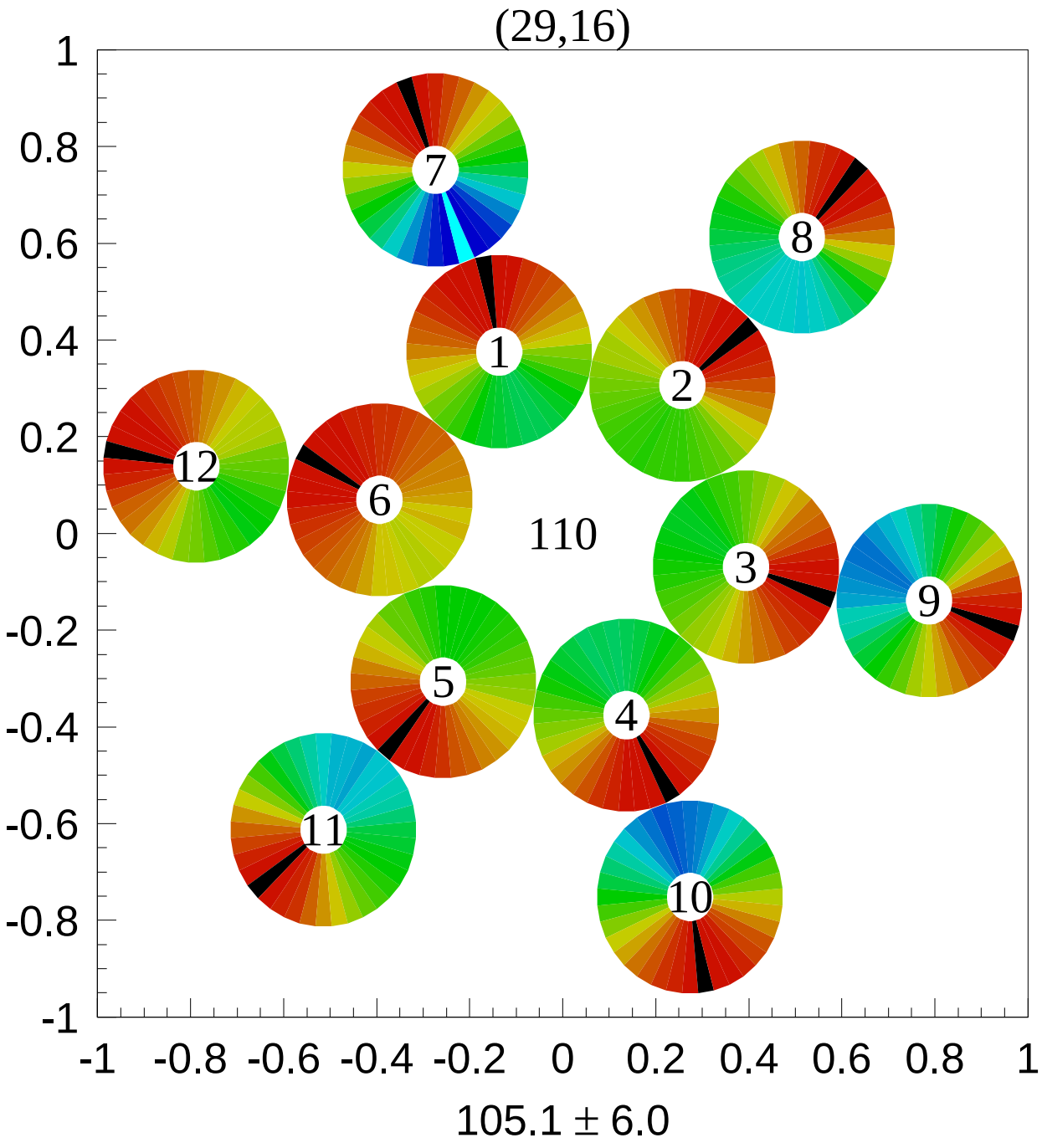

(29,14)
tilted LEDs
120 121 126 117 124 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 122 117 117 133 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

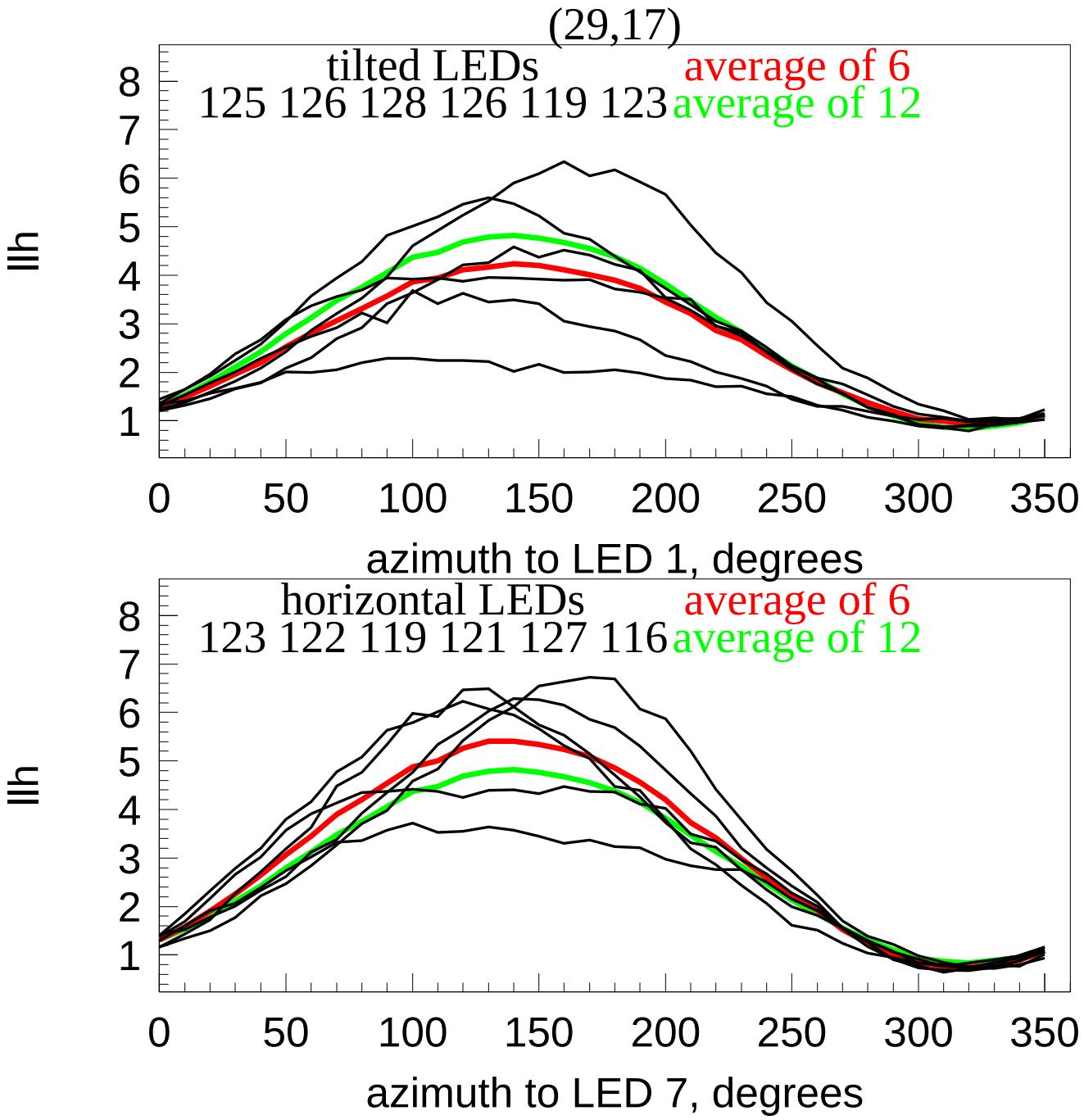

(29,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
169.8 ± 4.9

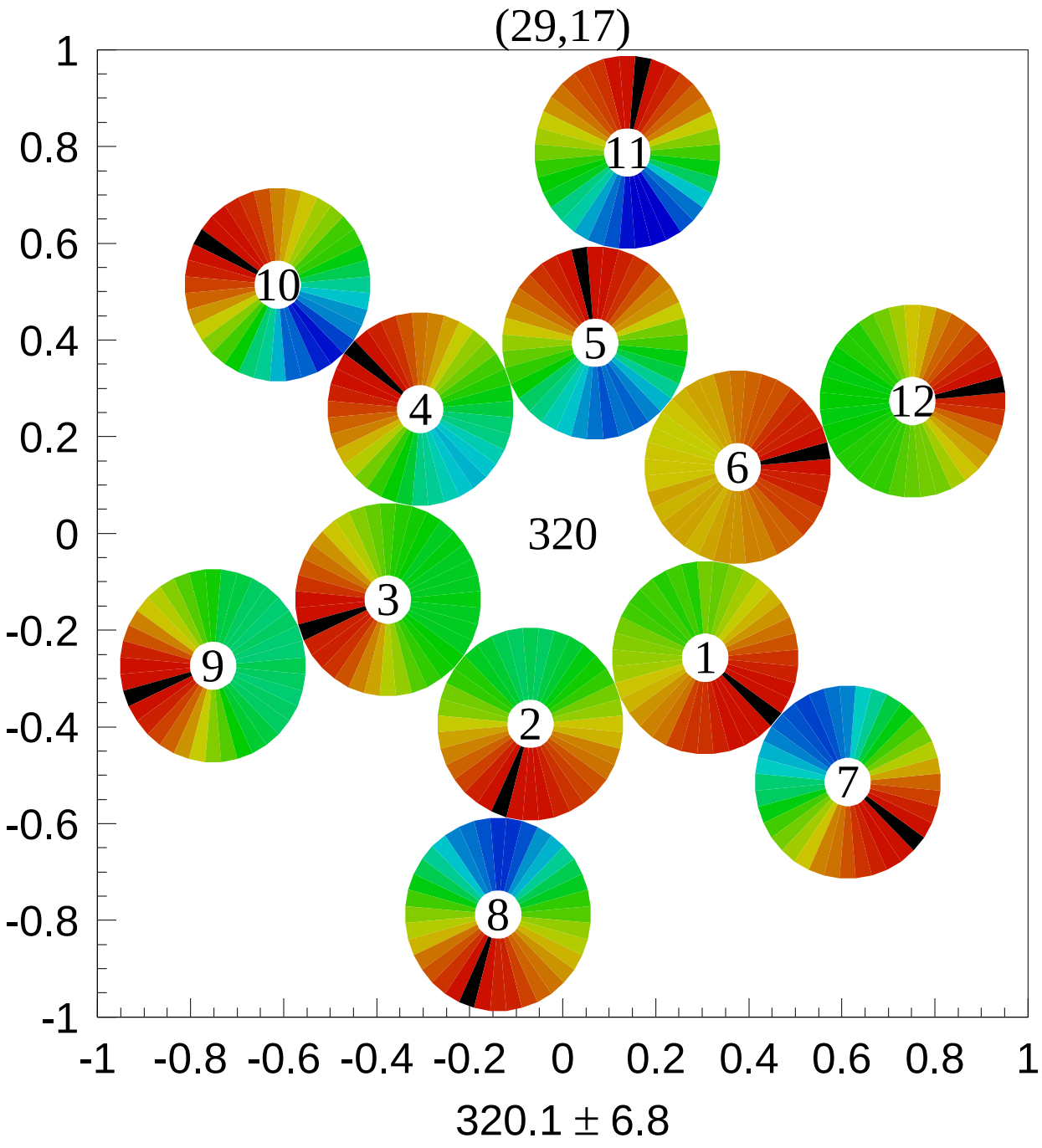

(29,15)
tilted LEDs
120 123 119 128 121 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 123 121 124 119 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

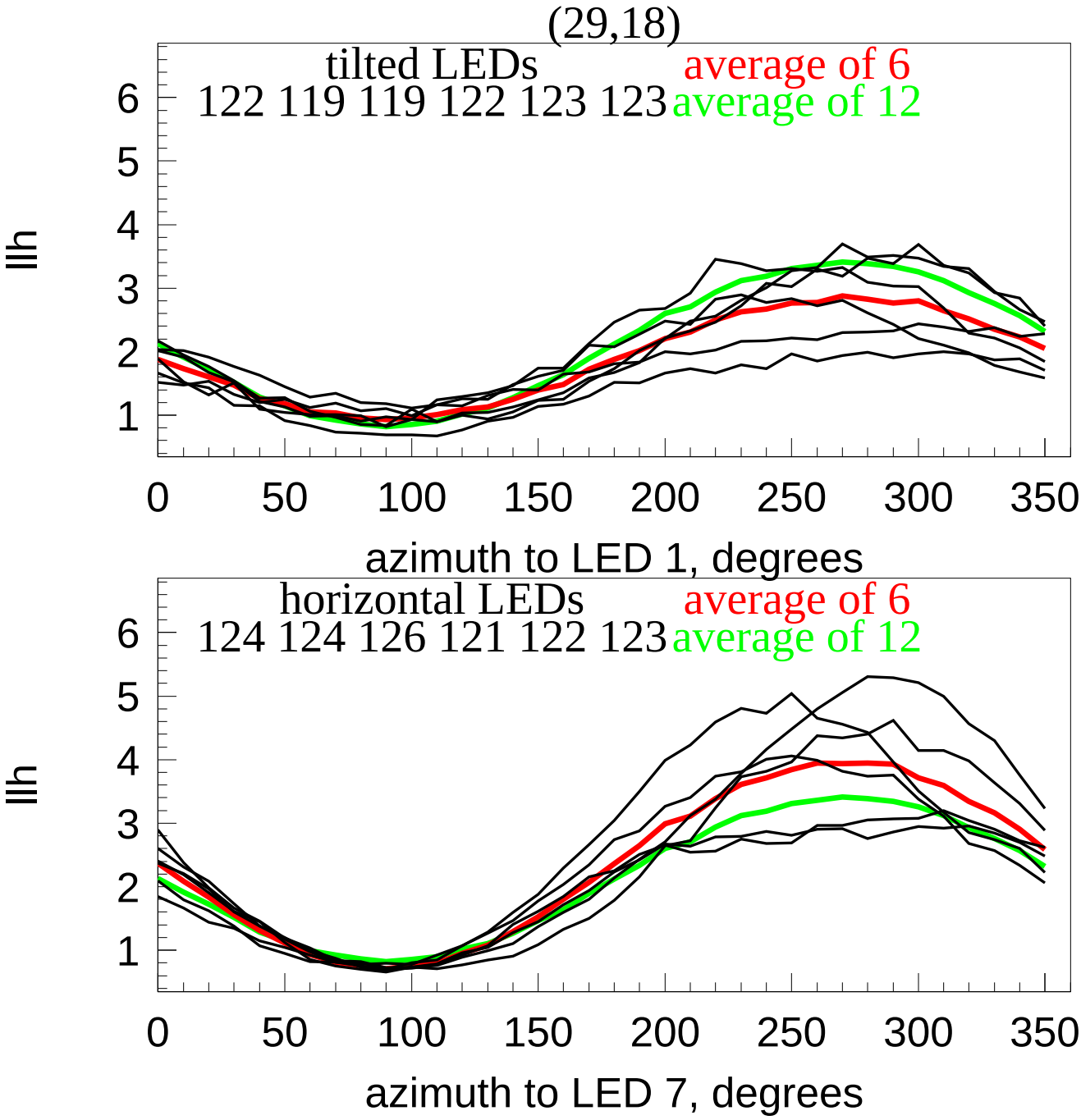

(29,15)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
325.3 ± 5.6

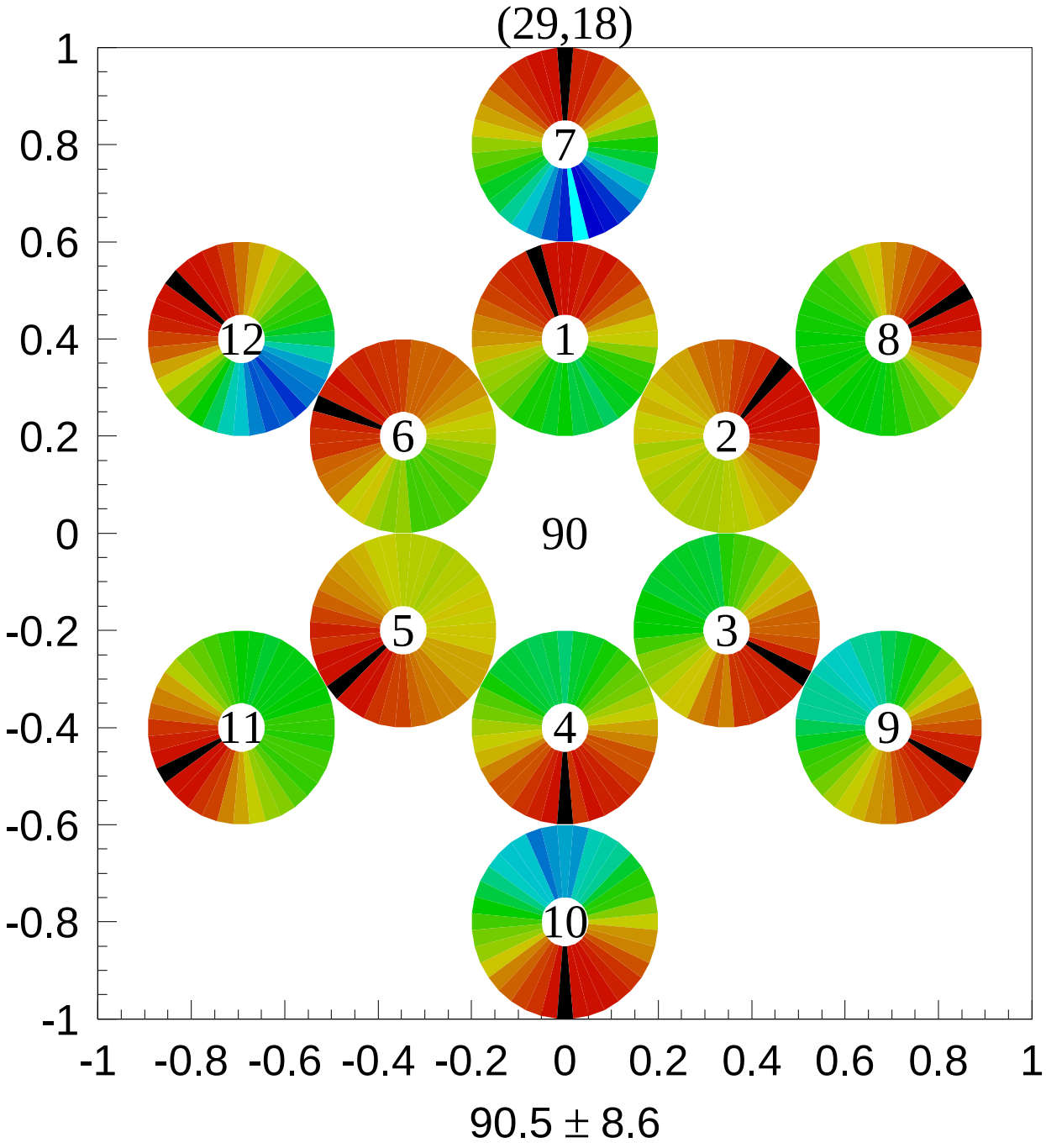

(29,16)
tilted LEDs
125 118 121 121 116 135
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 122 121 123 122 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

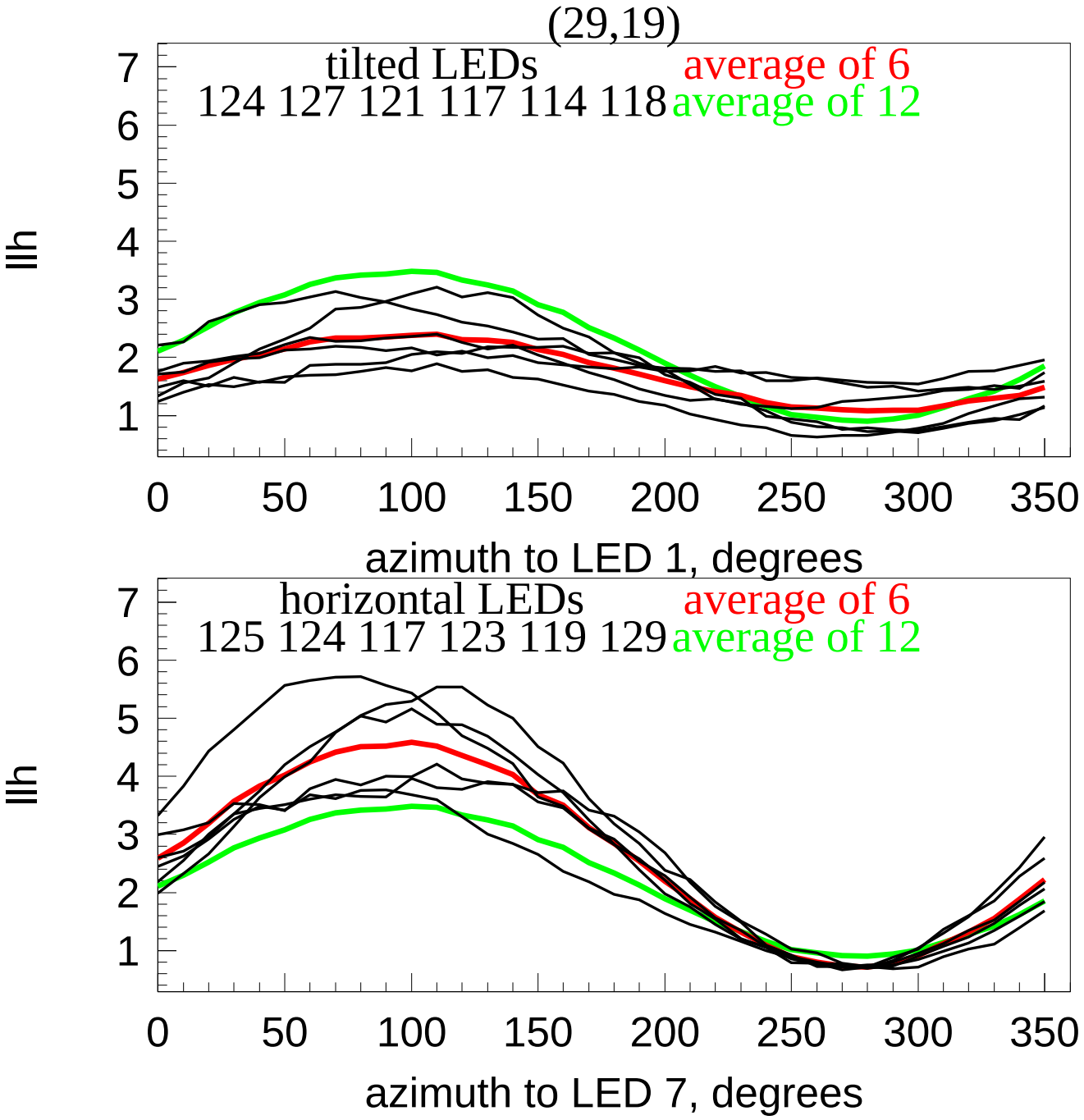

(29,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
105.1 ± 6.0
110
1
2
3
4
5
6
7
8
9
10
11
12

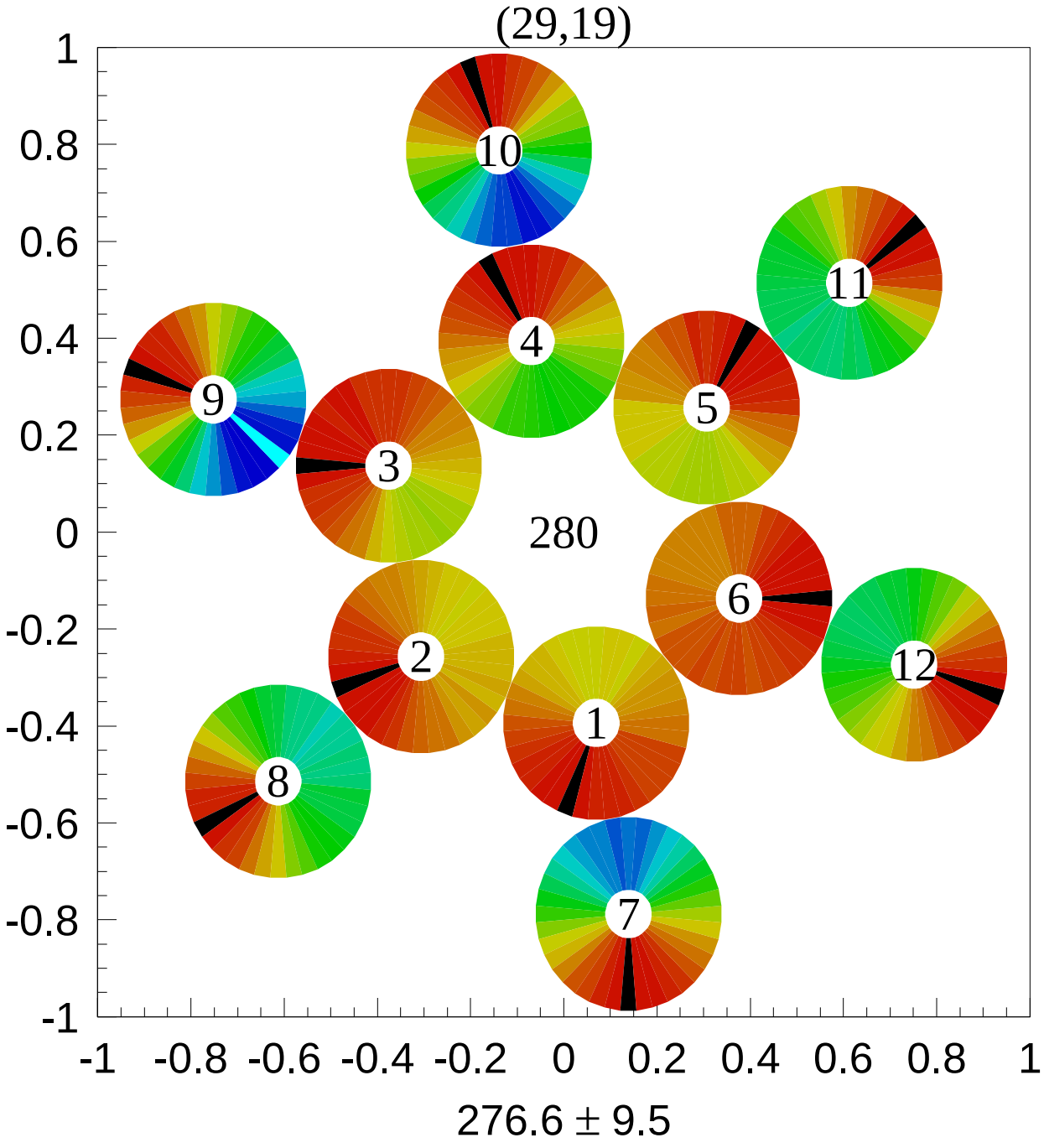

(29,17)
tilted LEDs
125 126 128 126 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 119 121 127 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

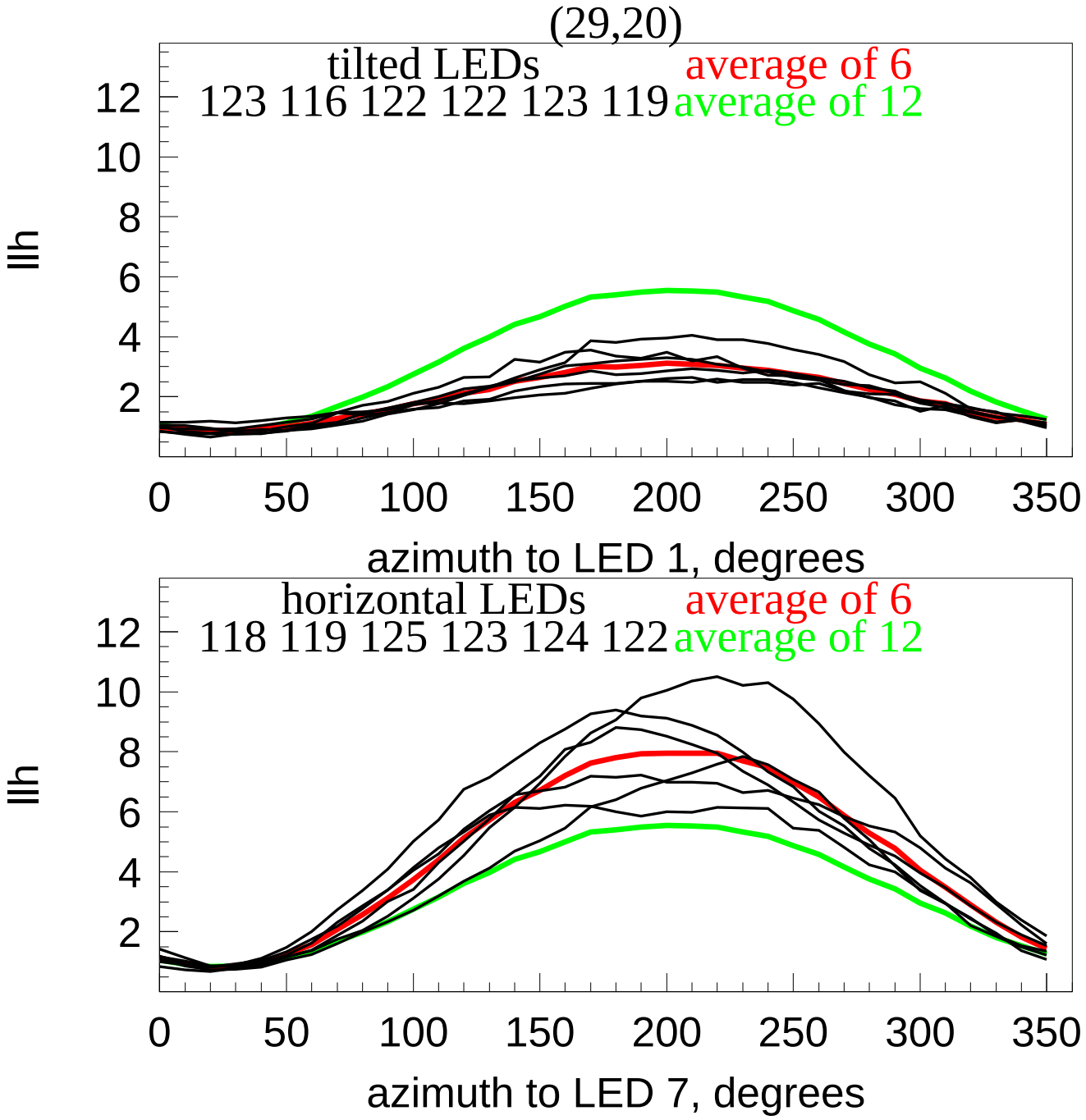

(29,17)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
320.1 ± 6.8

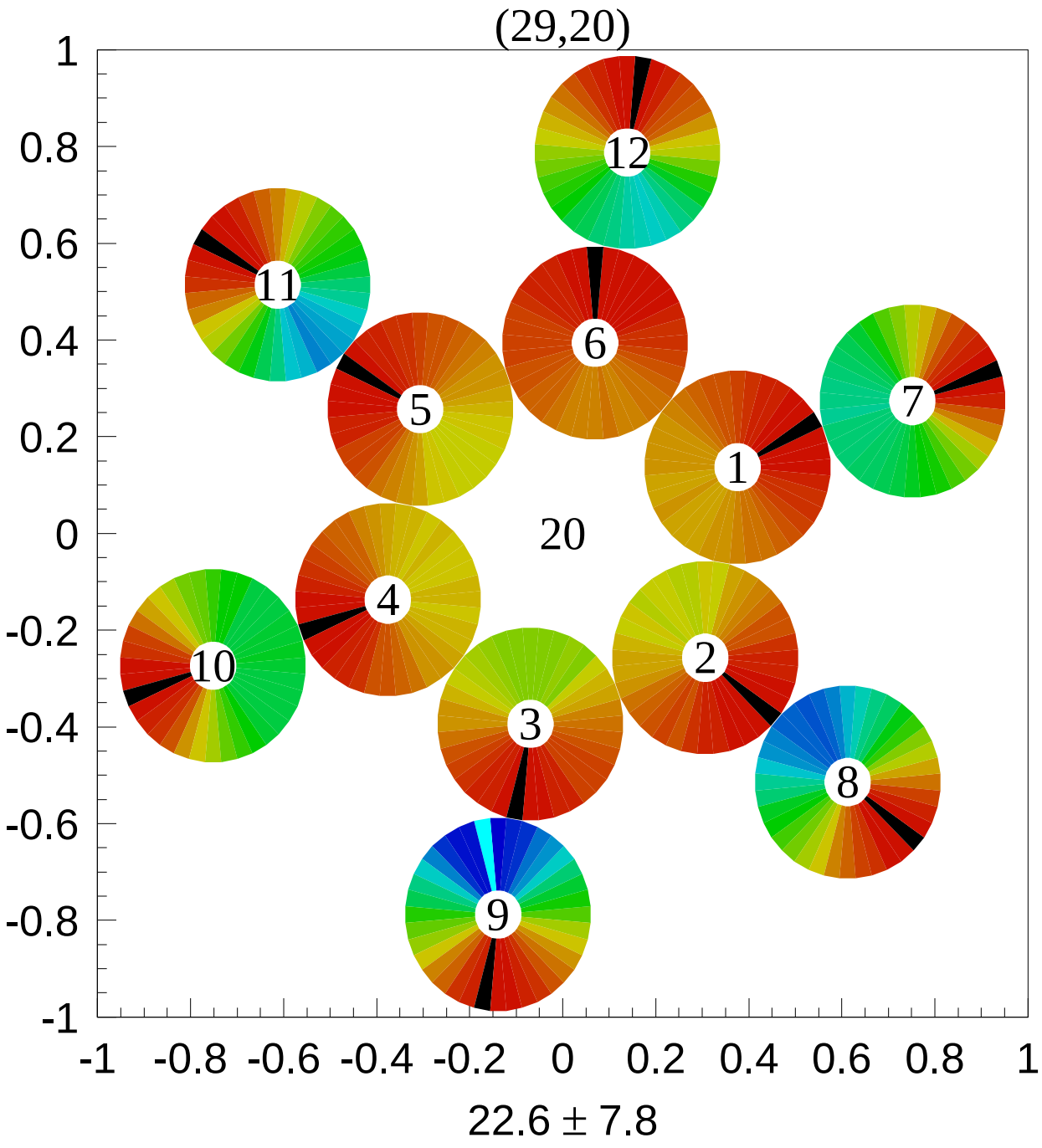

(29,18)
tilted LEDs
122 119 119 122 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 126 121 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

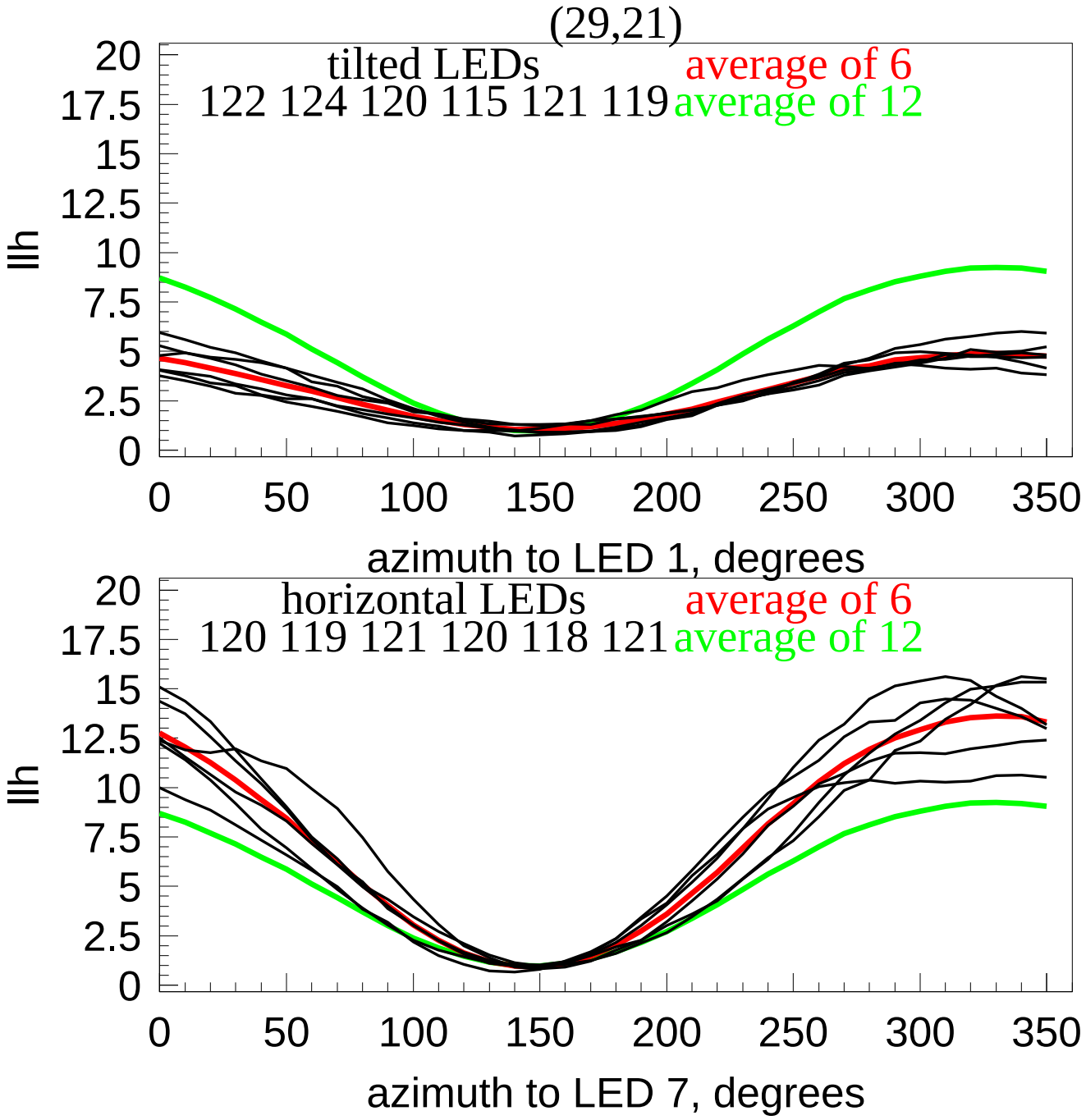

(29,18)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
90.5 ± 8.6

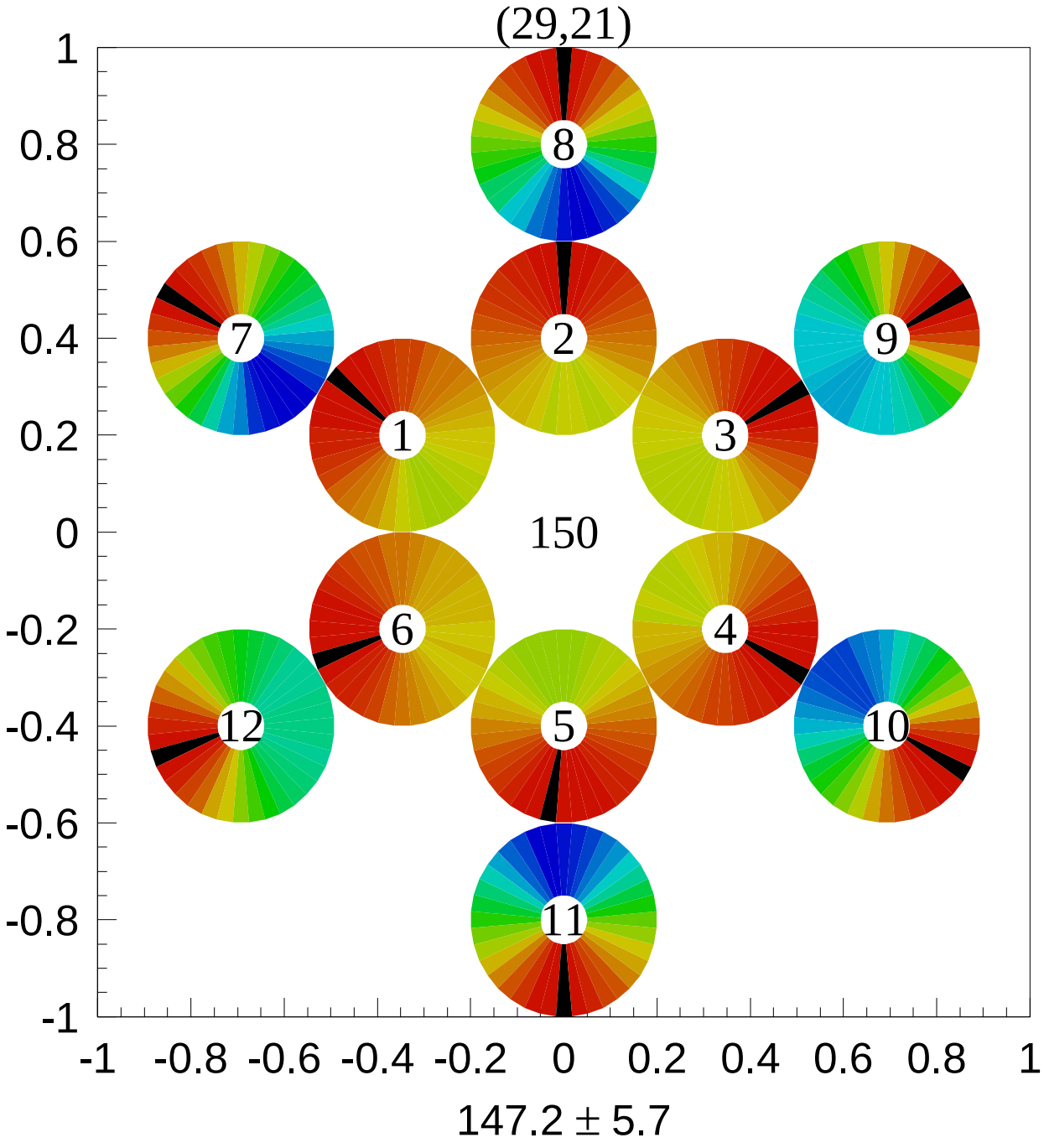

(29,19)
tilted LEDs
124 127 121 117 114 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 117 123 119 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

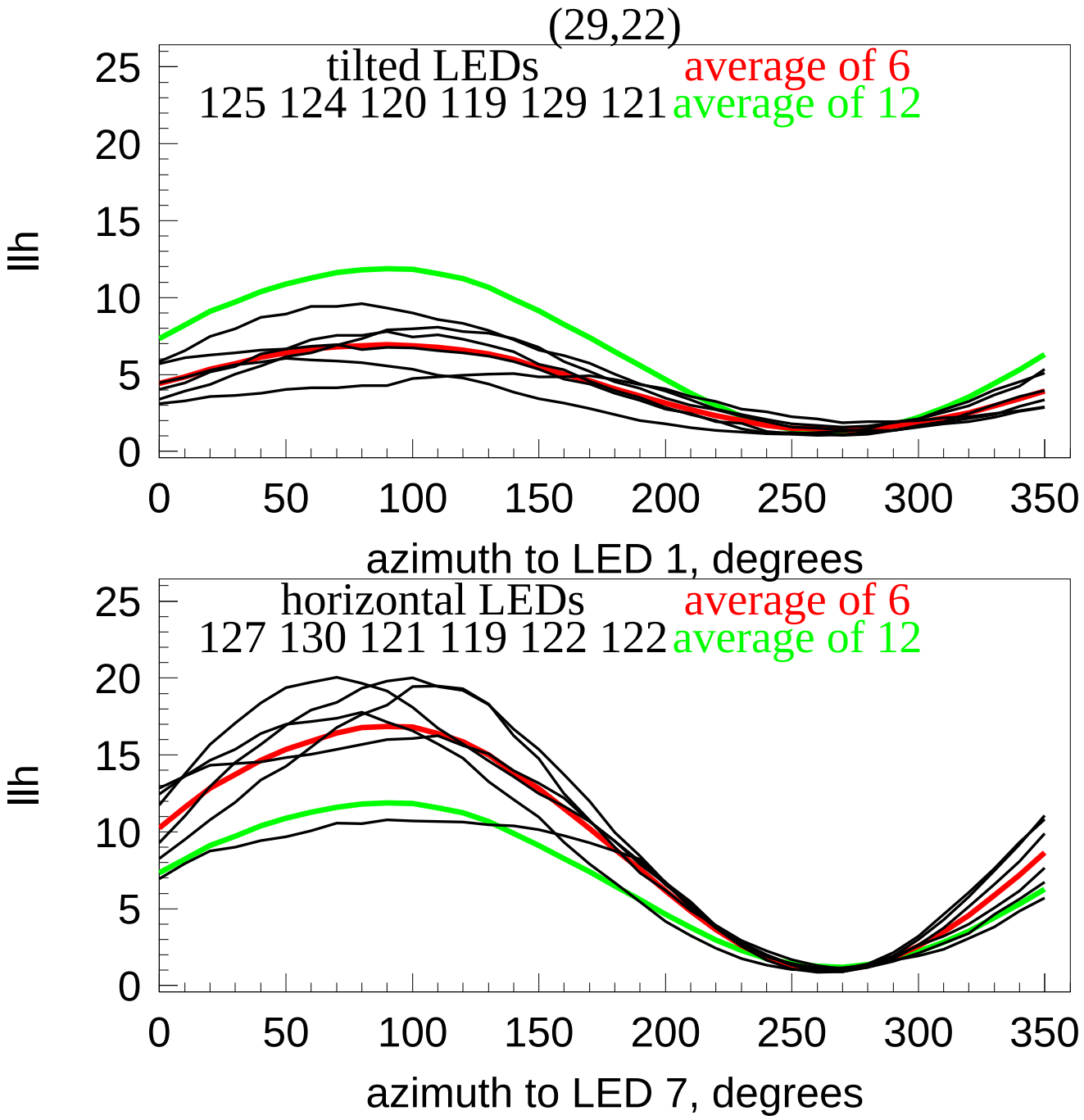

(29,19)
10
11
4
9
5
3
280
6
2
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
276.6 ± 9.5

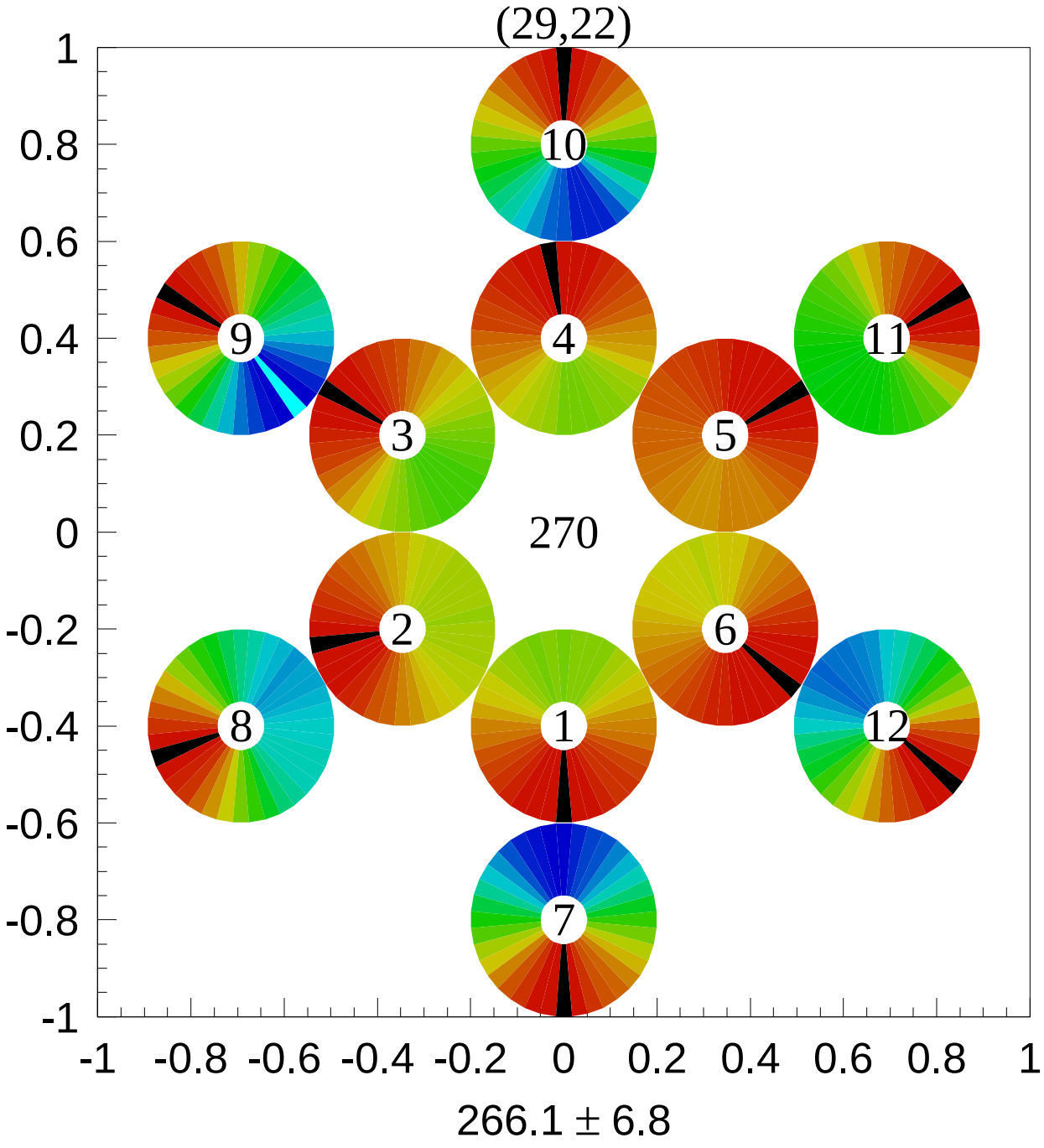

(29,20)
tilted LEDs
123 116 122 122 123 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 119 125 123 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

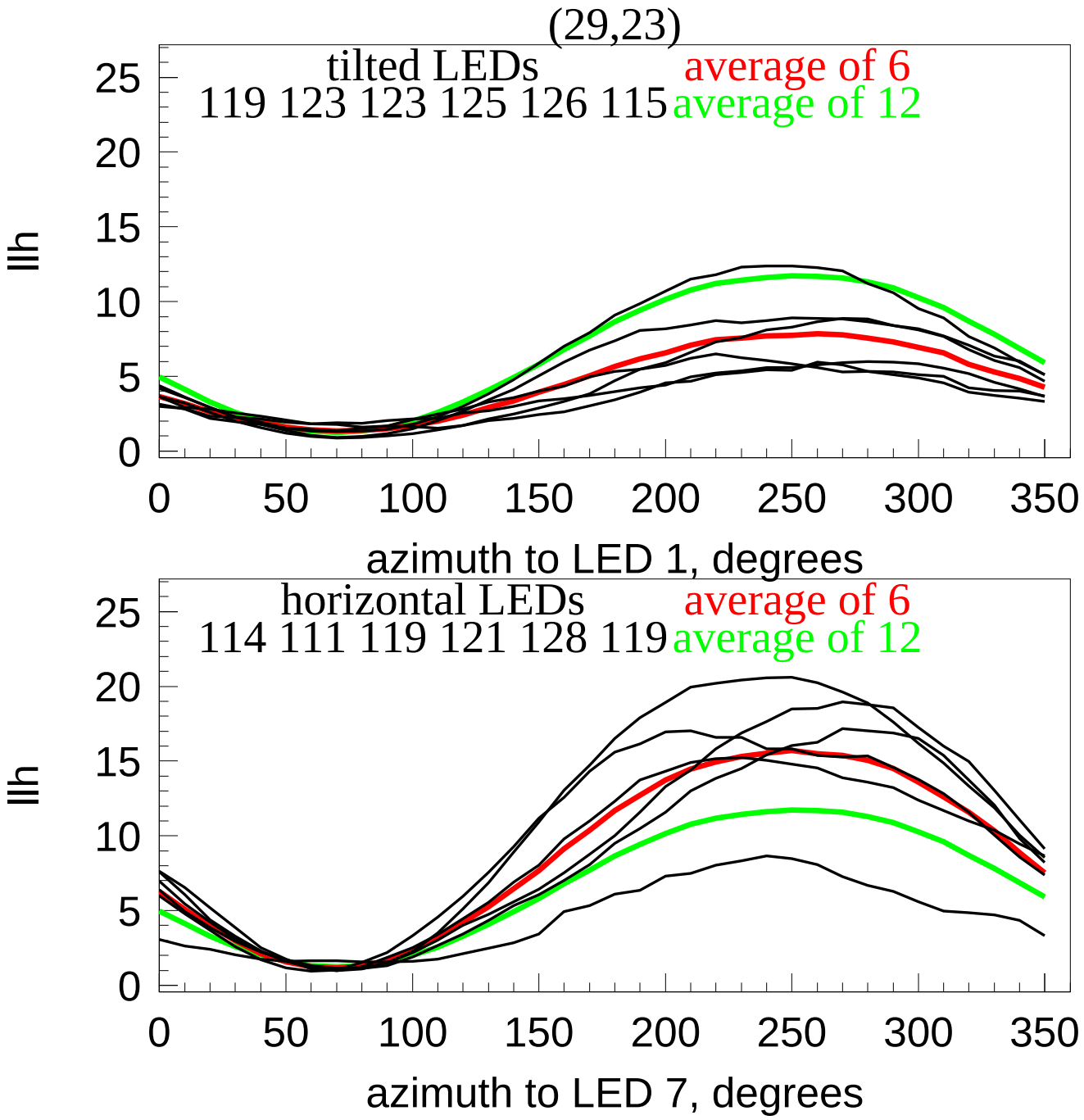

(29,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
22.6 ± 7.8
12
11
6
5
7
1
20
4
10
2
3
8
9

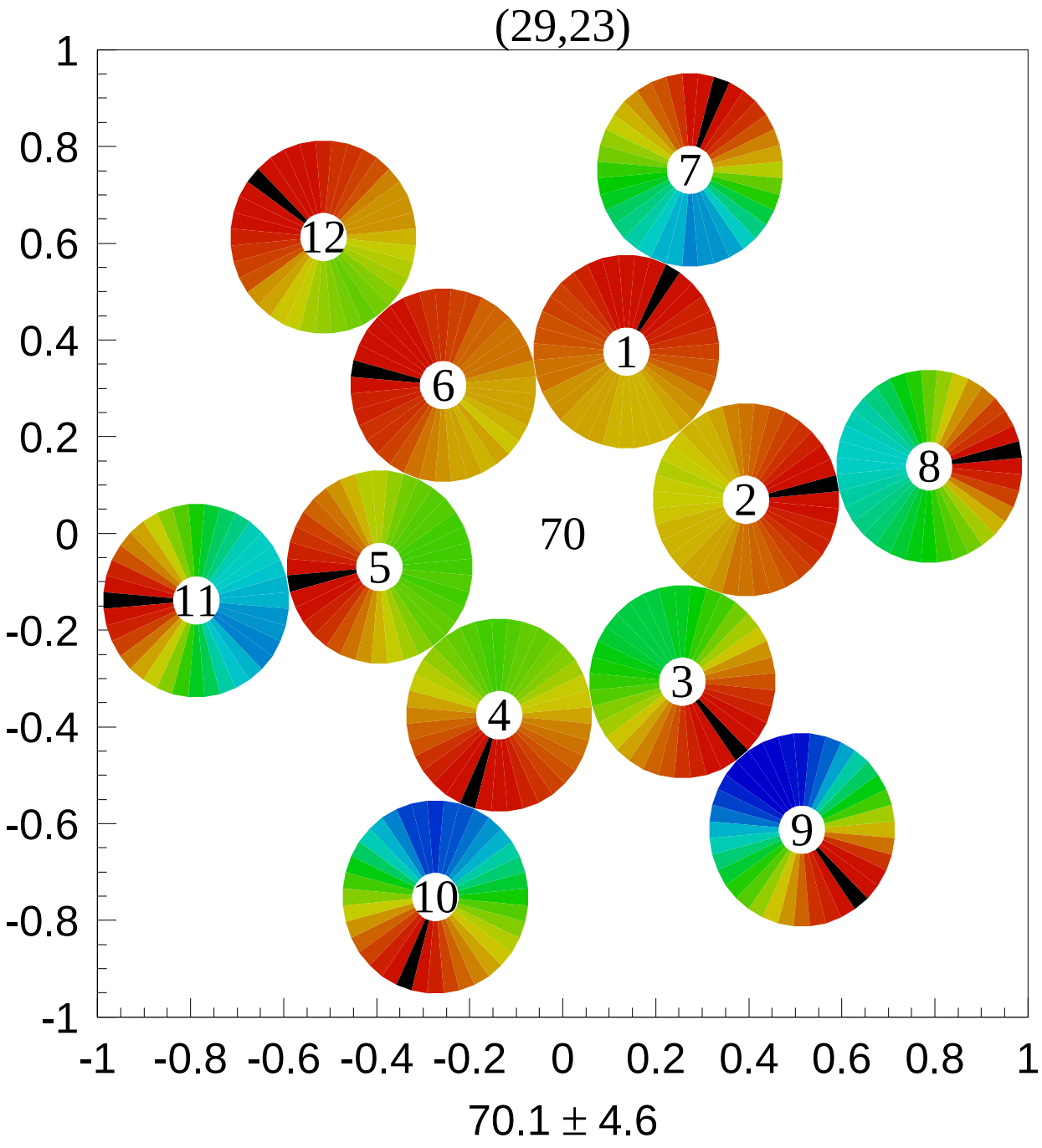

(29,21)
tilted LEDs
122 124 120 115 121 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 119 121 120 118 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

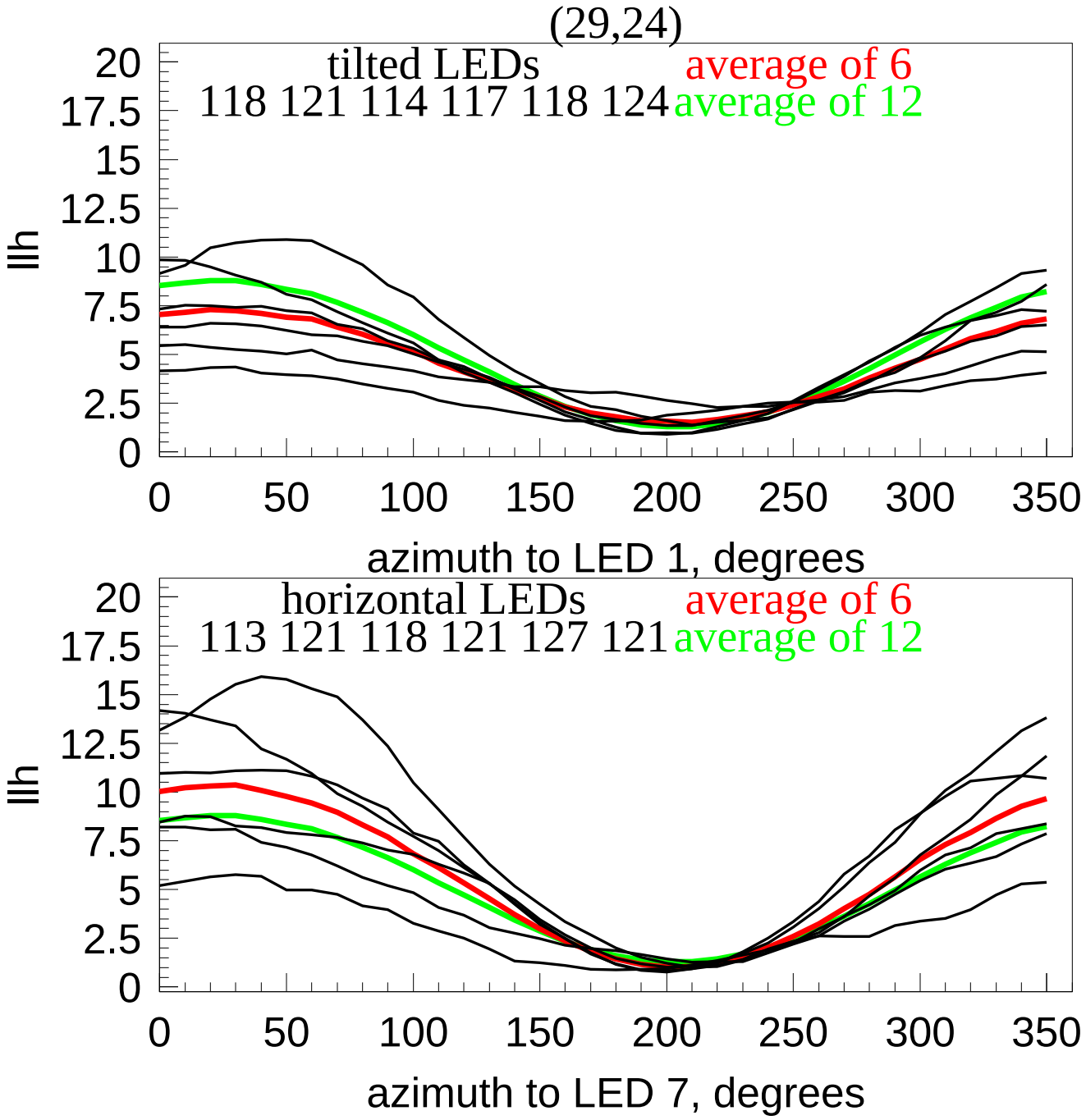

(29,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
147.2 ± 5.7

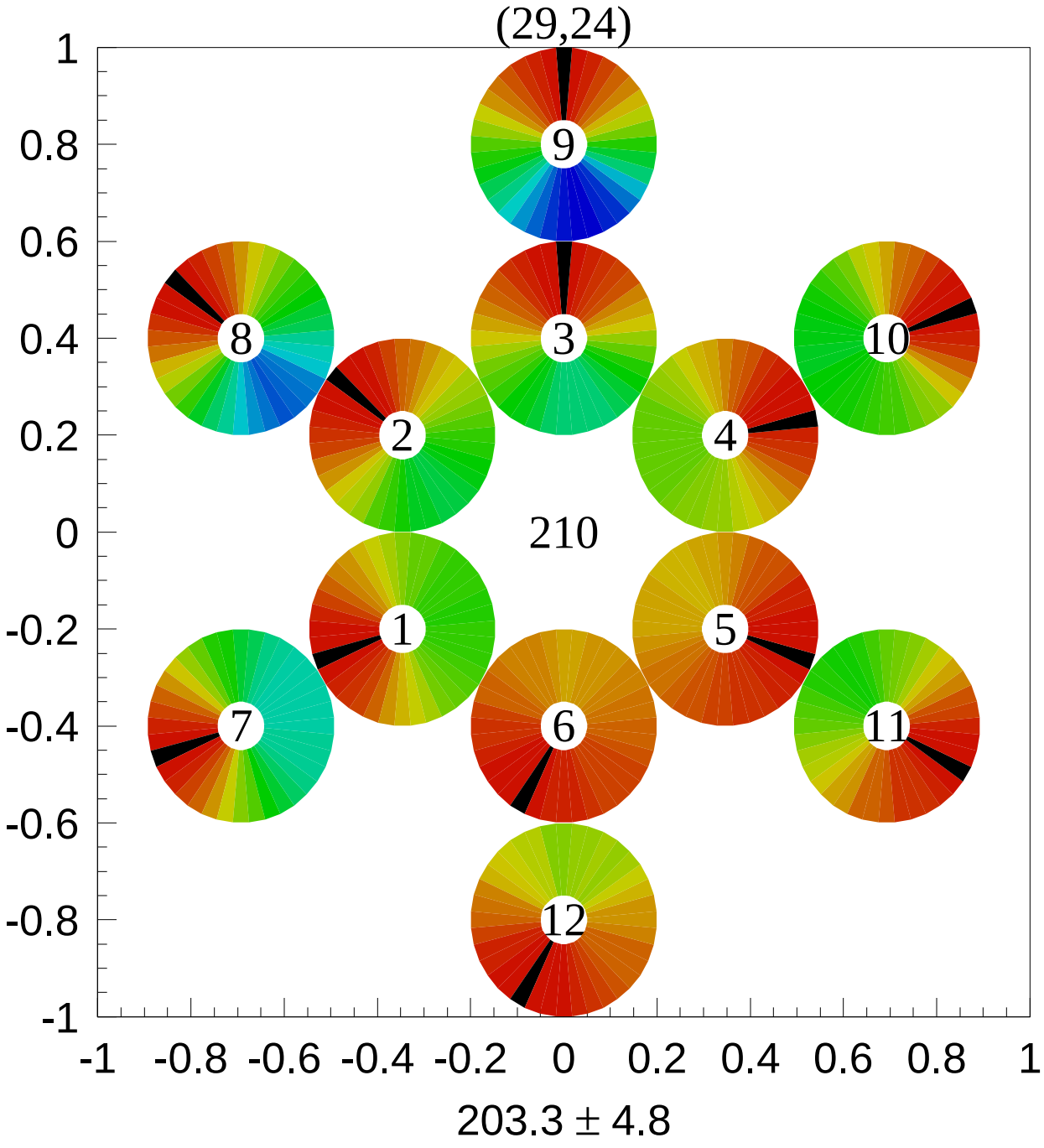

(29,22)
tilted LEDs
125 124 120 119 129 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 130 121 119 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

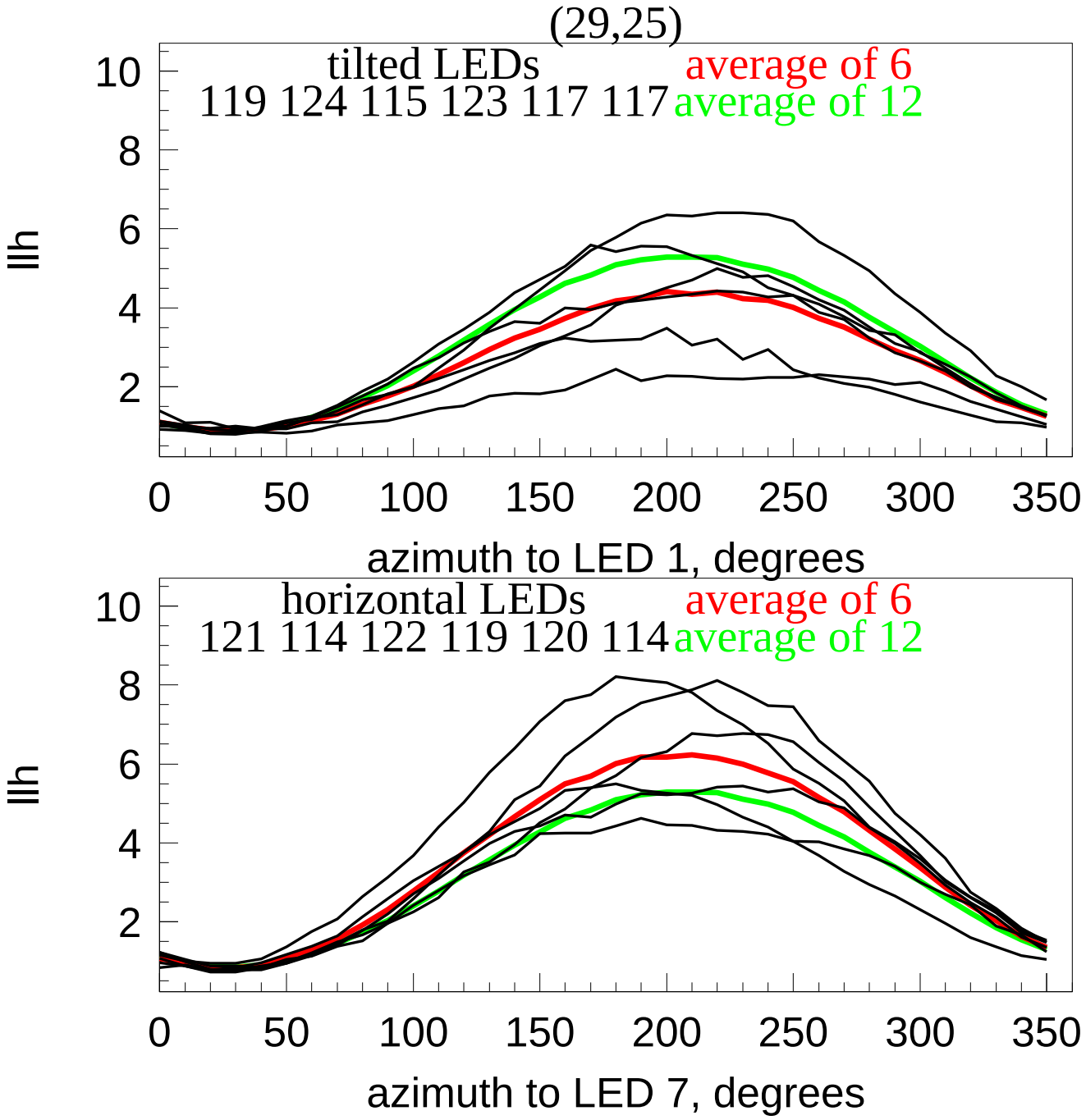

(29,22)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
266.1 ± 6.8

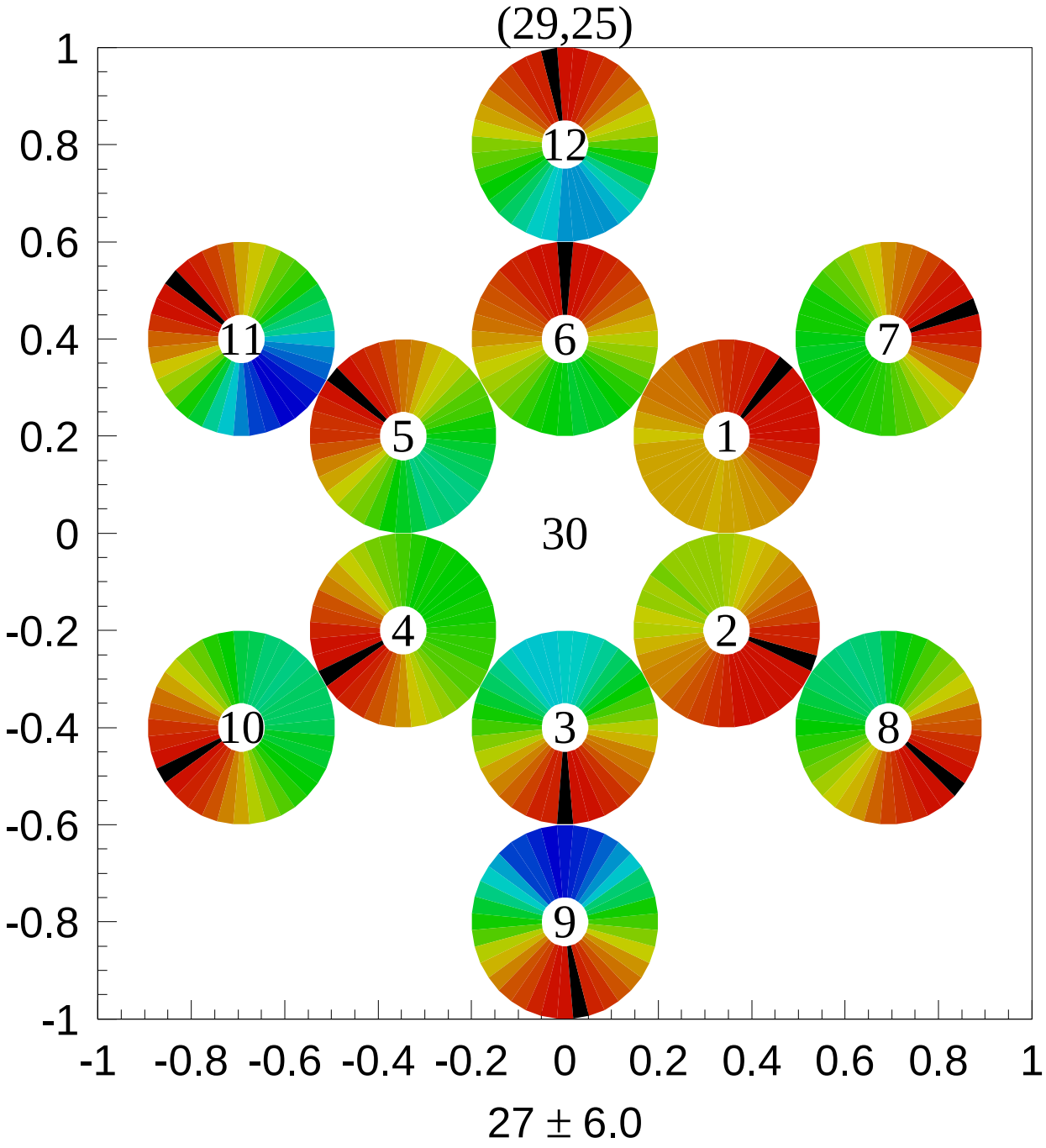

(29,23)
tilted LEDs
119 123 123 125 126 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 111 119 121 128 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

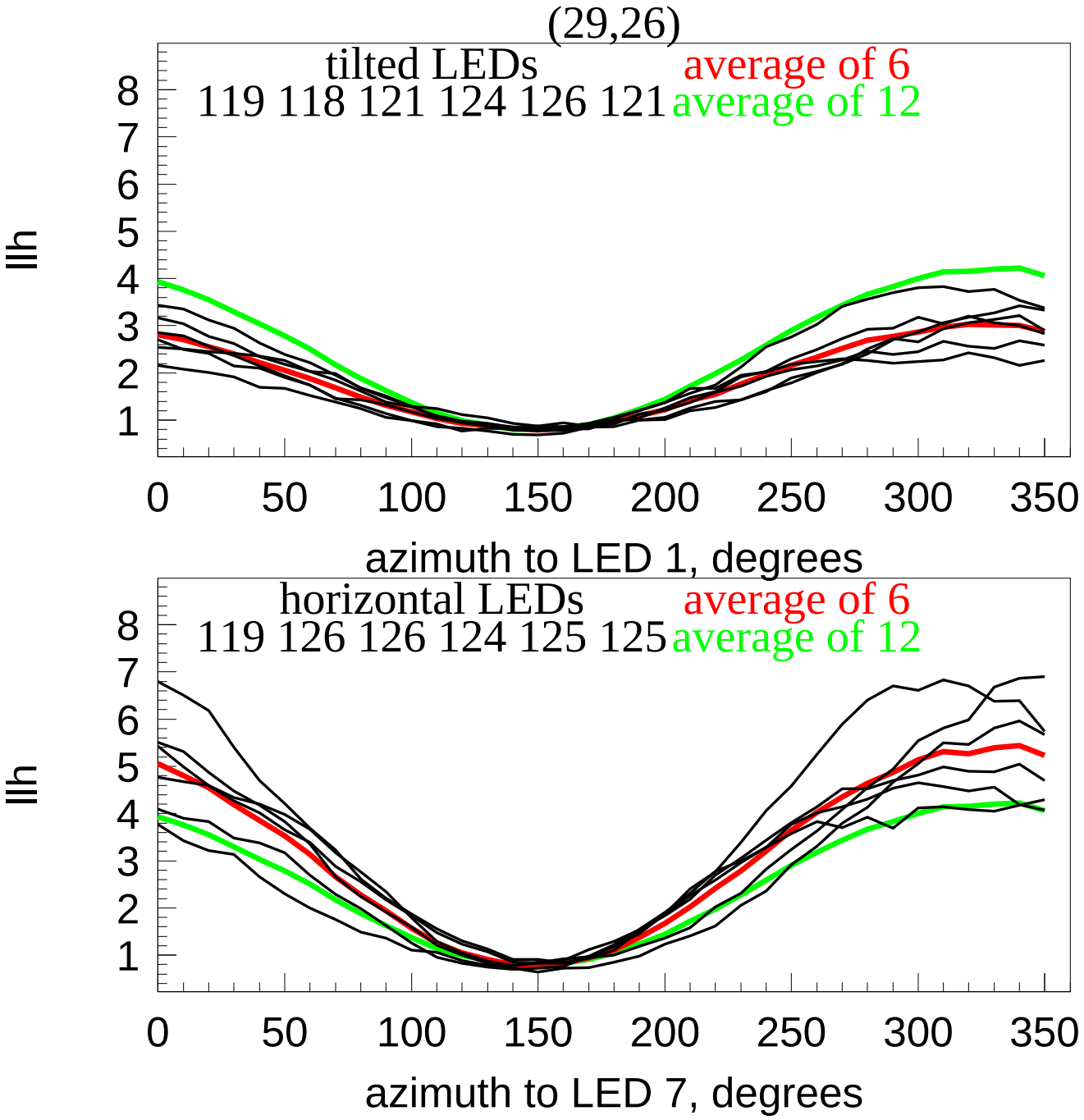

(29,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
70
12
7
1
6
2
8
5
11
3
4
9
10
70.1 ± 4.6

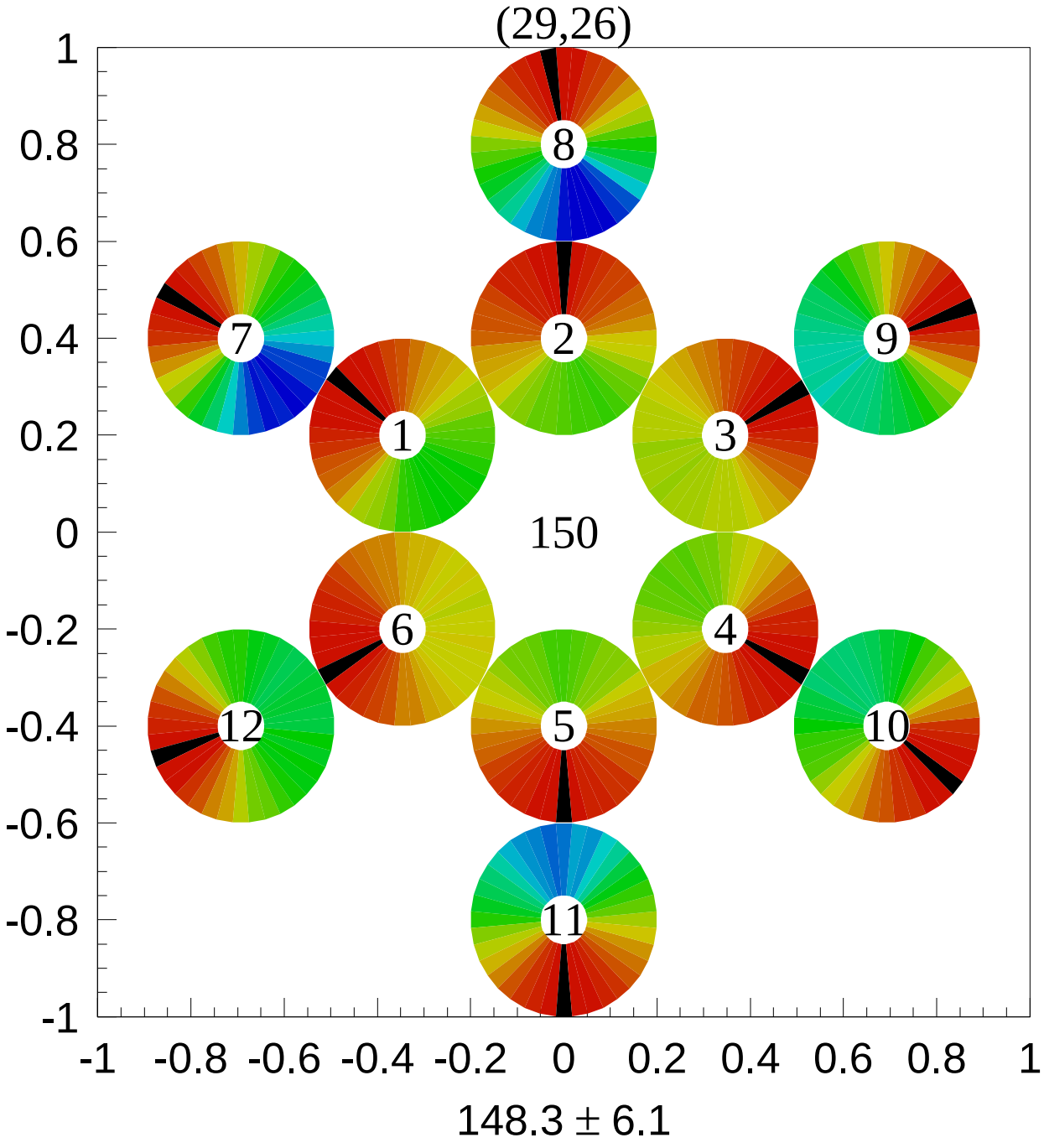

(29,24)
tilted LEDs
118 121 114 117 118 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 121 118 121 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

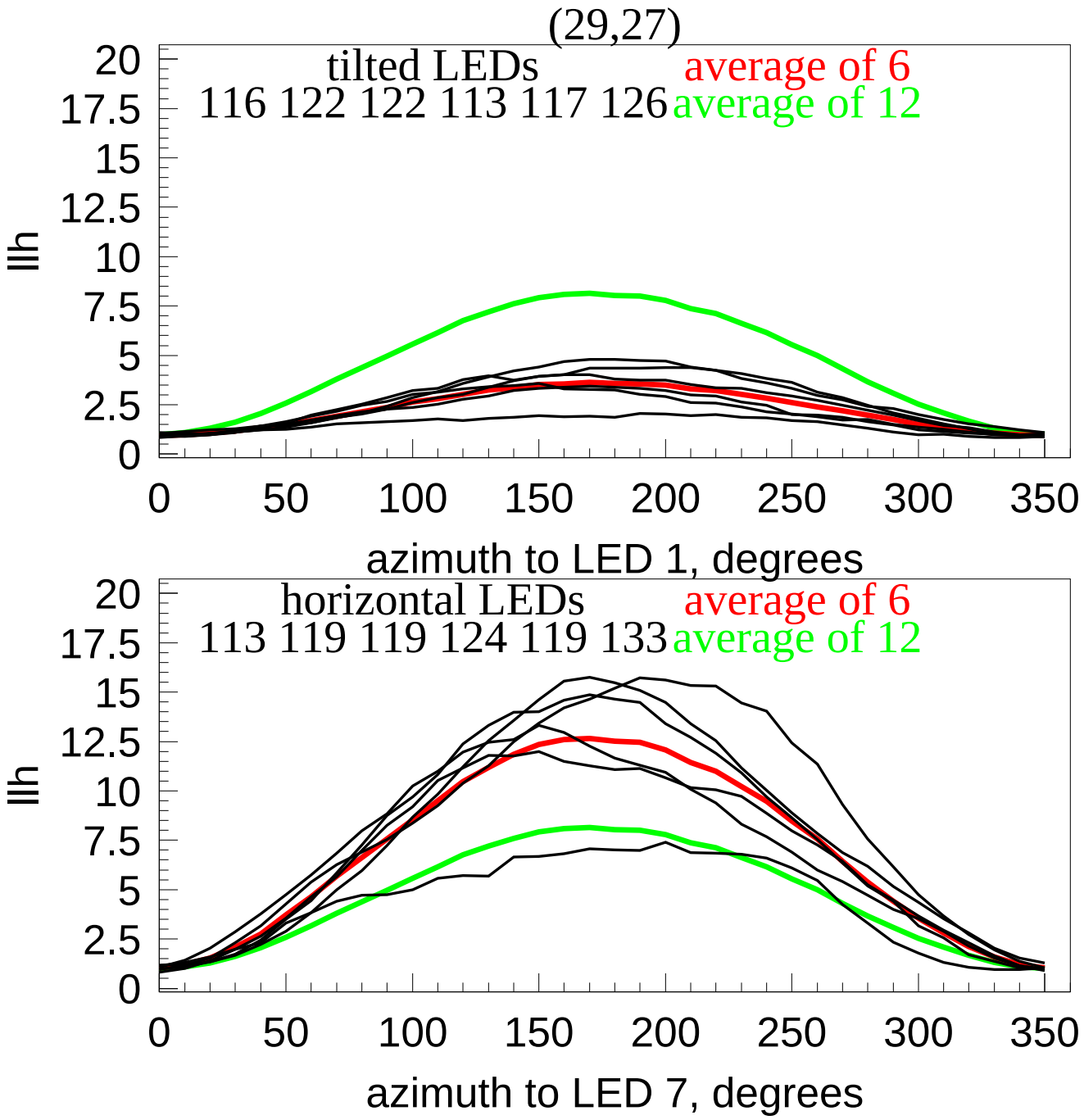

(29,24)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
203.3 ± 4.8

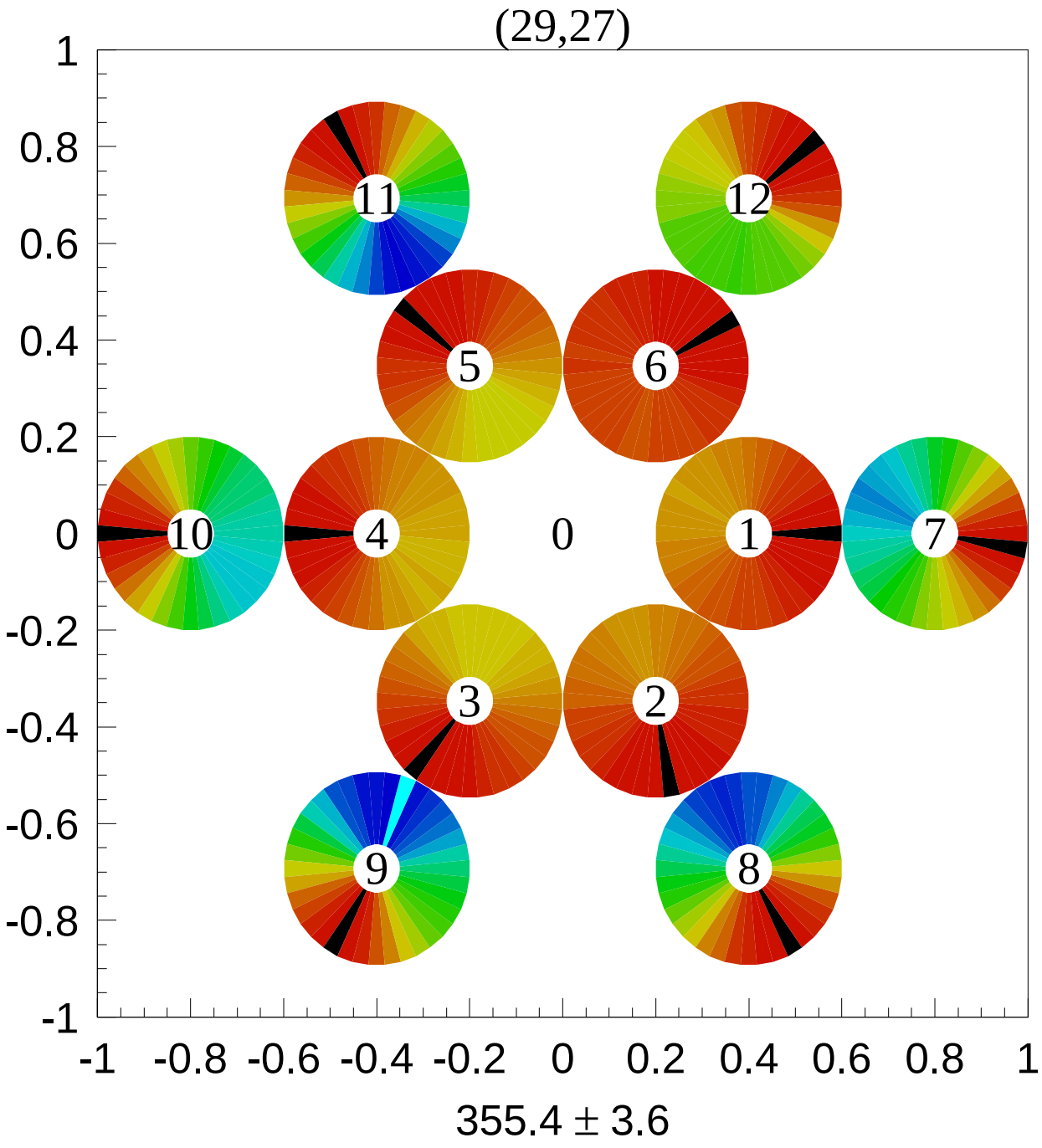

(29,25)
tilted LEDs
119 124 115 123 117 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 114 122 119 120 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

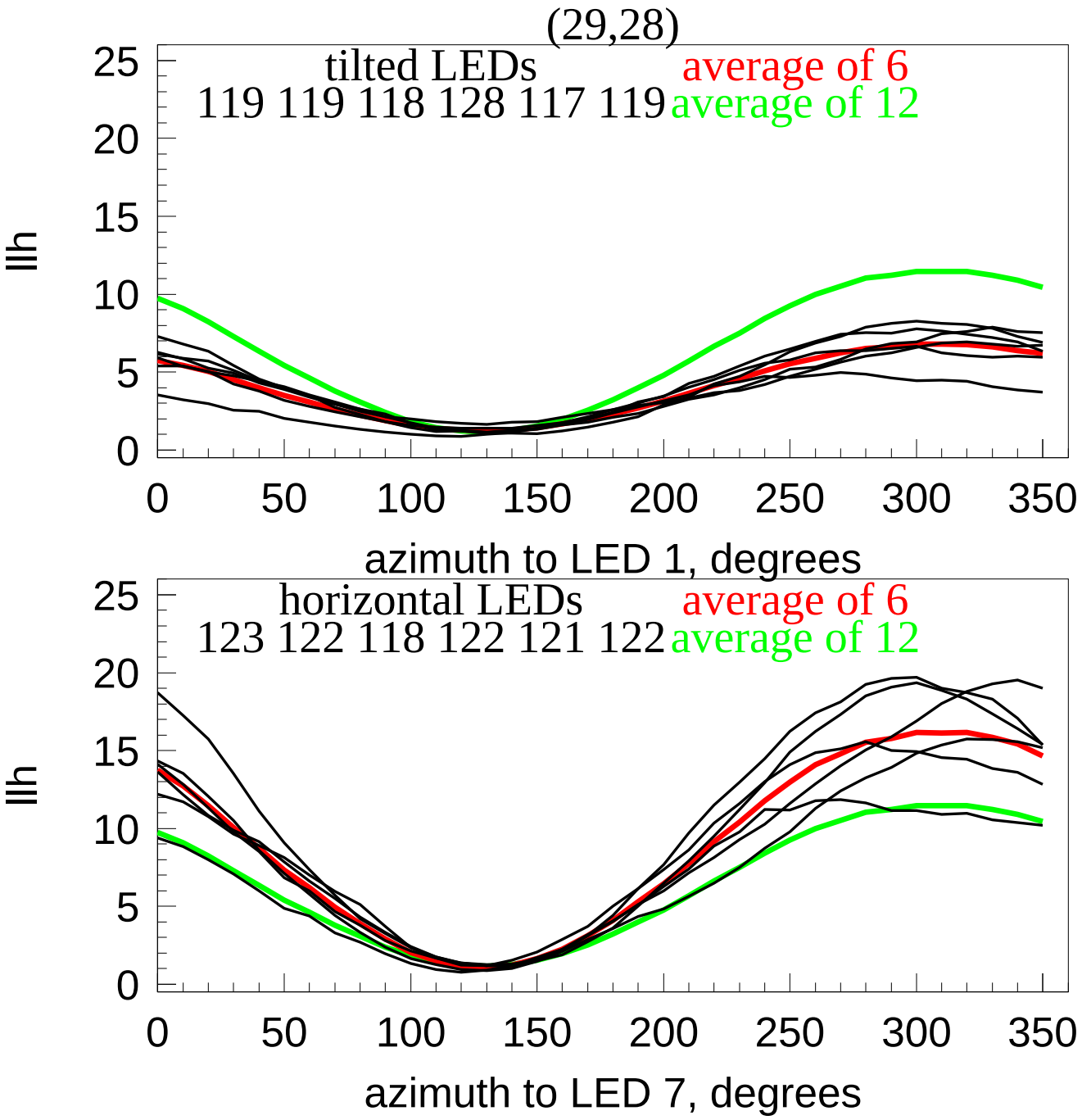

(29,25)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
27 ± 6.0

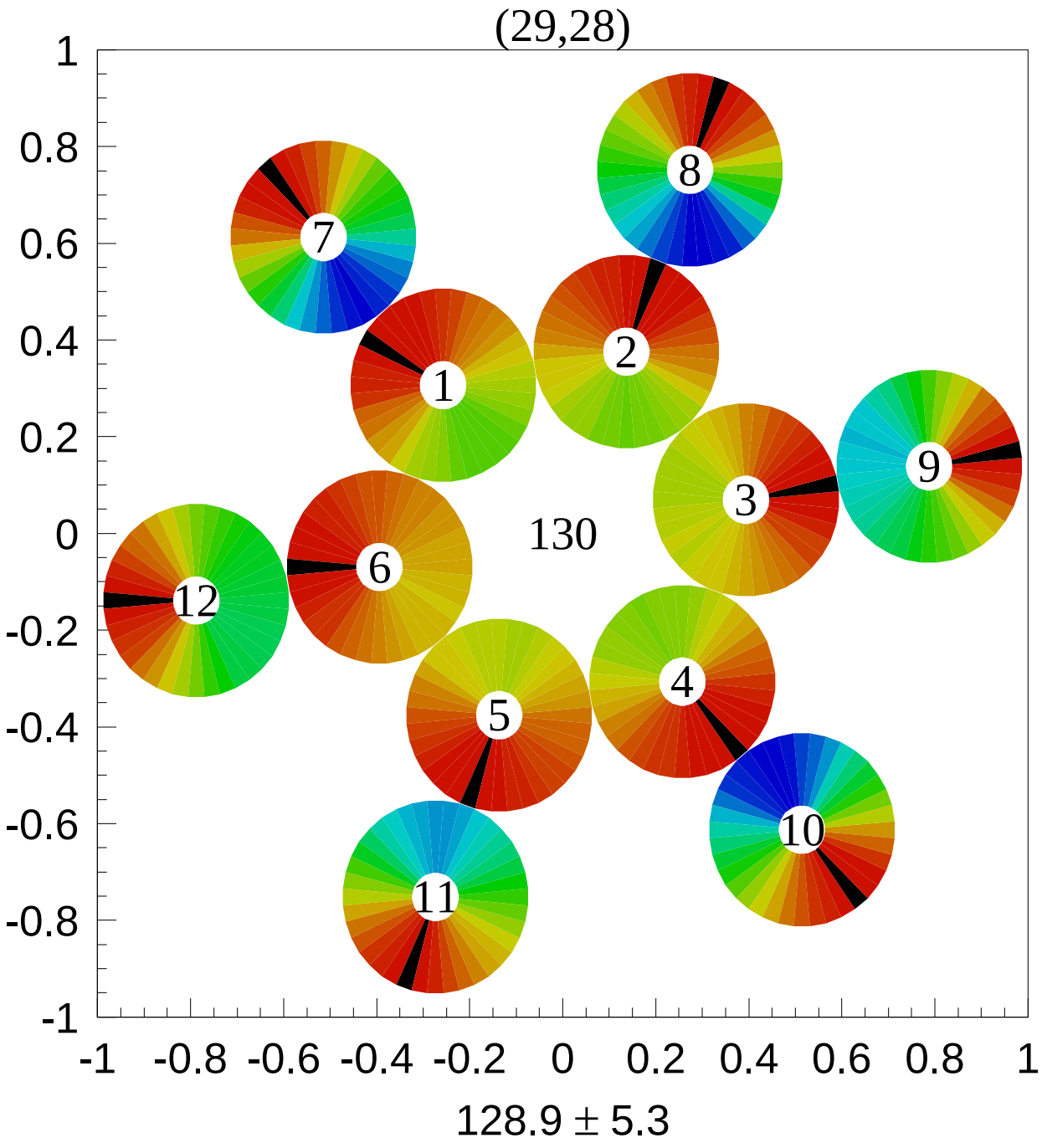

(29,26)
tilted LEDs
119 118 121 124 126 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 126 124 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

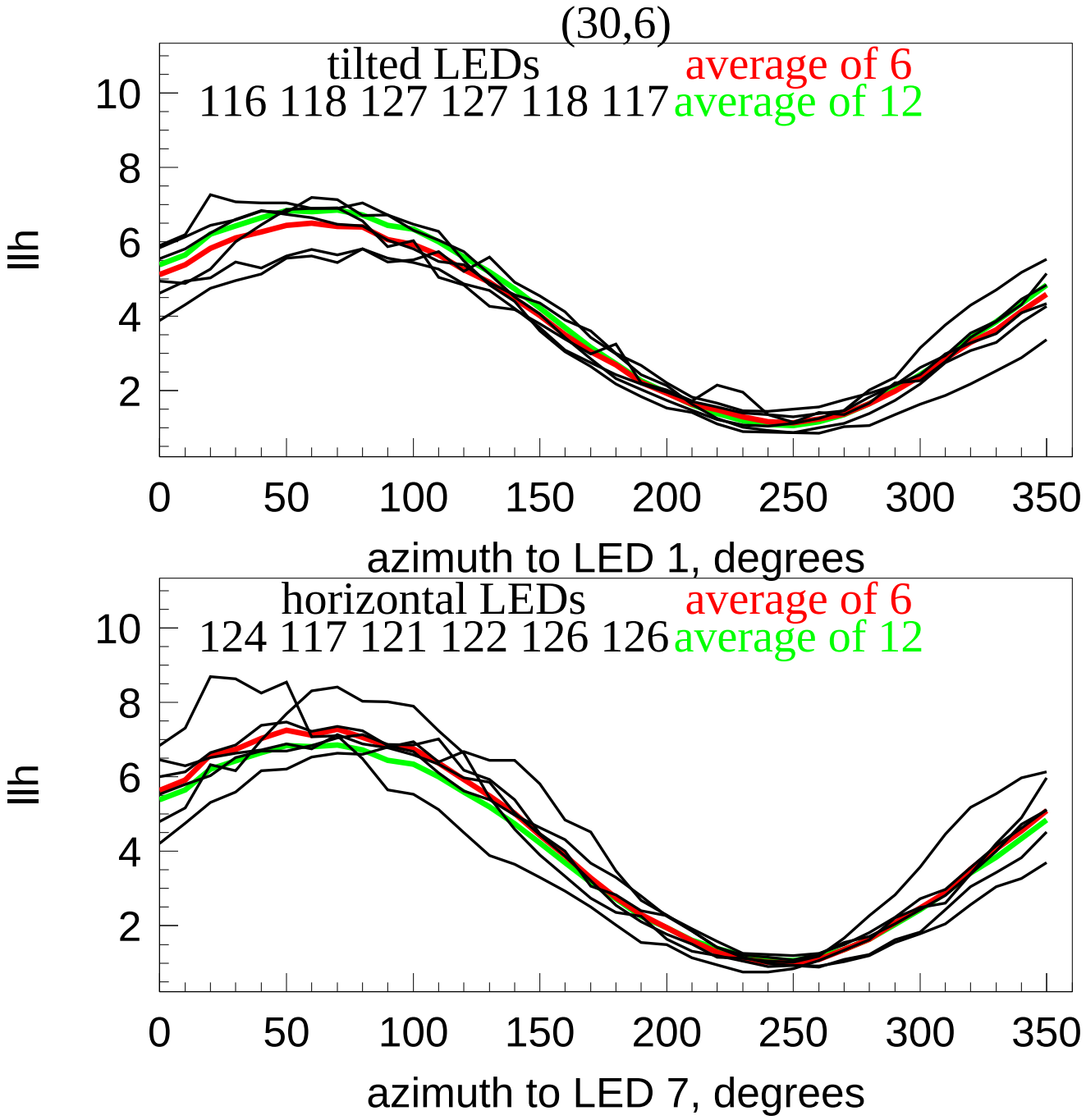

(29,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
148.3 ± 6.1

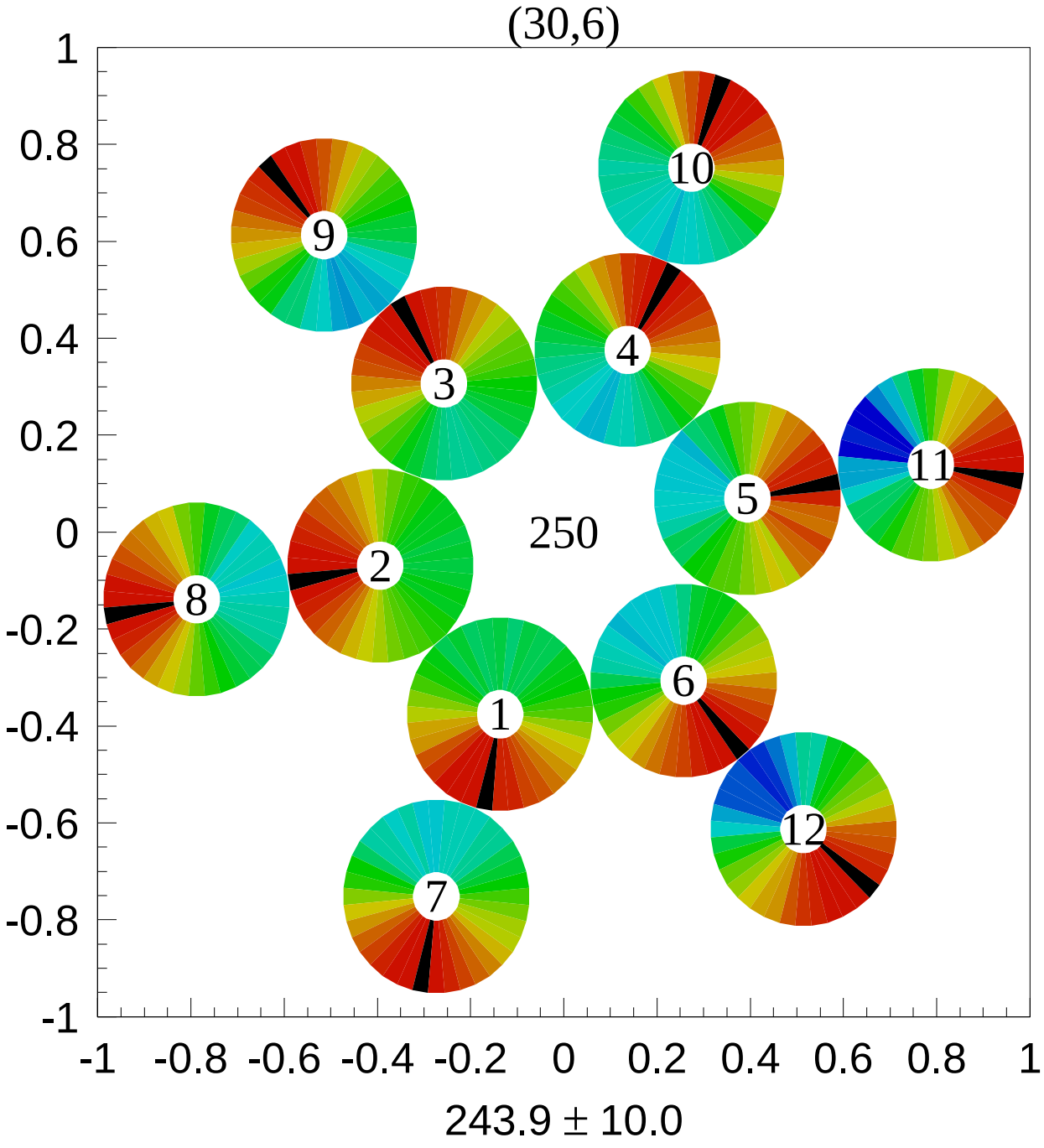

(29,27)
tilted LEDs
116 122 122 113 117 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 119 119 124 119 133
average of 6
average of 12
llh
azimuth to LED 7, degrees

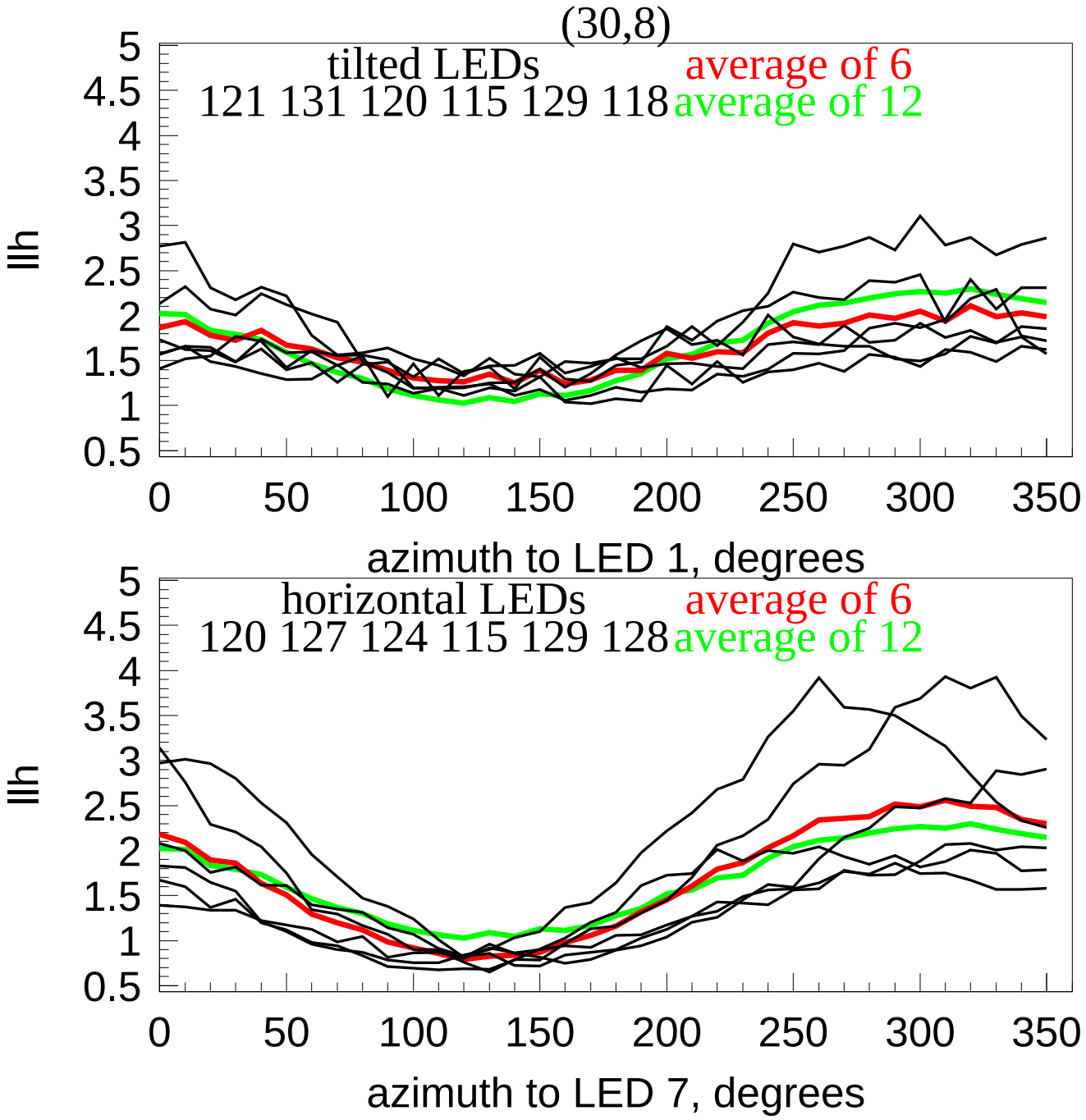

(29,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
355.4 ± 3.6

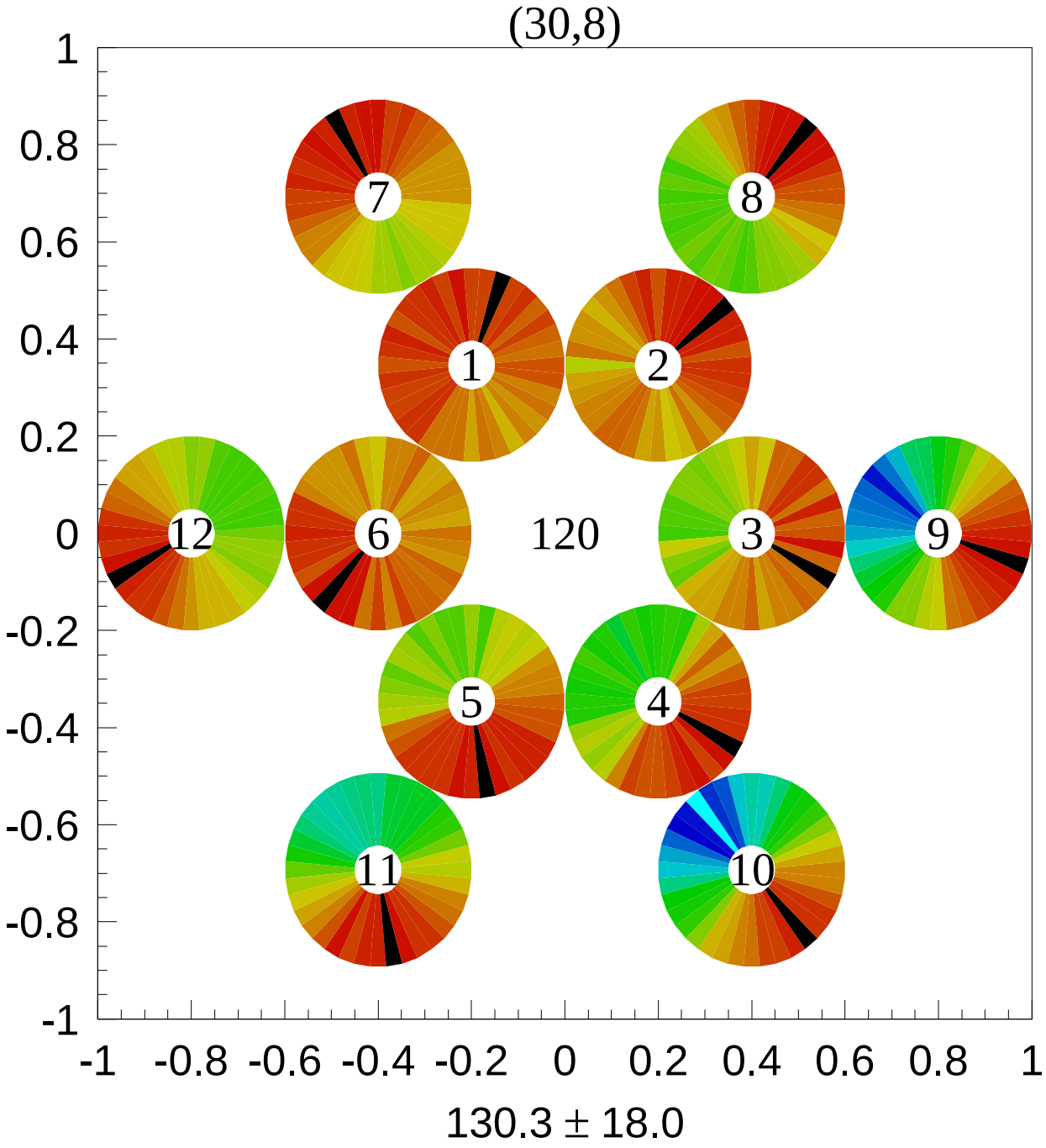

(29,28)
tilted LEDs
119 119 118 128 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 118 122 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

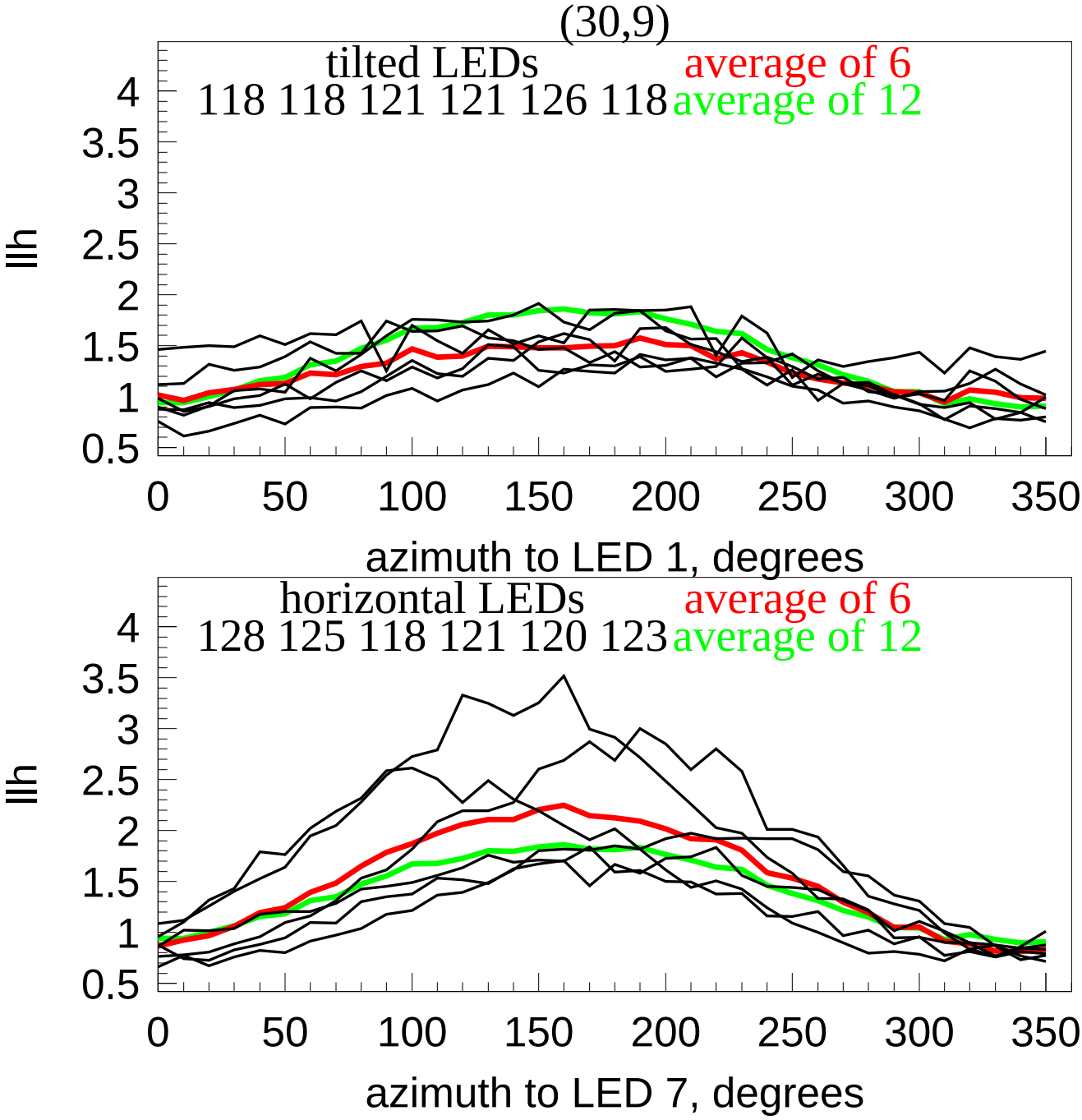

(29,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
128.9 ± 5.3

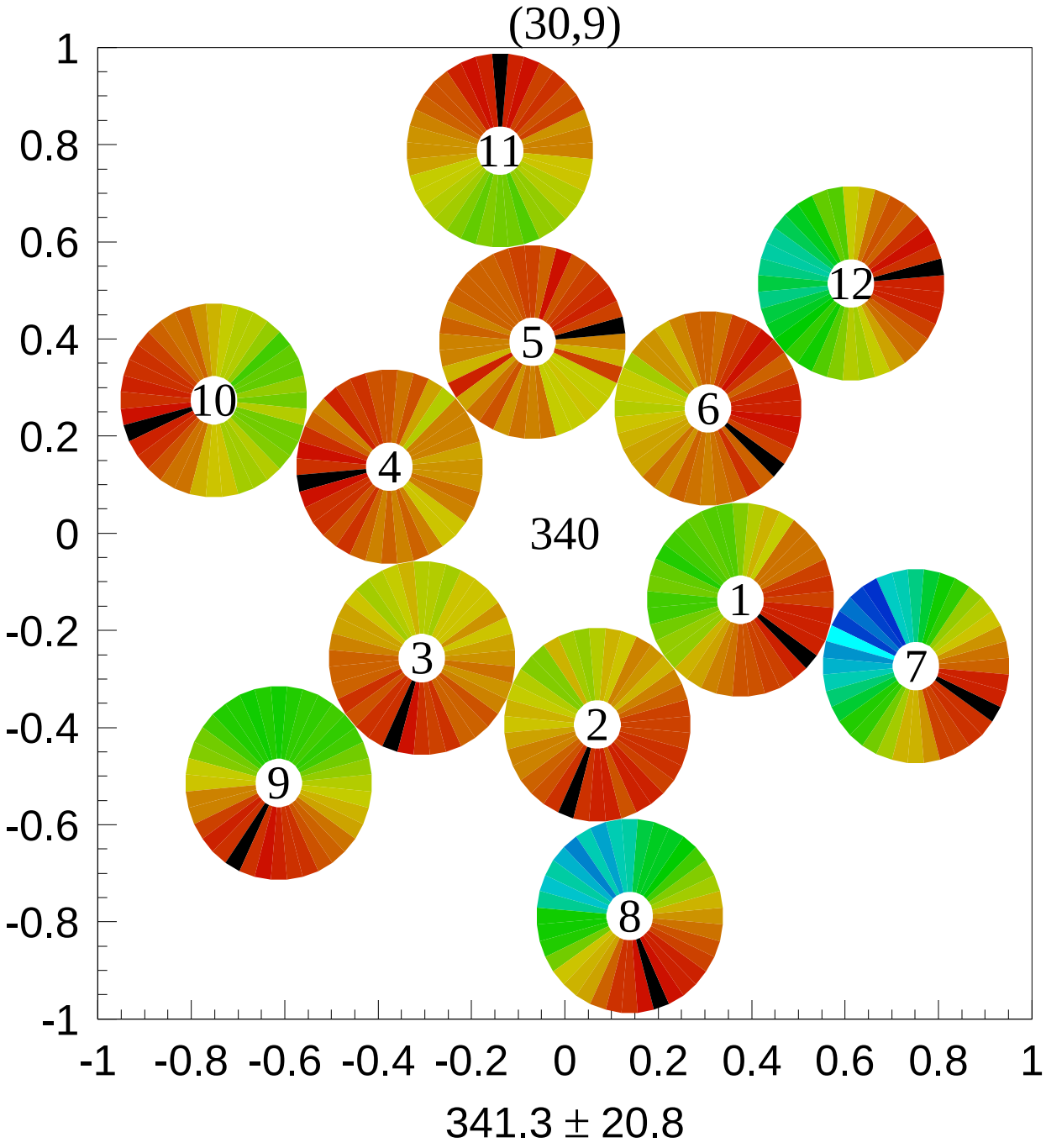

(30,6)
tilted LEDs
116 118 127 127 118 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 117 121 122 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

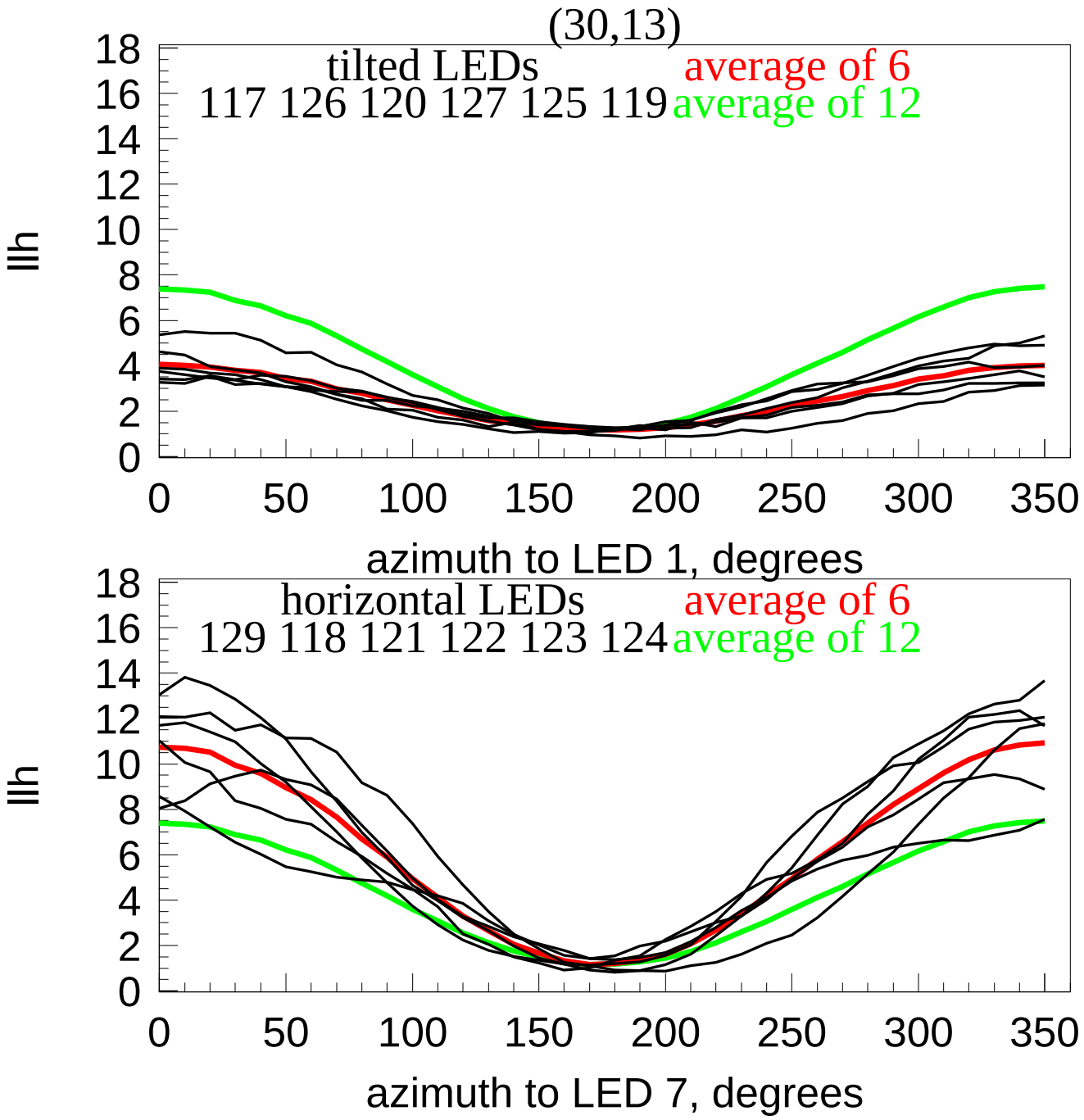

(30,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
243.9 ± 10.0
250
1
2
3
4
5
6
7
8
9
10
11
12

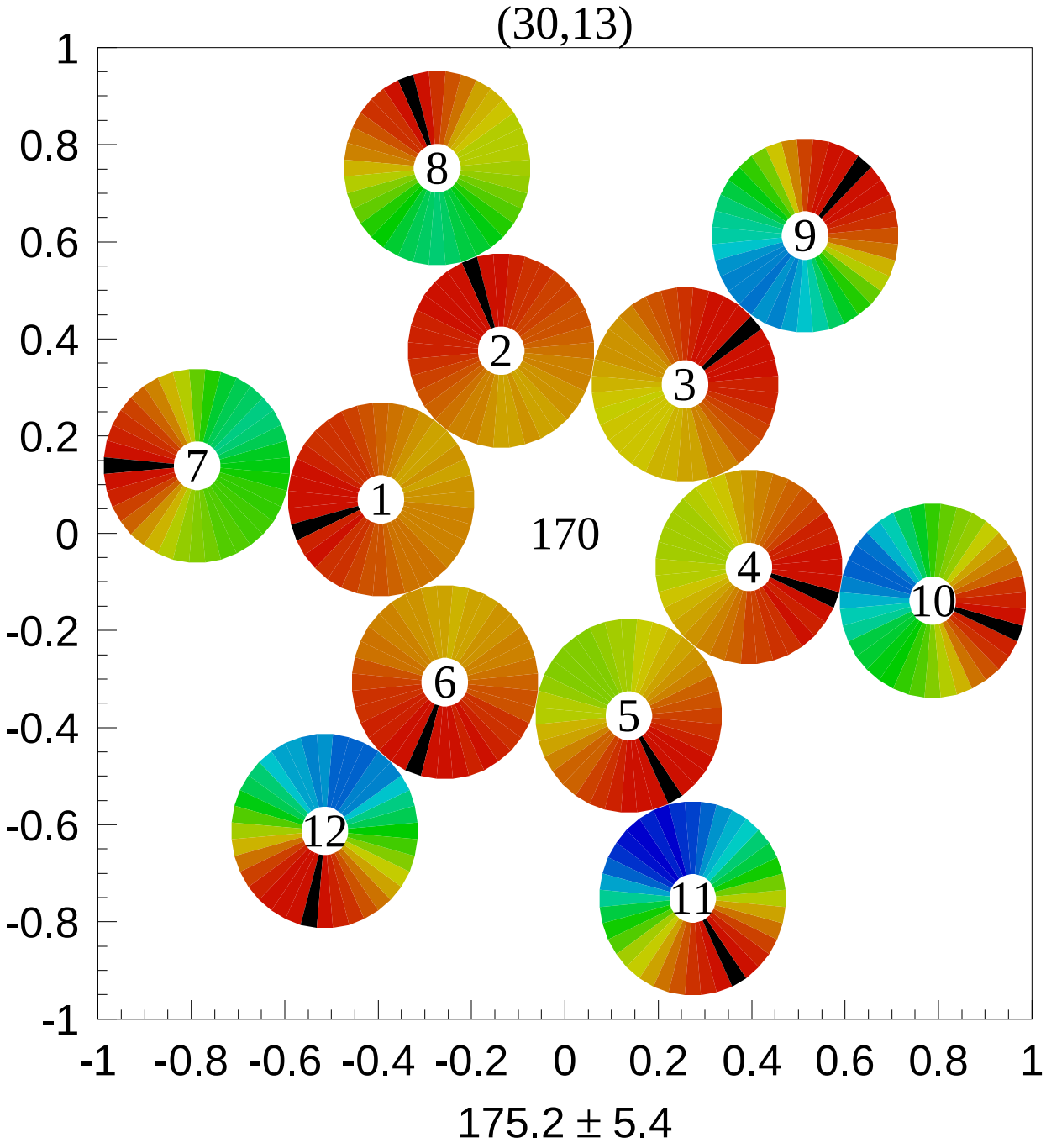

(30,8)
tilted LEDs
121 131 120 115 129 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 127 124 115 129 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

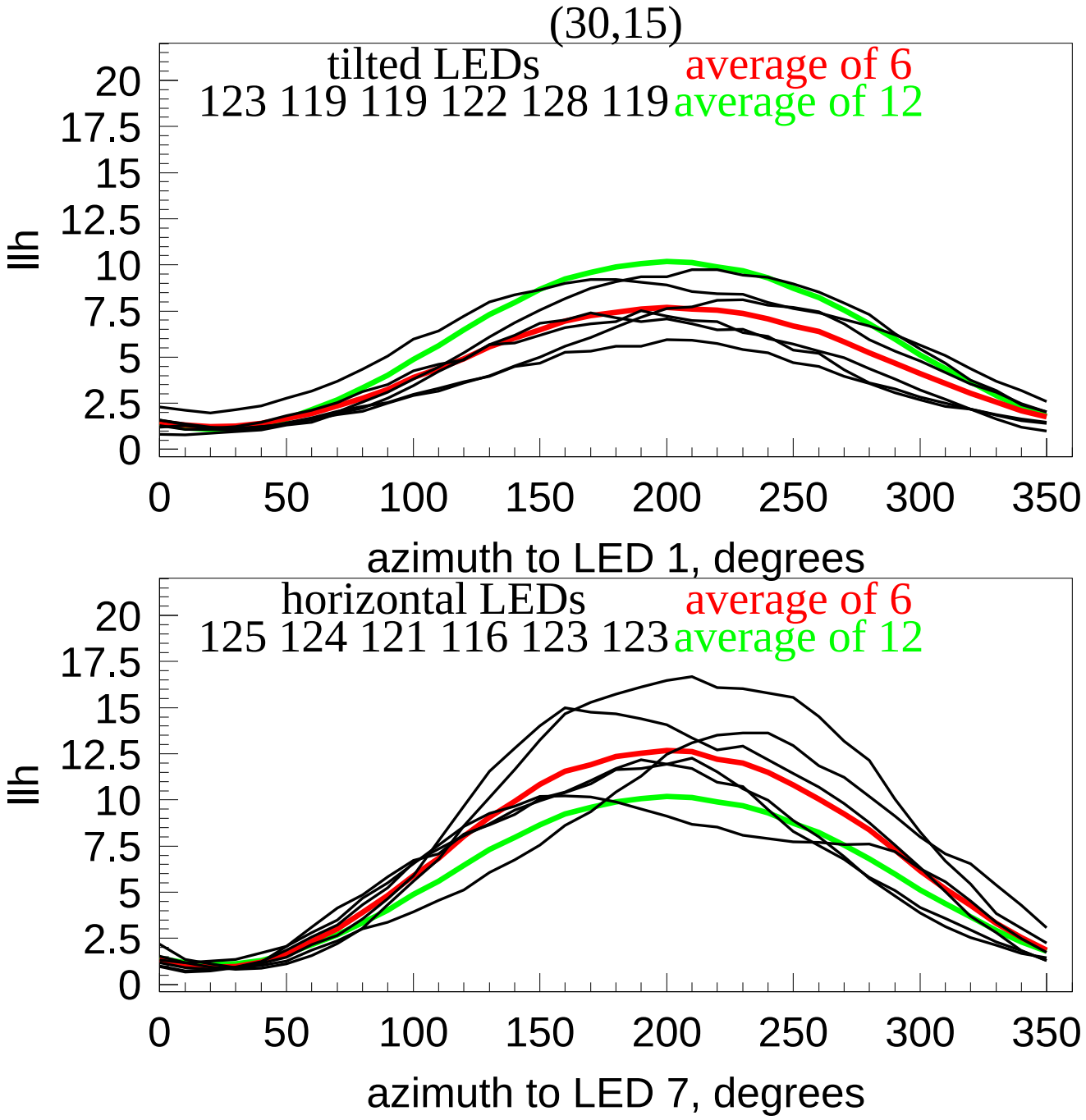

(30,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
130.3 ± 18.0

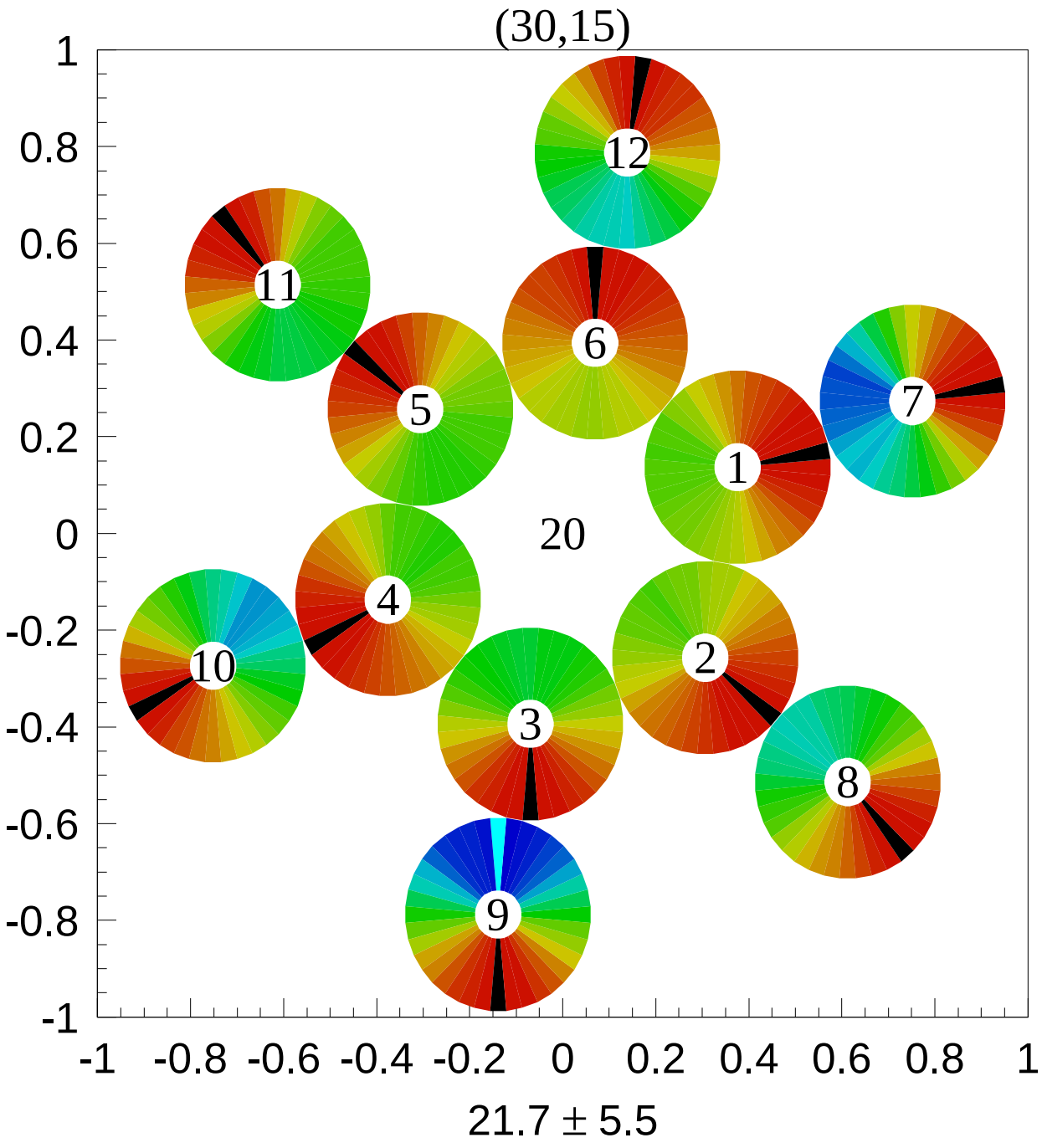

(30,9)
tilted LEDs
118 118 121 121 126 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 125 118 121 120 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

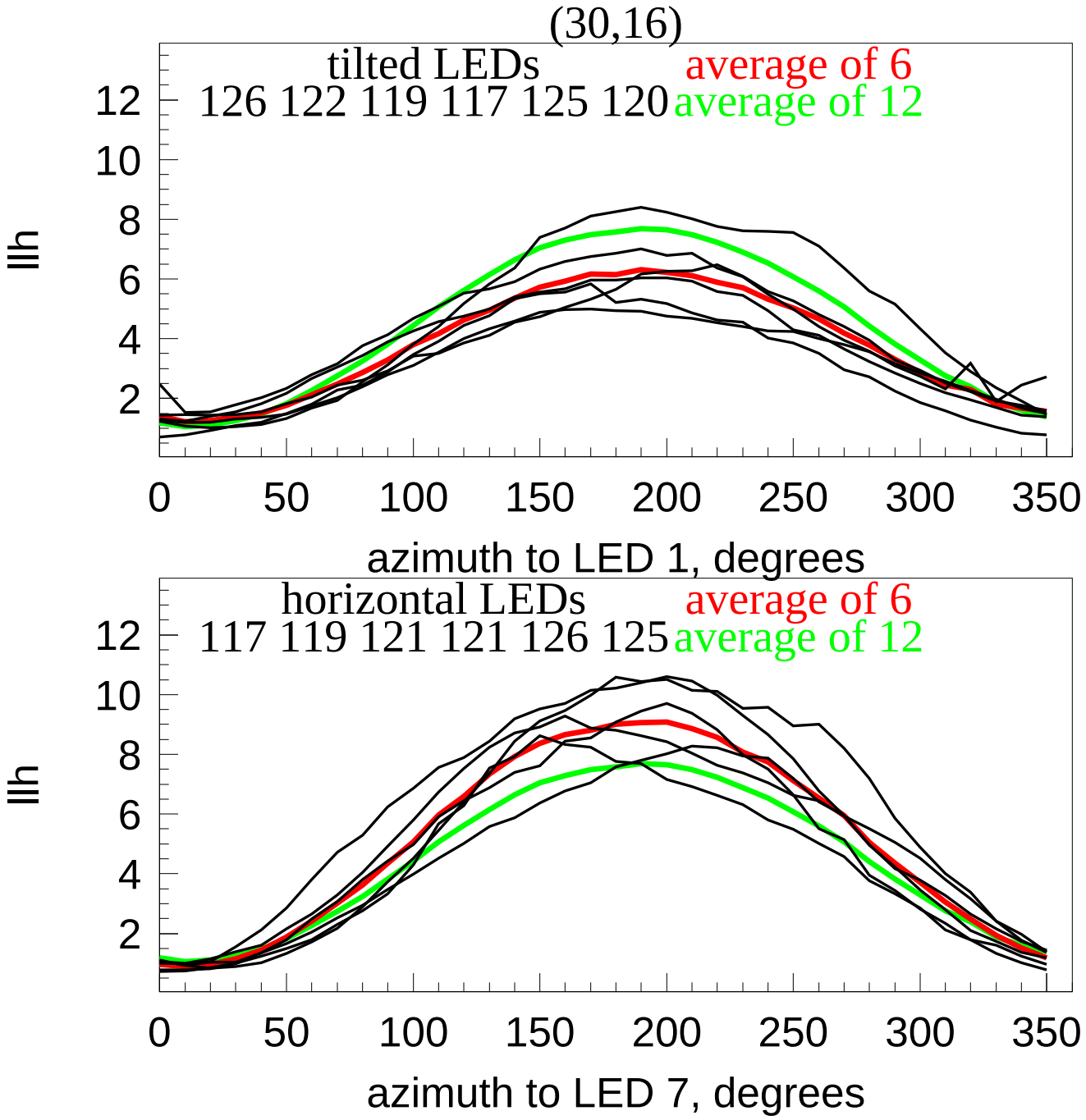

(30,9)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
341.3 ± 20.8

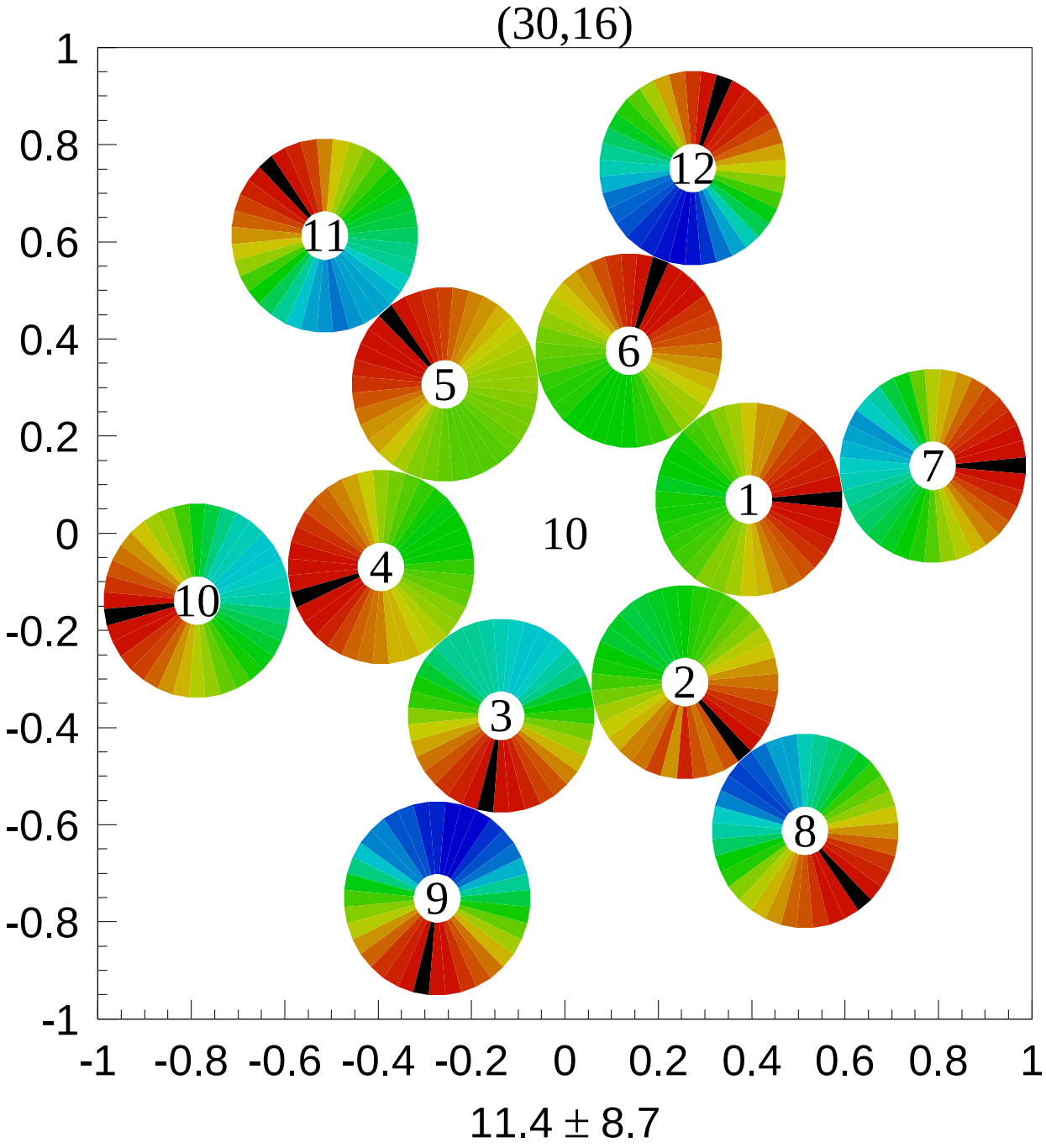

(30,13)
tilted LEDs
117 126 120 127 125 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
129 118 121 122 123 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

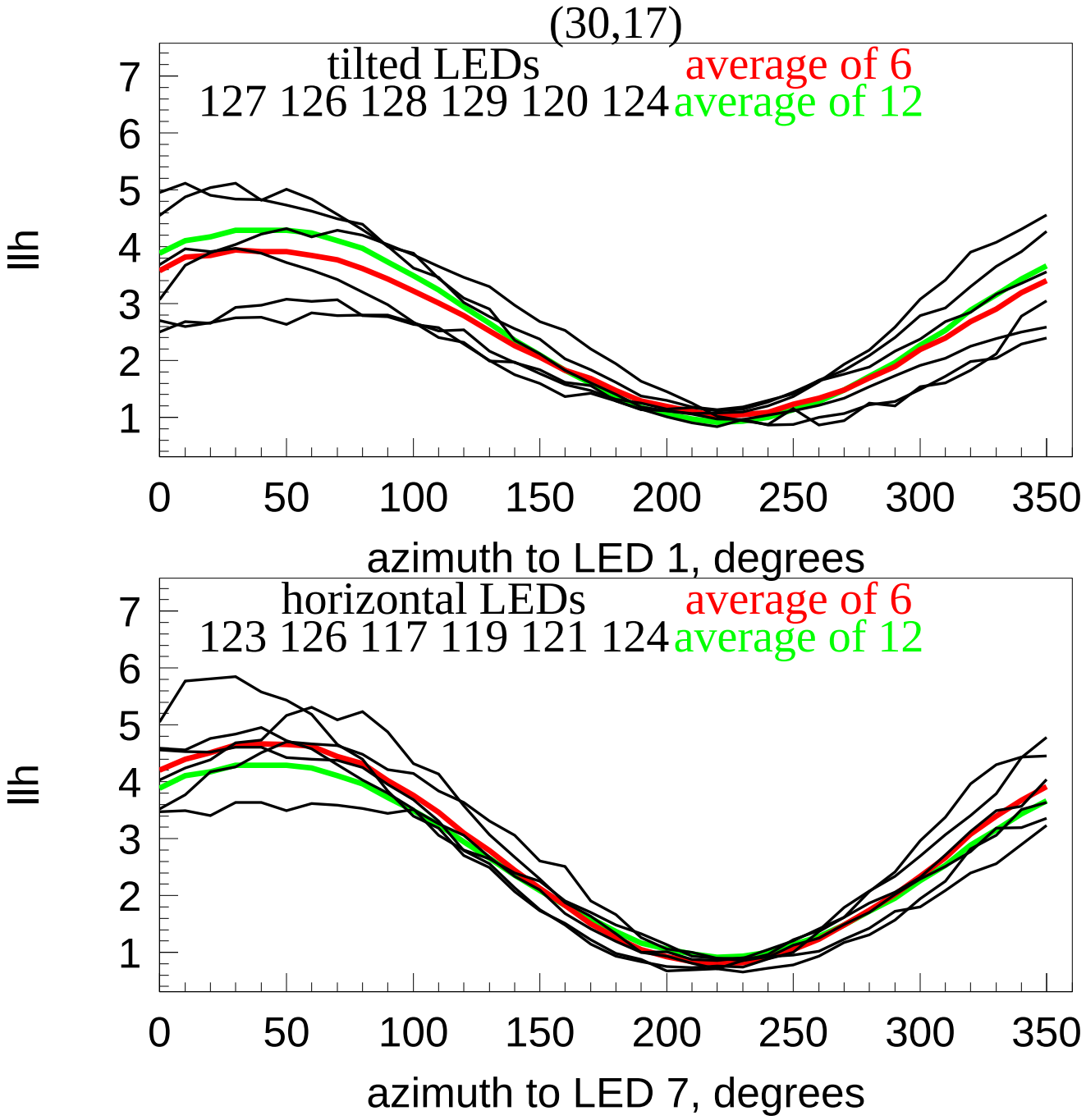

(30,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
175.2 ± 5.4

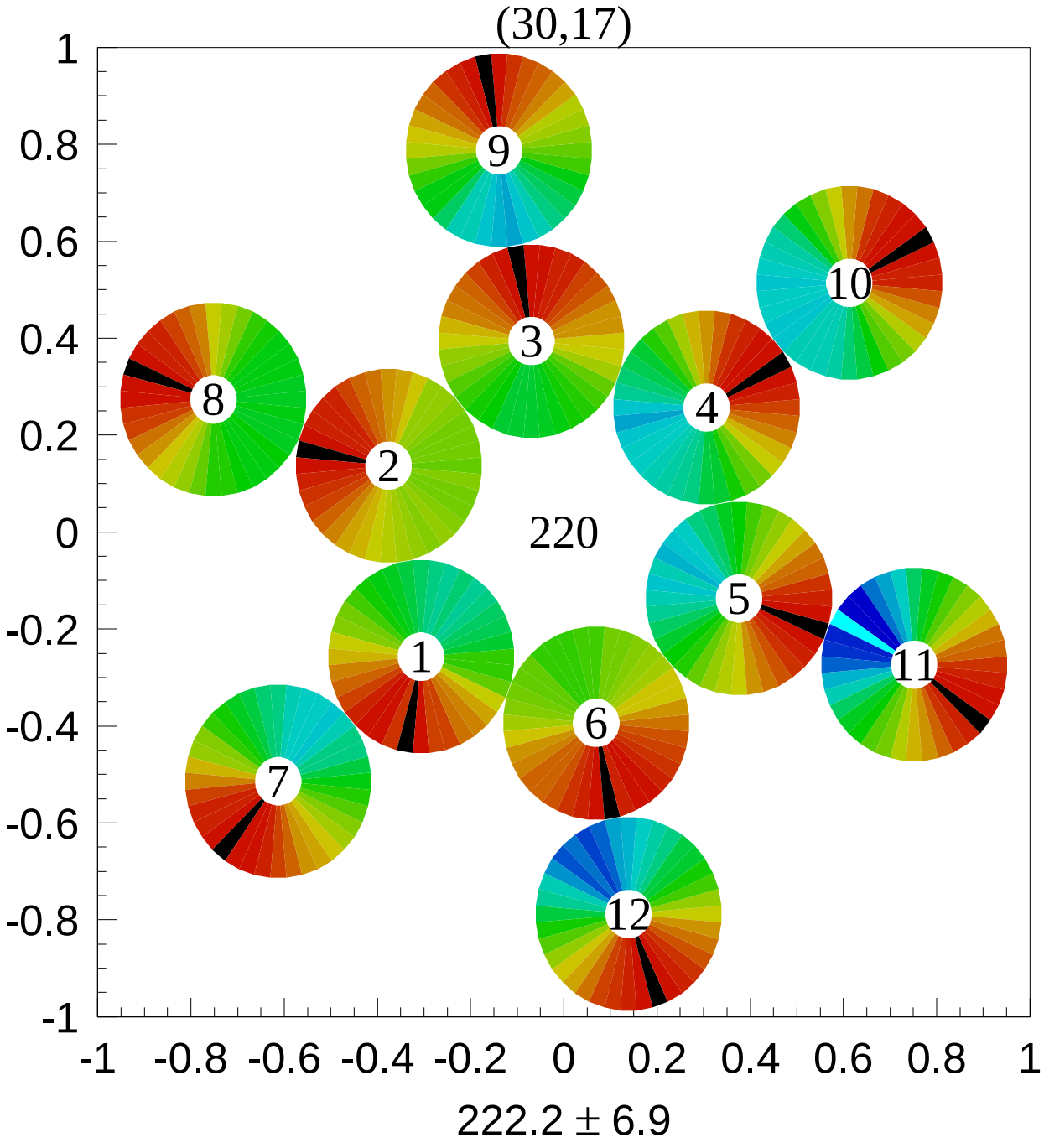

(30,15)
tilted LEDs
123 119 119 122 128 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 121 116 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

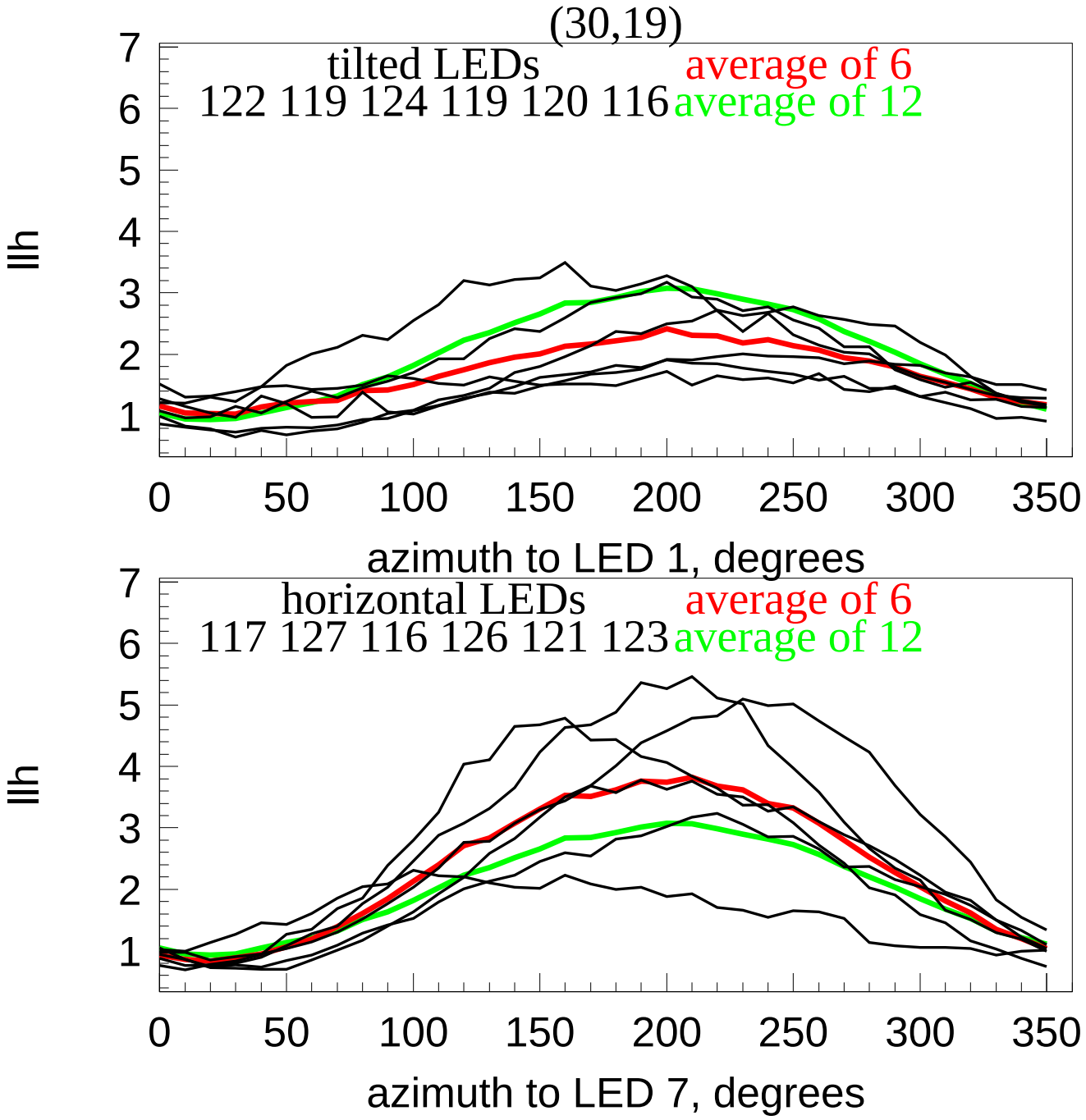

(30,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
21.7 ± 5.5

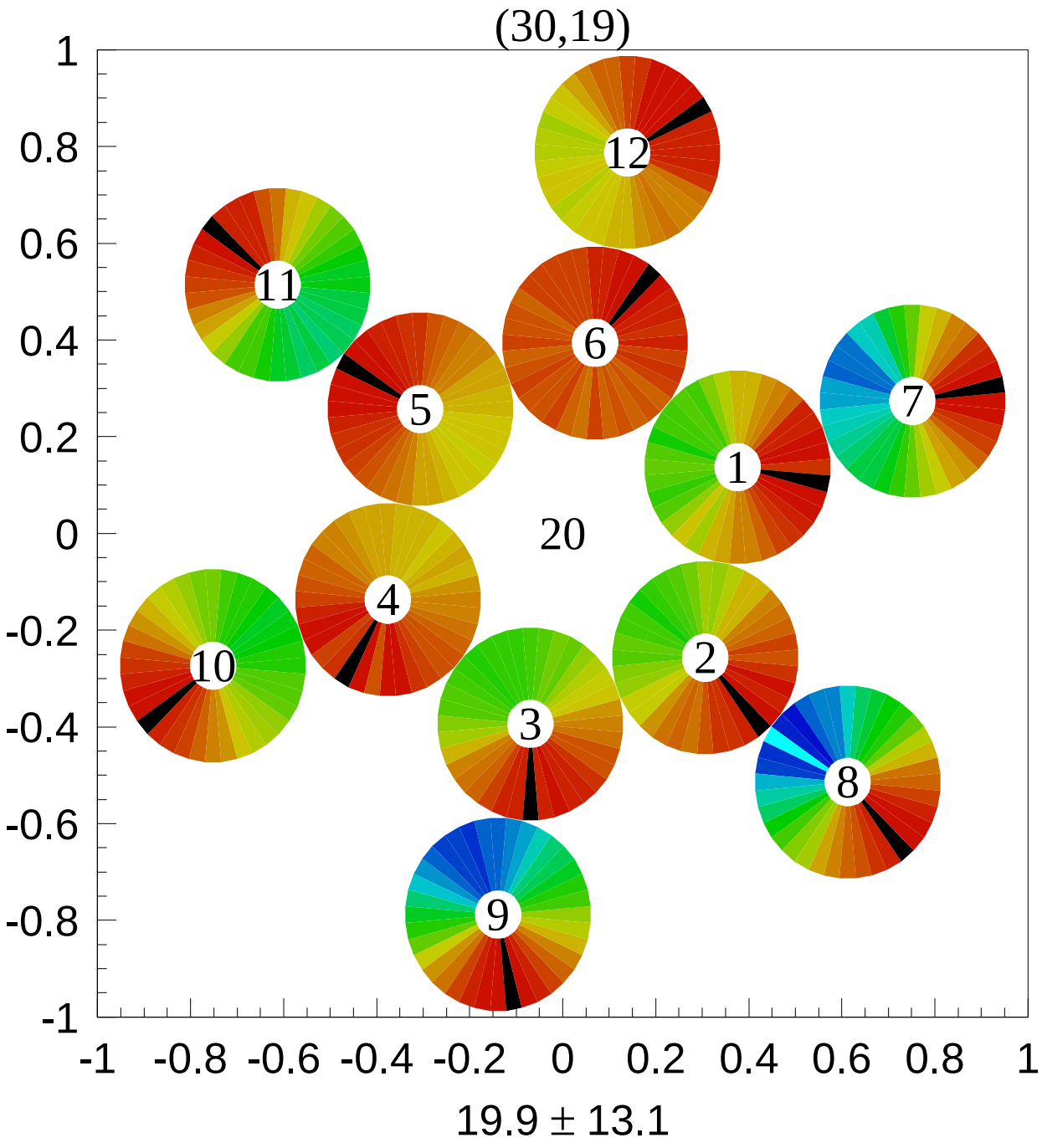

(30,16)
tilted LEDs
126 122 119 117 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 121 121 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

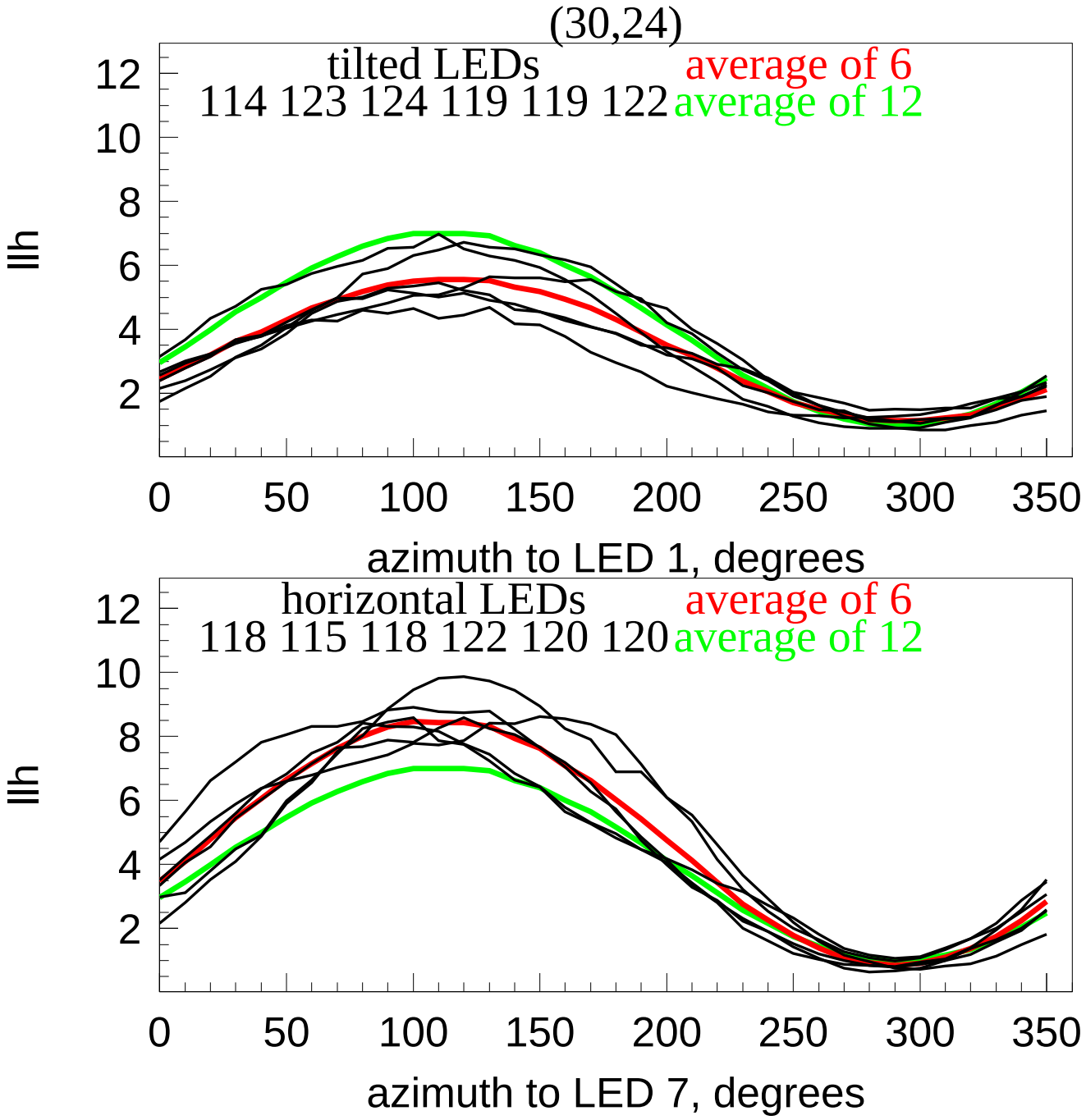

(30,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11.4 ± 8.7
12
11
6
5
7
1
10
4
10
2
3
8
9

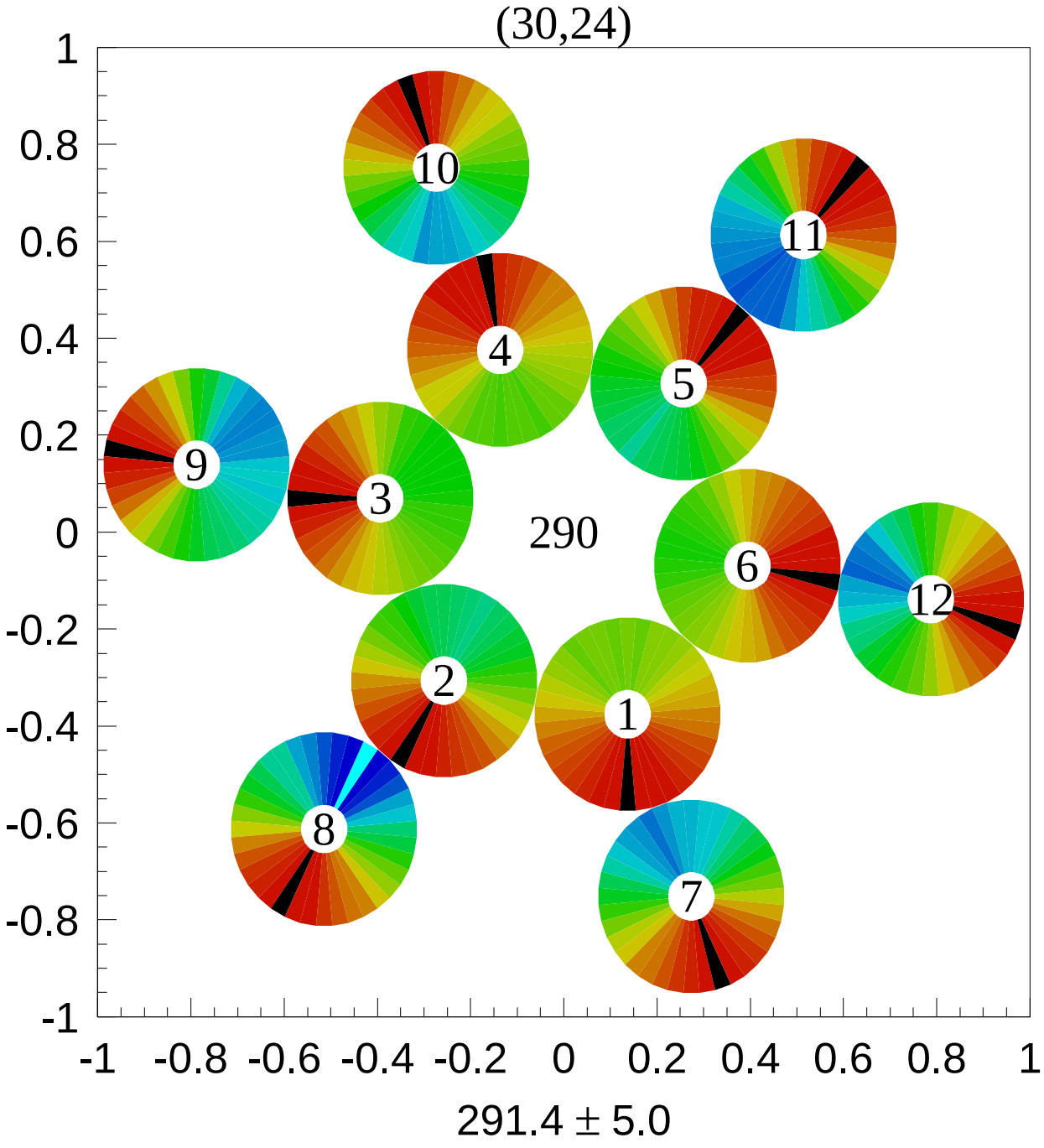

(30,17)
tilted LEDs
127 126 128 129 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 126 117 119 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

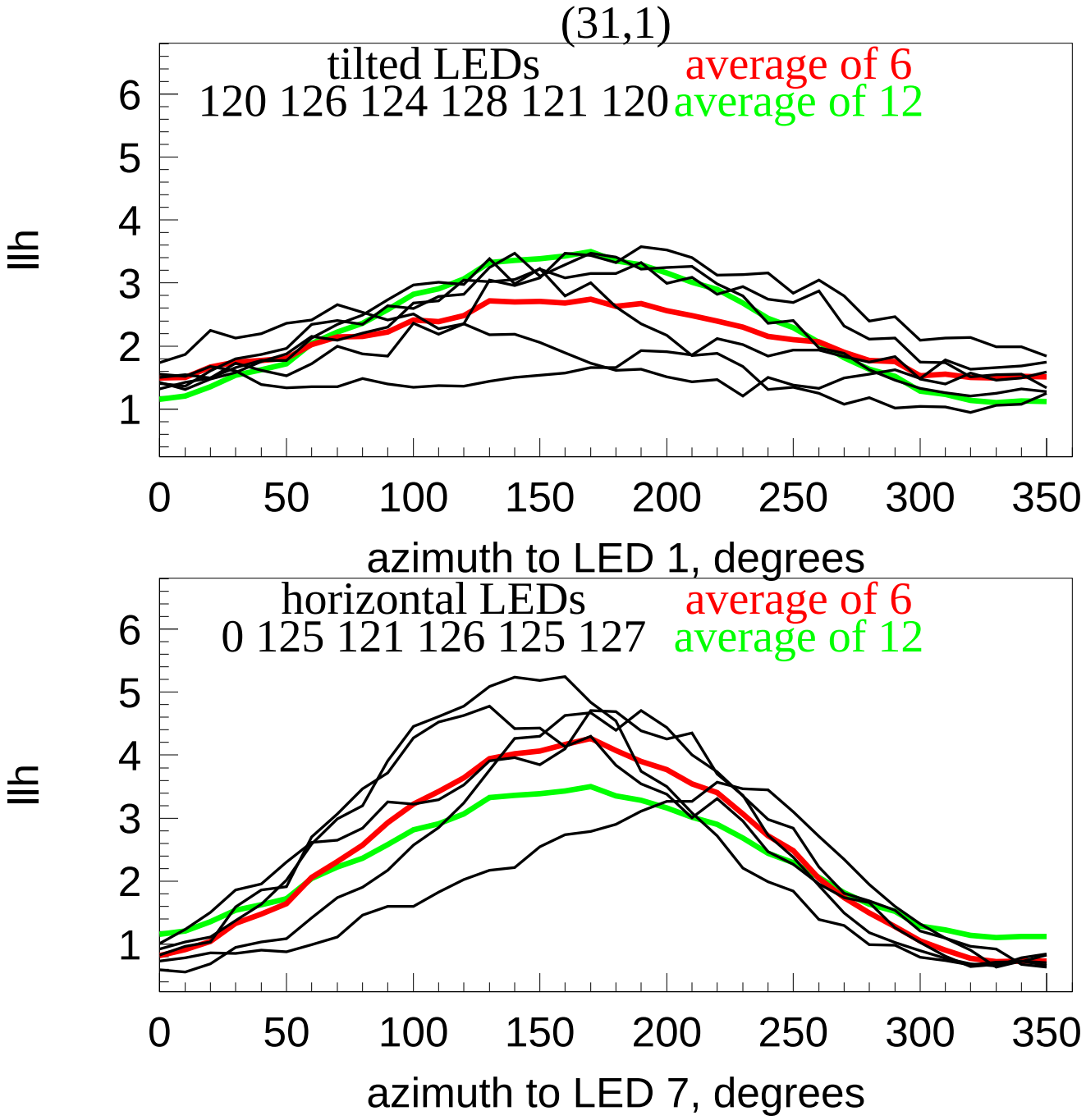

(30,17)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
222.2 ± 6.9

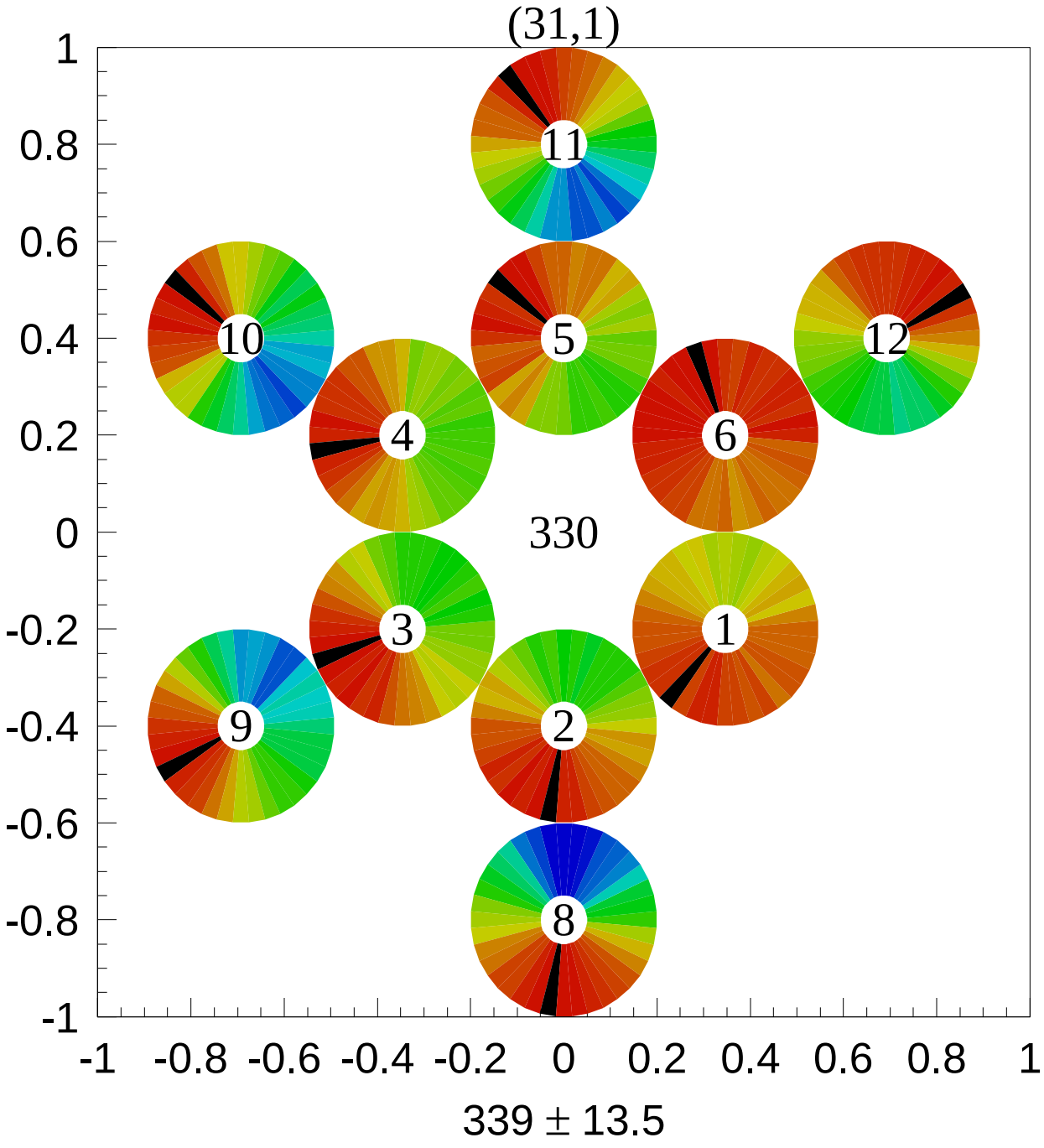

(30,19)
tilted LEDs
122 119 124 119 120 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 127 116 126 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

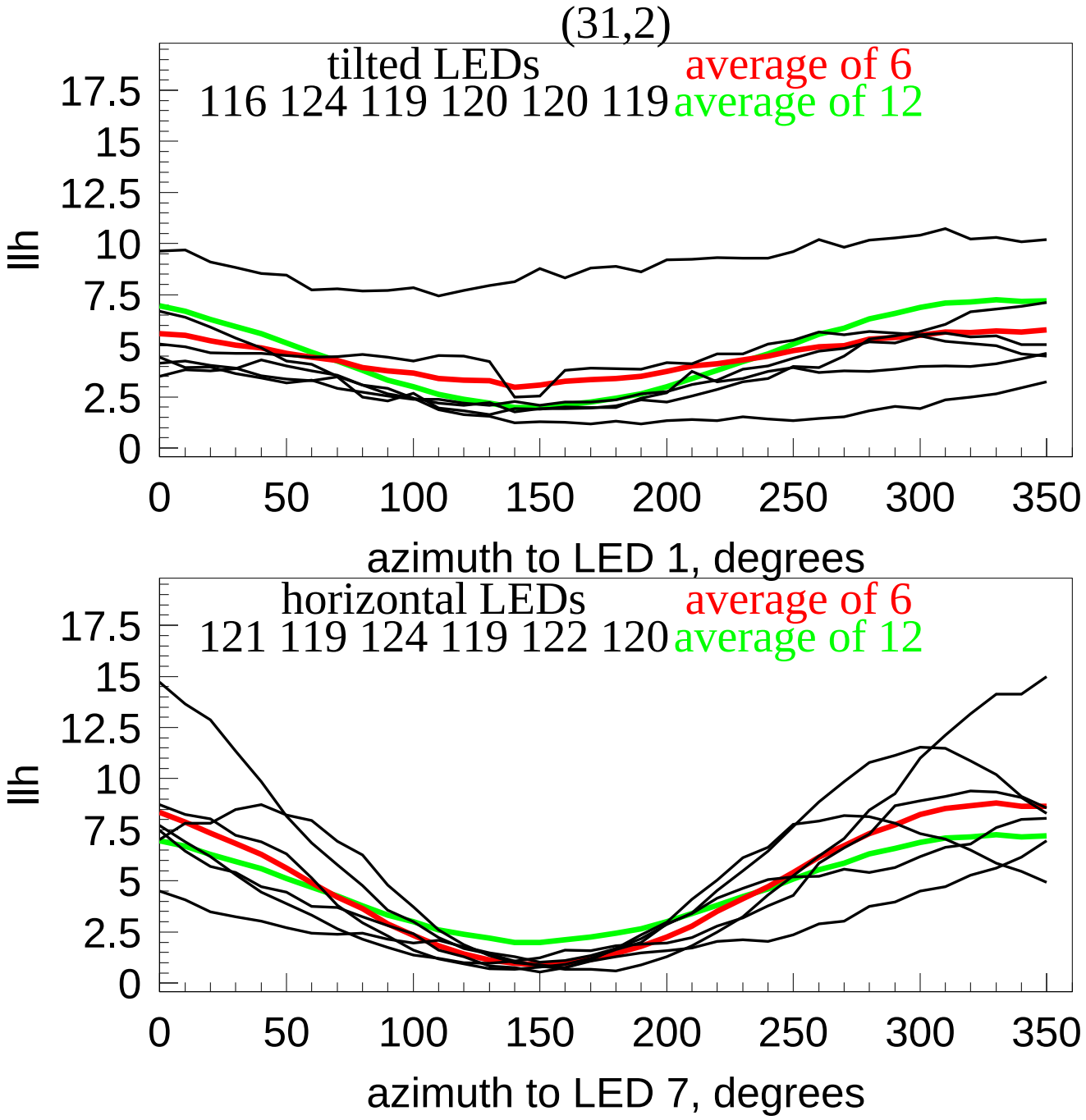

(30,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
19.9 ± 13.1
12
11
6
5
7
1
20
4
10
2
3
8
9

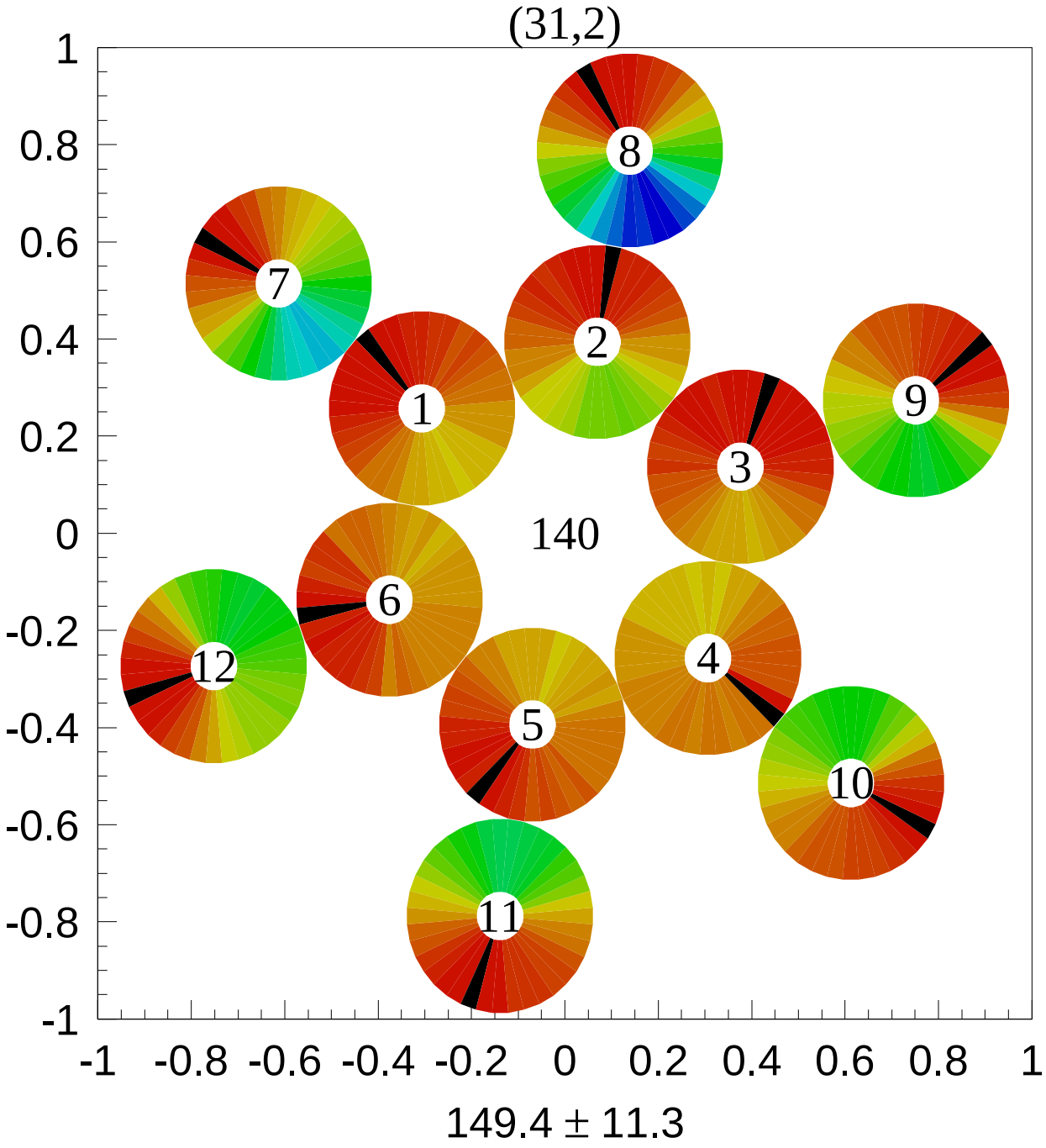

(30,24)
tilted LEDs
114 123 124 119 119 122
average of 6
average of 12
Ilh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 115 118 122 120 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

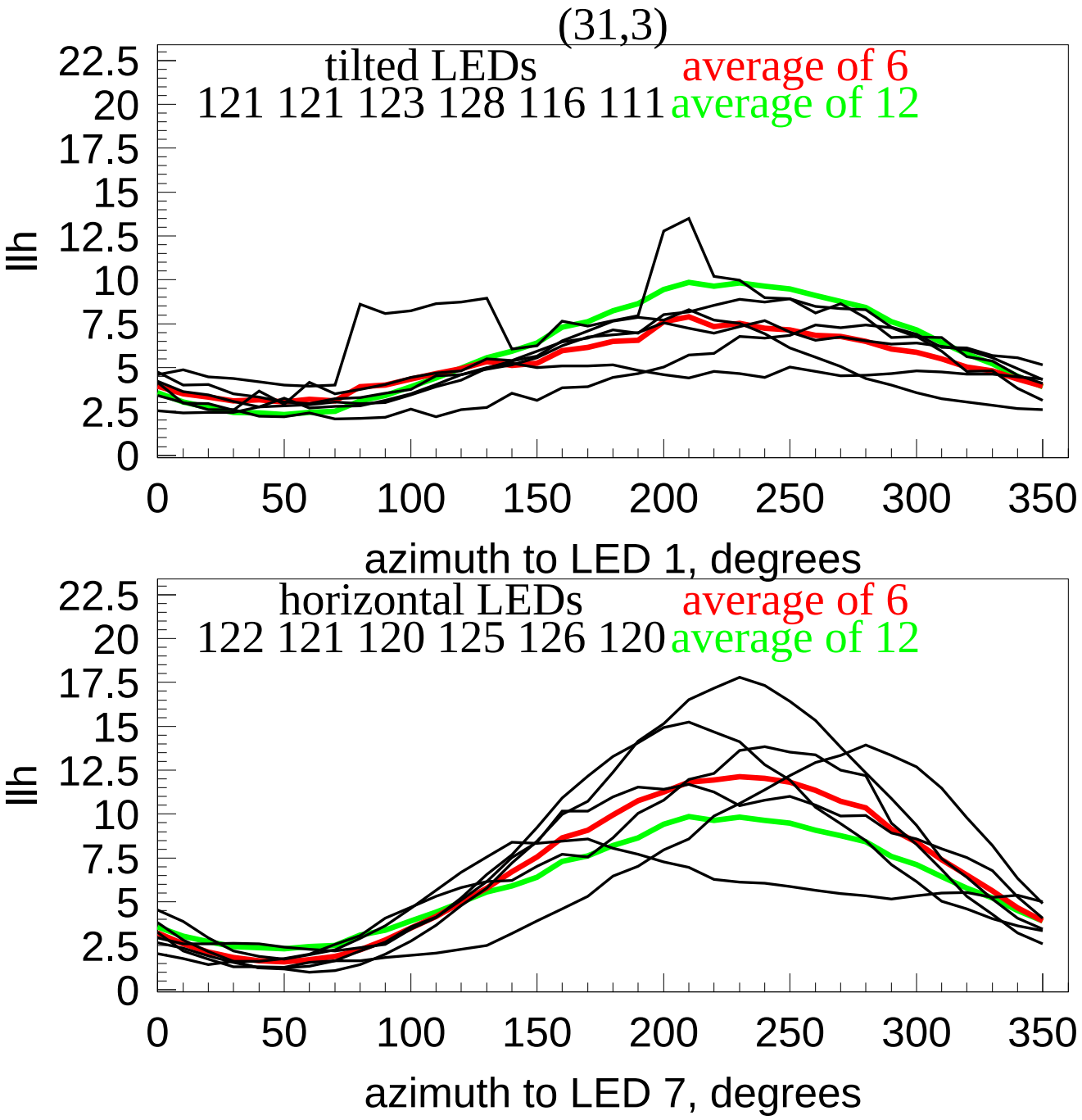

(30,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
291.4 ± 5.0

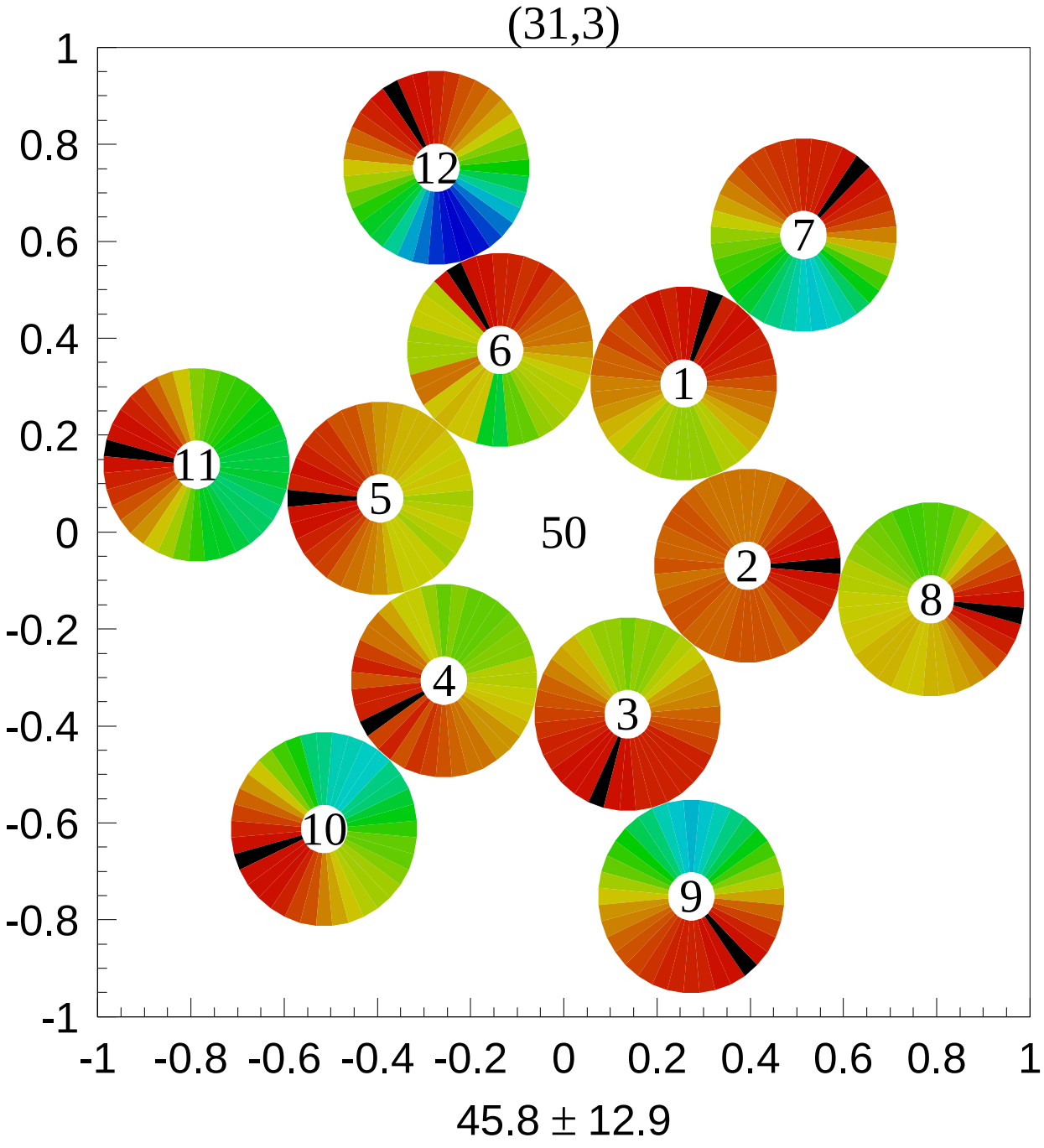

(31,1)
tilted LEDs
120 126 124 128 121 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
0 125 121 126 125 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

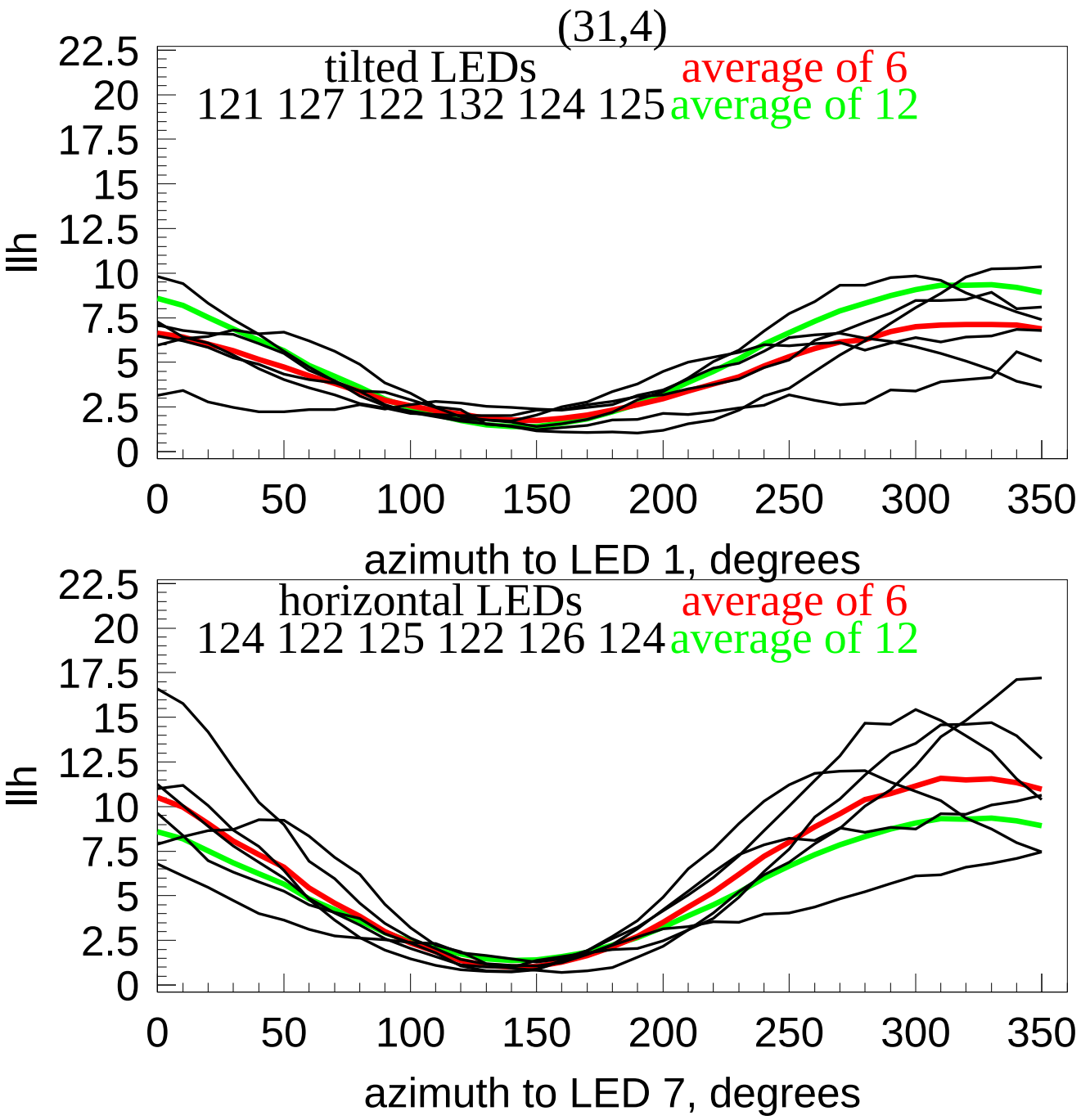

(31,1)
11
10
5
12
4
6
330
3
1
9
2
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
339 ± 13.5

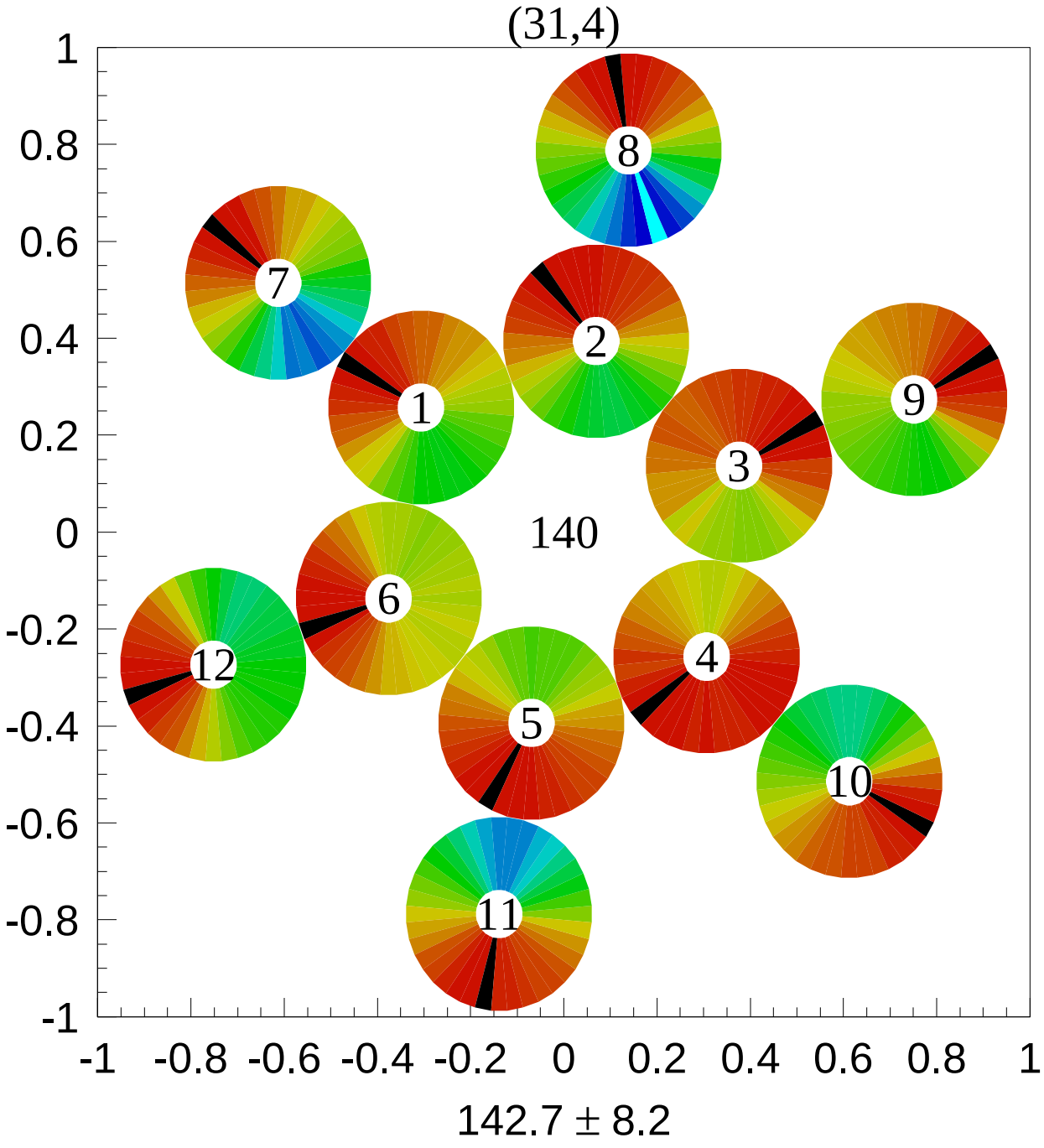

(31,2)
tilted LEDs
116 124 119 120 120 119
average of 6
average of 12
llh
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 119 124 119 122 120
average of 6
average of 12
llh
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

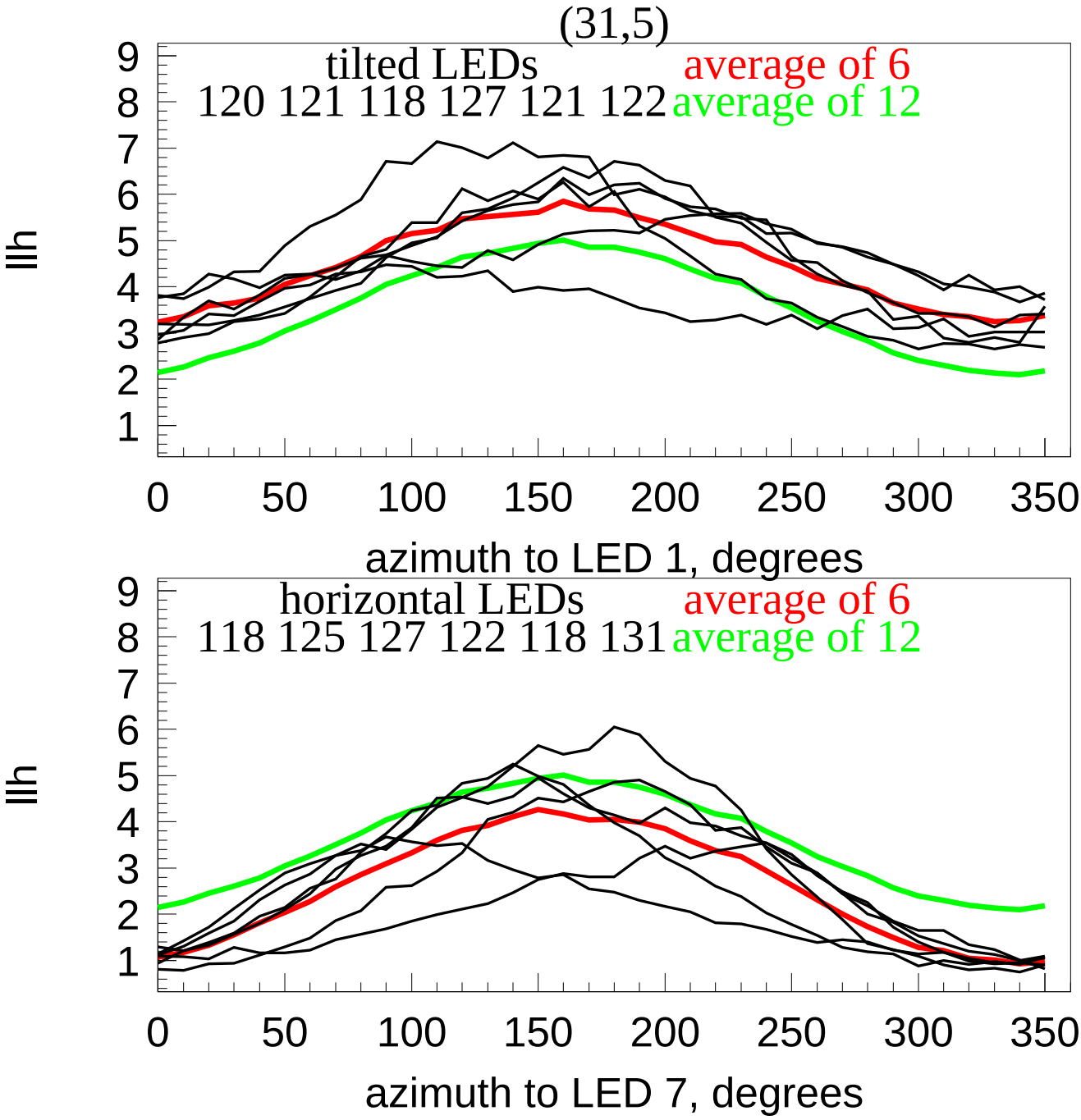

(31,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
149.4 ± 11.3

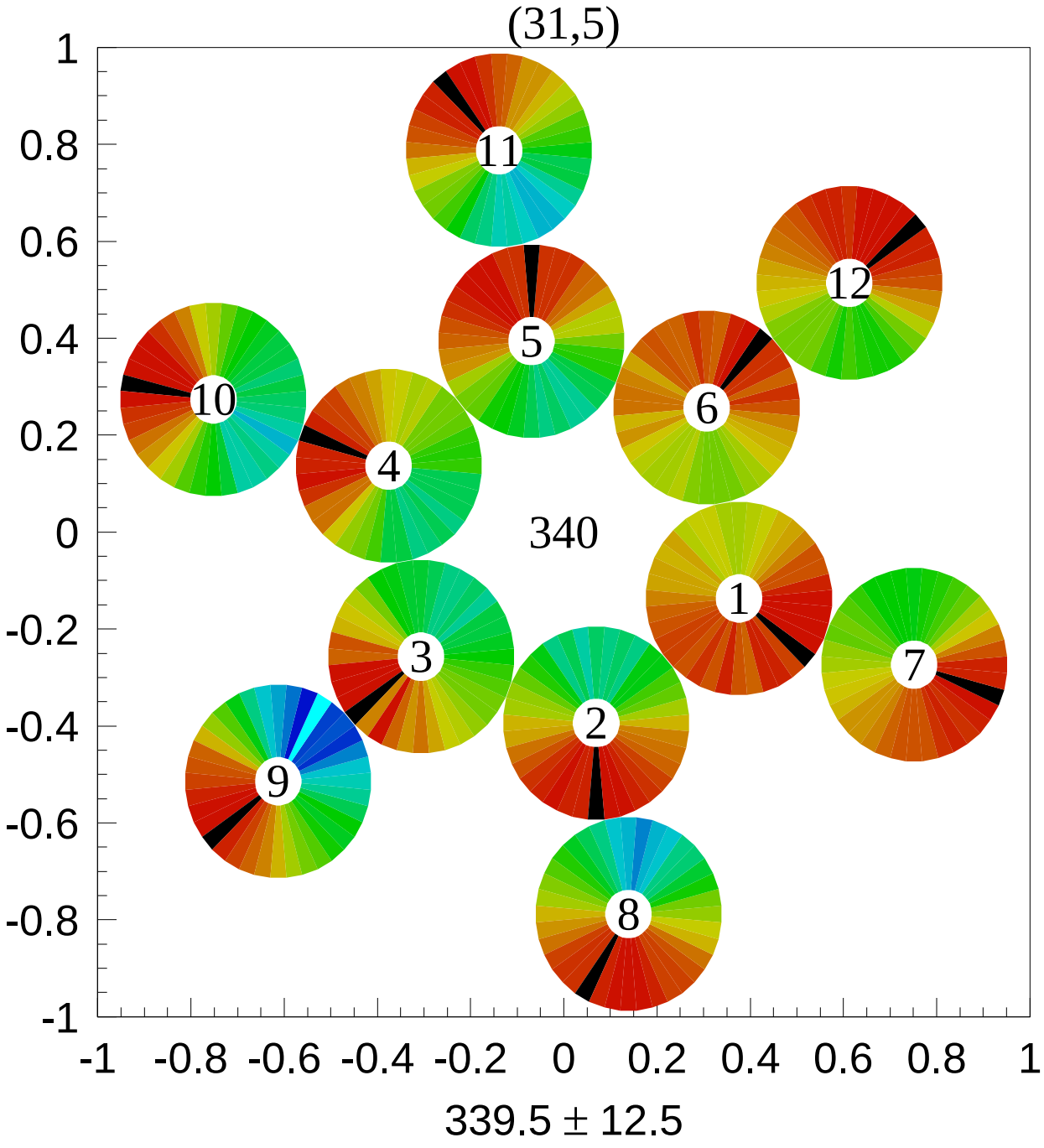

(31,3)
tilted LEDs
121 121 123 128 116 111
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 120 125 126 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

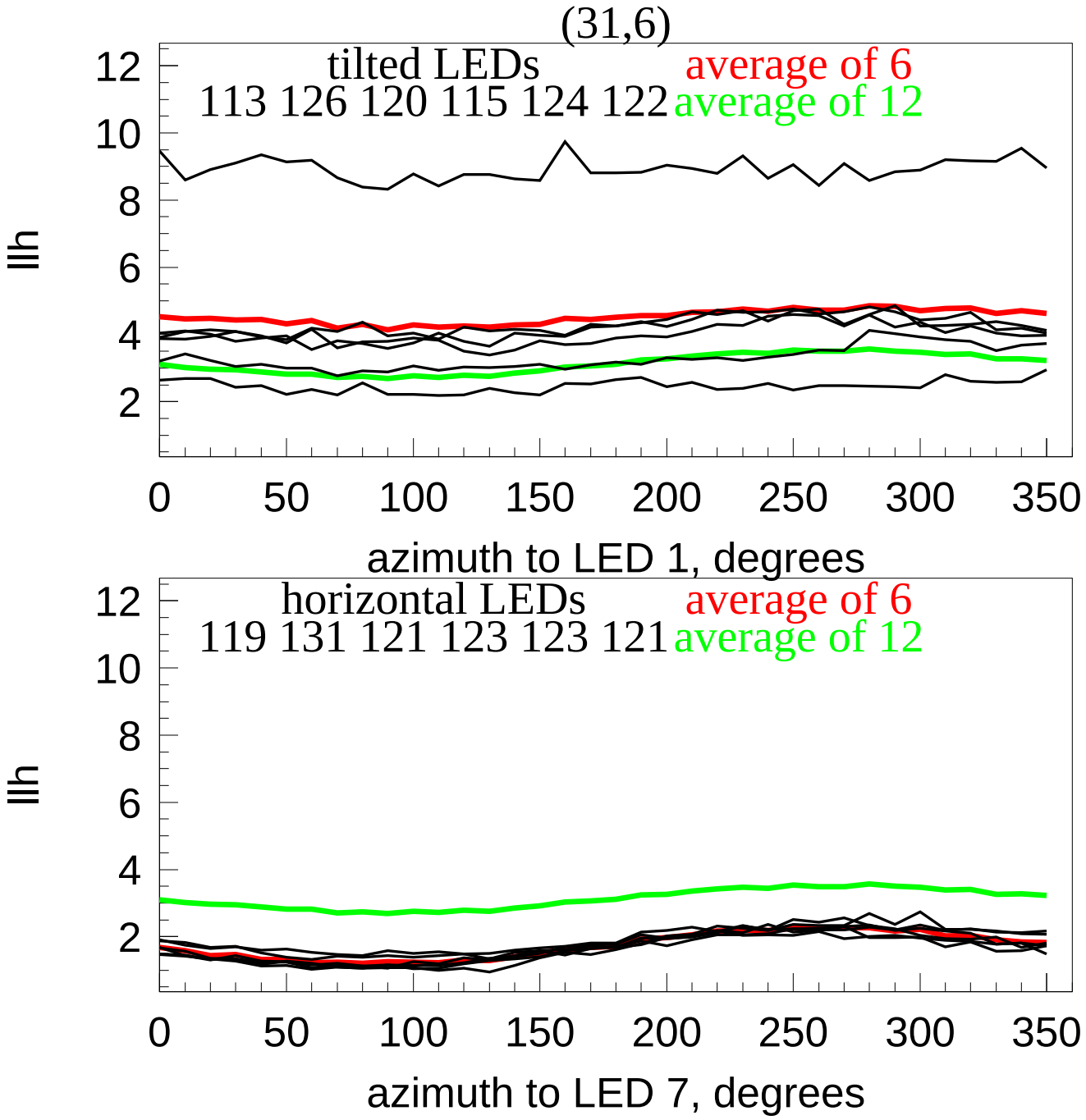

(31,3)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
45.8 ± 12.9

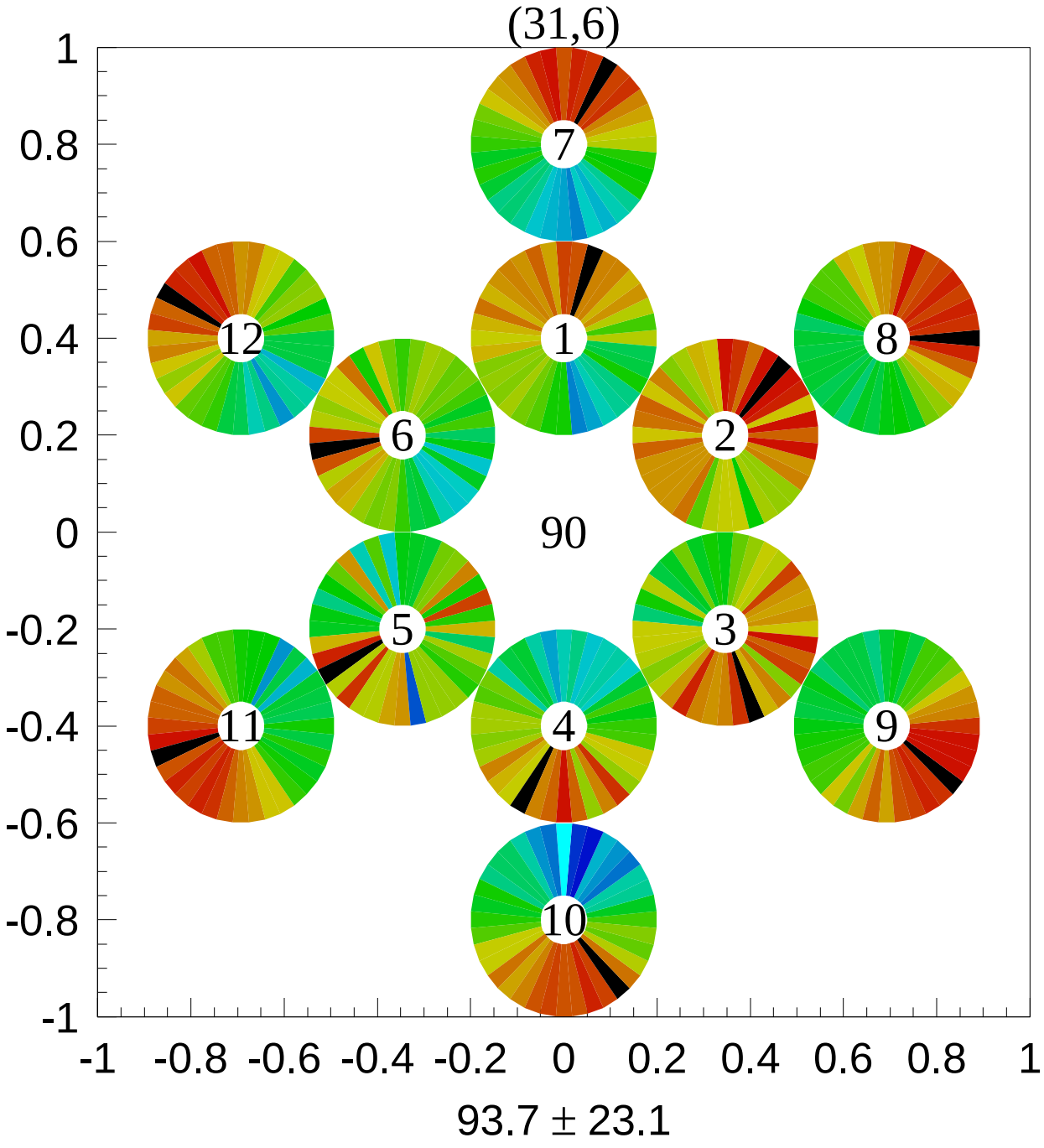

(31,4)
tilted LEDs
121 127 122 132 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 125 122 126 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

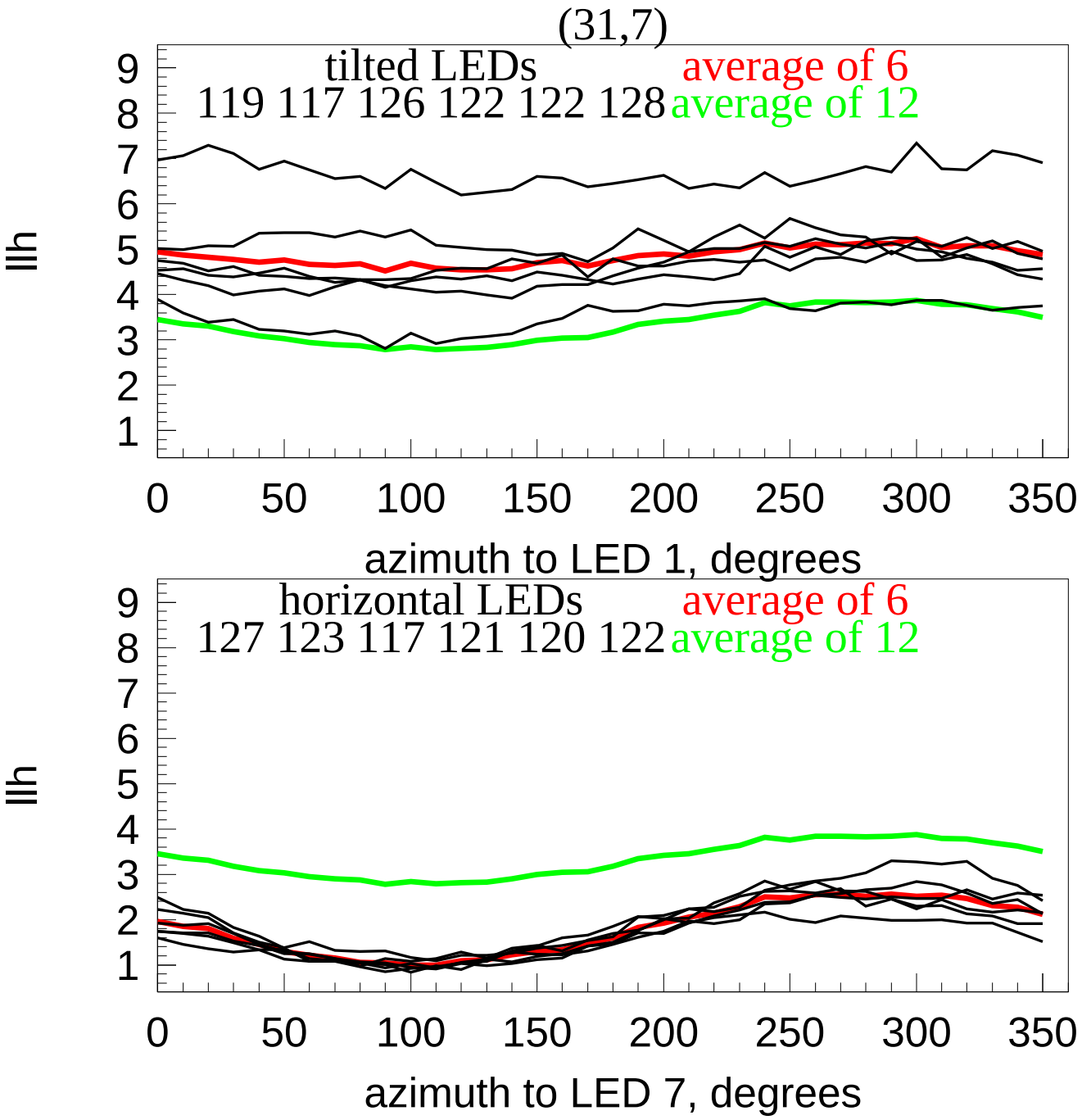

(31,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
142.7 ± 8.2

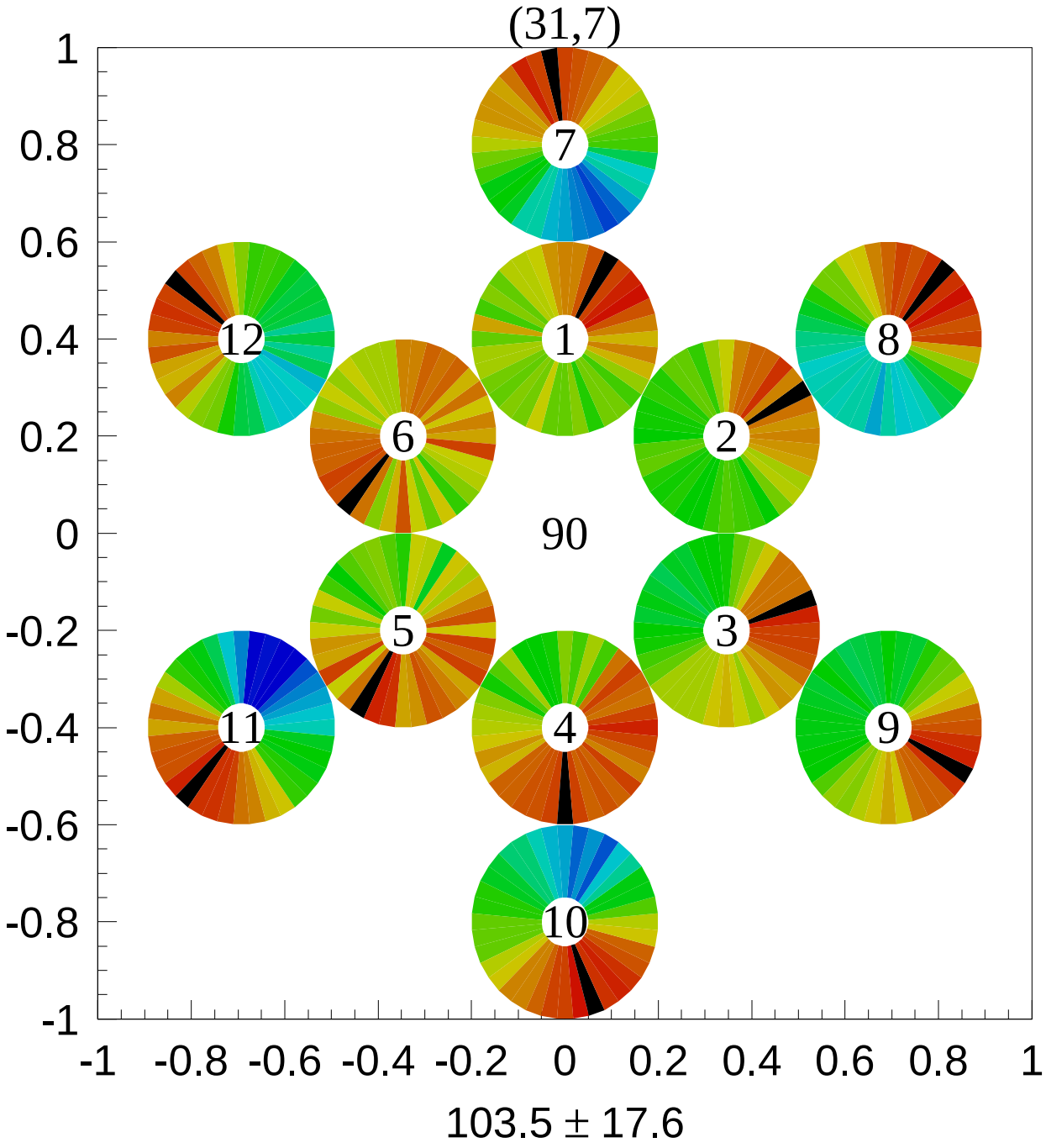

(31,5)
tilted LEDs
120 121 118 127 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 125 127 122 118 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

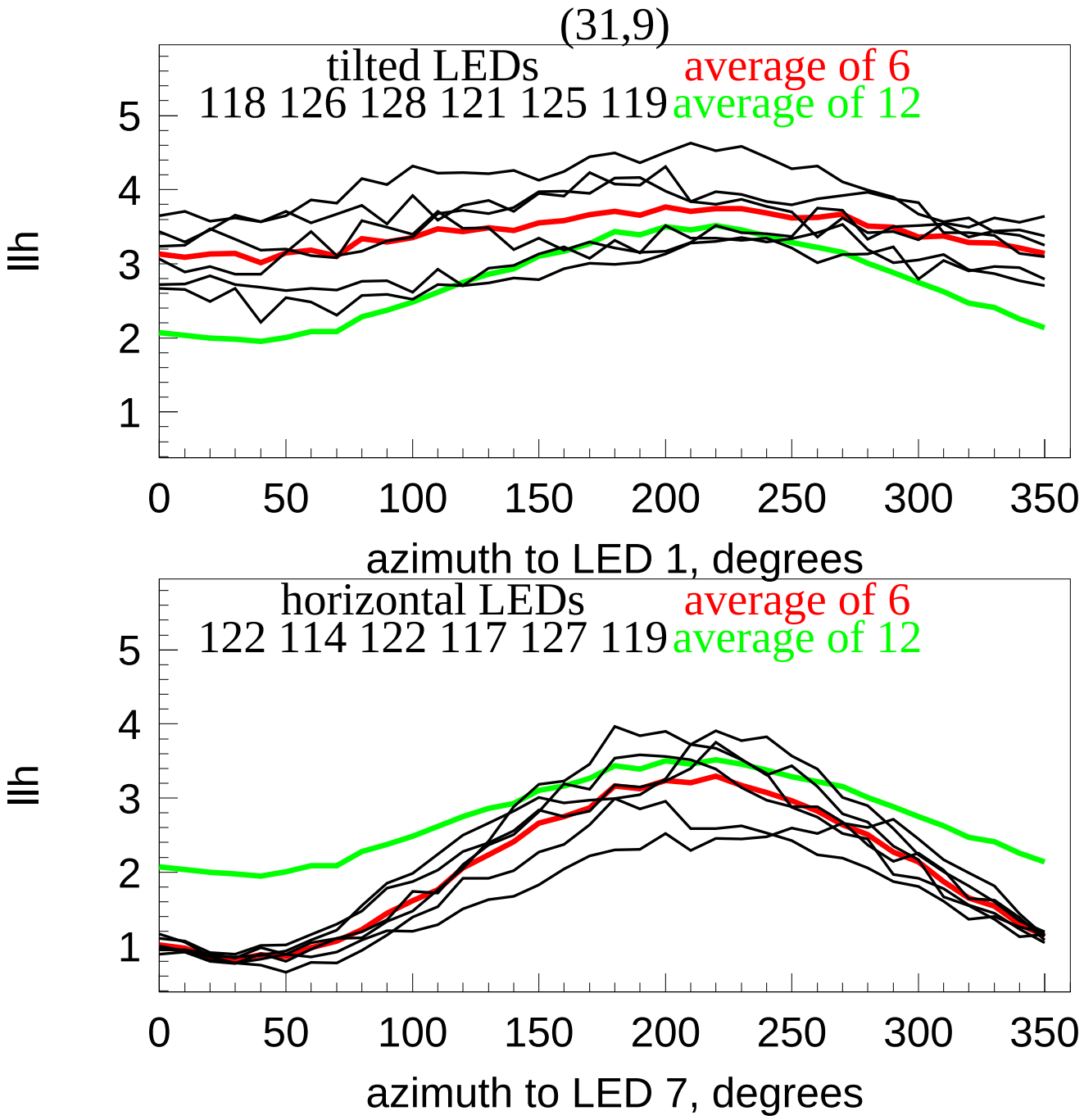

(31,5)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
339.5 ± 12.5

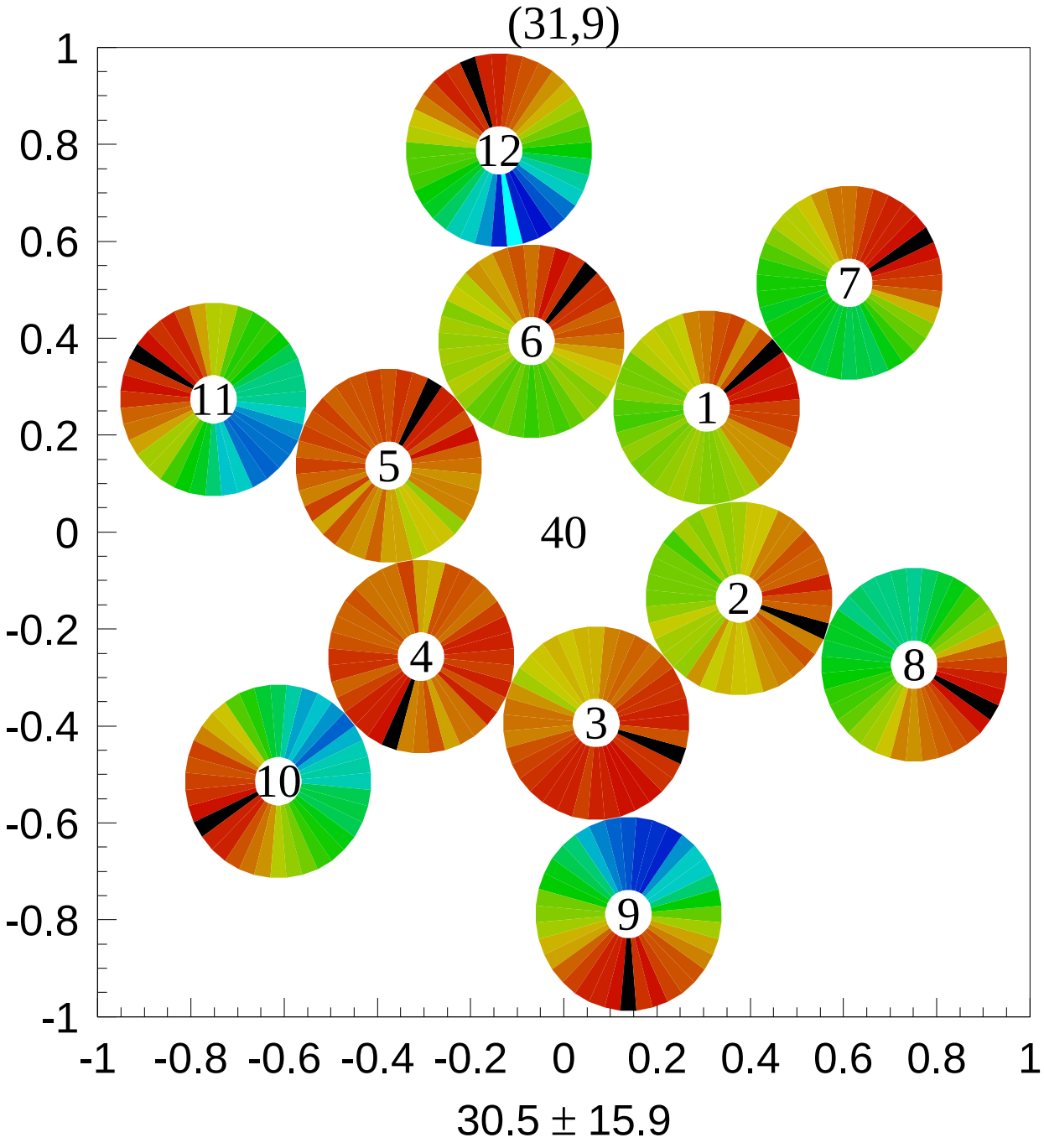

(31,6)
tilted LEDs
113 126 120 115 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 131 121 123 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

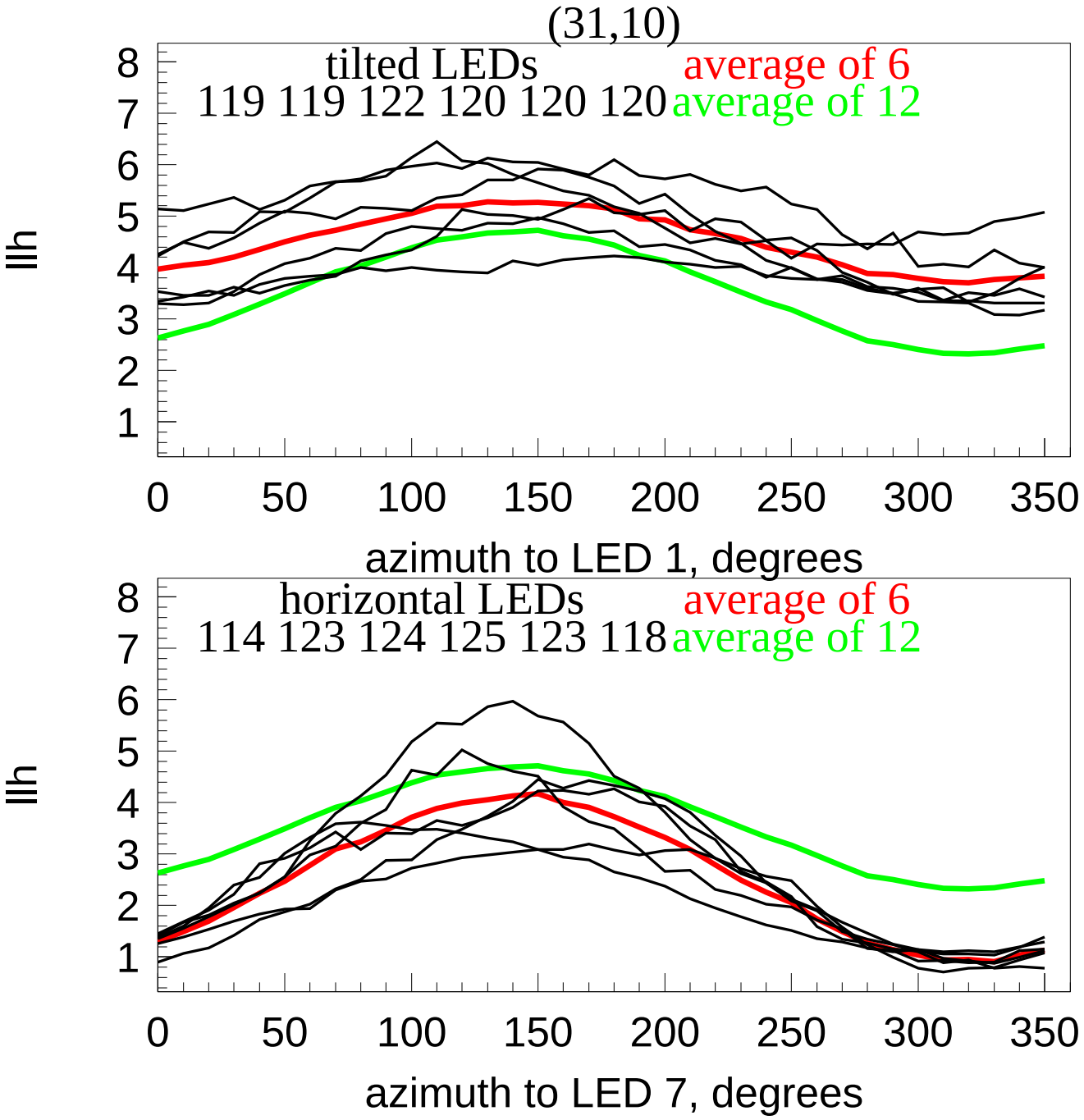

(31,6)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
93.7 ± 23.1

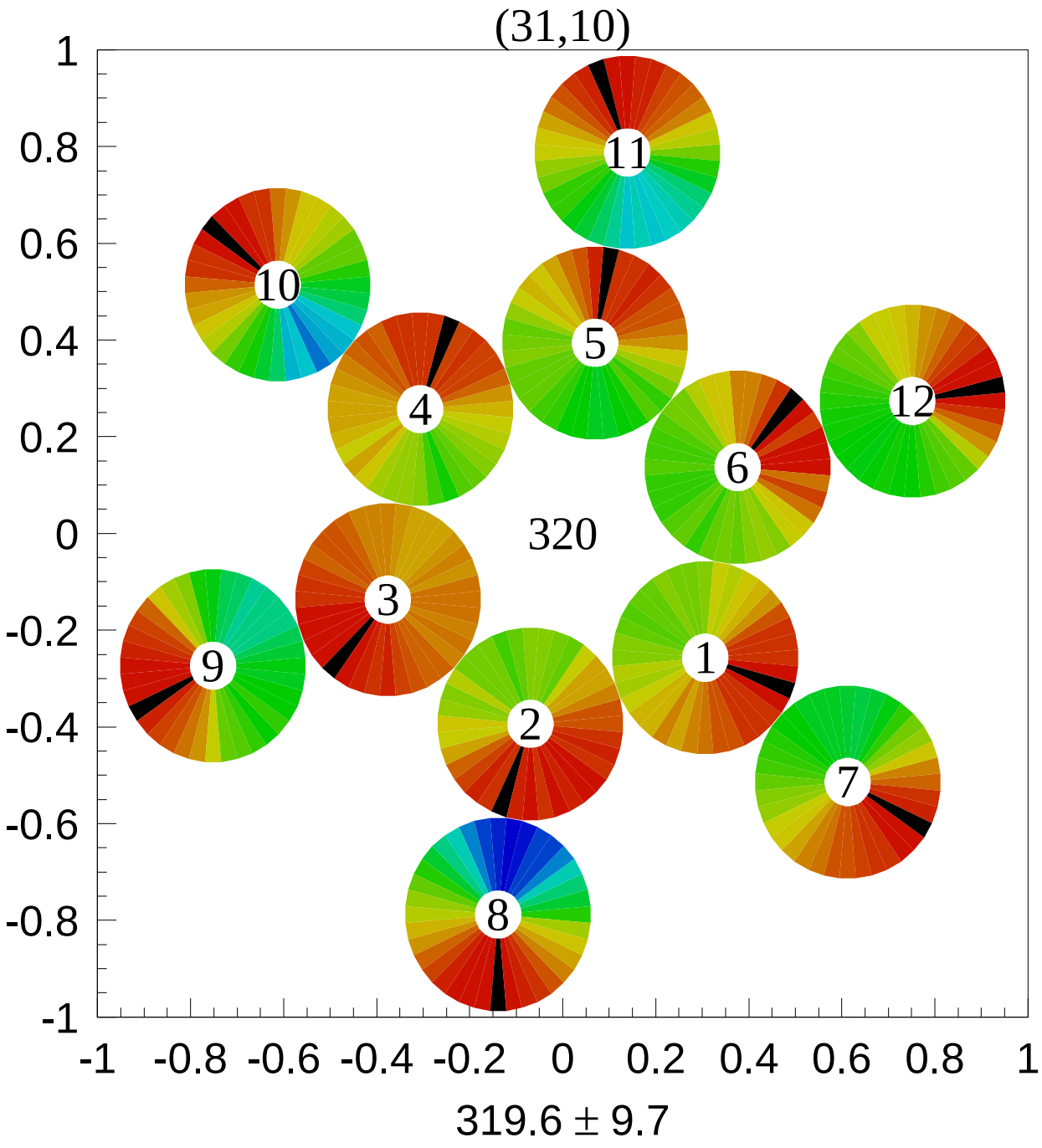

(31,7)
tilted LEDs
119 117 126 122 122 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 123 117 121 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

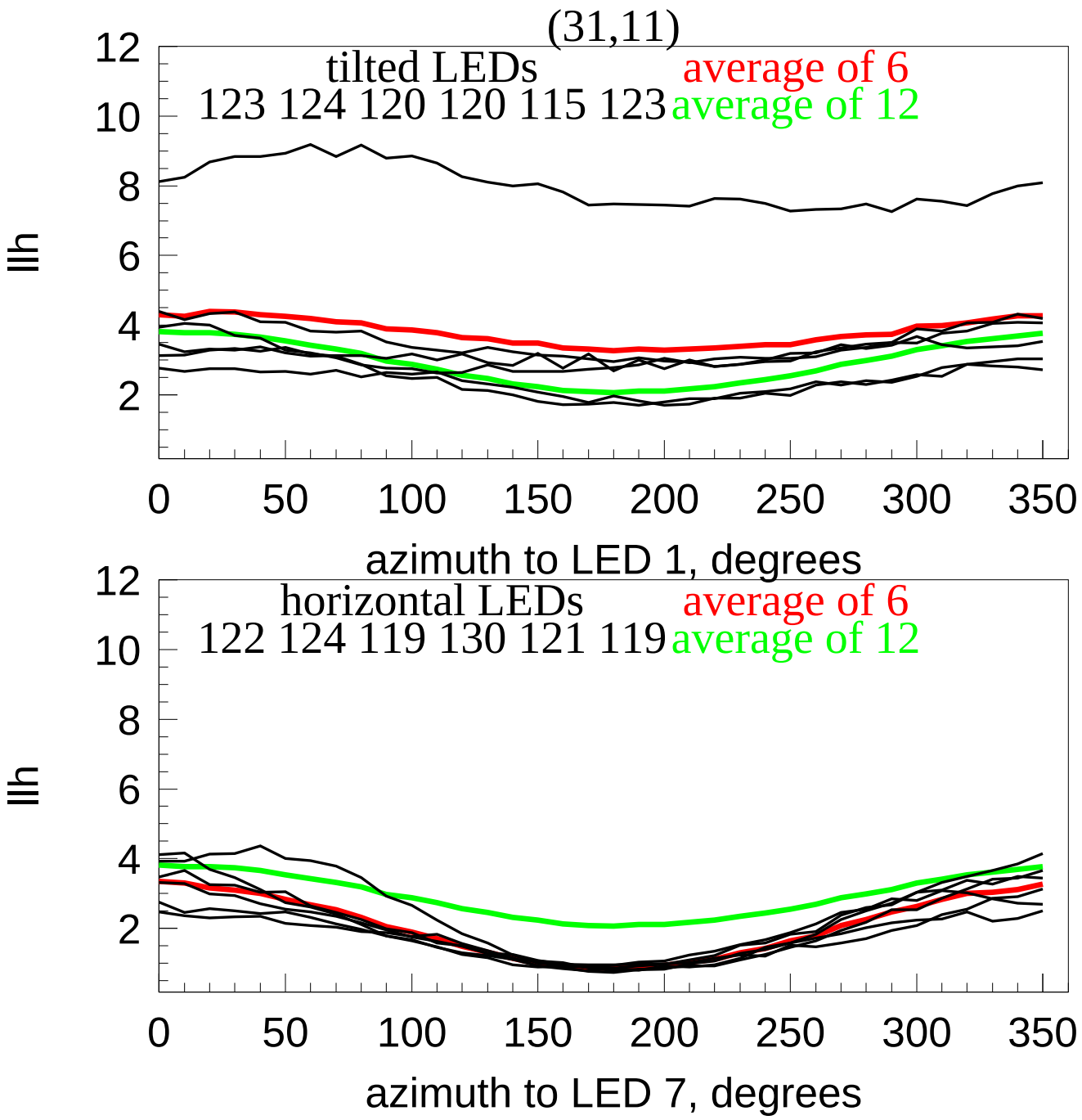

(31,7)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
103.5 ± 17.6

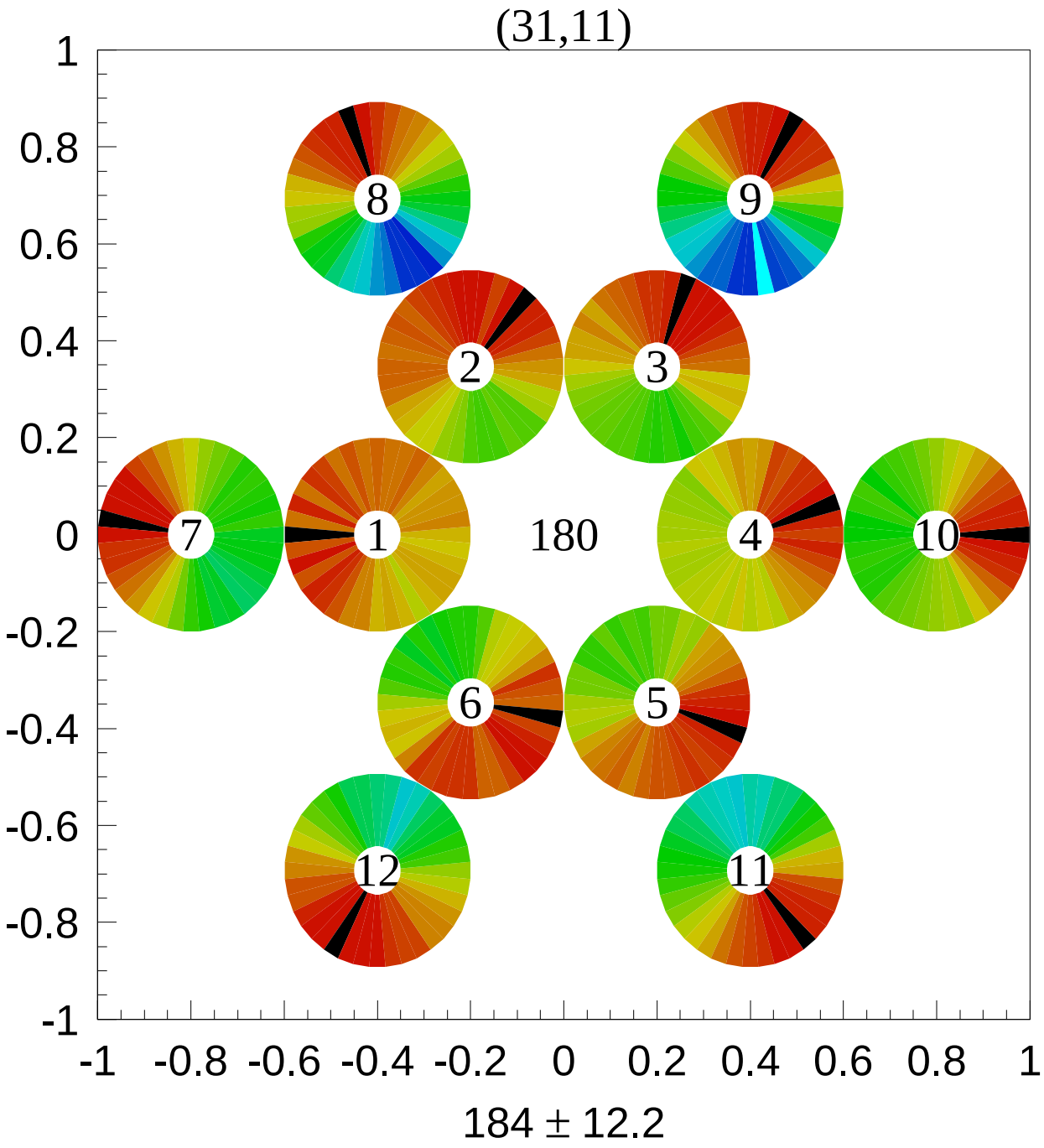

(31,9)
tilted LEDs
118 126 128 121 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 114 122 117 127 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

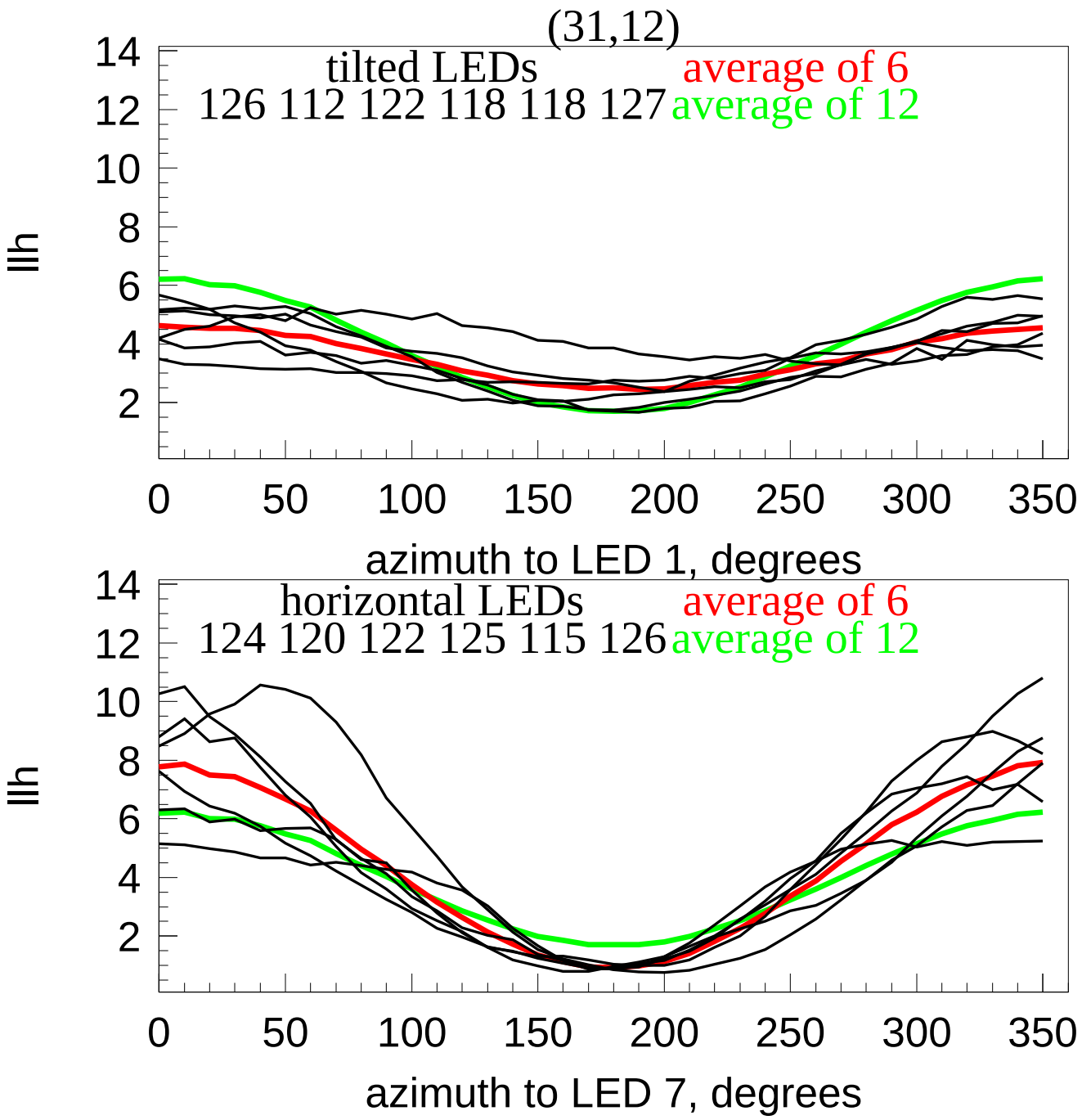

(31,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
30.5 ± 15.9

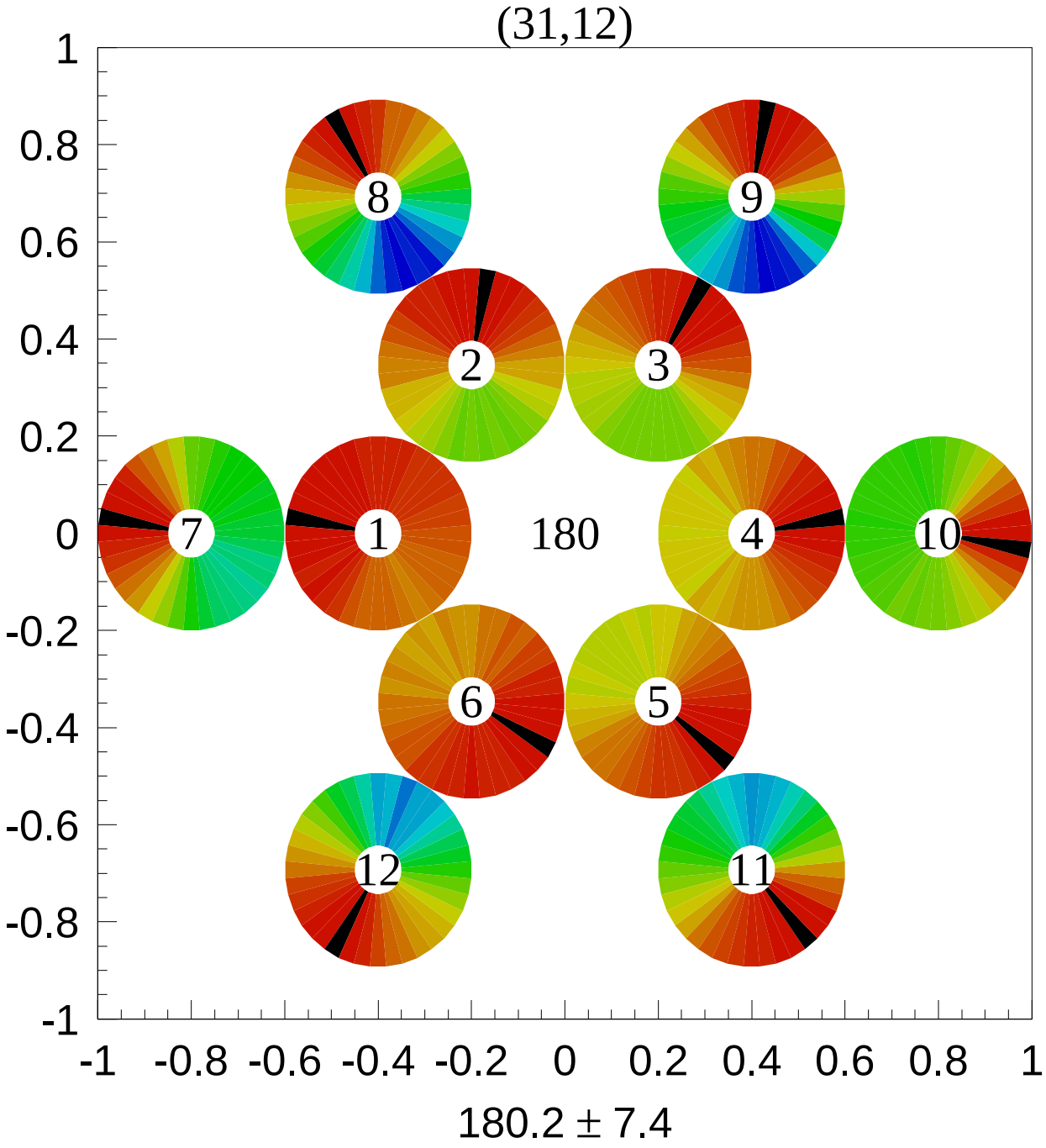

(31,10)
tilted LEDs
119 119 122 120 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 123 124 125 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

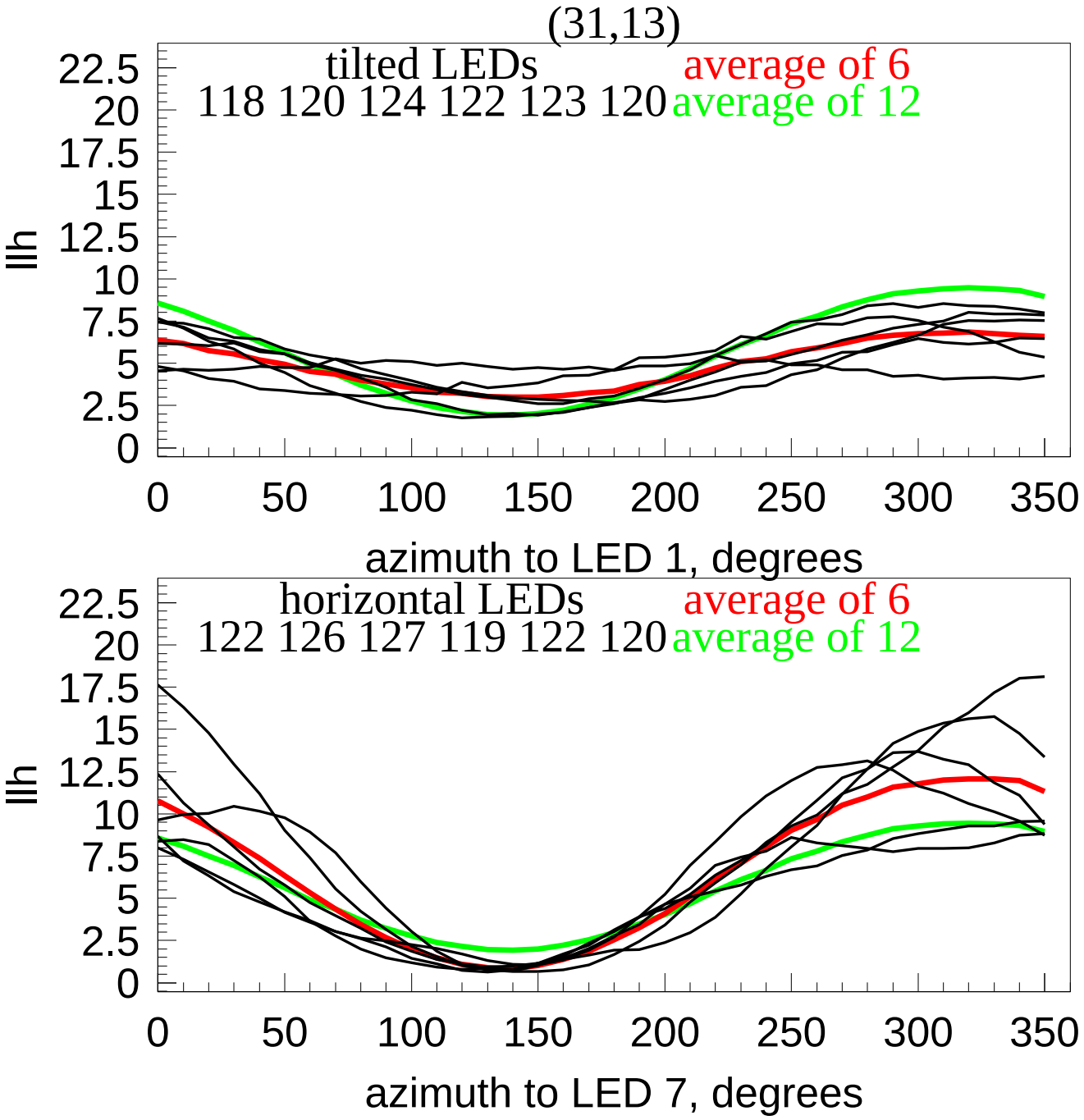

(31,10)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
319.6 ± 9.7

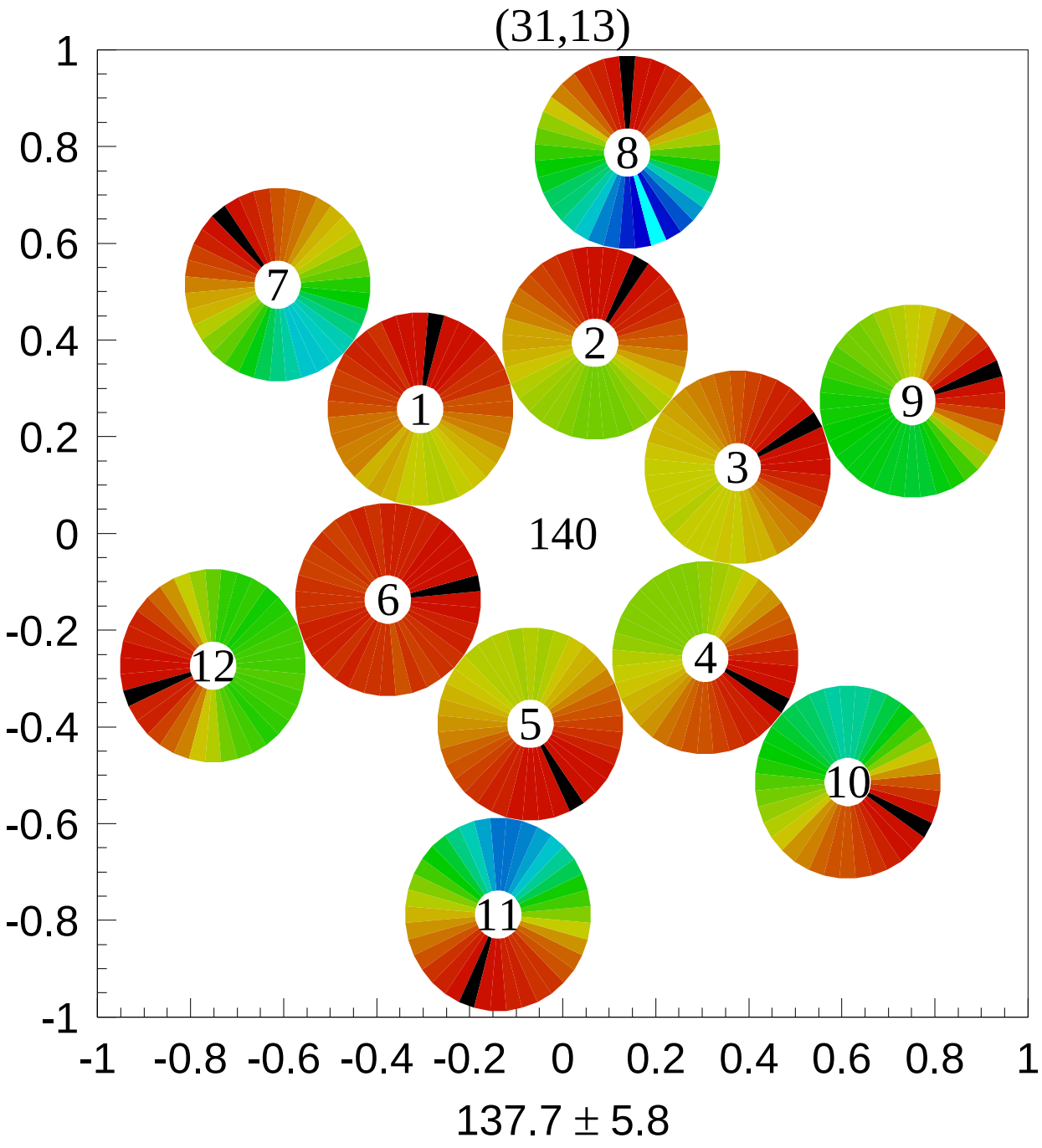

(31,11)
tilted LEDs
123 124 120 120 115 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 124 119 130 121 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

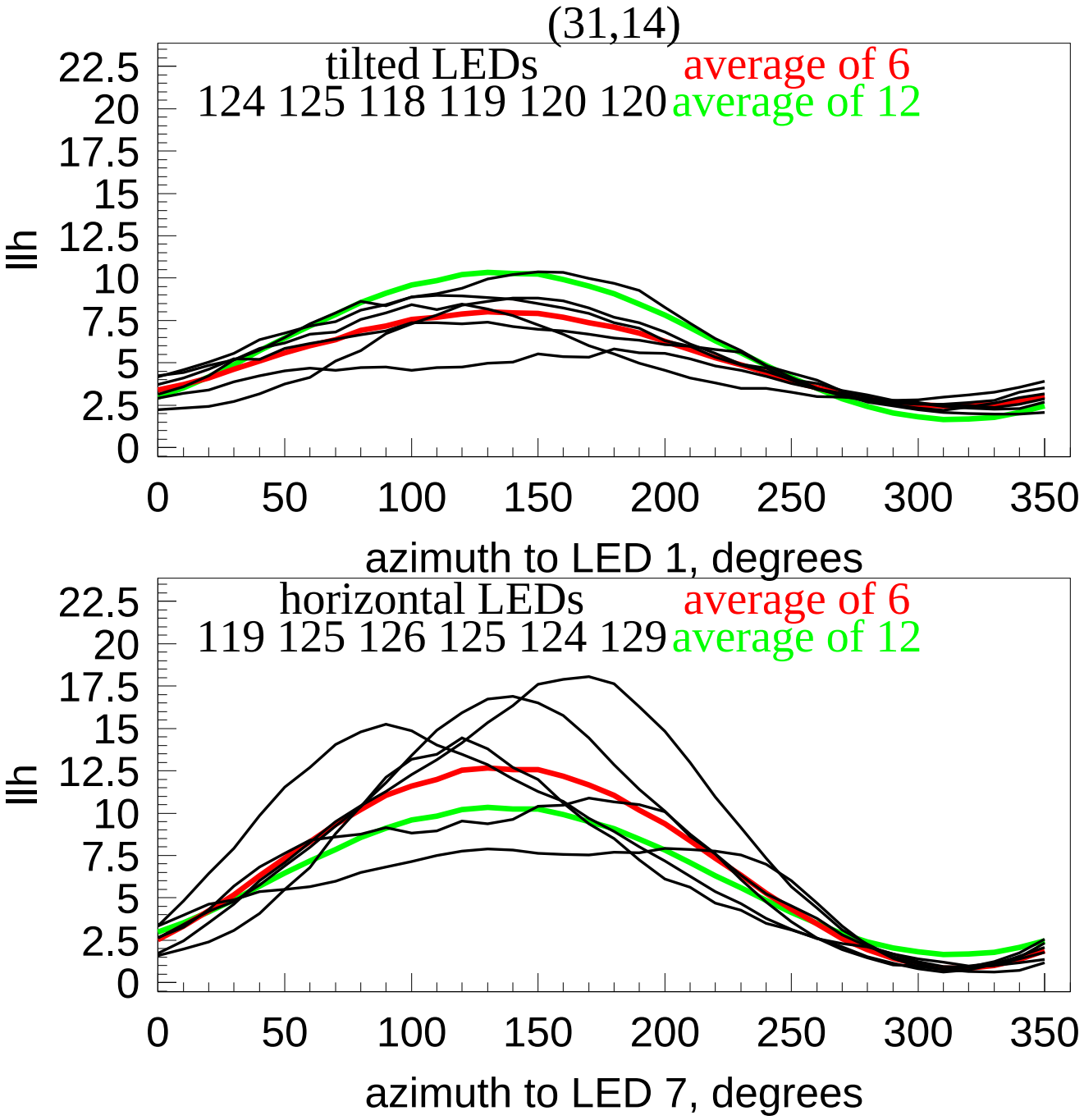

(31,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
184 ± 12.2
8
9
2
3
7
1
180
4
10
6
5
12
11

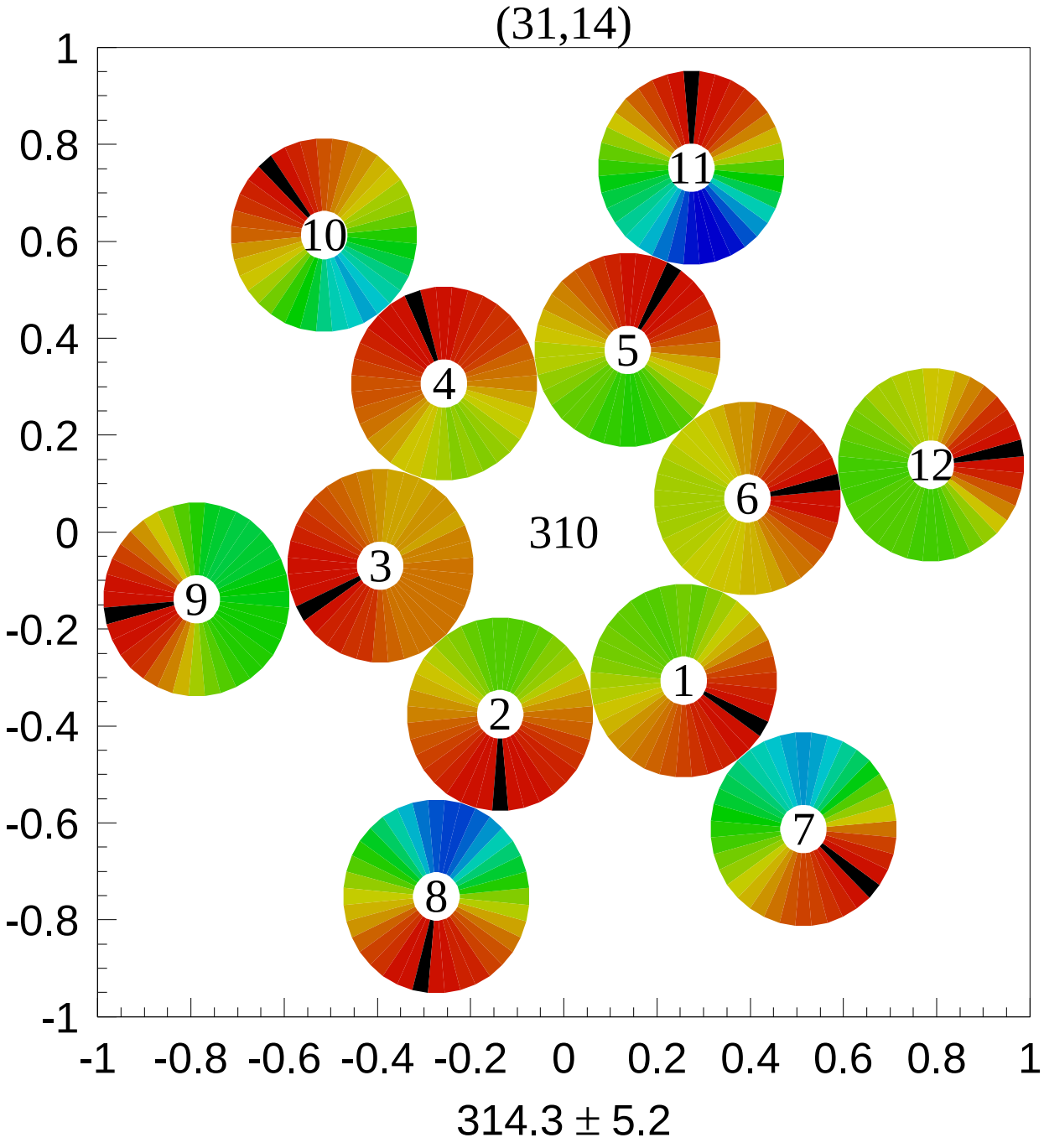

(31,12)
tilted LEDs
126 112 122 118 118 127
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 120 122 125 115 126
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

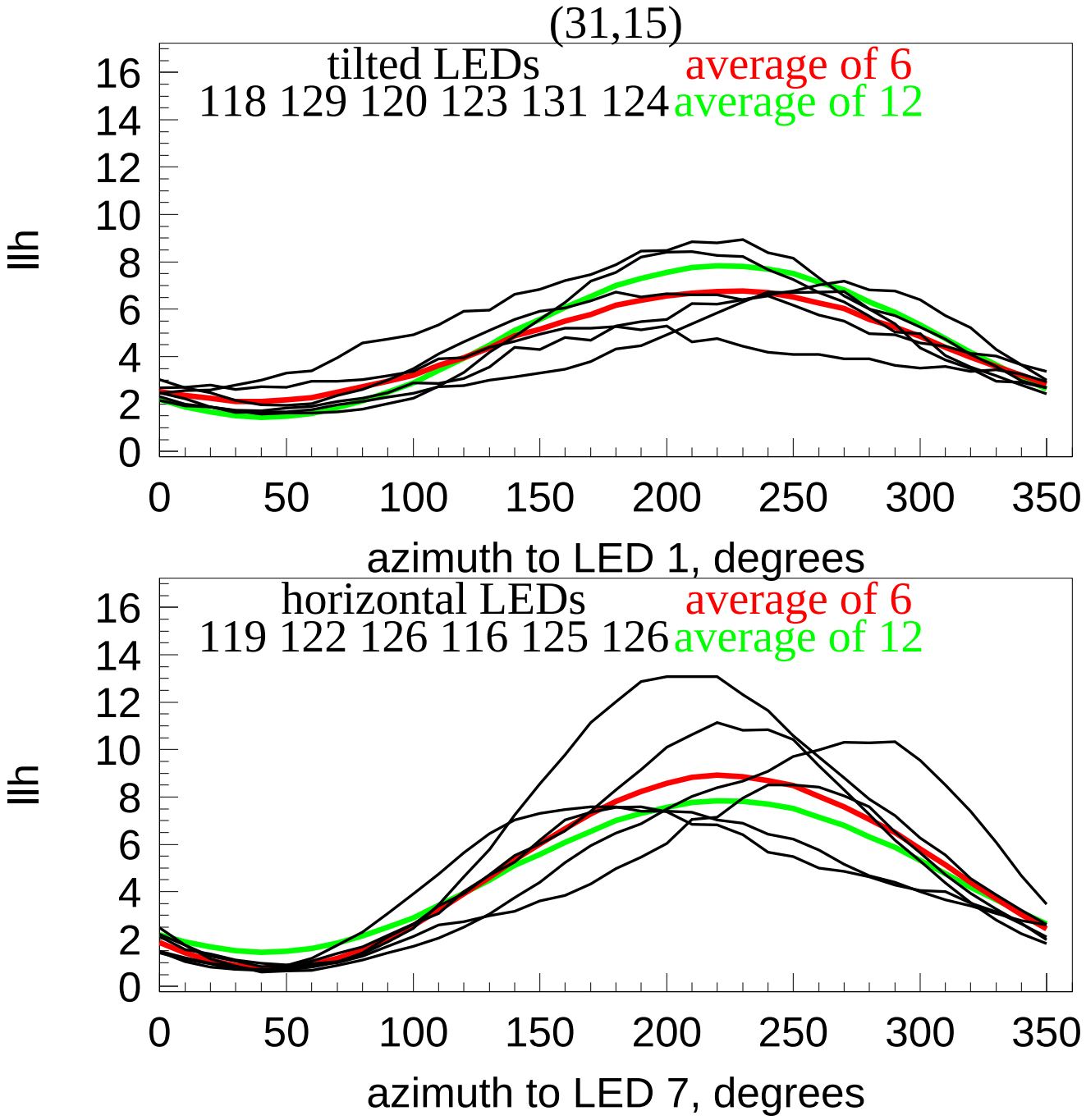

(31,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
180.2 ± 7.4
8
9
2
3
7
1
180
4
10
6
5
12
11

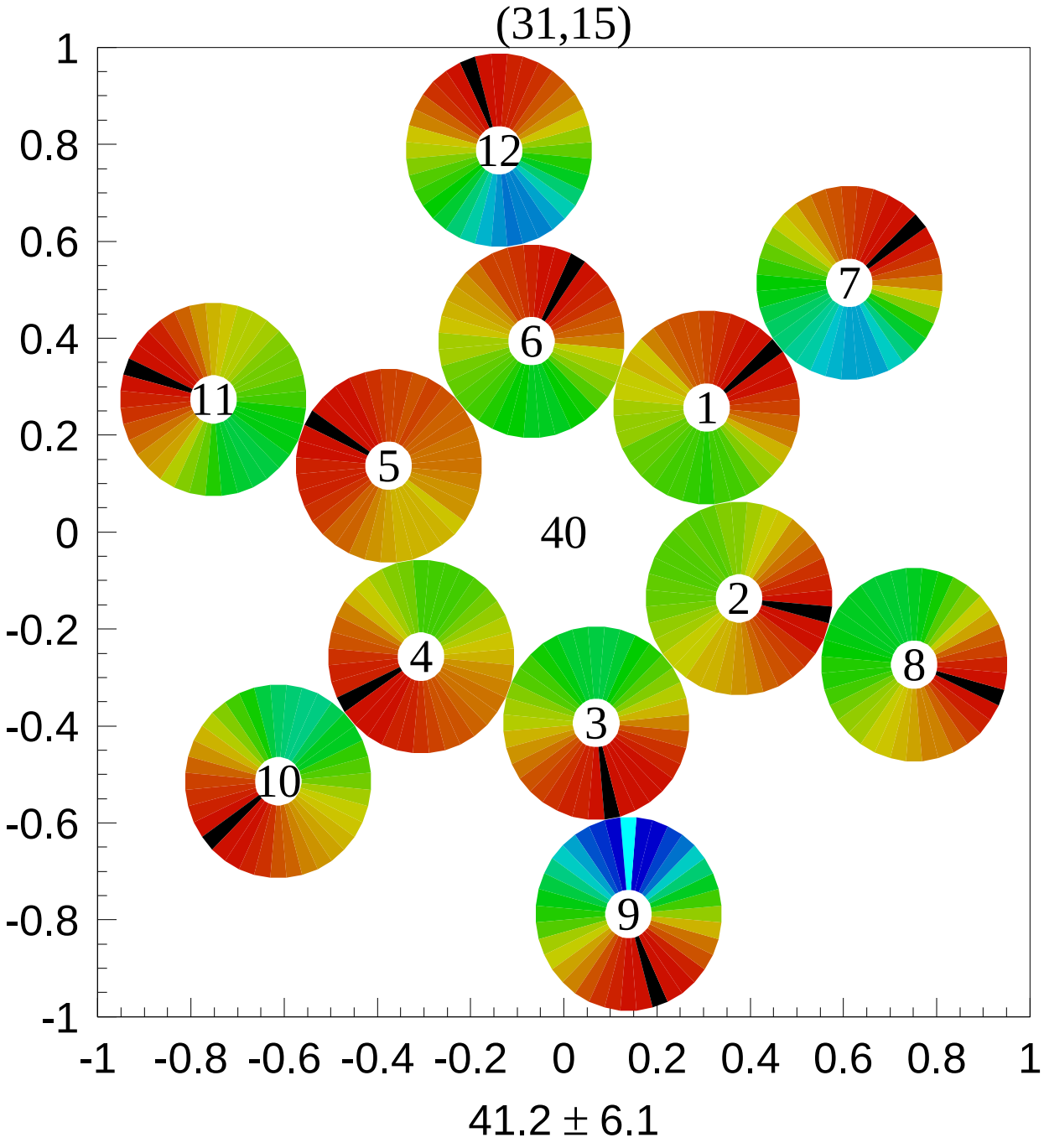

(31,13)
tilted LEDs
118 120 124 122 123 120
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 126 127 119 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

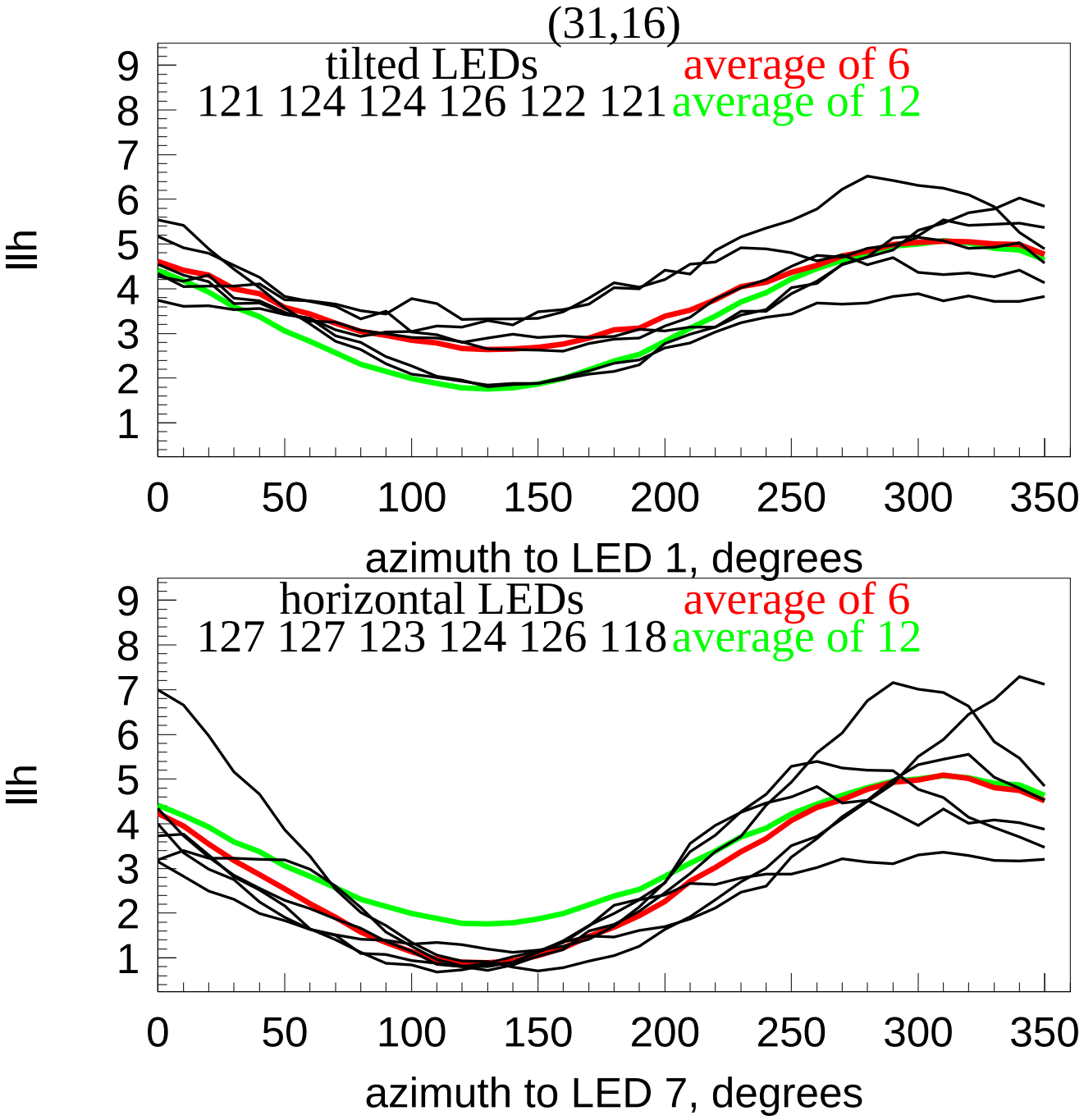

(31,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
137.7 ± 5.8
140
1
2
3
4
5
6
7
8
9
10
11
12

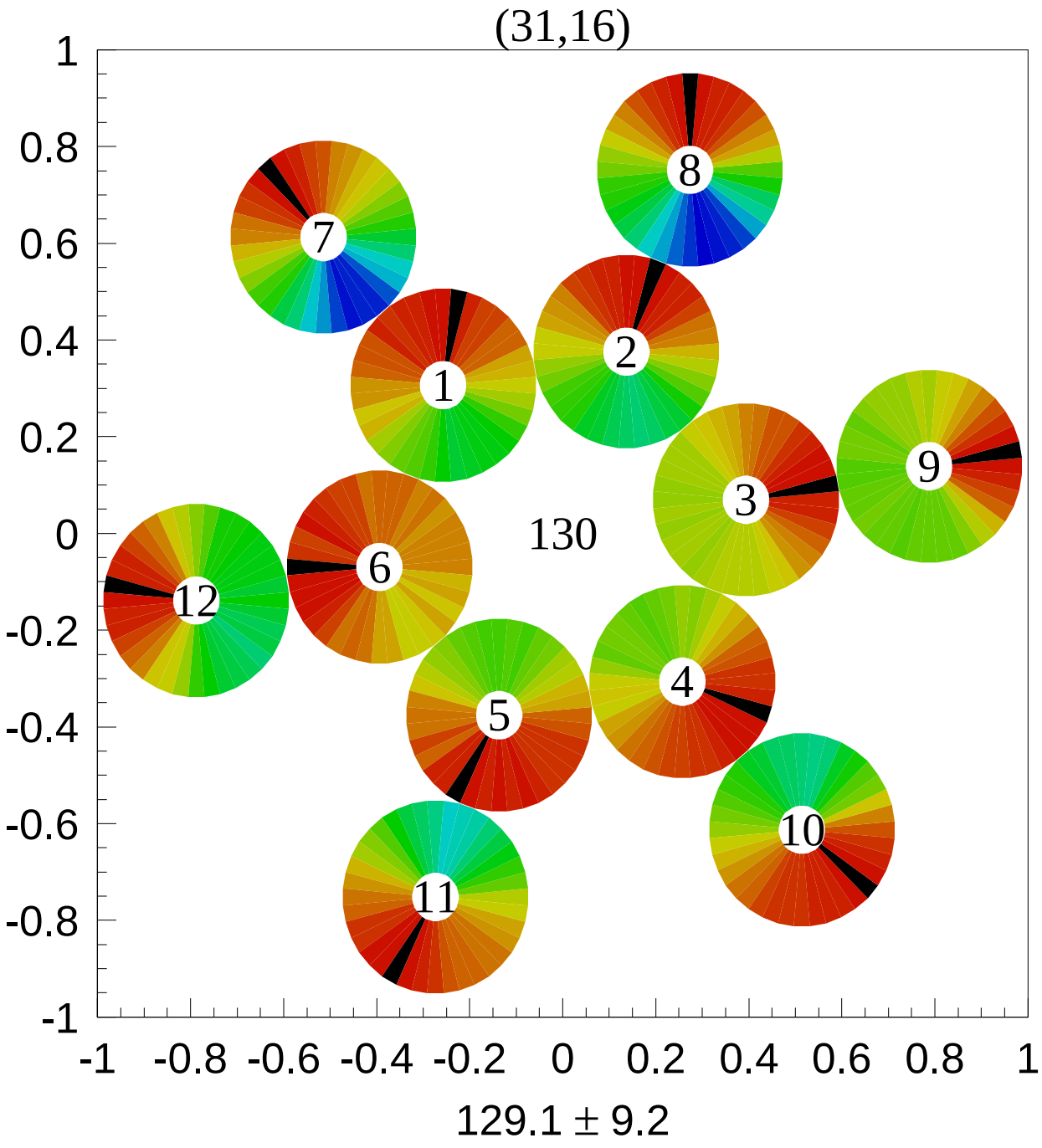

(31,14)
tilted LEDs
124 125 118 119 120 120
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 125 126 125 124 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

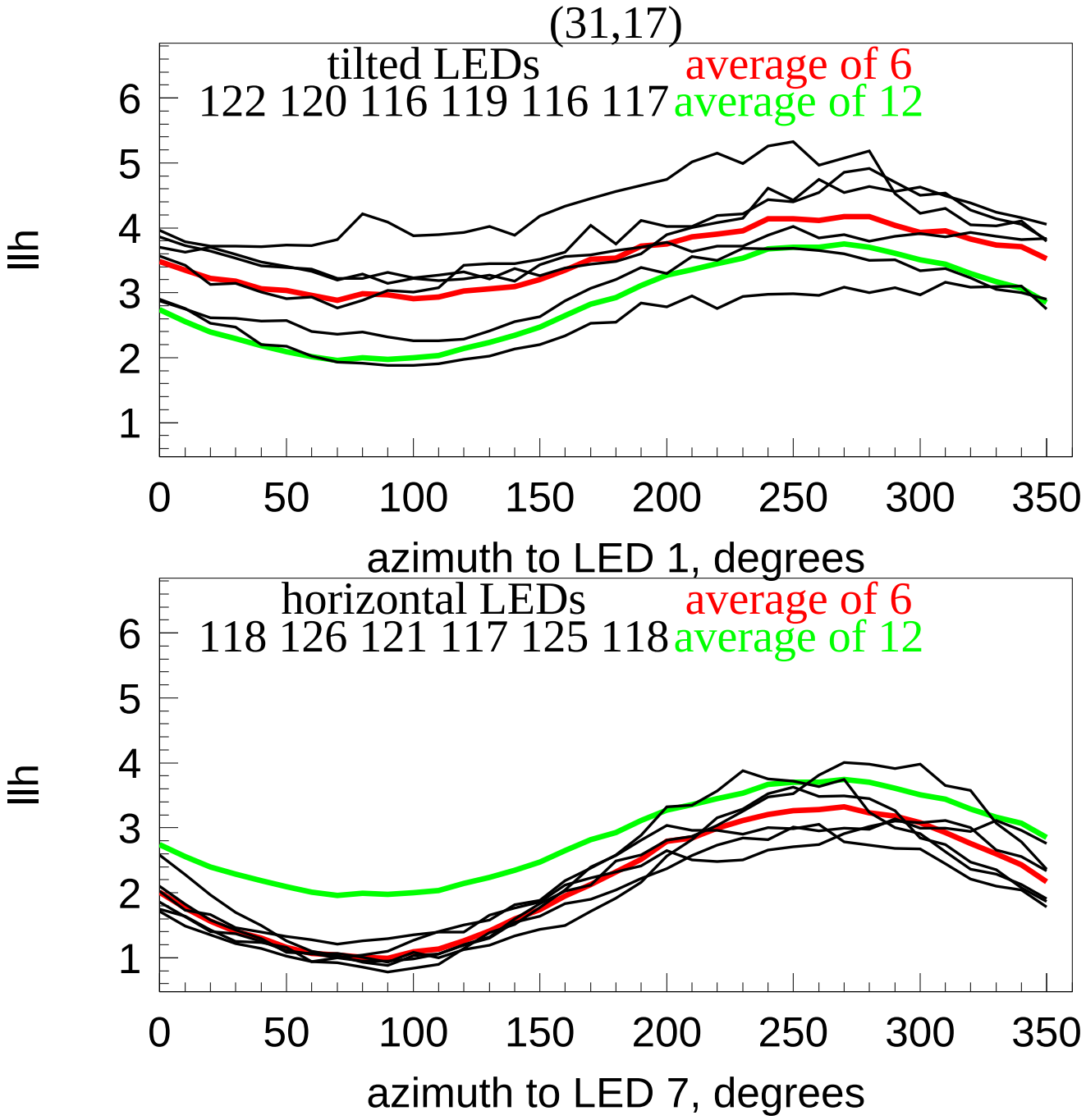

(31,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
314.3 ± 5.2

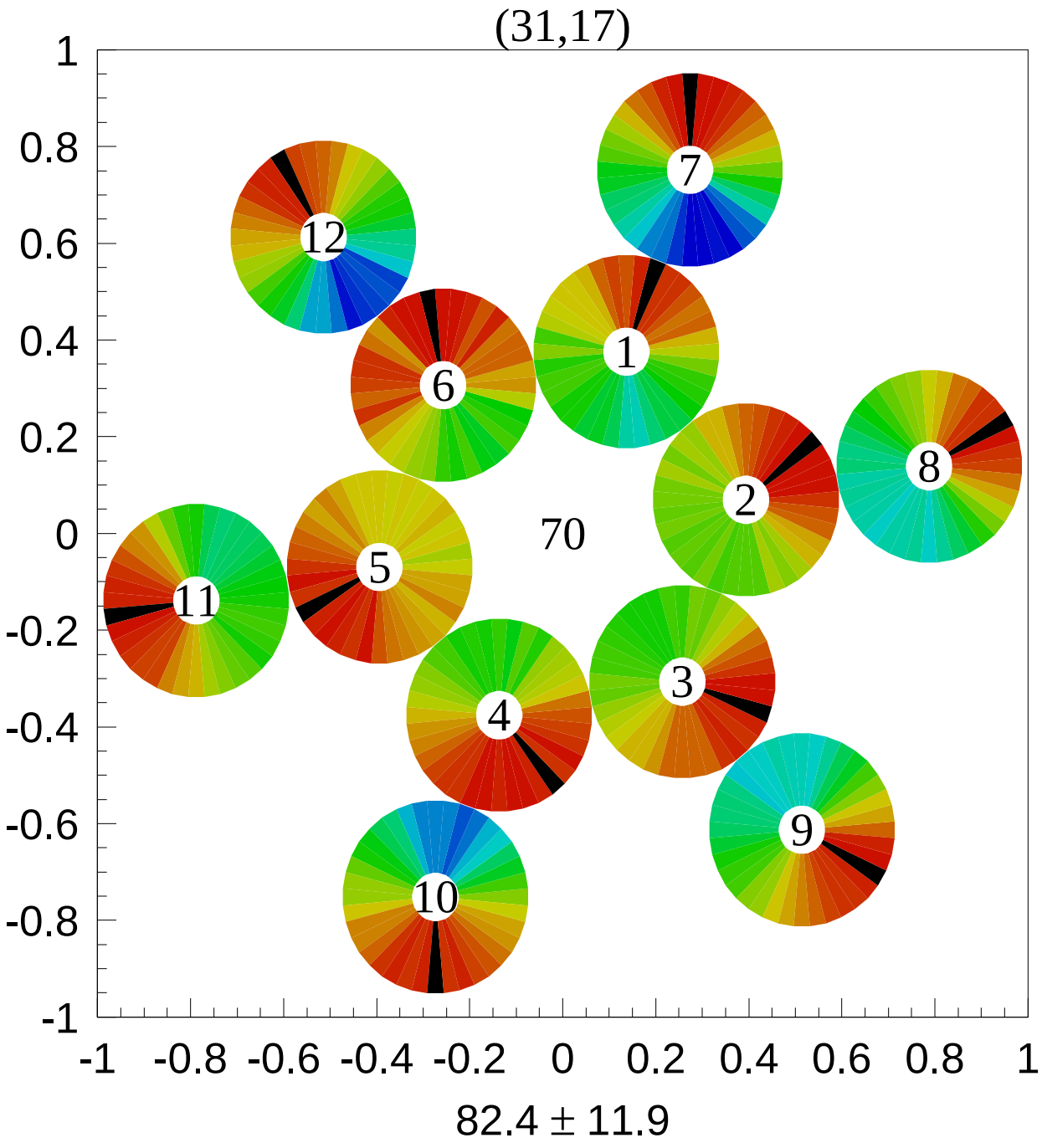

(31,15)
tilted LEDs
118 129 120 123 131 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 126 116 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

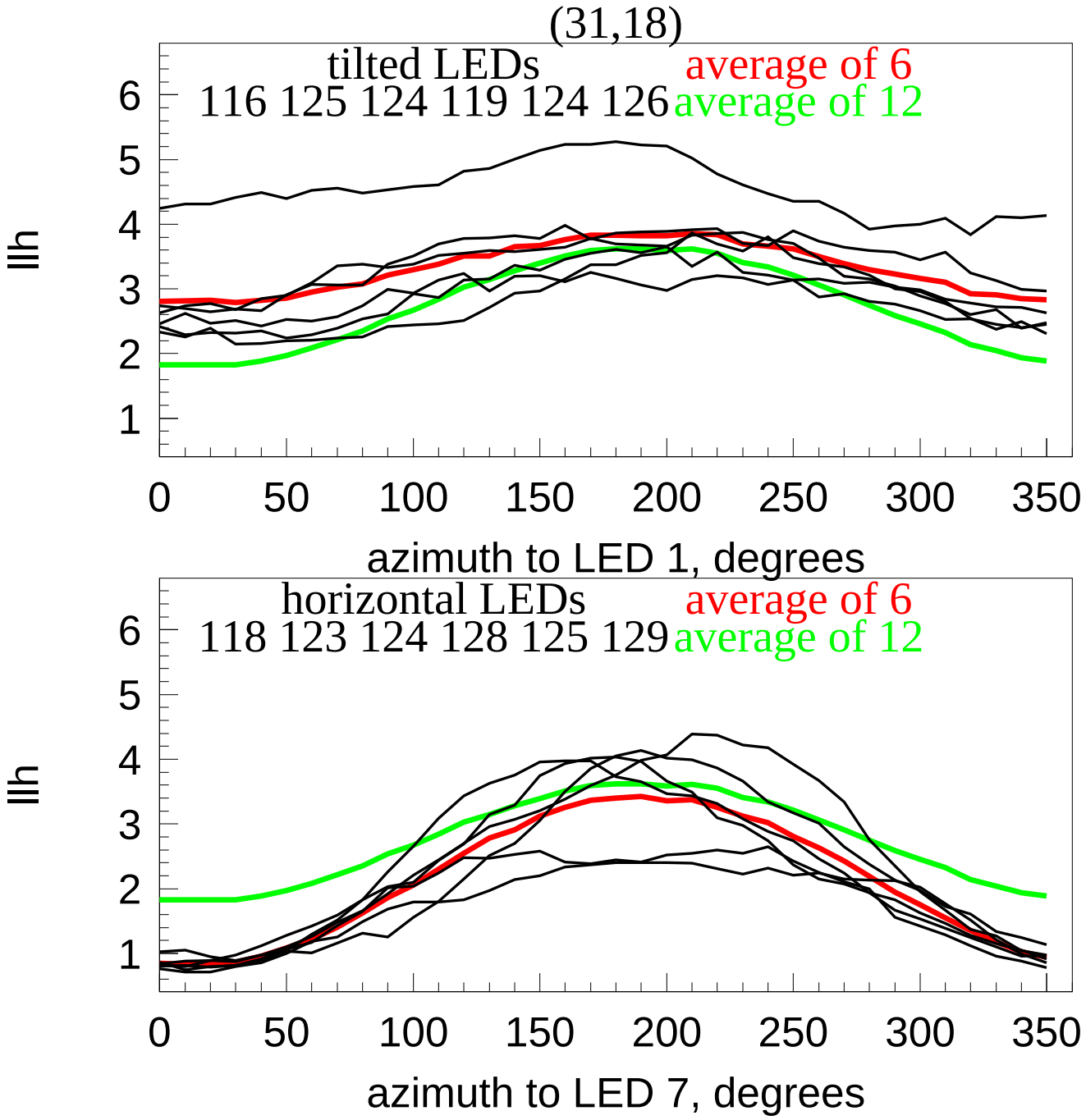

(31,15)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
41.2 ± 6.1

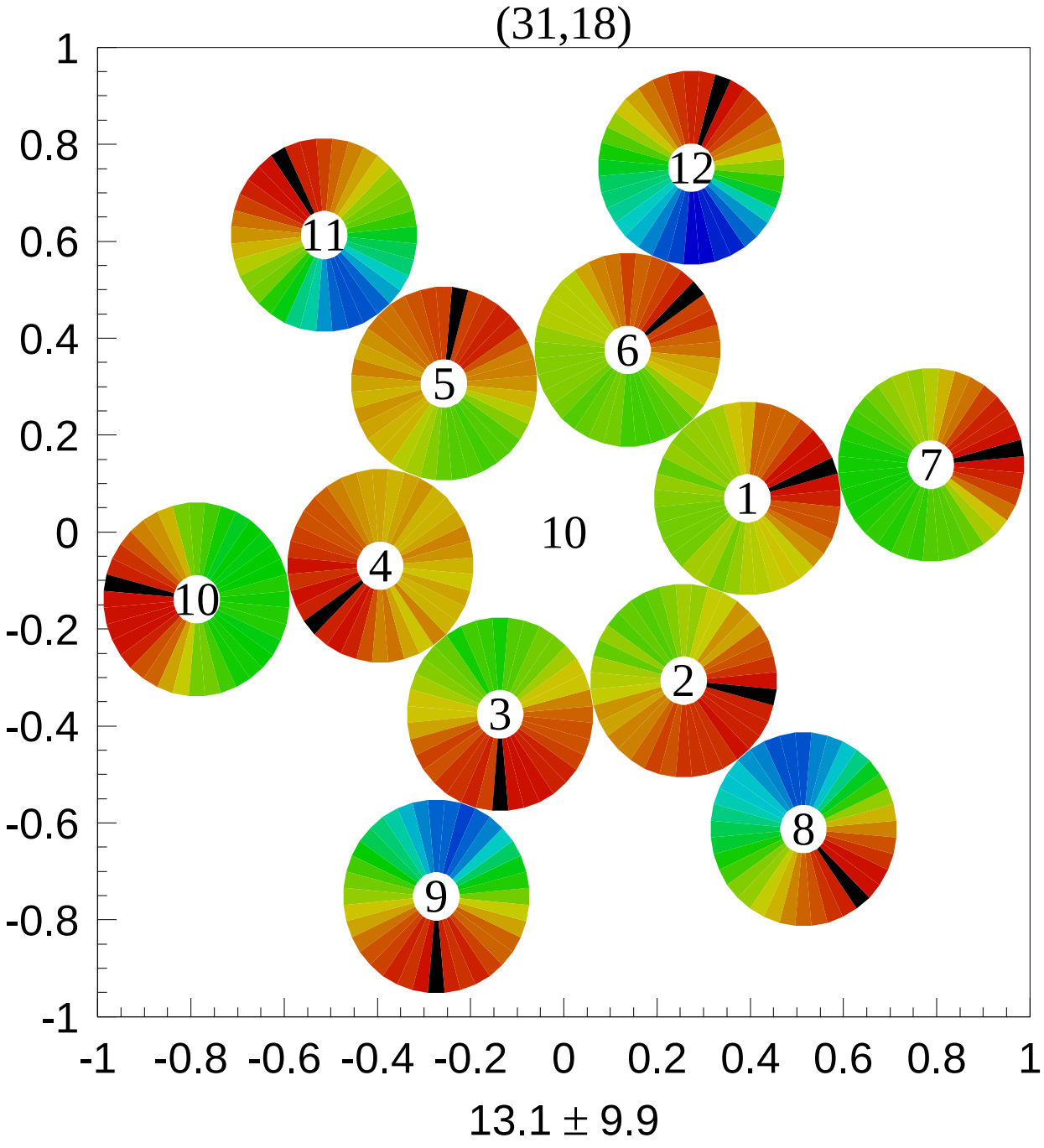

(31,16)
tilted LEDs
121 124 124 126 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 127 123 124 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

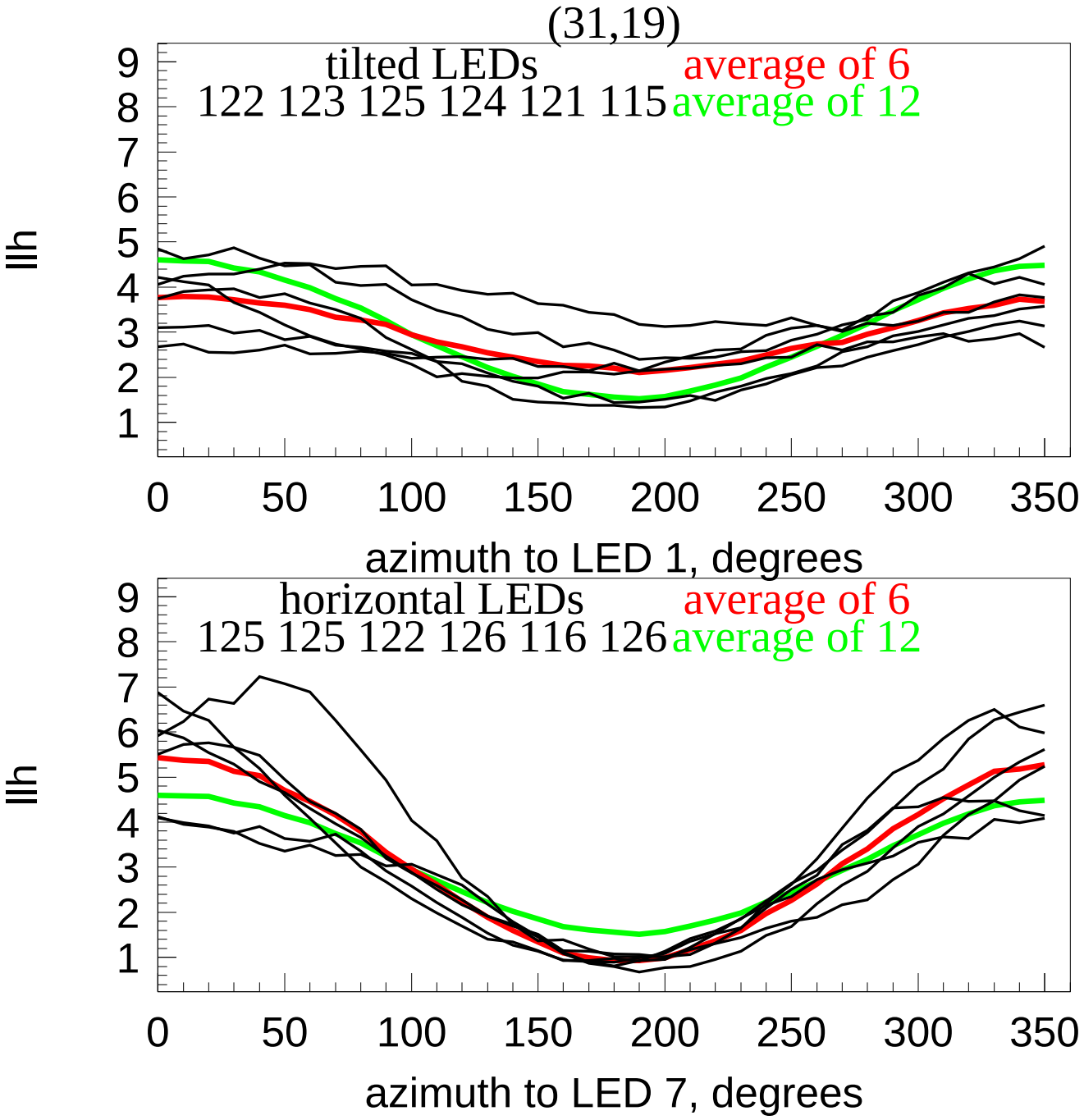

(31,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
129.1 ± 9.2

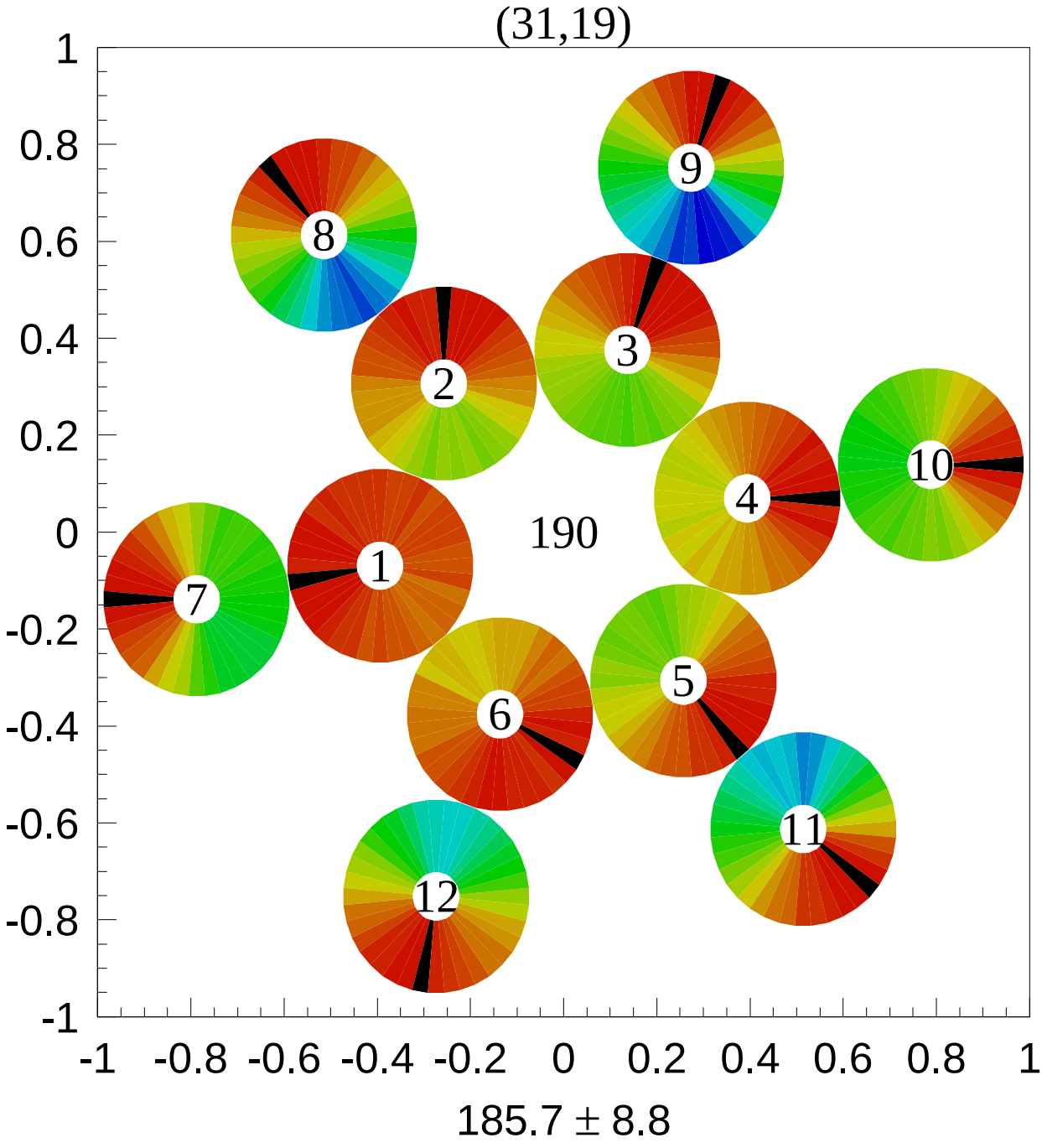

(31,17)
tilted LEDs
122 120 116 119 116 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 126 121 117 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

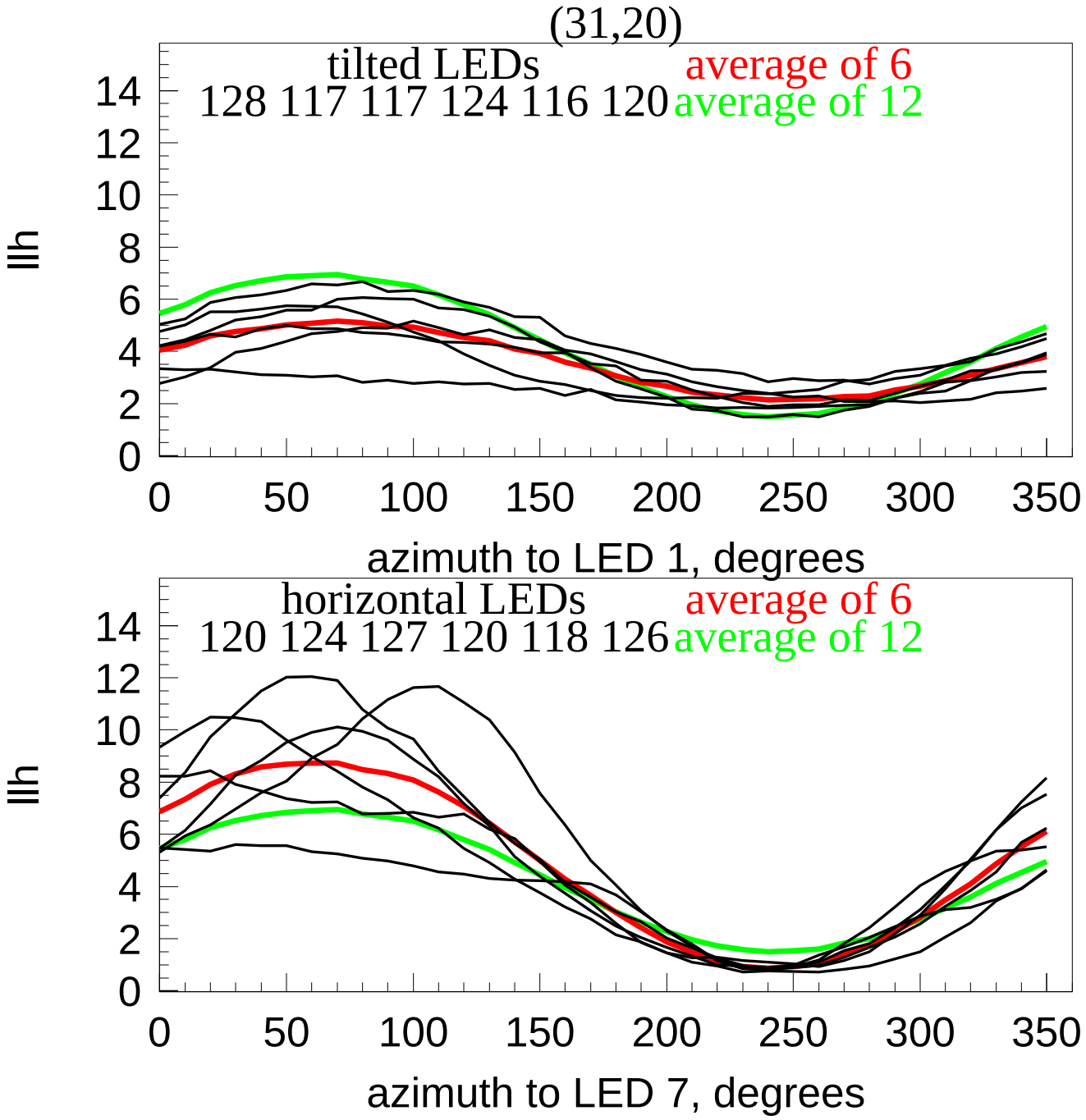

(31,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
70
5
11
3
4
9
10
82.4 ± 11.9

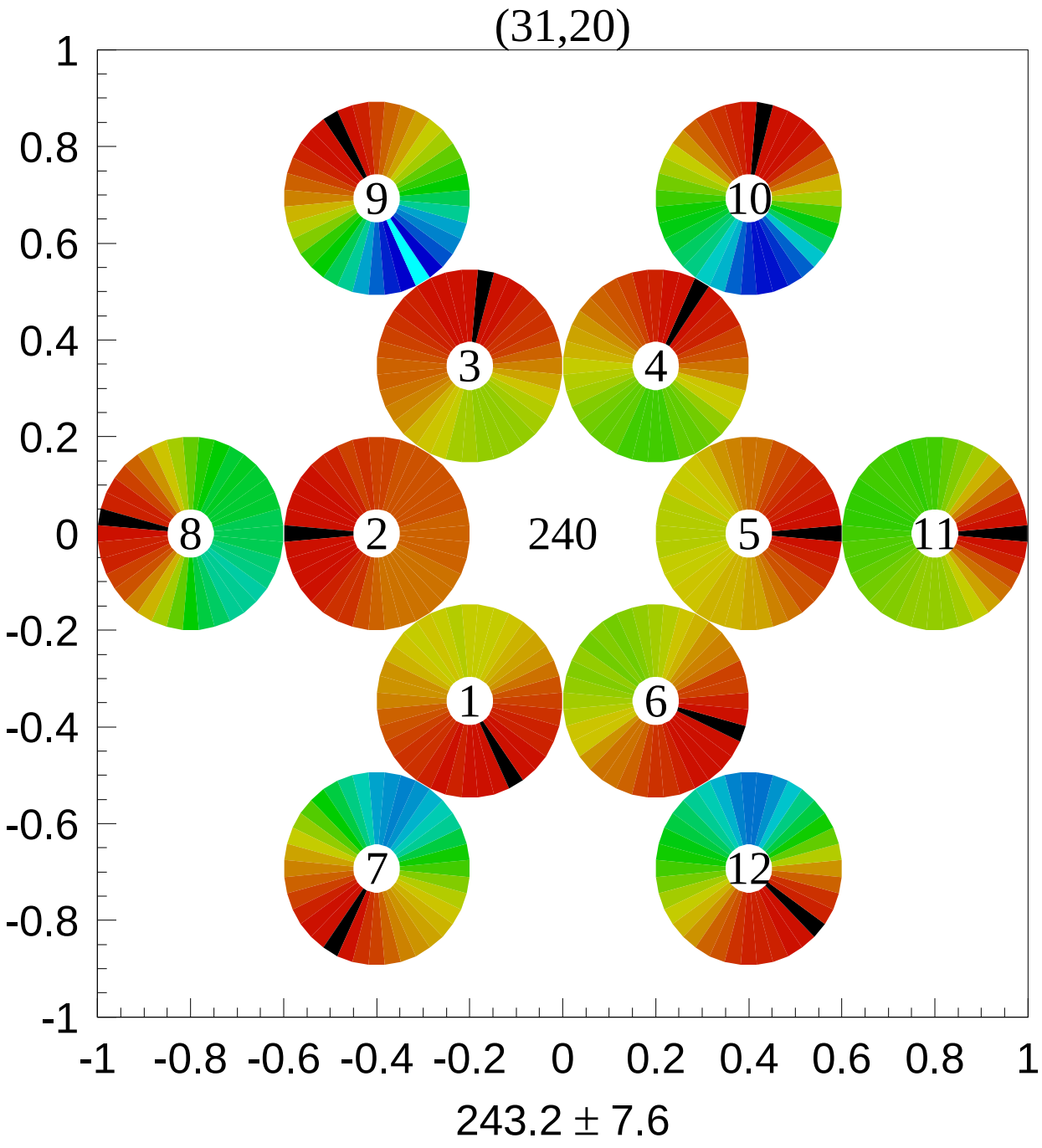

(31,18)
tilted LEDs
116 125 124 119 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 123 124 128 125 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

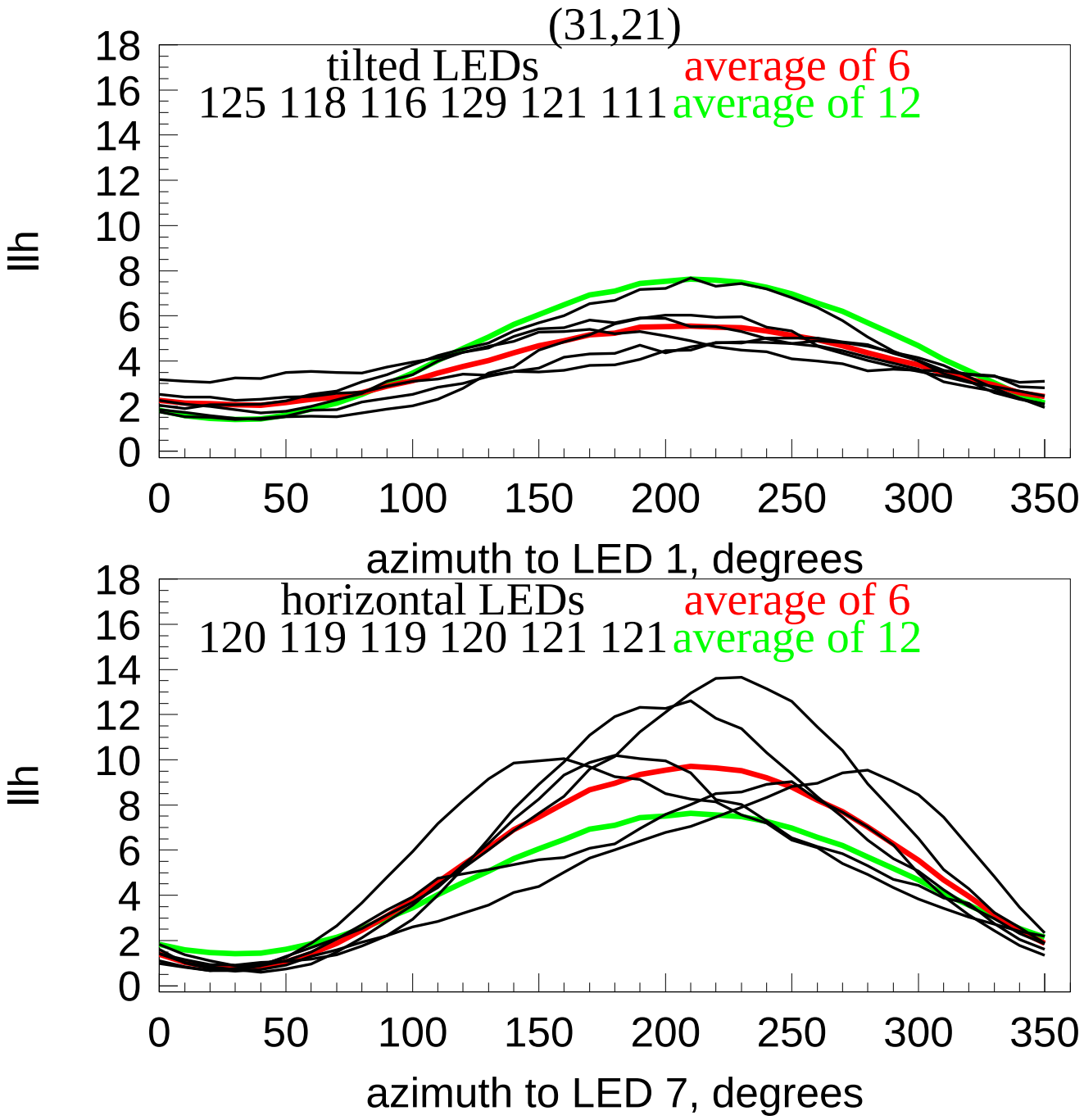

(31,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
13.1 ± 9.9

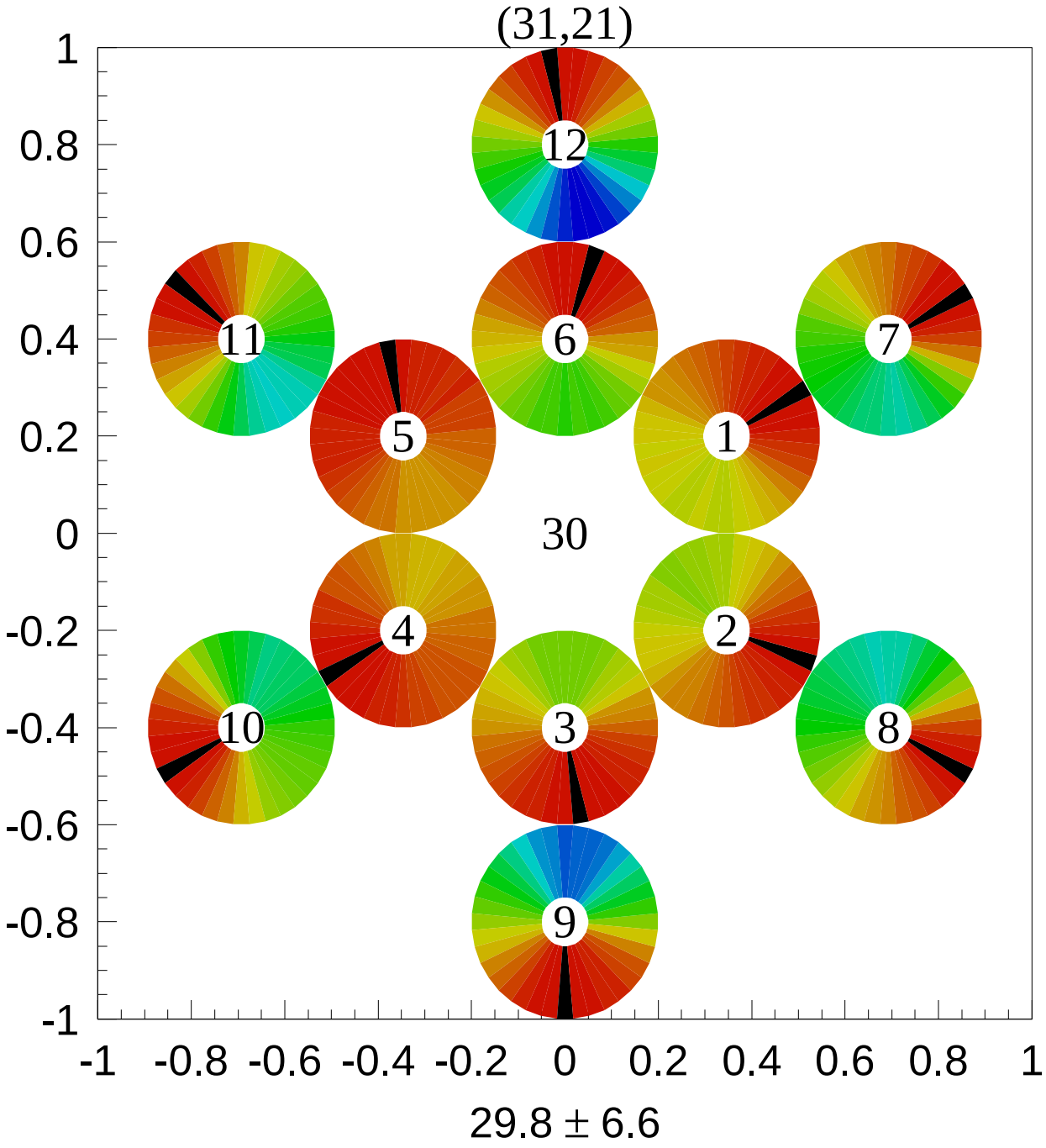

(31,19)
tilted LEDs
122 123 125 124 121 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 122 126 116 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

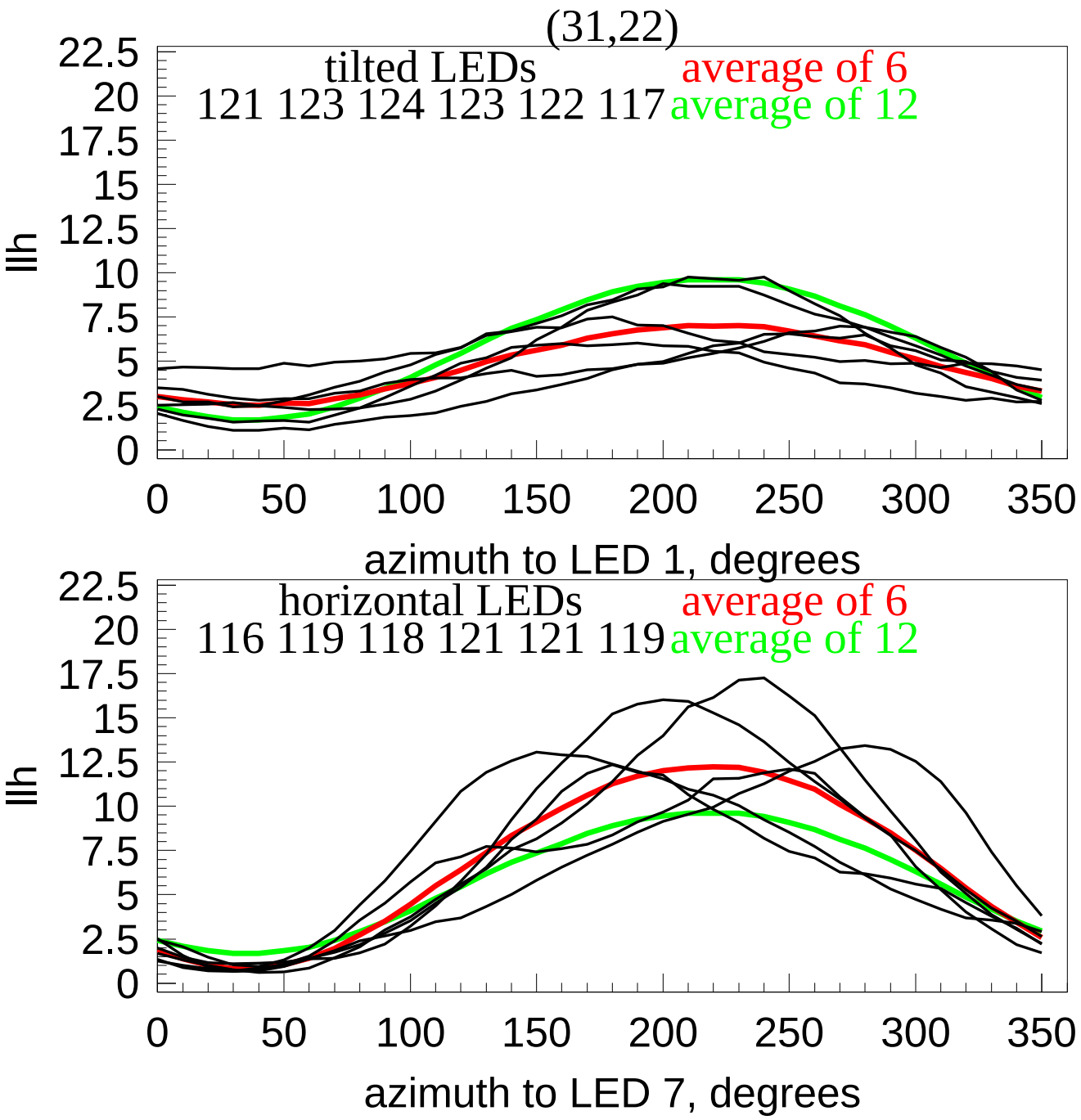

(31,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
185.7 ± 8.8
190
1
2
3
4
5
6
7
8
9
10
11
12

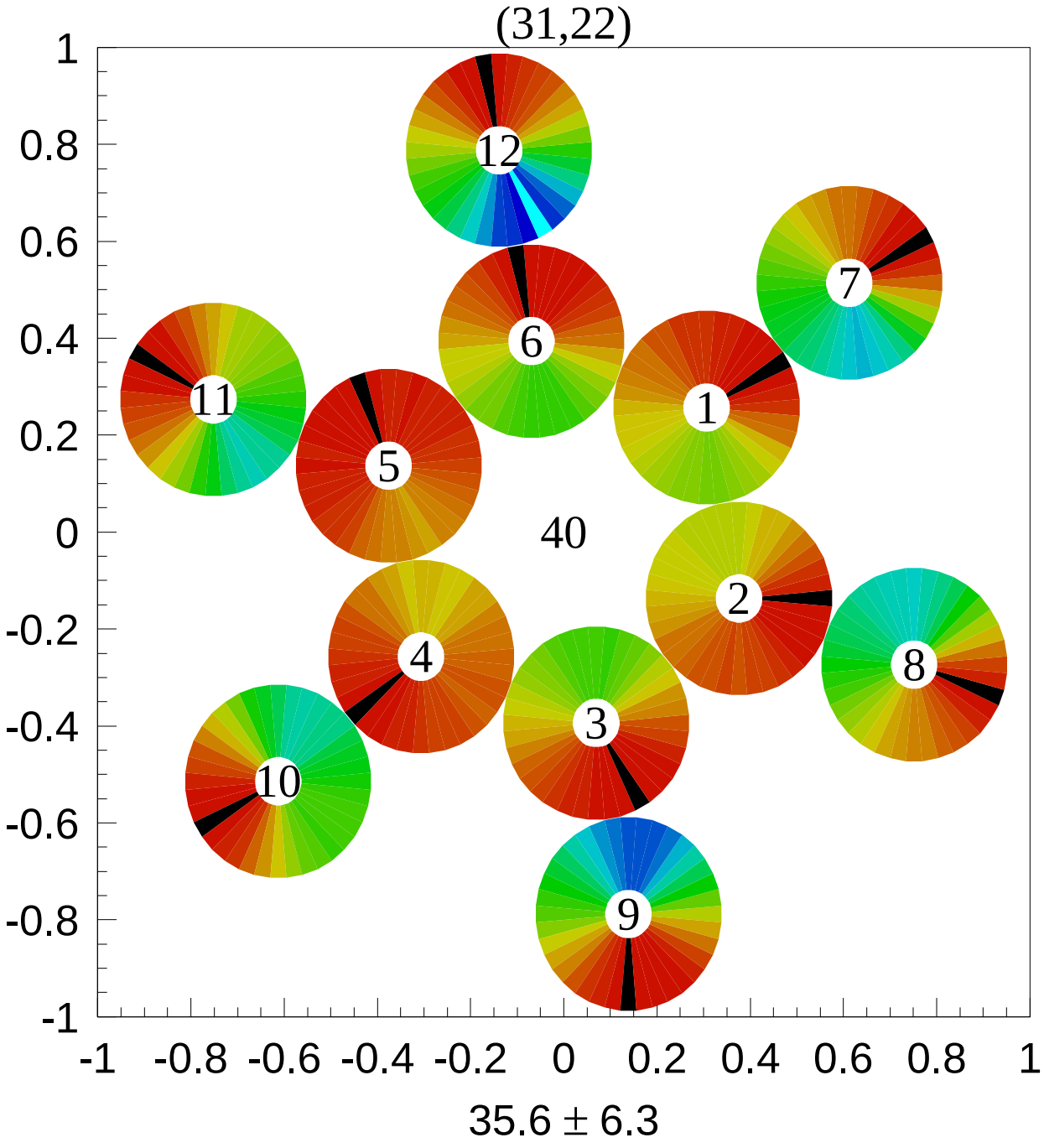

(31,20)
tilted LEDs
128 117 117 124 116 120
average of 6
average of 12
llh
0
2
4
6
8
10
12
14
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 124 127 120 118 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

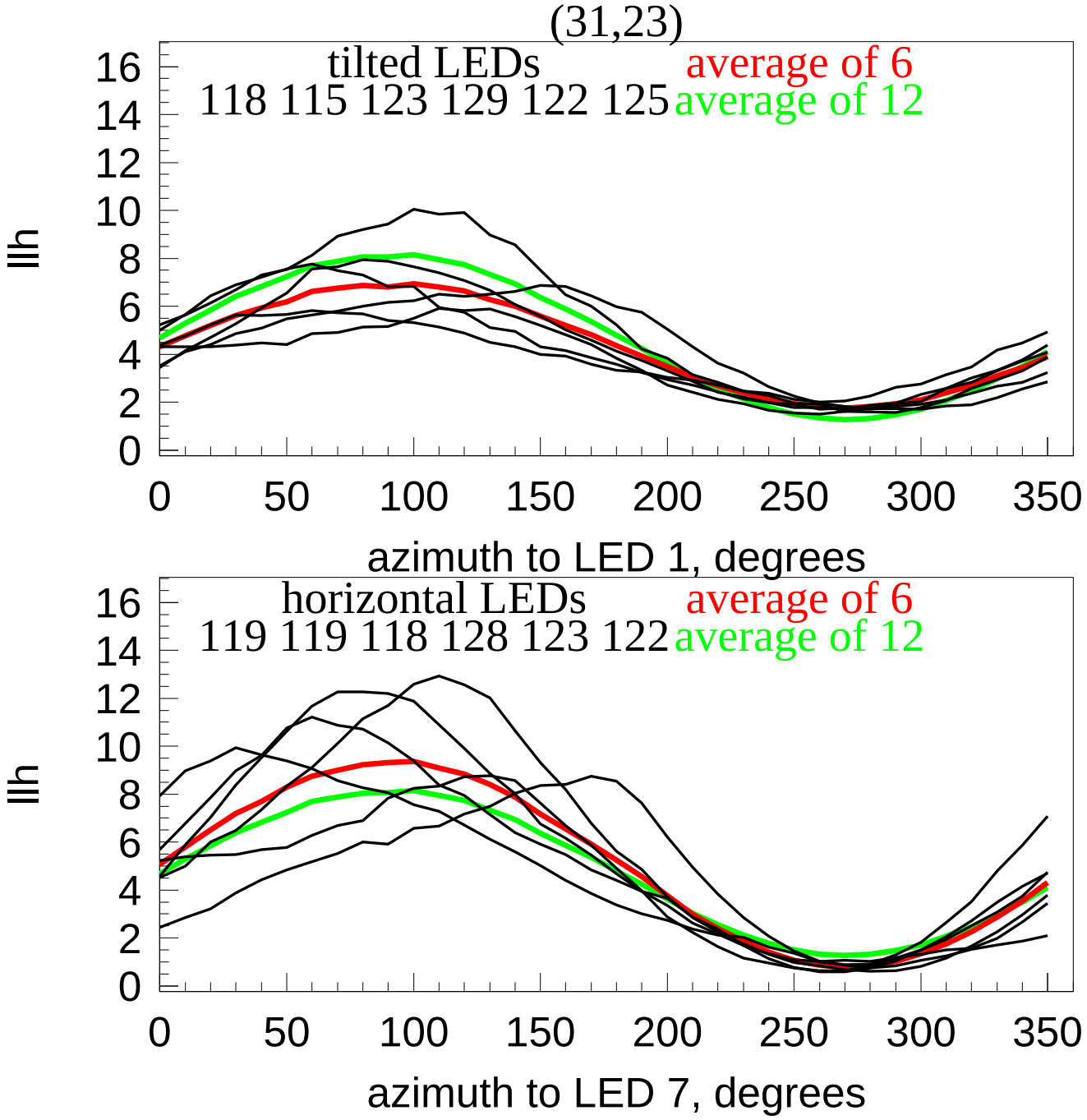

(31,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
243.2 ± 7.6

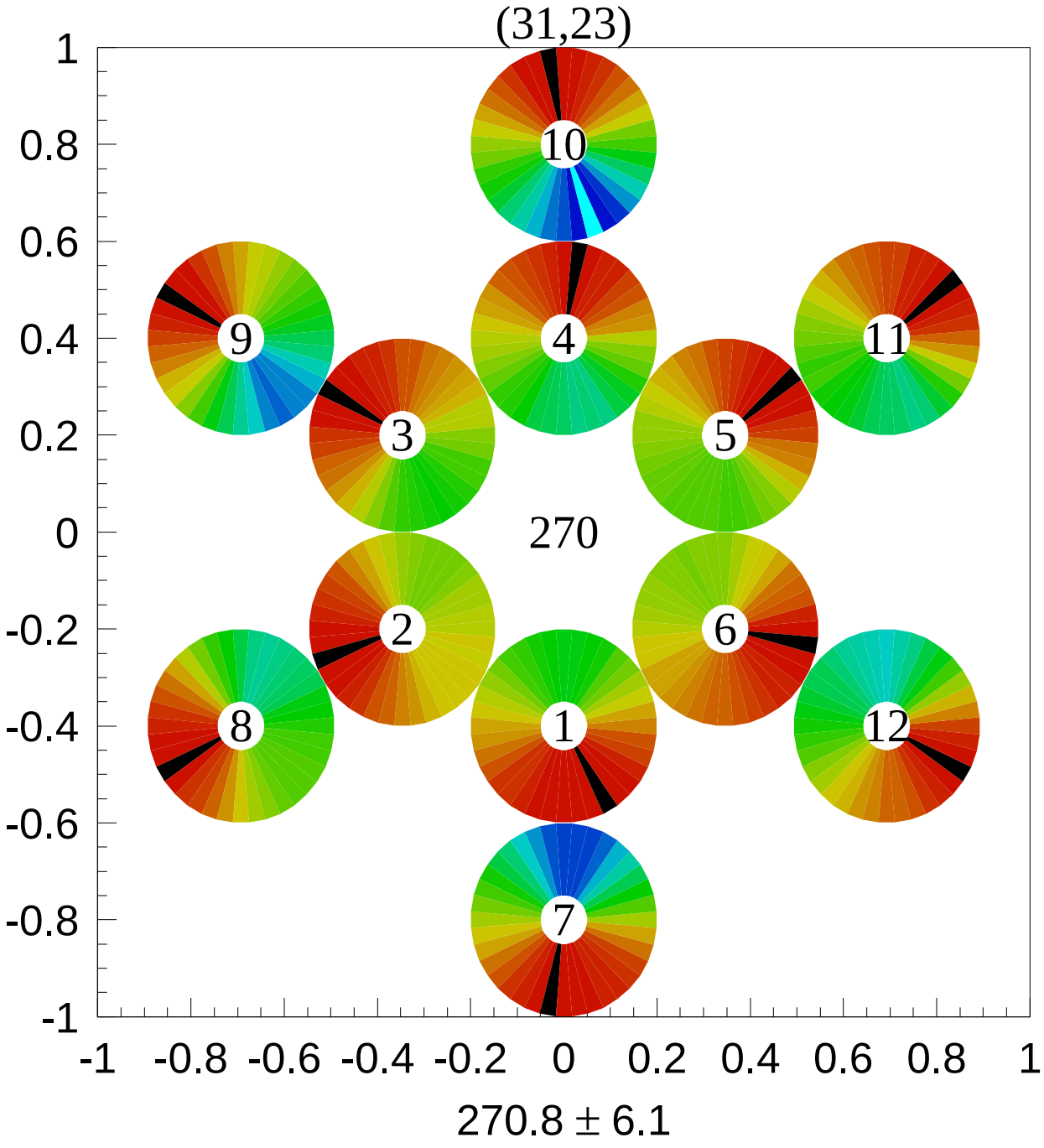

(31,21)
tilted LEDs
125 118 116 129 121 111
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 119 119 120 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

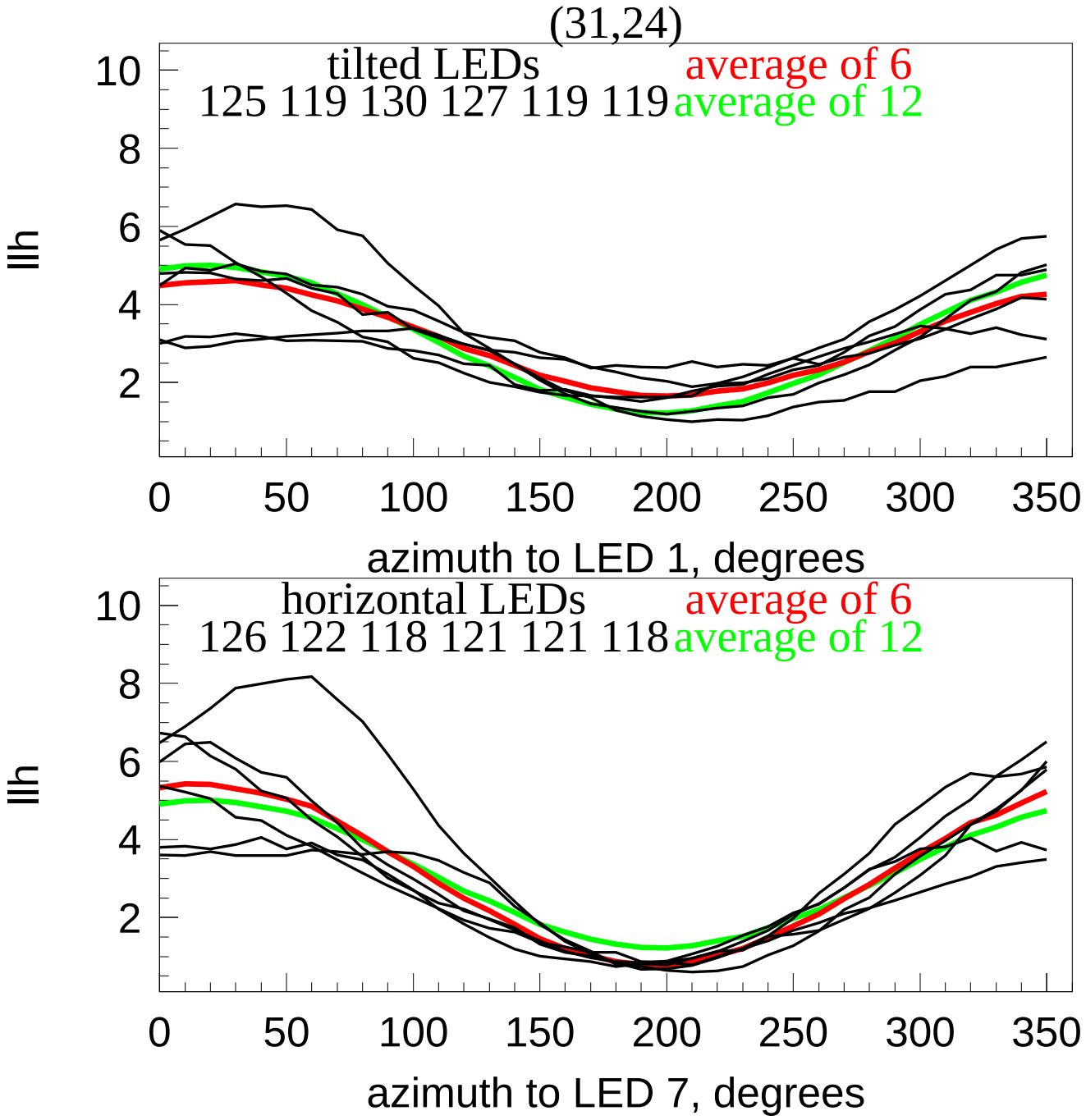

(31,21)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
29.8 ± 6.6

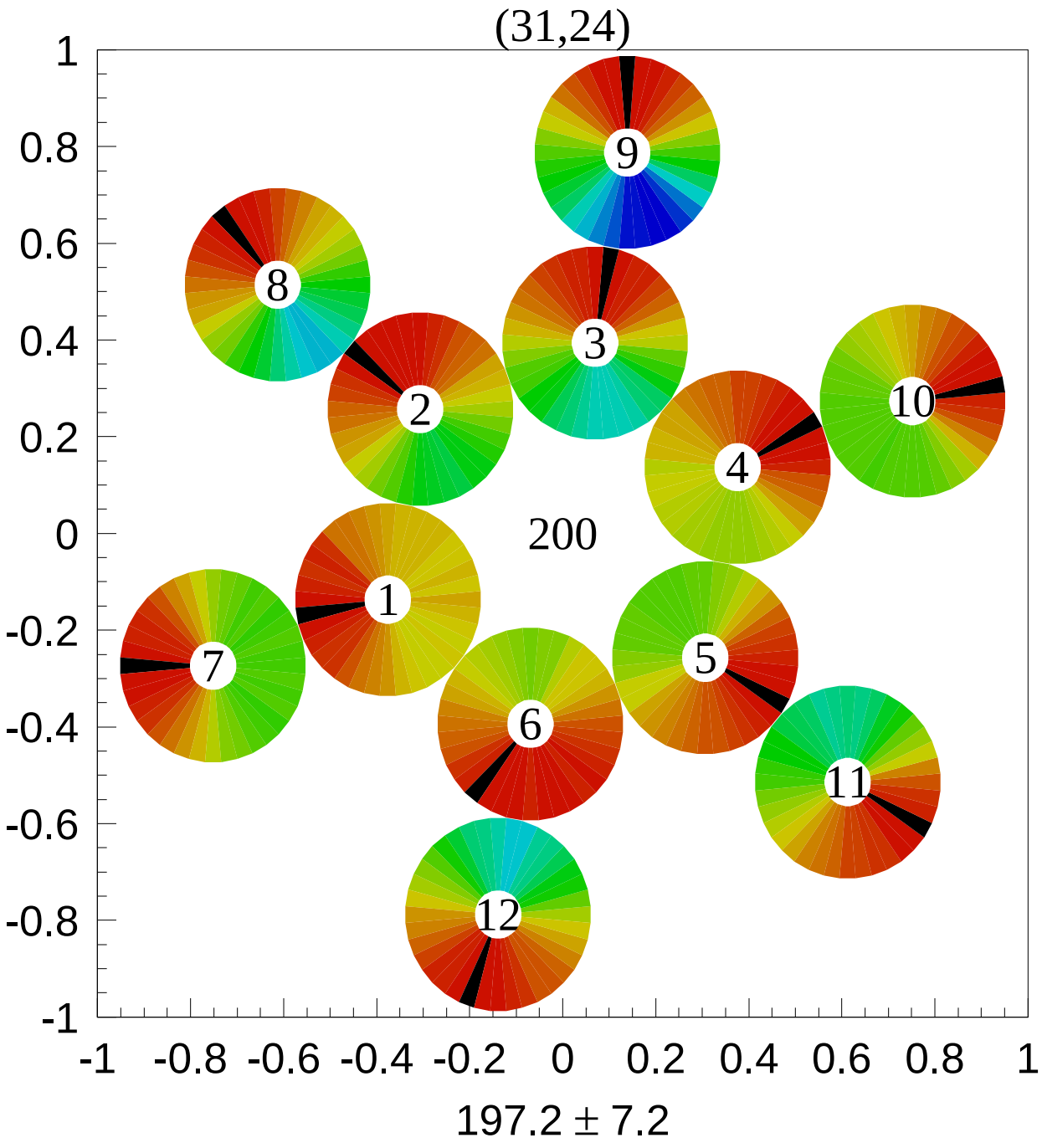

(31,22)
tilted LEDs
121 123 124 123 122 117
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 119 118 121 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

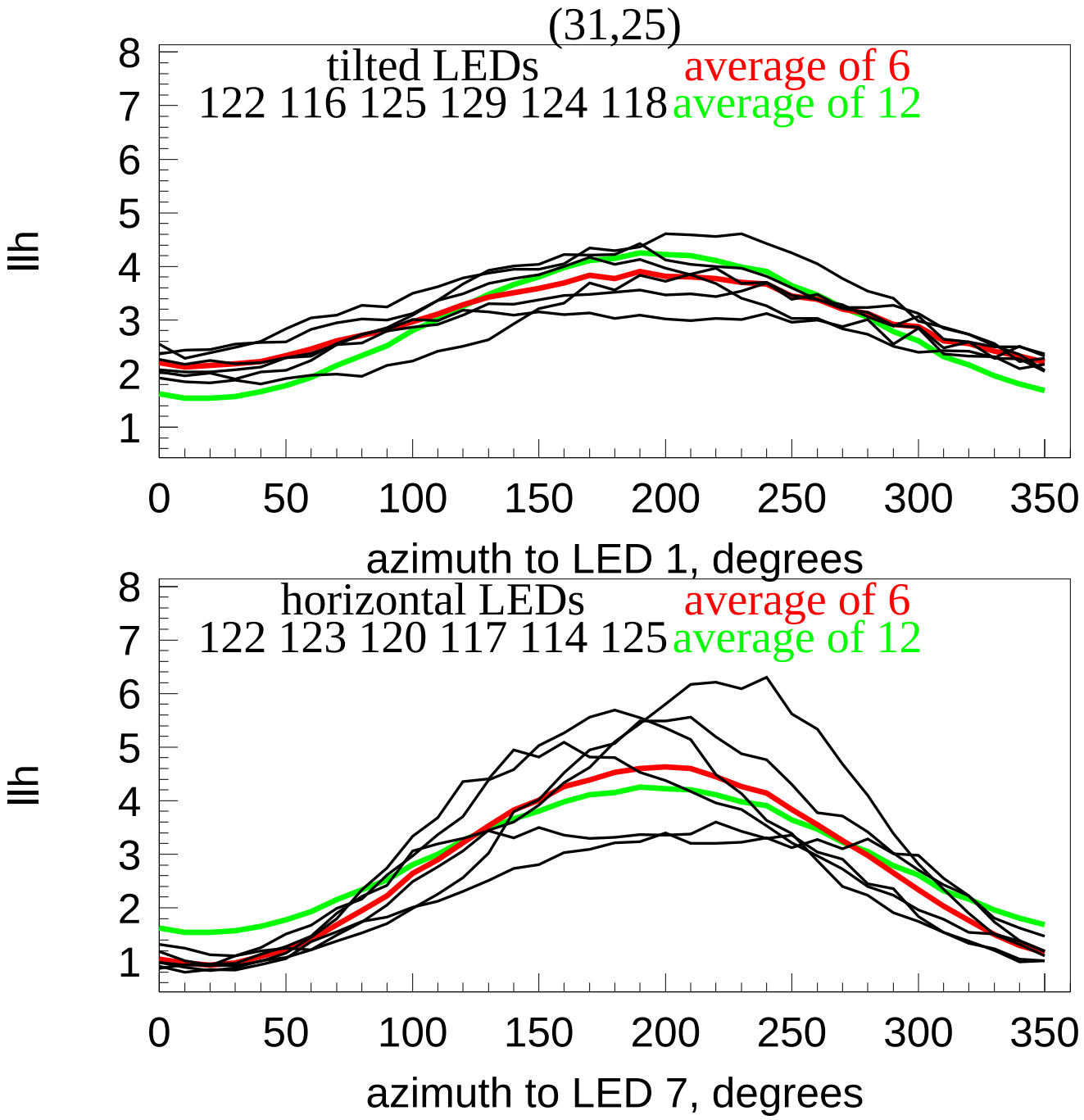

(31,22)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
35.6 ± 6.3

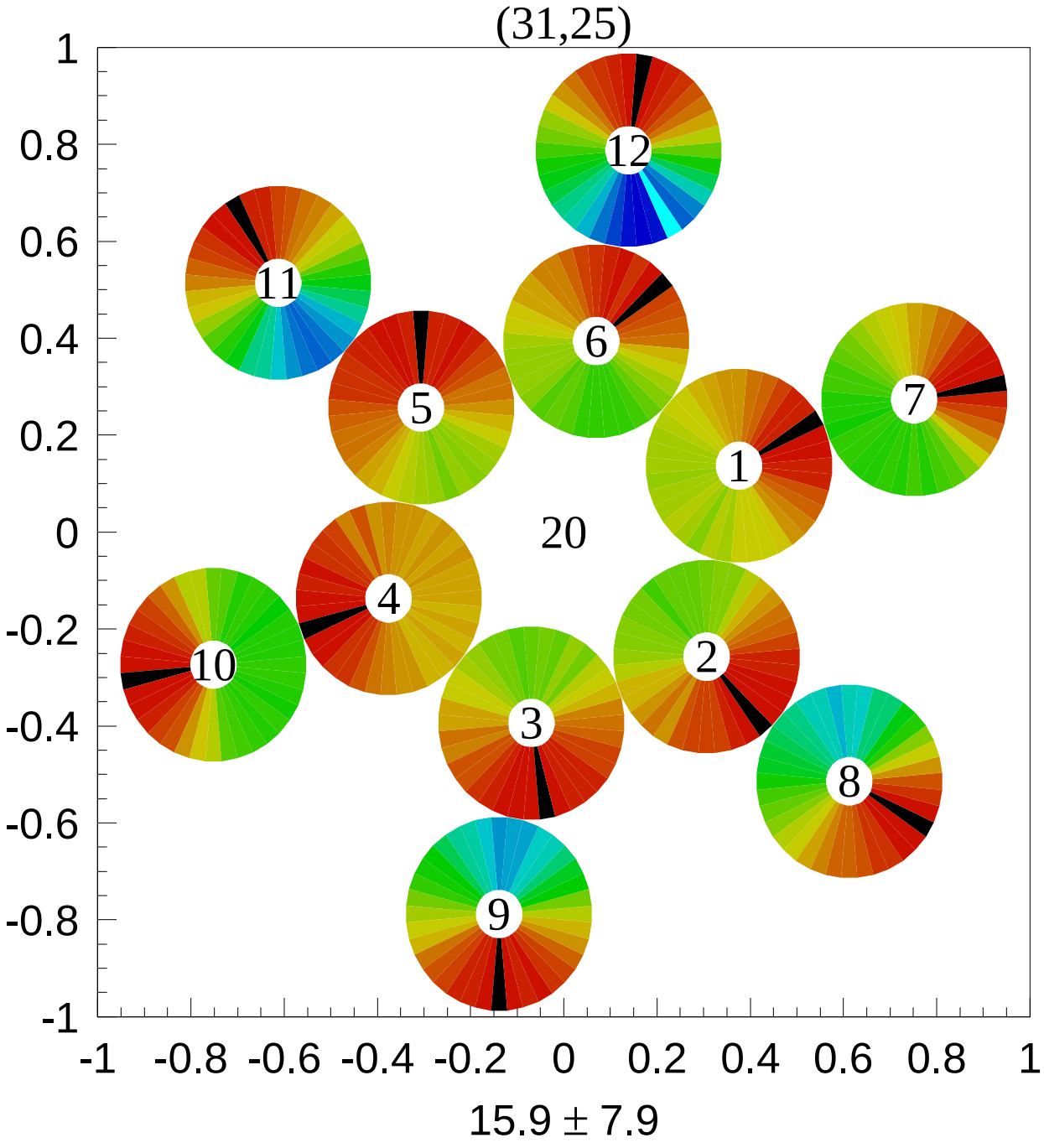

(31,23)
tilted LEDs
118 115 123 129 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 119 118 128 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

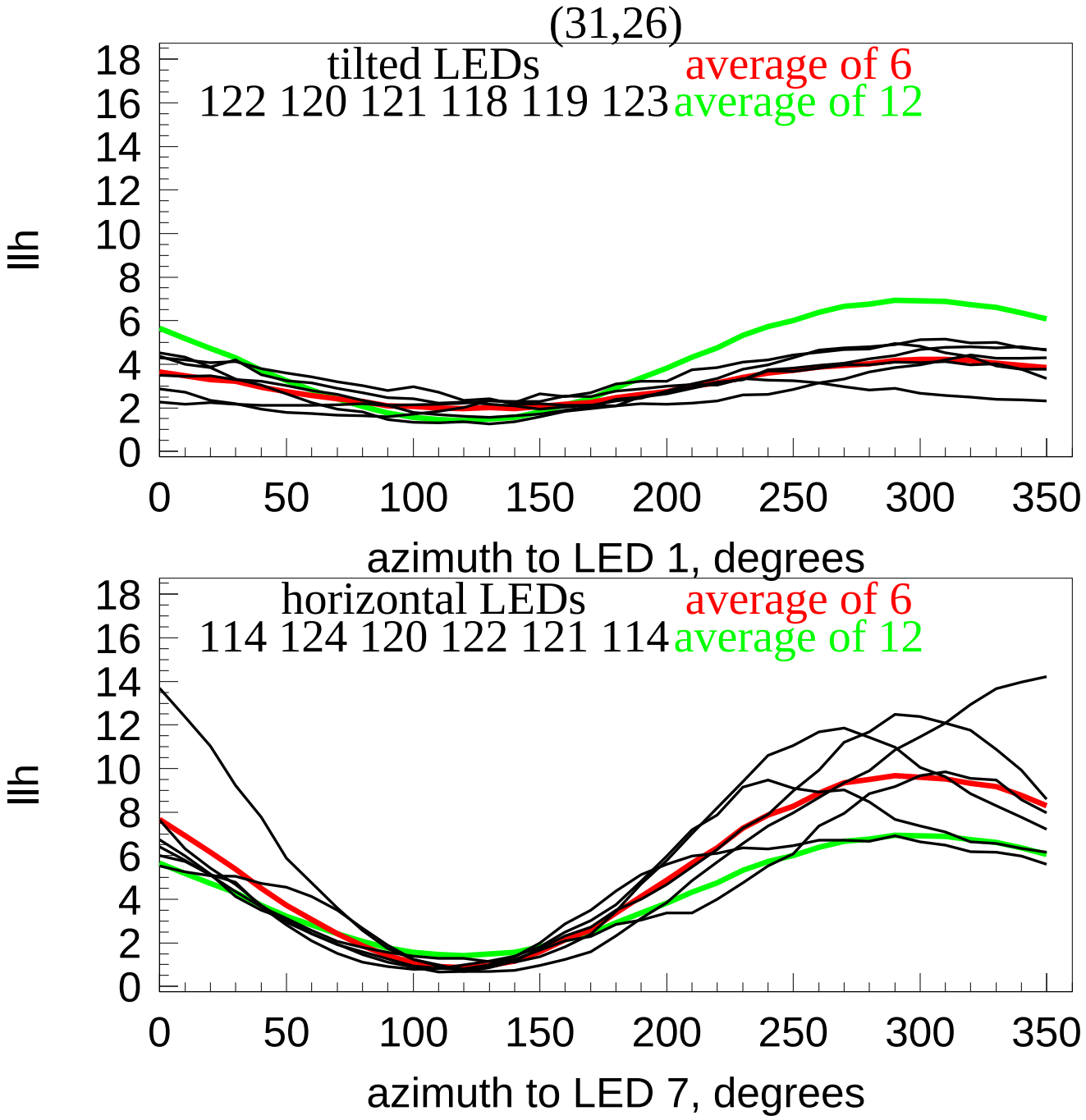

(31,23)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
270.8 ± 6.1

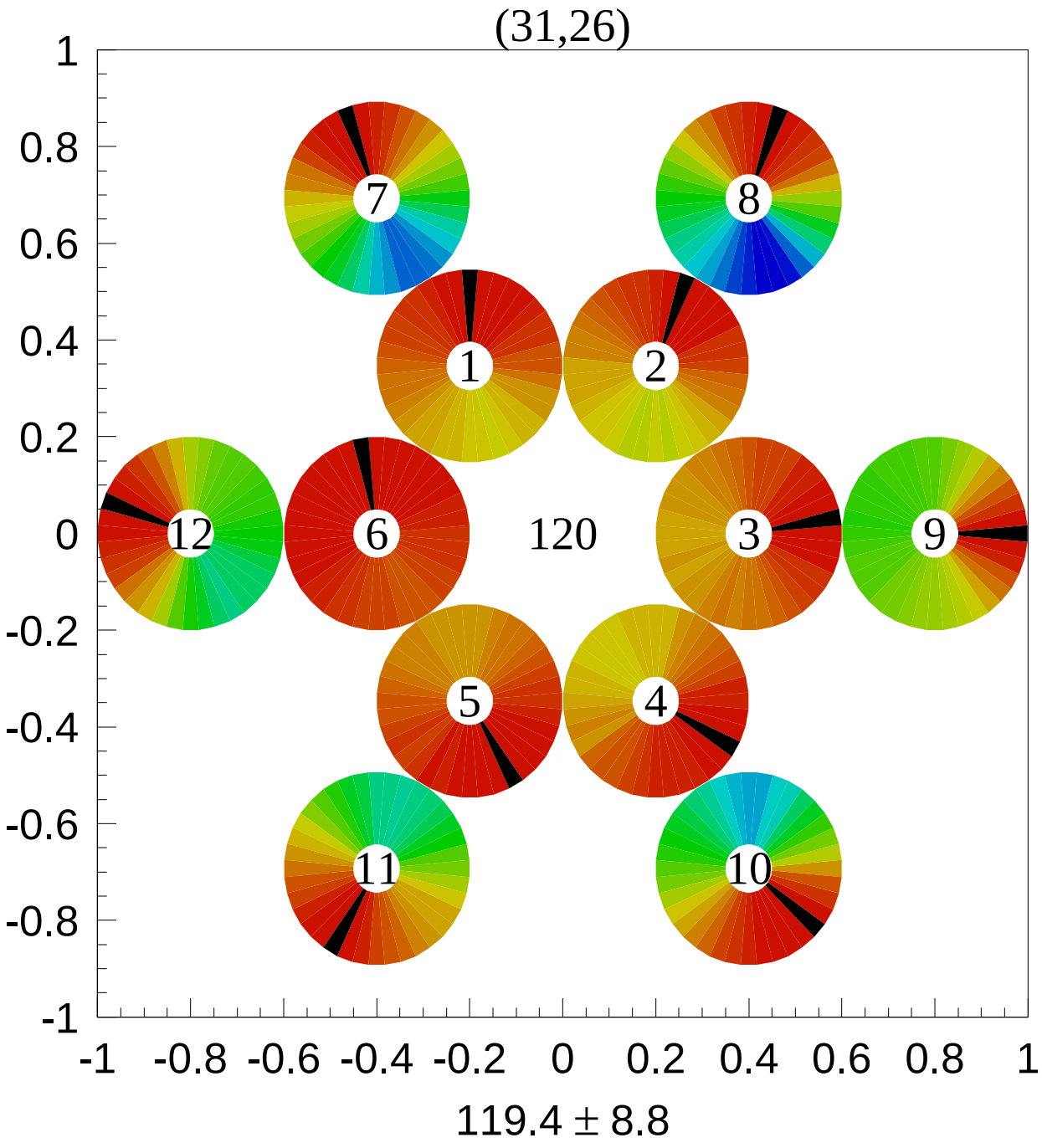

(31,24)
tilted LEDs
125 119 130 127 119 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 122 118 121 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

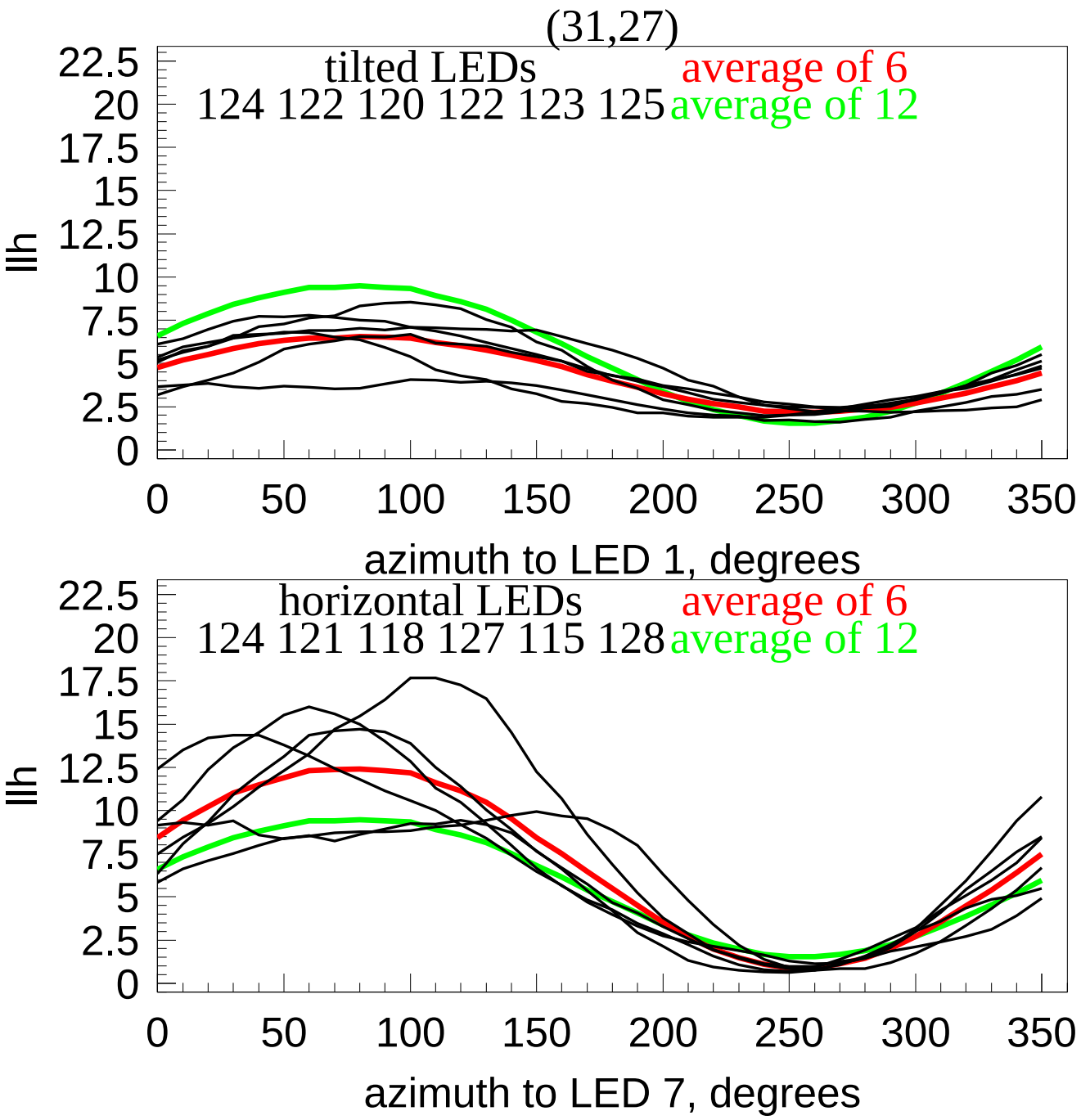

(31,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
197.2 ± 7.2

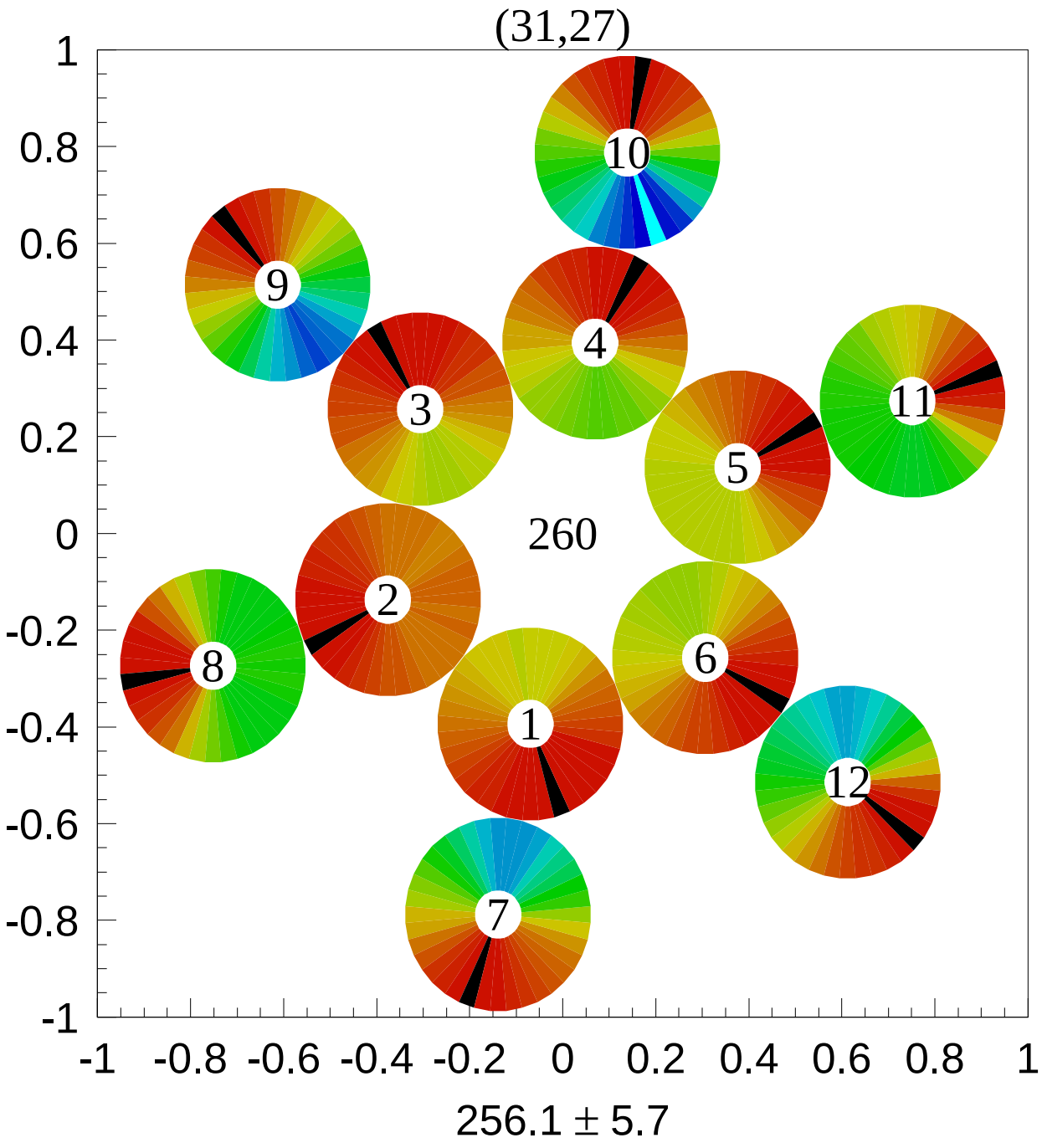

(31,25)
tilted LEDs
122 116 125 129 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 120 117 114 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

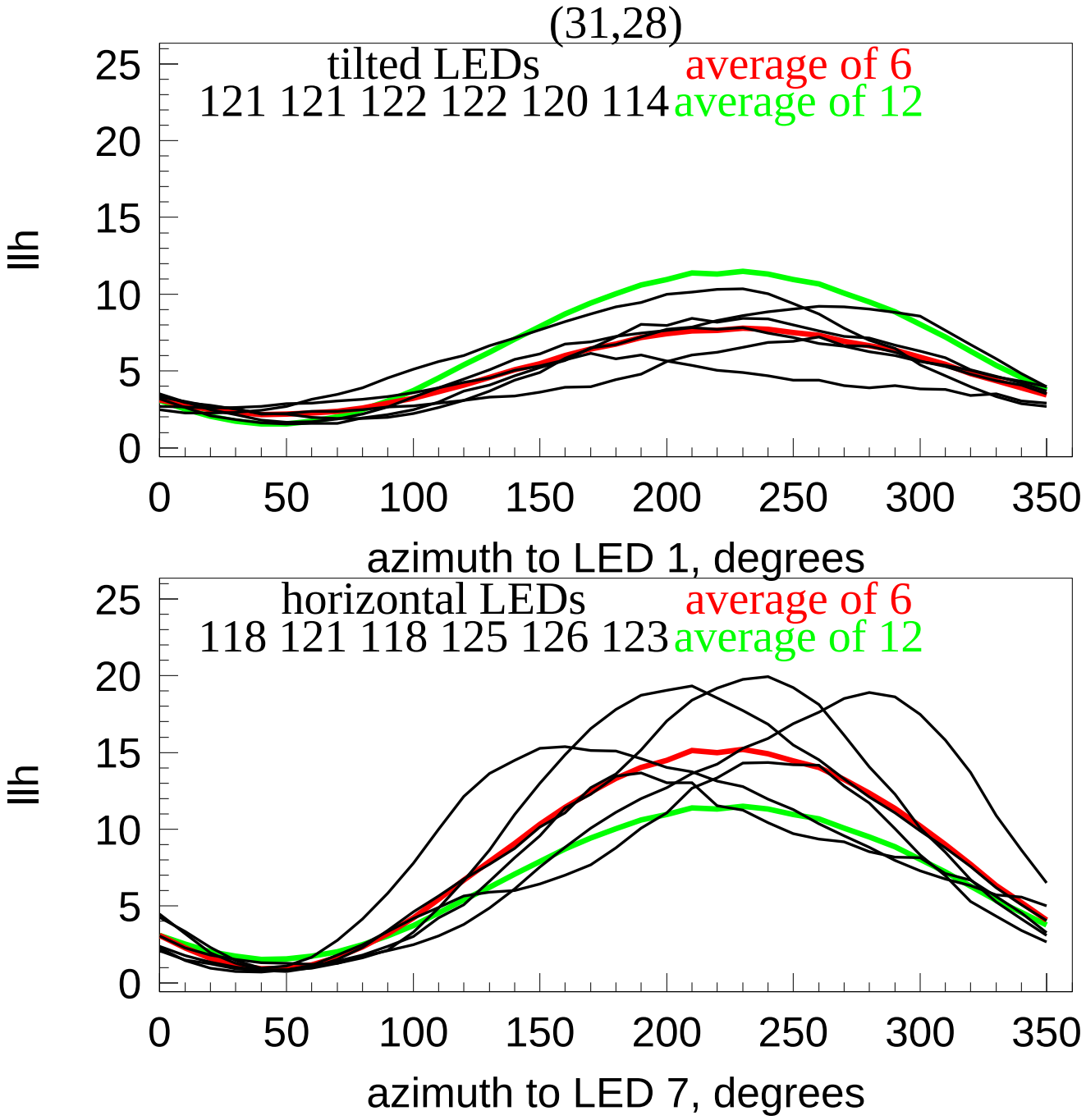

(31,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
11
6
5
7
1
20
4
10
2
3
8
9
15.9 ± 7.9

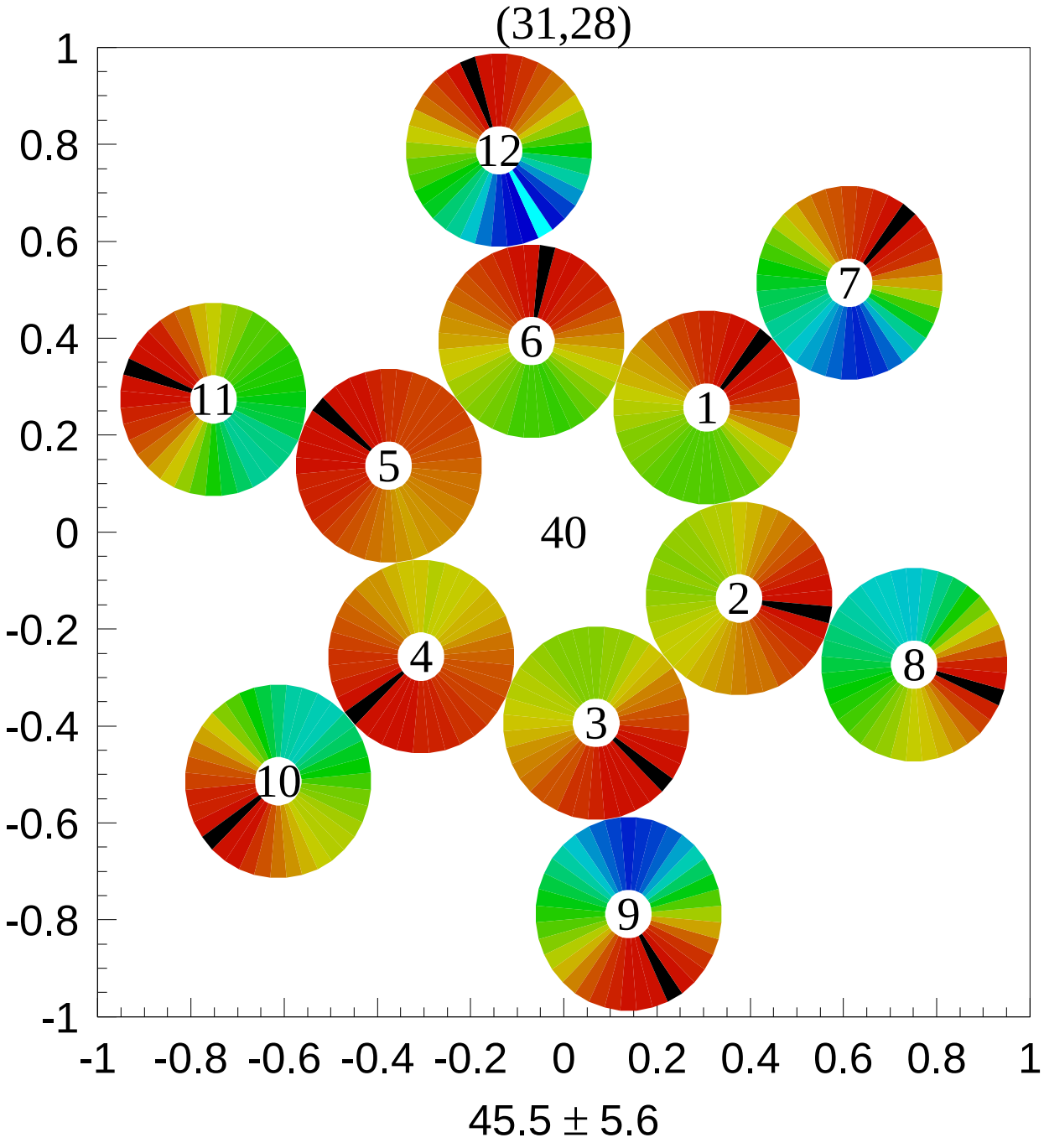

(31,26)
tilted LEDs
122 120 121 118 119 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 124 120 122 121 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

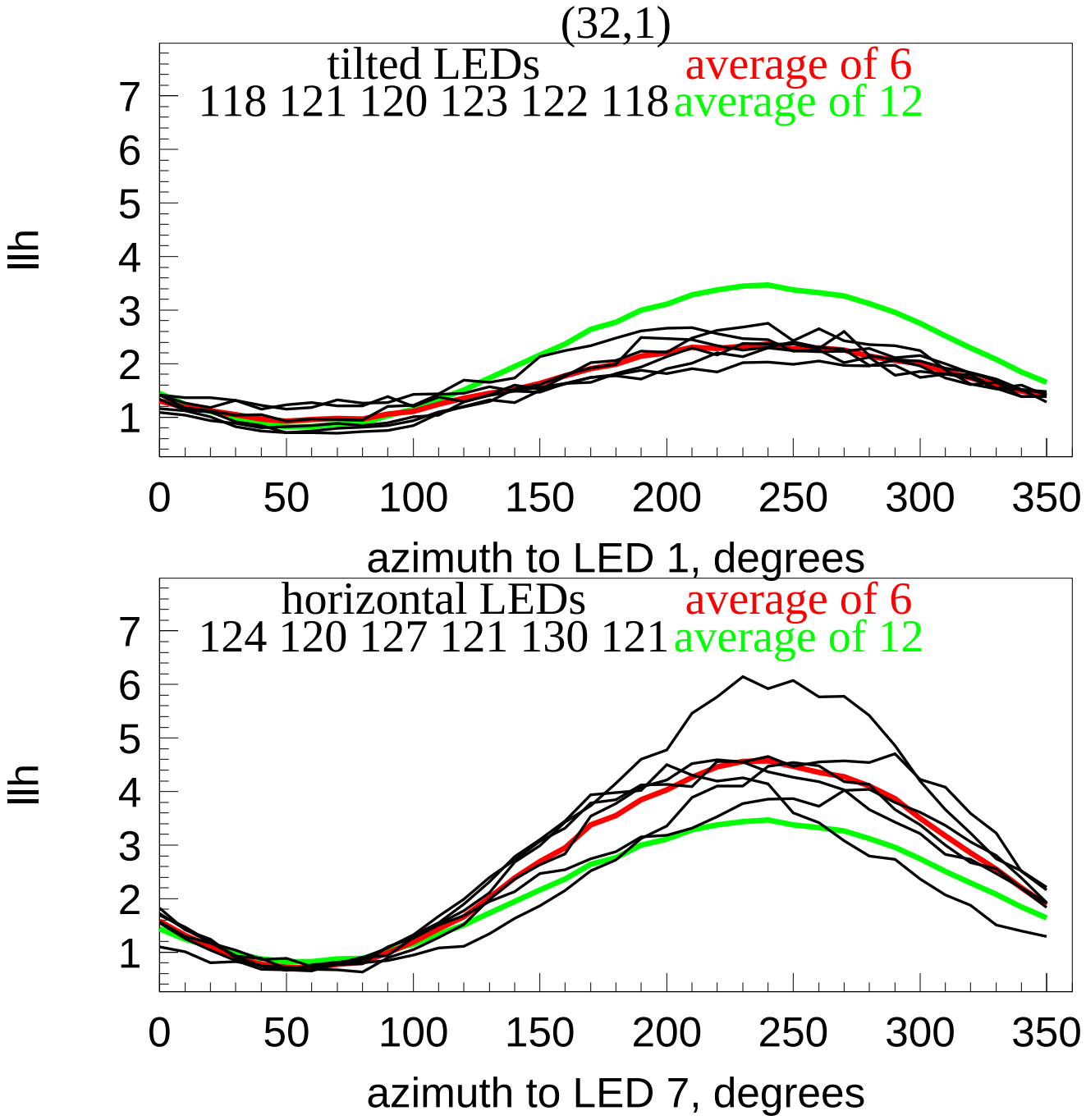

(31,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
119.4 ± 8.8

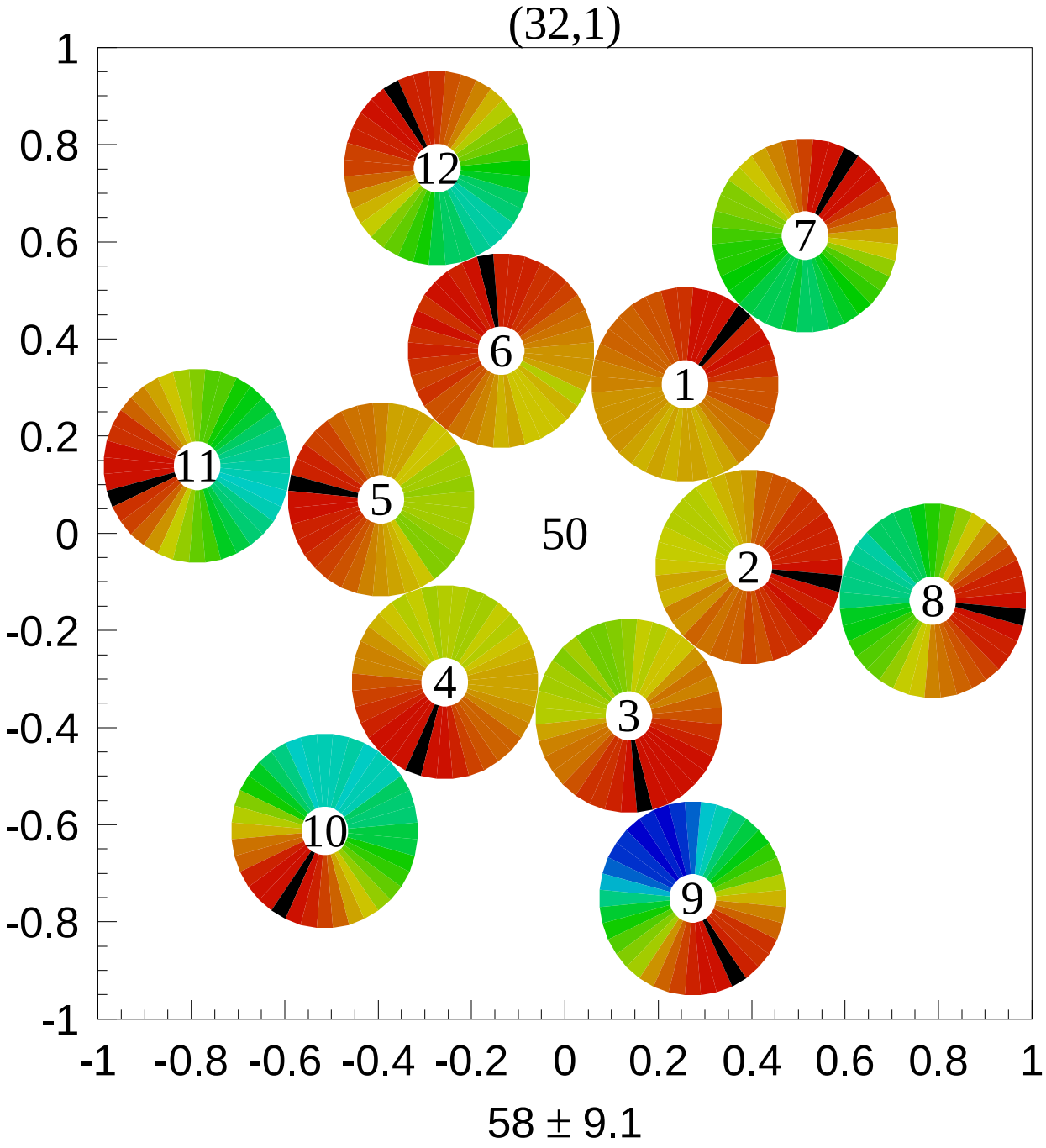

(31,27)
tilted LEDs
124 122 120 122 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 118 127 115 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

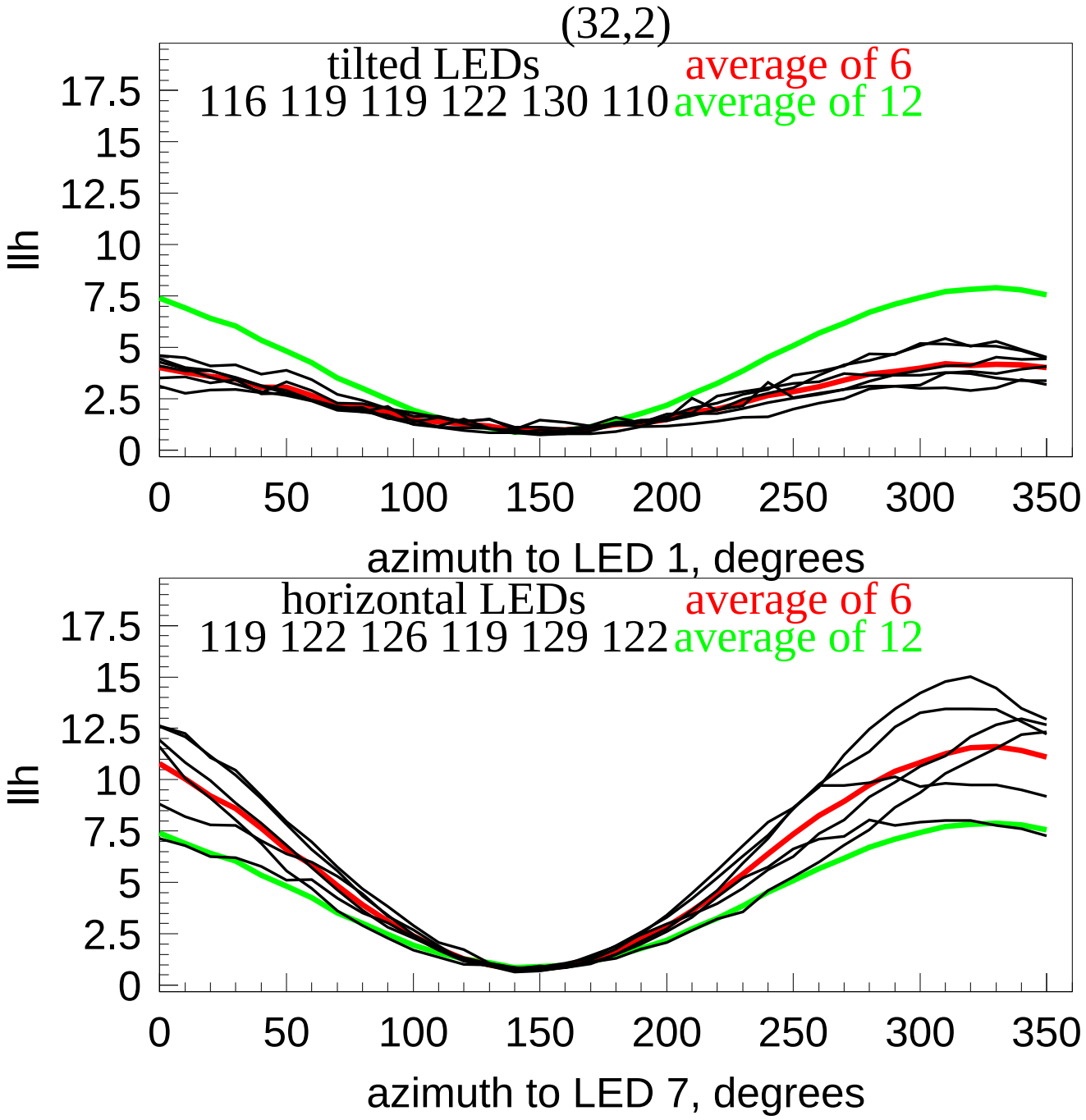

(31,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
256.1 ± 5.7

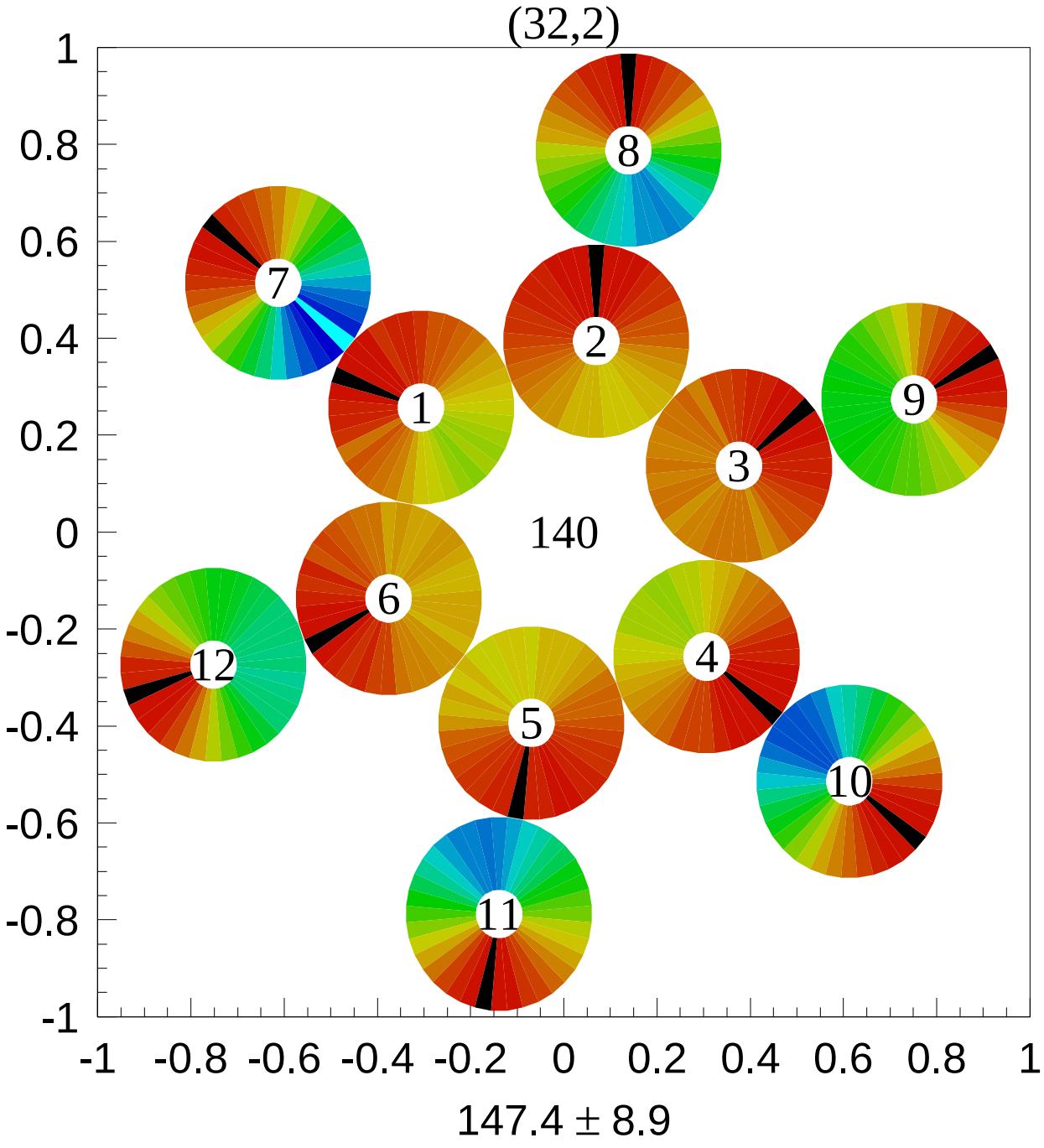

(31,28)
tilted LEDs
121 121 122 122 120 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 118 125 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

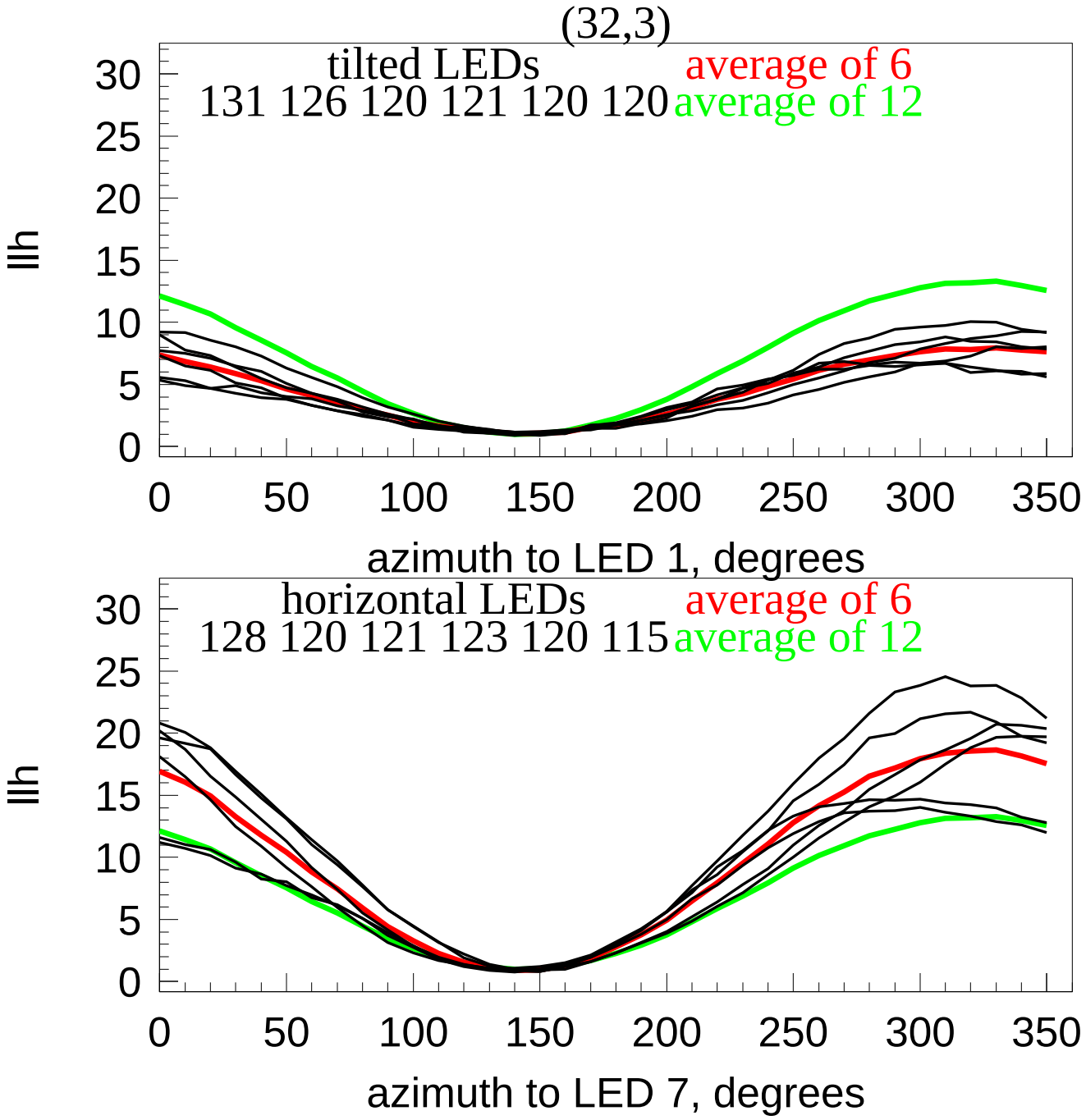

(31,28)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
45.5 ± 5.6

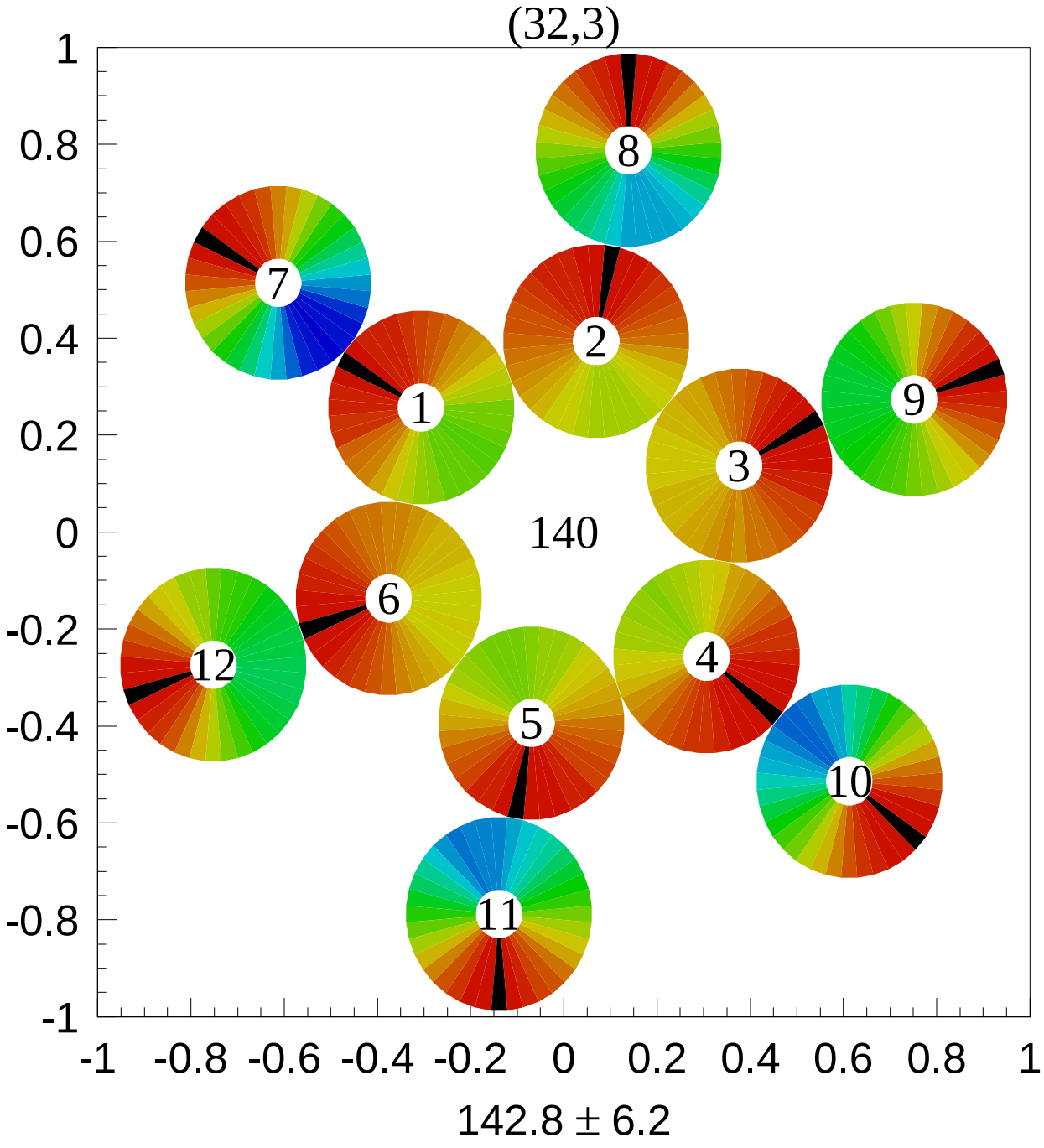

(32,1)
tilted LEDs
118 121 120 123 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 120 127 121 130 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

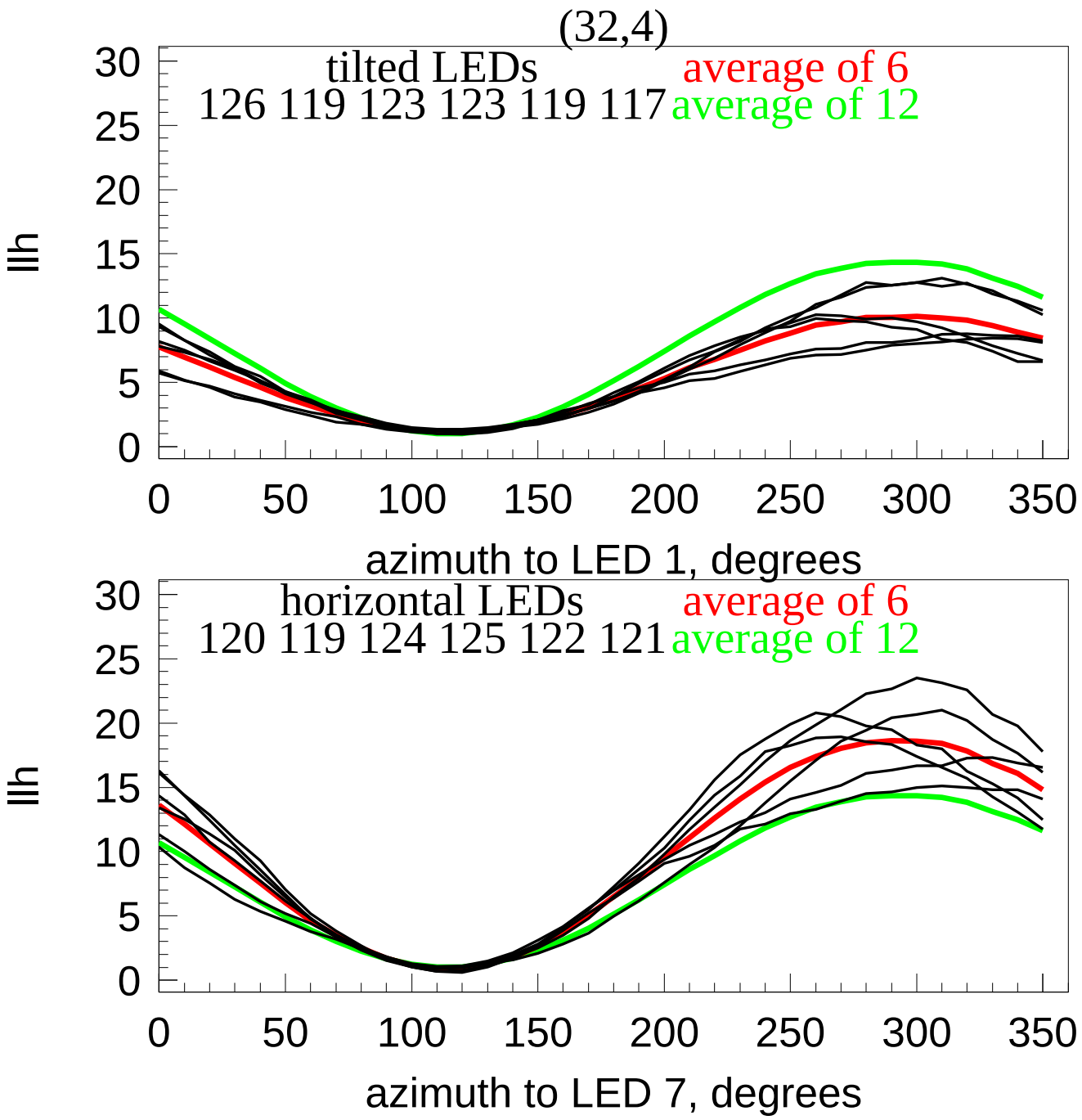

(32,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
58 ± 9.1

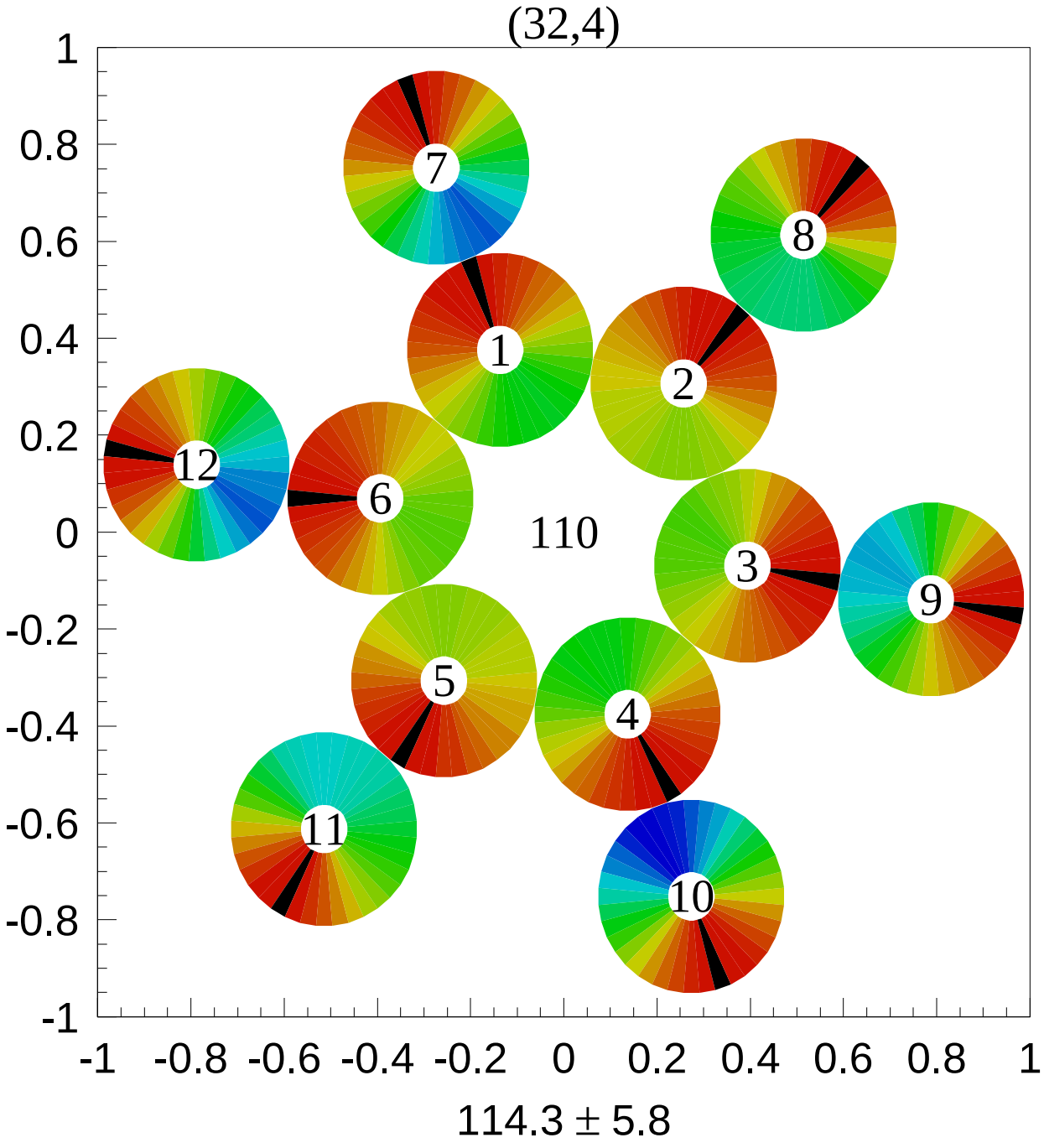

(32,2)
tilted LEDs
116 119 119 122 130 110
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 122 126 119 129 122
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

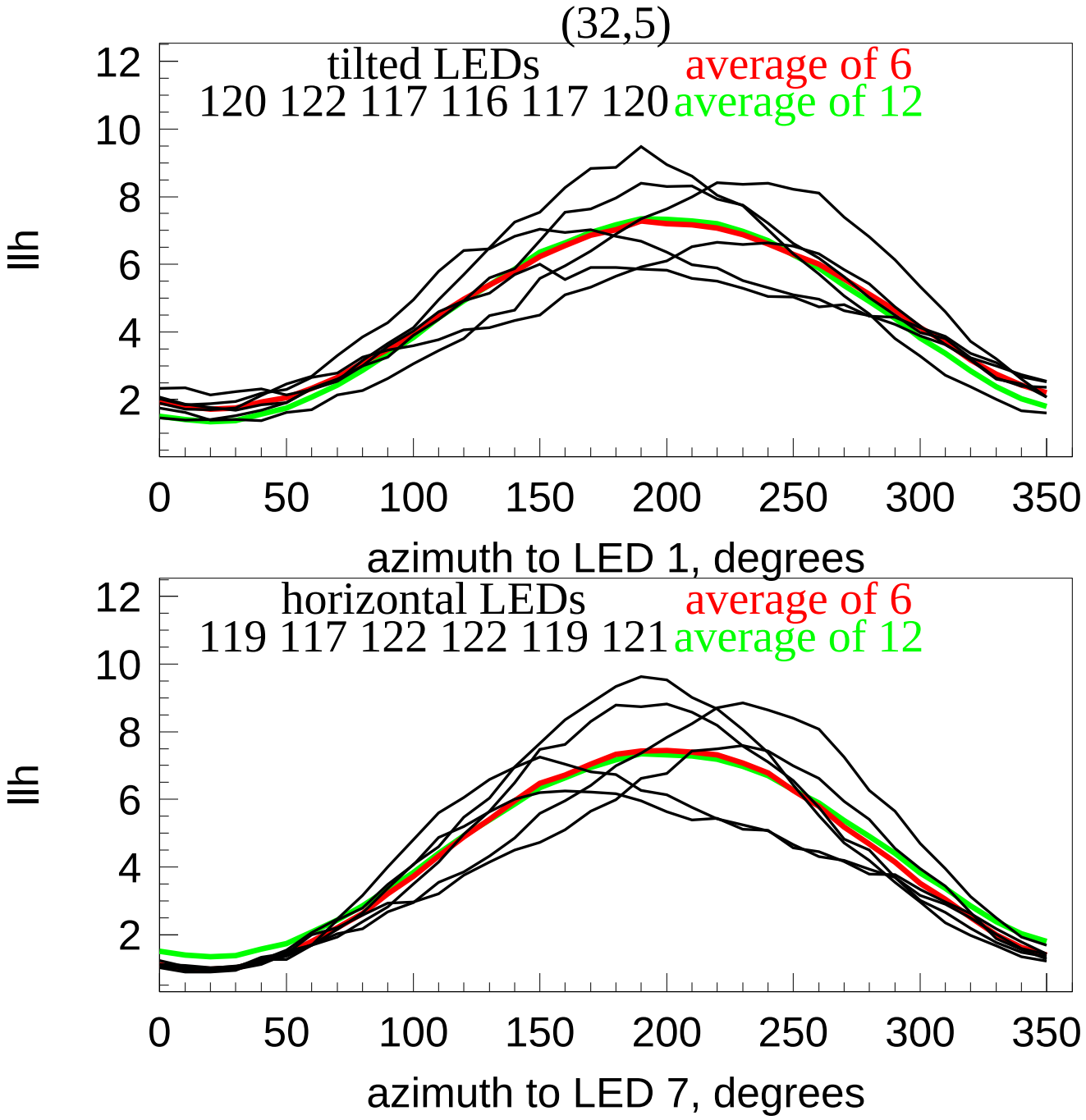

(32,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
140
147.4 ± 8.9

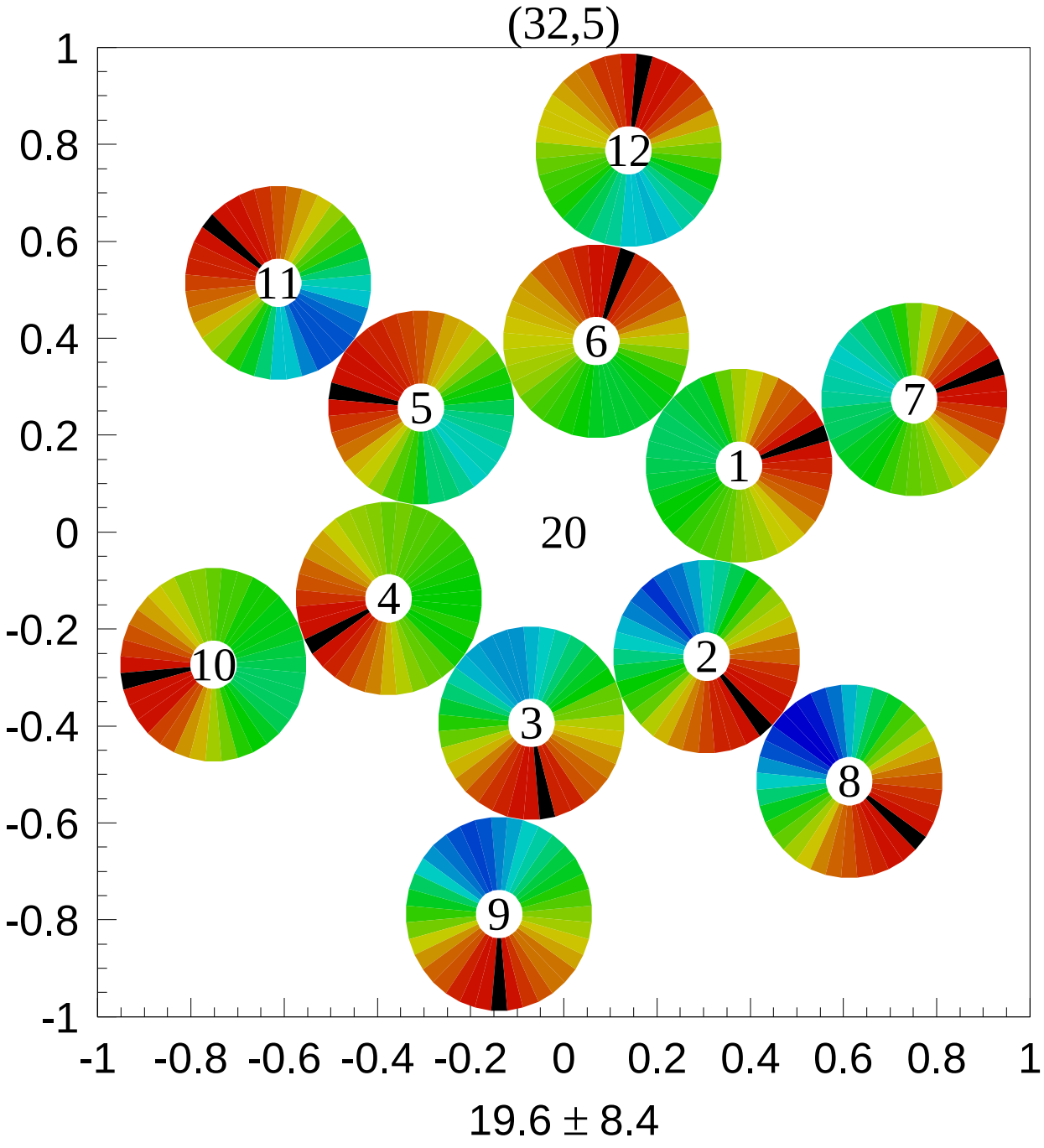

(32,3)
tilted LEDs
131 126 120 121 120 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 120 121 123 120 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

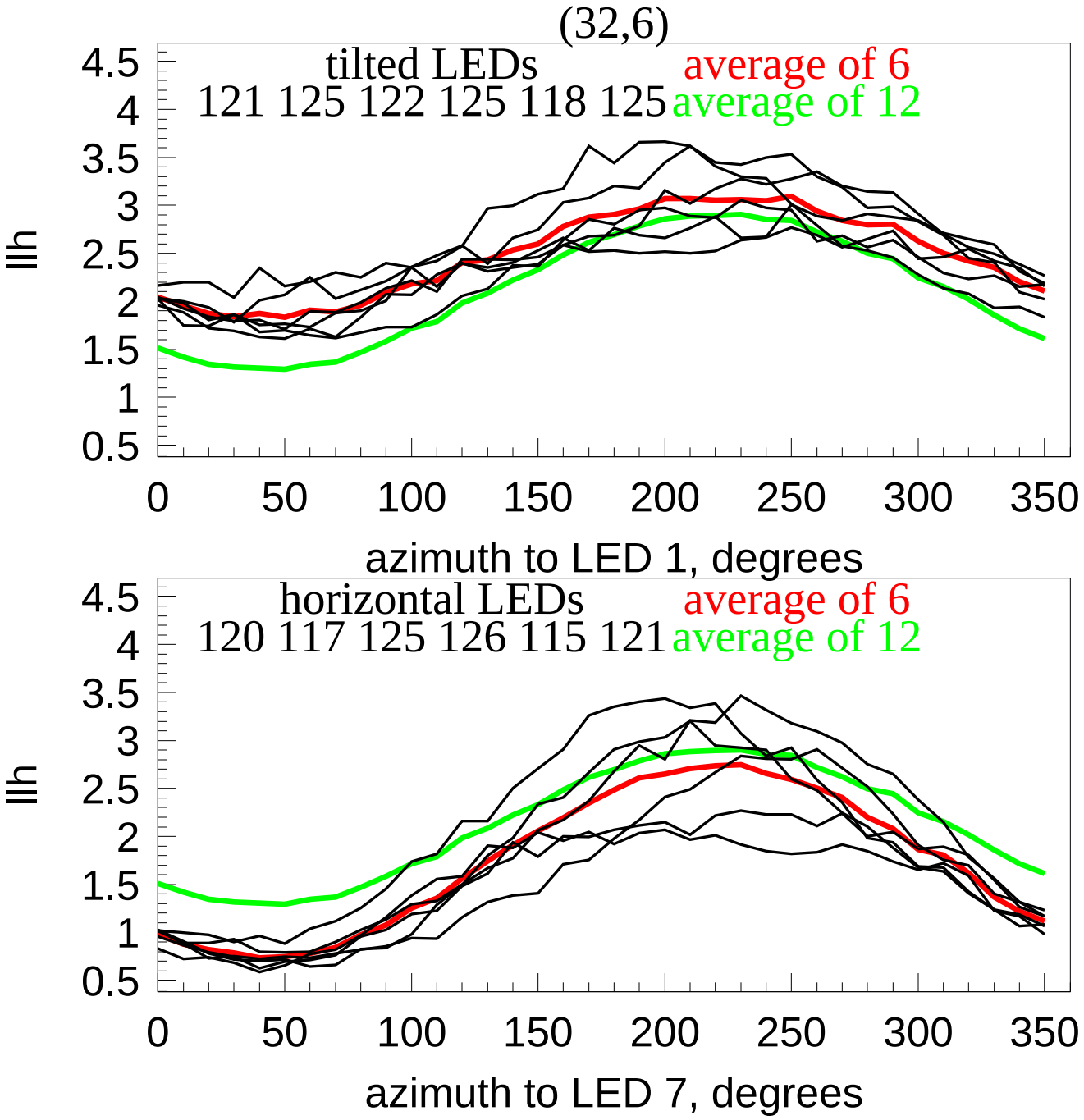

(32,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
142.8 ± 6.2
140
1
2
3
4
5
6
7
8
9
10
11
12

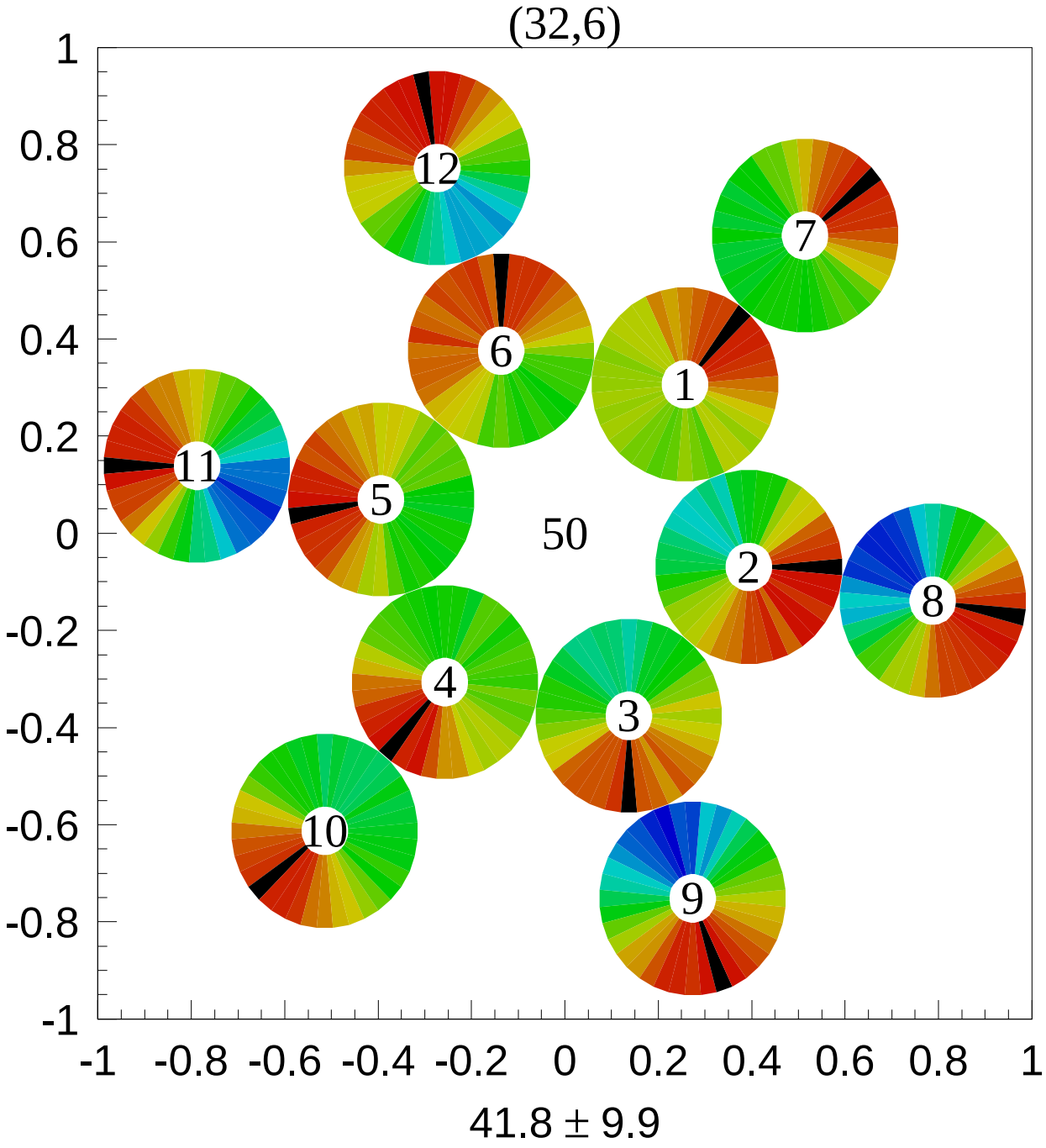

(32,4)
tilted LEDs
126 119 123 123 119 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 119 124 125 122 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

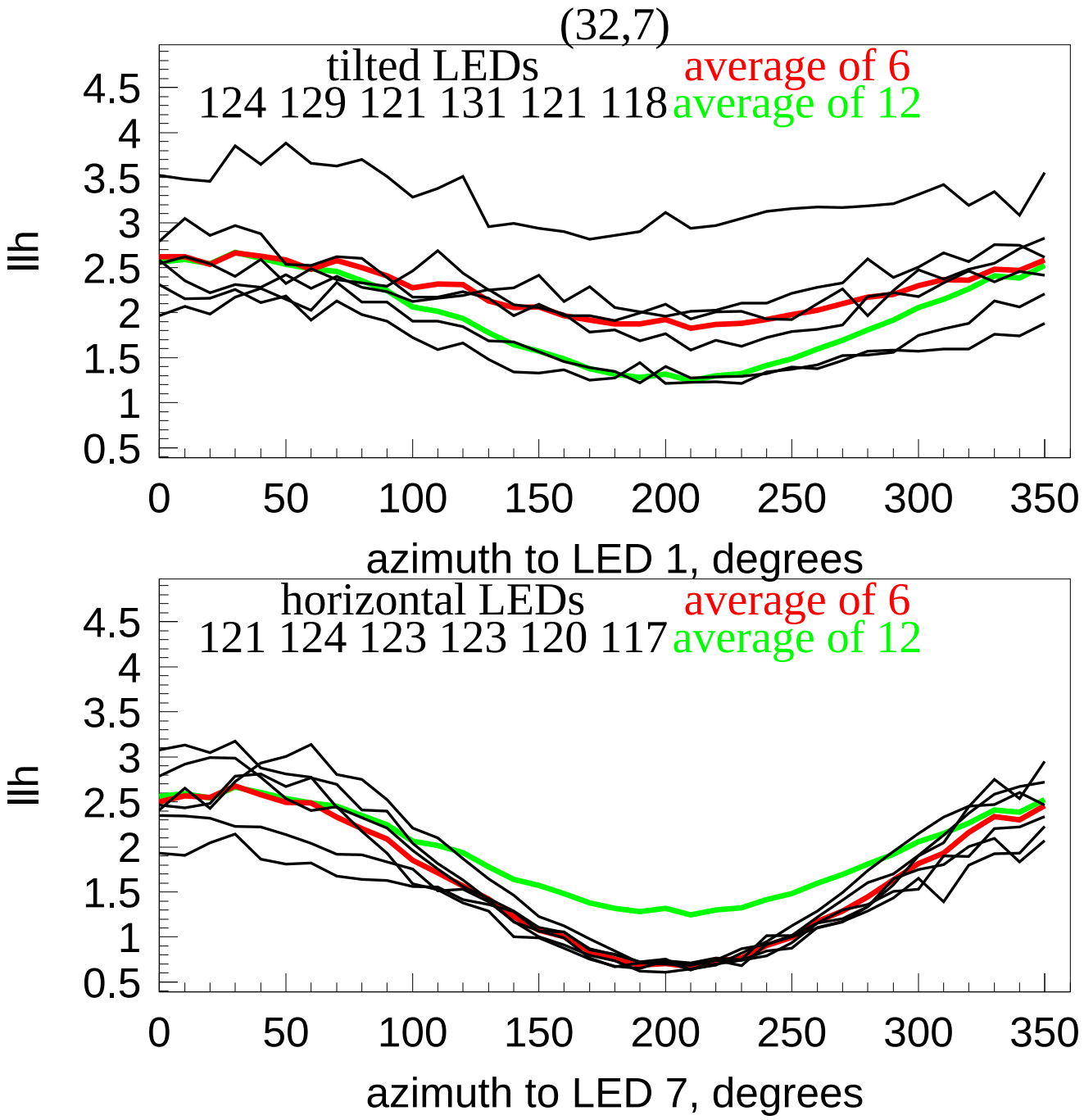

(32,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
114.3 ± 5.8

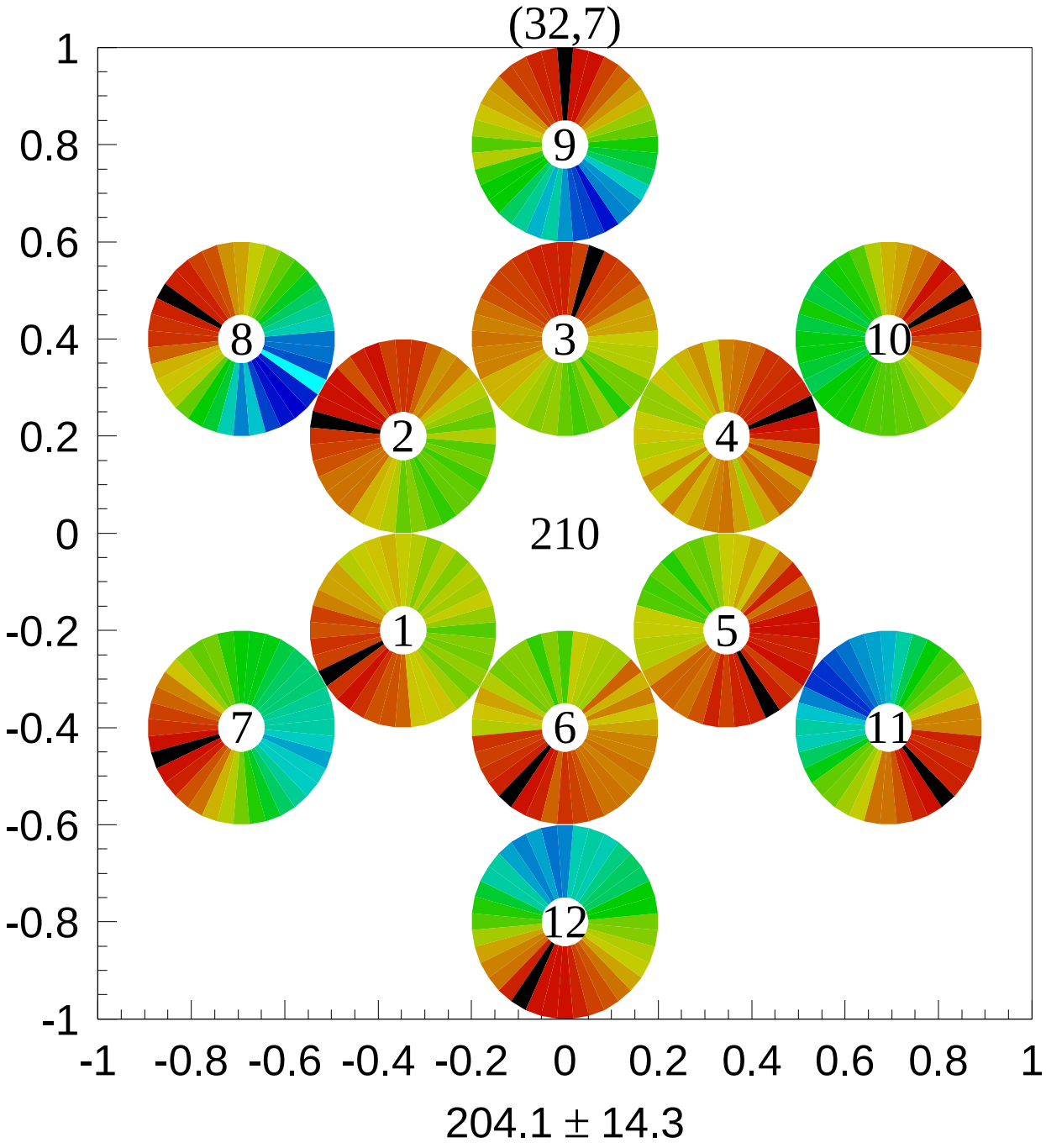

(32,5)
tilted LEDs
120 122 117 116 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 117 122 122 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

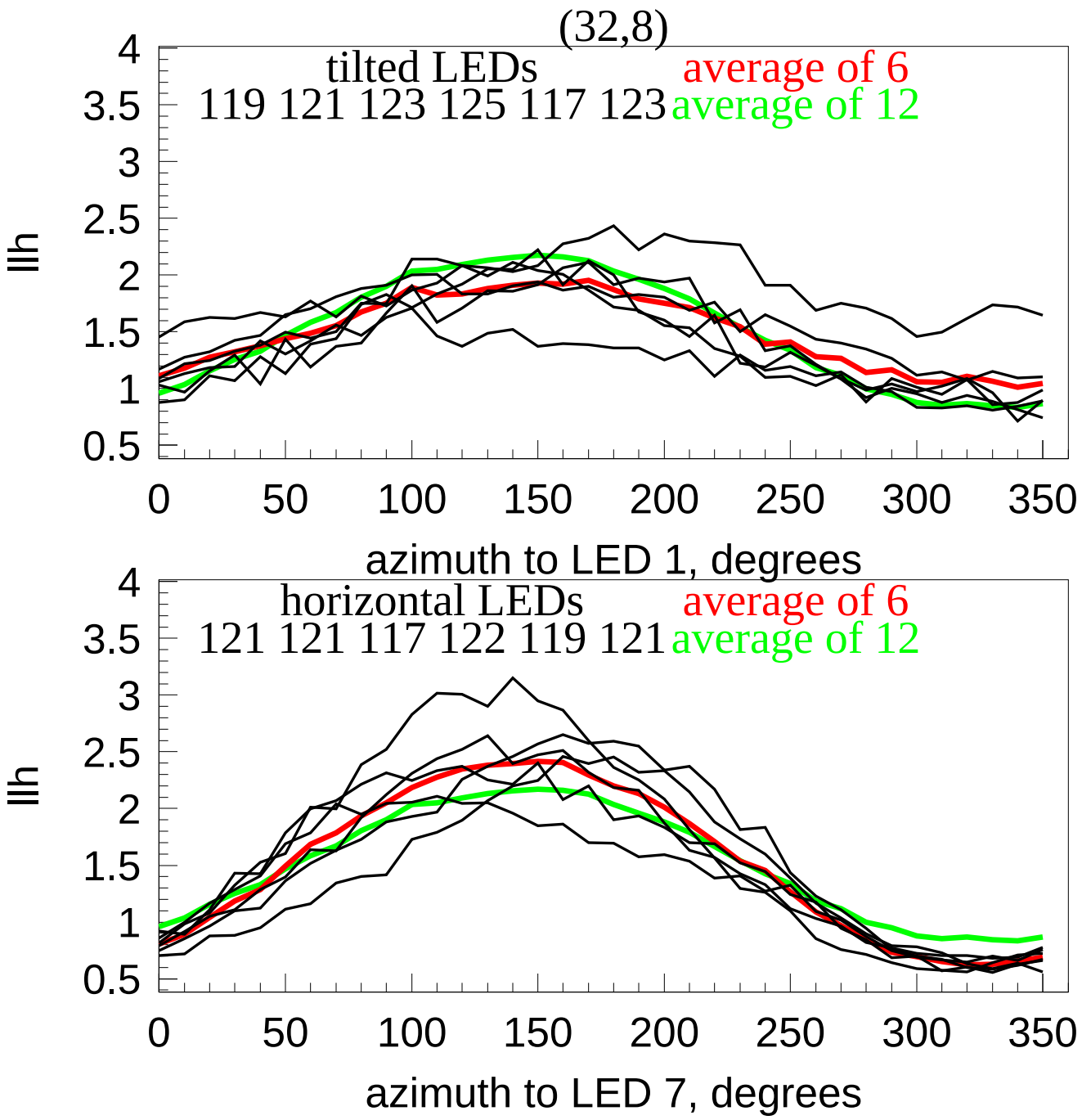

(32,5)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
19.6 ± 8.4

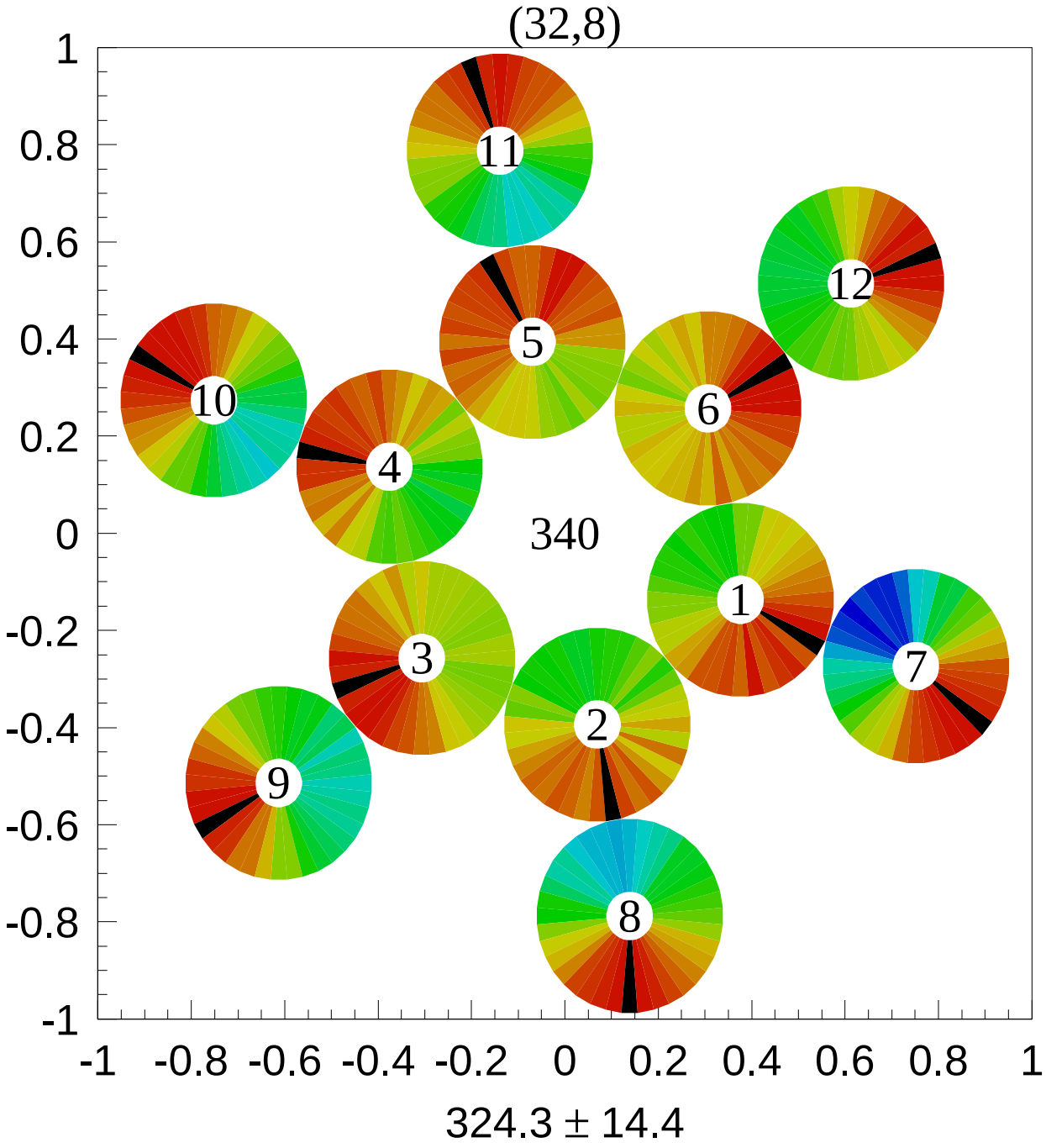

(32,6)
tilted LEDs
121 125 122 125 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 117 125 126 115 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

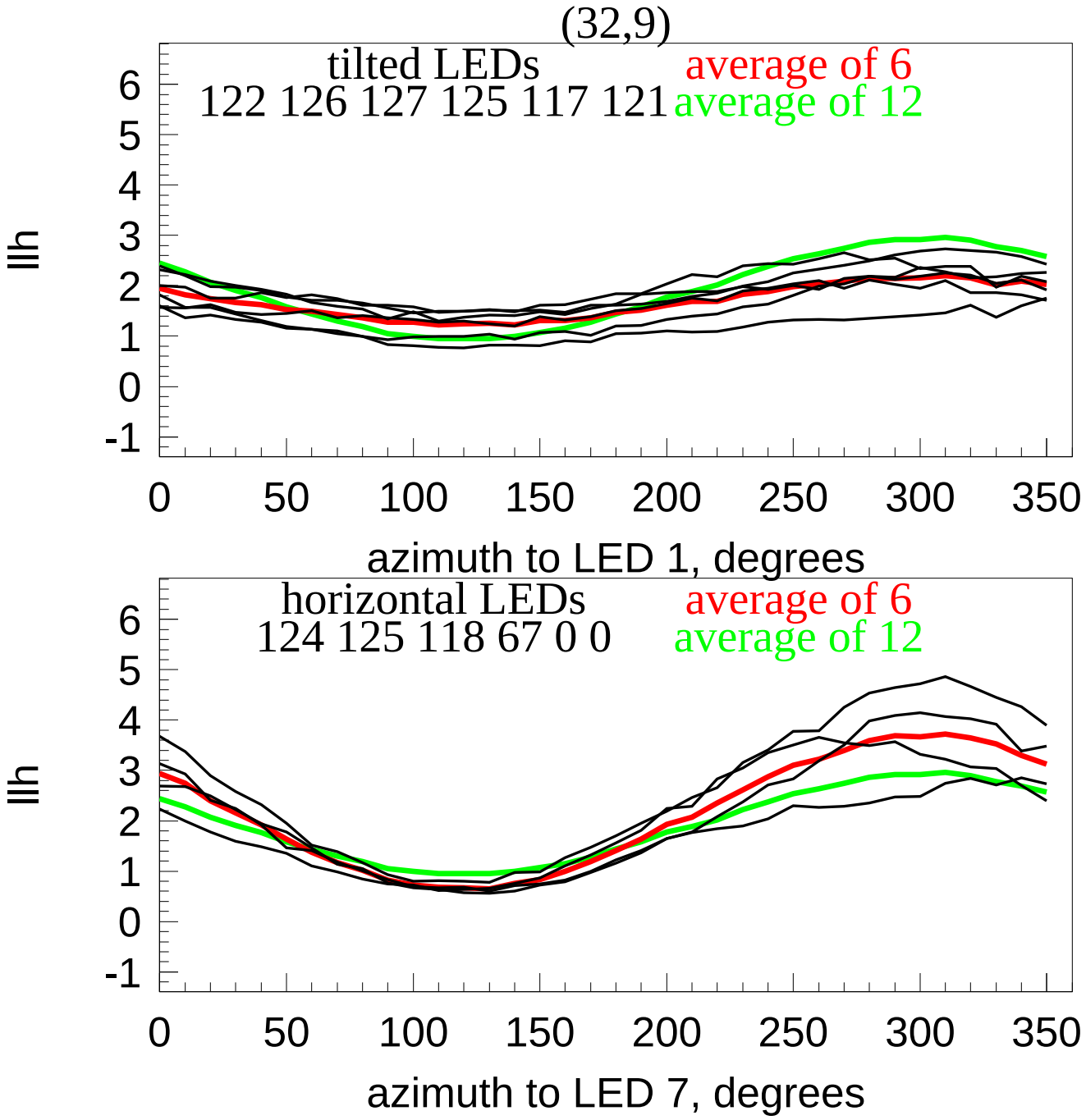

(32,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
41.8 ± 9.9

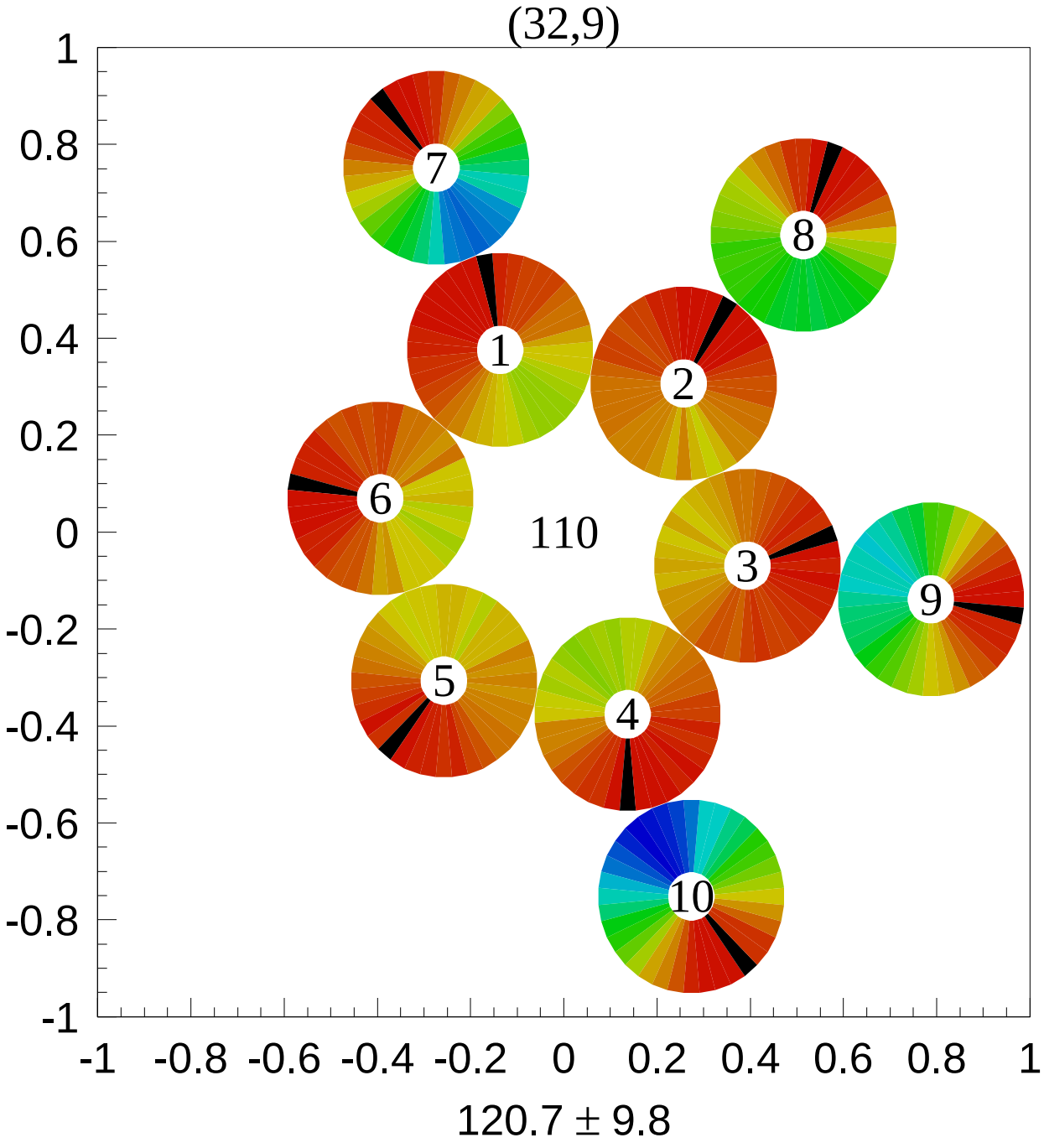

(32,7)
tilted LEDs
124 129 121 131 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 123 123 120 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

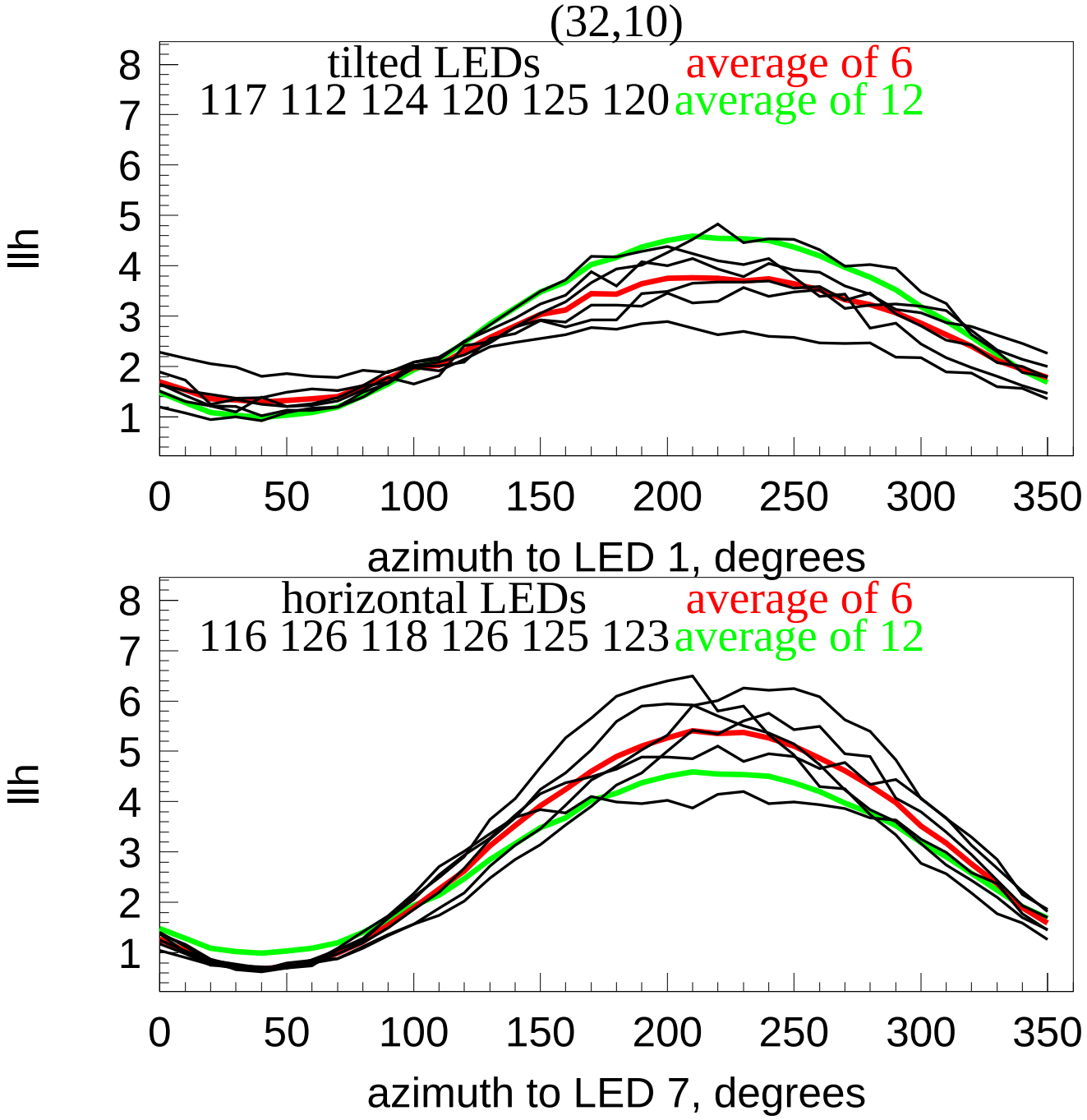

(32,7)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
204.1 ± 14.3

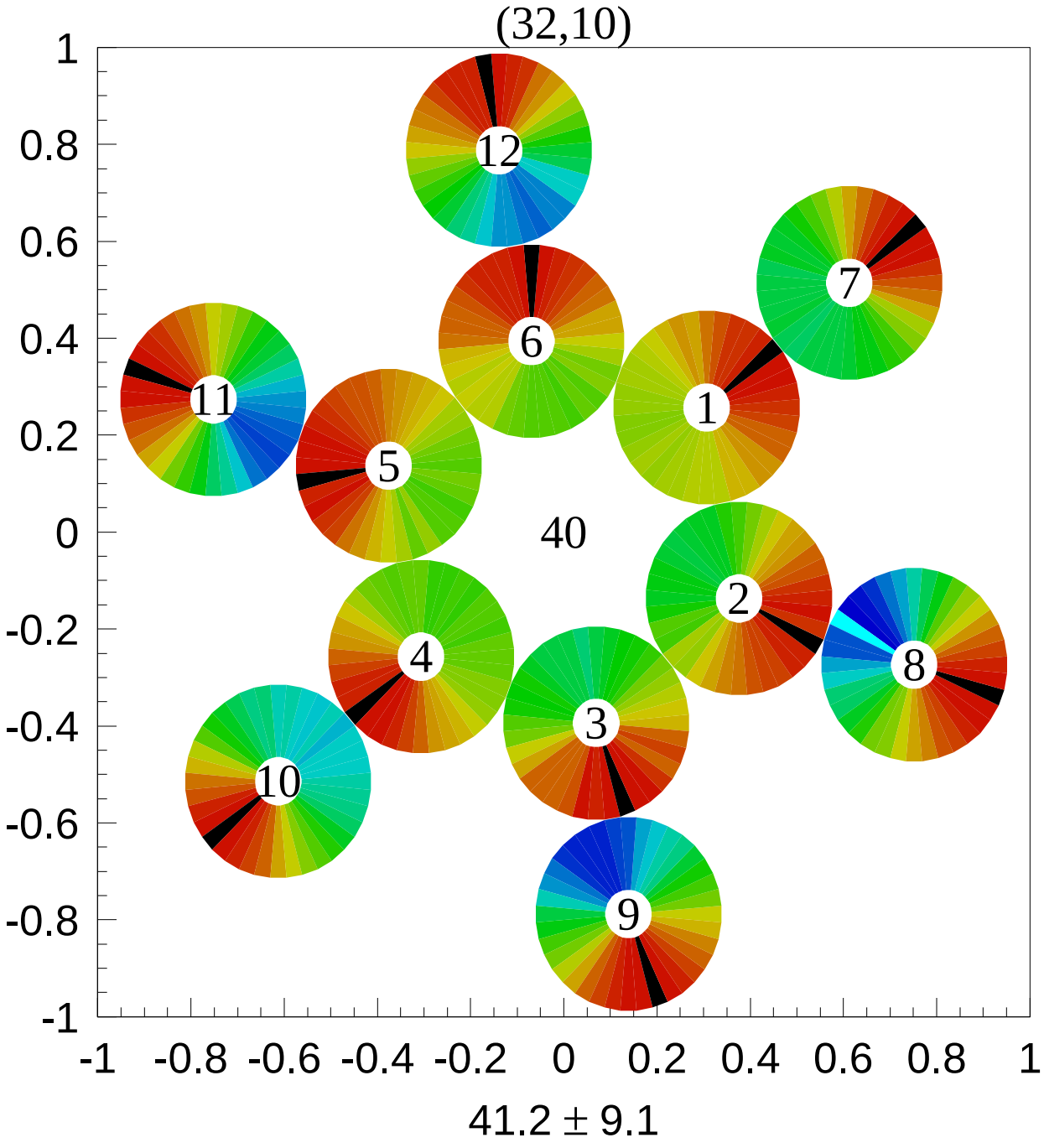

(32,8)
tilted LEDs
119 121 123 125 117 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 121 117 122 119 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

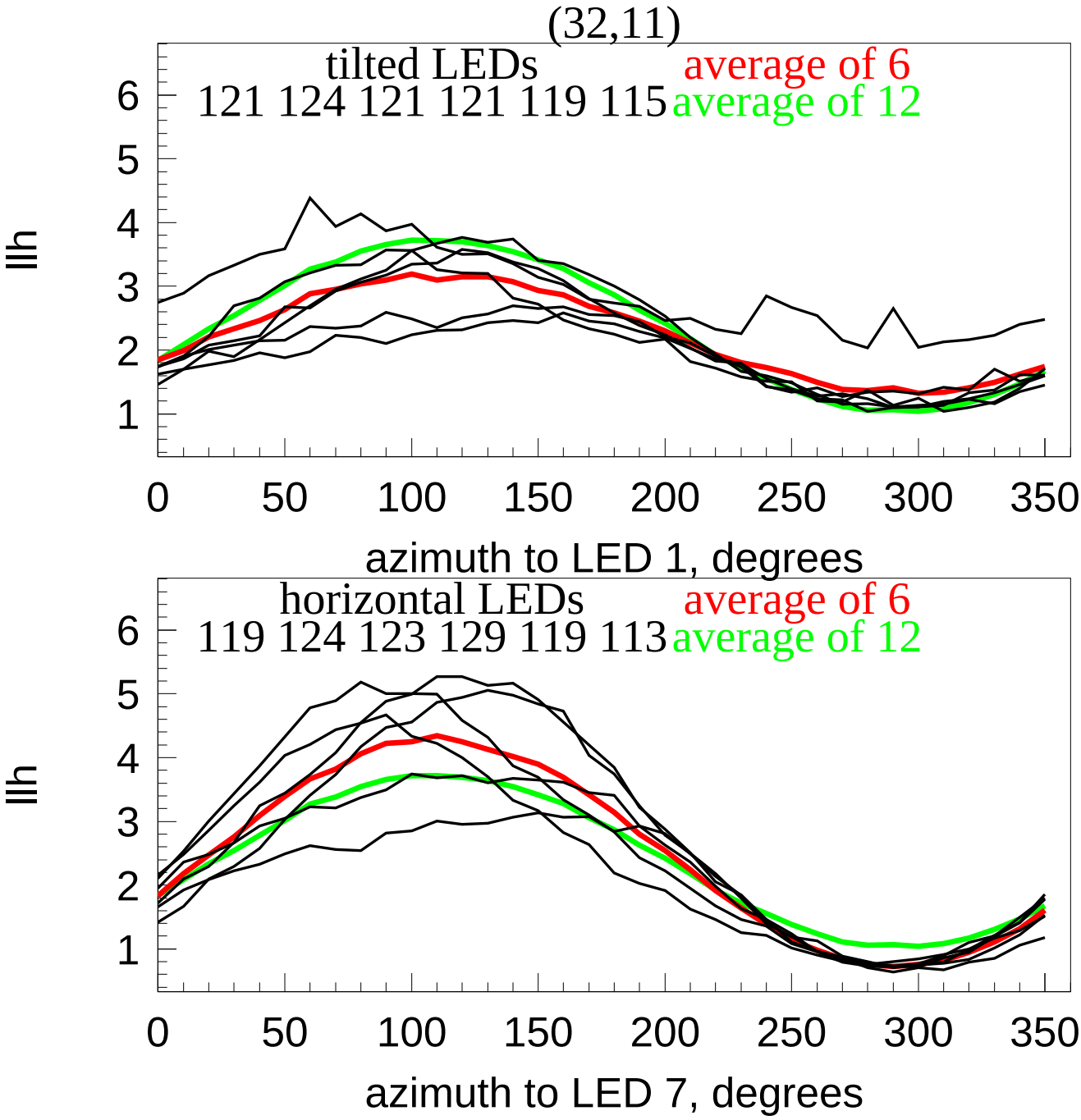

(32,8)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
324.3 ± 14.4

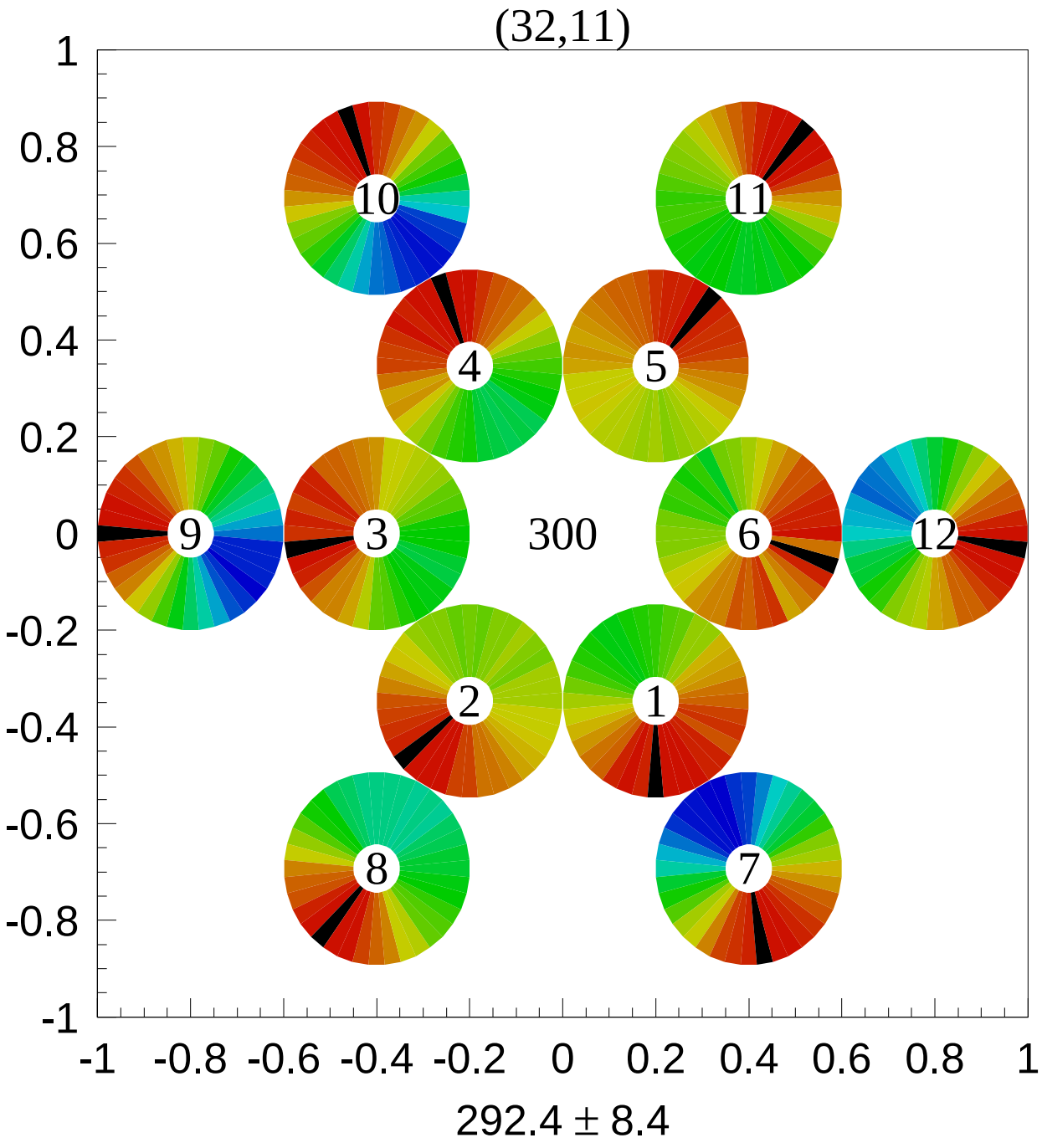

(32,9)
tilted LEDs
122 126 127 125 117 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 118 67 0 0
average of 6
average of 12
llh
azimuth to LED 7, degrees

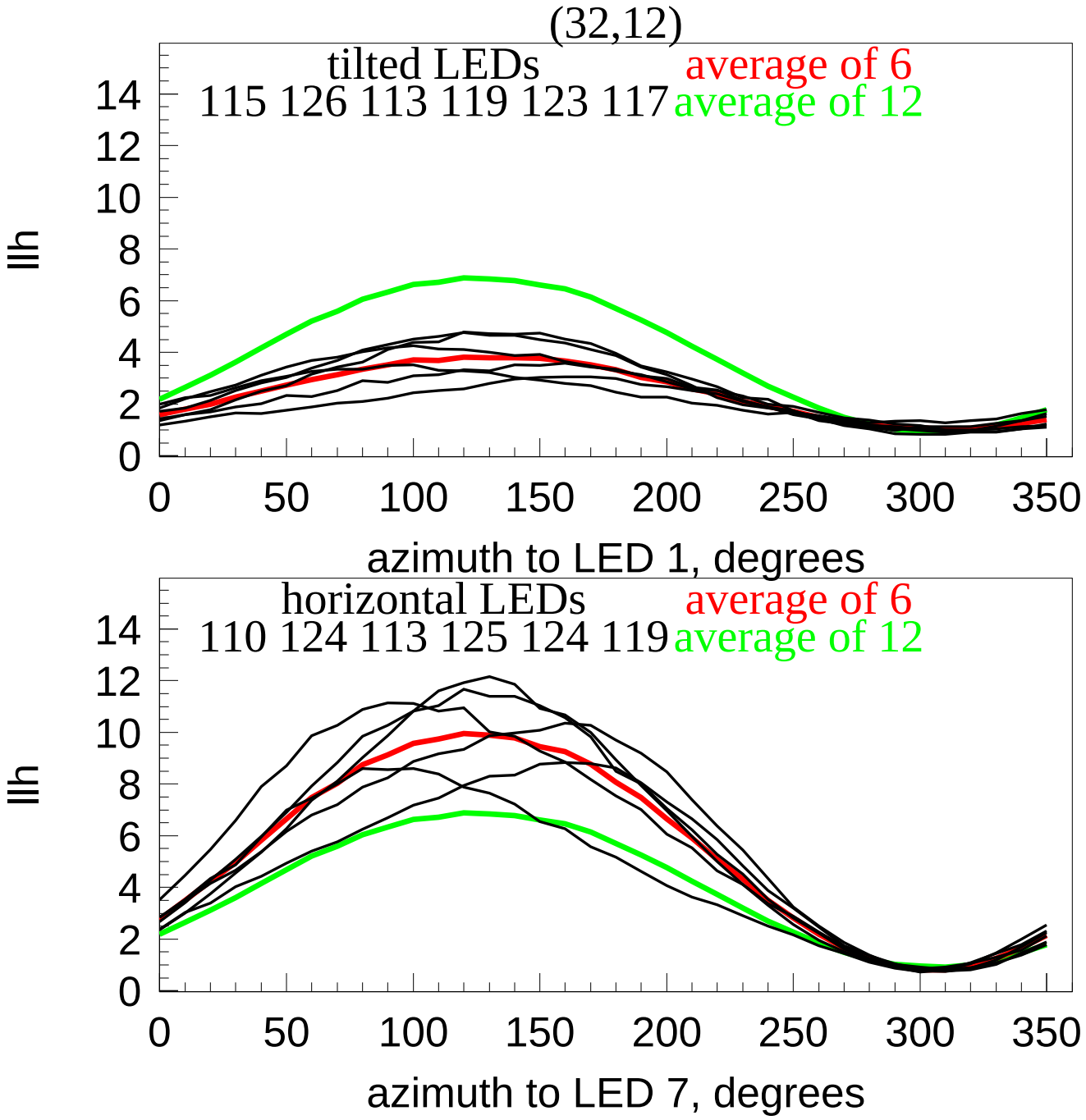

(32,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
6
110
3
9
5
4
10
120.7 ± 9.8

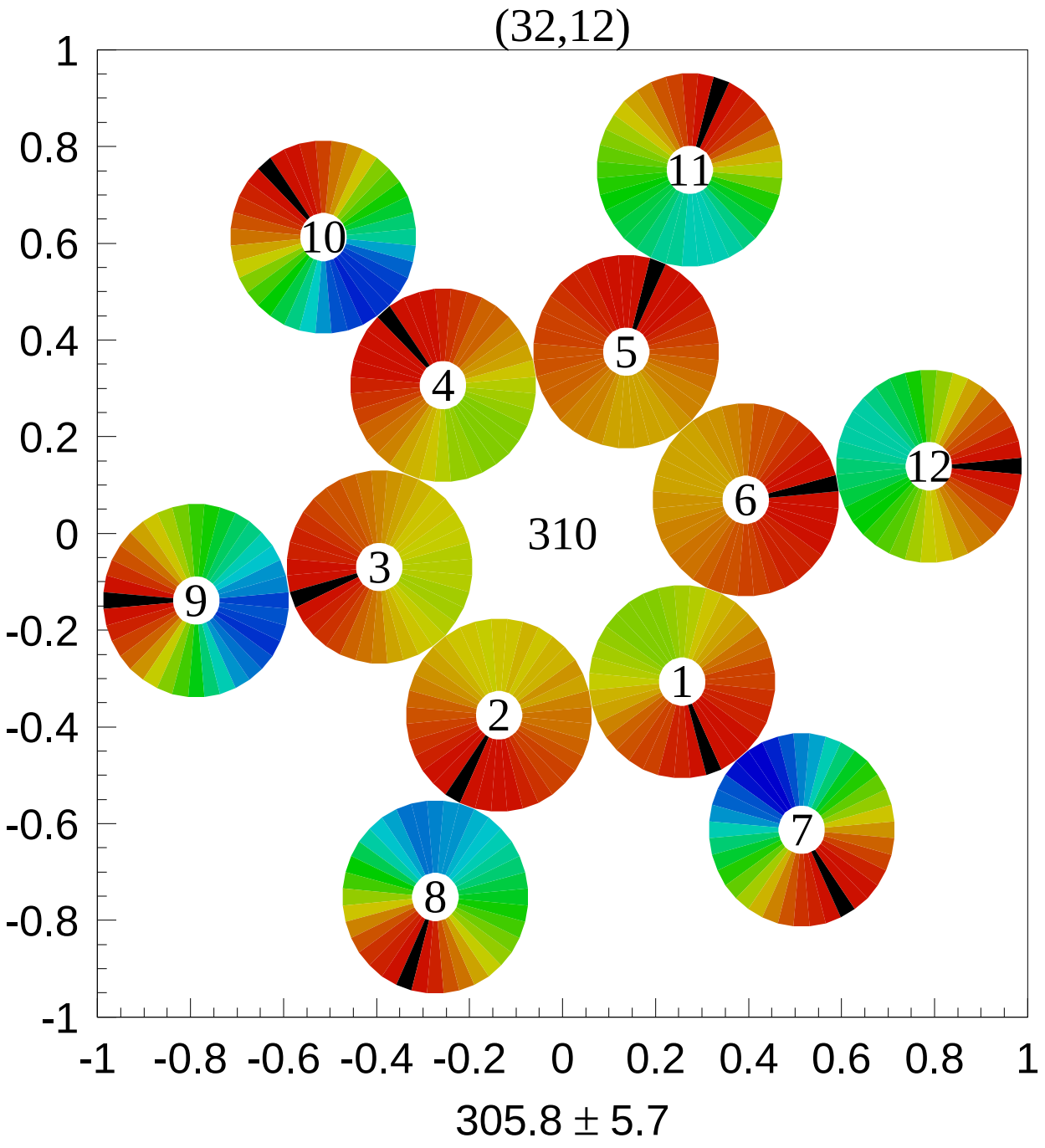

(32,10)
tilted LEDs
117 112 124 120 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 126 118 126 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

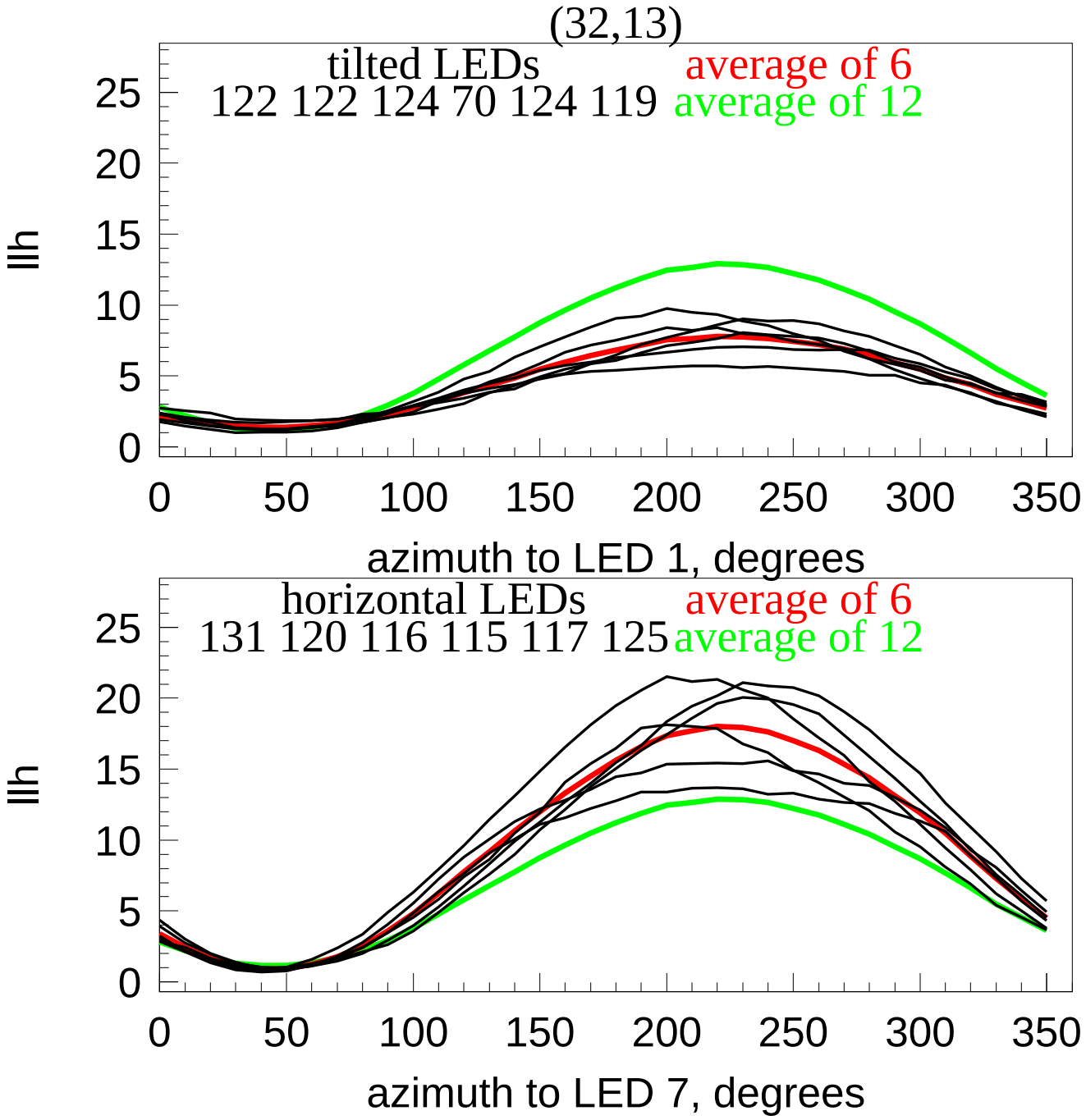

(32,10)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
41.2 ± 9.1

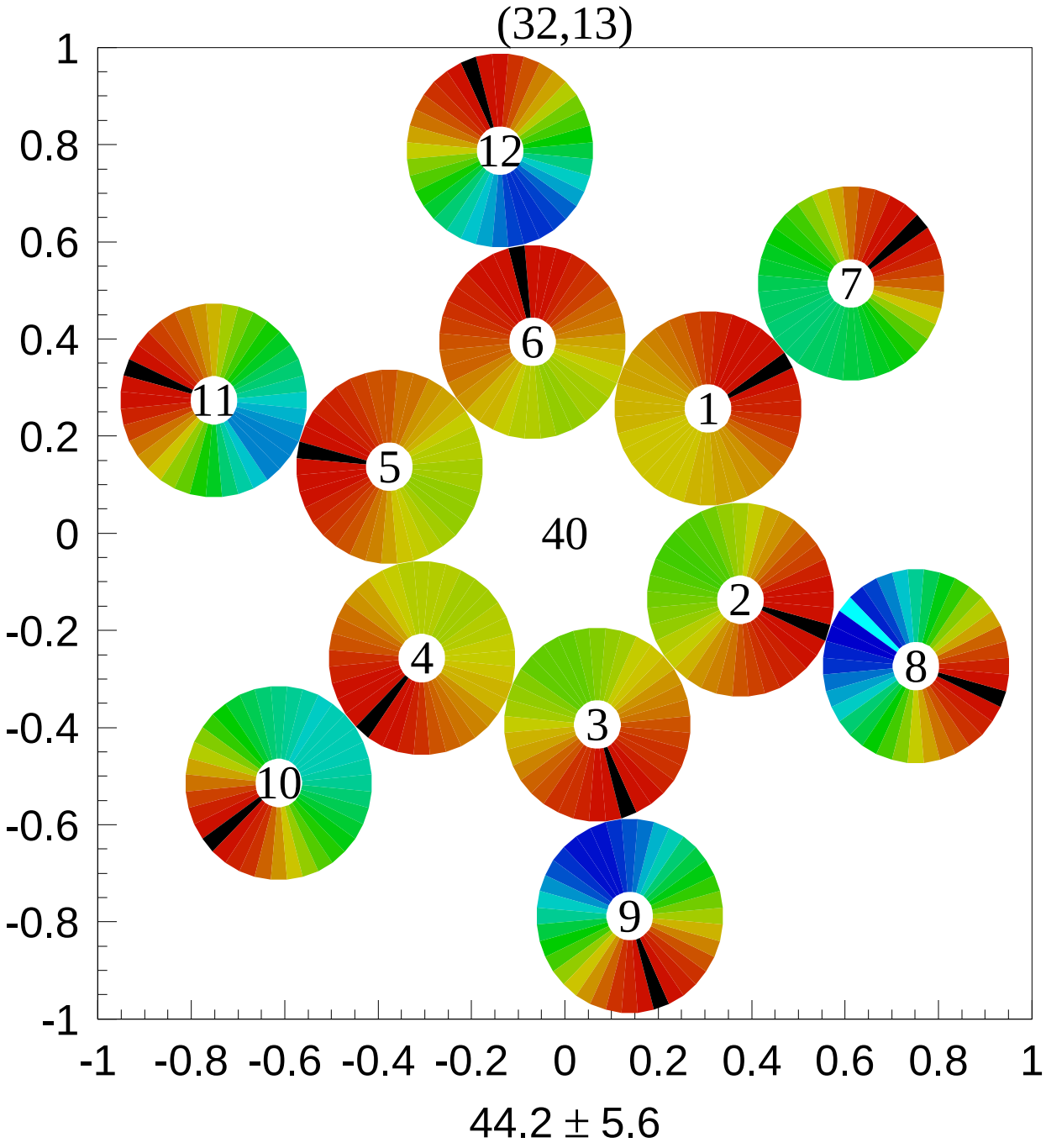

(32,11)
tilted LEDs
121 124 121 121 119 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 124 123 129 119 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

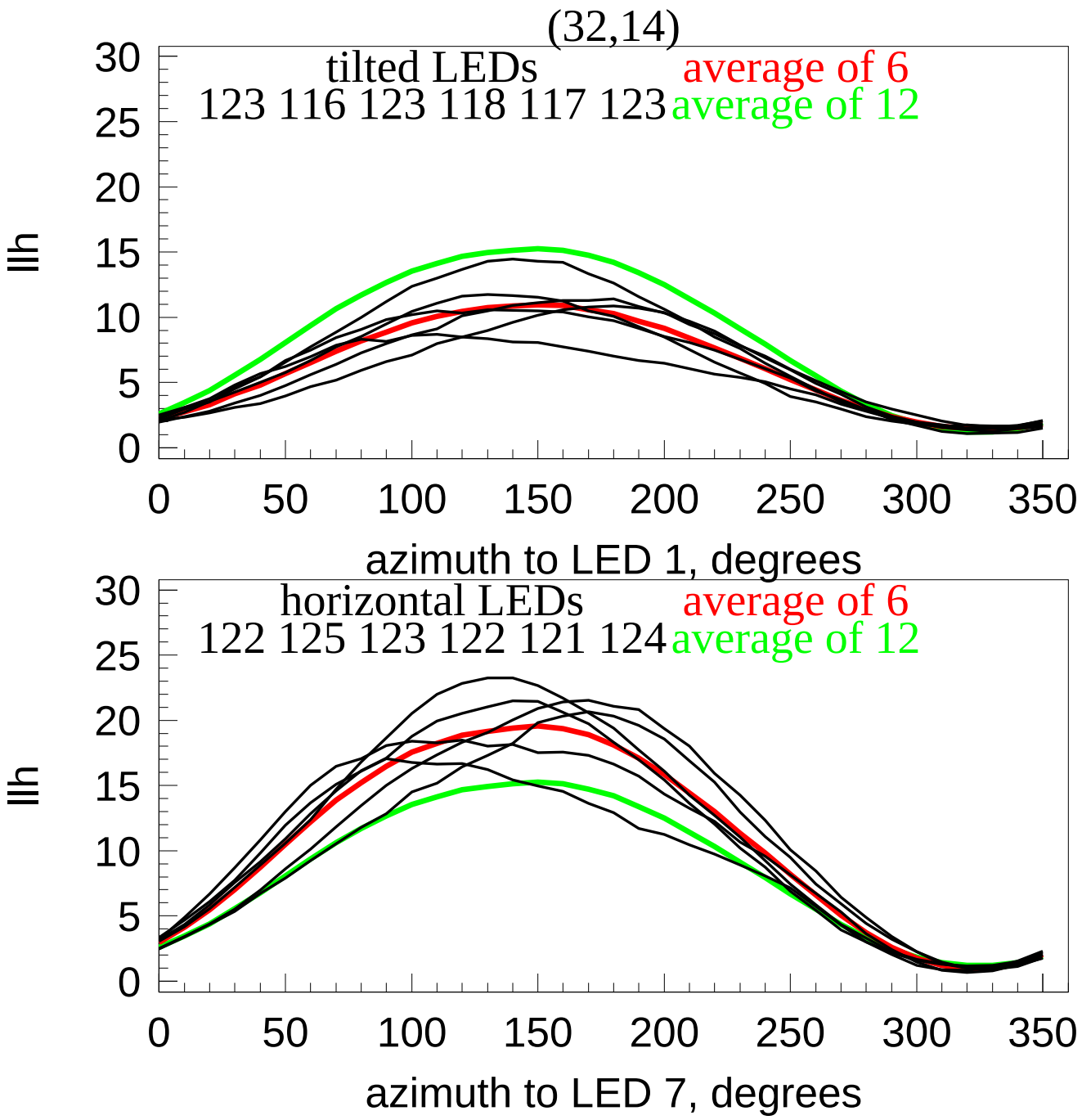

(32,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
292.4 ± 8.4

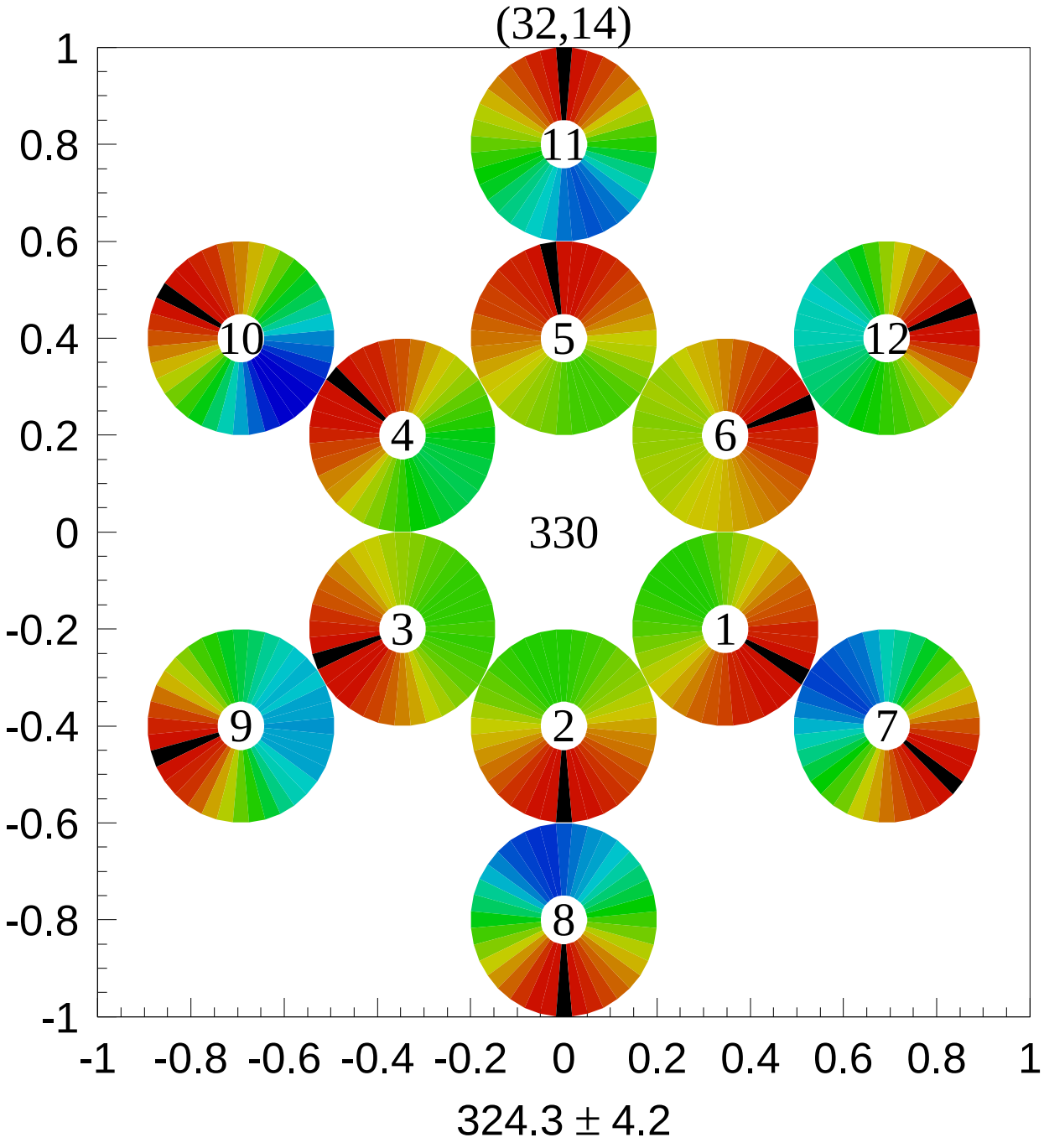

(32,12)
tilted LEDs
115 126 113 119 123 117
average of 6
average of 12
llh
0
2
4
6
8
10
12
14
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
110 124 113 125 124 119
average of 6
average of 12
llh
0
2
4
6
8
10
12
14
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

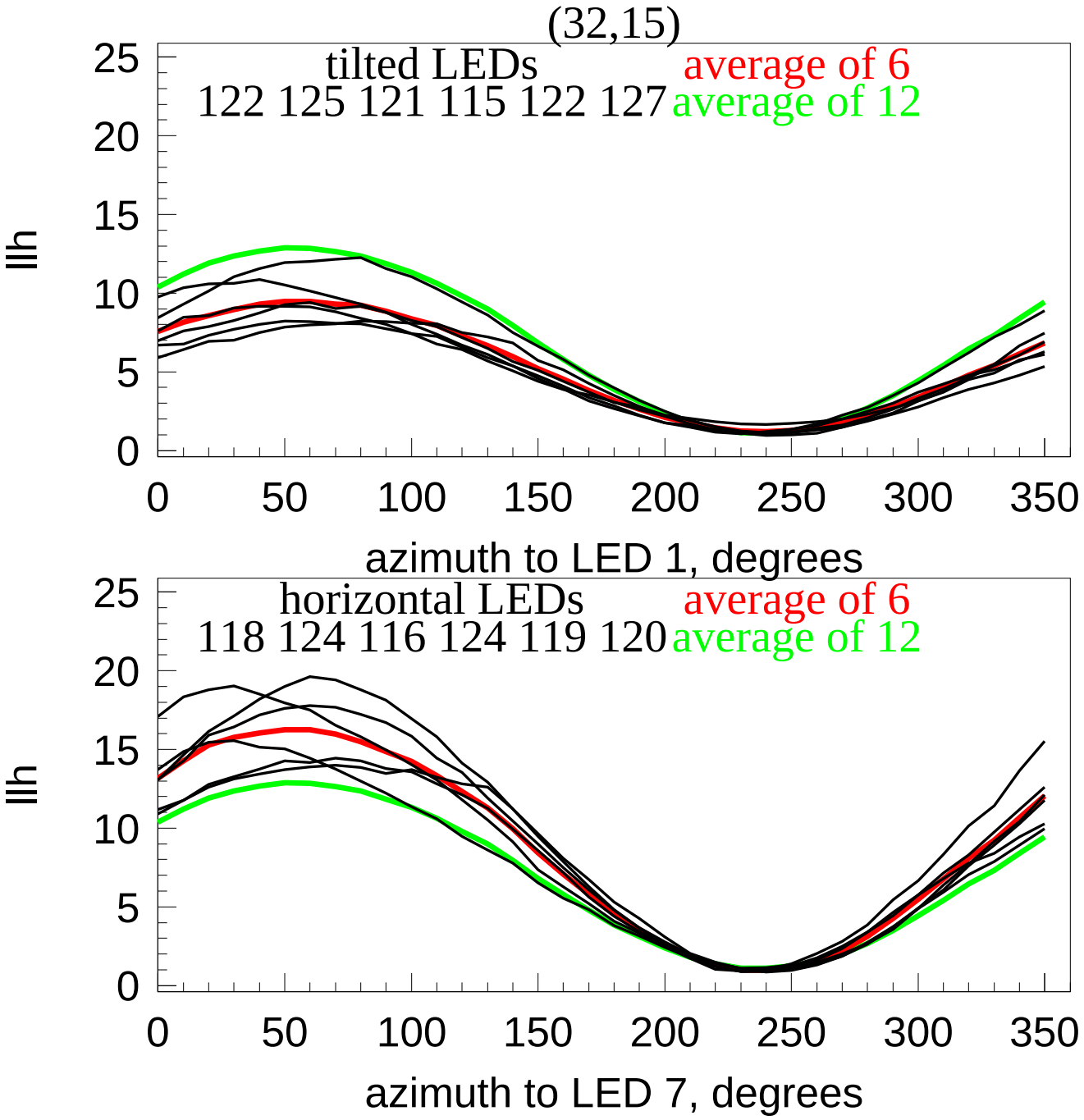

(32,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
305.8 ± 5.7

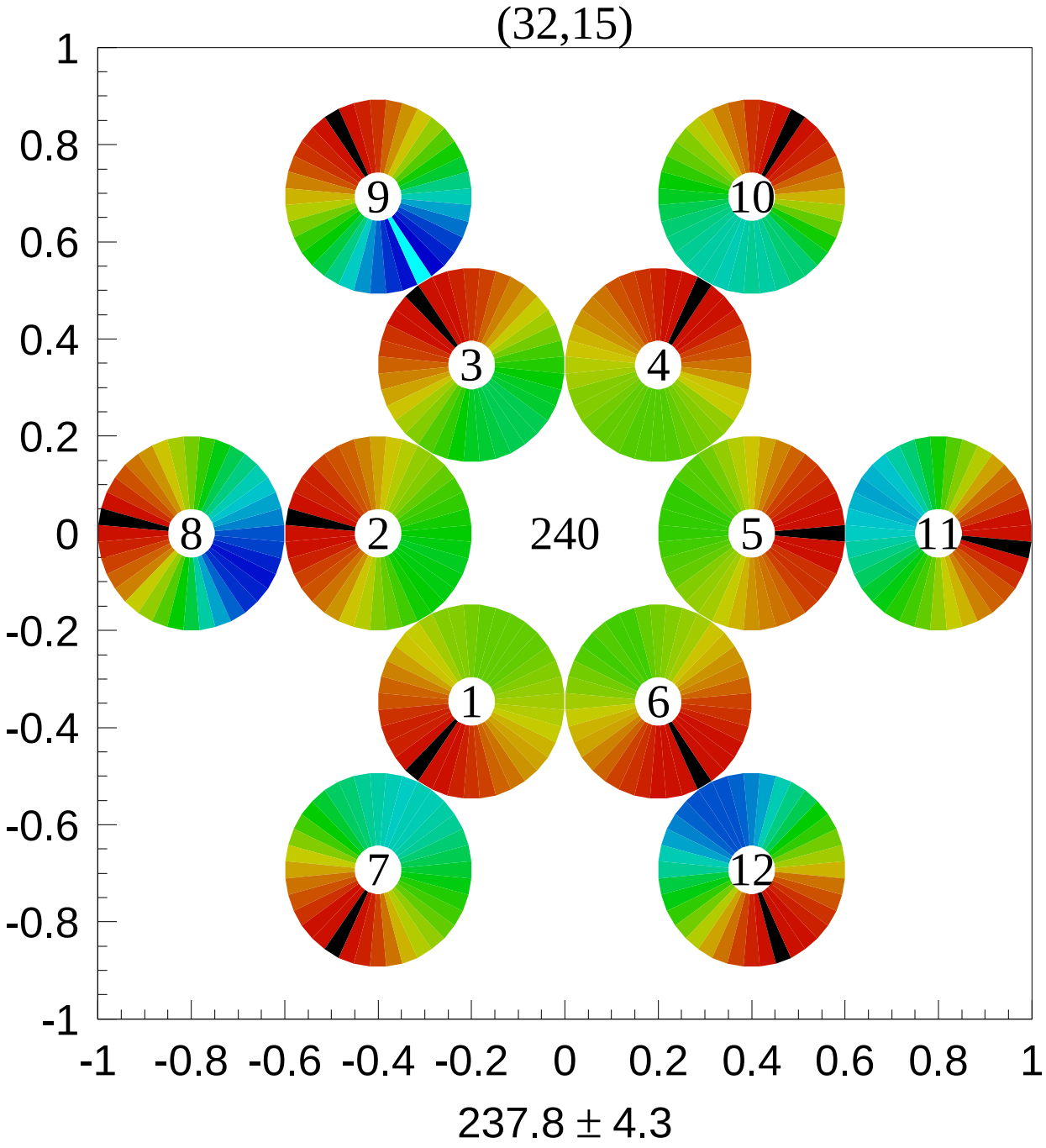

(32,13)
tilted LEDs
122 122 124 70 124 119
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
131 120 116 115 117 125
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

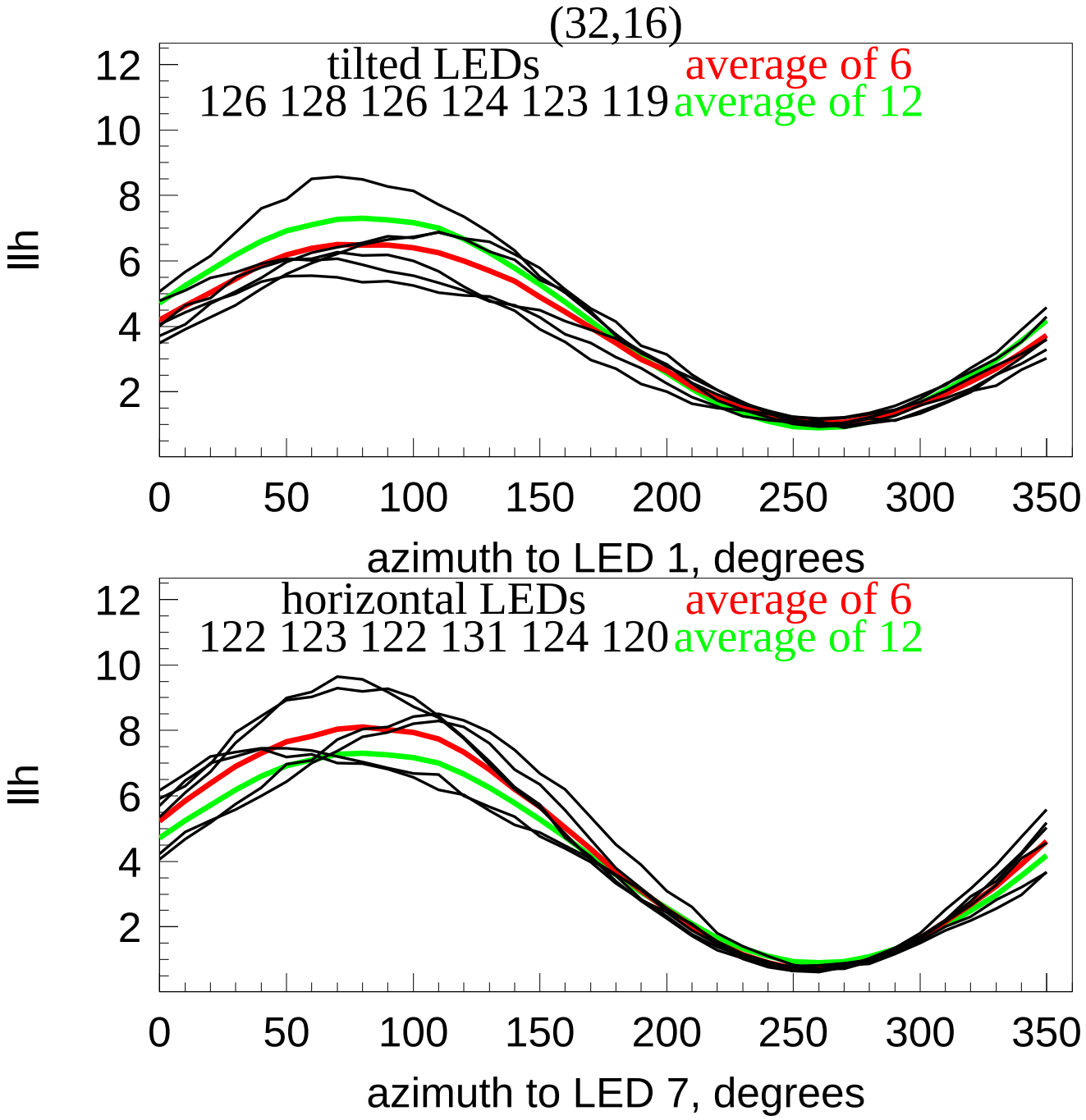

(32,13)
12
7
6
1
11
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
44.2 ± 5.6

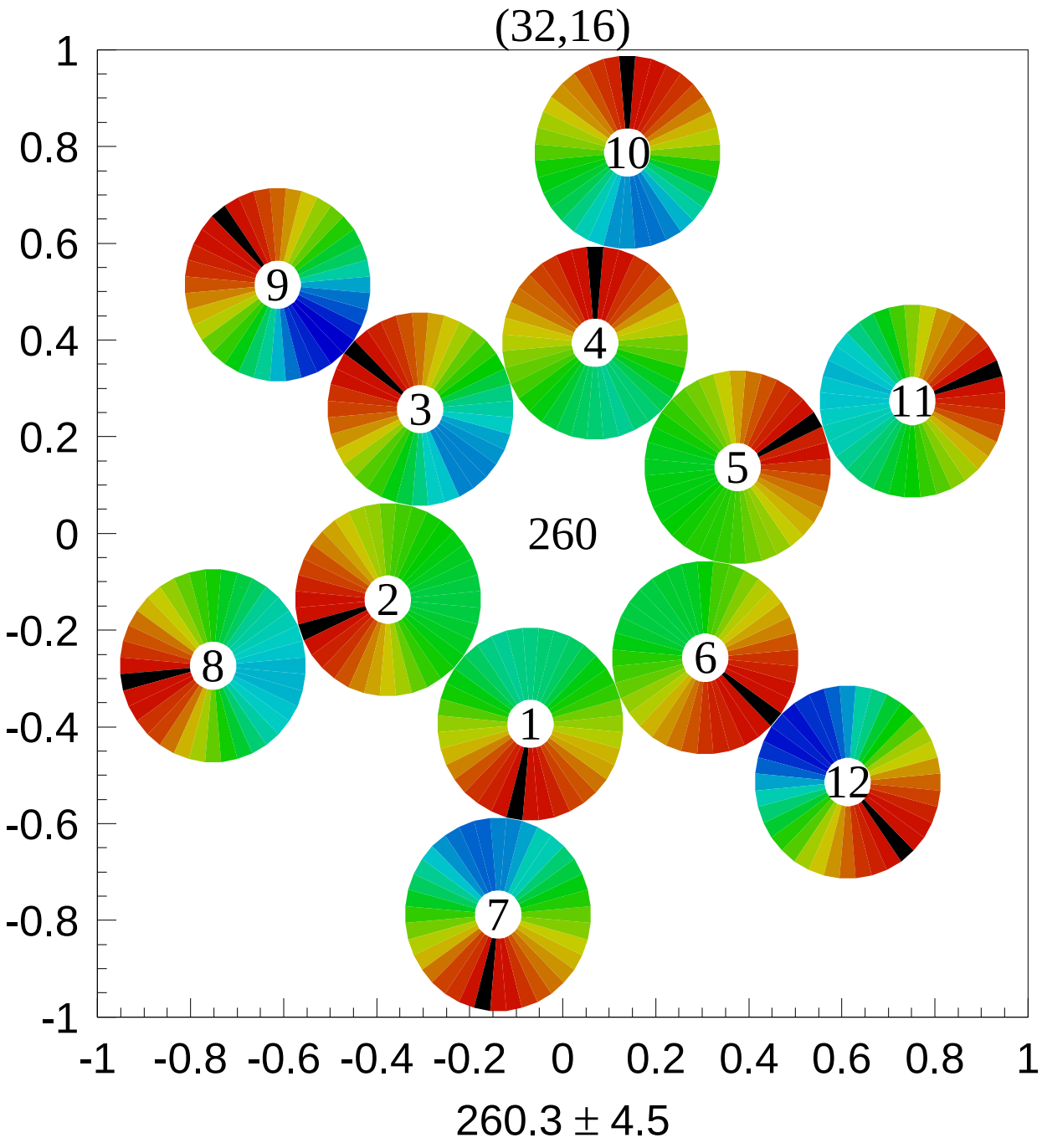

(32,14)
tilted LEDs
123 116 123 118 117 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 125 123 122 121 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

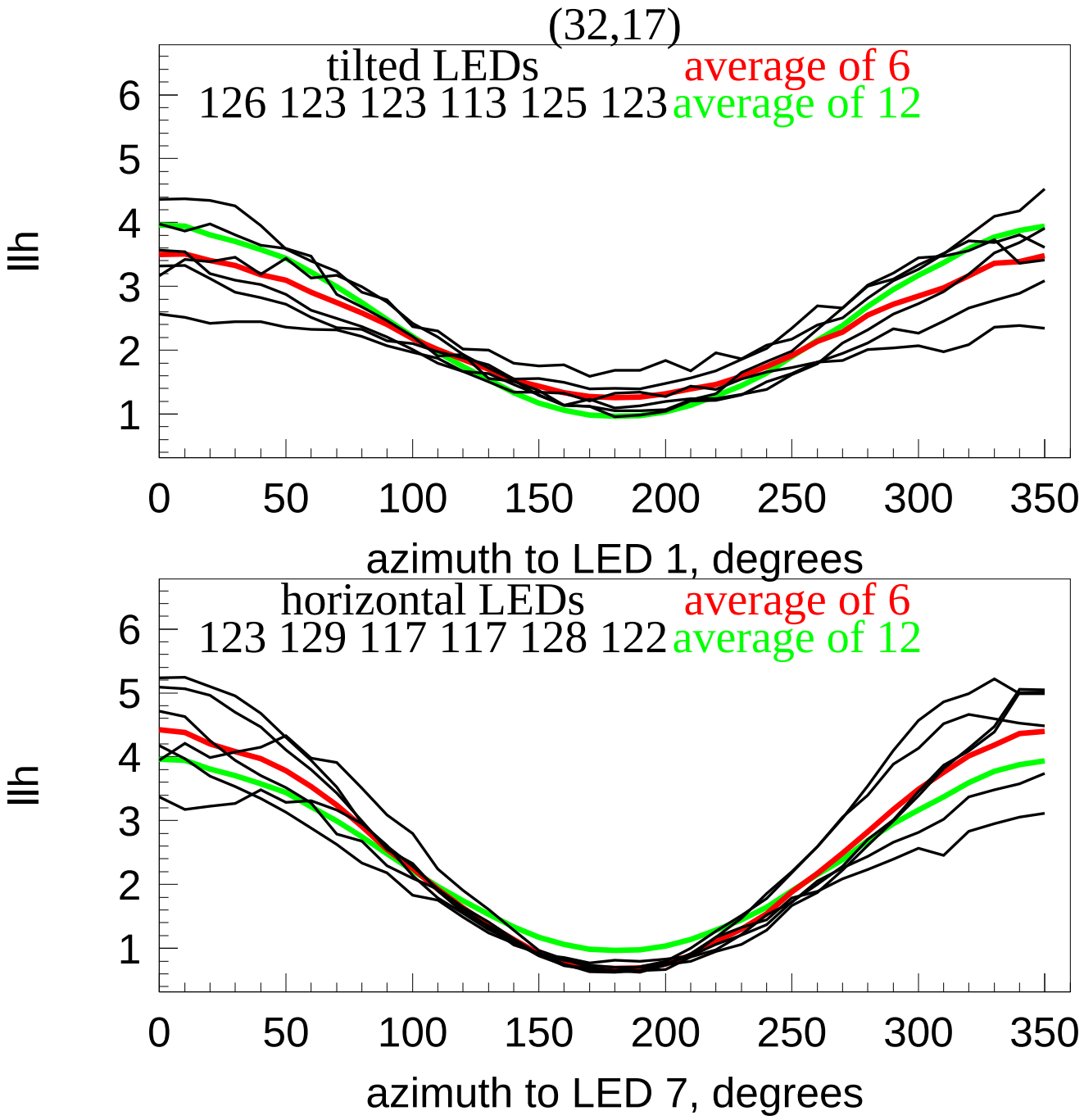

(32,14)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
324.3 ± 4.2

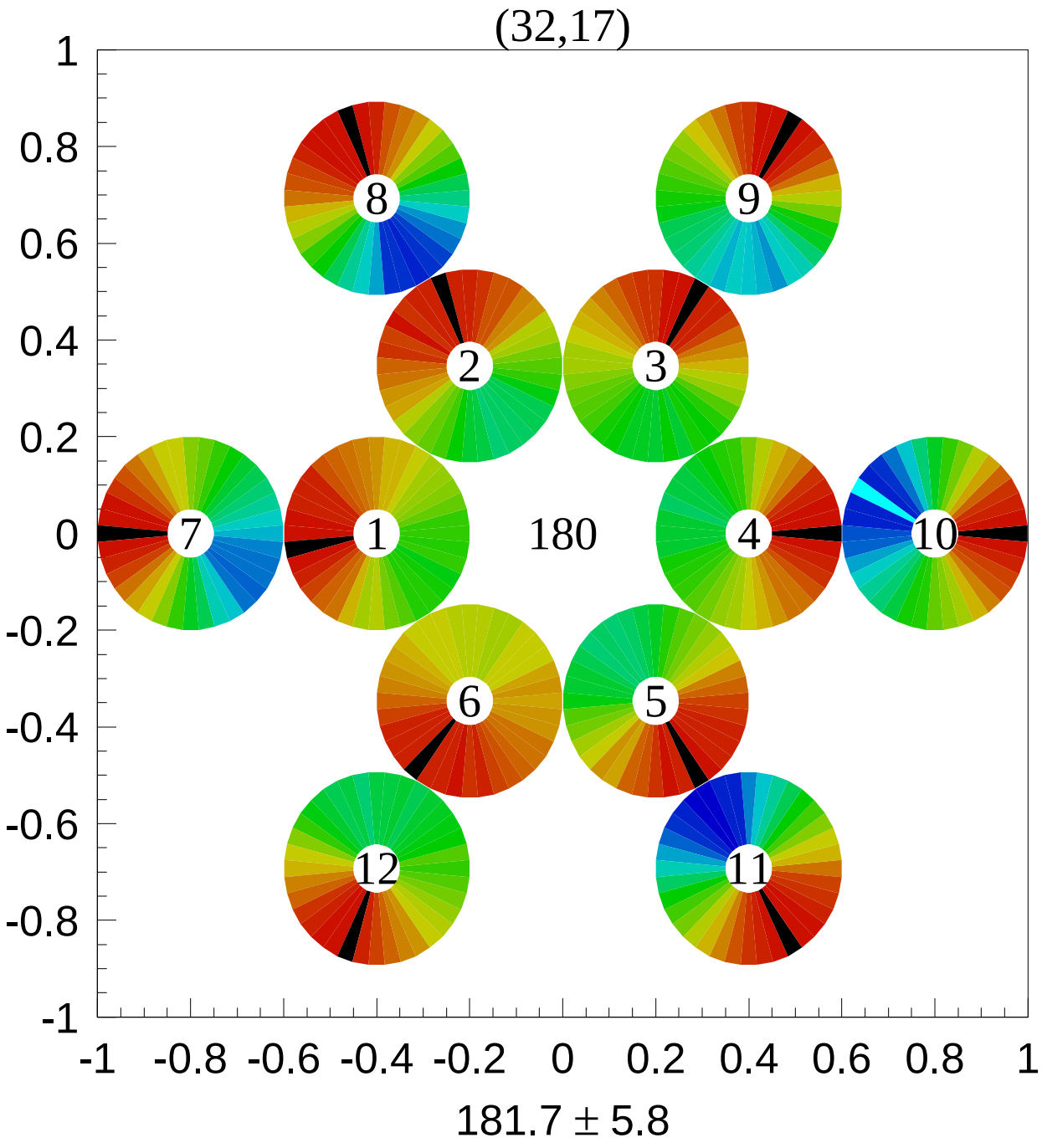

(32,15)
tilted LEDs
122 125 121 115 122 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 124 116 124 119 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

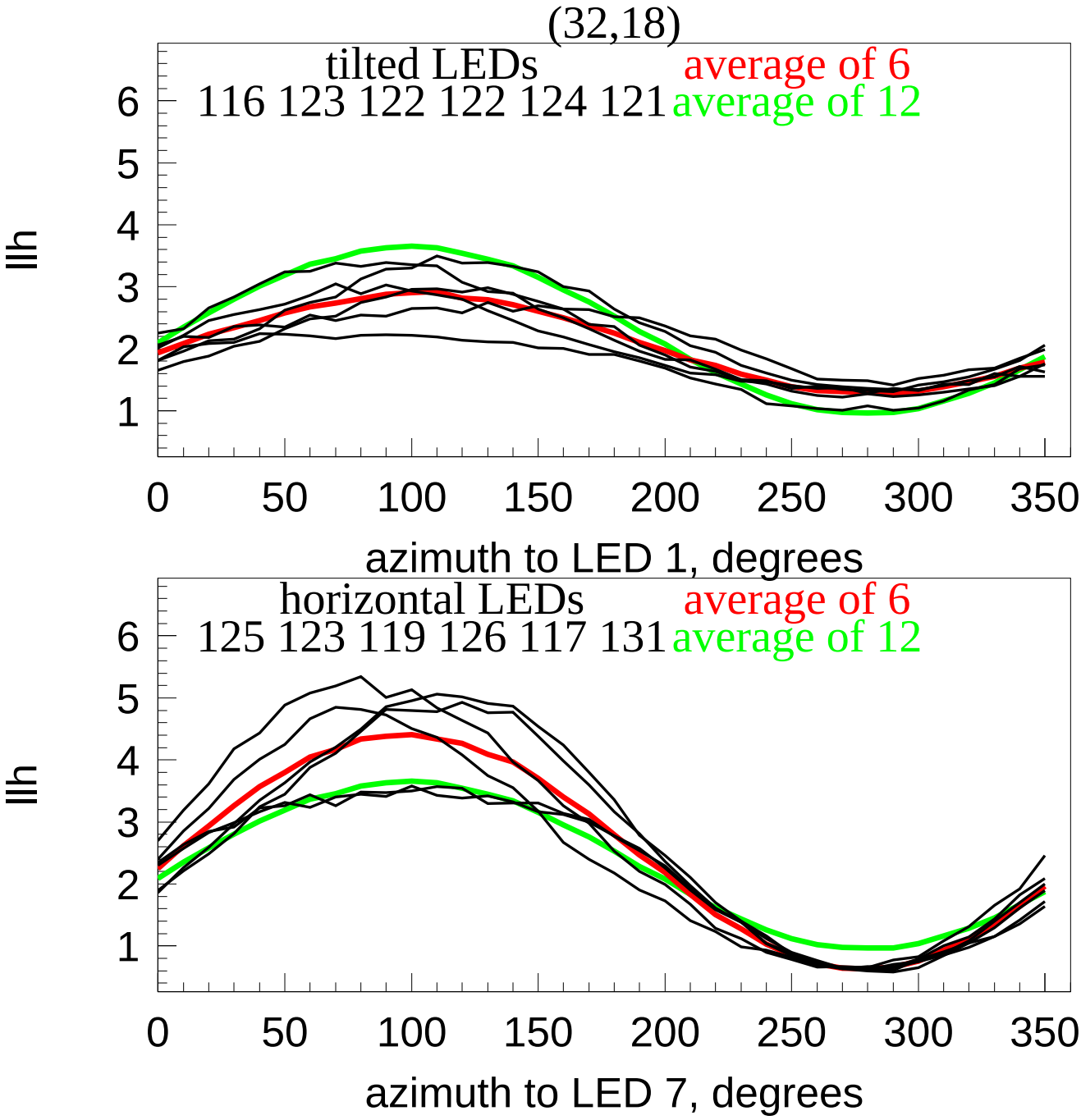

(32,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
237.8 ± 4.3

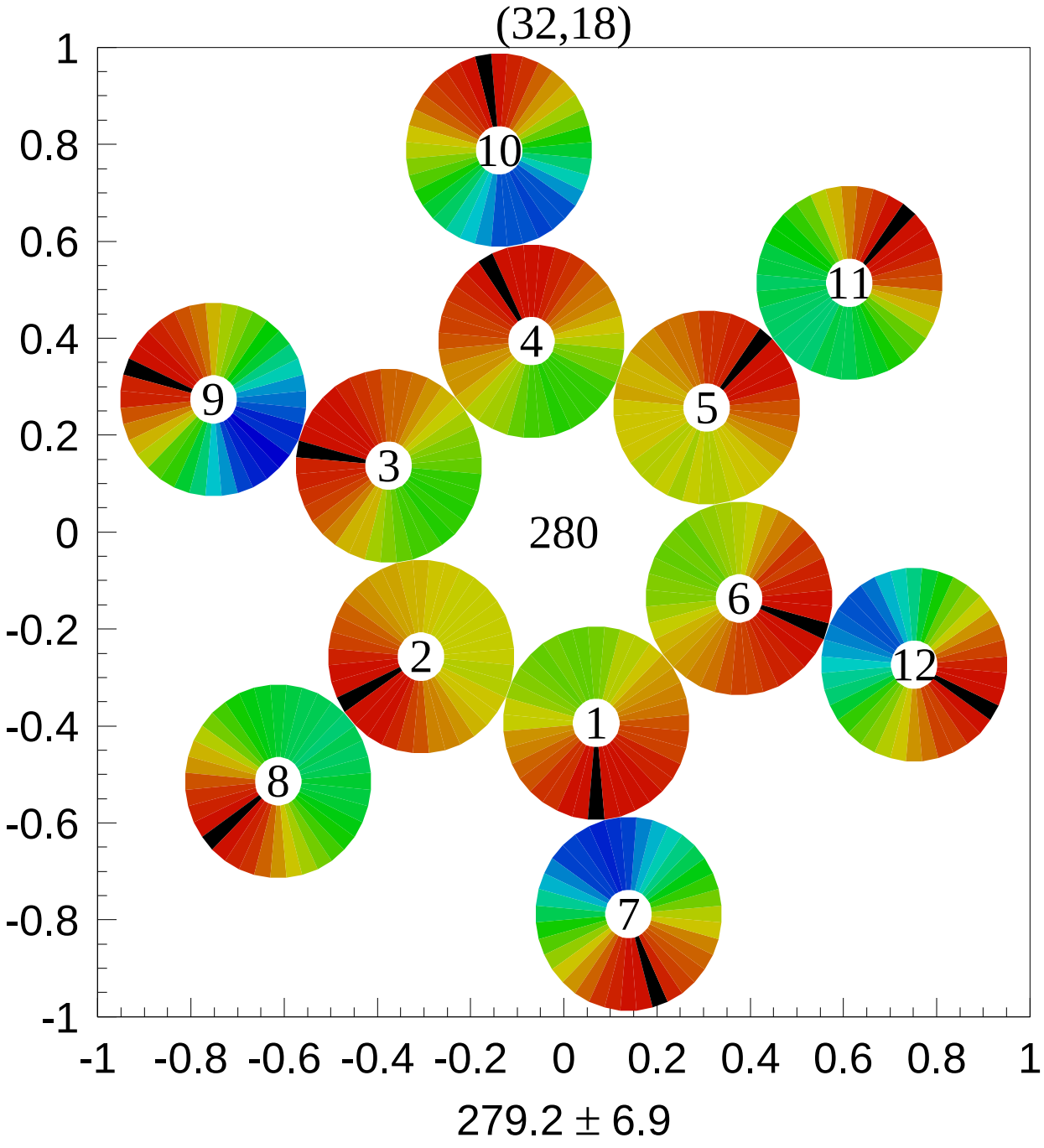

(32,16)
tilted LEDs
126 128 126 124 123 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 122 131 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

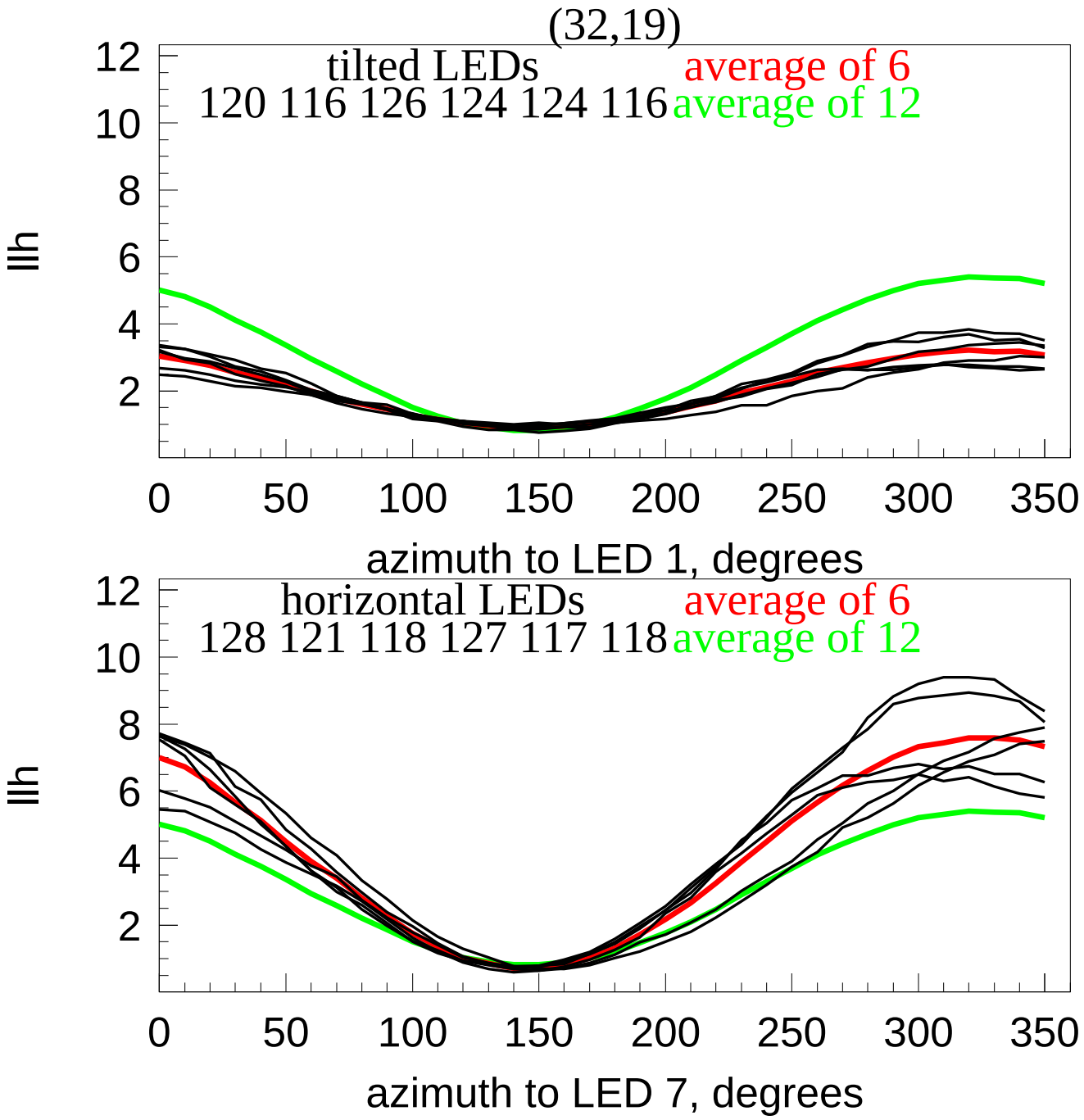

(32,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
260.3 ± 4.5

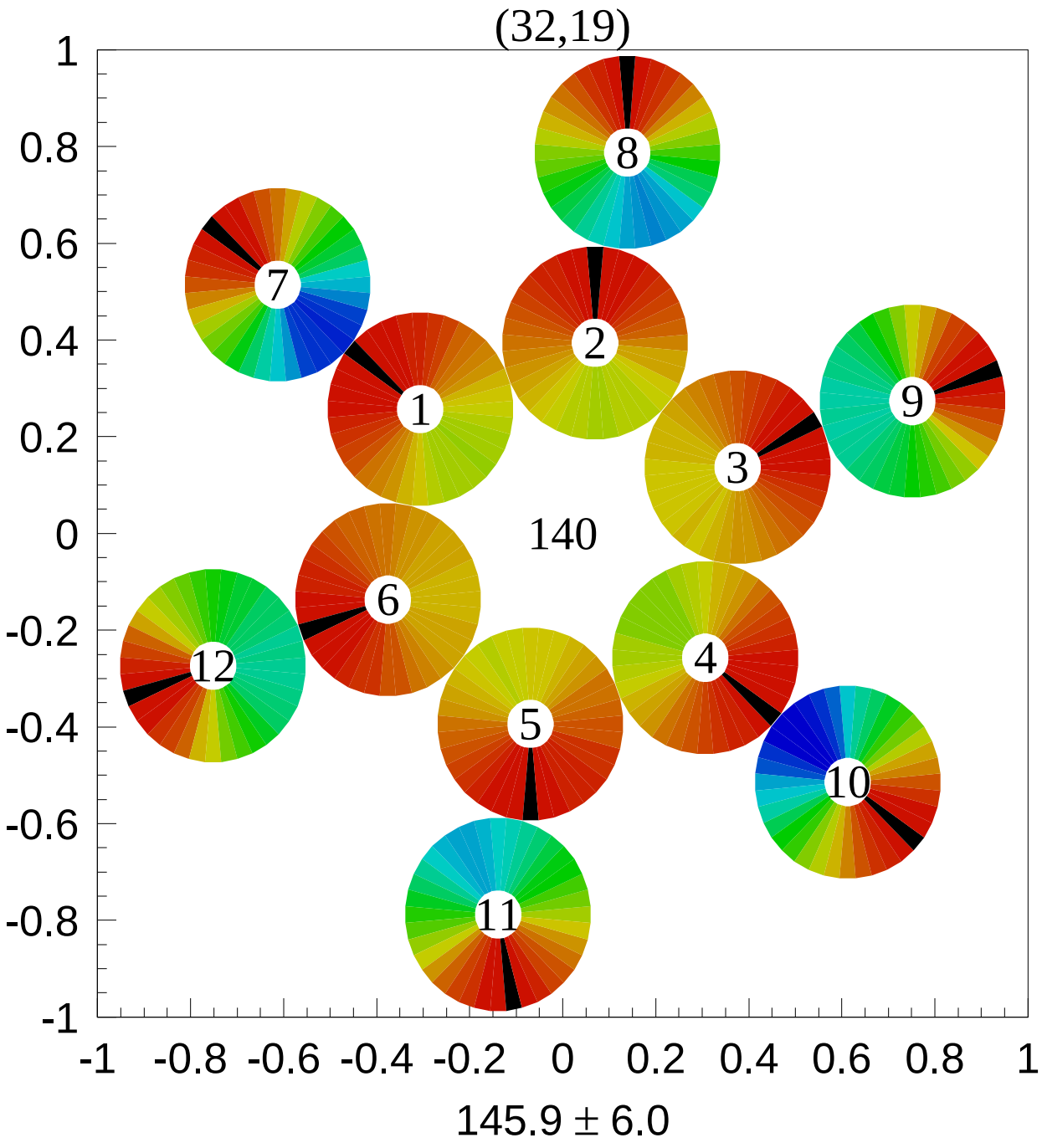

(32,17)
tilted LEDs
126 123 123 113 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 129 117 117 128 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

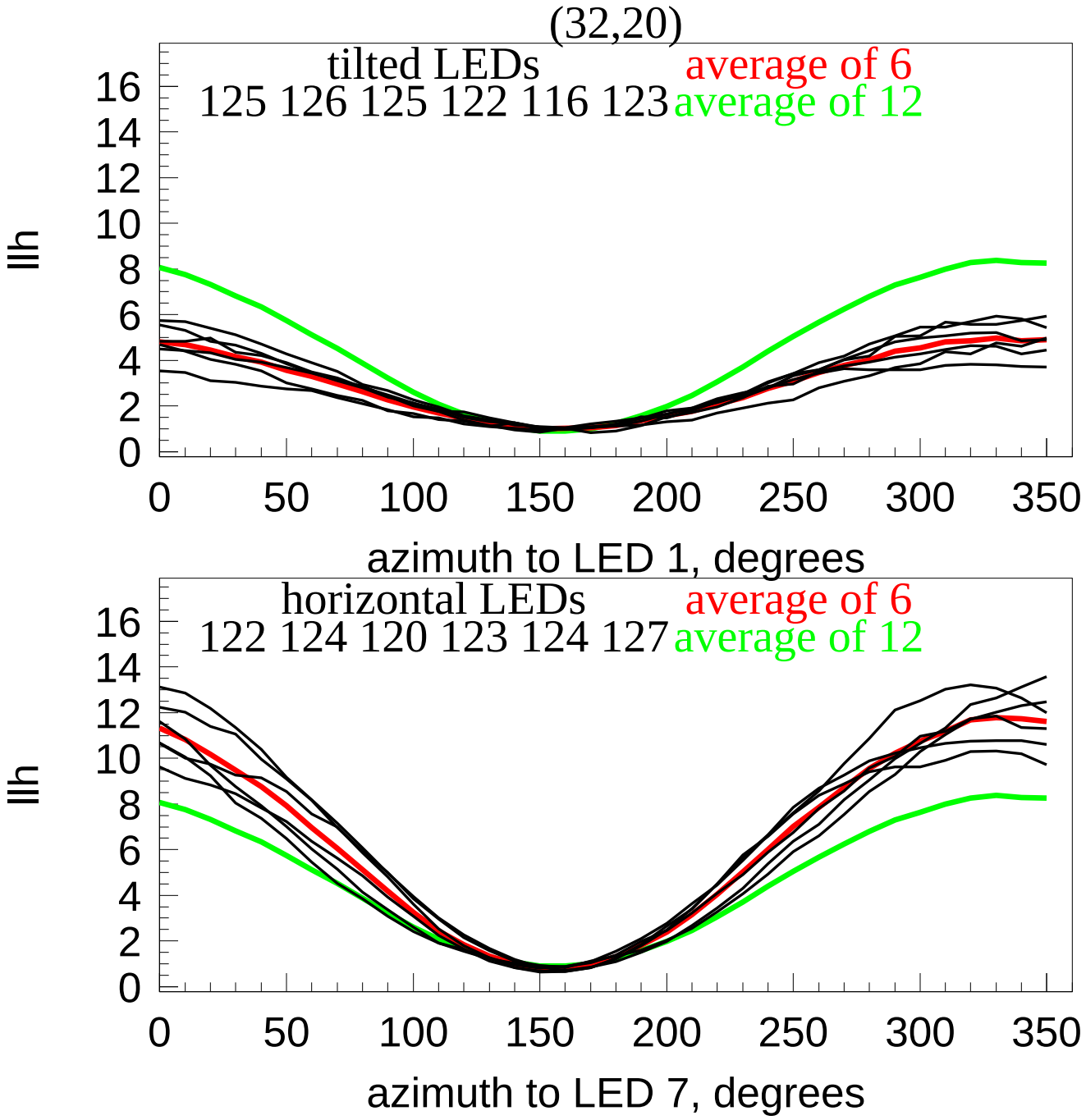

(32,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
181.7 ± 5.8
8
9
2
3
7
1
180
4
10
6
5
12
11

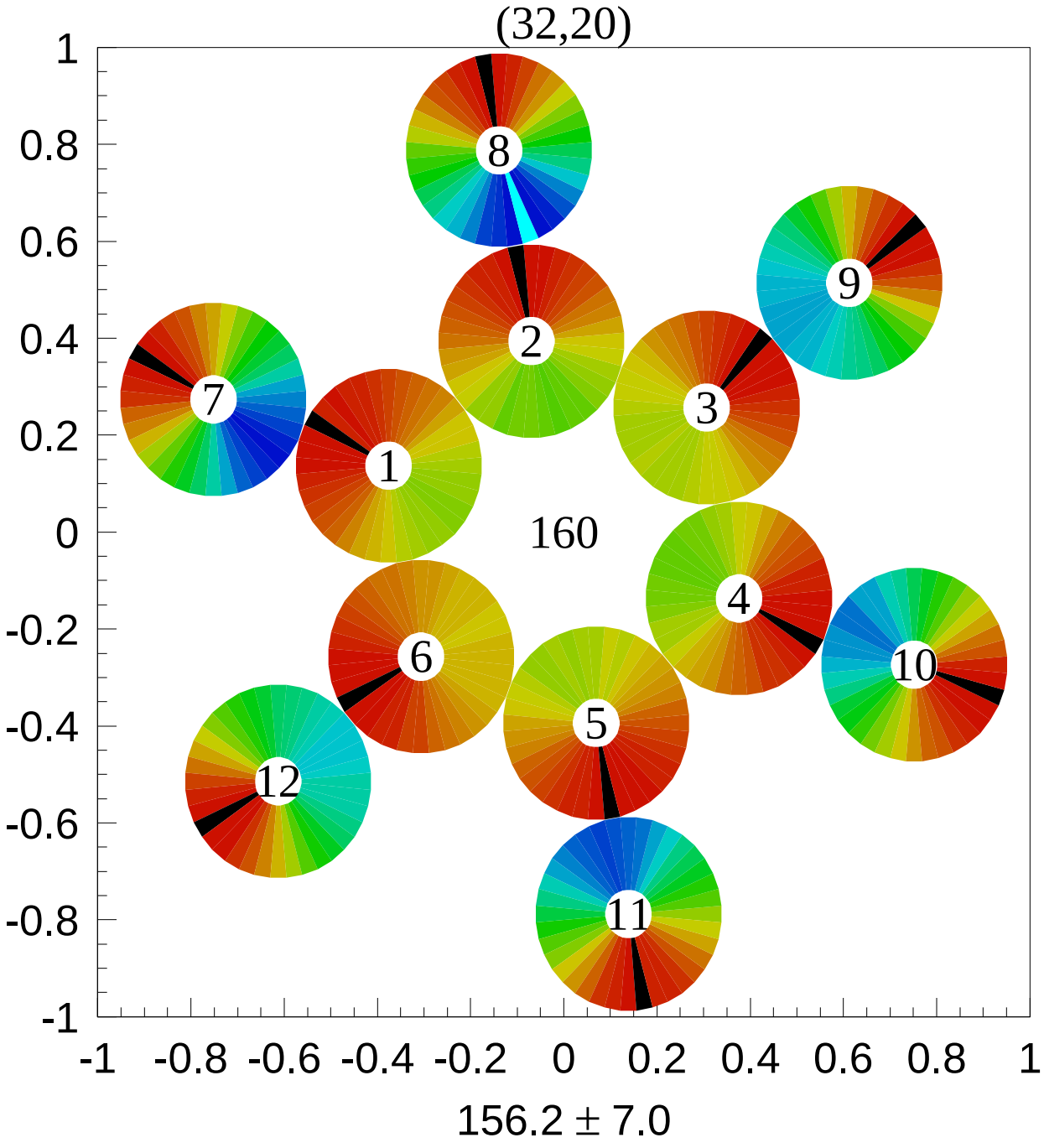

(32,18)
tilted LEDs
116 123 122 122 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 119 126 117 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

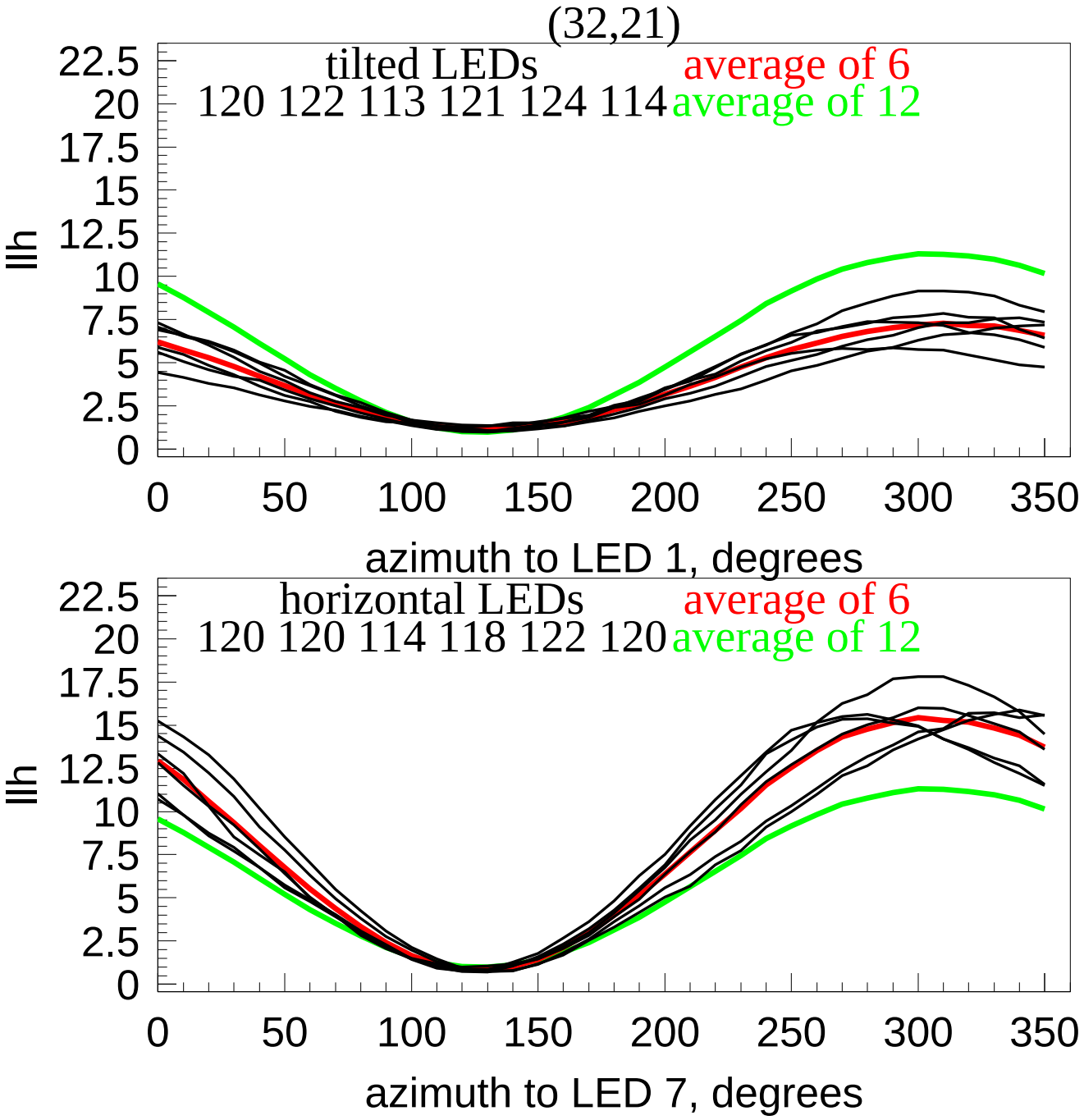

(32,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
279.2 ± 6.9

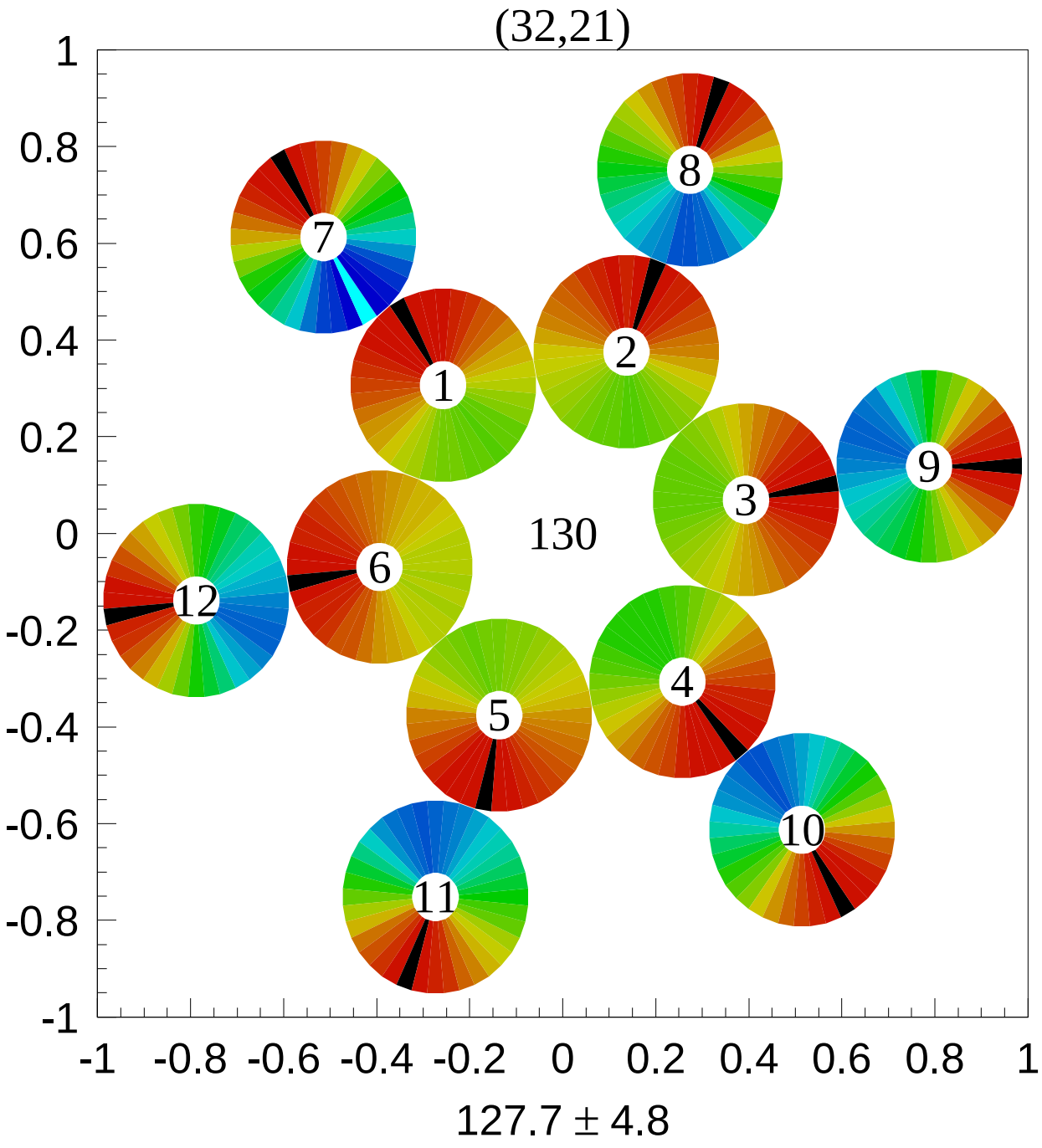

(32,19)
tilted LEDs
120 116 126 124 124 116
average of 6
average of 12
Ilh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 121 118 127 117 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

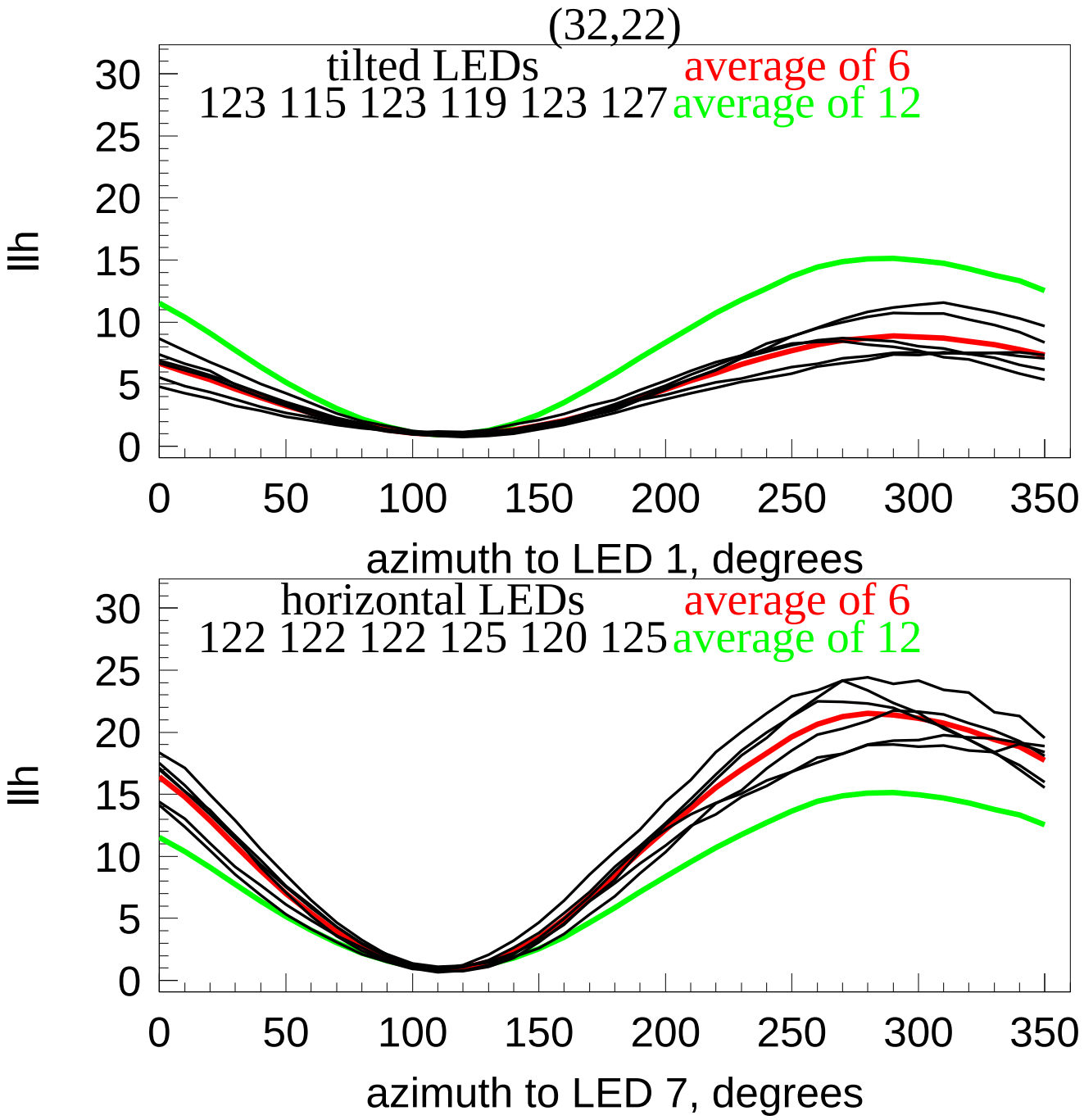

(32,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
140
145.9 ± 6.0
1
2
3
4
5
6
7
8
9
10
11
12

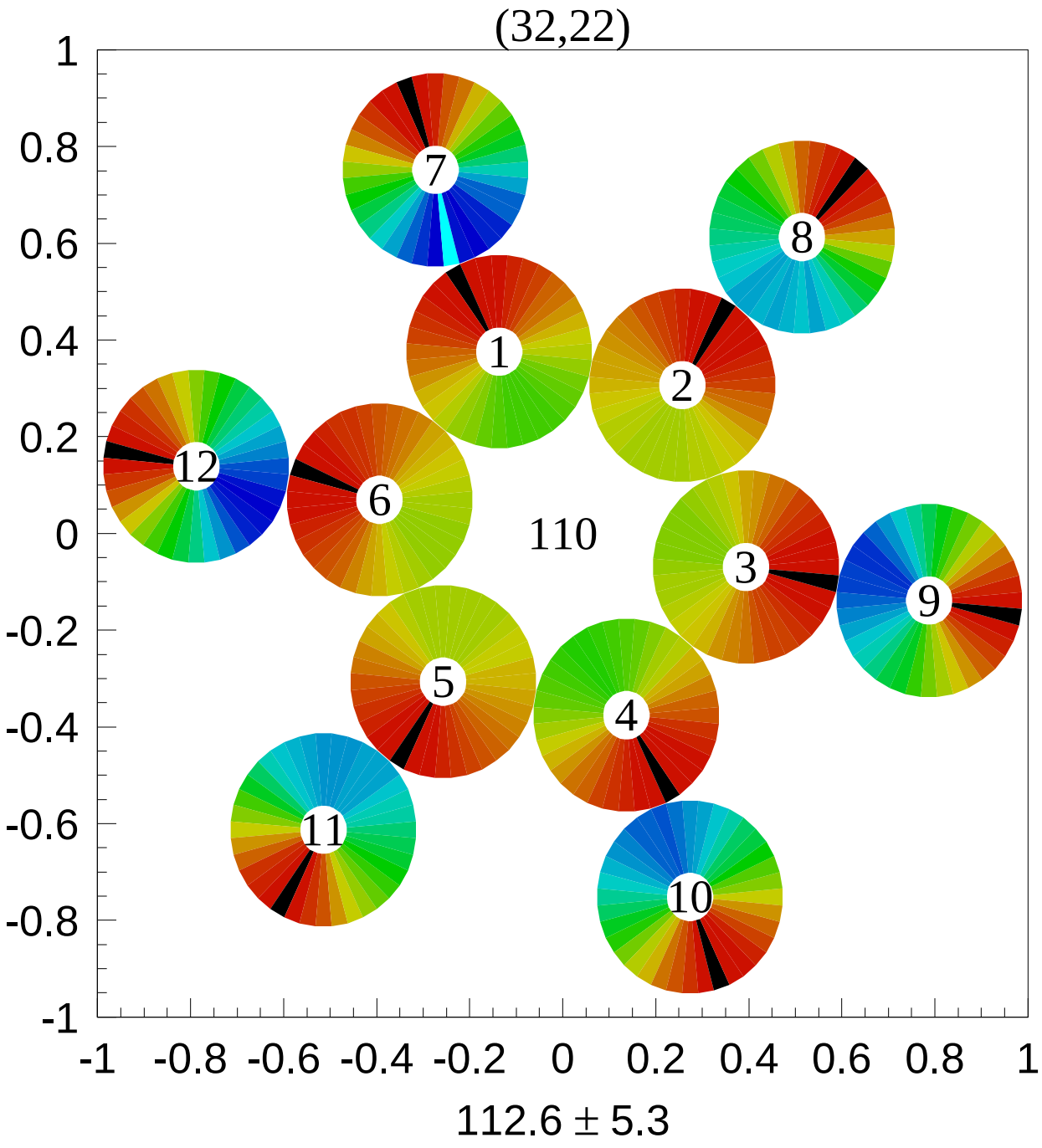

(32,20)
tilted LEDs
125 126 125 122 116 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 120 123 124 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

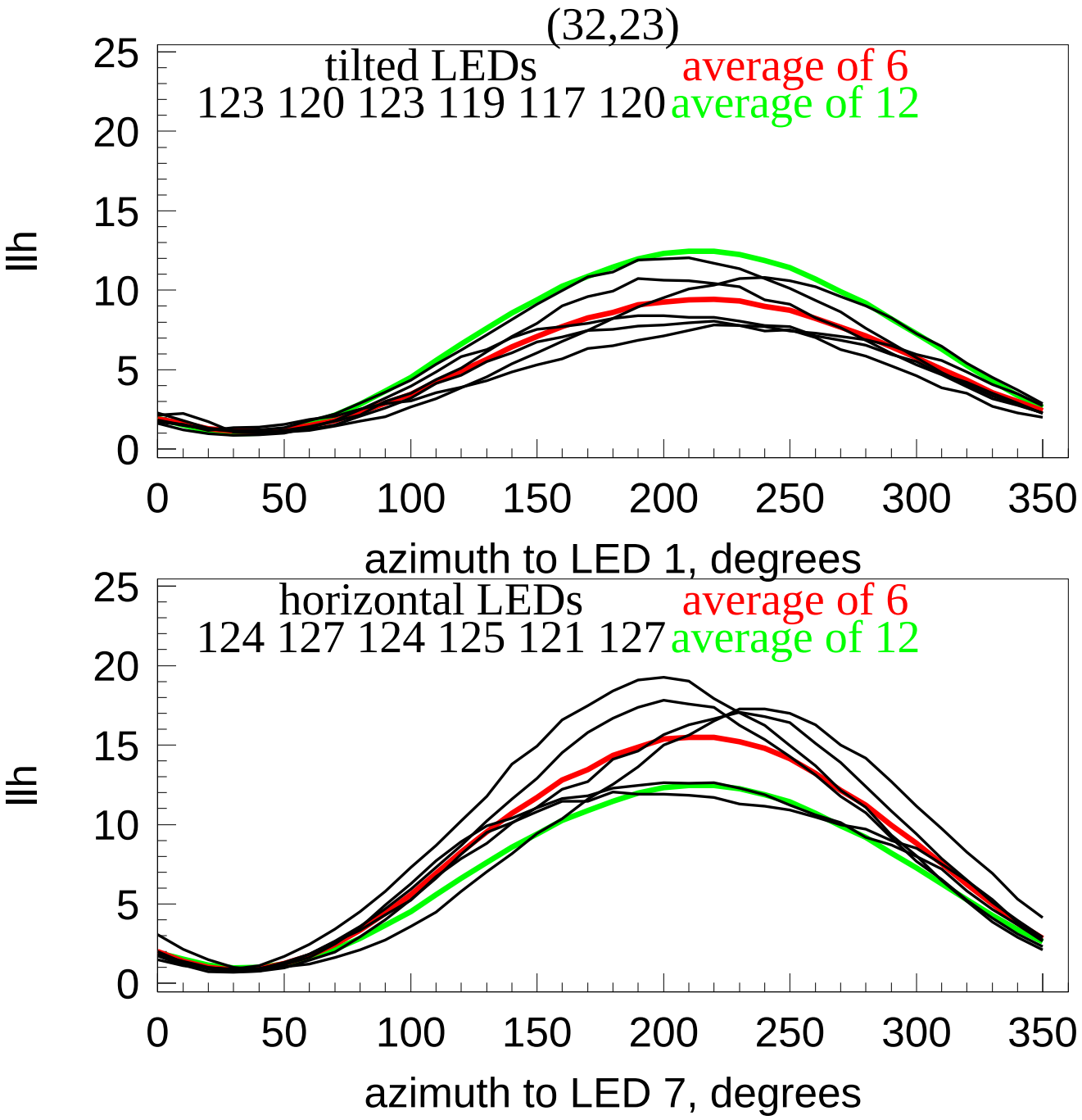

(32,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
156.2 ± 7.0

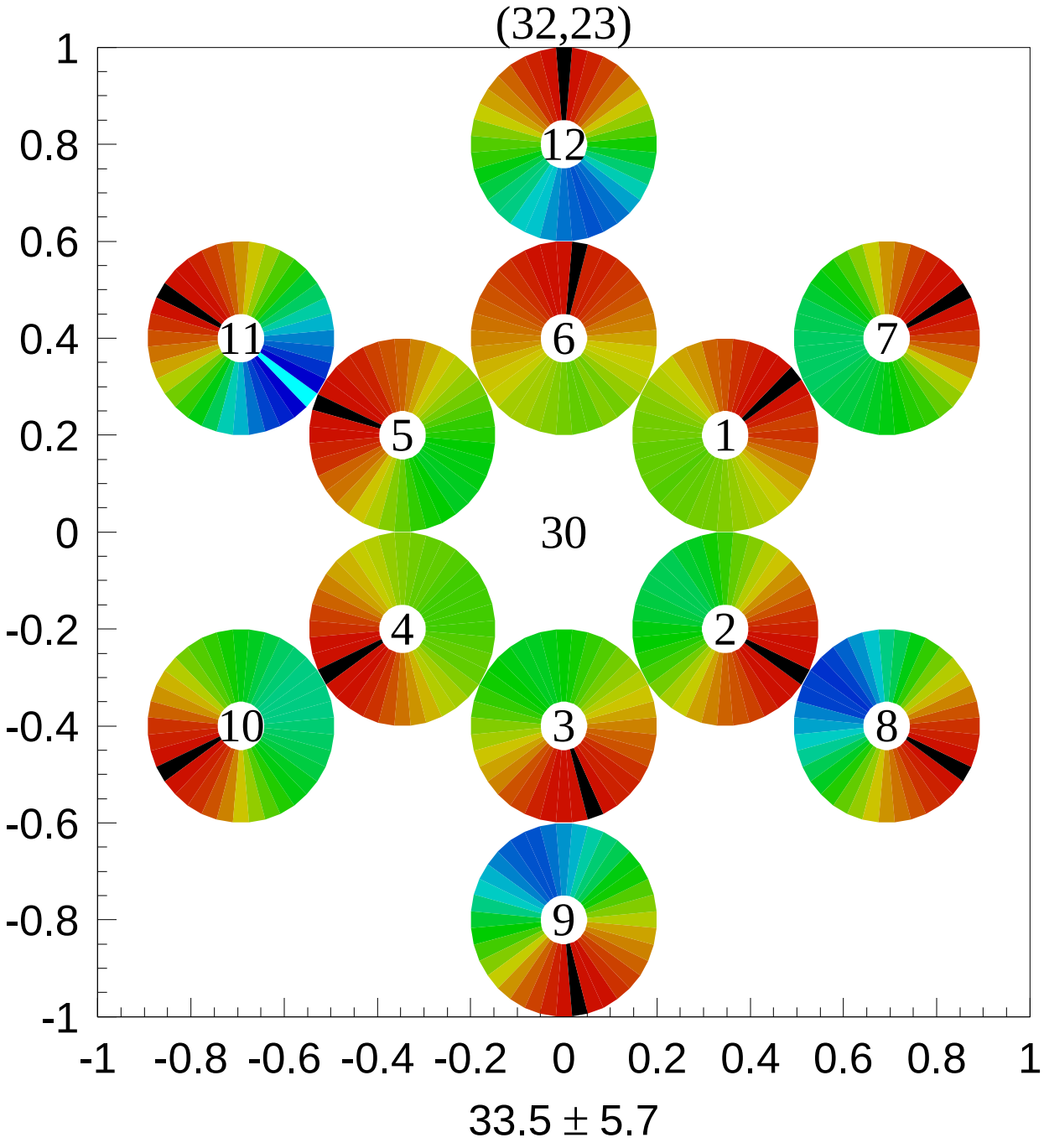

(32,21)
tilted LEDs
120 122 113 121 124 114
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 120 114 118 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

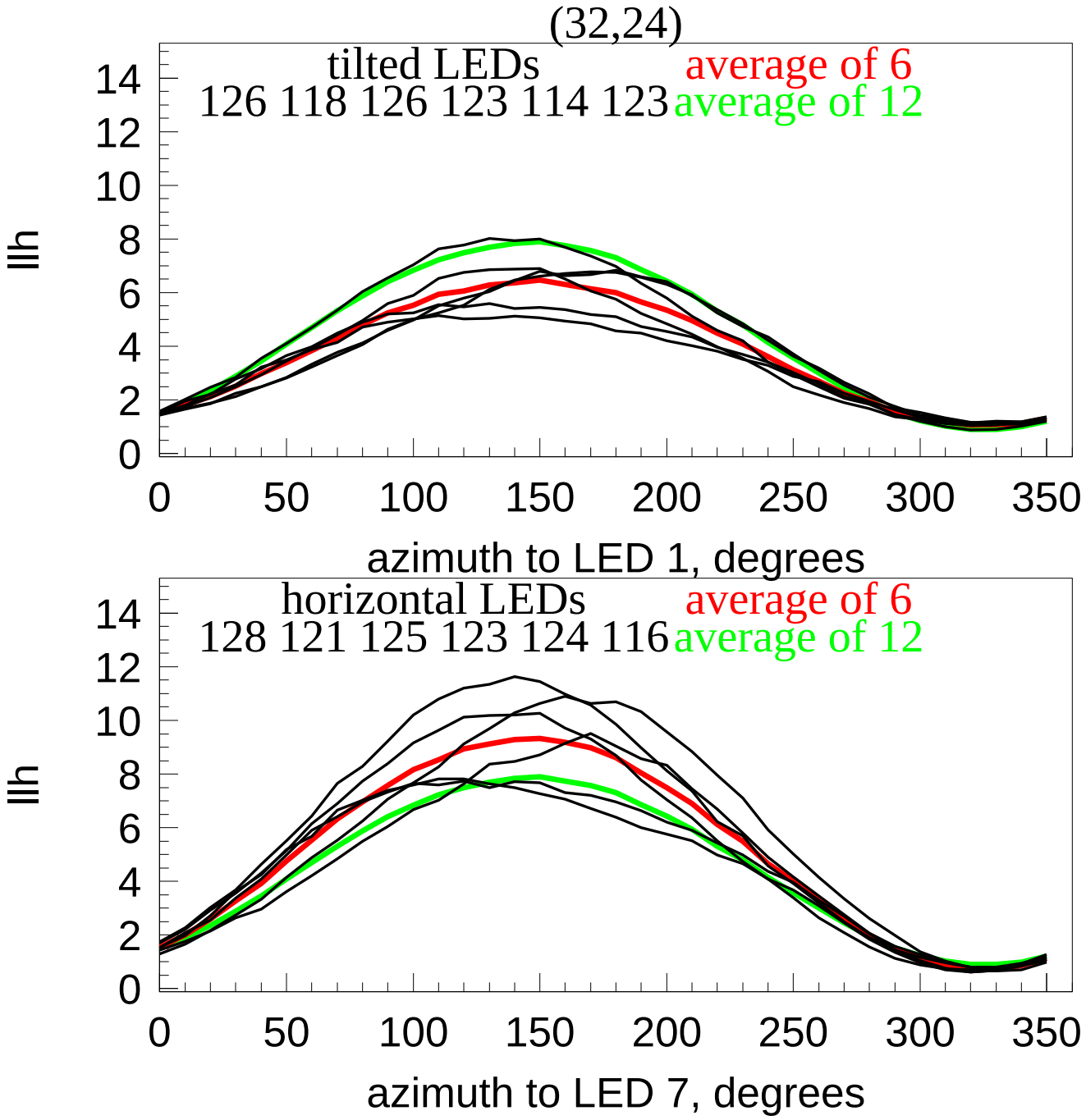

(32,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
127.7 ± 4.8

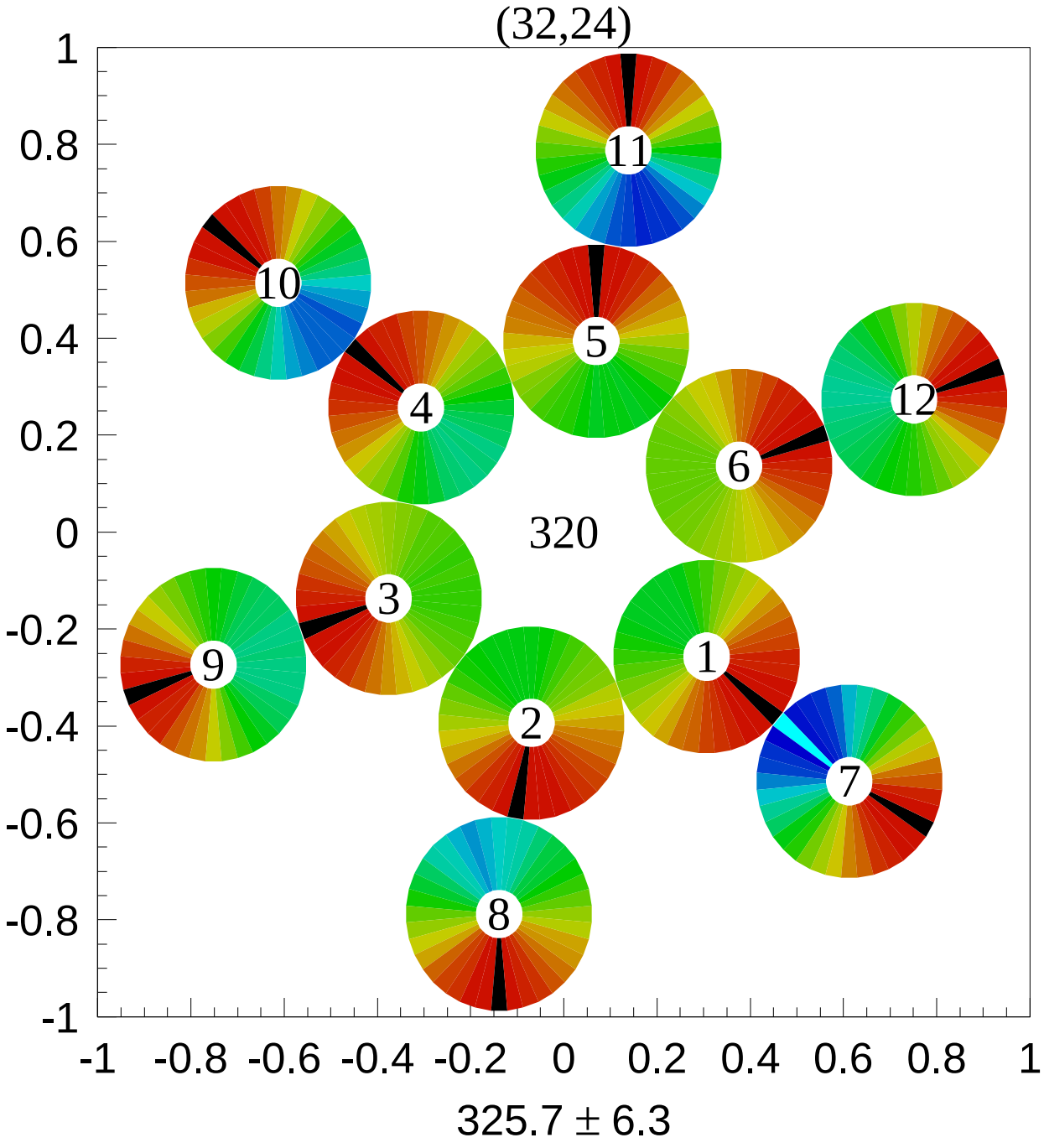

(32,22)
tilted LEDs
123 115 123 119 123 127
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
122 122 122 125 120 125
average of 6
average of 12
IIh
azimuth to LED 7, degrees

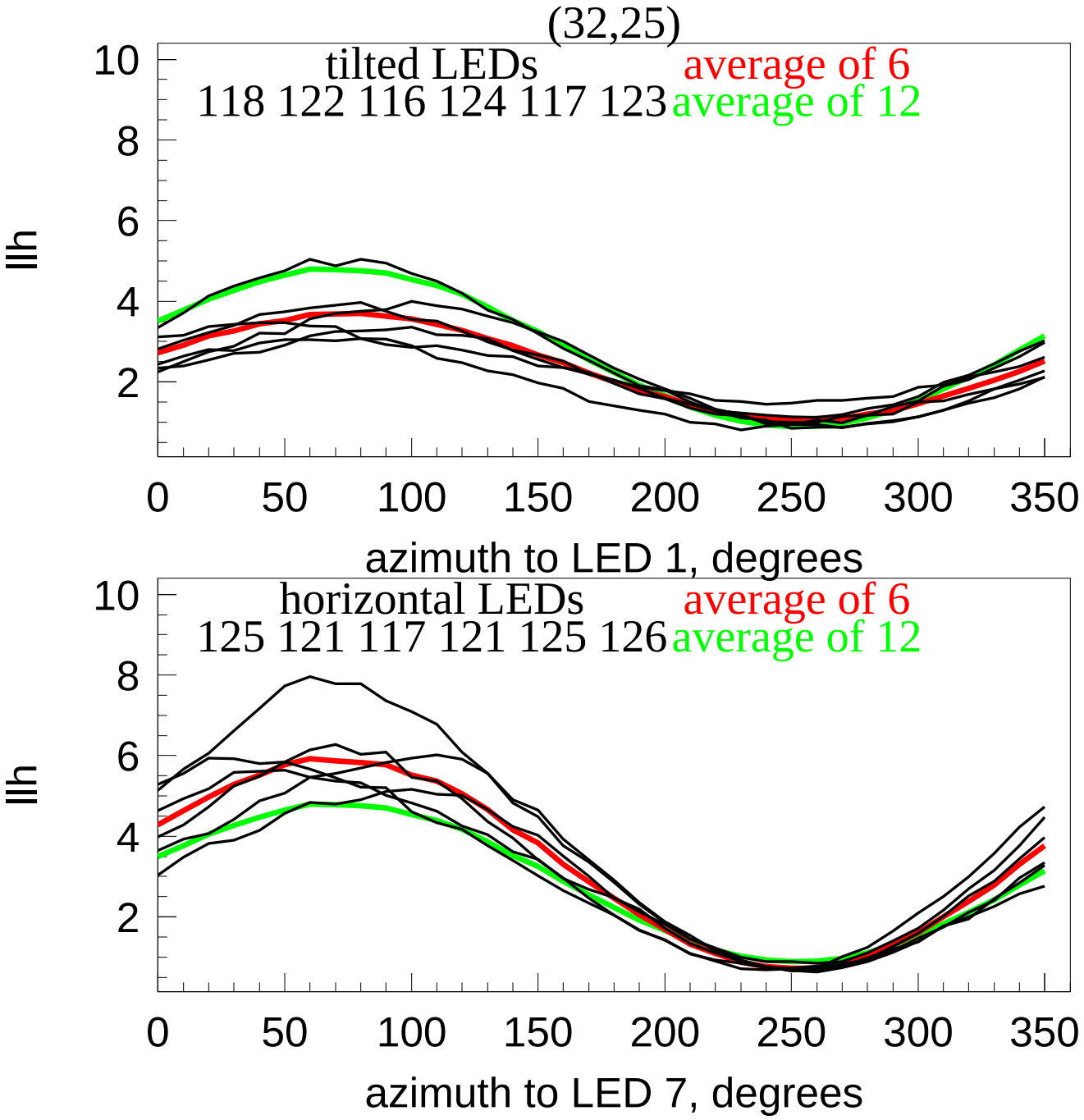

(32,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112.6 ± 5.3

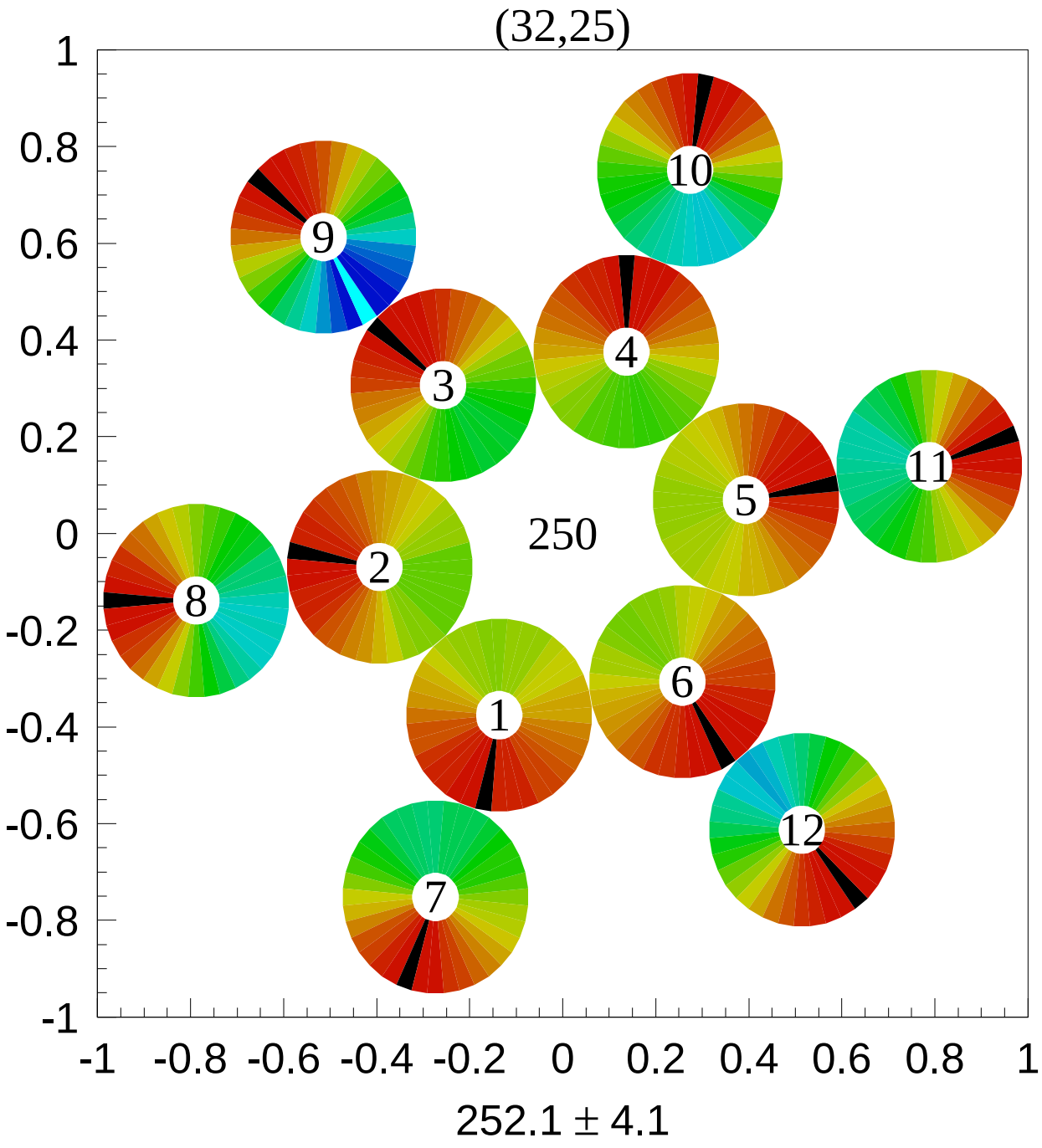

(32,23)
tilted LEDs
123 120 123 119 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 127 124 125 121 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

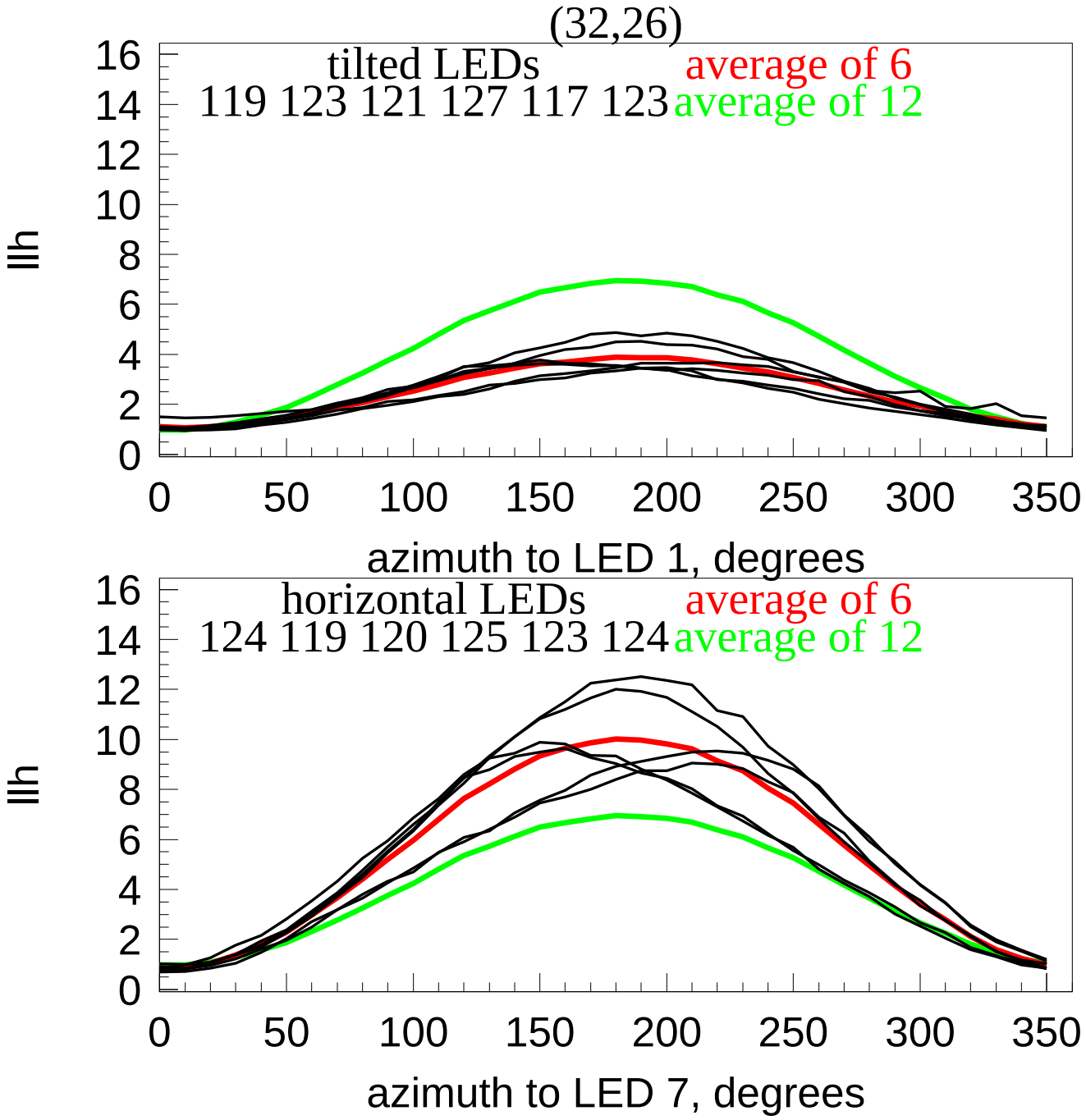

(32,23)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
33.5 ± 5.7

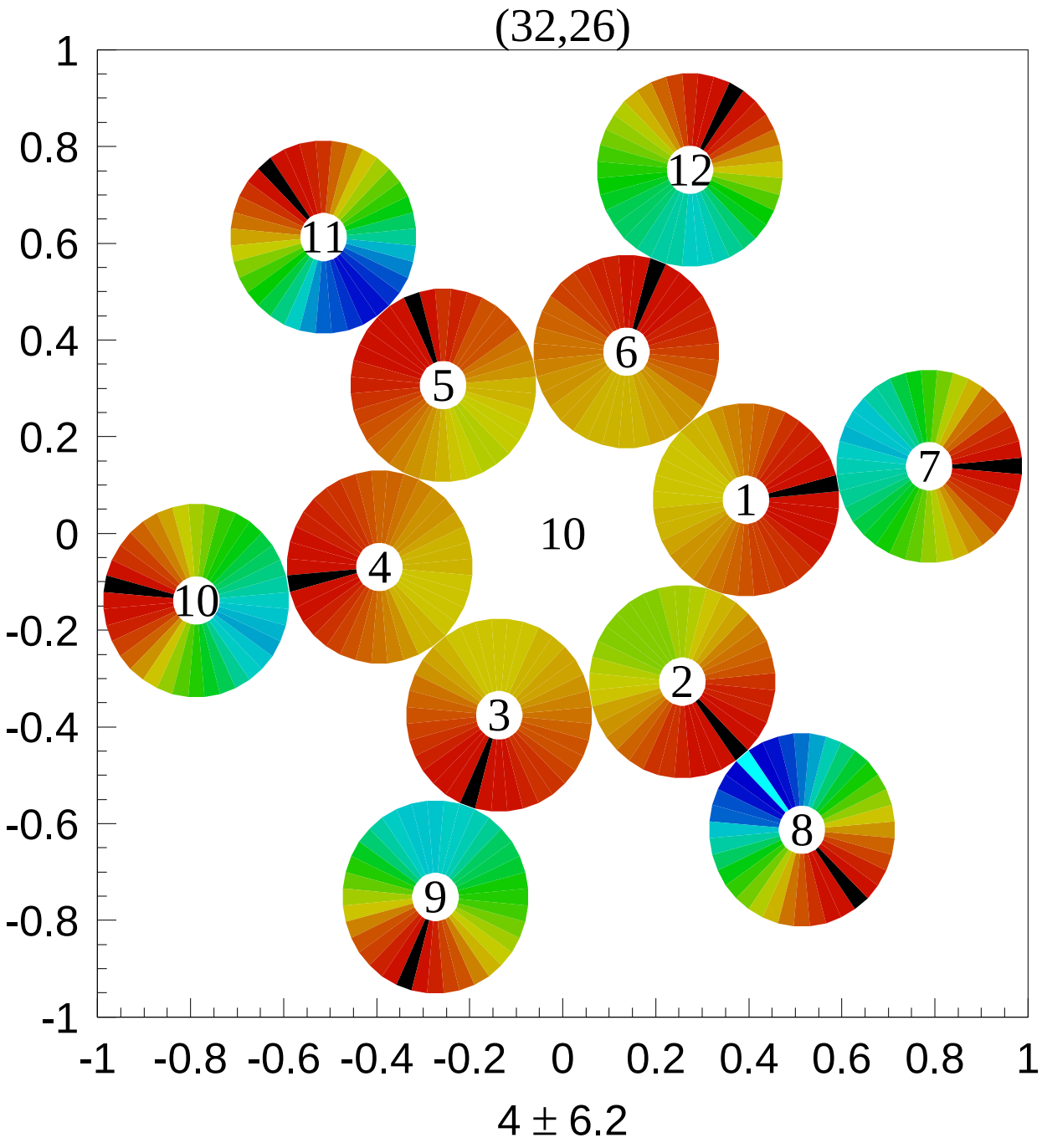

(32,24)
tilted LEDs
126 118 126 123 114 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 121 125 123 124 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

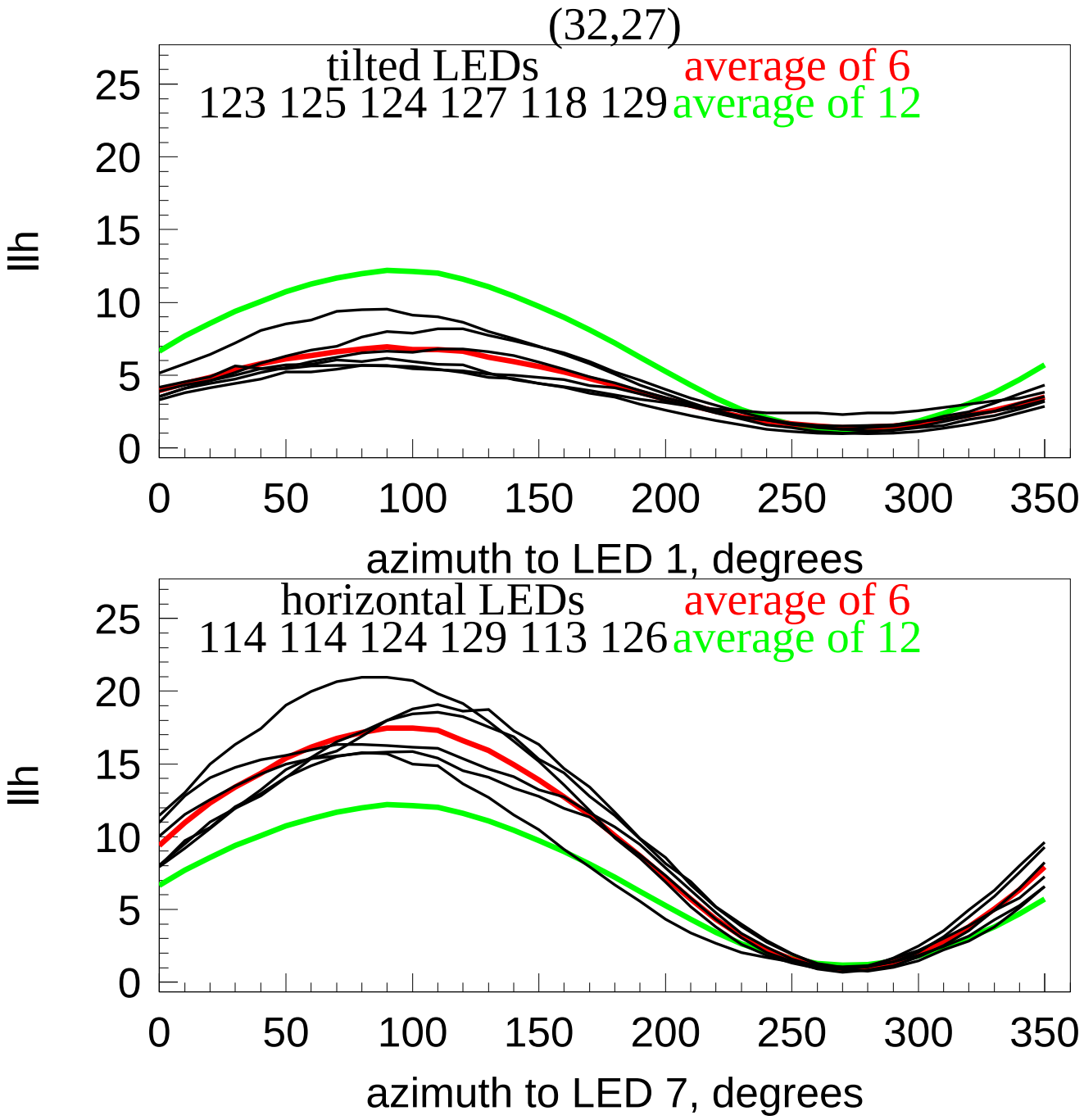

(32,24)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
325.7 ± 6.3

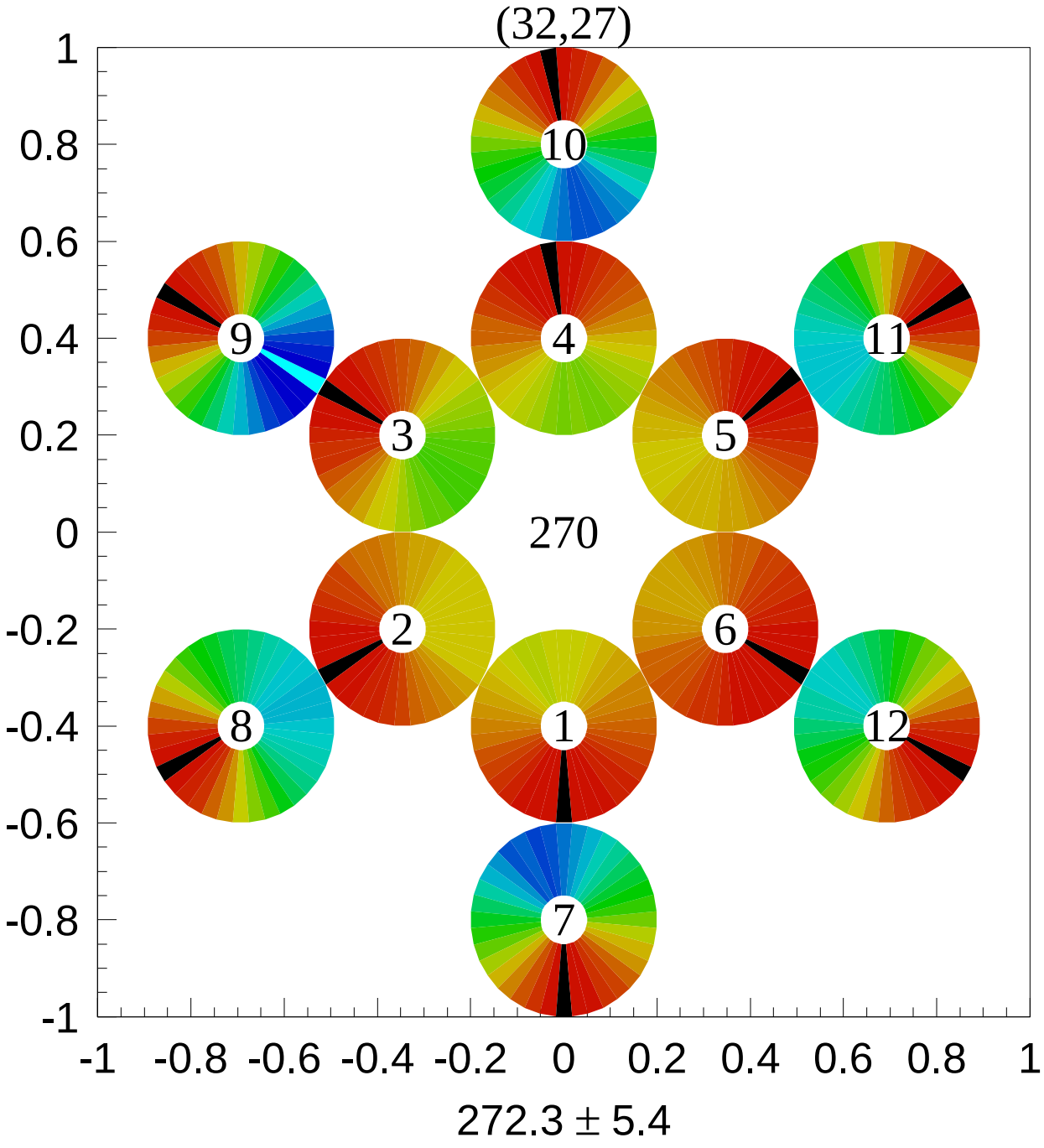

(32,25)
tilted LEDs
118 122 116 124 117 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 117 121 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

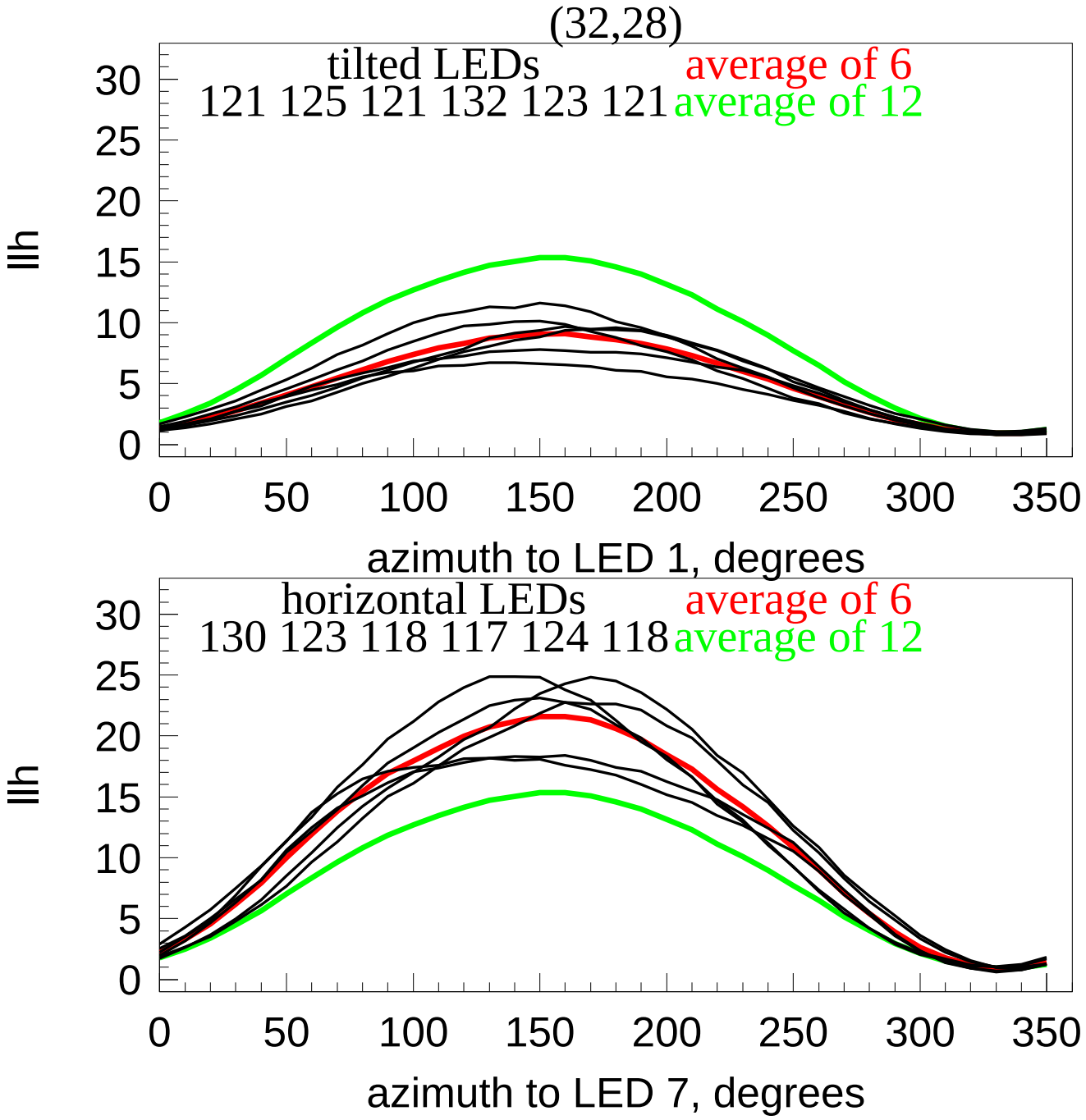

(32,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
252.1 ± 4.1
250
1
2
3
4
5
6
7
8
9
10
11
12

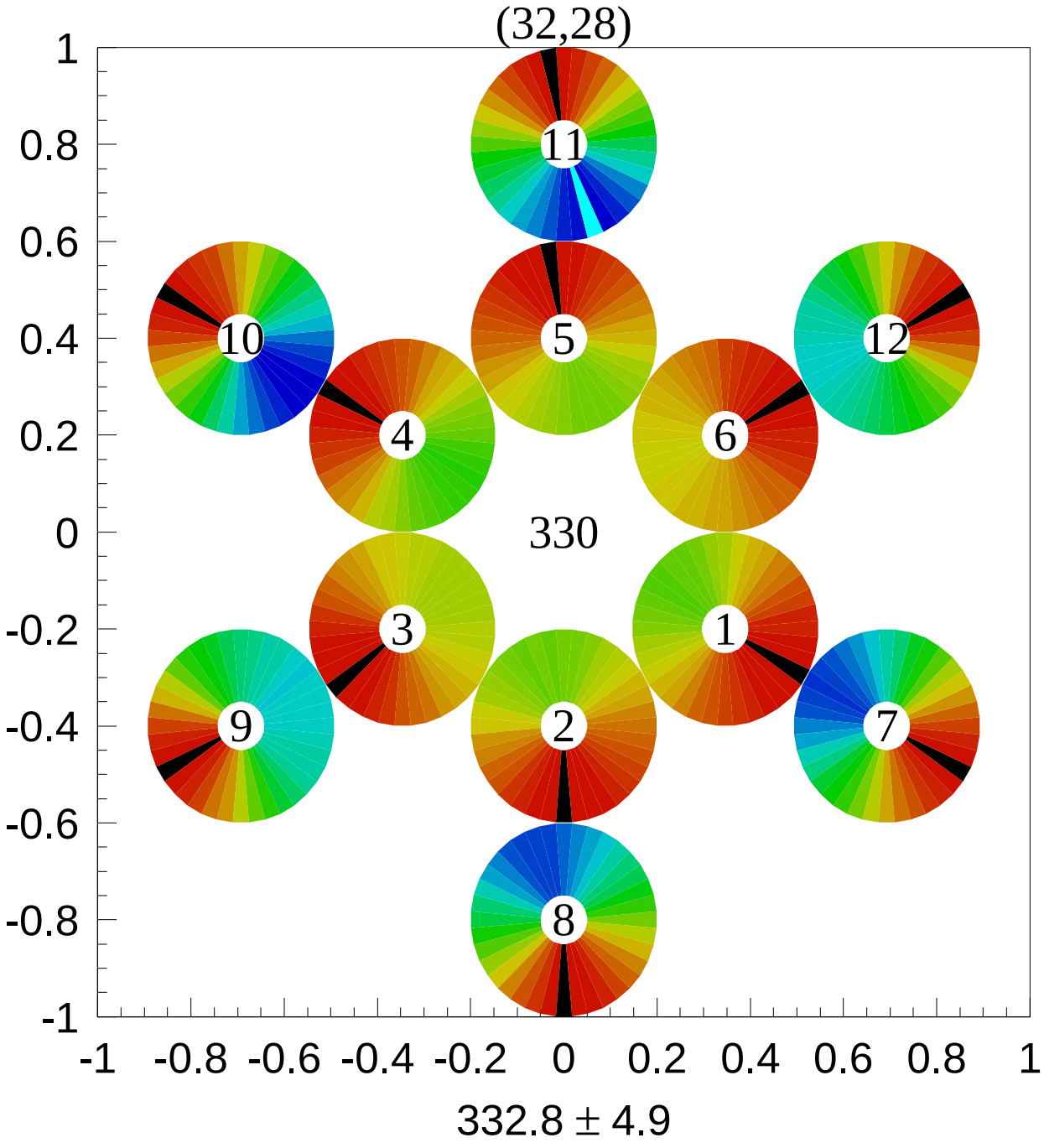

(32,26)
tilted LEDs
119 123 121 127 117 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 120 125 123 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

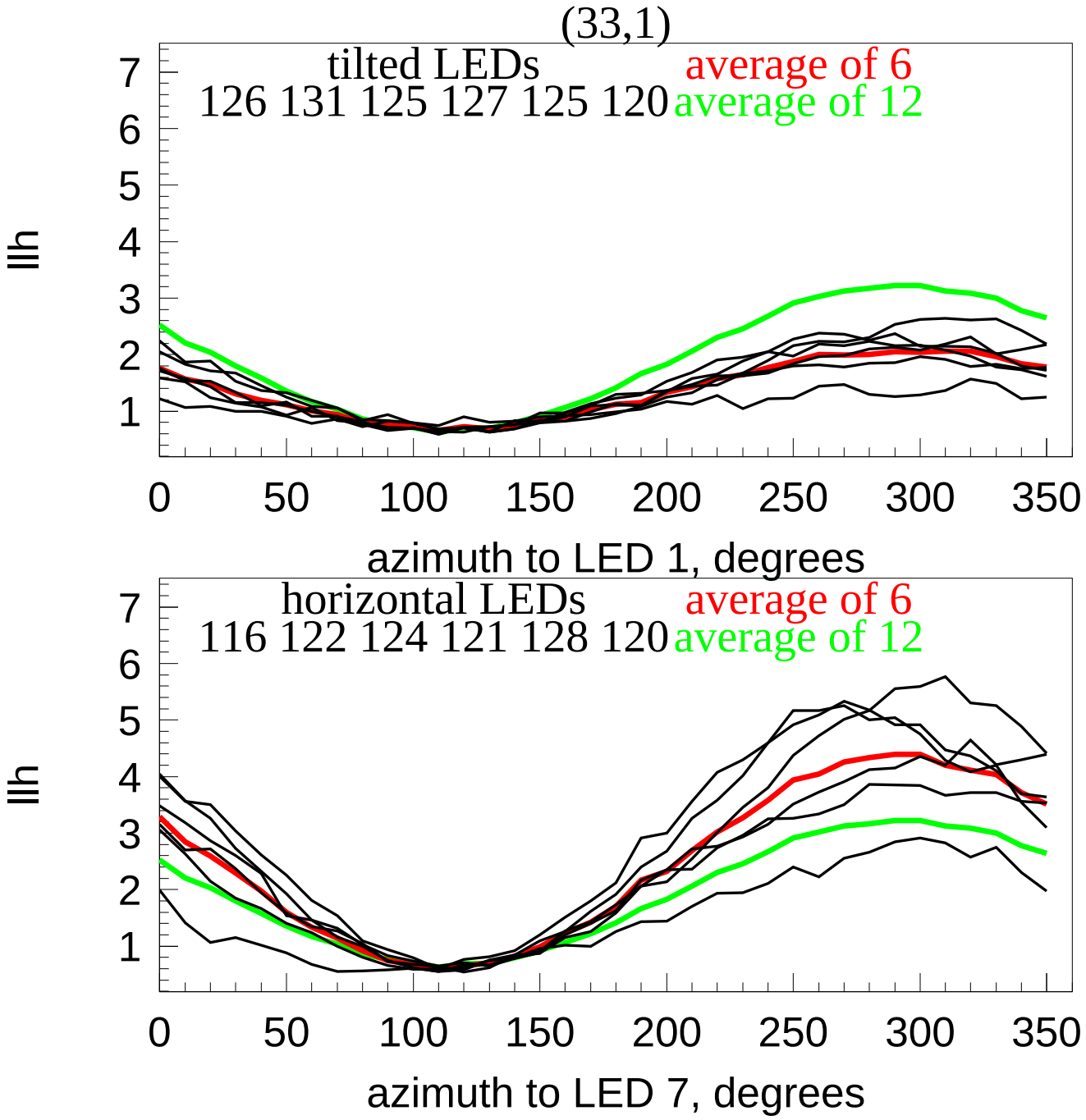

(32,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
4 ± 6.2

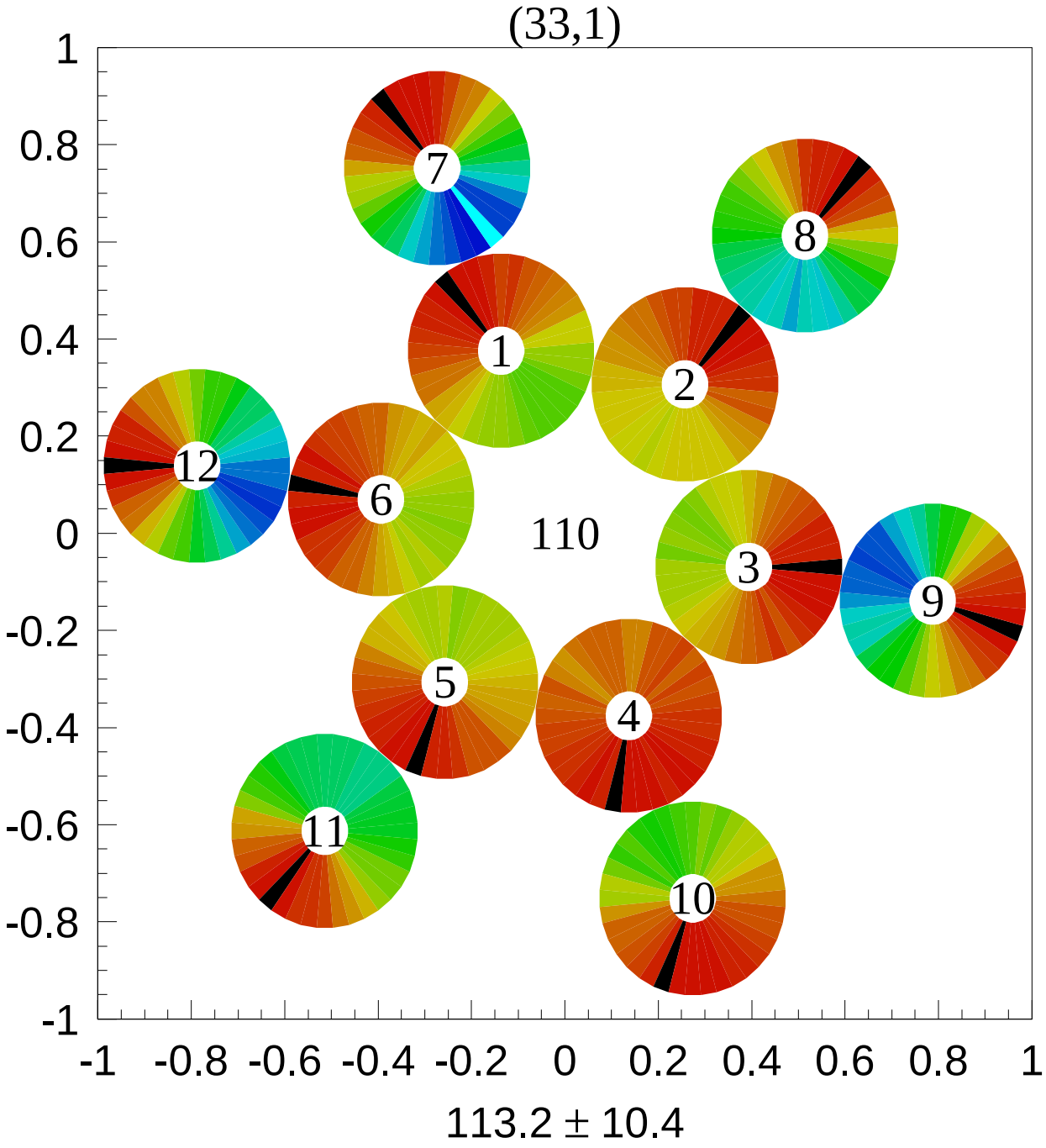

(32,27)
tilted LEDs
123 125 124 127 118 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 114 124 129 113 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

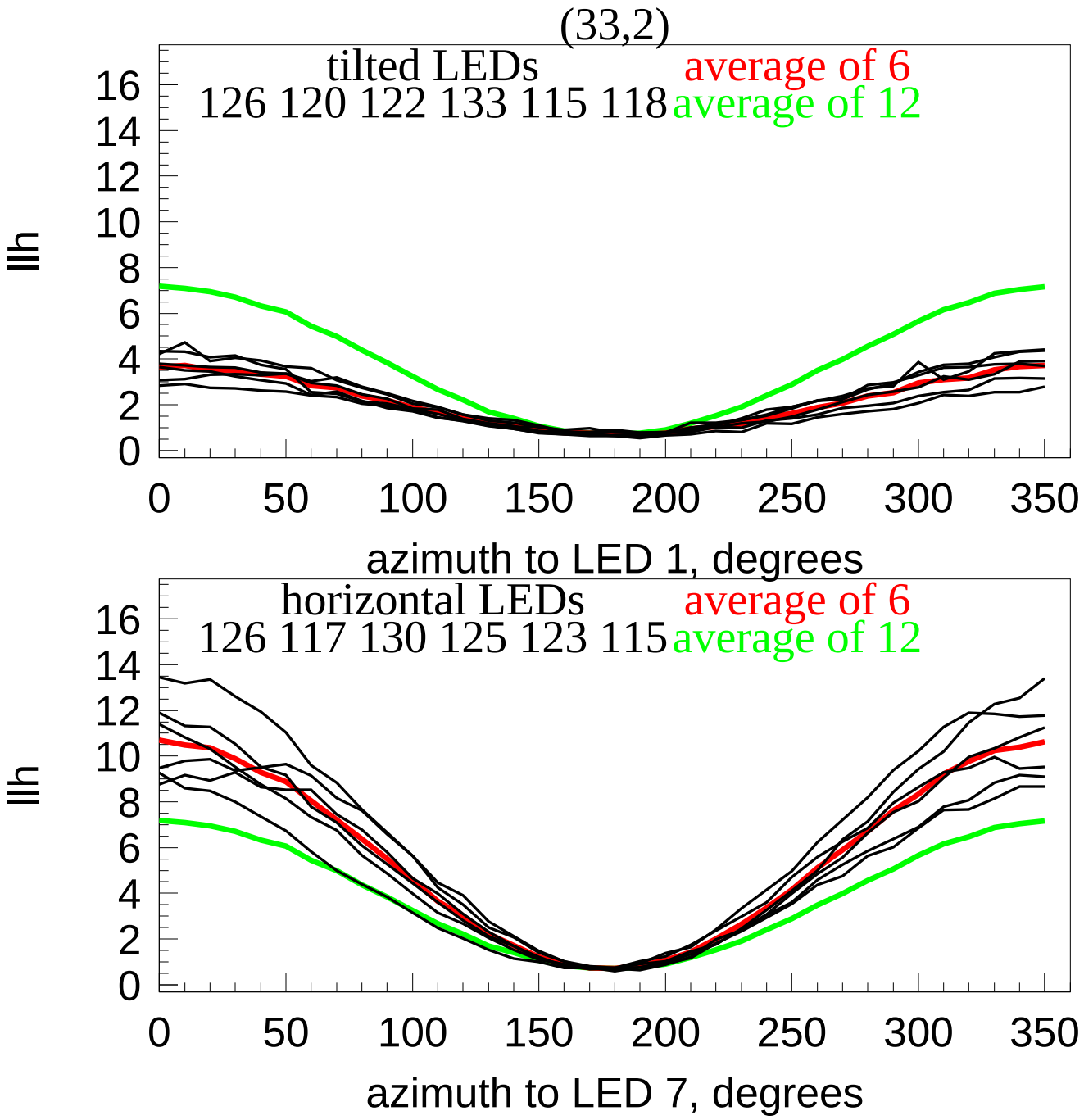

(32,27)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.3 ± 5.4

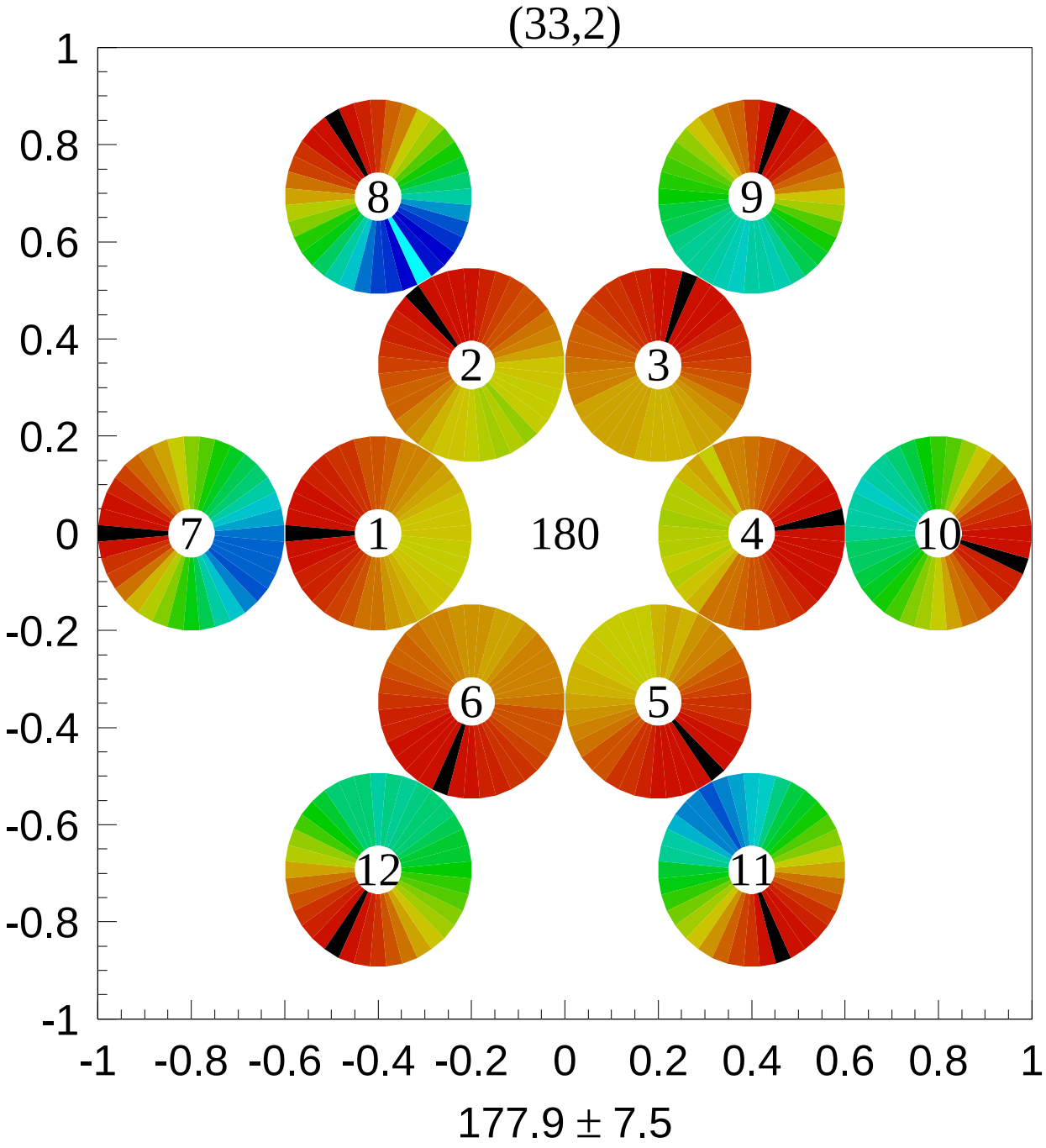

(32,28)
tilted LEDs
121 125 121 132 123 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
130 123 118 117 124 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

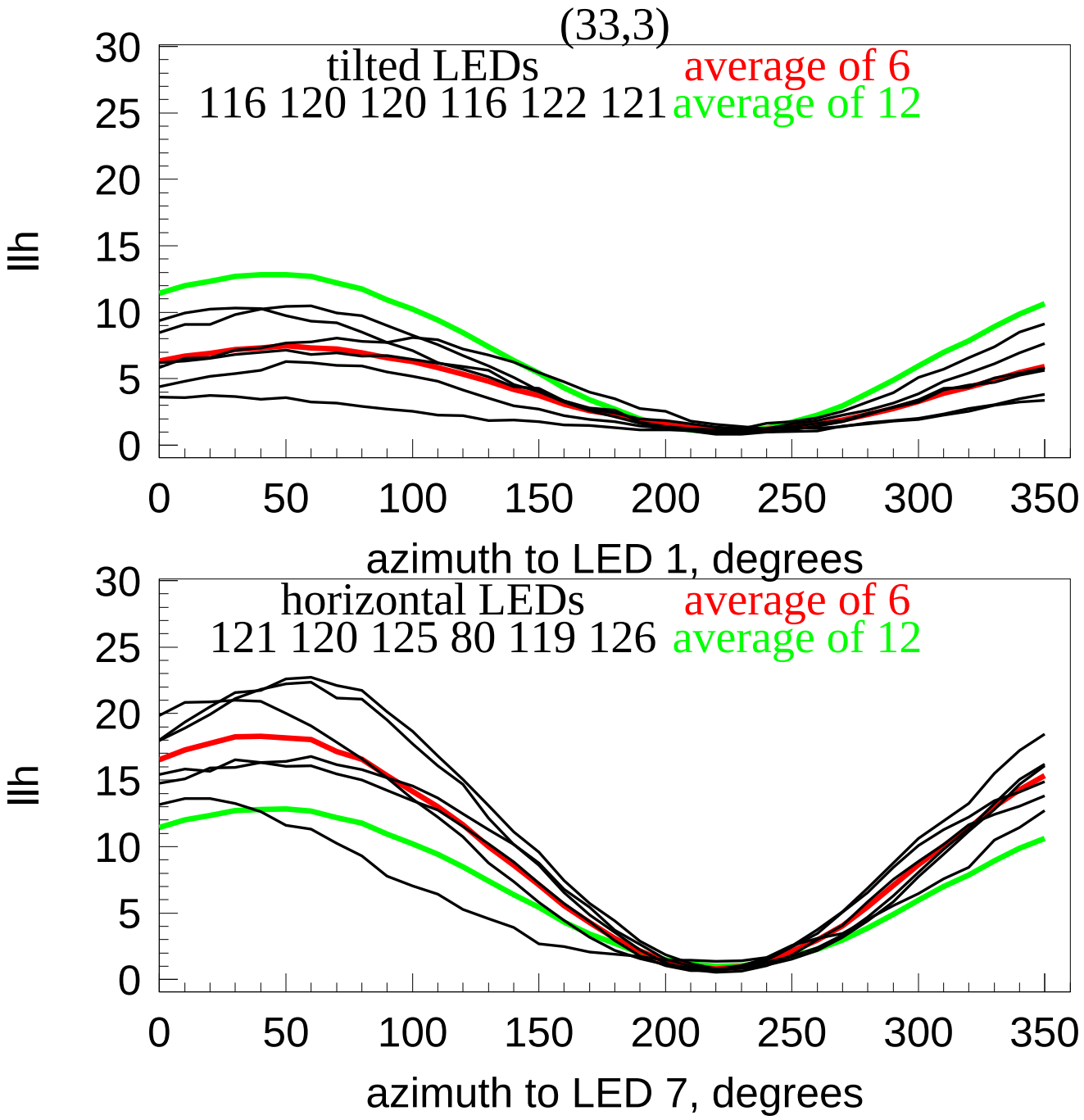

(32,28)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
332.8 ± 4.9

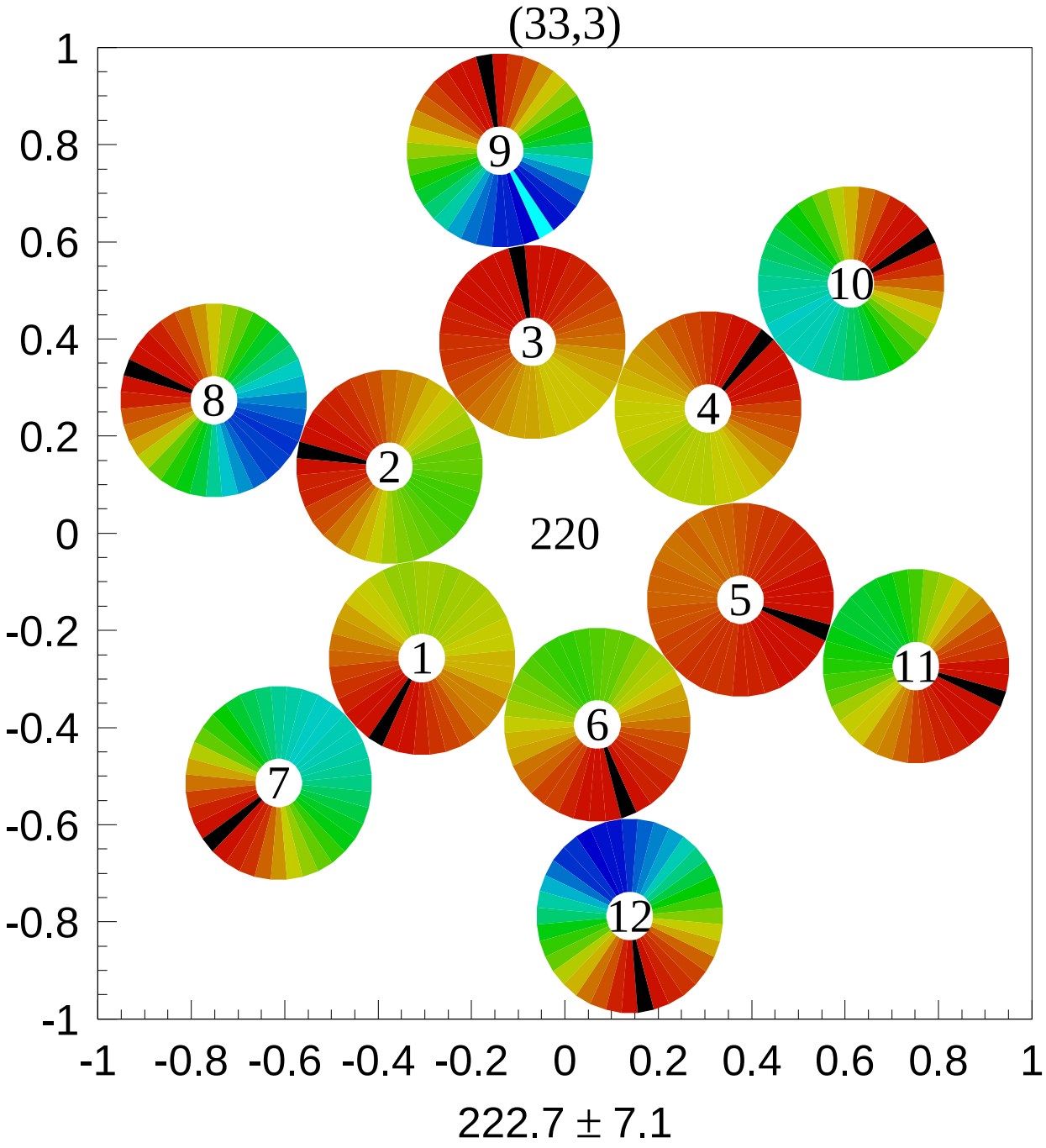

(33,1)
tilted LEDs
126 131 125 127 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 122 124 121 128 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

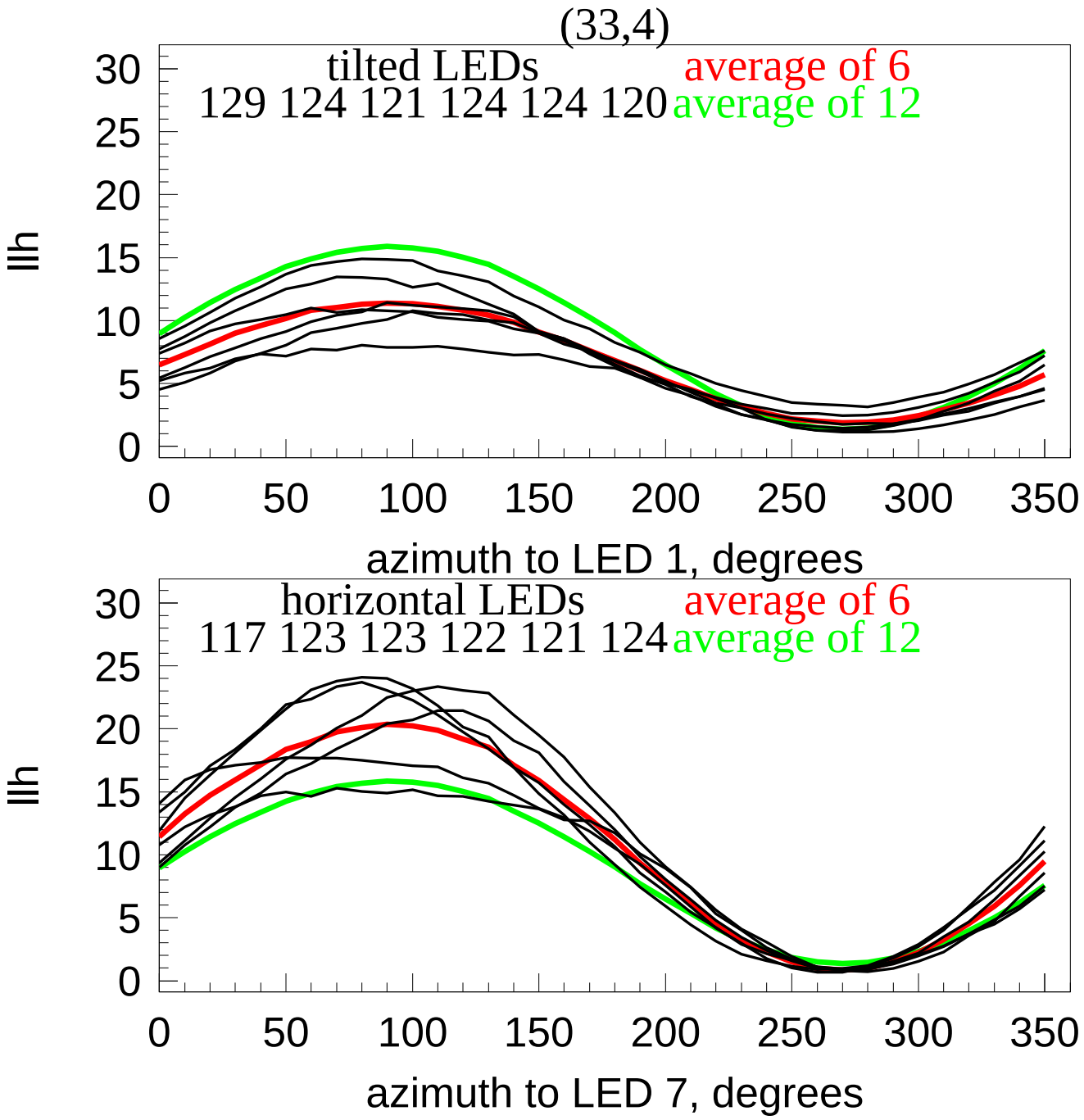

(33,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
113.2 ± 10.4

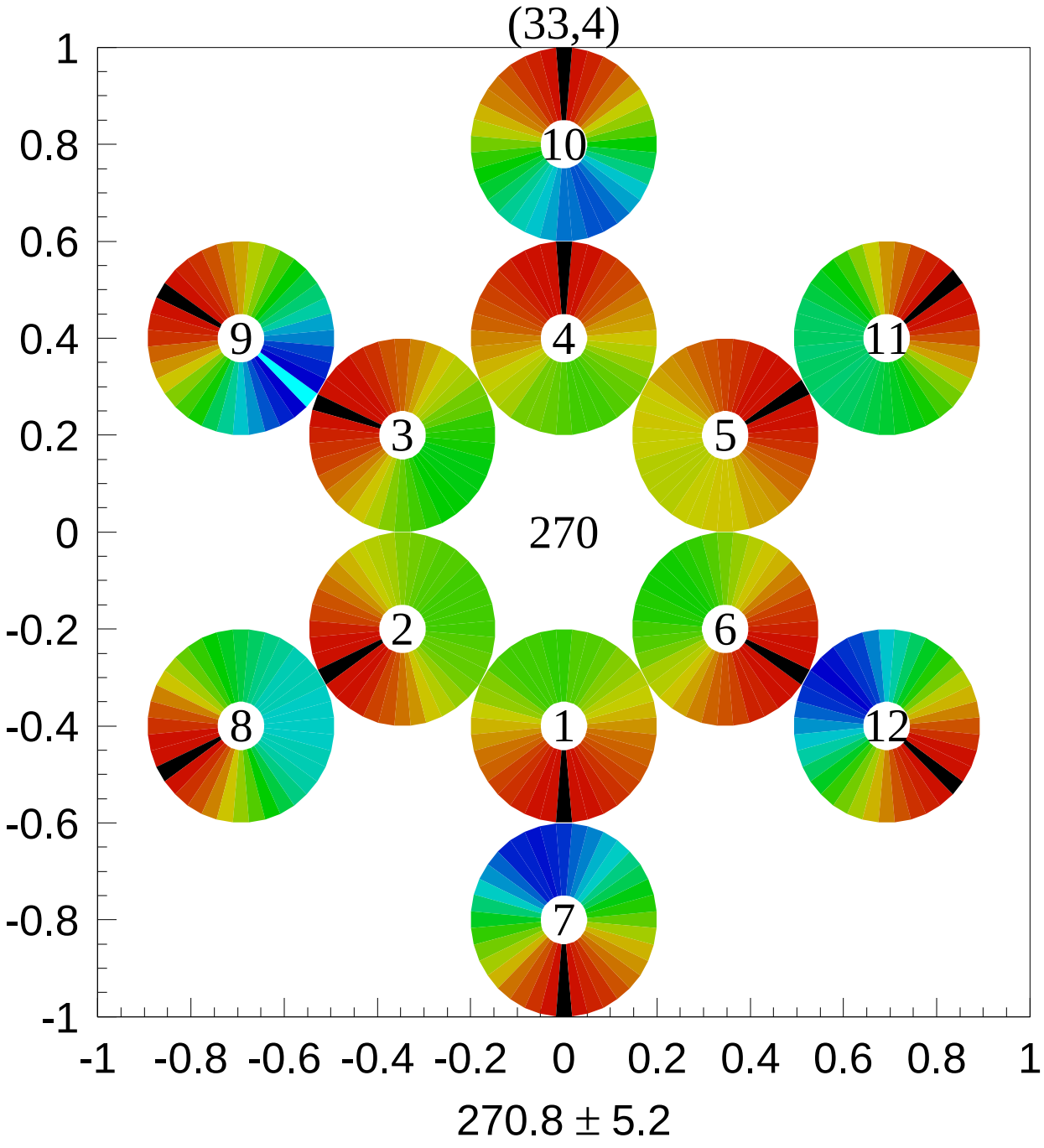

(33,2)
tilted LEDs
126 120 122 133 115 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 117 130 125 123 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

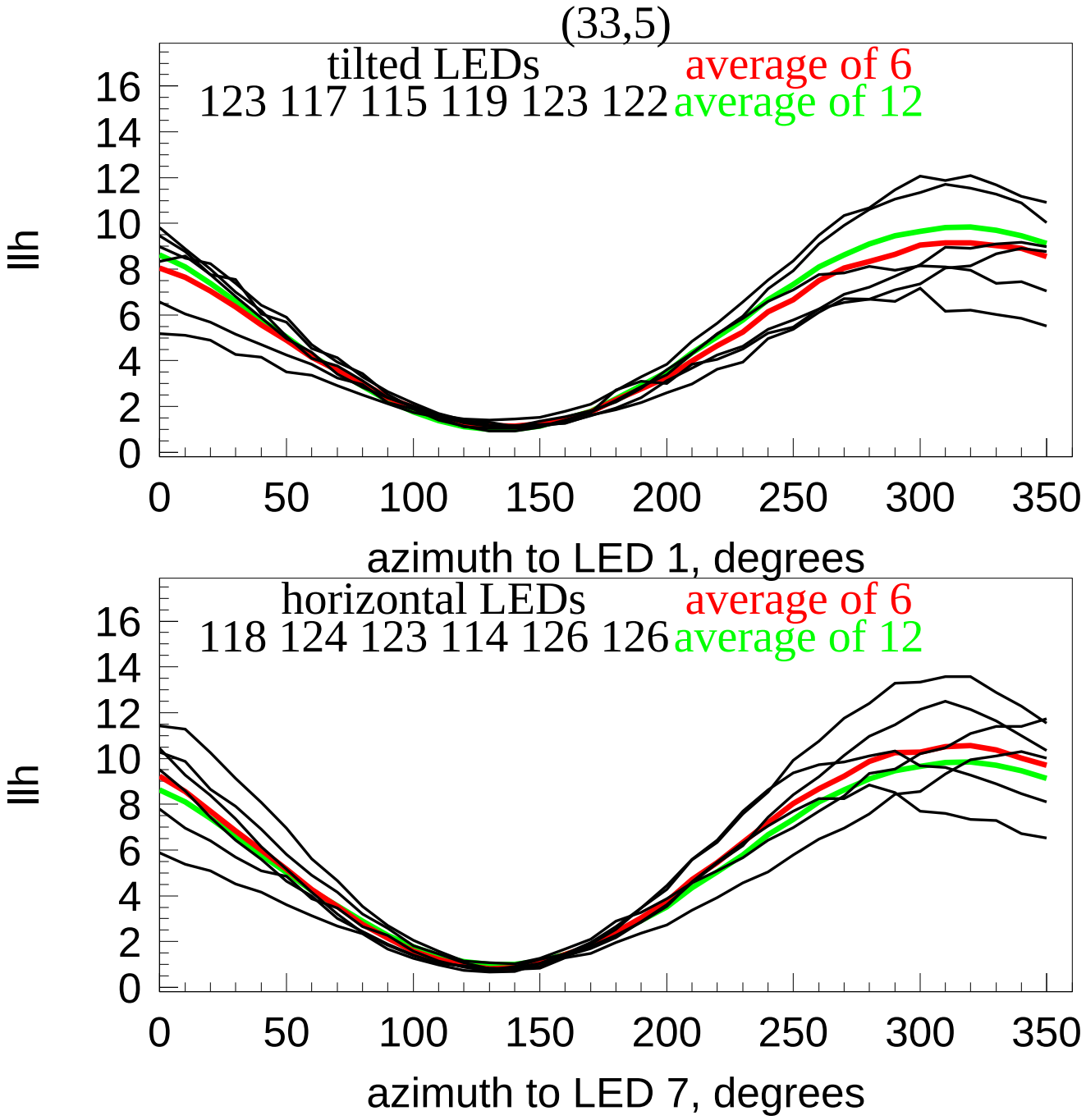

(33,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
177.9 ± 7.5

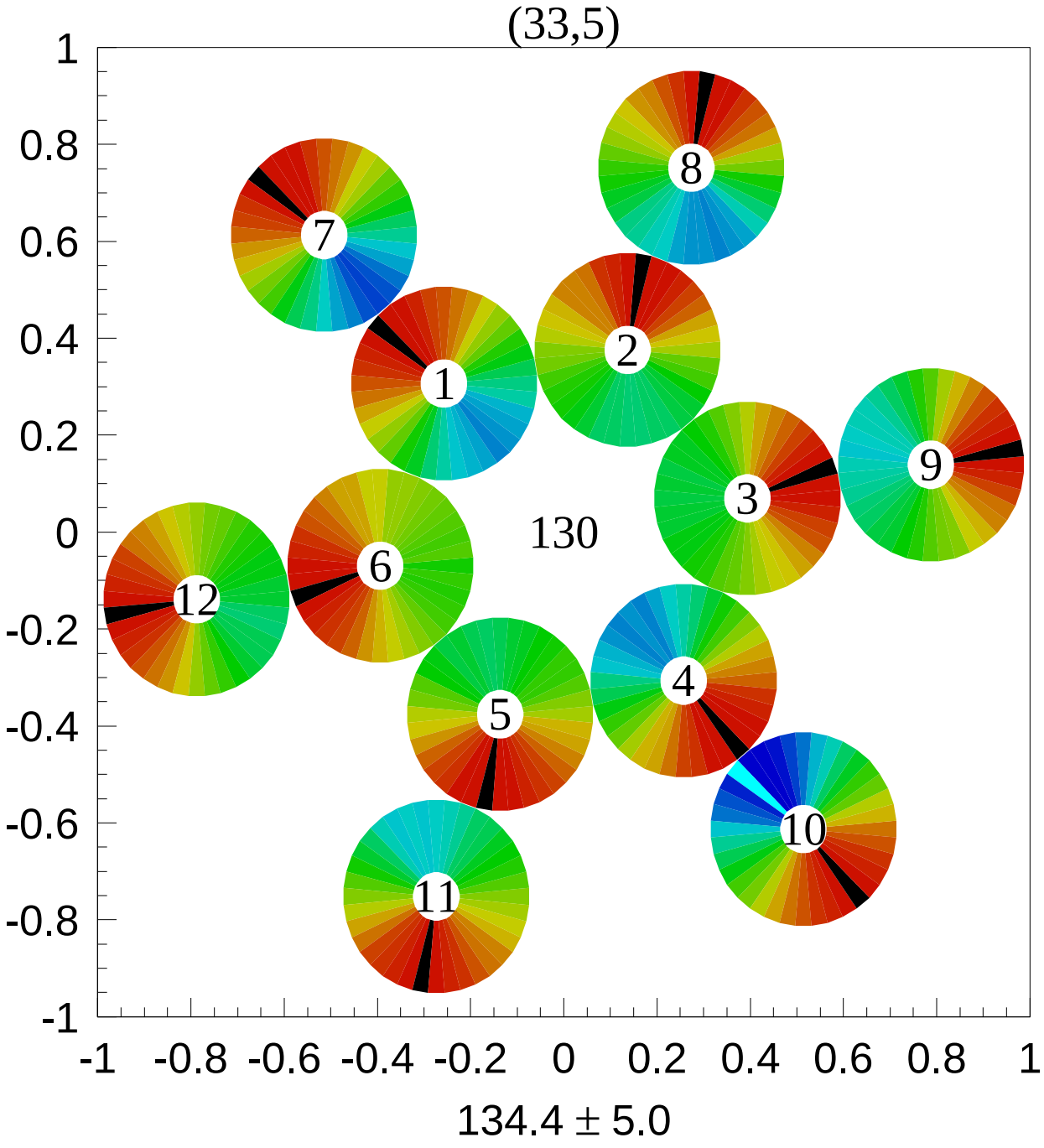

(33,3)
tilted LEDs
116 120 120 116 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 125 80 119 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

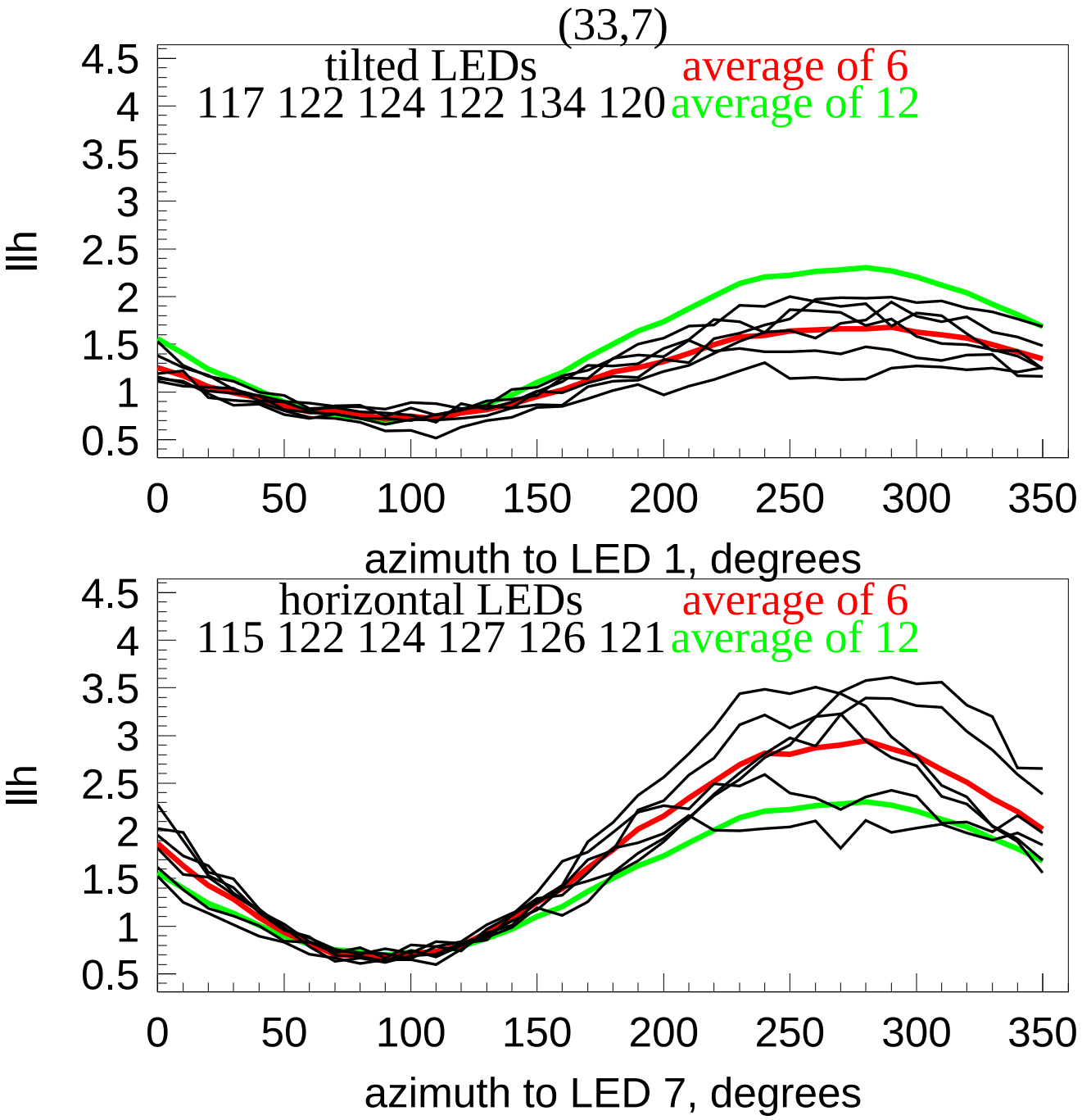

(33,3)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
222.7 ± 7.1

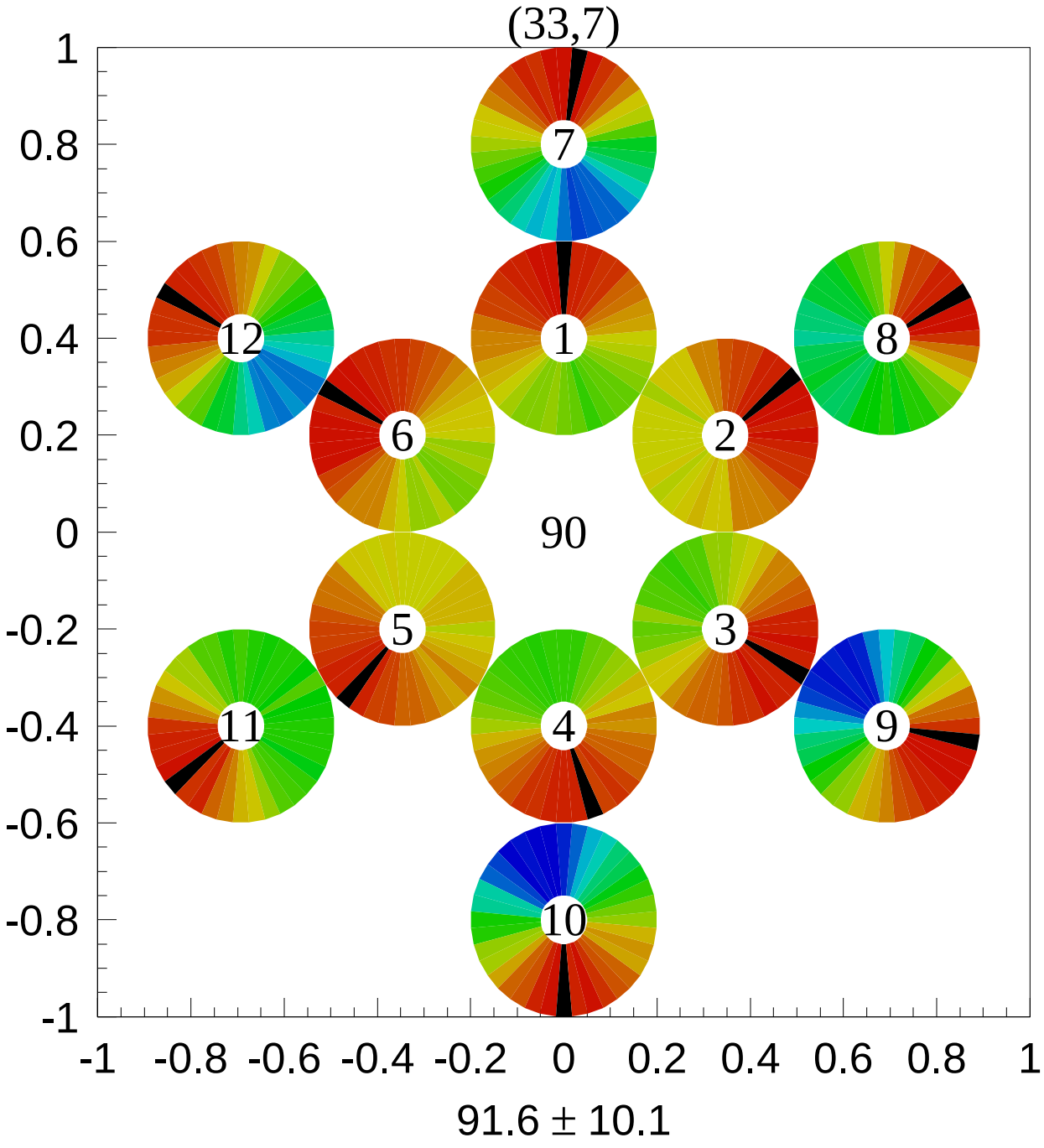

(33,4)
tilted LEDs
129 124 121 124 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 123 123 122 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

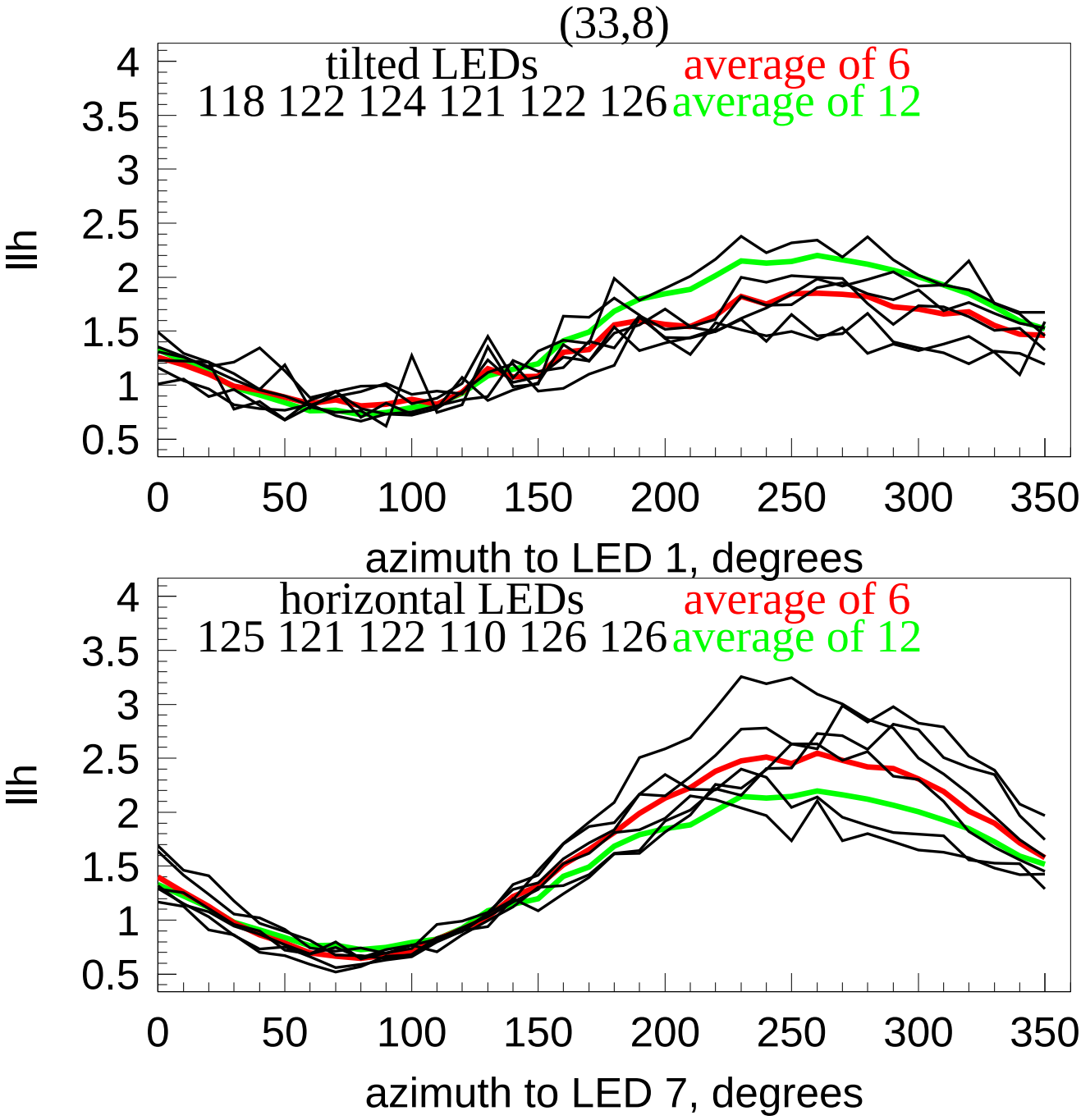

(33,4)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
270.8 ± 5.2

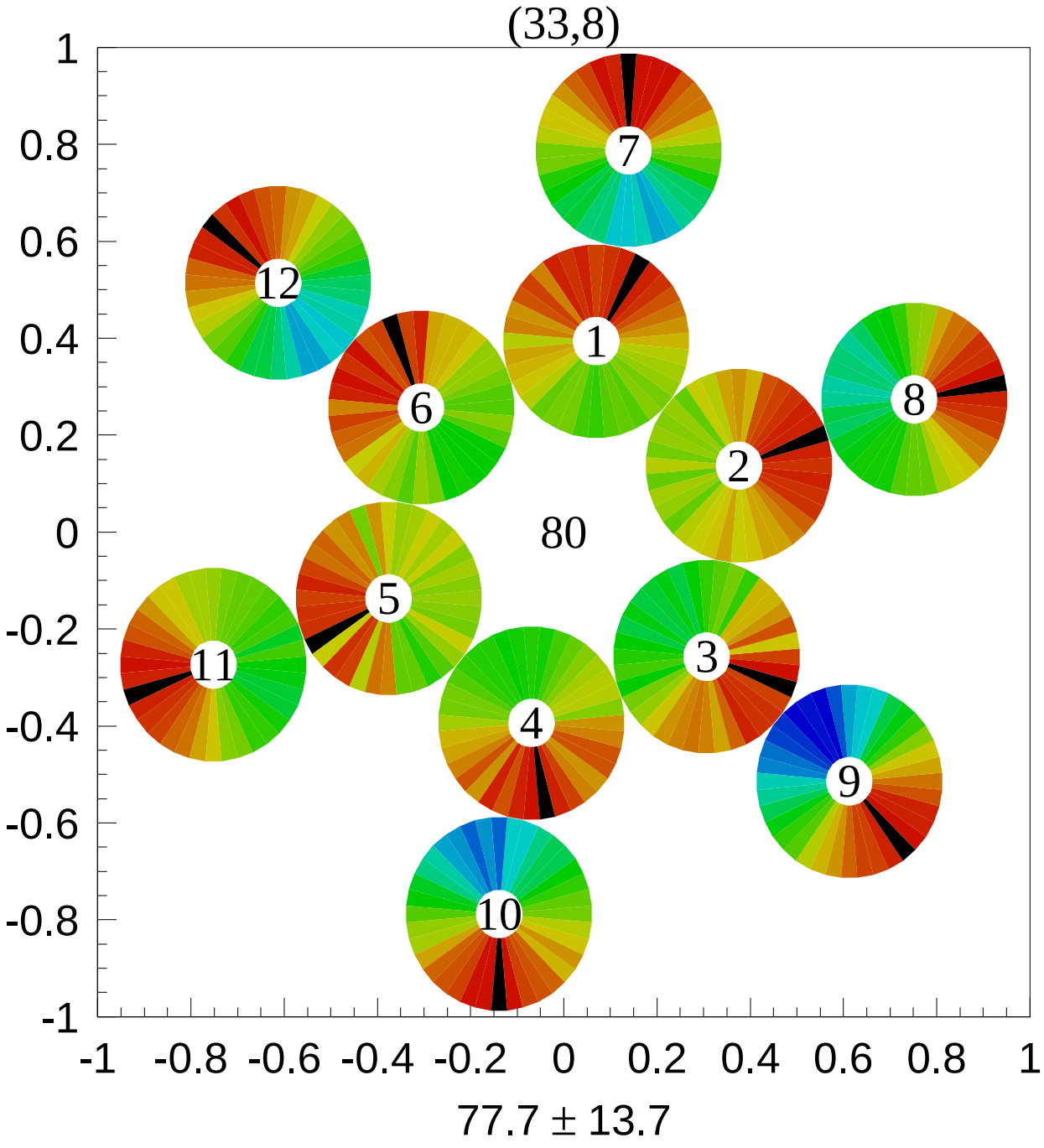

(33,5)
tilted LEDs
123 117 115 119 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 124 123 114 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

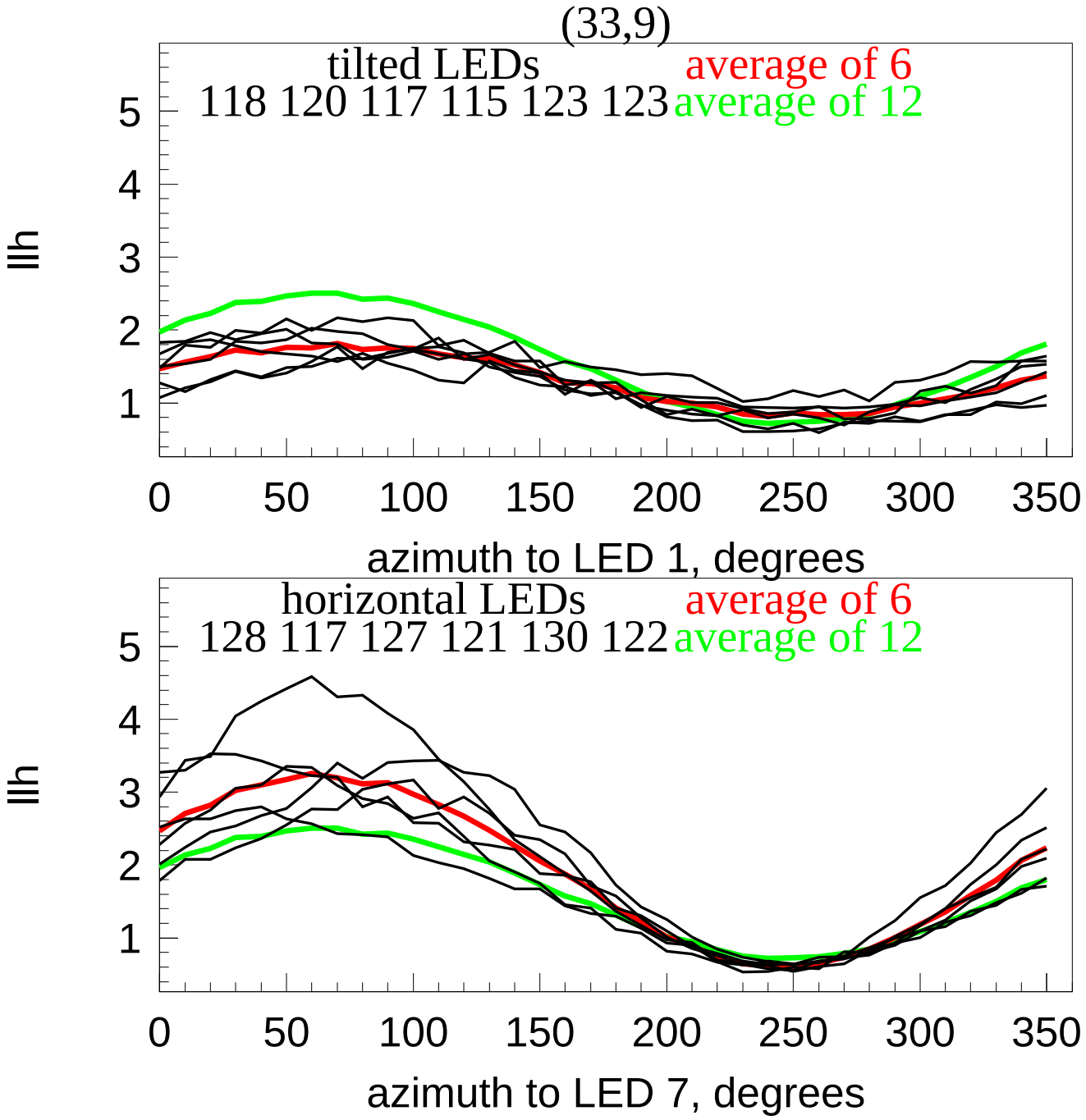

(33,5)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
134.4 ± 5.0

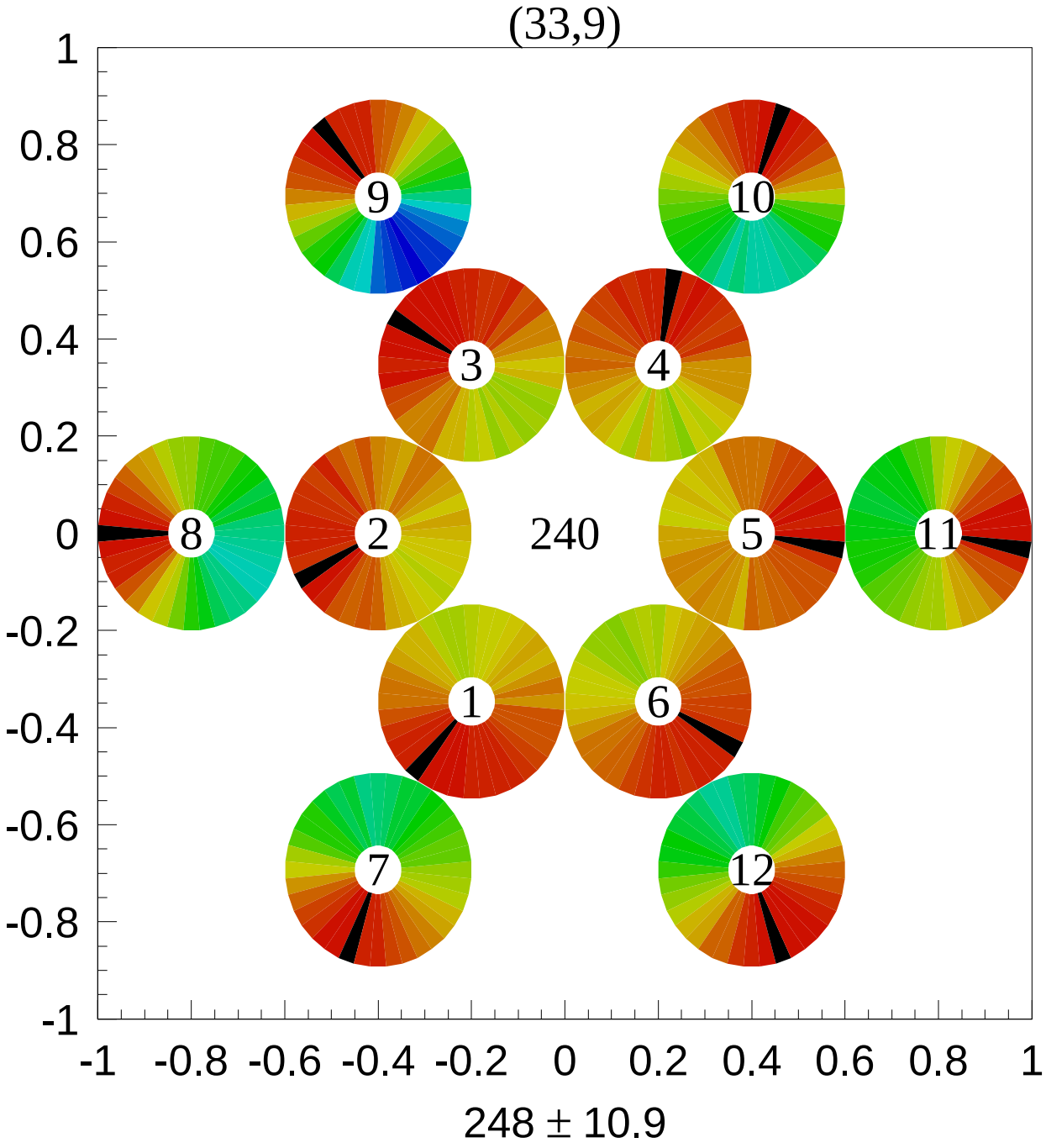

(33,7)
tilted LEDs
117 122 124 122 134 120
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
115 122 124 127 126 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

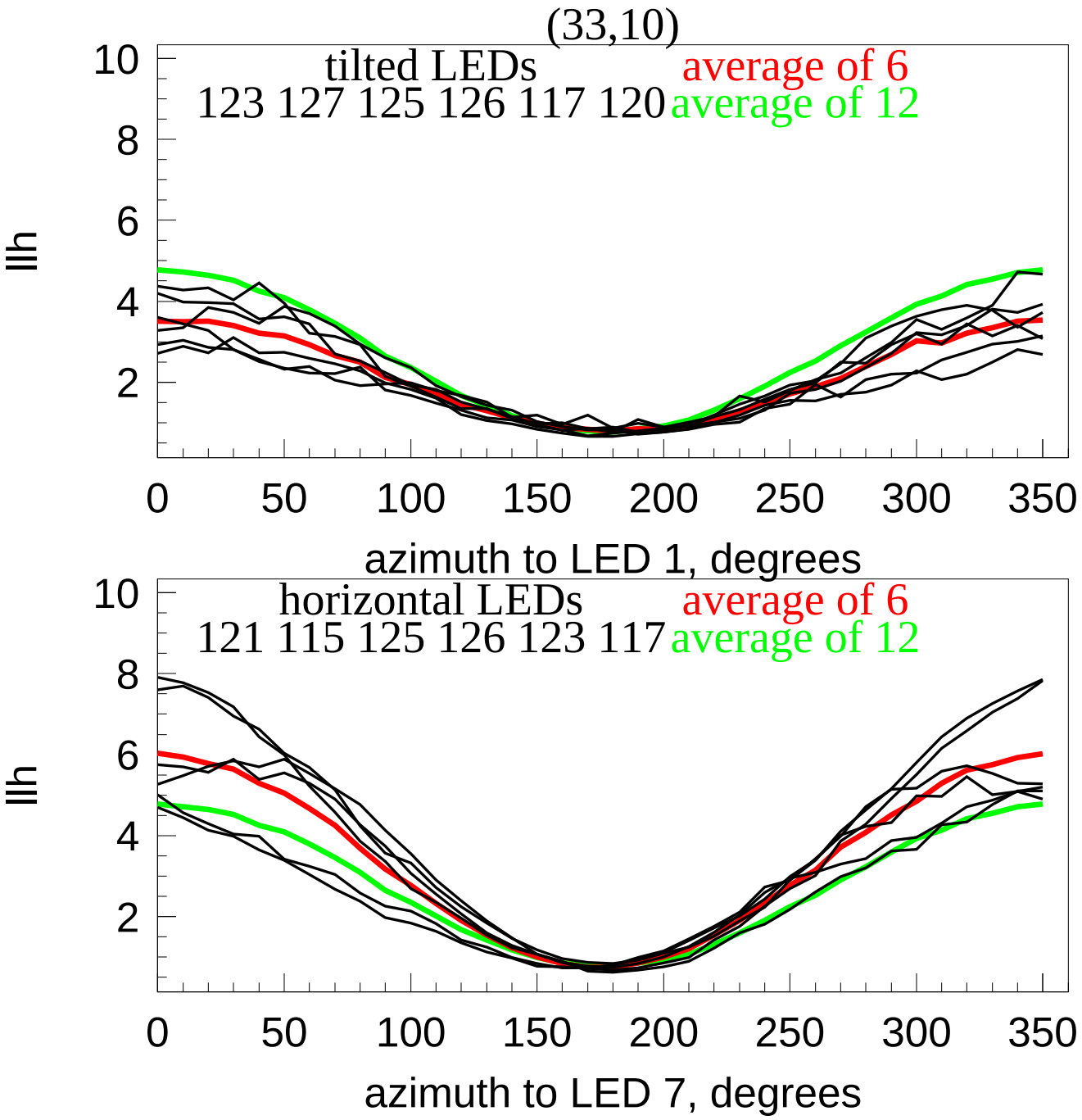

(33,7)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
91.6 ± 10.1

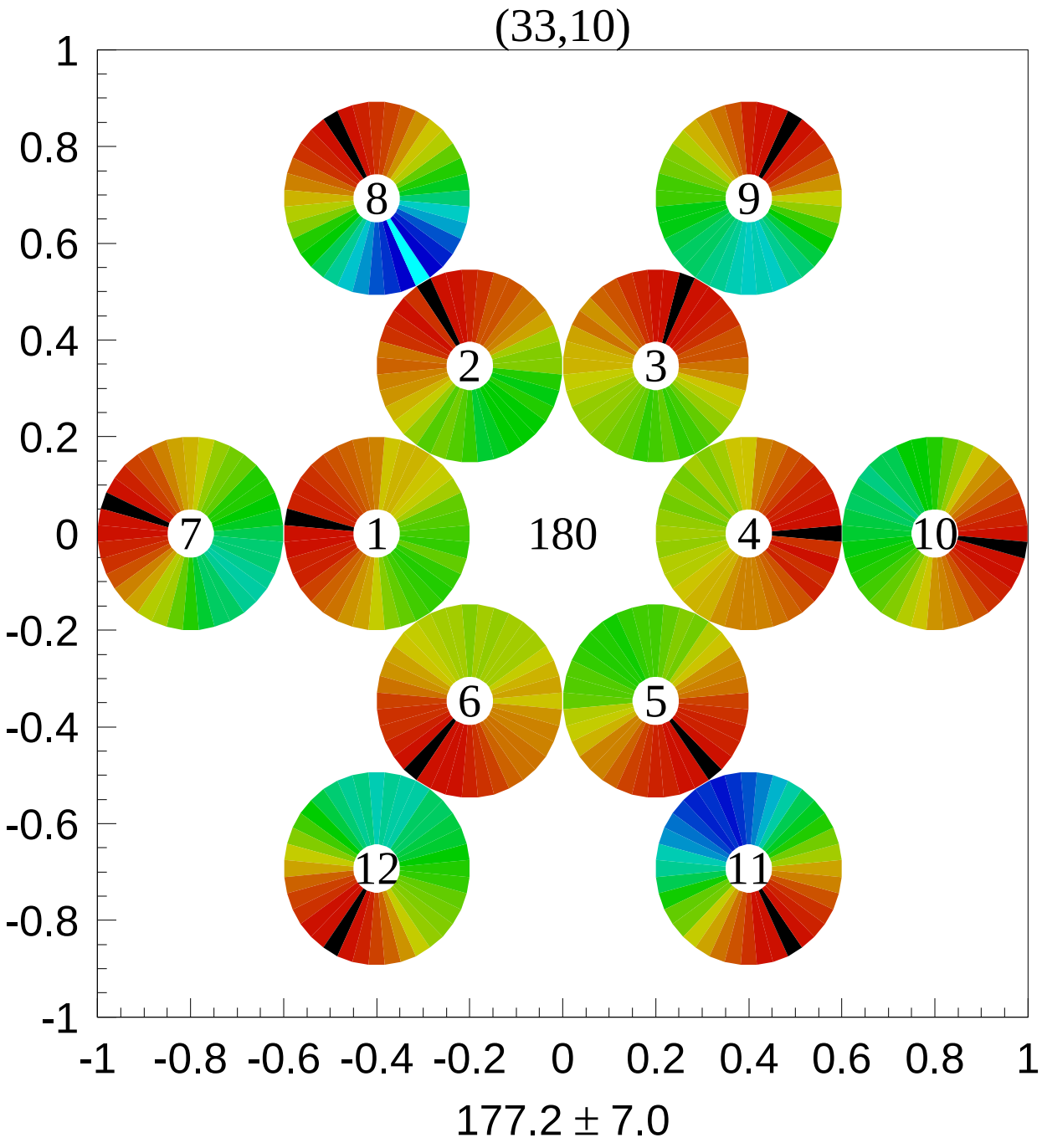

(33,8)
tilted LEDs
118 122 124 121 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 122 110 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

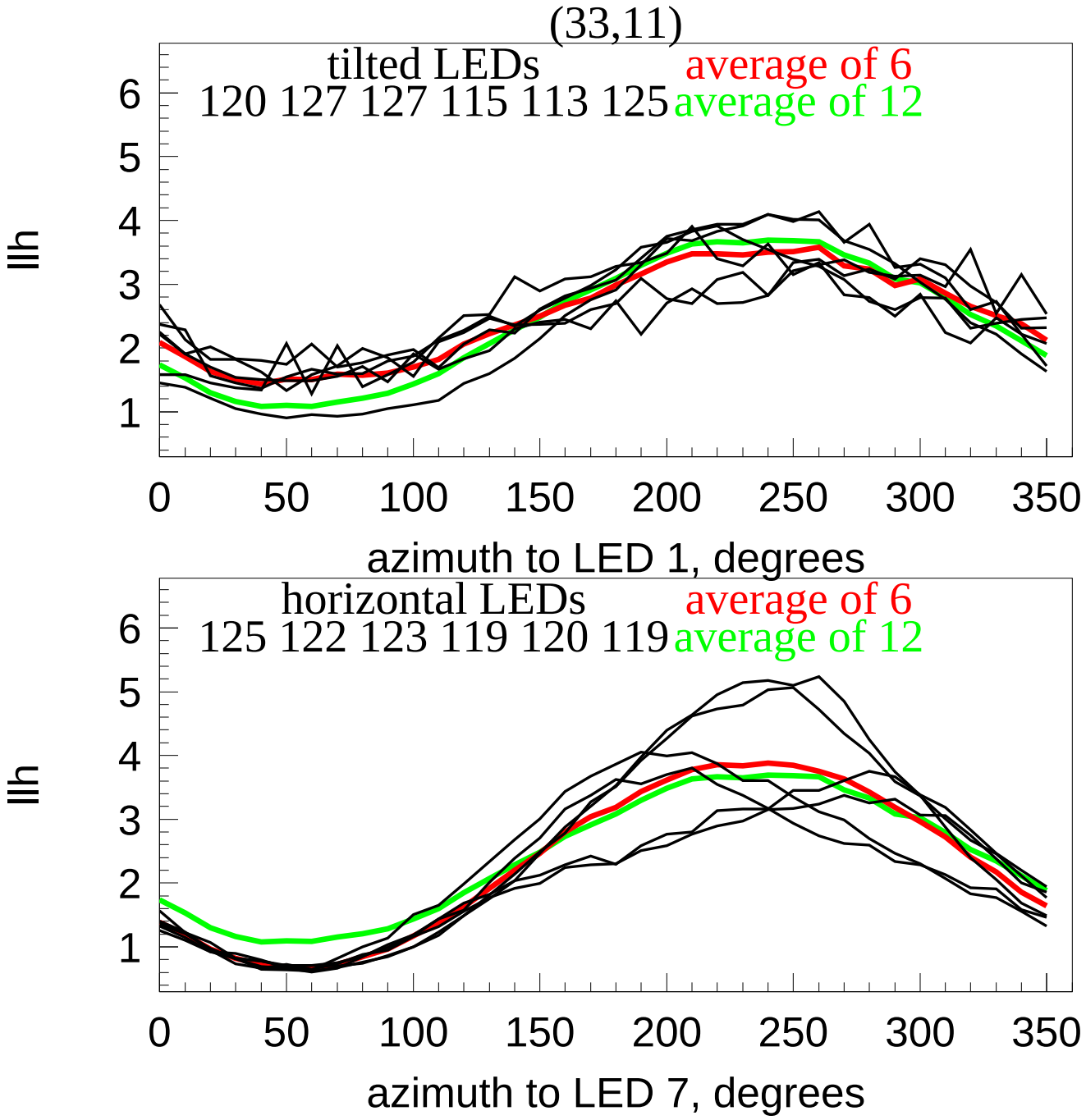

(33,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
77.7 ± 13.7

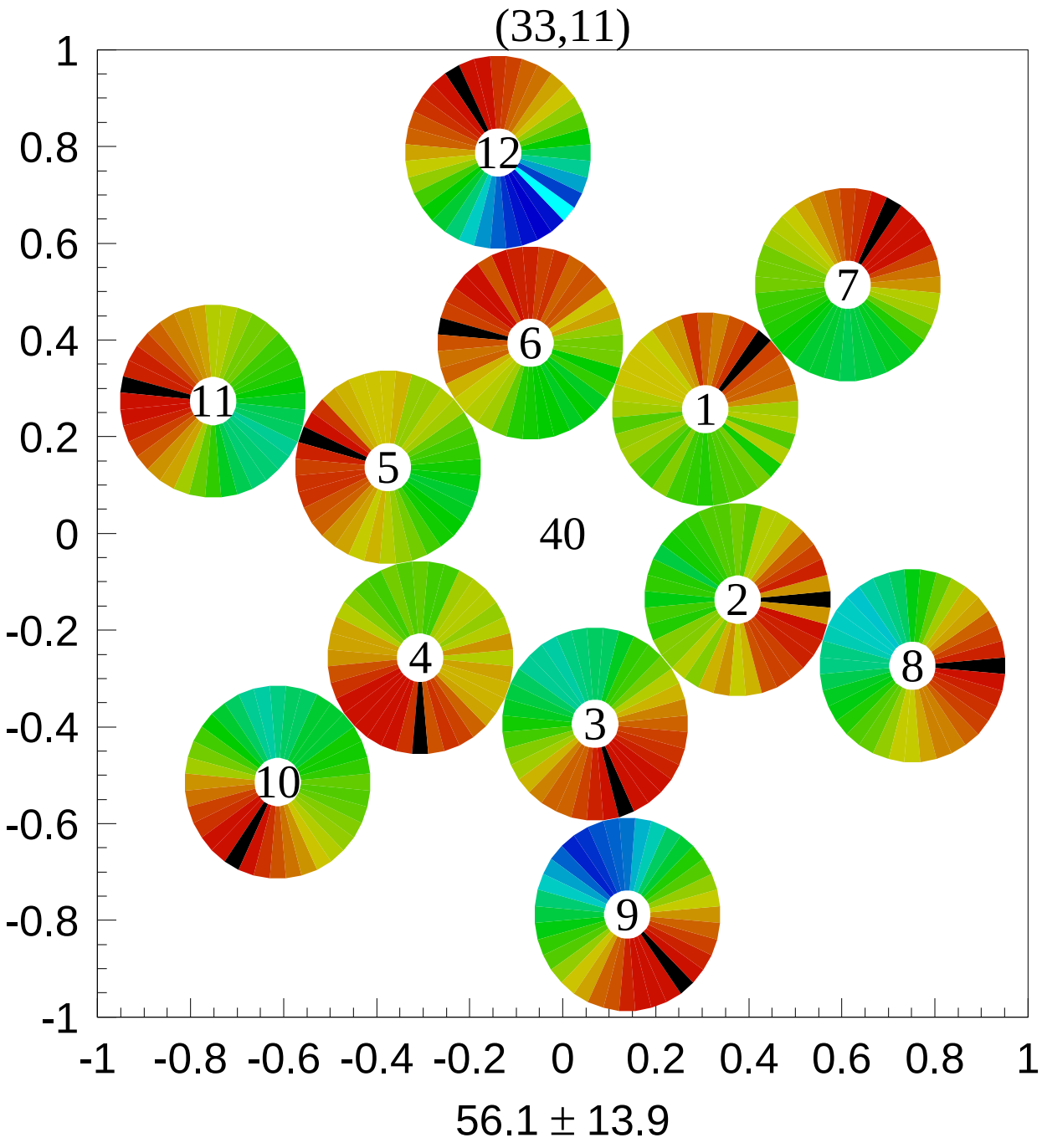

(33,9)
tilted LEDs
118 120 117 115 123 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 117 127 121 130 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

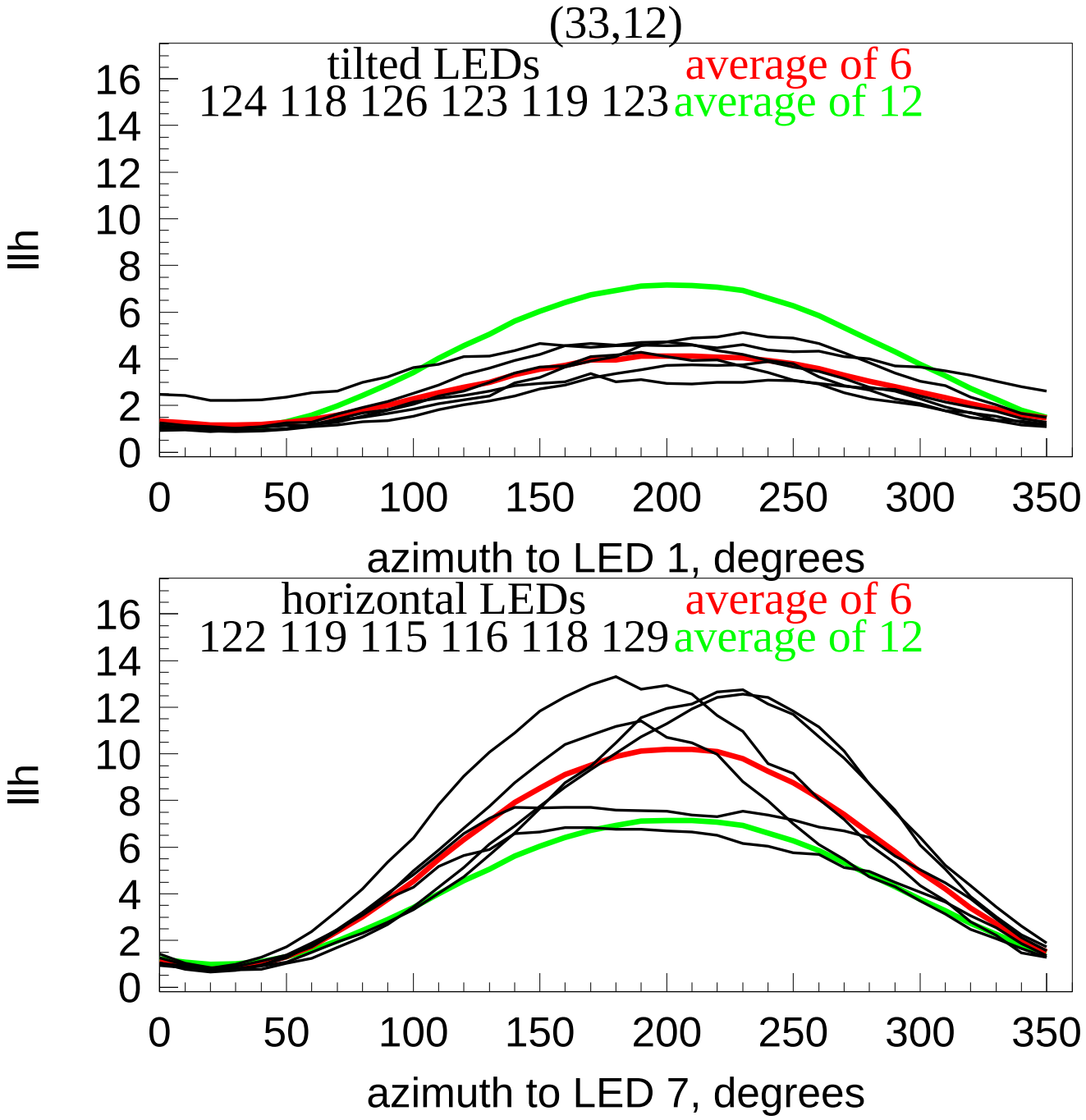

(33,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
248 ± 10.9

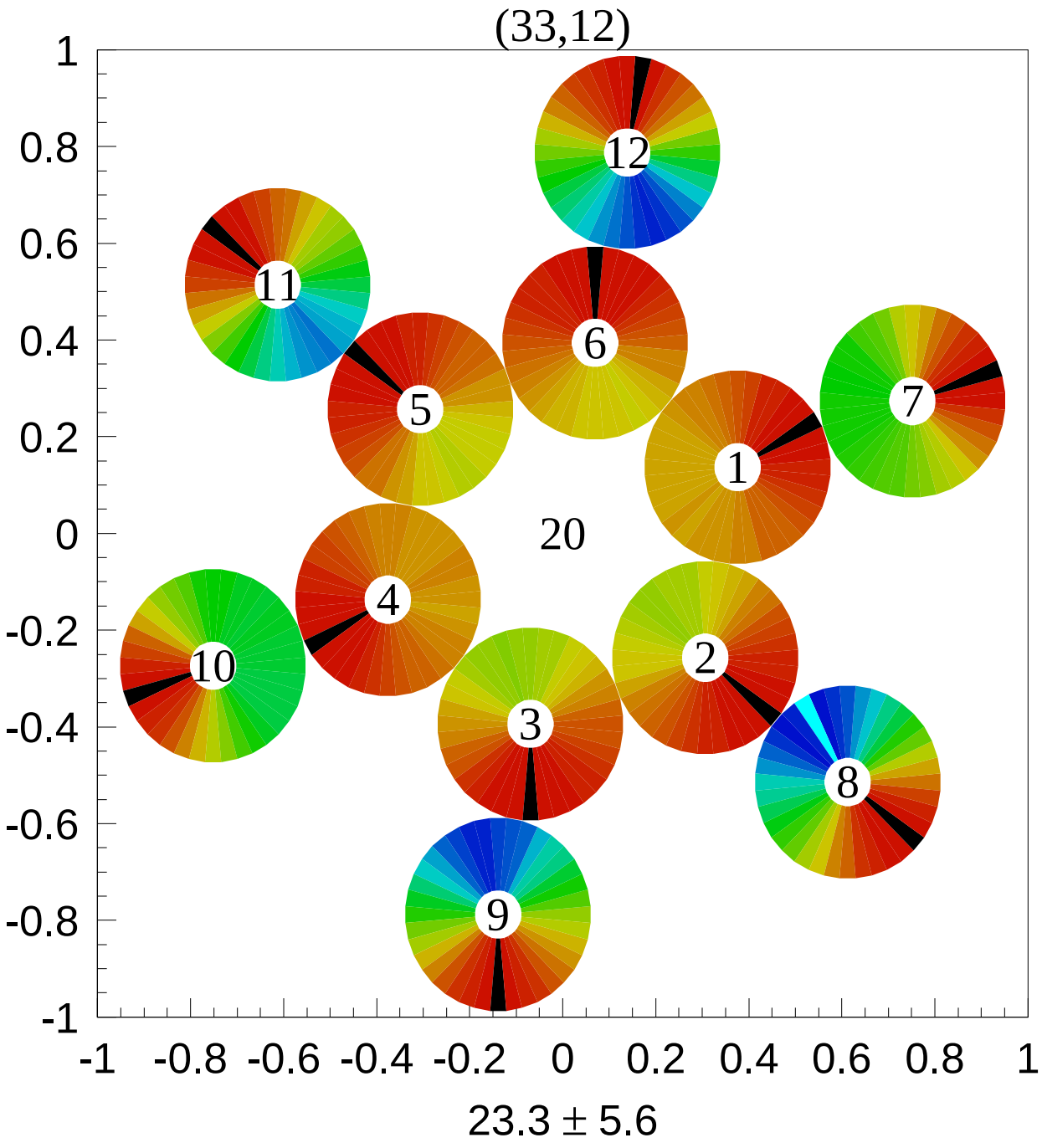

(33,10)
tilted LEDs
123 127 125 126 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 115 125 126 123 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

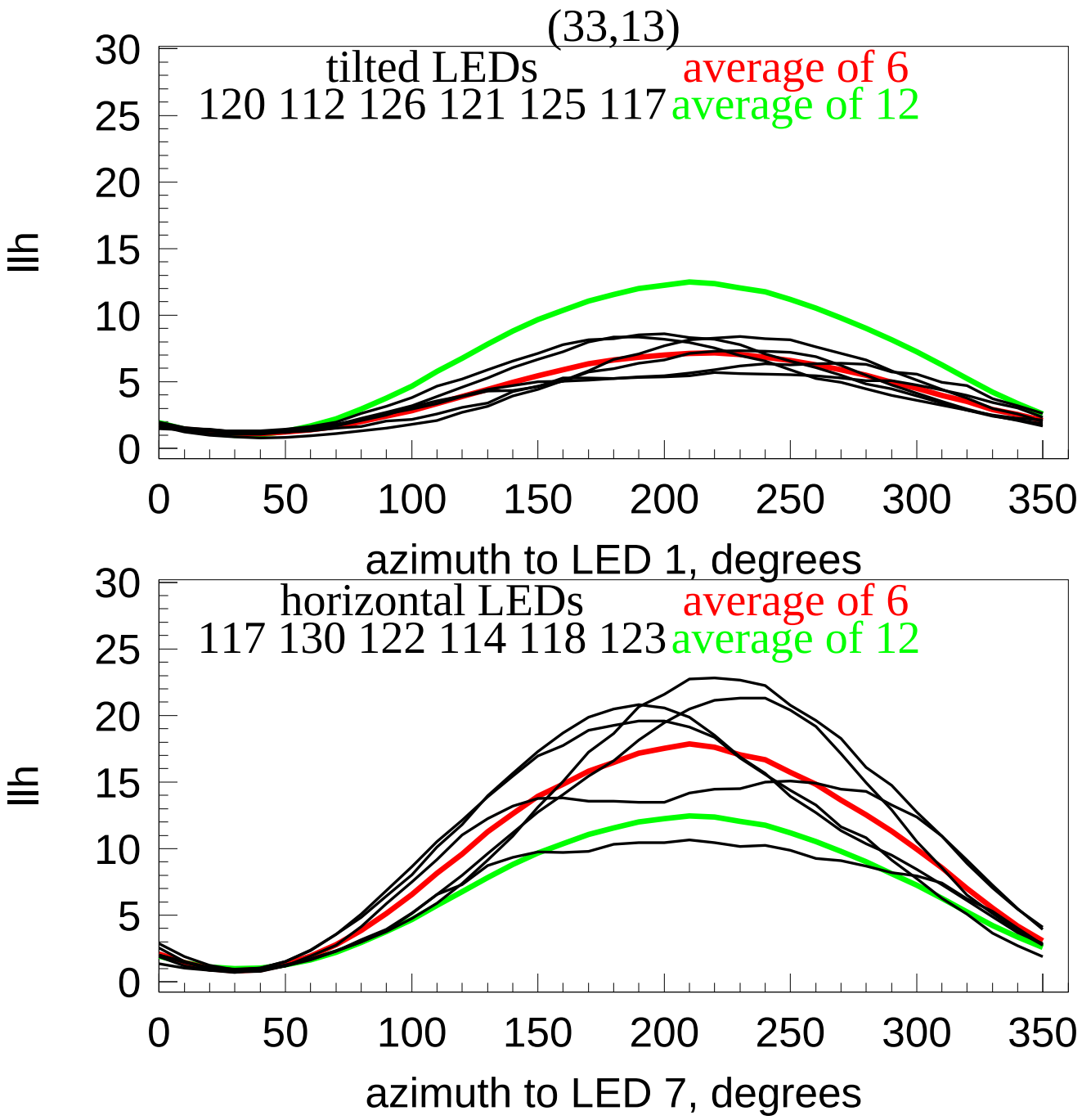

(33,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
177.2 ± 7.0

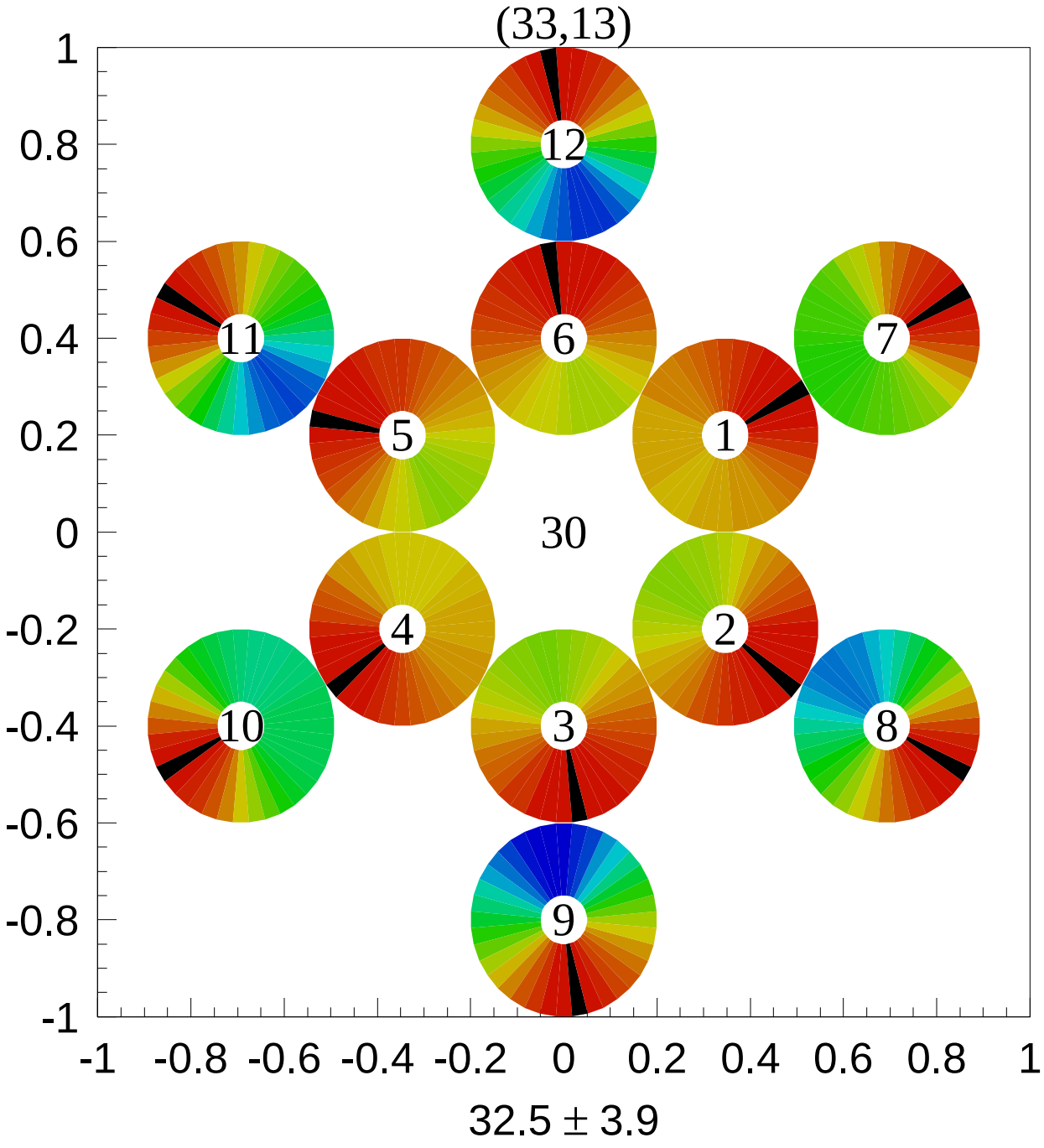

(33,11)
tilted LEDs
120 127 127 115 113 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 123 119 120 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

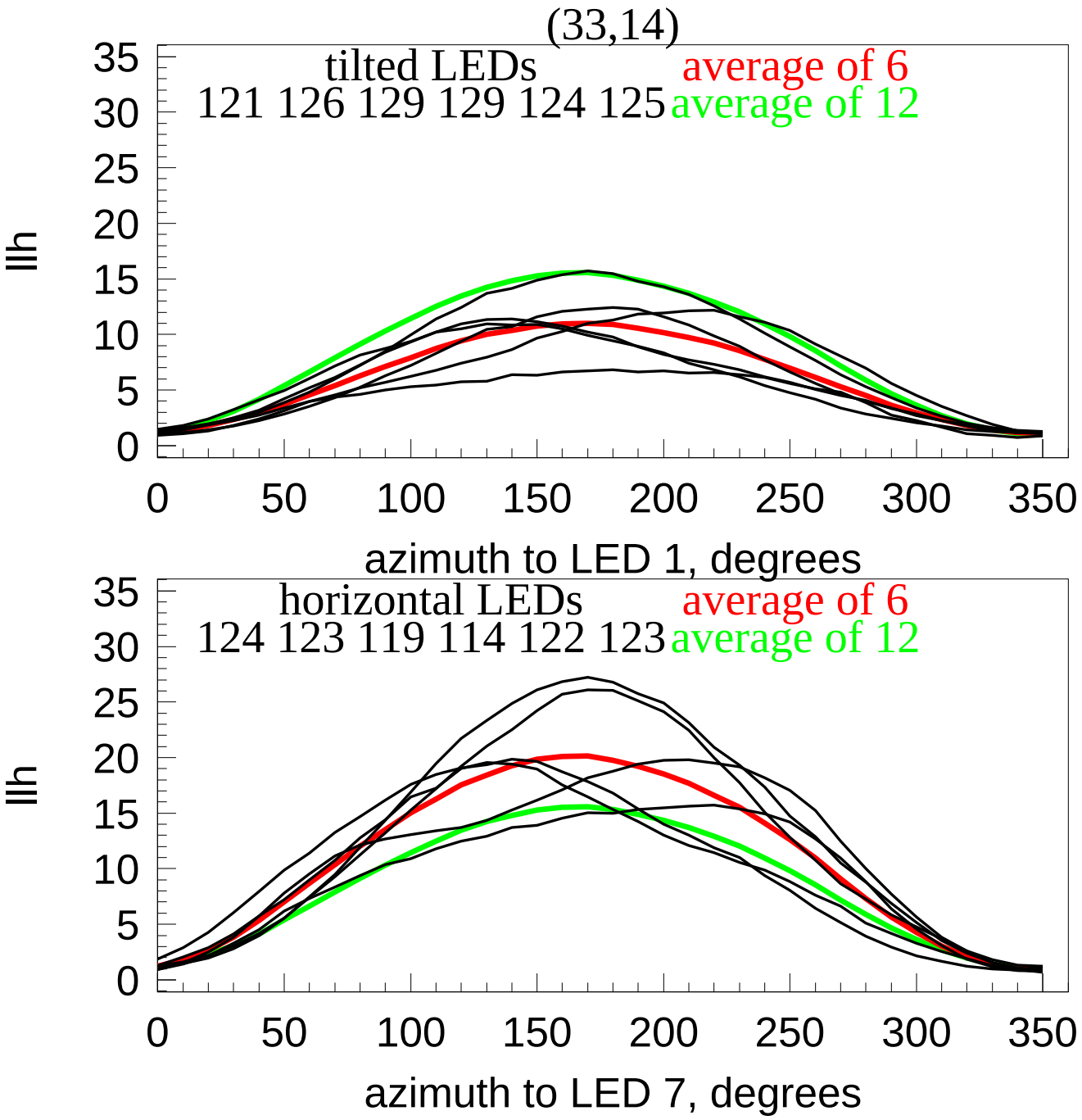

(33,11)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
56.1 ± 13.9

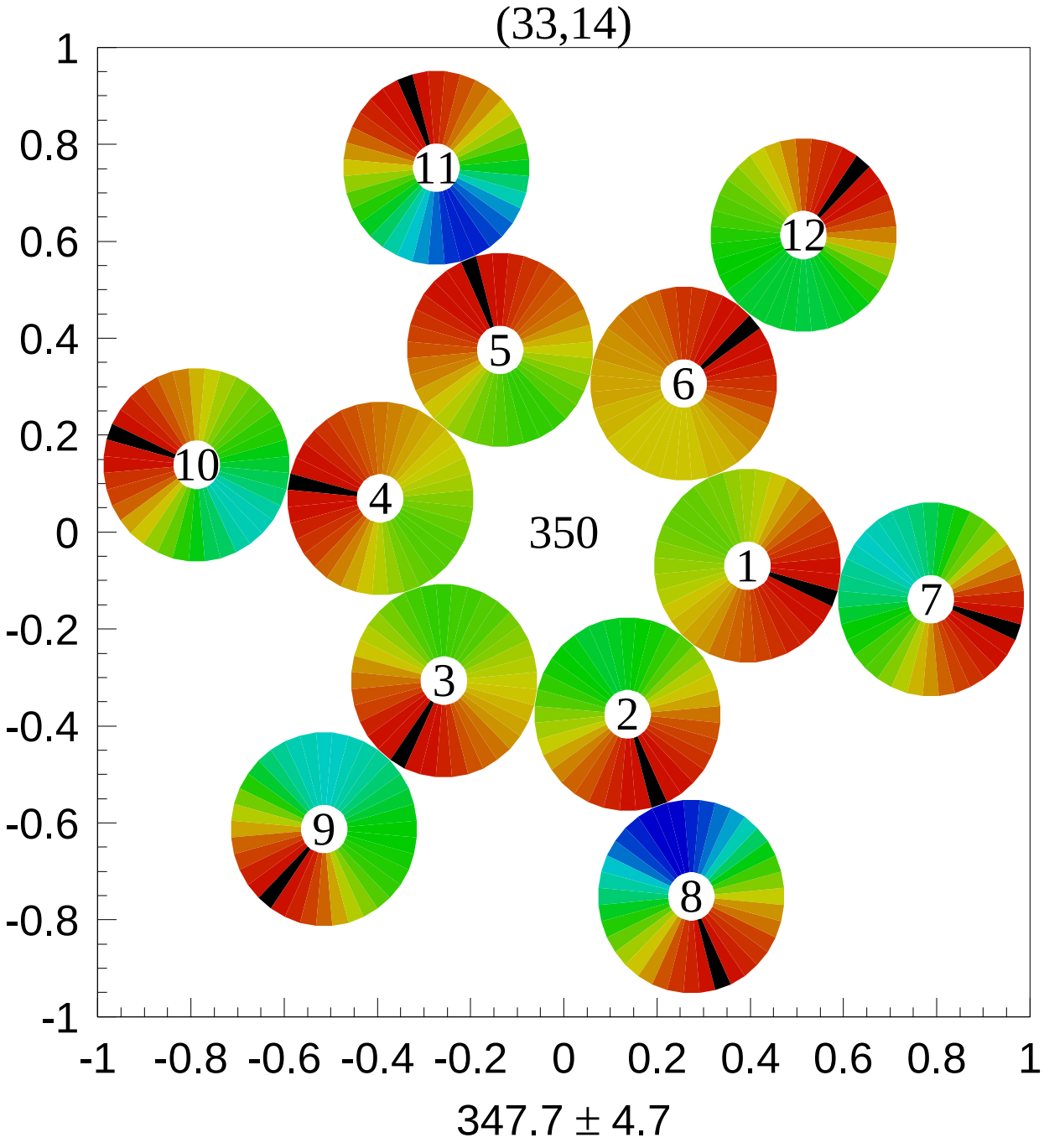

(33,12)
tilted LEDs
124 118 126 123 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 115 116 118 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

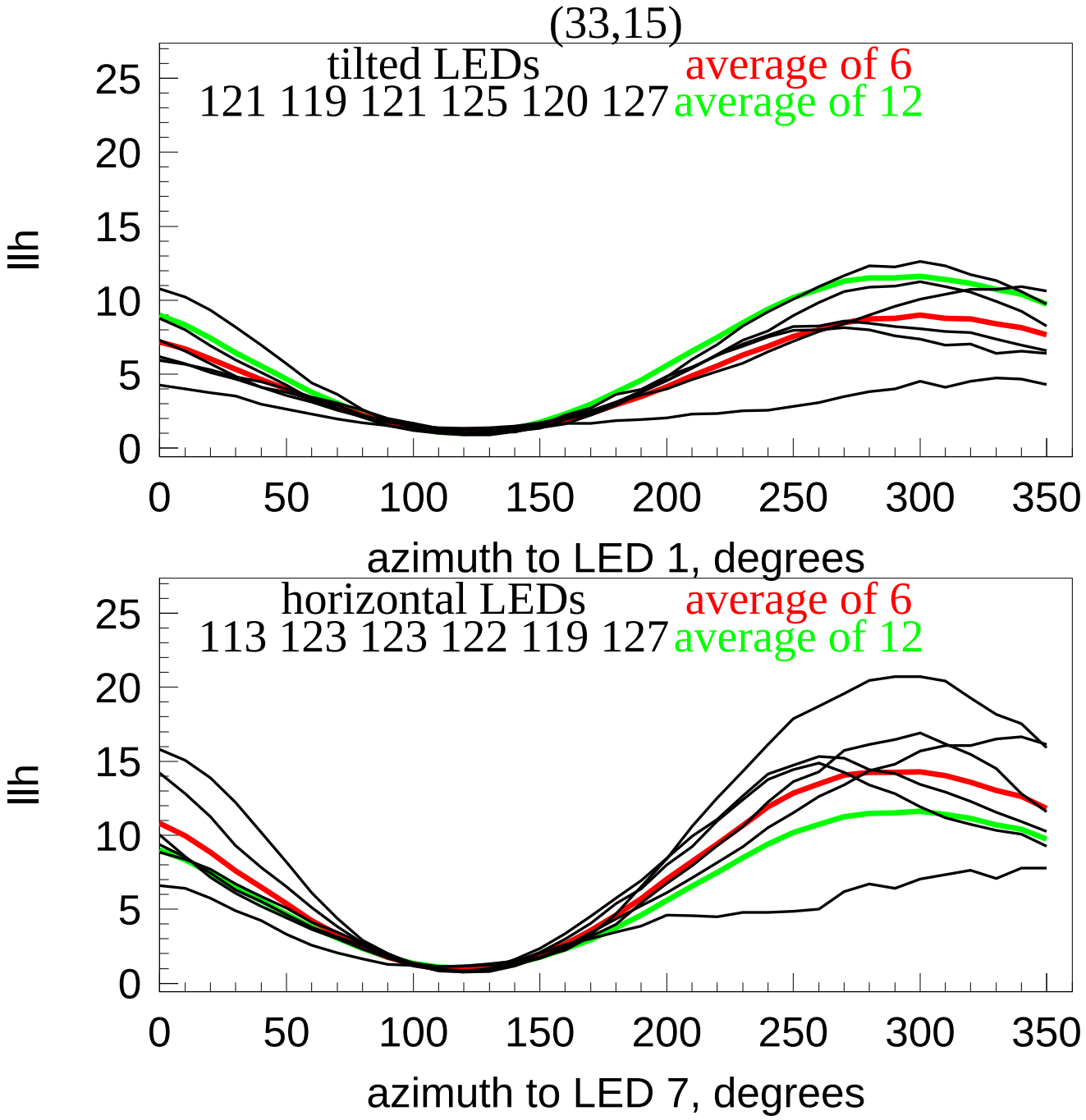

(33,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
23.3 ± 5.6

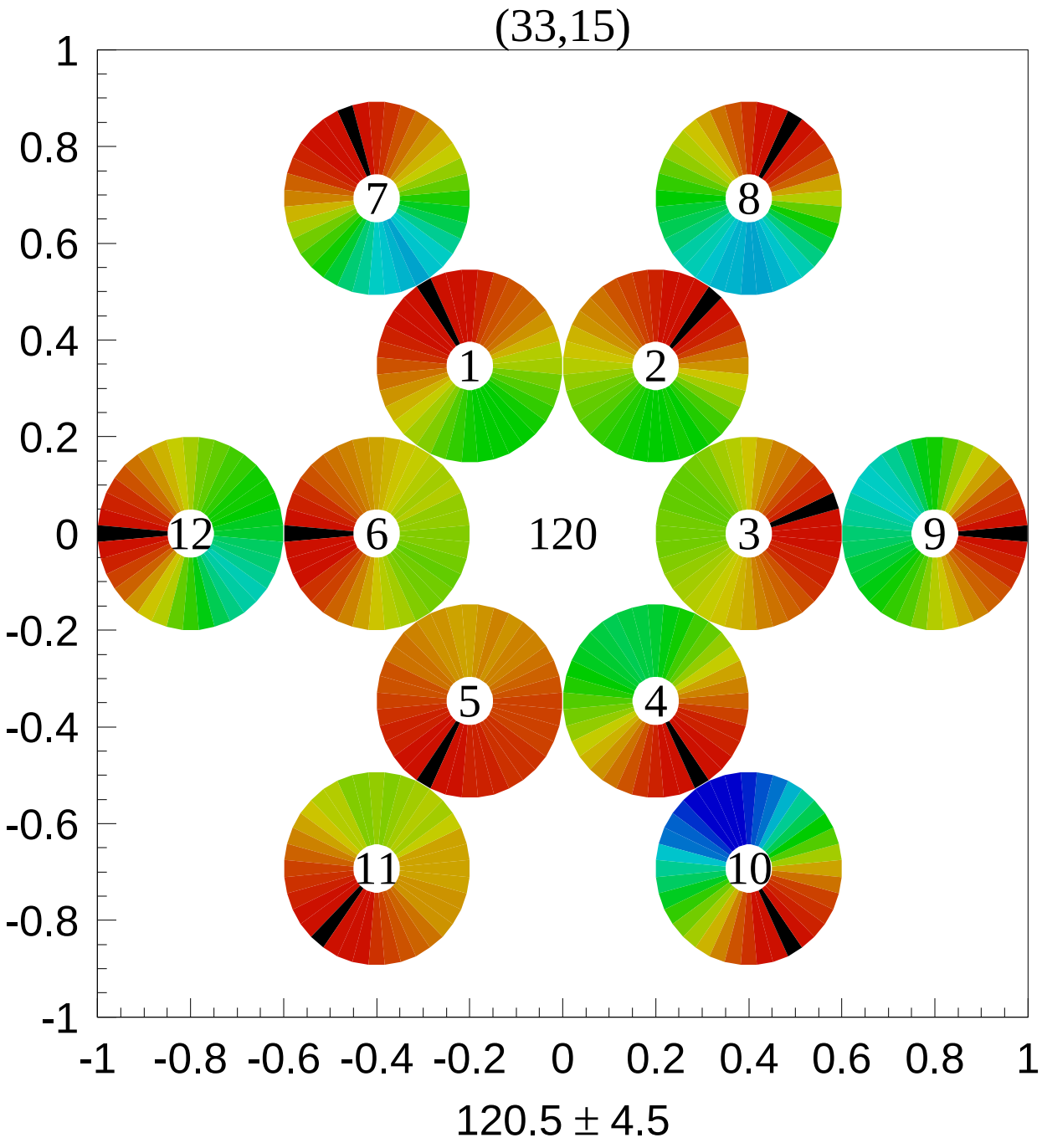

(33,13)
tilted LEDs
120 112 126 121 125 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 130 122 114 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

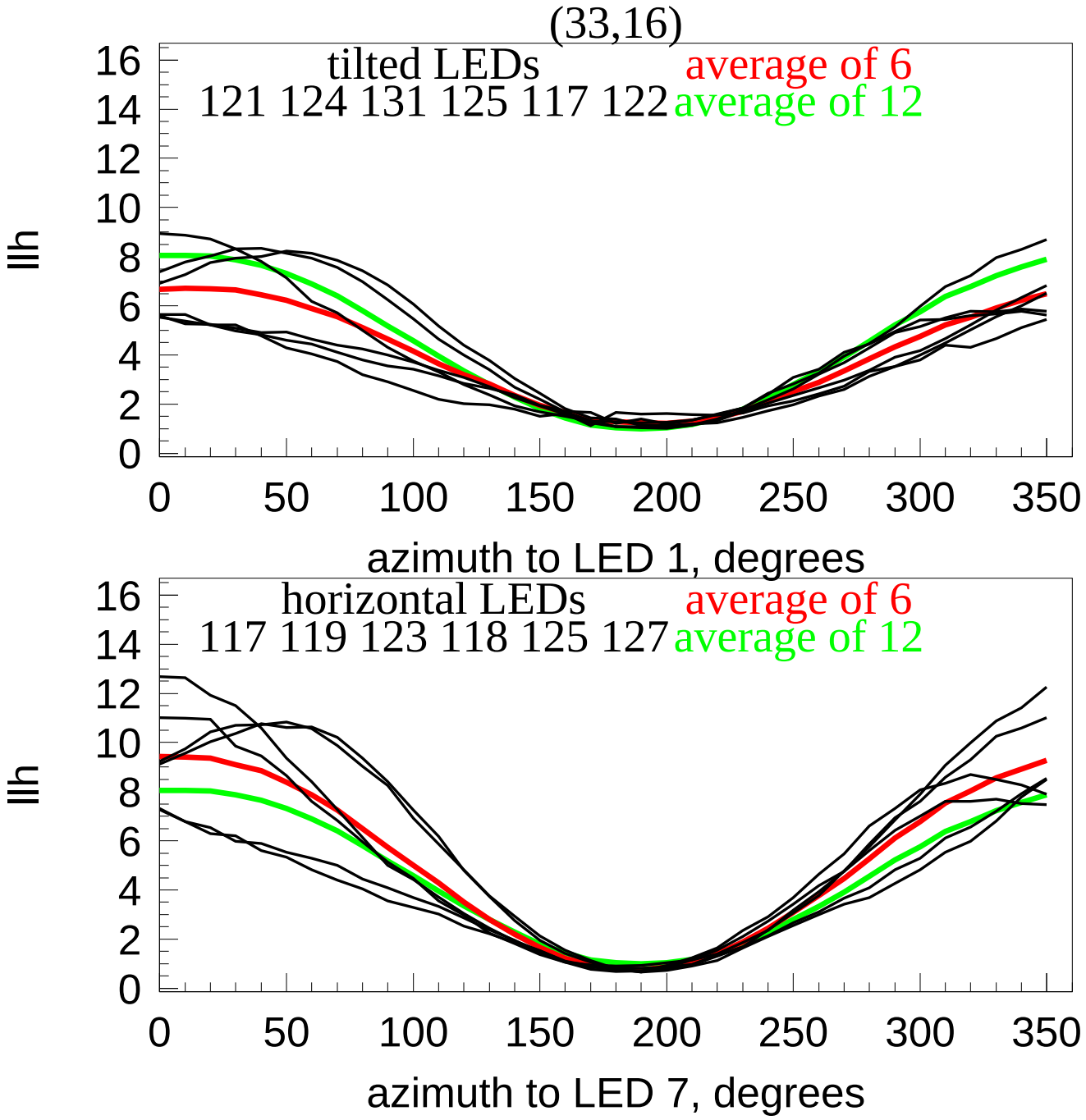

(33,13)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
32.5 ± 3.9

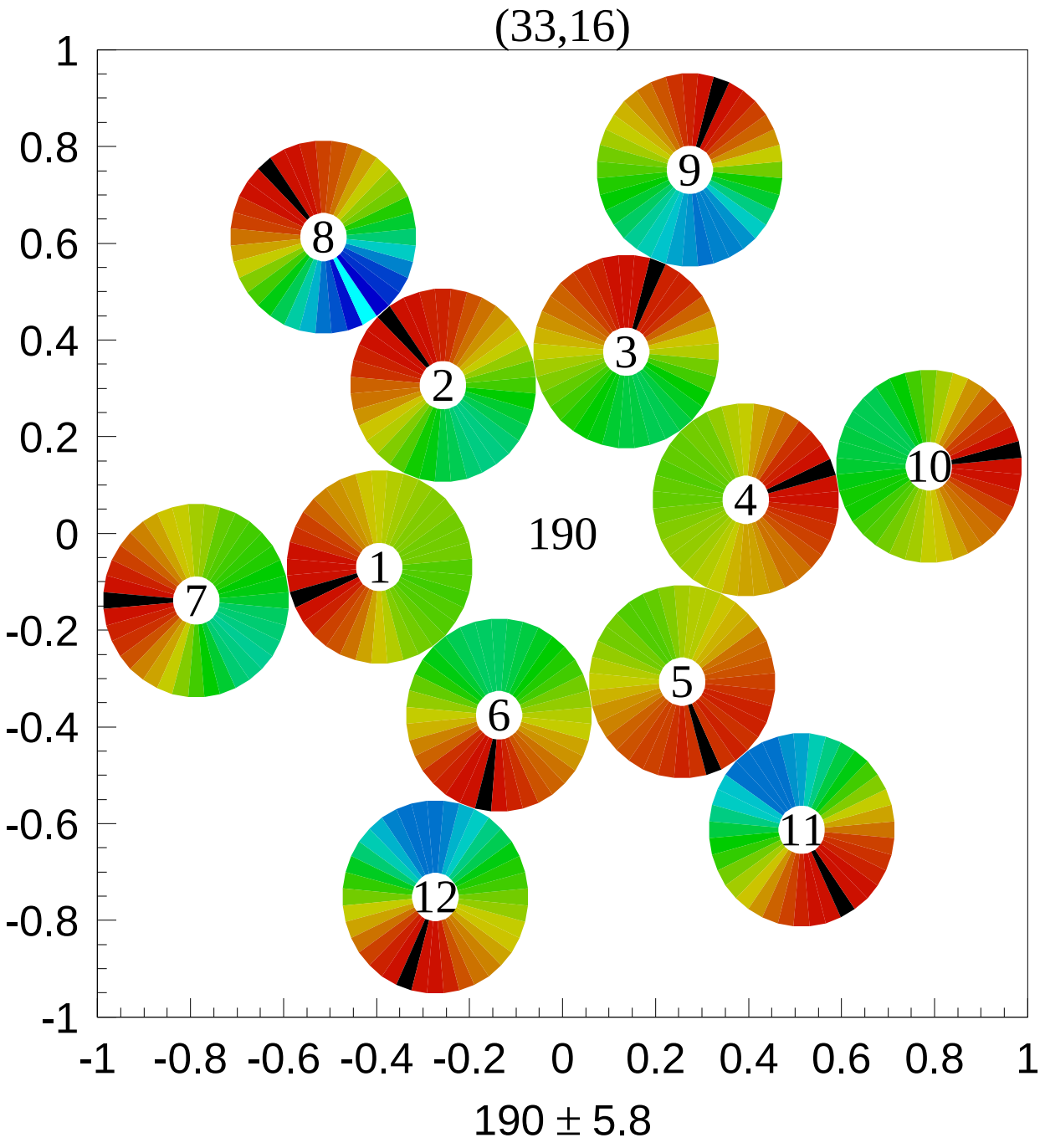

(33,14)
tilted LEDs
121 126 129 129 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 119 114 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

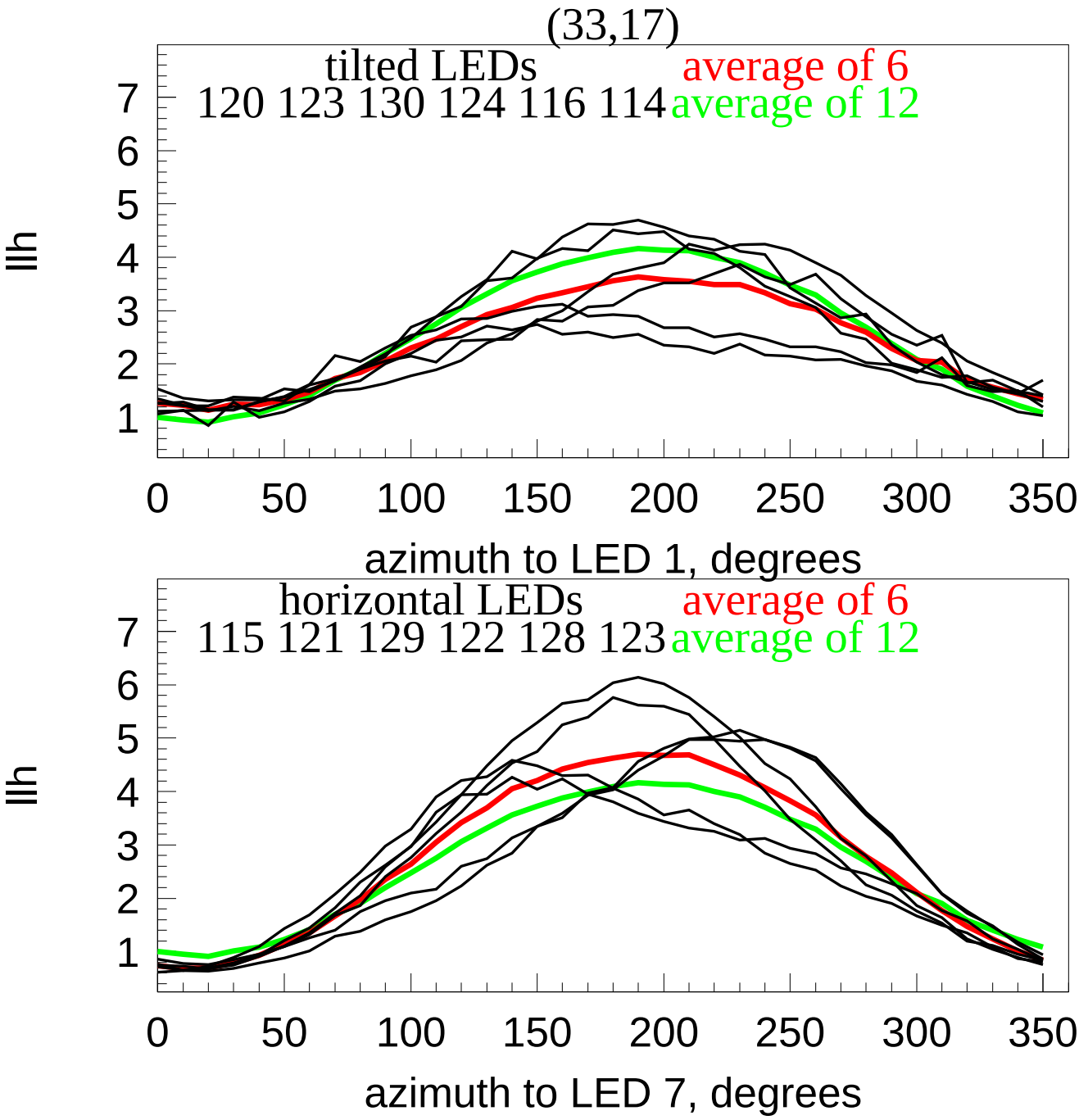

(33,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
347.7 ± 4.7

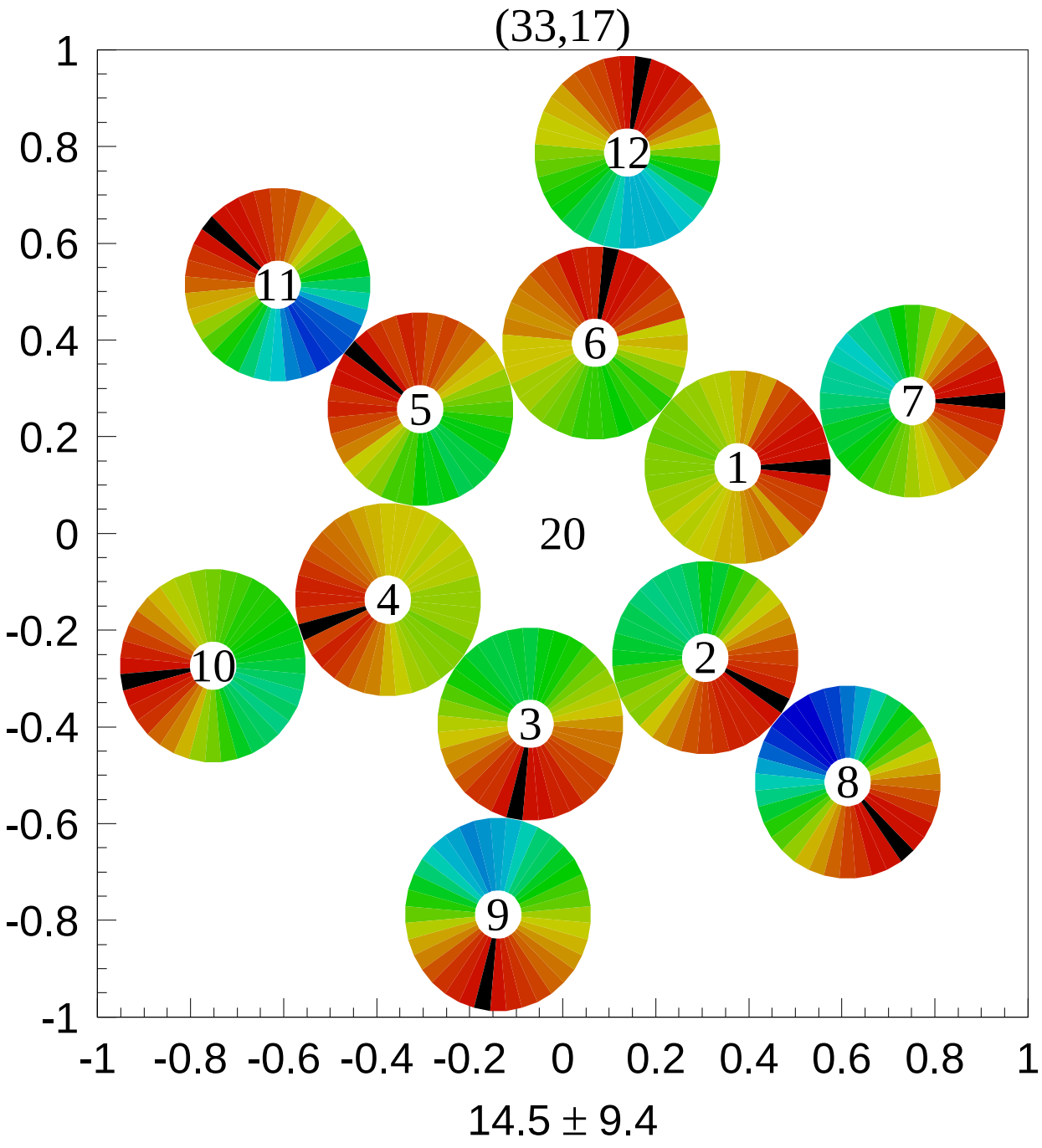

(33,15)
tilted LEDs
121 119 121 125 120 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 123 123 122 119 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

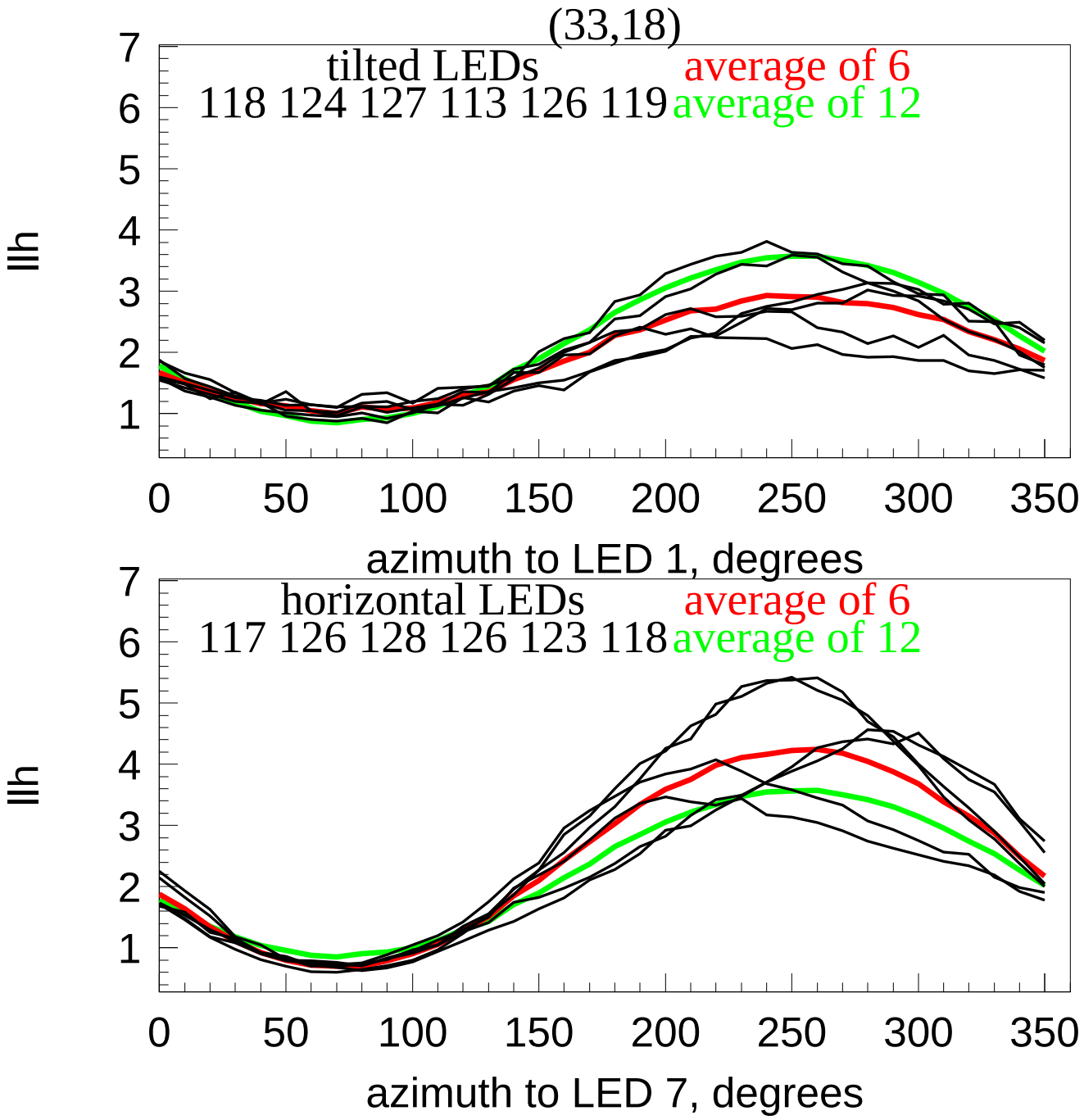

(33,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
120.5 ± 4.5
7
8
1
2
12
6
120
3
9
5
4
11
10

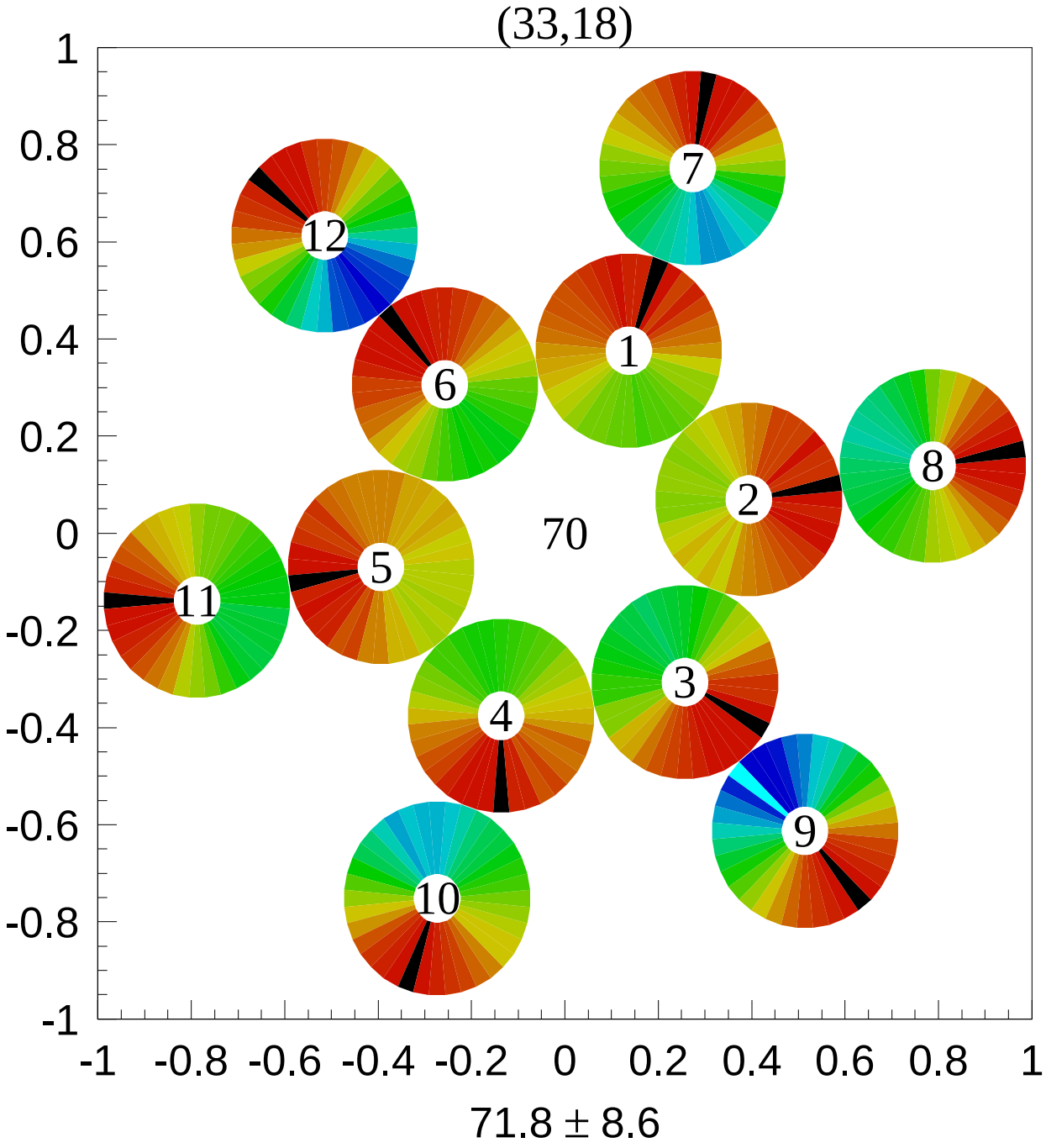

(33,16)
tilted LEDs
121 124 131 125 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 123 118 125 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

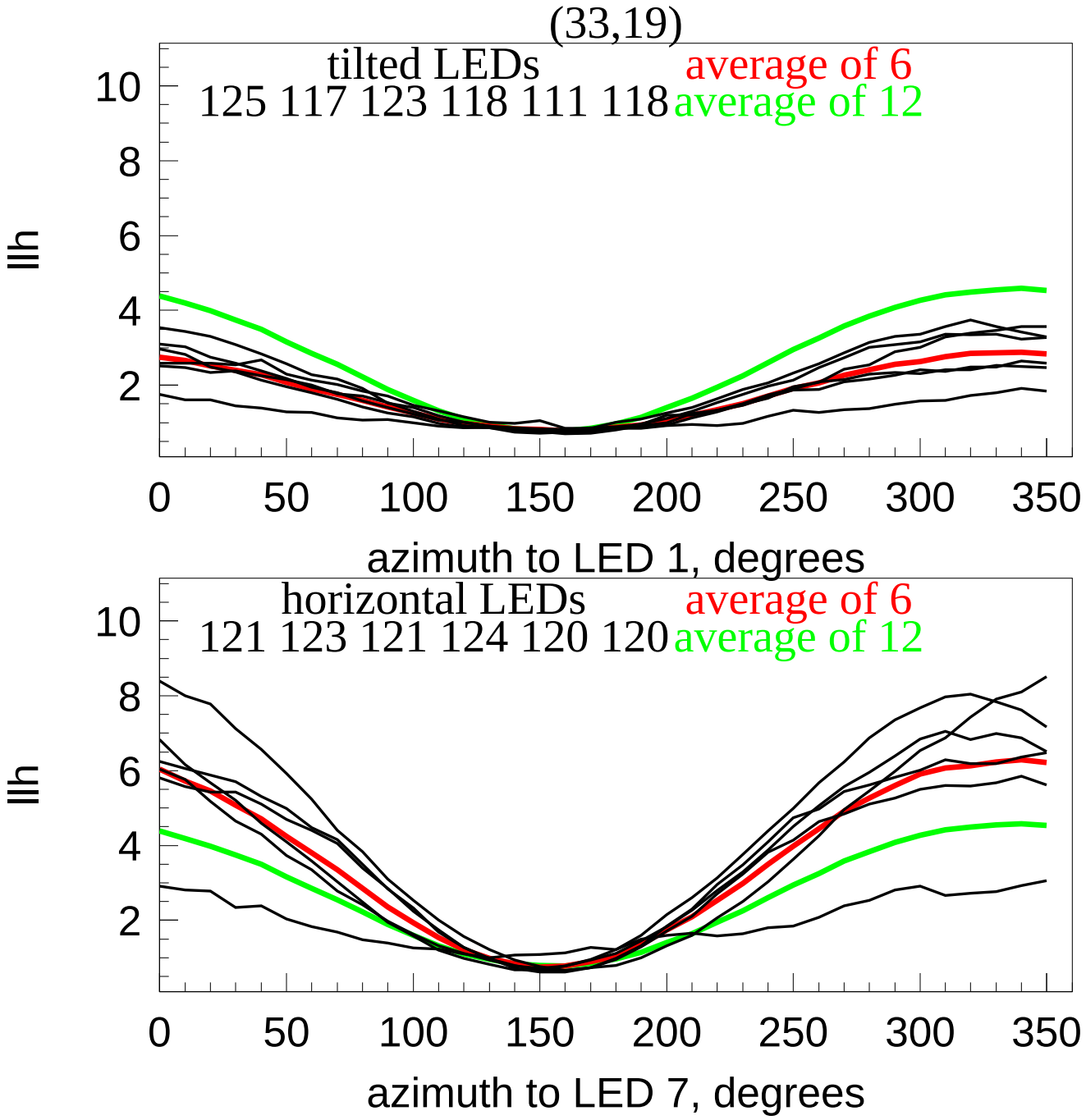

(33,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
190 ± 5.8
1
2
3
4
5
6
7
8
9
10
11
12

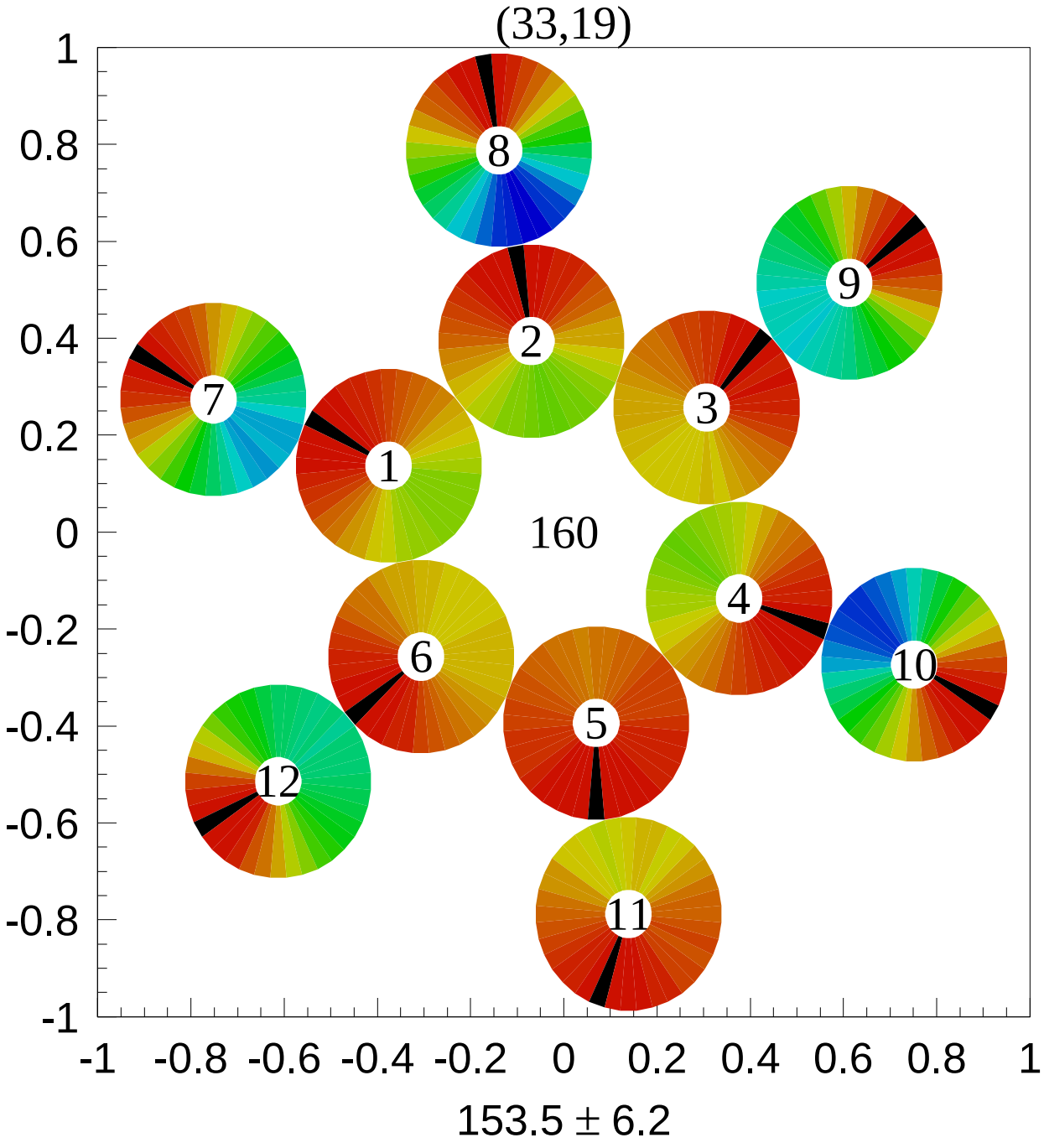

(33,17)
tilted LEDs
120 123 130 124 116 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 121 129 122 128 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

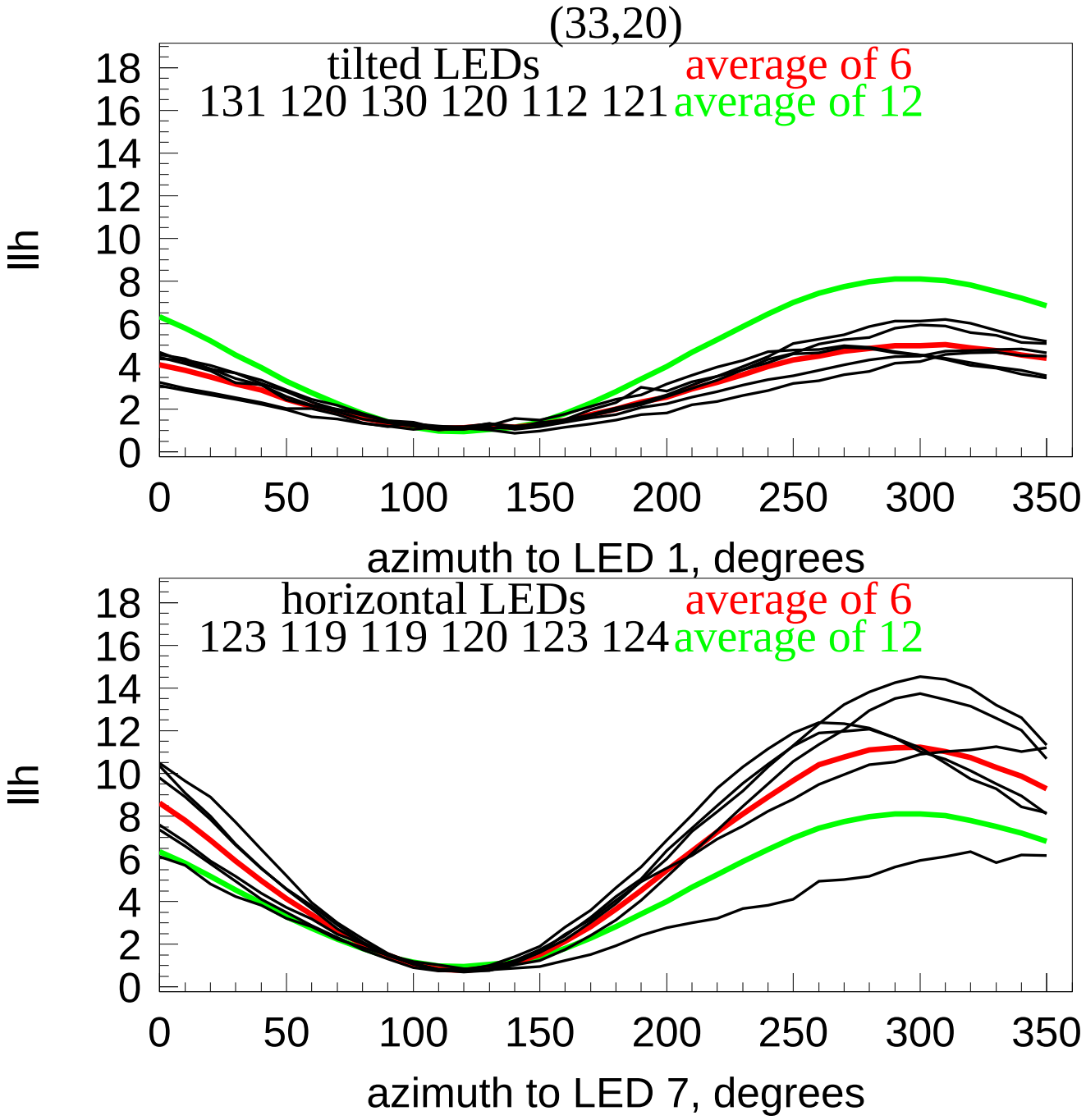

(33,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
14.5 ± 9.4

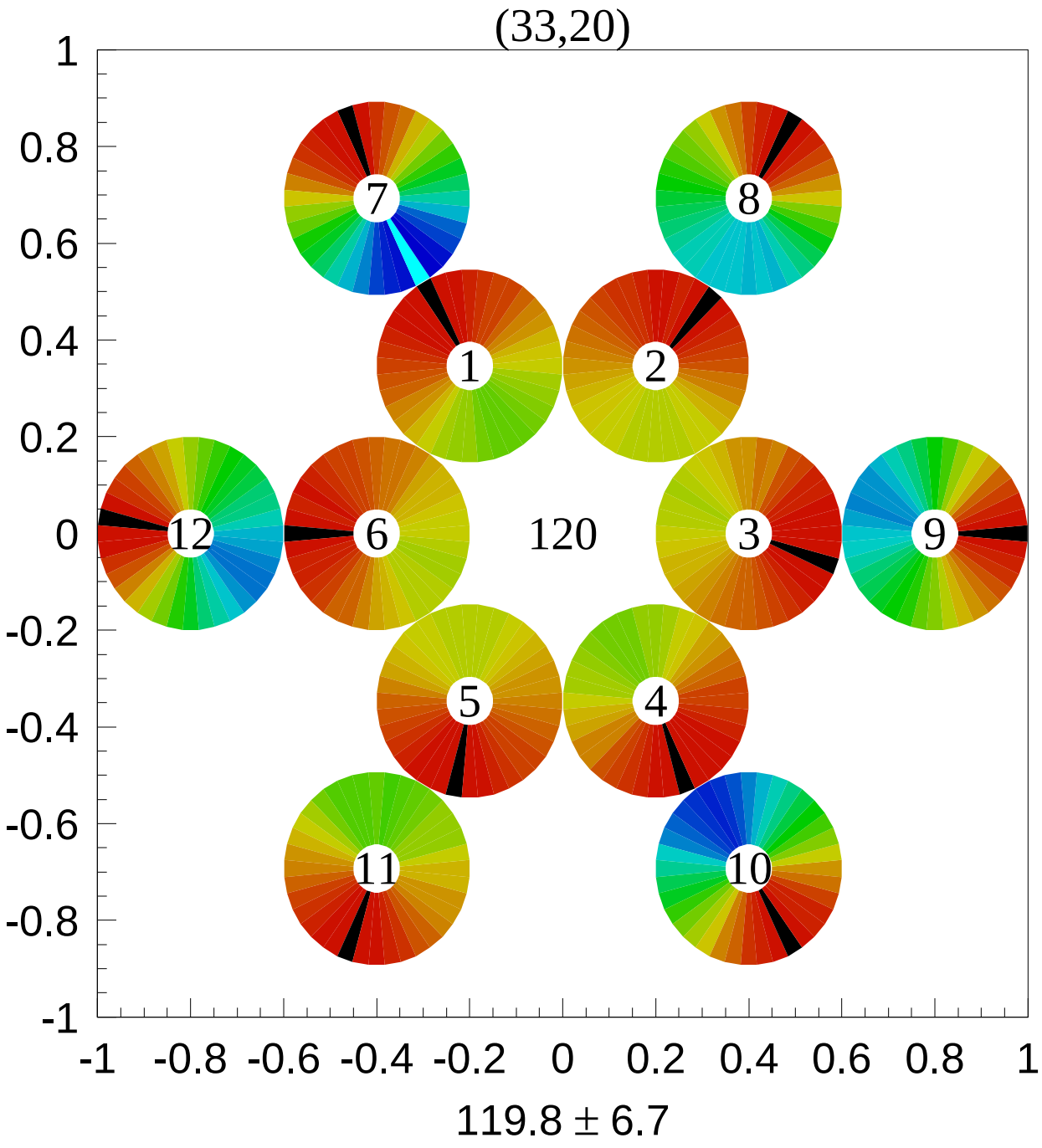

(33,18)
tilted LEDs
118 124 127 113 126 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 126 128 126 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

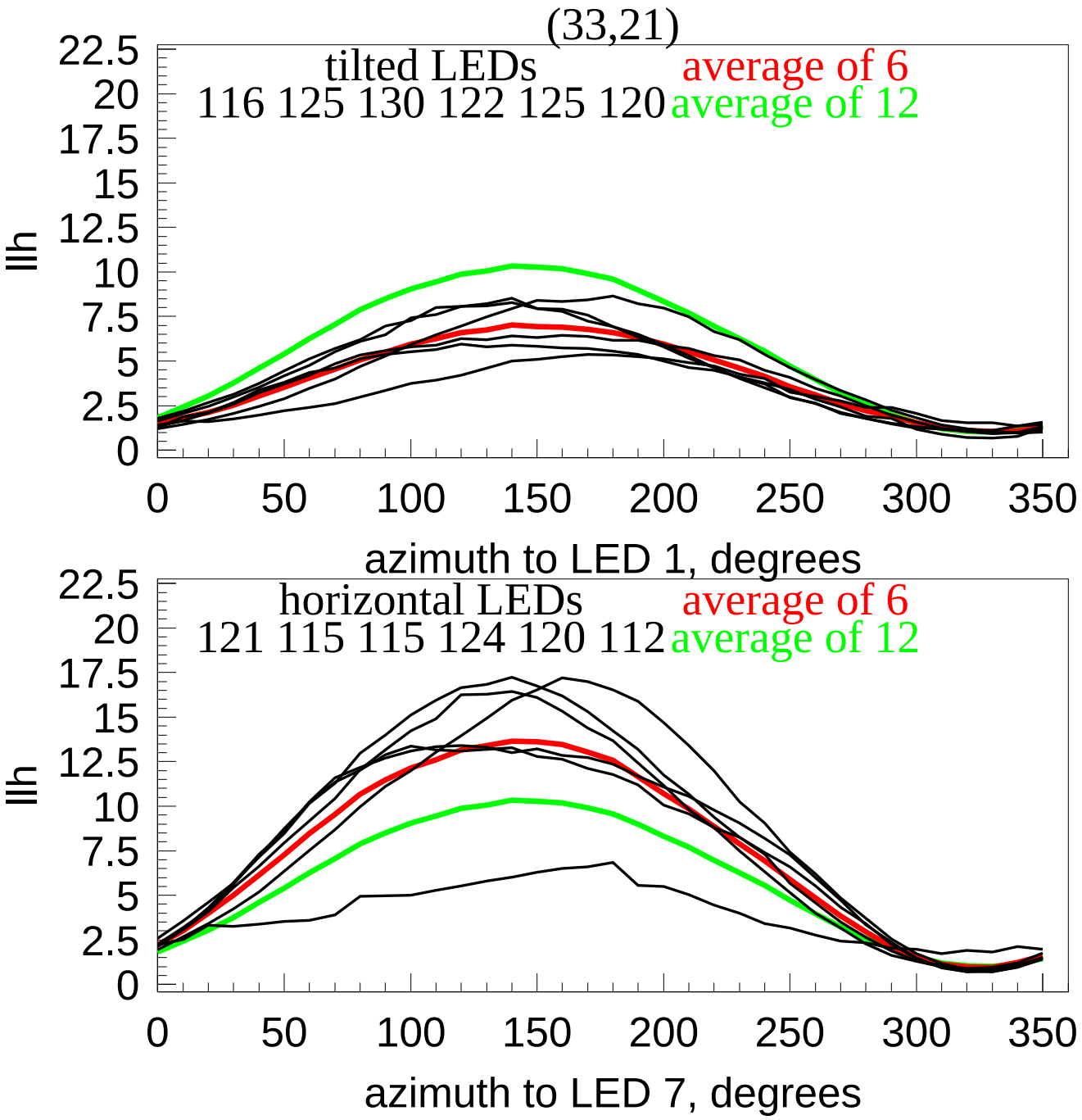

(33,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
2
8
70
5
11
3
4
9
10
71.8 ± 8.6

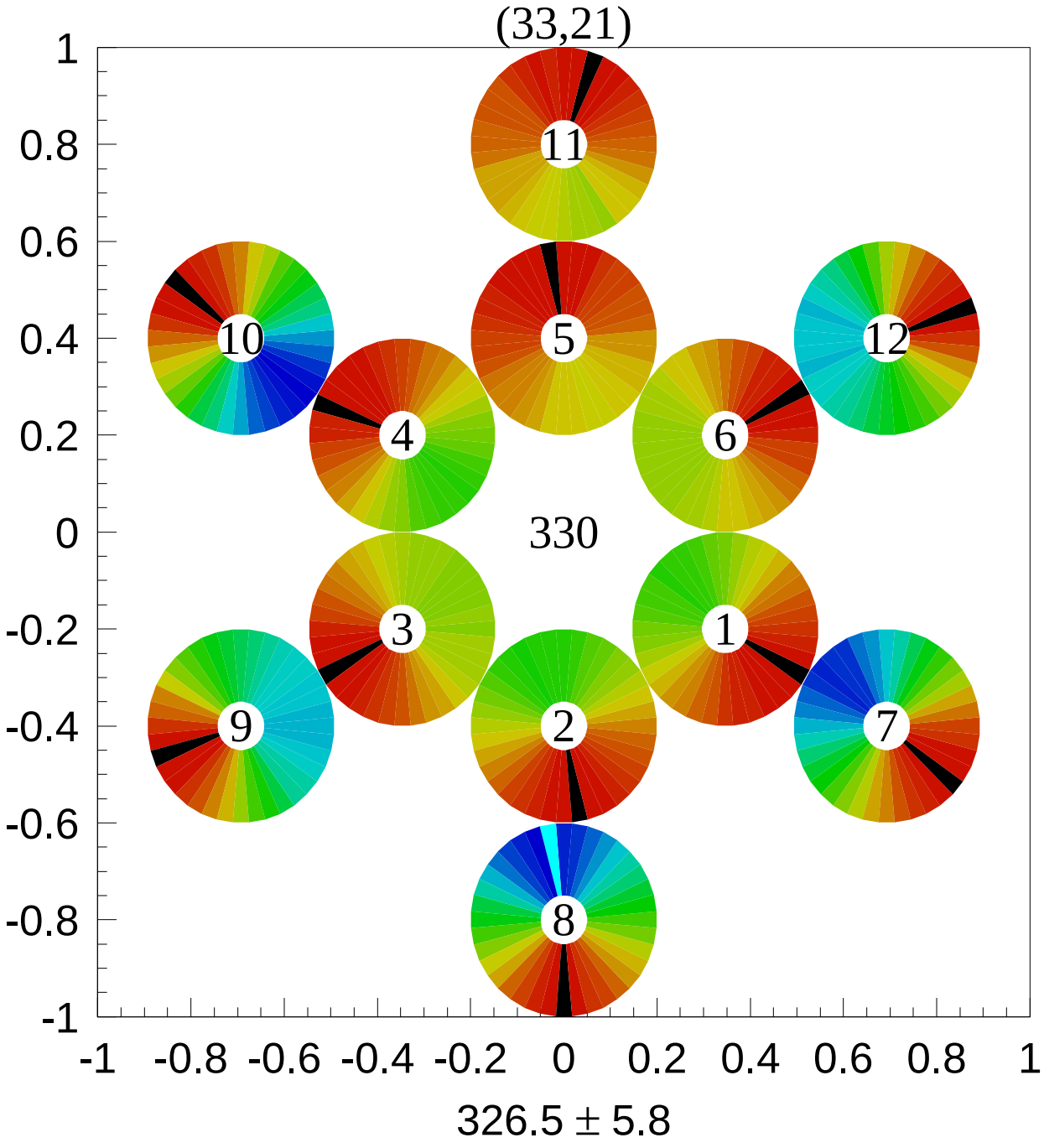

(33,19)
tilted LEDs
125 117 123 118 111 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 123 121 124 120 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

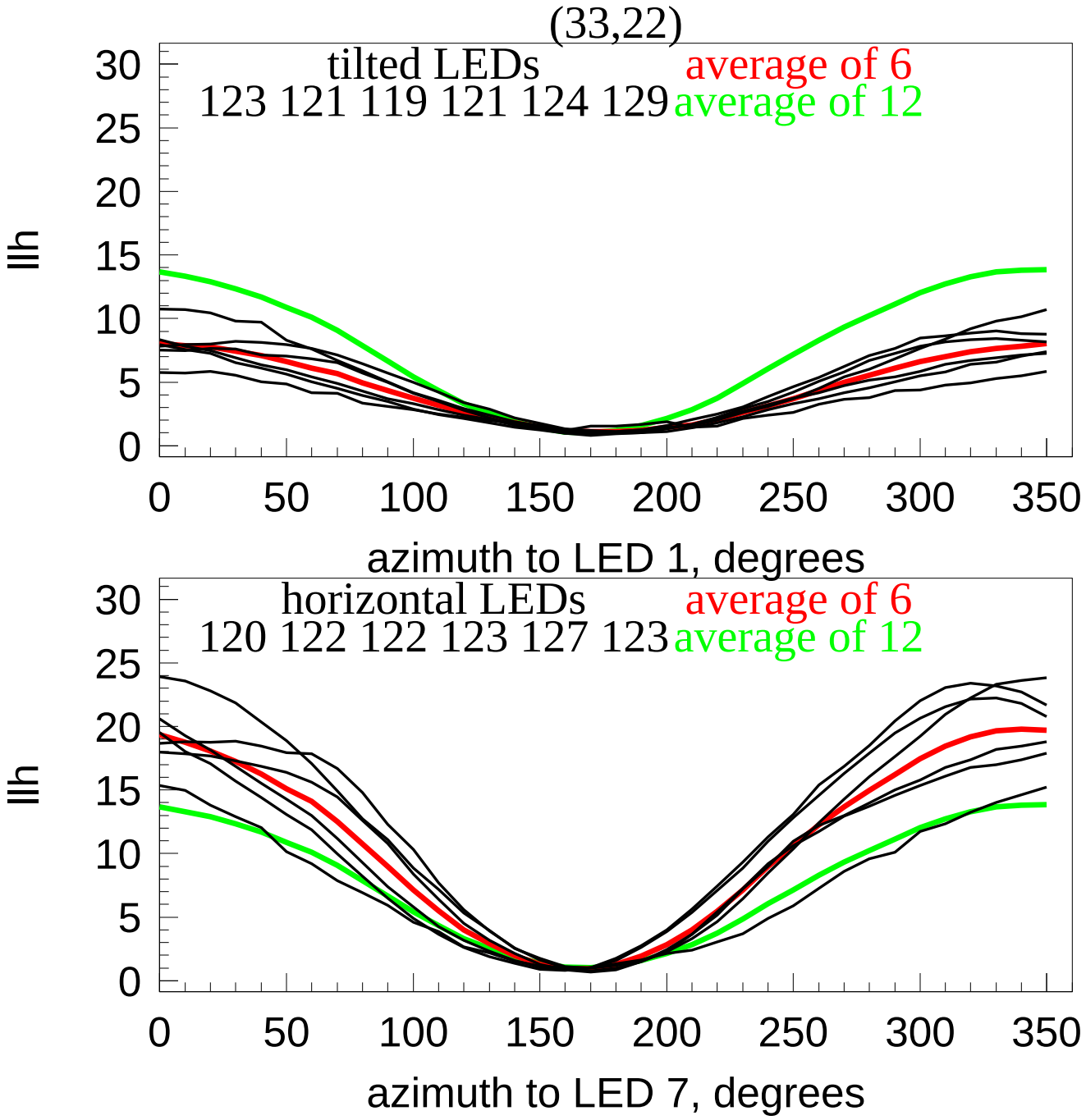

(33,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
153.5 ± 6.2

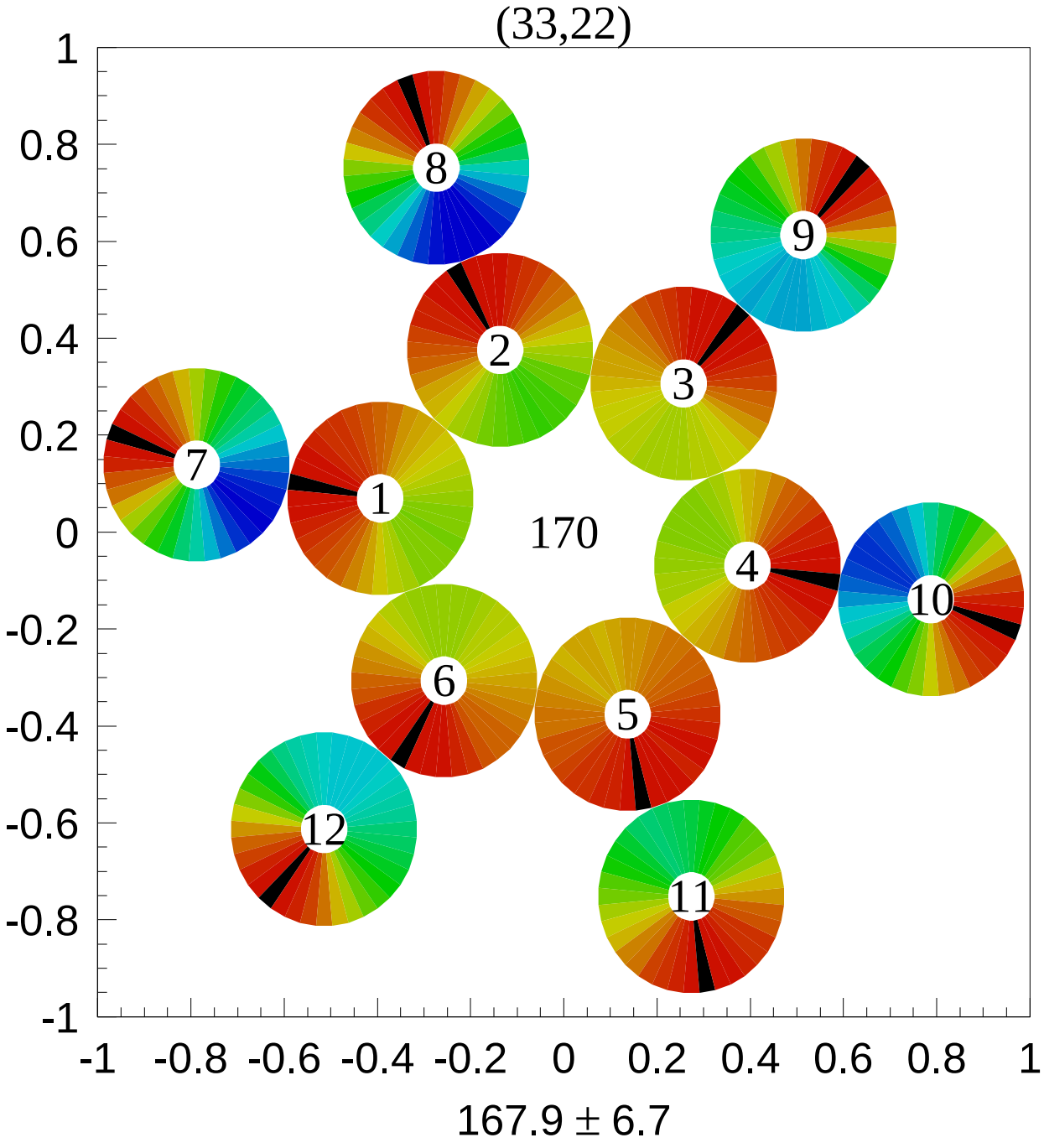

(33,20)
tilted LEDs
131 120 130 120 112 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 119 119 120 123 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

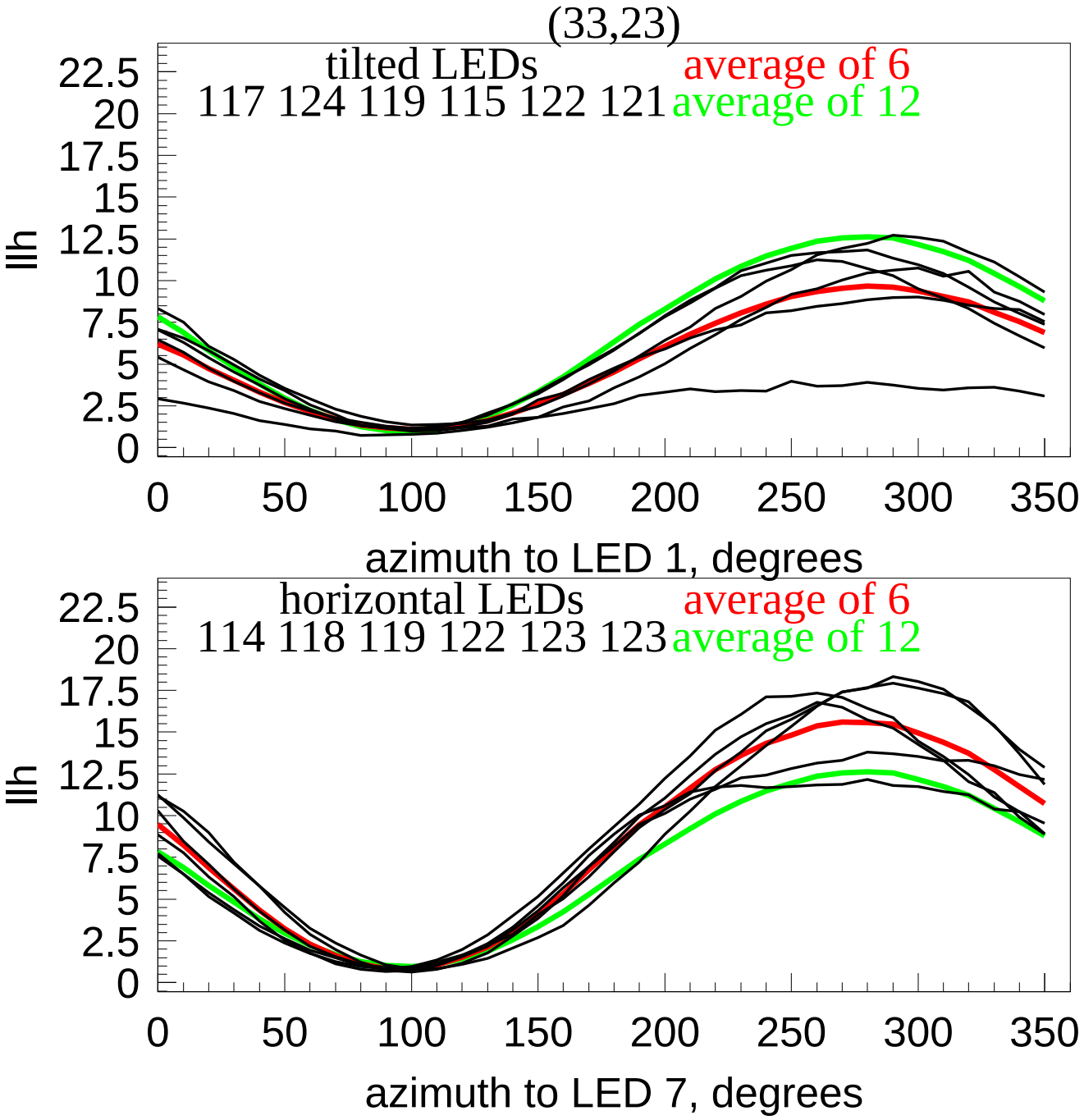

(33,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
119.8 ± 6.7

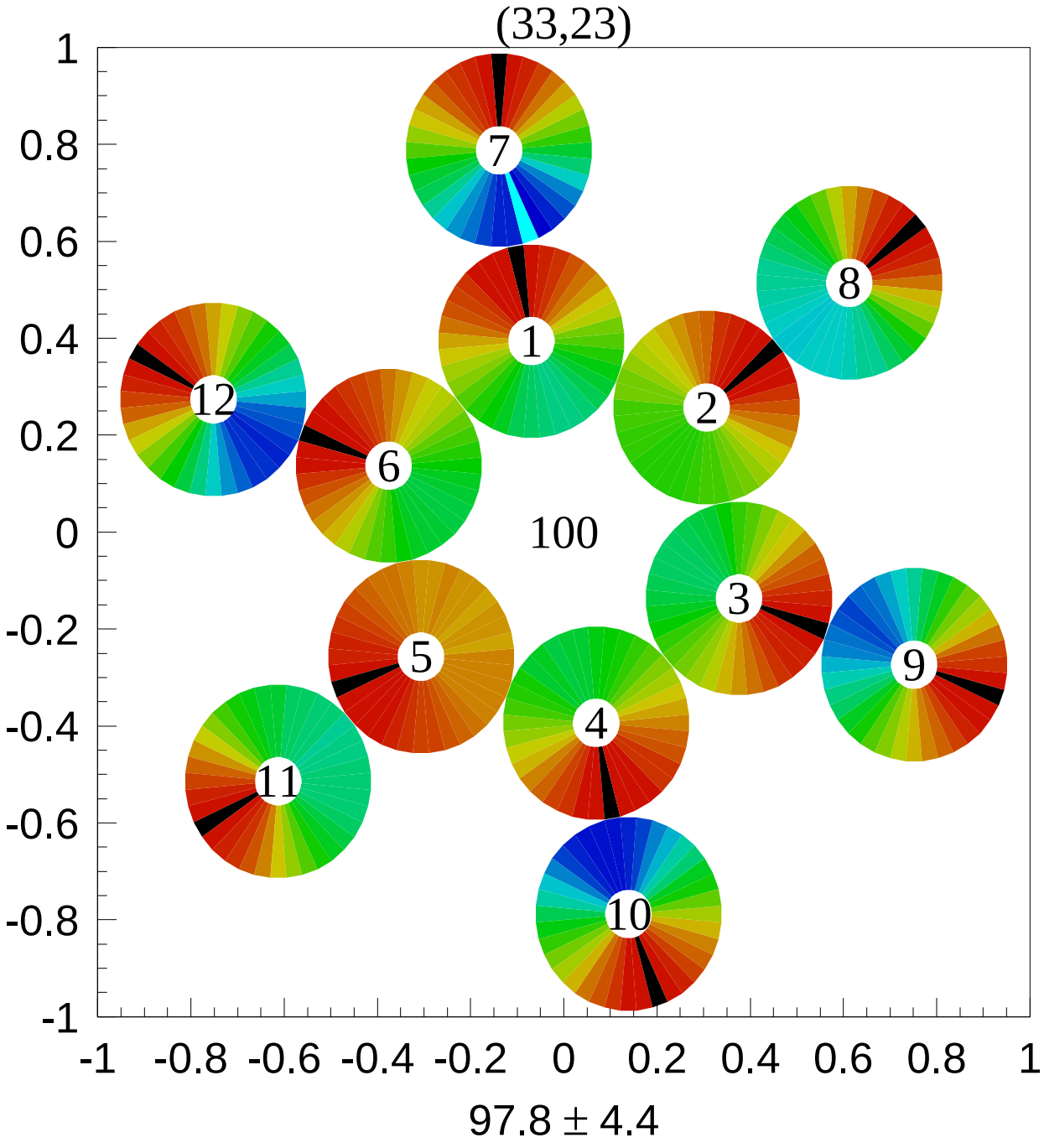

(33,21)
tilted LEDs
116 125 130 122 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 115 115 124 120 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

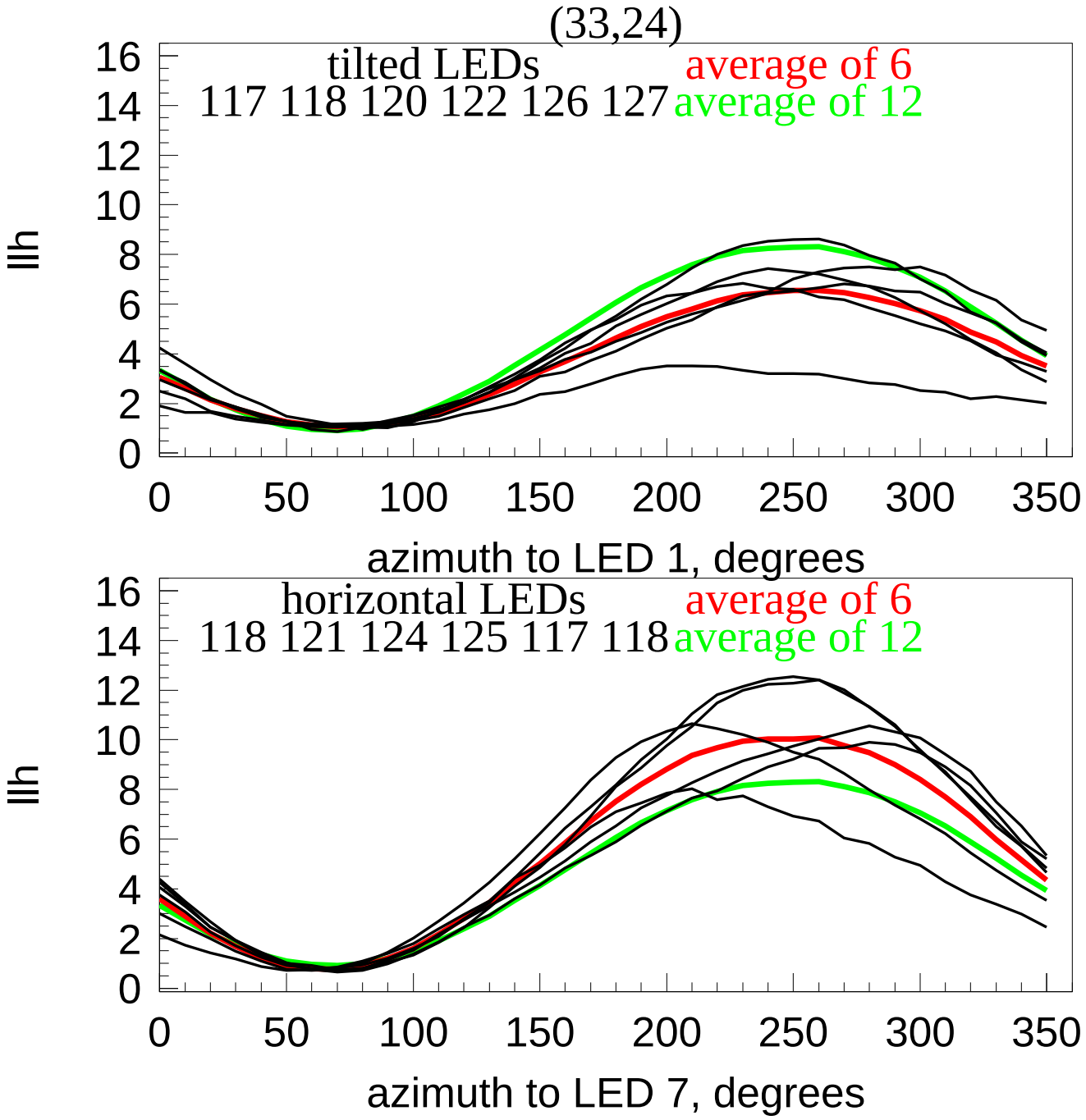

(33,21)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
326.5 ± 5.8

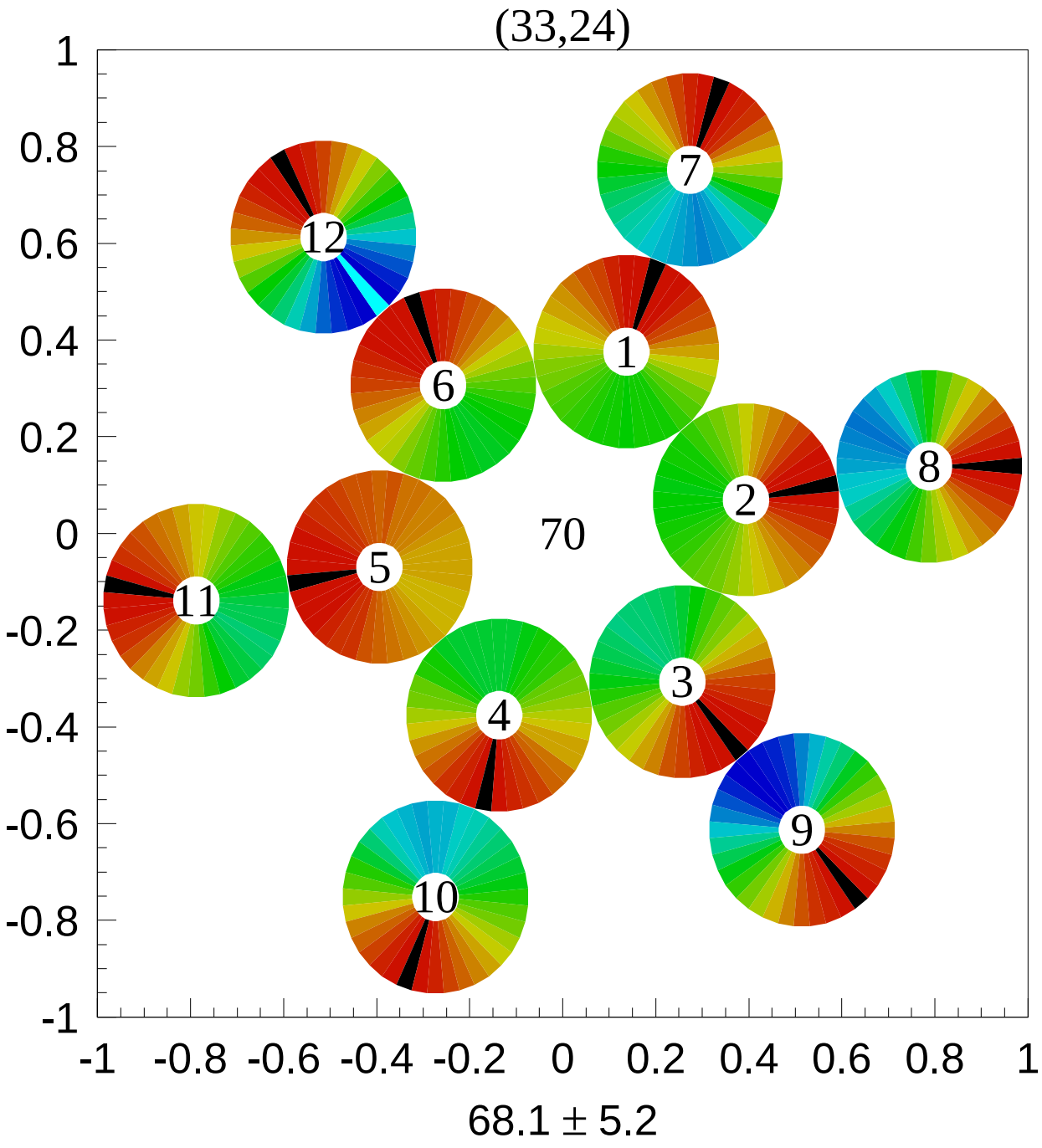

(33,22)
tilted LEDs
123 121 119 121 124 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 122 123 127 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

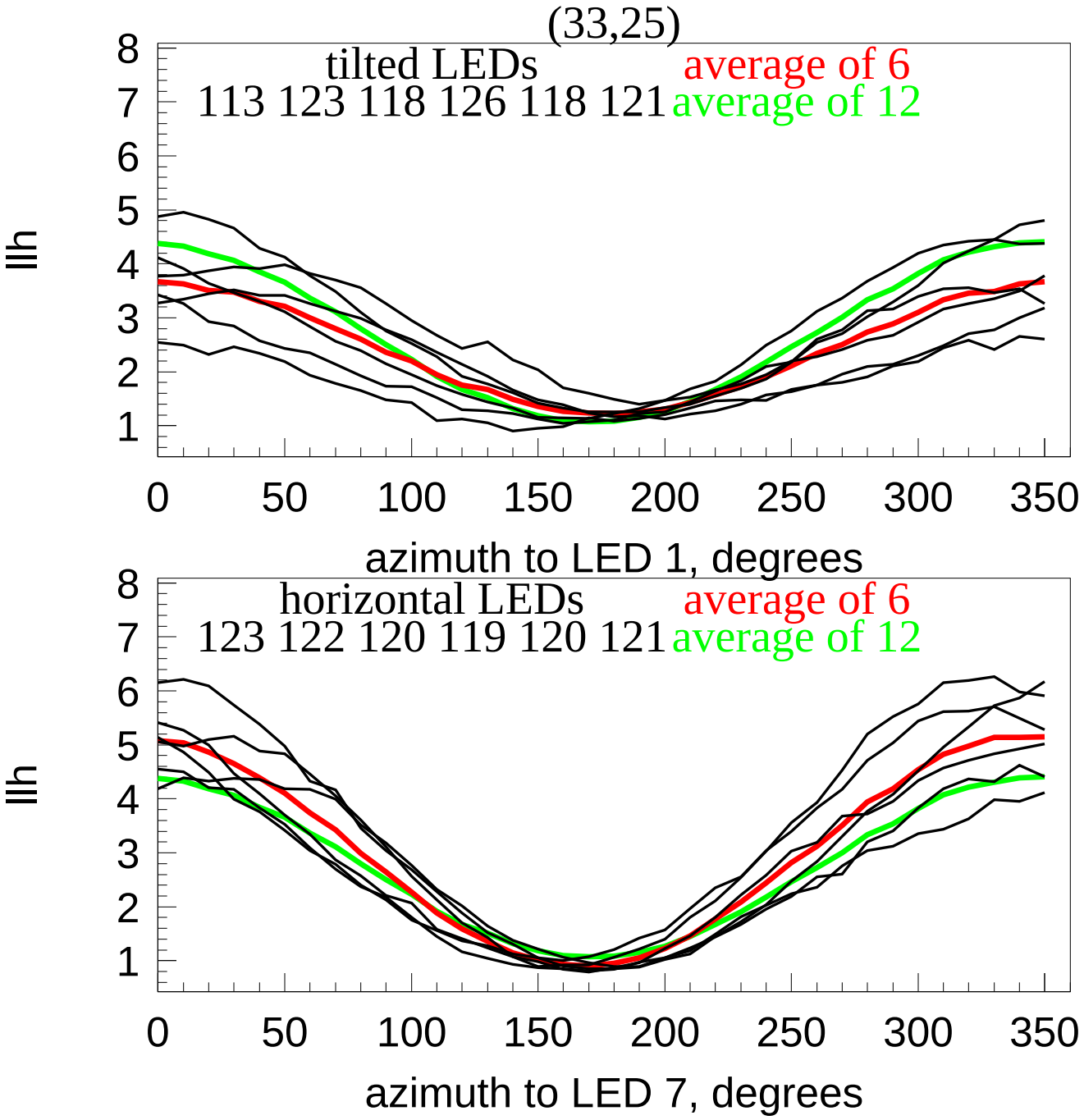

(33,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
167.9 ± 6.7

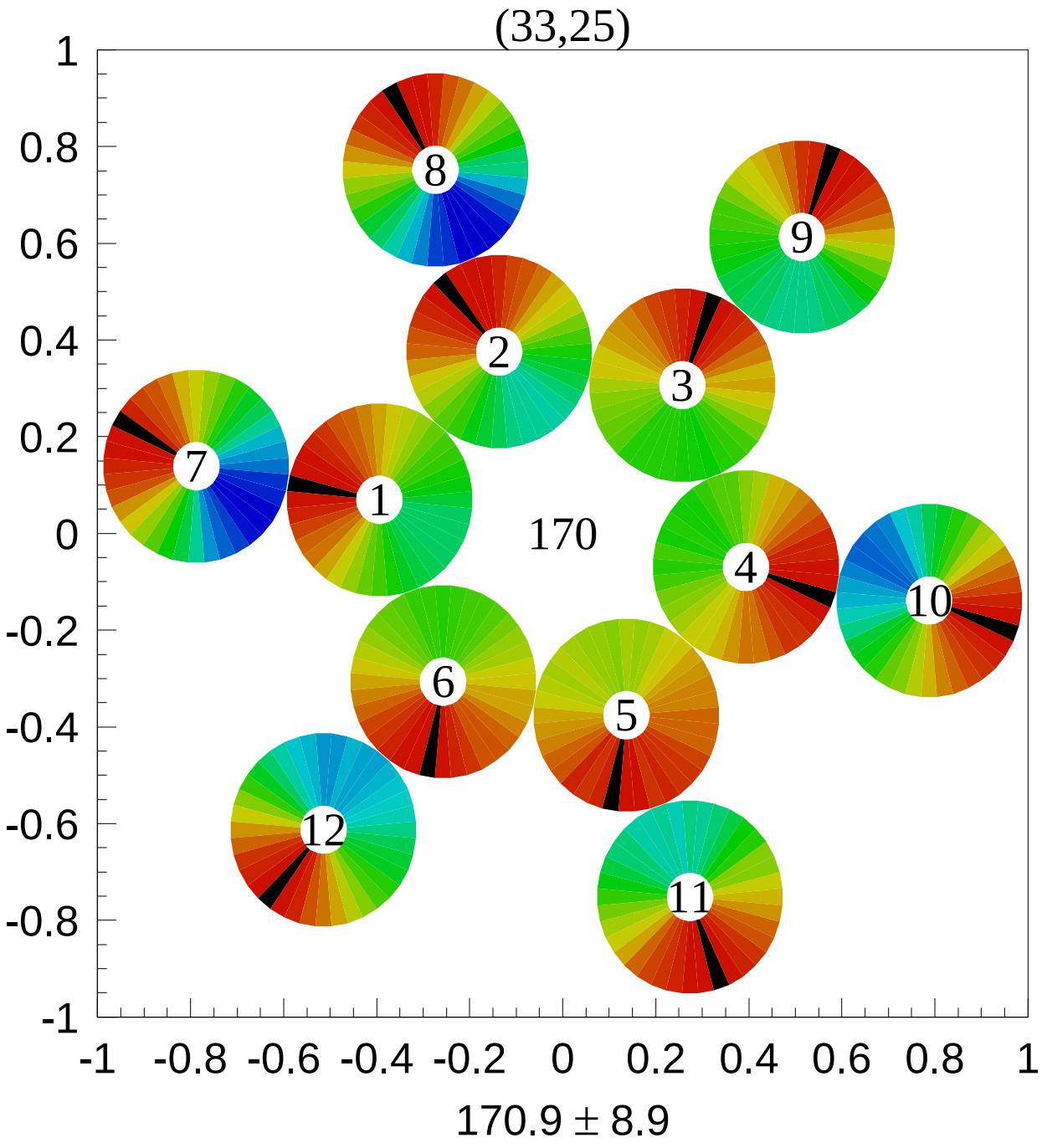

(33,23)
tilted LEDs
117 124 119 115 122 121
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
114 118 119 122 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

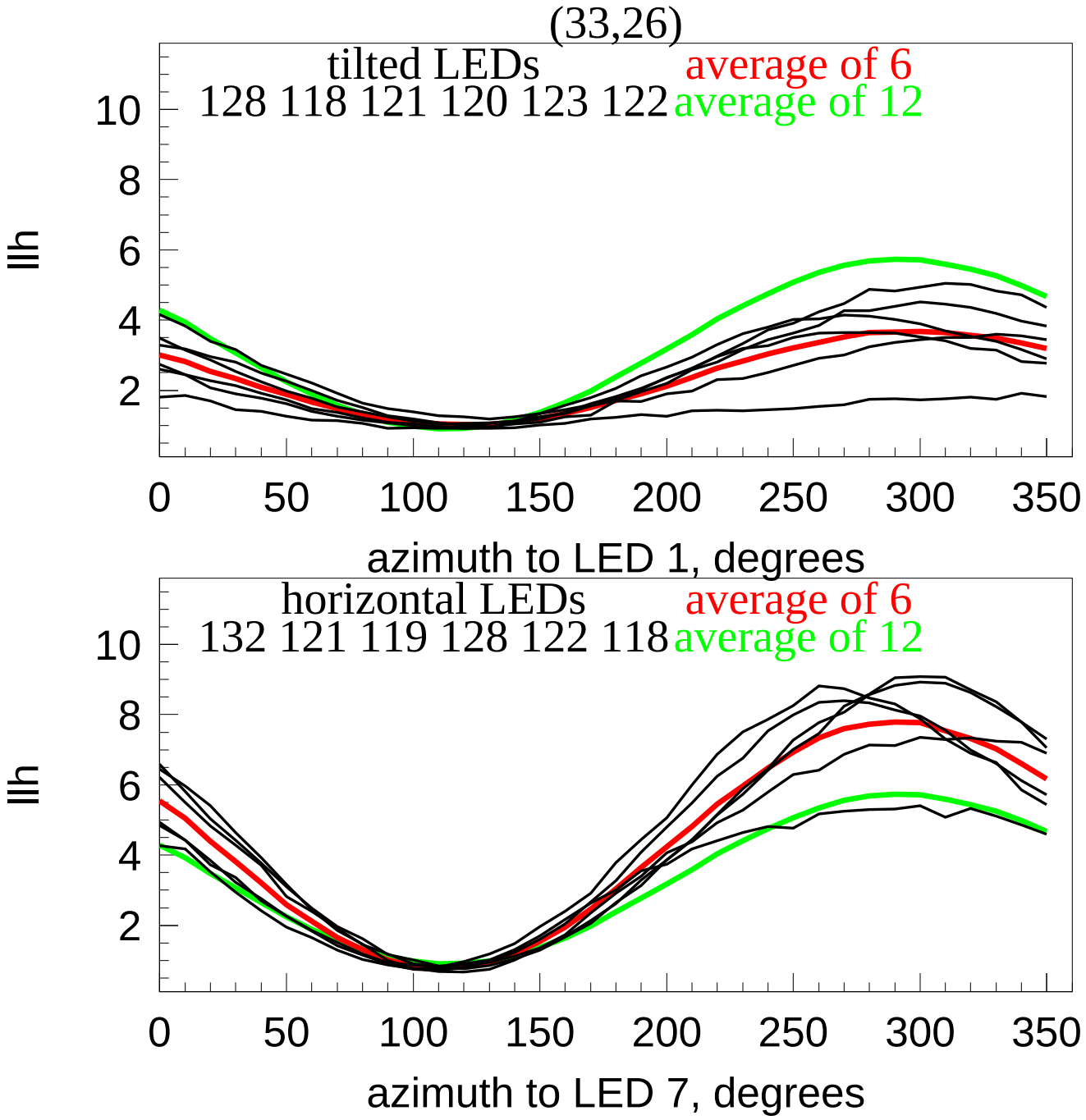

(33,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
97.8 ± 4.4

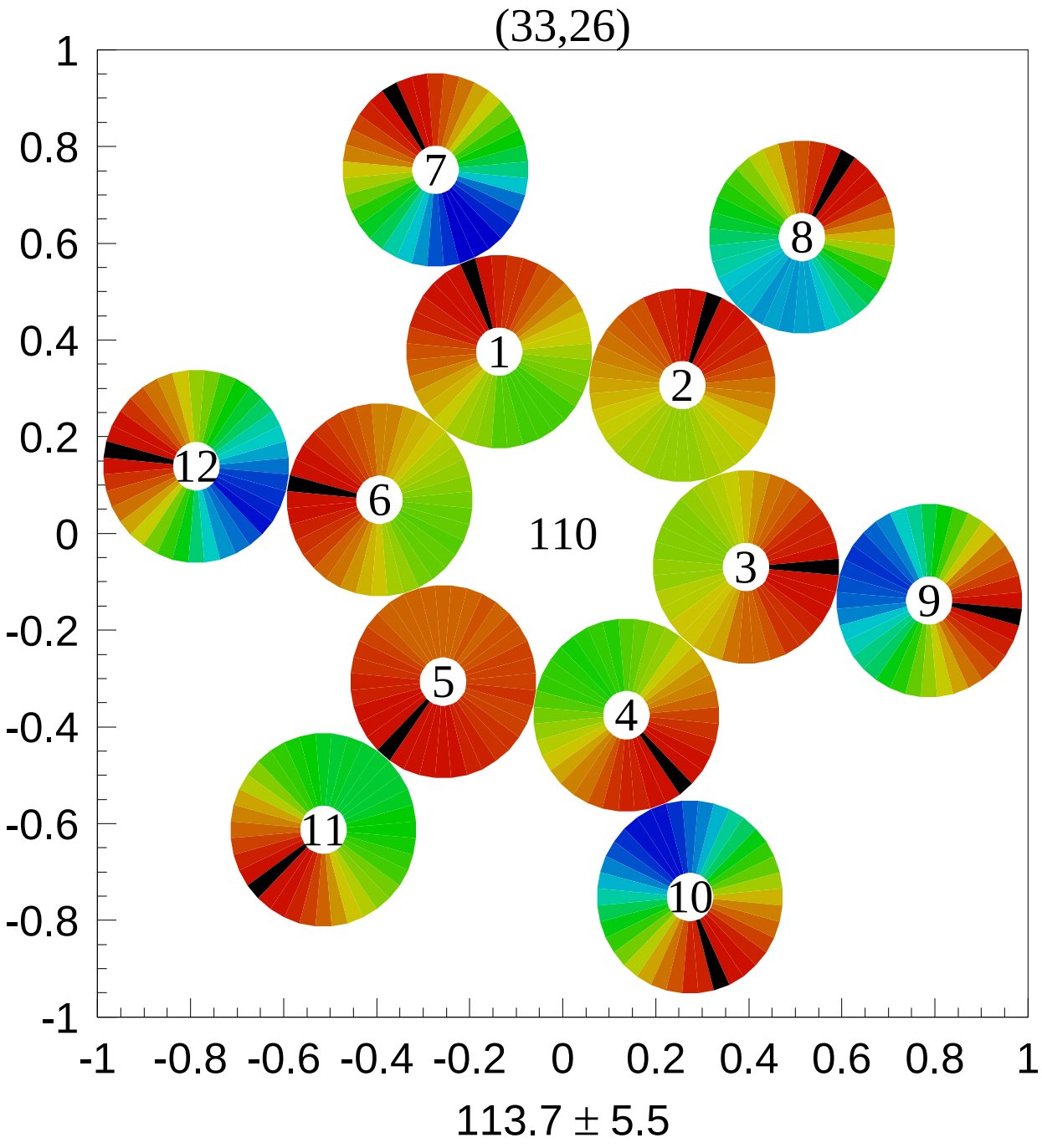

(33,24)
tilted LEDs
117 118 120 122 126 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 124 125 117 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

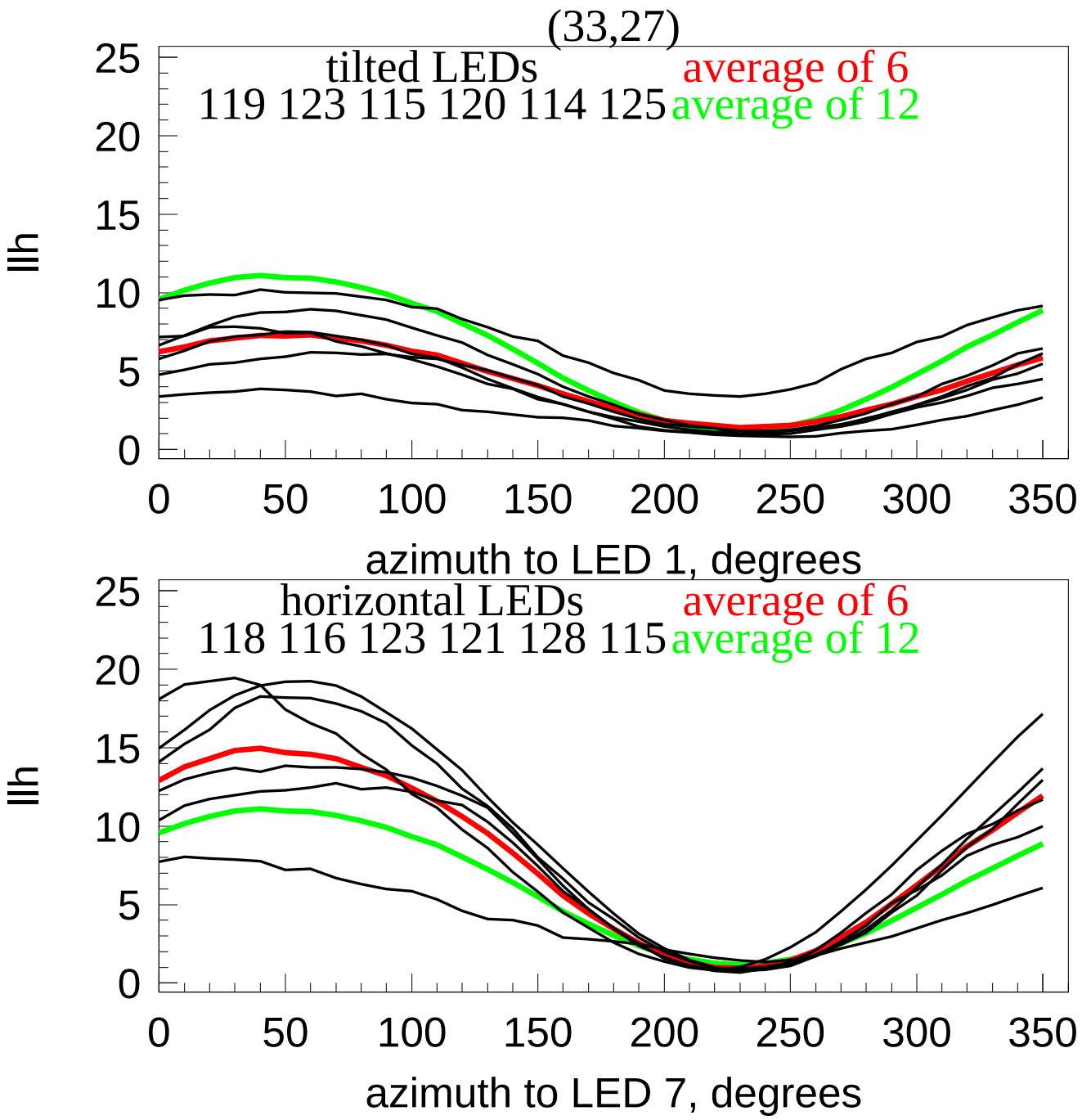

(33,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
68.1 ± 5.2

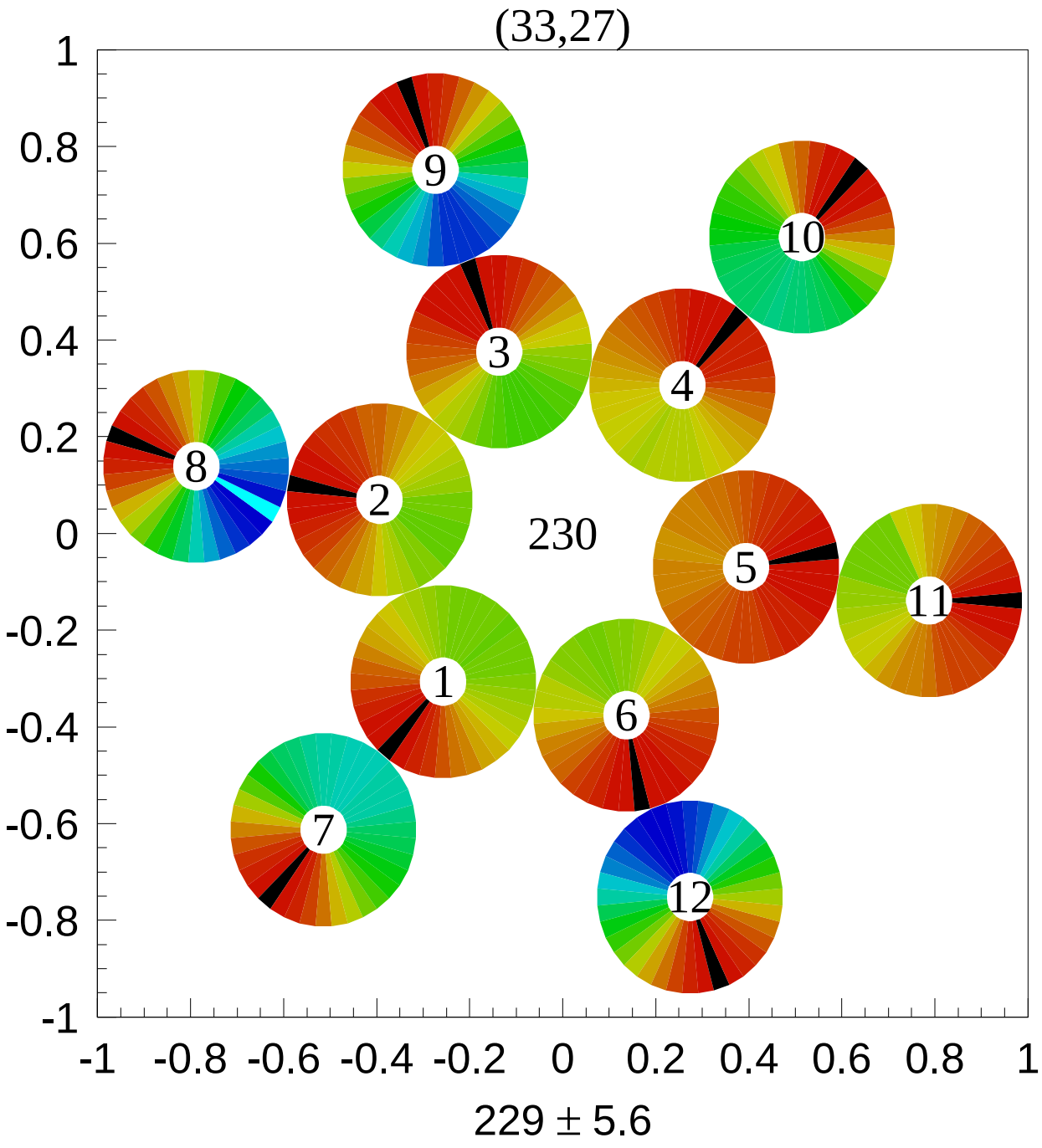

(33,25)
tilted LEDs
113 123 118 126 118 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 120 119 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

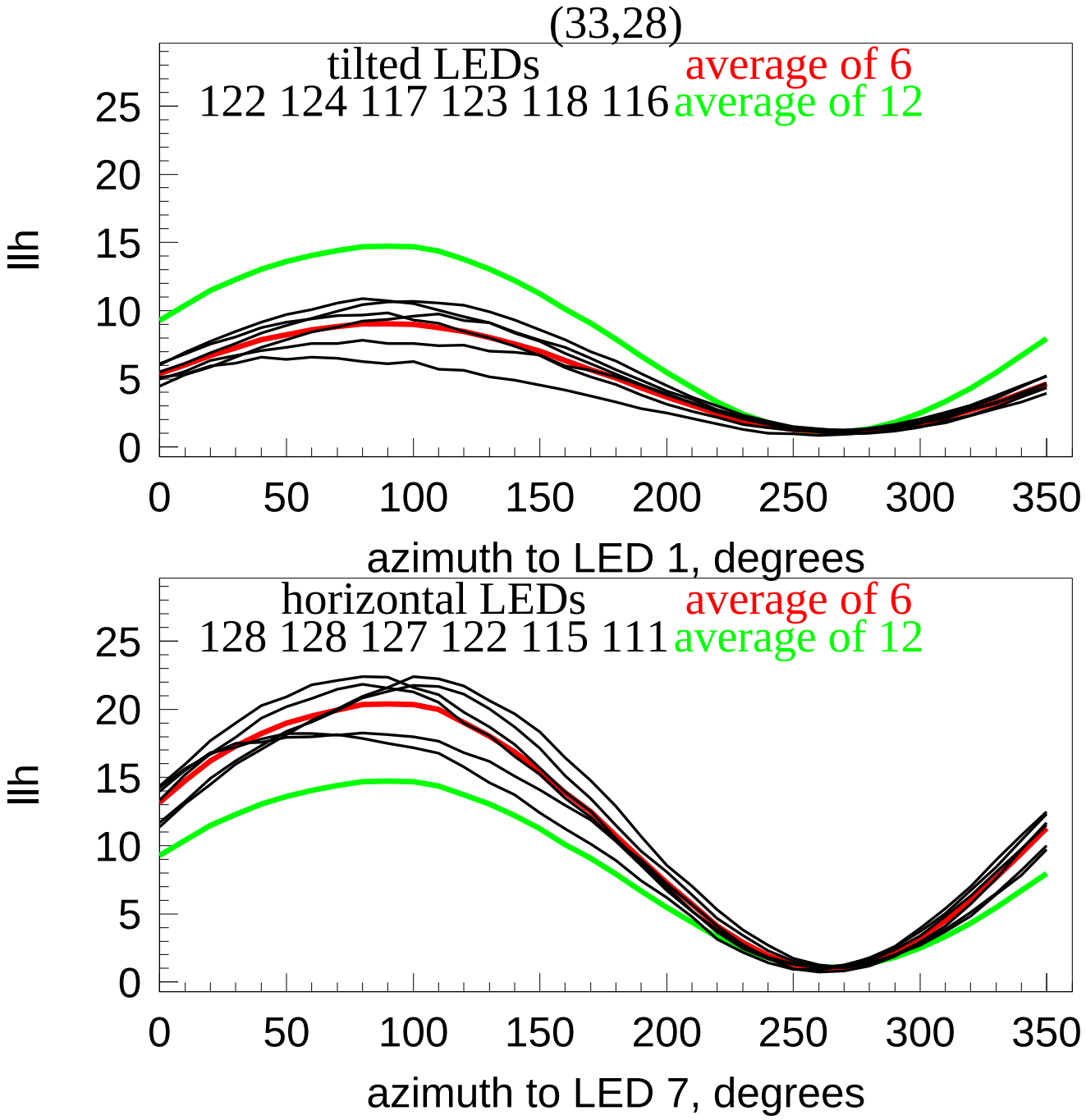

(33,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
170
170.9 ± 8.9
1
2
3
4
5
6
7
8
9
10
11
12

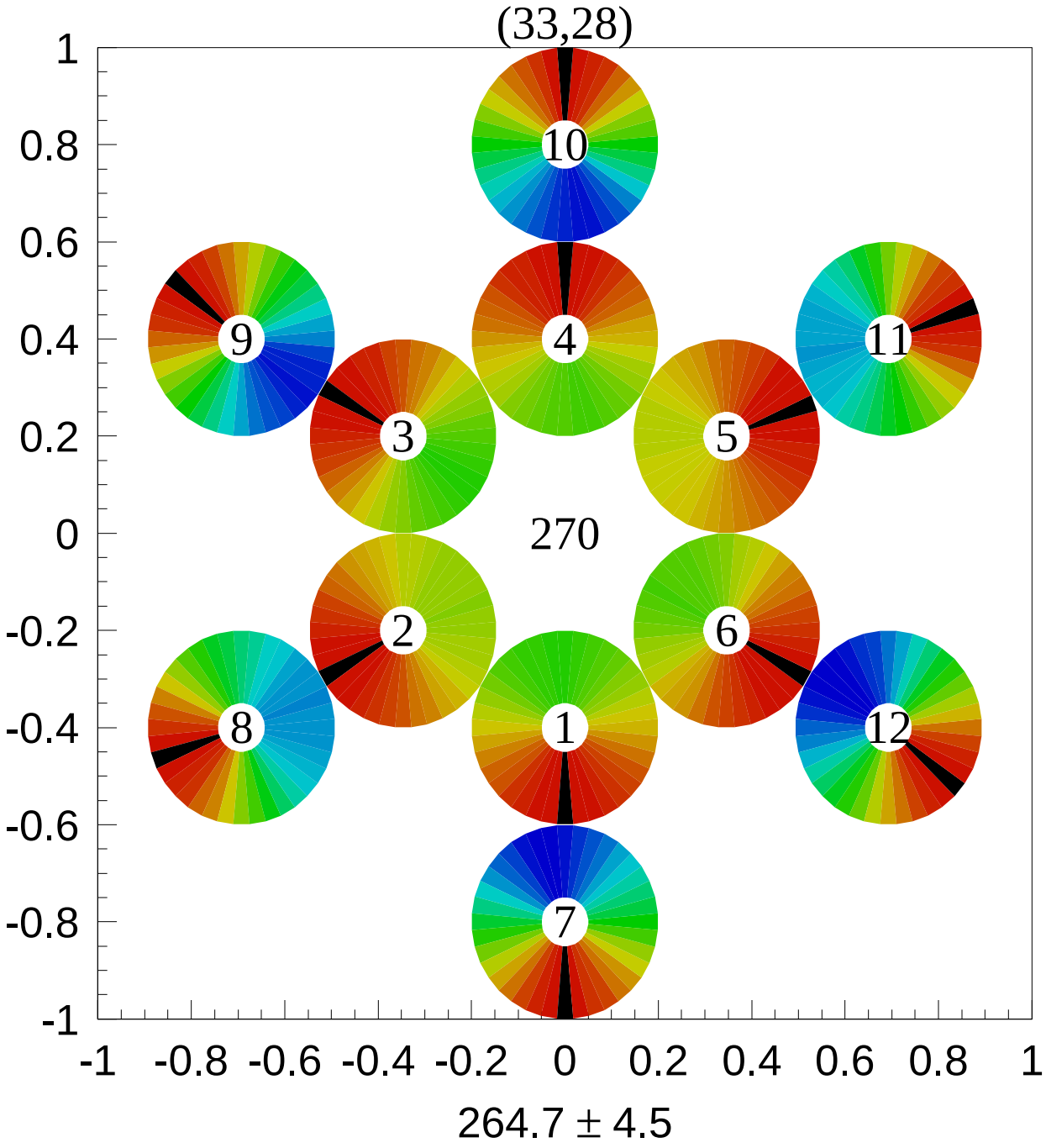

(33,26)
tilted LEDs
128 118 121 120 123 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
132 121 119 128 122 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

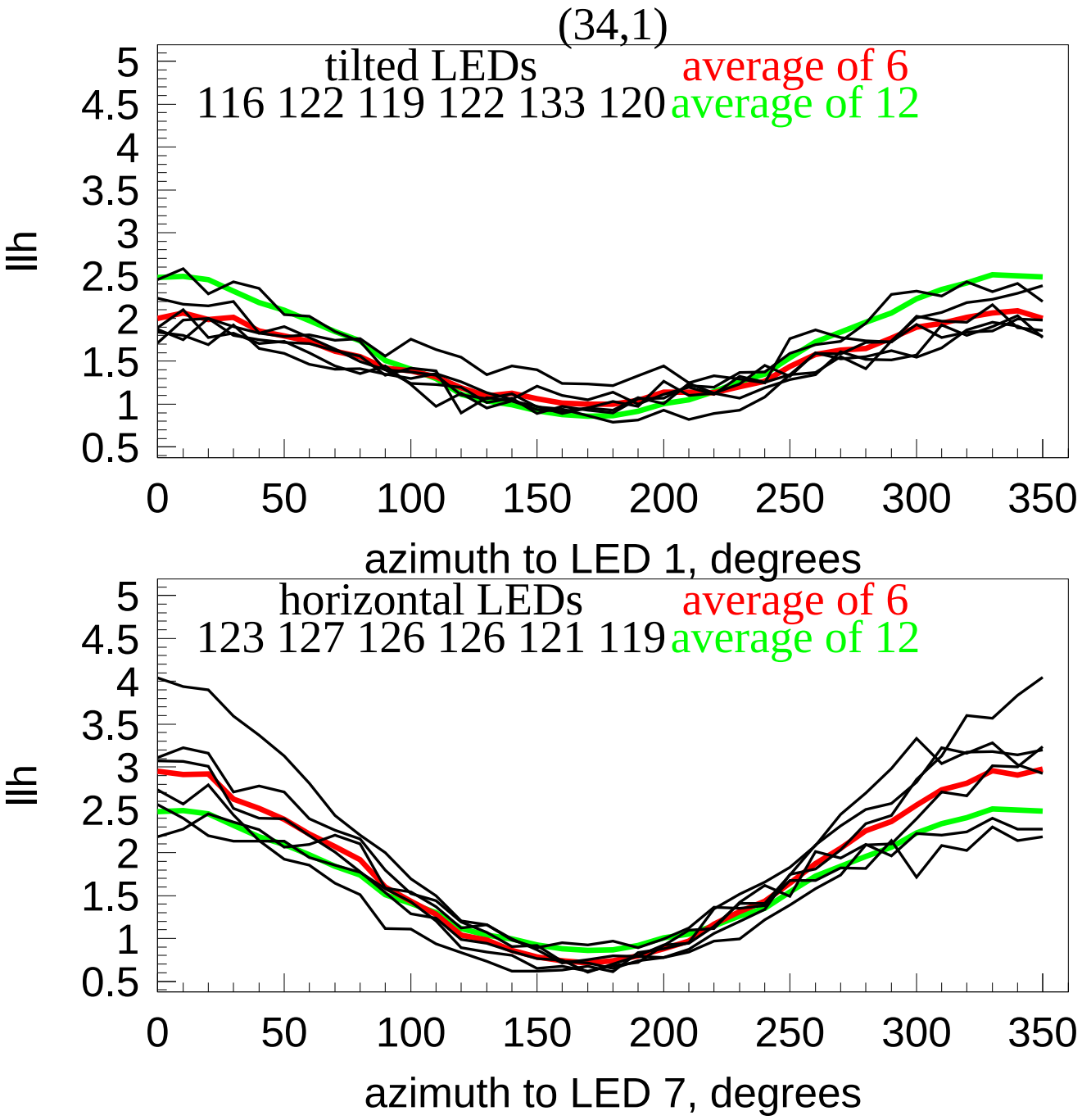

(33,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
113.7 ± 5.5

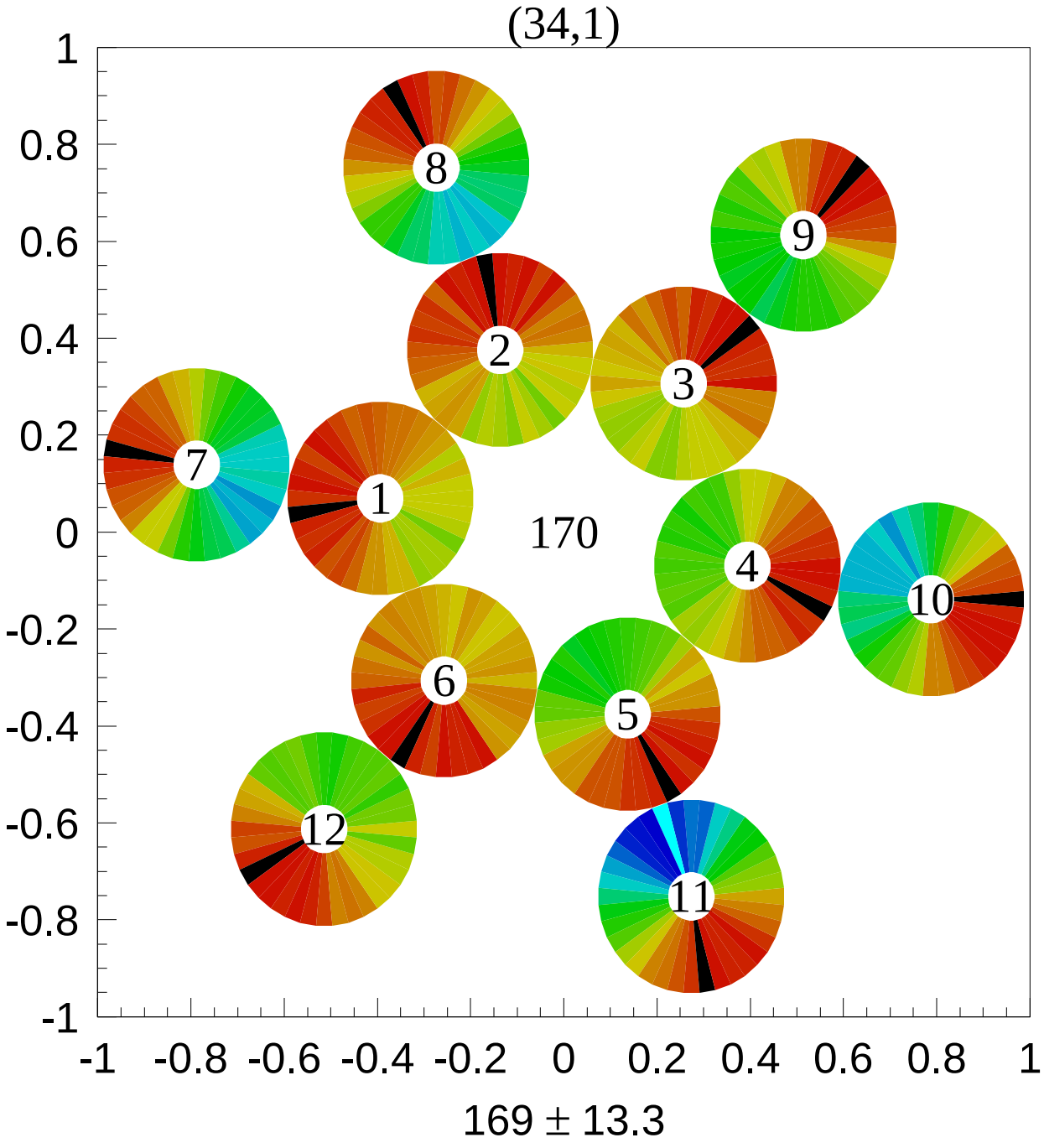

(33,27)
tilted LEDs
119 123 115 120 114 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 116 123 121 128 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

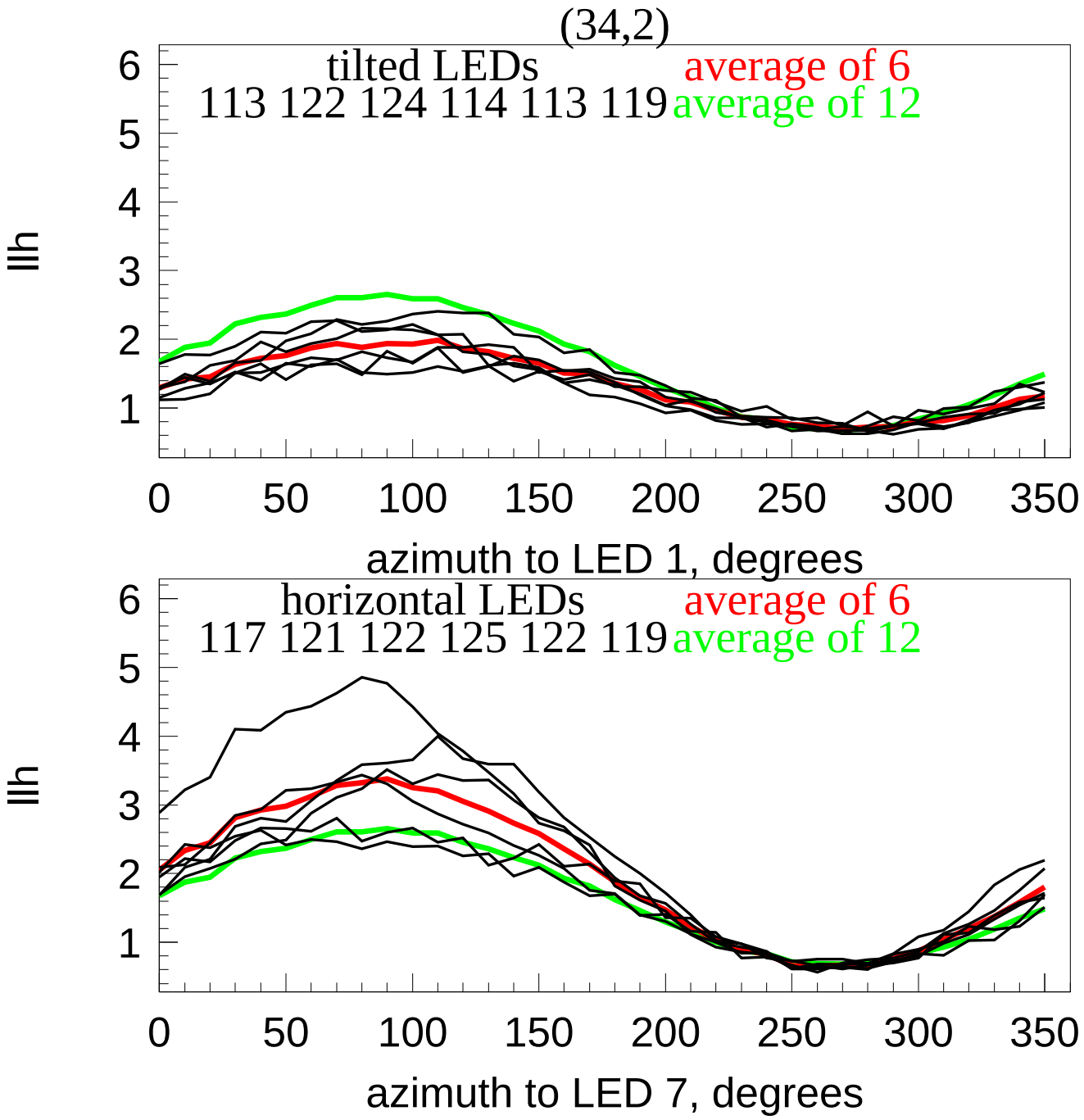

(33,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
229 ± 5.6

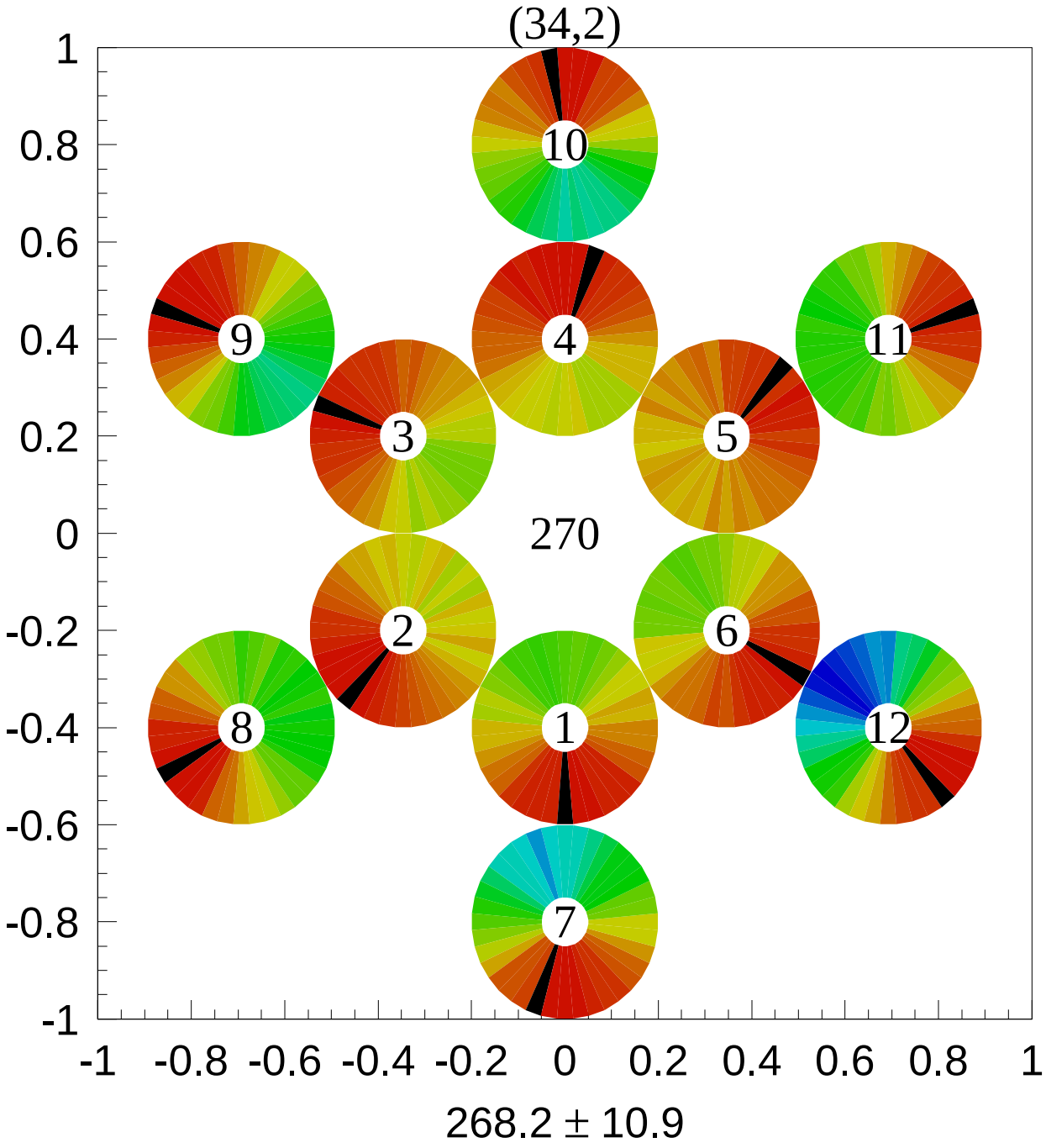

(33,28)
tilted LEDs
122 124 117 123 118 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 128 127 122 115 111
average of 6
average of 12
llh
azimuth to LED 7, degrees

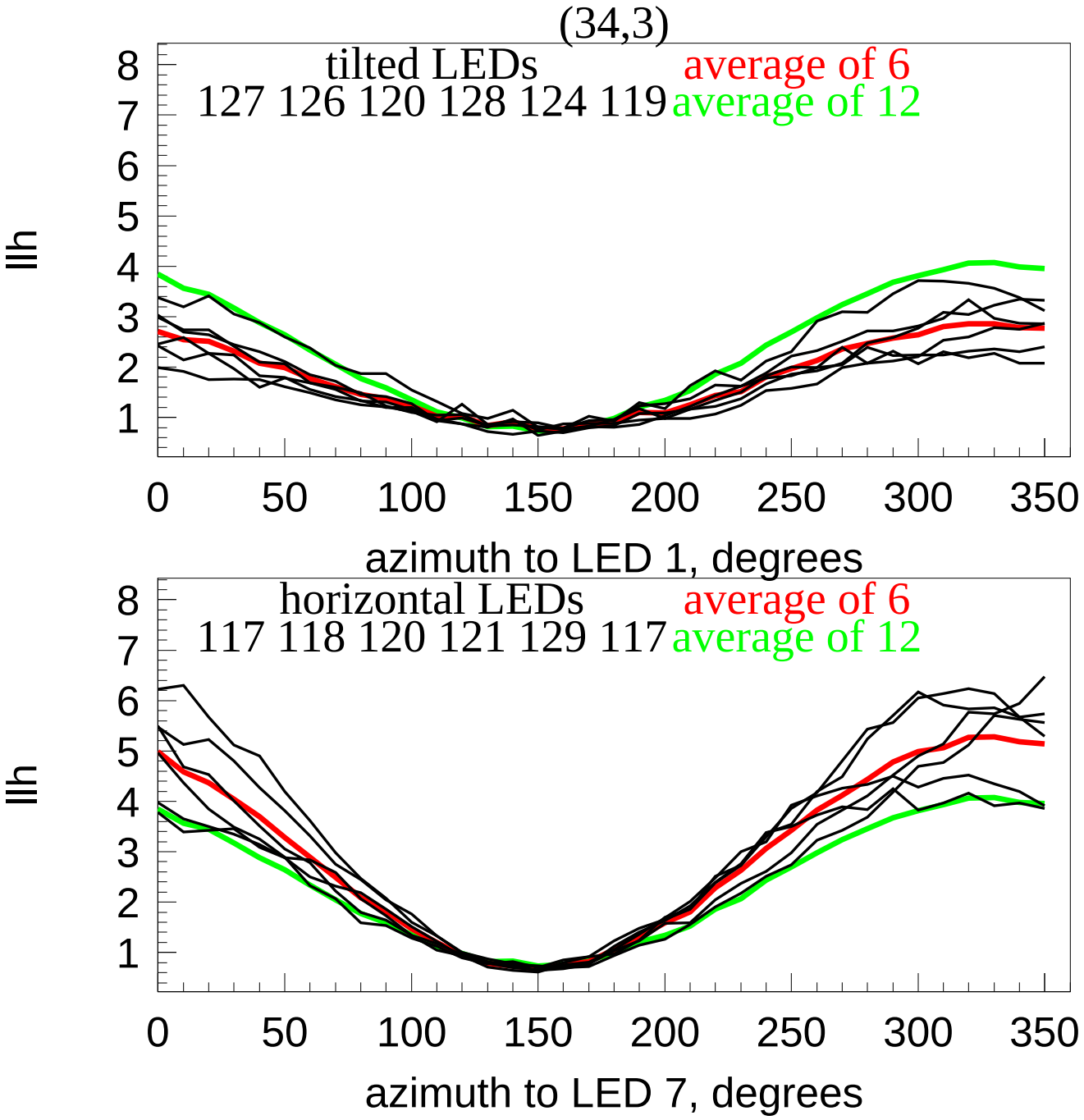

(33,28)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
264.7 ± 4.5

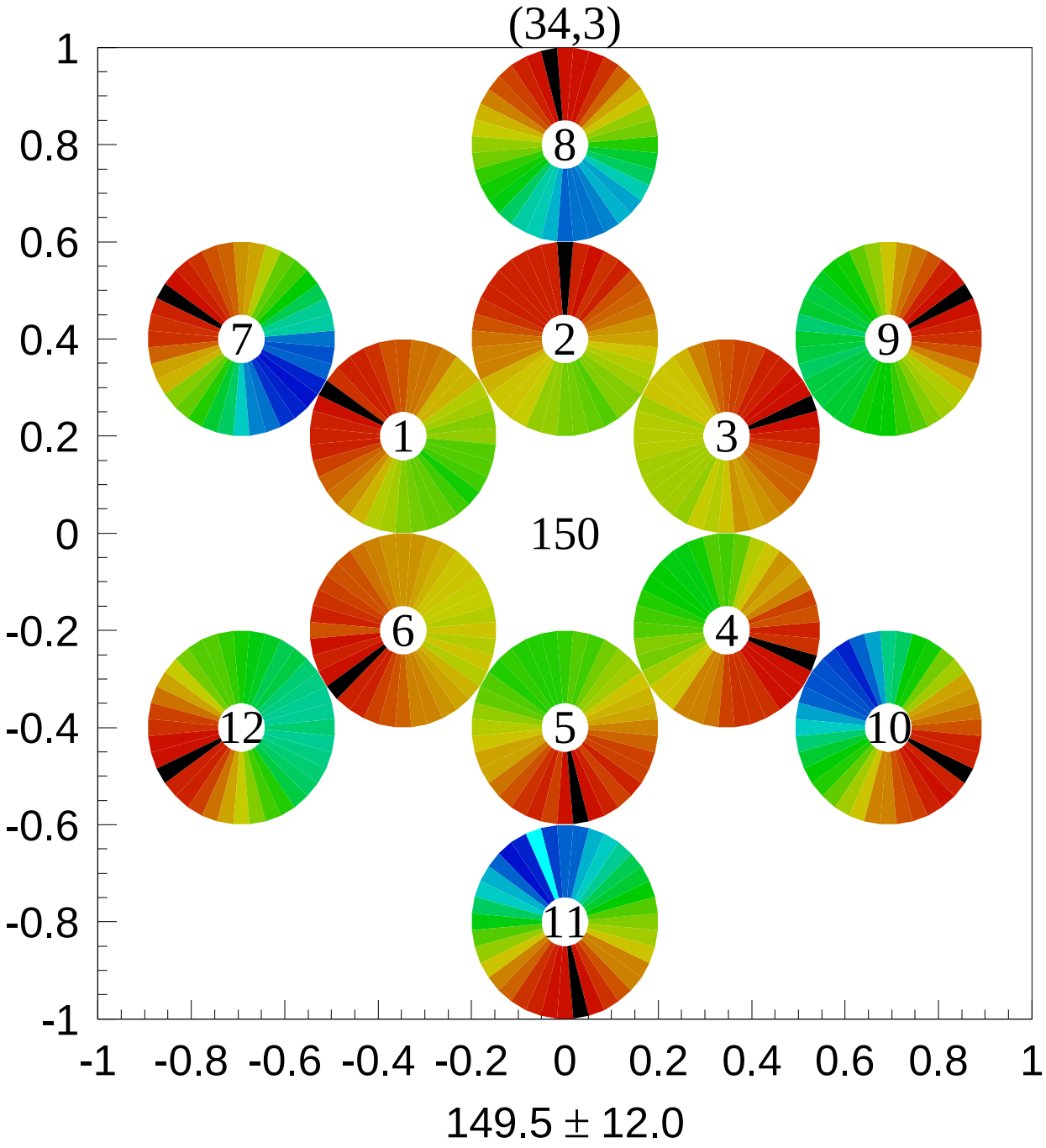

(34,1)
tilted LEDs
116 122 119 122 133 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 127 126 126 121 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

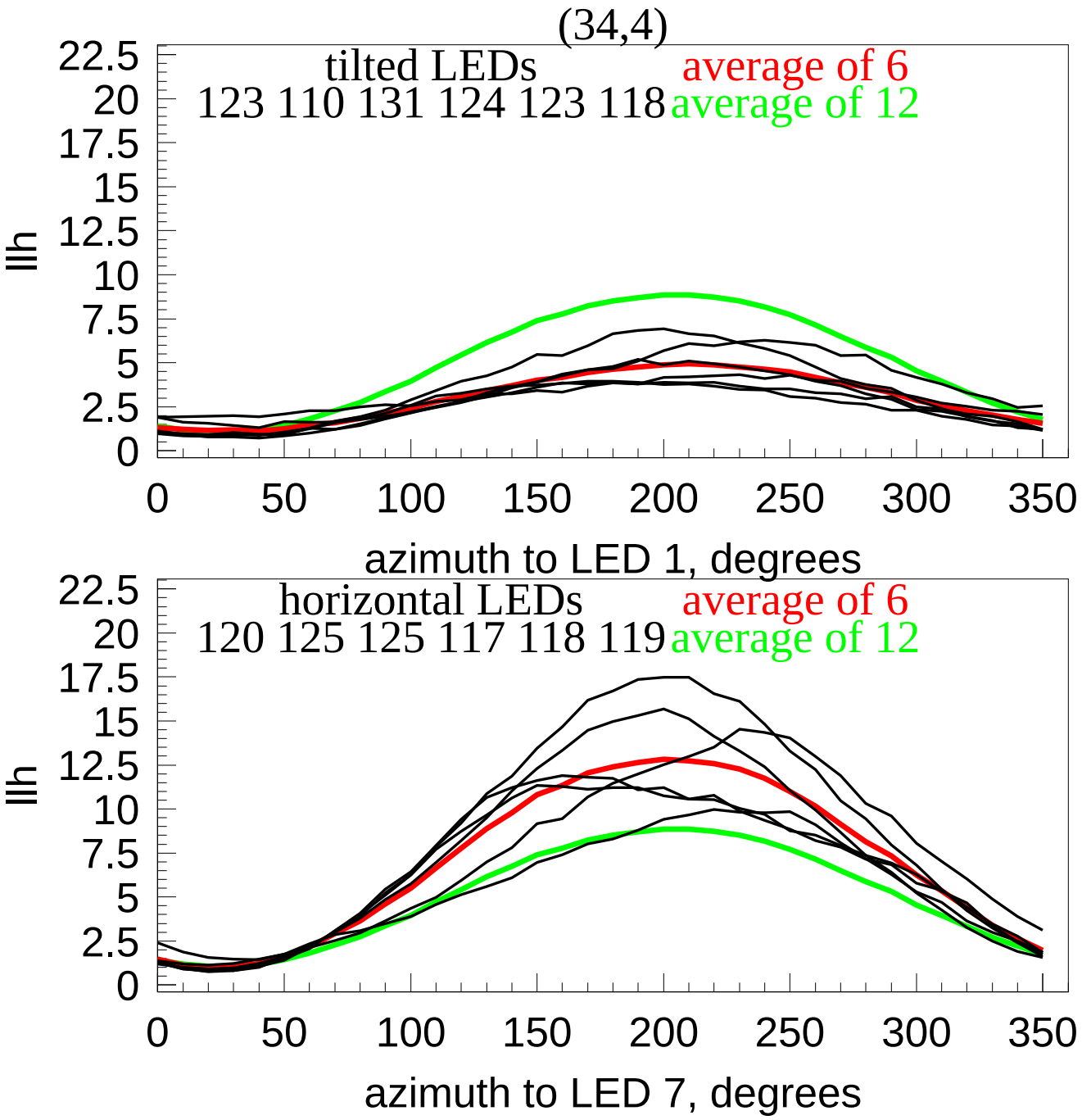

(34,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
169 ± 13.3

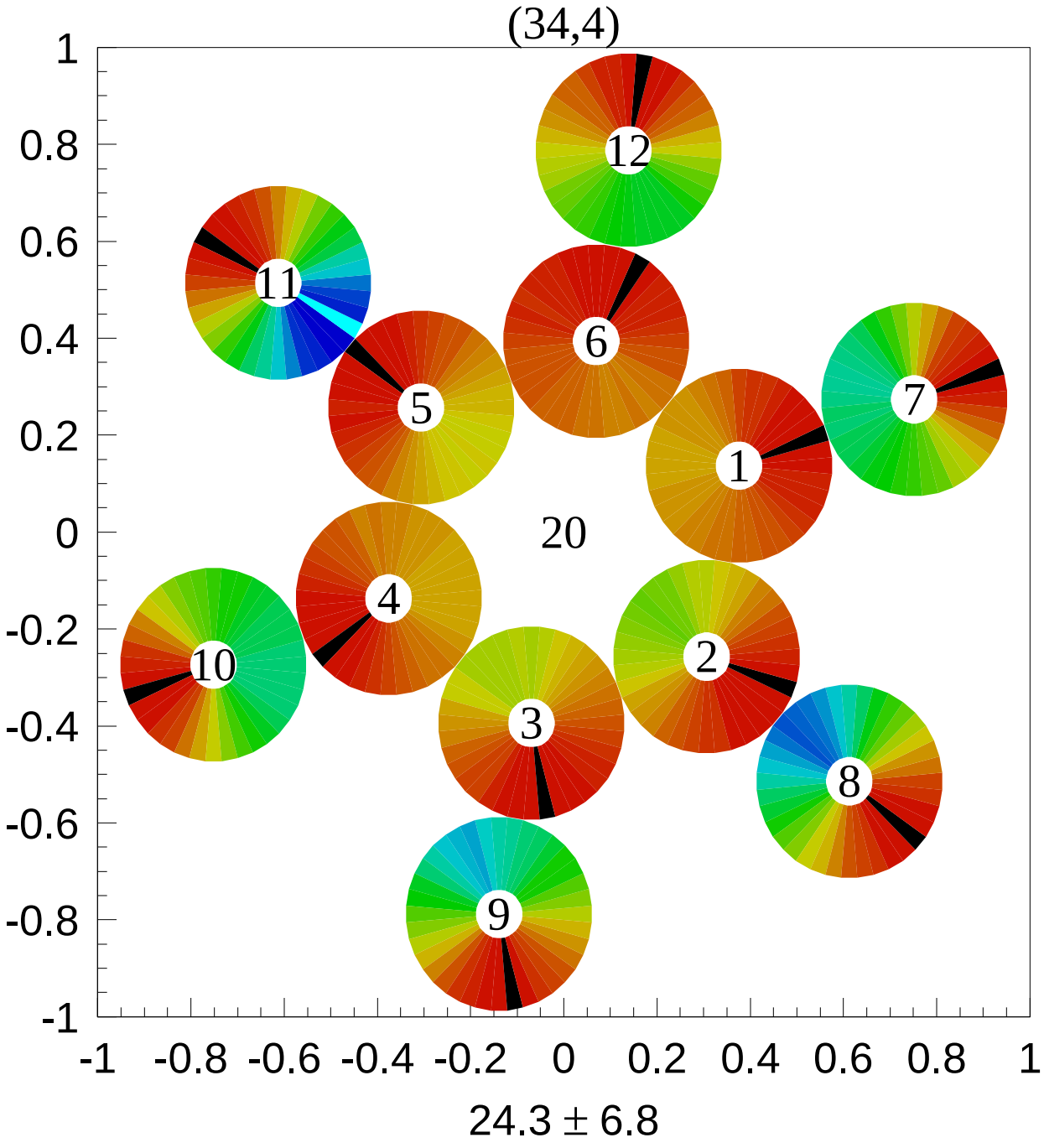

(34,2)
tilted LEDs
113 122 124 114 113 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 121 122 125 122 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

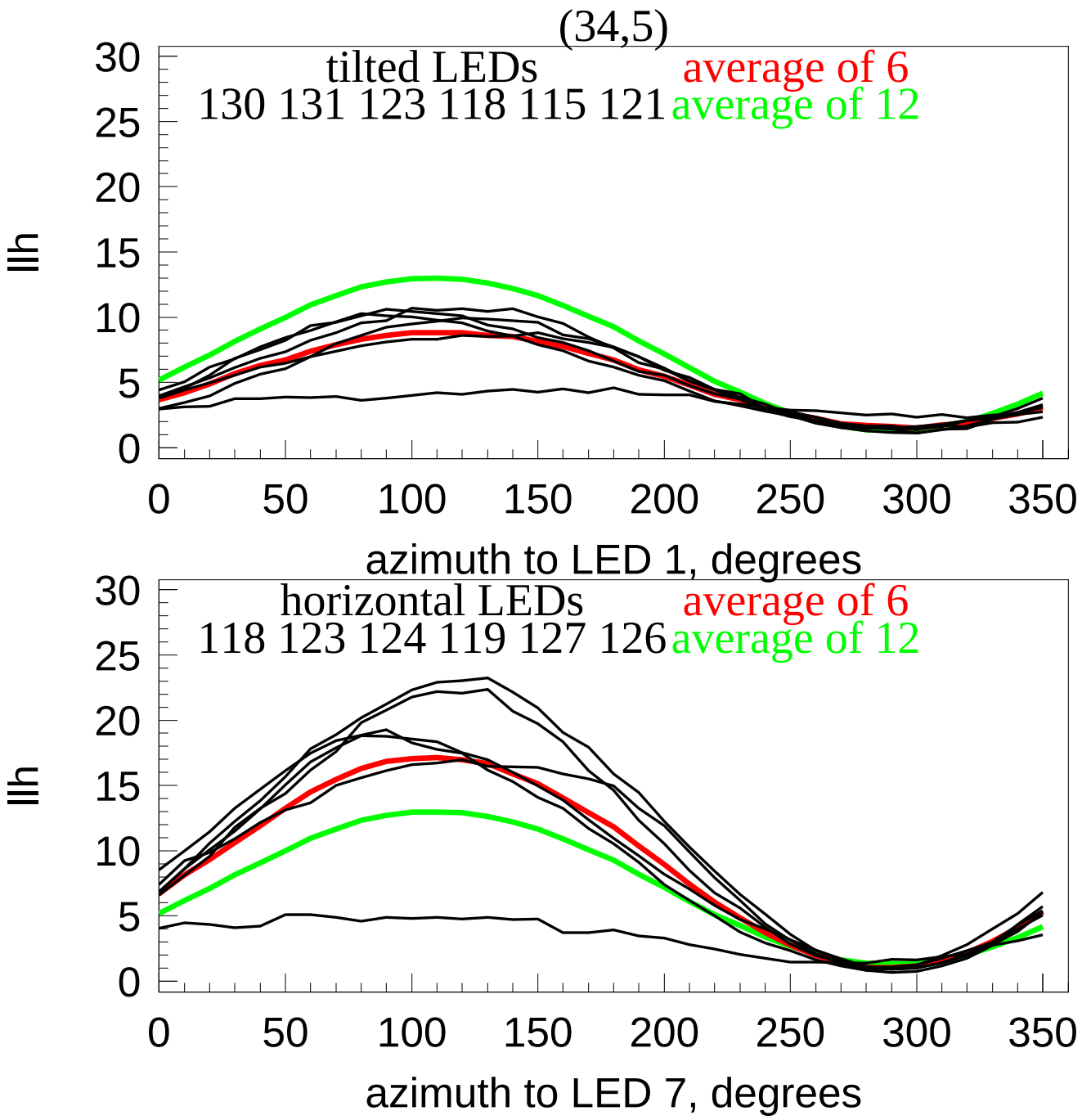

(34,2)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
268.2 ± 10.9

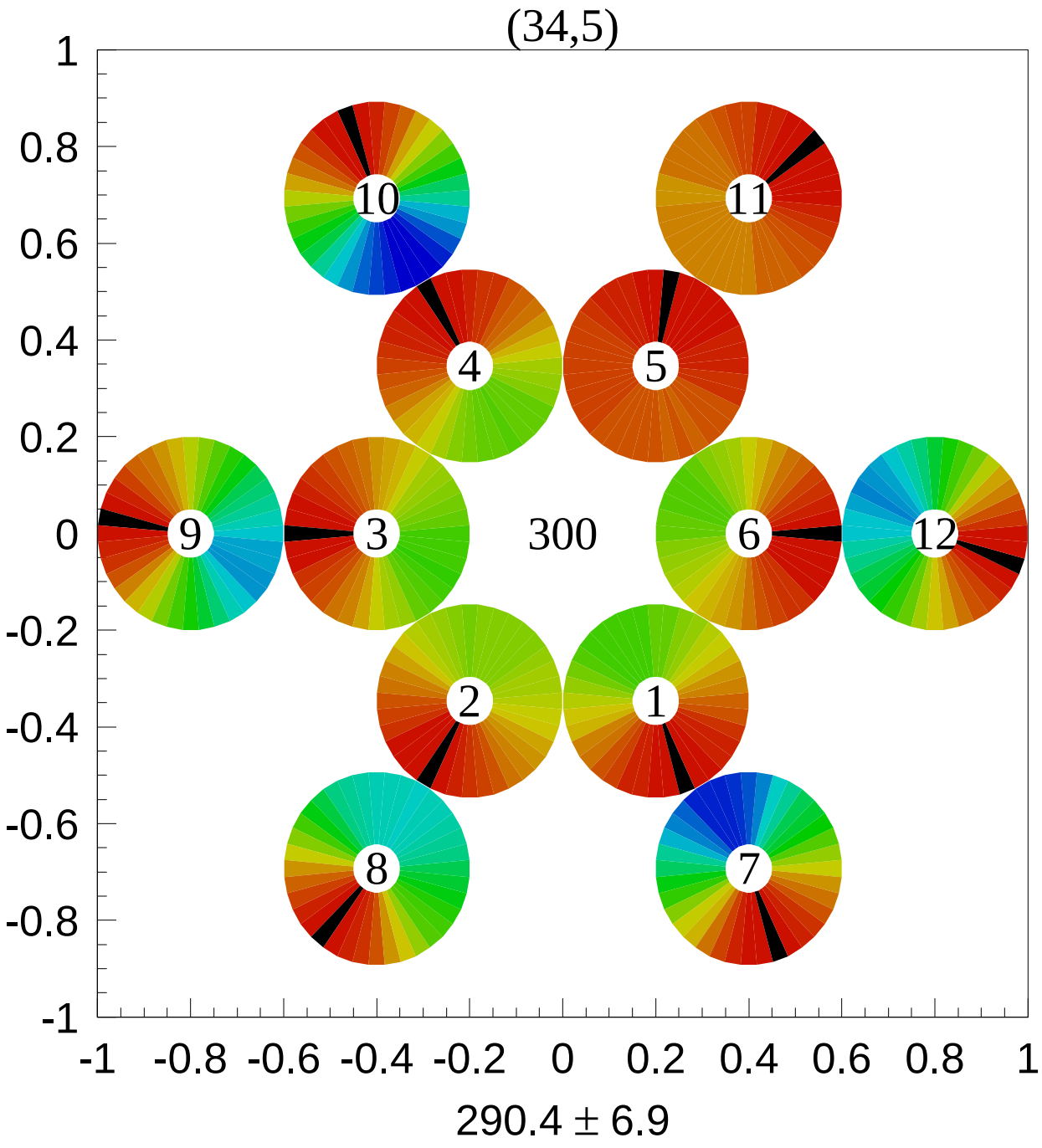

(34,3)
tilted LEDs
127 126 120 128 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 120 121 129 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

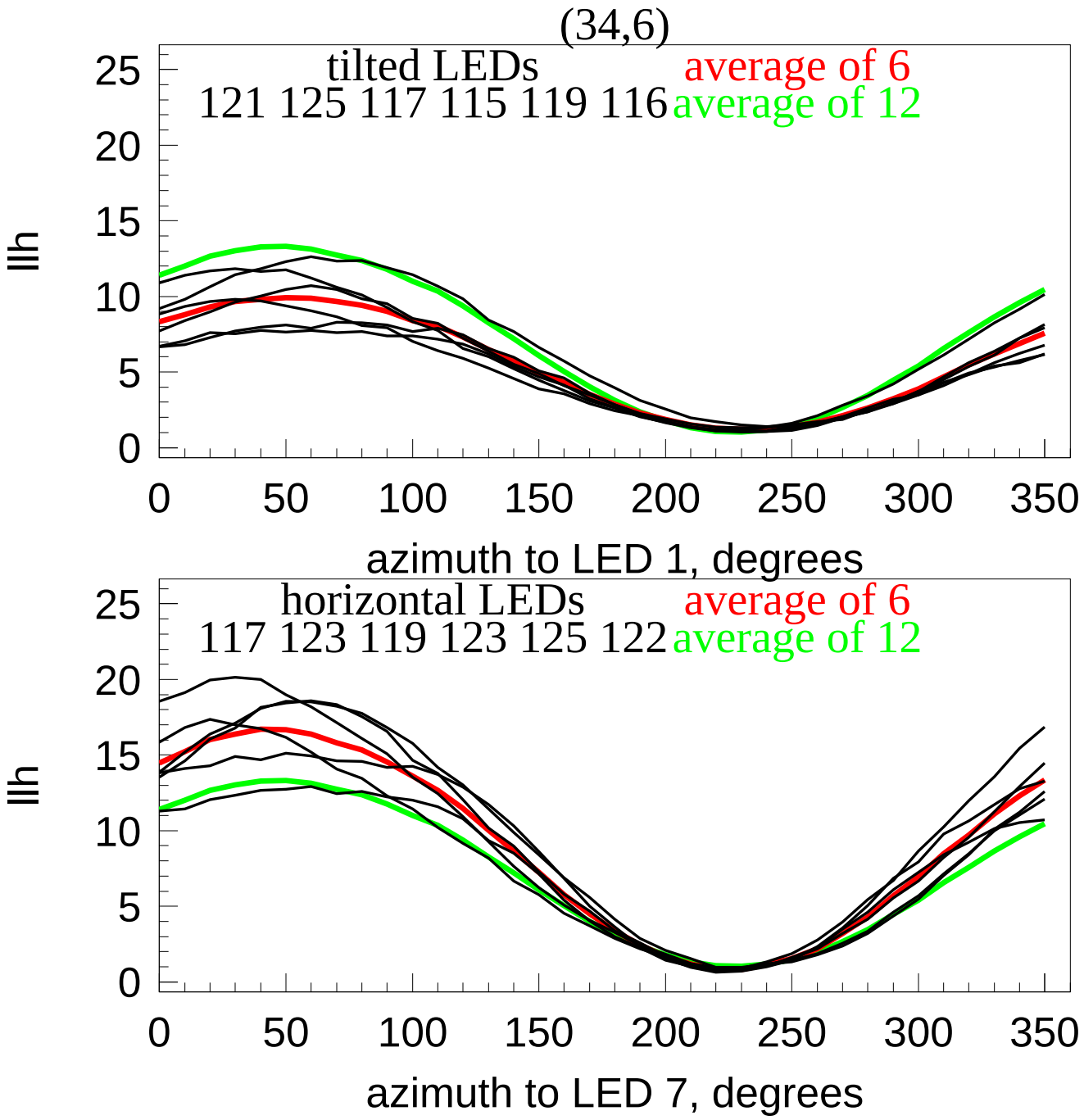

(34,3)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
149.5 ± 12.0

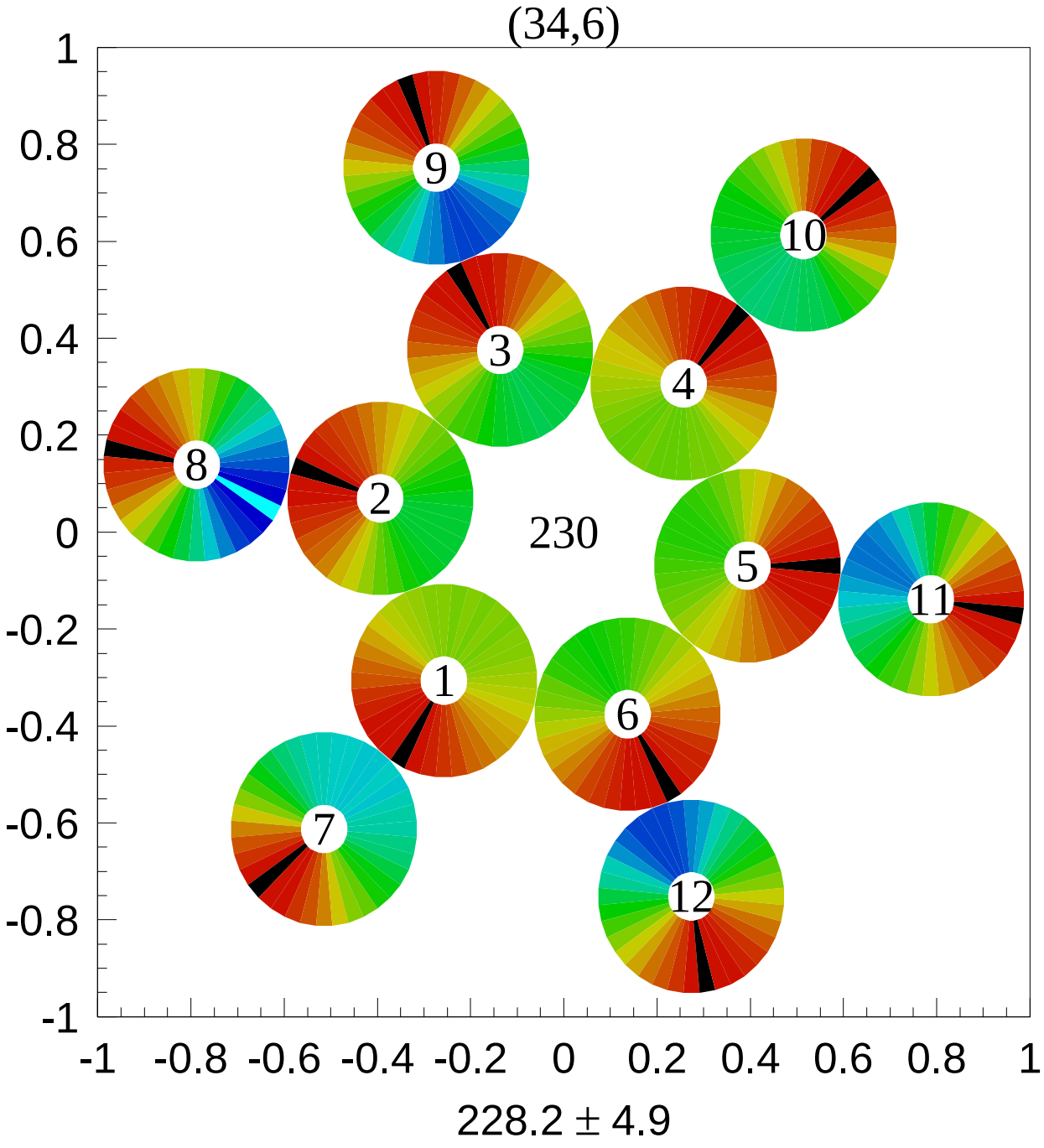

(34,4)
tilted LEDs
123 110 131 124 123 118
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 125 125 117 118 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

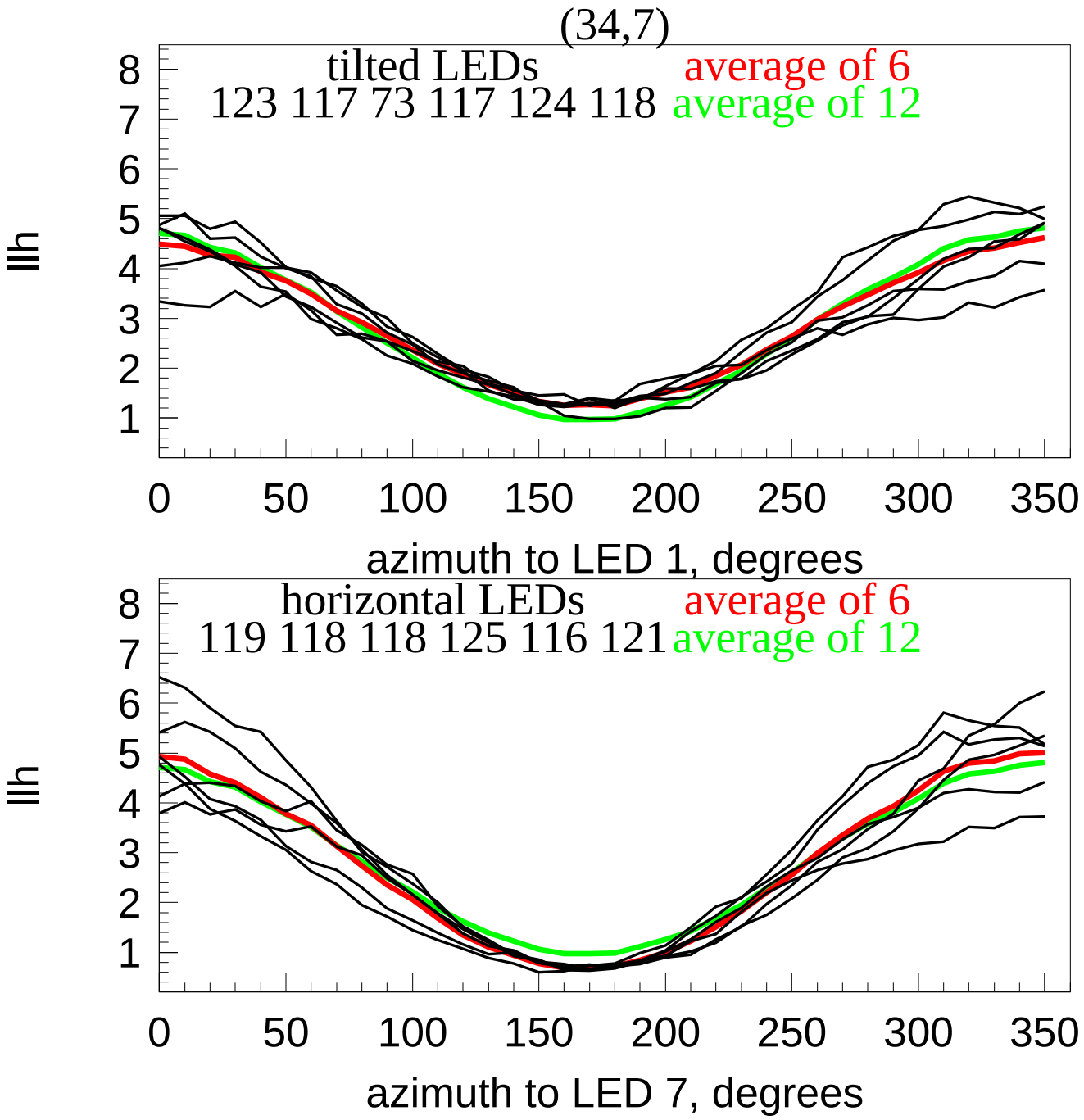

(34,4)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
24.3 ± 6.8

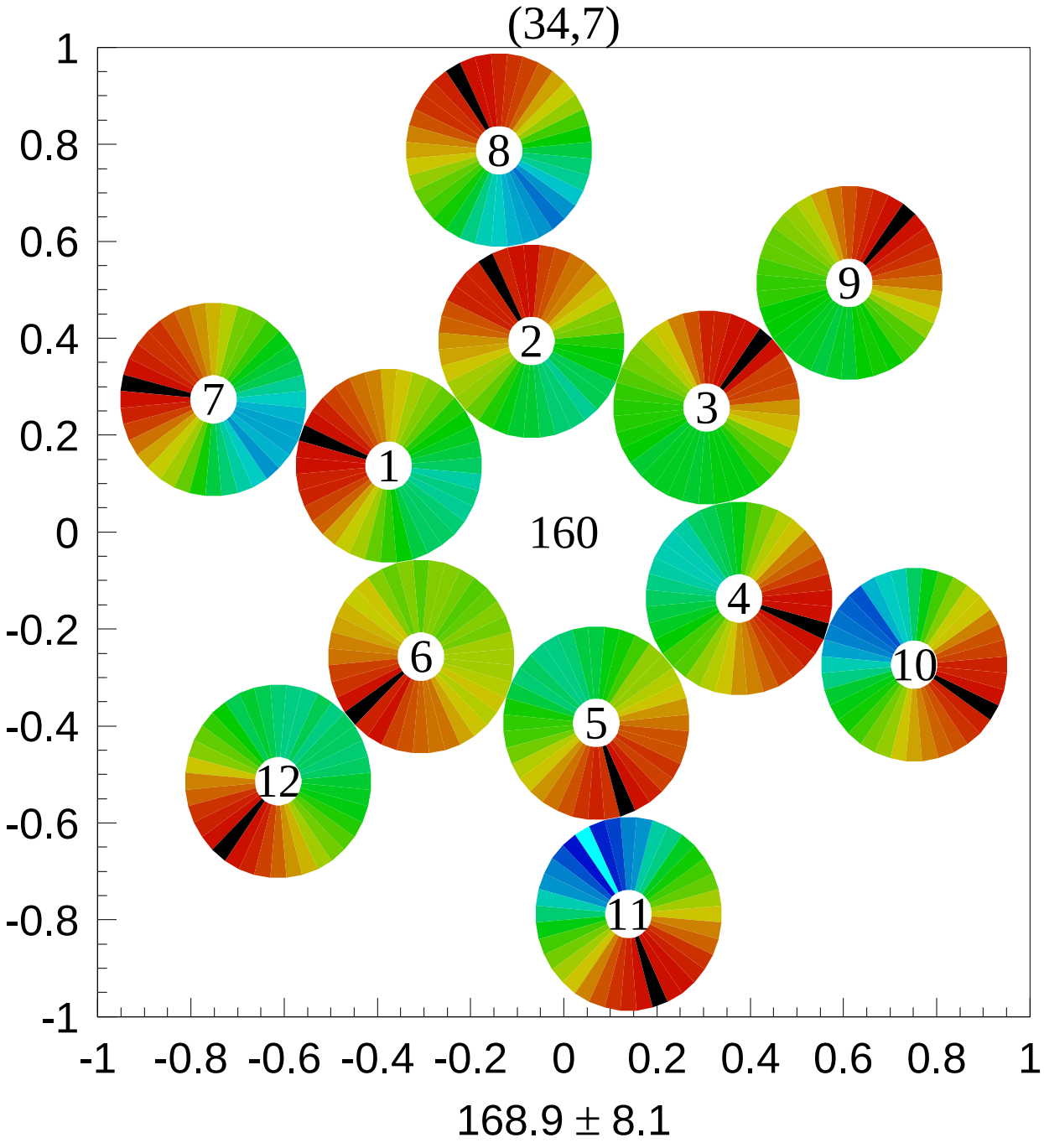

(34,5)
tilted LEDs
130 131 123 118 115 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 123 124 119 127 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

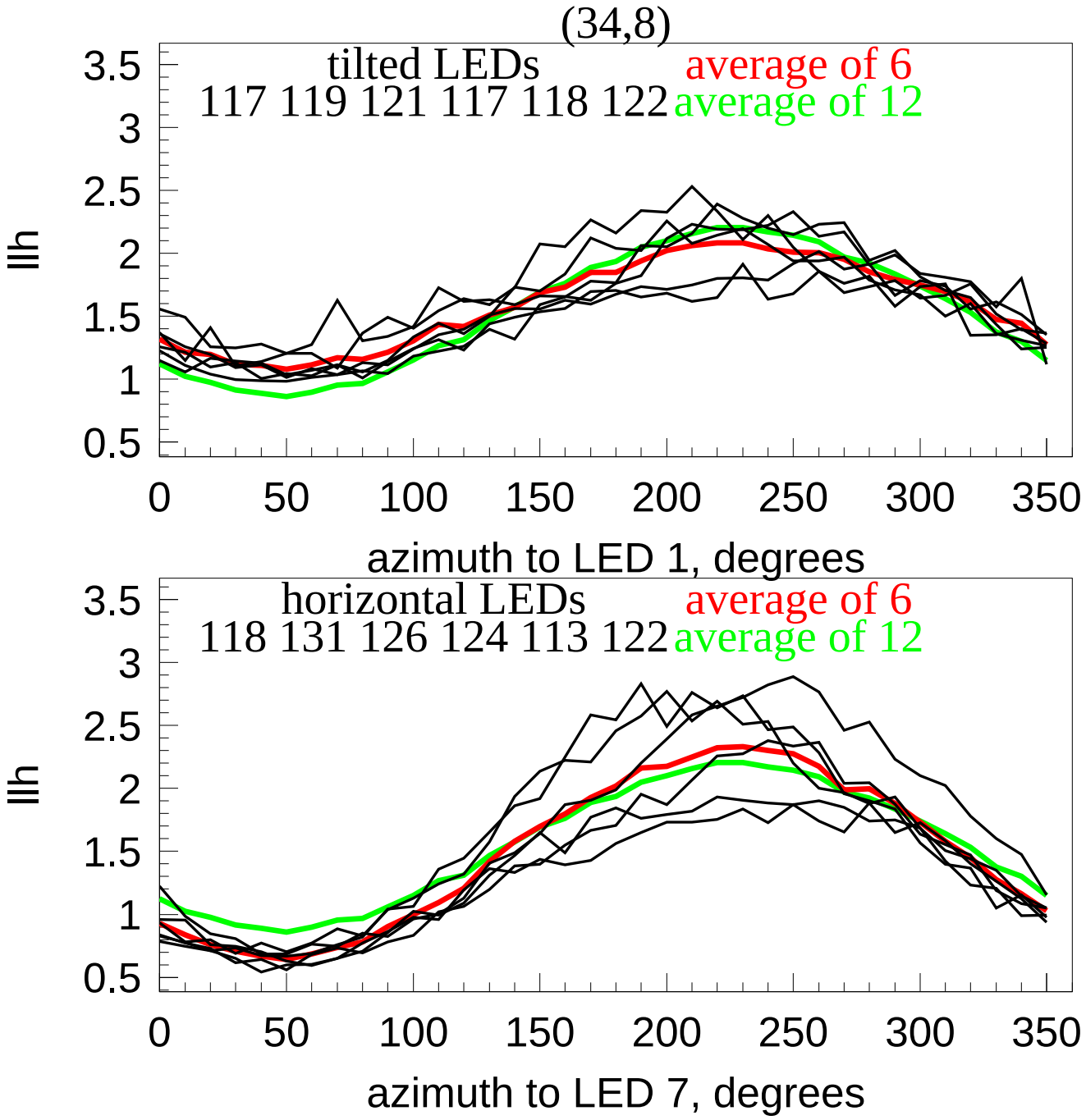

(34,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
290.4 ± 6.9

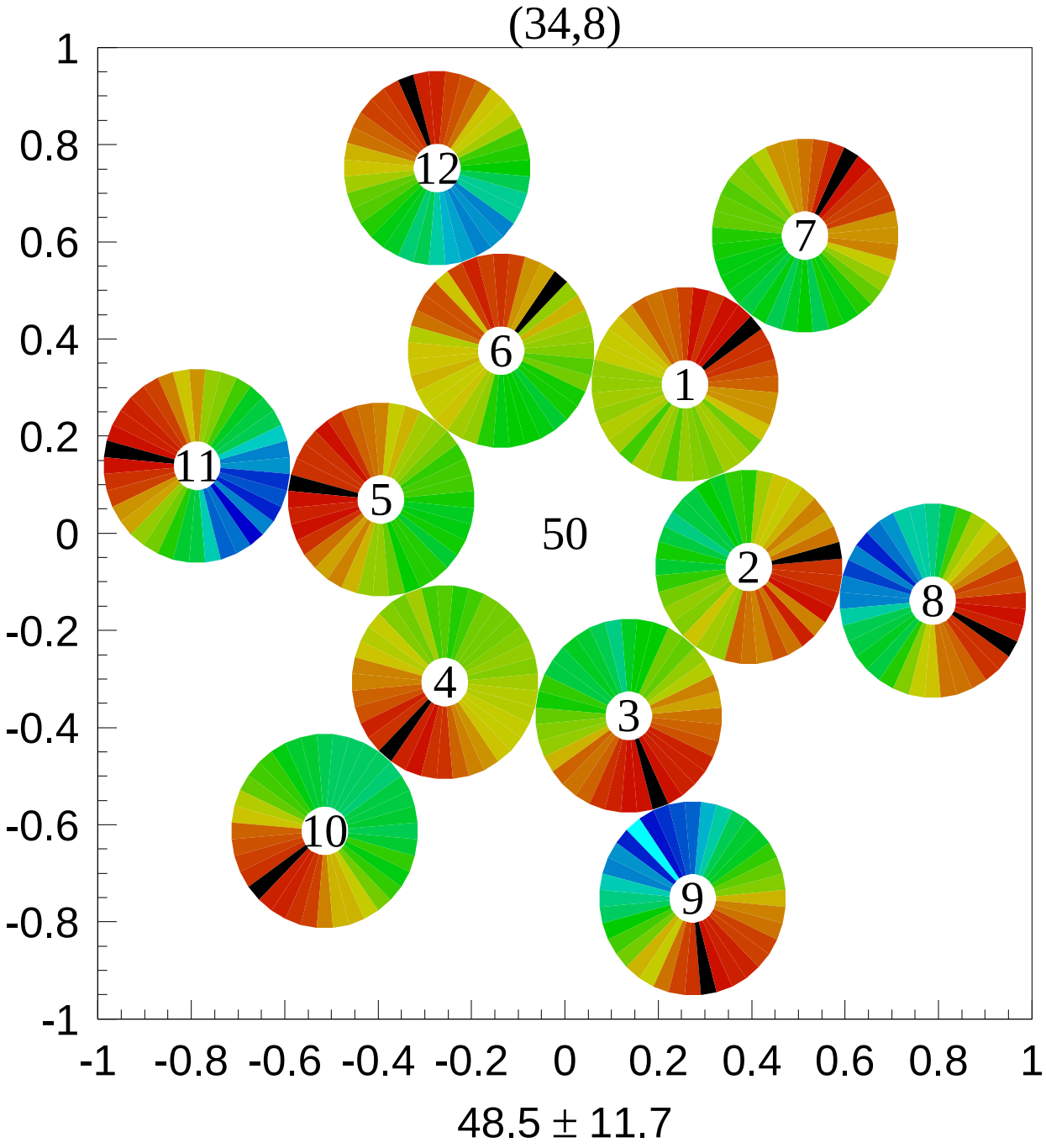

(34,6)
tilted LEDs
121 125 117 115 119 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 123 119 123 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

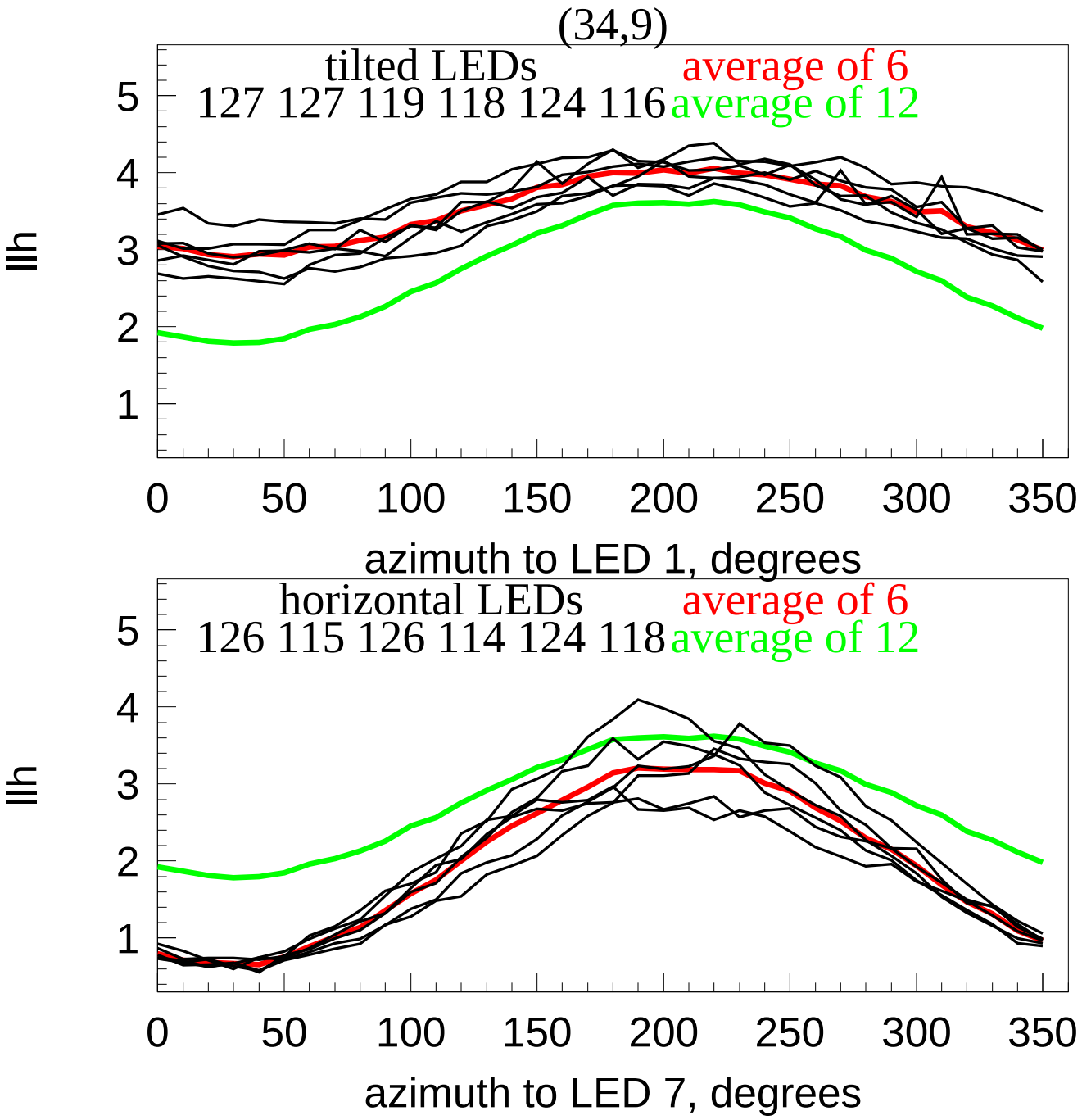

(34,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
228.2 ± 4.9

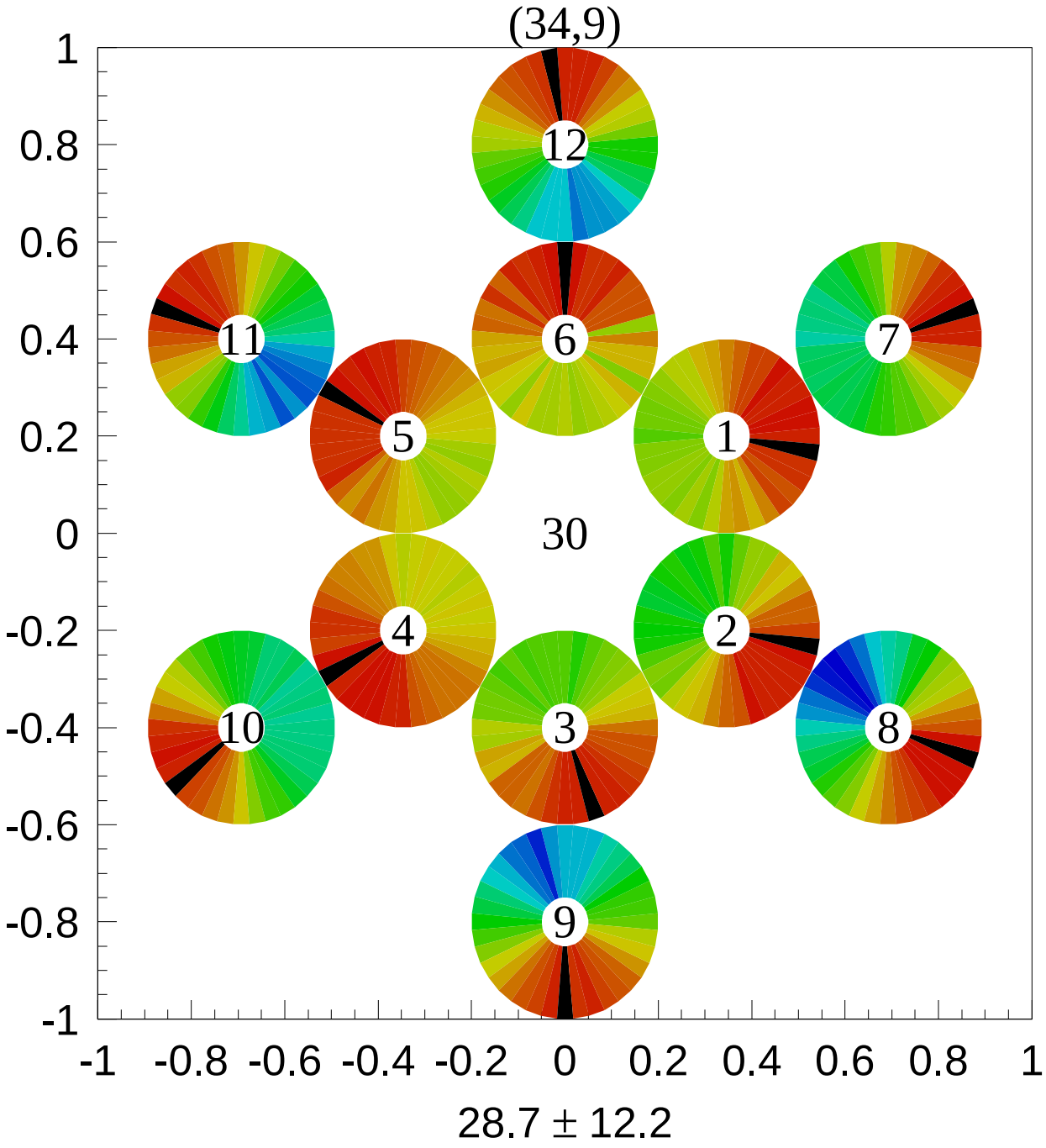

(34,7)
tilted LEDs
123 117 73 117 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 118 125 116 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

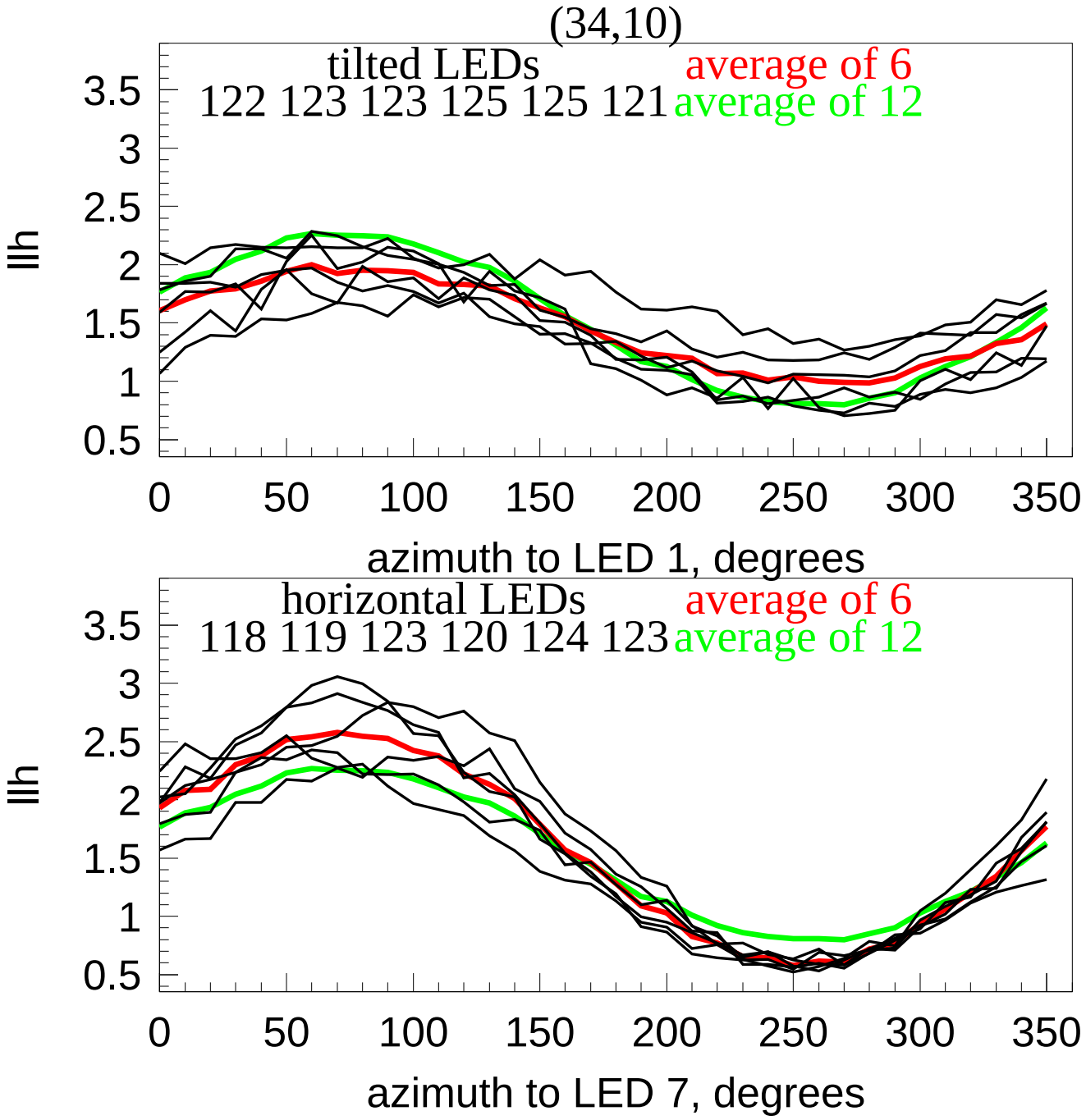

(34,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
168.9 ± 8.1

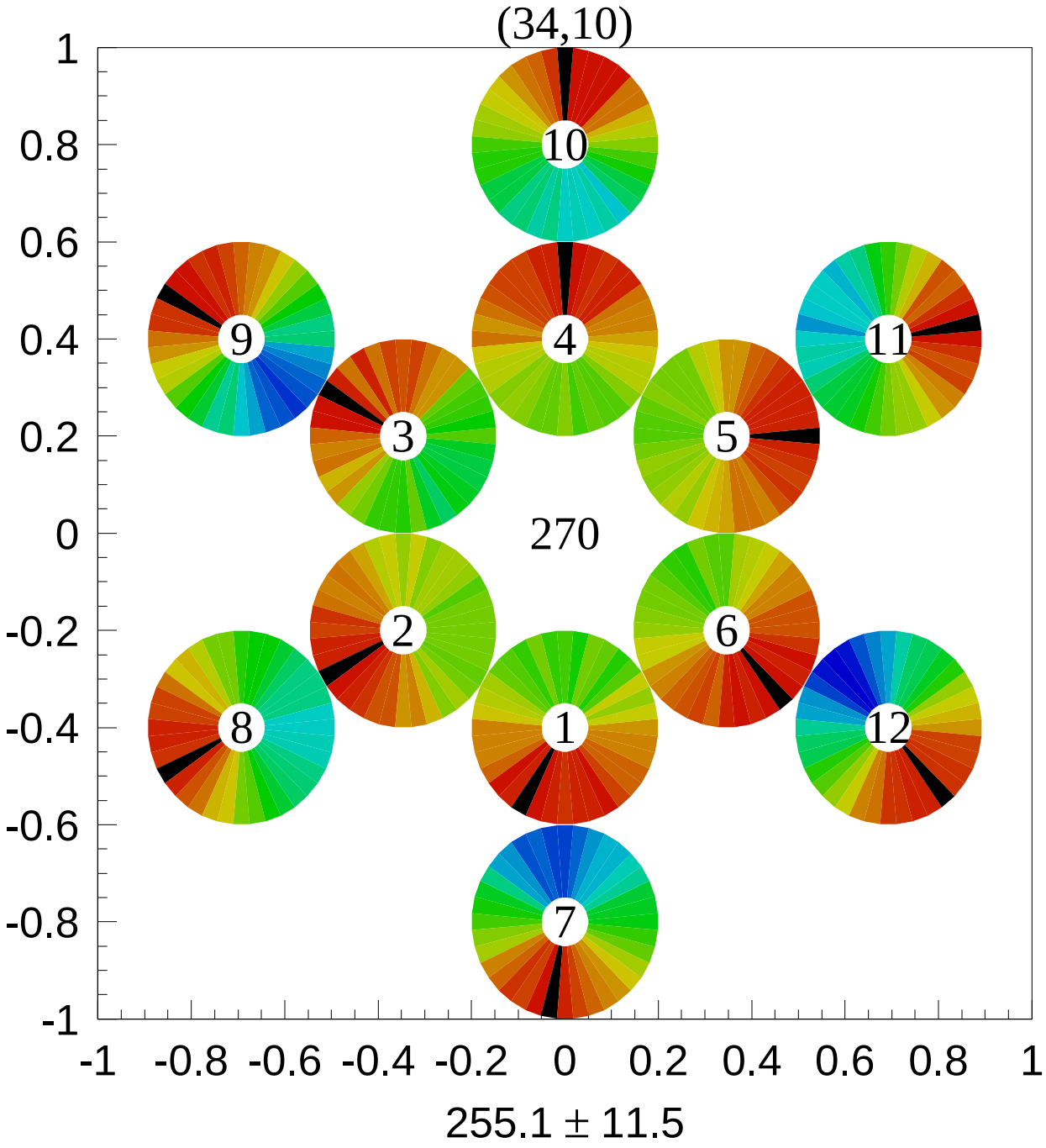

(34,8)
tilted LEDs
117 119 121 117 118 122
average of 6
average of 12
IIh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 131 126 124 113 122
average of 6
average of 12
IIh
azimuth to LED 7, degrees

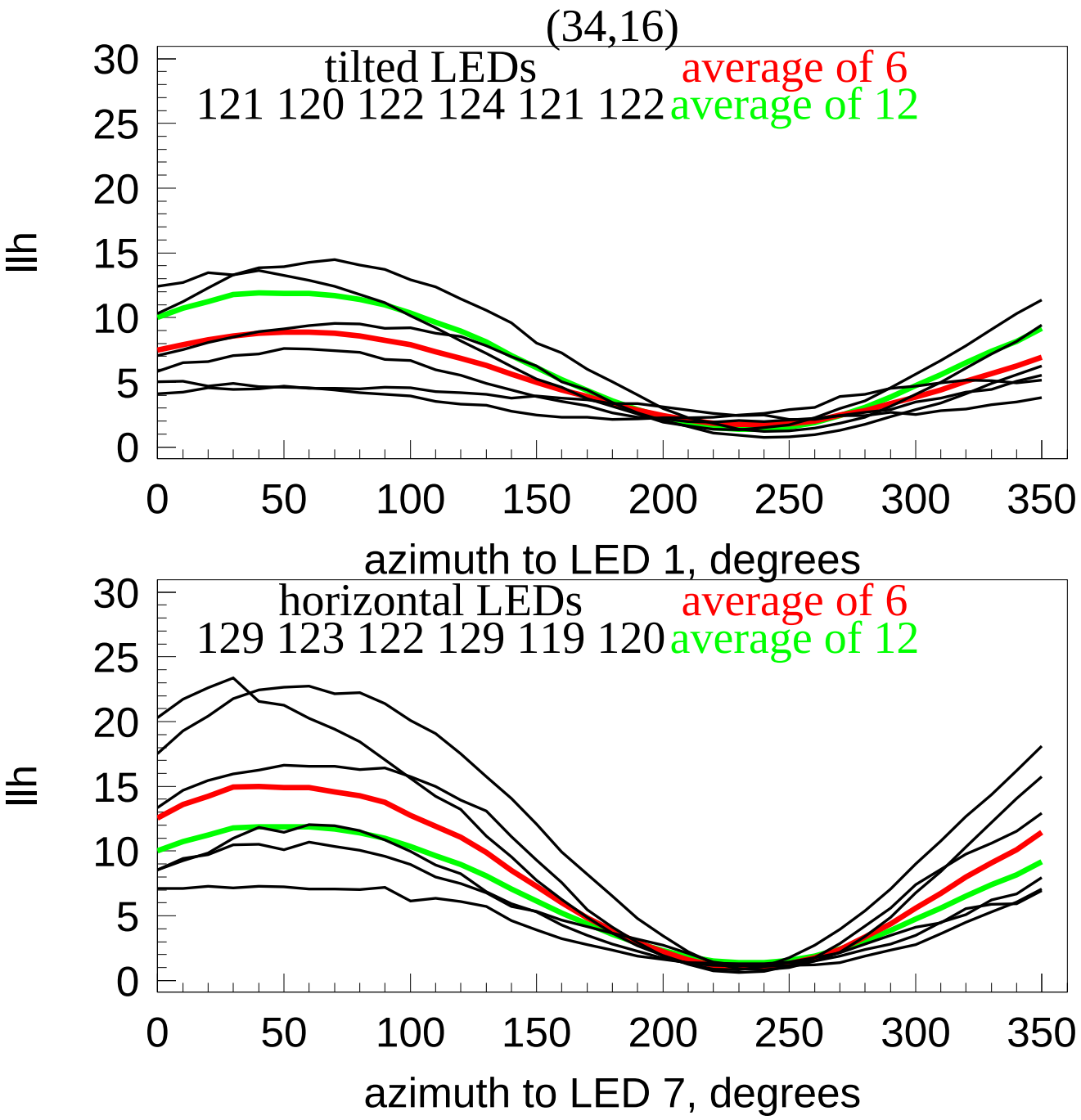

(34,8)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
48.5 ± 11.7

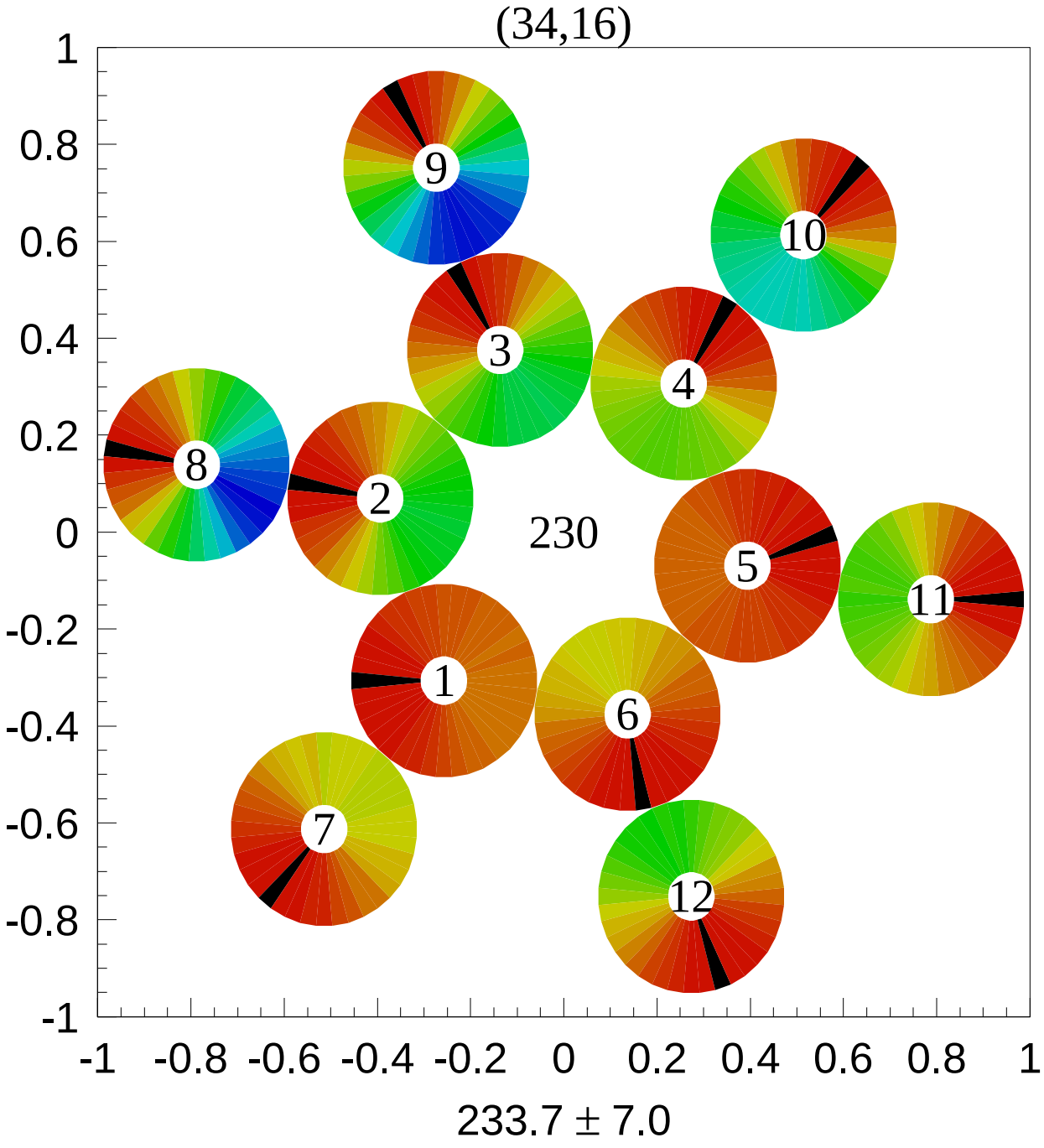

(34,9)
tilted LEDs
127 127 119 118 124 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 115 126 114 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

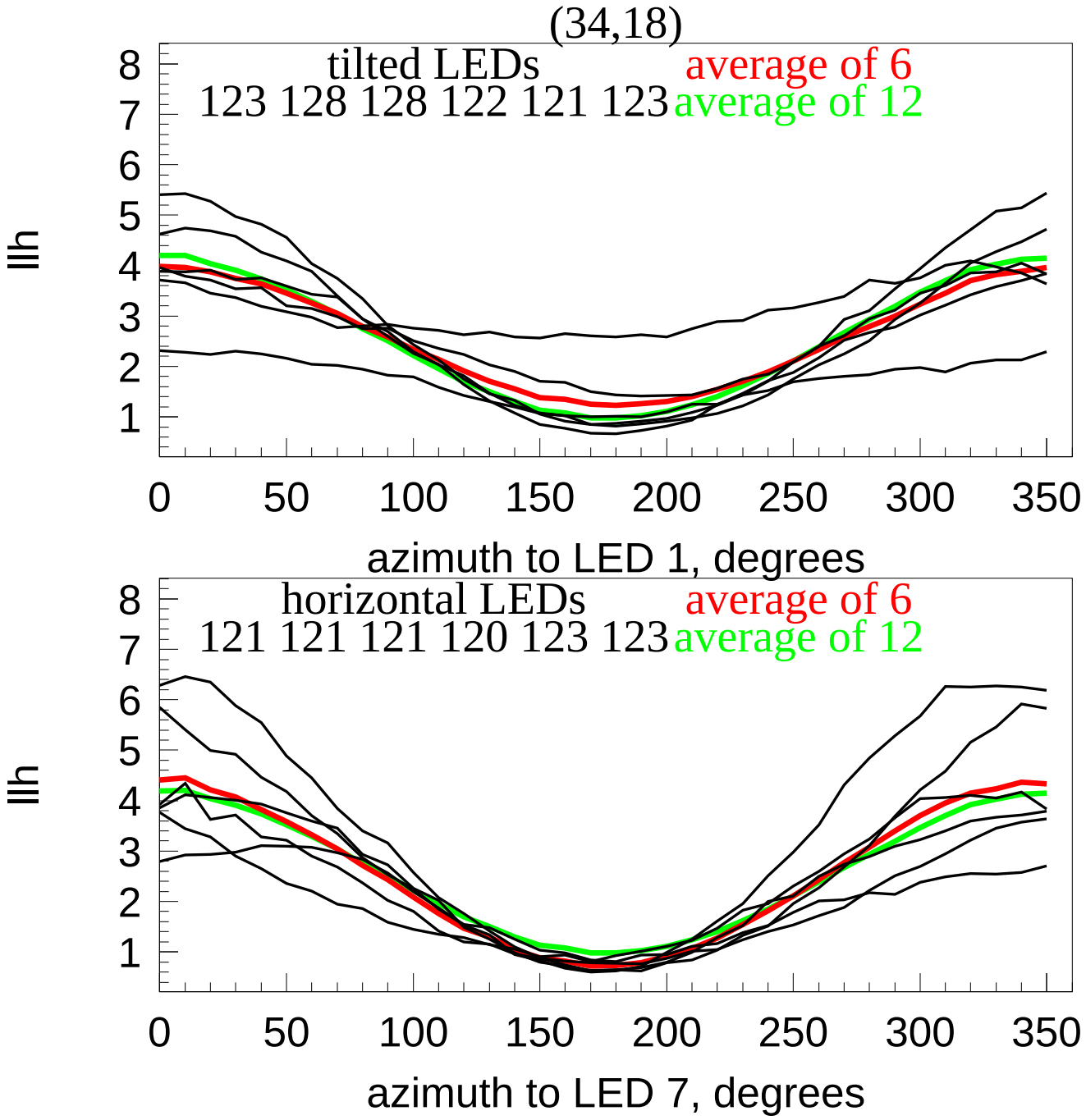

(34,9)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
28.7 ± 12.2

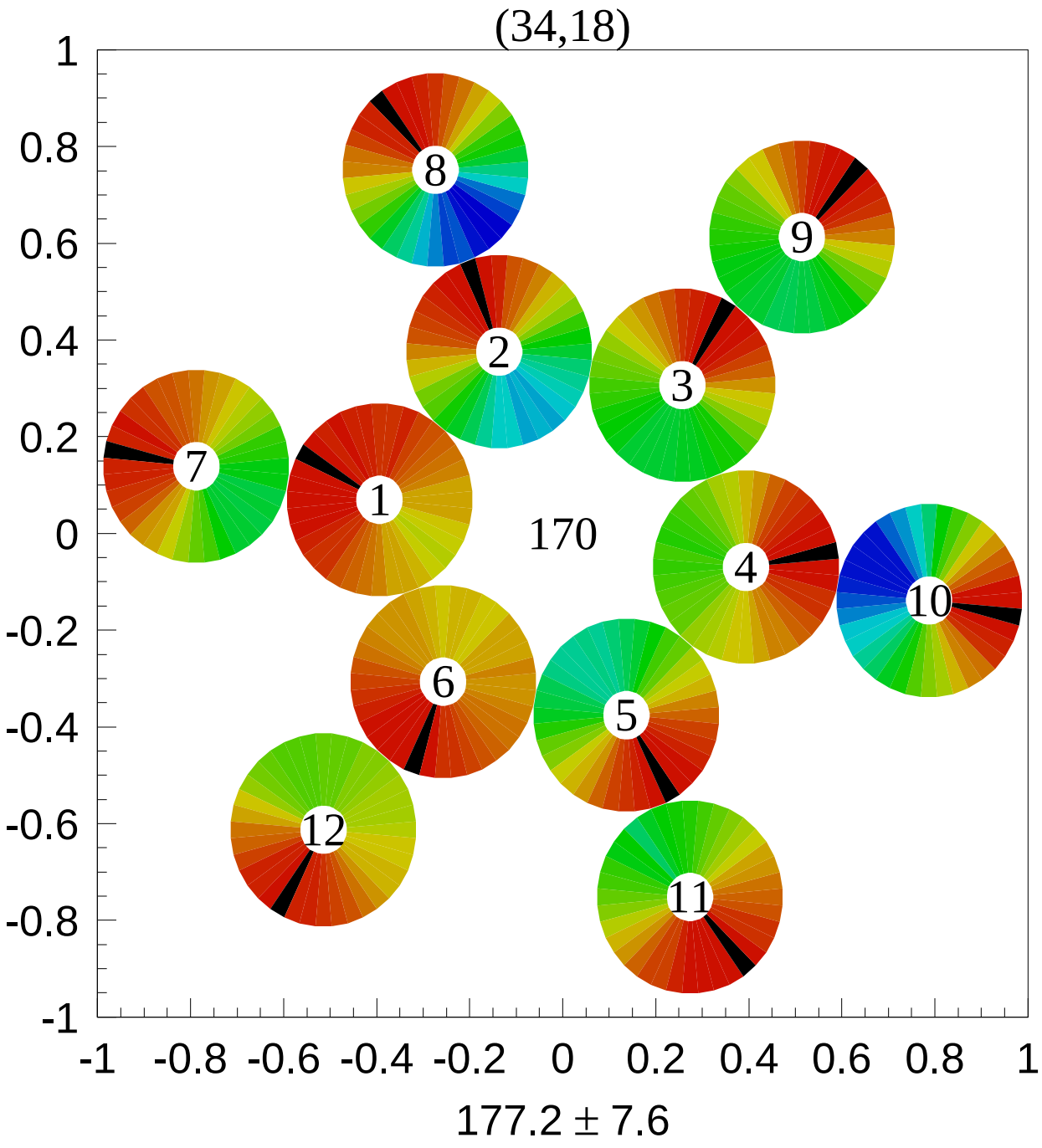

(34,10)
tilted LEDs
122 123 123 125 125 121
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 119 123 120 124 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

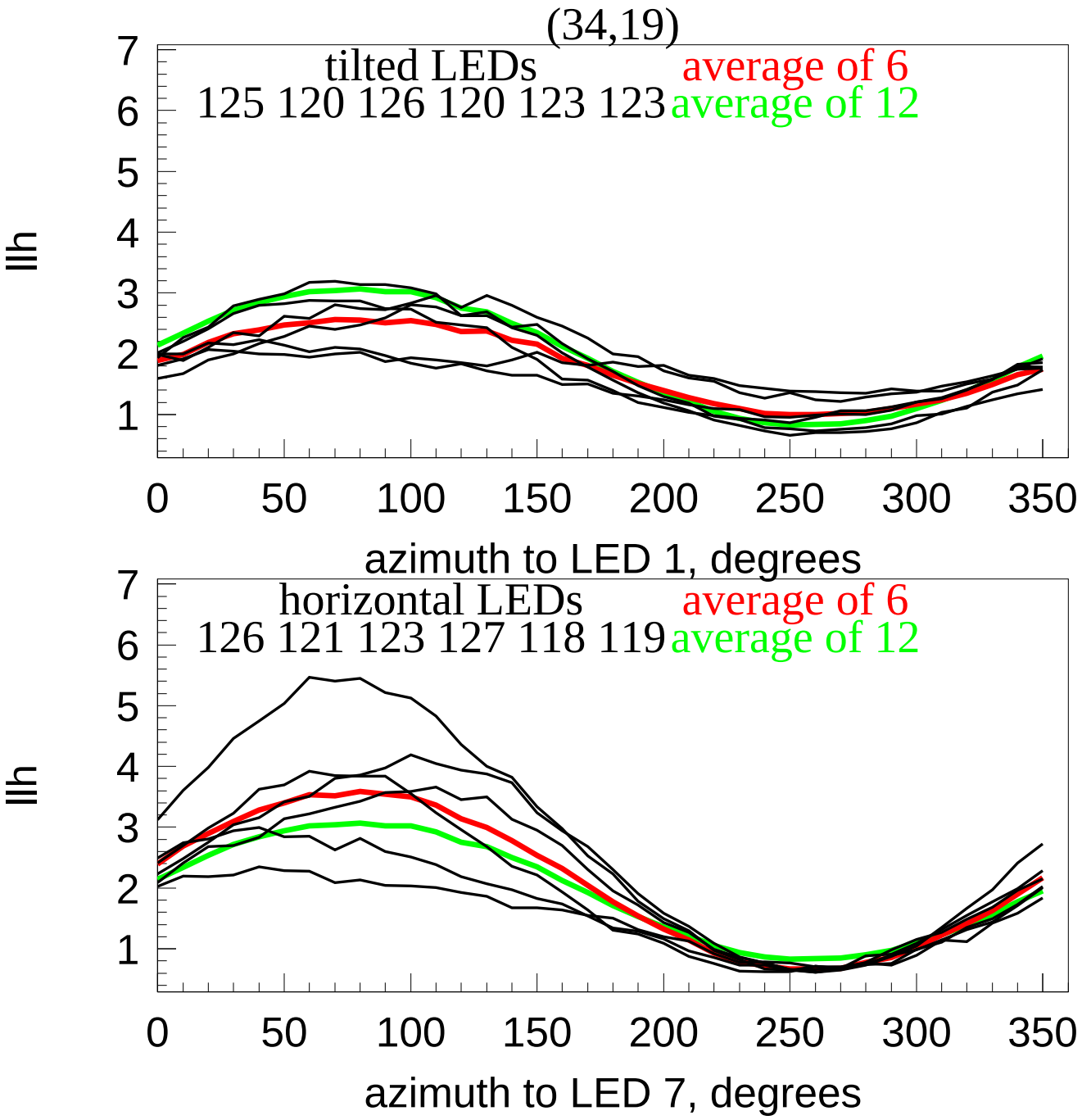

(34,10)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
255.1 ± 11.5

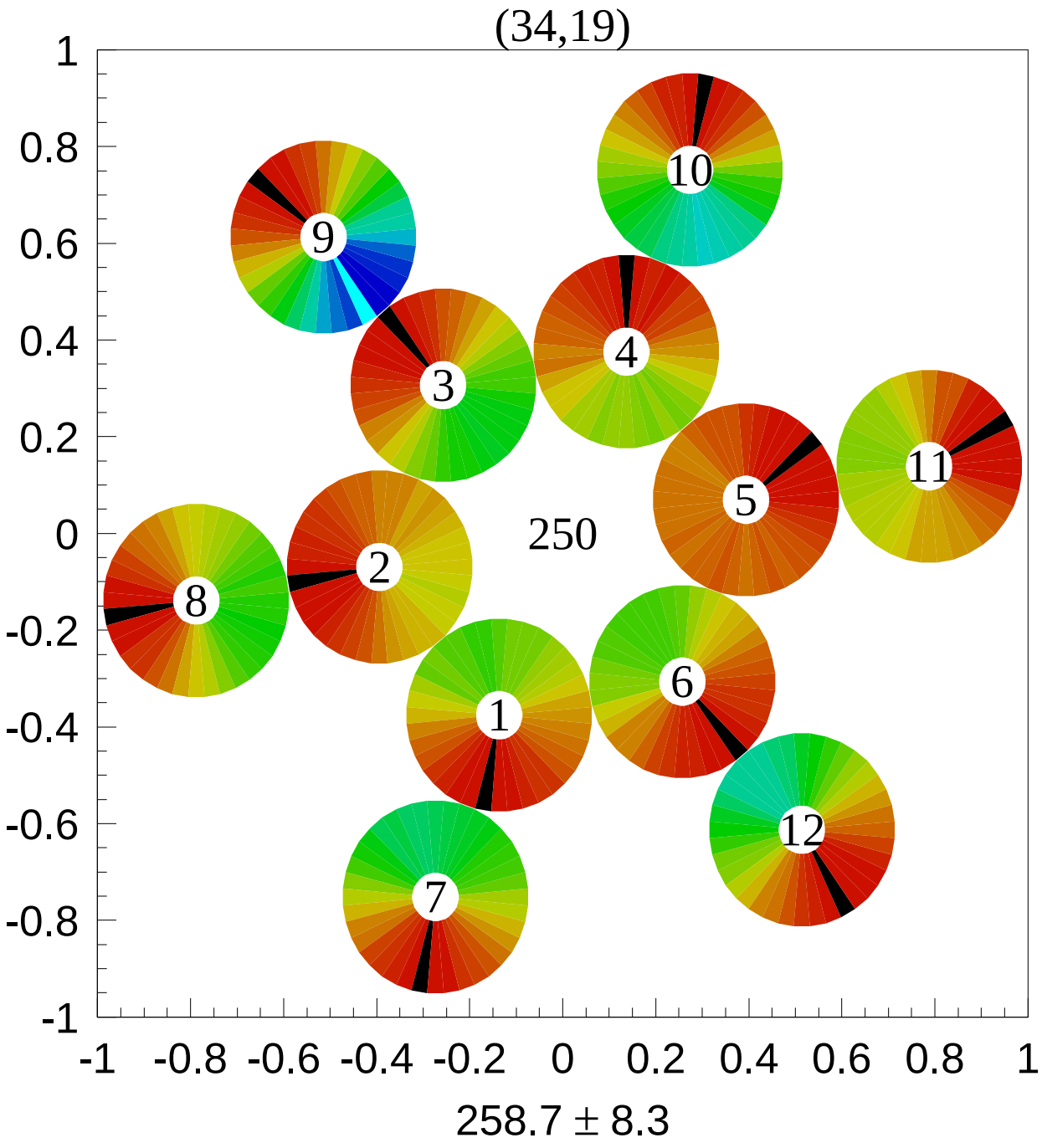

(34,16)
tilted LEDs
121 120 122 124 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 123 122 129 119 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

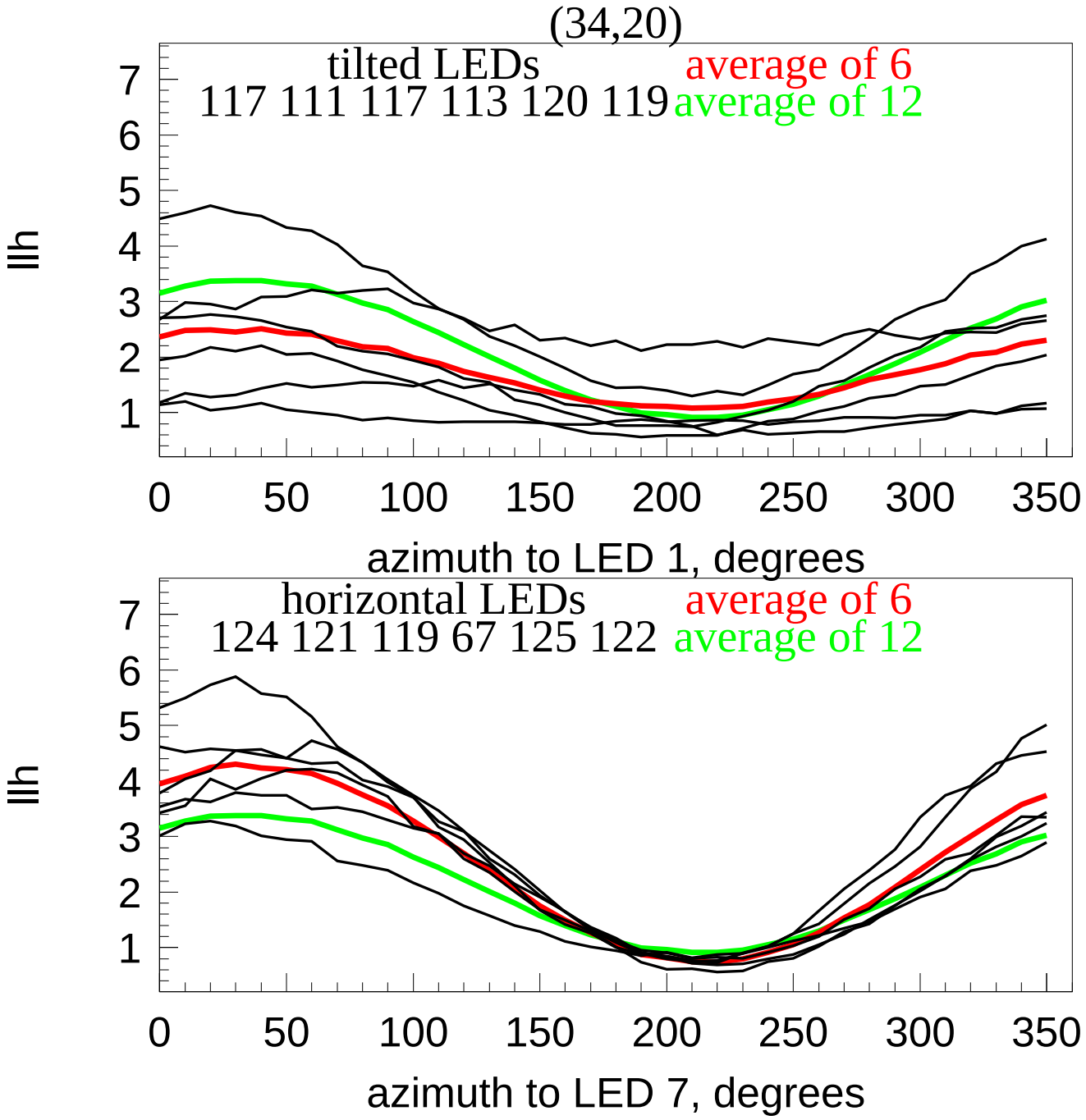

(34,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
233.7 ± 7.0

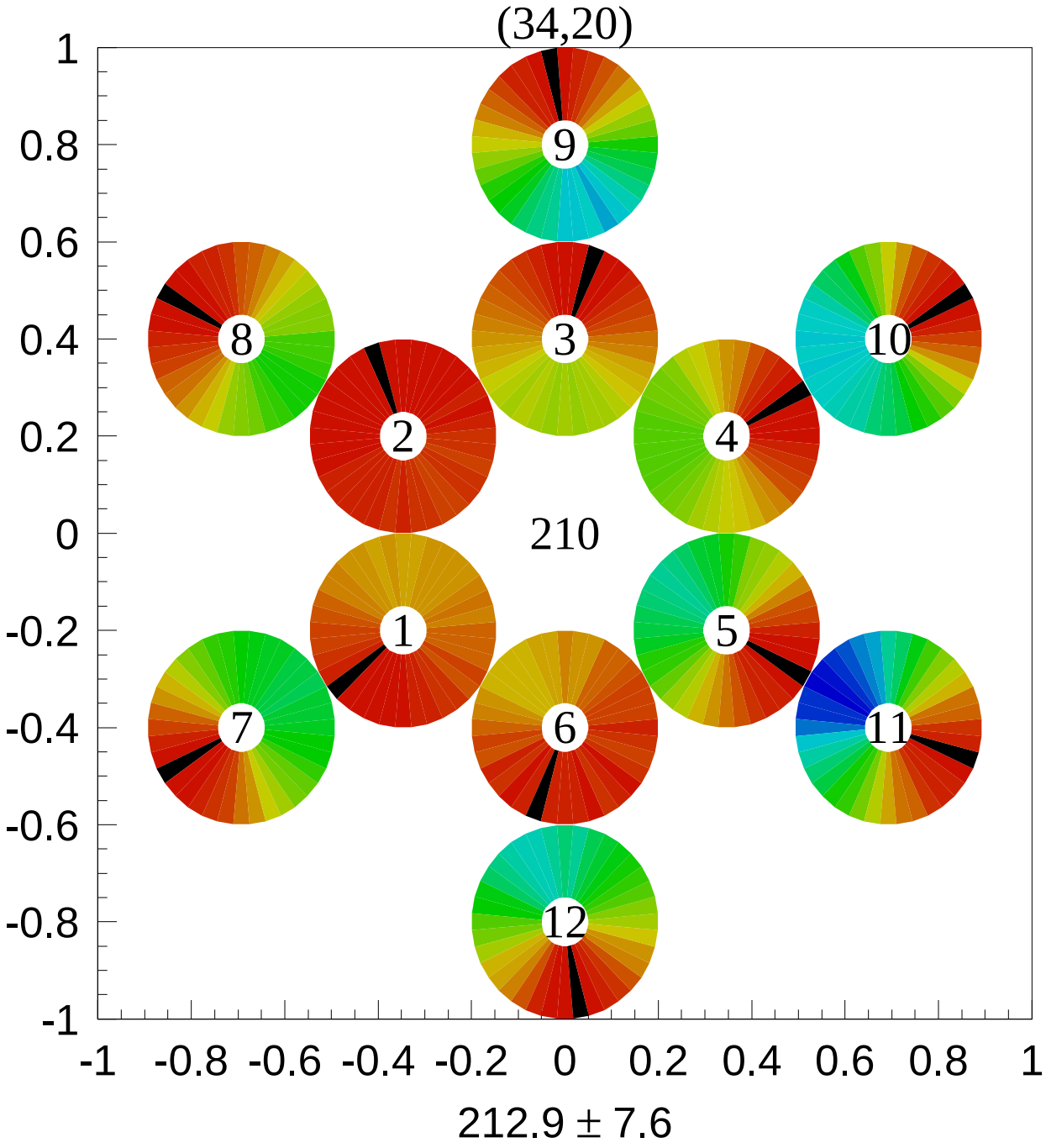

(34,18)
tilted LEDs
123 128 128 122 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 121 120 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

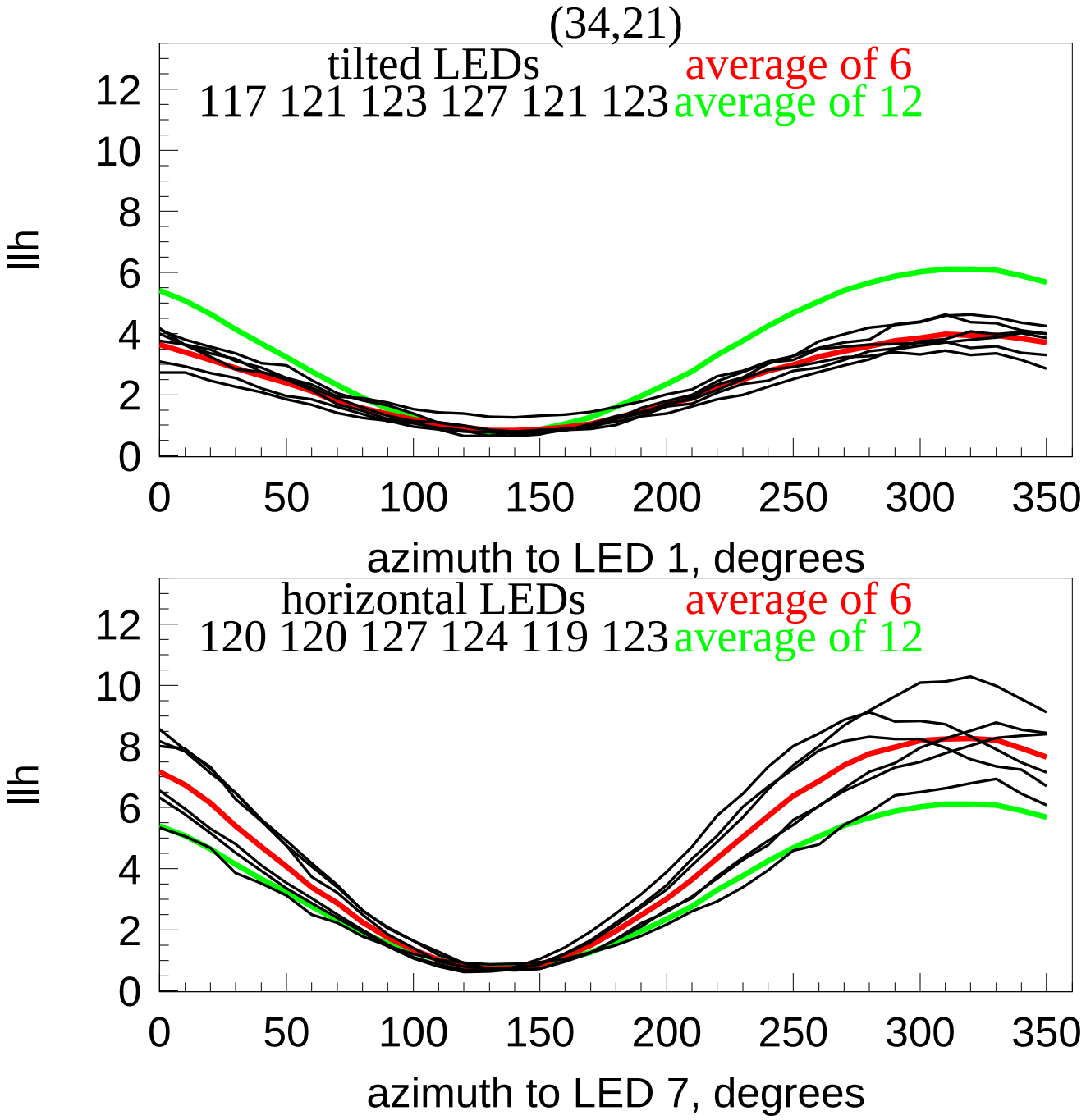

(34,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
177.2 ± 7.6

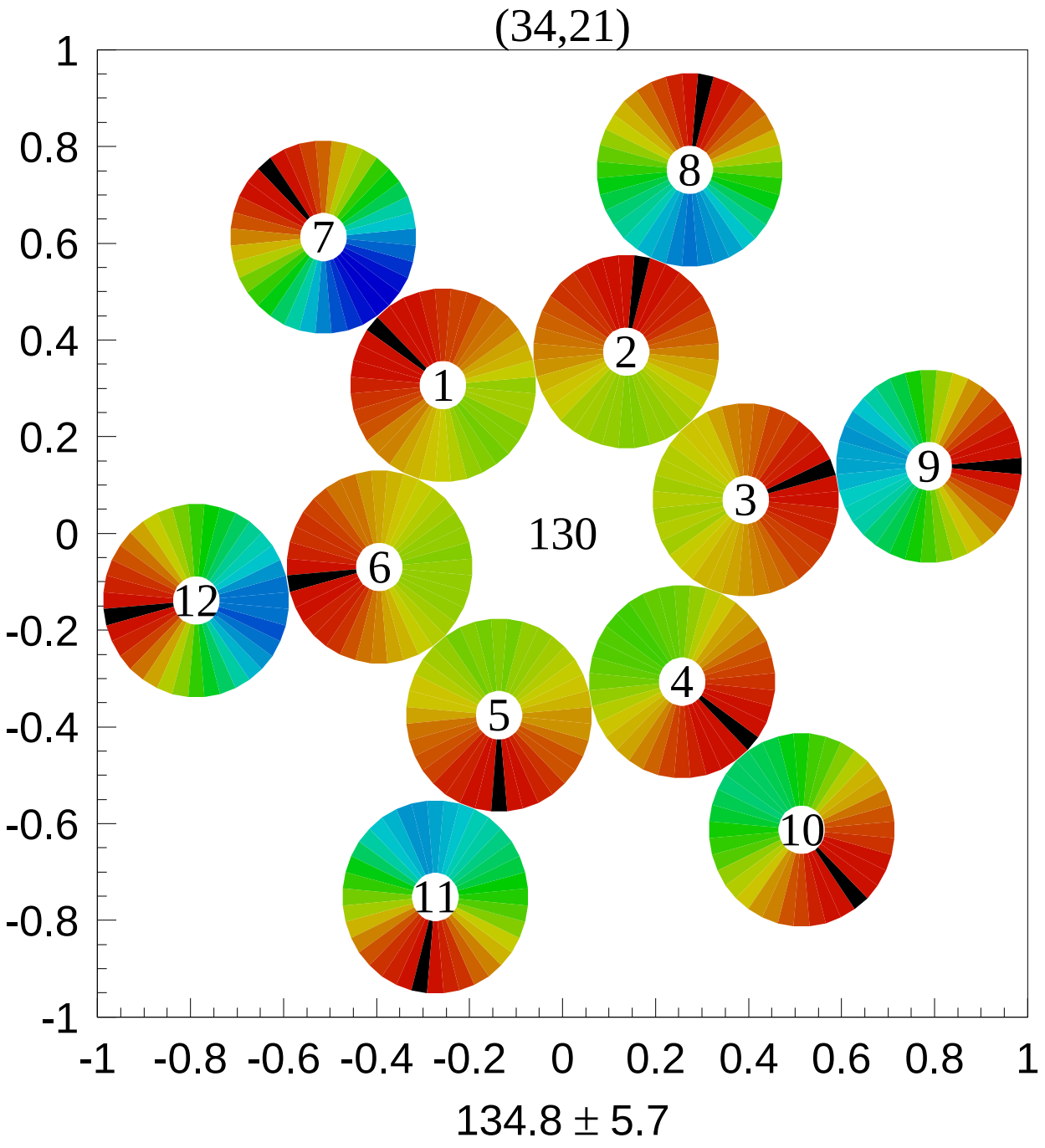

(34,19)
tilted LEDs
125 120 126 120 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 121 123 127 118 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

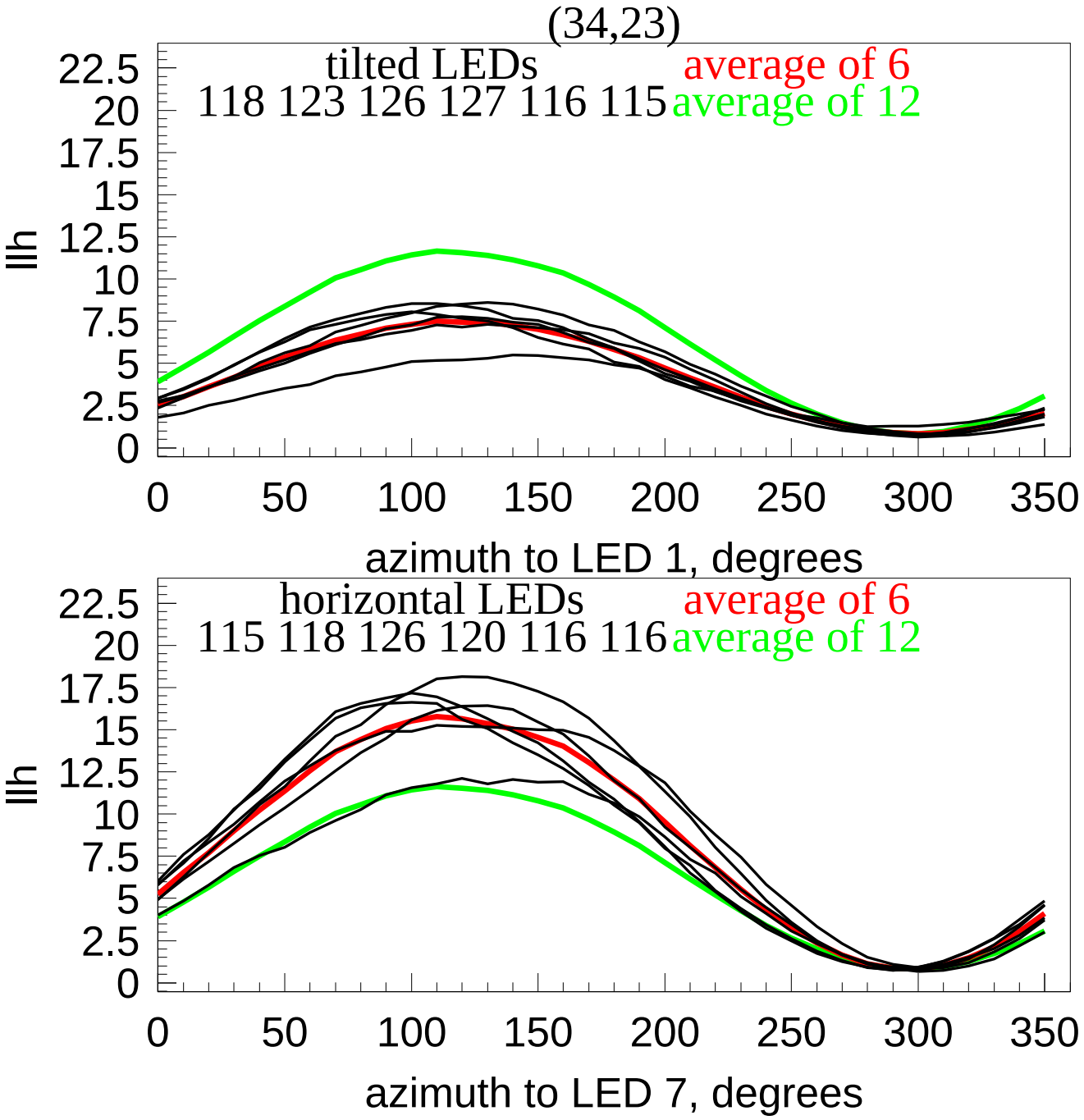

(34,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
258.7 ± 8.3

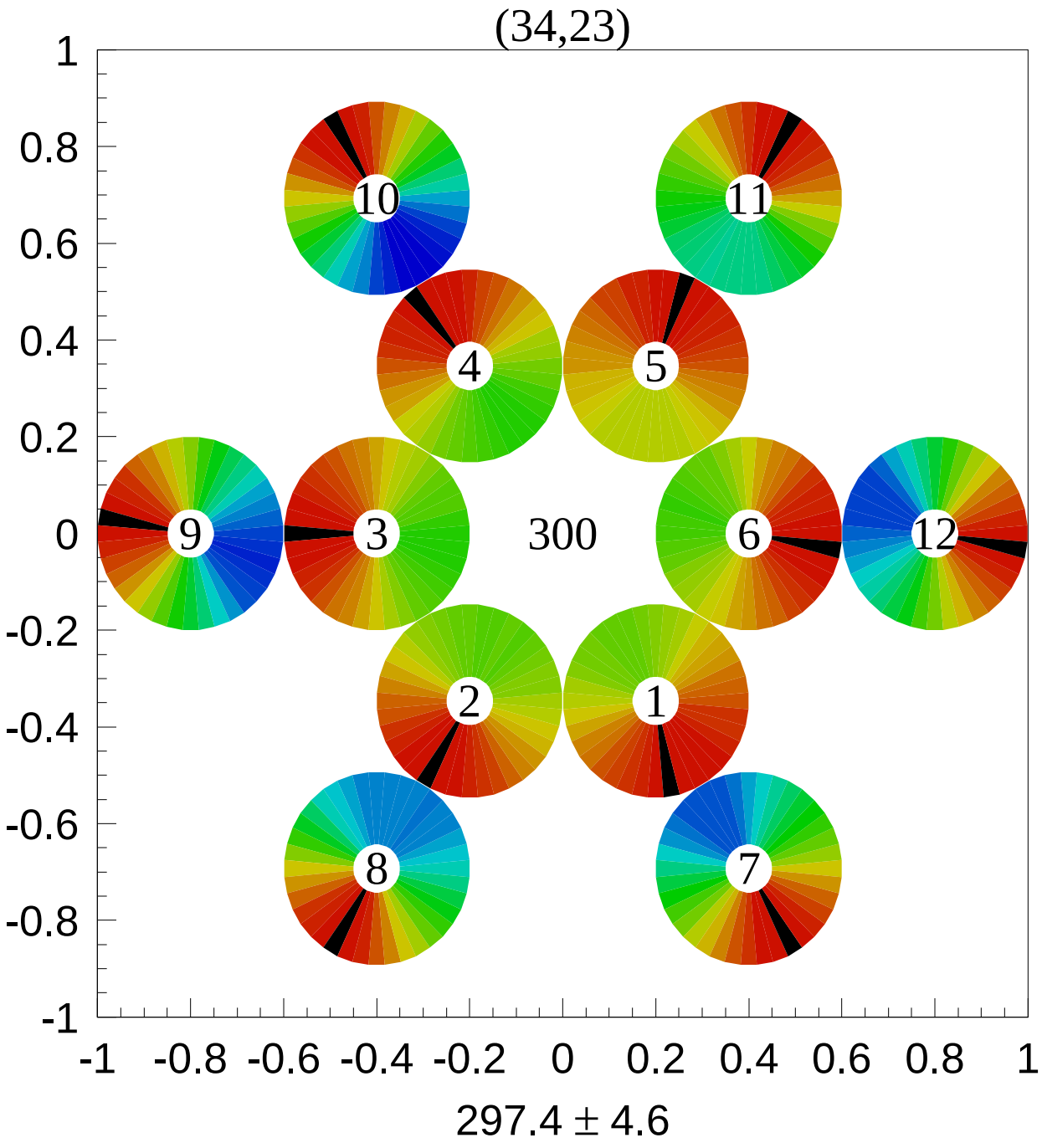

(34,20)
tilted LEDs
117 111 117 113 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 119 67 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

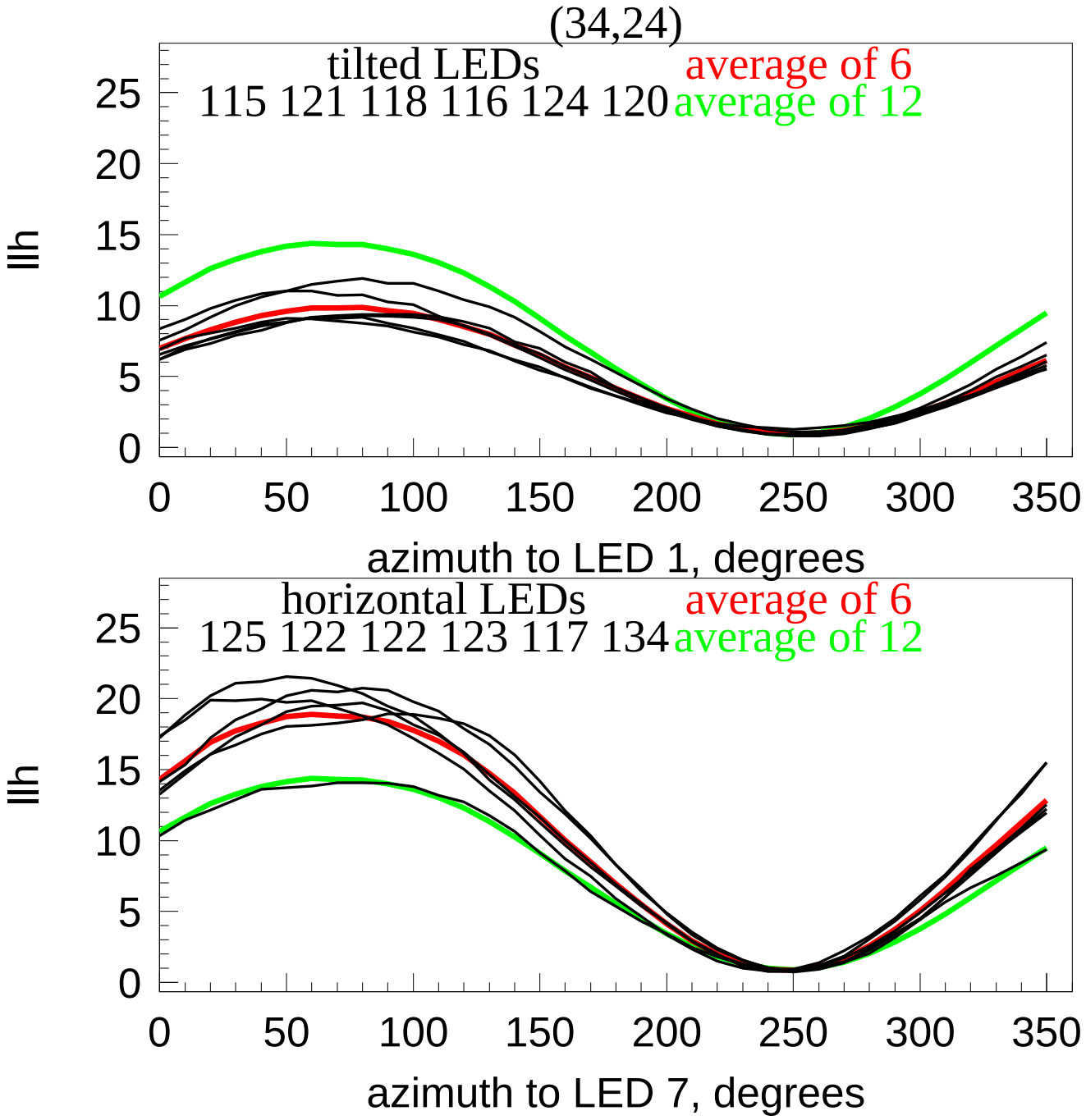

(34,20)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
212.9 ± 7.6

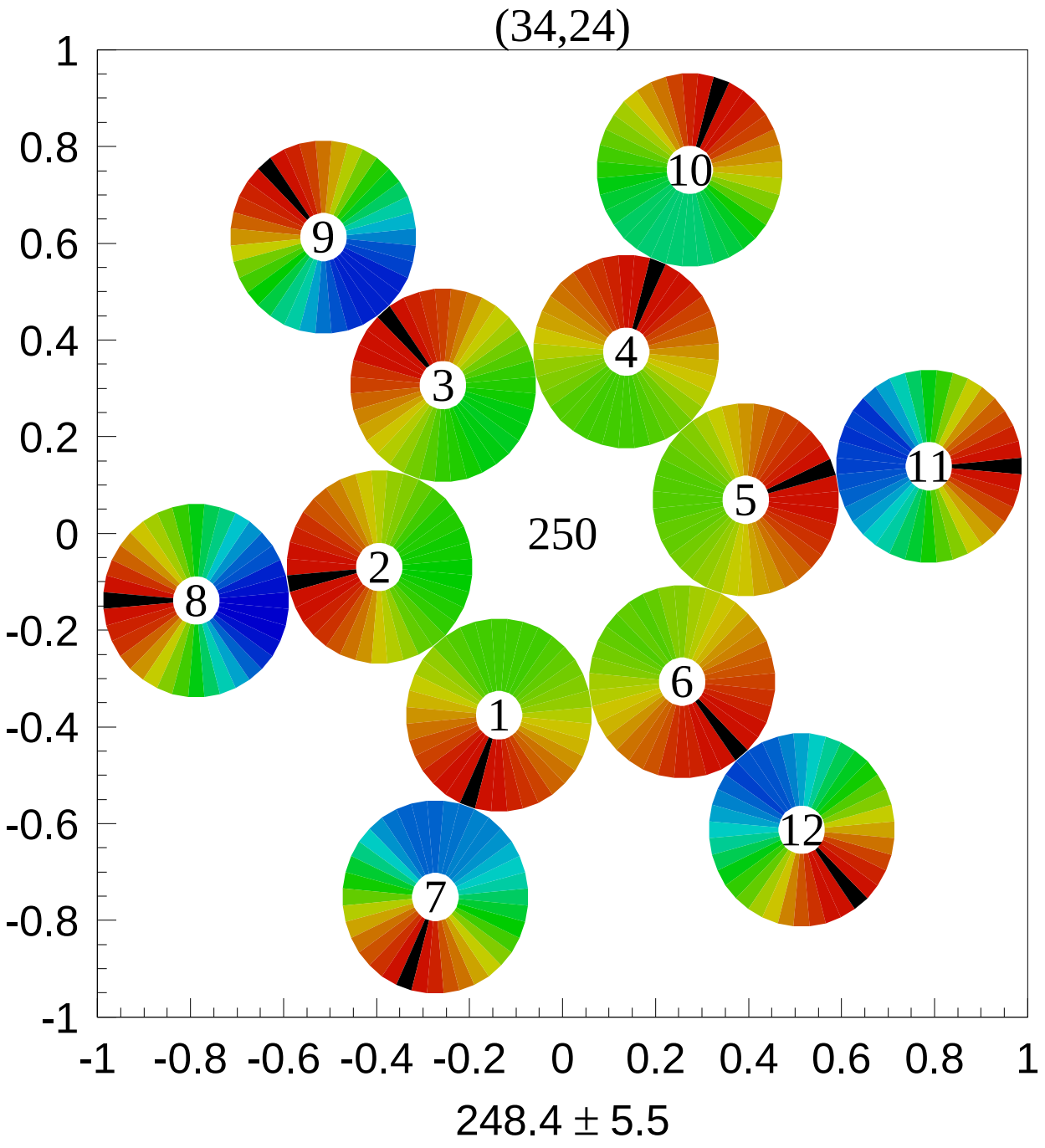

(34,21)
tilted LEDs
117 121 123 127 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 127 124 119 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

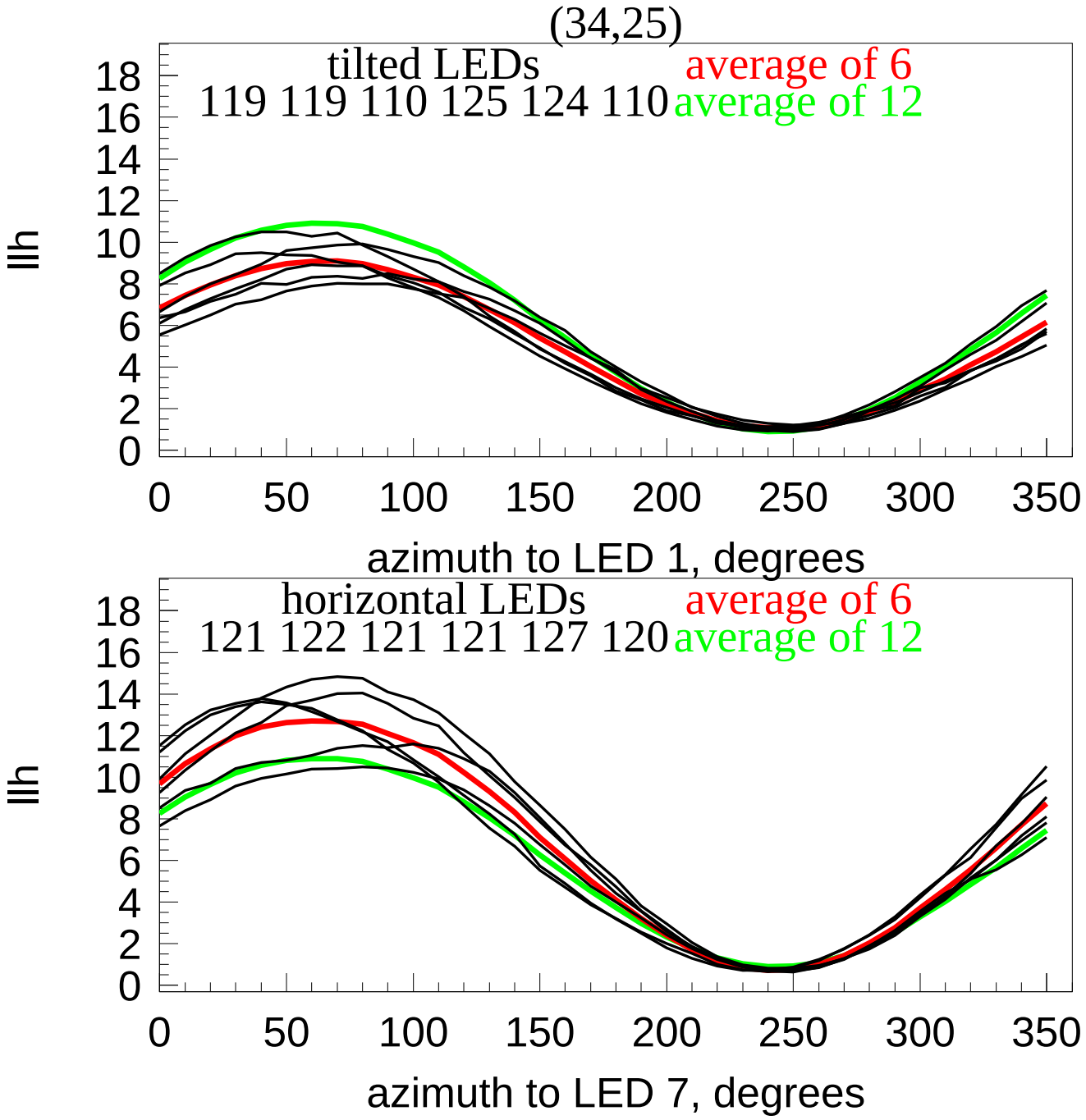

(34,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
134.8 ± 5.7
130
1
2
3
4
5
6
7
8
9
10
11
12

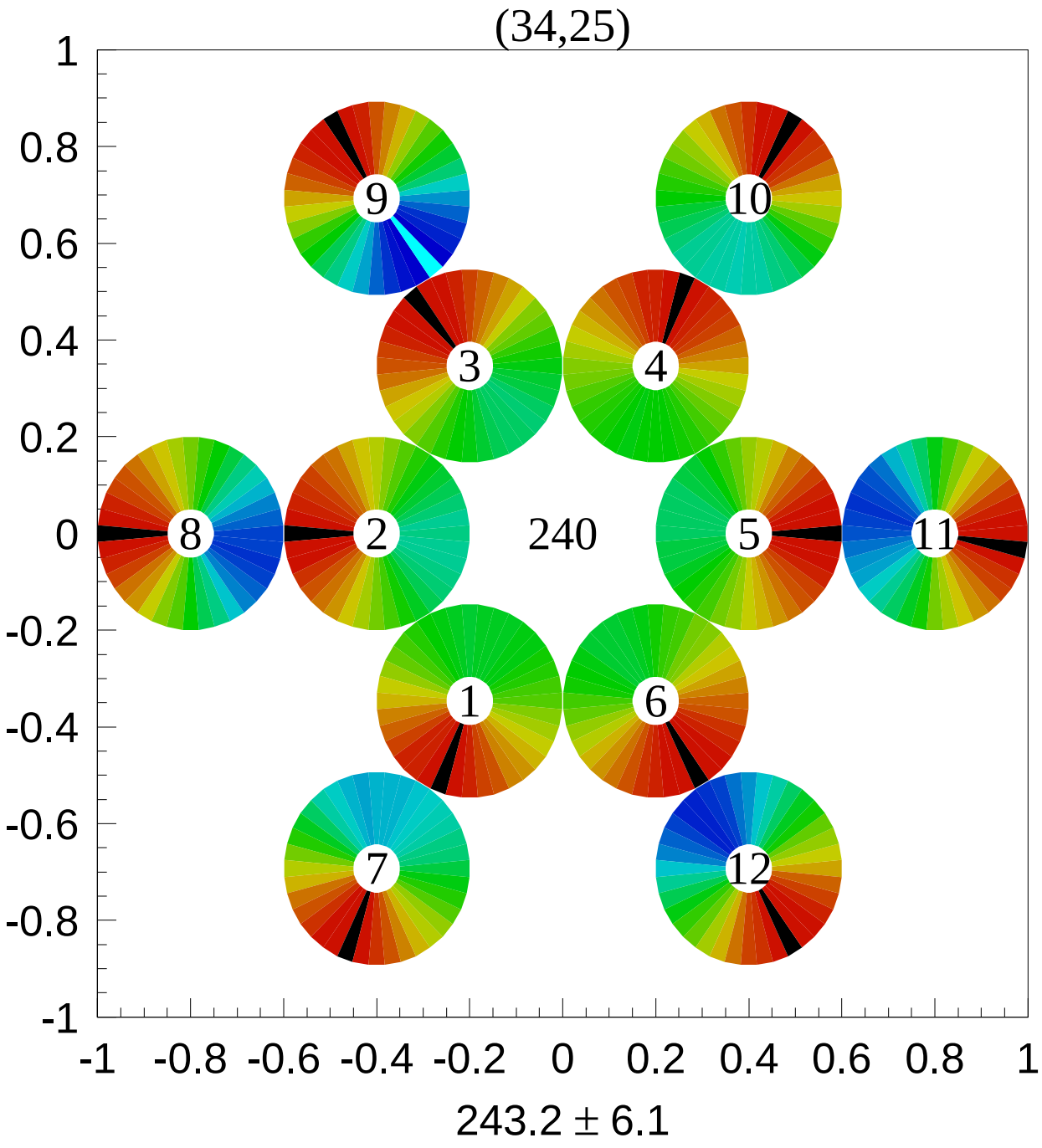

(34,23)
tilted LEDs
118 123 126 127 116 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 118 126 120 116 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

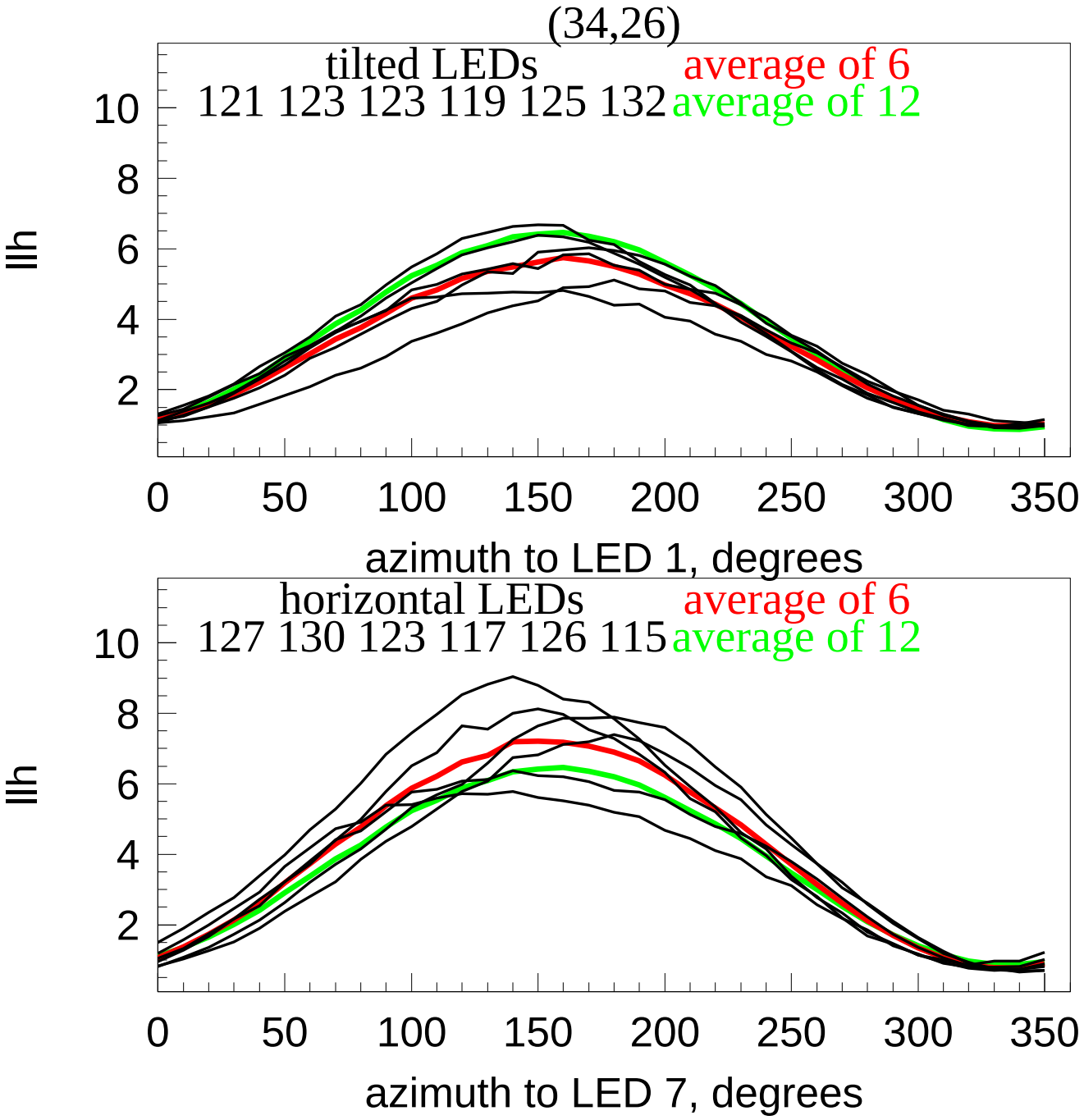

(34,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
297.4 ± 4.6

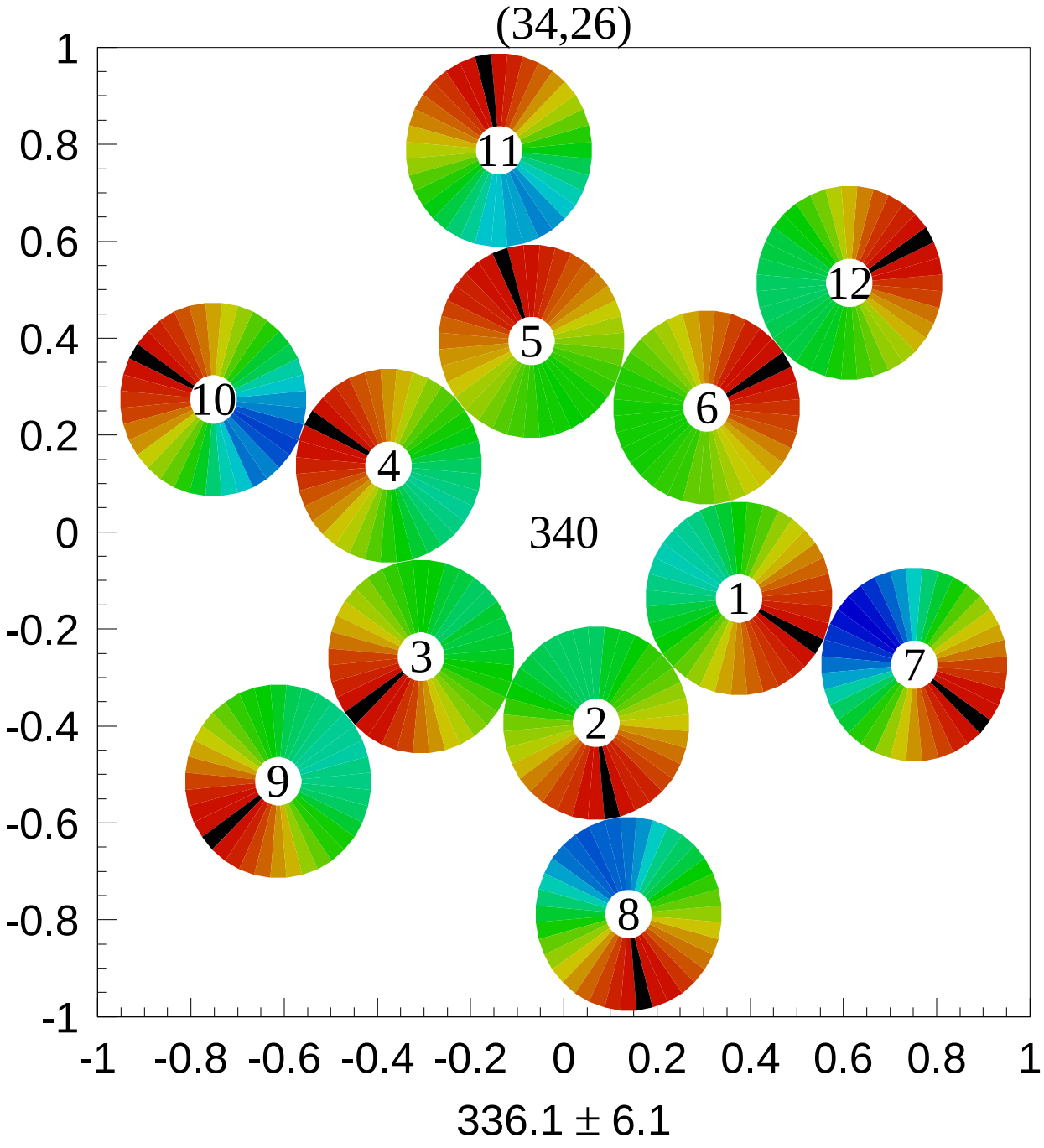

(34,24)
tilted LEDs
115 121 118 116 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 122 123 117 134
average of 6
average of 12
llh
azimuth to LED 7, degrees

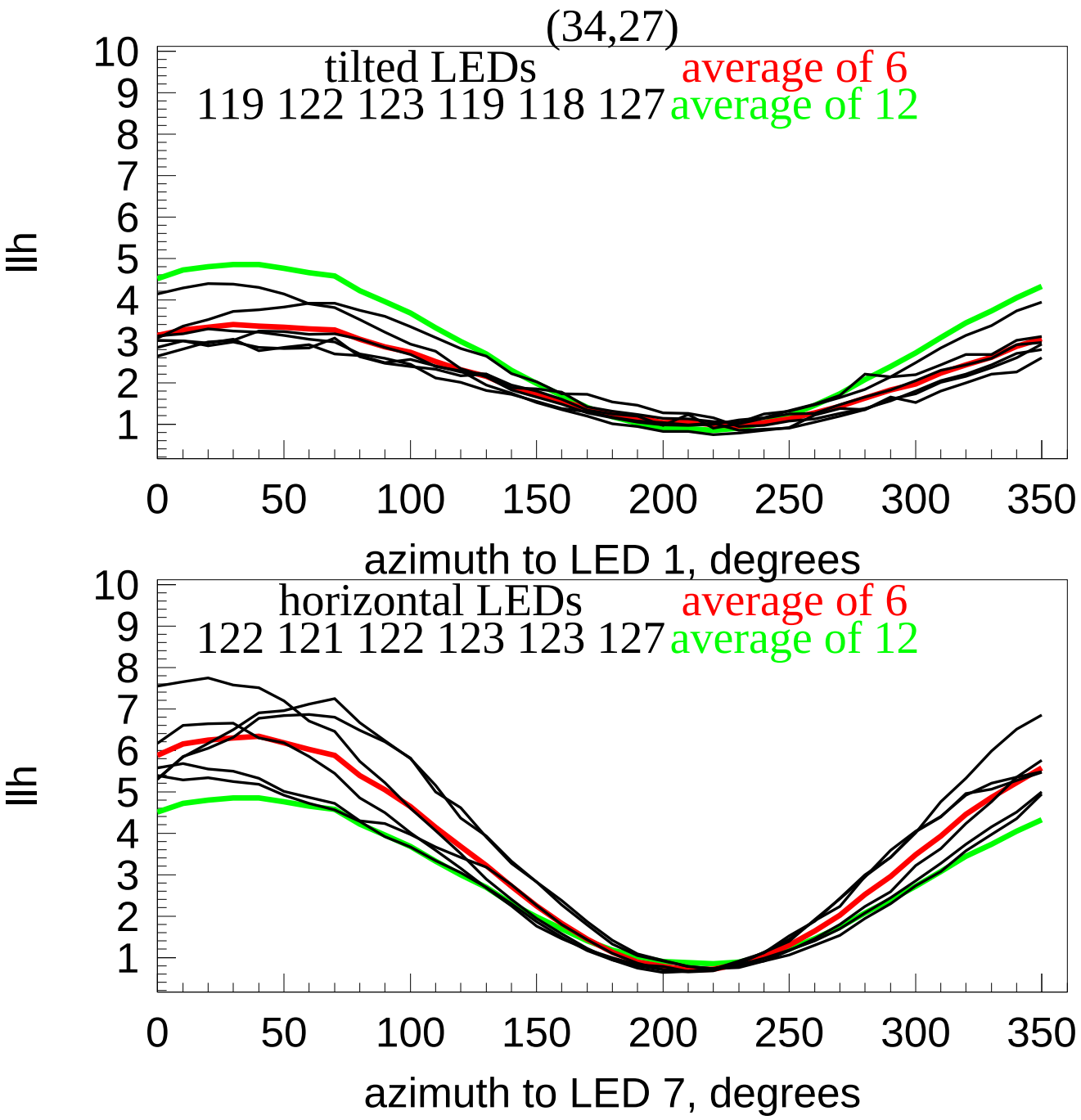

(34,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
248.4 ± 5.5

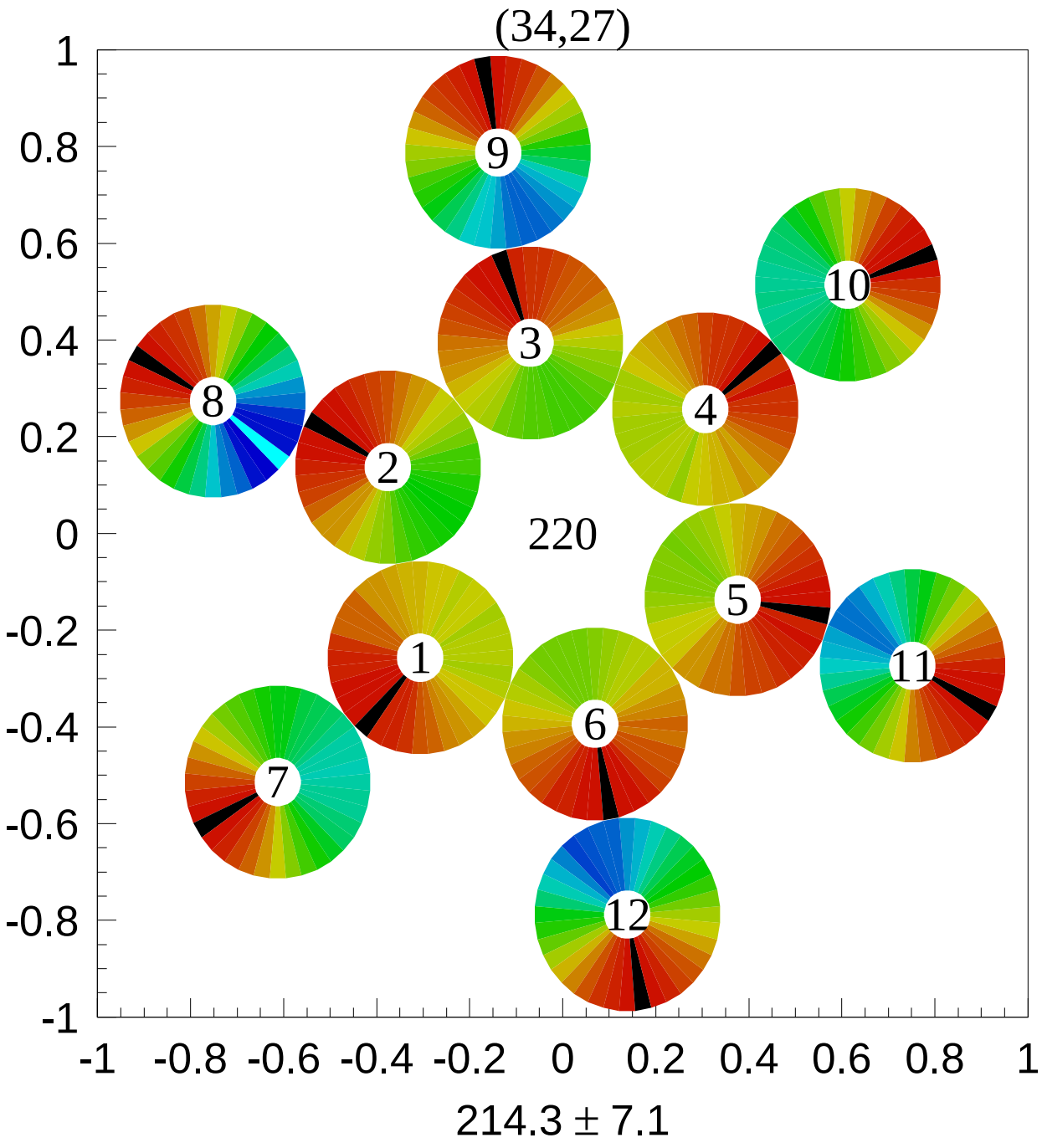

(34,25)
tilted LEDs
119 119 110 125 124 110
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 121 121 127 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

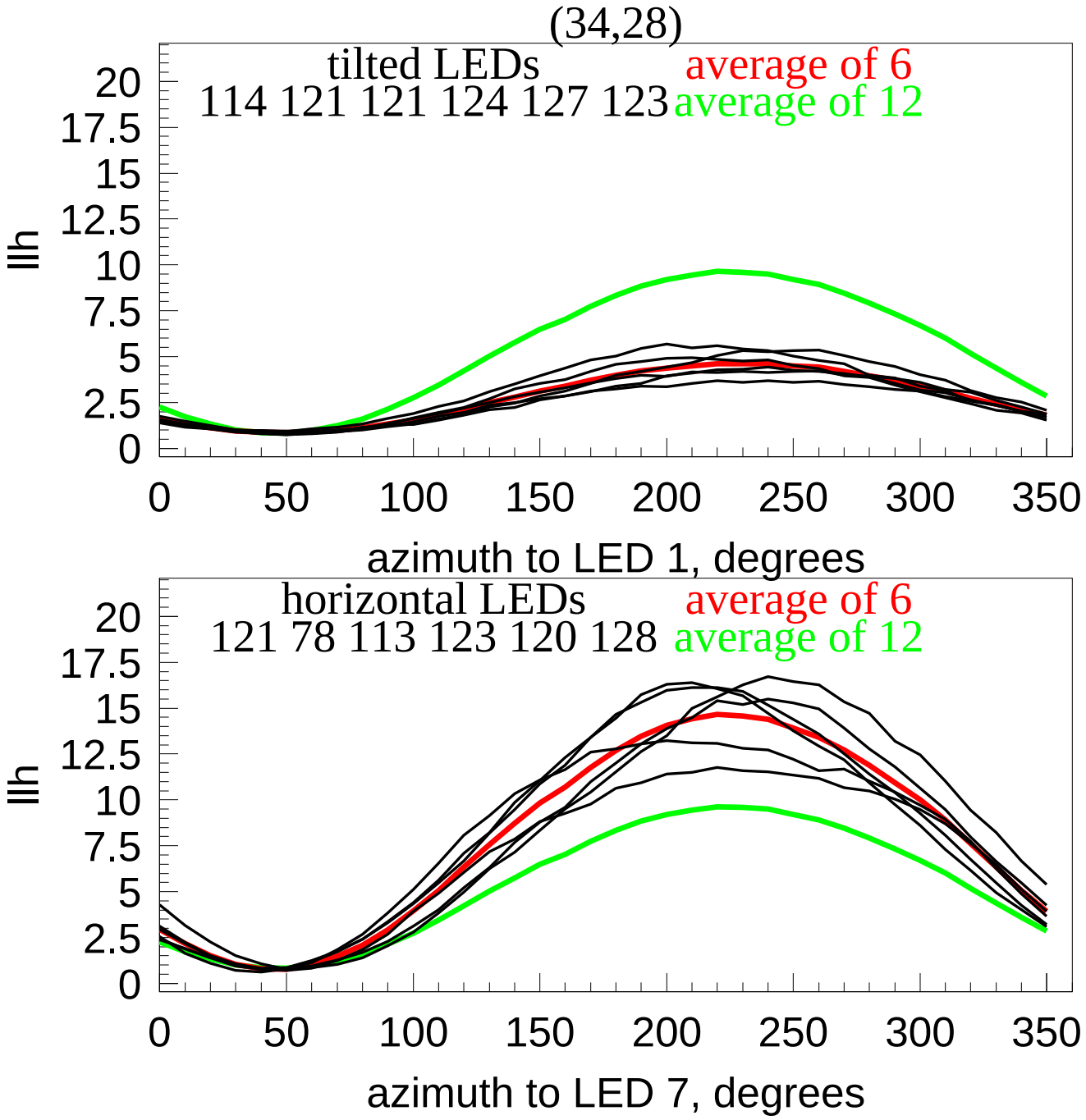

(34,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
243.2 ± 6.1

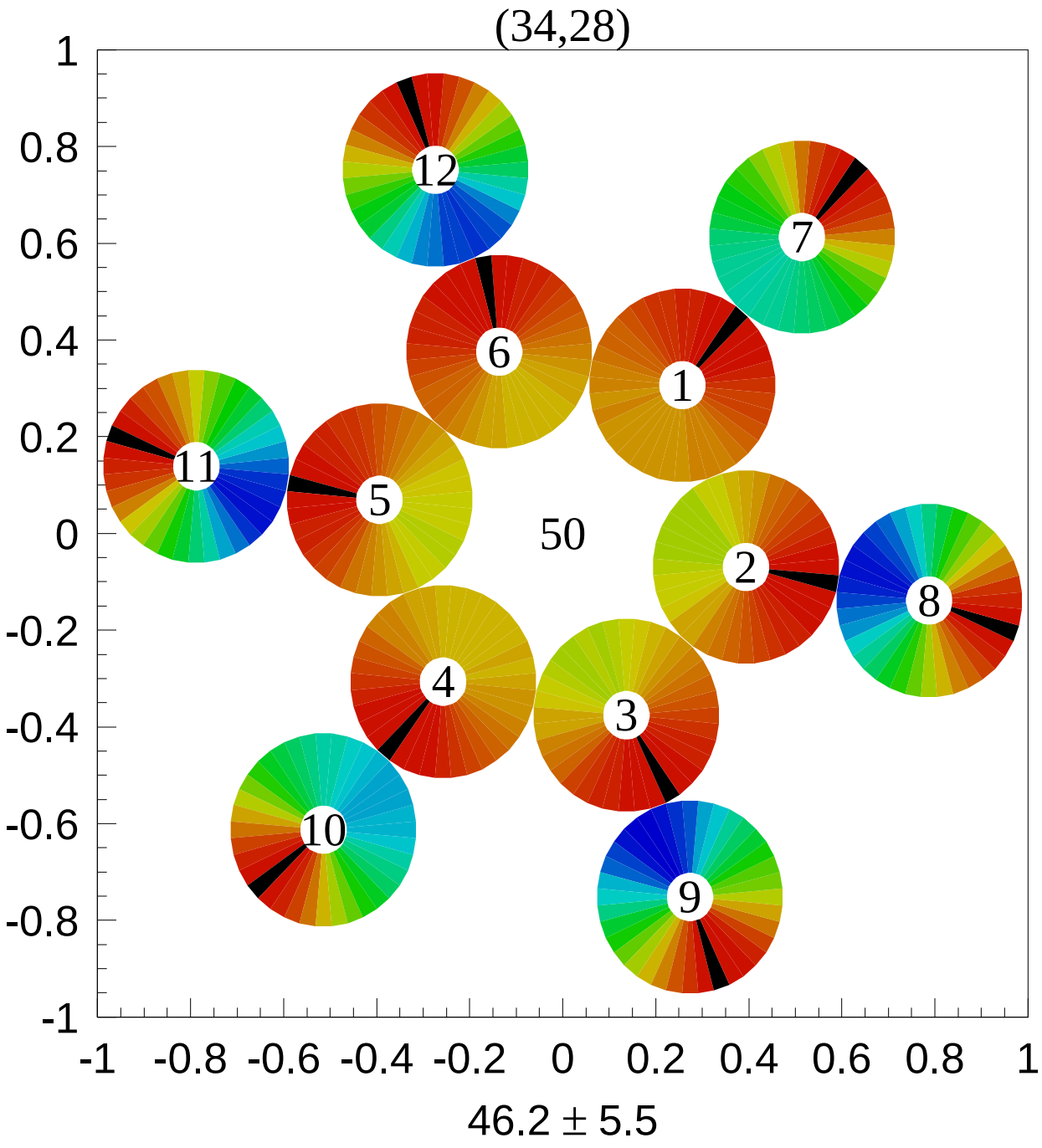

(34,26)
tilted LEDs
121 123 123 119 125 132
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 130 123 117 126 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

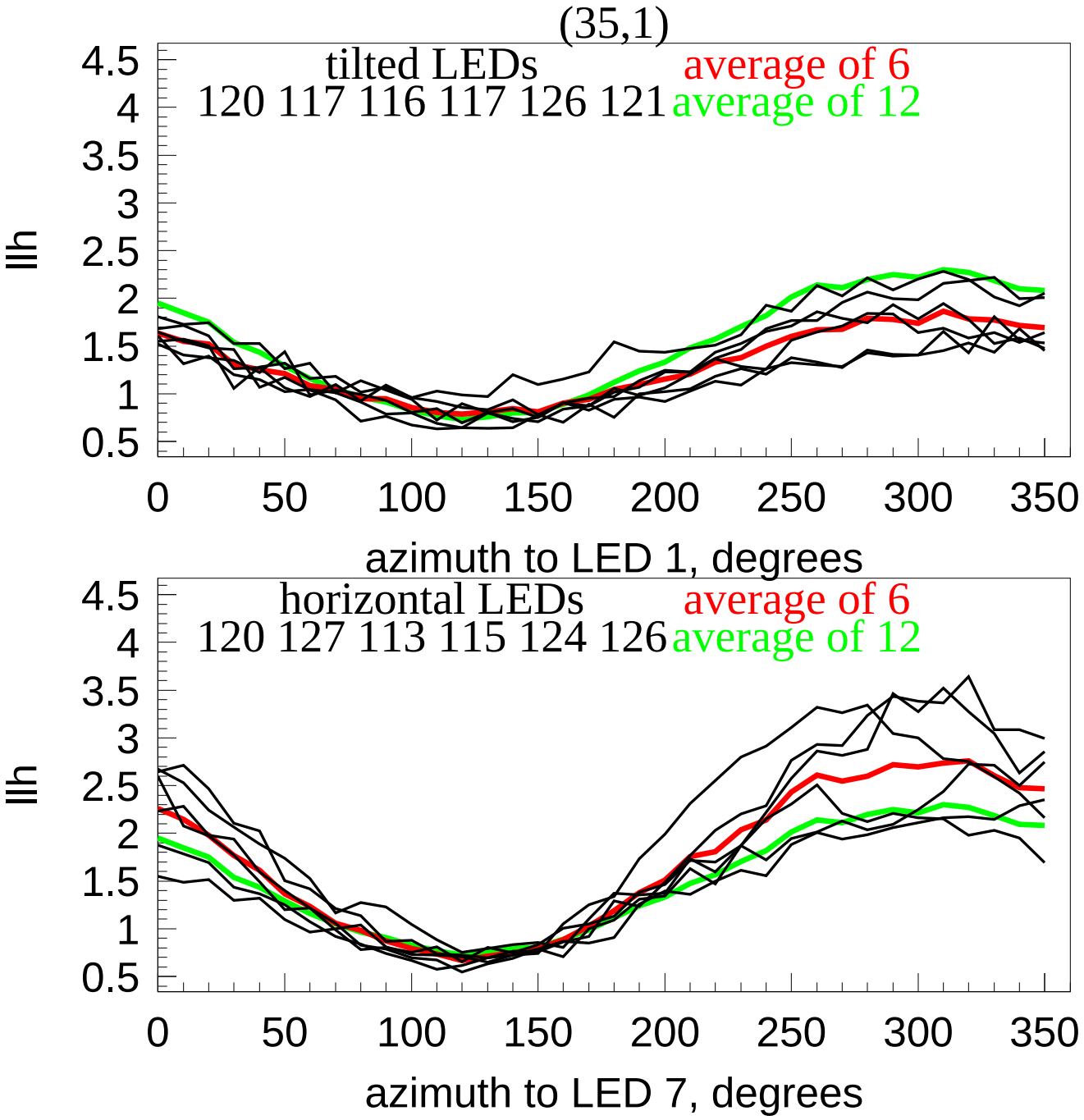

(34,26)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
336.1 ± 6.1

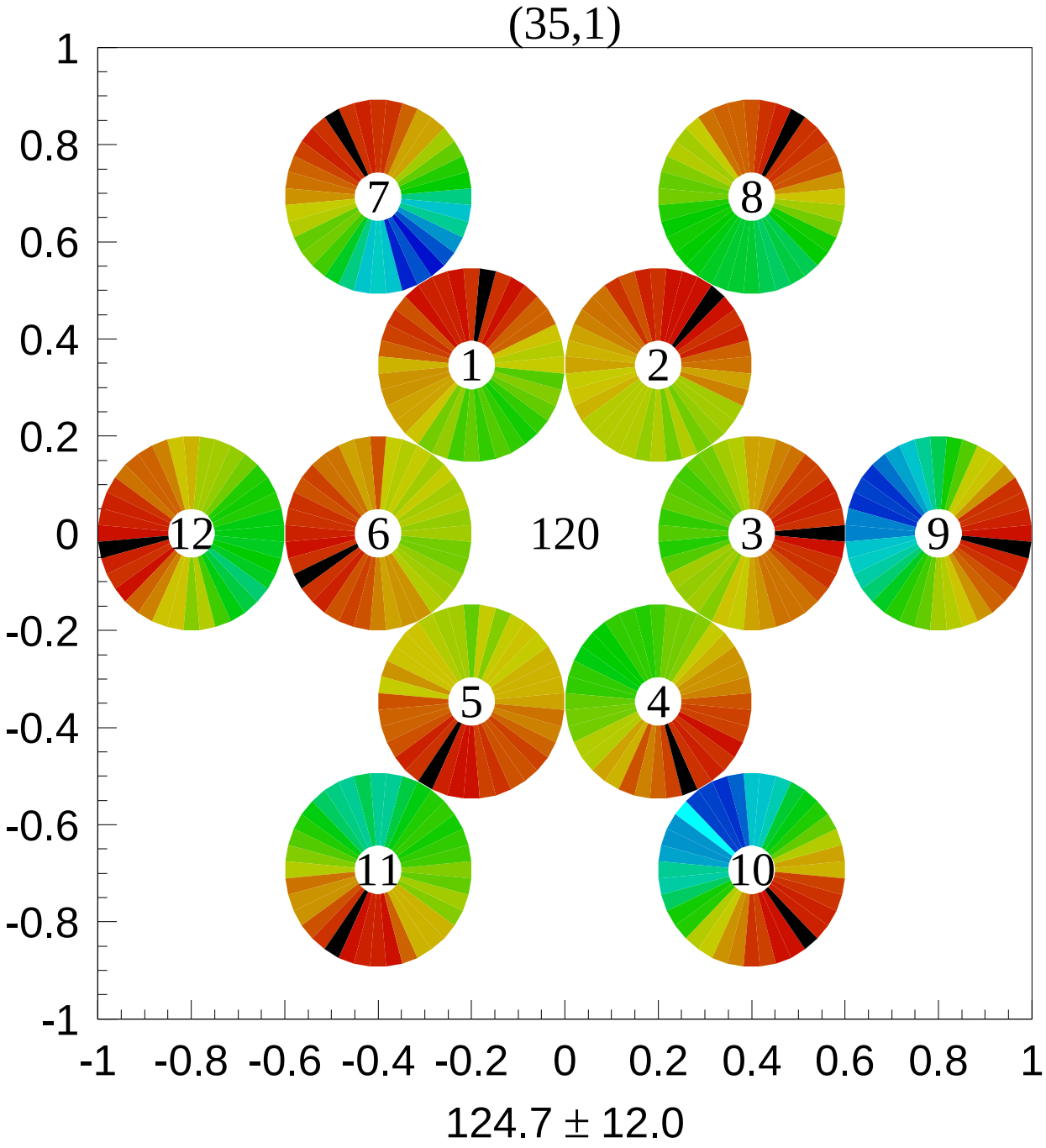

(34,27)
tilted LEDs
119 122 123 119 118 127
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 121 122 123 123 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

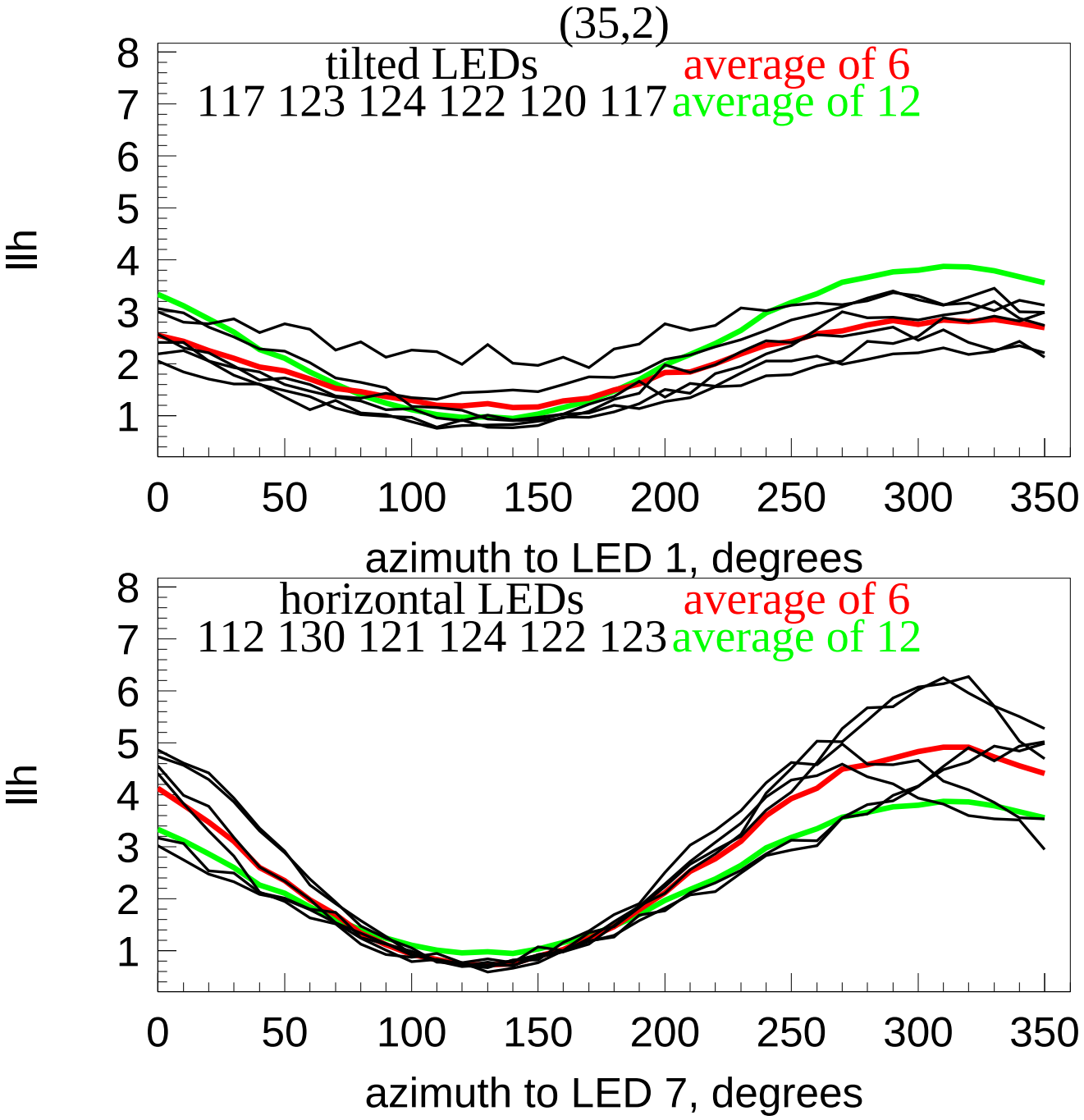

(34,27)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
214.3 ± 7.1

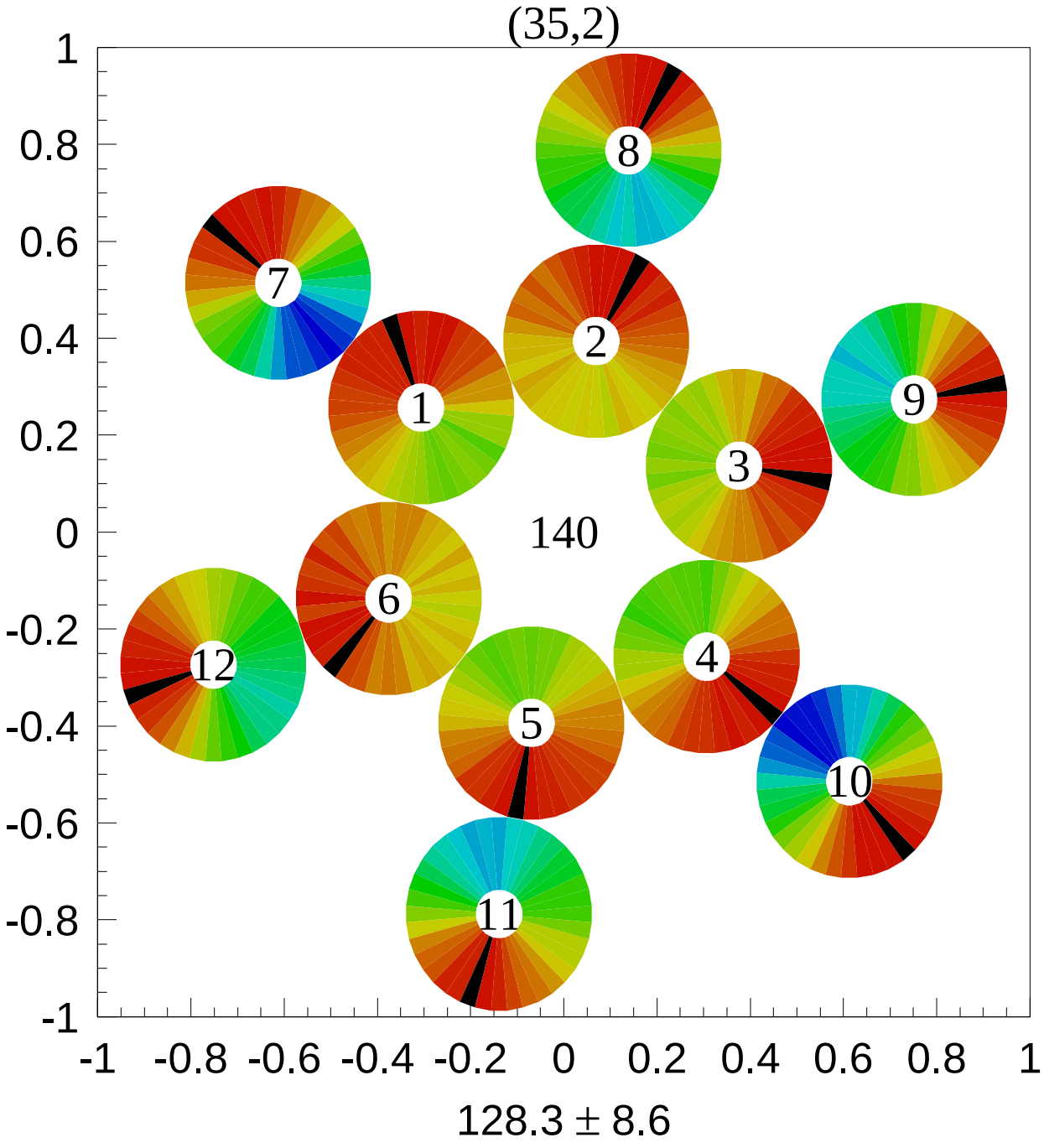

(34,28)
tilted LEDs
114 121 121 124 127 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 78 113 123 120 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

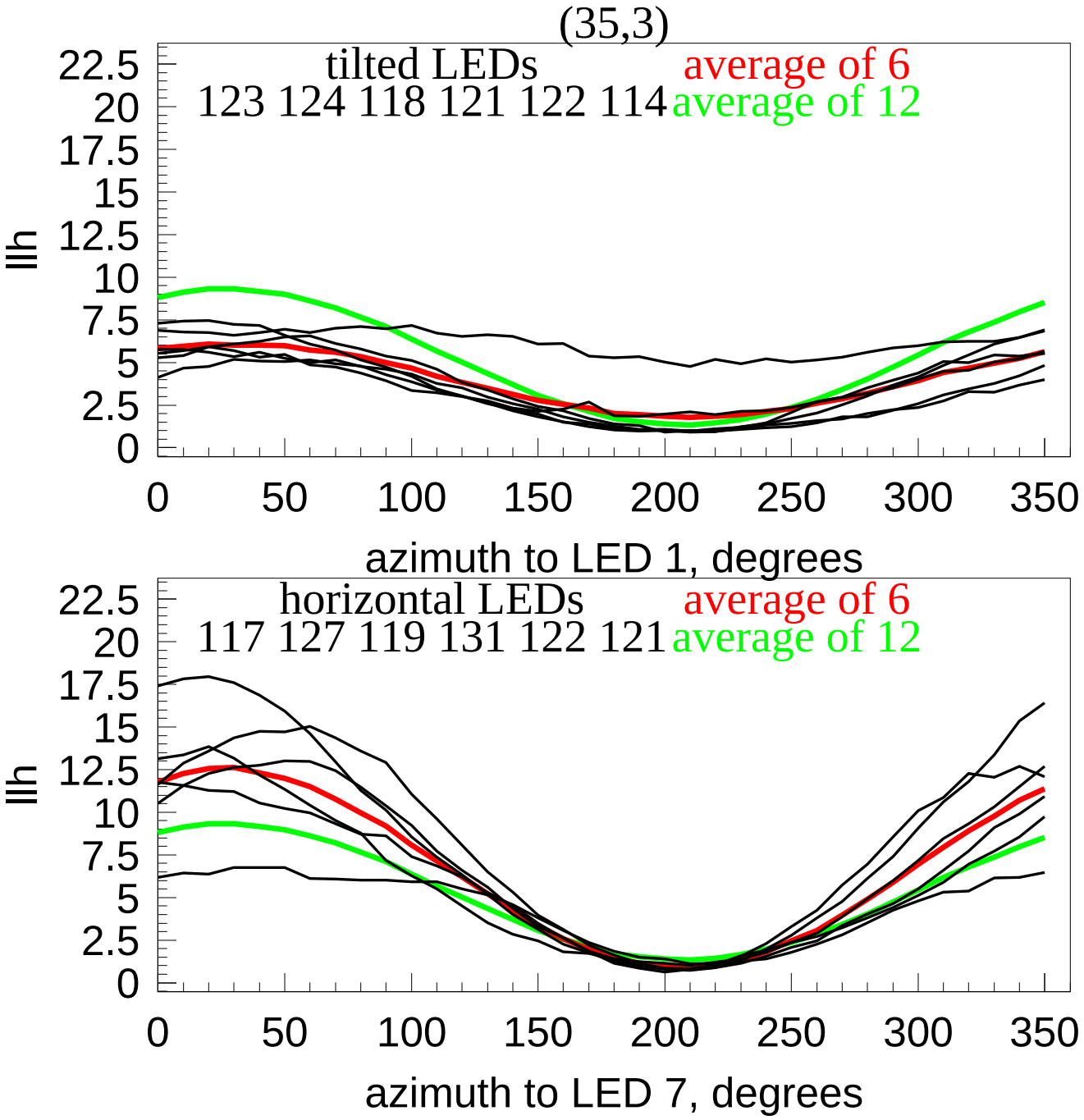

(34,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
46.2 ± 5.5

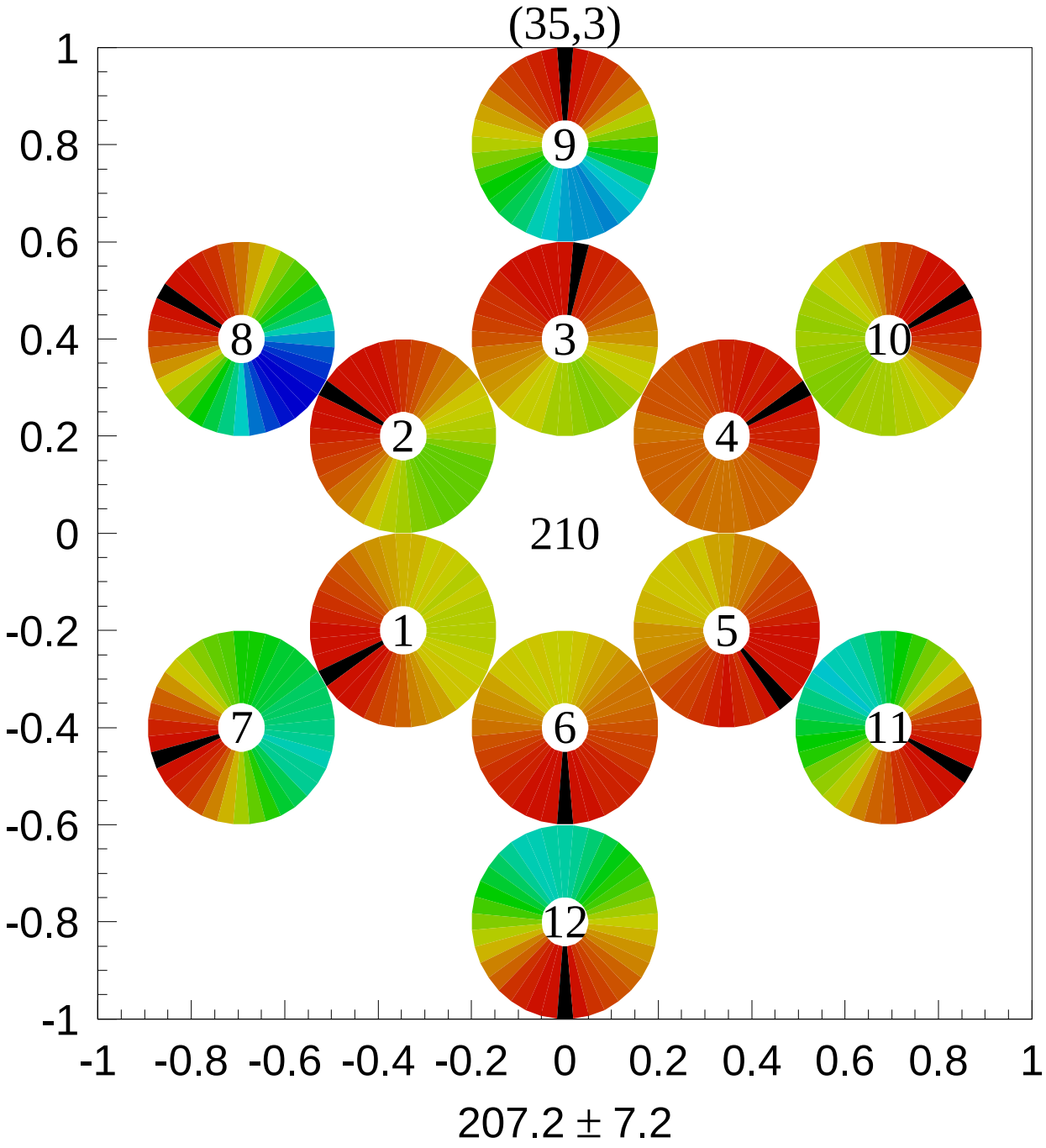

(35,1)
tilted LEDs
120 117 116 117 126 121
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 127 113 115 124 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

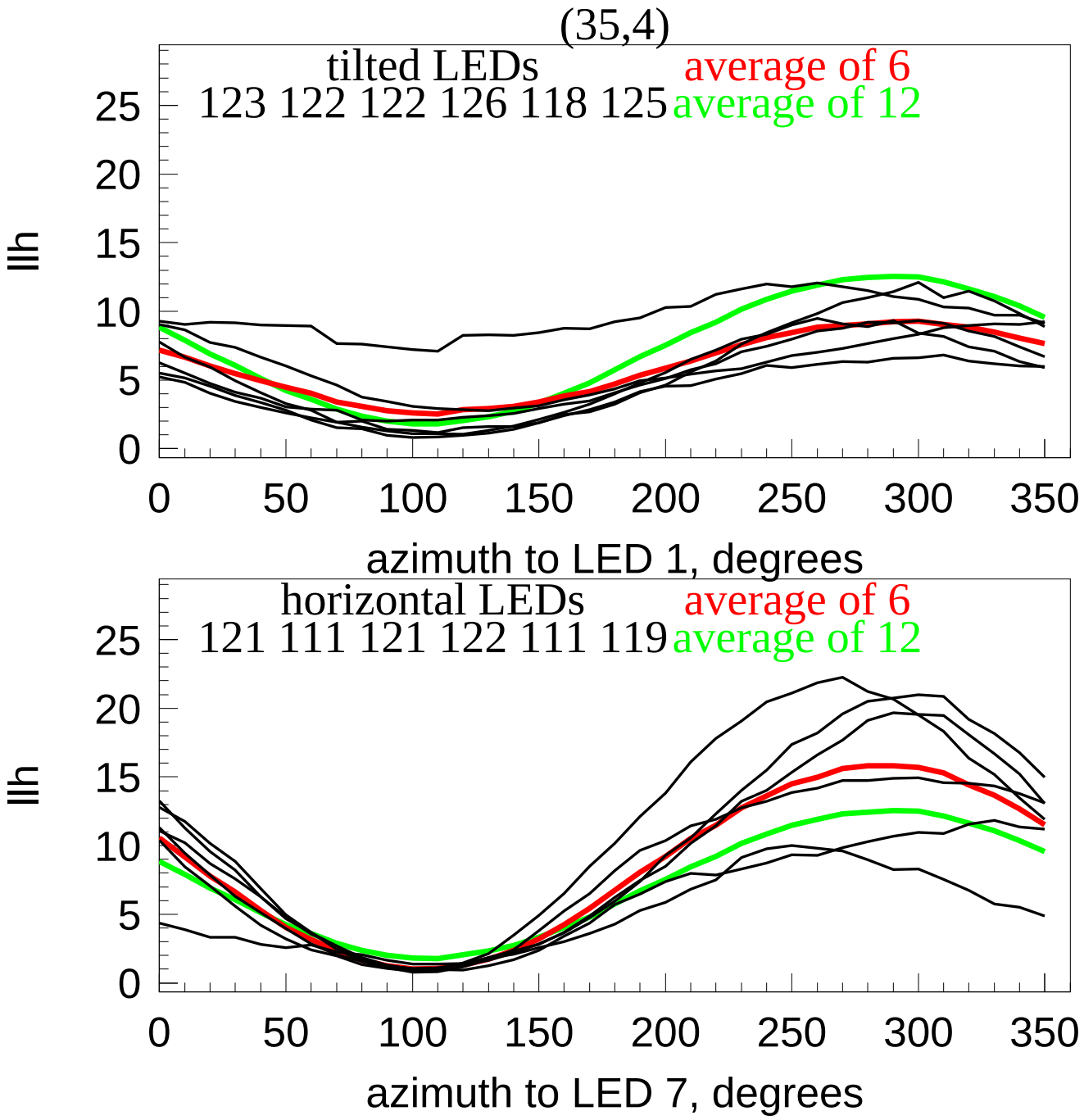

(35,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
124.7 ± 12.0

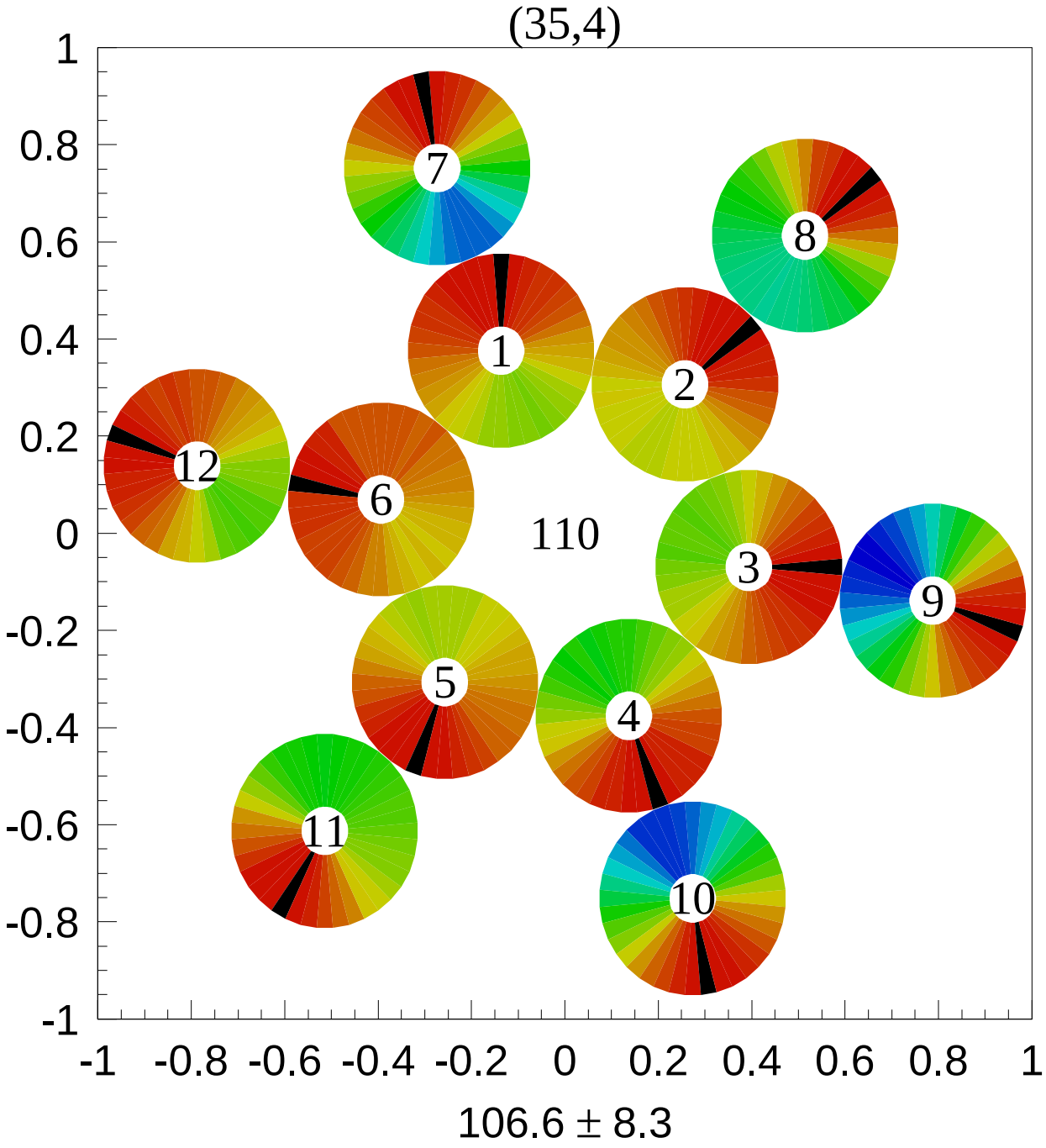

(35,2)
tilted LEDs
117 123 124 122 120 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
112 130 121 124 122 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

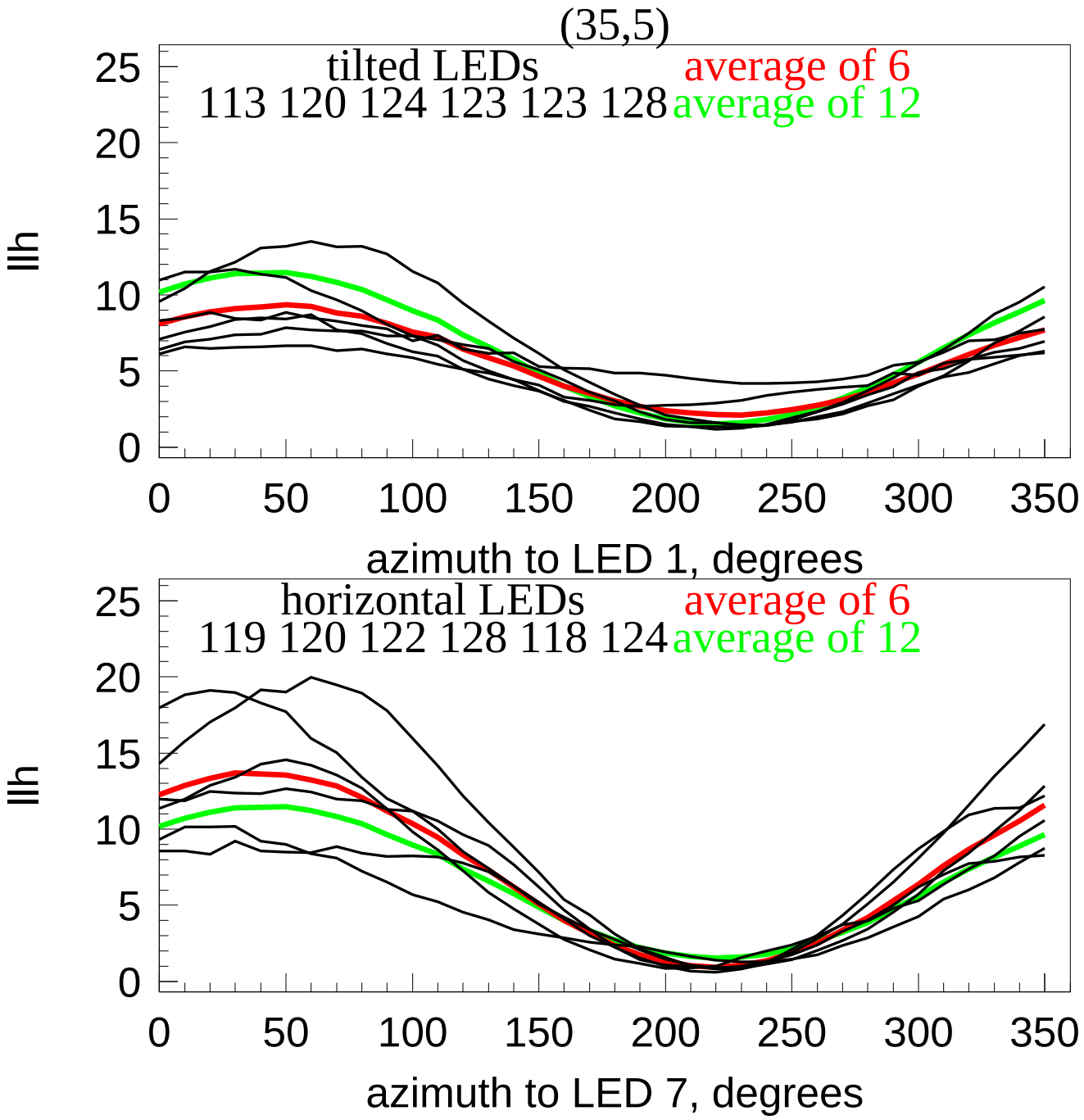

(35,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
128.3 ± 8.6
140
1
2
3
4
5
6
7
8
9
10
11
12

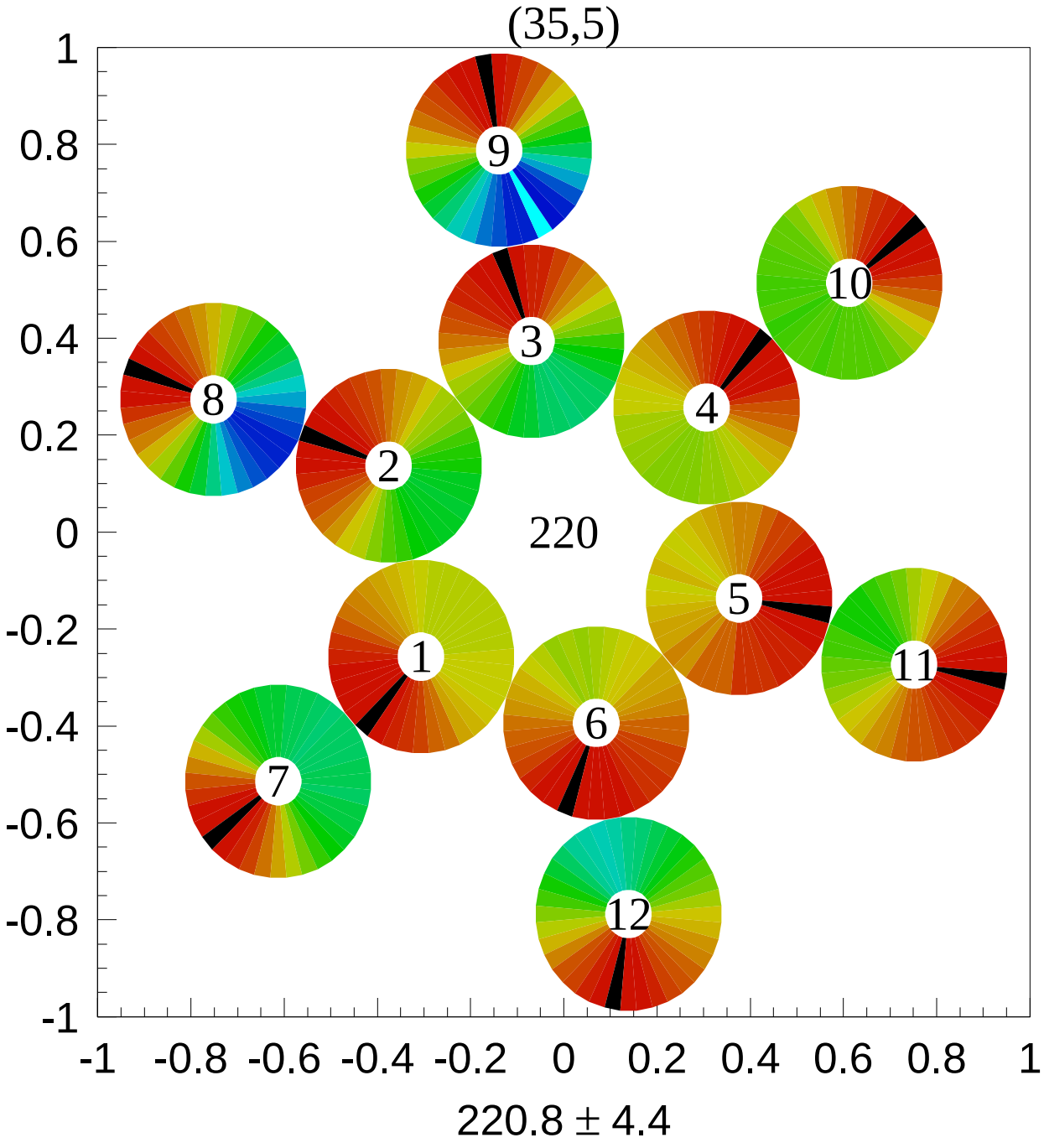

(35,3)
tilted LEDs
123 124 118 121 122 114
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 127 119 131 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

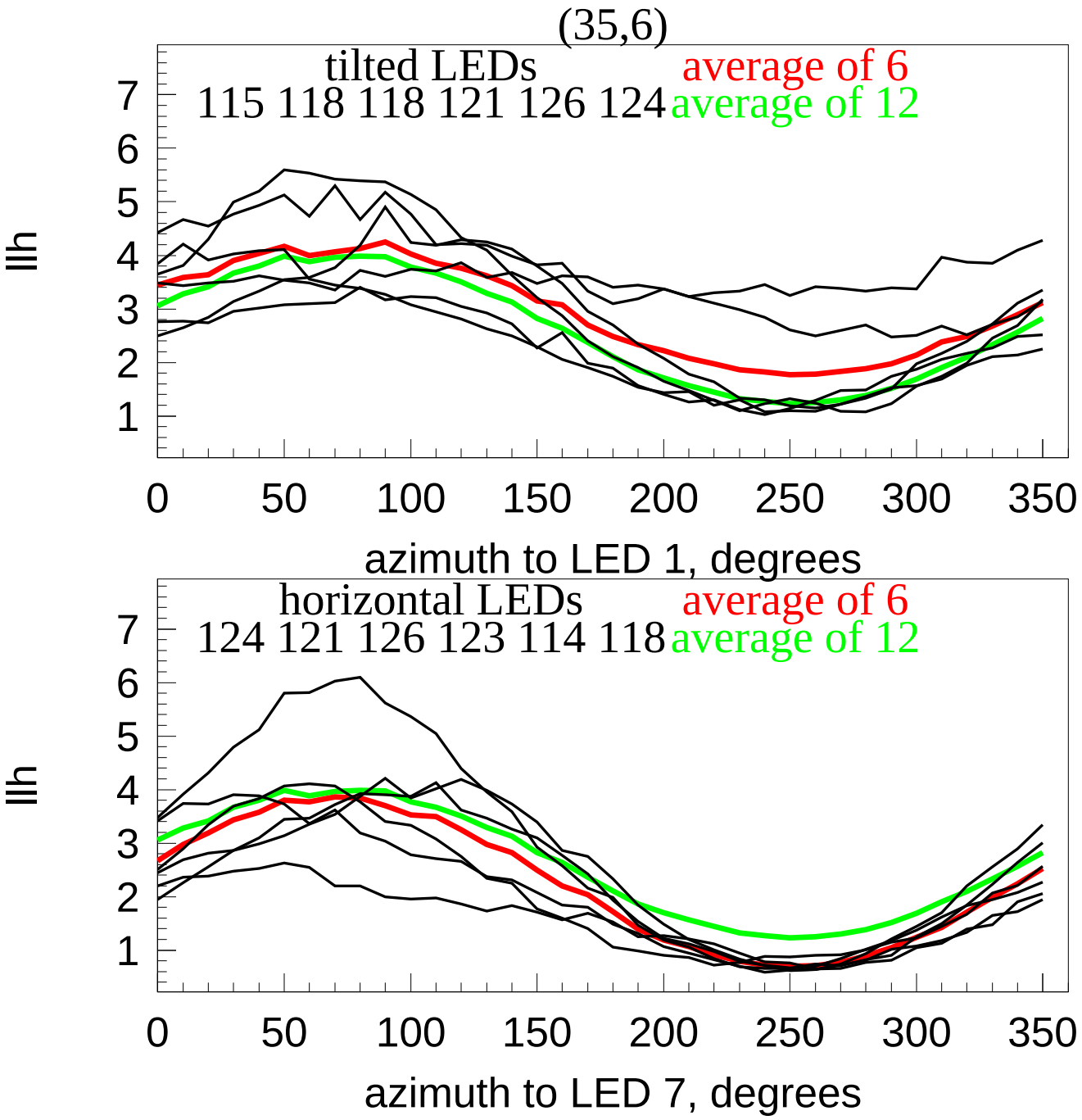

(35,3)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
207.2 ± 7.2

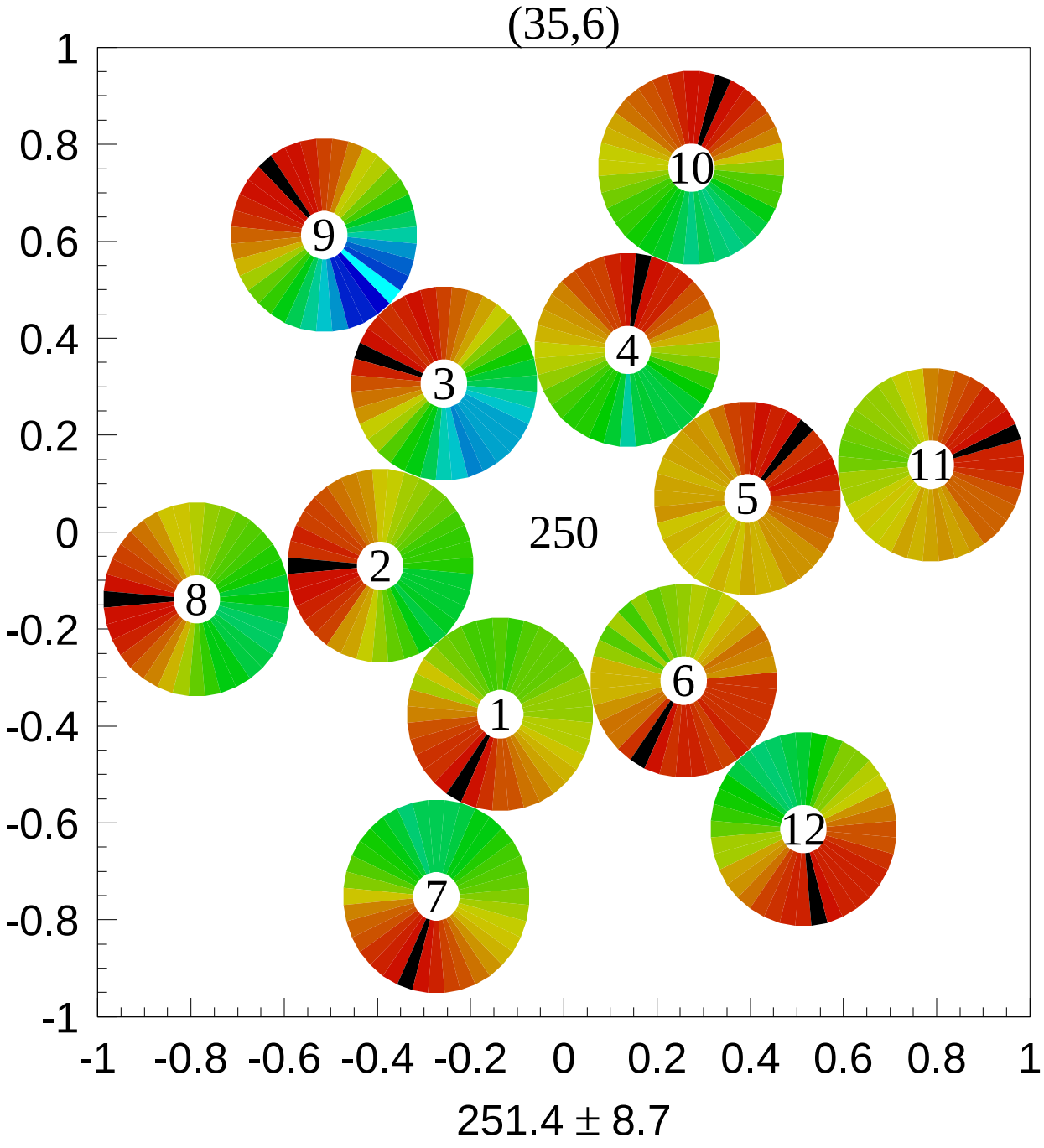

(35,4)
tilted LEDs
123 122 122 126 118 125
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 111 121 122 111 119
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

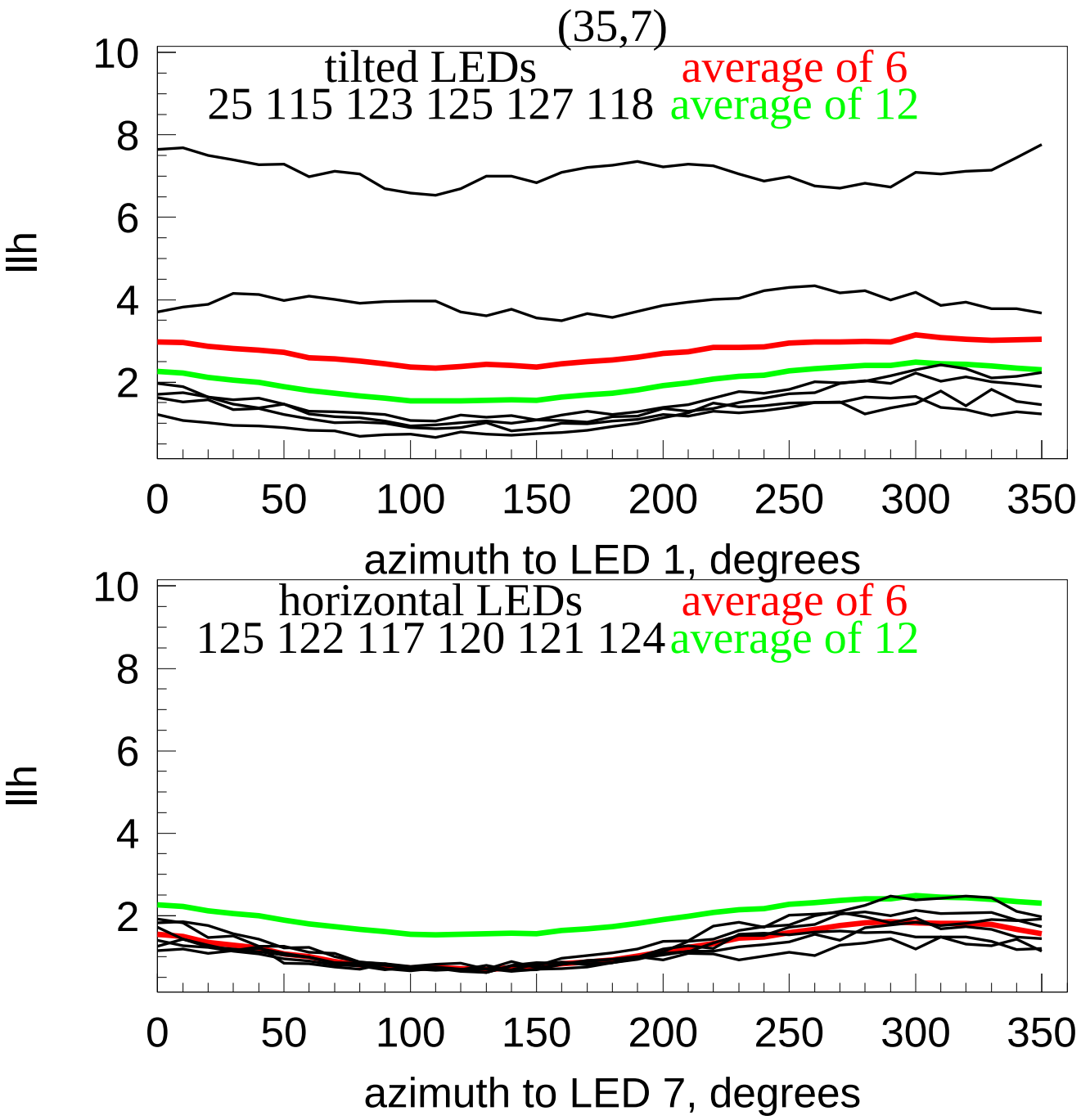

(35,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
106.6 ± 8.3

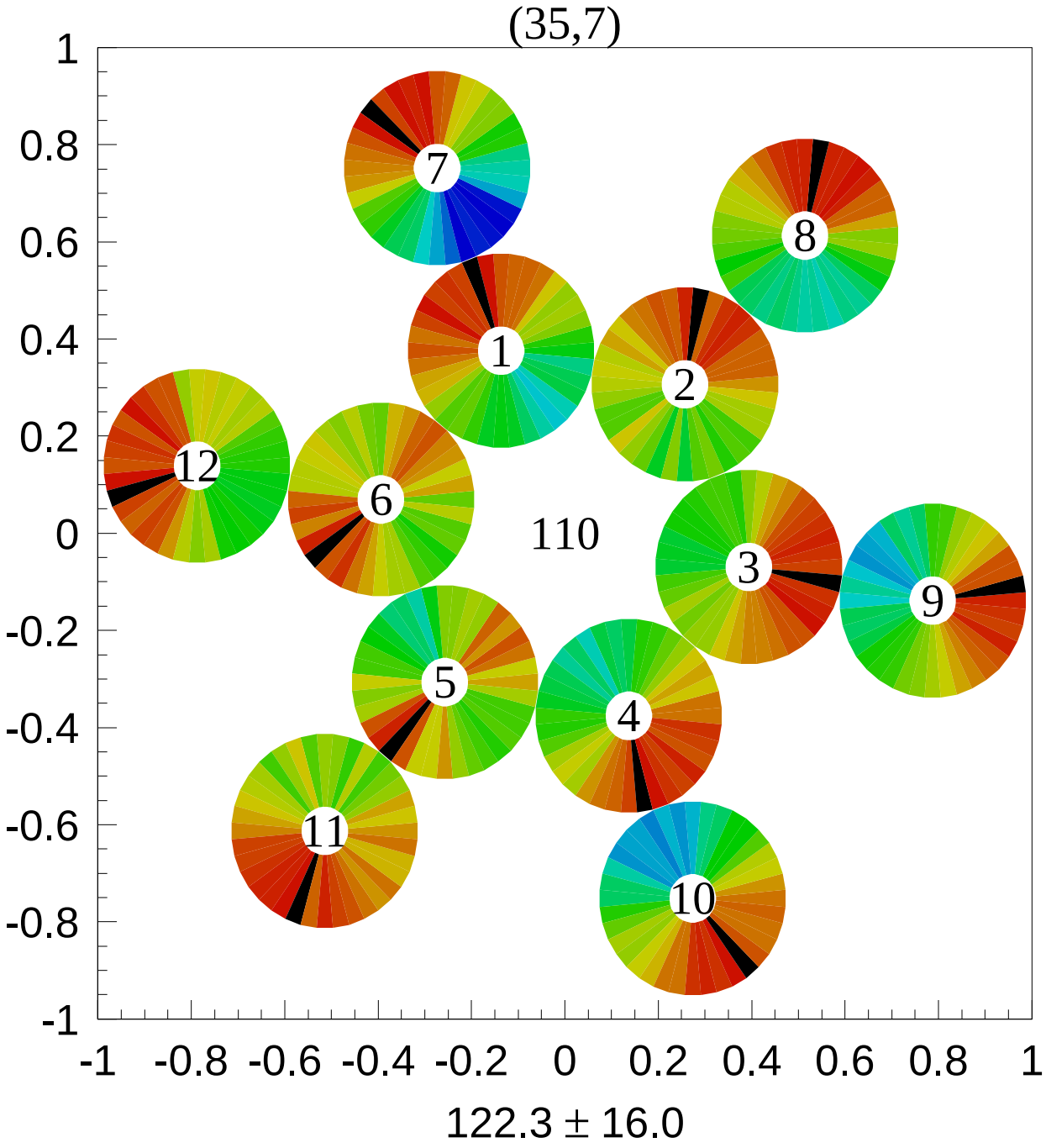

(35,5)
tilted LEDs
113 120 124 123 123 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 122 128 118 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

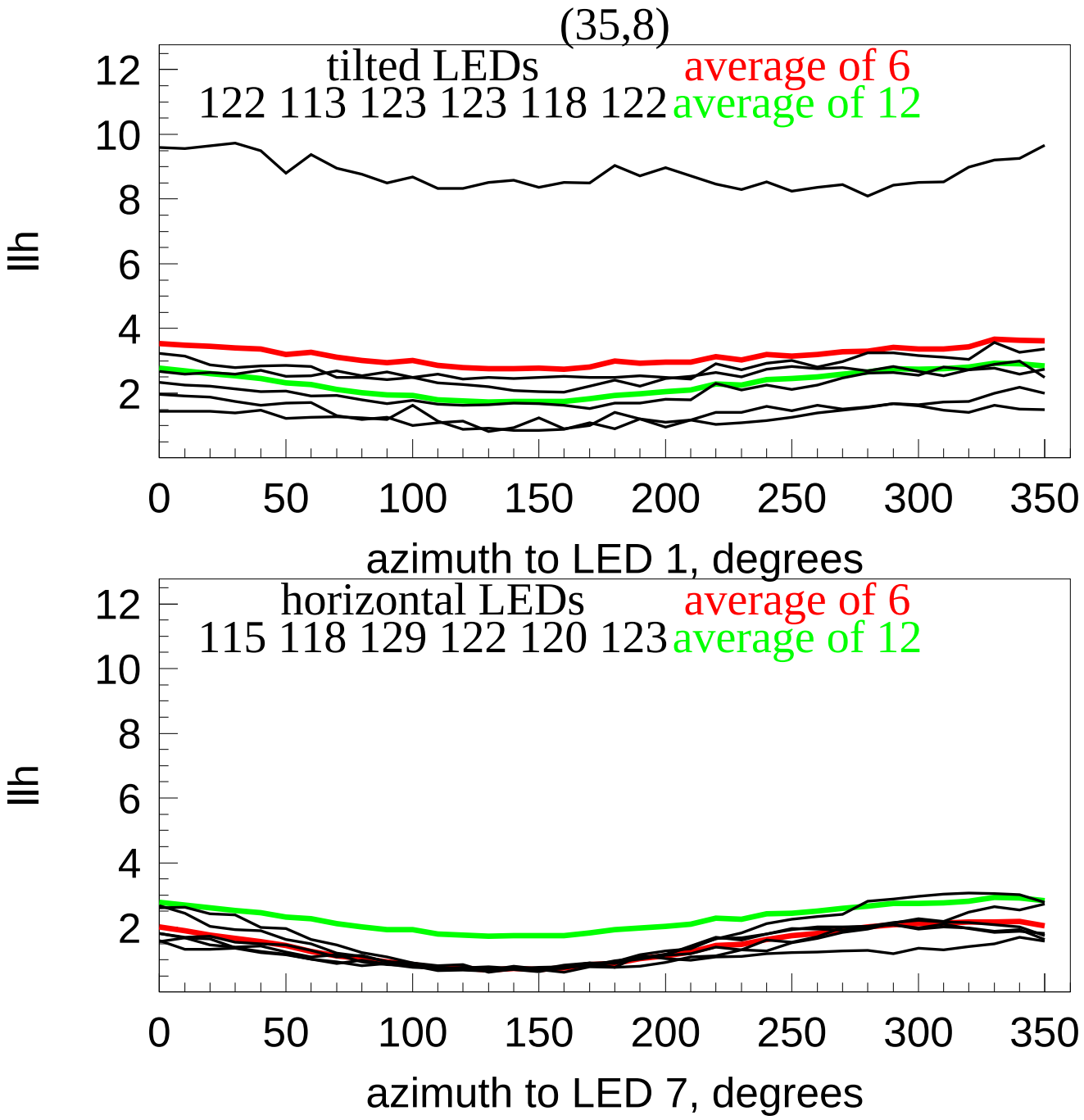

(35,5)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
220.8 ± 4.4

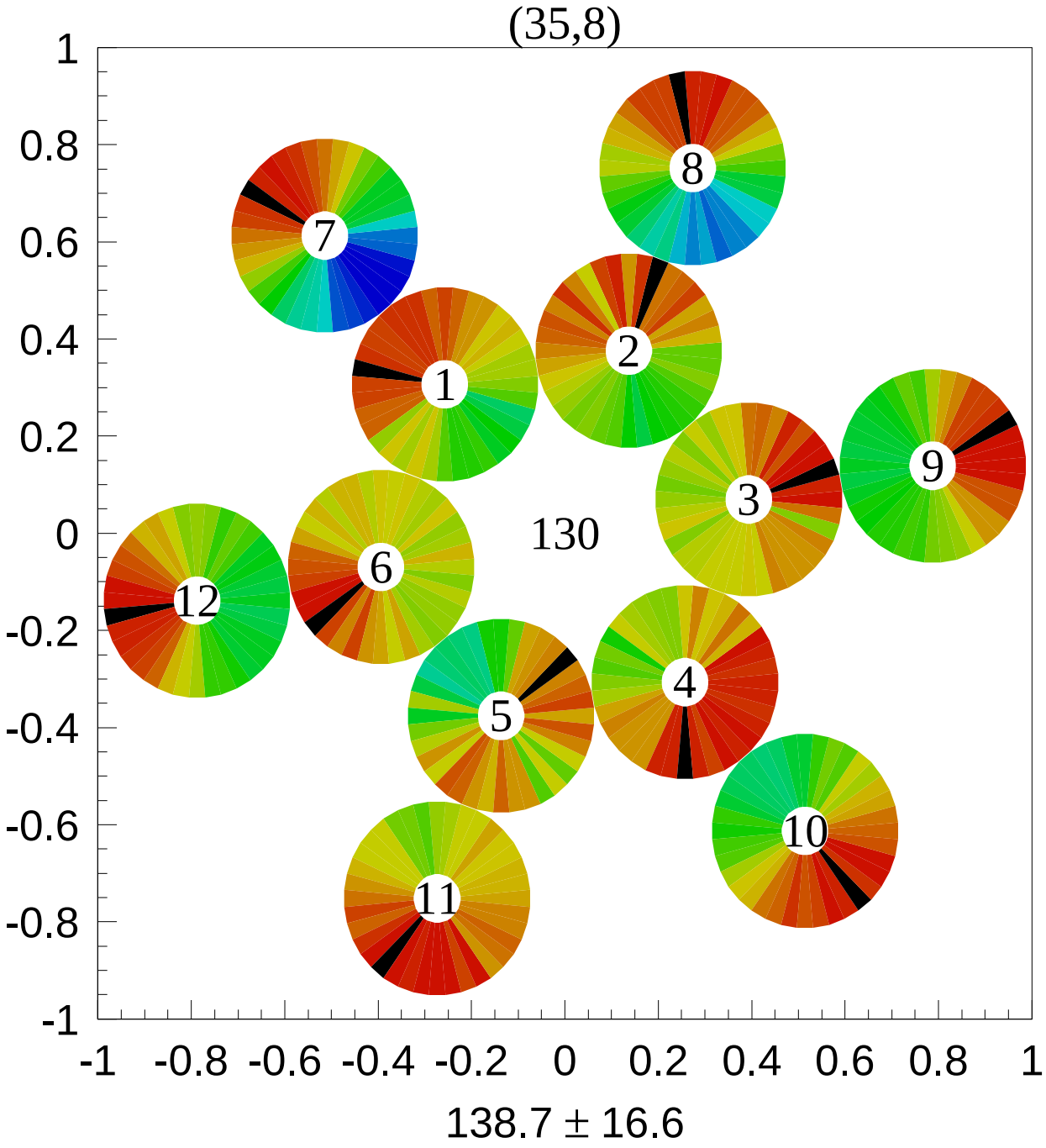

(35,6)
tilted LEDs
115 118 118 121 126 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 126 123 114 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

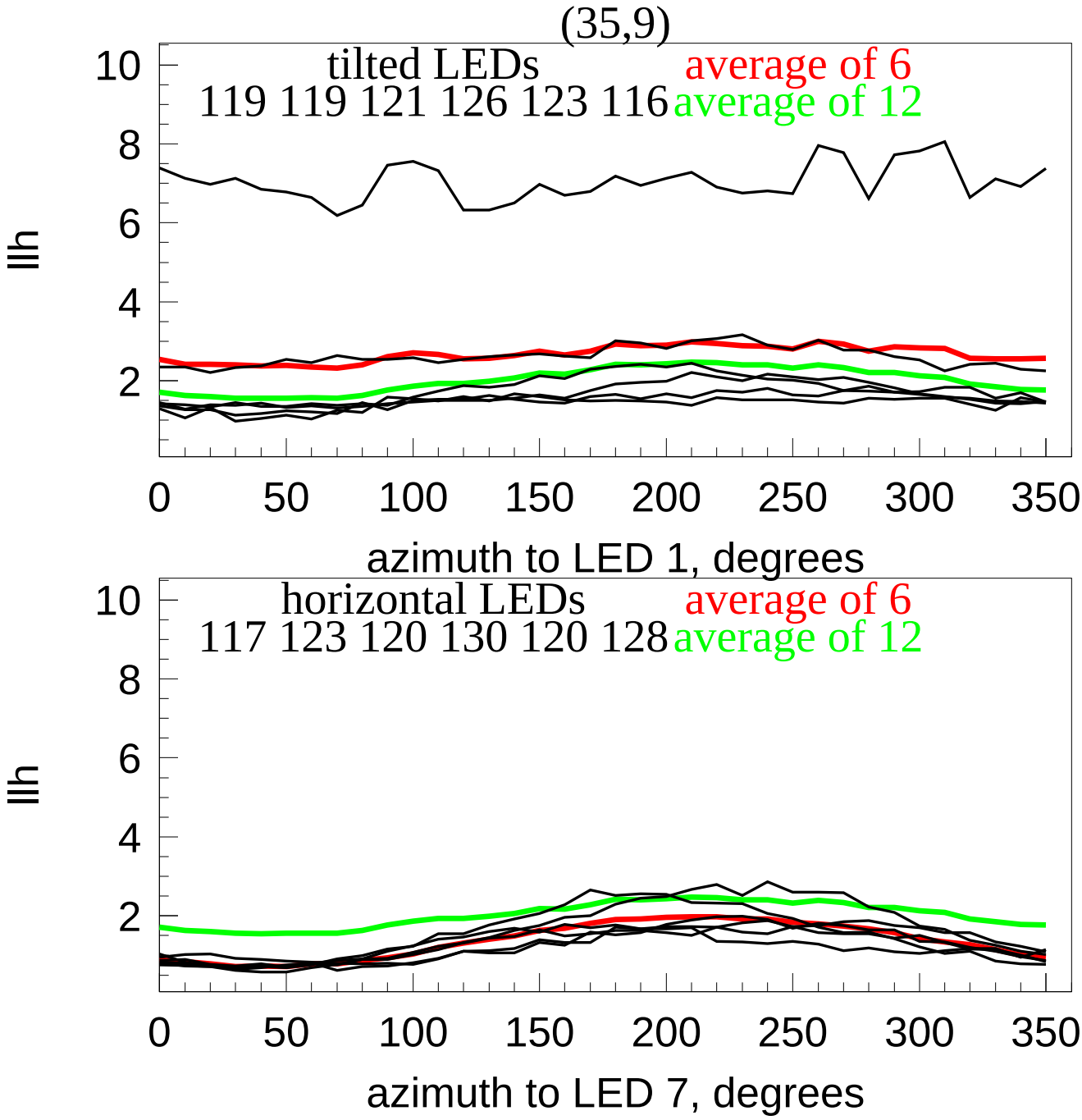

(35,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
251.4 ± 8.7

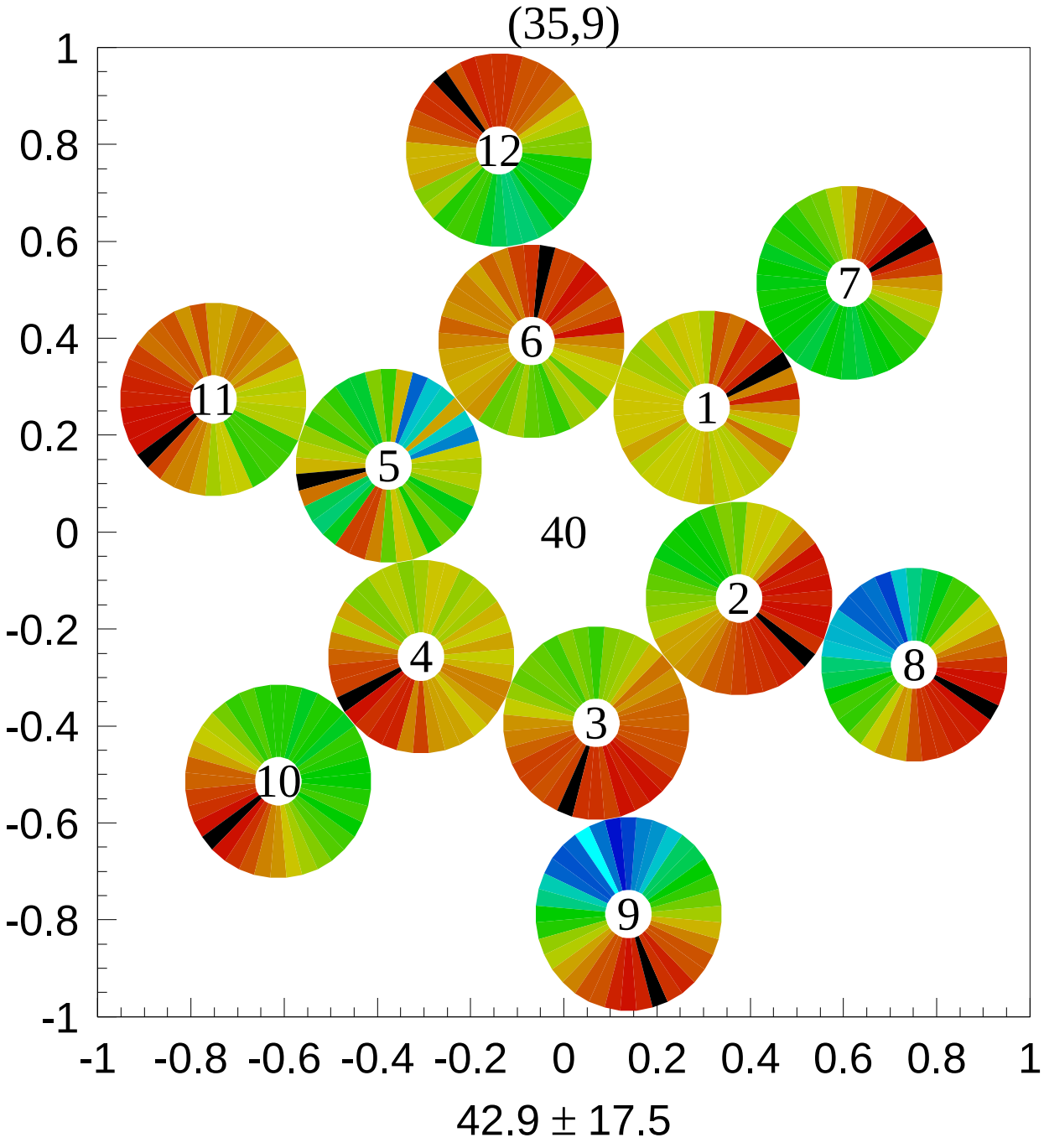

(35,7)
tilted LEDs
25 115 123 125 127 118
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 122 117 120 121 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

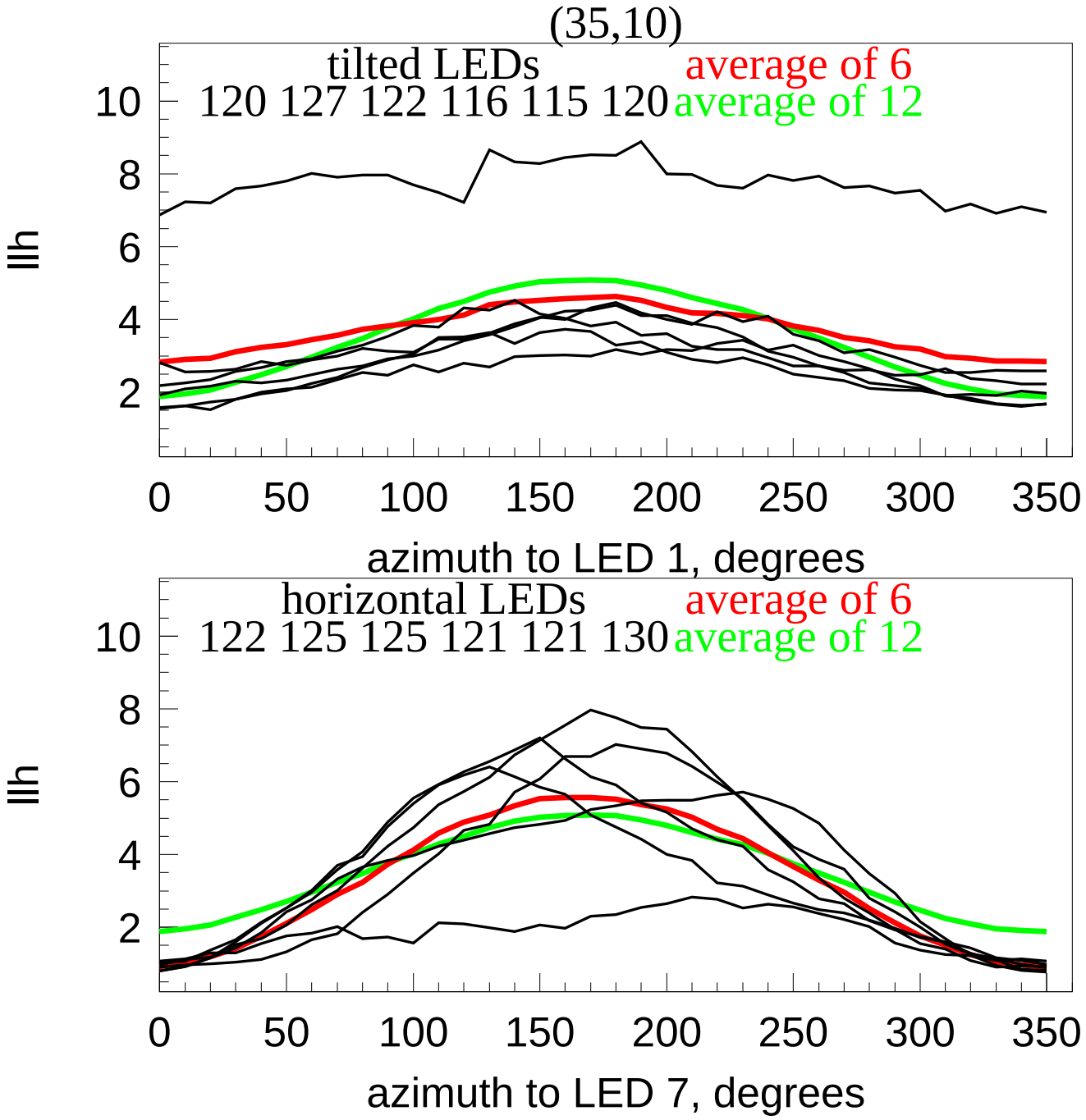

(35,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
122.3 ± 16.0

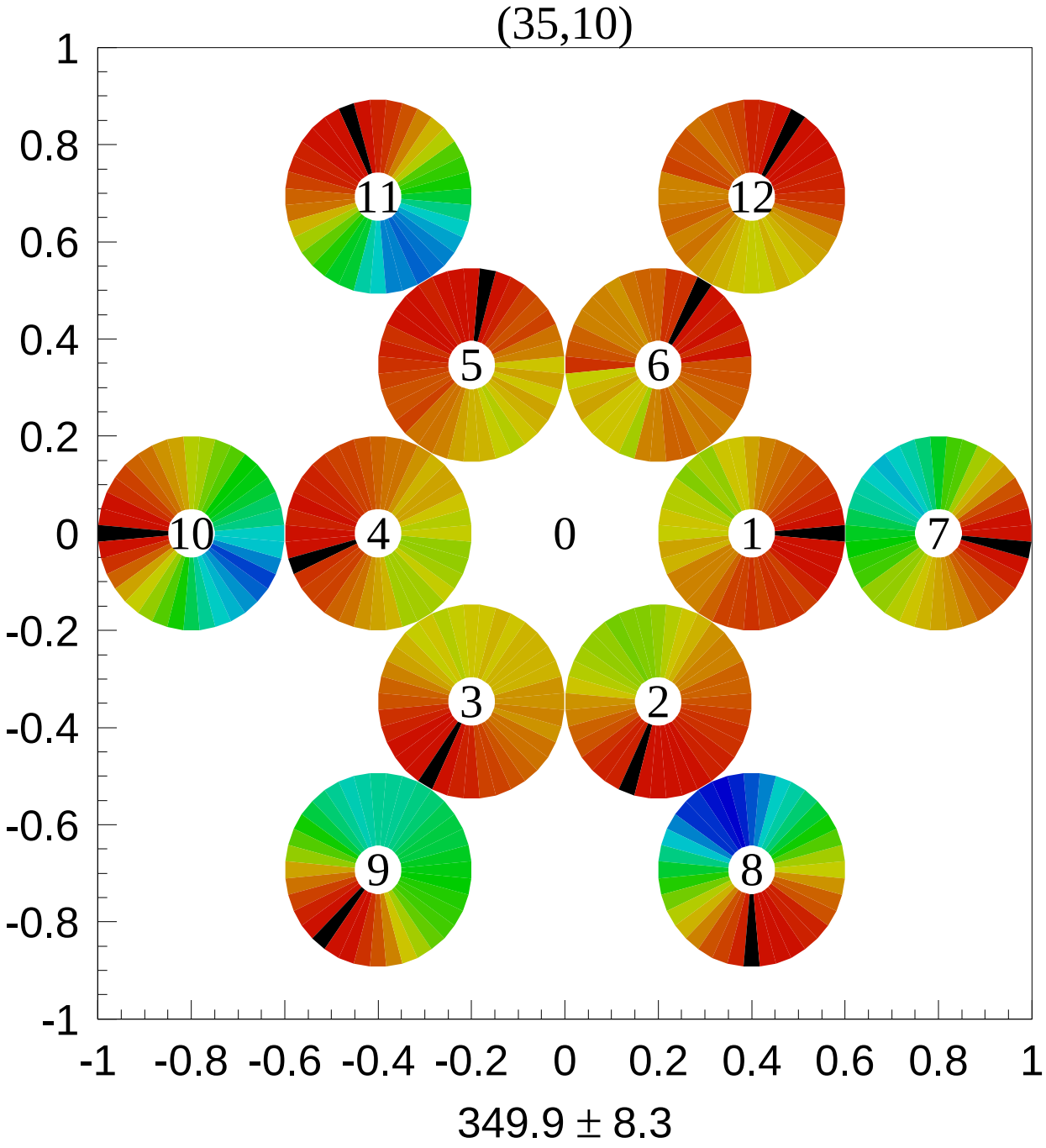

(35,8)
tilted LEDs
122 113 123 123 118 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 118 129 122 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

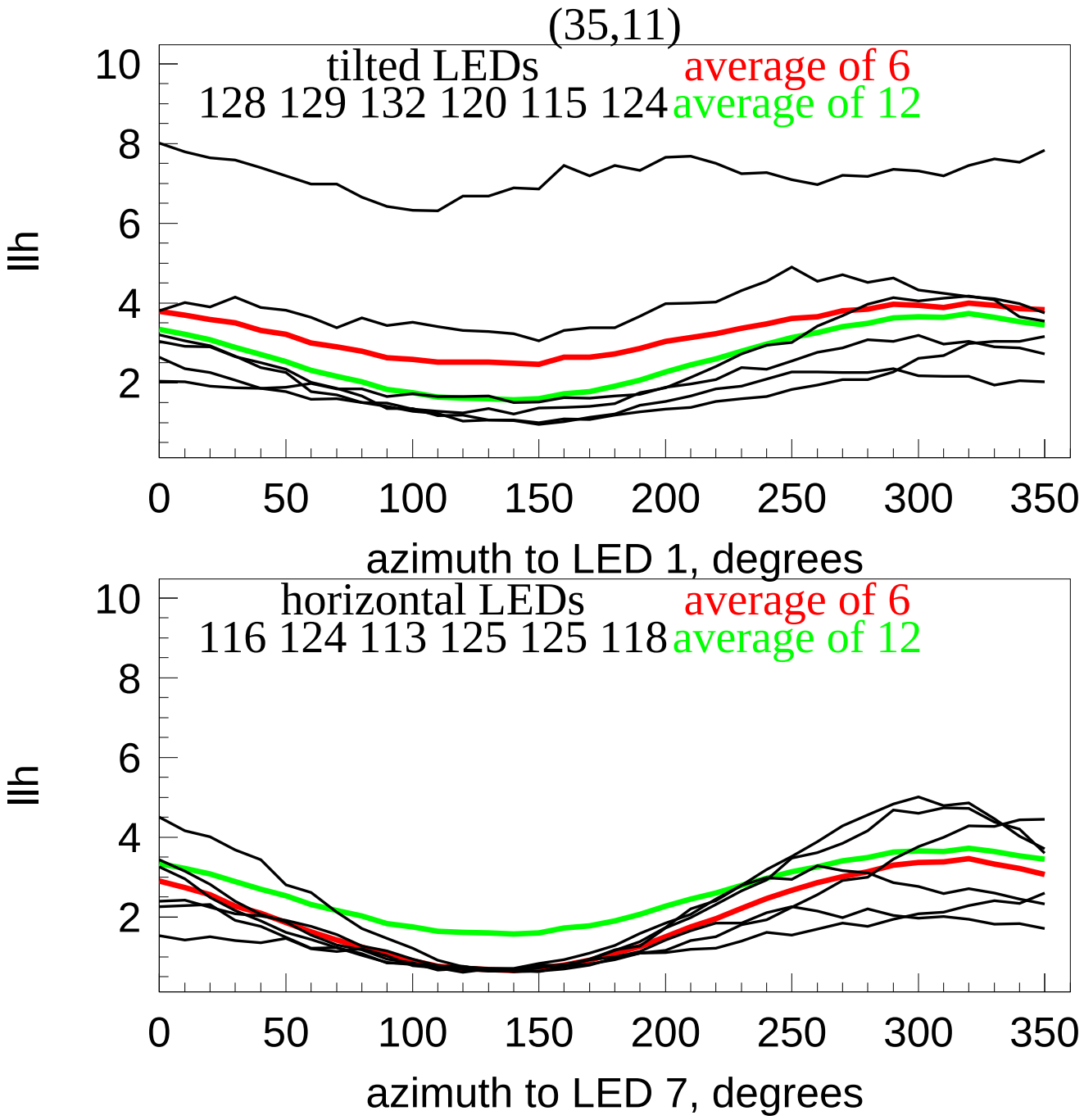

(35,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
138.7 ± 16.6
130
1
2
3
4
5
6
7
8
9
10
11
12

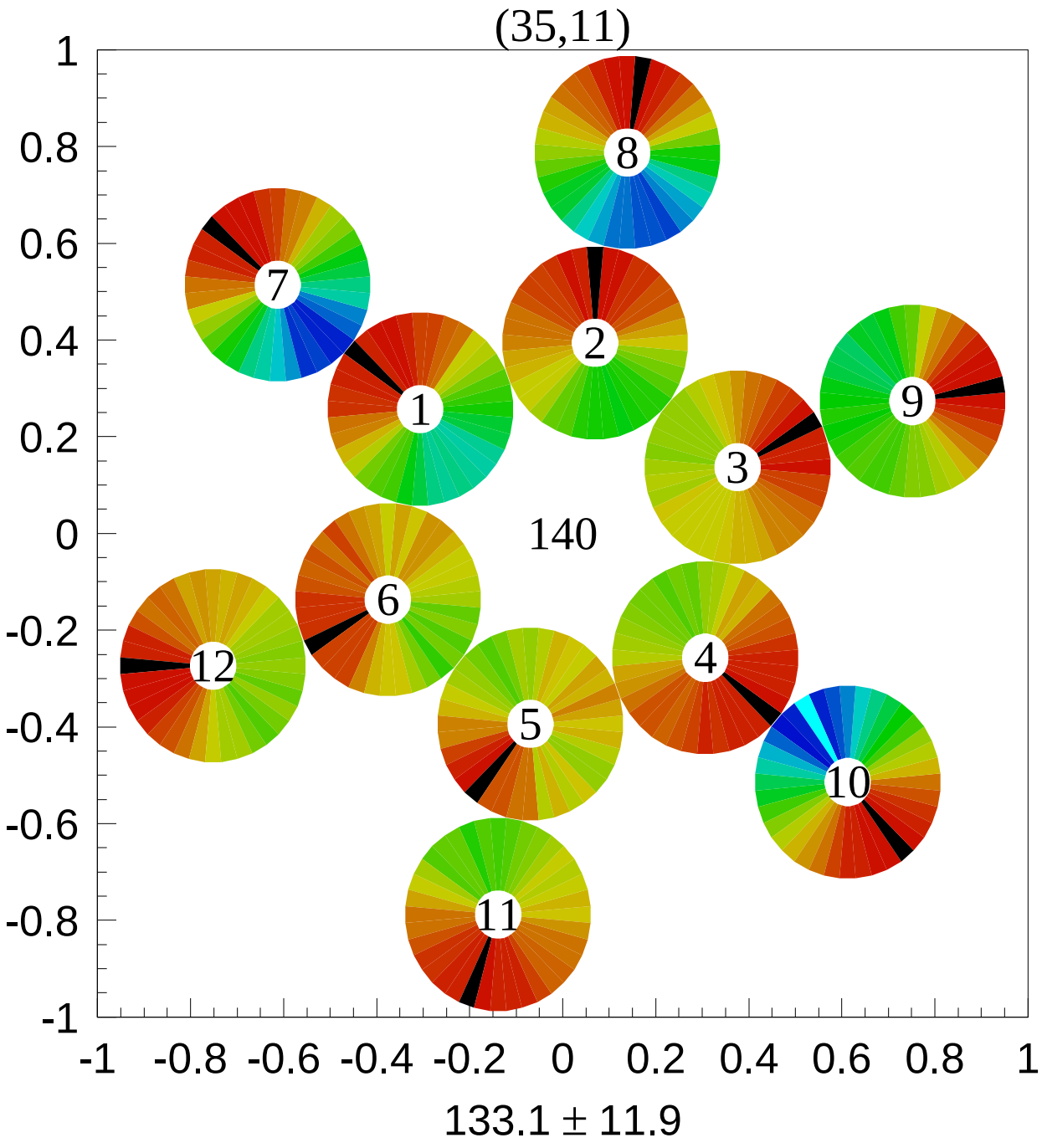

(35,9)
tilted LEDs
119 119 121 126 123 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 123 120 130 120 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

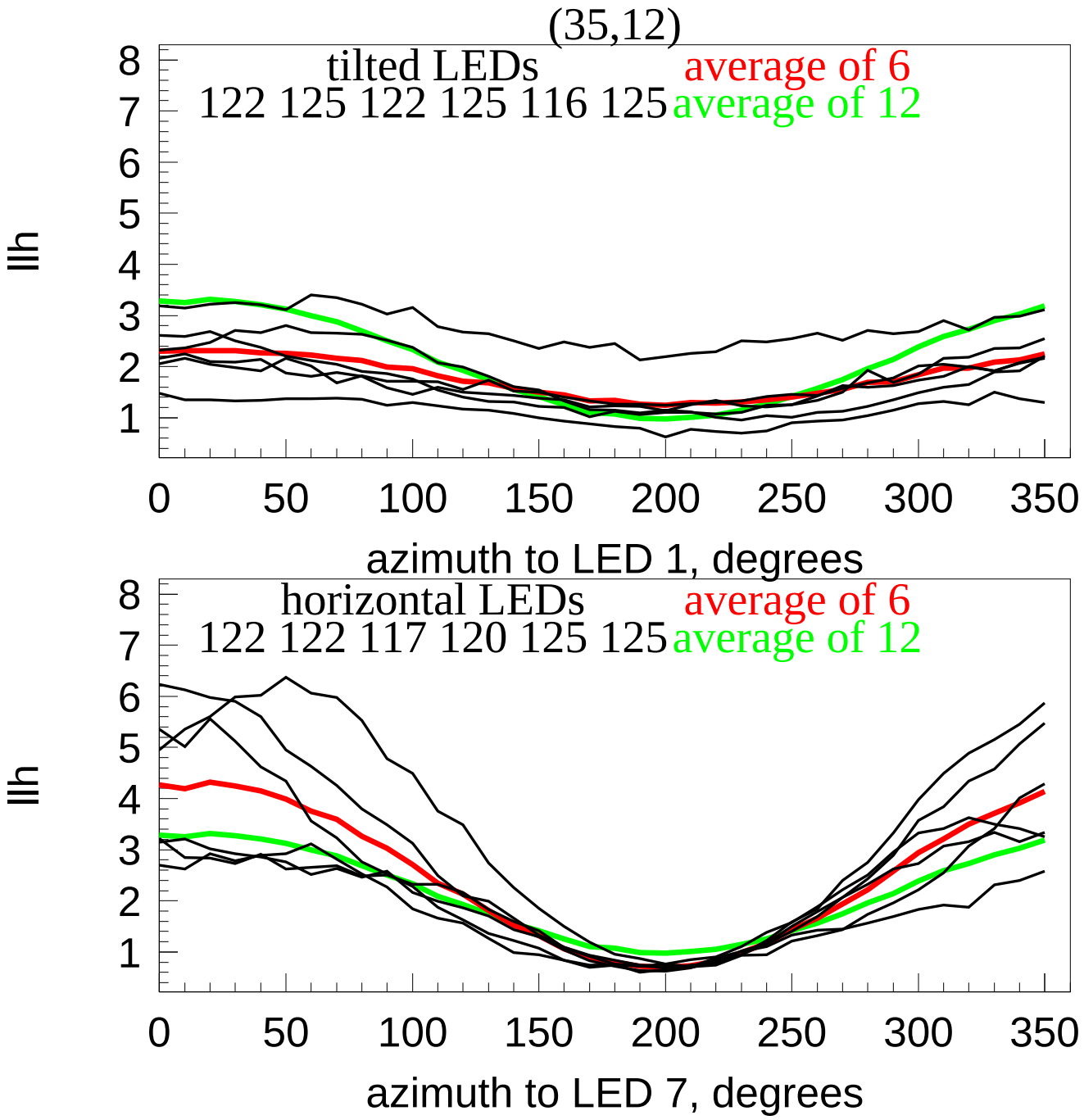

(35,9)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
42.9 ± 17.5

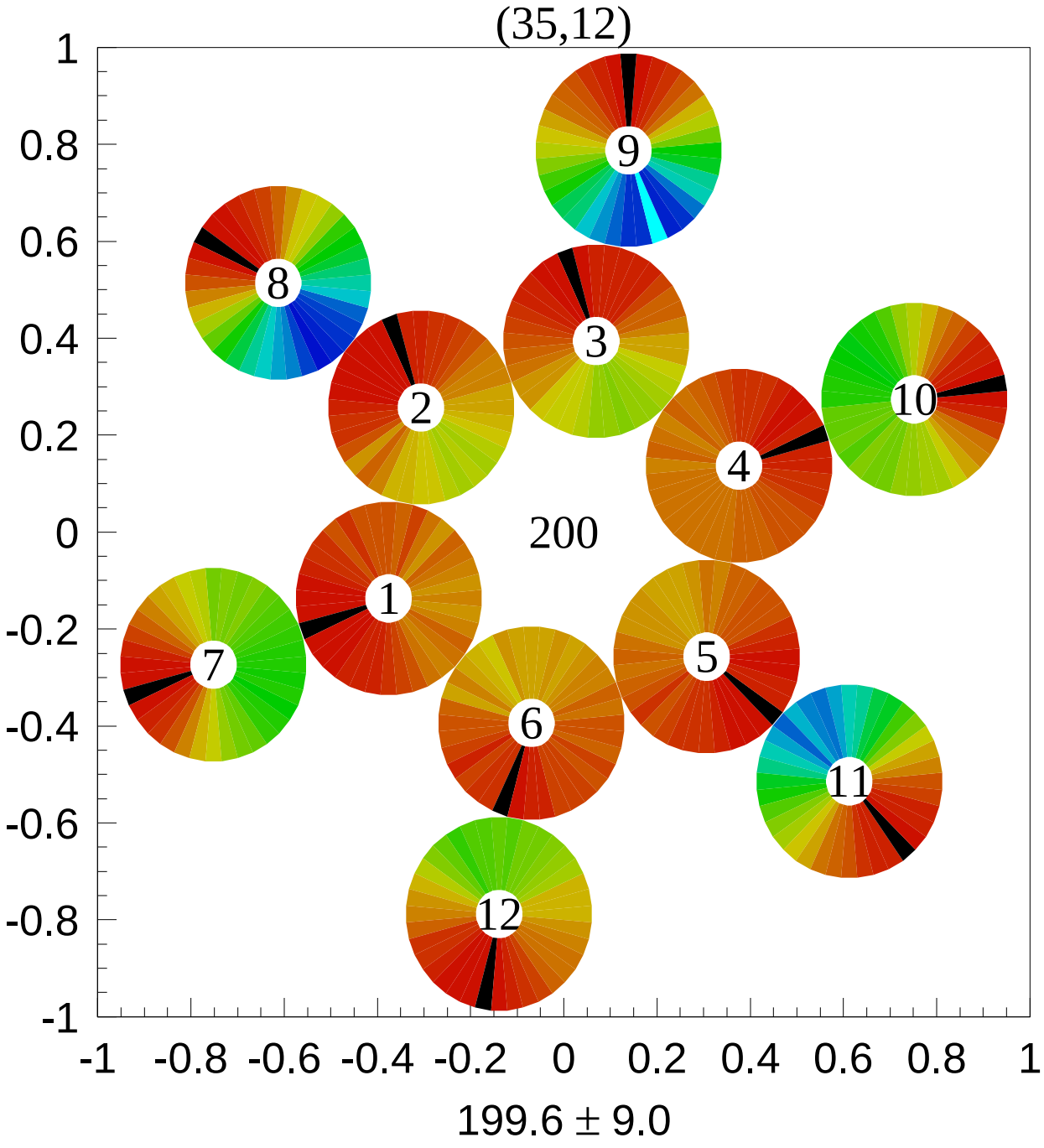

(35,10)
tilted LEDs
120 127 122 116 115 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 125 125 121 121 130
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

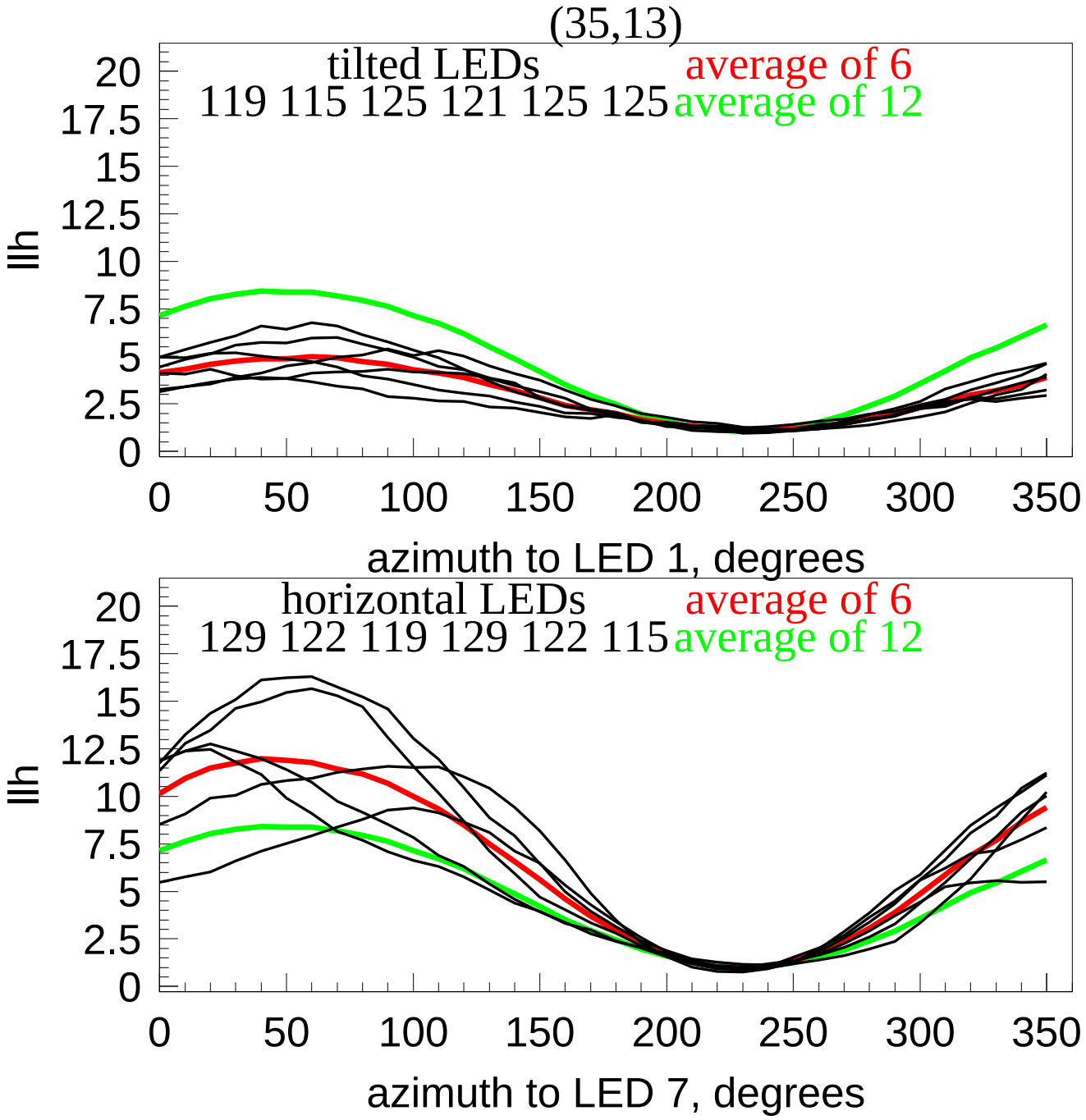

(35,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
349.9 ± 8.3

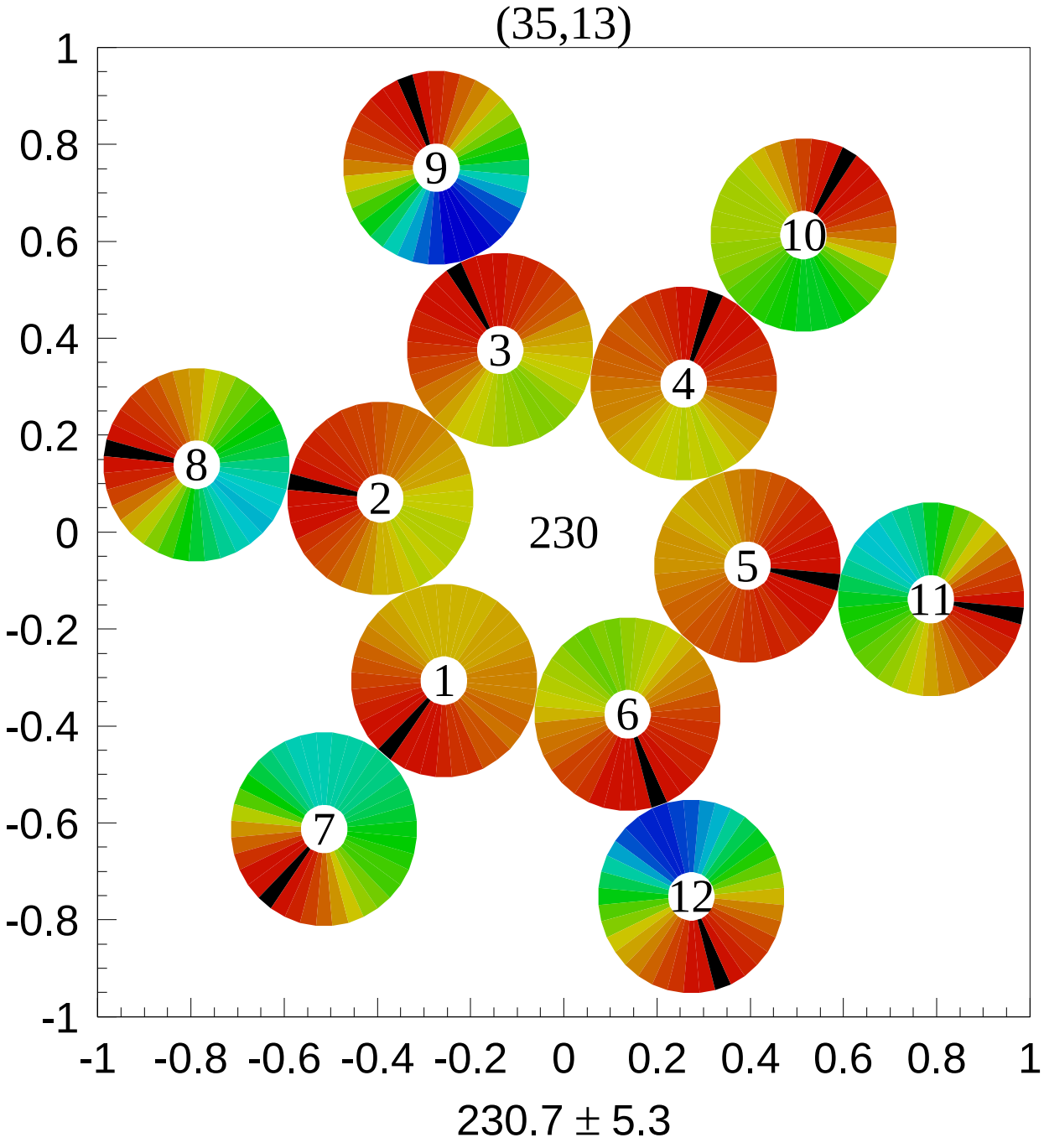

(35,11)
tilted LEDs
128 129 132 120 115 124
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 124 113 125 125 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

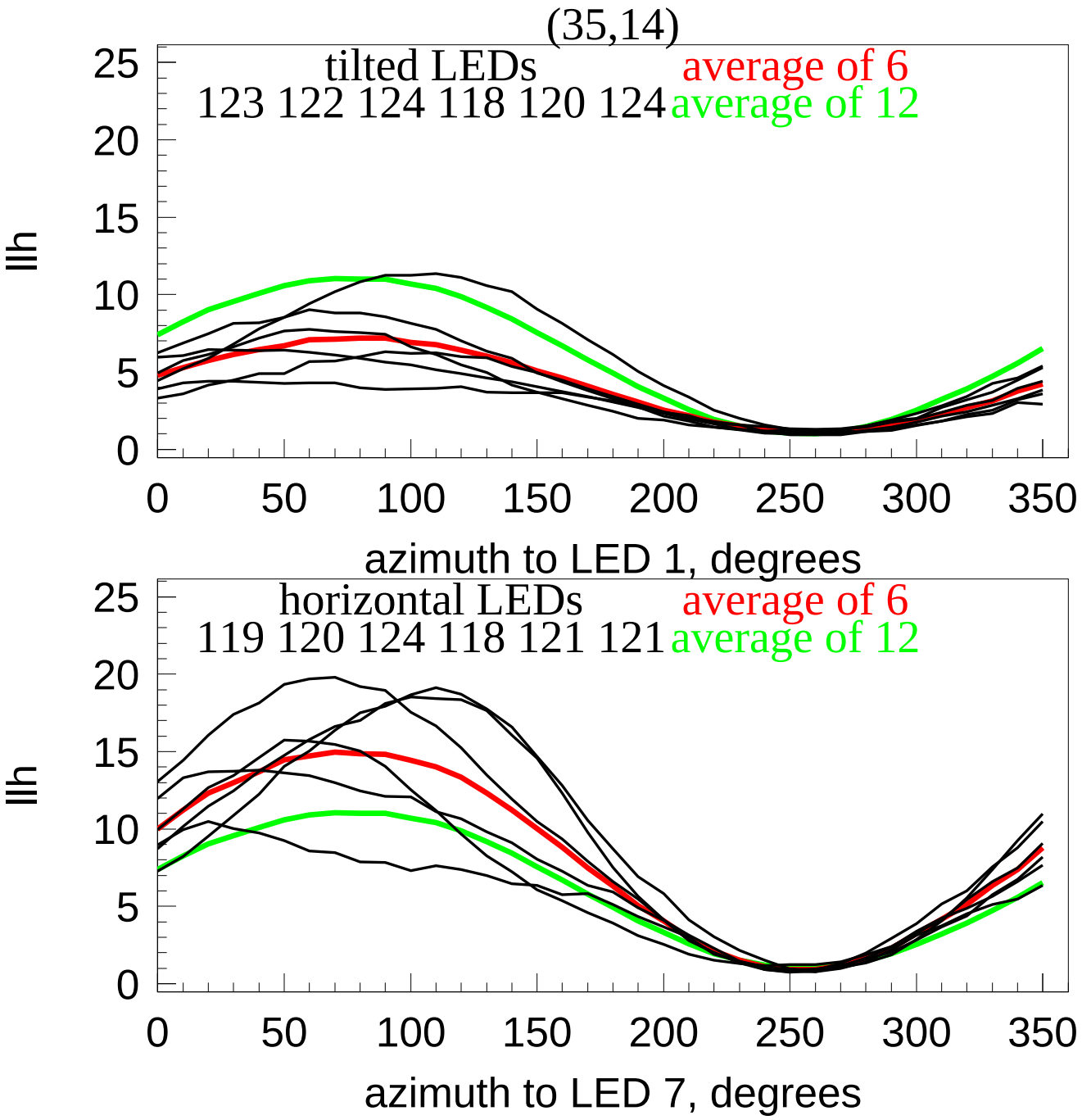

(35,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
133.1 ± 11.9
140
1
2
3
4
5
6
7
8
9
10
11
12

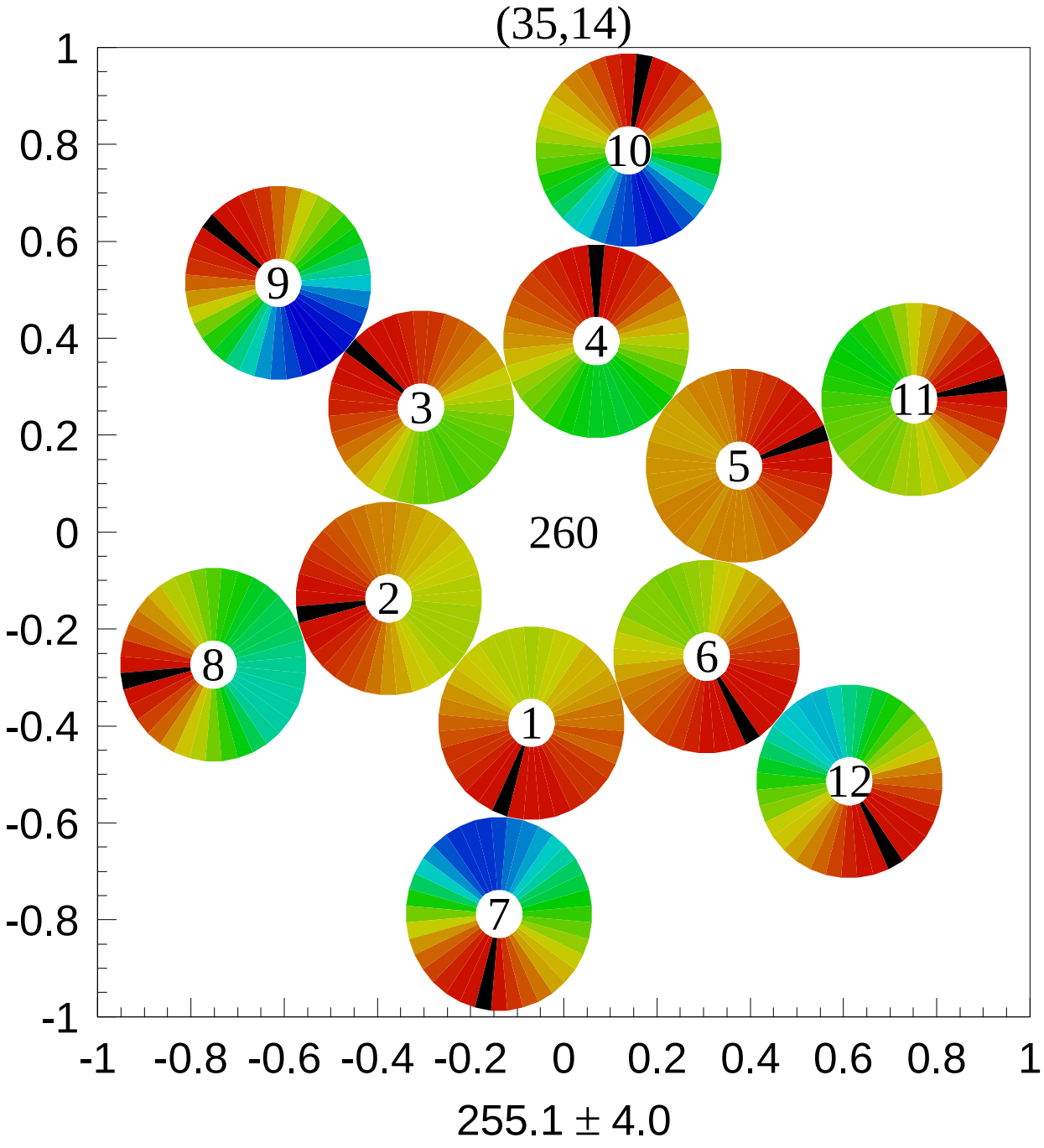

(35,12)
tilted LEDs
122 125 122 125 116 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 117 120 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

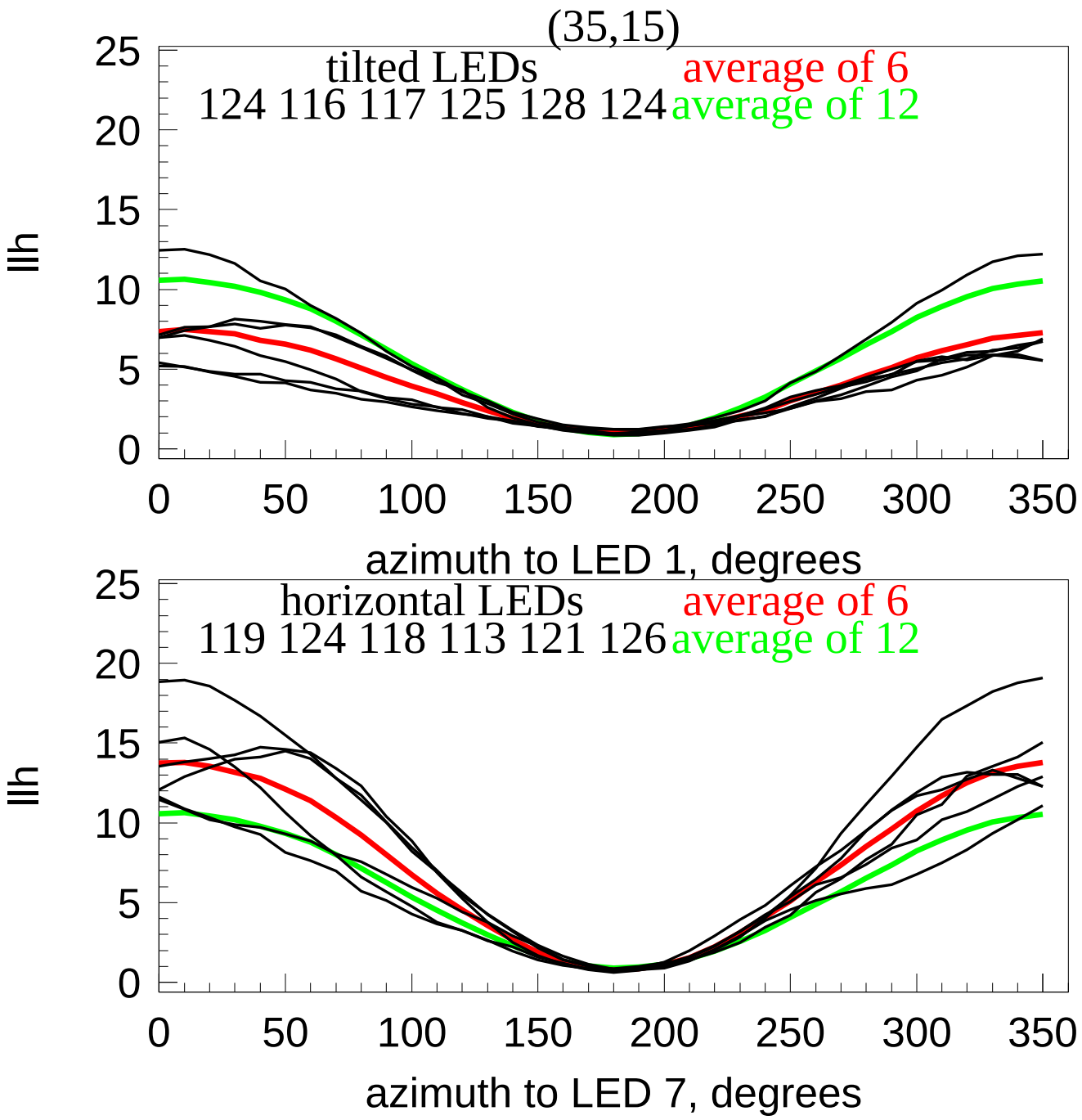

(35,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
199.6 ± 9.0

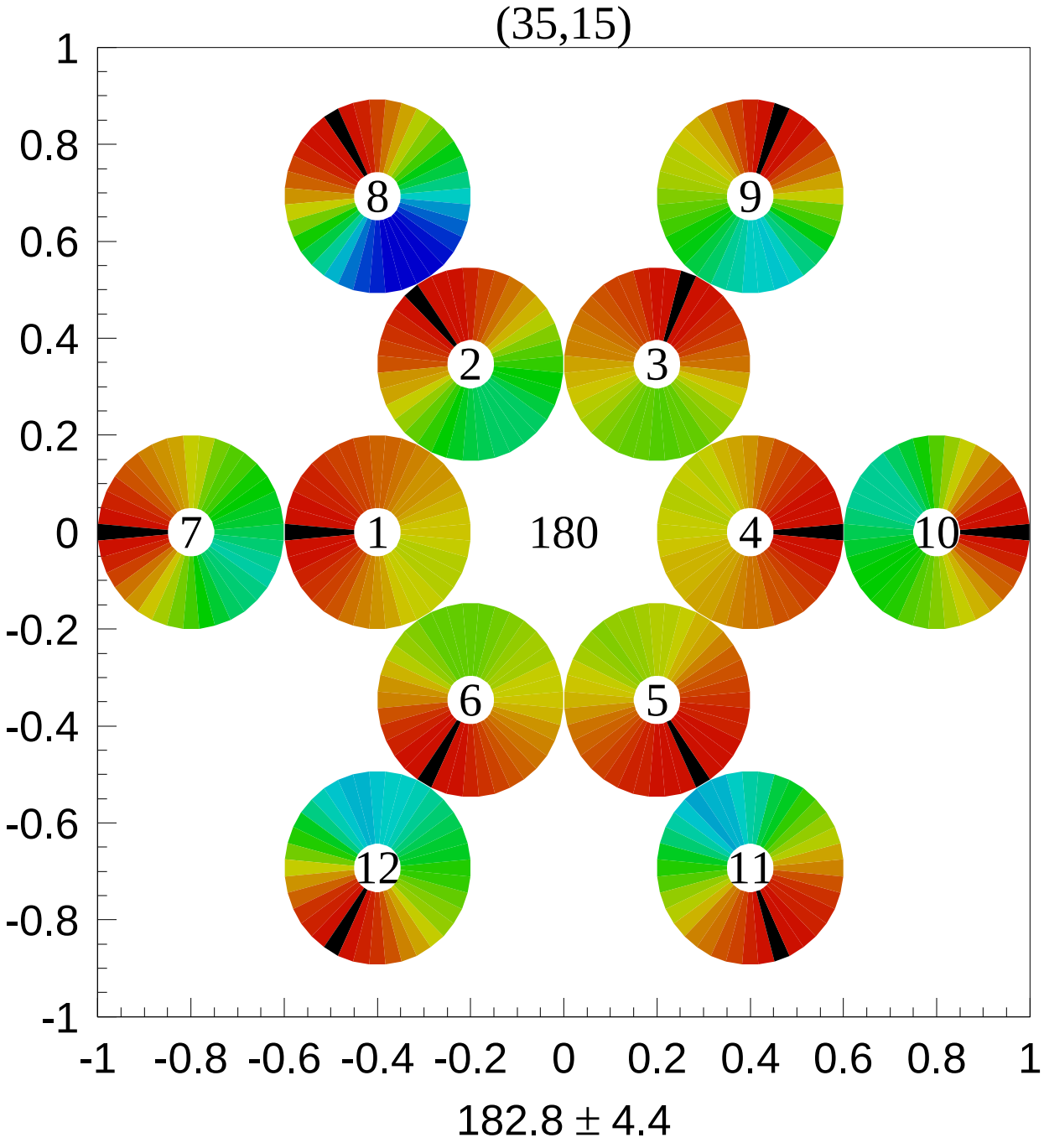

(35,13)
tilted LEDs
119 115 125 121 125 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 122 119 129 122 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

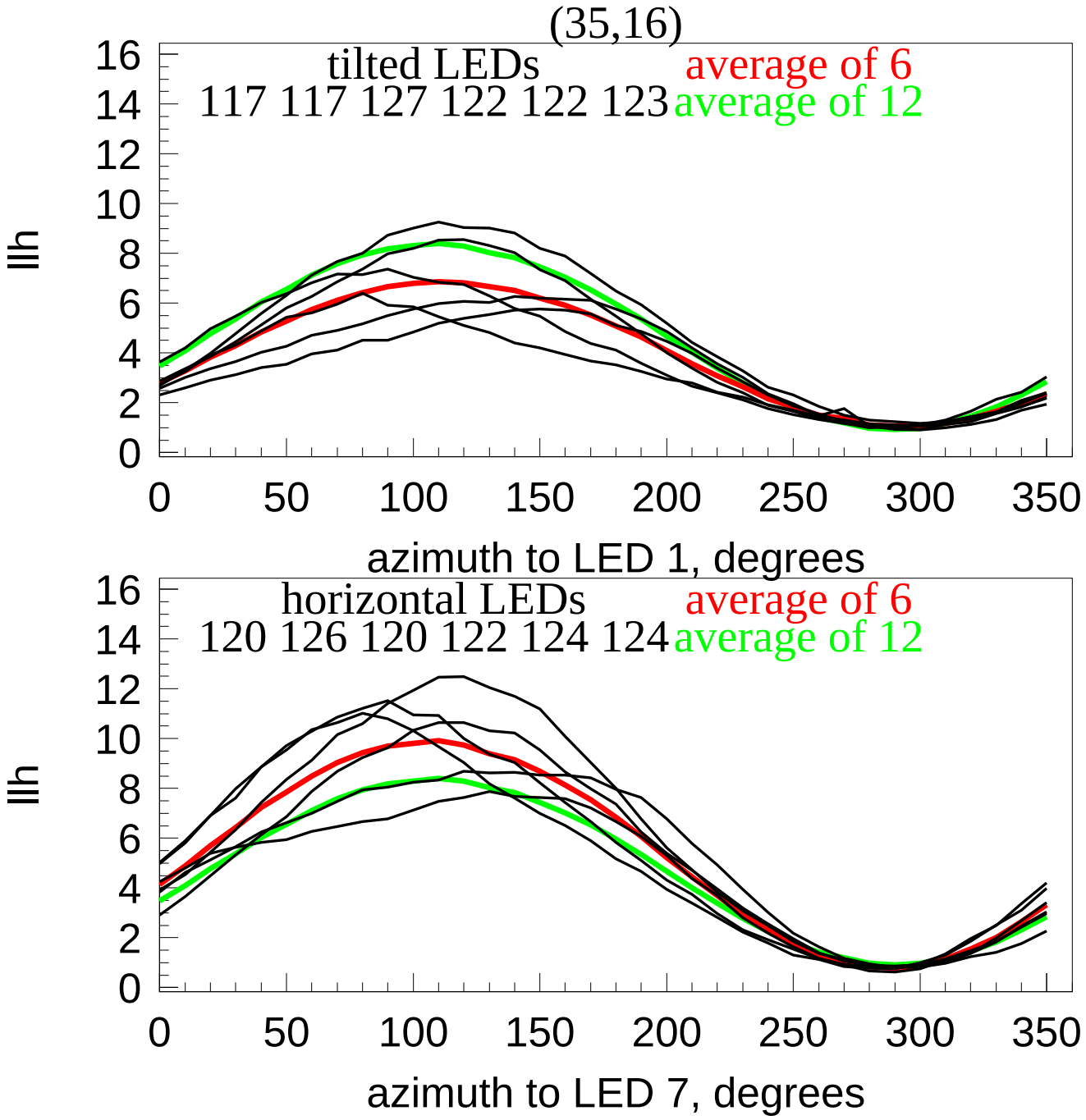

(35,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
230.7 ± 5.3

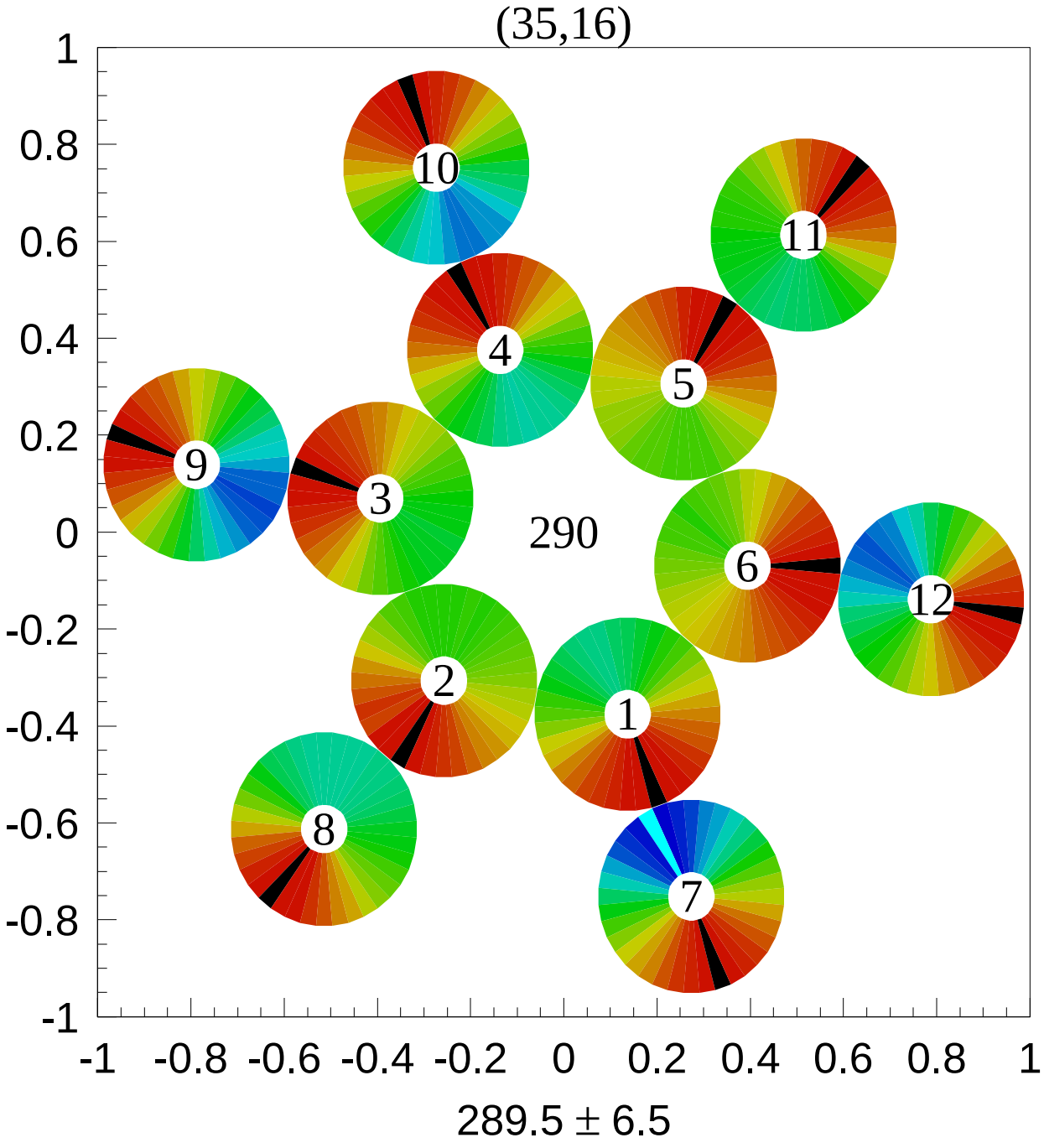

(35,14)
tilted LEDs
123 122 124 118 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 124 118 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

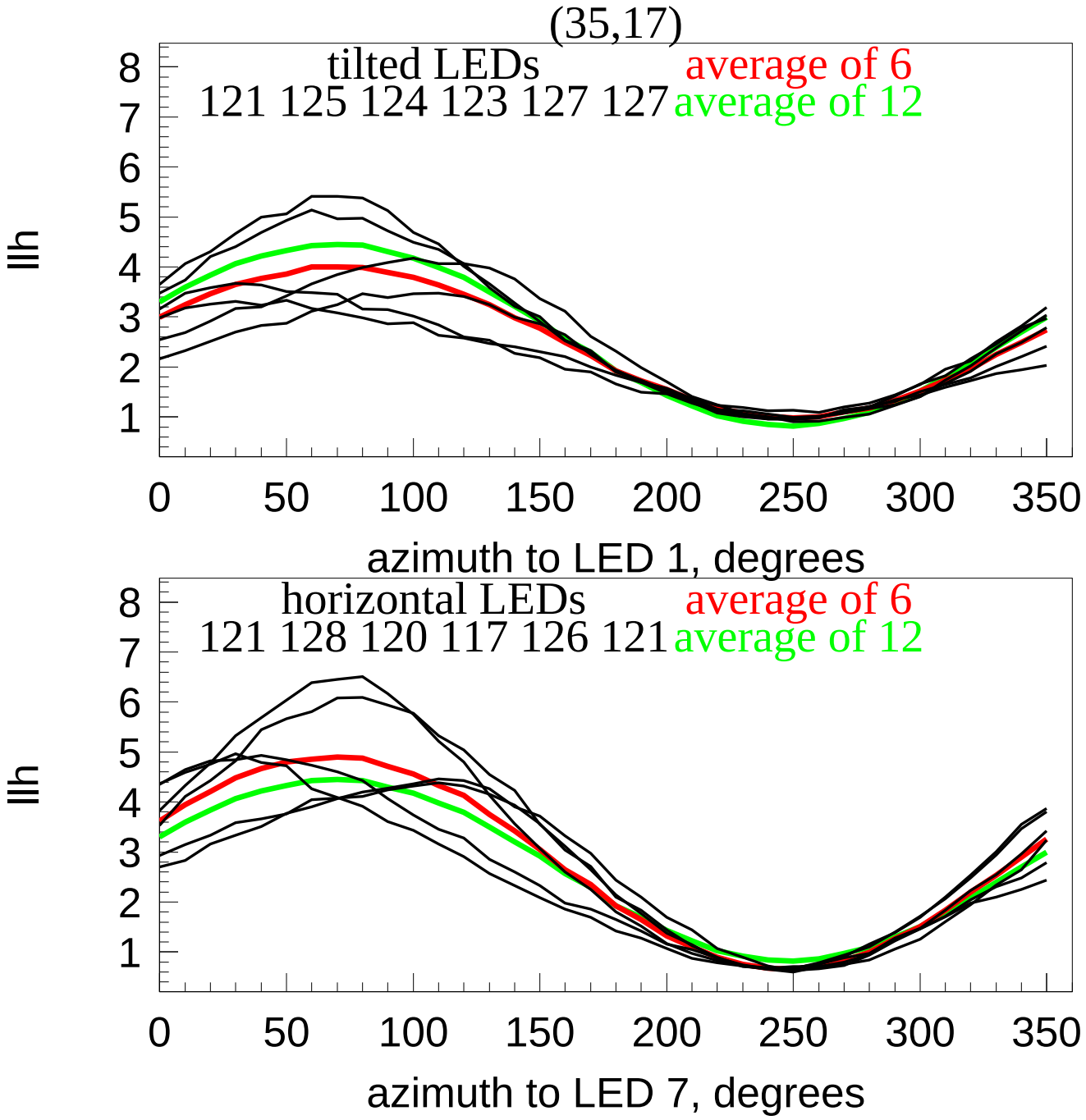

(35,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
255.1 ± 4.0

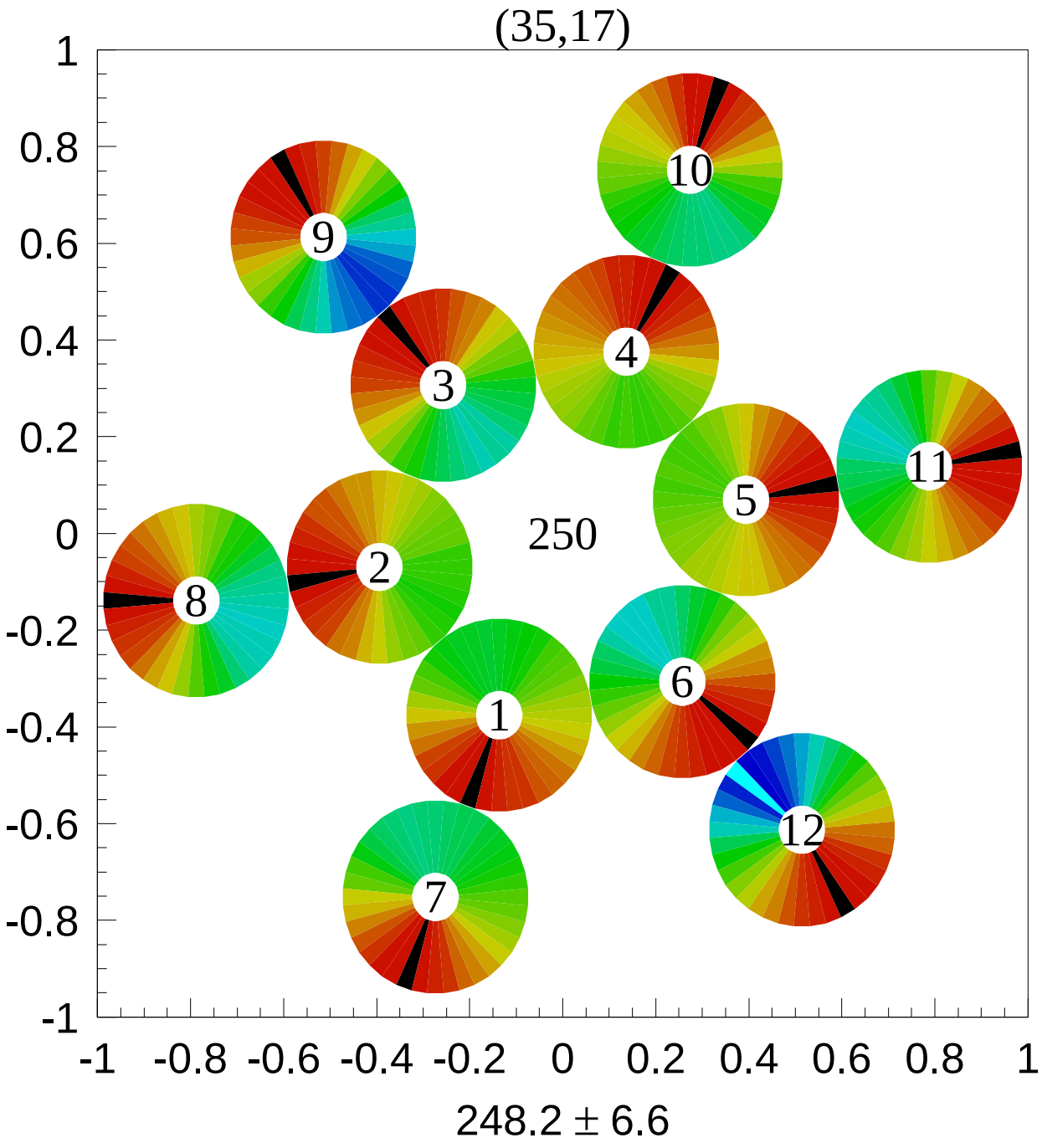

(35,15)
tilted LEDs
124 116 117 125 128 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 124 118 113 121 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

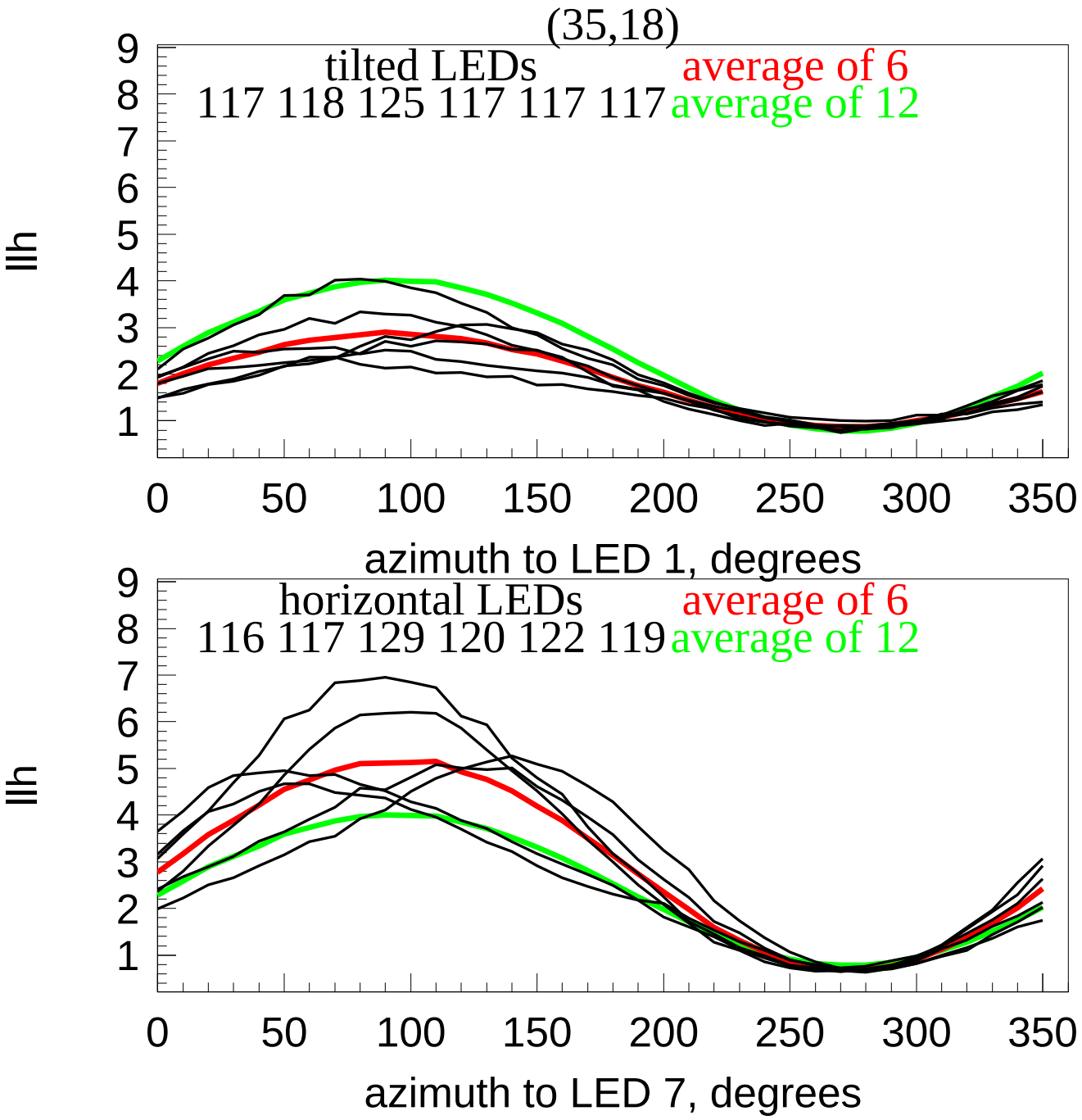

(35,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
182.8 ± 4.4

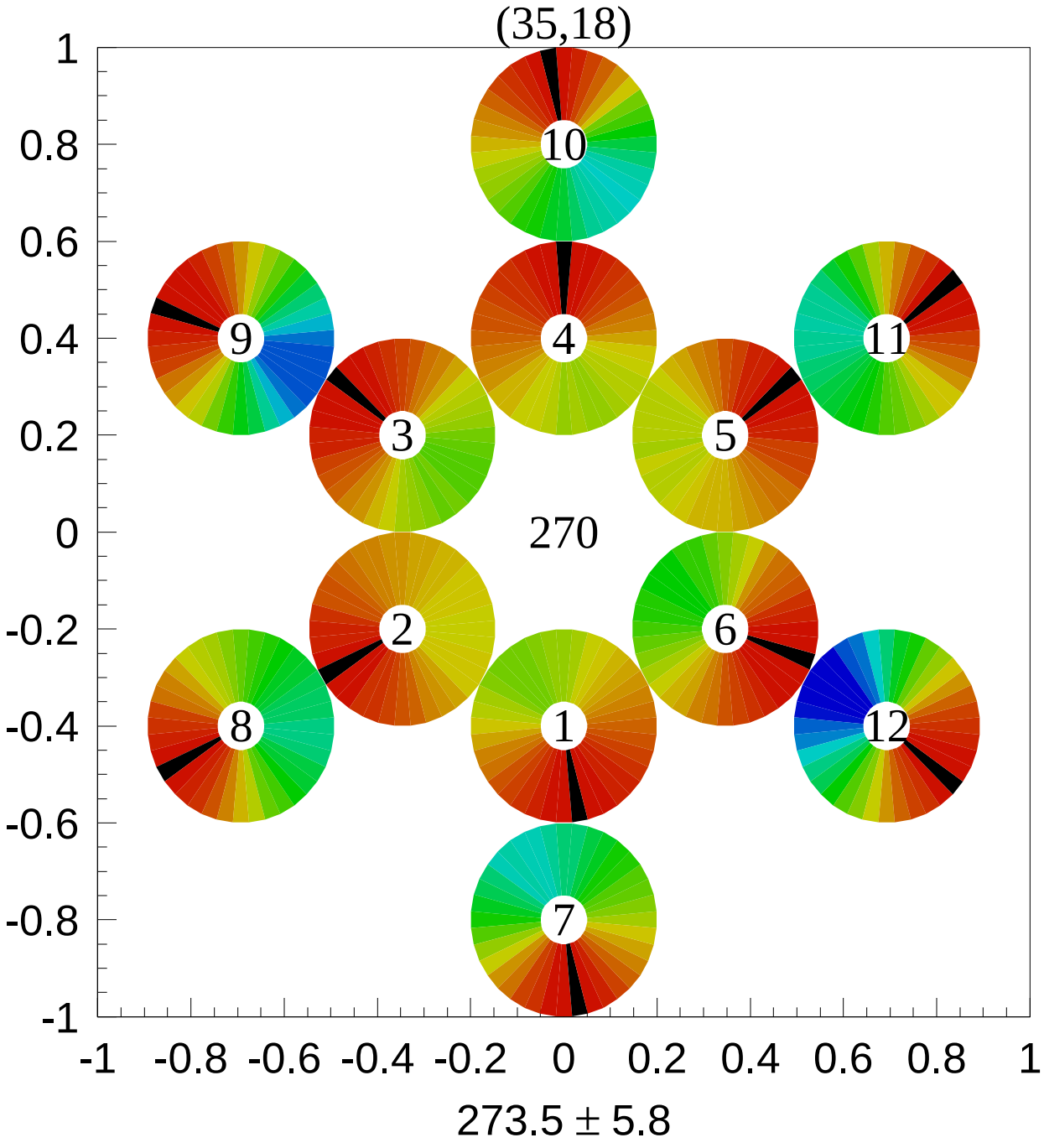

(35,16)
tilted LEDs
117 117 127 122 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 126 120 122 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

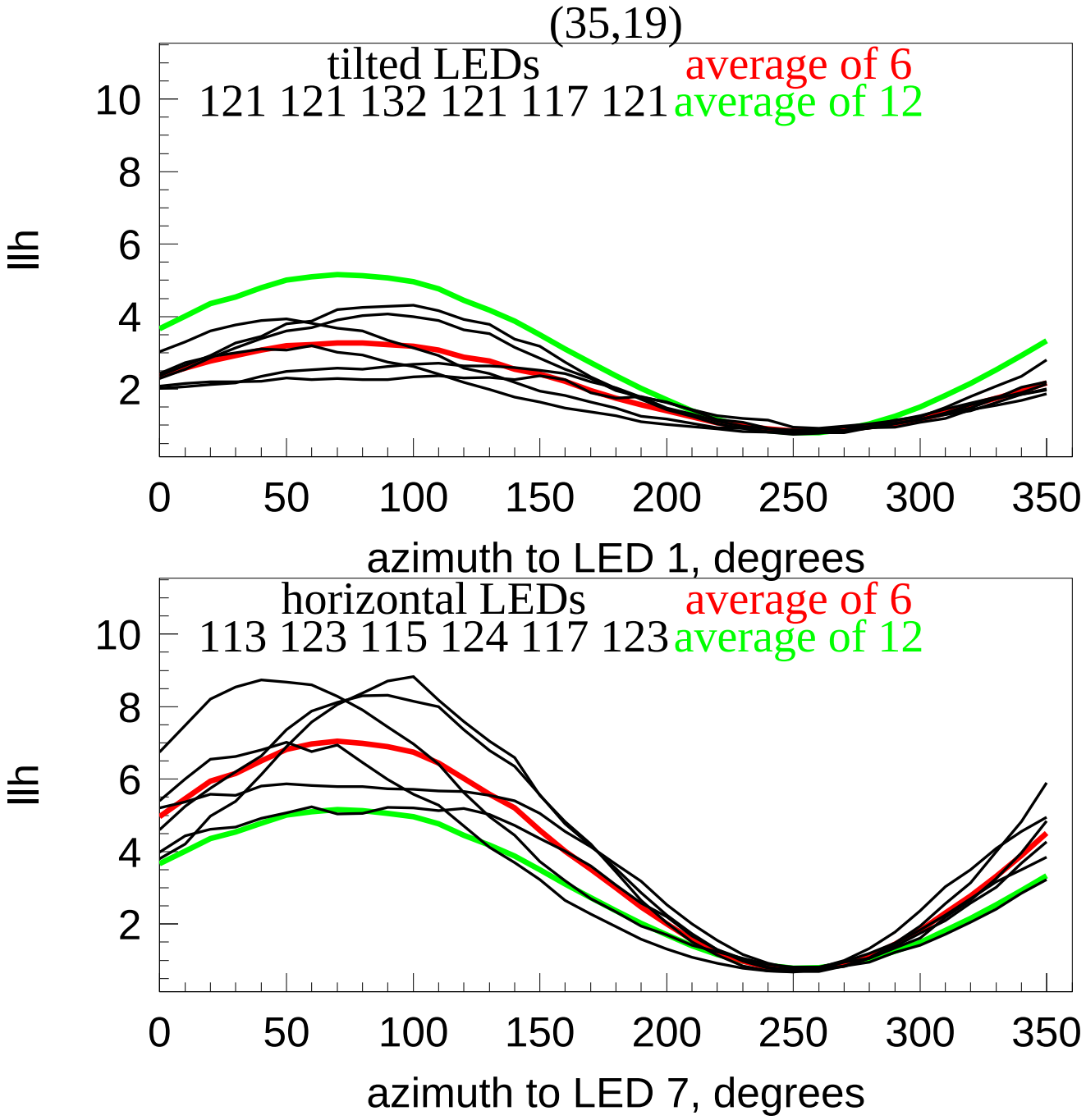

(35,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
289.5 ± 6.5
290
1
2
3
4
5
6
7
8
9
10
11
12

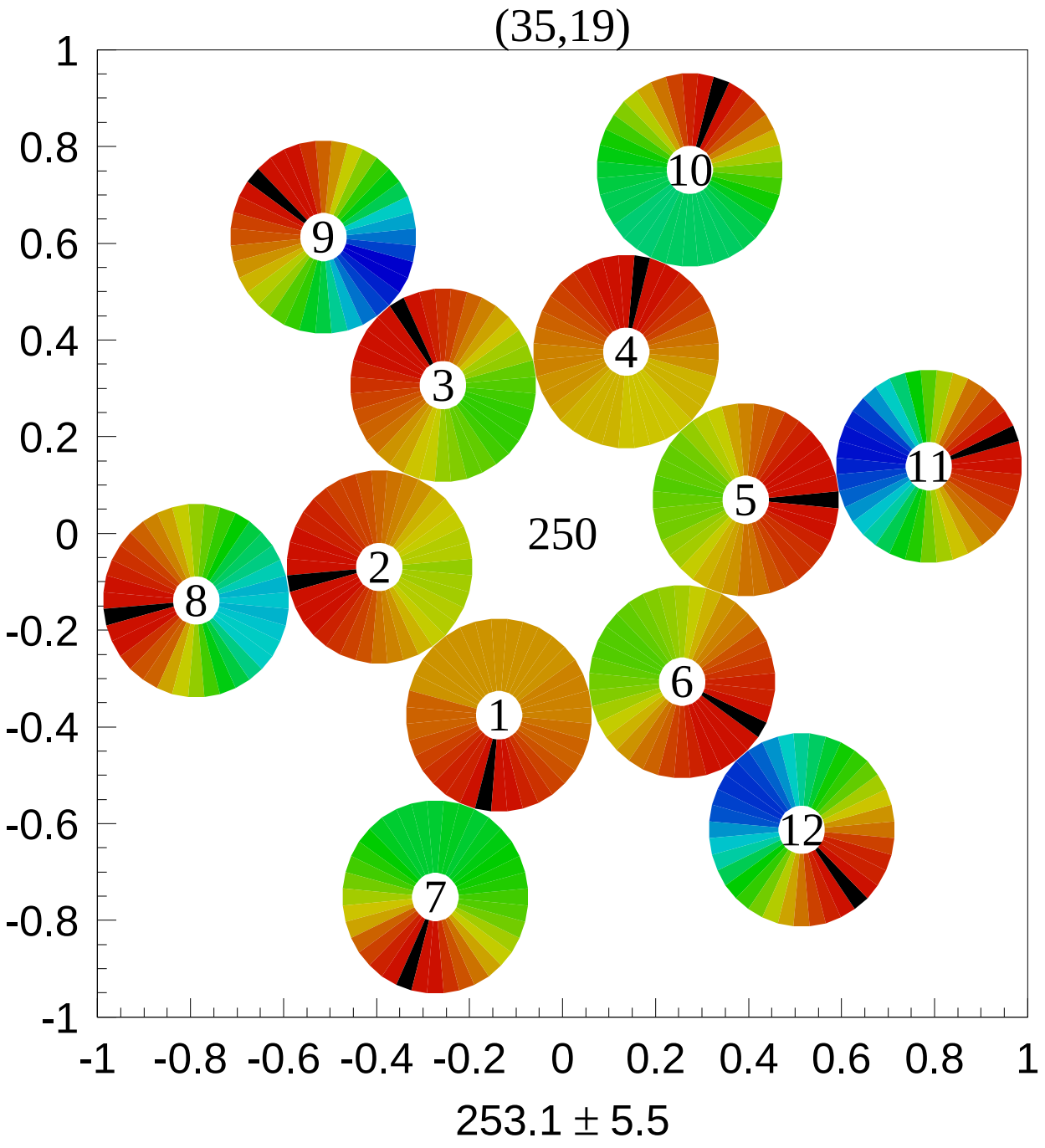

(35,17)
tilted LEDs
121 125 124 123 127 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 128 120 117 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

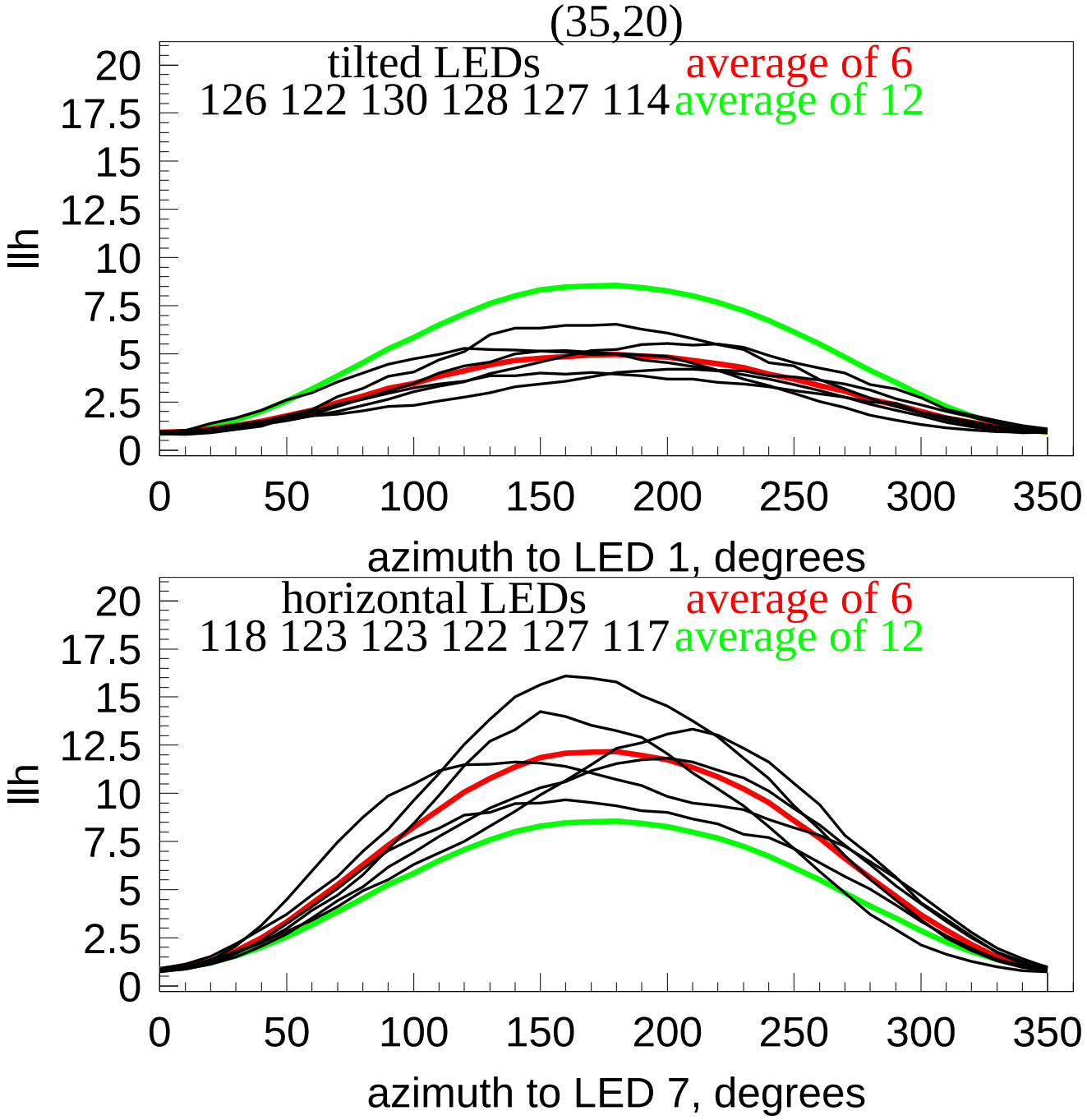

(35,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
1
6
12
7
248.2 ± 6.6

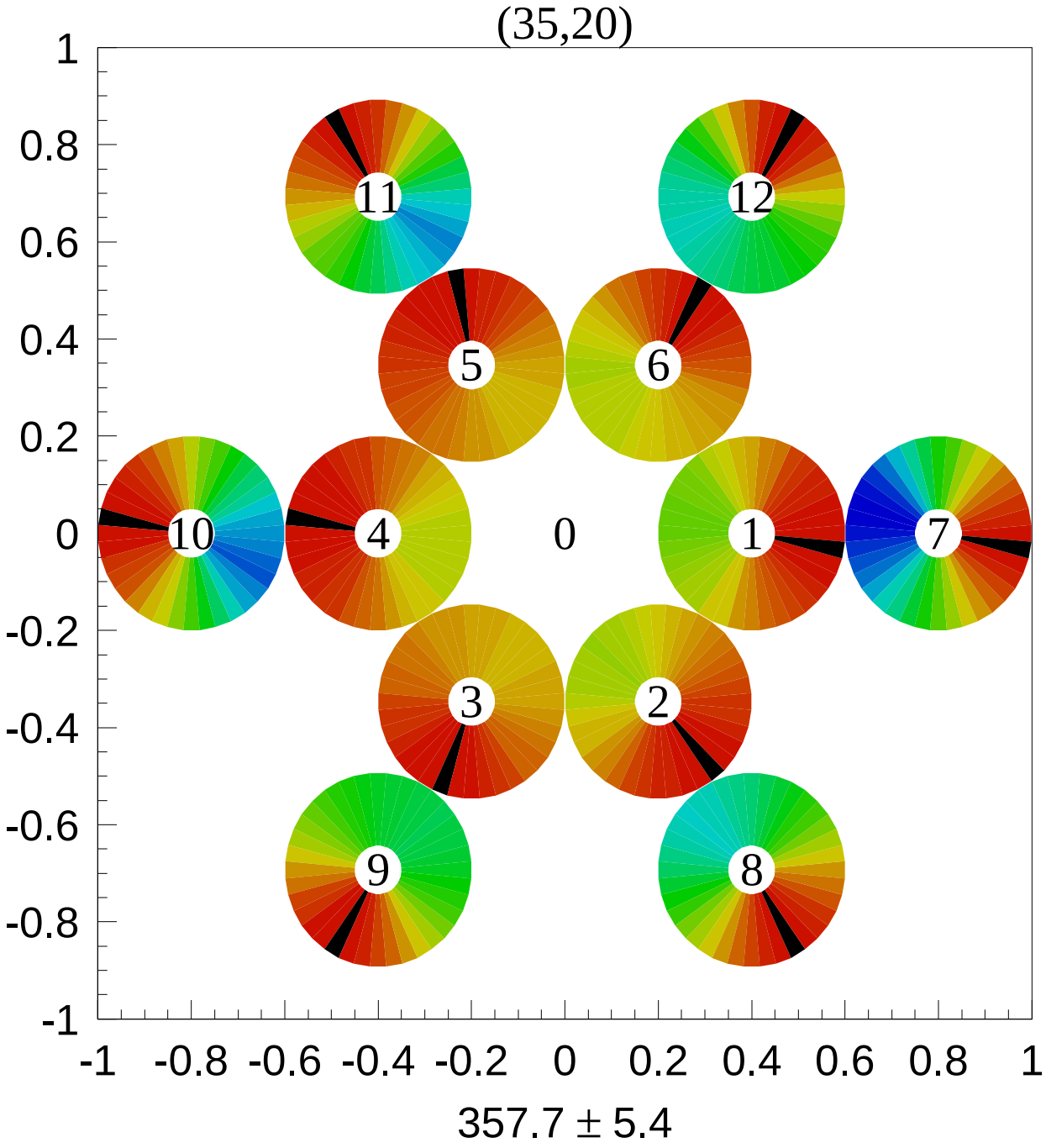

(35,18)
tilted LEDs
117 118 125 117 117 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 117 129 120 122 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

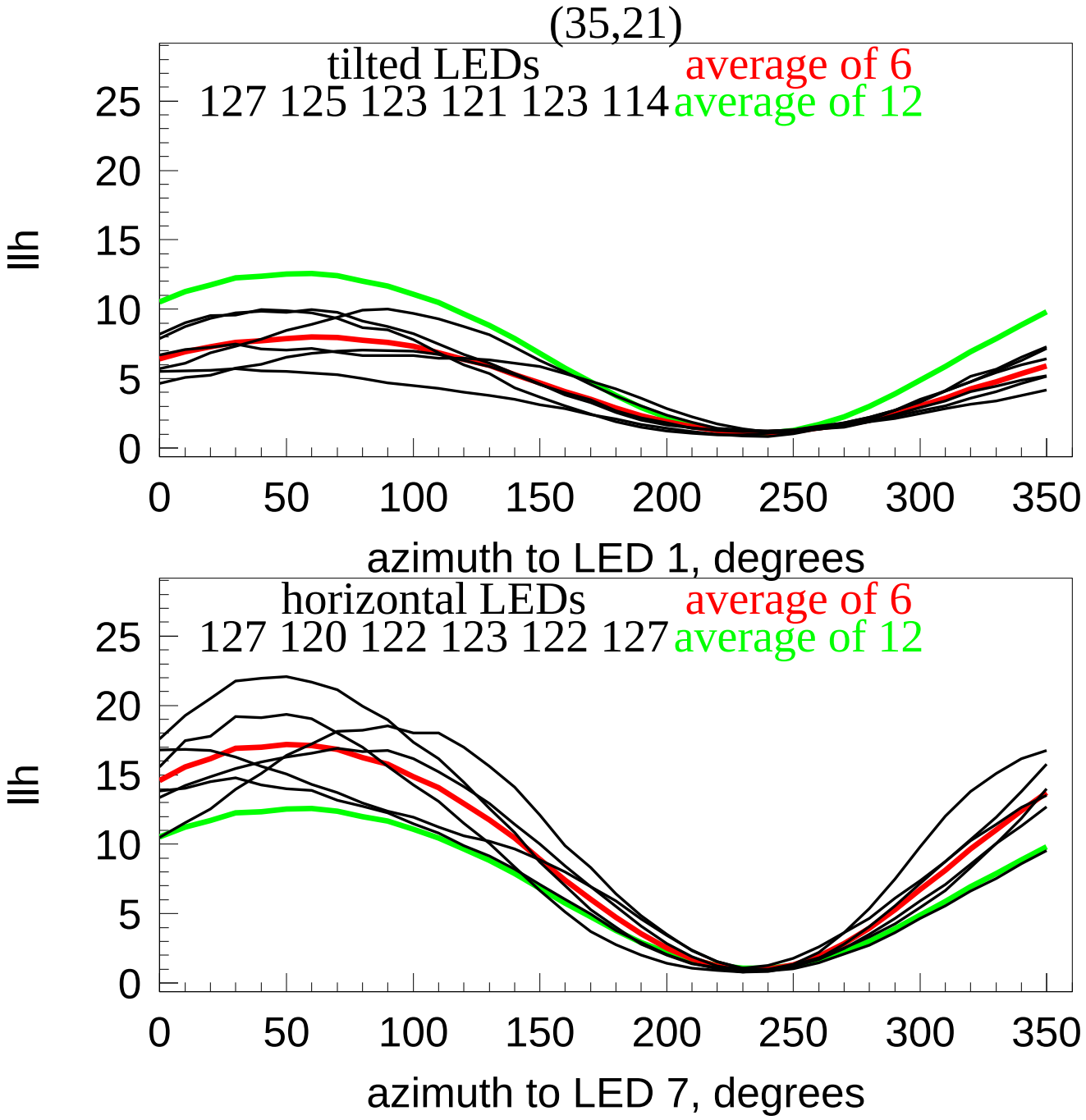

(35,18)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
273.5 ± 5.8

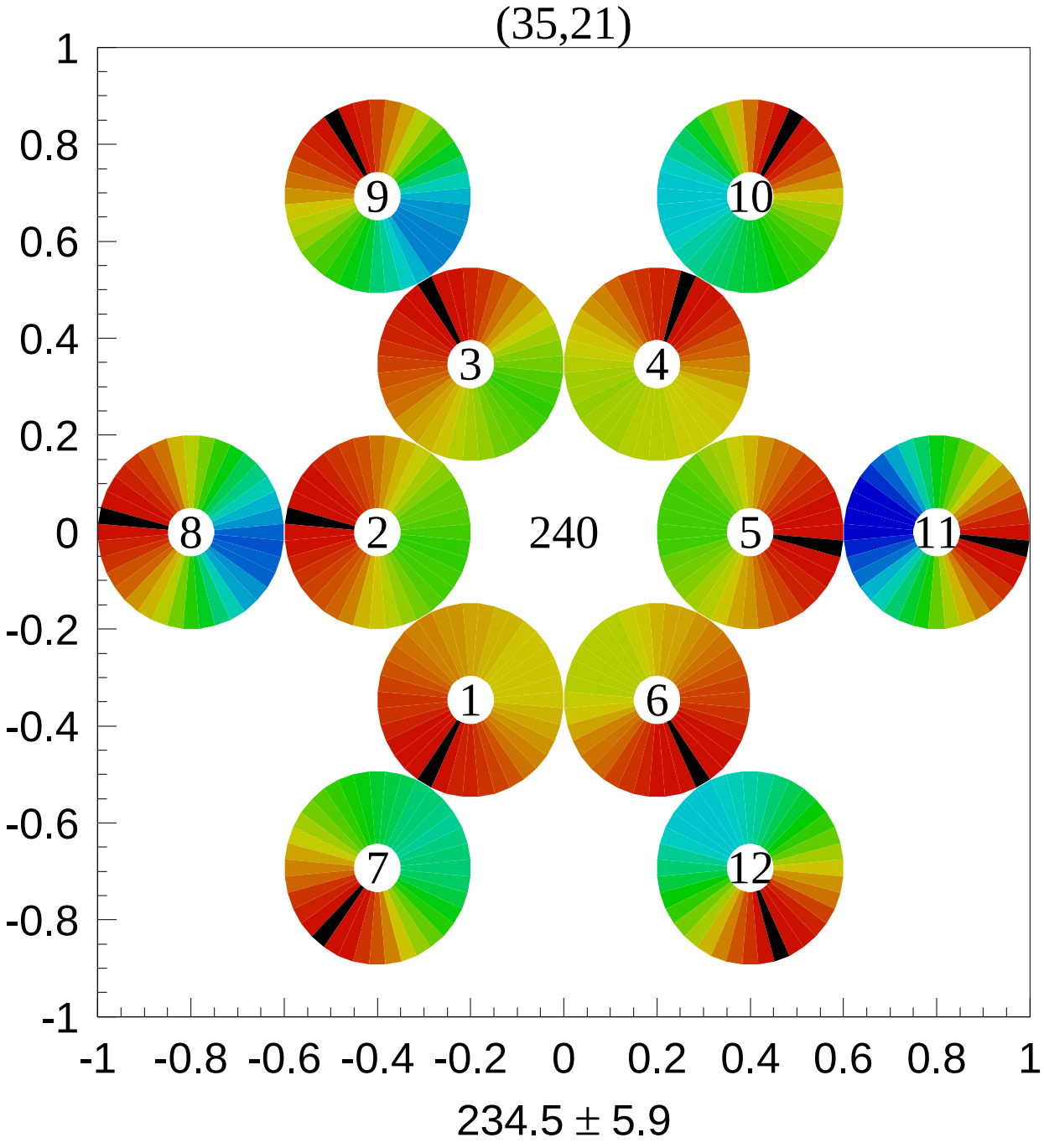

(35,19)
tilted LEDs
121 121 132 121 117 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
113 123 115 124 117 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

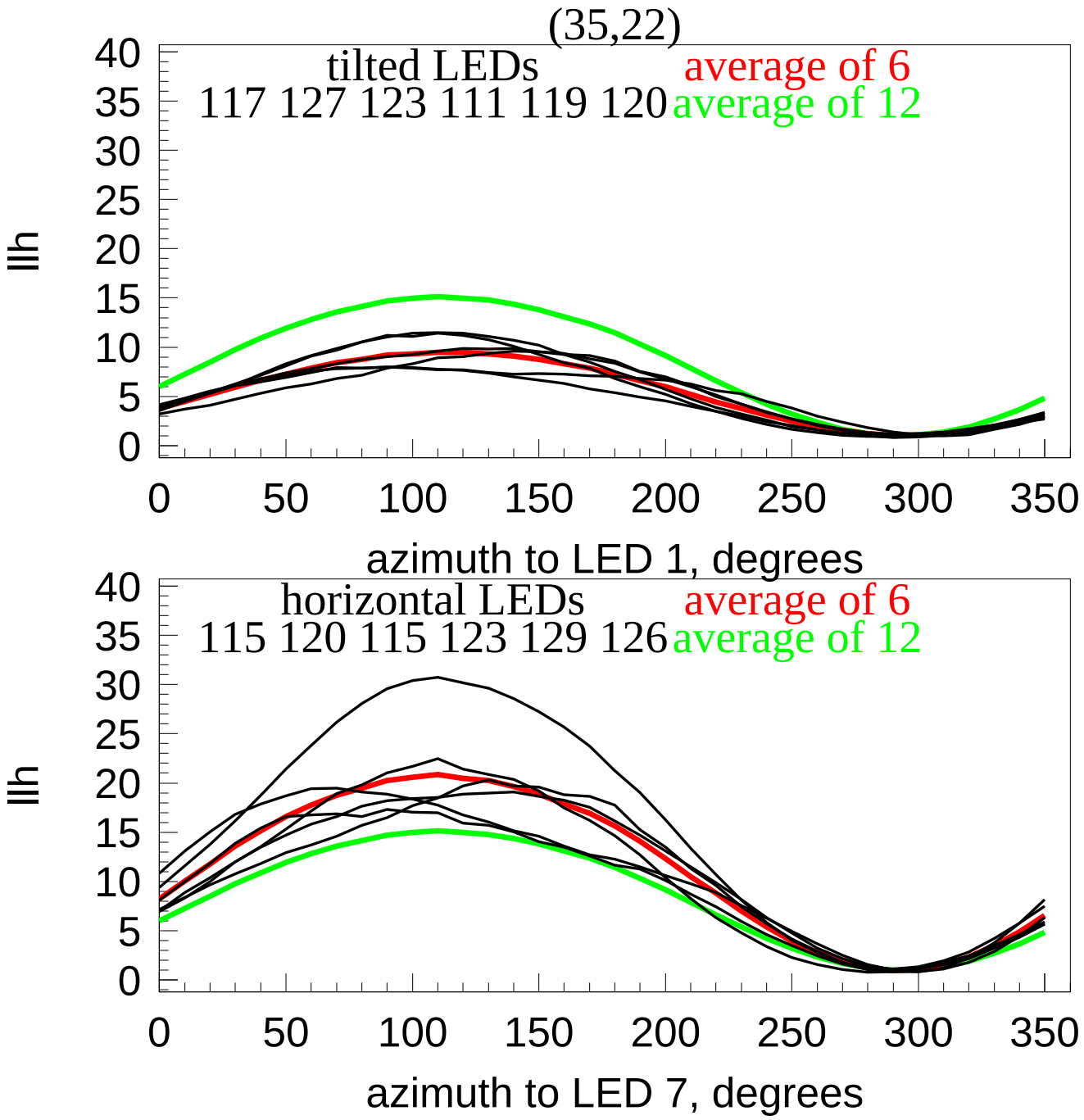

(35,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
253.1 ± 5.5

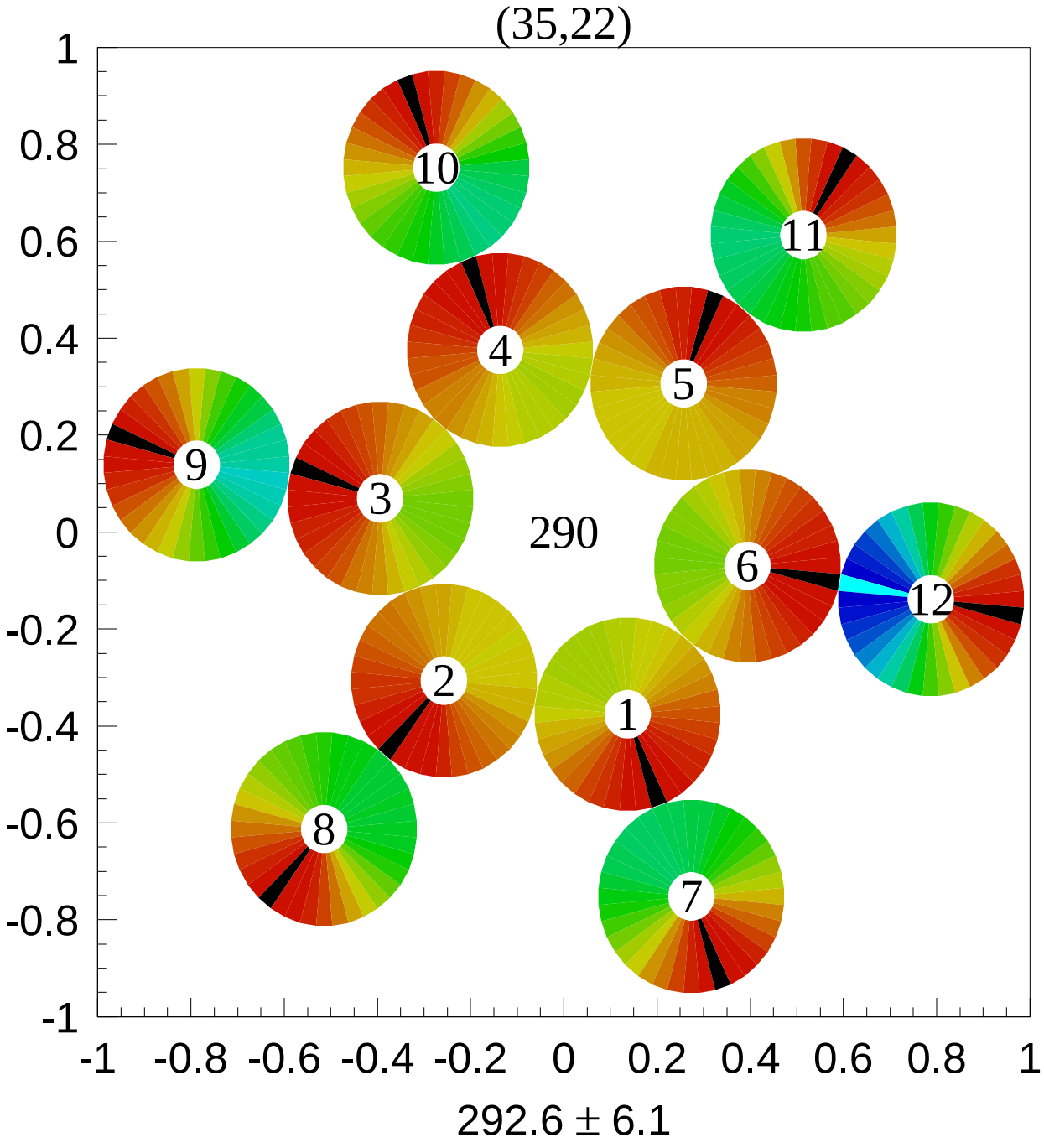

(35,20)
tilted LEDs
126 122 130 128 127 114
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 123 123 122 127 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

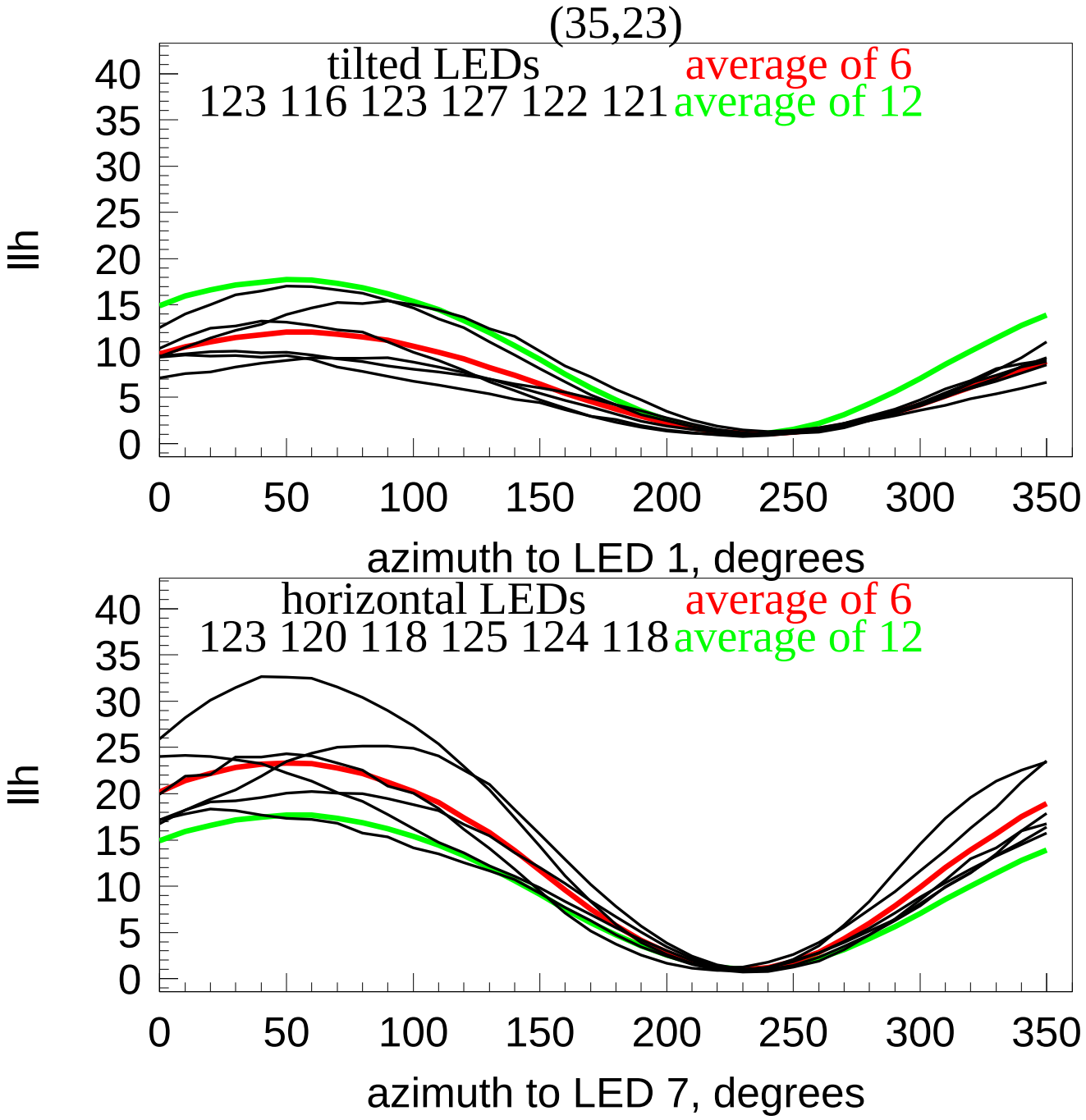

(35,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
357.7 ± 5.4

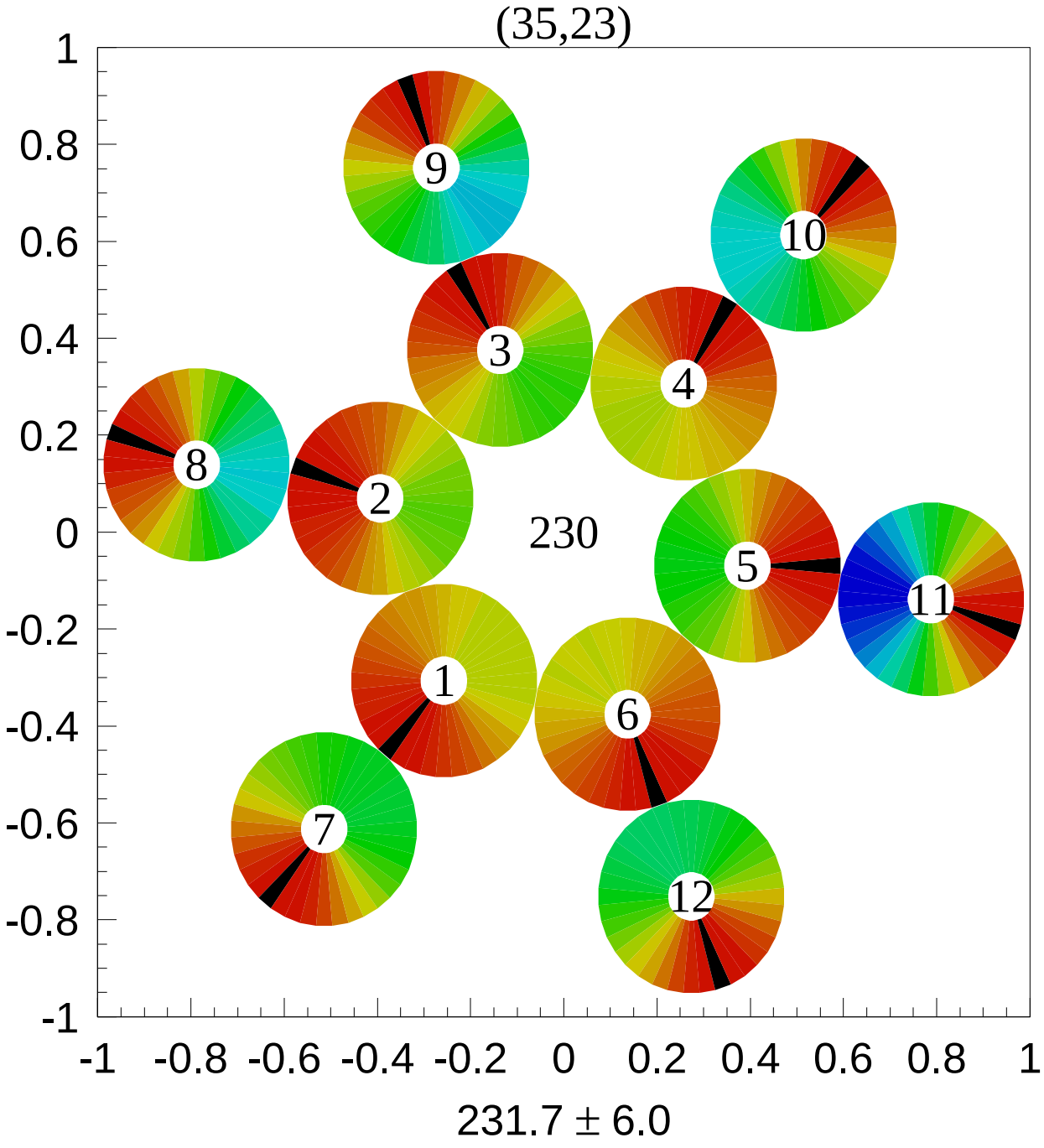

(35,21)
tilted LEDs
127 125 123 121 123 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 120 122 123 122 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

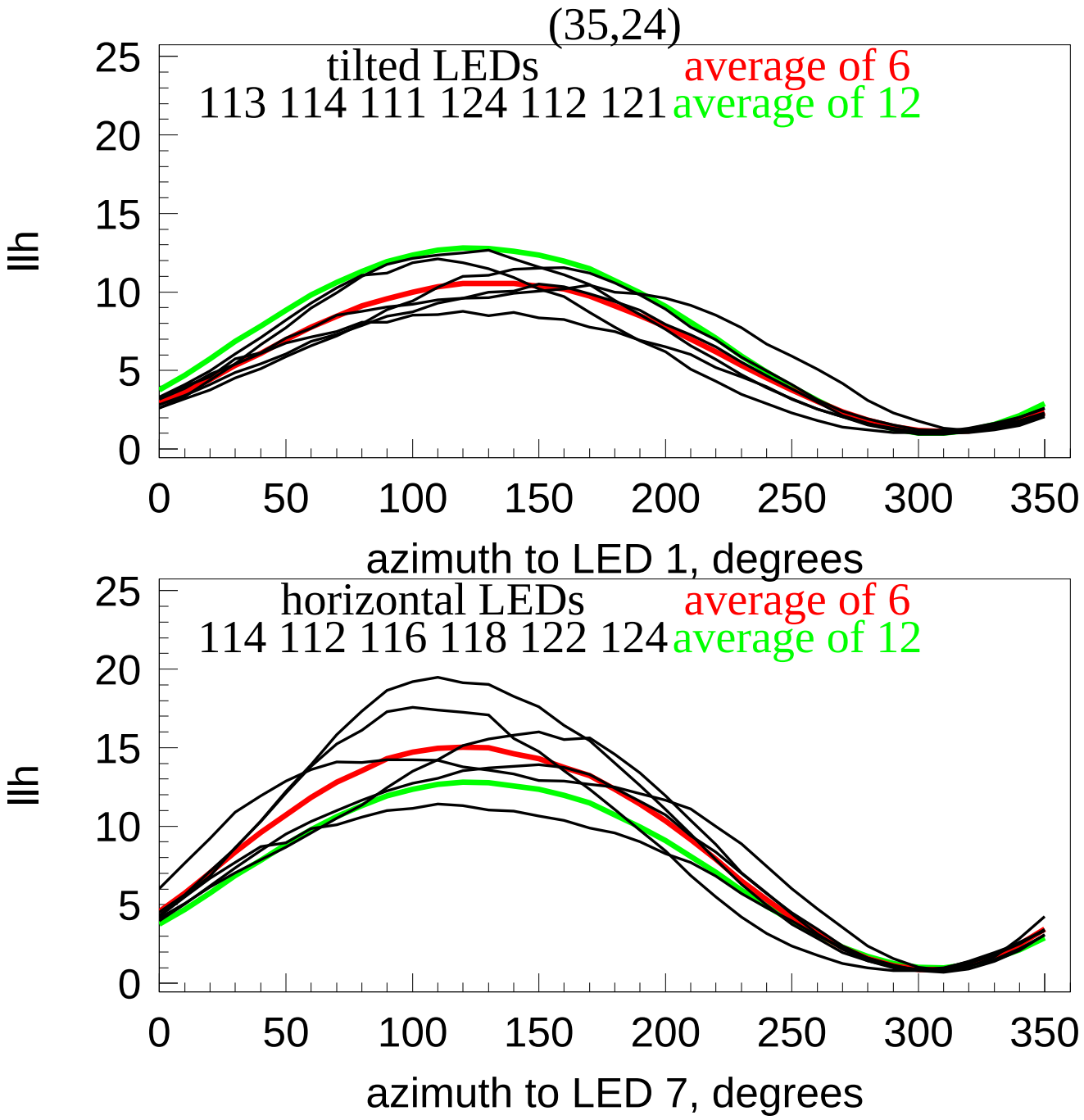

(35,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
234.5 ± 5.9

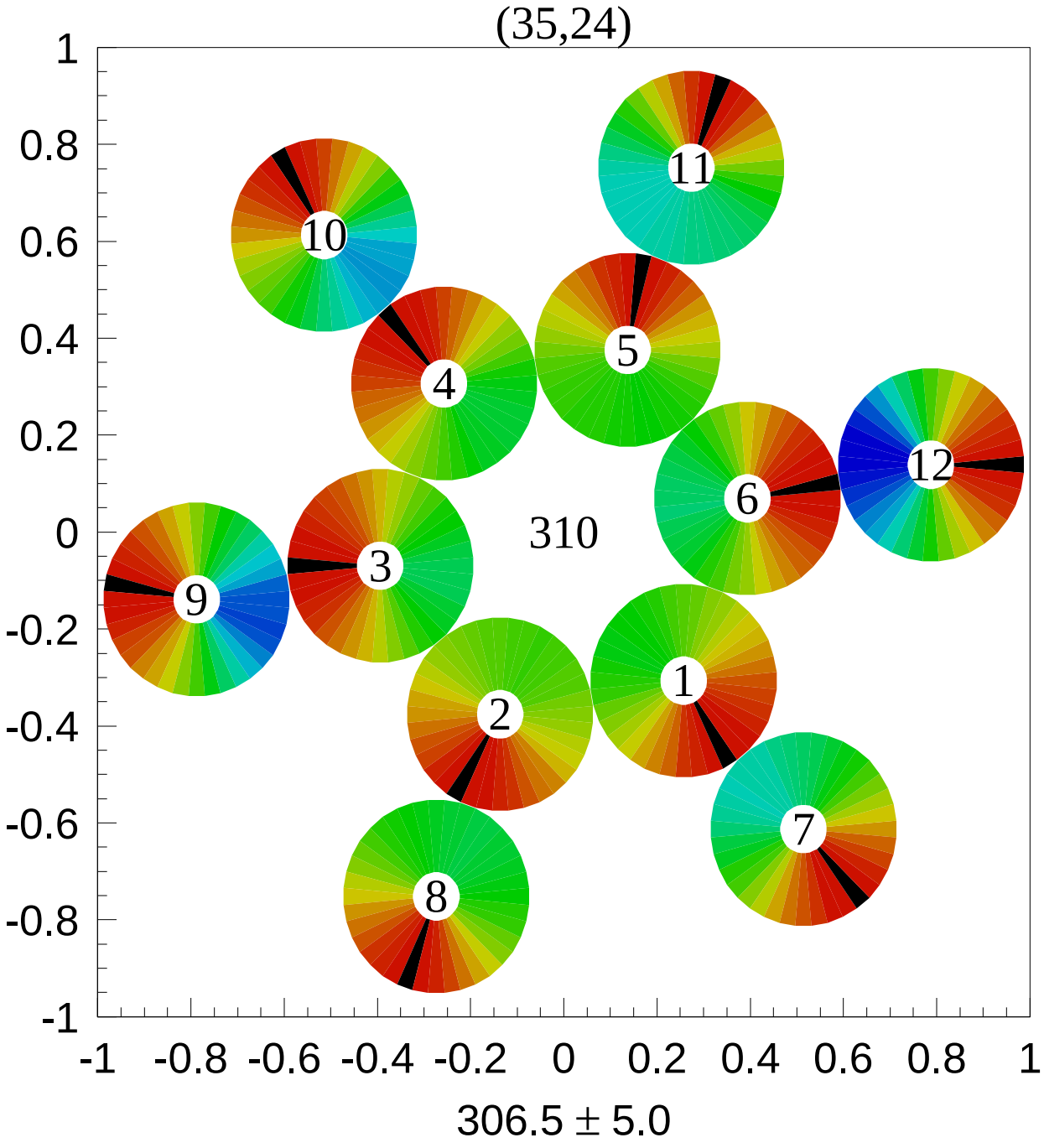

(35,22)
tilted LEDs
117 127 123 111 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 120 115 123 129 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

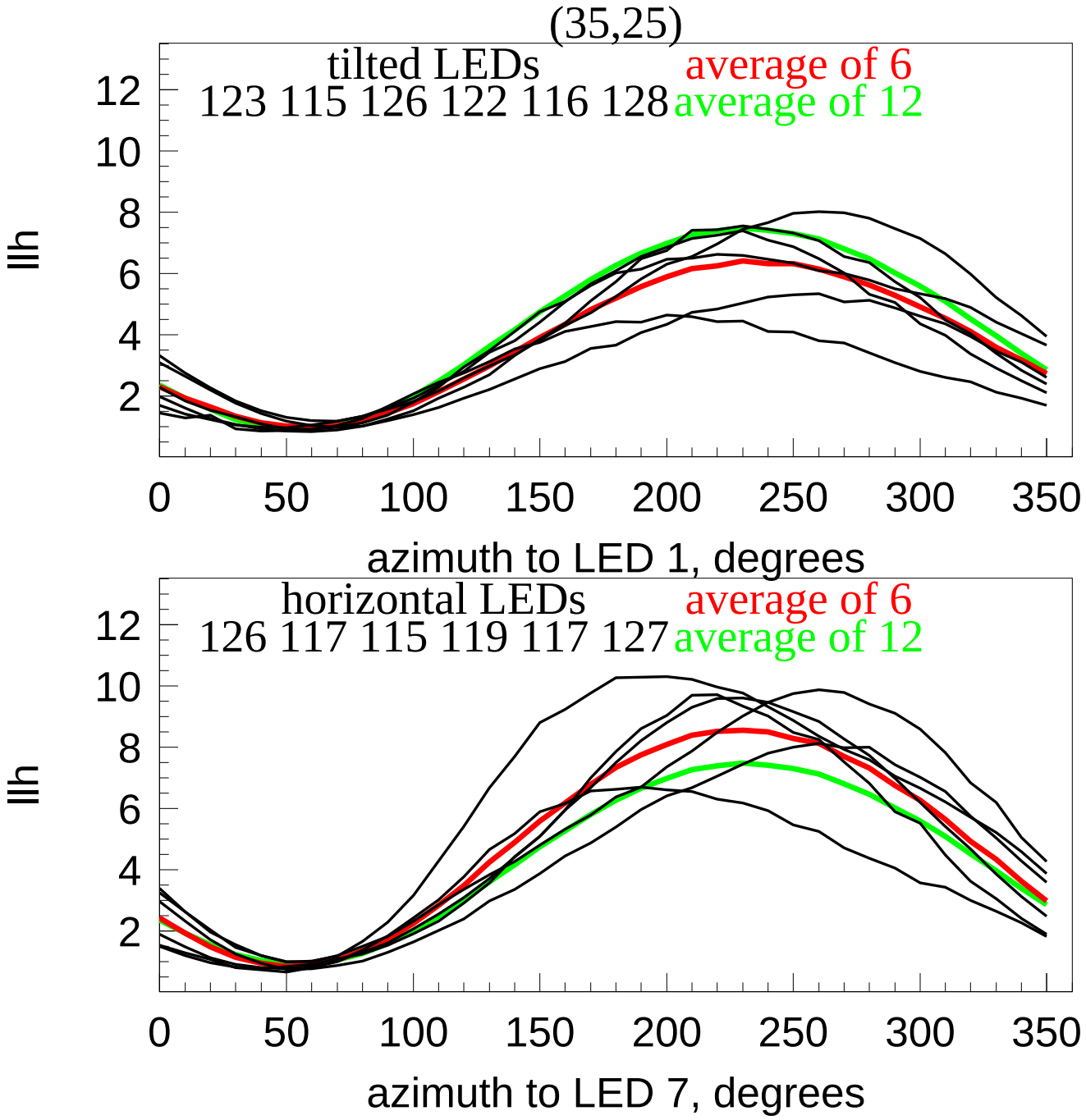

(35,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
292.6 ± 6.1

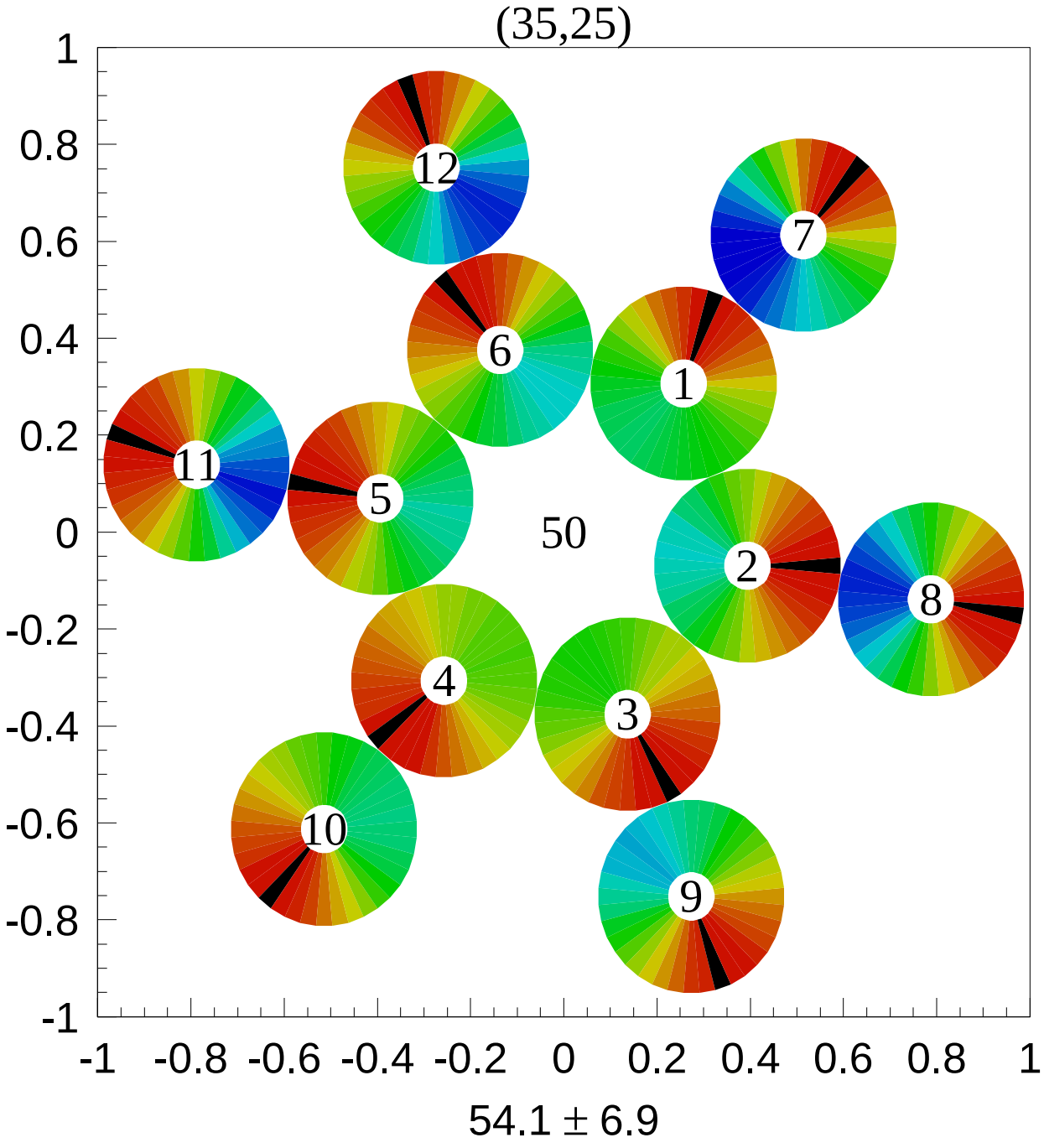

(35,23)
tilted LEDs
123 116 123 127 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 118 125 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

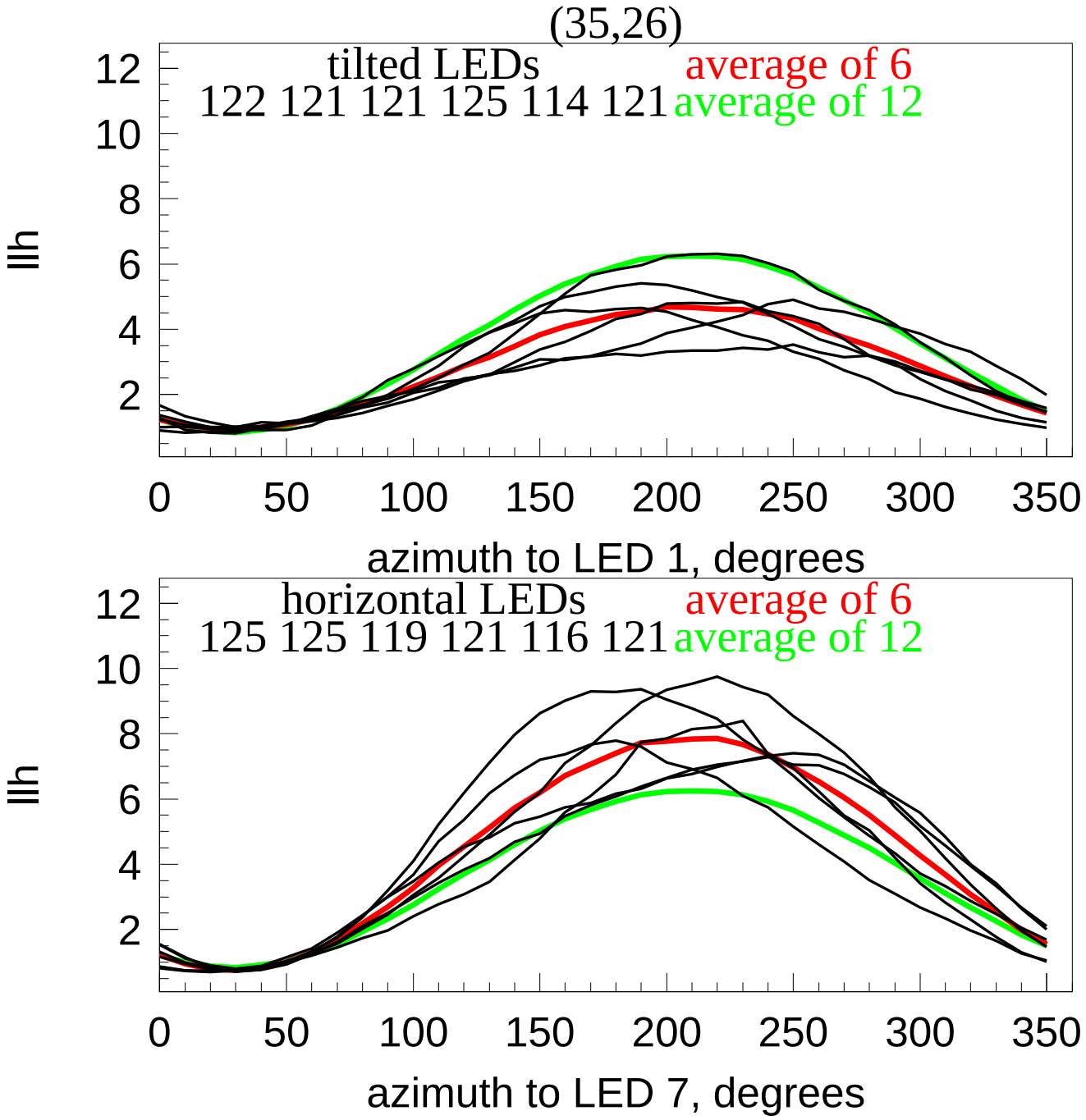

(35,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.7 ± 6.0

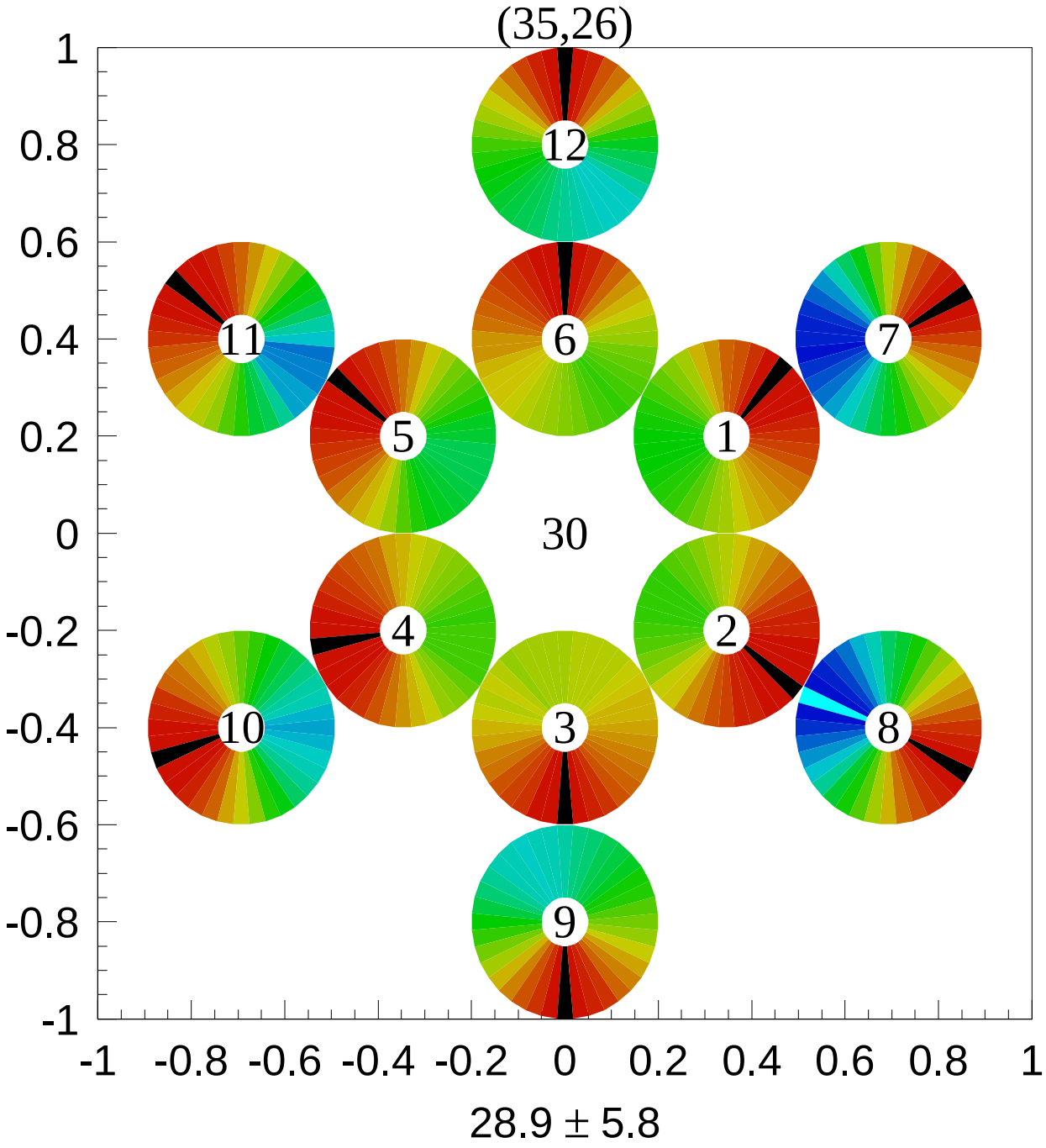

(35,24)
tilted LEDs
113 114 111 124 112 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 112 116 118 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

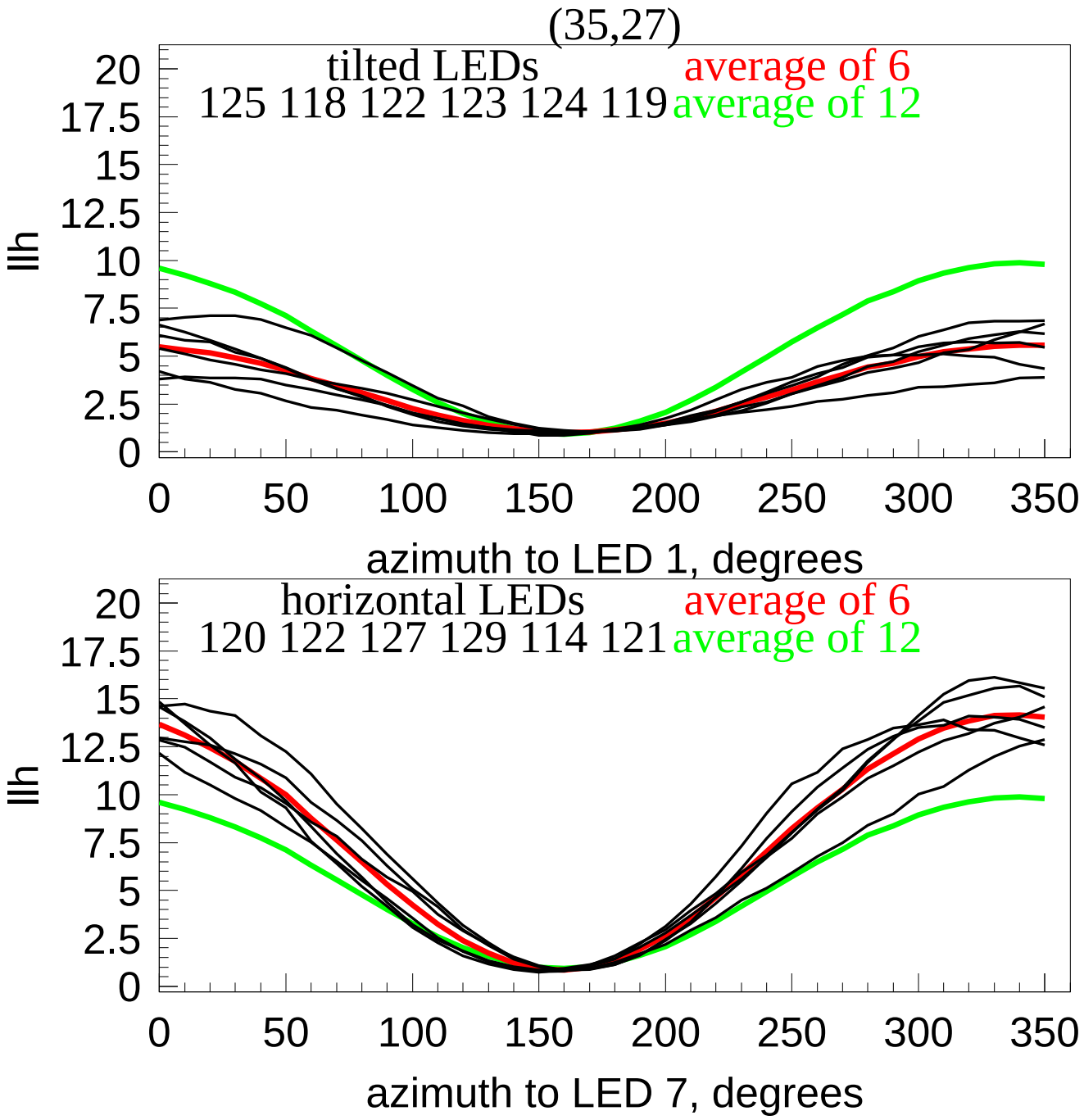

(35,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
306.5 ± 5.0
310
1
2
3
4
5
6
7
8
9
10
11
12

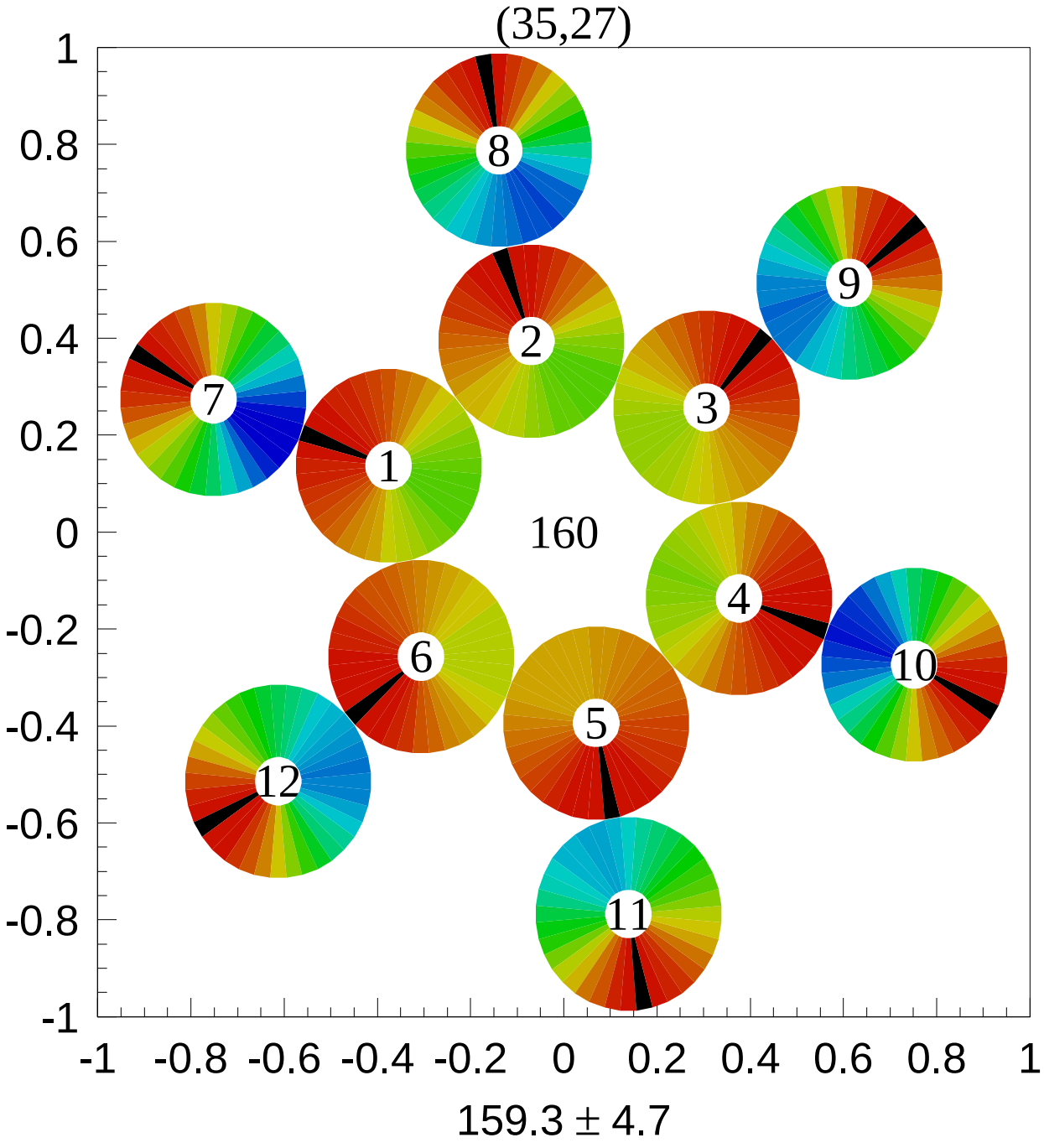

(35,25)
tilted LEDs
123 115 126 122 116 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 117 115 119 117 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

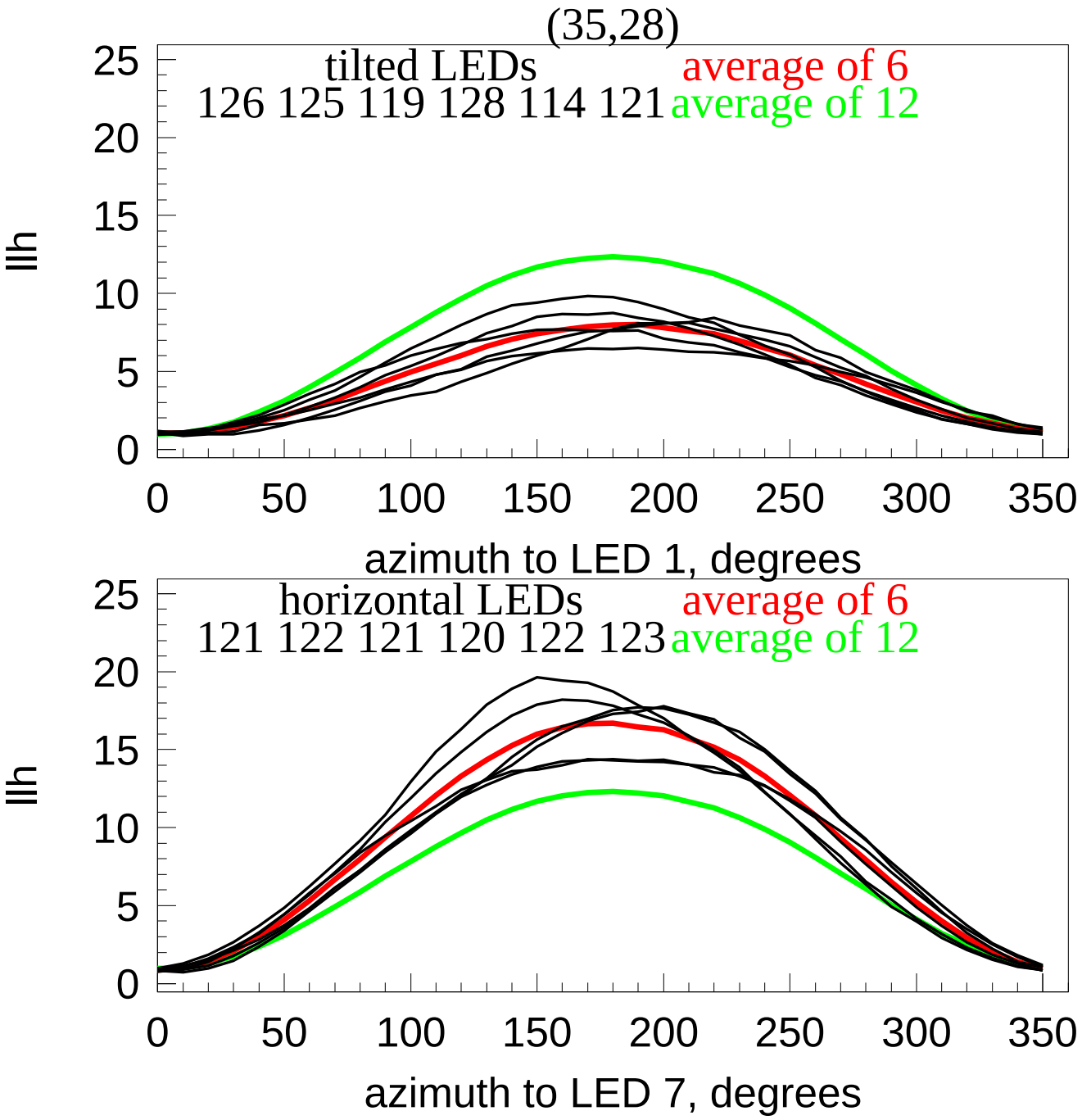

(35,25)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
54.1 ± 6.9

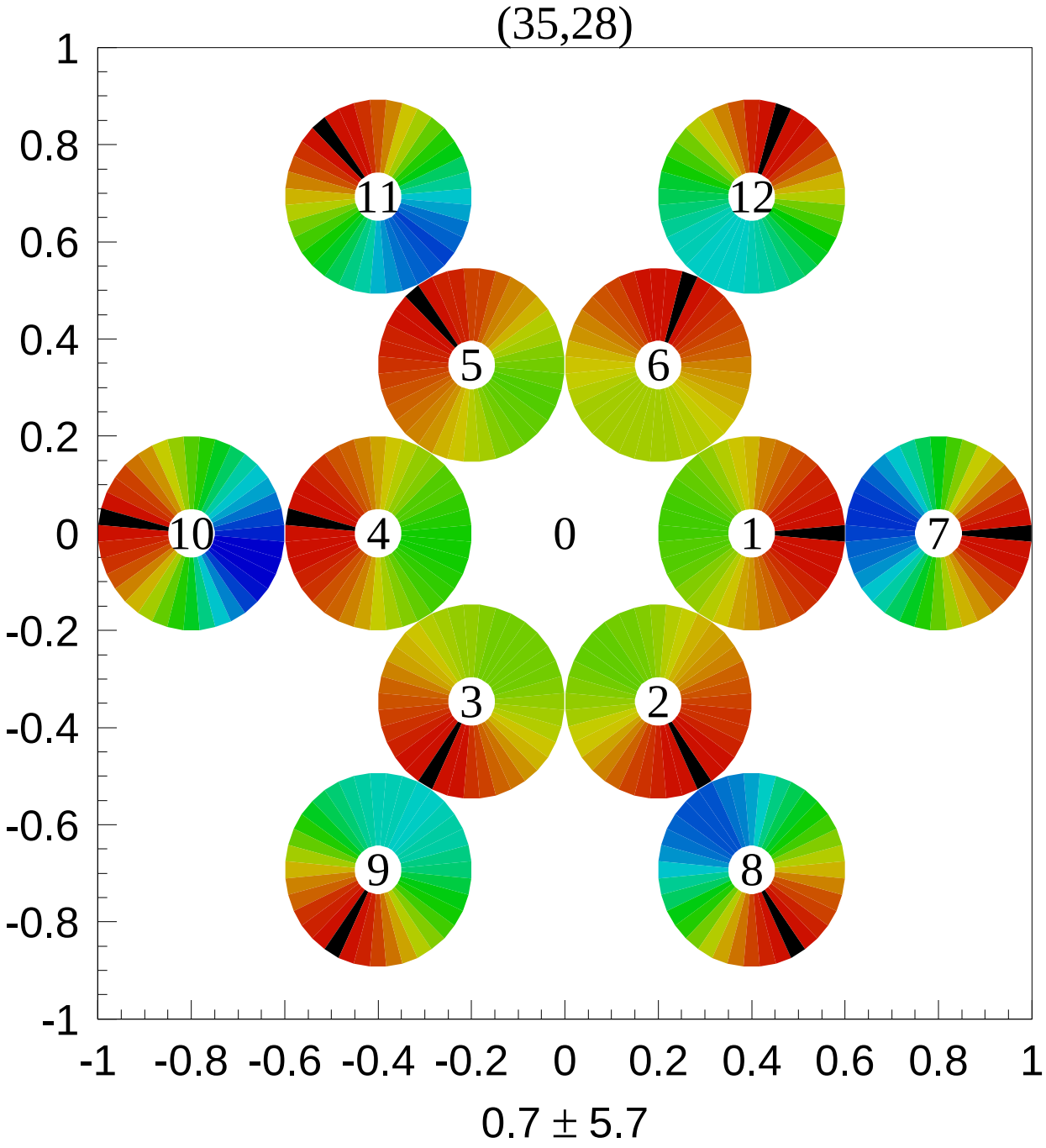

(35,26)
tilted LEDs
122 121 121 125 114 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 119 121 116 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

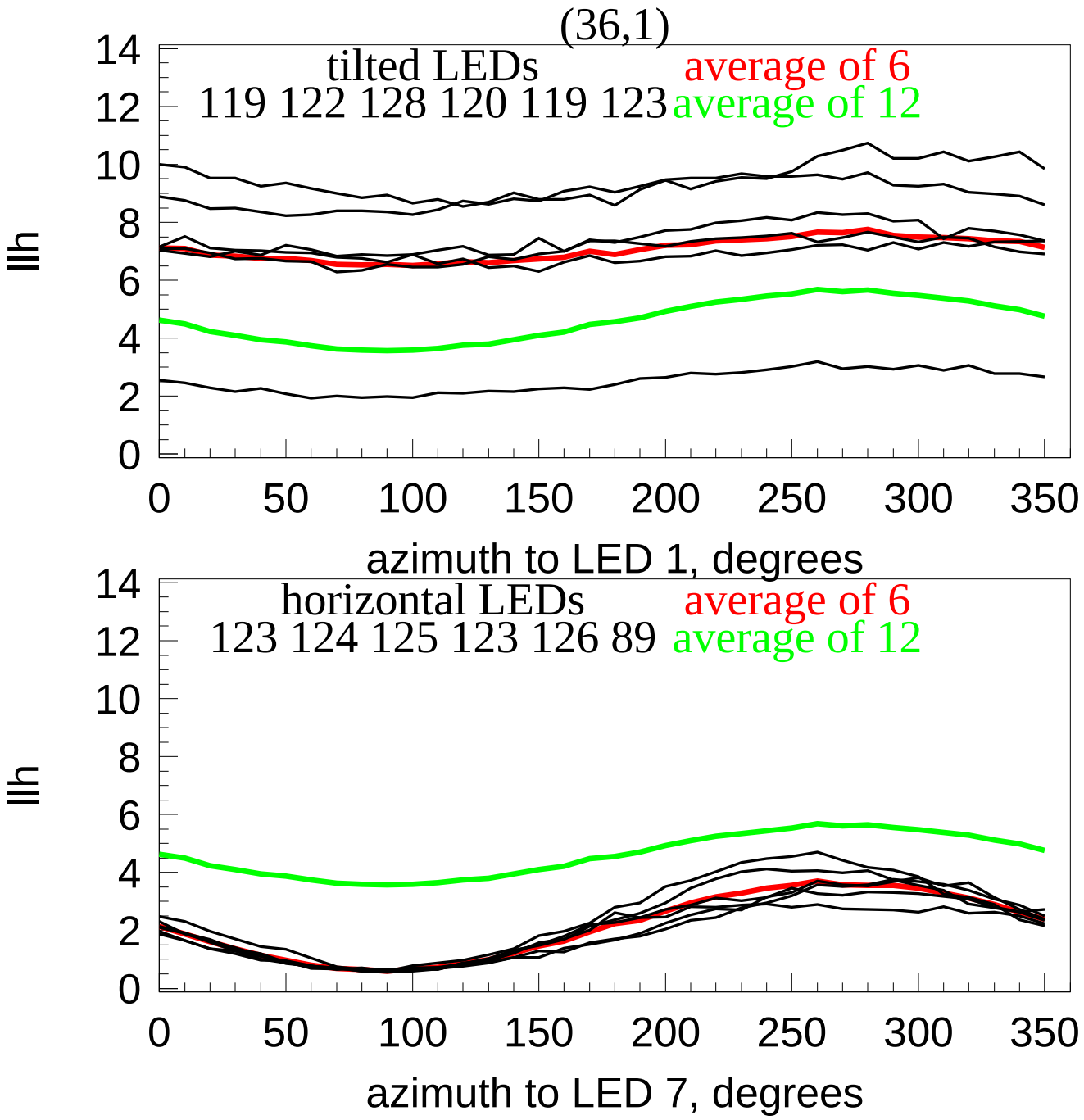

(35,26)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
28.9 ± 5.8

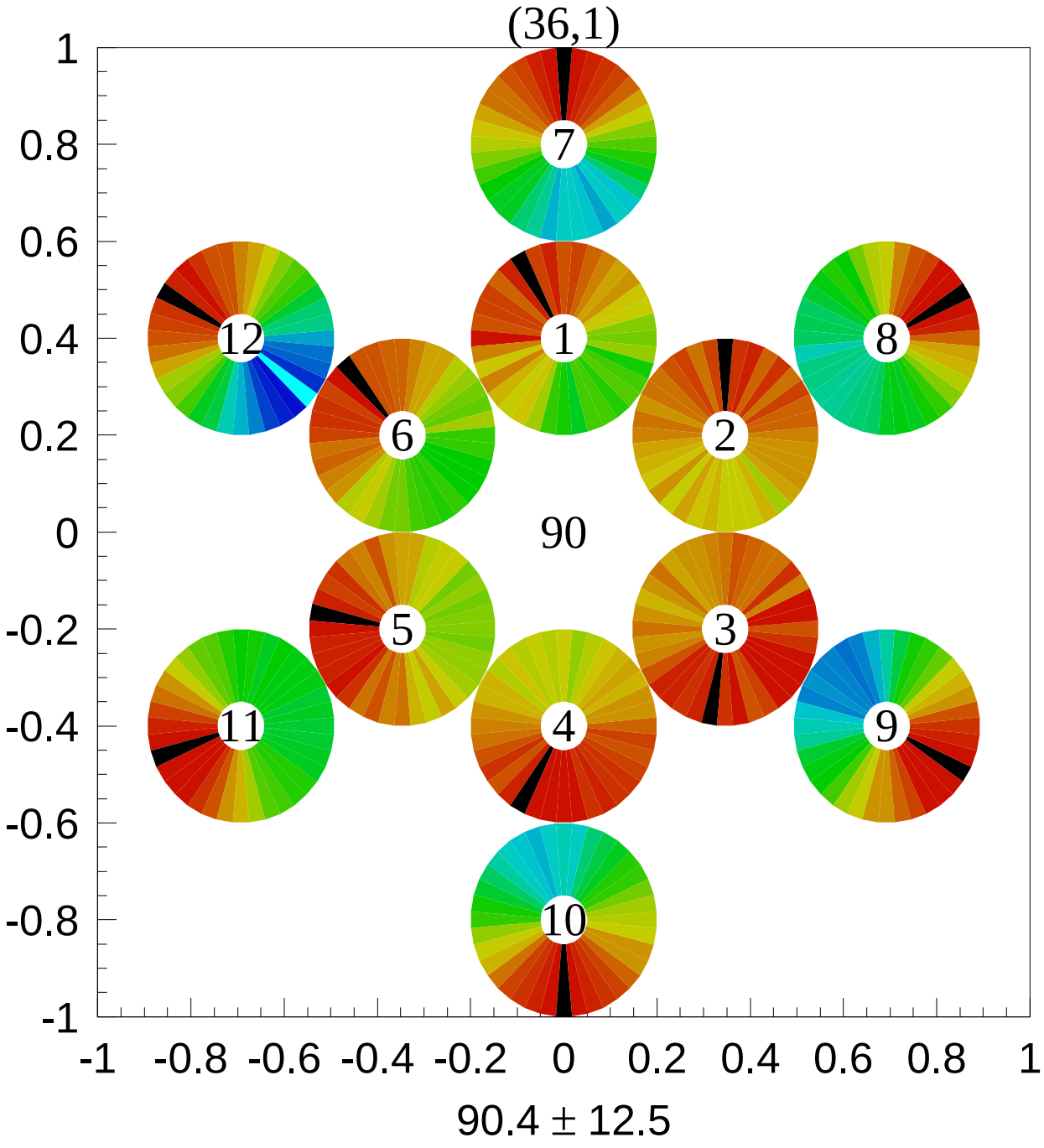

(35,27)
tilted LEDs
125 118 122 123 124 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 122 127 129 114 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

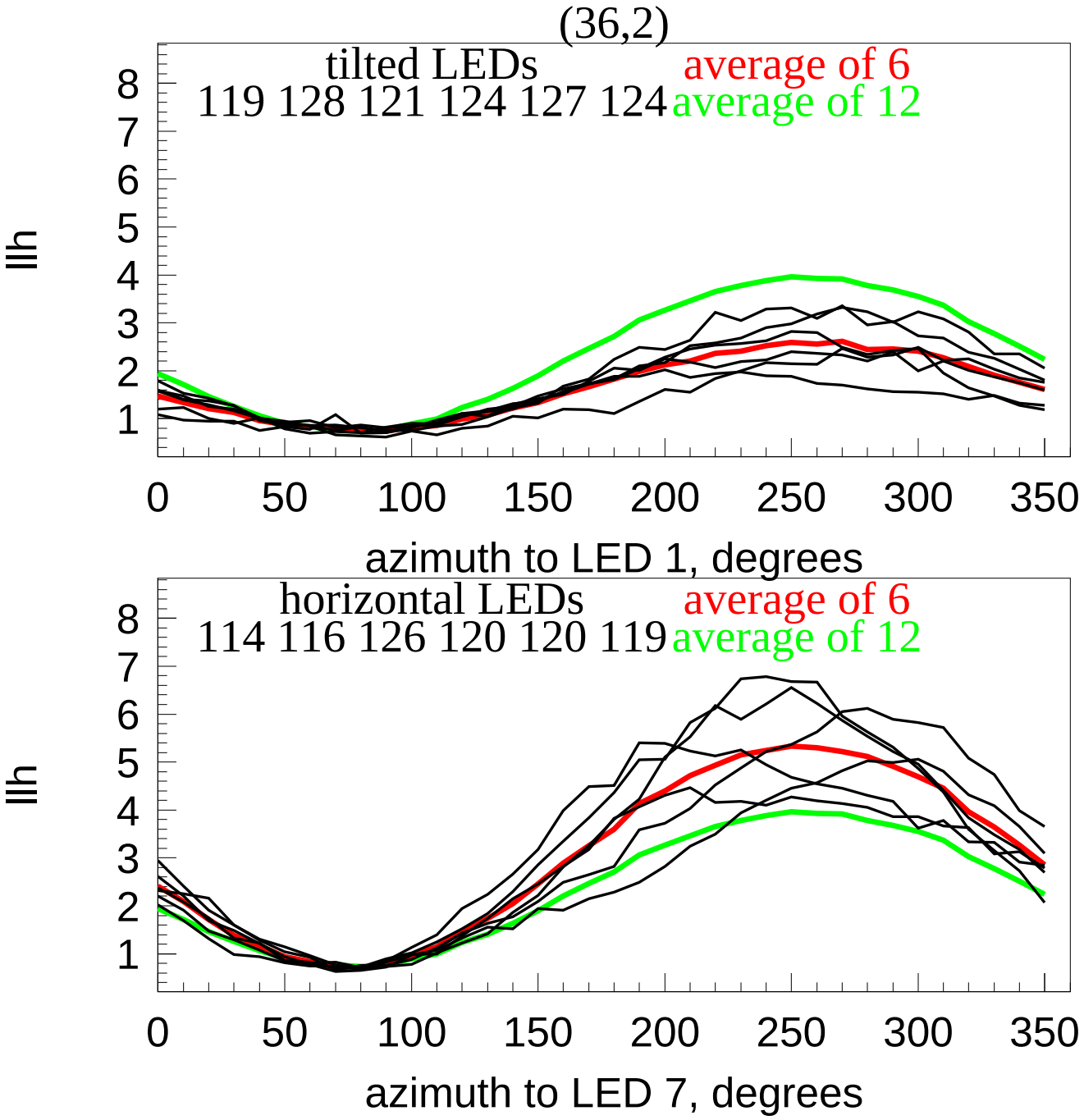

(35,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
159.3 ± 4.7

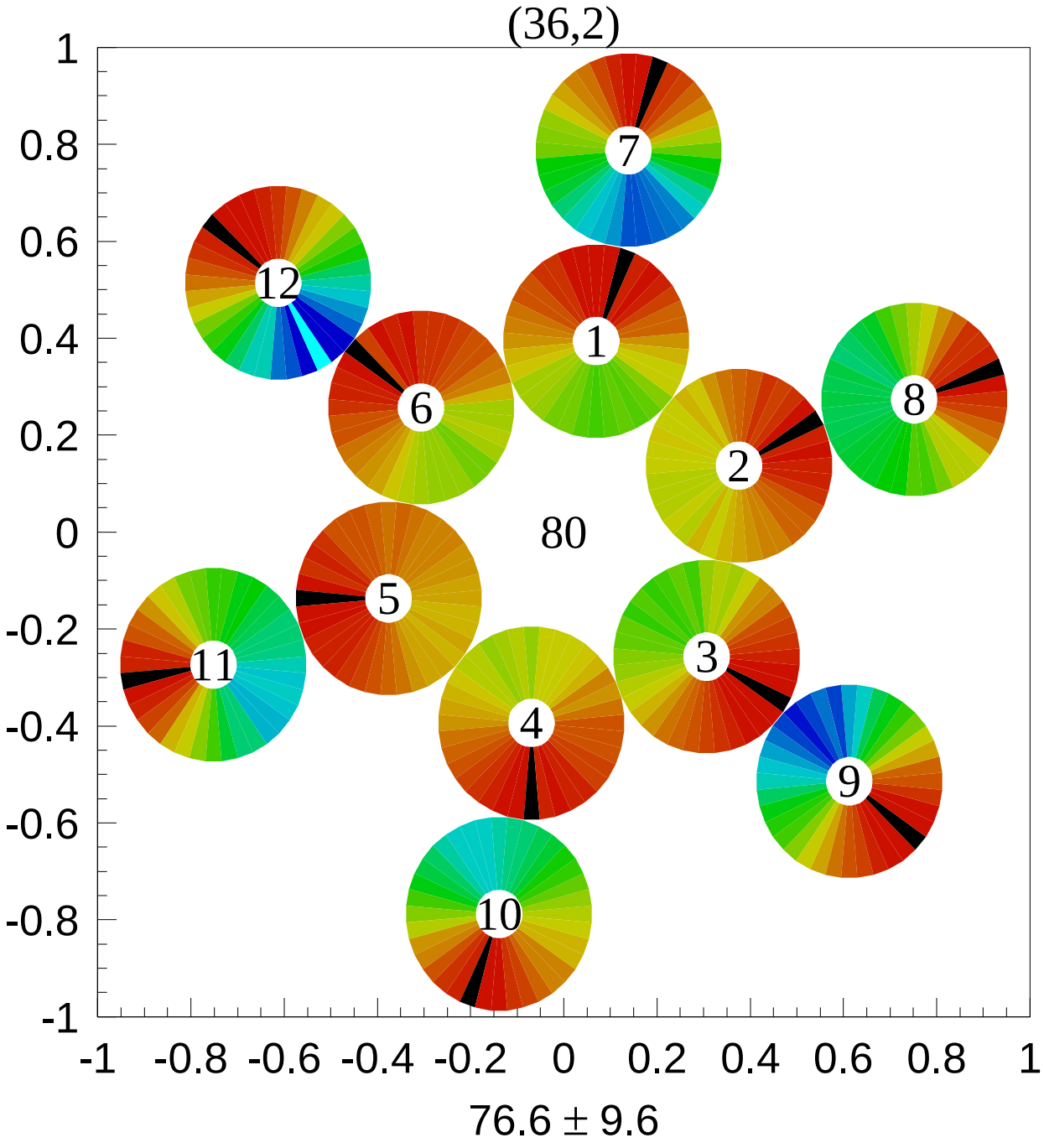

(35,28)
tilted LEDs
126 125 119 128 114 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 121 120 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

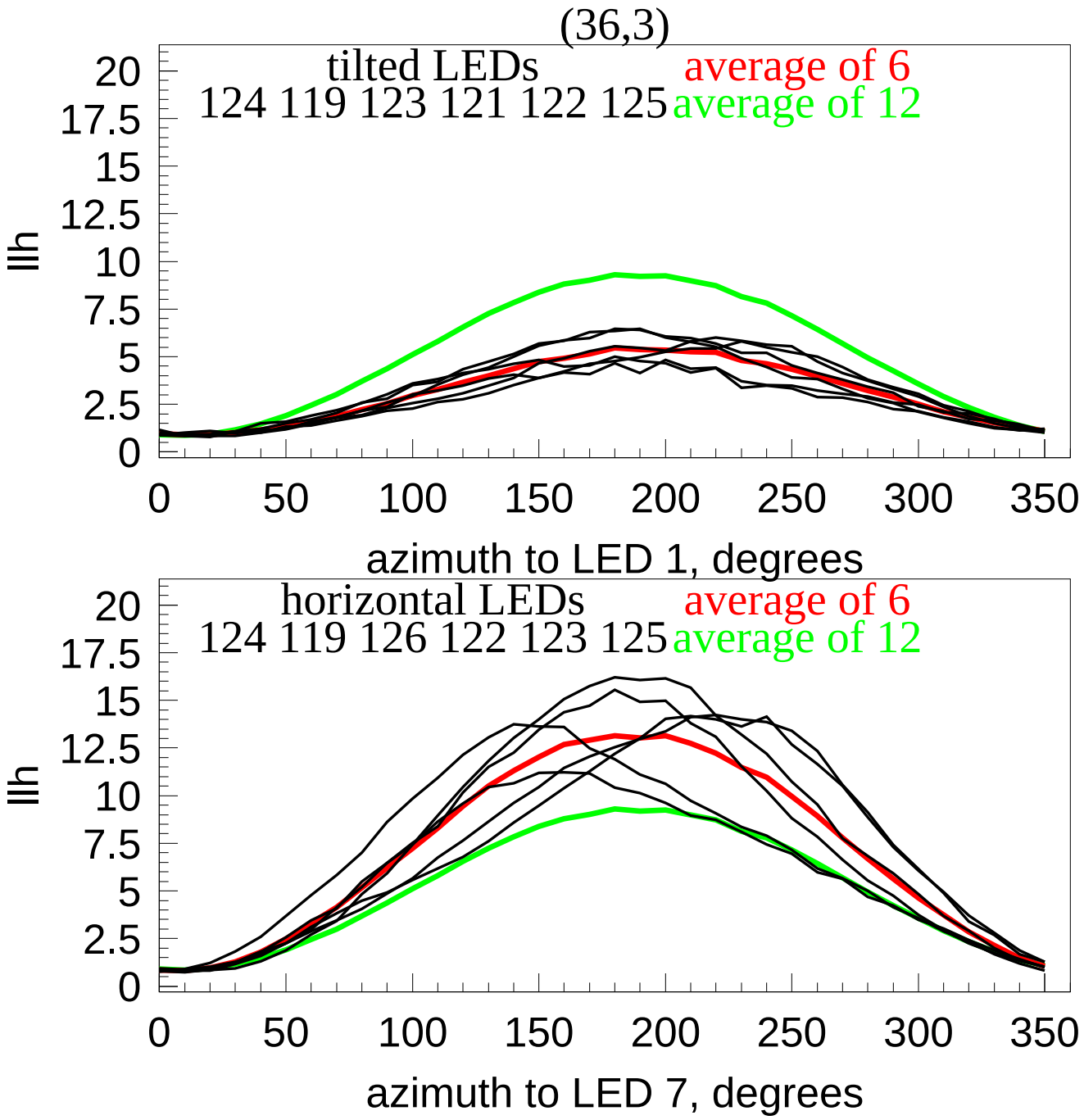

(35,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
0.7 ± 5.7
11
12
5
6
10
4
0
1
7
3
2
9
8

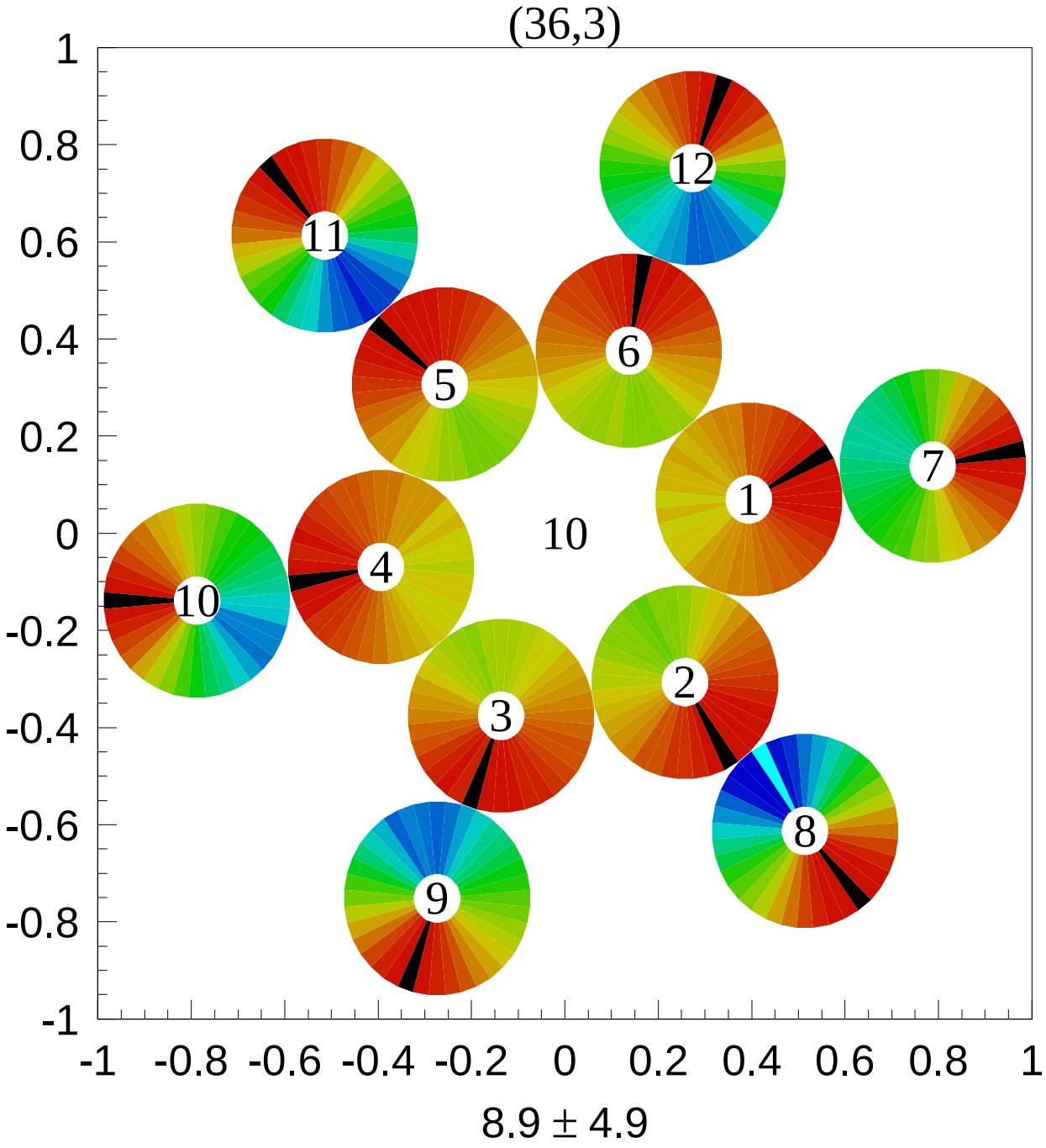

(36,1)
tilted LEDs
119 122 128 120 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 124 125 123 126 89
average of 6
average of 12
llh
azimuth to LED 7, degrees

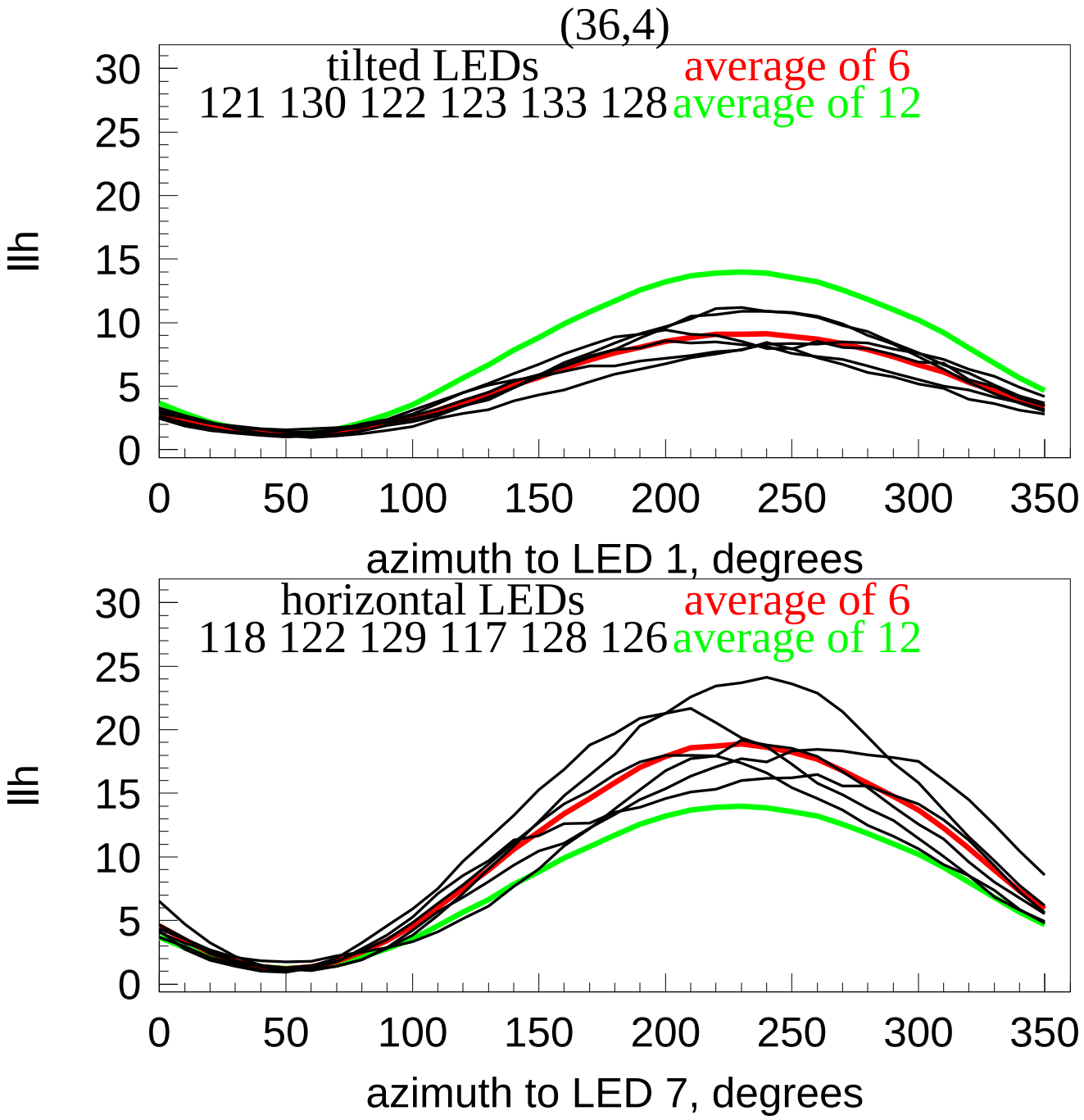

(36,1)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
90.4 ± 12.5

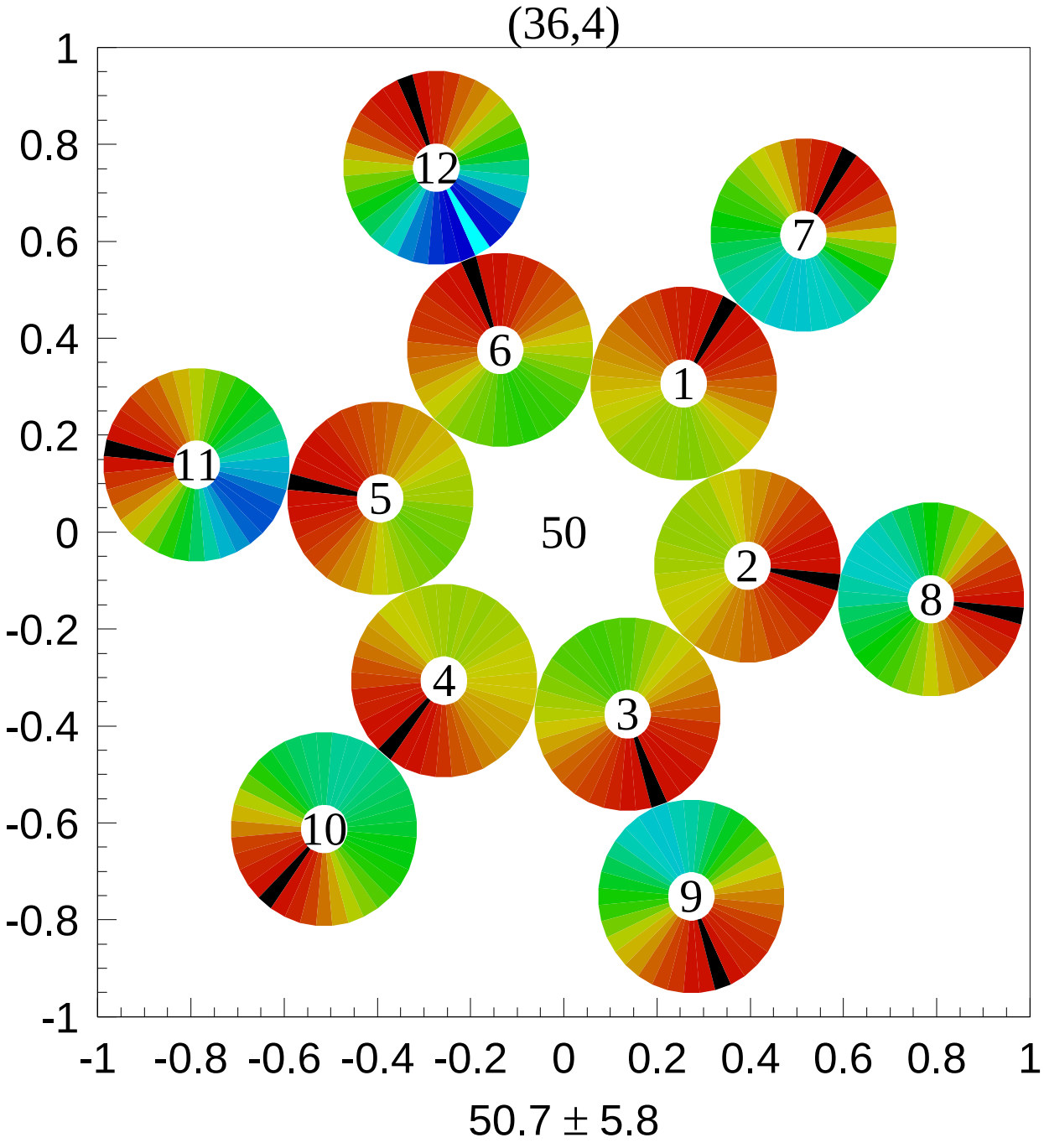

(36,2)
tilted LEDs
119 128 121 124 127 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 116 126 120 120 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

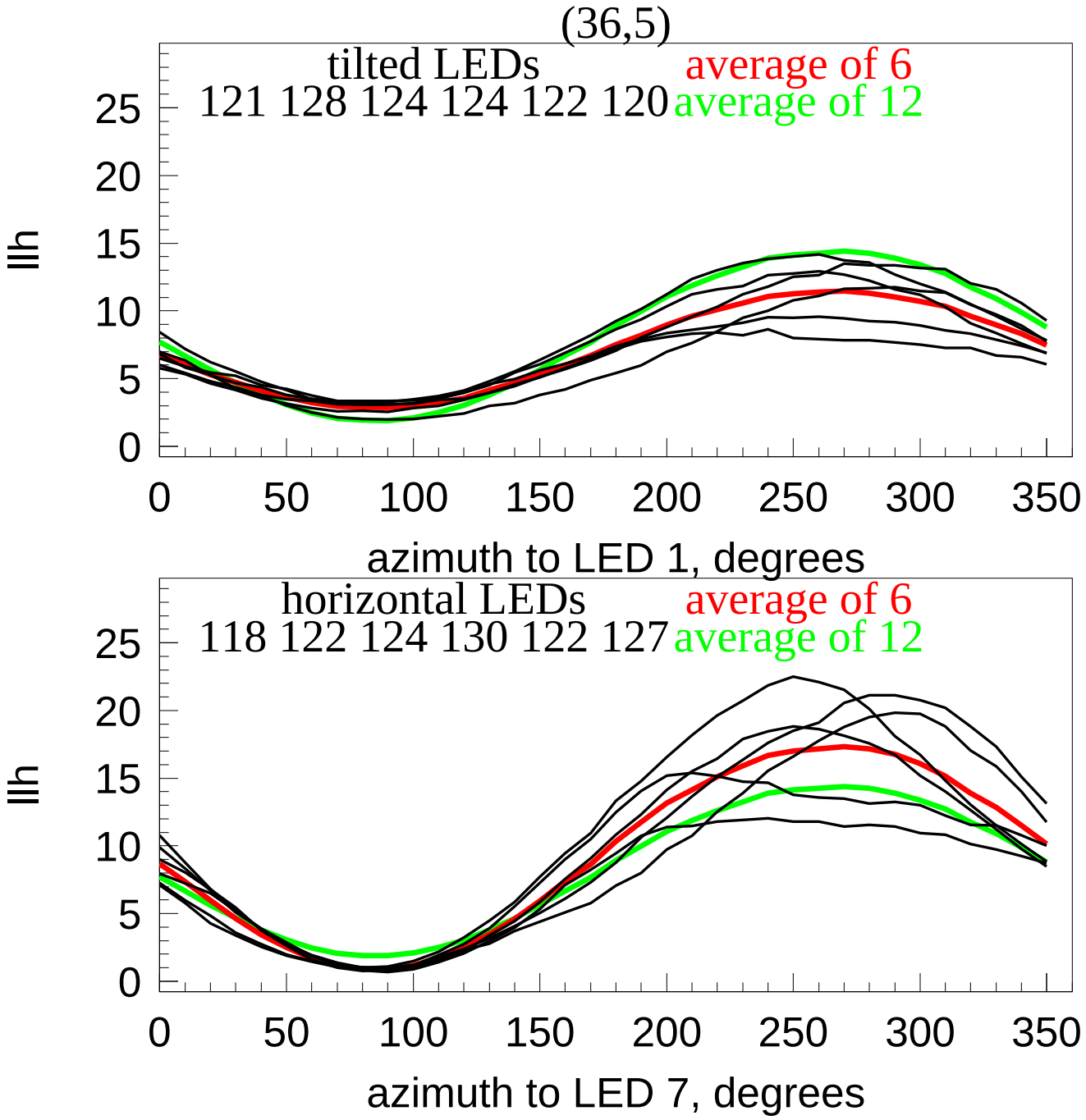

(36,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
76.6 ± 9.6

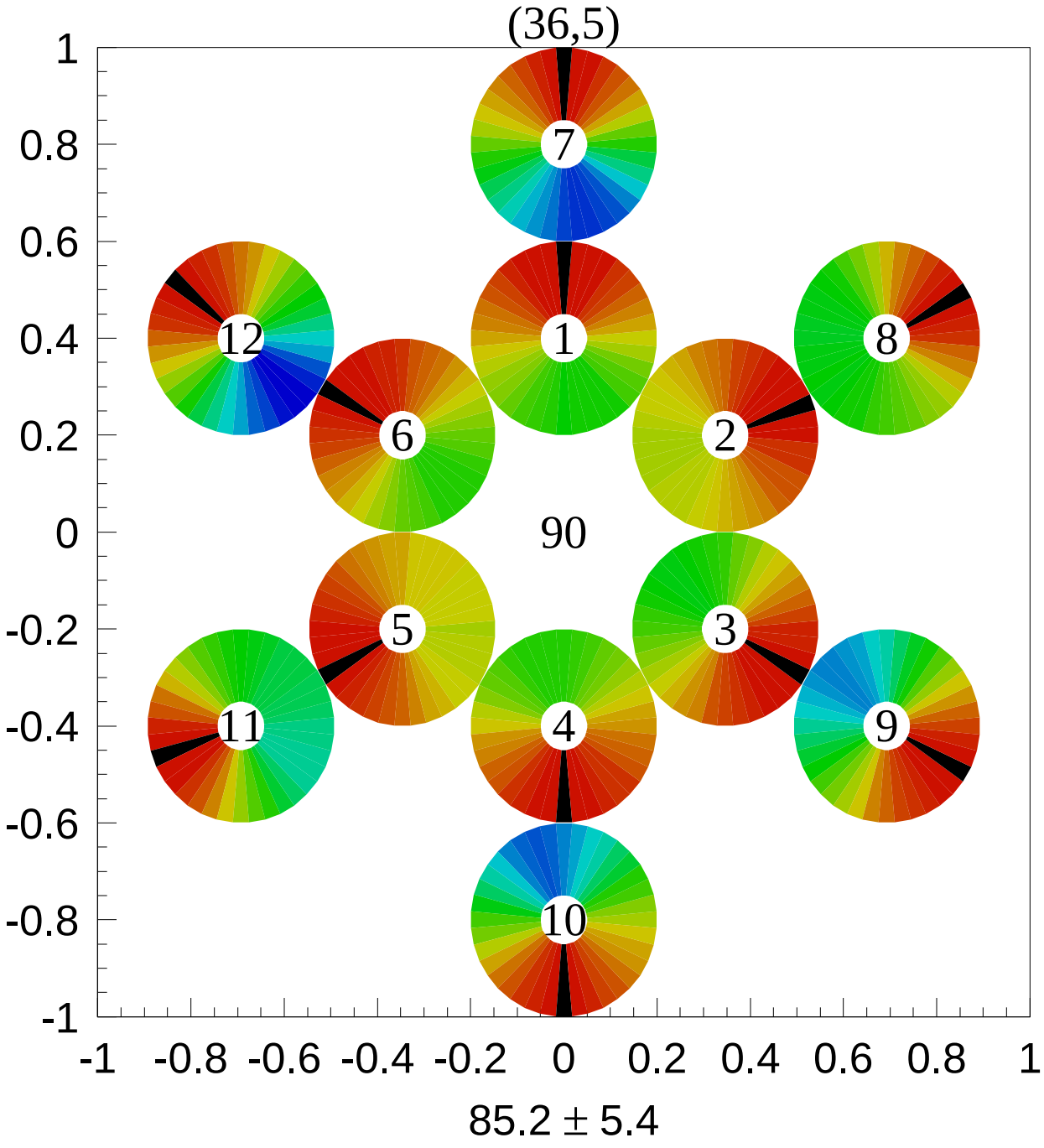

(36,3)
tilted LEDs
124 119 123 121 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 126 122 123 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

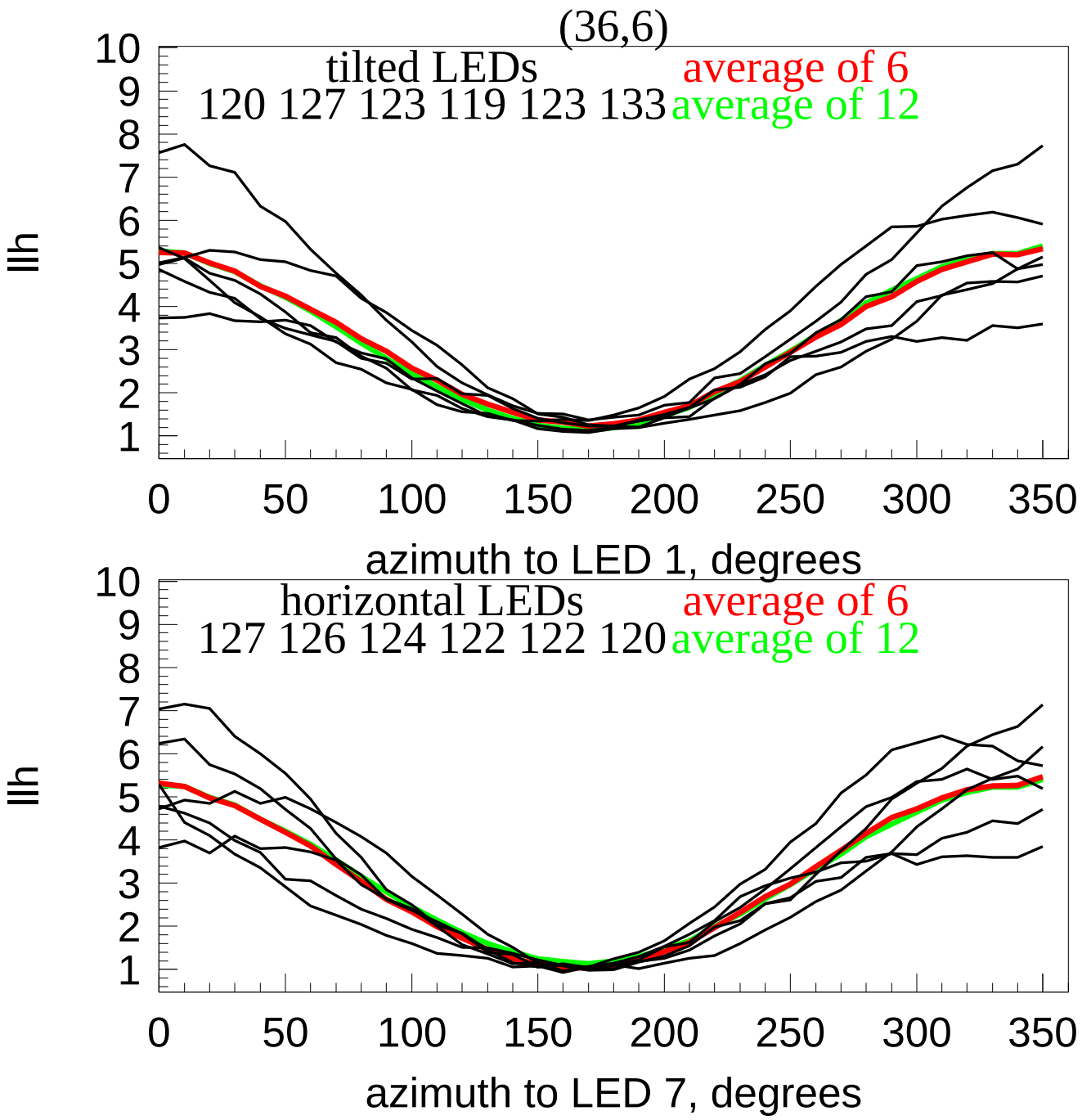

(36,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
8.9 ± 4.9

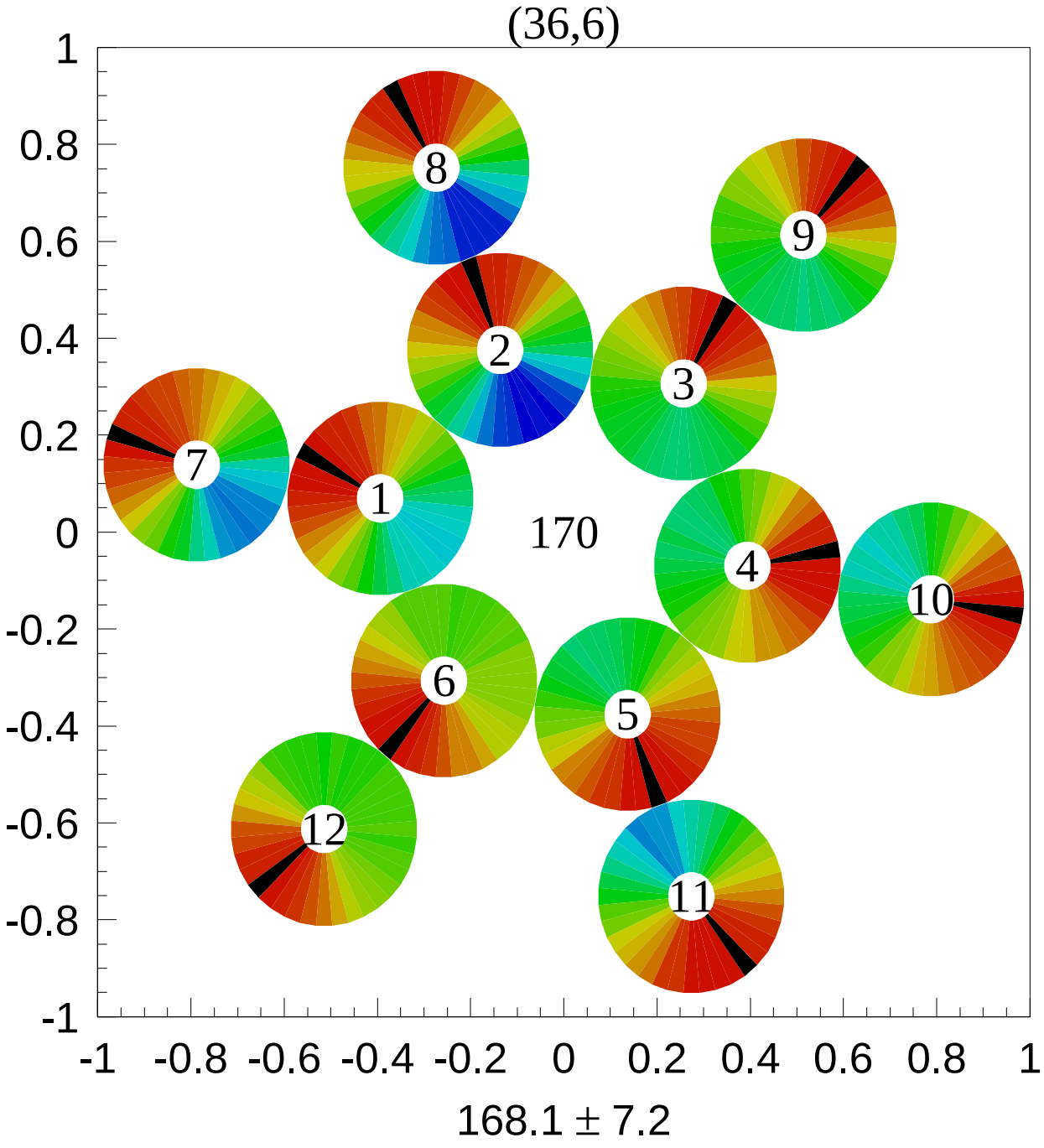

(36,4)
tilted LEDs
121 130 122 123 133 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 122 129 117 128 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

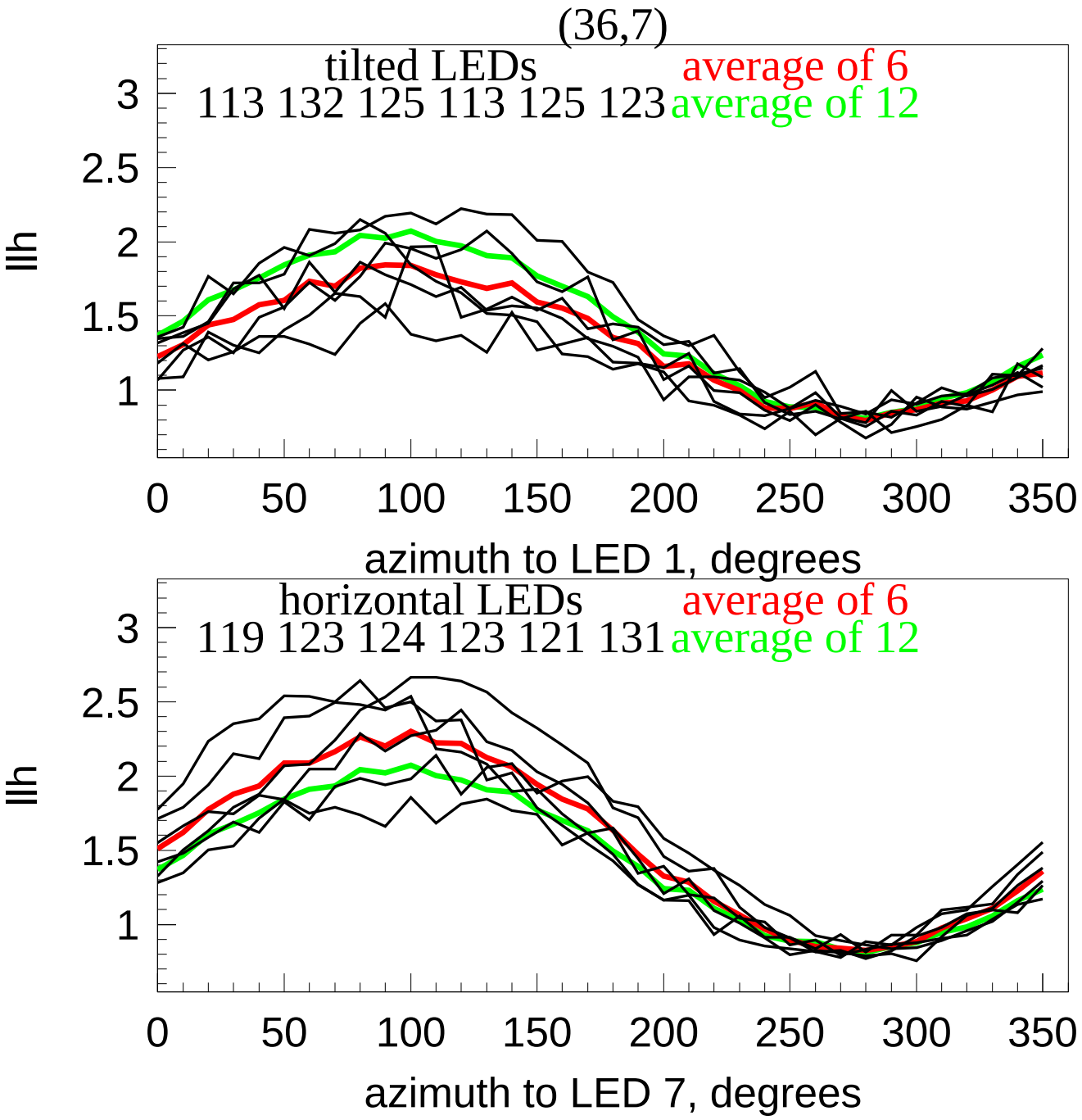

(36,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
50.7 ± 5.8

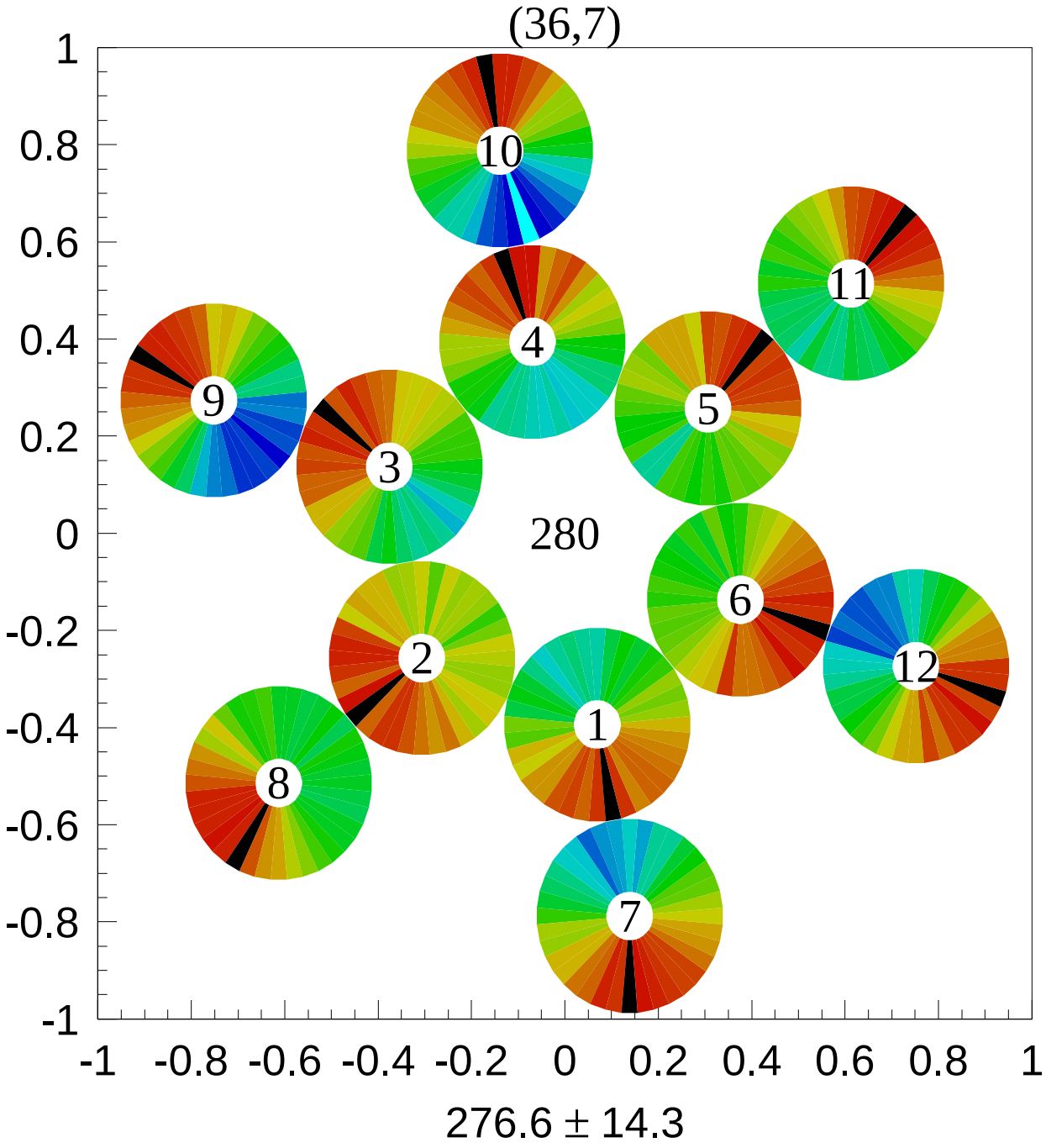

(36,5)
tilted LEDs
121 128 124 124 122 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 122 124 130 122 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

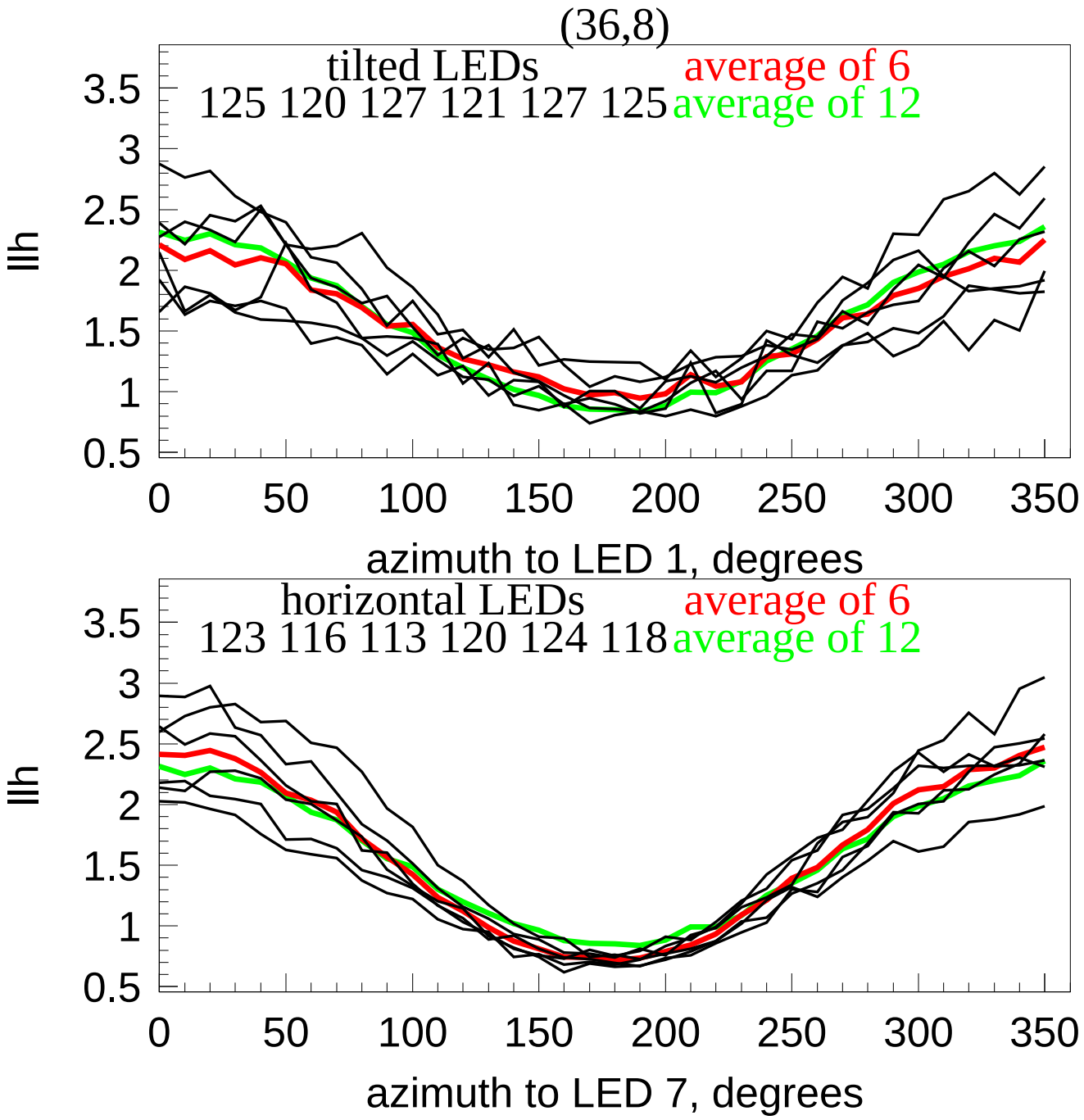

(36,5)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
85.2 ± 5.4

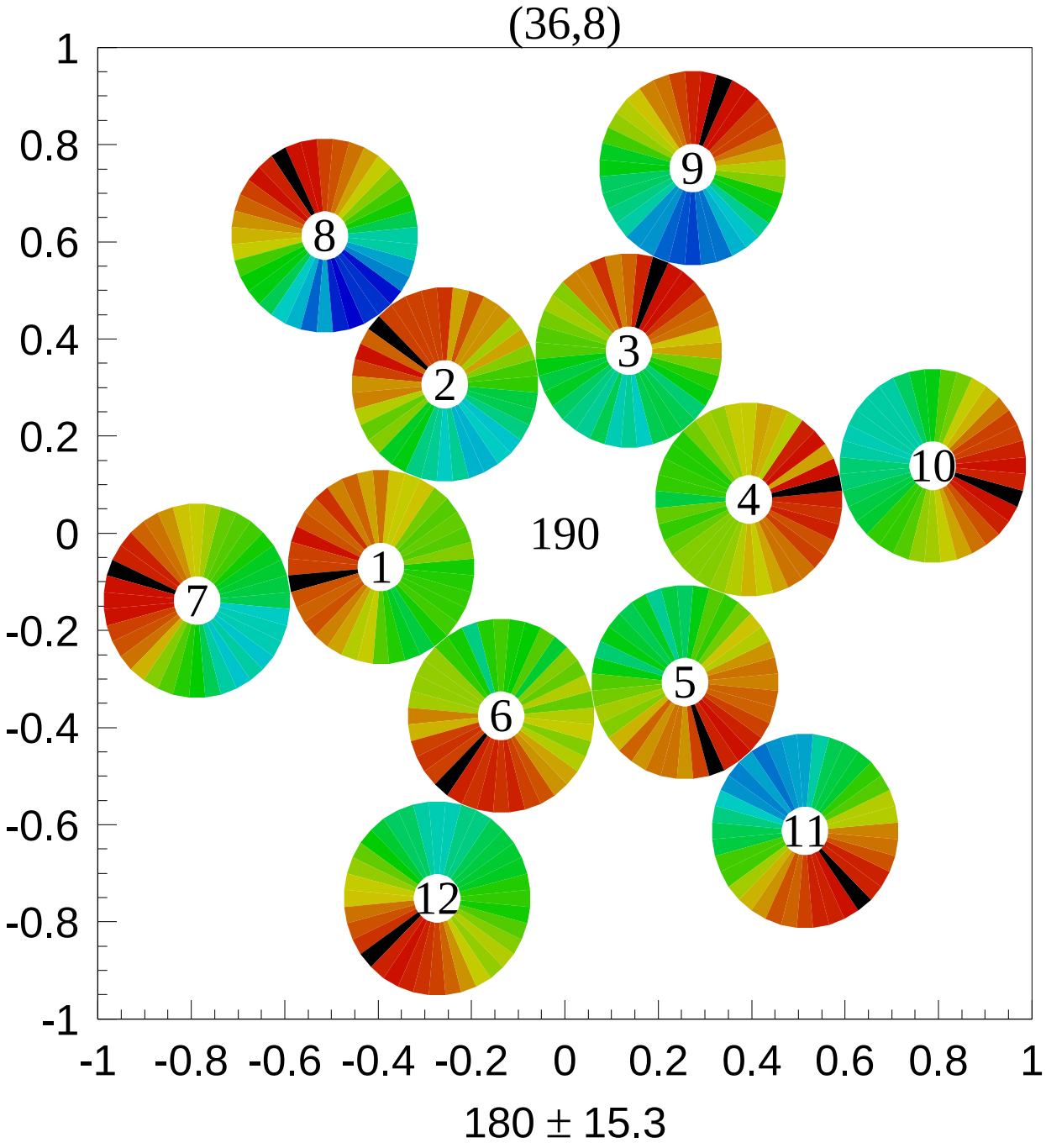

(36,6)
tilted LEDs
120 127 123 119 123 133
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 126 124 122 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

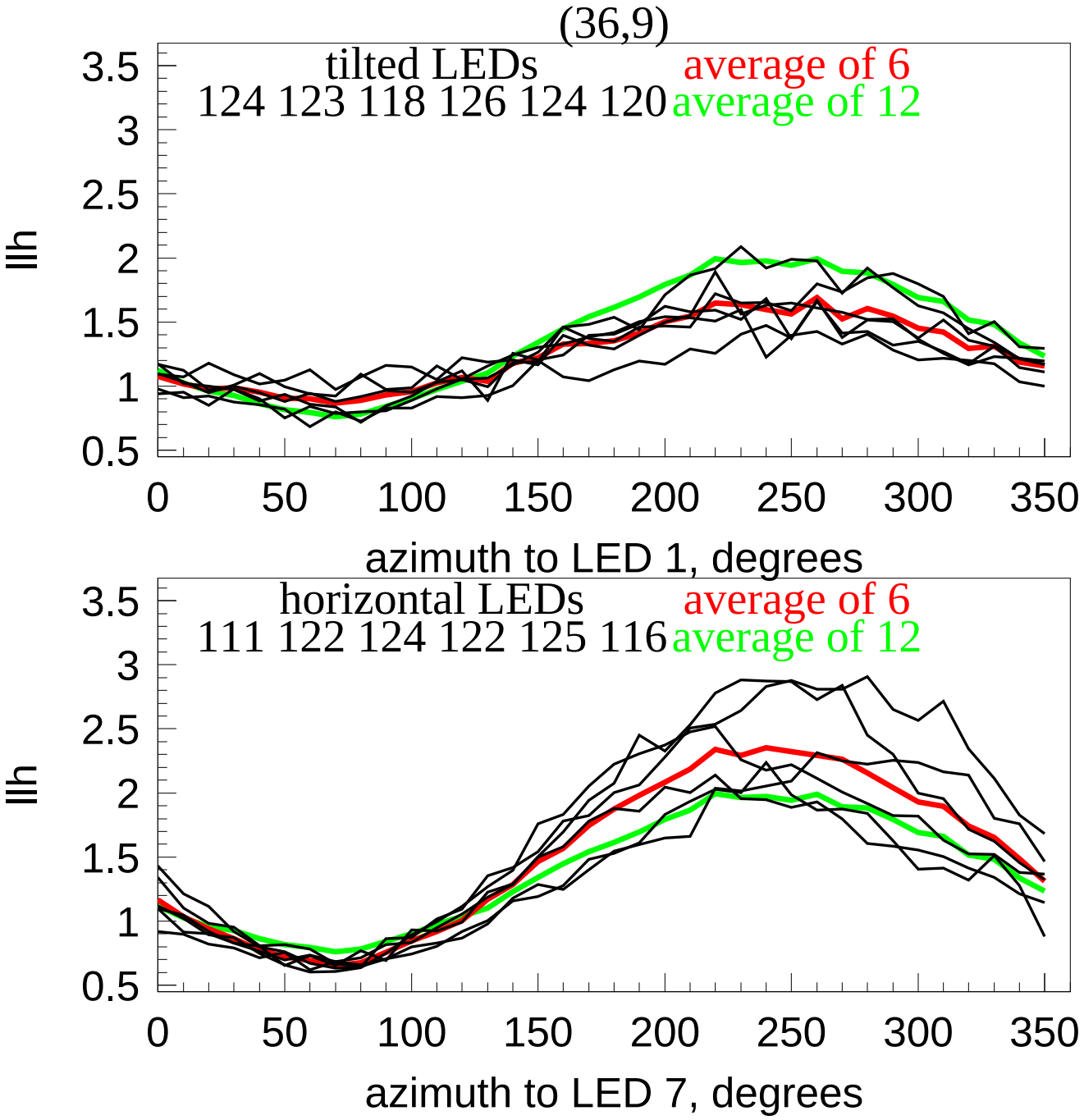

(36,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
168.1 ± 7.2

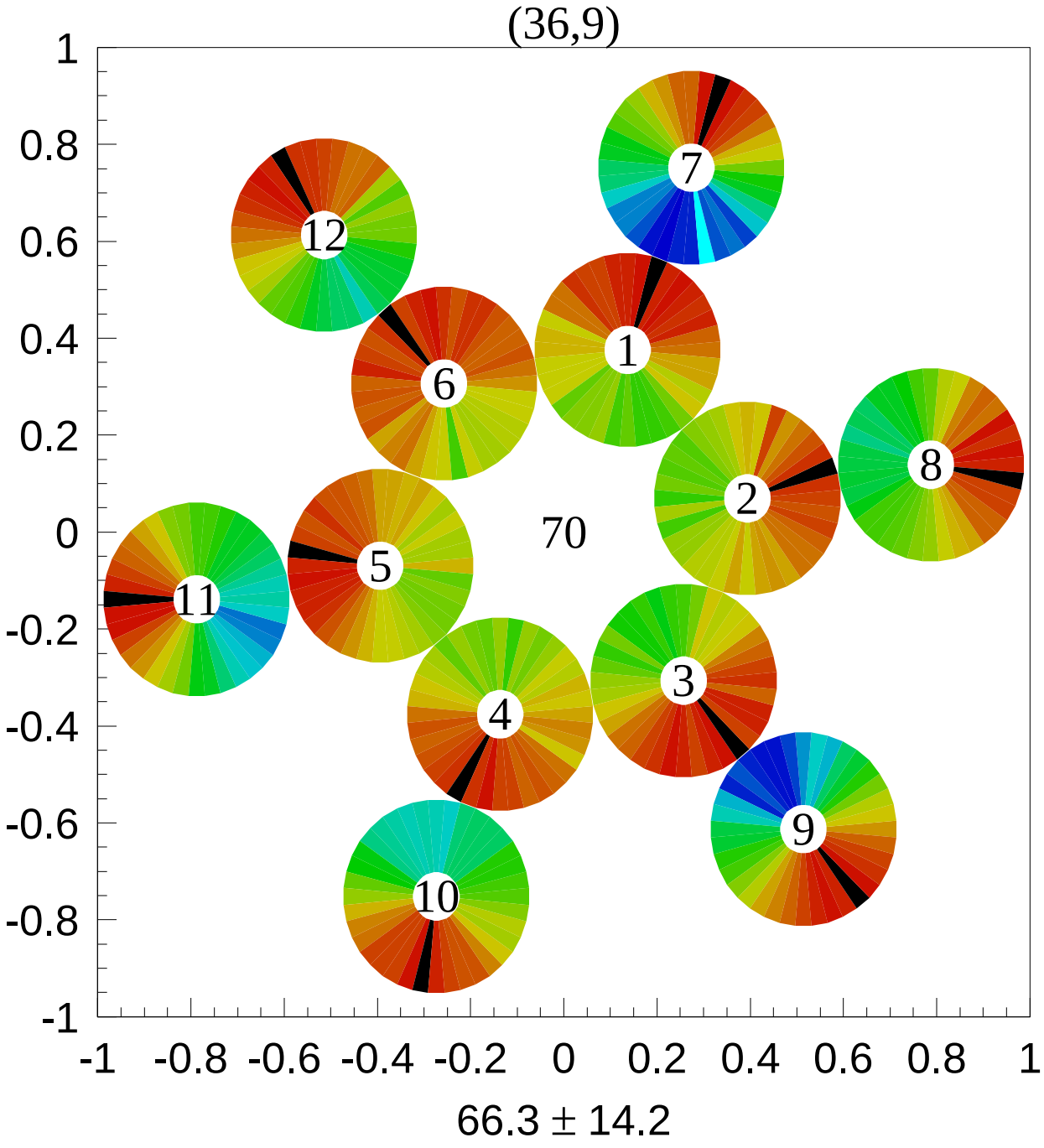

(36,7)
tilted LEDs
113 132 125 113 125 123
average of 6
average of 12
IIh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 123 124 123 121 131
average of 6
average of 12
IIh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

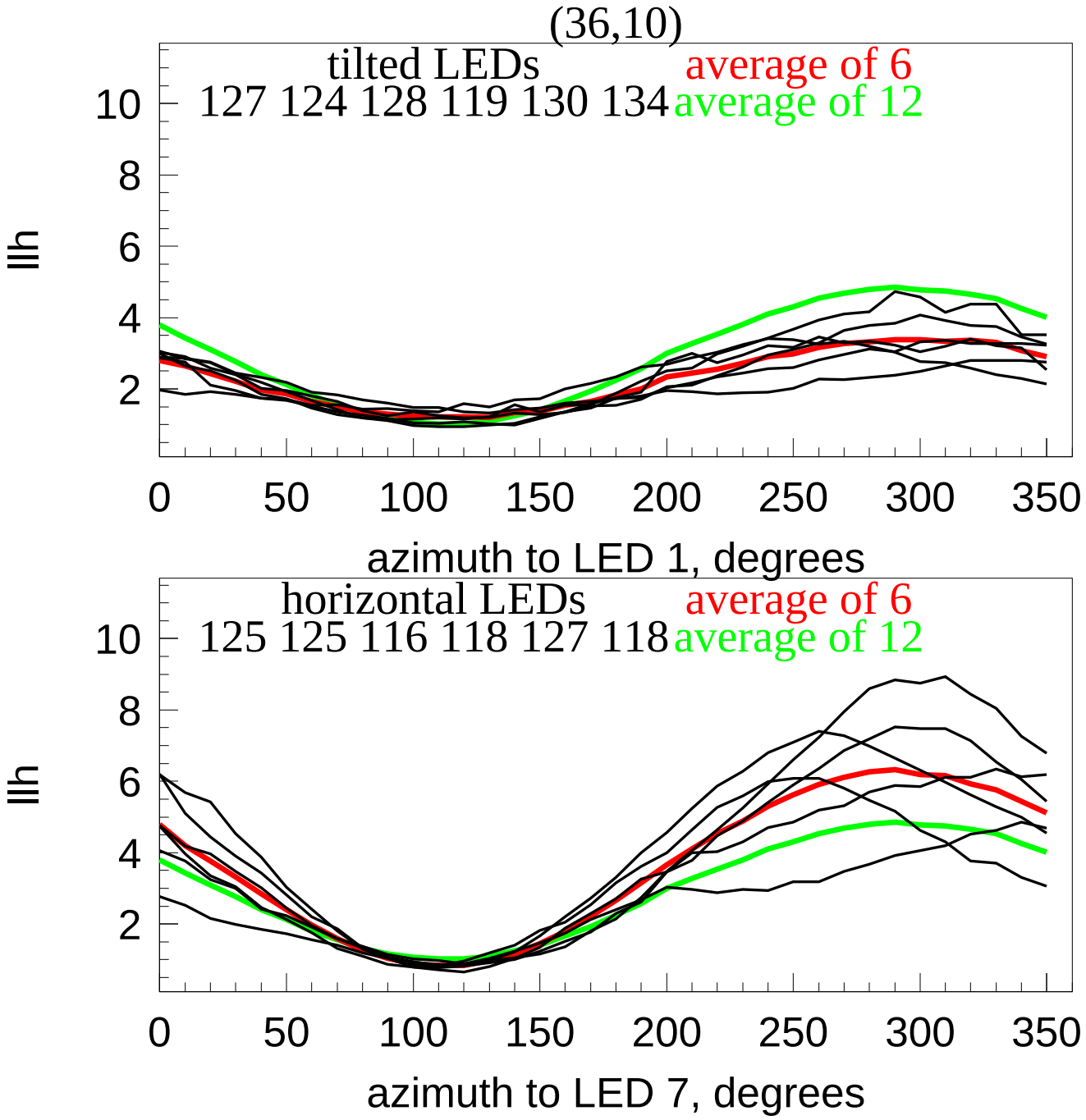

(36,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
276.6 ± 14.3

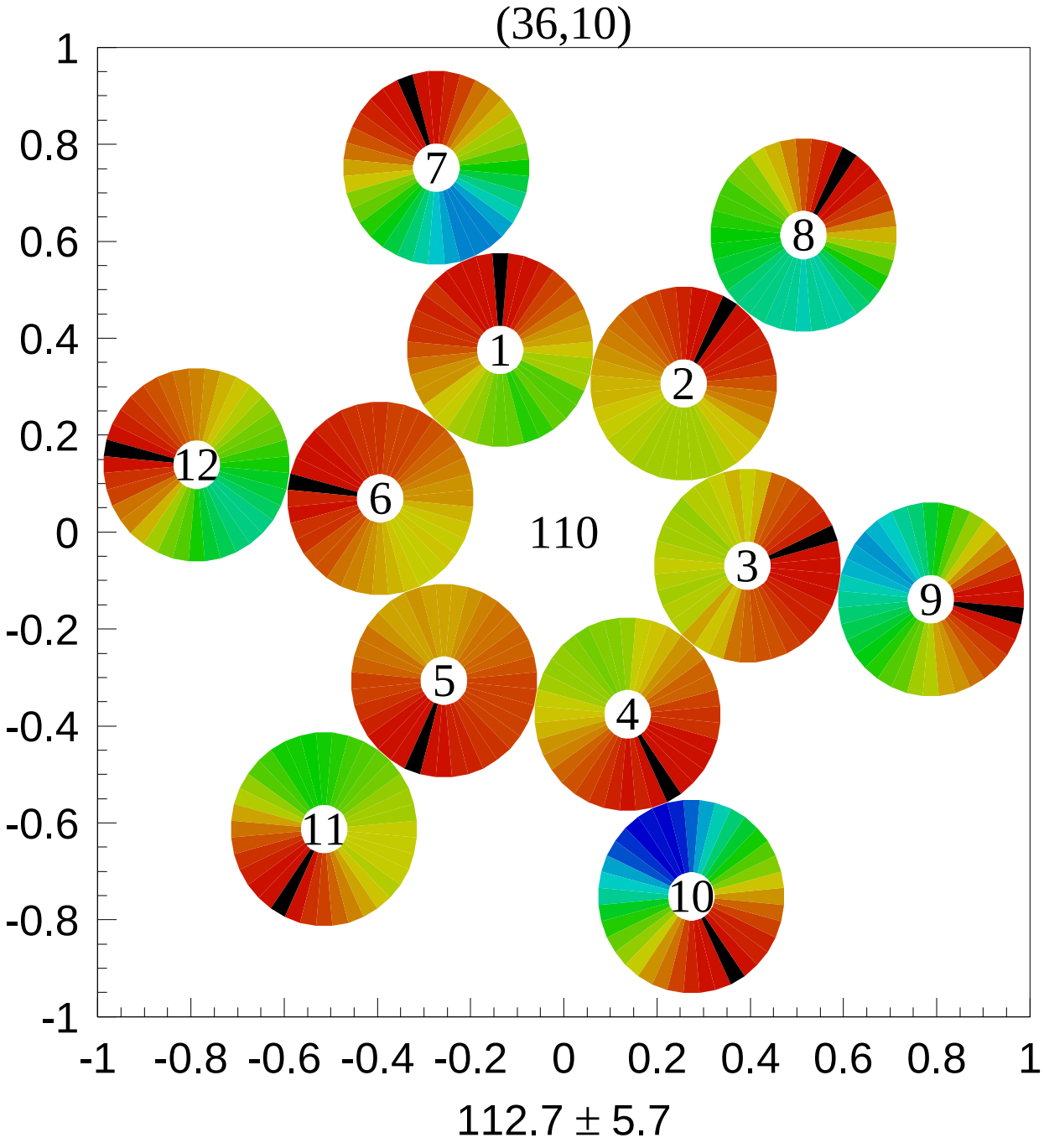

(36,8)
tilted LEDs
125 120 127 121 127 125
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 116 113 120 124 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

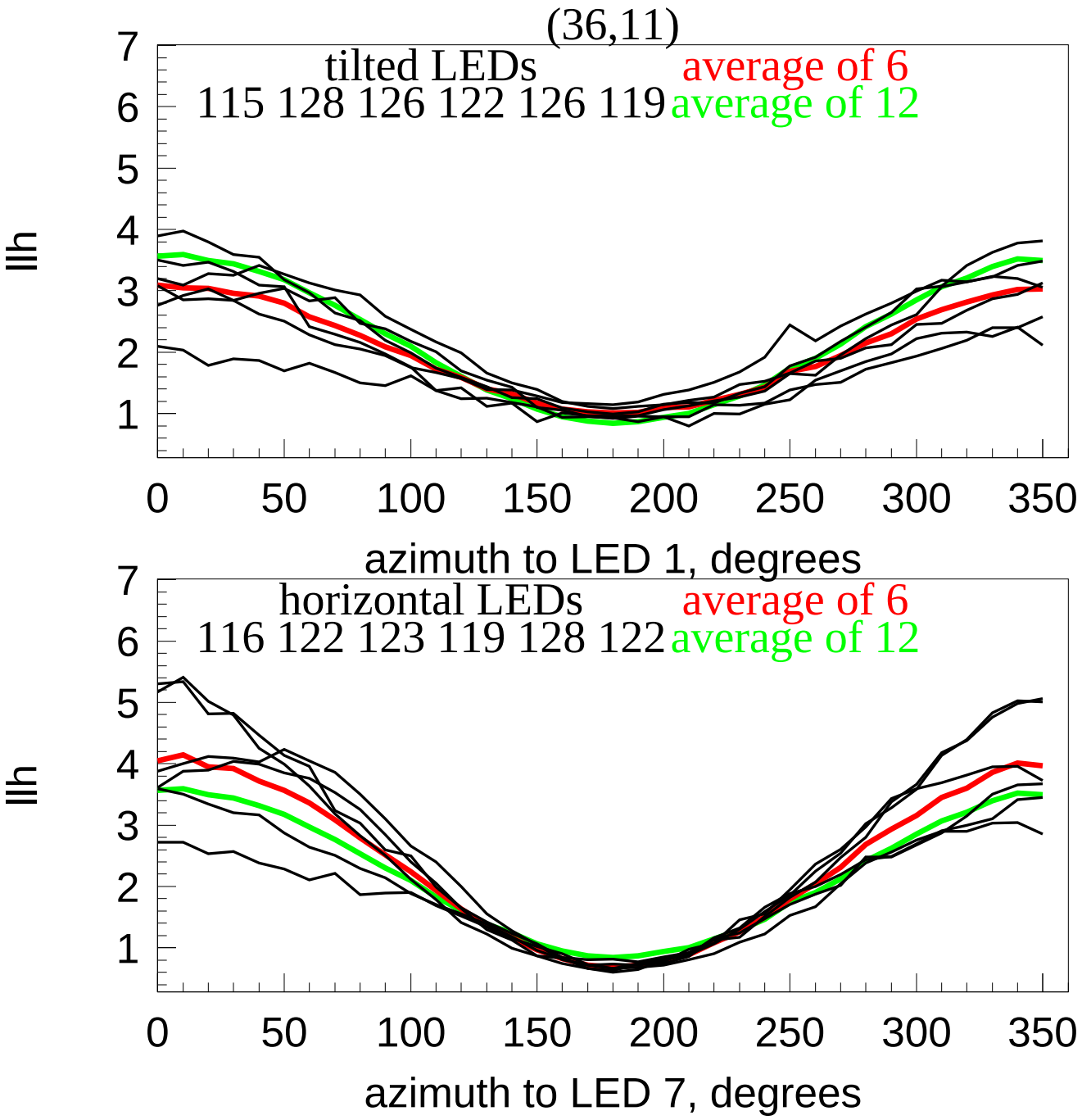

(36,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
180 ± 15.3
190
1
2
3
4
5
6
7
8
9
10
11
12

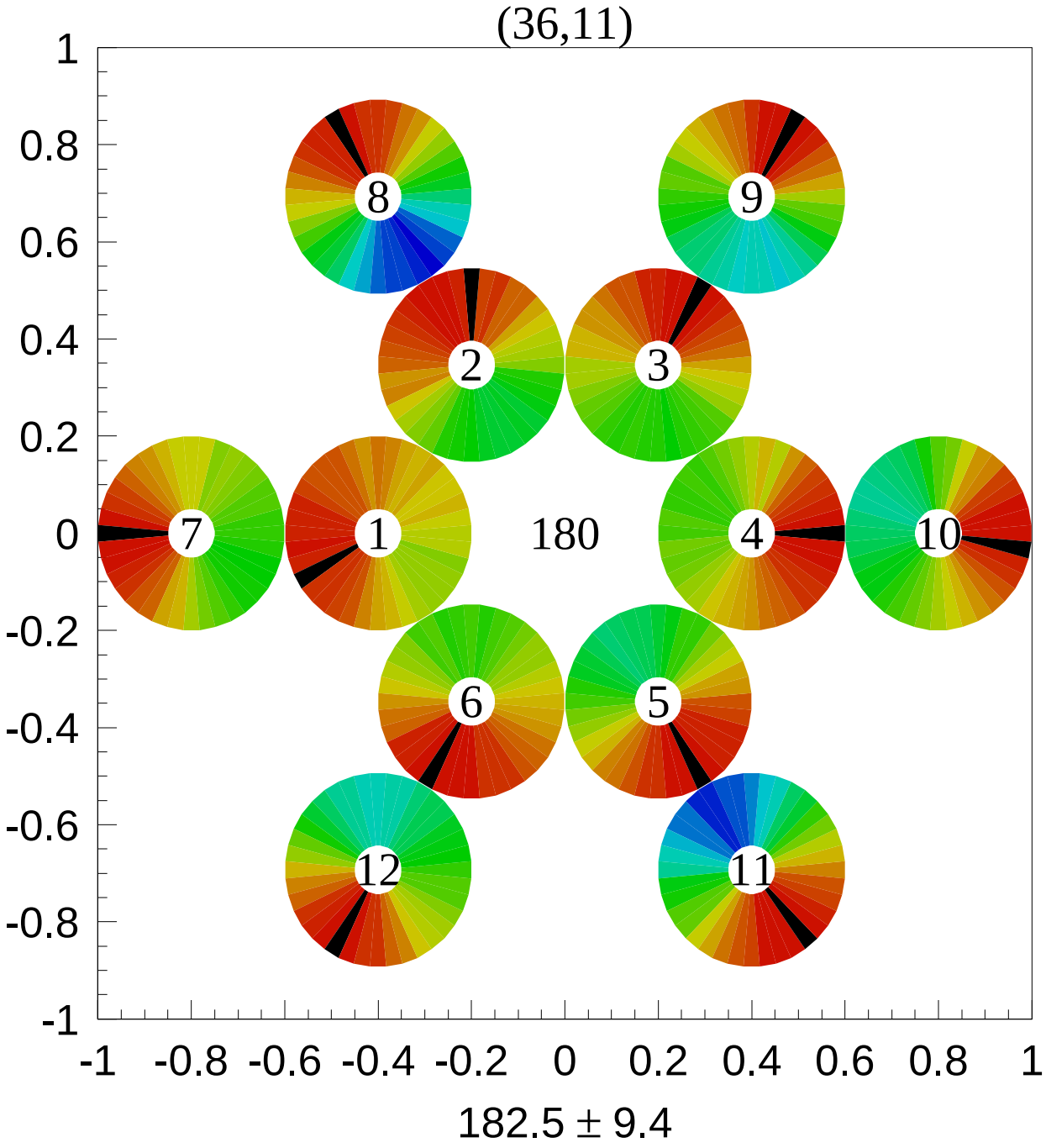

(36,9)
tilted LEDs
124 123 118 126 124 120
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
111 122 124 122 125 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

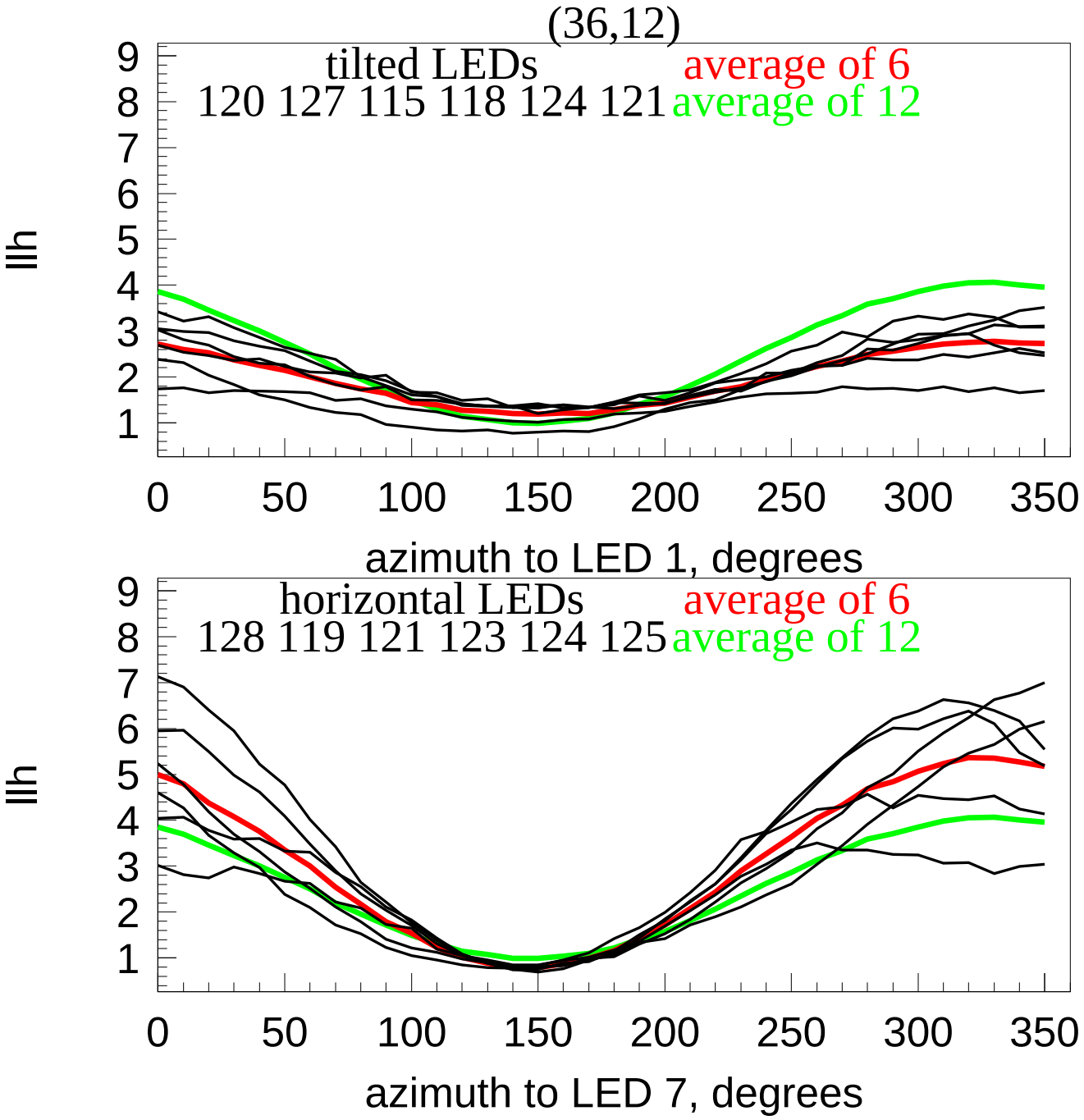

(36,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
3
4
9
10
66.3 ± 14.2

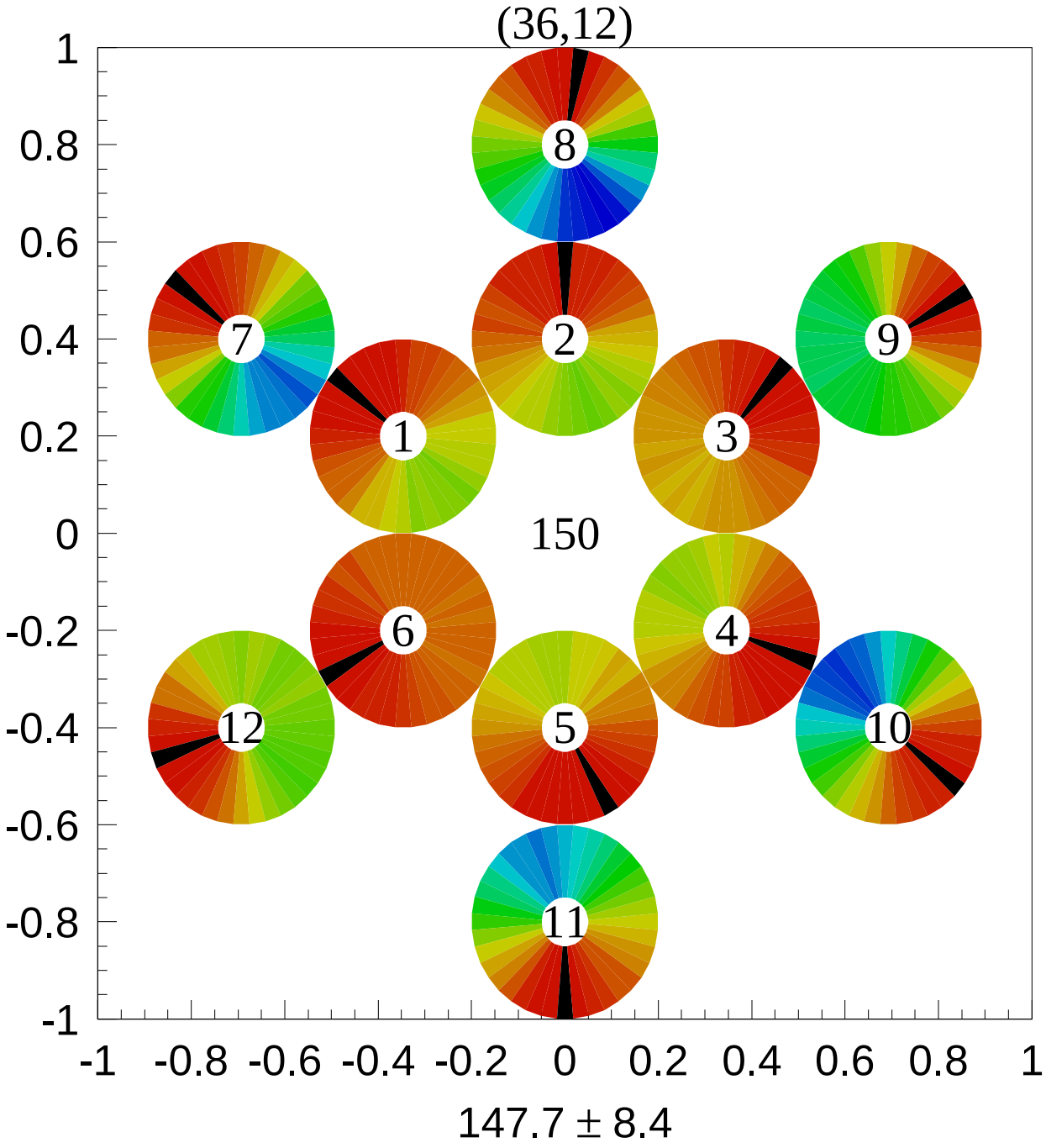

(36,10)
tilted LEDs
127 124 128 119 130 134
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 125 116 118 127 118
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

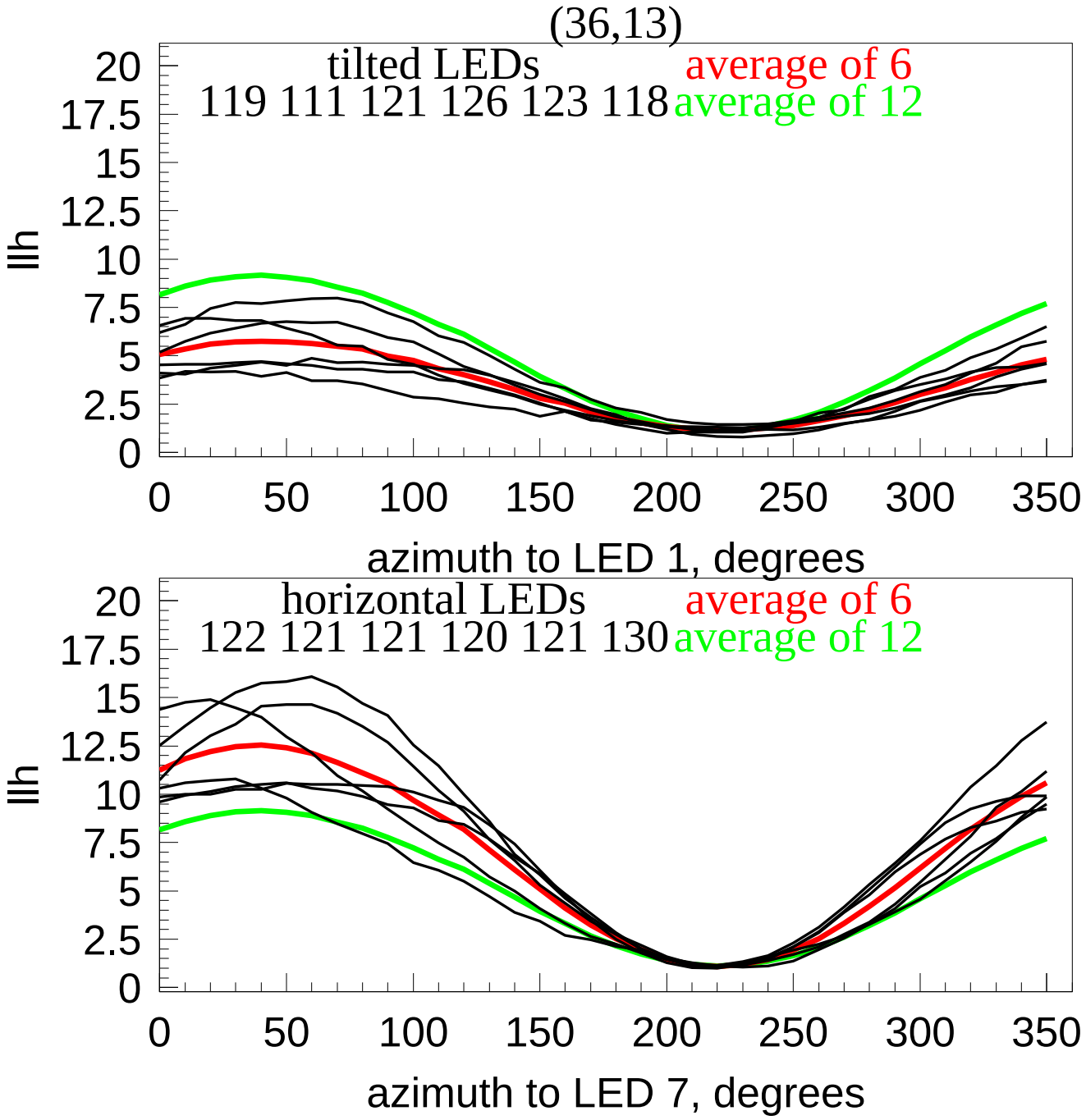

(36,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112.7 ± 5.7

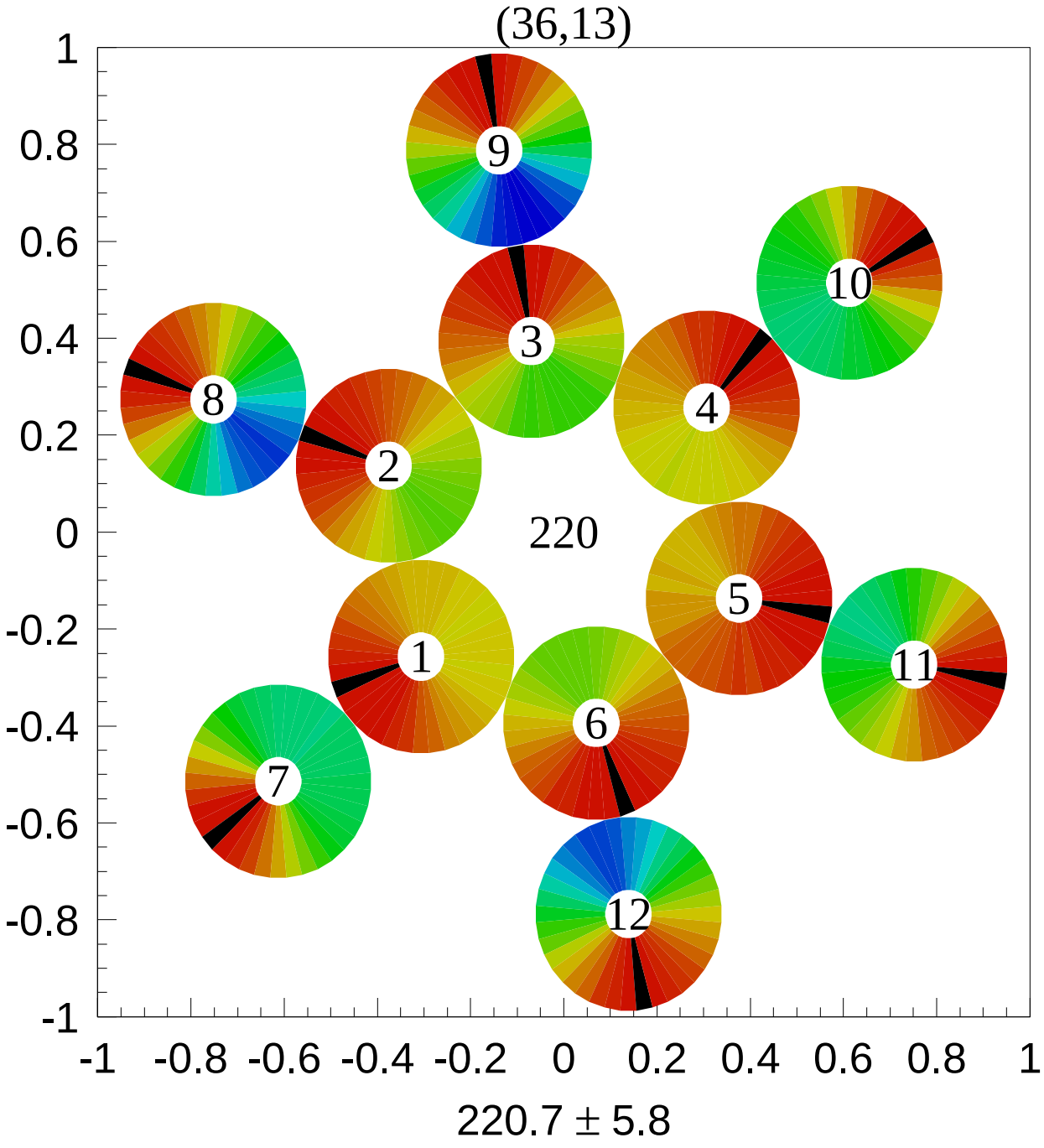

(36,11)
tilted LEDs
115 128 126 122 126 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 122 123 119 128 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

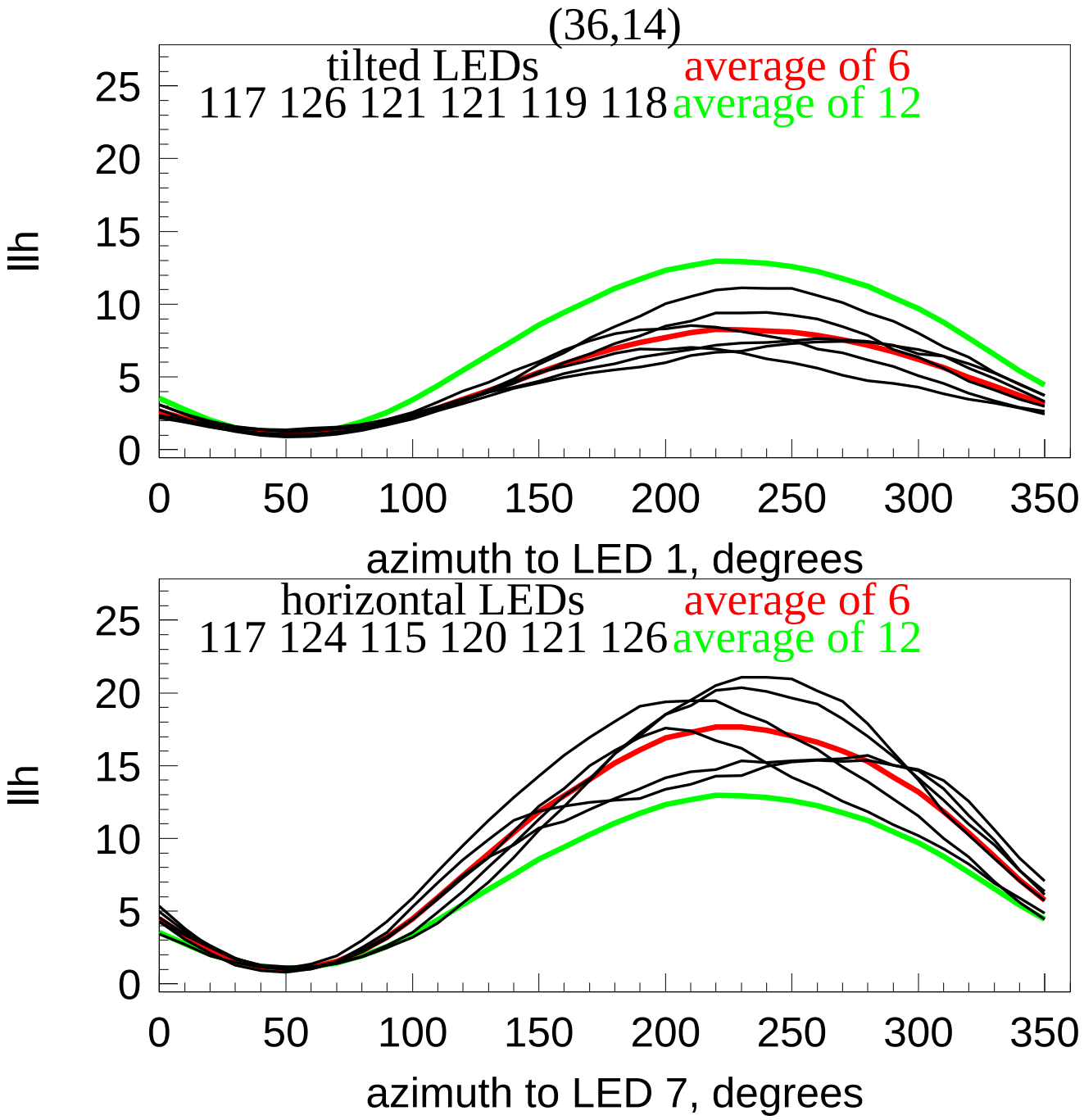

(36,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
182.5 ± 9.4
8
9
2
3
7
1
180
4
10
6
5
12
11

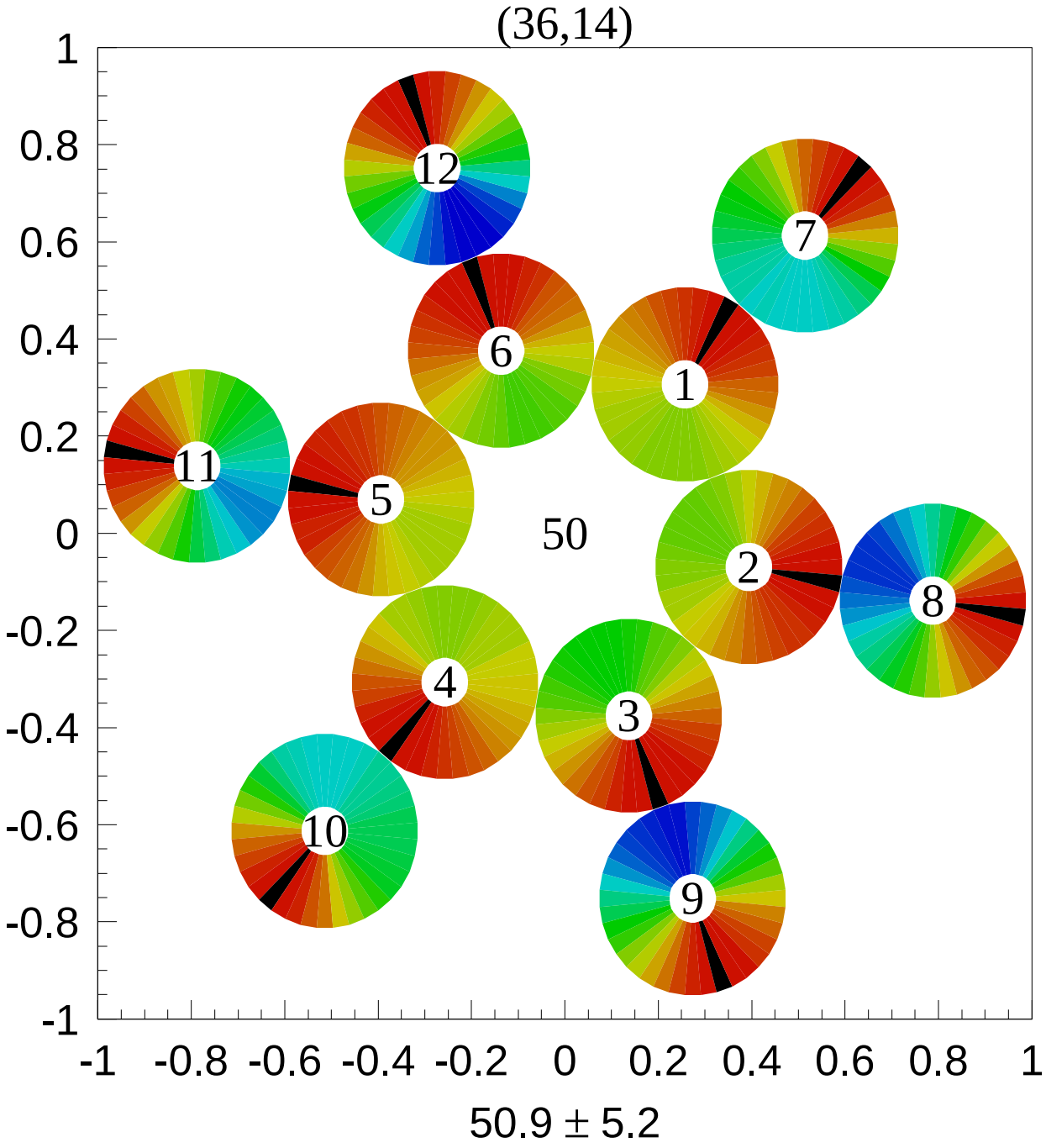

(36,12)
tilted LEDs
120 127 115 118 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 119 121 123 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

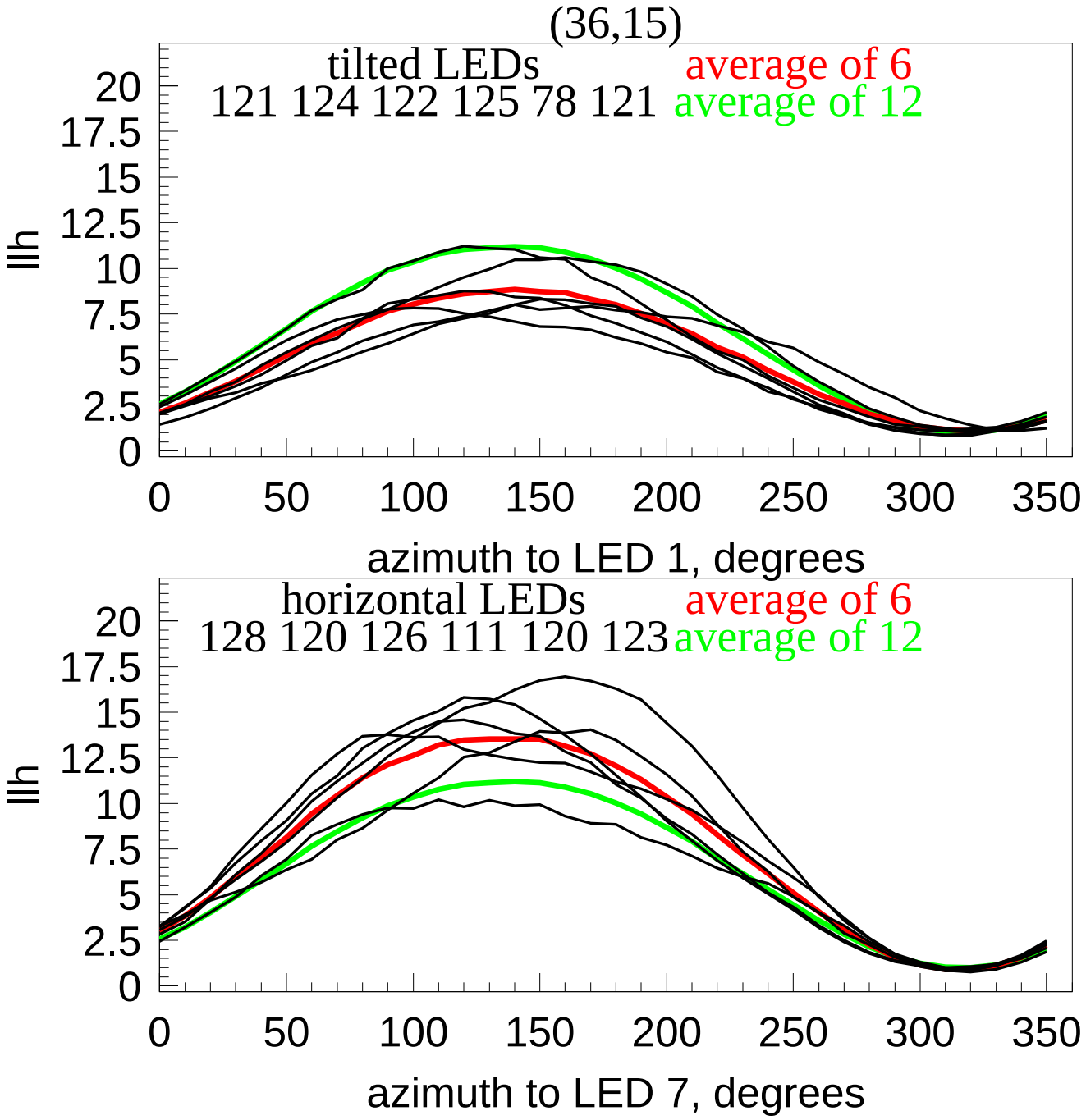

(36,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
147.7 ± 8.4

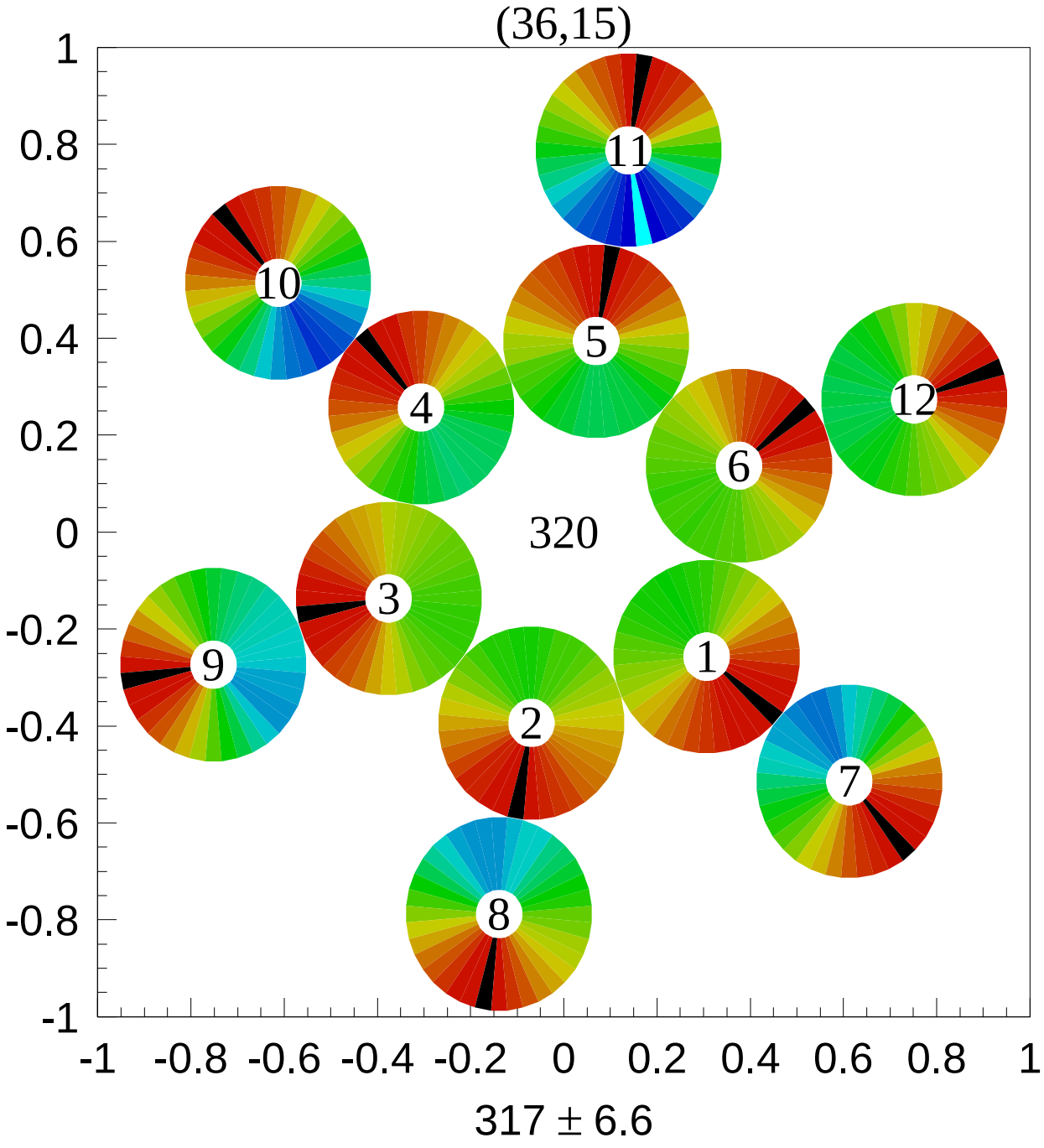

(36,13)
tilted LEDs
119 111 121 126 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 121 120 121 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

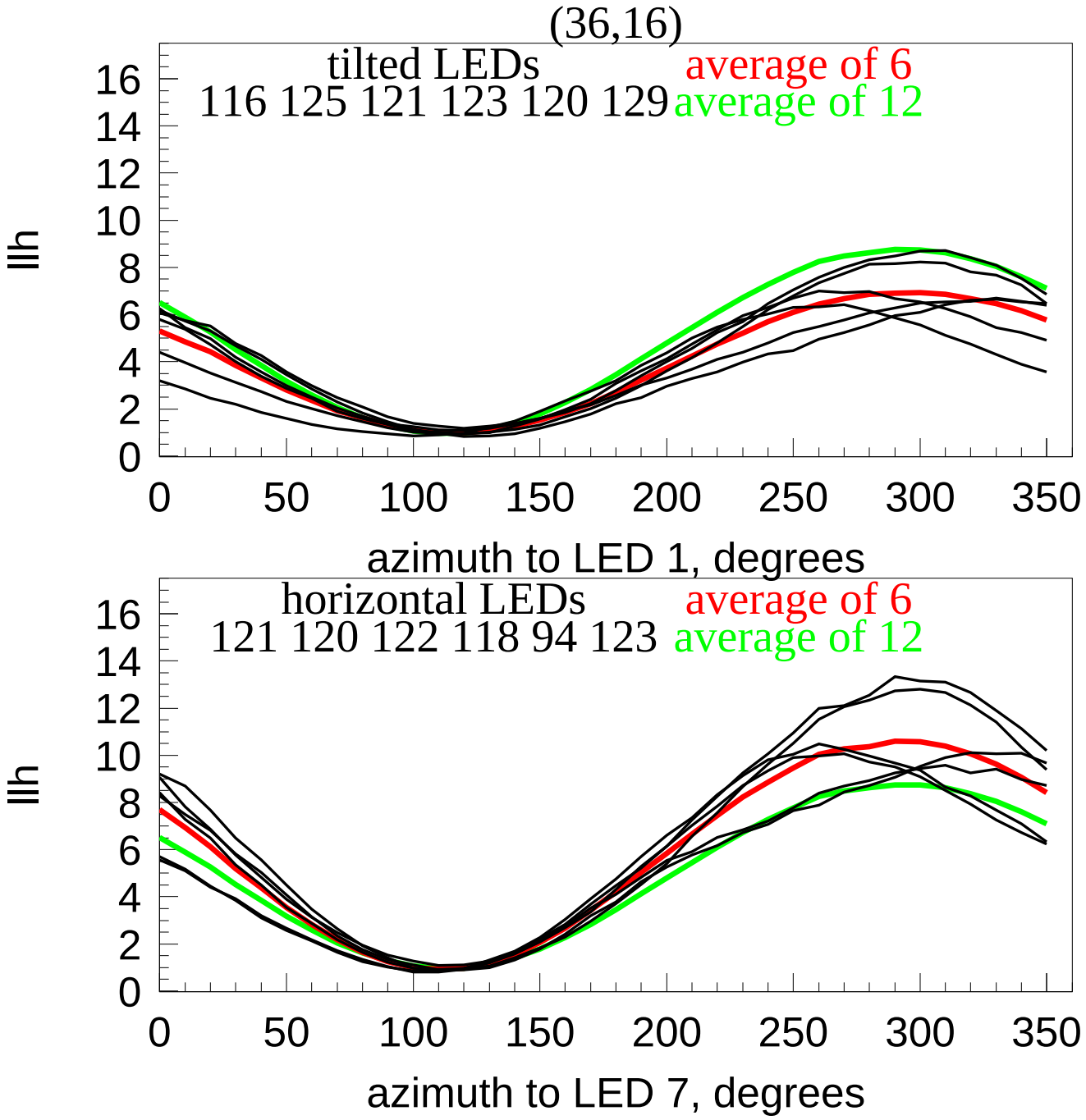

(36,13)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
220.7 ± 5.8

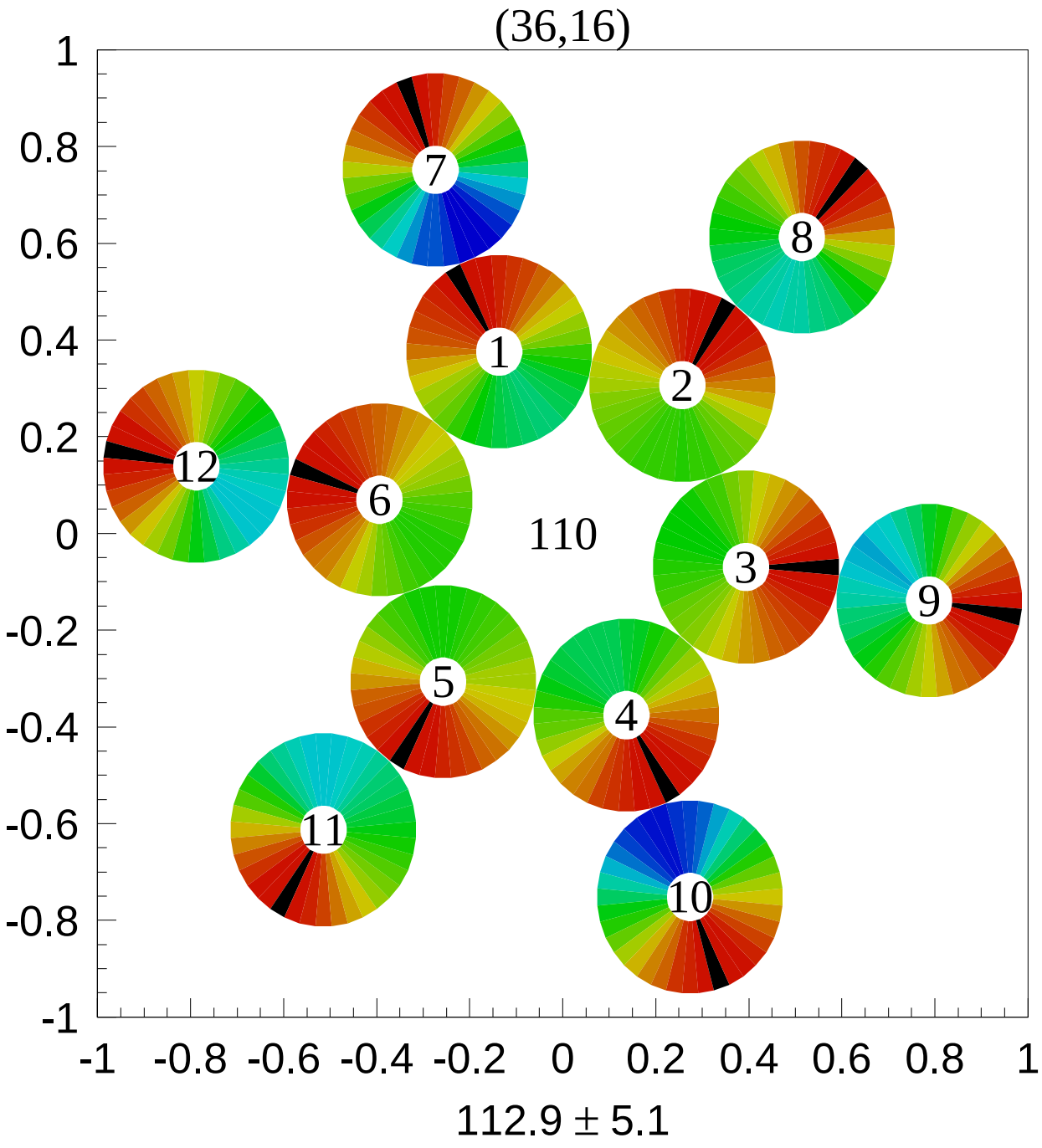

(36,14)
tilted LEDs
117 126 121 121 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 124 115 120 121 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

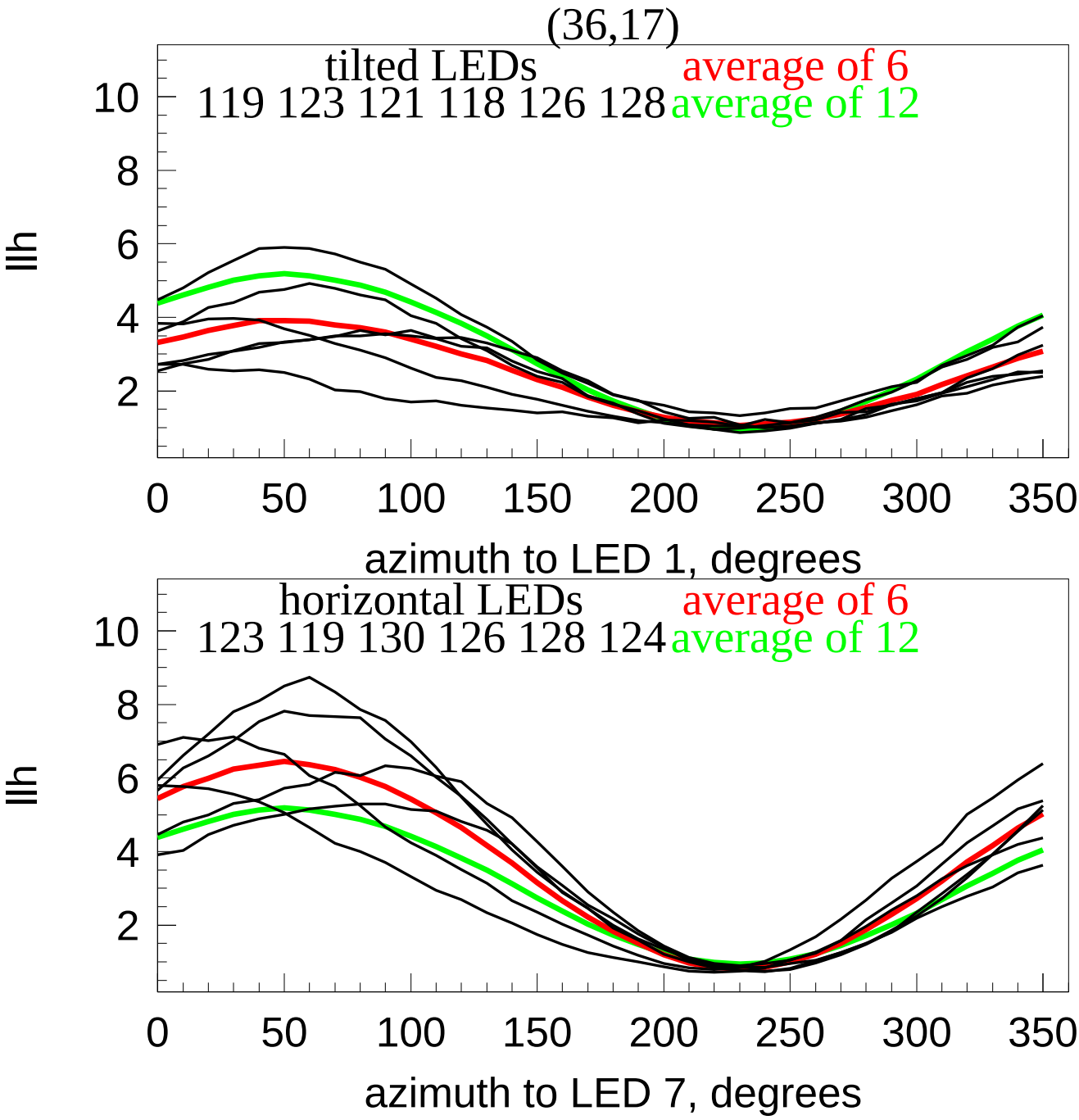

(36,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
50.9 ± 5.2

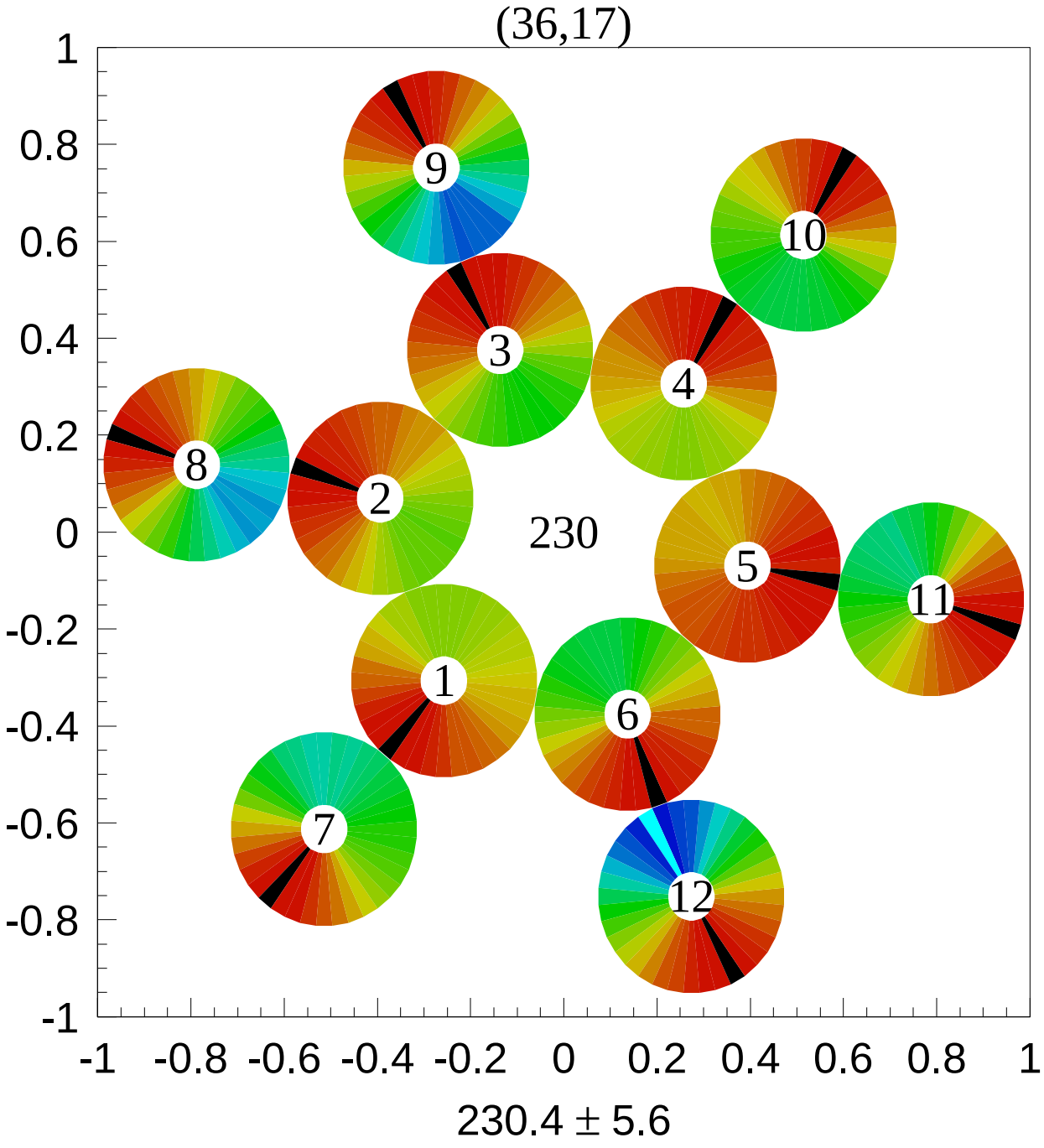

(36,15)
tilted LEDs
121 124 122 125 78 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 120 126 111 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

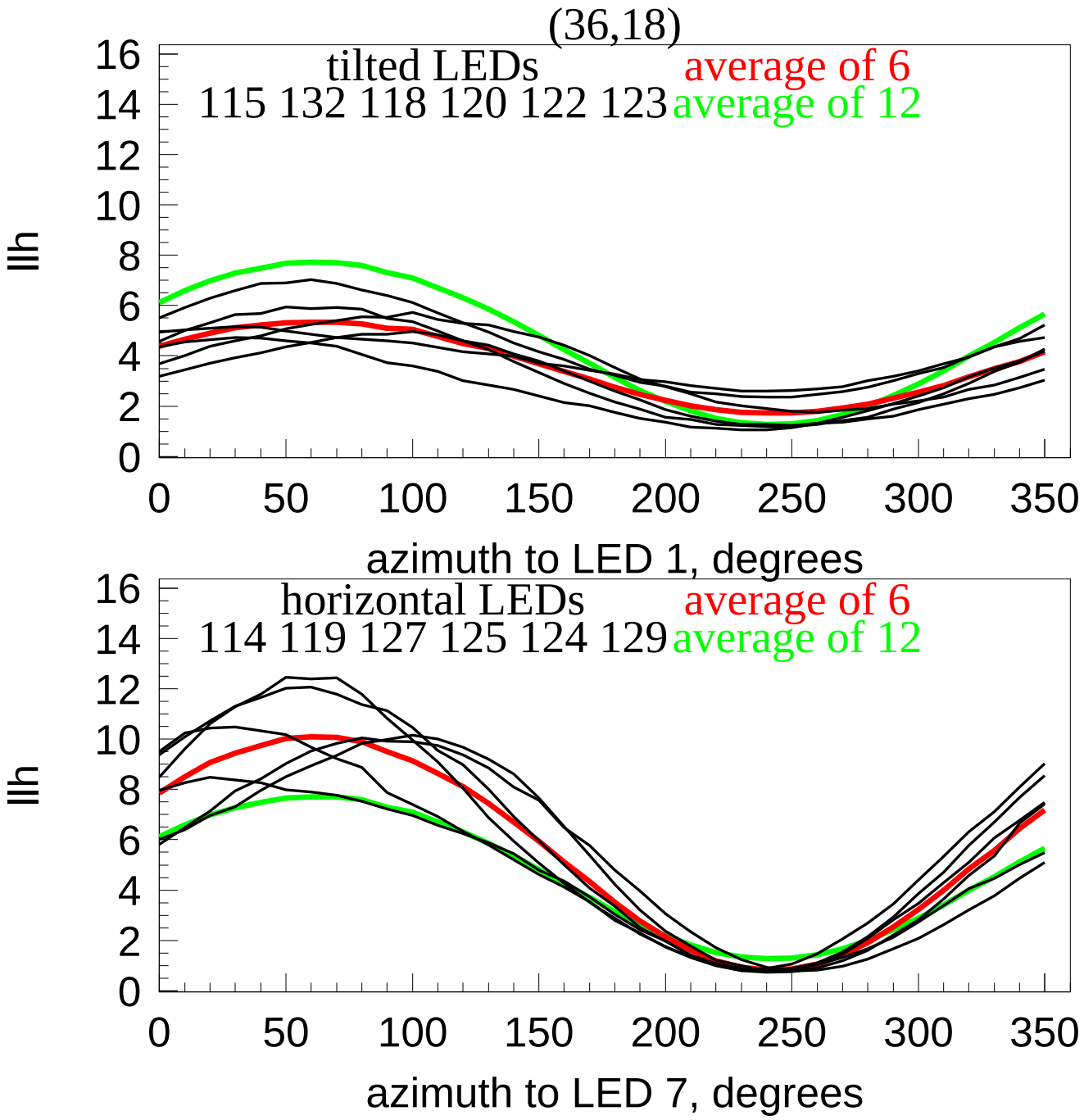

(36,15)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
317 ± 6.6

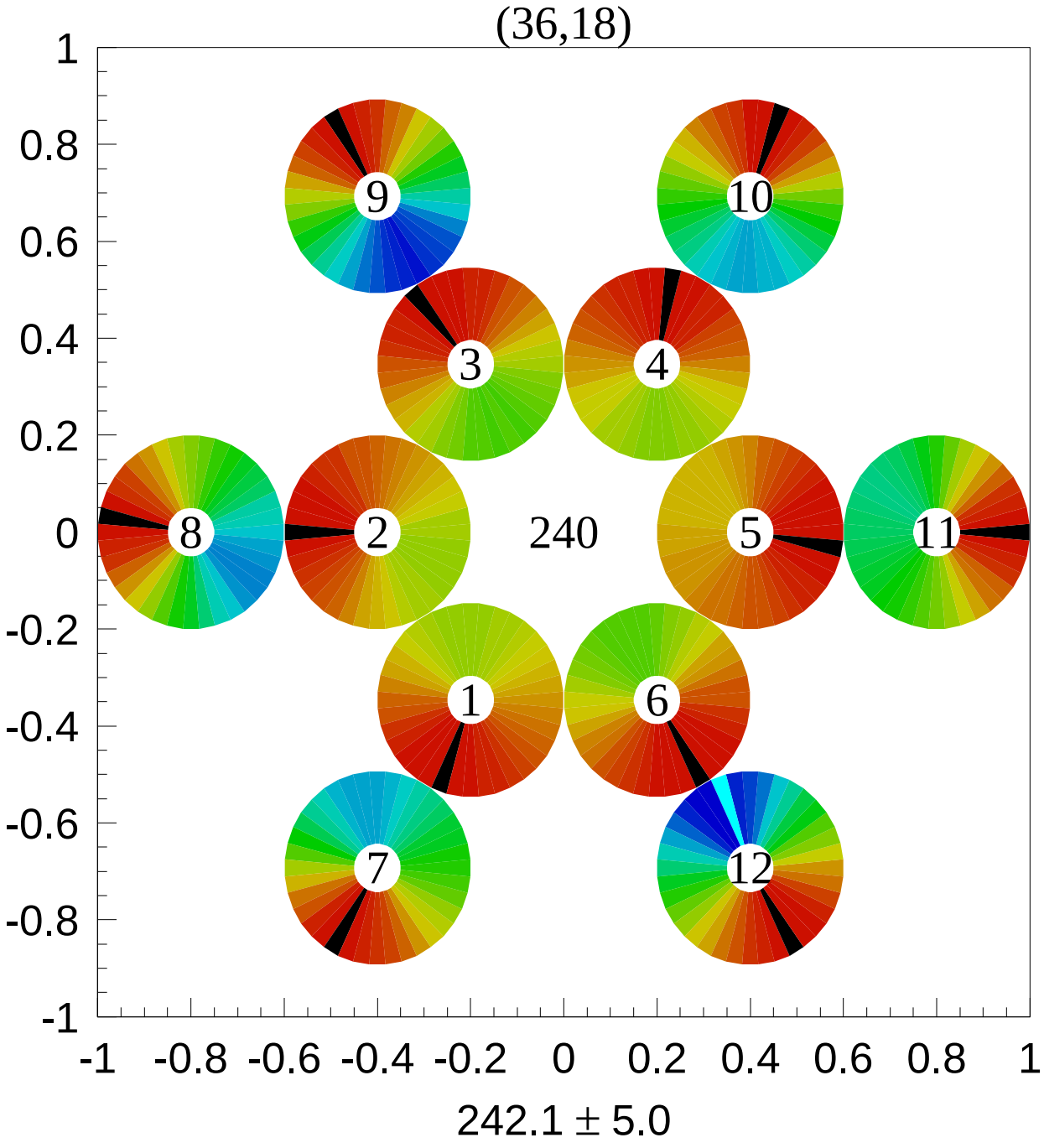

(36,16)
tilted LEDs
116 125 121 123 120 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 122 118 94 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

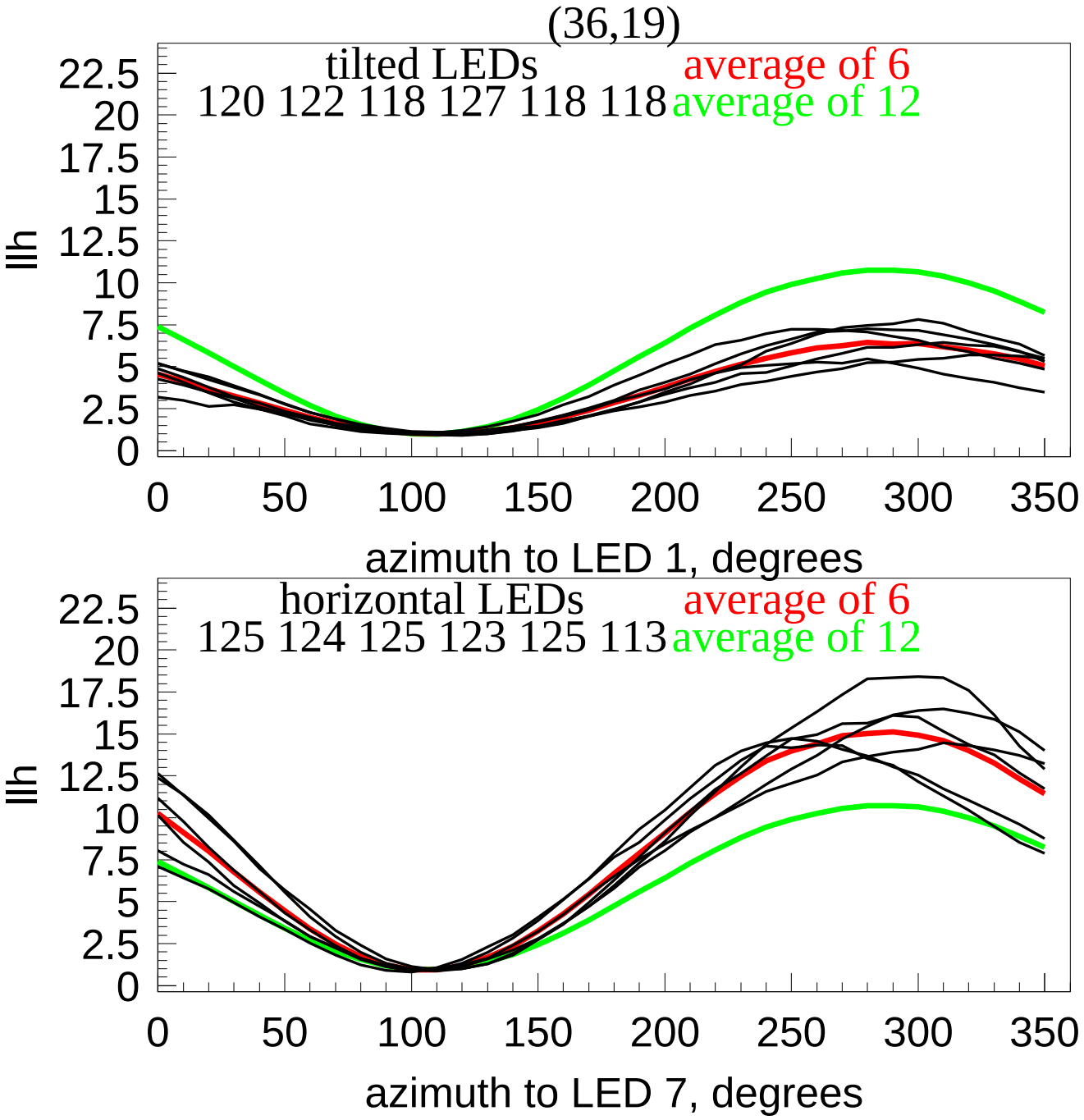

(36,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112.9 ± 5.1

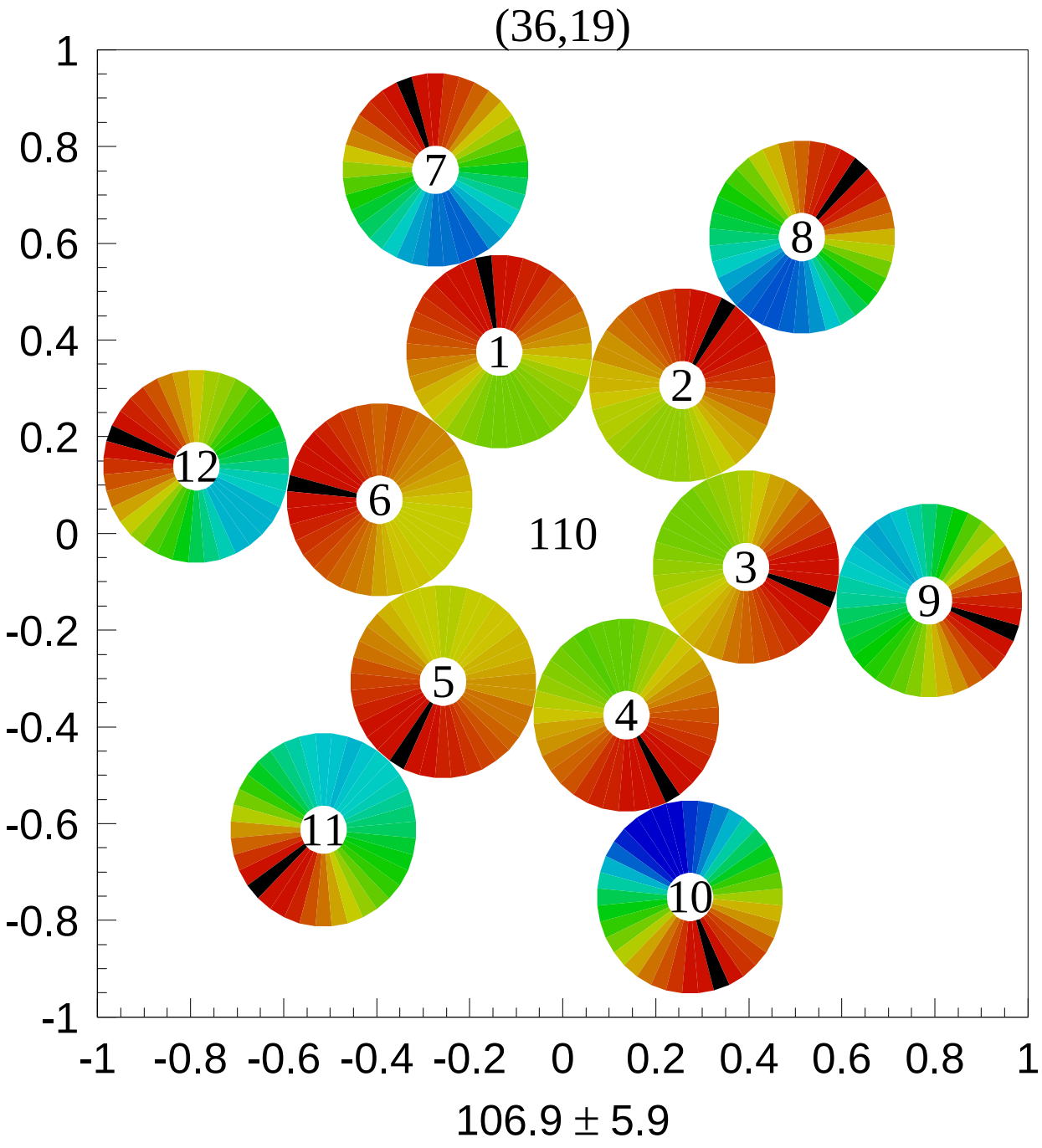

(36,17)
tilted LEDs
119 123 121 118 126 128
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 119 130 126 128 124
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

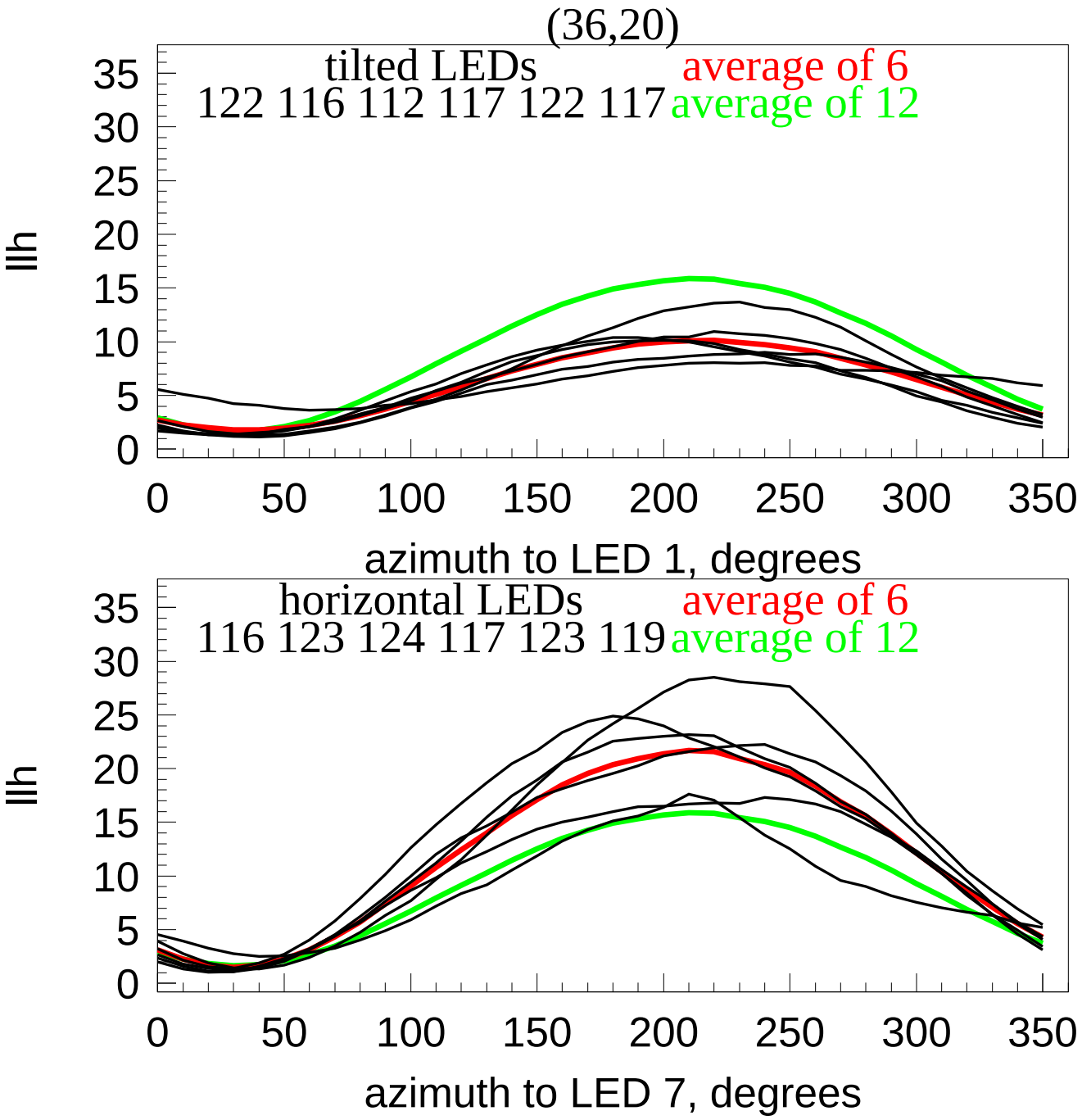

(36,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
230.4 ± 5.6

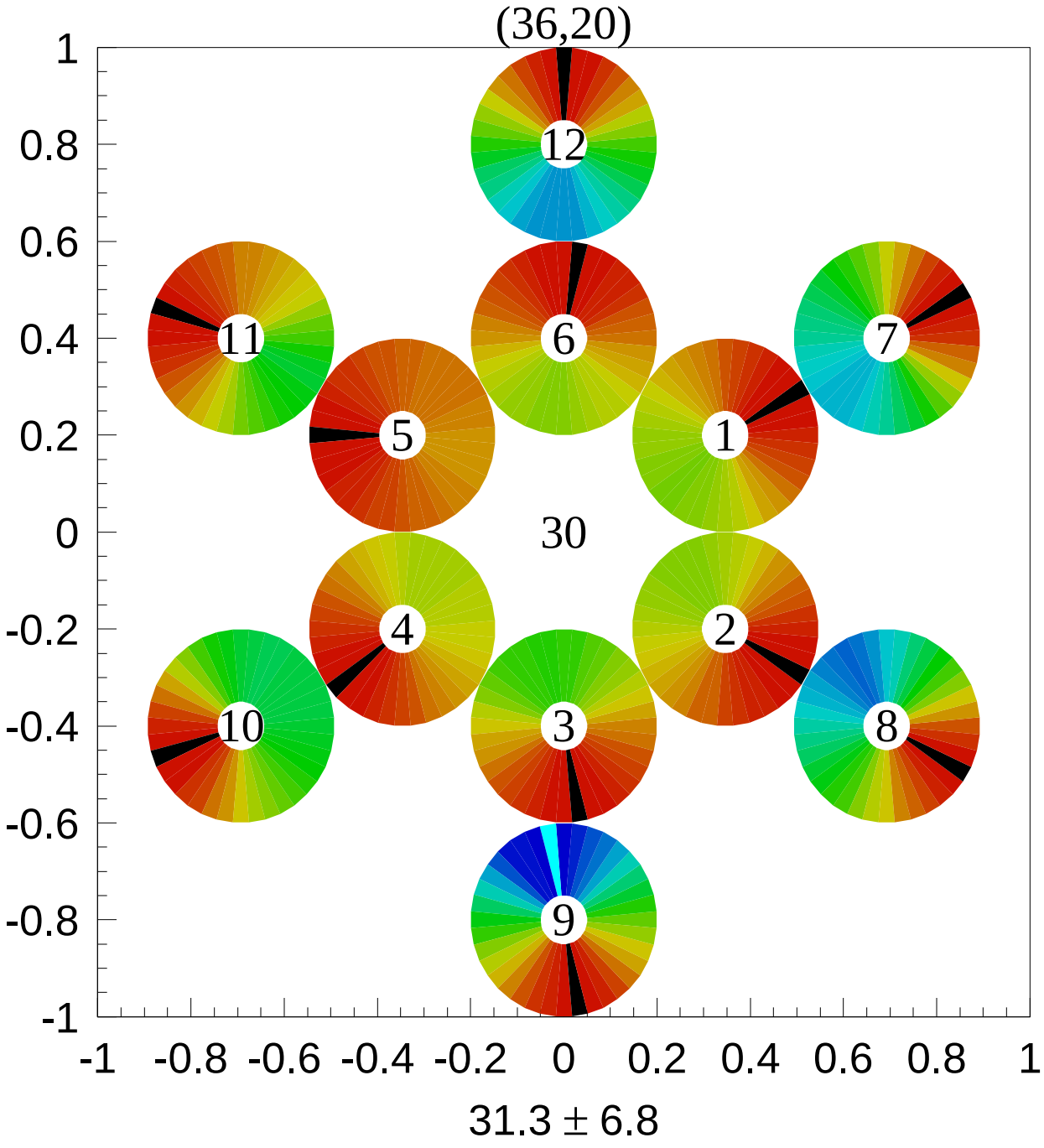

(36,18)
tilted LEDs
115 132 118 120 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 119 127 125 124 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

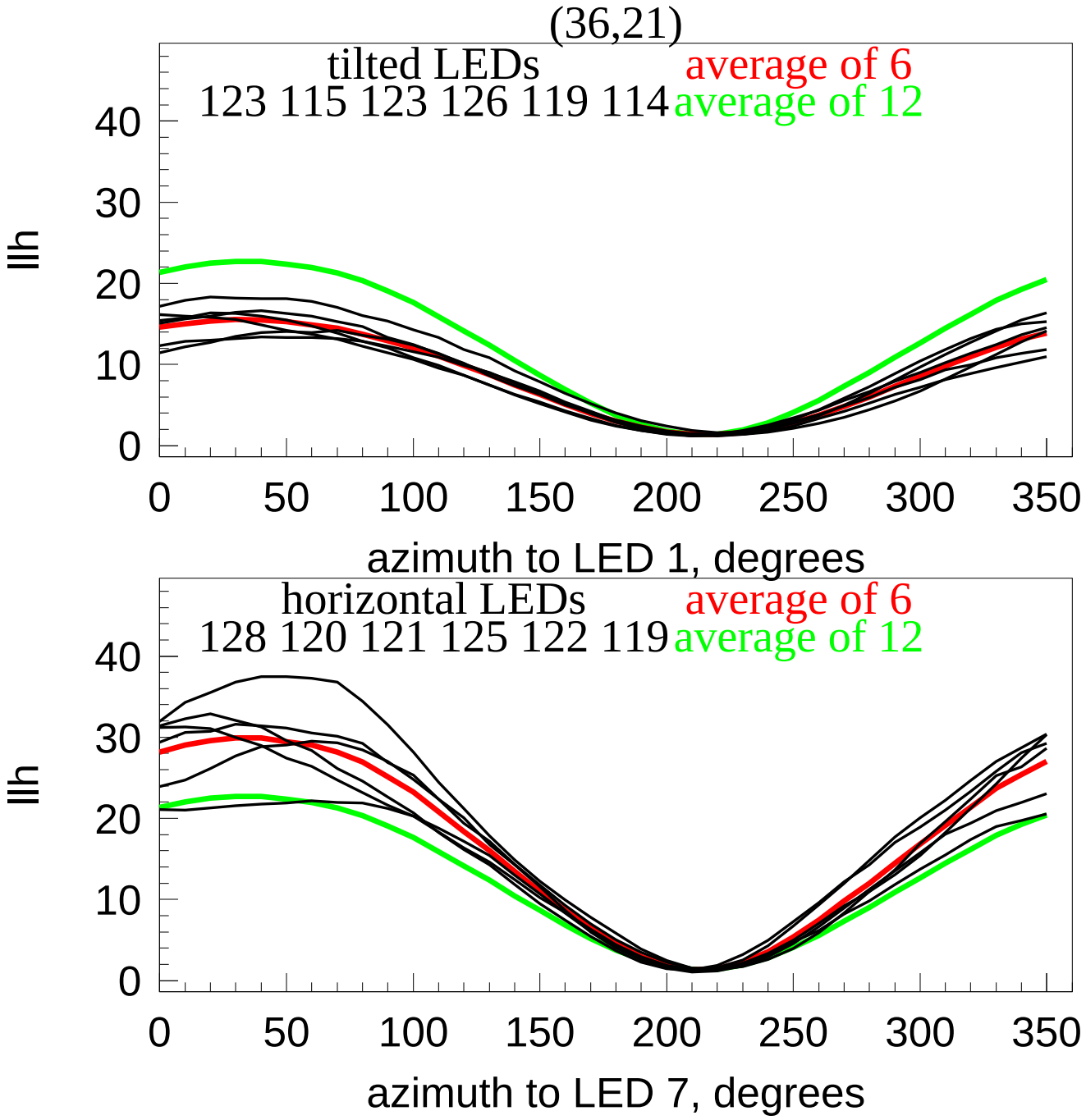

(36,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242.1 ± 5.0

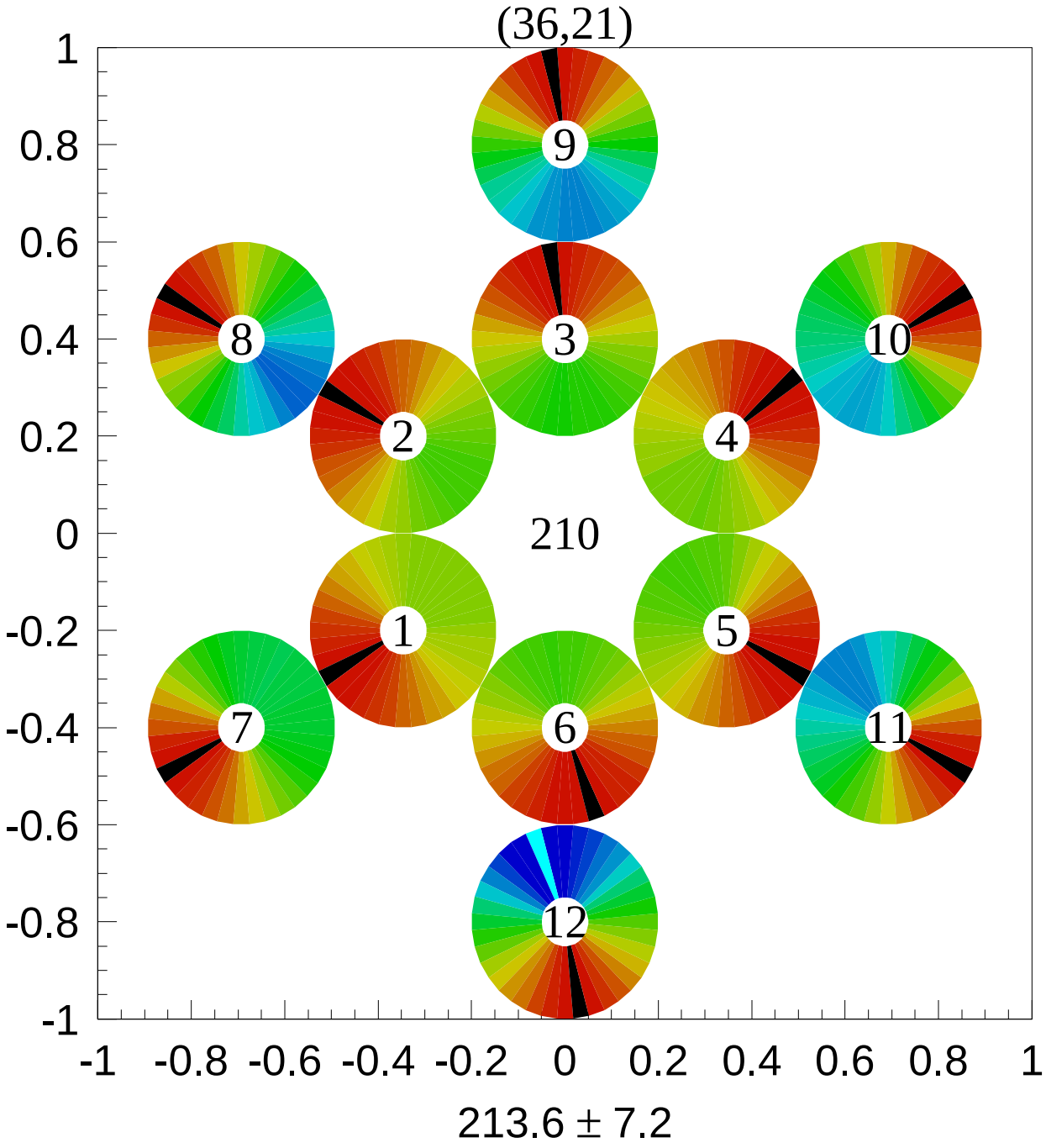

(36,19)
tilted LEDs
120 122 118 127 118 118
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 124 125 123 125 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

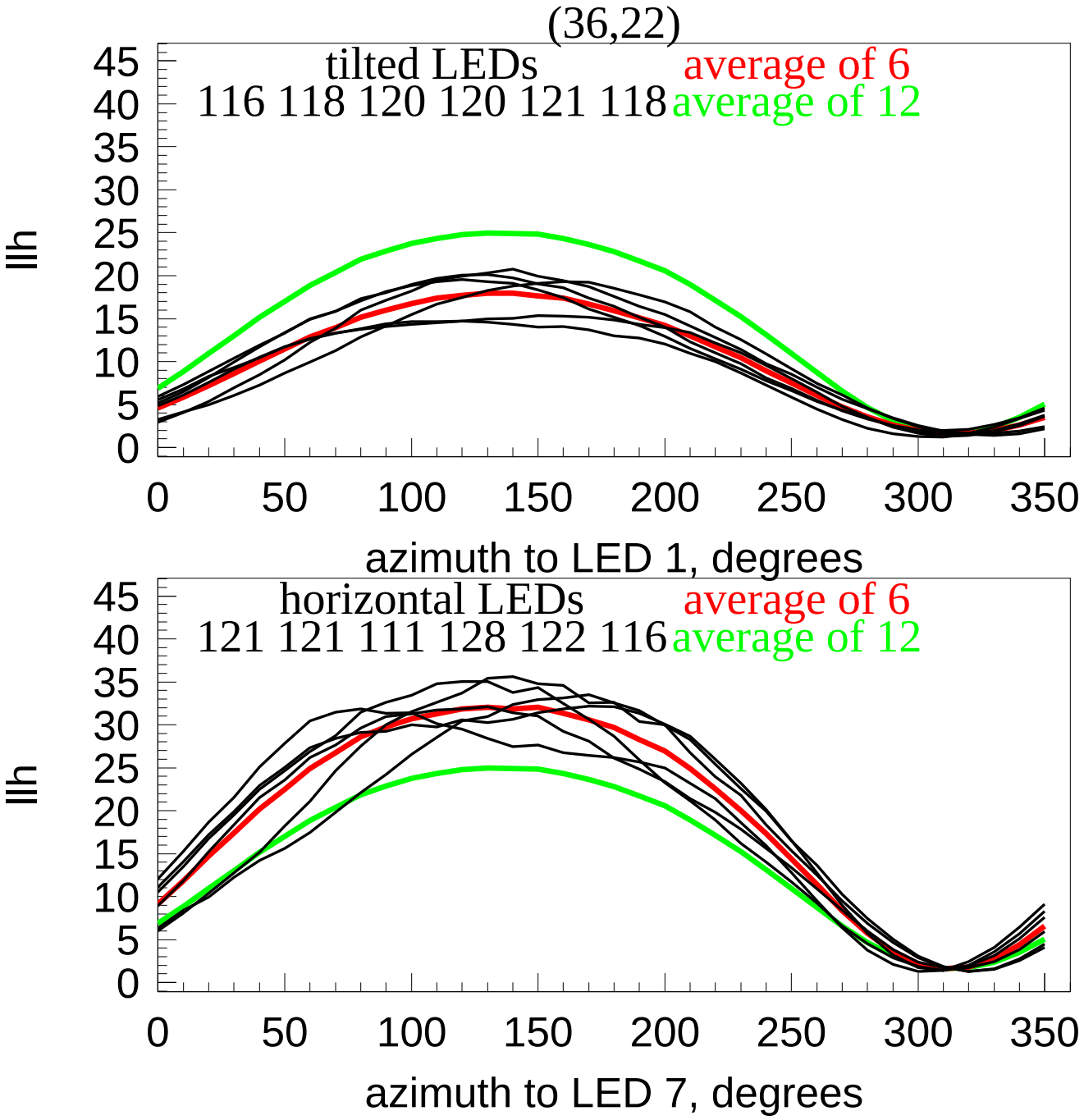

(36,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
106.9 ± 5.9

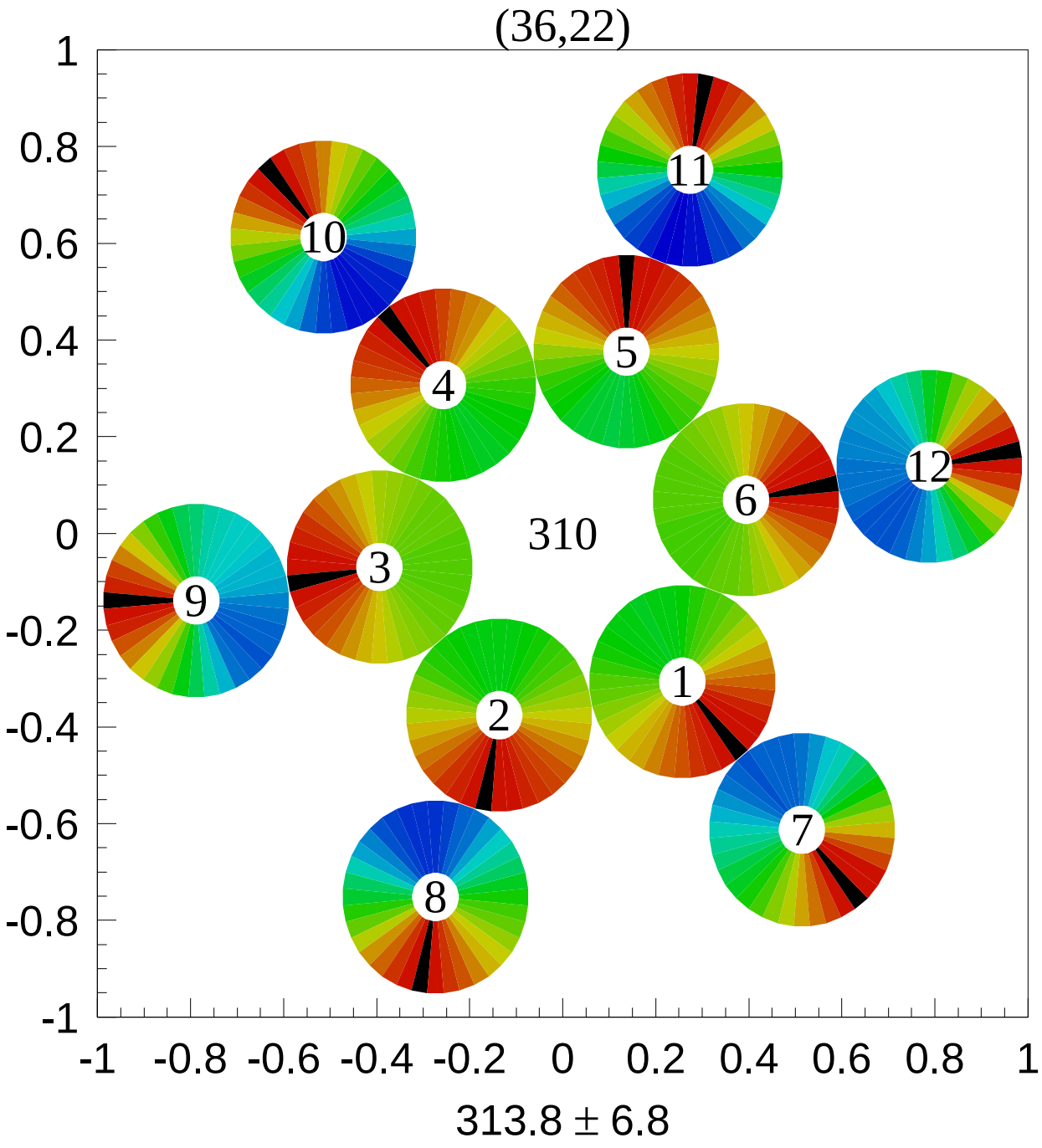

(36,20)
tilted LEDs
122 116 112 117 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 123 124 117 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

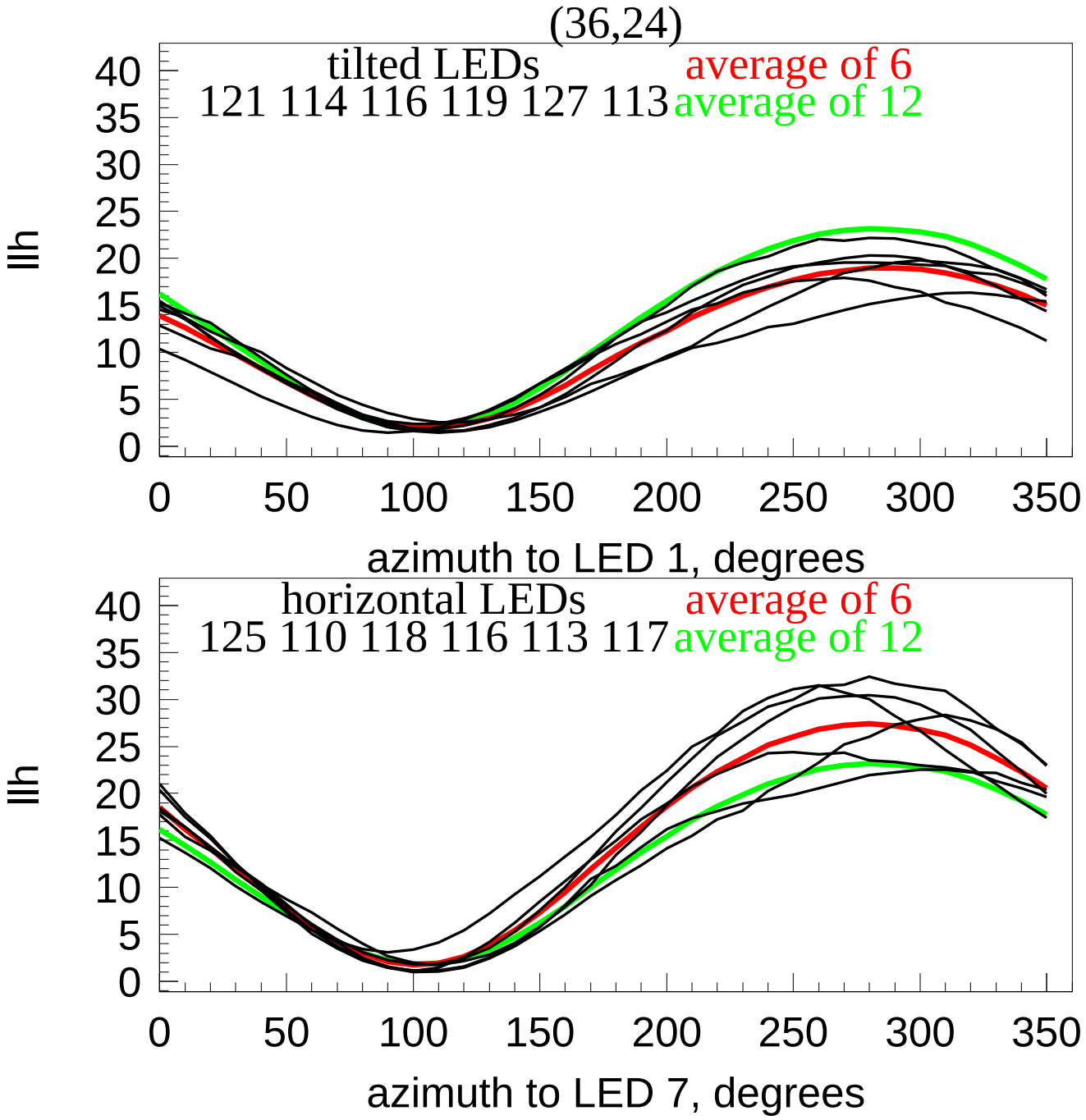

(36,20)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
31.3 ± 6.8

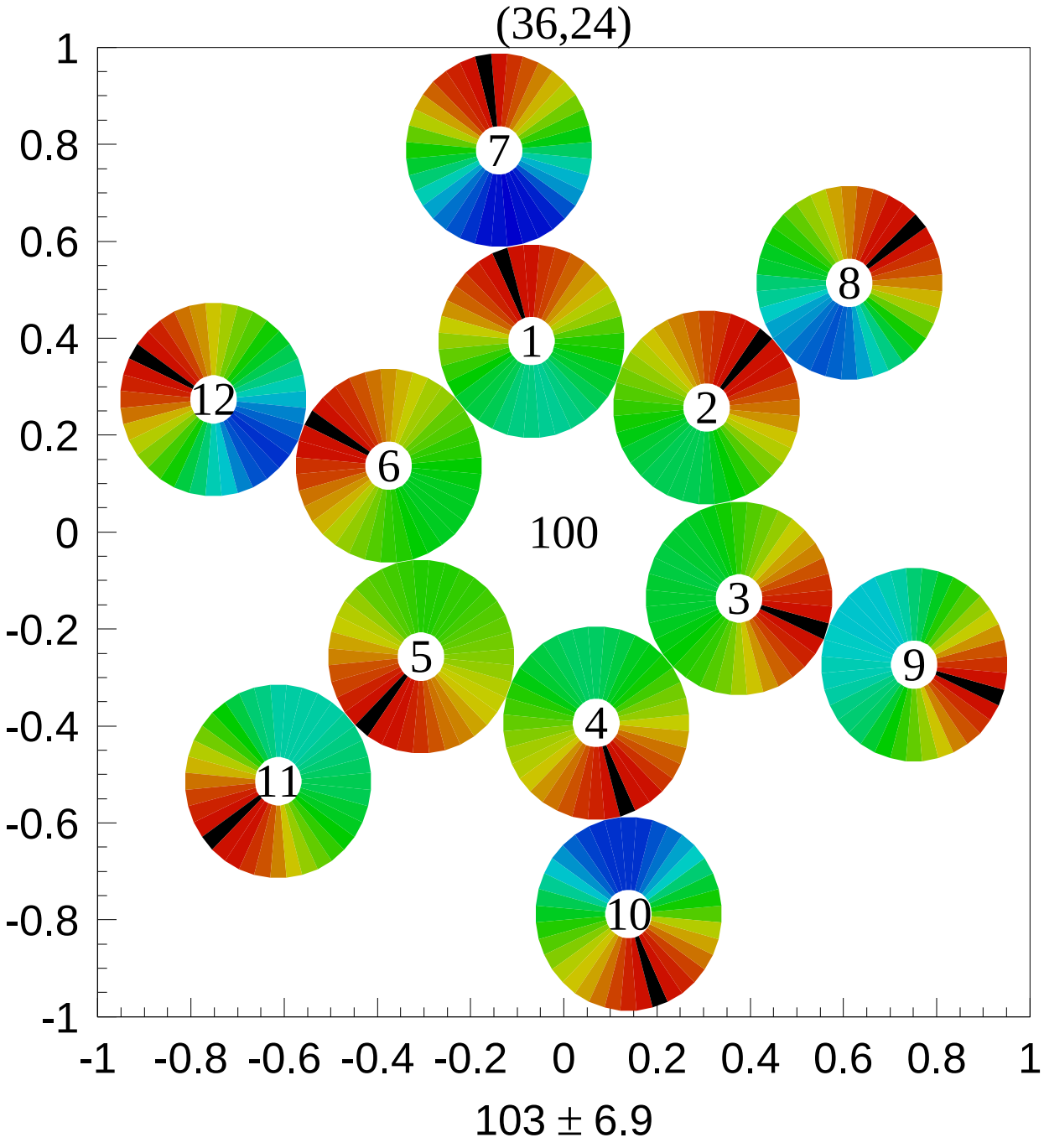

(36,21)
tilted LEDs
123 115 123 126 119 114
average of 6
average of 12
llh
0
10
20
30
40
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 120 121 125 122 119
average of 6
average of 12
llh
0
10
20
30
40
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

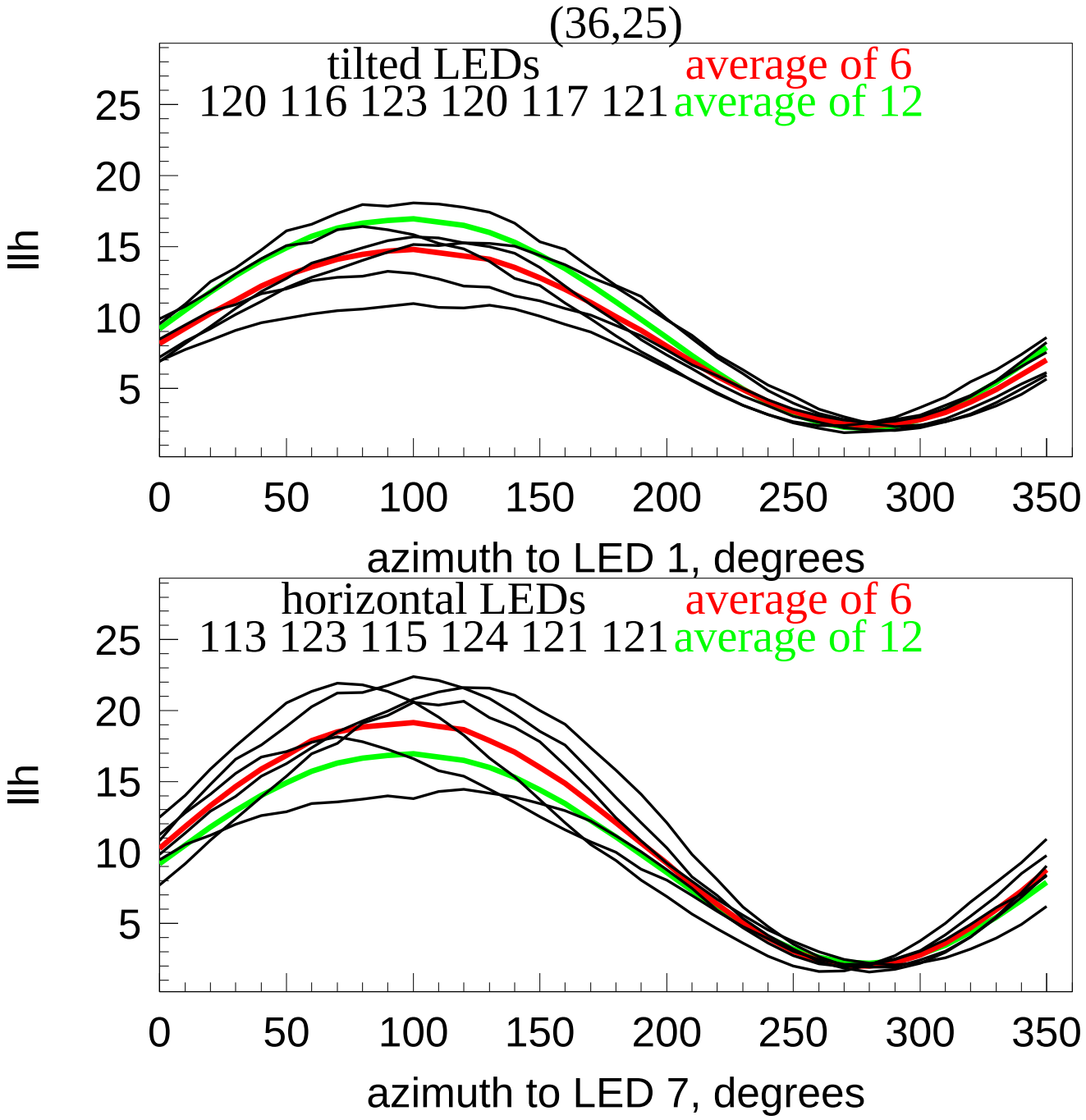

(36,21)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
213.6 ± 7.2

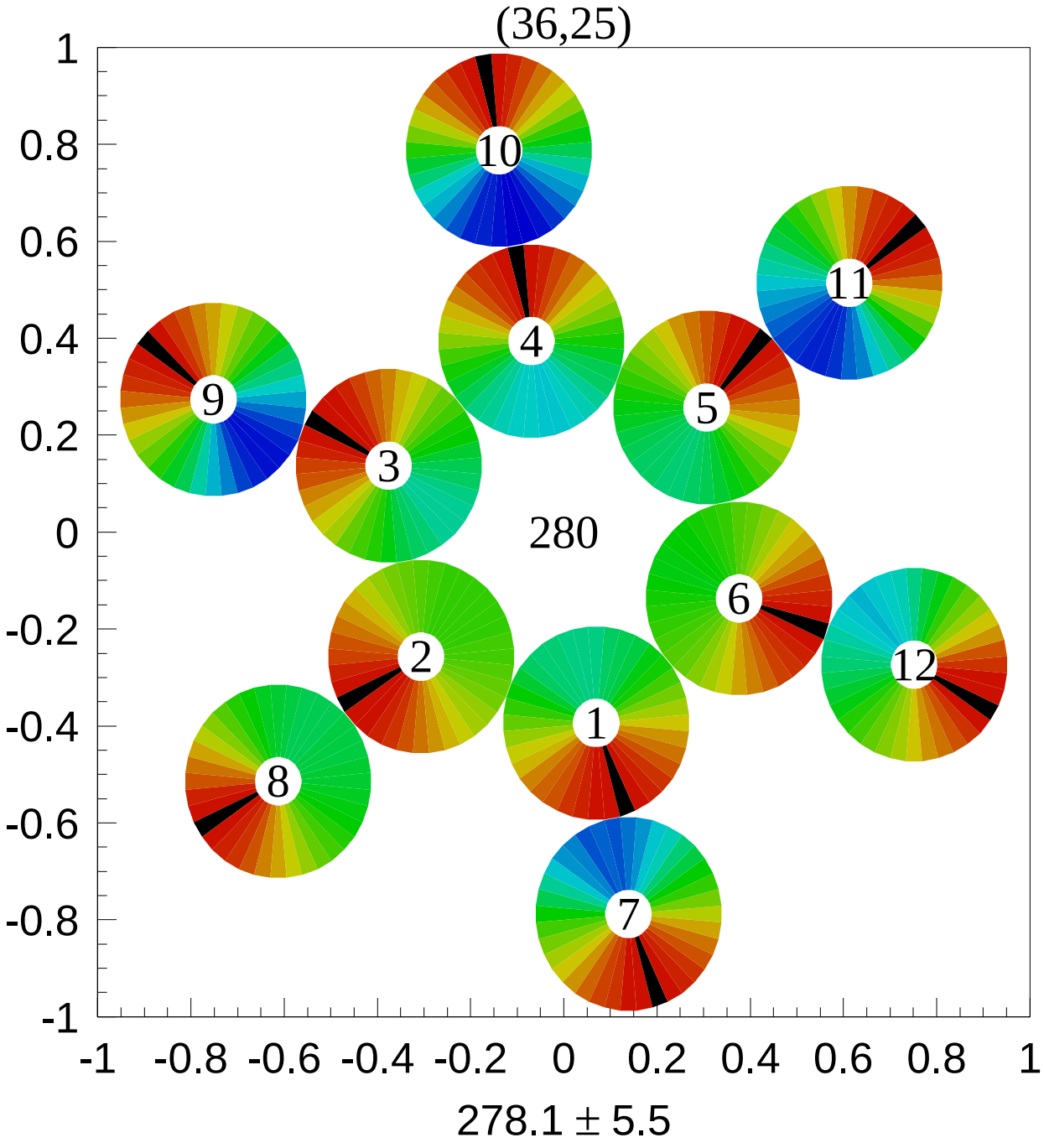

(36,22)
tilted LEDs
116 118 120 120 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 111 128 122 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

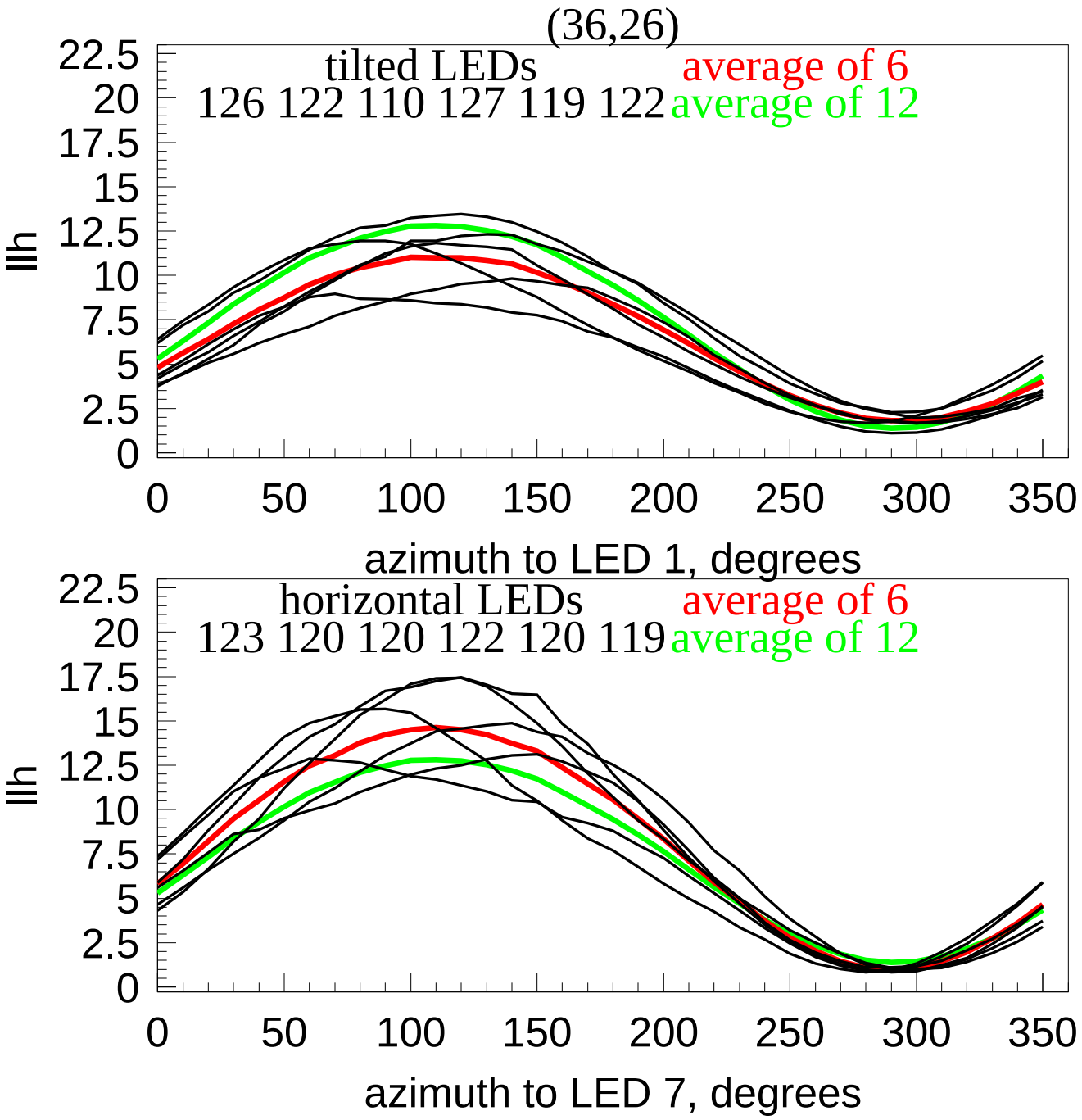

(36,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
313.8 ± 6.8
310
1
2
3
4
5
6
7
8
9
10
11
12

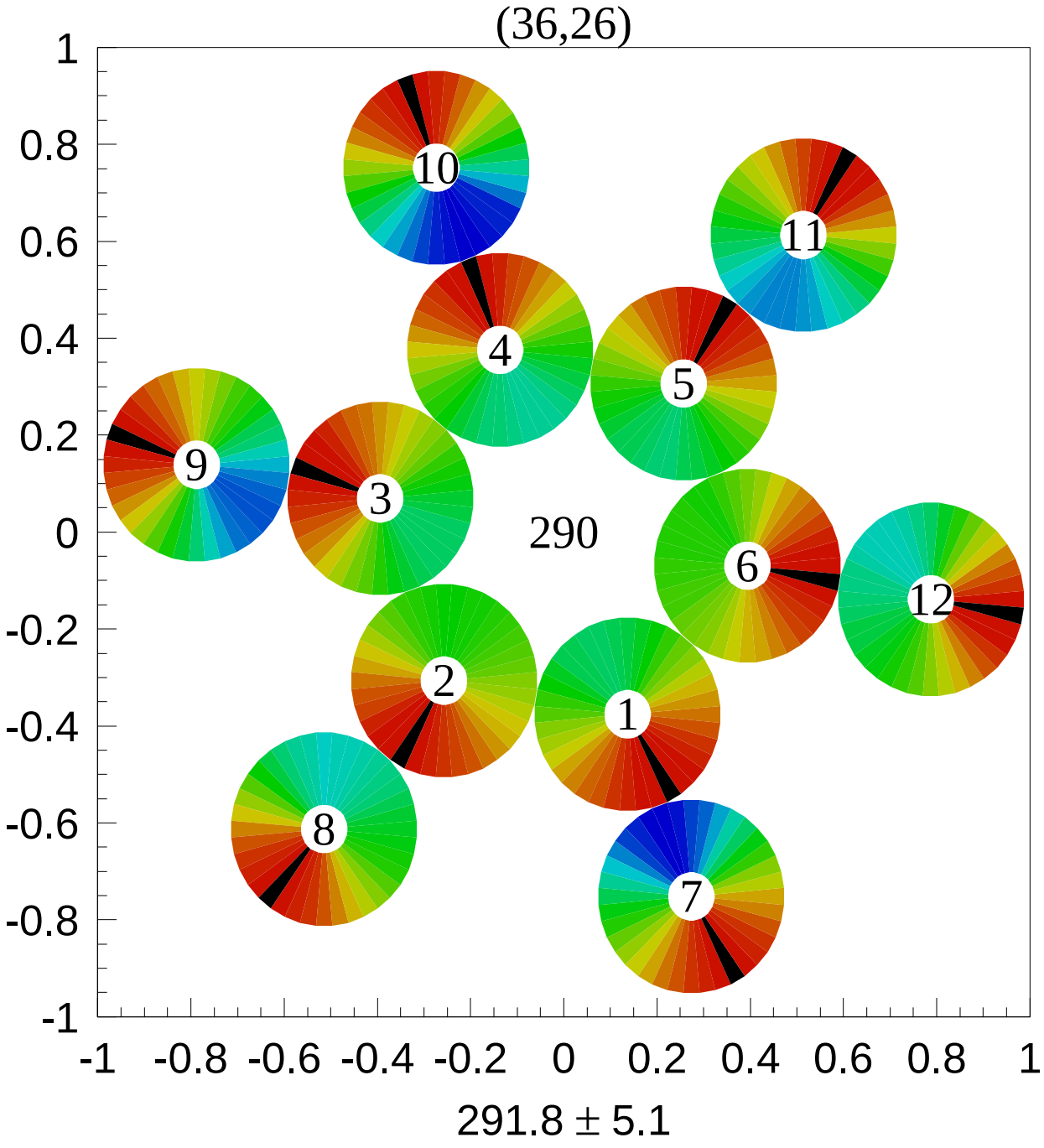

(36,24)
tilted LEDs
121 114 116 119 127 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 110 118 116 113 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

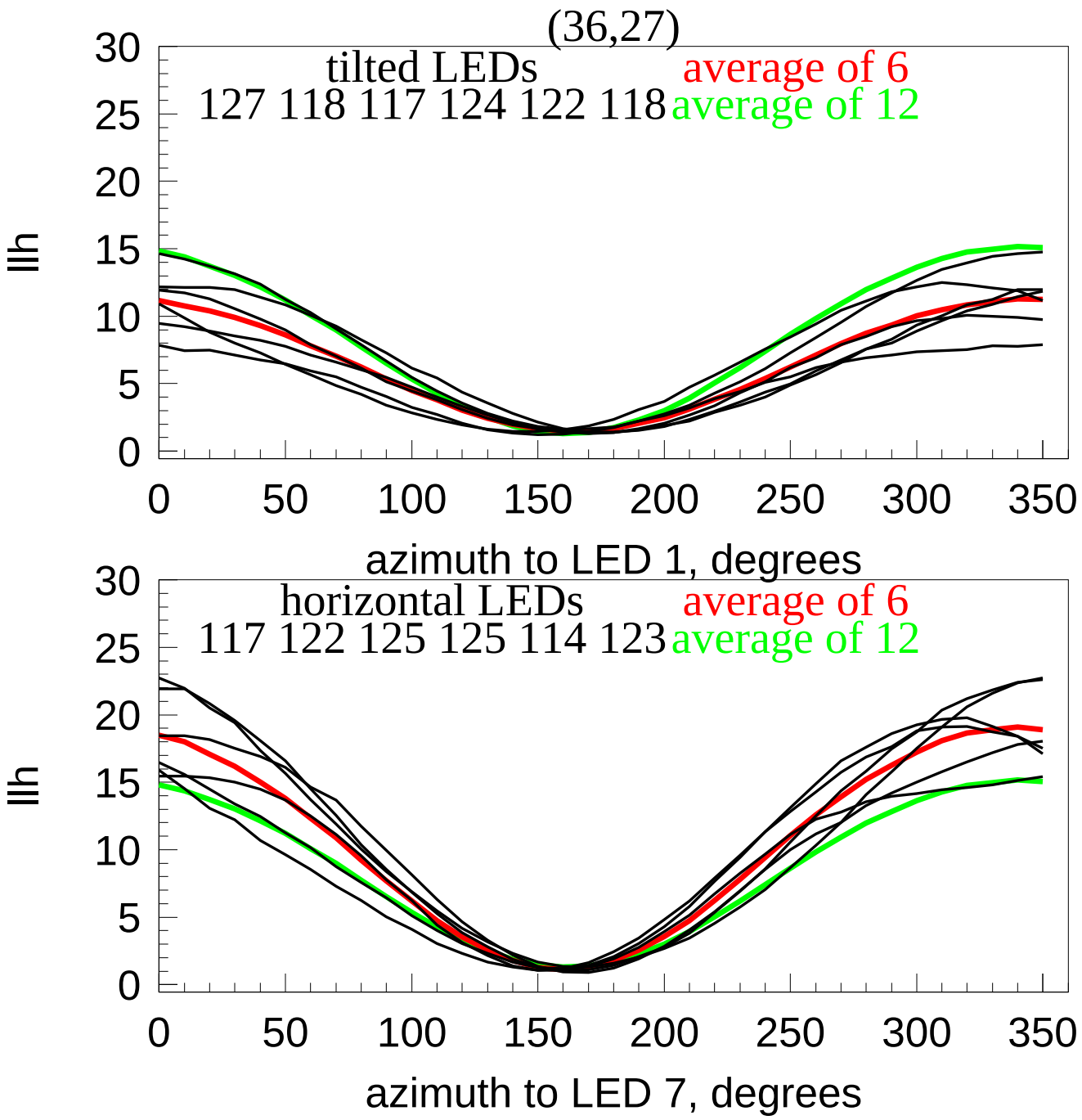

(36,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
1
8
12
2
6
100
3
5
9
4
11
10
103 ± 6.9

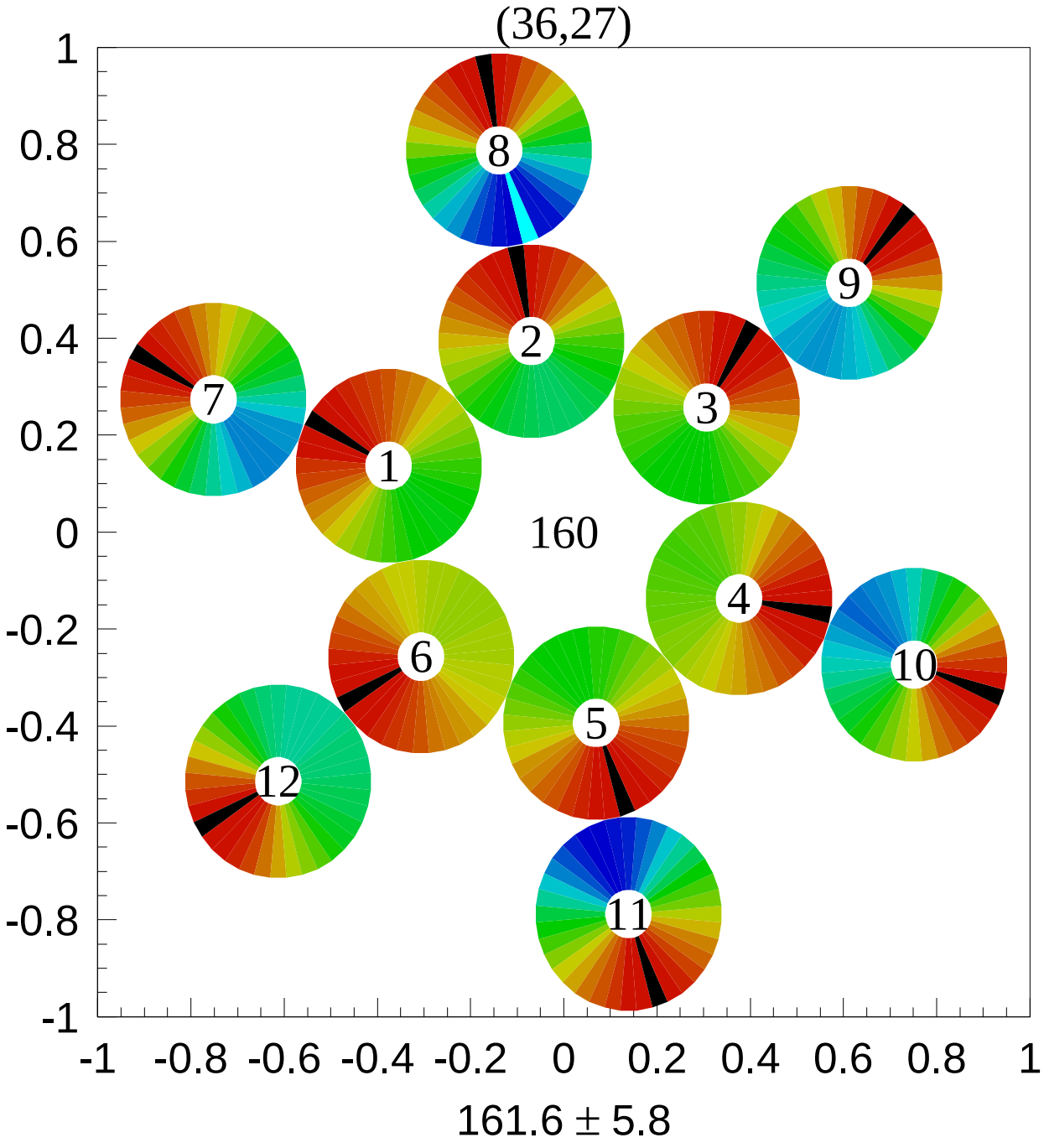

(36,25)
tilted LEDs
120 116 123 120 117 121
average of 6
average of 12
25
20
15
10
5
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
113 123 115 124 121 121
average of 6
average of 12
25
20
15
10
5
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

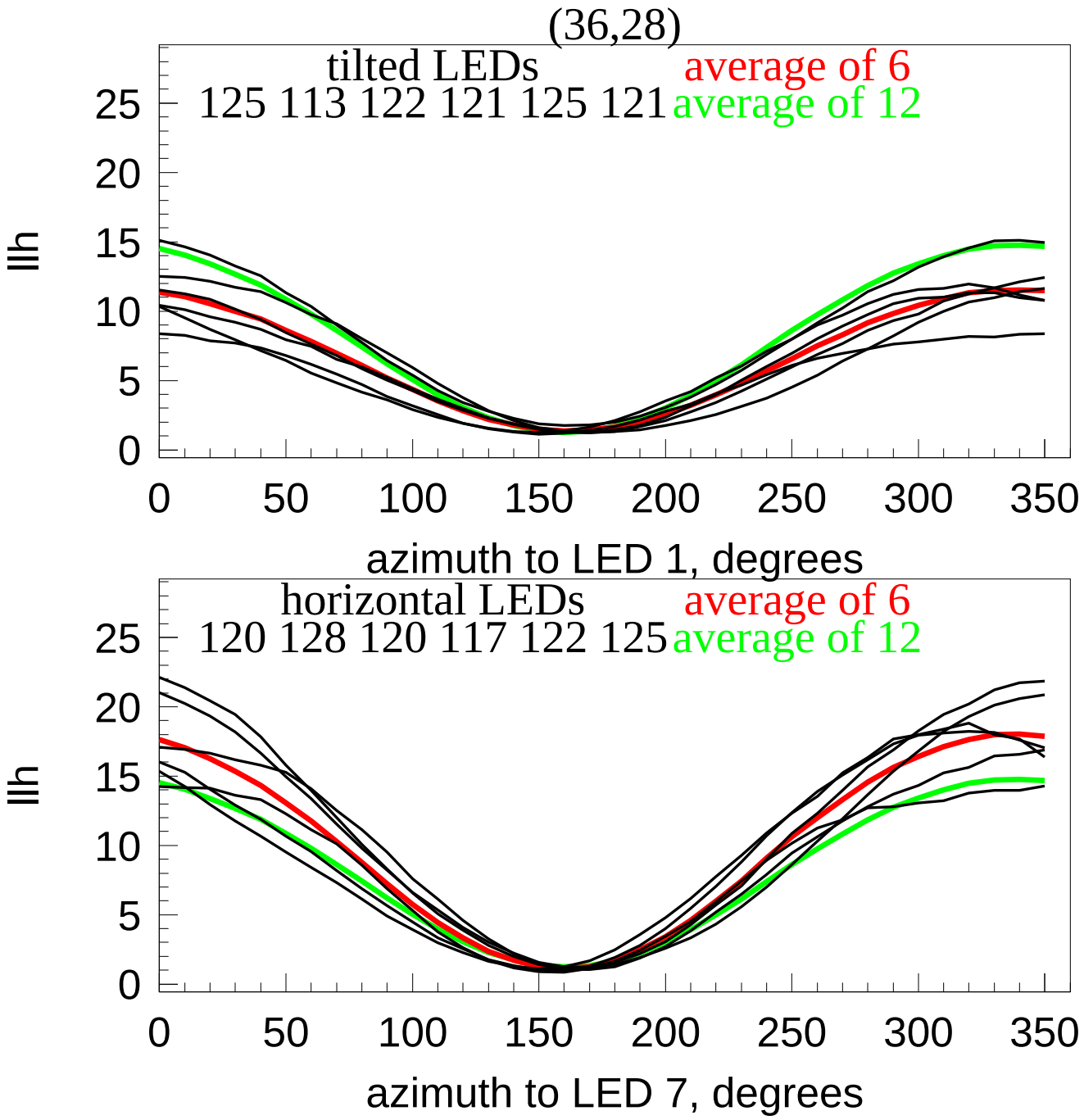

(36,25)
10
11
4
9
5
3
280
6
2
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
278.1 ± 5.5

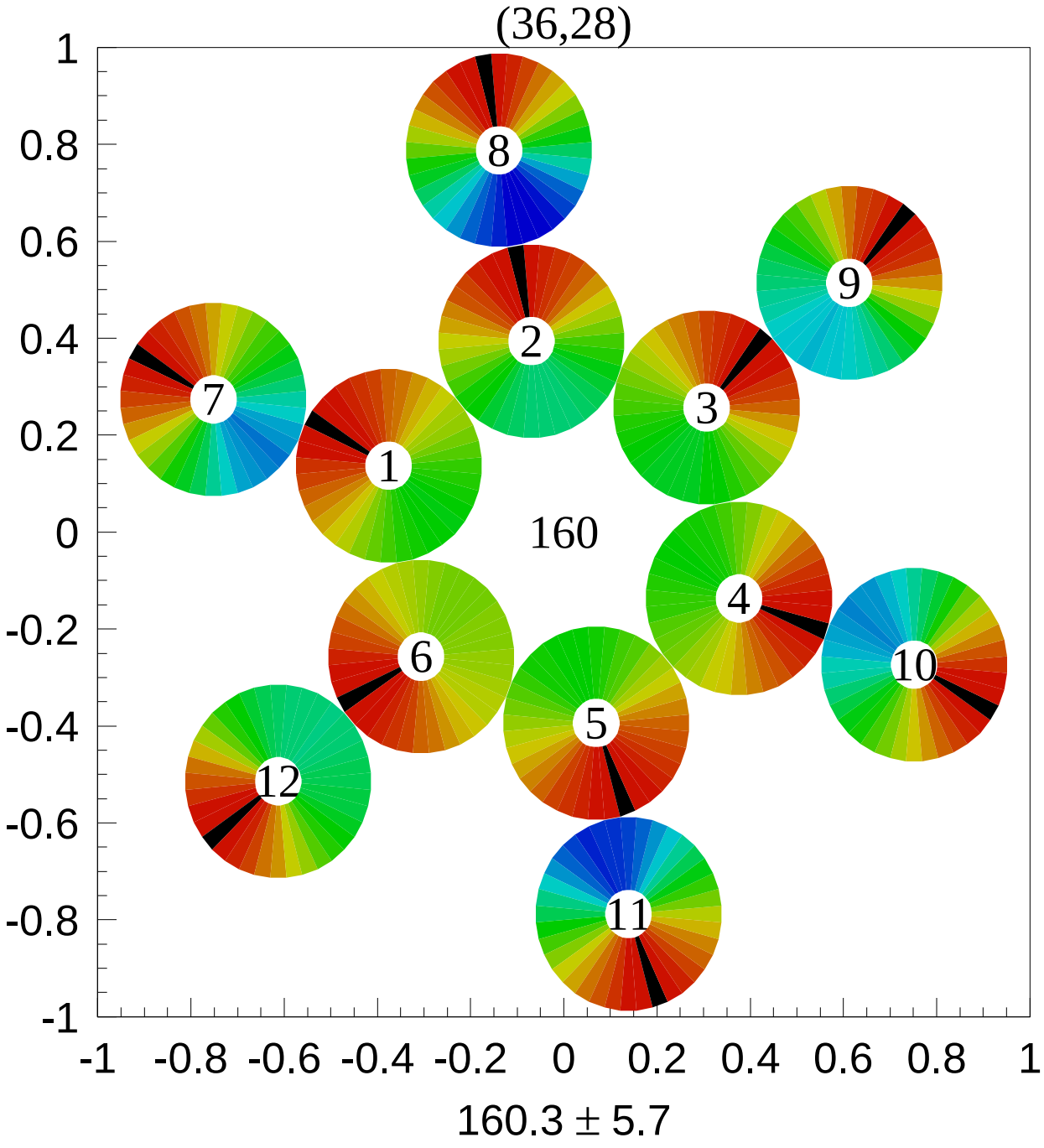

(36,26)
tilted LEDs
126 122 110 127 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 120 122 120 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

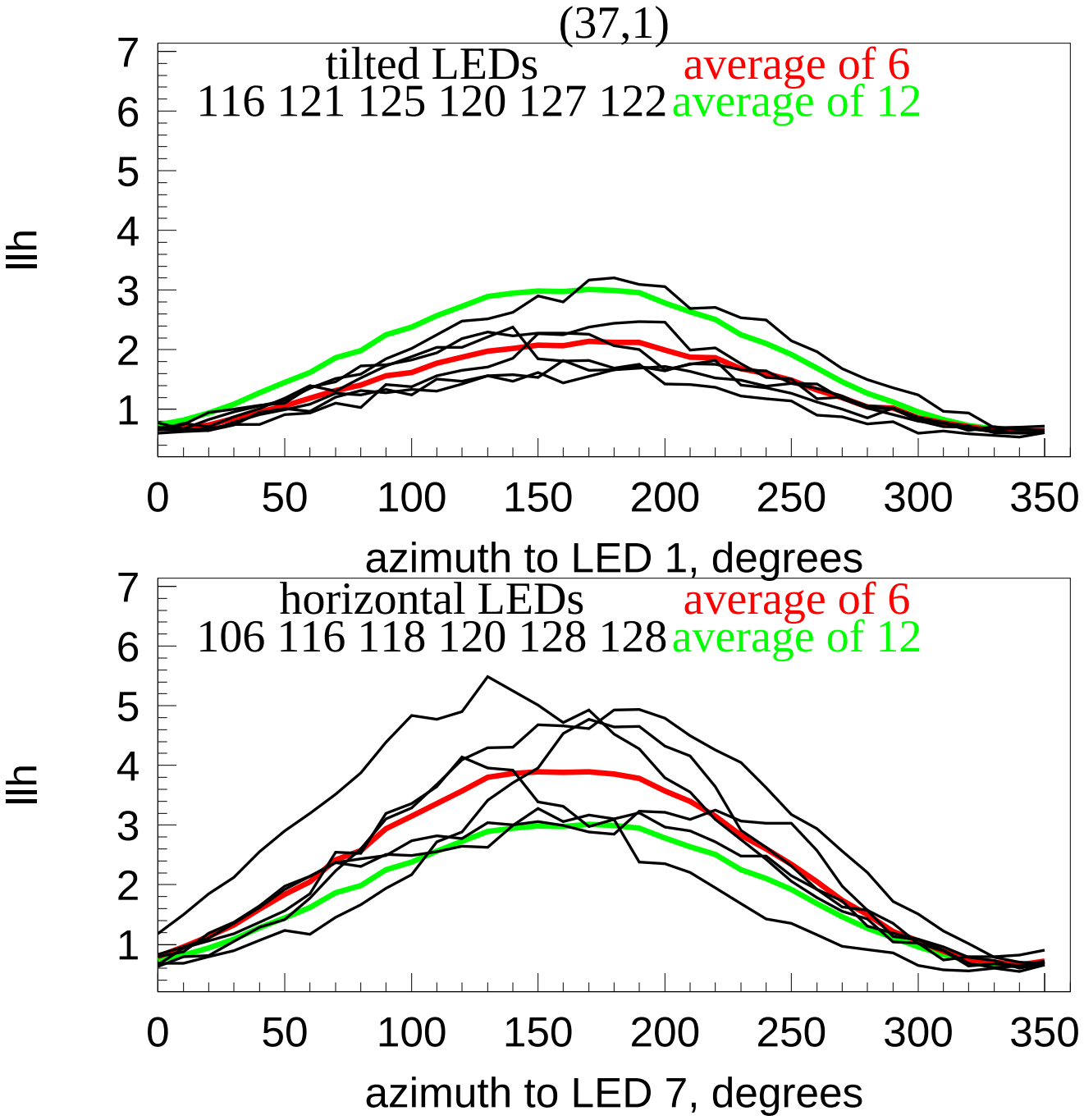

(36,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
291.8 ± 5.1

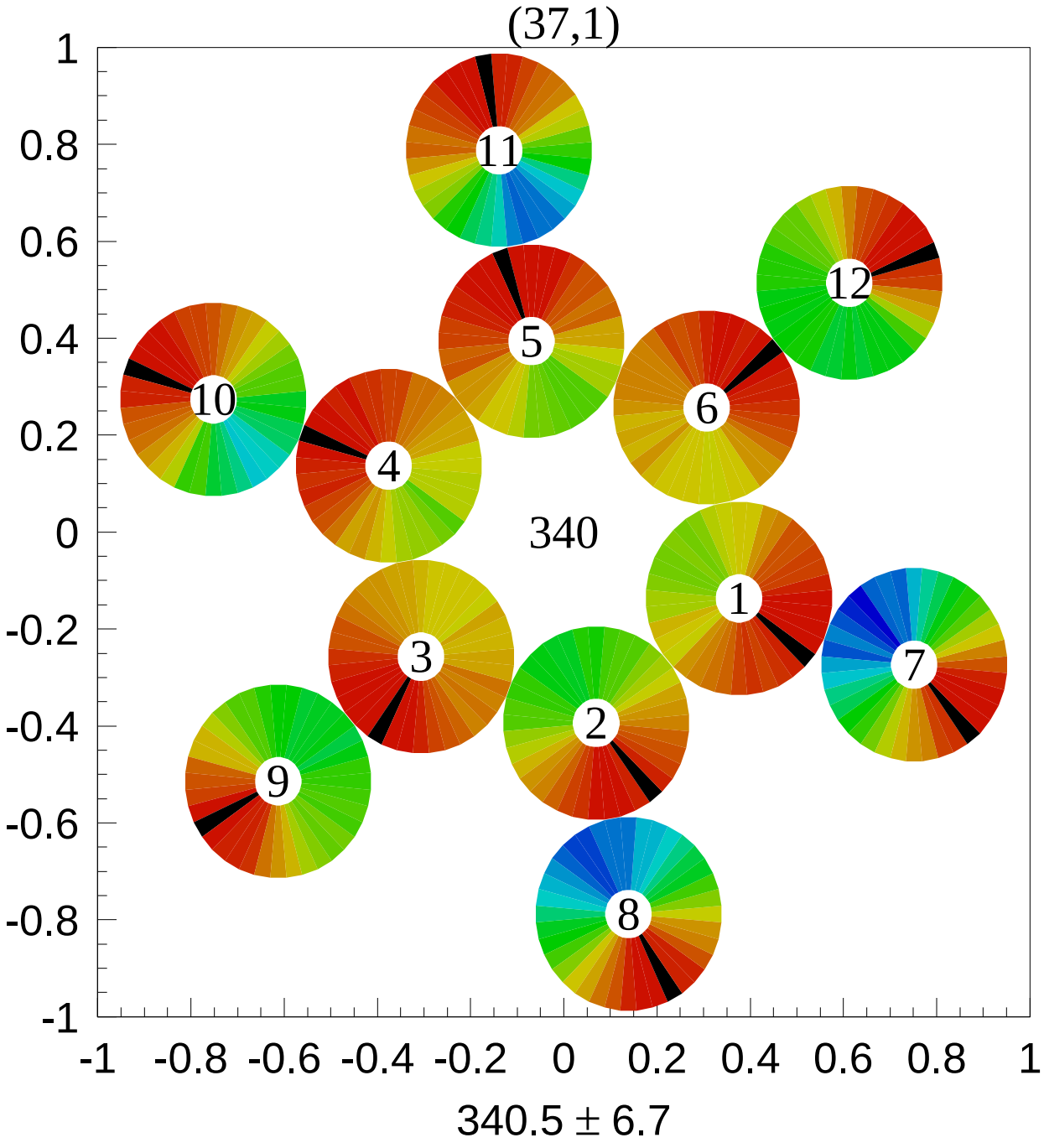

(36,27)
tilted LEDs
127 118 117 124 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 125 125 114 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

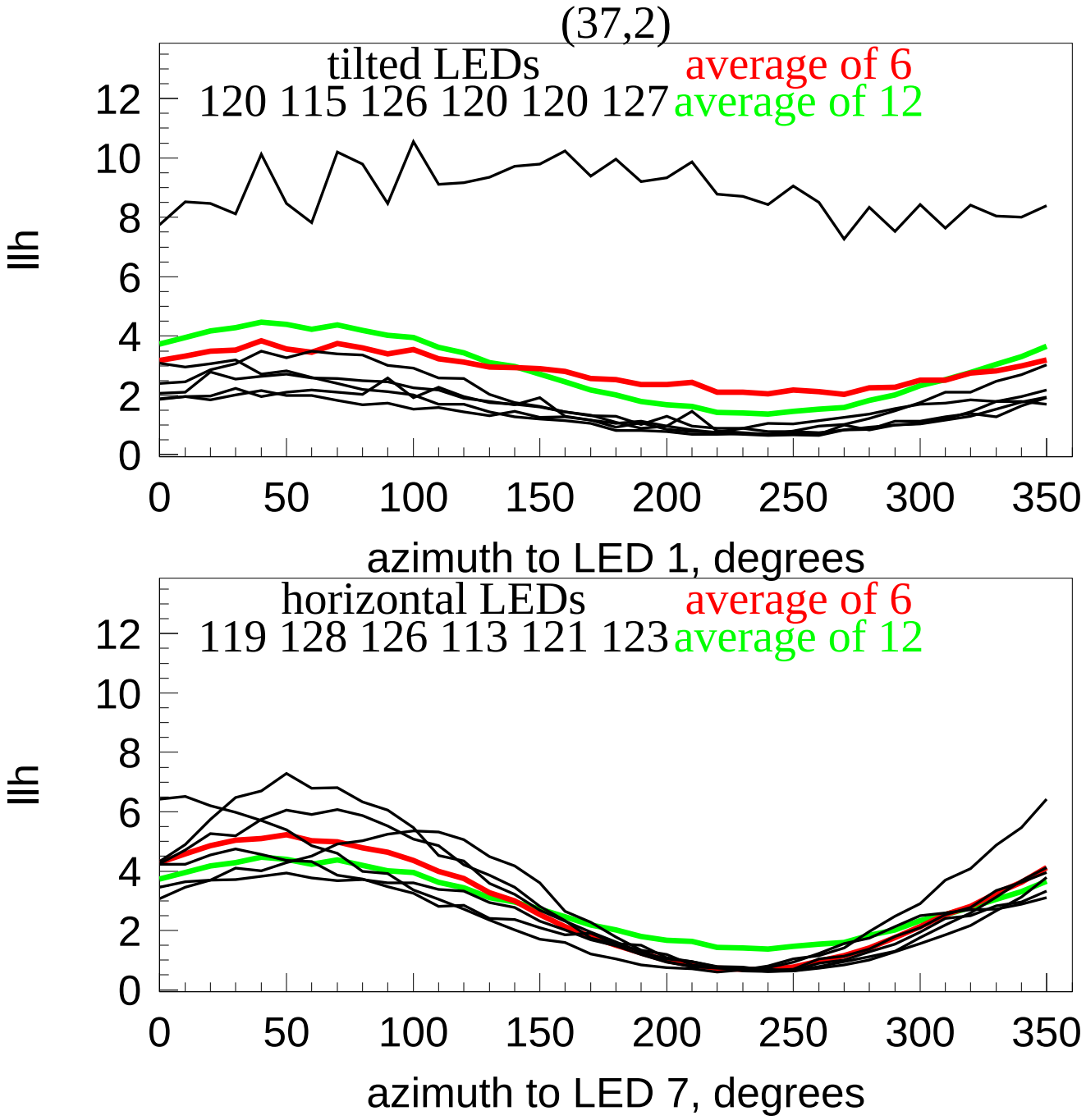

(36,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
161.6 ± 5.8

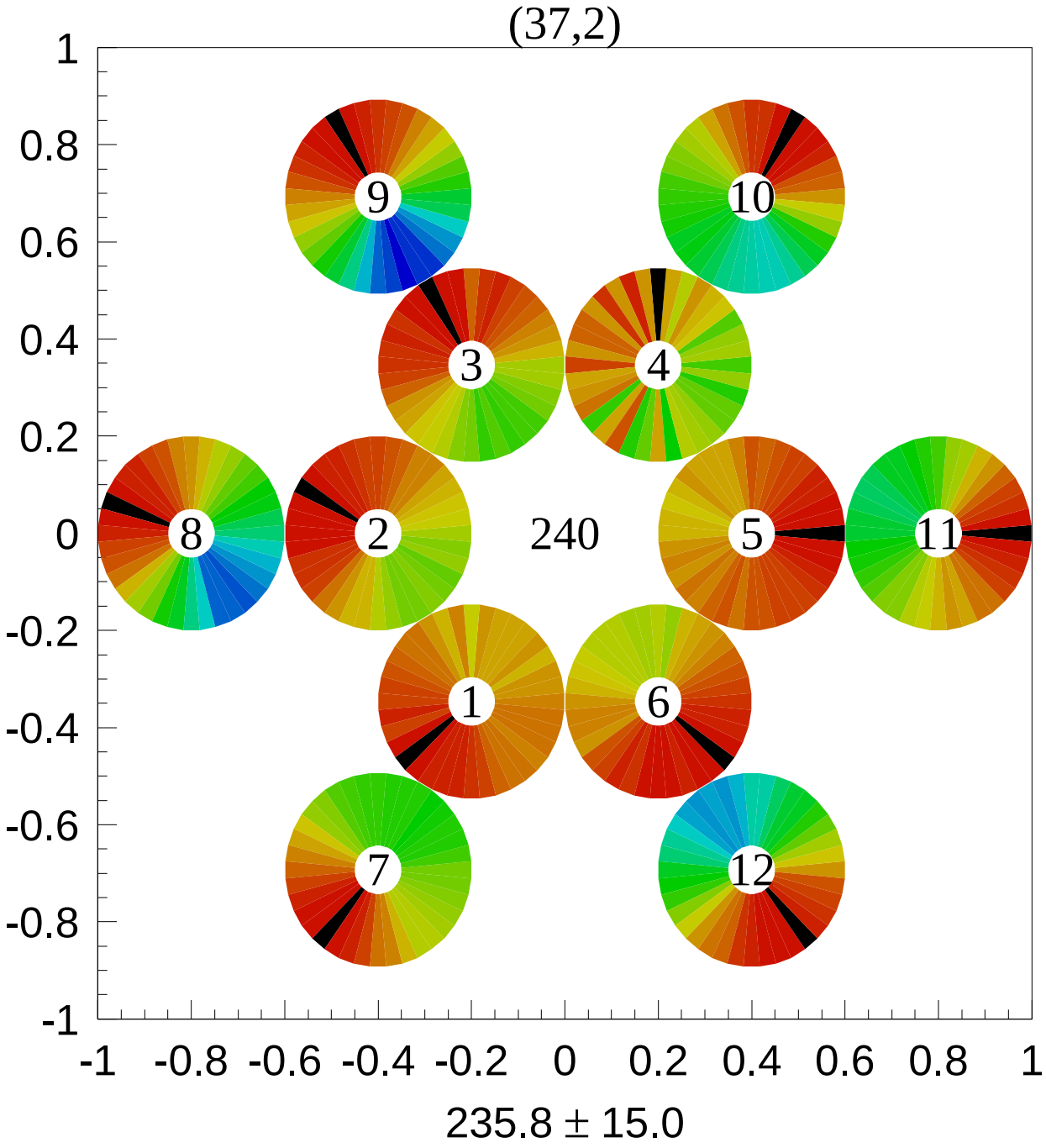

(36,28)
tilted LEDs
125 113 122 121 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 128 120 117 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

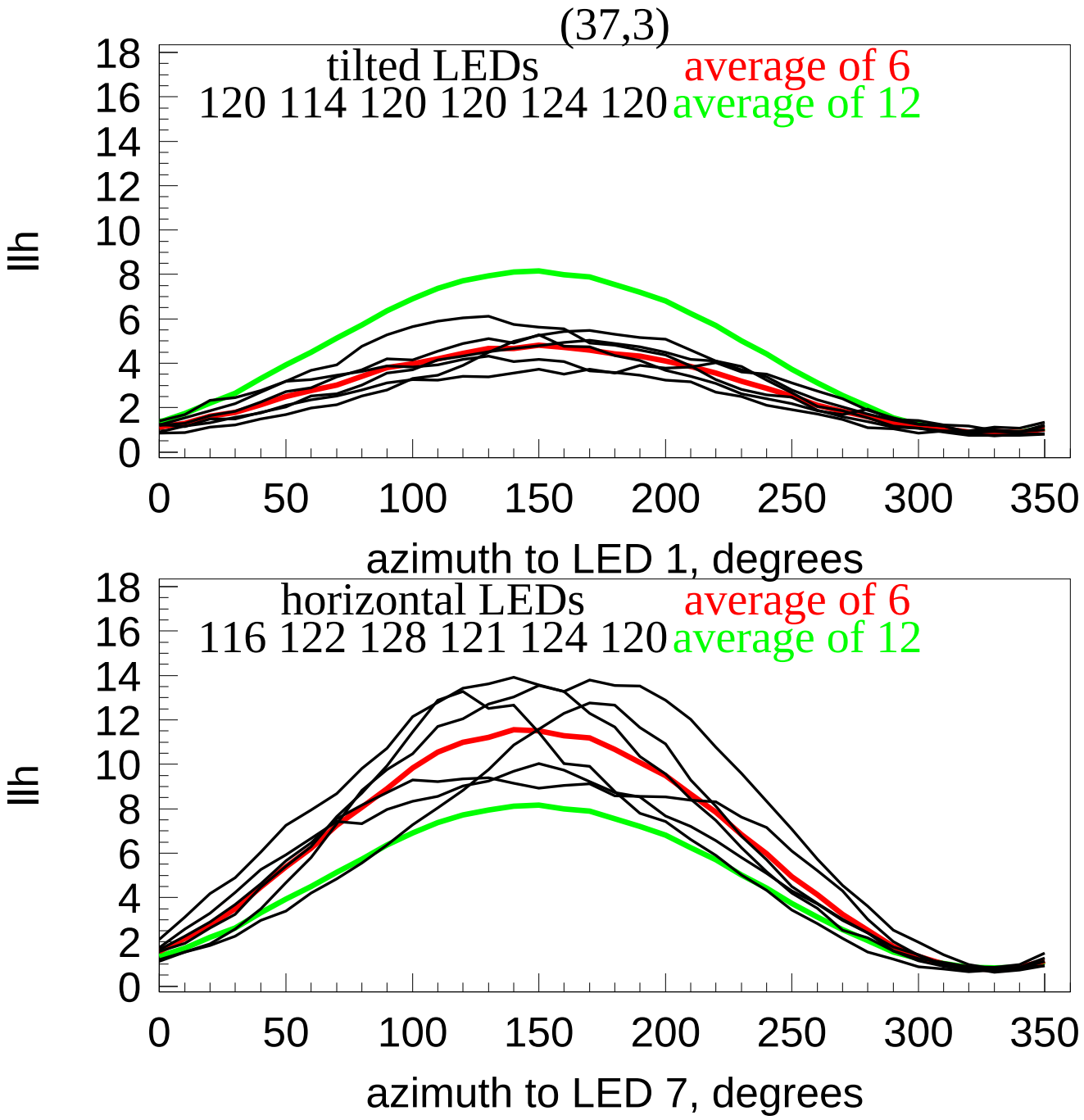

(36,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
160
160.3 ± 5.7
1
2
3
4
5
6
7
8
9
10
11
12

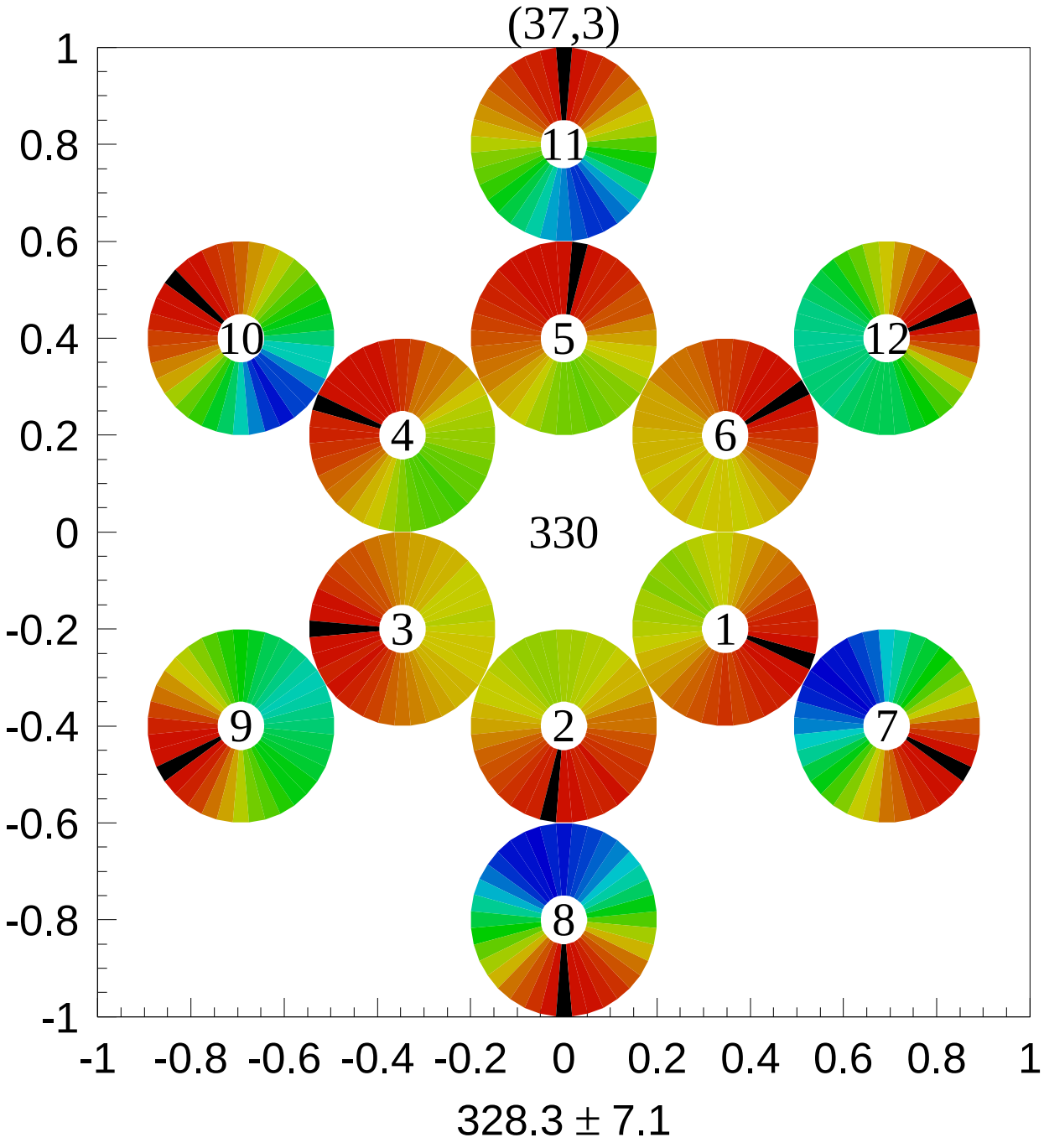

(37,1)
tilted LEDs
116 121 125 120 127 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
106 116 118 120 128 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

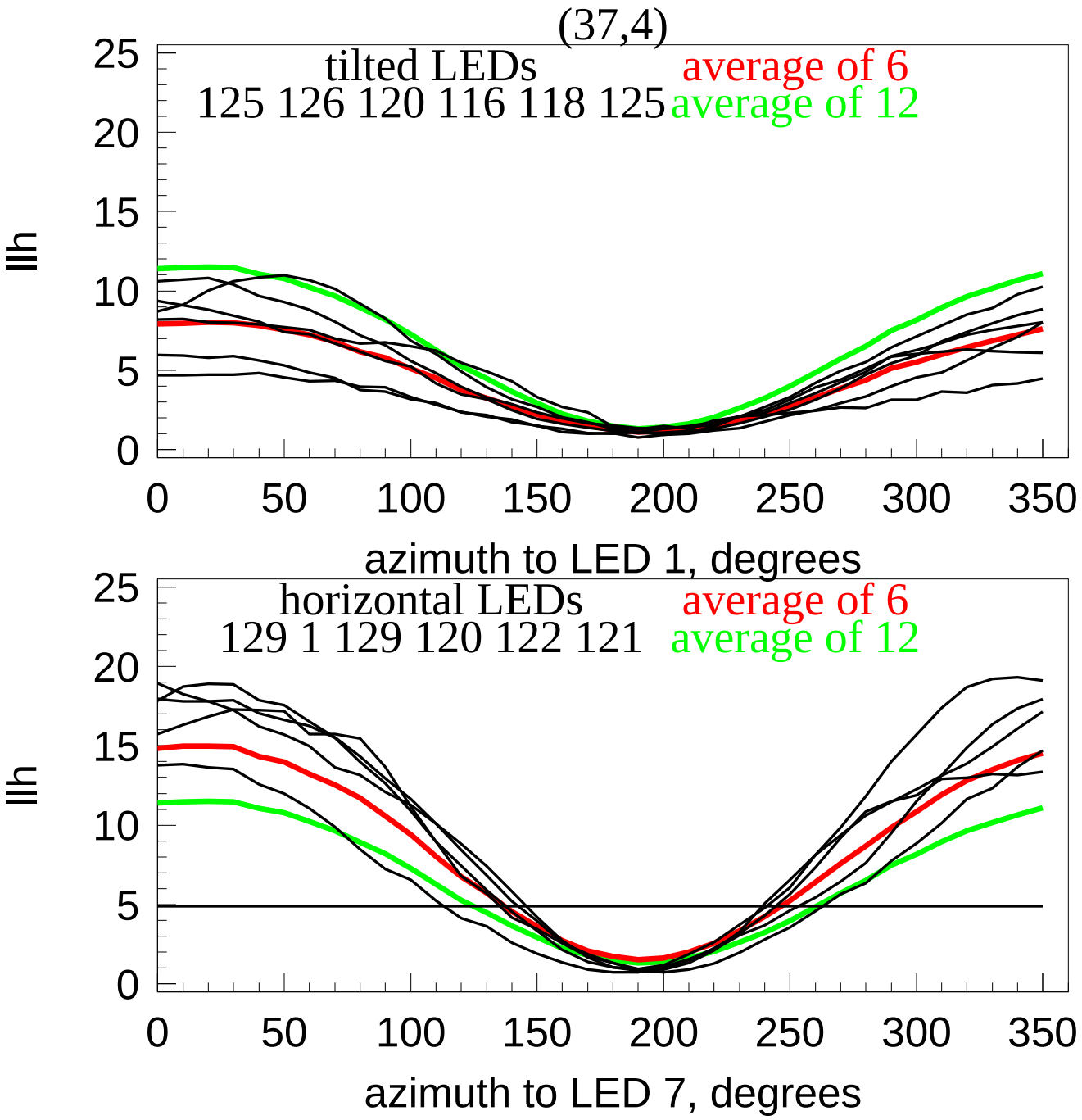

(37,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
340.5 ± 6.7

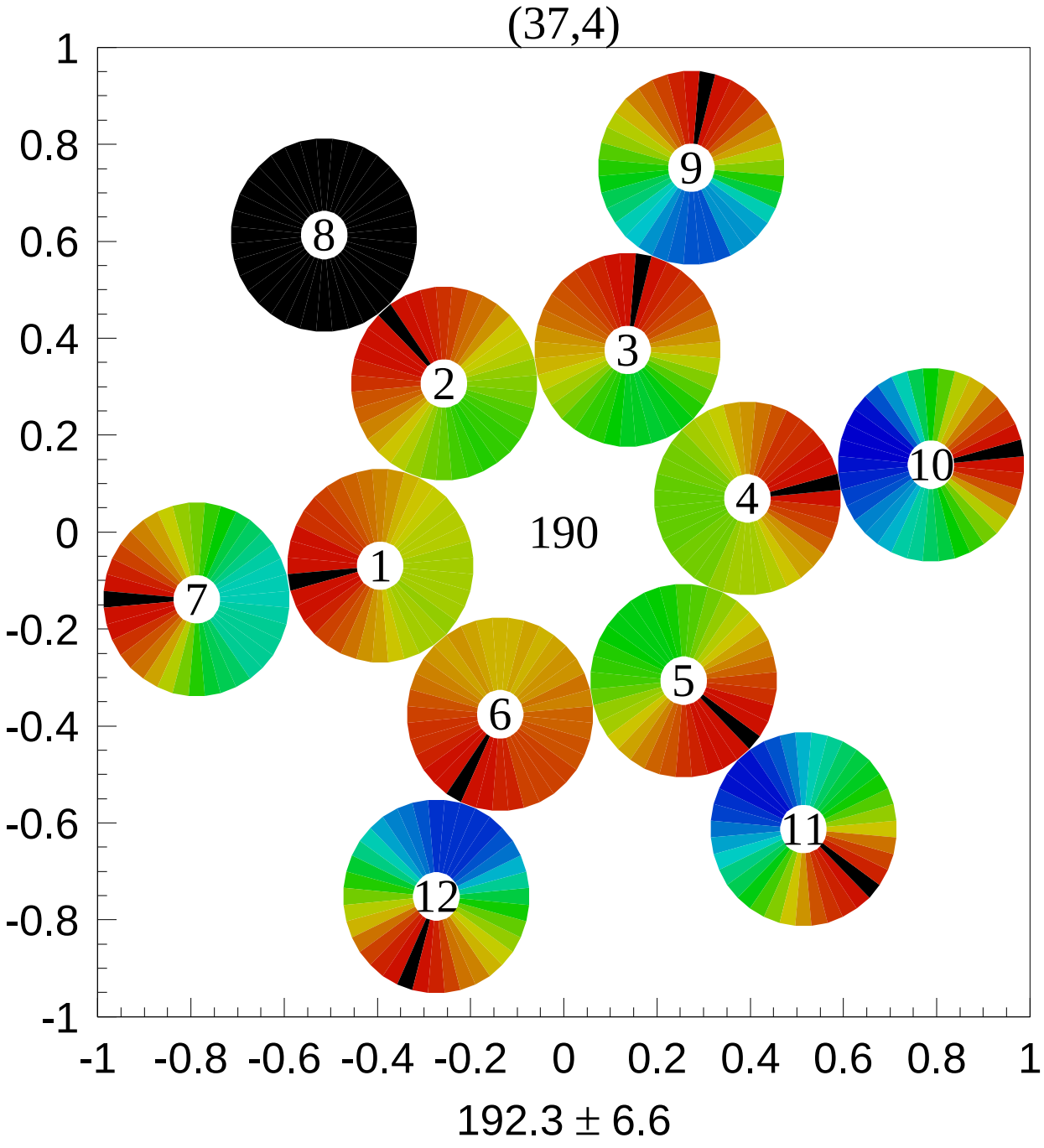

(37,2)
tilted LEDs
120 115 126 120 120 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 128 126 113 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

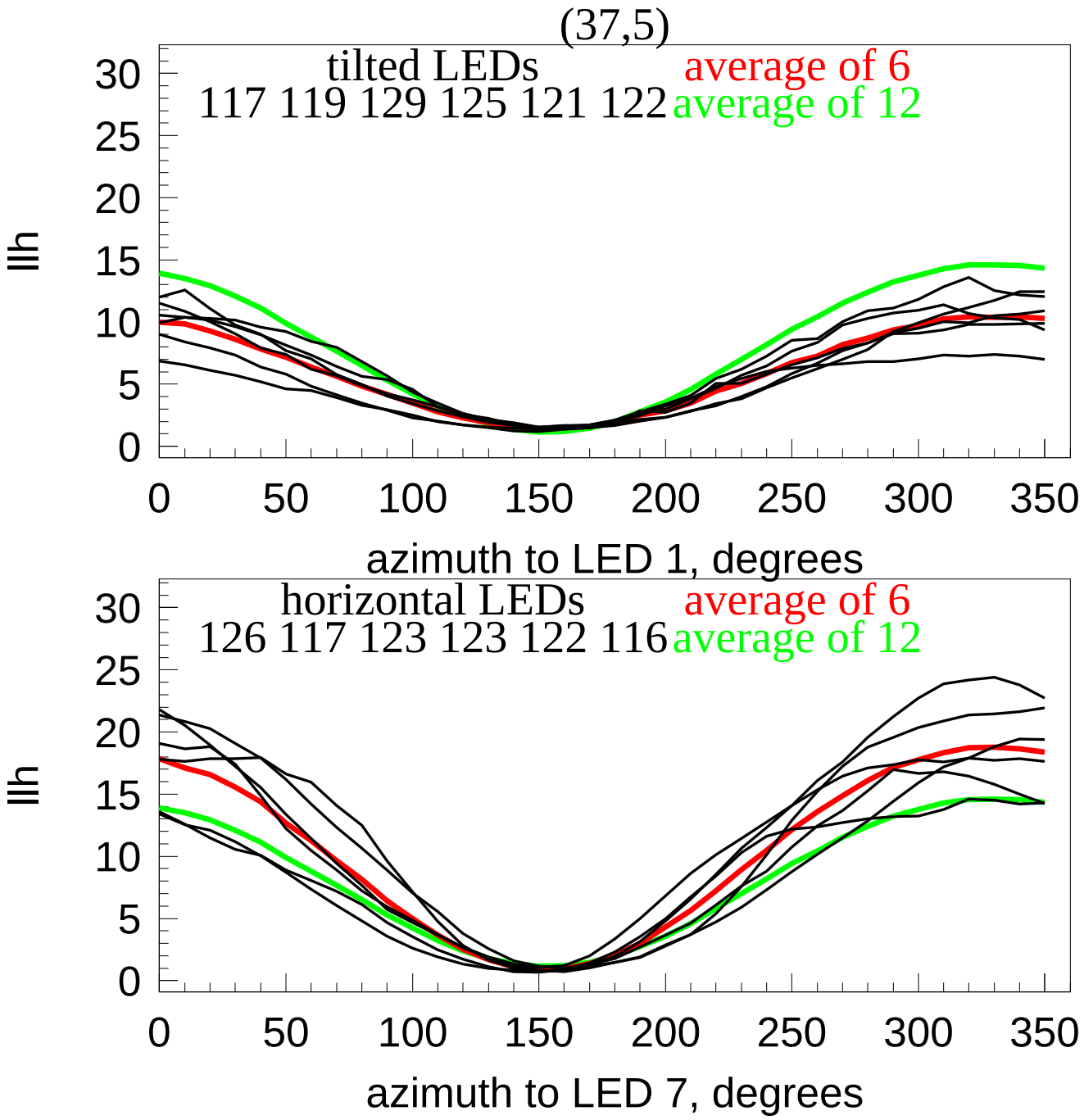

(37,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
235.8 ± 15.0

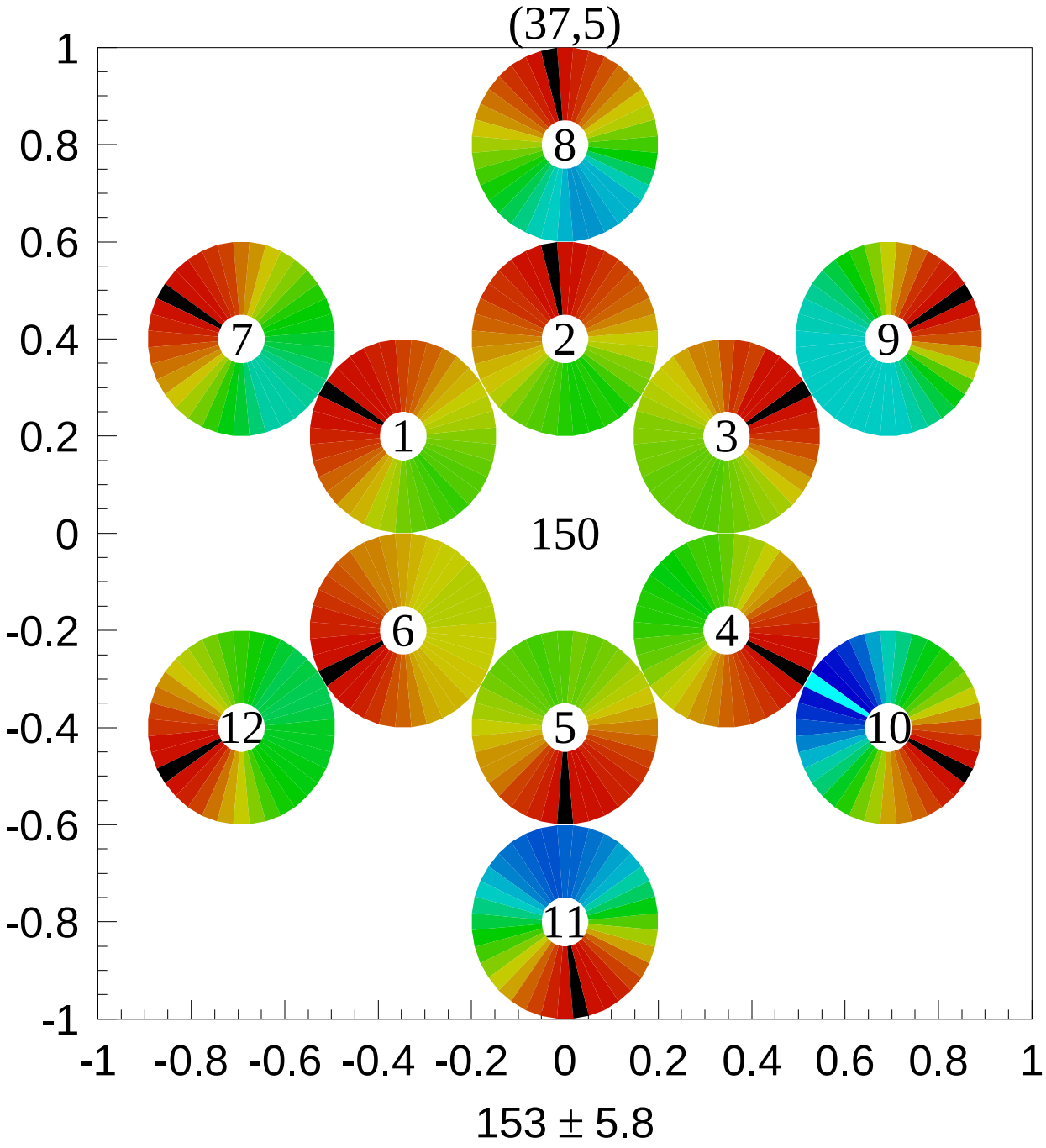

(37,3)
tilted LEDs
120 114 120 120 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 122 128 121 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

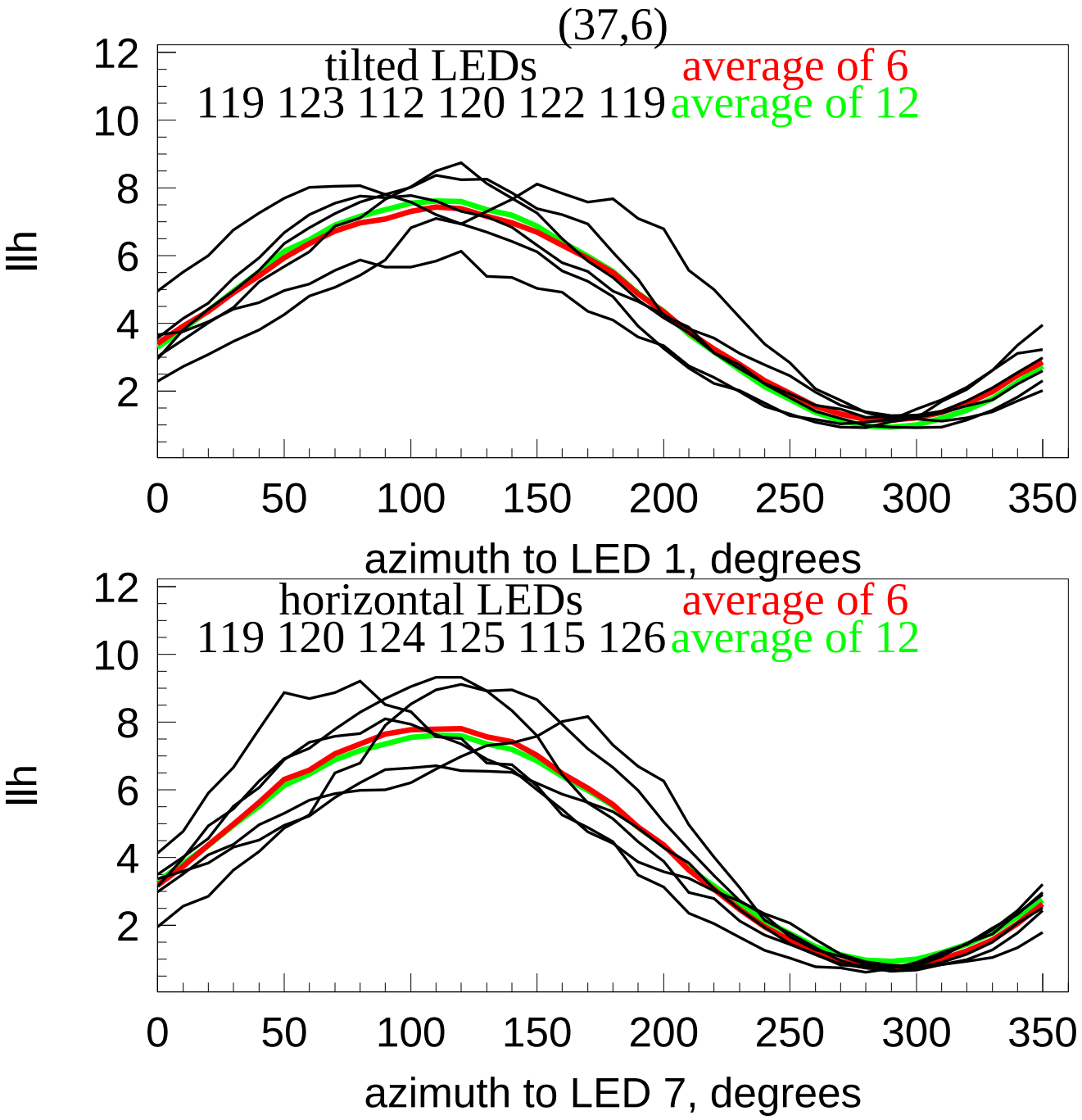

(37,3)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
328.3 ± 7.1

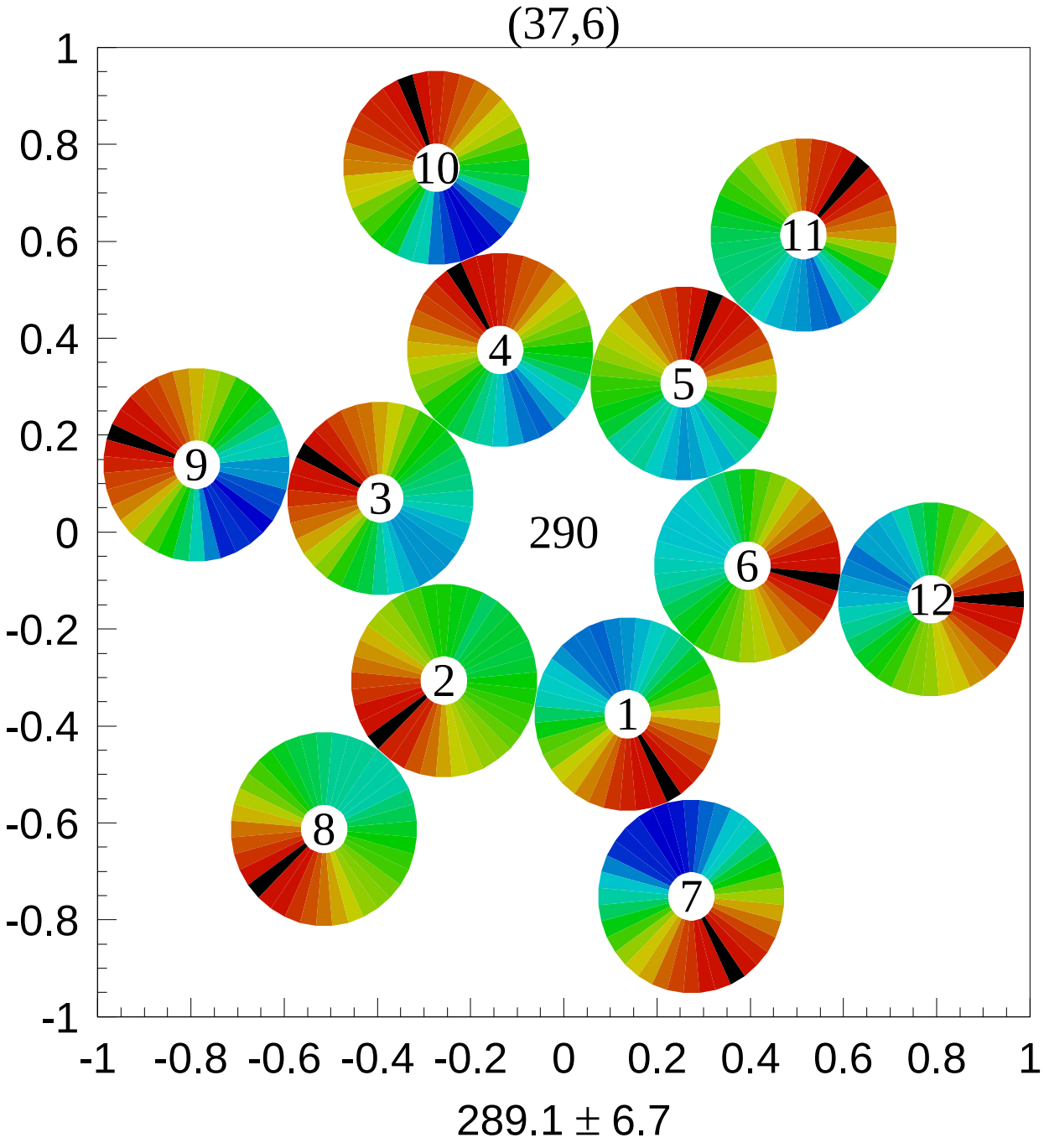

(37,4)
tilted LEDs
125 126 120 116 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 1 129 120 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

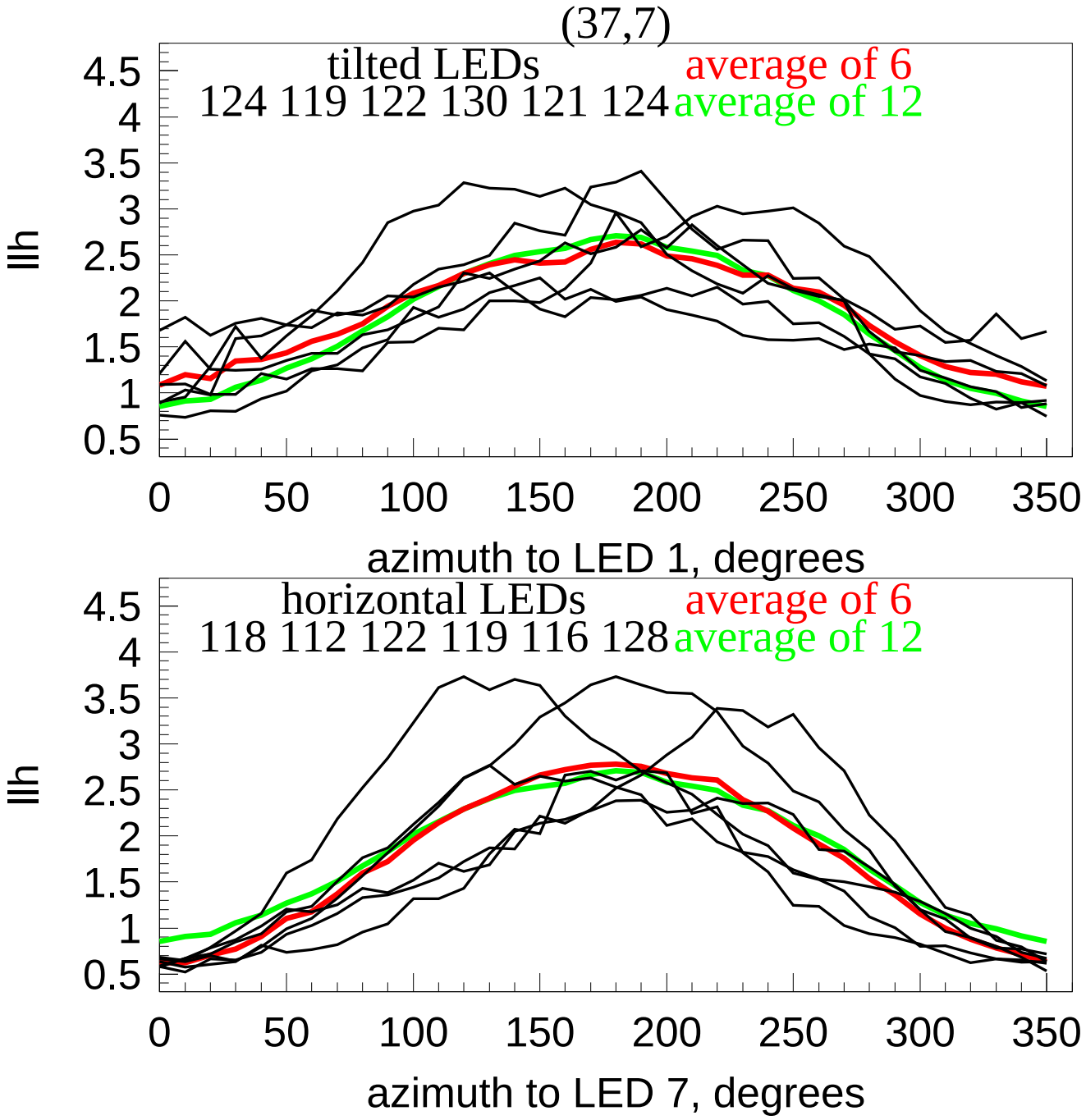

(37,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
192.3 ± 6.6
190
1
2
3
4
5
6
7
8
9
10
11
12

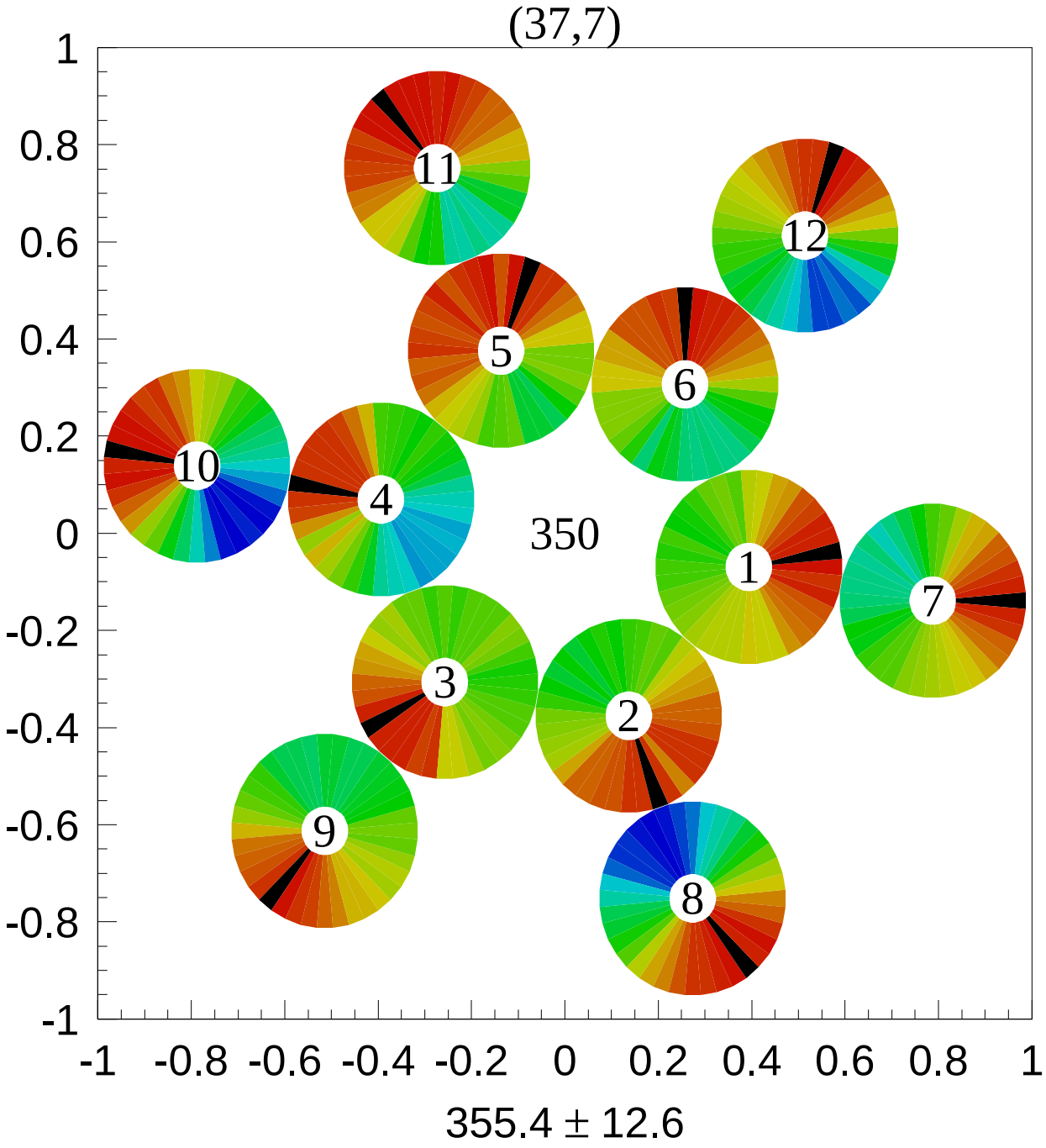

(37,5)
tilted LEDs
117 119 129 125 121 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 117 123 123 122 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

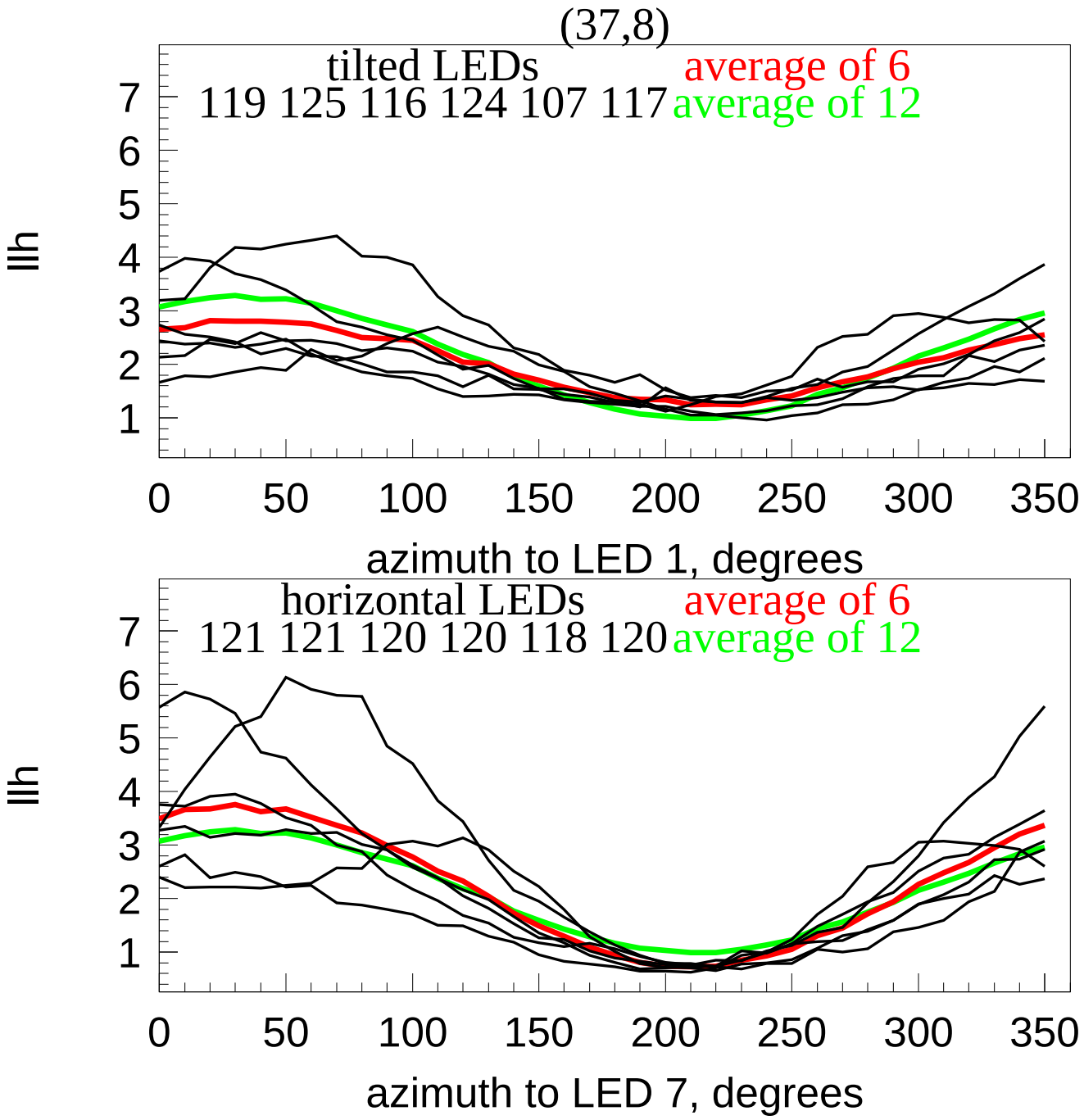

(37,5)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
153 ± 5.8

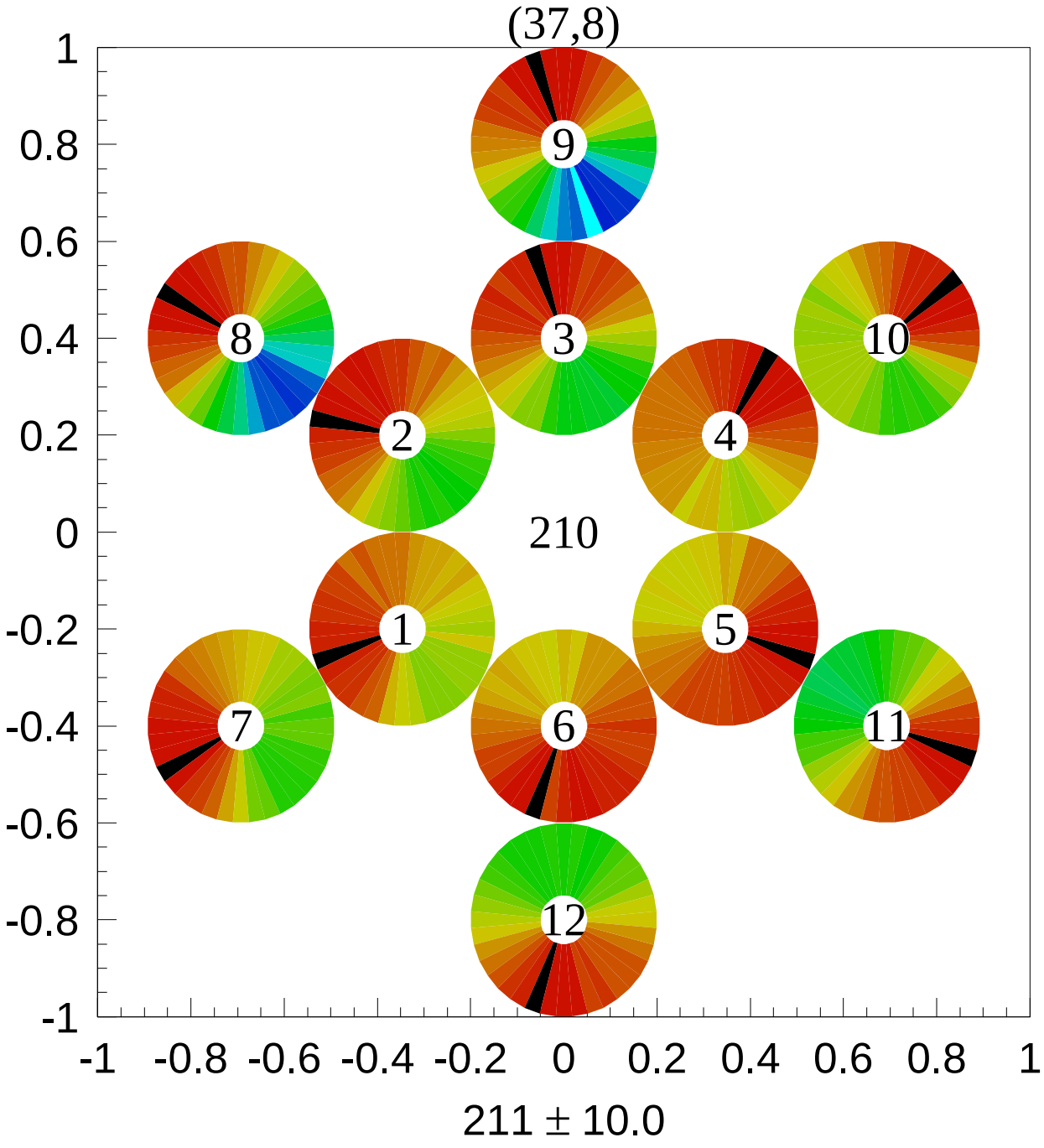

(37,6)
tilted LEDs
119 123 112 120 122 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 120 124 125 115 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

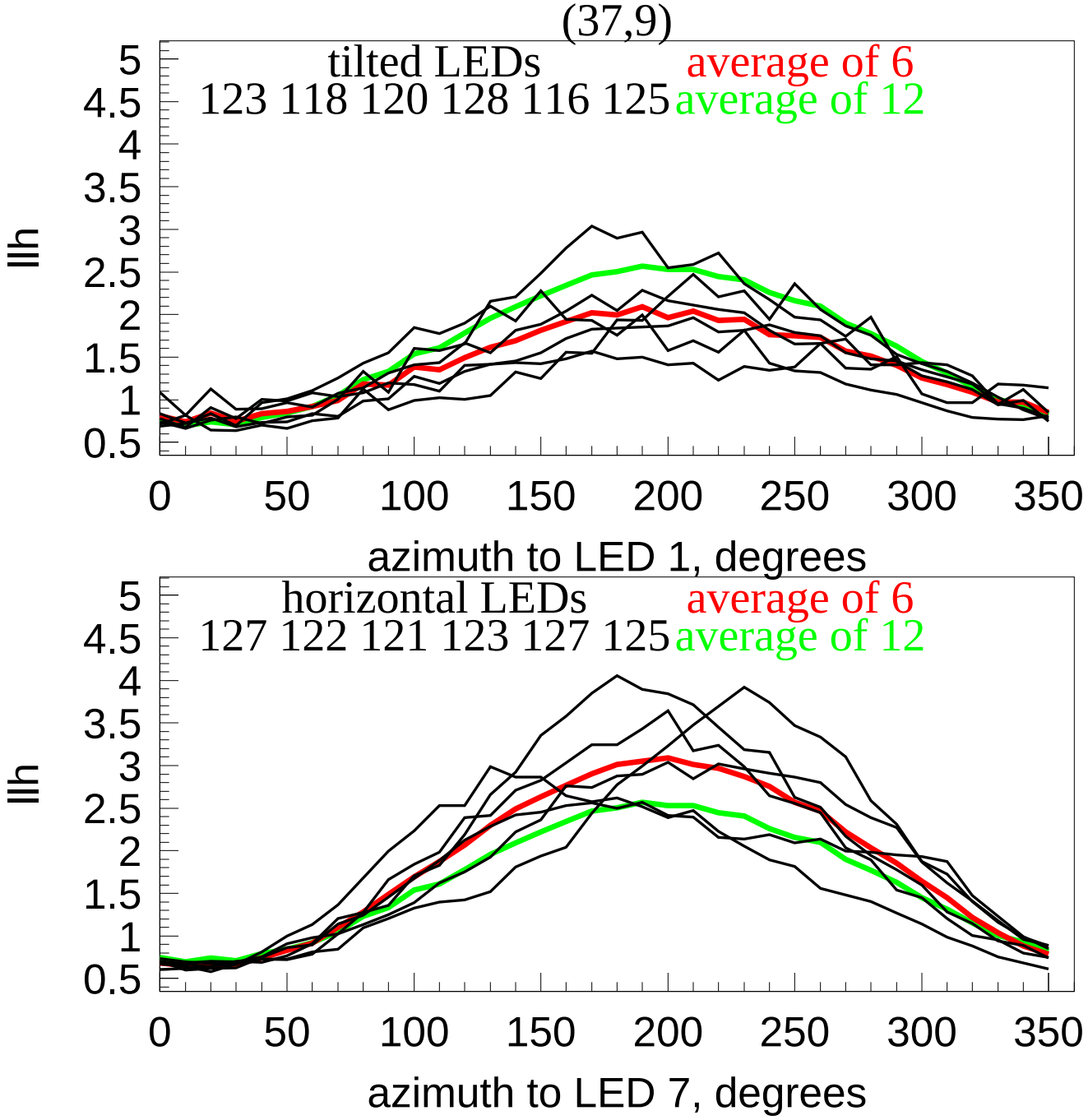

(37,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
289.1 ± 6.7

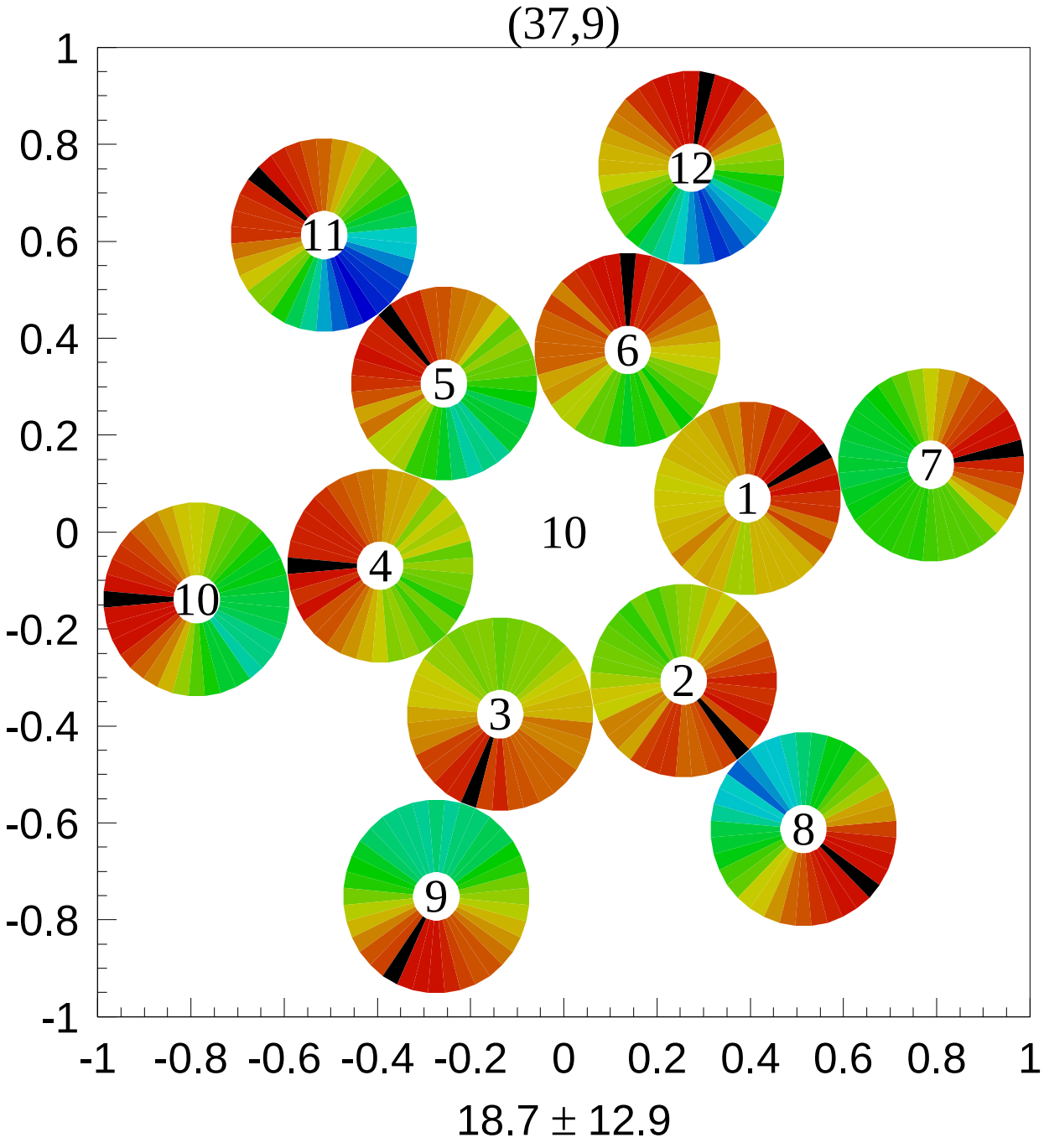

(37,7)
tilted LEDs
124 119 122 130 121 124
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 112 122 119 116 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

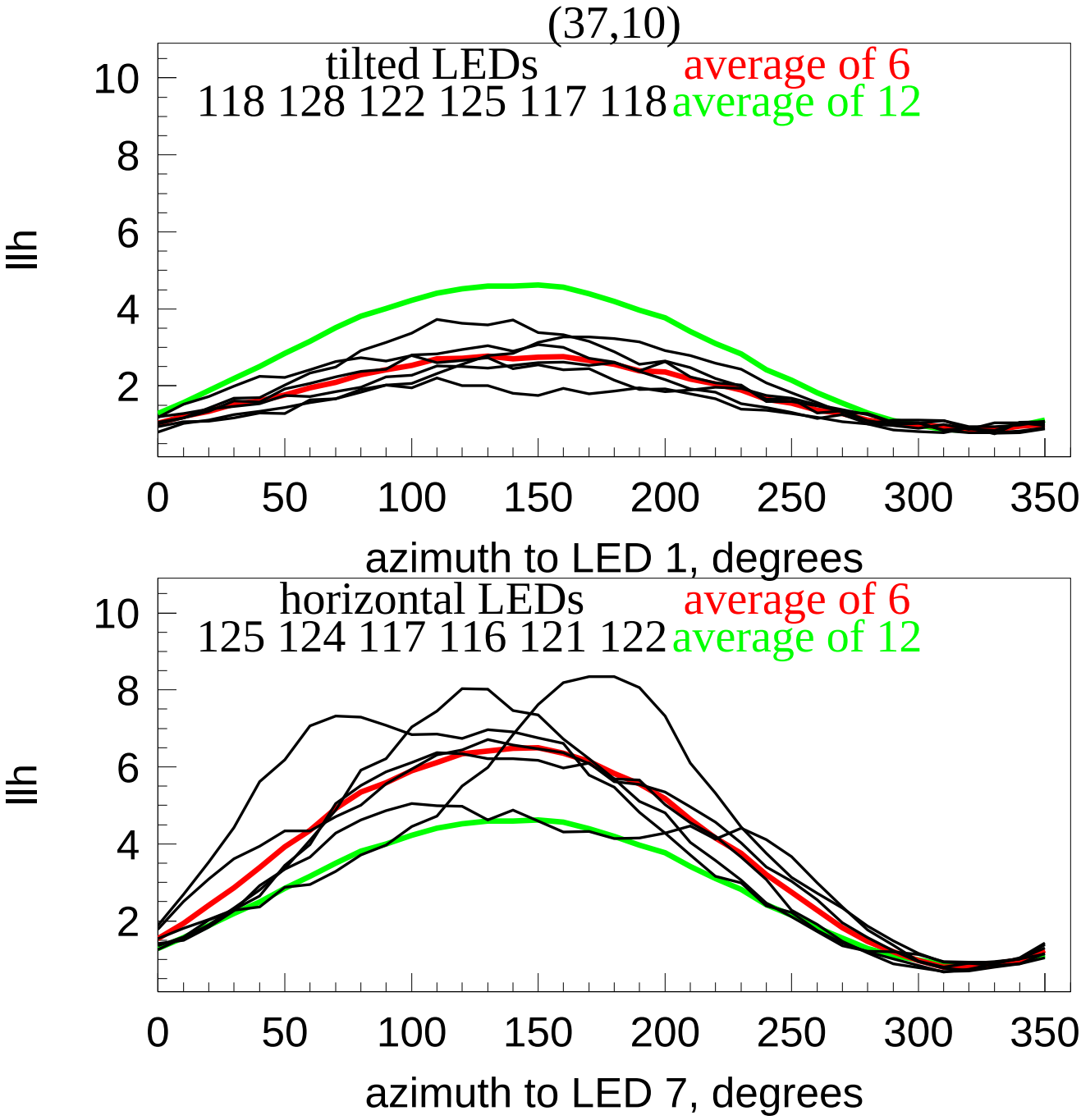

(37,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
355.4 ± 12.6

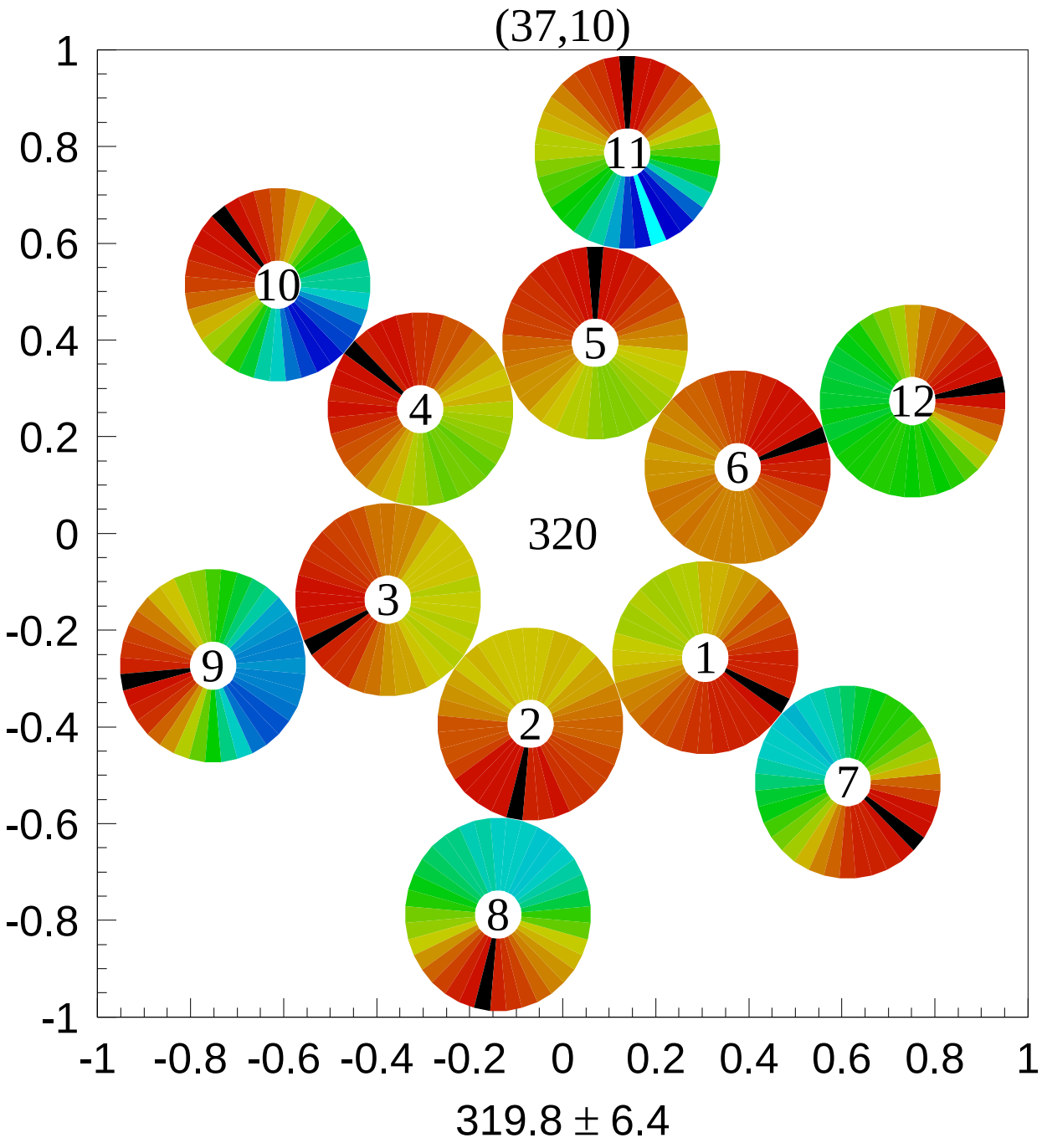

(37,8)
tilted LEDs
119 125 116 124 107 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 120 120 118 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

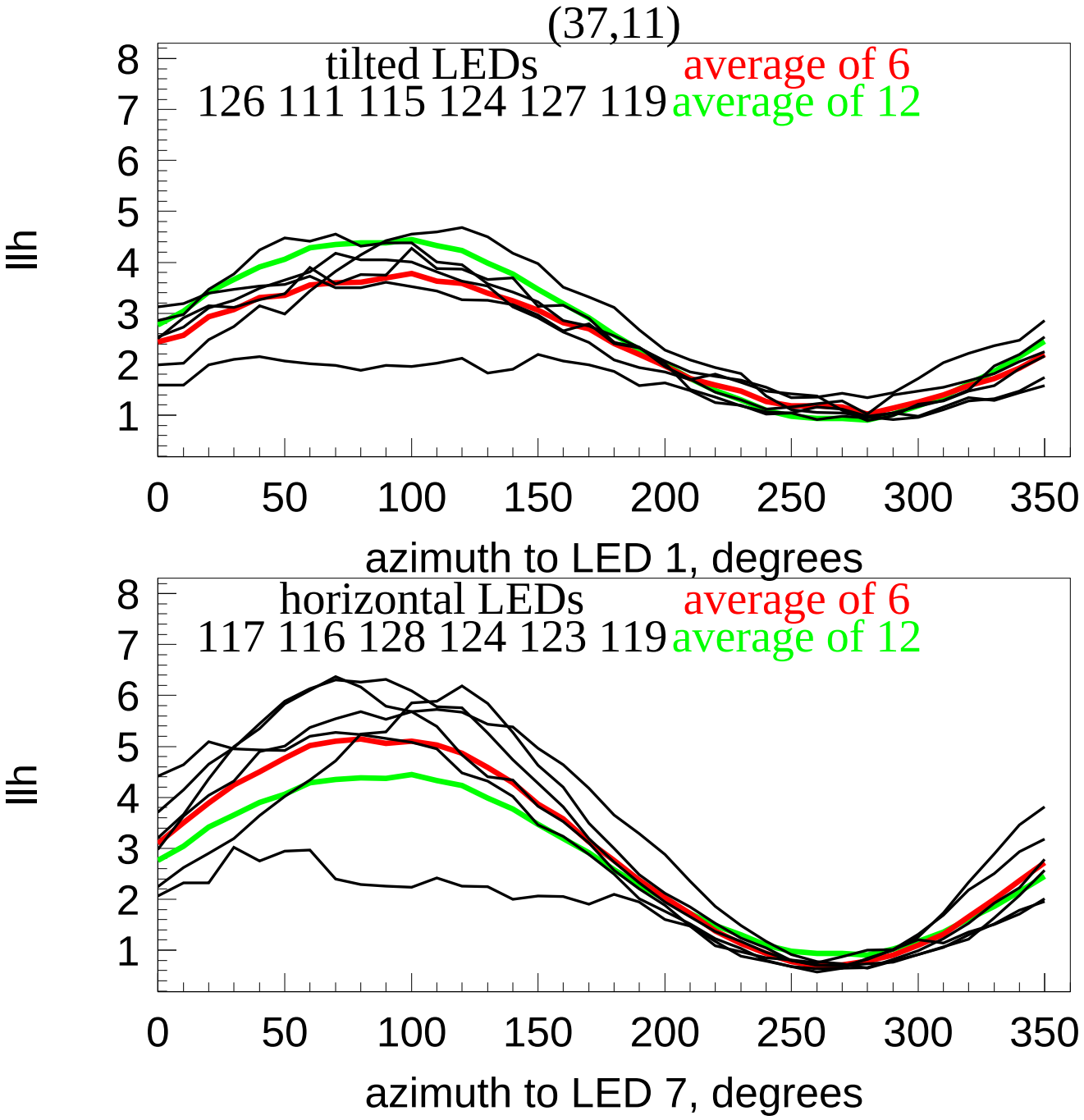

(37,8)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211 ± 10.0

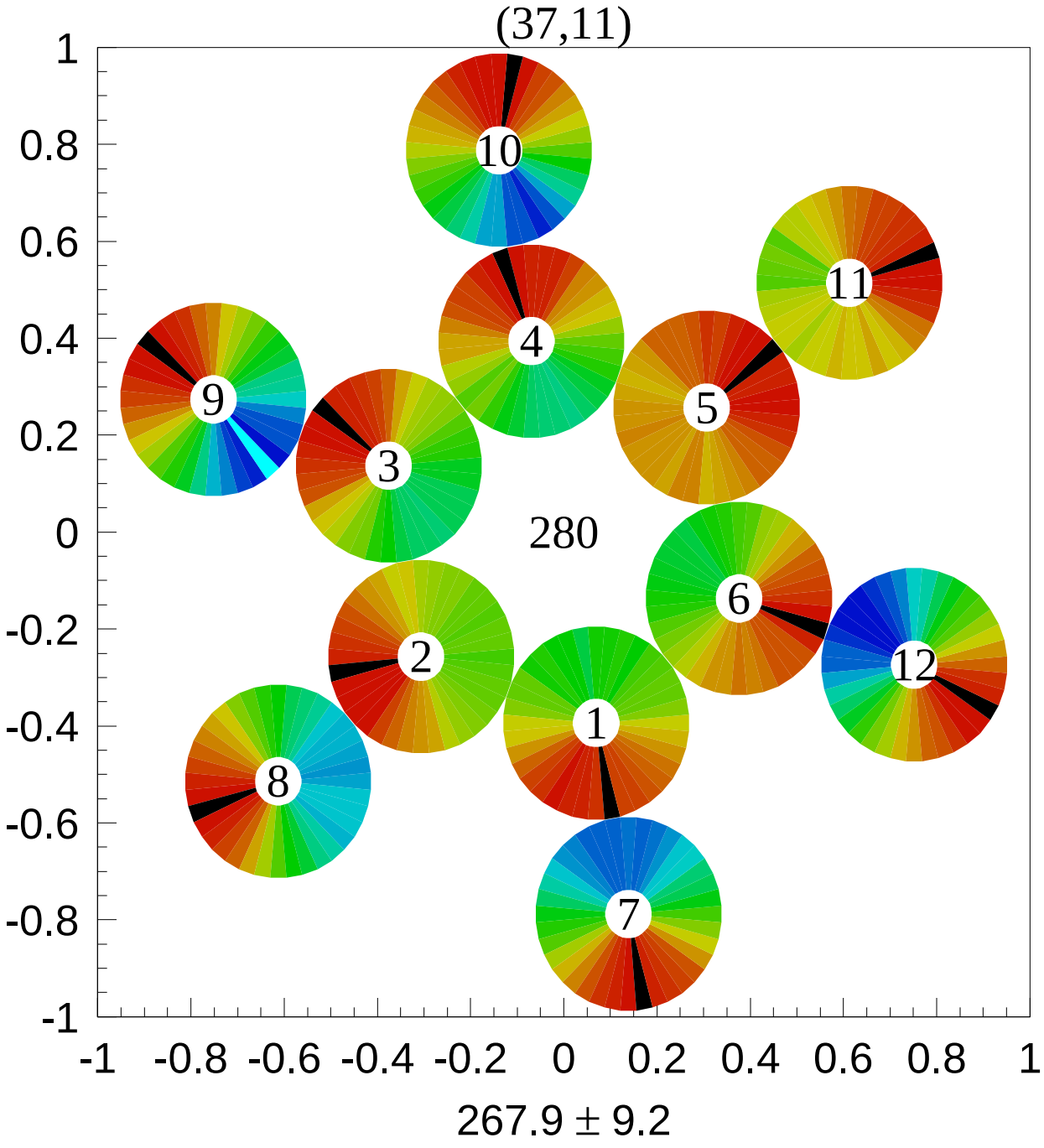

(37,9)
tilted LEDs
123 118 120 128 116 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 121 123 127 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

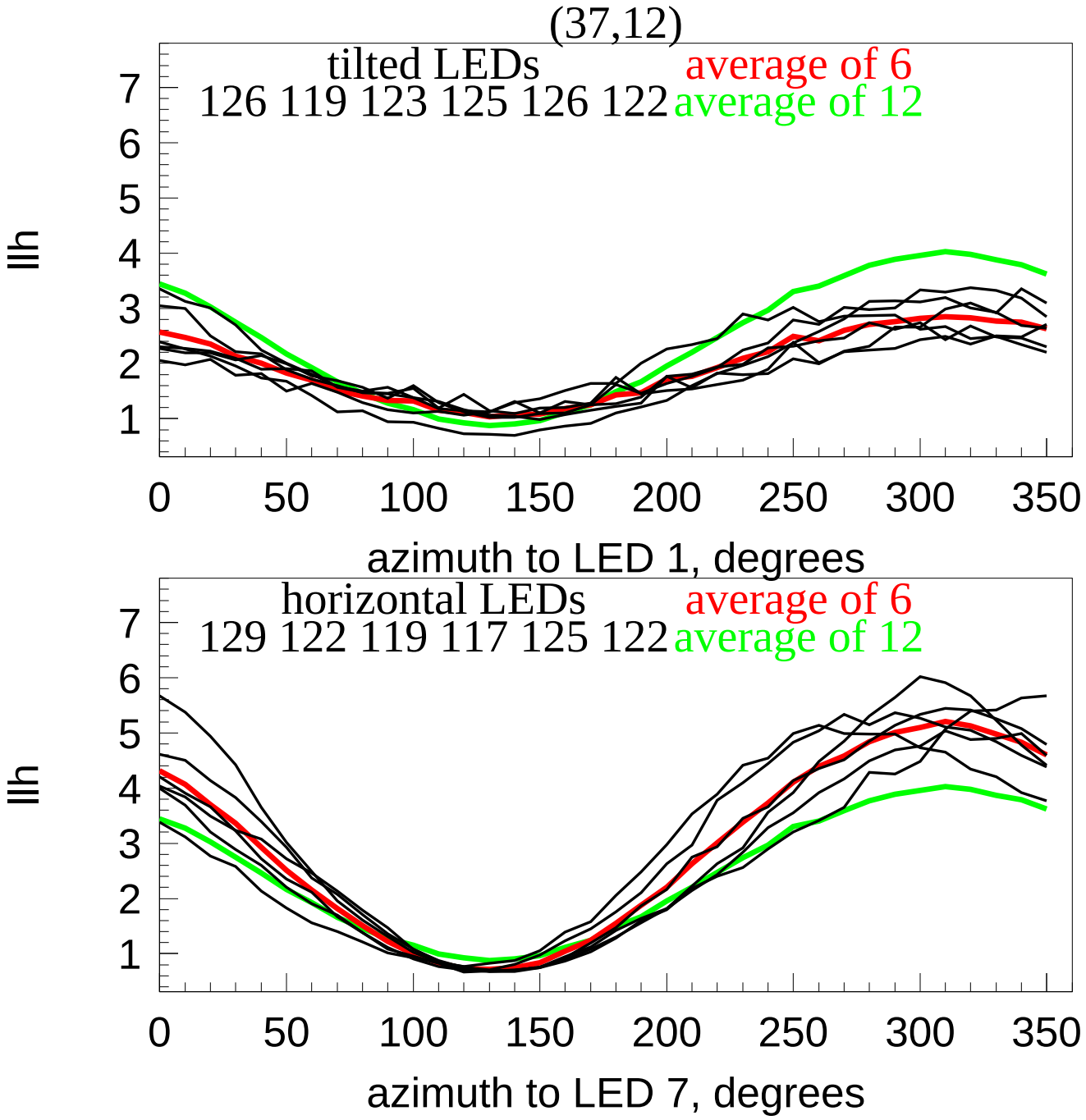

(37,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
18.7 ± 12.9
12
11
6
5
7
1
10
4
10
2
3
8
9

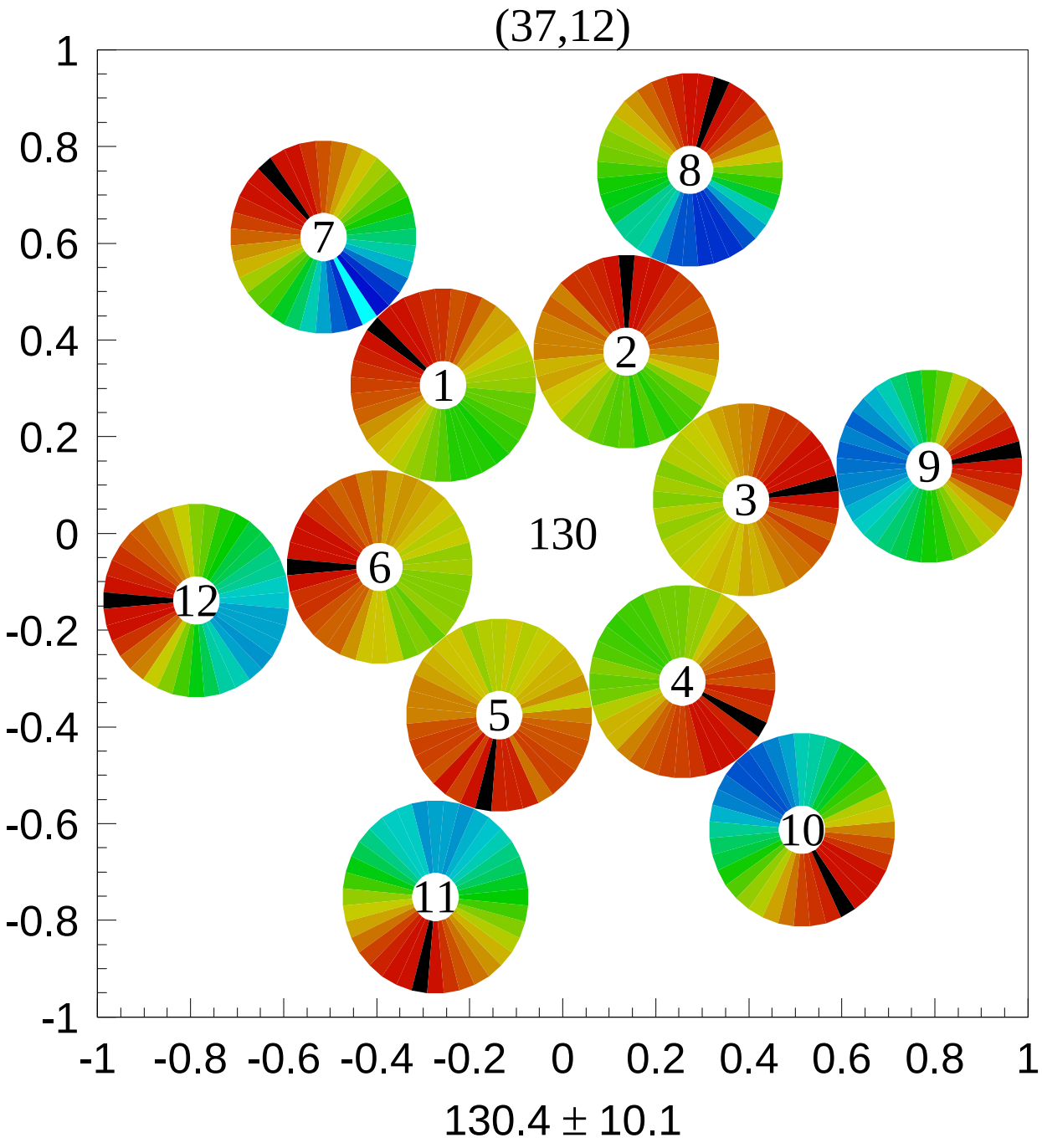

(37,10)
tilted LEDs
118 128 122 125 117 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 117 116 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

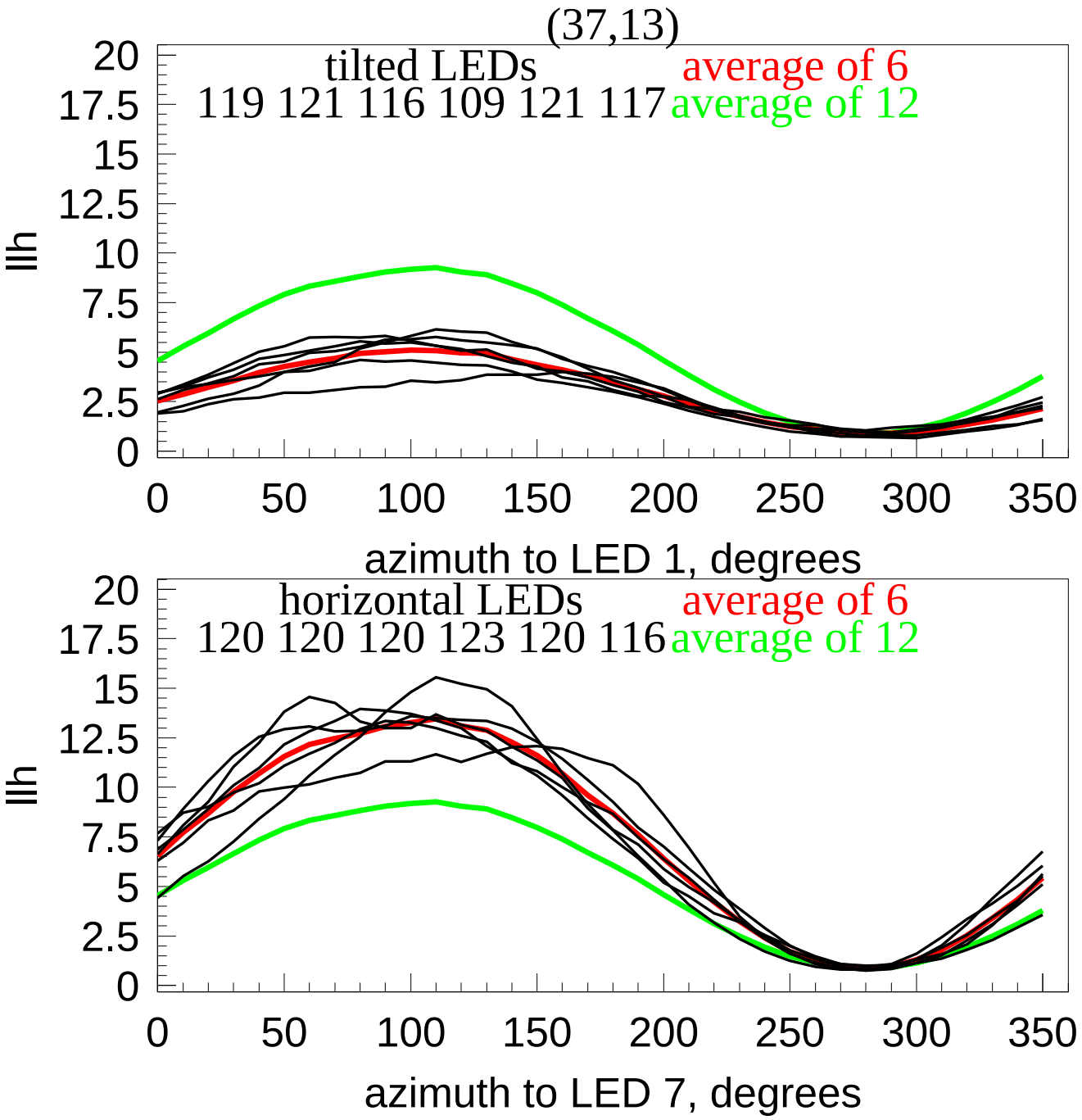

(37,10)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
319.8 ± 6.4

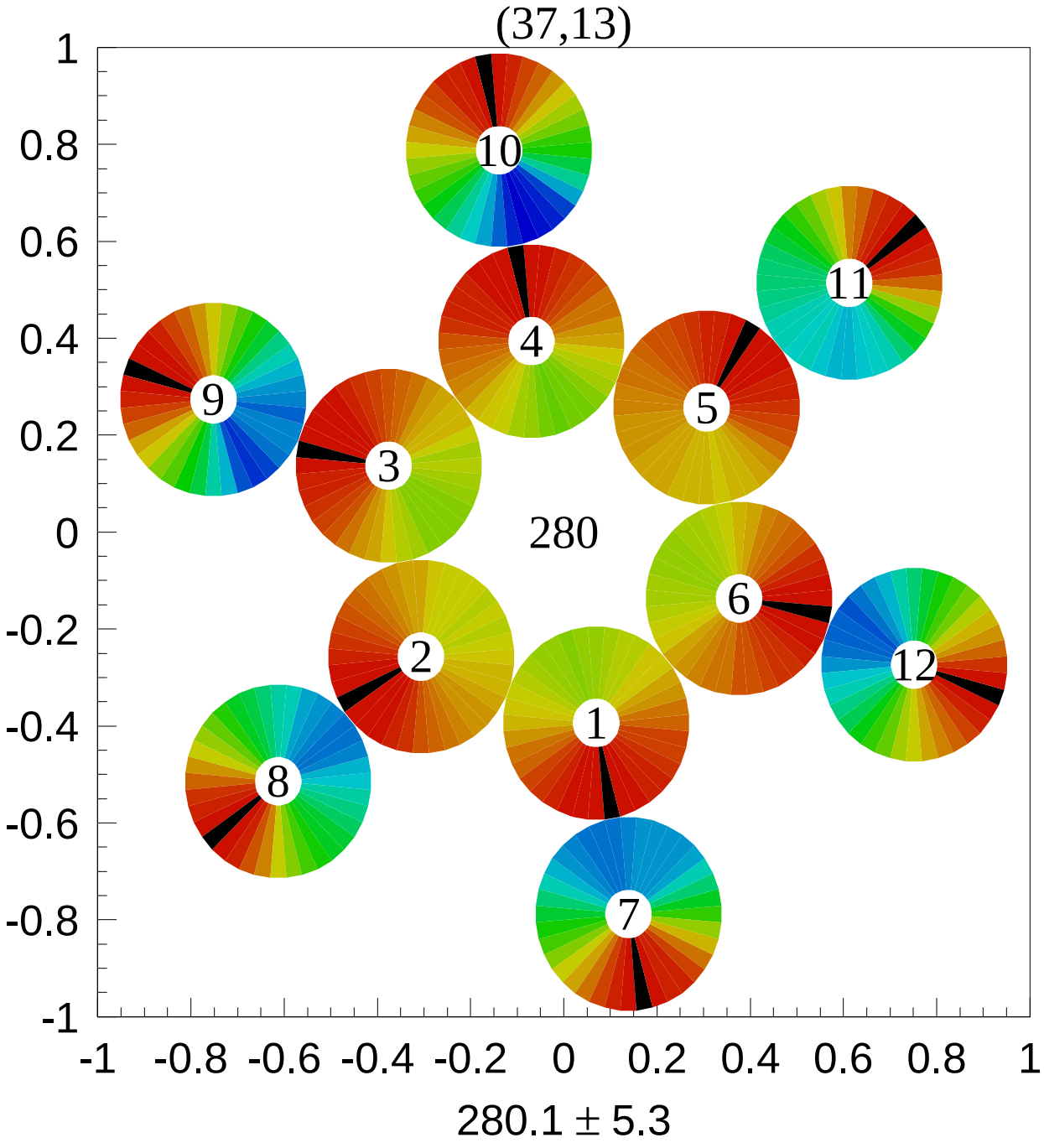

(37,11)
tilted LEDs
126 111 115 124 127 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 116 128 124 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

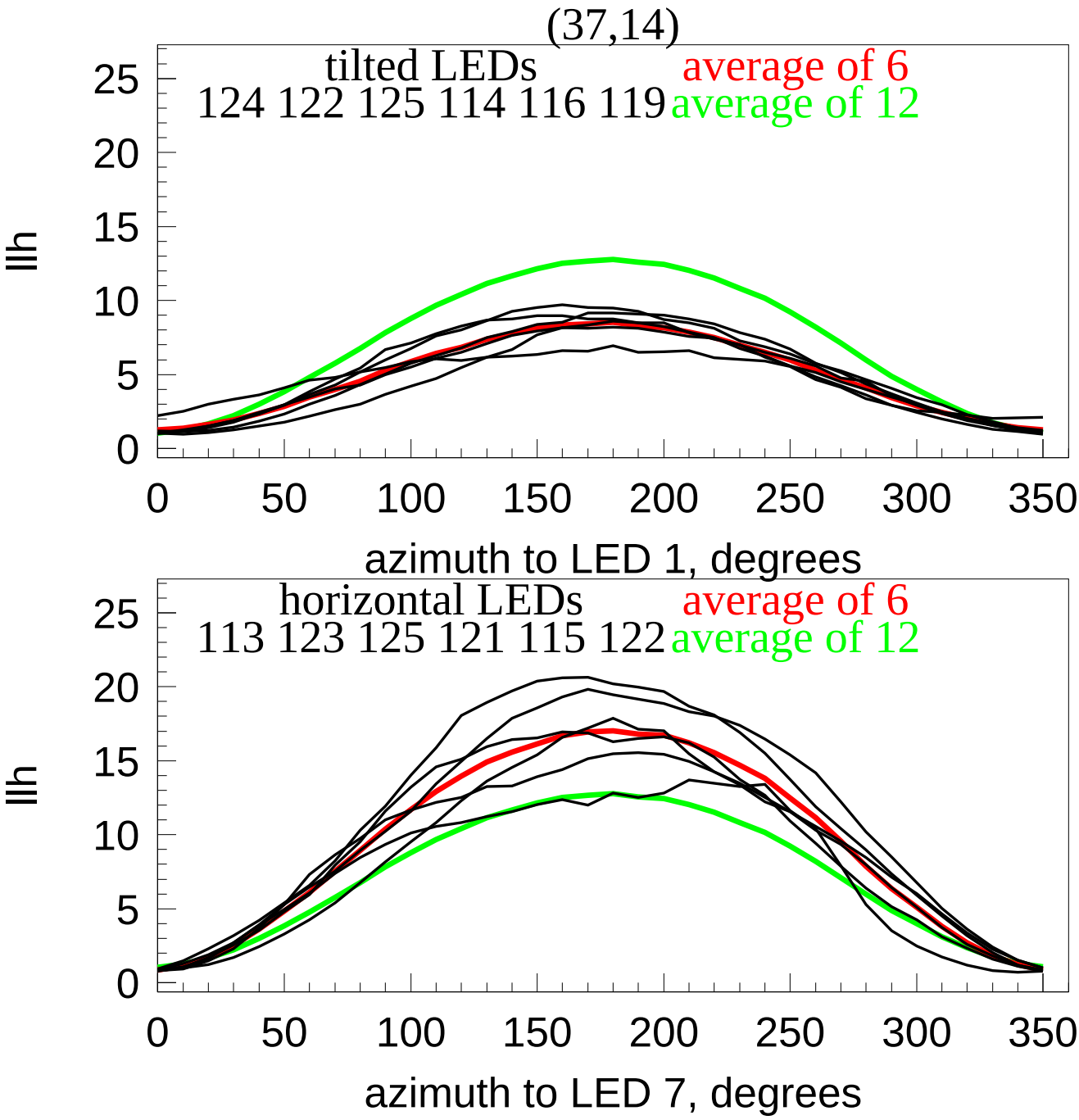

(37,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
267.9 ± 9.2

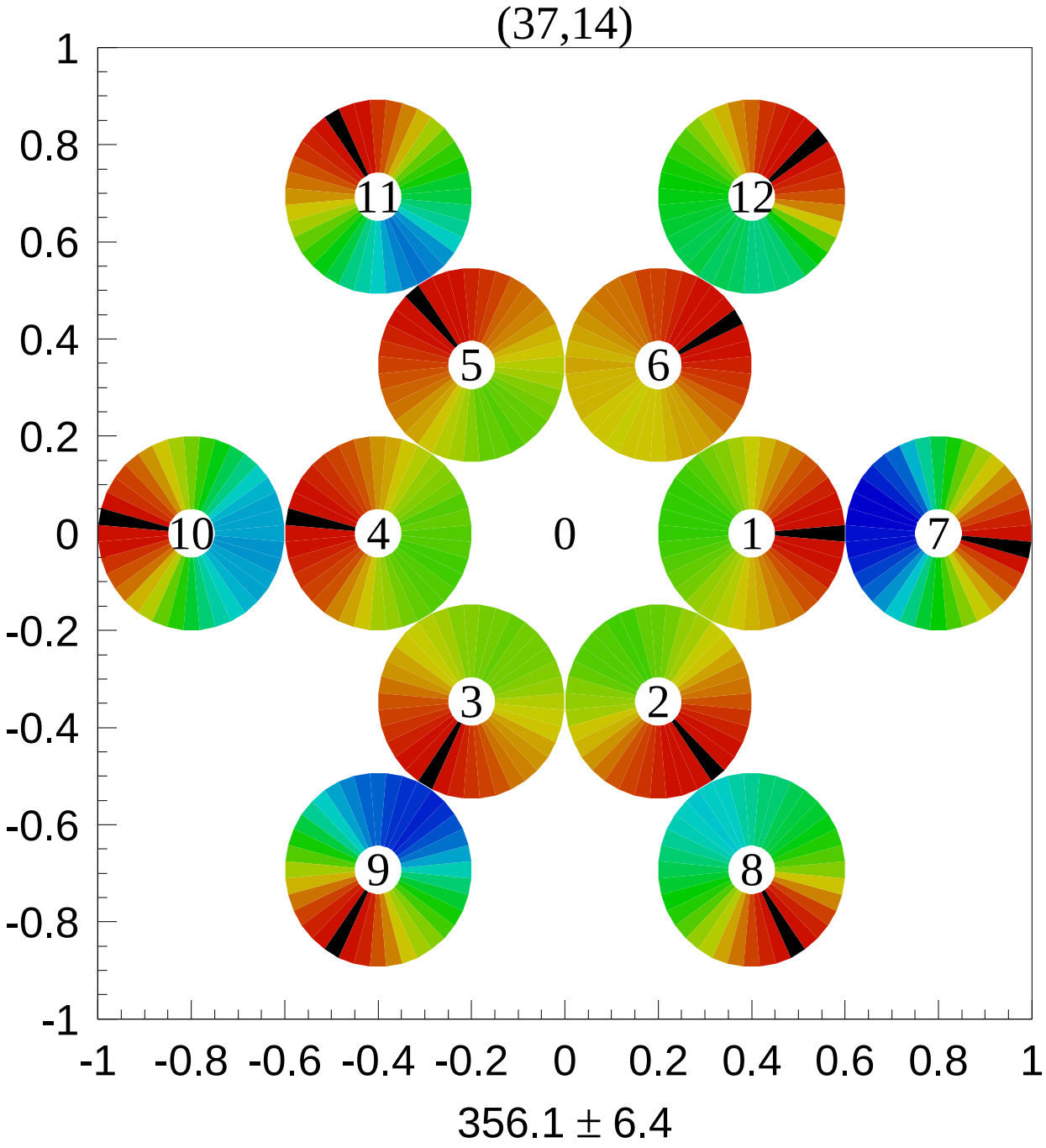

(37,12)
tilted LEDs
126 119 123 125 126 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
129 122 119 117 125 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

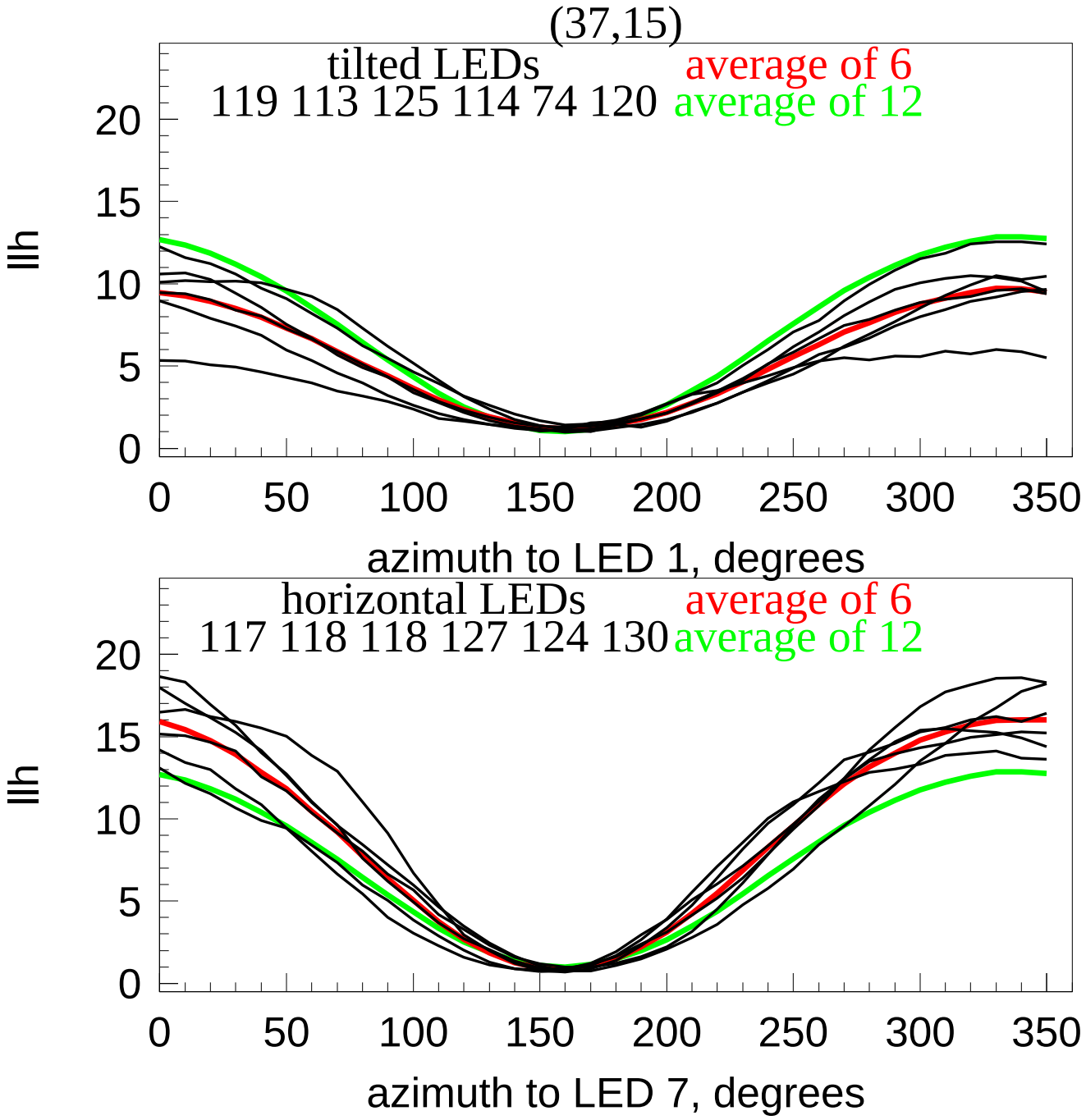

(37,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
130
1
2
3
4
5
6
7
8
9
10
11
12
130.4 ± 10.1

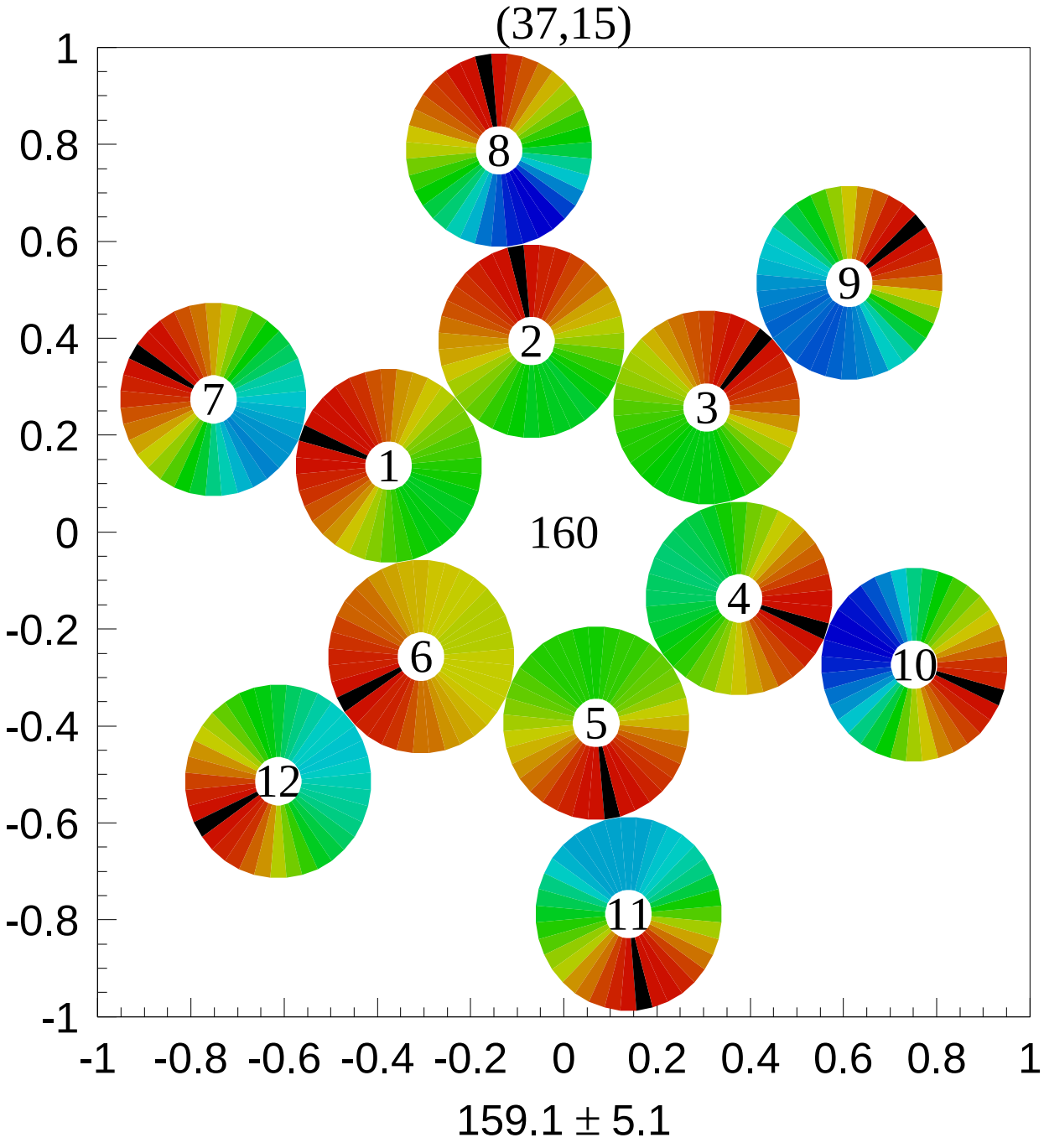

(37,13)
tilted LEDs
119 121 116 109 121 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 120 120 123 120 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

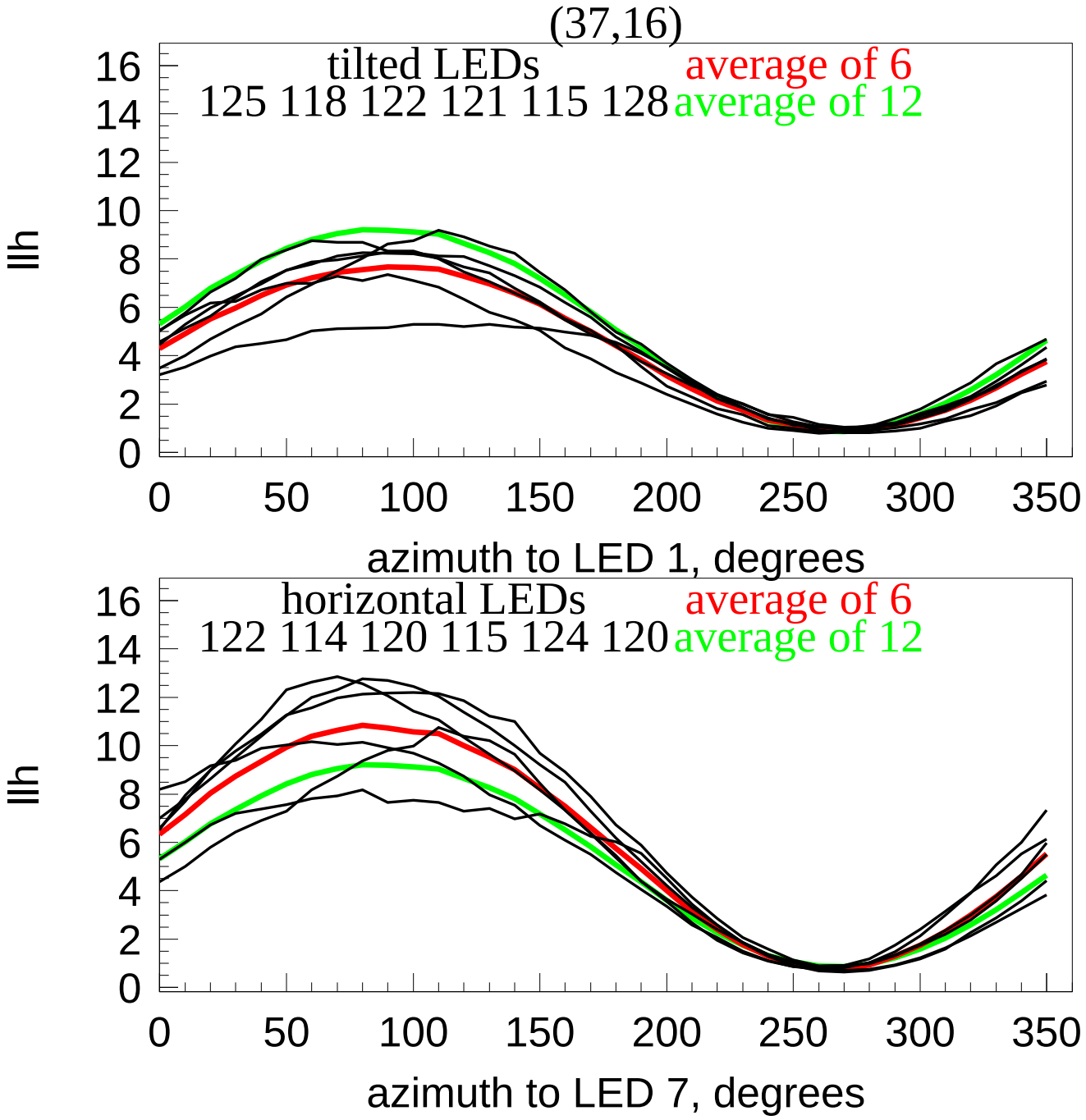

(37,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
280.1 ± 5.3

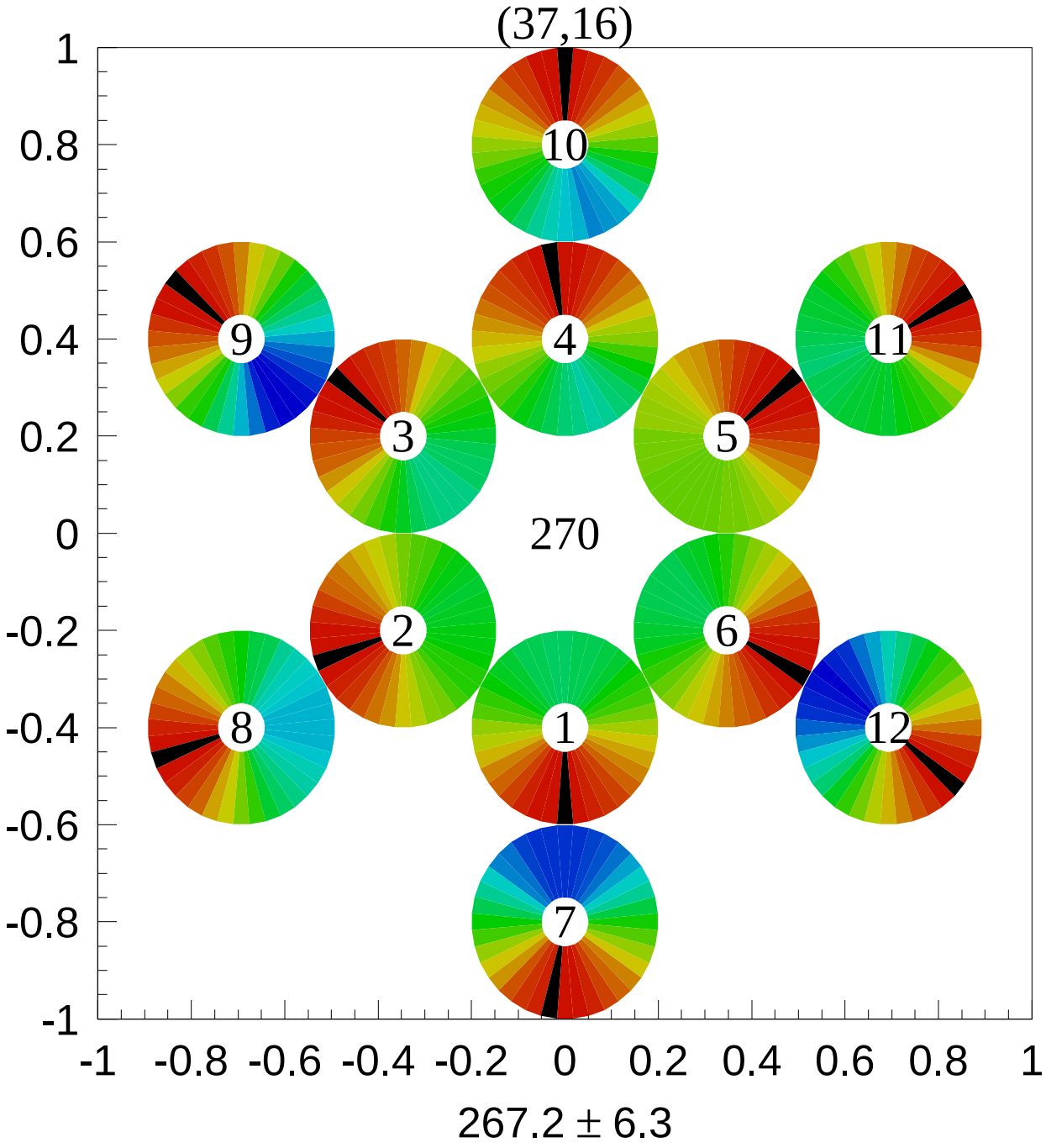

(37,14)
tilted LEDs
124 122 125 114 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 123 125 121 115 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

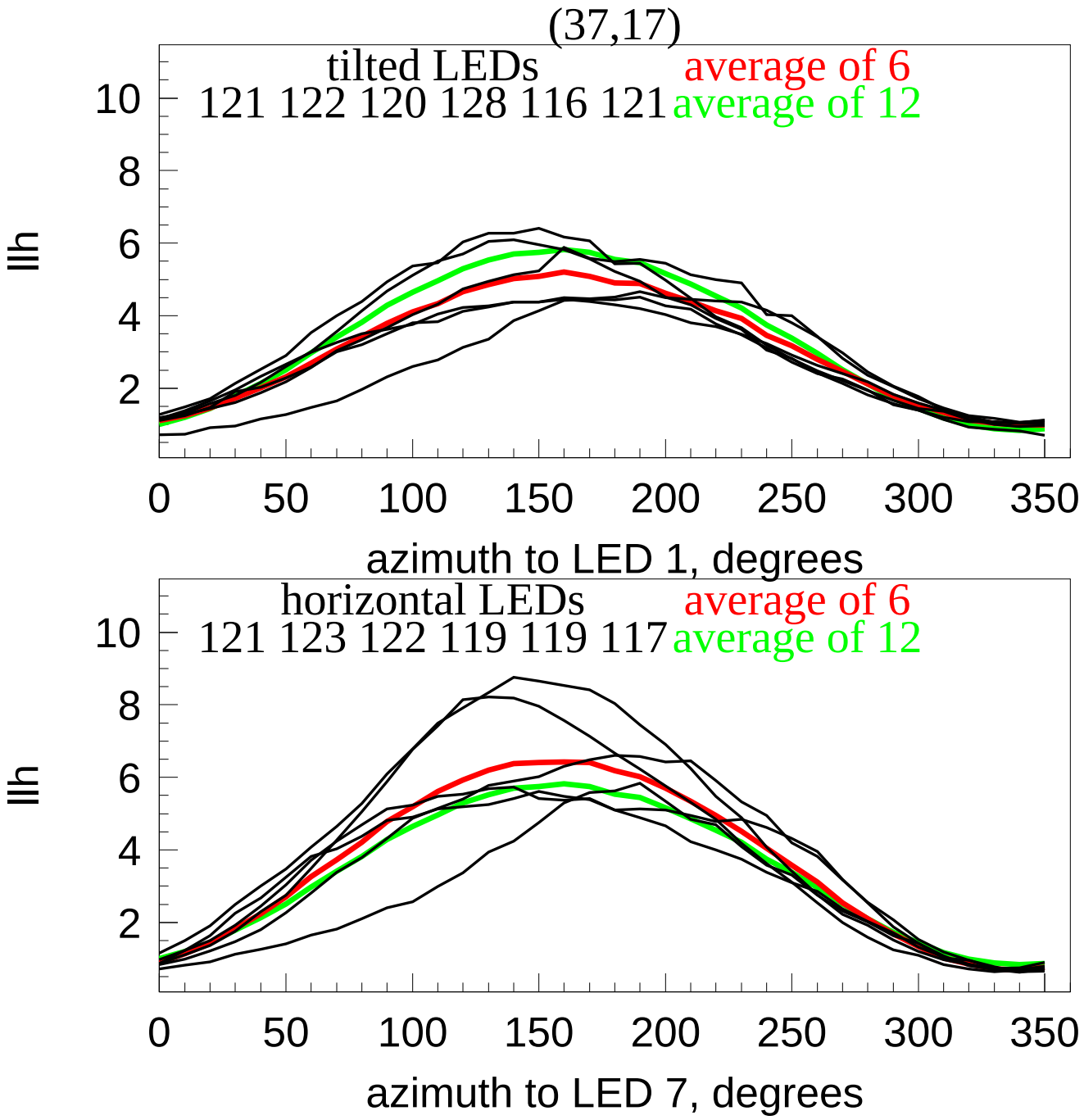

(37,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
356.1 ± 6.4

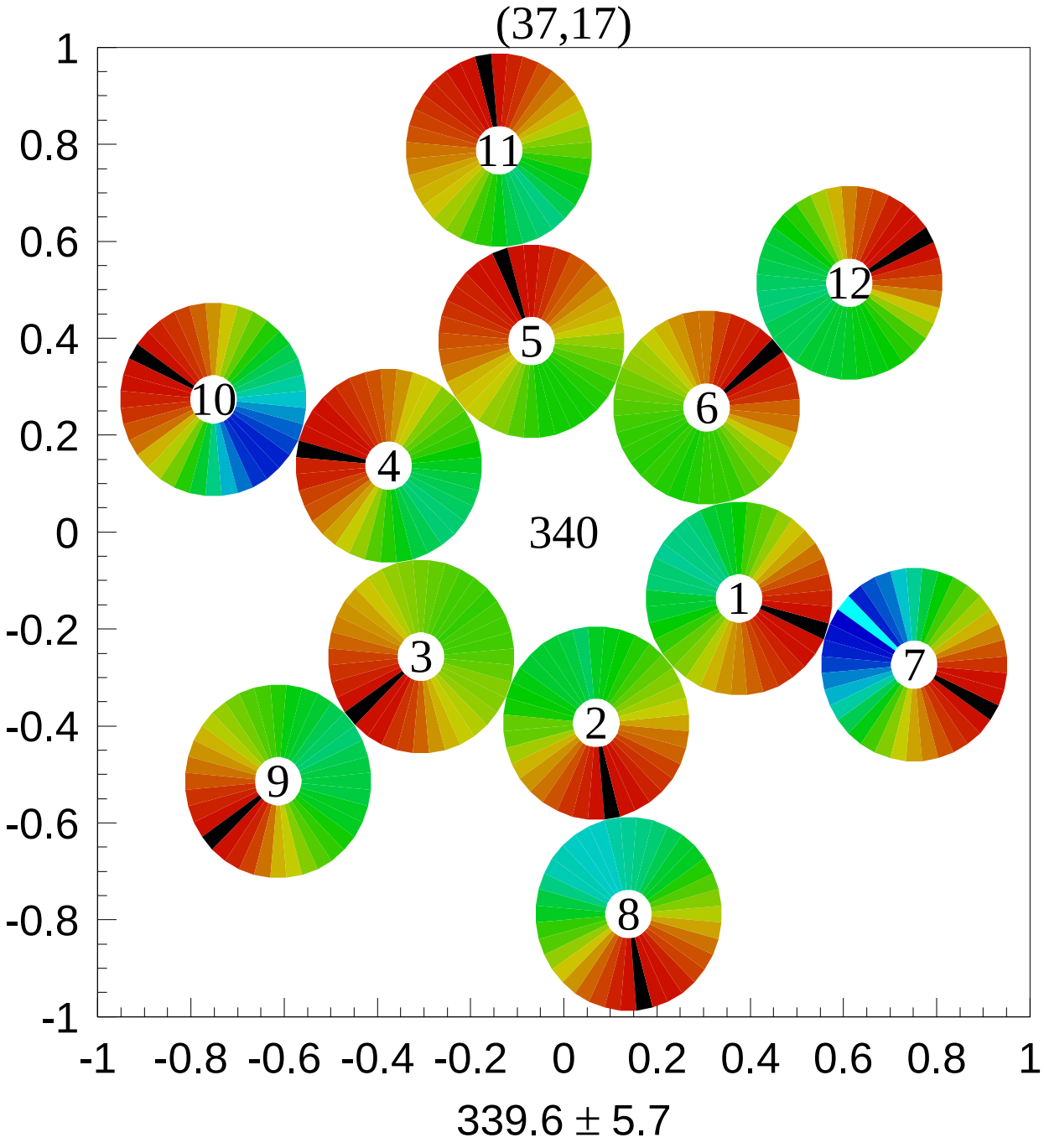

(37,15)
tilted LEDs
119 113 125 114 74 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 118 127 124 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

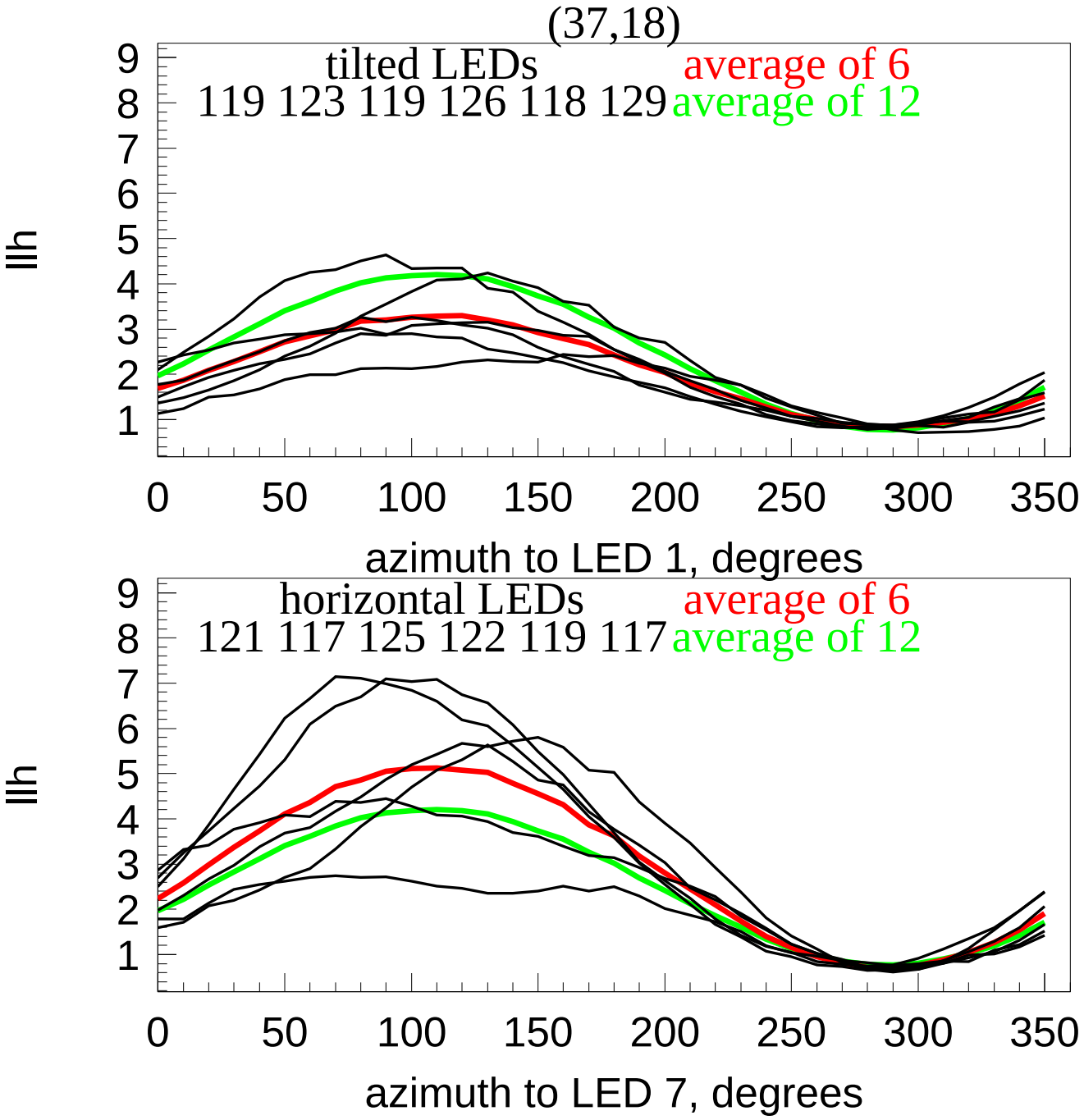

(37,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
159.1 ± 5.1

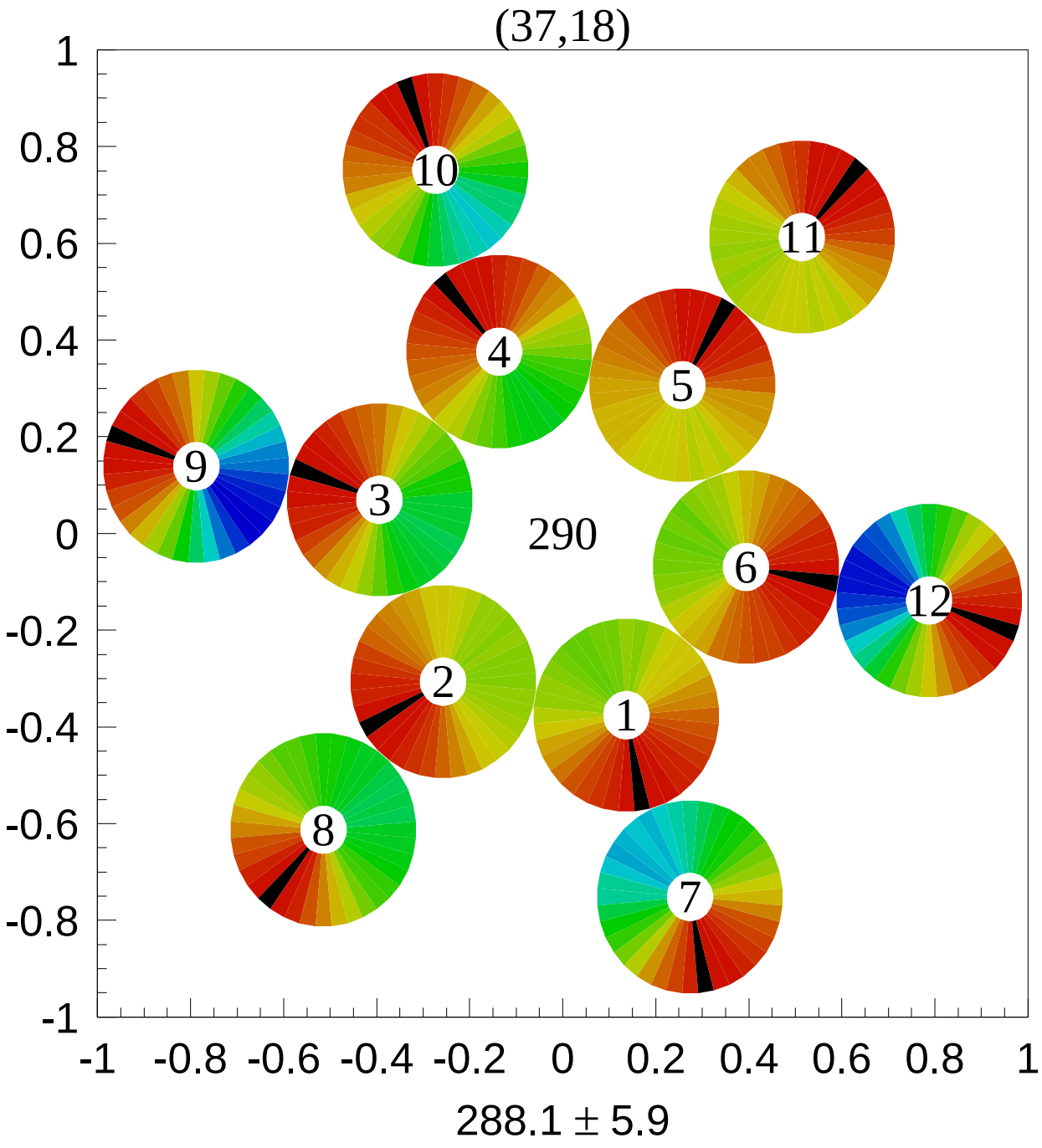

(37,16)
tilted LEDs
125 118 122 121 115 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 114 120 115 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

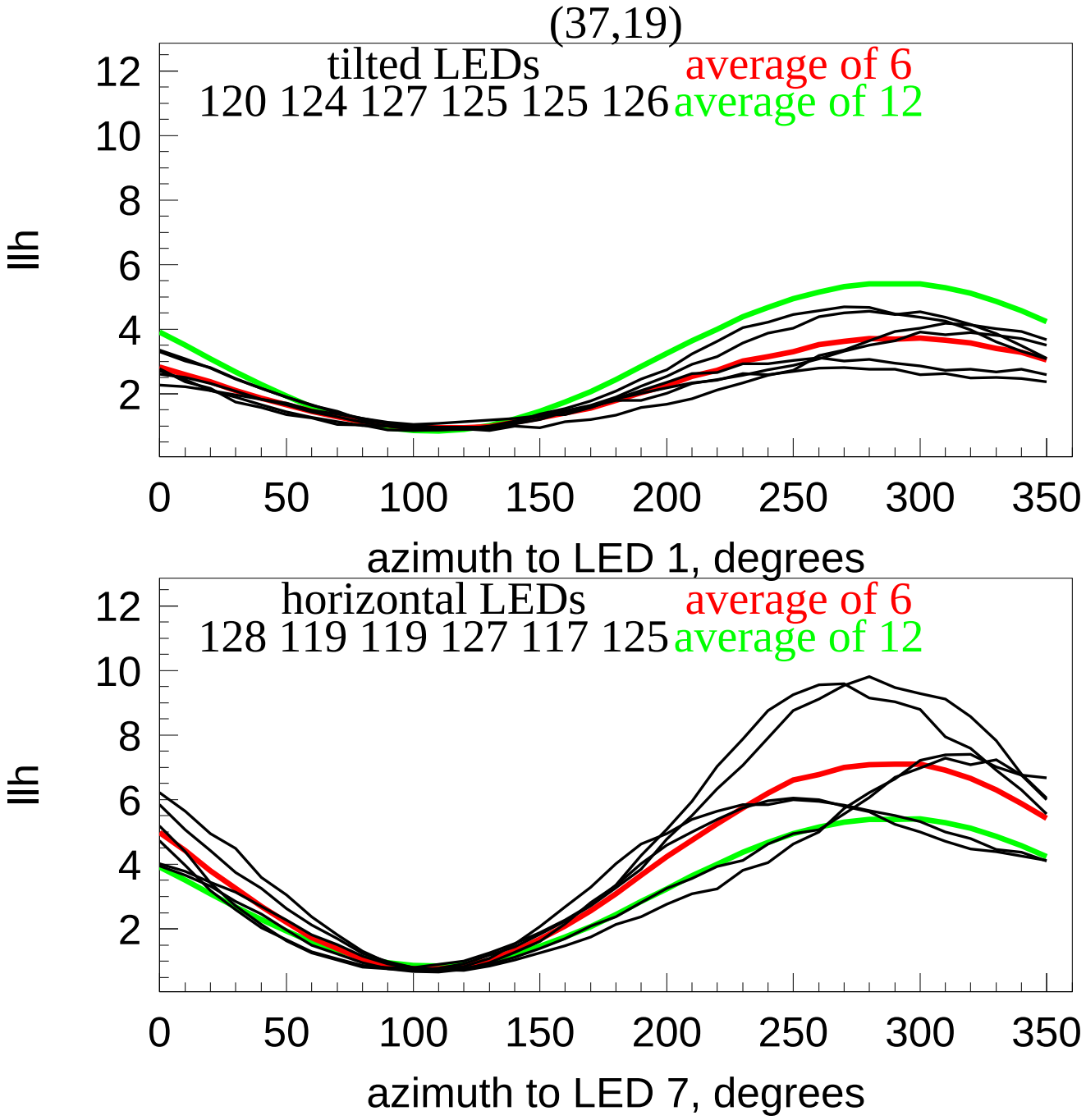

(37,16)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
267.2 ± 6.3

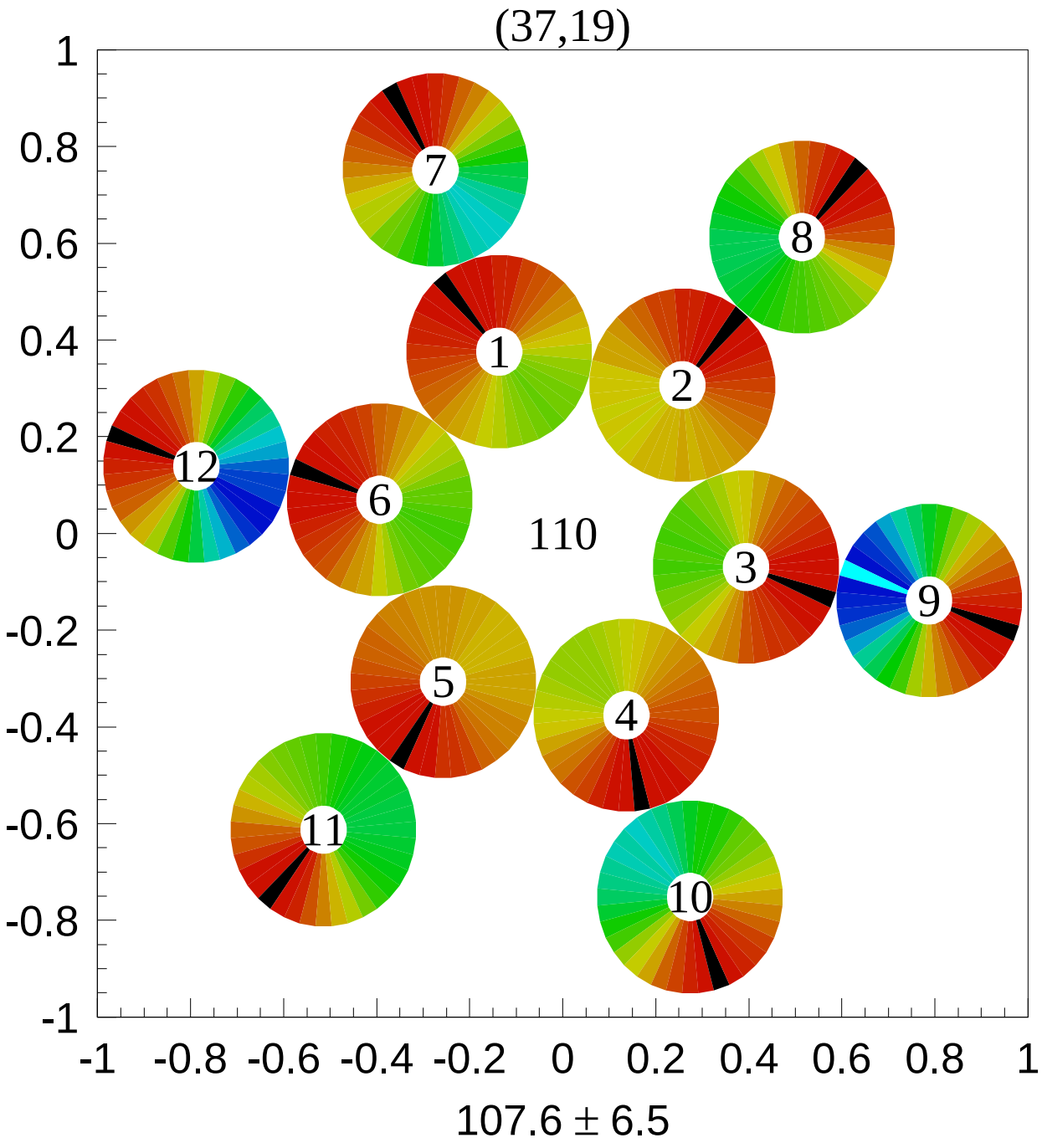

(37,17)
tilted LEDs
121 122 120 128 116 121
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 123 122 119 119 117
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

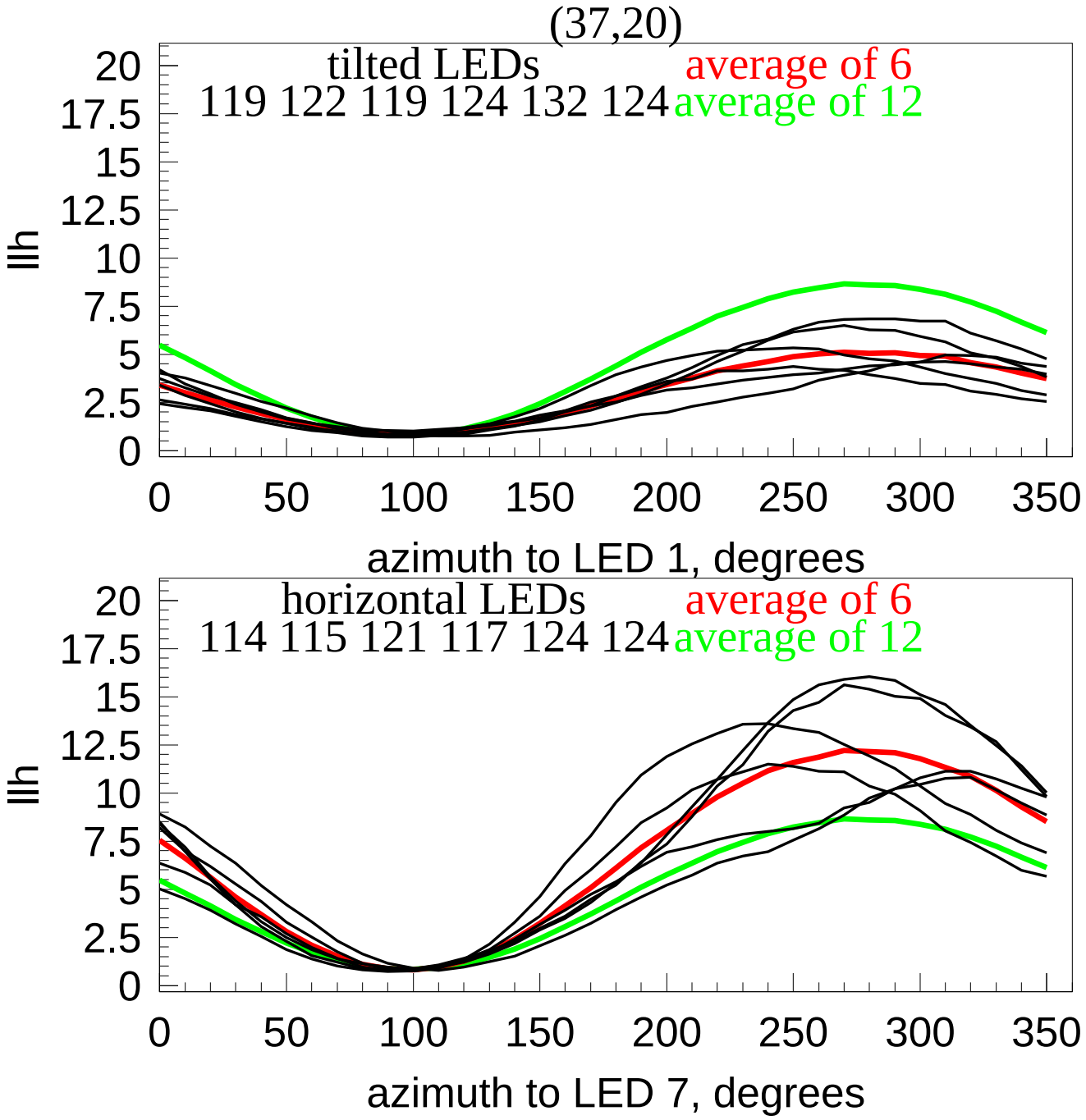

(37,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
3
7
2
9
8
339.6 ± 5.7

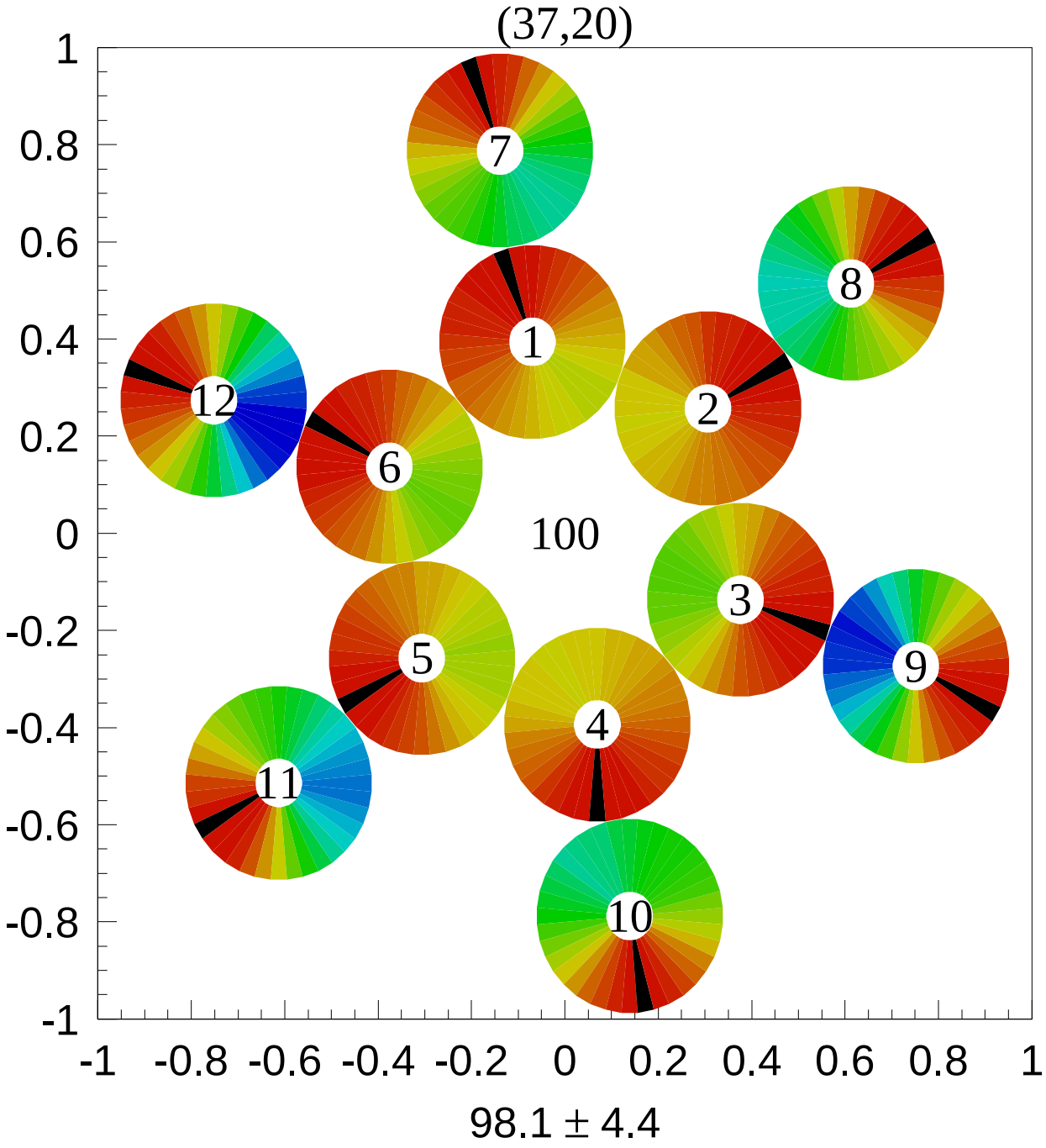

(37,18)
tilted LEDs
119 123 119 126 118 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 117 125 122 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

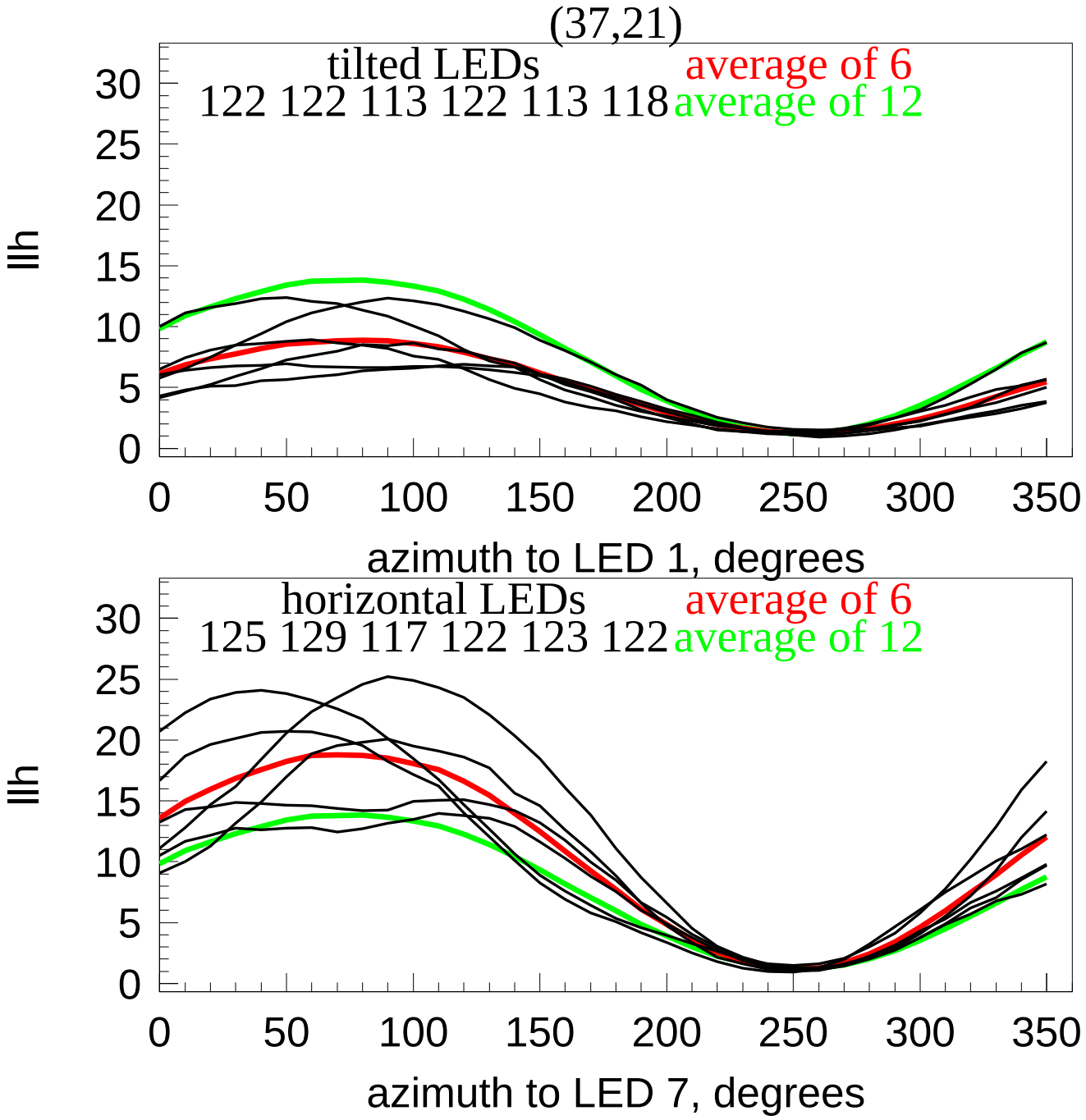

(37,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
288.1 ± 5.9

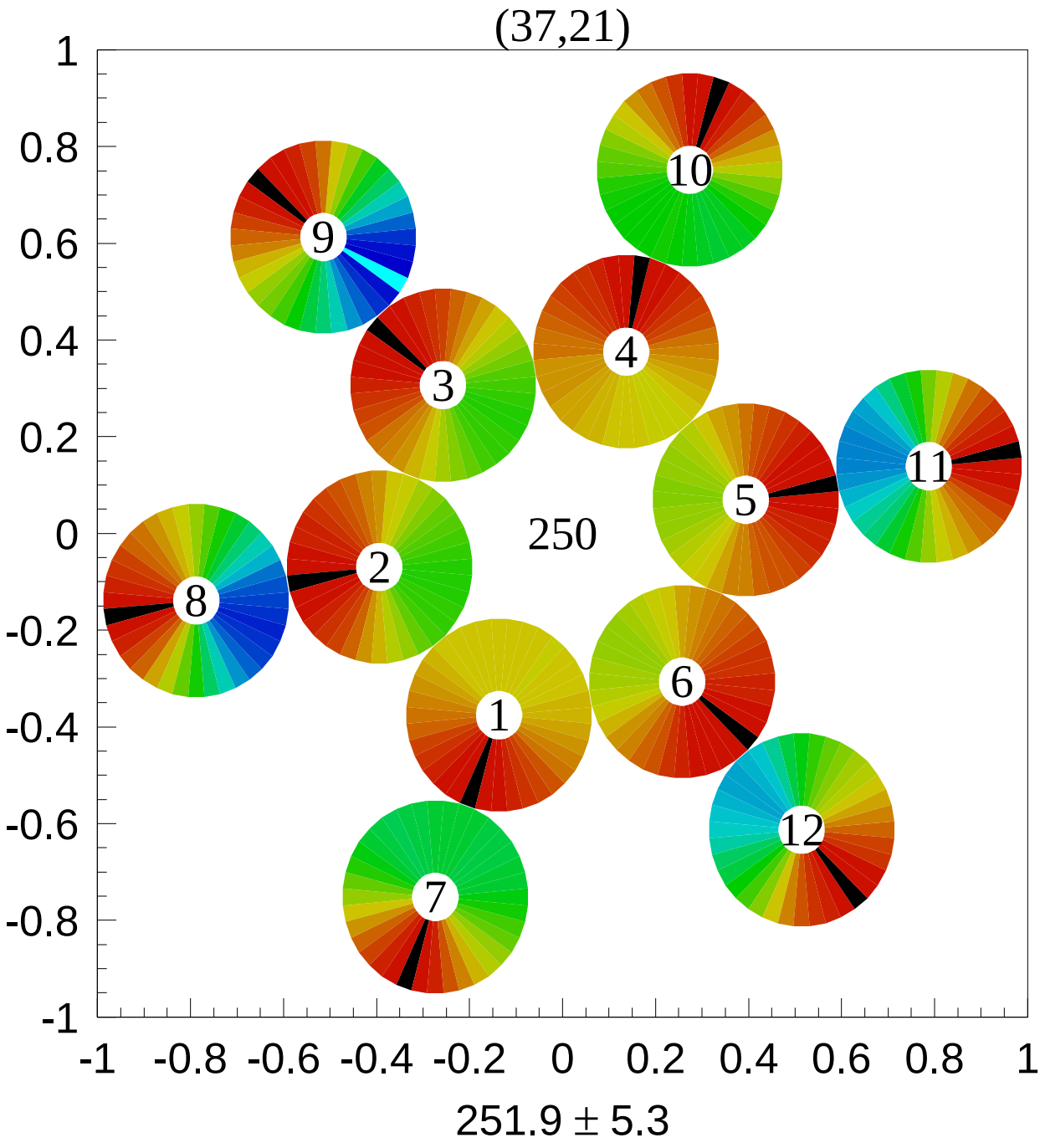

(37,19)
tilted LEDs
120 124 127 125 125 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 119 119 127 117 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

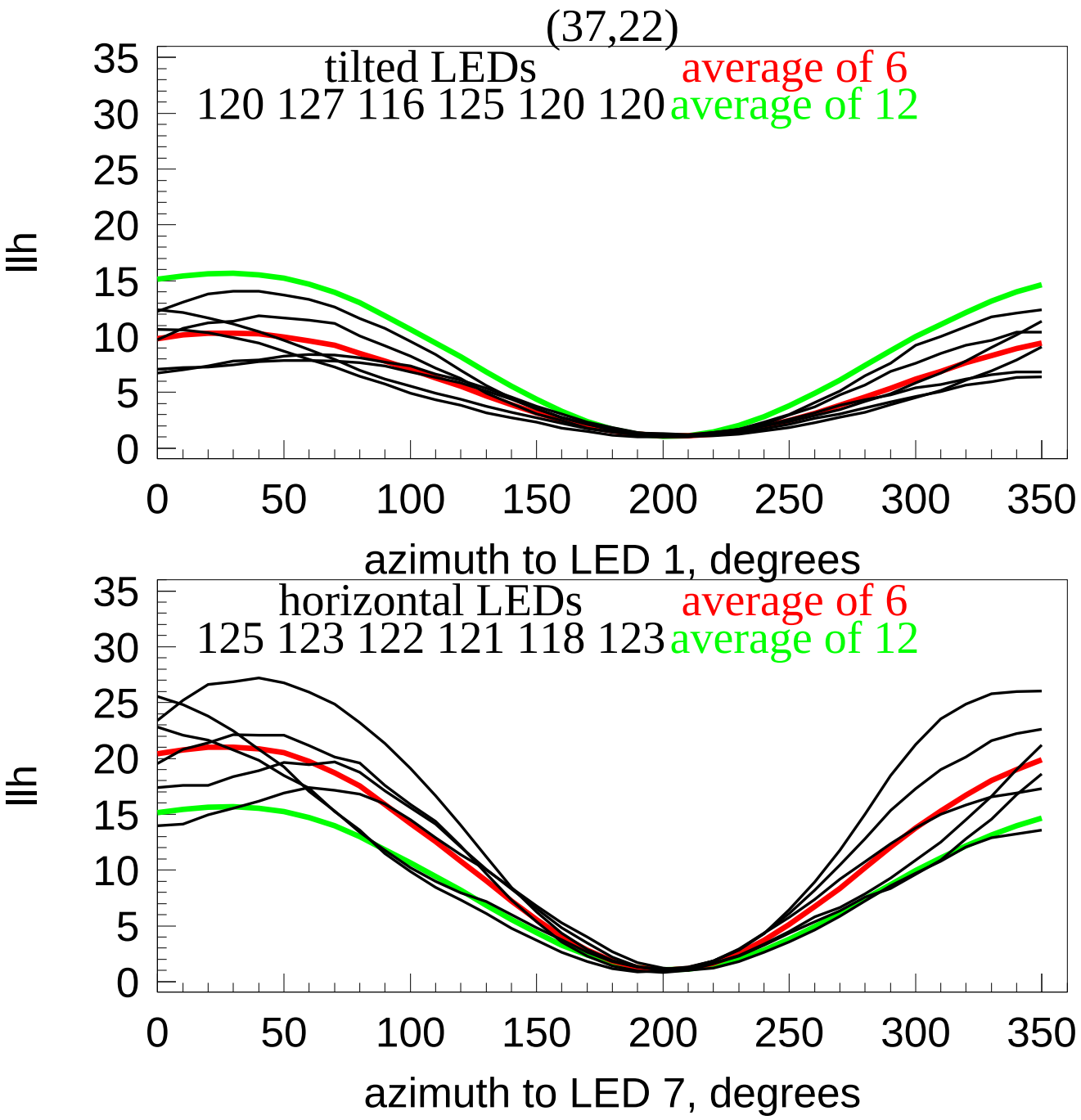

(37,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
107.6 ± 6.5

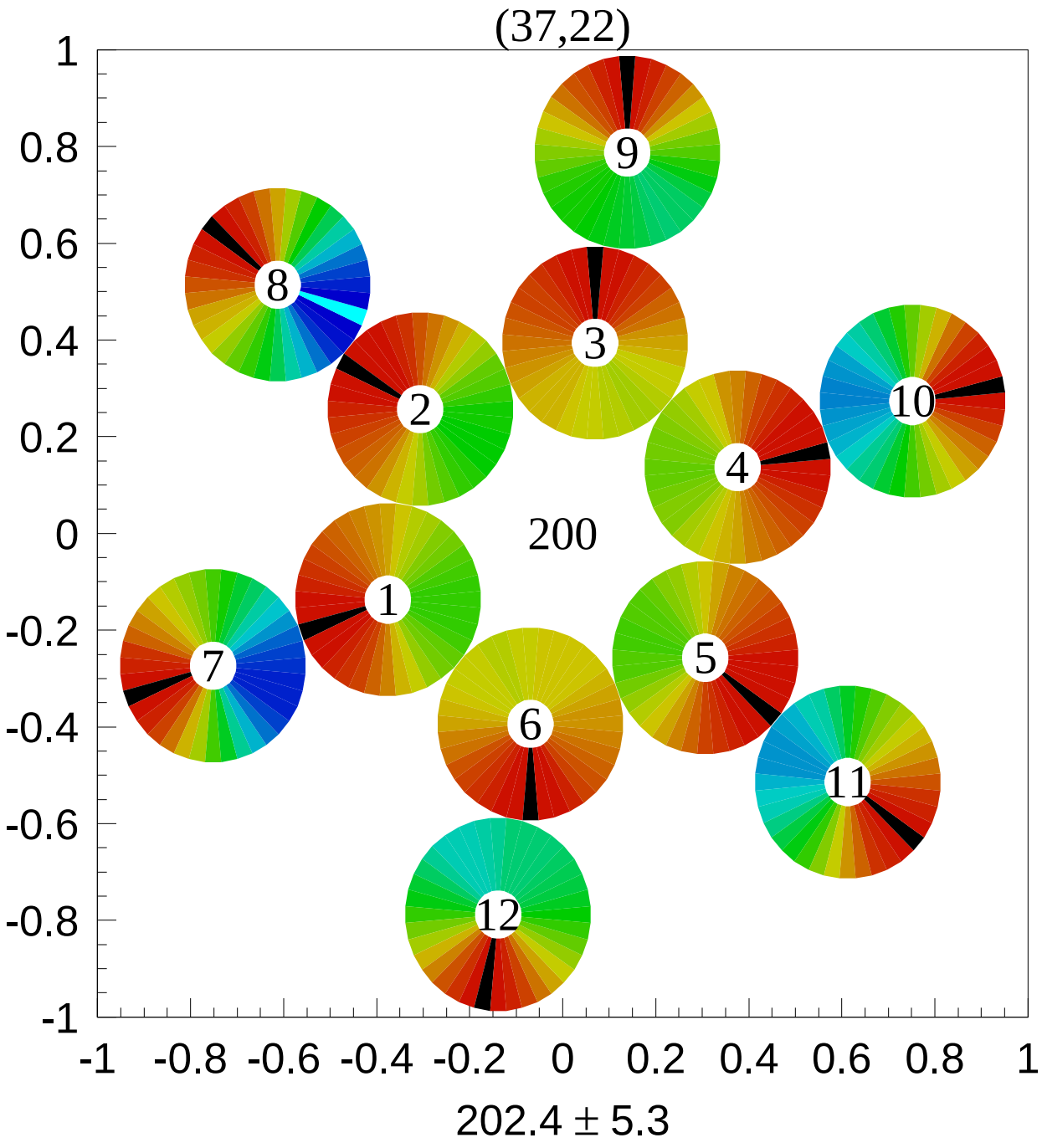

(37,20)
tilted LEDs
119 122 119 124 132 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 115 121 117 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

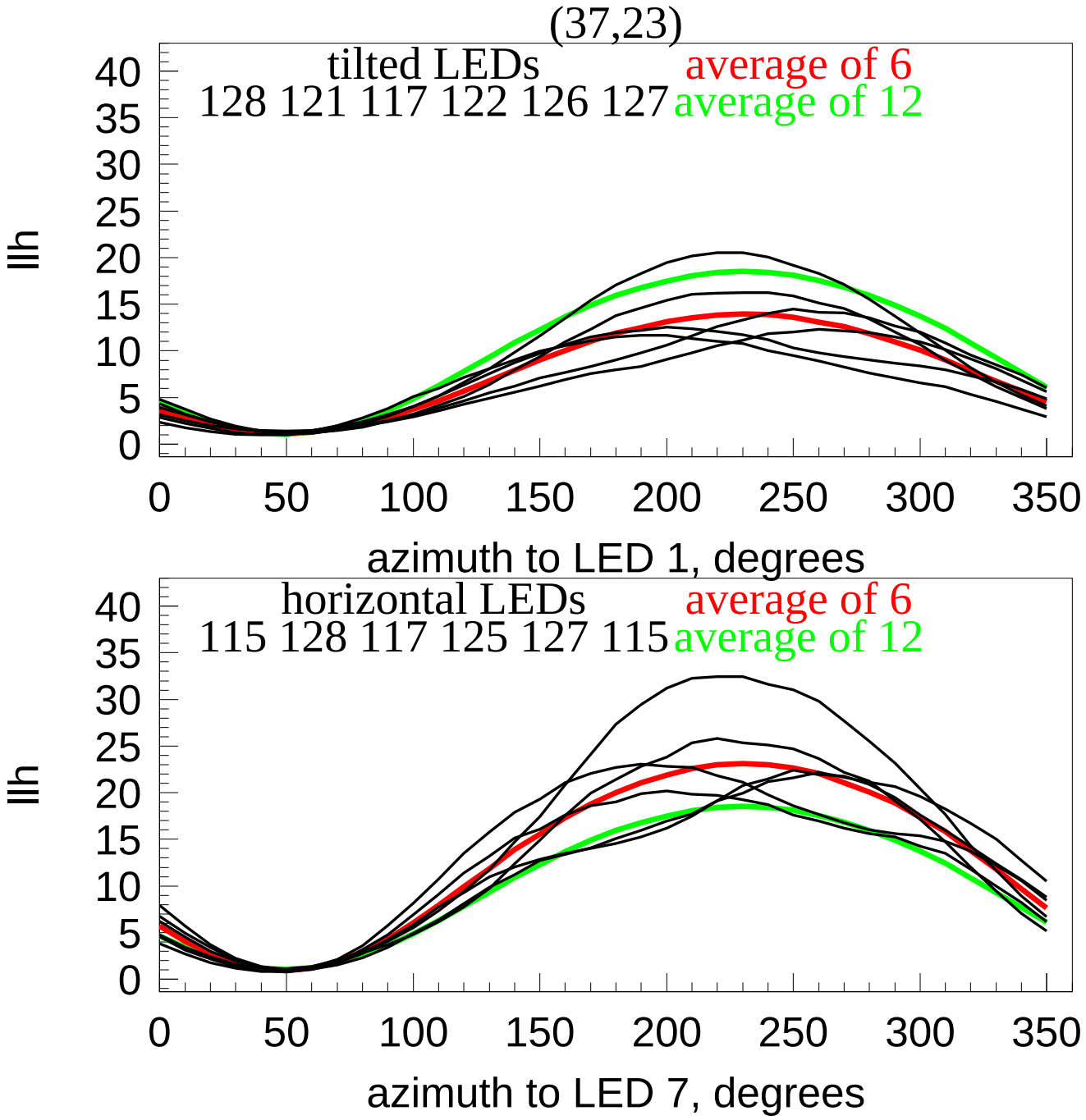

(37,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
1
8
12
2
6
100
3
5
9
4
11
10
98.1 ± 4.4

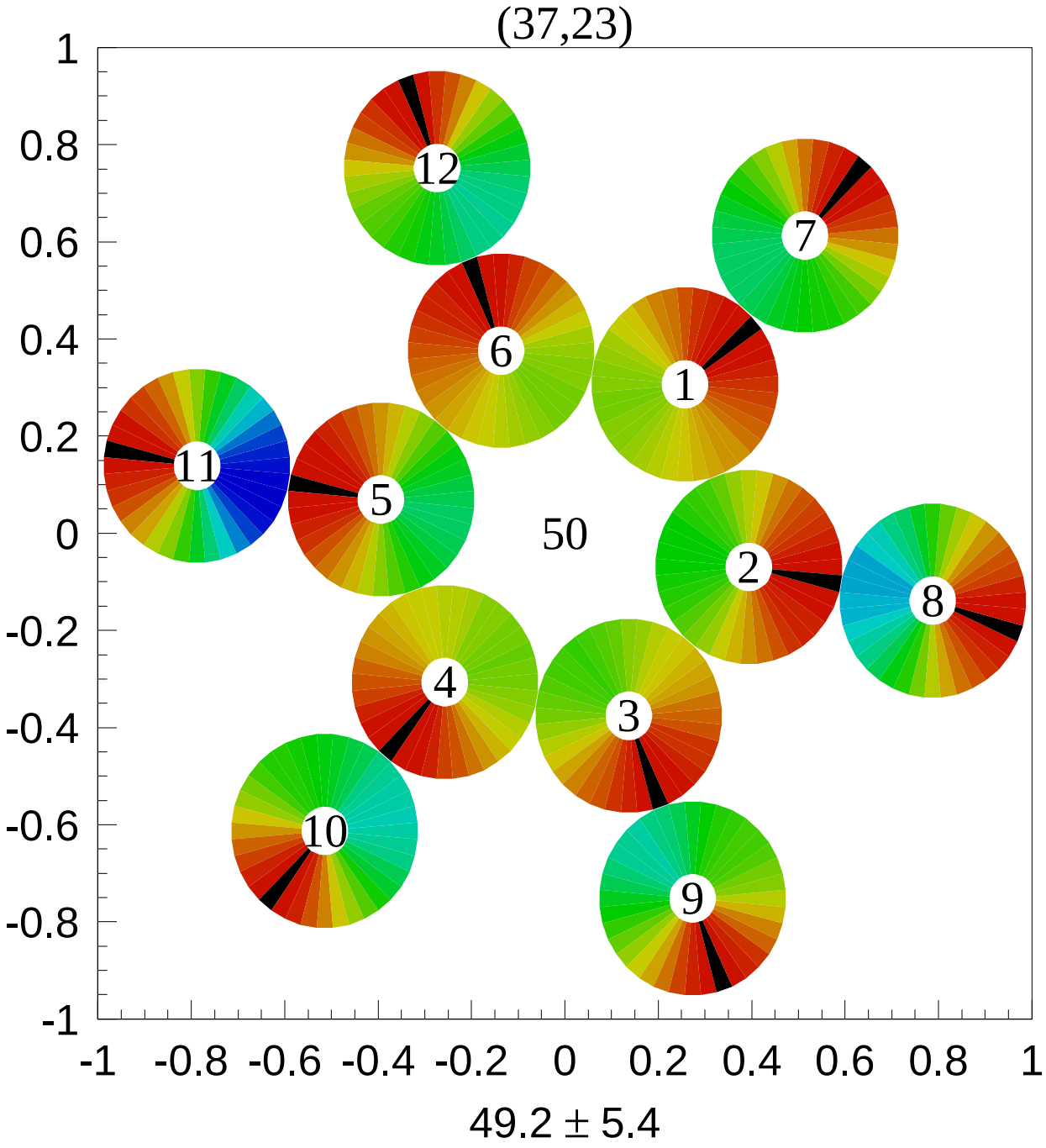

(37,21)
tilted LEDs
122 122 113 122 113 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 129 117 122 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

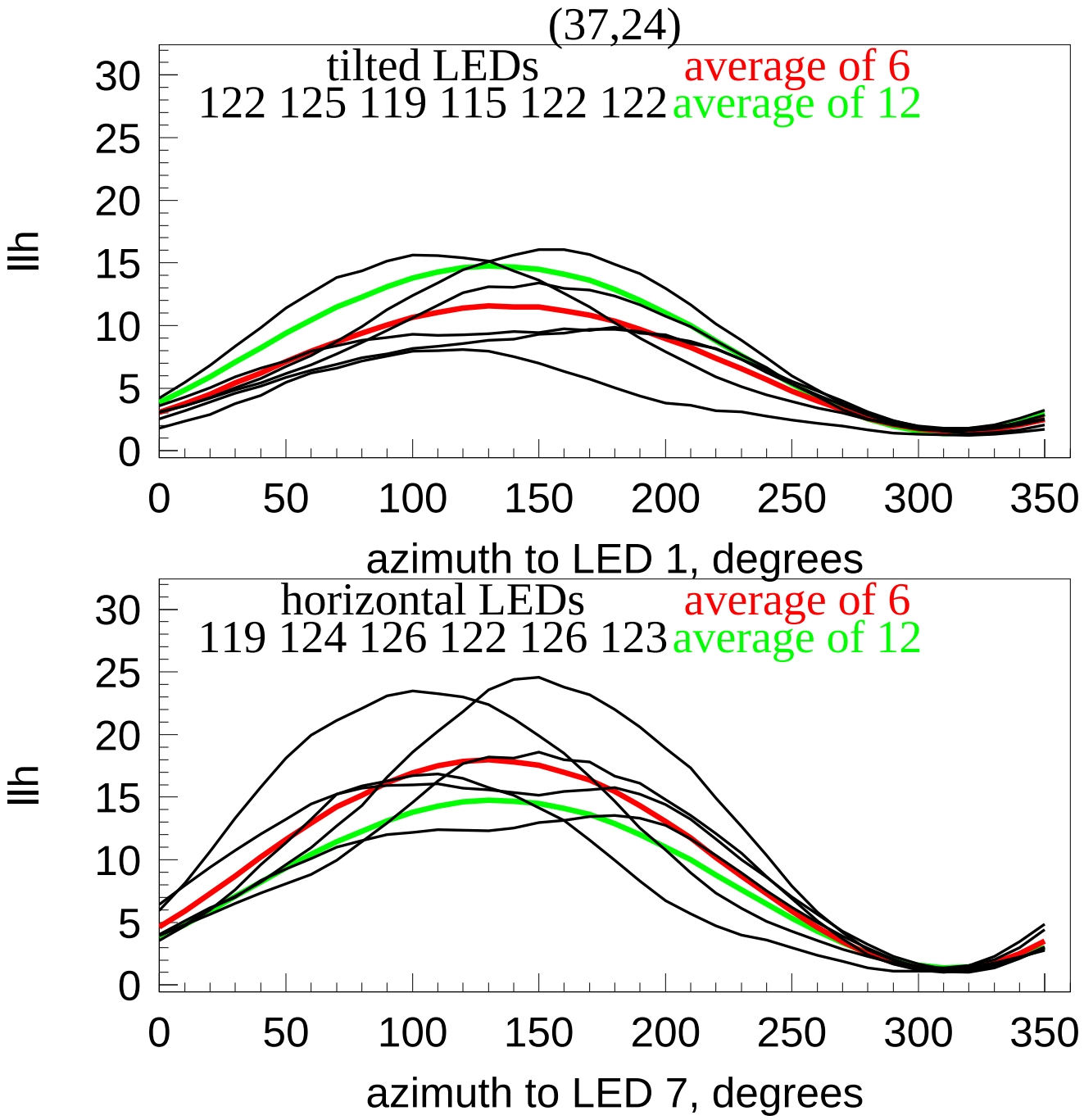

(37,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
251.9 ± 5.3

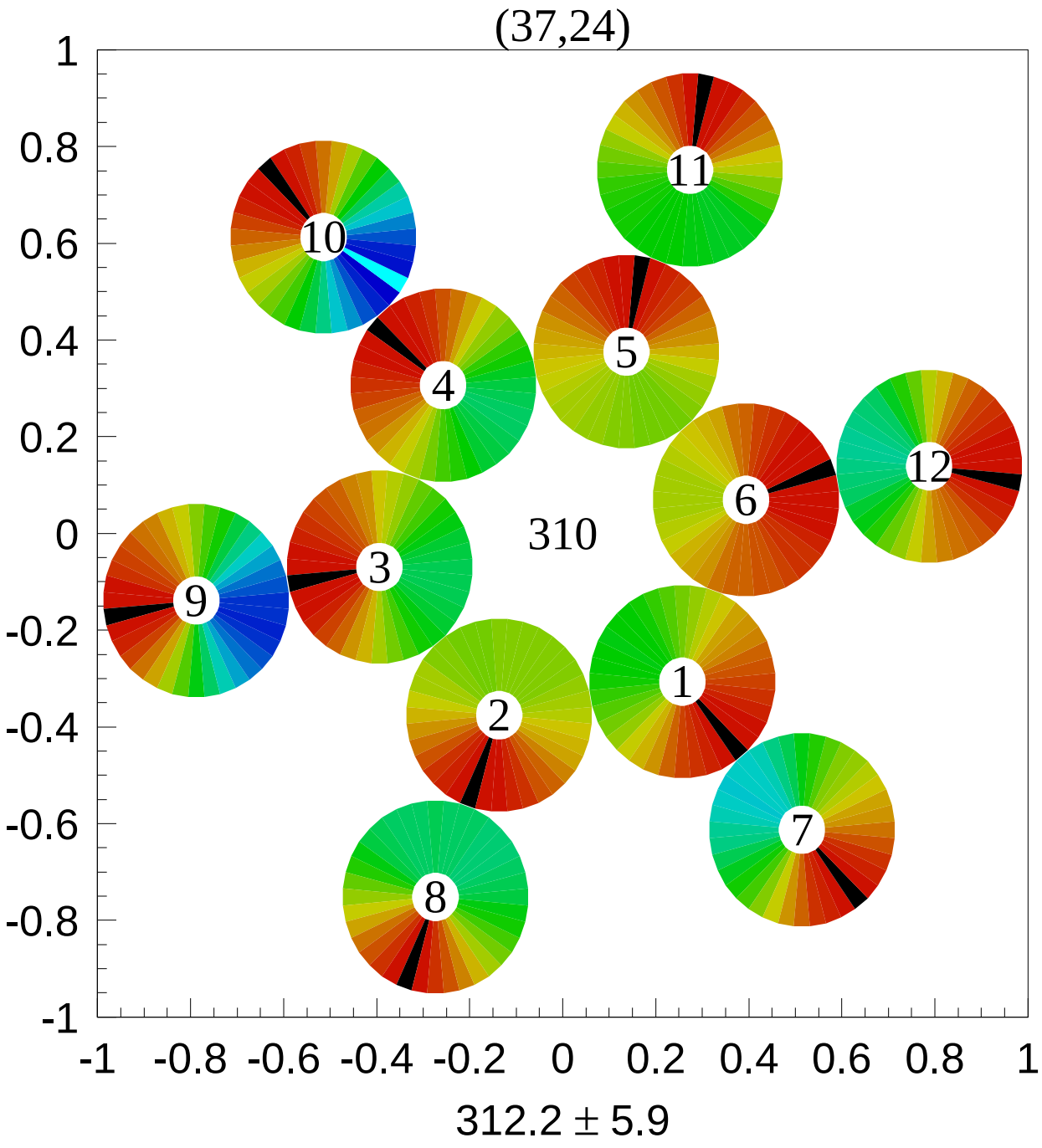

(37,22)
tilted LEDs
120 127 116 125 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 122 121 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

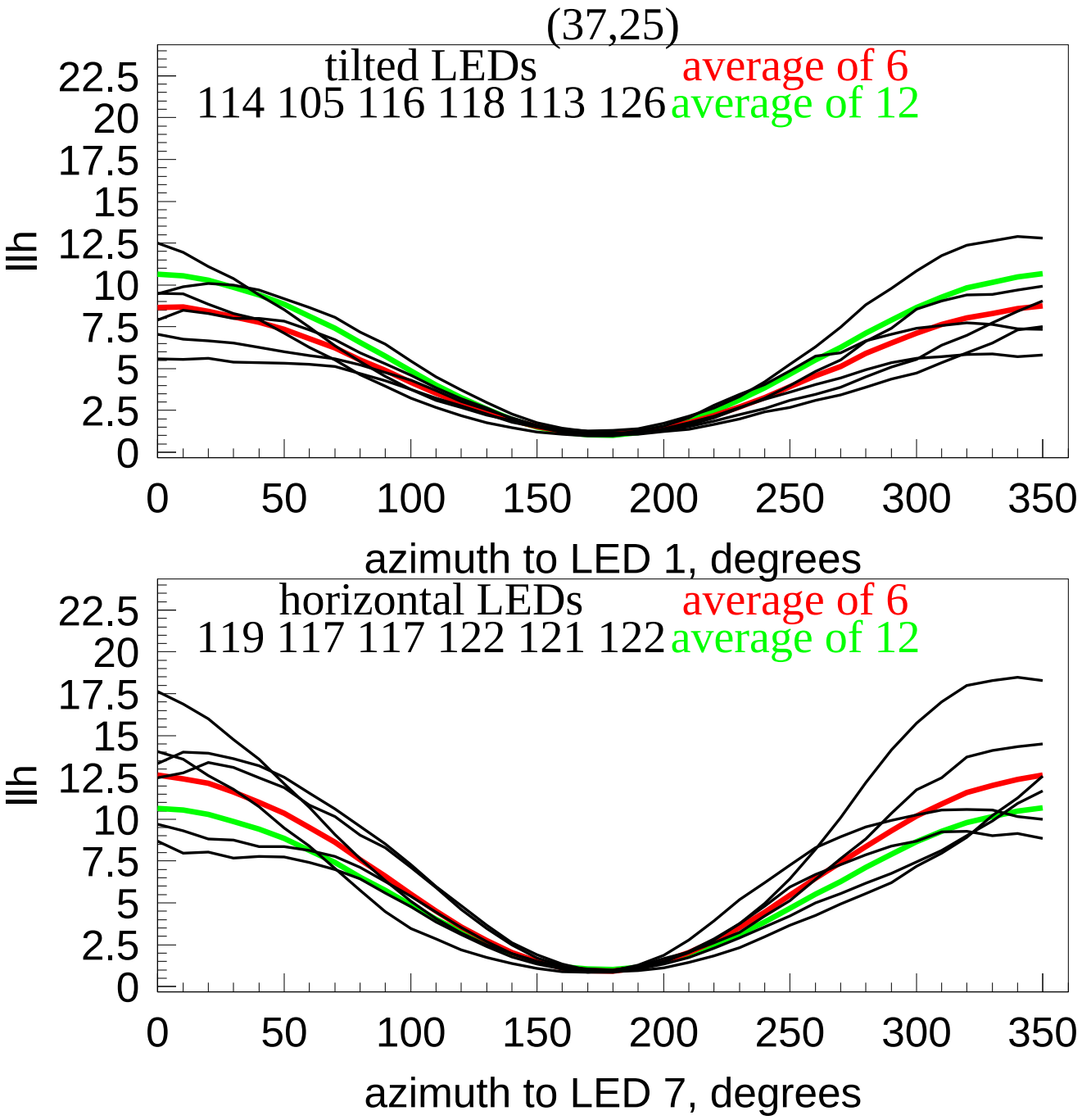

(37,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
202.4 ± 5.3

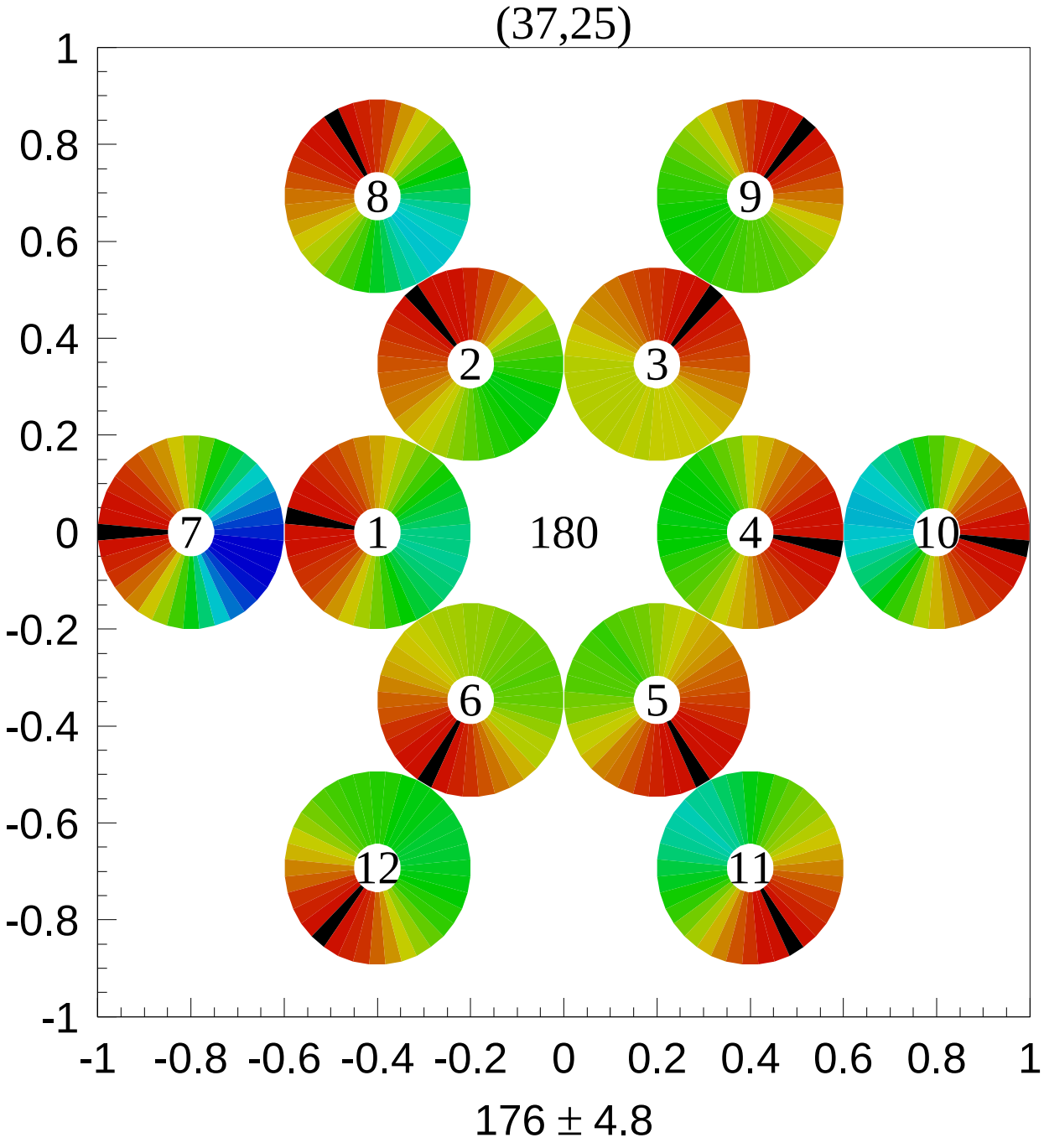

(37,23)
tilted LEDs
128 121 117 122 126 127
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 128 117 125 127 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

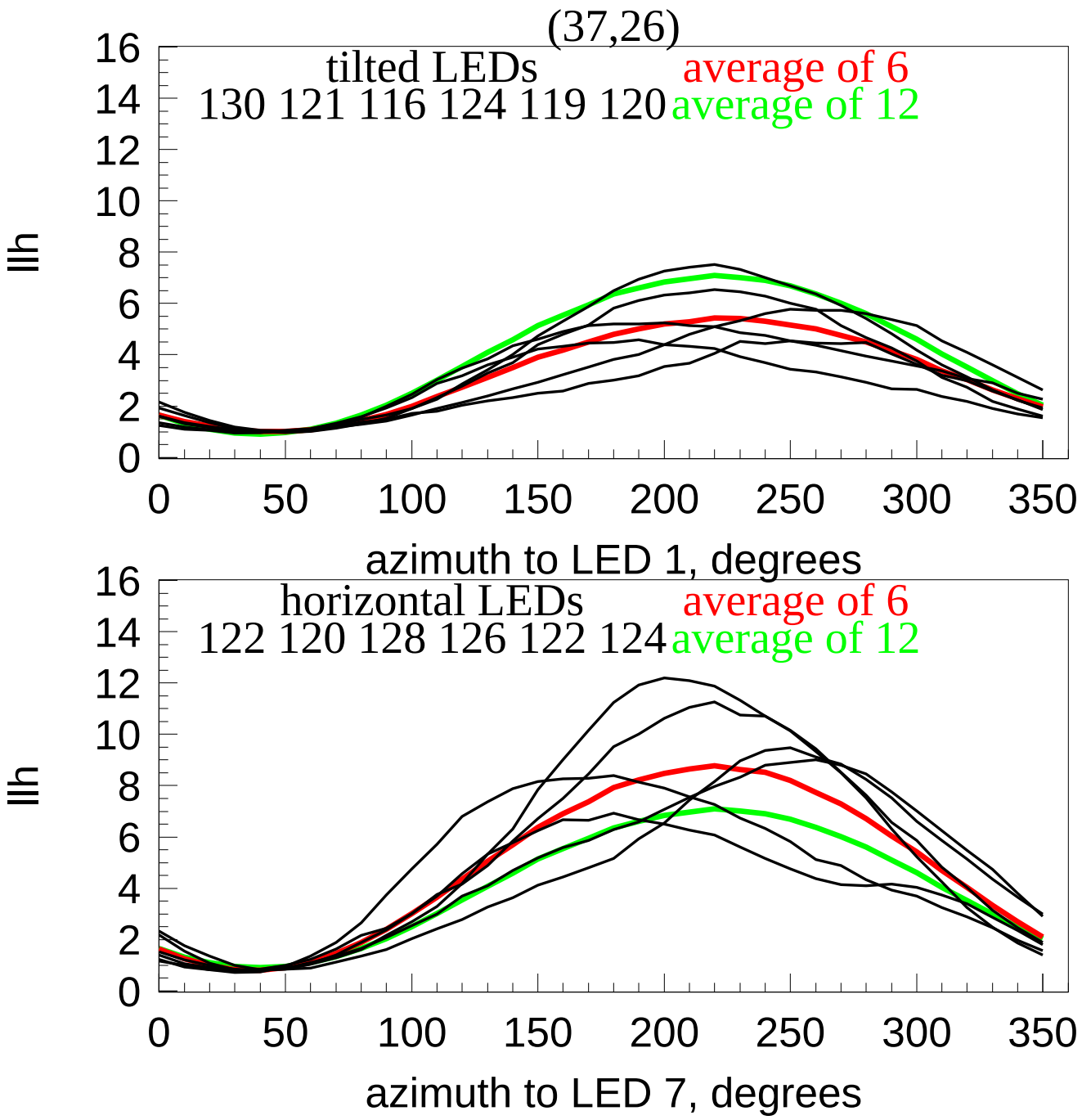

(37,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
49.2 ± 5.4

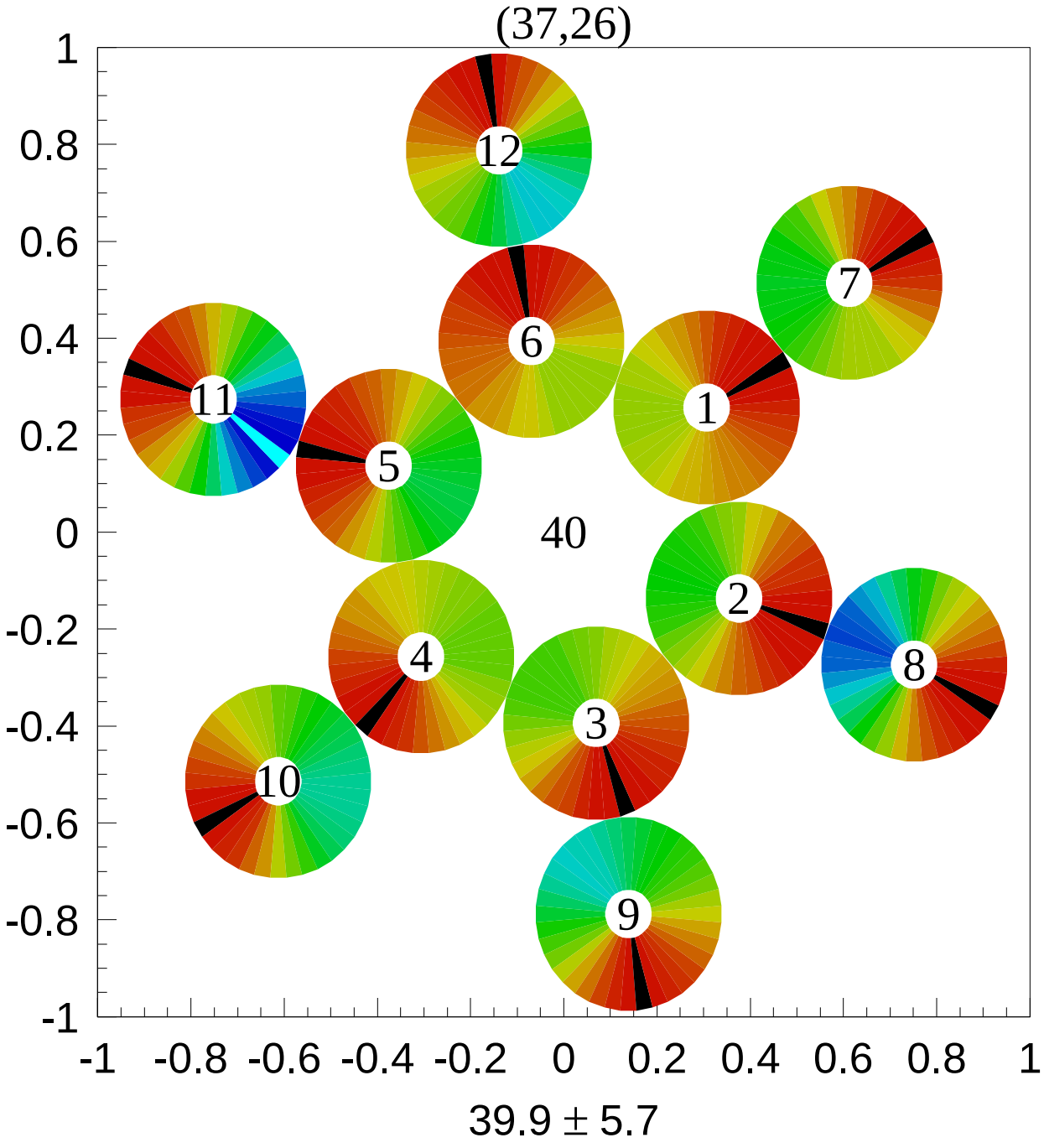

(37,24)
tilted LEDs
122 125 119 115 122 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 124 126 122 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

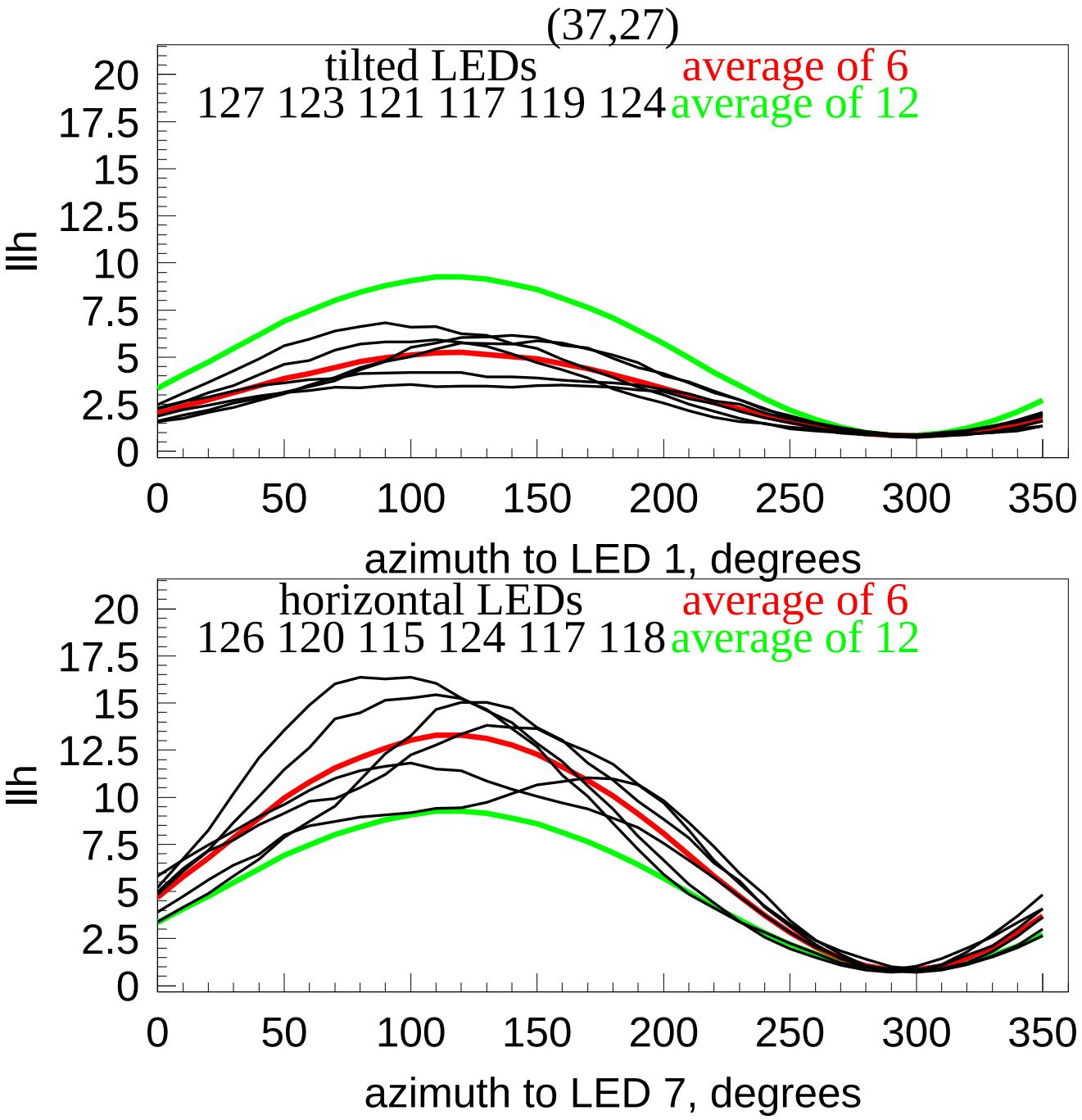

(37,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
312.2 ± 5.9

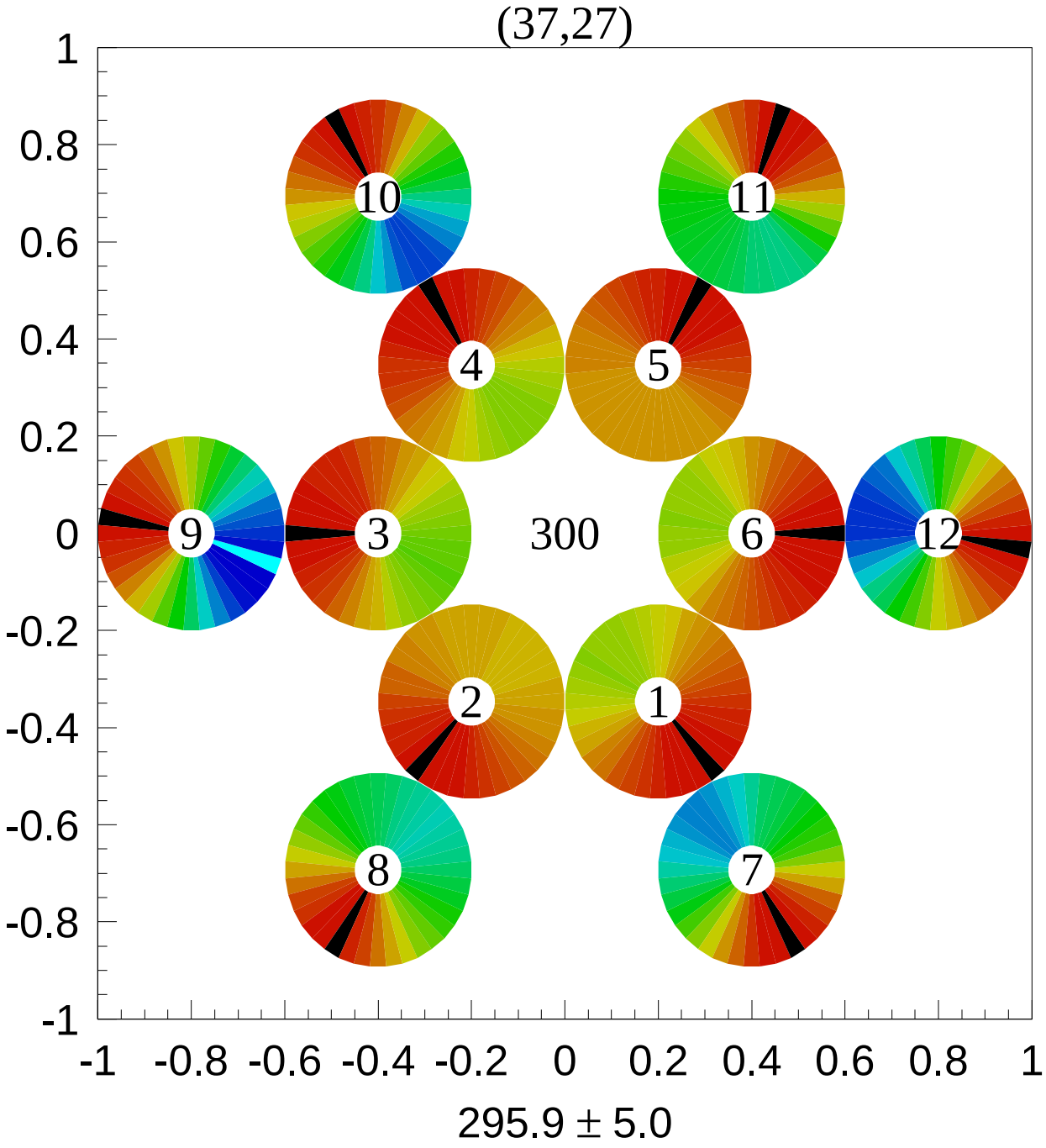

(37,25)
tilted LEDs
114 105 116 118 113 126
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 117 117 122 121 122
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

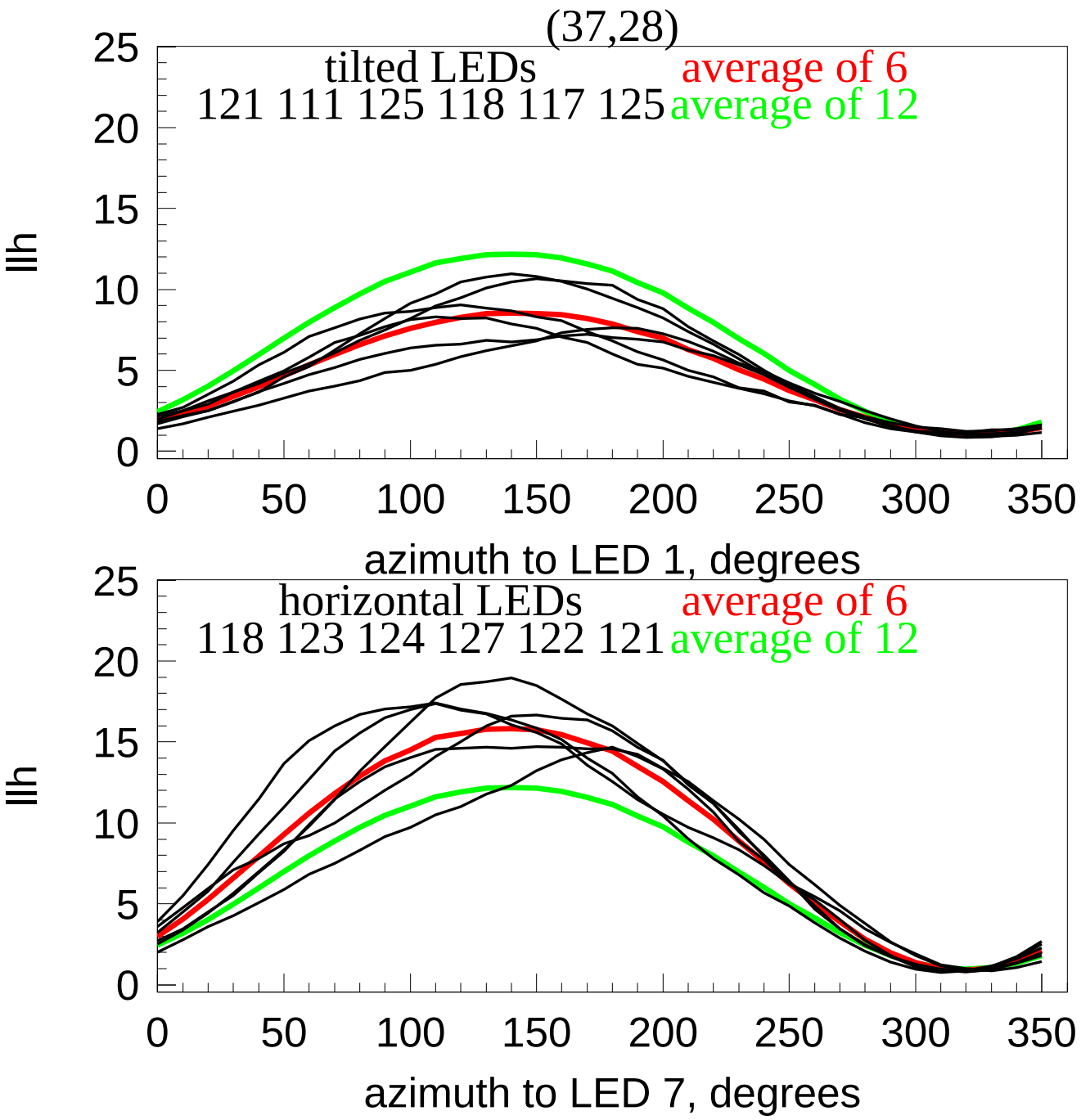

(37,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
176 ± 4.8

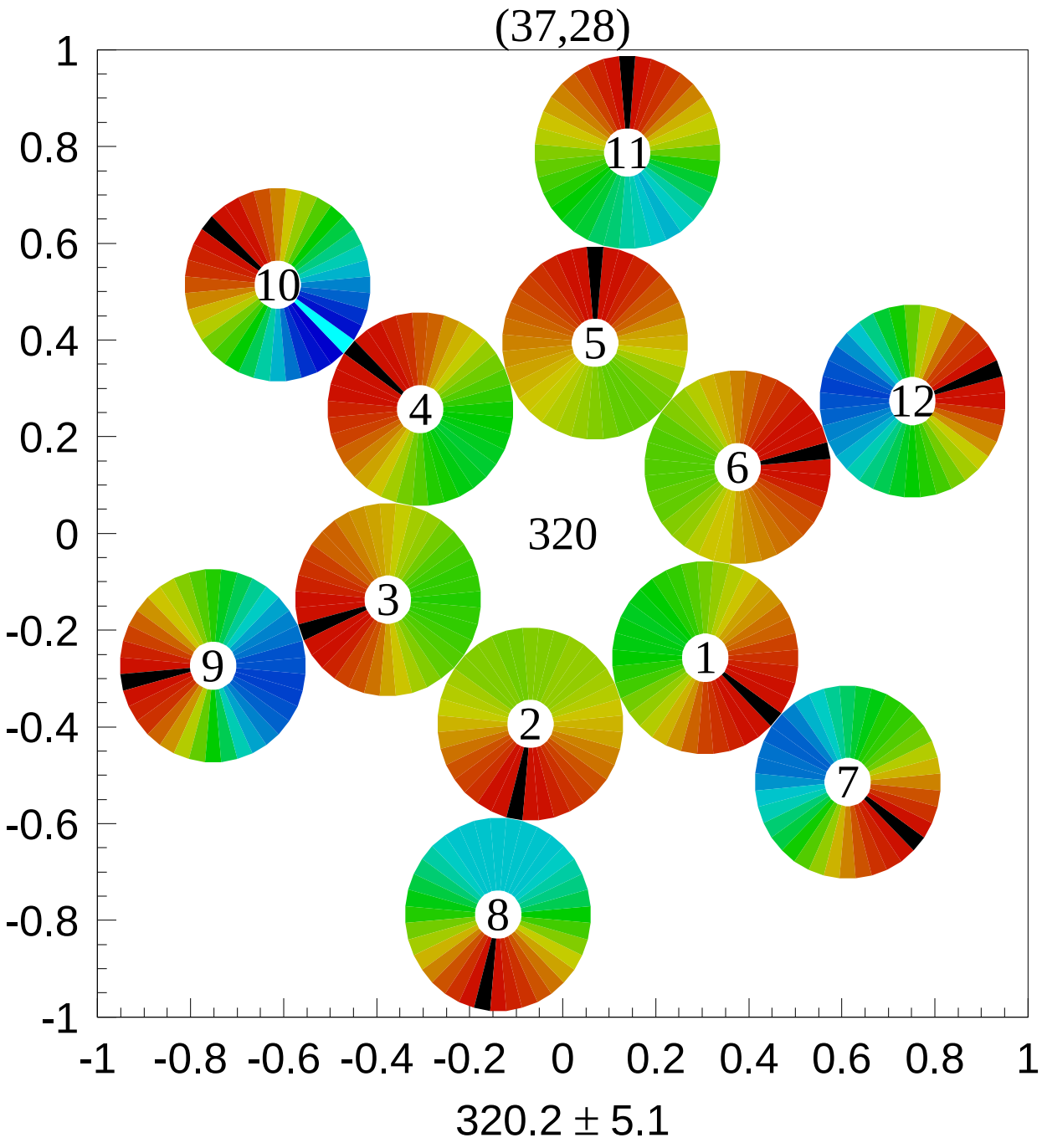

(37,26)
tilted LEDs
130 121 116 124 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 120 128 126 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

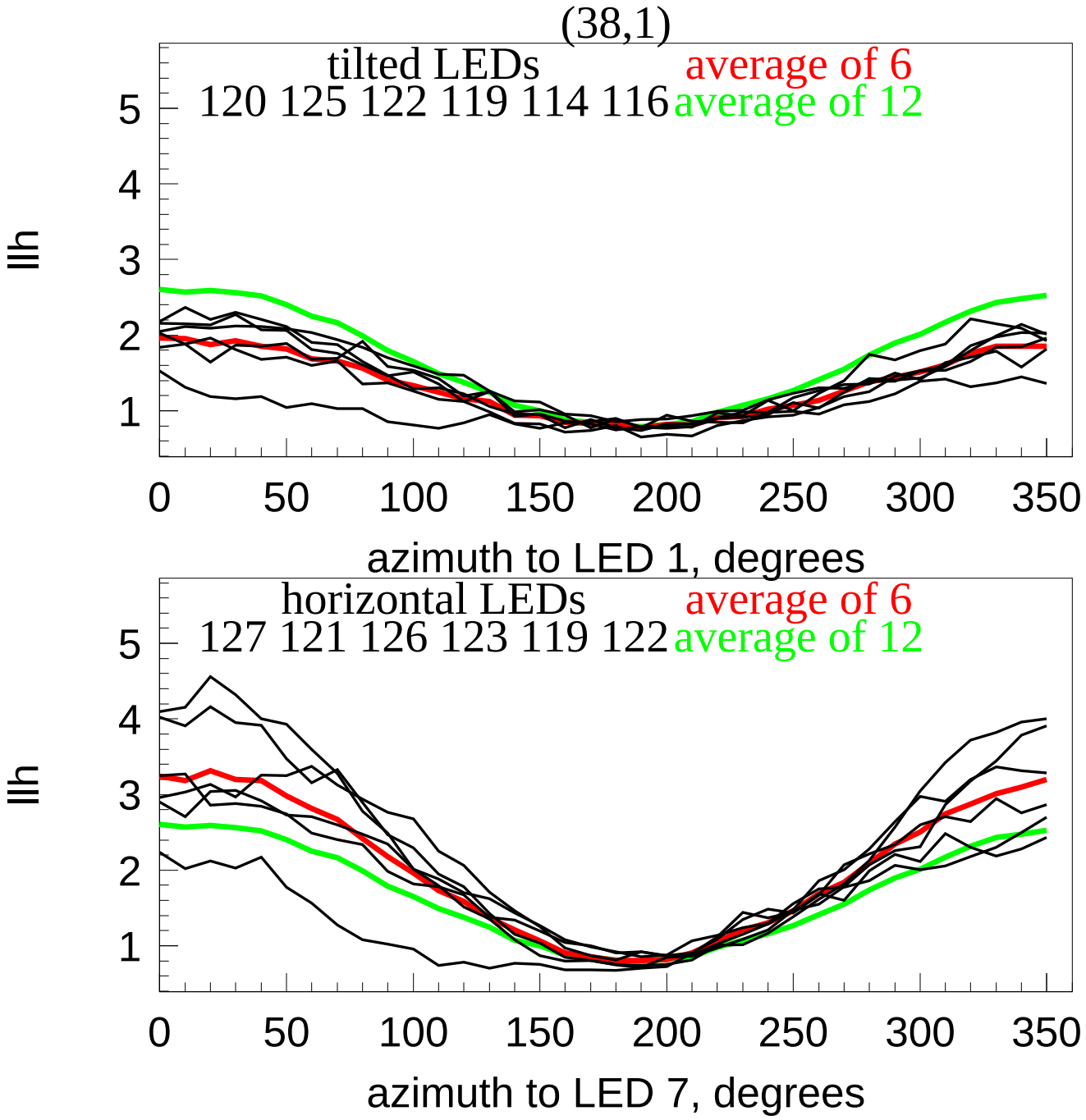

(37,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
39.9 ± 5.7

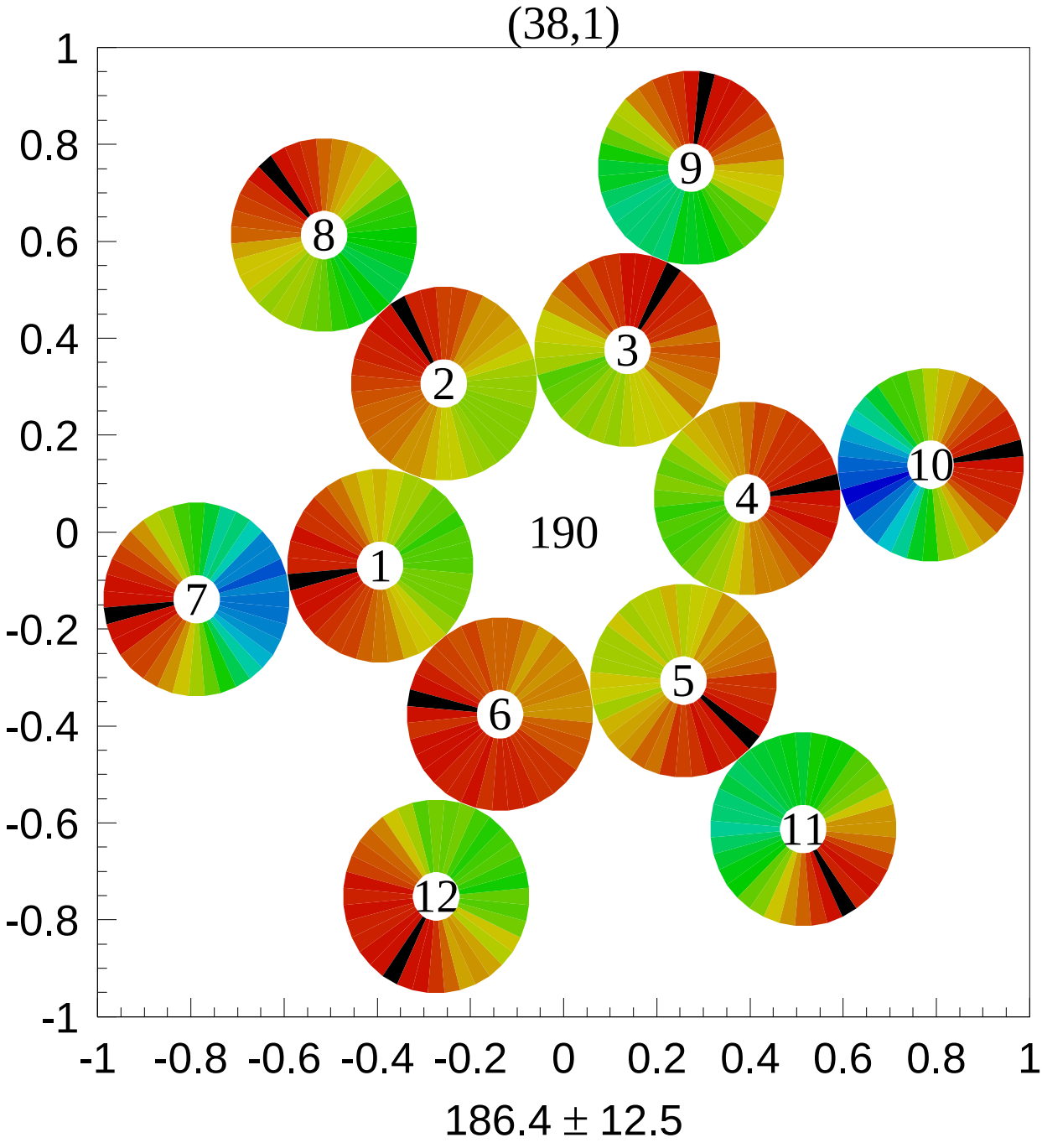

(37,27)
tilted LEDs
127 123 121 117 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 115 124 117 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

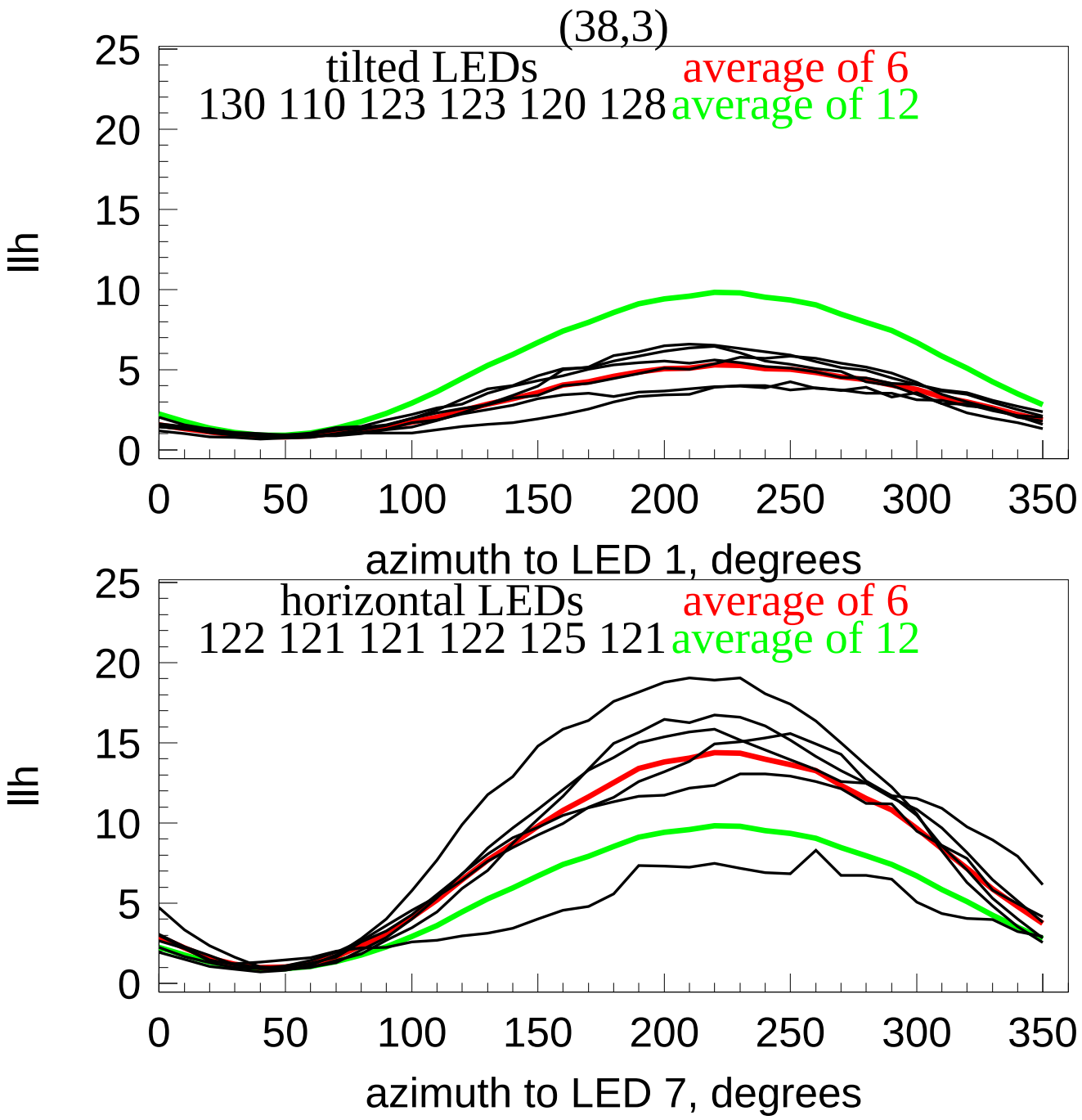

(37,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
295.9 ± 5.0

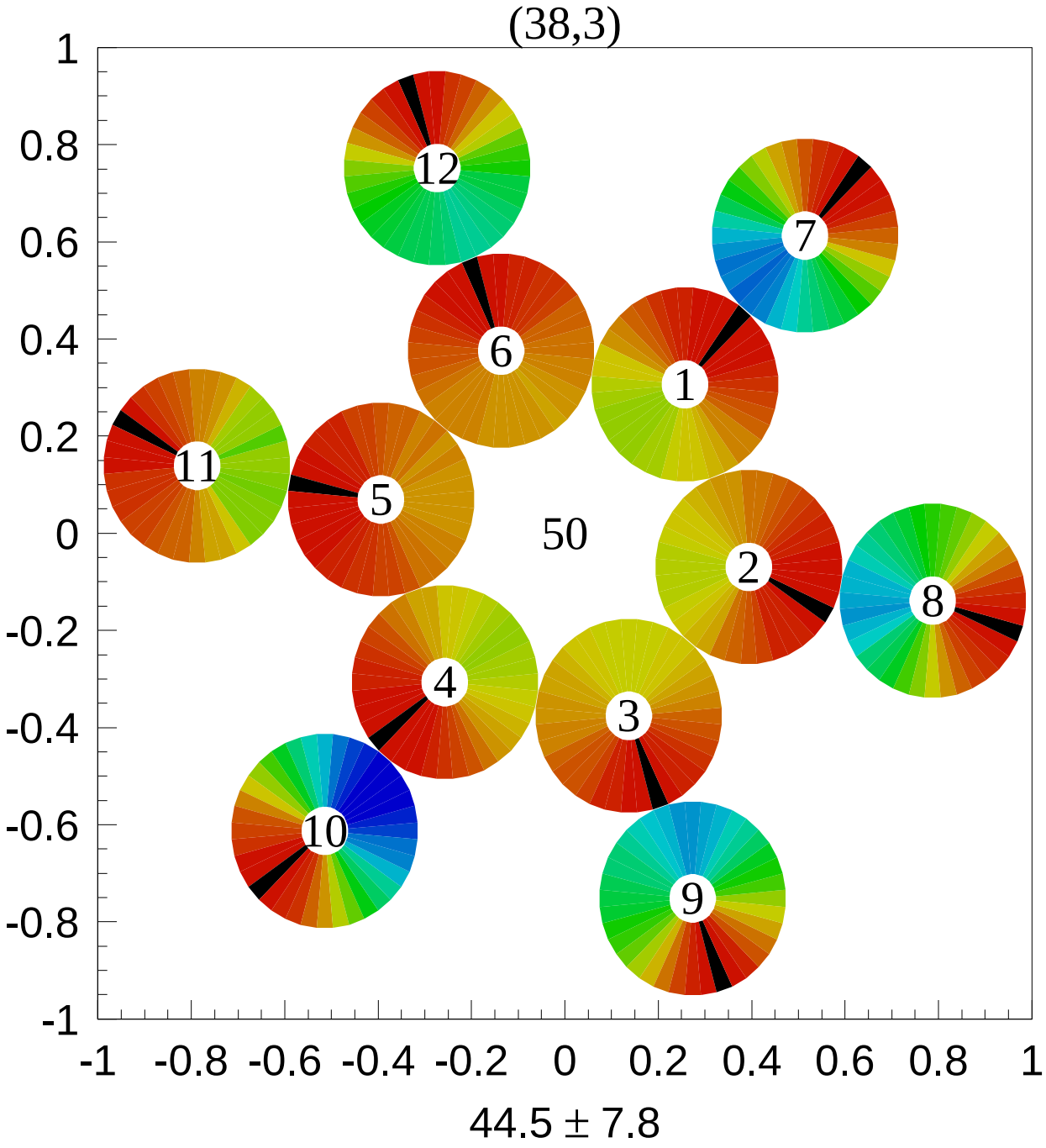

(37,28)
tilted LEDs
121 111 125 118 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 123 124 127 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

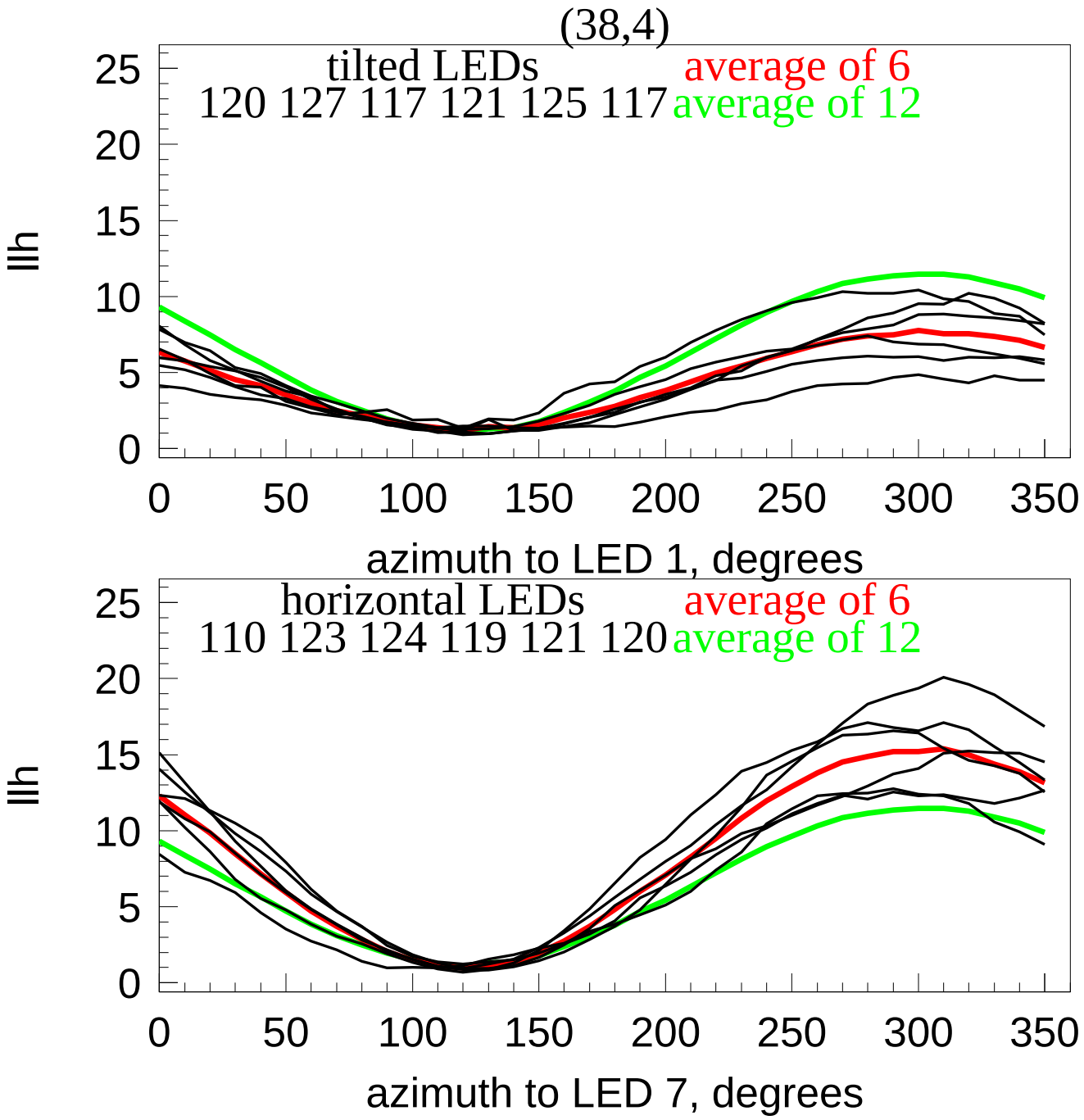

(37,28)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
320.2 ± 5.1

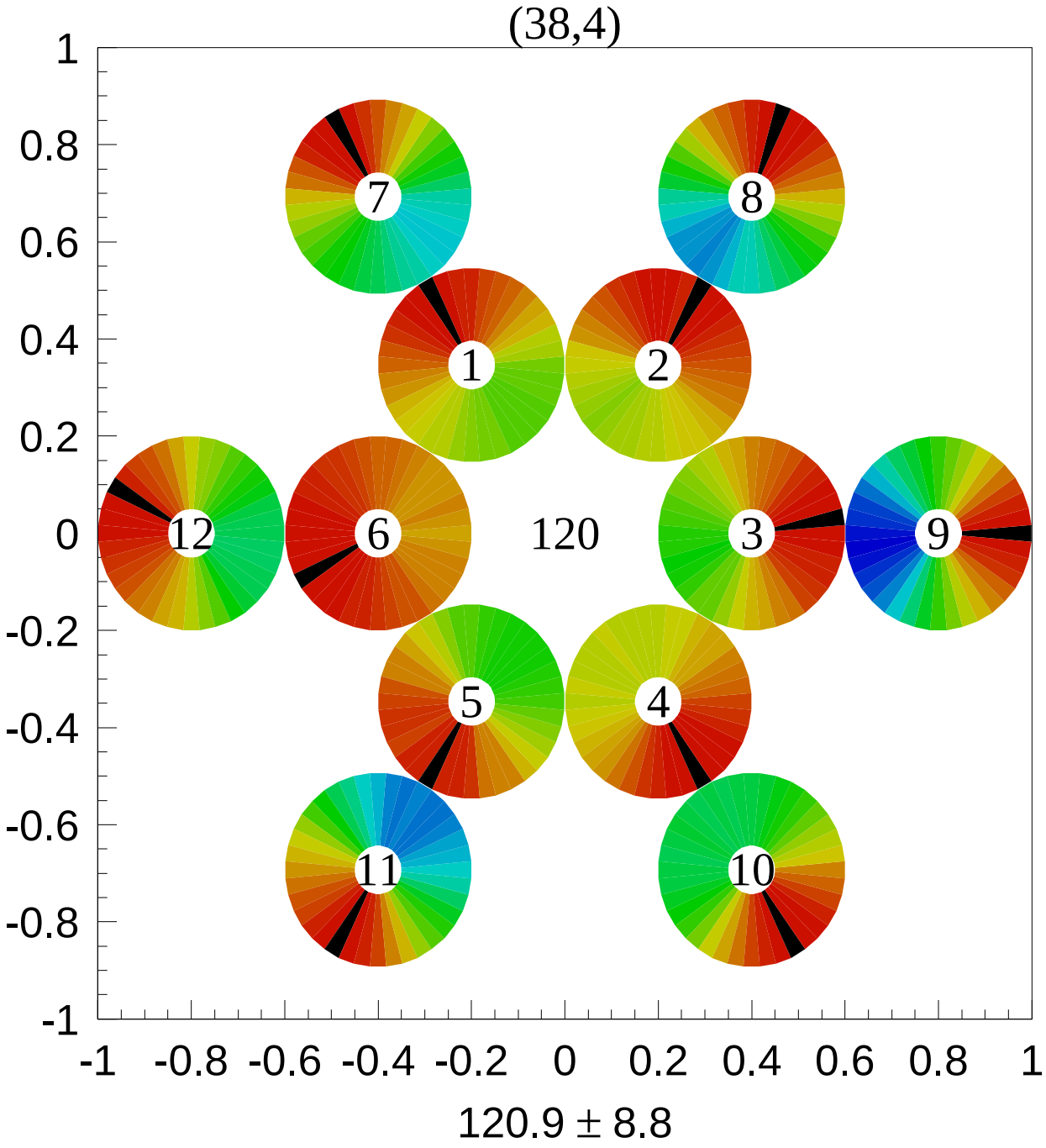

(38,1)
tilted LEDs
120 125 122 119 114 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 121 126 123 119 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

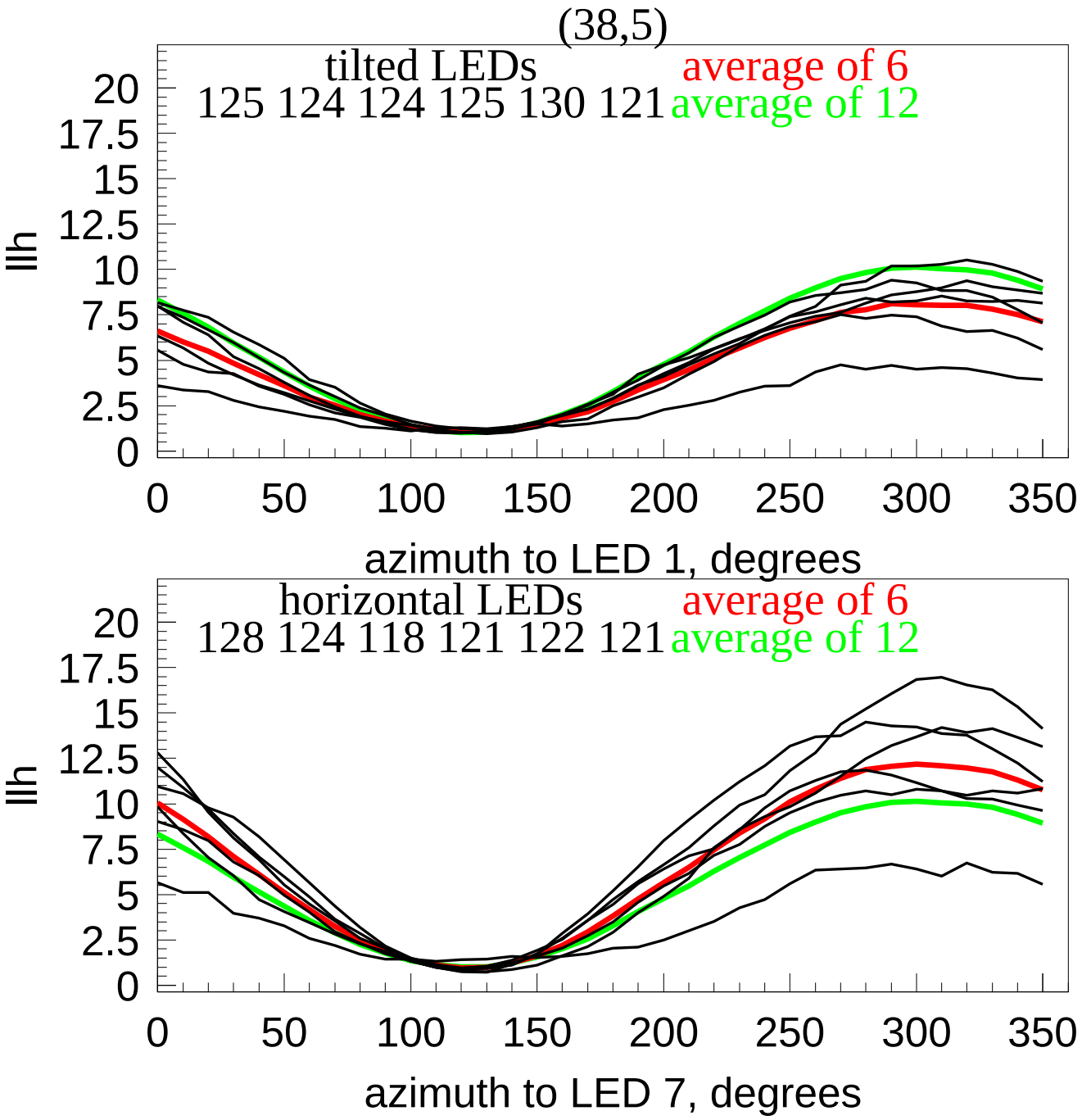

(38,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.4 ± 12.5
190
1
2
3
4
5
6
7
8
9
10
11
12

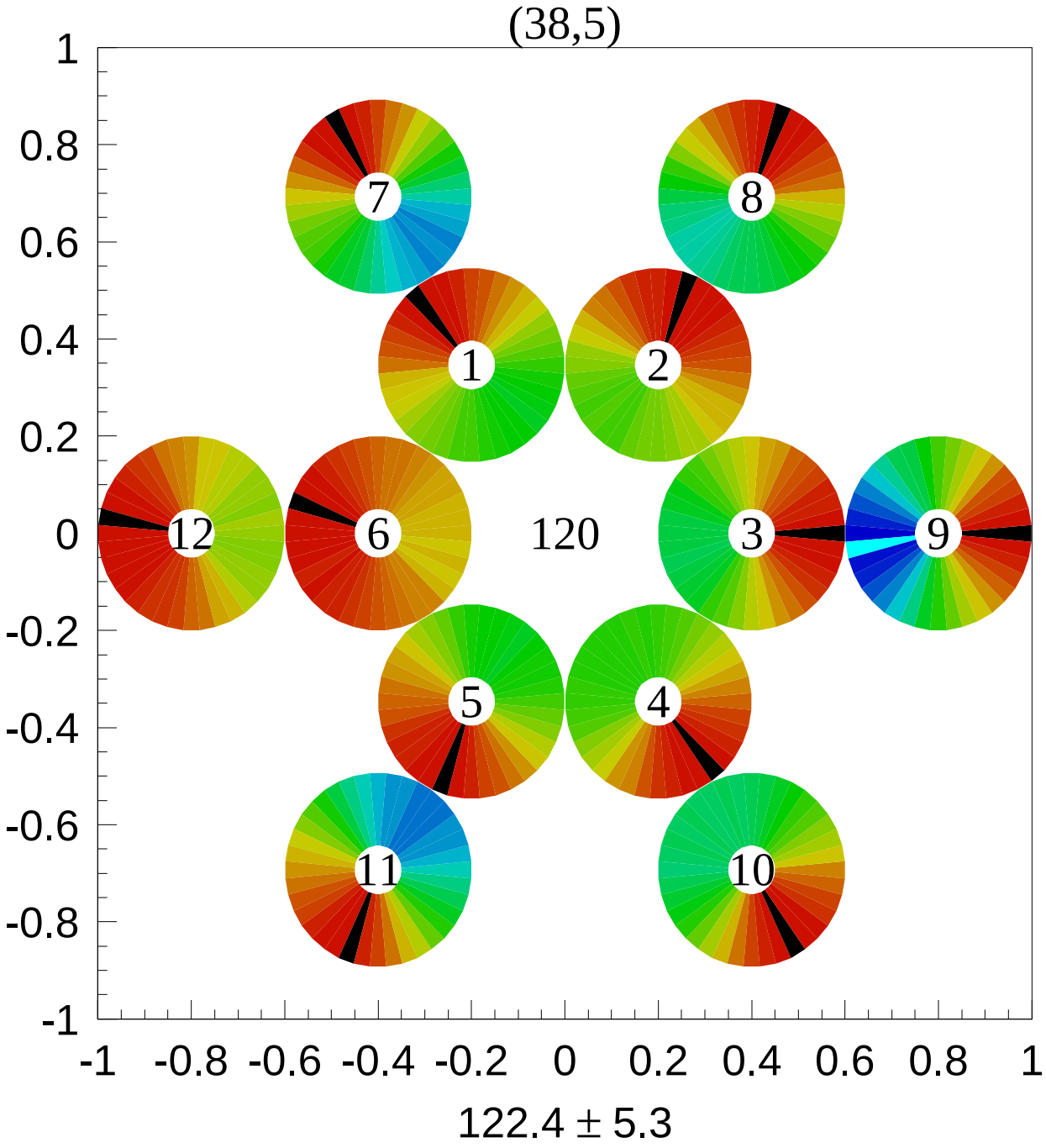

(38,3)
tilted LEDs
130 110 123 123 120 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 121 122 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

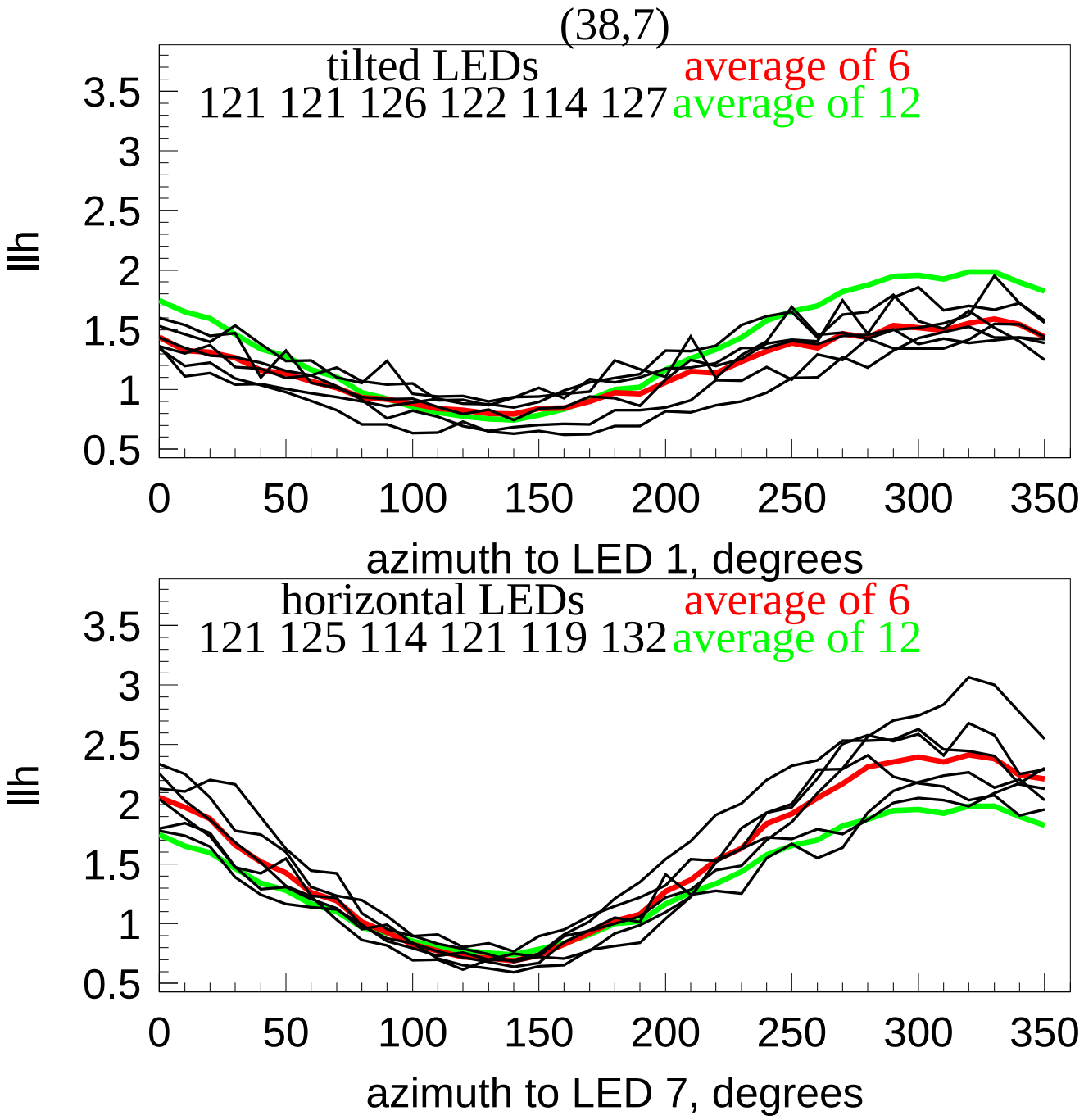

(38,3)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
44.5 ± 7.8

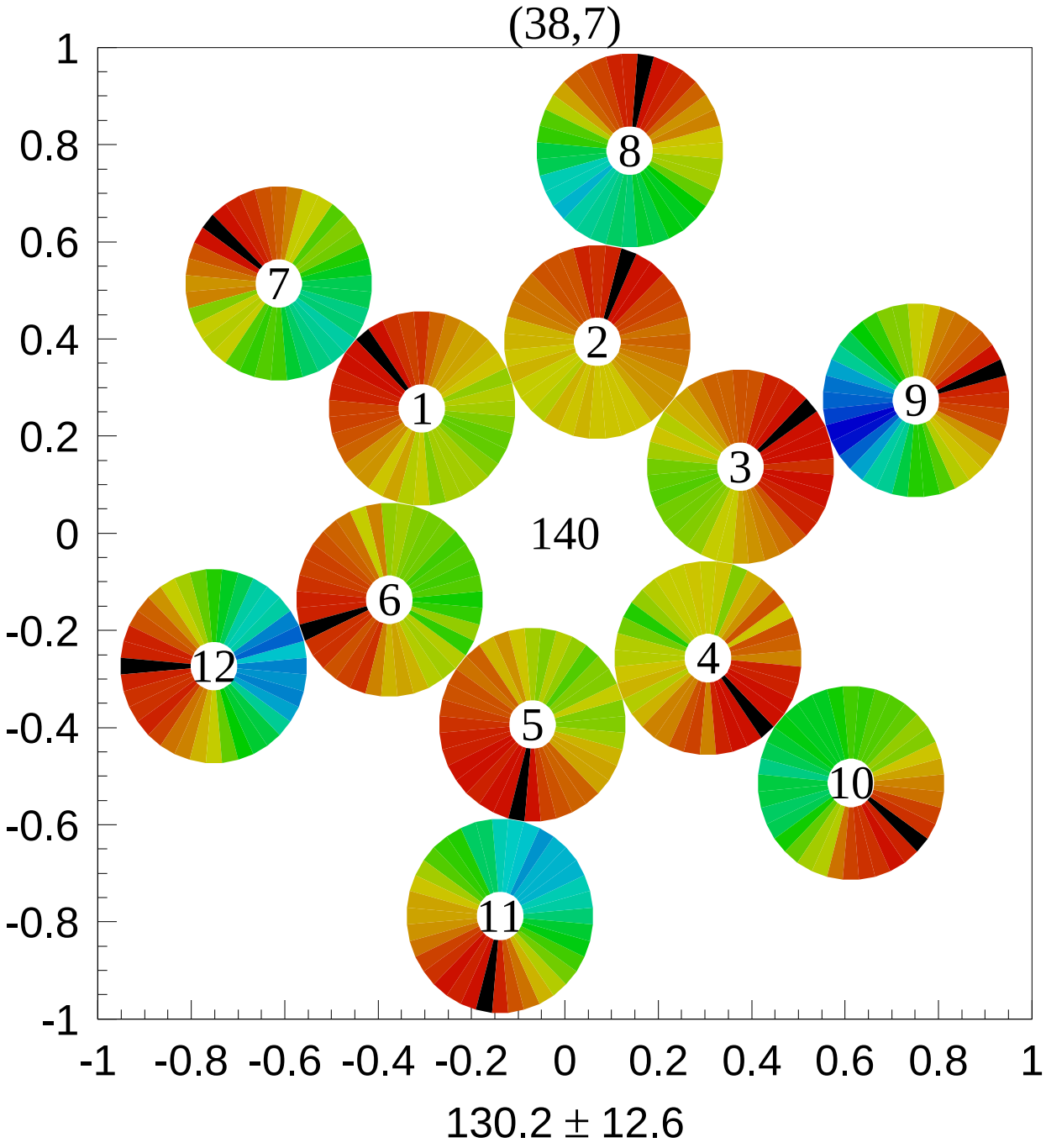

(38,4)
tilted LEDs
120 127 117 121 125 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
110 123 124 119 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

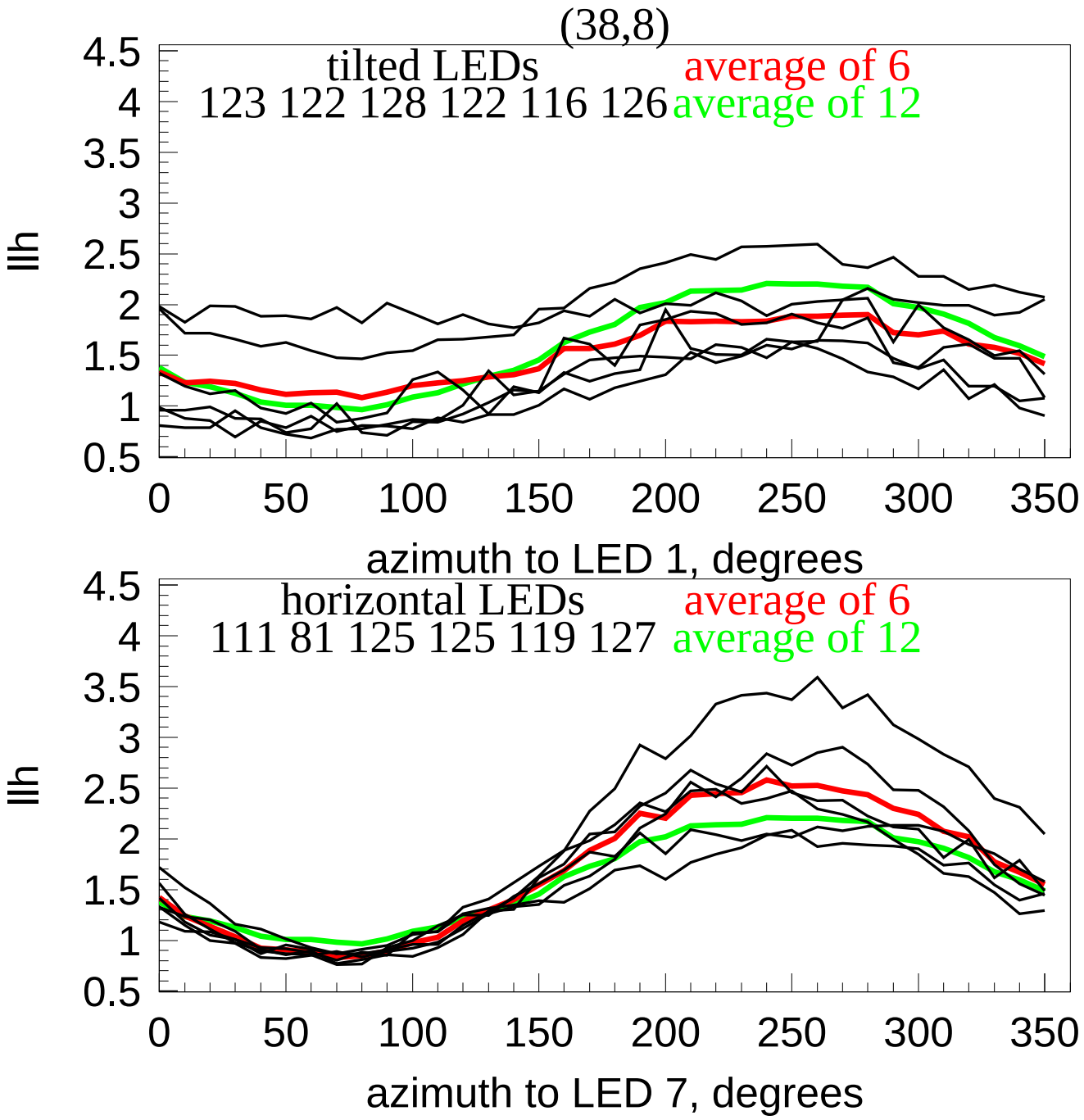

(38,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
120.9 ± 8.8

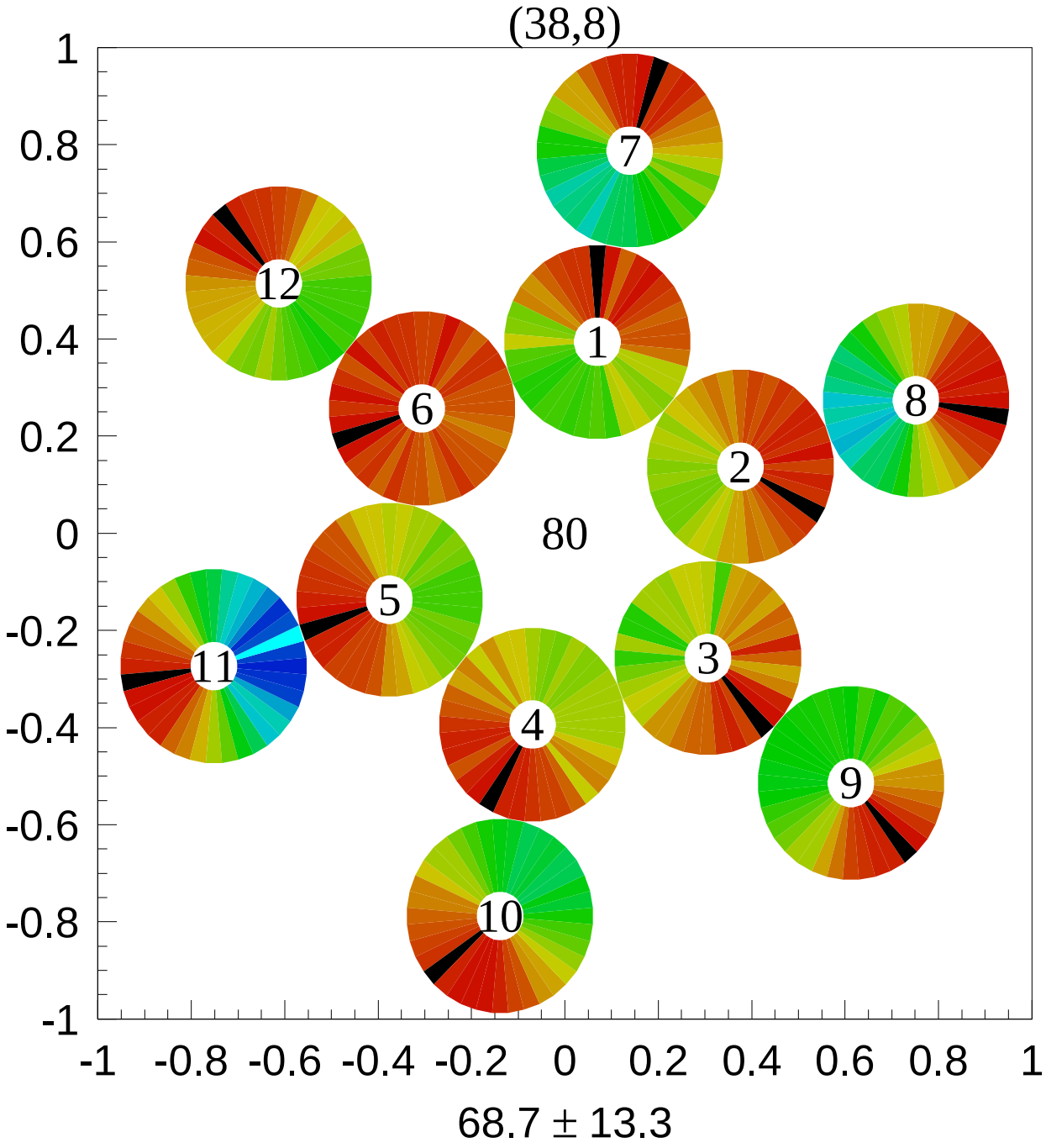

(38,5)
tilted LEDs
125 124 124 125 130 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 124 118 121 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

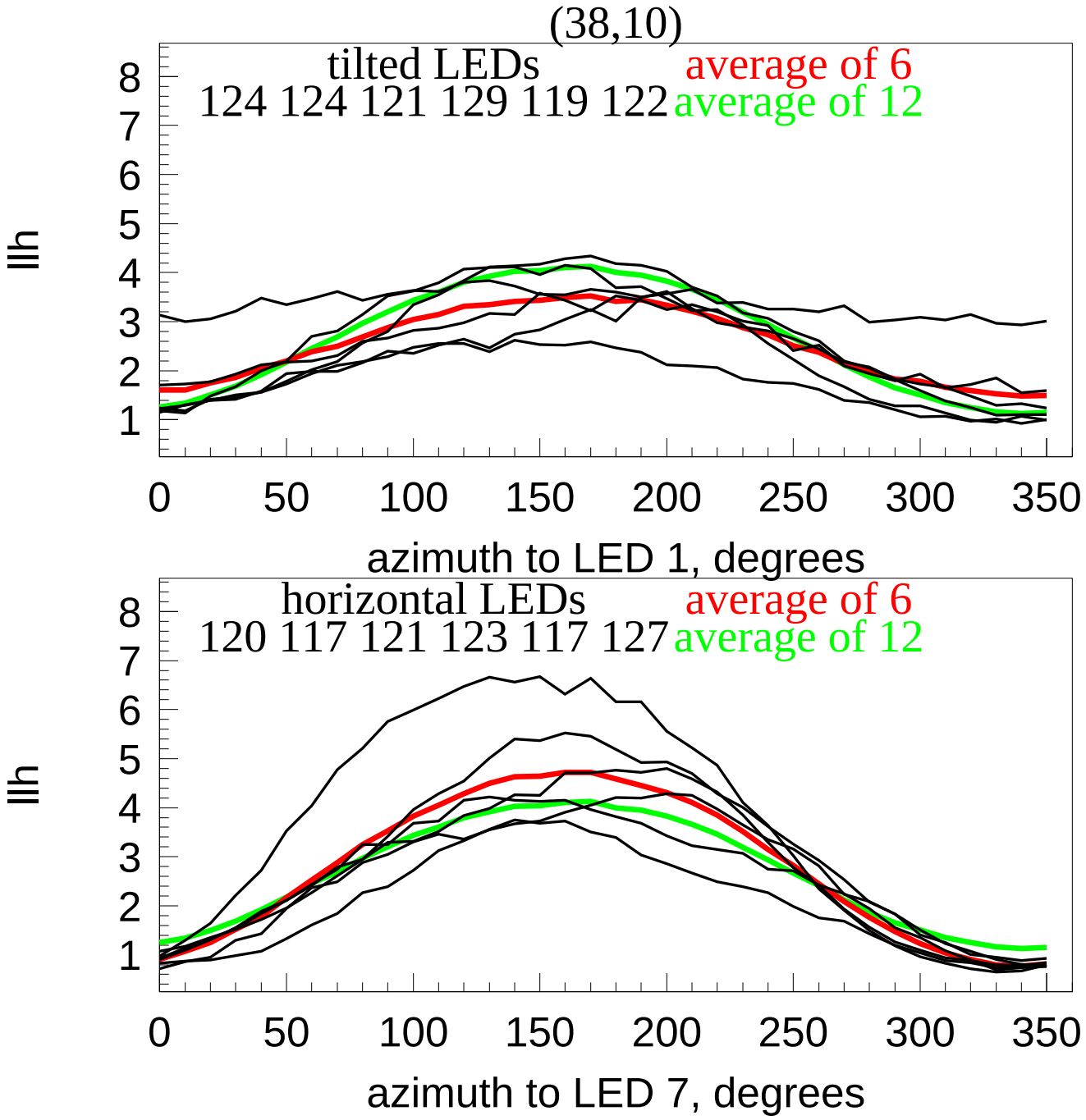

(38,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
122.4 ± 5.3

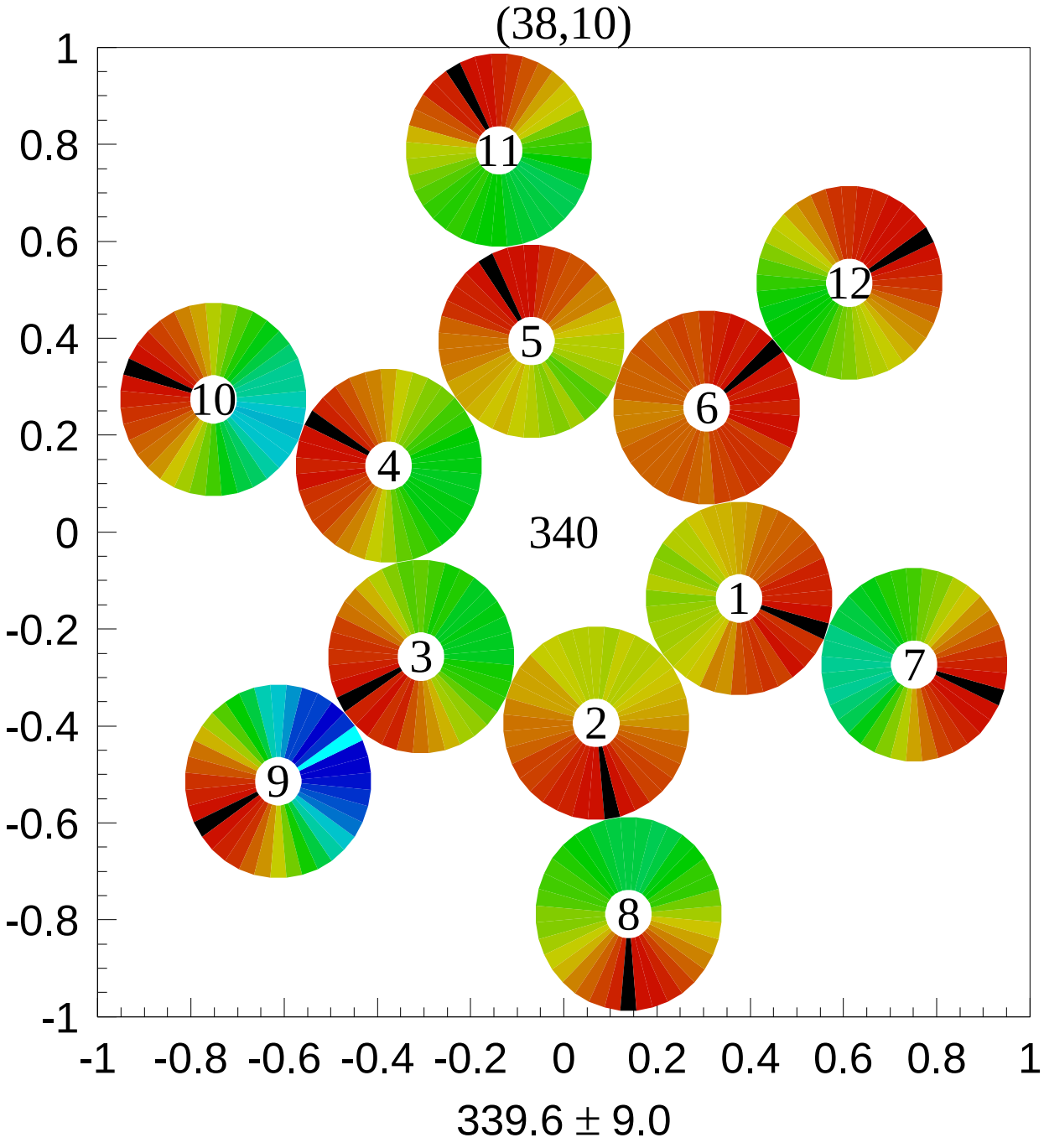

(38,7)
tilted LEDs
121 121 126 122 114 127
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 125 114 121 119 132
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

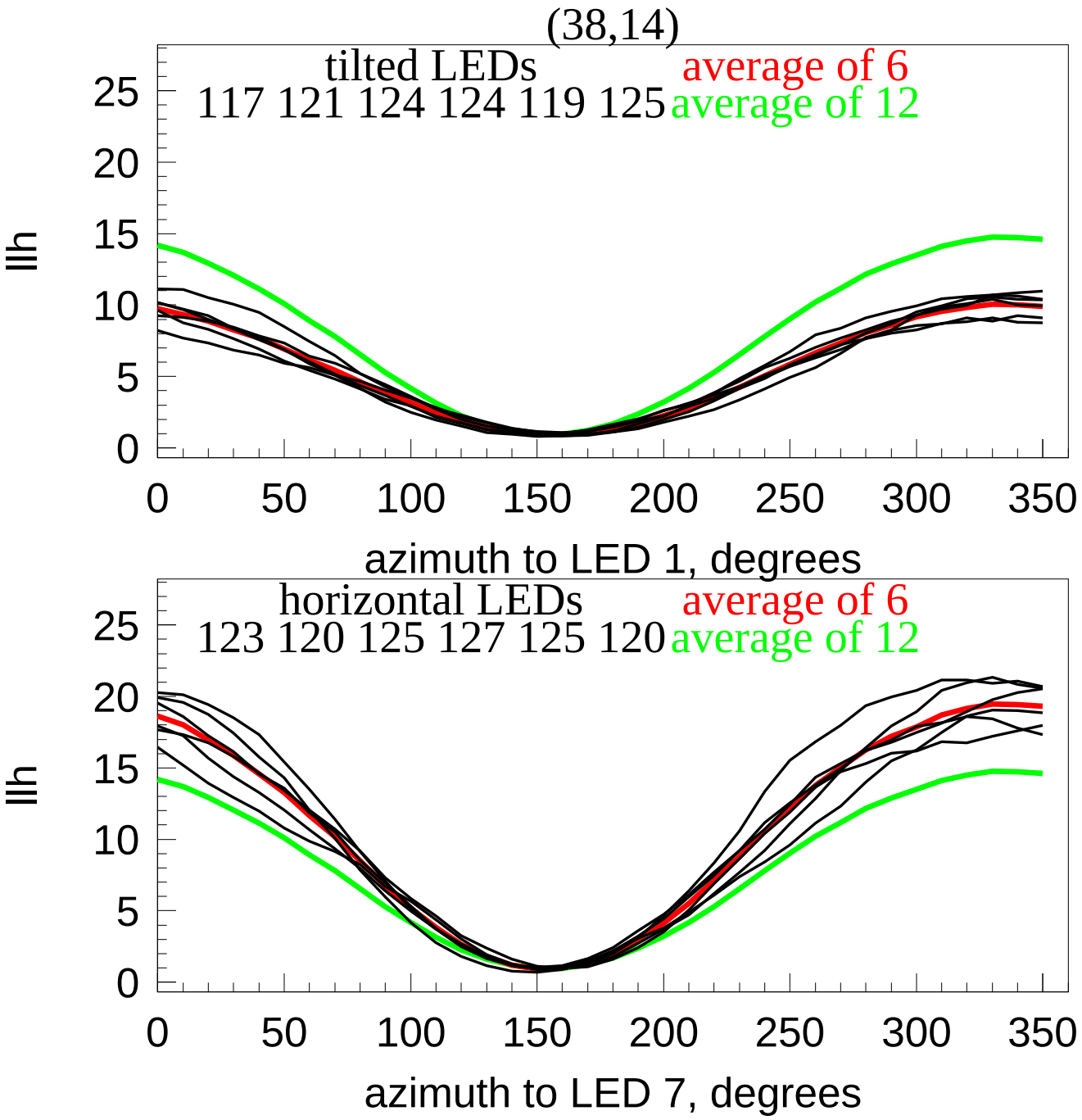

(38,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
130.2 ± 12.6
140
1
2
3
4
5
6
7
8
9
10
11
12

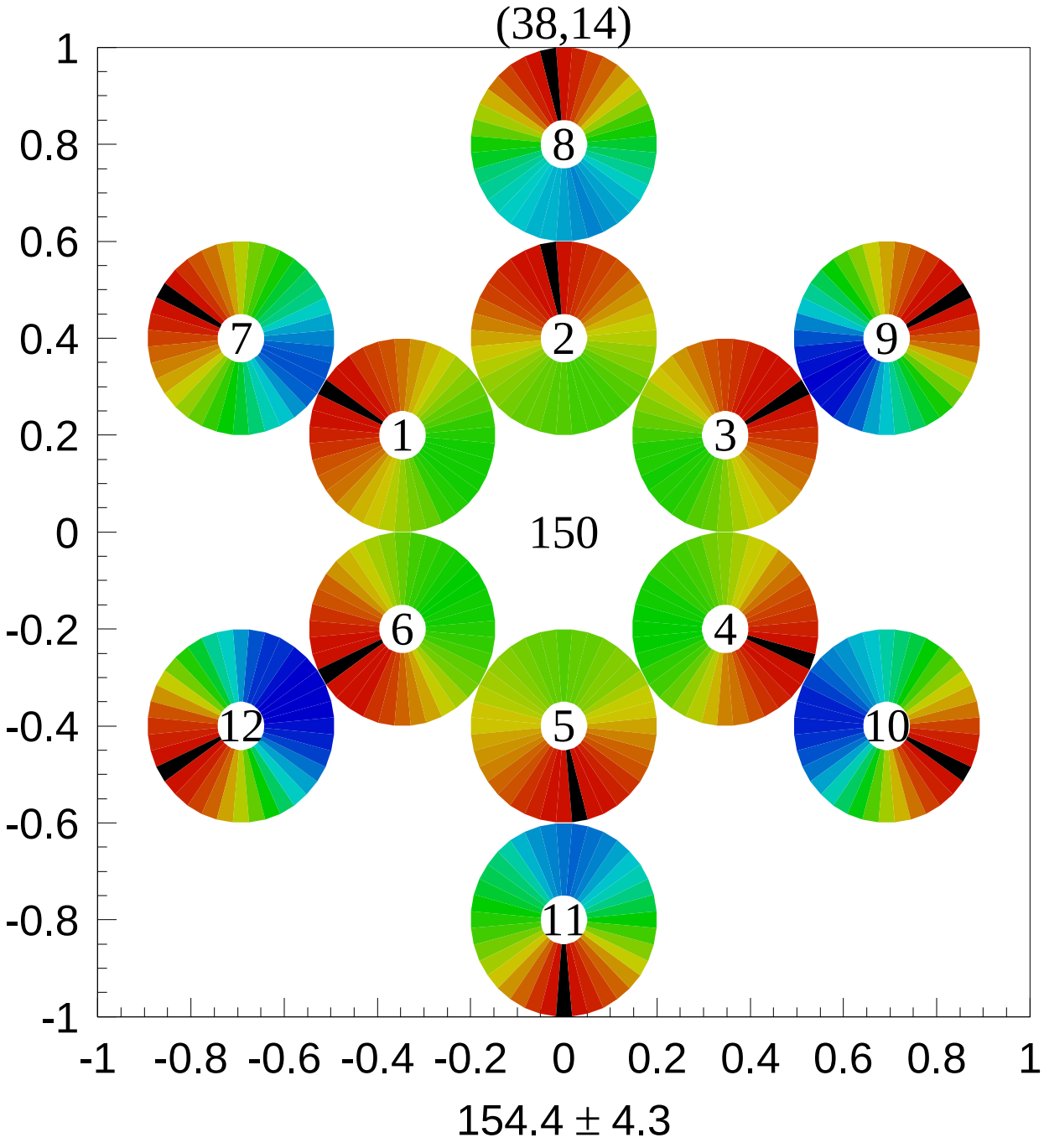

(38,8)
tilted LEDs
123 122 128 122 116 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
111 81 125 125 119 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

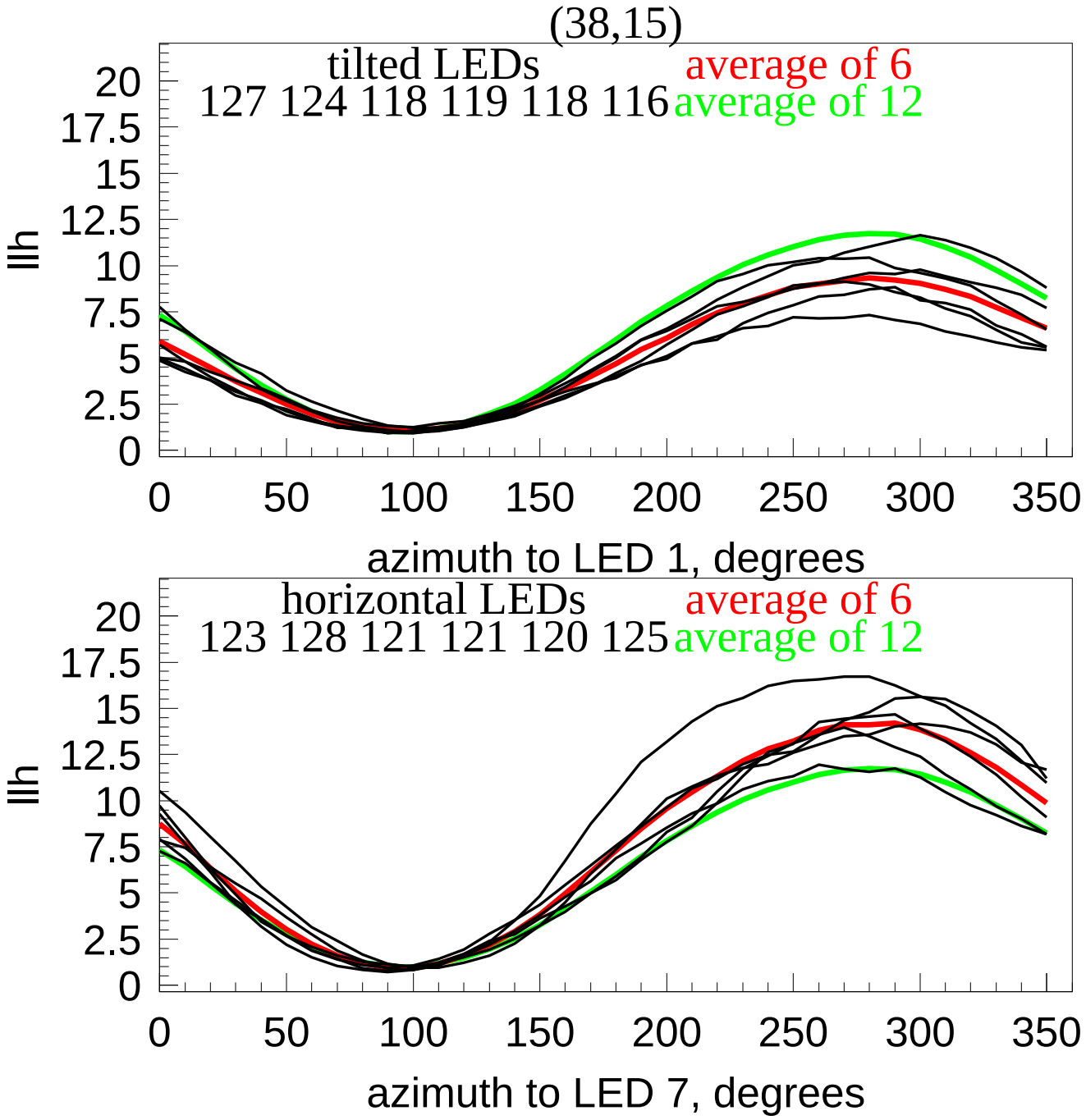

(38,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
68.7 ± 13.3

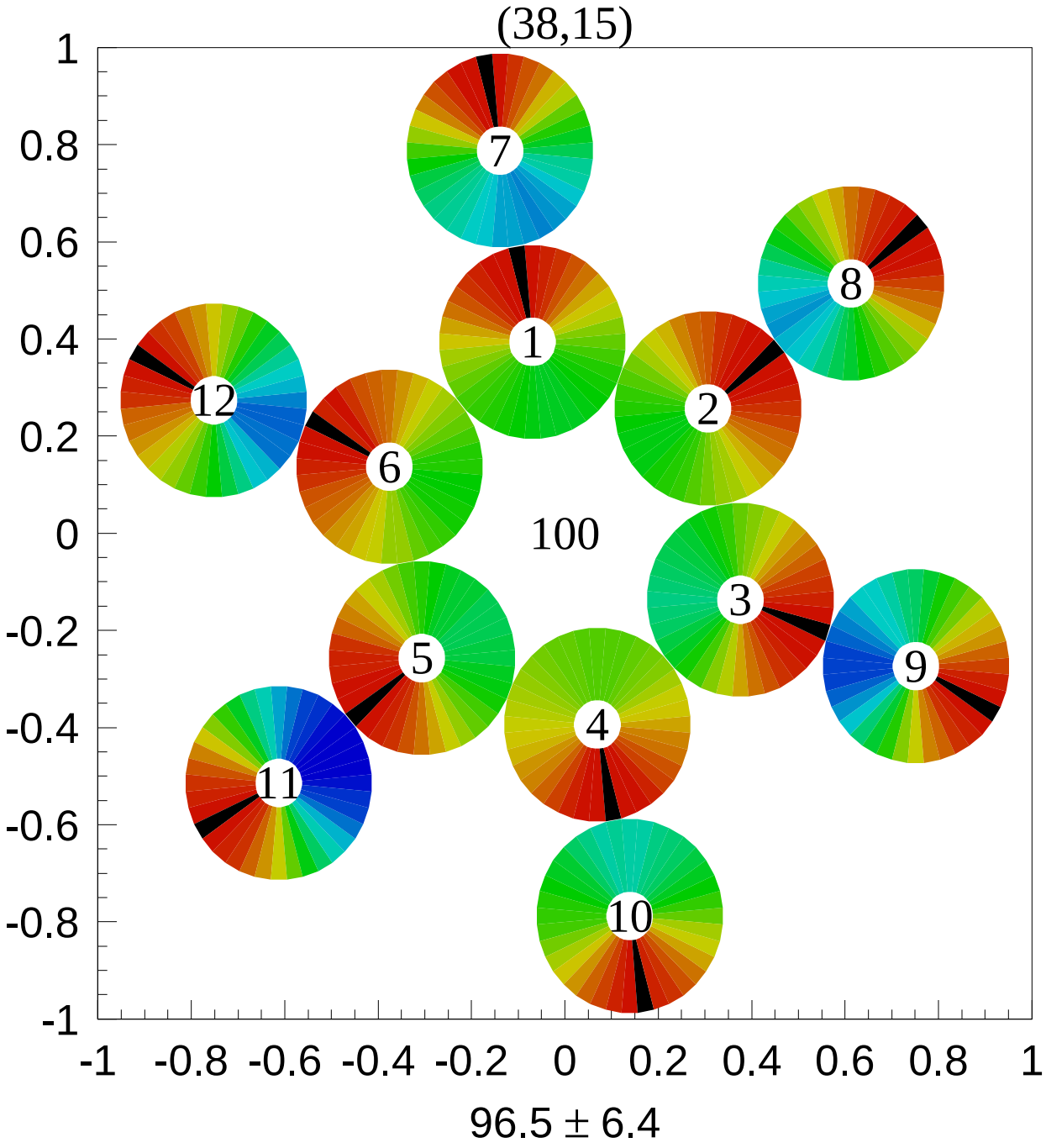

(38,10)
tilted LEDs
124 124 121 129 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 117 121 123 117 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

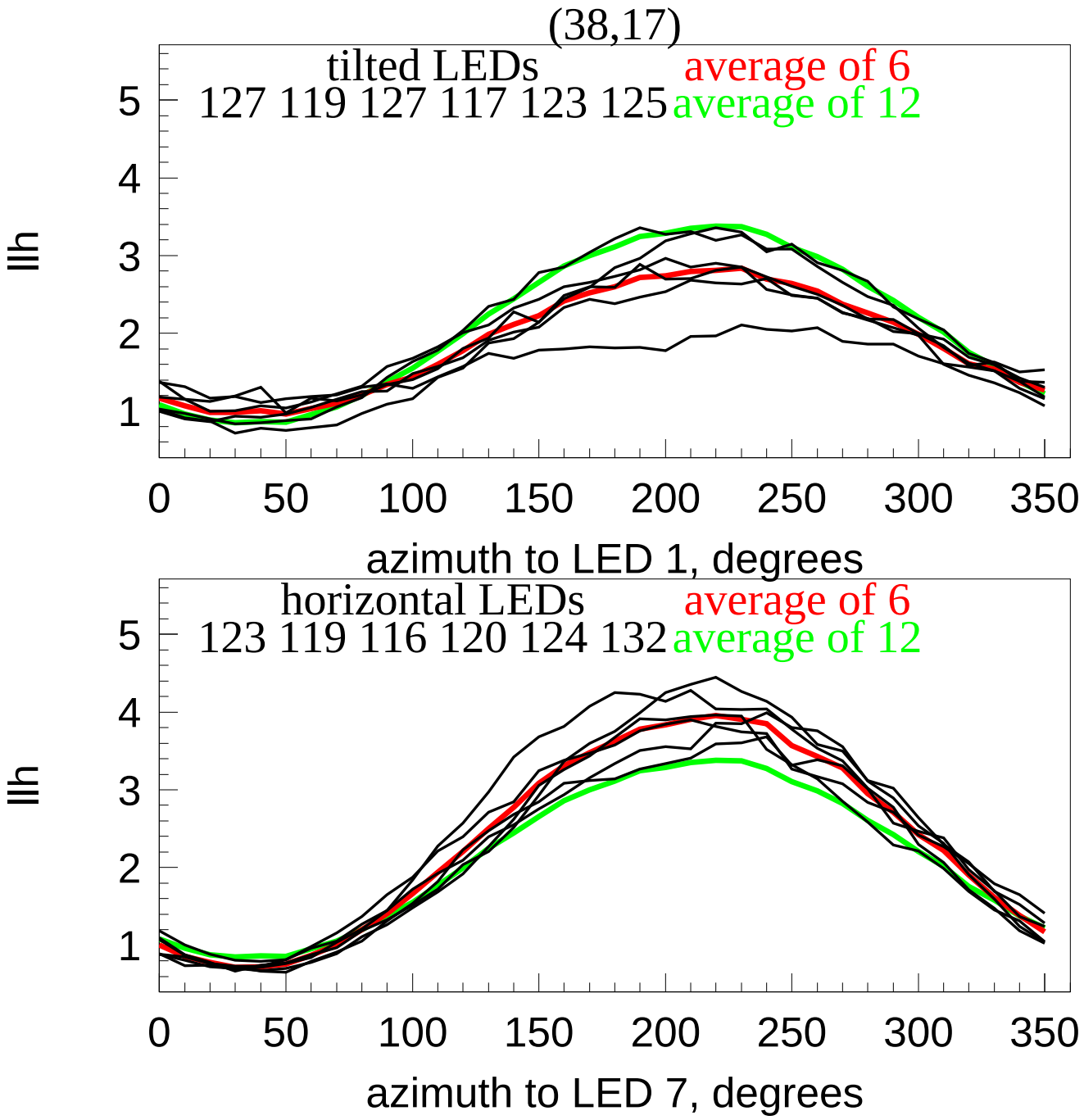

(38,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
3
7
2
9
8
339.6 ± 9.0

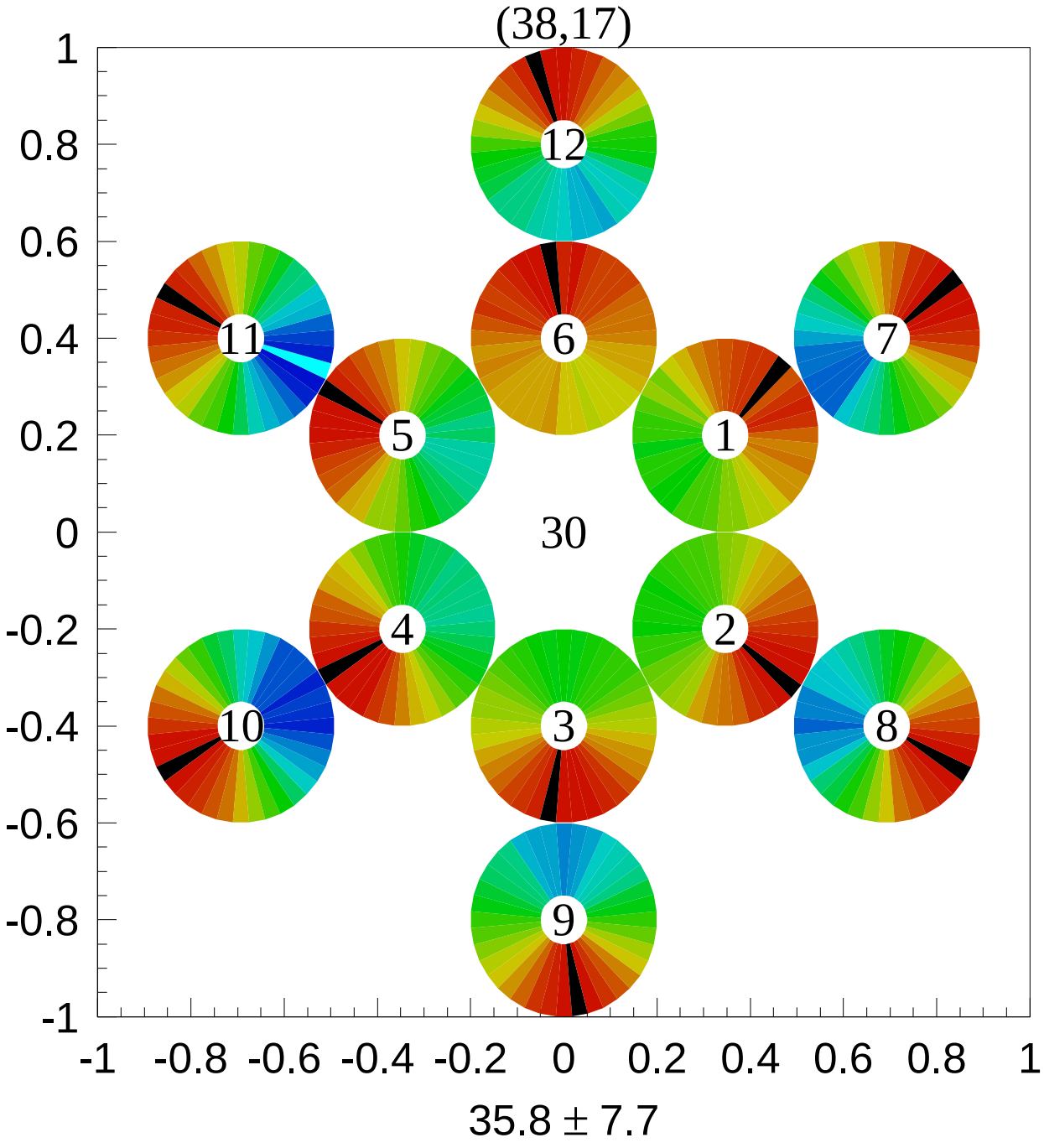

(38,14)
tilted LEDs
117 121 124 124 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 125 127 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

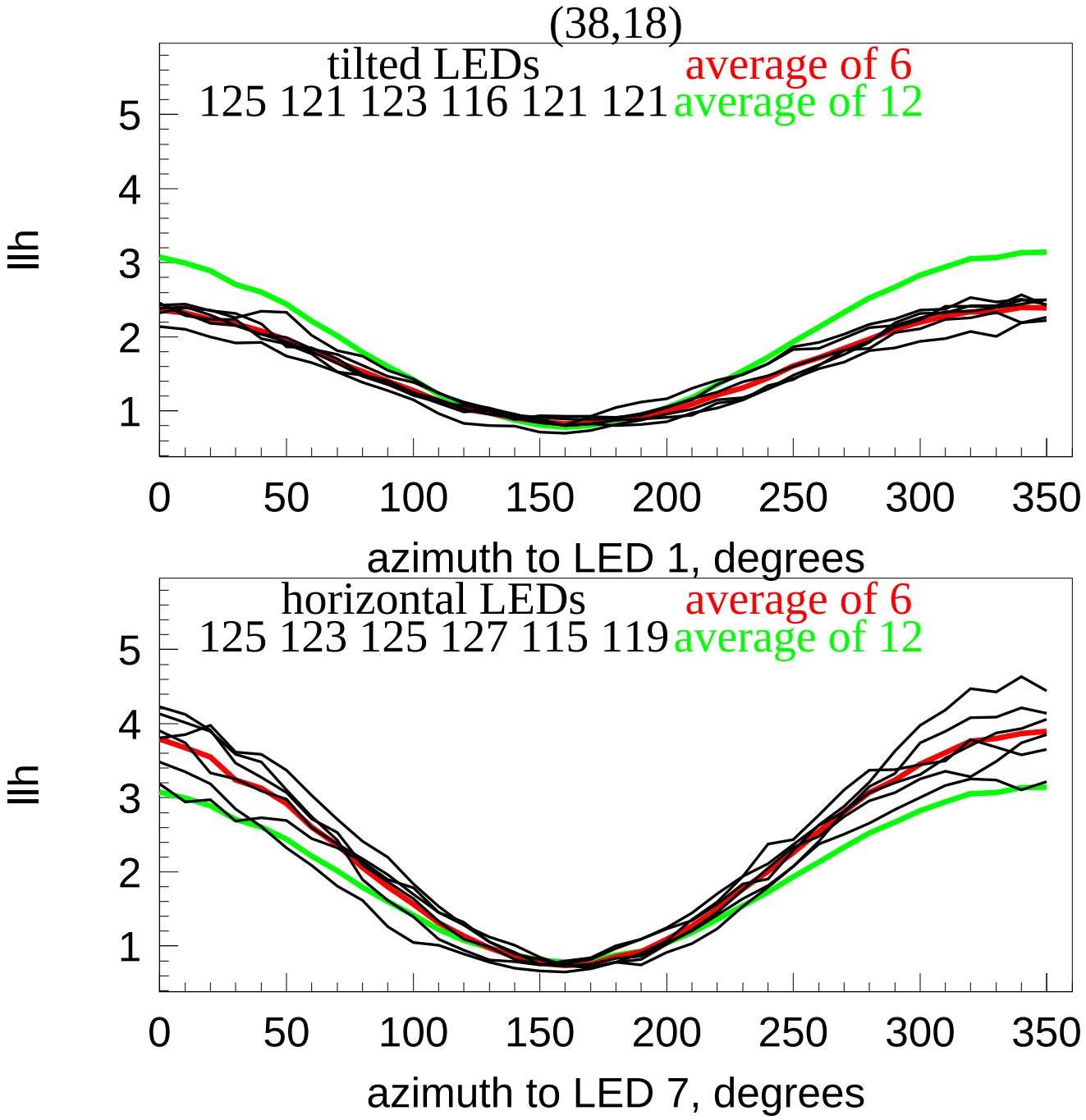

(38,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
154.4 ± 4.3

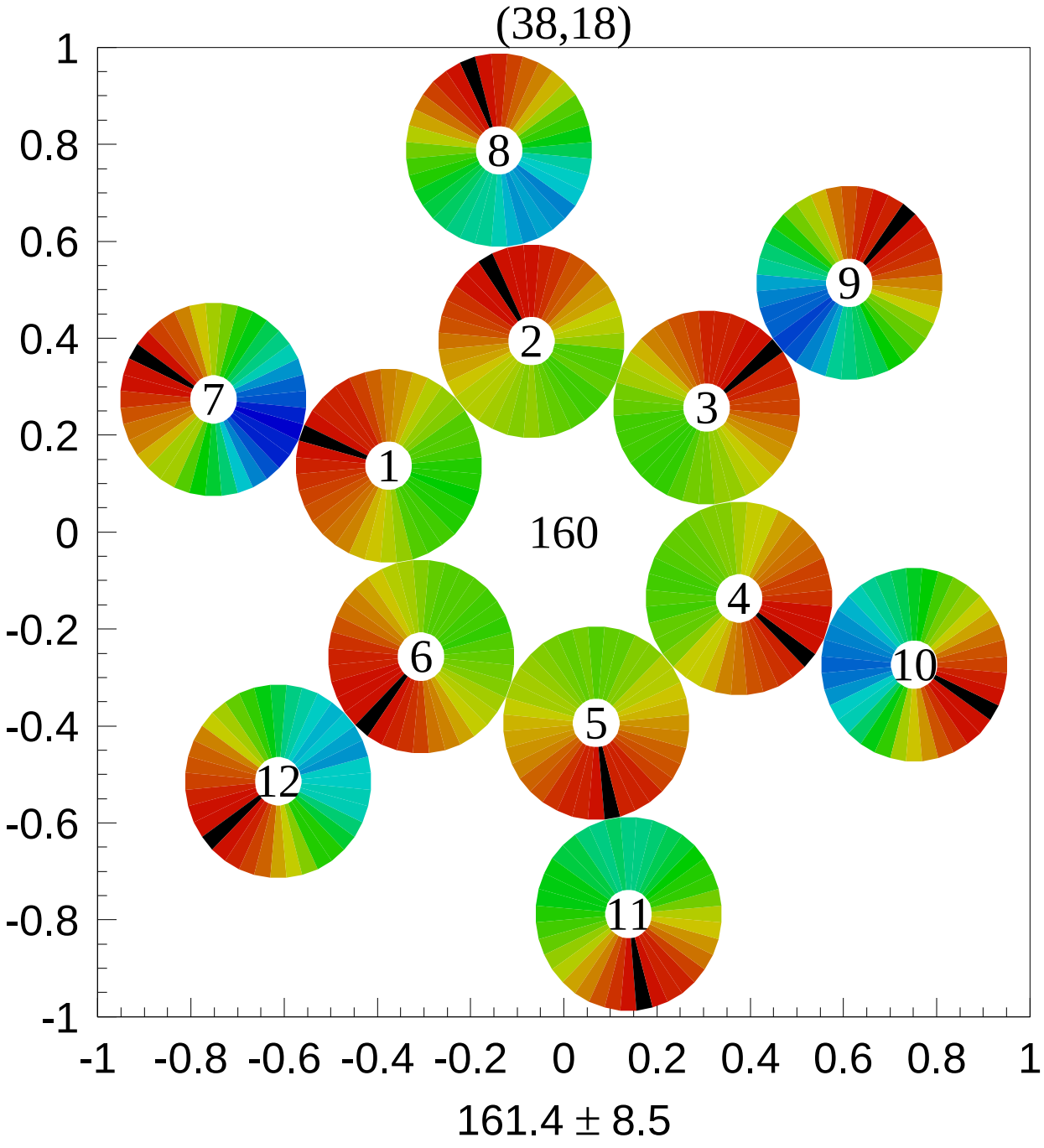

(38,15)
tilted LEDs
127 124 118 119 118 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 128 121 121 120 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

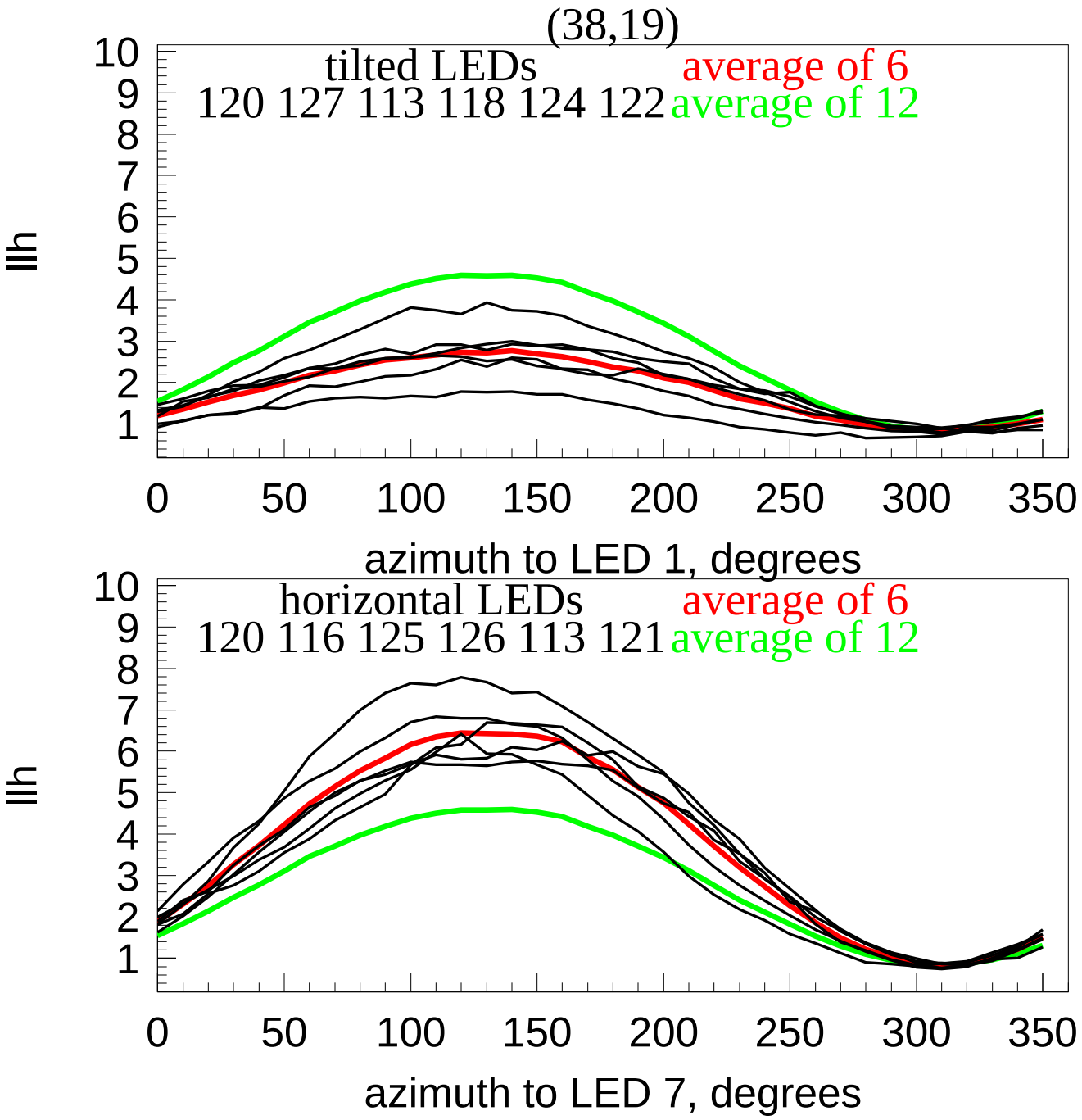

(38,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
96.5 ± 6.4

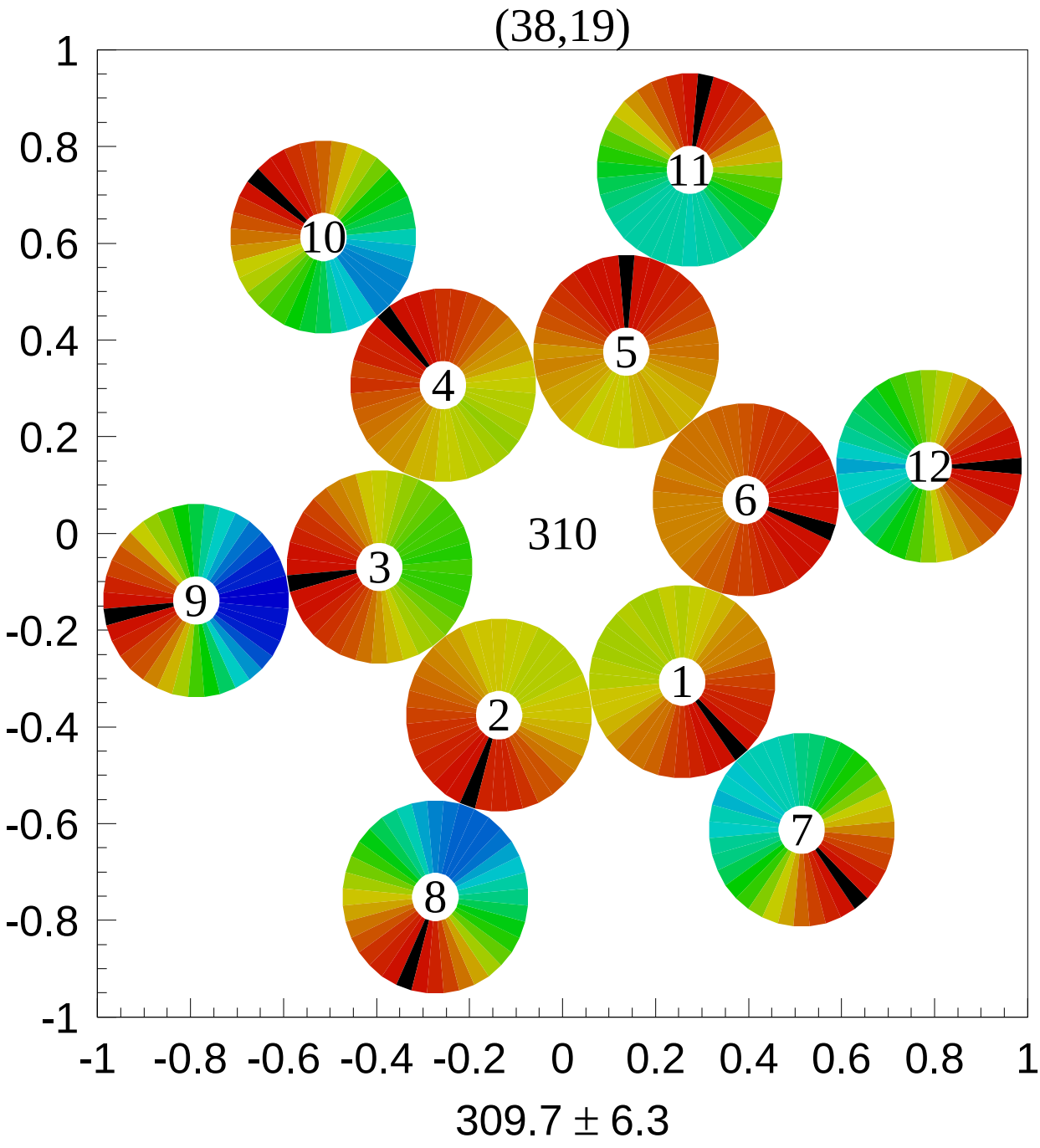

(38,17)
tilted LEDs
127 119 127 117 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 116 120 124 132
average of 6
average of 12
llh
azimuth to LED 7, degrees

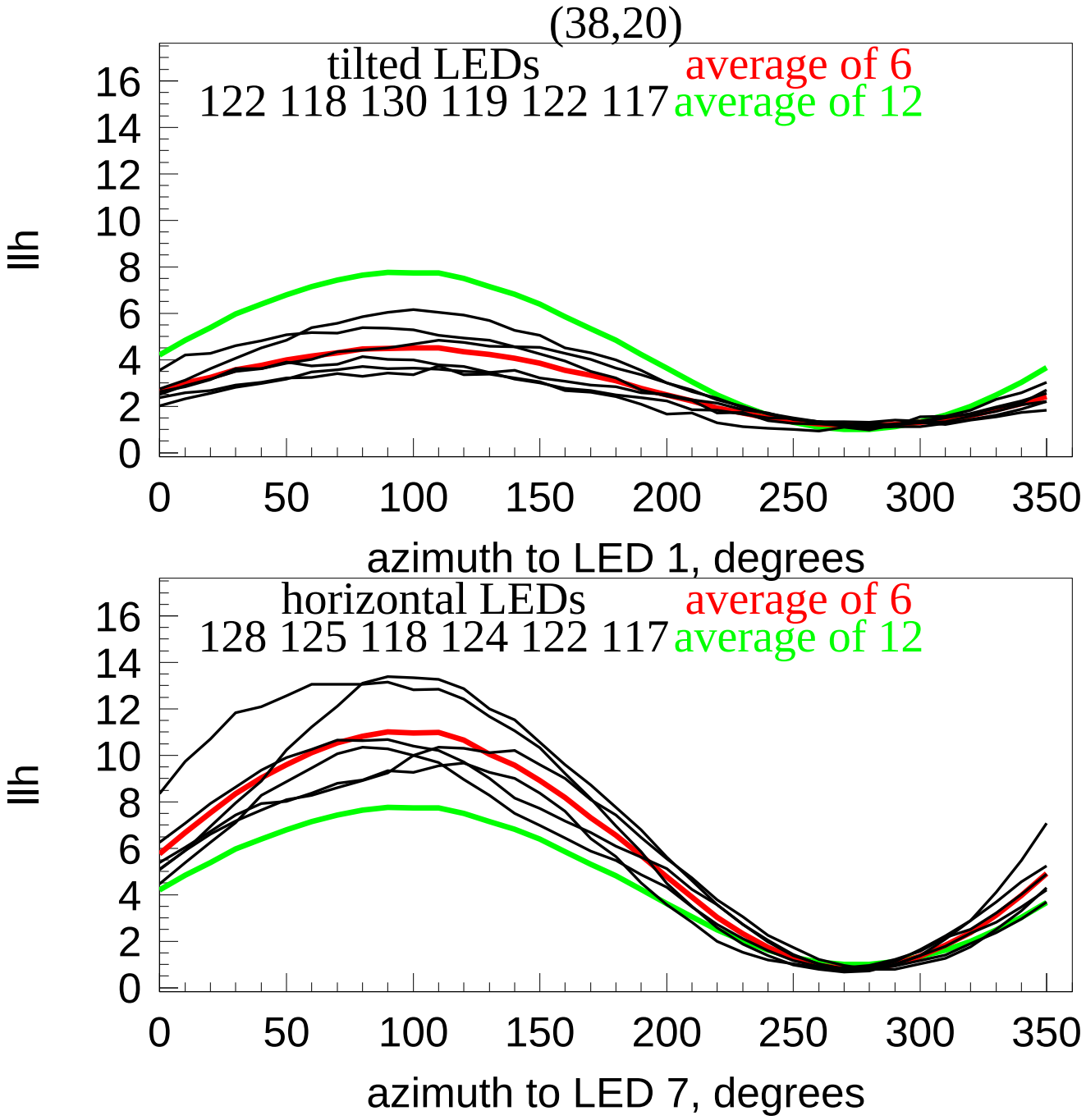

(38,17)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
35.8 ± 7.7

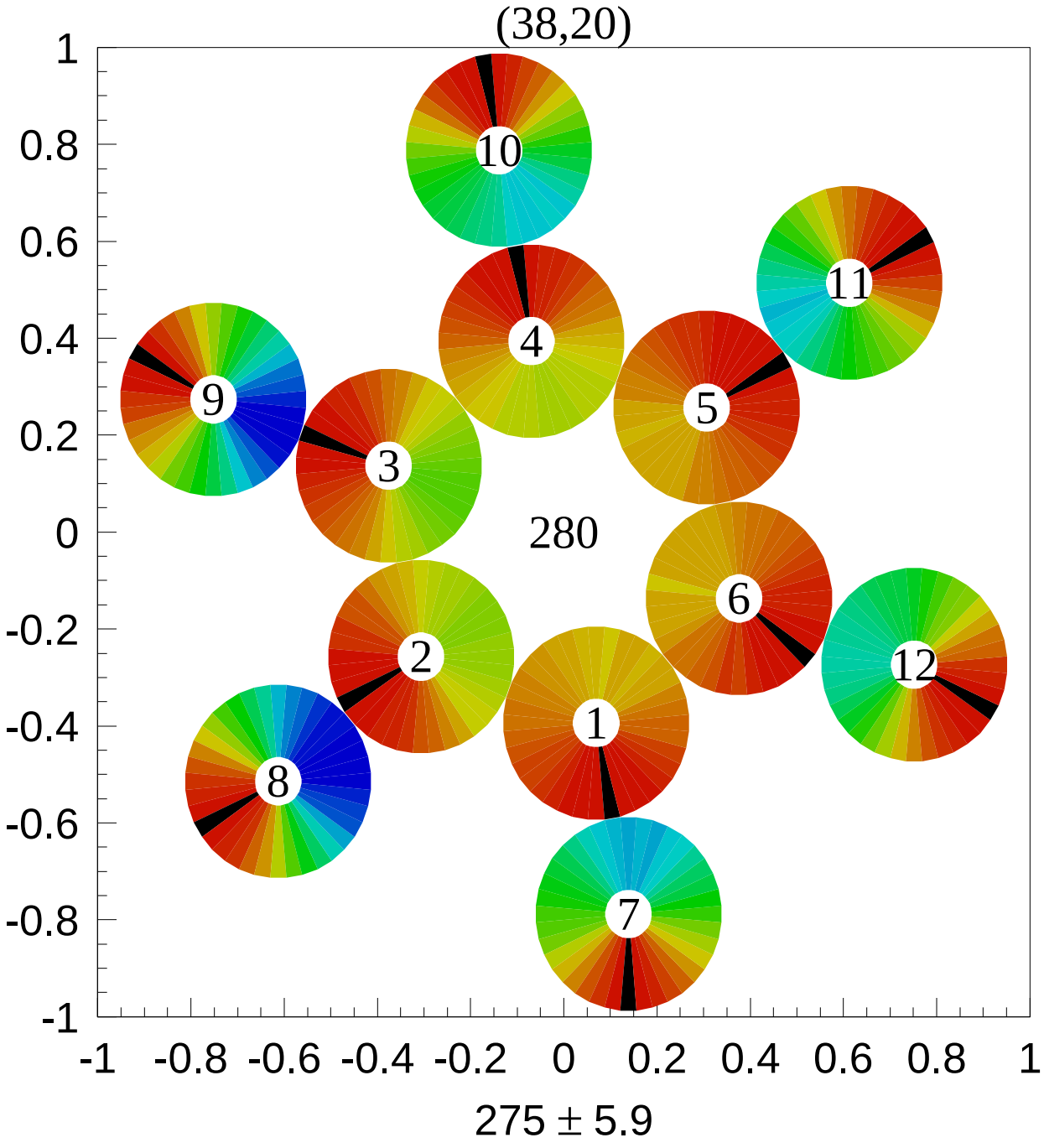

(38,18)
tilted LEDs
125 121 123 116 121 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 123 125 127 115 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

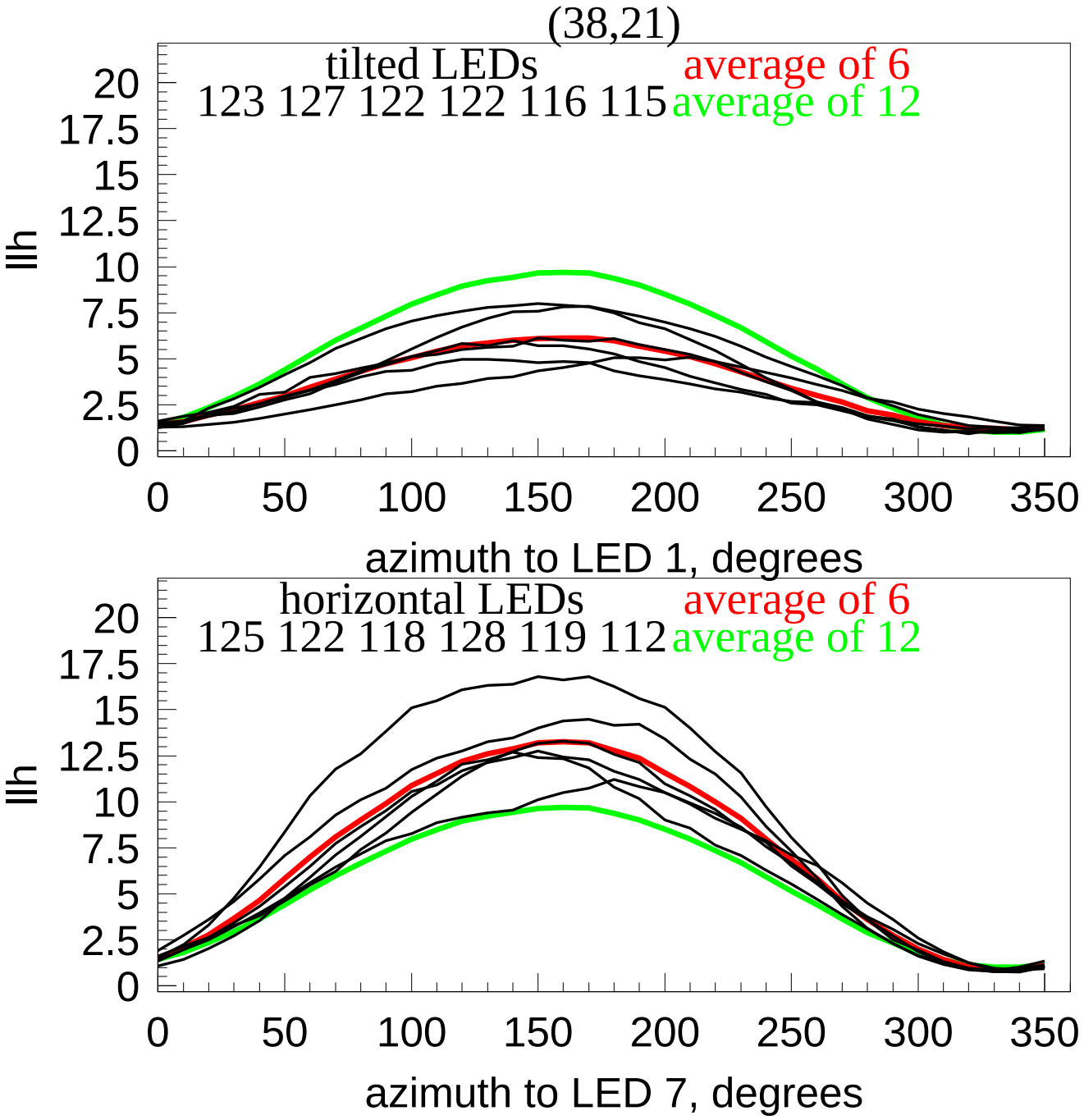

(38,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
161.4 ± 8.5

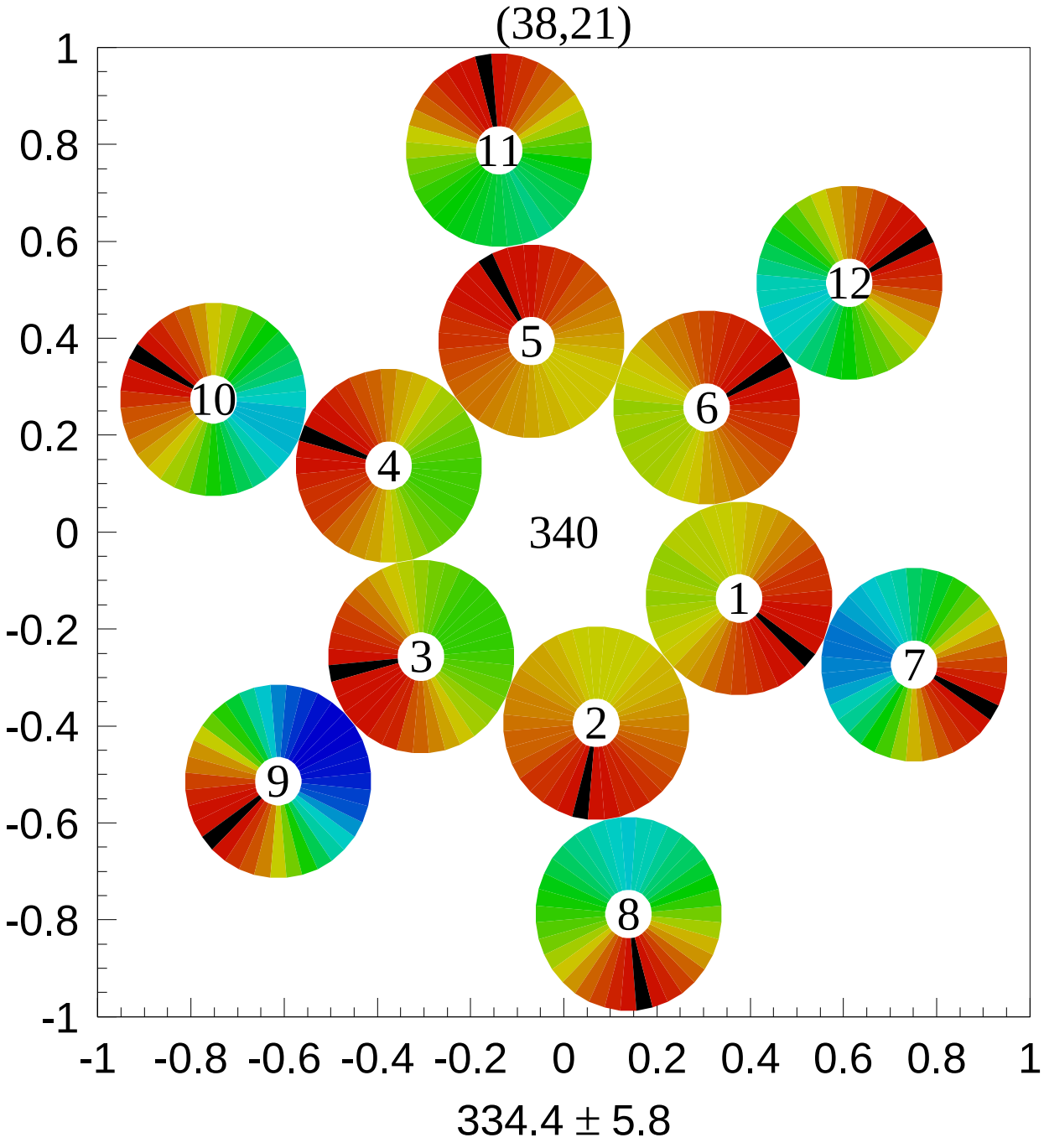

(38,19)
tilted LEDs
120 127 113 118 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 116 125 126 113 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

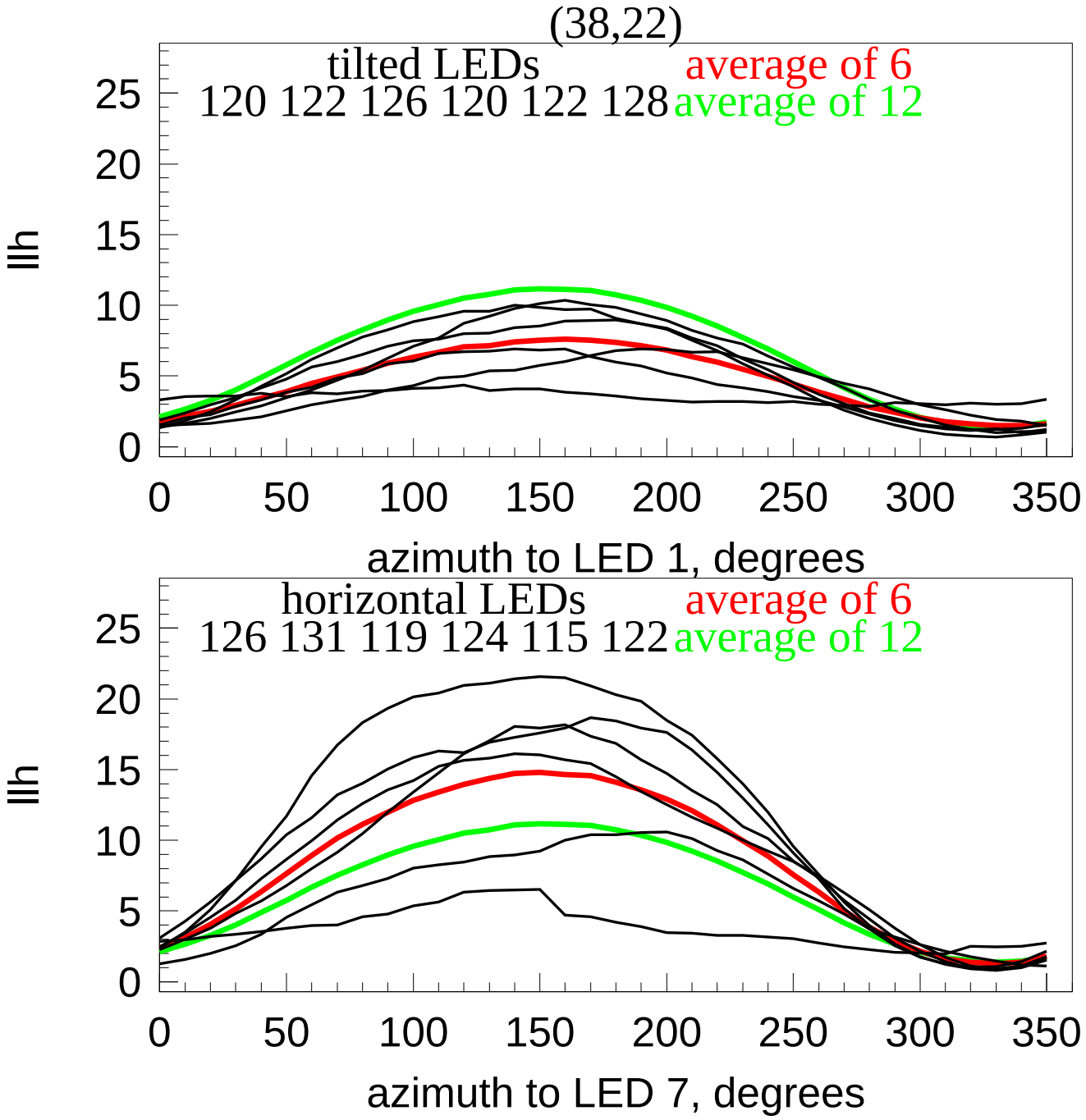

(38,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
309.7 ± 6.3

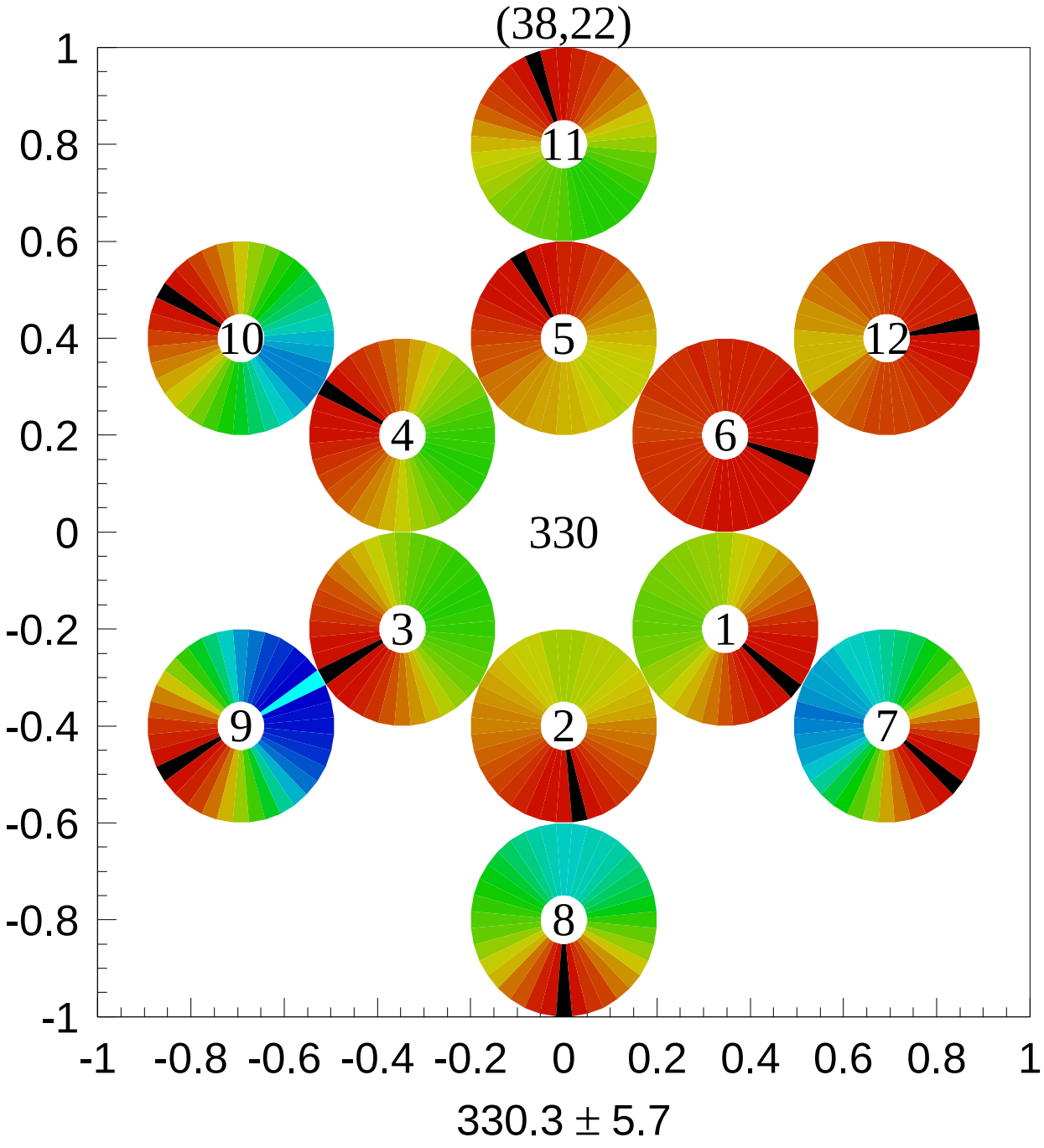

(38,20)
tilted LEDs
122 118 130 119 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 125 118 124 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

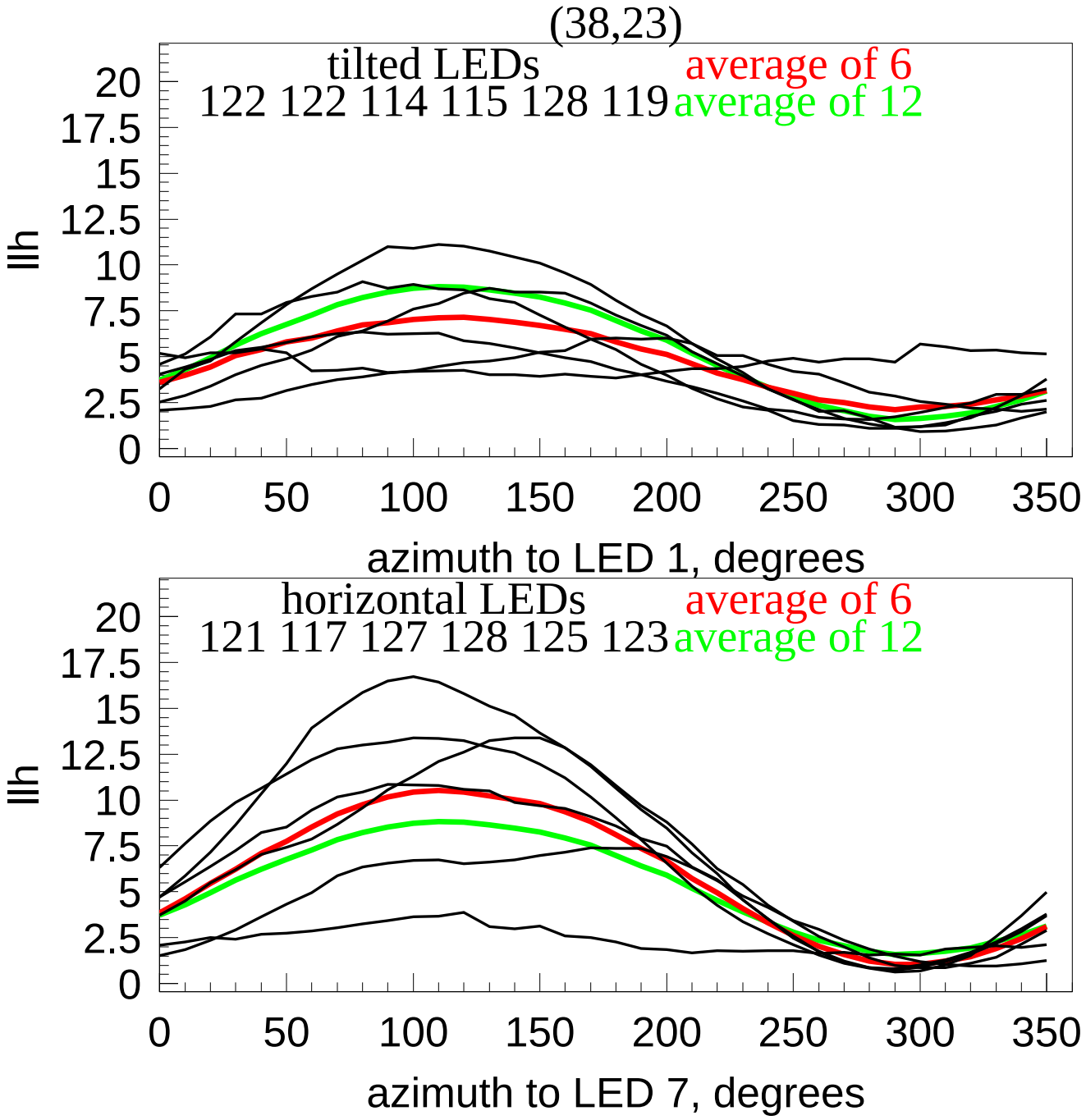

(38,20)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
275 ± 5.9

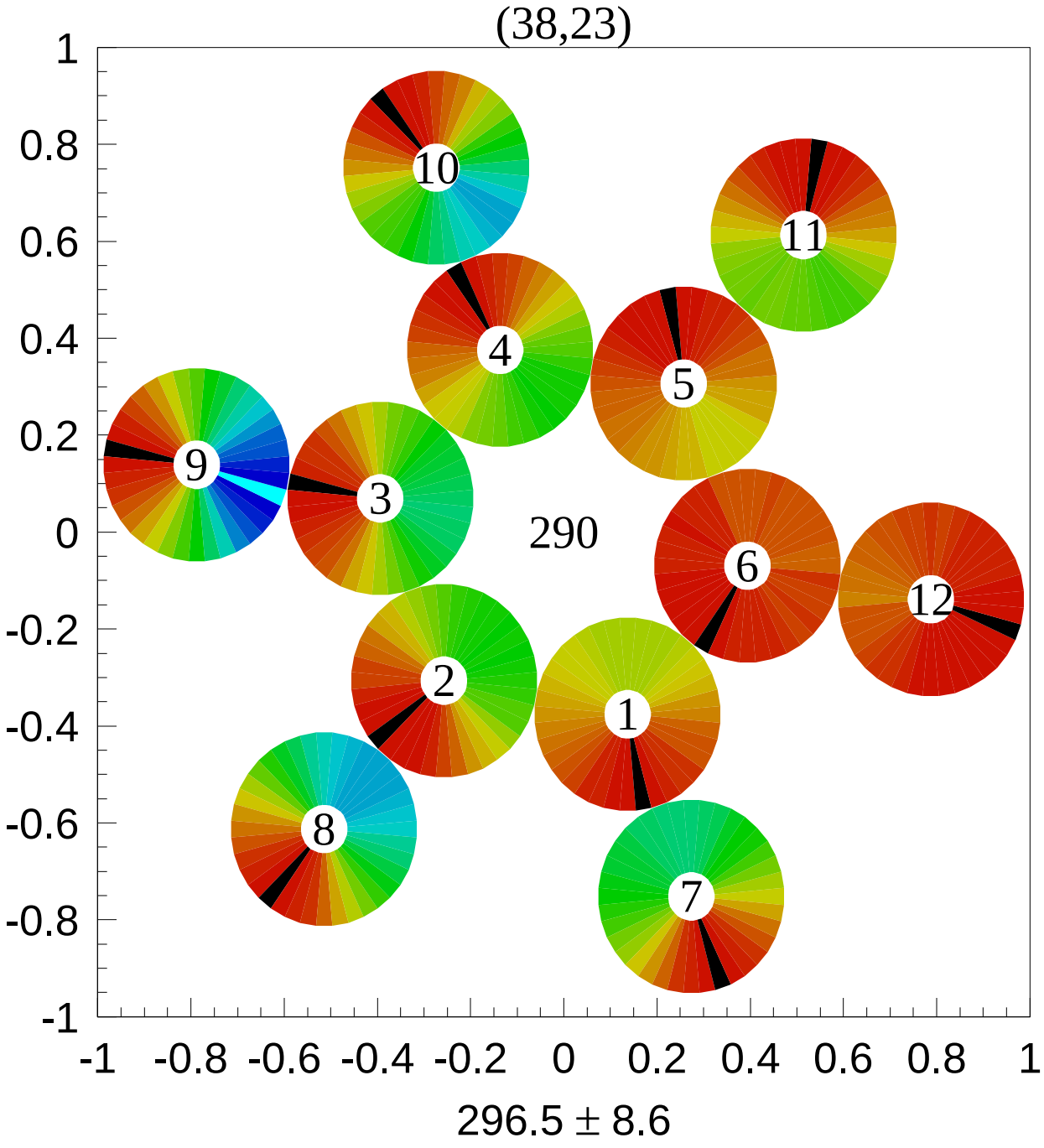

(38,21)
tilted LEDs
123 127 122 122 116 115
average of 6
average of 12
Ilh
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 122 118 128 119 112
average of 6
average of 12
Ilh
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

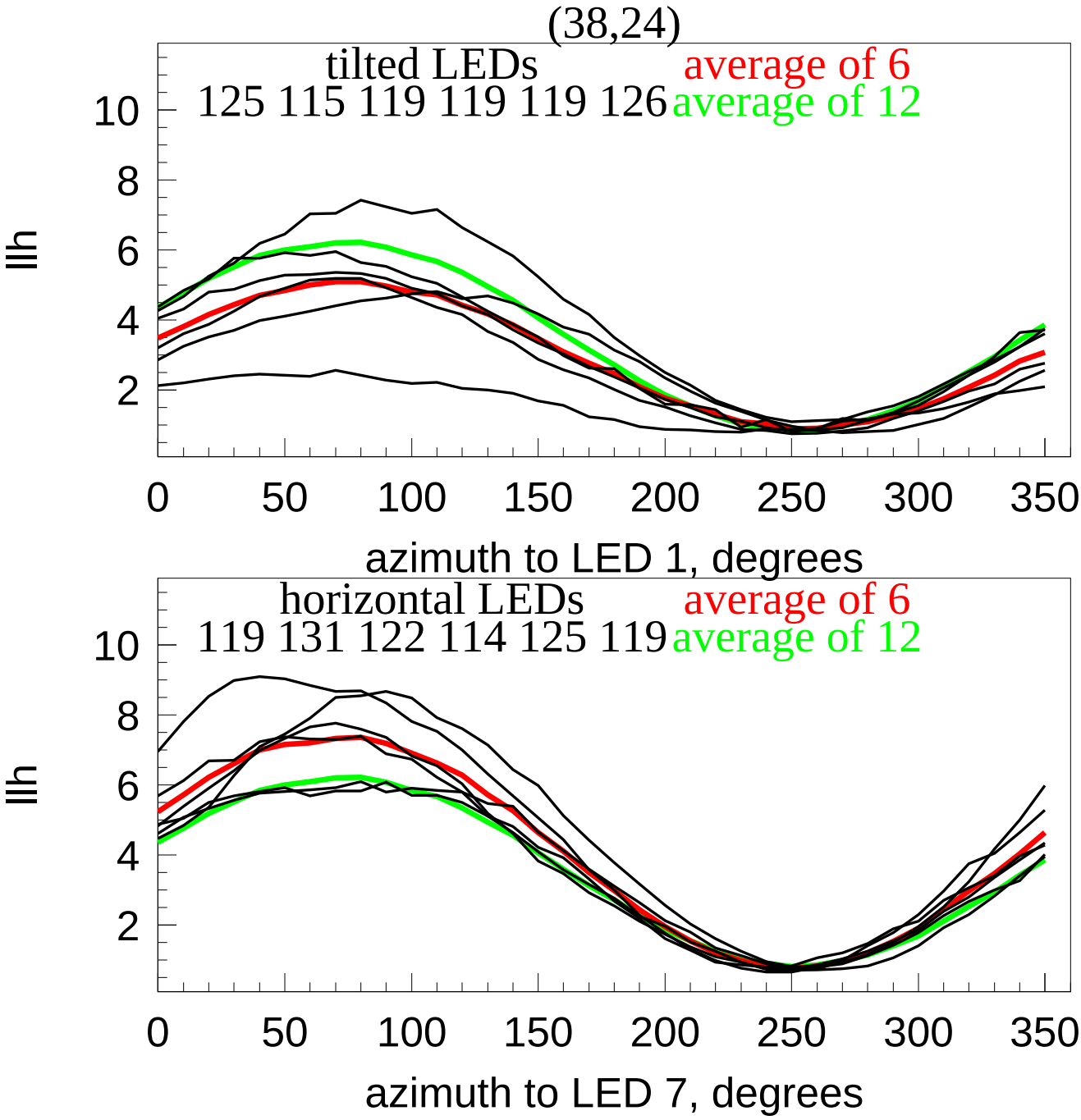

(38,21)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
334.4 ± 5.8

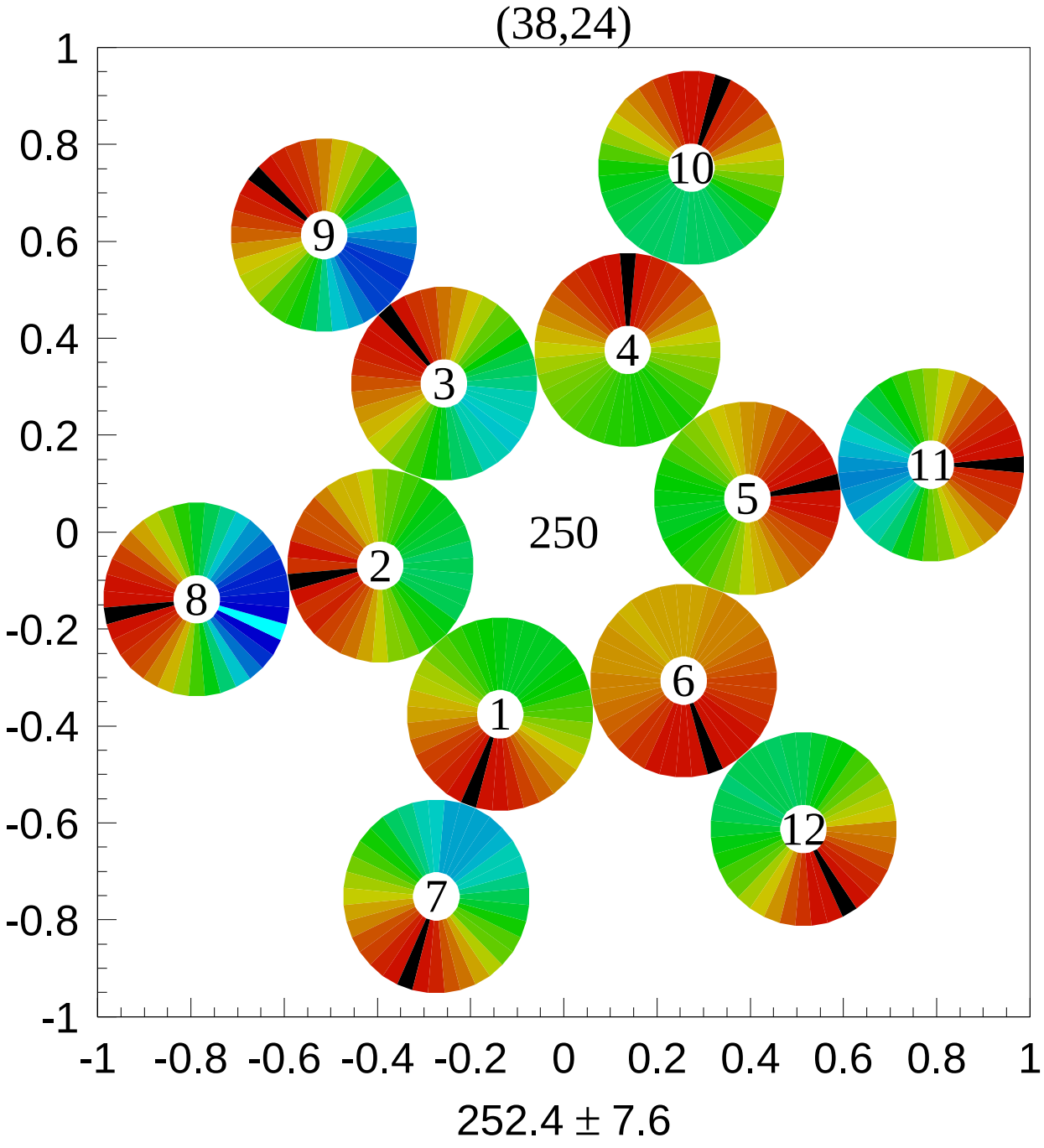

(38,22)
tilted LEDs
120 122 126 120 122 128
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 131 119 124 115 122
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

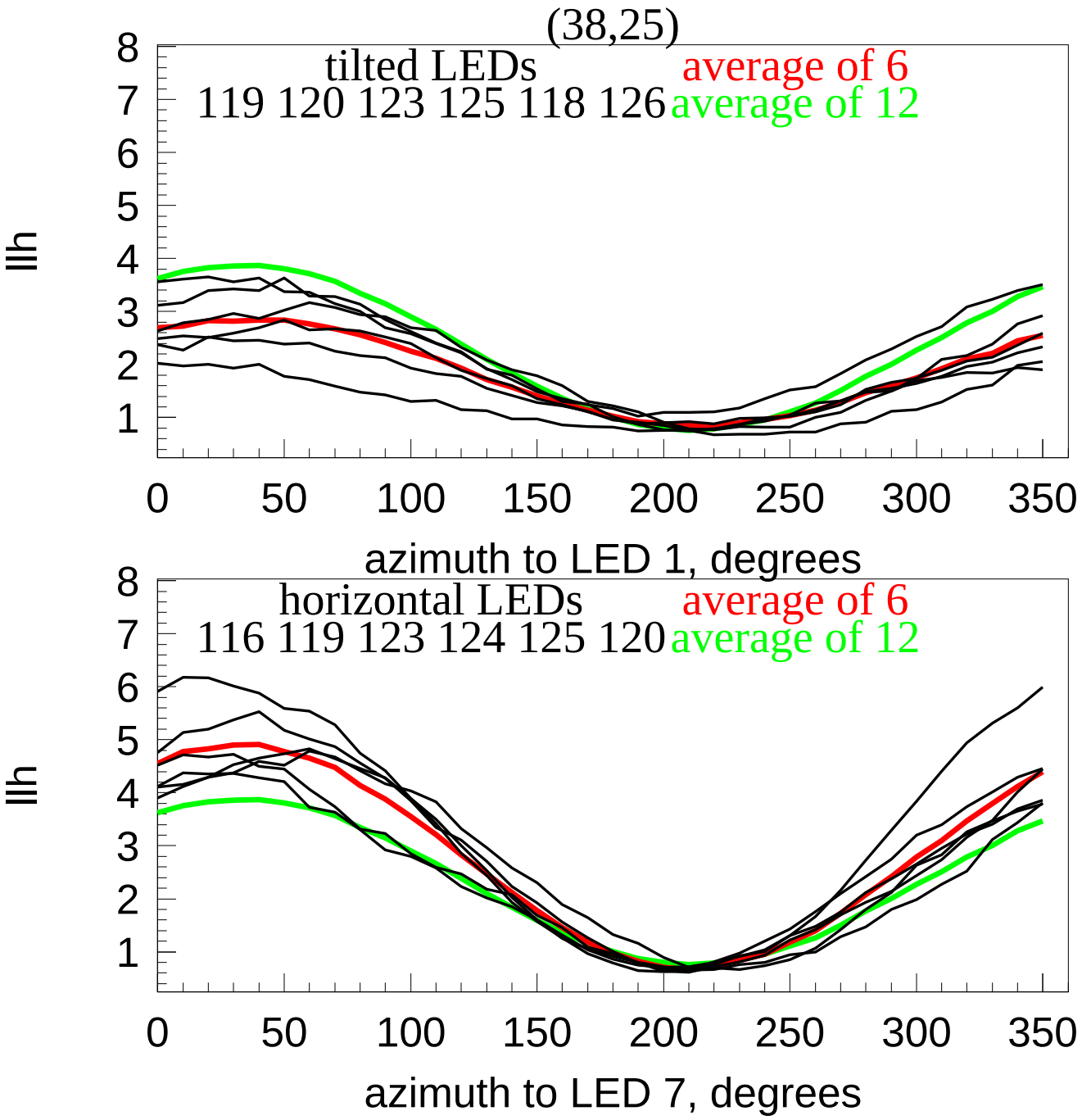

(38,22)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
330.3 ± 5.7

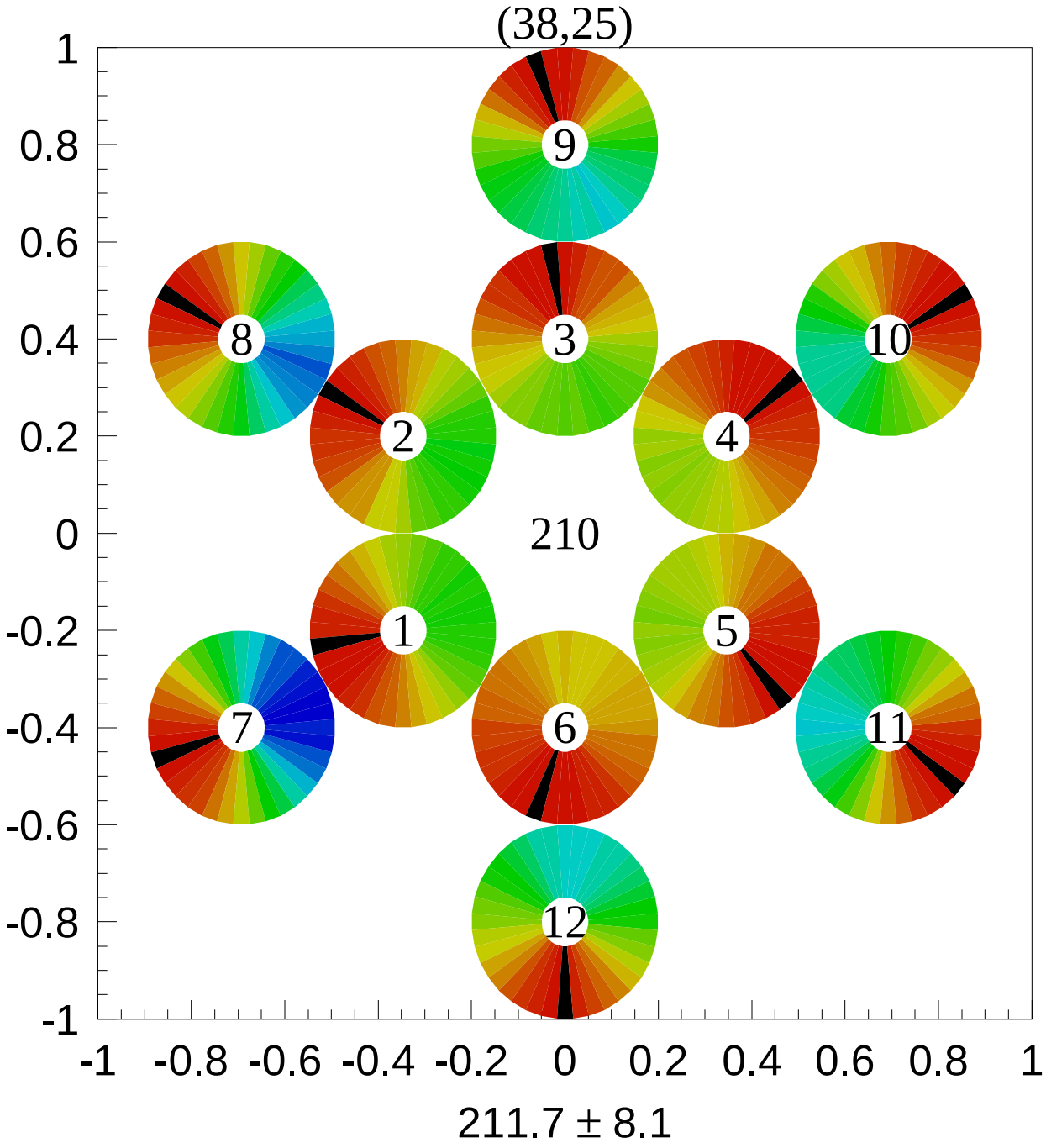

(38,23)
tilted LEDs
122 122 114 115 128 119
average of 6
average of 12
llh
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 117 127 128 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

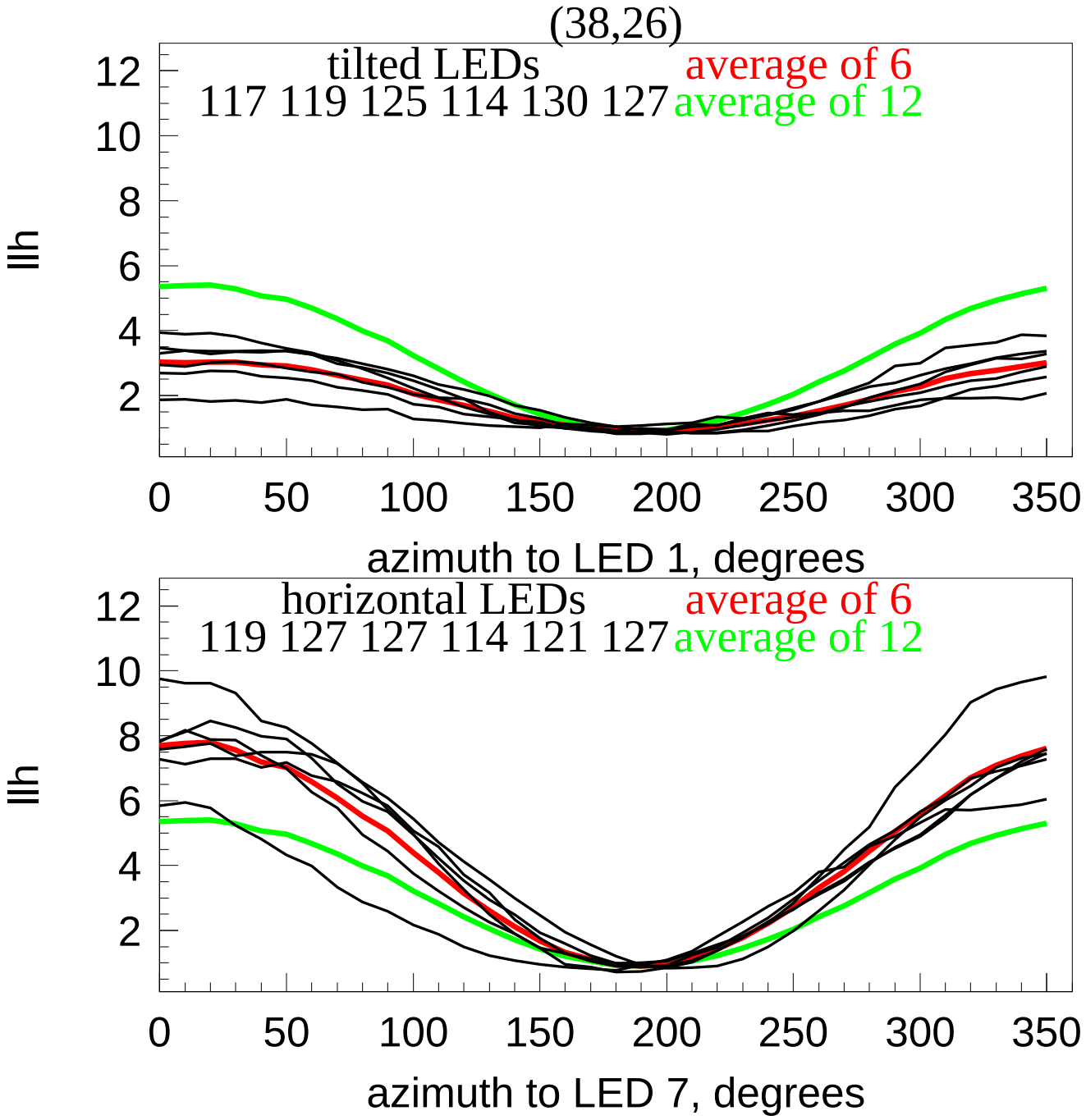

(38,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
296.5 ± 8.6

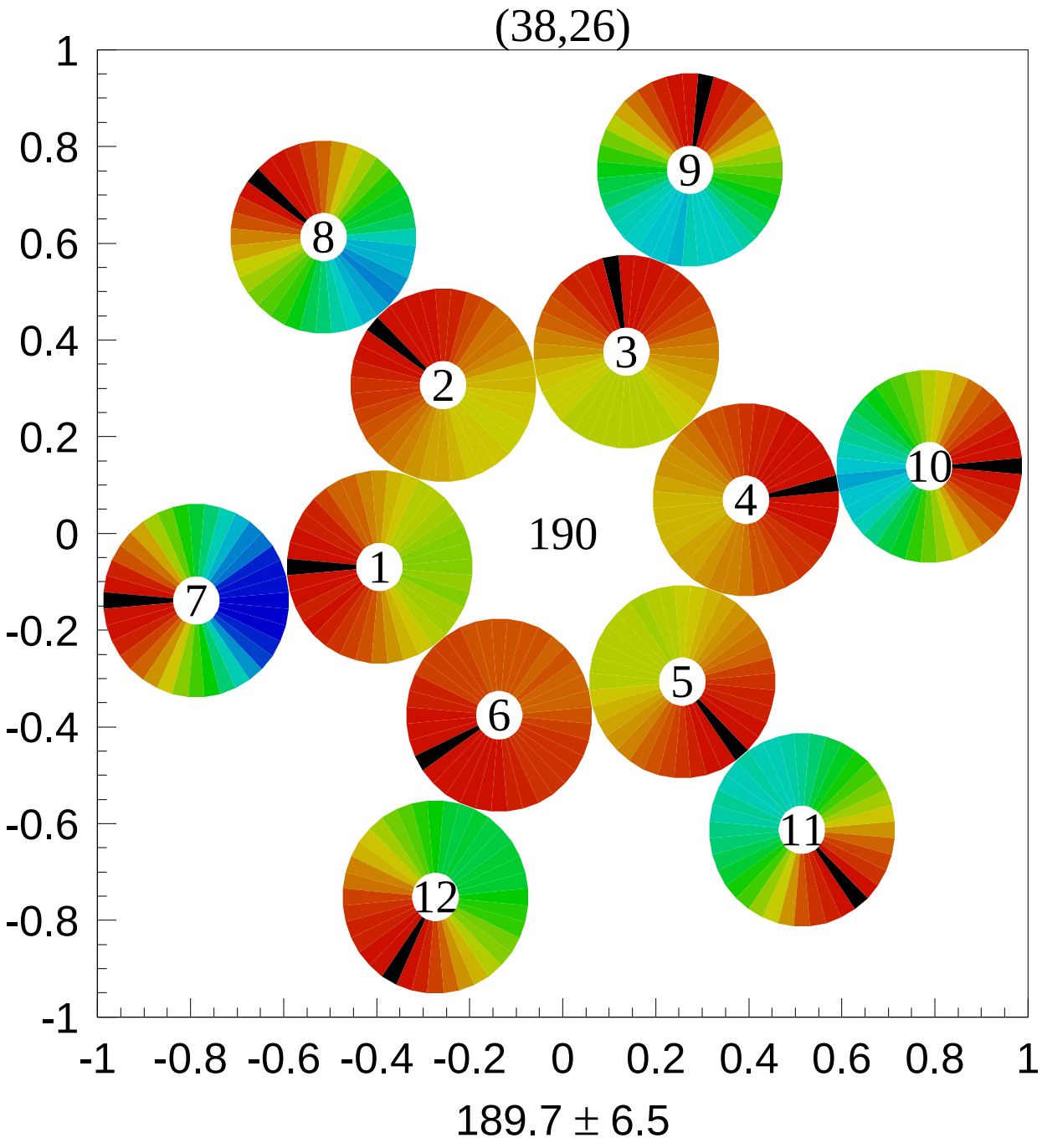

(38,24)
tilted LEDs
125 115 119 119 119 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 131 122 114 125 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

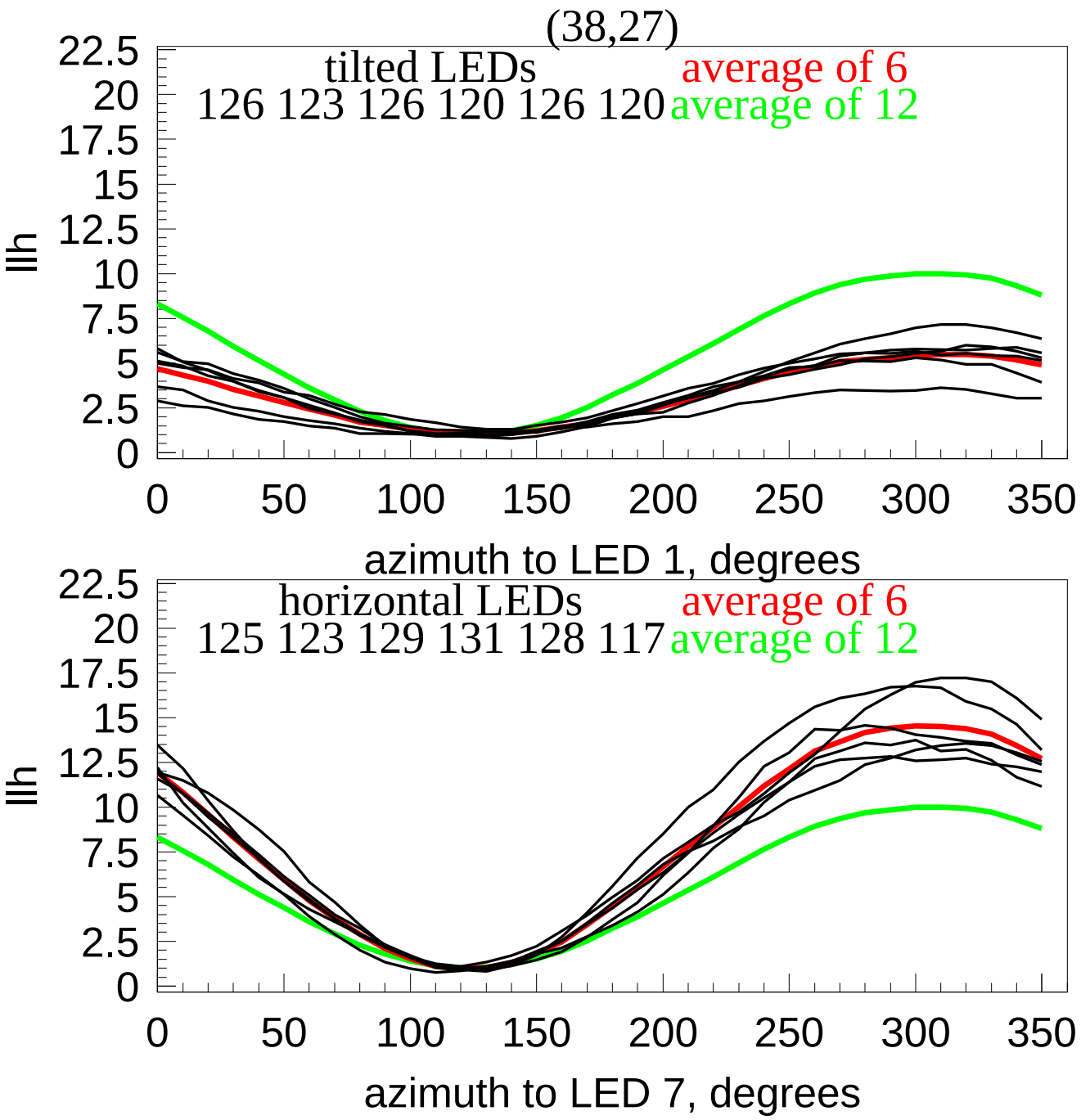

(38,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
252.4 ± 7.6
250
1
2
3
4
5
6
7
8
9
10
11
12

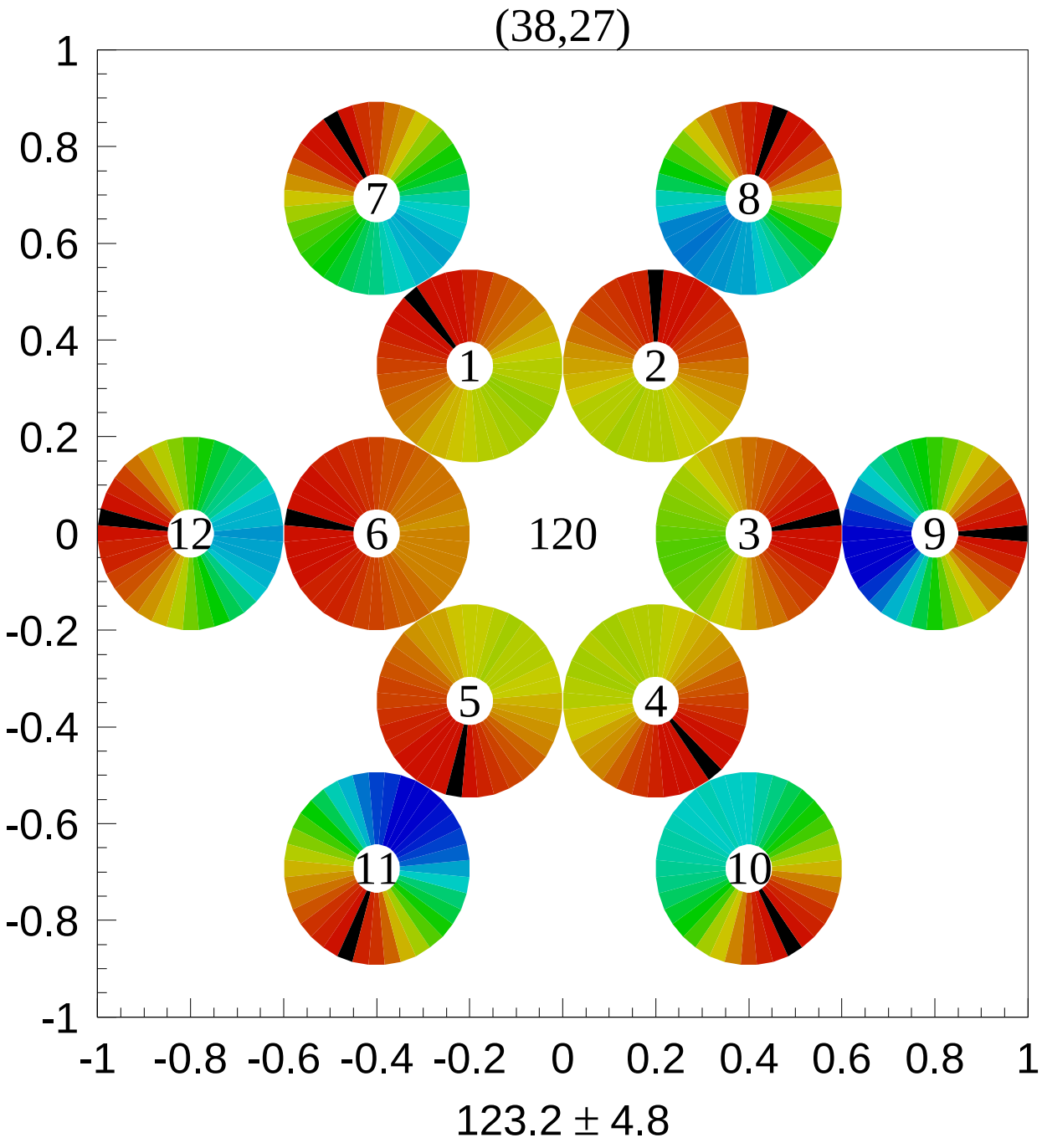

(38,25)
tilted LEDs
119 120 123 125 118 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 119 123 124 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

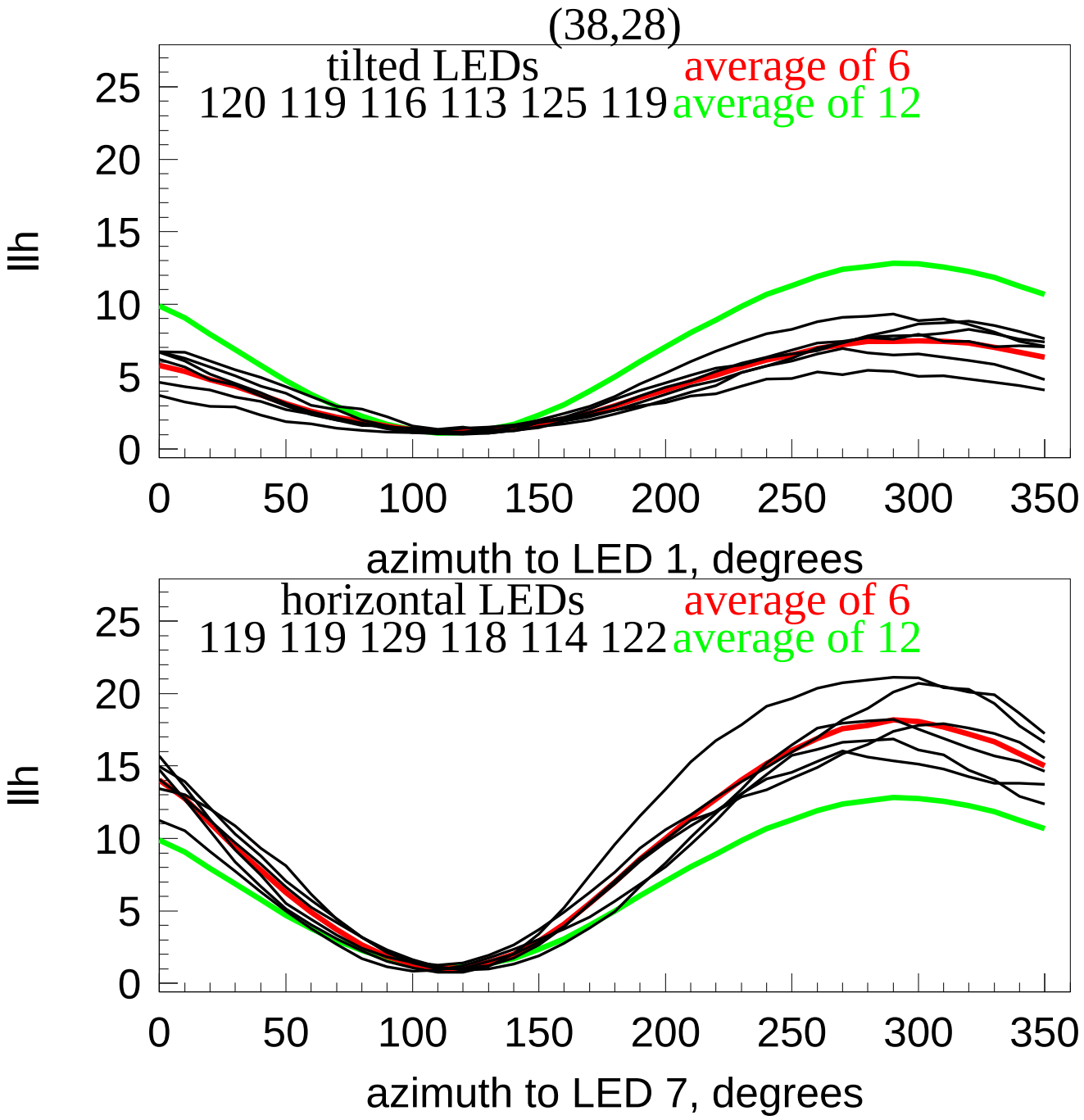

(38,25)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.7 ± 8.1

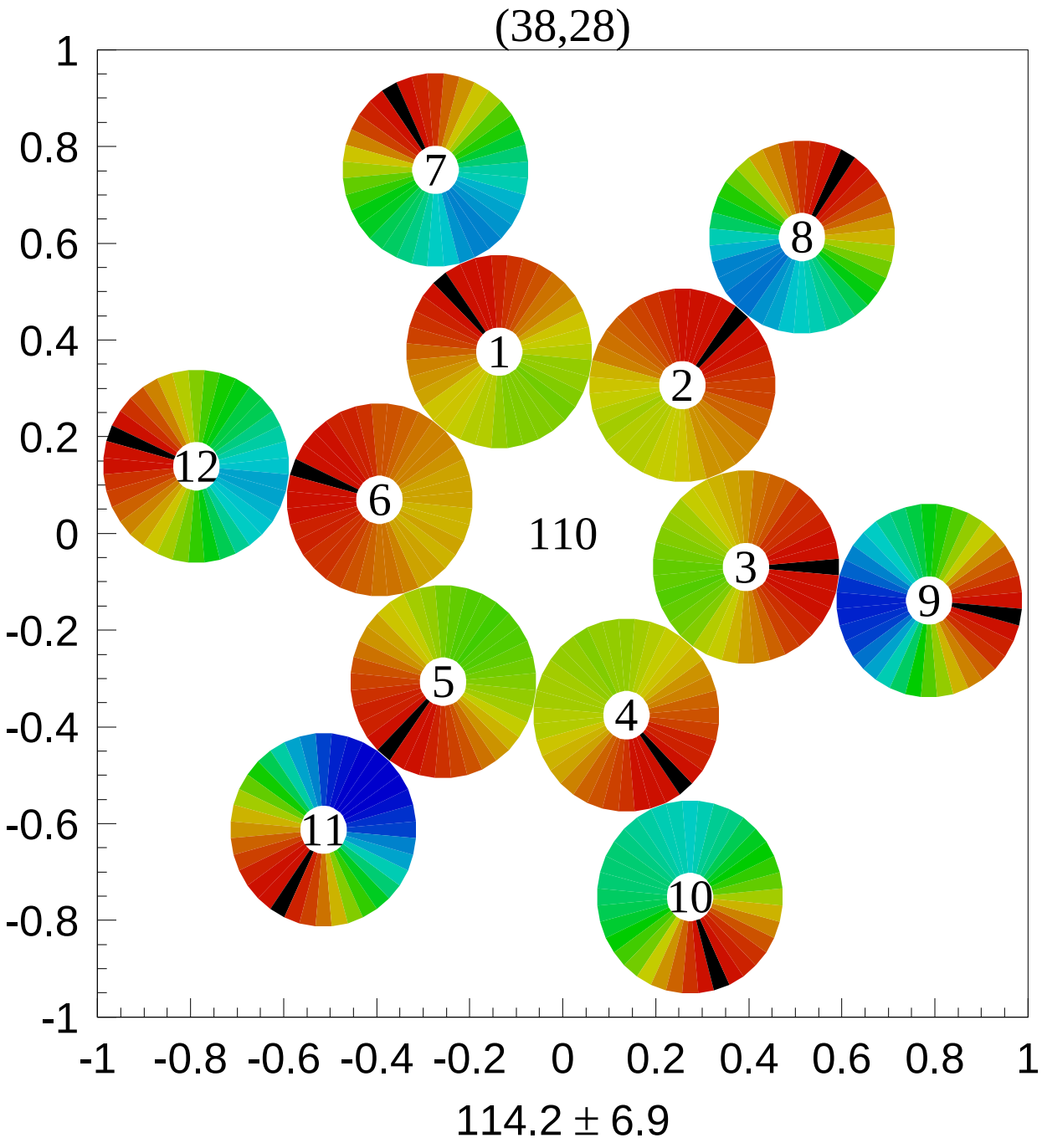

(38,26)
tilted LEDs
117 119 125 114 130 127
average of 6
average of 12
12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 127 127 114 121 127
average of 6
average of 12
12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

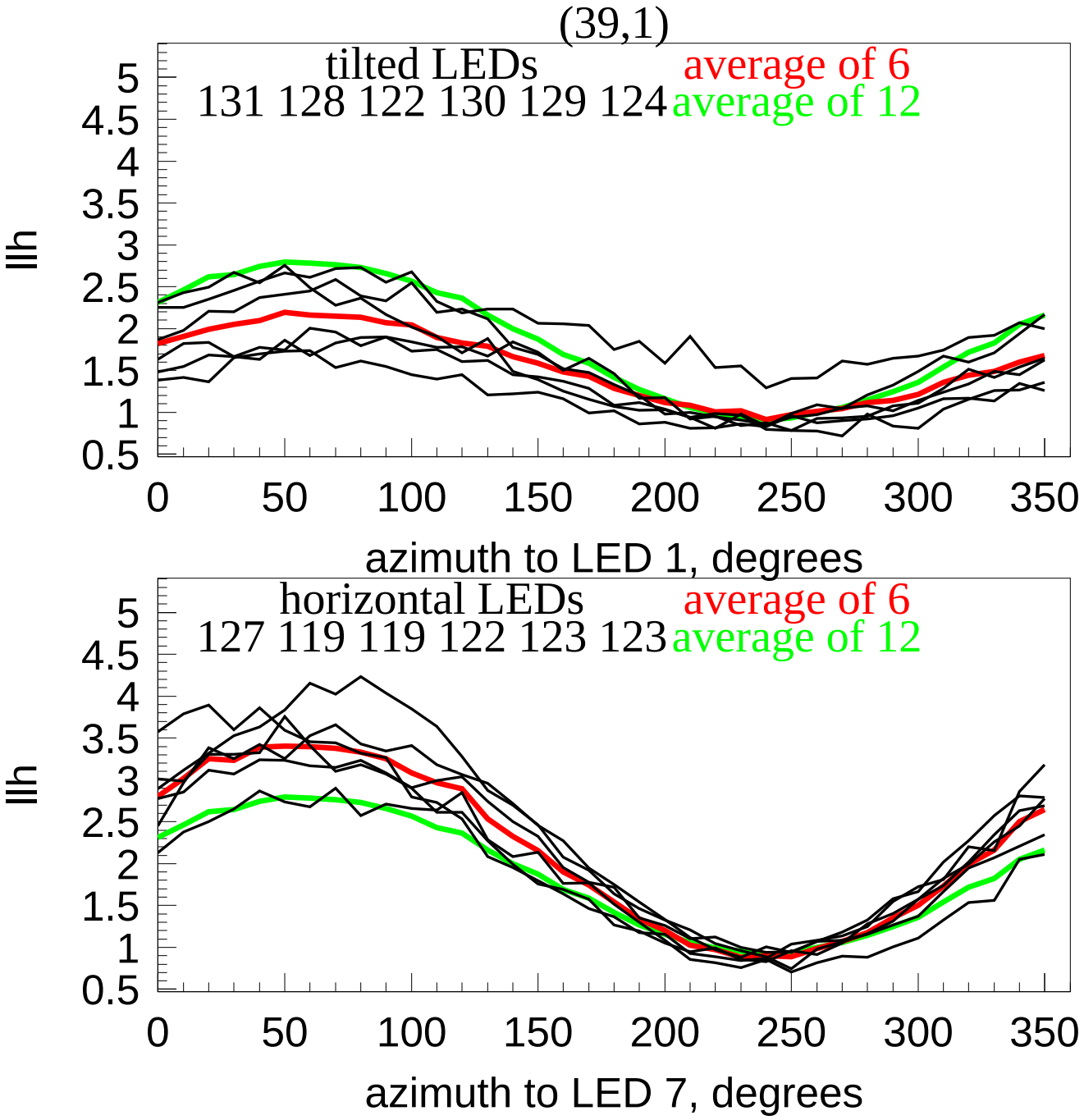

(38,26)
1
2
3
4
5
6
7
8
9
10
11
12
190
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
189.7 ± 6.5

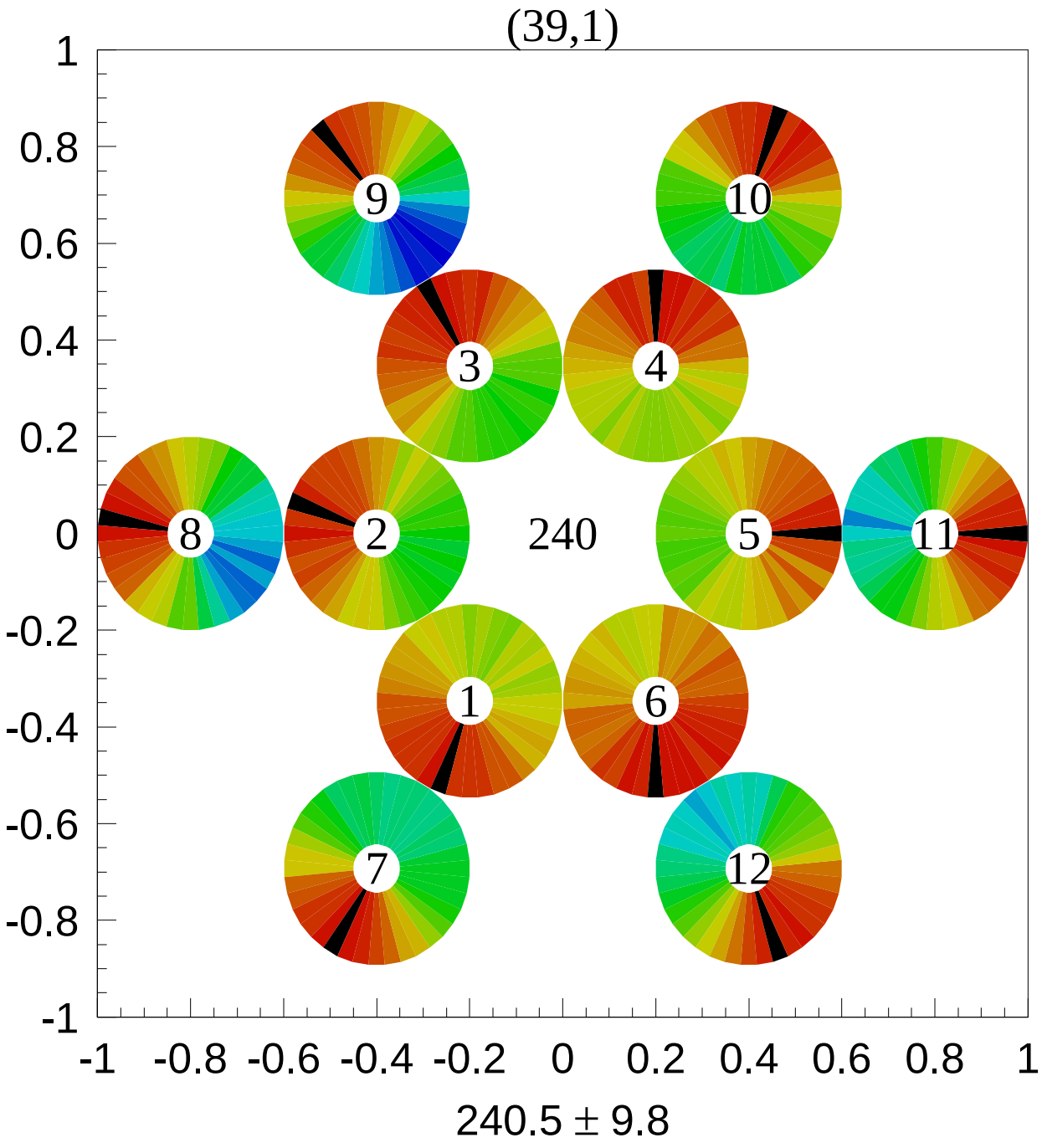

(38,27)
tilted LEDs
126 123 126 120 126 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 129 131 128 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

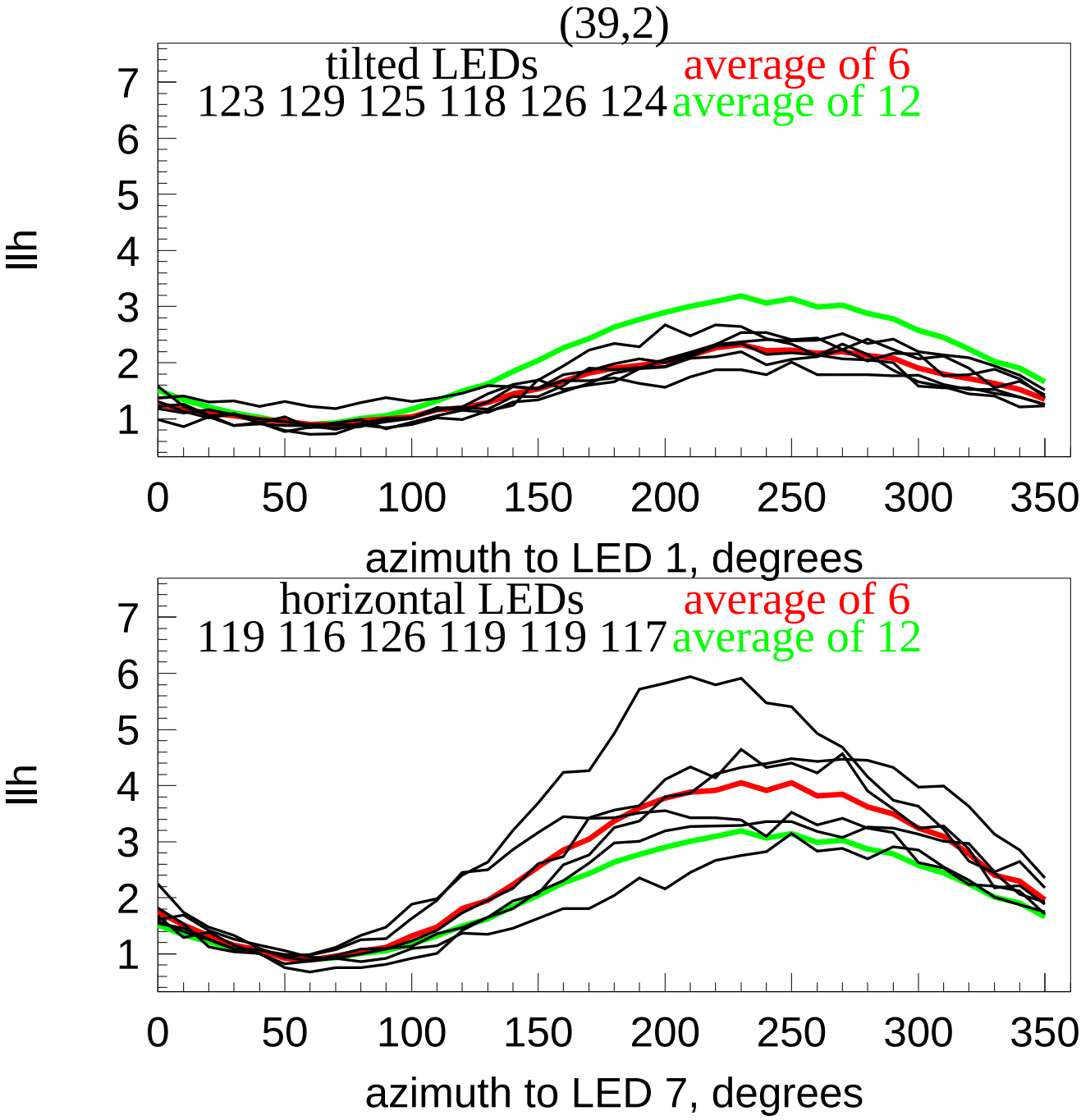

(38,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
123.2 ± 4.8

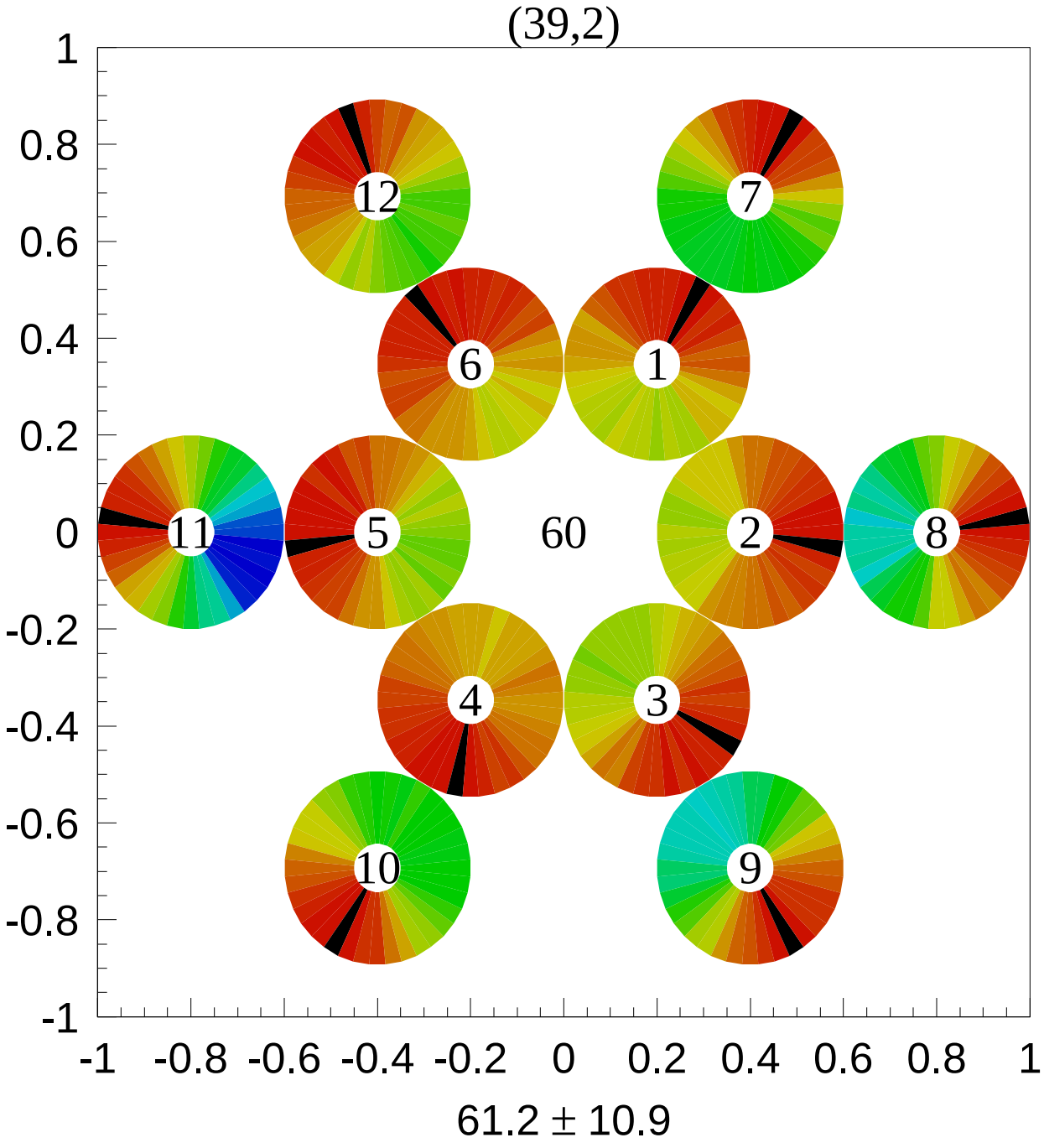

(38,28)
tilted LEDs
120 119 116 113 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 119 129 118 114 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

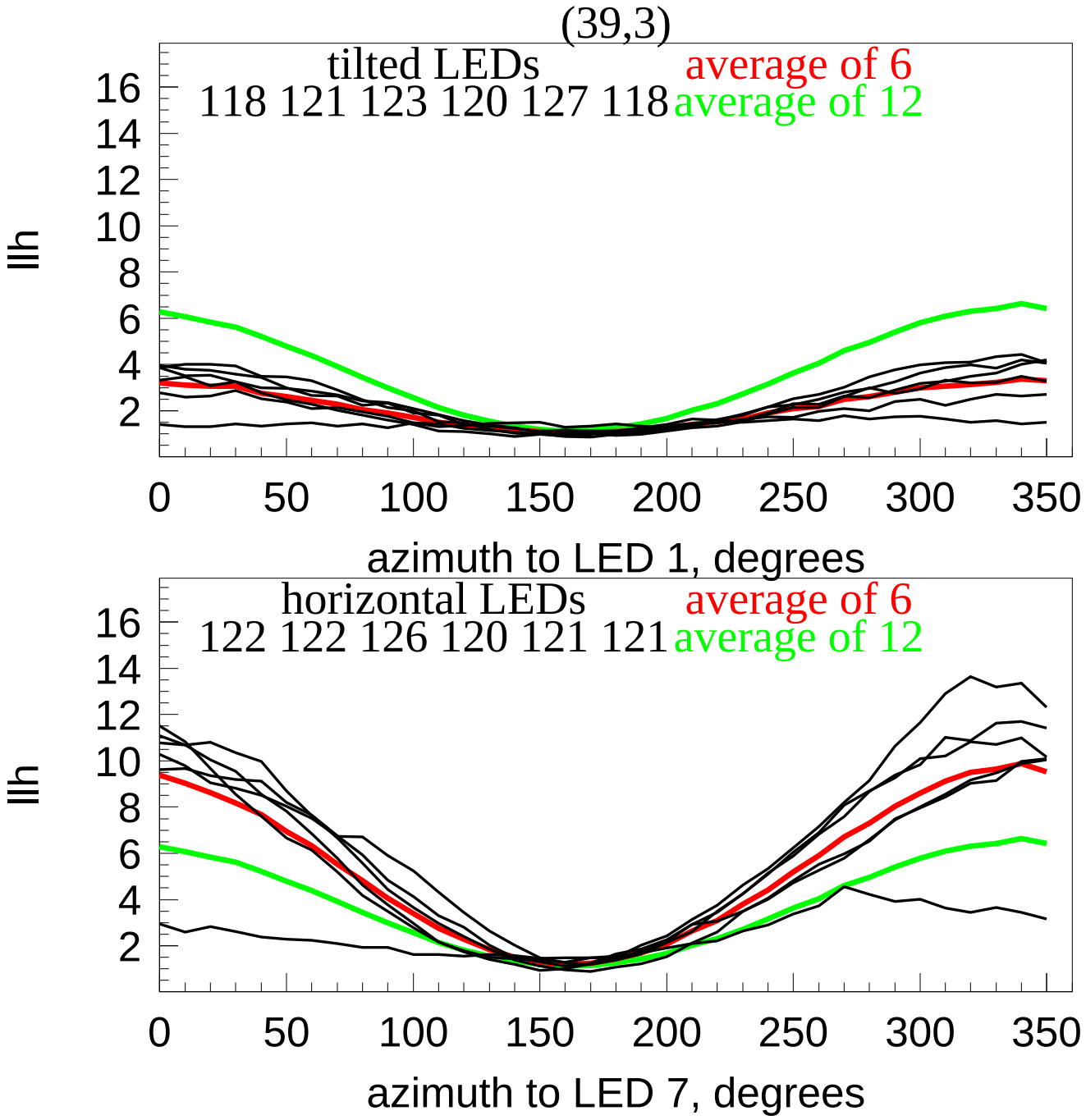

(38,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
114.2 ± 6.9

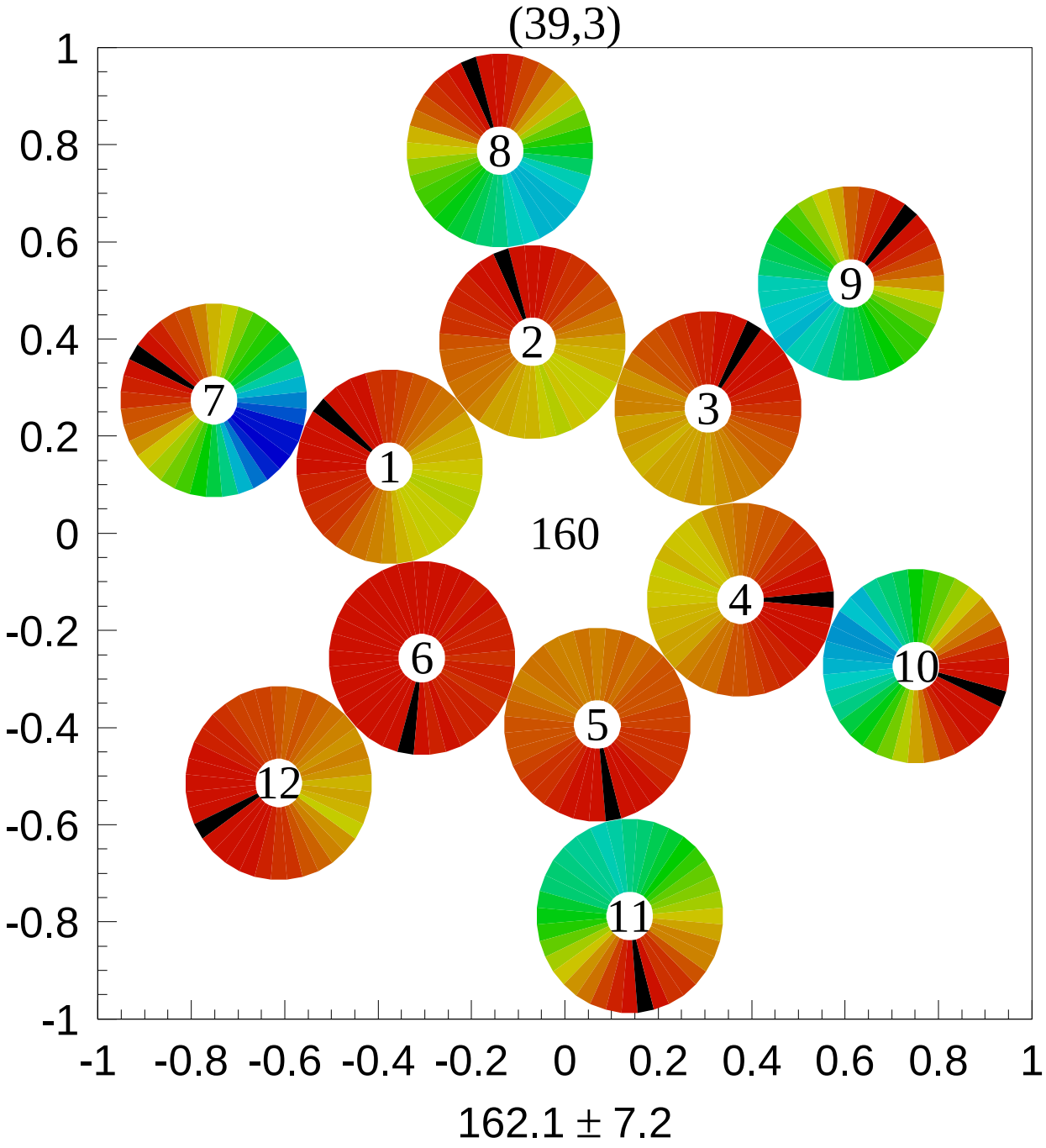

(39,1)
tilted LEDs
131 128 122 130 129 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 119 119 122 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

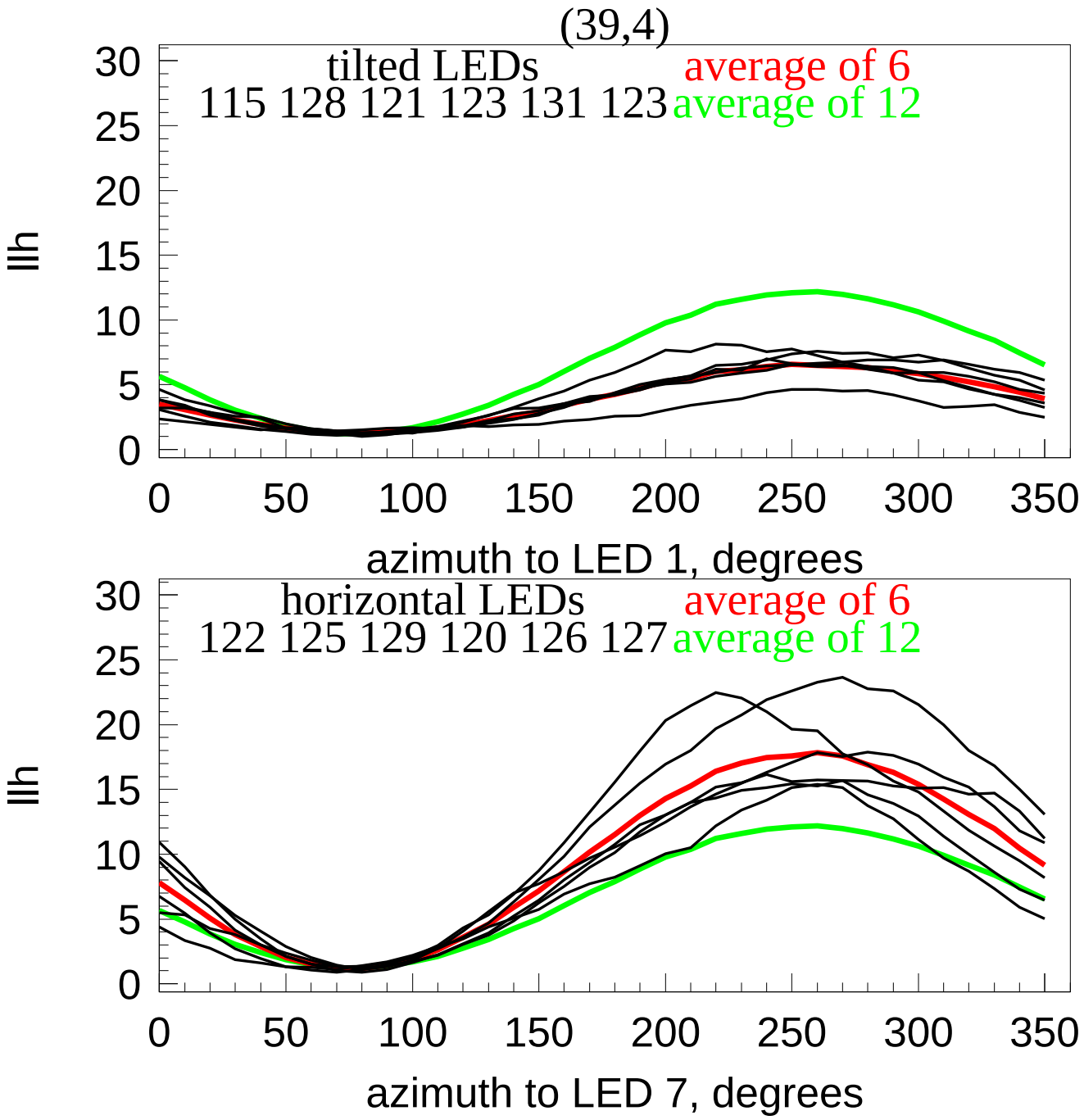

(39,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
240.5 ± 9.8
9
10
3
4
8
2
240
5
11
1
6
7
12

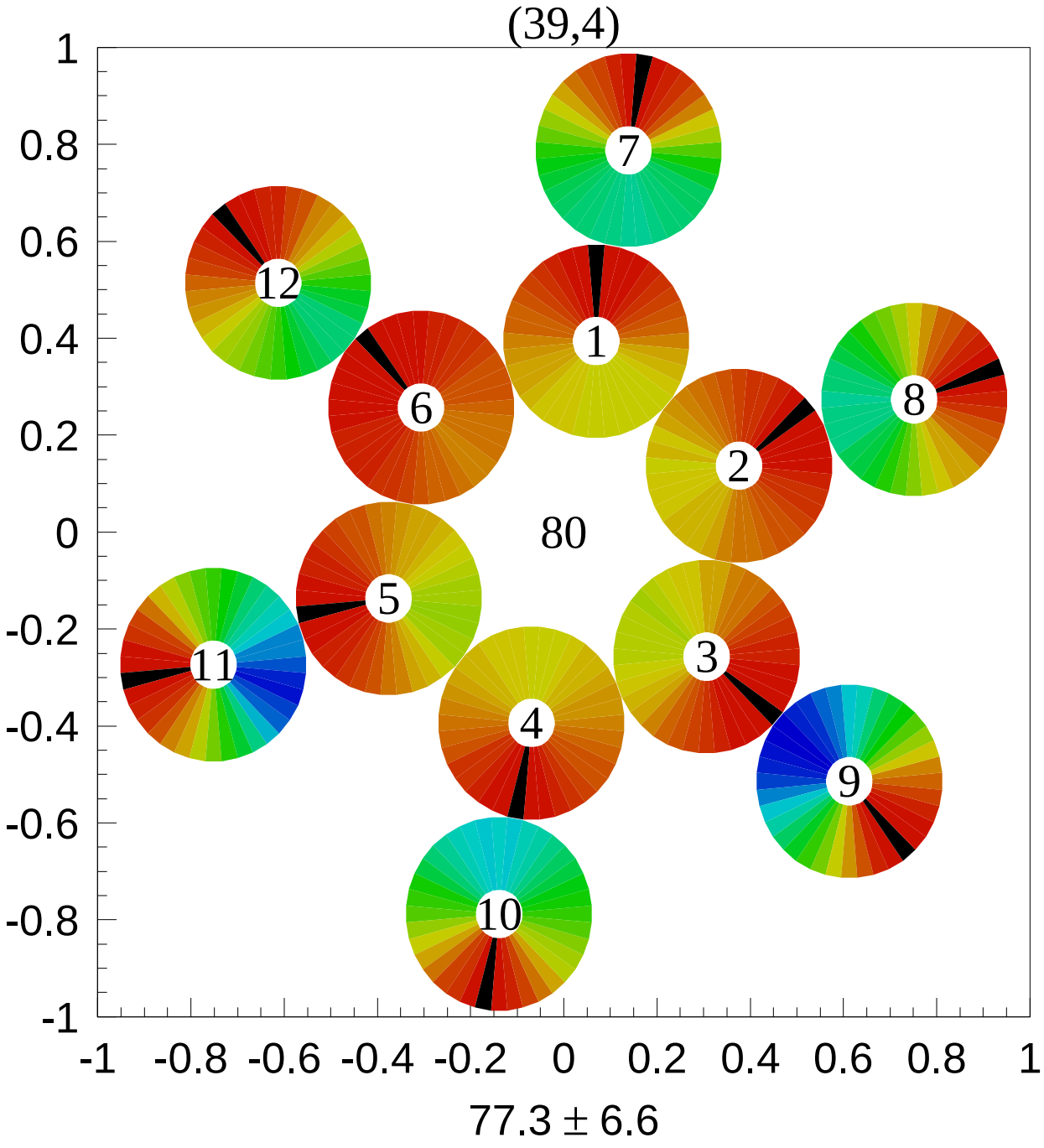

(39,2)
tilted LEDs
123 129 125 118 126 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 116 126 119 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

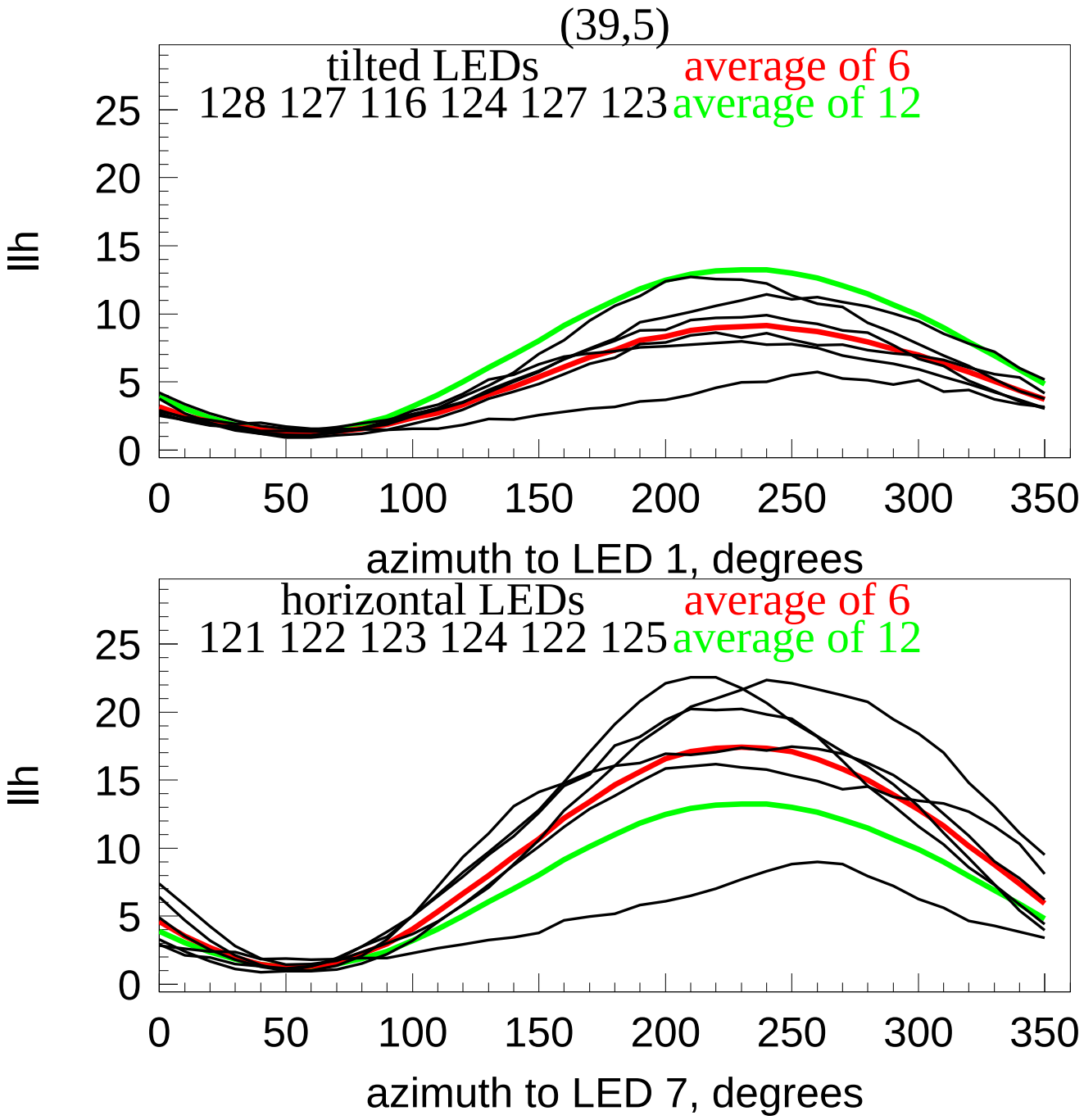

(39,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
61.2 ± 10.9

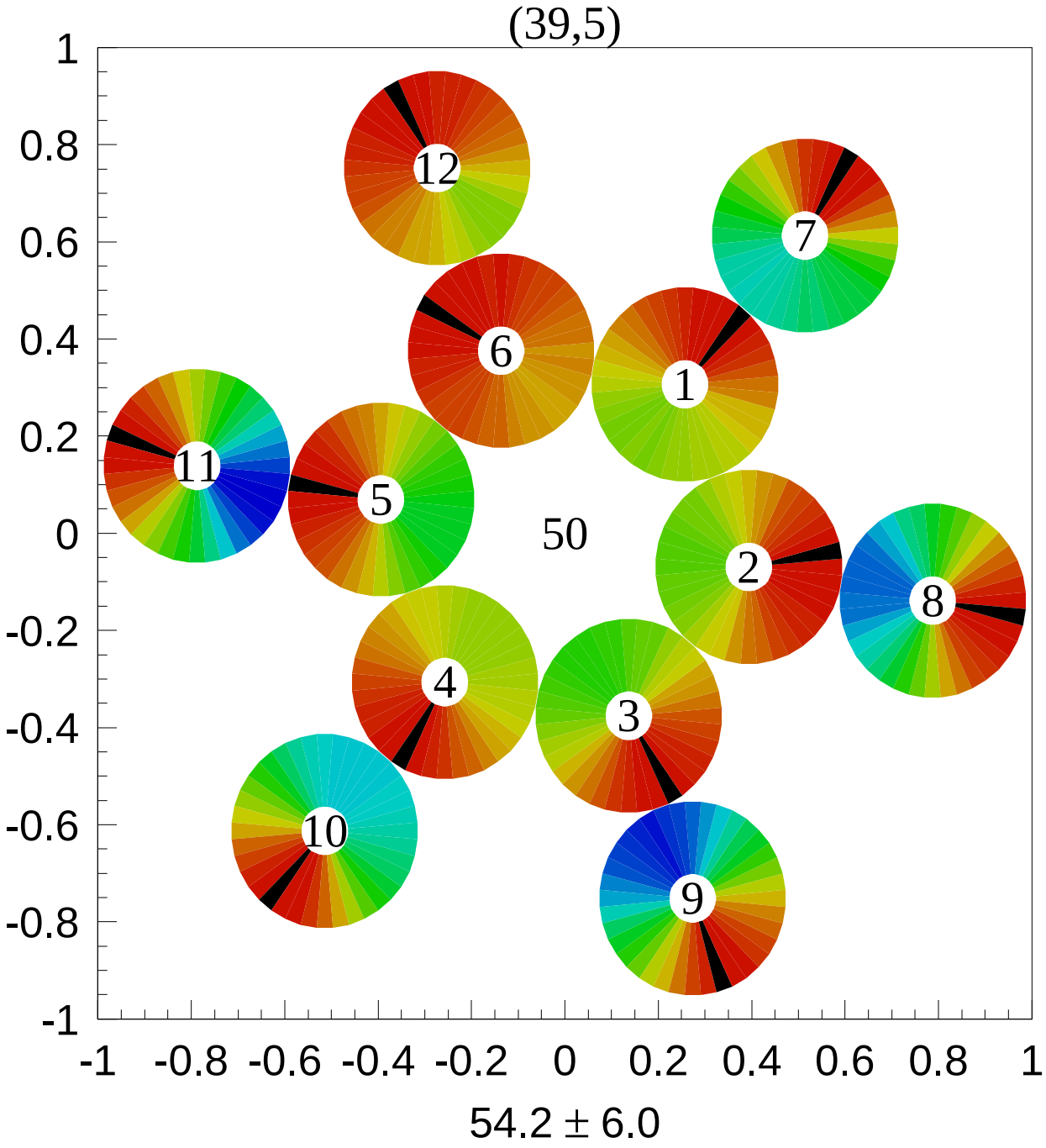

(39,3)
tilted LEDs
118 121 123 120 127 118
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 122 126 120 121 121
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

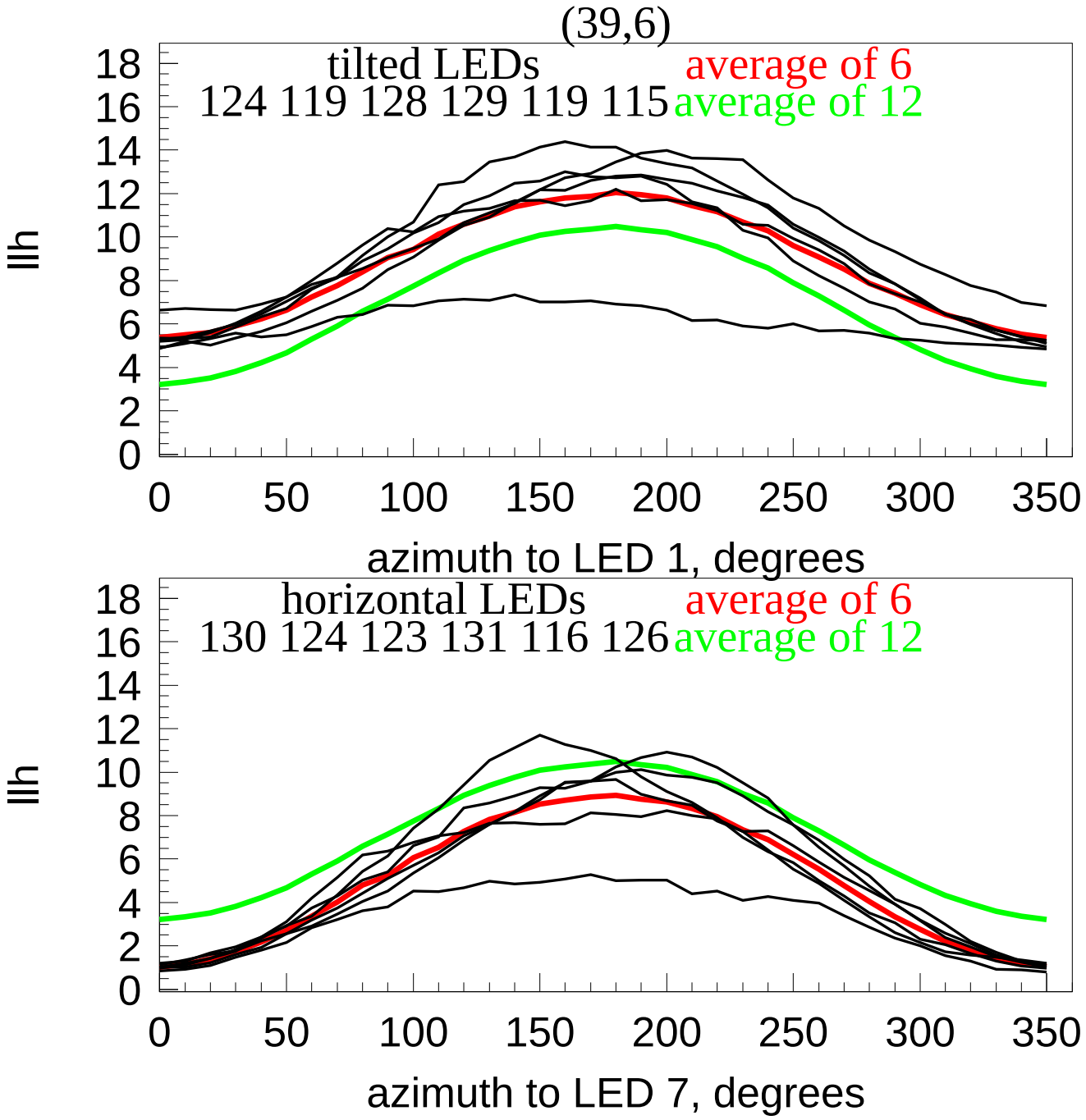

(39,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
162.1 ± 7.2

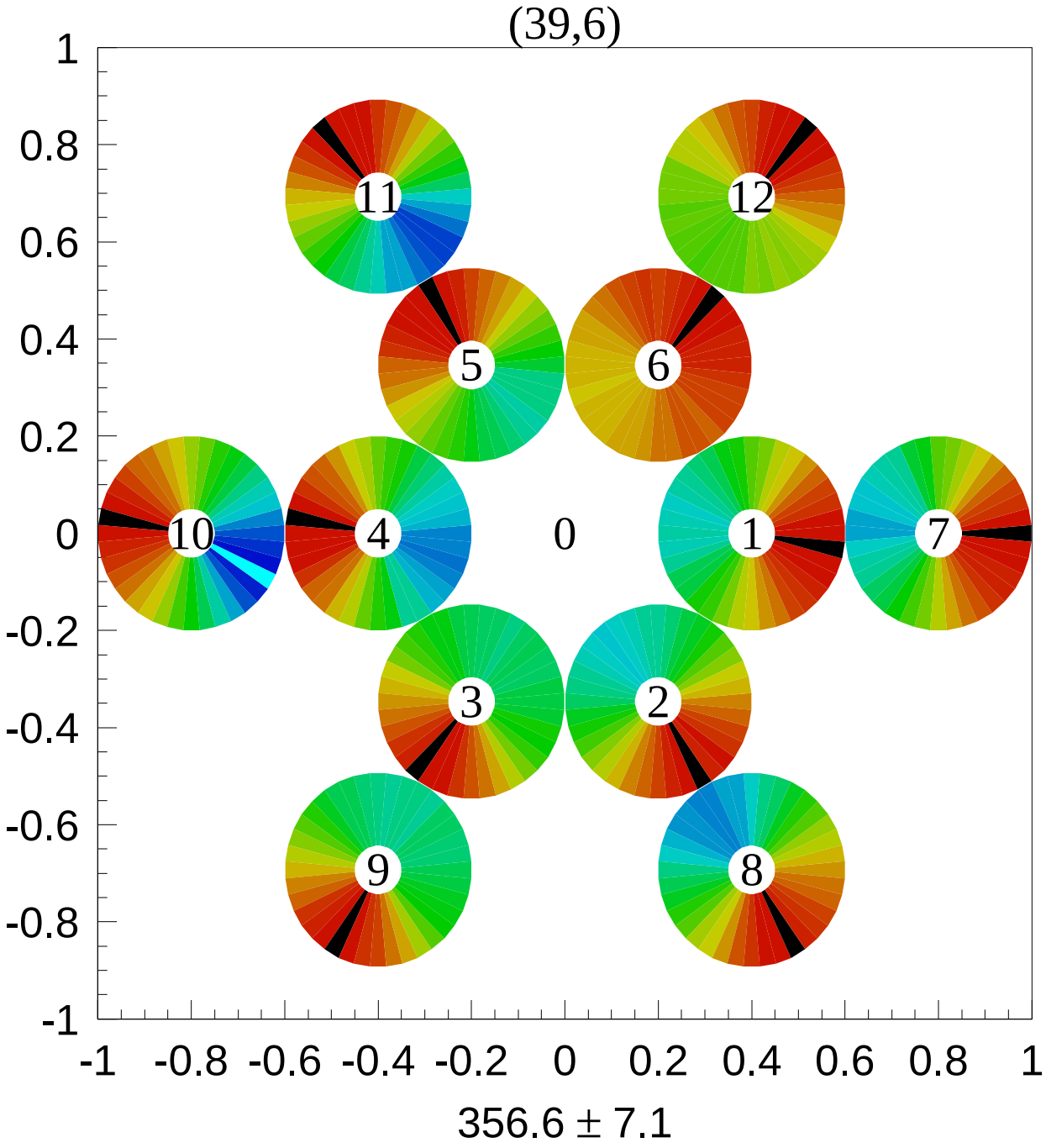

(39,4)
tilted LEDs
115 128 121 123 131 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 129 120 126 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

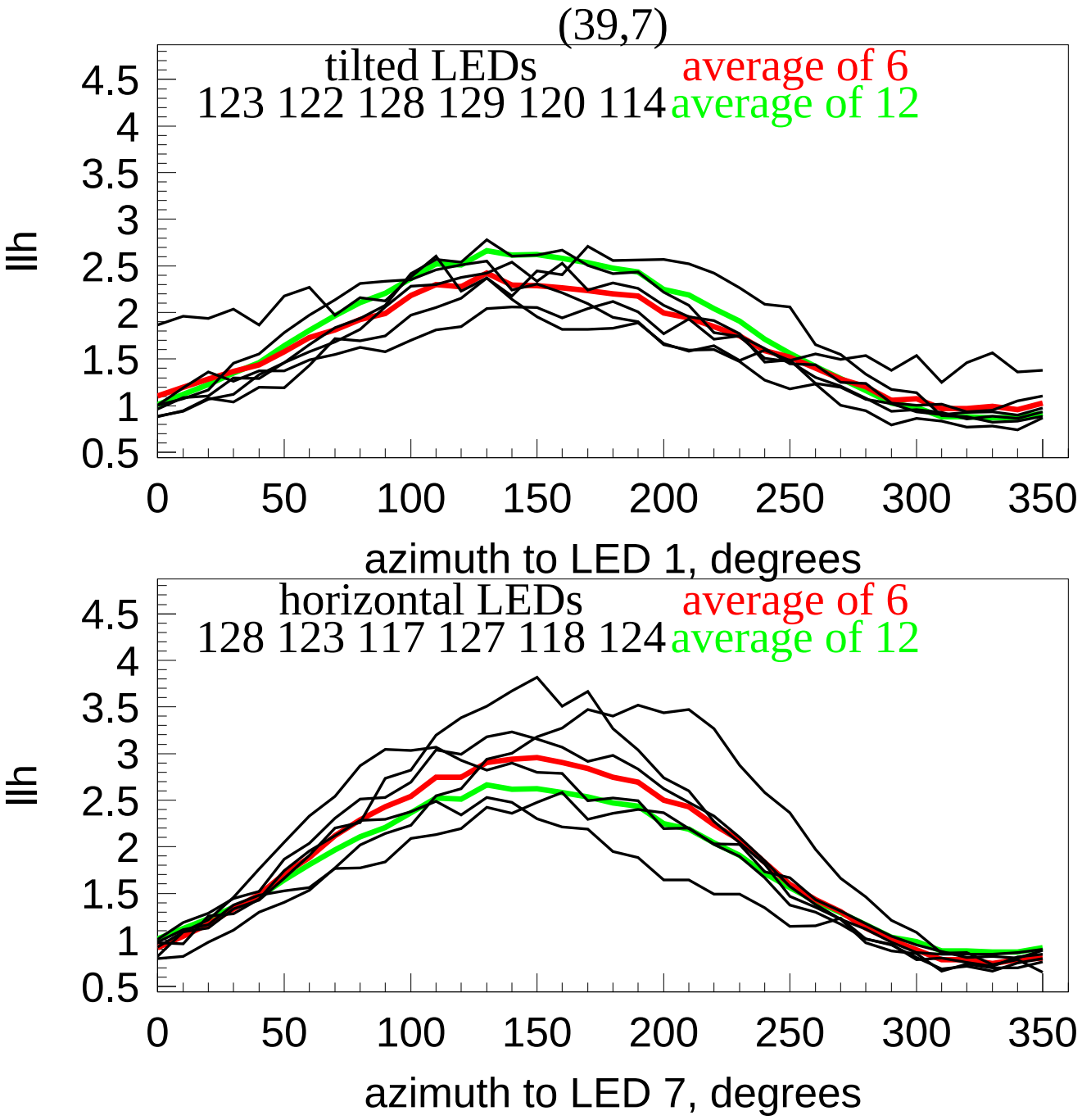

(39,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
77.3 ± 6.6
7
12
1
6
8
2
80
5
11
3
4
9
10

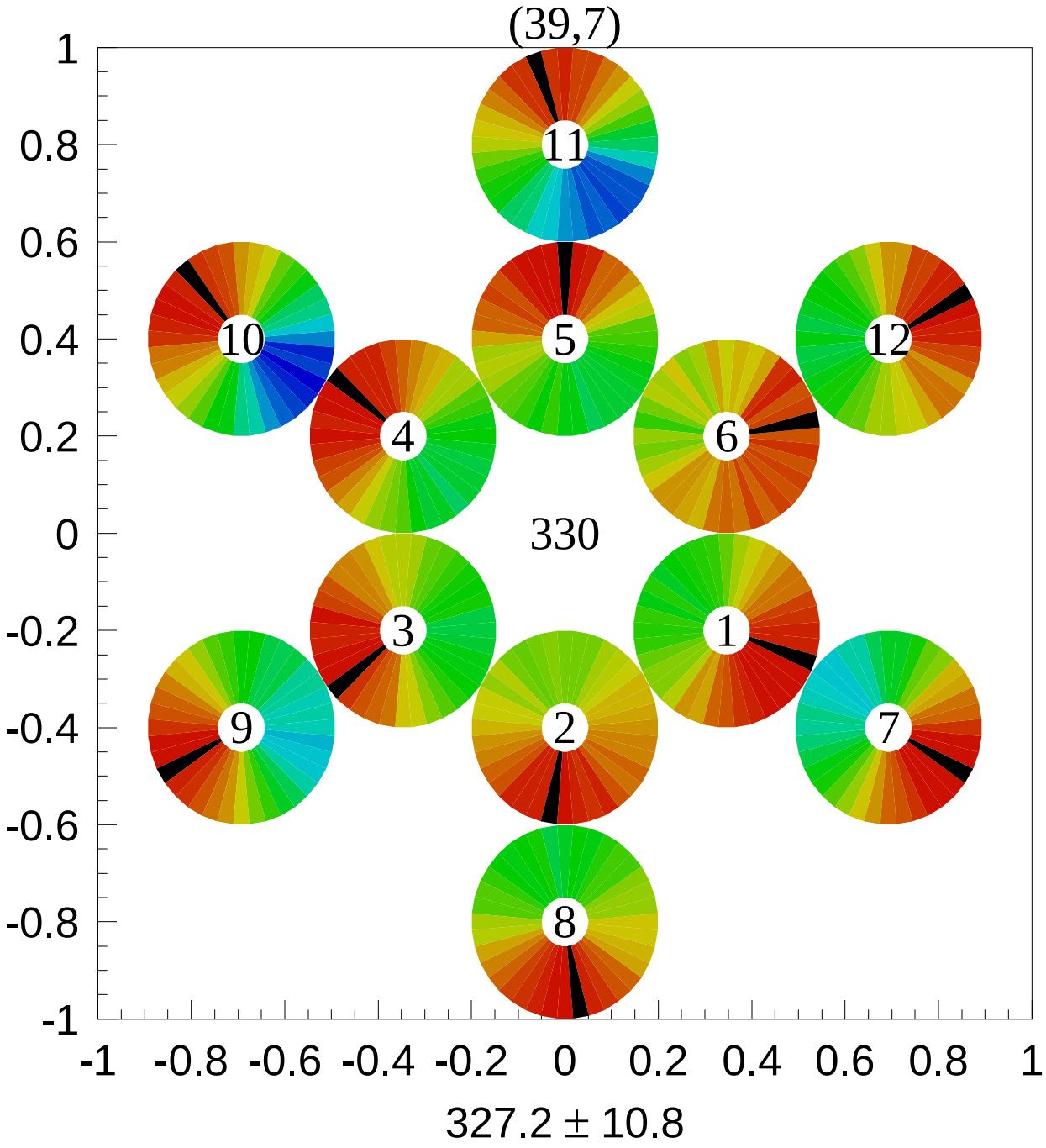

(39,5)
tilted LEDs
128 127 116 124 127 123
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 122 123 124 122 125
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

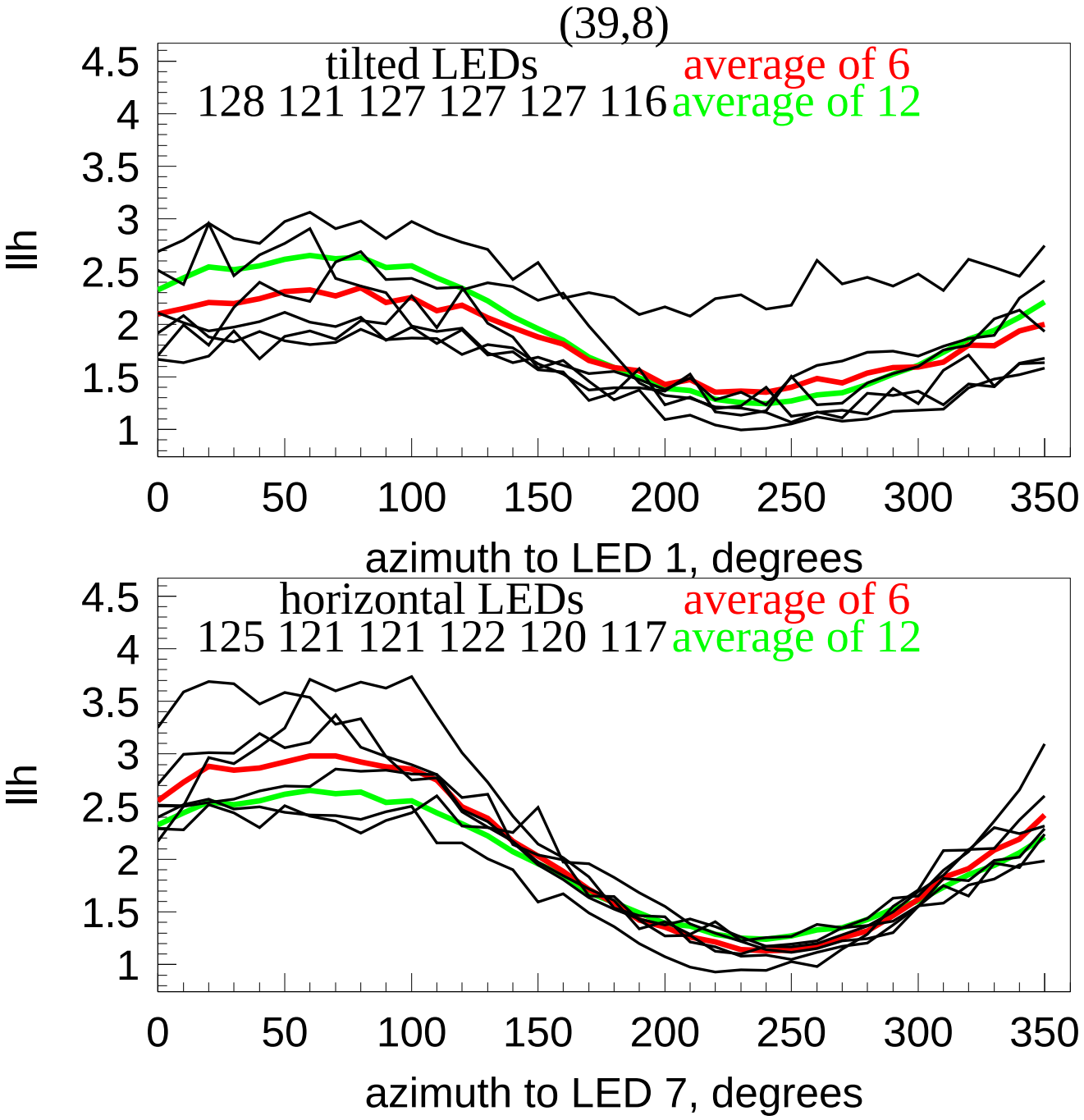

(39,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
54.2 ± 6.0

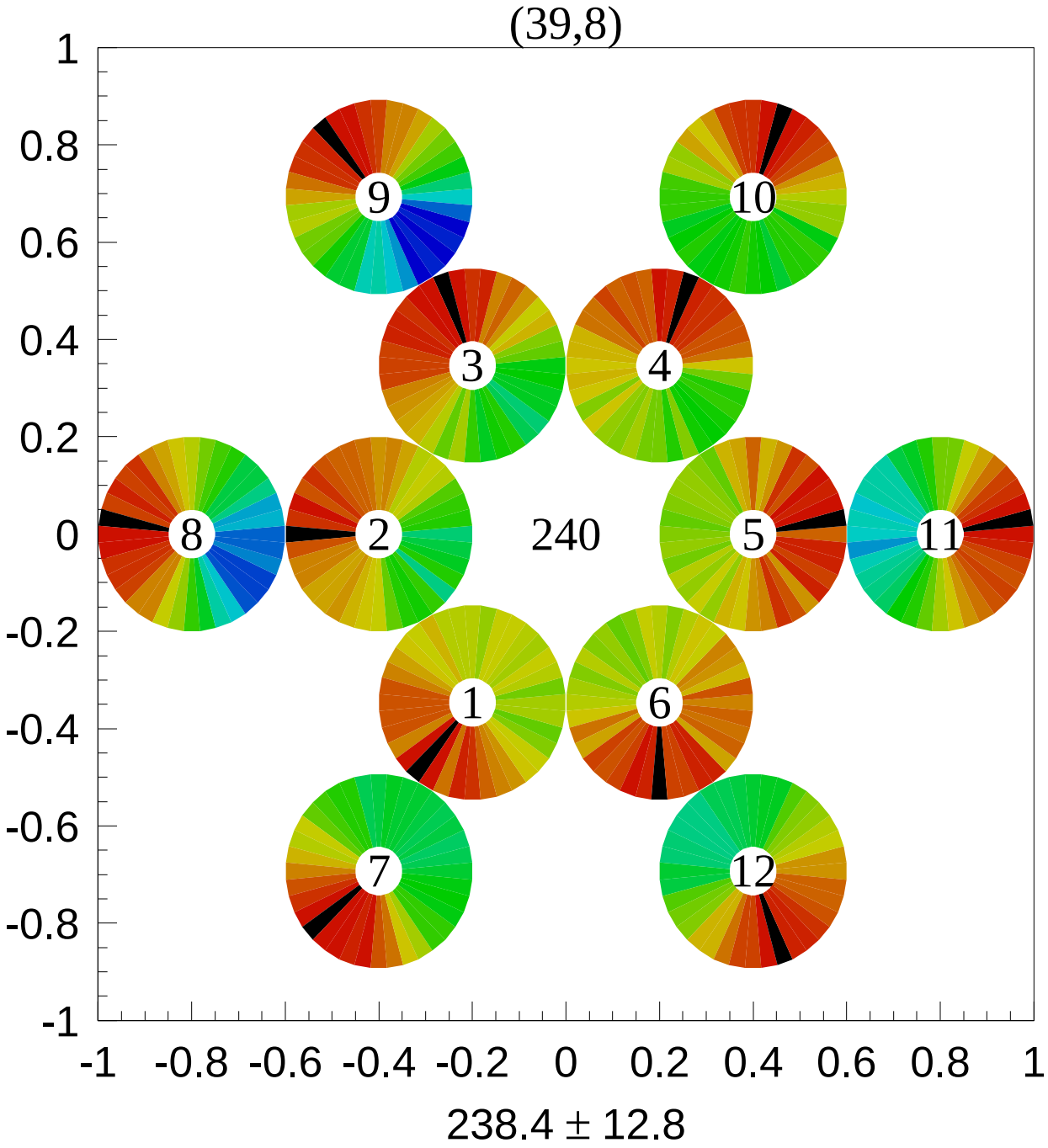

(39,6)
tilted LEDs
124 119 128 129 119 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 124 123 131 116 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

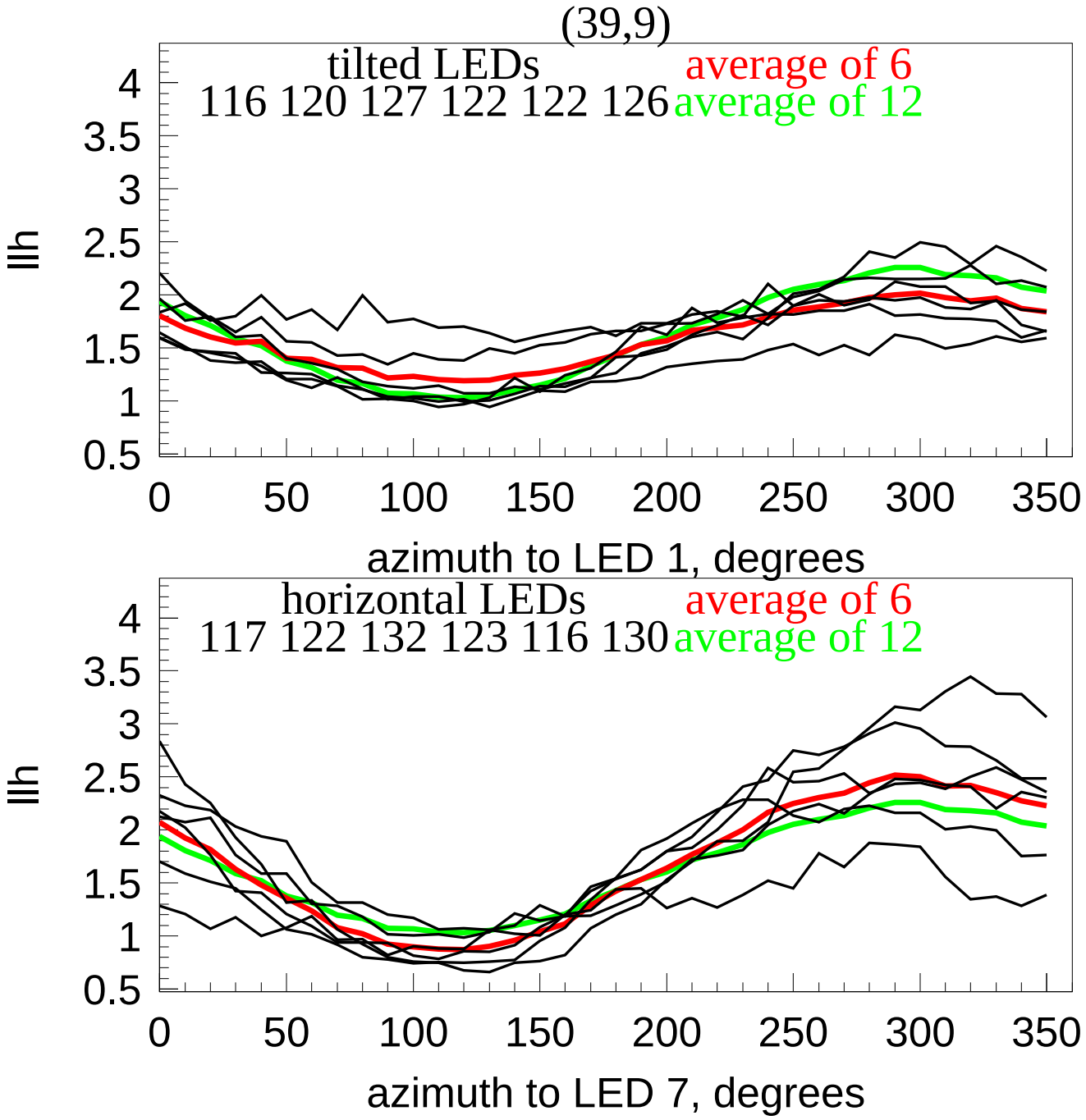

(39,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
356.6 ± 7.1

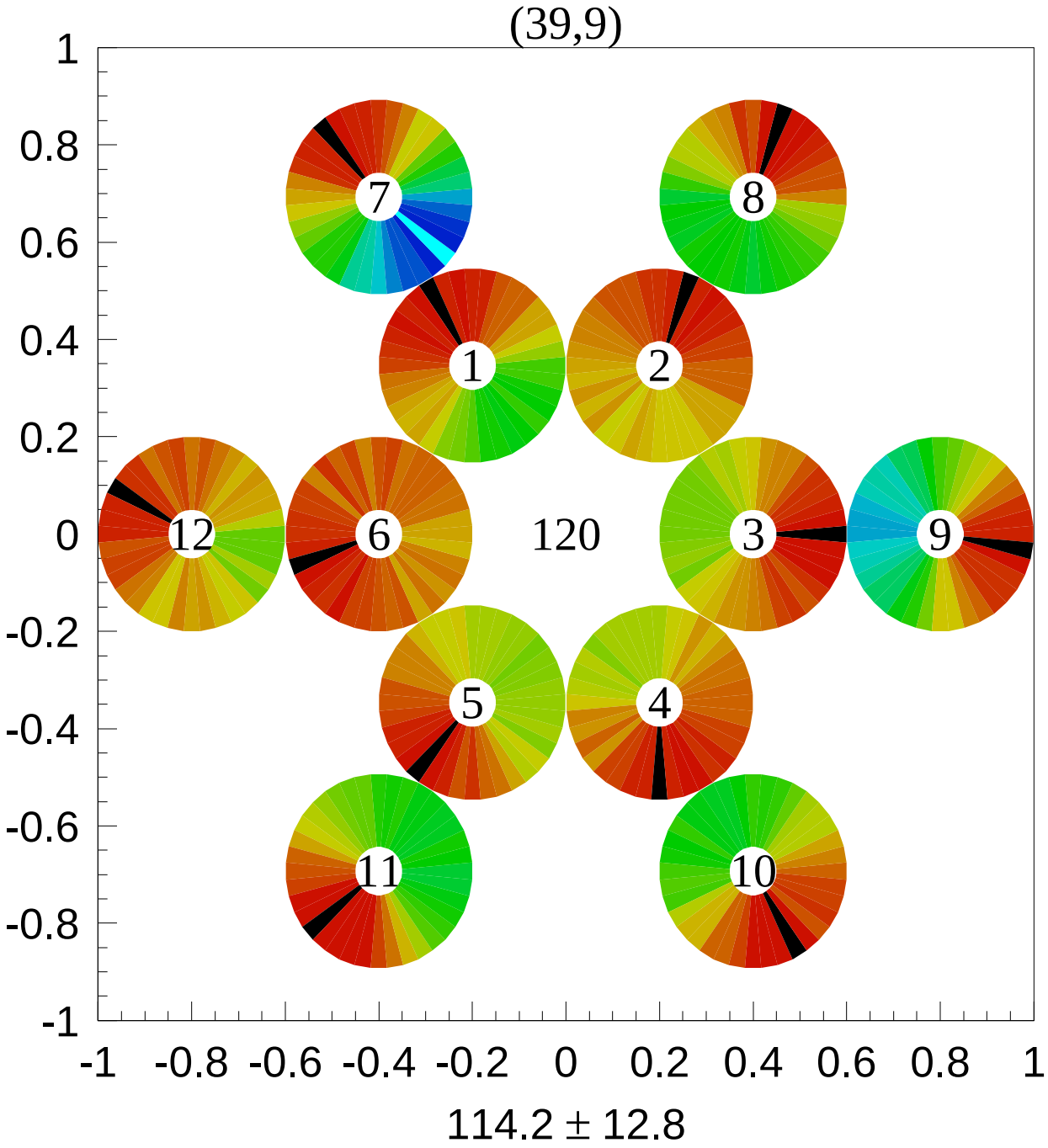

(39,7)
tilted LEDs
123 122 128 129 120 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 123 117 127 118 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

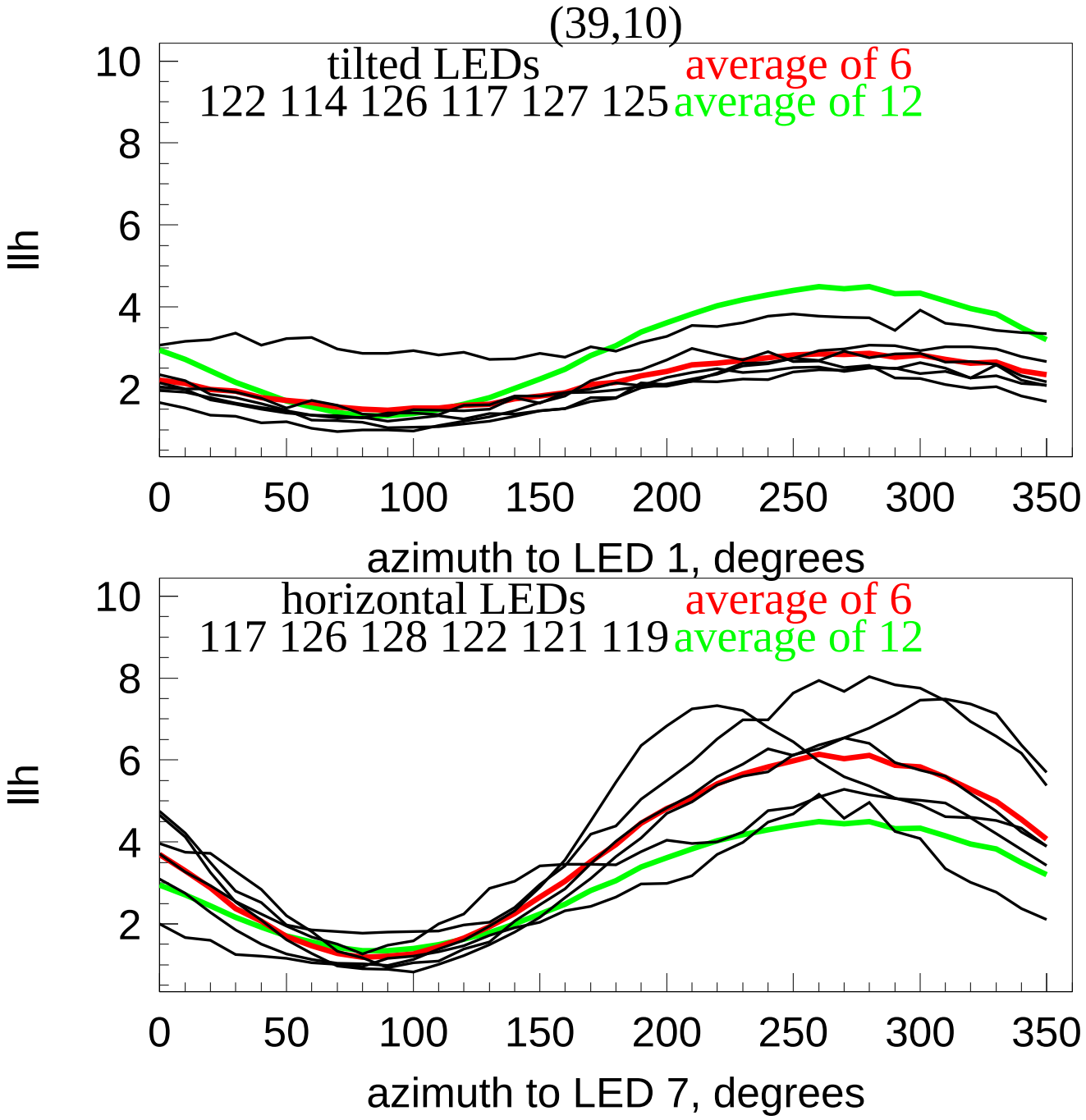

(39,7)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
327.2 ± 10.8

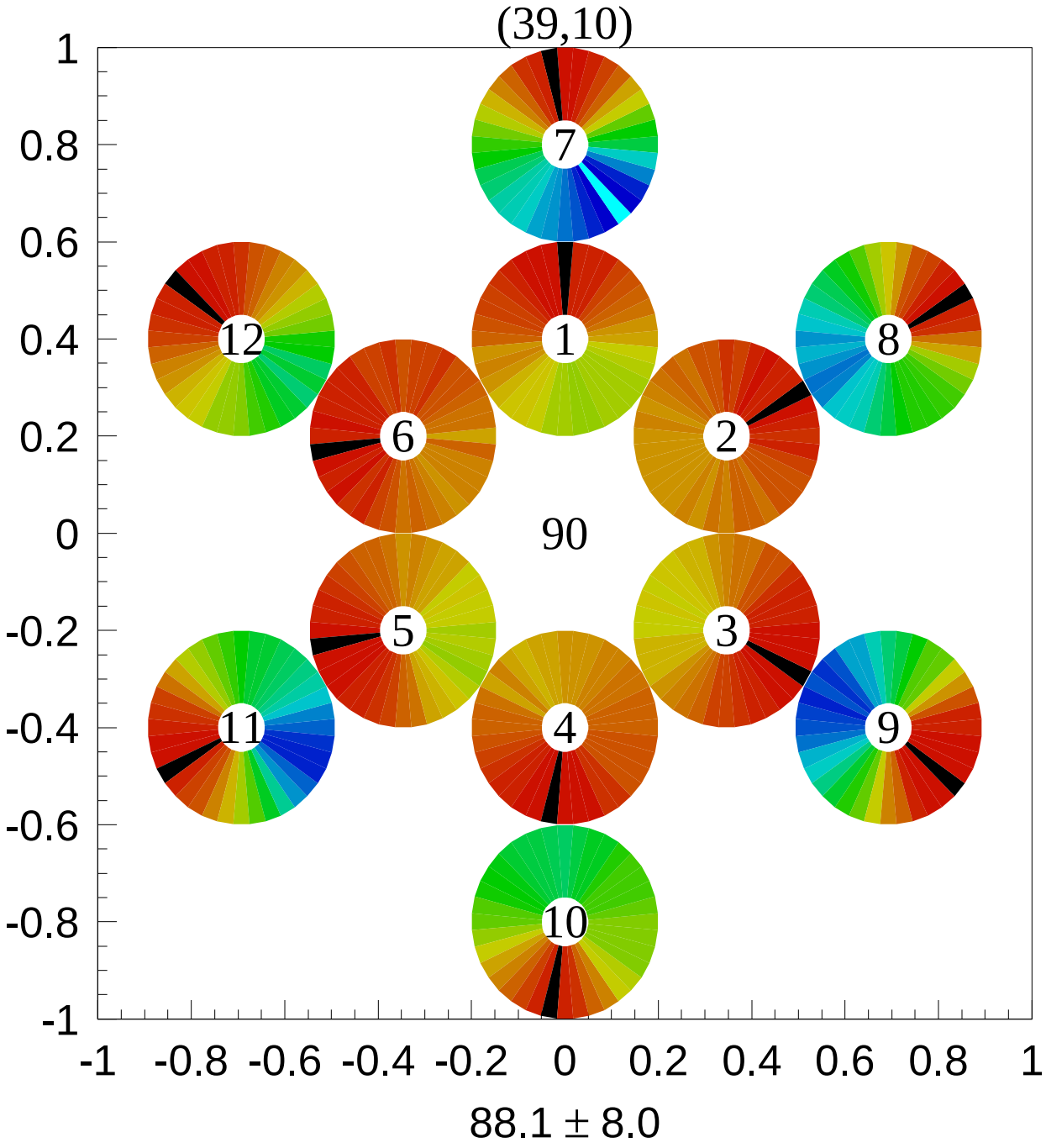

(39,8)
tilted LEDs
128 121 127 127 127 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 121 122 120 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

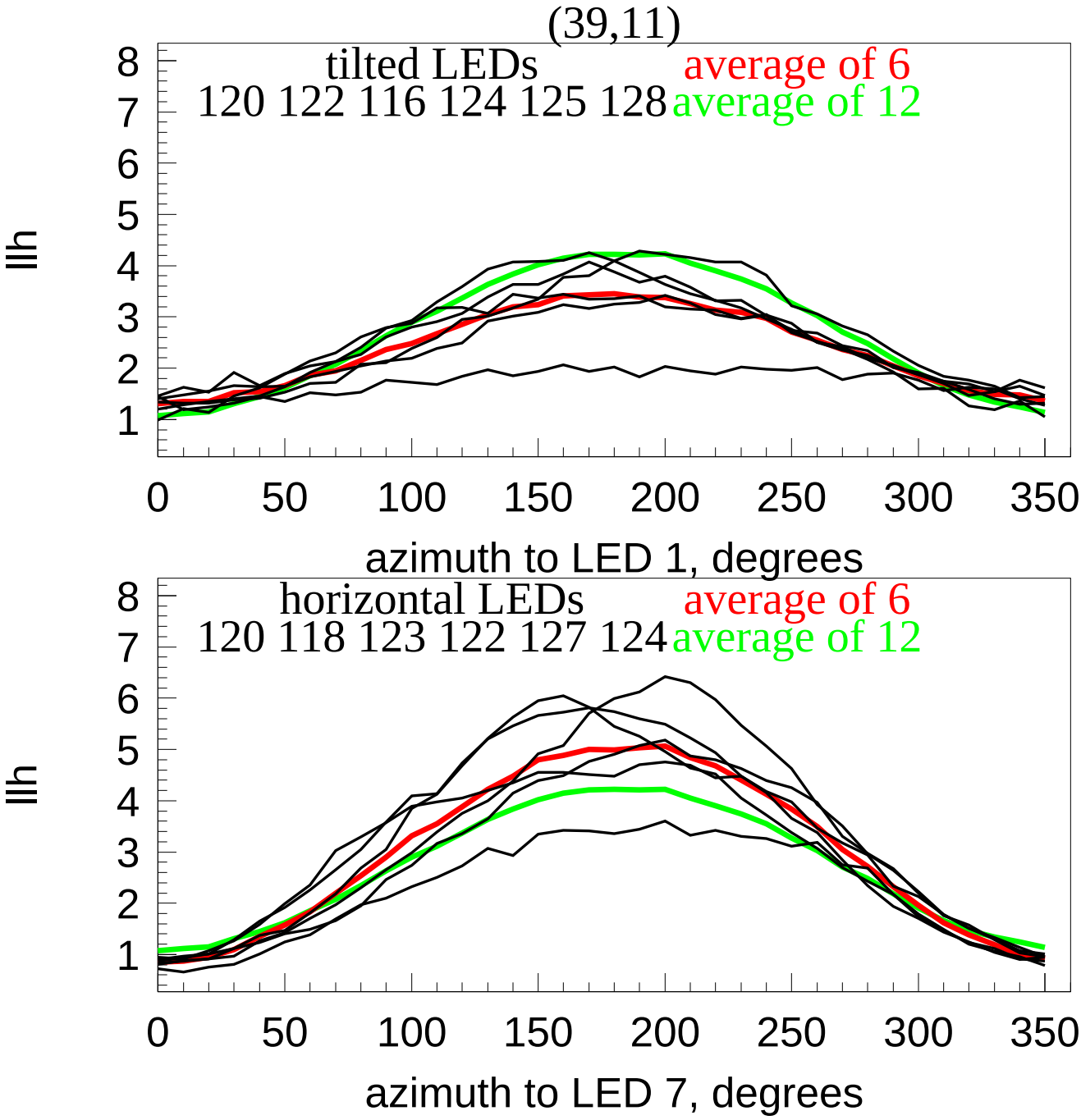

(39,8)
9
10
3
4
8
2
240
5
11
1
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
238.4 ± 12.8

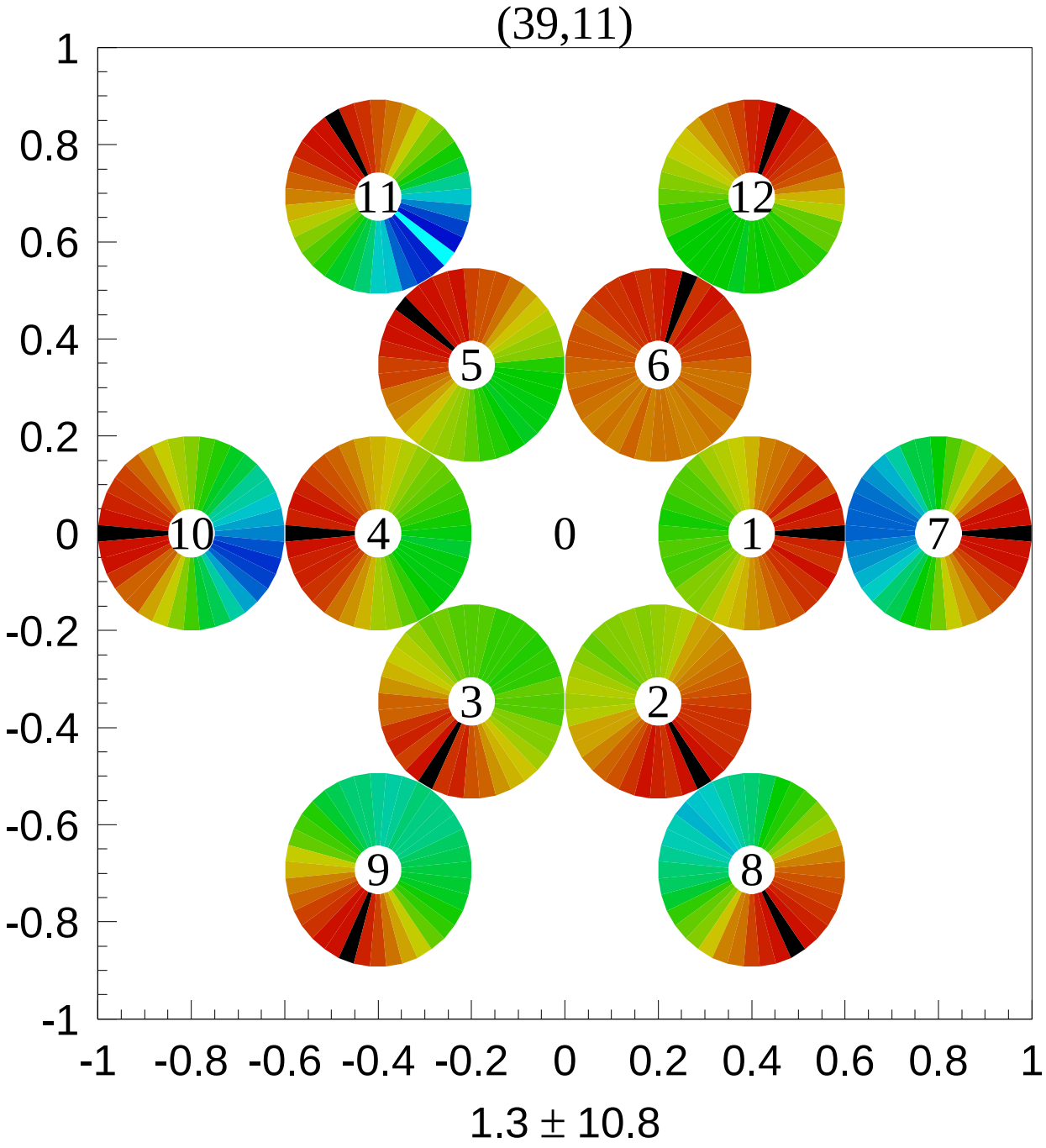

(39,9)
tilted LEDs
116 120 127 122 122 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 122 132 123 116 130
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

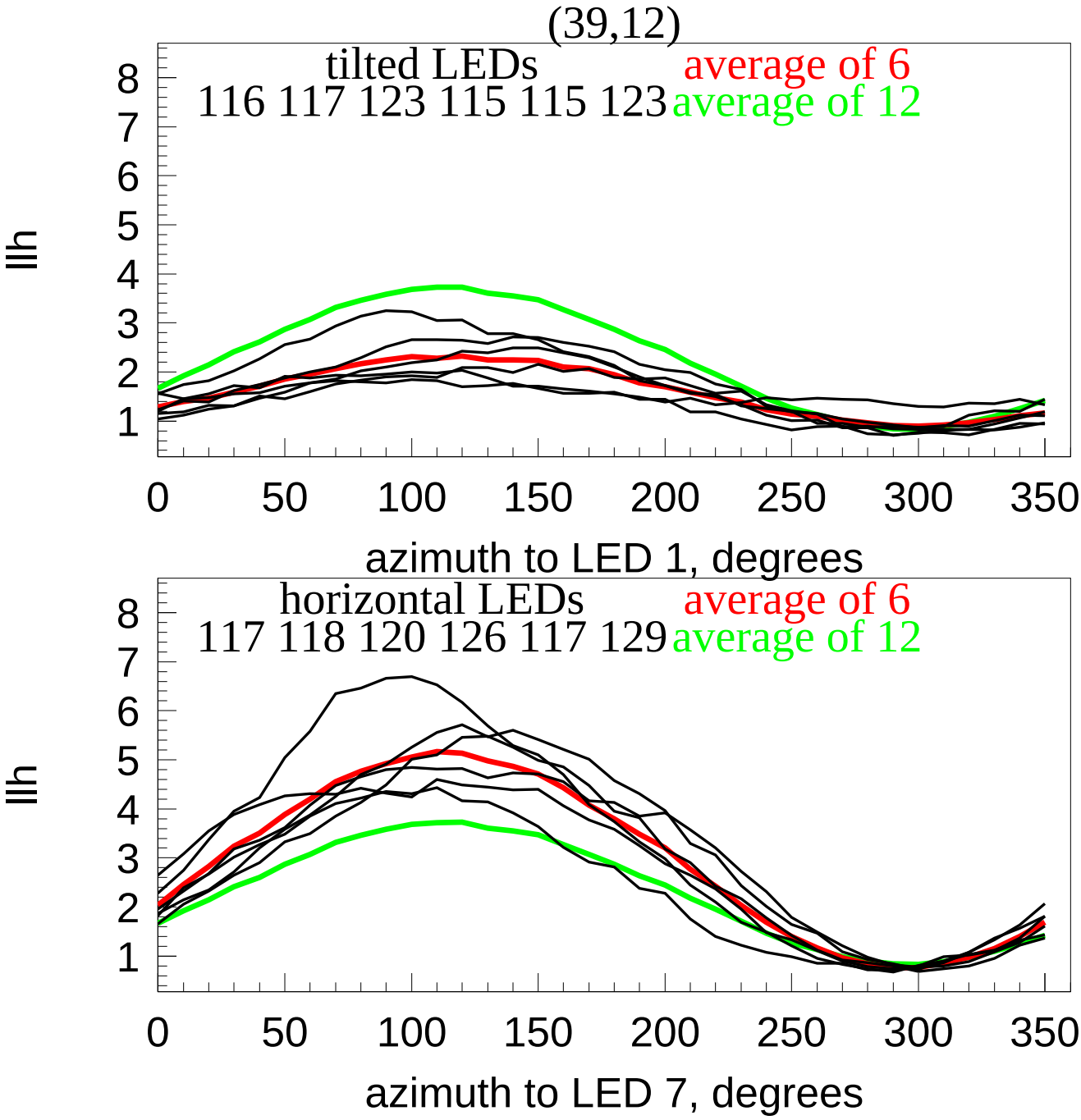

(39,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
114.2 ± 12.8

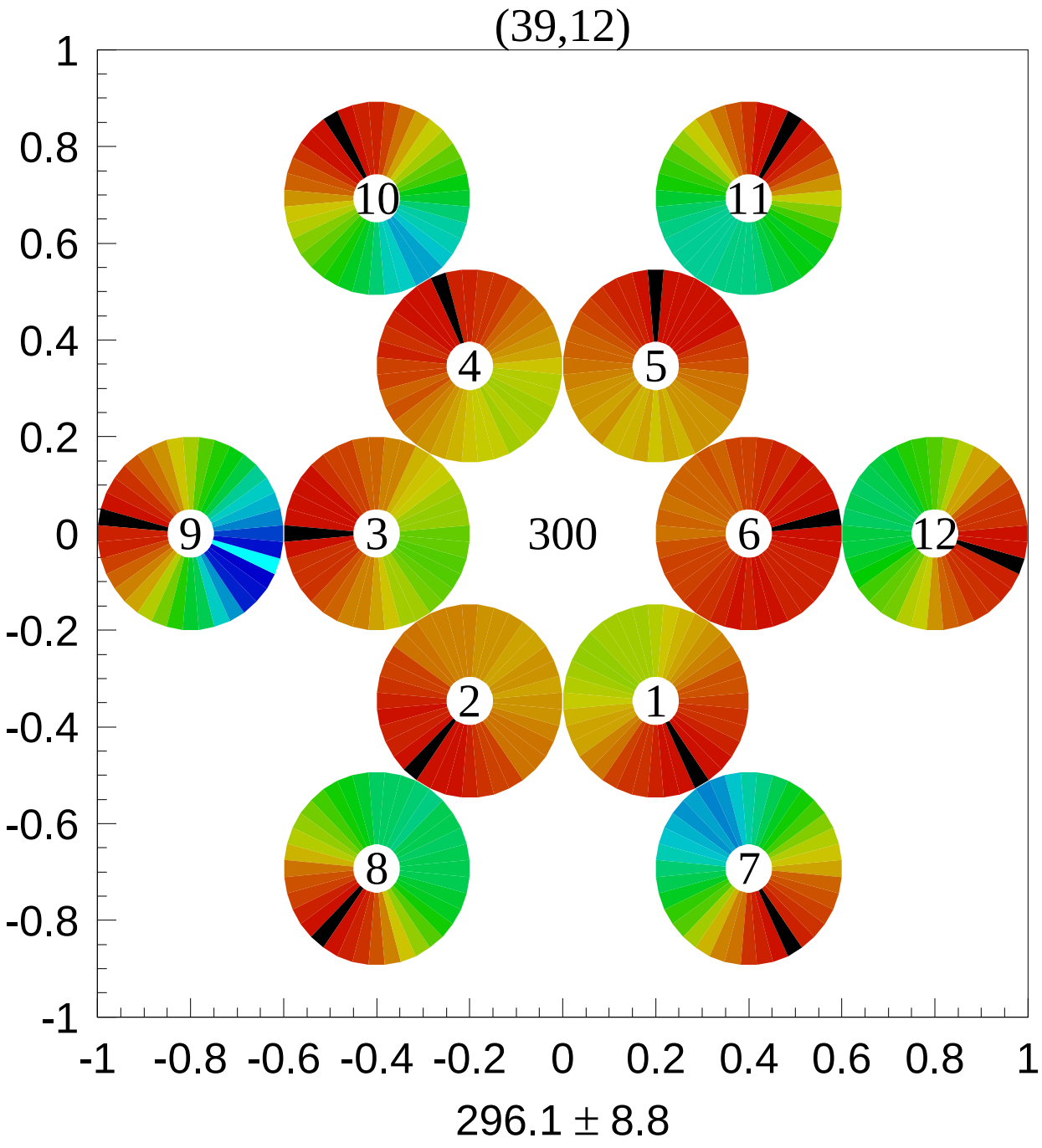

(39,10)
tilted LEDs
122 114 126 117 127 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 126 128 122 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

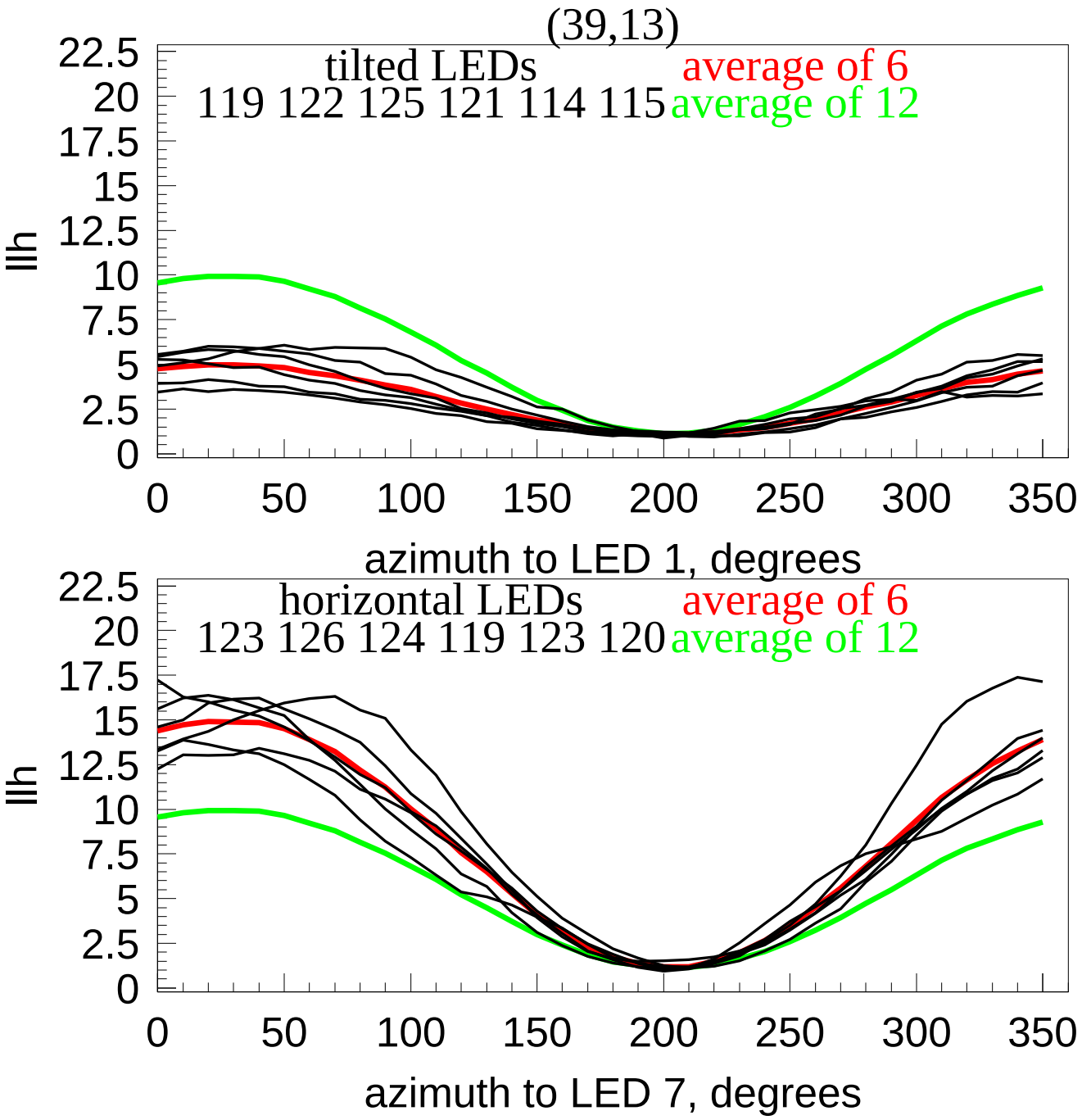

(39,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
88.1 ± 8.0

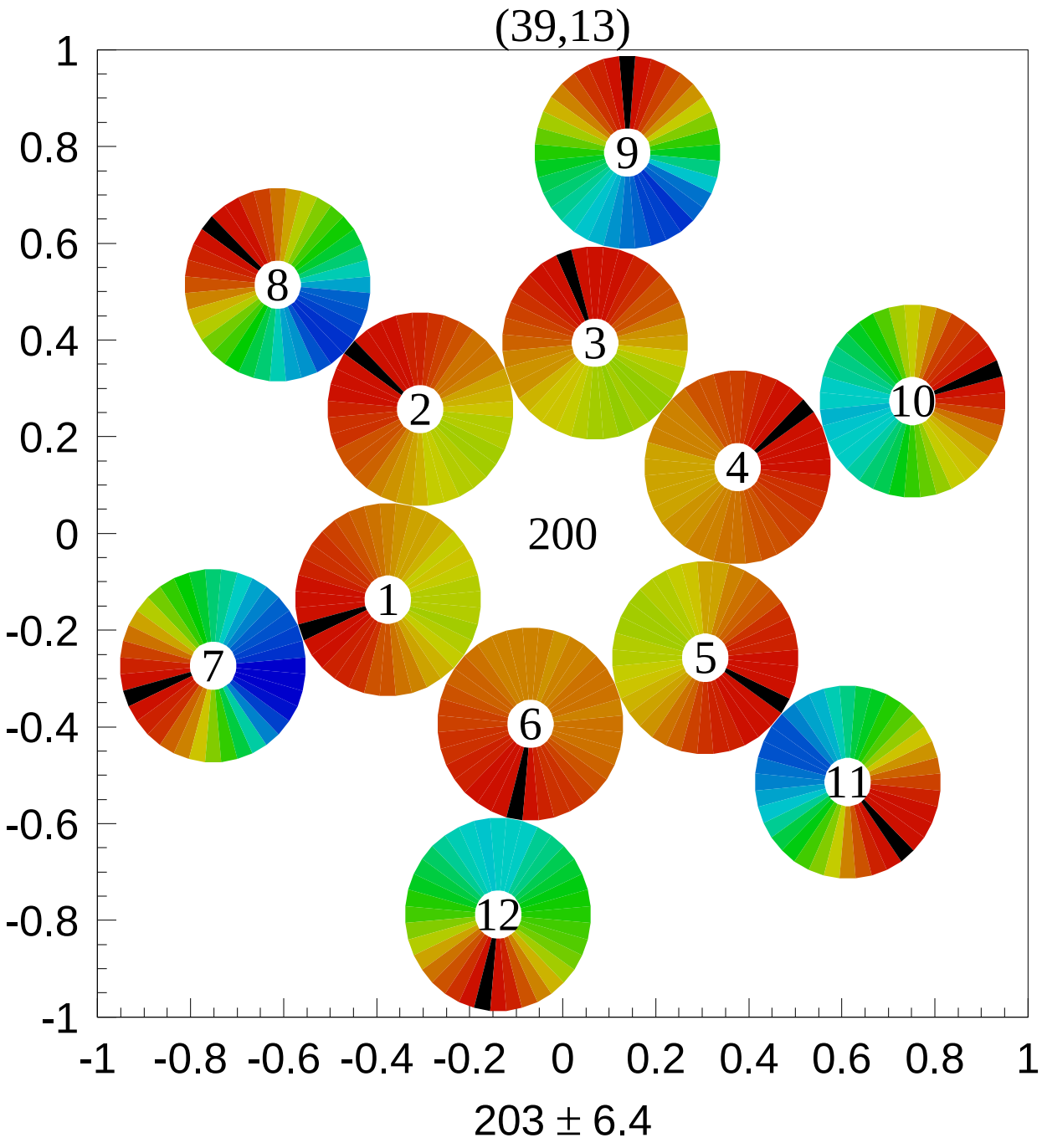

(39,11)
tilted LEDs
120 122 116 124 125 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 118 123 122 127 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

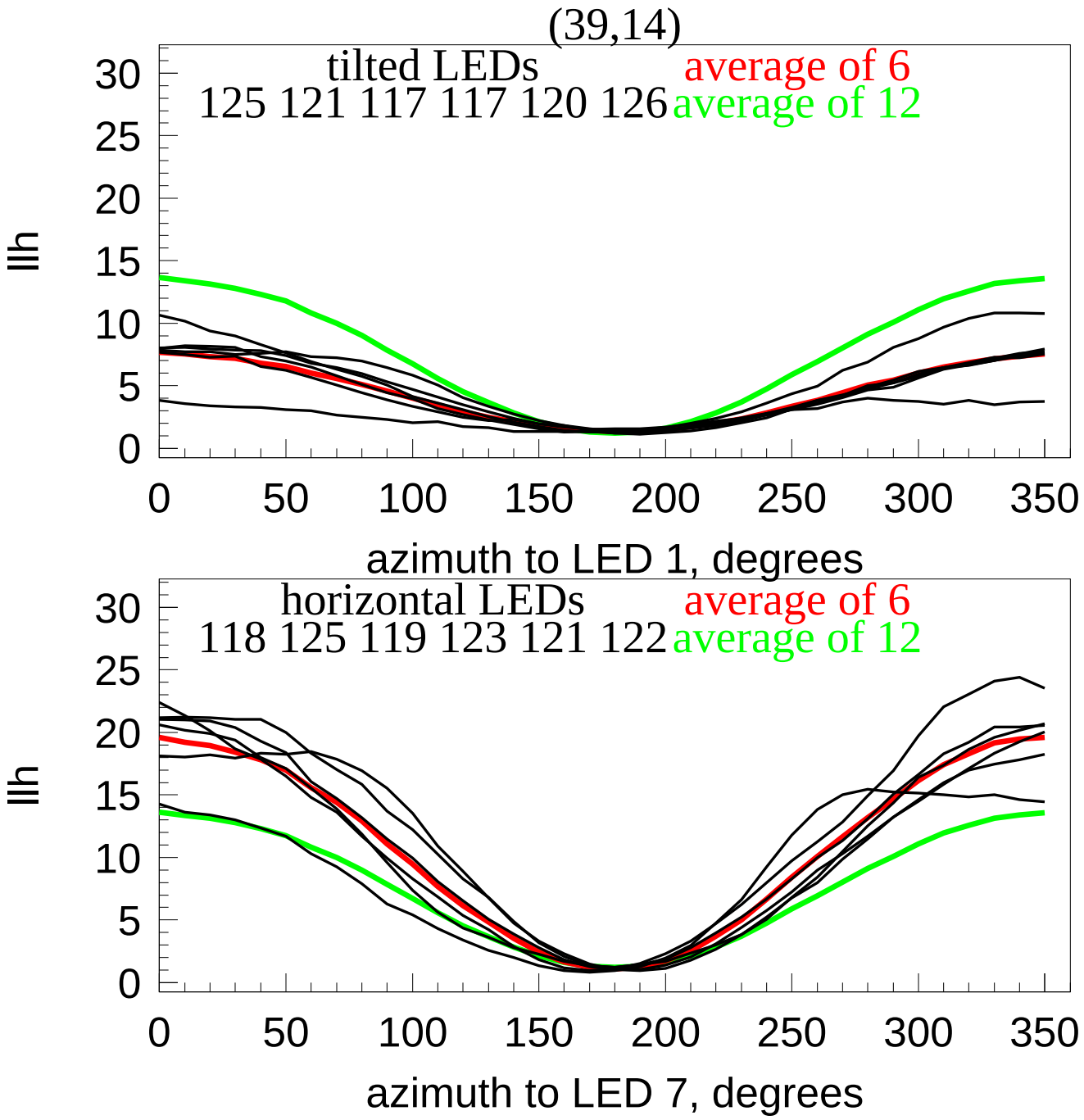

(39,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1.3 ± 10.8
11
12
5
6
10
4
0
1
7
3
2
9
8

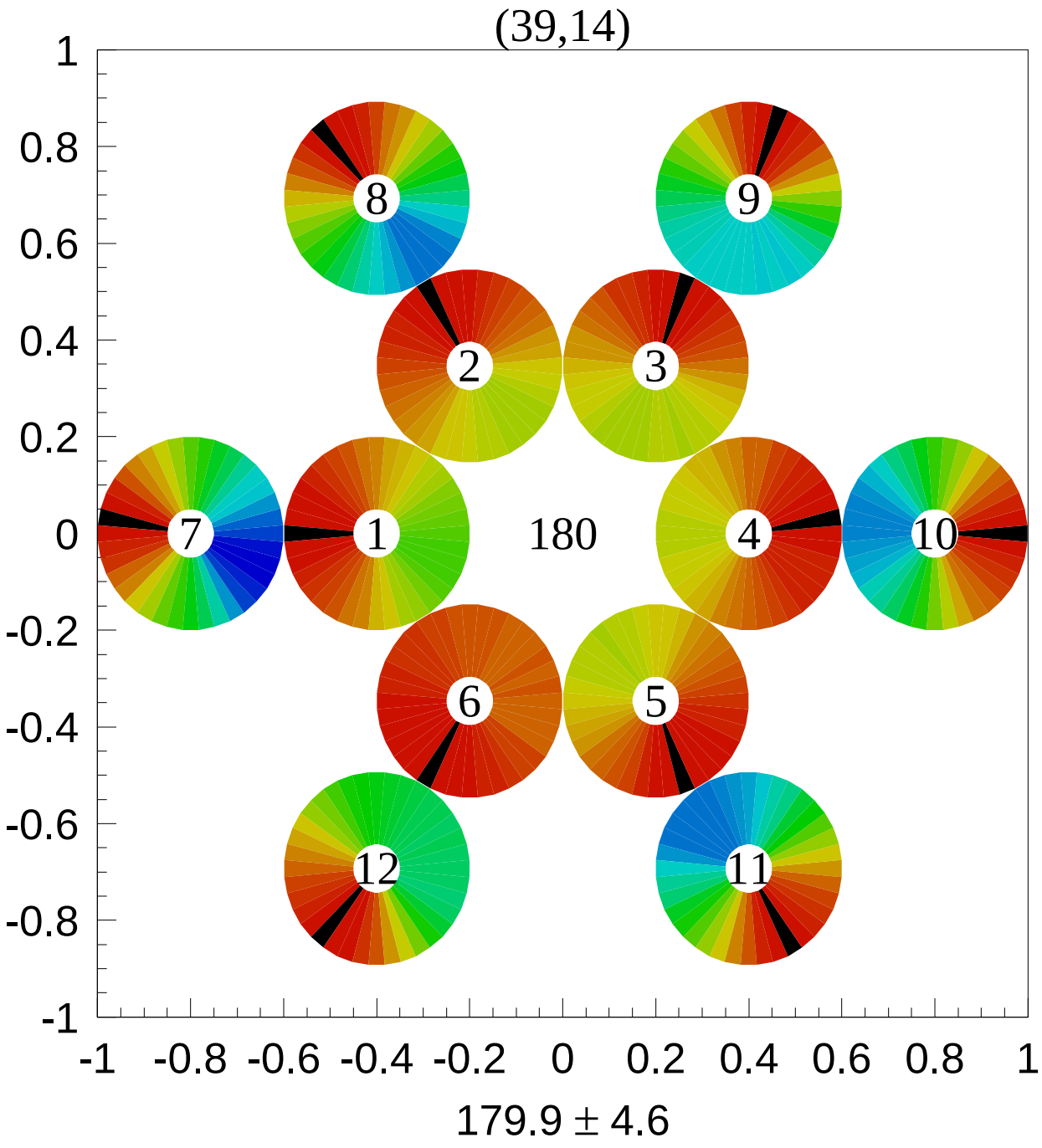

(39,12)
tilted LEDs
116 117 123 115 115 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 120 126 117 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

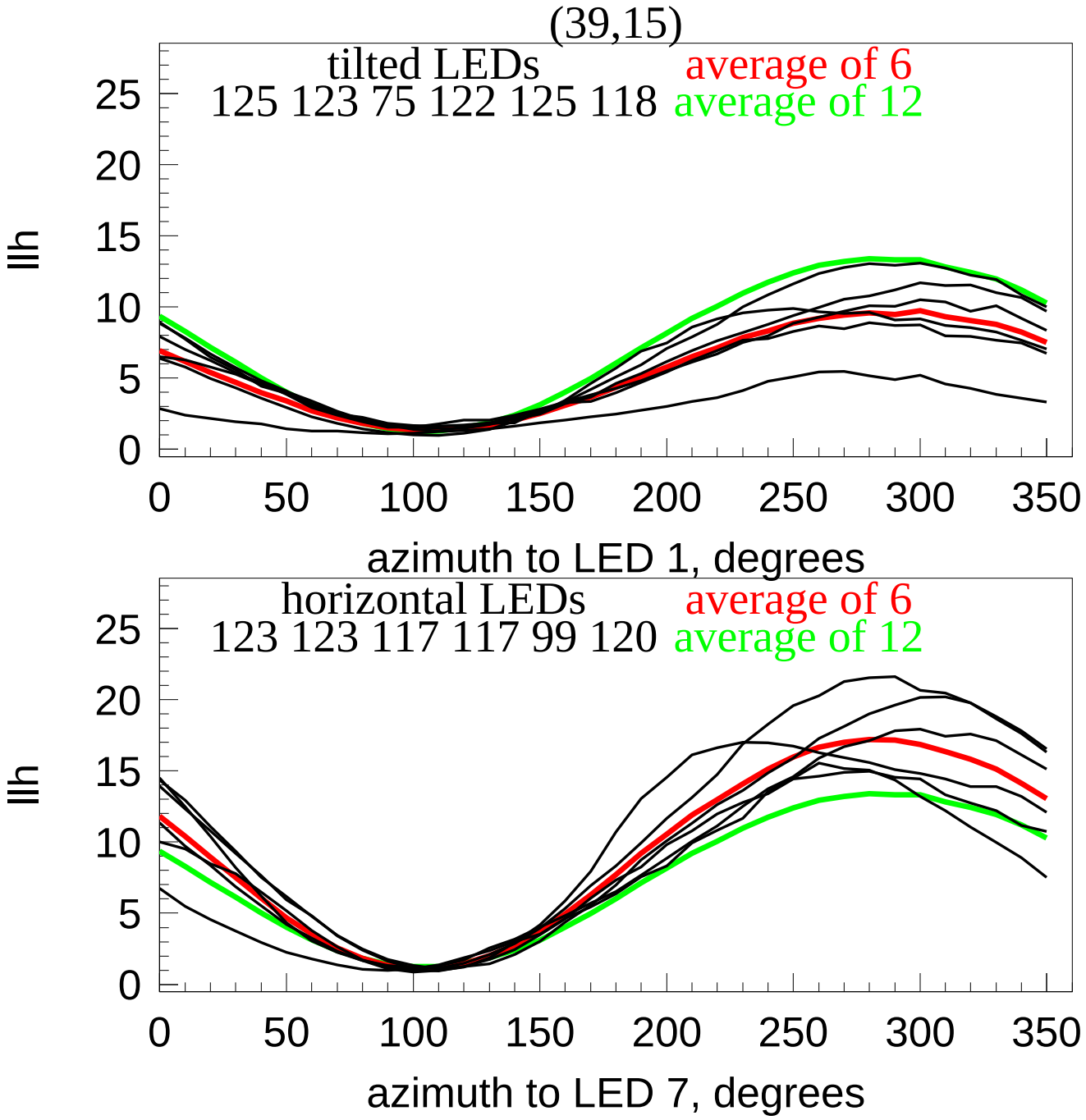

(39,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
296.1 ± 8.8
10
11
4
5
9
3
300
6
12
2
1
8
7

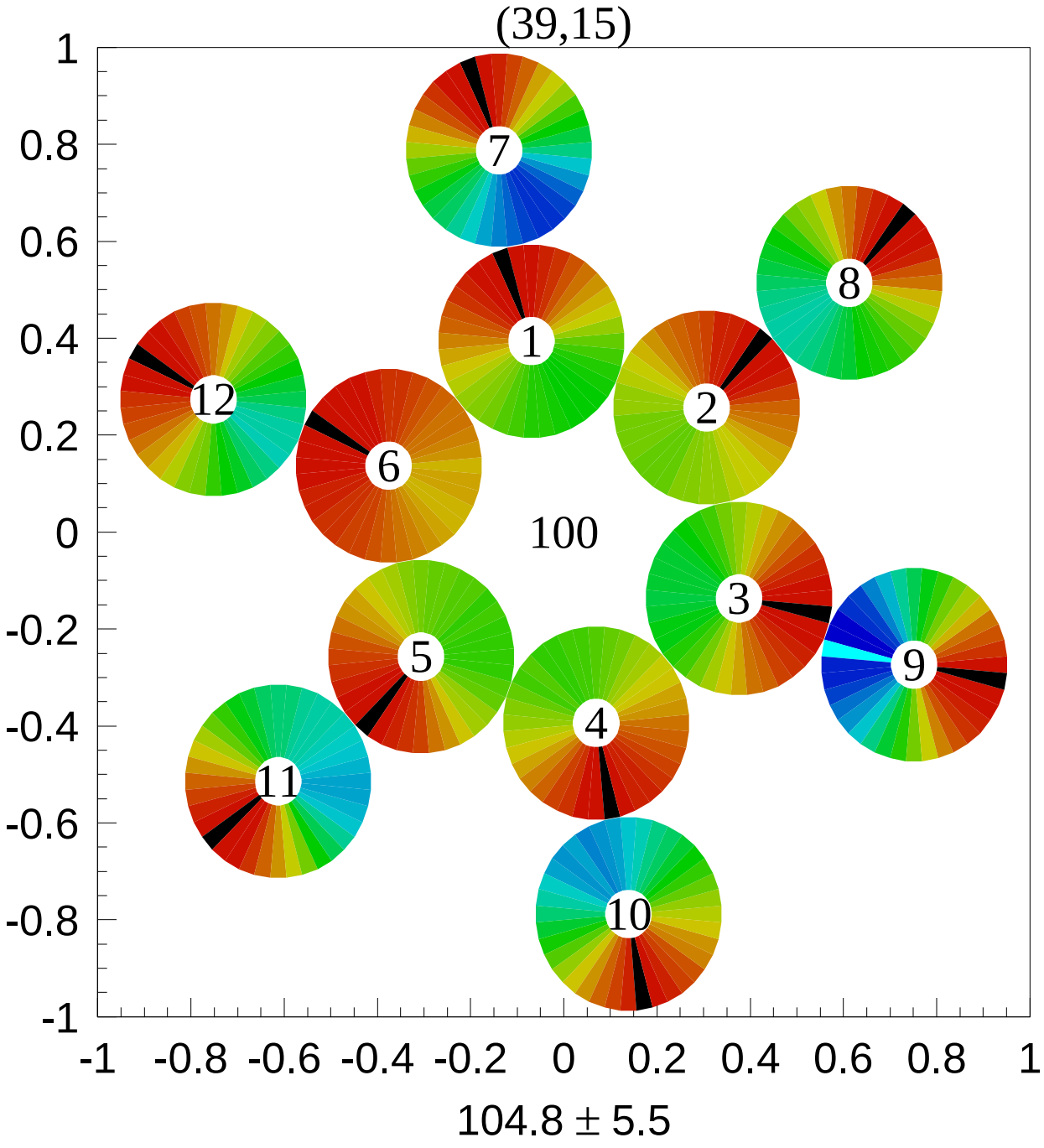

(39,13)
tilted LEDs
119 122 125 121 114 115
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 126 124 119 123 120
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

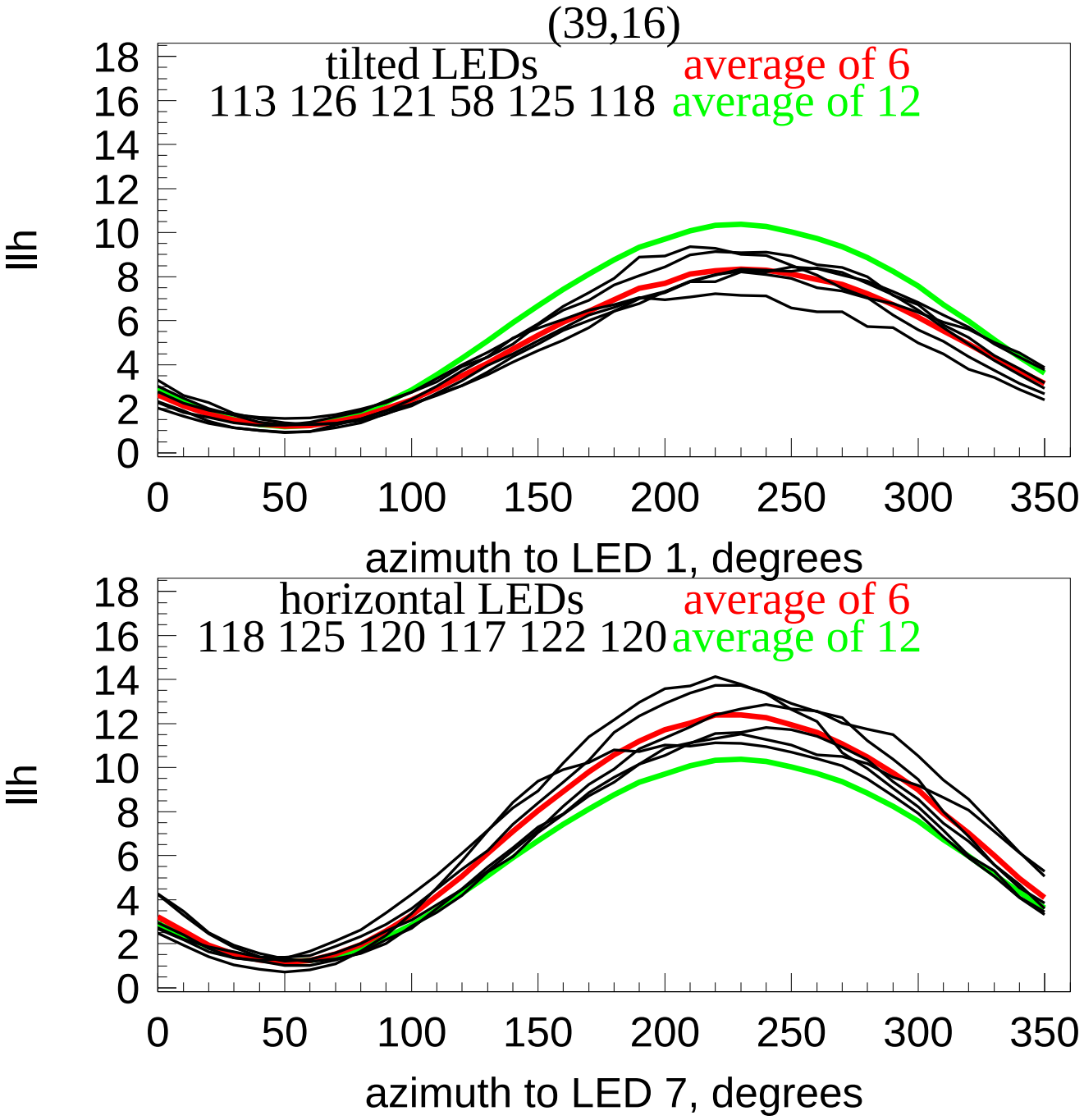

(39,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
203 ± 6.4

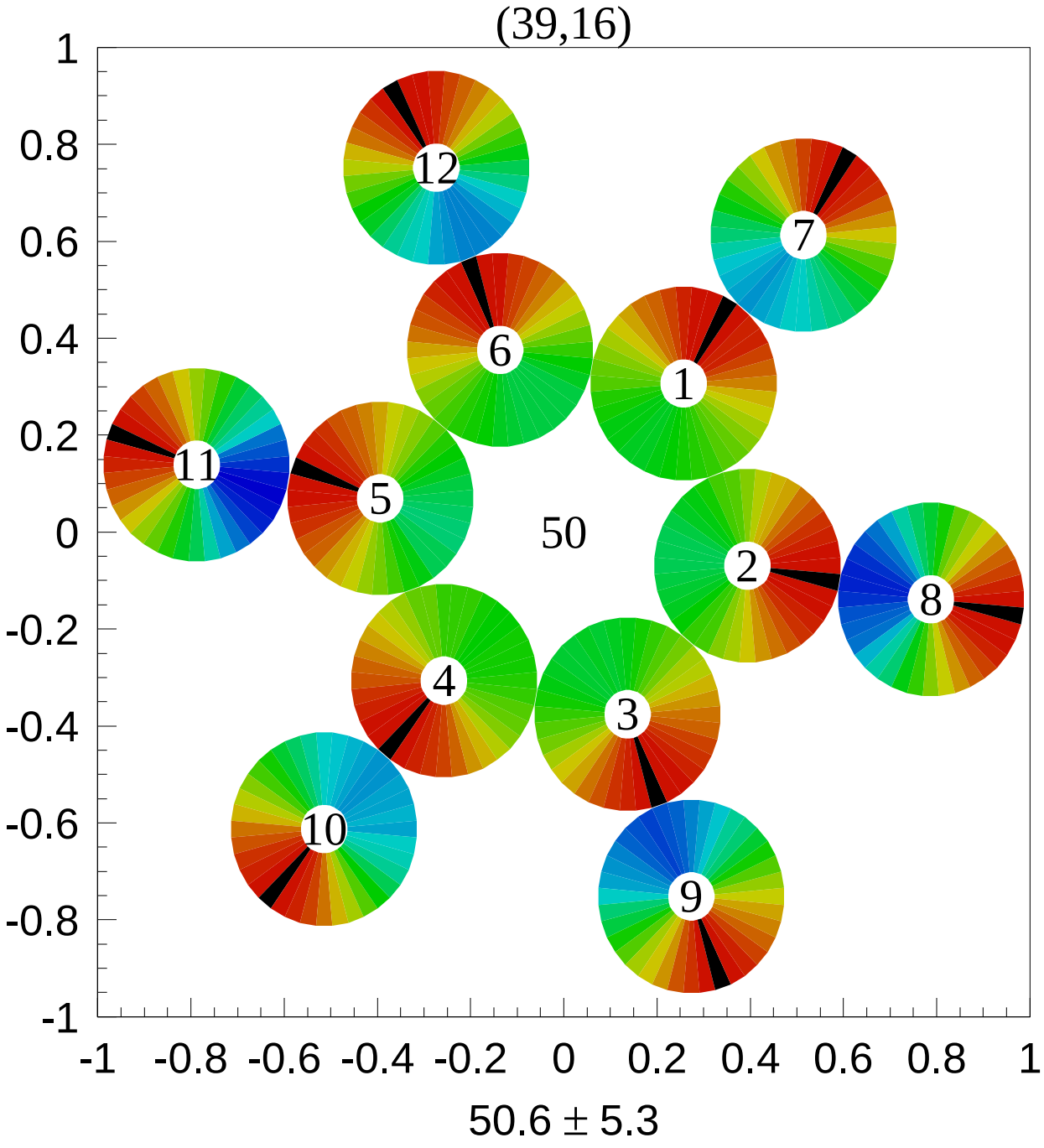

(39,14)
tilted LEDs
125 121 117 117 120 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 125 119 123 121 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

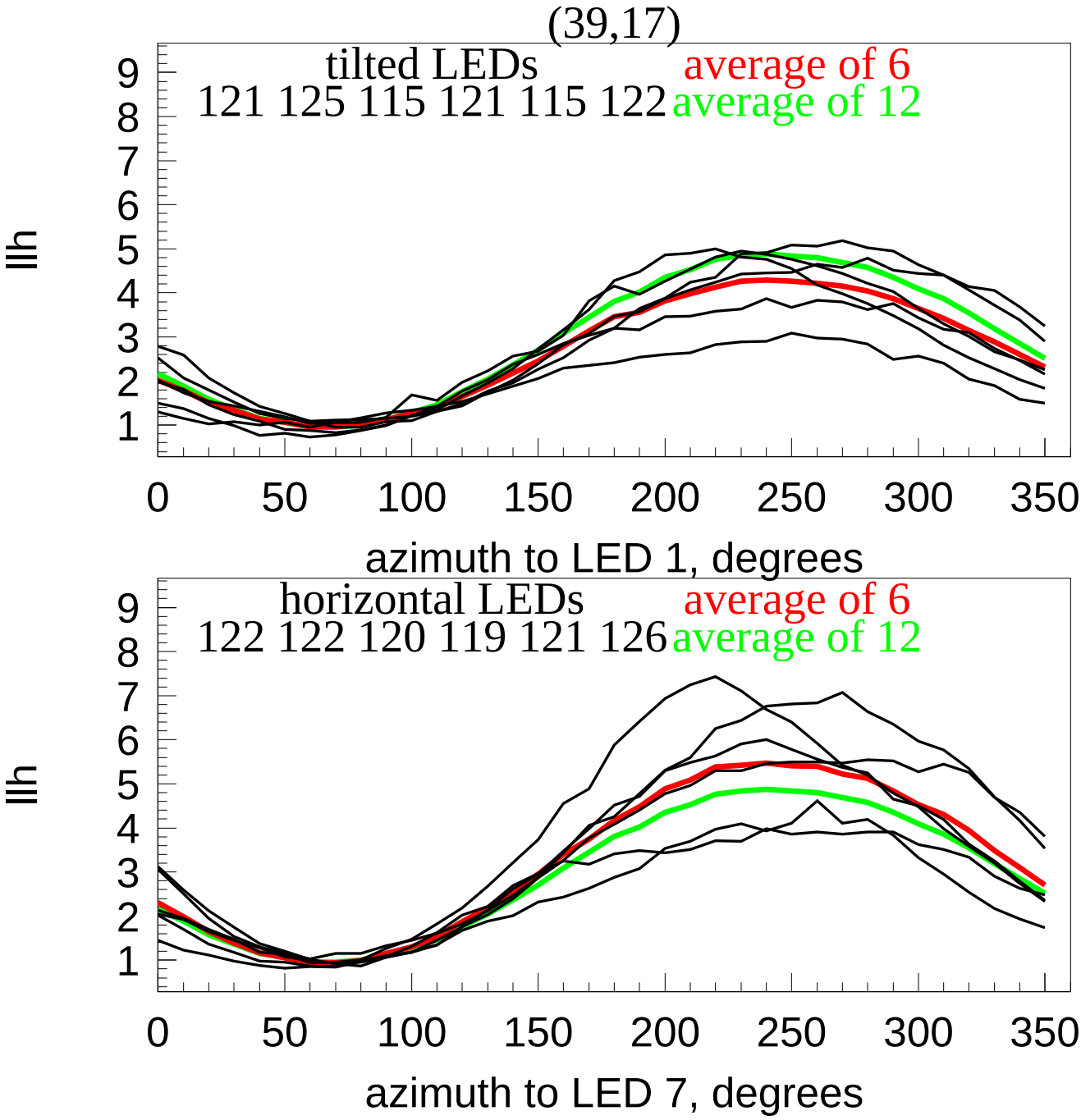

(39,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
179.9 ± 4.6
8
9
2
3
7
1
180
4
10
6
5
12
11

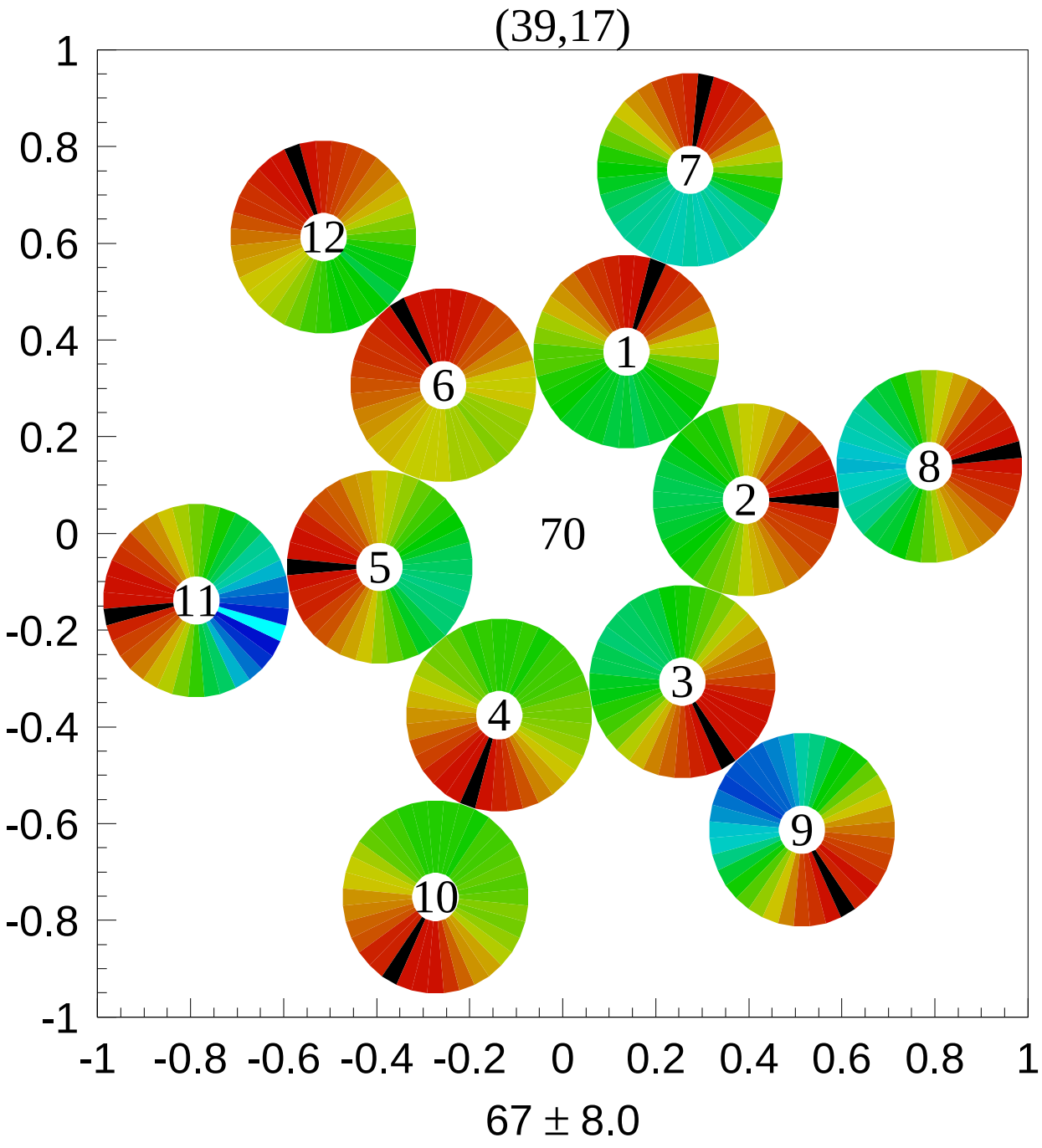

(39,15)
tilted LEDs
125 123 75 122 125 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 117 117 99 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

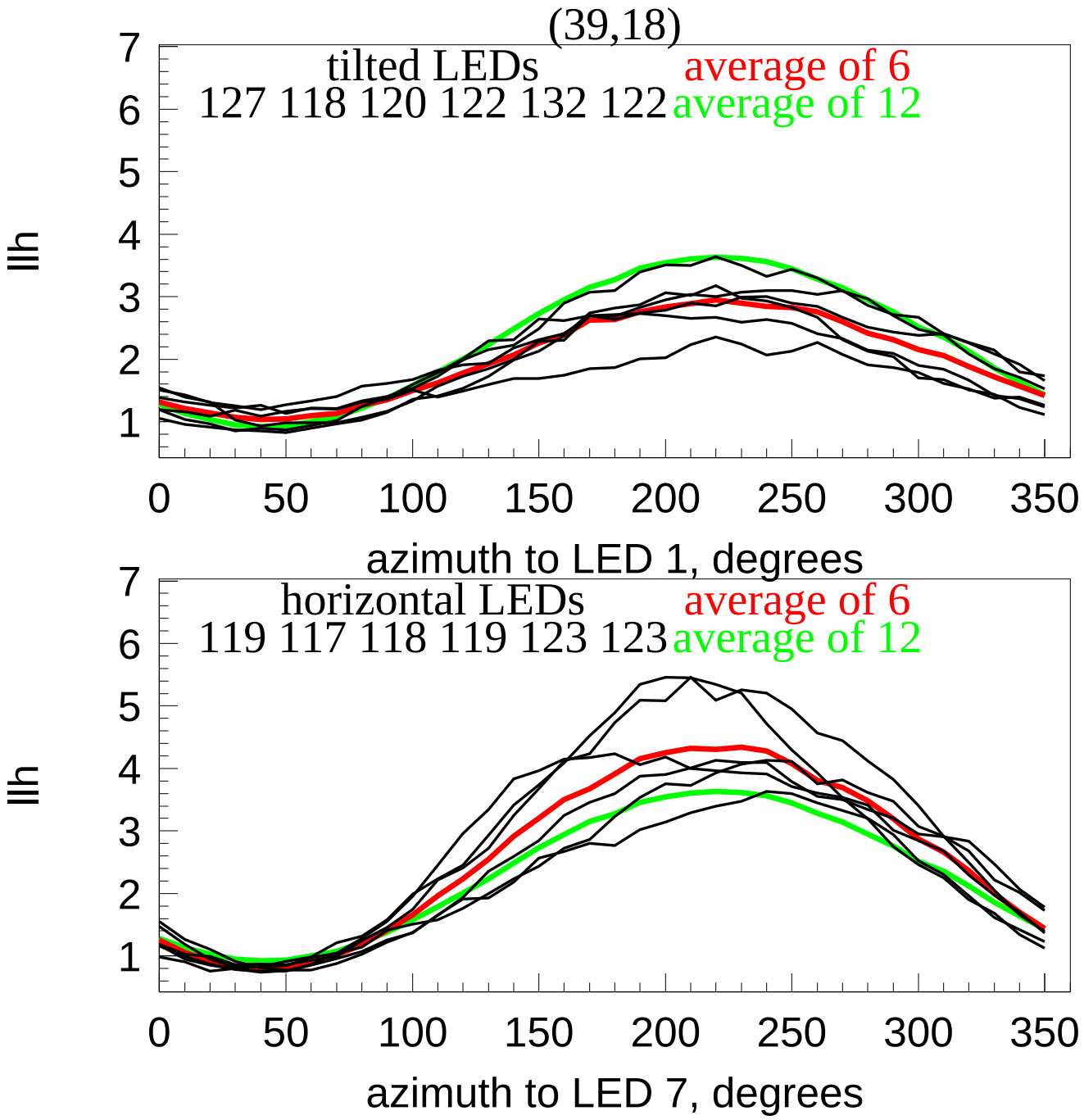

(39,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
104.8 ± 5.5
7
1
8
12
2
6
100
3
5
9
4
11
10

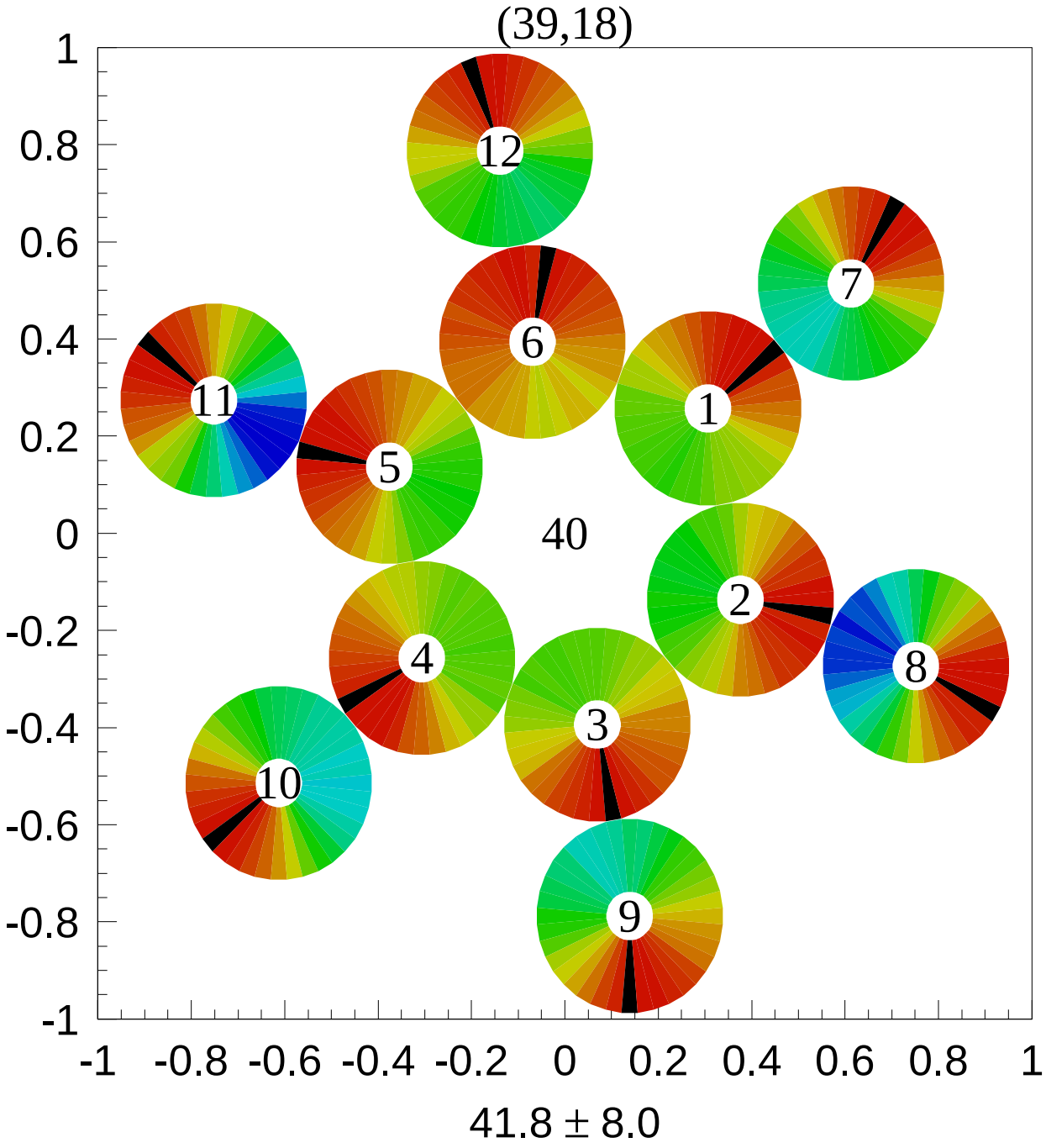

(39,16)
tilted LEDs
113 126 121 58 125 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 125 120 117 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

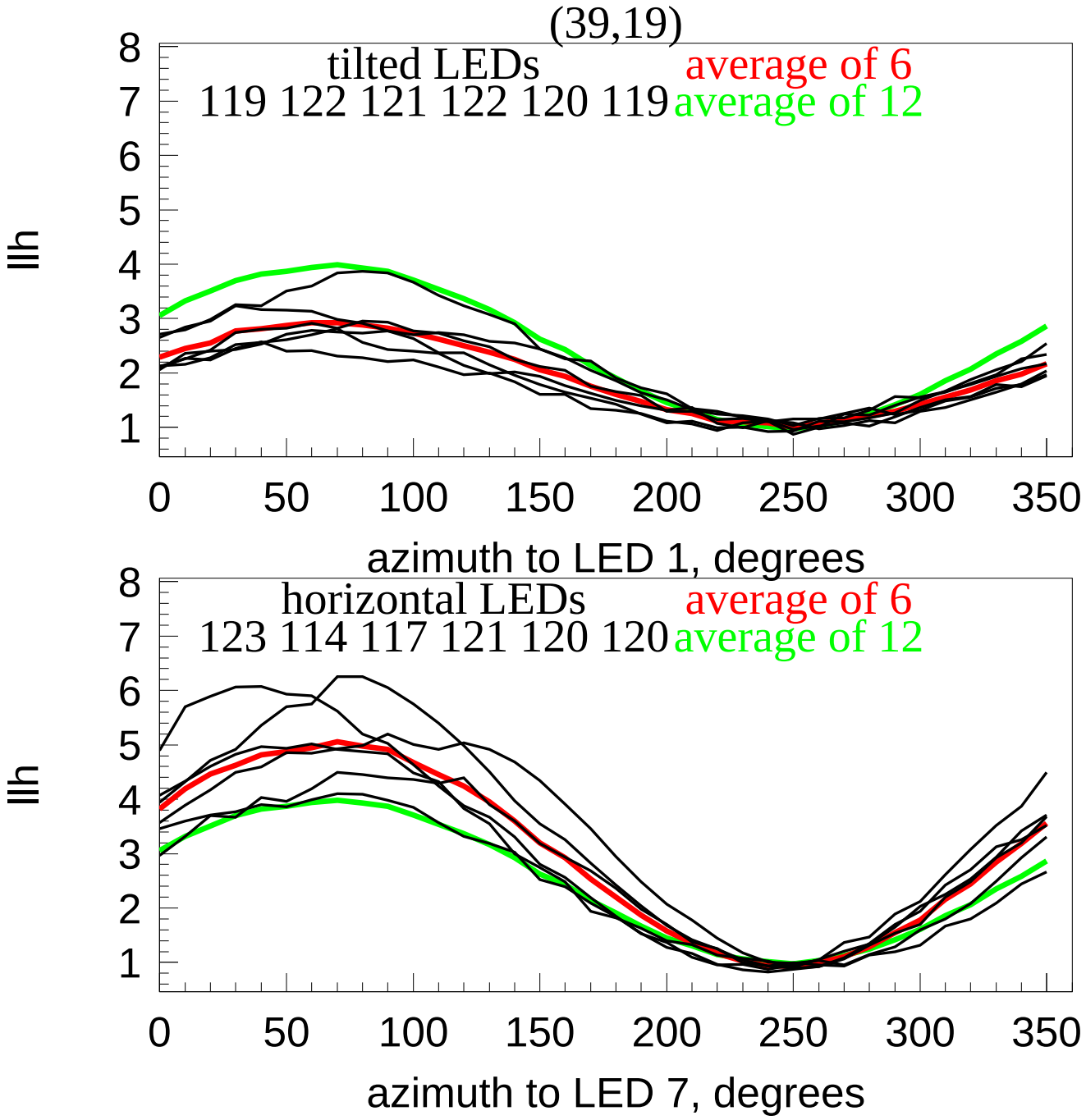

(39,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
50.6 ± 5.3

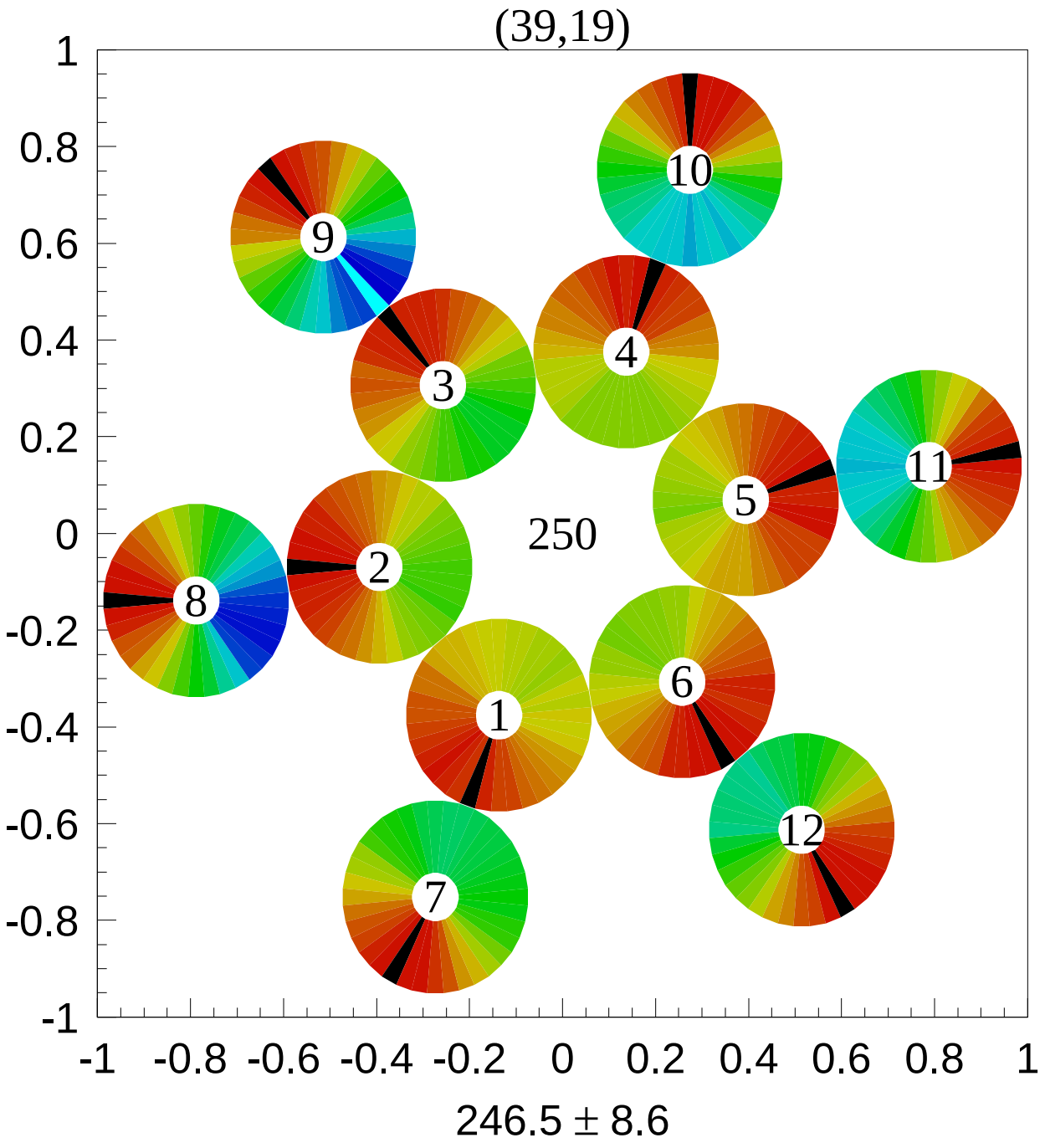

(39,17)
tilted LEDs
121 125 115 121 115 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 120 119 121 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

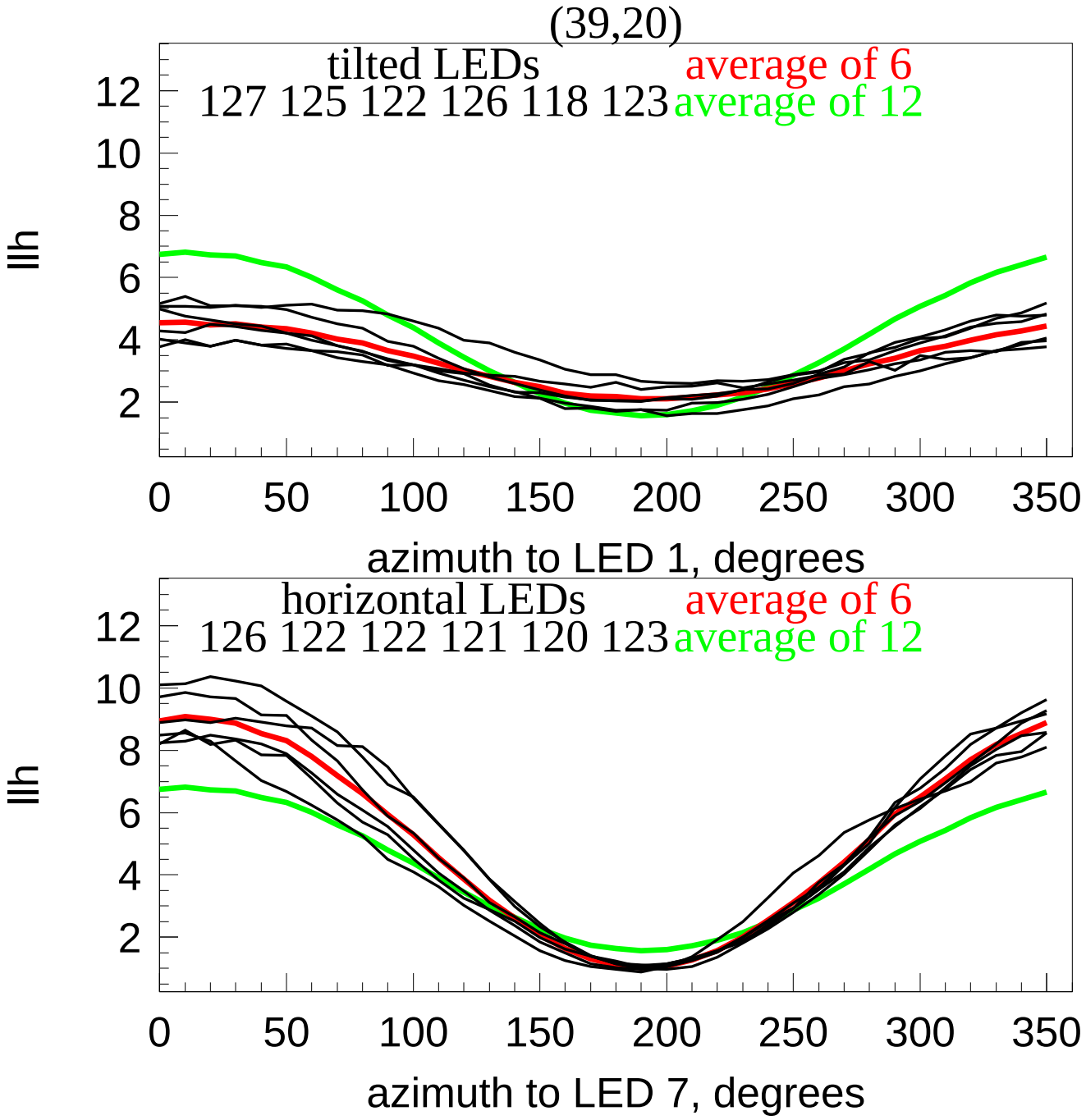

(39,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
70
5
11
3
4
9
10
67 ± 8.0

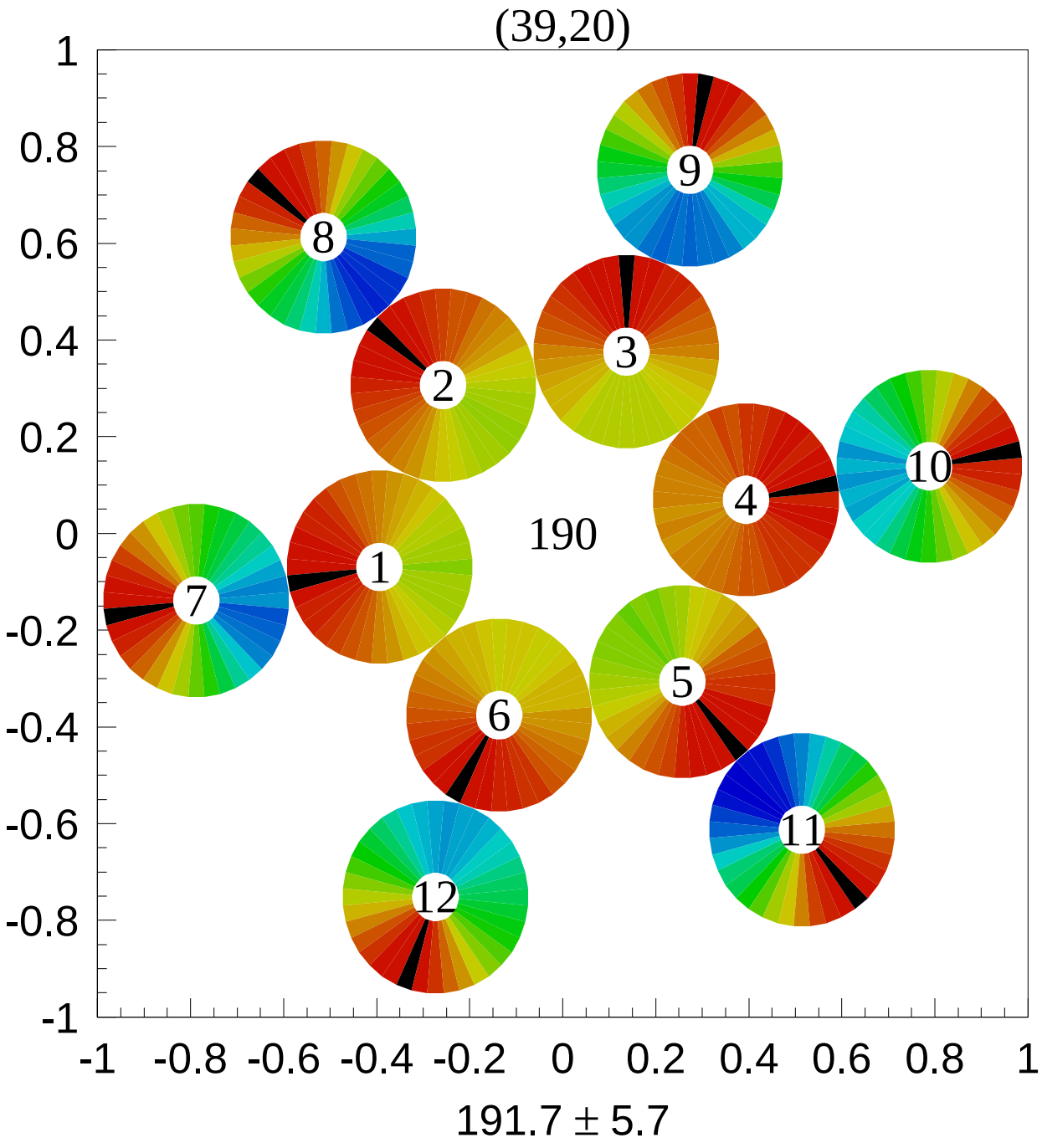

(39,18)
tilted LEDs
127 118 120 122 132 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 117 118 119 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

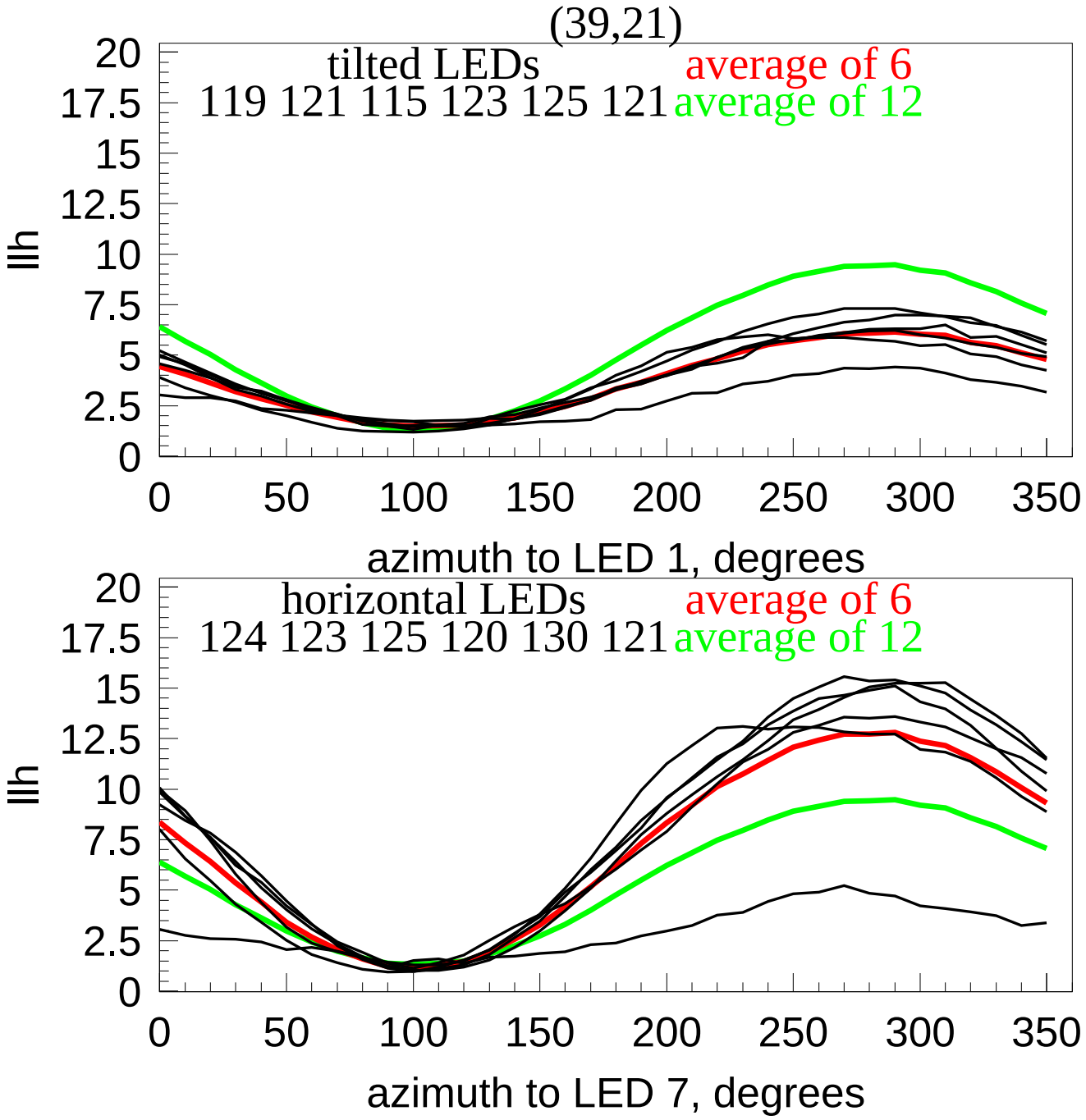

(39,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
41.8 ± 8.0

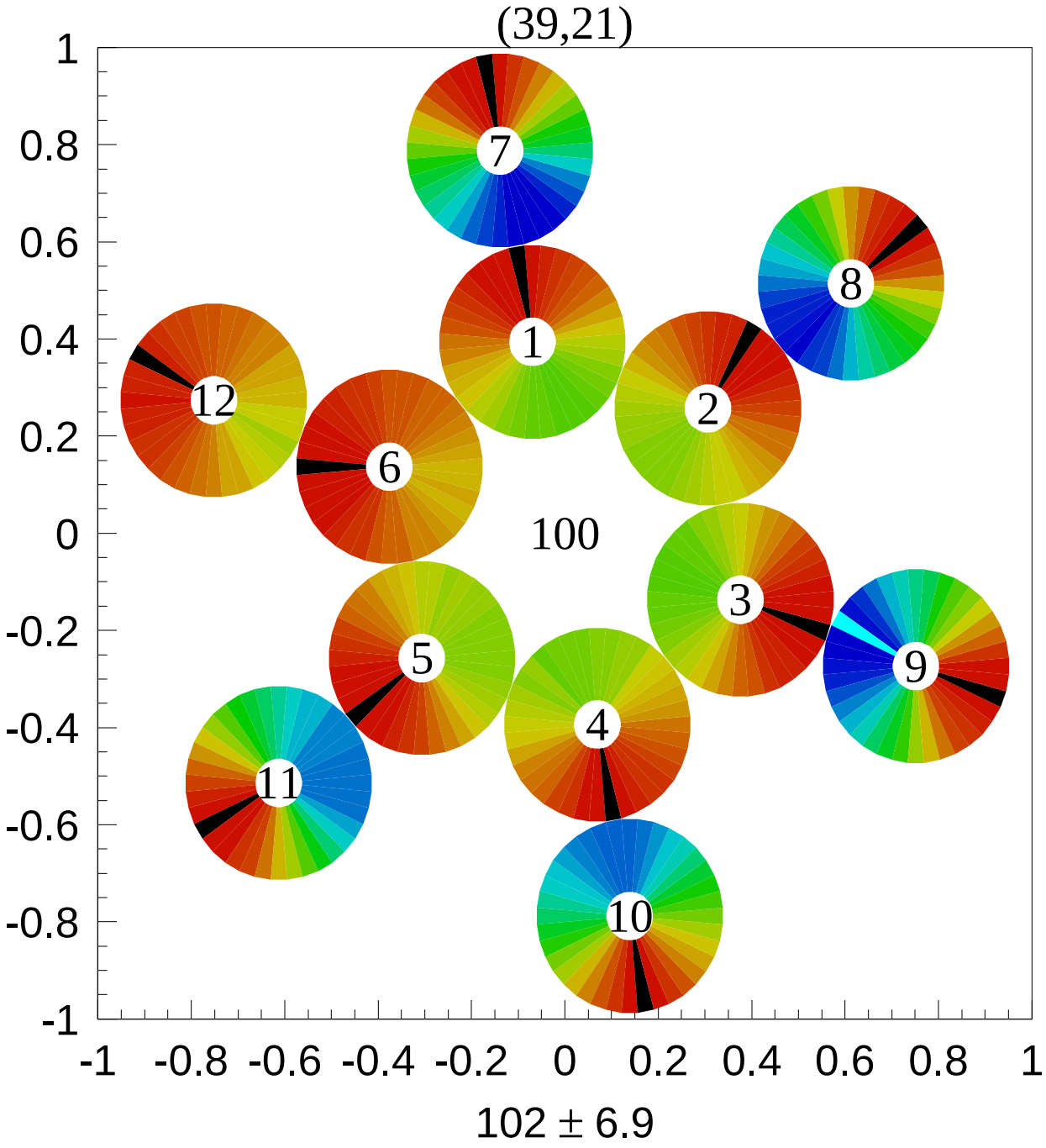

(39,19)
tilted LEDs
119 122 121 122 120 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 114 117 121 120 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

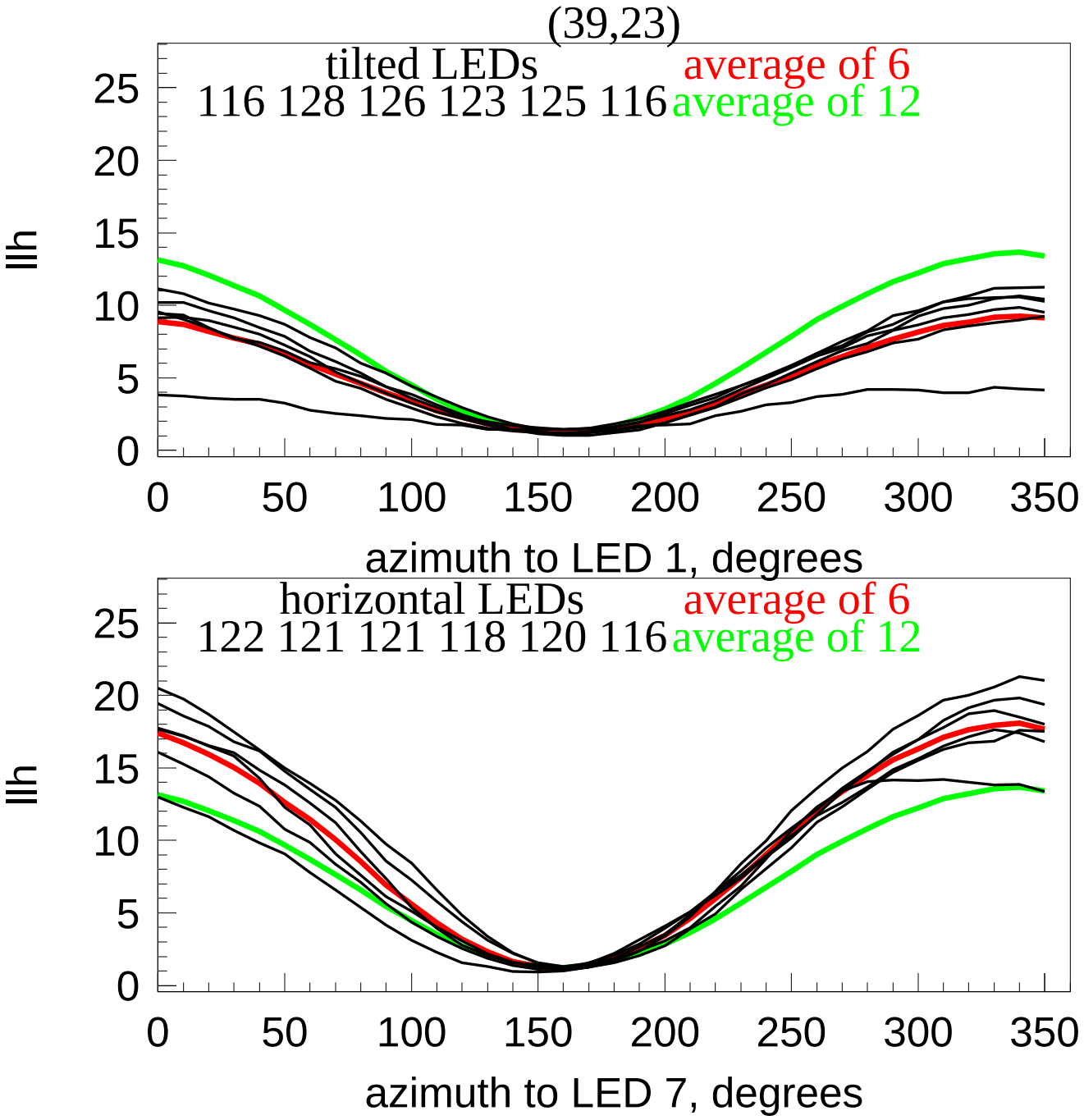

(39,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
246.5 ± 8.6
250
1
2
3
4
5
6
7
8
9
10
11
12

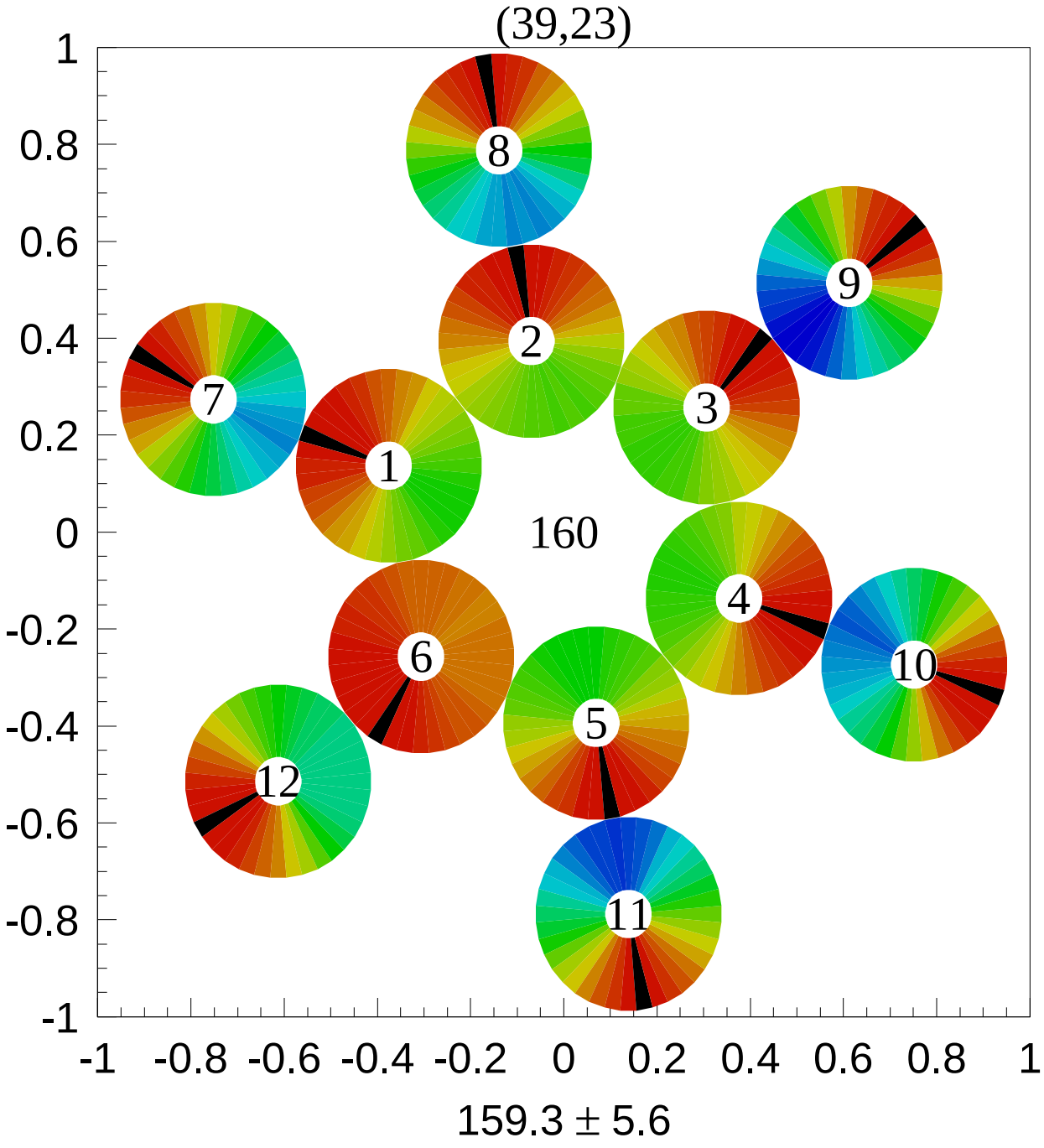

(39,20)
tilted LEDs
127 125 122 126 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 122 122 121 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

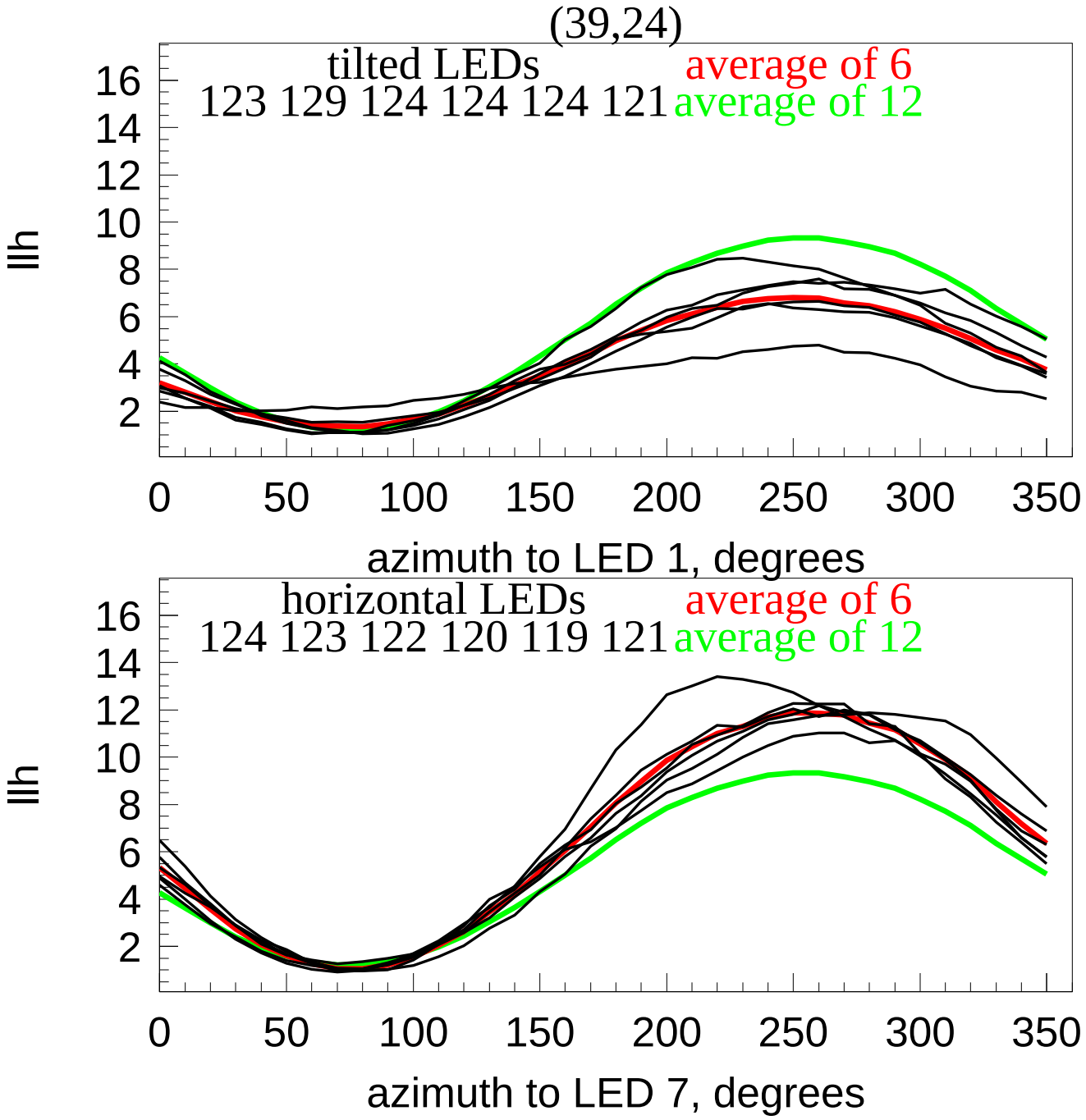

(39,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
191.7 ± 5.7

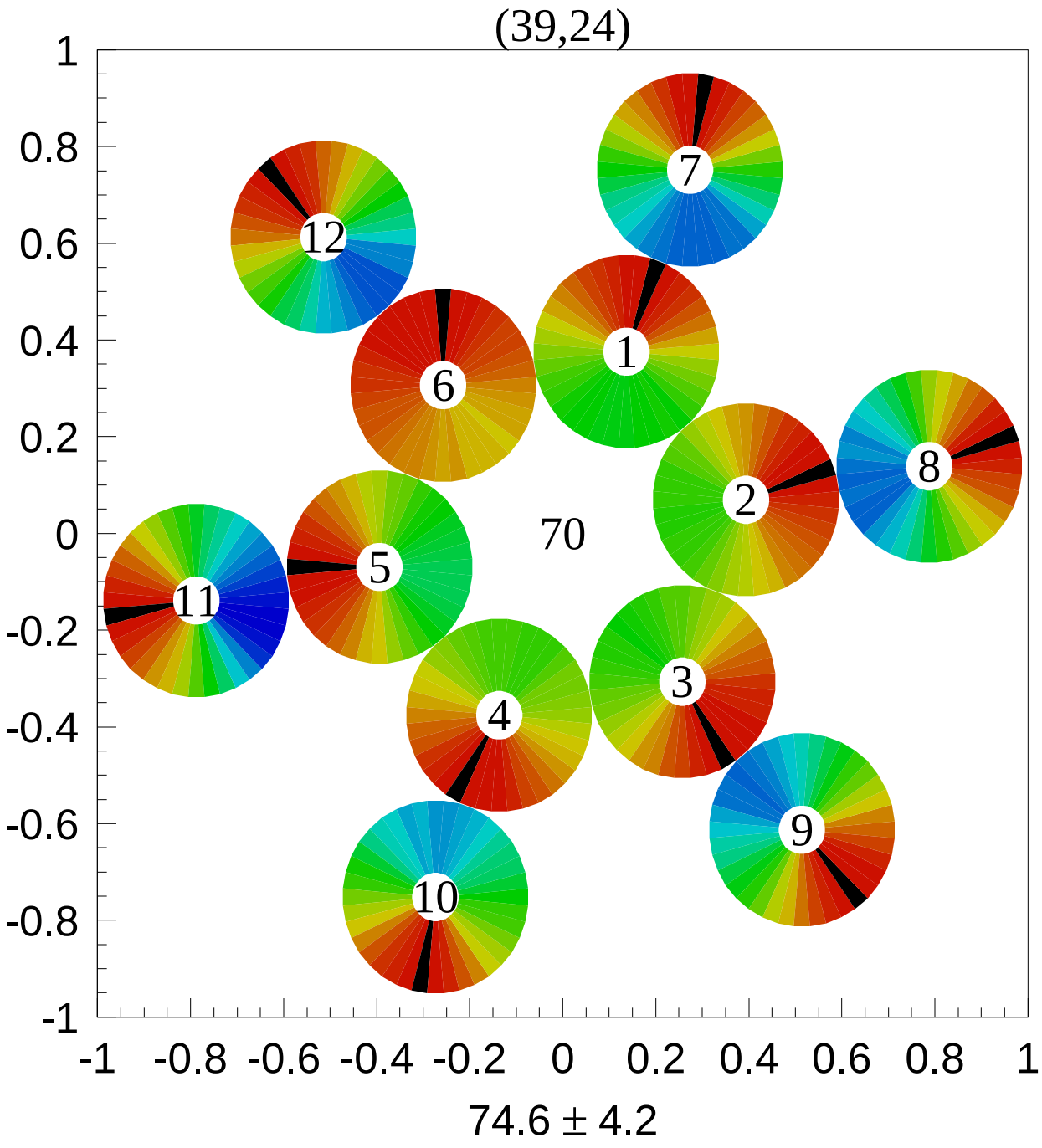

(39,21)
tilted LEDs
119 121 115 123 125 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 123 125 120 130 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

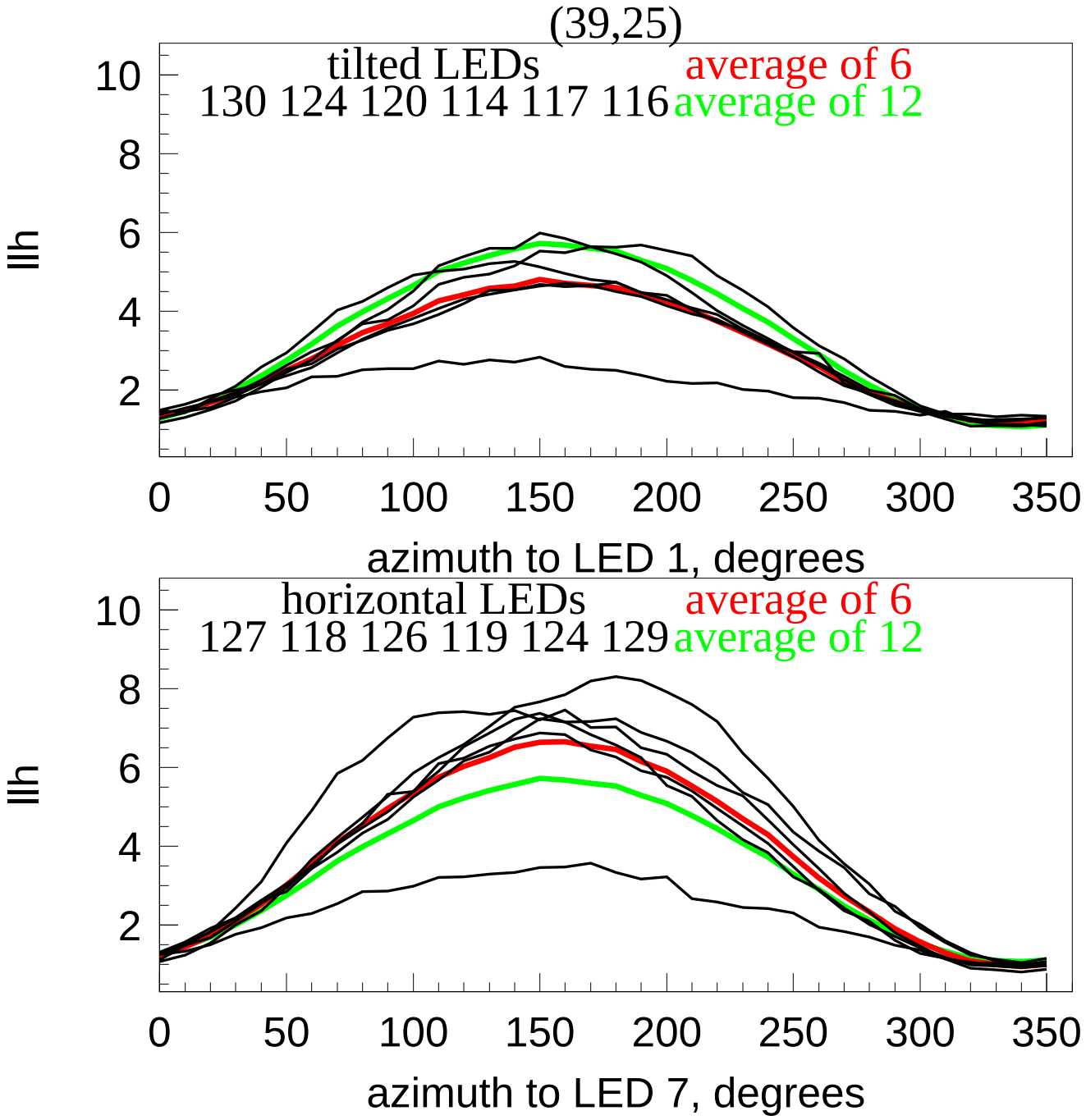

(39,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
102 ± 6.9

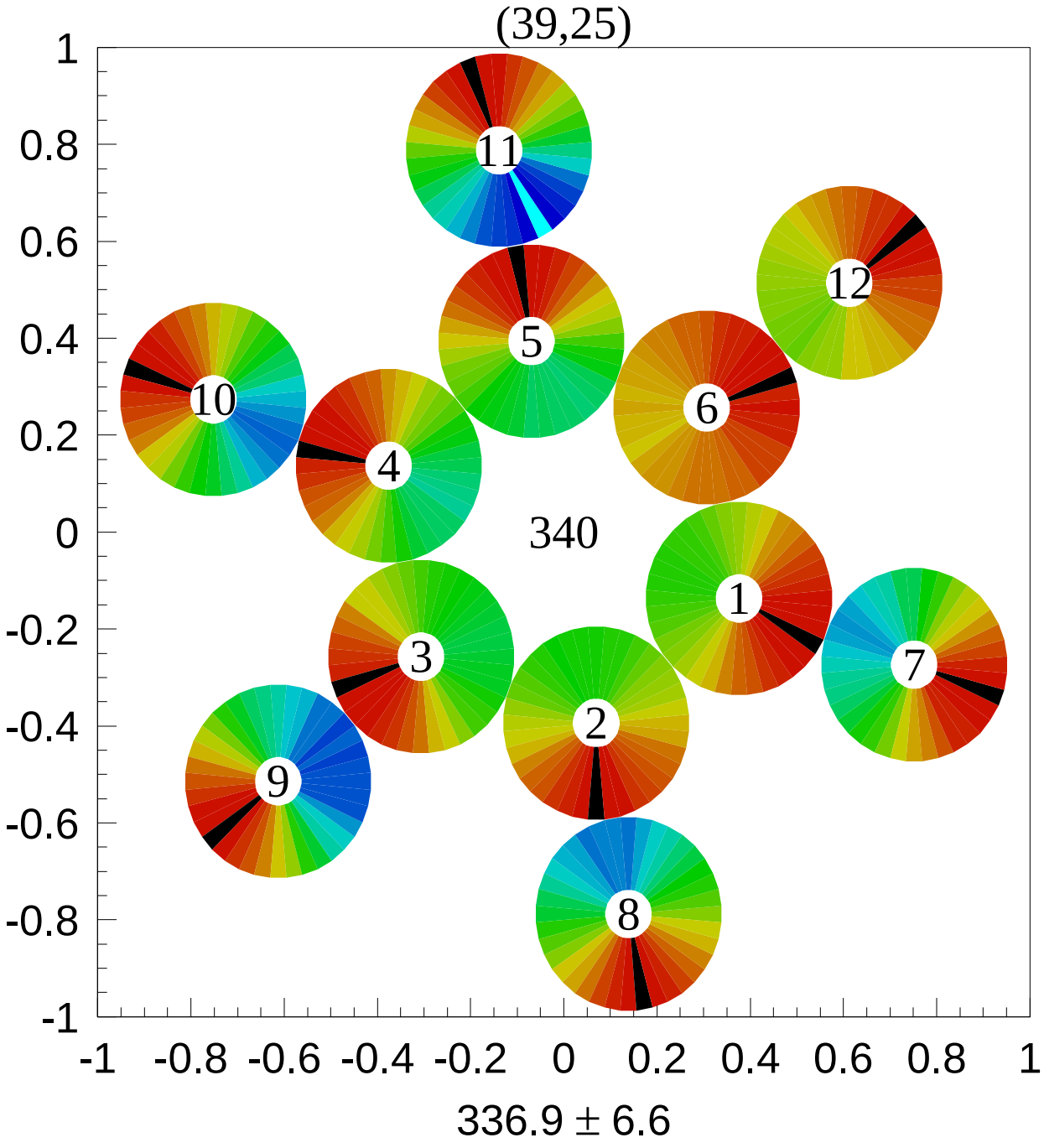

(39,23)
tilted LEDs
116 128 126 123 125 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 121 118 120 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

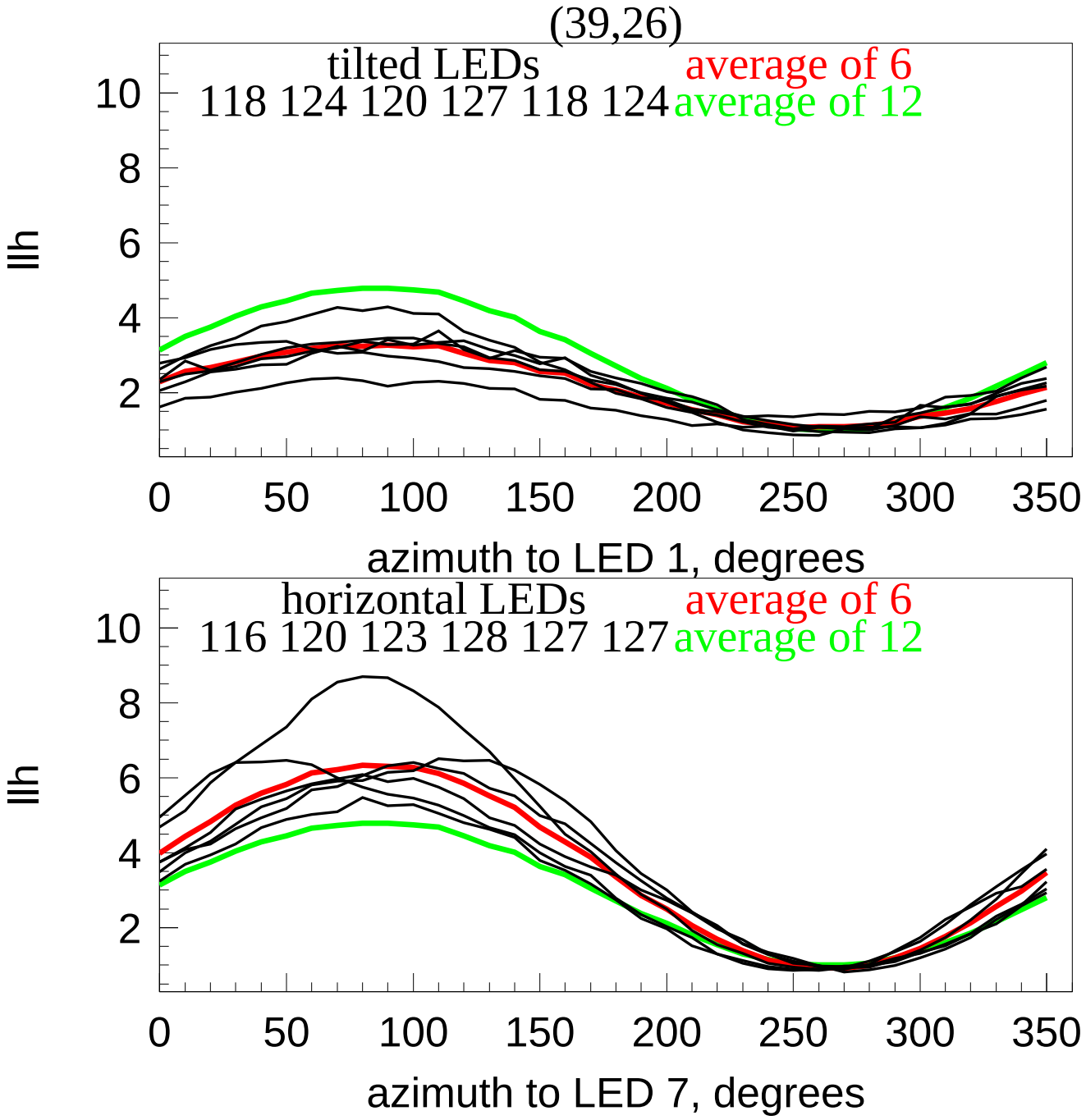

(39,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
159.3 ± 5.6

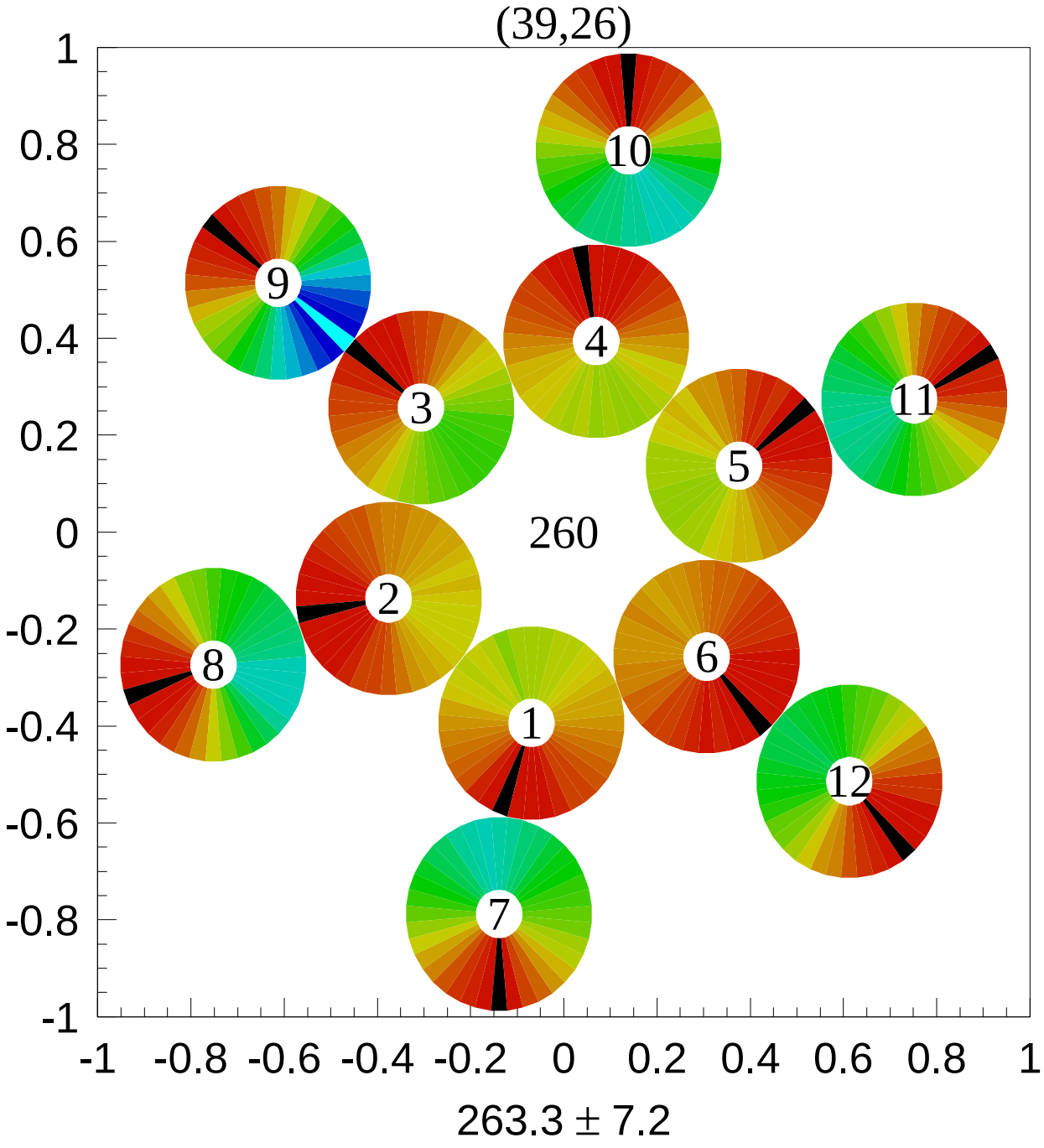

(39,24)
tilted LEDs
123 129 124 124 124 121
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 123 122 120 119 121
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

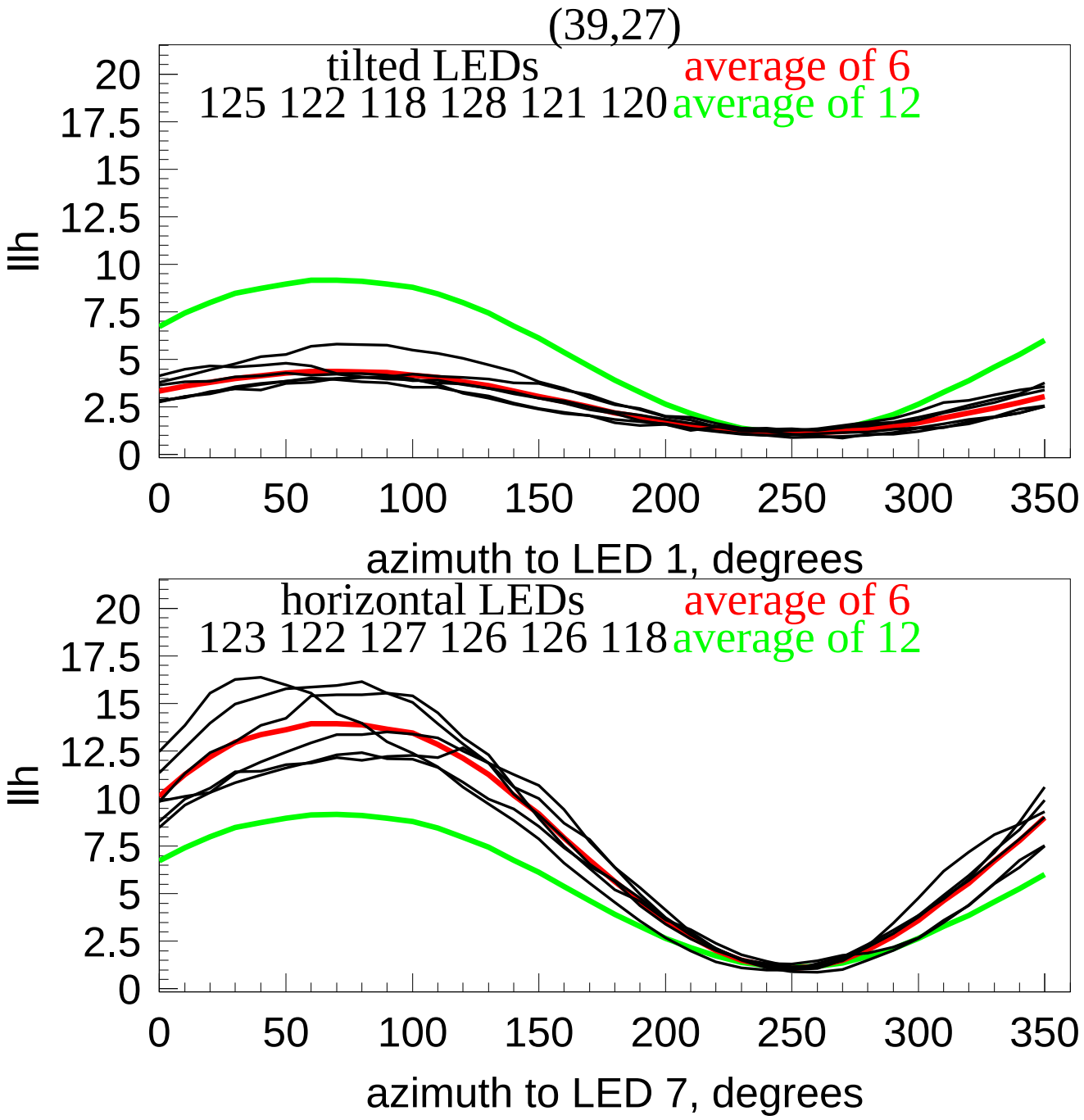

(39,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
3
4
9
10
74.6 ± 4.2

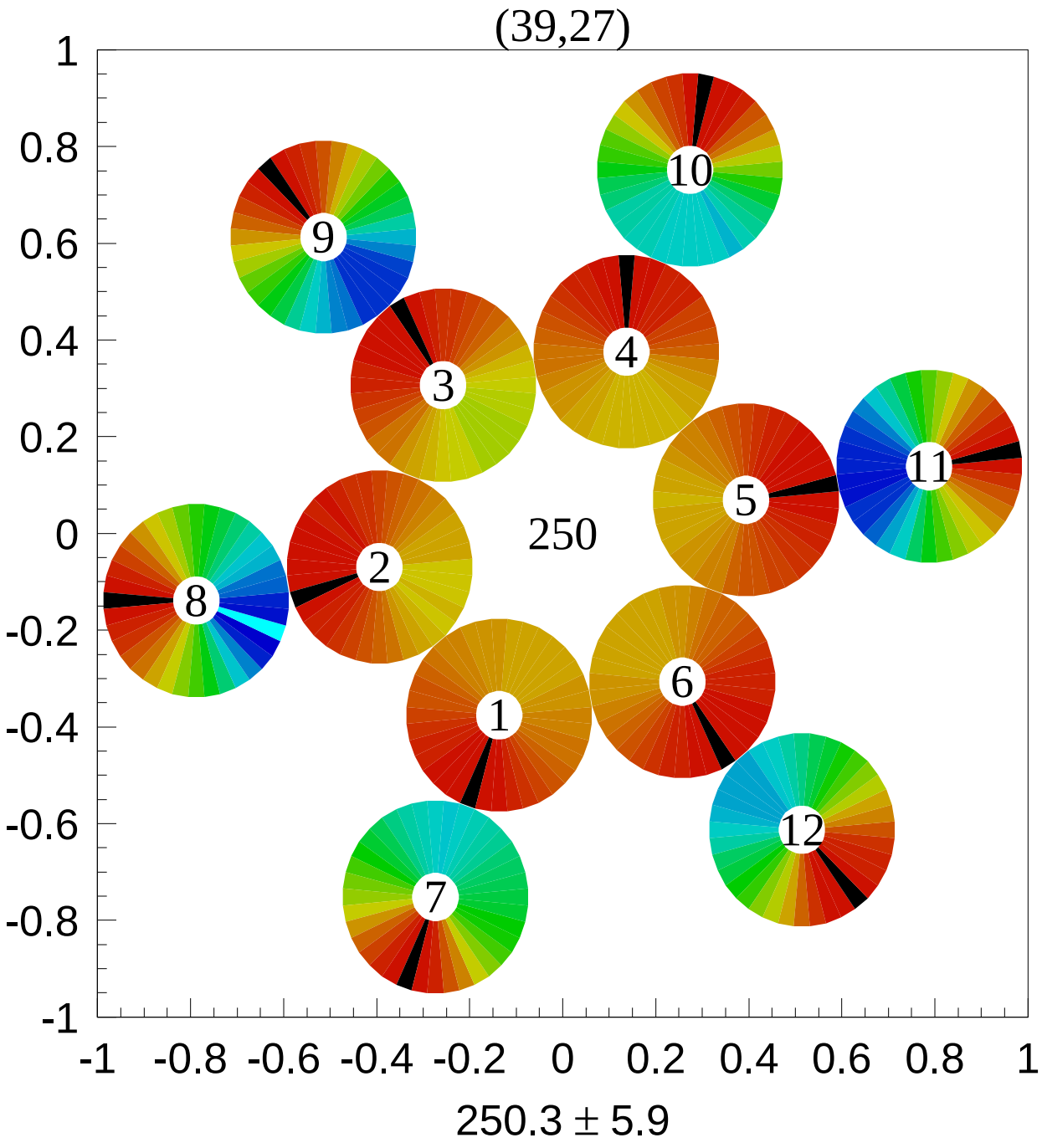

(39,25)
tilted LEDs
130 124 120 114 117 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 118 126 119 124 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

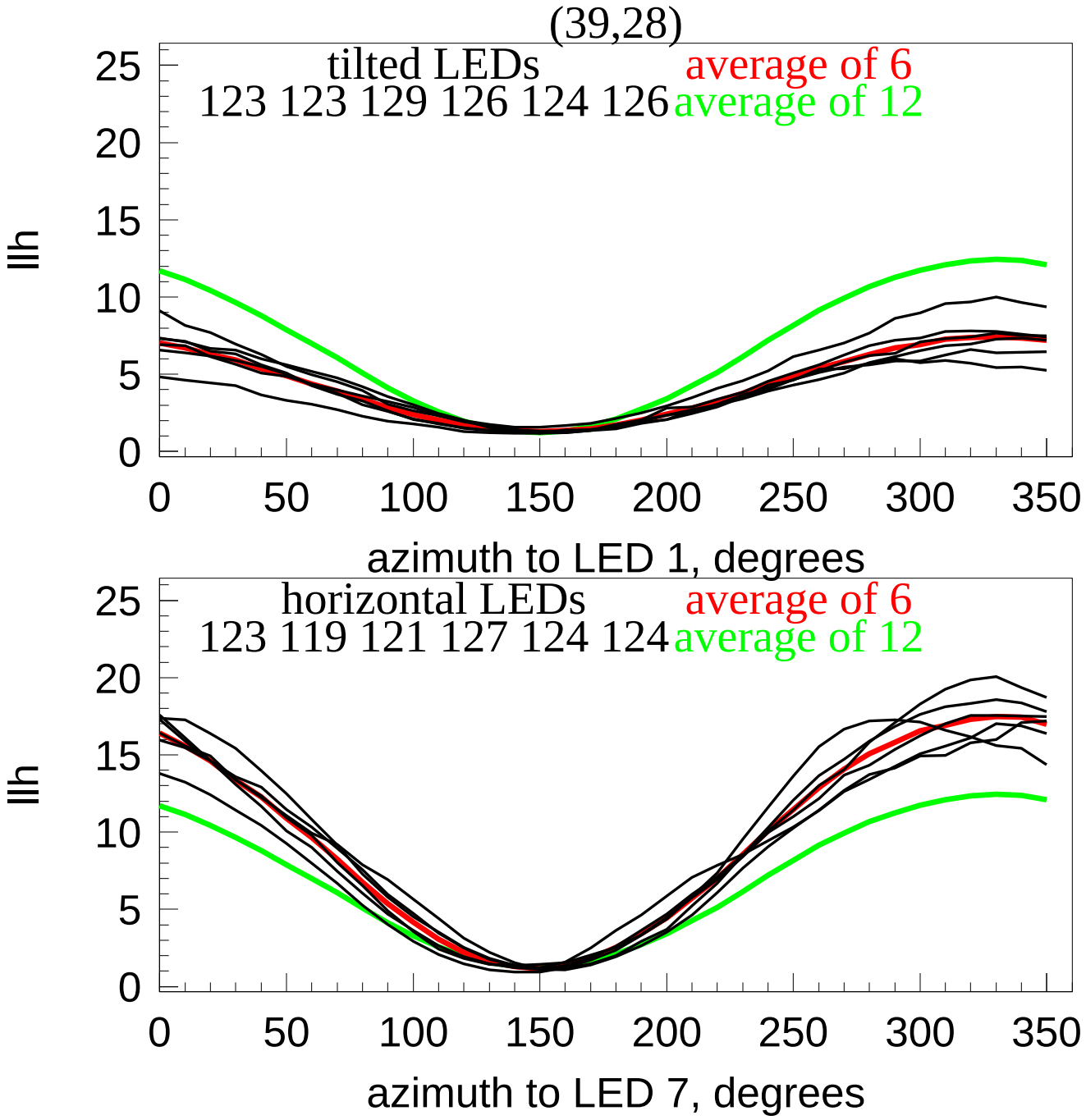

(39,25)
11
12
5
6
10
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
336.9 ± 6.6

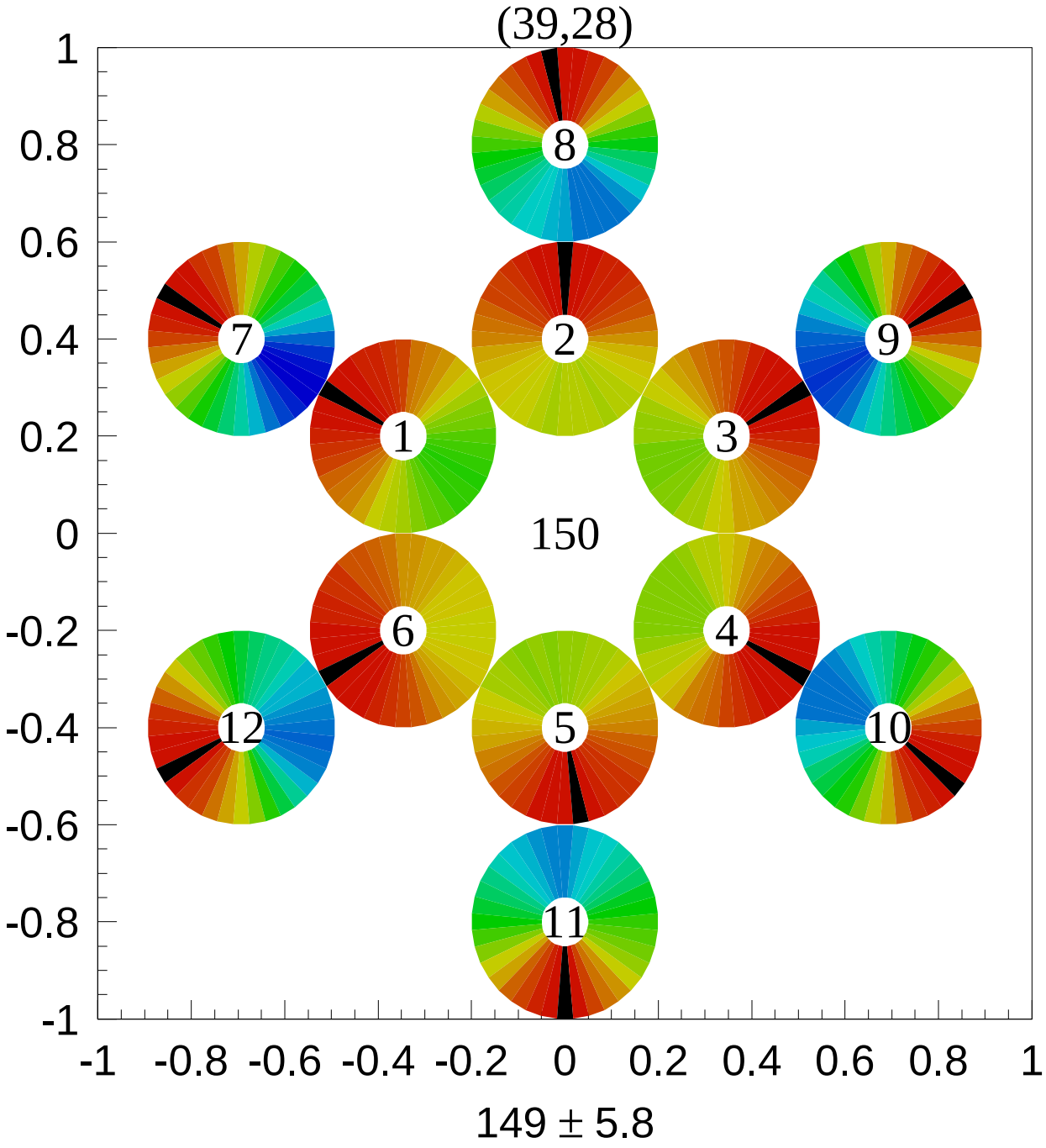

(39,26)
tilted LEDs
118 124 120 127 118 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 120 123 128 127 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

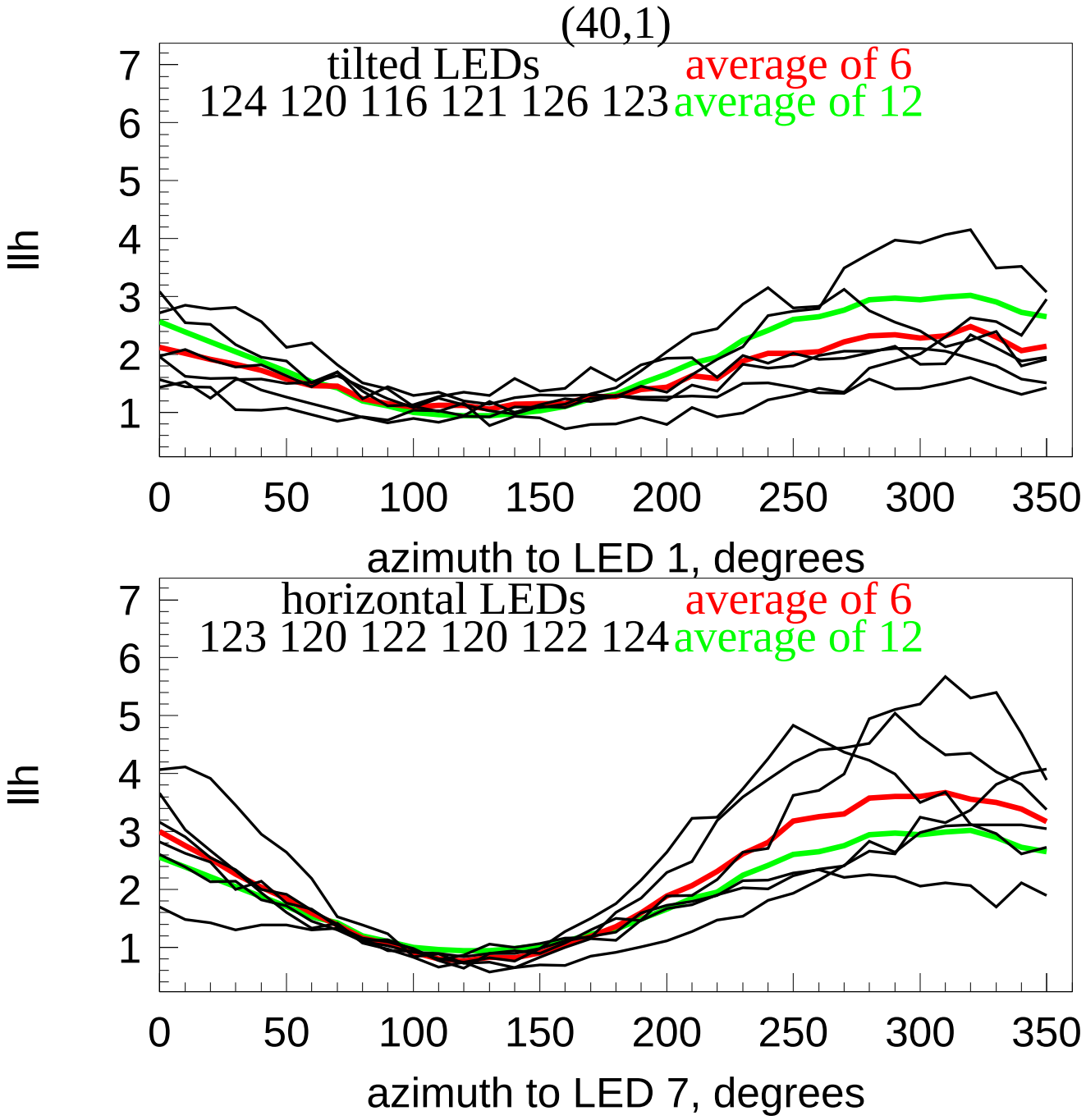

(39,26)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
263.3 ± 7.2

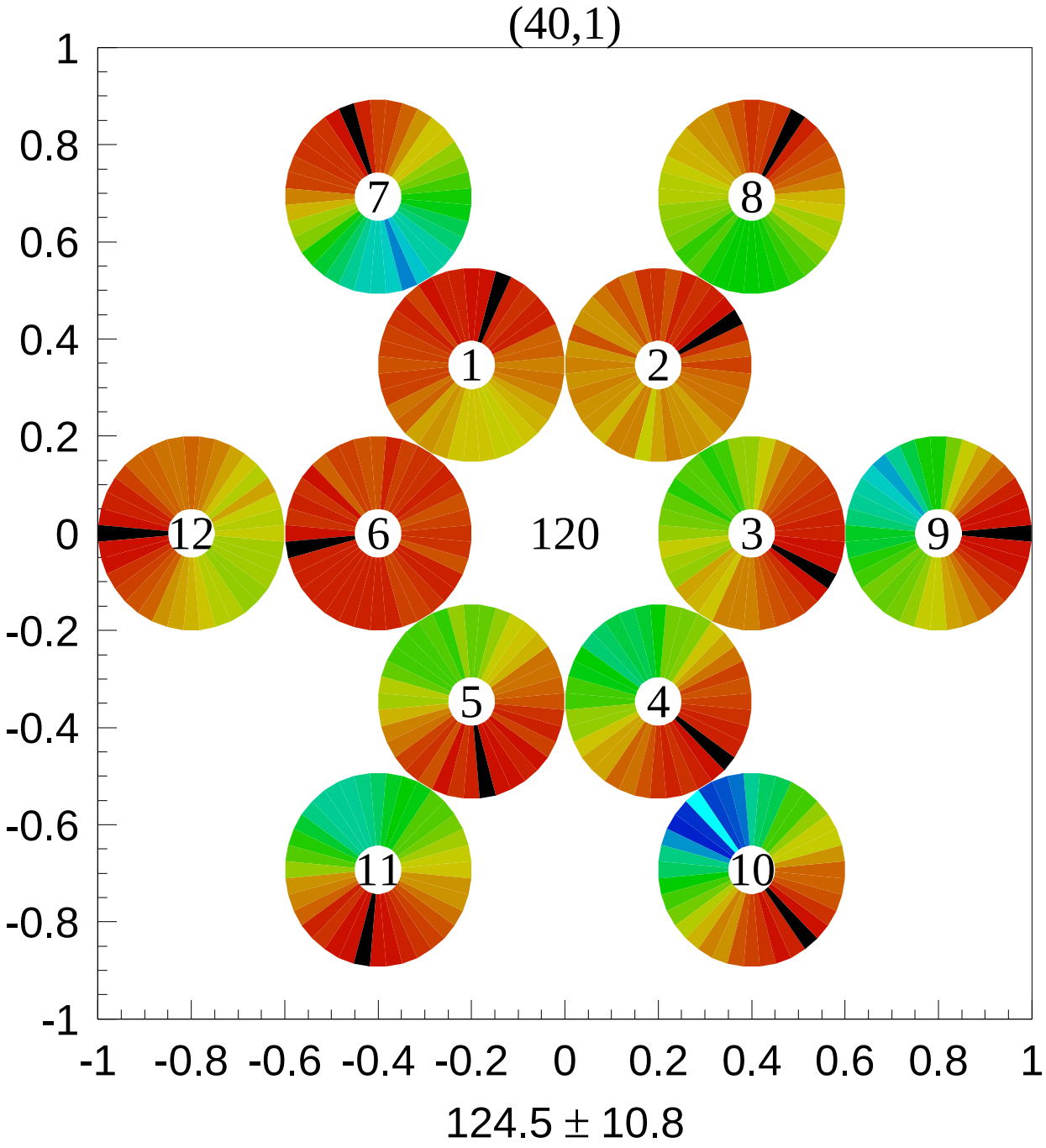

(39,27)
tilted LEDs
125 122 118 128 121 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 127 126 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

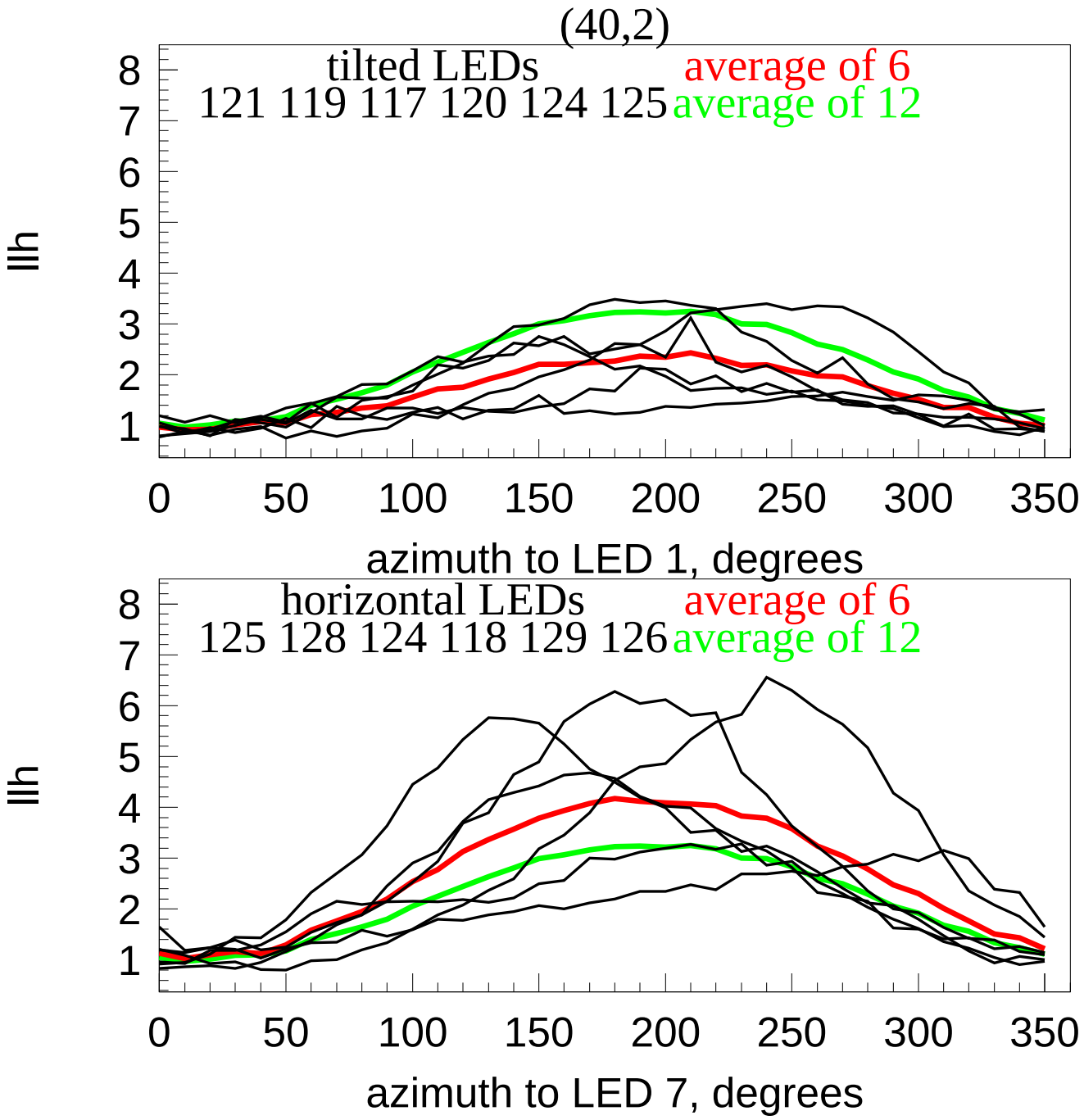

(39,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
250.3 ± 5.9
1
2
3
4
5
6
7
8
9
10
11
12

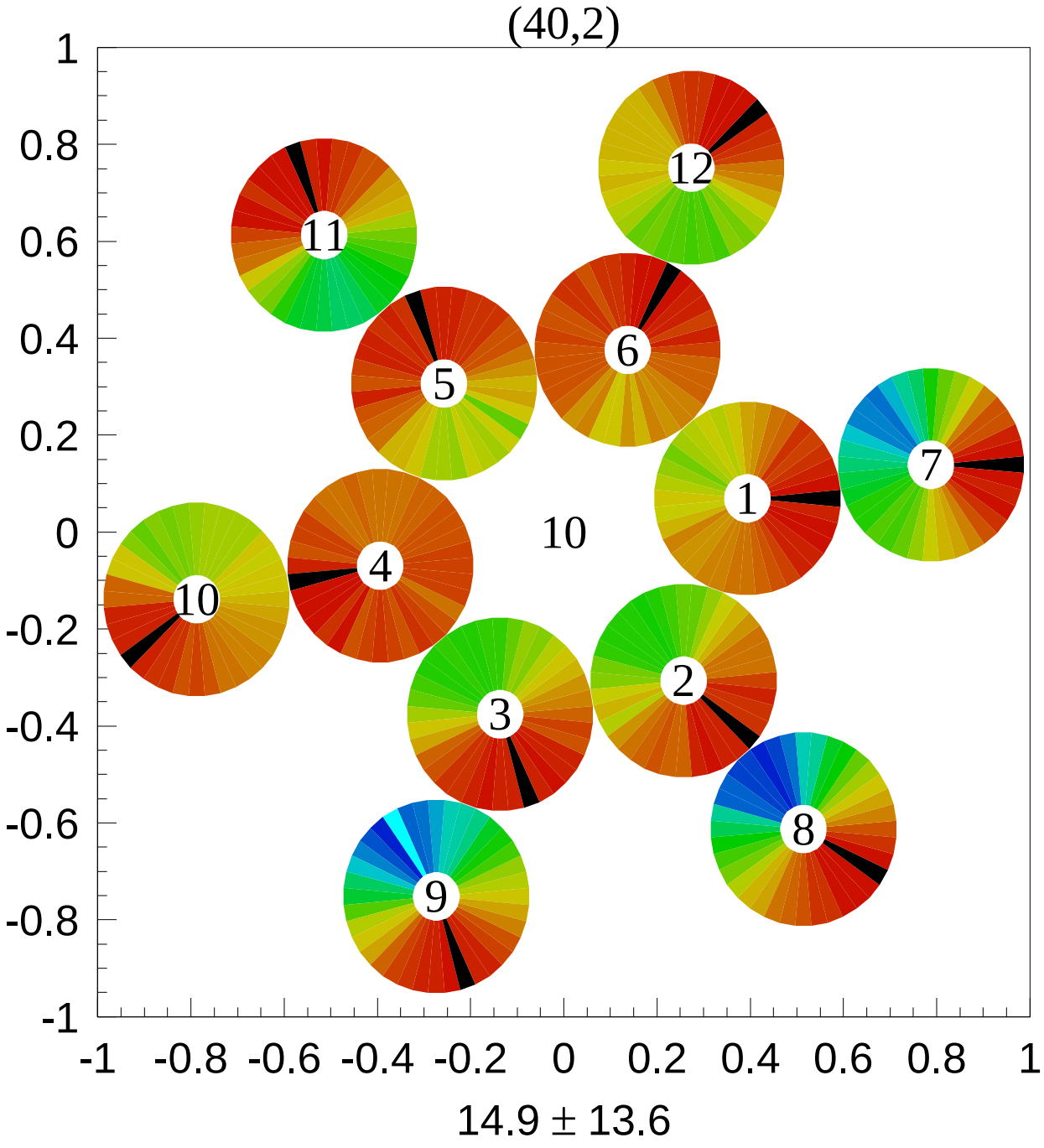

(39,28)
tilted LEDs
123 123 129 126 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 121 127 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

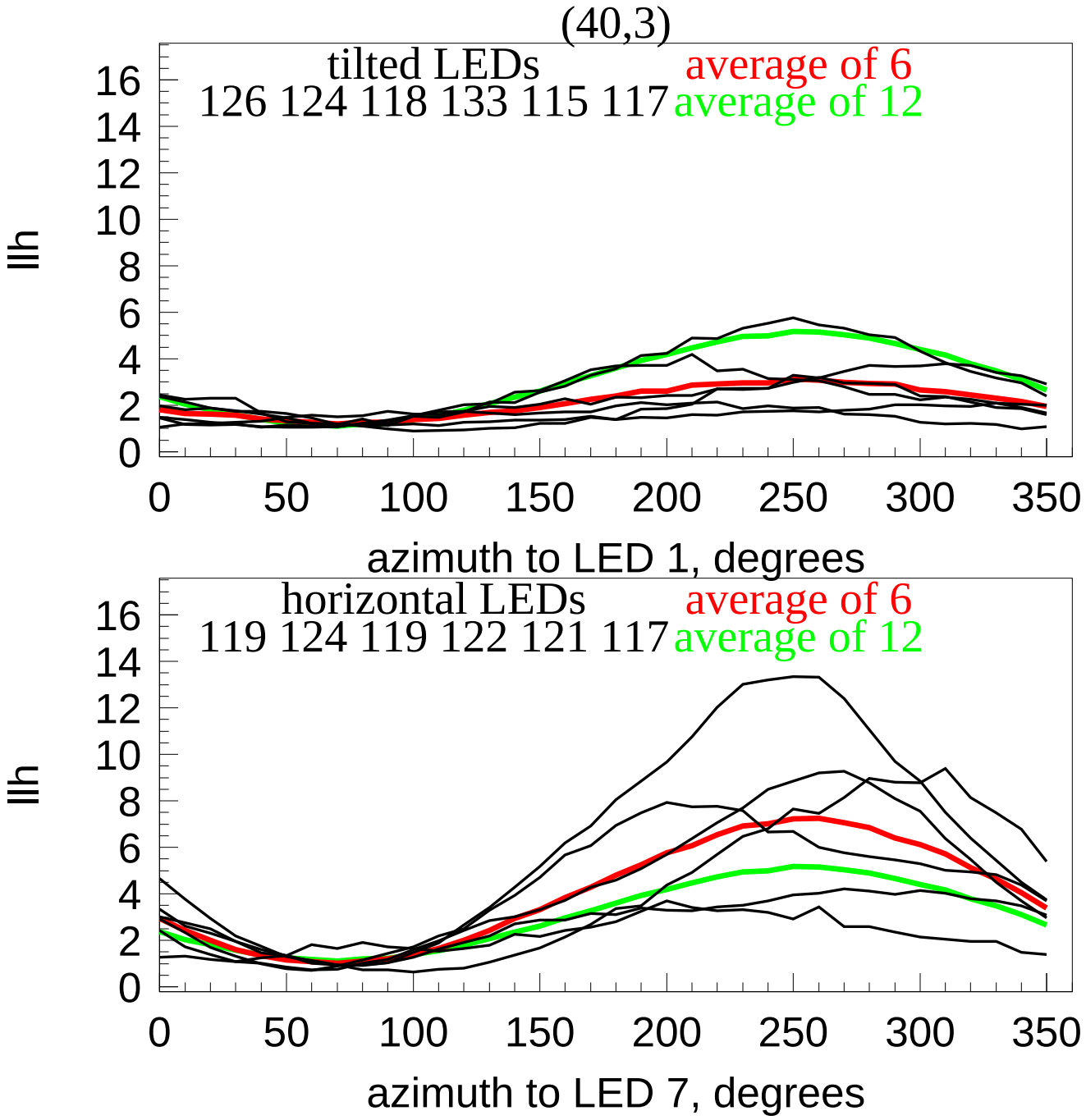

(39,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
149 ± 5.8

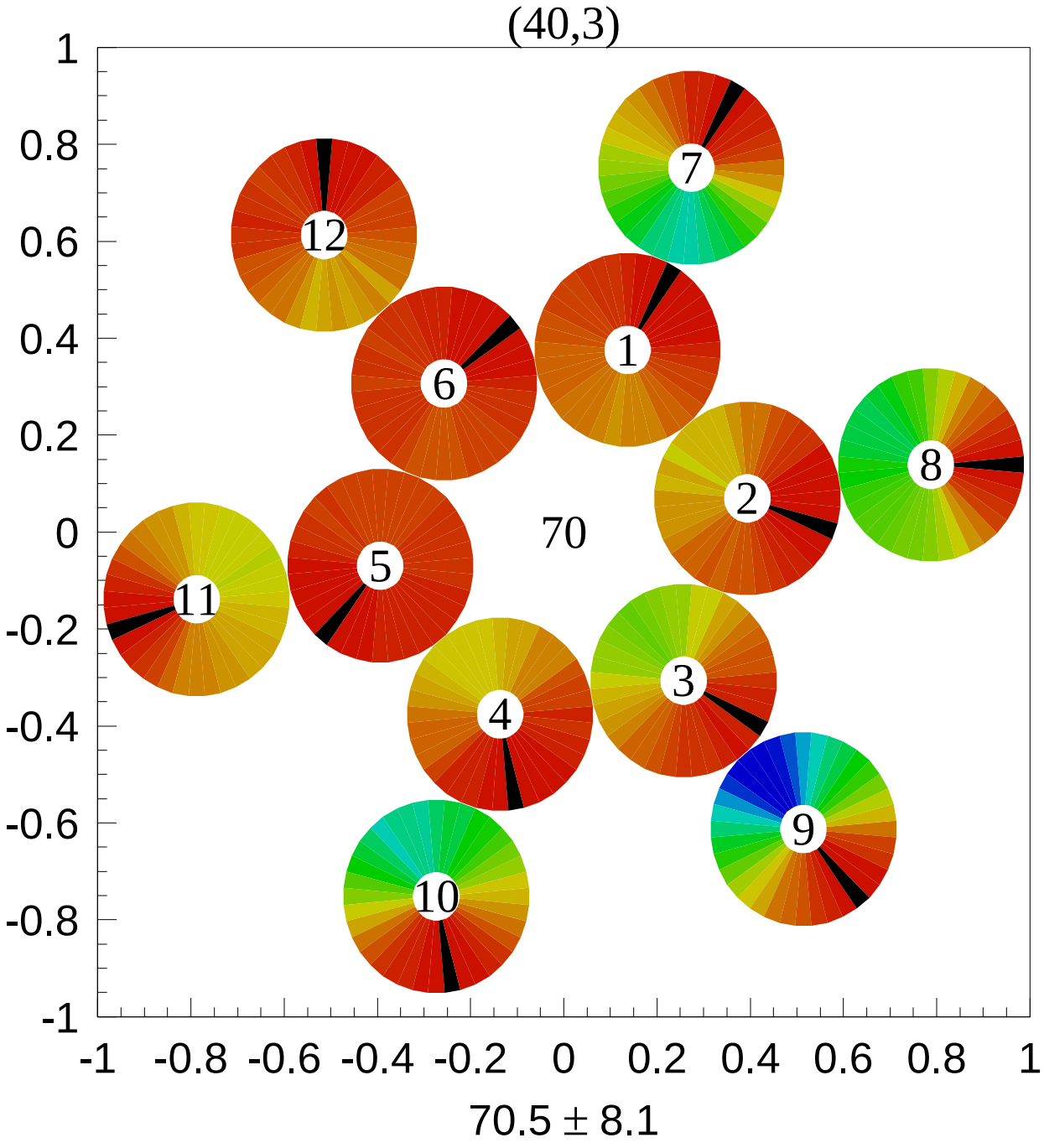

(40,1)
tilted LEDs
124 120 116 121 126 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 122 120 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

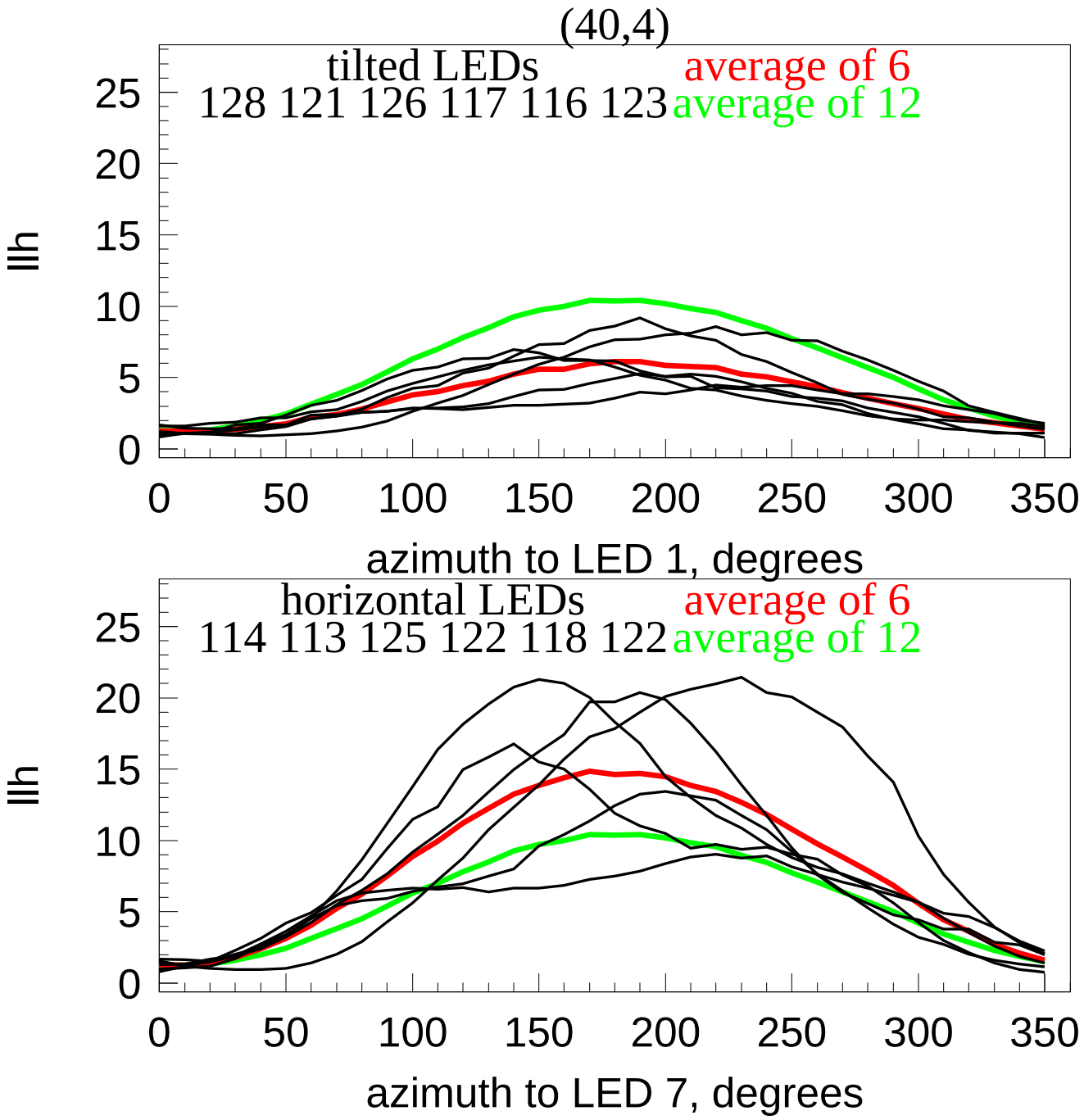

(40,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
124.5 ± 10.8
7
8
1
2
12
6
120
3
9
5
4
11
10

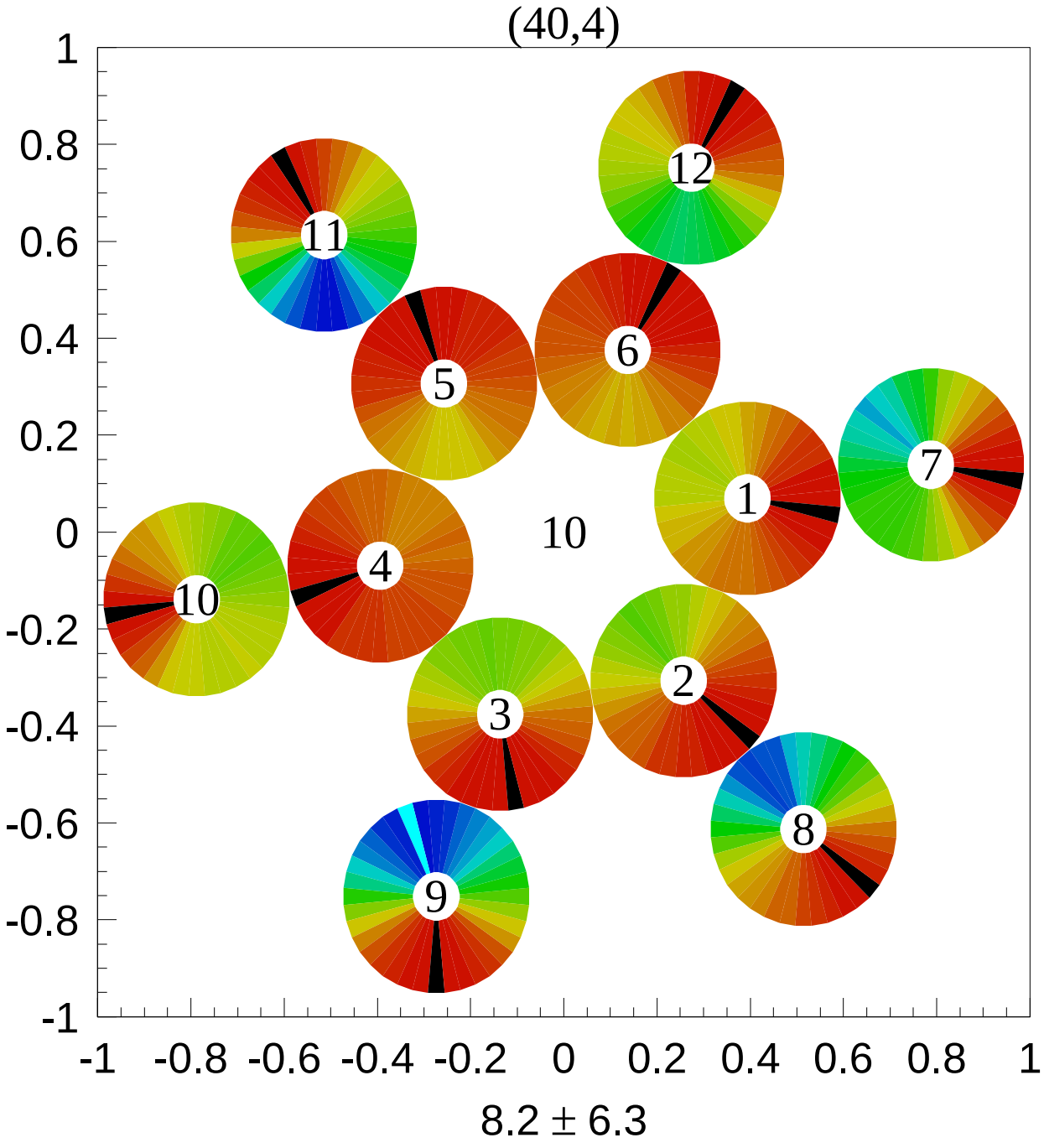

(40,2)
tilted LEDs
121 119 117 120 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 128 124 118 129 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

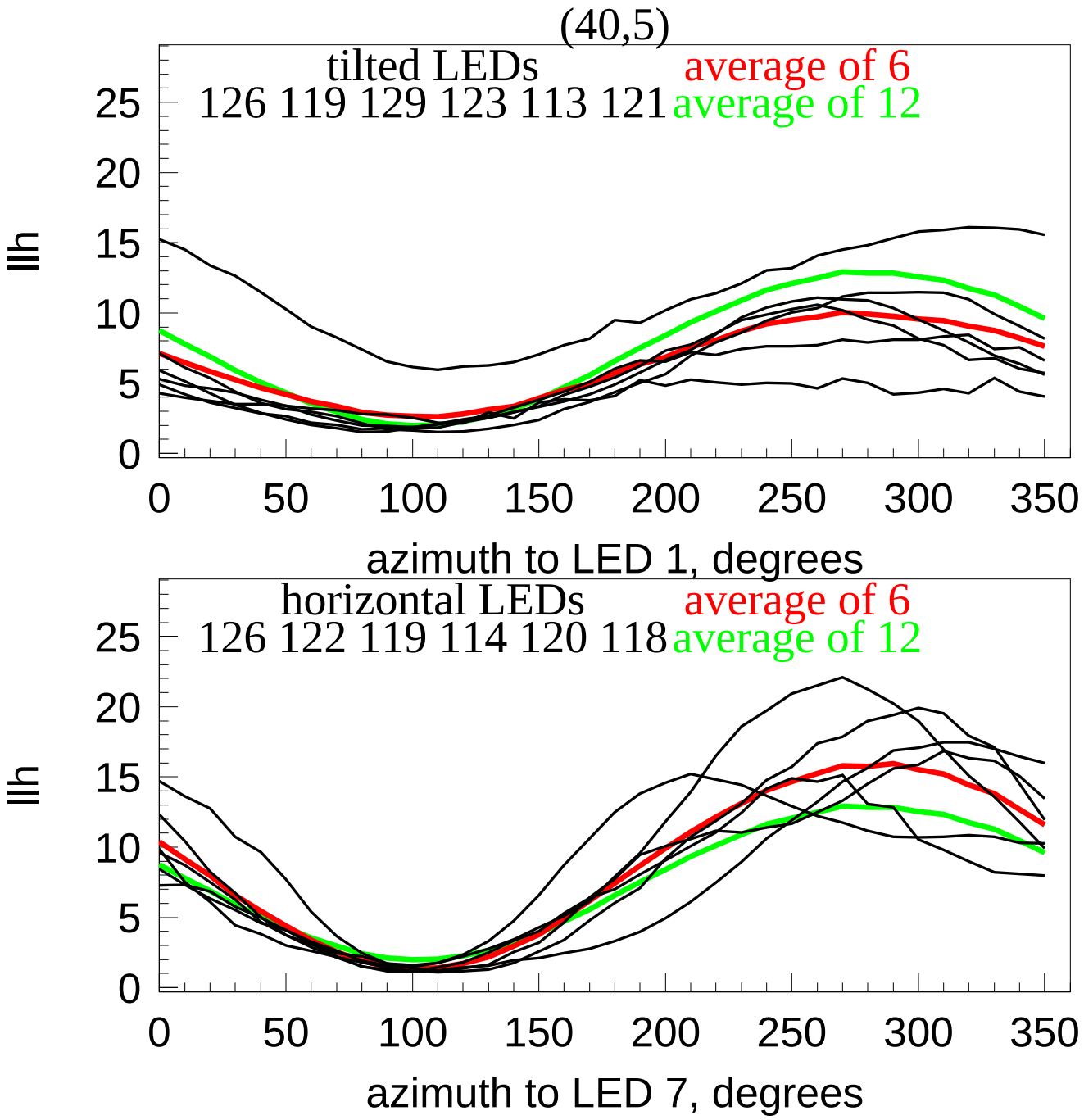

(40,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
14.9 ± 13.6

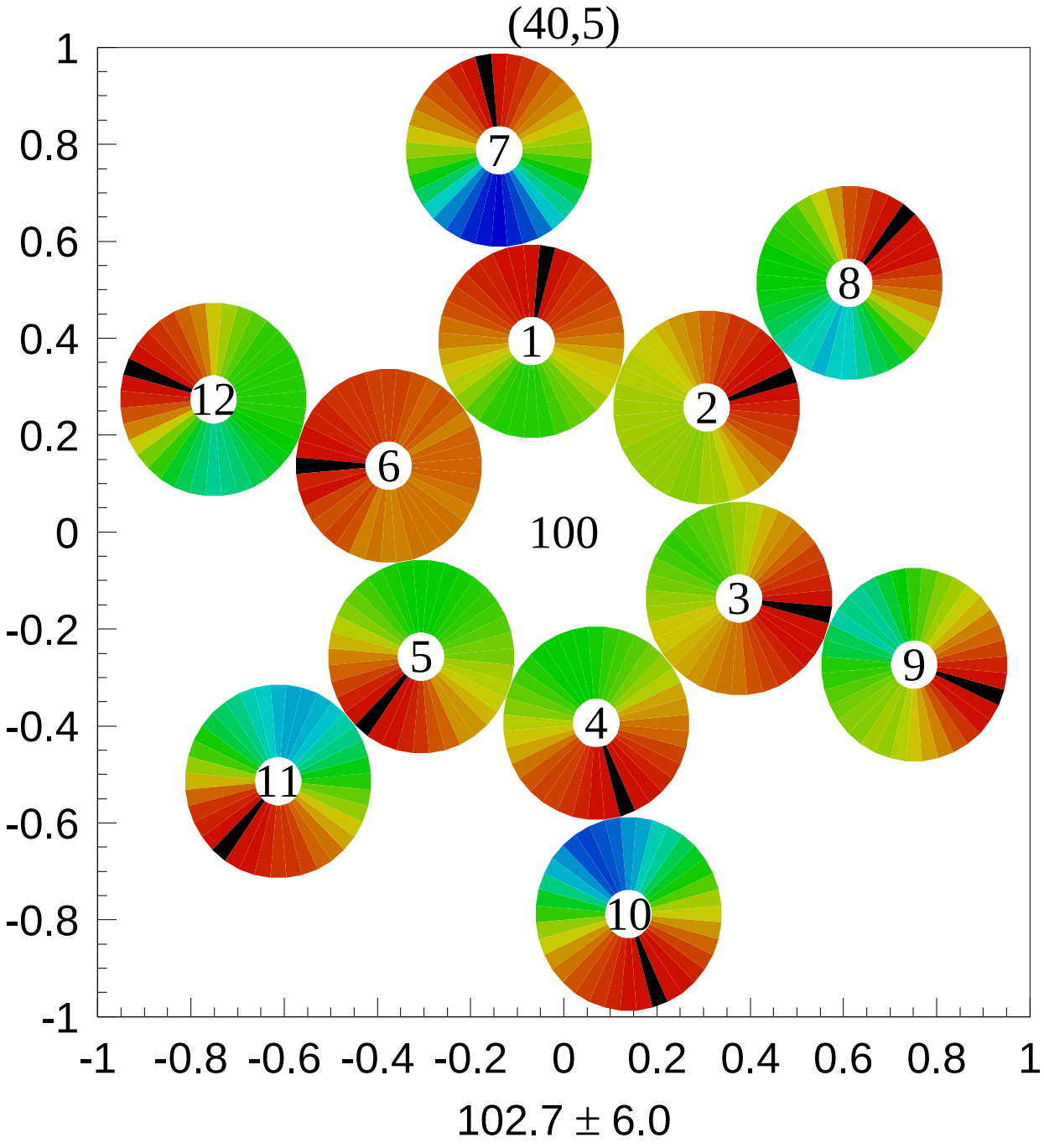

(40,3)
tilted LEDs
126 124 118 133 115 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 124 119 122 121 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

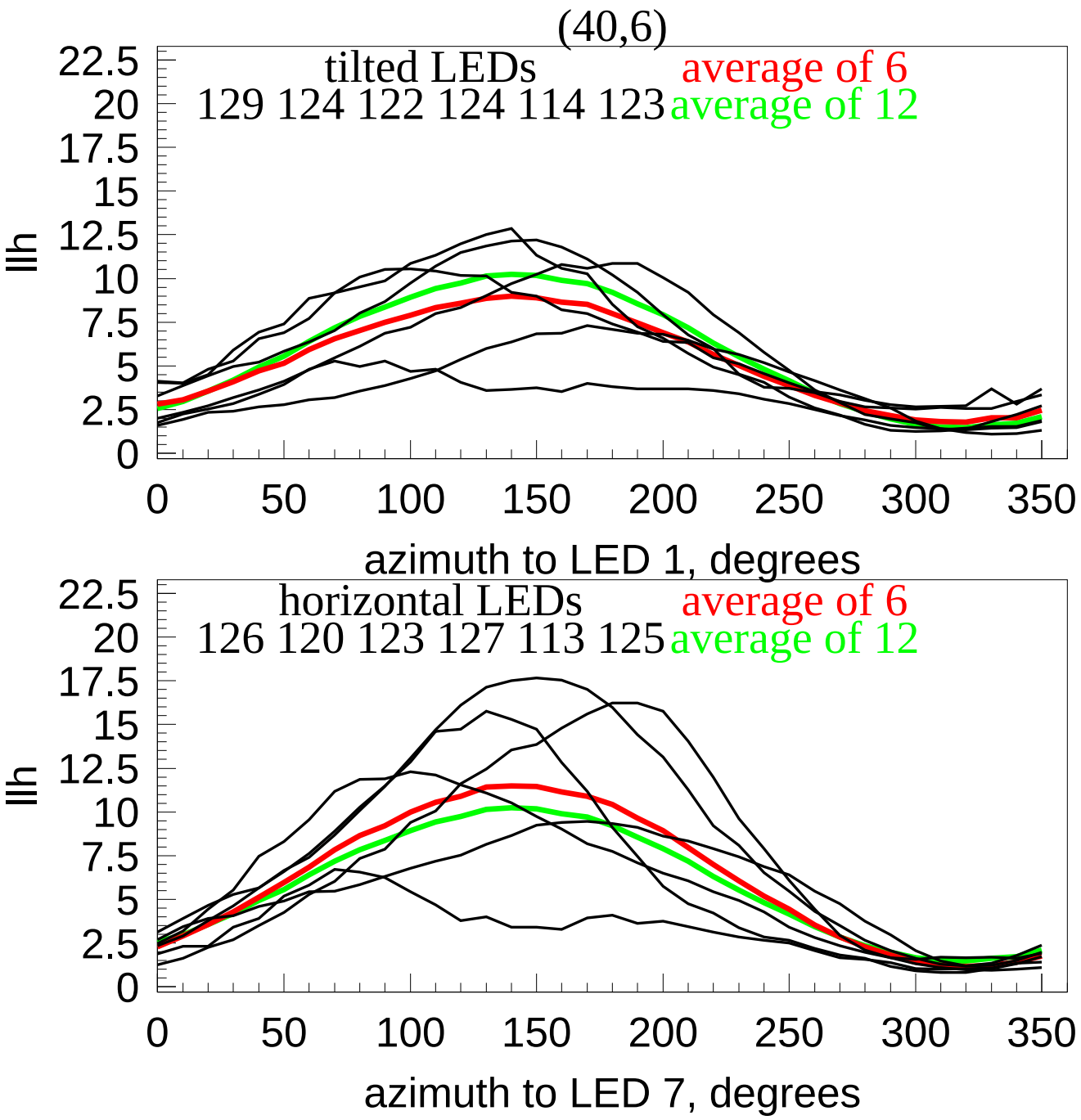

(40,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
70
12
7
6
1
8
2
5
11
4
3
9
10
70.5 ± 8.1

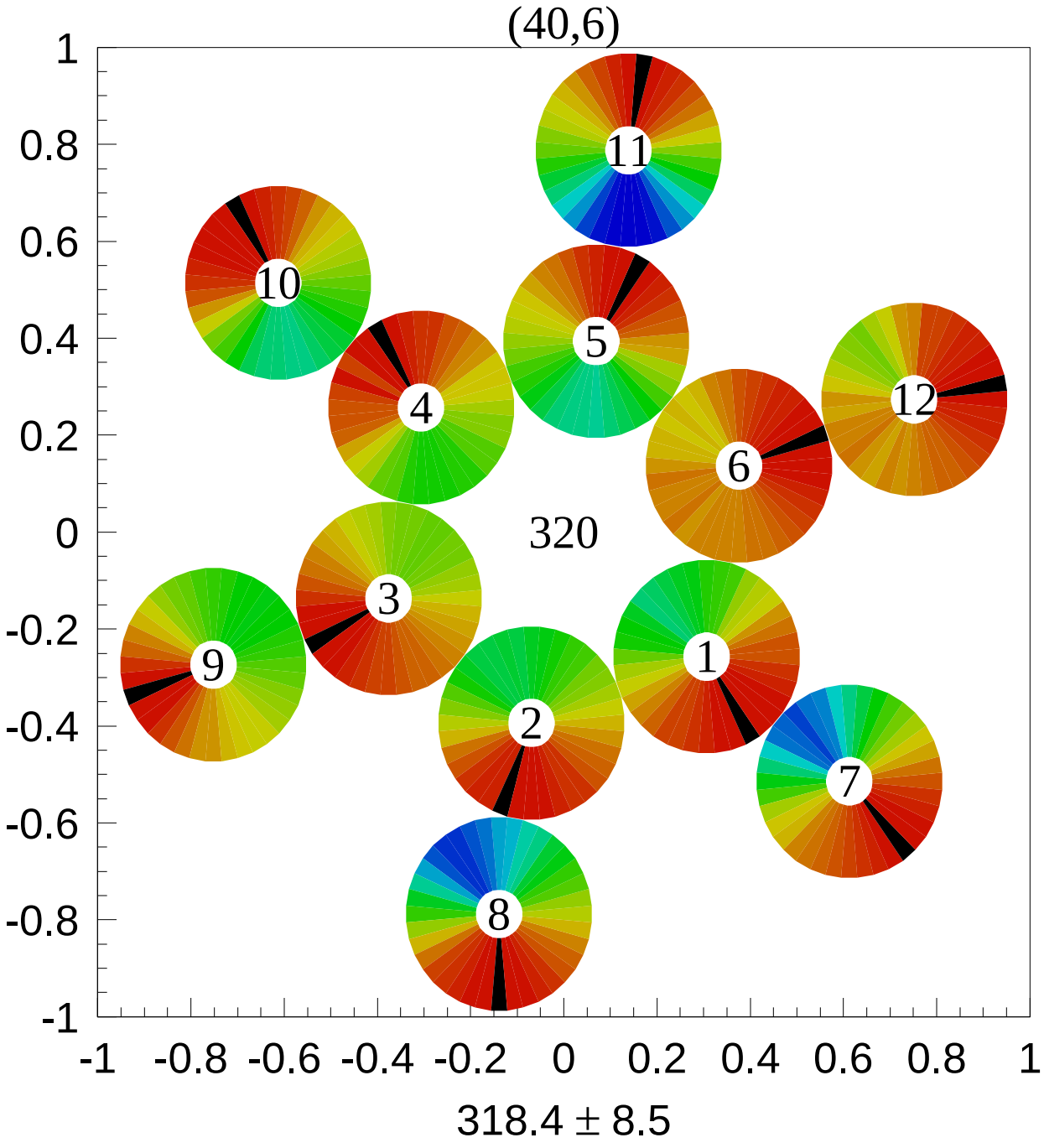

(40,4)
tilted LEDs
128 121 126 117 116 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 113 125 122 118 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

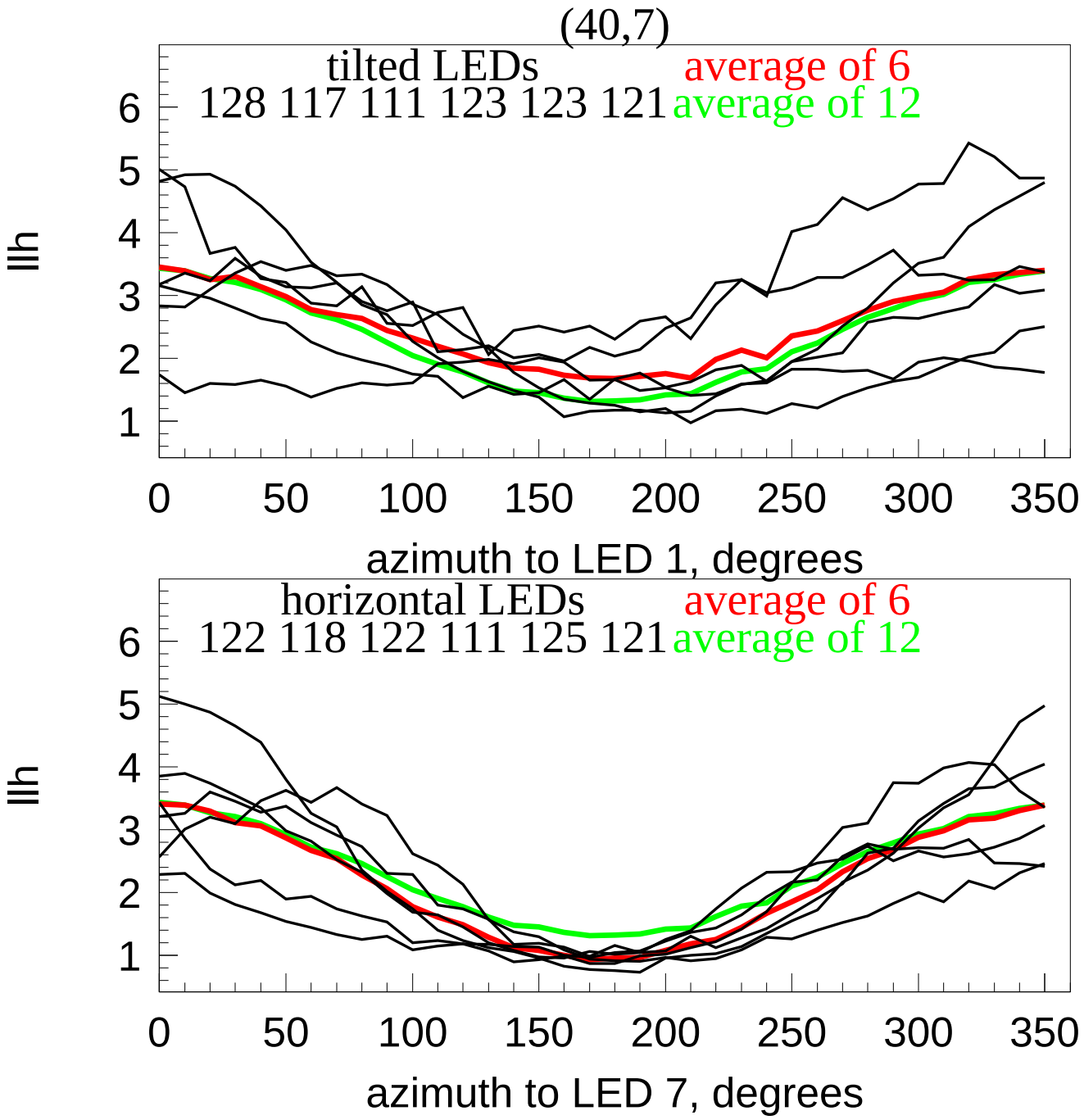

(40,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
8.2 ± 6.3

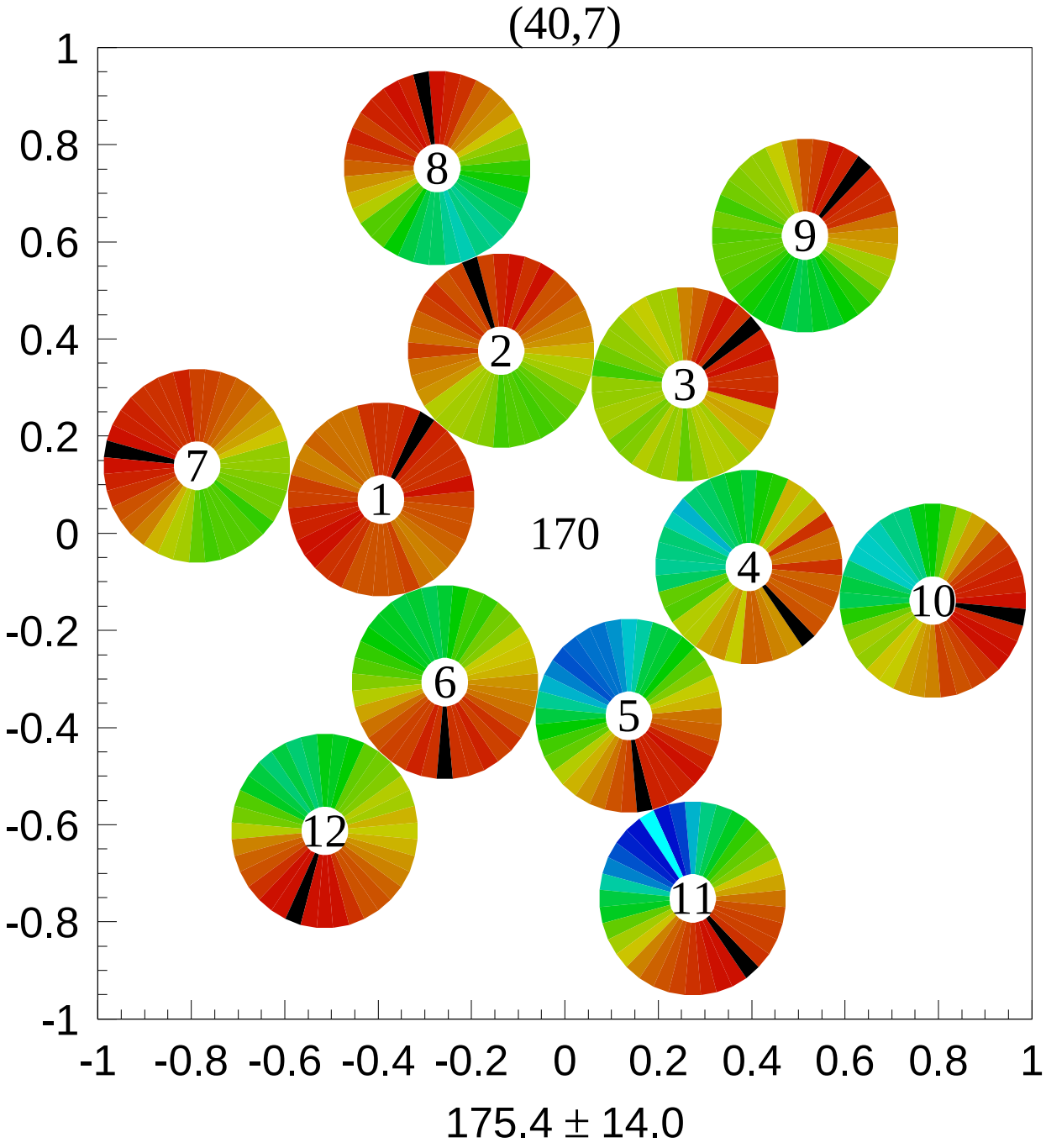

(40,5)
tilted LEDs
126 119 129 123 113 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 122 119 114 120 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

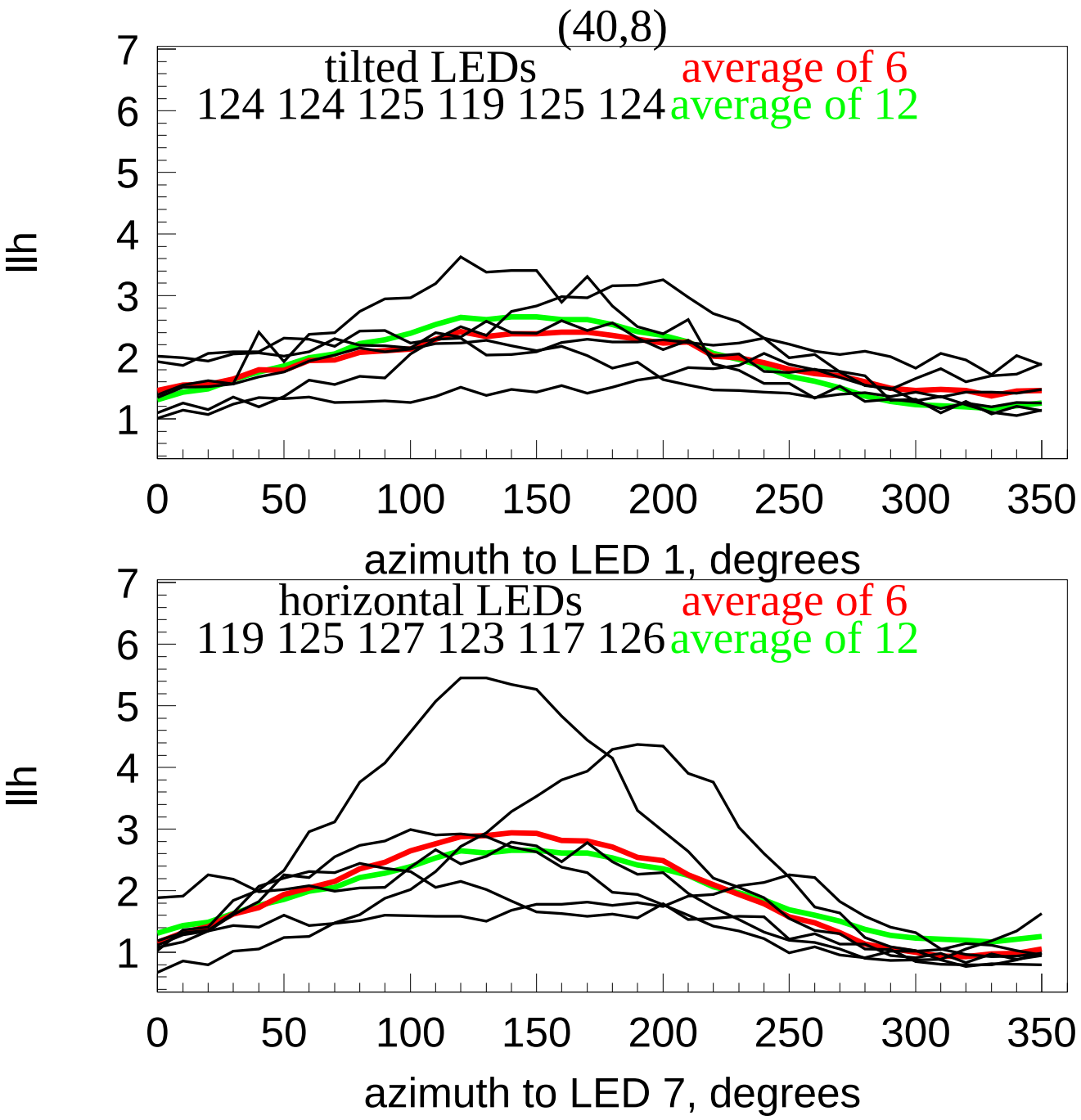

(40,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
102.7 ± 6.0

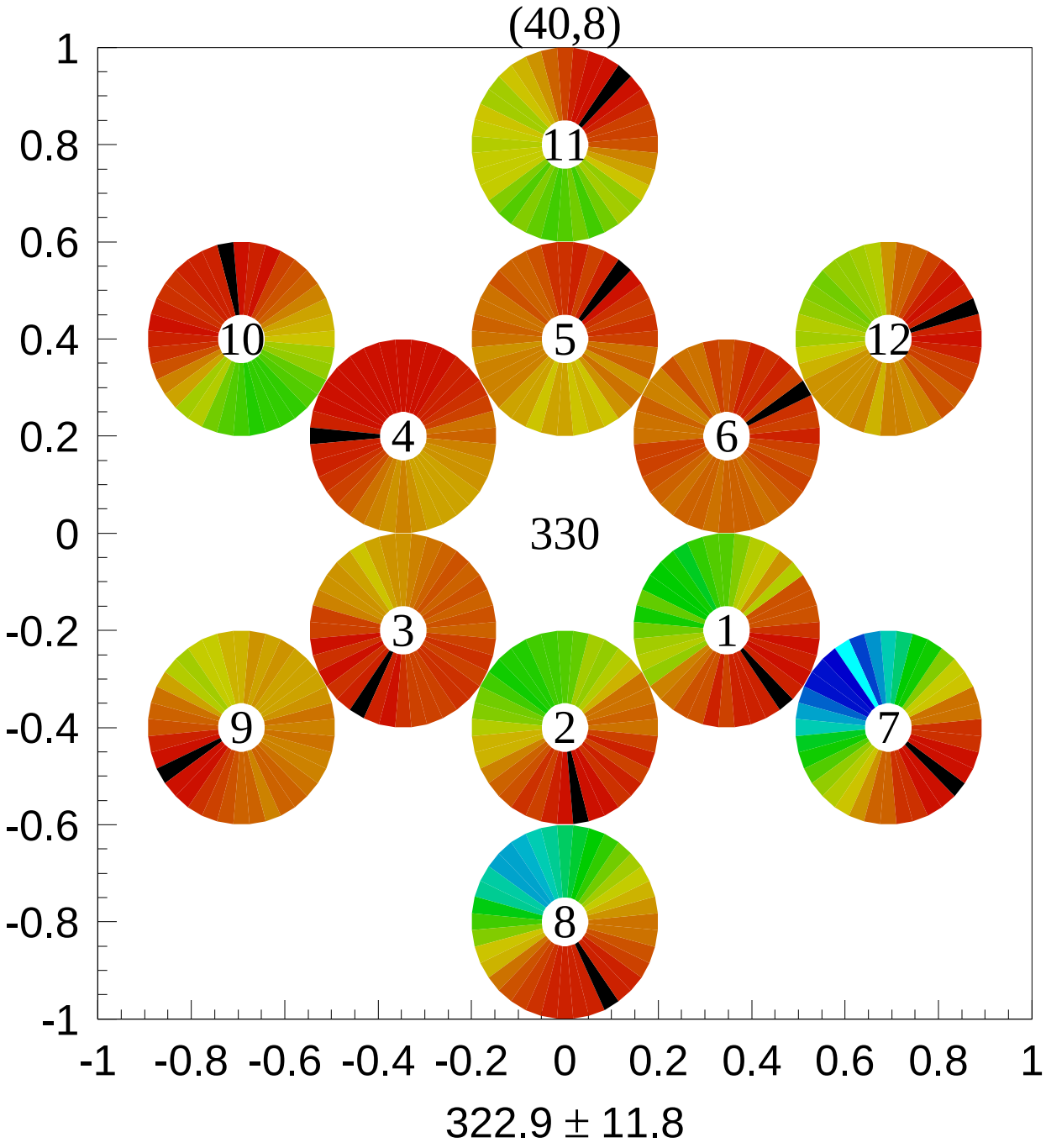

(40,6)
tilted LEDs
129 124 122 124 114 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 123 127 113 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

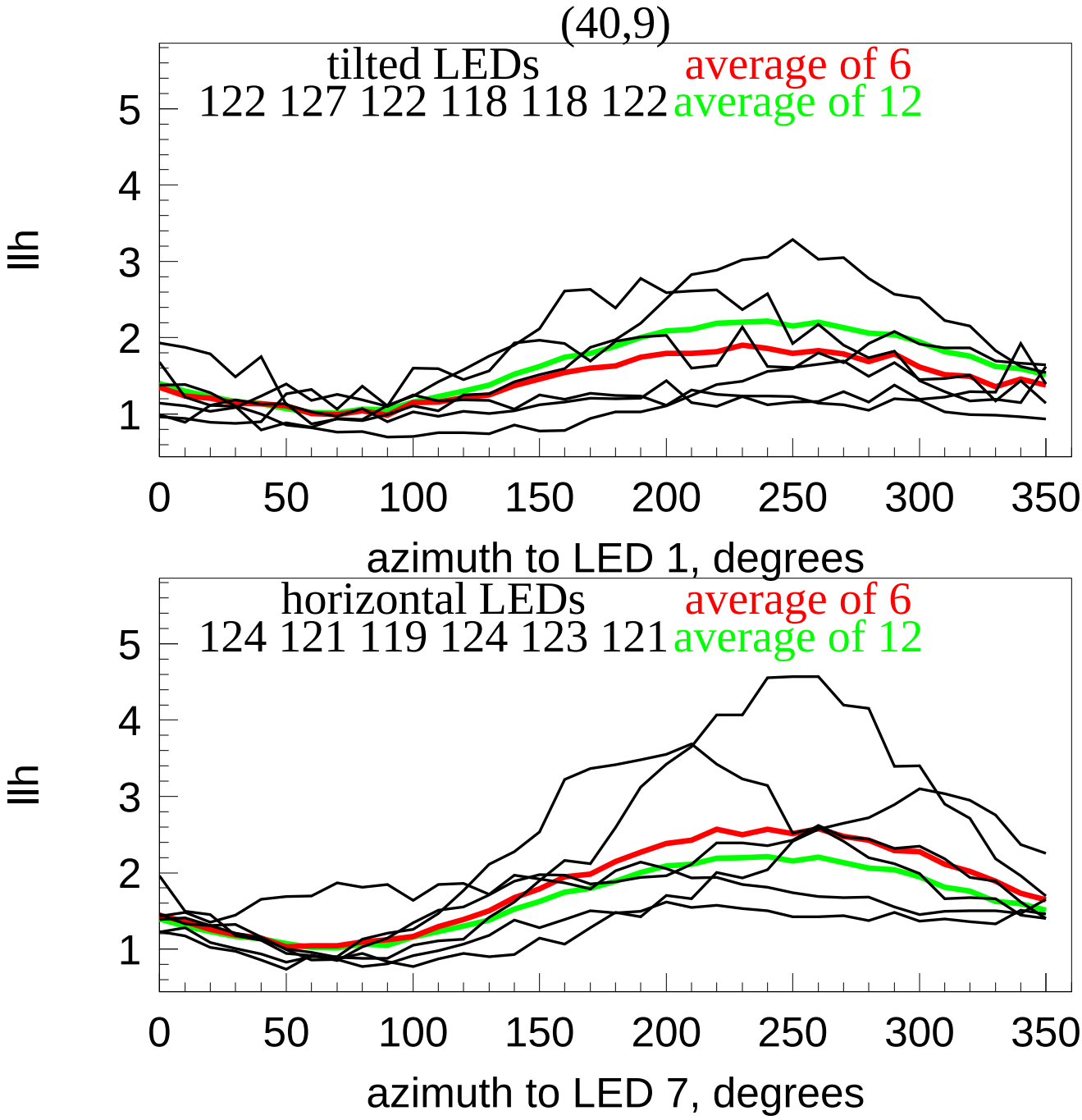

(40,6)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
318.4 ± 8.5

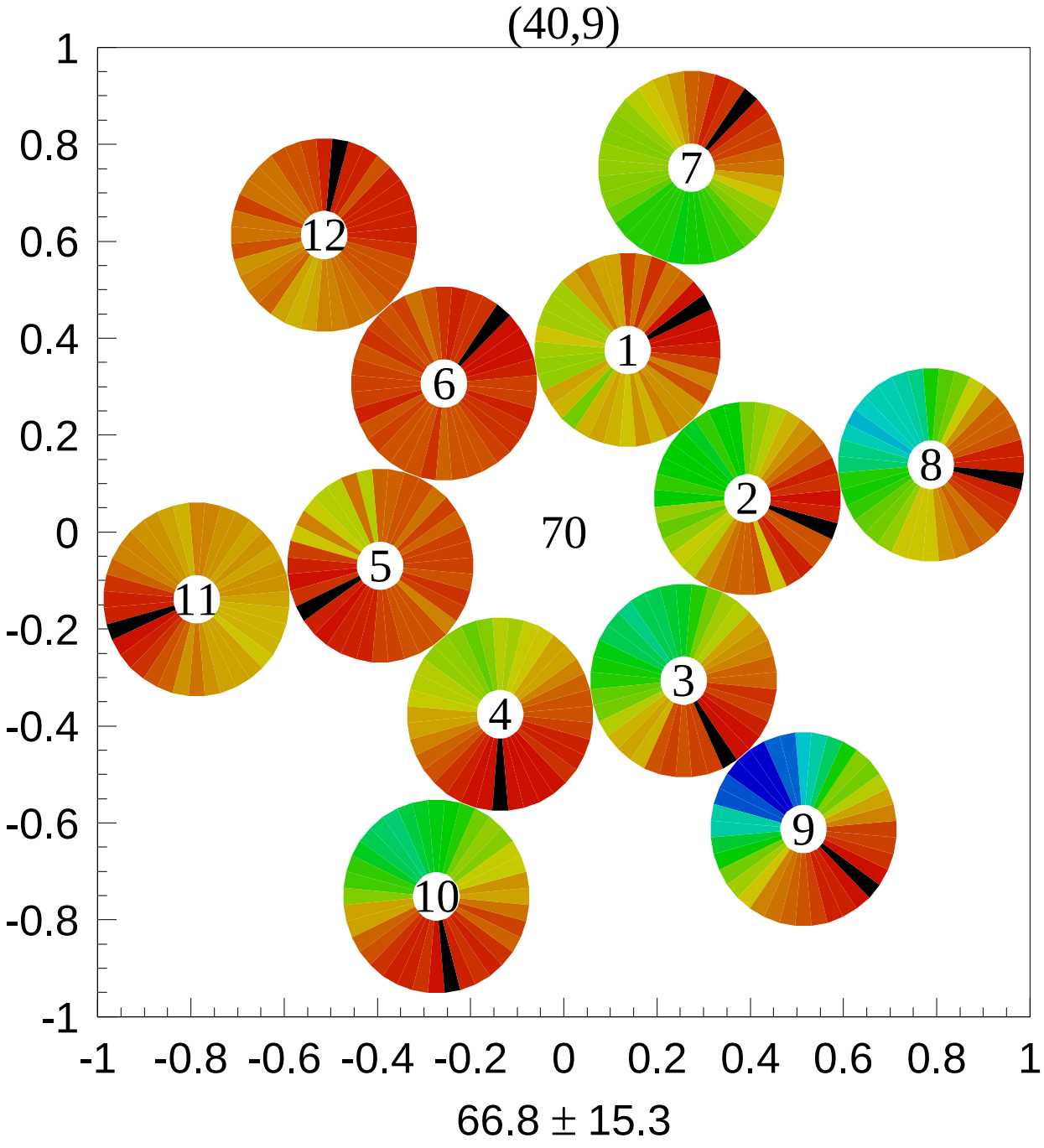

(40,7)
tilted LEDs
128 117 111 123 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 118 122 111 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

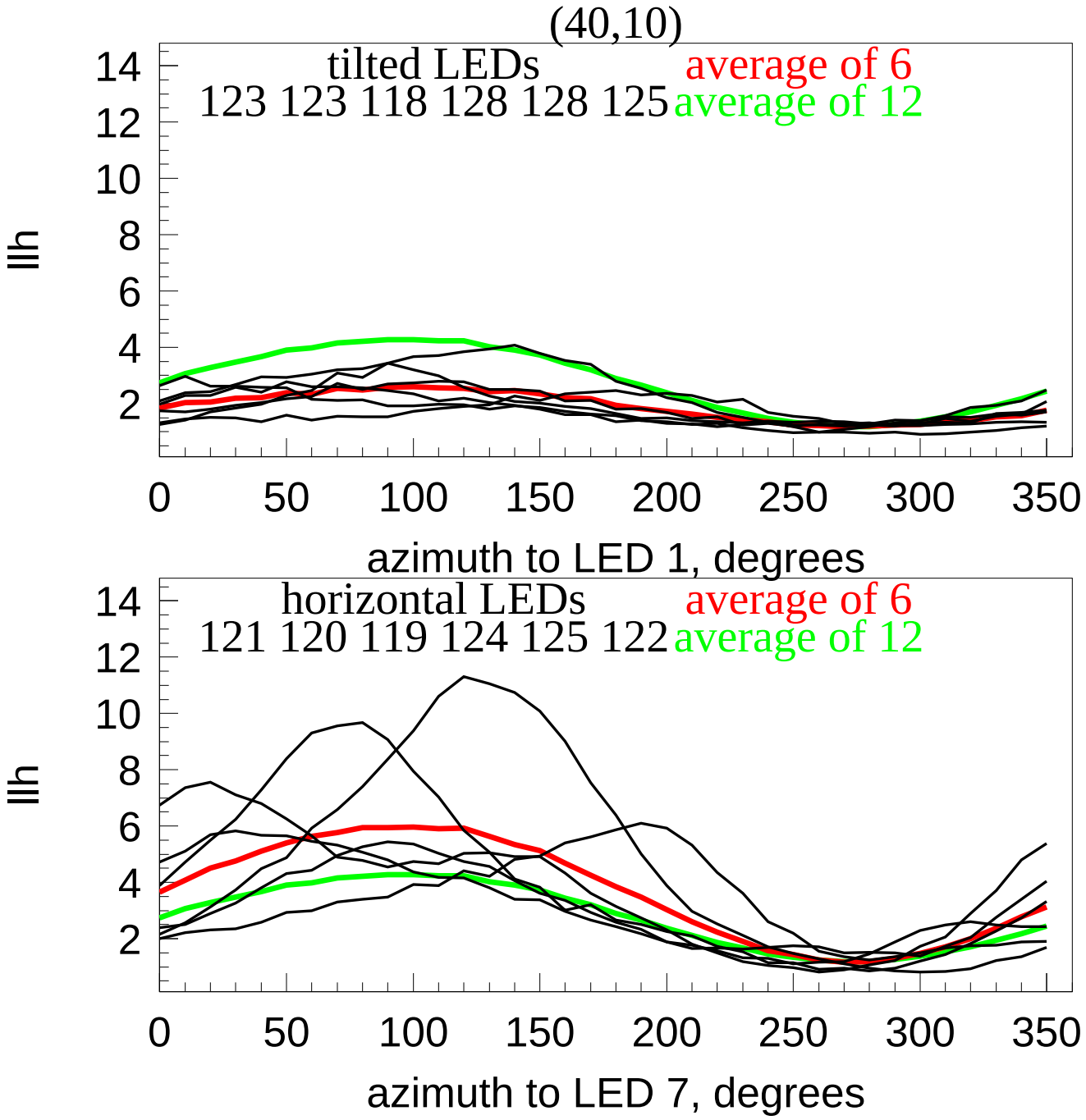

(40,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
175.4 ± 14.0
8
9
2
3
7
1
170
4
10
6
5
12
11

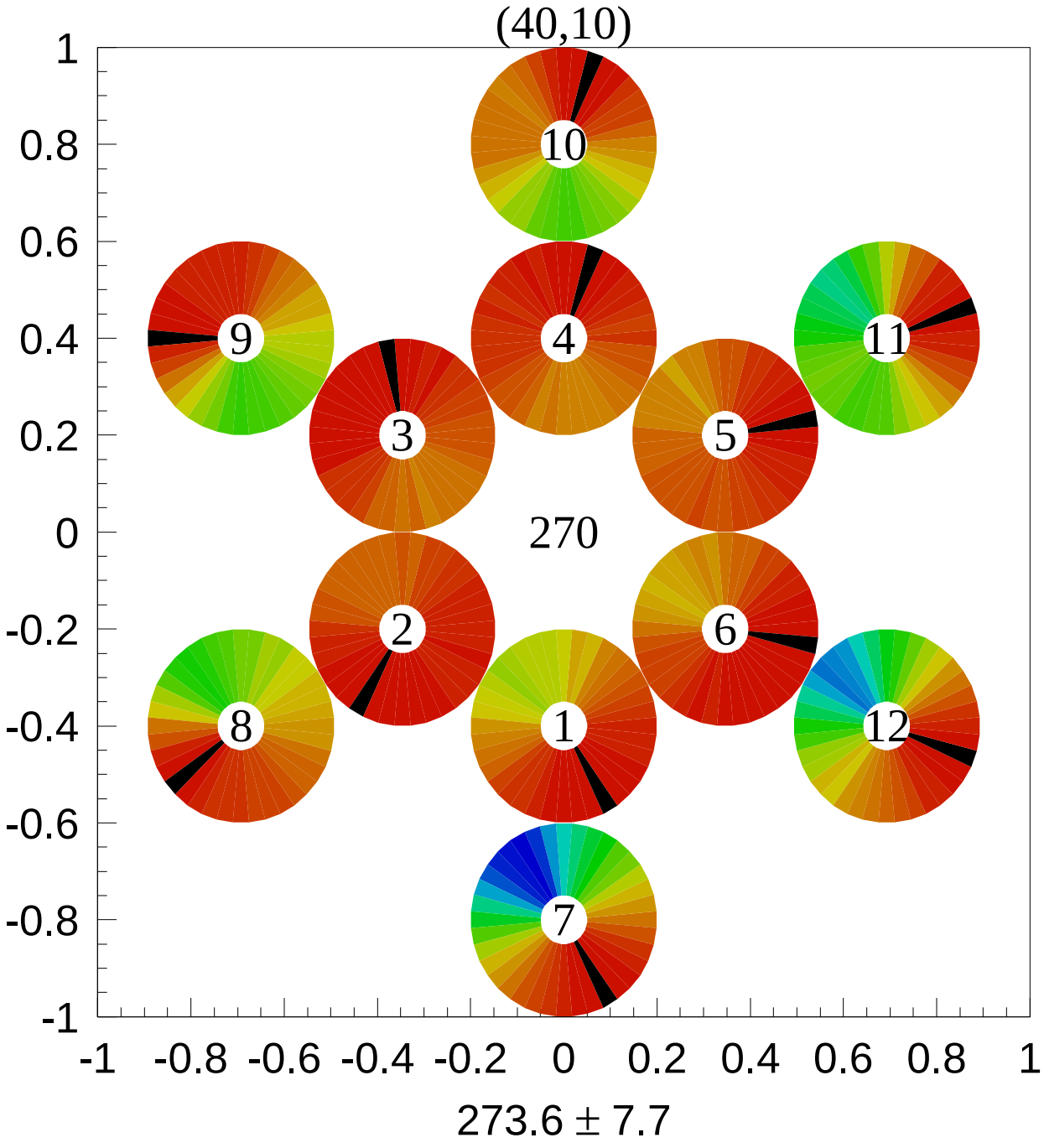

(40,8)
tilted LEDs
124 124 125 119 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 125 127 123 117 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

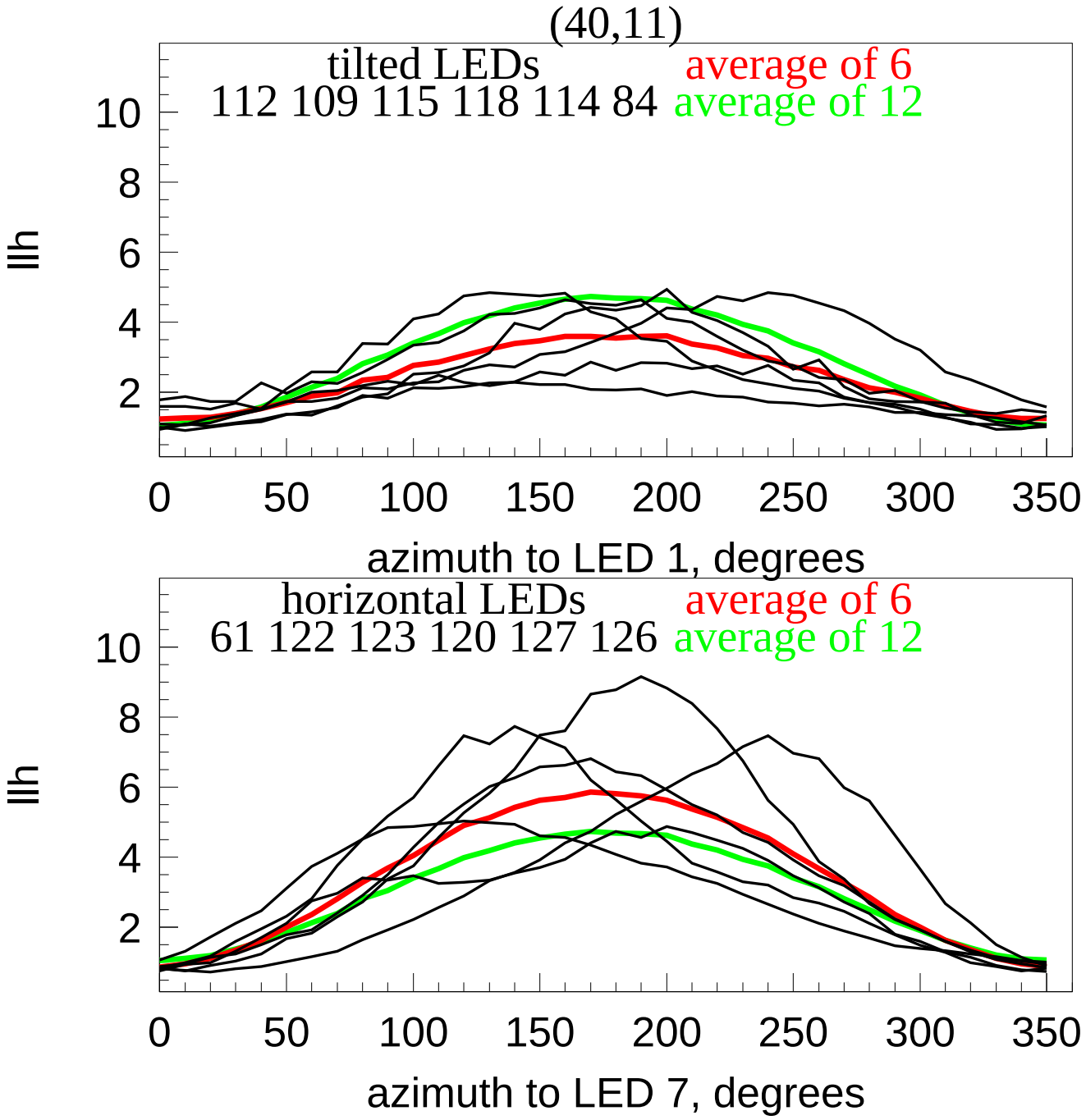

(40,8)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
322.9 ± 11.8

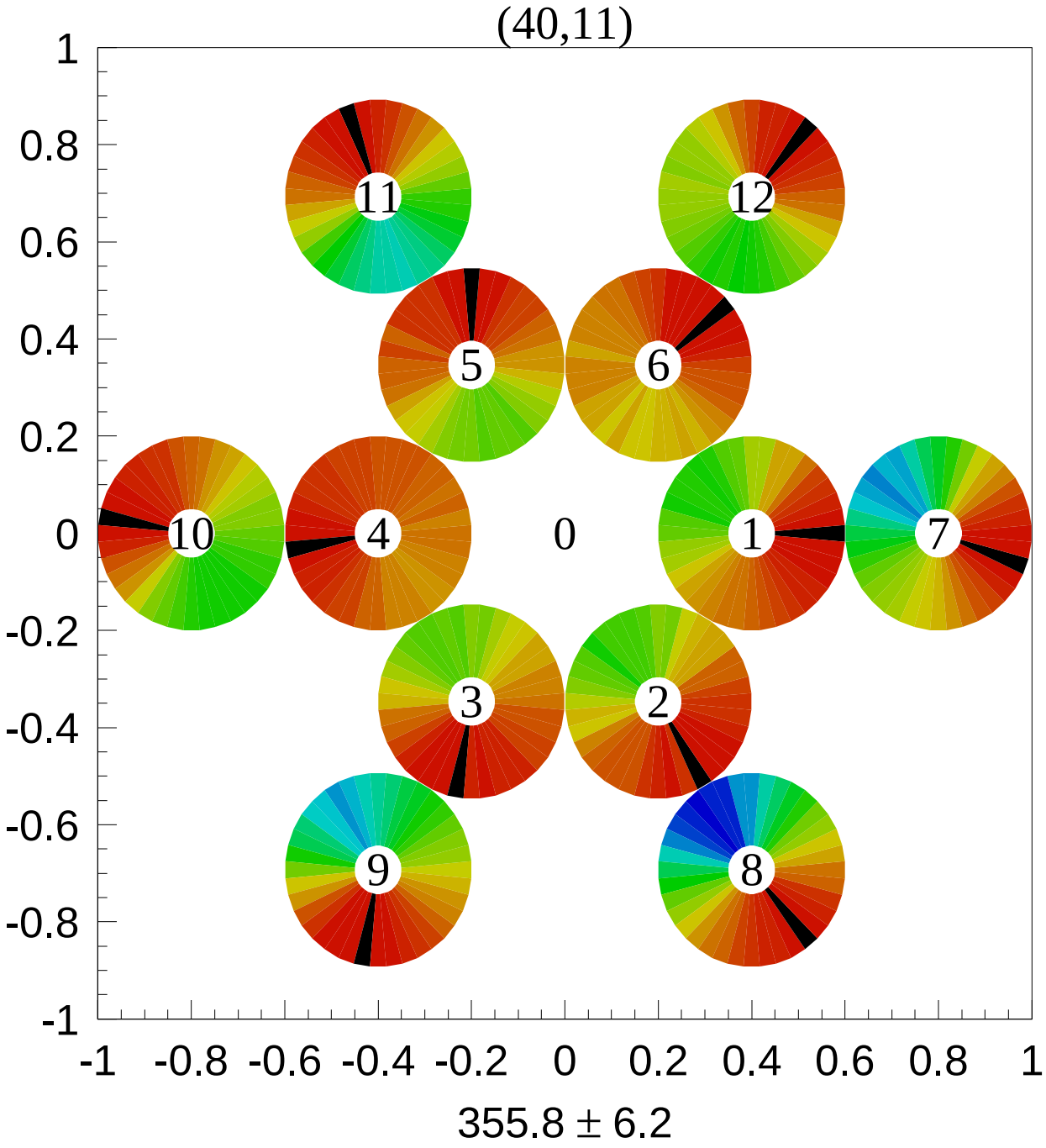

(40,9)
tilted LEDs
122 127 122 118 118 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 119 124 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

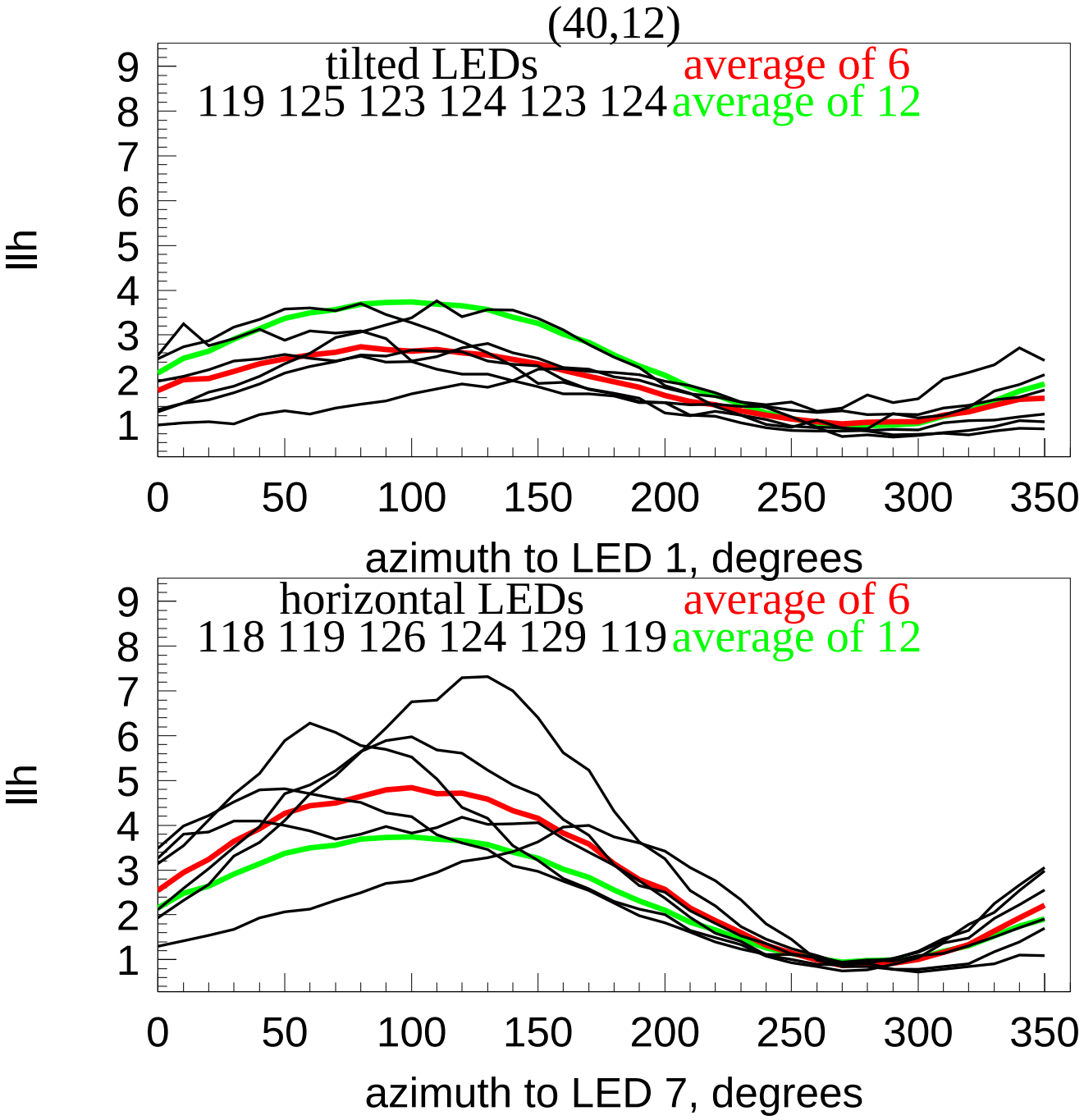

(40,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
70
5
11
3
4
9
10
66.8 ± 15.3

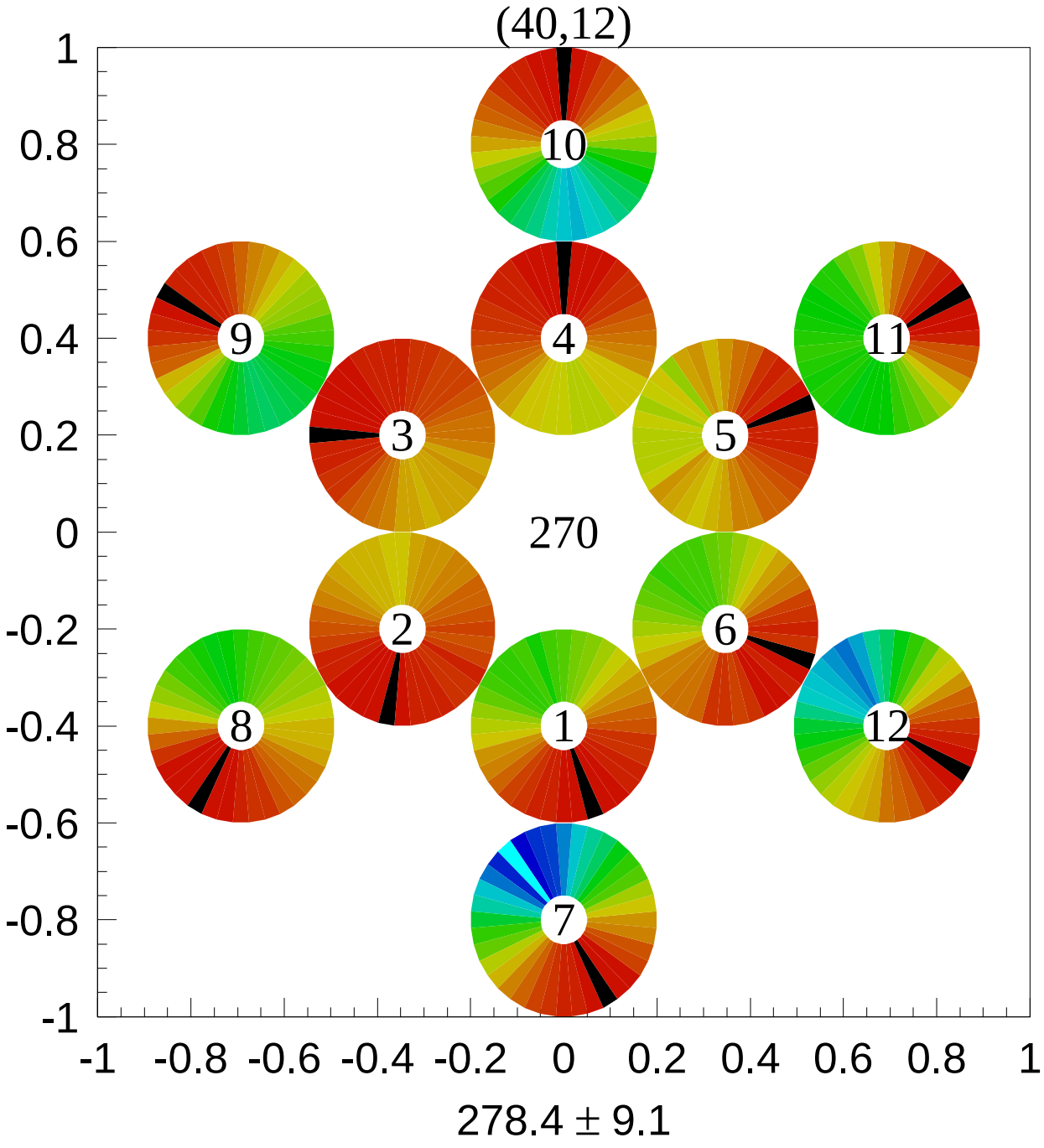

(40,10)
tilted LEDs
123 123 118 128 128 125
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 120 119 124 125 122
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

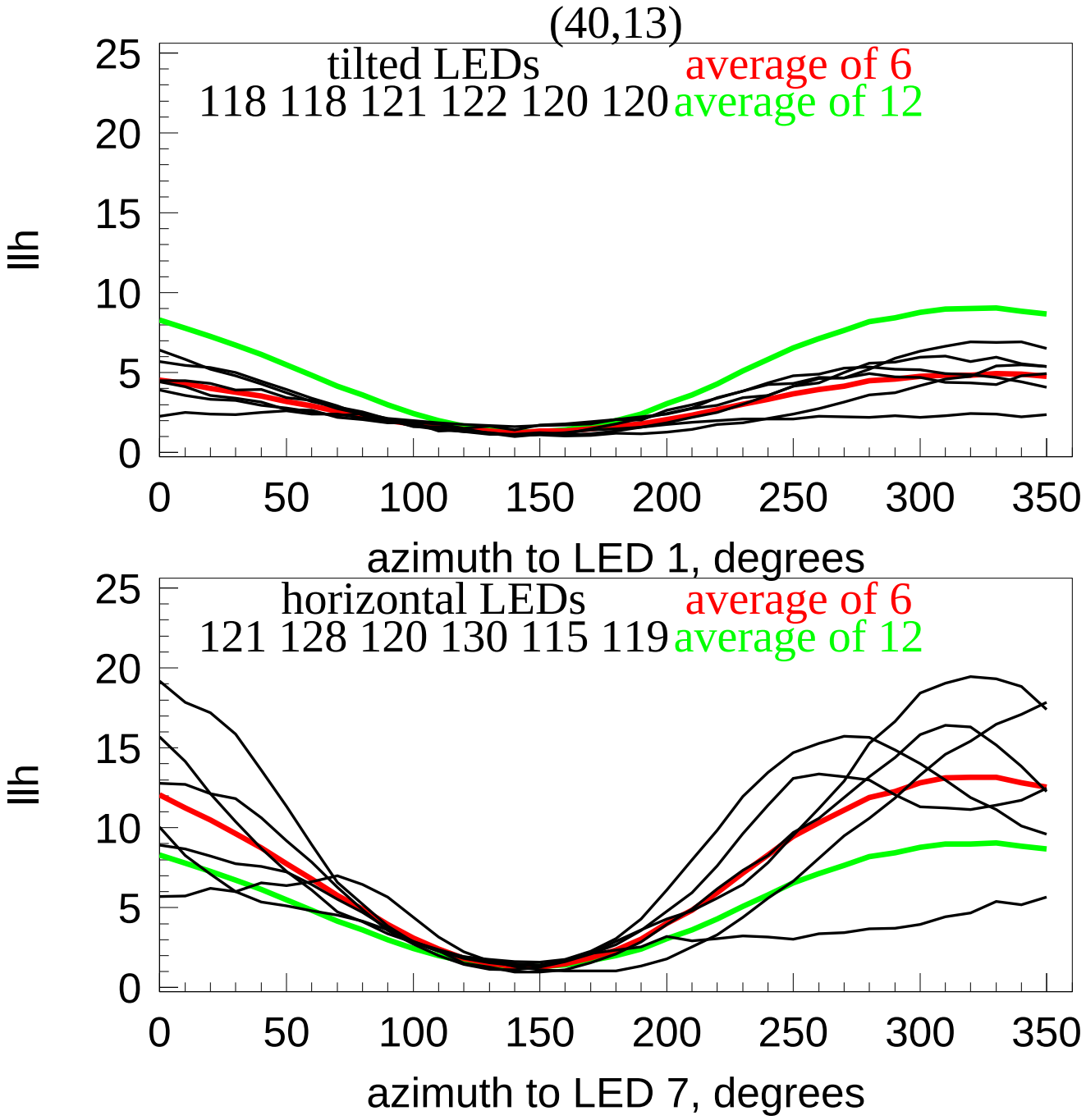

(40,10)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
273.6 ± 7.7

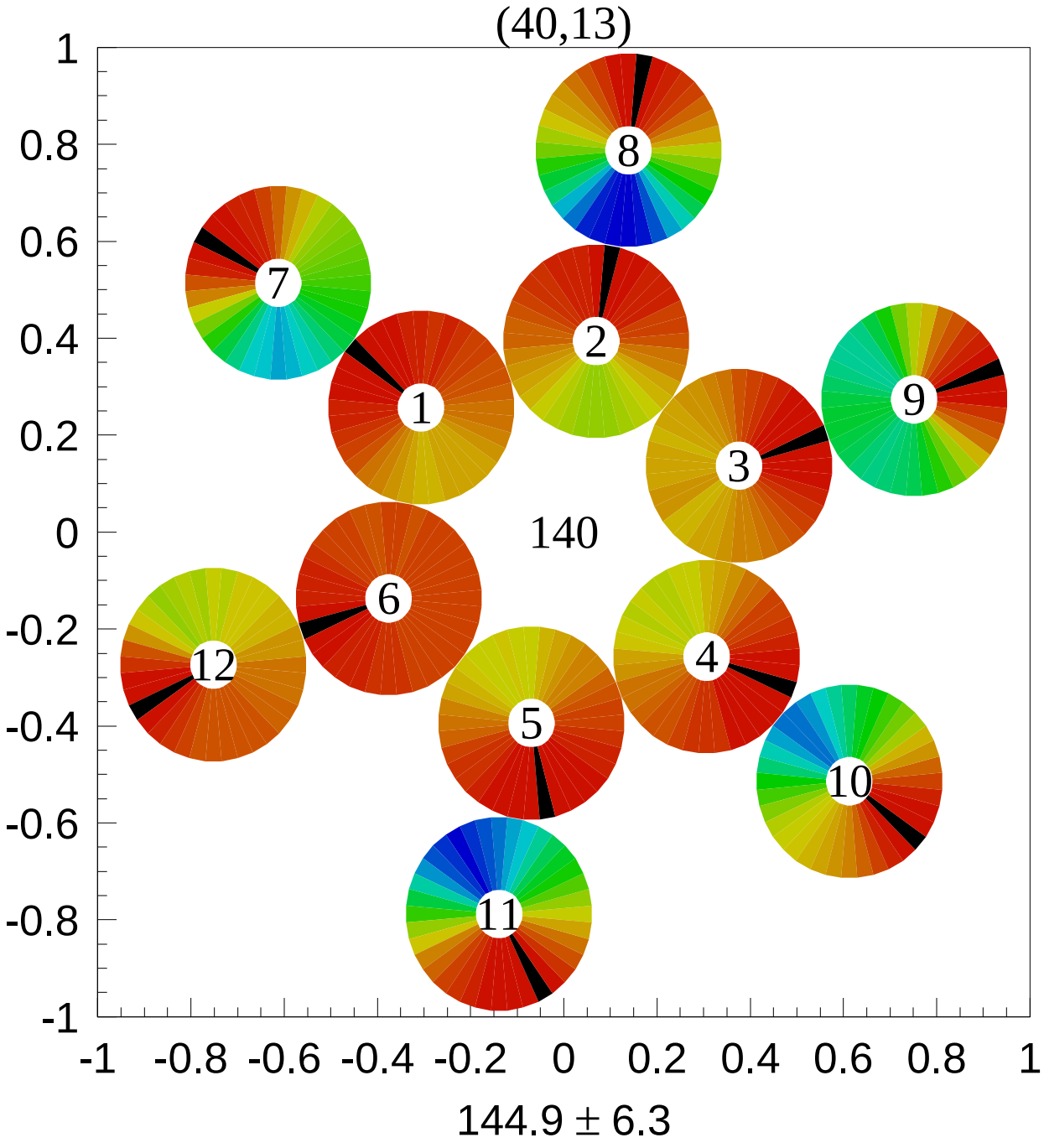

(40,11)
tilted LEDs
112 109 115 118 114 84
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
61 122 123 120 127 126
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

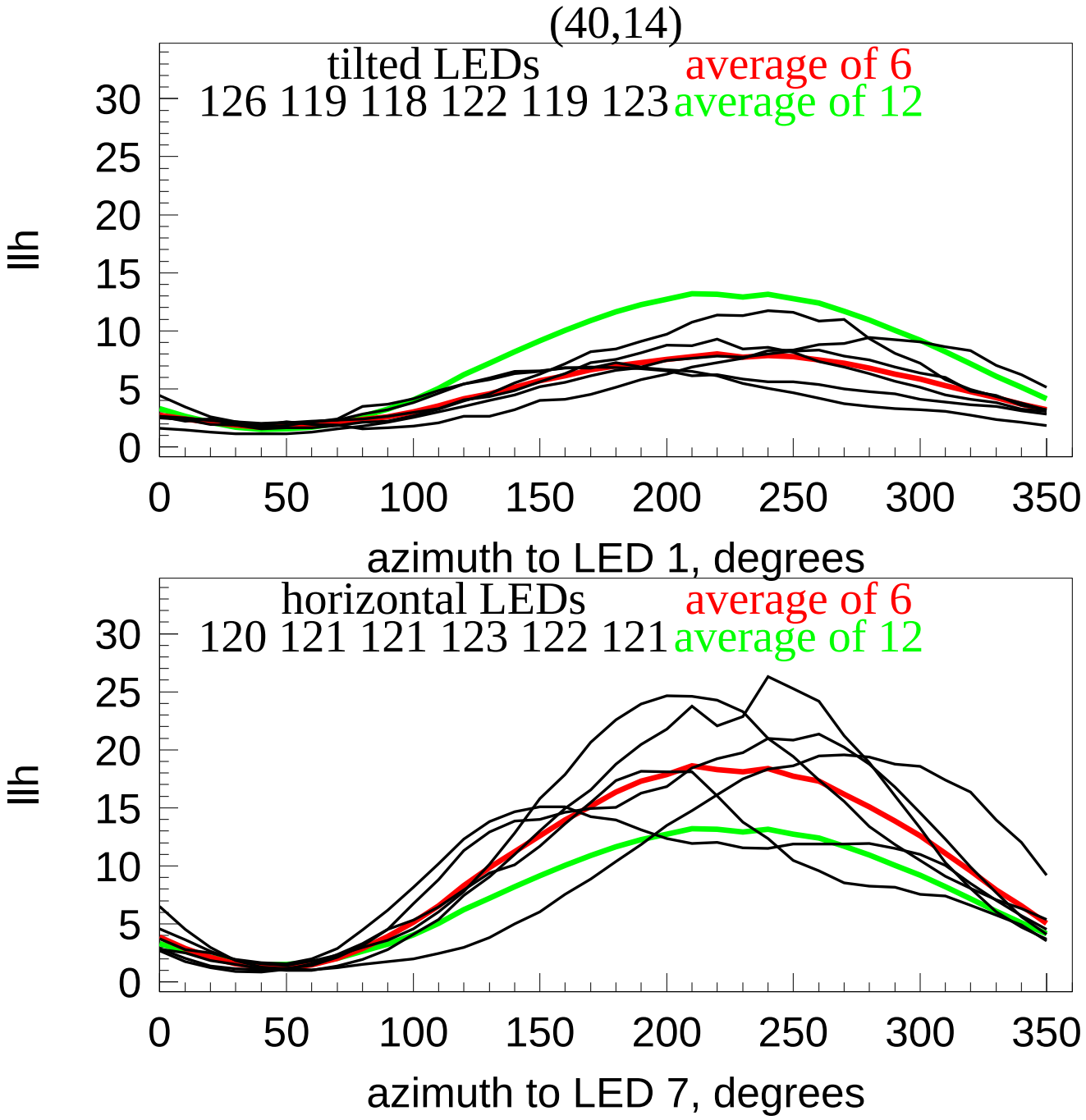

(40,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
355.8 ± 6.2

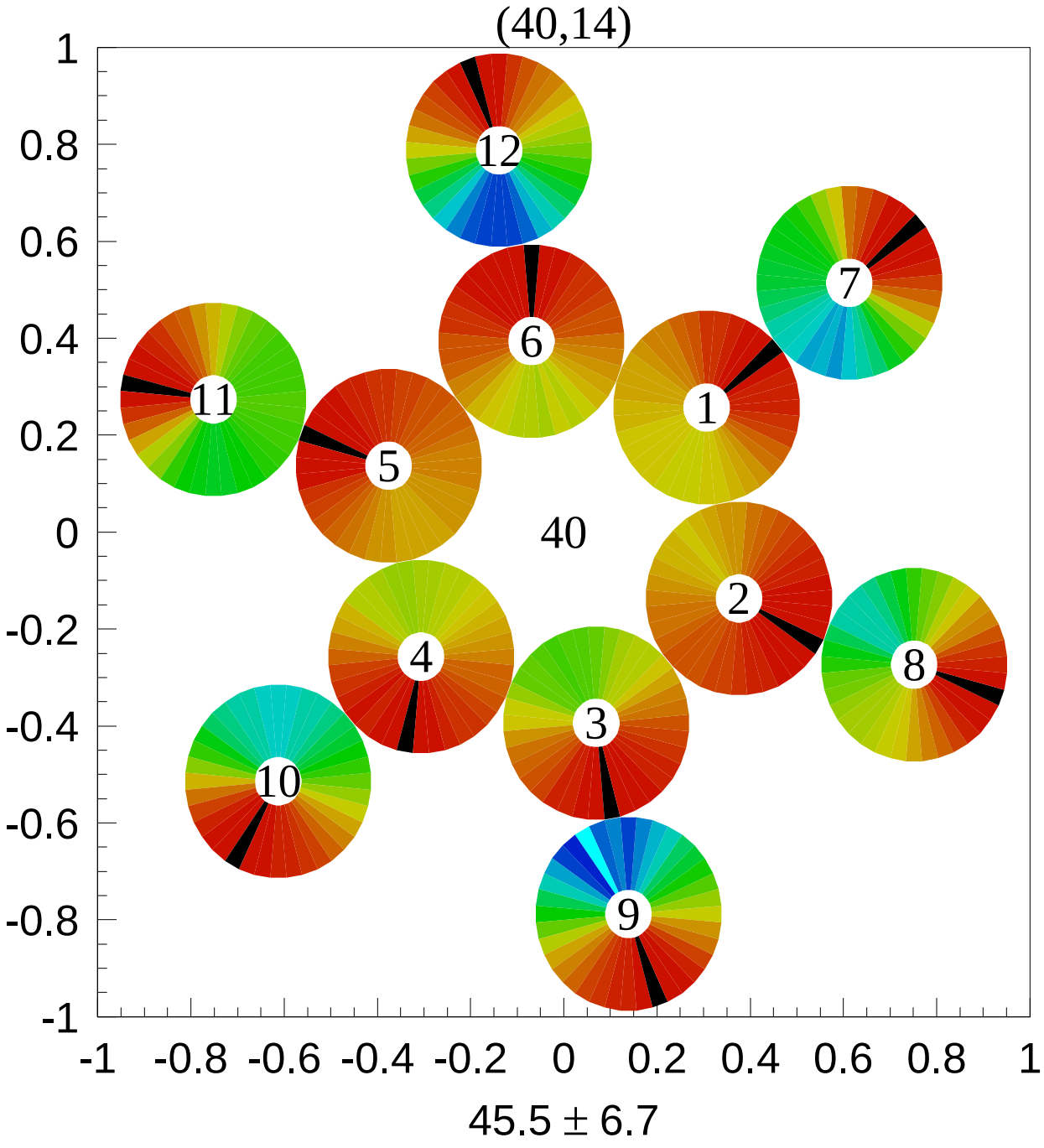

(40,12)
tilted LEDs
119 125 123 124 123 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 119 126 124 129 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

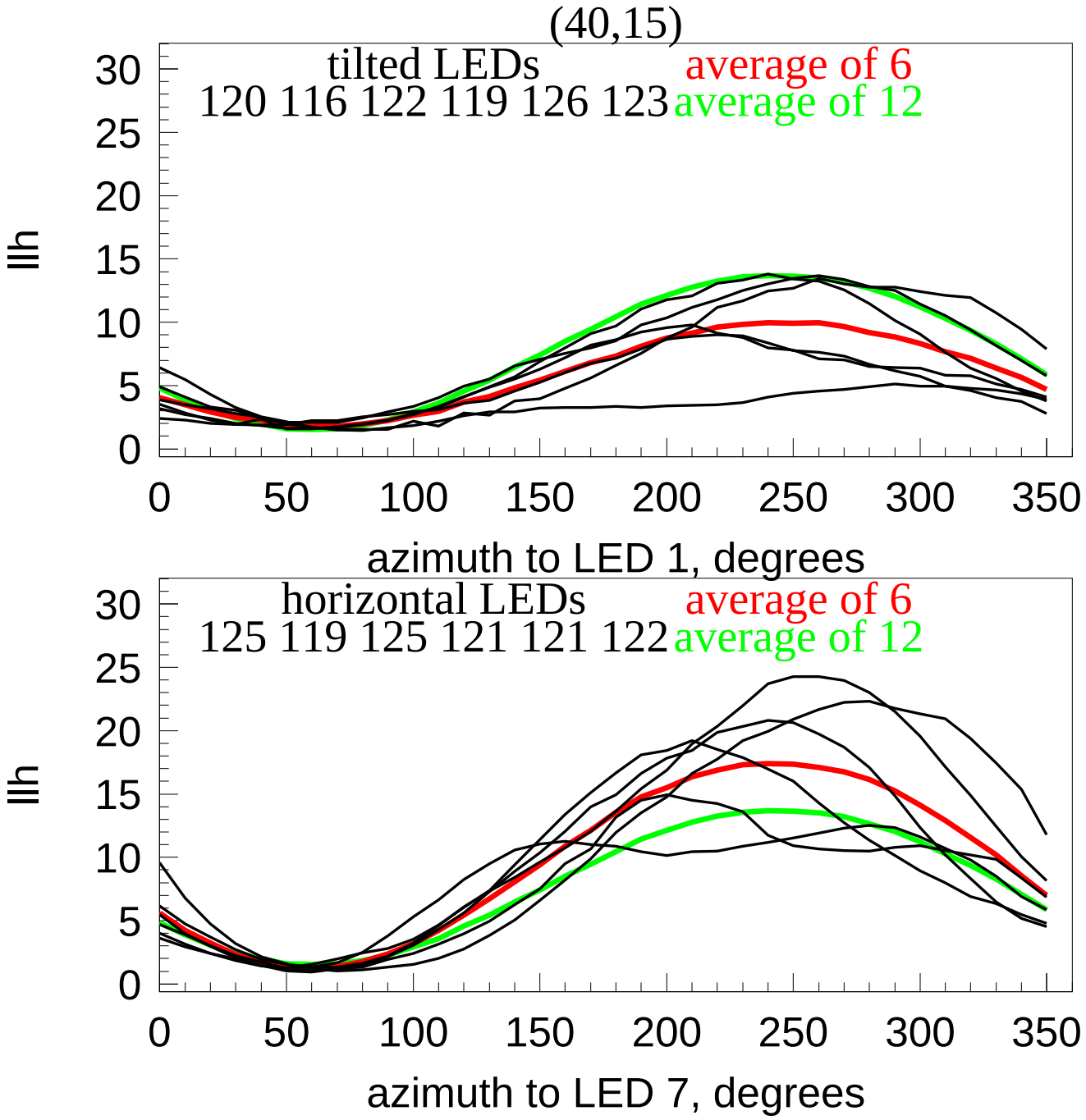

(40,12)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
278.4 ± 9.1

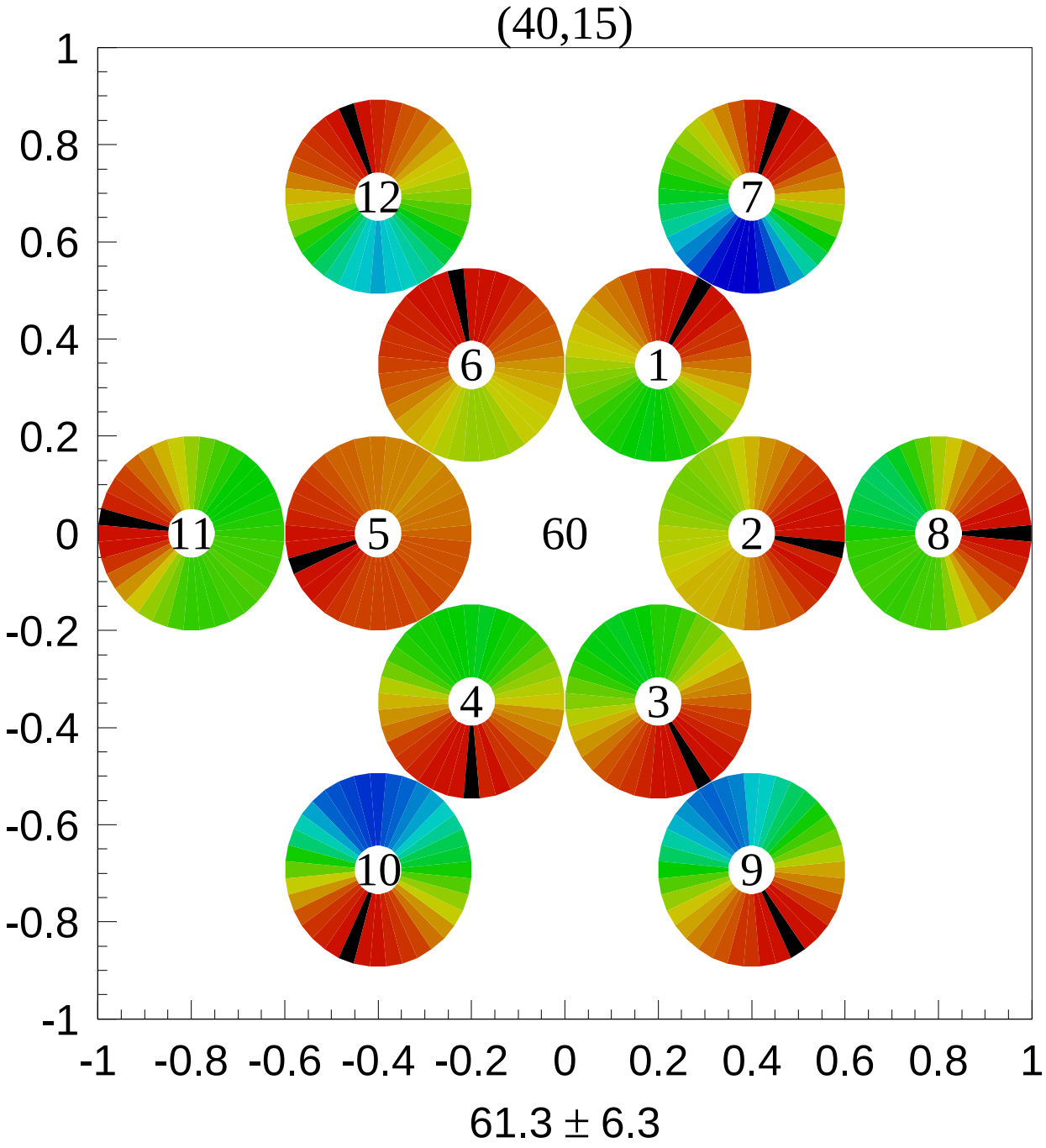

(40,13)
tilted LEDs
118 118 121 122 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 128 120 130 115 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

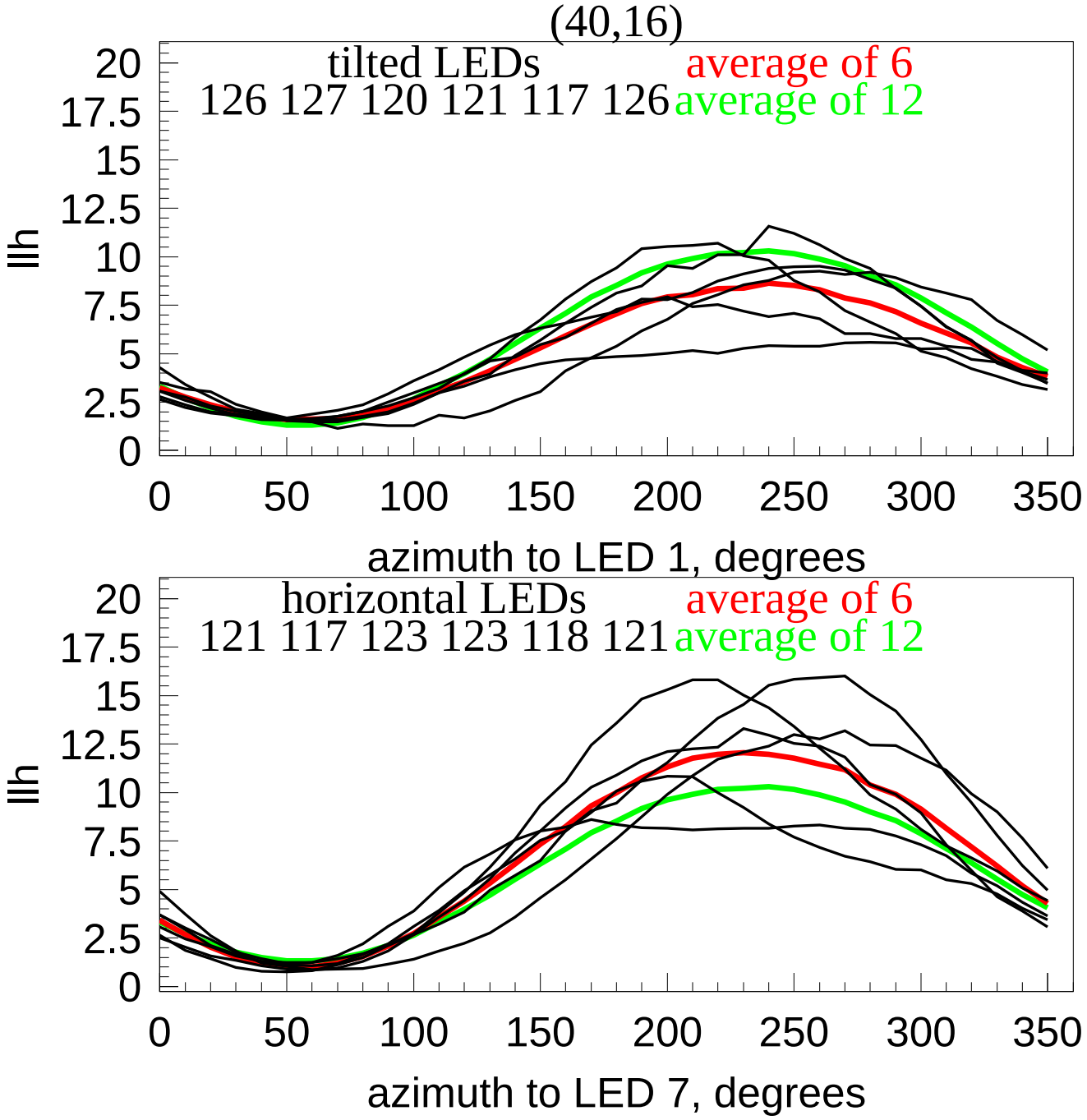

(40,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
144.9 ± 6.3
140
1
2
3
4
5
6
7
8
9
10
11
12

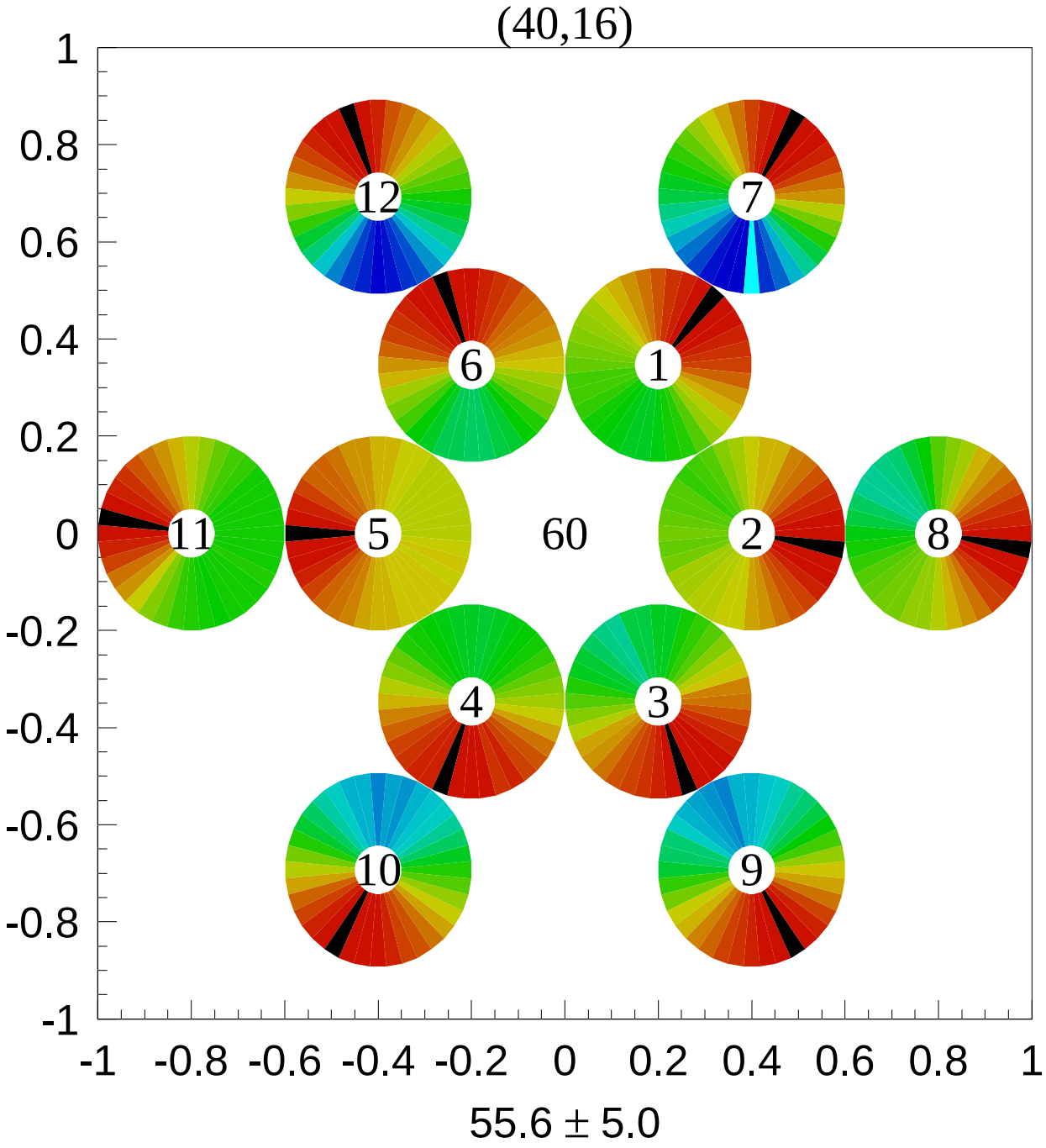

(40,14)
tilted LEDs
126 119 118 122 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 121 123 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

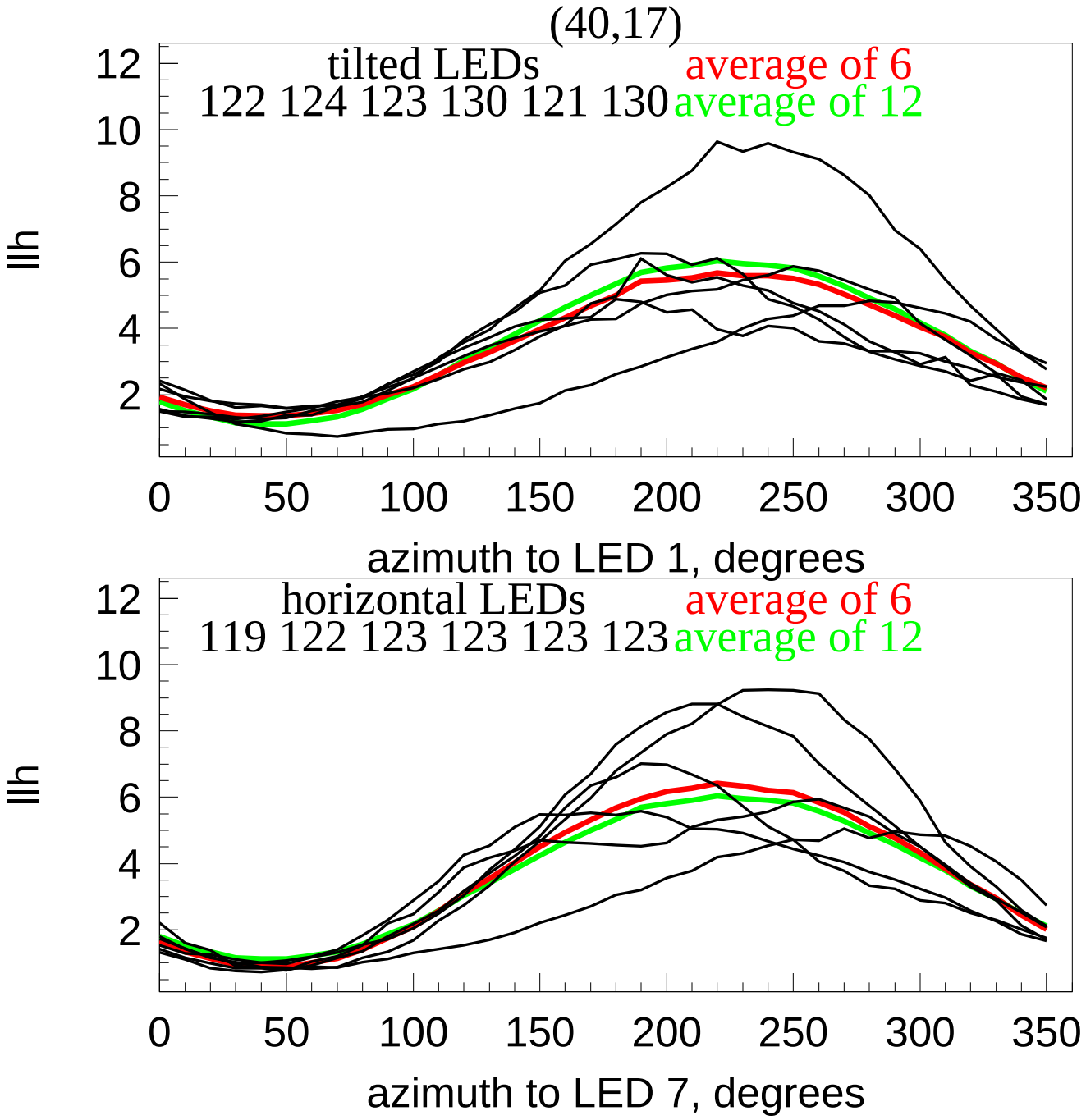

(40,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
7
6
11
1
5
40
2
8
4
3
10
9
45.5 ± 6.7

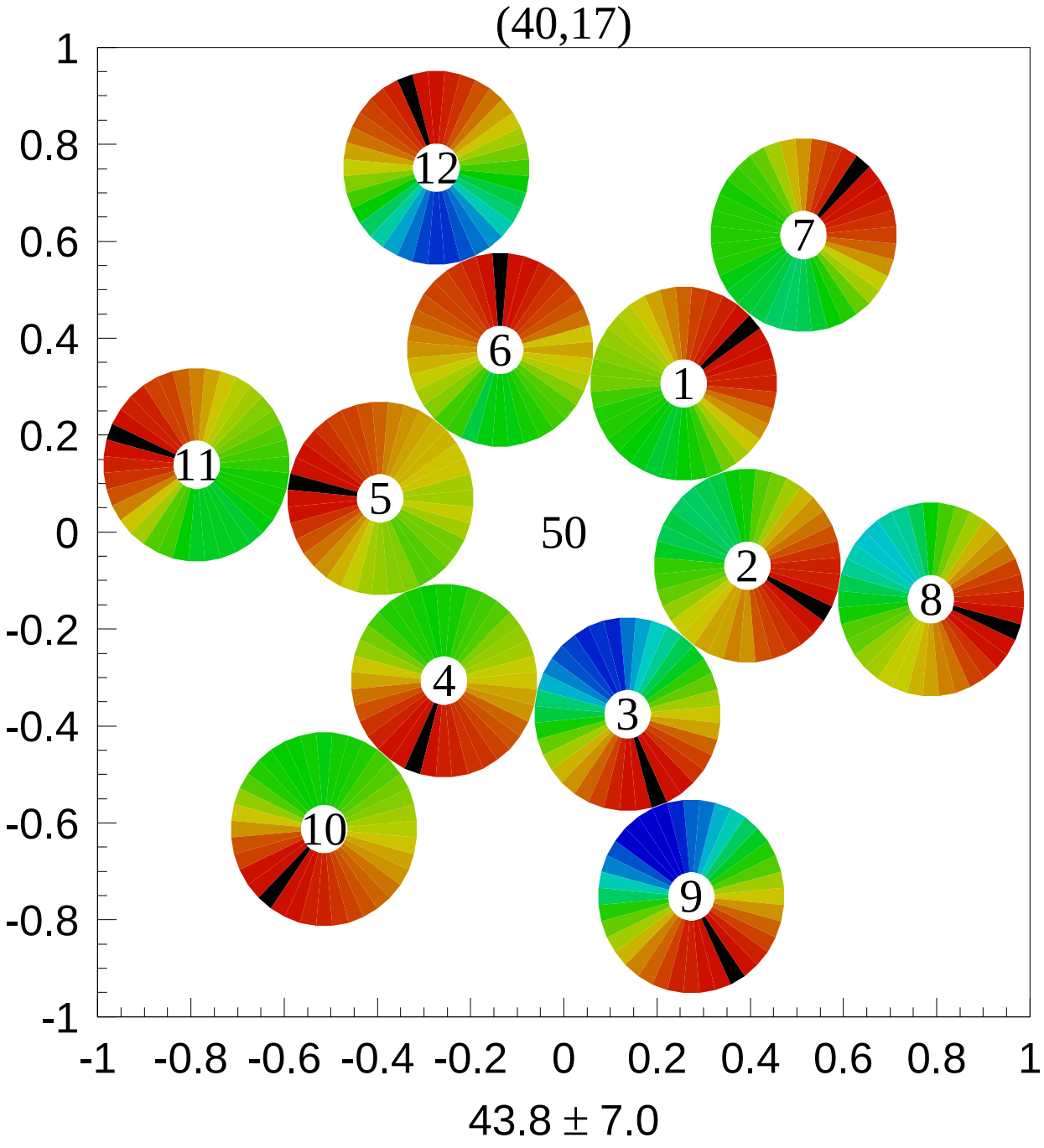

(40,15)
tilted LEDs
120 116 122 119 126 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 119 125 121 121 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

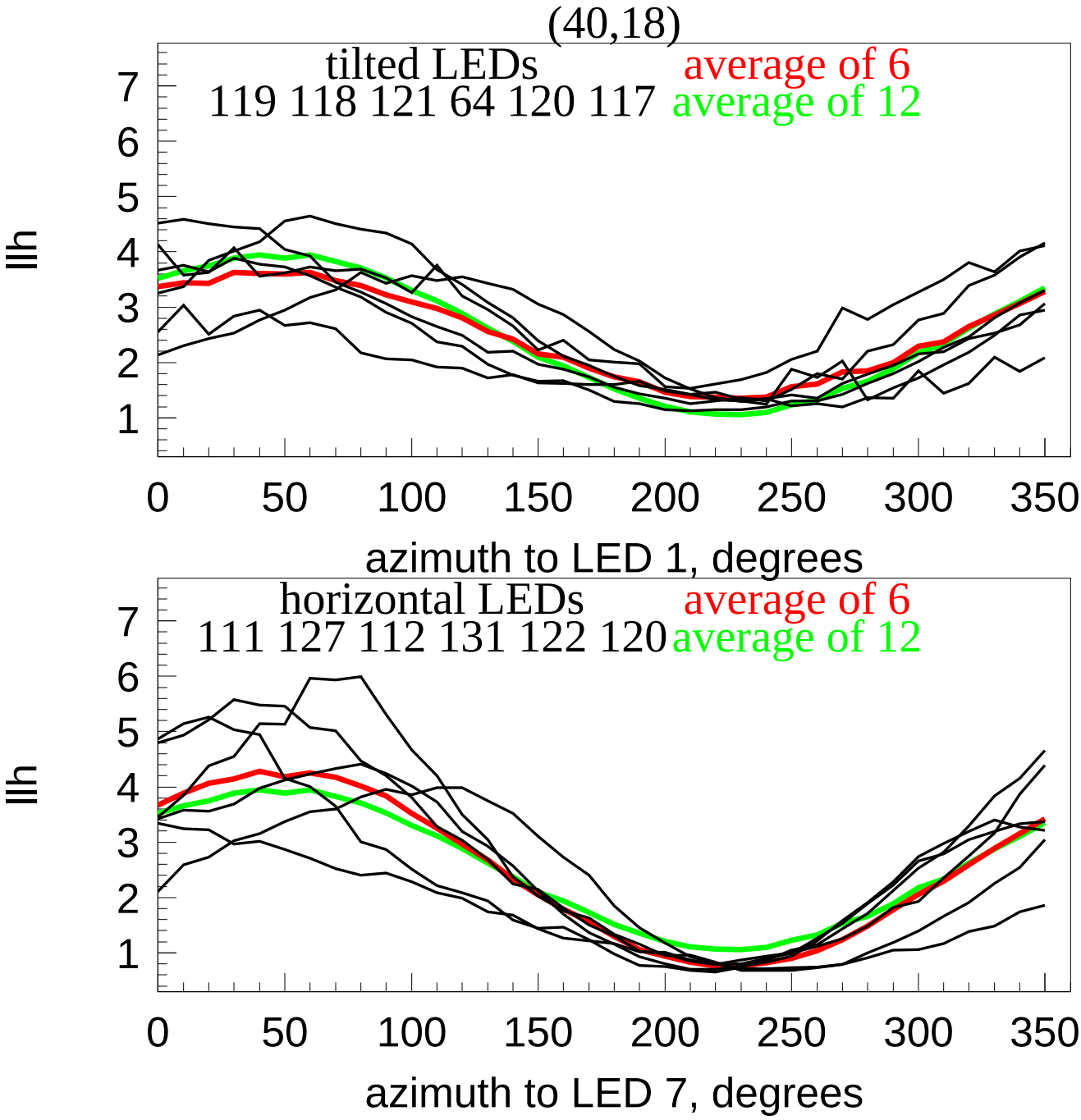

(40,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
61.3 ± 6.3

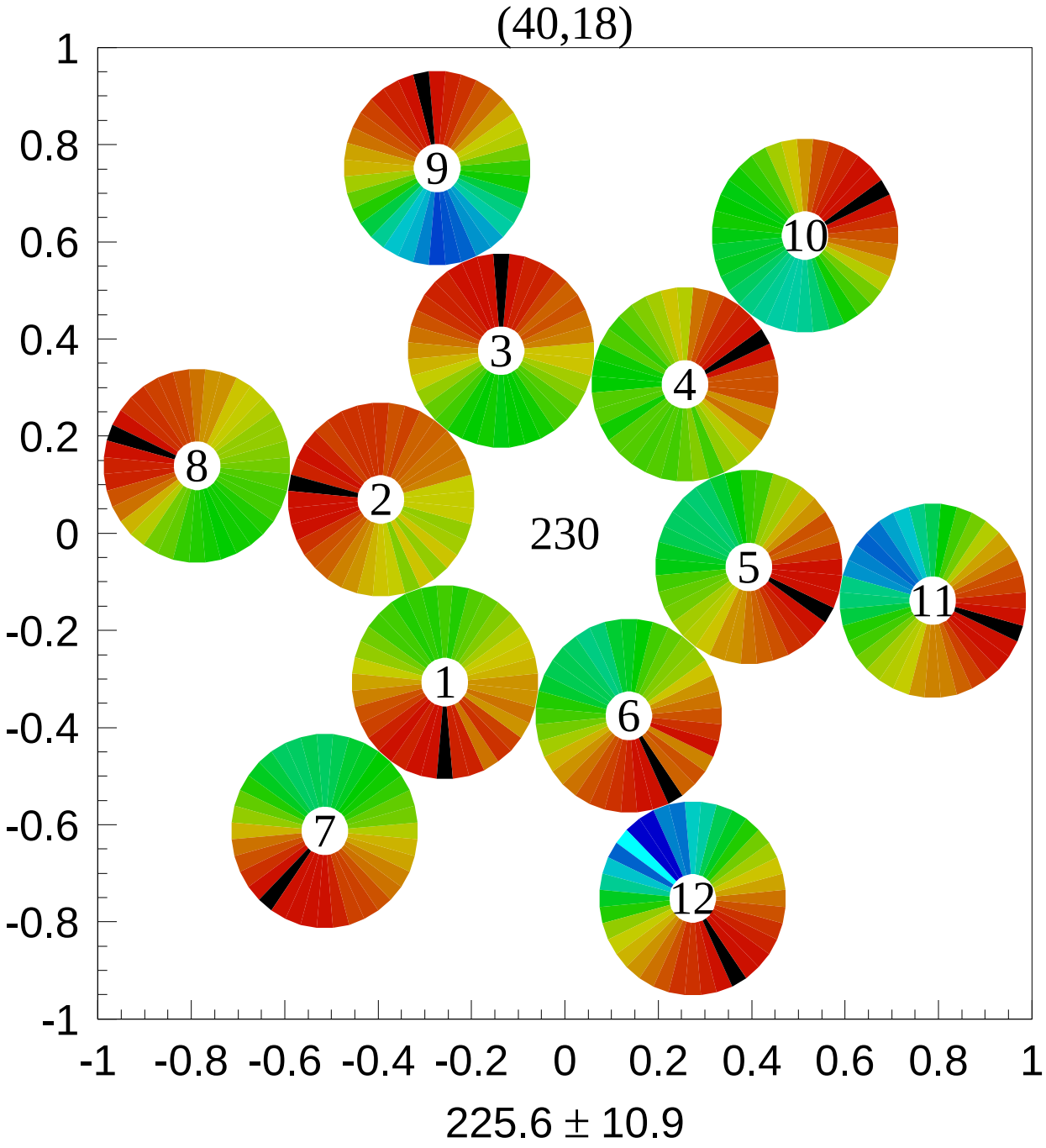

(40,16)
tilted LEDs
126 127 120 121 117 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 117 123 123 118 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

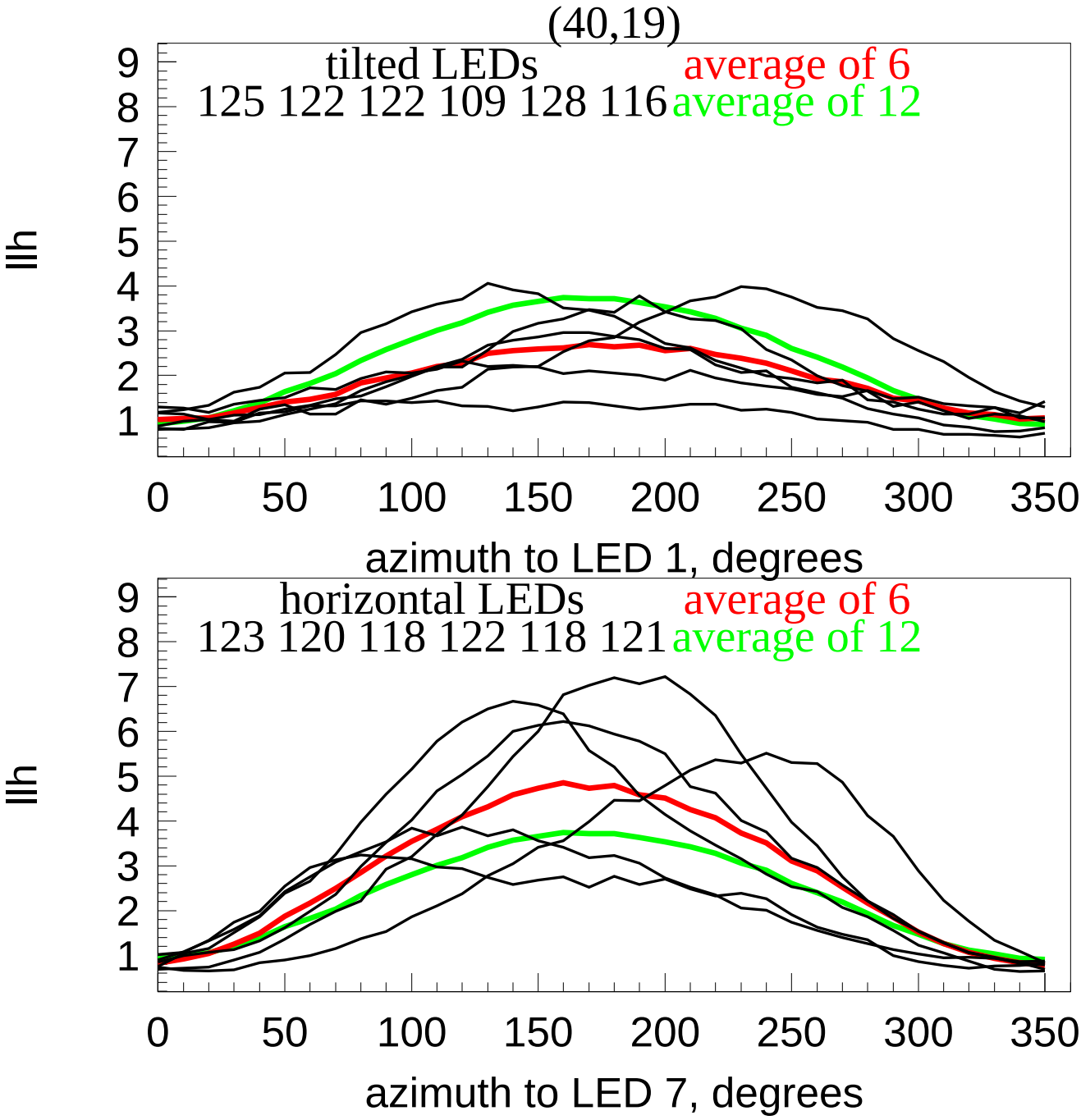

(40,16)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
55.6 ± 5.0

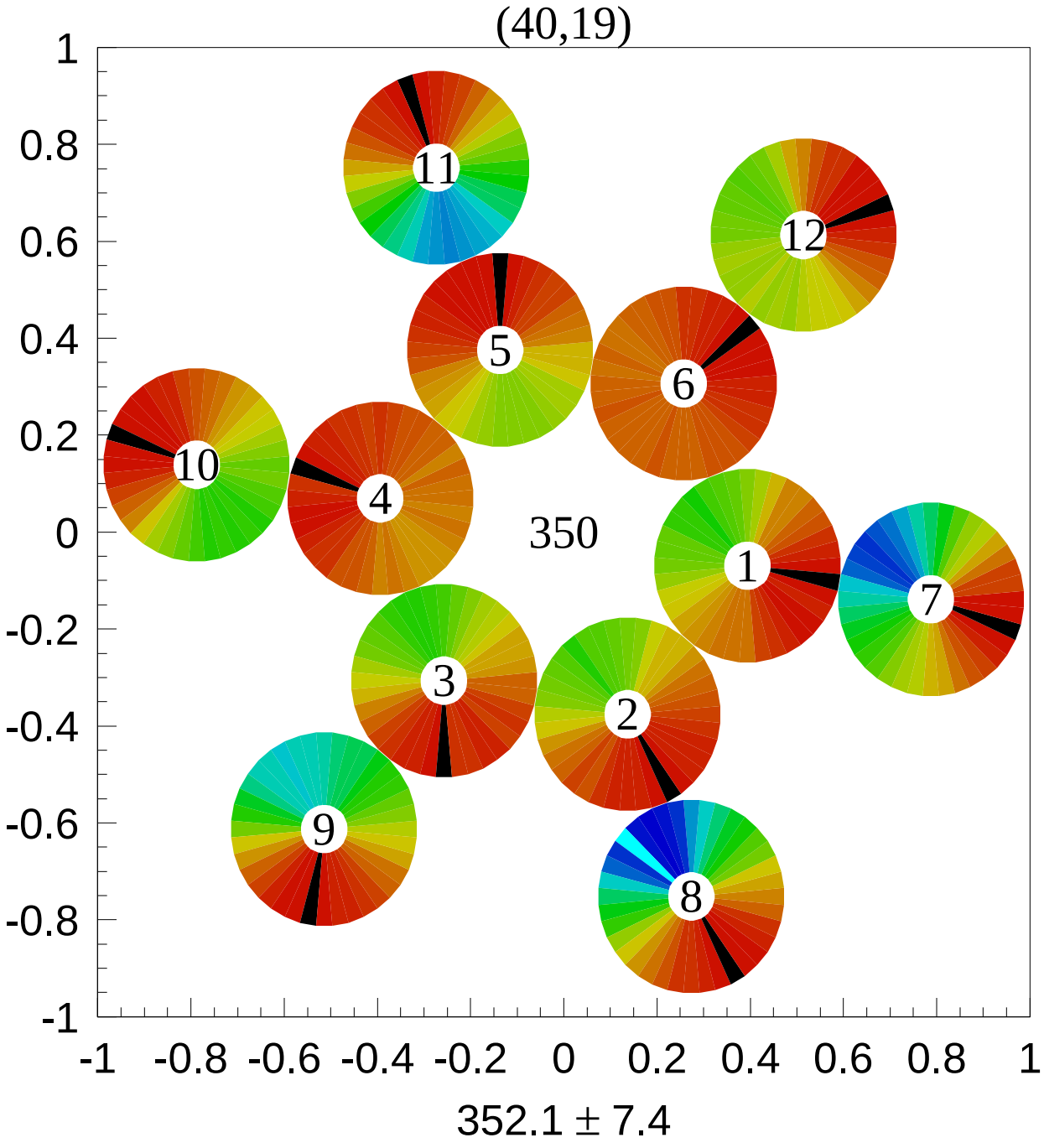

(40,17)
tilted LEDs
122 124 123 130 121 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 123 123 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

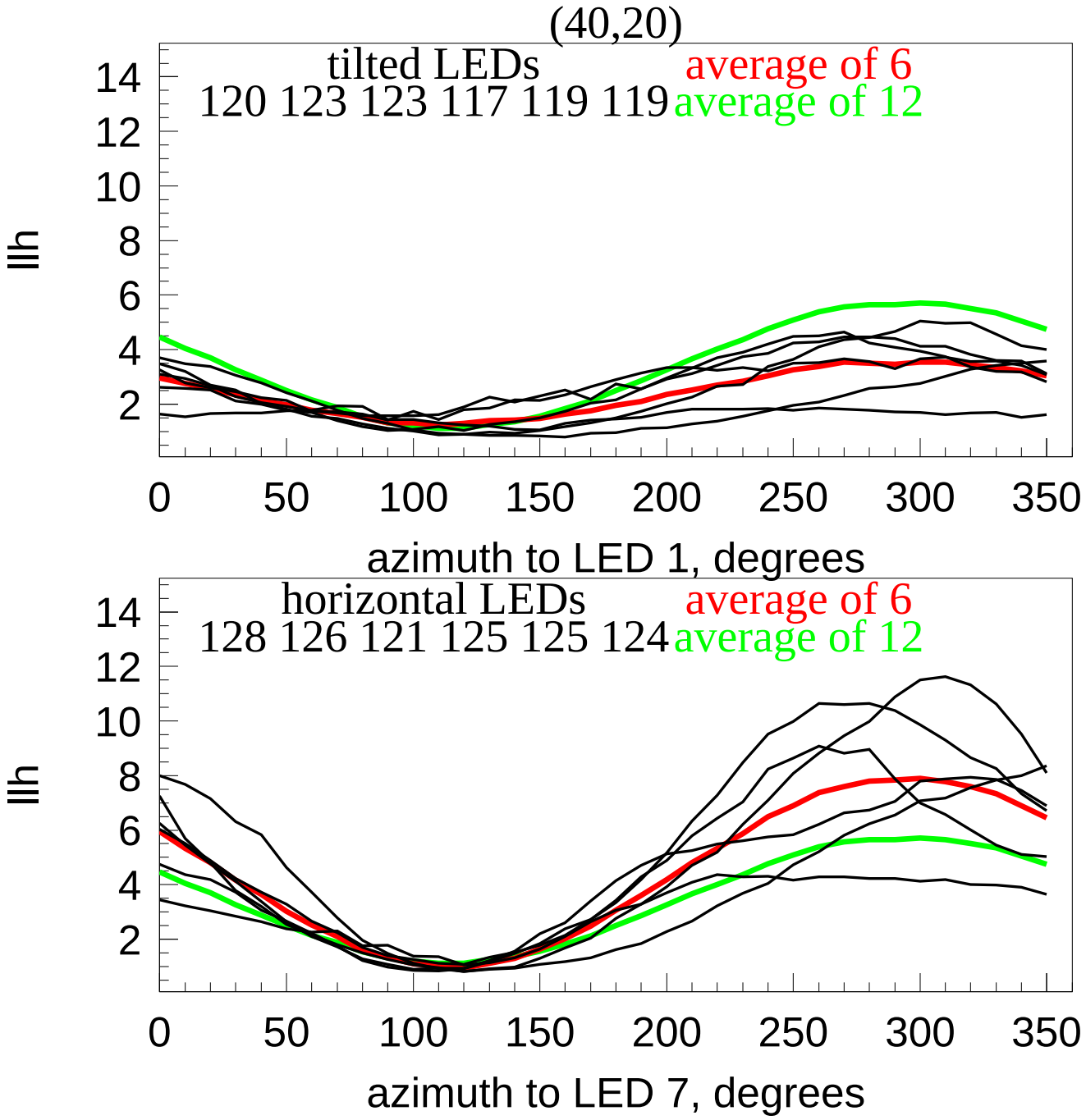

(40,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
43.8 ± 7.0

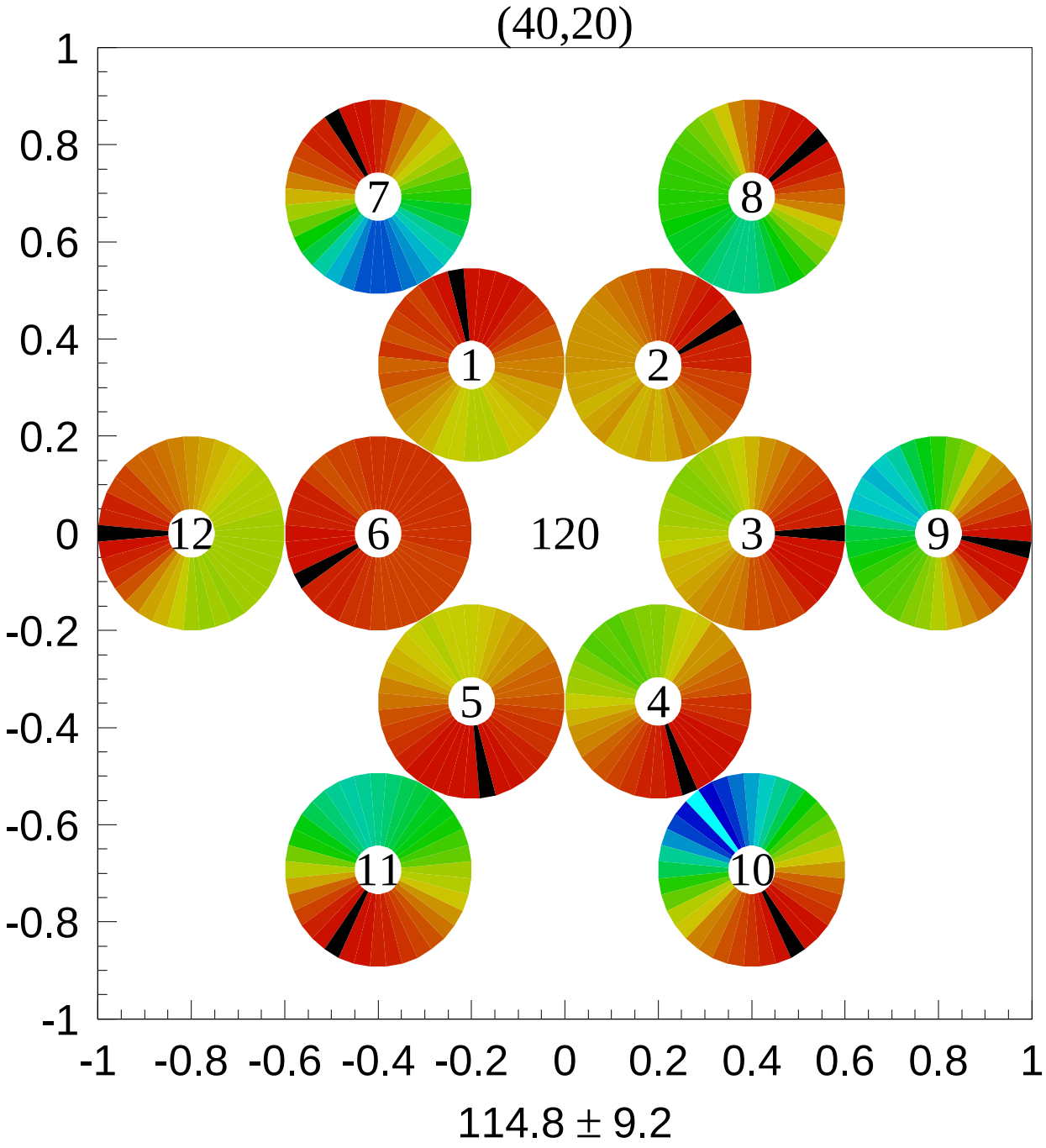

(40,18)
tilted LEDs
119 118 121 64 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 127 112 131 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

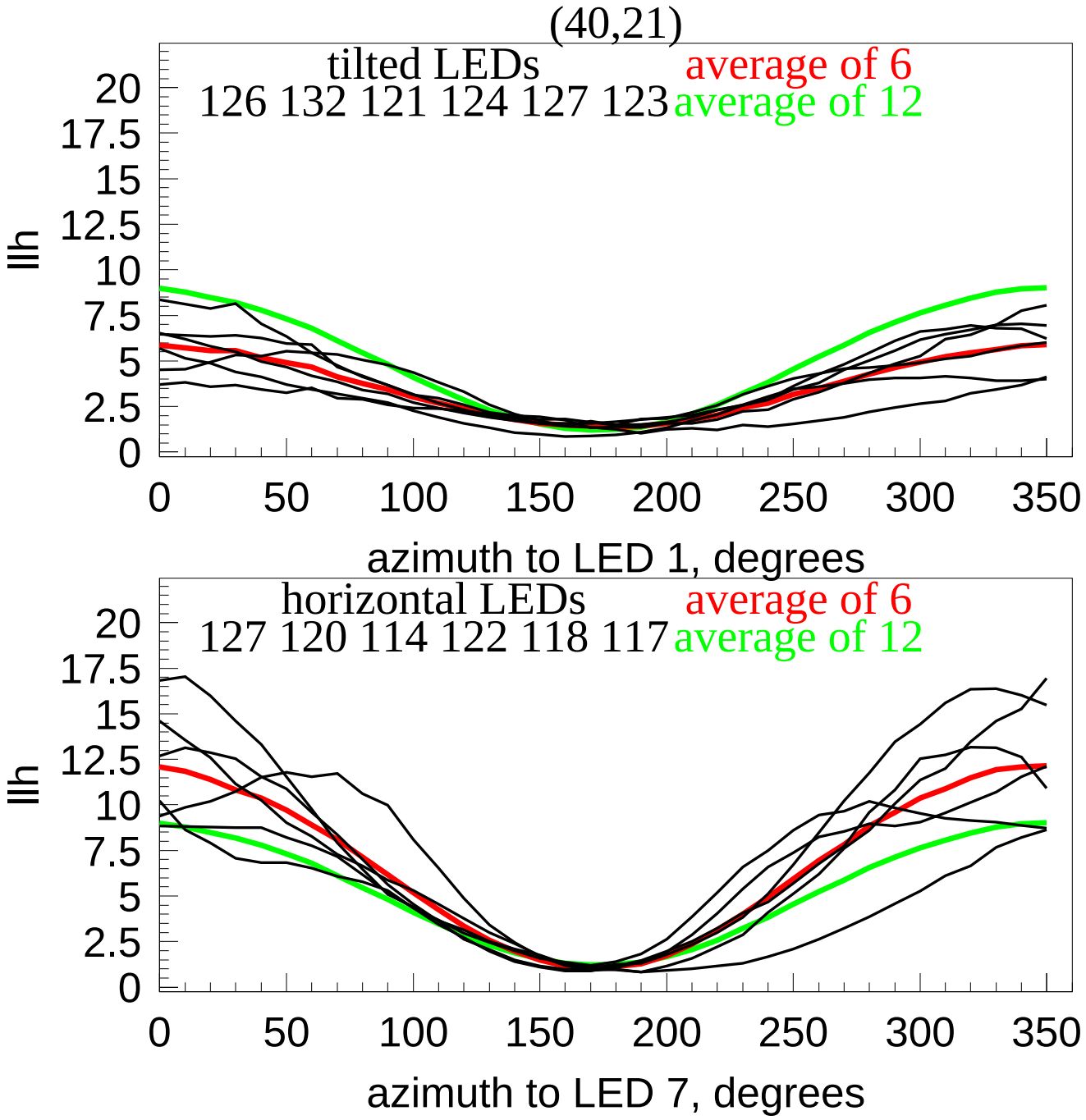

(40,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
225.6 ± 10.9
230
1
2
3
4
5
6
7
8
9
10
11
12

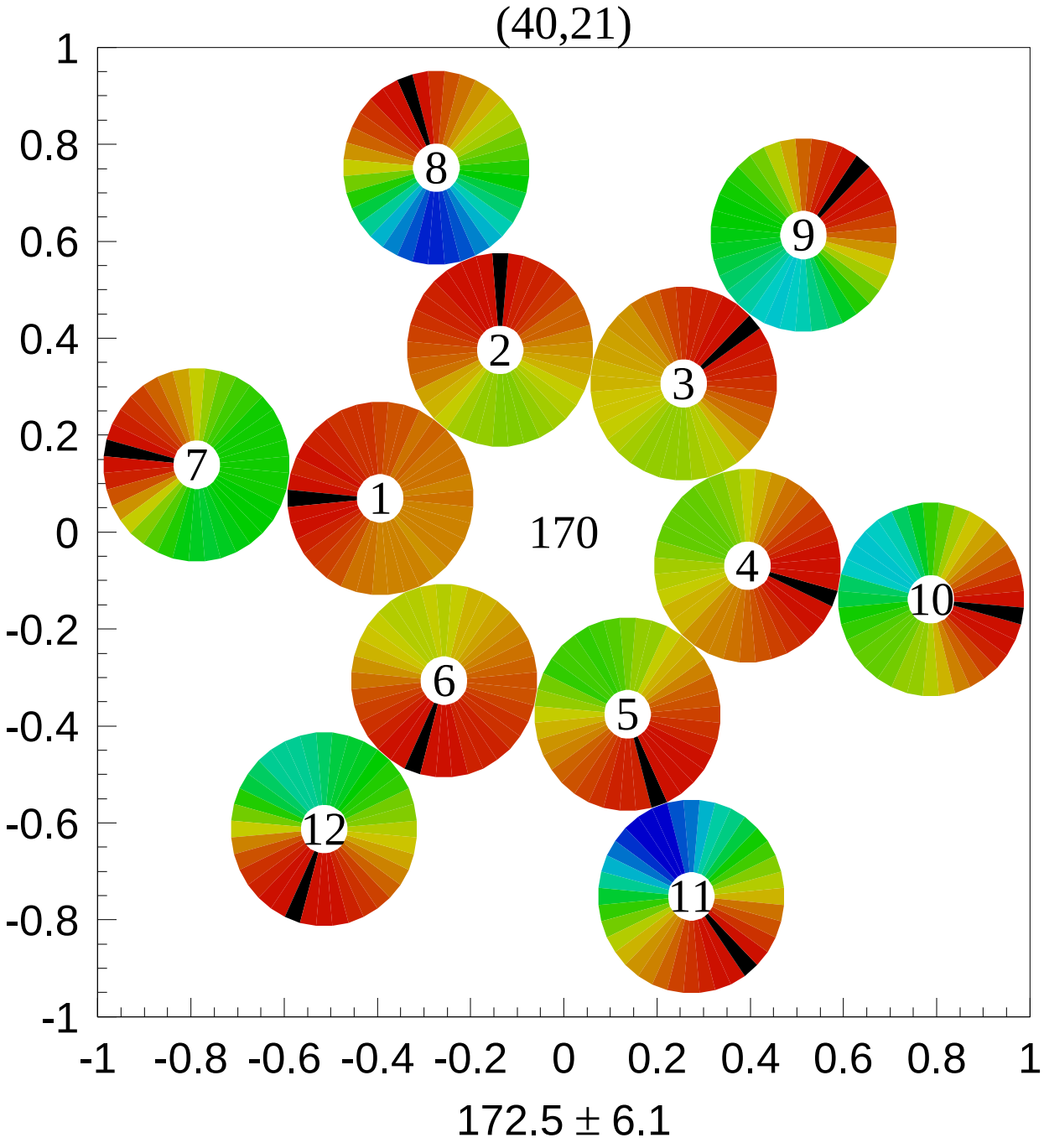

(40,19)
tilted LEDs
125 122 122 109 128 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 118 122 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

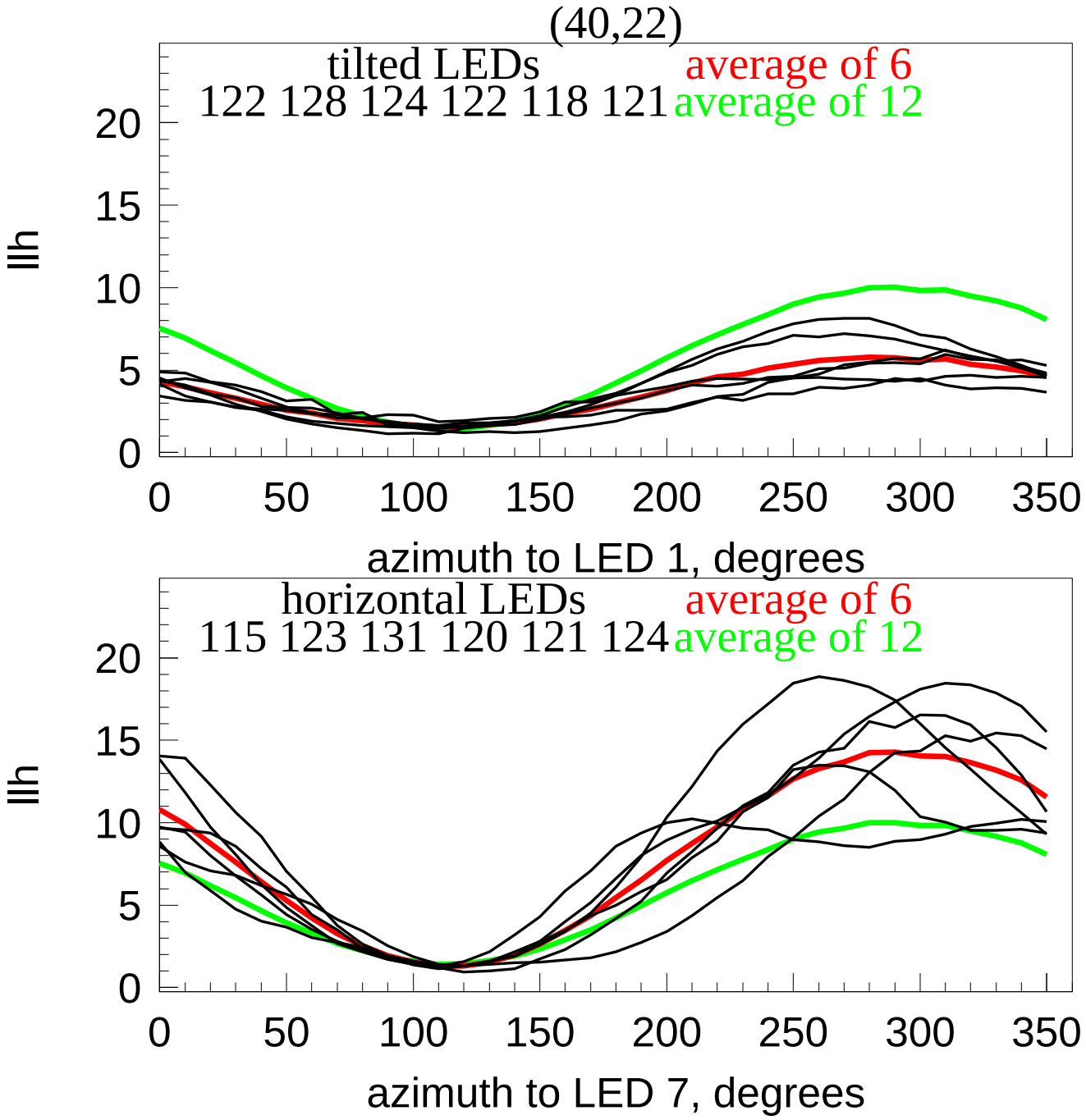

(40,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
352.1 ± 7.4

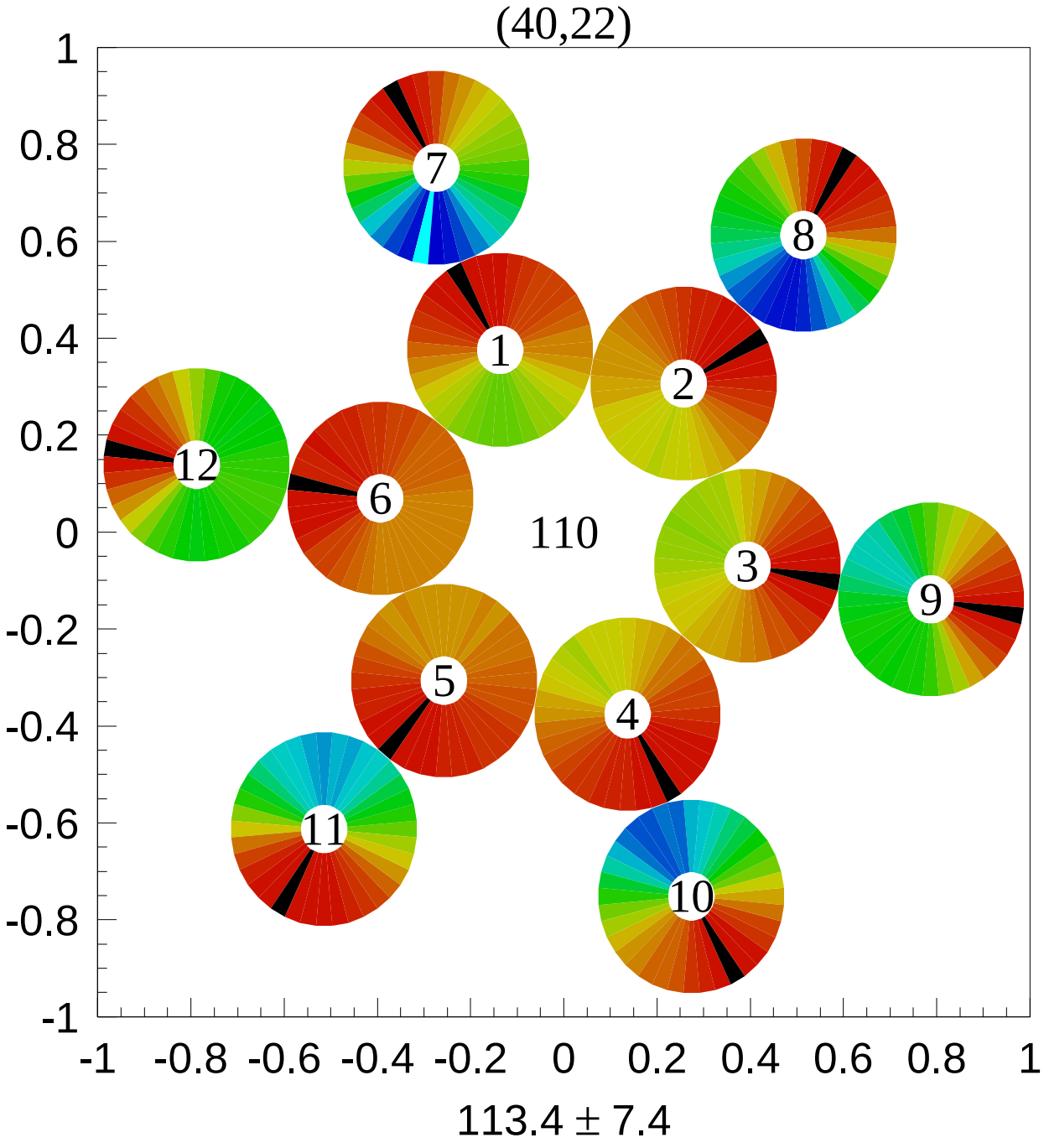

(40,20)
tilted LEDs
120 123 123 117 119 119
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 126 121 125 125 124
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

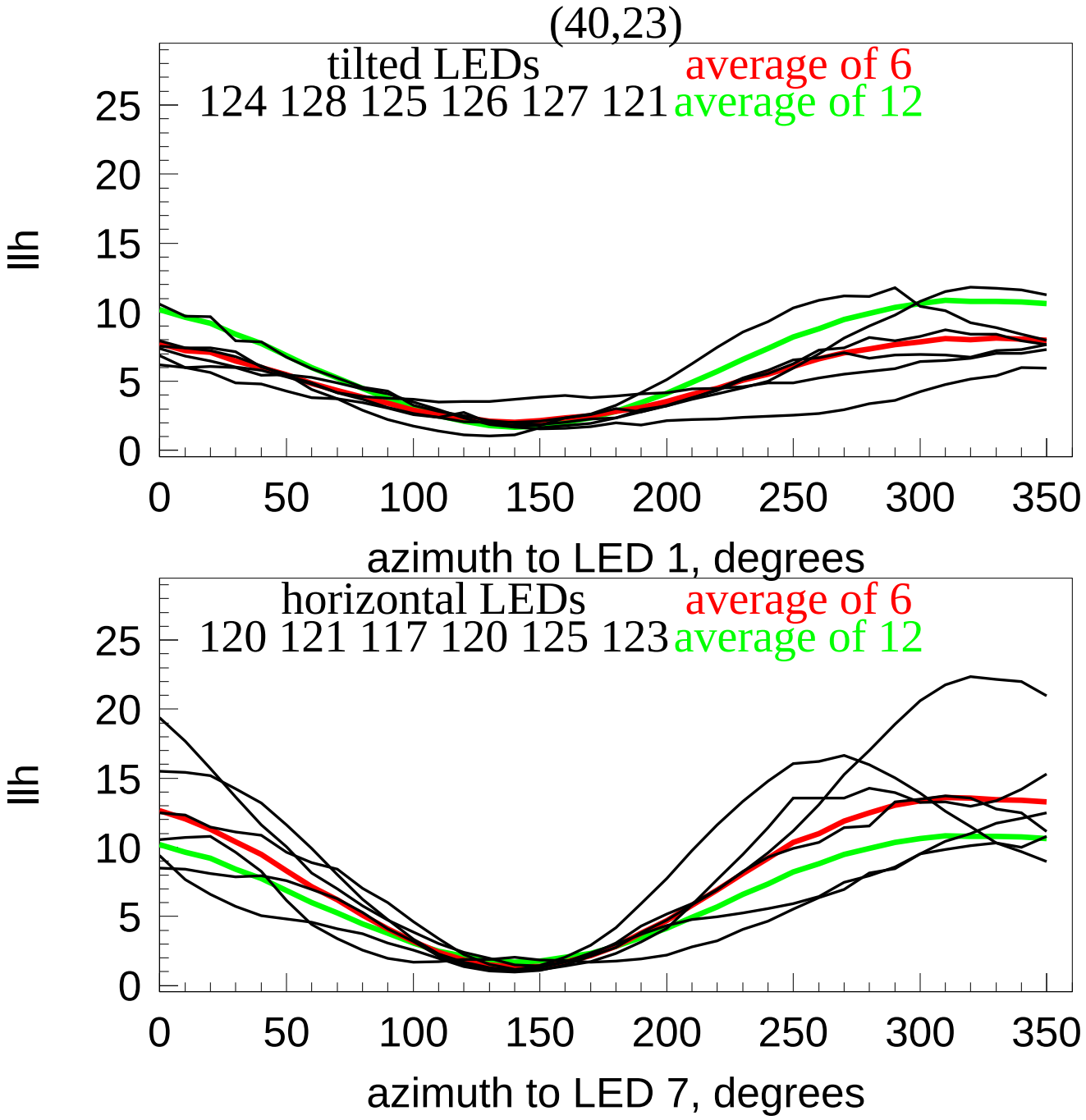

(40,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
114.8 ± 9.2

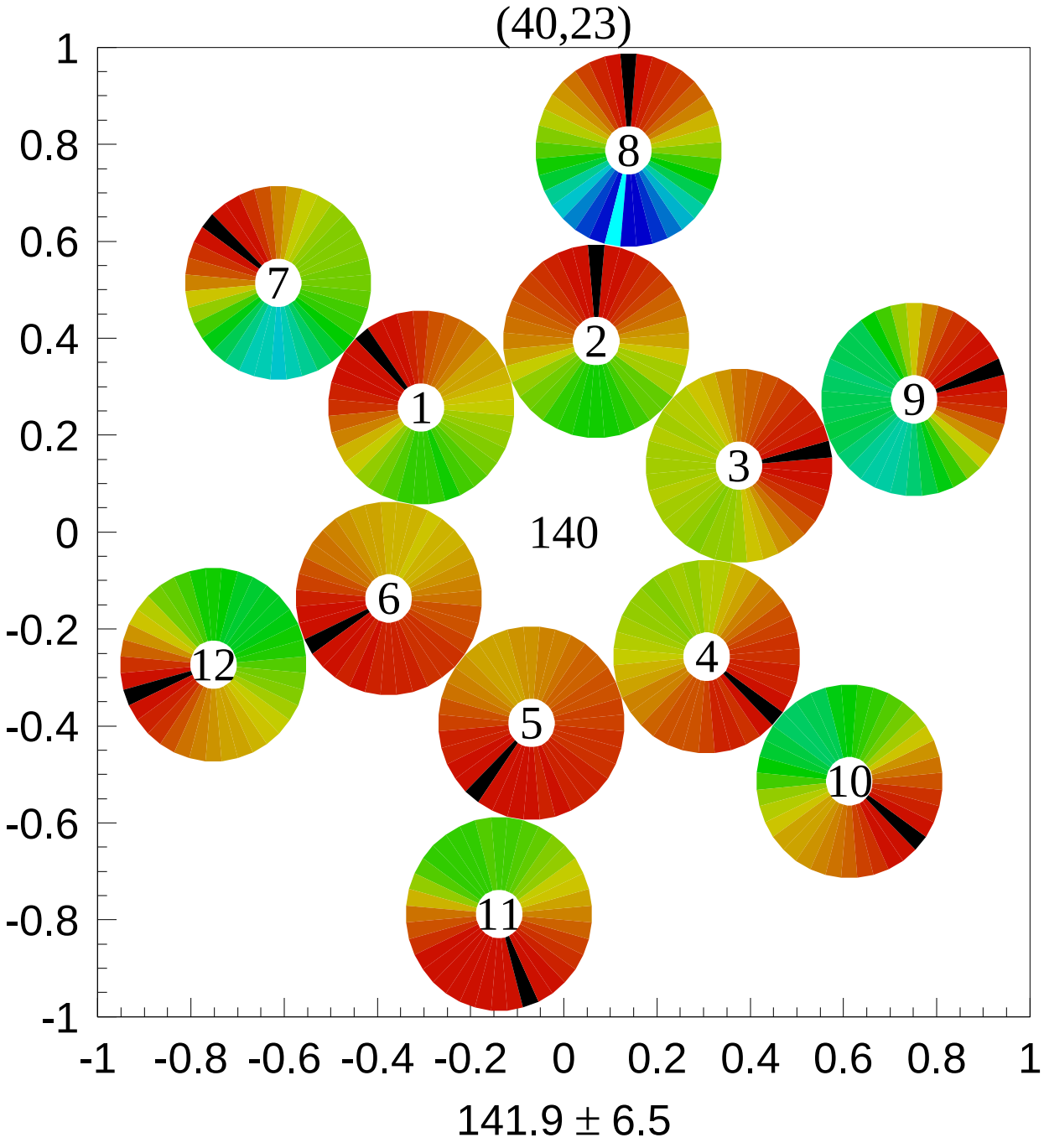

(40,21)
tilted LEDs
126 132 121 124 127 123
average of 6
average of 12
llh
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 120 114 122 118 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

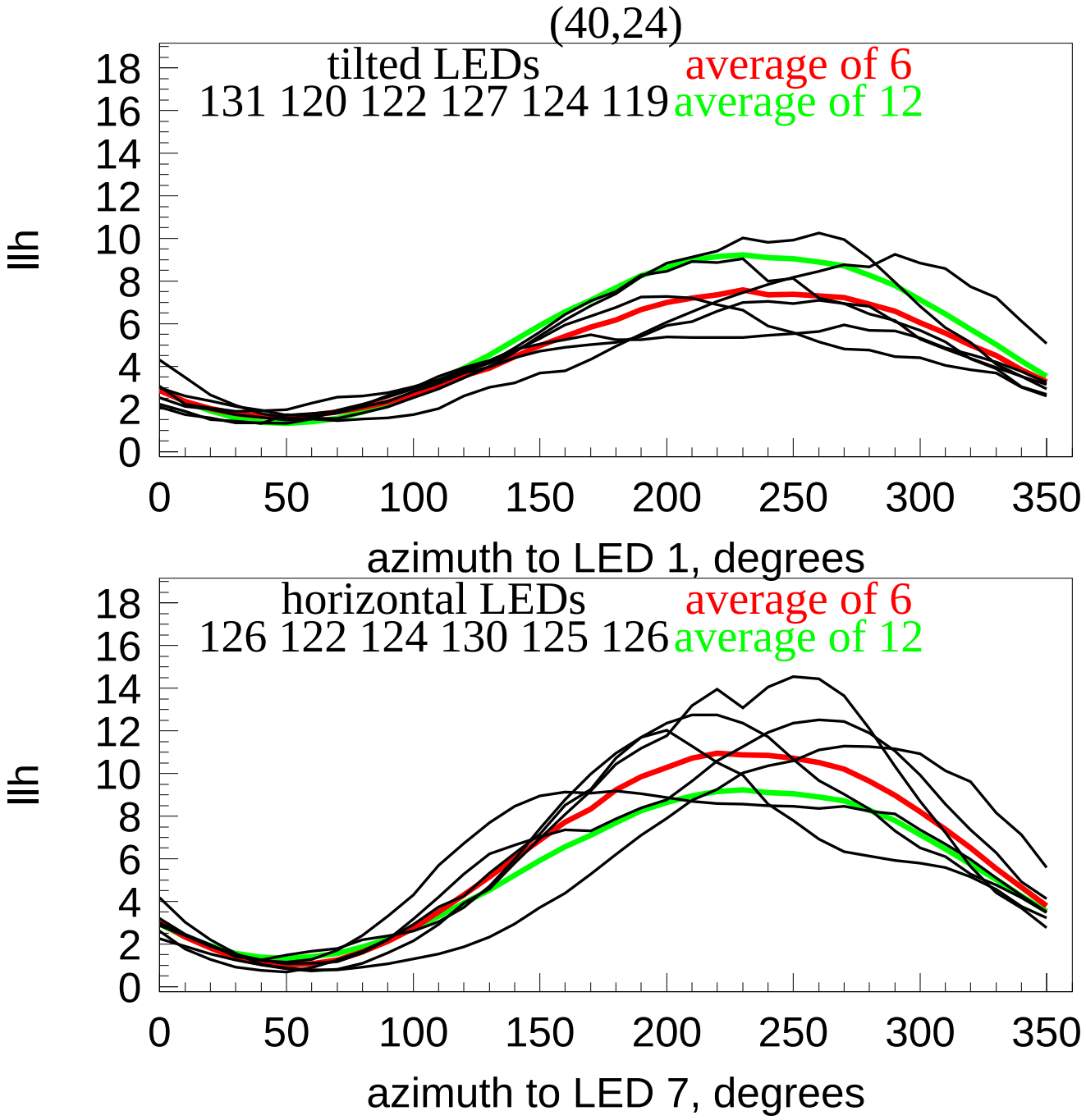

(40,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
172.5 ± 6.1

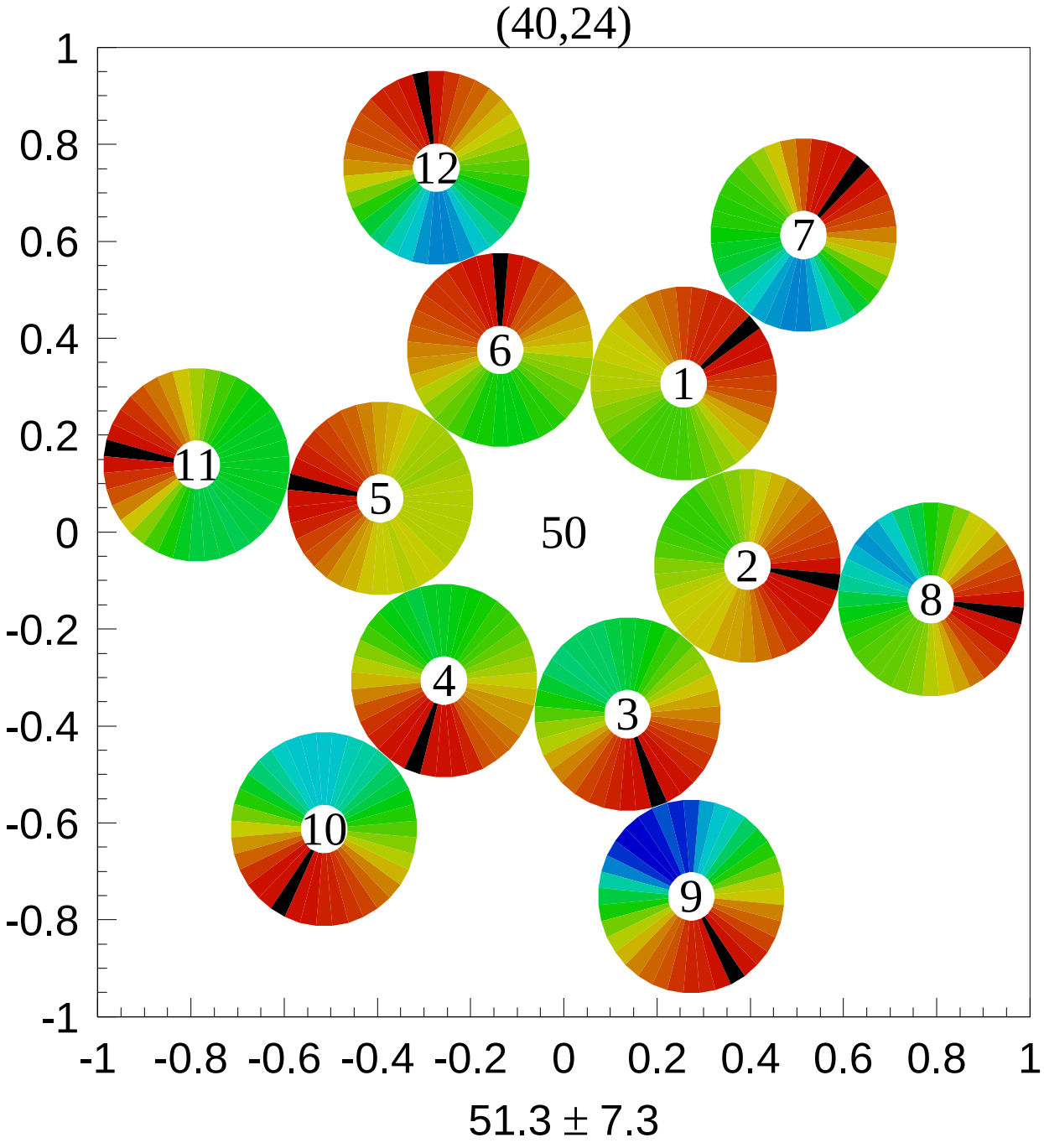

(40,22)
tilted LEDs
122 128 124 122 118 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 123 131 120 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

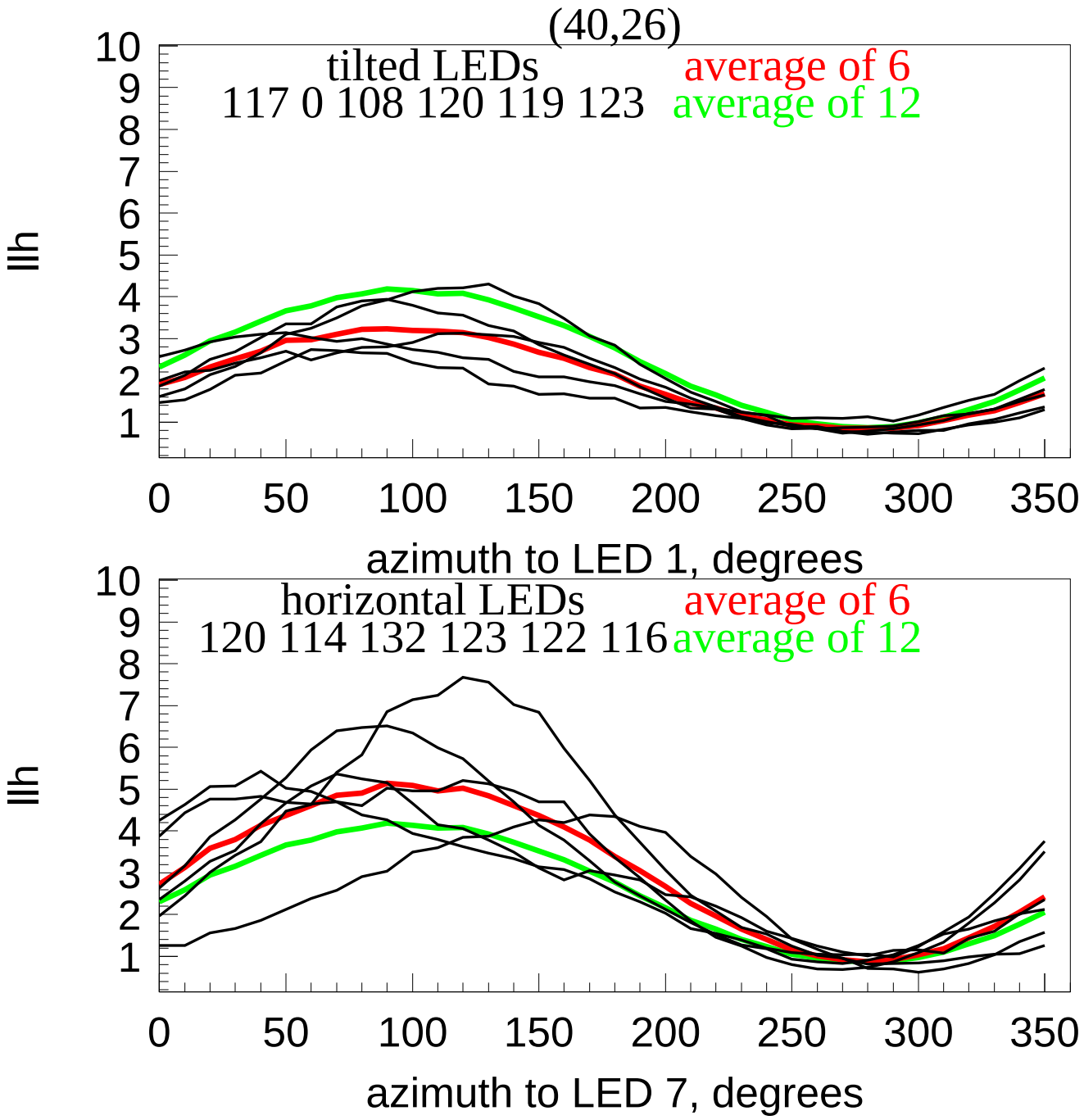

(40,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
113.4 ± 7.4

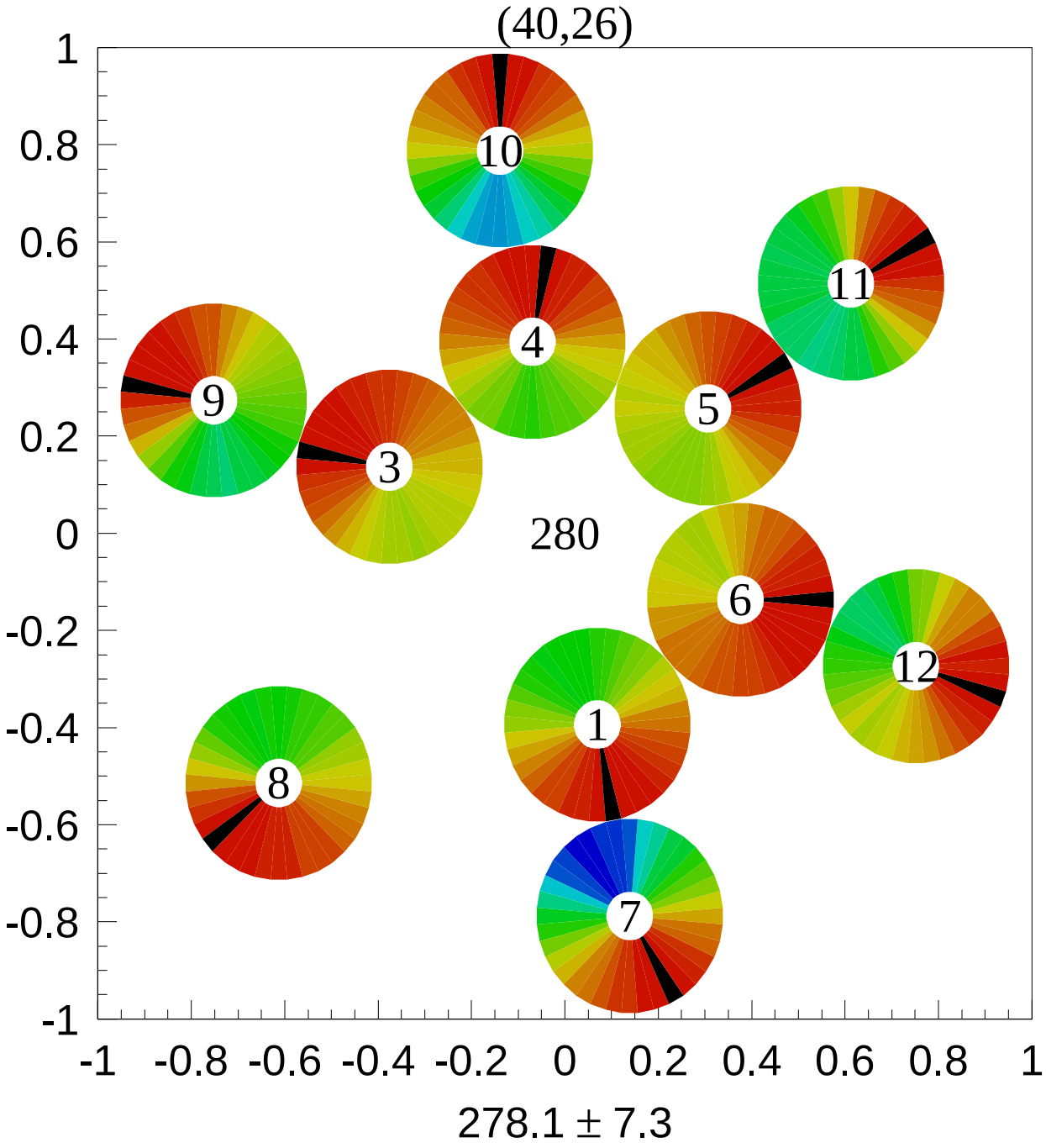

(40,23)
tilted LEDs
124 128 125 126 127 121
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 121 117 120 125 123
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

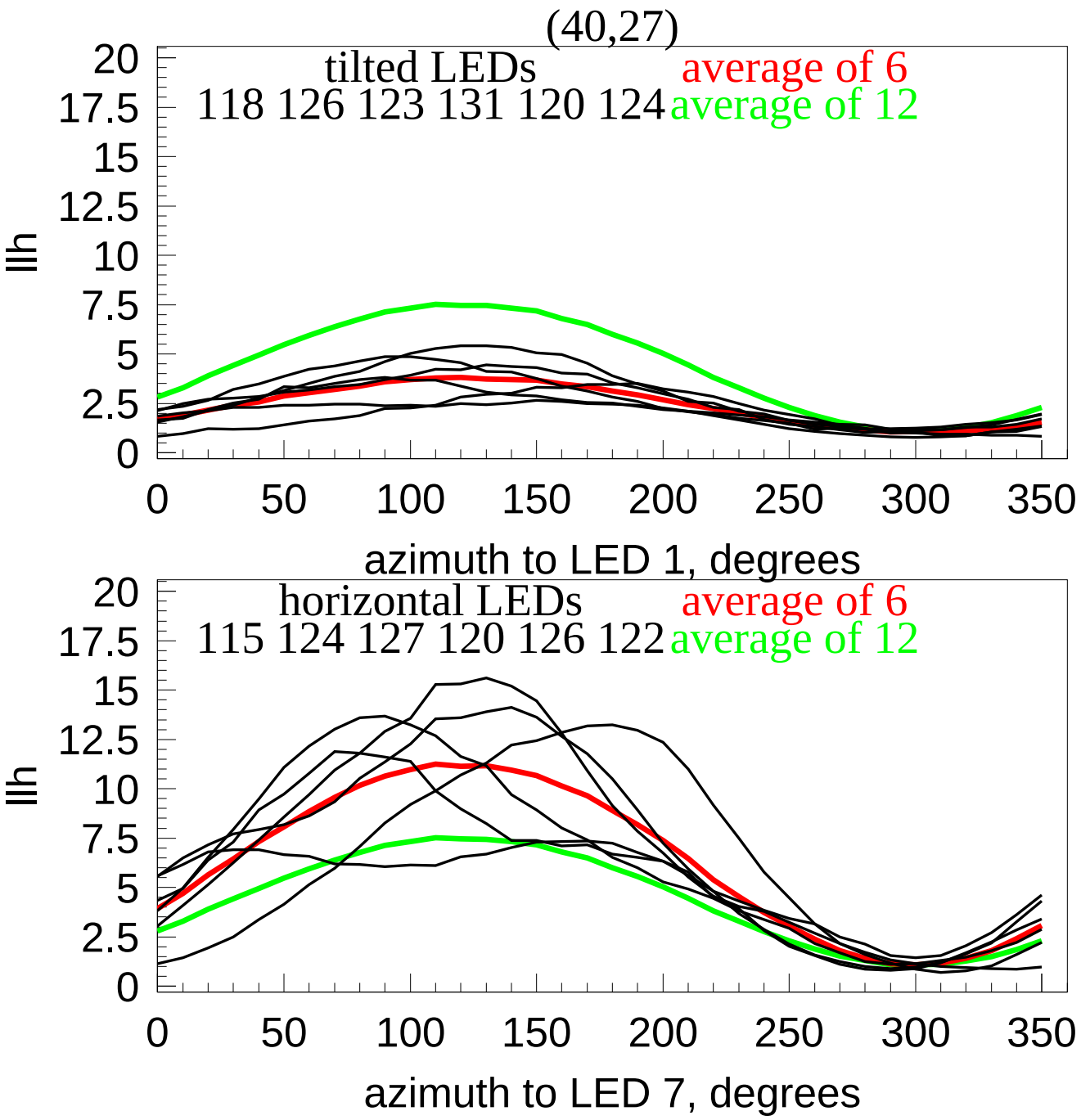

(40,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
141.9 ± 6.5
140
1
2
3
4
5
6
7
8
9
10
11
12

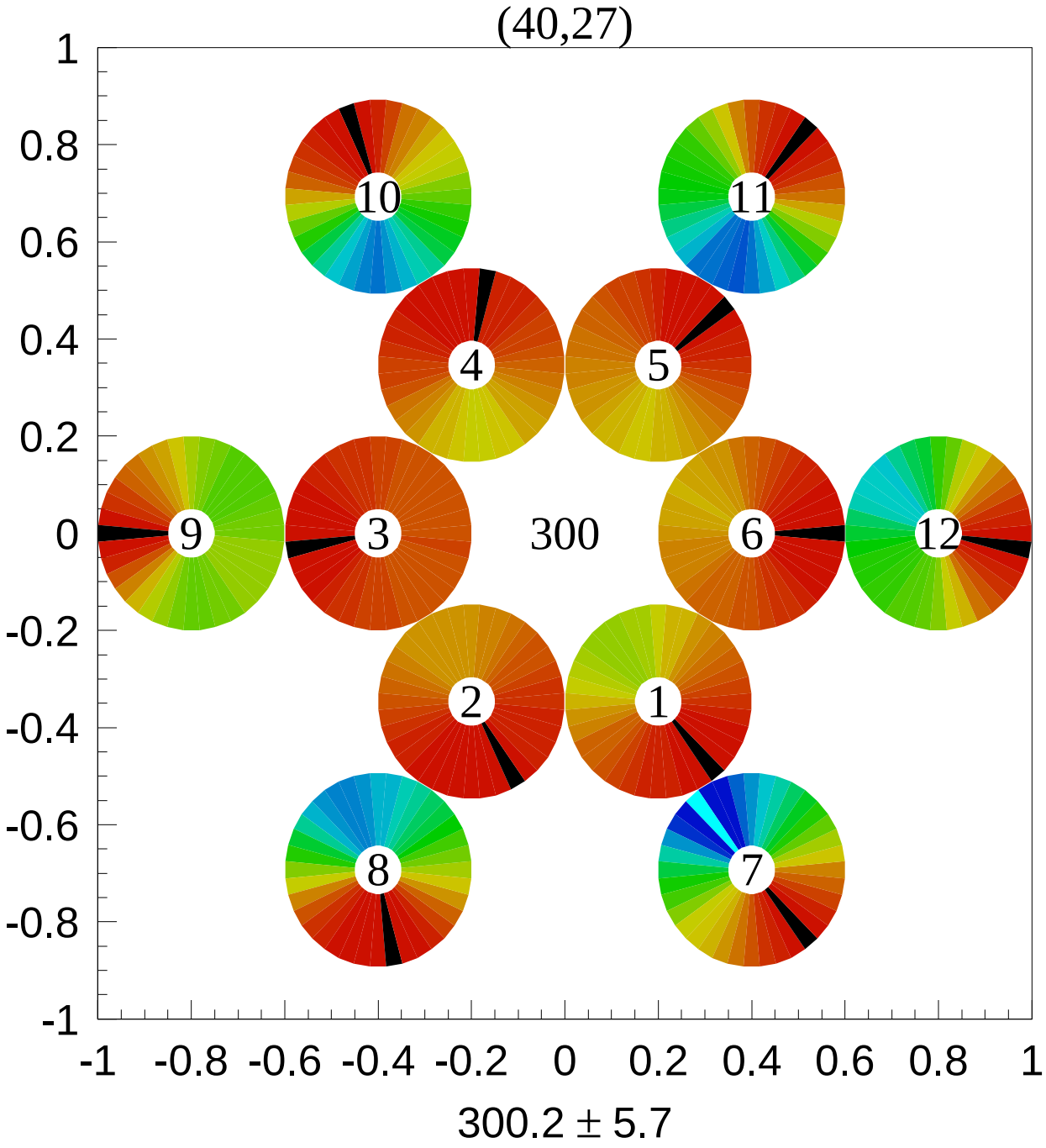

(40,24)
tilted LEDs
131 120 122 127 124 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 122 124 130 125 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

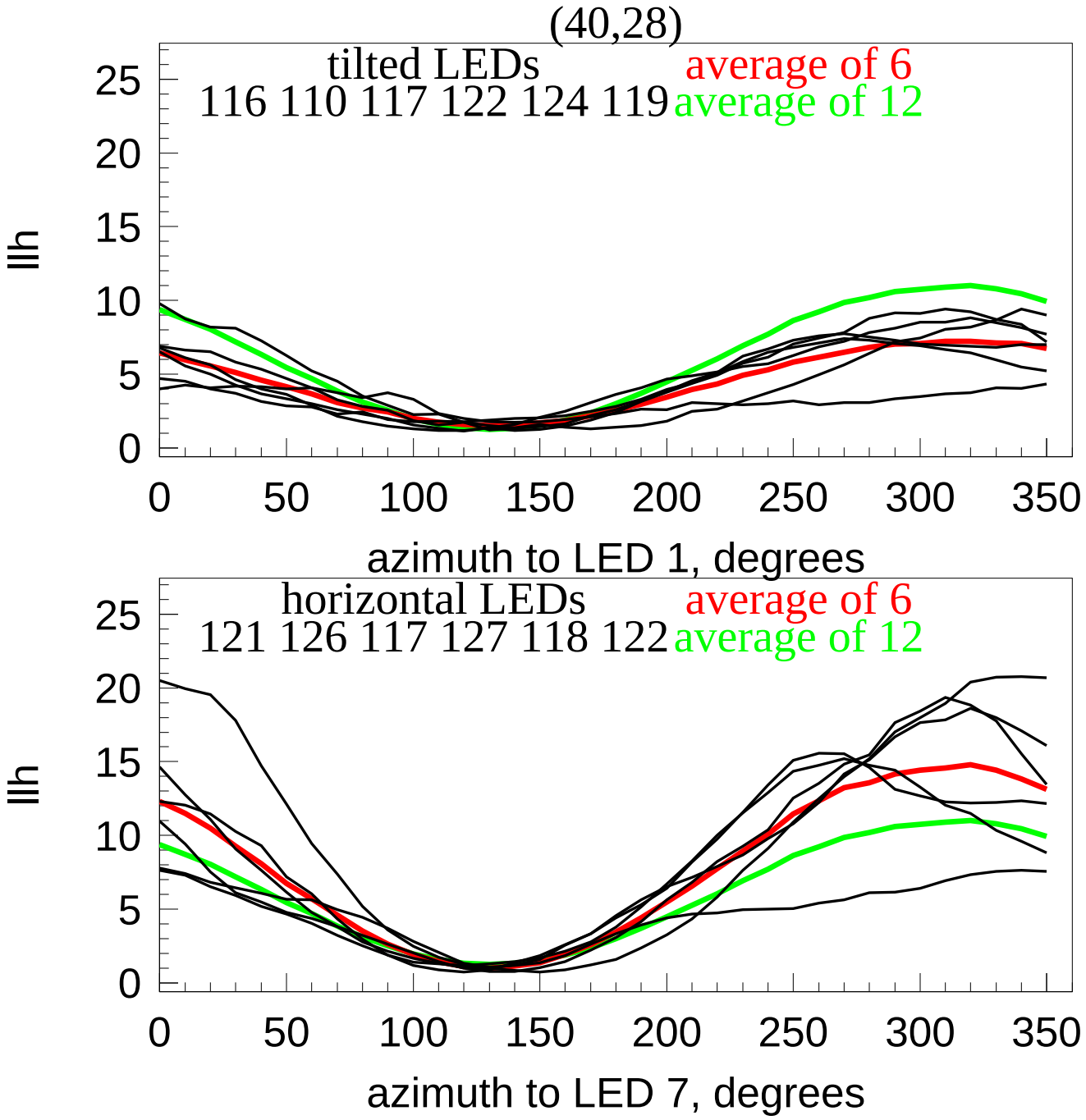

(40,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
51.3 ± 7.3

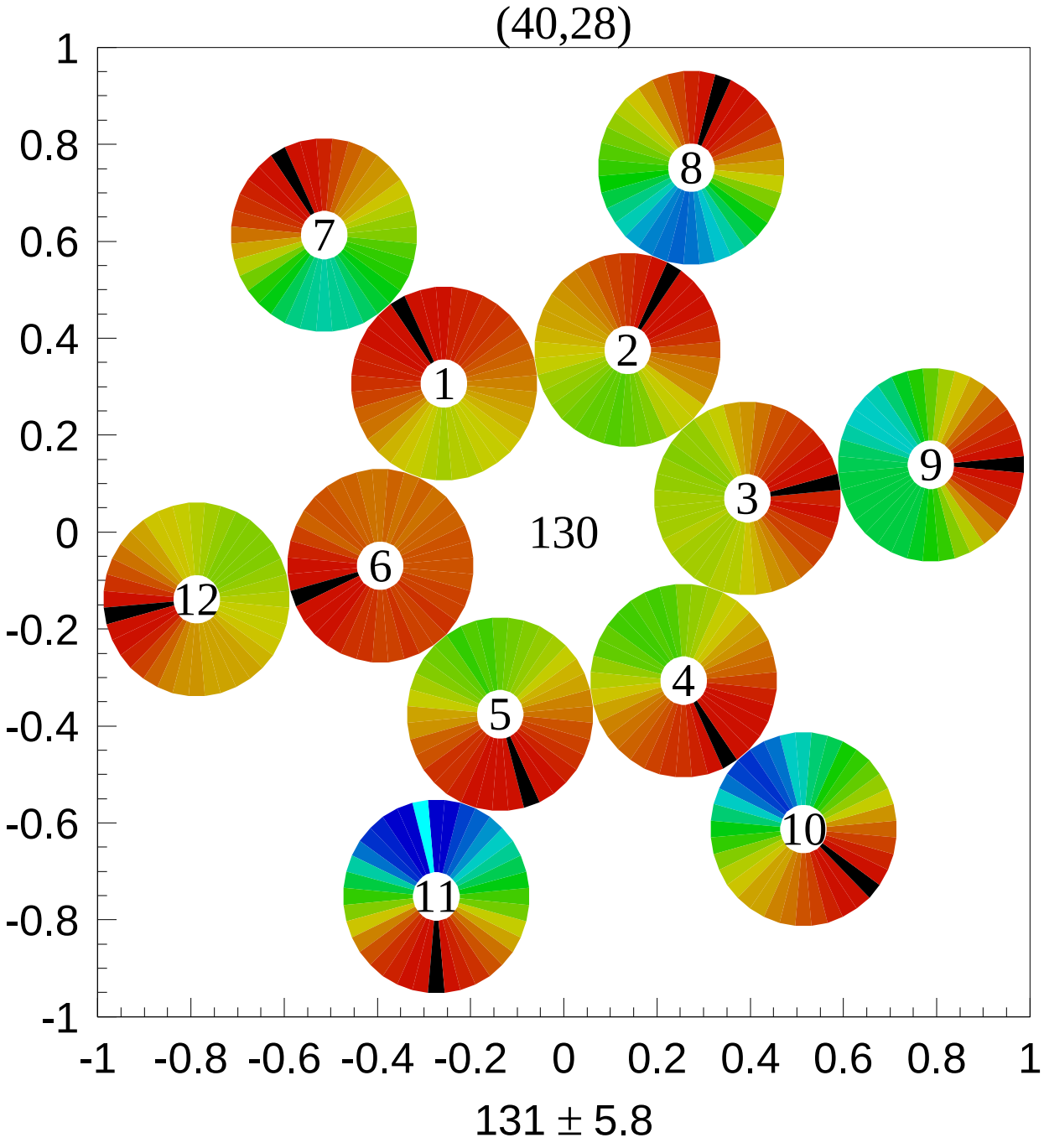

(40,26)
tilted LEDs
117 0 108 120 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 114 132 123 122 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

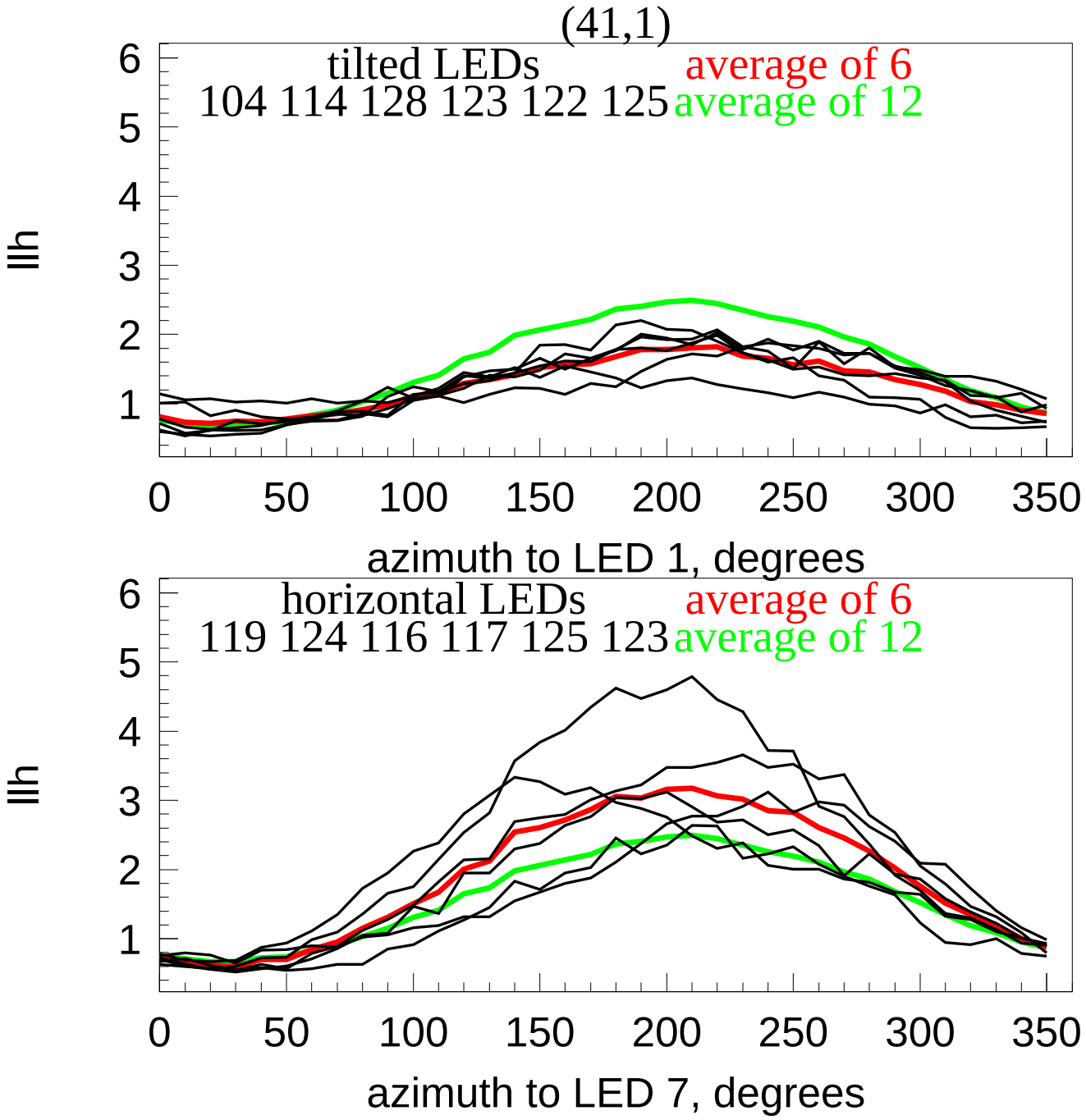

(40,26)
10
11
4
9
5
3
280
6
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
278.1 ± 7.3

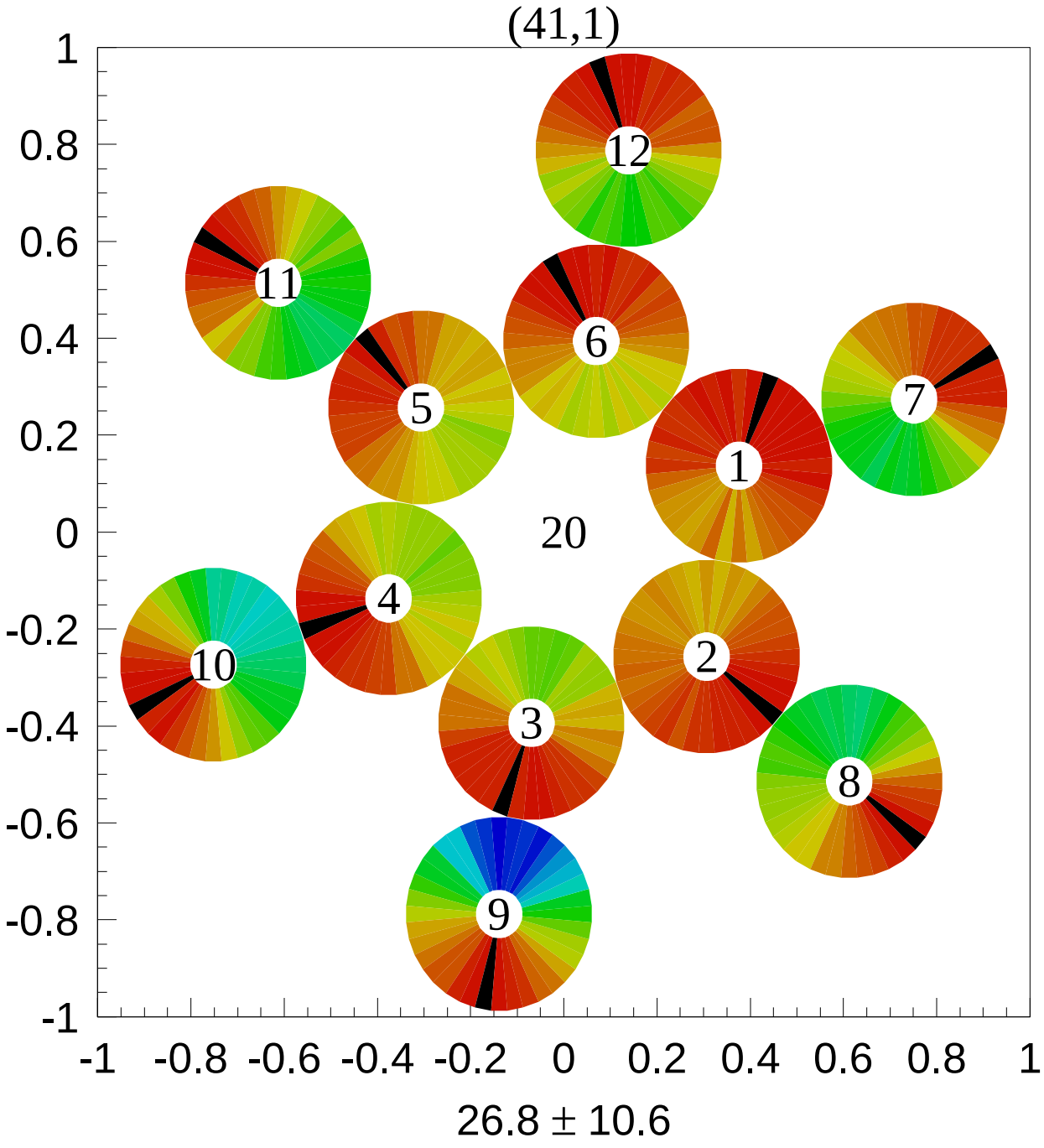

(40,27)
tilted LEDs
118 126 123 131 120 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 124 127 120 126 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

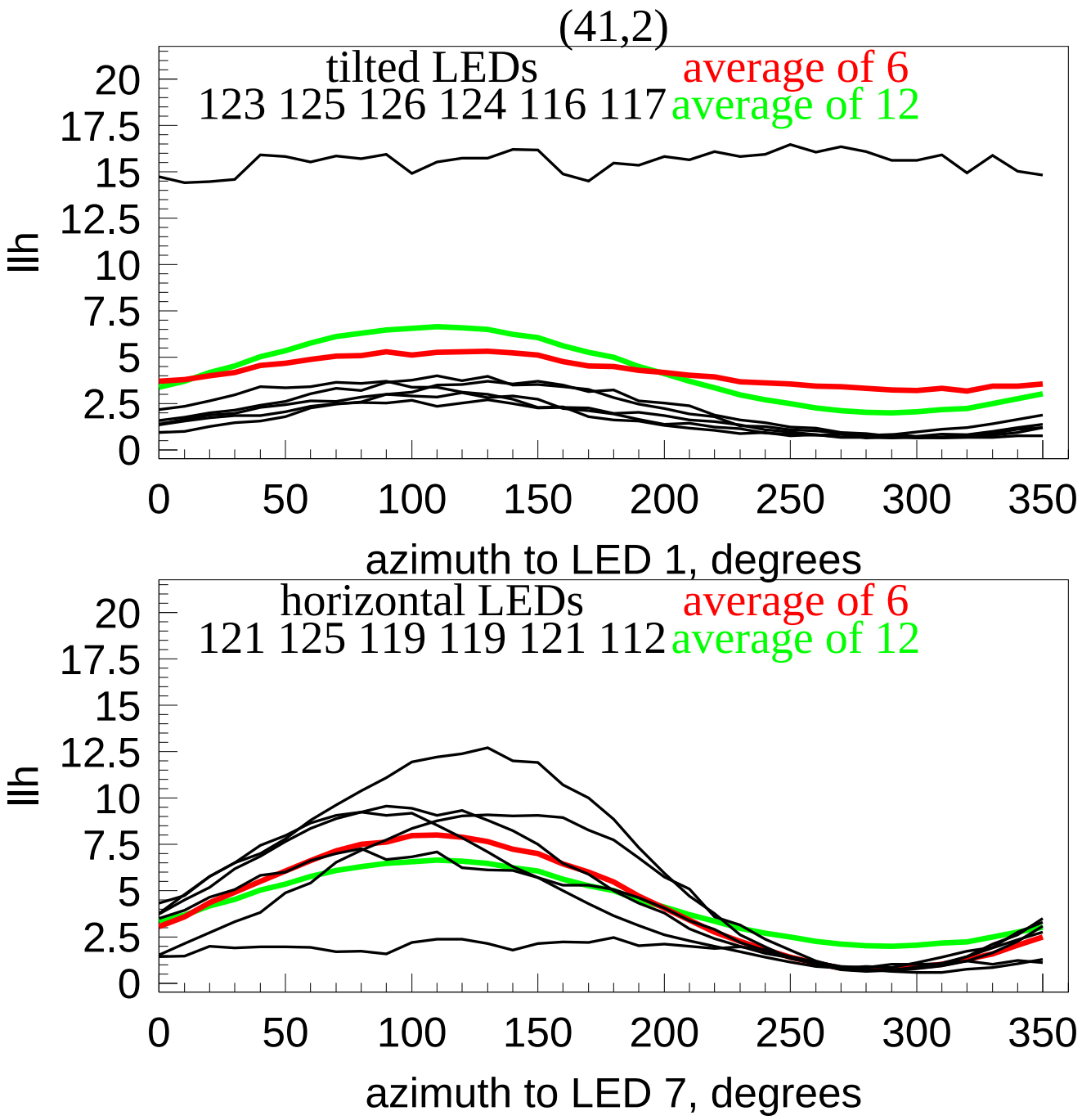

(40,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
300.2 ± 5.7

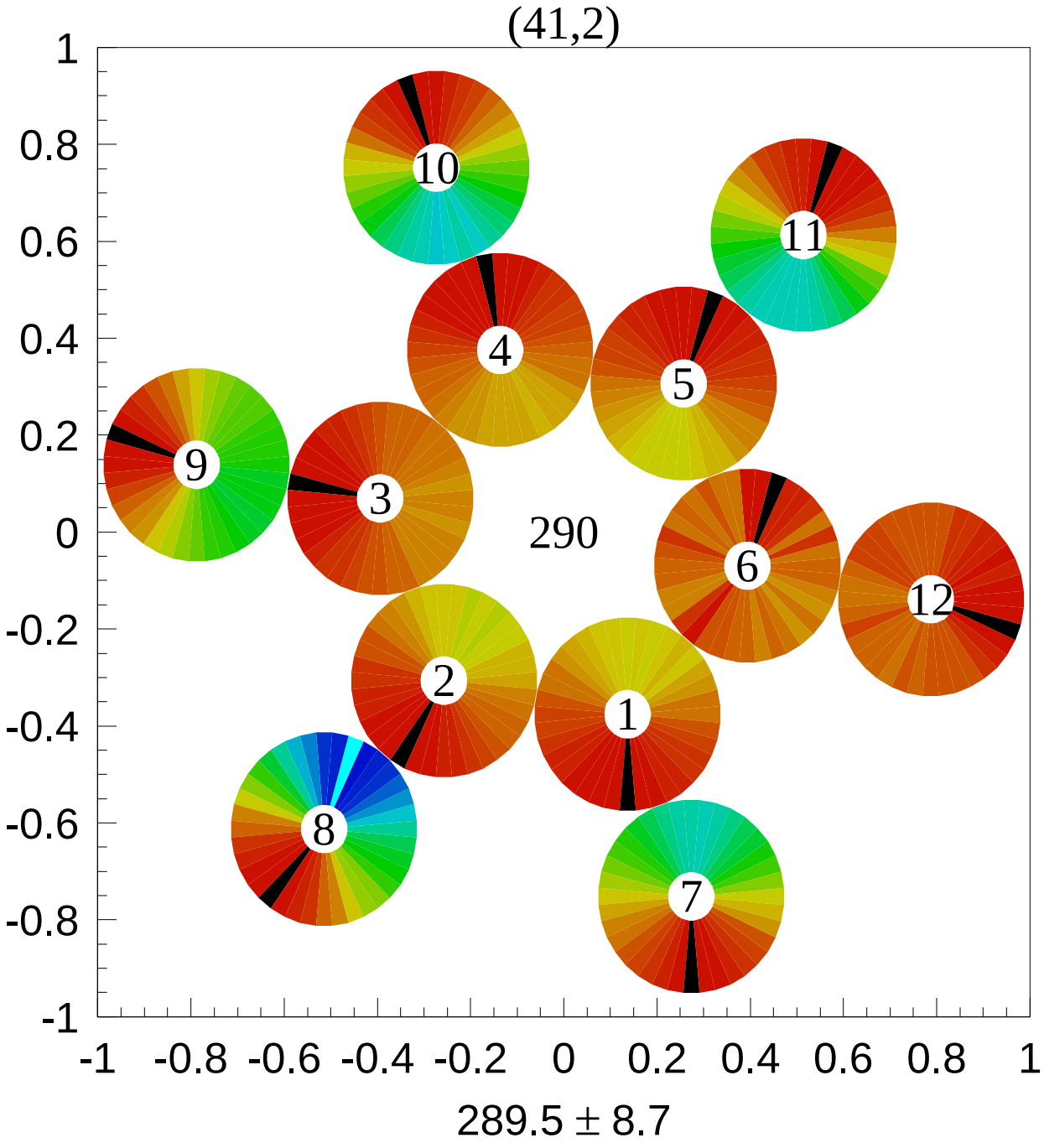

(40,28)
tilted LEDs
116 110 117 122 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 126 117 127 118 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

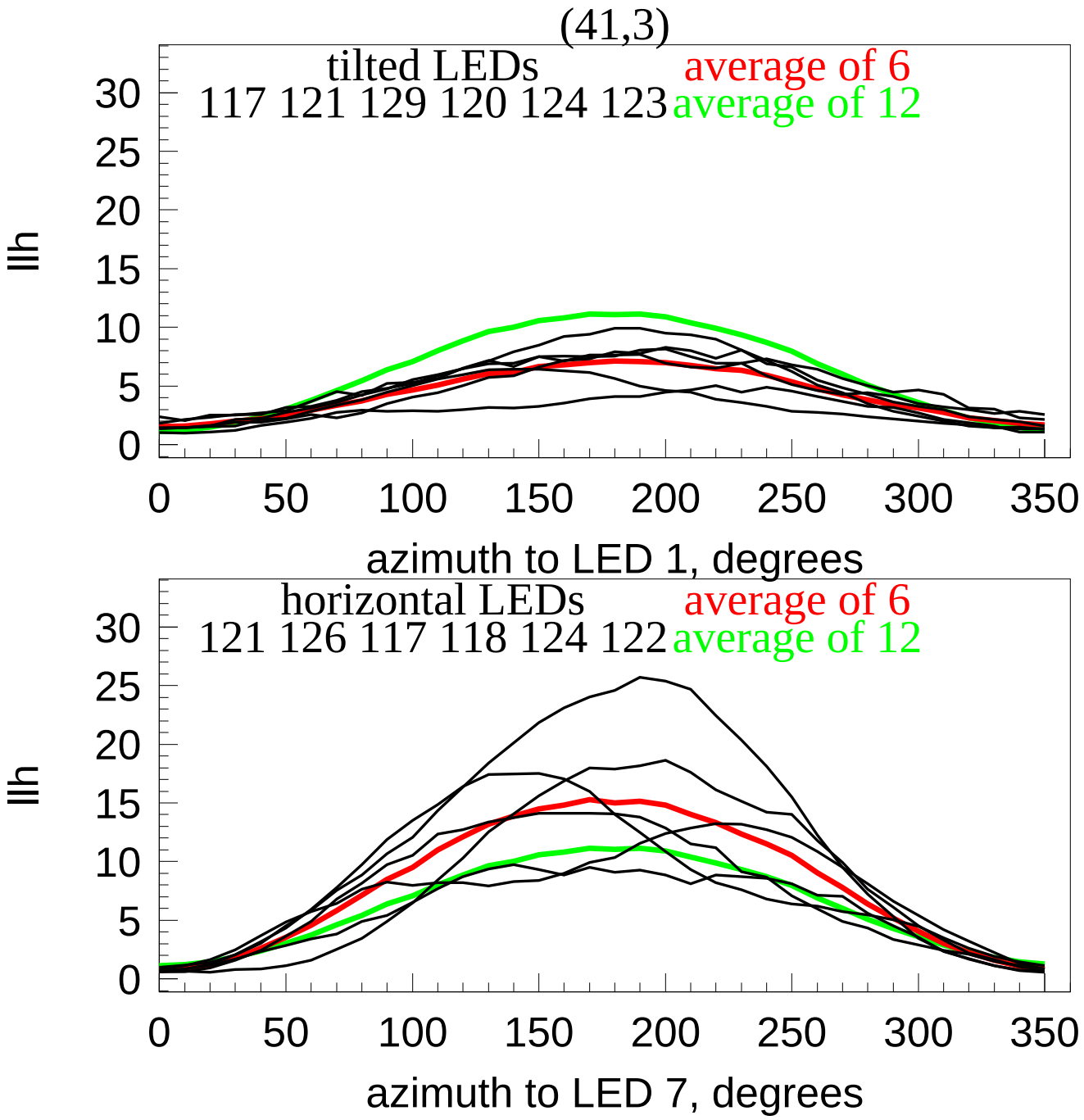

(40,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
130
131 ± 5.8
1
2
3
4
5
6
7
8
9
10
11
12

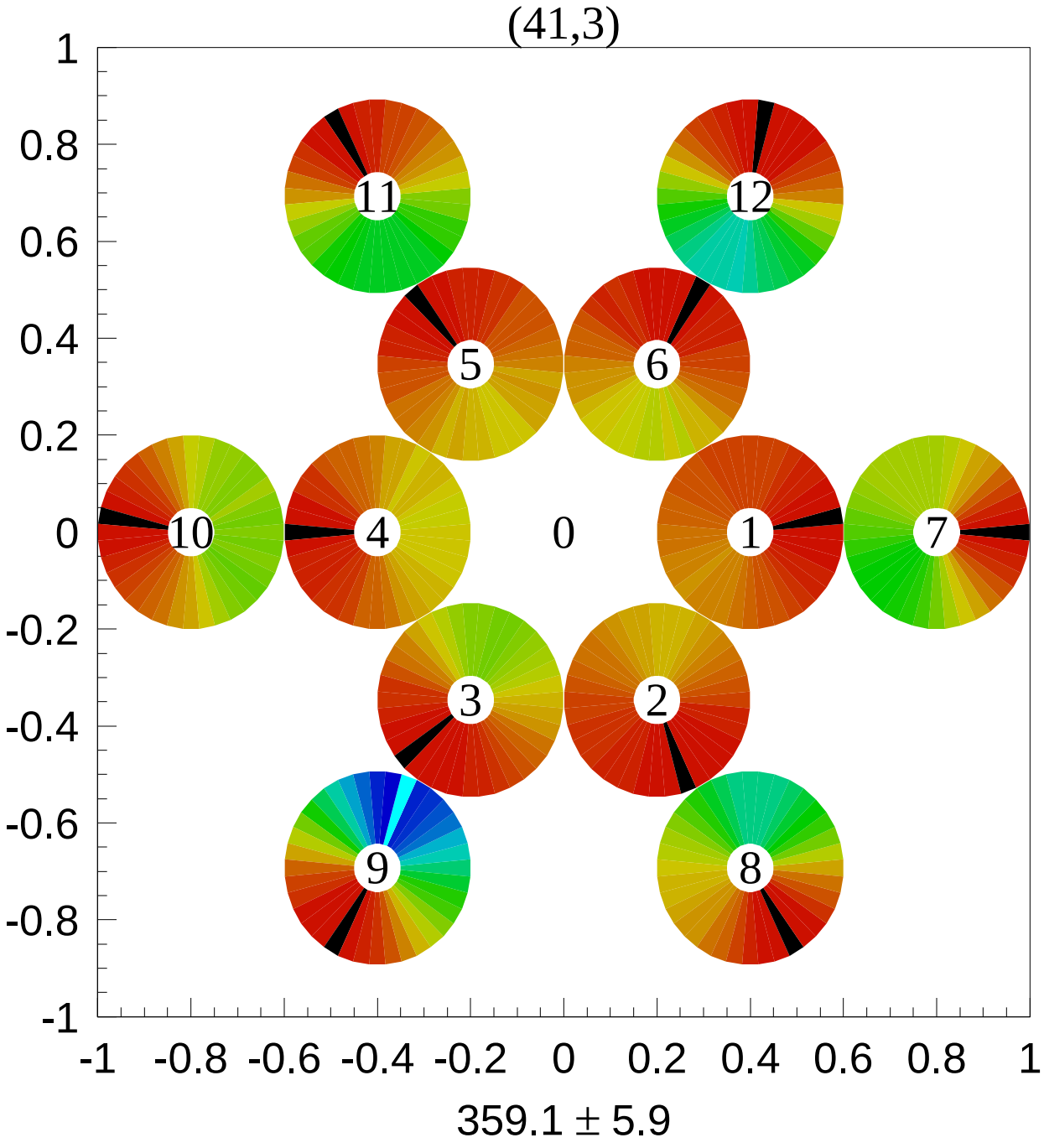

(41,1)
tilted LEDs
104 114 128 123 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 124 116 117 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

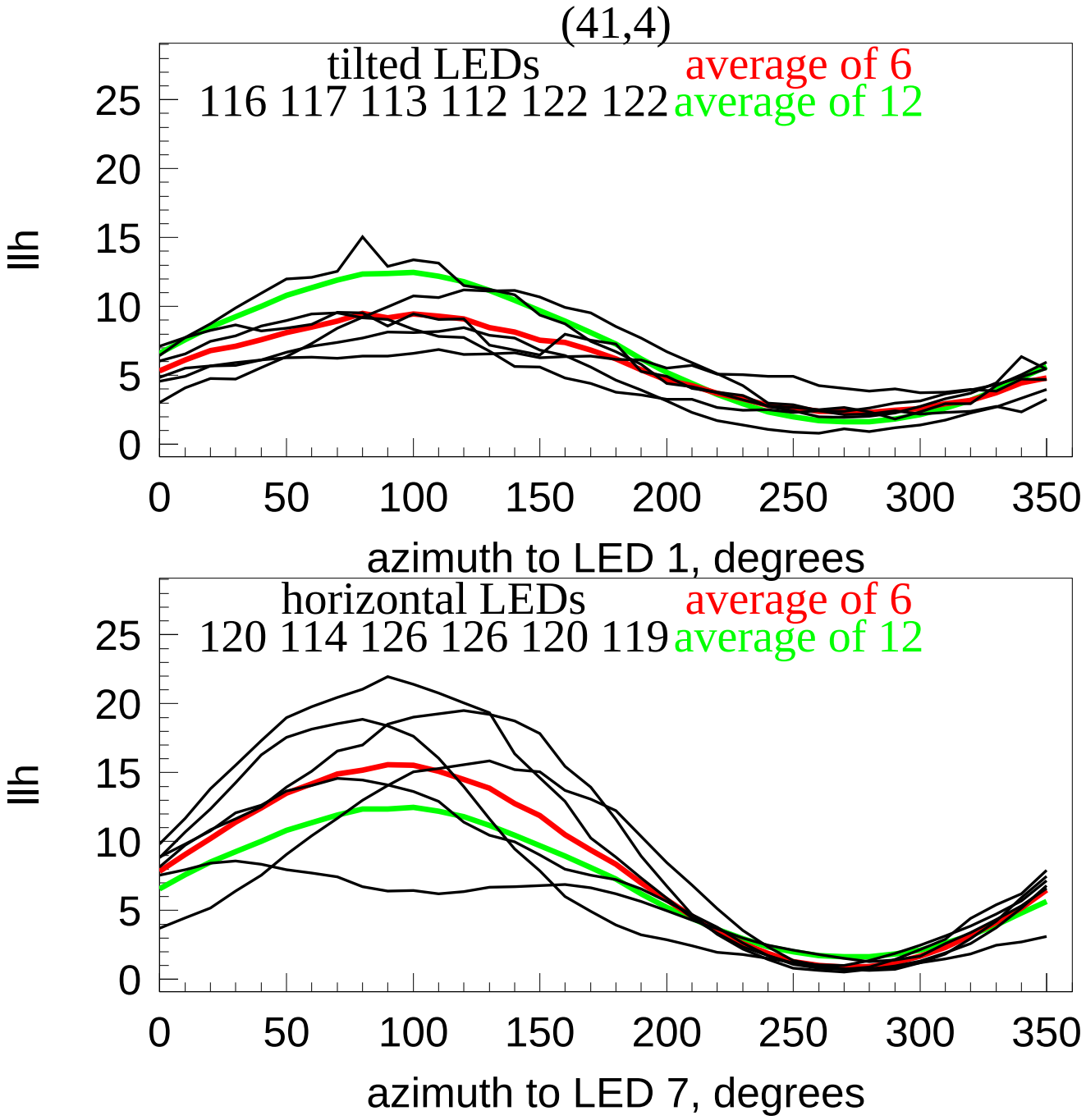

(41,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
26.8 ± 10.6

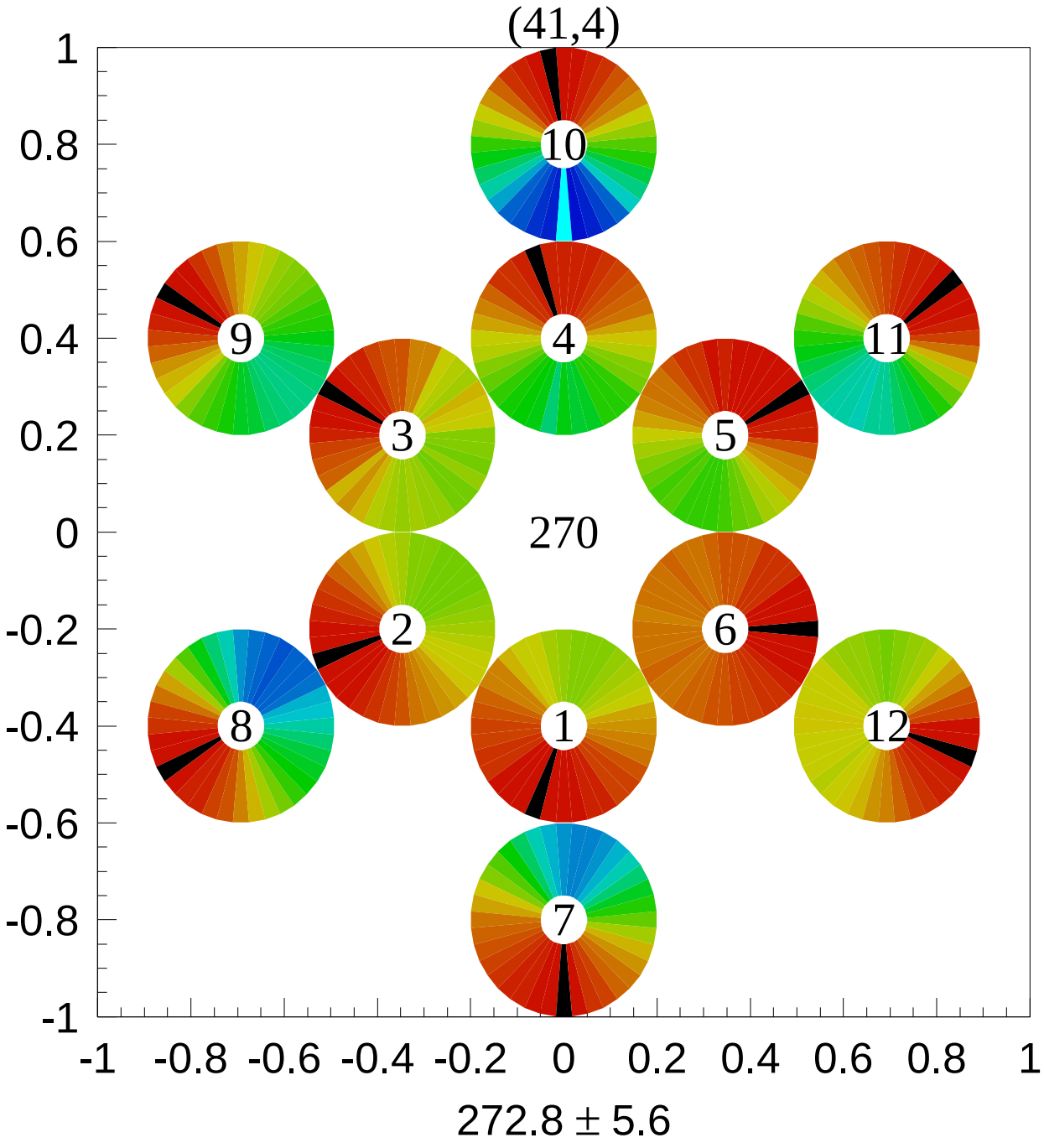

(41,2)
tilted LEDs
123 125 126 124 116 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 119 119 121 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

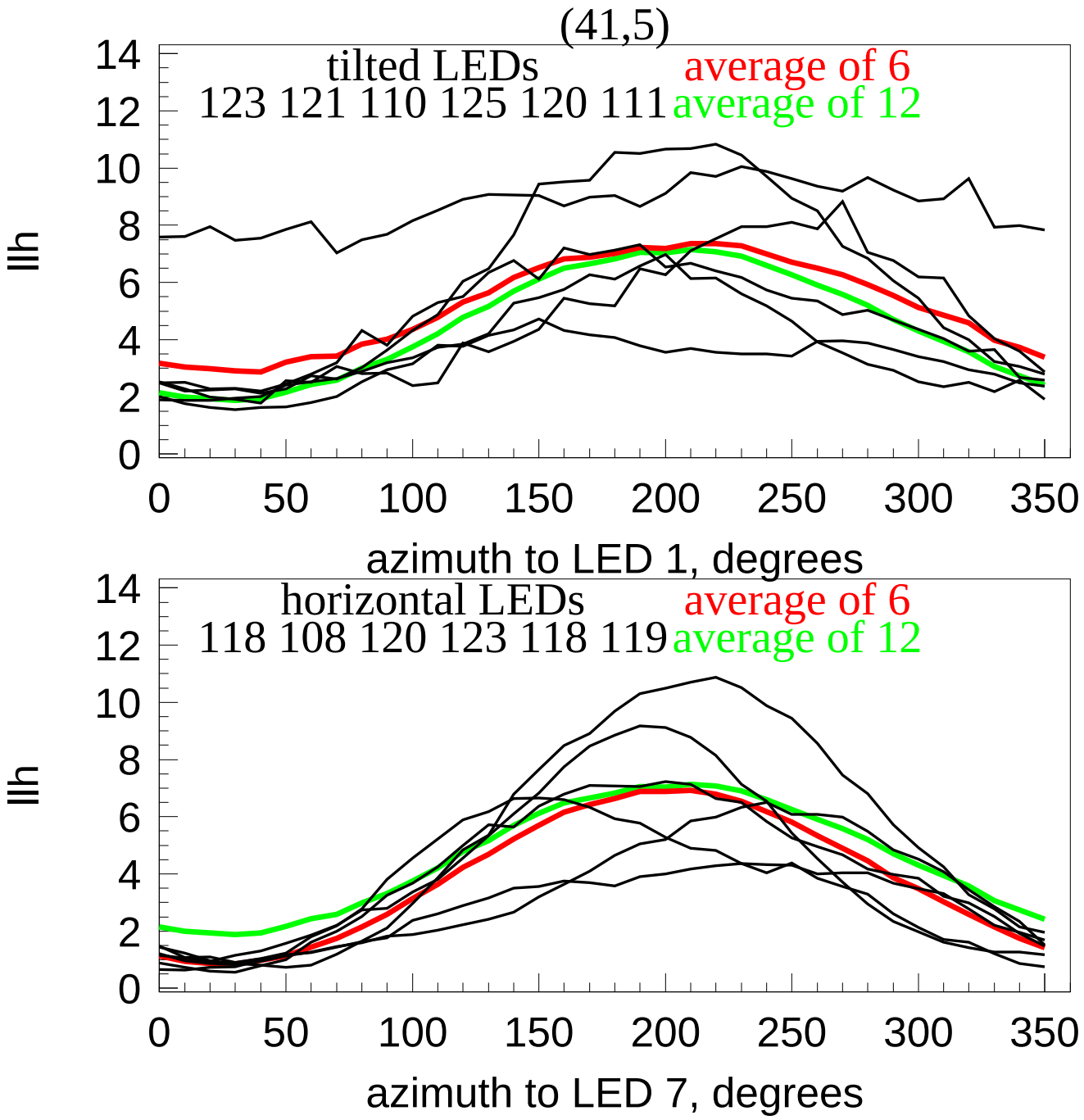

(41,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
289.5 ± 8.7

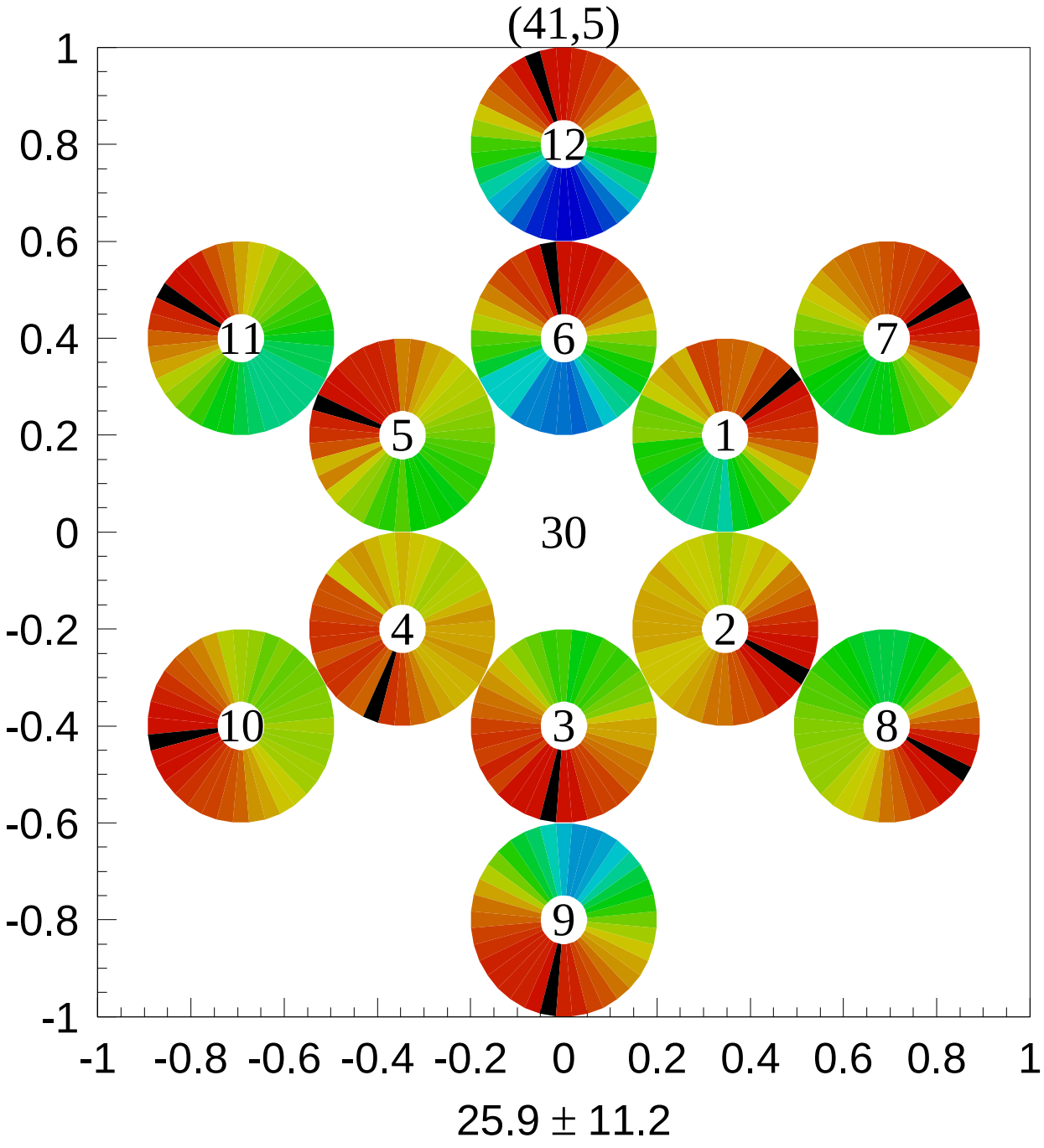

(41,3)
tilted LEDs
117 121 129 120 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 126 117 118 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

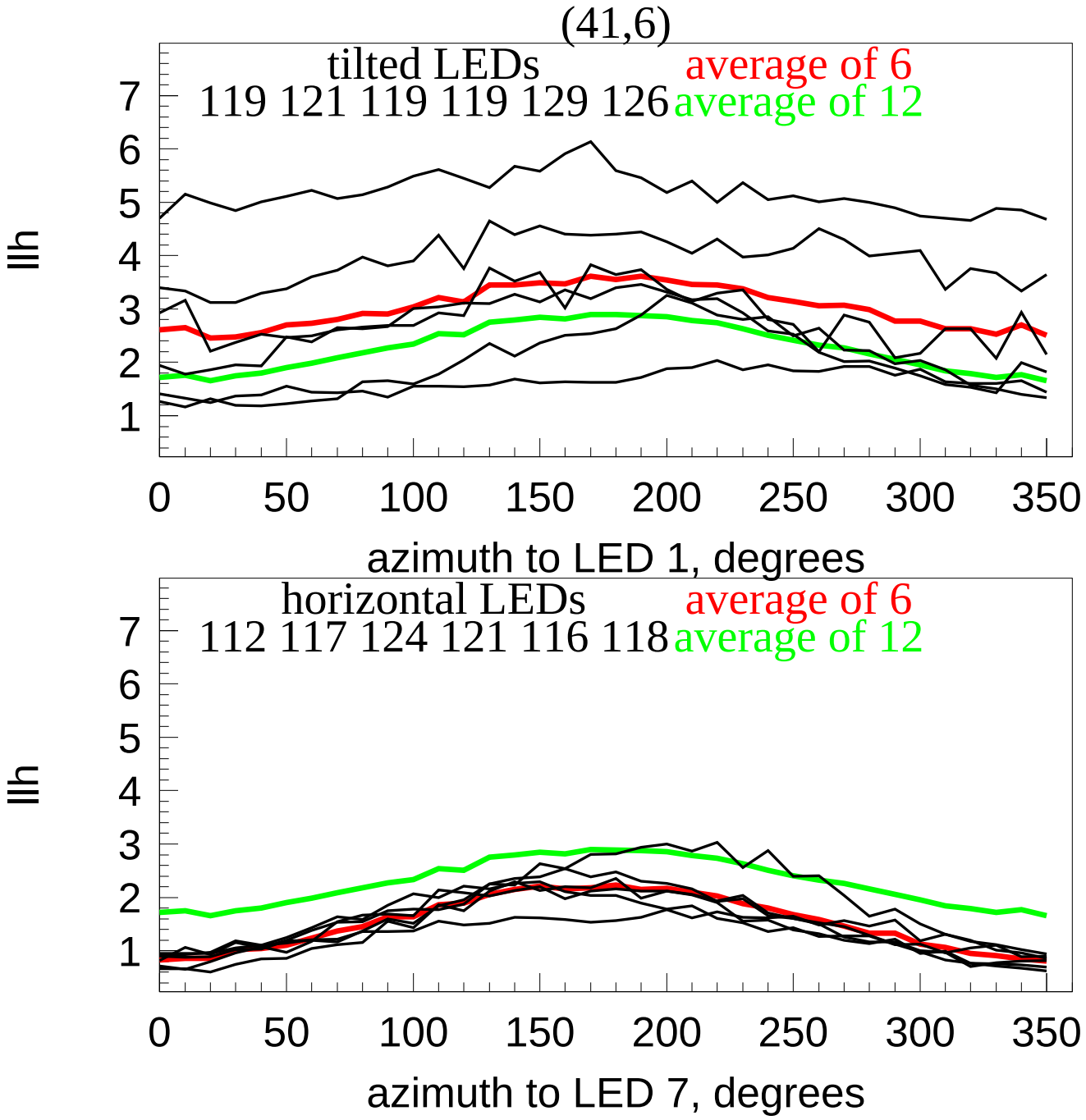

(41,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.1 ± 5.9

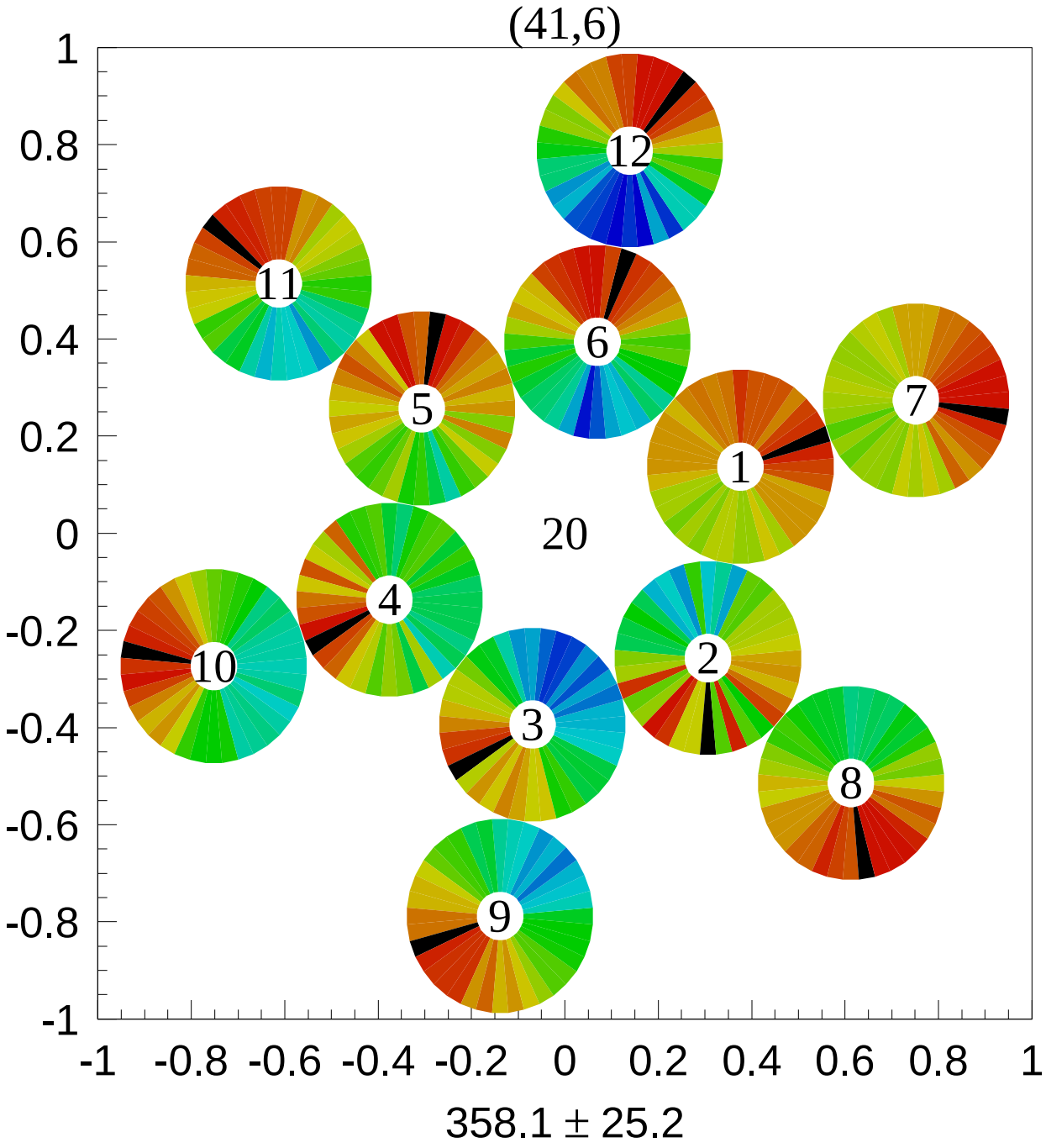

(41,4)
tilted LEDs
116 117 113 112 122 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 114 126 126 120 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

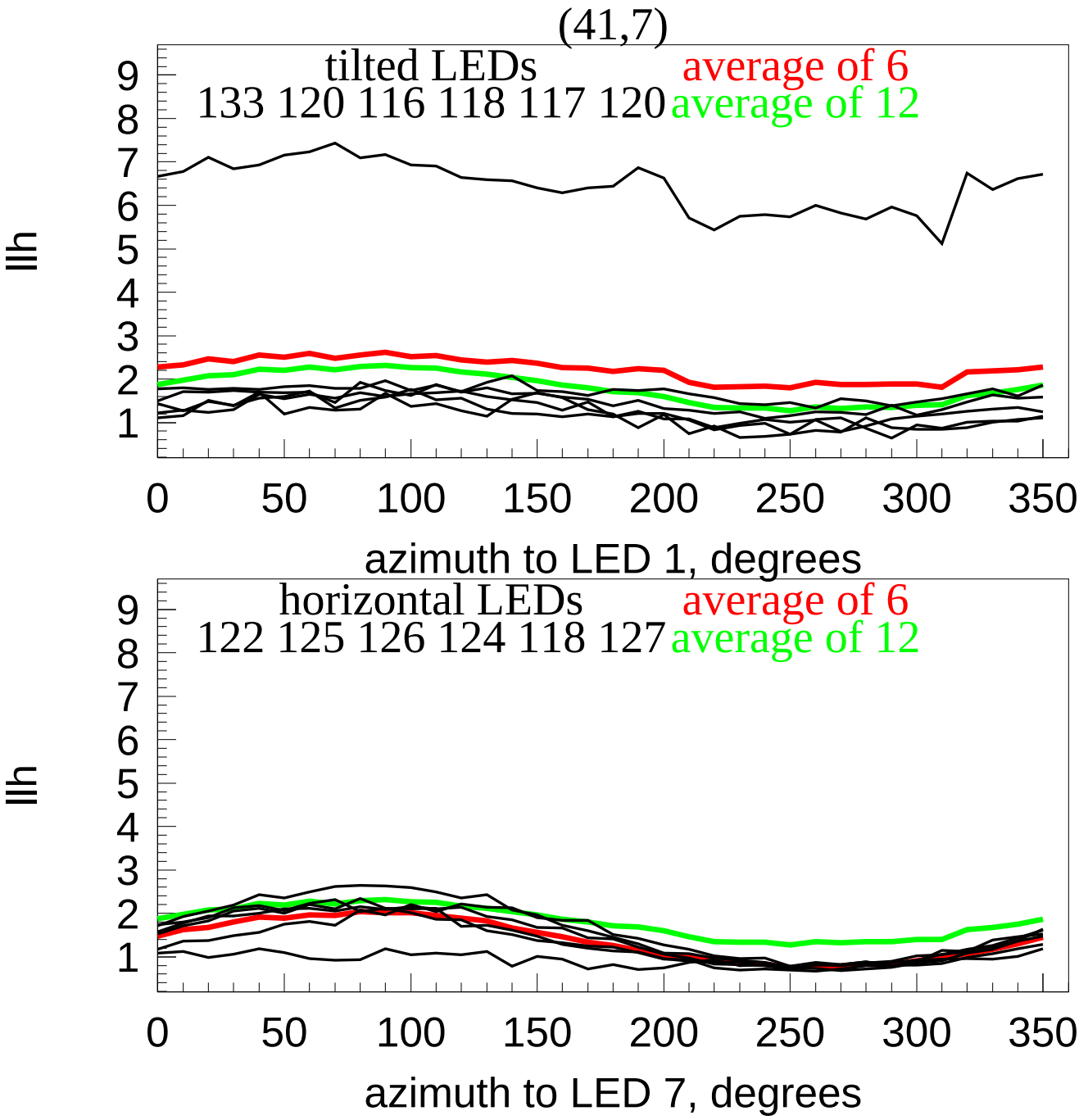

(41,4)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.8 ± 5.6

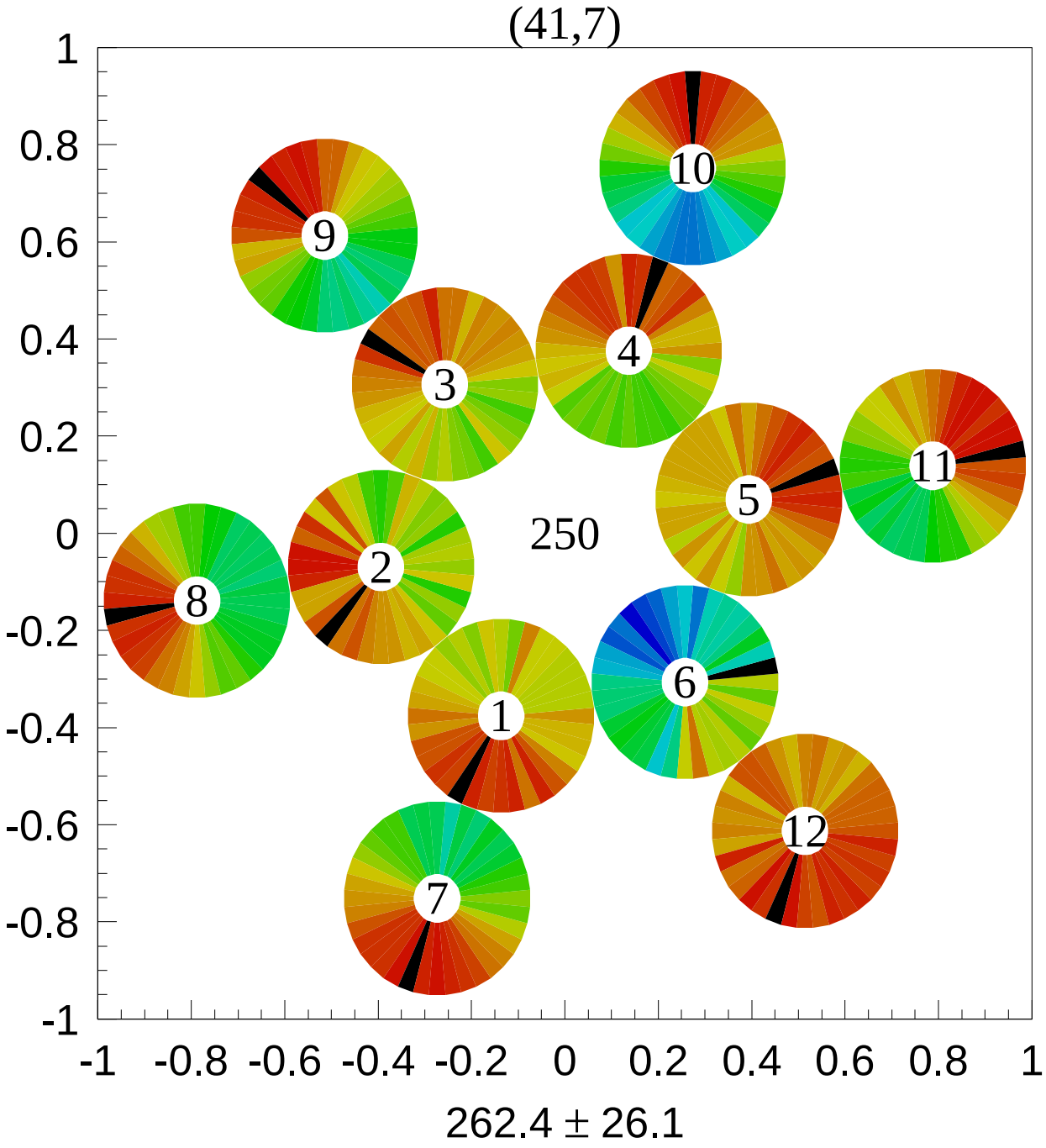

(41,5)
tilted LEDs
123 121 110 125 120 111
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 108 120 123 118 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

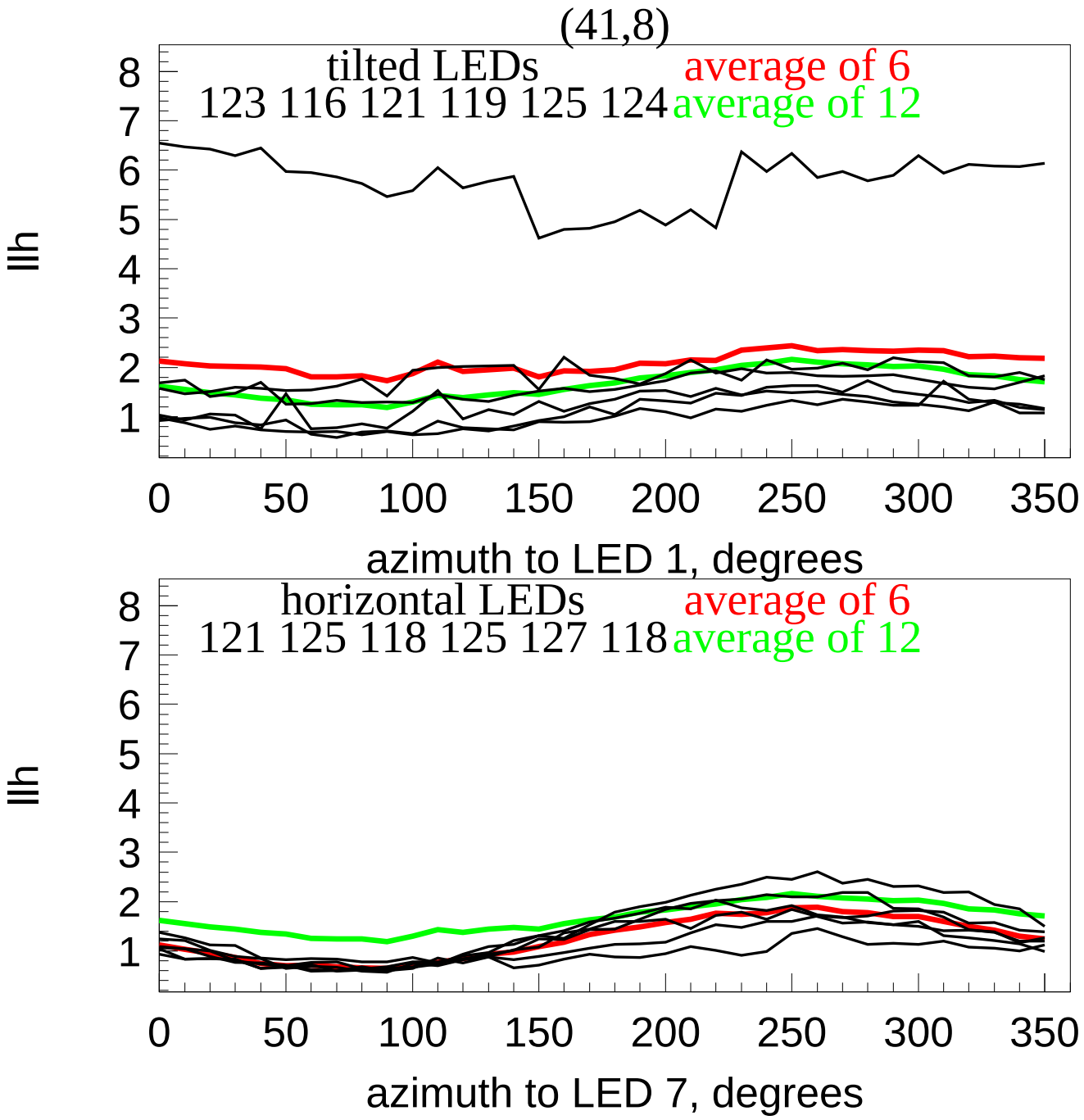

(41,5)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
25.9 ± 11.2

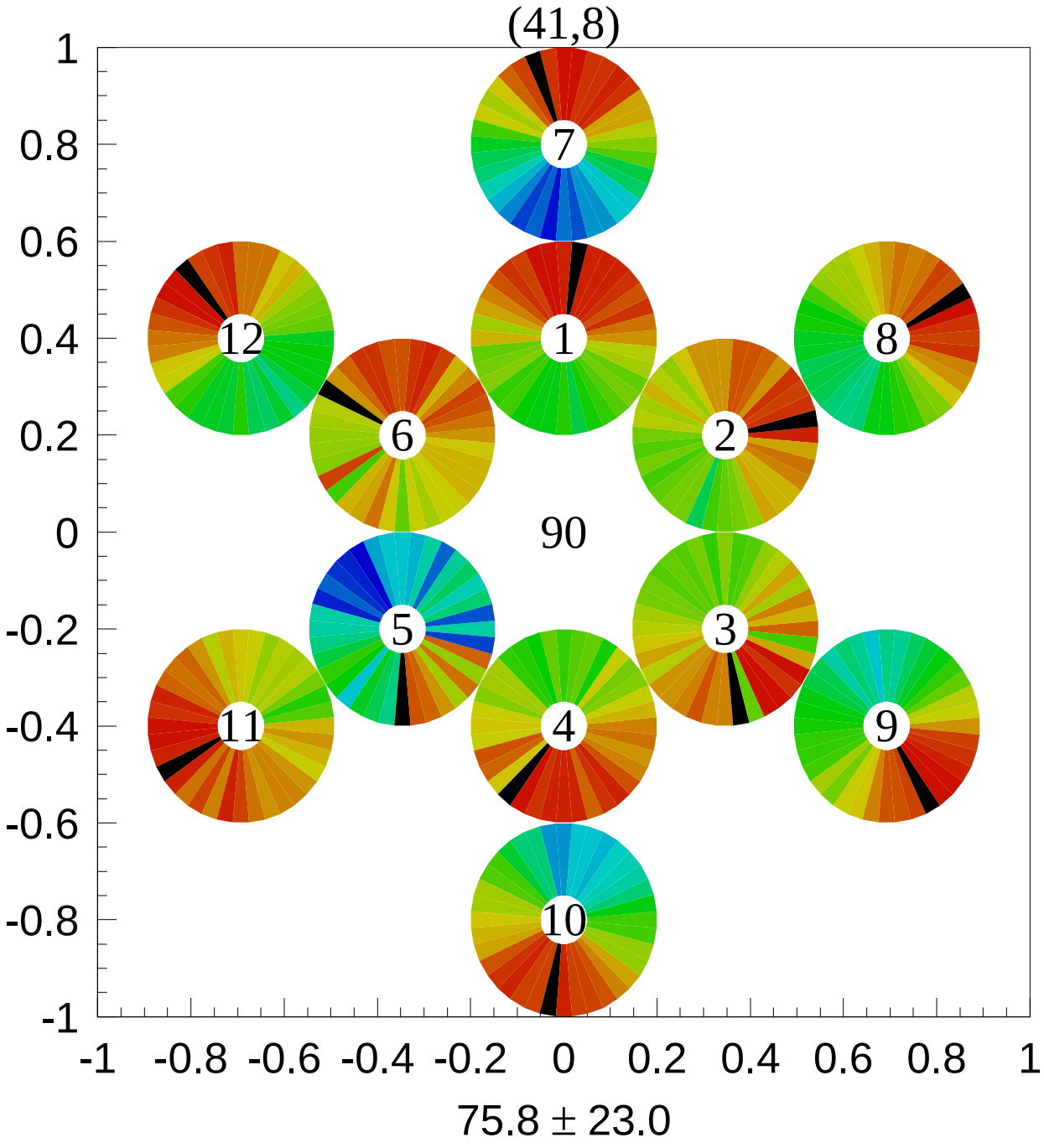

(41,6)
tilted LEDs
119 121 119 119 129 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
112 117 124 121 116 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

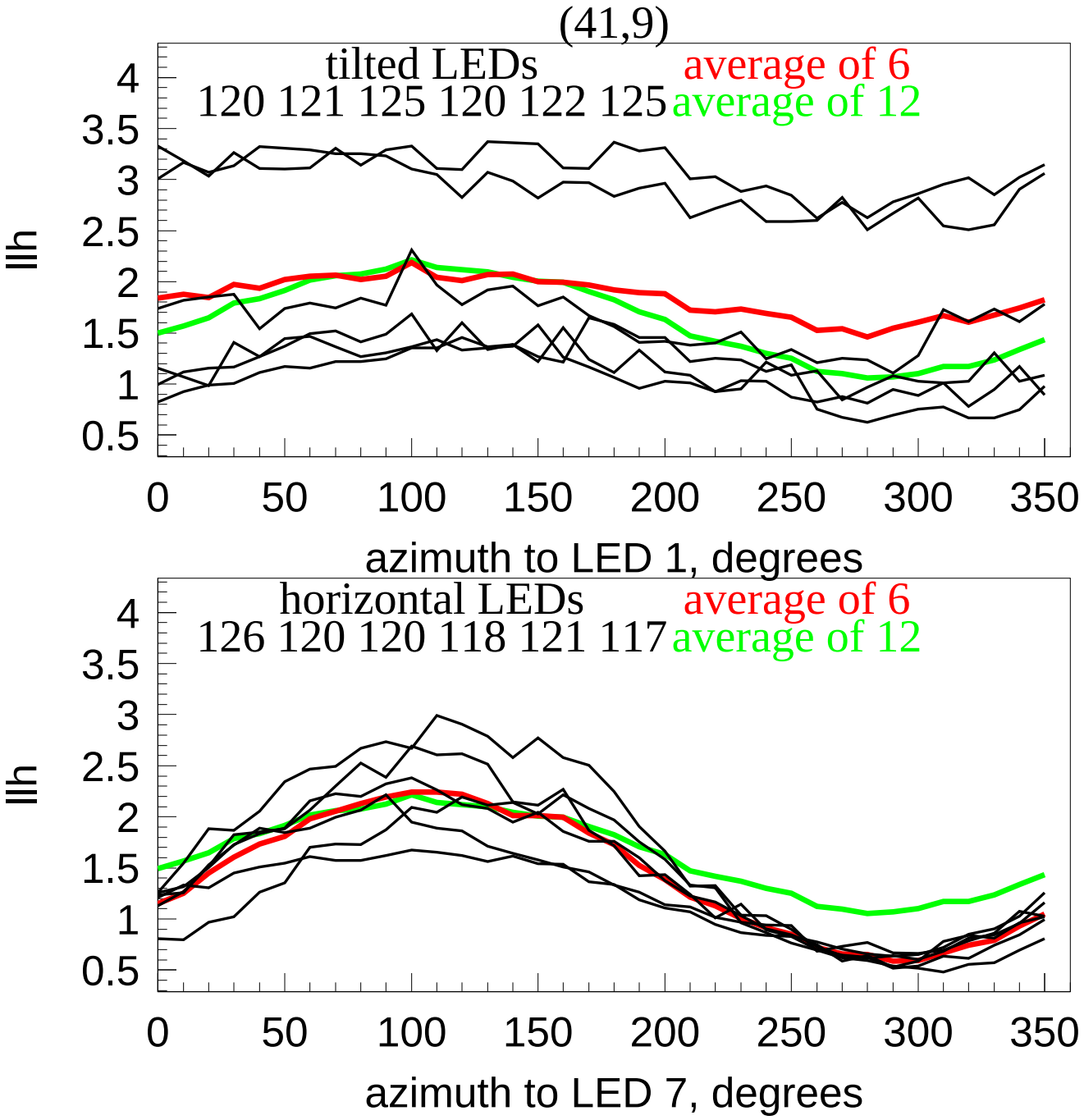

(41,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
358.1 ± 25.2
12
11
6
5
7
1
20
4
10
2
3
8
9

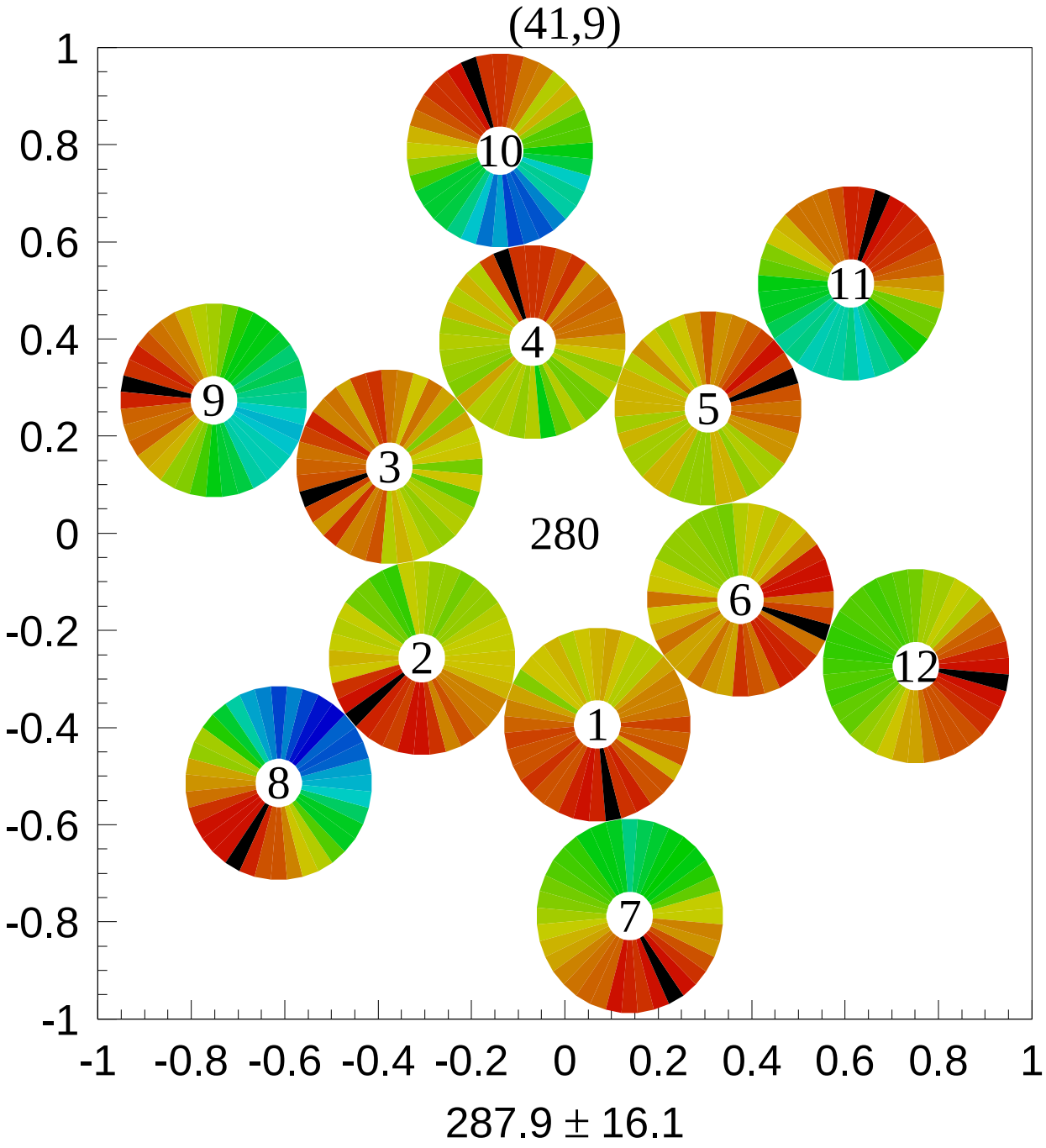

(41,7)
tilted LEDs
133 120 116 118 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 126 124 118 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

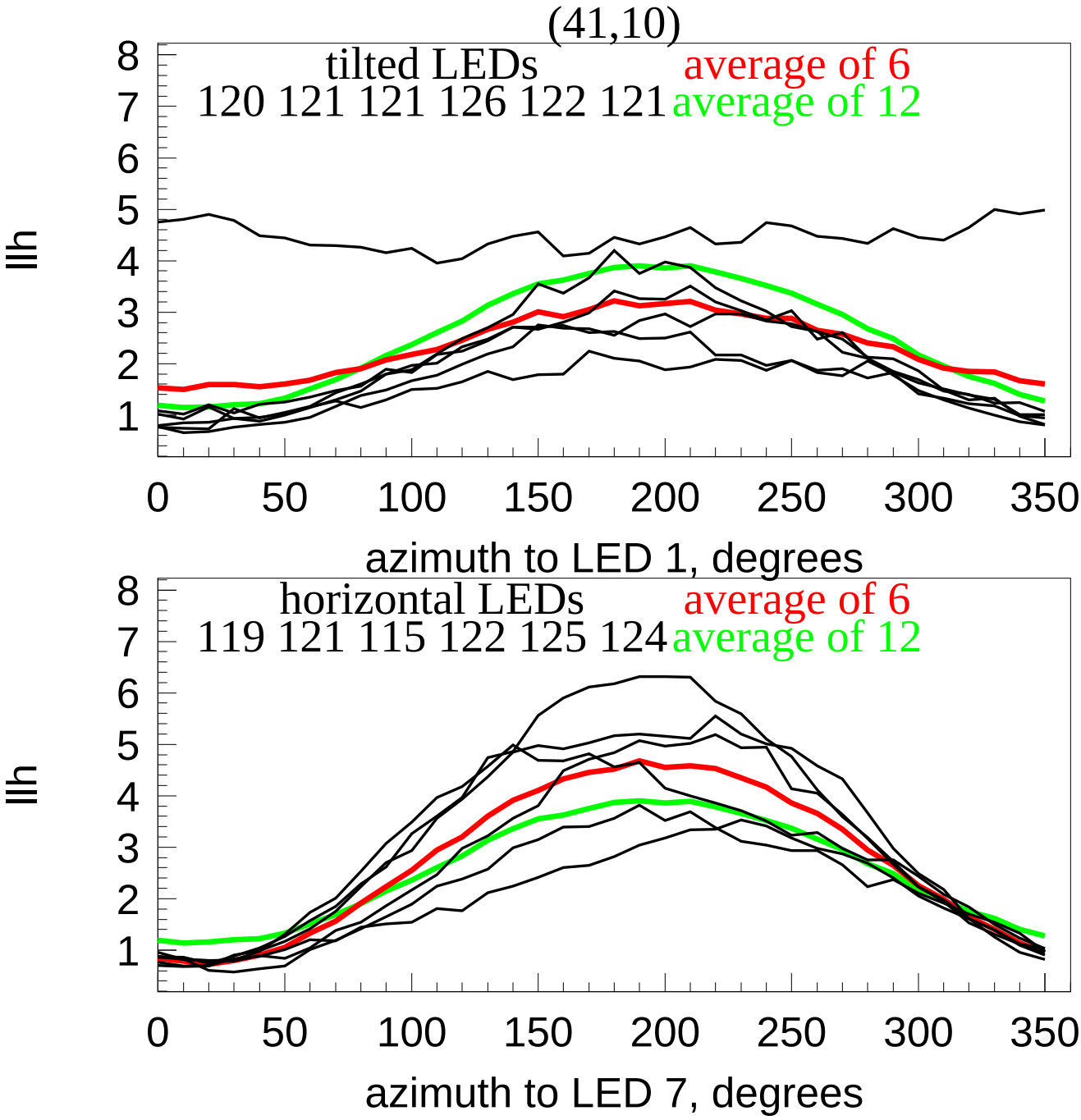

(41,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
262.4 ± 26.1
250
1
2
3
4
5
6
7
8
9
10
11
12

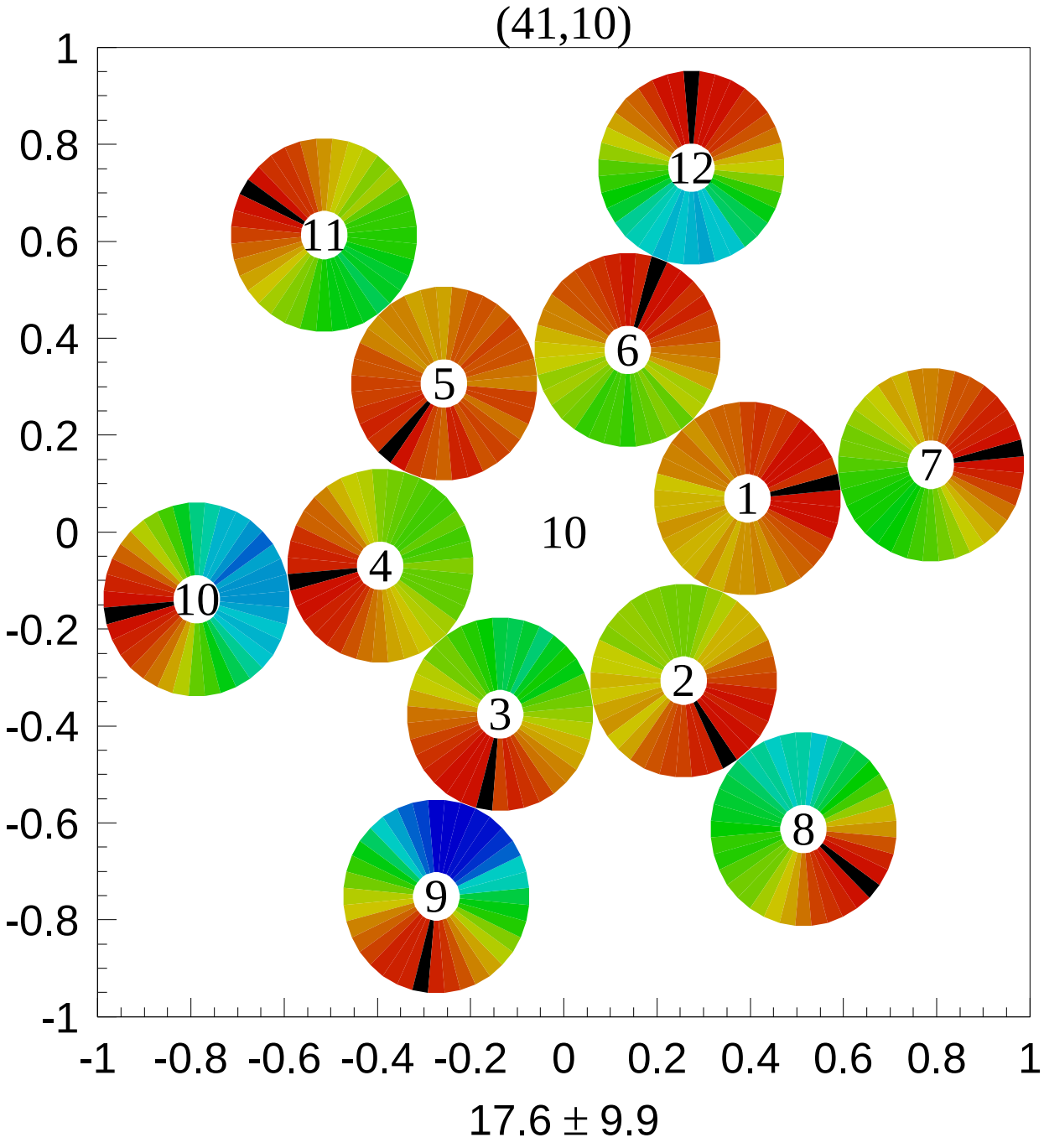

(41,8)
tilted LEDs
123 116 121 119 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 118 125 127 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

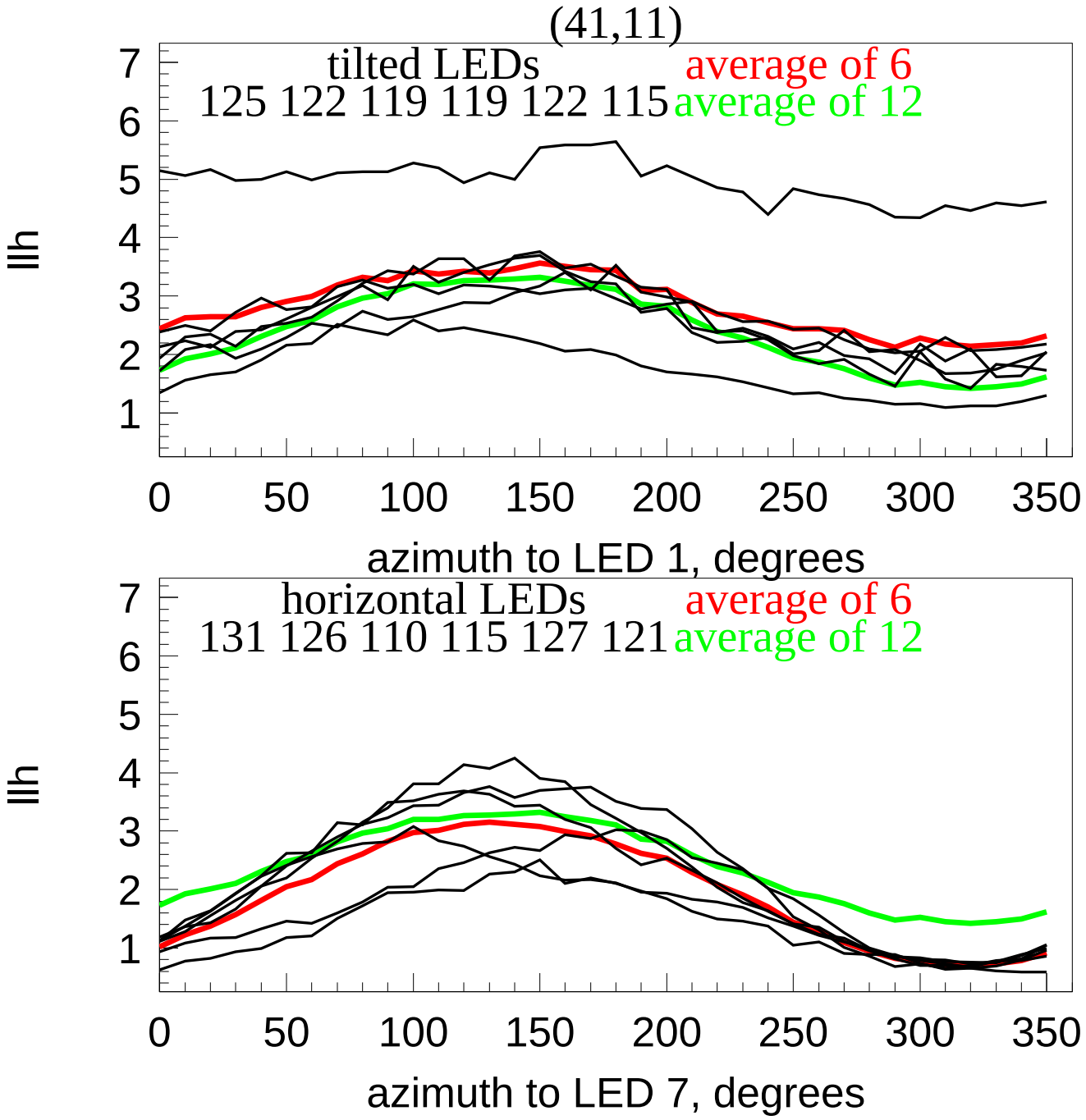

(41,8)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
75.8 ± 23.0

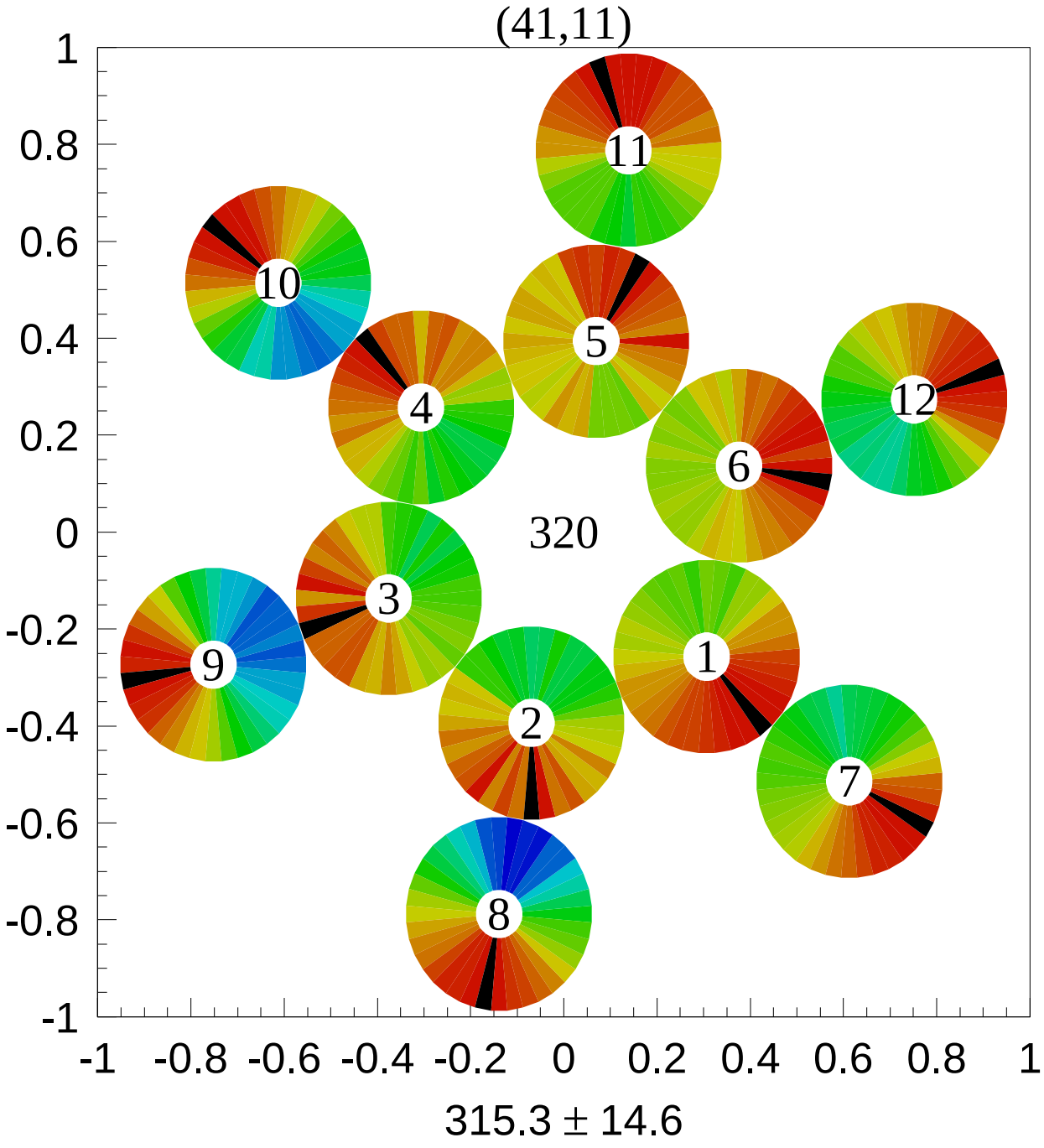

(41,9)
tilted LEDs
120 121 125 120 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 120 118 121 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

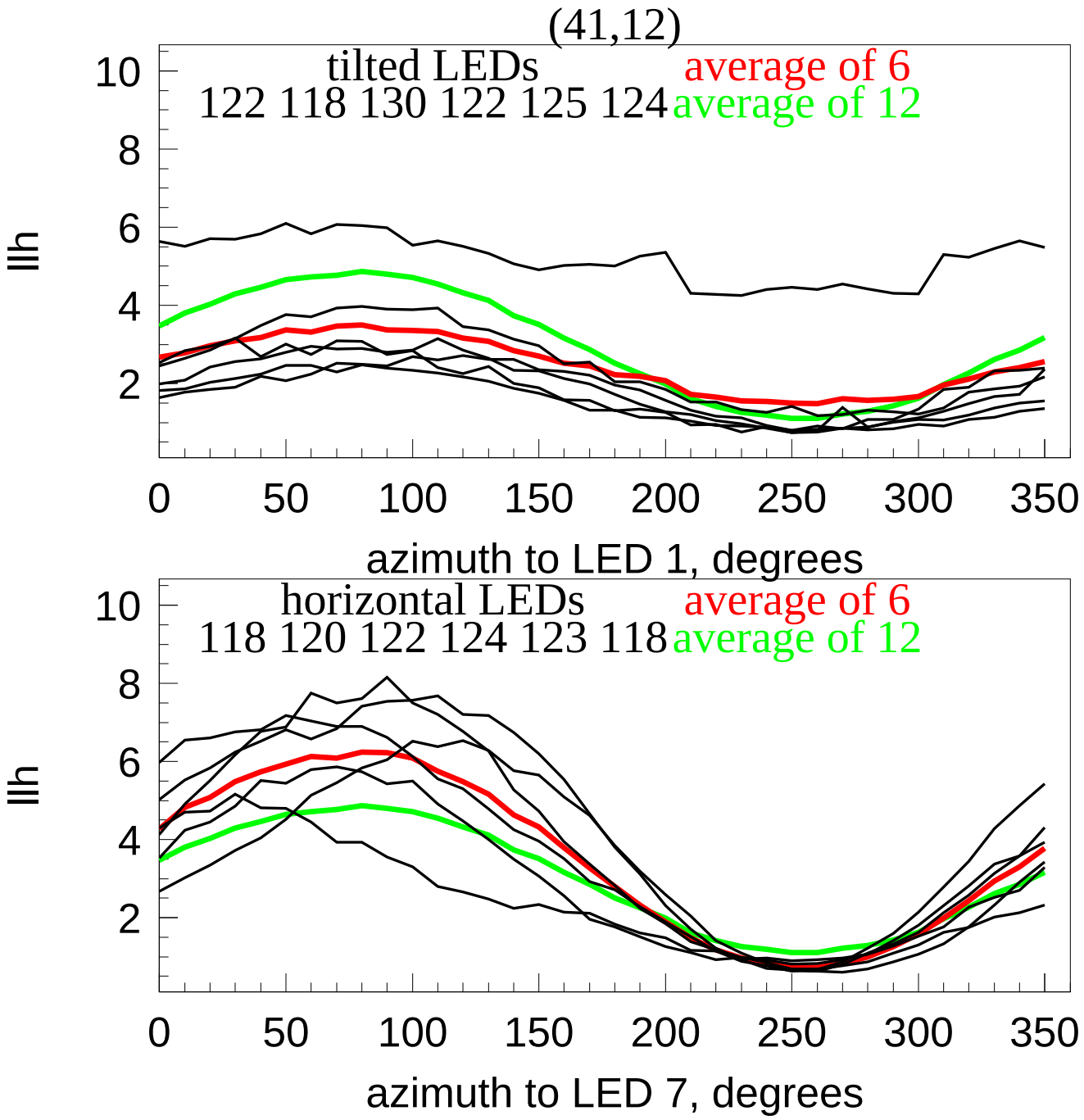

(41,9)
10
4
11
9
3
5
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
287.9 ± 16.1

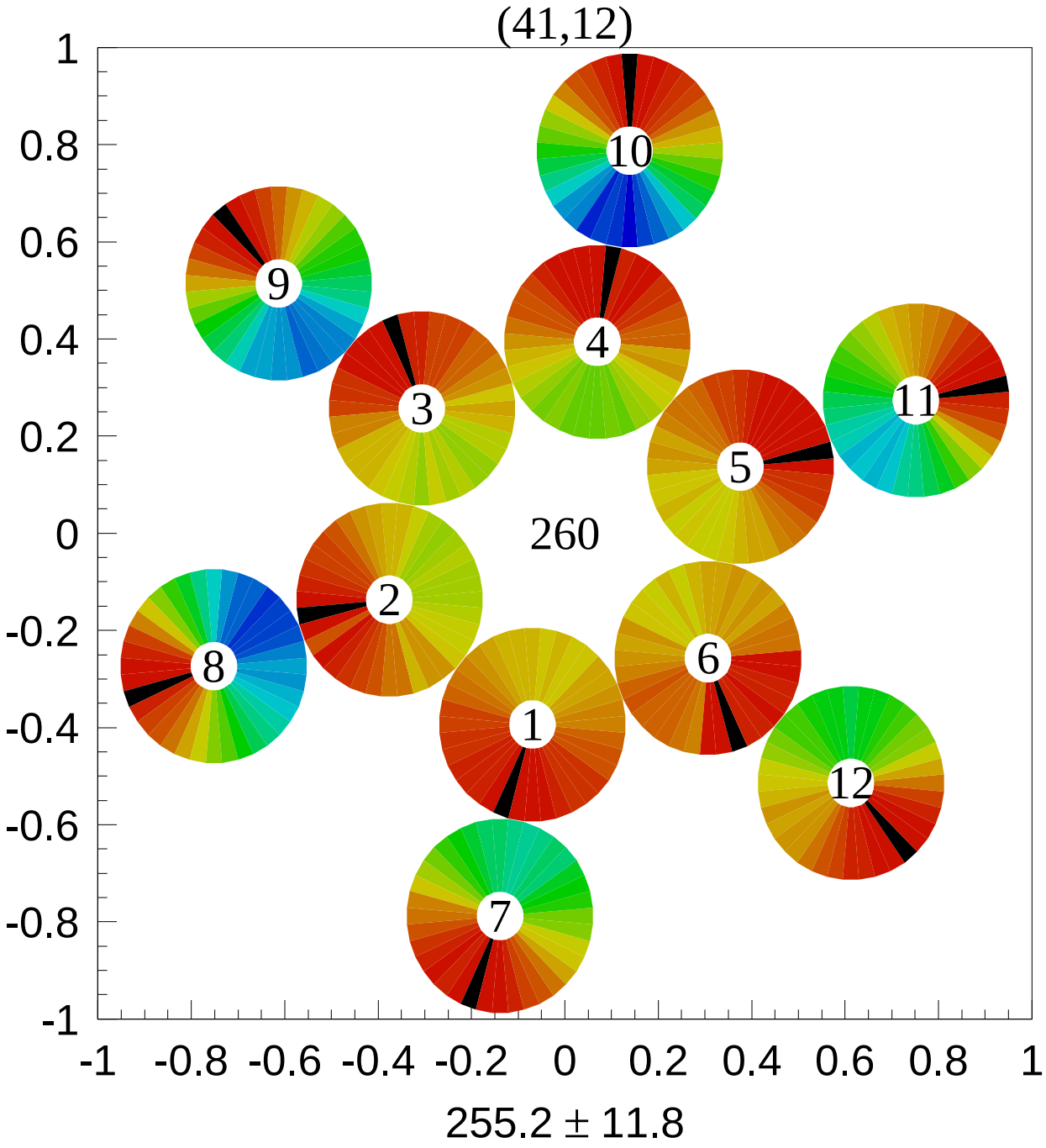

(41,10)
tilted LEDs
120 121 121 126 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 115 122 125 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

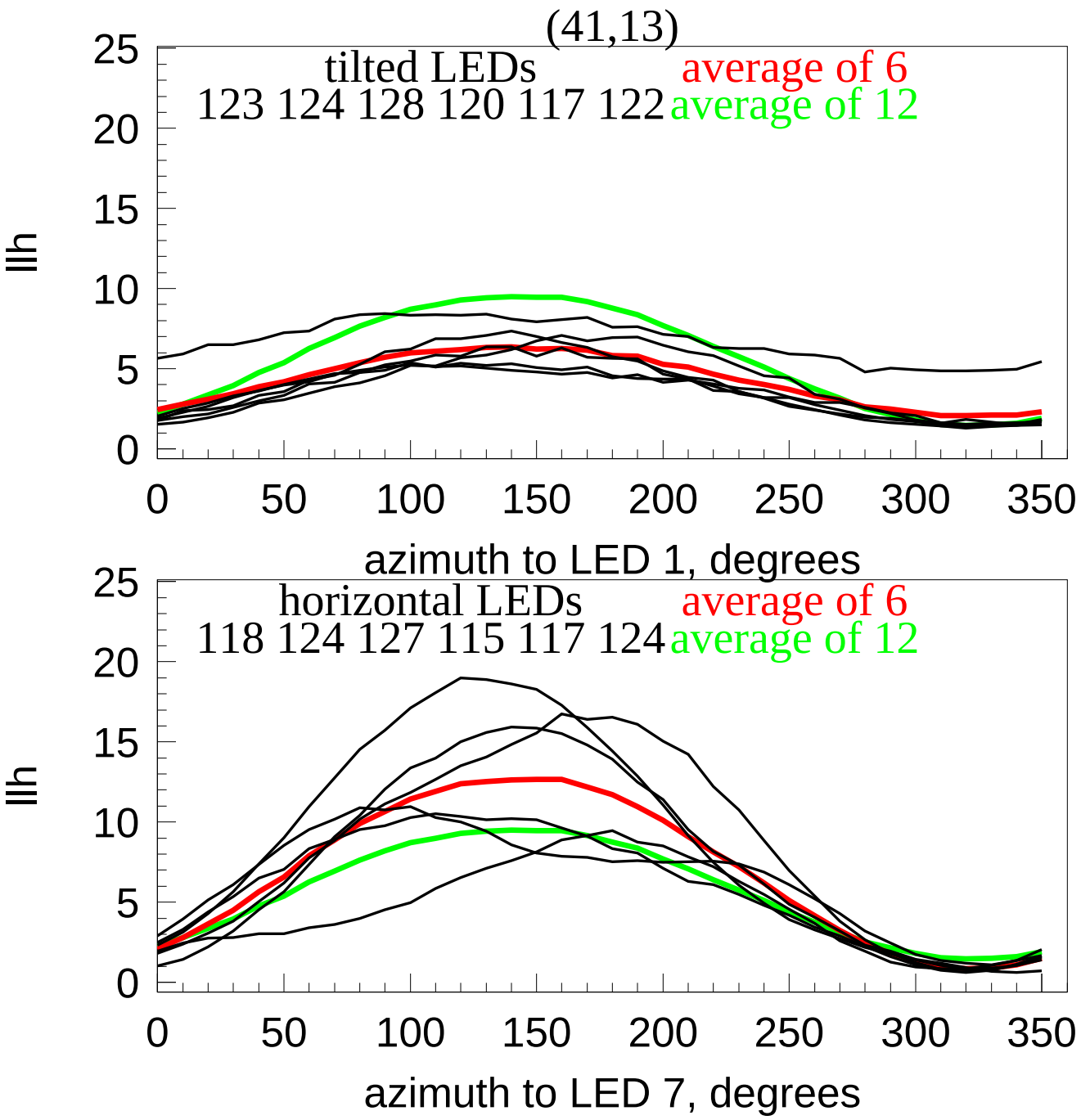

(41,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
17.6 ± 9.9

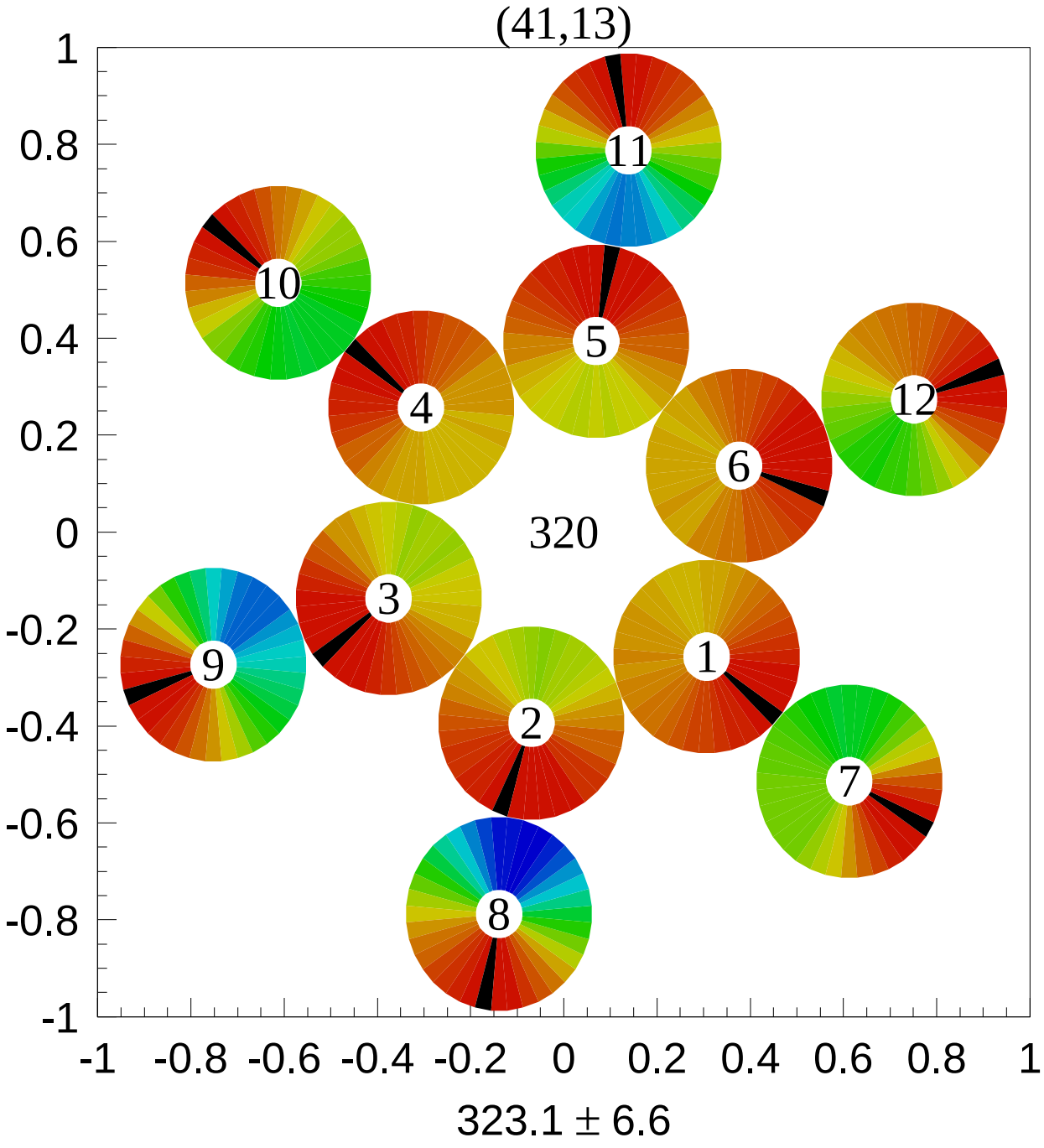

(41,11)
tilted LEDs
125 122 119 119 122 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 126 110 115 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

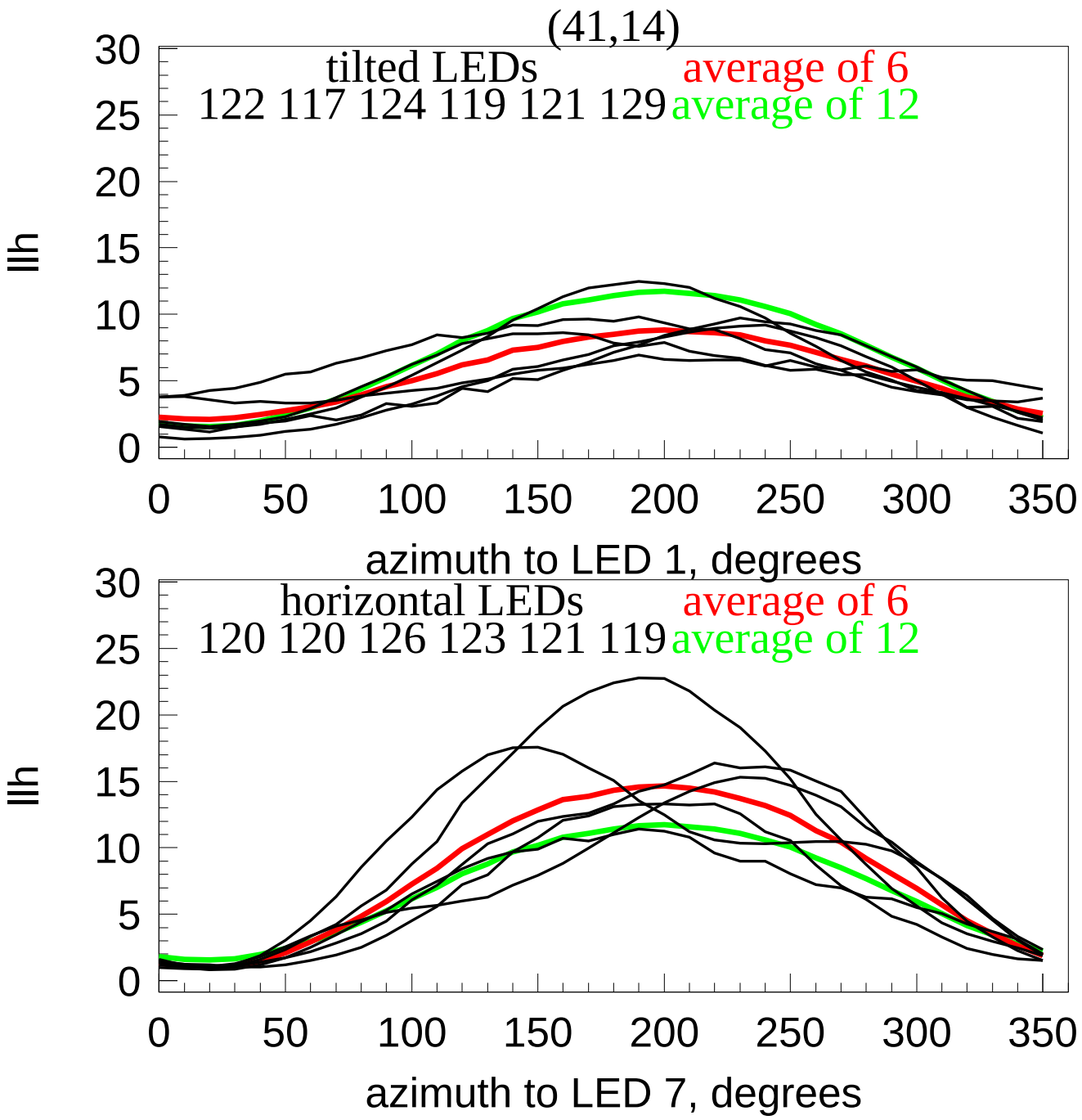

(41,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
315.3 ± 14.6

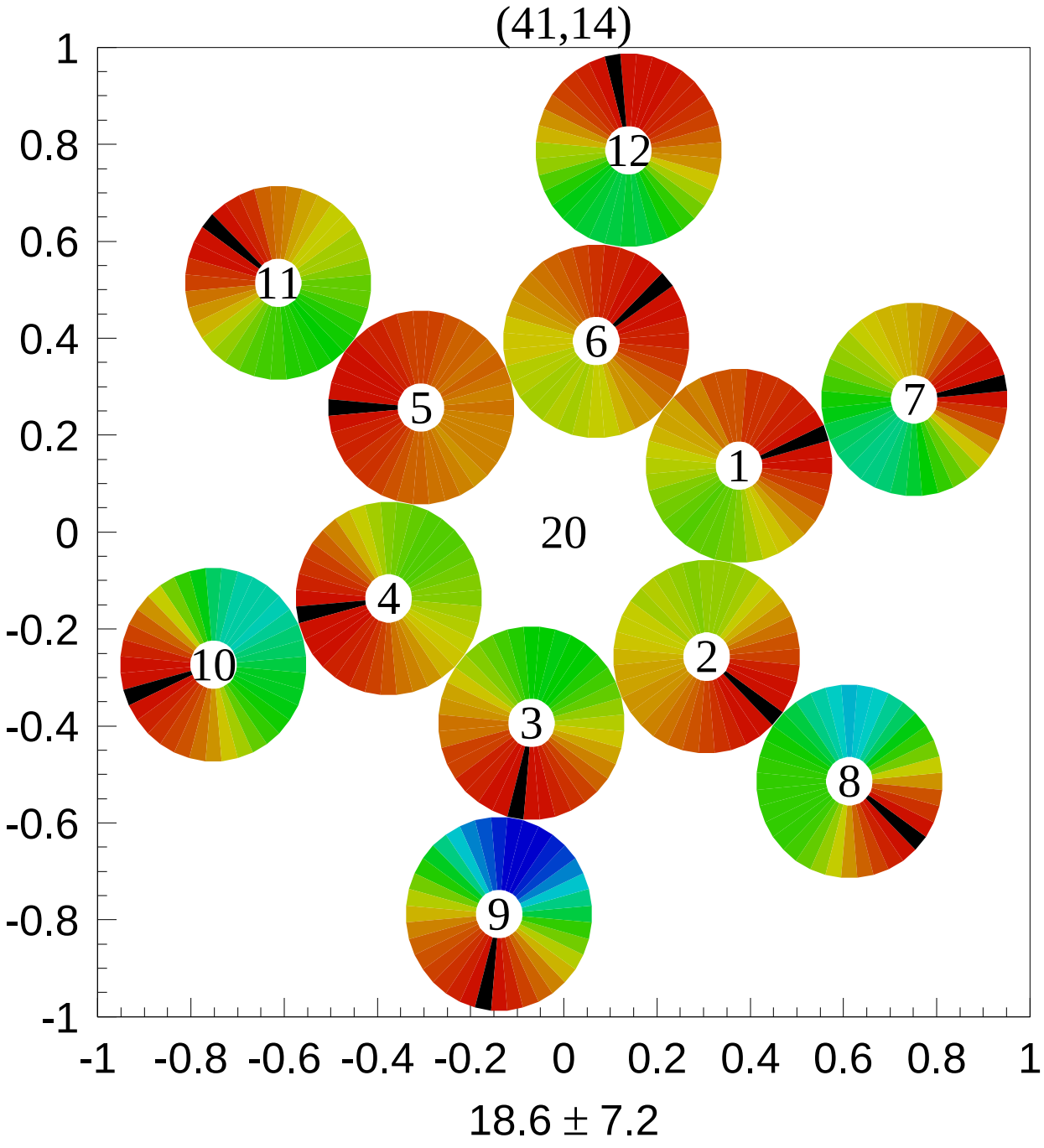

(41,12)
tilted LEDs
122 118 130 122 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 122 124 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

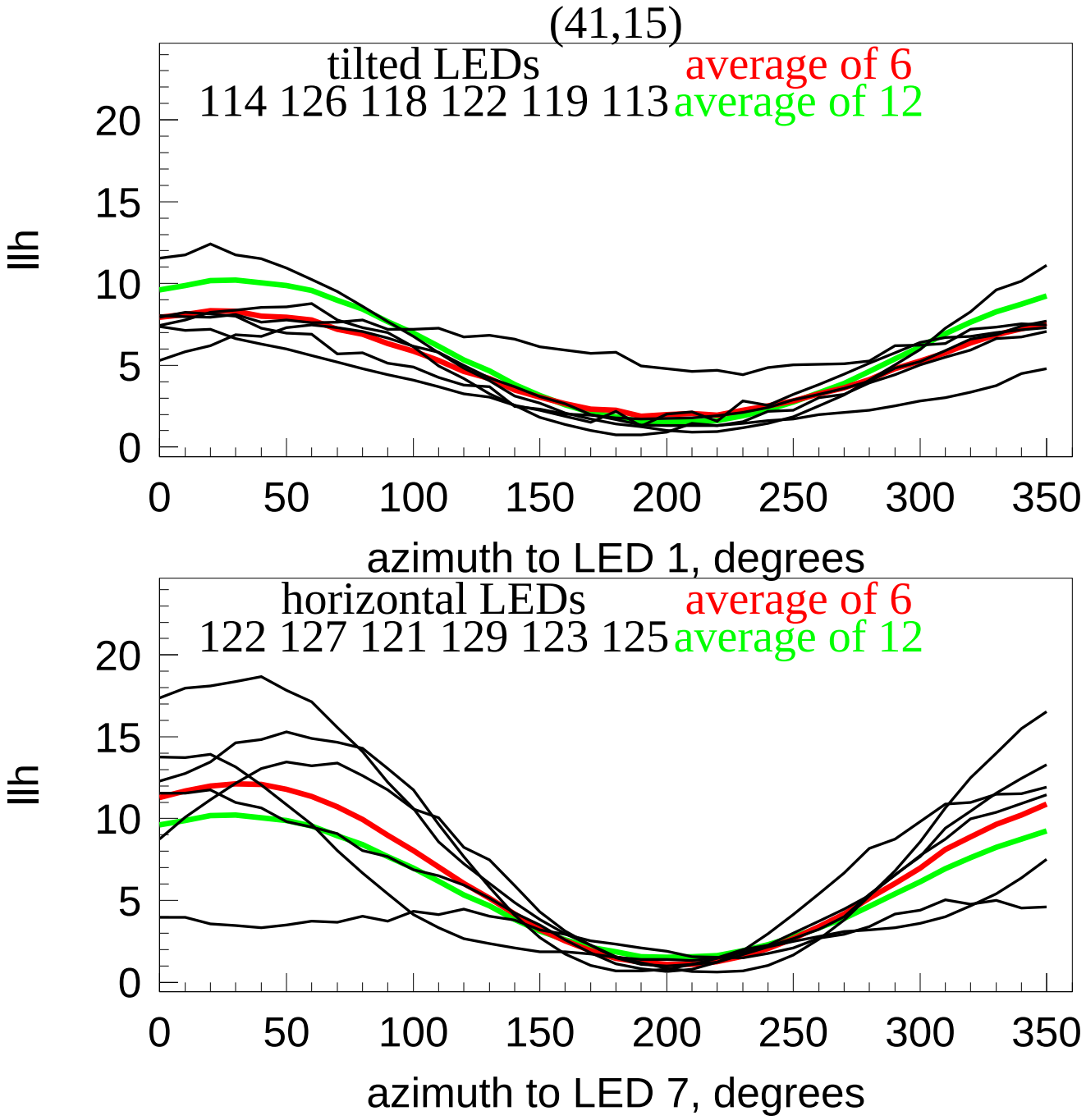

(41,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
255.2 ± 11.8

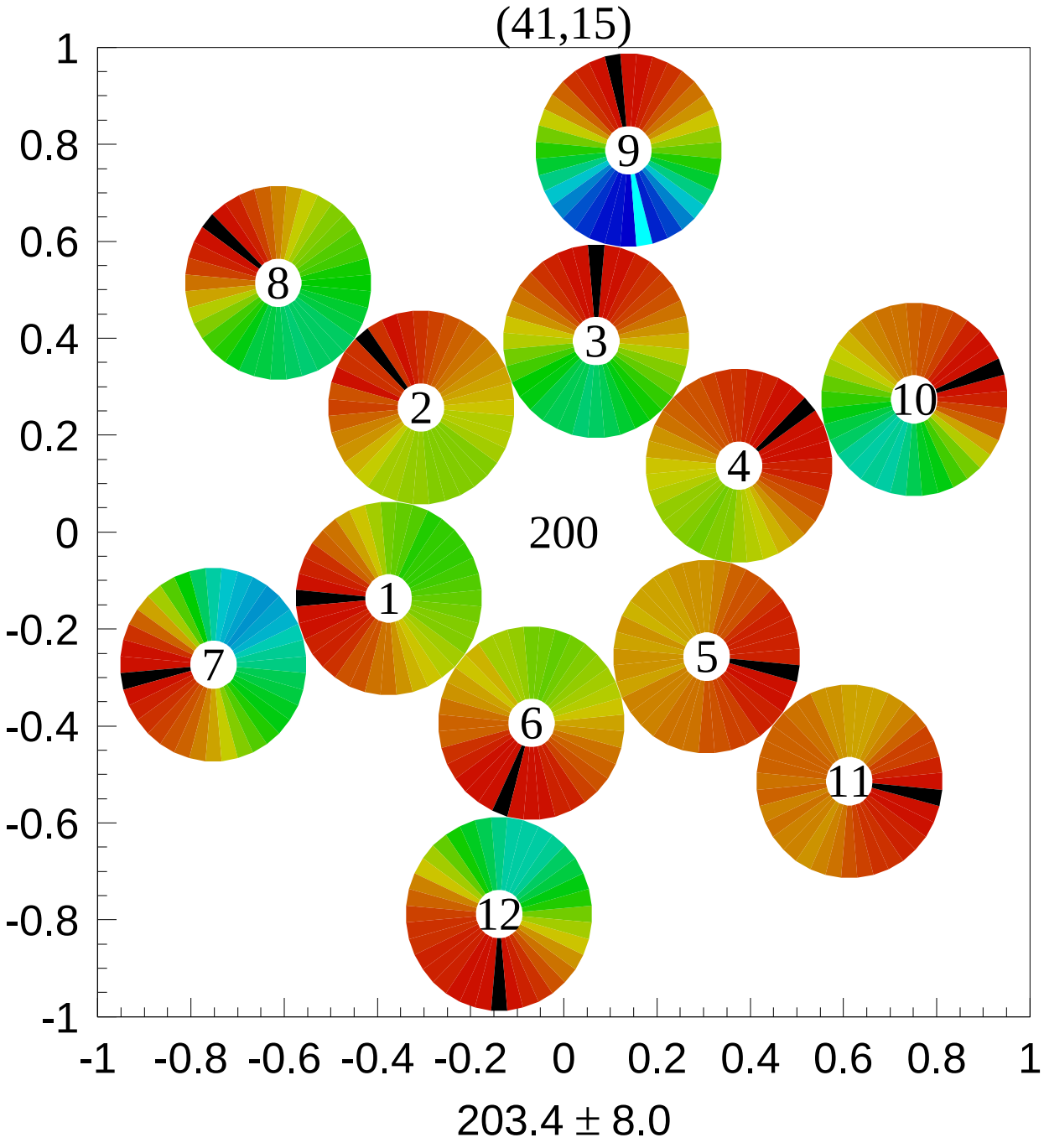

(41,13)
tilted LEDs
123 124 128 120 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 124 127 115 117 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

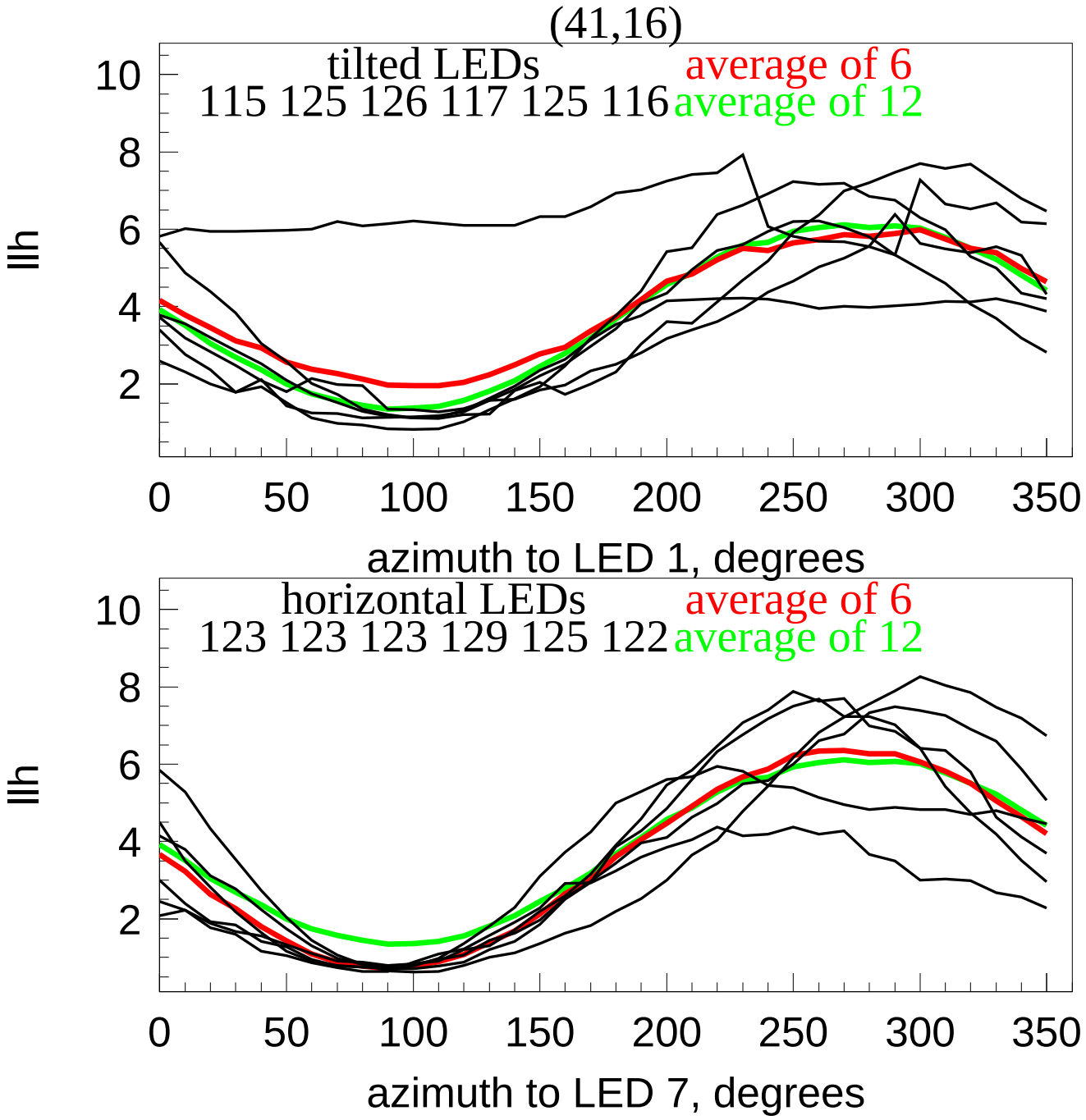

(41,13)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
323.1 ± 6.6

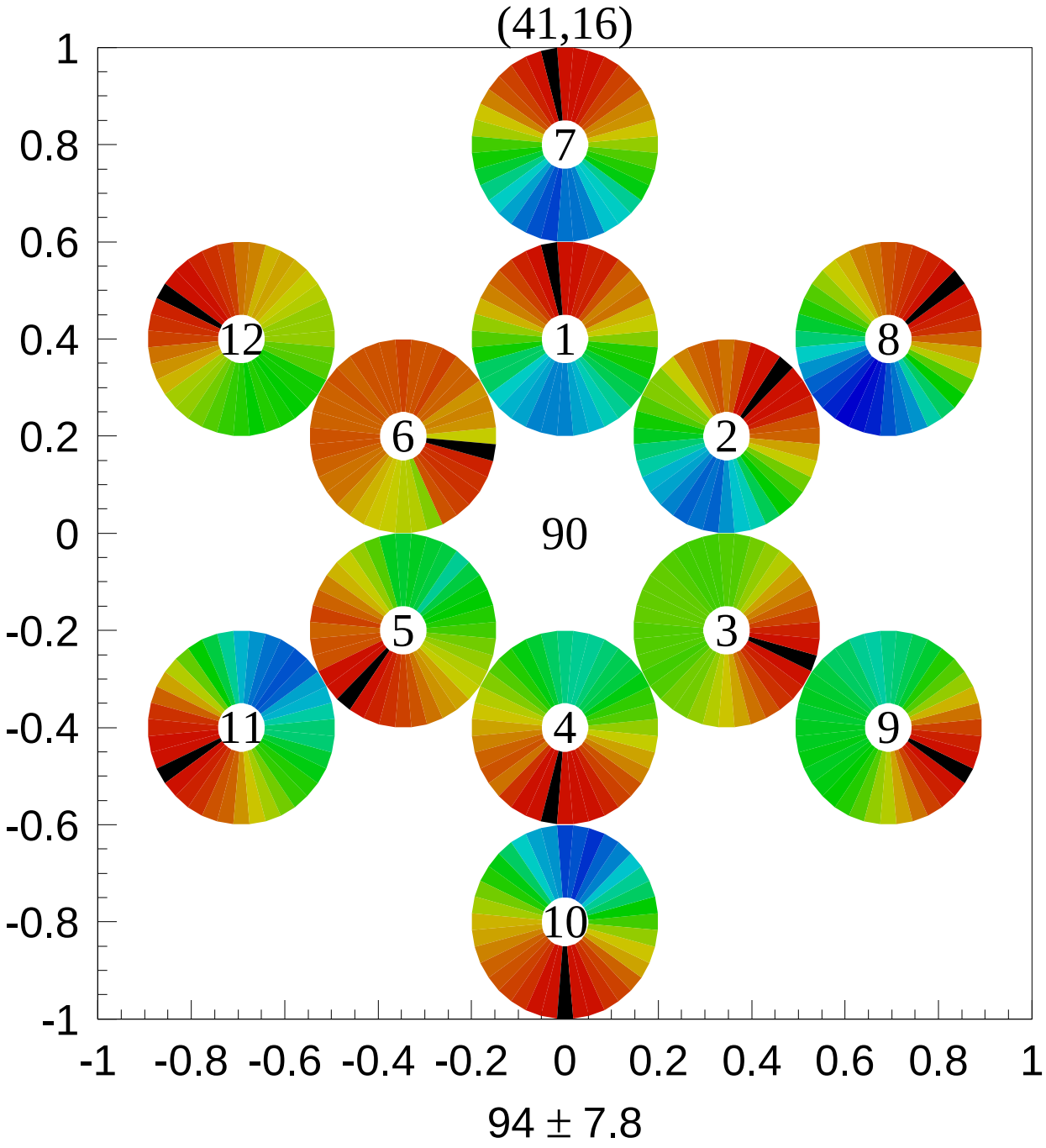

(41,14)
tilted LEDs
122 117 124 119 121 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 126 123 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

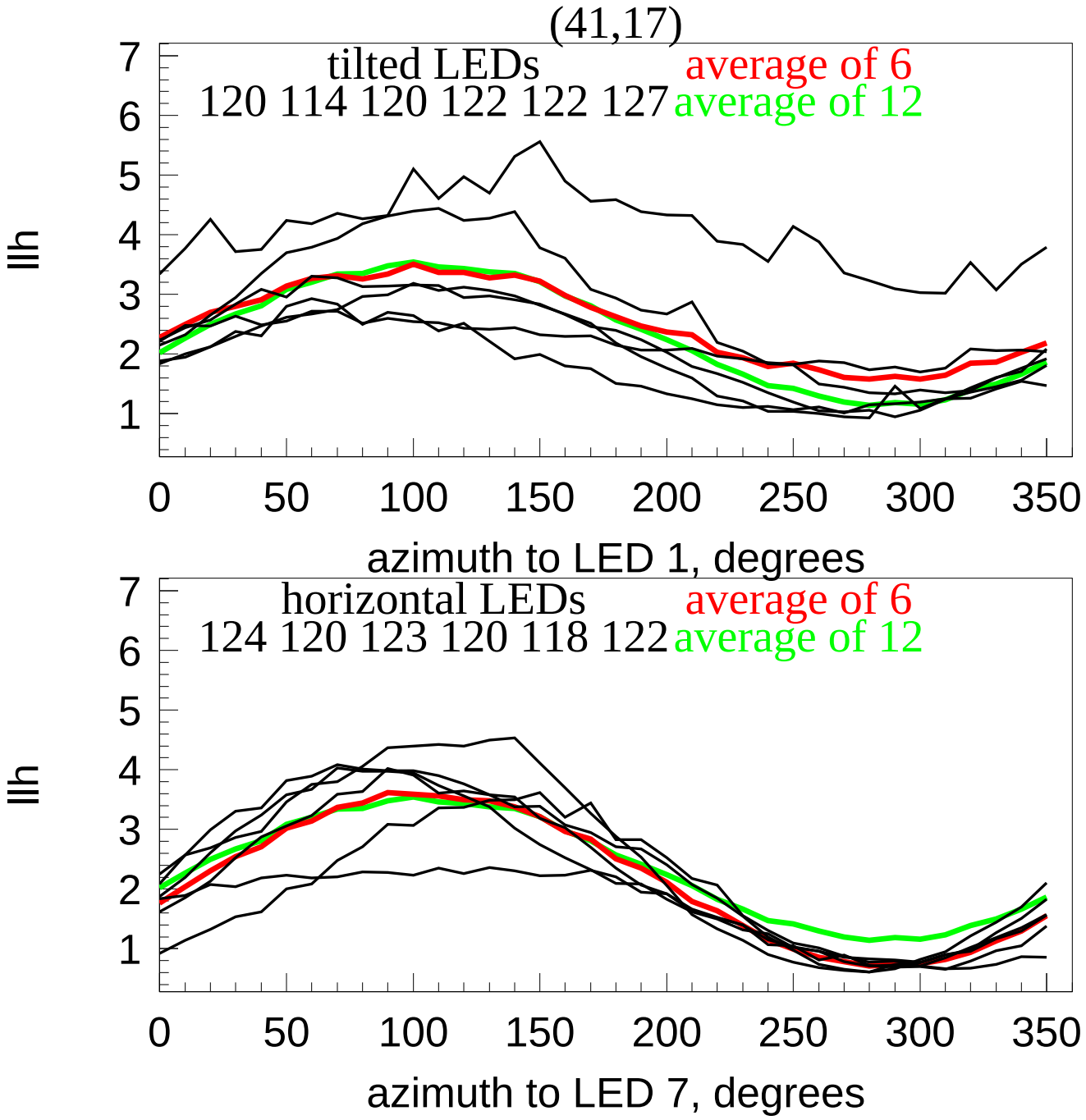

(41,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
18.6 ± 7.2

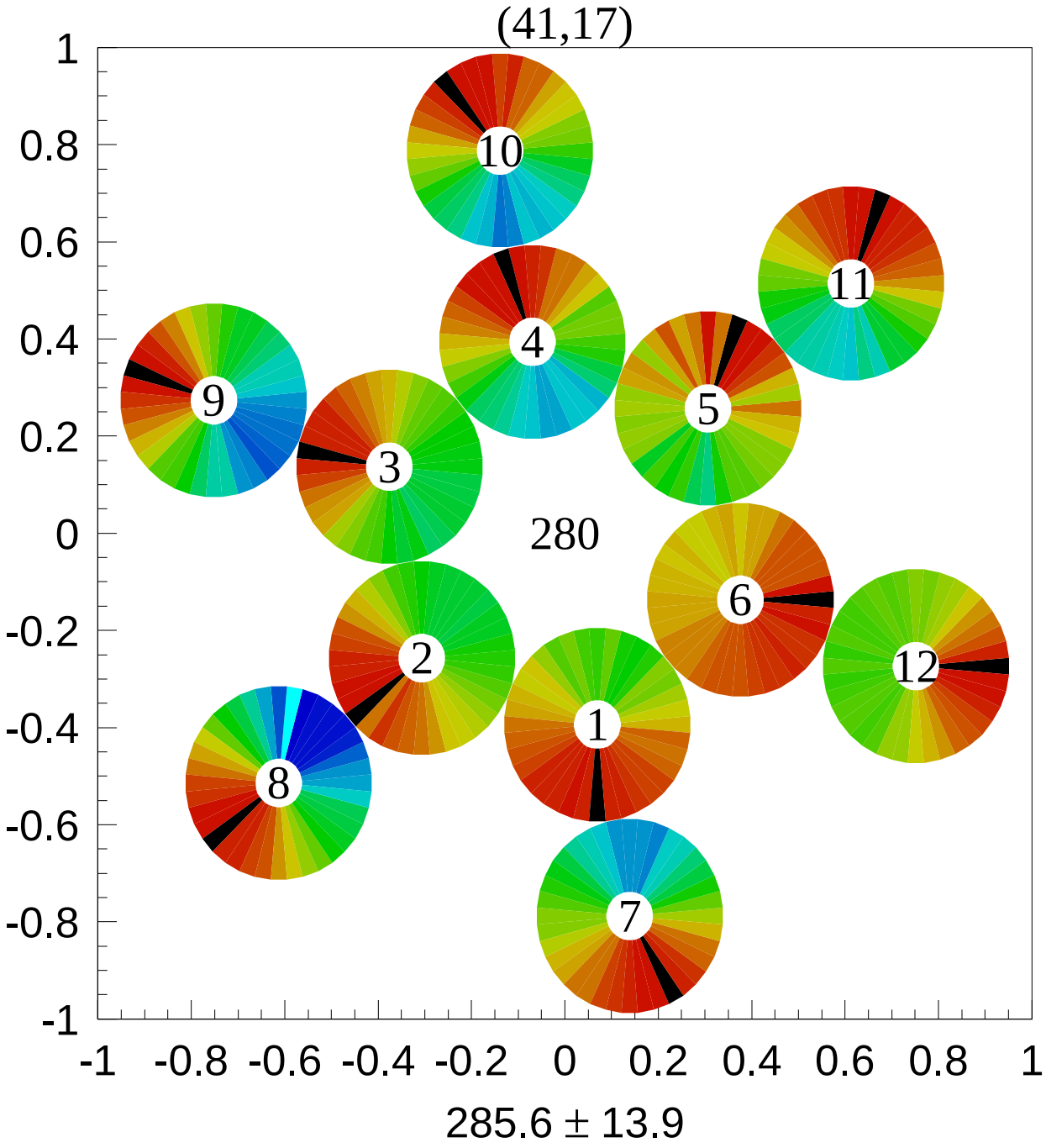

(41,15)
tilted LEDs
114 126 118 122 119 113
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 127 121 129 123 125
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

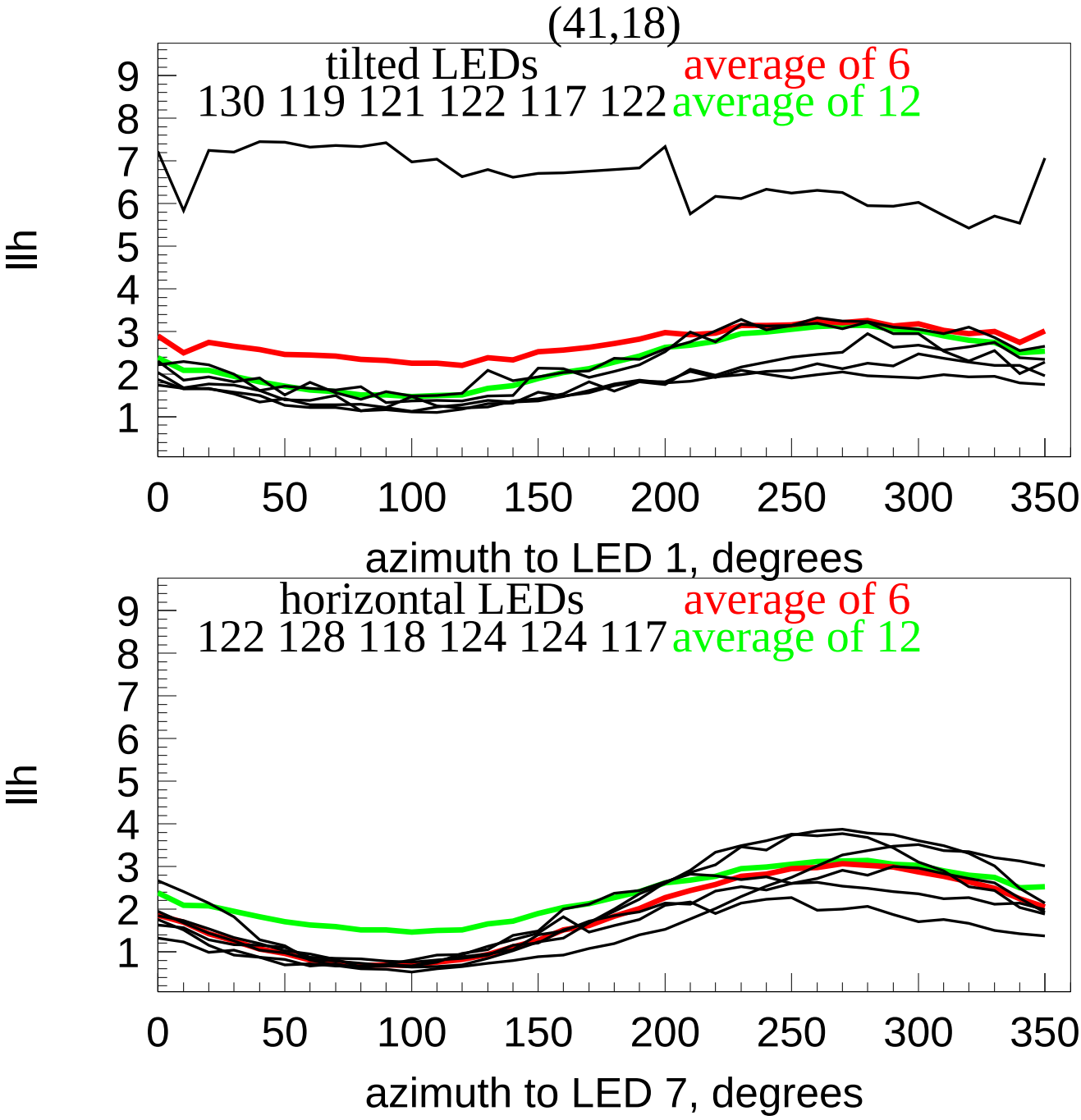

(41,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
203.4 ± 8.0

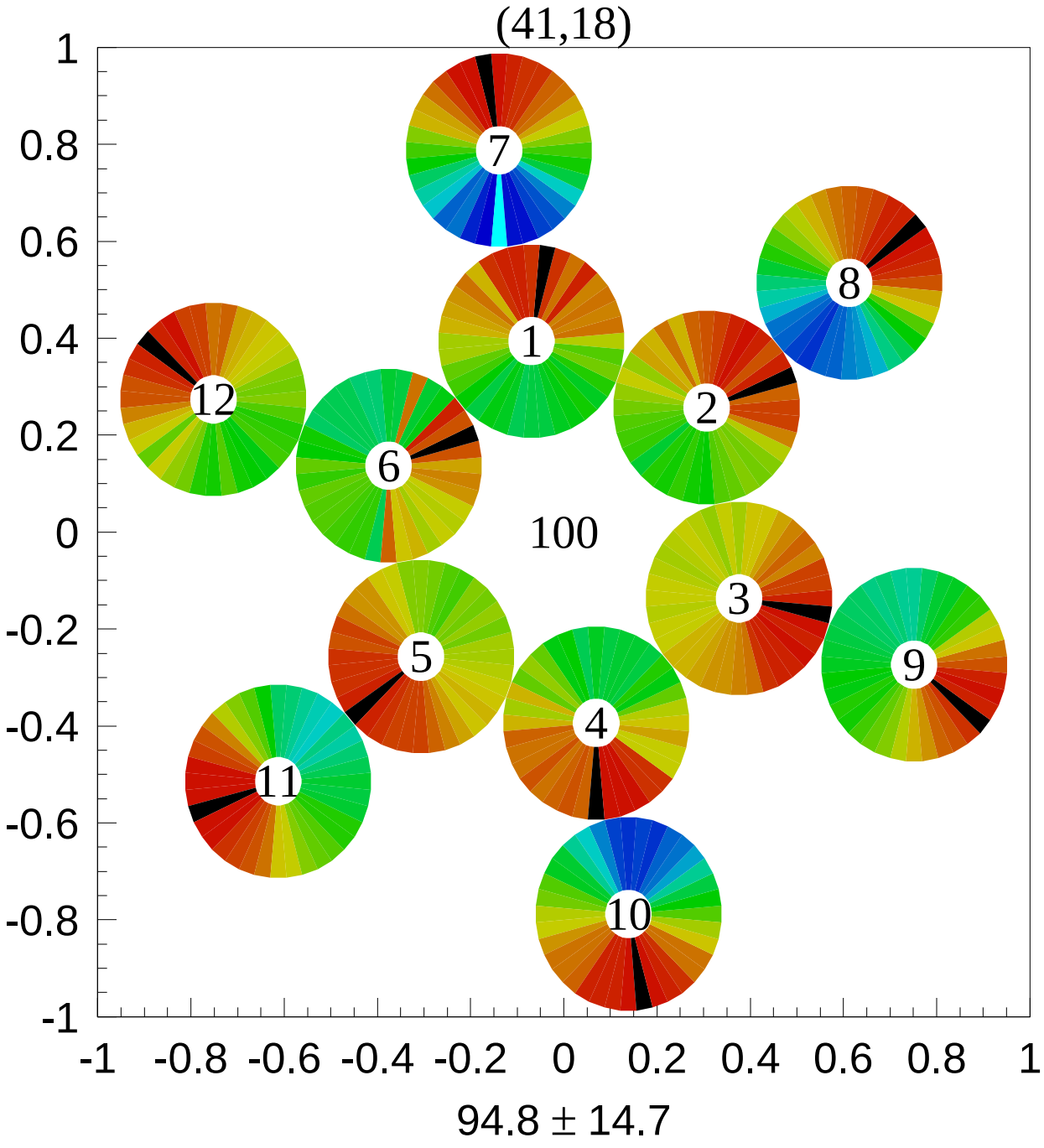

(41,16)
tilted LEDs
115 125 126 117 125 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 123 129 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

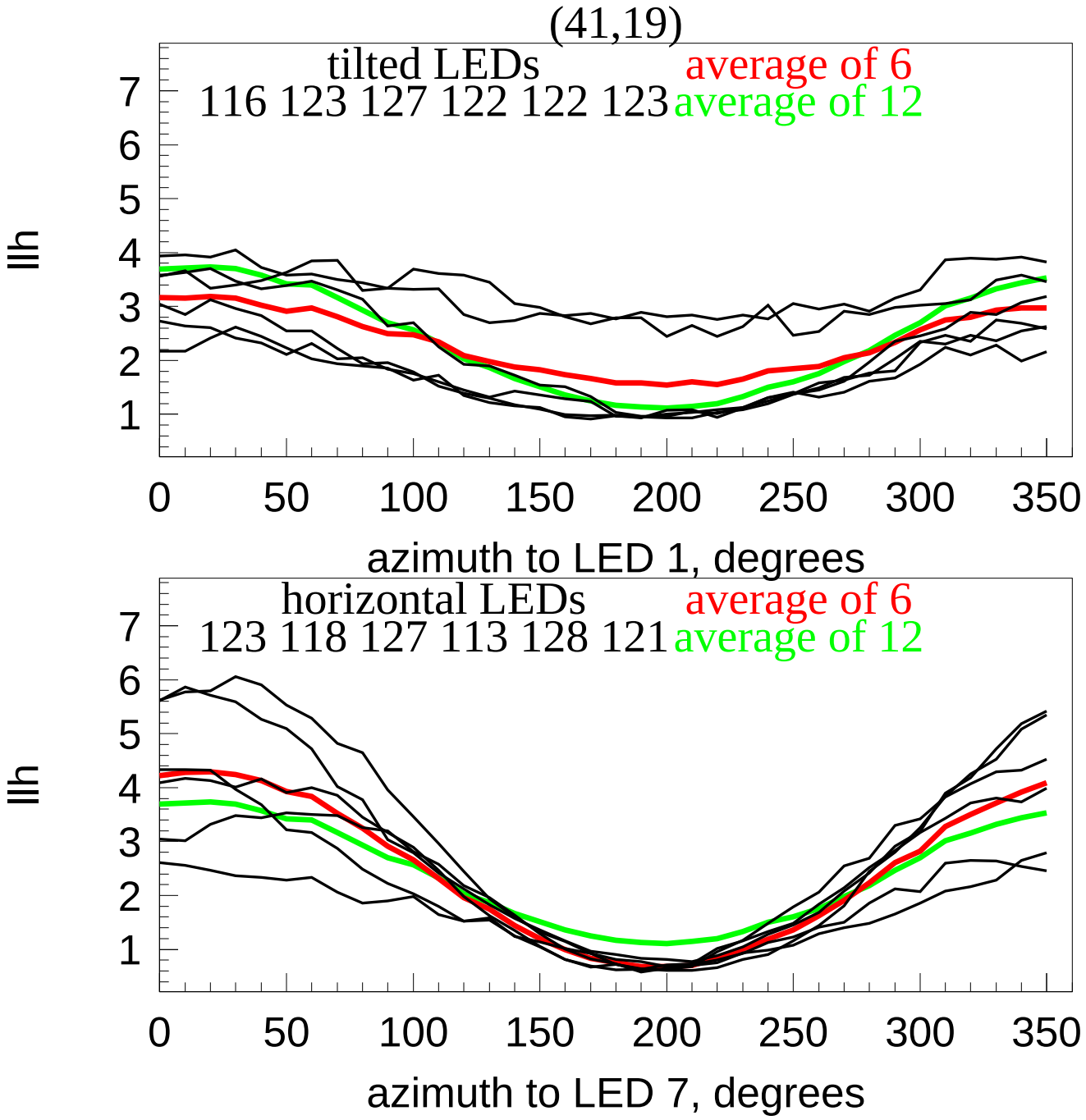

(41,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
94 ± 7.8

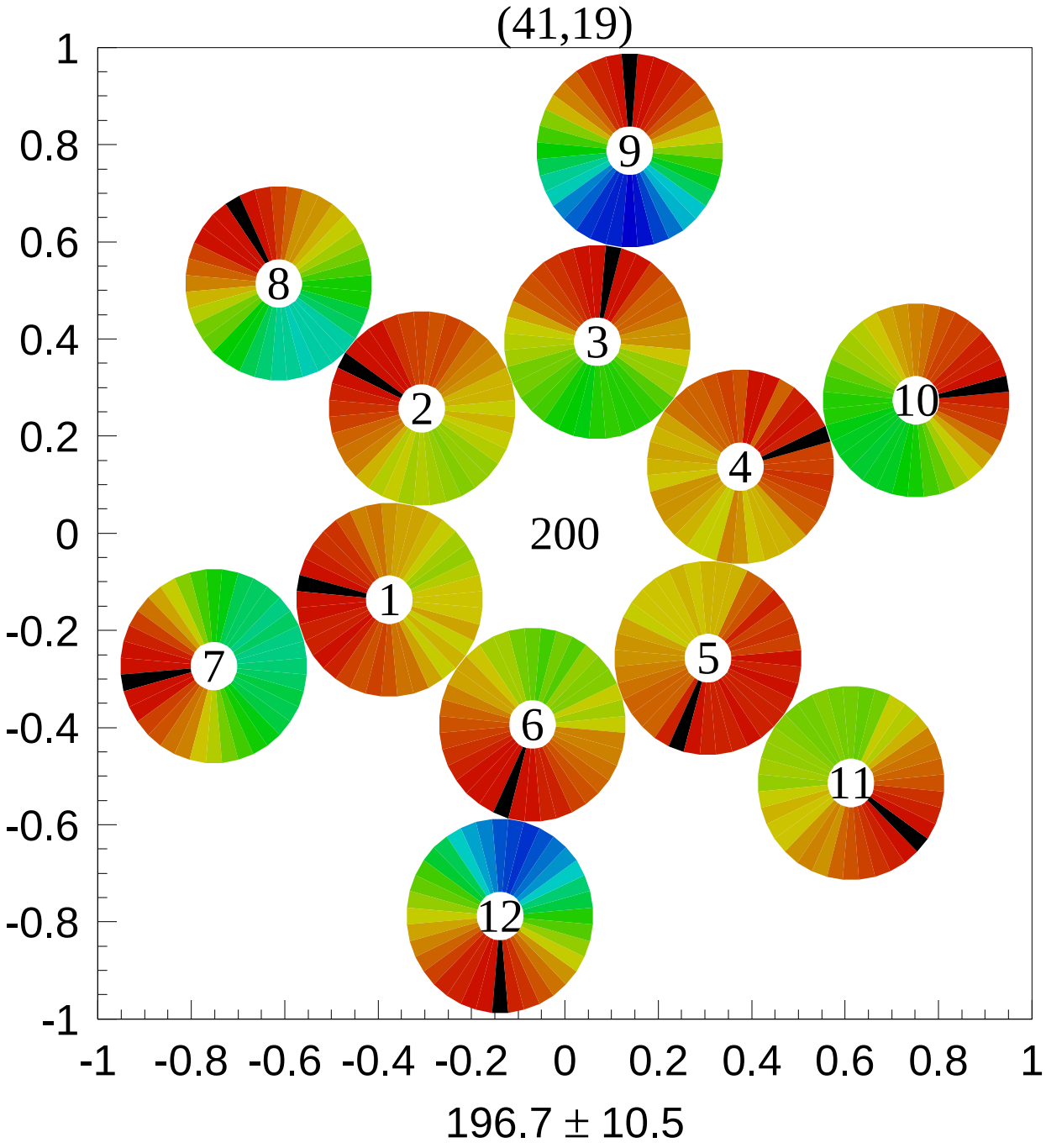

(41,17)
tilted LEDs
120 114 120 122 122 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 120 123 120 118 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

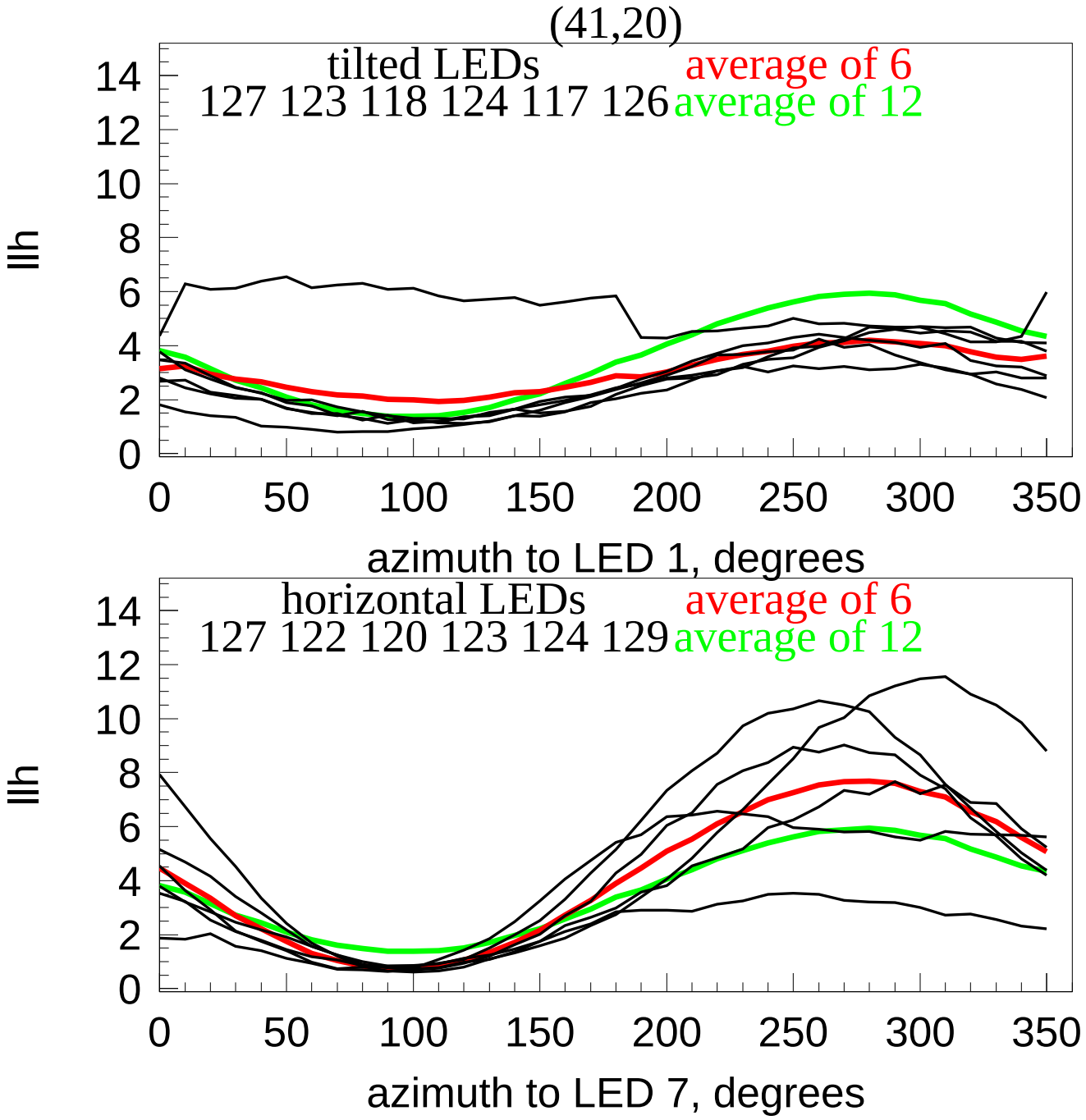

(41,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
285.6 ± 13.9

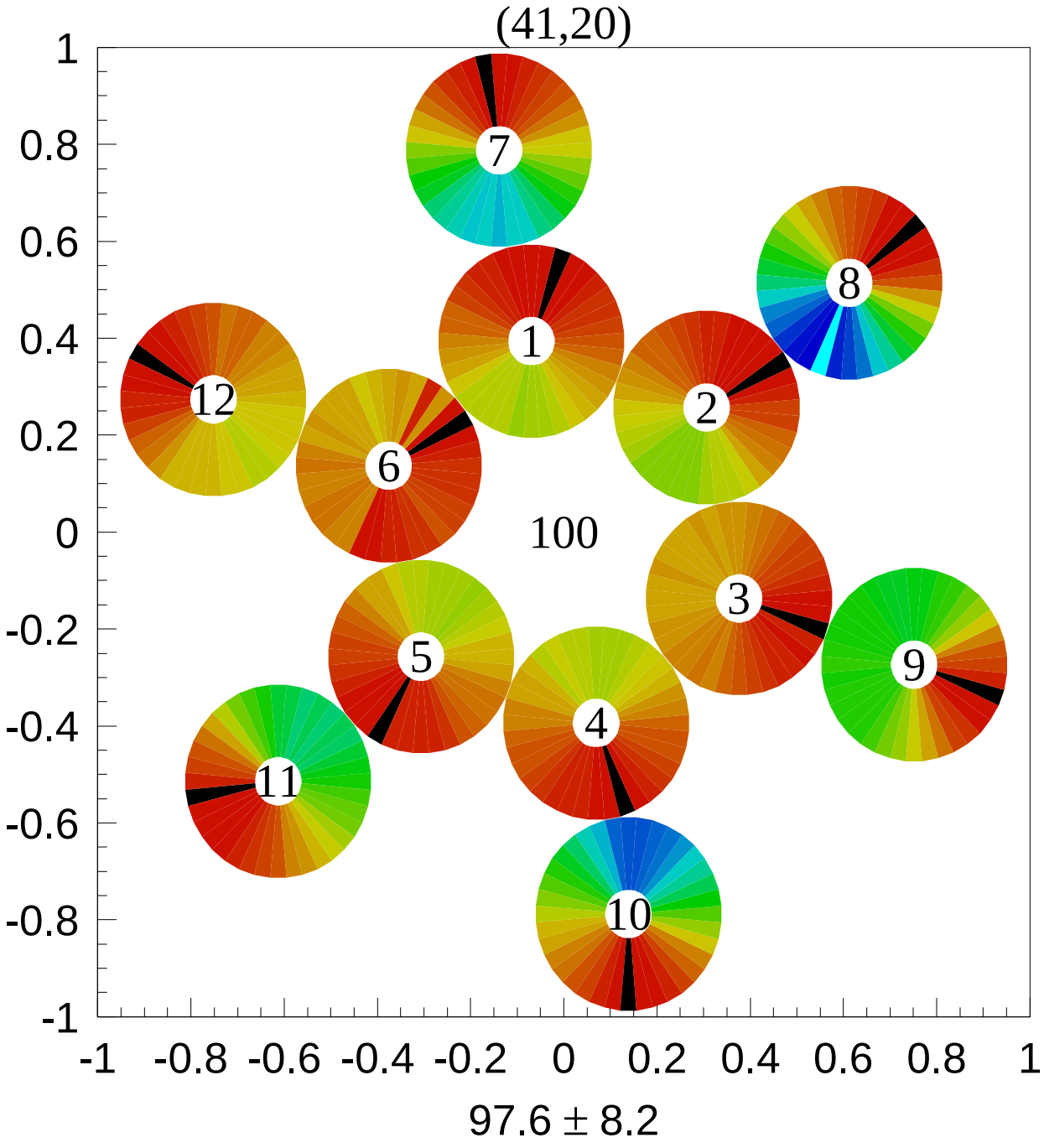

(41,18)
tilted LEDs
130 119 121 122 117 122
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 128 118 124 124 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

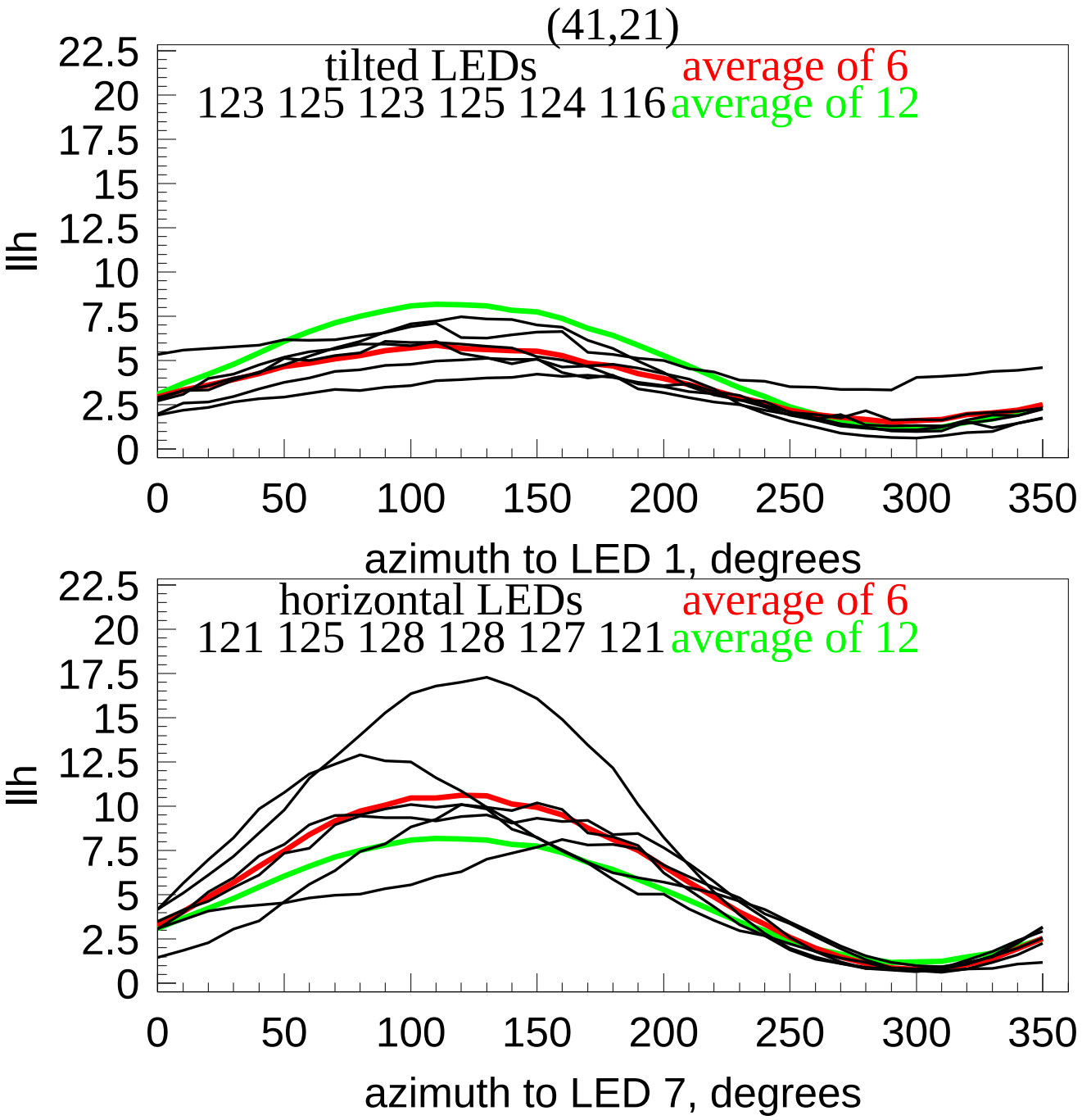

(41,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
94.8 ± 14.7

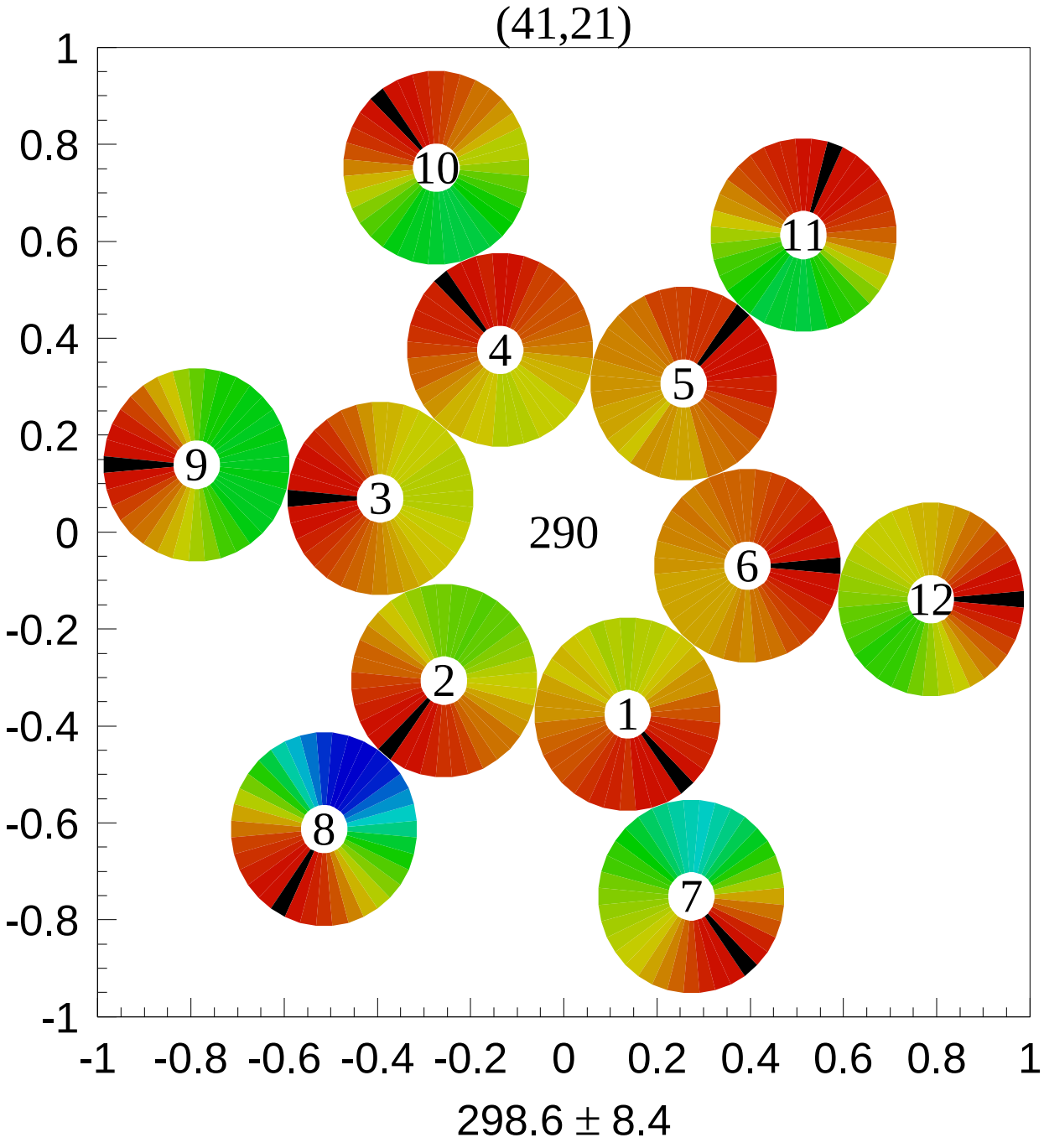

(41,19)
tilted LEDs
116 123 127 122 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 127 113 128 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

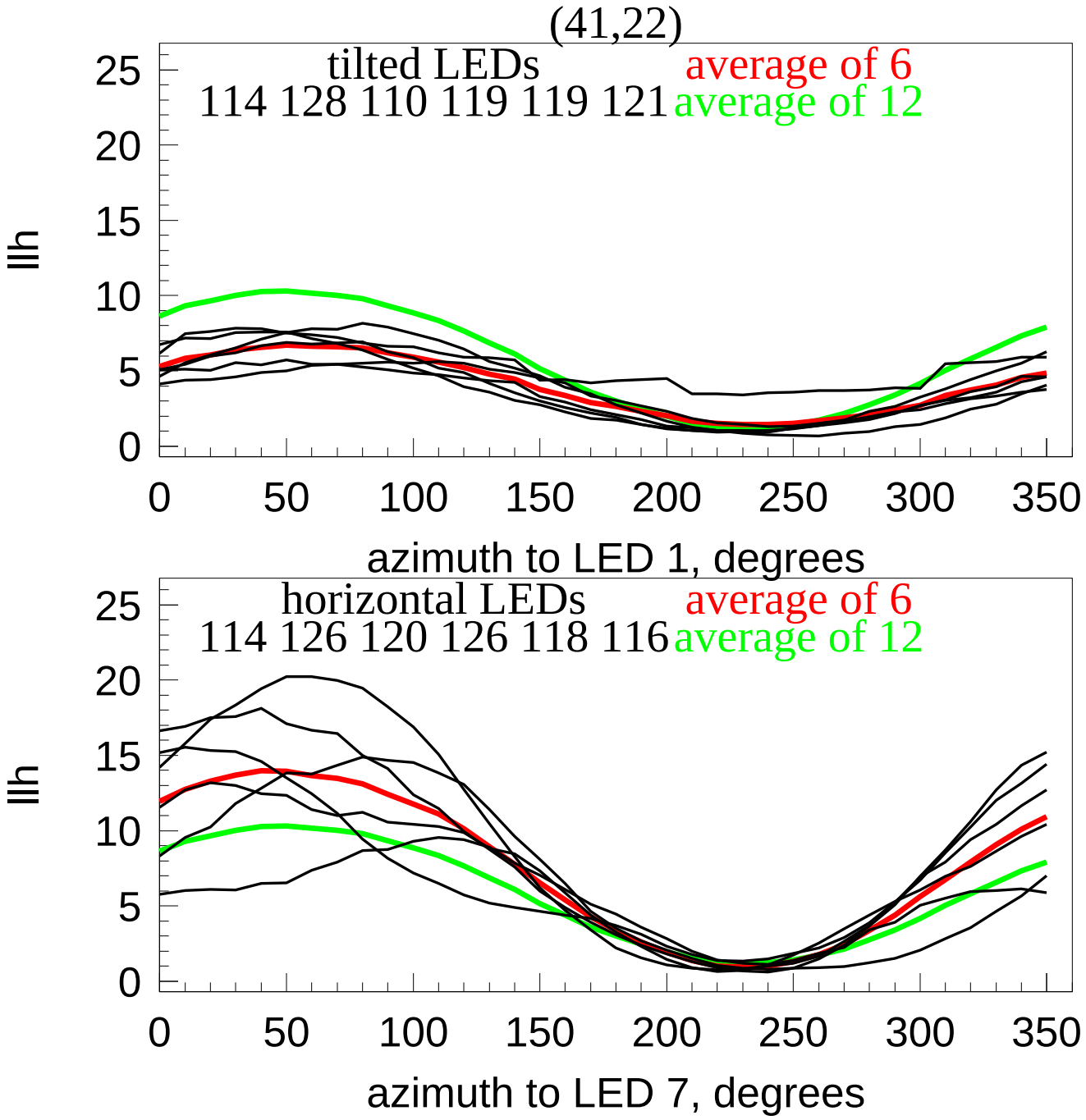

(41,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
200
1
2
3
4
5
6
7
8
9
10
11
12
196.7 ± 10.5

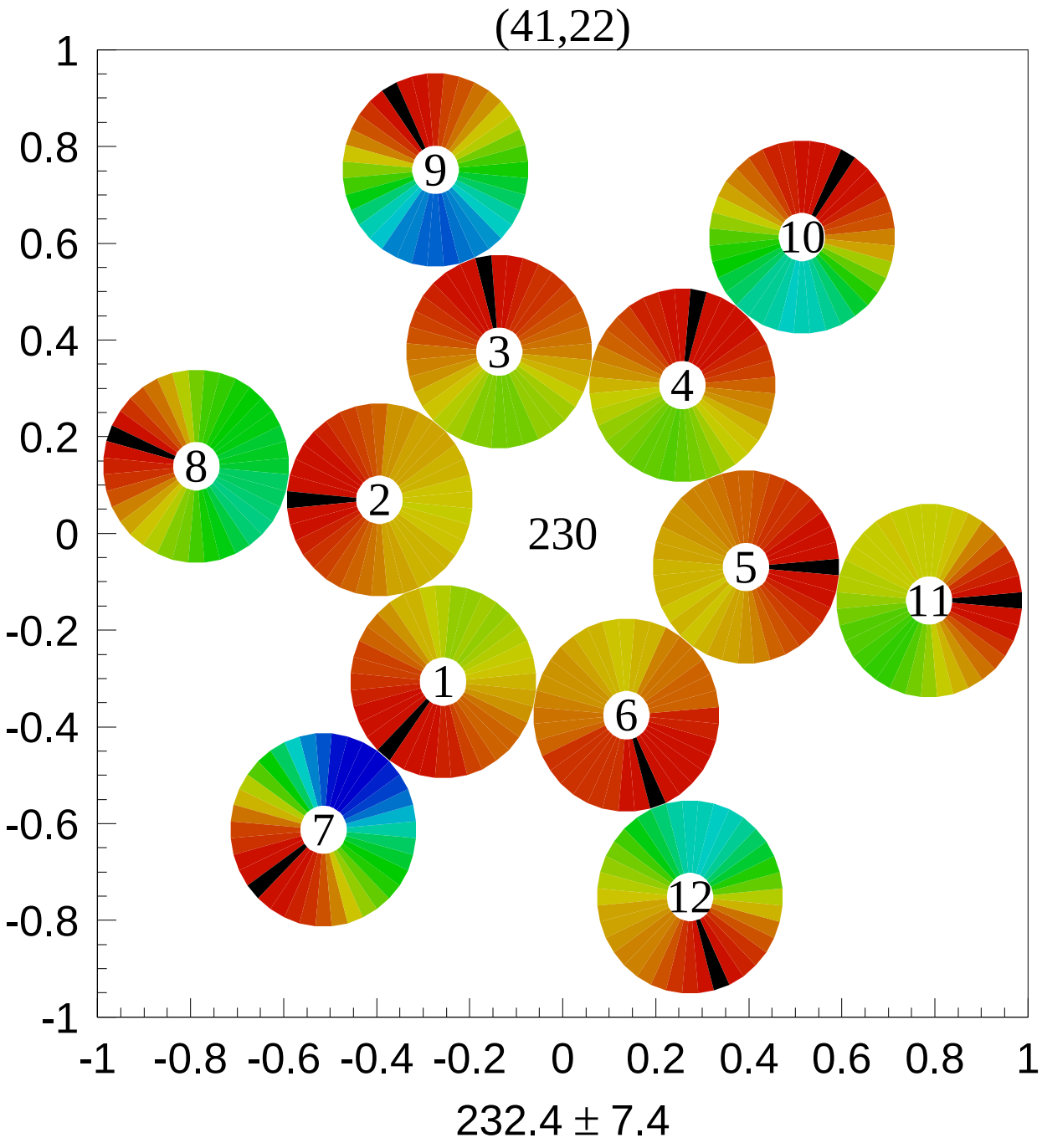

(41,20)
tilted LEDs
127 123 118 124 117 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 120 123 124 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

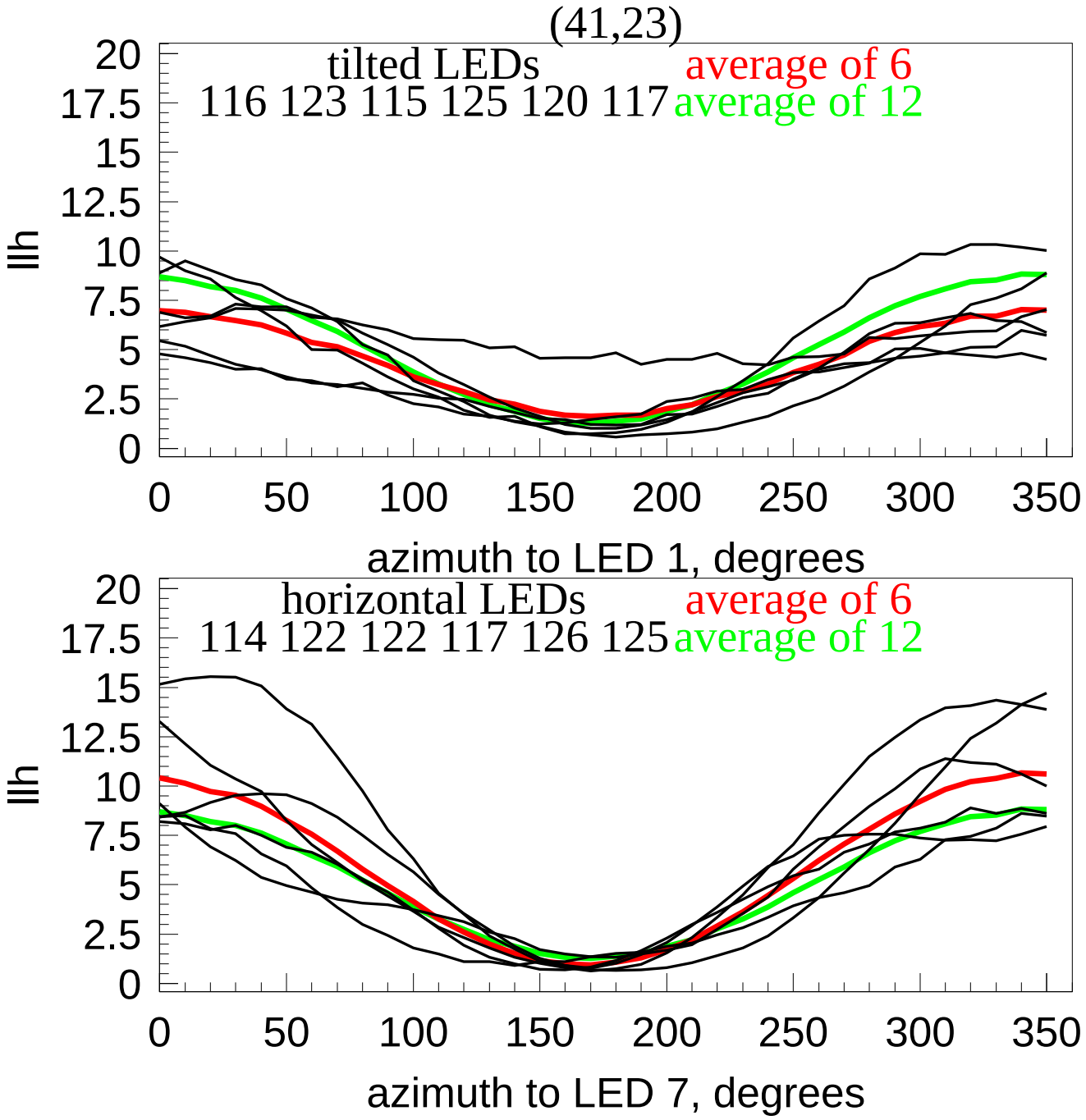

(41,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
97.6 ± 8.2

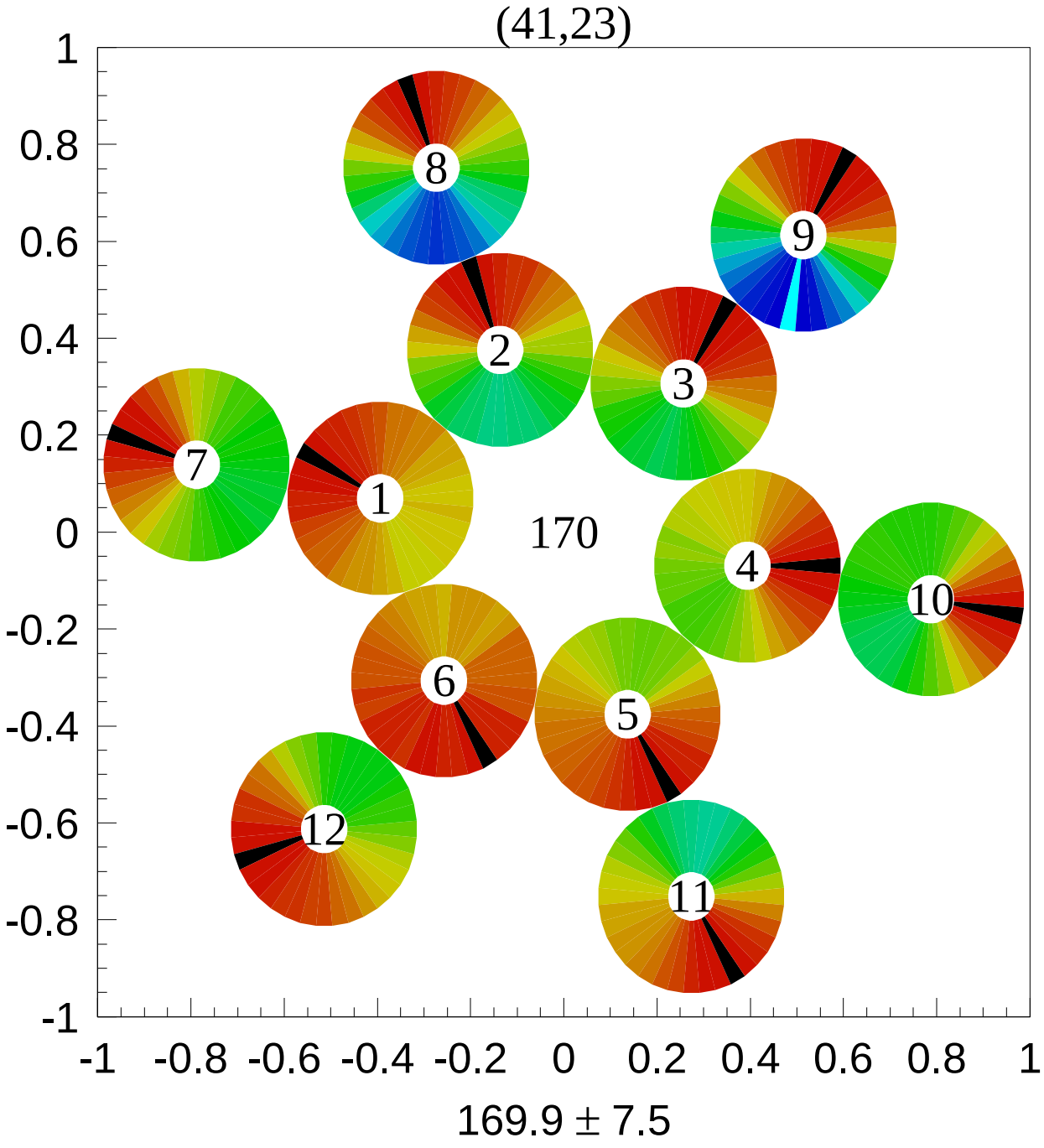

(41,21)
tilted LEDs
123 125 123 125 124 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 128 128 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

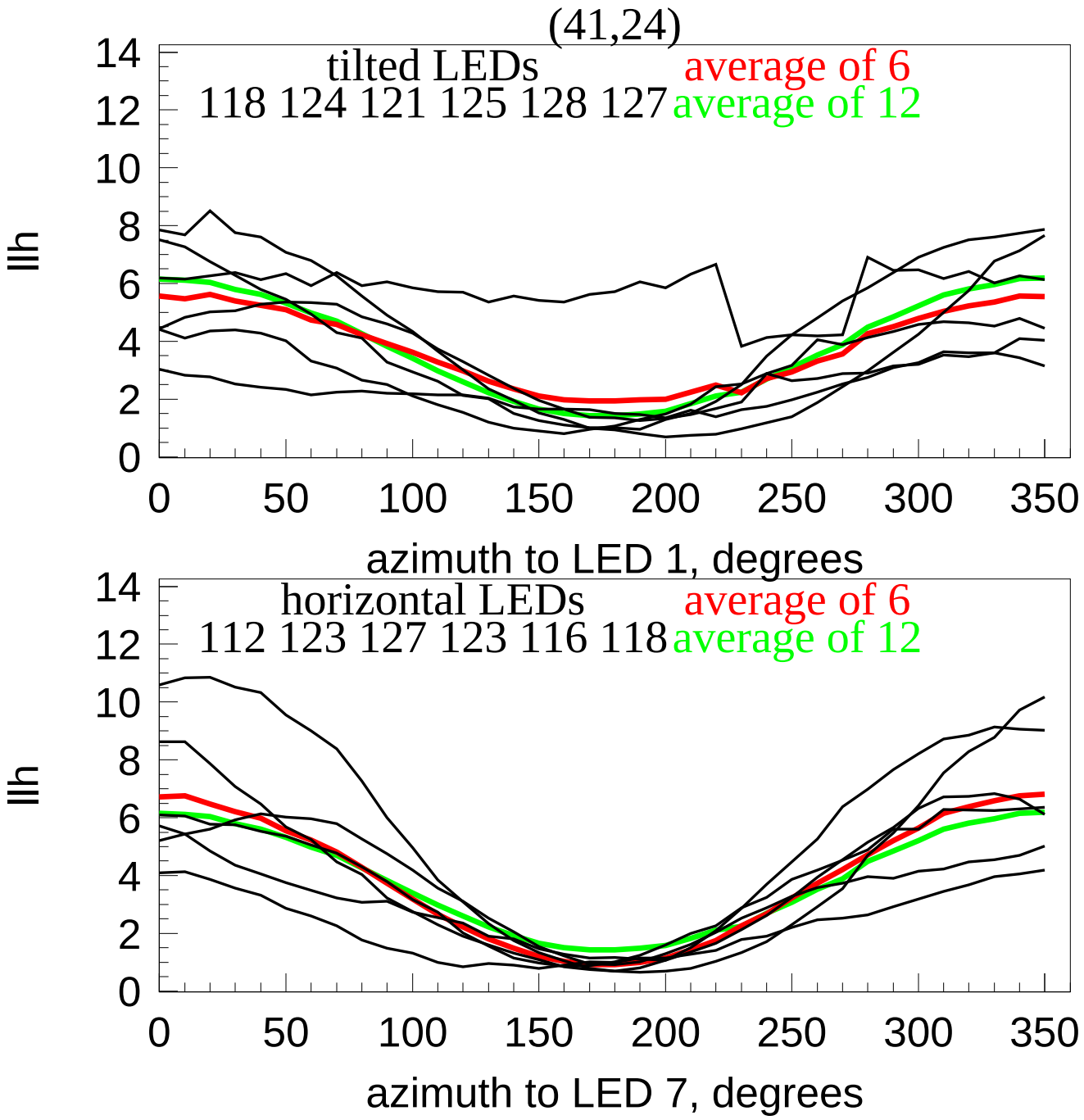

(41,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
298.6 ± 8.4

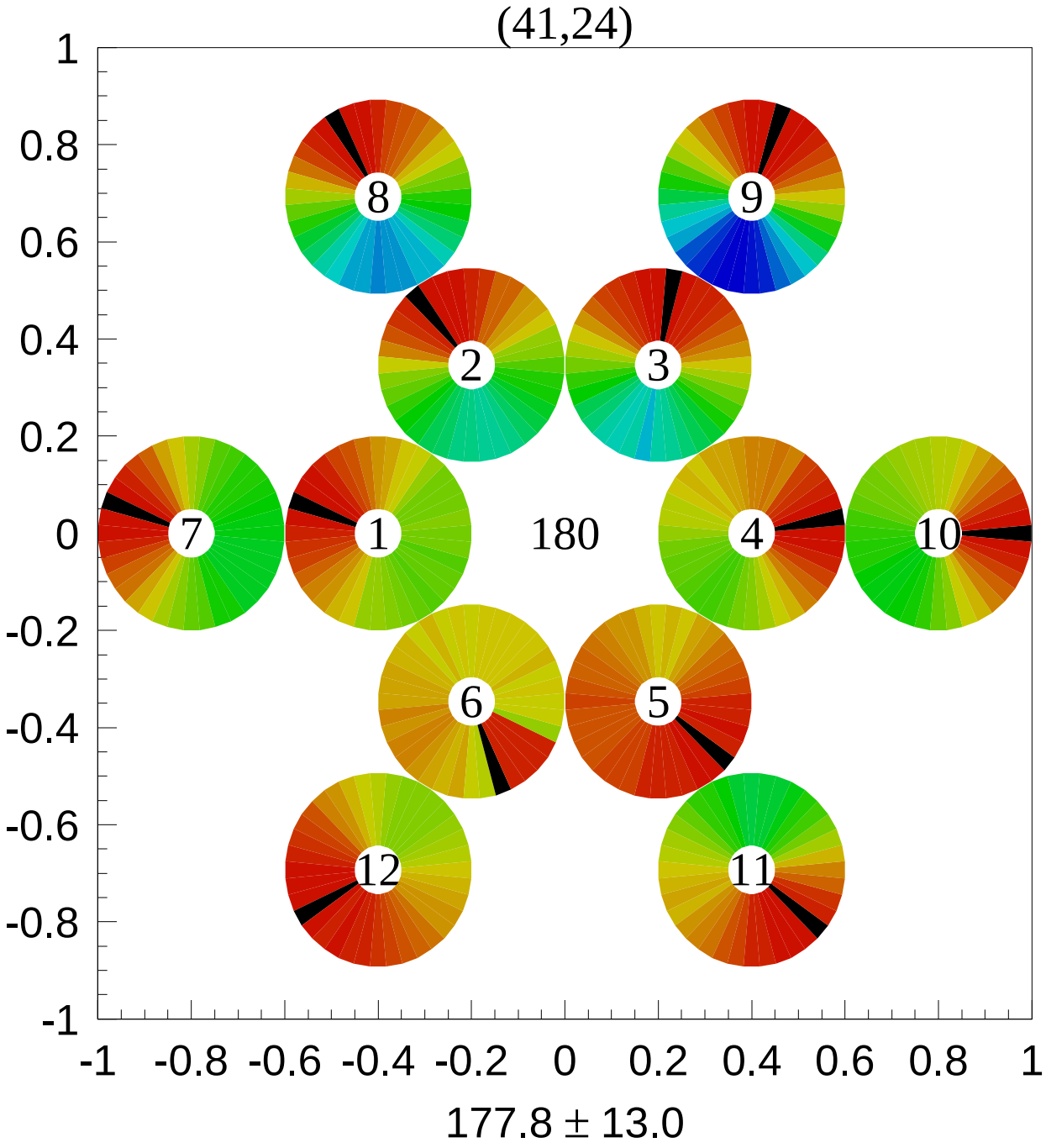

(41,22)
tilted LEDs
114 128 110 119 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 126 120 126 118 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

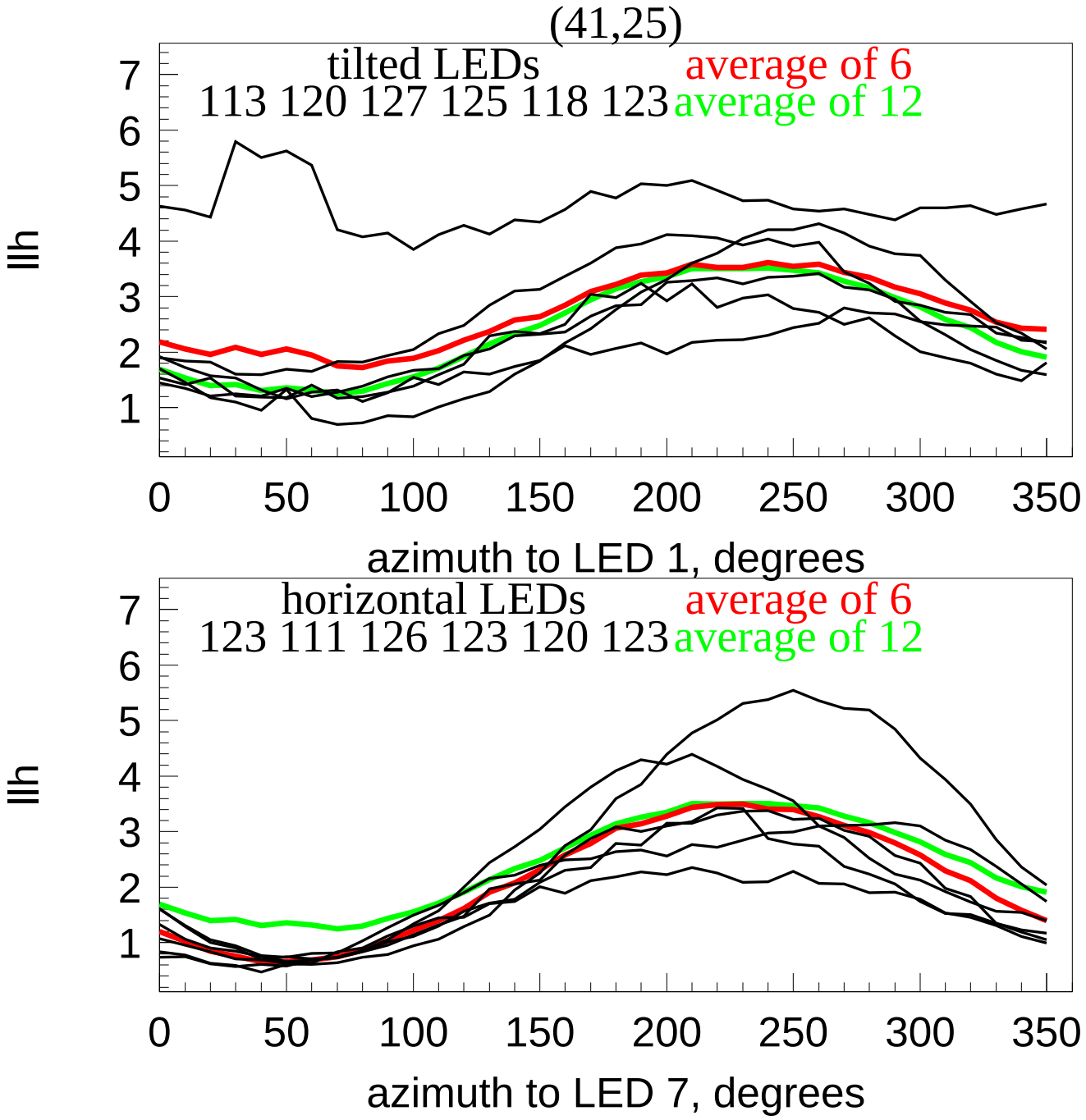

(41,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
232.4 ± 7.4

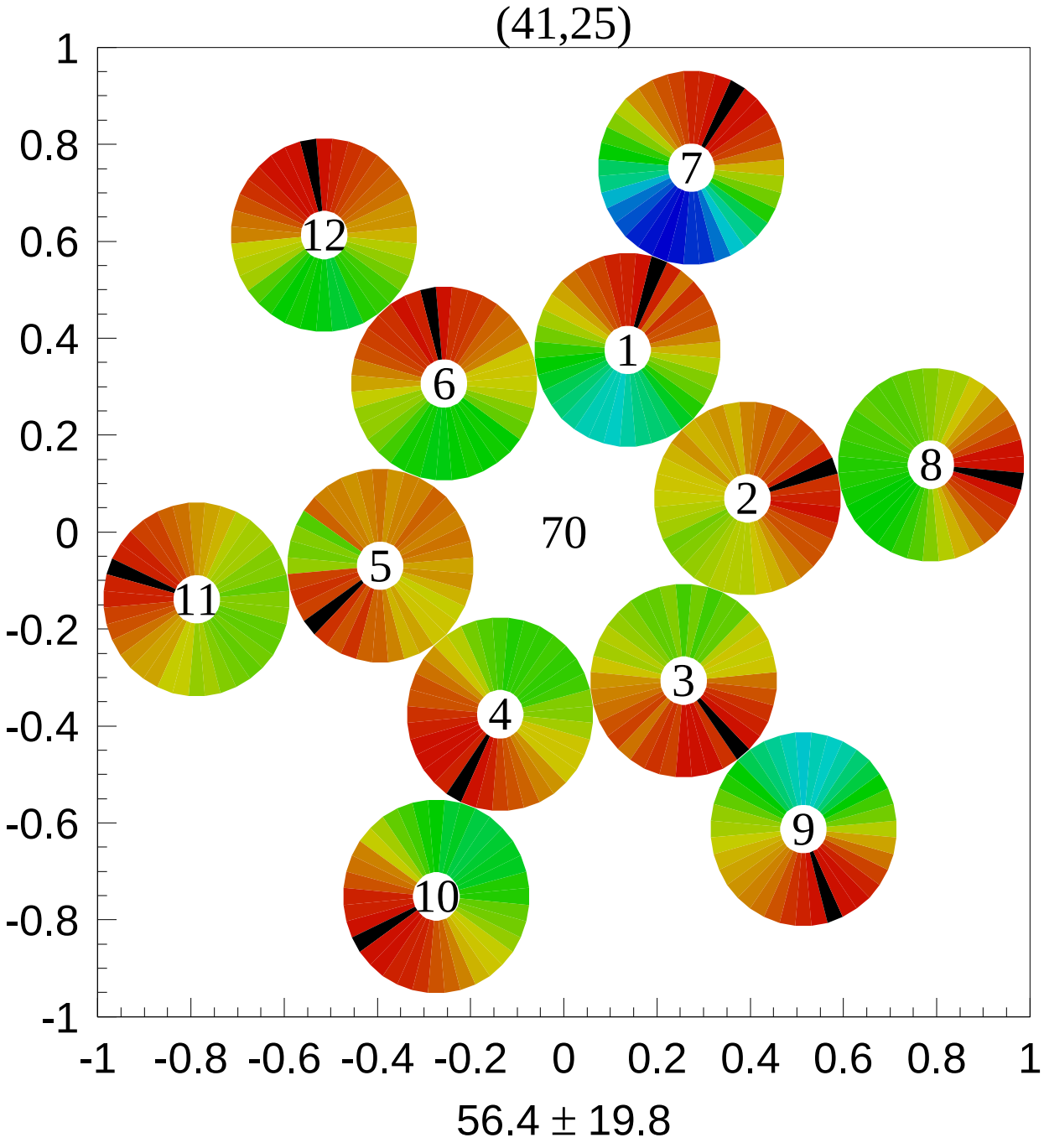

(41,23)
tilted LEDs
116 123 115 125 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 122 122 117 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

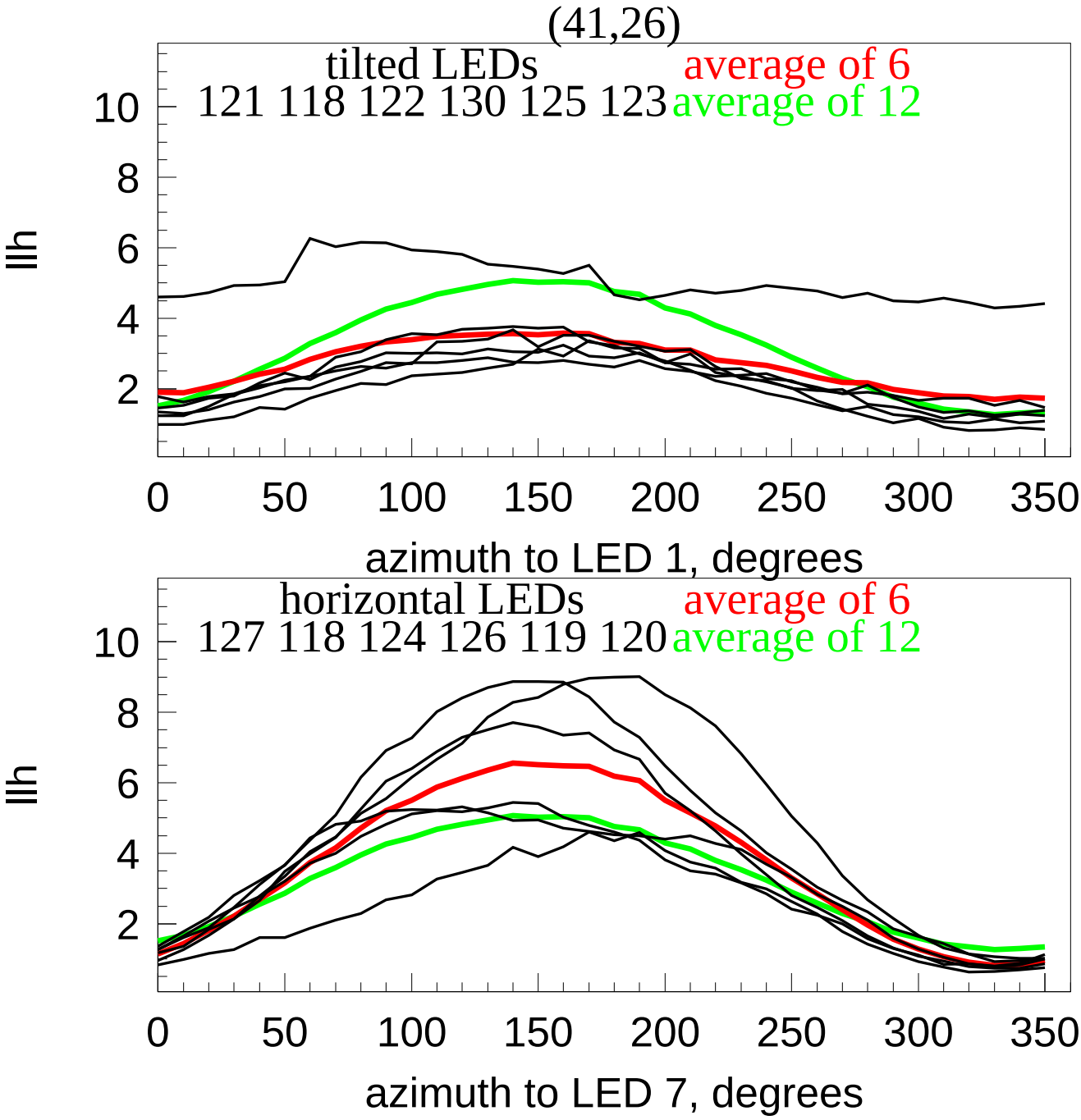

(41,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
169.9 ± 7.5

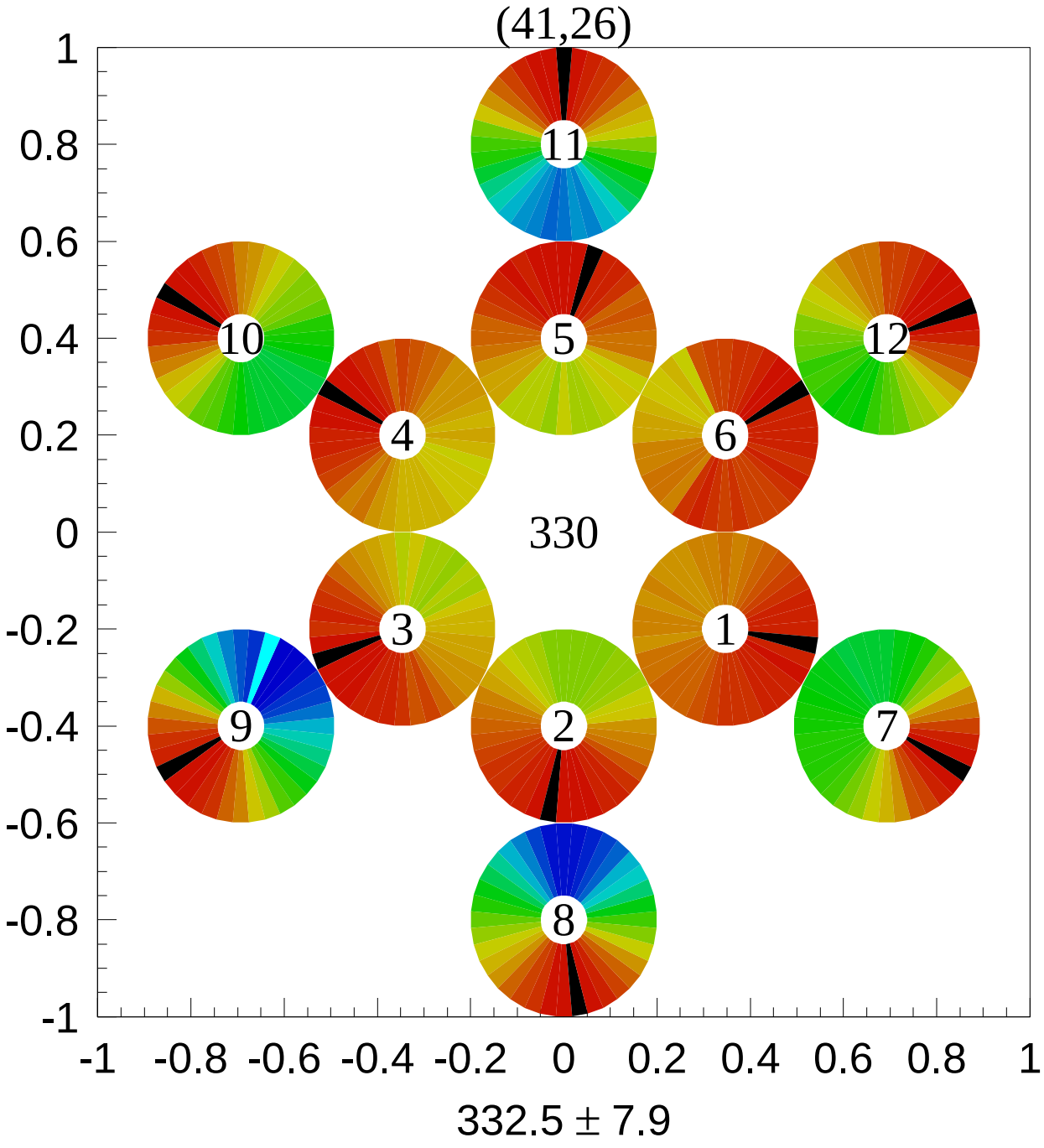

(41,24)
tilted LEDs
118 124 121 125 128 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 123 127 123 116 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

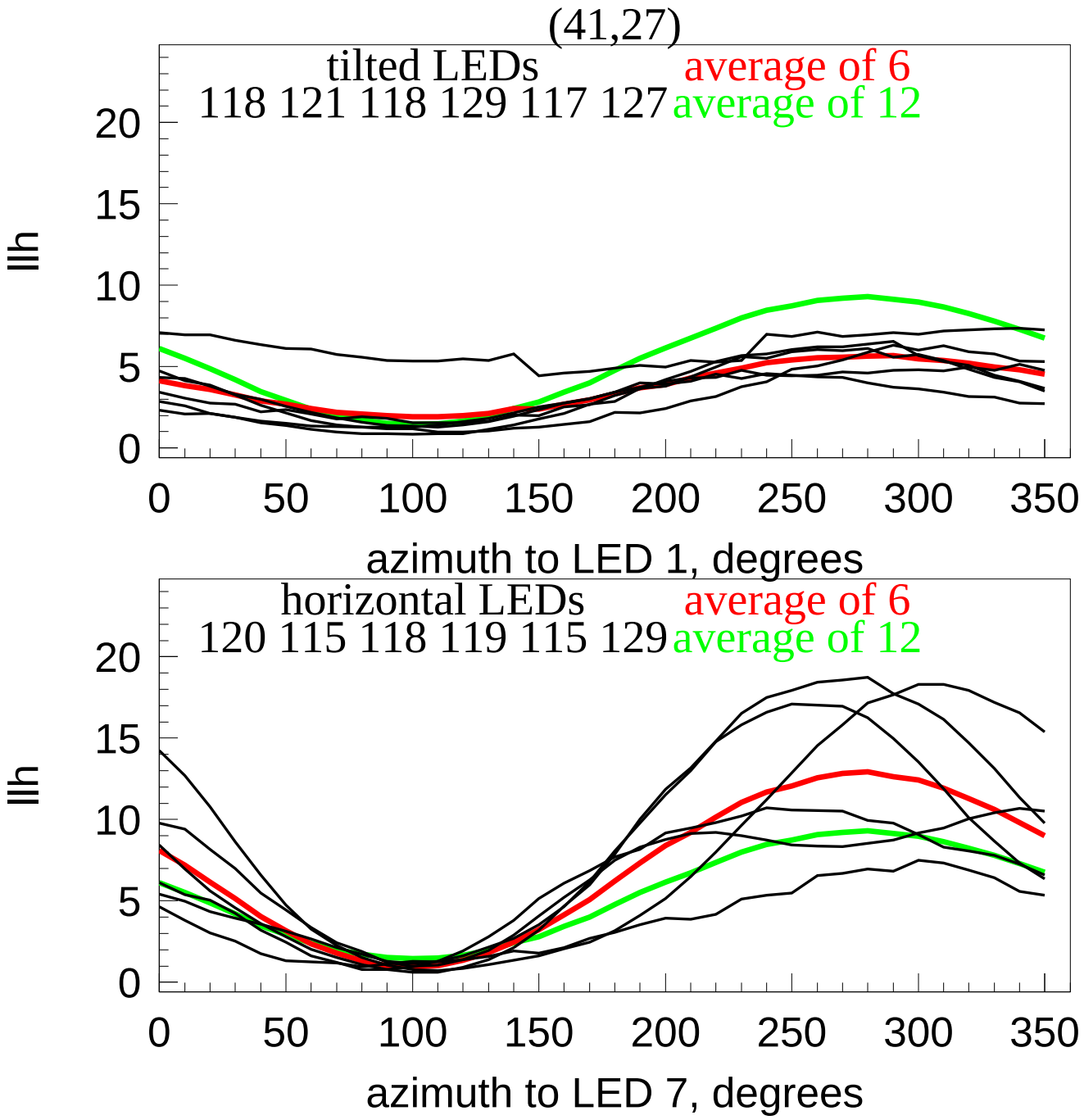

(41,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
177.8 ± 13.0
8
9
2
3
7
1
180
4
10
6
5
12
11

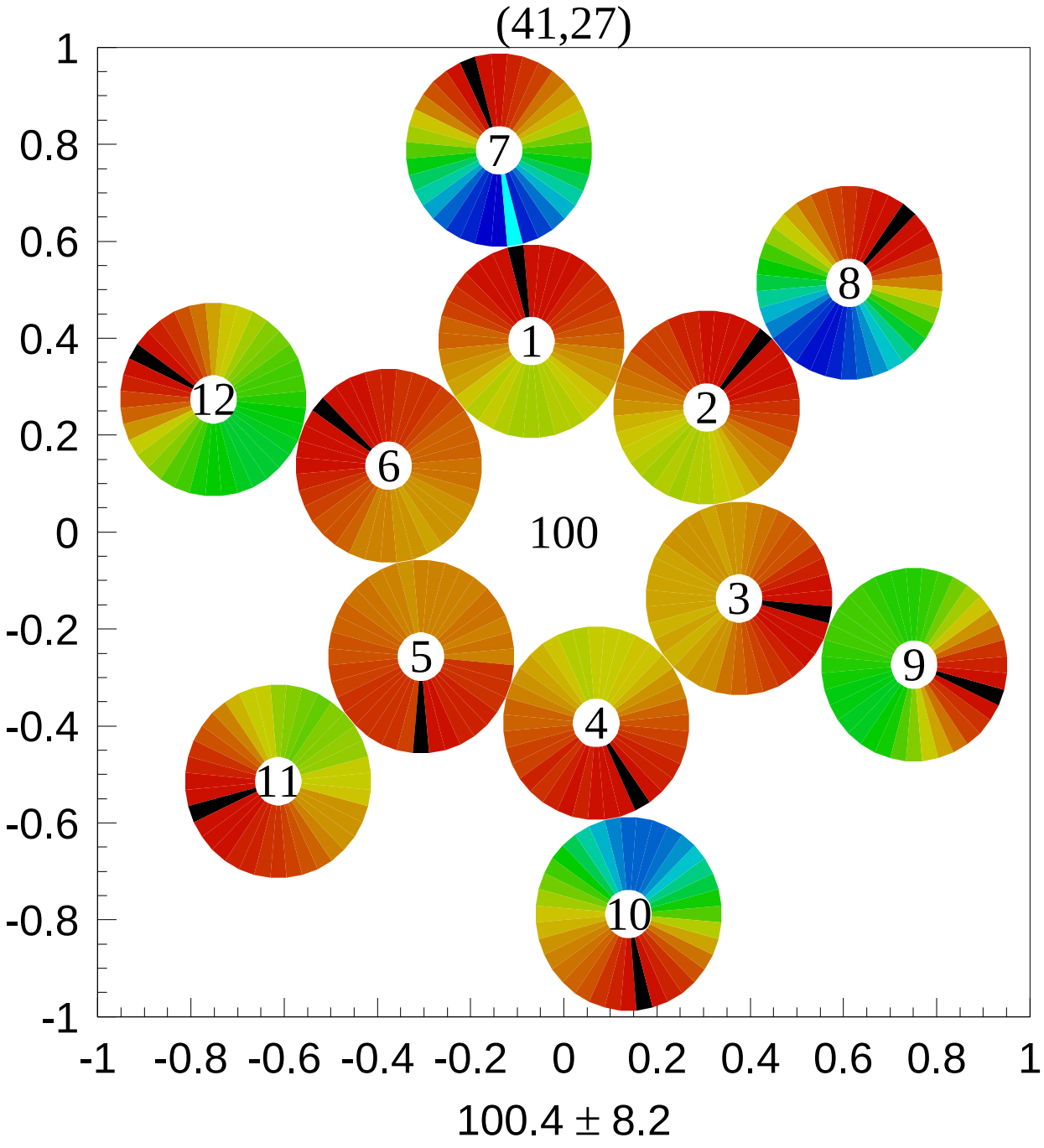

(41,25)
tilted LEDs
113 120 127 125 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 111 126 123 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

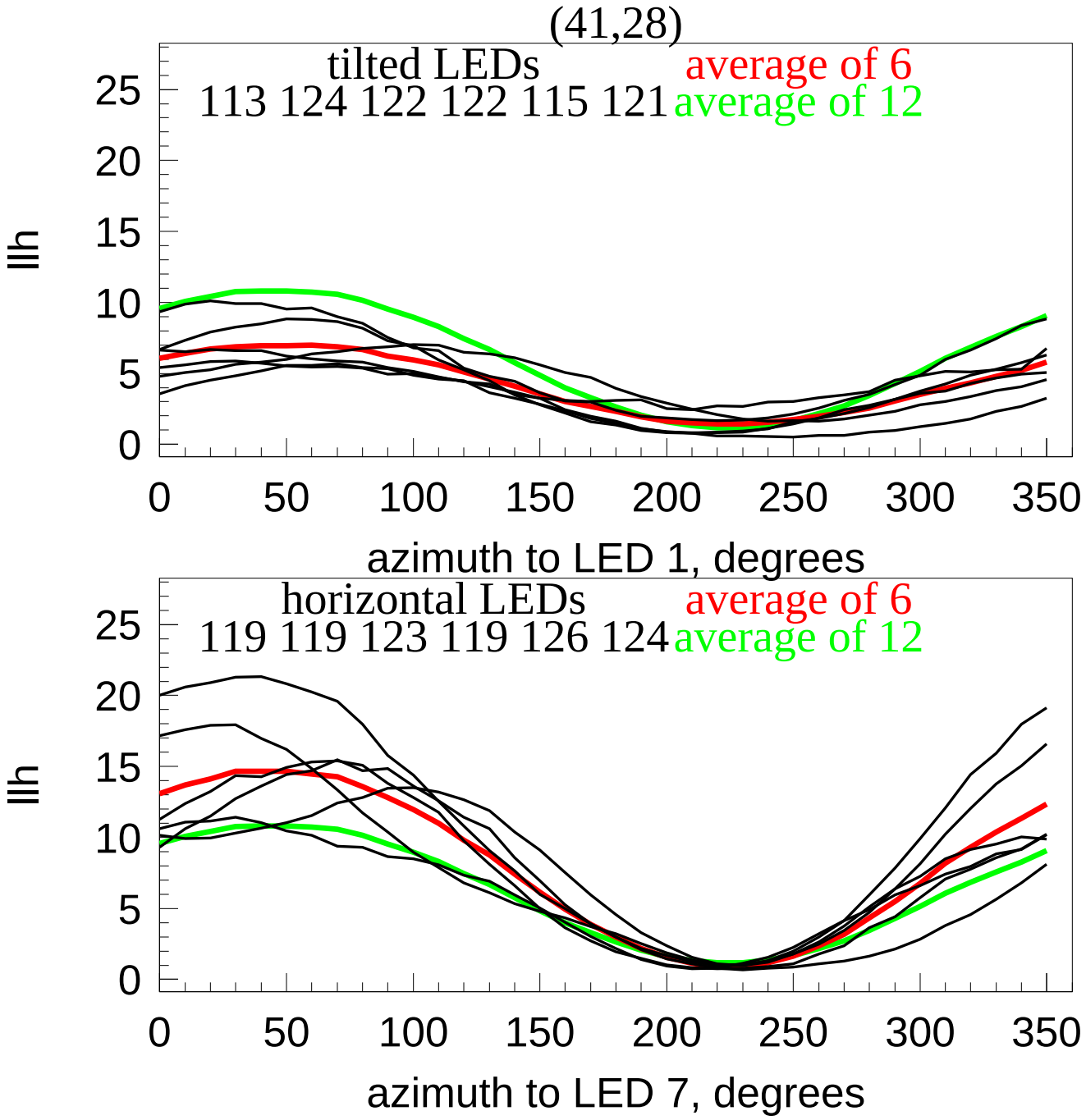

(41,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
70
5
11
3
4
9
10
56.4 ± 19.8

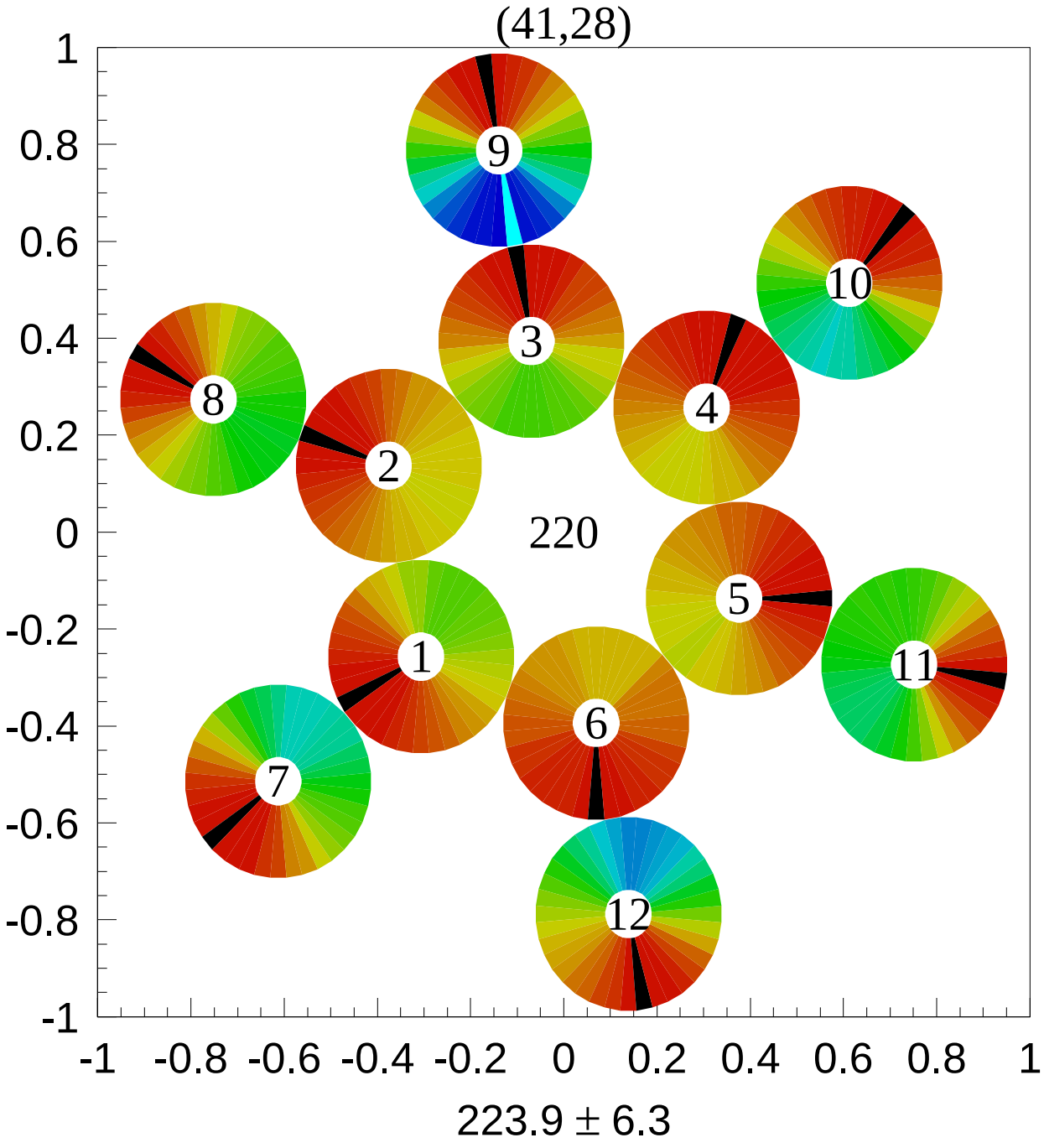

(41,26)
tilted LEDs
121 118 122 130 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 118 124 126 119 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

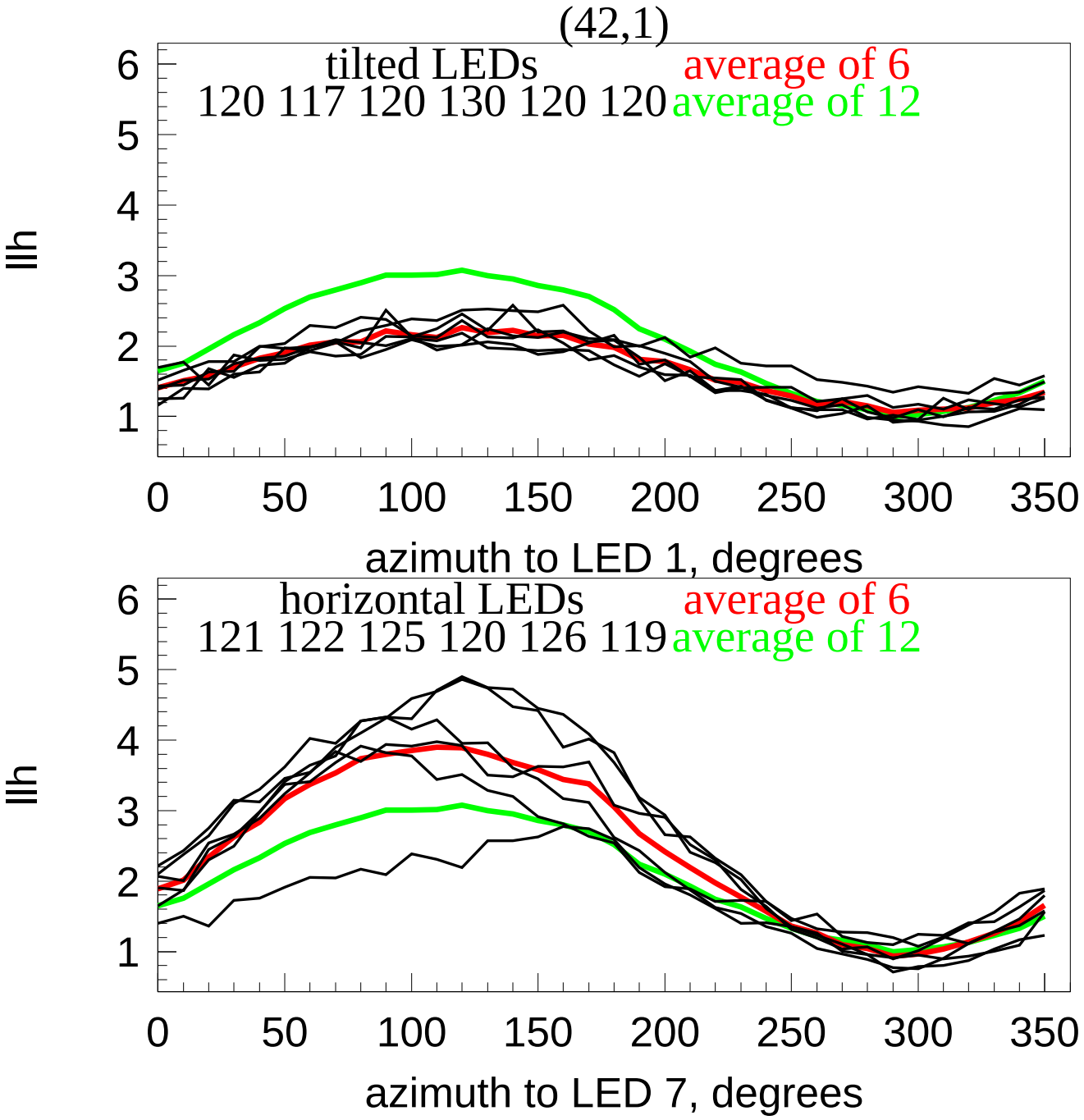

(41,26)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
332.5 ± 7.9

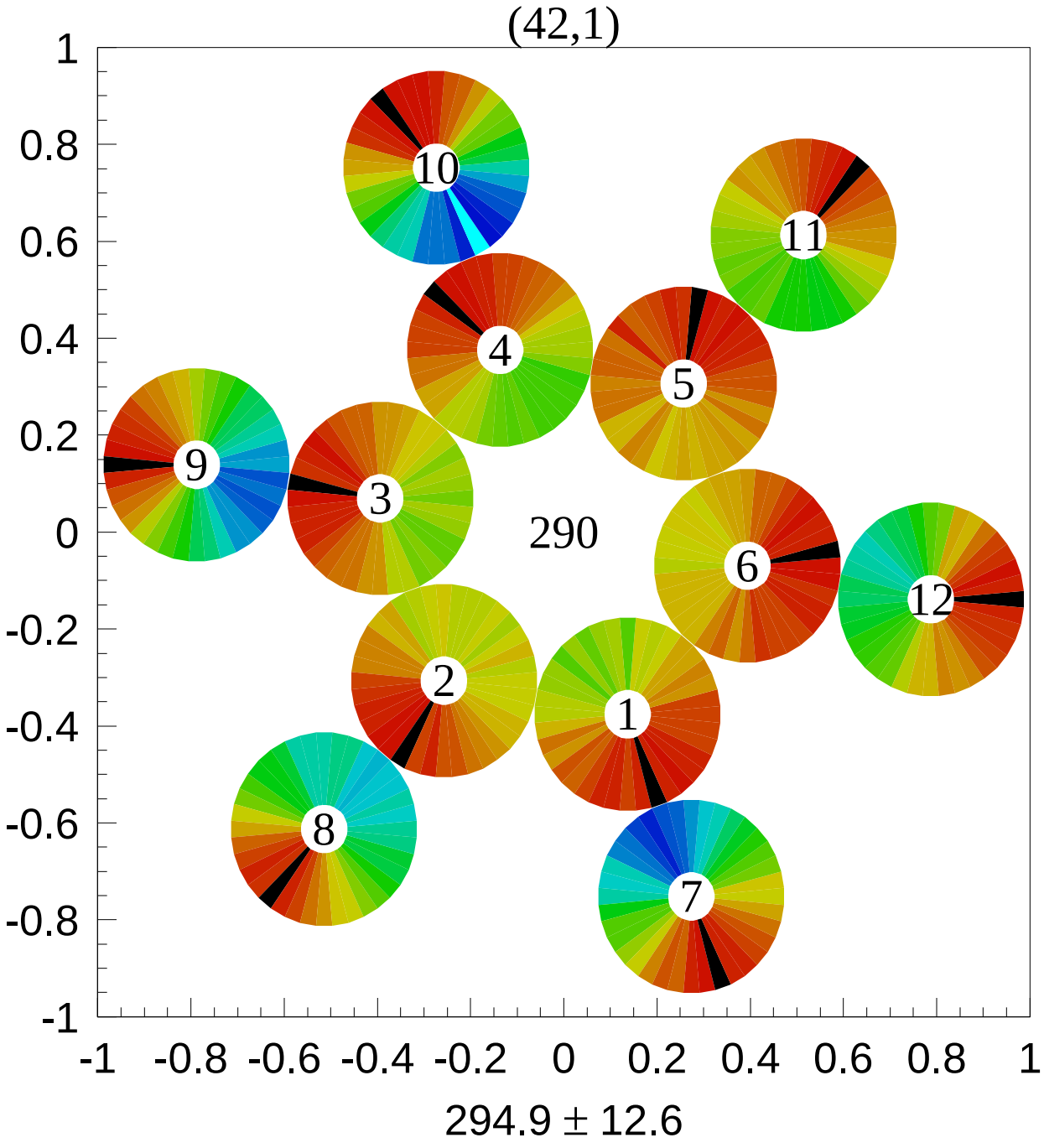

(41,27)
tilted LEDs
118 121 118 129 117 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 115 118 119 115 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

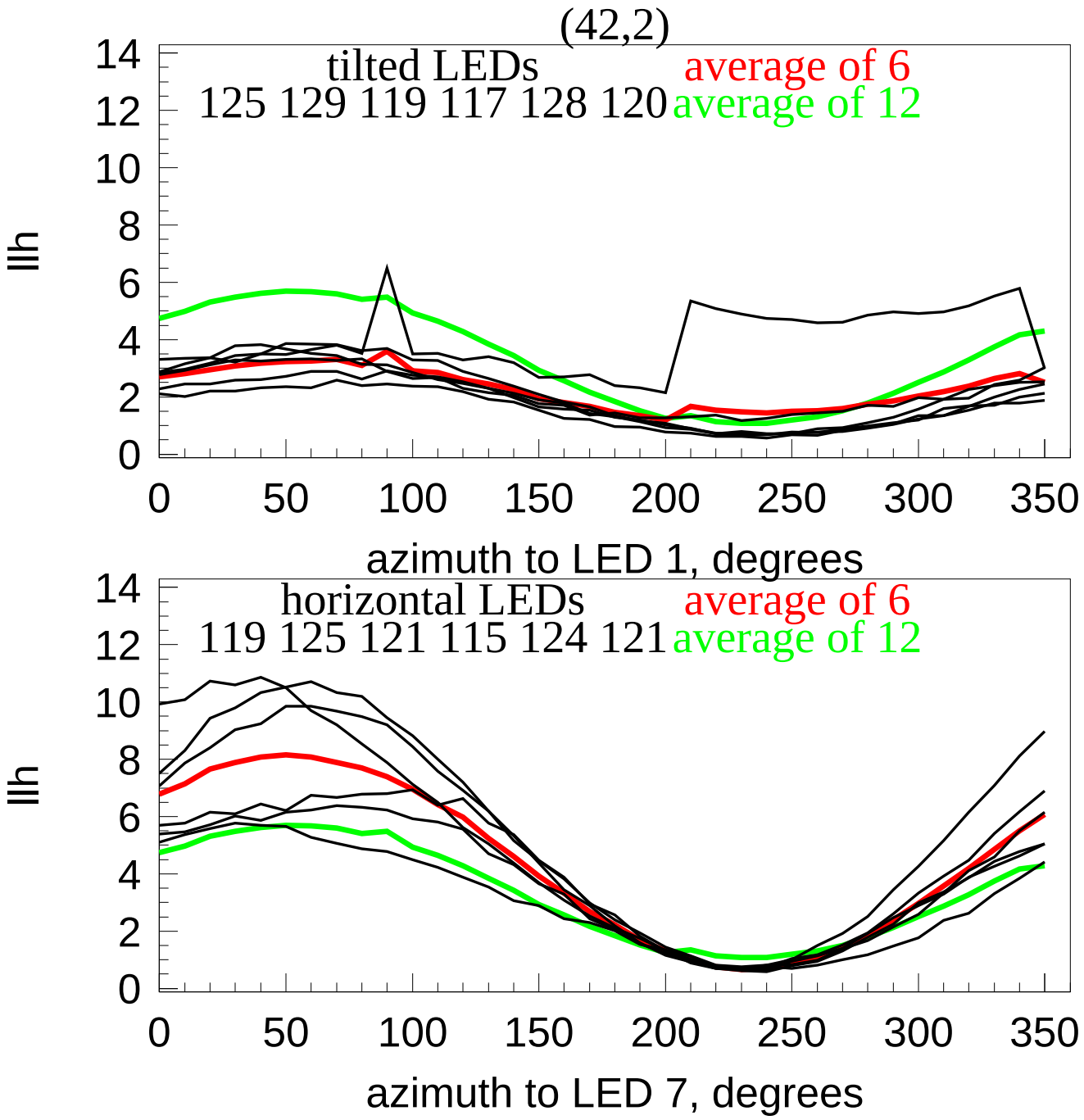

(41,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
100.4 ± 8.2

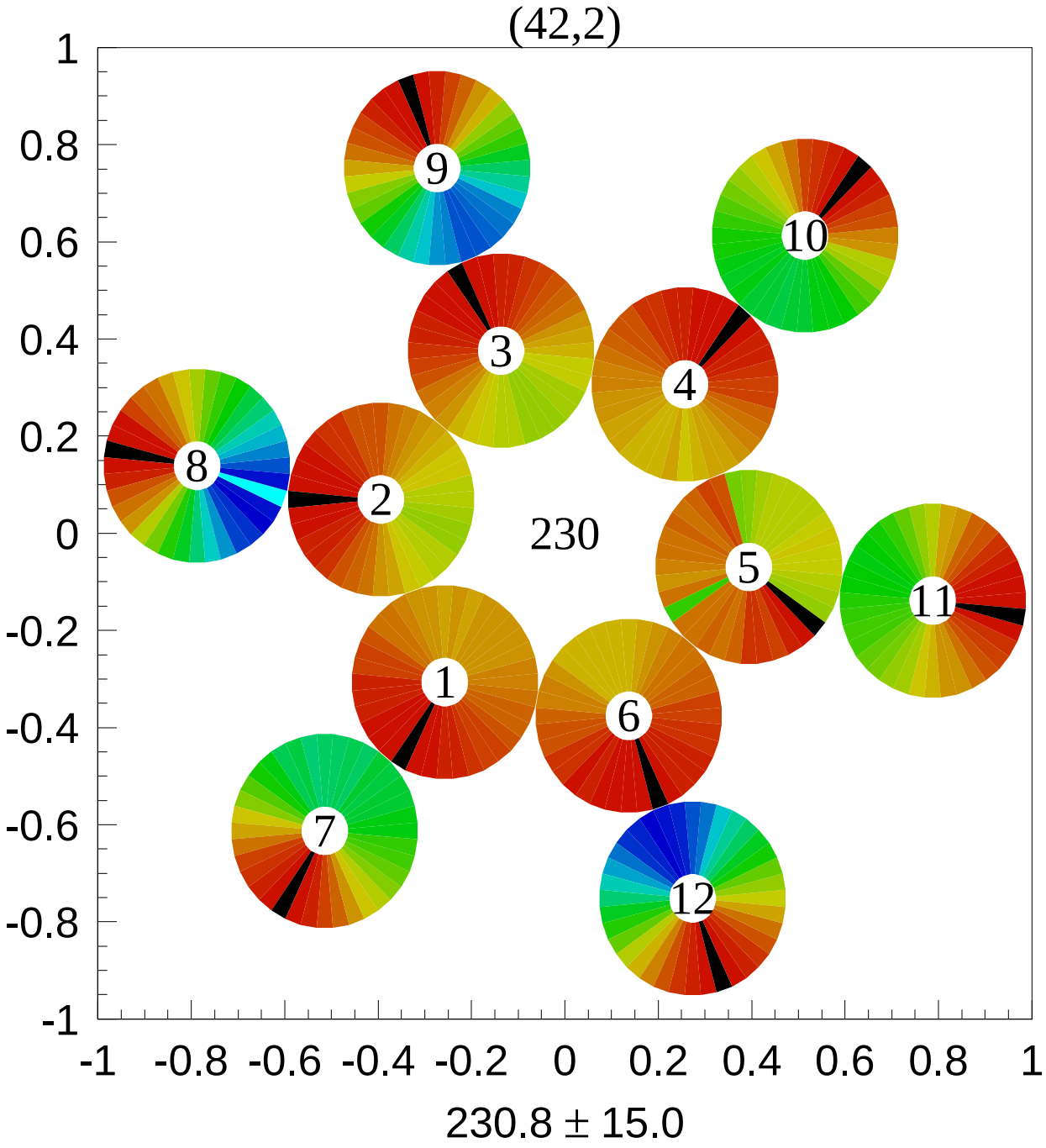

(41,28)
tilted LEDs
113 124 122 122 115 121
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 119 123 119 126 124
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

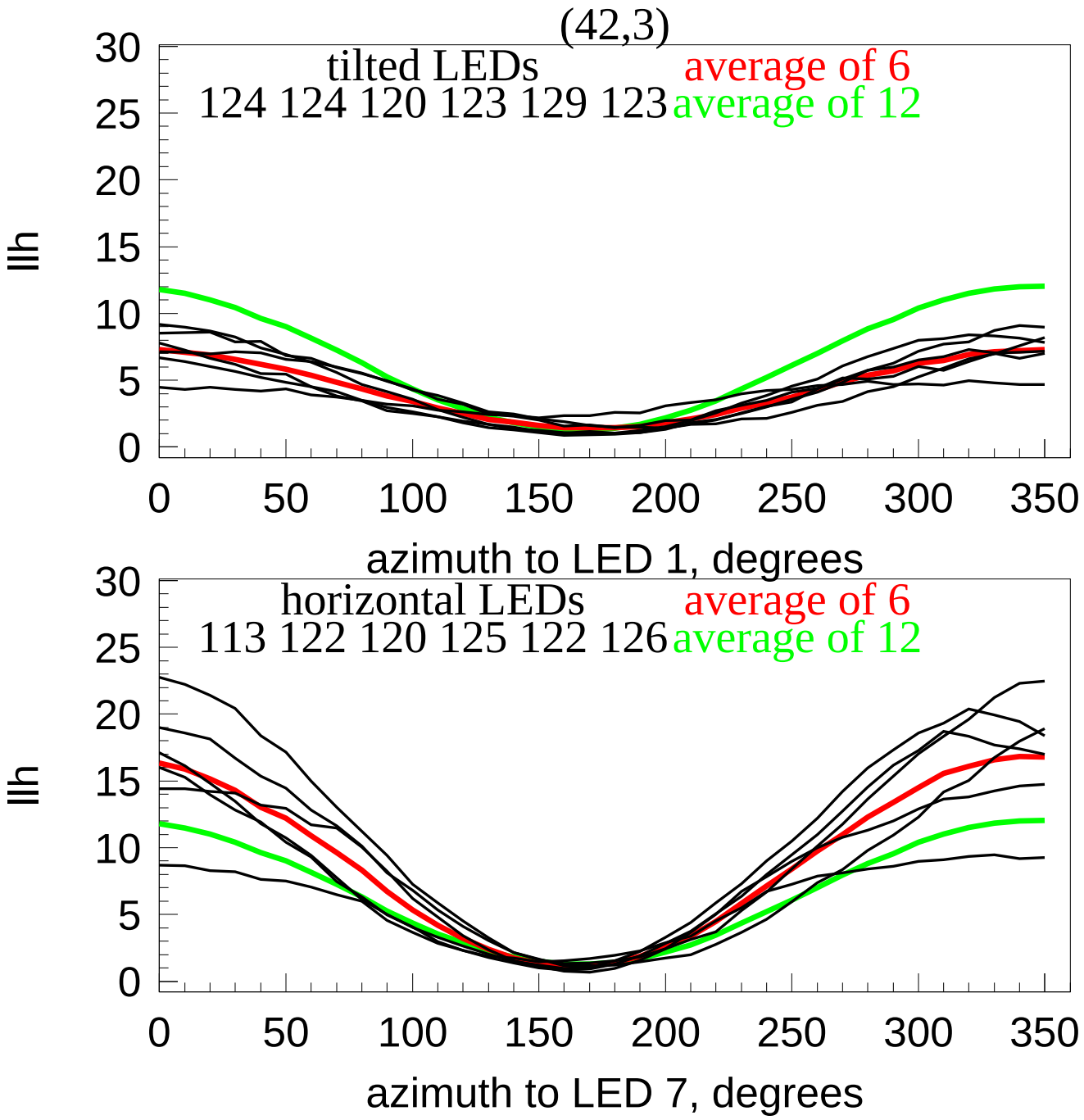

(41,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
223.9 ± 6.3

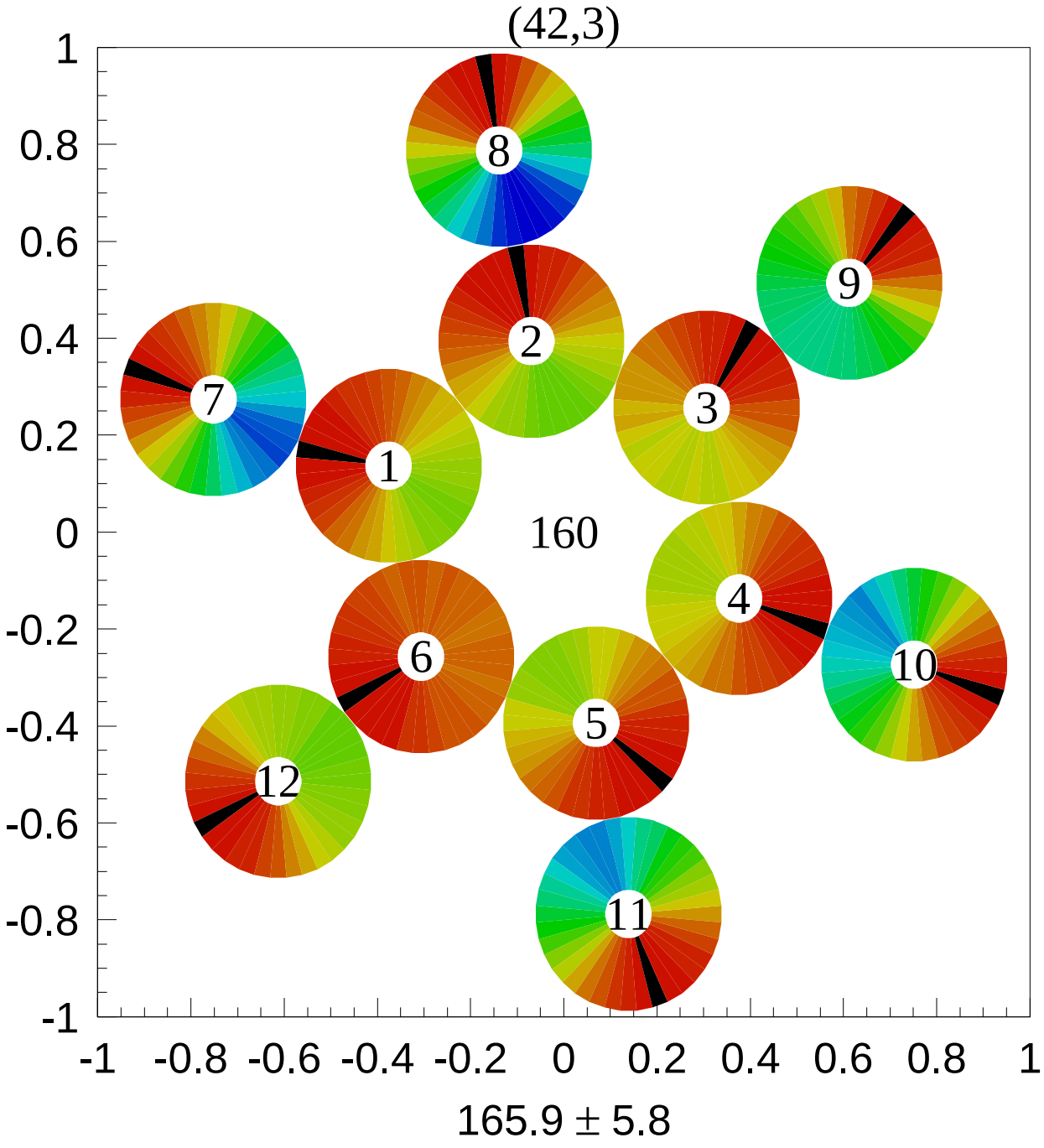

(42,1)
tilted LEDs
120 117 120 130 120 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 122 125 120 126 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

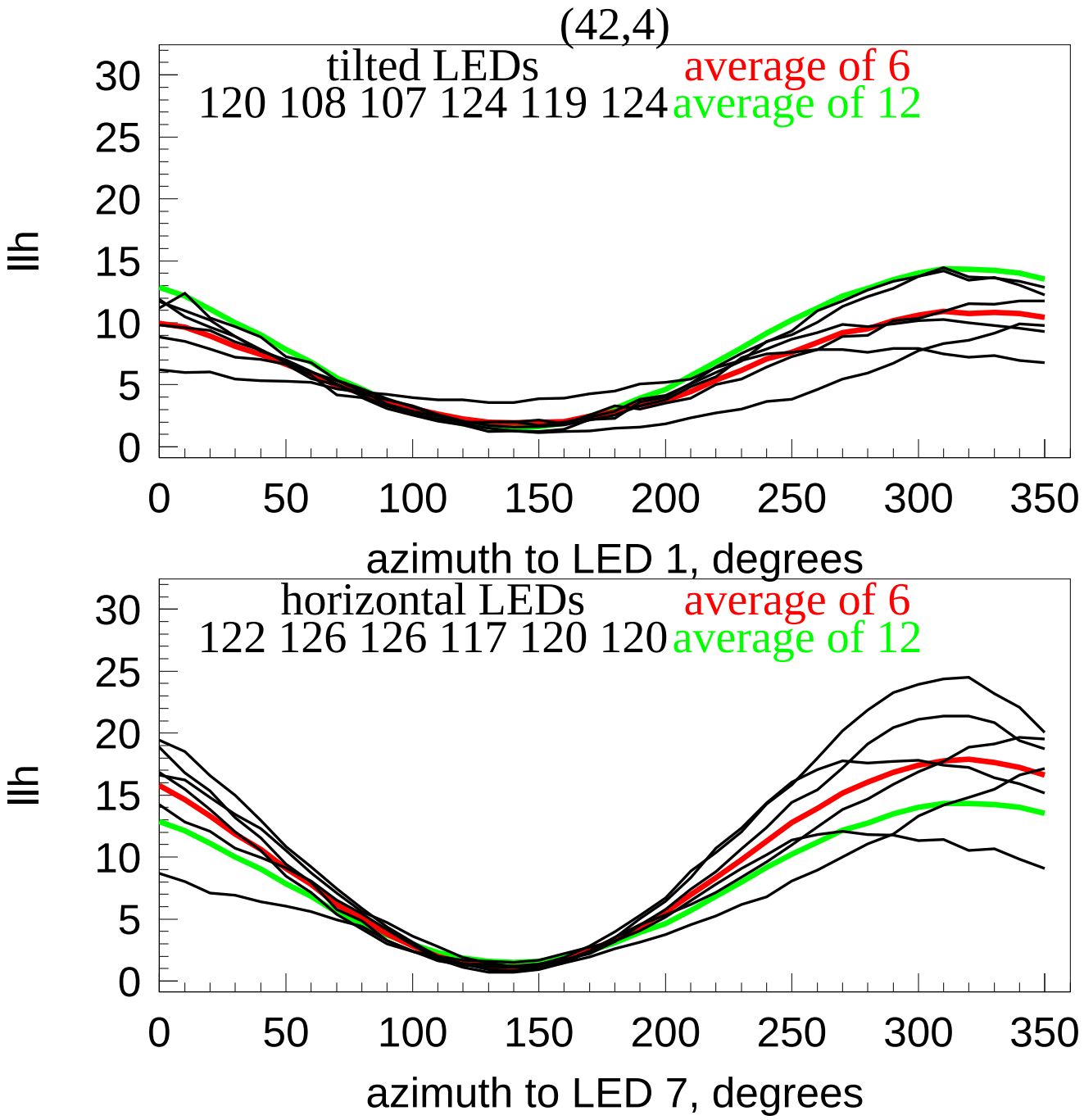

(42,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
294.9 ± 12.6

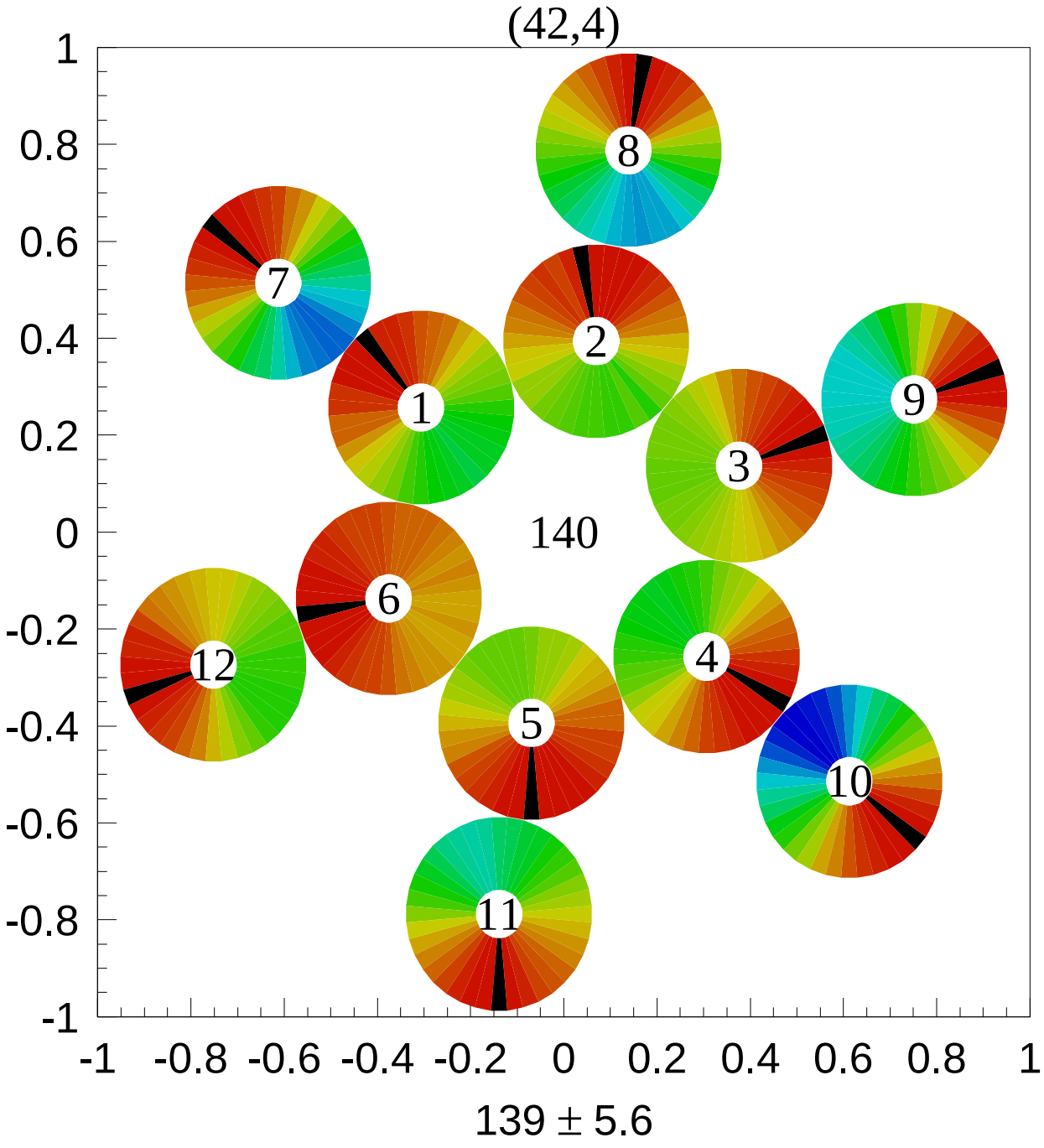

(42,2)
tilted LEDs
125 129 119 117 128 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 125 121 115 124 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

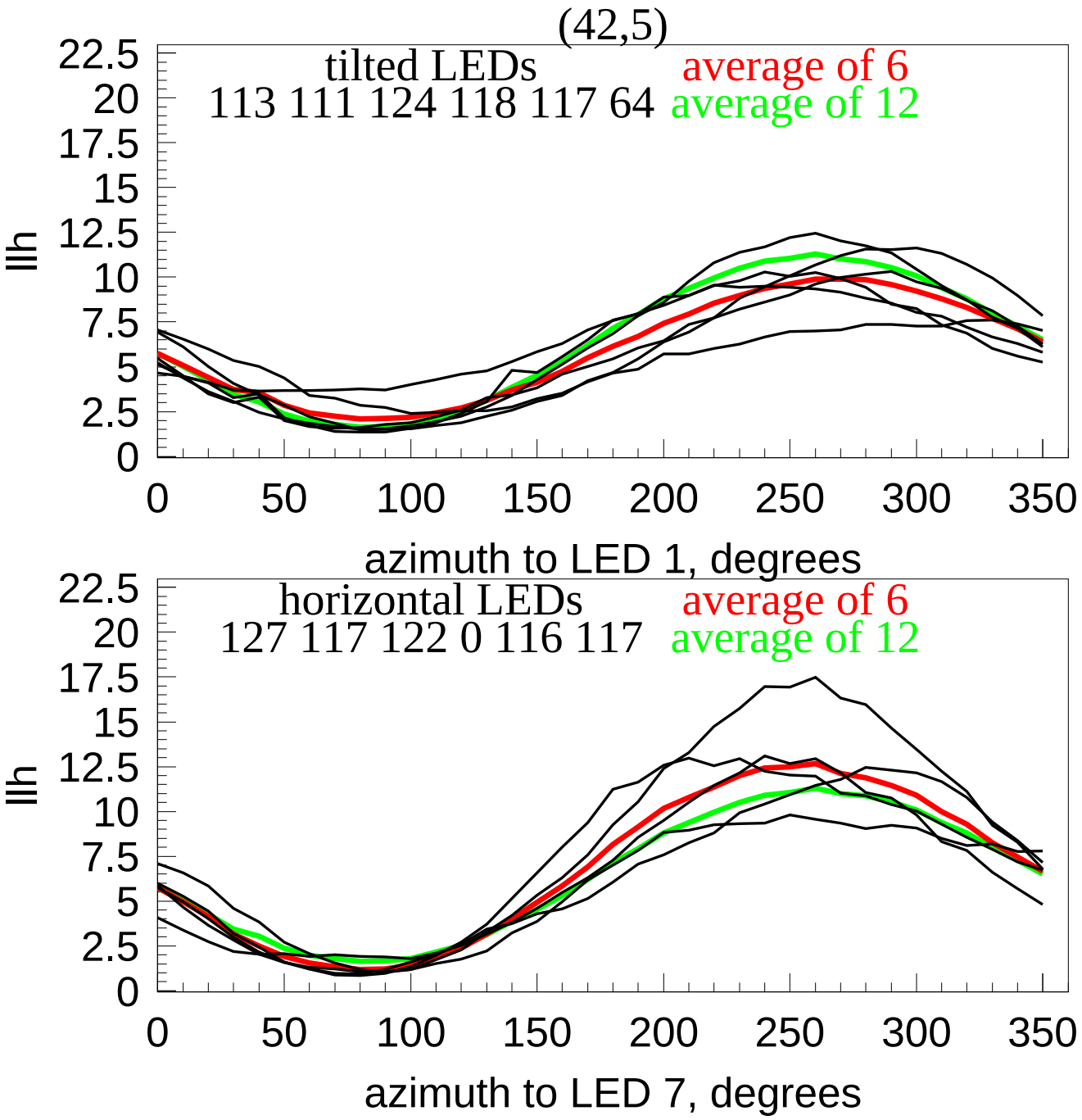

(42,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
230
9
10
3
4
8
2
5
11
1
6
7
12
230.8 ± 15.0

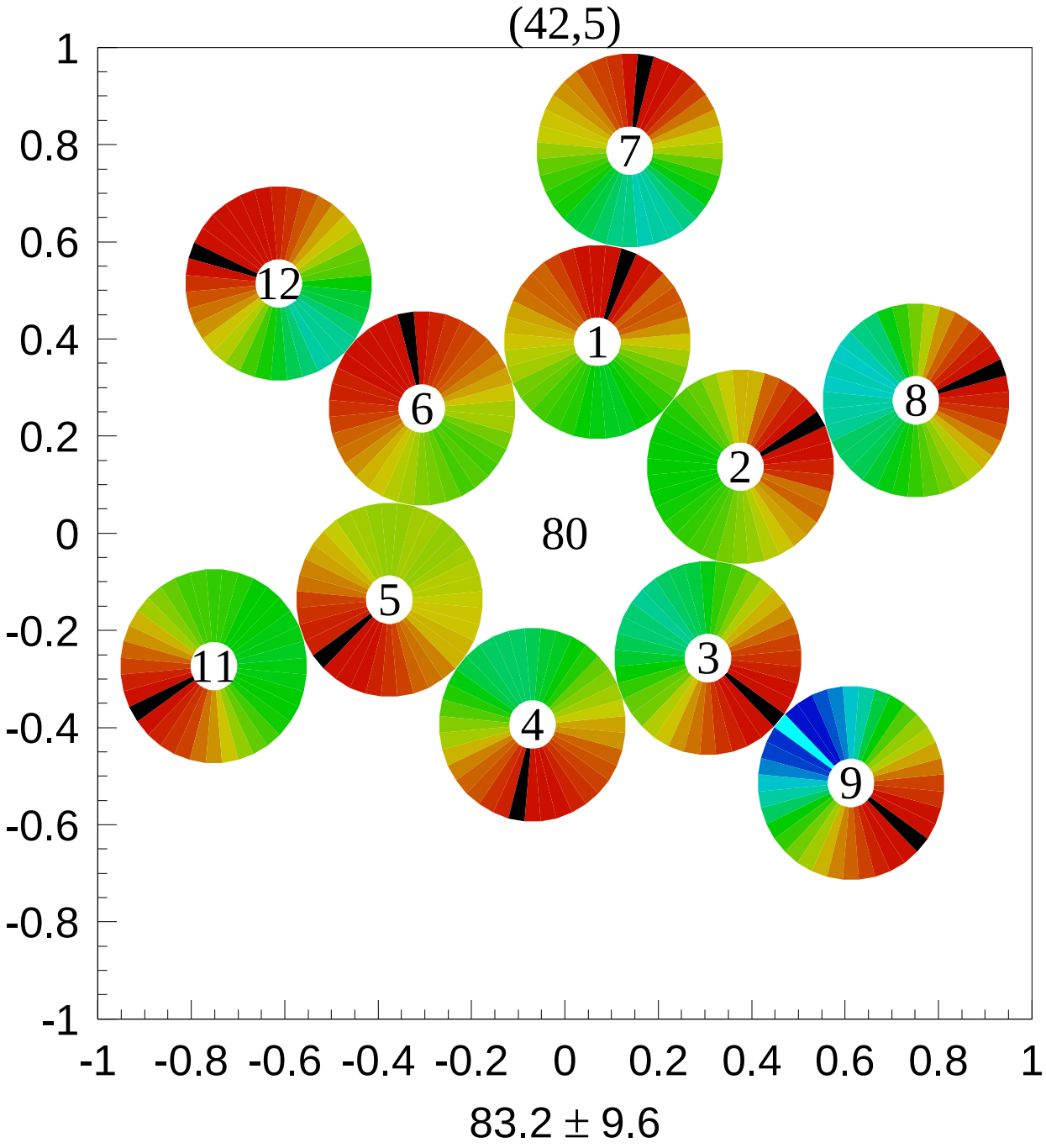

(42,3)
tilted LEDs
124 124 120 123 129 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 122 120 125 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

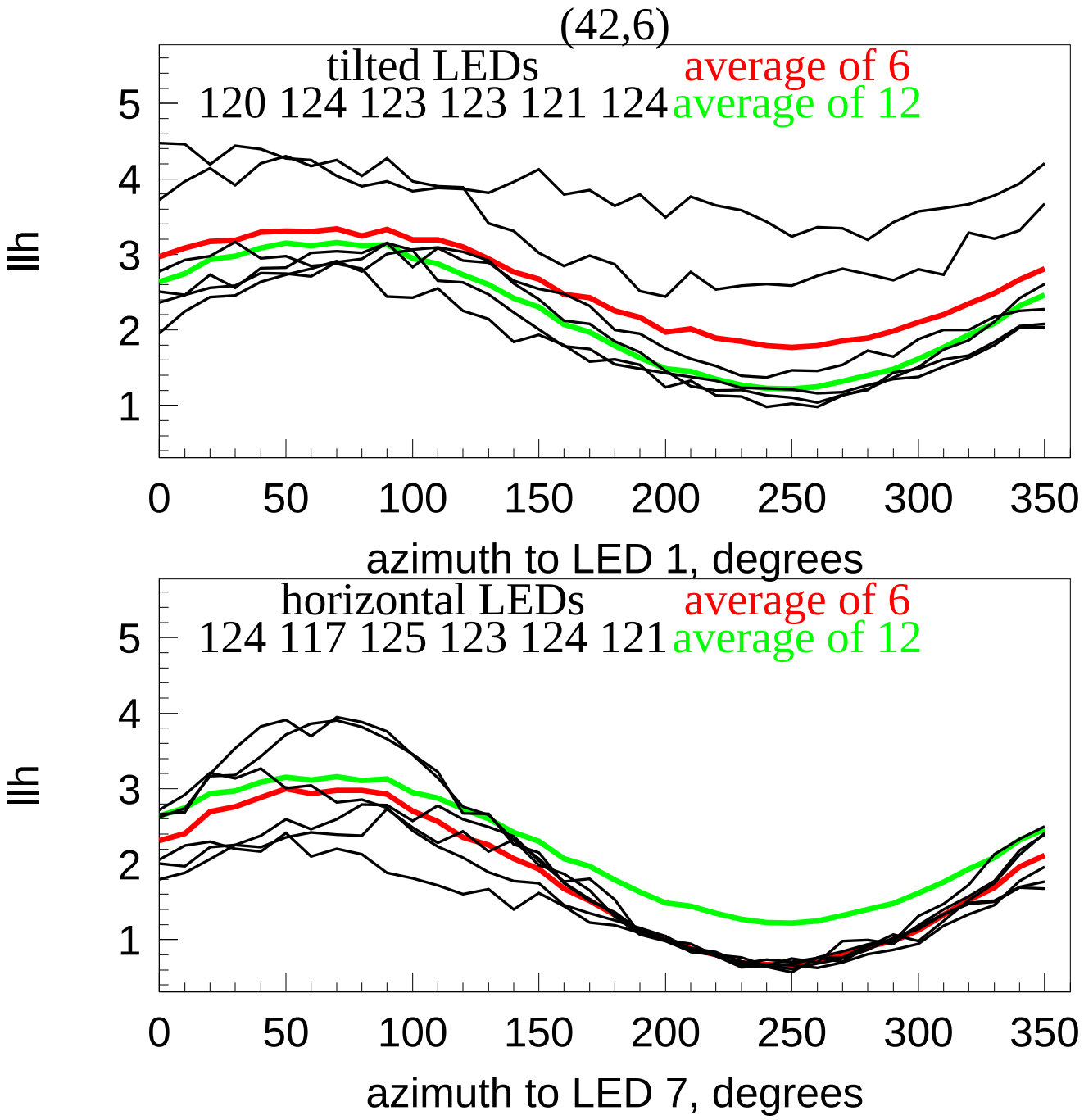

(42,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
165.9 ± 5.8

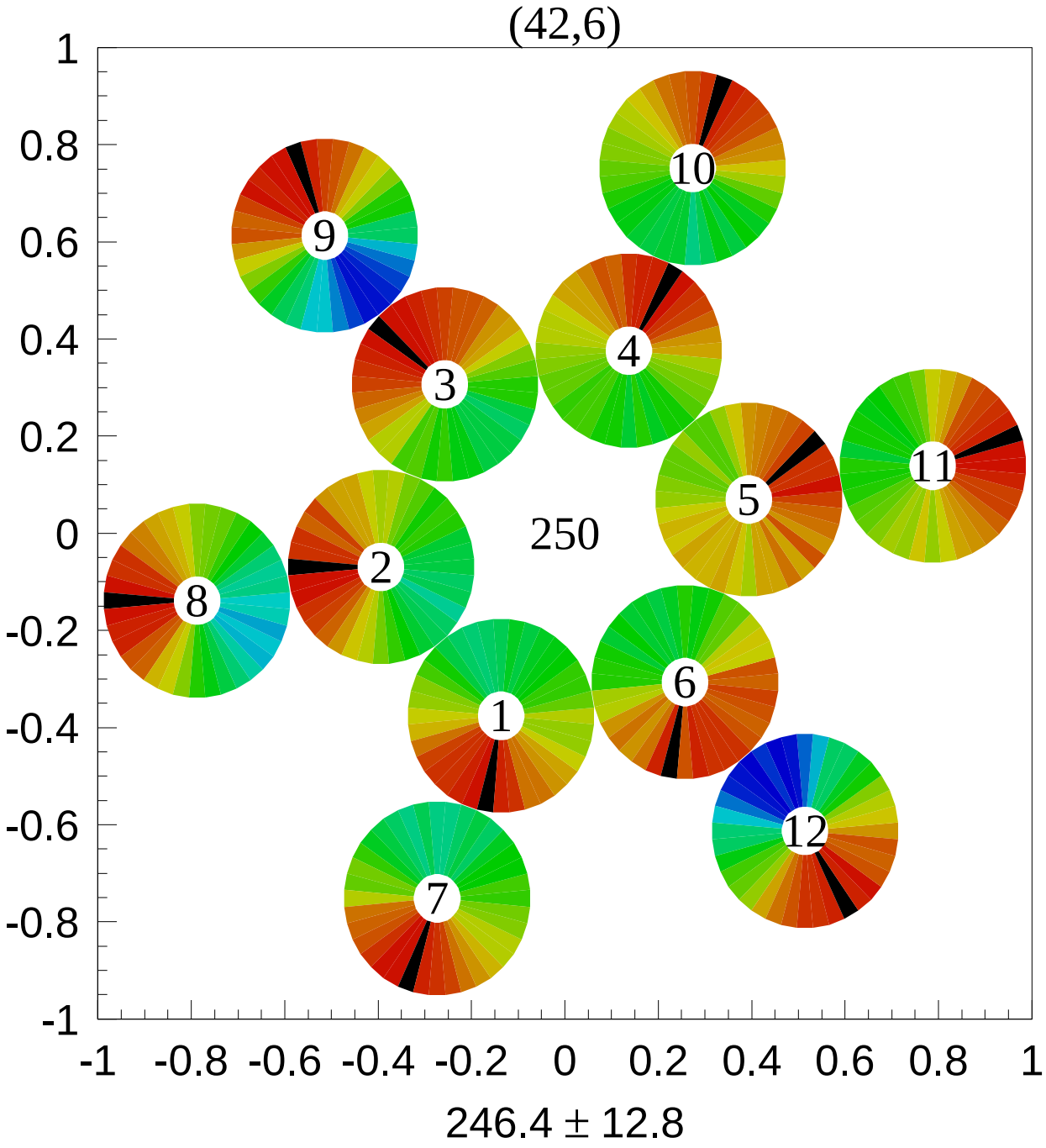

(42,4)
tilted LEDs
120 108 107 124 119 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 126 126 117 120 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

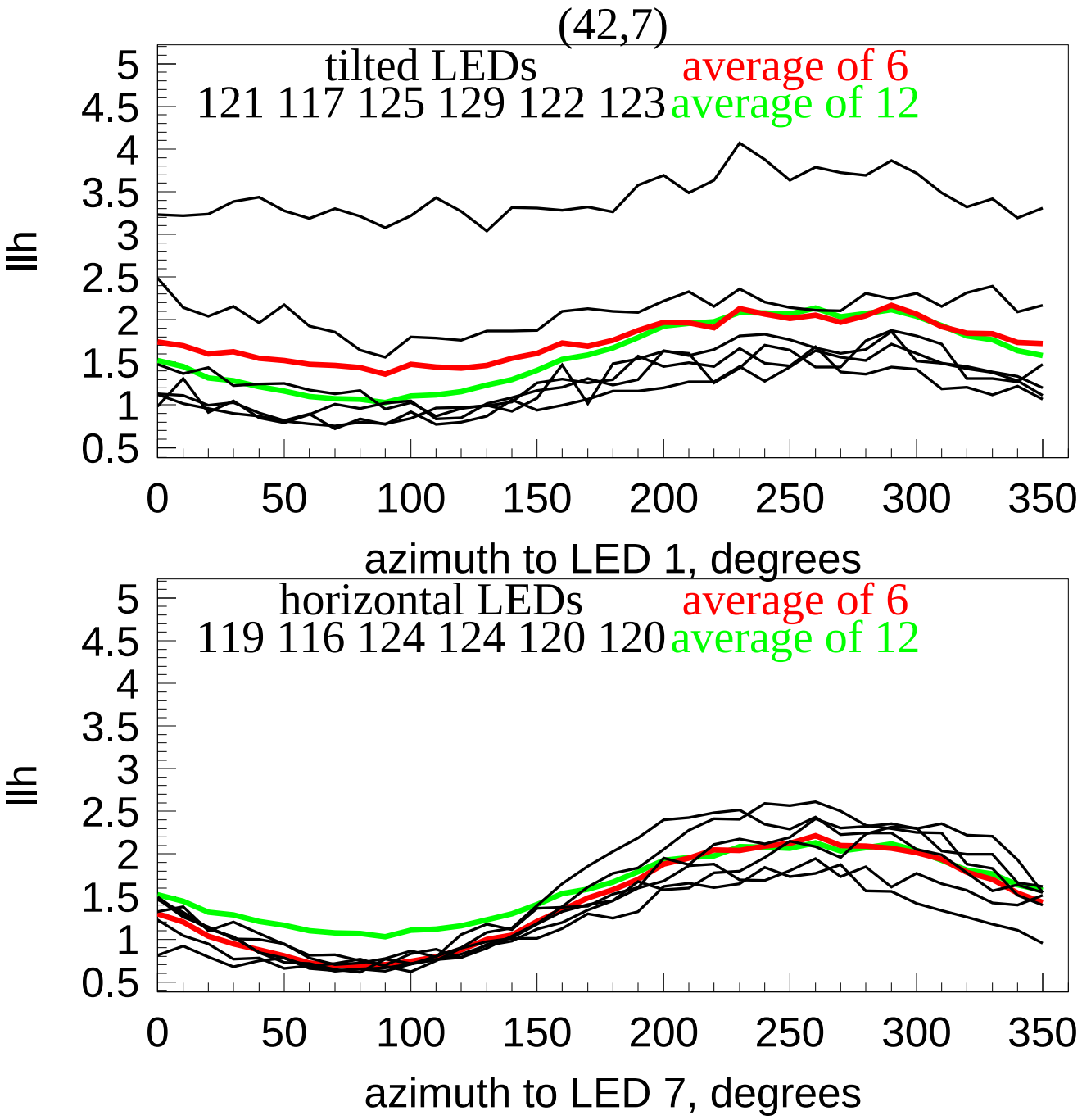

(42,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
139 ± 5.6

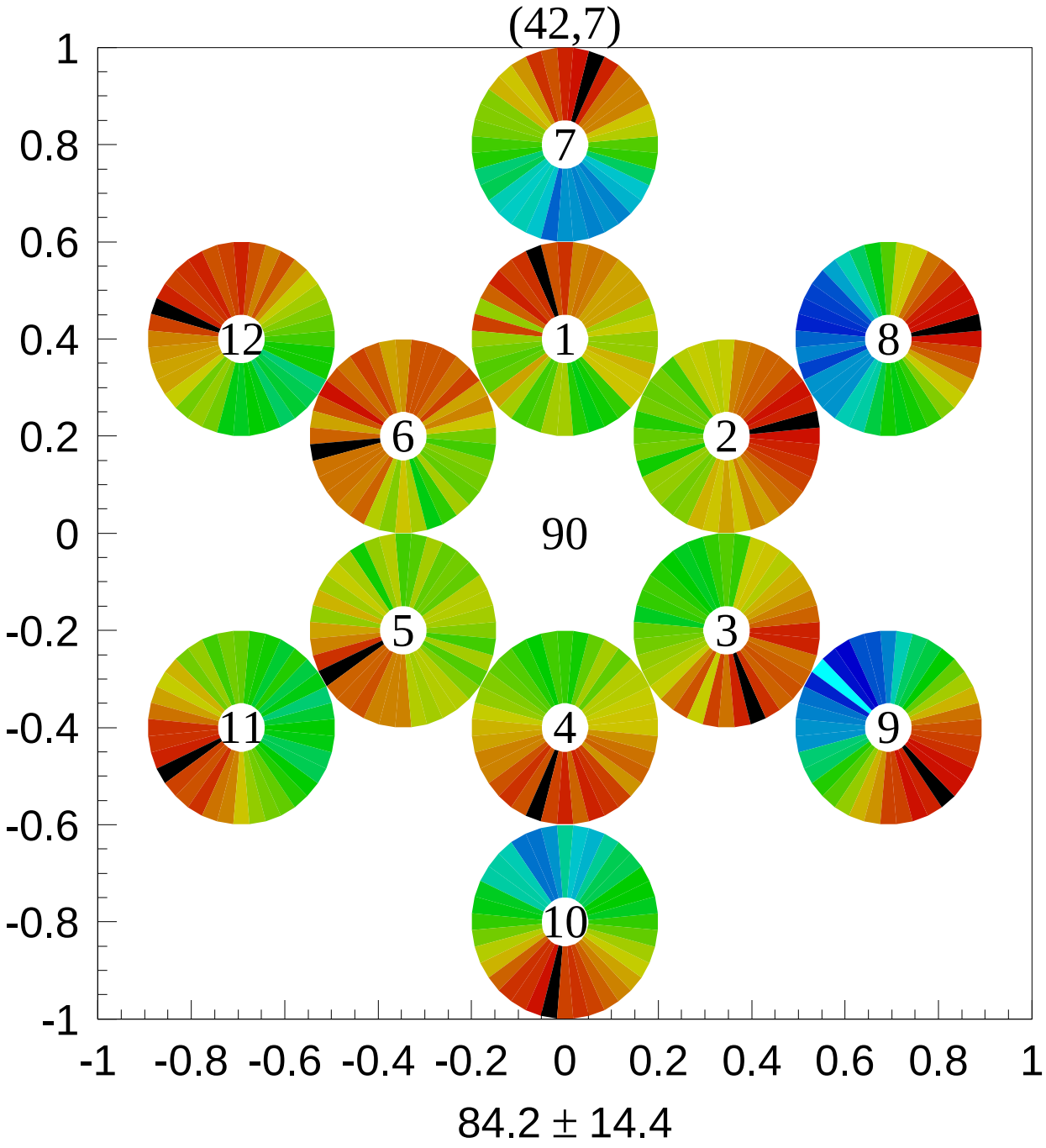

(42,5)
tilted LEDs
113 111 124 118 117 64
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 117 122 0 116 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

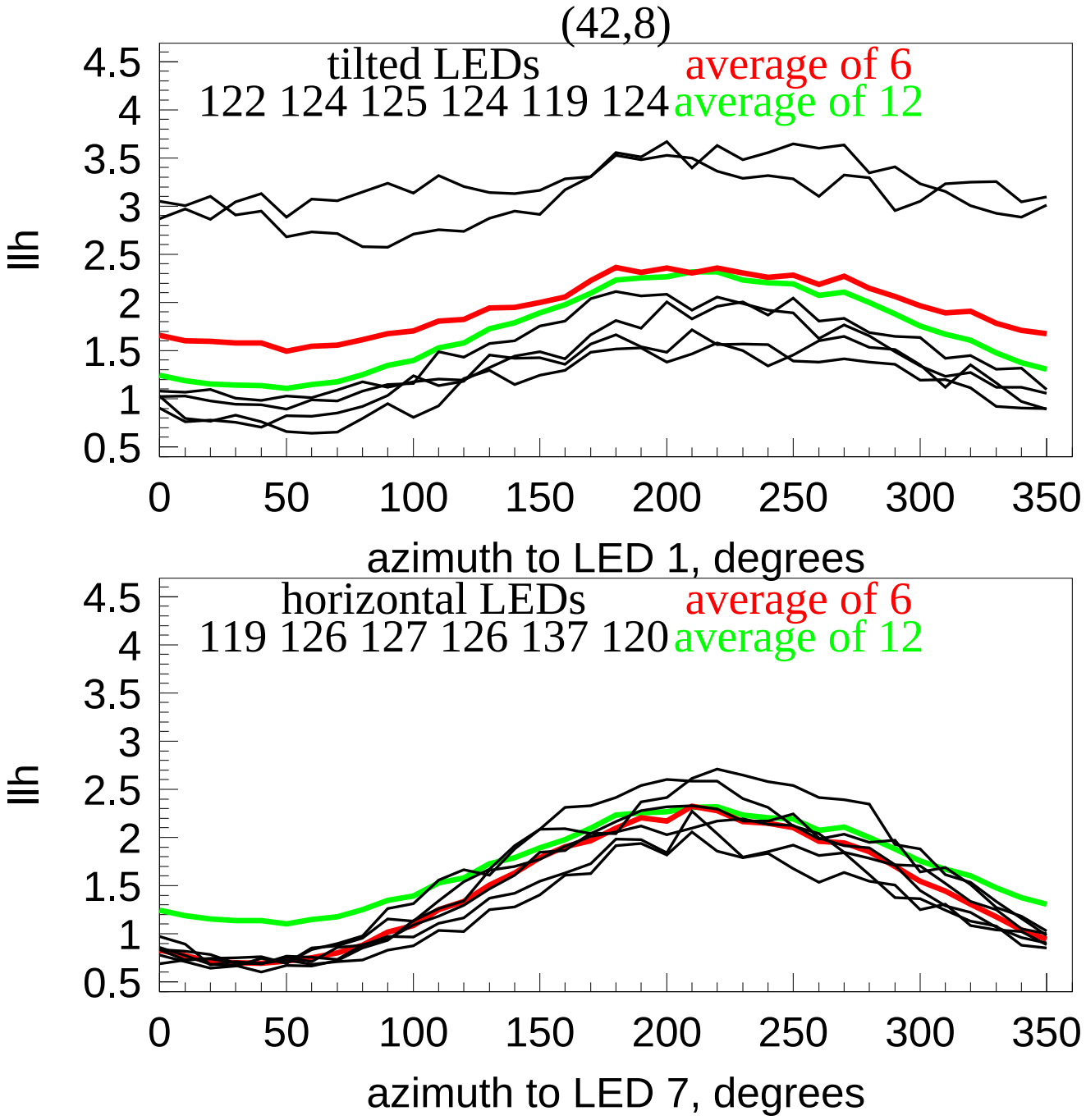

(42,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
83.2 ± 9.6

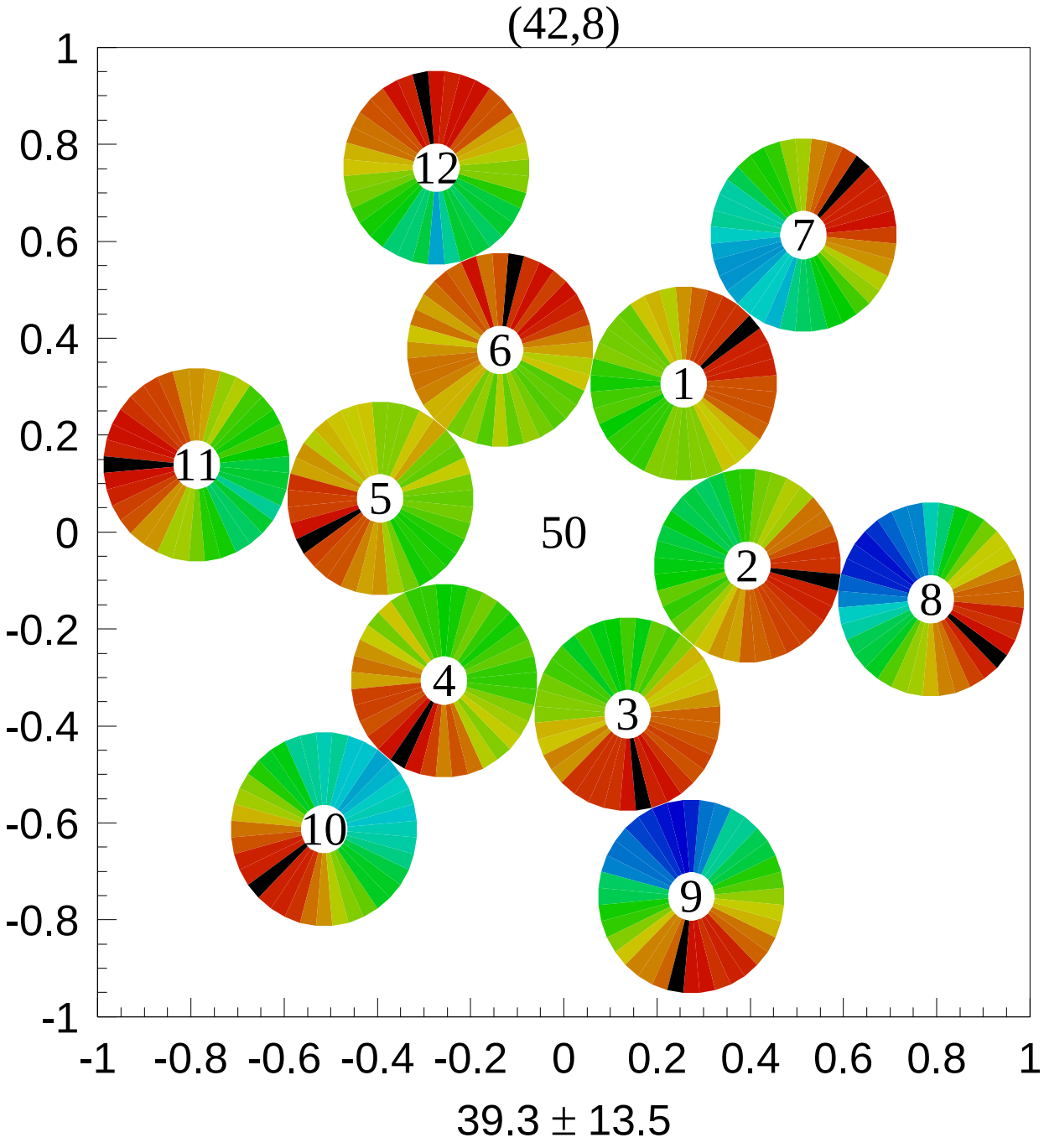

(42,6)
tilted LEDs
120 124 123 123 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 117 125 123 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

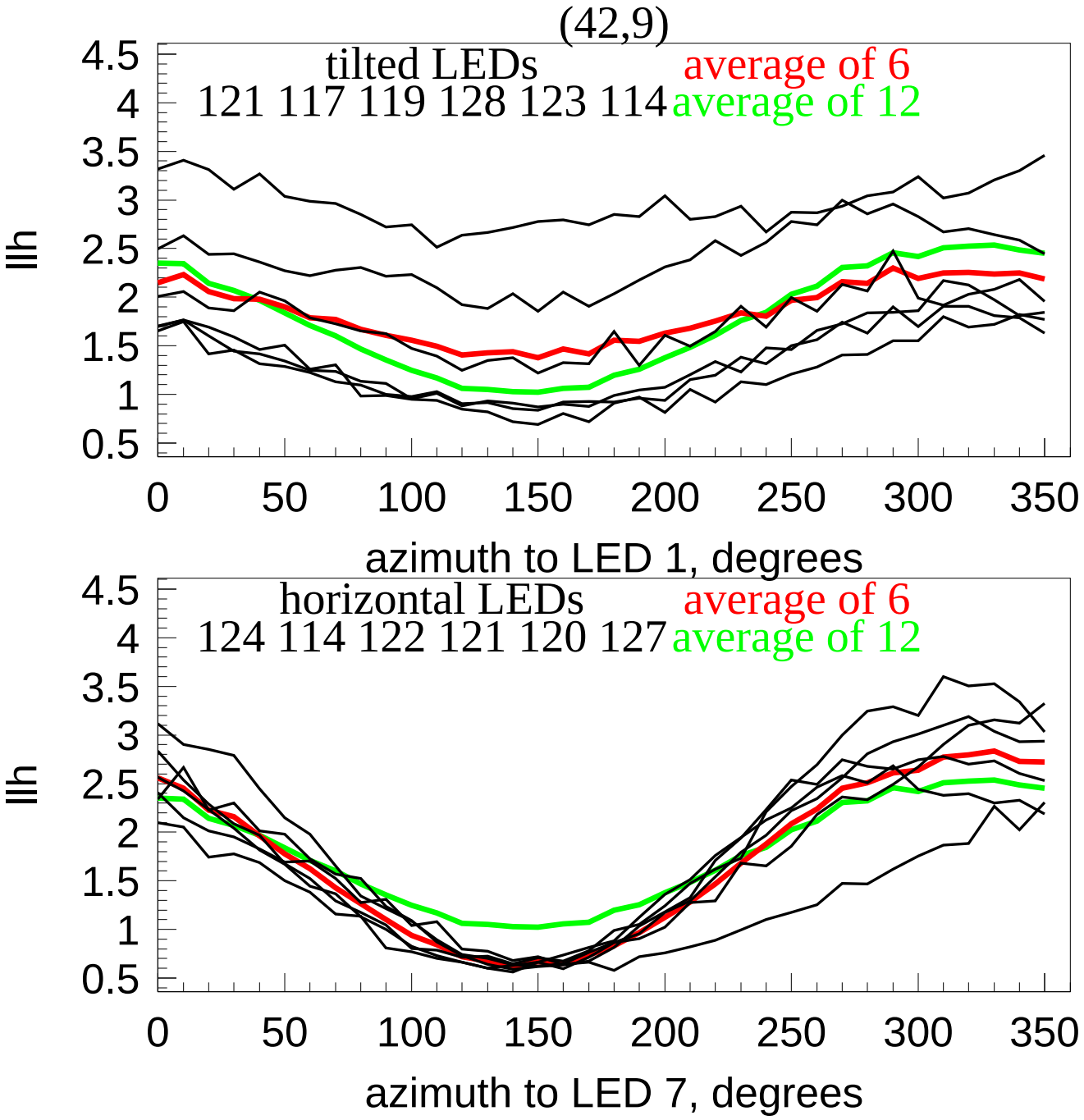

(42,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
246.4 ± 12.8
250
1
2
3
4
5
6
7
8
9
10
11
12

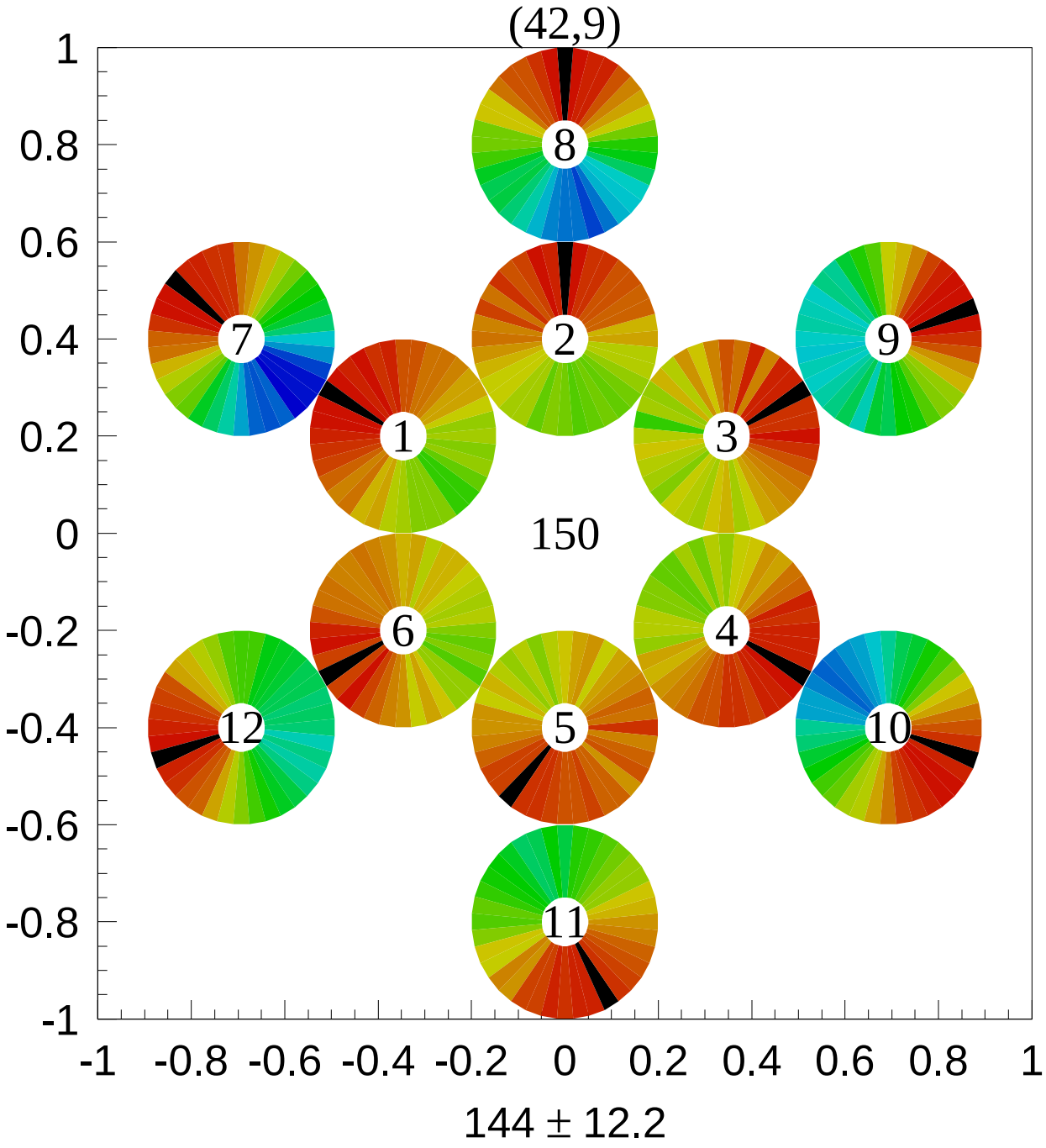

(42,7)
tilted LEDs
121 117 125 129 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 116 124 124 120 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

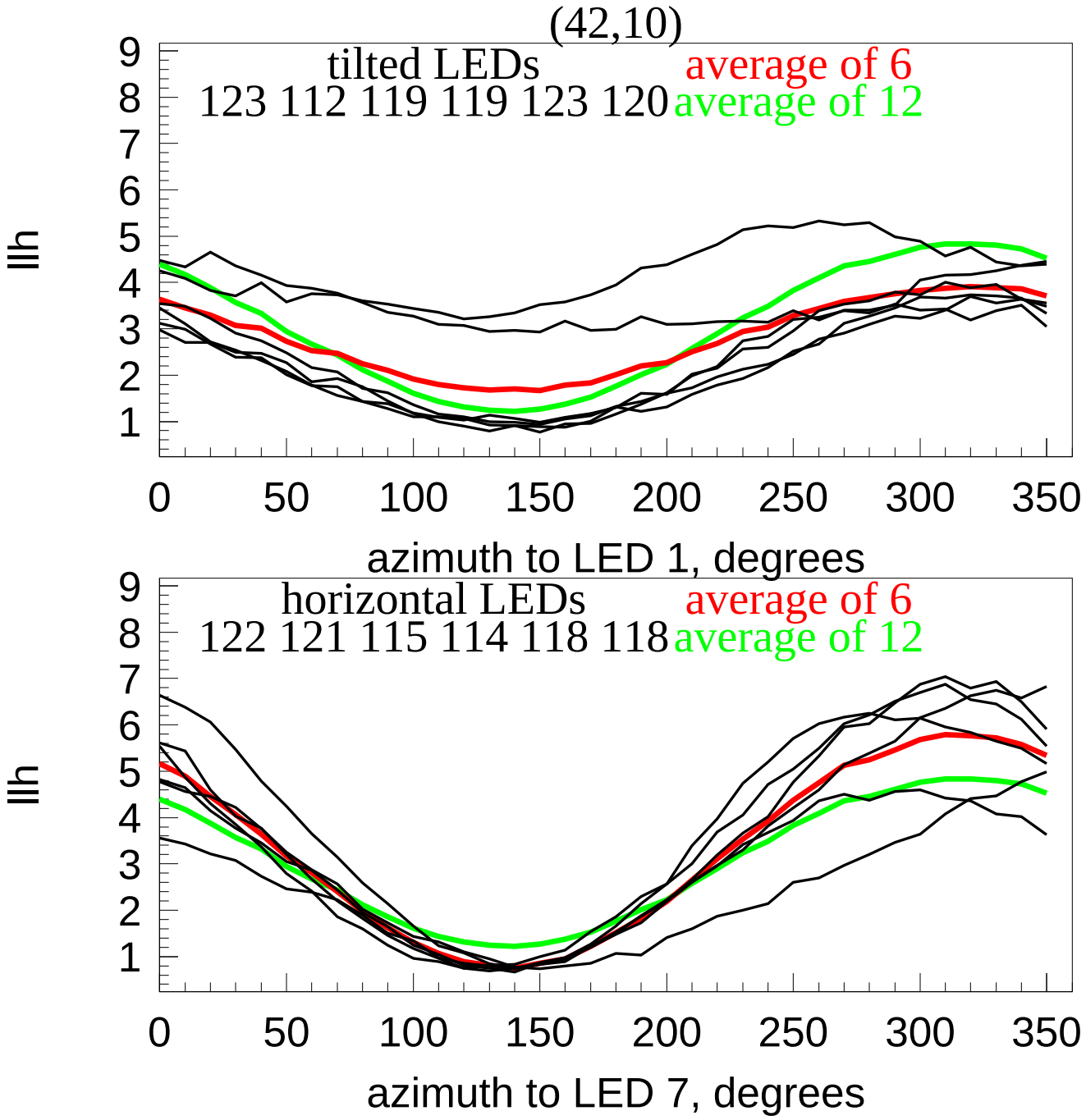

(42,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
84.2 ± 14.4

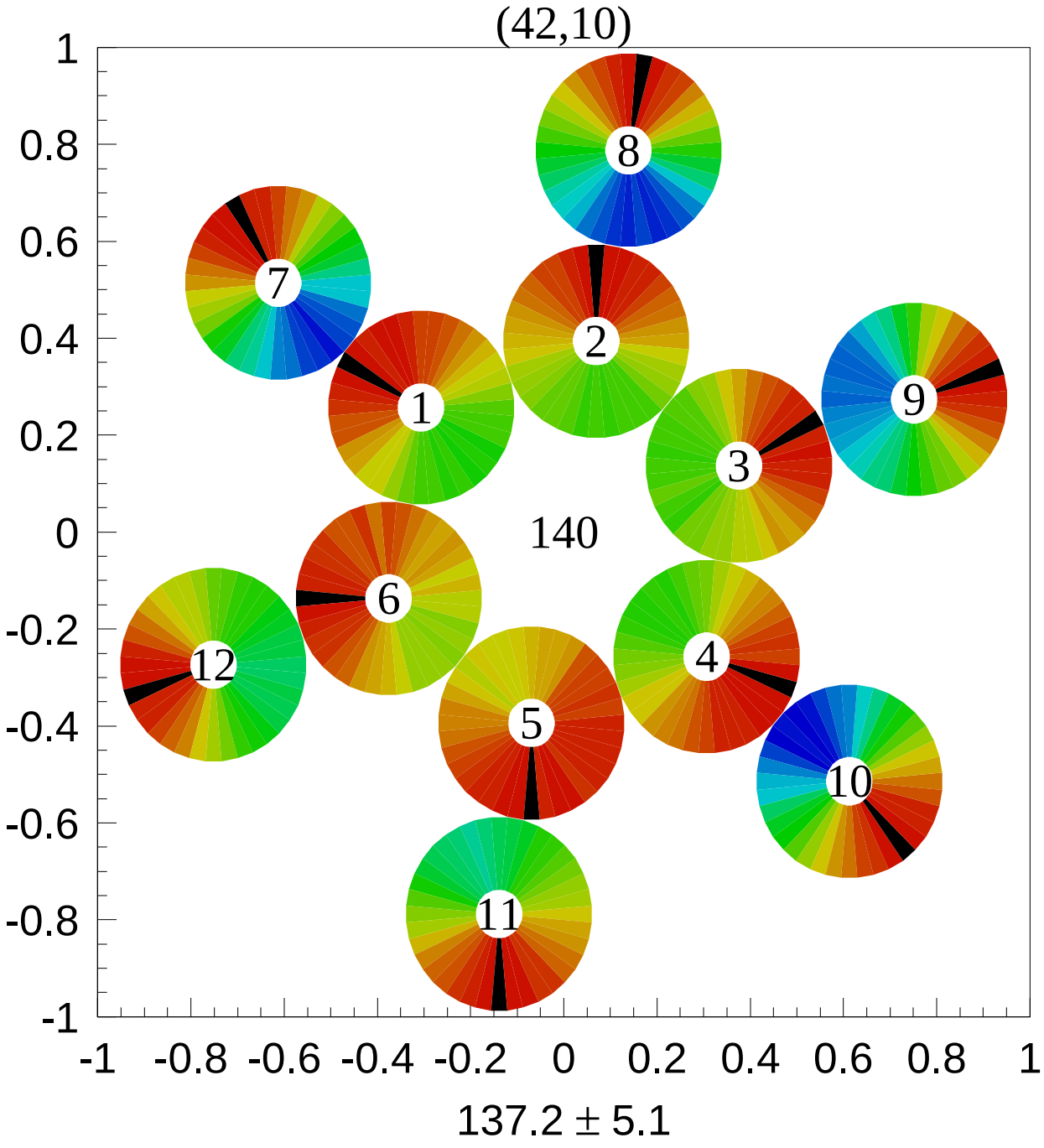

(42,8)
tilted LEDs
122 124 125 124 119 124
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 126 127 126 137 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

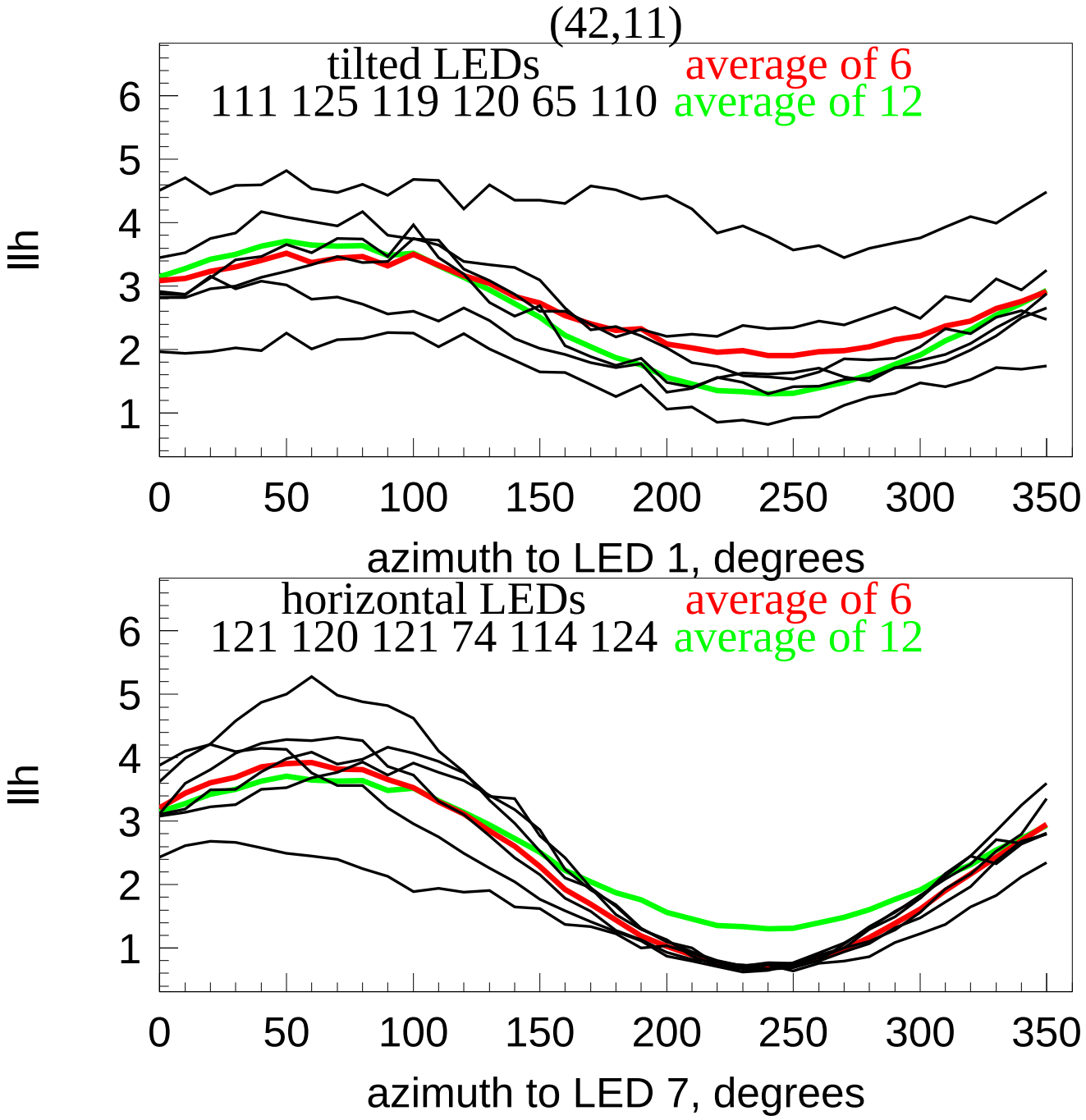

(42,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
39.3 ± 13.5

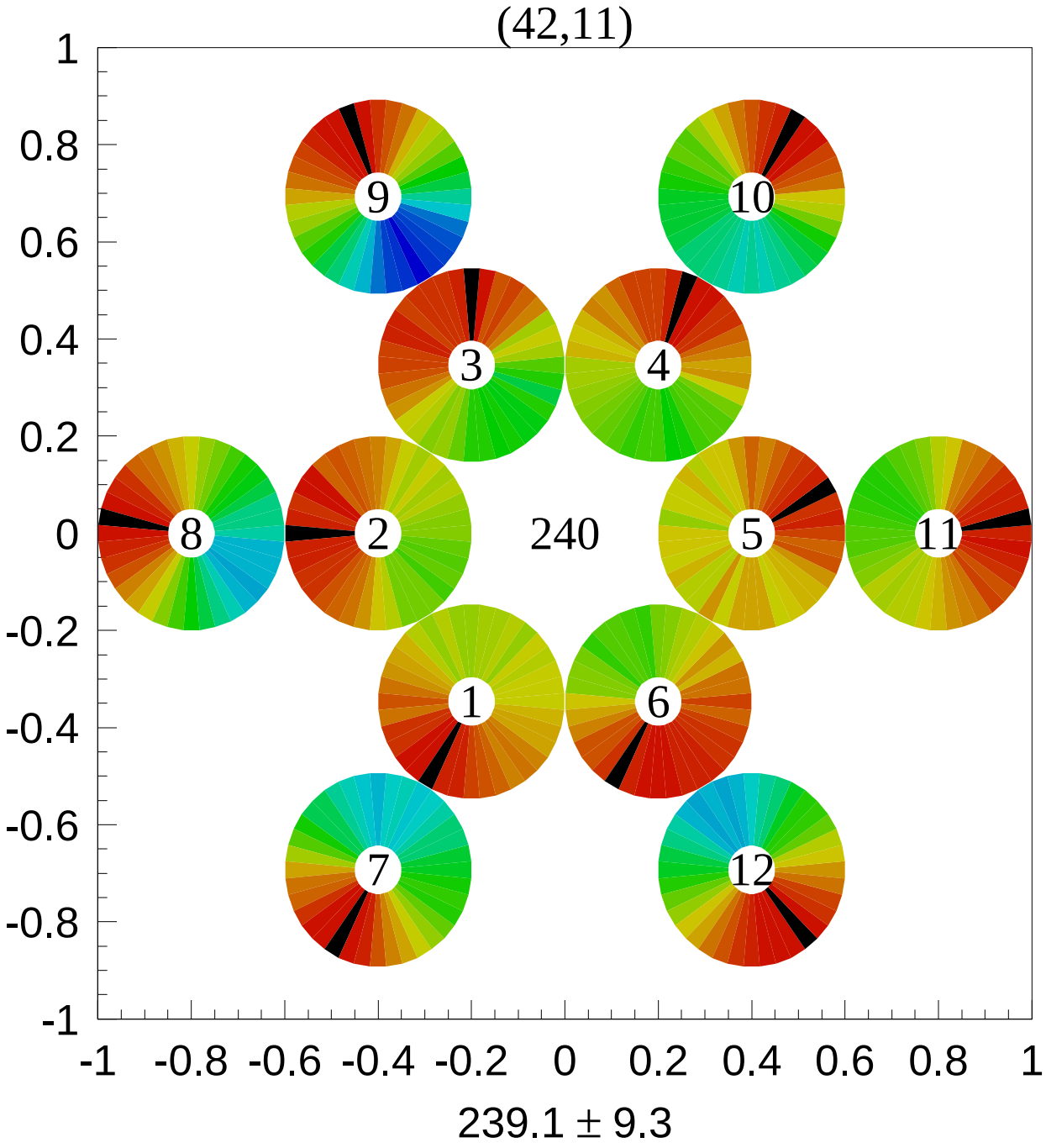

(42,9)
tilted LEDs
121 117 119 128 123 114
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
124 114 122 121 120 127
average of 6
average of 12
IIh
azimuth to LED 7, degrees

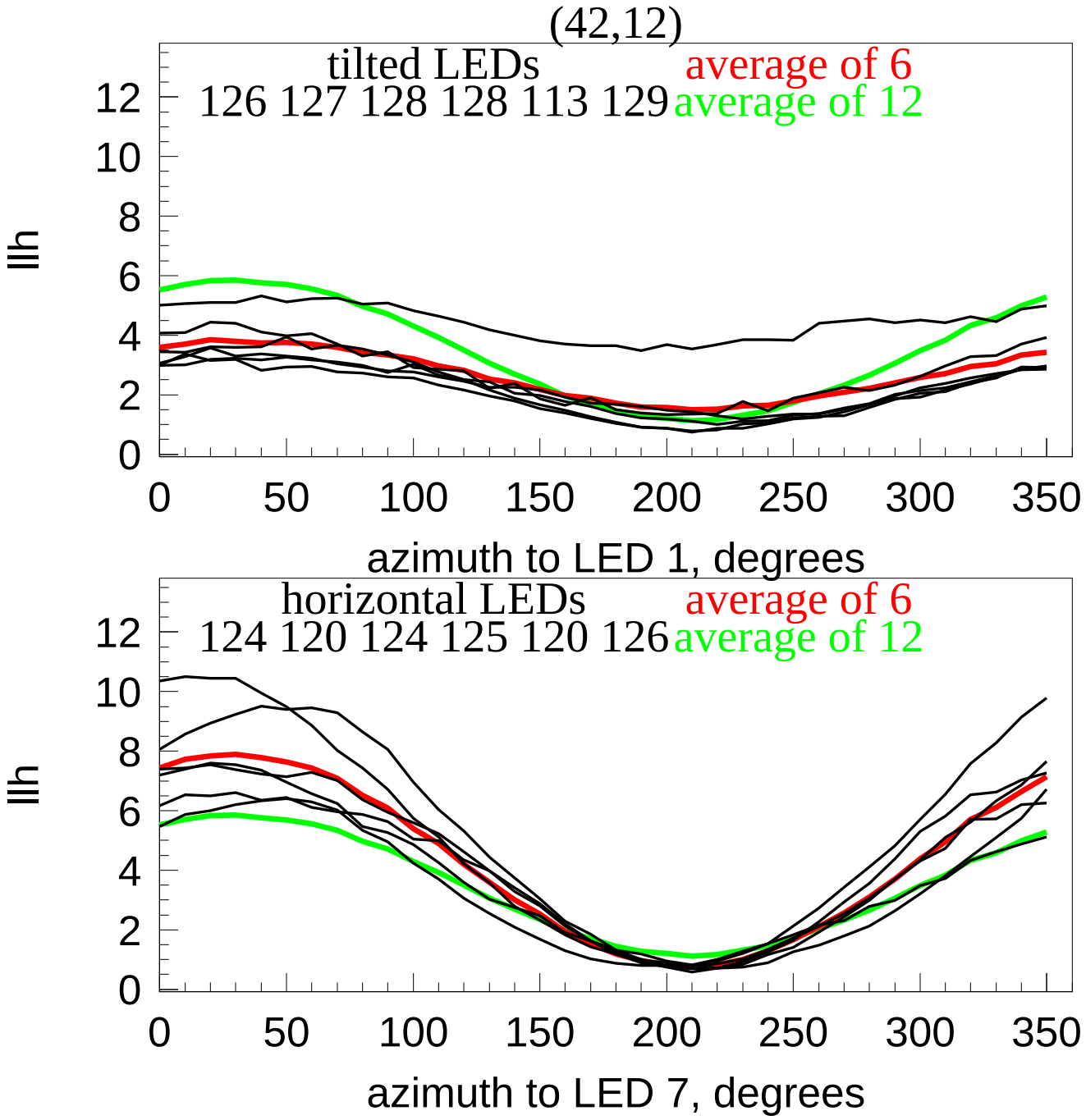

(42,9)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
144 ± 12.2

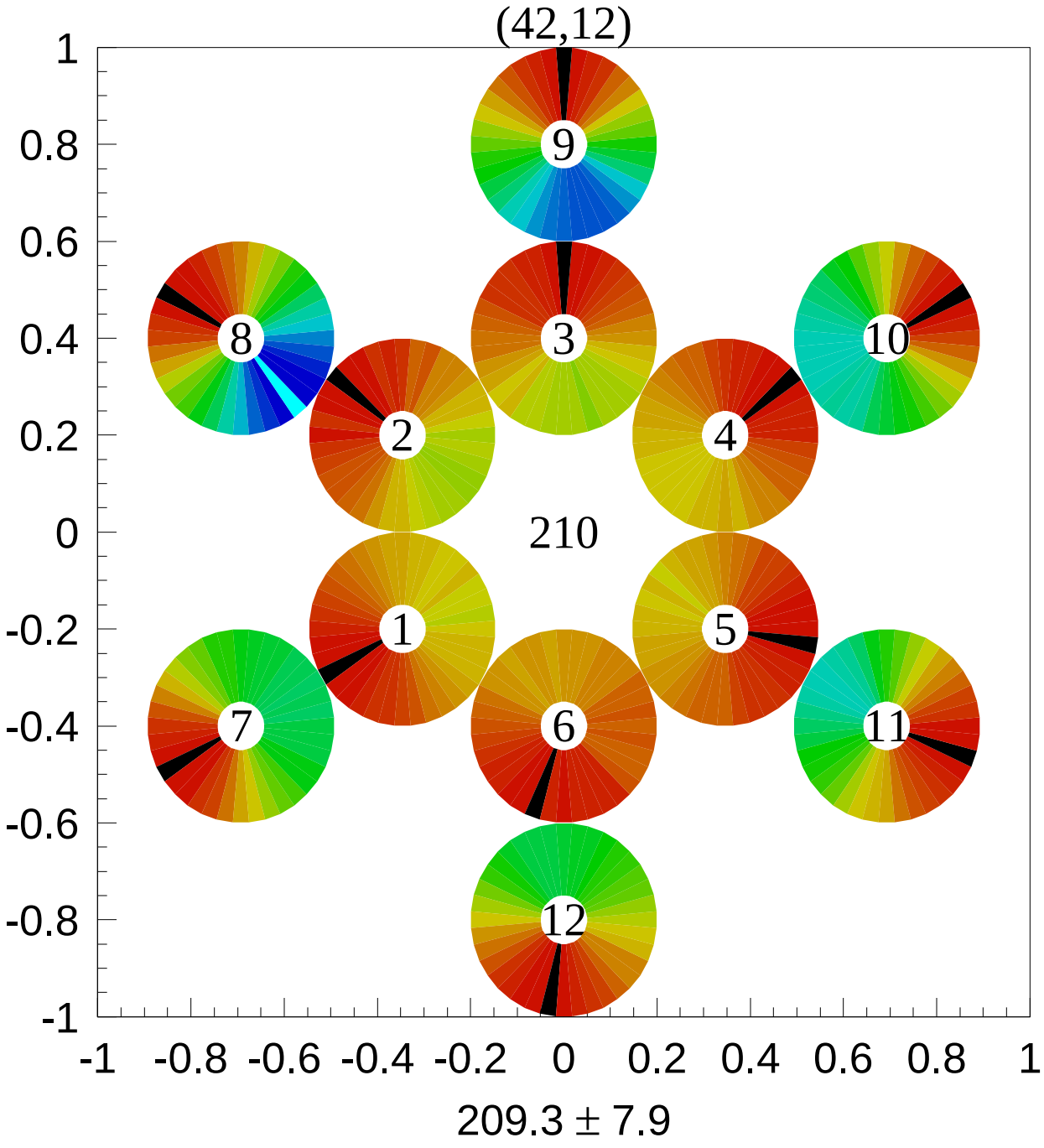

(42,10)
tilted LEDs
123 112 119 119 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 115 114 118 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

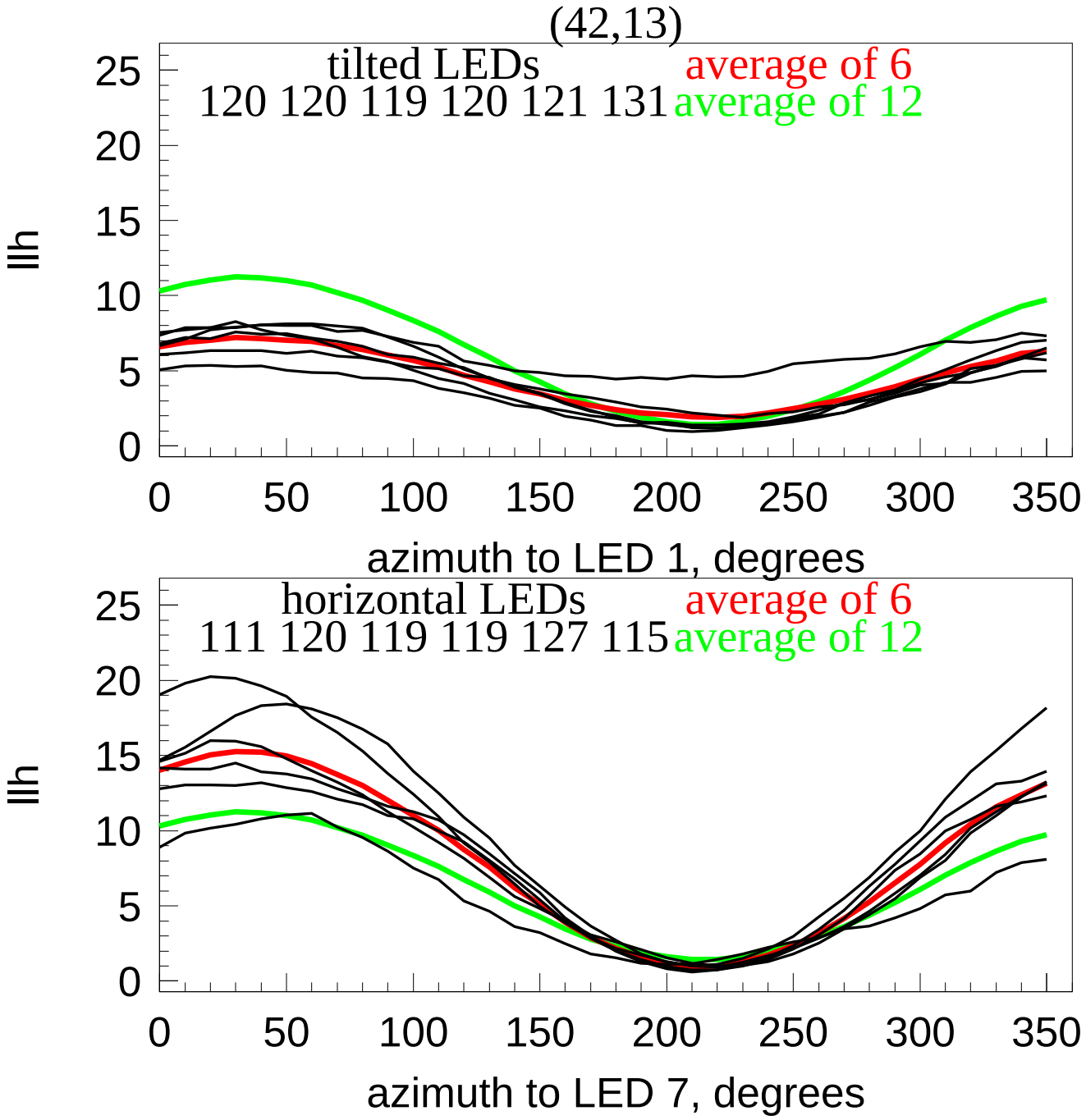

(42,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
137.2 ± 5.1
140
1
2
3
4
5
6
7
8
9
10
11
12

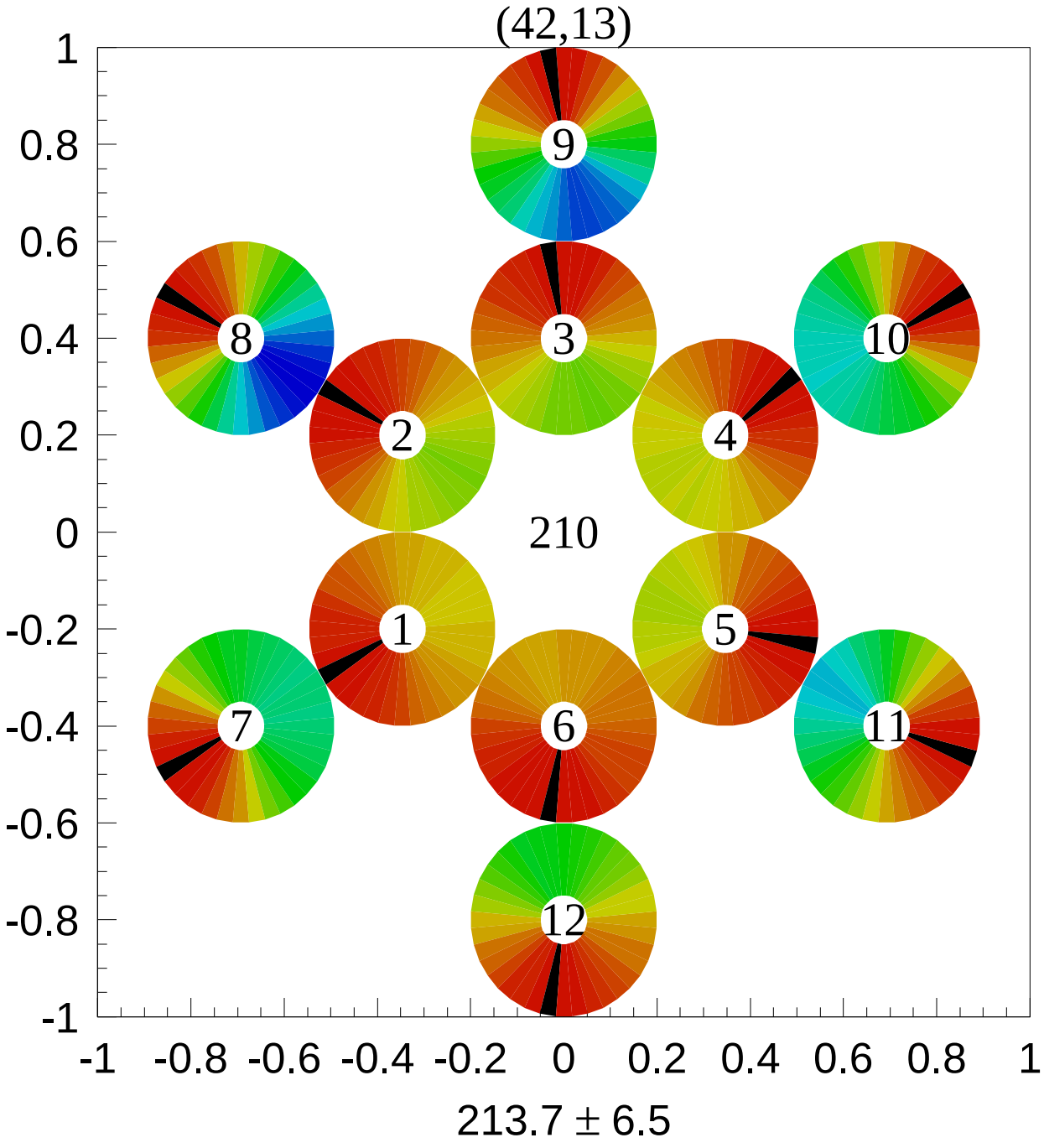

(42,11)
tilted LEDs
111 125 119 120 65 110
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 121 74 114 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

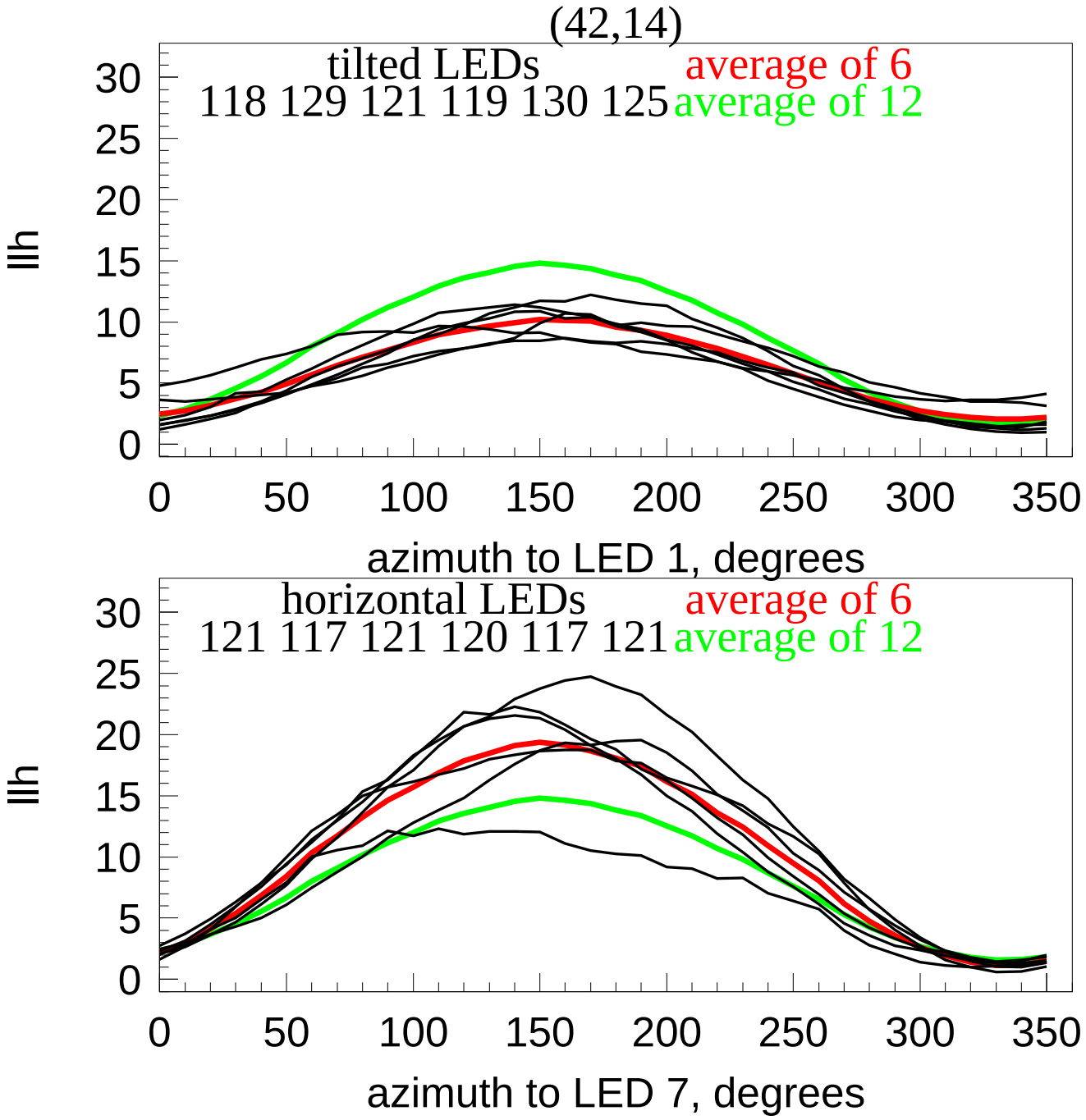

(42,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
239.1 ± 9.3

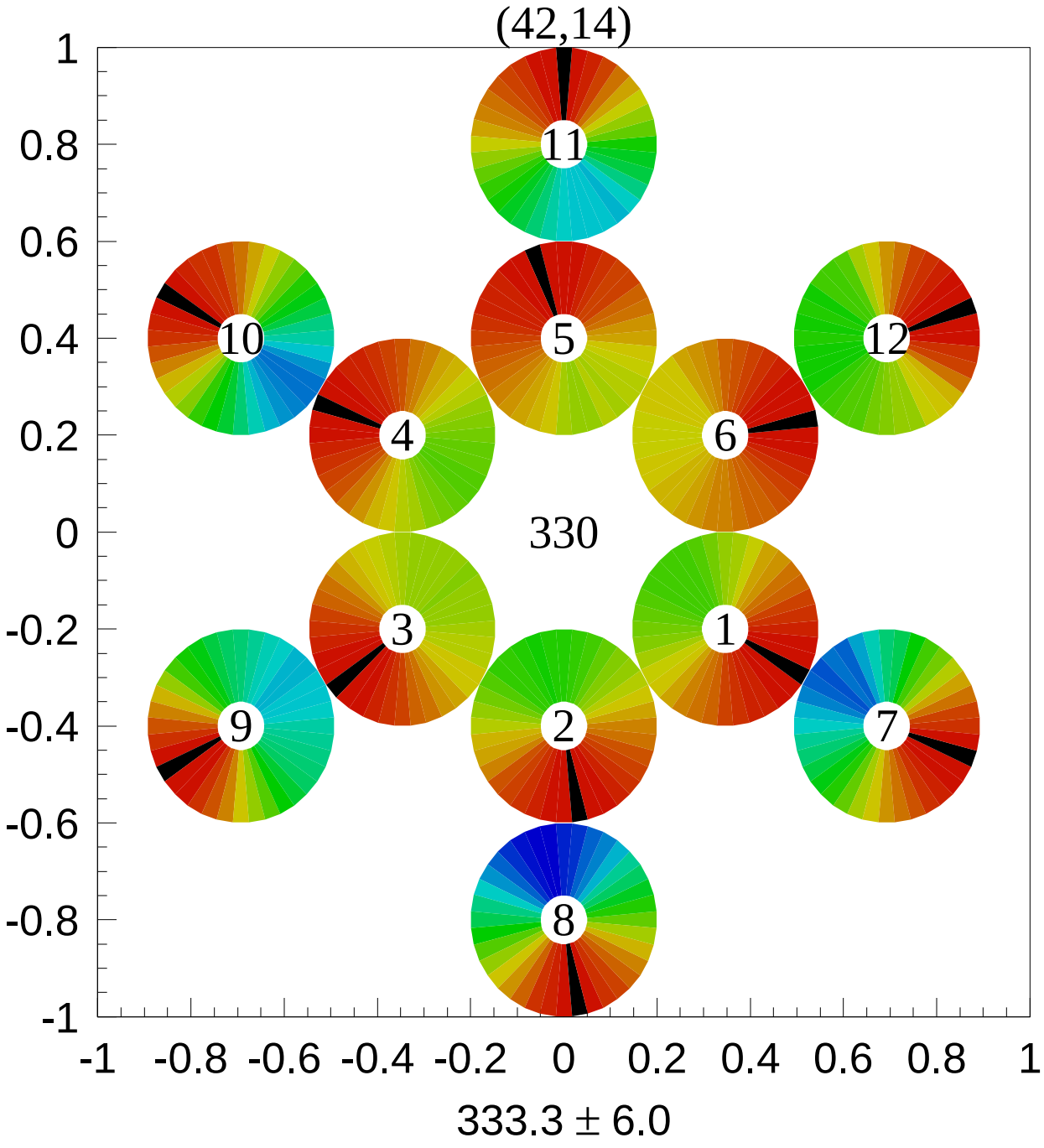

(42,12)
tilted LEDs
126 127 128 128 113 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 120 124 125 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

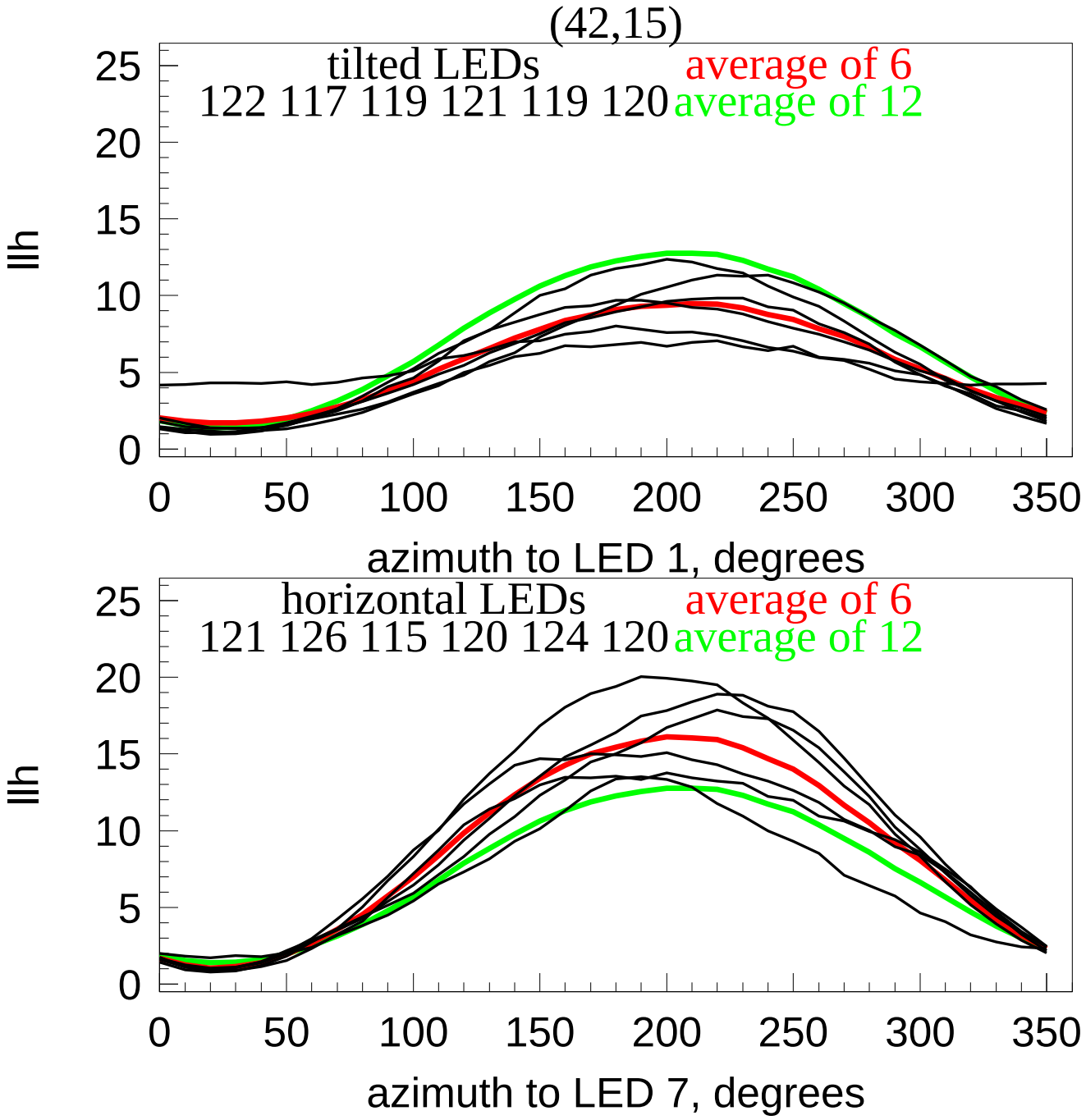

(42,12)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
209.3 ± 7.9

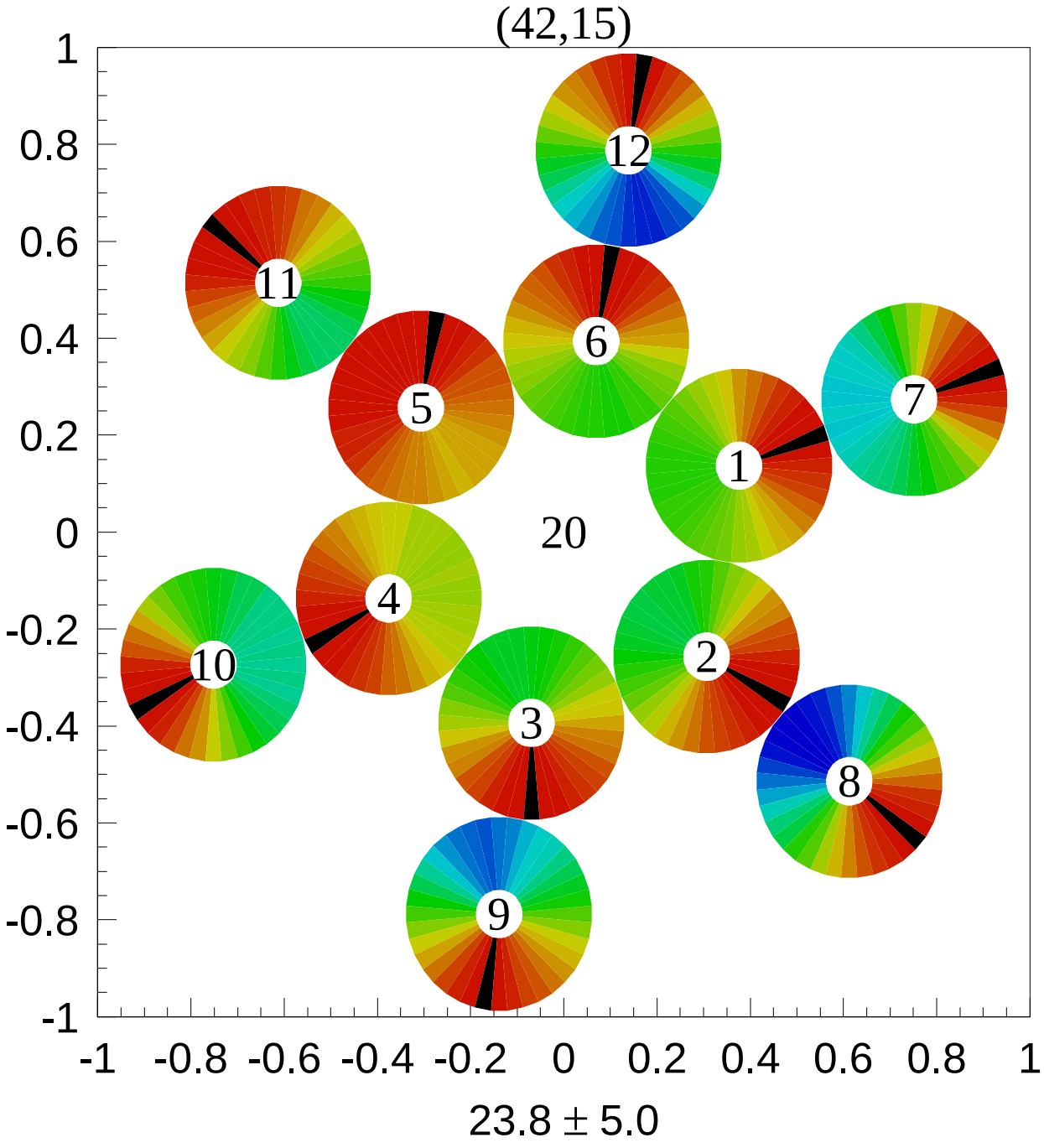

(42,13)
tilted LEDs
120 120 119 120 121 131
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 120 119 119 127 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

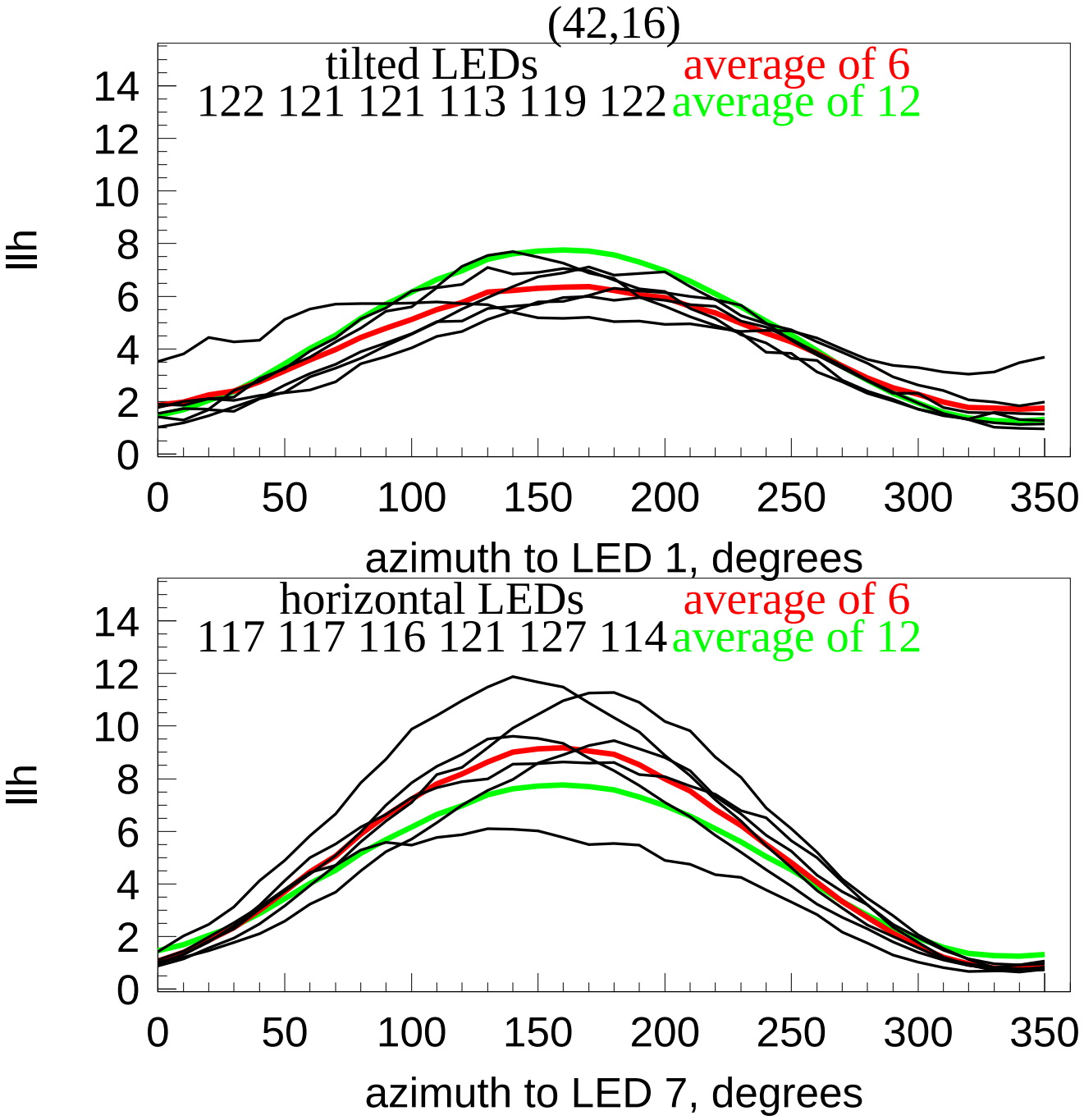

(42,13)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
213.7 ± 6.5

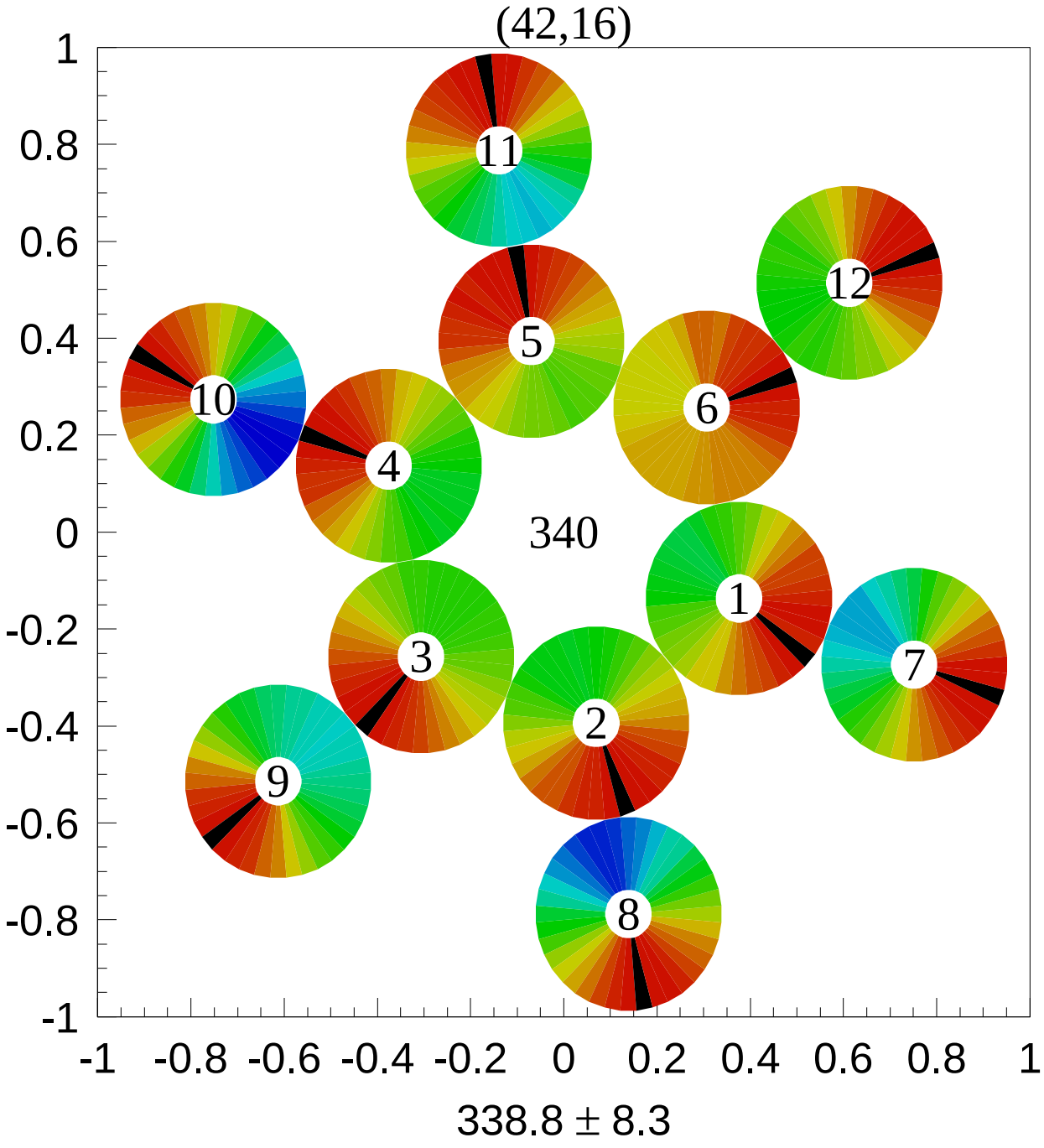

(42,14)
tilted LEDs
118 129 121 119 130 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 117 121 120 117 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

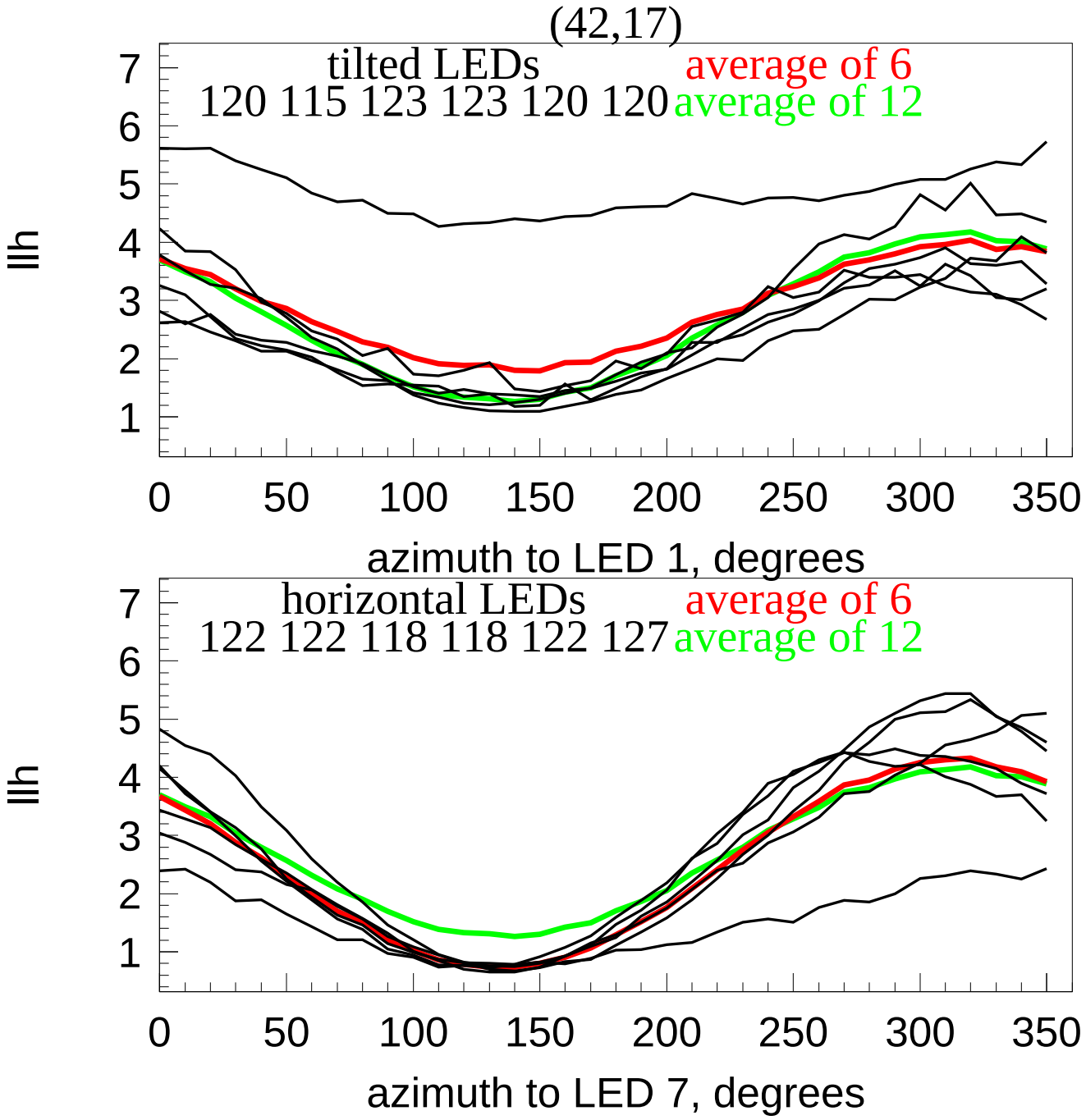

(42,14)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
333.3 ± 6.0

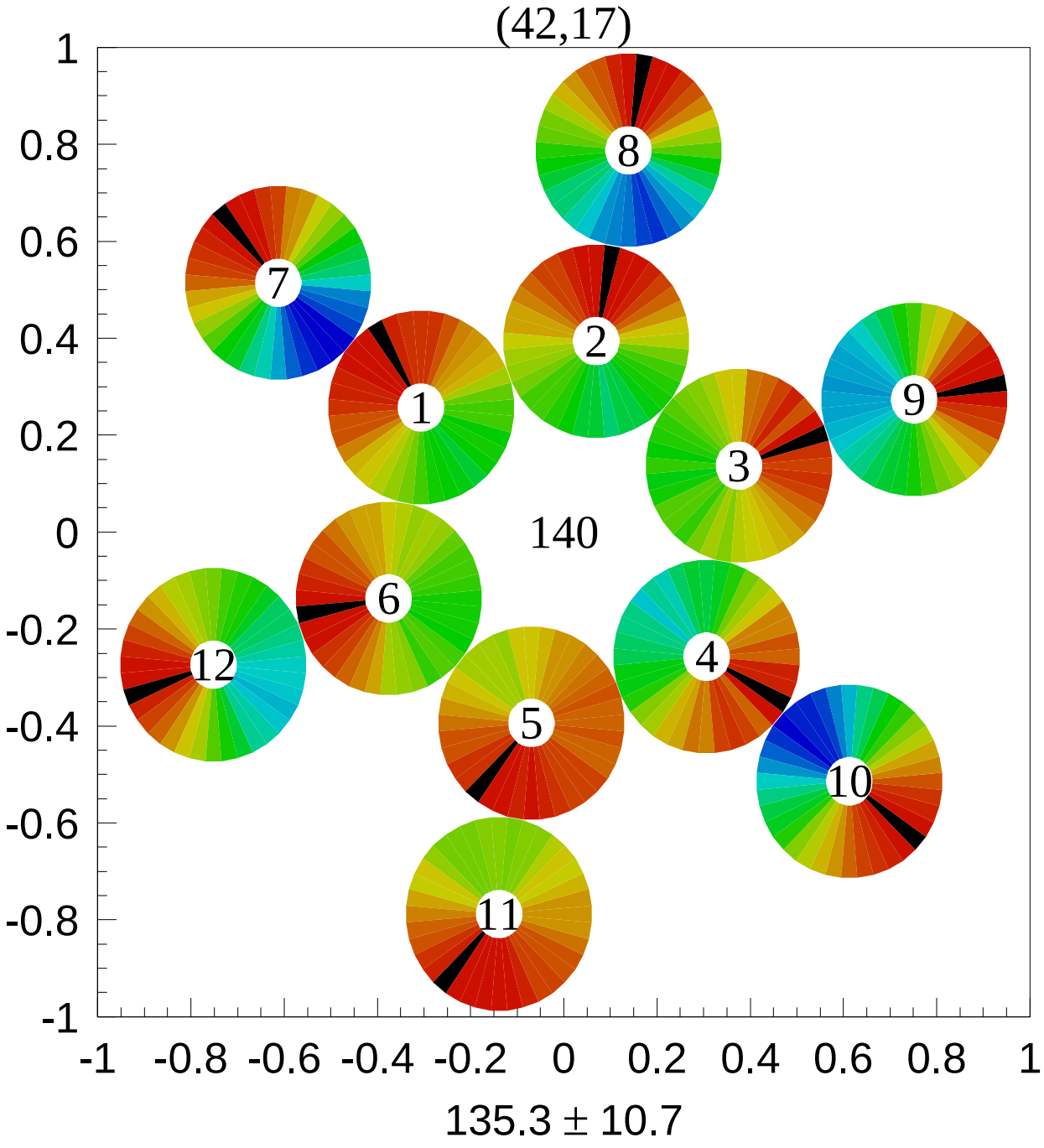

(42,15)
tilted LEDs
122 117 119 121 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 126 115 120 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

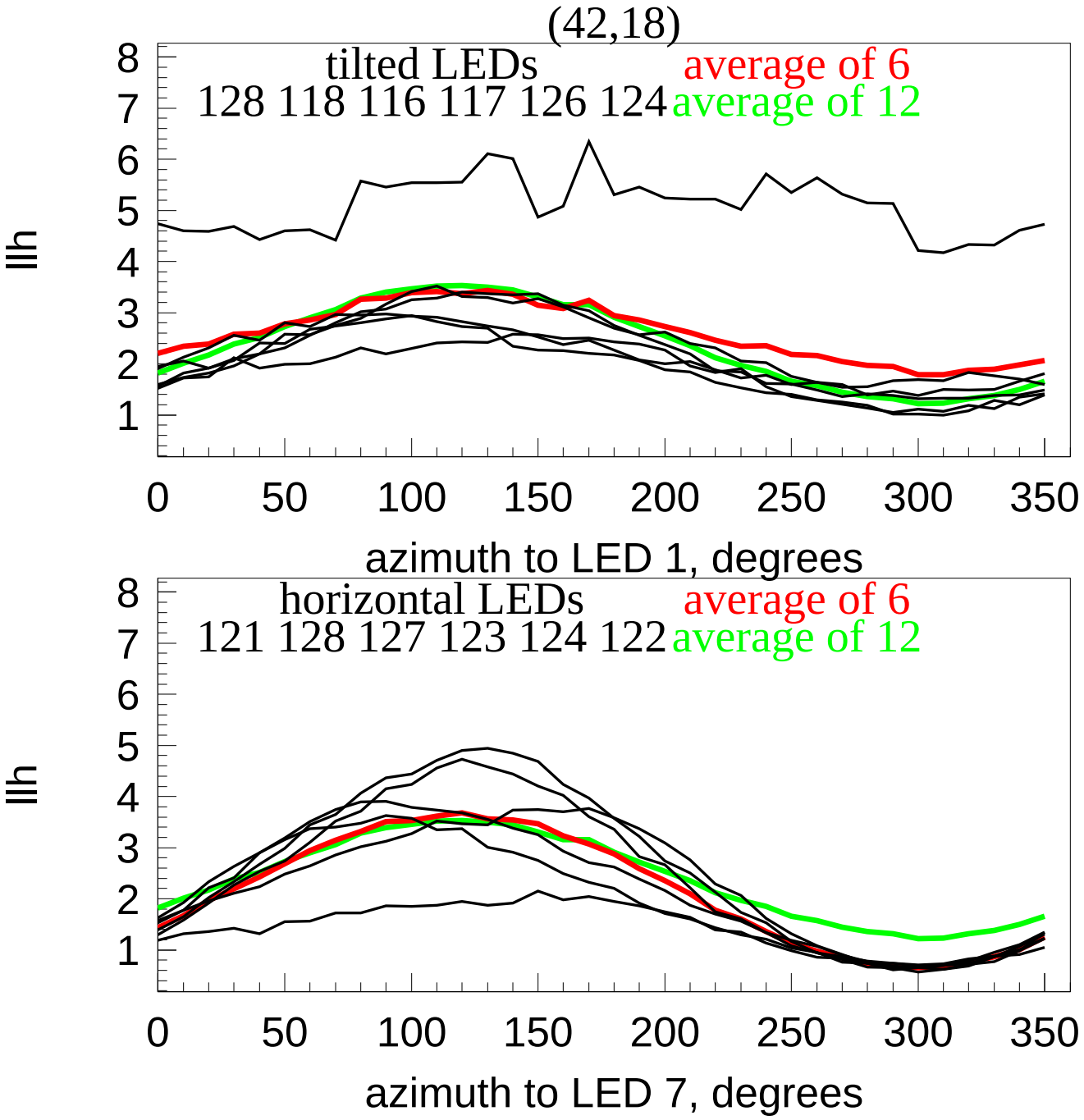

(42,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
23.8 ± 5.0

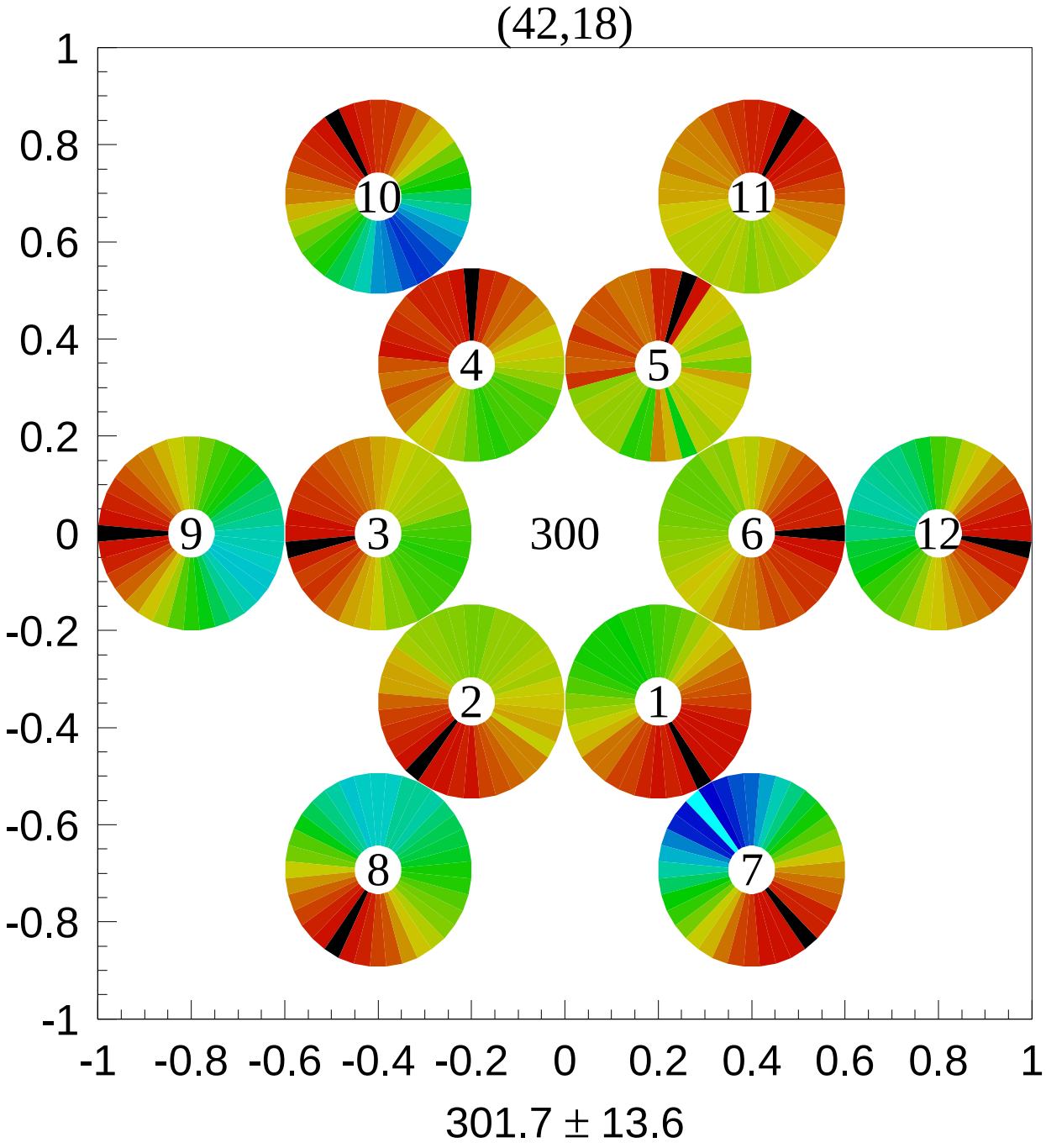

(42,16)
tilted LEDs
122 121 121 113 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 117 116 121 127 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

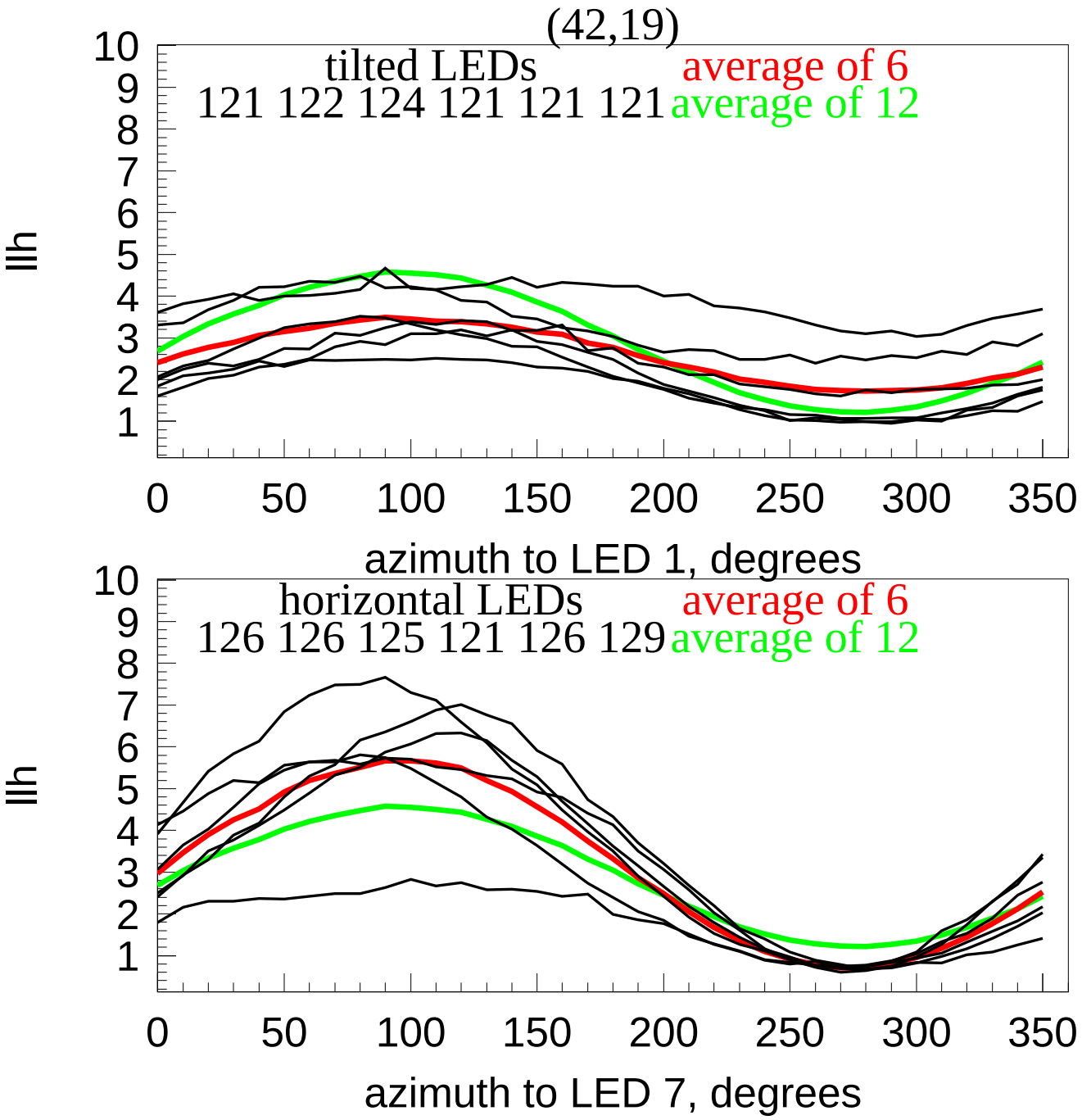

(42,16)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
338.8 ± 8.3

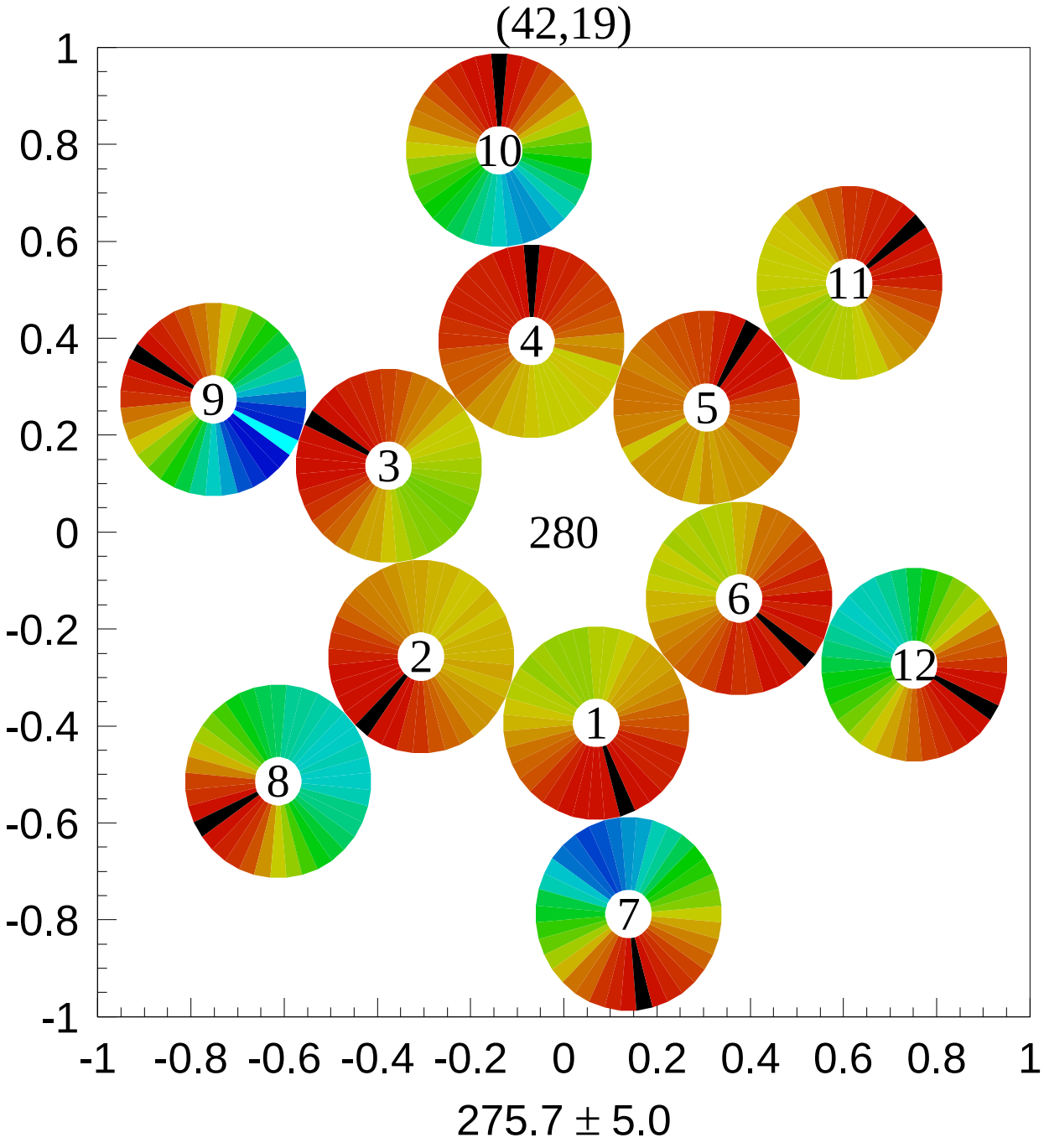

(42,17)
tilted LEDs
120 115 123 123 120 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 122 118 118 122 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

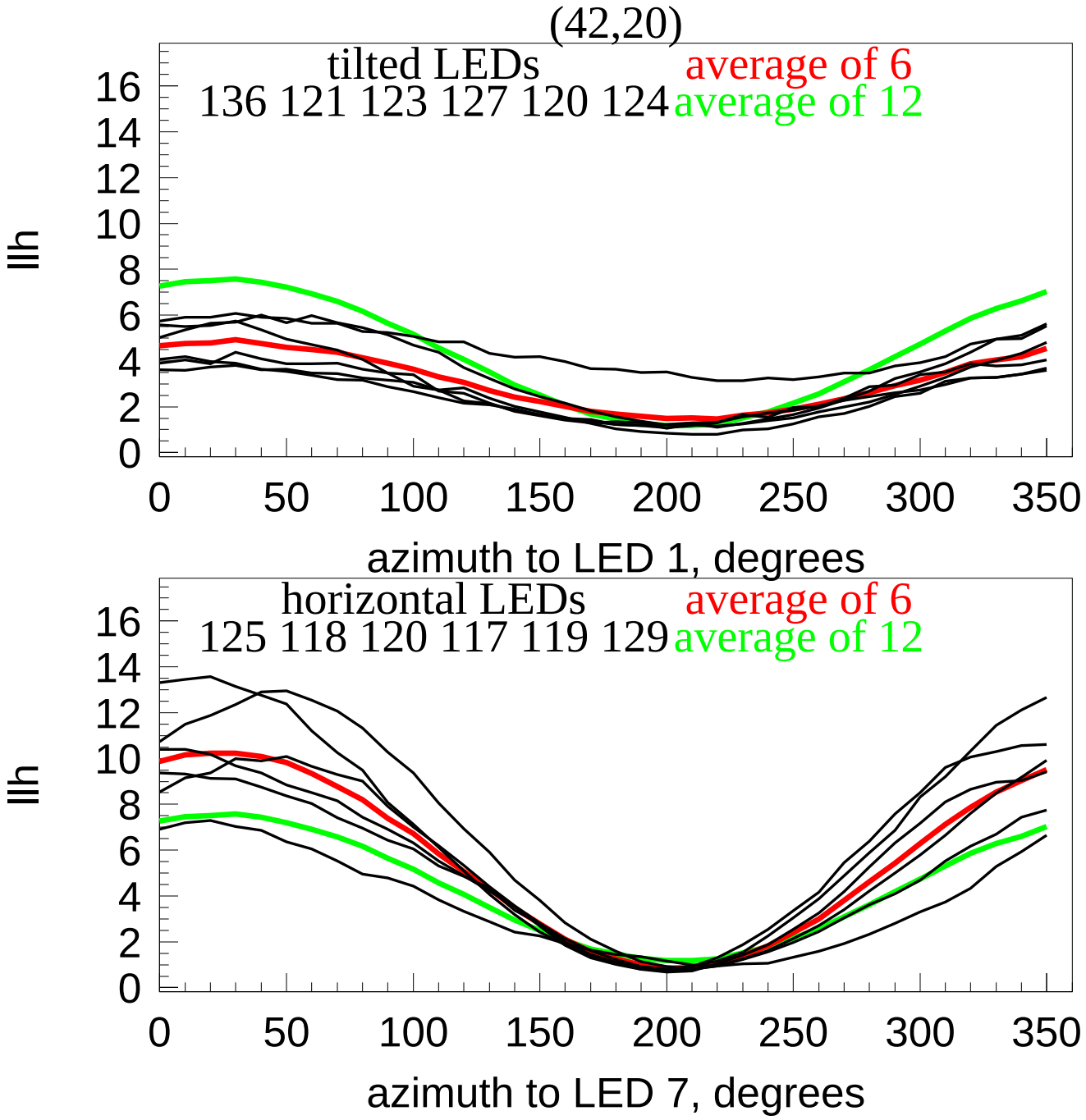

(42,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
135.3 ± 10.7
140
1
2
3
4
5
6
7
8
9
10
11
12

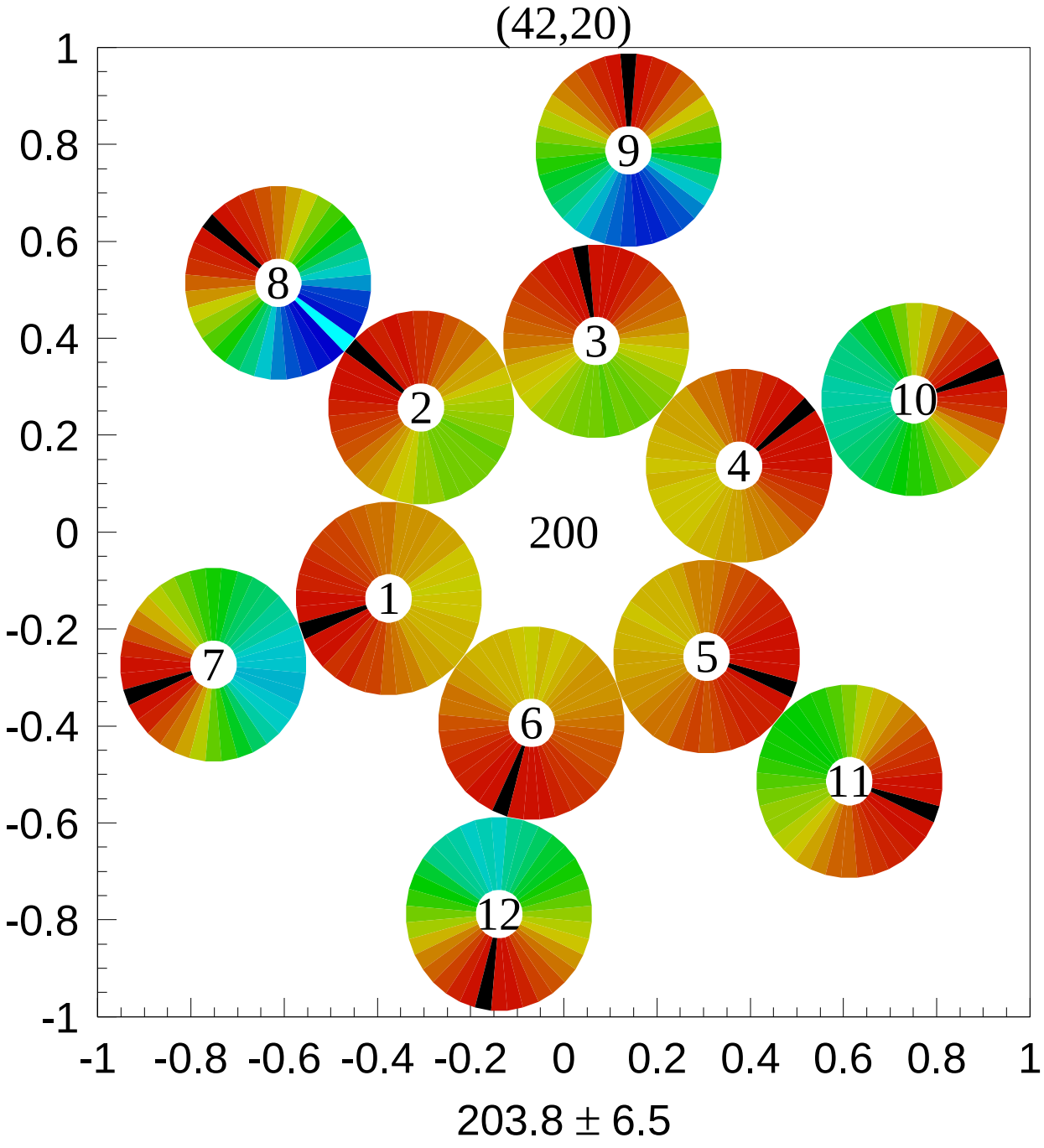

(42,18)
tilted LEDs
128 118 116 117 126 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 128 127 123 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

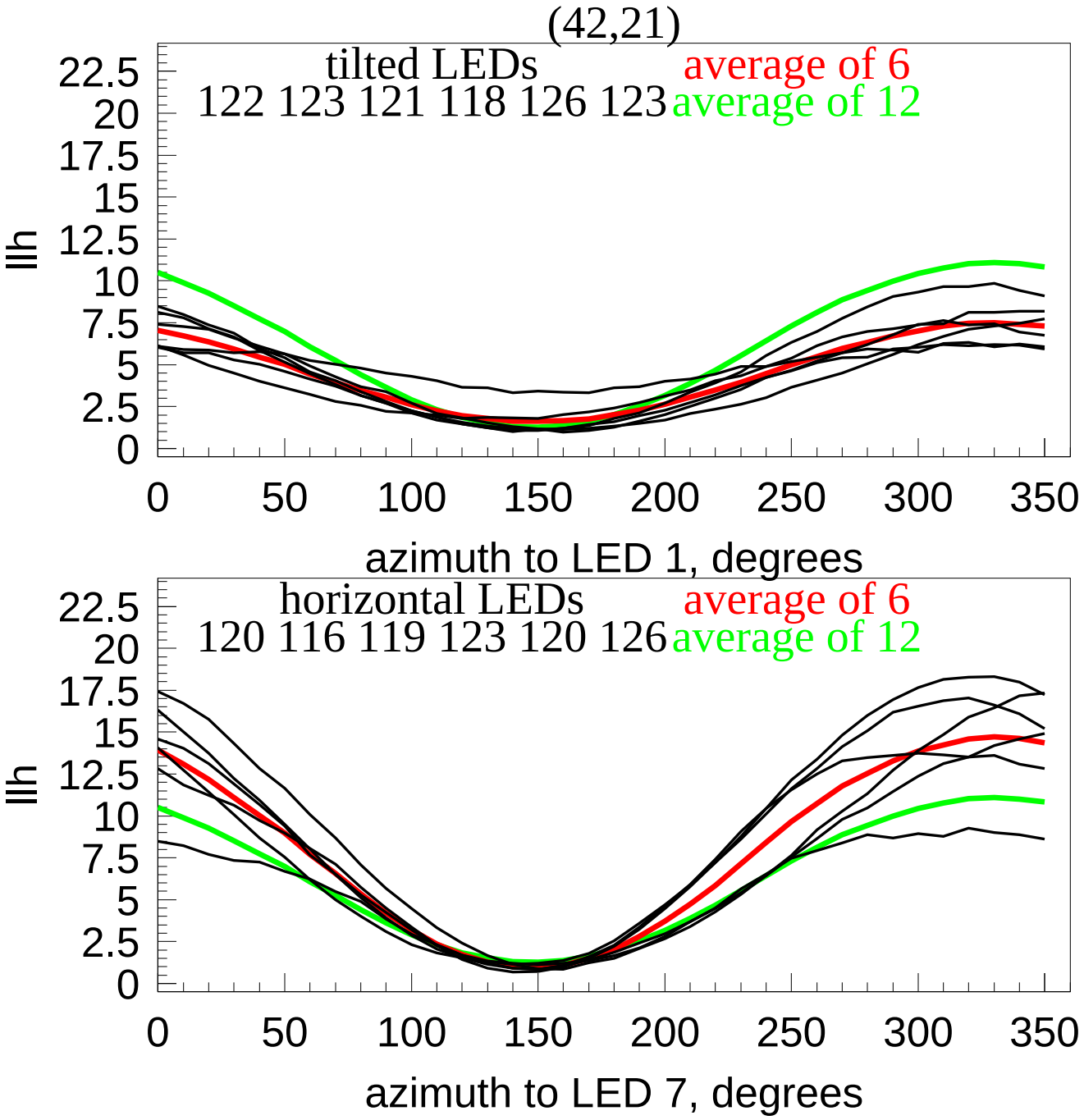

(42,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
301.7 ± 13.6

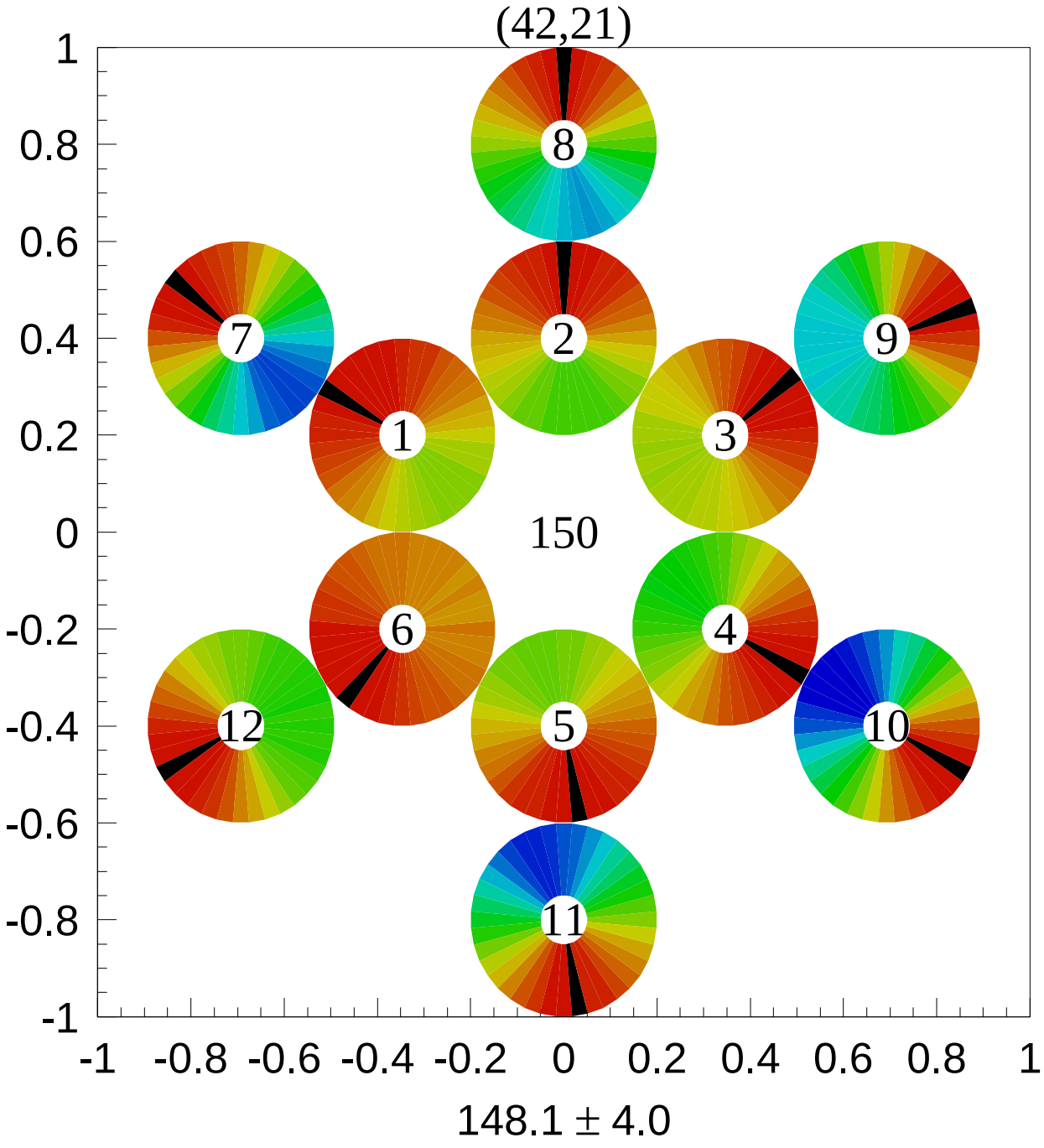

(42,19)
tilted LEDs
121 122 124 121 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 125 121 126 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

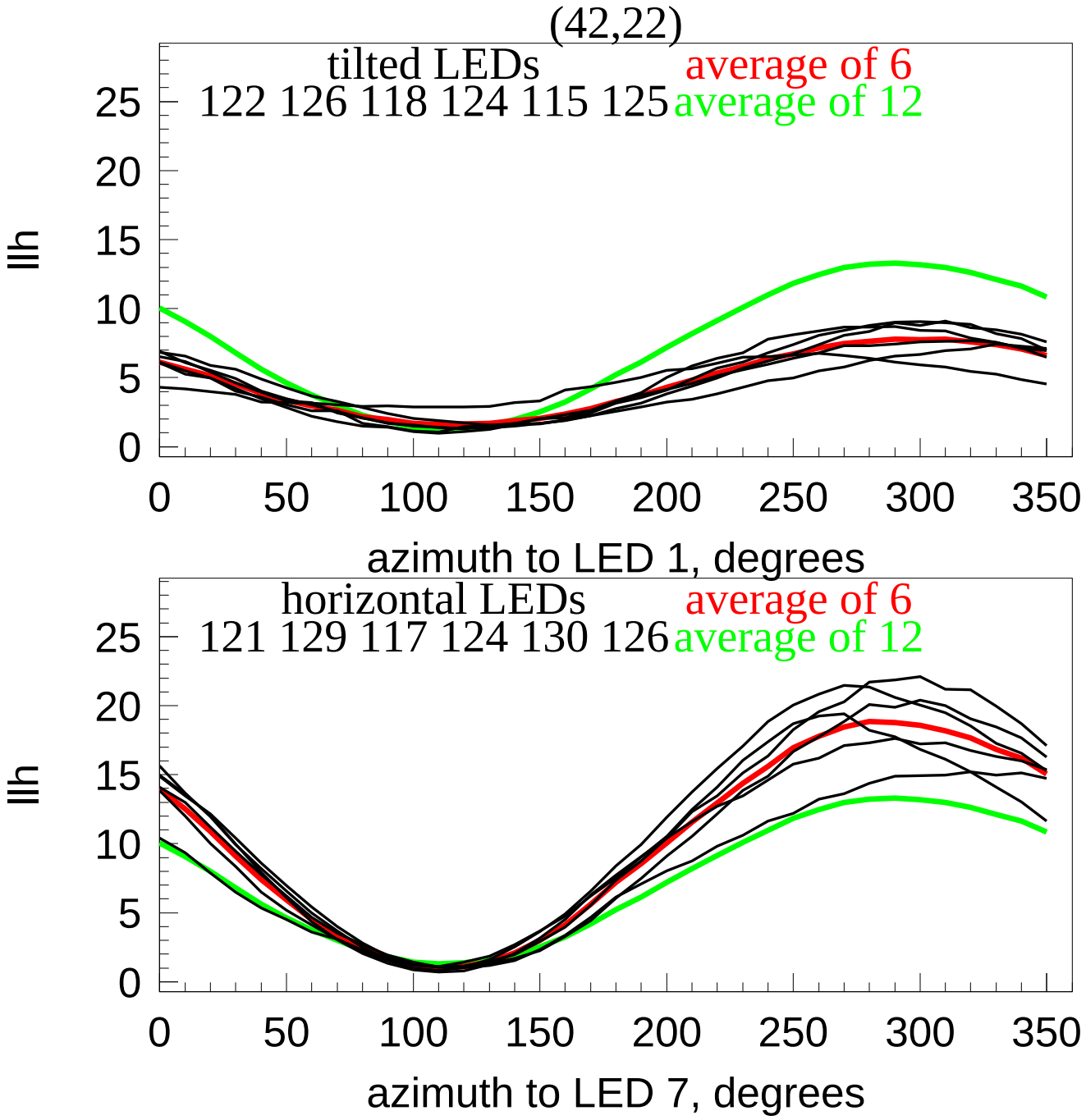

(42,19)
10
4
11
9
3
5
280
6
2
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
275.7 ± 5.0

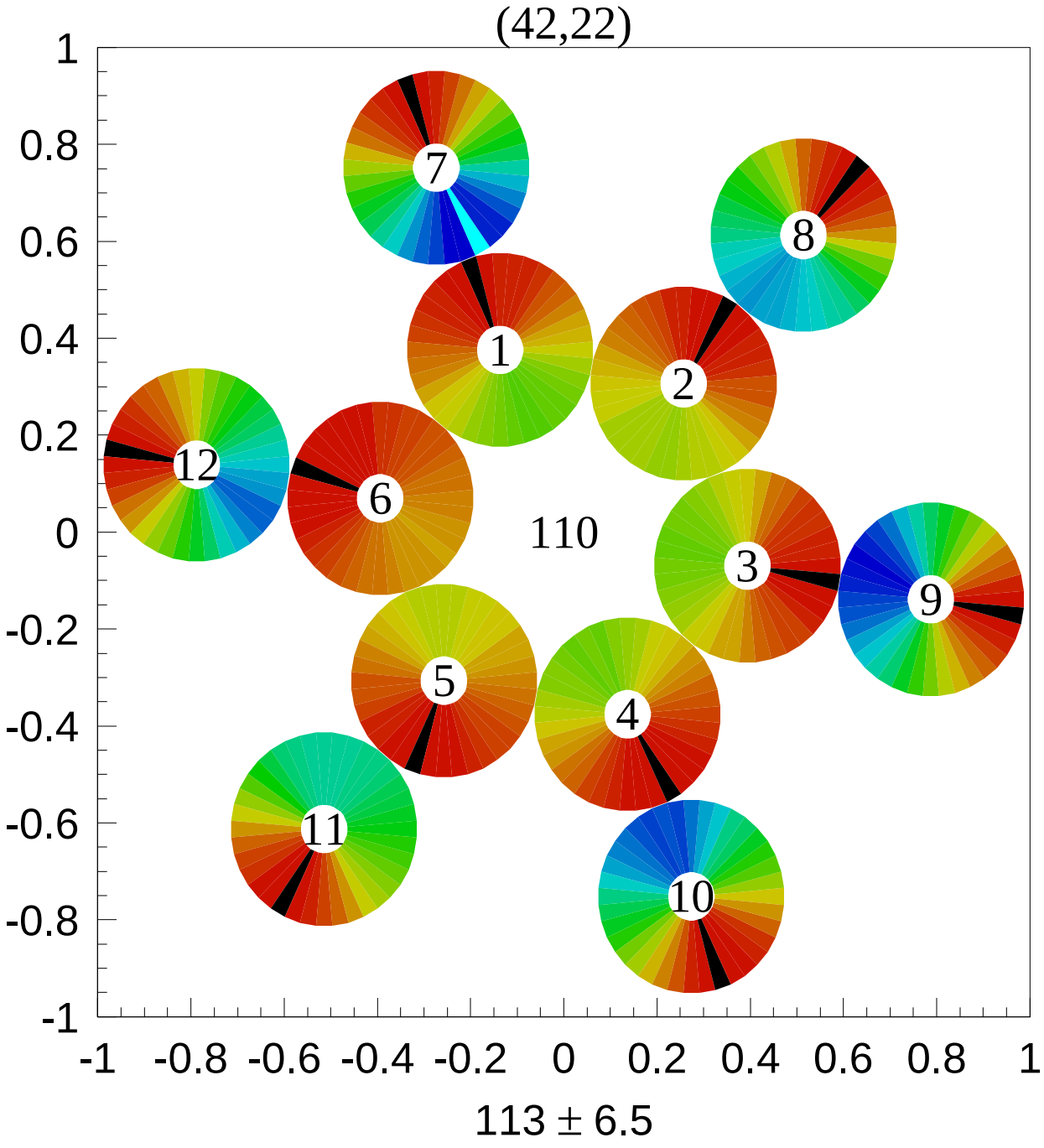

(42,20)
tilted LEDs
136 121 123 127 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 118 120 117 119 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

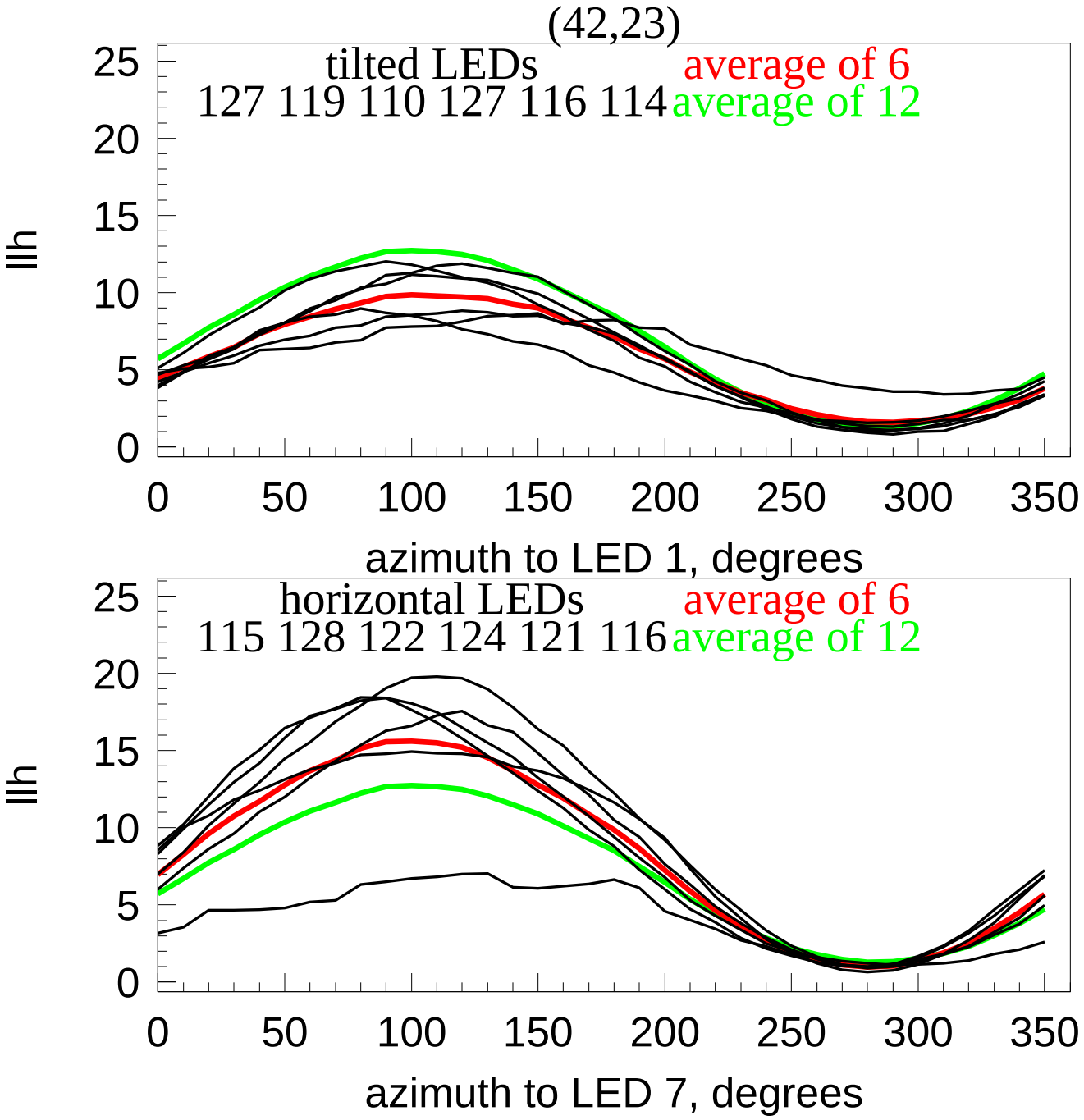

(42,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
203.8 ± 6.5

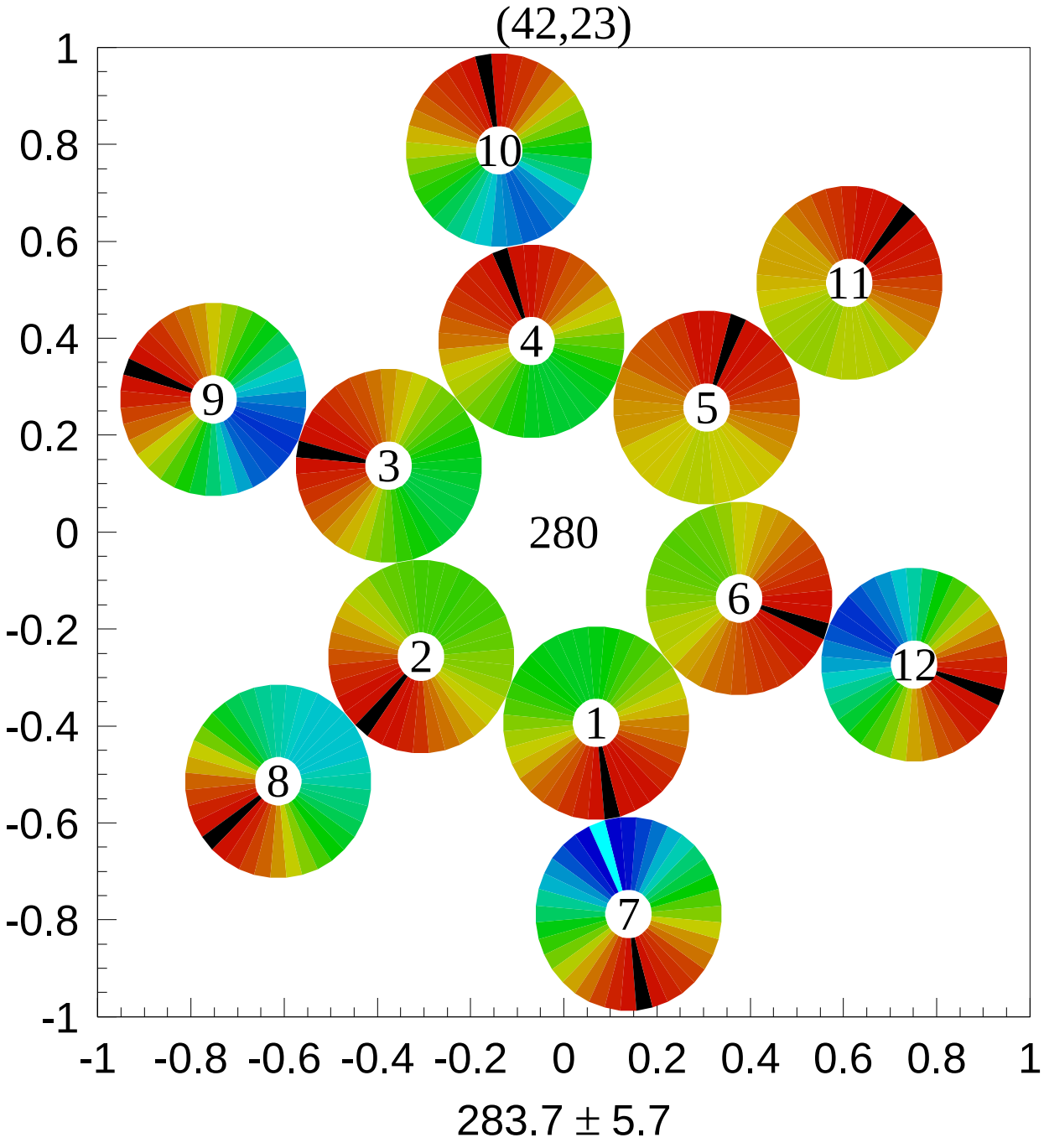

(42,21)
tilted LEDs
122 123 121 118 126 123
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 116 119 123 120 126
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

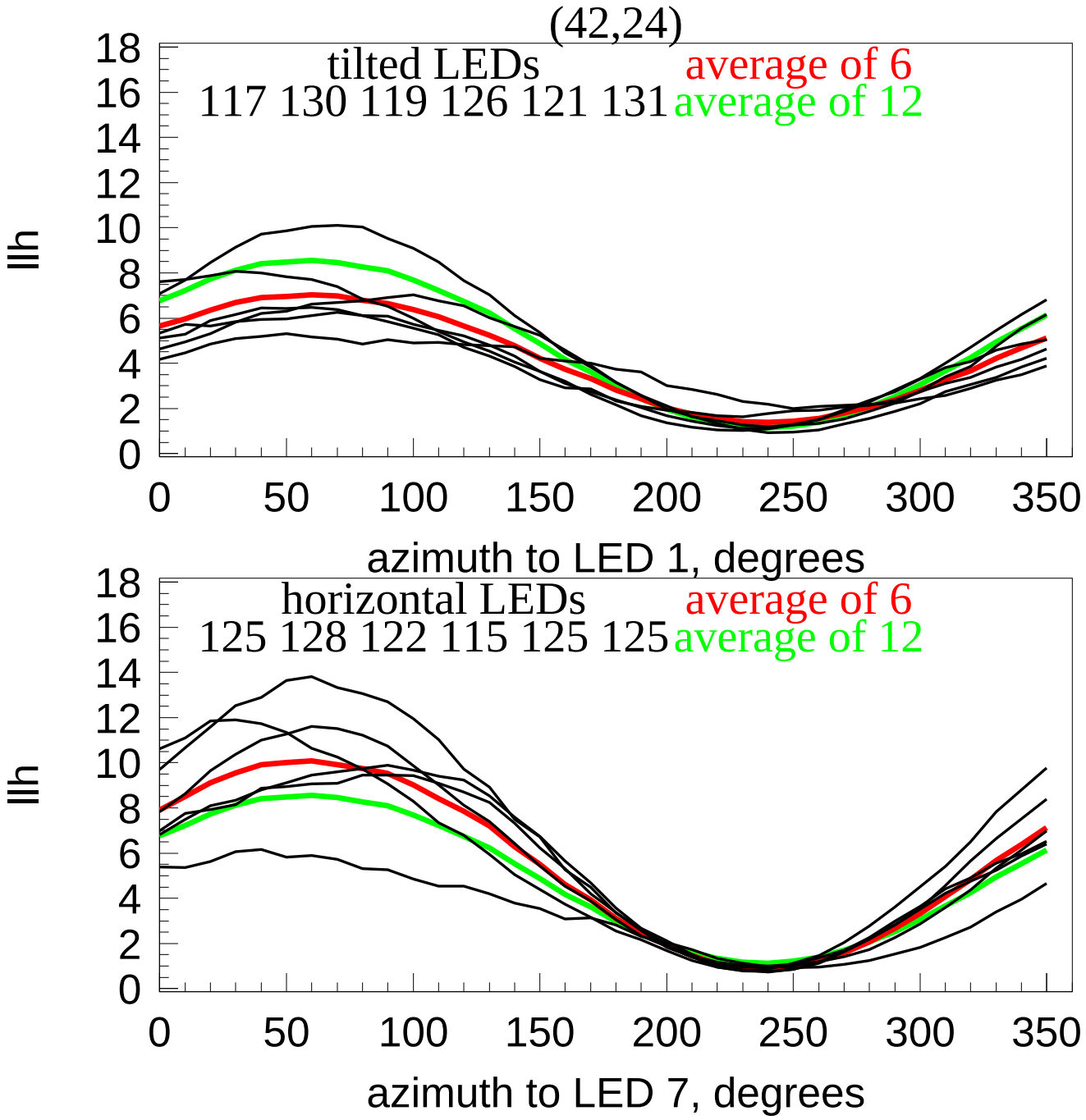

(42,21)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
148.1 ± 4.0

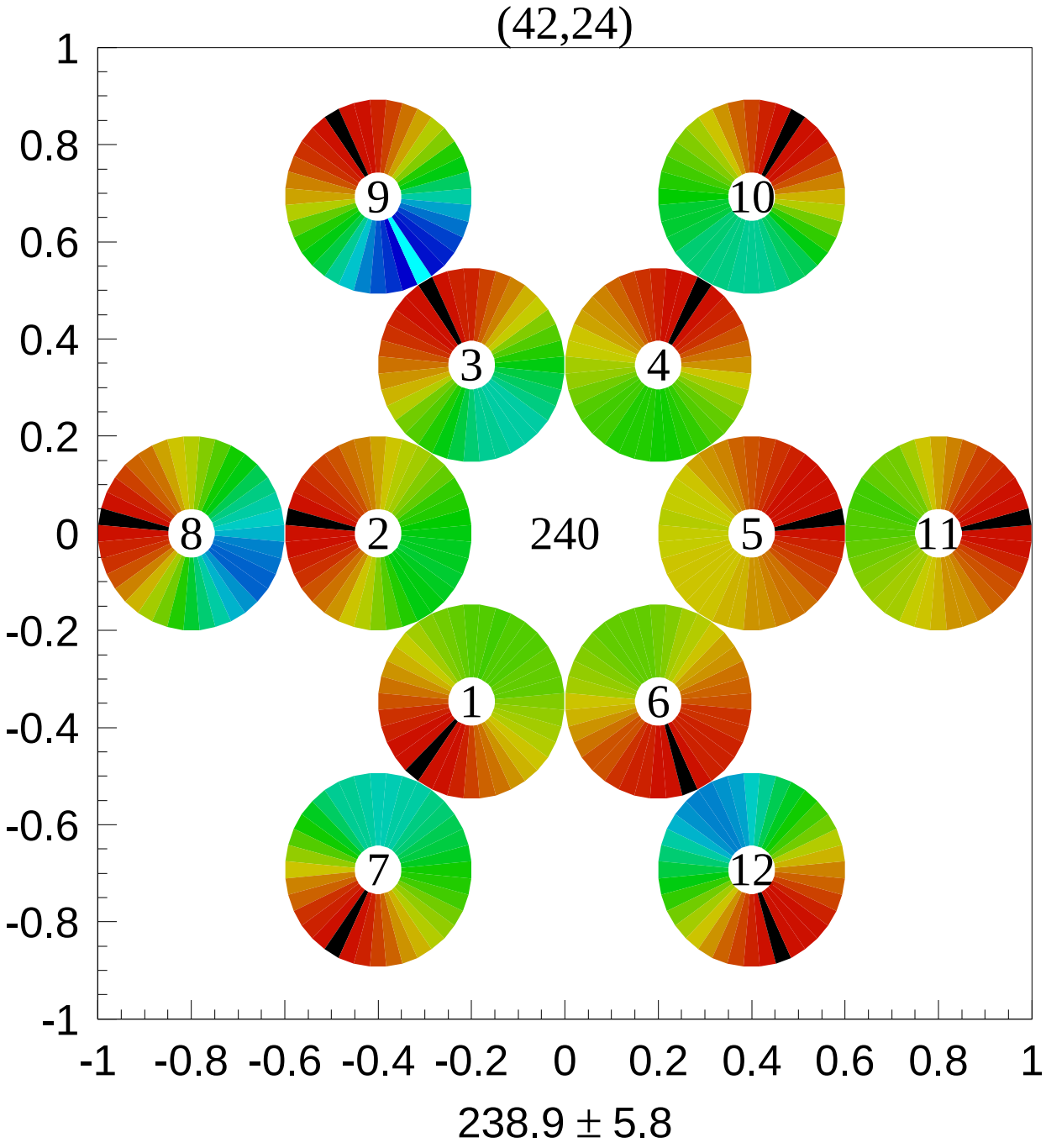

(42,22)
tilted LEDs
122 126 118 124 115 125
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 129 117 124 130 126
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

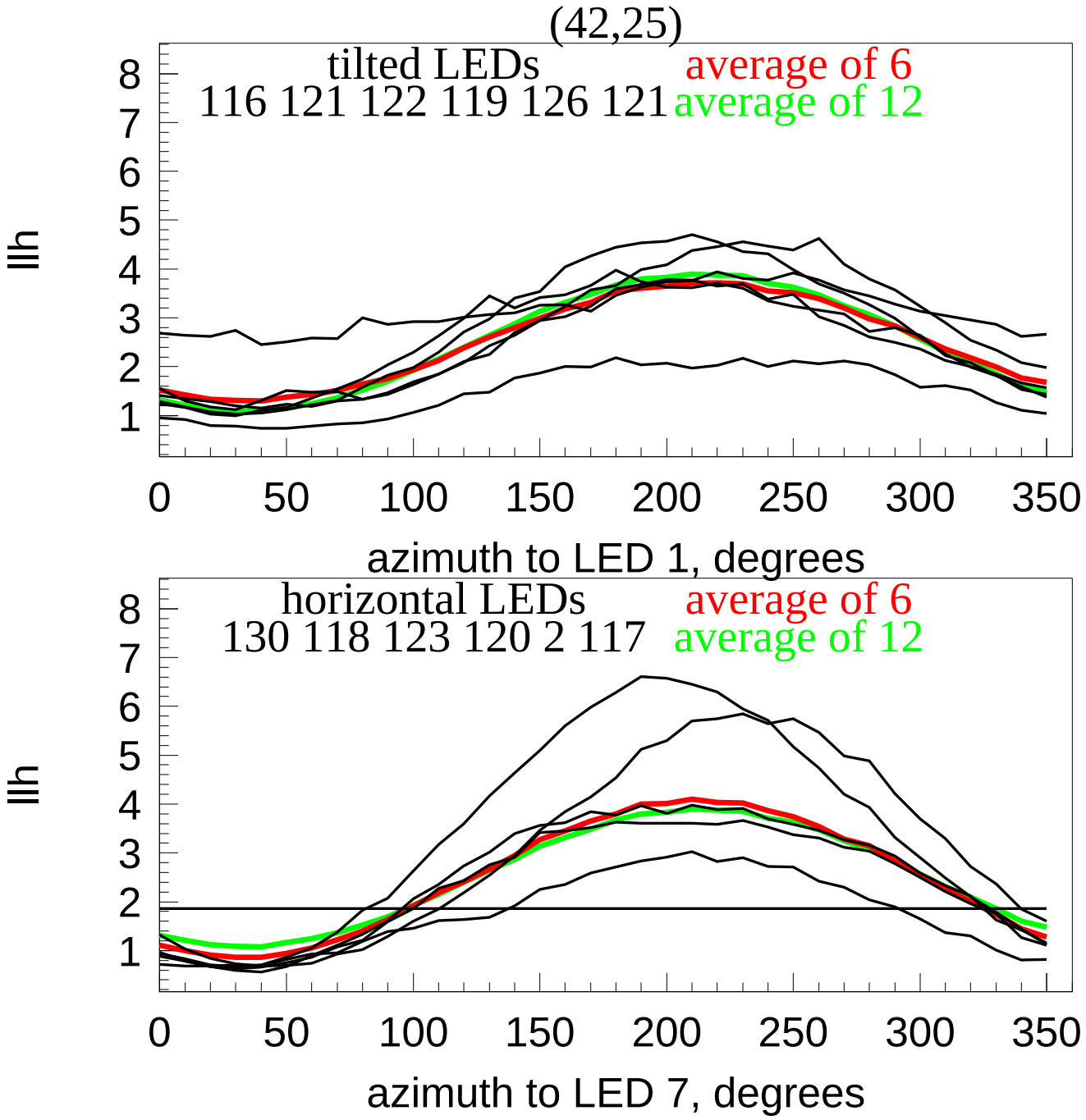

(42,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
113 ± 6.5

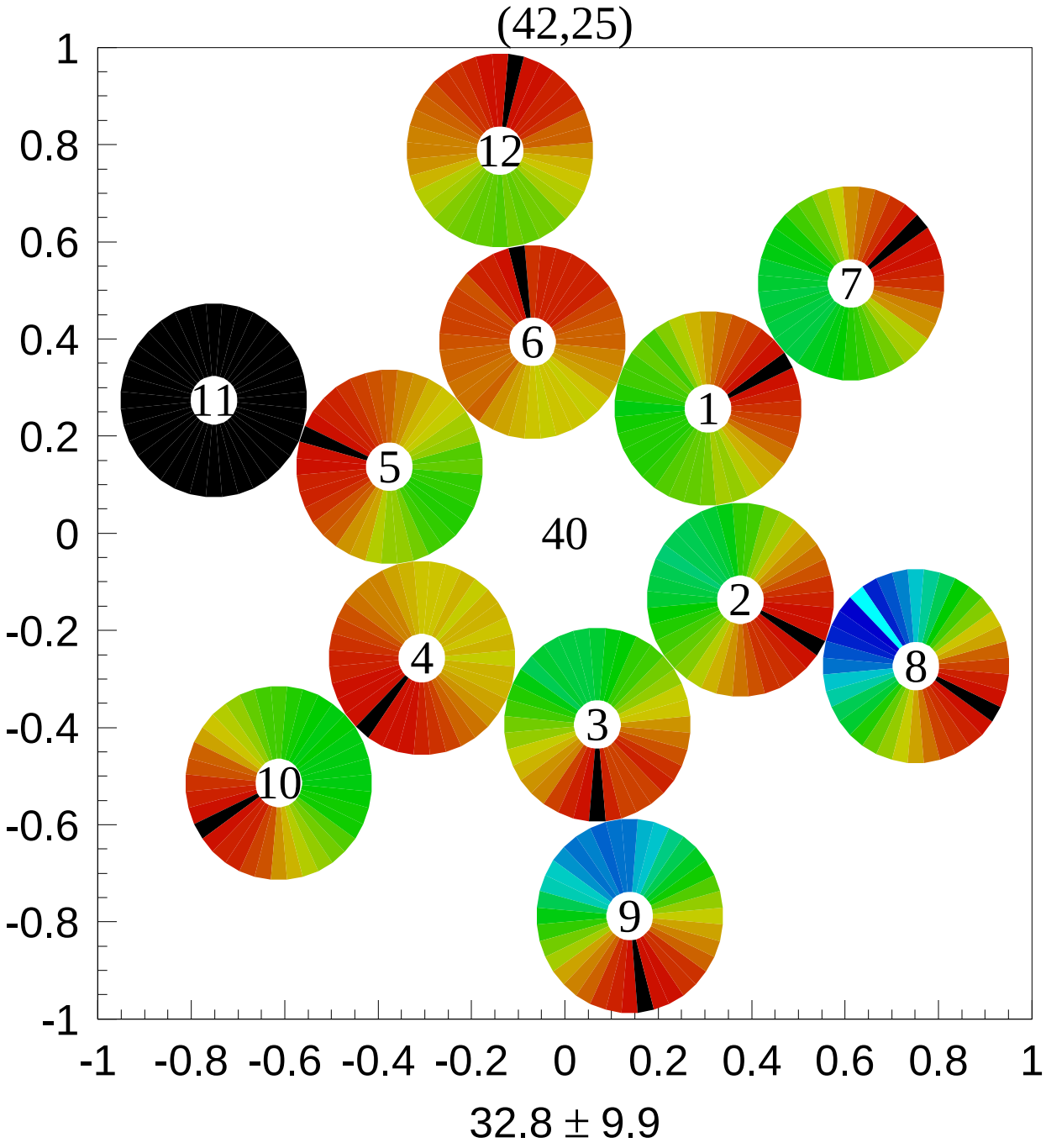

(42,23)
tilted LEDs
127 119 110 127 116 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 128 122 124 121 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

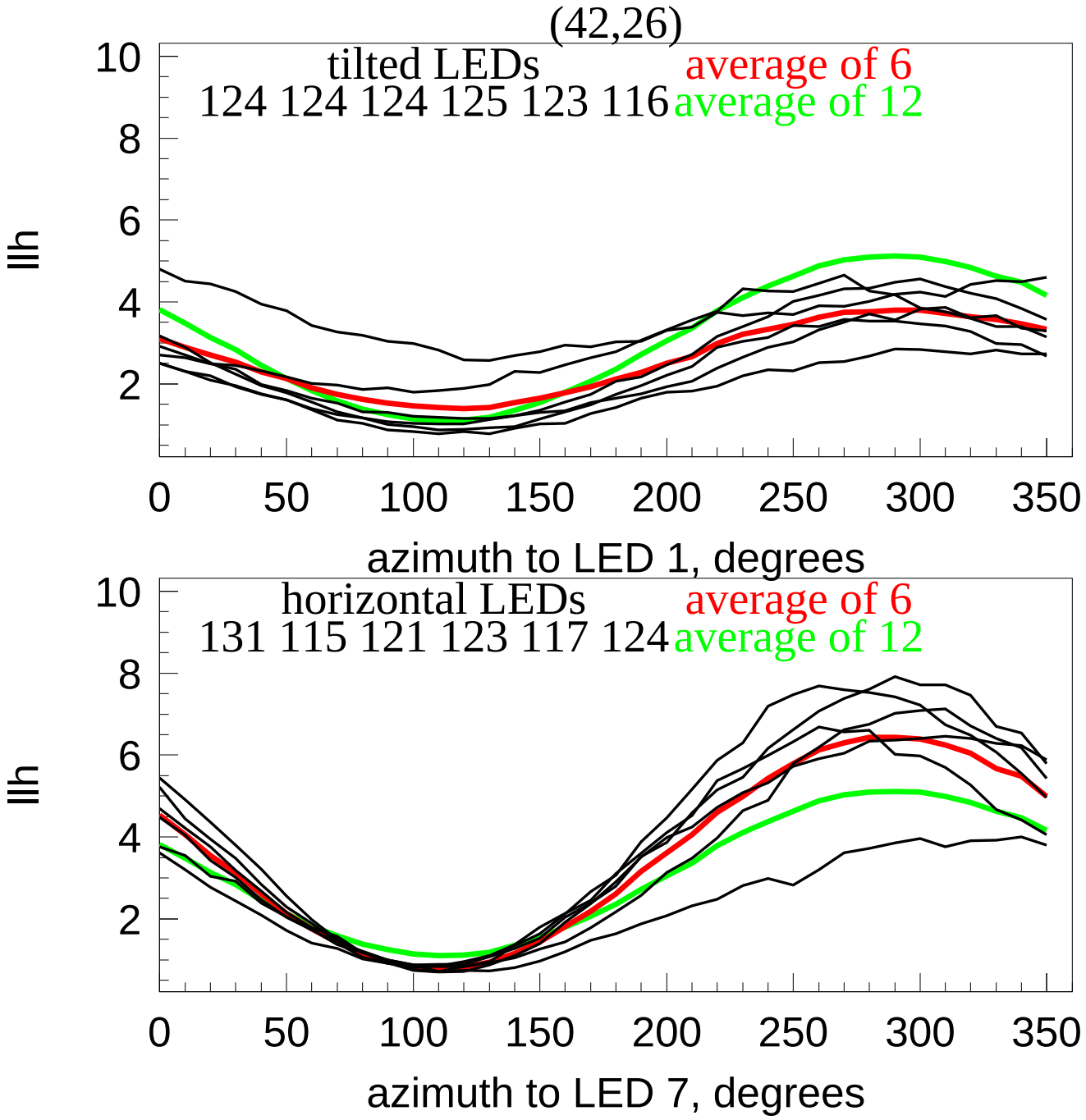

(42,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
283.7 ± 5.7

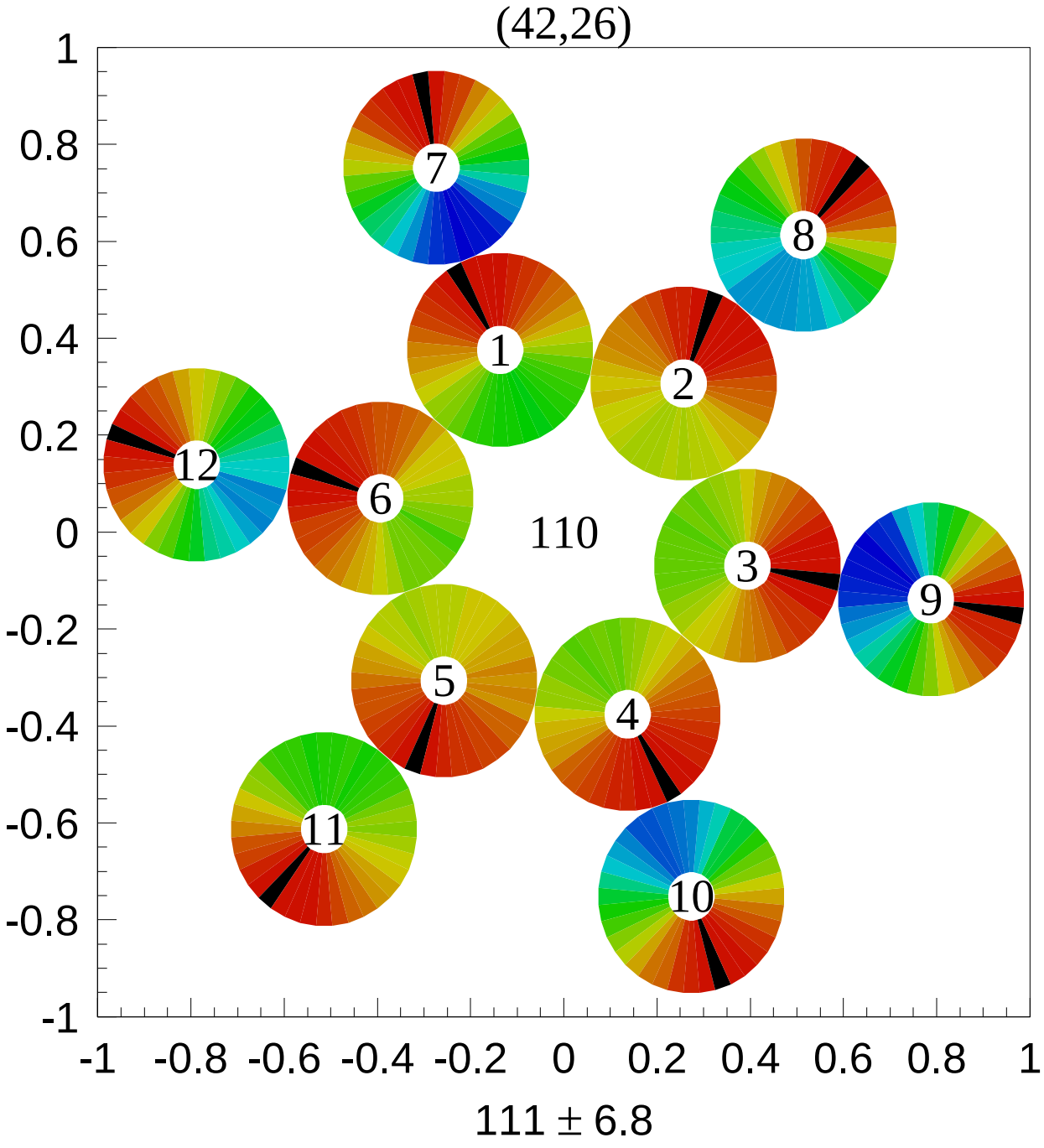

(42,24)
tilted LEDs
117 130 119 126 121 131
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 128 122 115 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

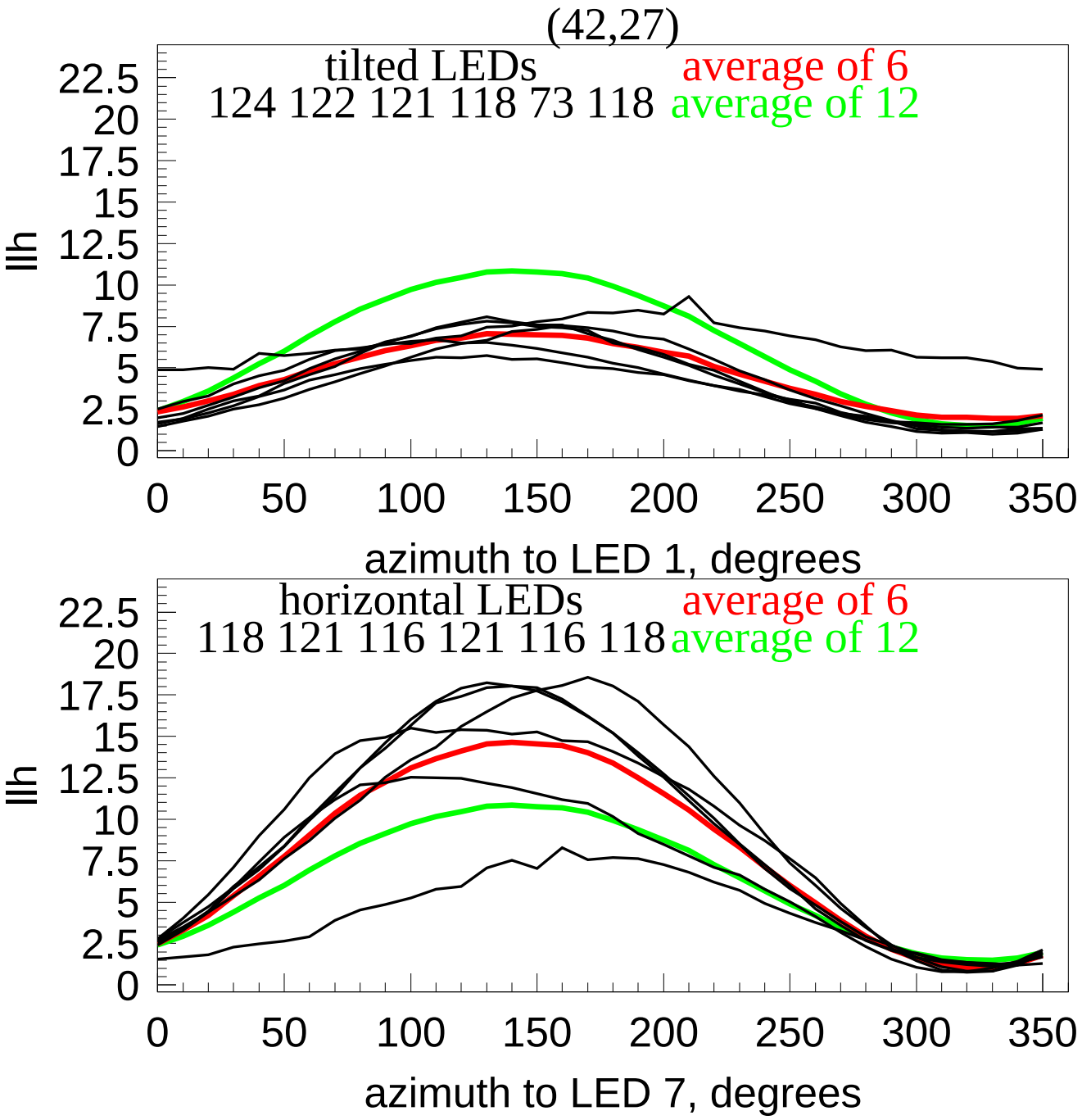

(42,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
238.9 ± 5.8

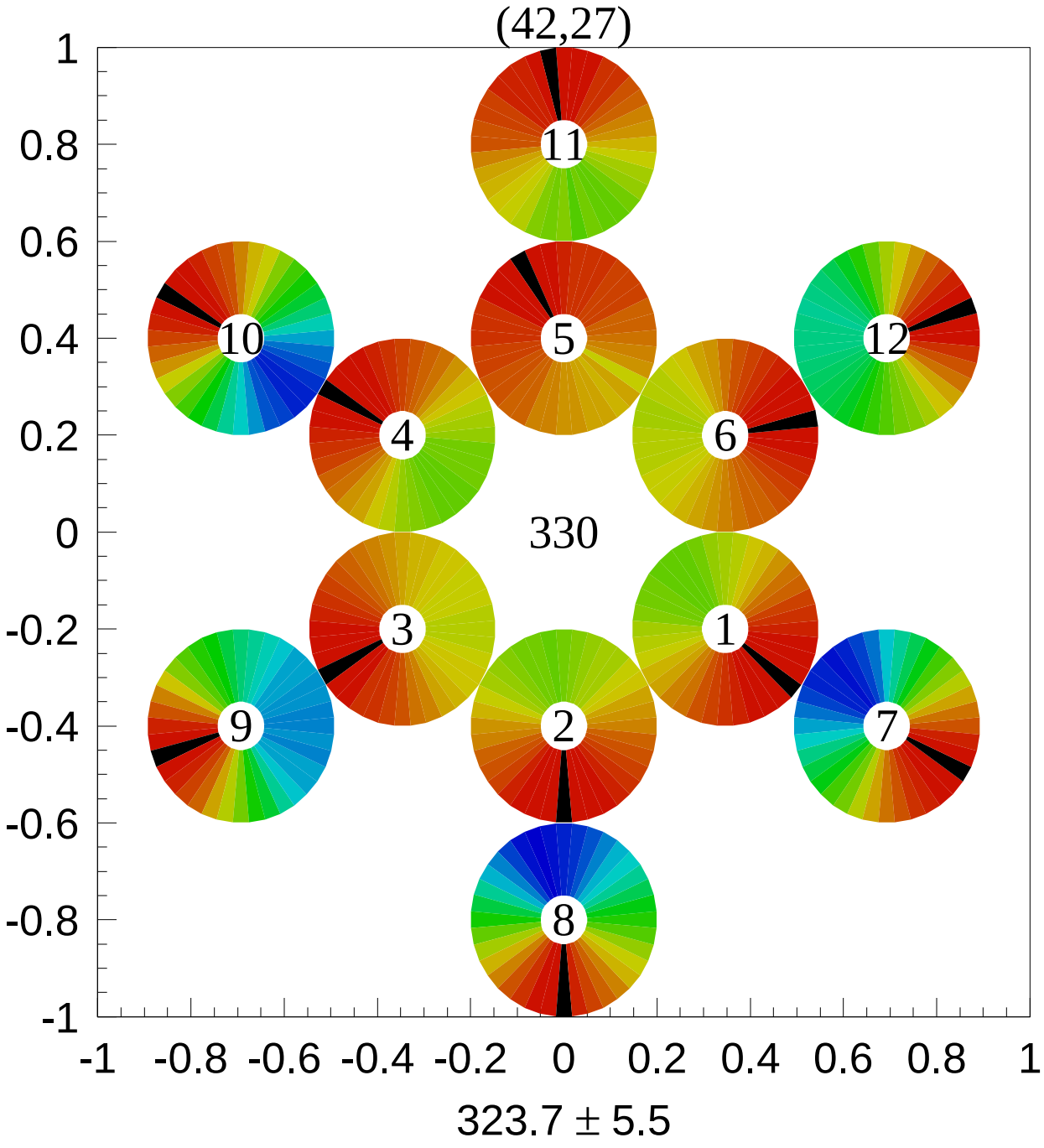

(42,25)
tilted LEDs
116 121 122 119 126 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 118 123 120 2 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

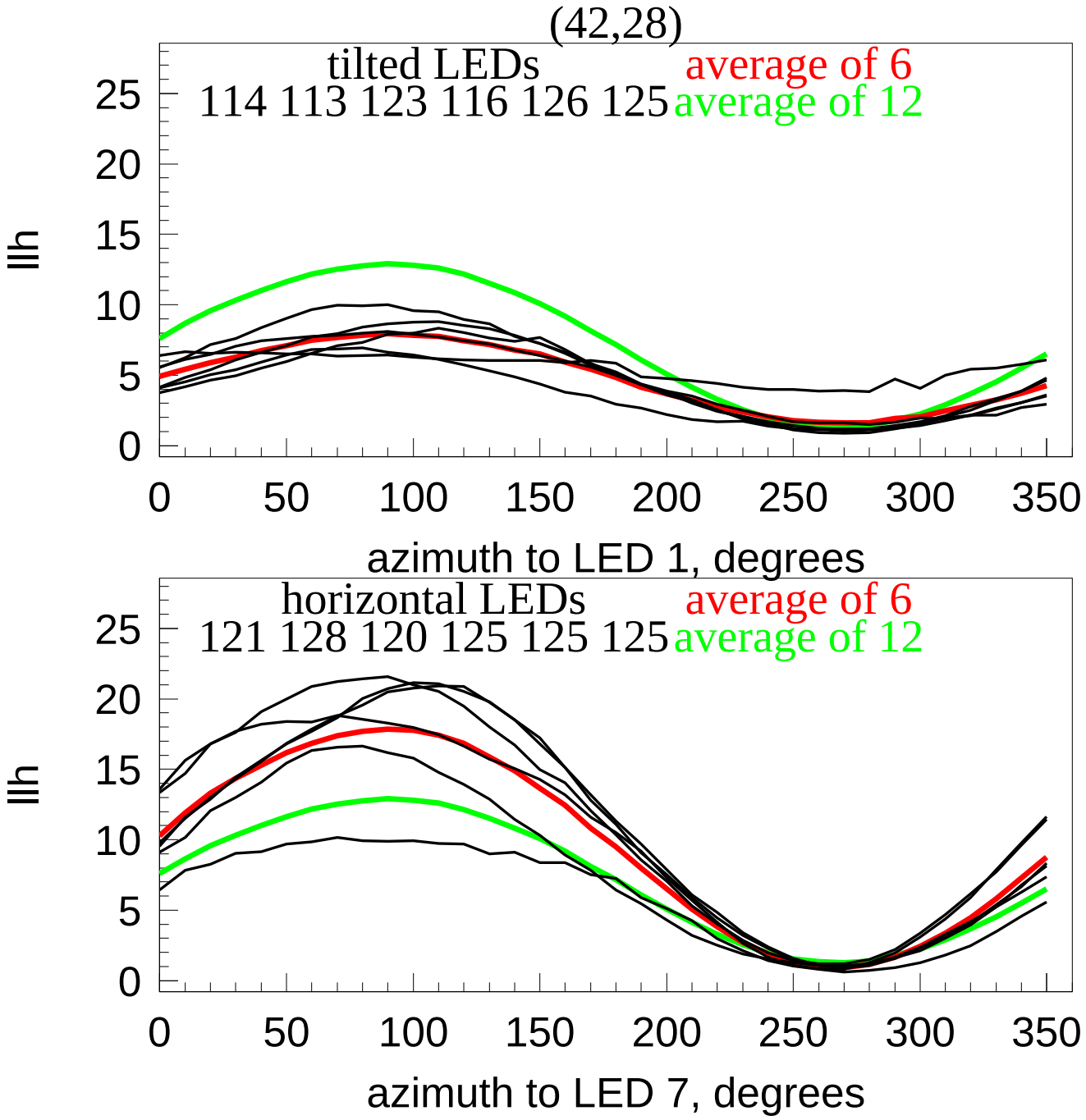

(42,25)
12
7
6
1
11
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
32.8 ± 9.9

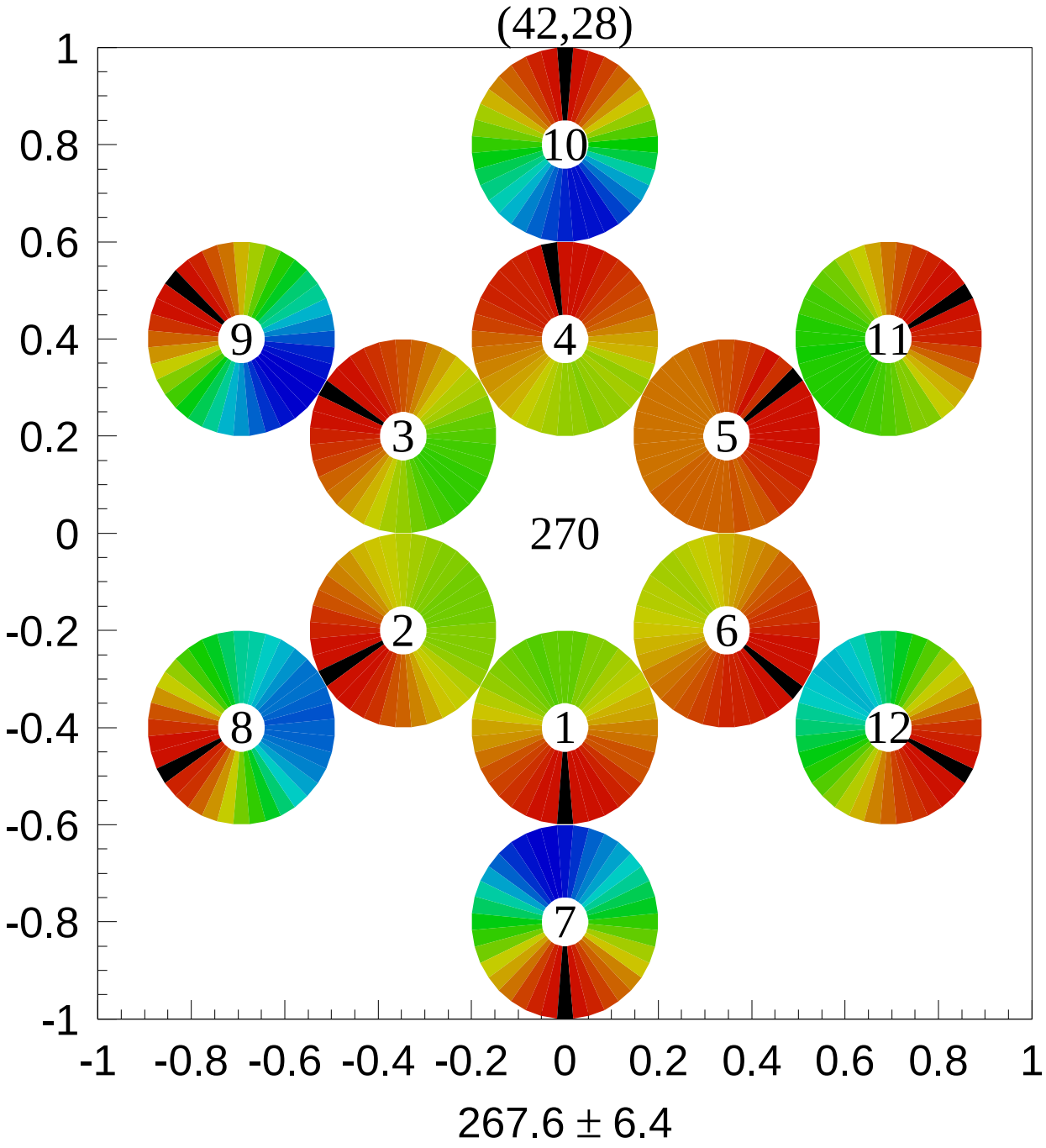

(42,26)
tilted LEDs
124 124 124 125 123 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 115 121 123 117 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

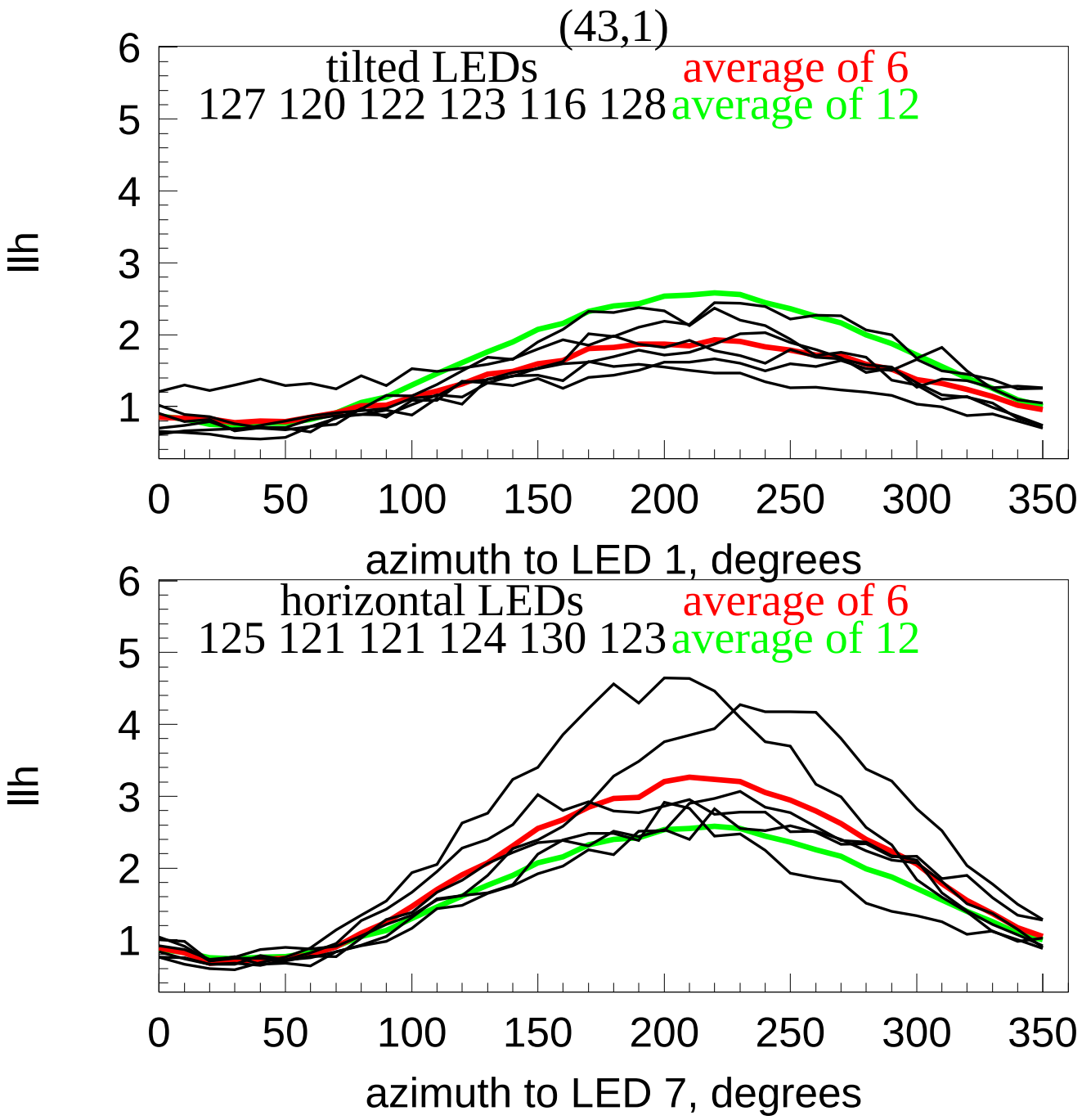

(42,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
111 ± 6.8

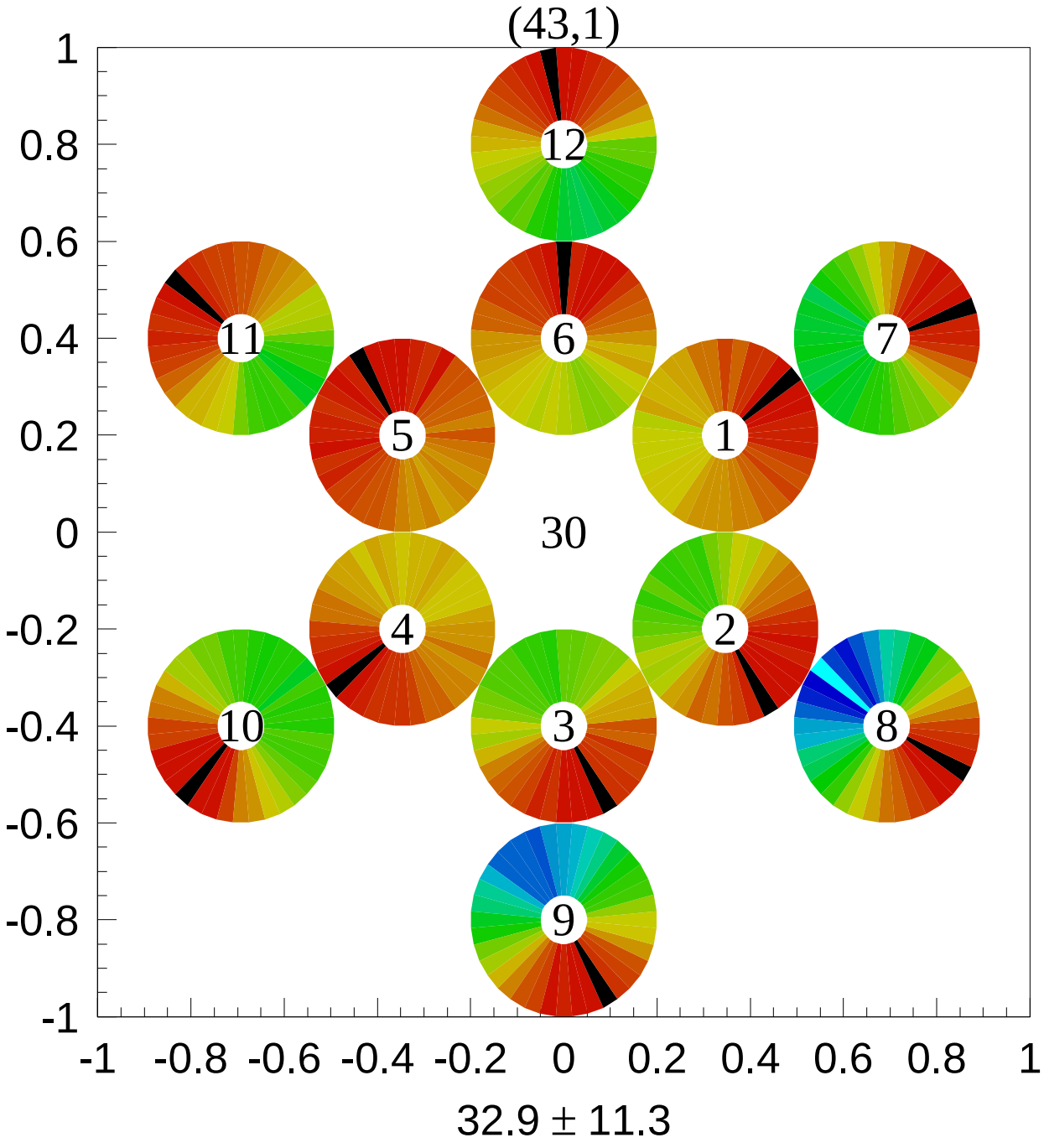

(42,27)
tilted LEDs
124 122 121 118 73 118
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 121 116 121 116 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

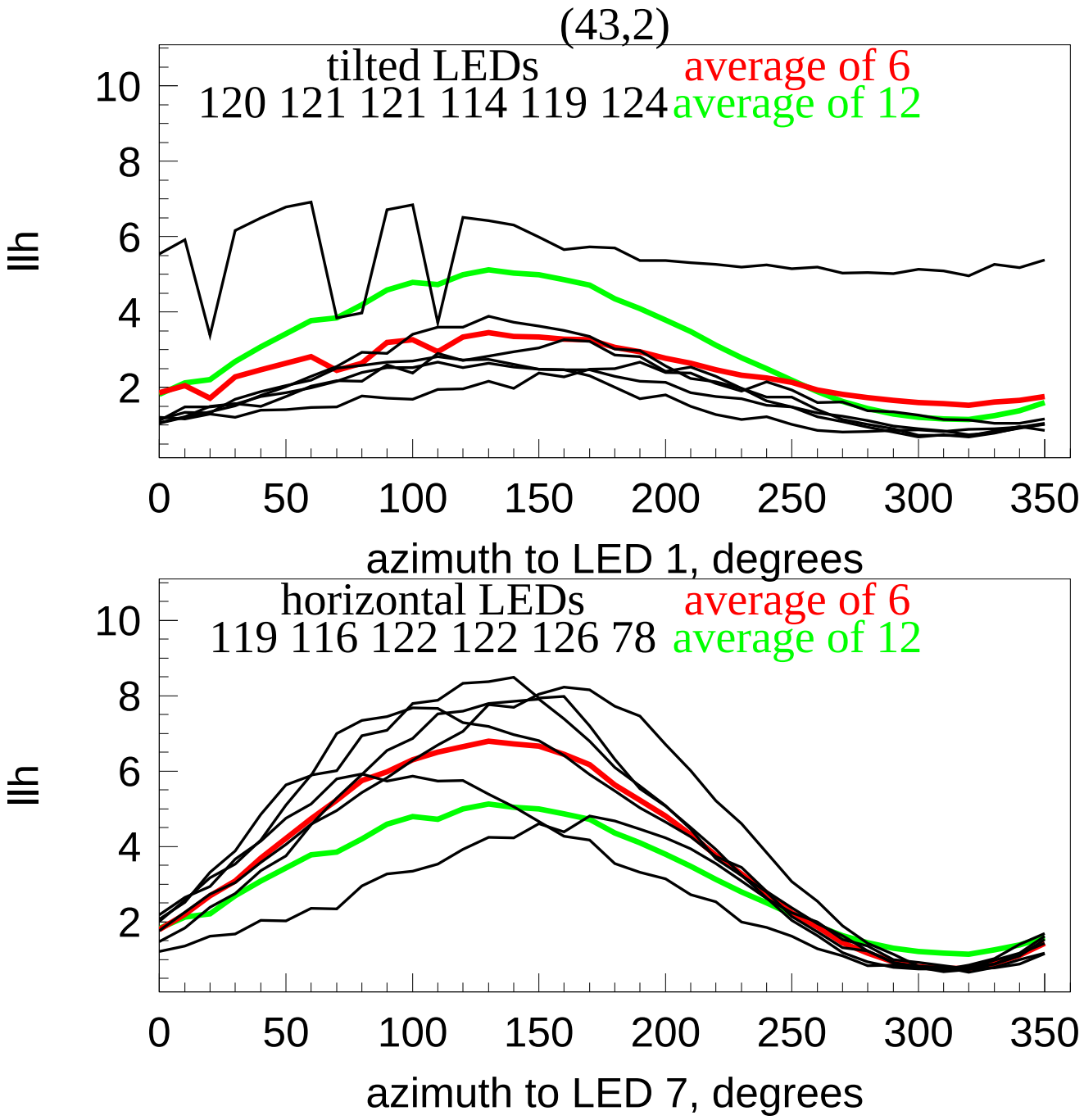

(42,27)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
323.7 ± 5.5

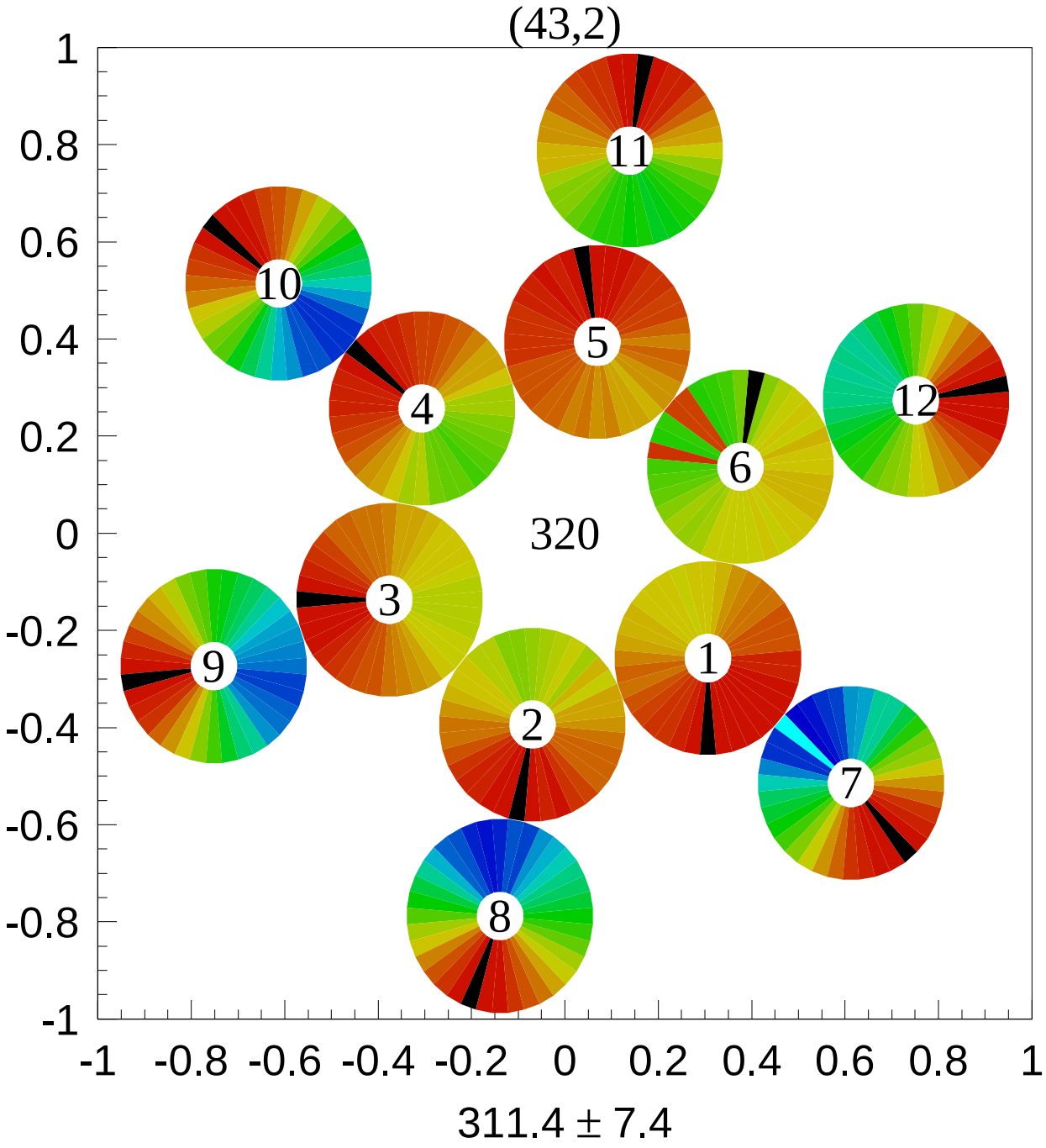

(42,28)
tilted LEDs
114 113 123 116 126 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 128 120 125 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

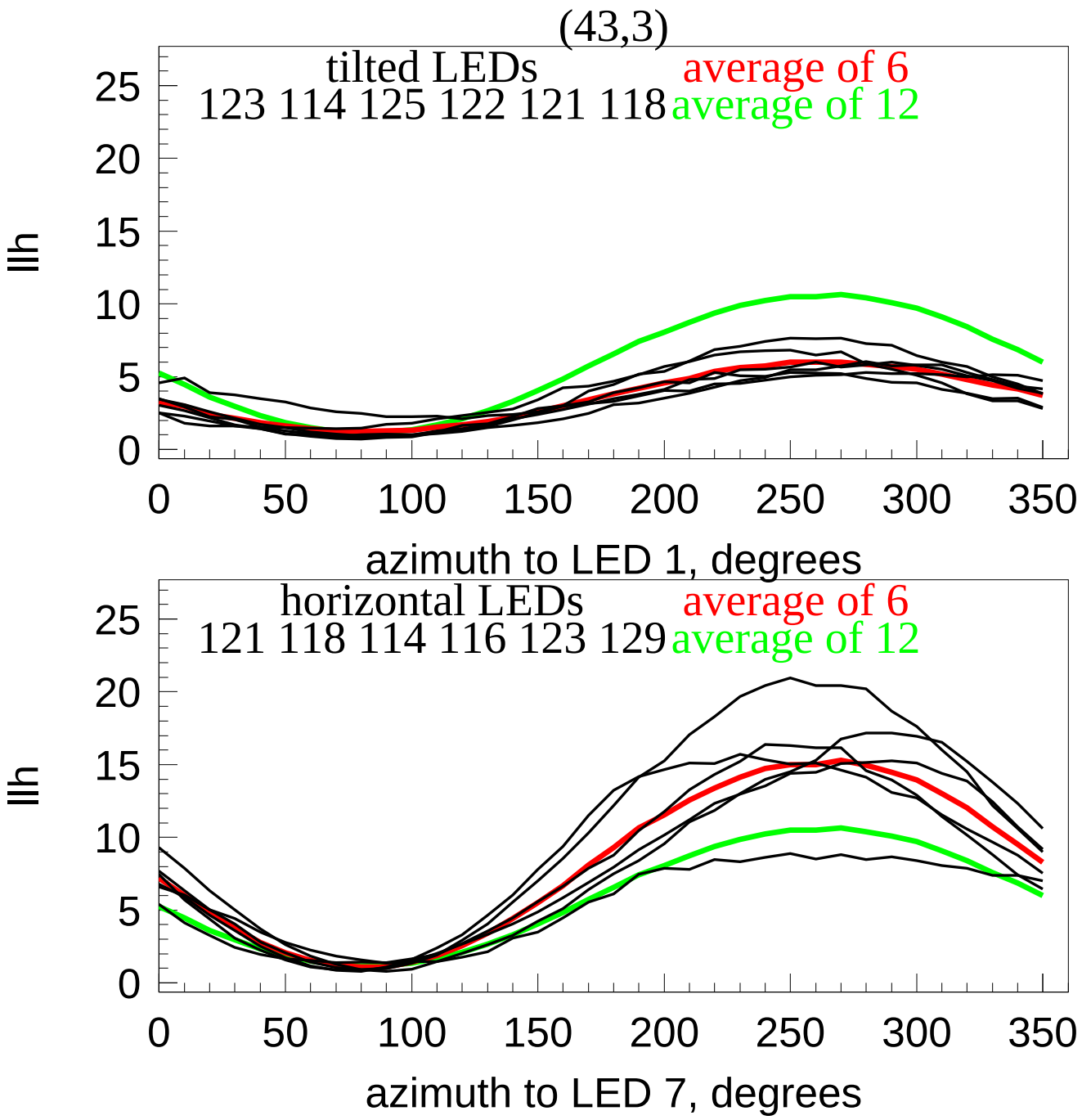

(42,28)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
267.6 ± 6.4

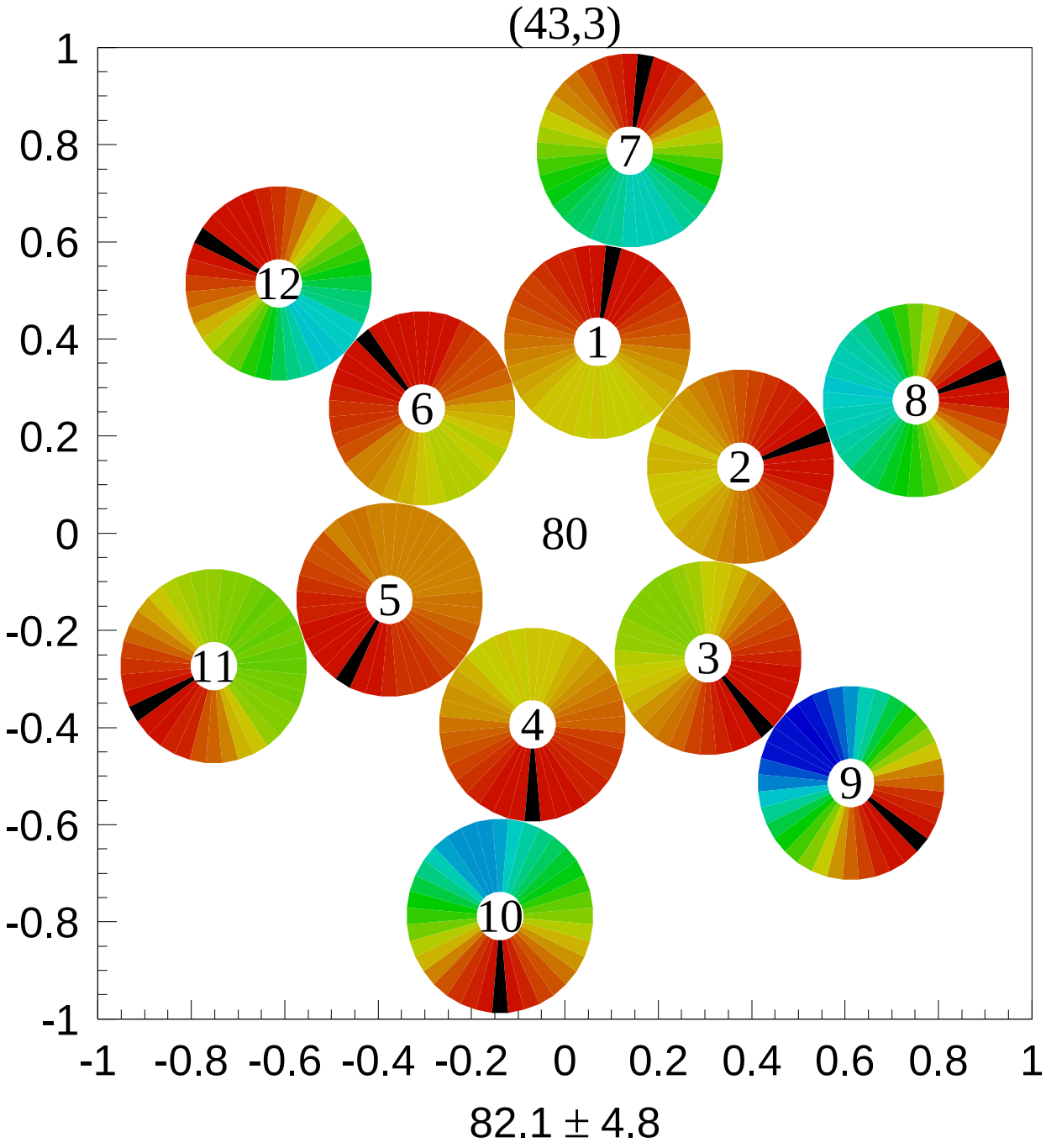

(43,1)
tilted LEDs
127 120 122 123 116 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 121 121 124 130 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

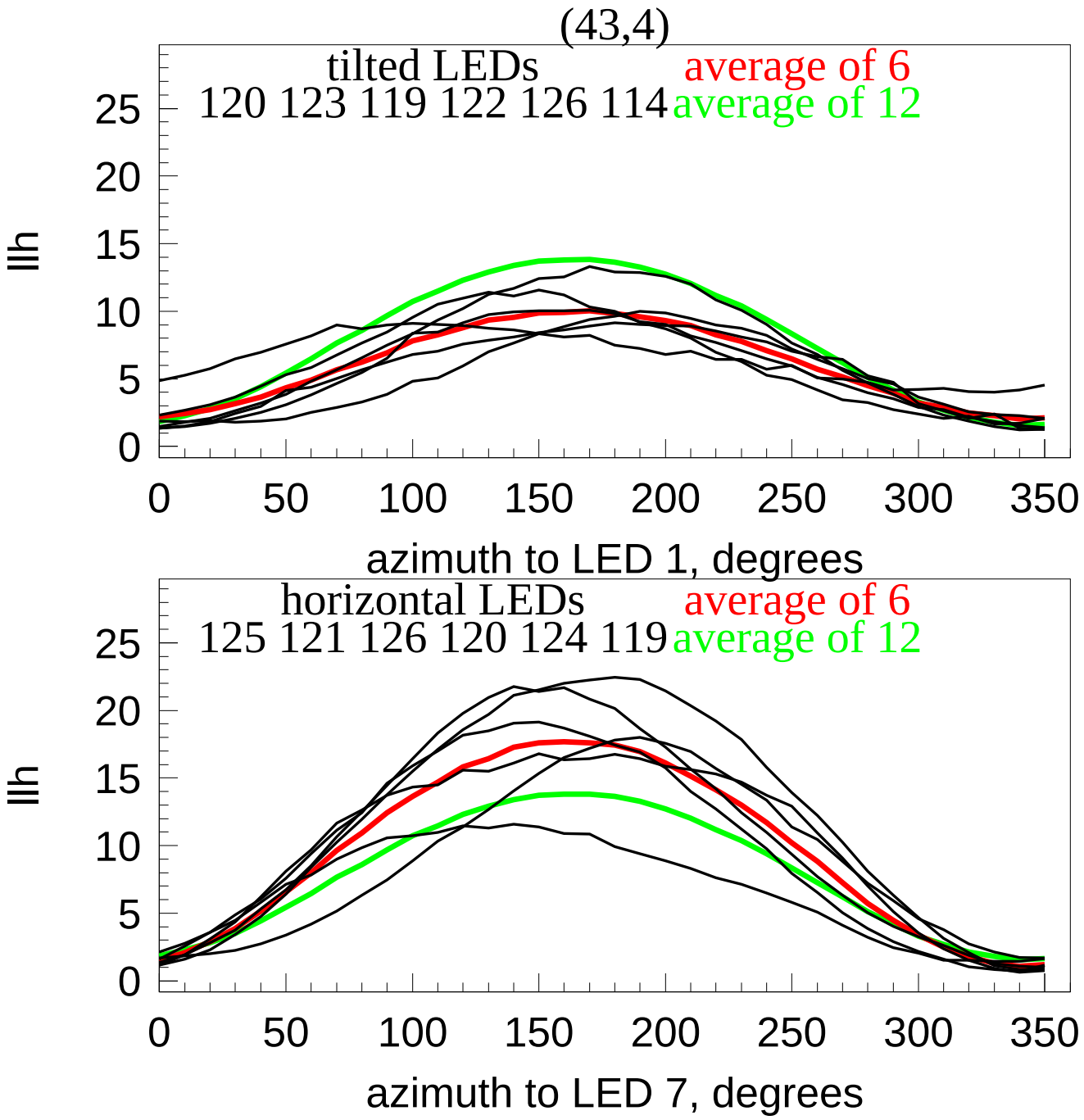

(43,1)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
32.9 ± 11.3

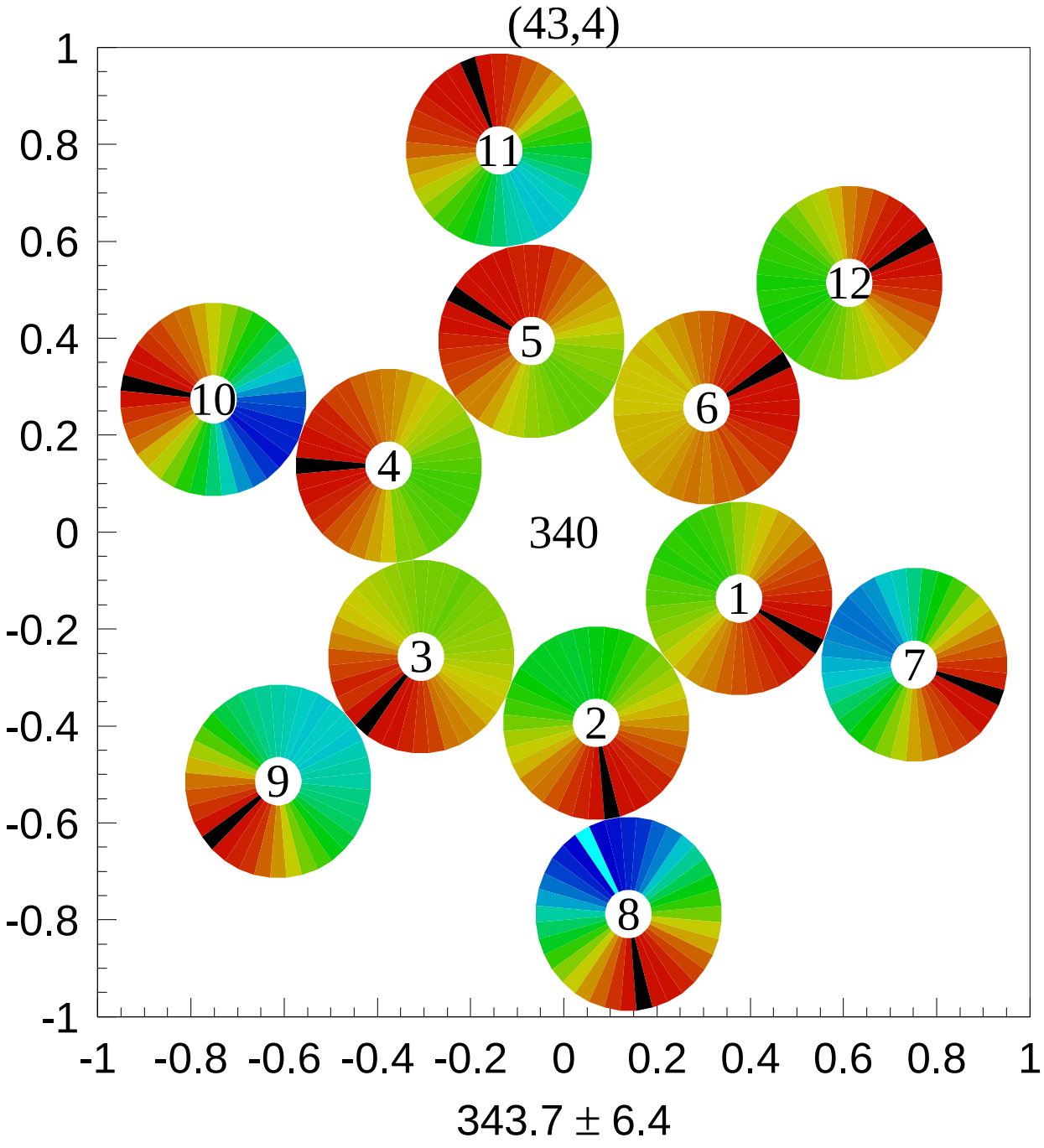

(43,2)
tilted LEDs
120 121 121 114 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 116 122 122 126 78
average of 6
average of 12
llh
azimuth to LED 7, degrees

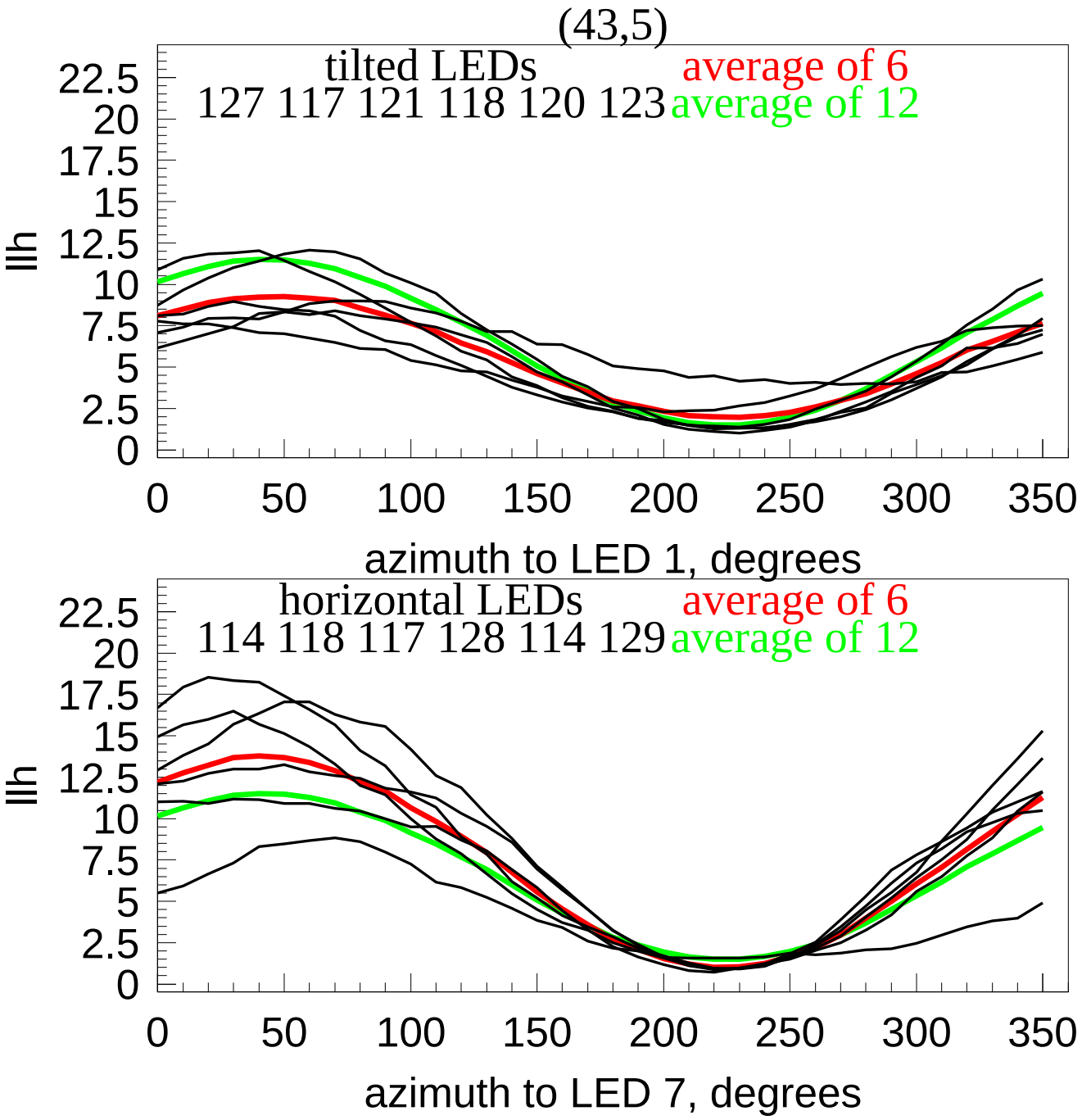

(43,2)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
311.4 ± 7.4

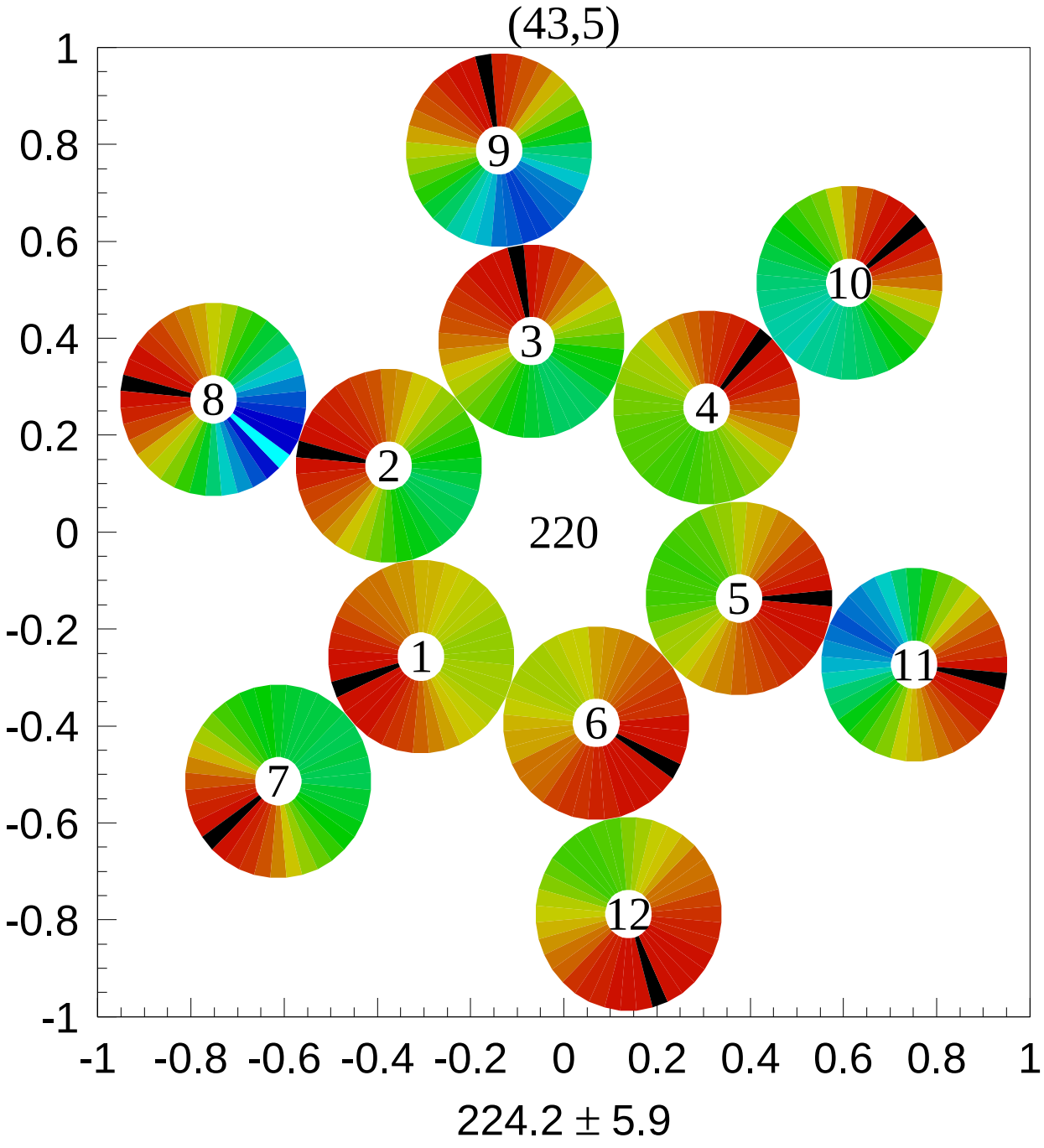

(43,3)
tilted LEDs
123 114 125 122 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 118 114 116 123 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

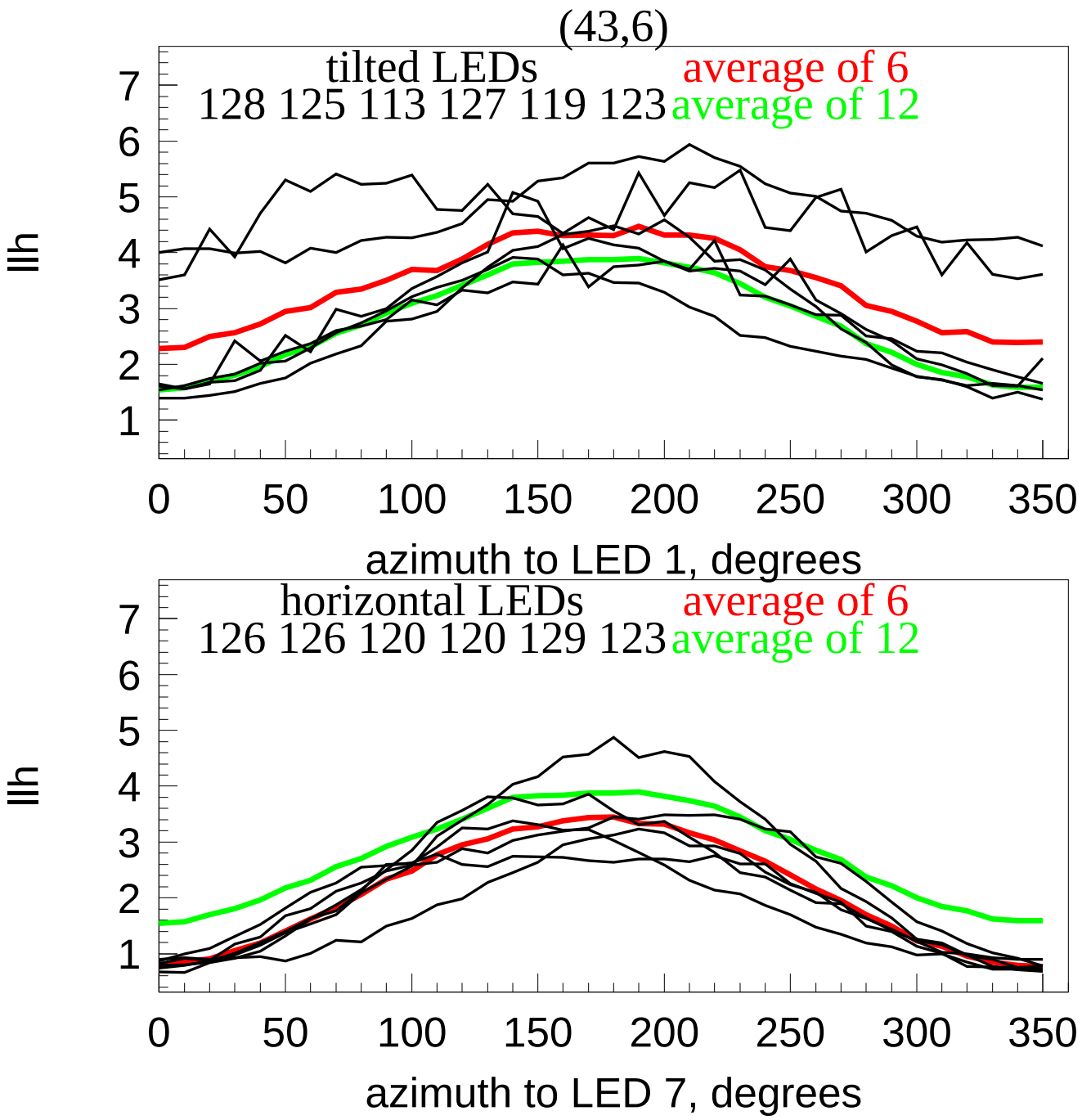

(43,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
82.1 ± 4.8

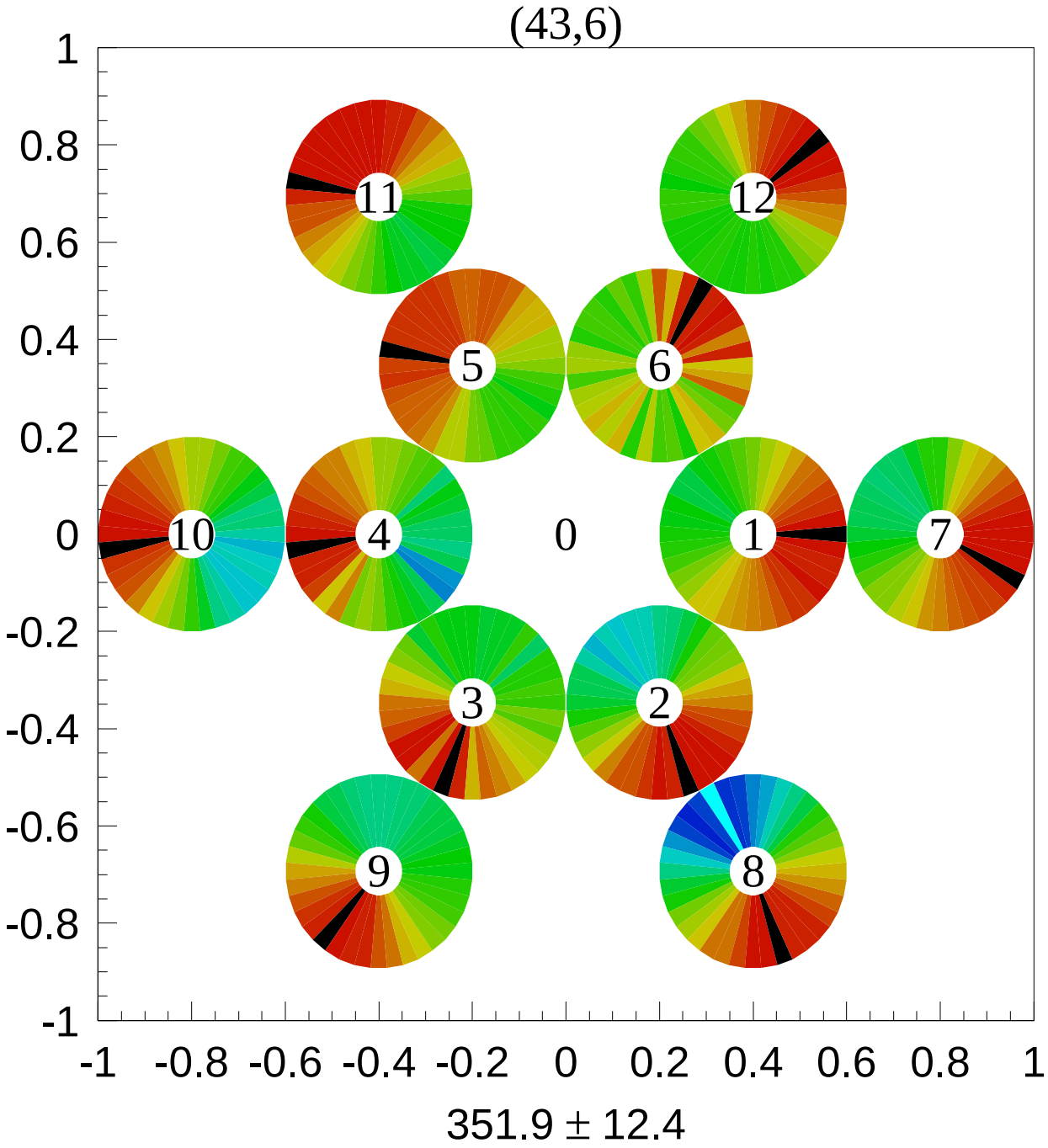

(43,4)
tilted LEDs
120 123 119 122 126 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 126 120 124 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

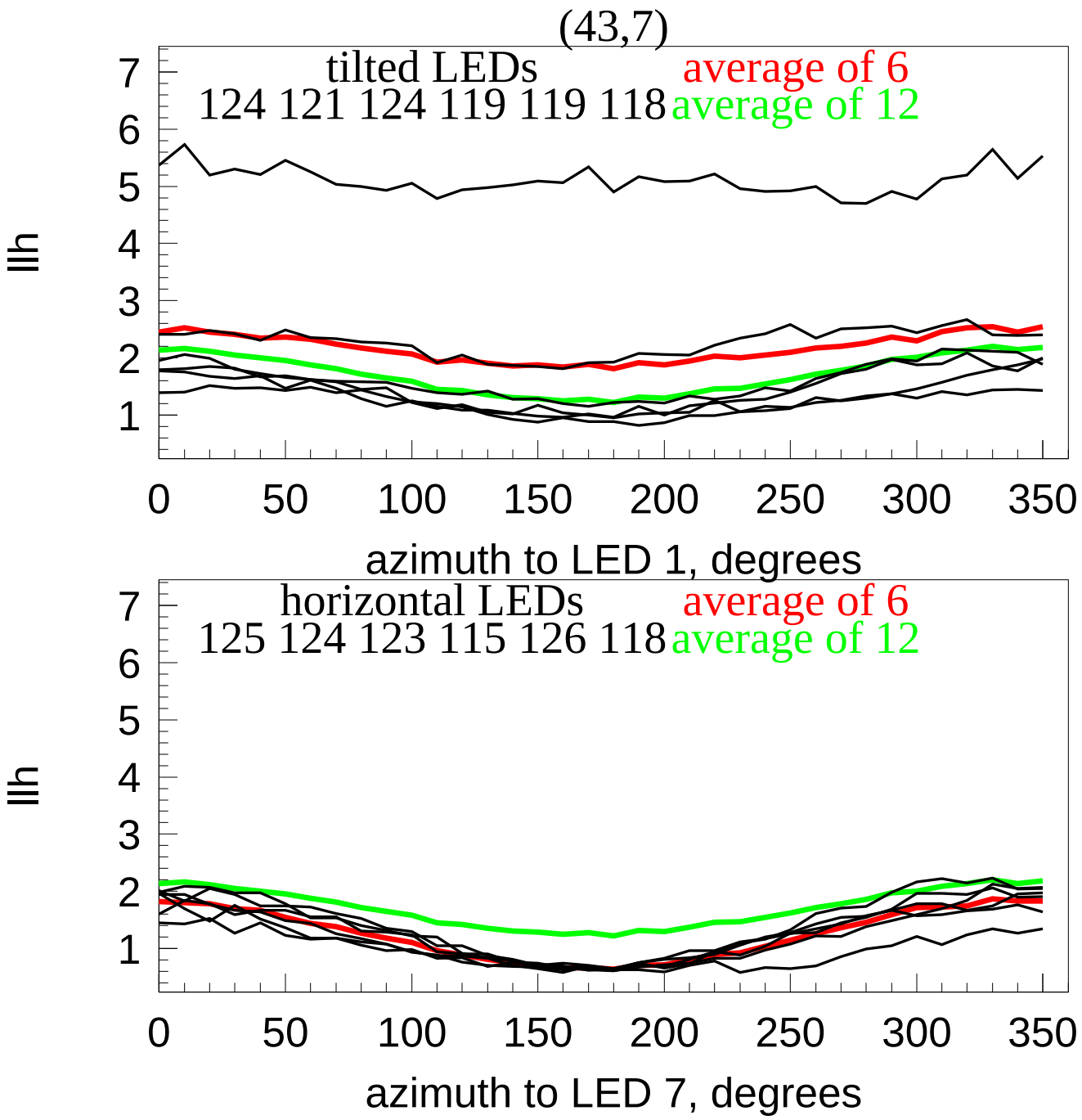

(43,4)
11
12
5
6
10
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
343.7 ± 6.4

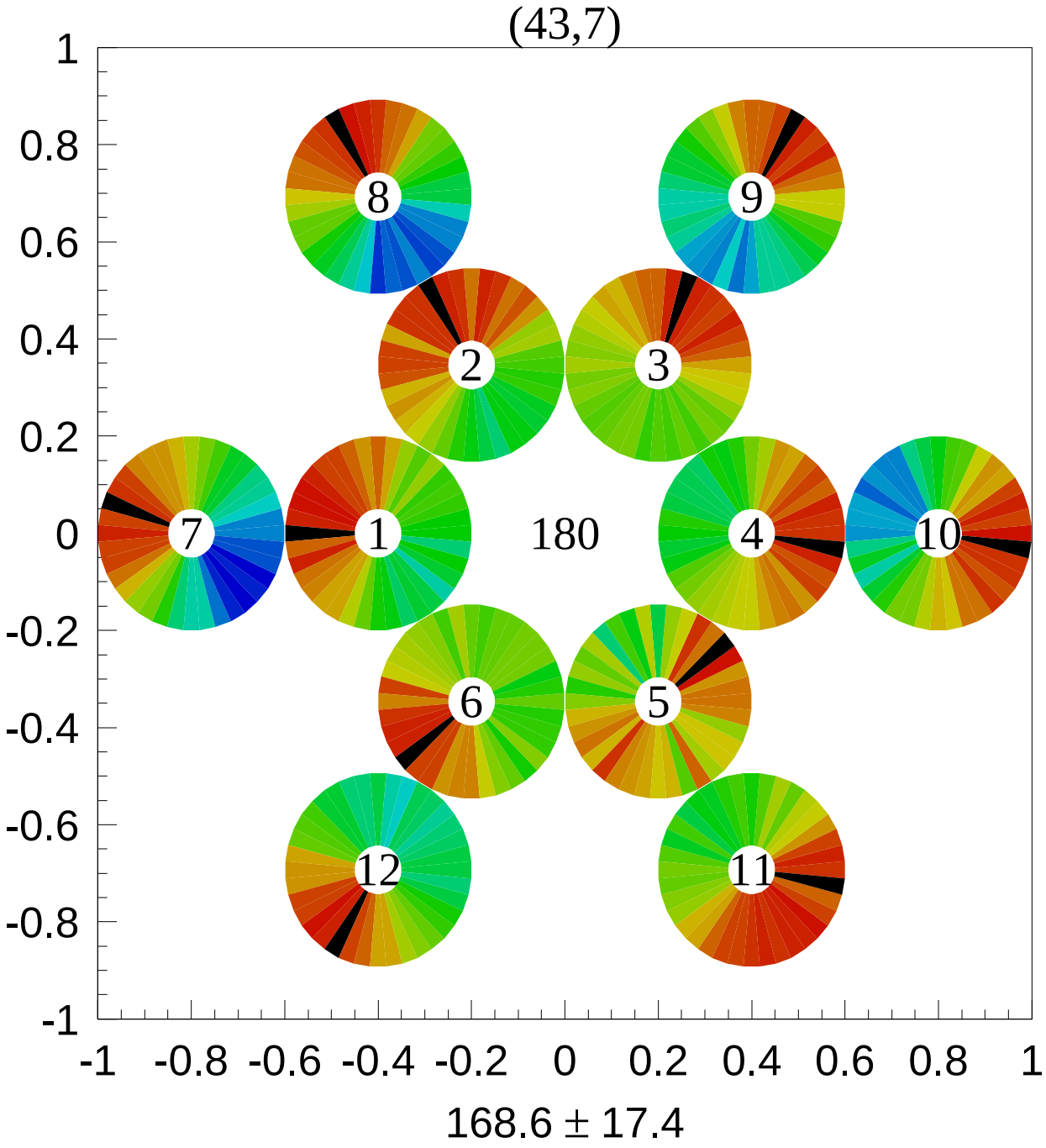

(43,5)
tilted LEDs
127 117 121 118 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 118 117 128 114 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

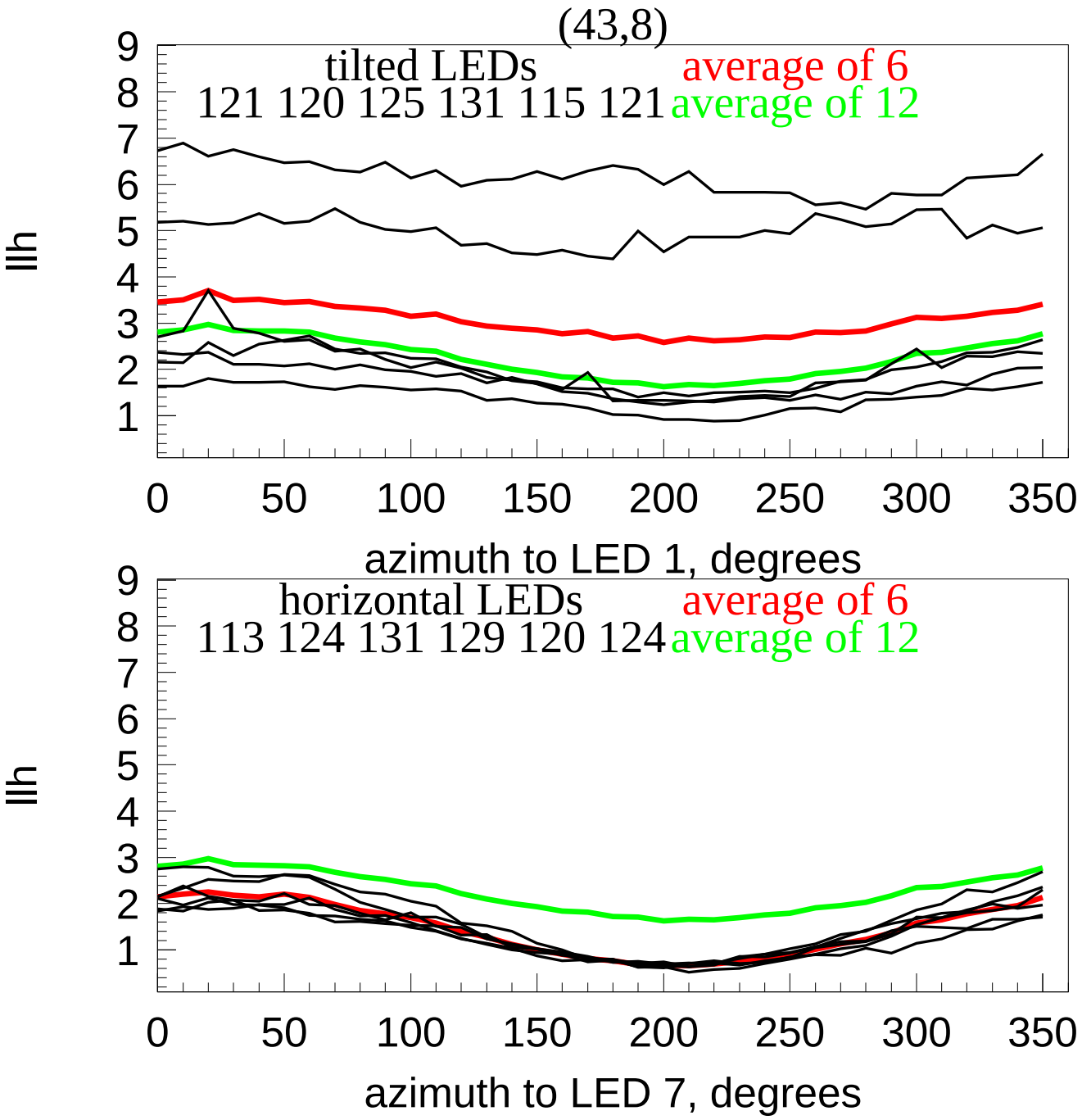

(43,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
224.2 ± 5.9

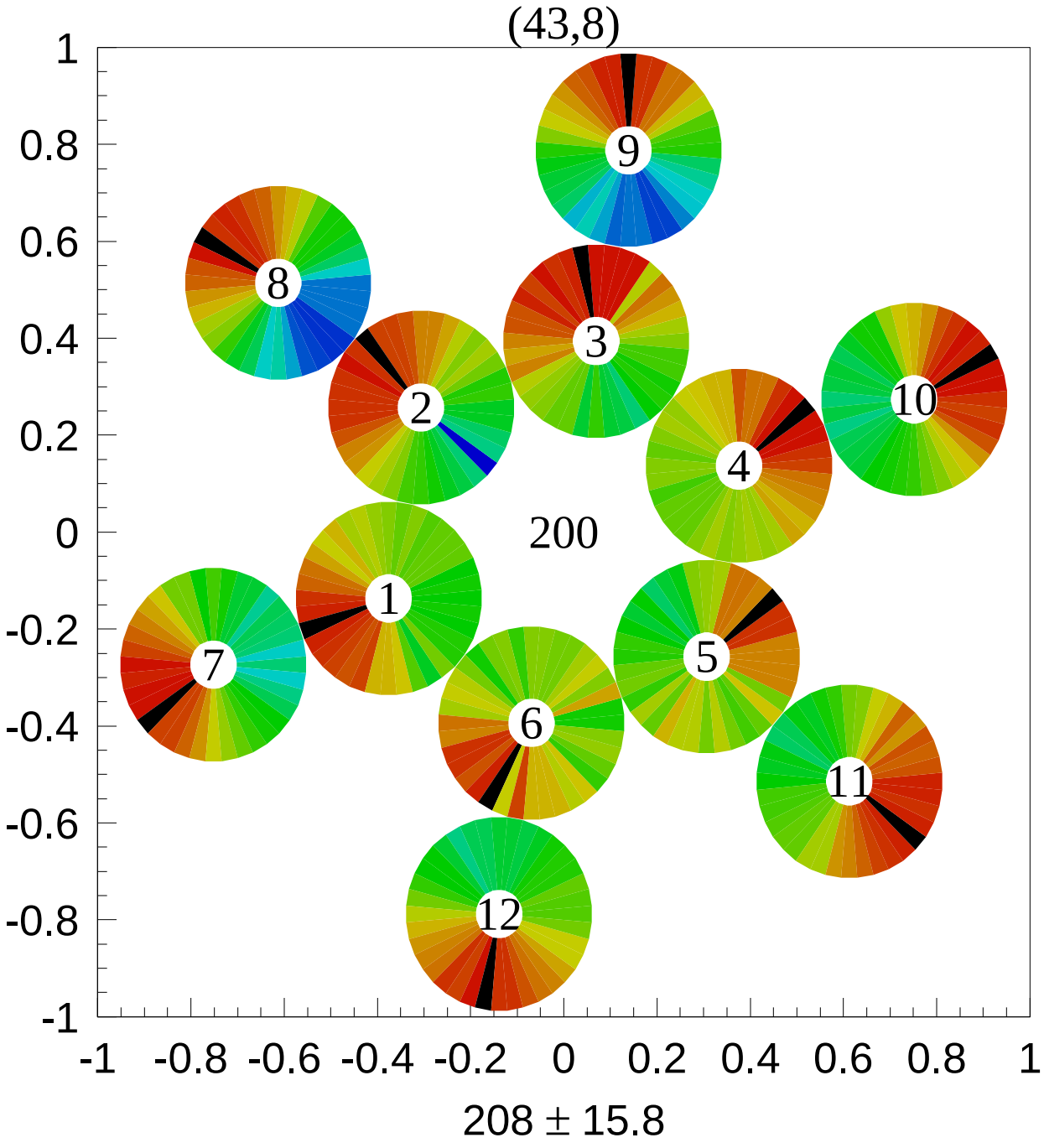

(43,6)
tilted LEDs
128 125 113 127 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 120 120 129 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

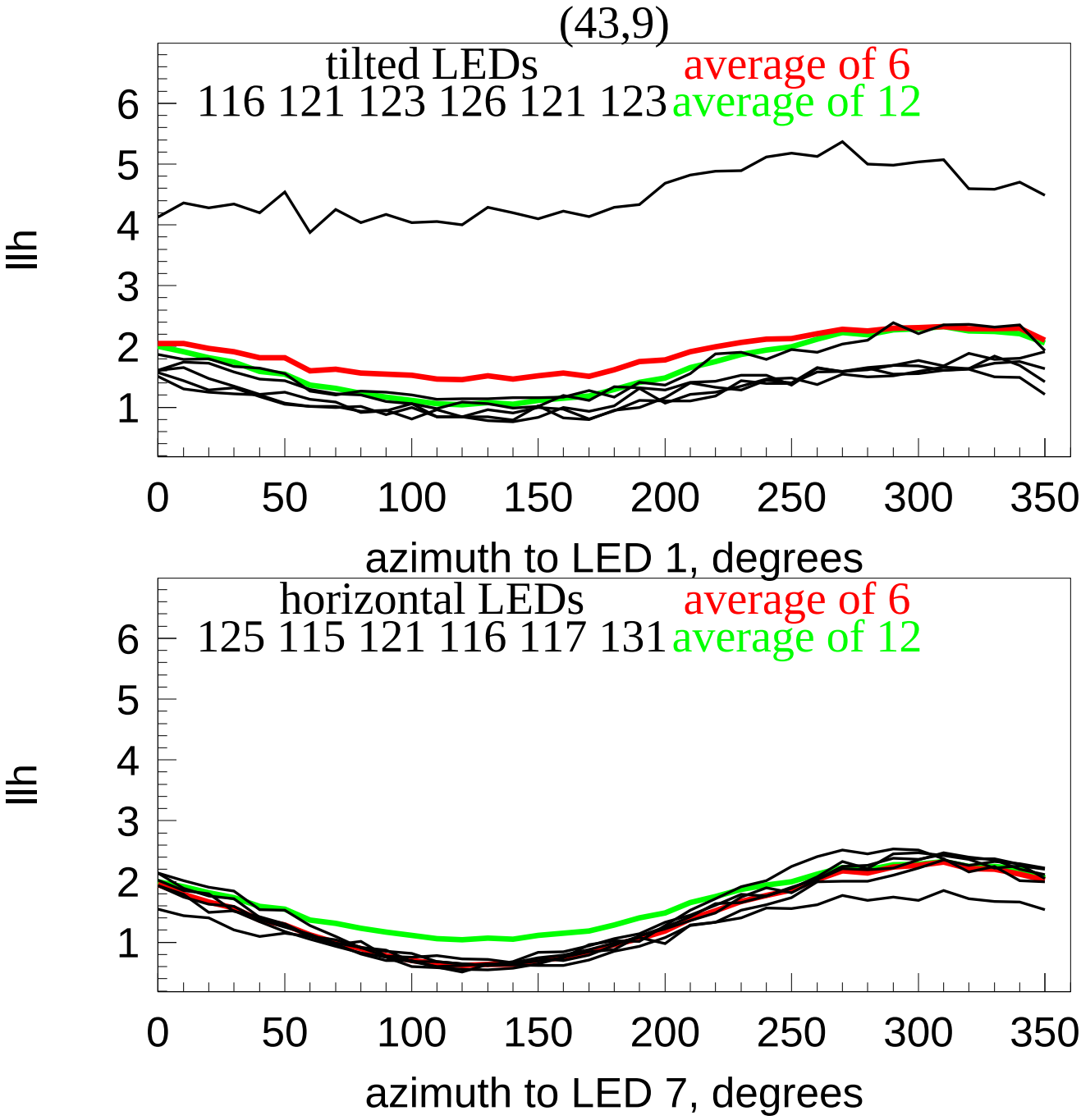

(43,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
351.9 ± 12.4

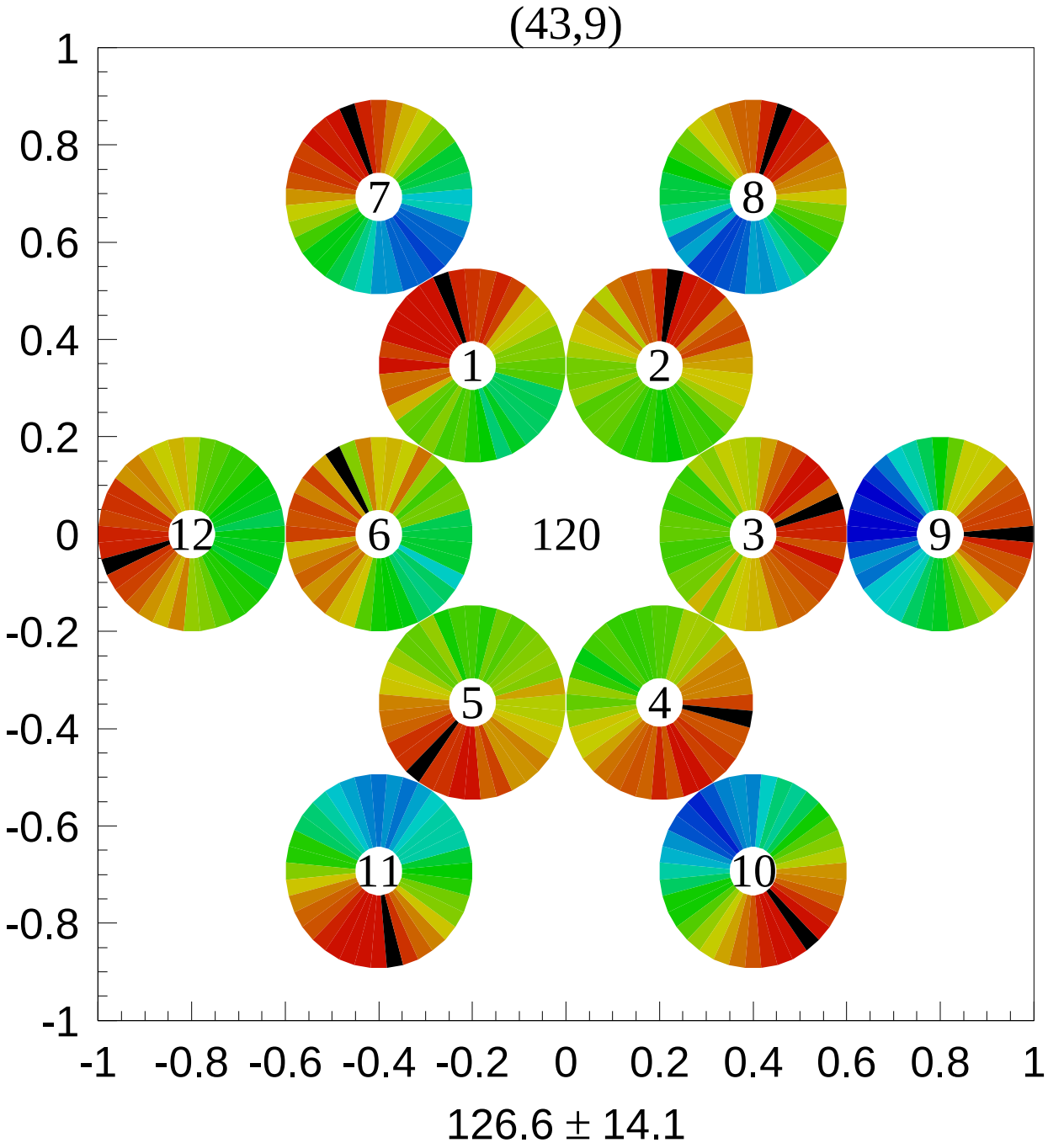

(43,7)
tilted LEDs
124 121 124 119 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 123 115 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

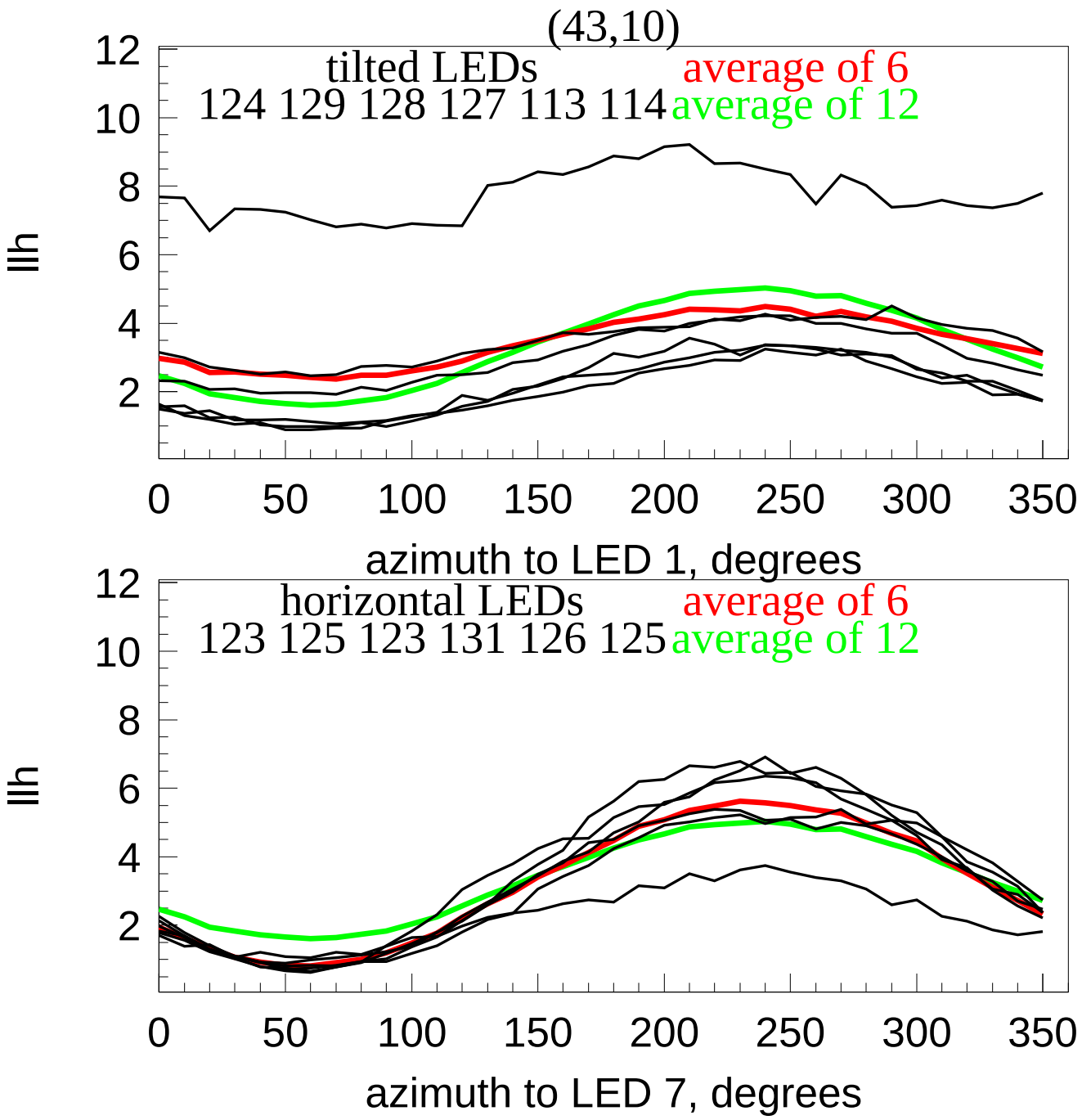

(43,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
168.6 ± 17.4
8
9
2
3
7
1
180
4
10
6
5
12
11

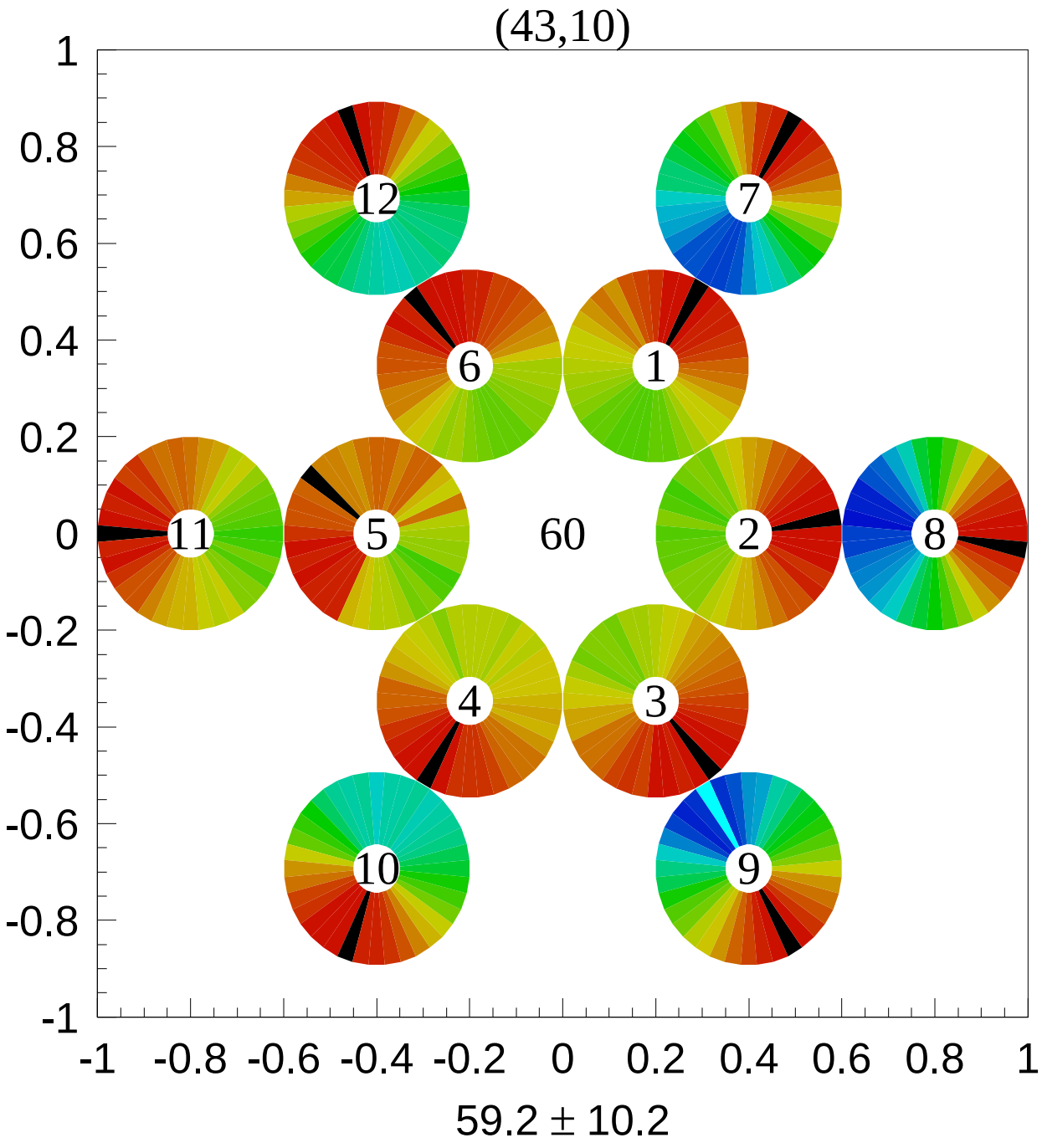

(43,8)
tilted LEDs
121 120 125 131 115 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 124 131 129 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

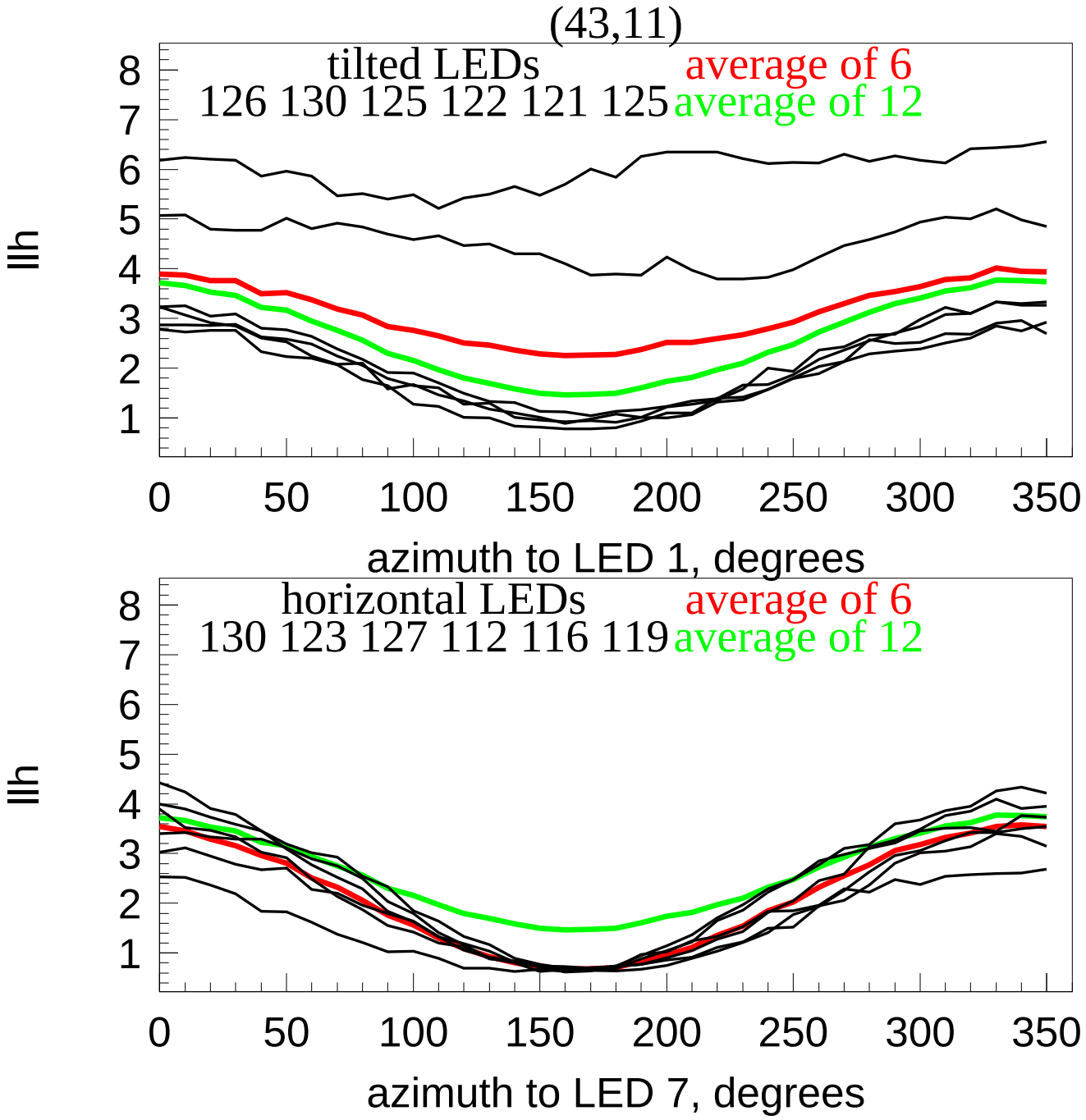

(43,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
208 ± 15.8
200
1
2
3
4
5
6
7
8
9
10
11
12

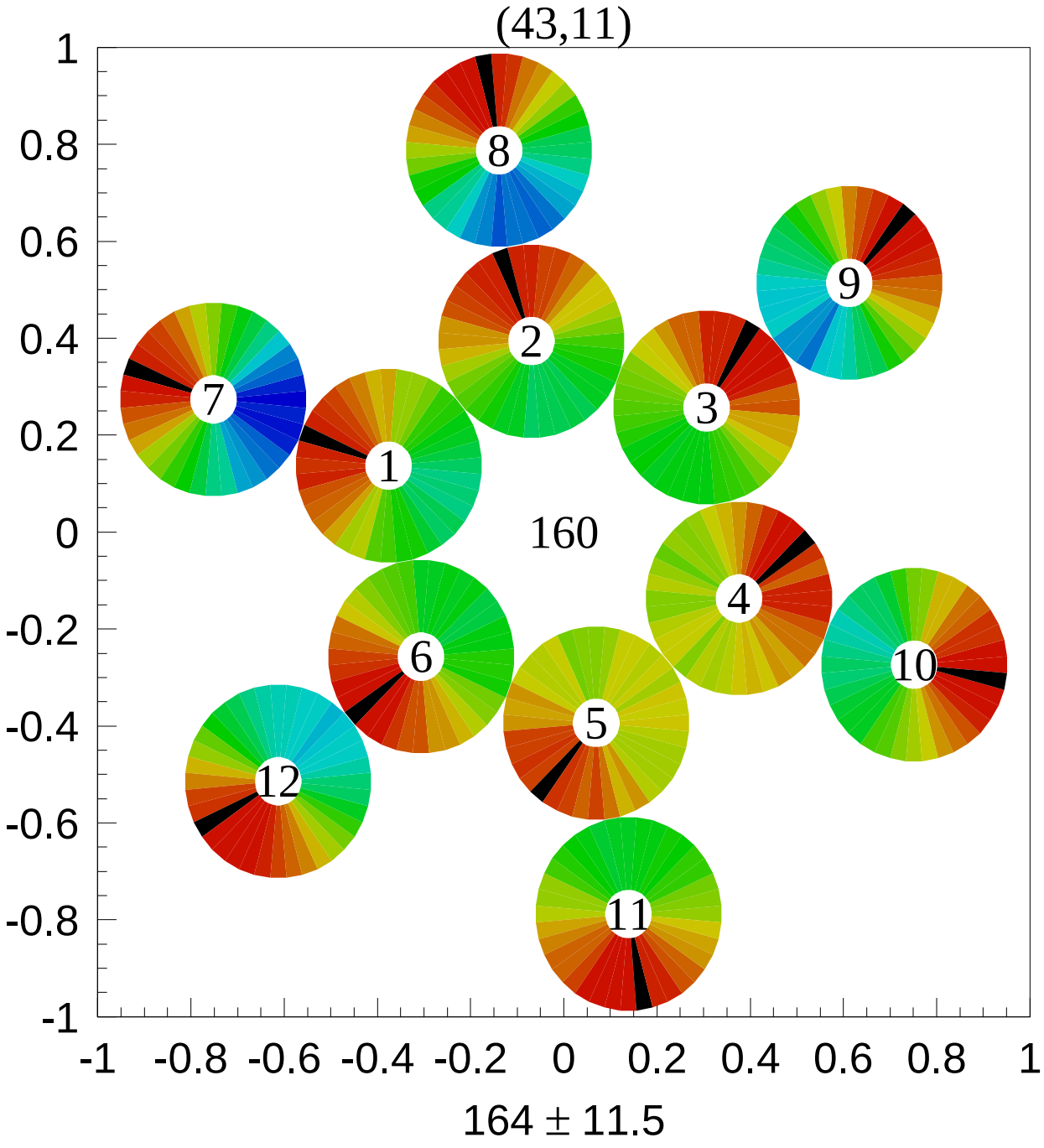

(43,9)
tilted LEDs
116 121 123 126 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 115 121 116 117 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

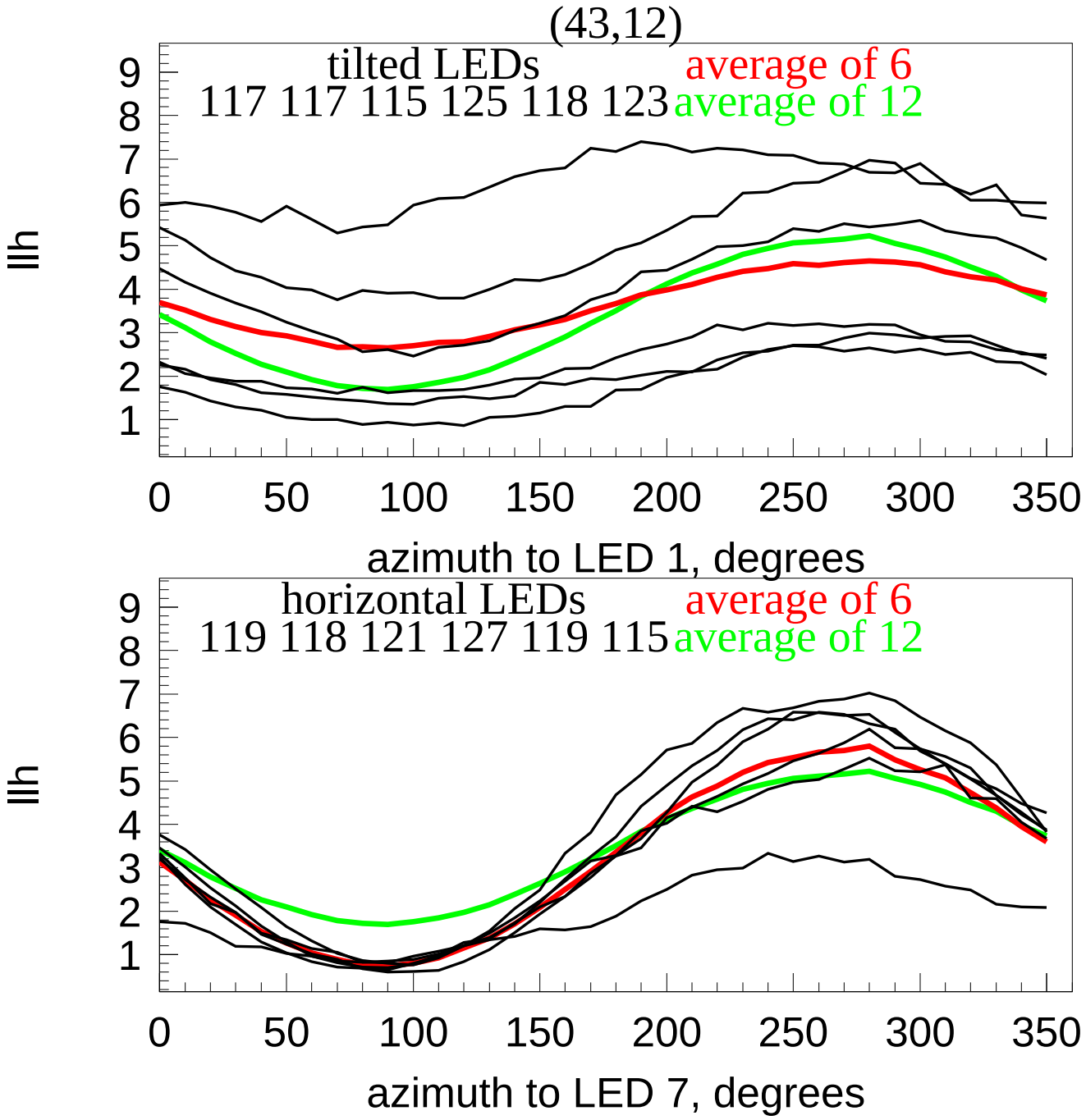

(43,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
126.6 ± 14.1

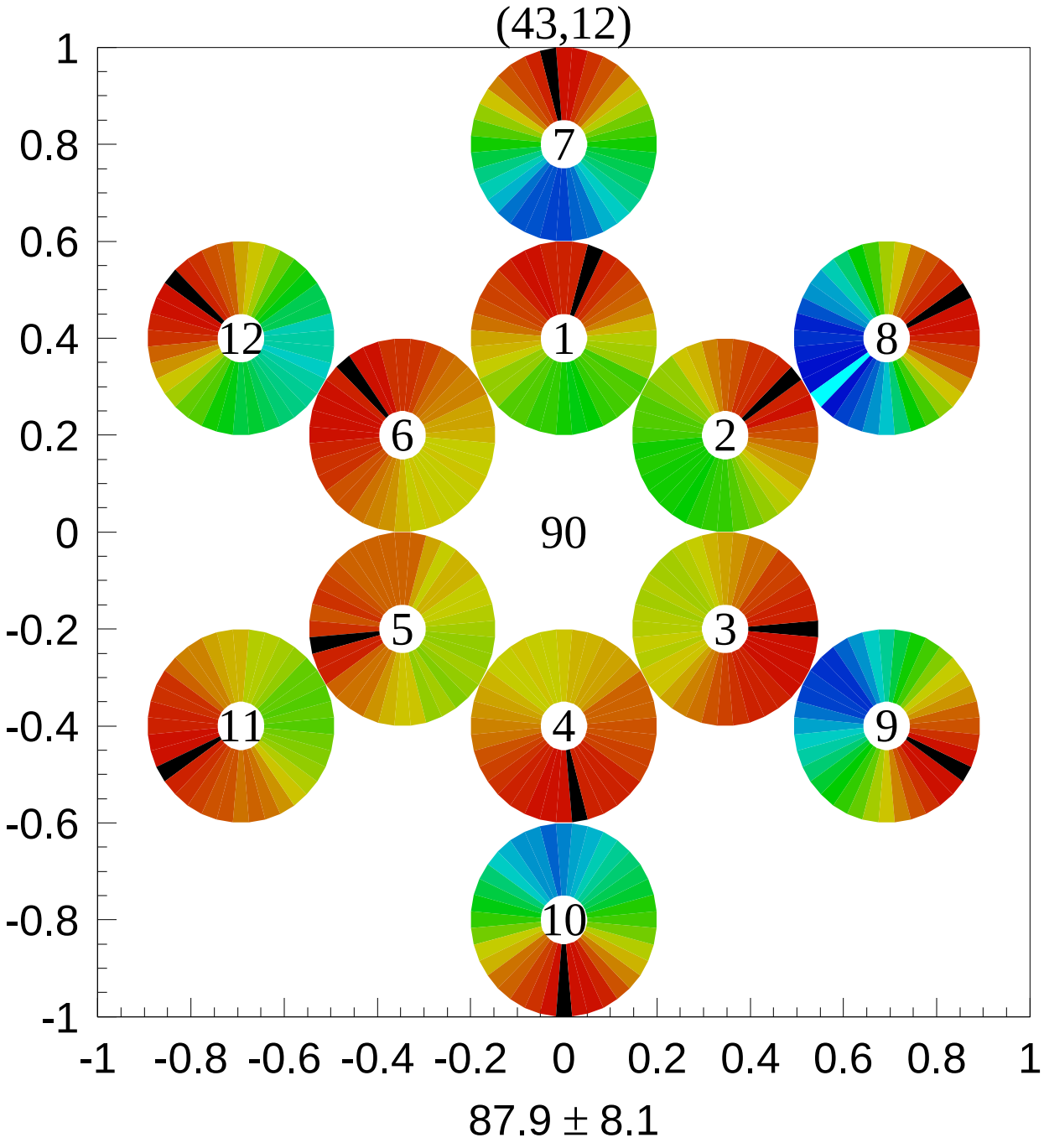

(43,10)
tilted LEDs
124 129 128 127 113 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 123 131 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

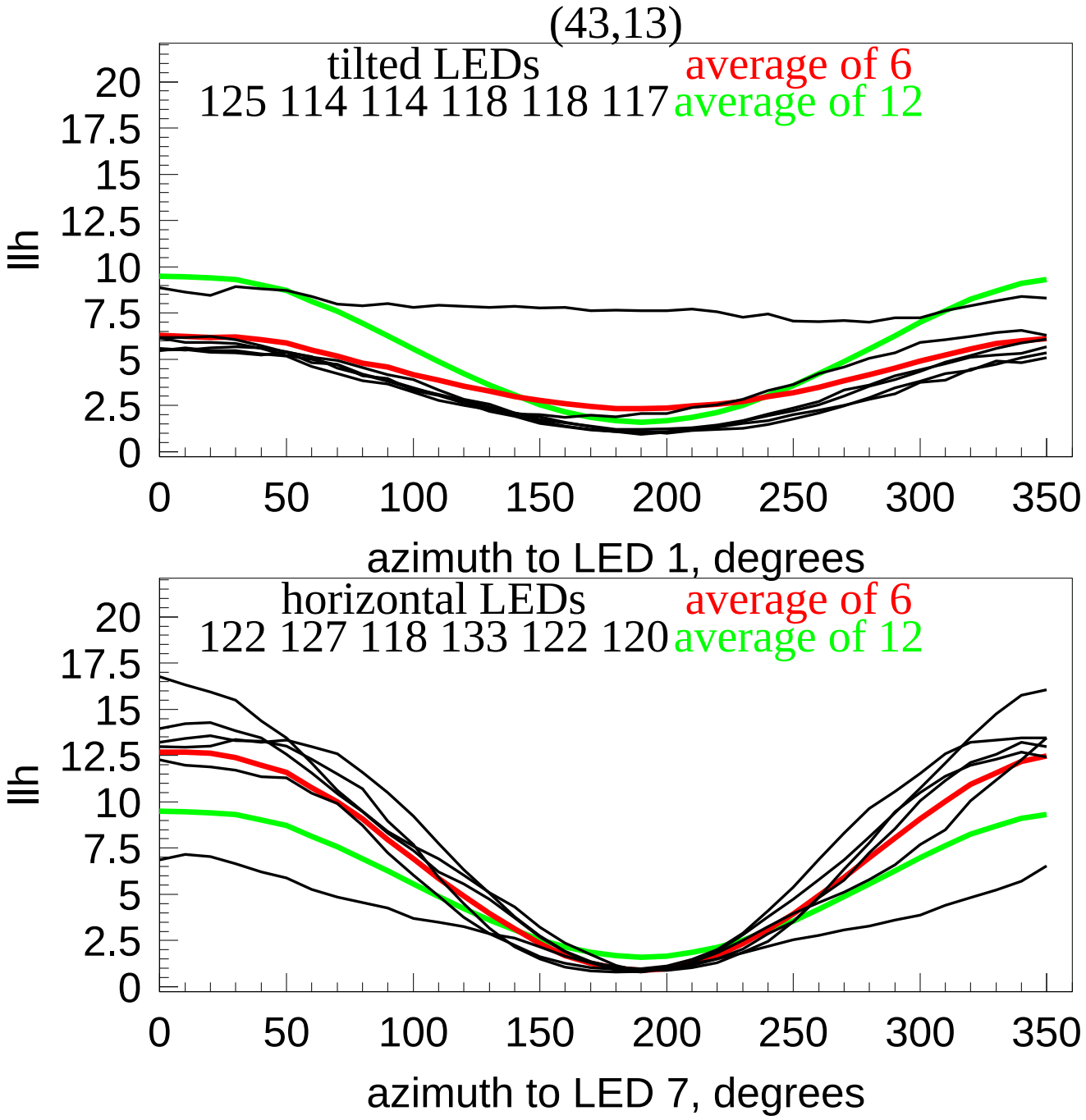

(43,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
59.2 ± 10.2

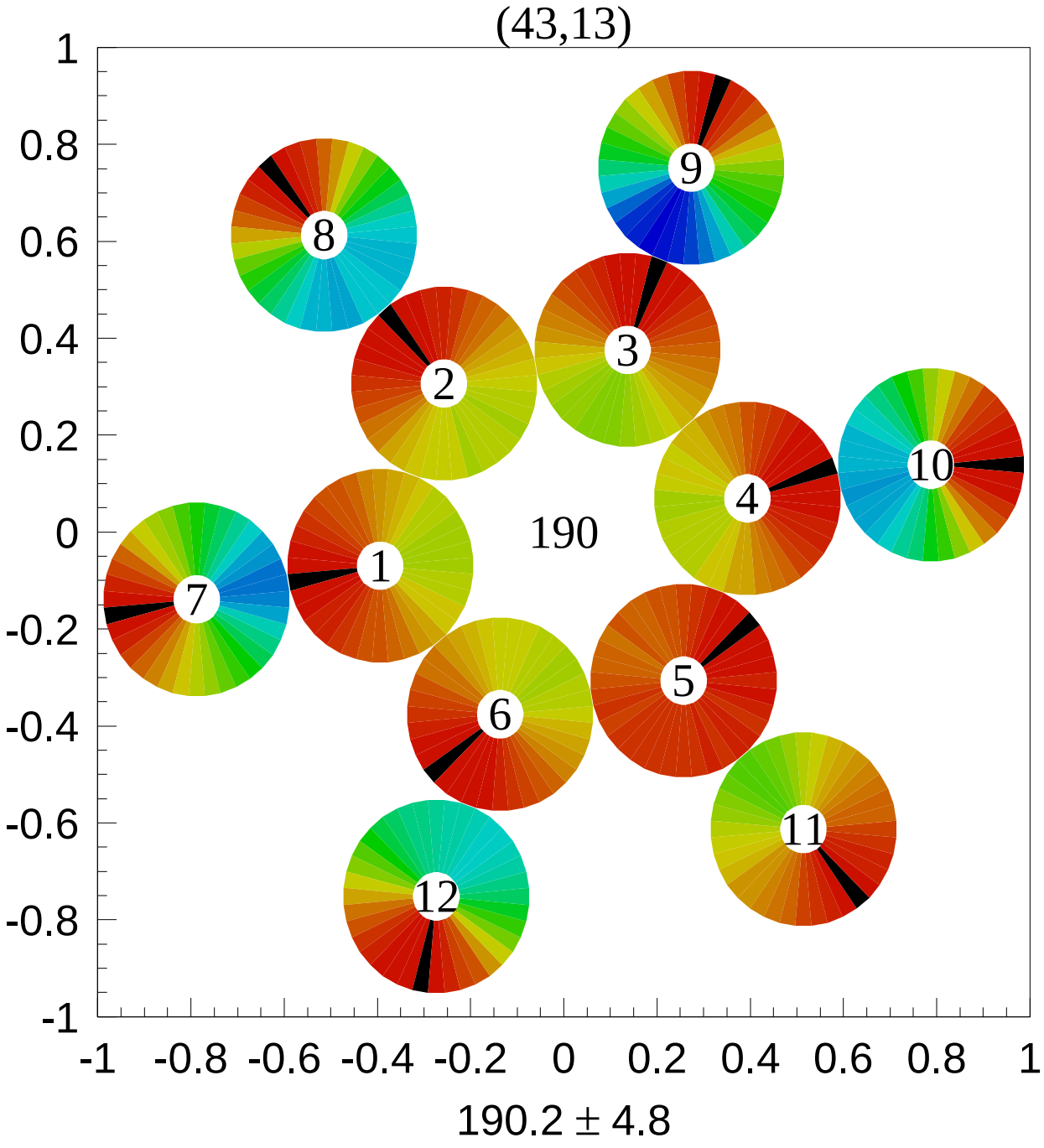

(43,11)
tilted LEDs
126 130 125 122 121 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 123 127 112 116 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

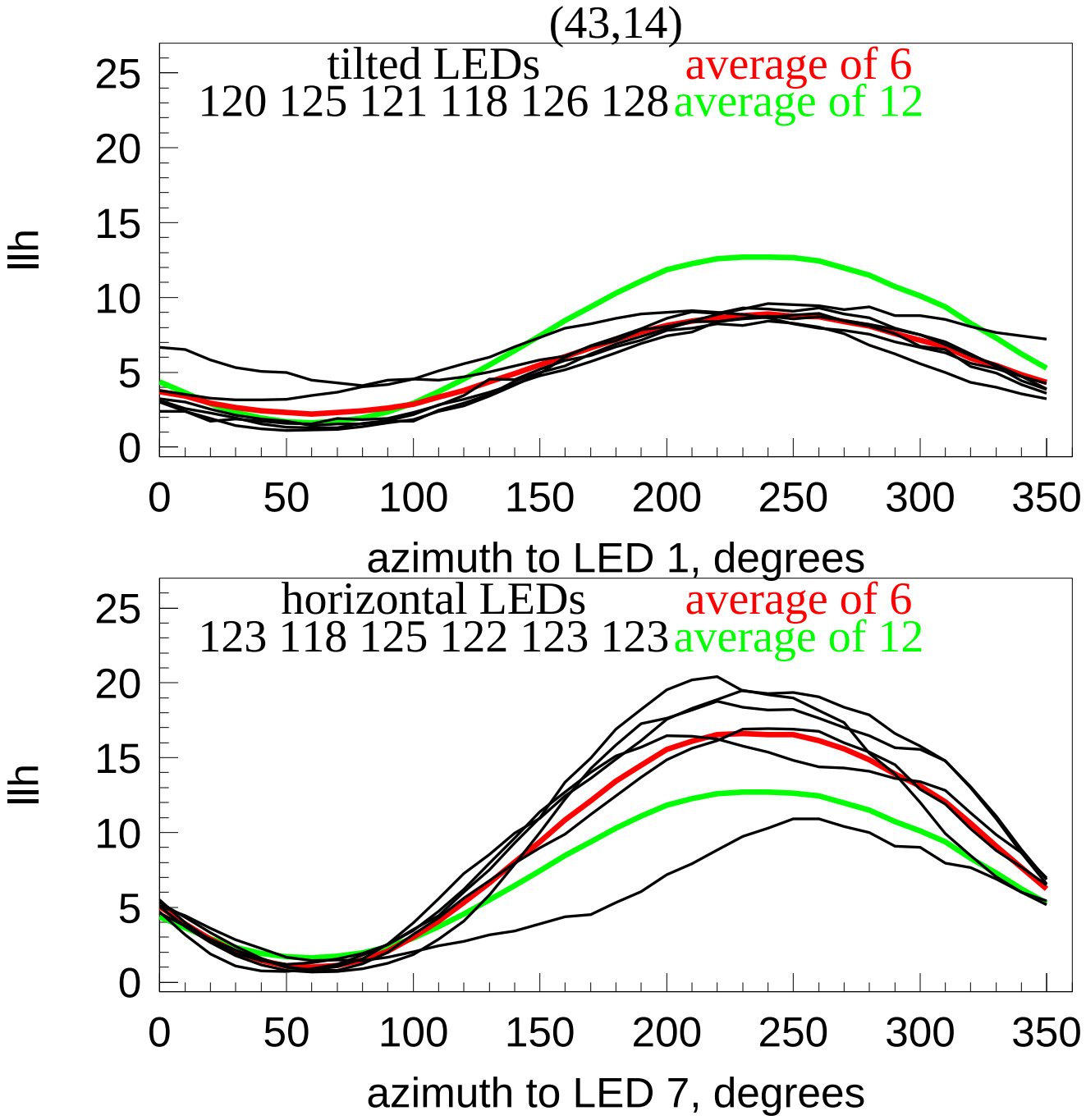

(43,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
164 ± 11.5

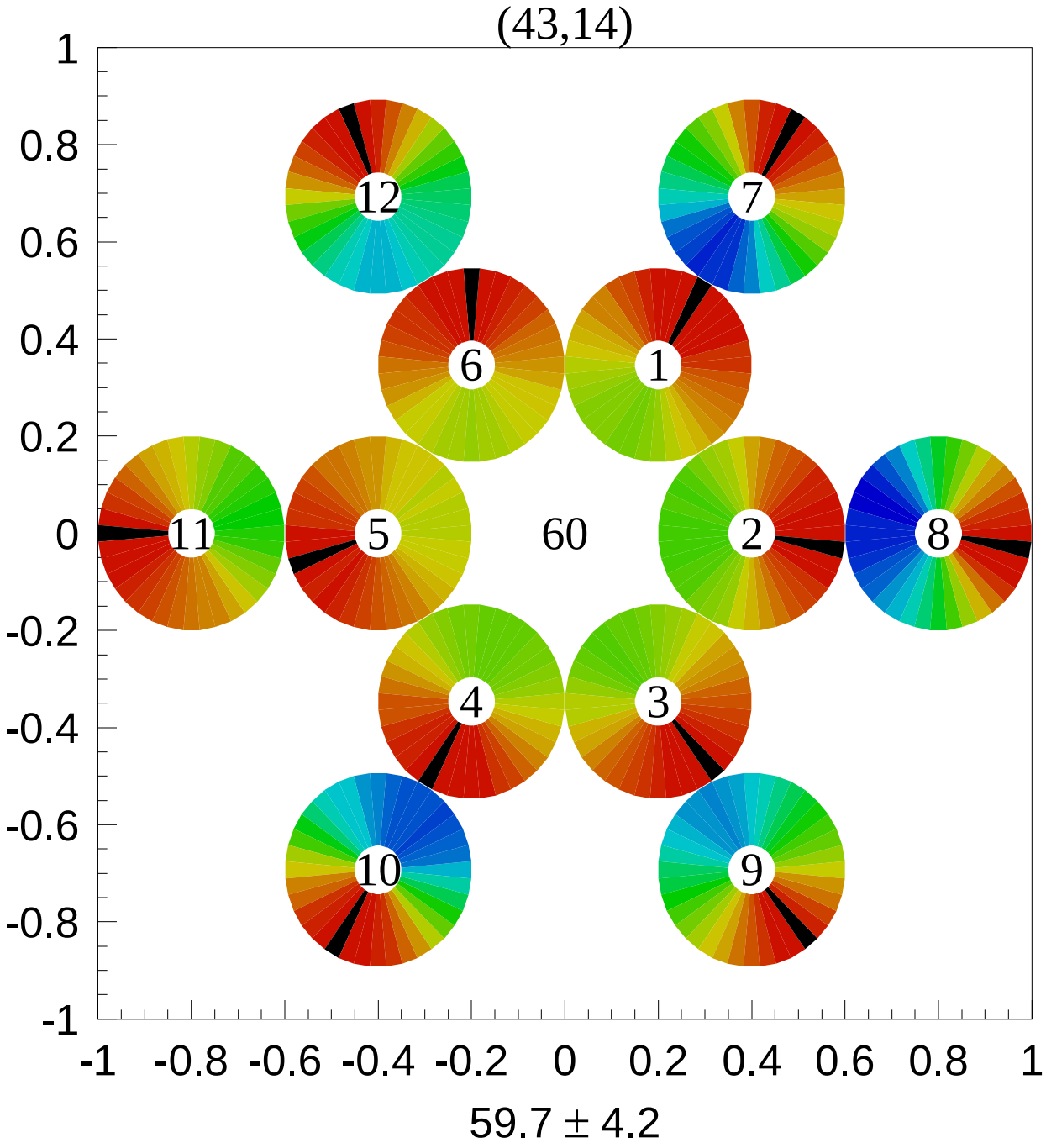

(43,12)
tilted LEDs
117 117 115 125 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 121 127 119 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

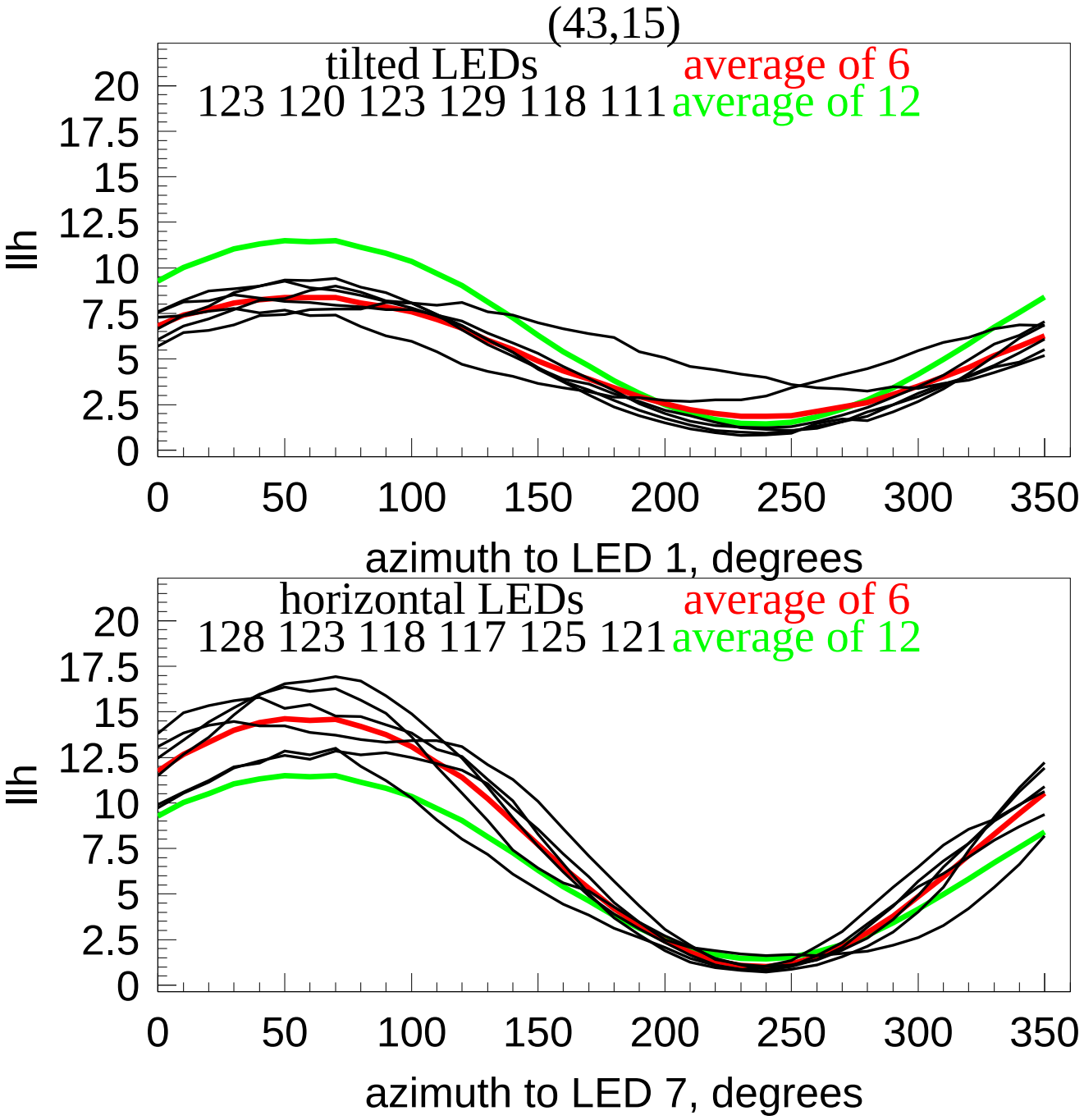

(43,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
87.9 ± 8.1

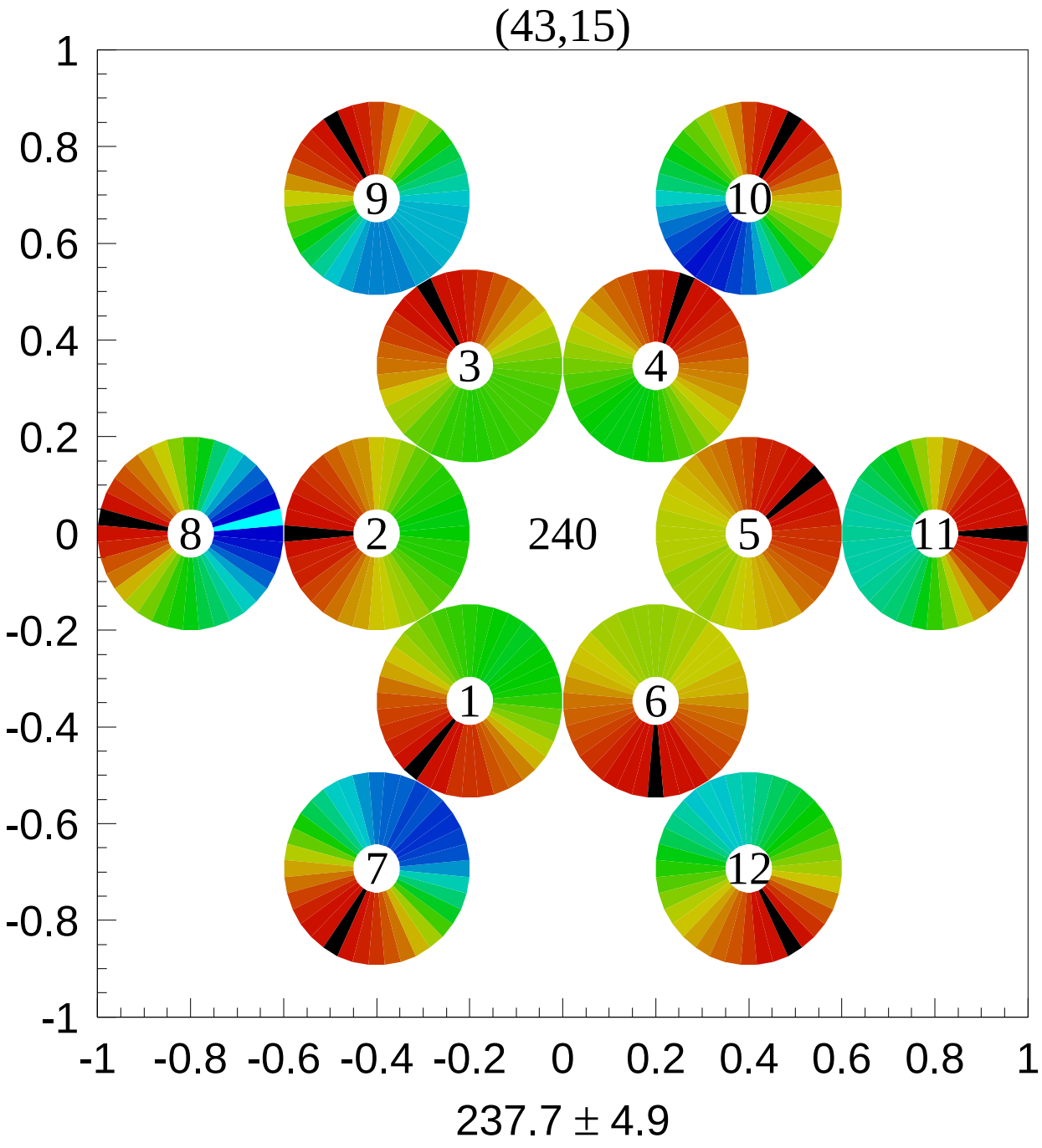

(43,13)
tilted LEDs
125 114 114 118 118 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 127 118 133 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

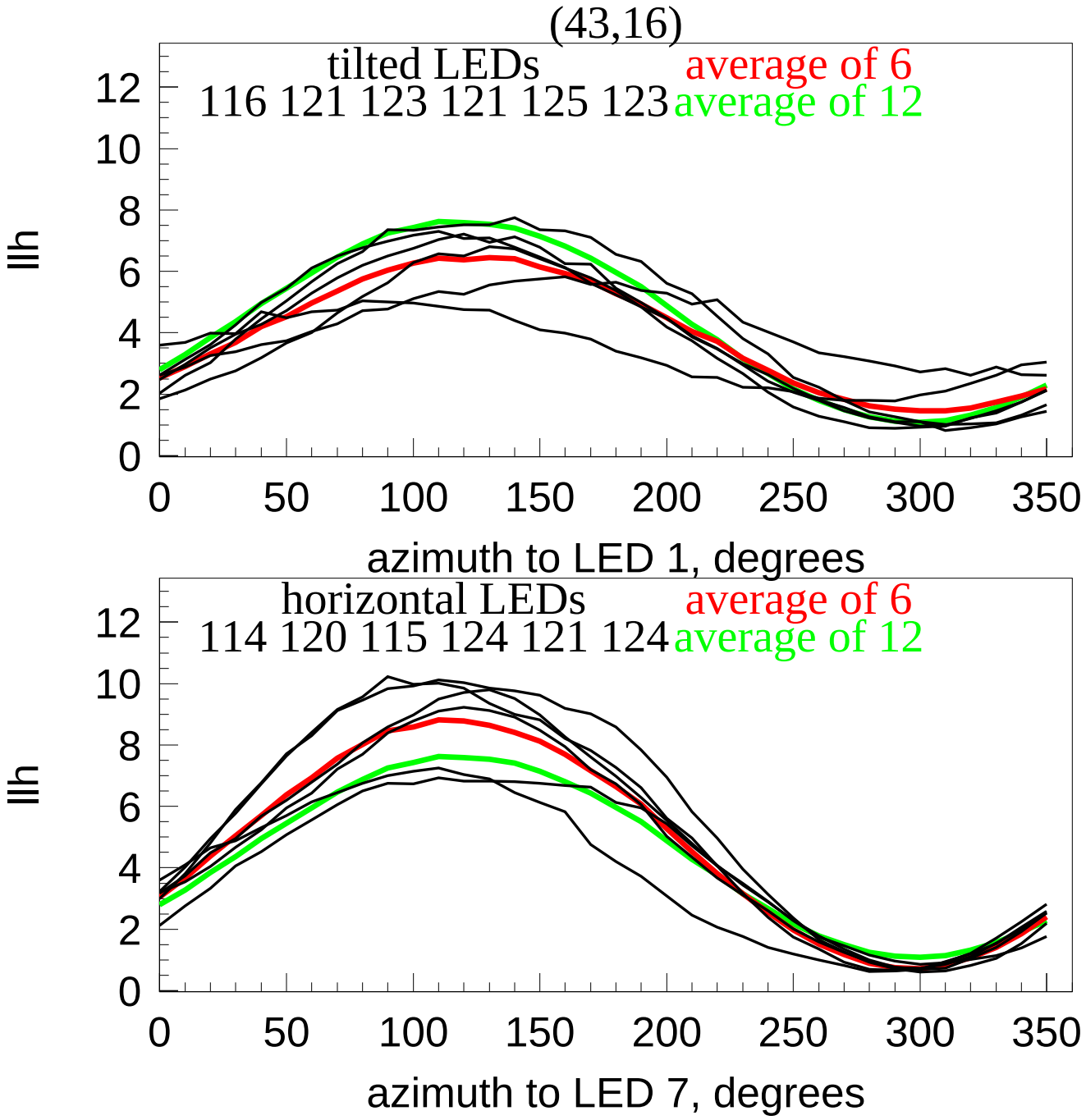

(43,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
190.2 ± 4.8

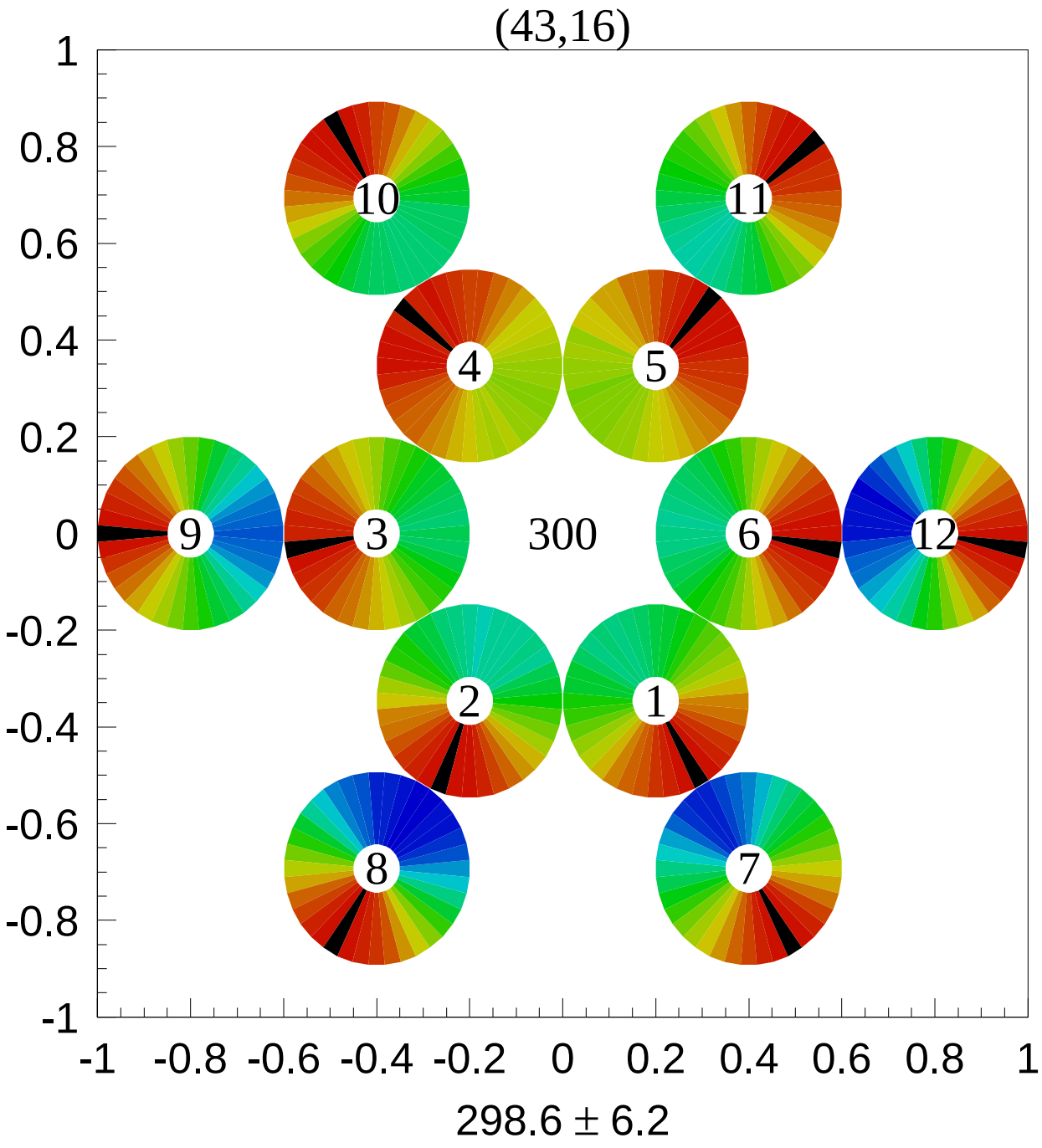

(43,14)
tilted LEDs
120 125 121 118 126 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 125 122 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

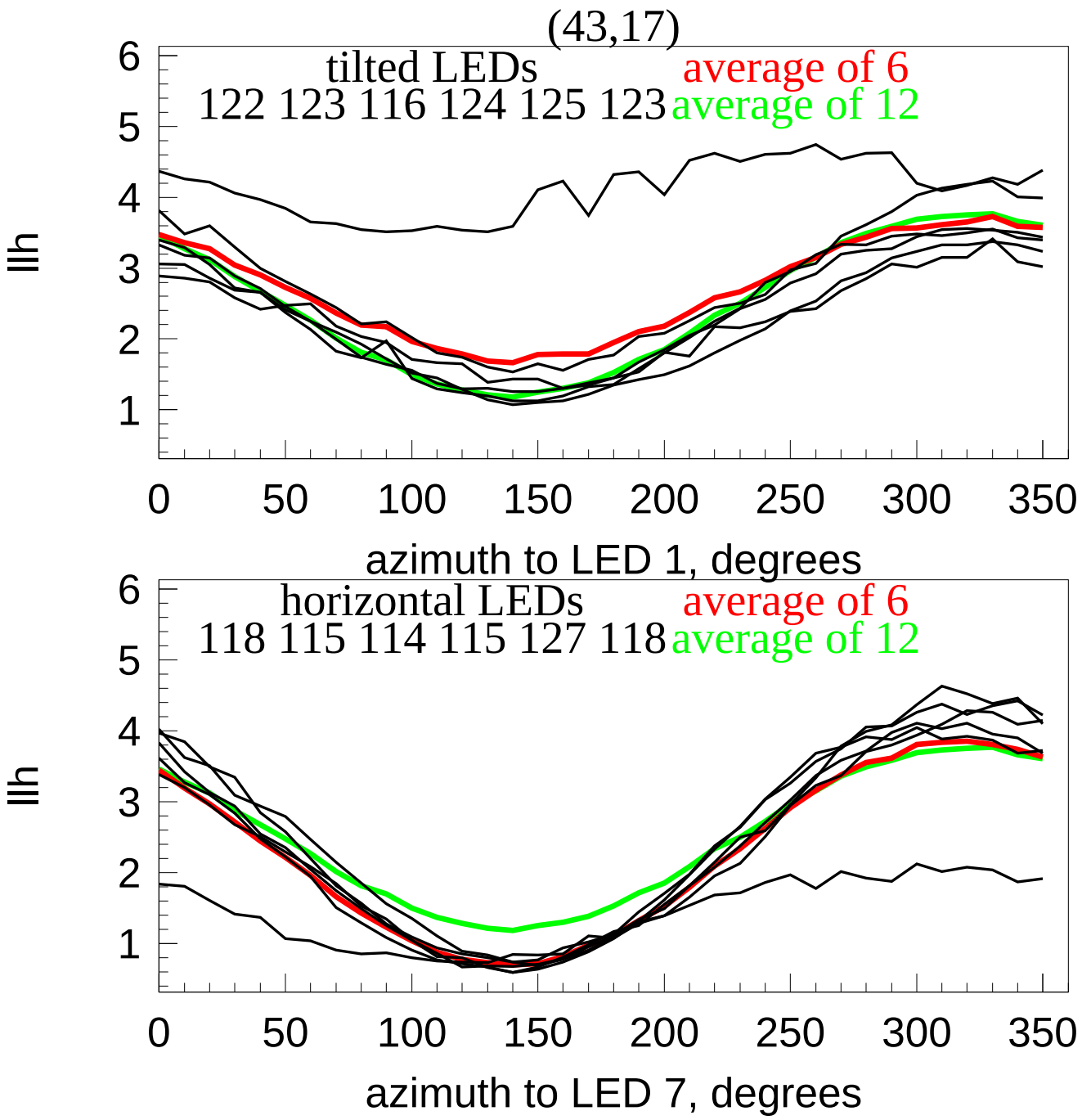

(43,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
59.7 ± 4.2

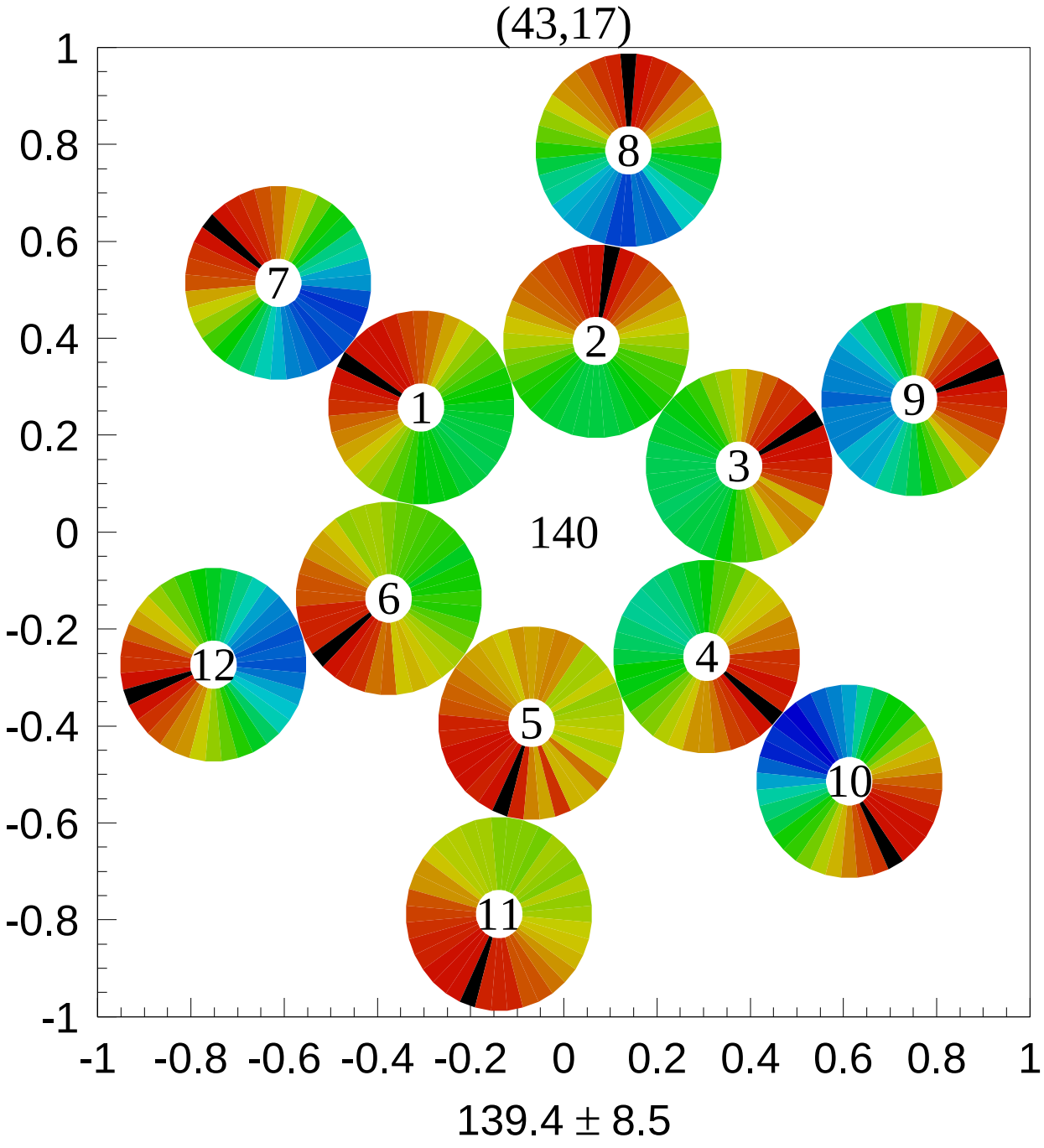

(43,15)
tilted LEDs
123 120 123 129 118 111
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 123 118 117 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

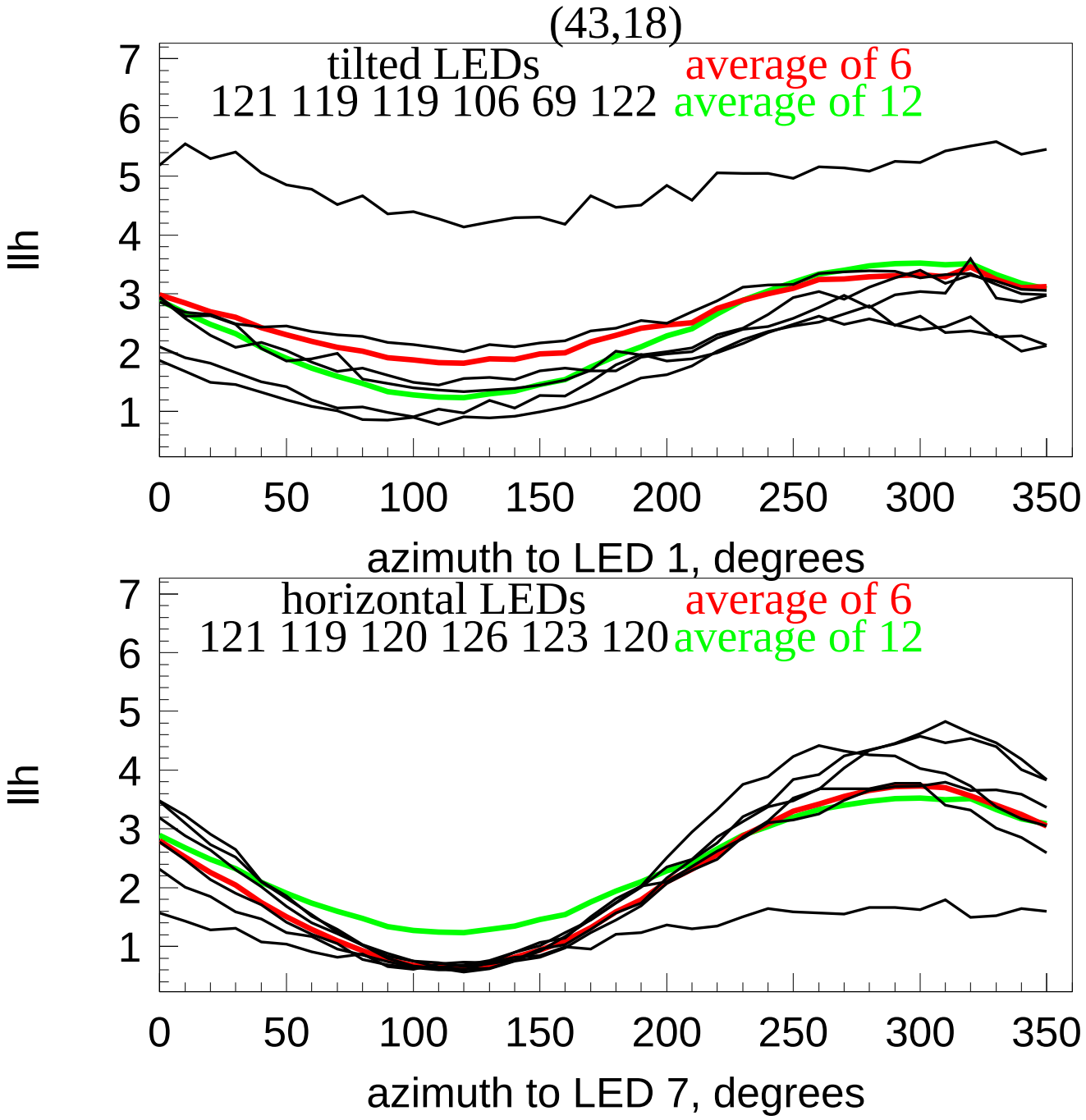

(43,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
237.7 ± 4.9

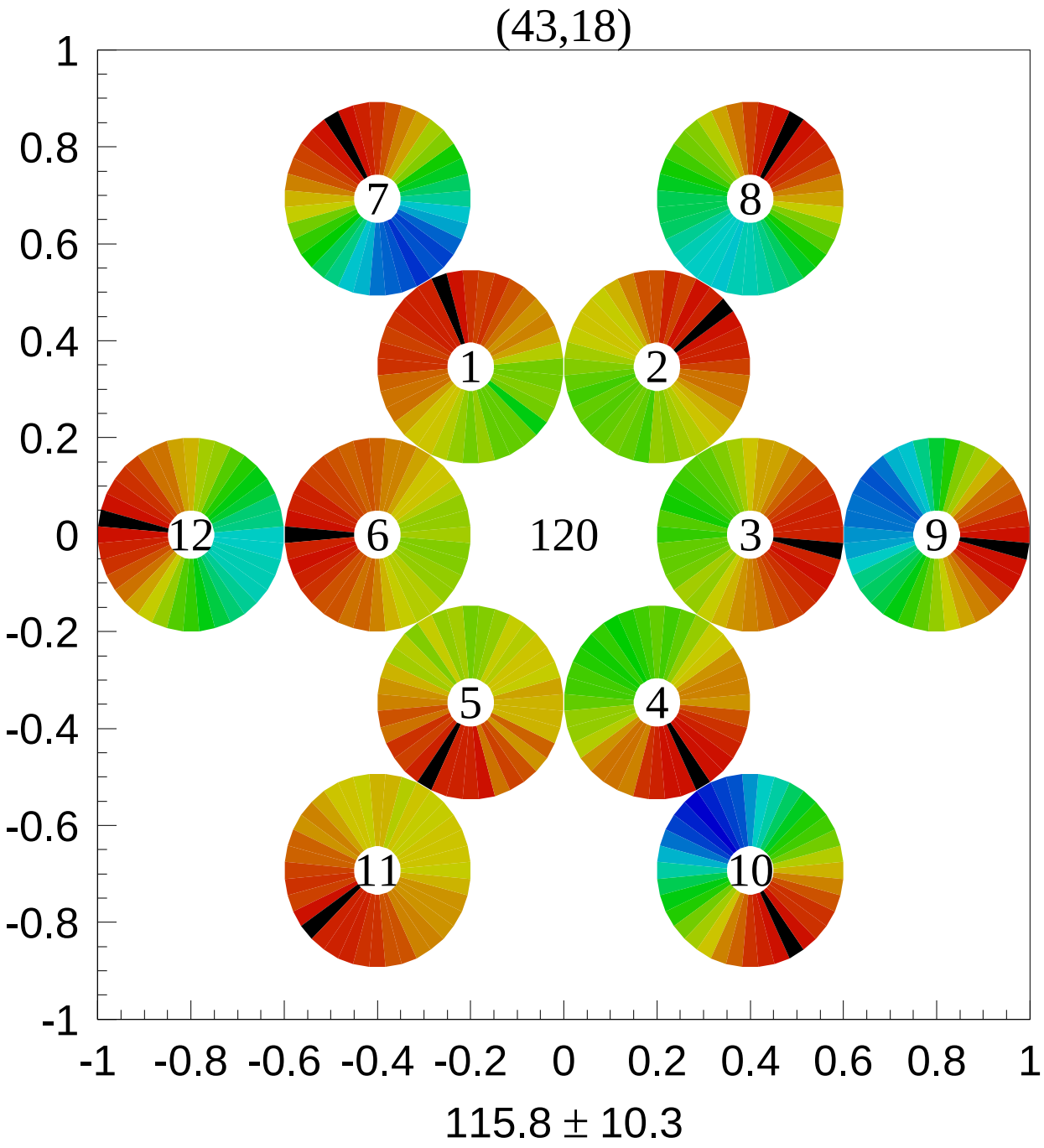

(43,16)
tilted LEDs
116 121 123 121 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 120 115 124 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

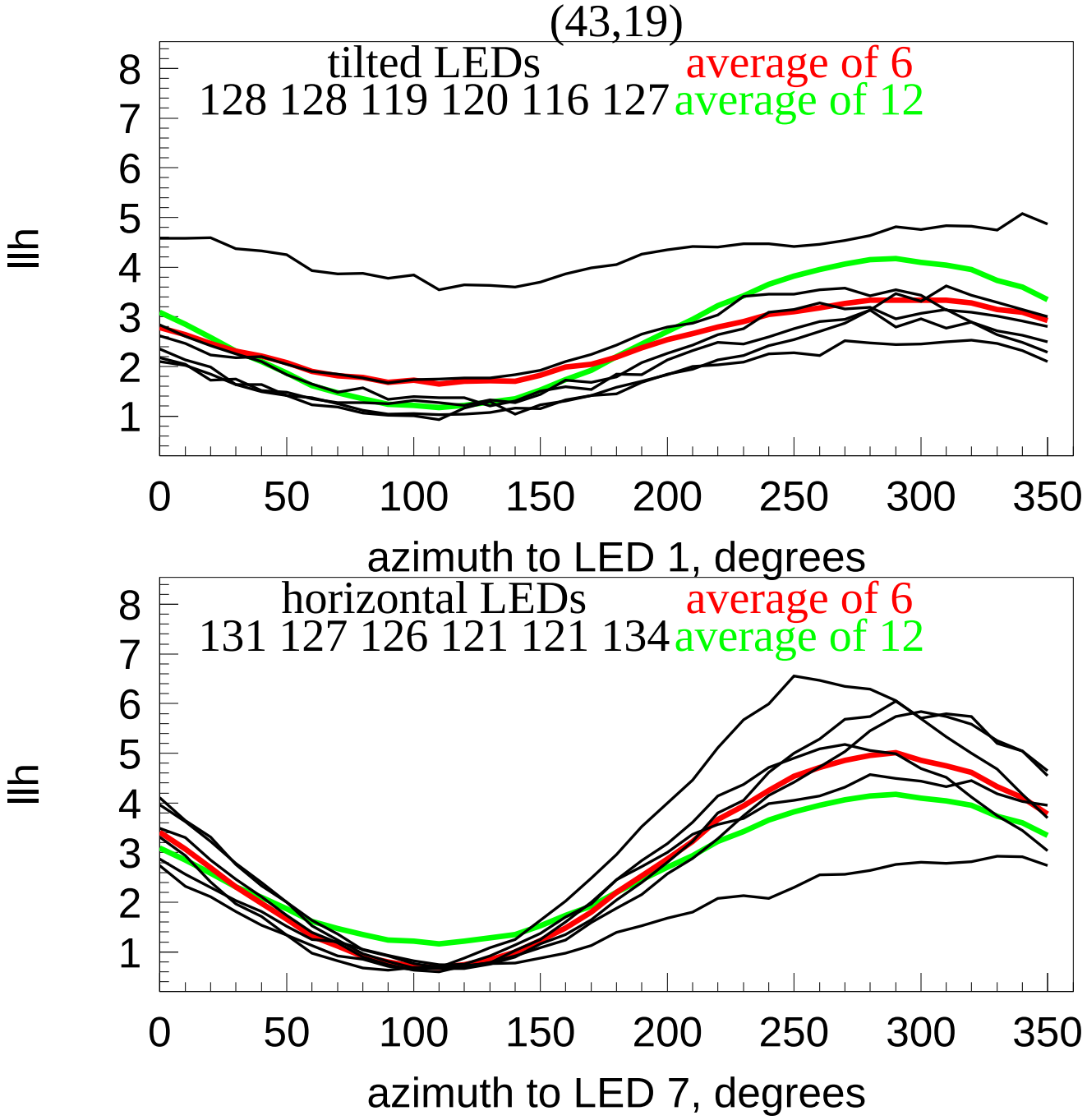

(43,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
298.6 ± 6.2

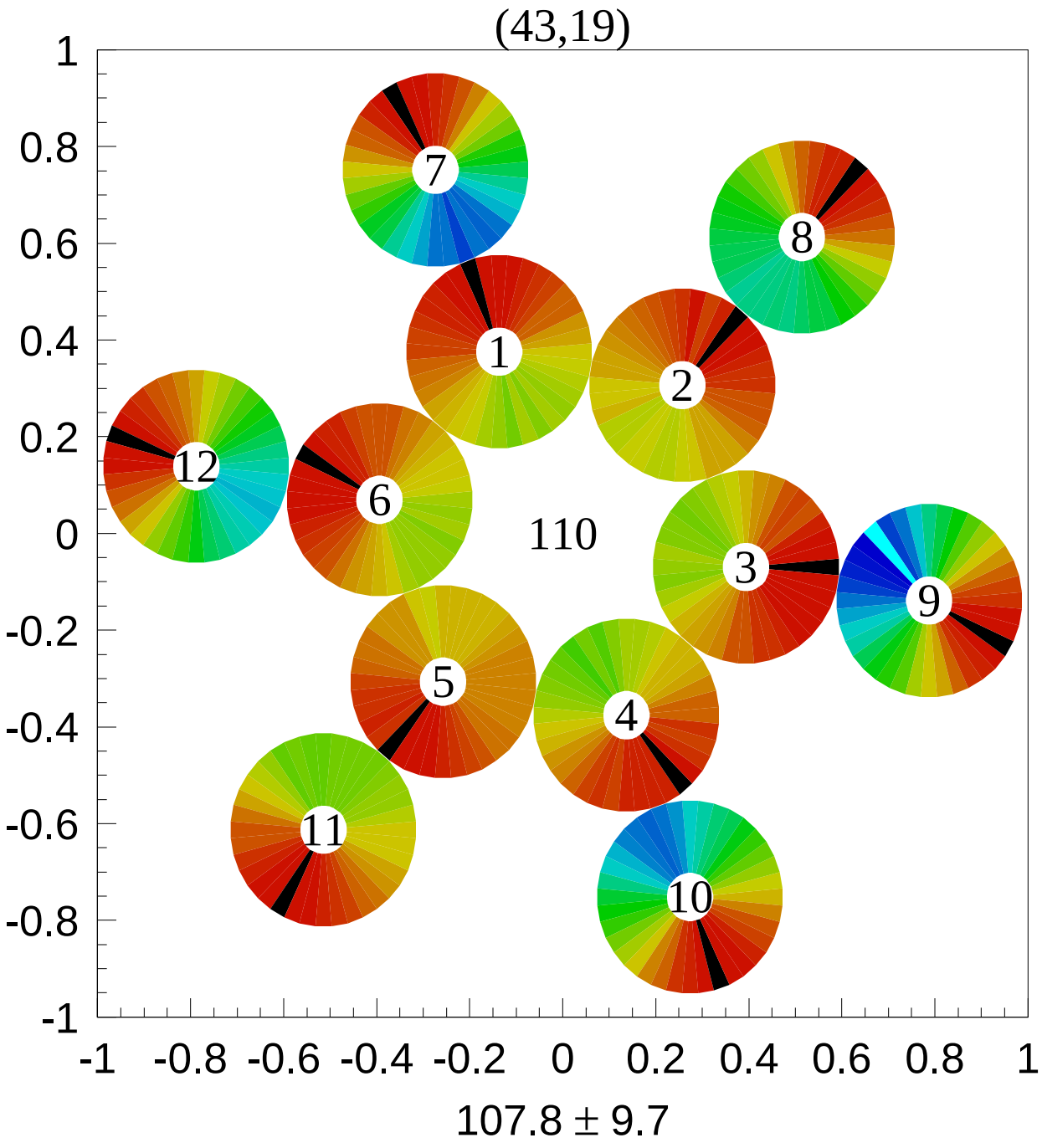

(43,17)
tilted LEDs
122 123 116 124 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 115 114 115 127 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

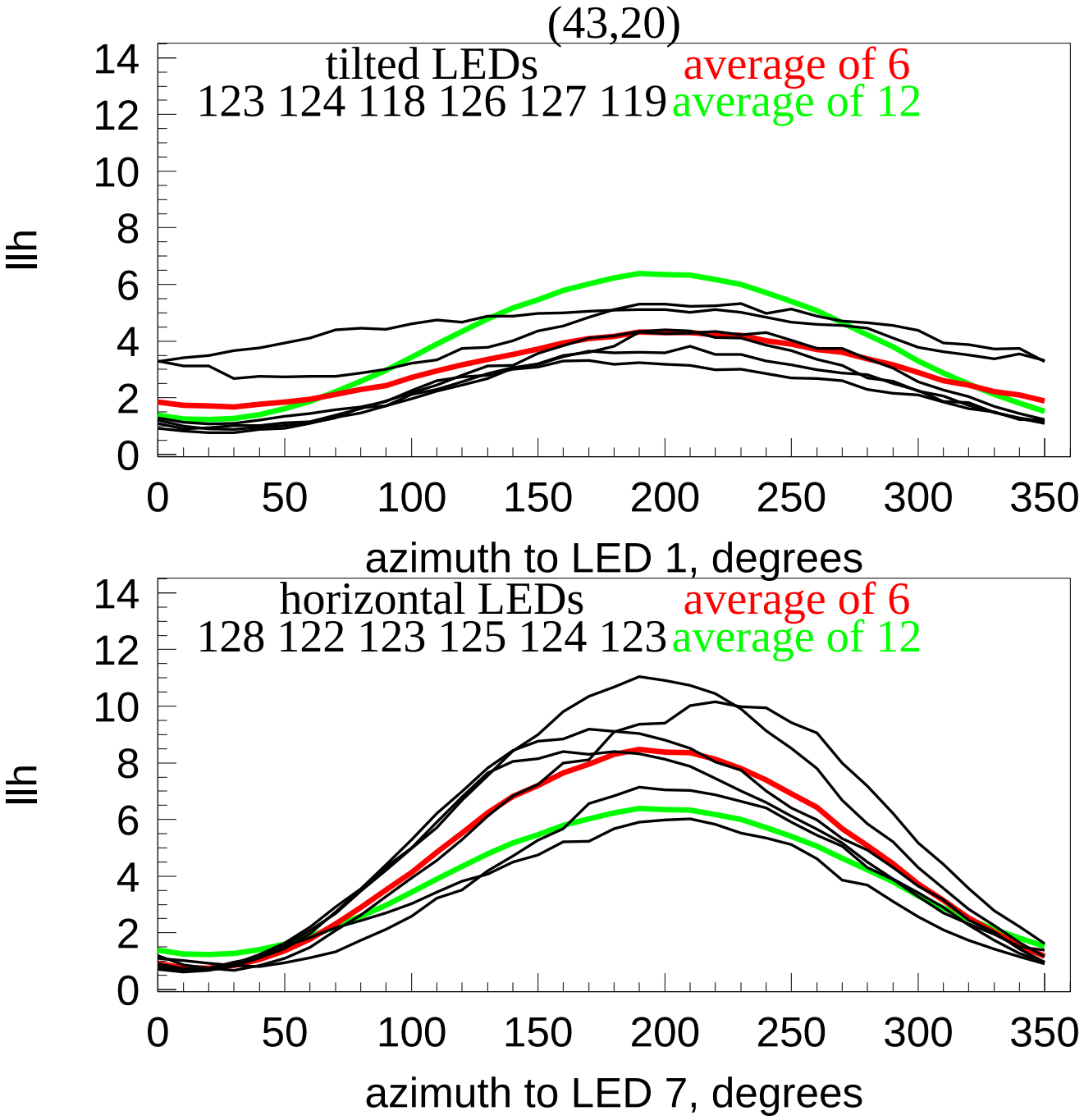

(43,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
139.4 ± 8.5

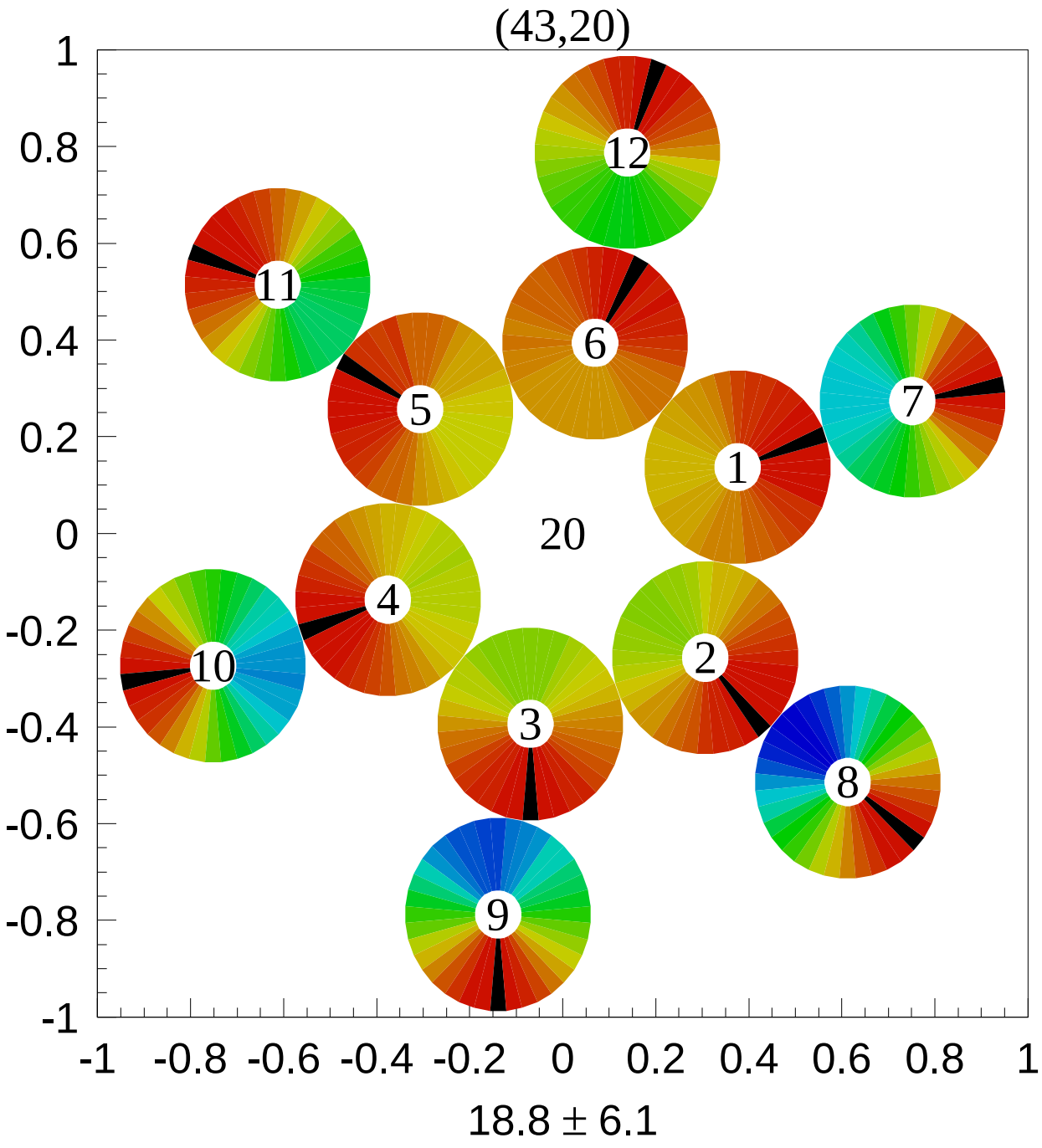

(43,18)
tilted LEDs
121 119 119 106 69 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 120 126 123 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

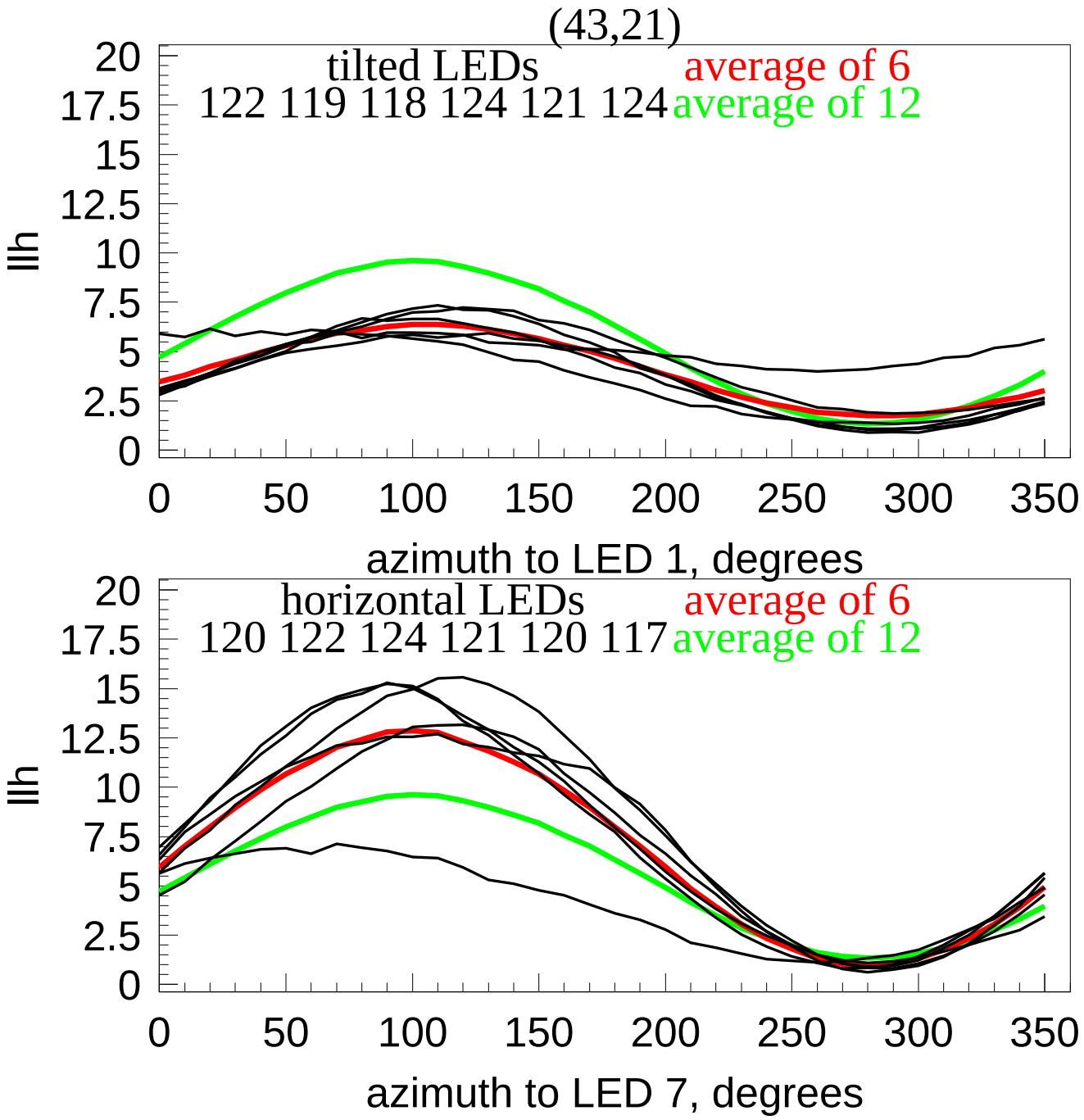

(43,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
115.8 ± 10.3

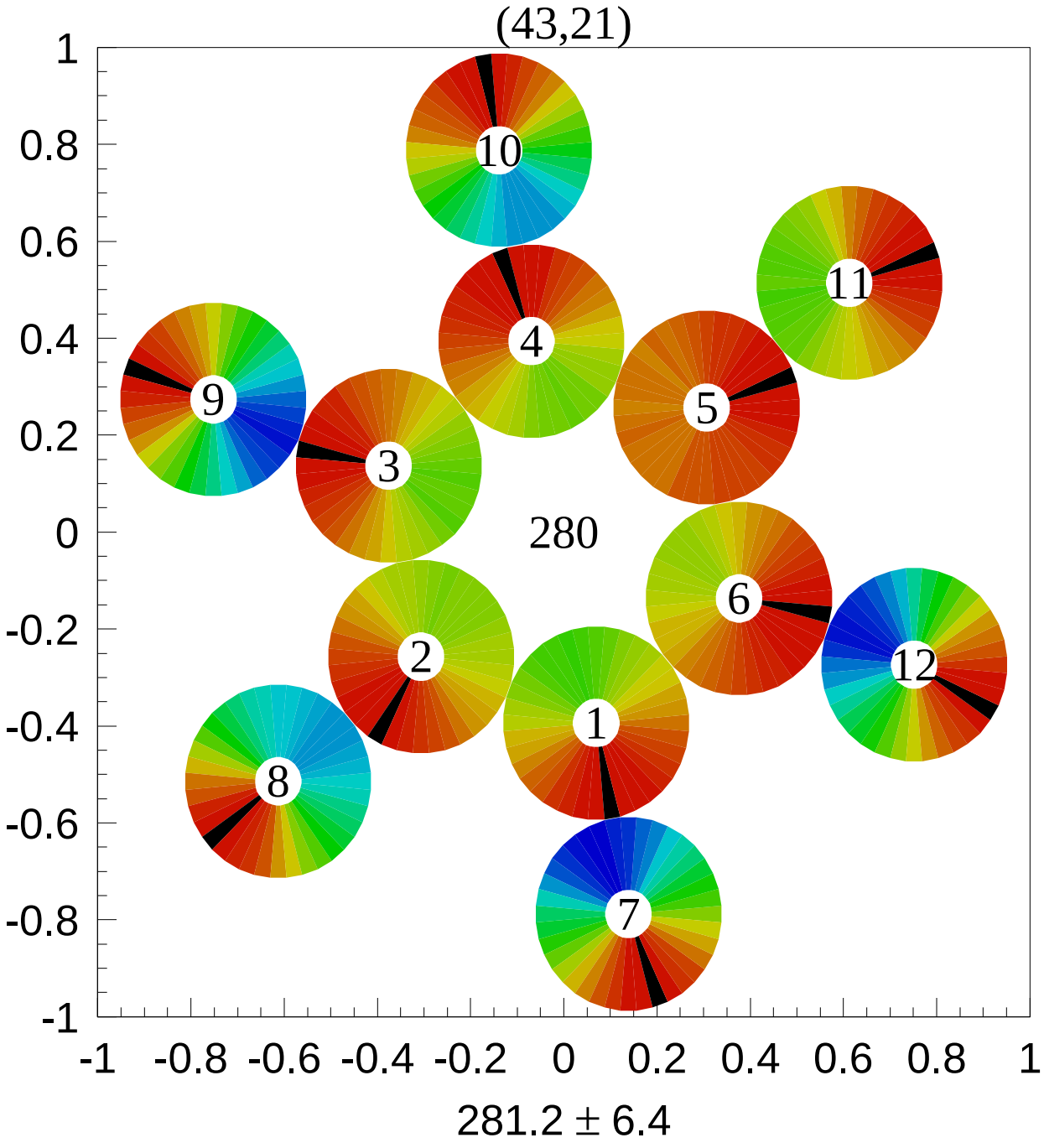

(43,19)
tilted LEDs
128 128 119 120 116 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 127 126 121 121 134
average of 6
average of 12
llh
azimuth to LED 7, degrees

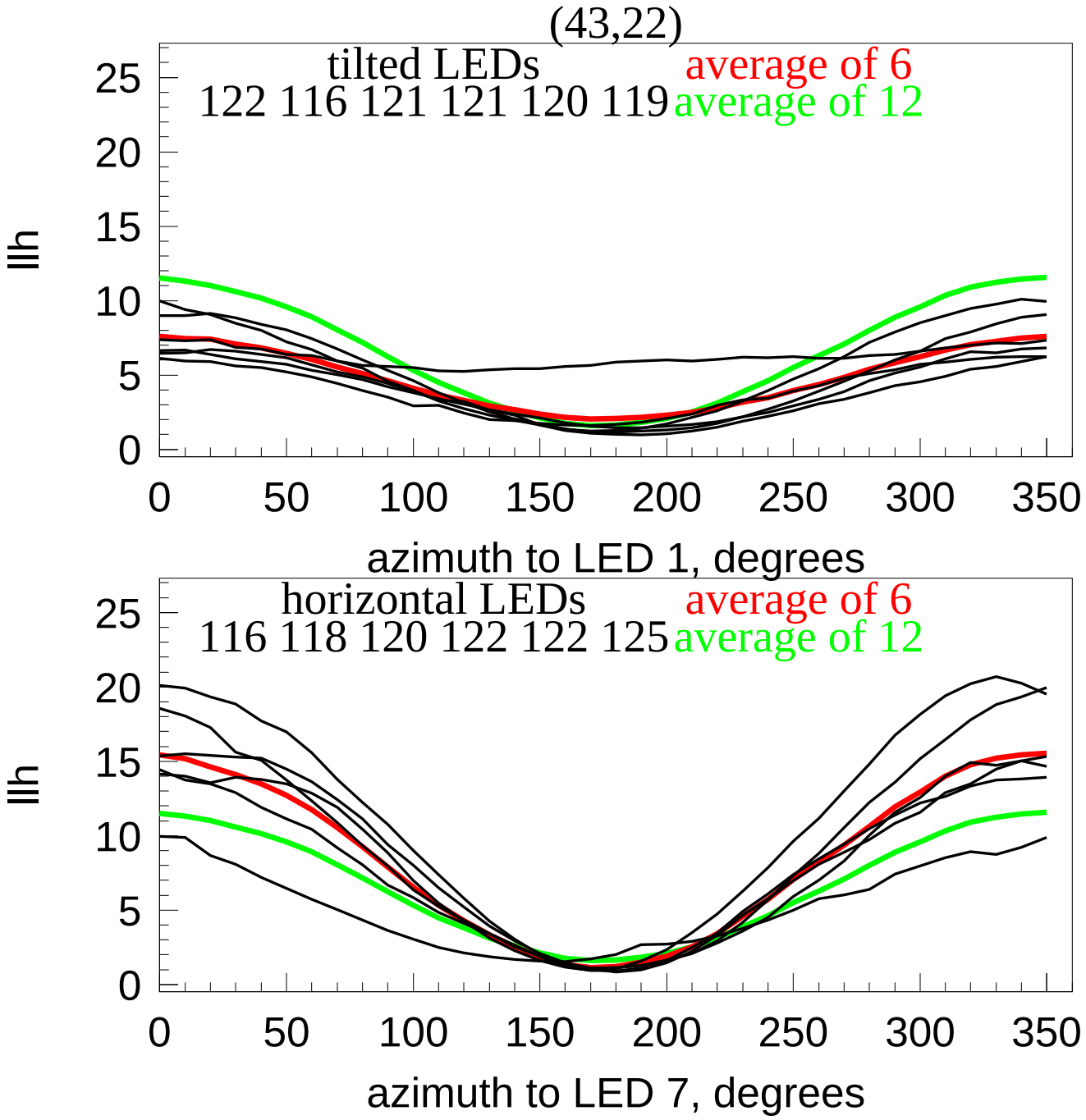

(43,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
107.8 ± 9.7

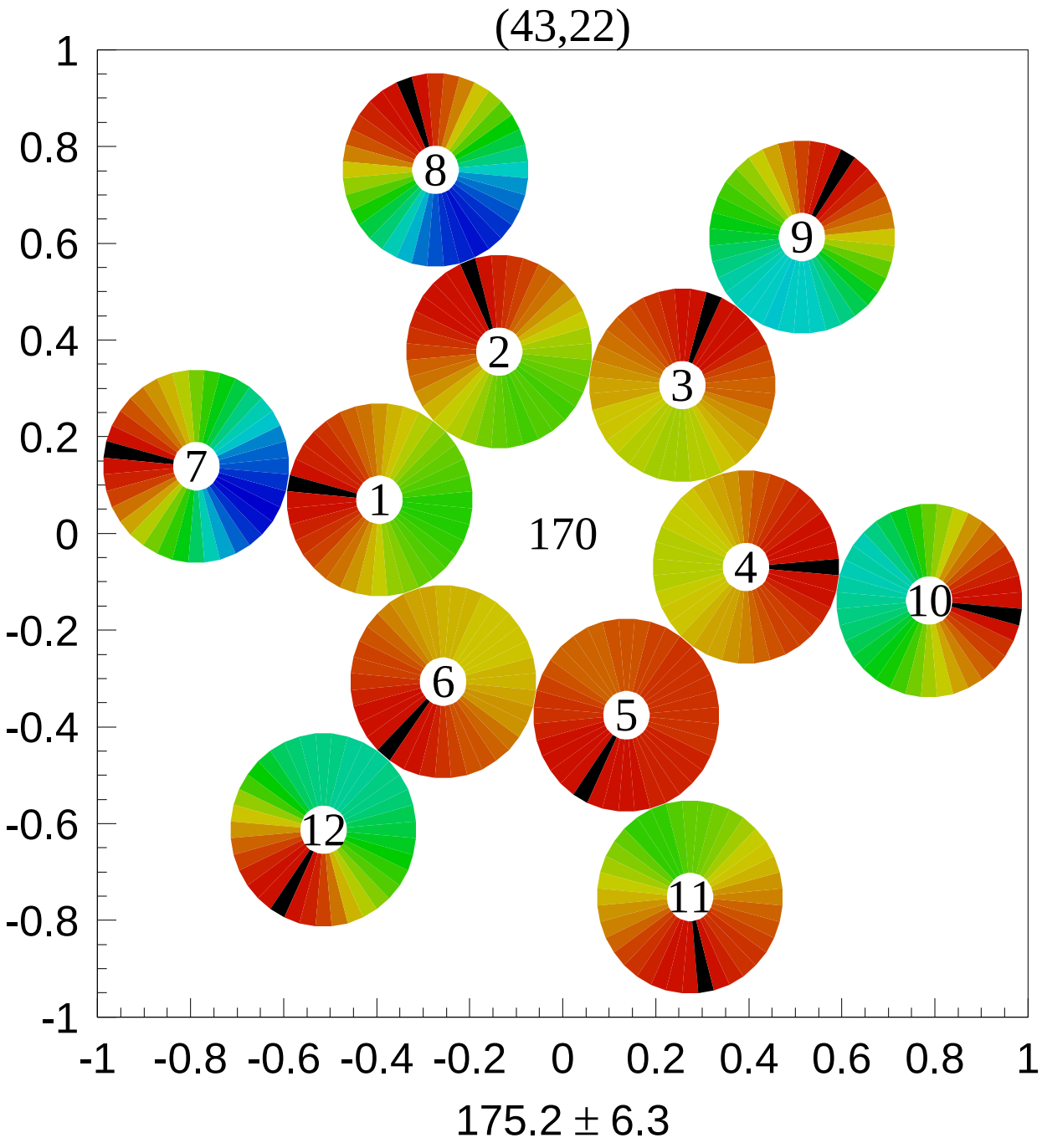

(43,20)
tilted LEDs
123 124 118 126 127 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 122 123 125 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

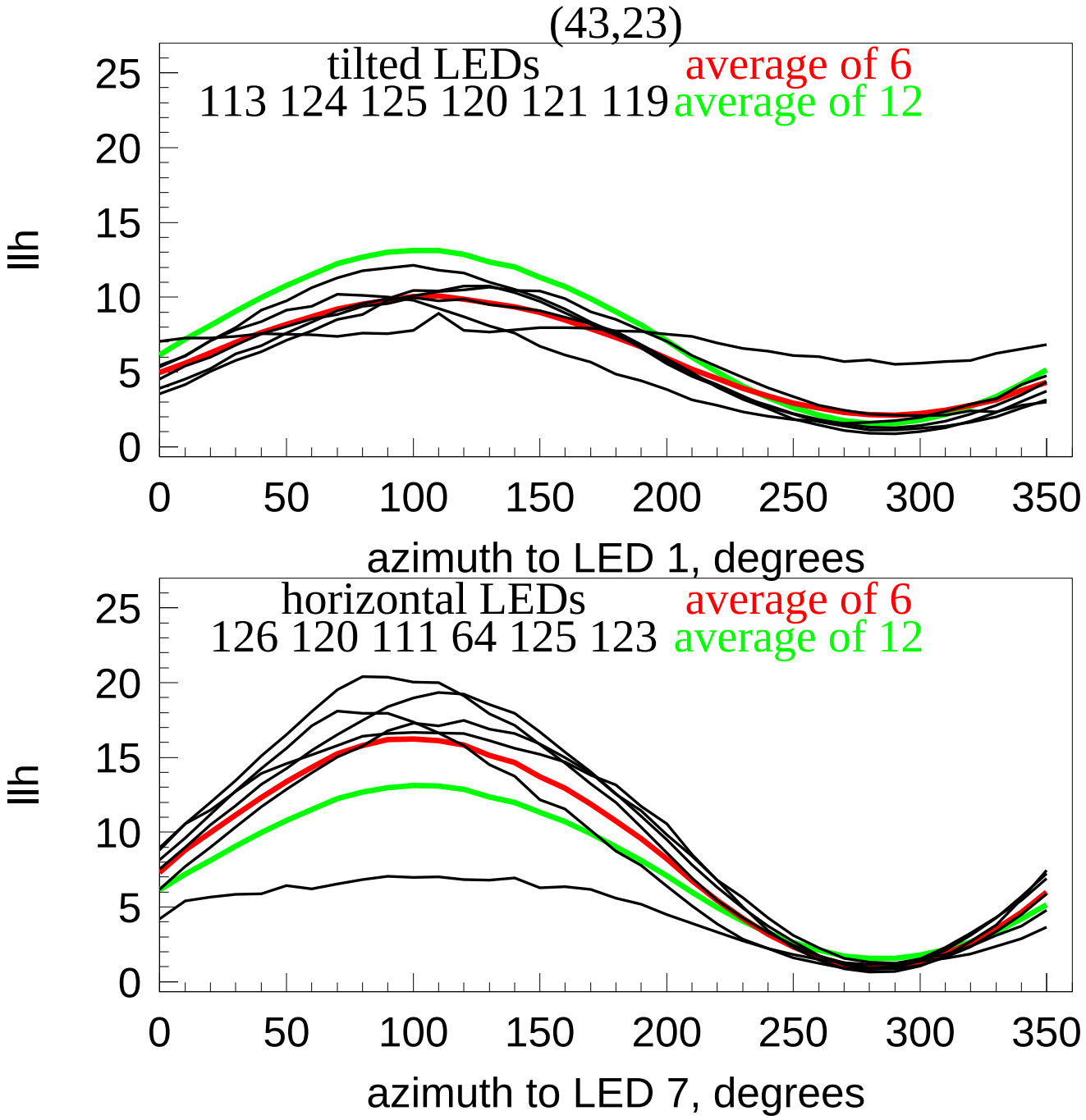

(43,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
11
6
5
7
1
20
4
10
2
3
8
9
18.8 ± 6.1

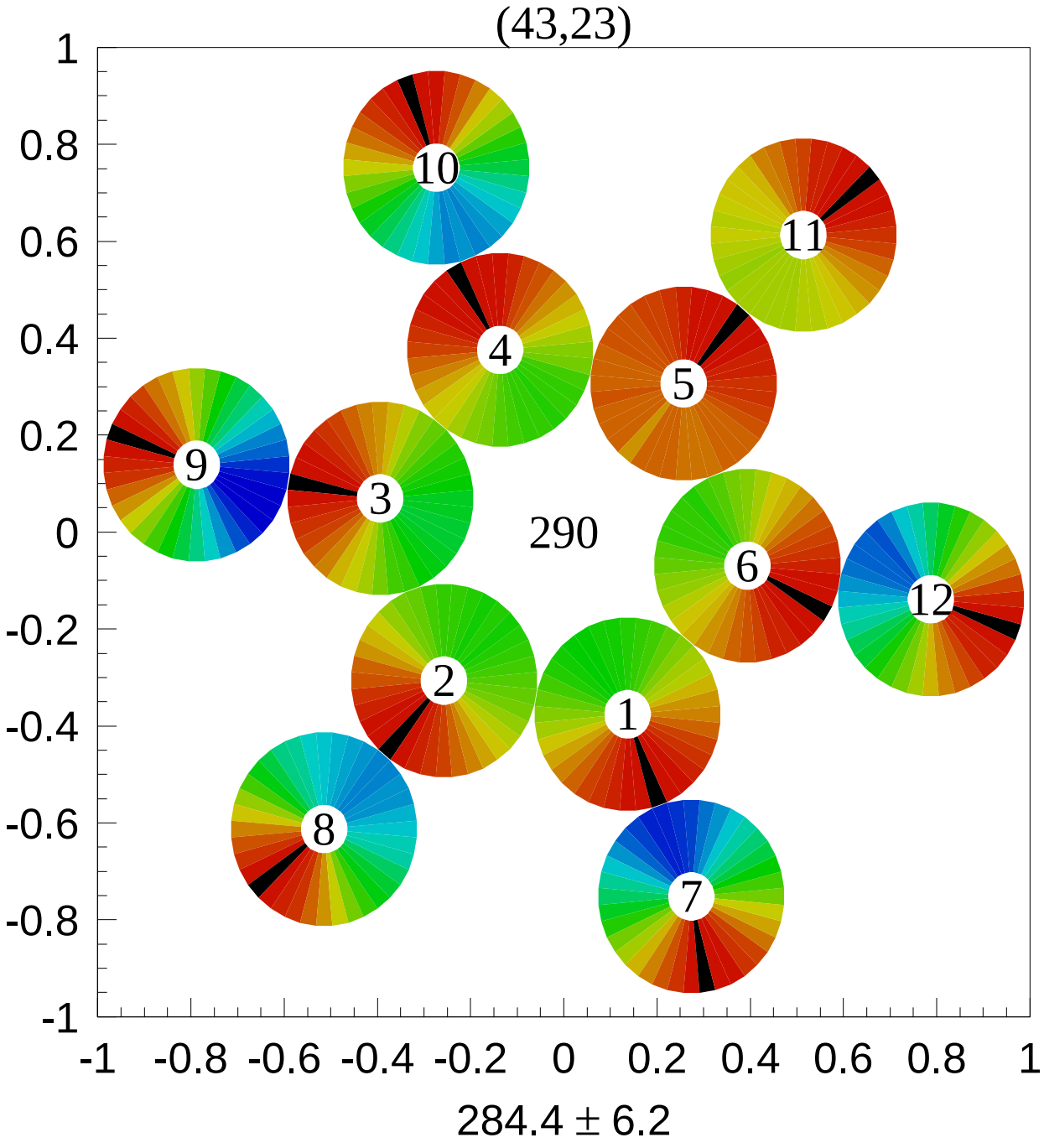

(43,21)
tilted LEDs
122 119 118 124 121 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 122 124 121 120 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

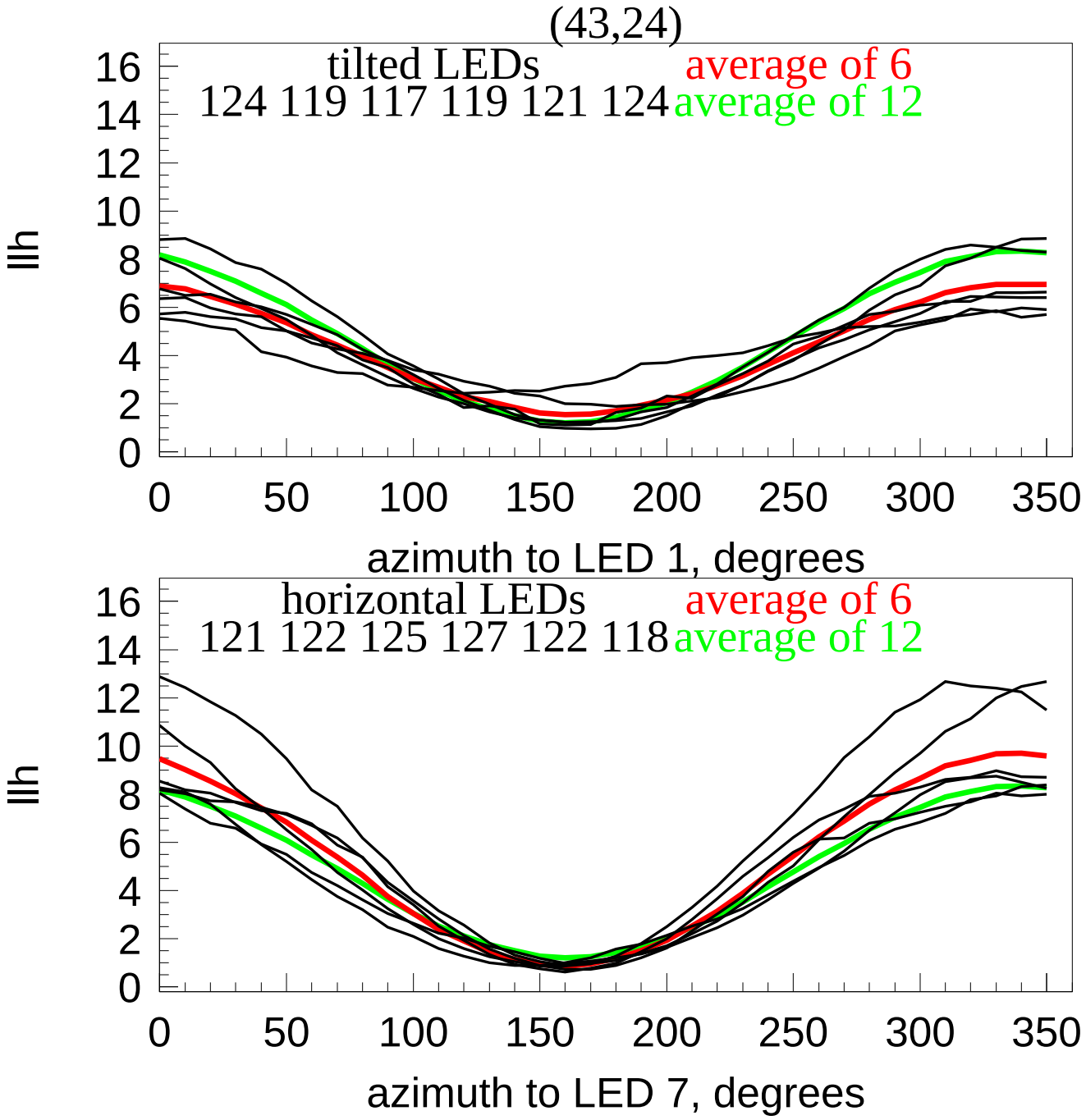

(43,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
281.2 ± 6.4

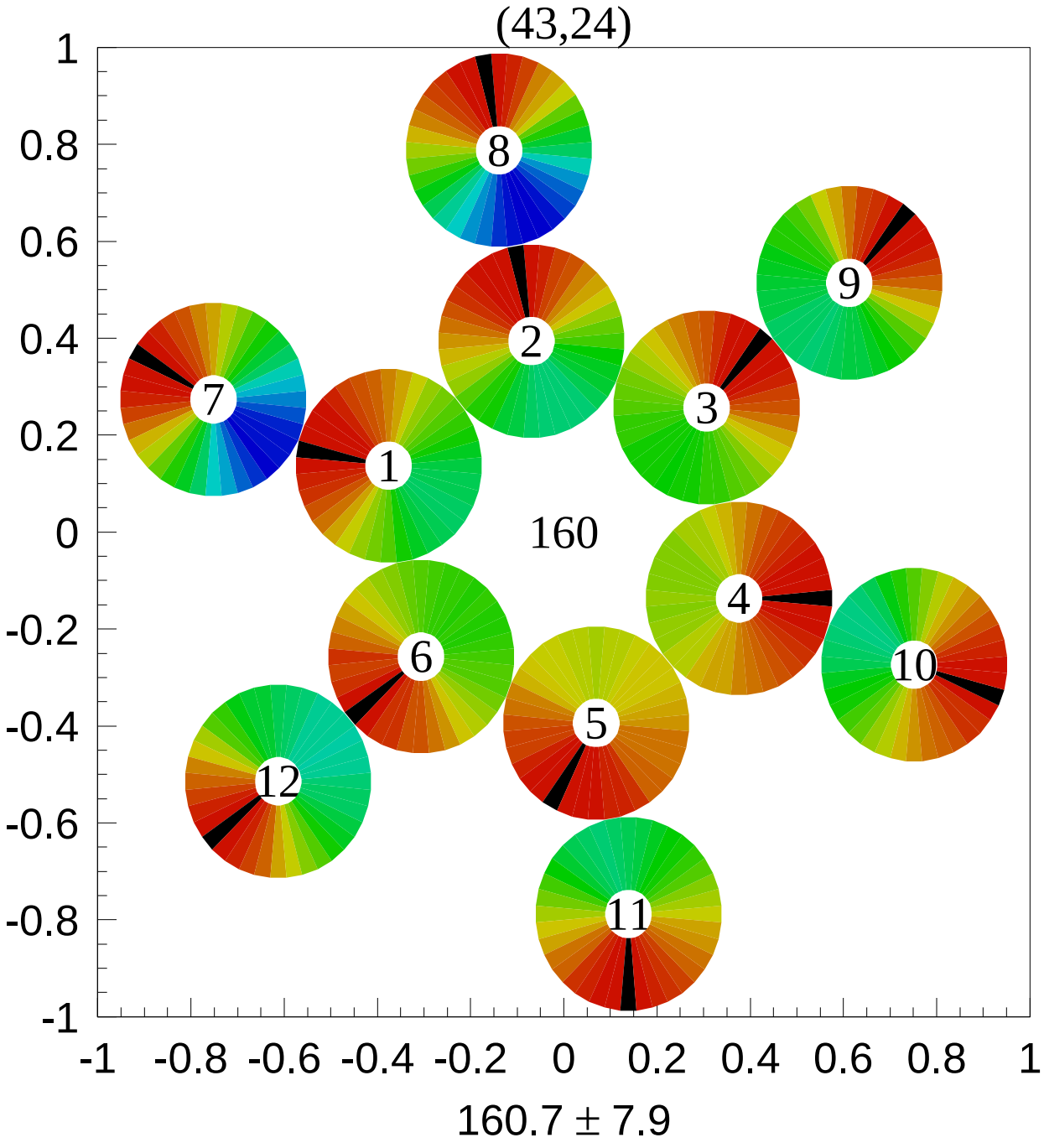

(43,22)
tilted LEDs
122 116 121 121 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 118 120 122 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

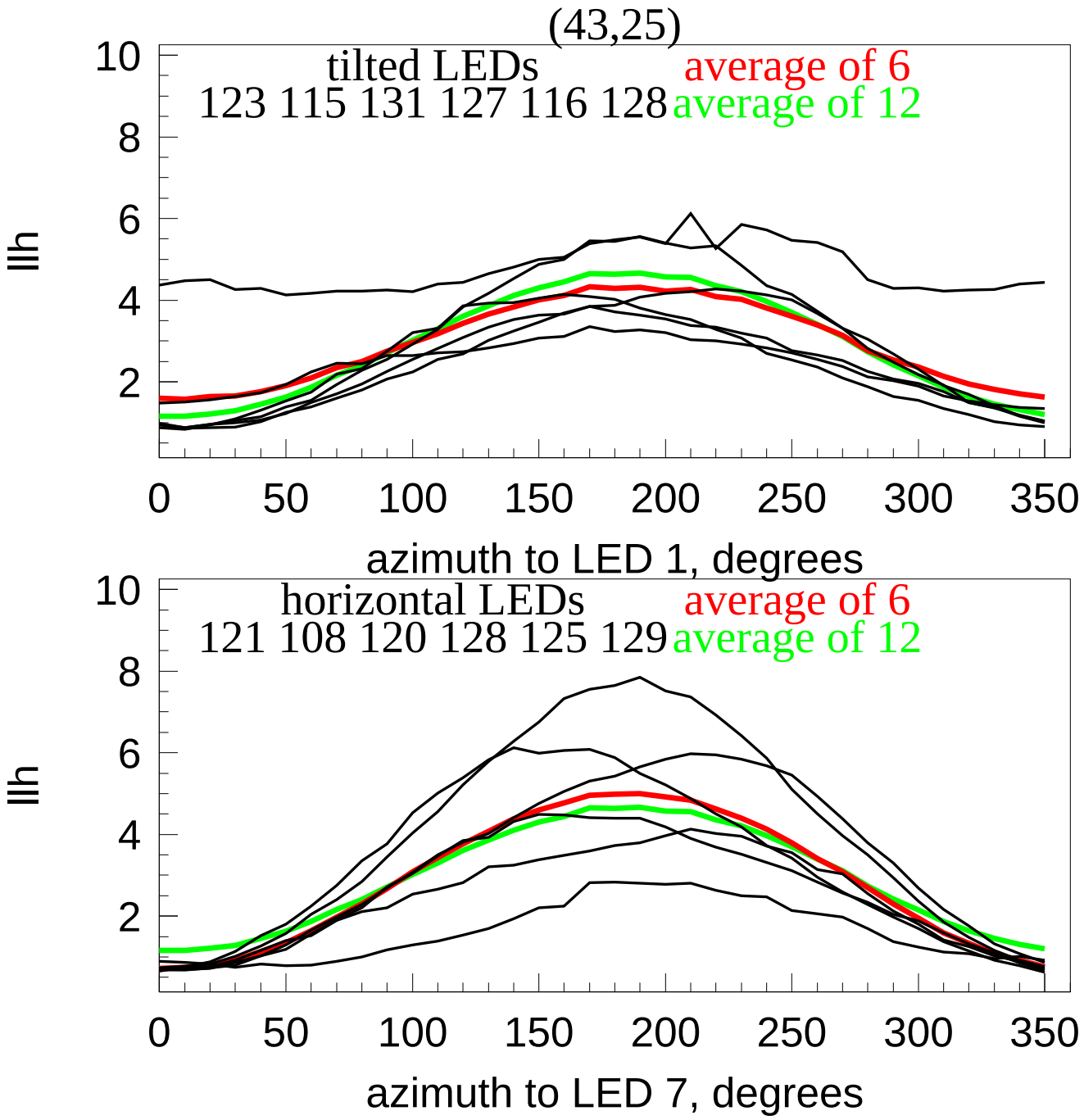

(43,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
175.2 ± 6.3

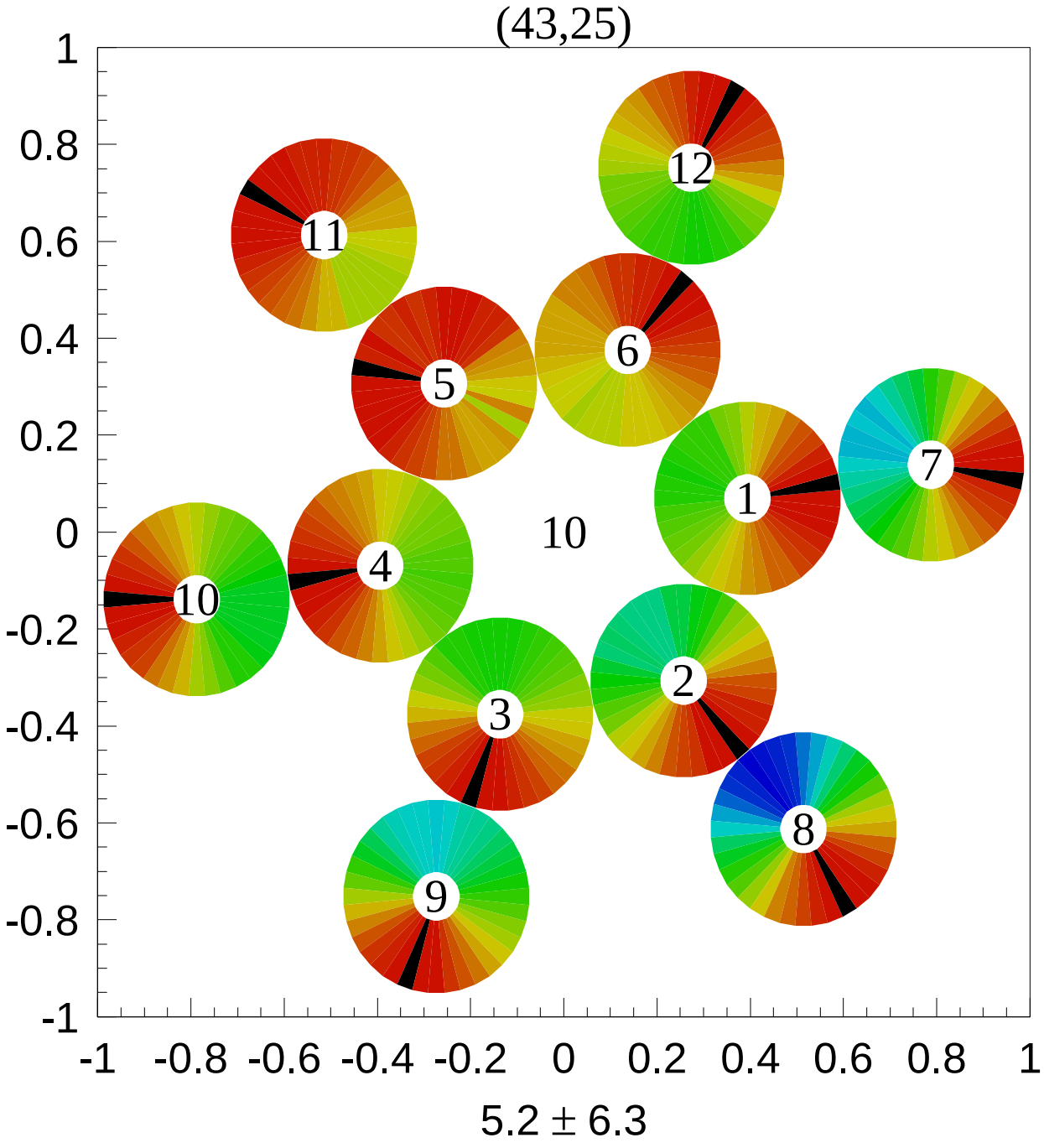

(43,23)
tilted LEDs
113 124 125 120 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 111 64 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

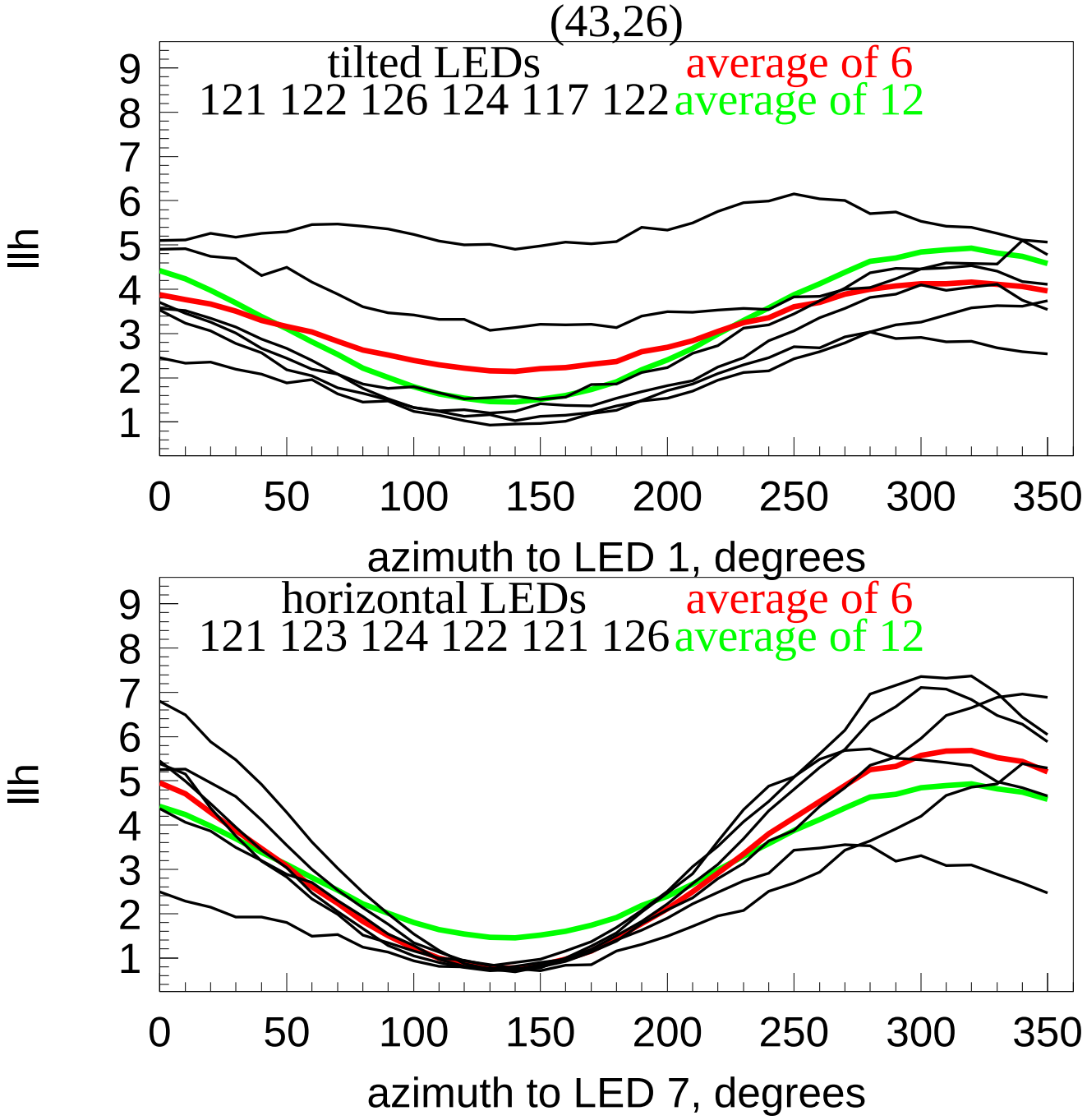

(43,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
284.4 ± 6.2

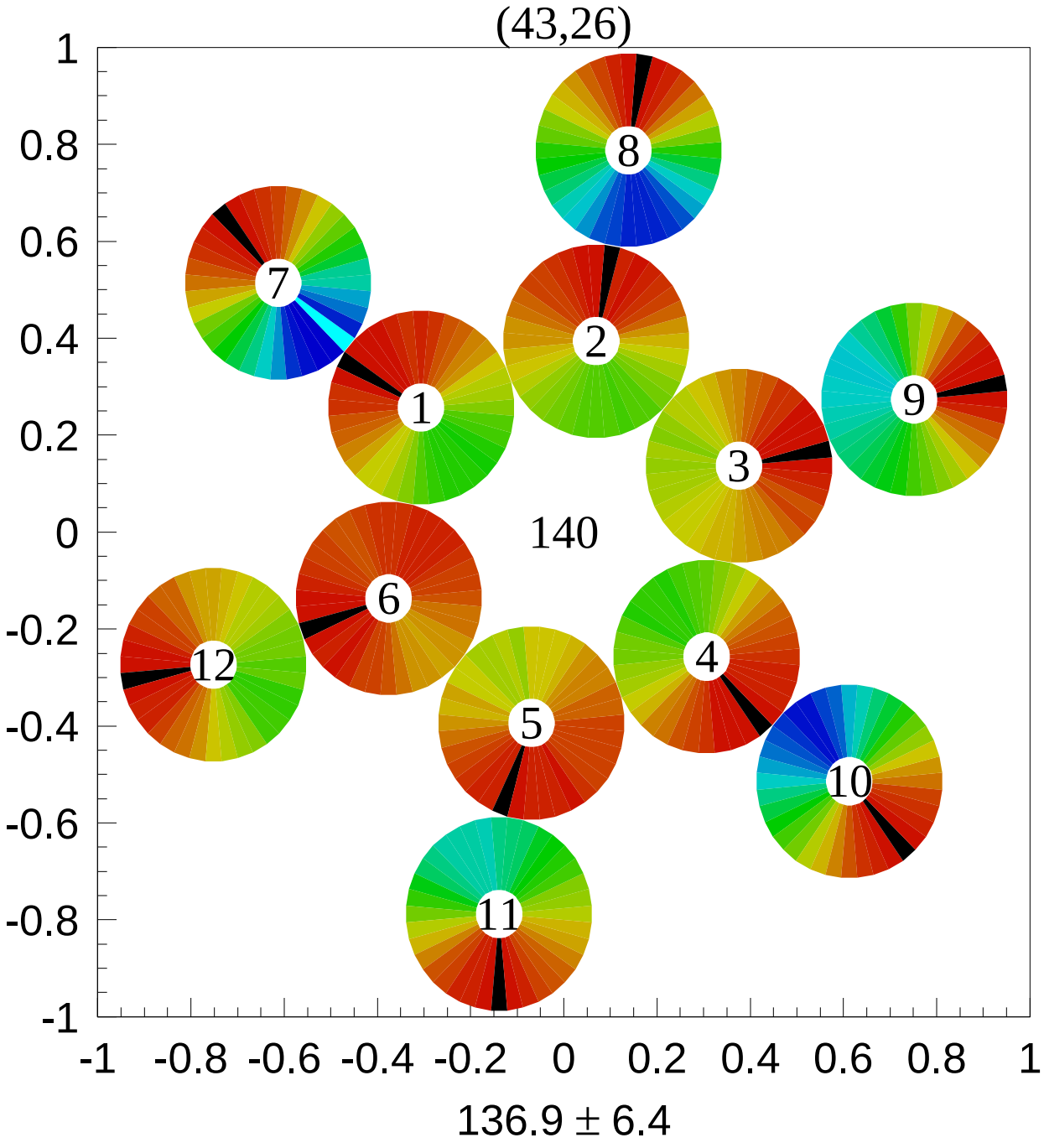

(43,24)
tilted LEDs
124 119 117 119 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 125 127 122 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

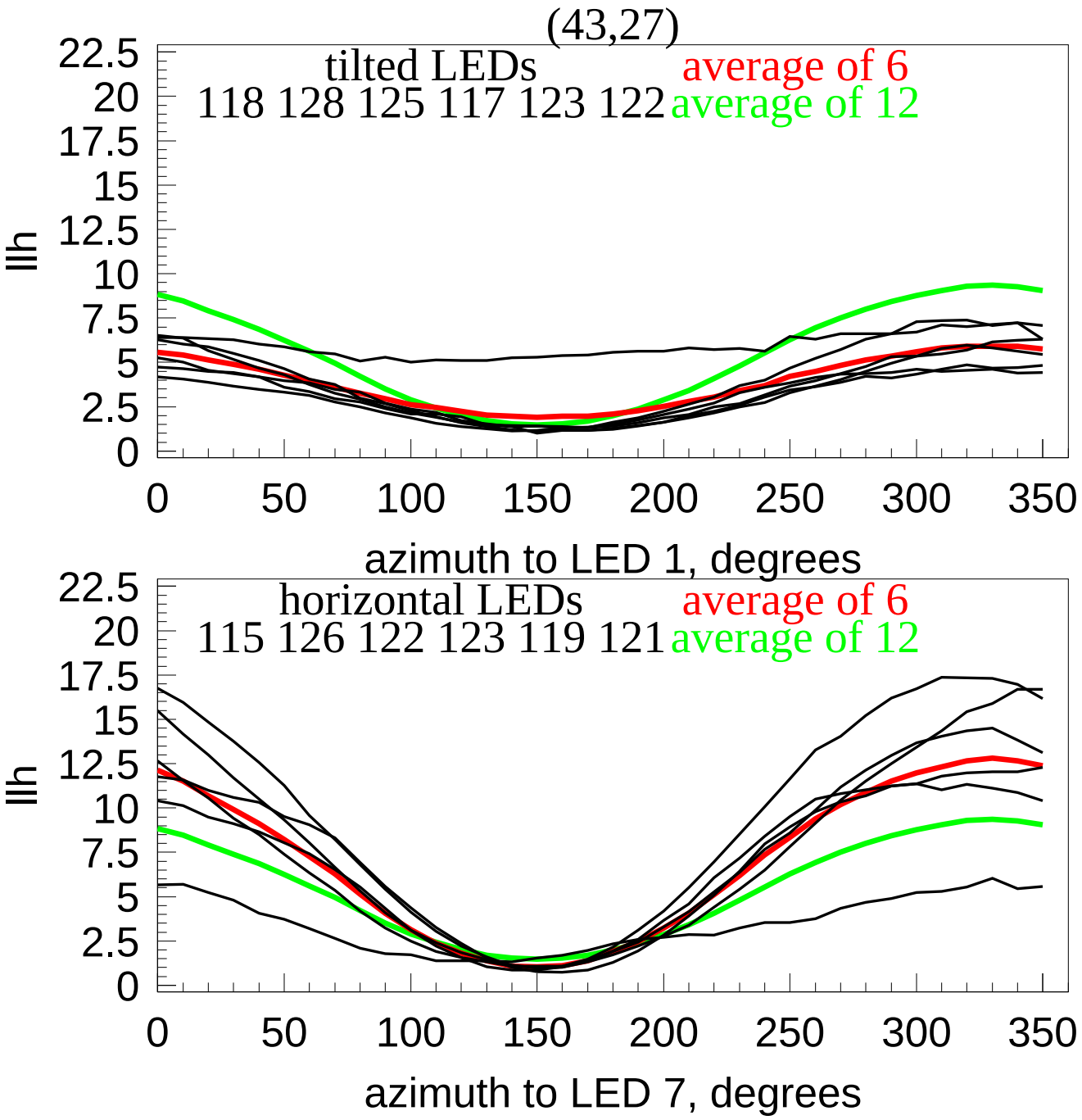

(43,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
160.7 ± 7.9

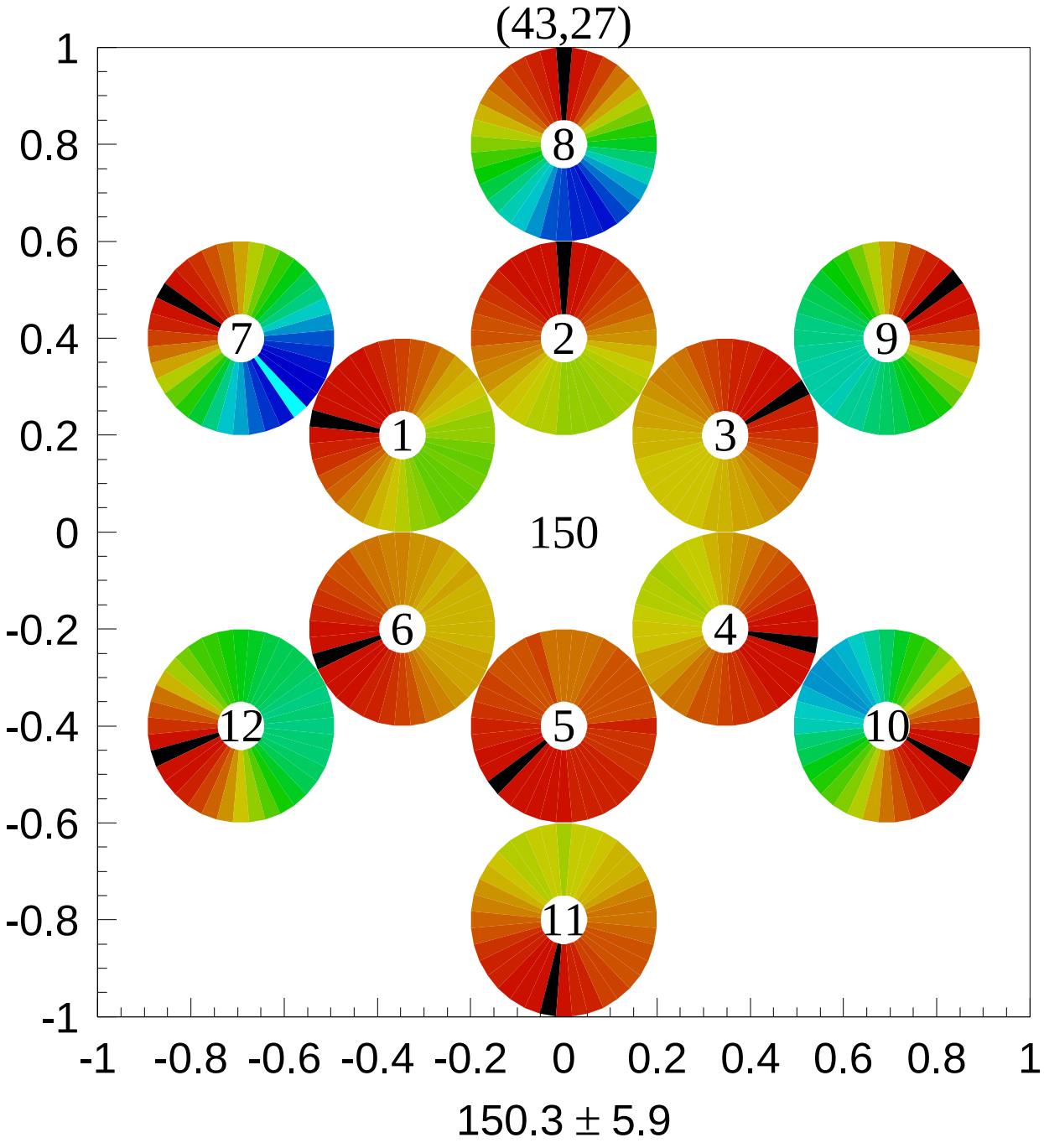

(43,25)
tilted LEDs
123 115 131 127 116 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 108 120 128 125 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

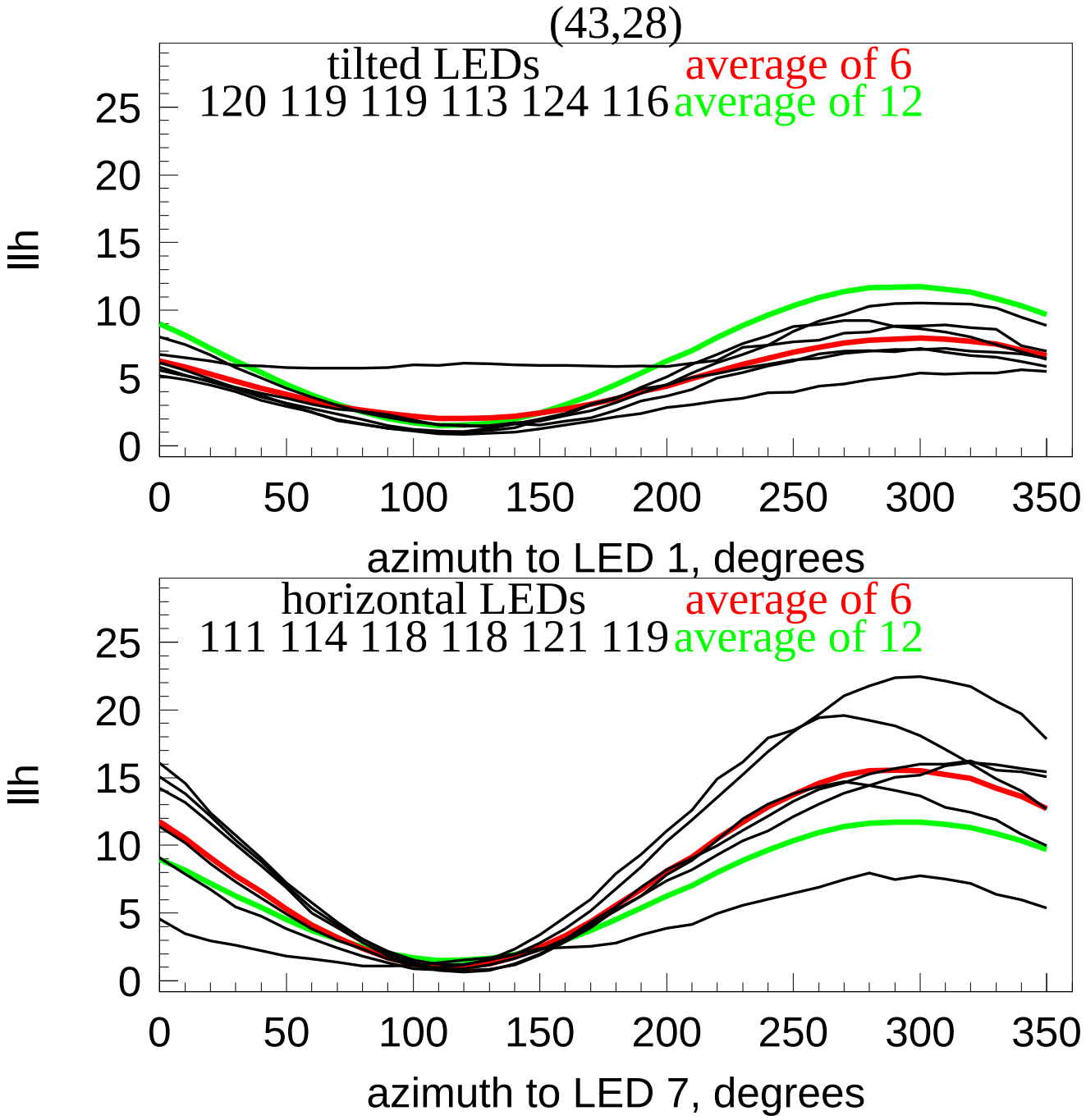

(43,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
5.2 ± 6.3

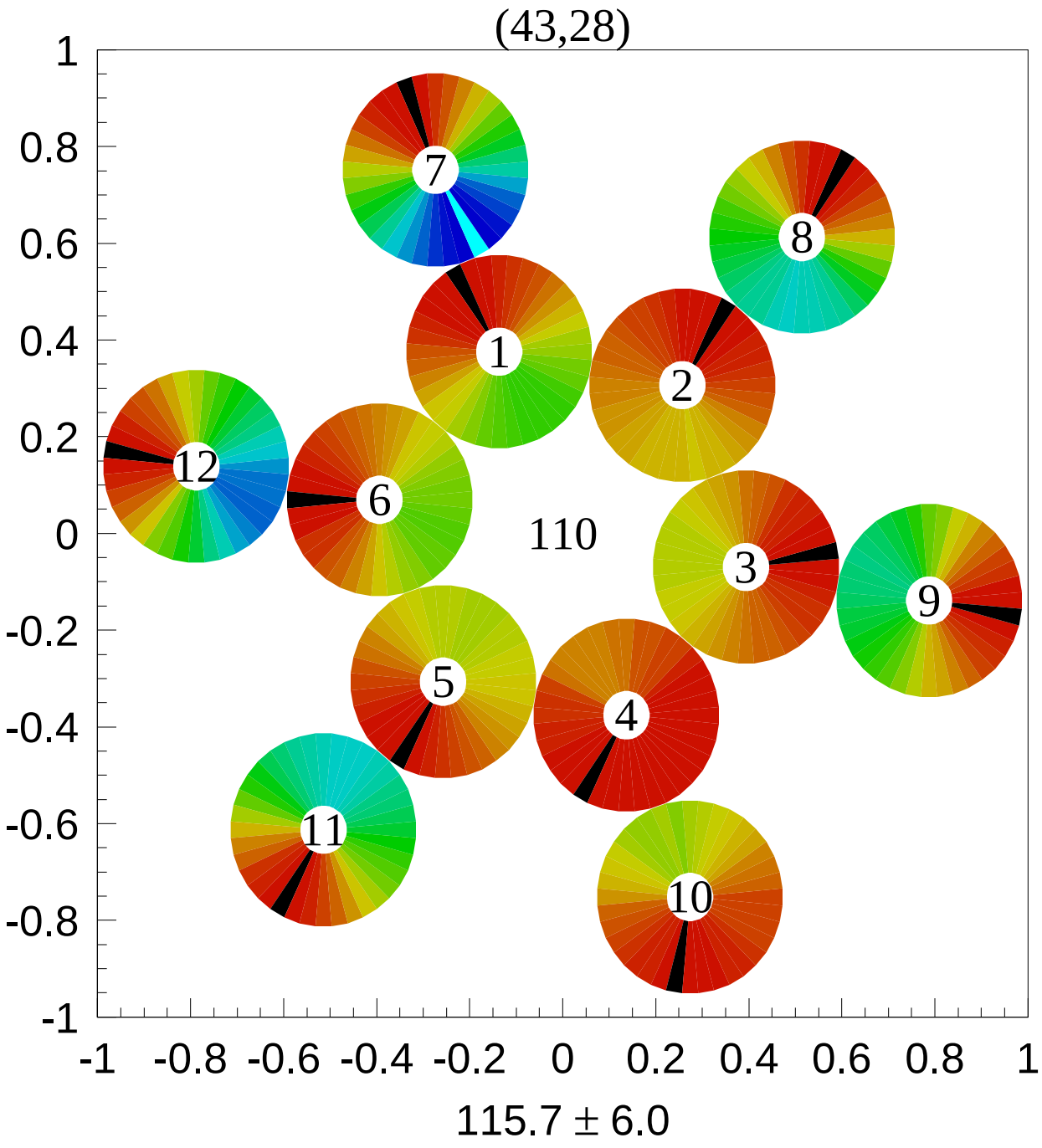

(43,26)
tilted LEDs
121 122 126 124 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 124 122 121 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

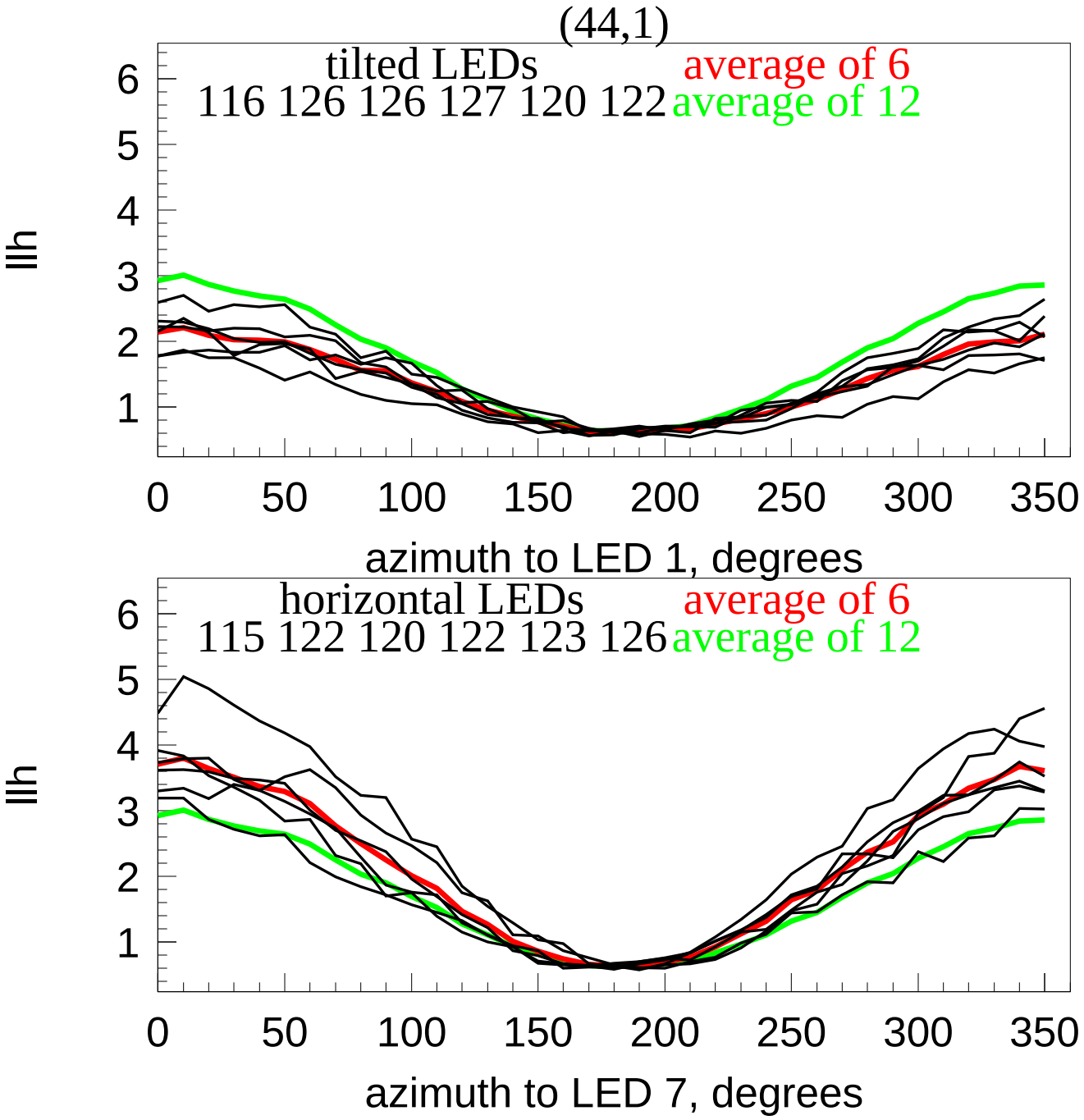

(43,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
136.9 ± 6.4

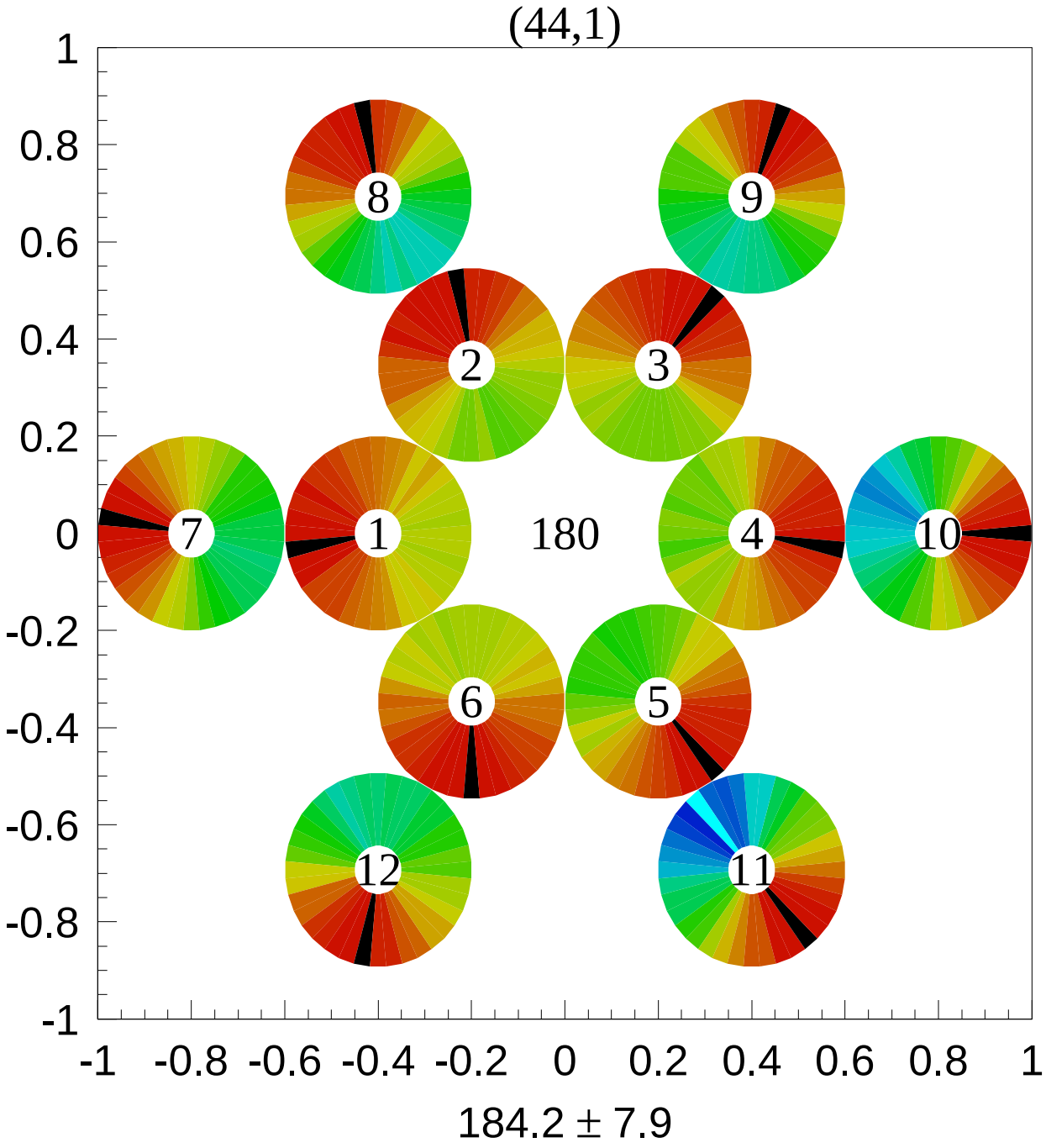

(43,27)
tilted LEDs
118 128 125 117 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 126 122 123 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

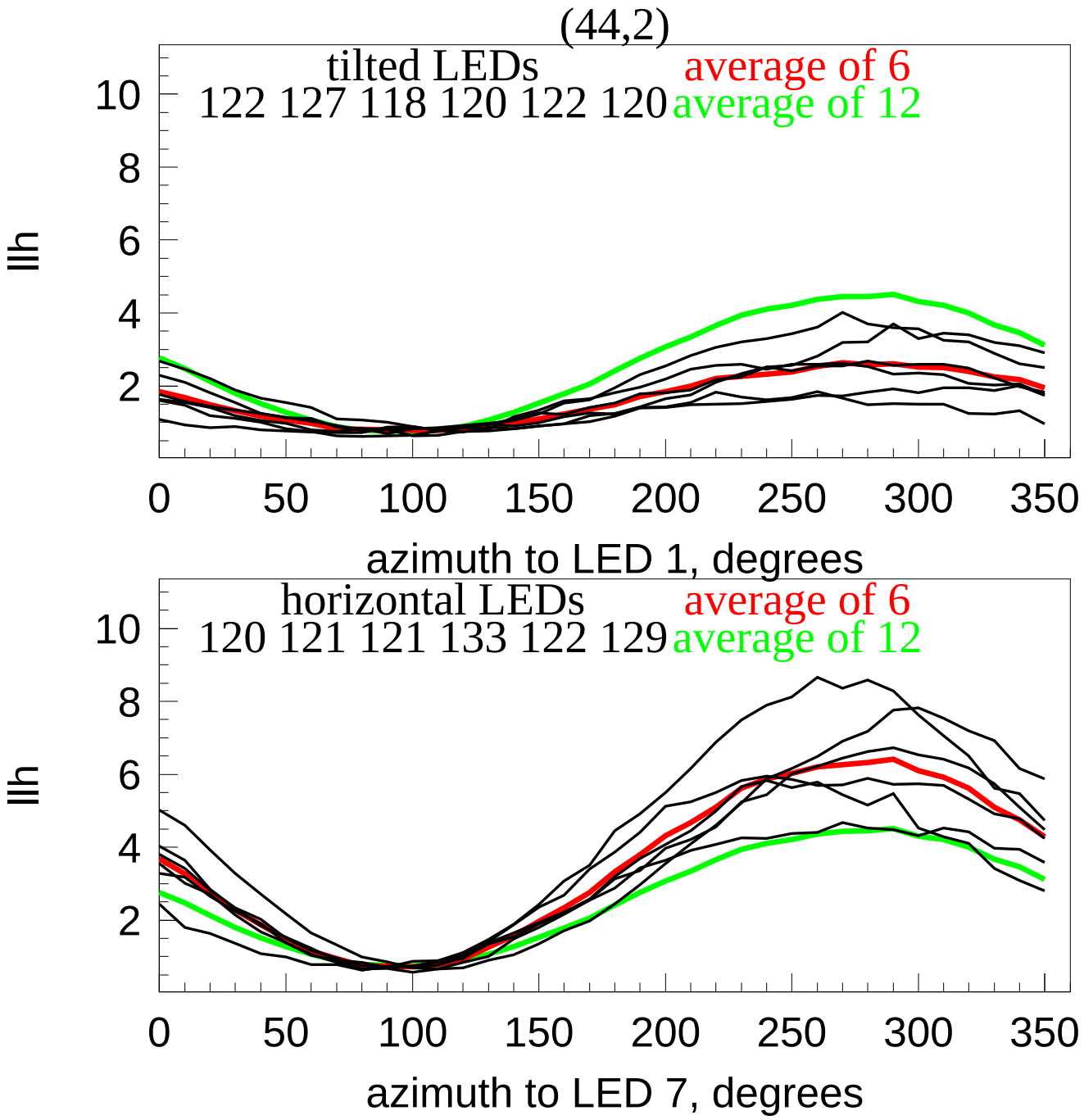

(43,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
150.3 ± 5.9

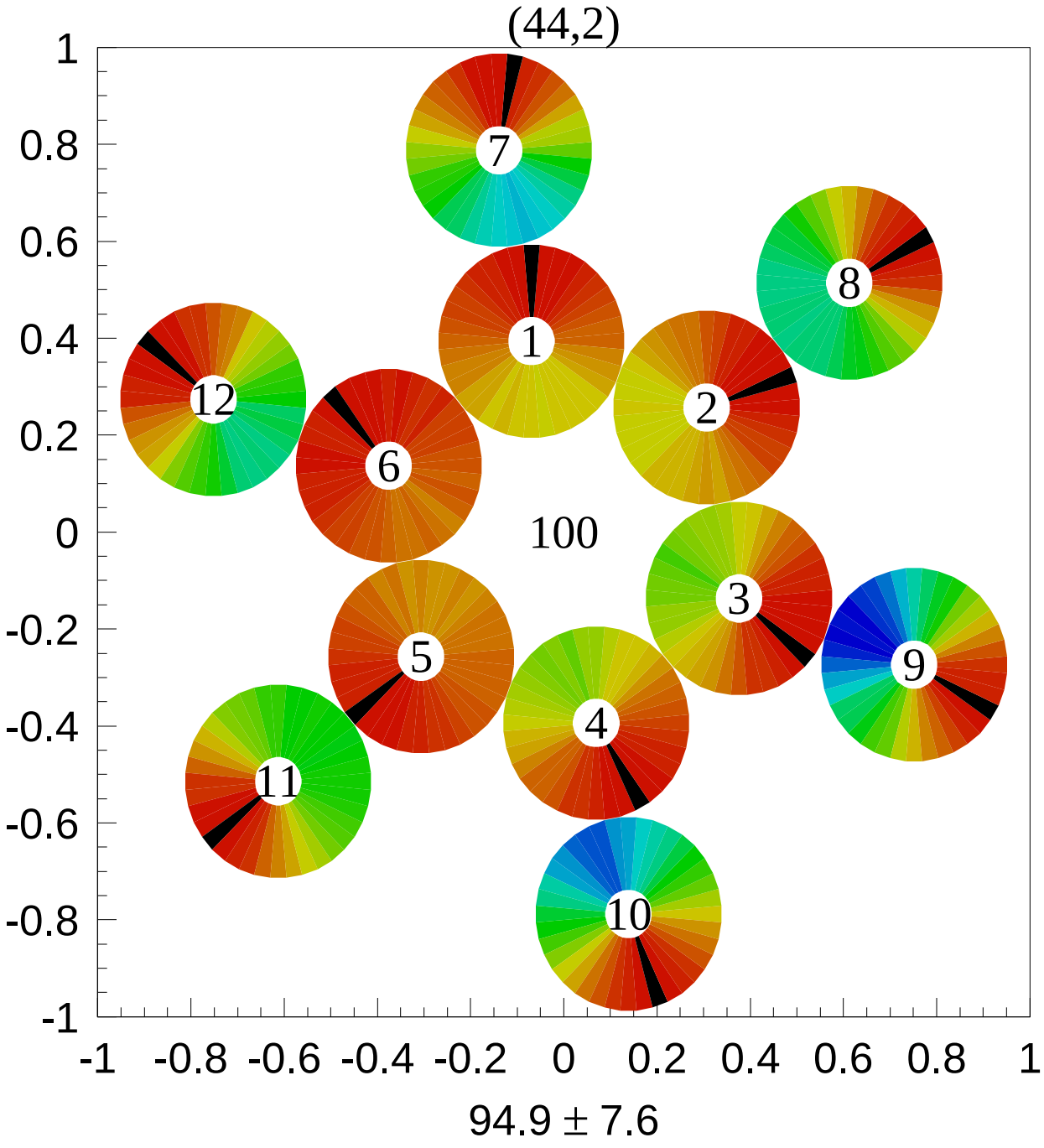

(43,28)
tilted LEDs
120 119 119 113 124 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 114 118 118 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

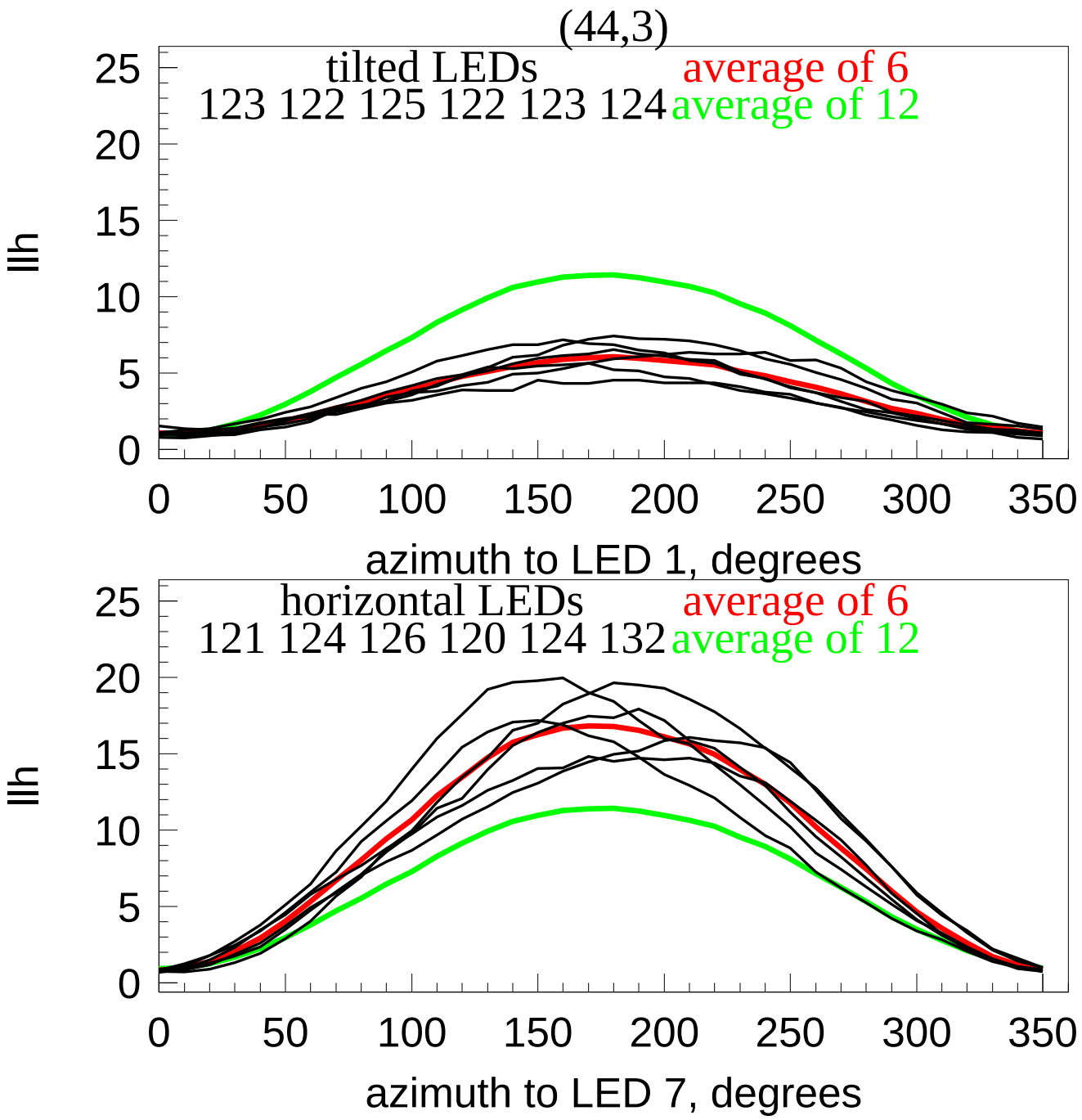

(43,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
115.7 ± 6.0

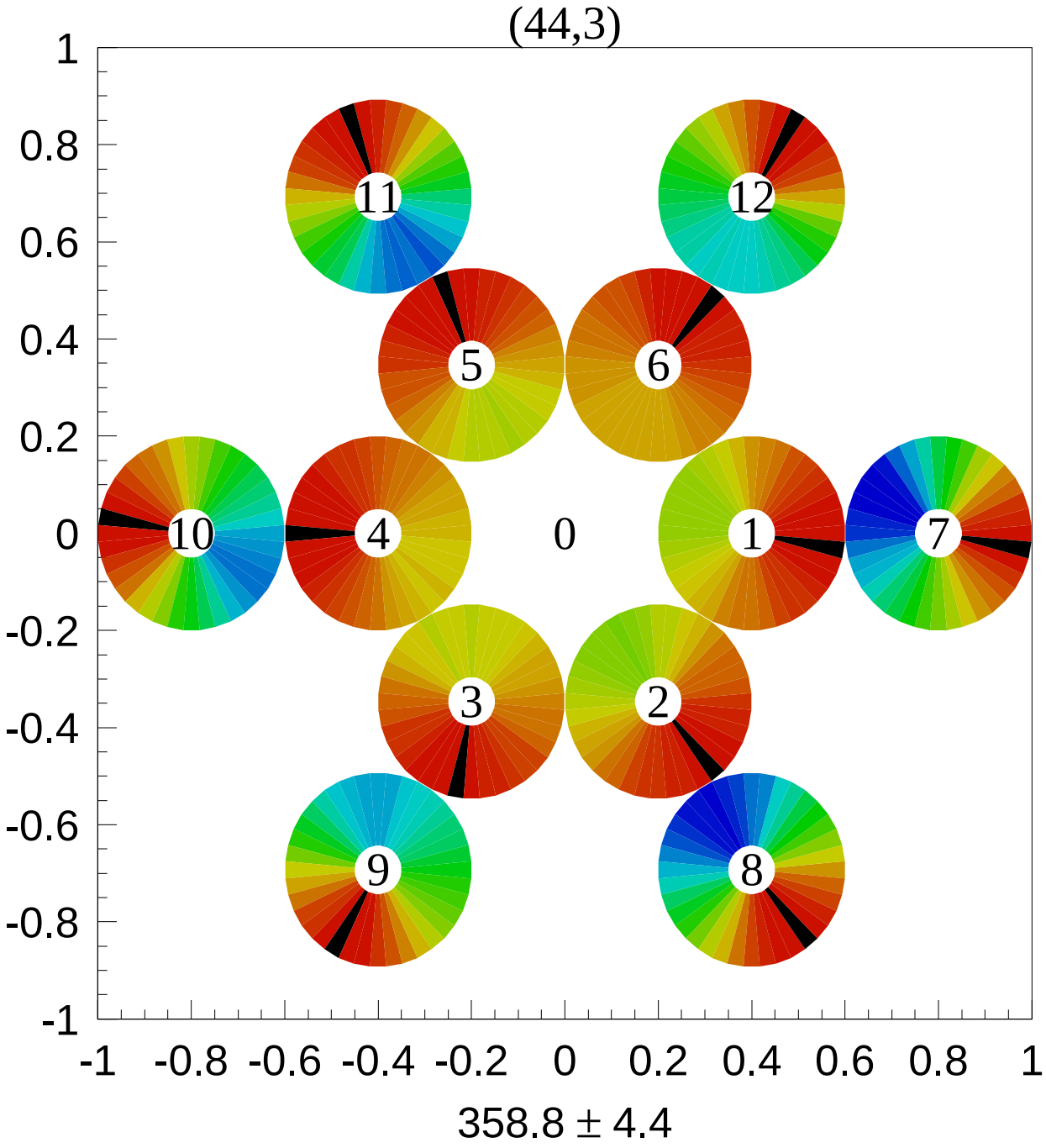

(44,1)
tilted LEDs
116 126 126 127 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 122 120 122 123 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

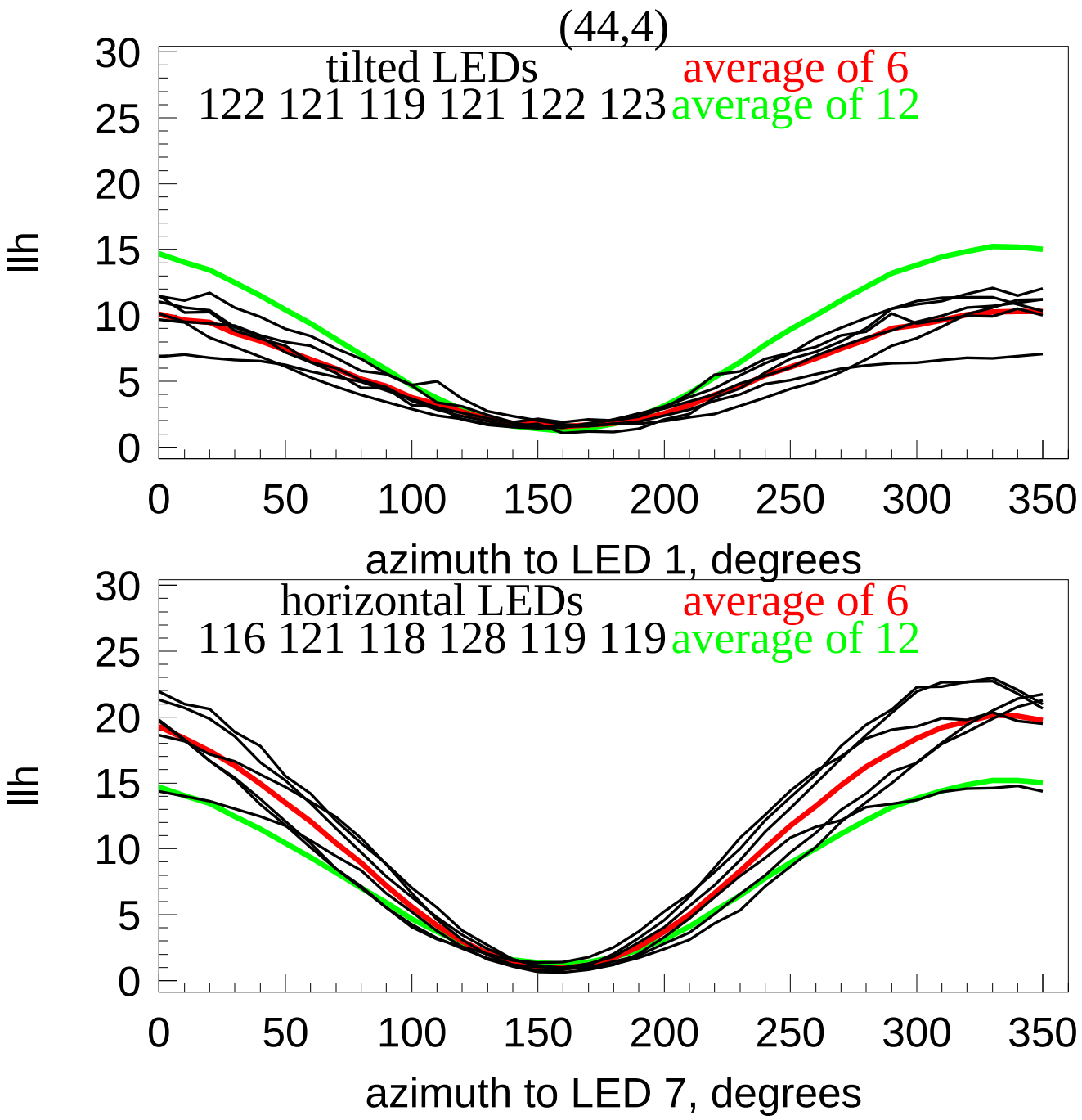

(44,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
184.2 ± 7.9
8
9
2
3
7
1
180
4
10
6
5
12
11

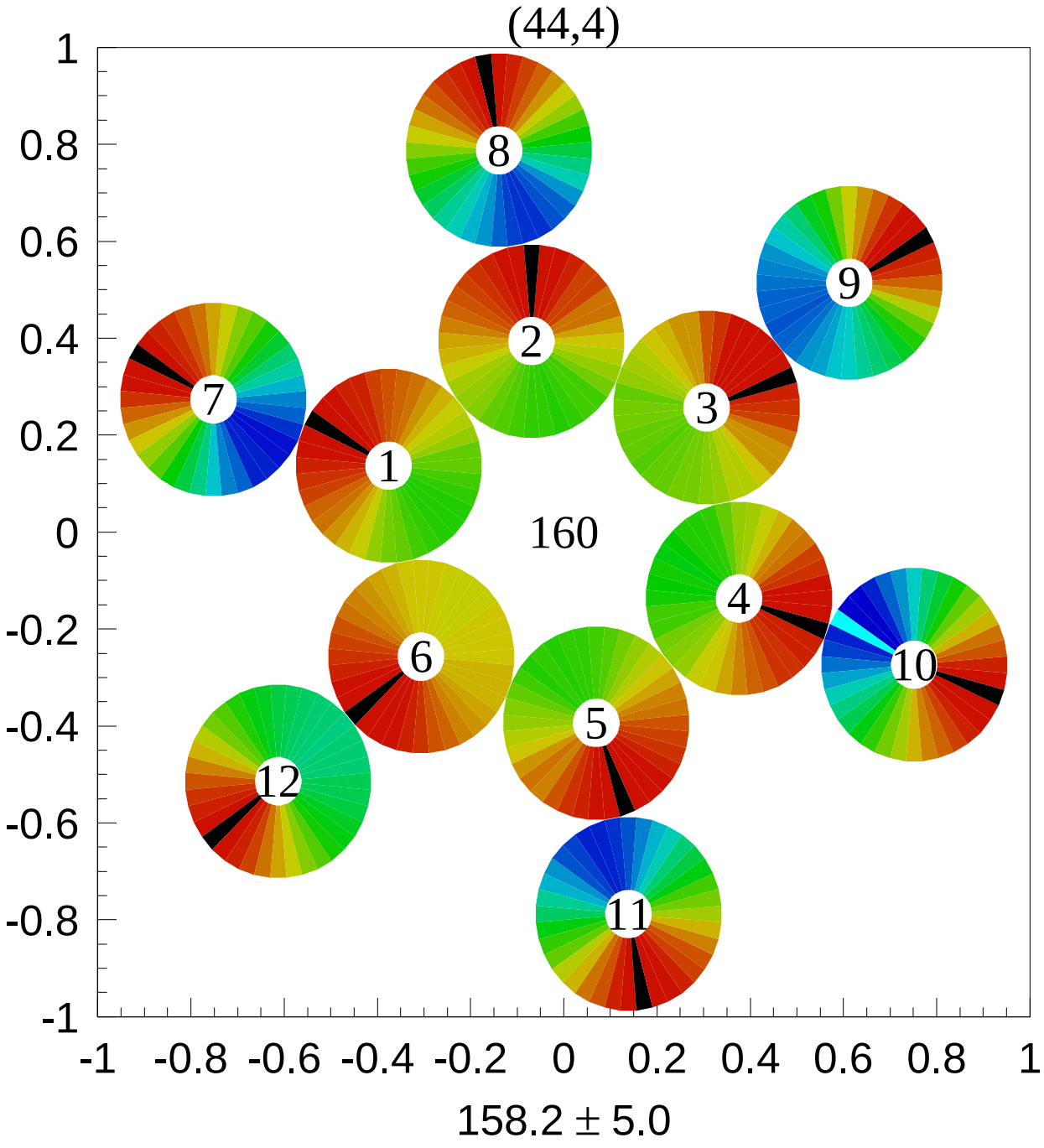

(44,2)
tilted LEDs
122 127 118 120 122 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 121 121 133 122 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

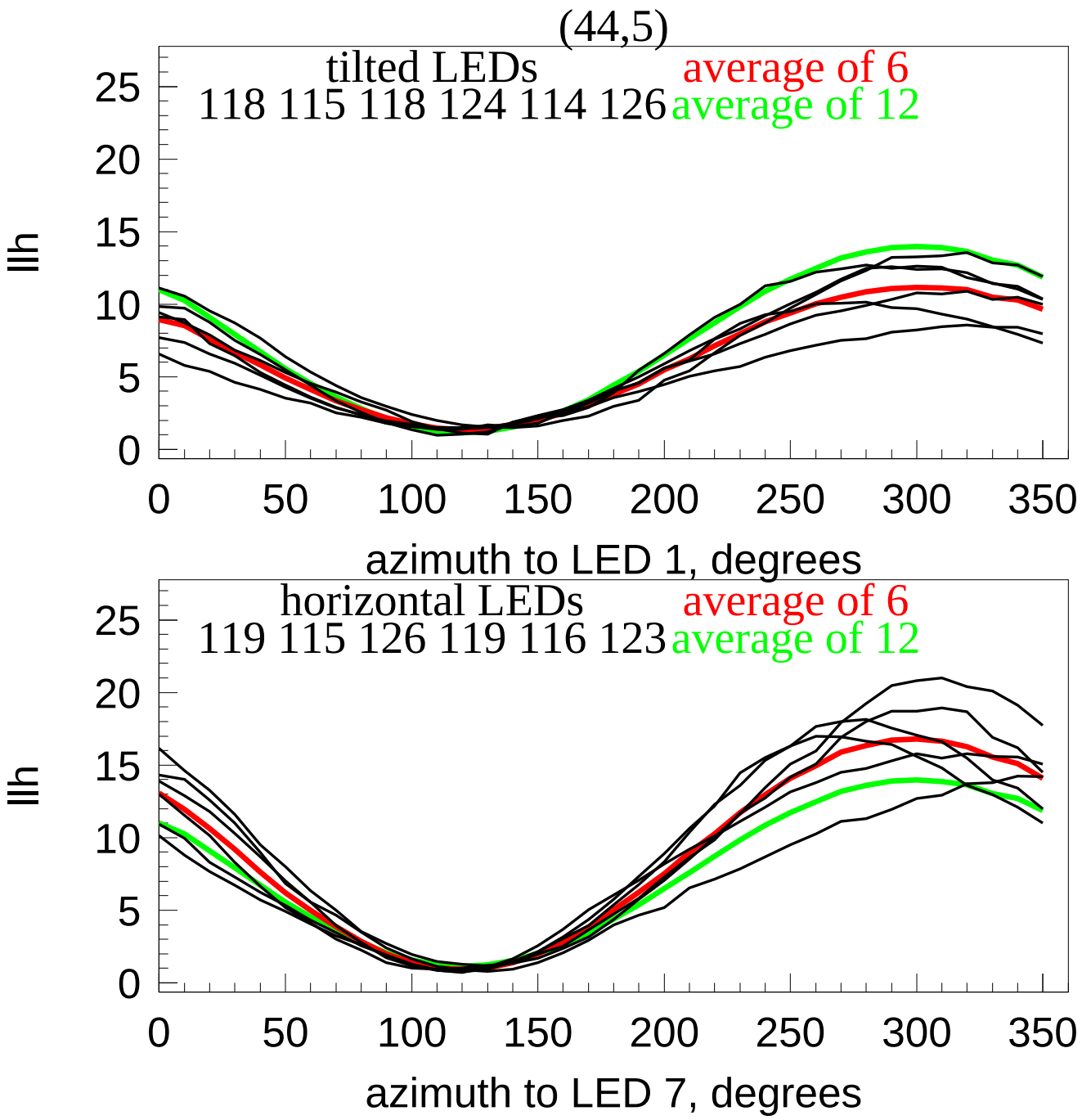

(44,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
94.9 ± 7.6

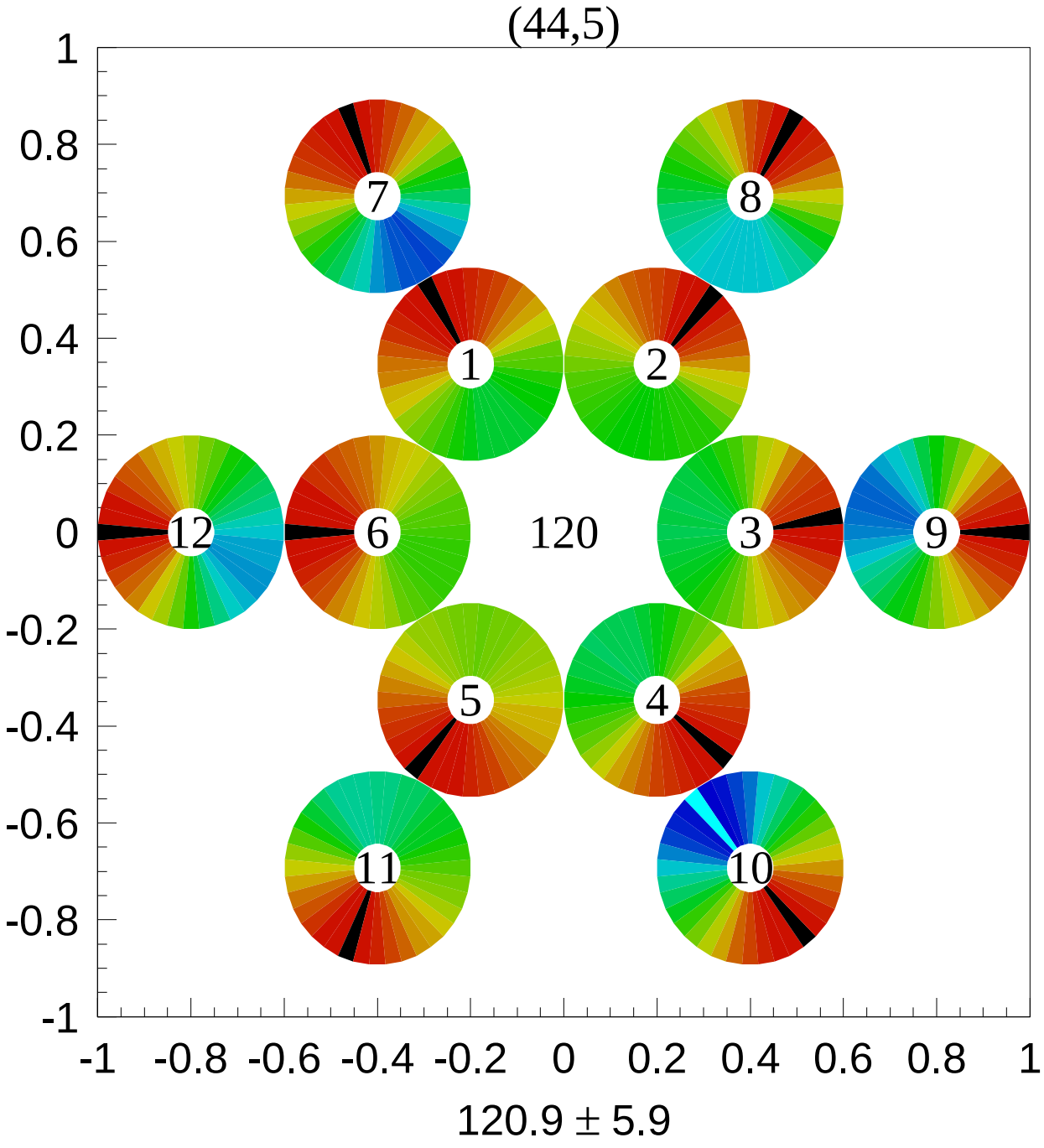

(44,3)
tilted LEDs
123 122 125 122 123 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 126 120 124 132
average of 6
average of 12
llh
azimuth to LED 7, degrees

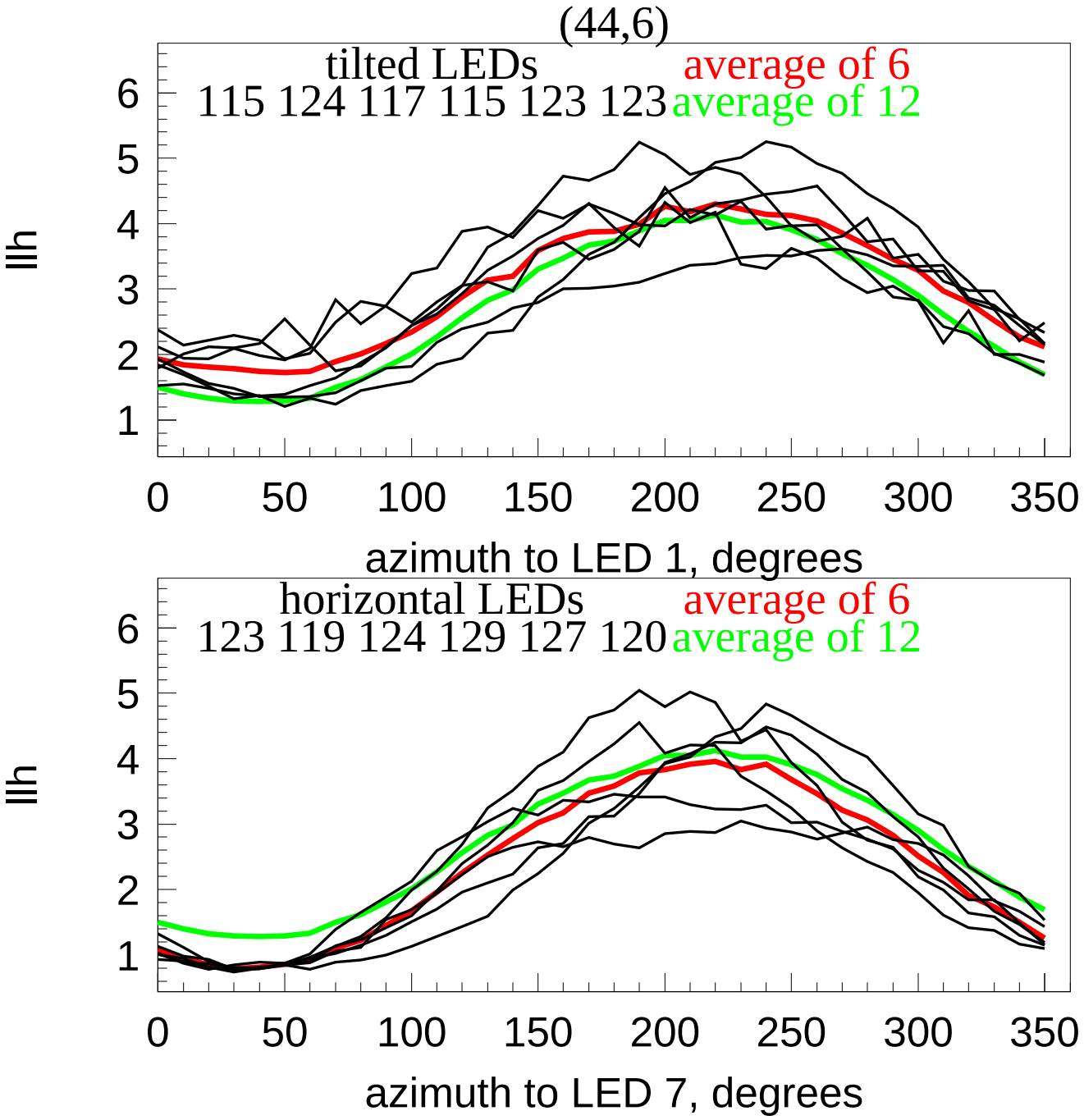

(44,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
358.8 ± 4.4

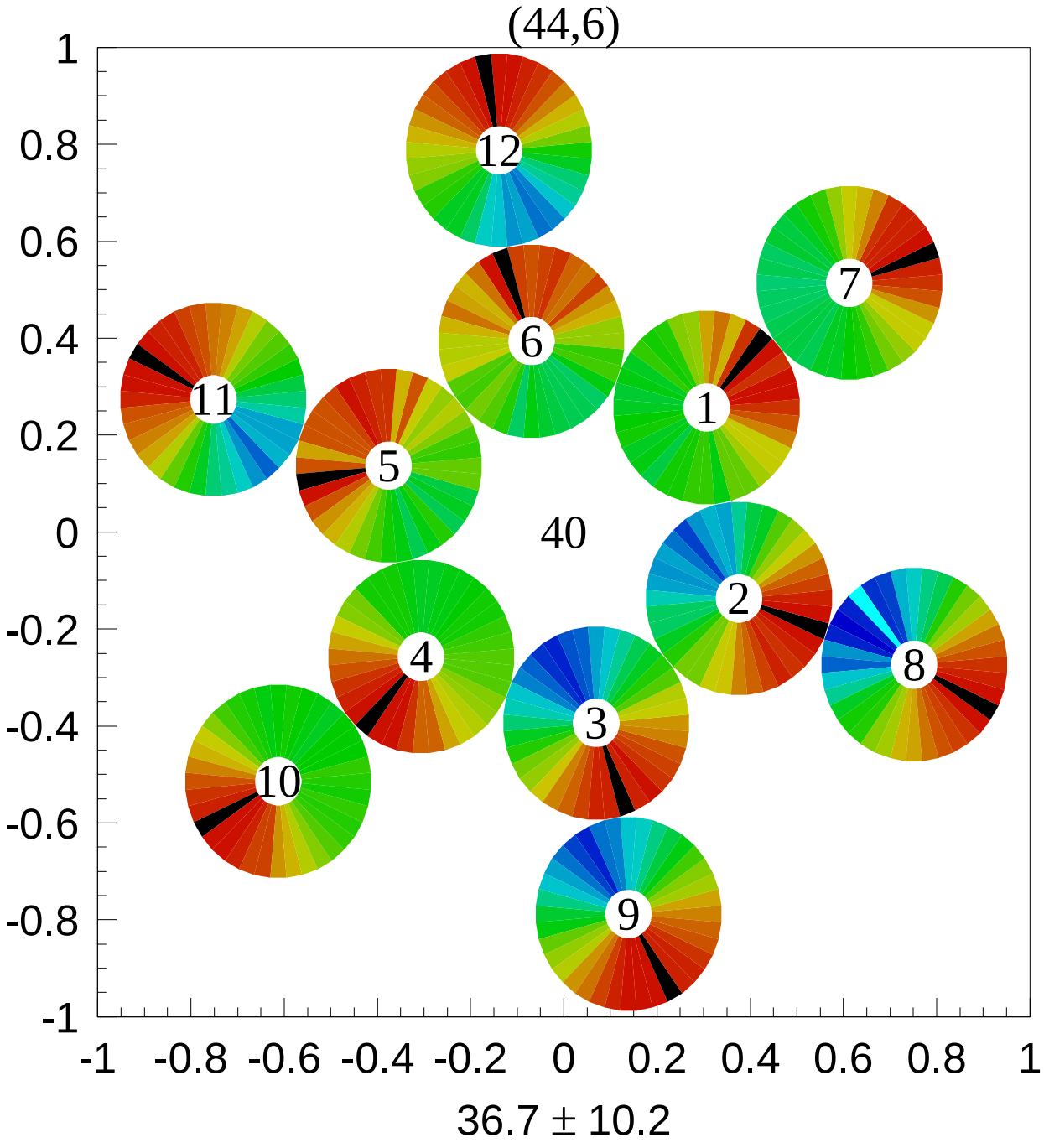

(44,4)
tilted LEDs
122 121 119 121 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 121 118 128 119 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

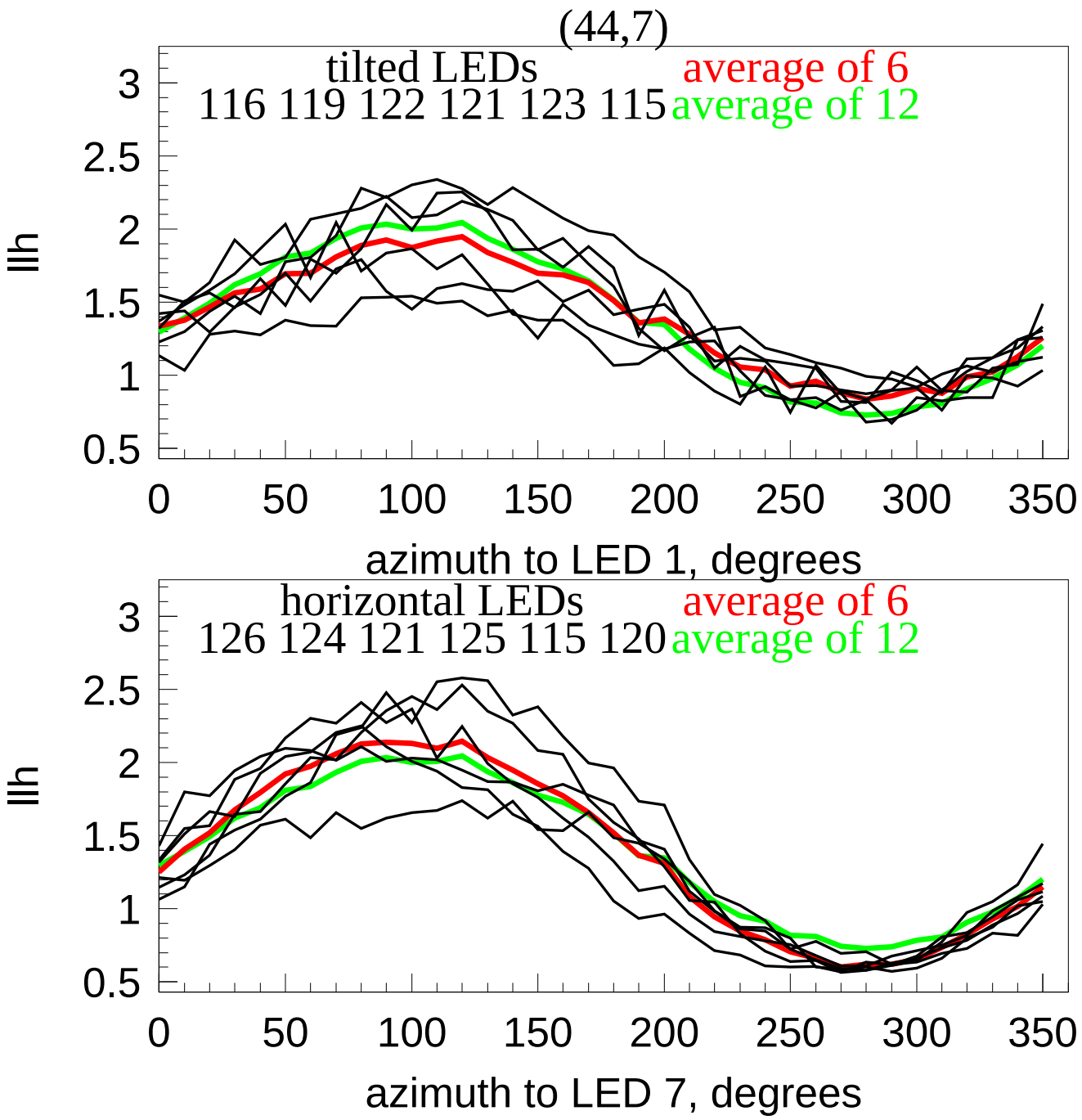

(44,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
158.2 ± 5.0
160
1
2
3
4
5
6
7
8
9
10
11
12

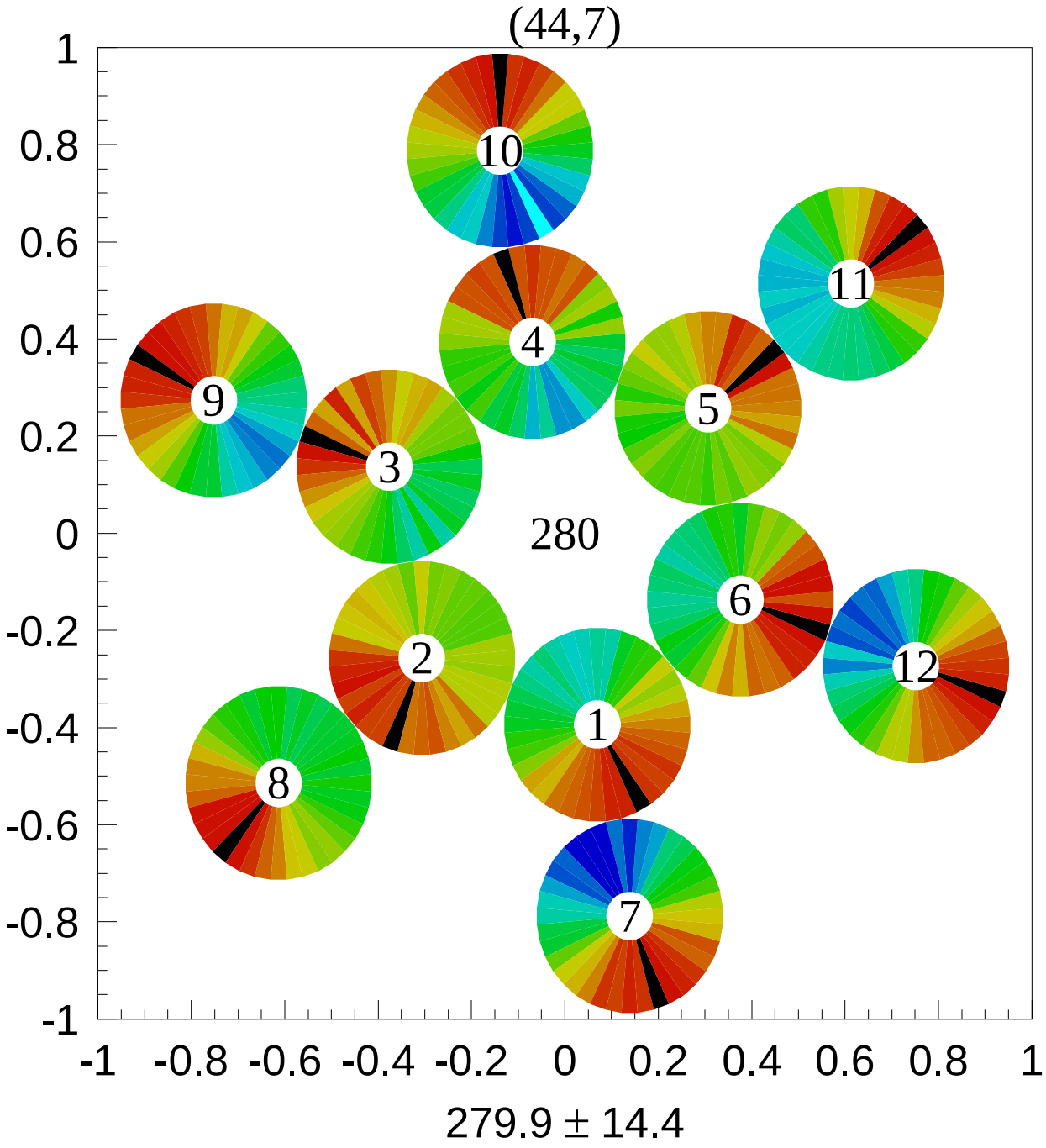

(44,5)
tilted LEDs
118 115 118 124 114 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 115 126 119 116 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

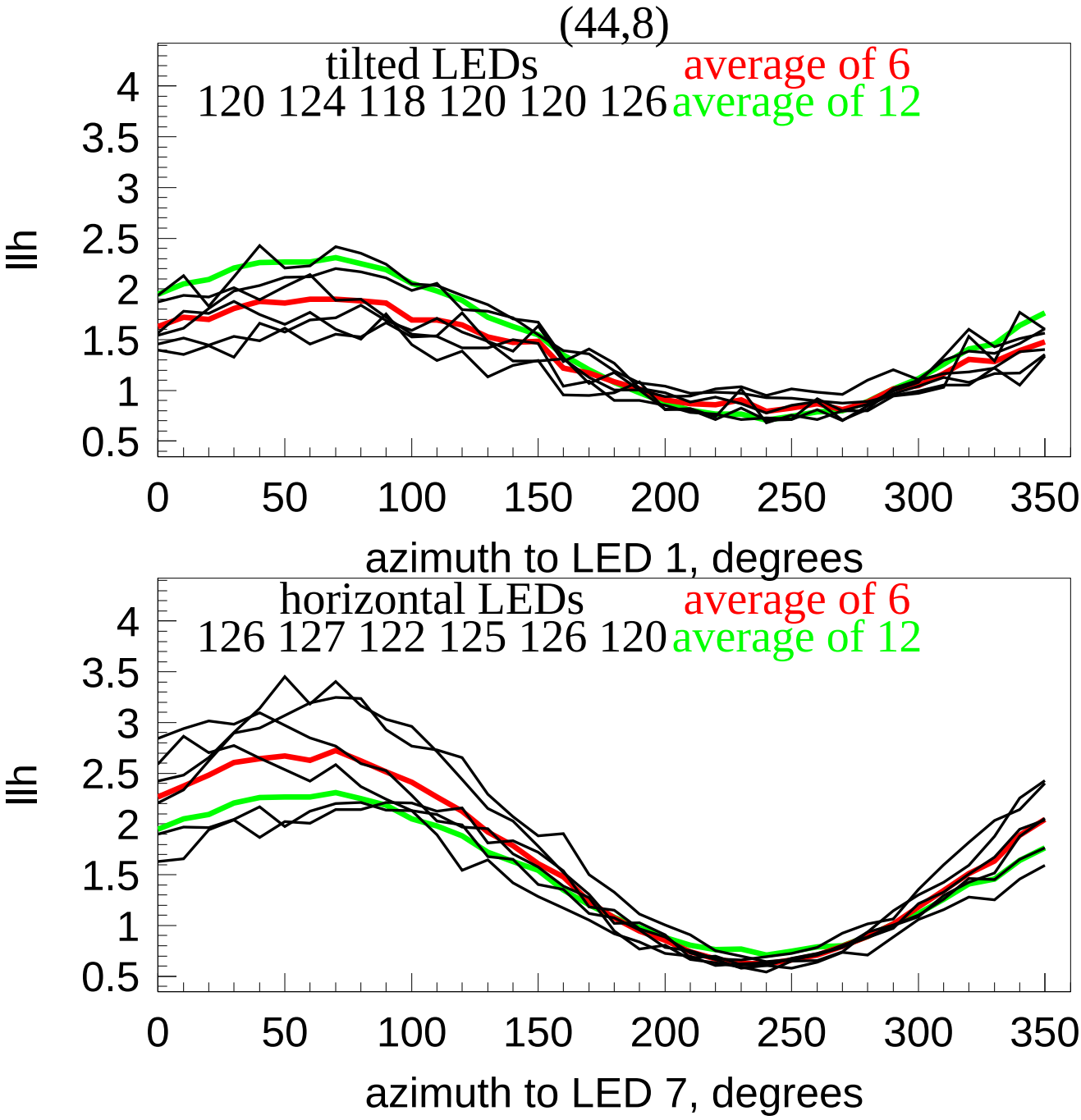

(44,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
120.9 ± 5.9

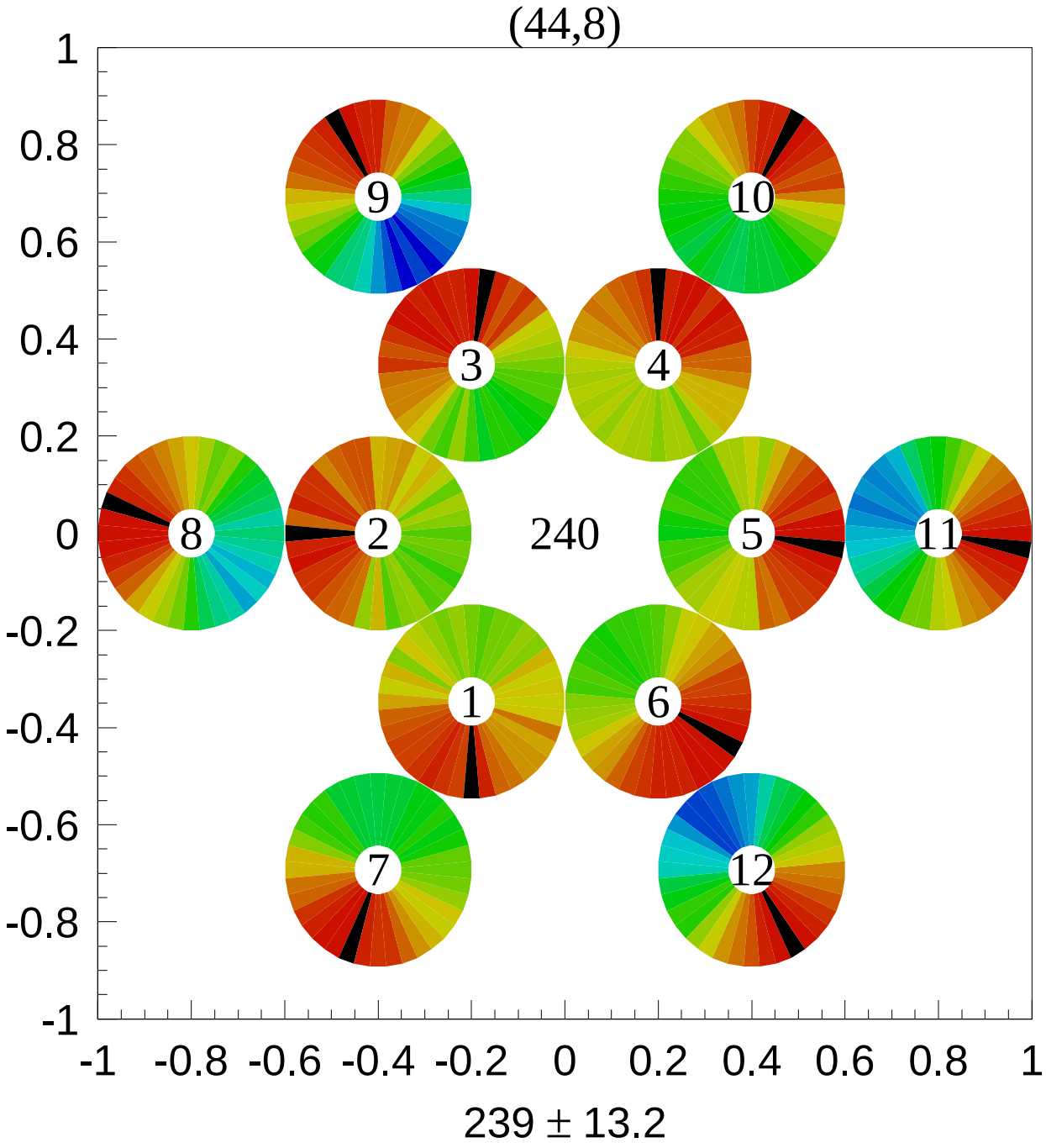

(44,6)
tilted LEDs
115 124 117 115 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 124 129 127 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

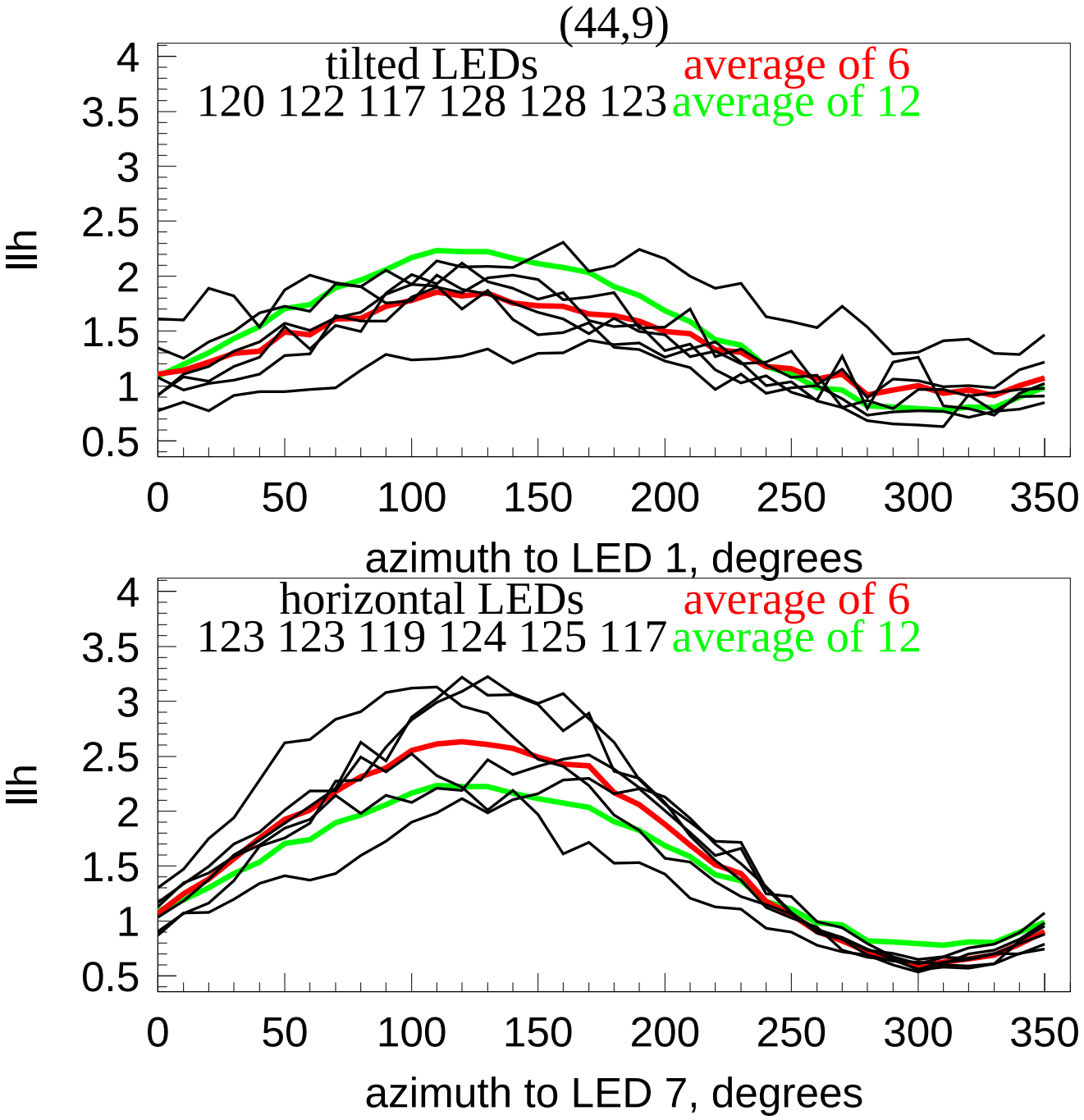

(44,6)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
36.7 ± 10.2

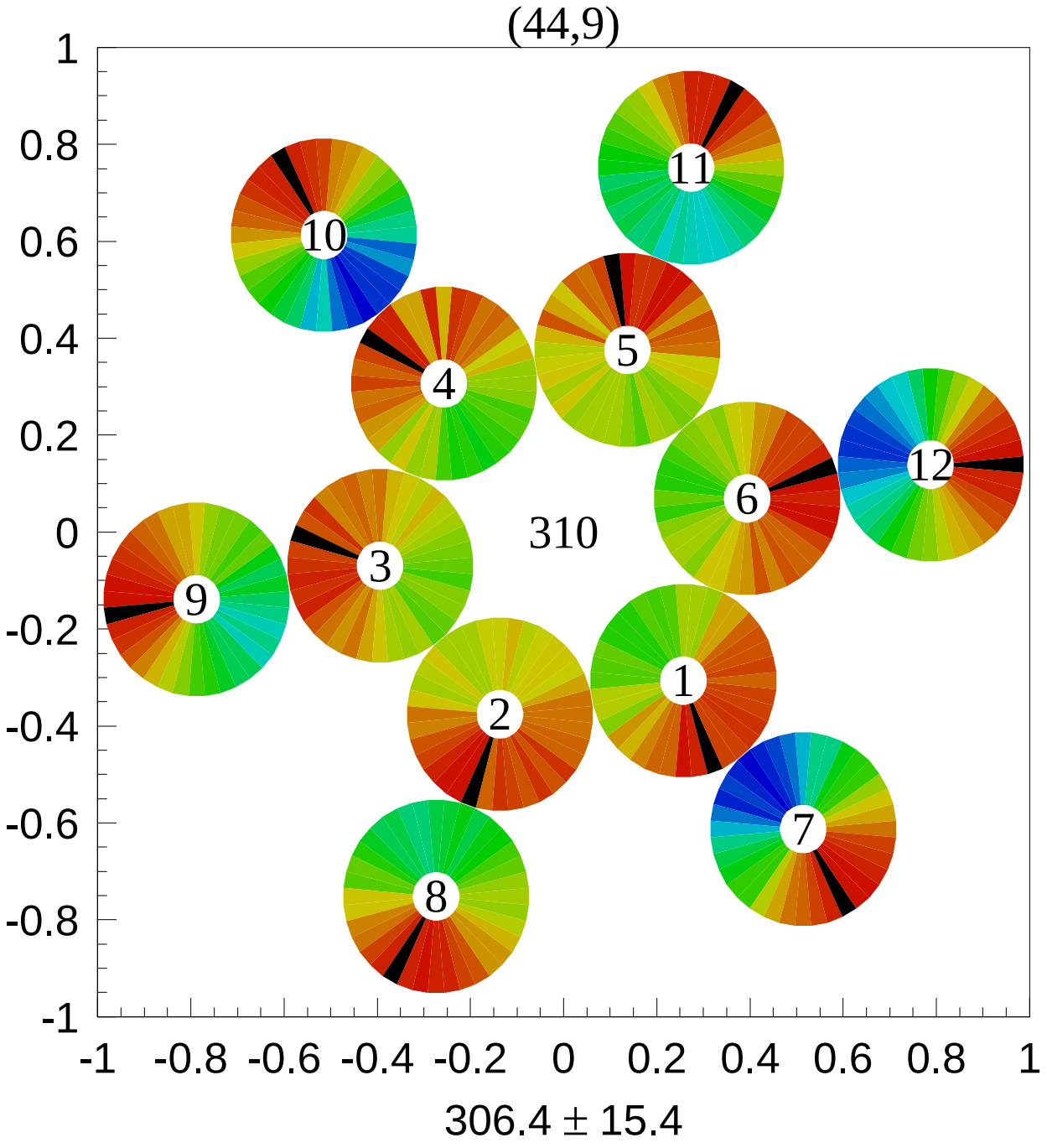

(44,7)
tilted LEDs
116 119 122 121 123 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 124 121 125 115 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

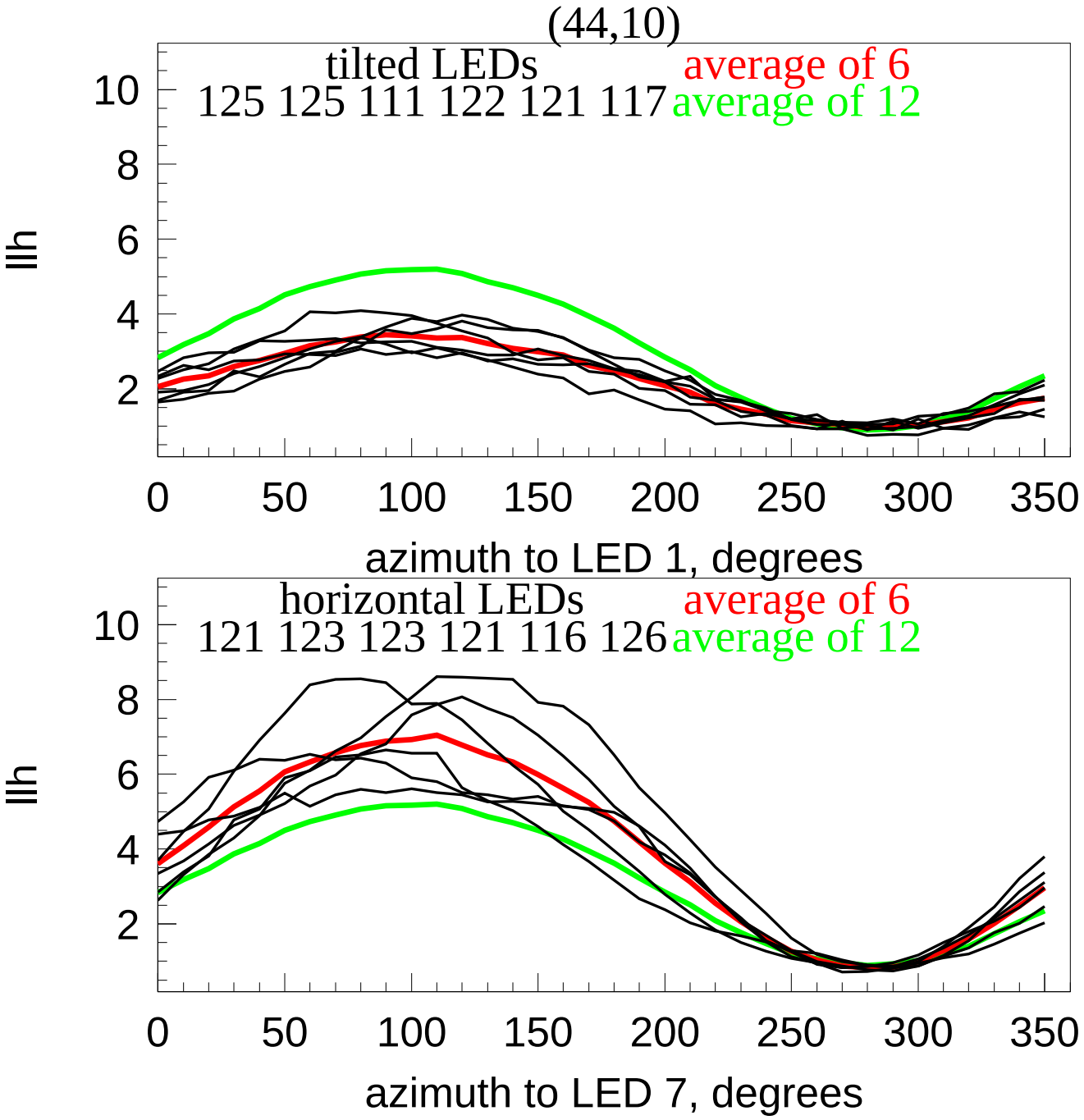

(44,7)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
279.9 ± 14.4

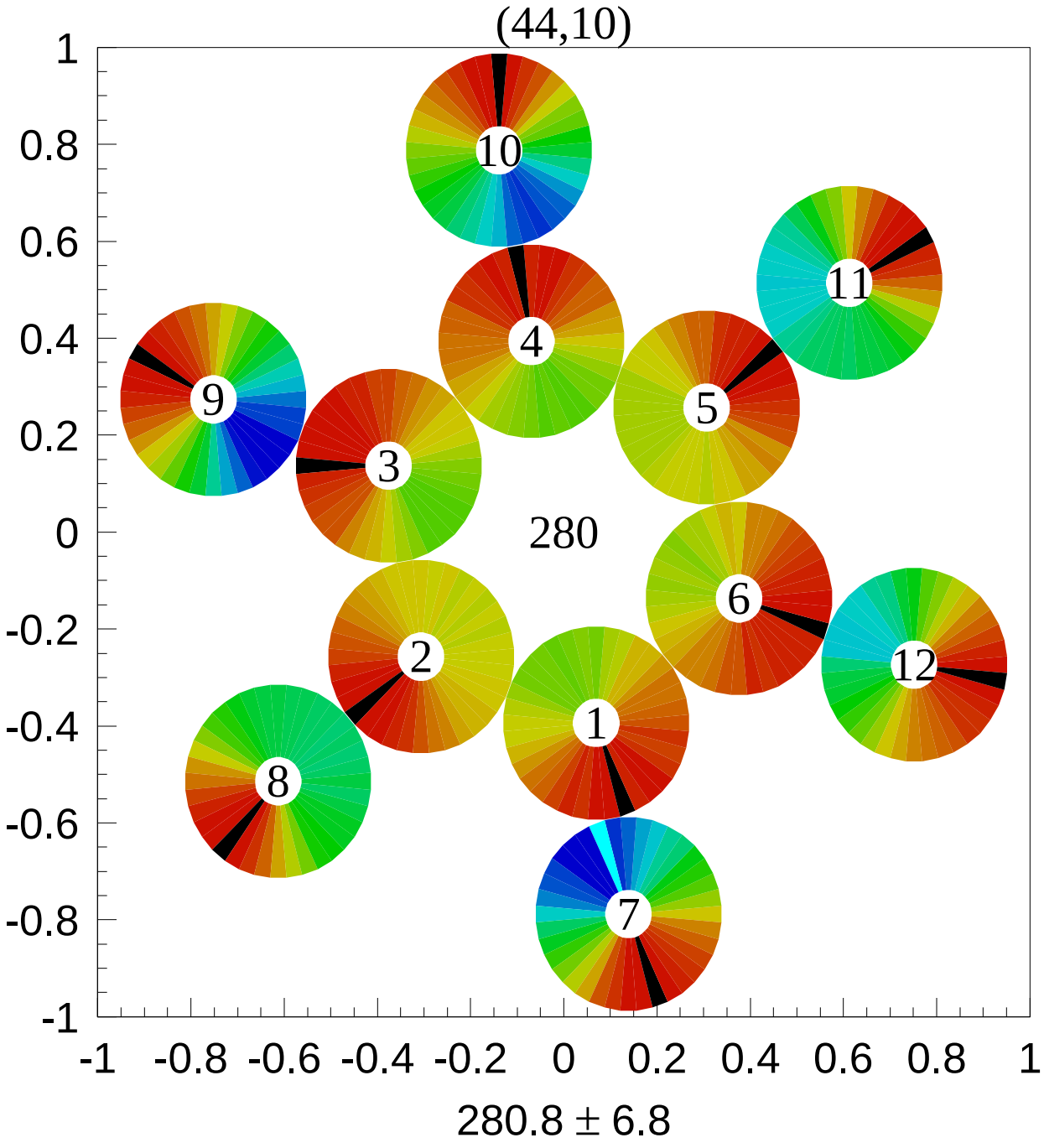

(44,8)
tilted LEDs
120 124 118 120 120 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 127 122 125 126 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

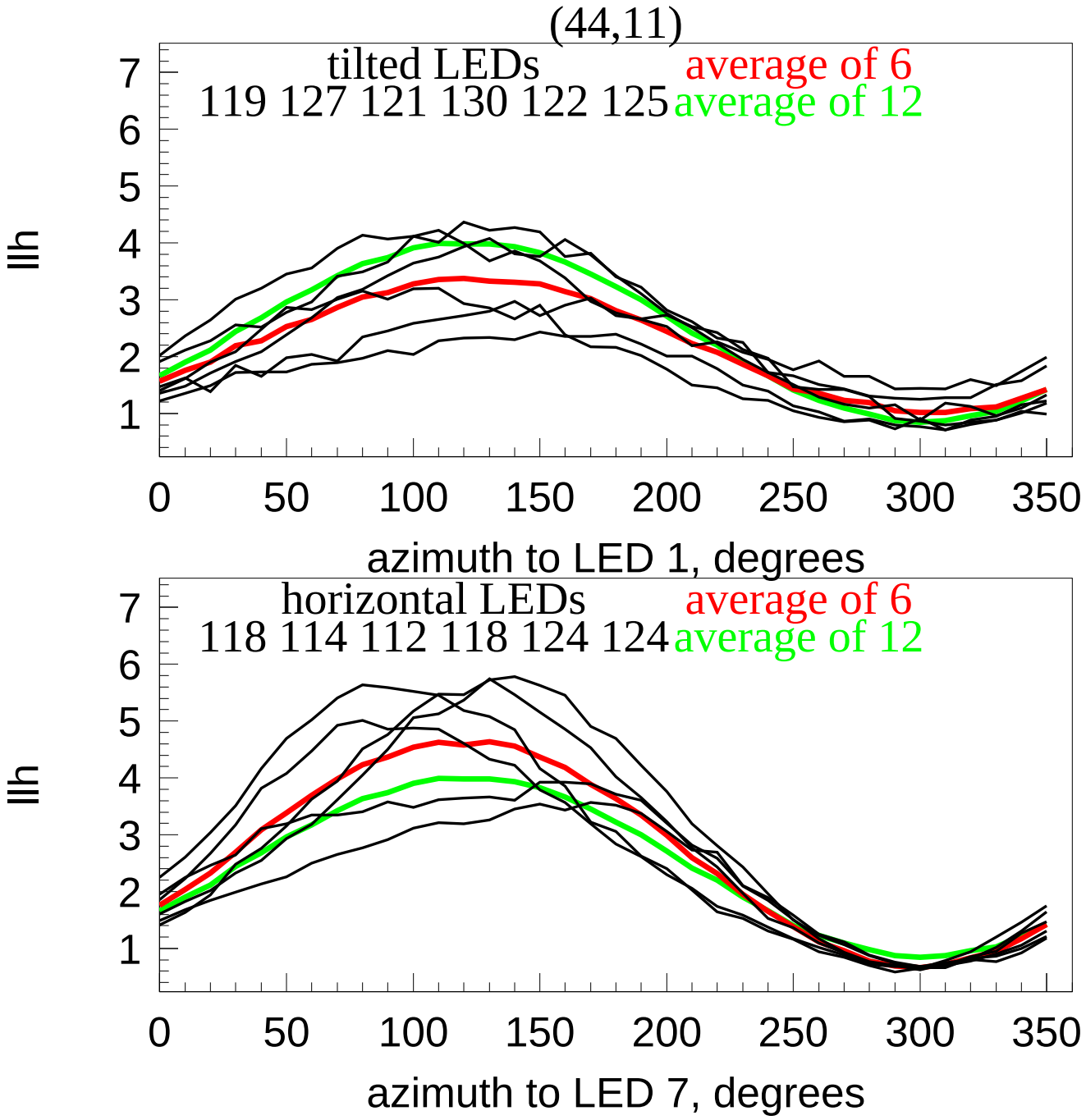

(44,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
239 ± 13.2

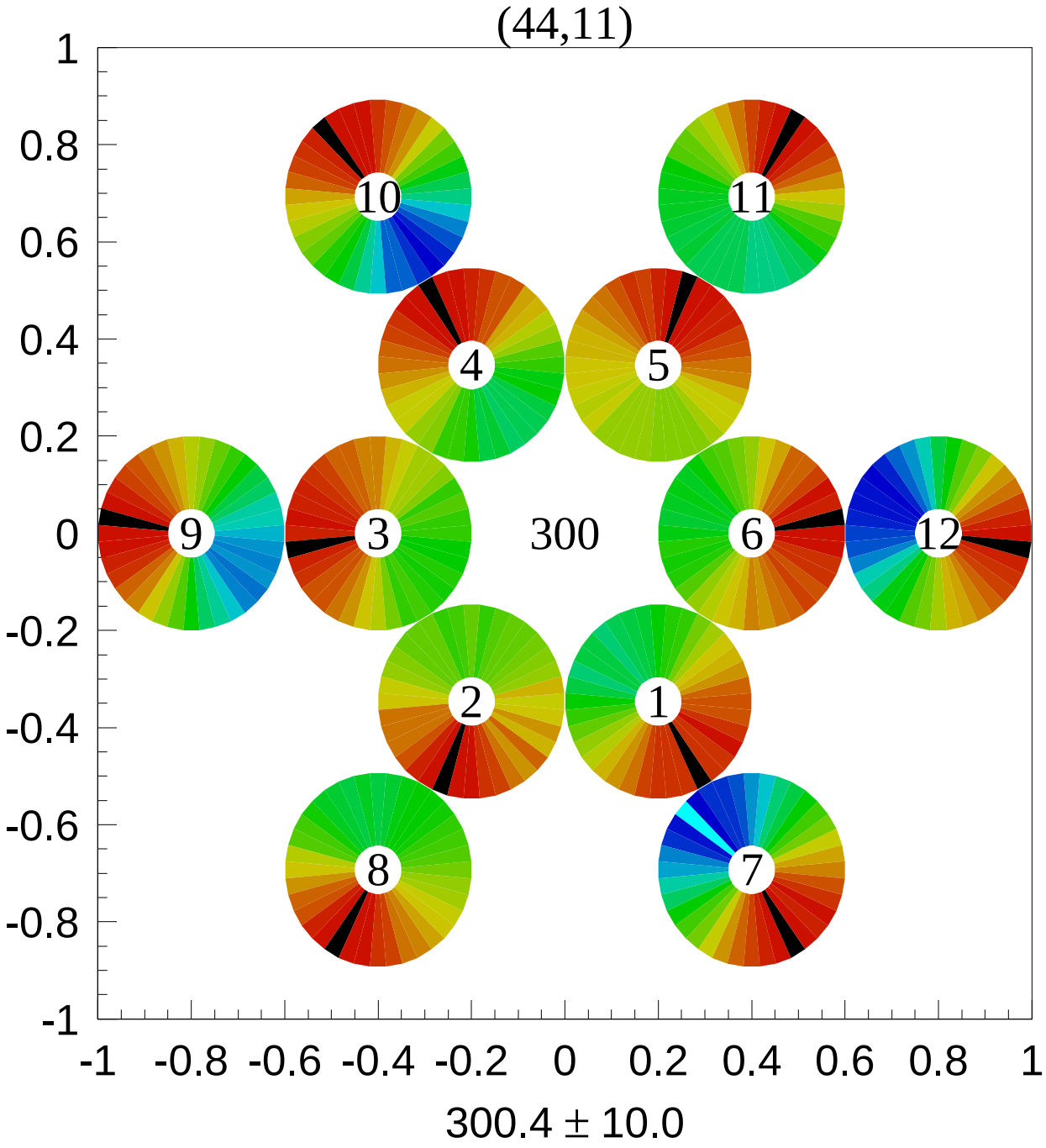

(44,9)
tilted LEDs
120 122 117 128 128 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 123 119 124 125 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

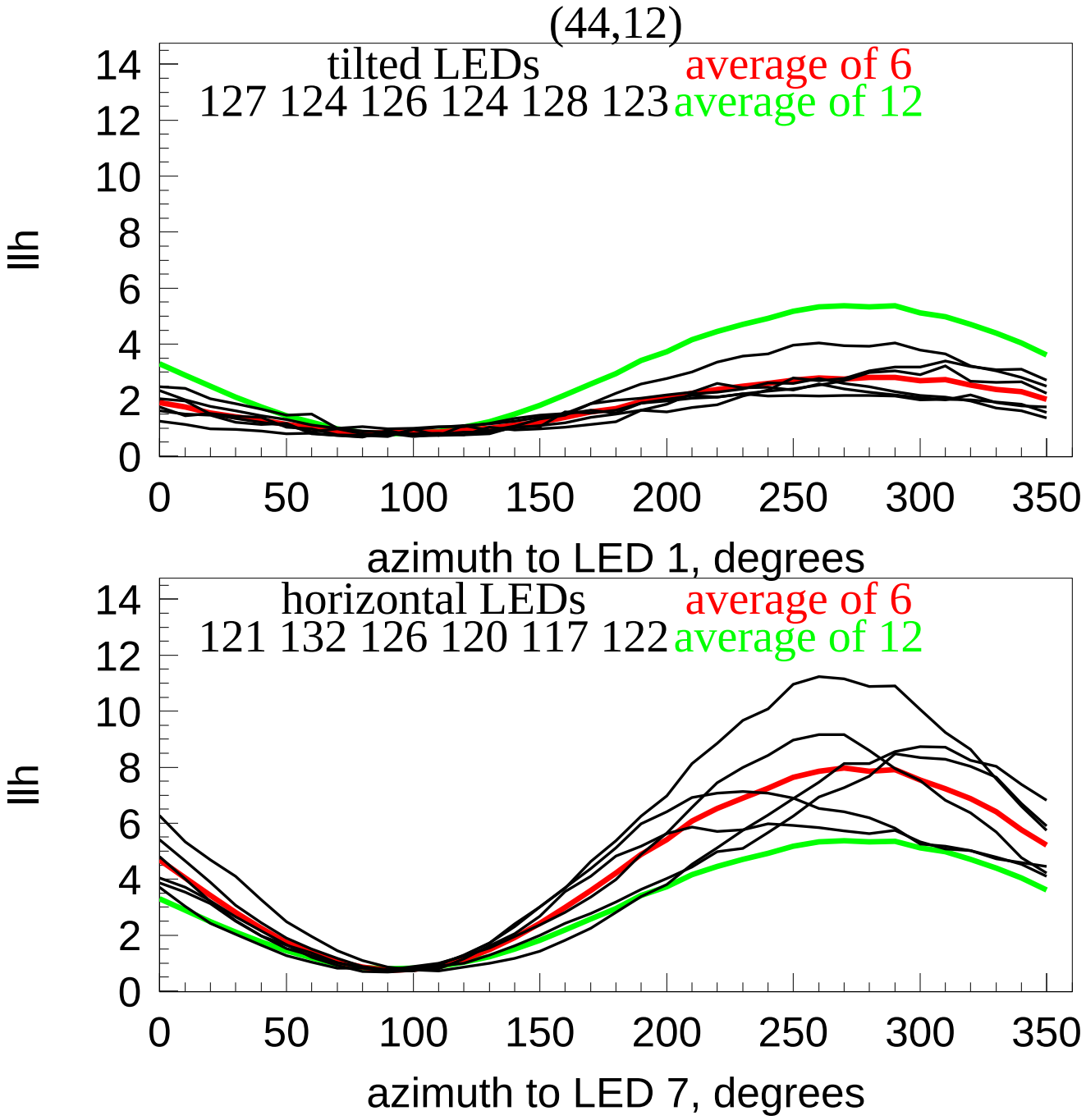

(44,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
306.4 ± 15.4
310
1
2
3
4
5
6
7
8
9
10
11
12

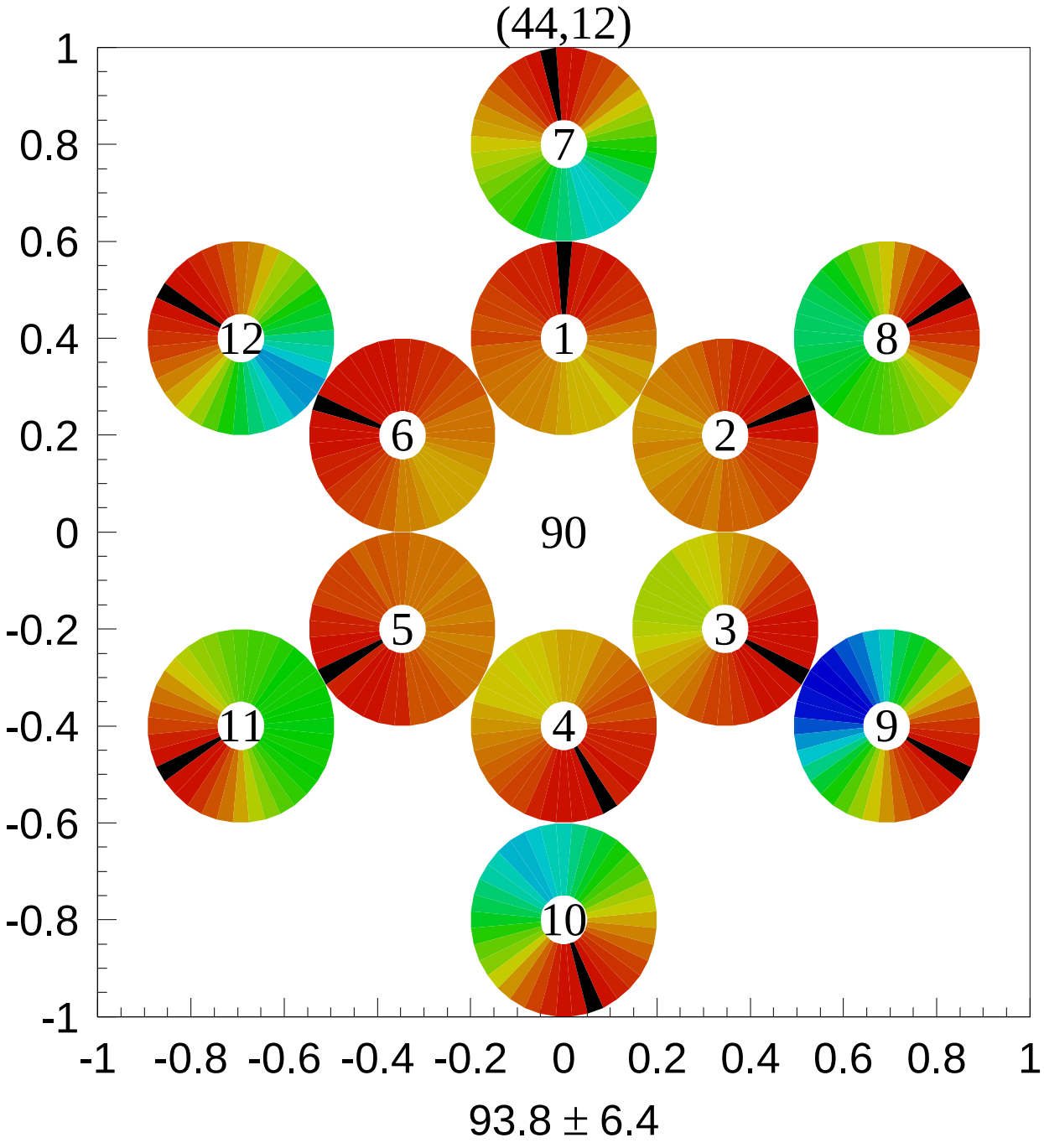

(44,10)
tilted LEDs
125 125 111 122 121 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 123 121 116 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

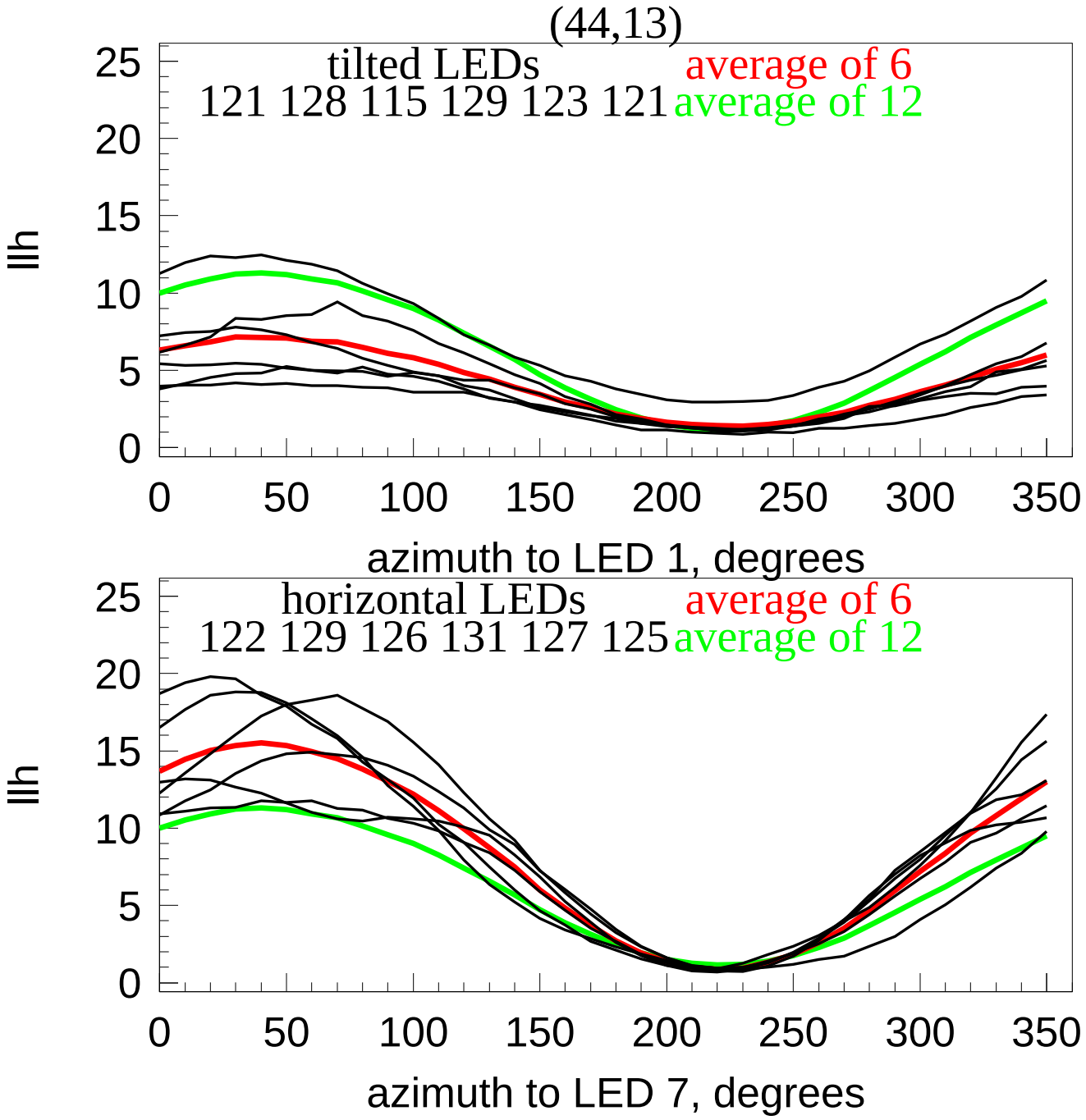

(44,10)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
280.8 ± 6.8

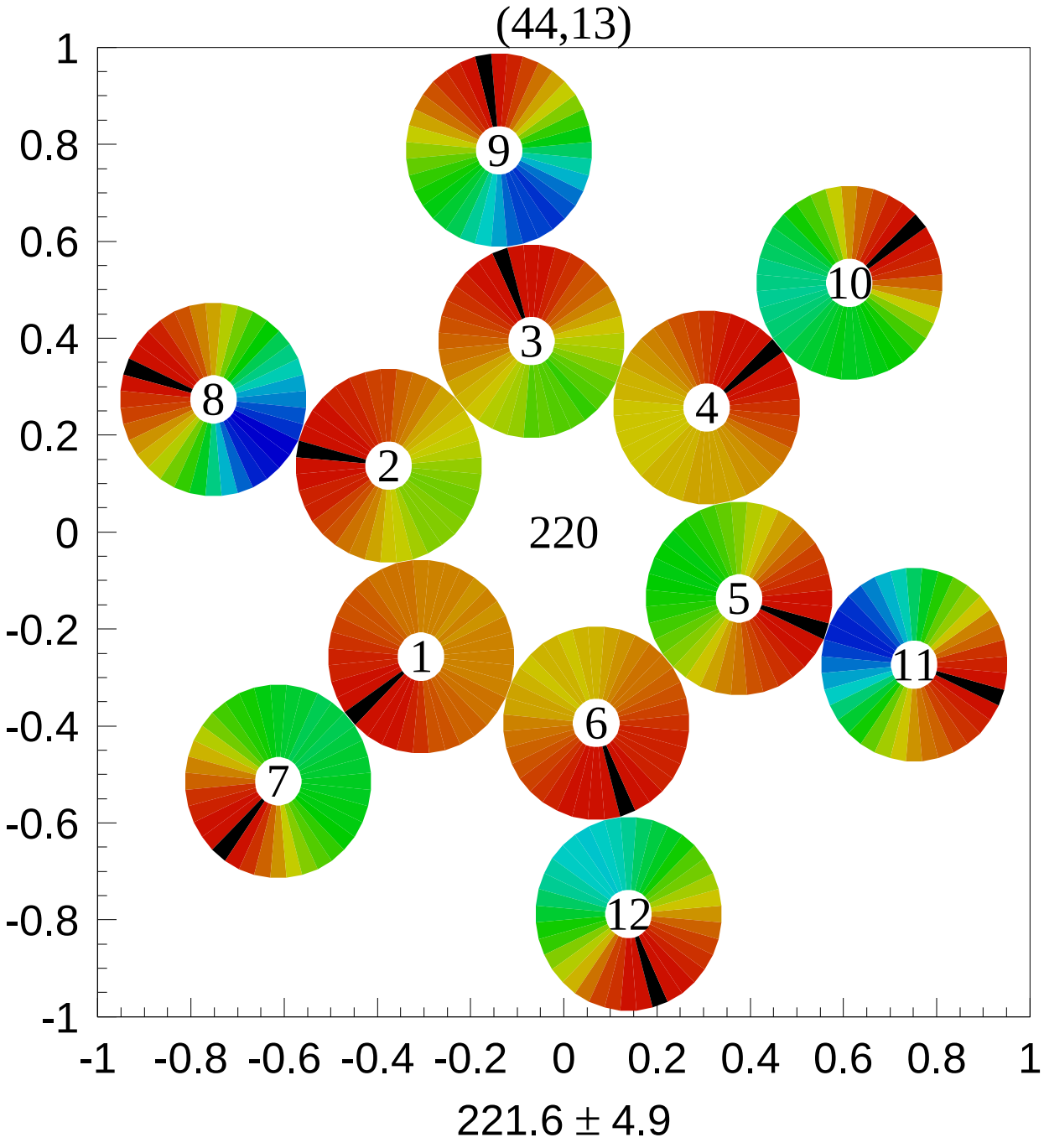

(44,11)
tilted LEDs
119 127 121 130 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 114 112 118 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

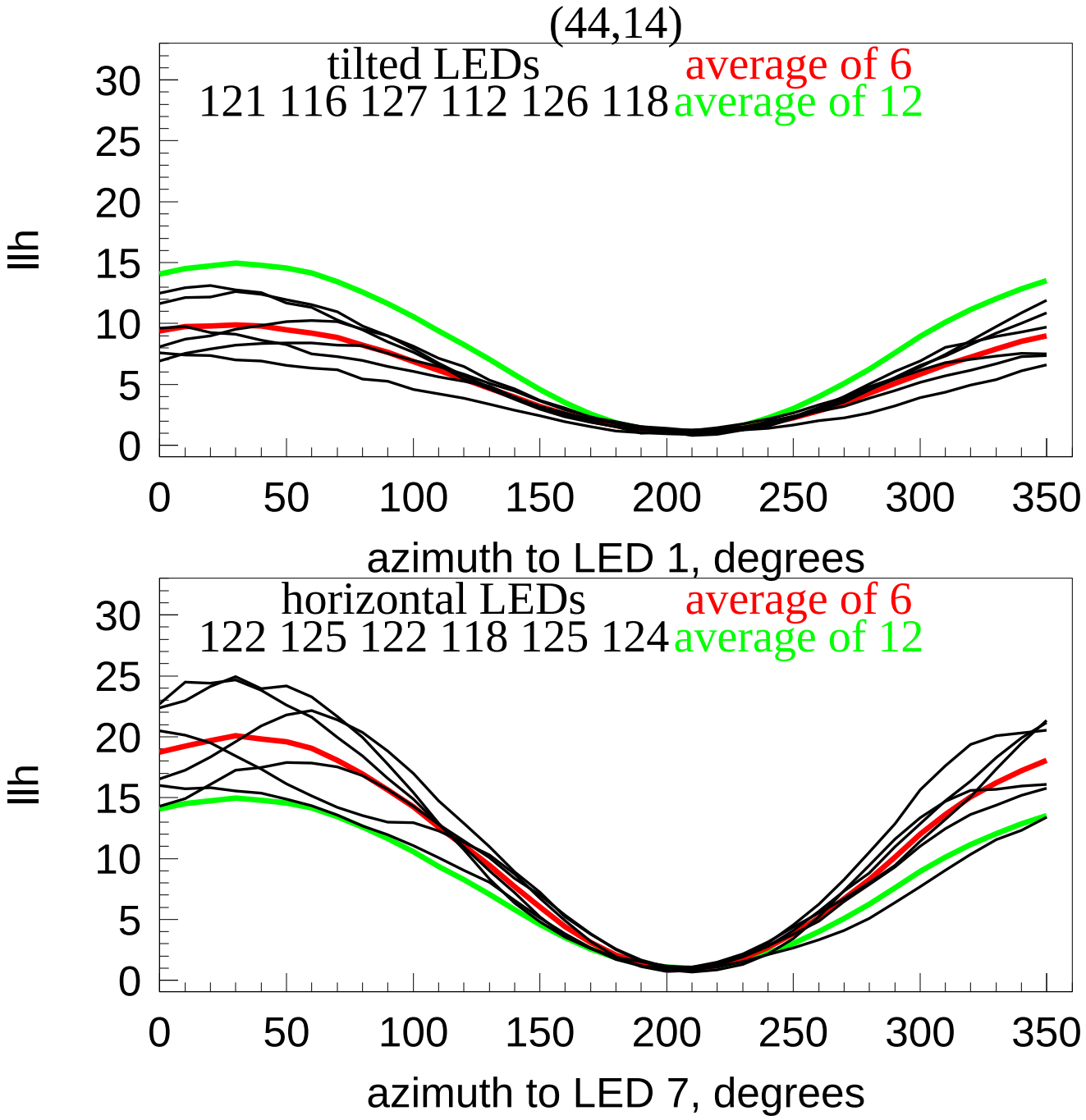

(44,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
300.4 ± 10.0

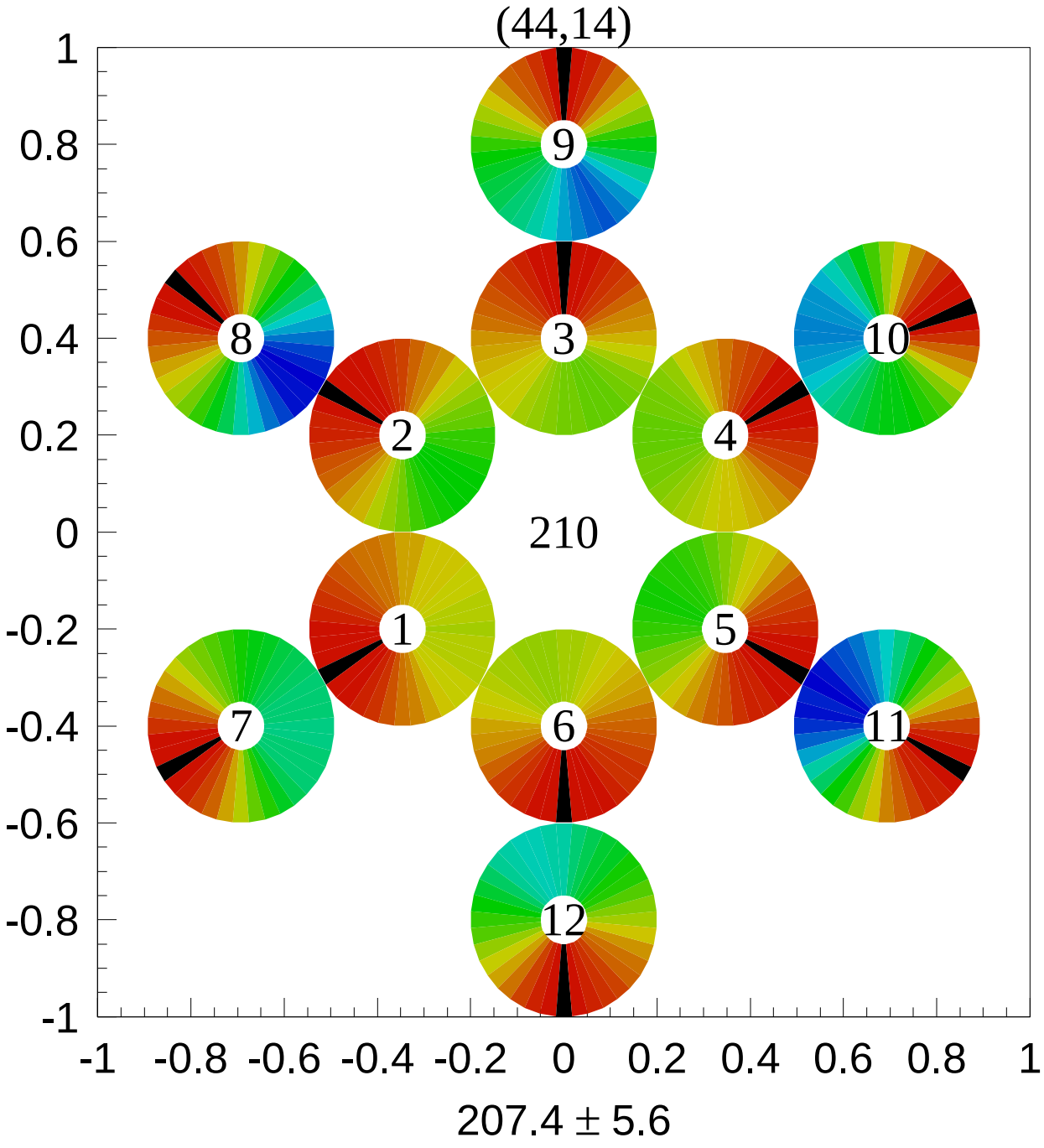

(44,12)
tilted LEDs
127 124 126 124 128 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 132 126 120 117 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

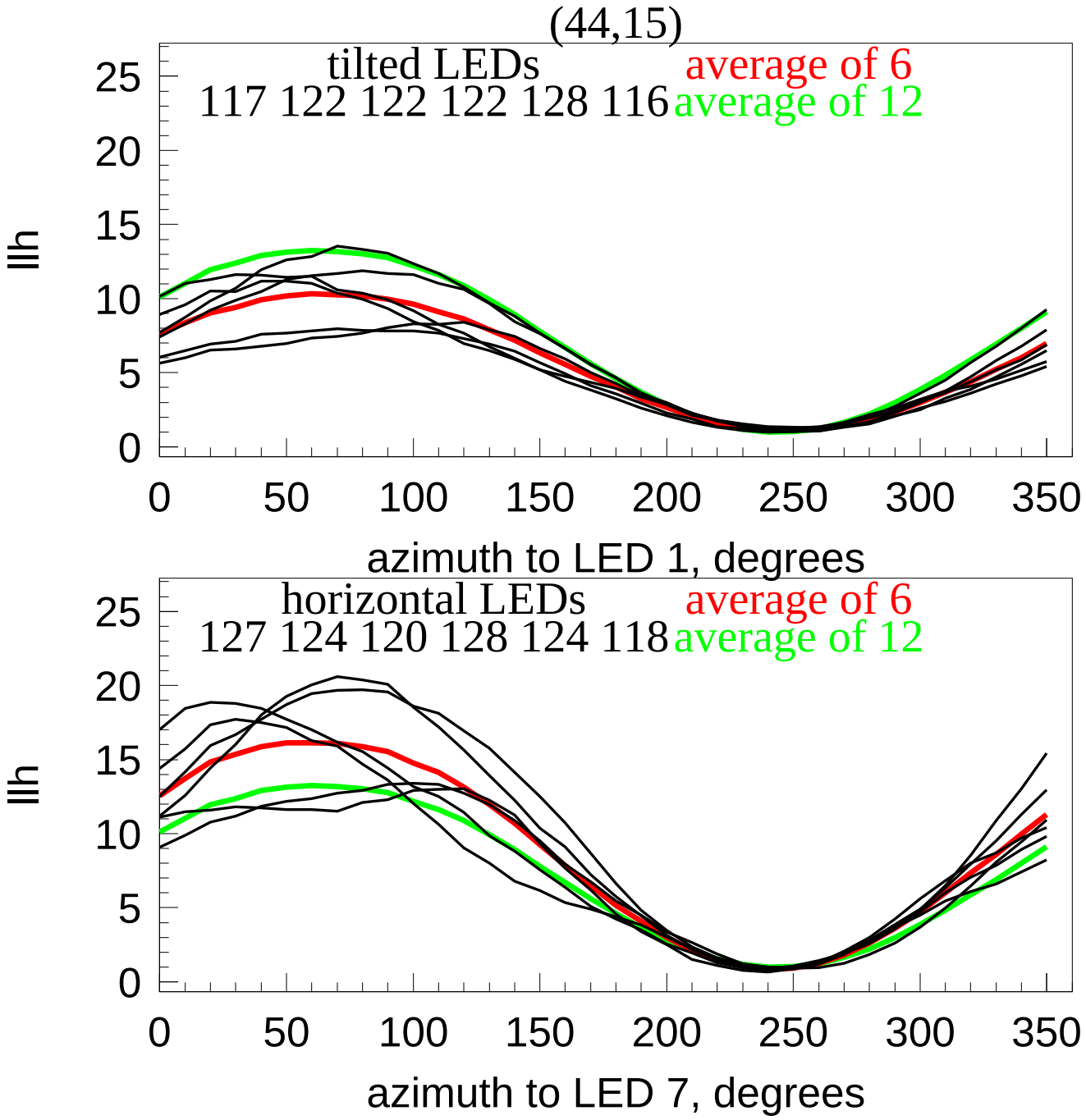

(44,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
93.8 ± 6.4

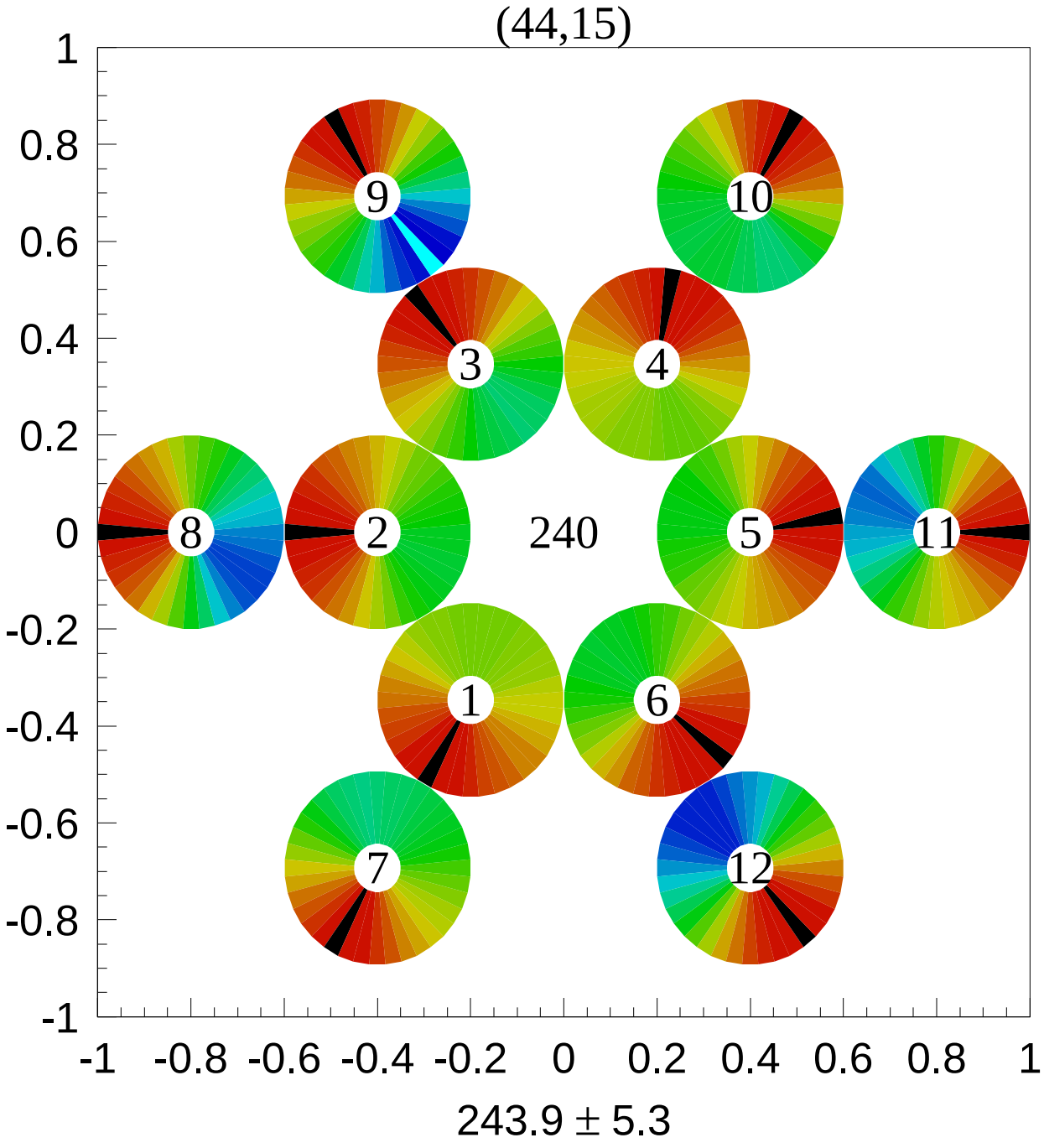

(44,13)
tilted LEDs
121 128 115 129 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 129 126 131 127 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

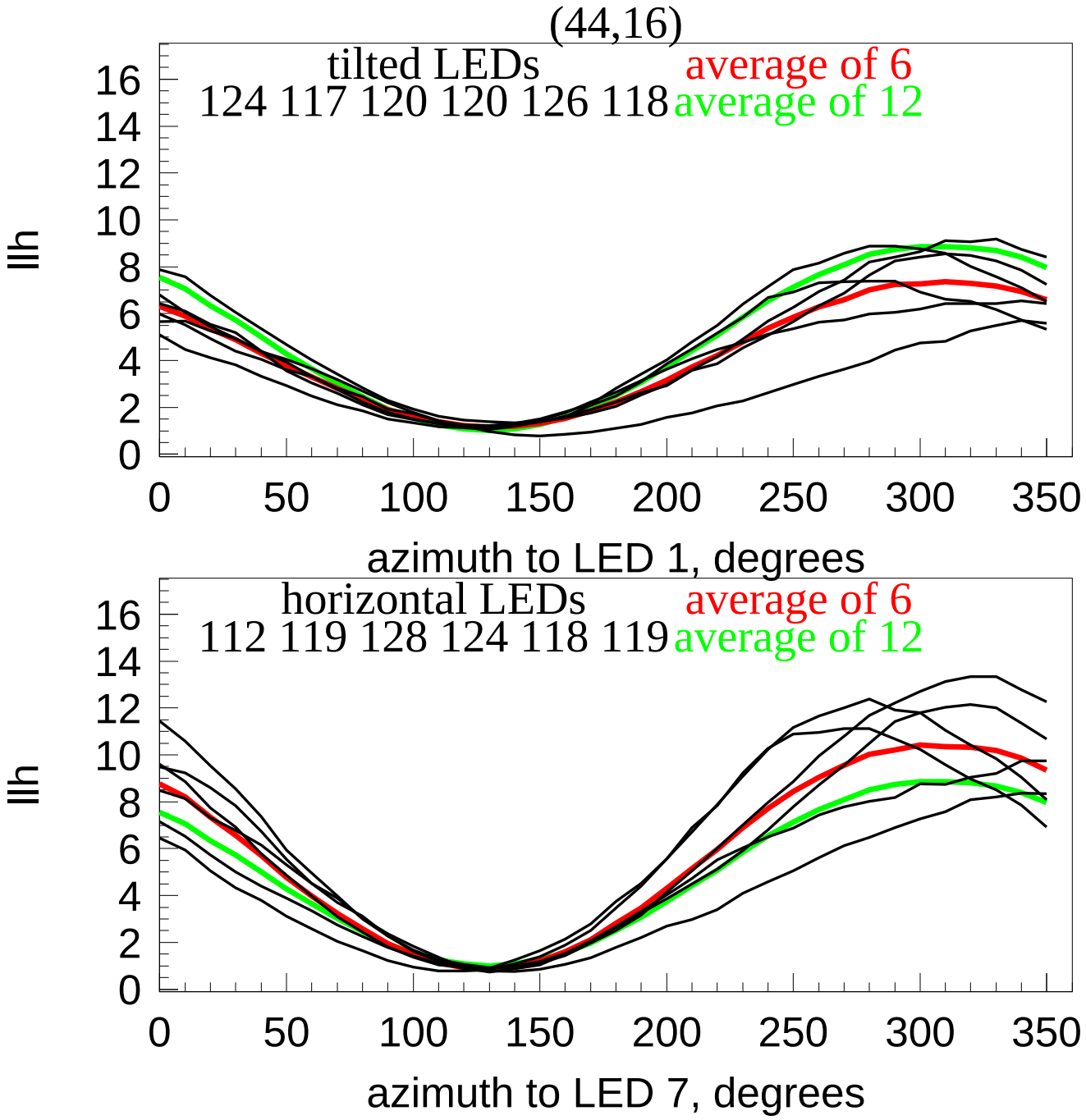

(44,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
11
1
6
7
12
221.6 ± 4.9

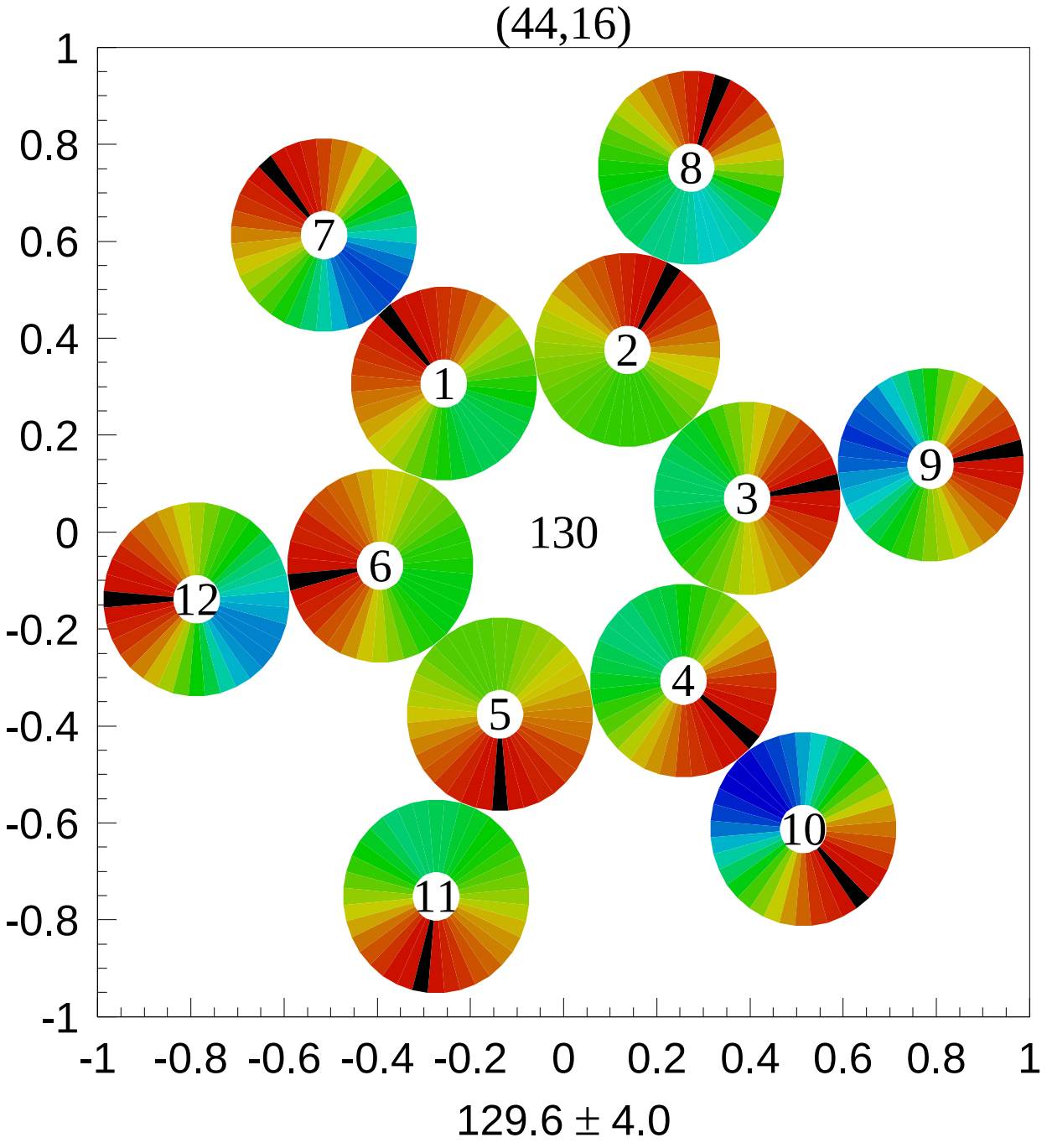

(44,14)
tilted LEDs
121 116 127 112 126 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 122 118 125 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

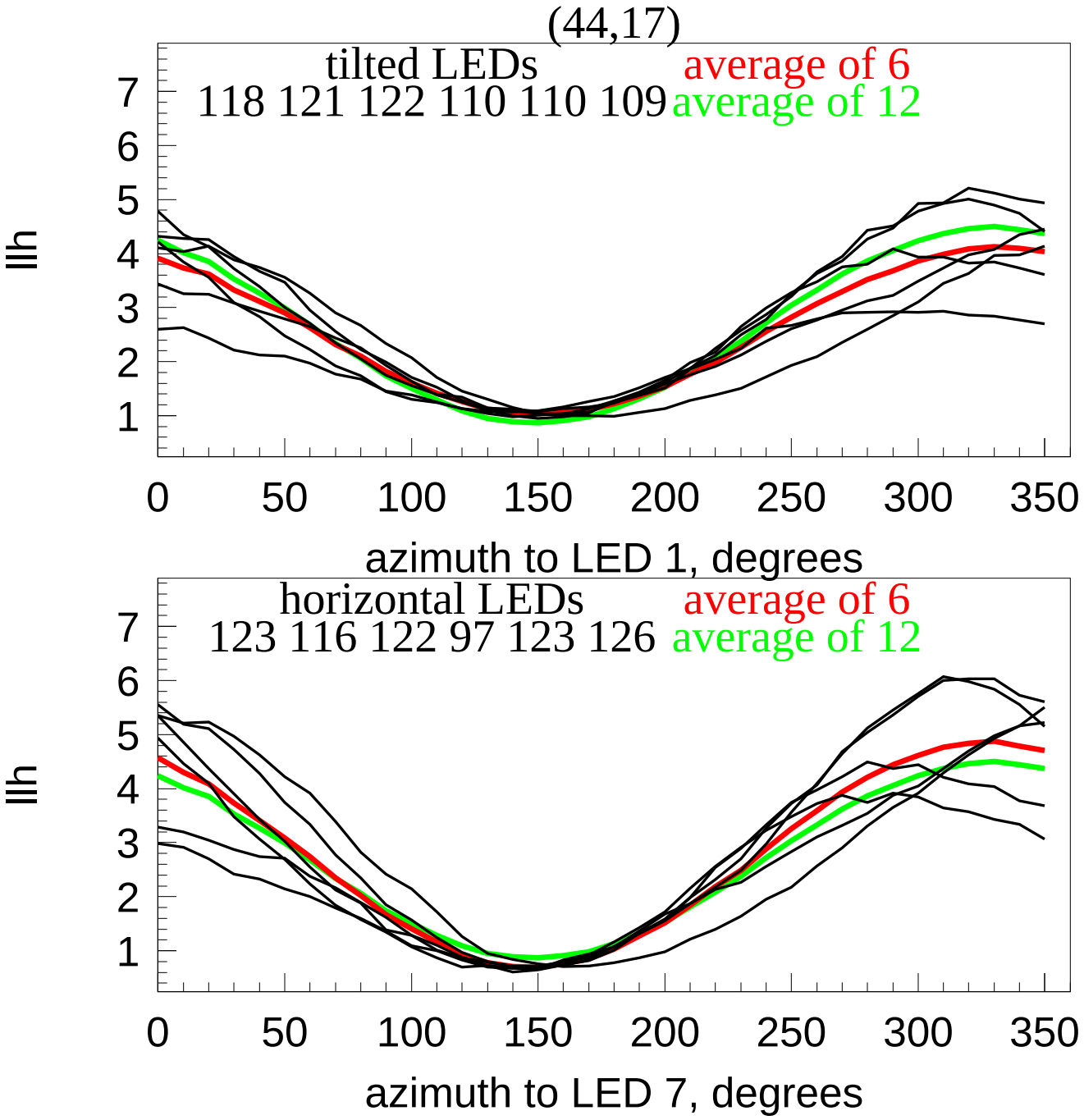

(44,14)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
207.4 ± 5.6

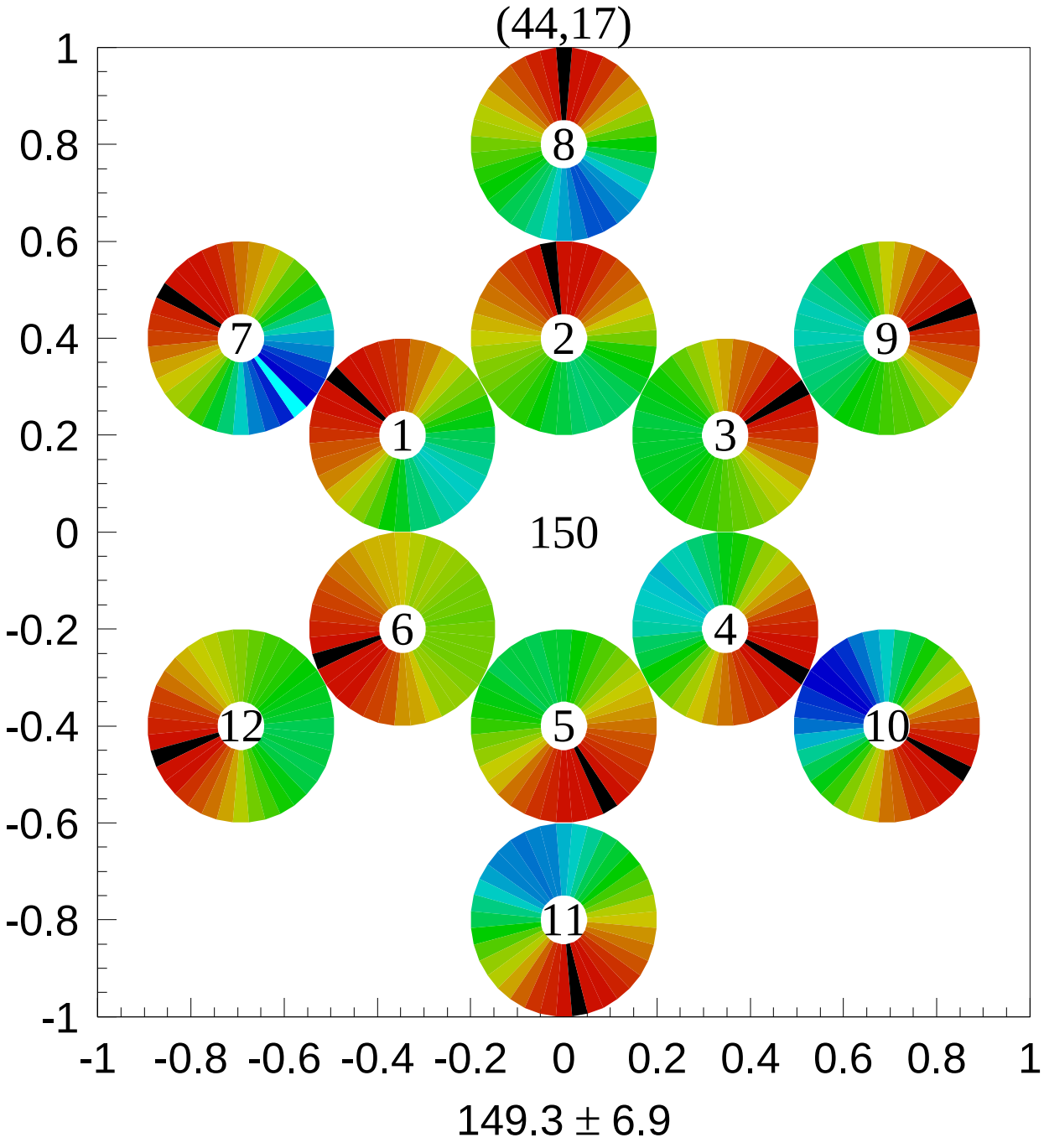

(44,15)
tilted LEDs
117 122 122 122 128 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 124 120 128 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

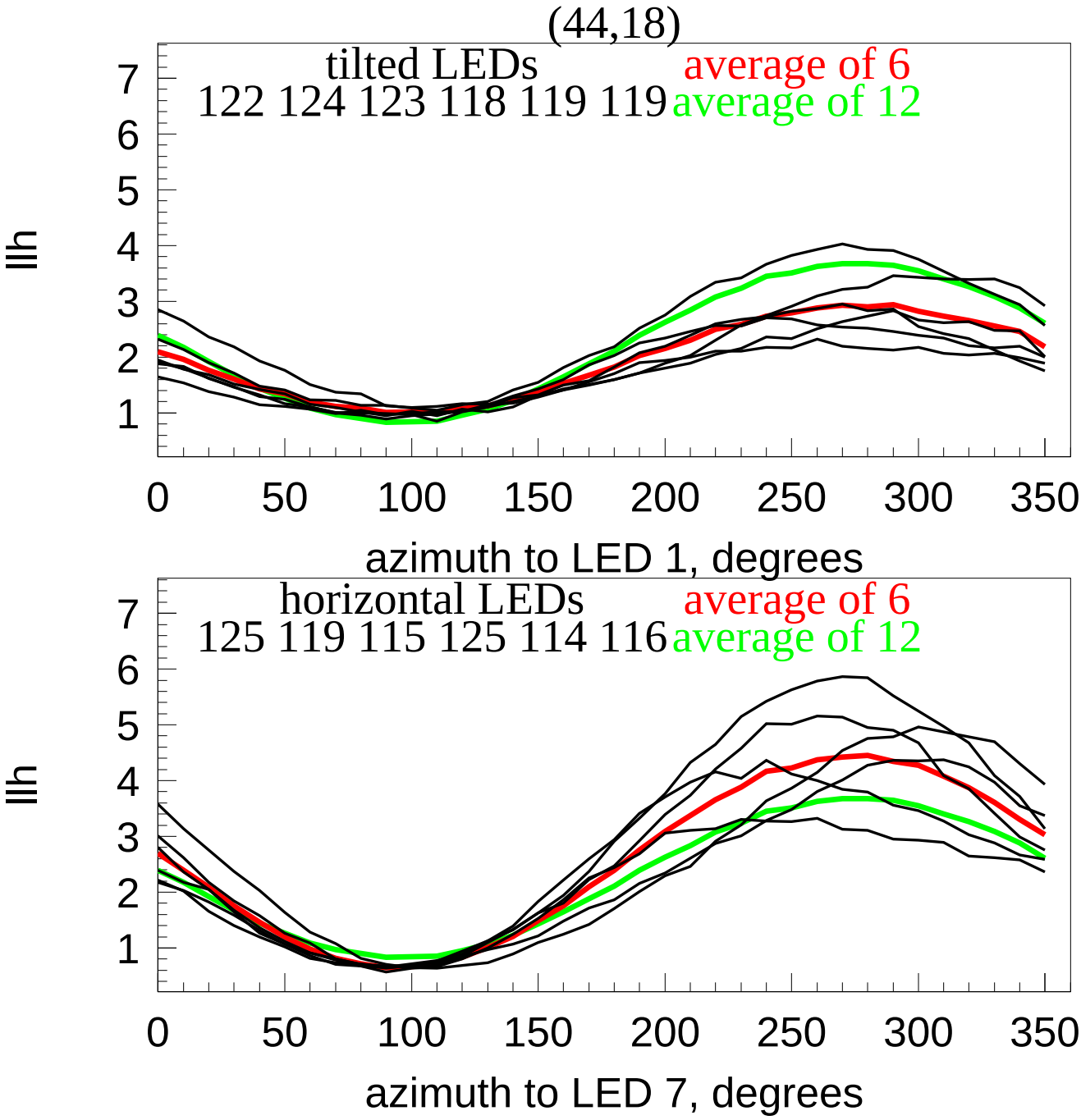

(44,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
243.9 ± 5.3

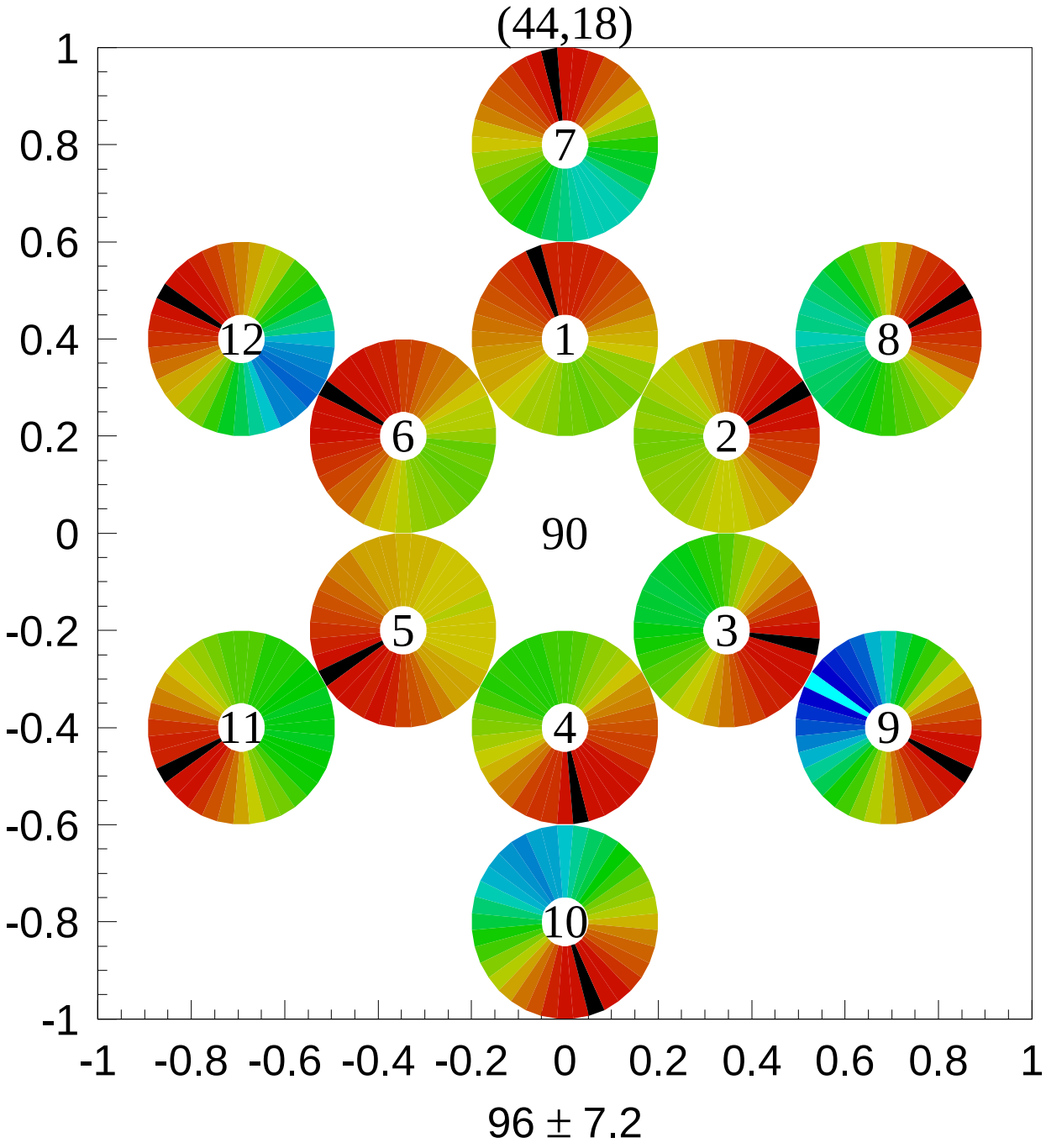

(44,16)
tilted LEDs
124 117 120 120 126 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 119 128 124 118 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

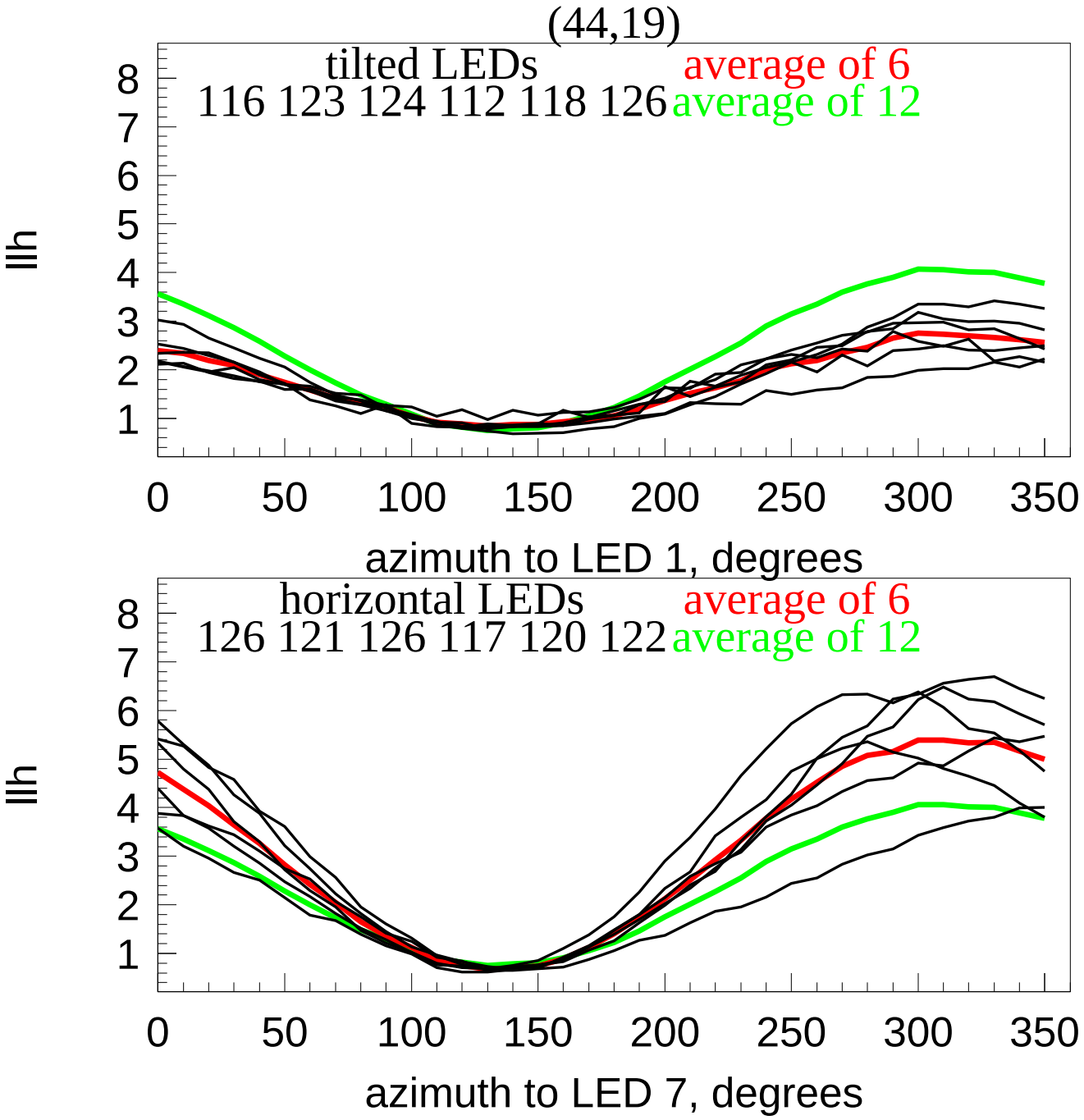

(44,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
129.6 ± 4.0

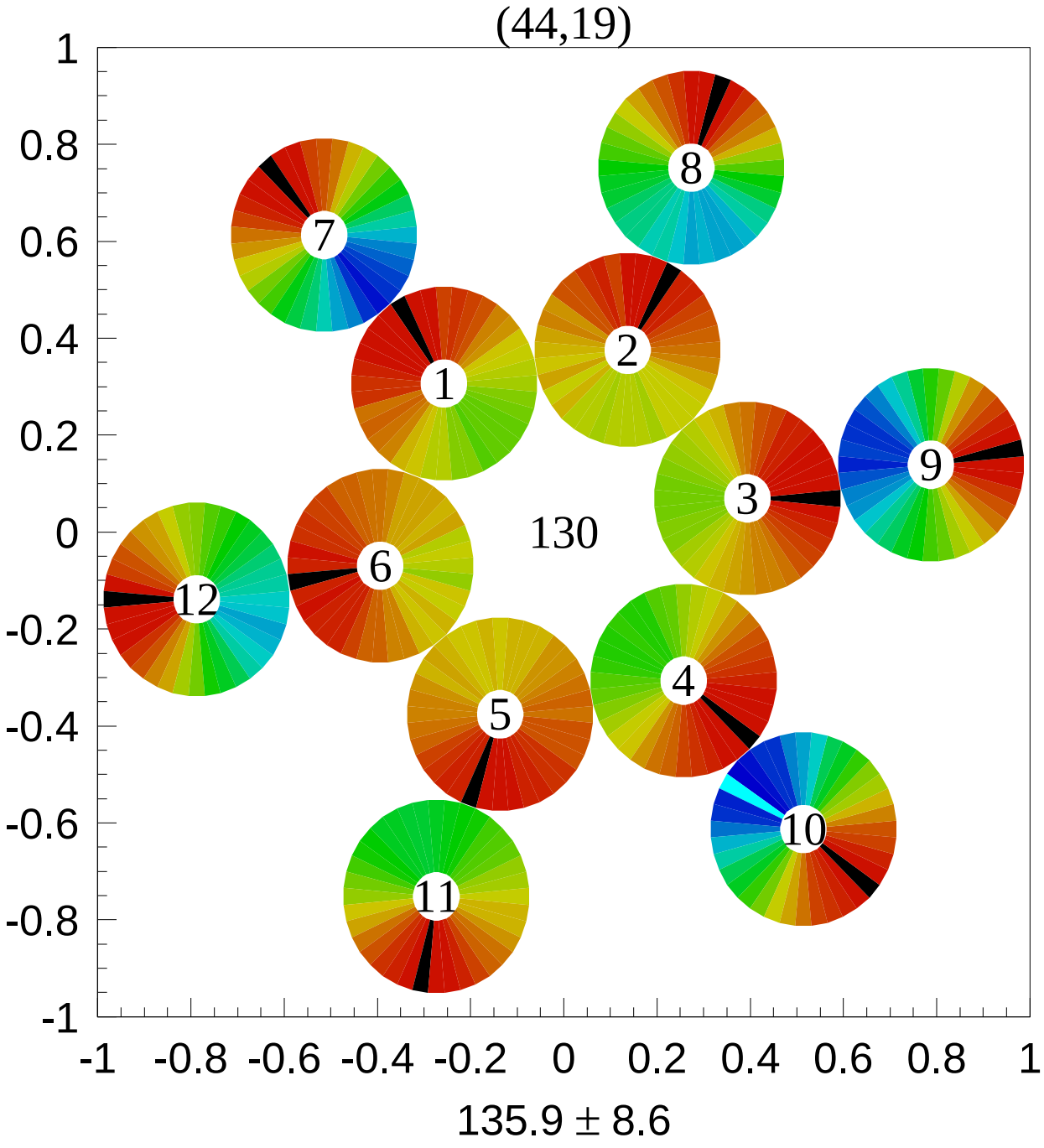

(44,17)
tilted LEDs
118 121 122 110 110 109
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 116 122 97 123 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

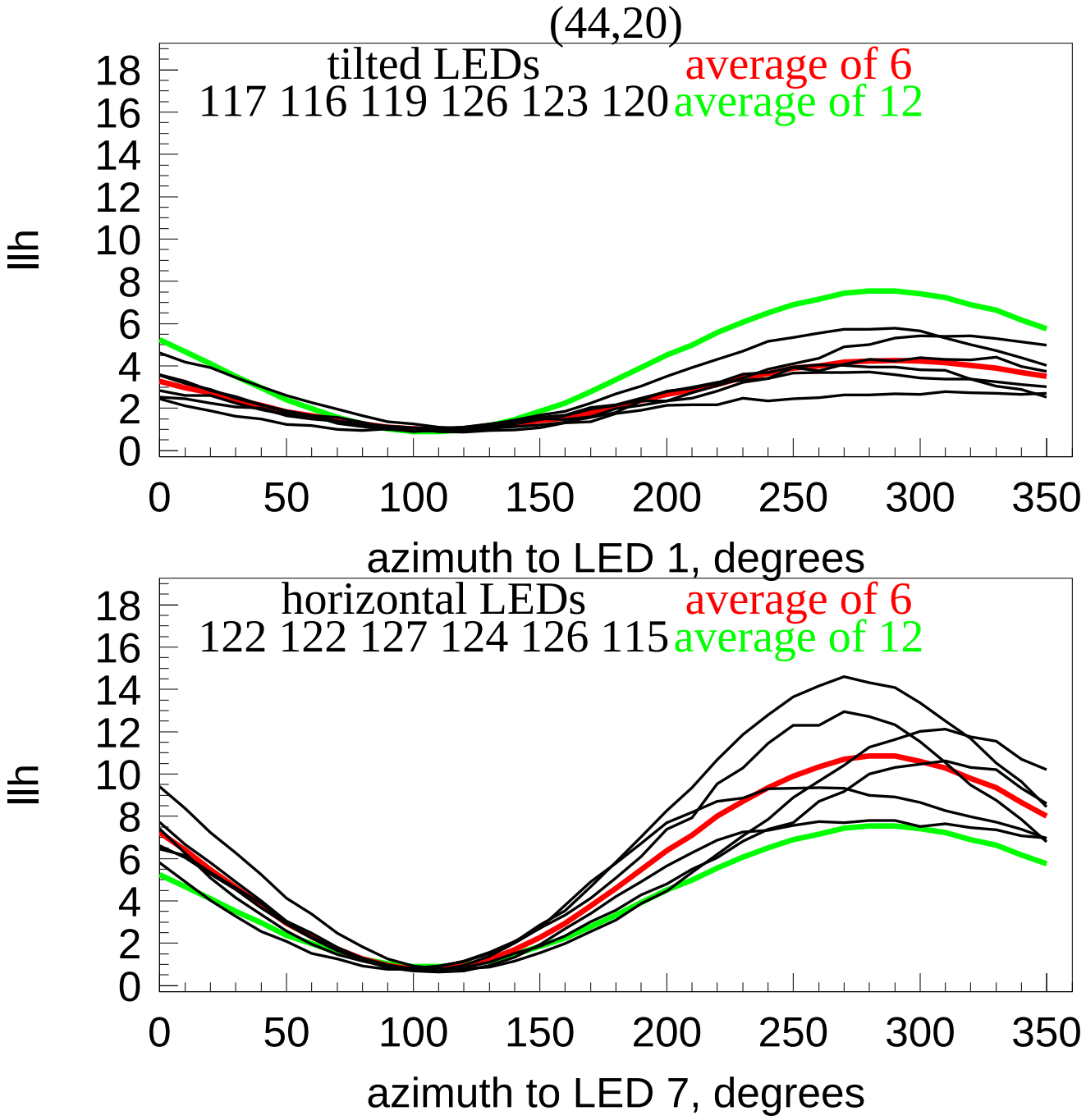

(44,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
149.3 ± 6.9

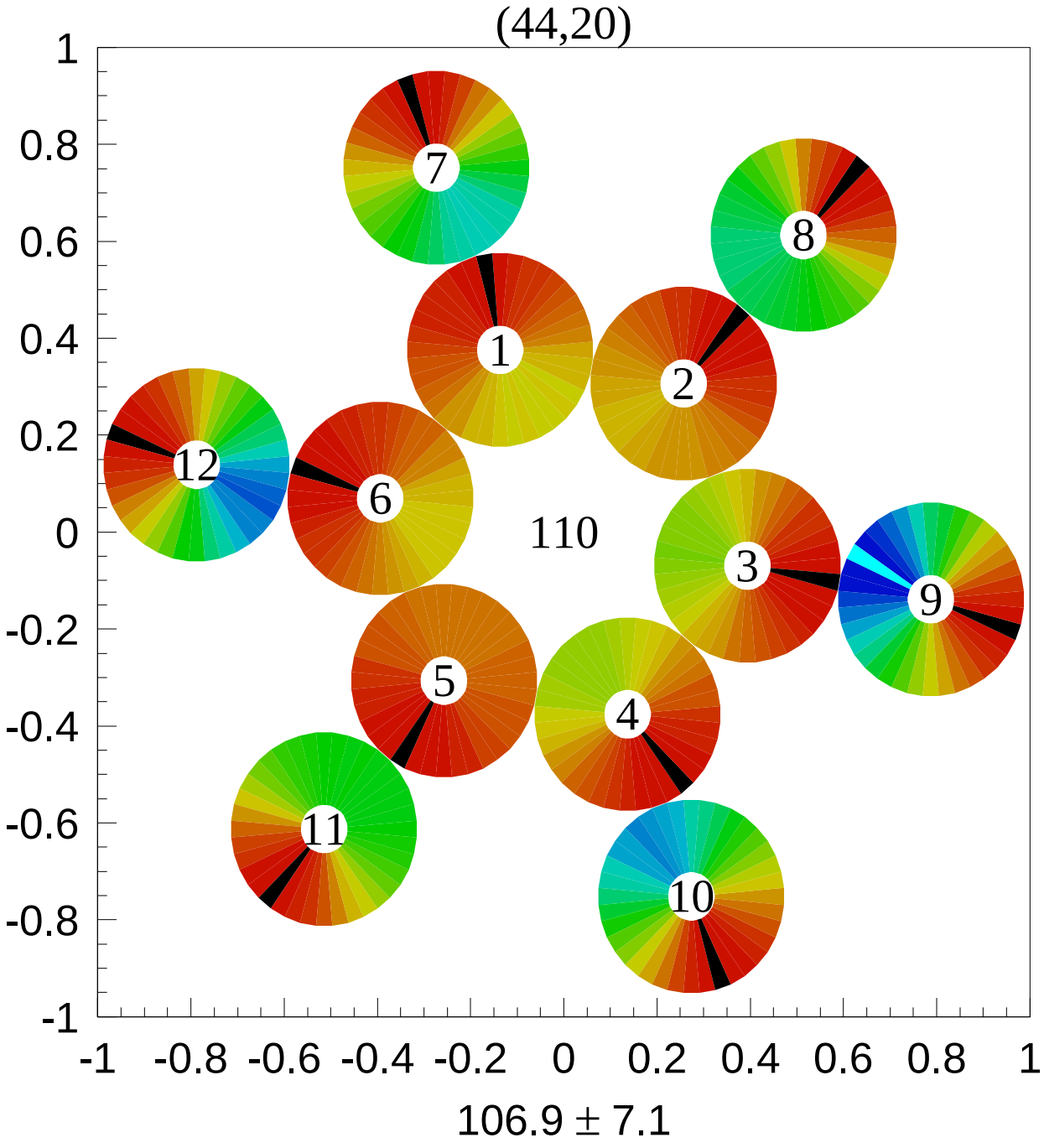

(44,18)
tilted LEDs
122 124 123 118 119 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 119 115 125 114 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

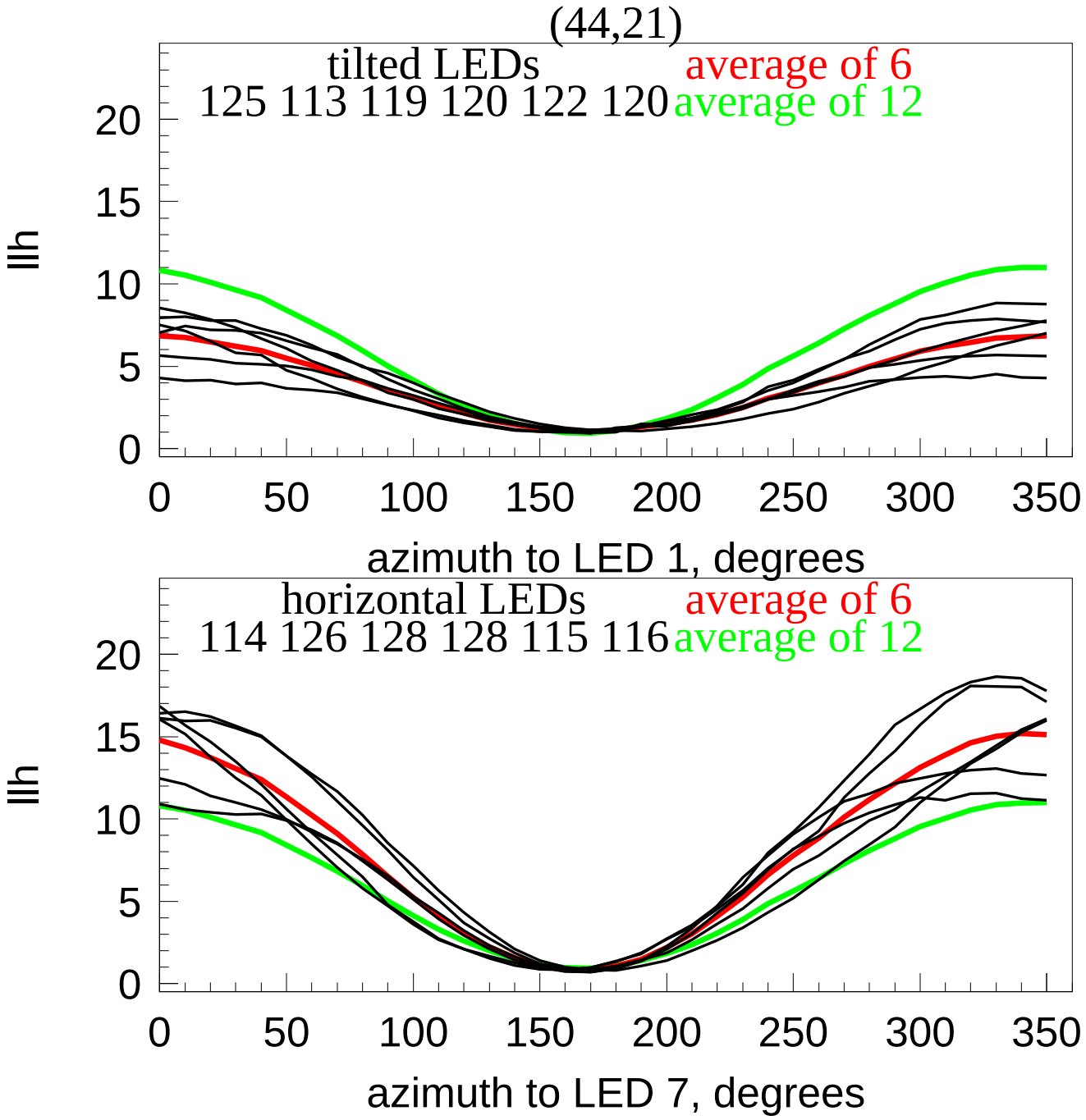

(44,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
96 ± 7.2

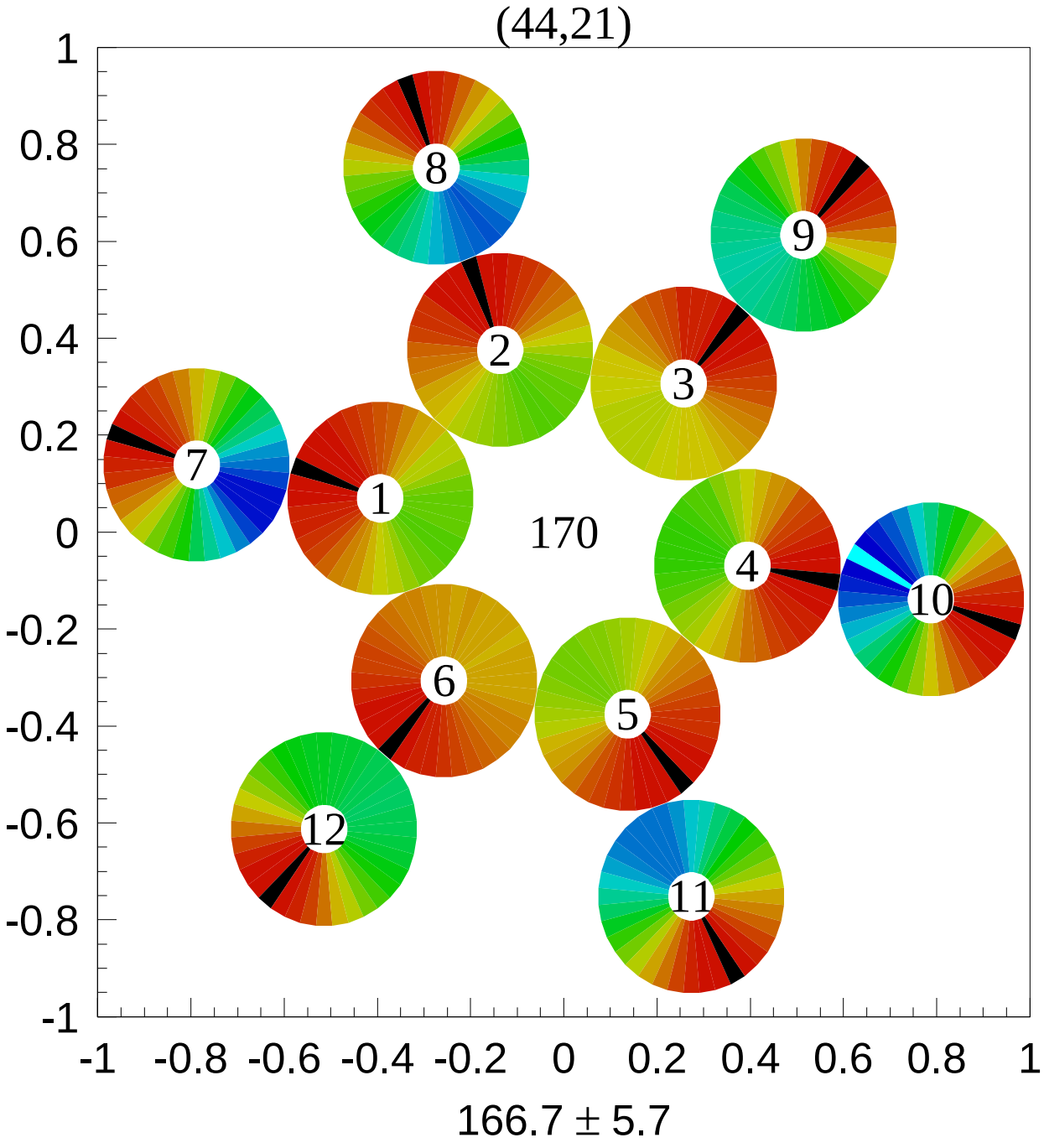

(44,19)
tilted LEDs
116 123 124 112 118 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 121 126 117 120 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

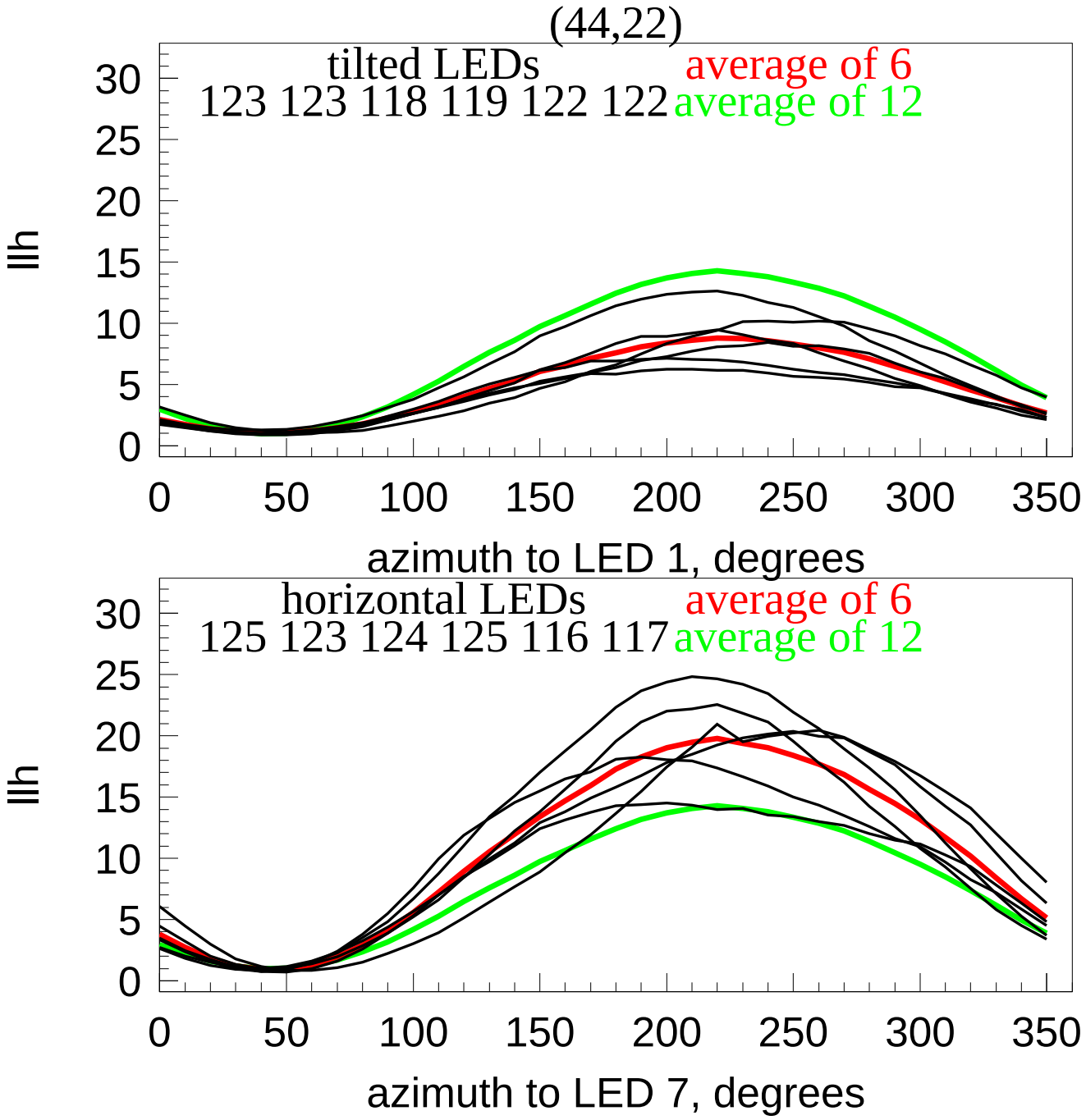

(44,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
135.9 ± 8.6
130
1
2
3
4
5
6
7
8
9
10
11
12

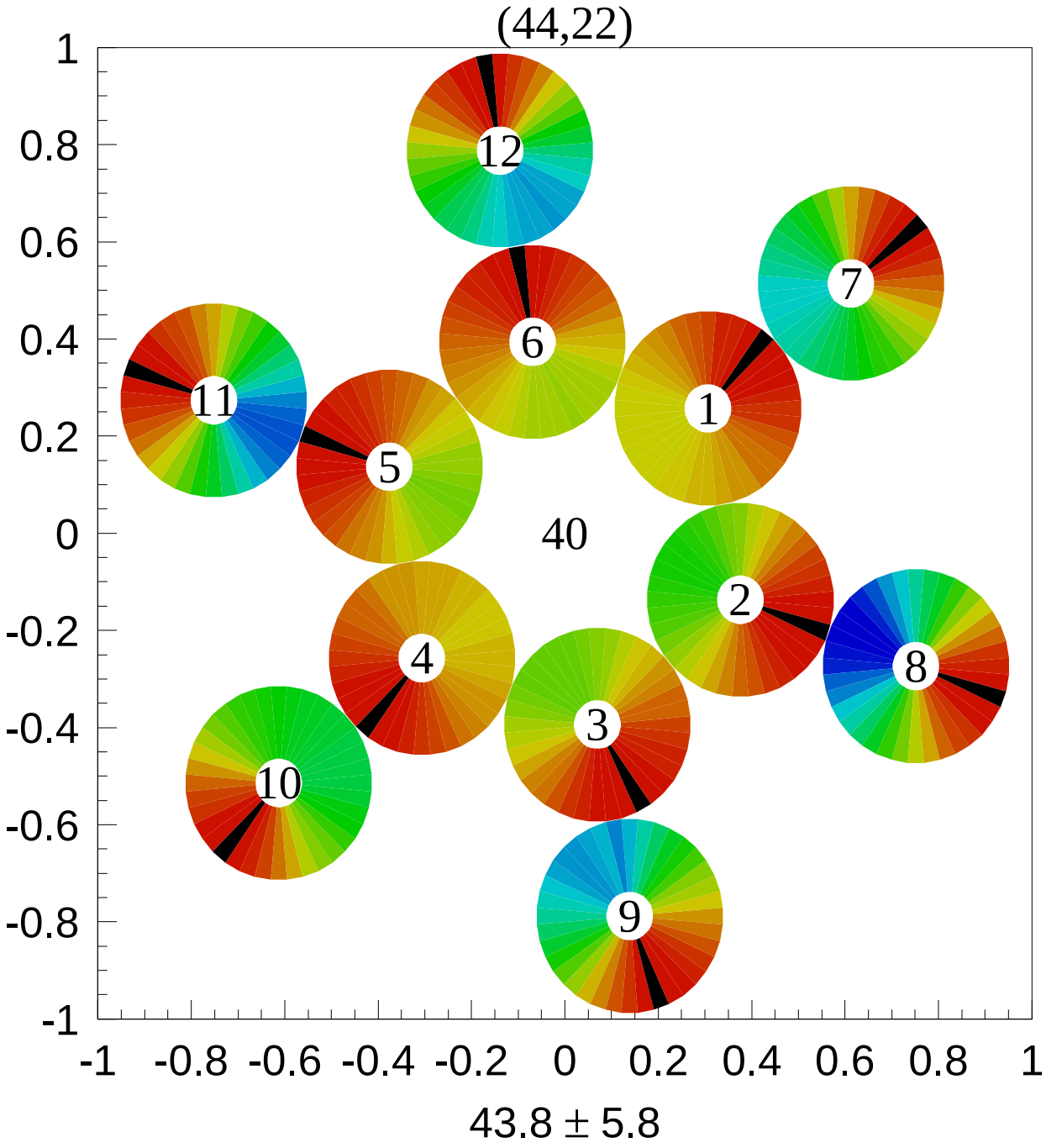

(44,20)
tilted LEDs
117 116 119 126 123 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 122 127 124 126 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

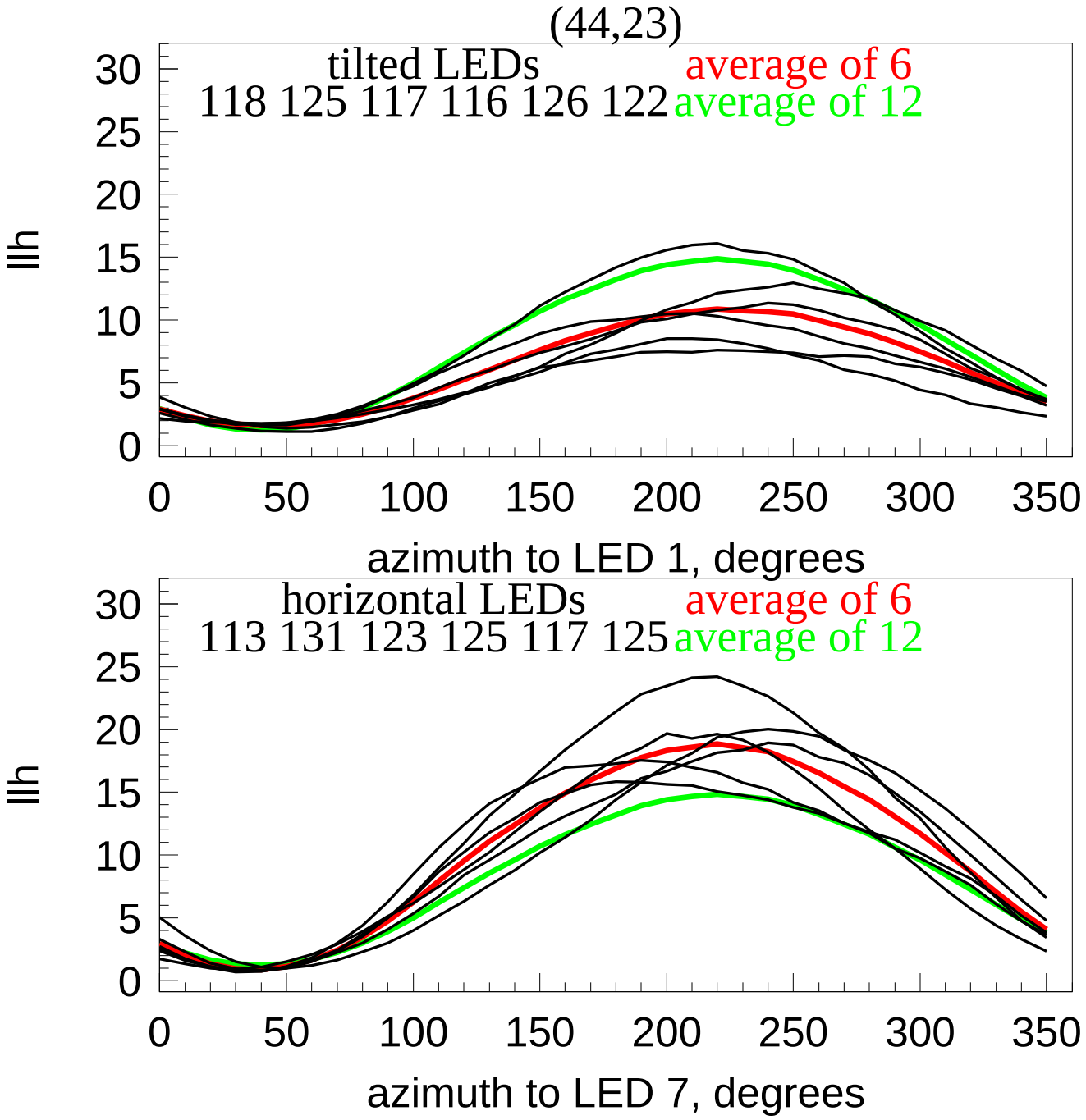

(44,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
106.9 ± 7.1

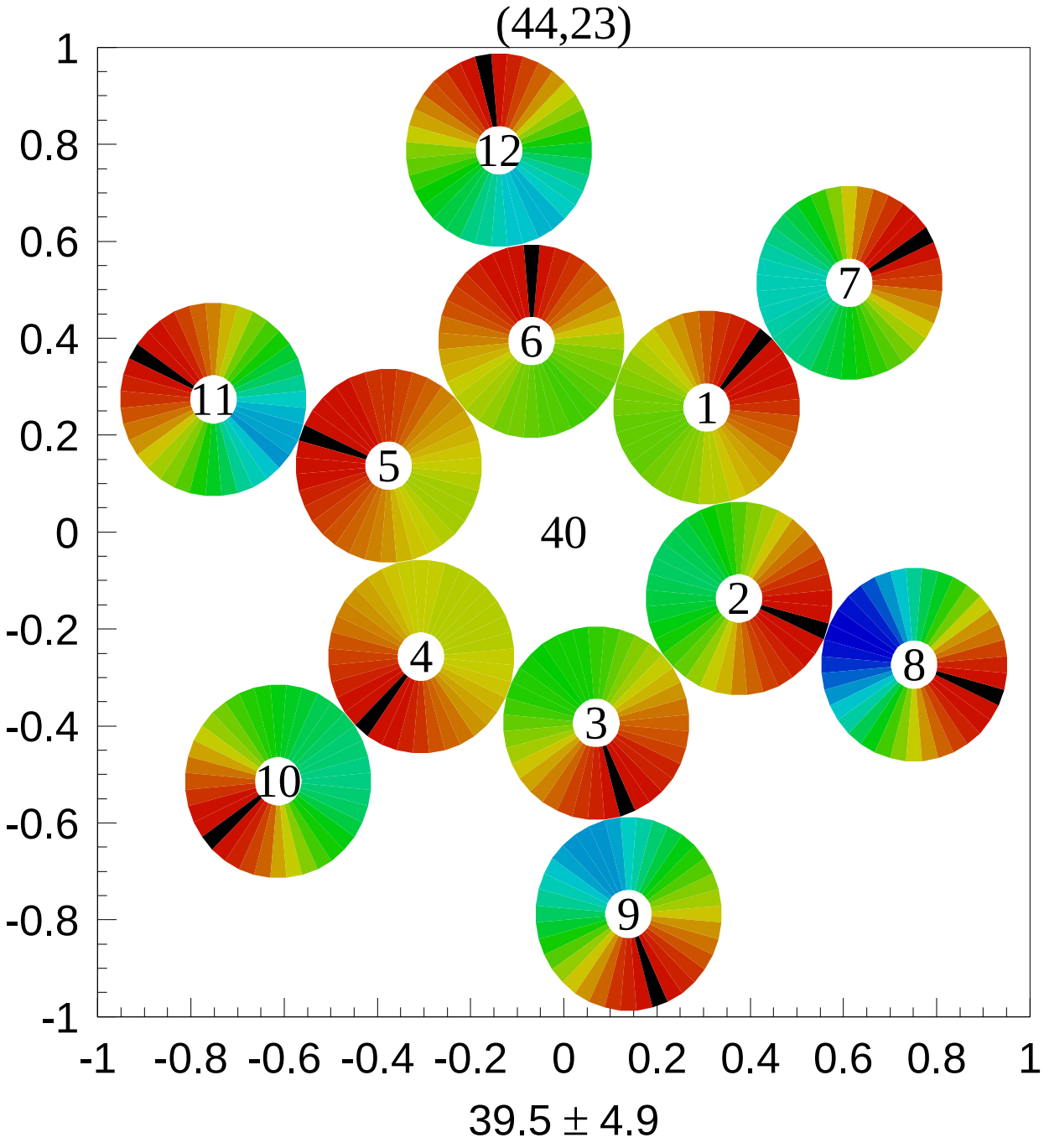

(44,21)
tilted LEDs
125 113 119 120 122 120
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
114 126 128 128 115 116
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

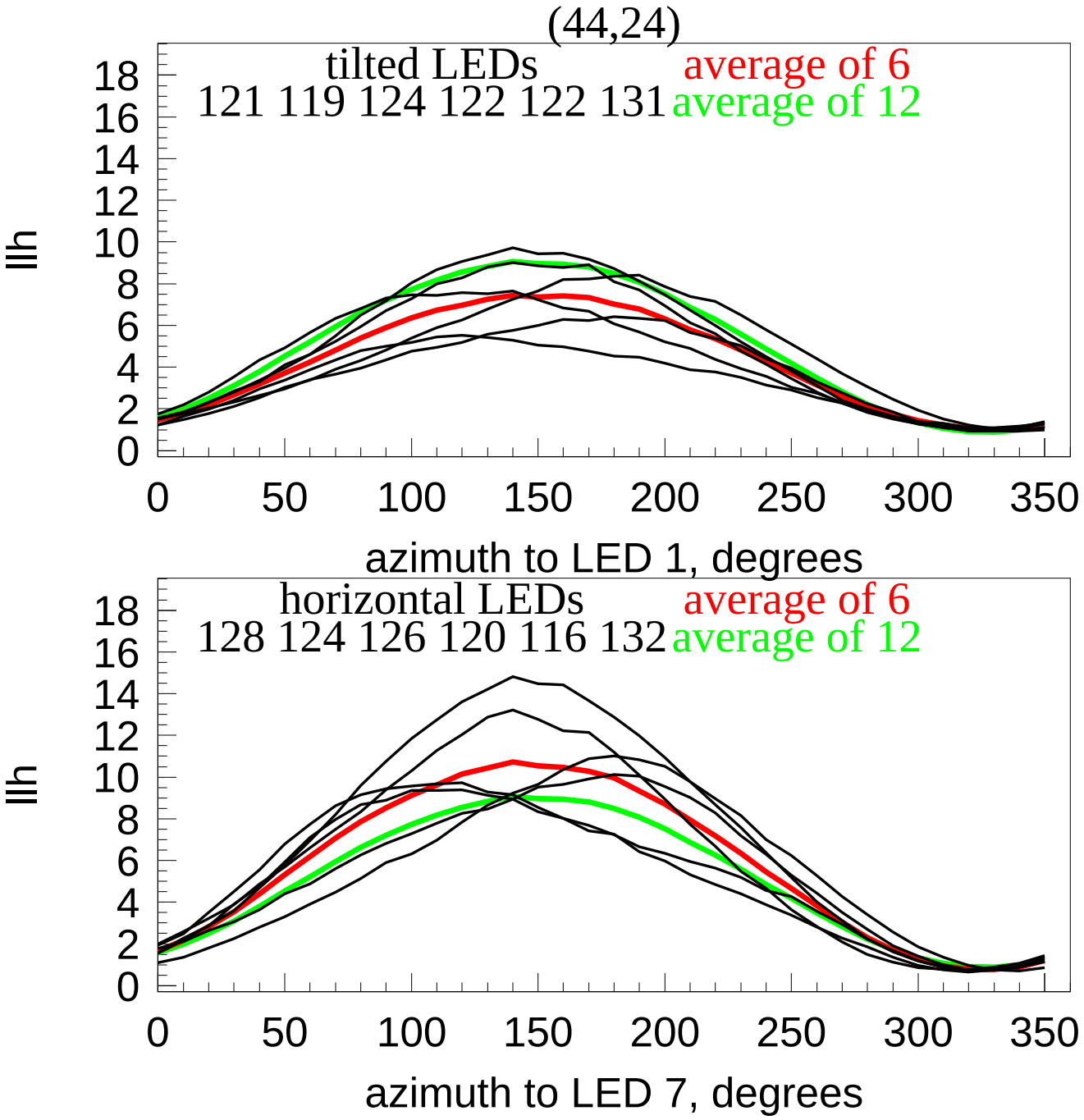

(44,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
166.7 ± 5.7

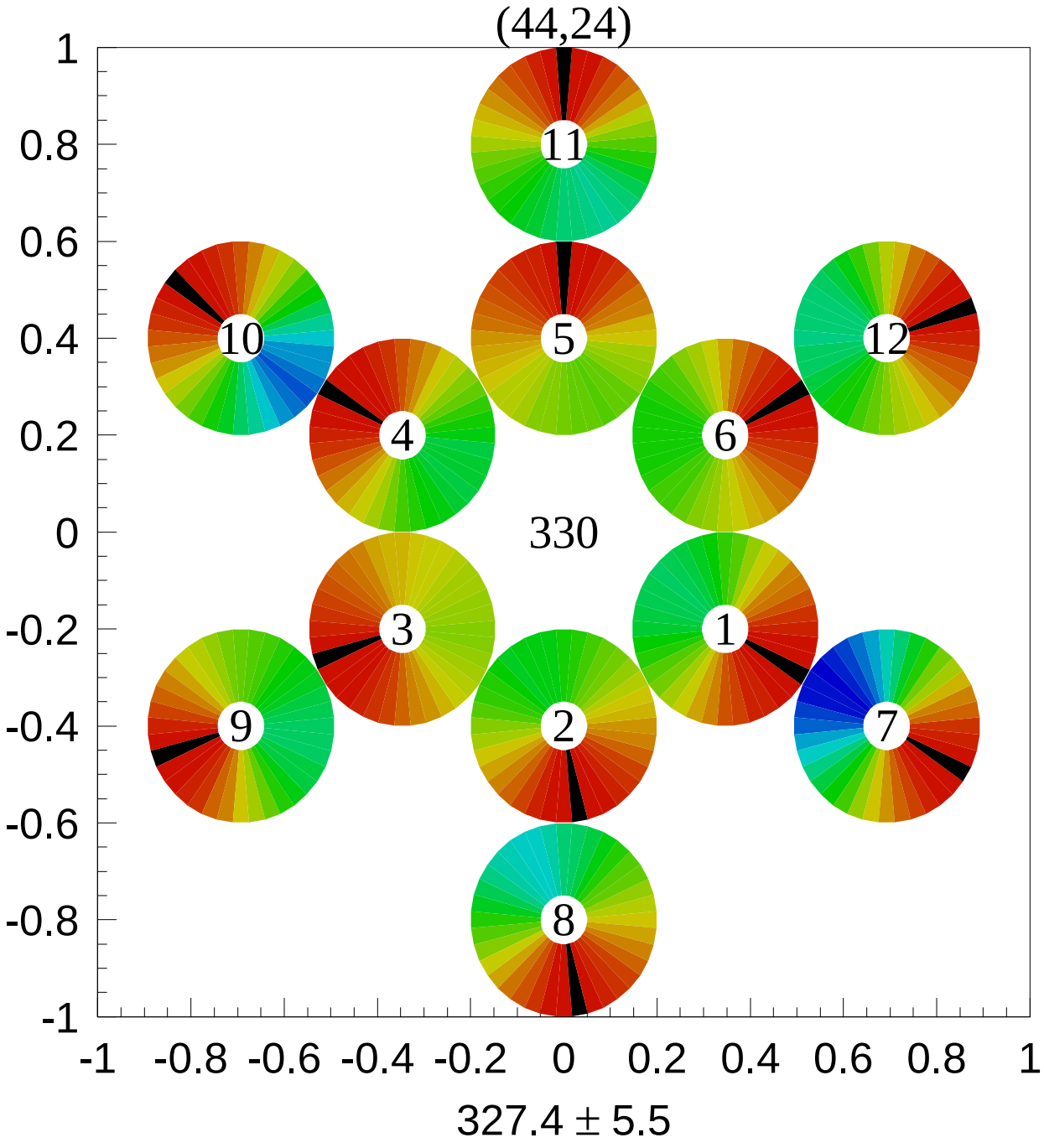

(44,22)
tilted LEDs
123 123 118 119 122 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 123 124 125 116 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

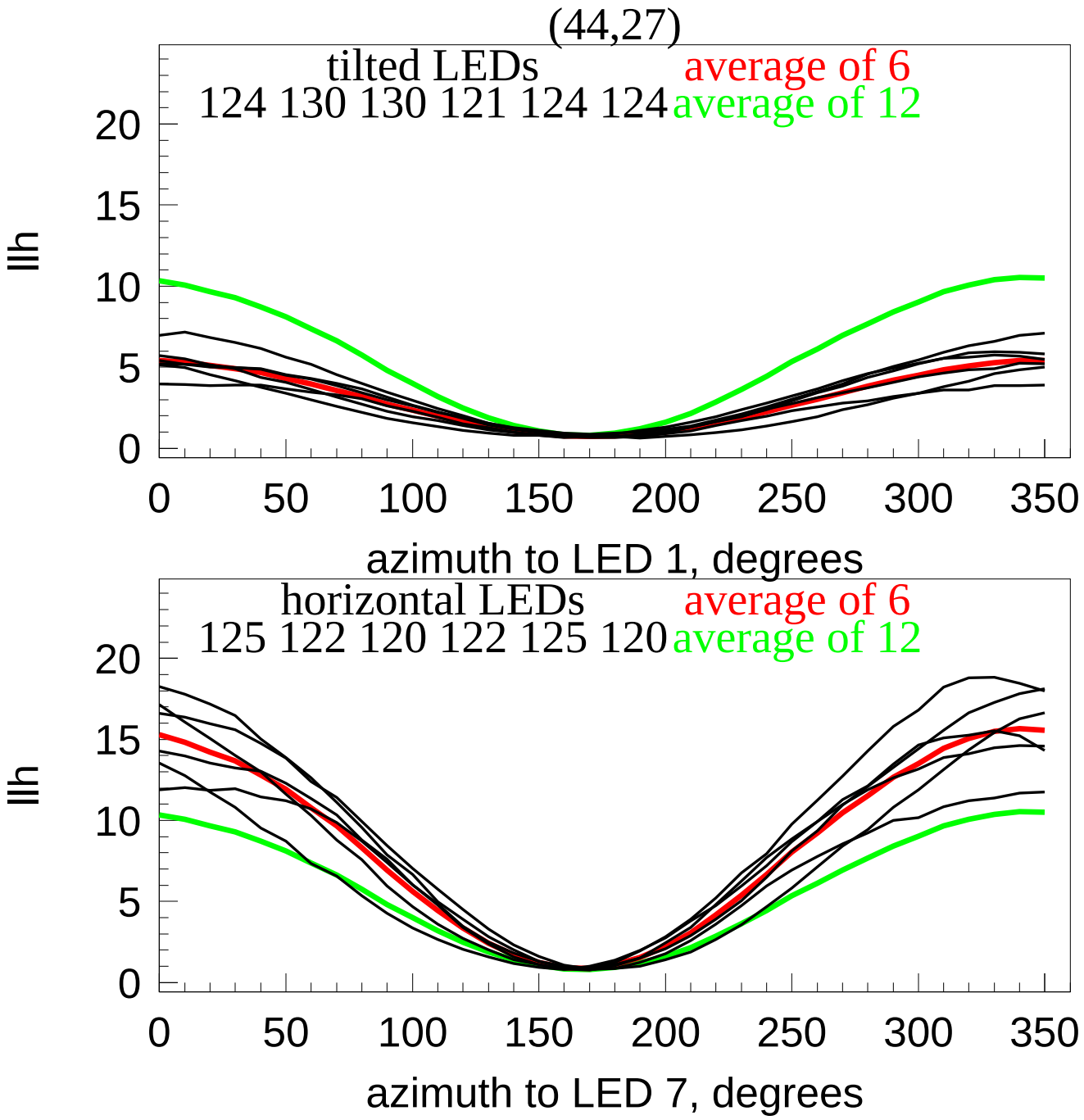

(44,22)
12
7
6
1
11
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
43.8 ± 5.8

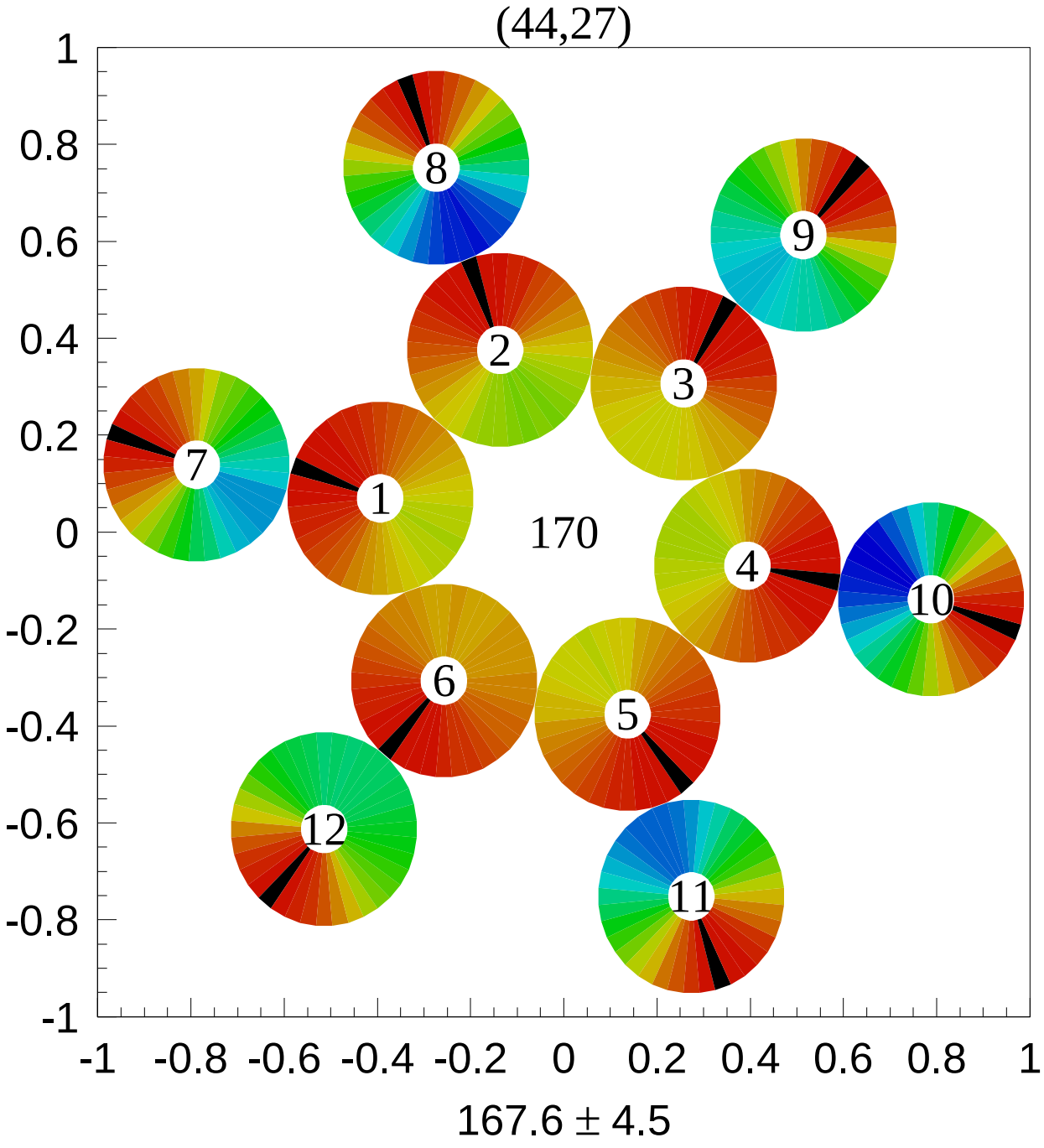

(44,23)
tilted LEDs
118 125 117 116 126 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
113 131 123 125 117 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

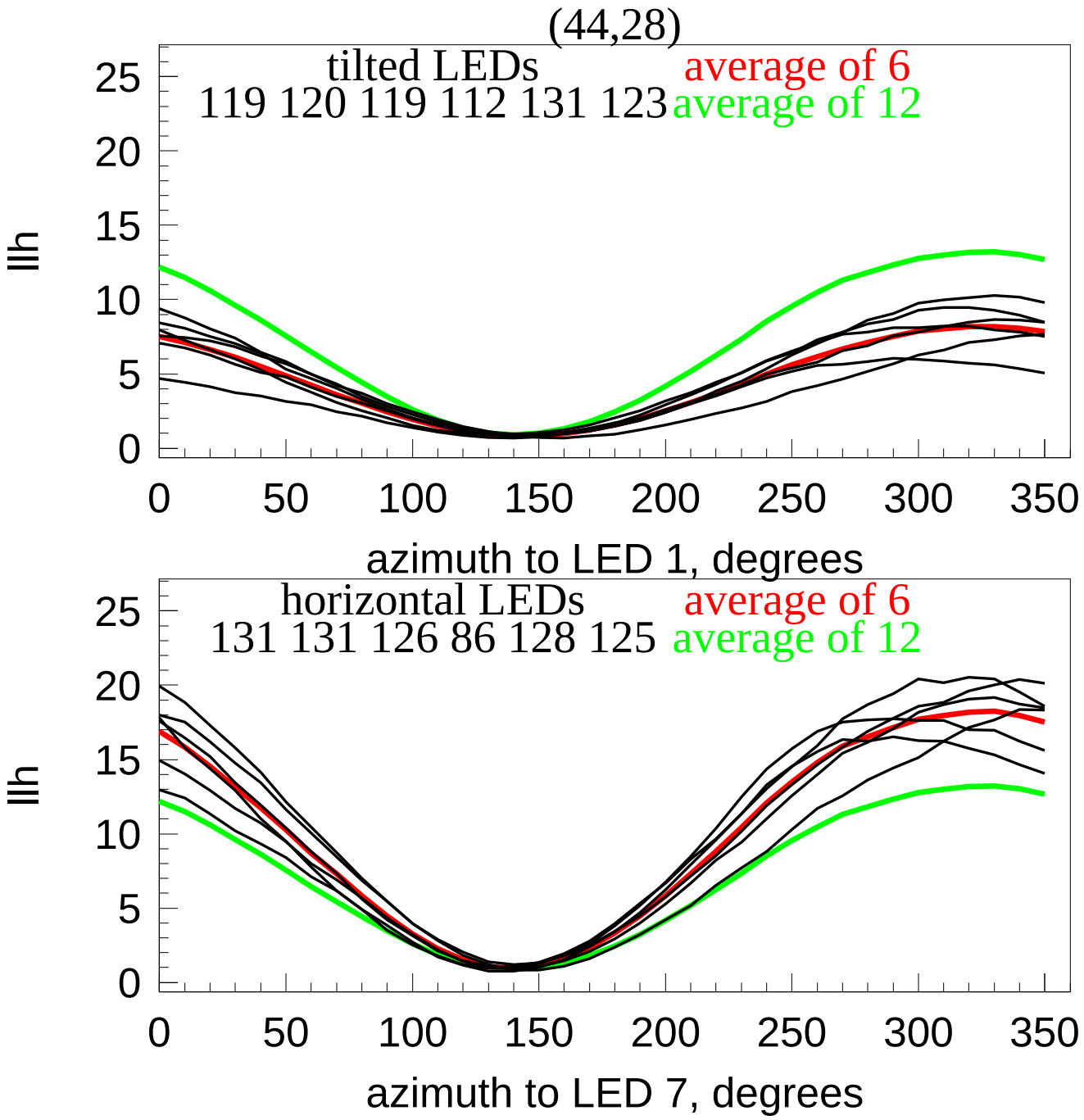

(44,23)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
39.5 ± 4.9

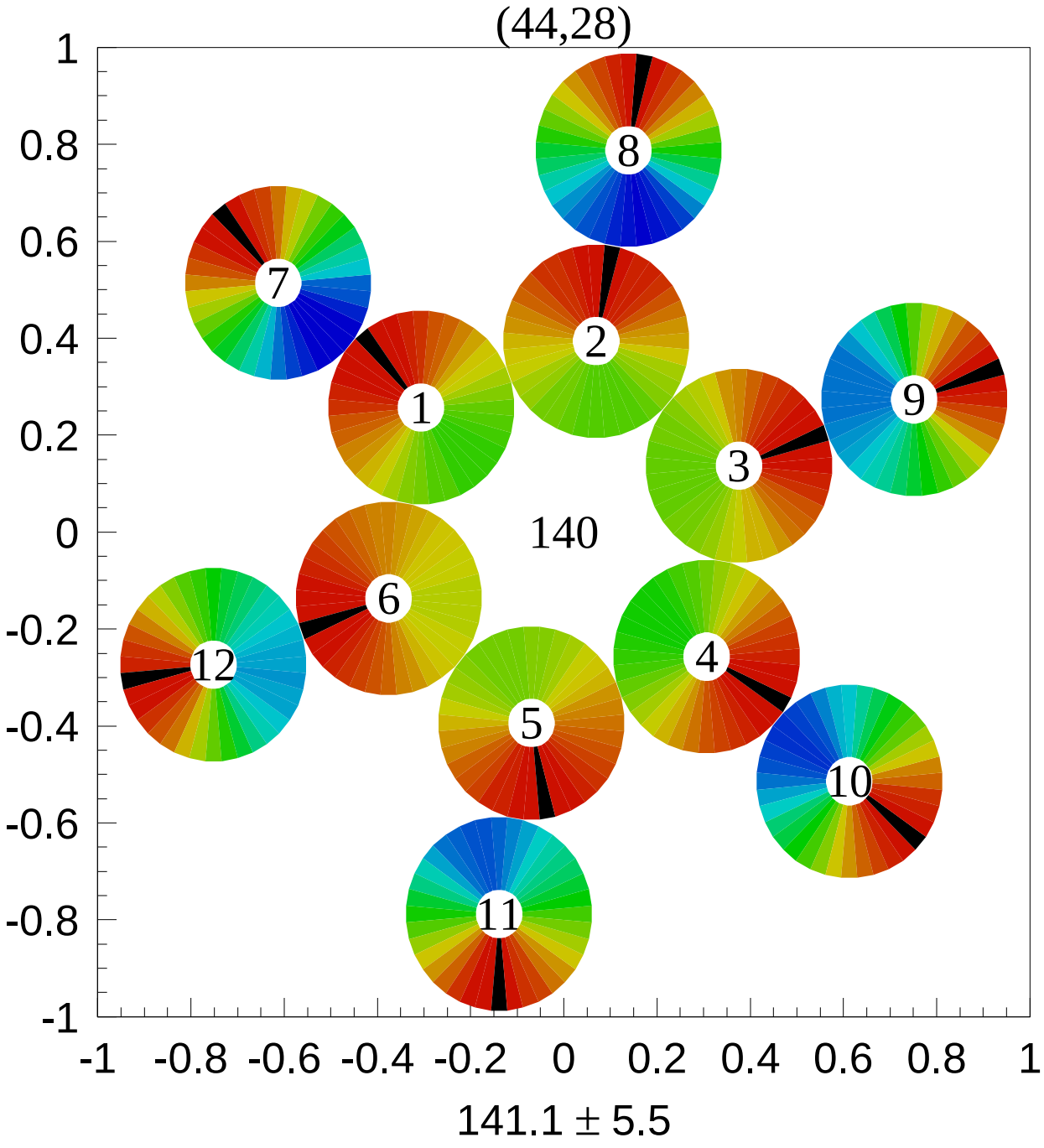

(44,24)
tilted LEDs
121 119 124 122 122 131
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 124 126 120 116 132
average of 6
average of 12
llh
azimuth to LED 7, degrees

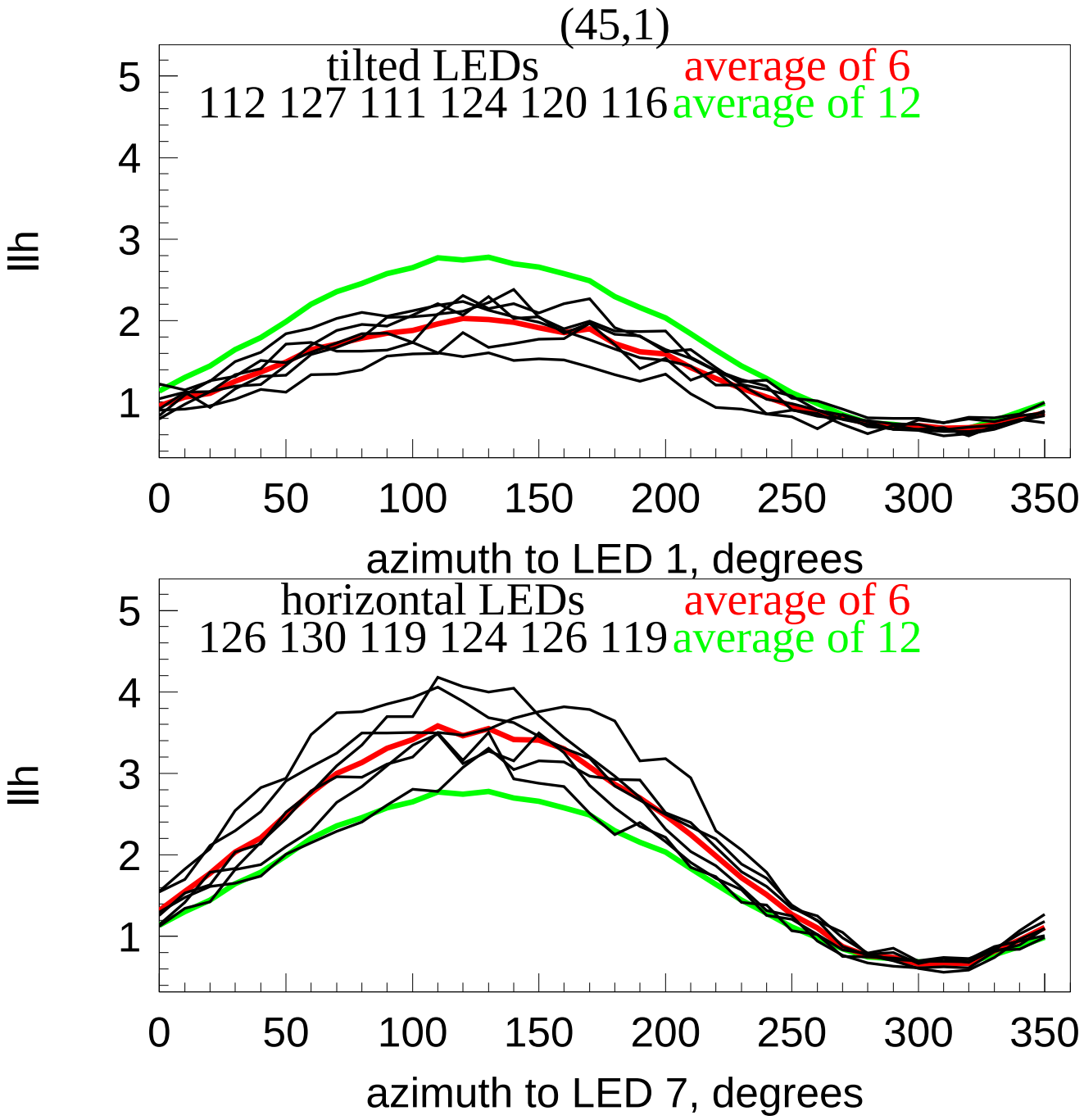

(44,24)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
327.4 ± 5.5

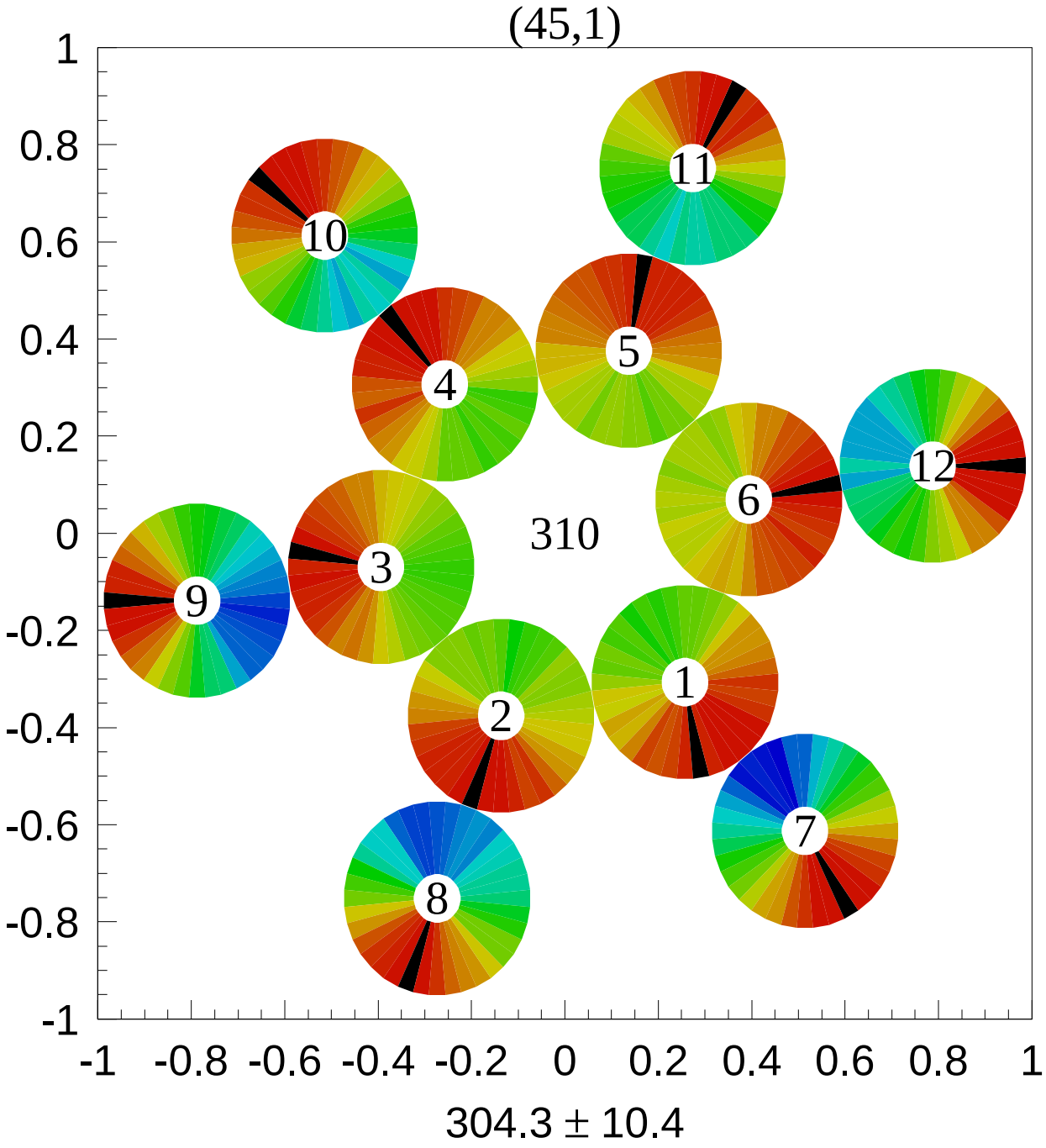

(44,27)
tilted LEDs
124 130 130 121 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 120 122 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

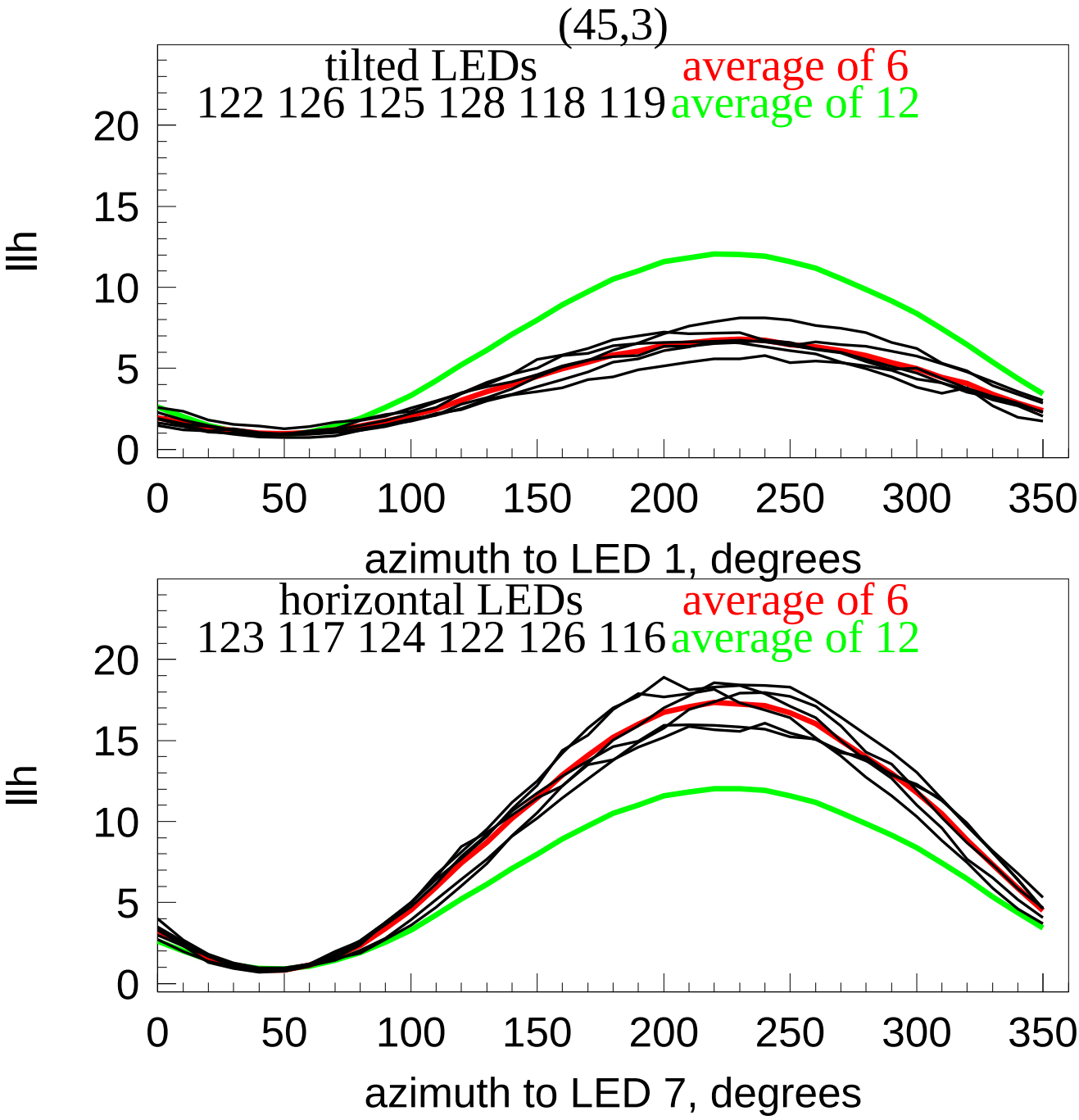

(44,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
167.6 ± 4.5

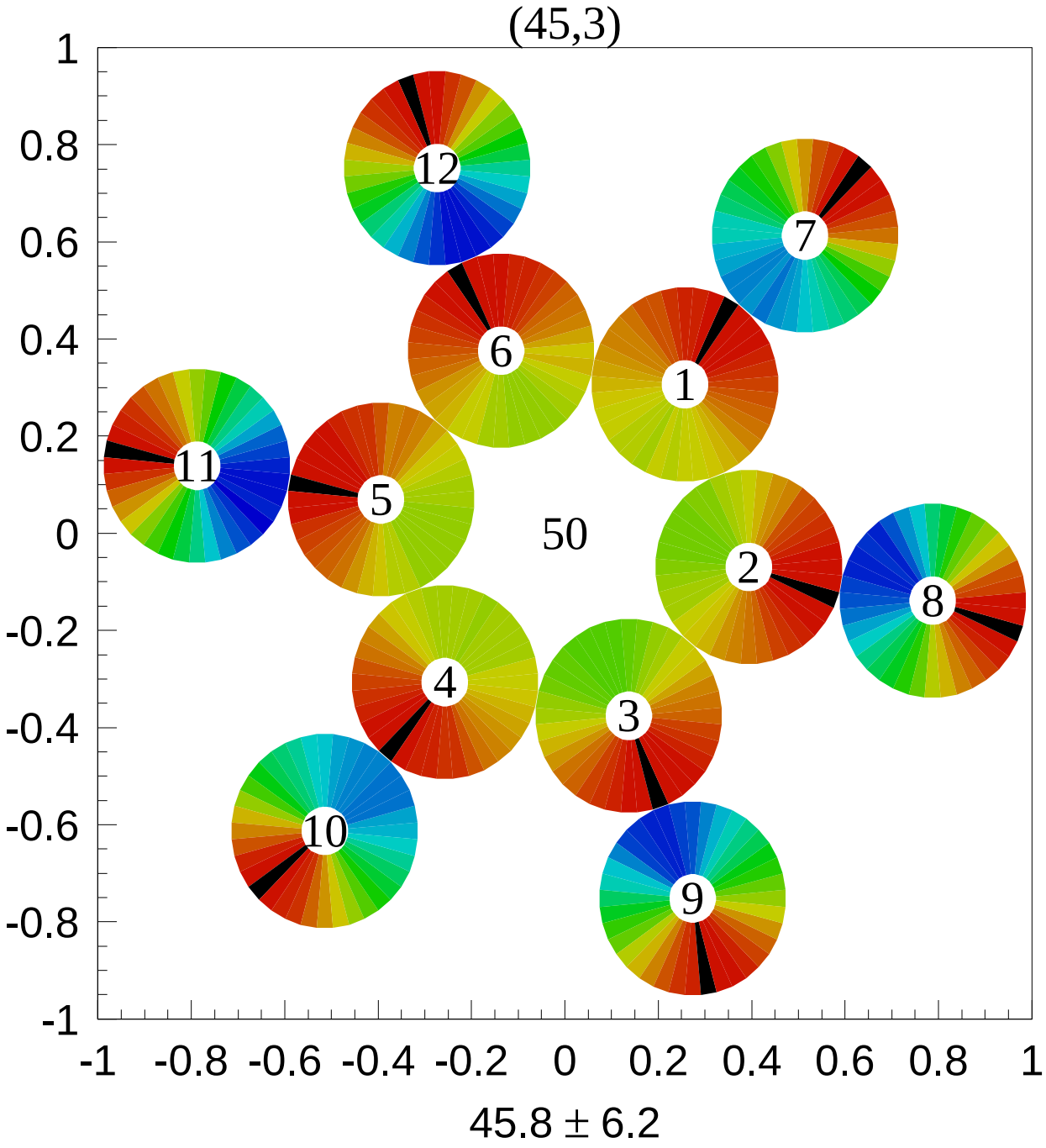

(44,28)
tilted LEDs
119 120 119 112 131 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 131 126 86 128 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

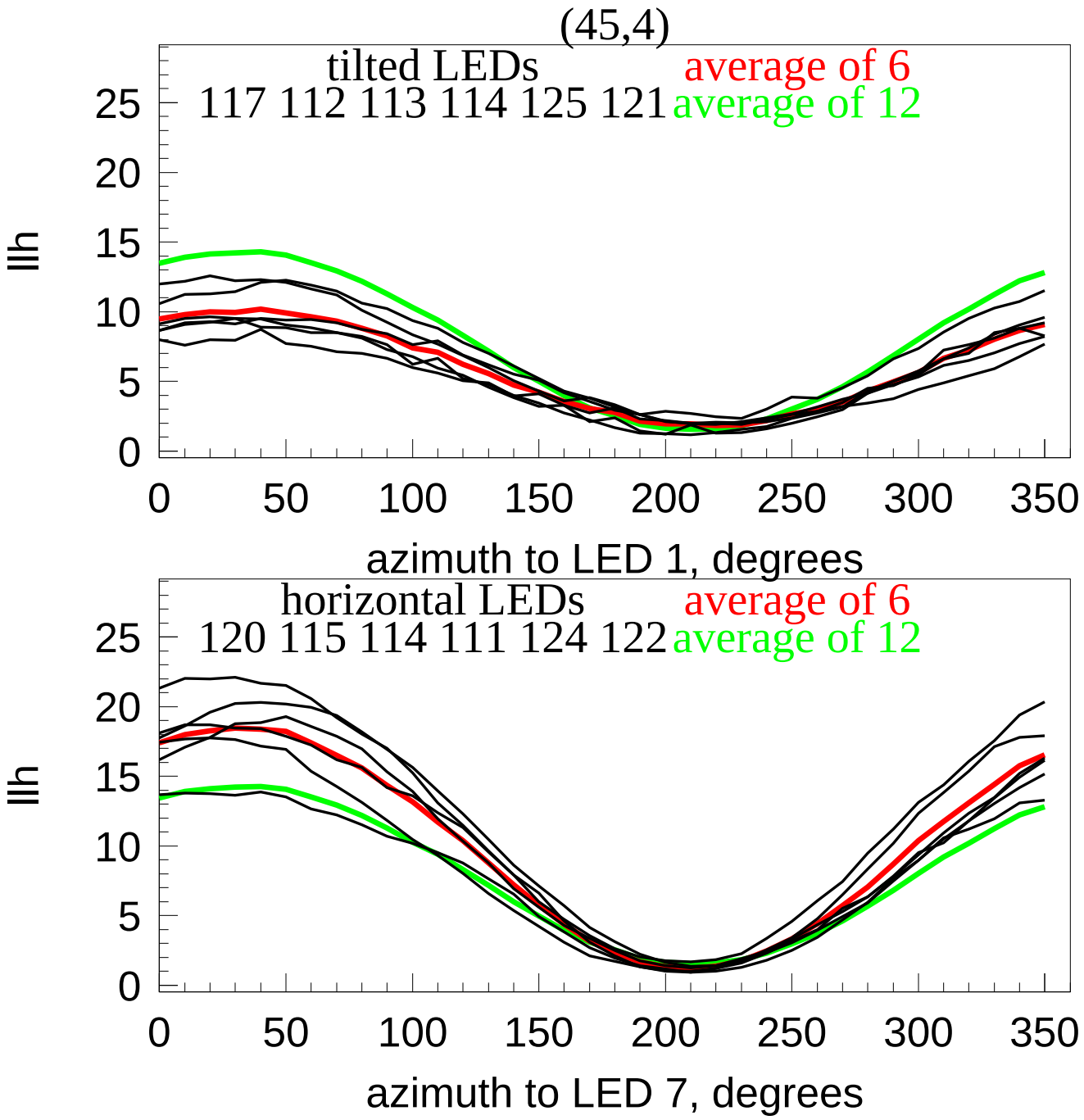

(44,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
141.1 ± 5.5
140
1
2
3
4
5
6
7
8
9
10
11
12

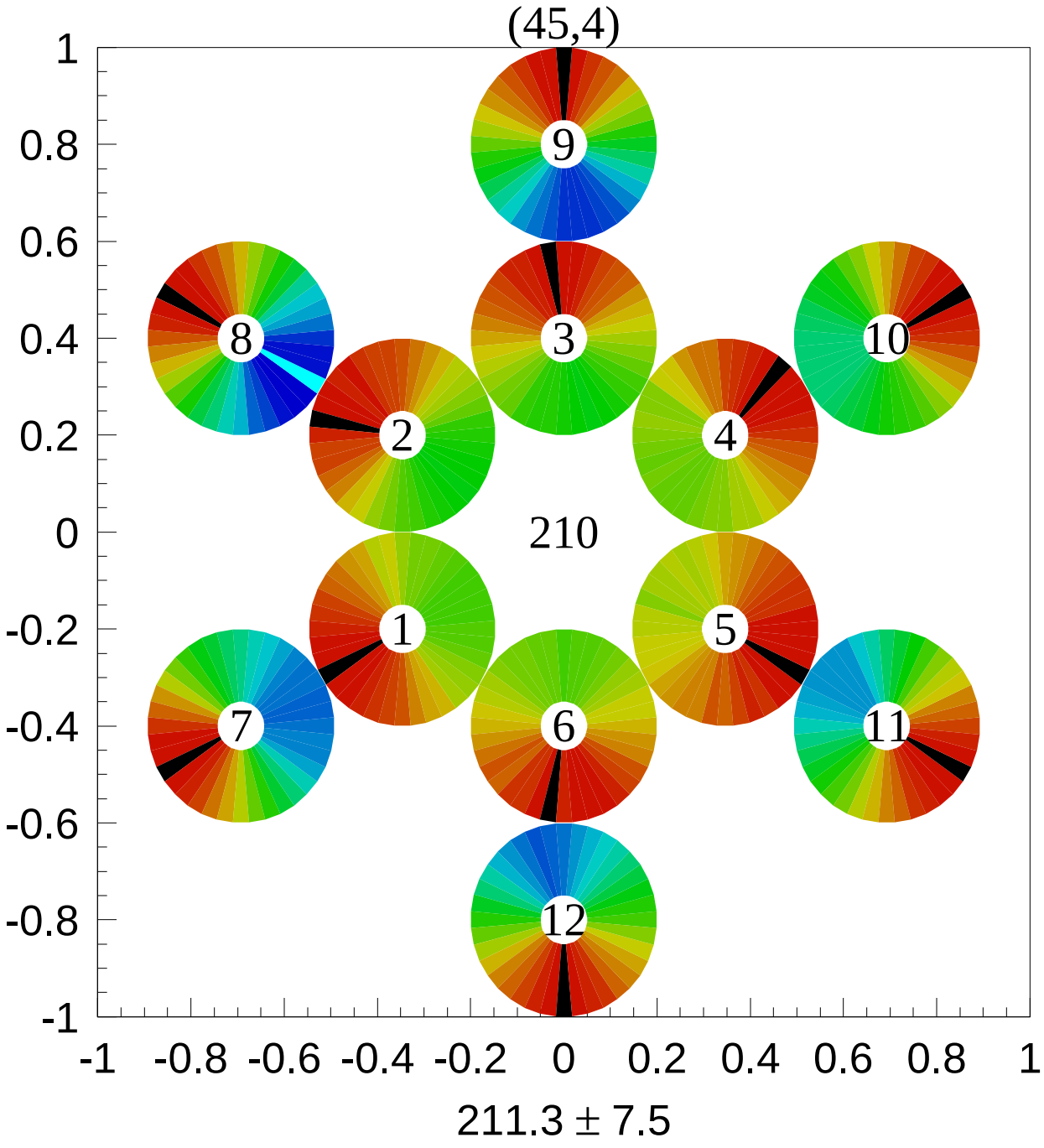

(45,1)
tilted LEDs
112 127 111 124 120 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 130 119 124 126 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

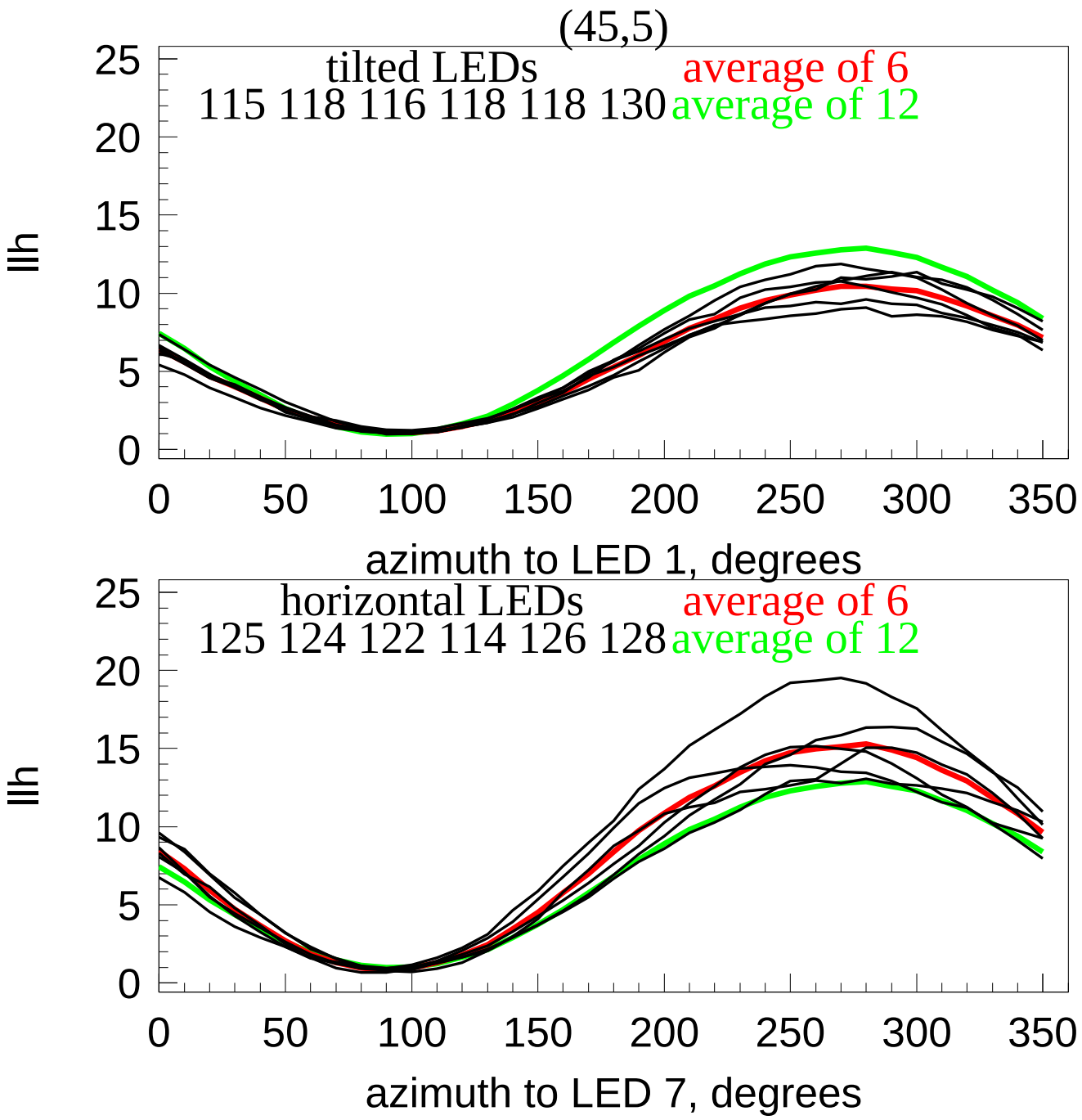

(45,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
304.3 ± 10.4
310
1
2
3
4
5
6
7
8
9
10
11
12

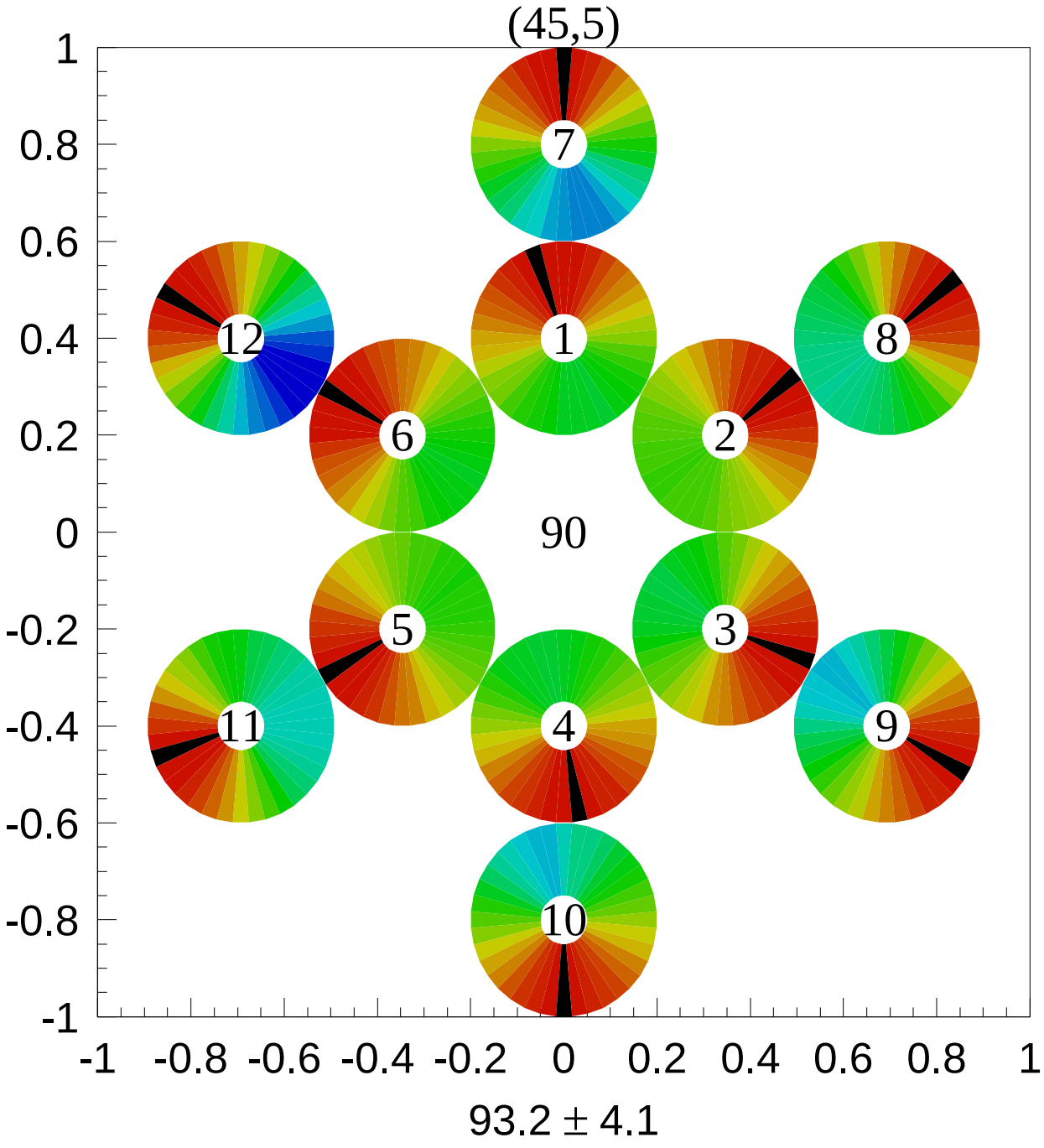

(45,3)
tilted LEDs
122 126 125 128 118 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 117 124 122 126 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

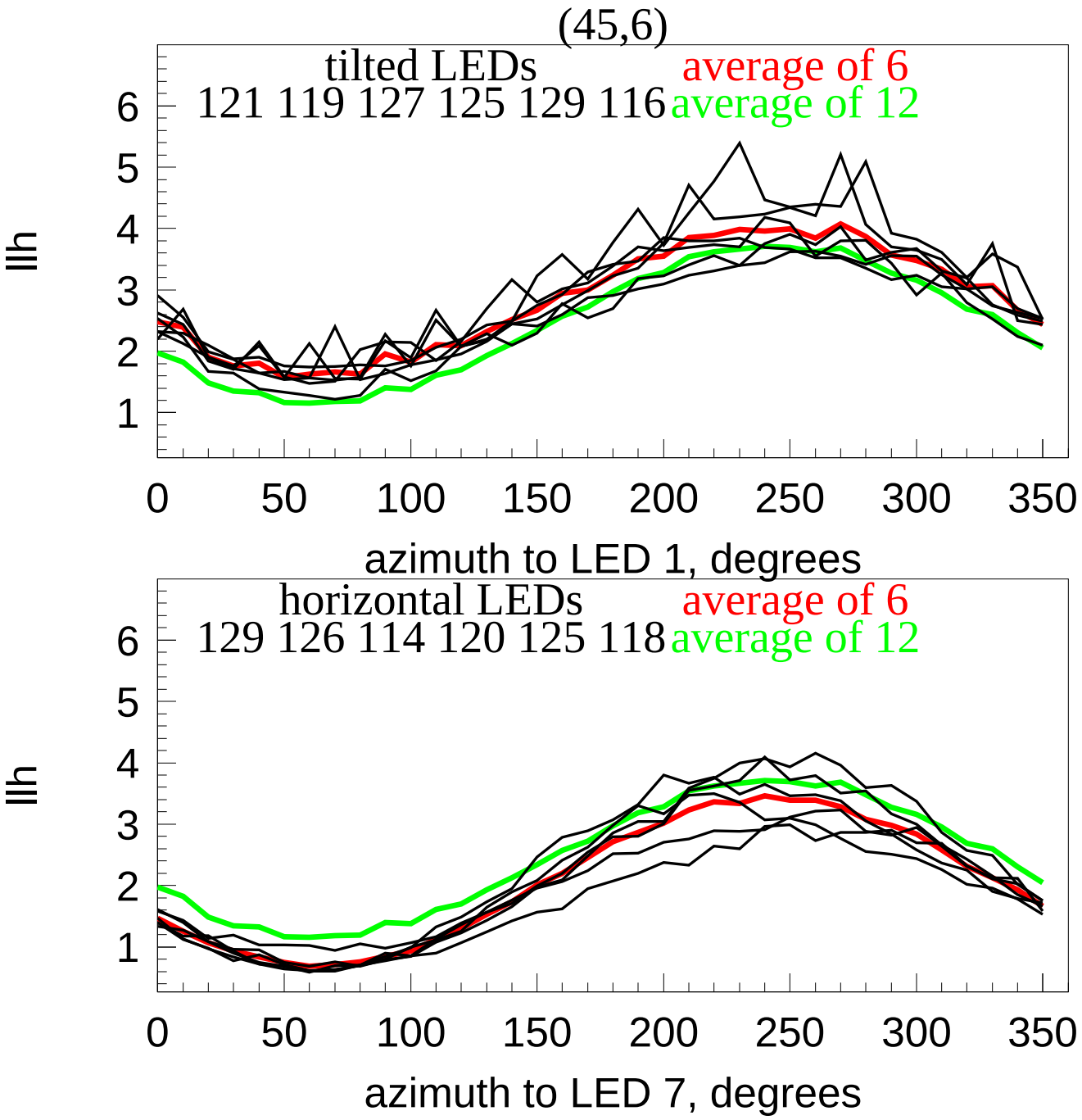

(45,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
45.8 ± 6.2

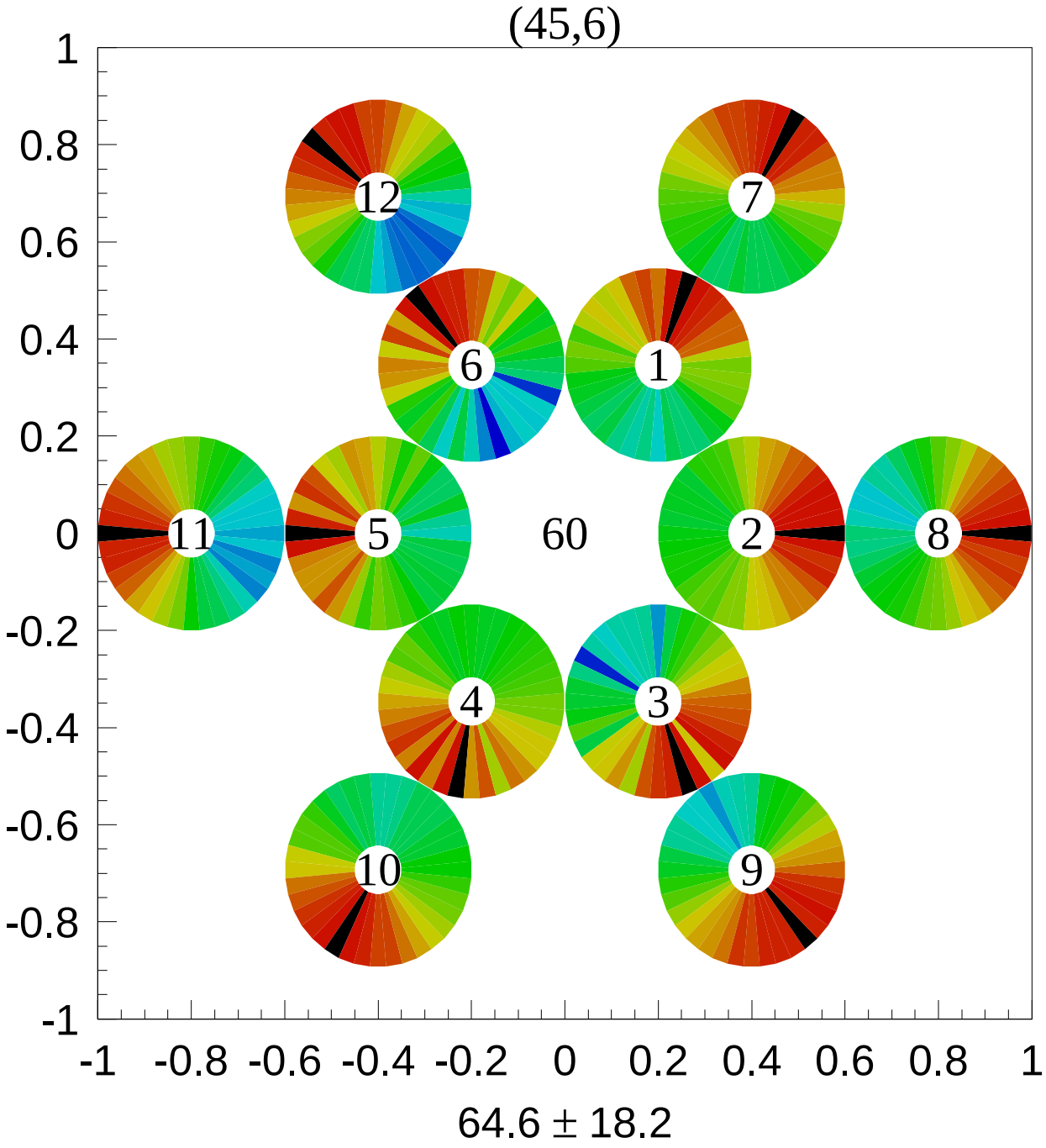

(45,4)
tilted LEDs
117 112 113 114 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 115 114 111 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

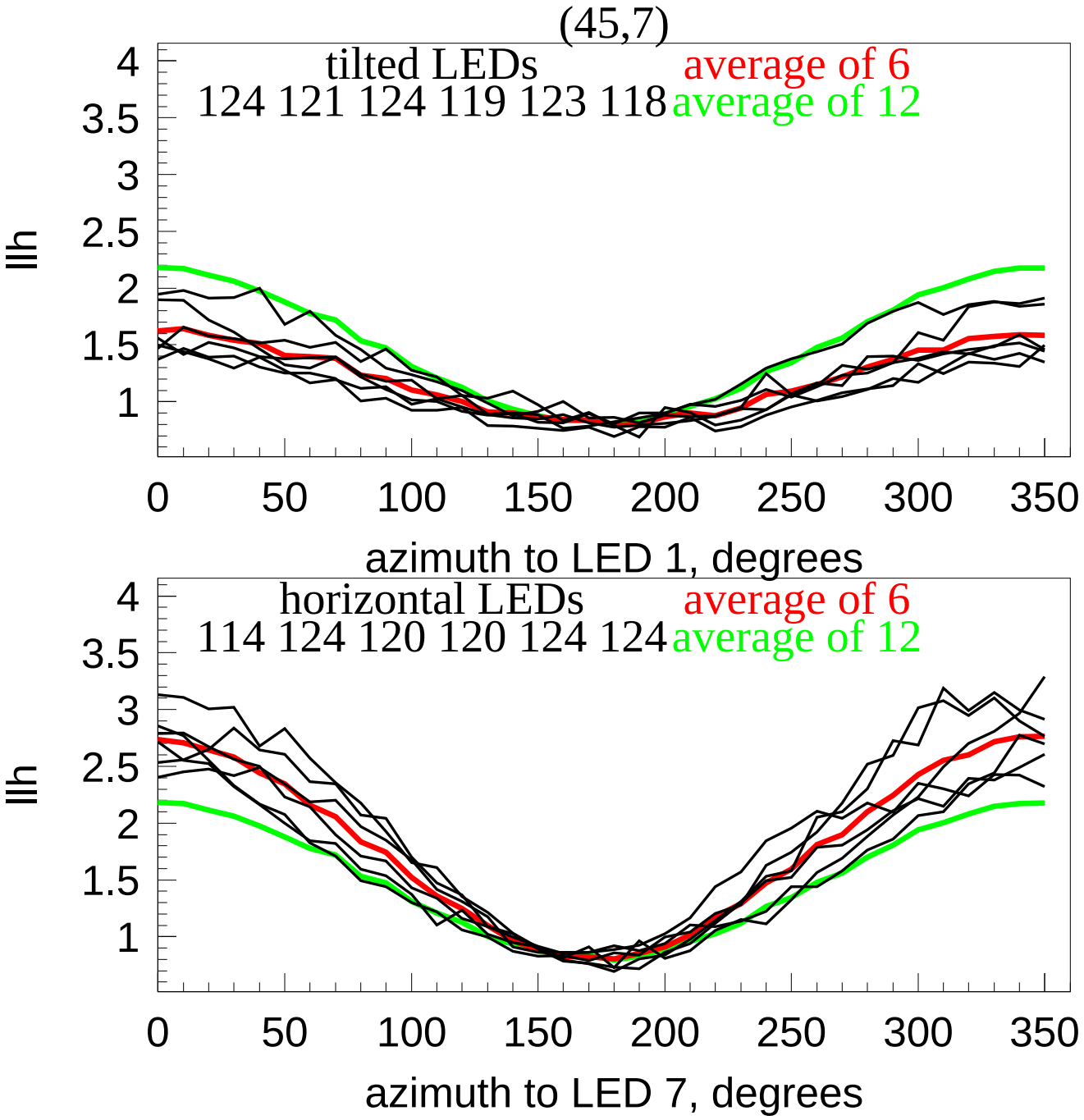

(45,4)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.3 ± 7.5

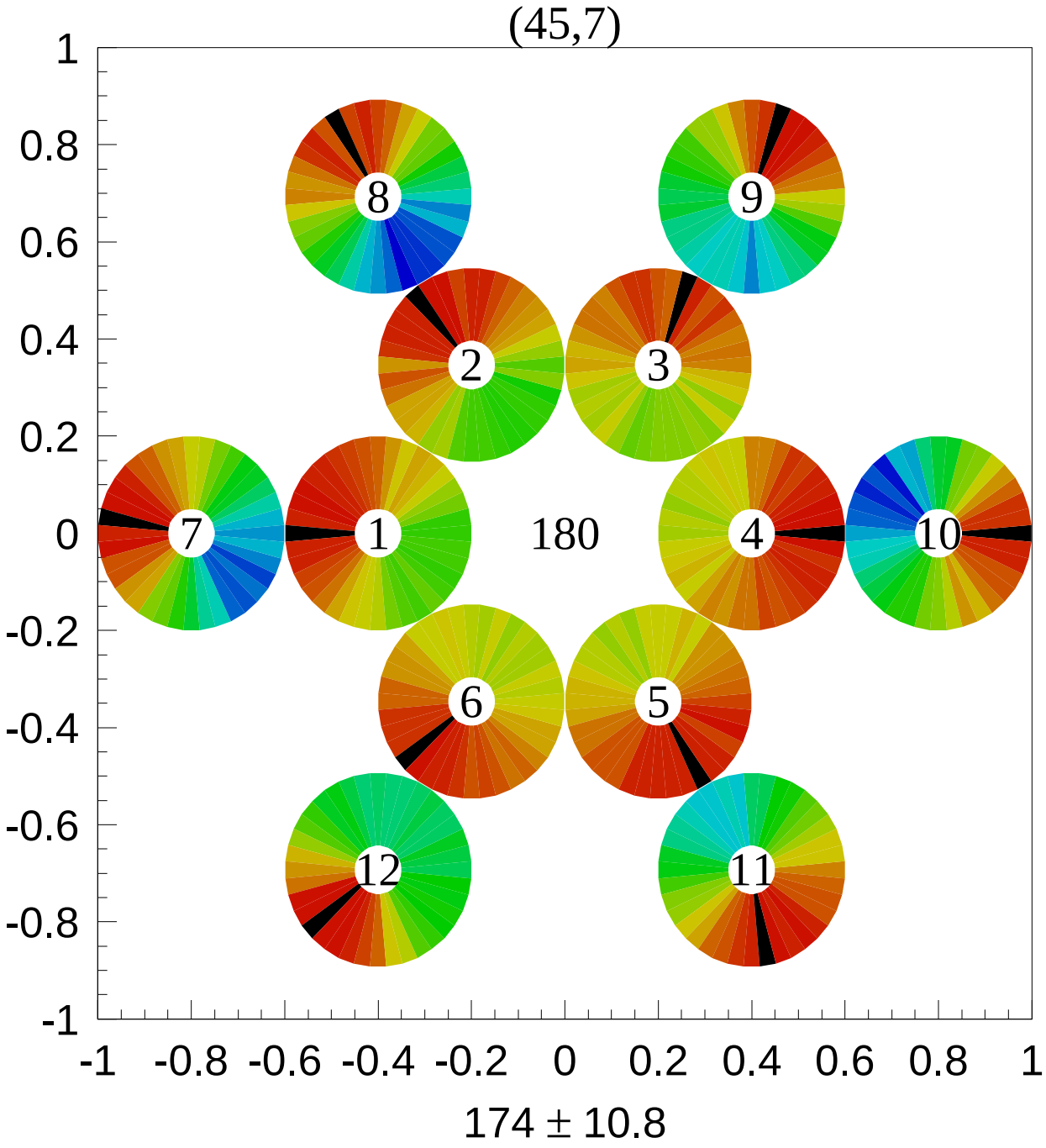

(45,5)
tilted LEDs
115 118 116 118 118 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 122 114 126 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

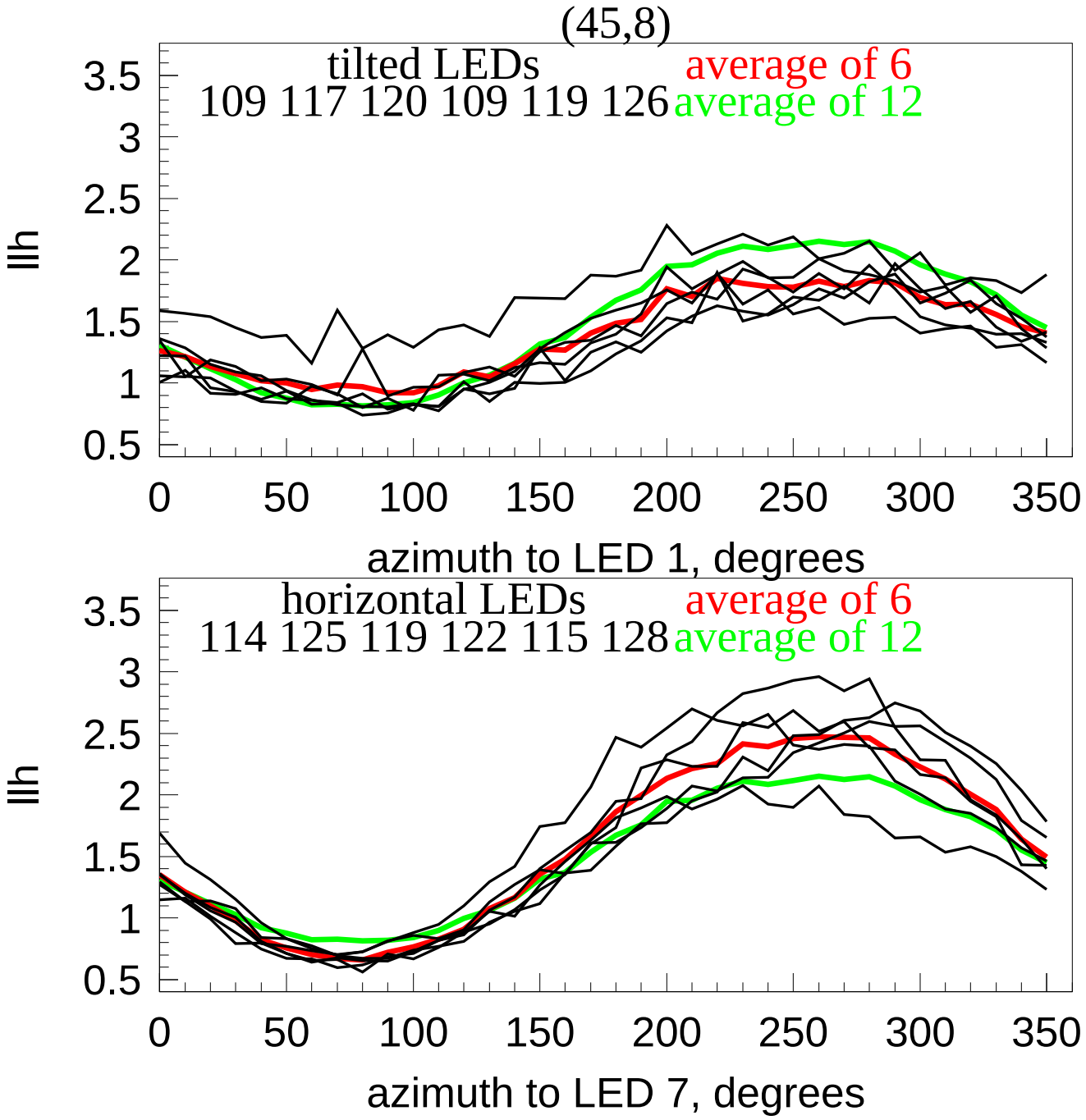

(45,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
93.2 ± 4.1

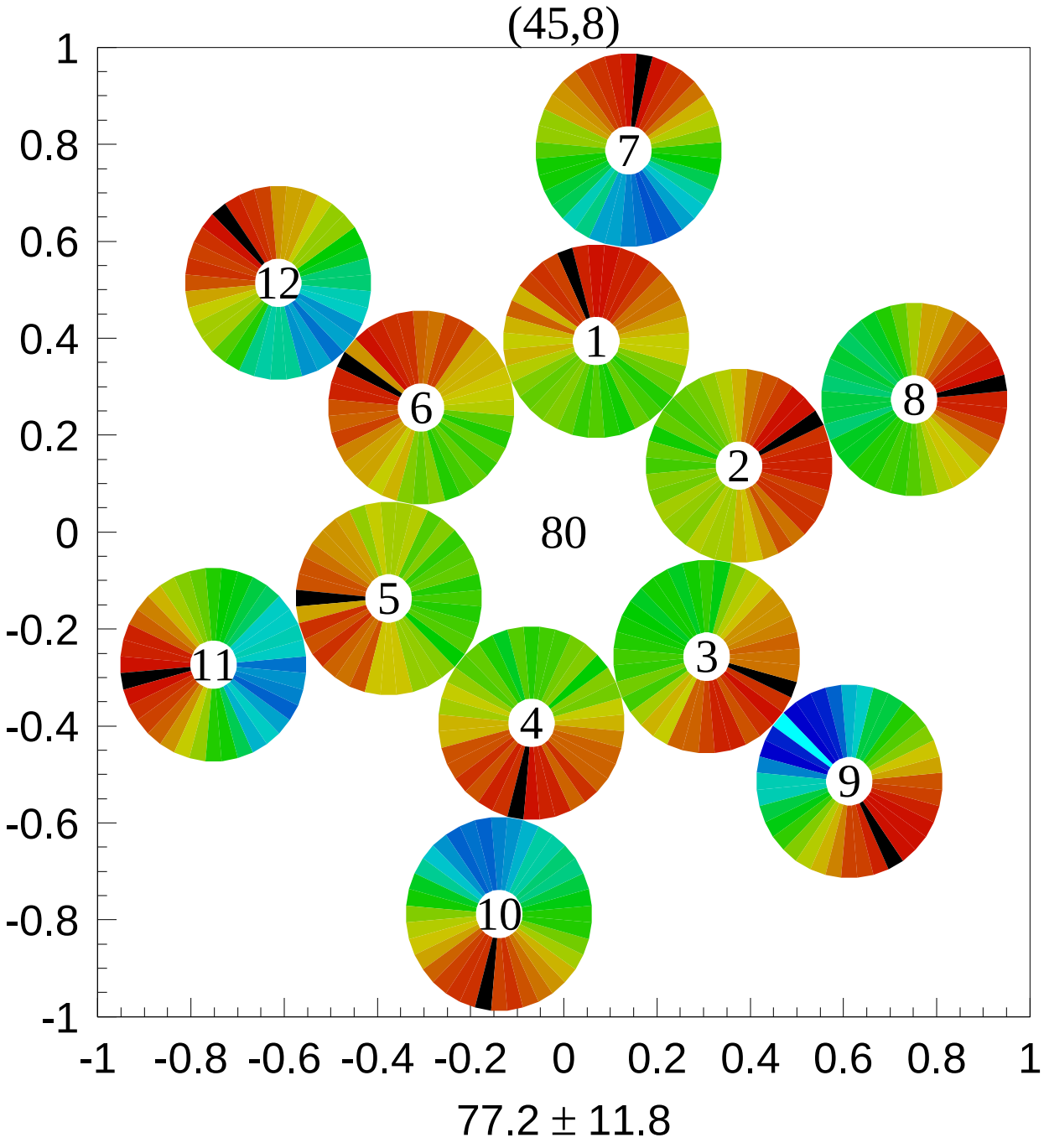

(45,6)
tilted LEDs
121 119 127 125 129 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 126 114 120 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

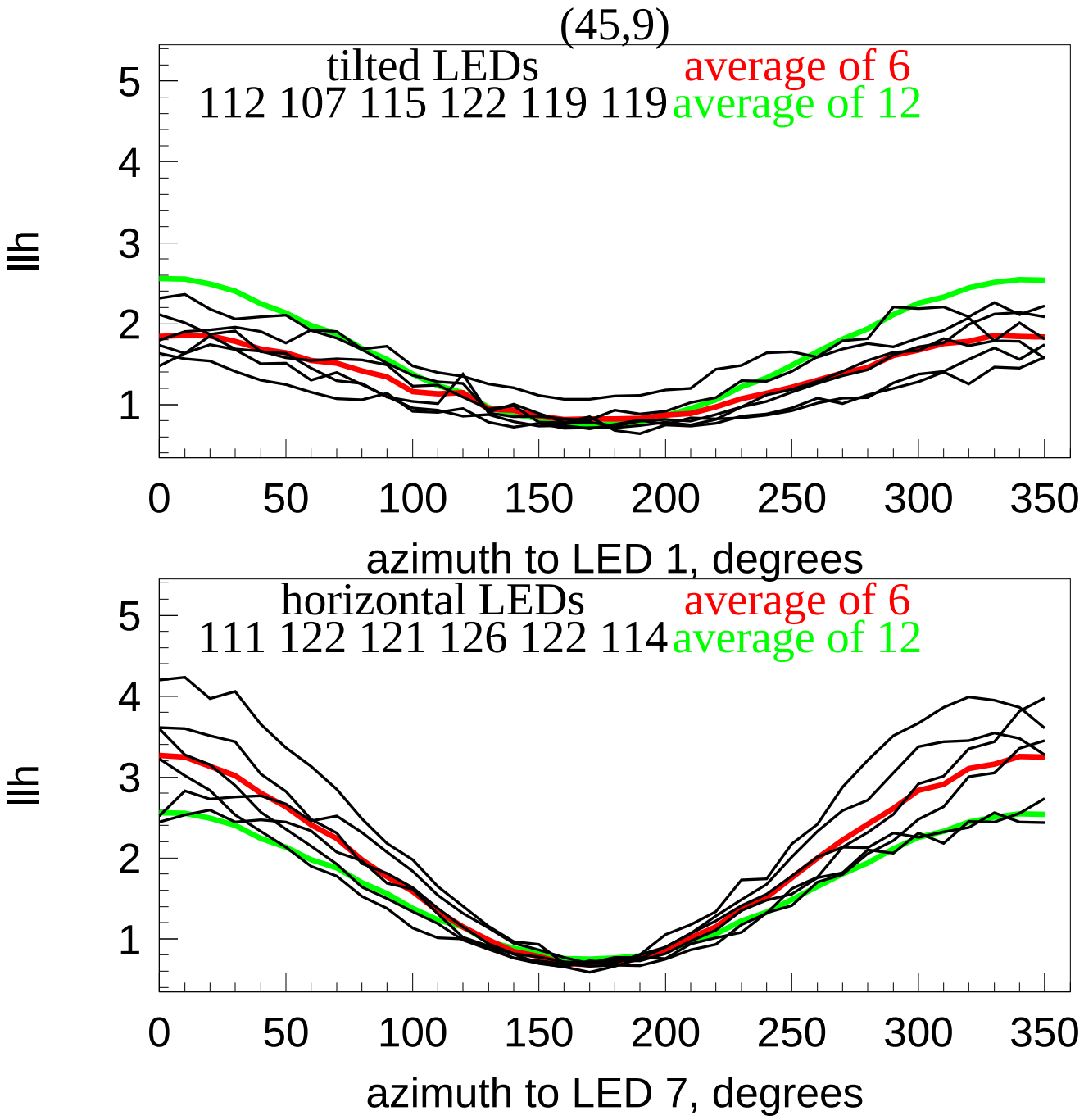

(45,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
64.6 ± 18.2

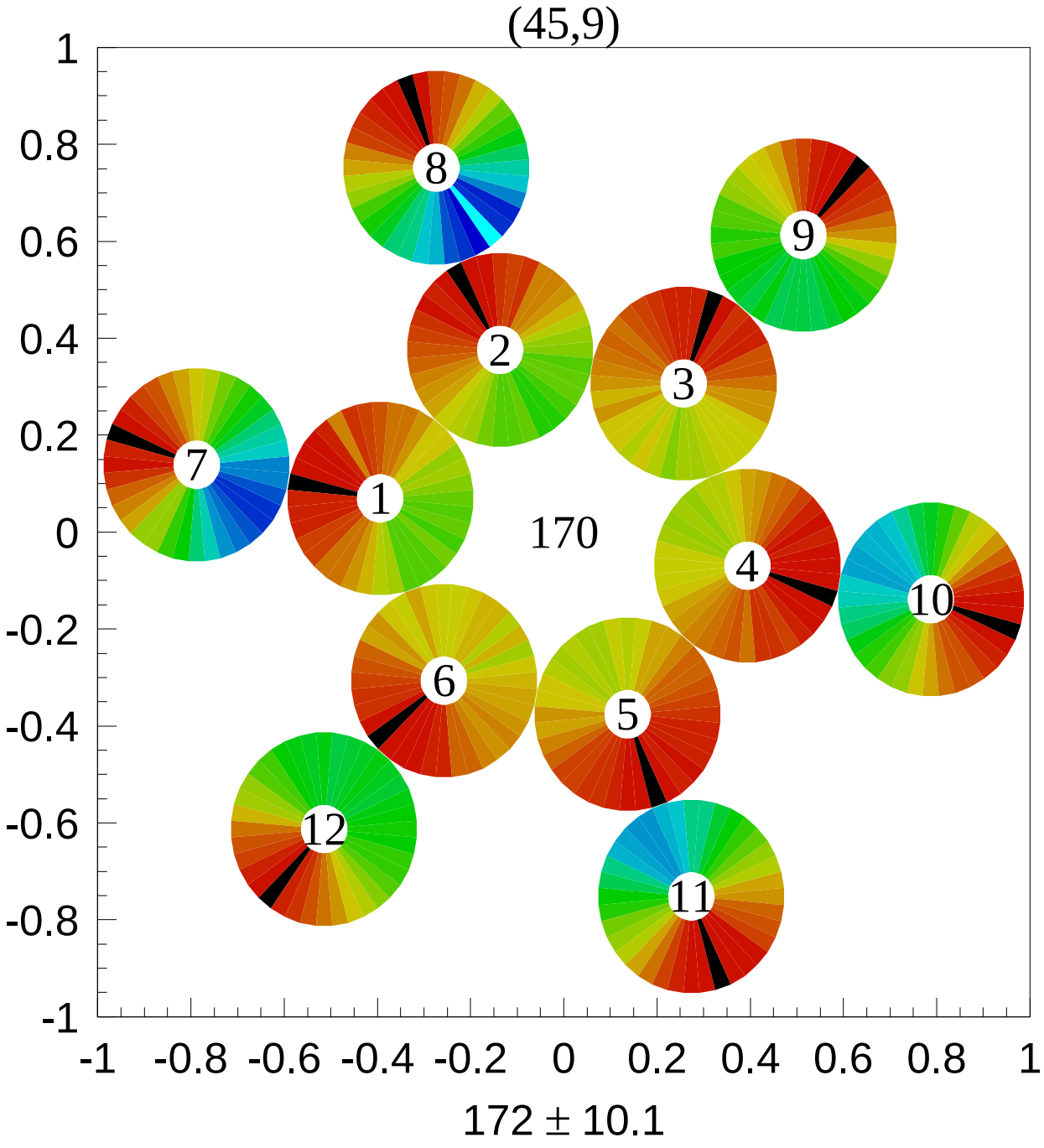

(45,7)
tilted LEDs
124 121 124 119 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 124 120 120 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

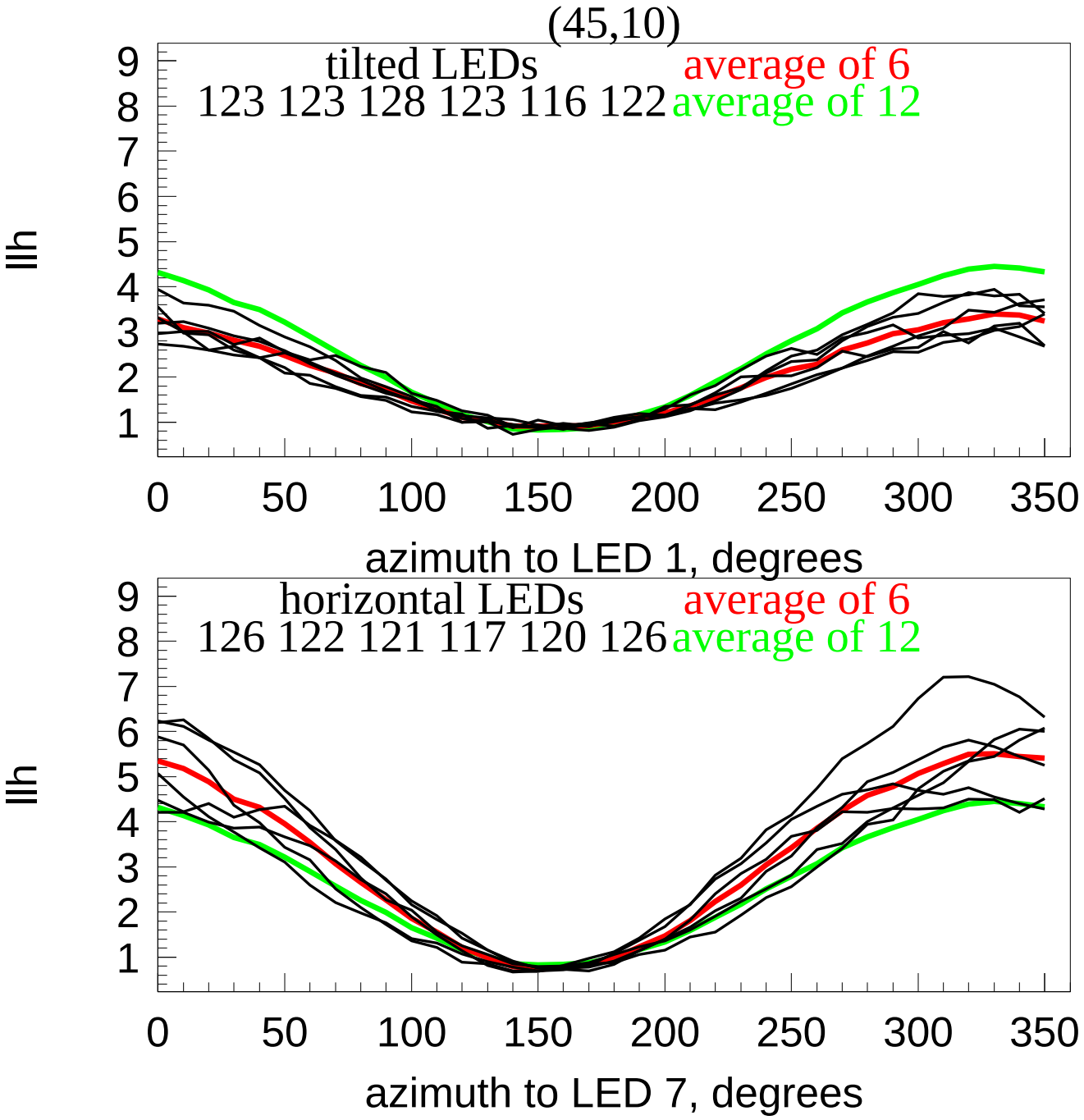

(45,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
174 ± 10.8

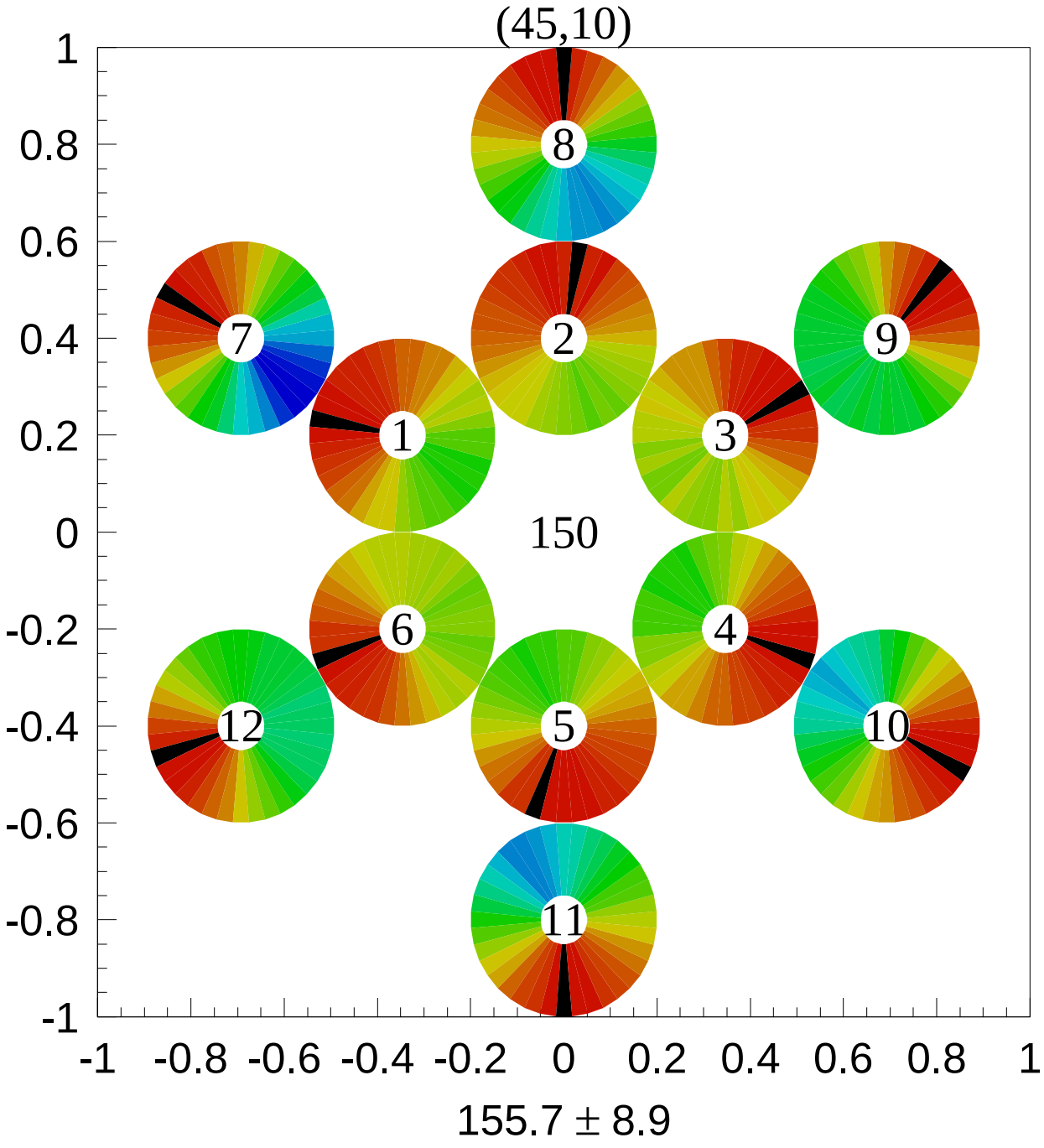

(45,8)
tilted LEDs
109 117 120 109 119 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 125 119 122 115 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

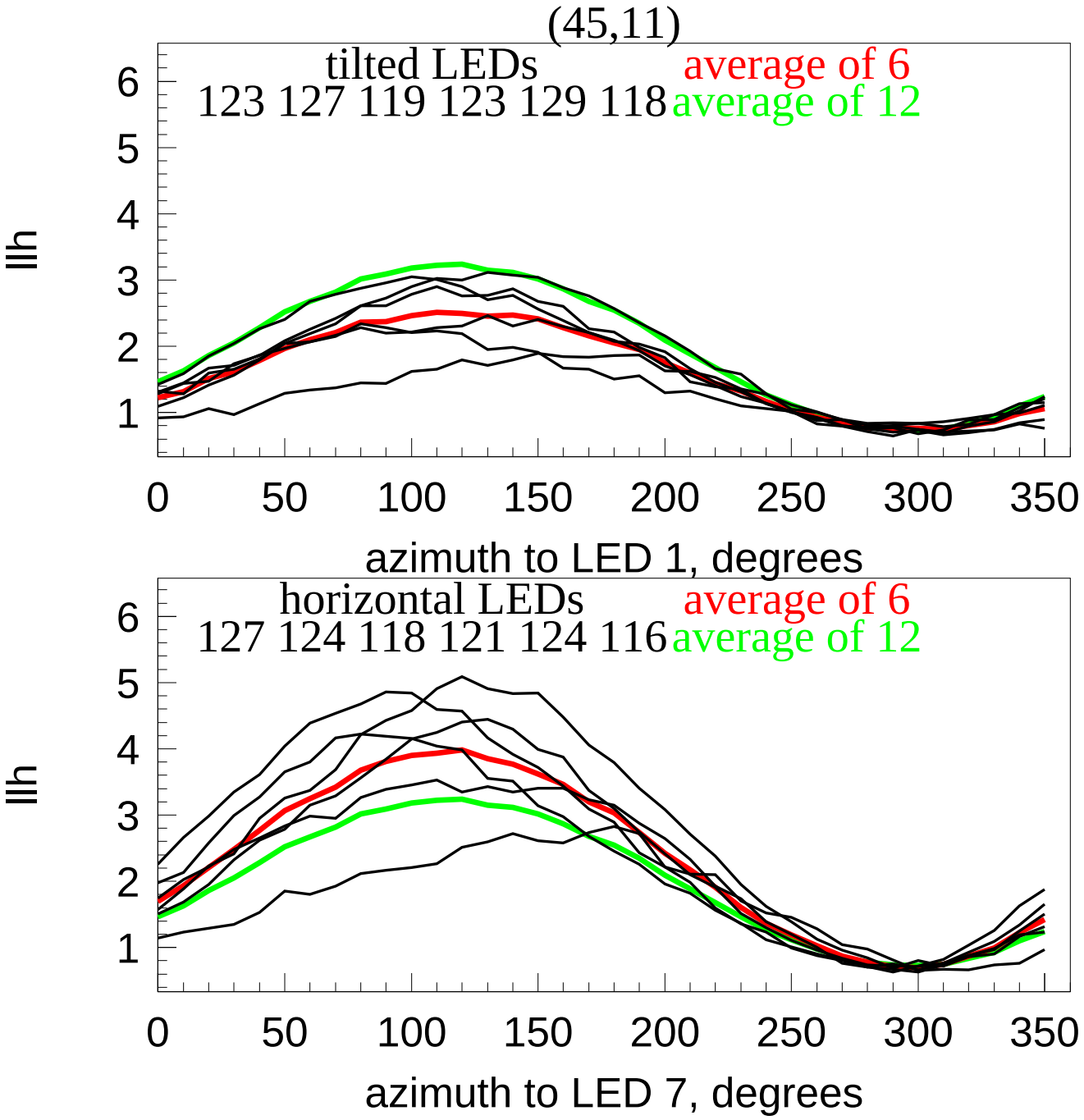

(45,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
77.2 ± 11.8
7
12
1
6
8
2
80
5
11
3
4
9
10

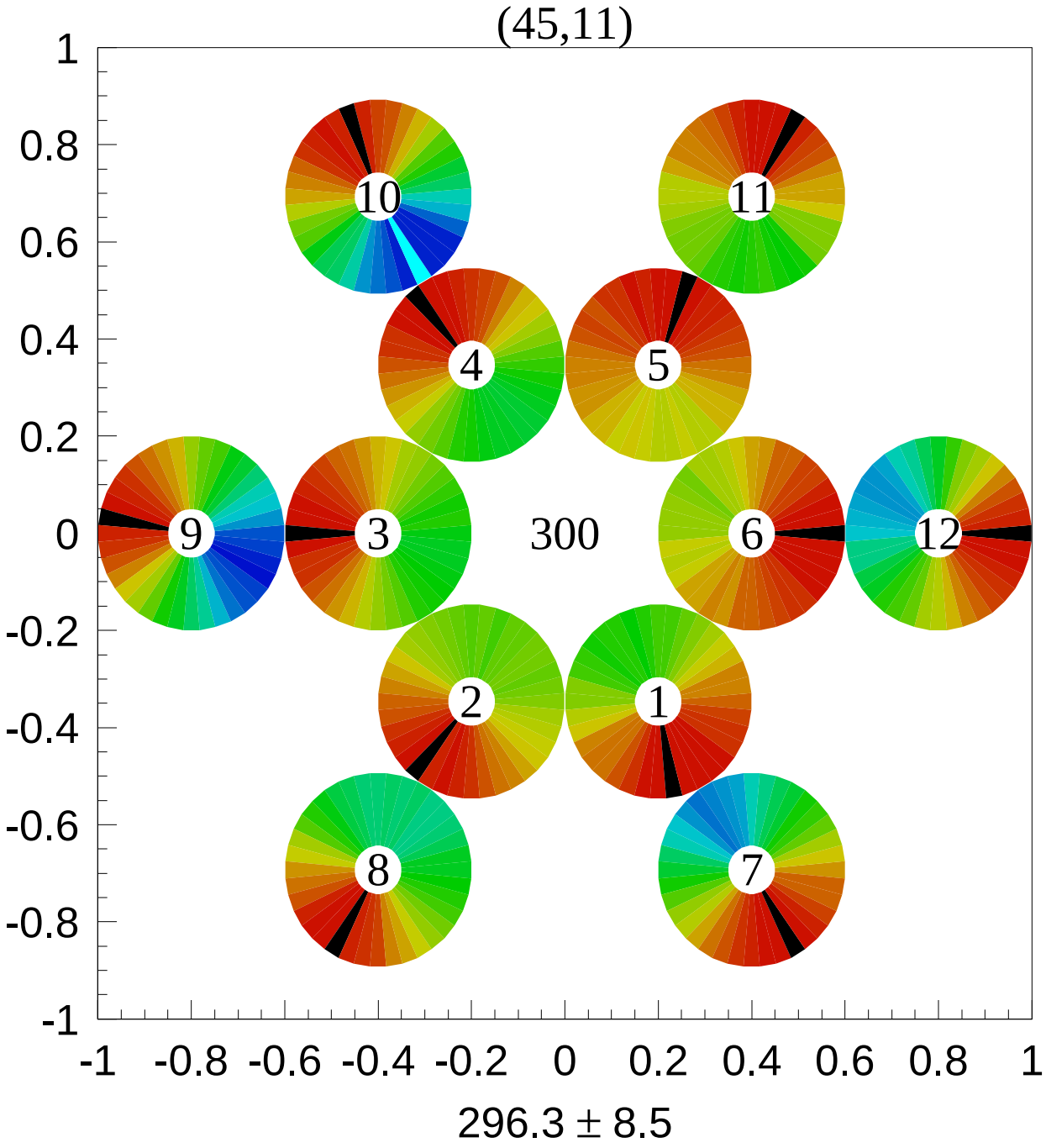

(45,9)
tilted LEDs
112 107 115 122 119 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
111 122 121 126 122 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

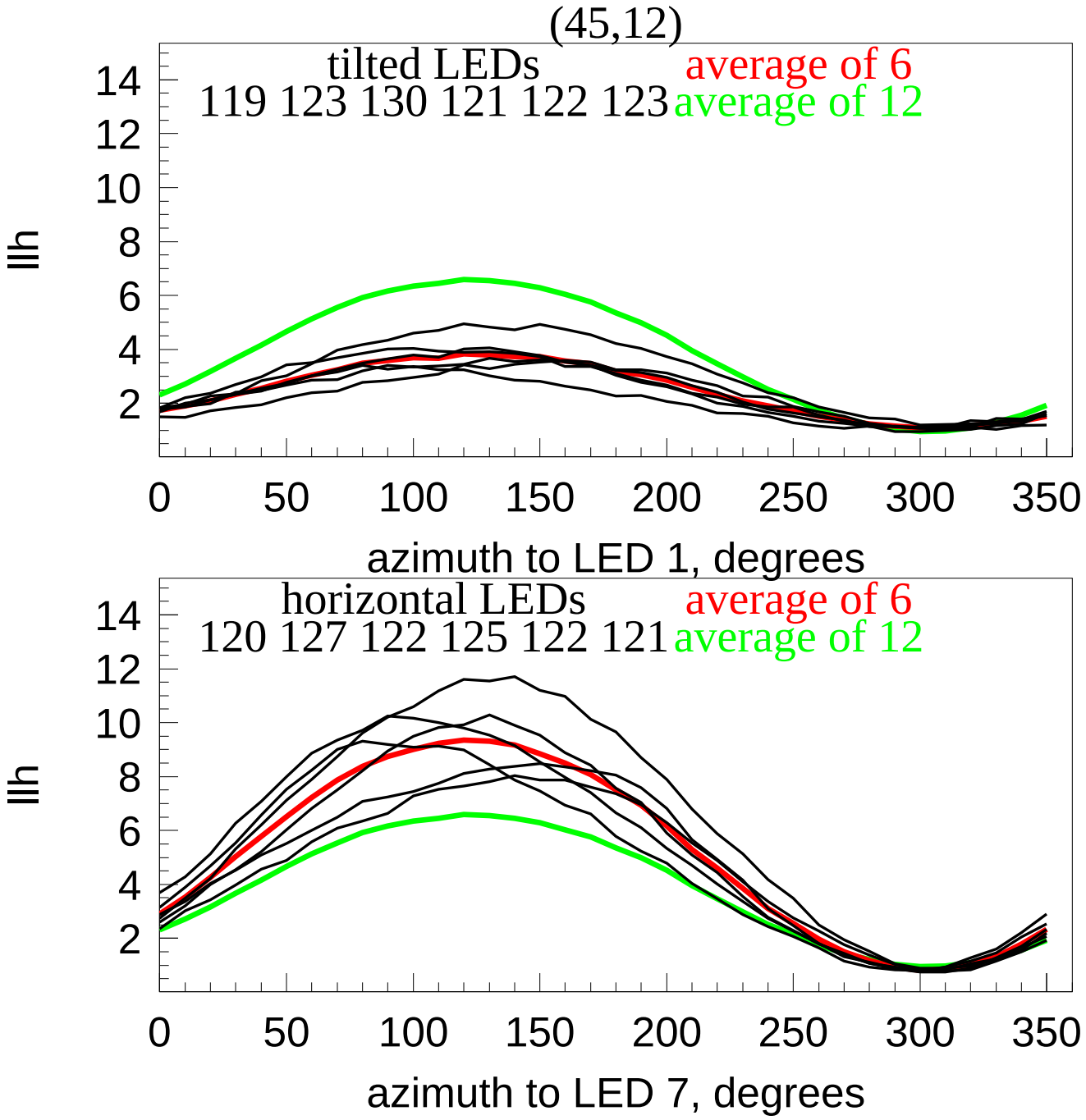

(45,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
172 ± 10.1

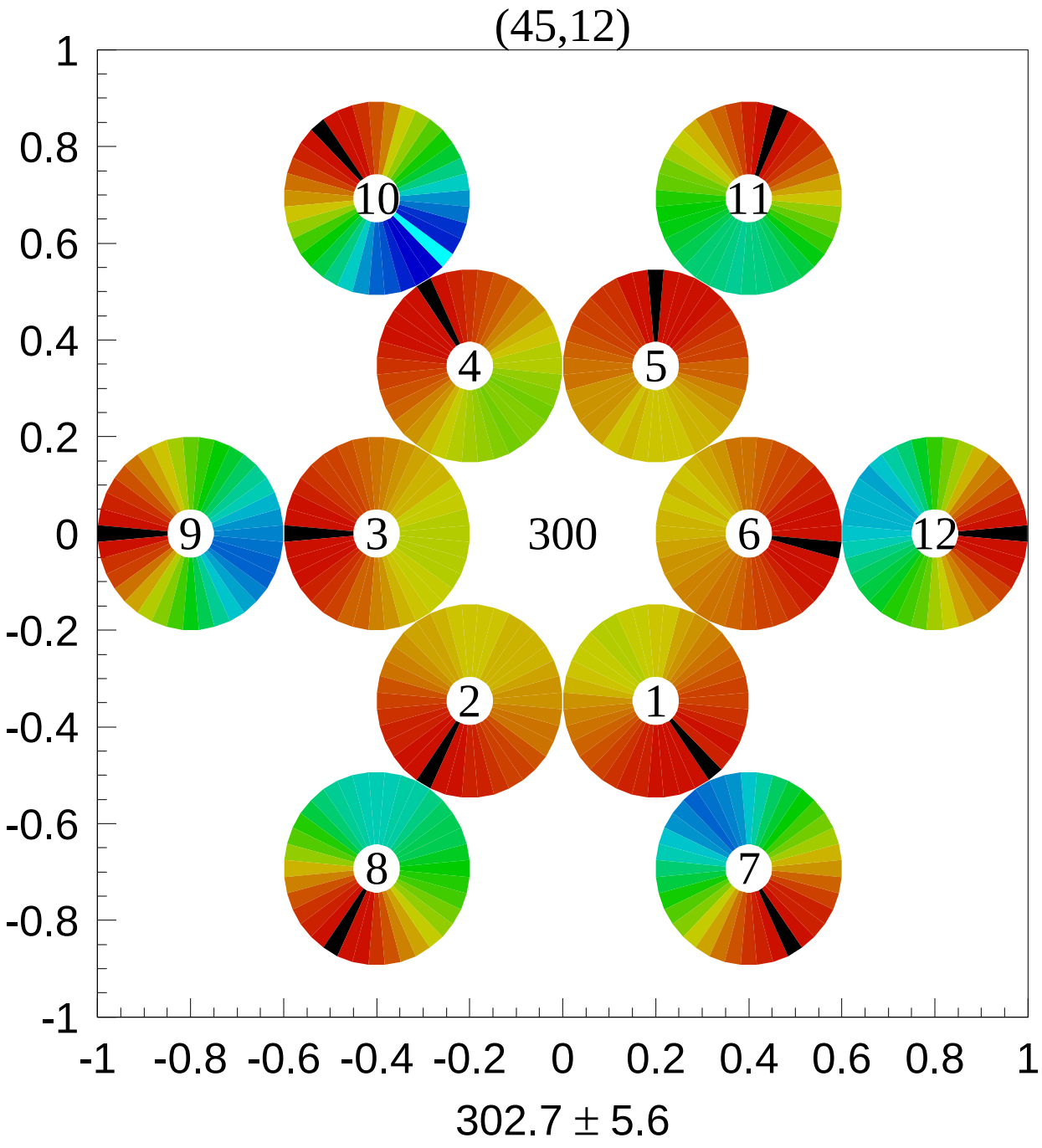

(45,10)
tilted LEDs
123 123 128 123 116 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 122 121 117 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

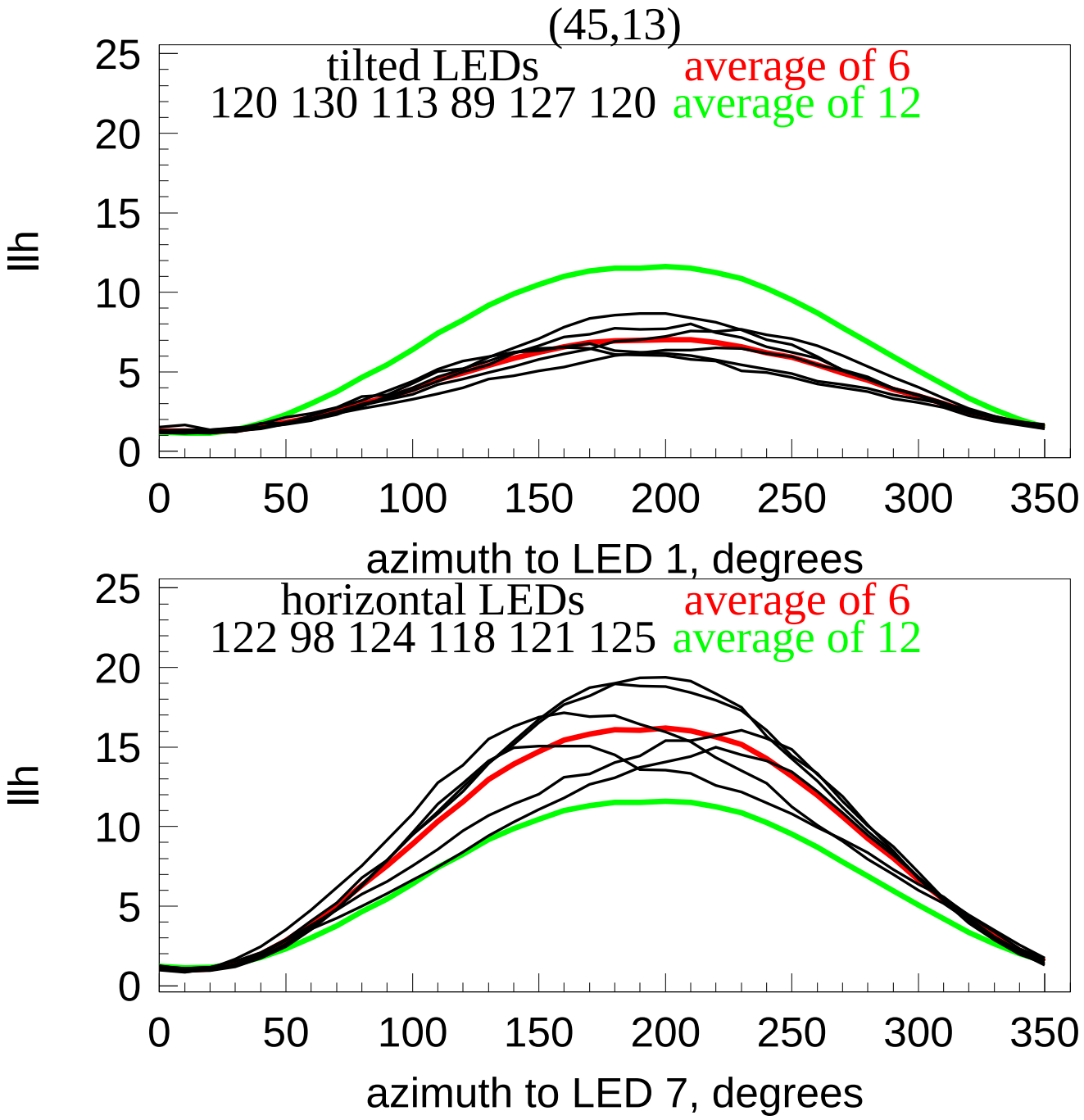

(45,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
155.7 ± 8.9

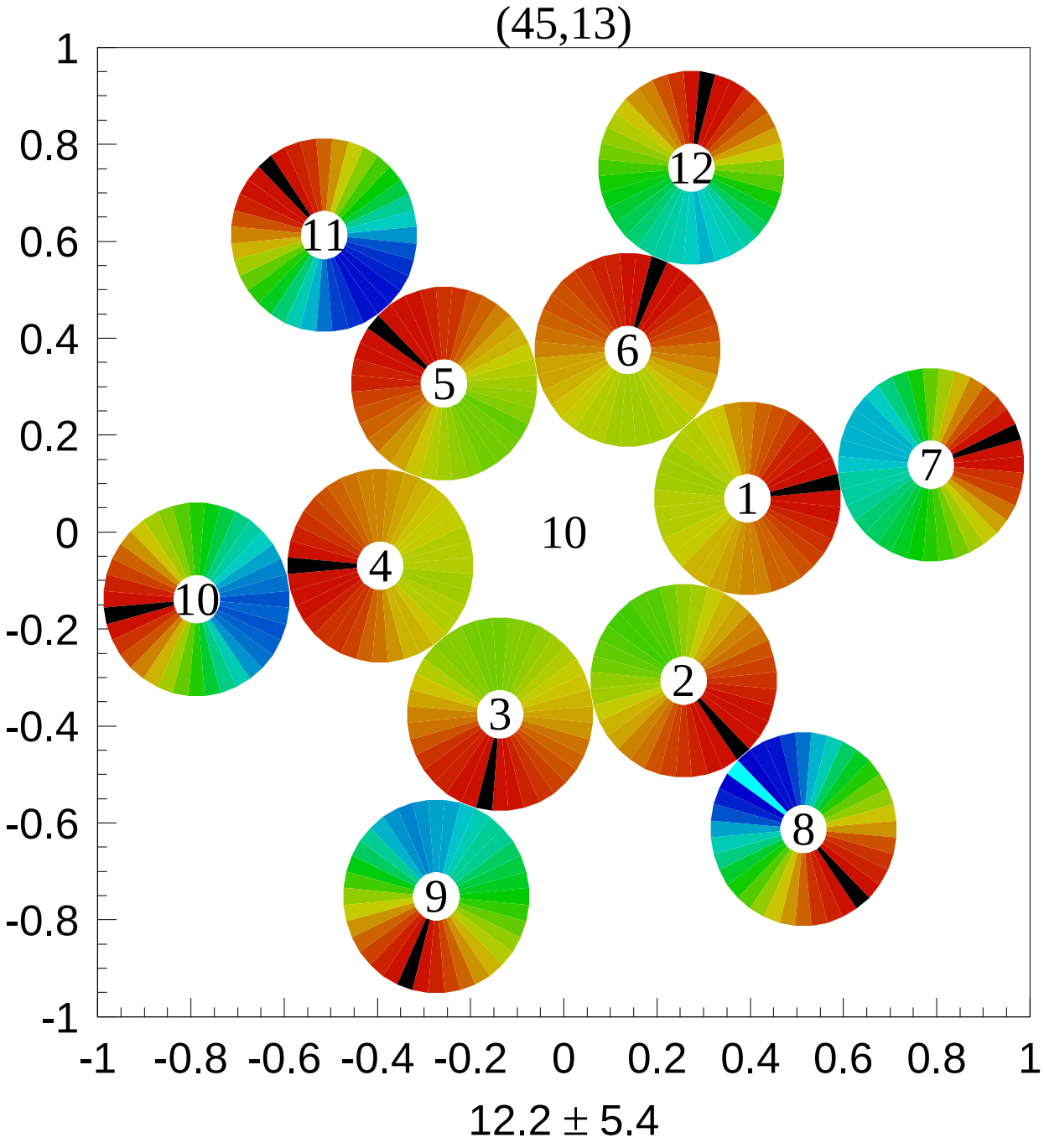

(45,11)
tilted LEDs
123 127 119 123 129 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 124 118 121 124 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

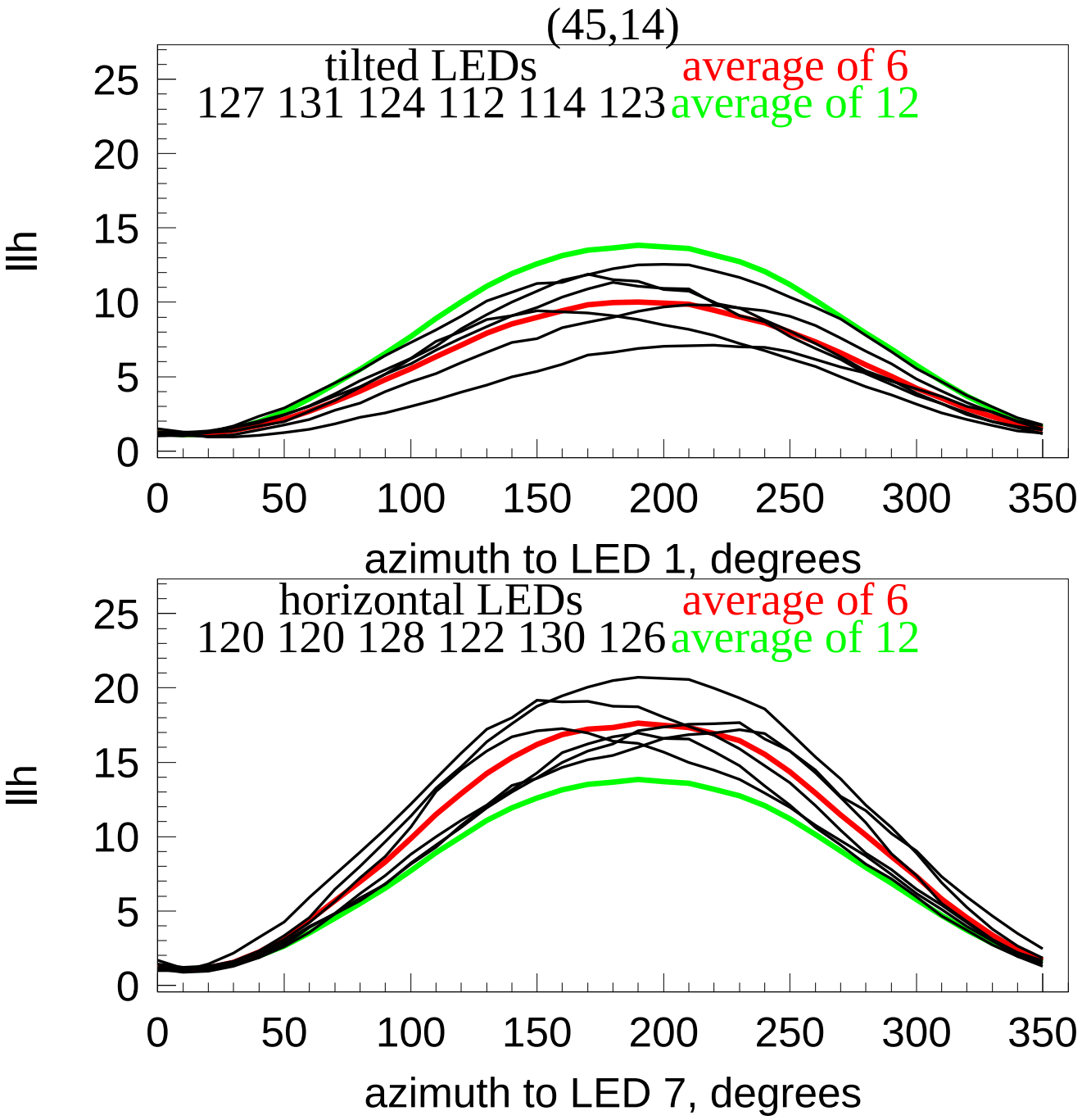

(45,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
296.3 ± 8.5

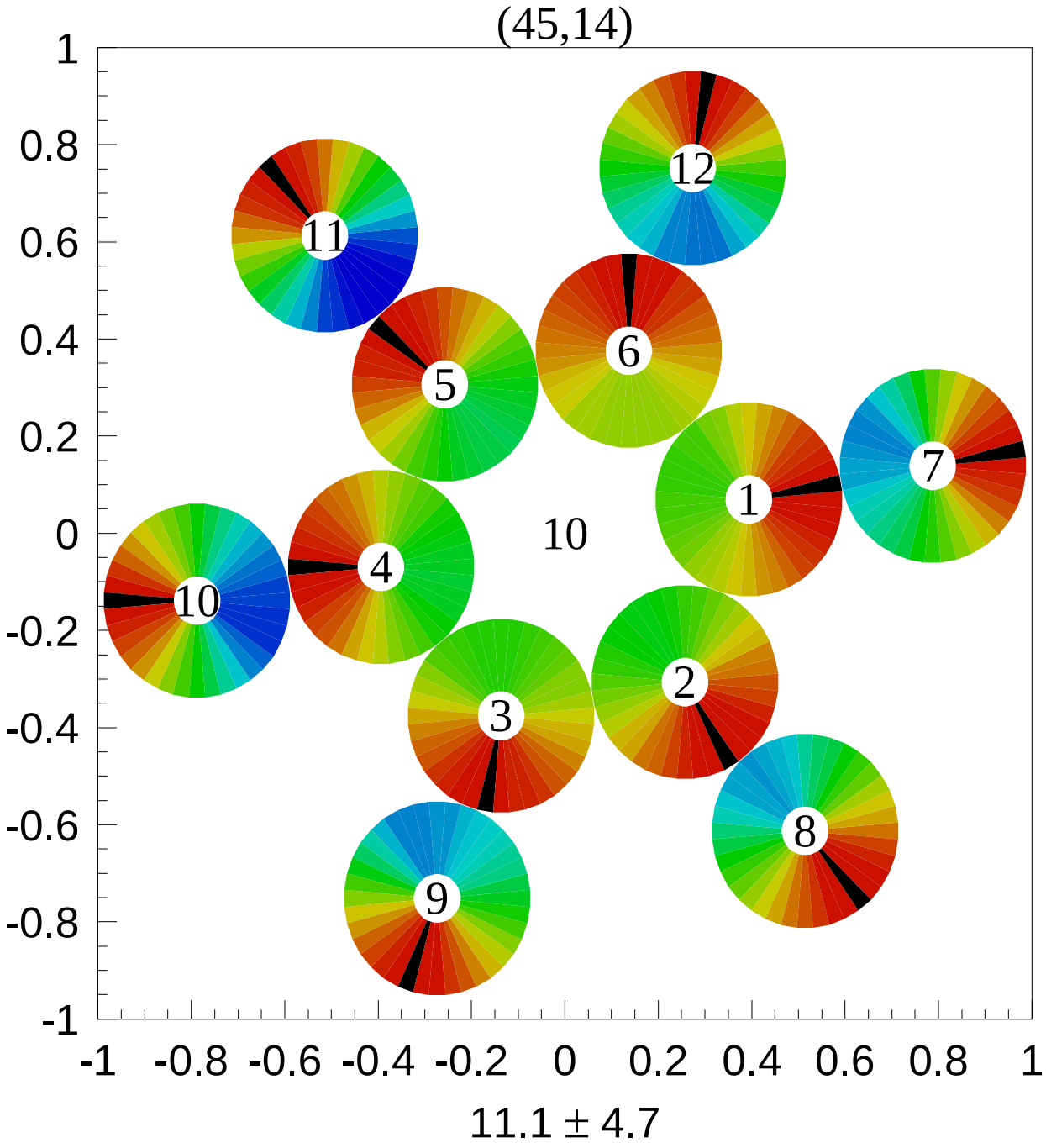

(45,12)
tilted LEDs
119 123 130 121 122 123
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 127 122 125 122 121
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

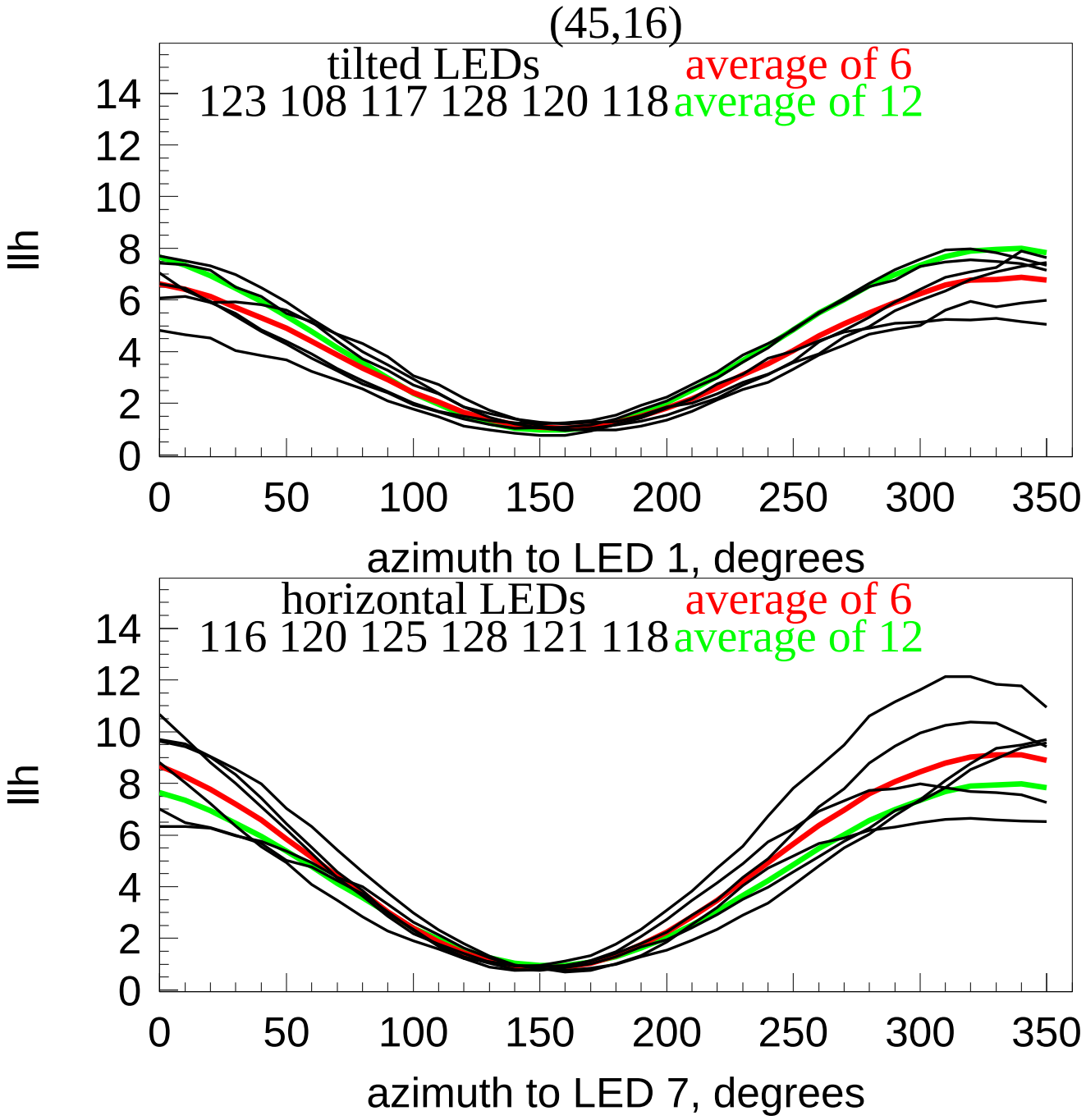

(45,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
302.7 ± 5.6

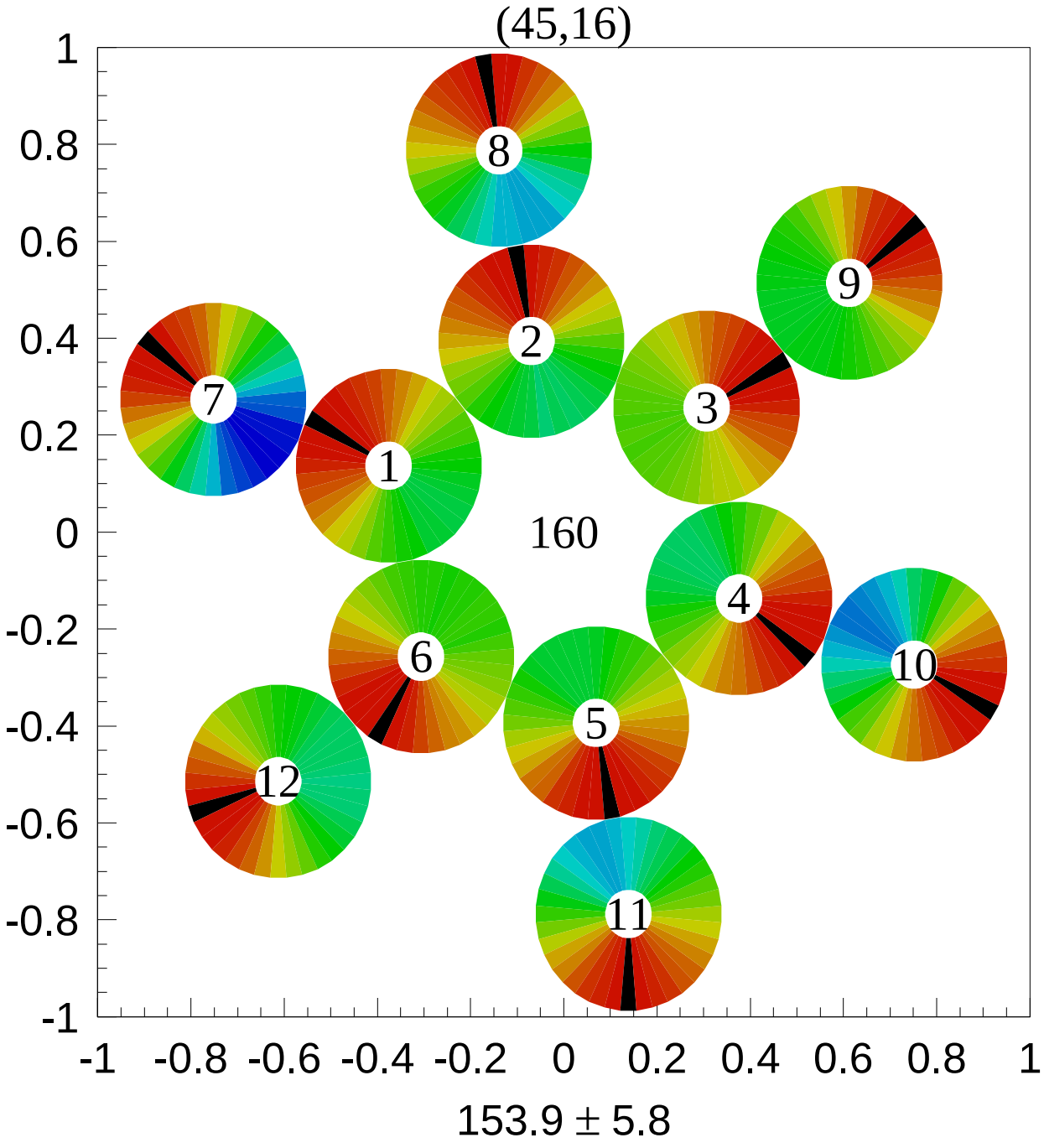

(45,13)
tilted LEDs
120 130 113 89 127 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 98 124 118 121 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

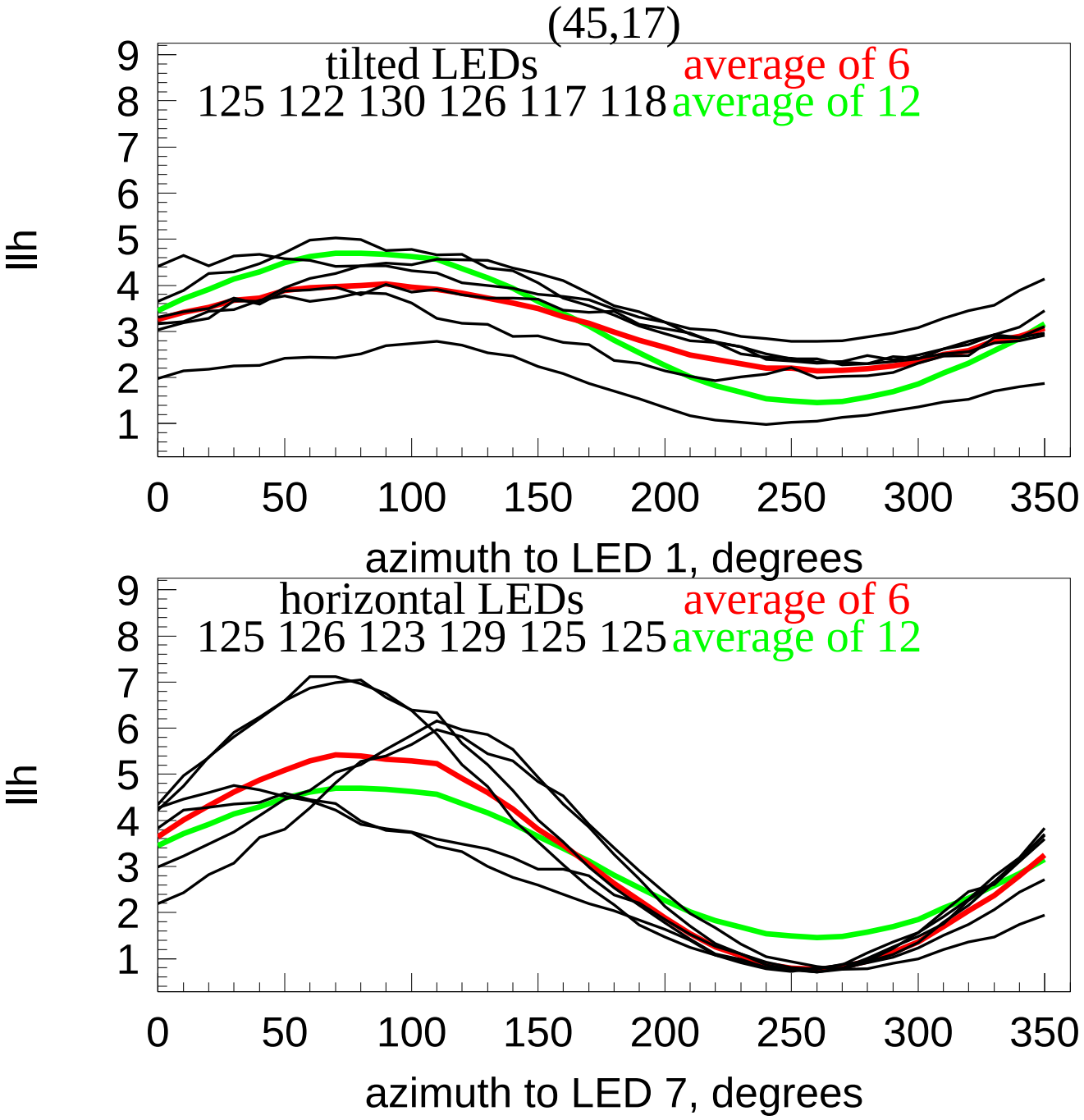

(45,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12.2 ± 5.4
12
11
6
5
7
1
10
4
10
2
3
8
9

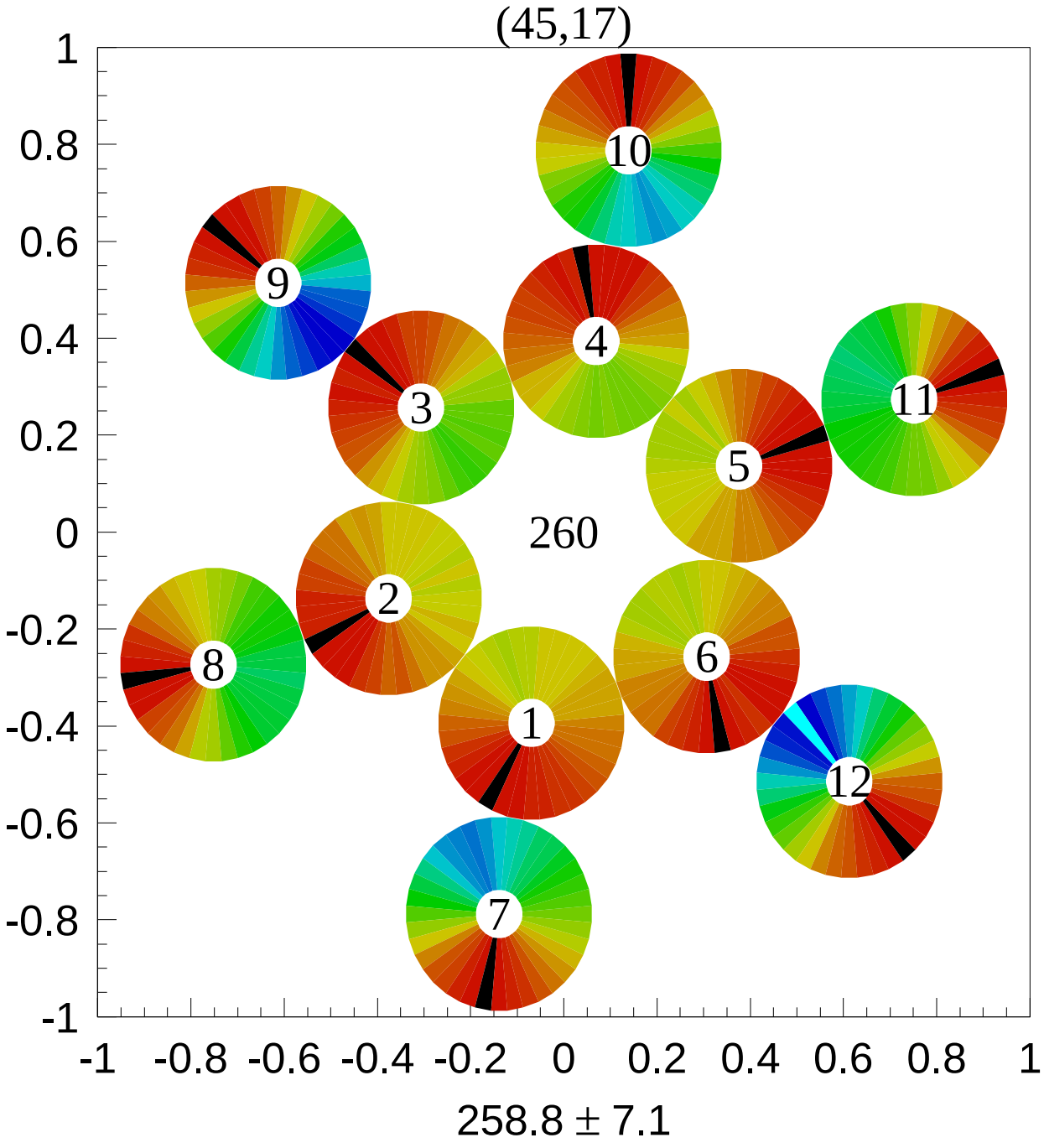

(45,14)
tilted LEDs
127 131 124 112 114 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 128 122 130 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

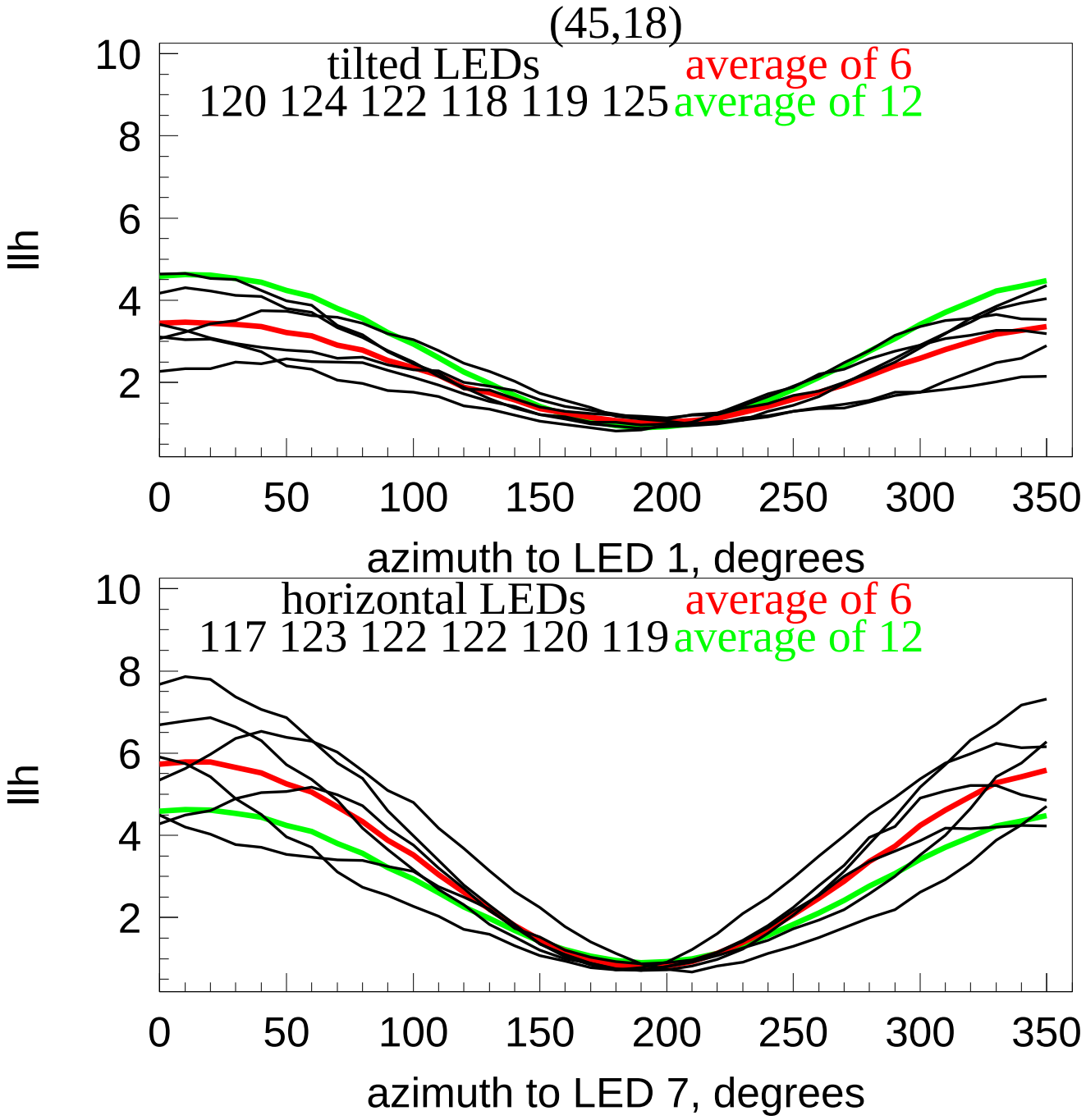

(45,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11.1 ± 4.7
12
11
6
5
7
1
10
4
10
2
3
8
9

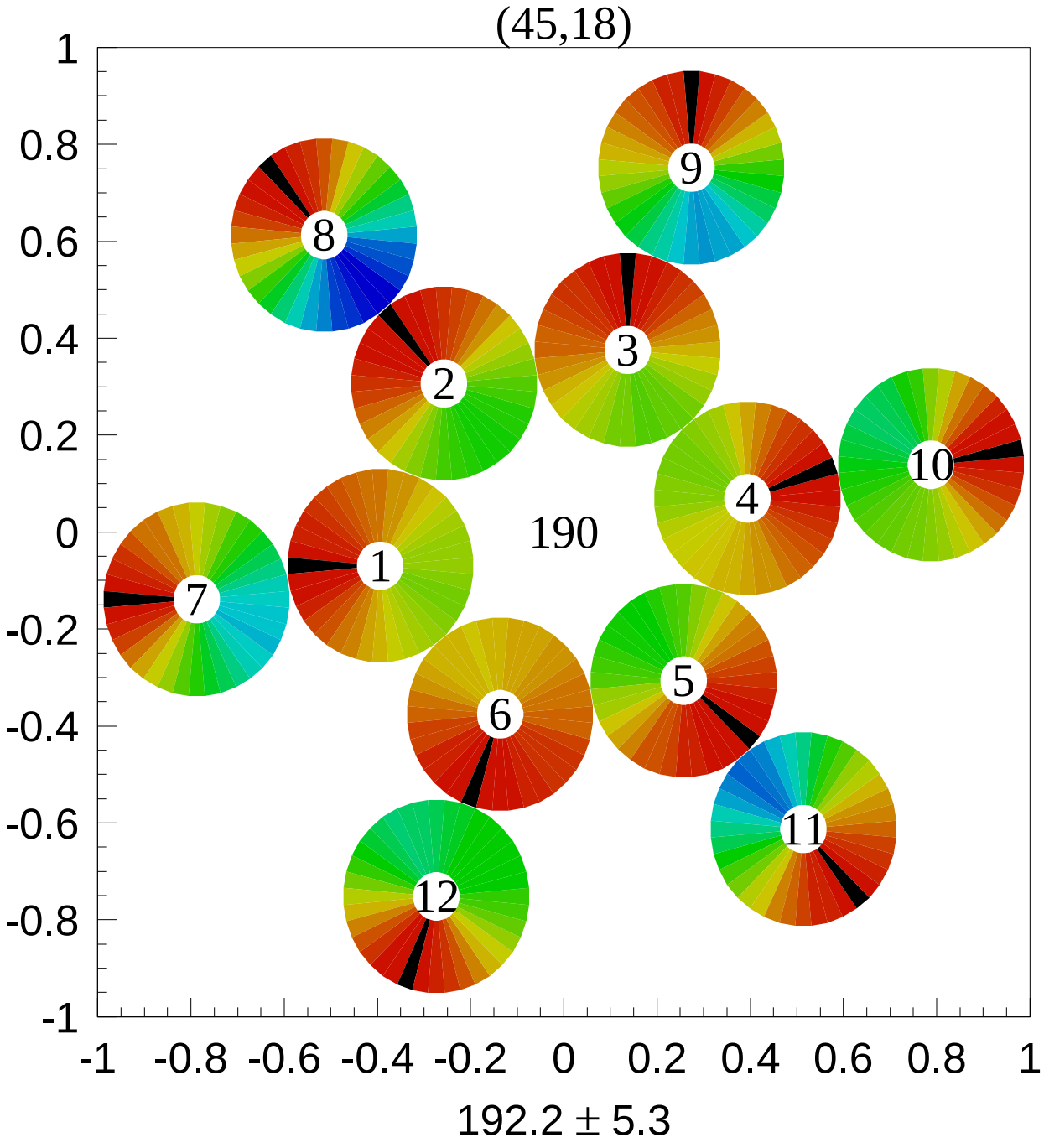

(45,16)
tilted LEDs
123 108 117 128 120 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 120 125 128 121 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

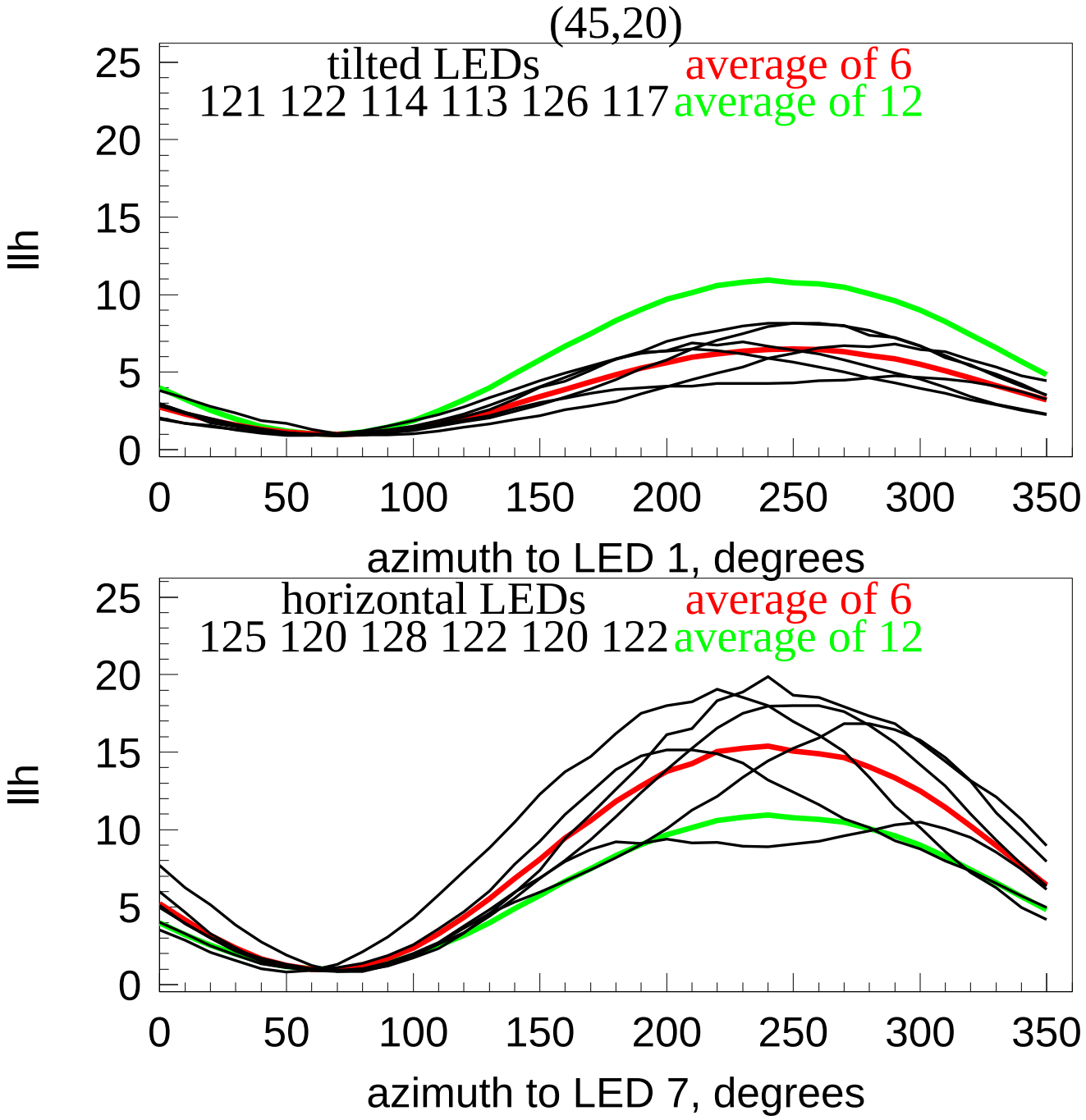

(45,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
153.9 ± 5.8
160
1
2
3
4
5
6
7
8
9
10
11
12

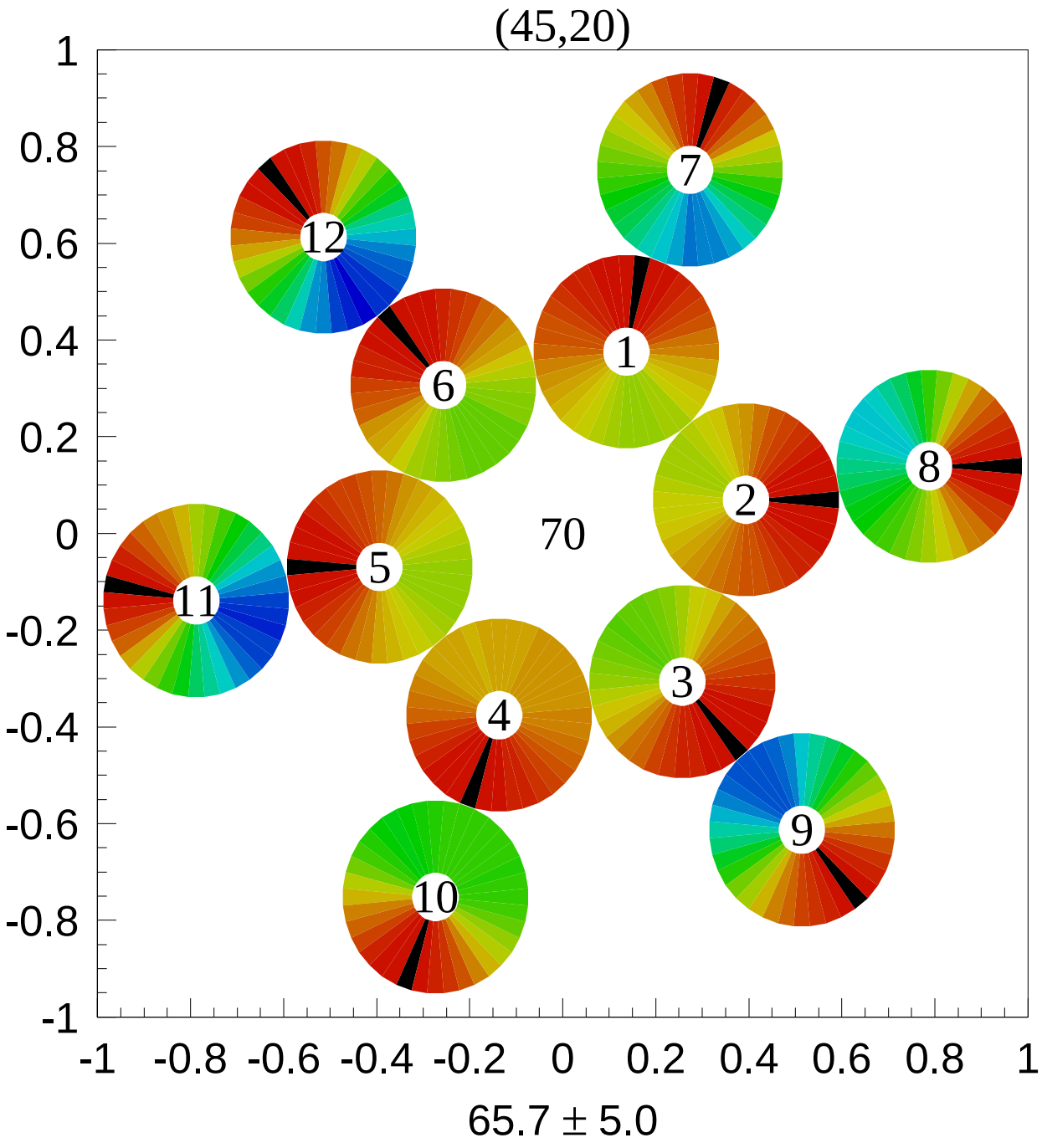

(45,17)
tilted LEDs
125 122 130 126 117 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 126 123 129 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

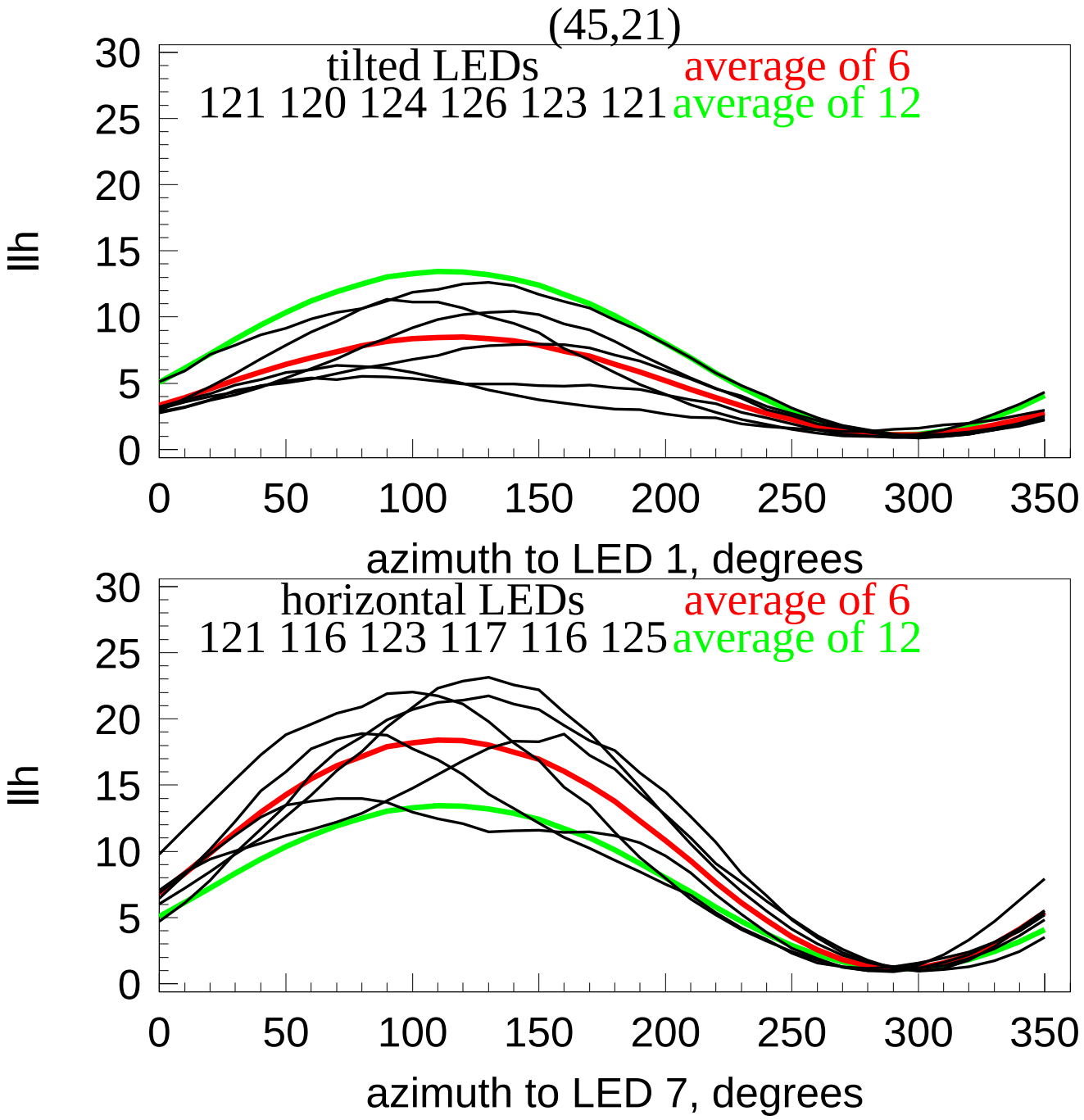

(45,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
258.8 ± 7.1

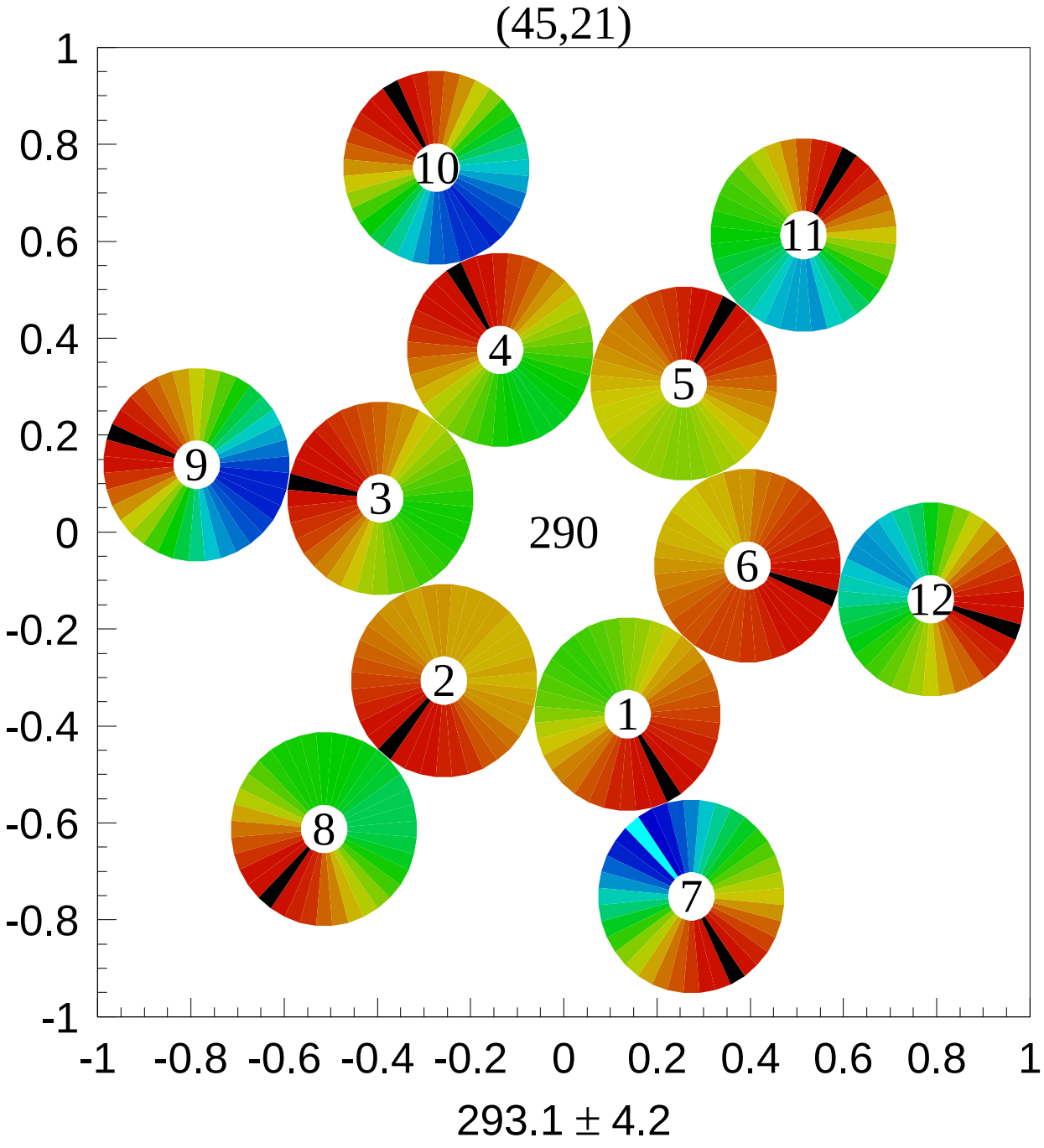

(45,18)
tilted LEDs
120 124 122 118 119 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 123 122 122 120 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

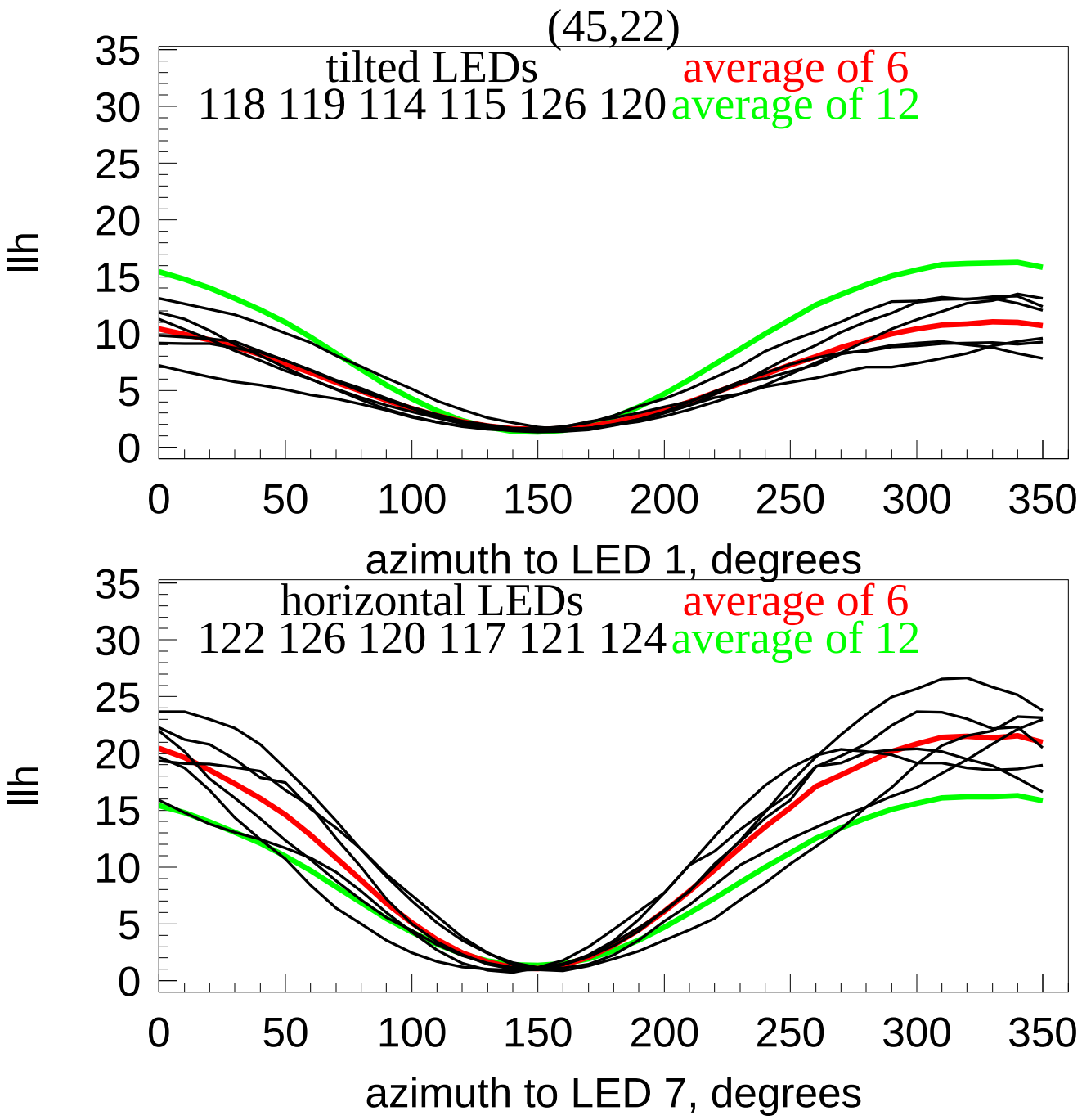

(45,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
192.2 ± 5.3
190
1
2
3
4
5
6
7
8
9
10
11
12

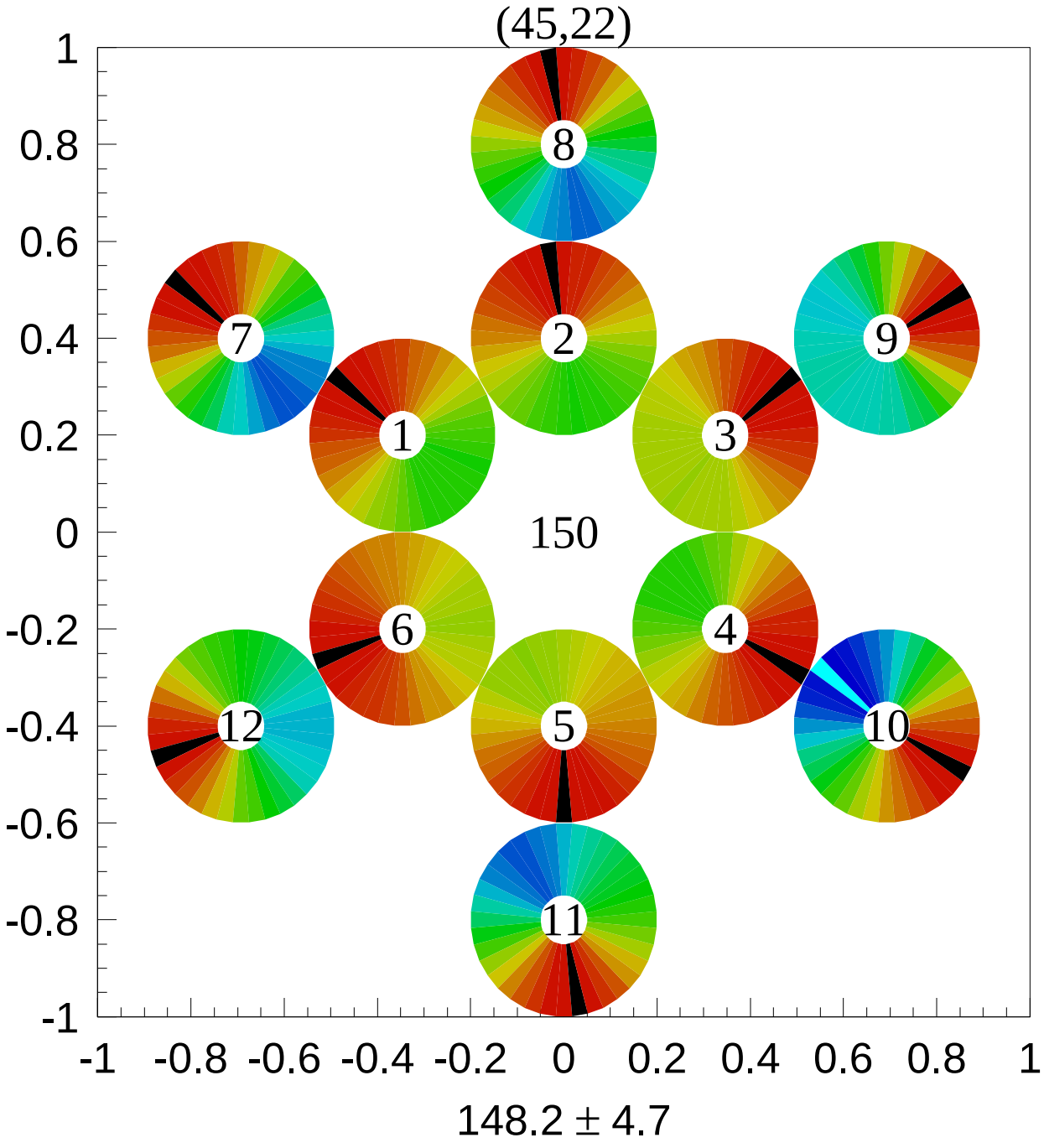

(45,20)
tilted LEDs
121 122 114 113 126 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 128 122 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

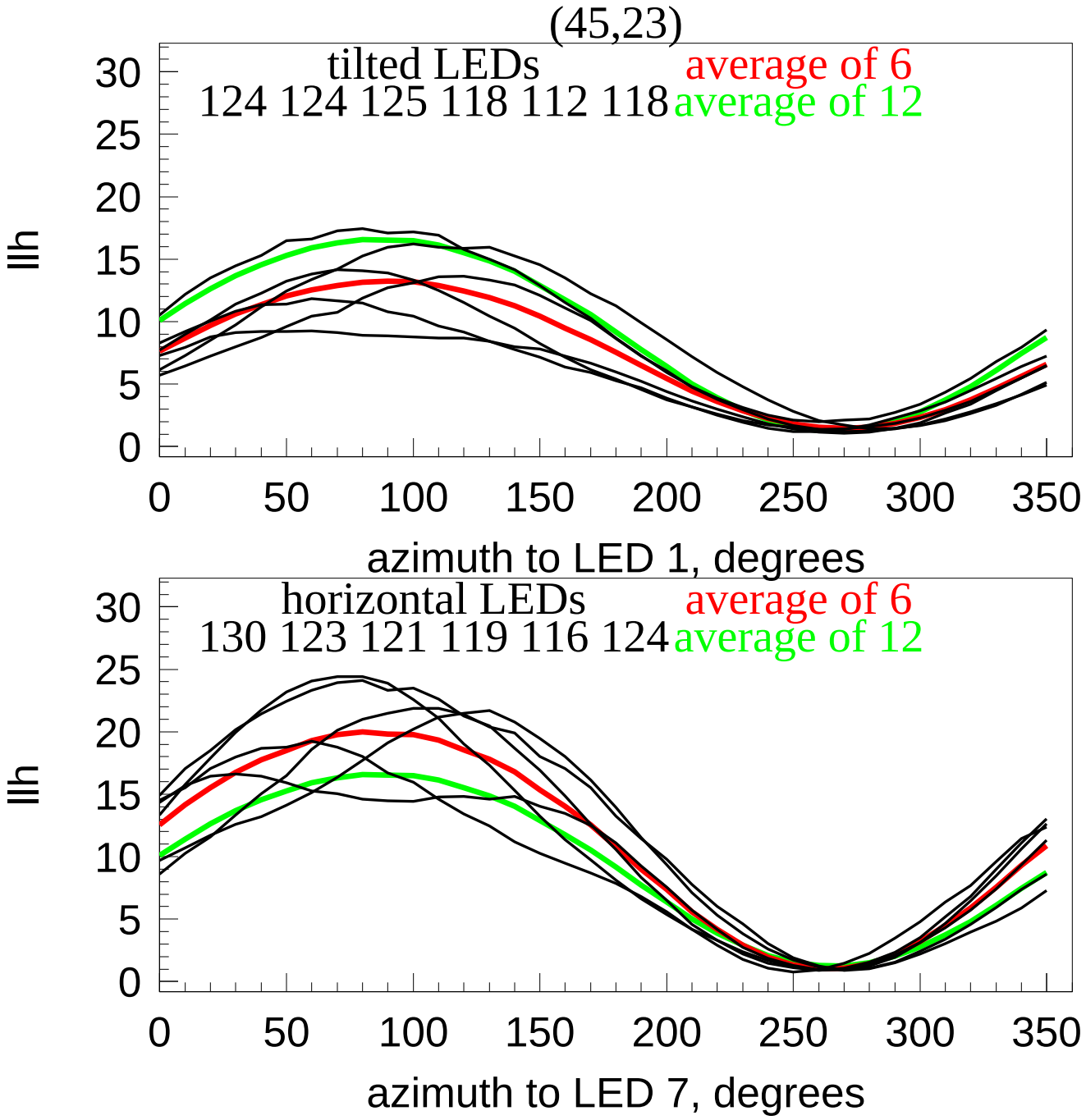

(45,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
70
5
11
4
3
9
10
65.7 ± 5.0

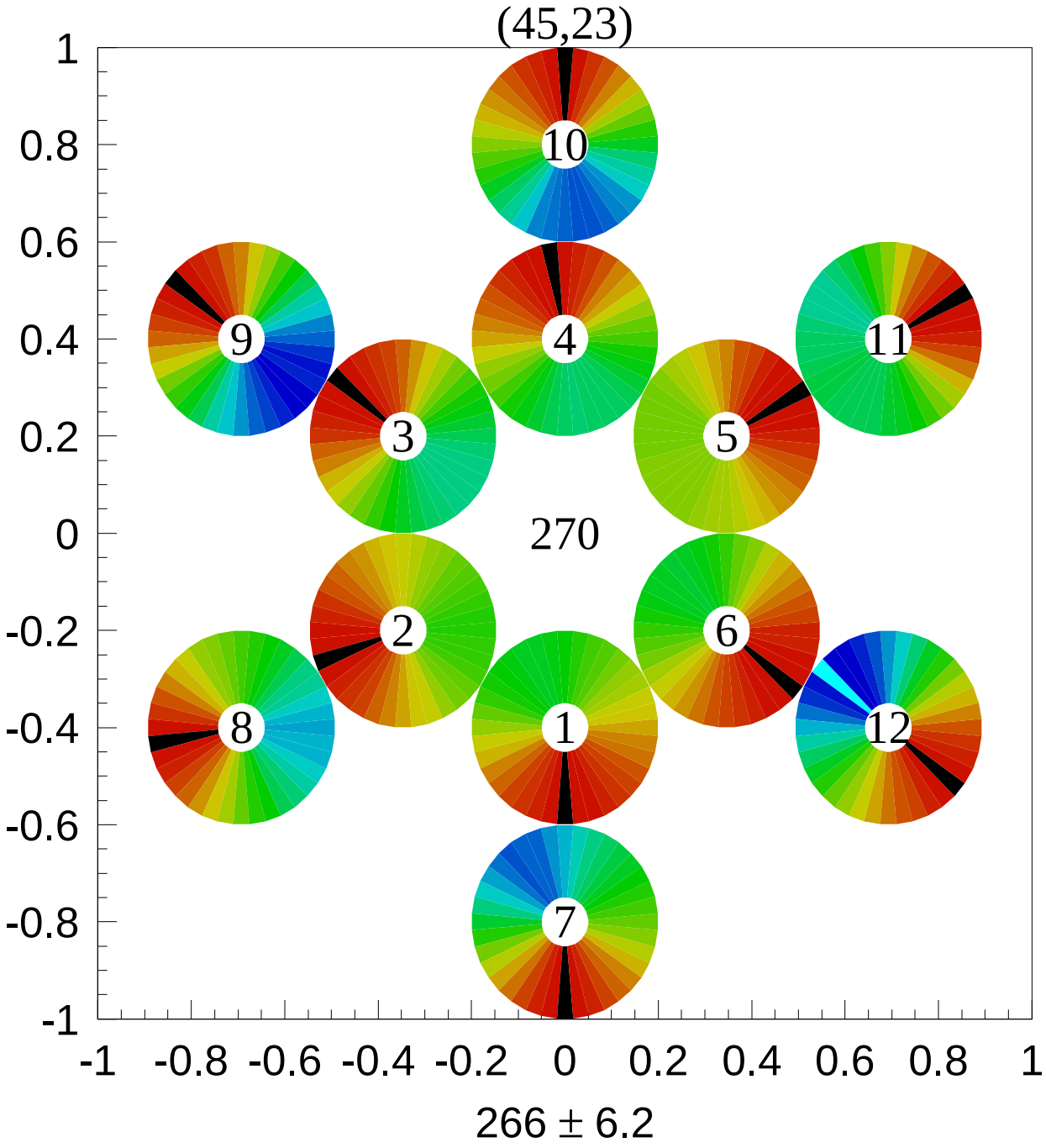

(45,21)
tilted LEDs
121 120 124 126 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 116 123 117 116 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

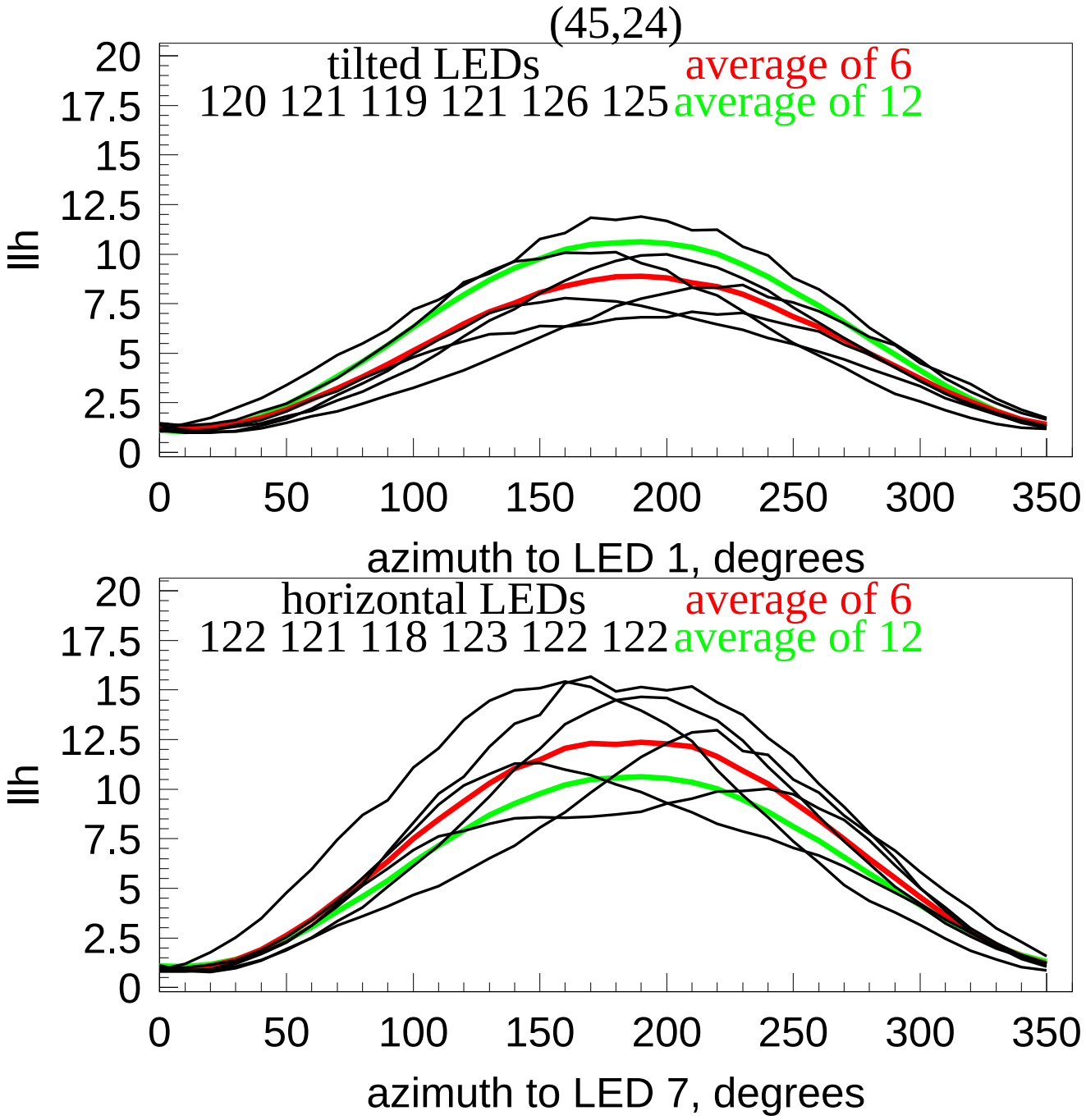

(45,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
293.1 ± 4.2

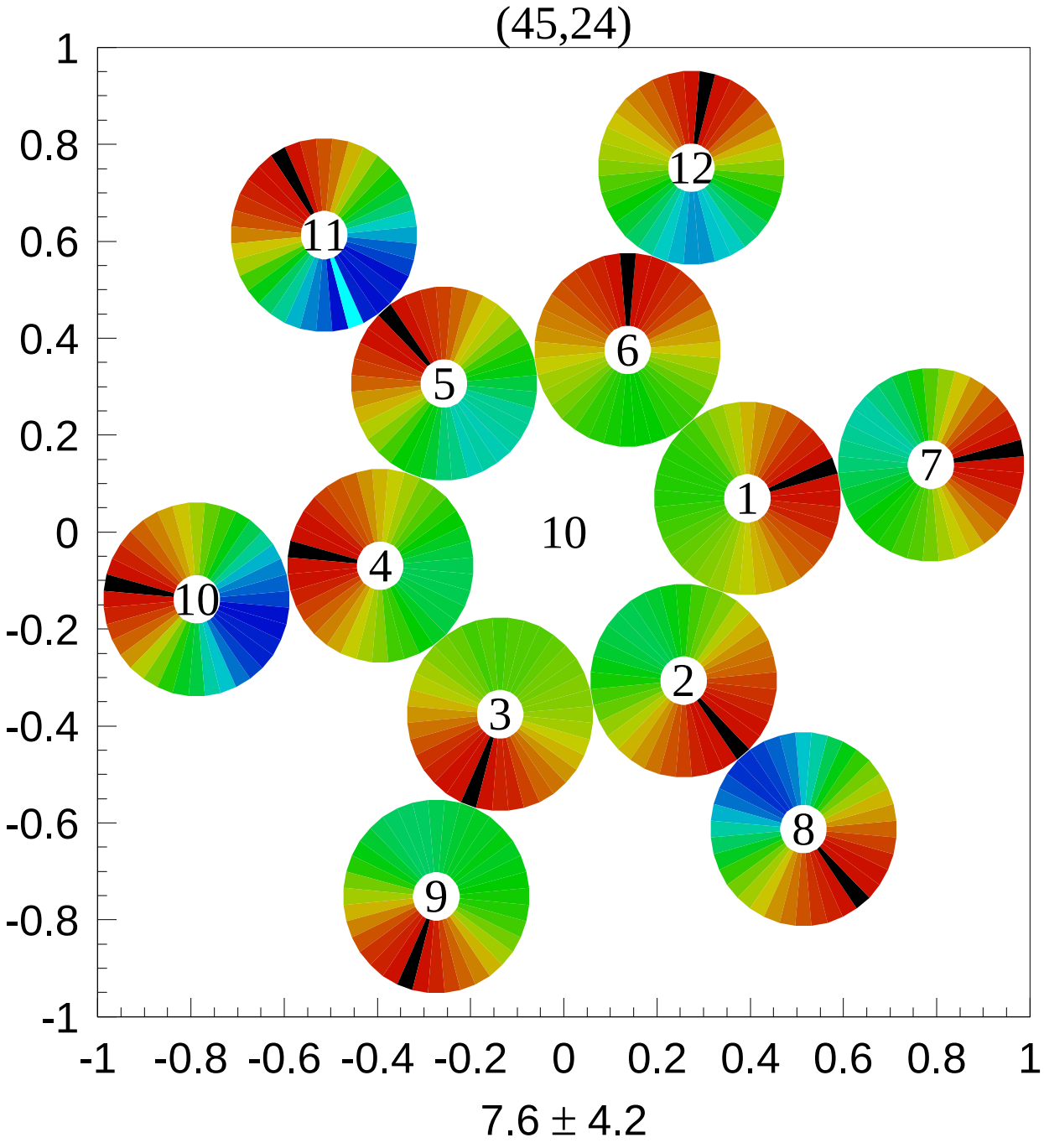

(45,22)
tilted LEDs
118 119 114 115 126 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 126 120 117 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

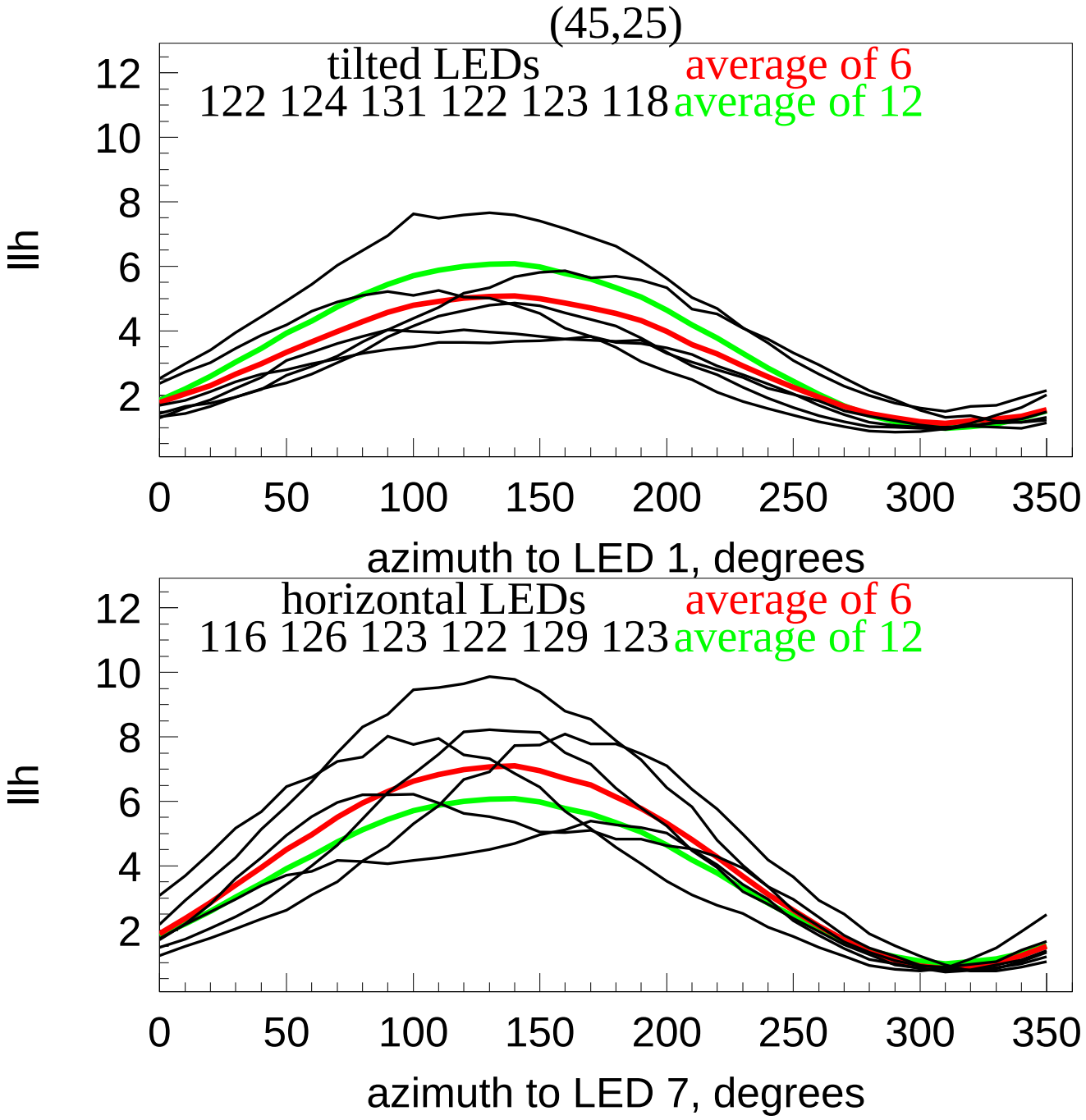

(45,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
148.2 ± 4.7

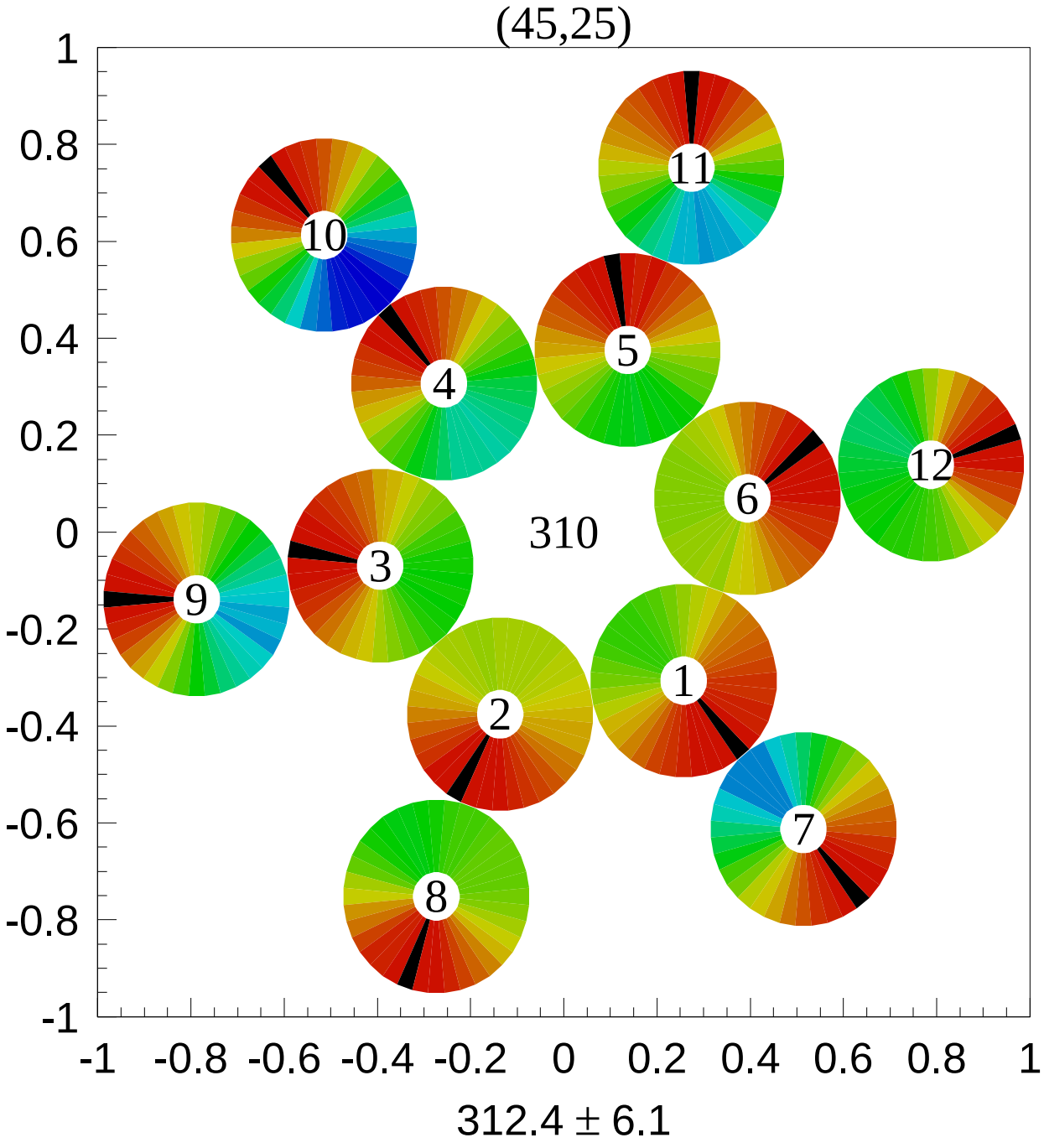

(45,23)
tilted LEDs
124 124 125 118 112 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 123 121 119 116 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

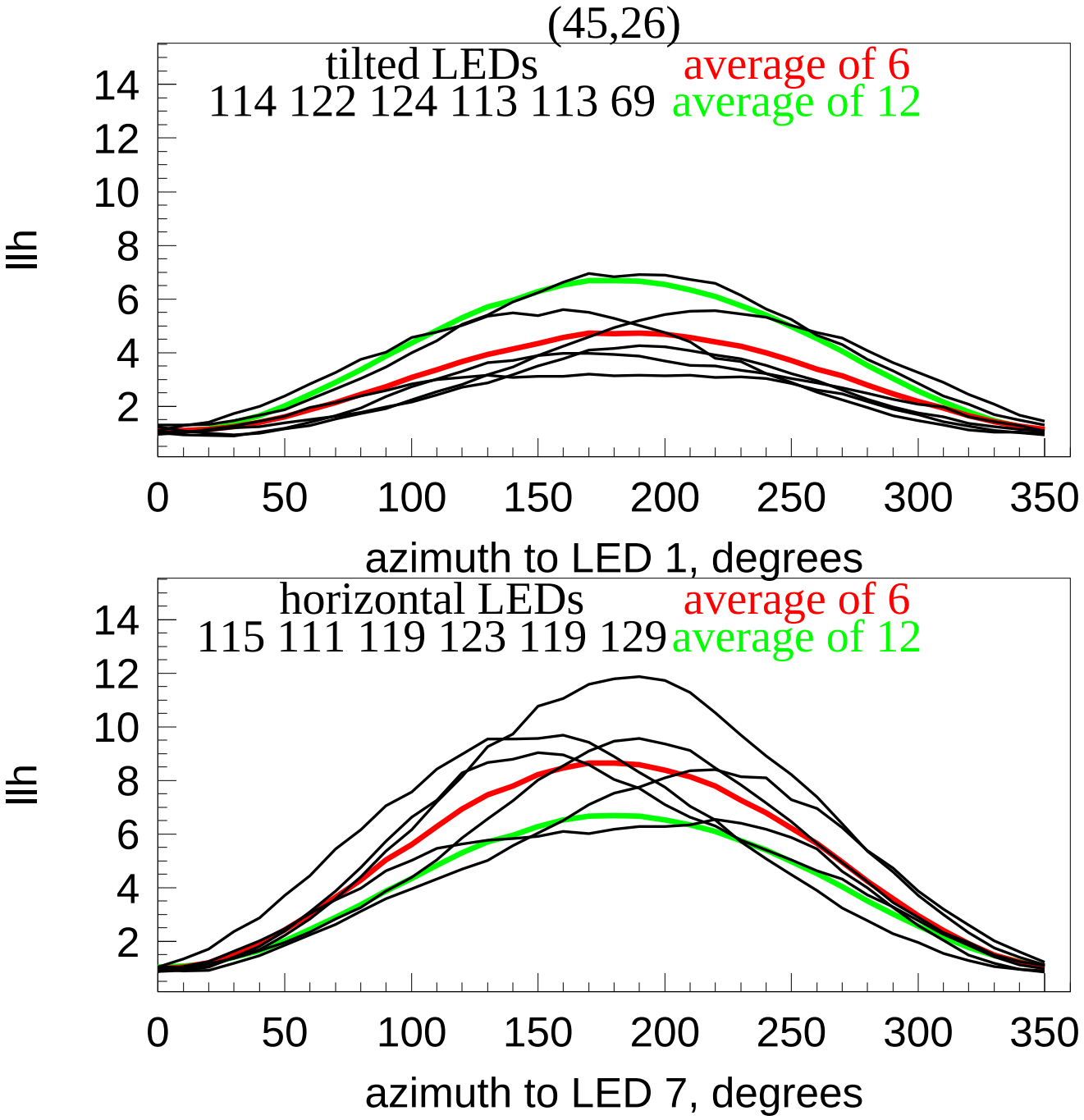

(45,23)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
266 ± 6.2

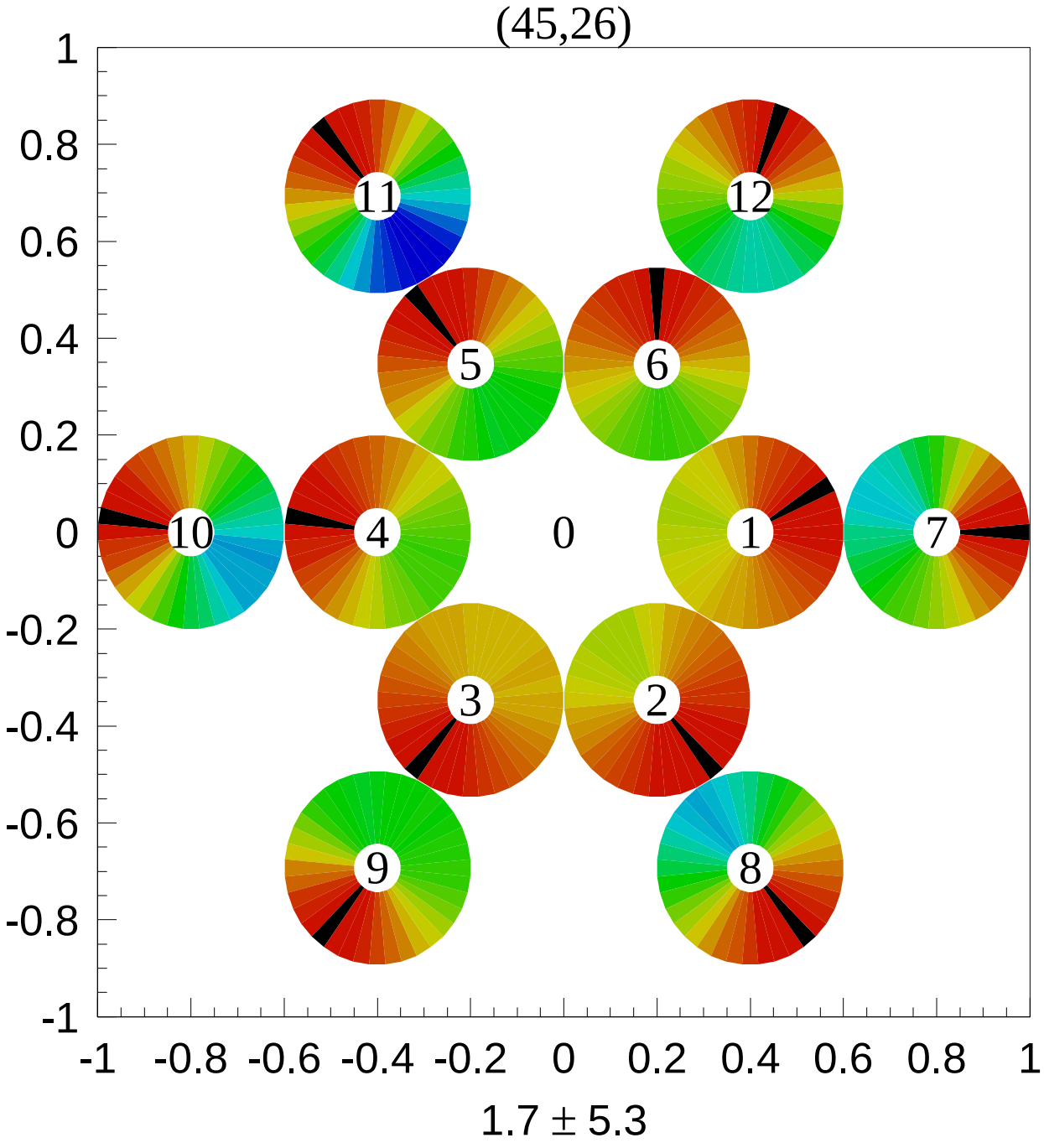

(45,24)
tilted LEDs
120 121 119 121 126 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 118 123 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

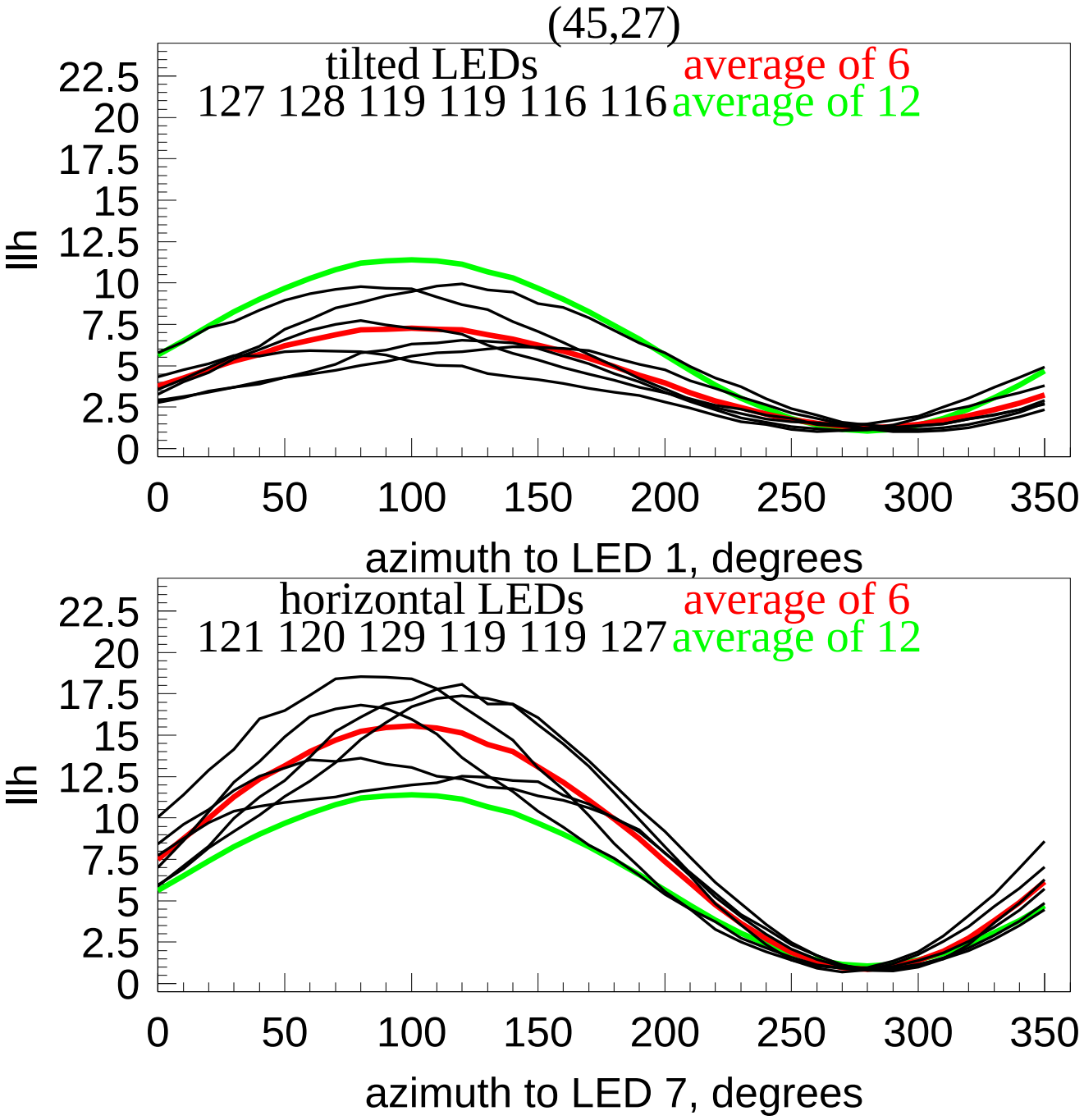

(45,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
7.6 ± 4.2

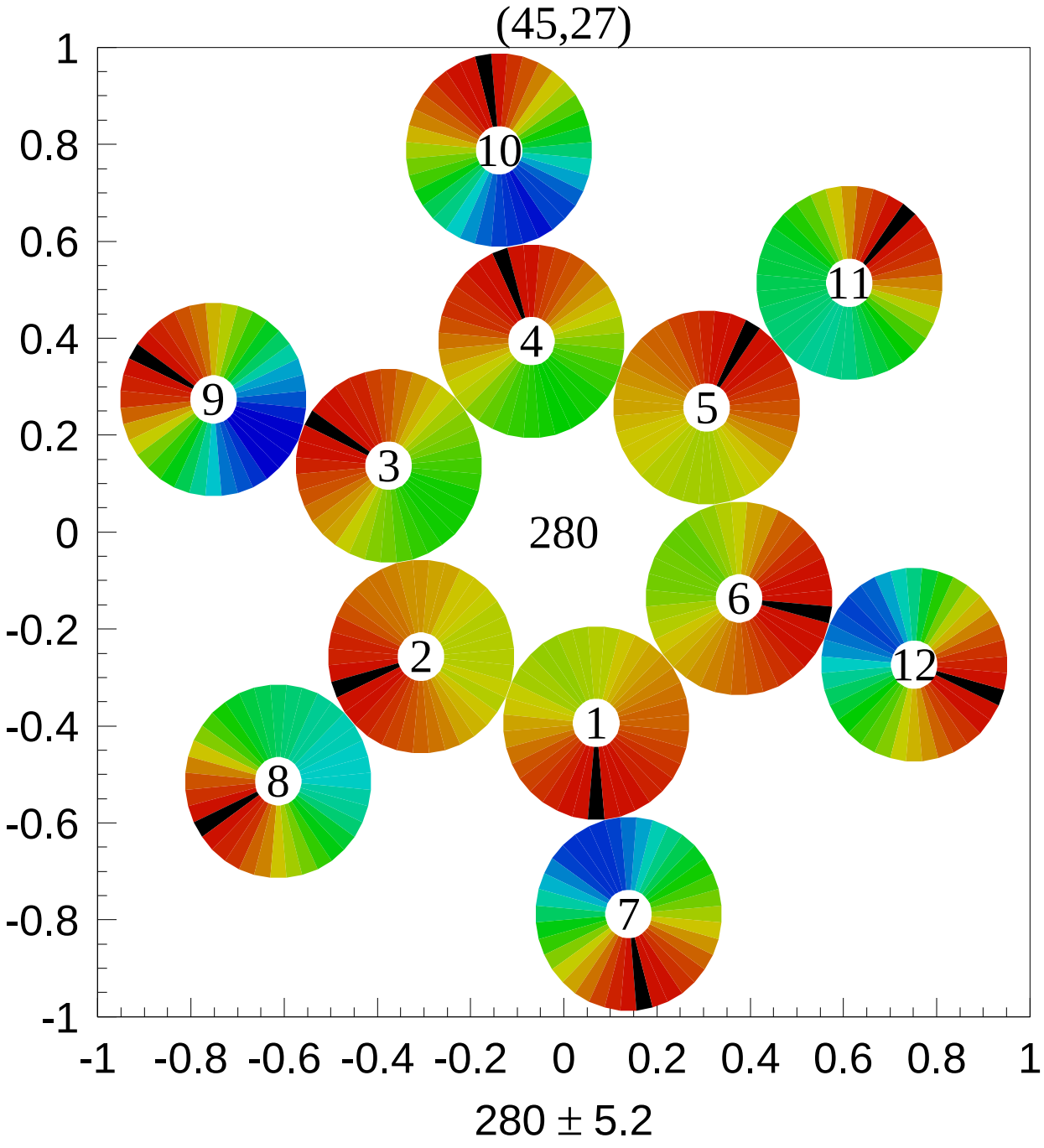

(45,25)
tilted LEDs
122 124 131 122 123 118
average of 6
average of 12
Ilh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 126 123 122 129 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

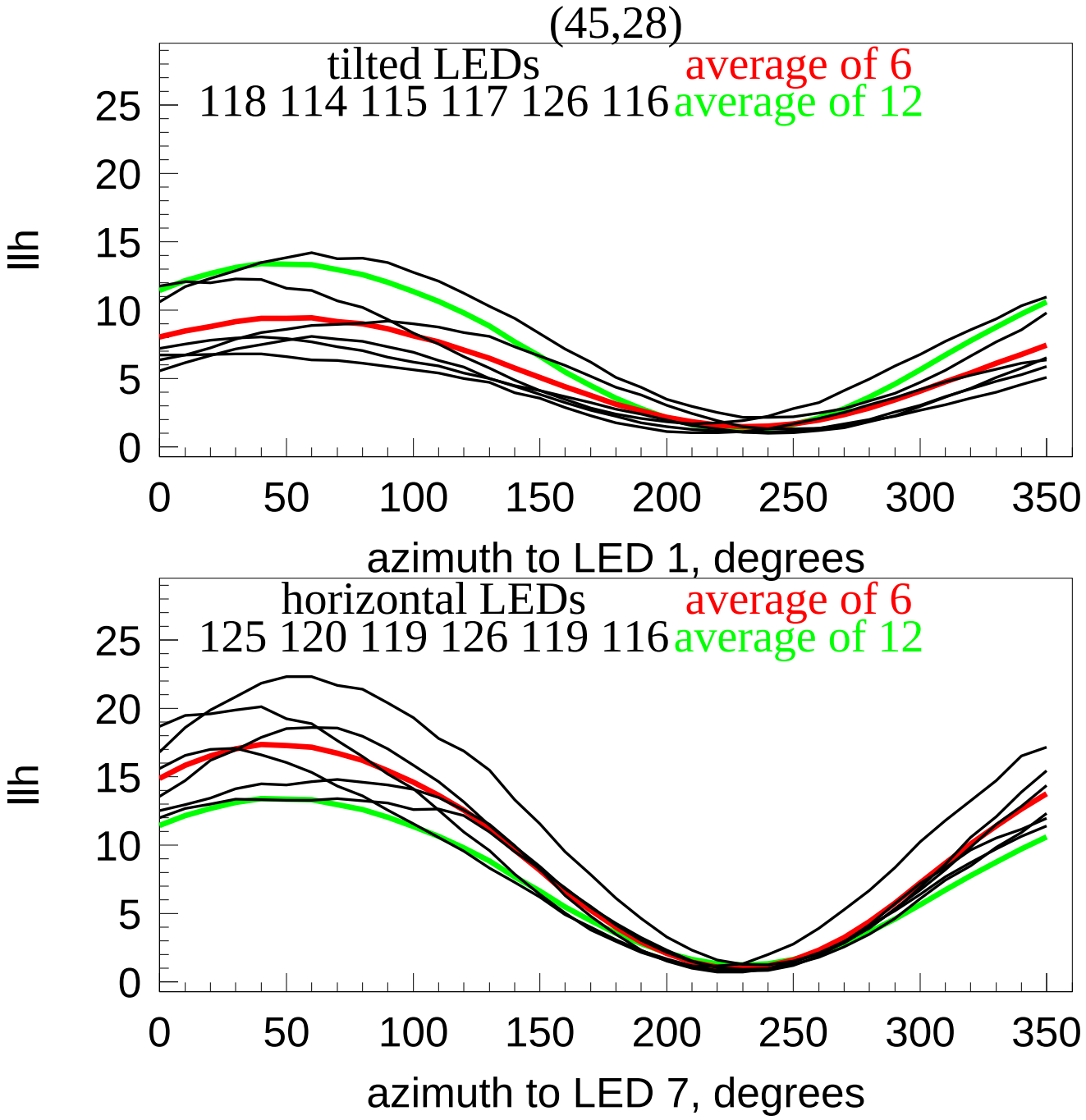

(45,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
312.4 ± 6.1

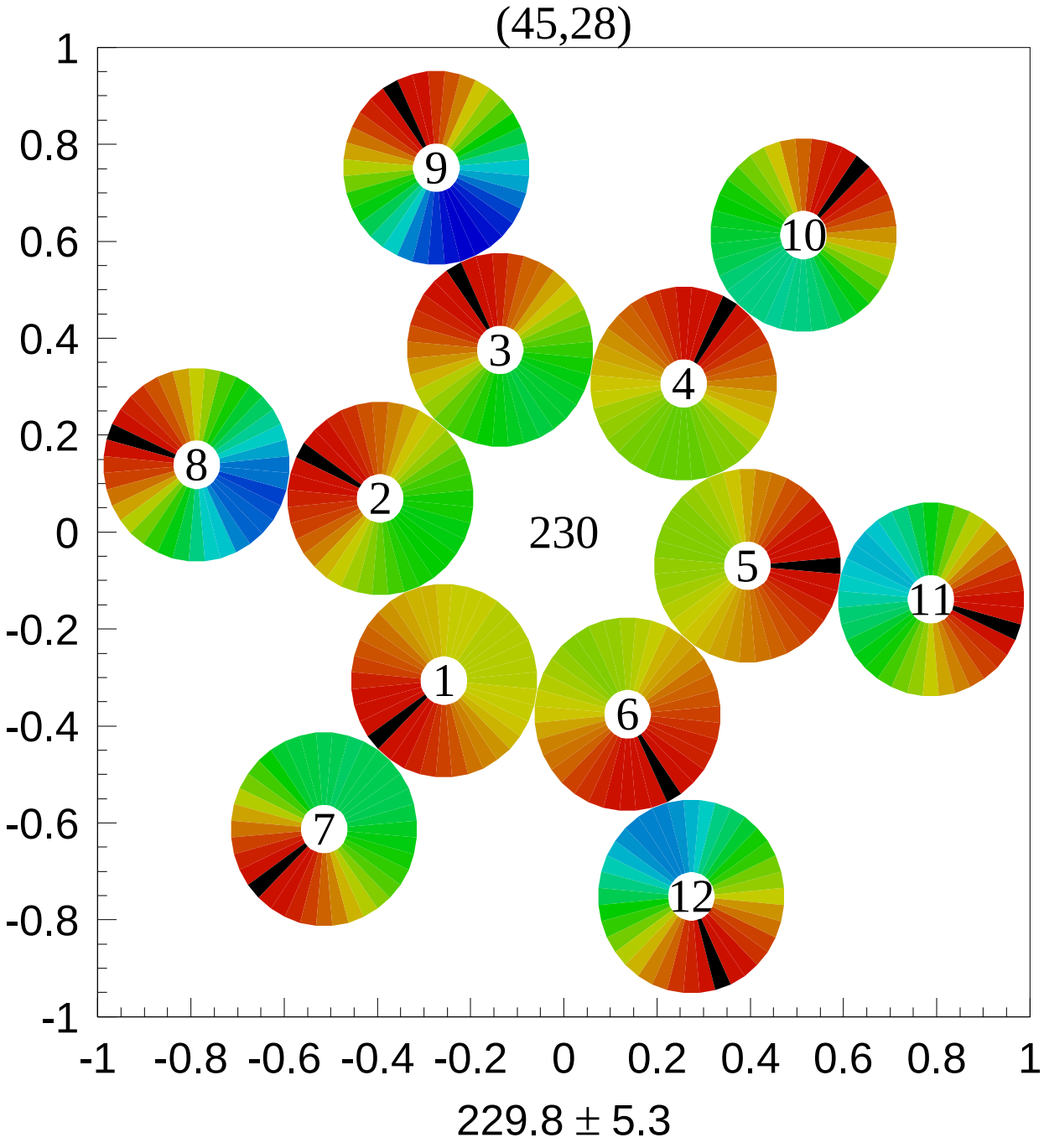

(45,26)
tilted LEDs
114 122 124 113 113 69
average of 6
average of 12
lih
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
115 111 119 123 119 129
average of 6
average of 12
lih
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

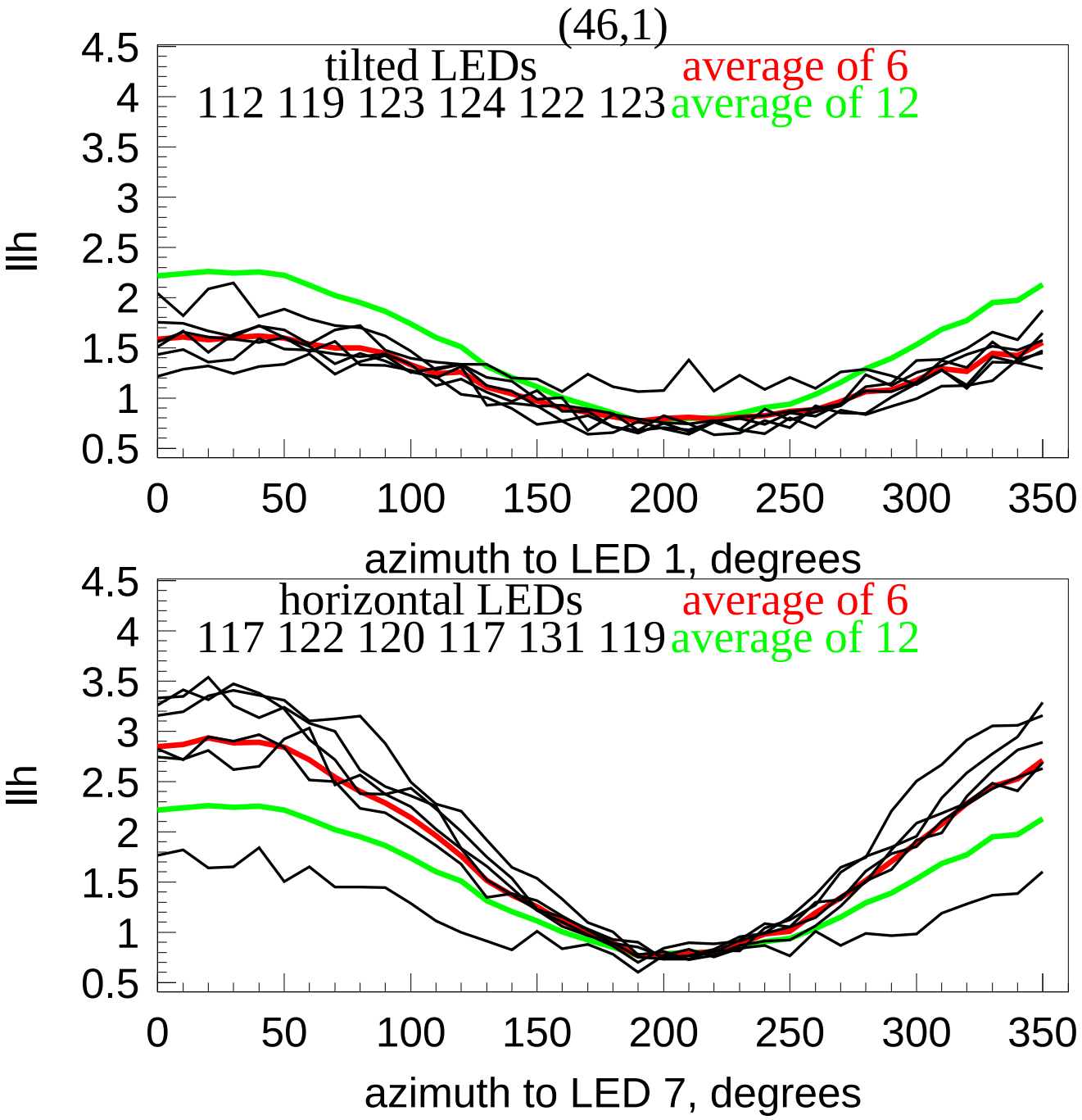

(45,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1.7 ± 5.3
11
12
5
6
10
4
0
1
7
3
2
9
8

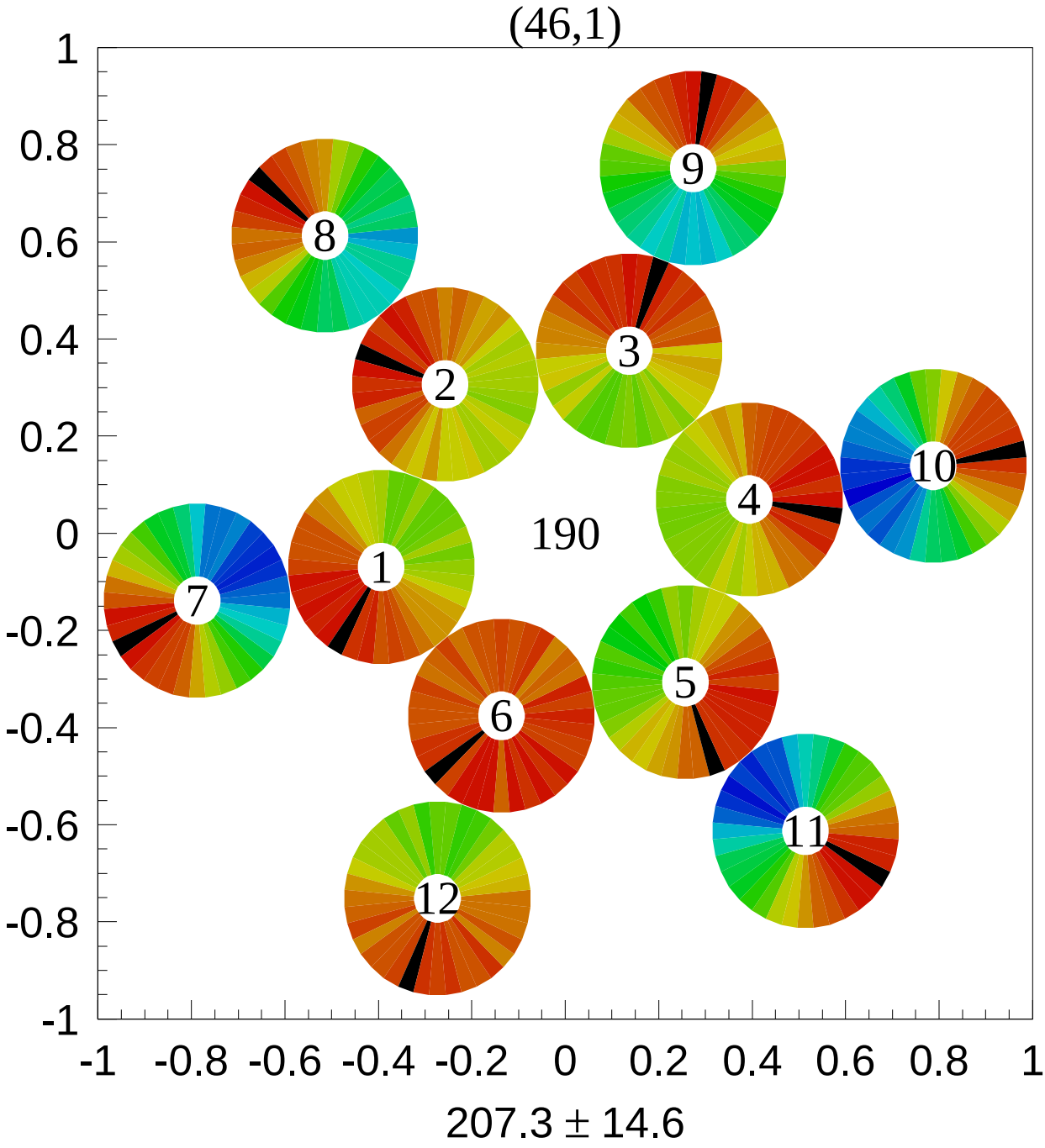

(45,27)
tilted LEDs
127 128 119 119 116 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 129 119 119 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

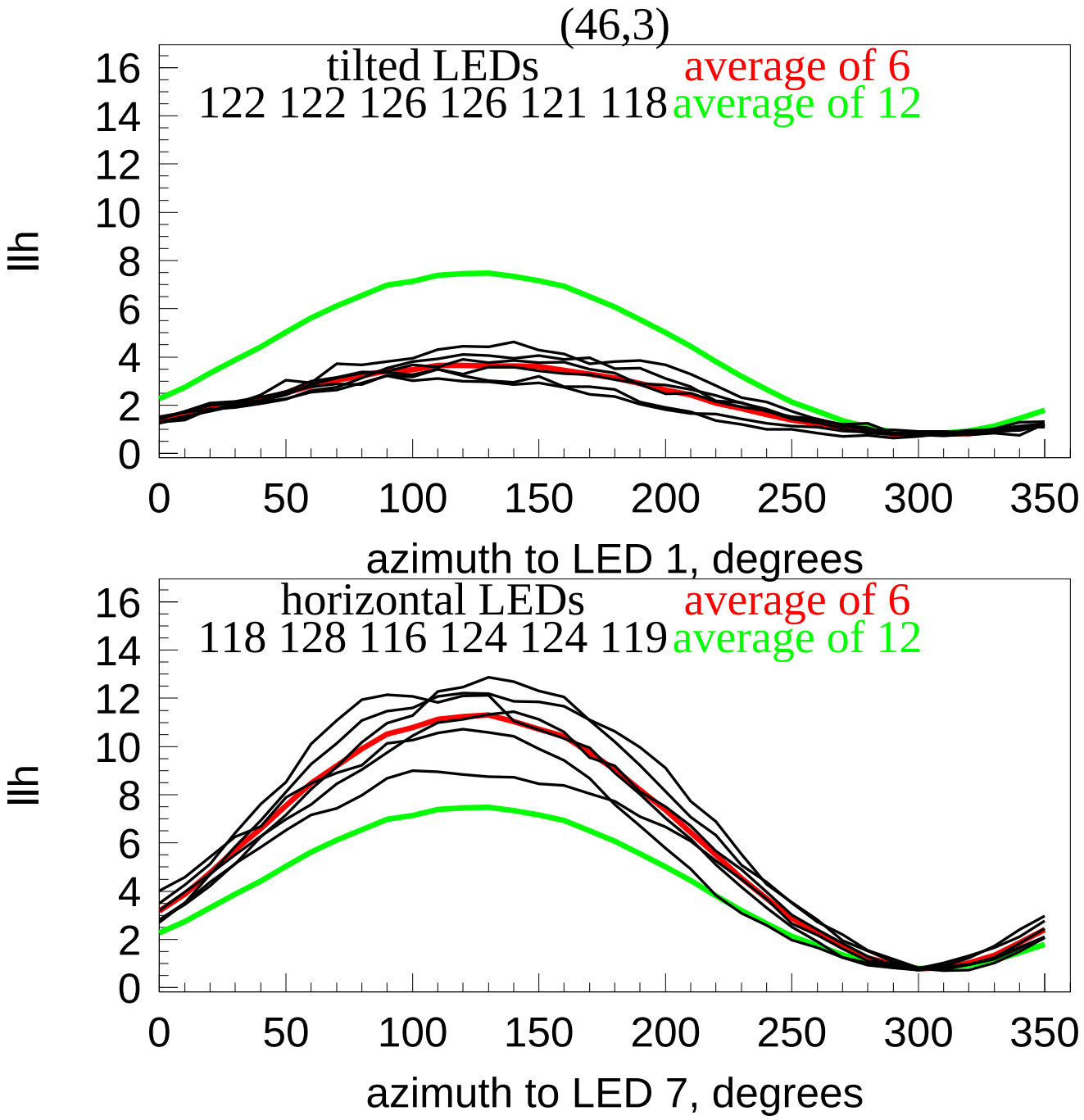

(45,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
280 ± 5.2
280
1
2
3
4
5
6
7
8
9
10
11
12

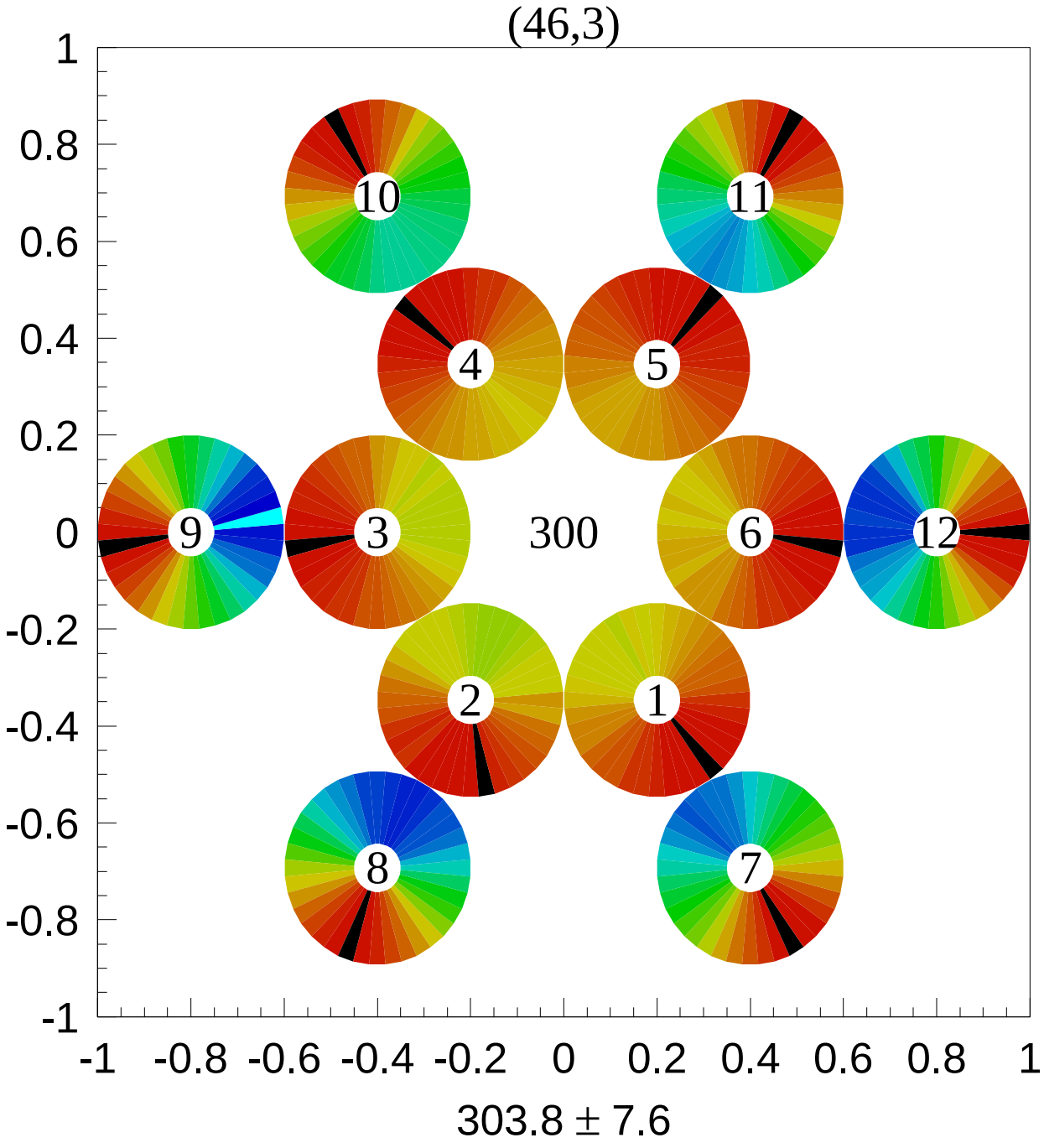

(45,28)
tilted LEDs
118 114 115 117 126 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 119 126 119 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

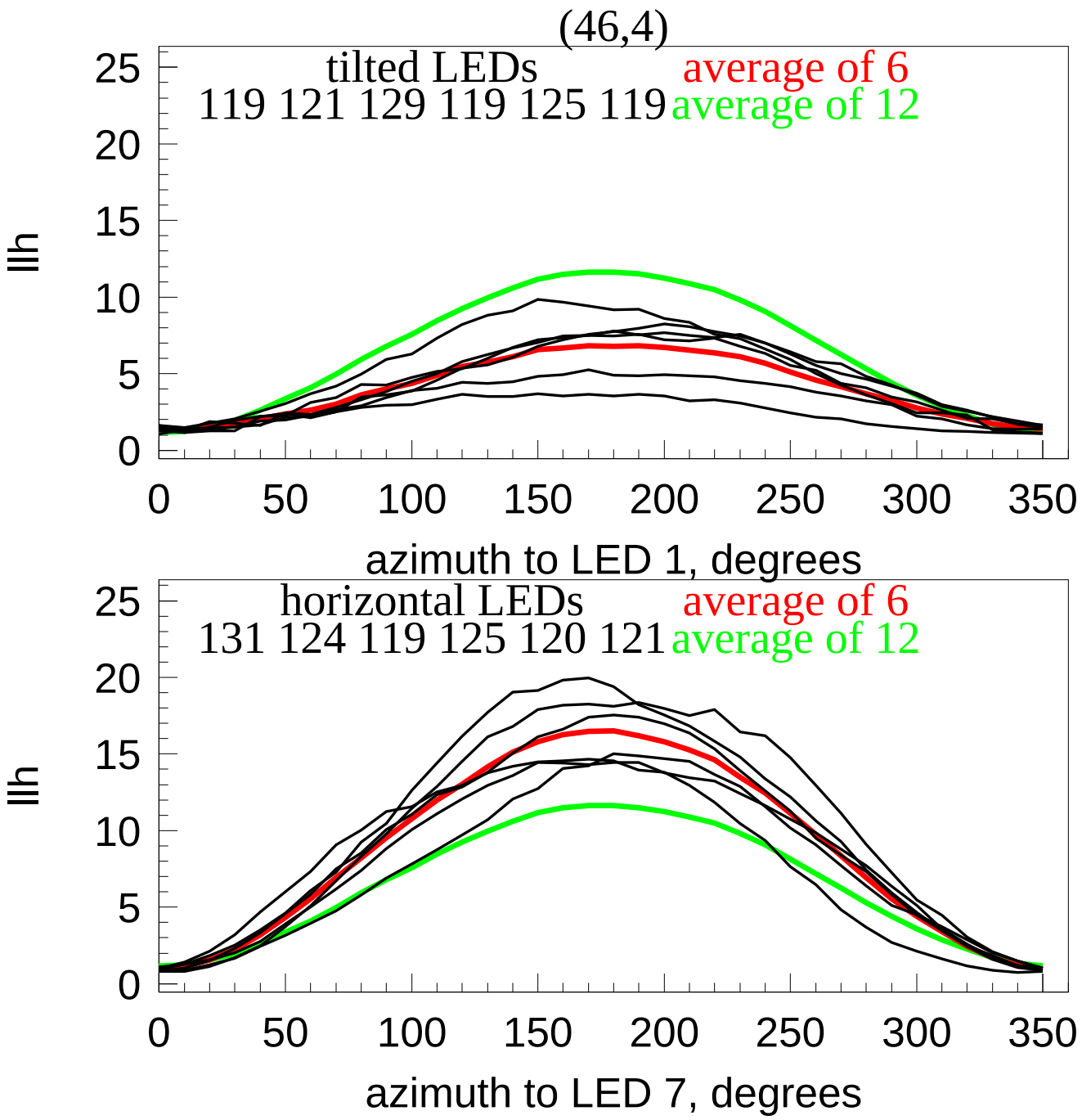

(45,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
229.8 ± 5.3

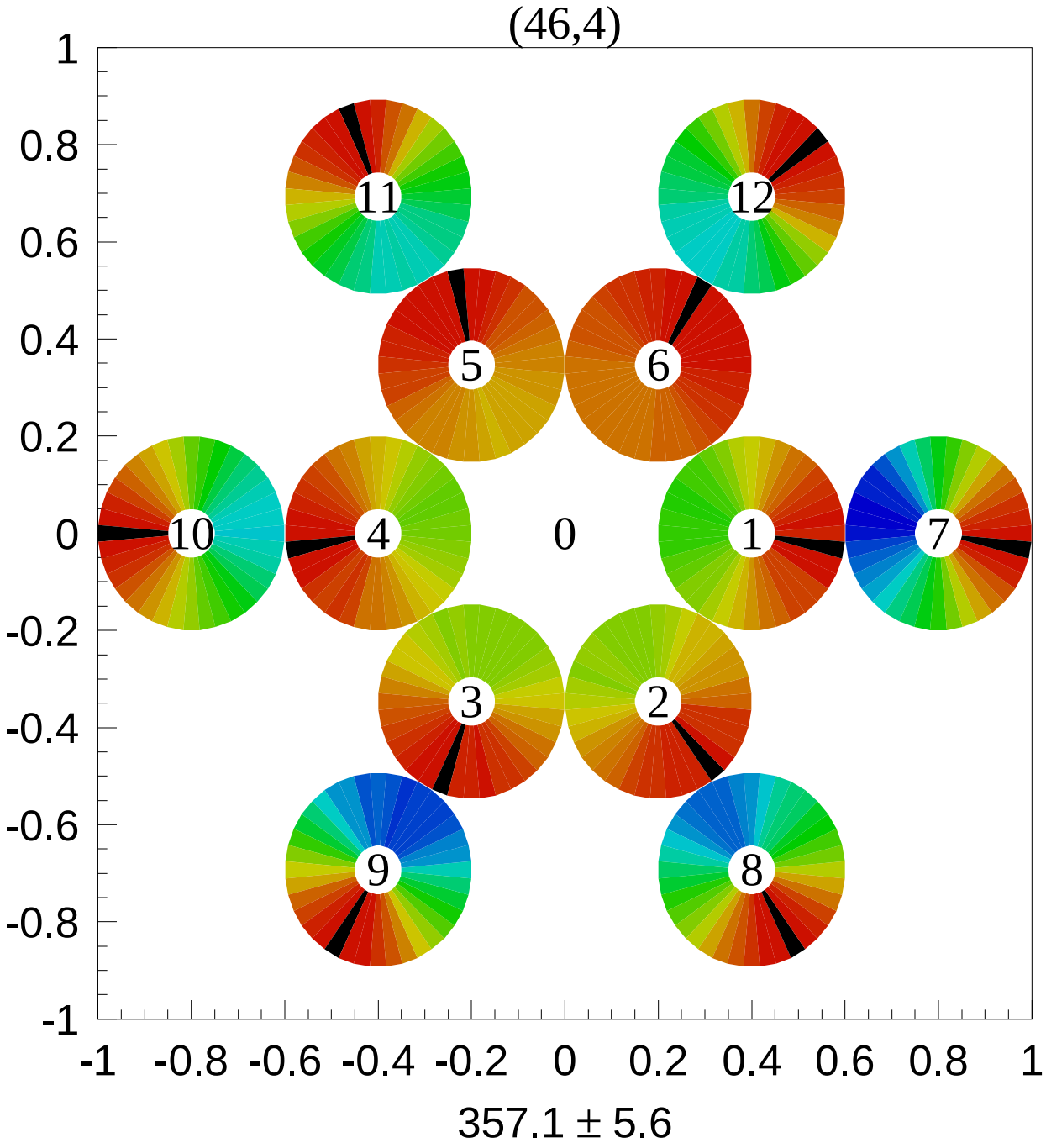

(46,1)
tilted LEDs
112 119 123 124 122 123
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
117 122 120 117 131 119
average of 6
average of 12
IIh
azimuth to LED 7, degrees

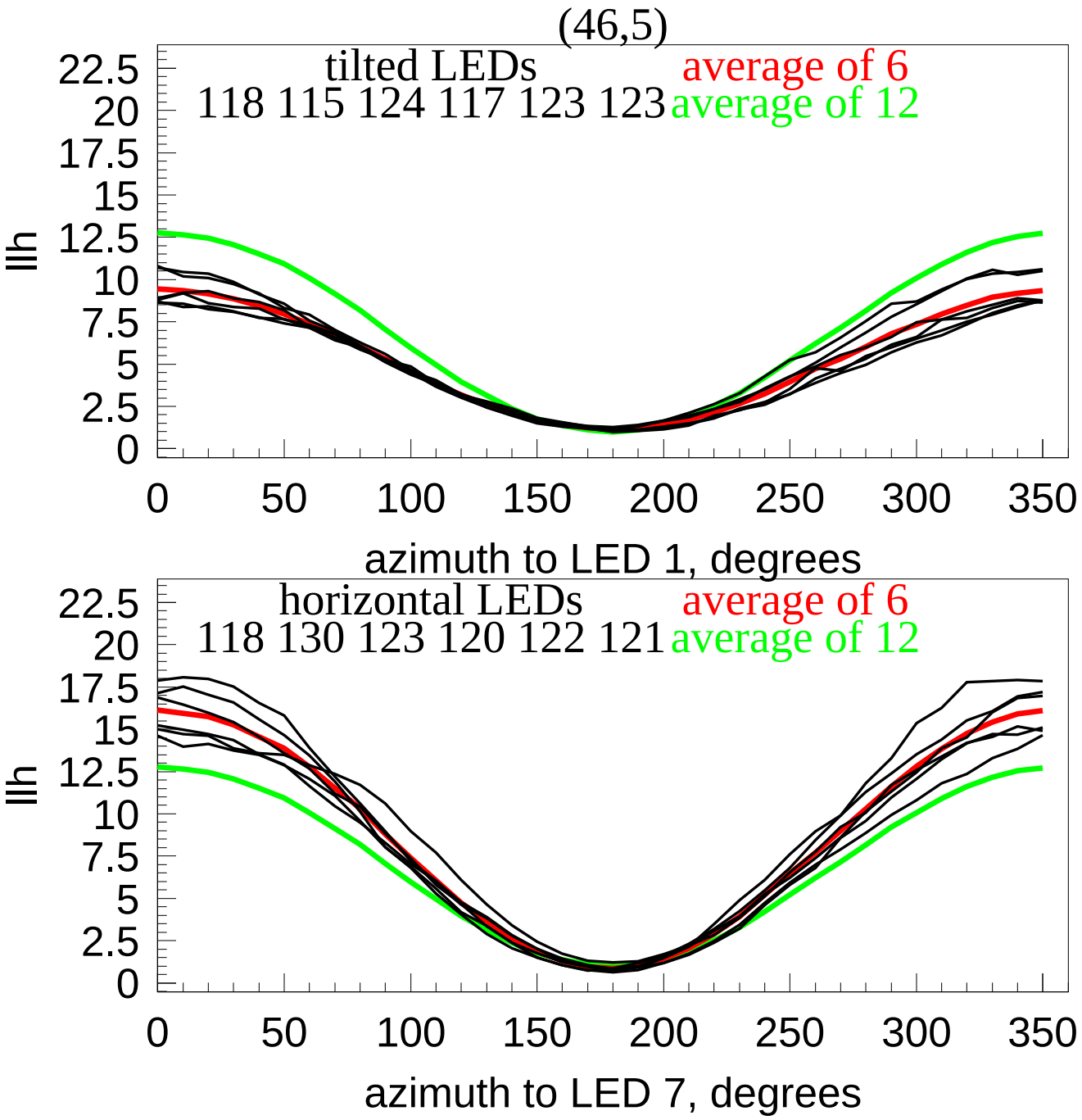

(46,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
207.3 ± 14.6
190
1
2
3
4
5
6
7
8
9
10
11
12

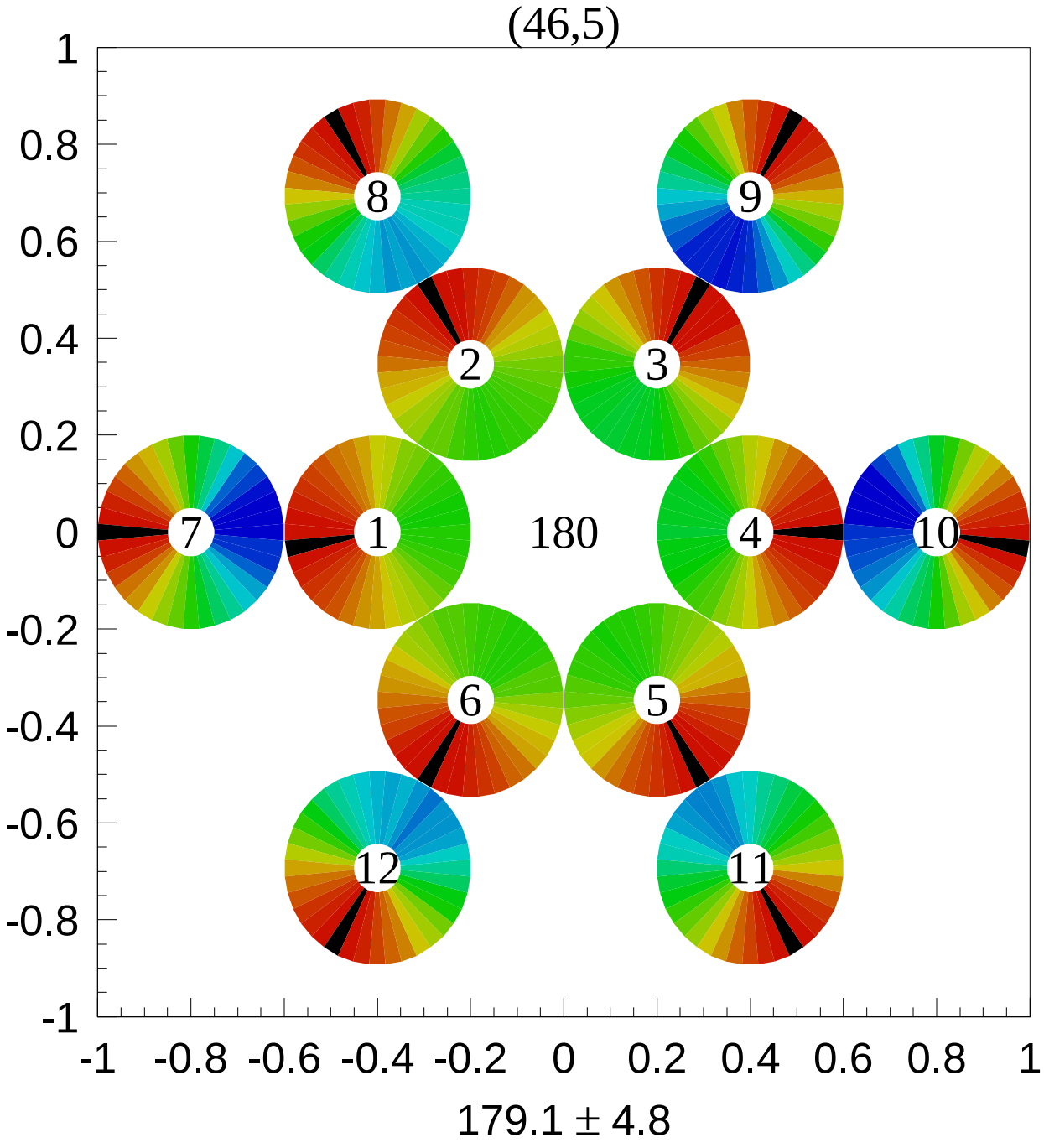

(46,3)
tilted LEDs
122 122 126 126 121 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 128 116 124 124 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

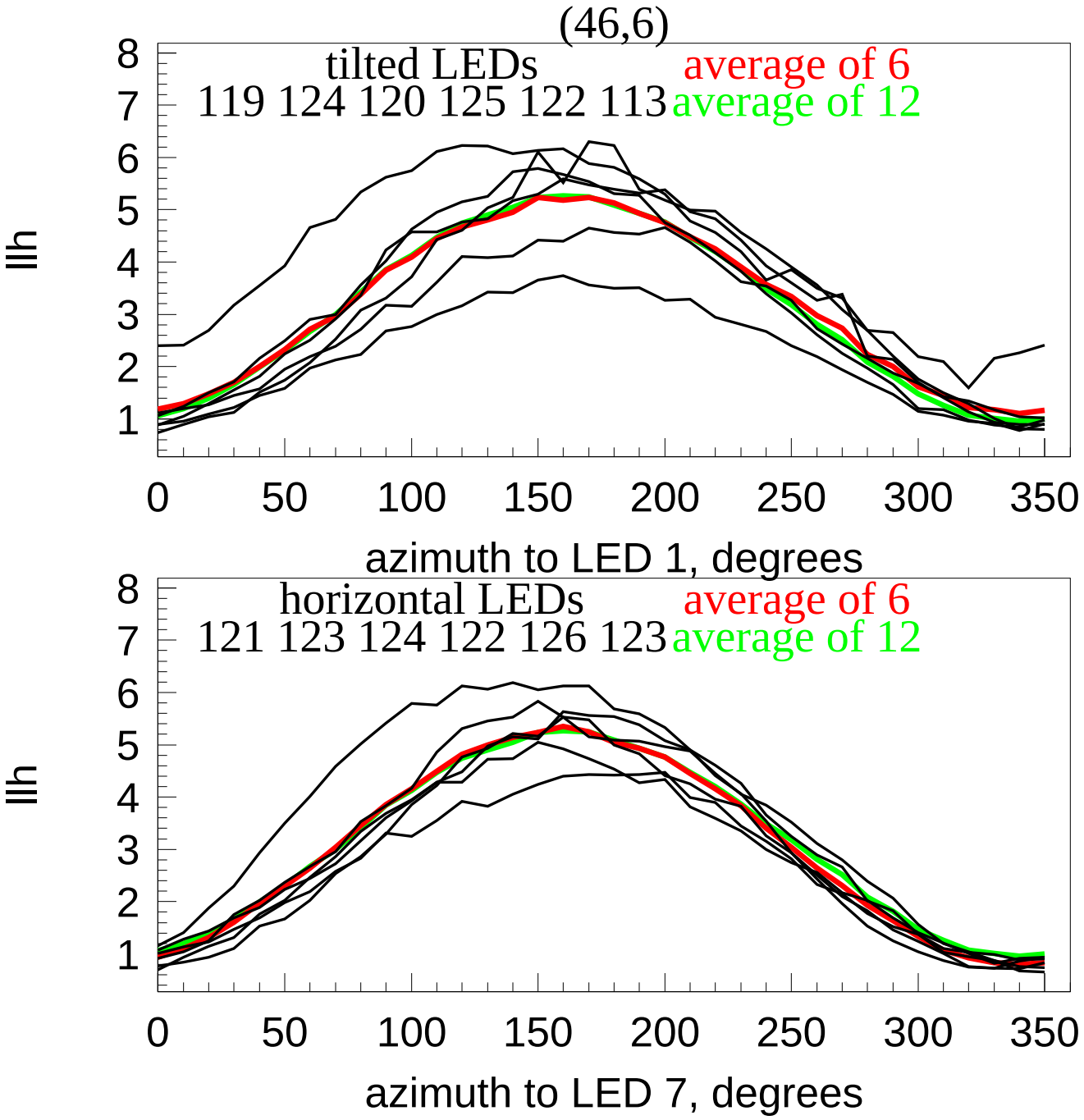

(46,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
303.8 ± 7.6

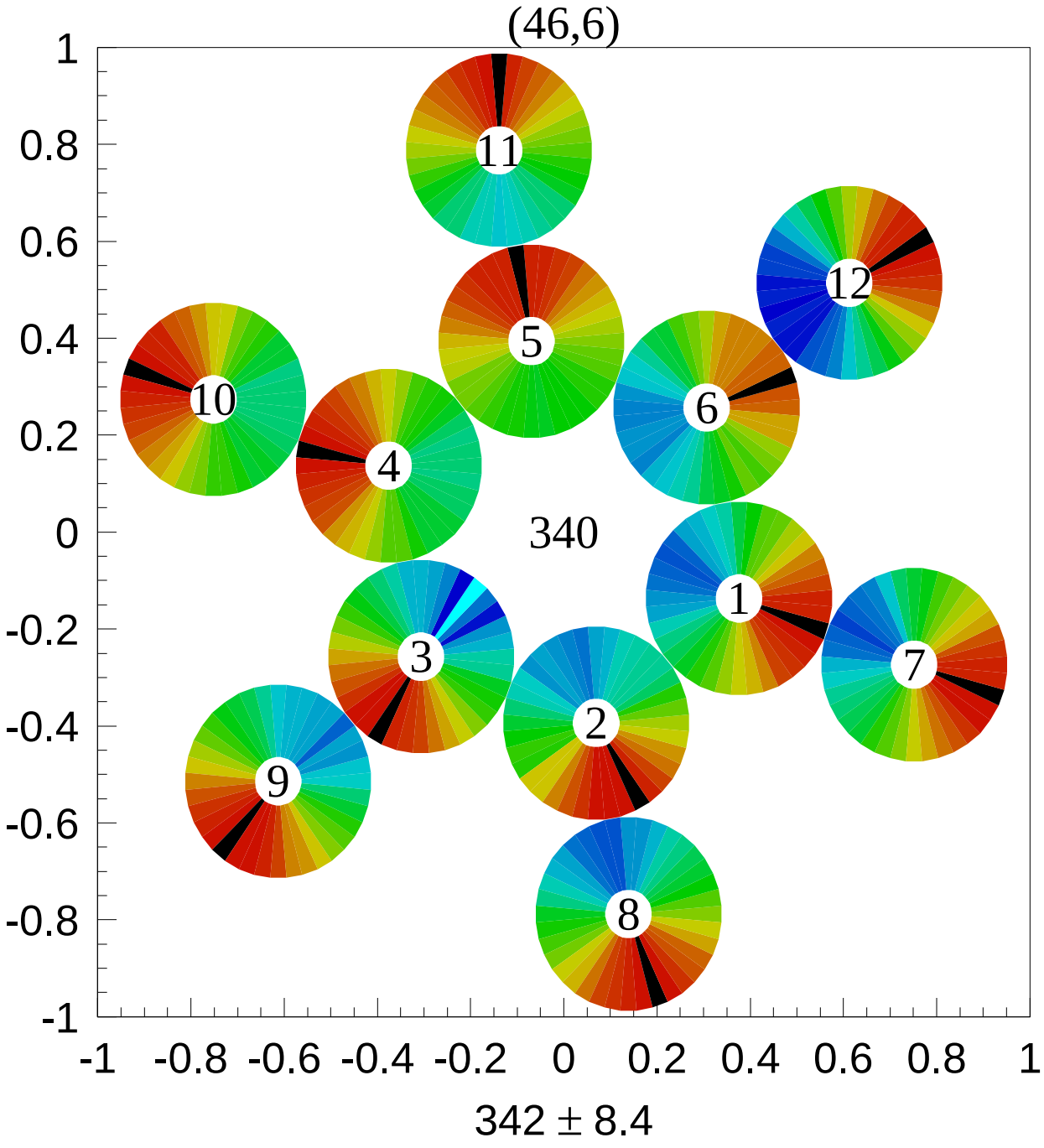

(46,4)
tilted LEDs
119 121 129 119 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 124 119 125 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

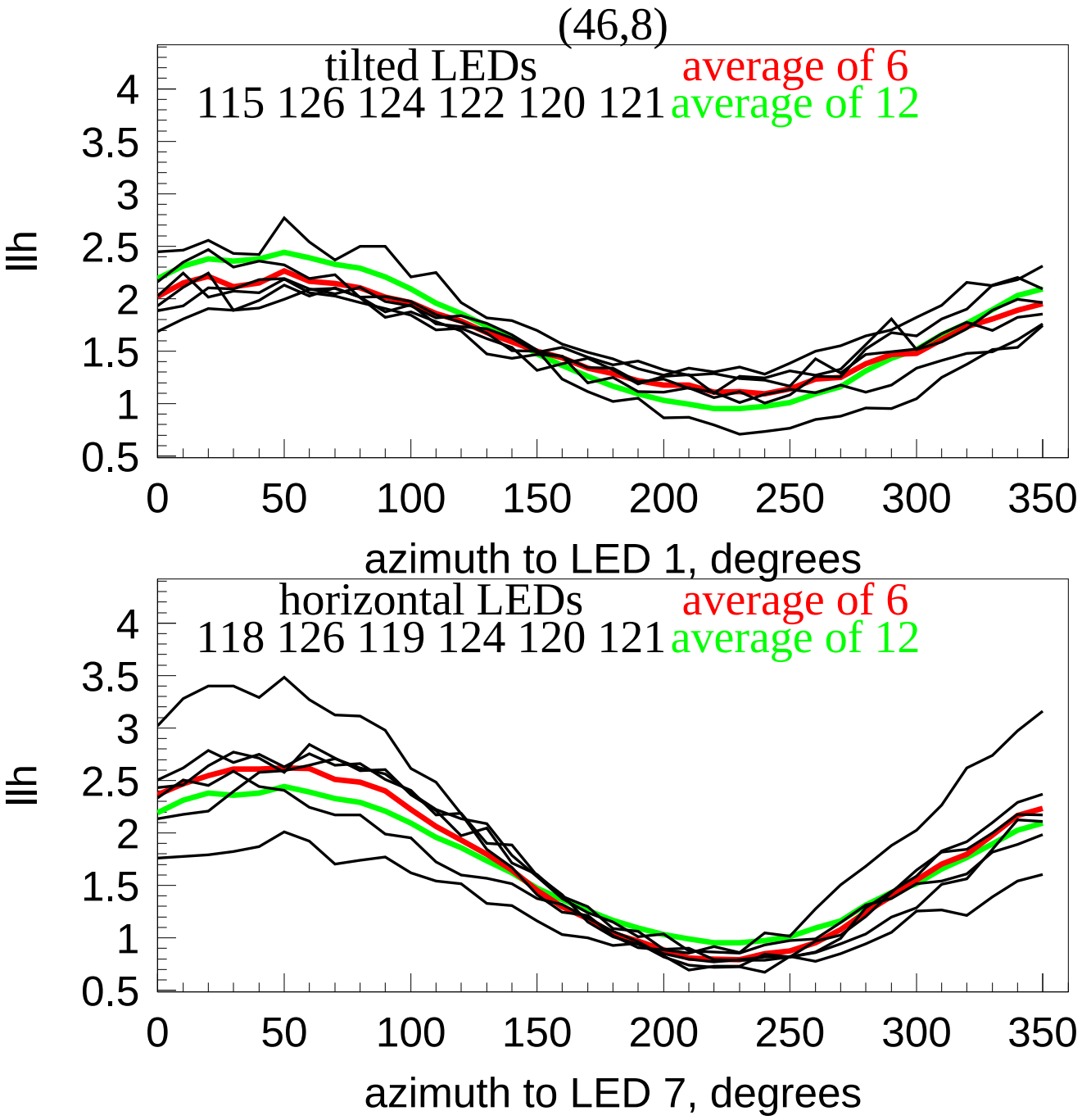

(46,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
357.1 ± 5.6

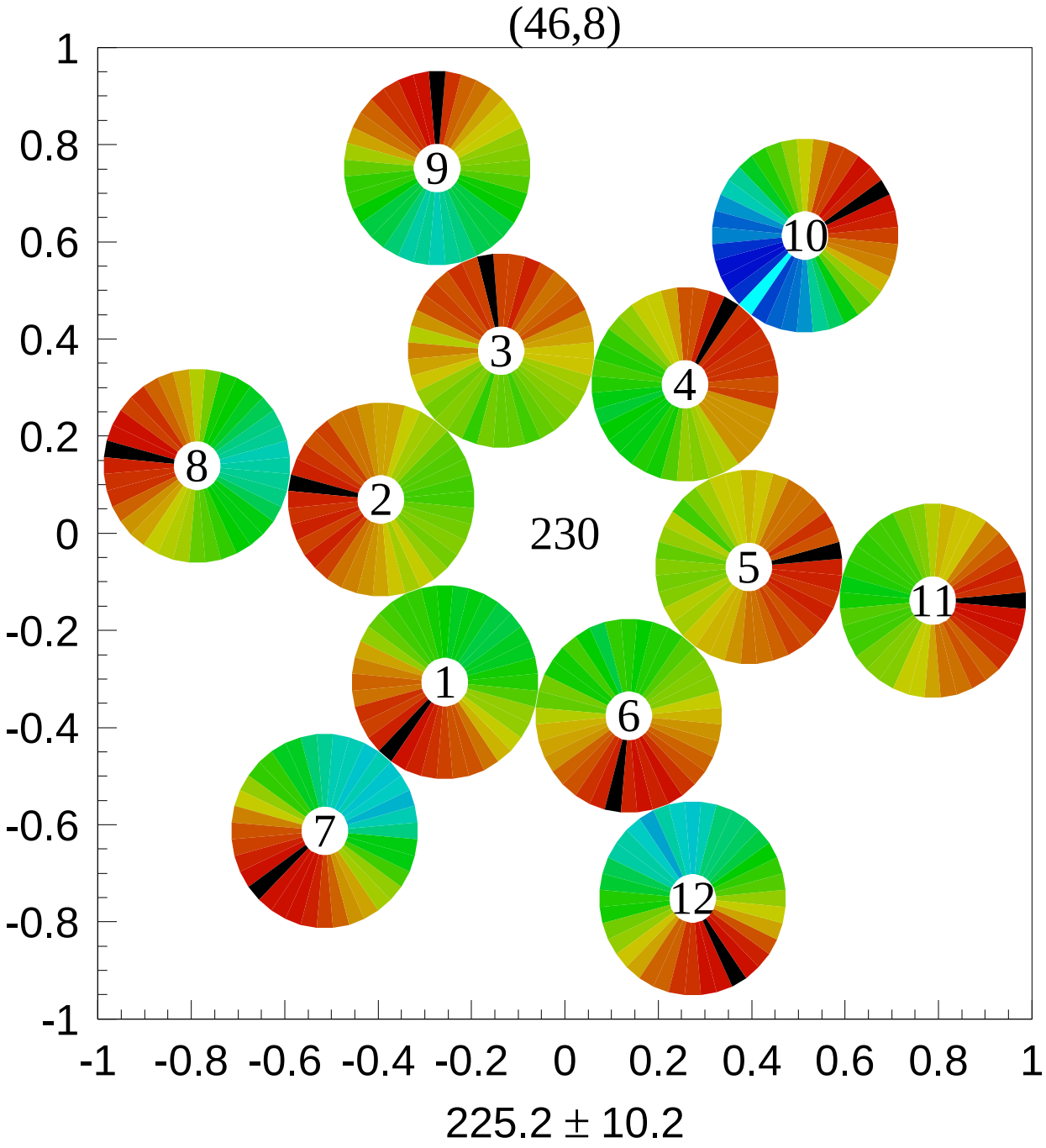

(46,5)
tilted LEDs
118 115 124 117 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 130 123 120 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

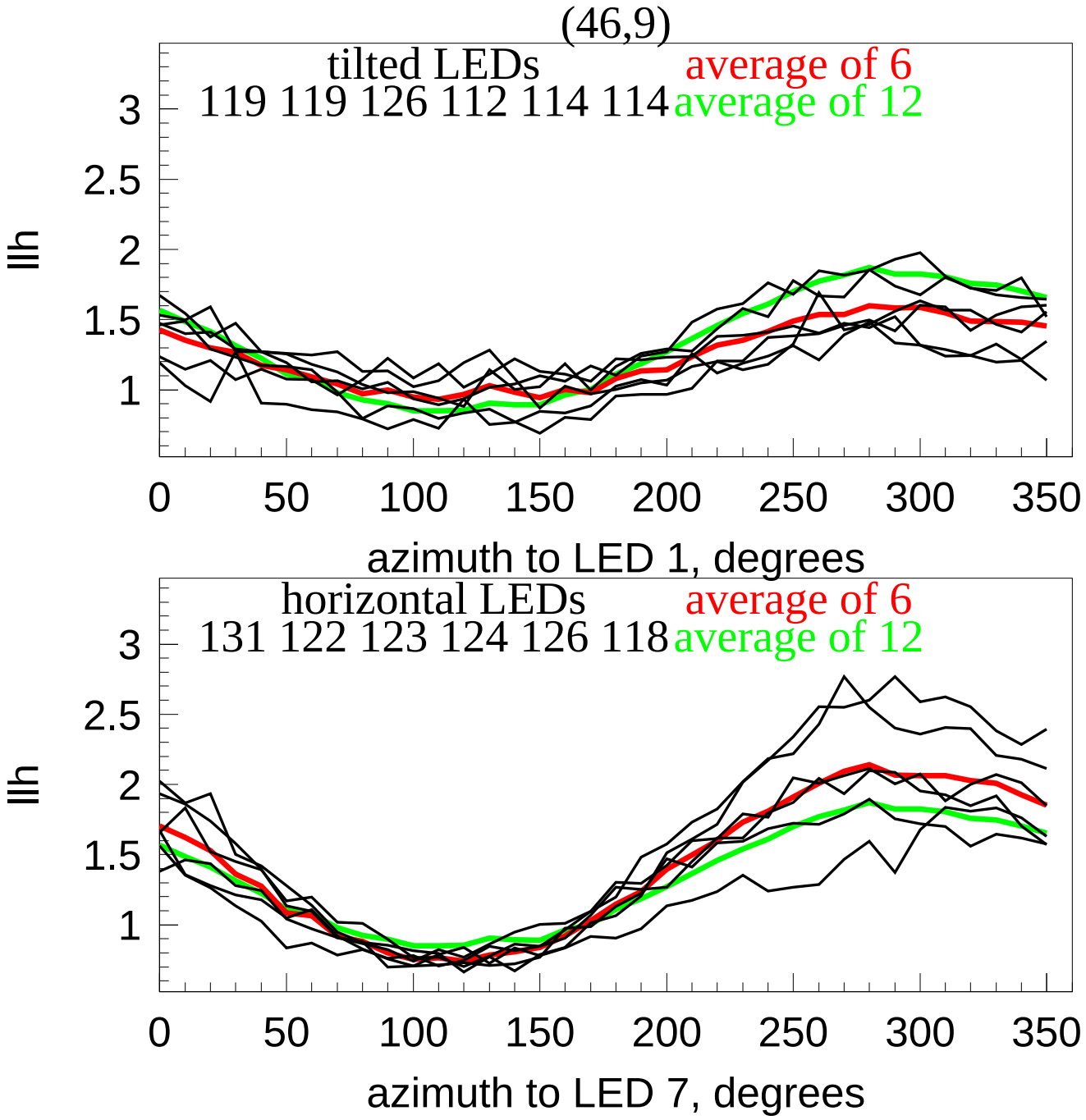

(46,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
179.1 ± 4.8

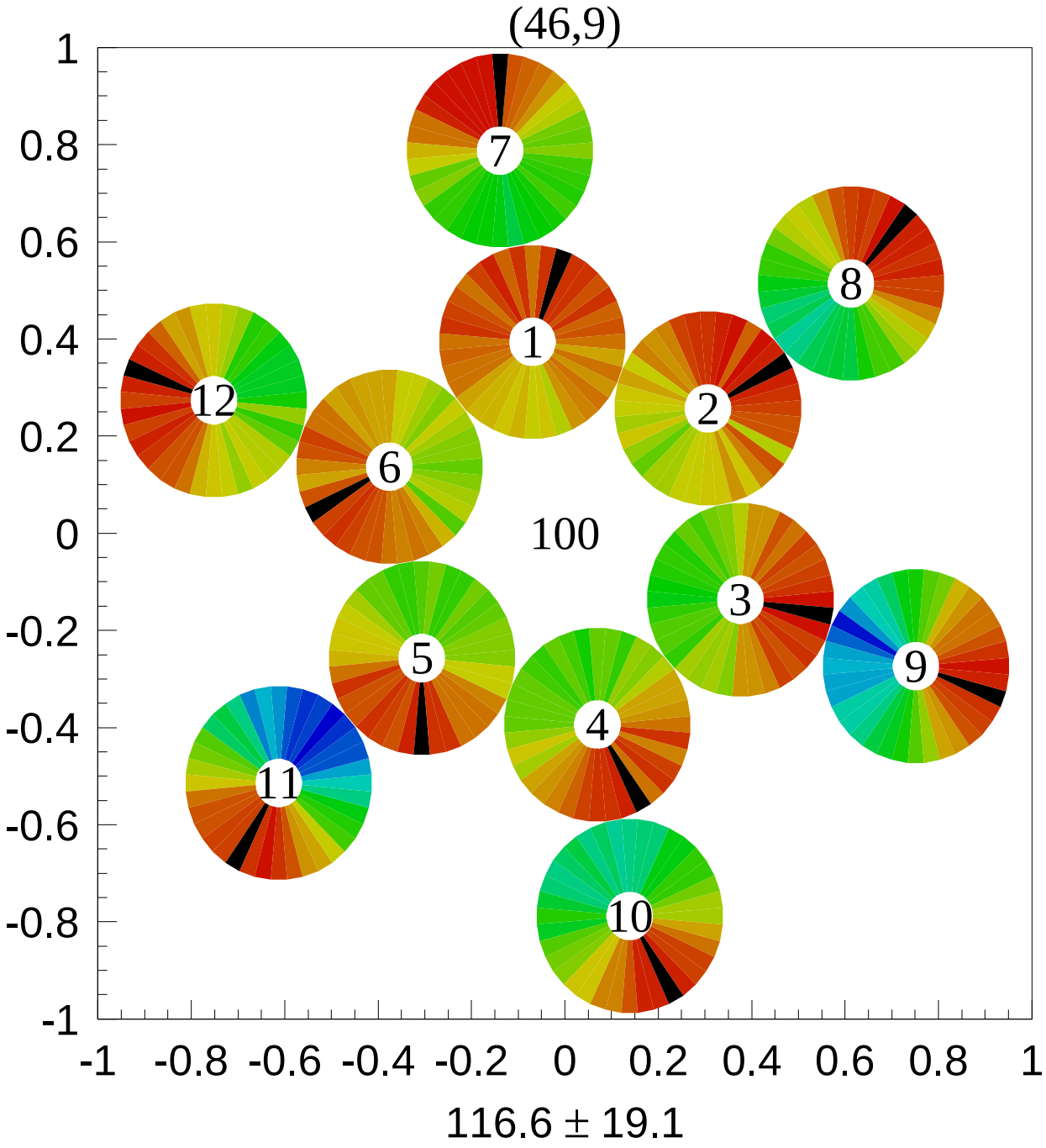

(46,6)
tilted LEDs
119 124 120 125 122 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 124 122 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

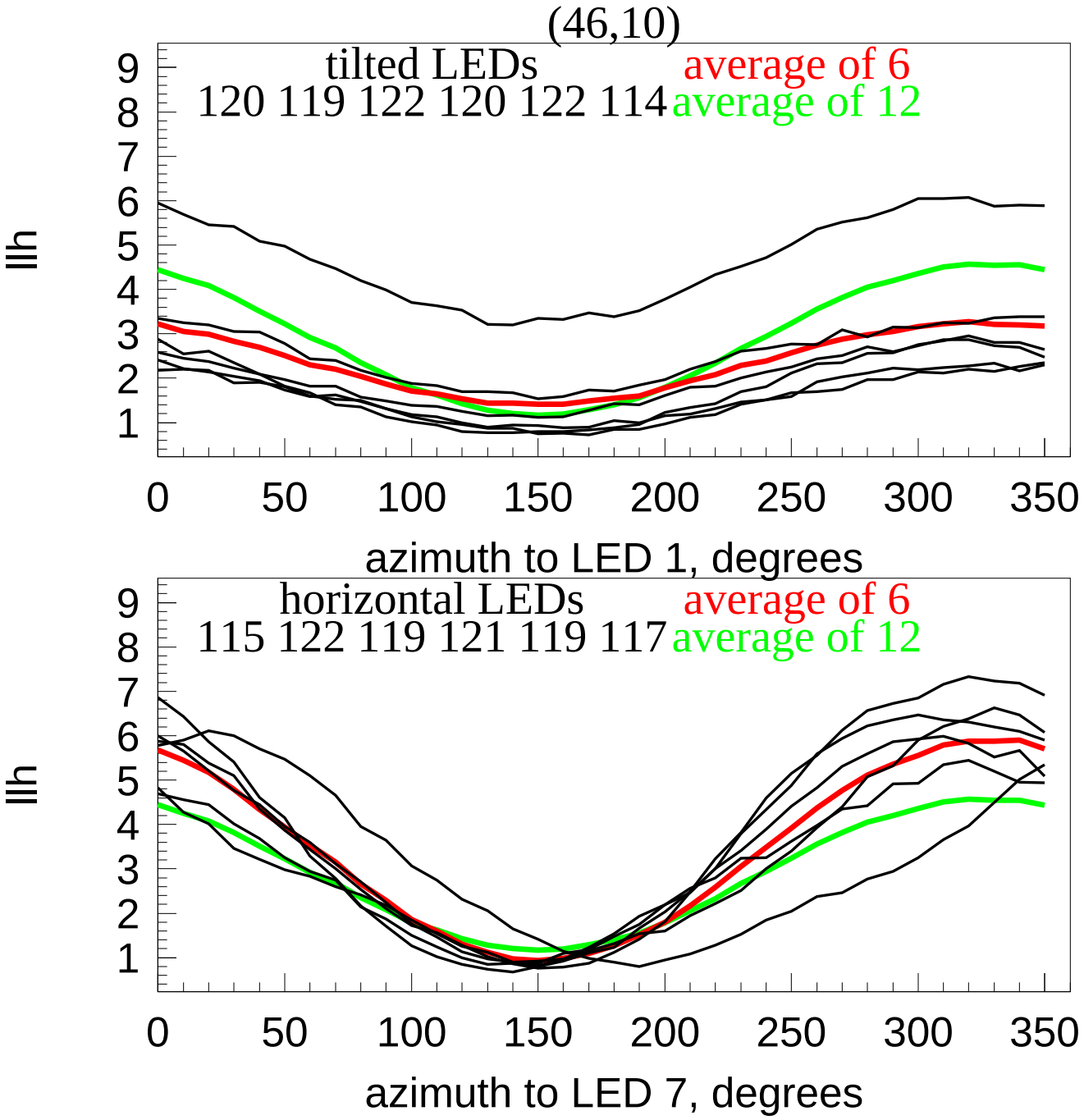

(46,6)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
342 ± 8.4

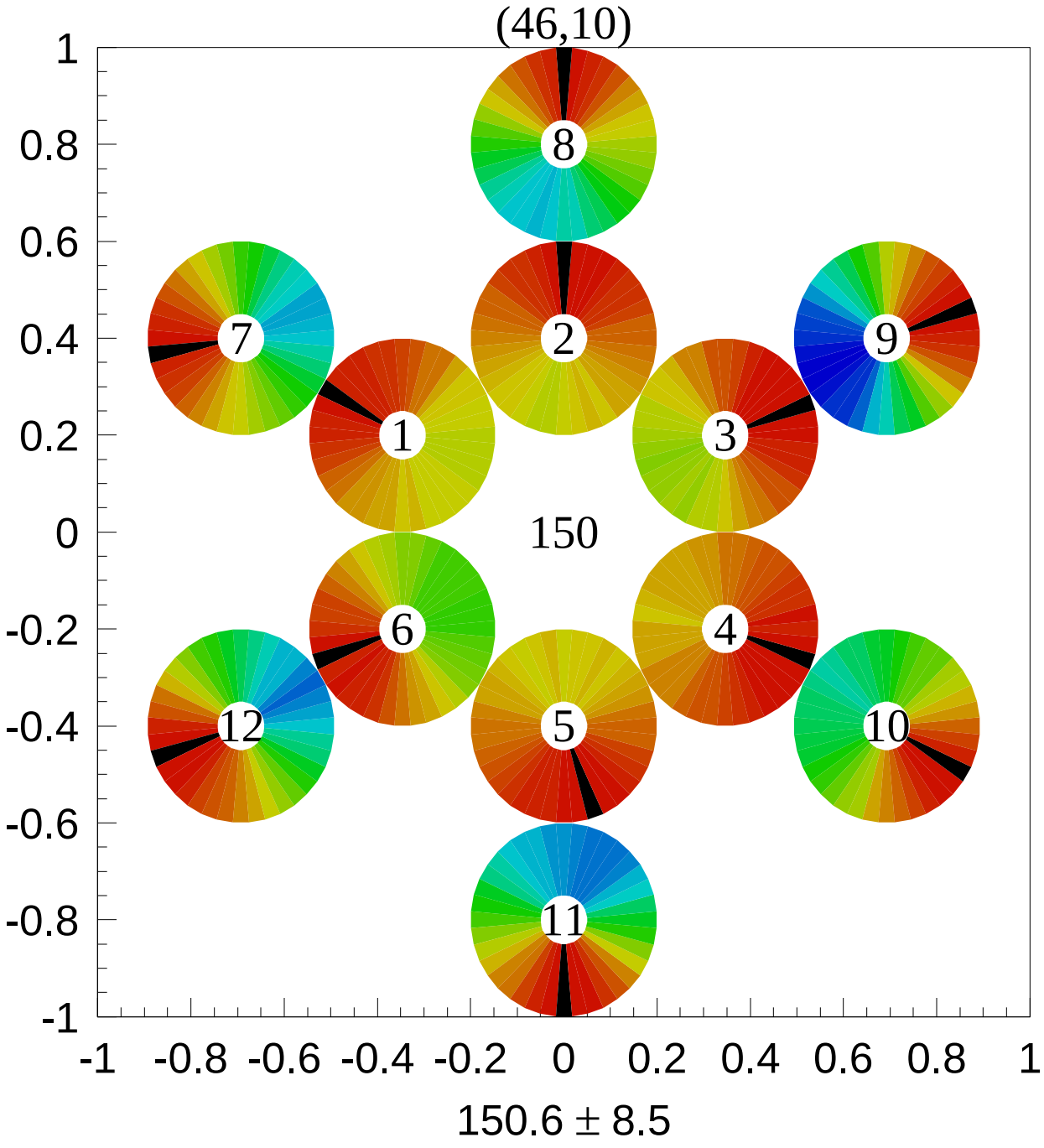

(46,8)
tilted LEDs
115 126 124 122 120 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 126 119 124 120 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

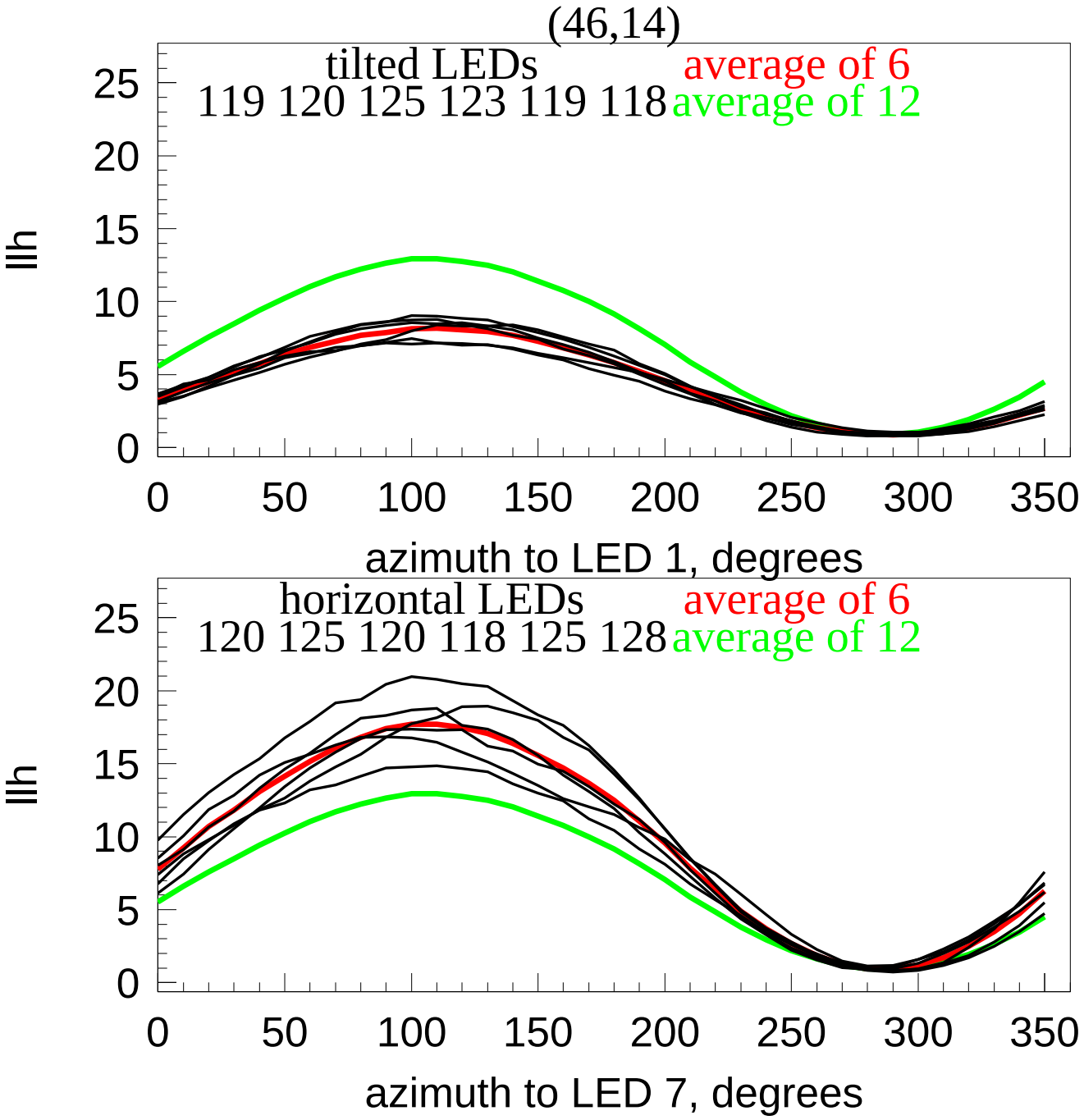

(46,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
225.2 ± 10.2
9
10
3
4
8
2
230
5
11
1
6
7
12

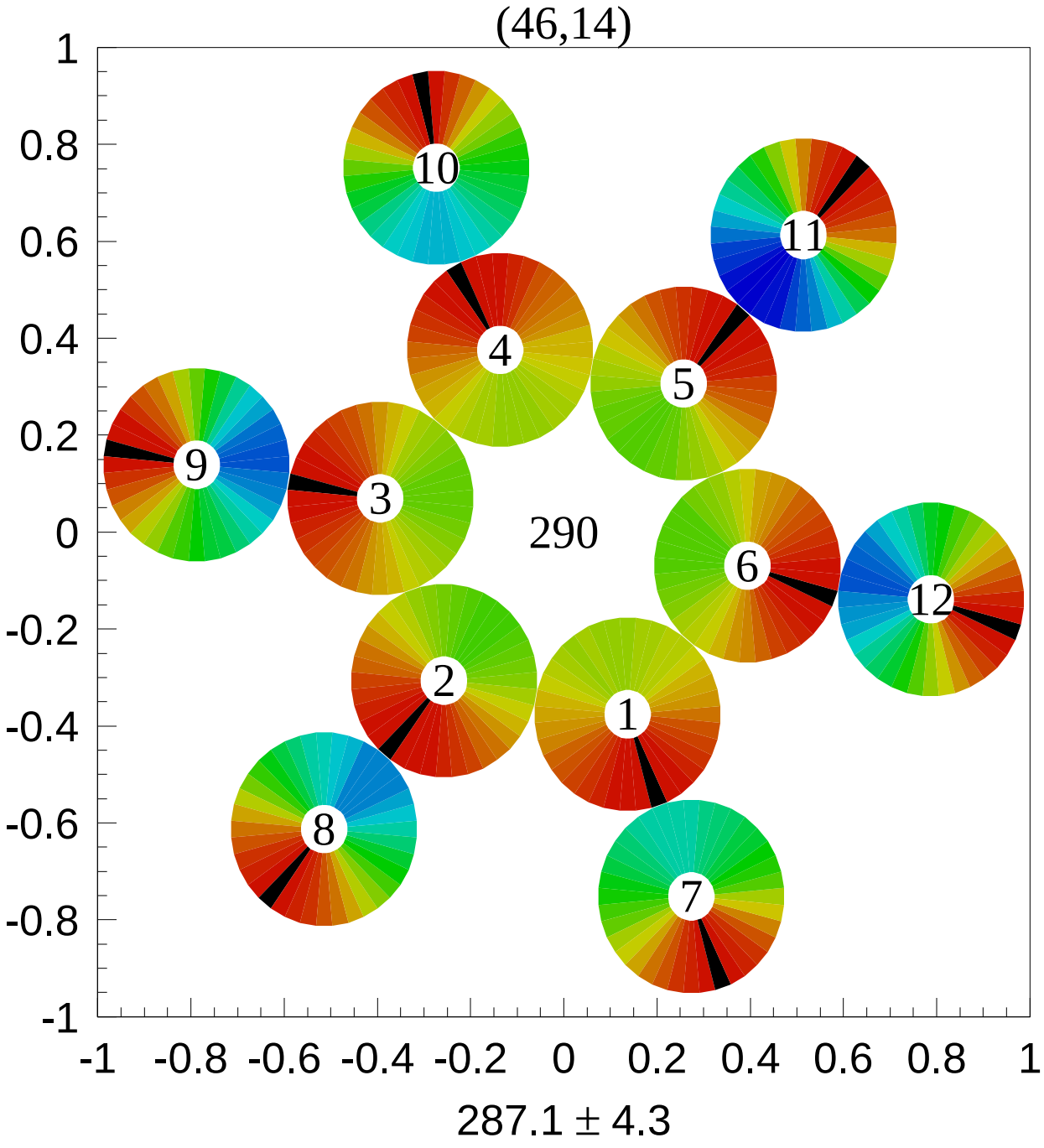

(46,9)
tilted LEDs
119 119 126 112 114 114
average of 6
average of 12
Ilh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
131 122 123 124 126 118
average of 6
average of 12
Ilh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

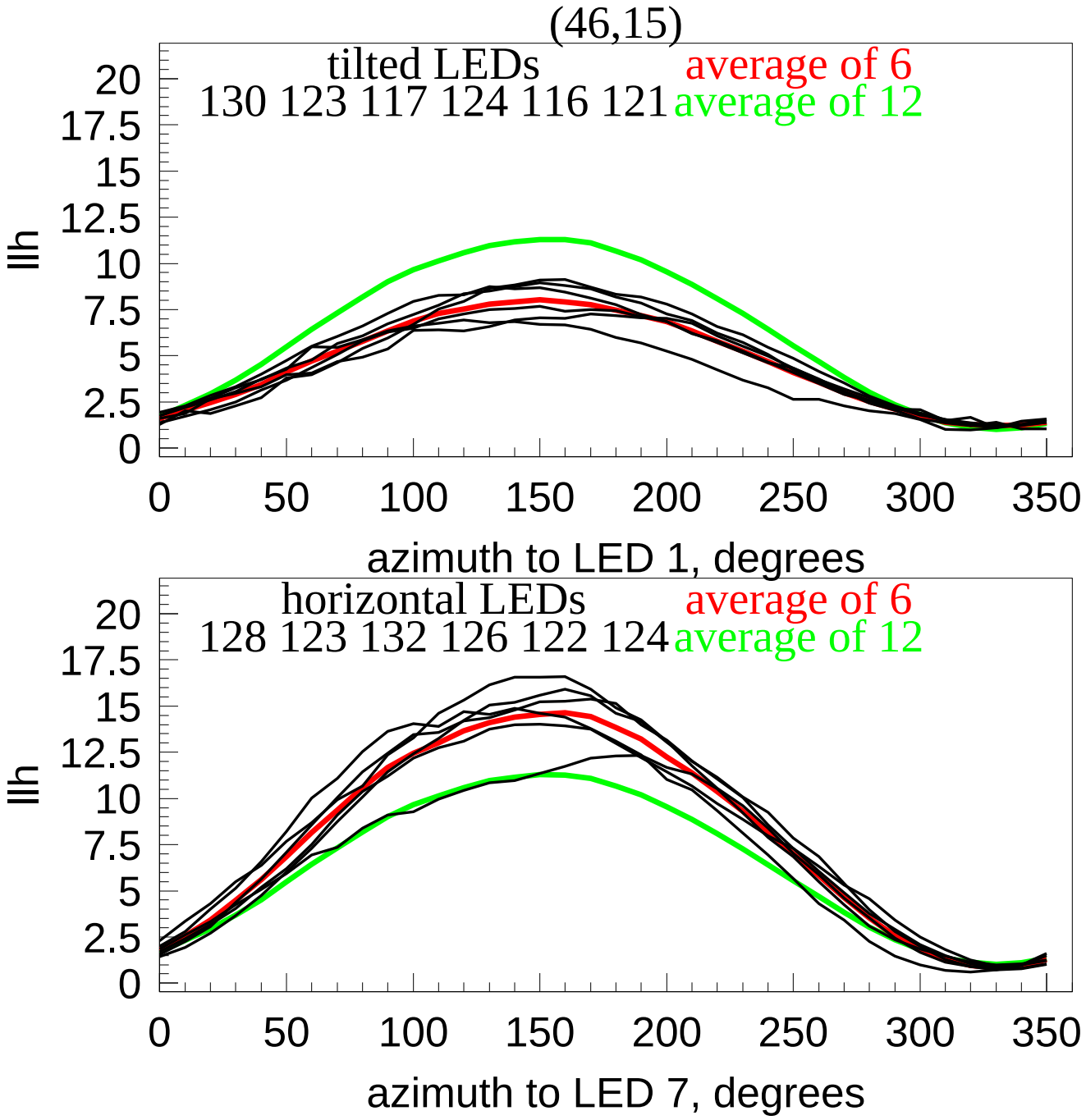

(46,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
116.6 ± 19.1
7
1
8
12
2
6
100
3
5
9
4
11
10

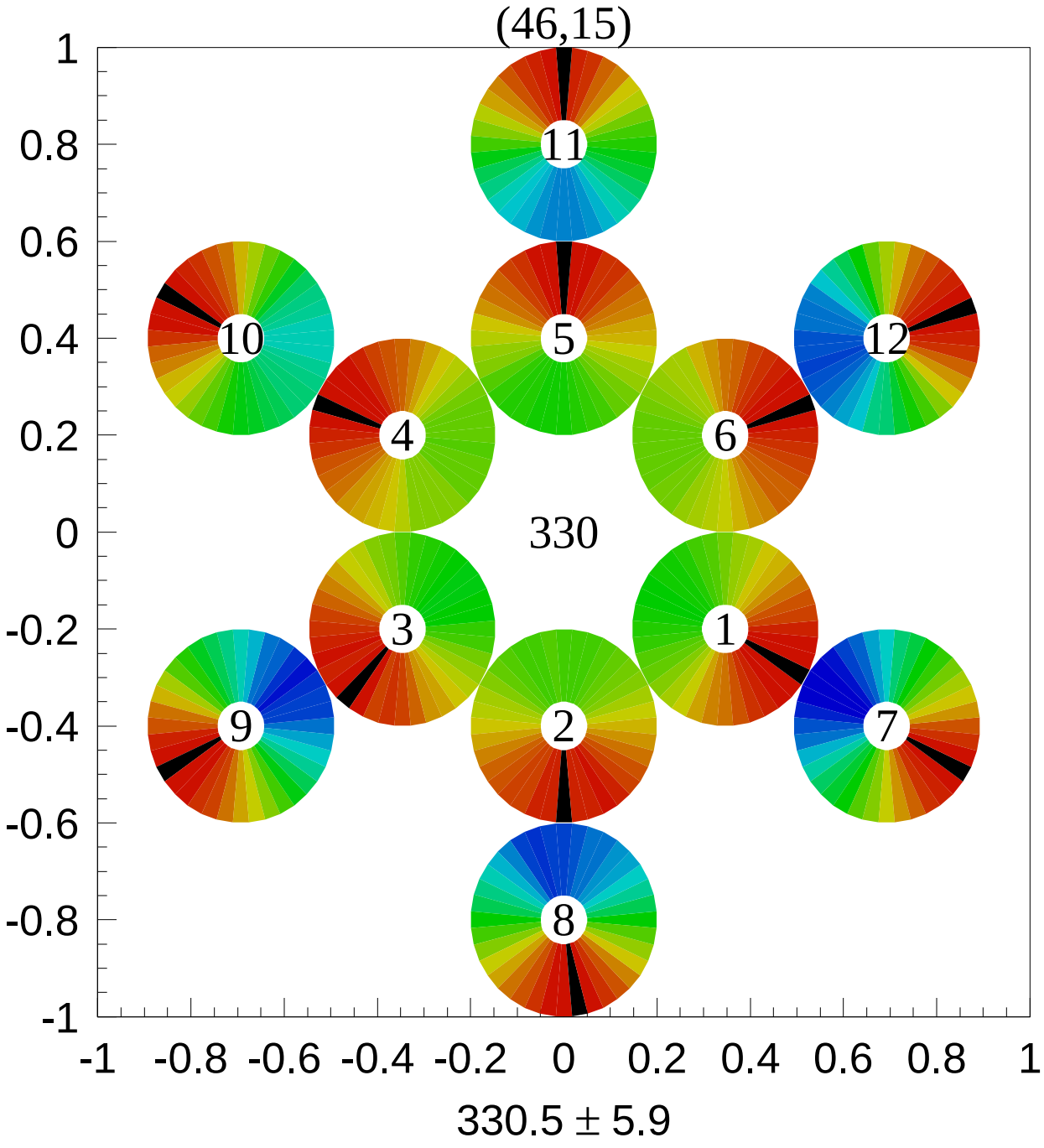

(46,10)
tilted LEDs
120 119 122 120 122 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 122 119 121 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

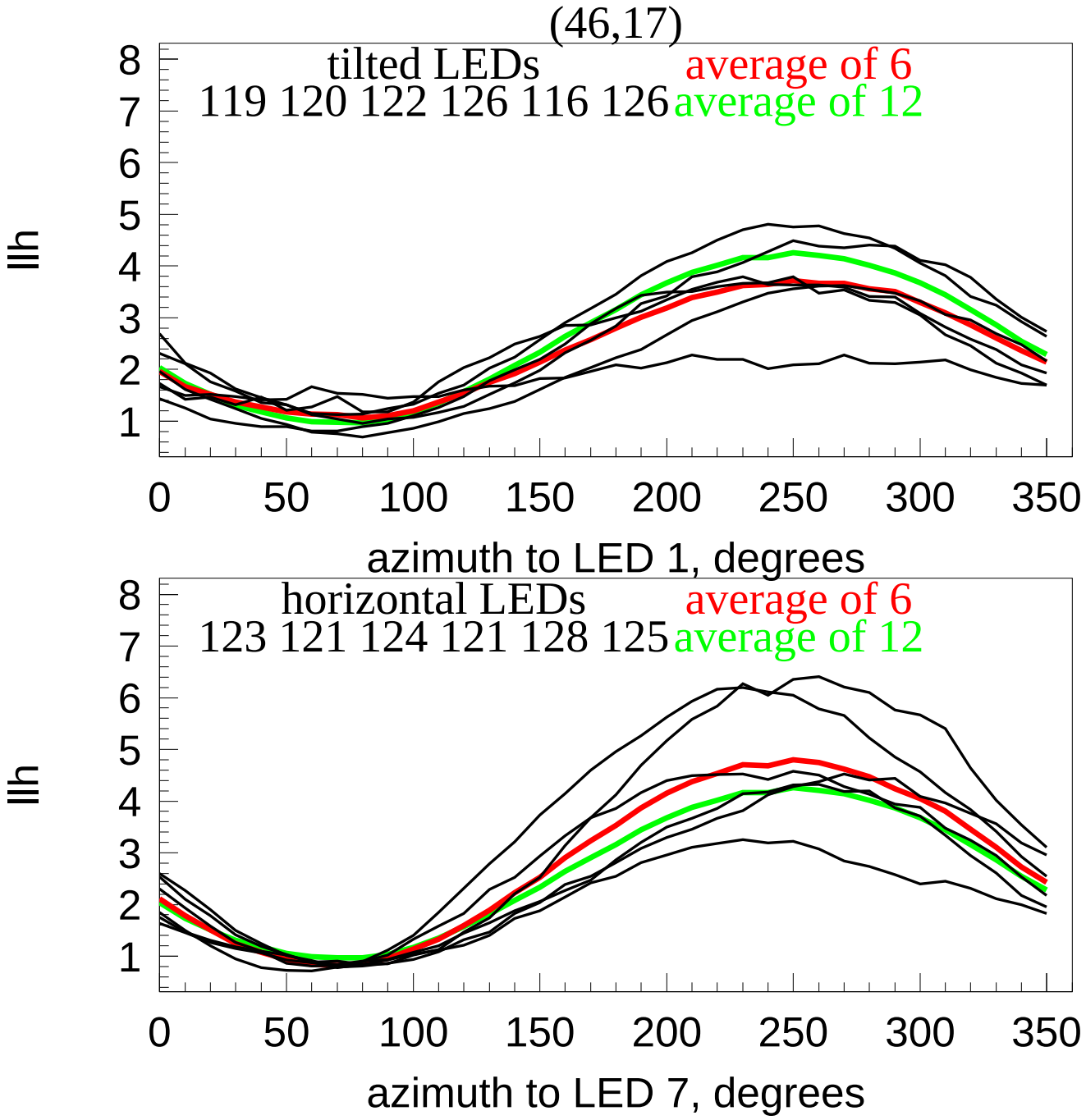

(46,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
150.6 ± 8.5

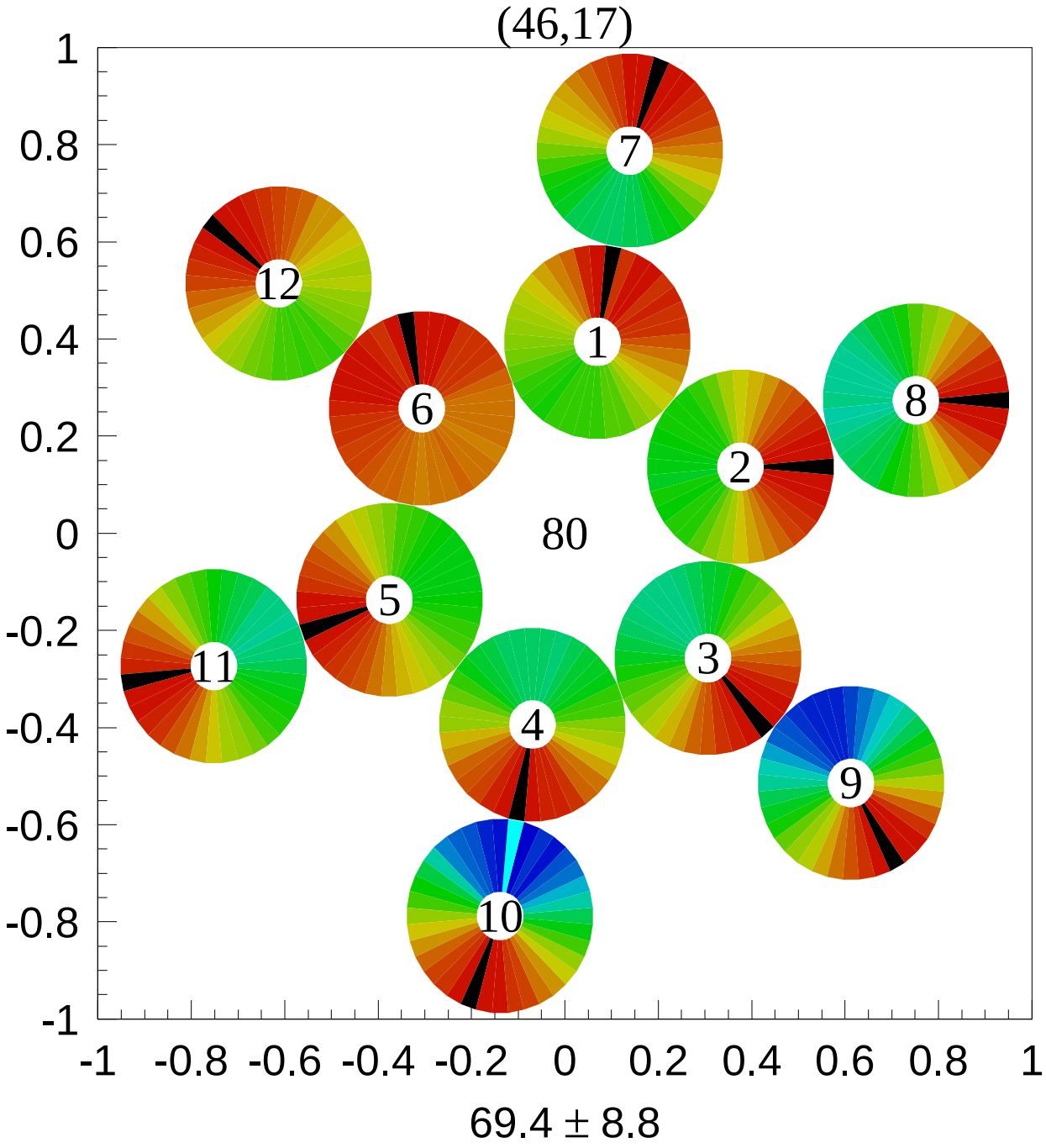

(46,14)
tilted LEDs
119 120 125 123 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 125 120 118 125 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

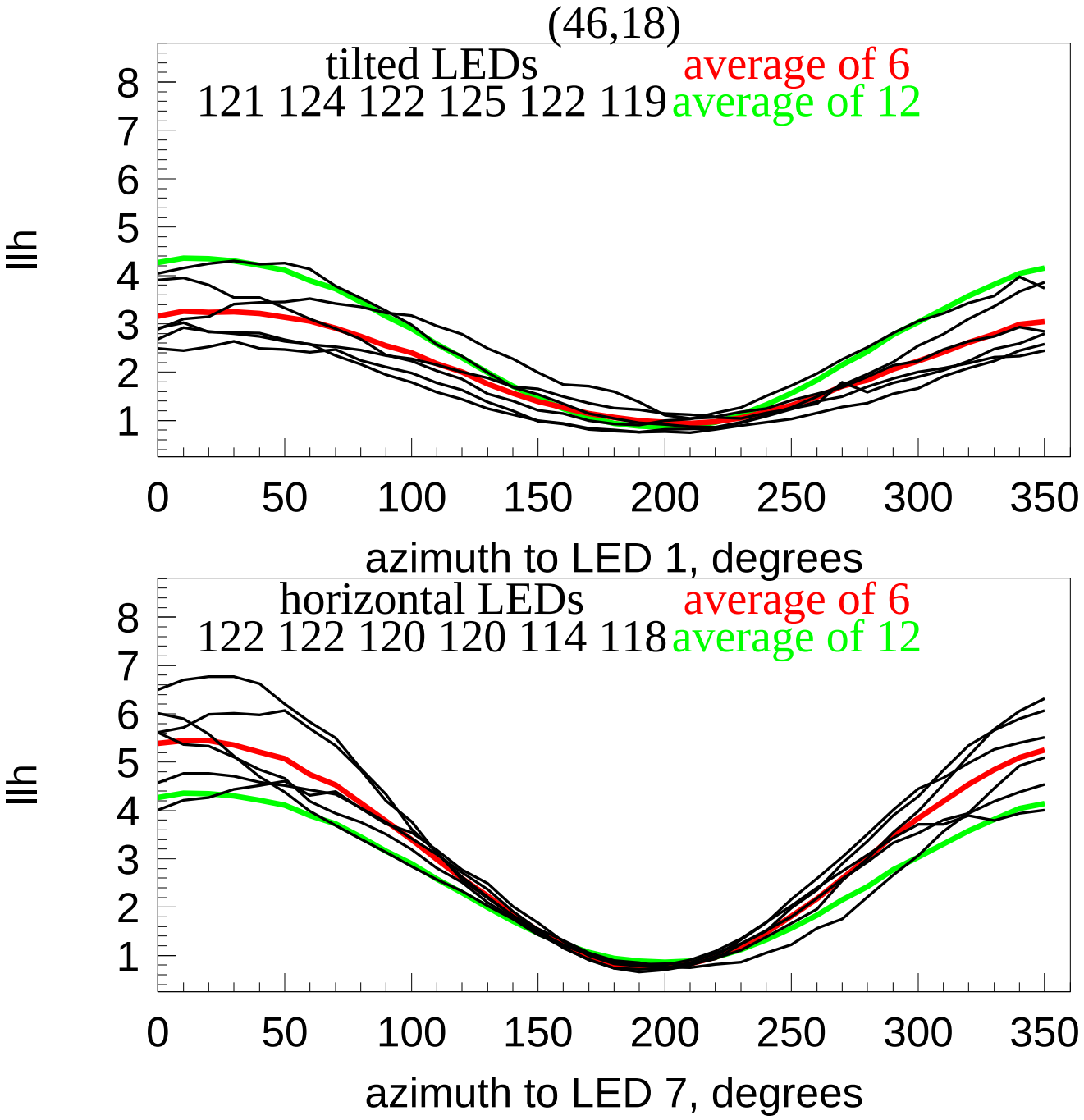

(46,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
287.1 ± 4.3

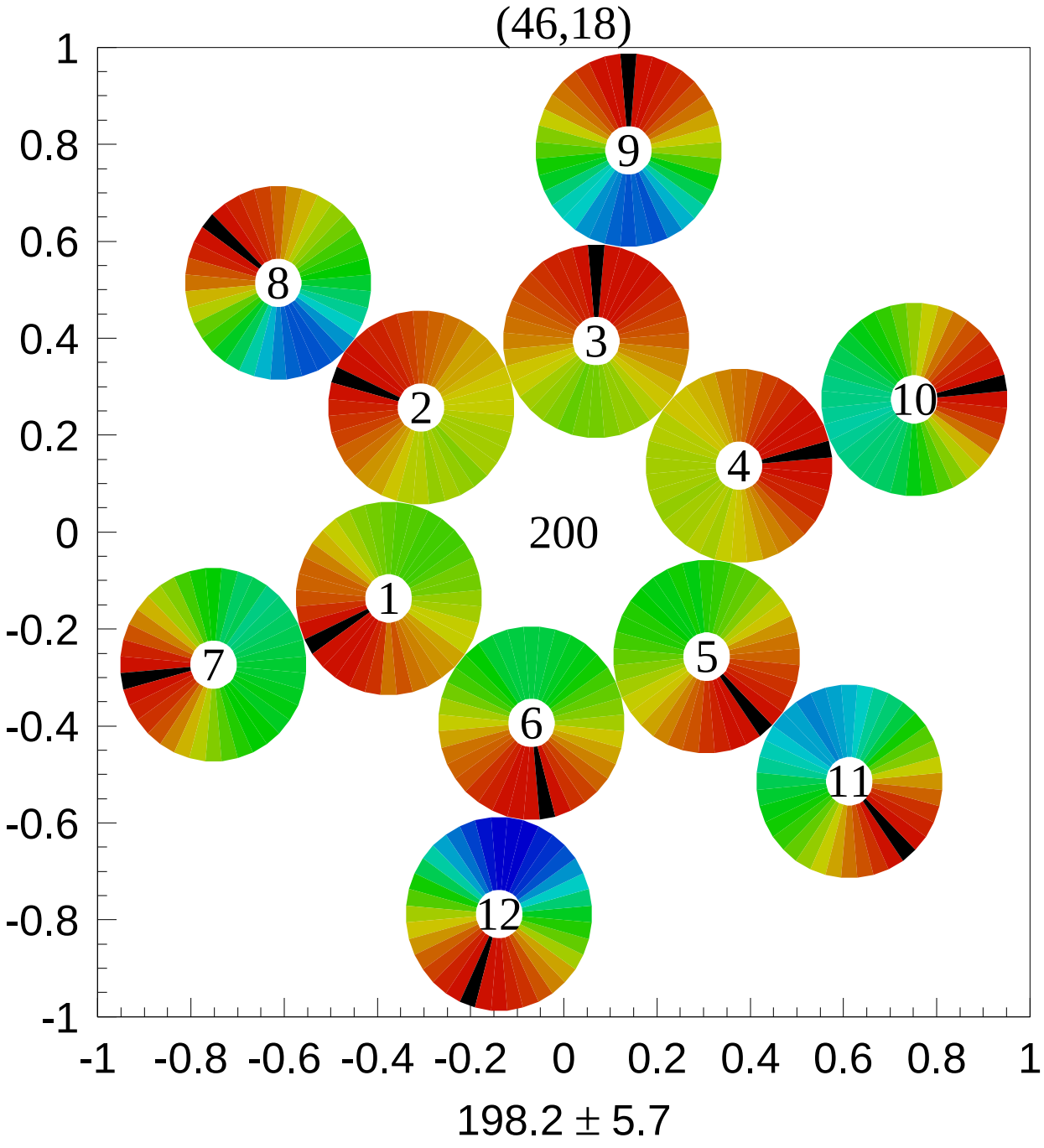

(46,15)
tilted LEDs
130 123 117 124 116 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 123 132 126 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

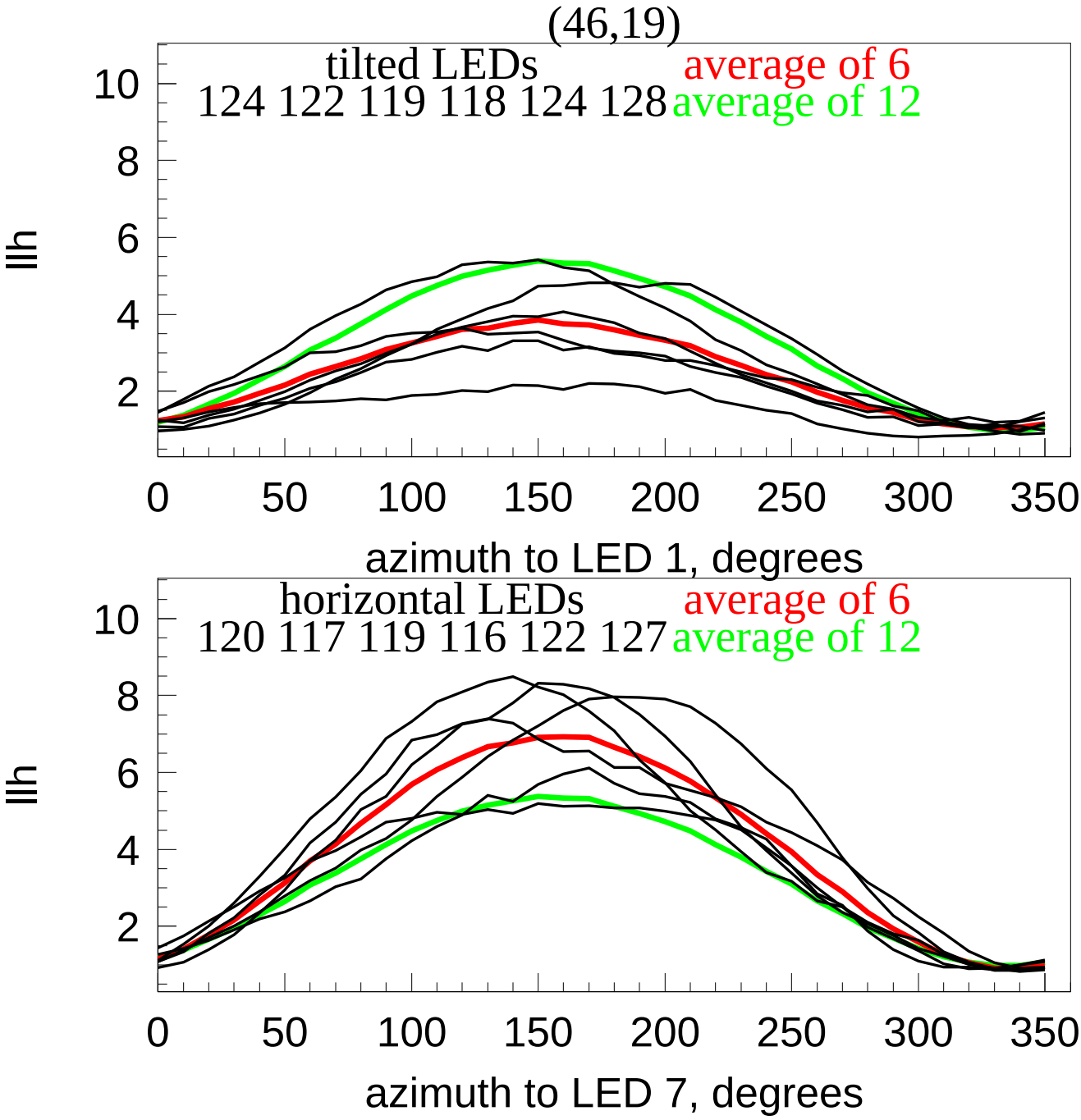

(46,15)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
330.5 ± 5.9

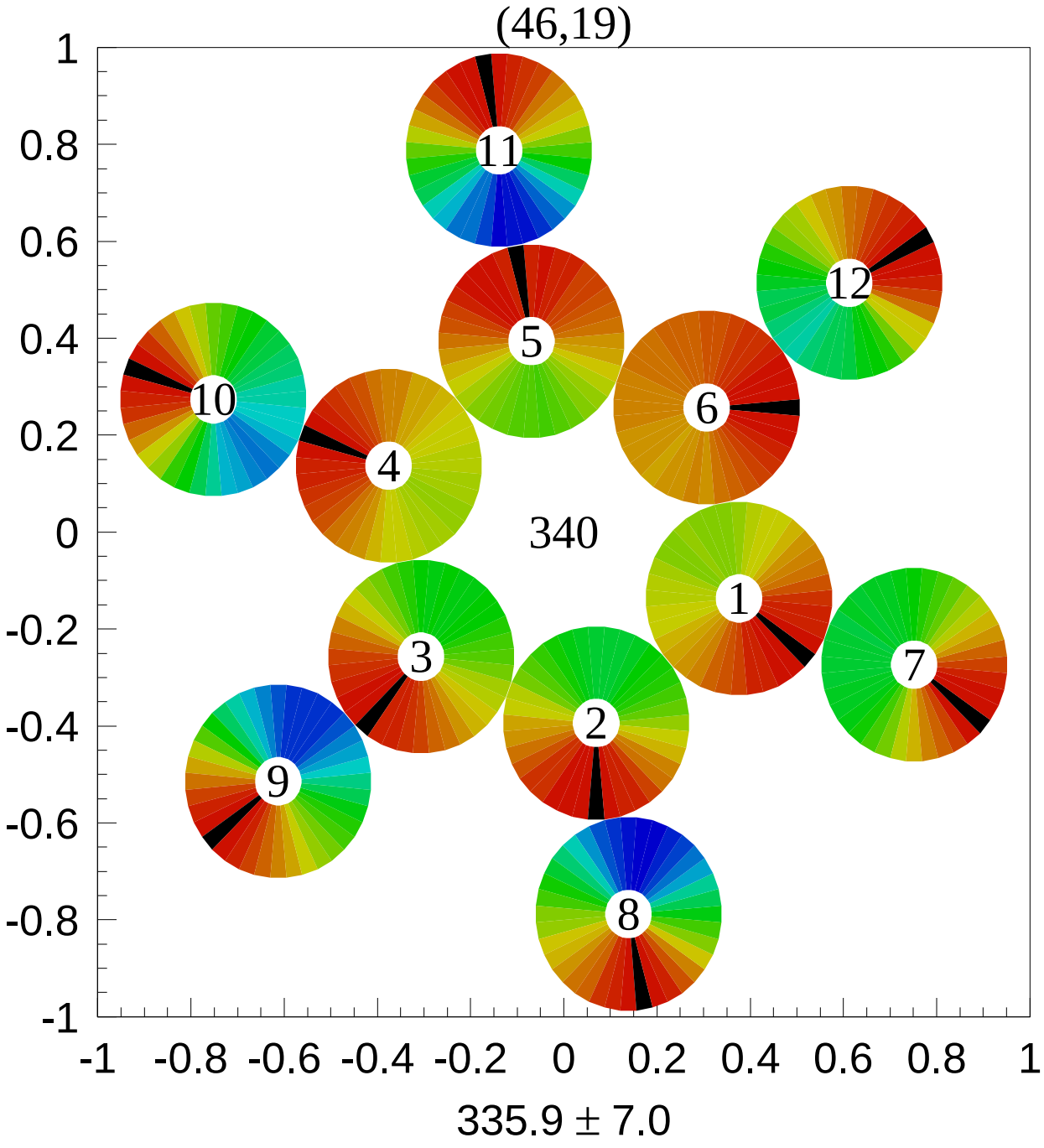

(46,17)
tilted LEDs
119 120 122 126 116 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 124 121 128 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

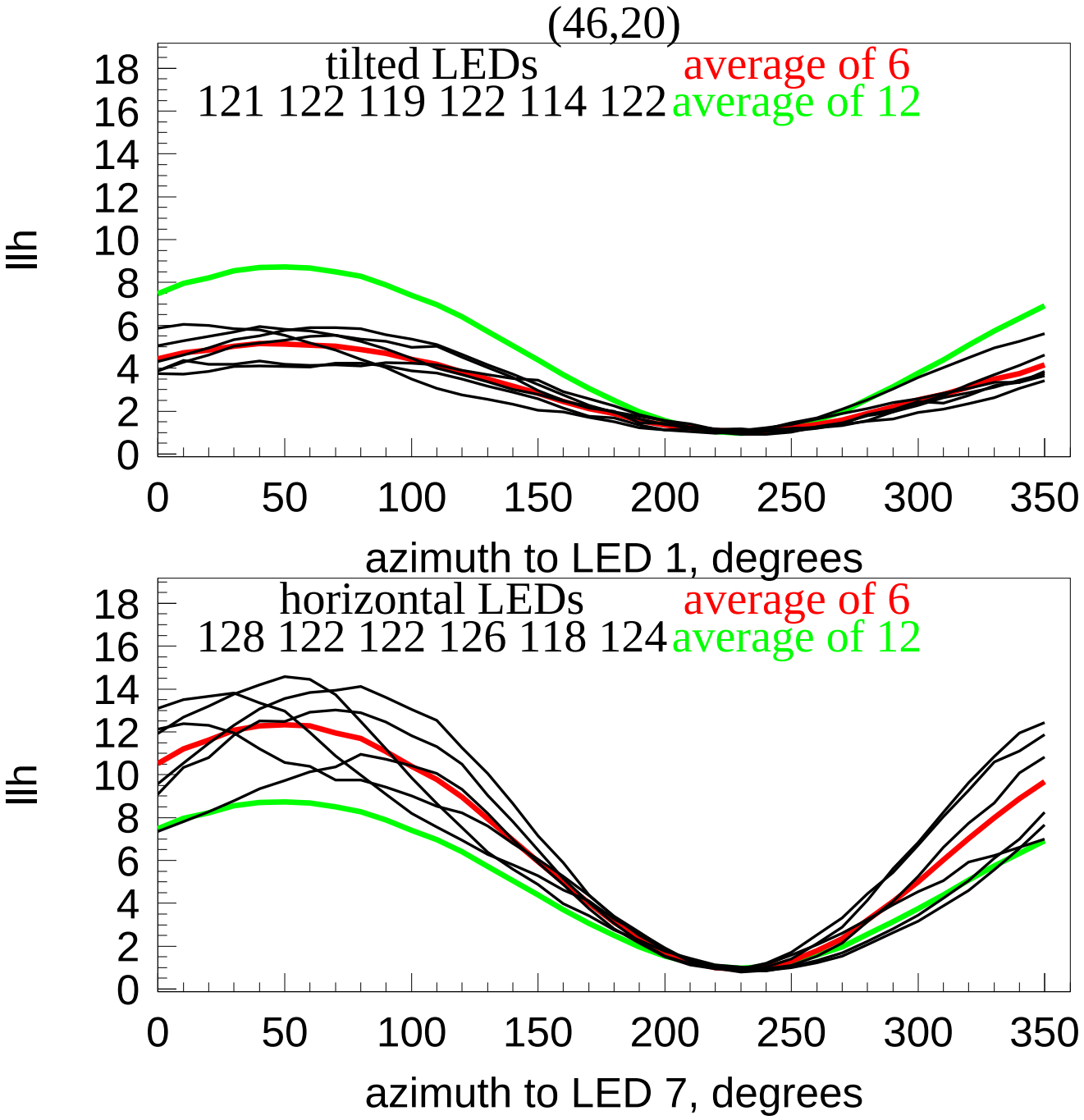

(46,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
69.4 ± 8.8

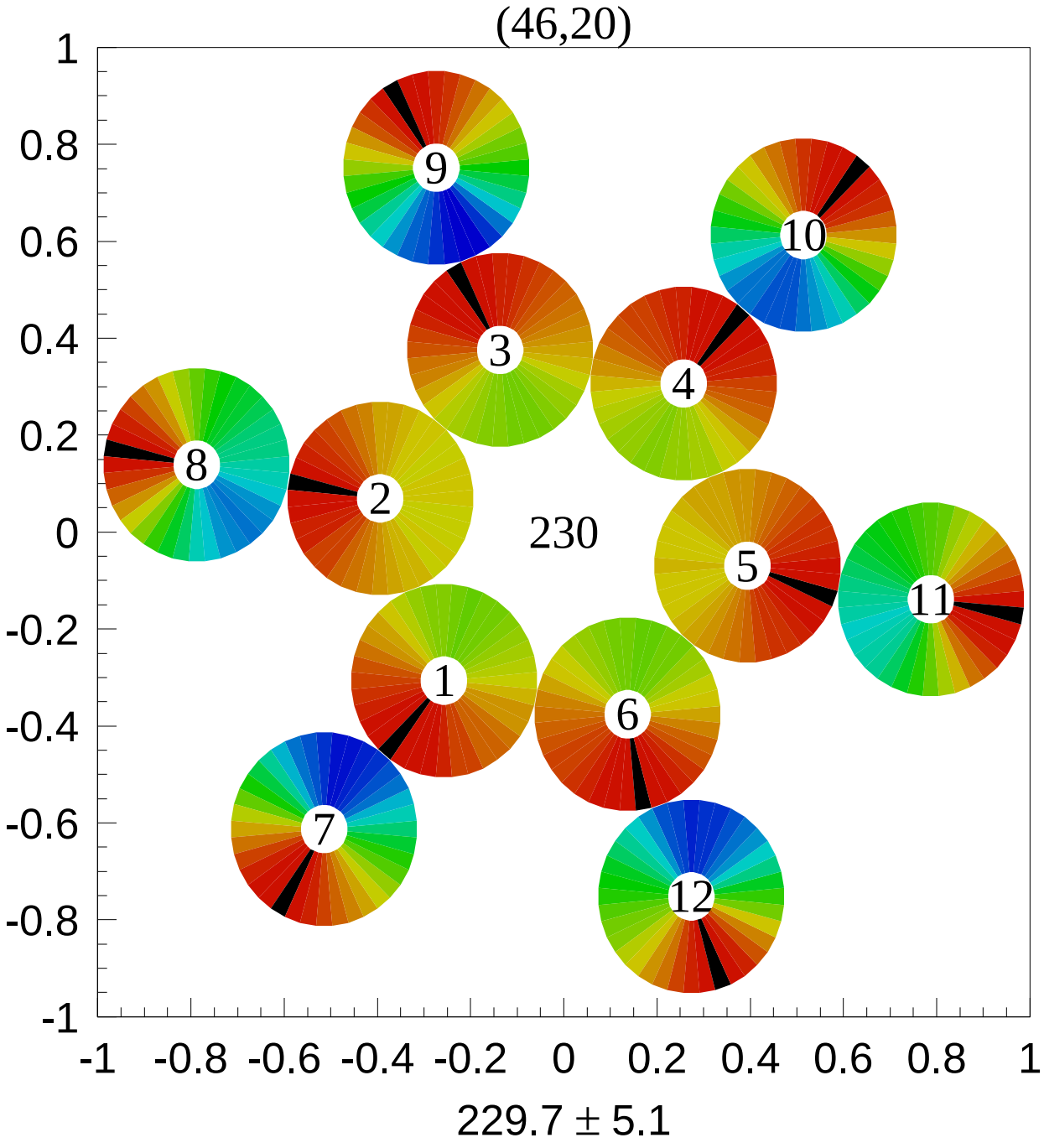

(46,18)
tilted LEDs
121 124 122 125 122 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 120 120 114 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

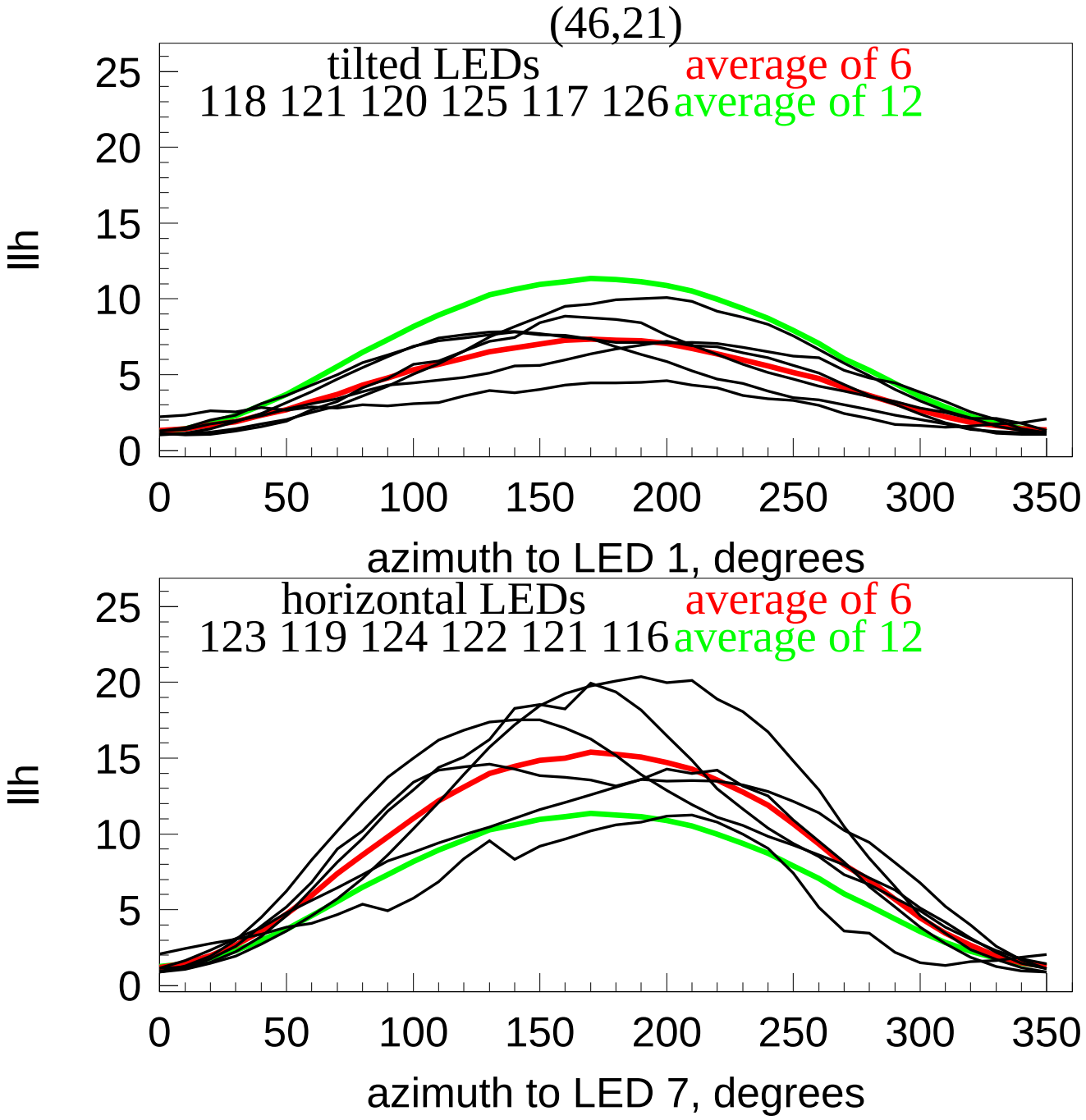

(46,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
198.2 ± 5.7

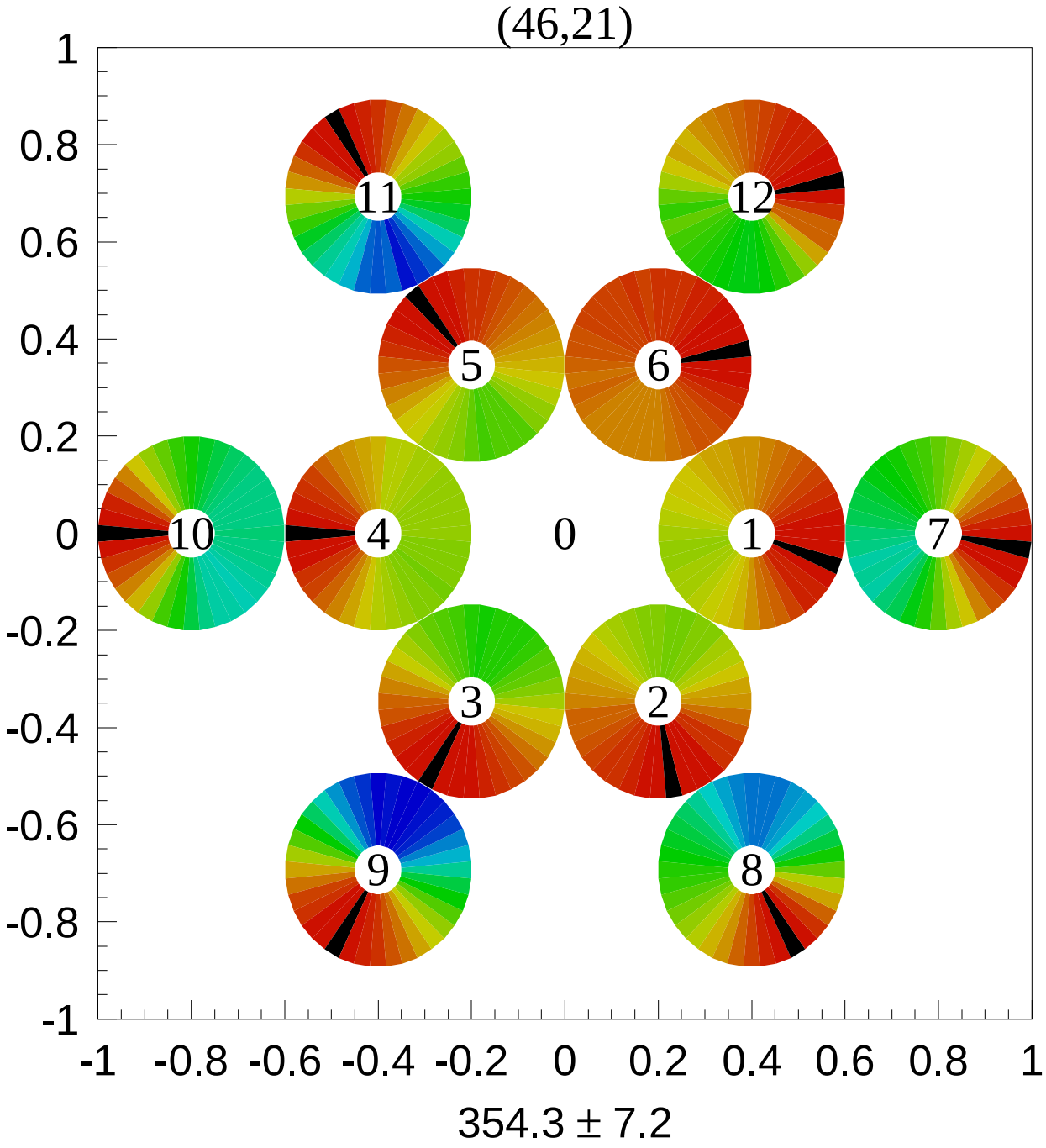

(46,19)
tilted LEDs
124 122 119 118 124 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 117 119 116 122 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

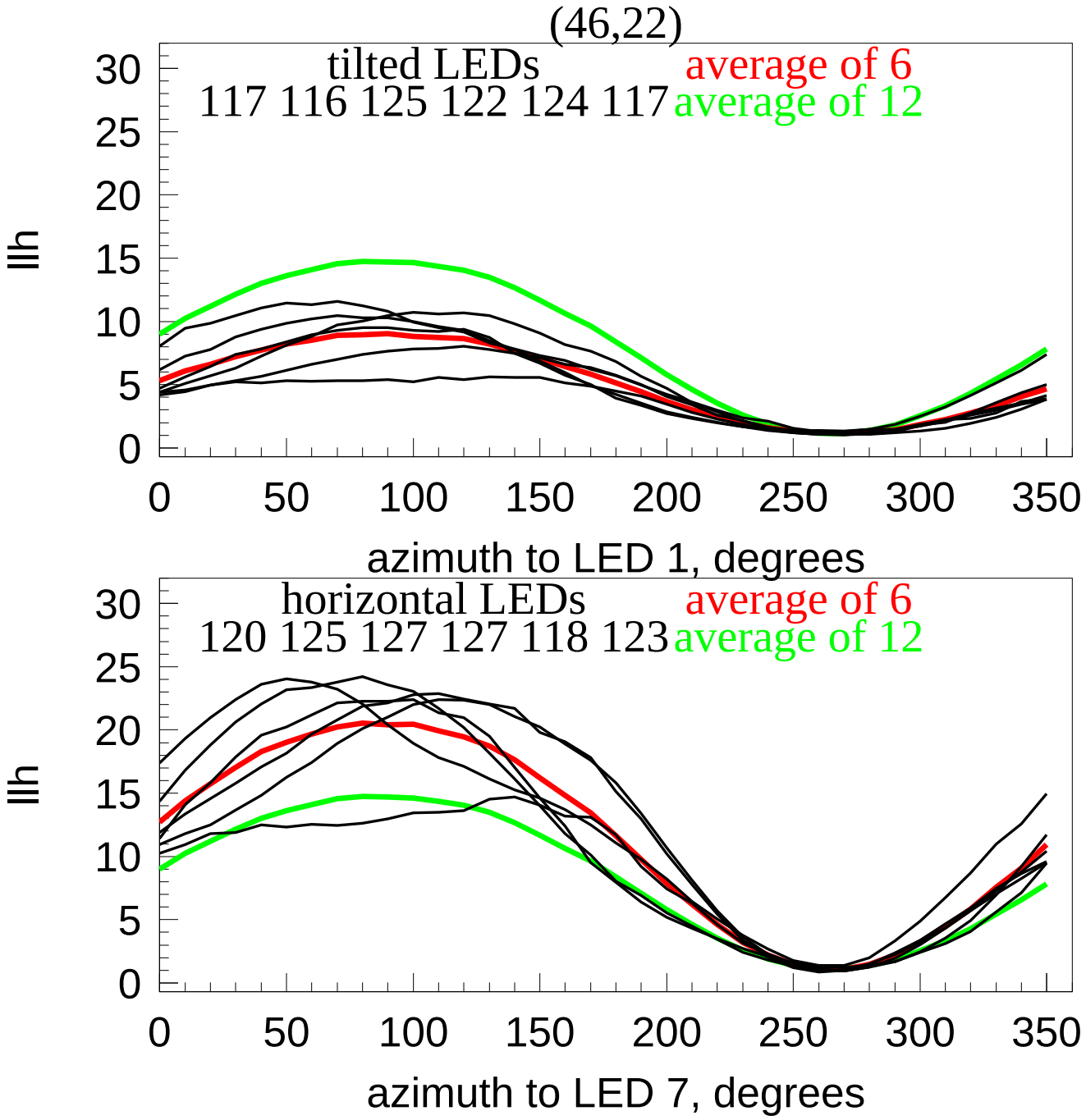

(46,19)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
335.9 ± 7.0

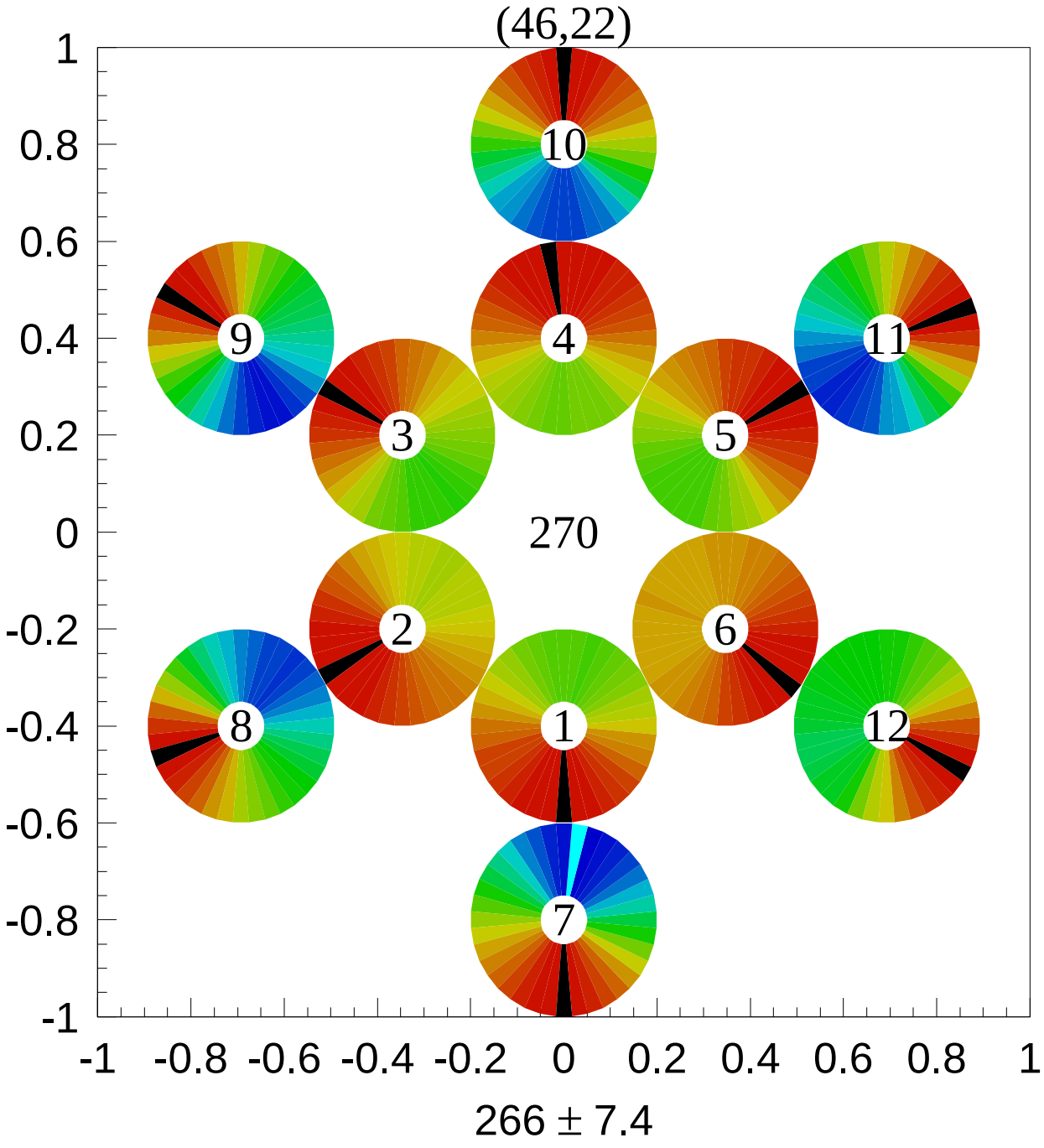

(46,20)
tilted LEDs
121 122 119 122 114 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 122 122 126 118 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

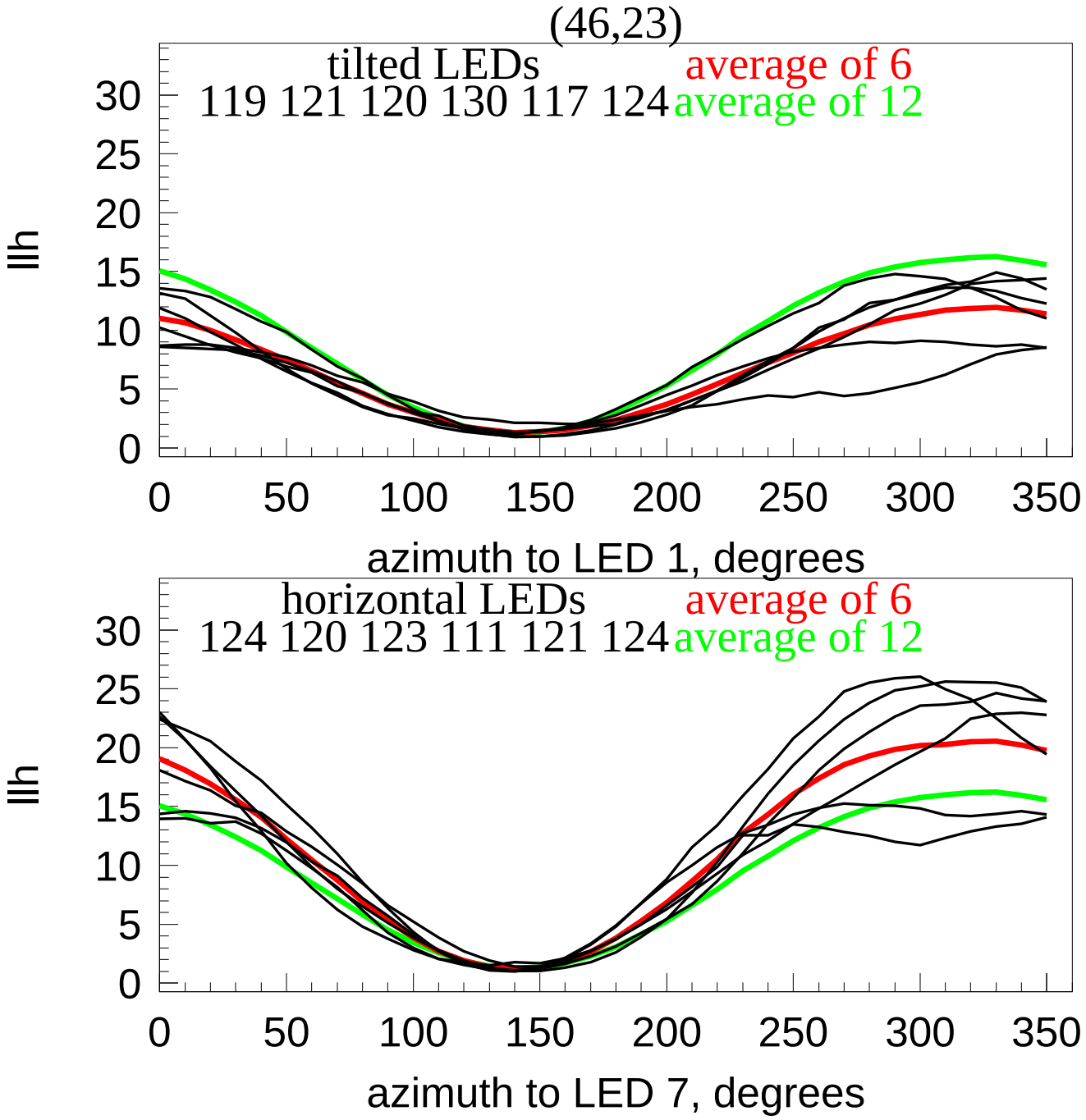

(46,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
229.7 ± 5.1

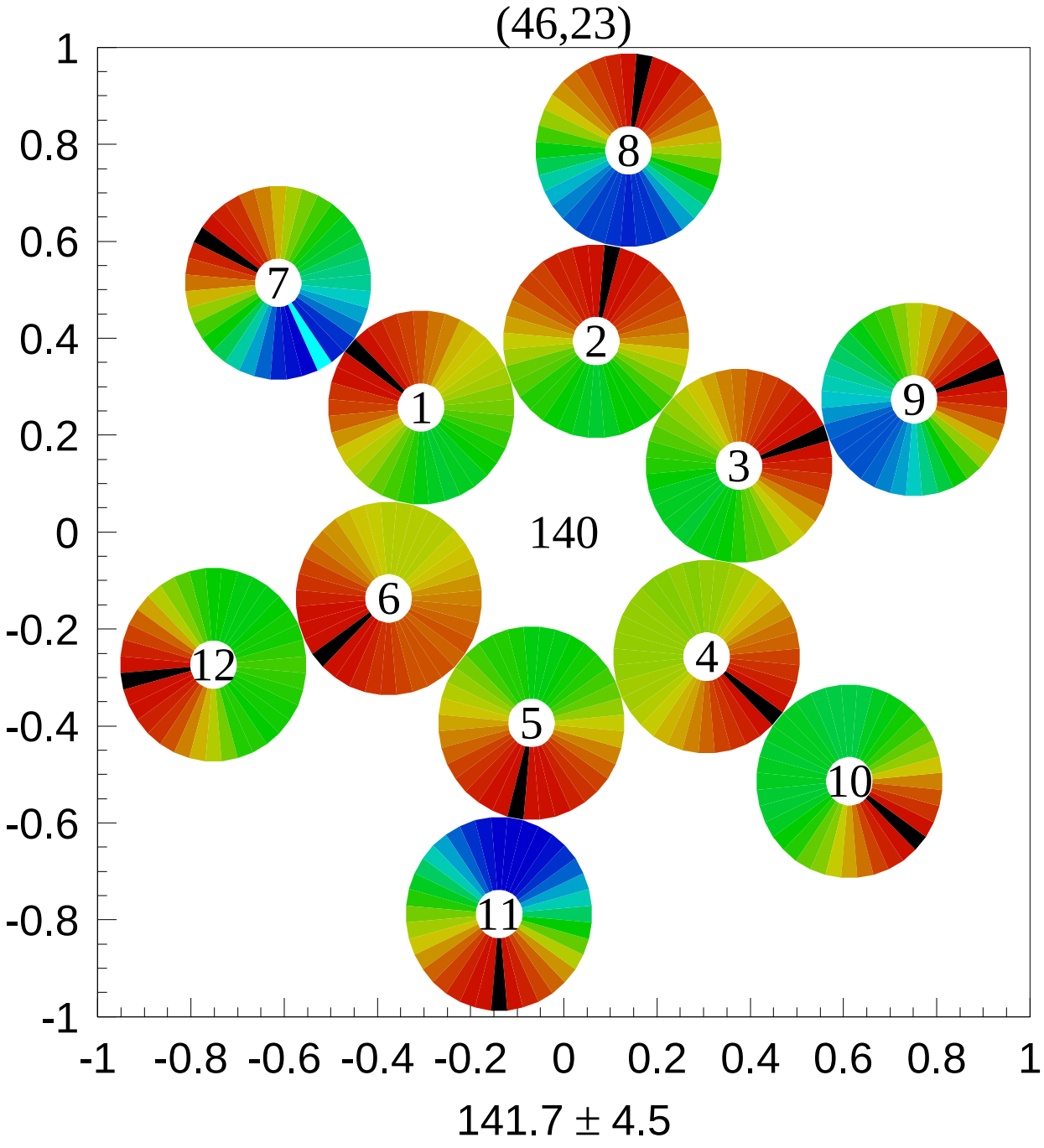

(46,21)
tilted LEDs
118 121 120 125 117 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 124 122 121 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

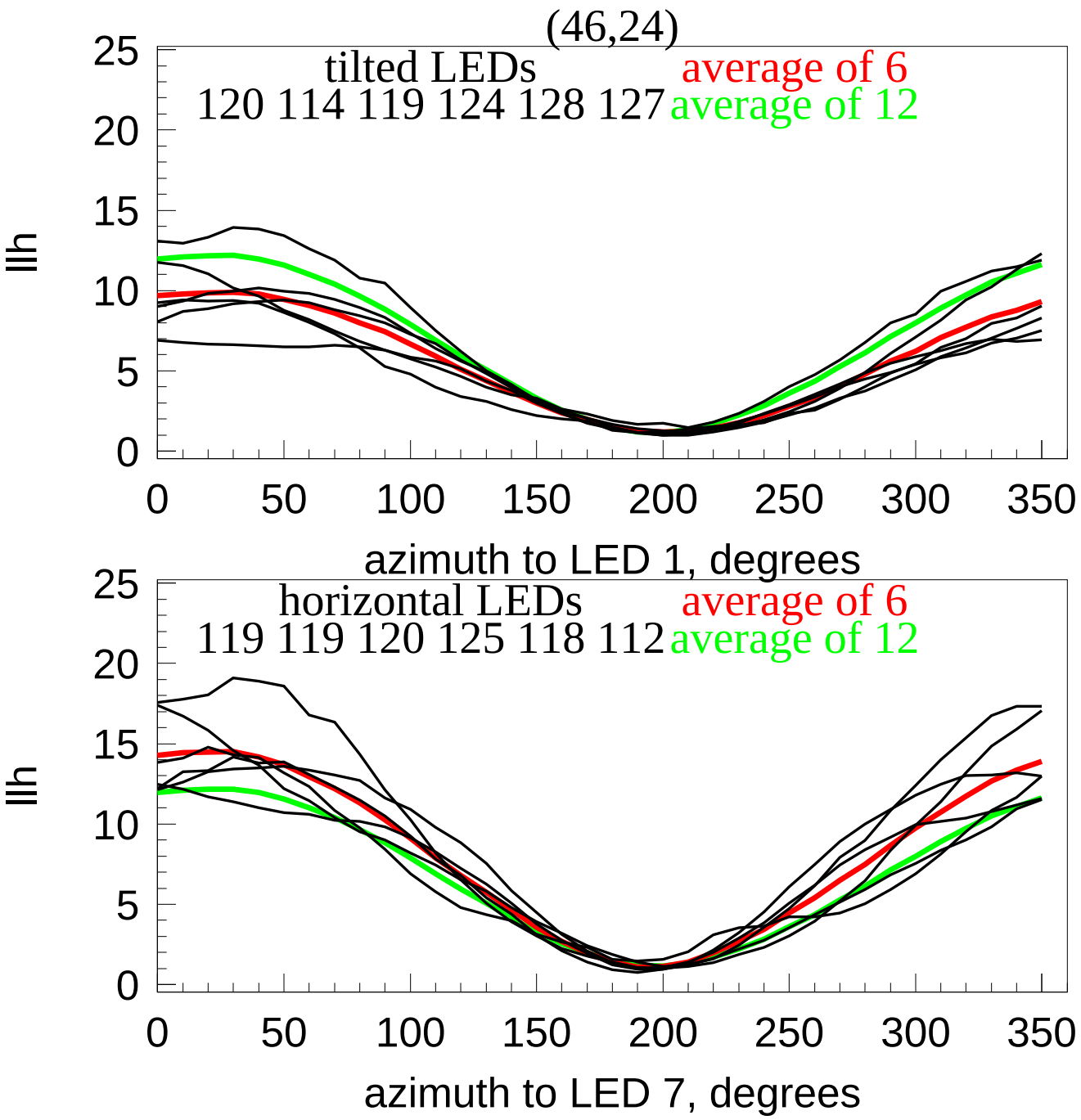

(46,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
354.3 ± 7.2

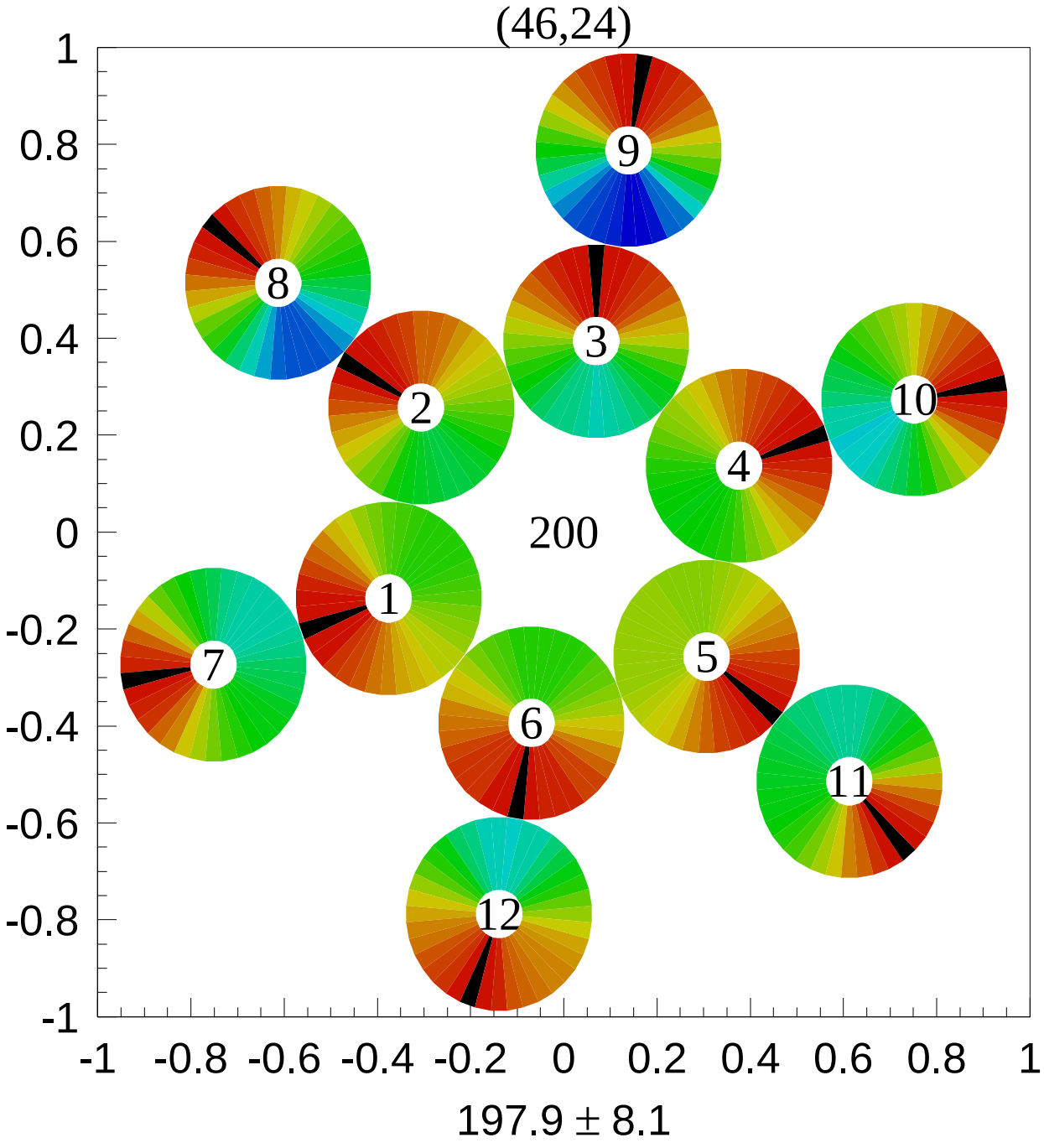

(46,22)
tilted LEDs
117 116 125 122 124 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 125 127 127 118 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

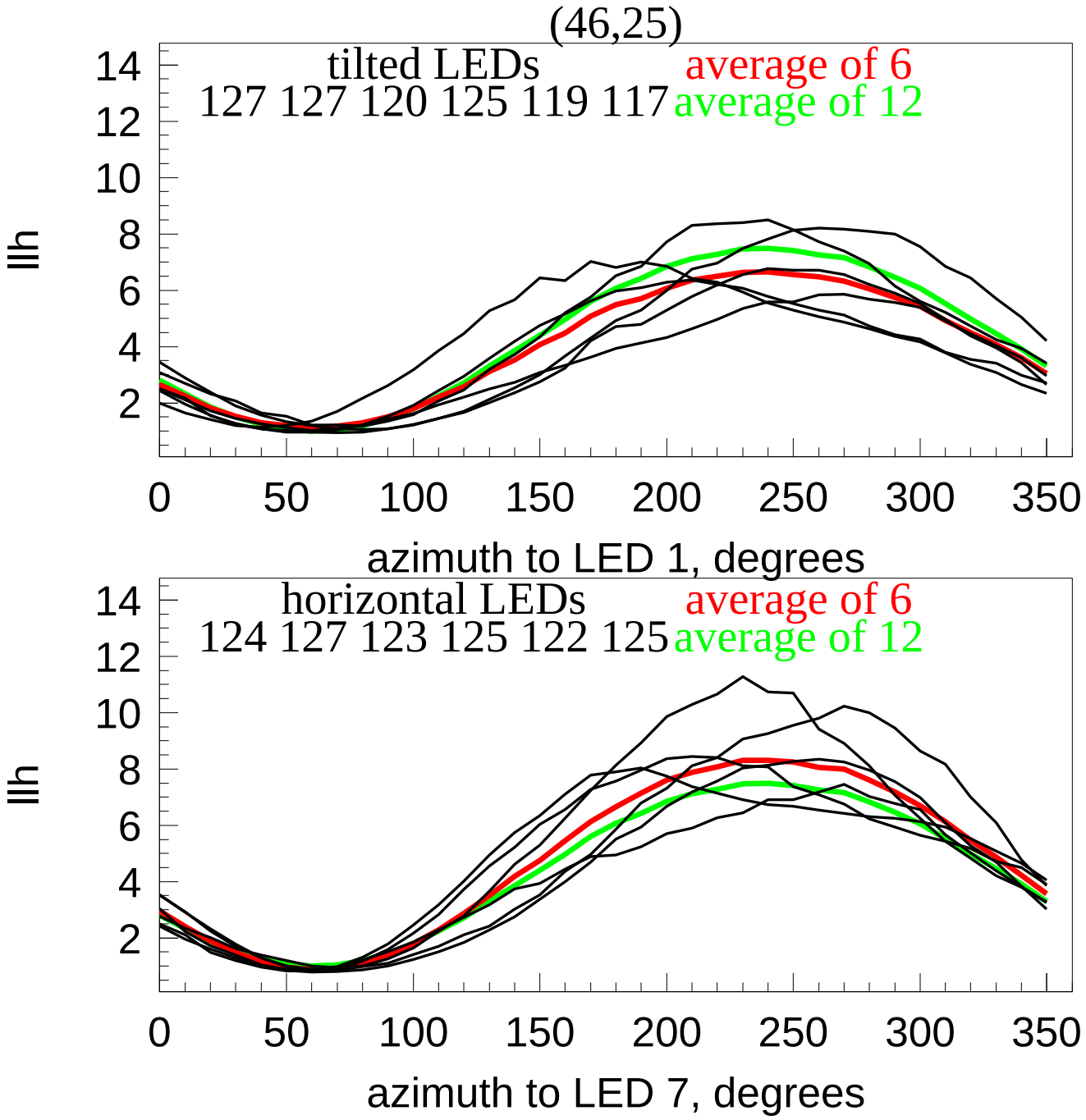

(46,22)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
266 ± 7.4

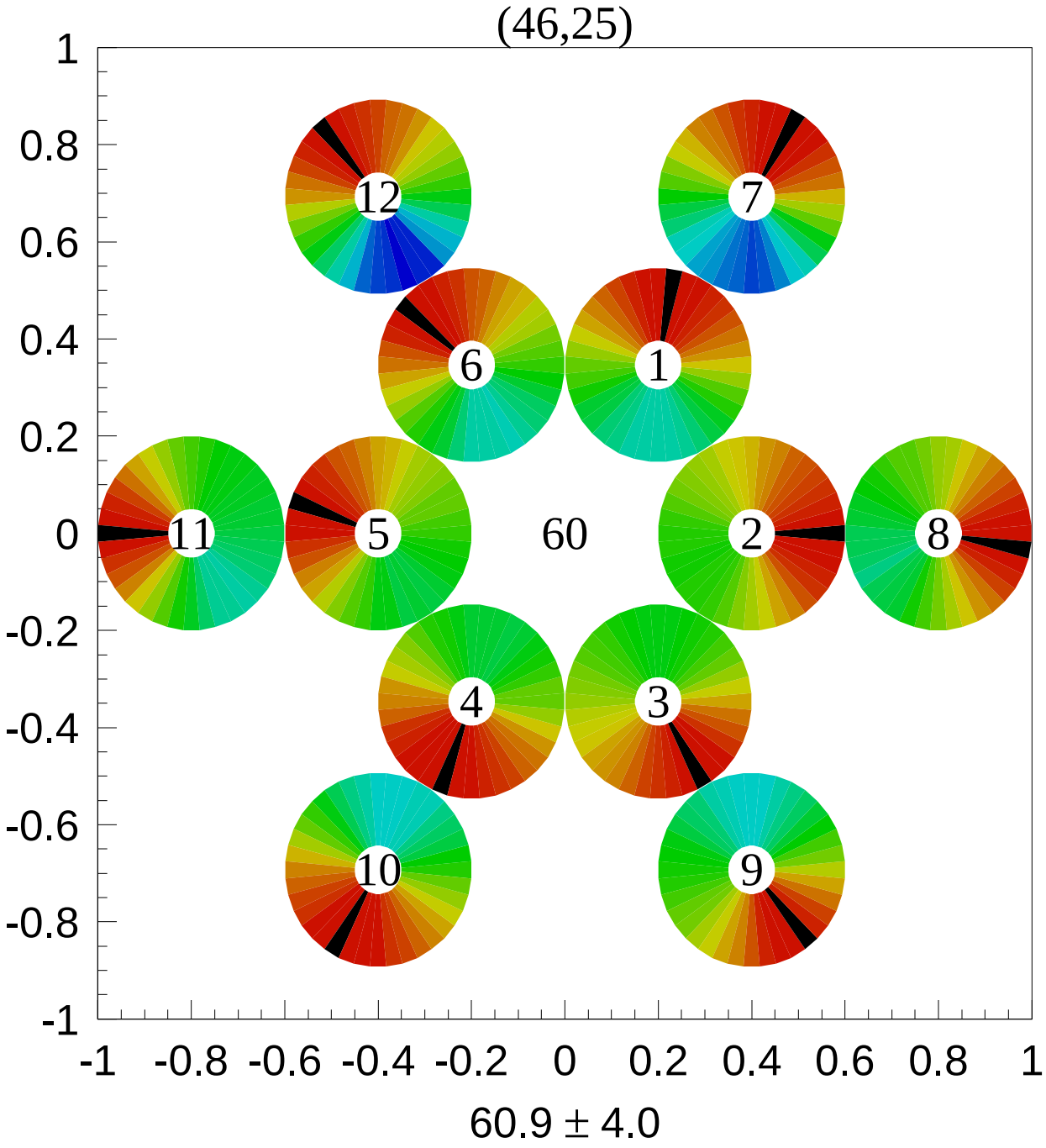

(46,23)
tilted LEDs
119 121 120 130 117 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 120 123 111 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

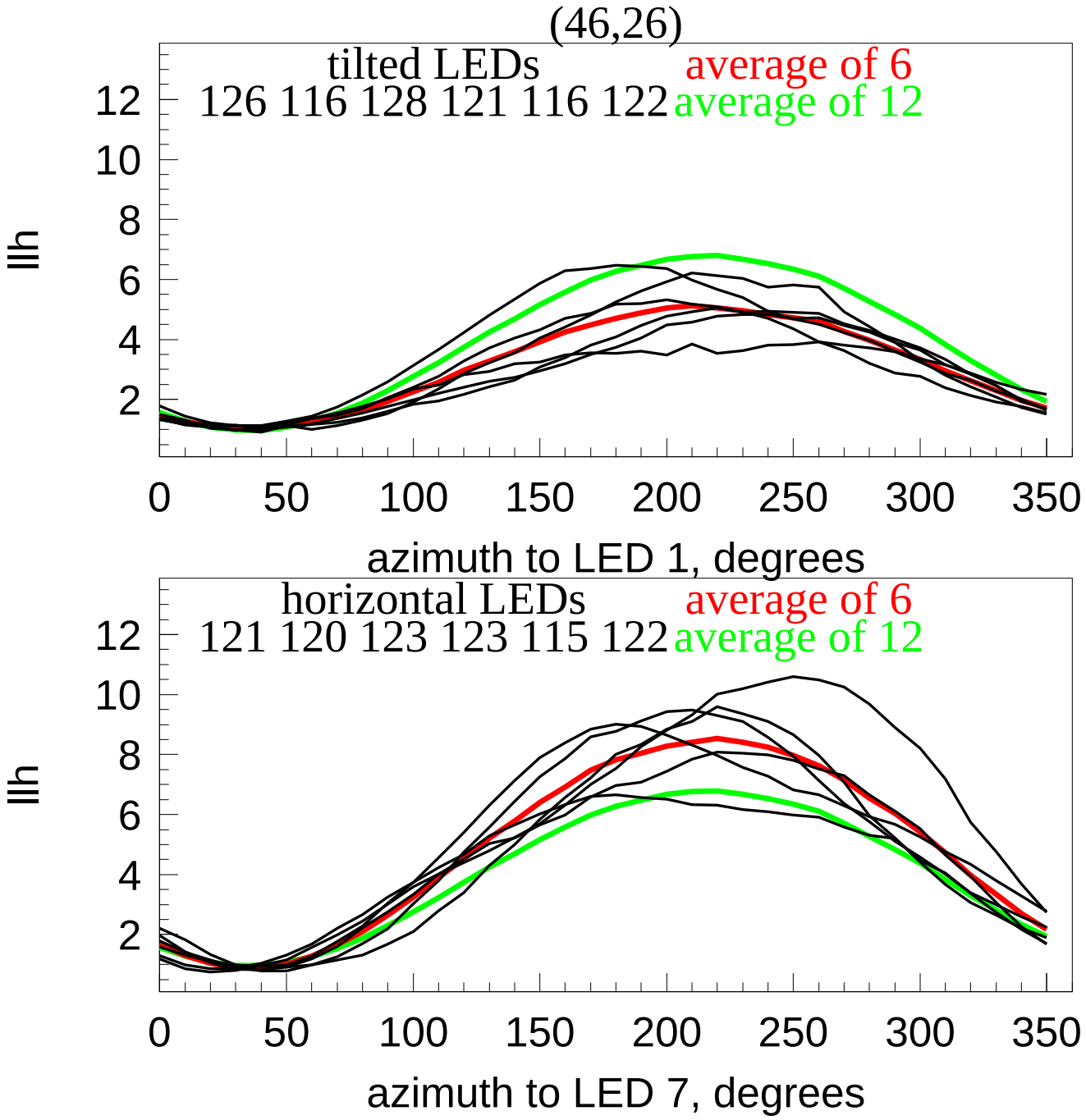

(46,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
141.7 ± 4.5

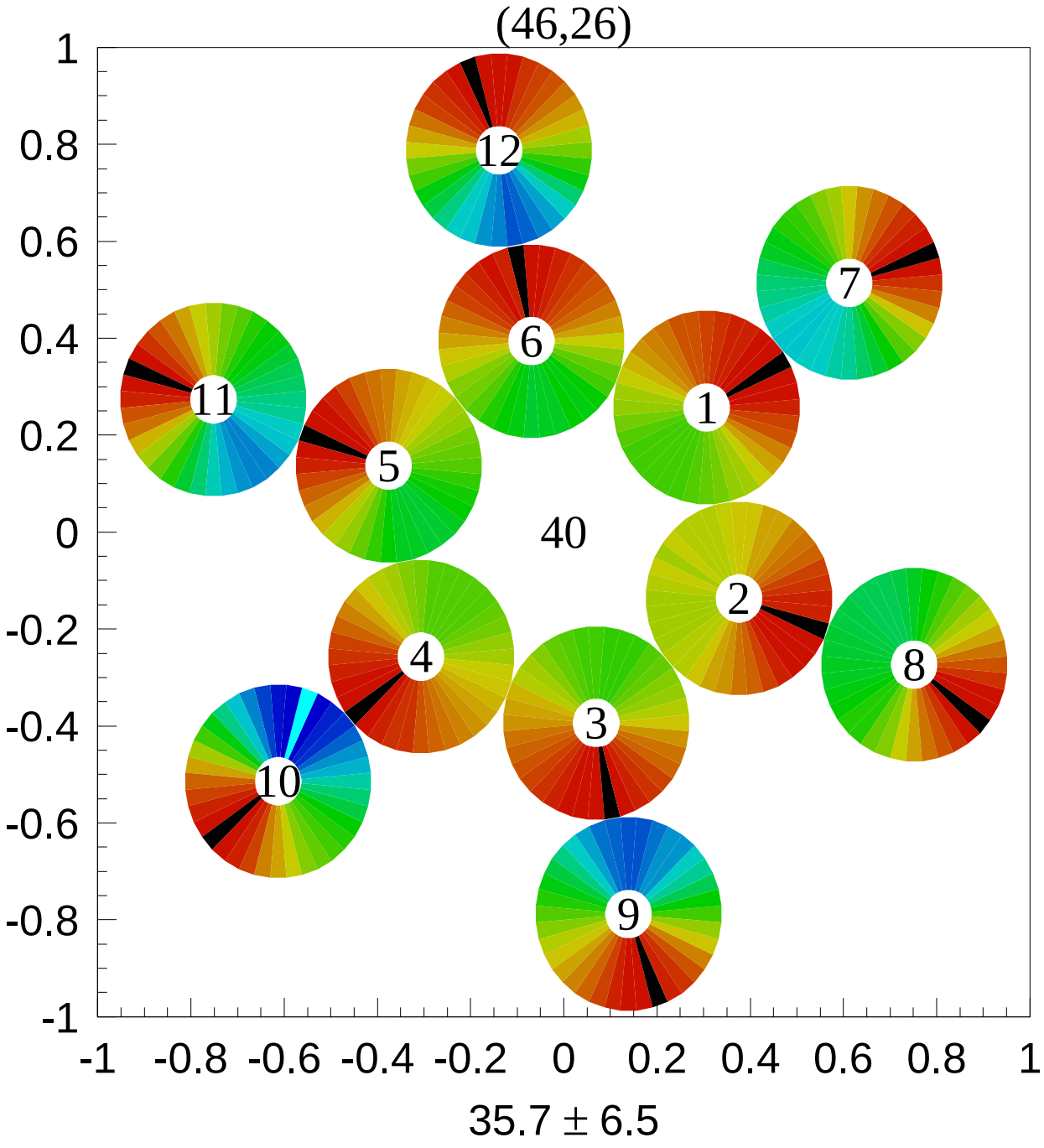

(46,24)
tilted LEDs
120 114 119 124 128 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 119 120 125 118 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

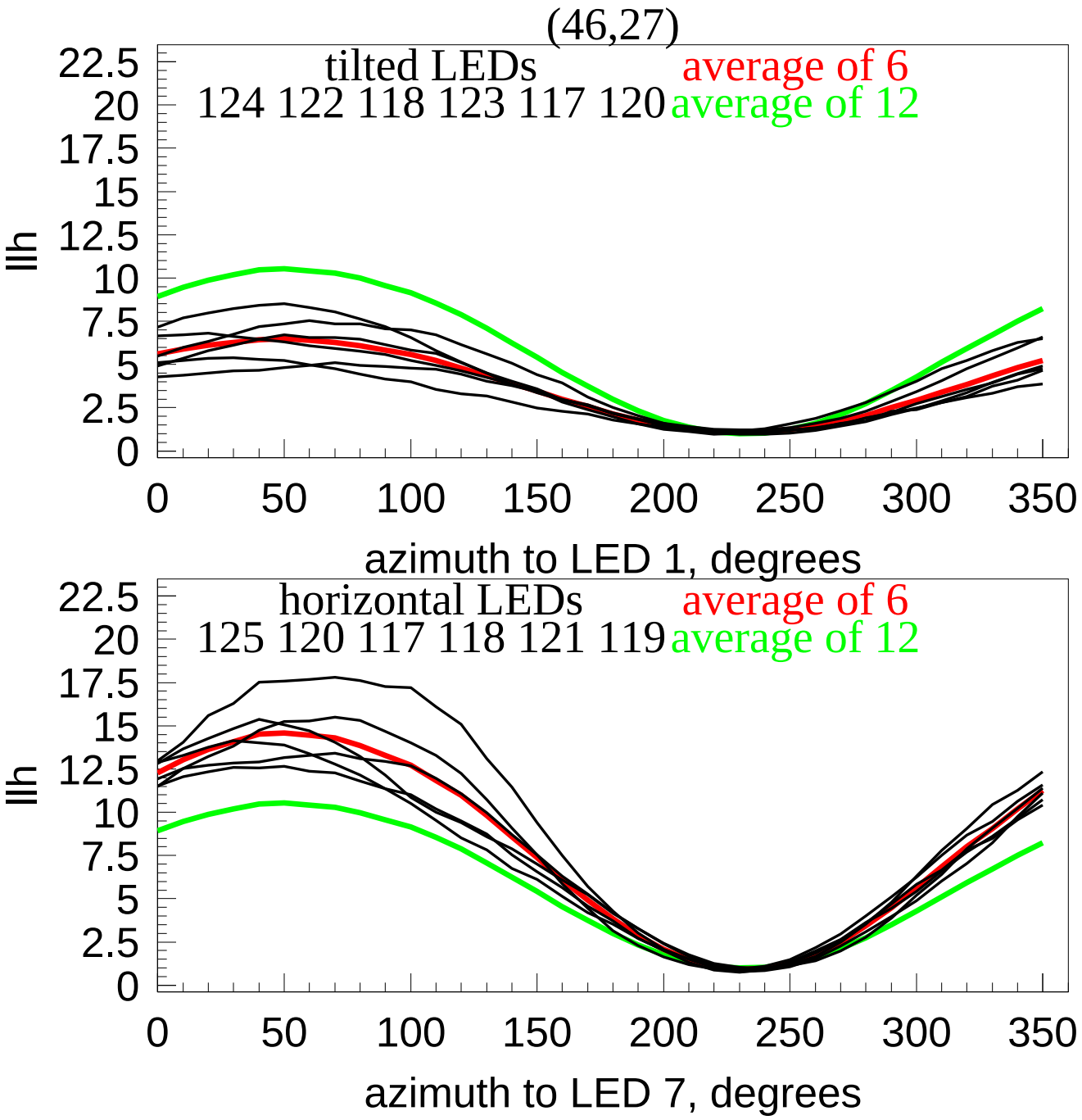

(46,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
197.9 ± 8.1

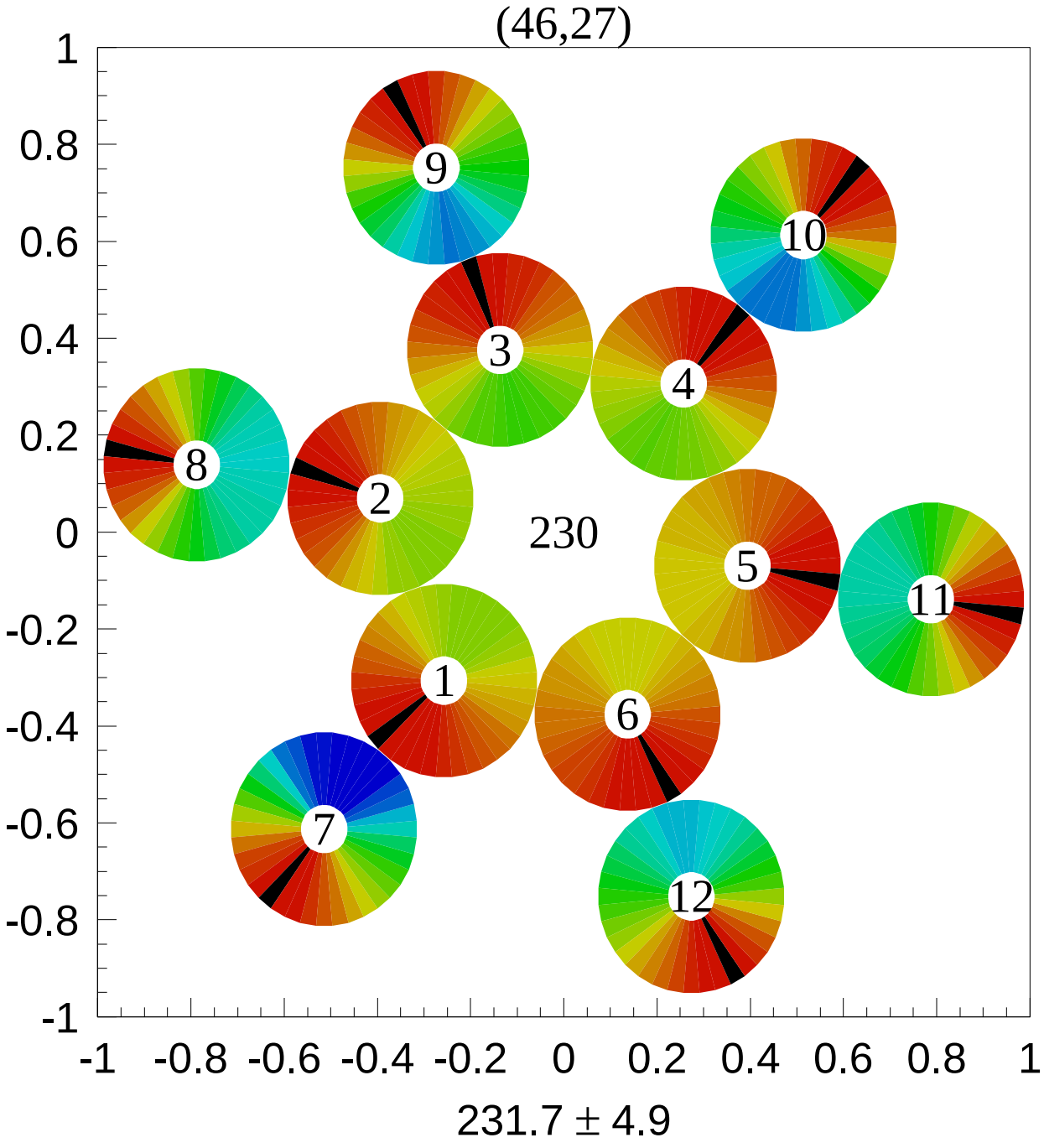

(46,25)
tilted LEDs
127 127 120 125 119 117
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 127 123 125 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

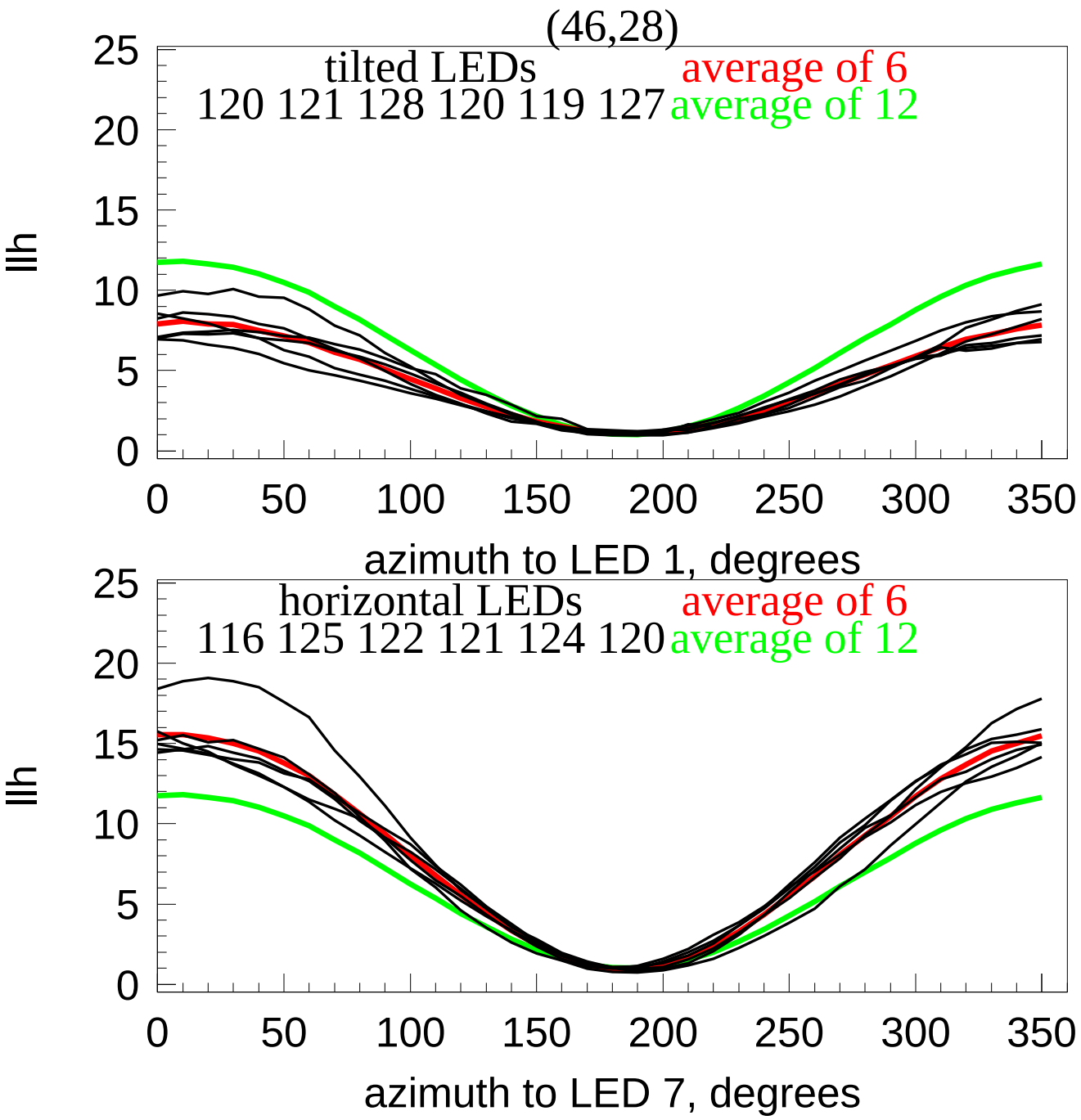

(46,25)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
60.9 ± 4.0

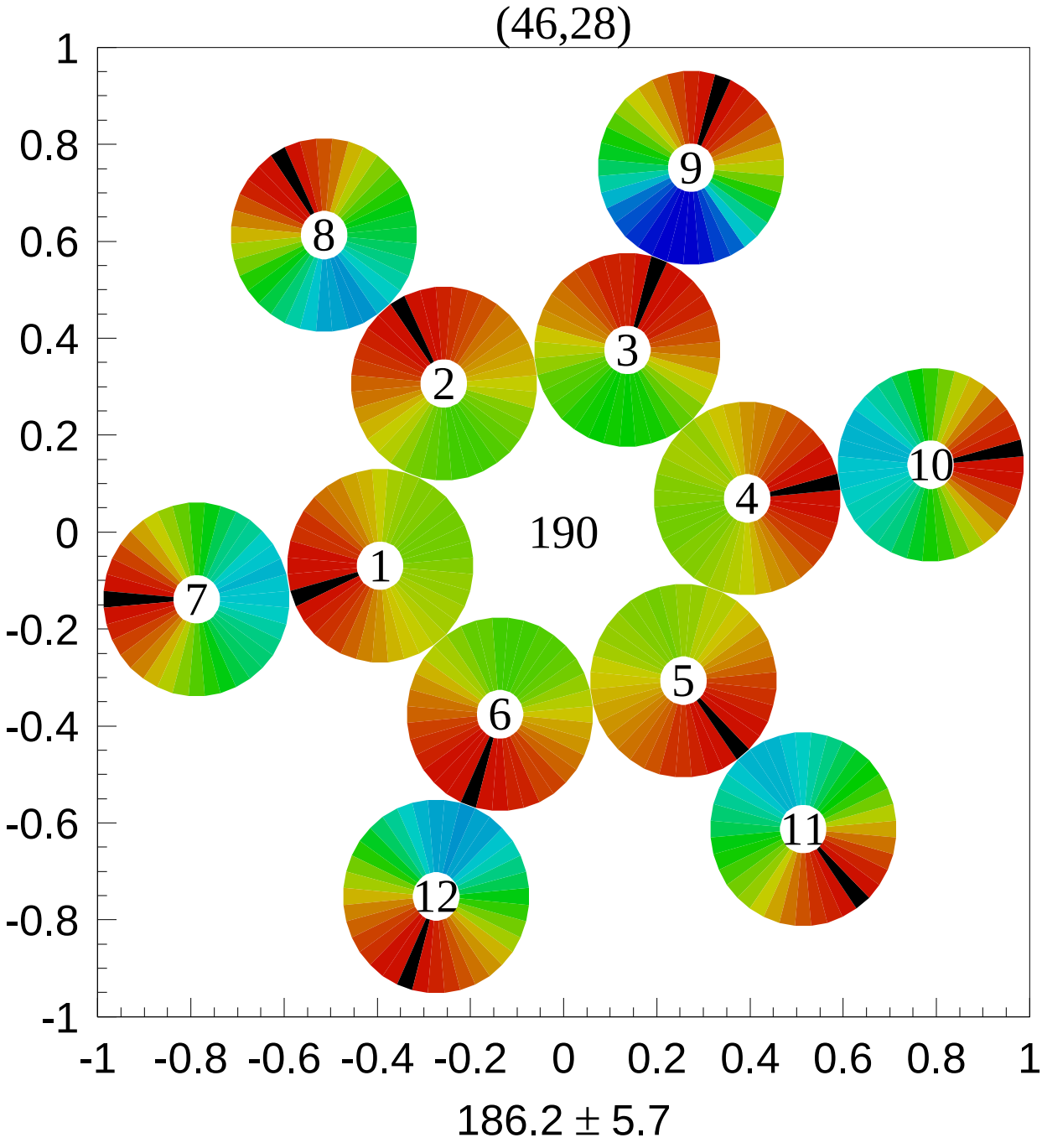

(46,26)
tilted LEDs
126 116 128 121 116 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 123 123 115 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

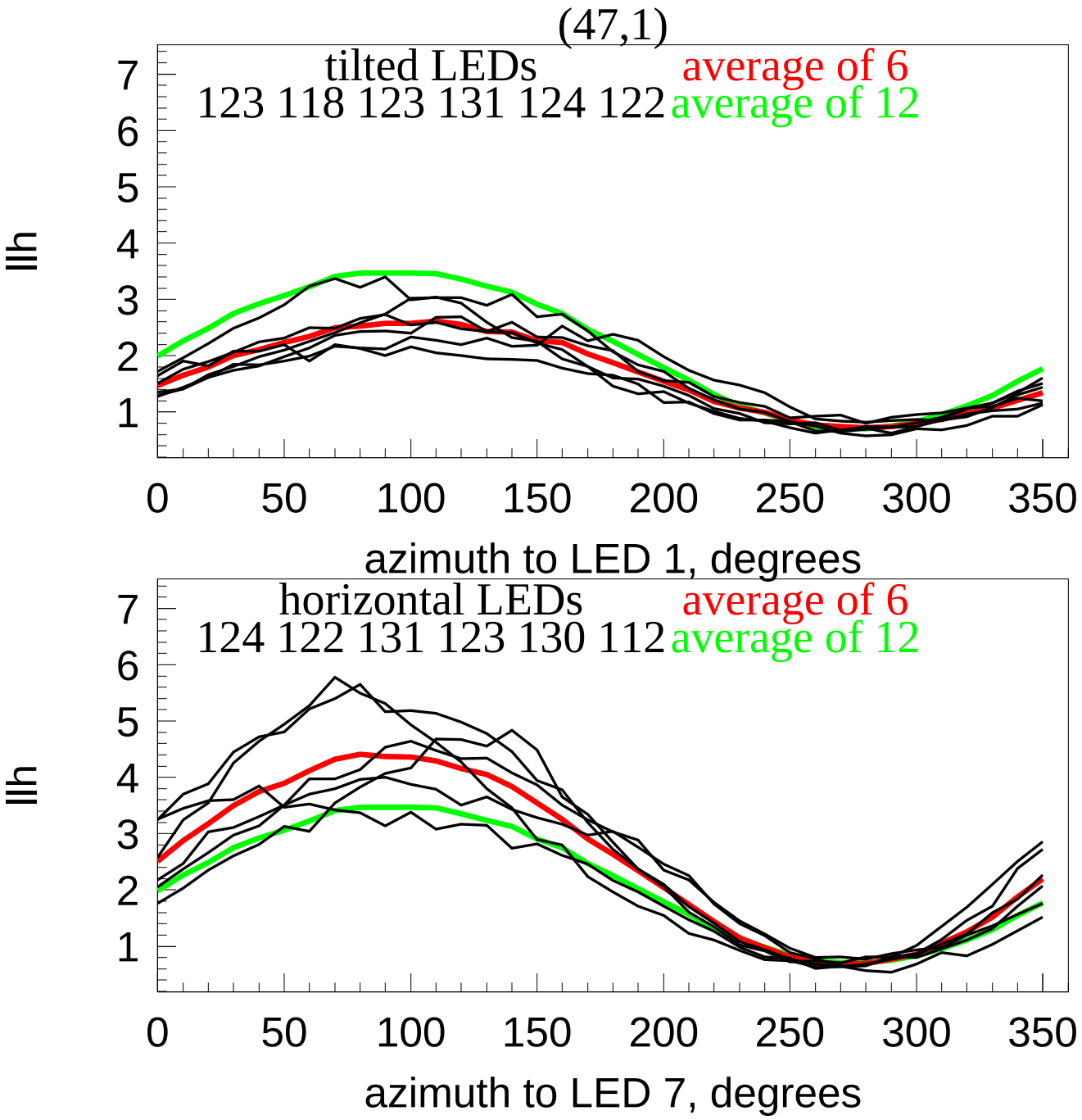

(46,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
35.7 ± 6.5

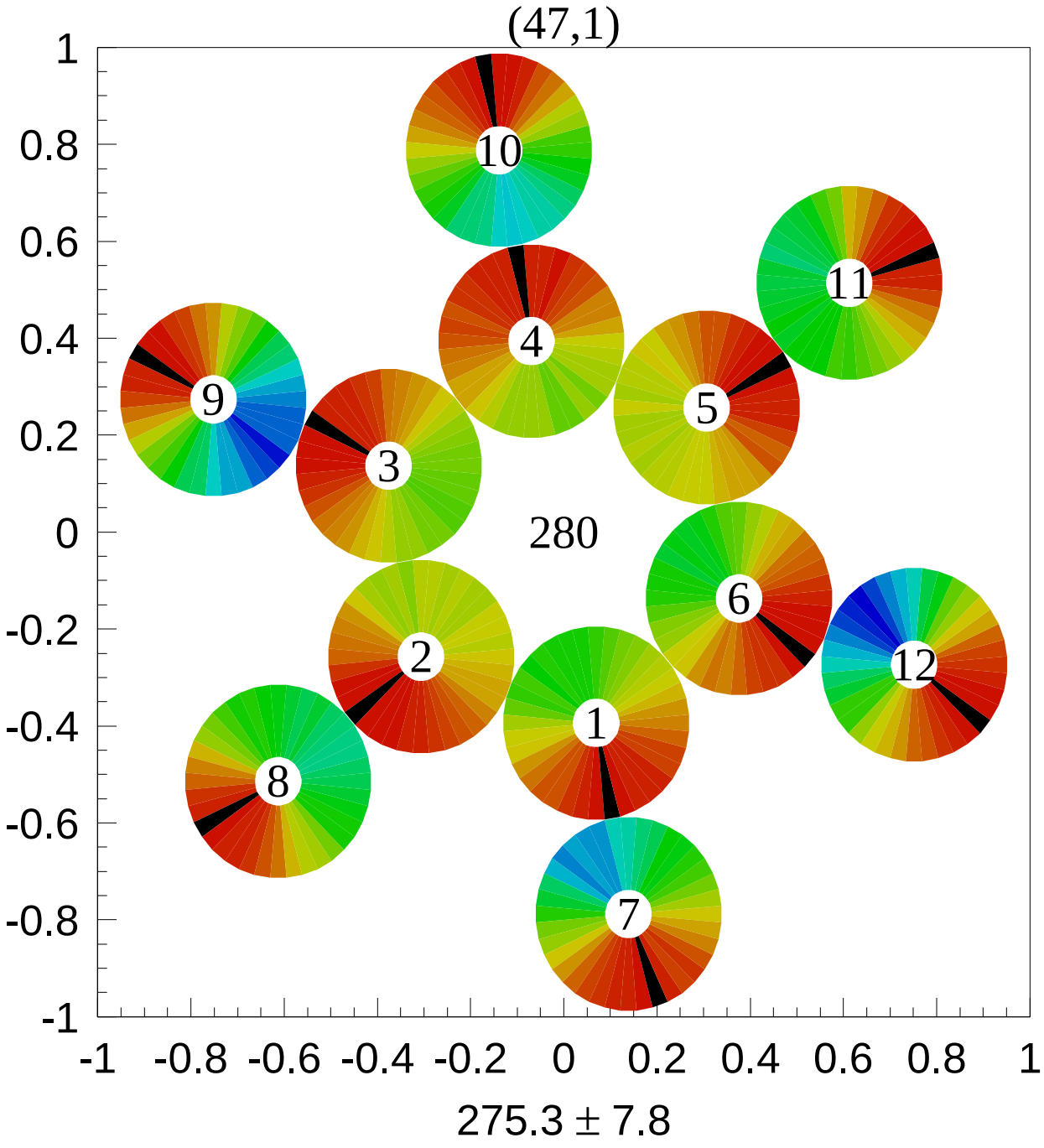

(46,27)
tilted LEDs
124 122 118 123 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 117 118 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

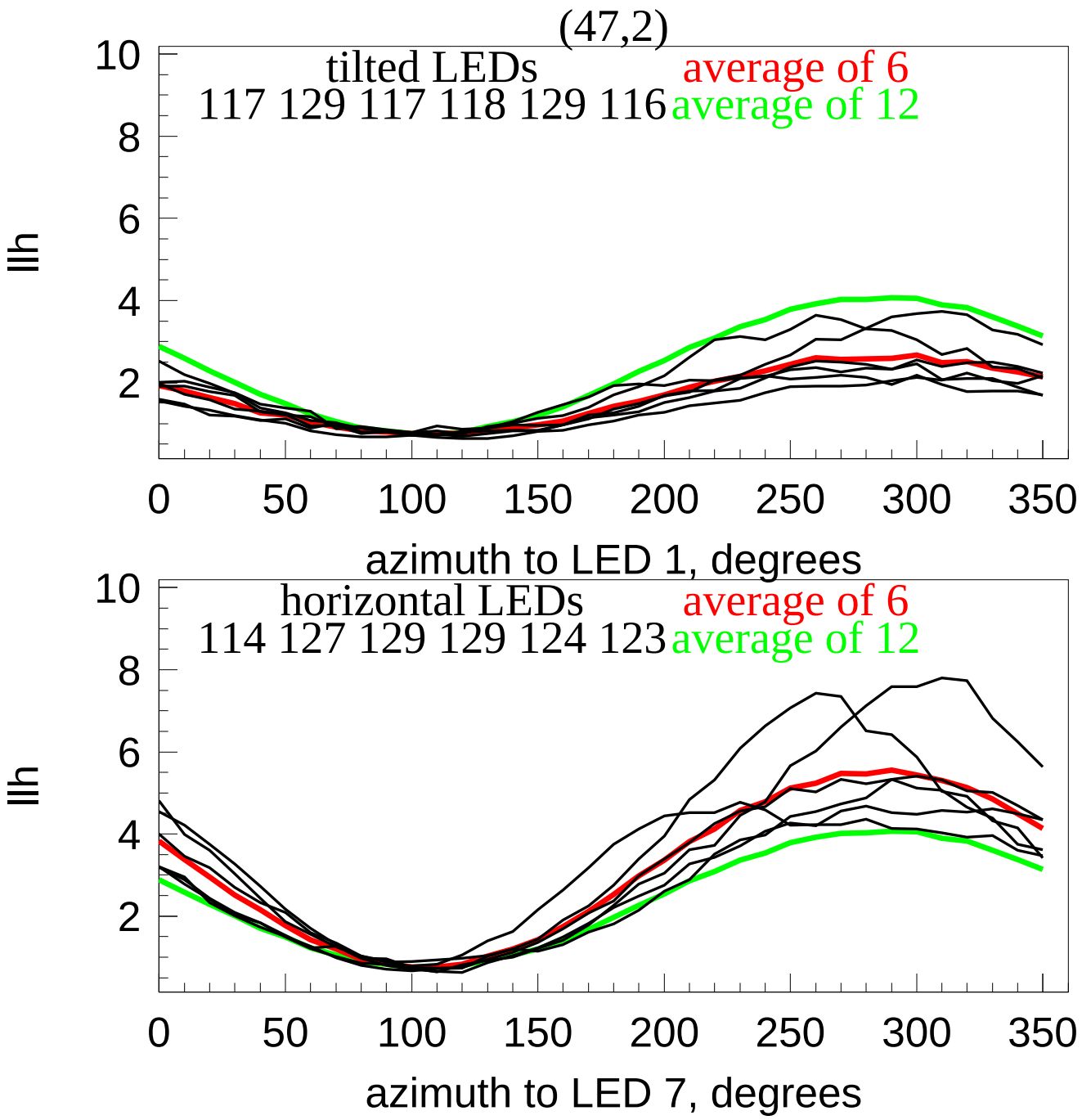

(46,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.7 ± 4.9

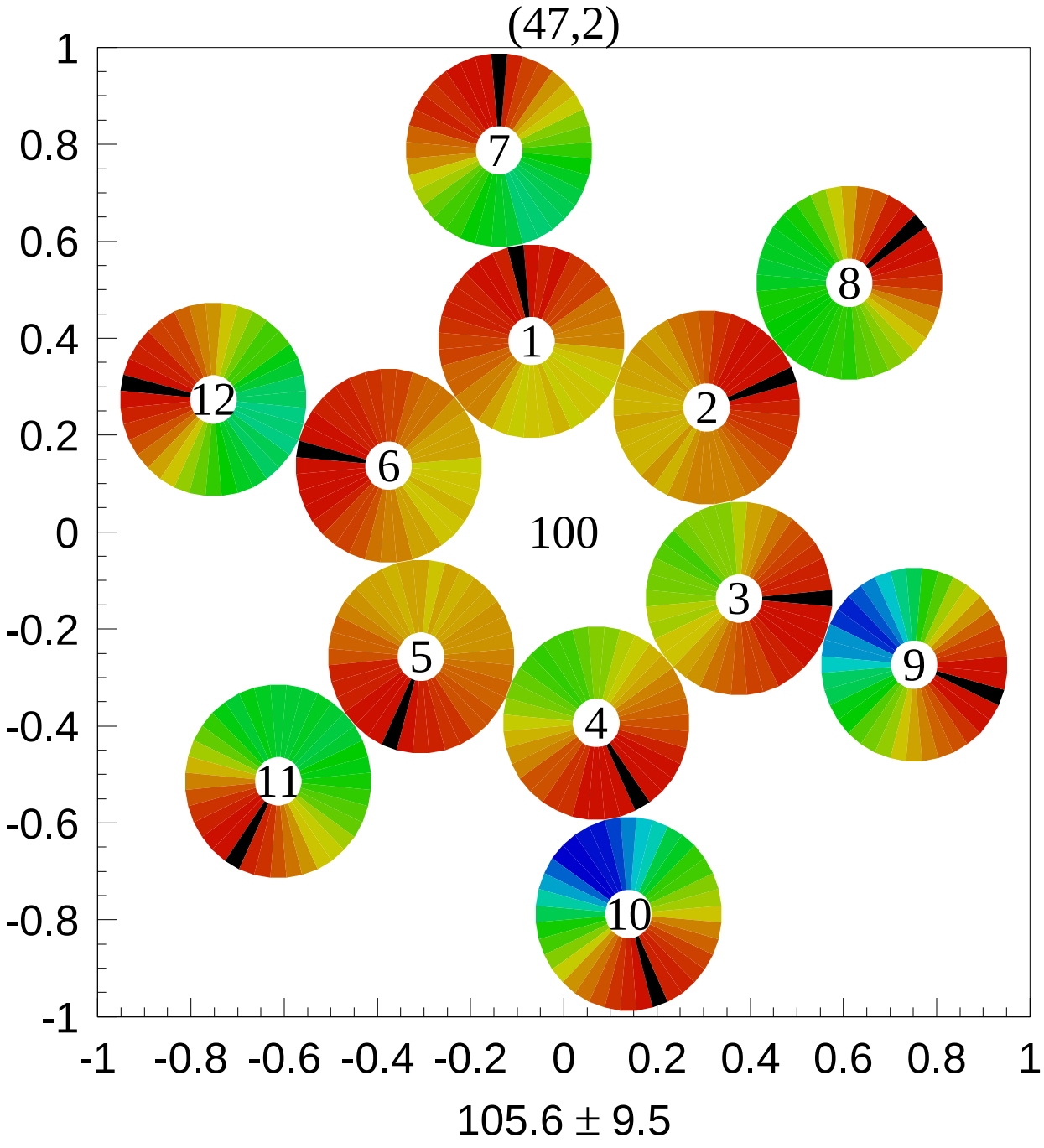

(46,28)
tilted LEDs
120 121 128 120 119 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 125 122 121 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

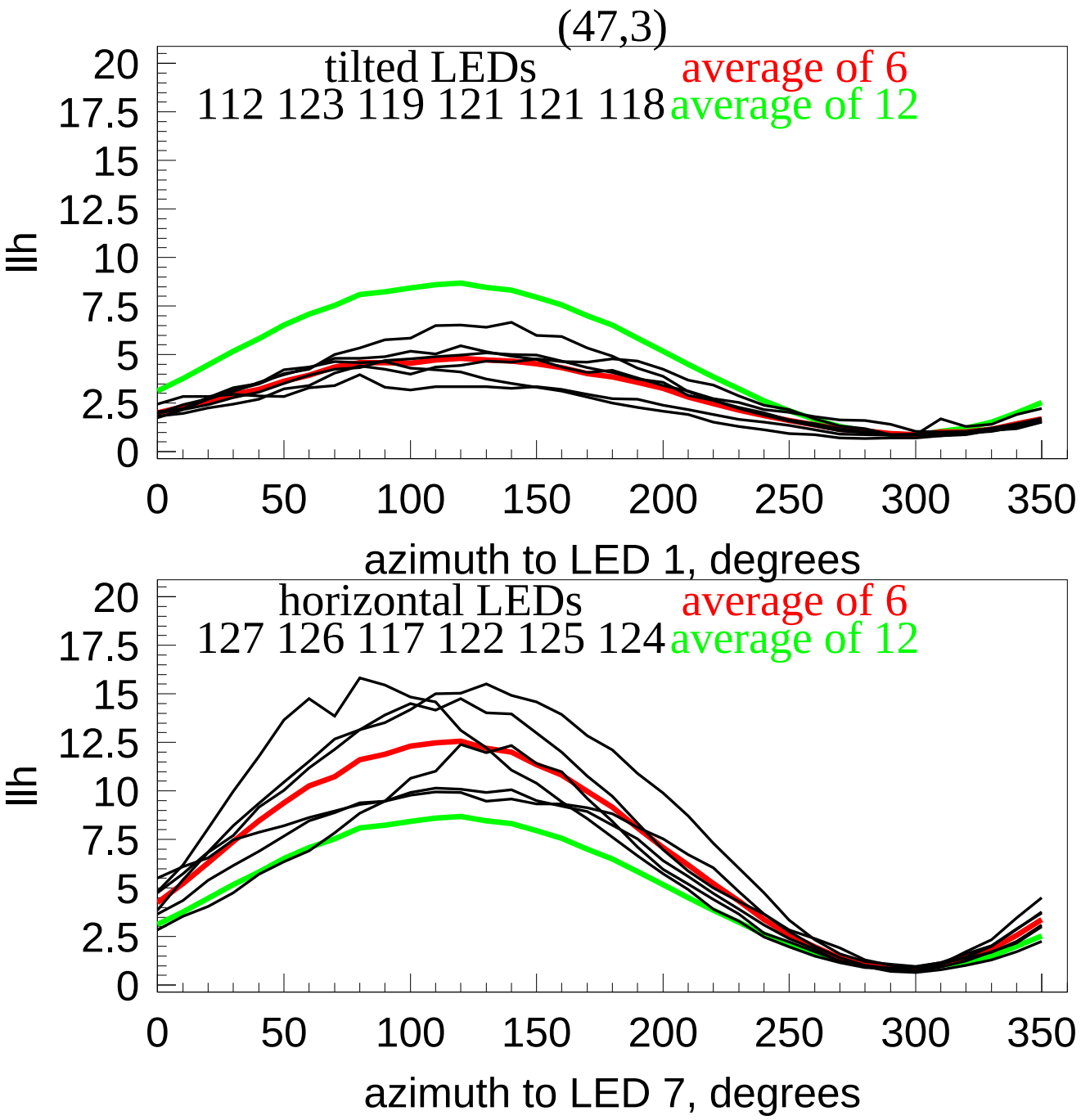

(46,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.2 ± 5.7
190
1
2
3
4
5
6
7
8
9
10
11
12

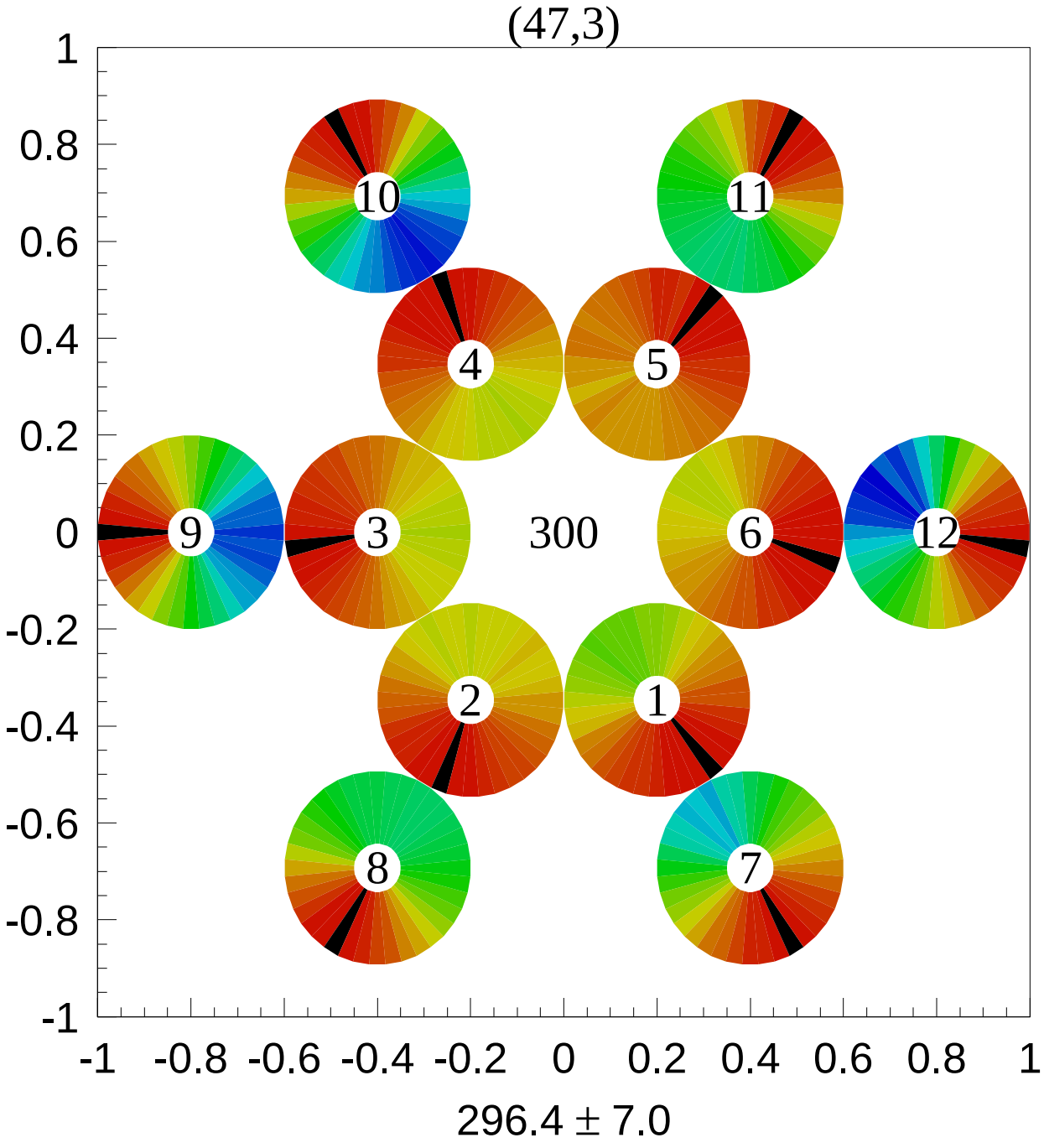

(47,1)
tilted LEDs
123 118 123 131 124 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 122 131 123 130 112
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

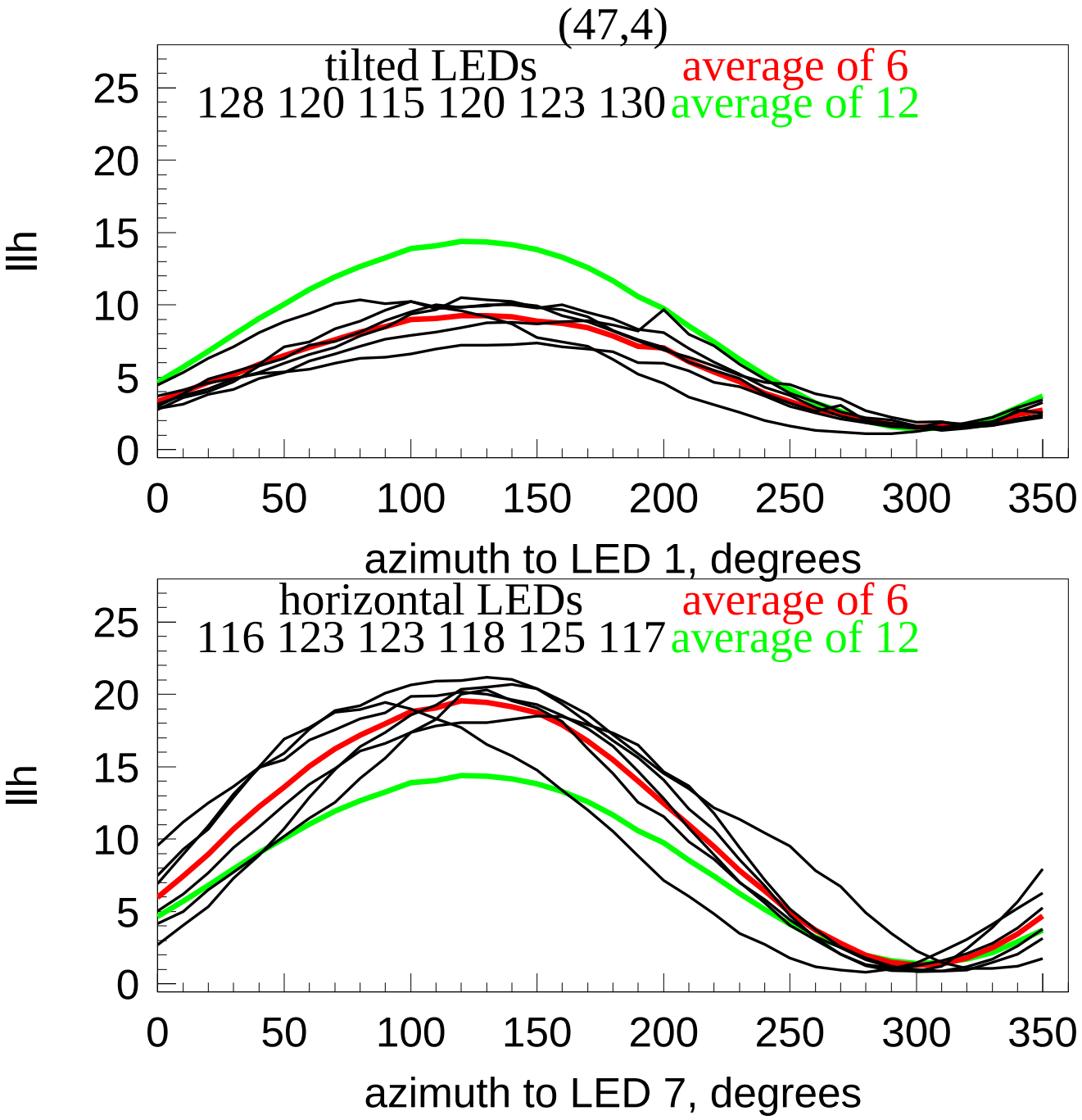

(47,1)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
275.3 ± 7.8

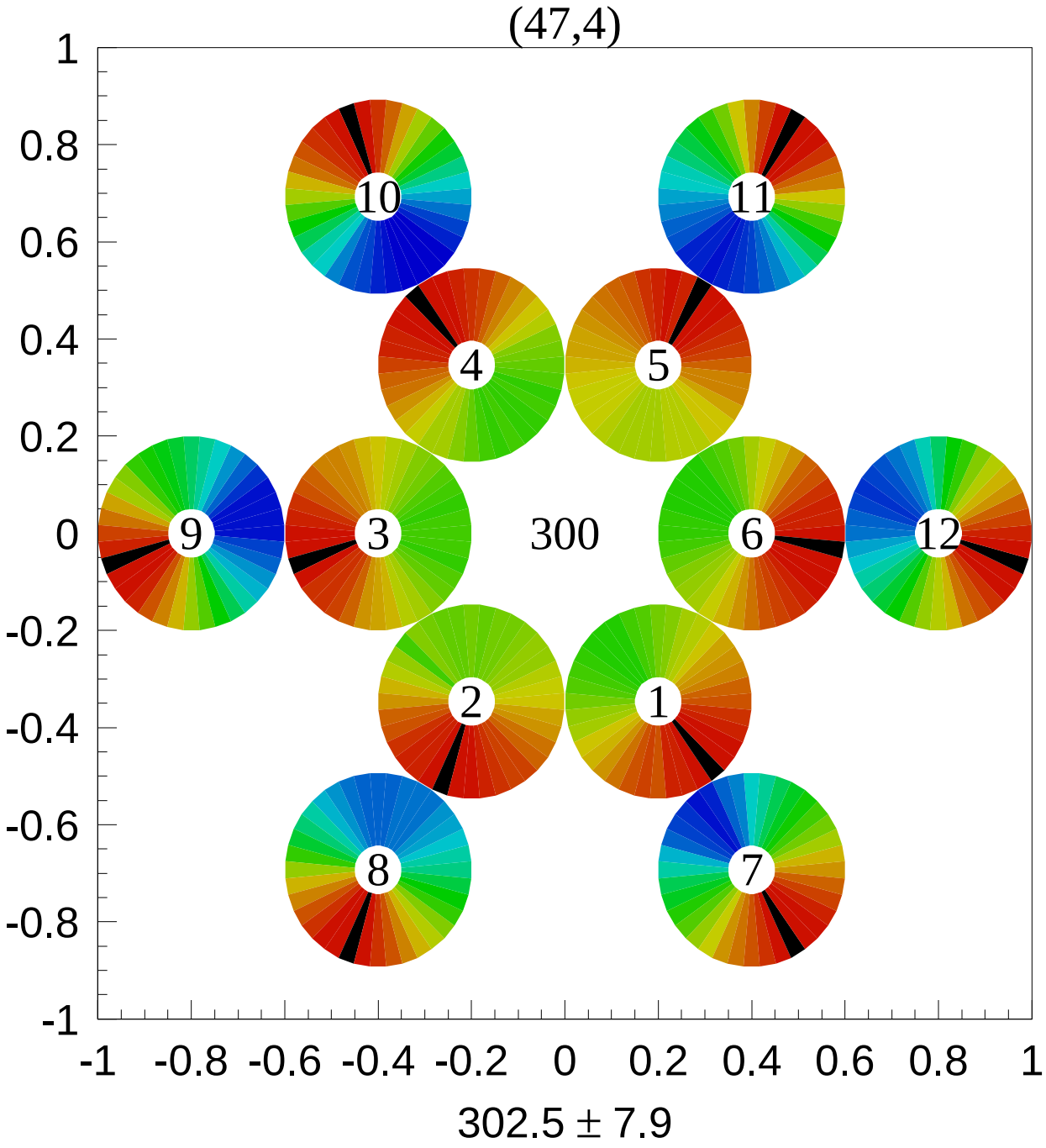

(47,2)
tilted LEDs
117 129 117 118 129 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 127 129 129 124 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

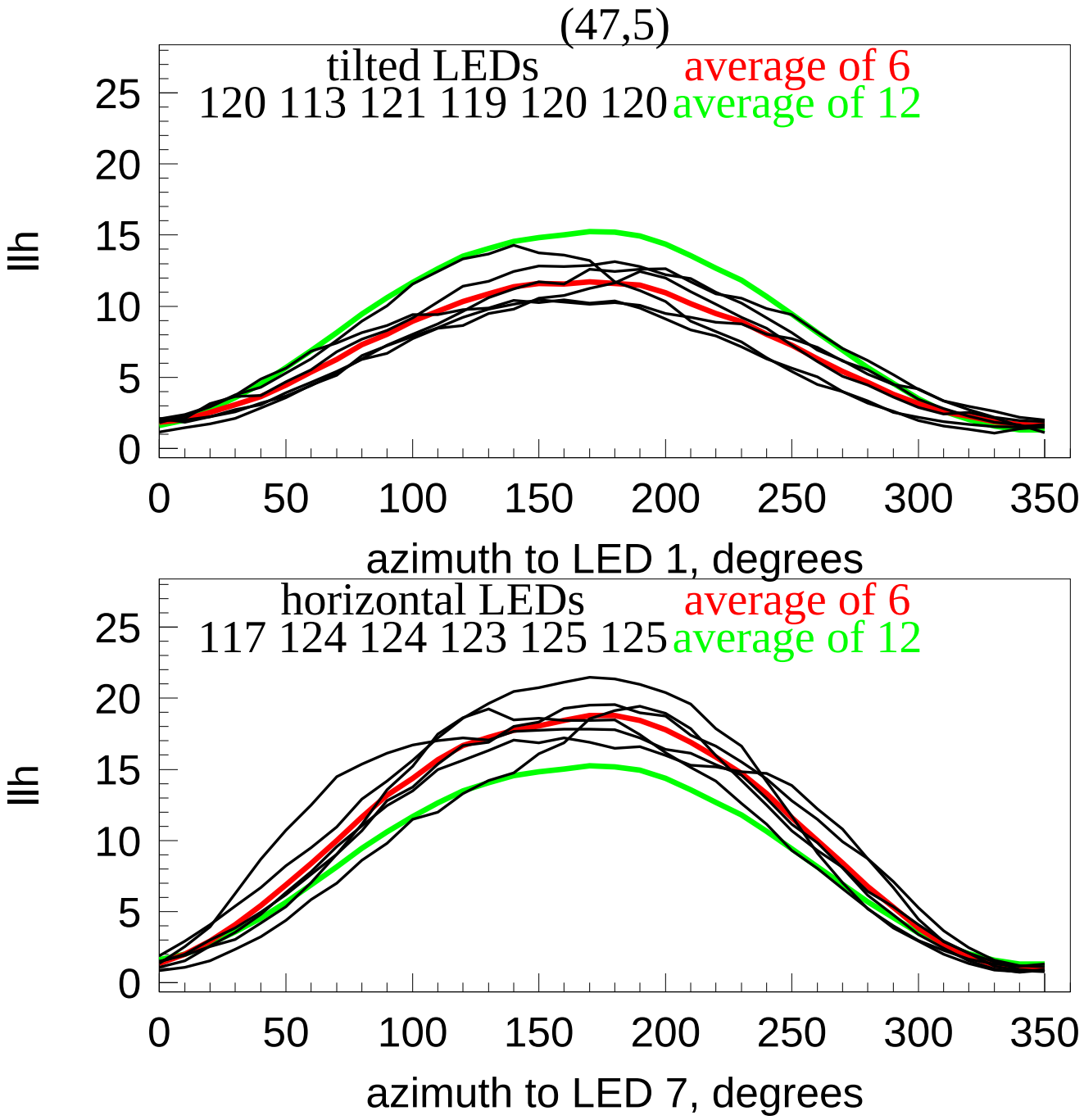

(47,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
105.6 ± 9.5

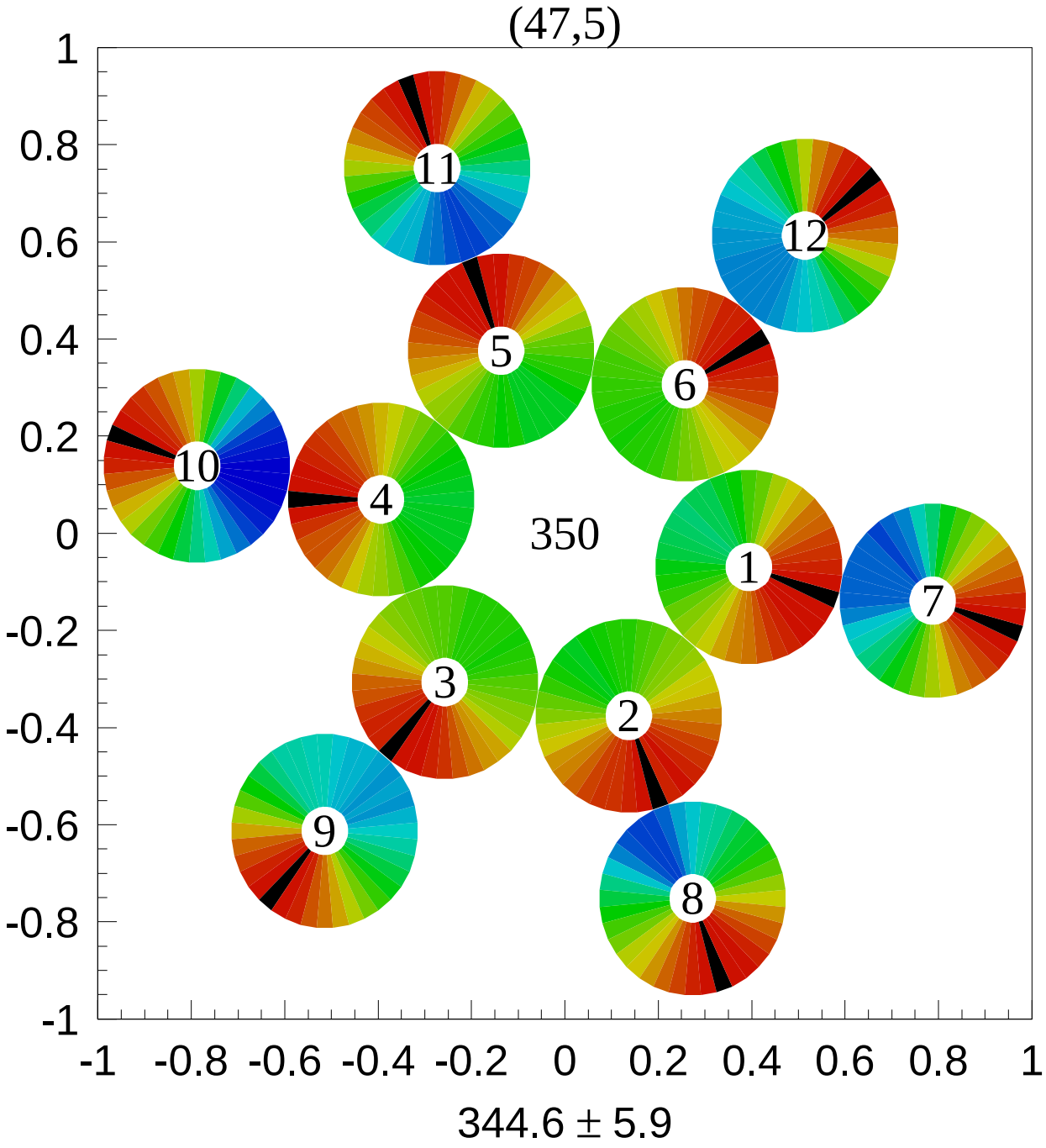

(47,3)
tilted LEDs
112 123 119 121 121 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 126 117 122 125 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

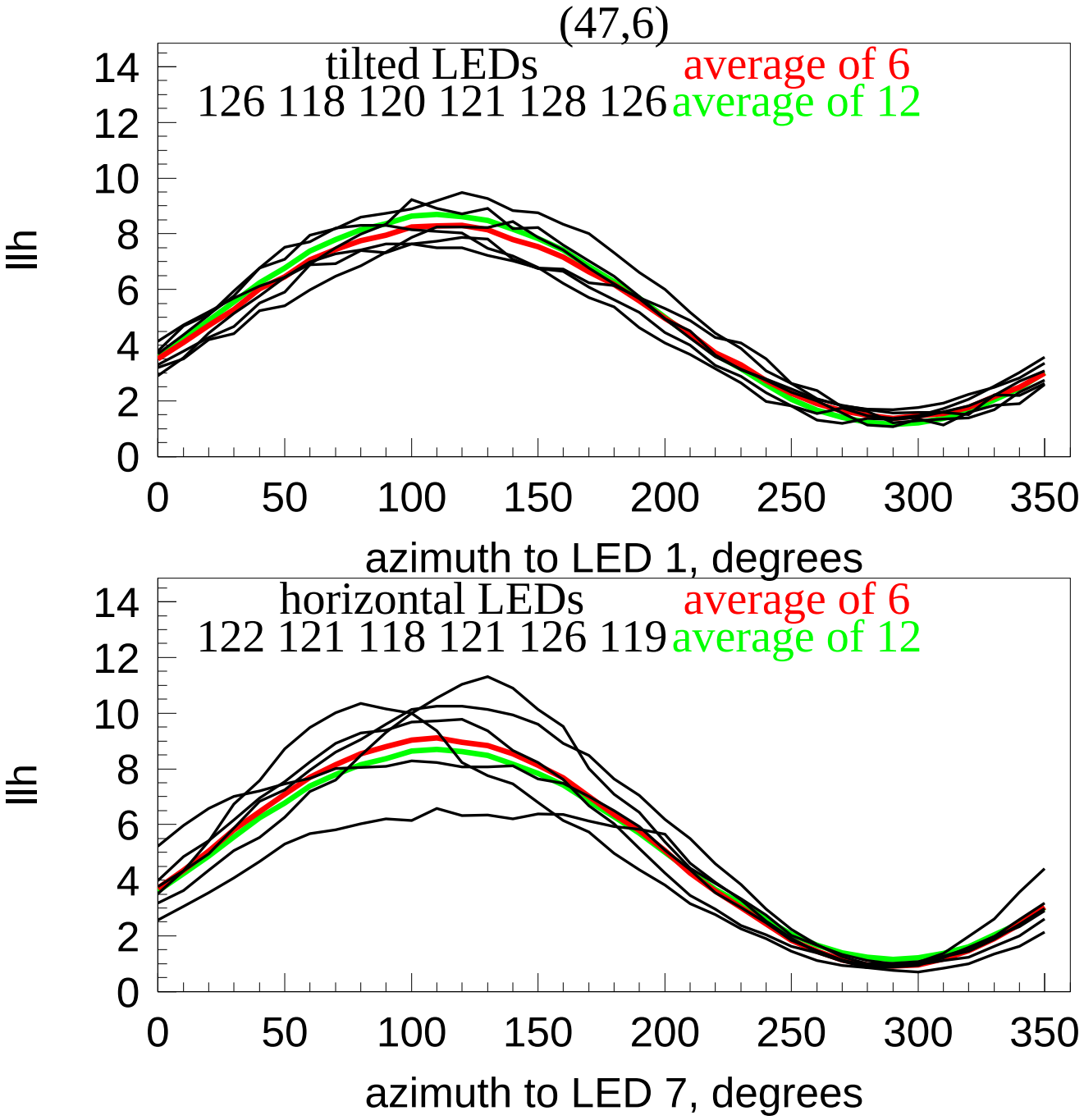

(47,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
296.4 ± 7.0

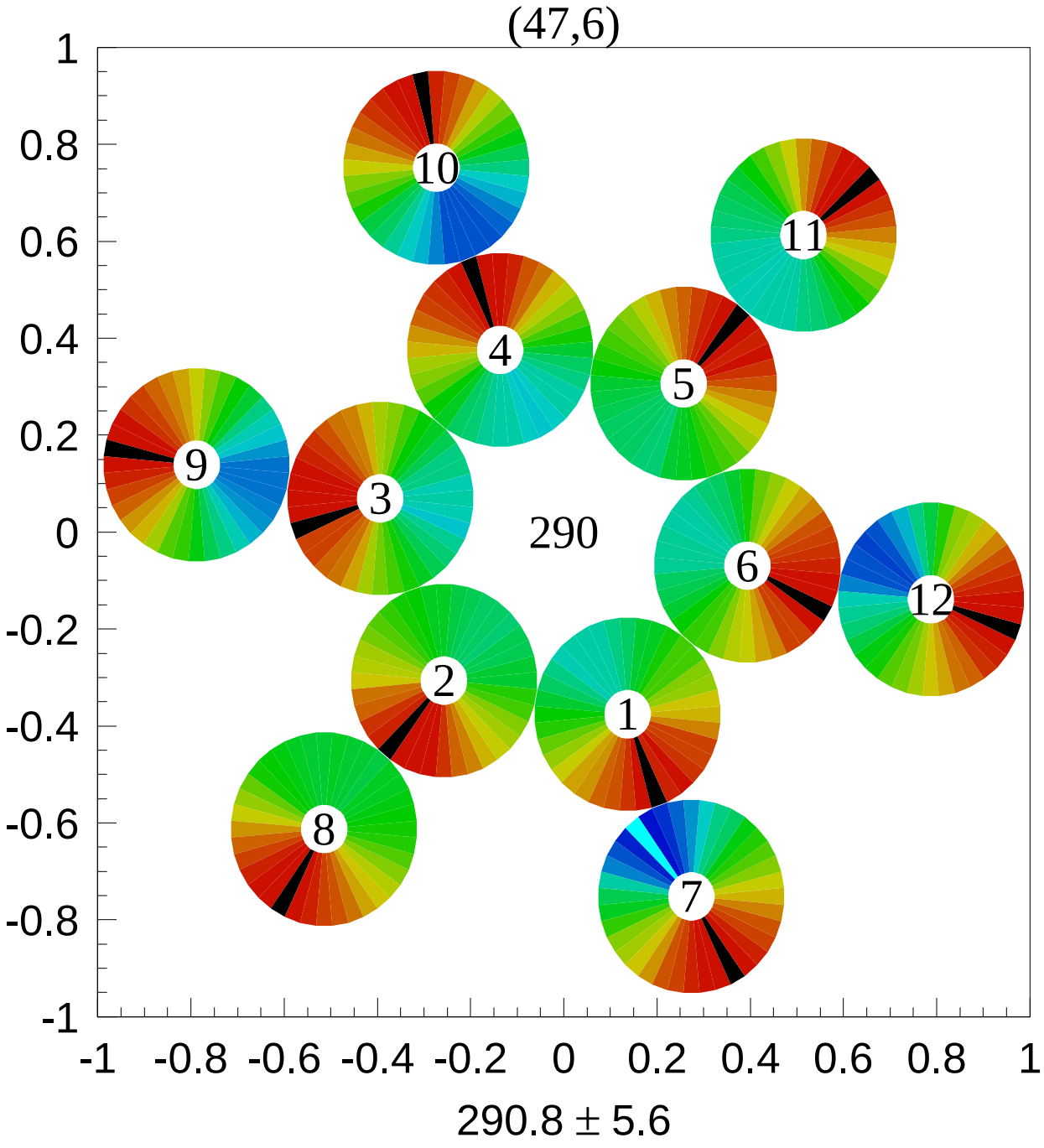

(47,4)
tilted LEDs
128 120 115 120 123 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 123 123 118 125 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

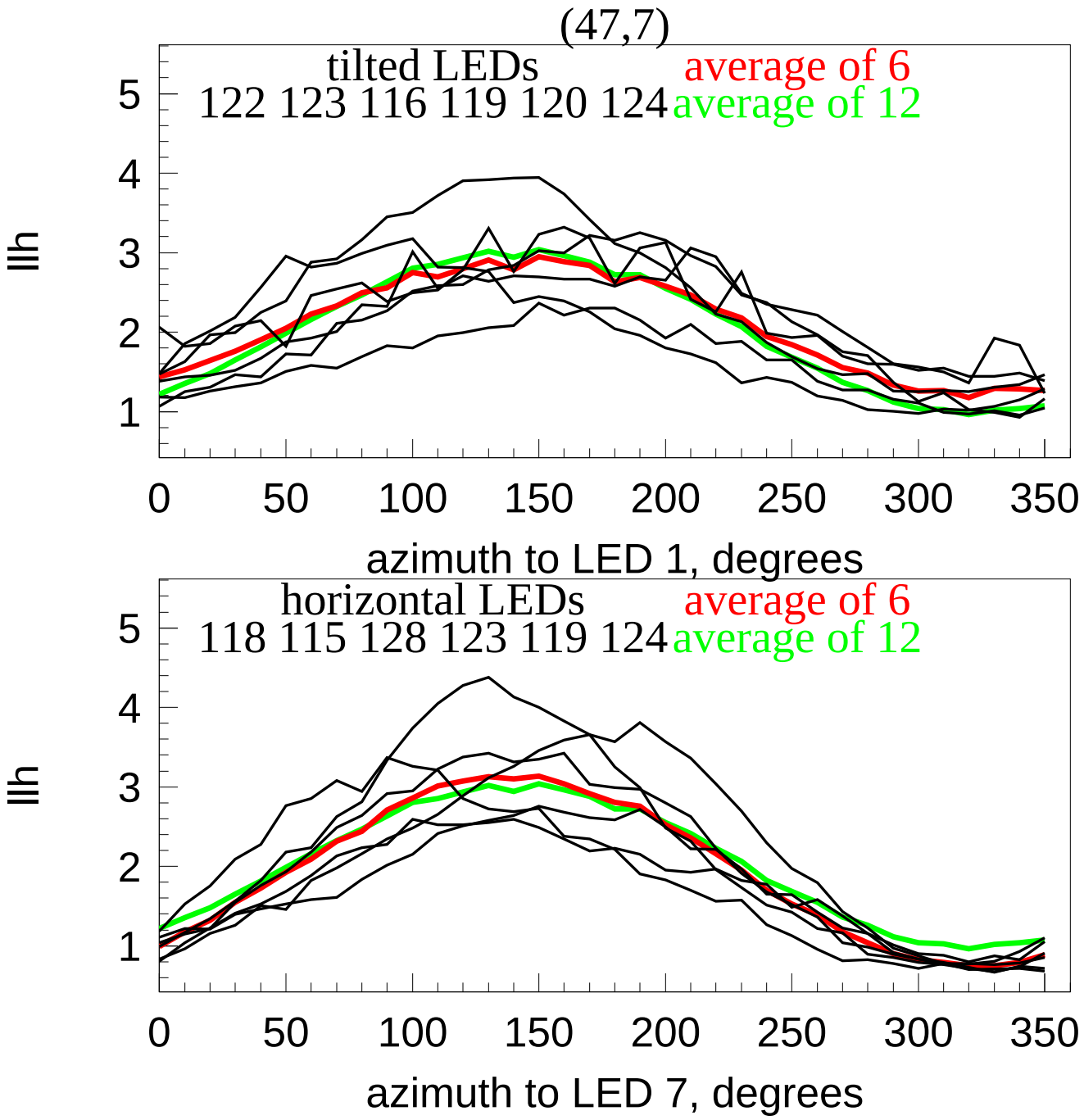

(47,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
302.5 ± 7.9

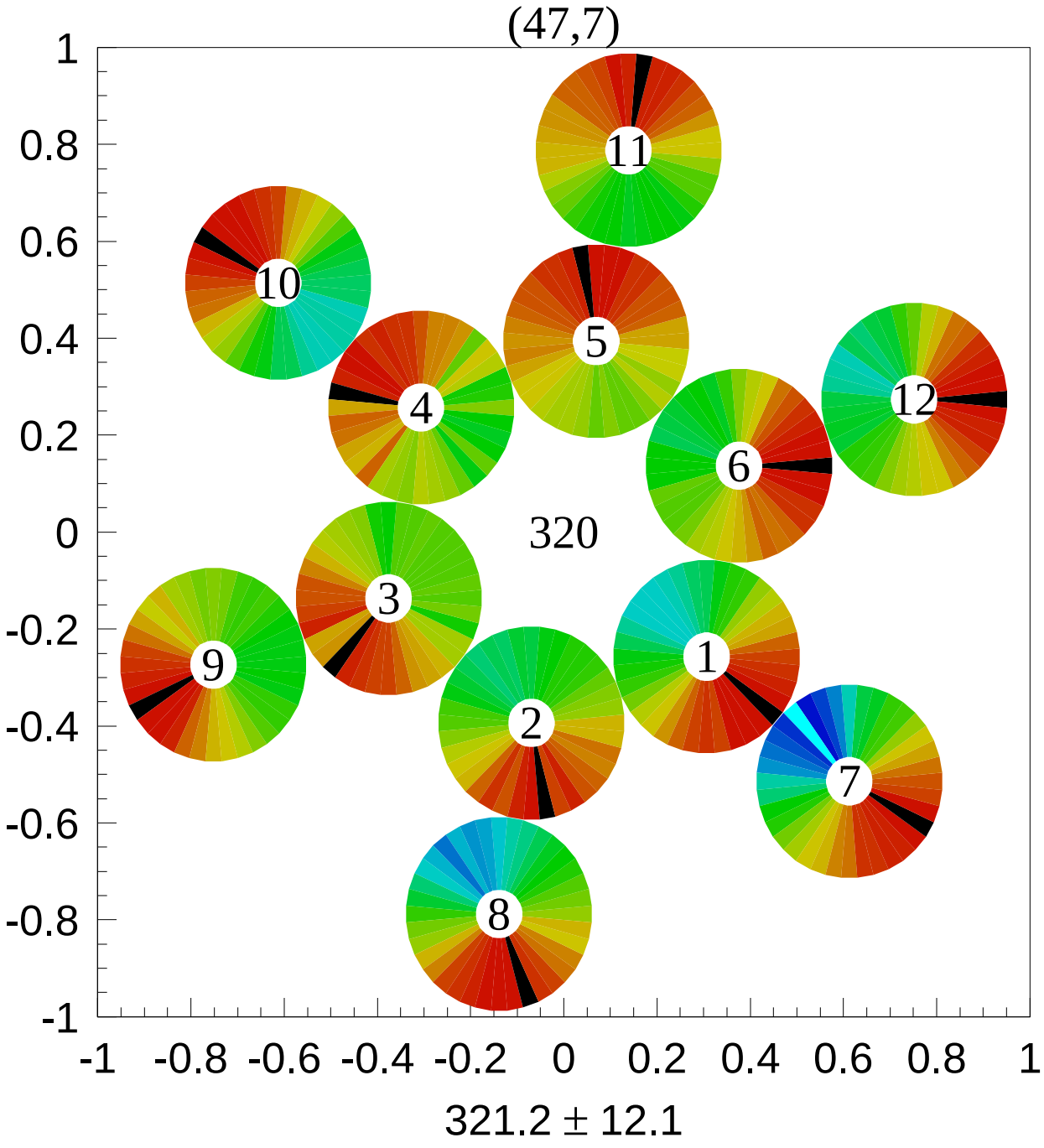

(47,5)
tilted LEDs
120 113 121 119 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 124 124 123 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

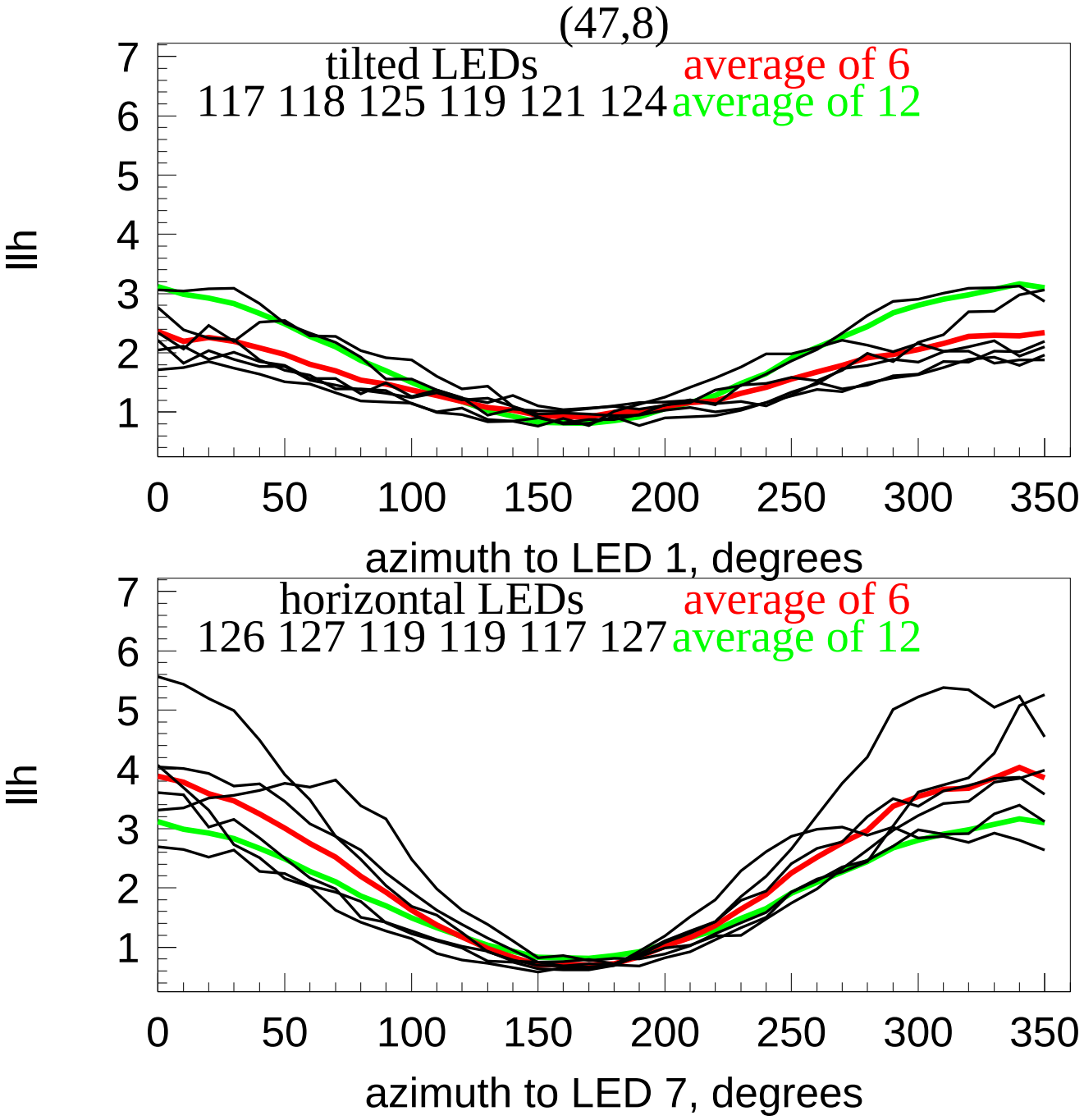

(47,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
344.6 ± 5.9

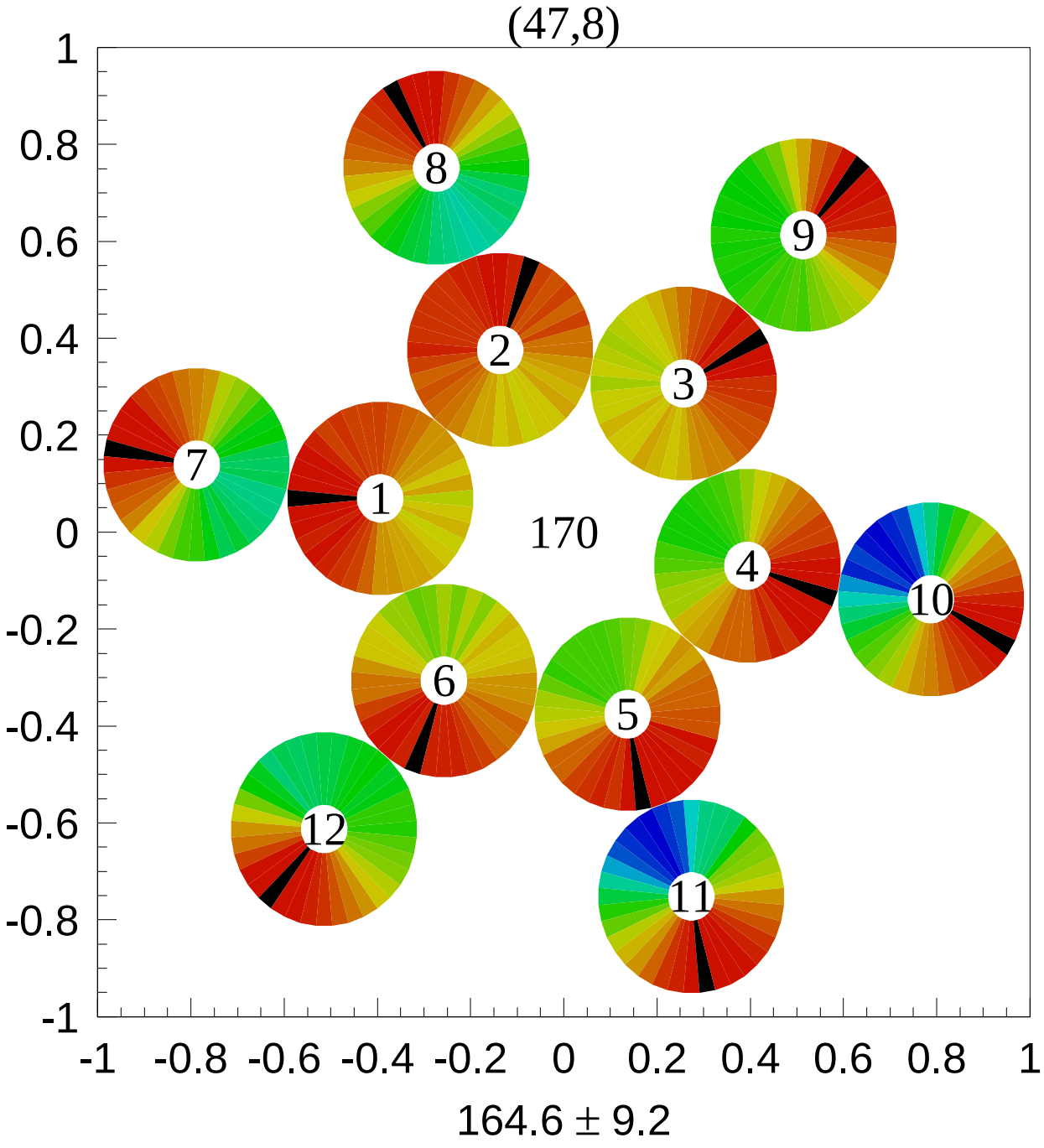

(47,6)
tilted LEDs
126 118 120 121 128 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 118 121 126 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

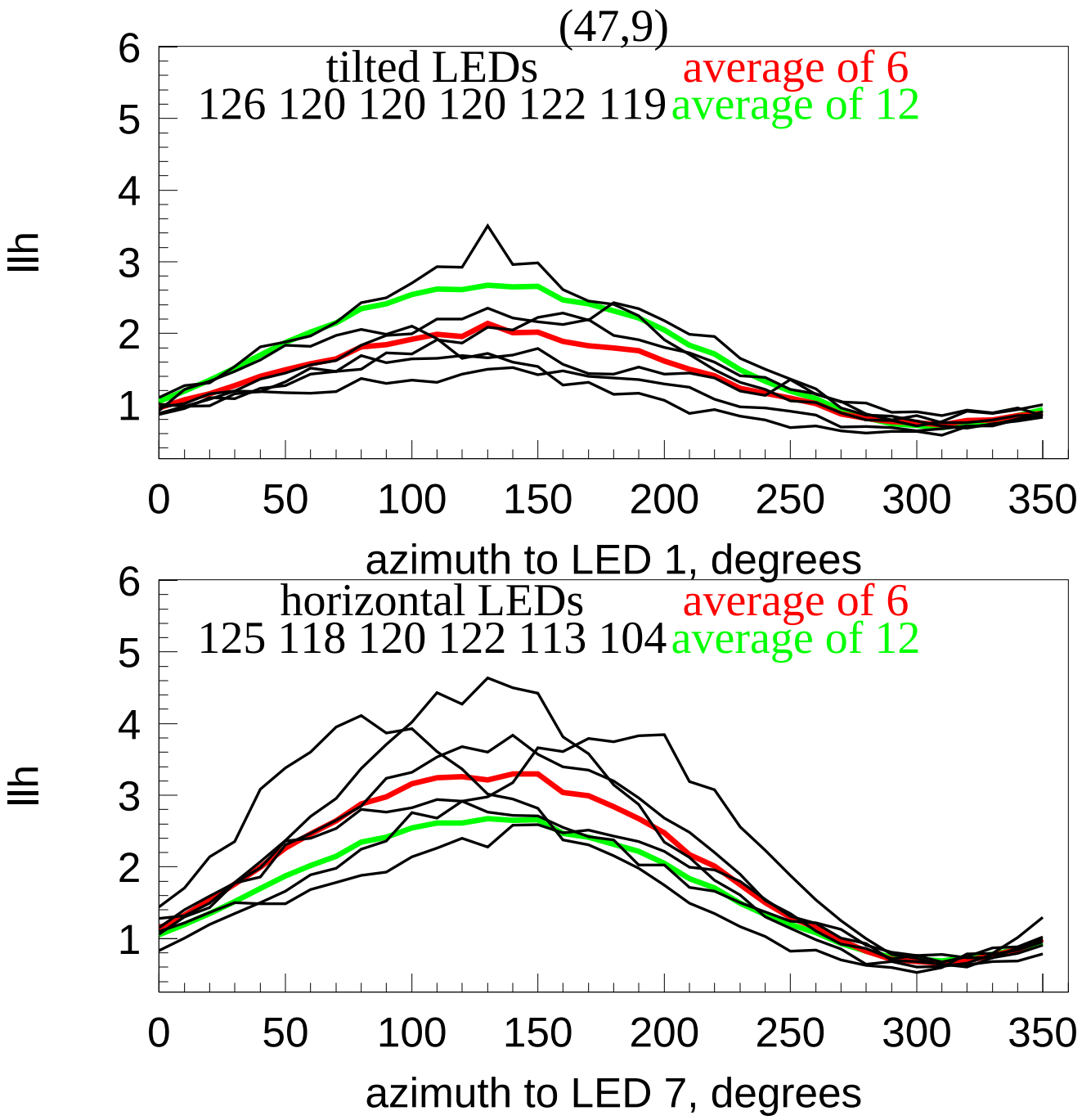

(47,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
290
290.8 ± 5.6
1
2
3
4
5
6
7
8
9
10
11
12

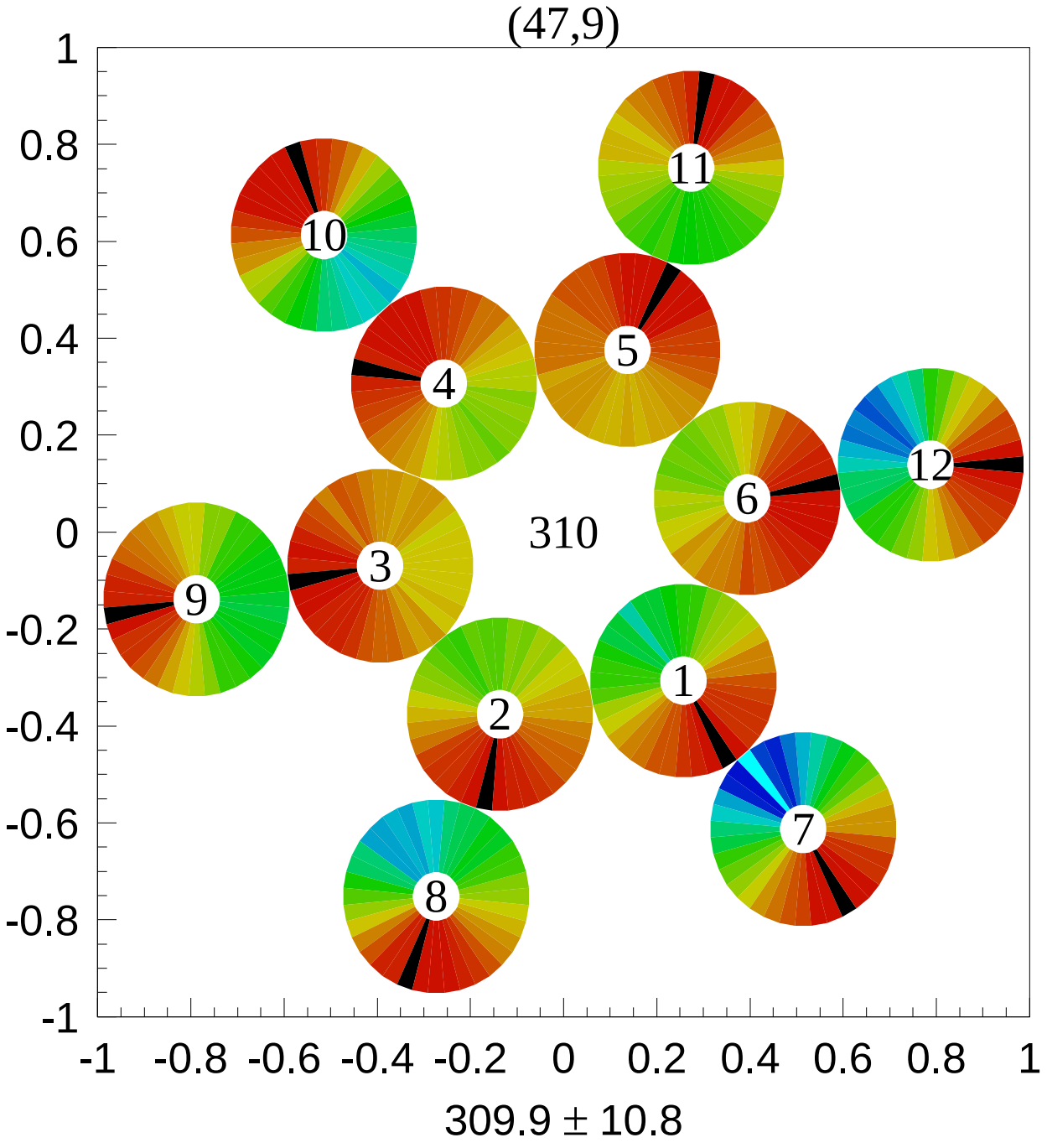

(47,7)
tilted LEDs
122 123 116 119 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 115 128 123 119 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

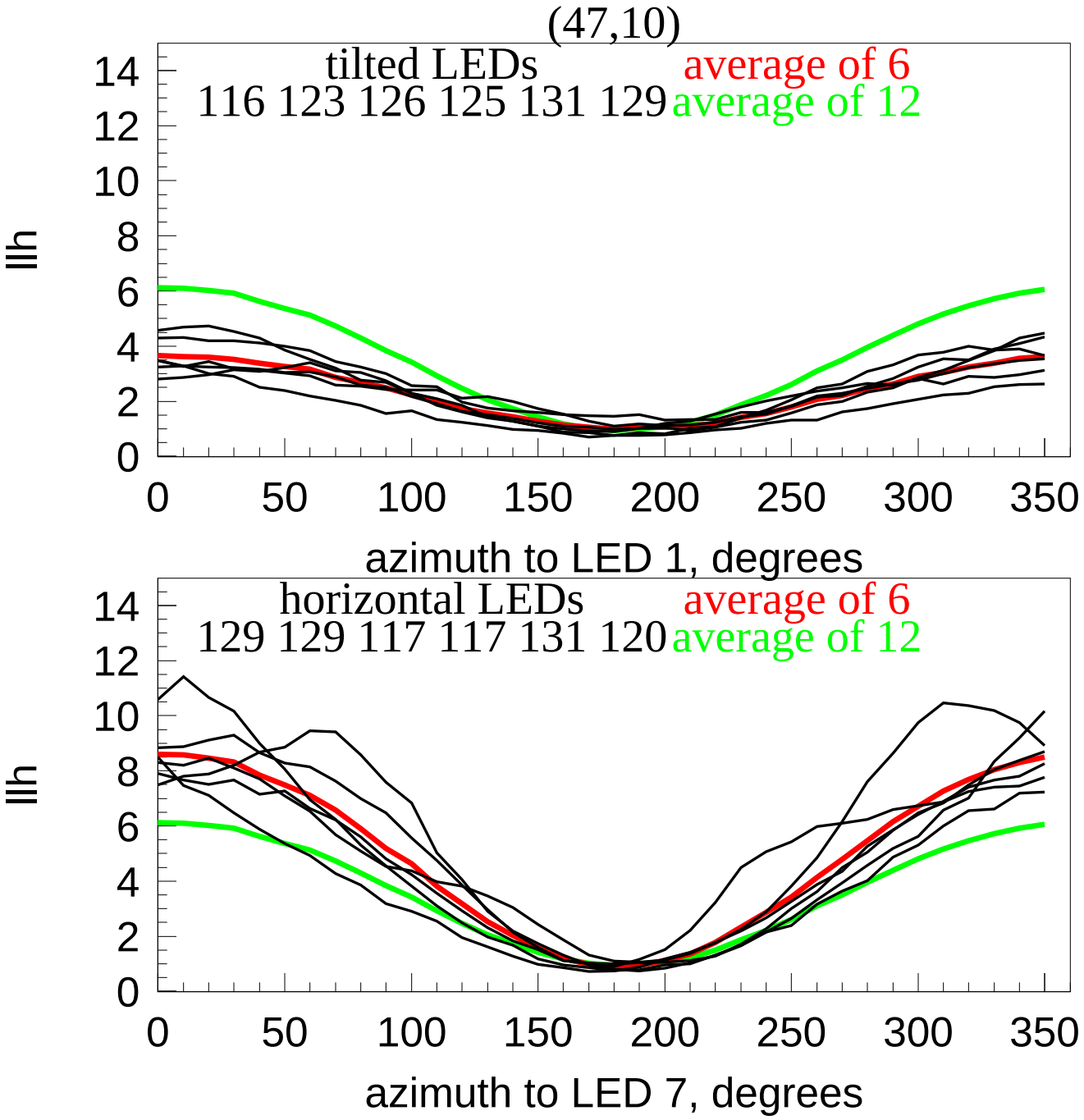

(47,7)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
321.2 ± 12.1

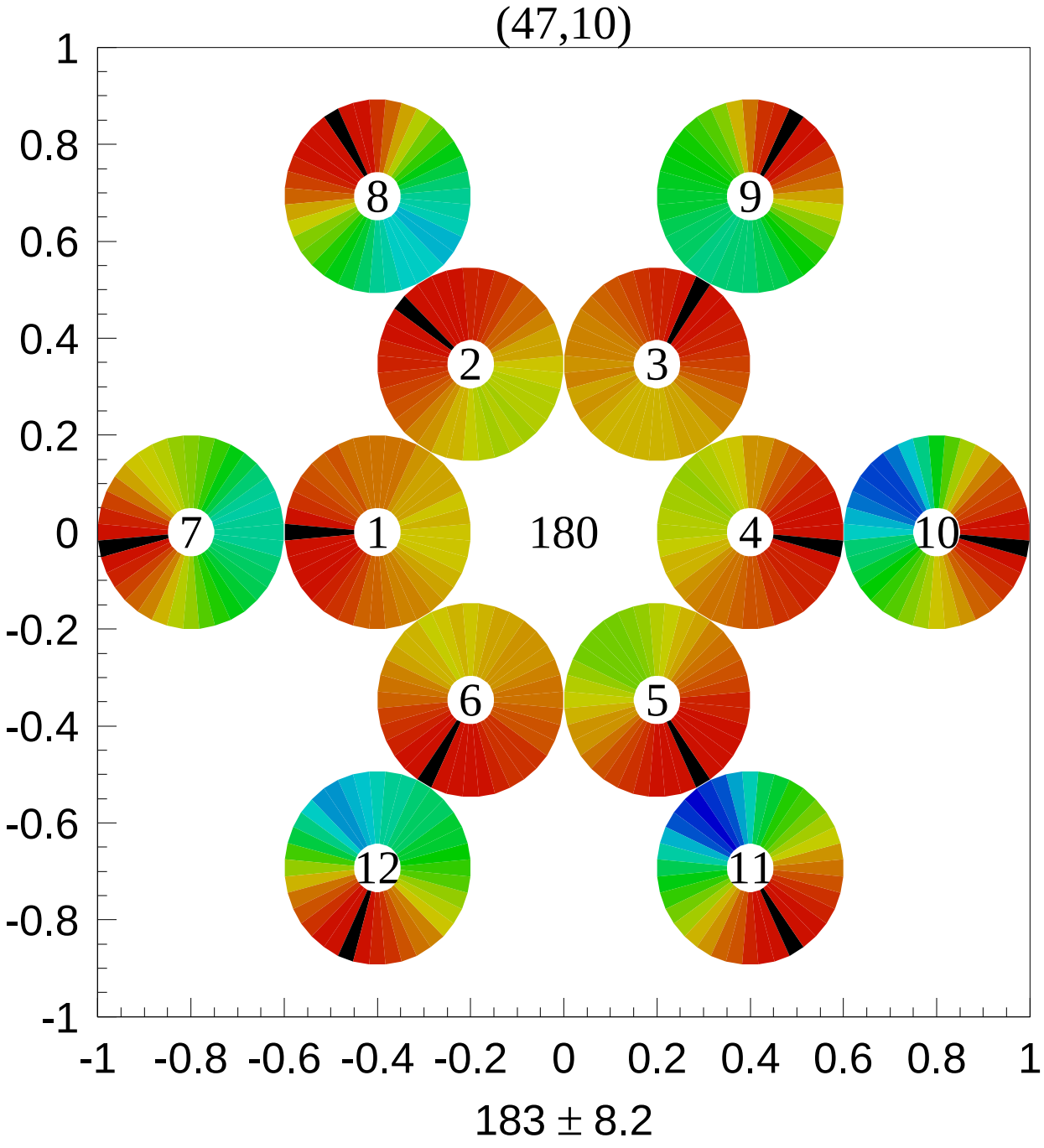

(47,8)
tilted LEDs
117 118 125 119 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 127 119 119 117 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

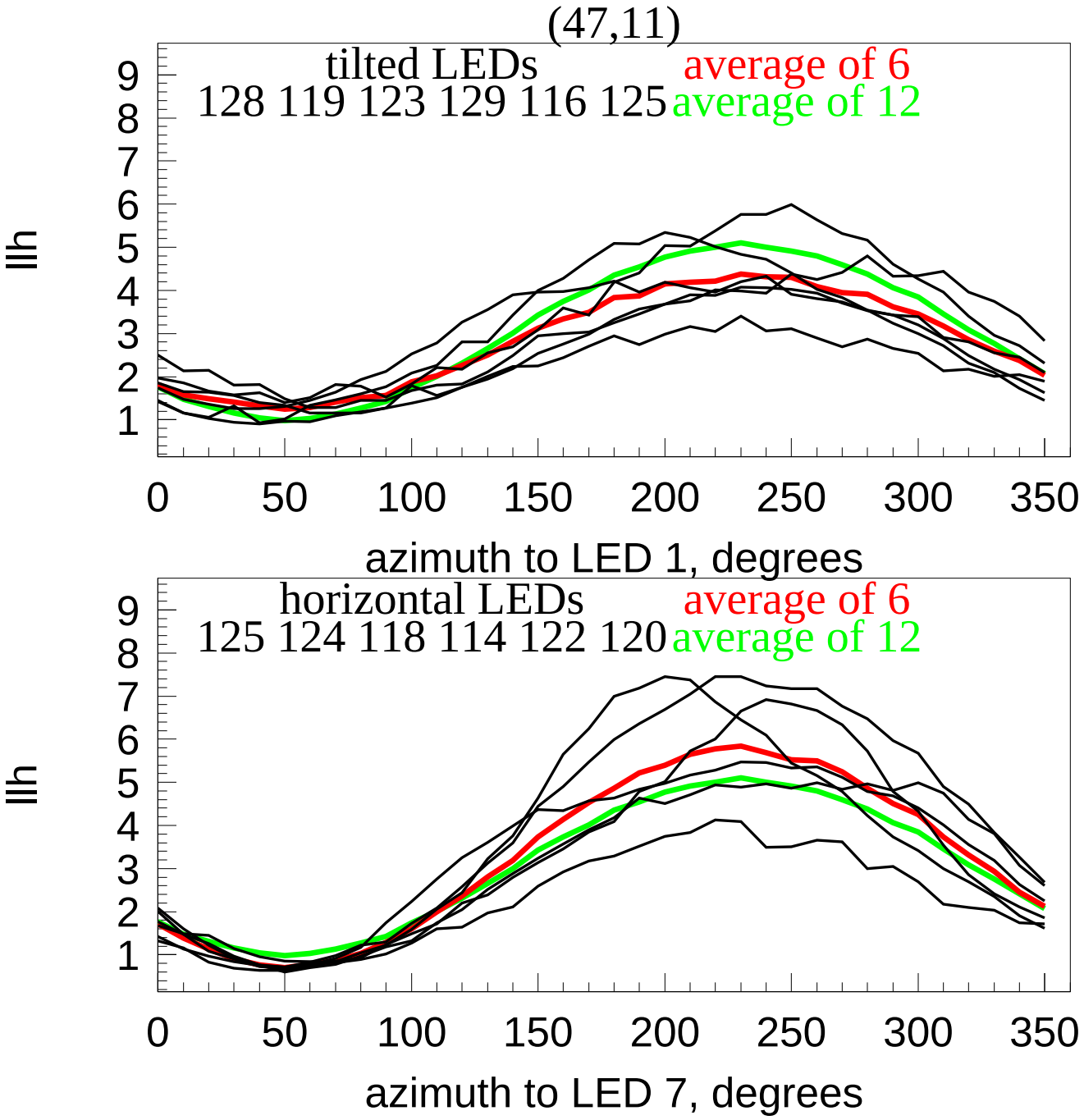

(47,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
164.6 ± 9.2

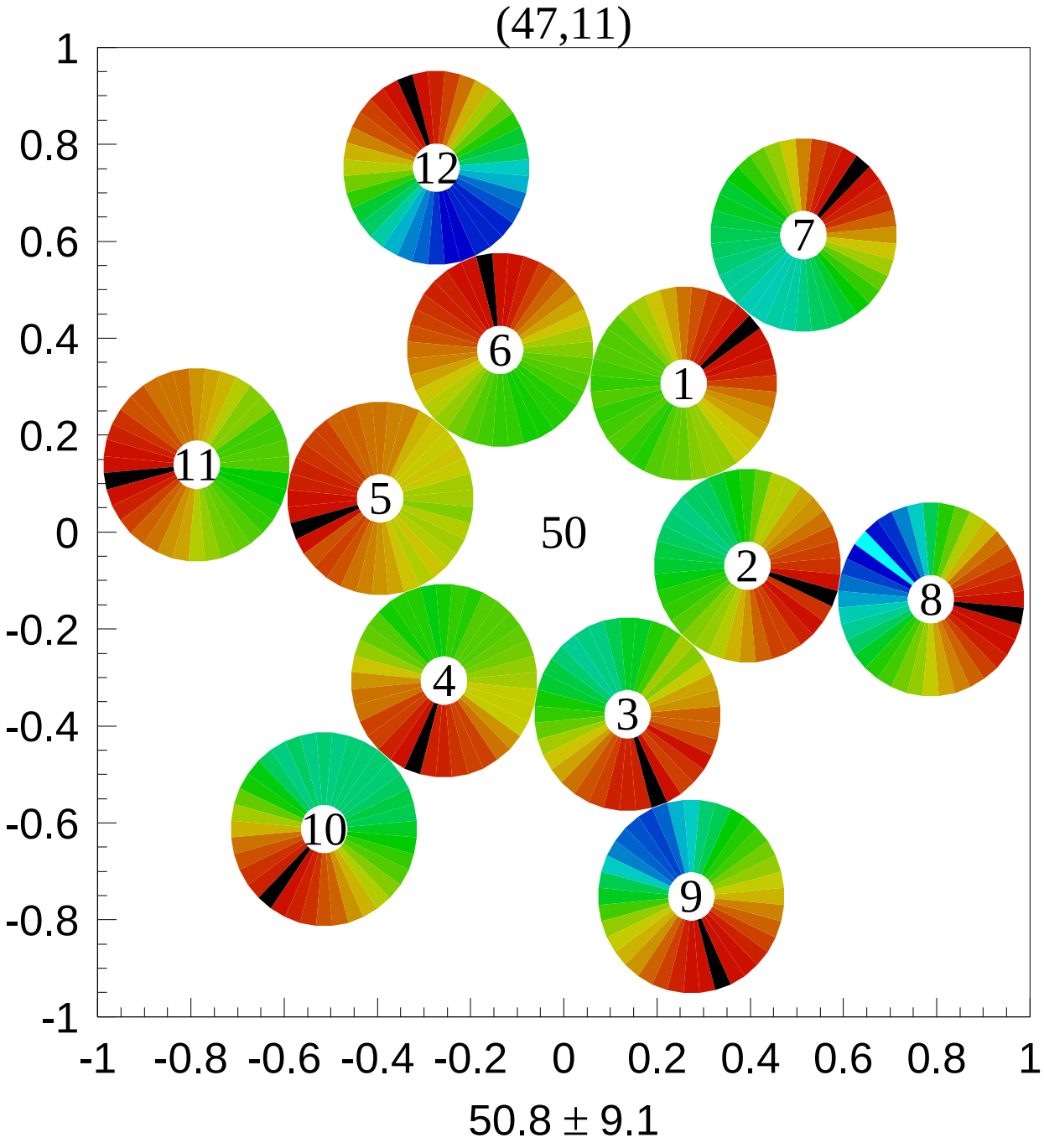

(47,9)
tilted LEDs
126 120 120 120 122 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 118 120 122 113 104
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

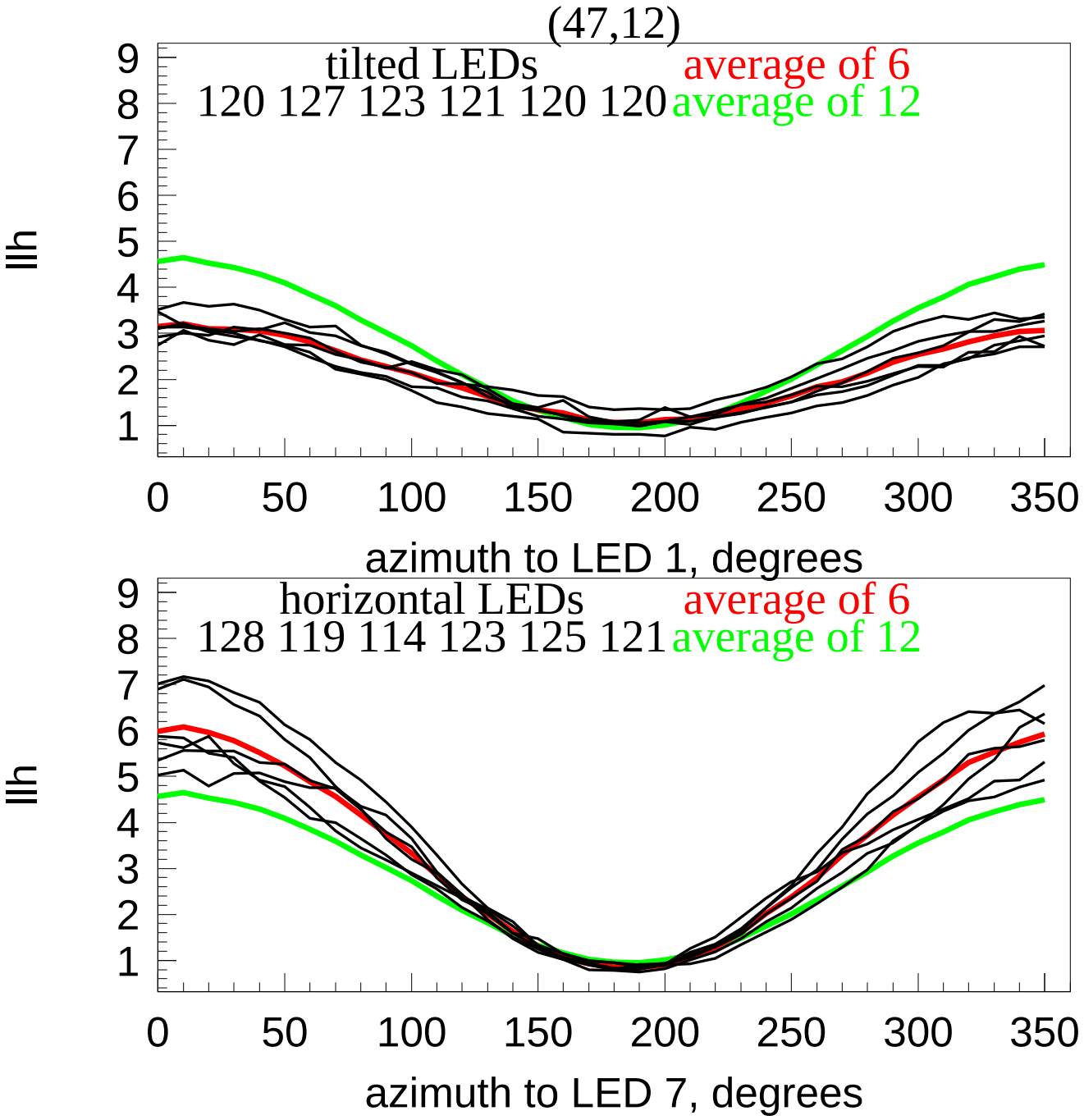

(47,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
309.9 ± 10.8
310
1
2
3
4
5
6
7
8
9
10
11
12

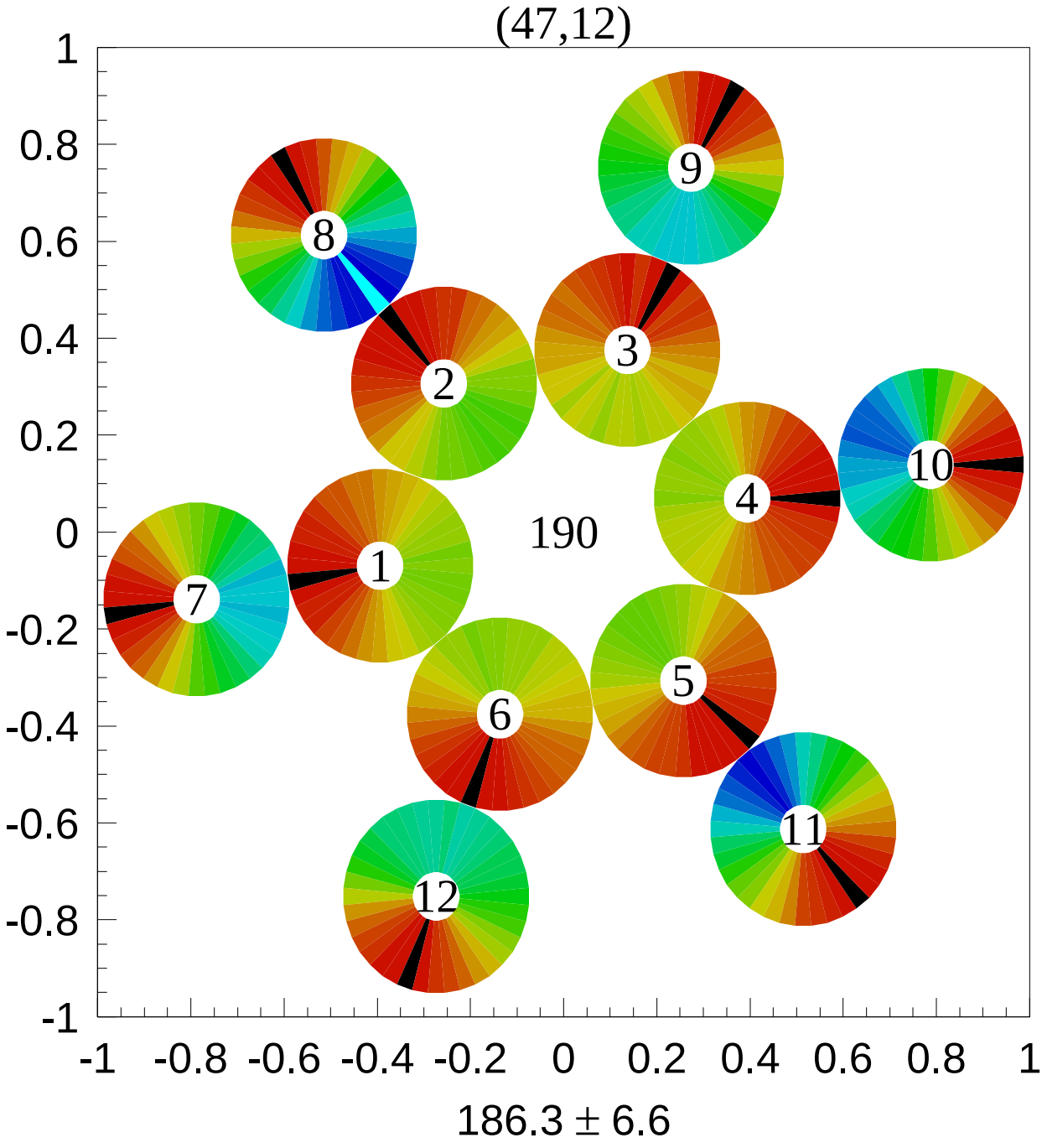

(47,10)
tilted LEDs
116 123 126 125 131 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 129 117 117 131 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

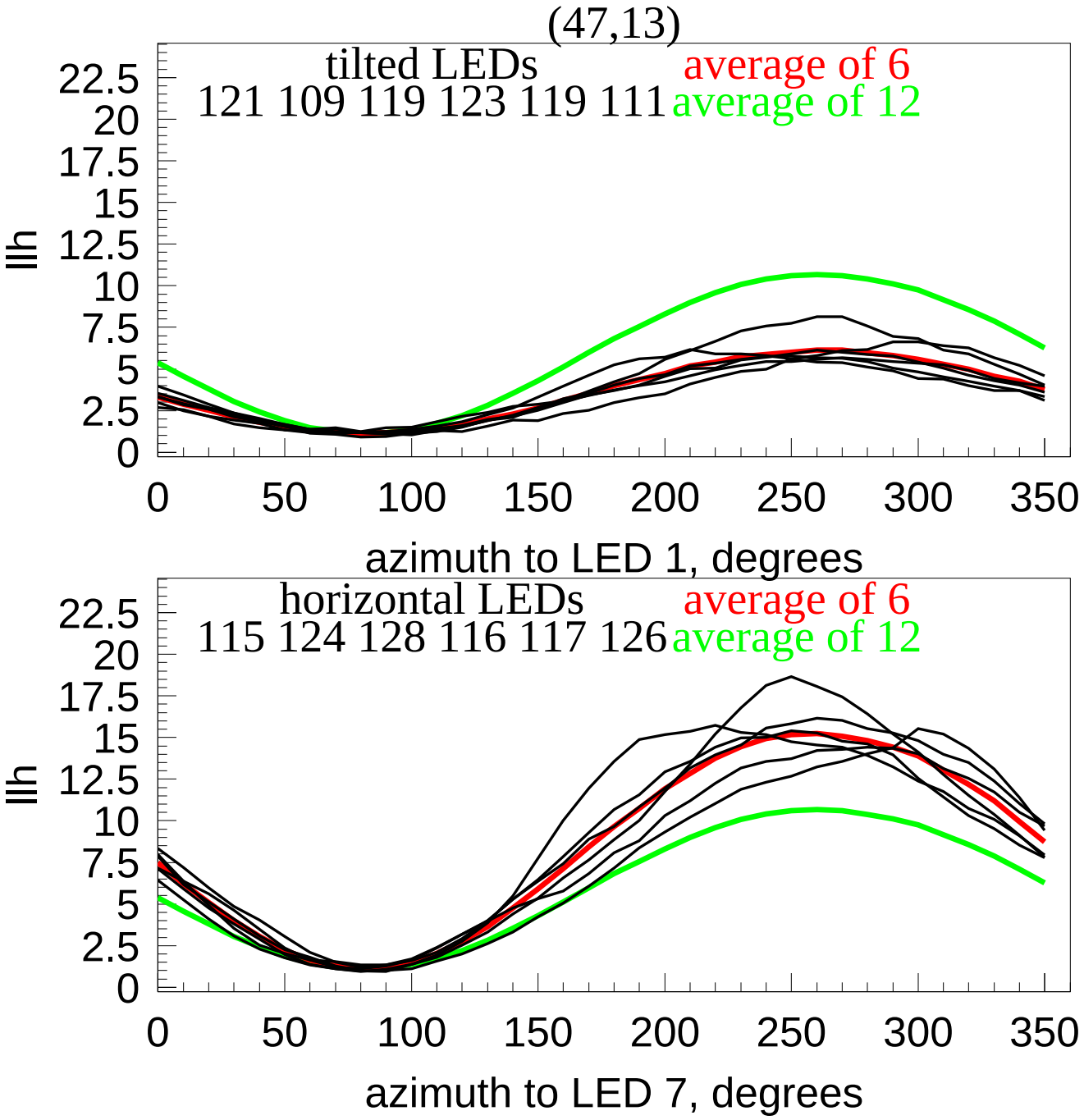

(47,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
183 ± 8.2

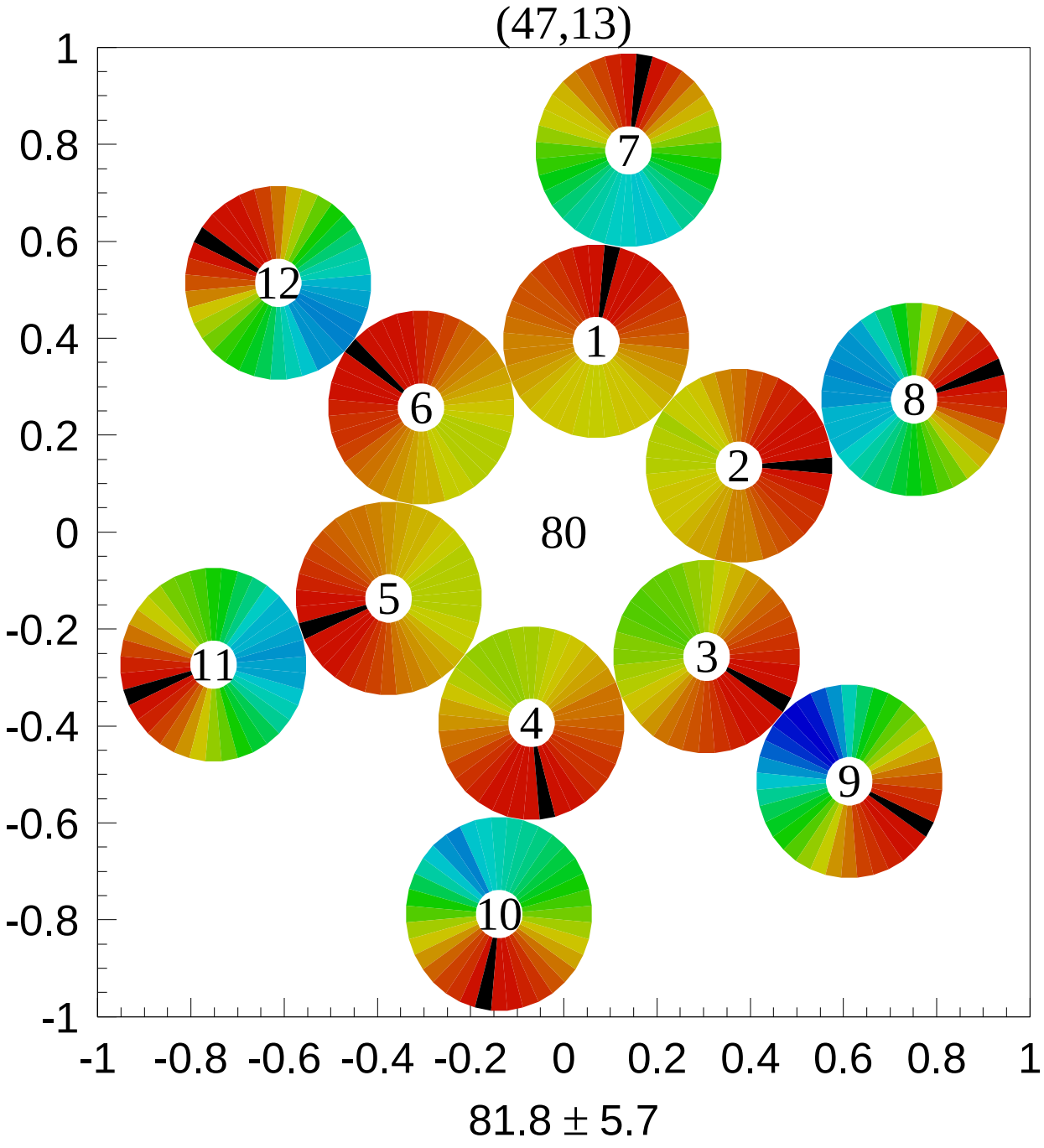

(47,11)
tilted LEDs
128 119 123 129 116 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 118 114 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

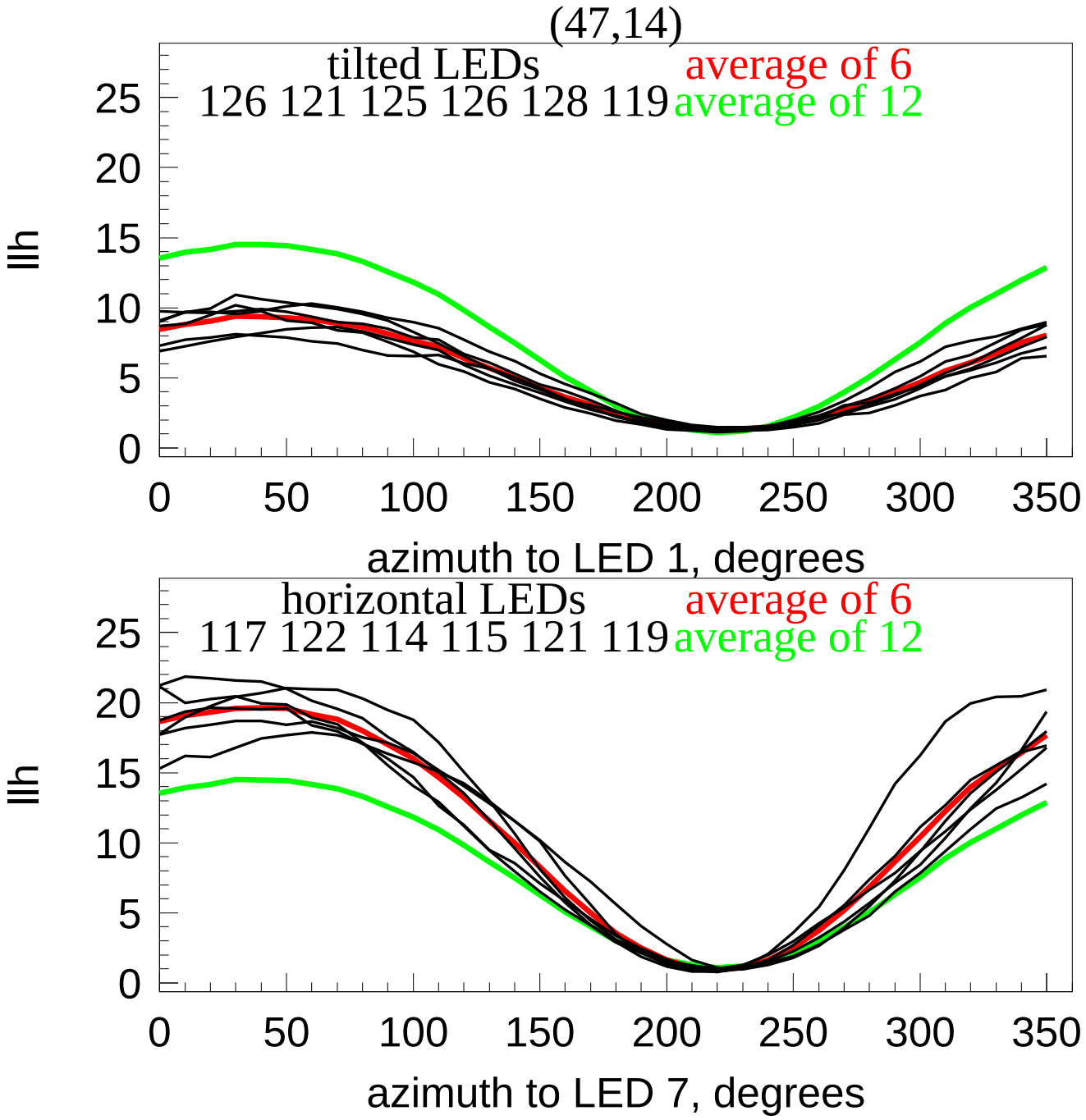

(47,11)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
50.8 ± 9.1

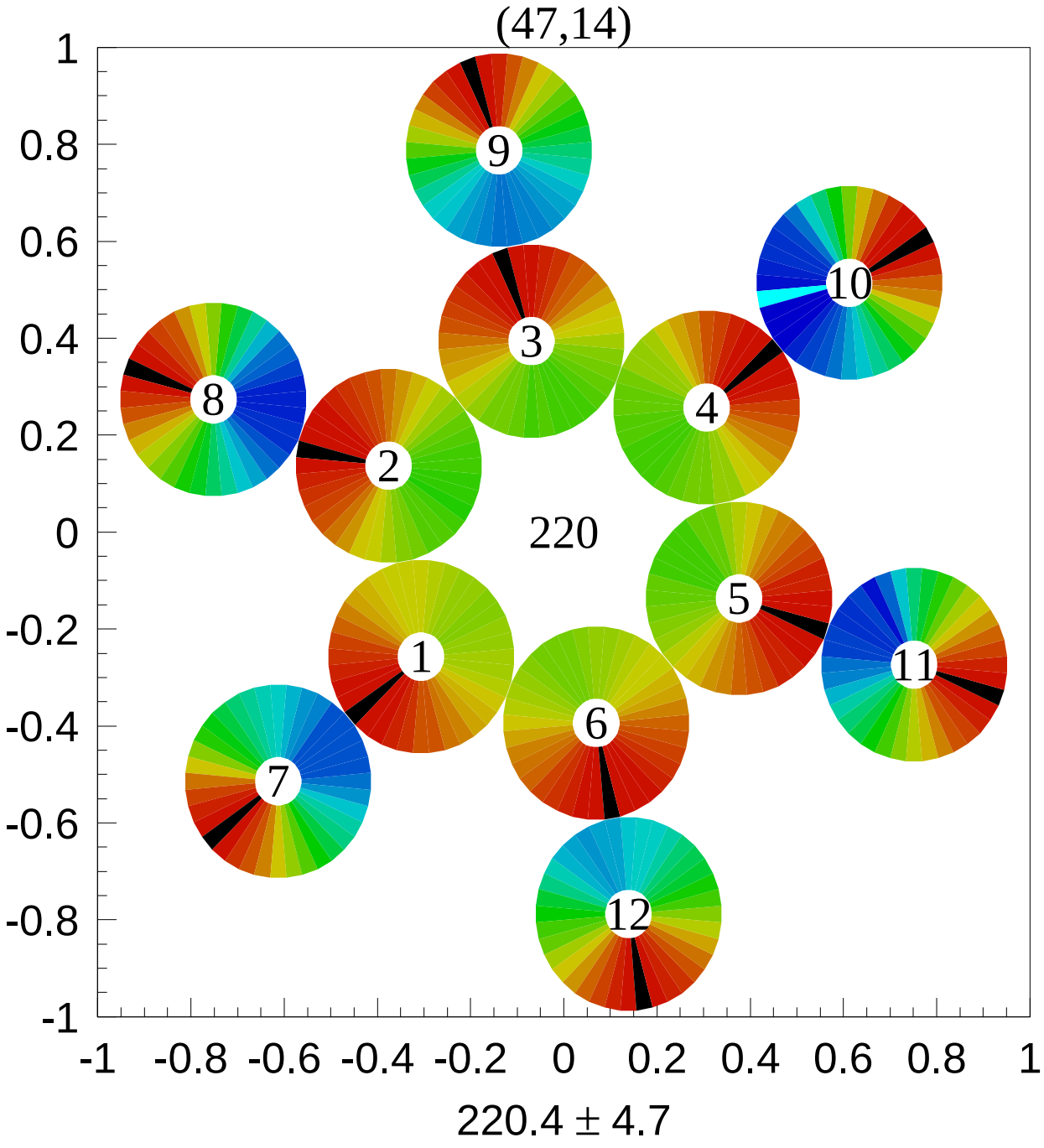

(47,12)
tilted LEDs
120 127 123 121 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 119 114 123 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

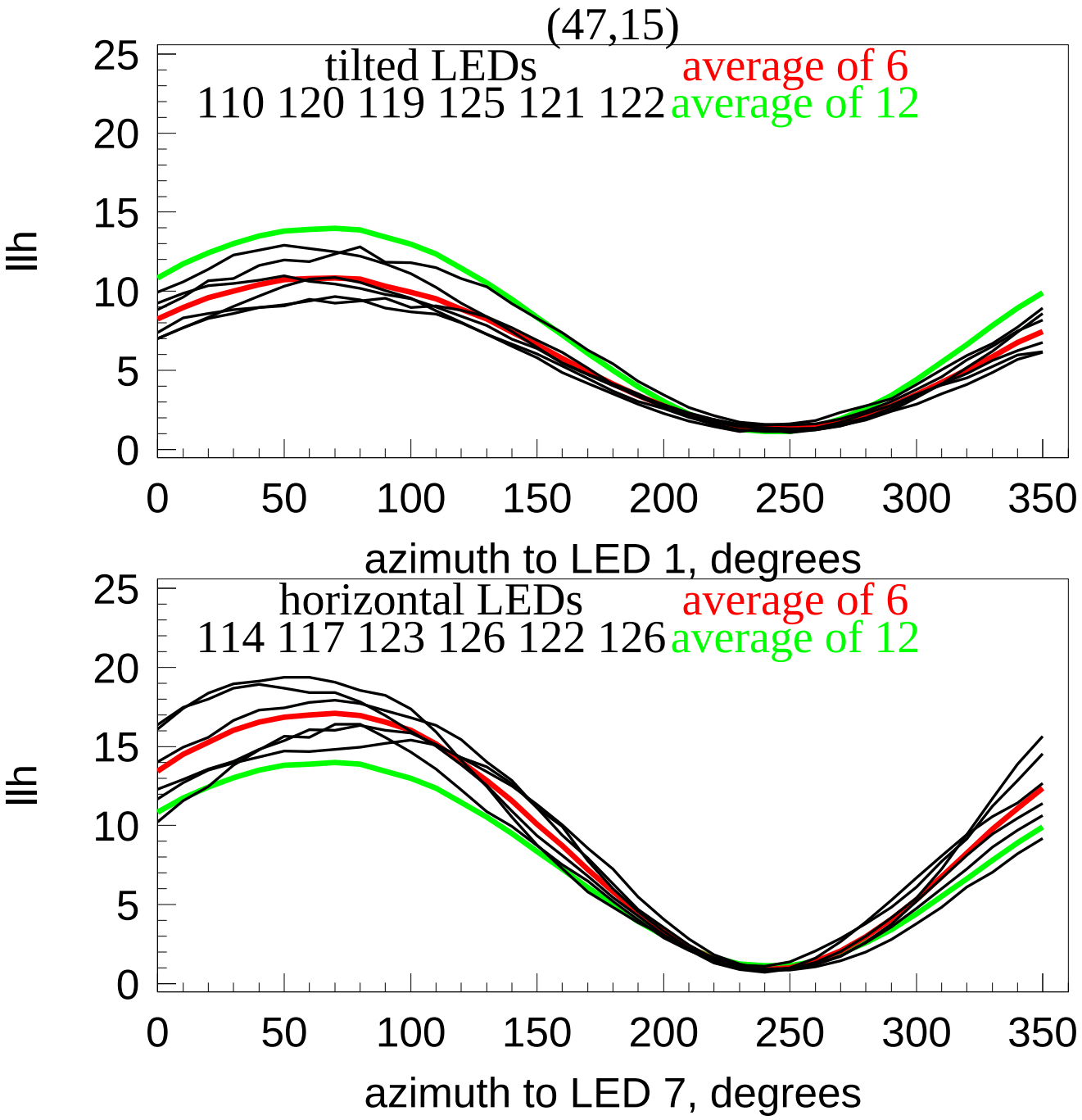

(47,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.3 ± 6.6
190
1
2
3
4
5
6
7
8
9
10
11
12

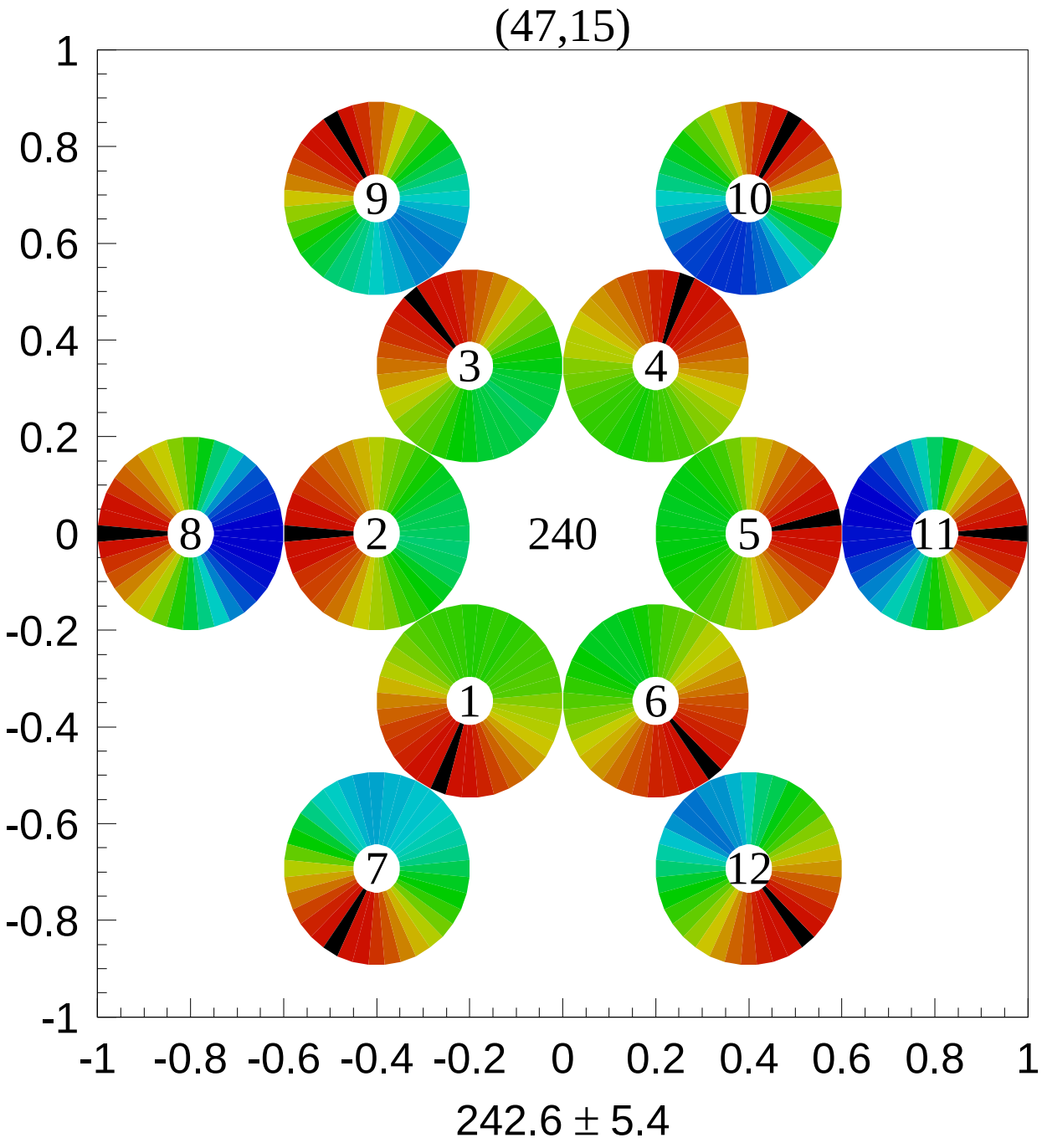

(47,13)
tilted LEDs
121 109 119 123 119 111
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
115 124 128 116 117 126
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

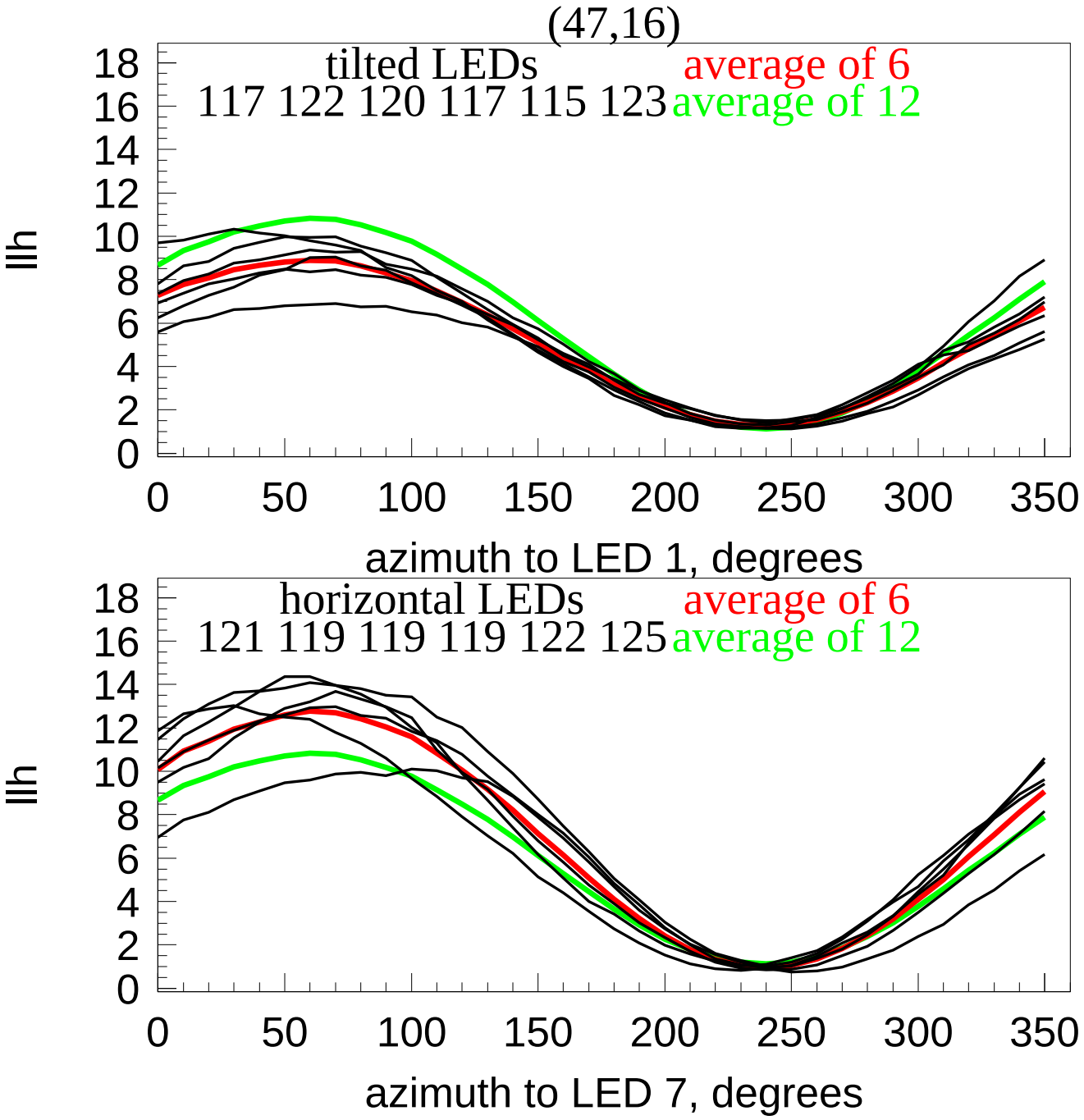

(47,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
81.8 ± 5.7

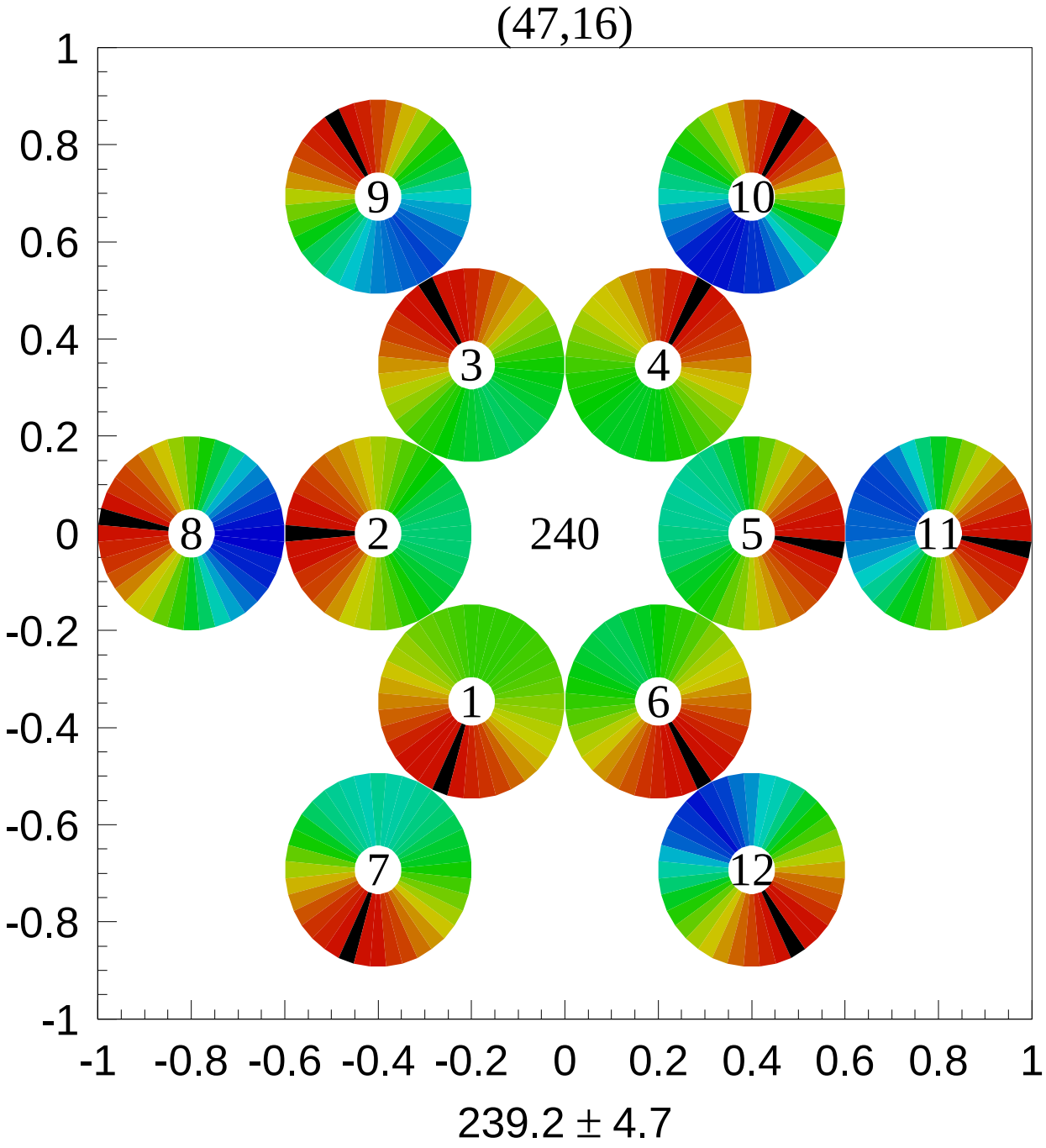

(47,14)
tilted LEDs
126 121 125 126 128 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 114 115 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

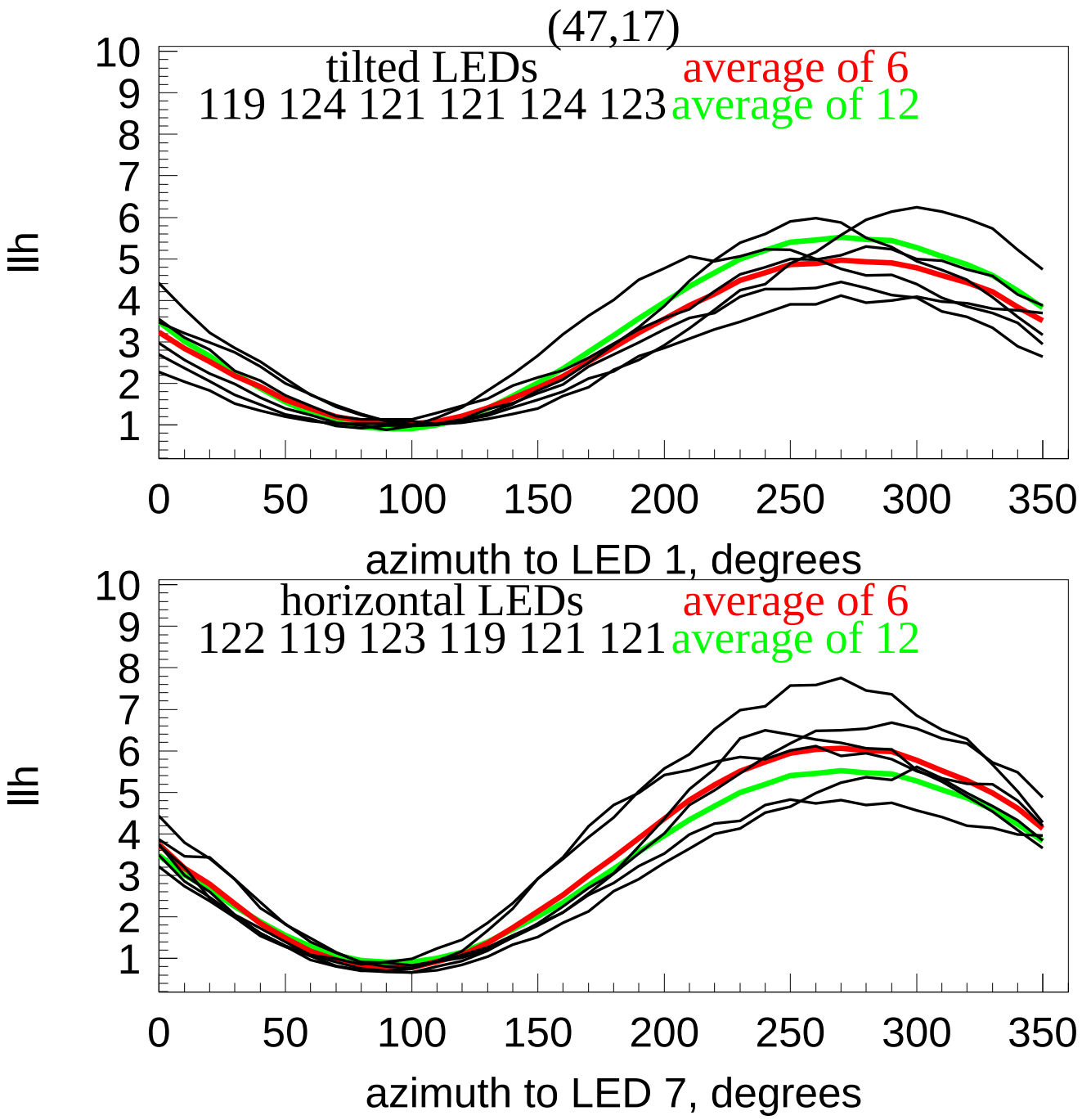

(47,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
220.4 ± 4.7

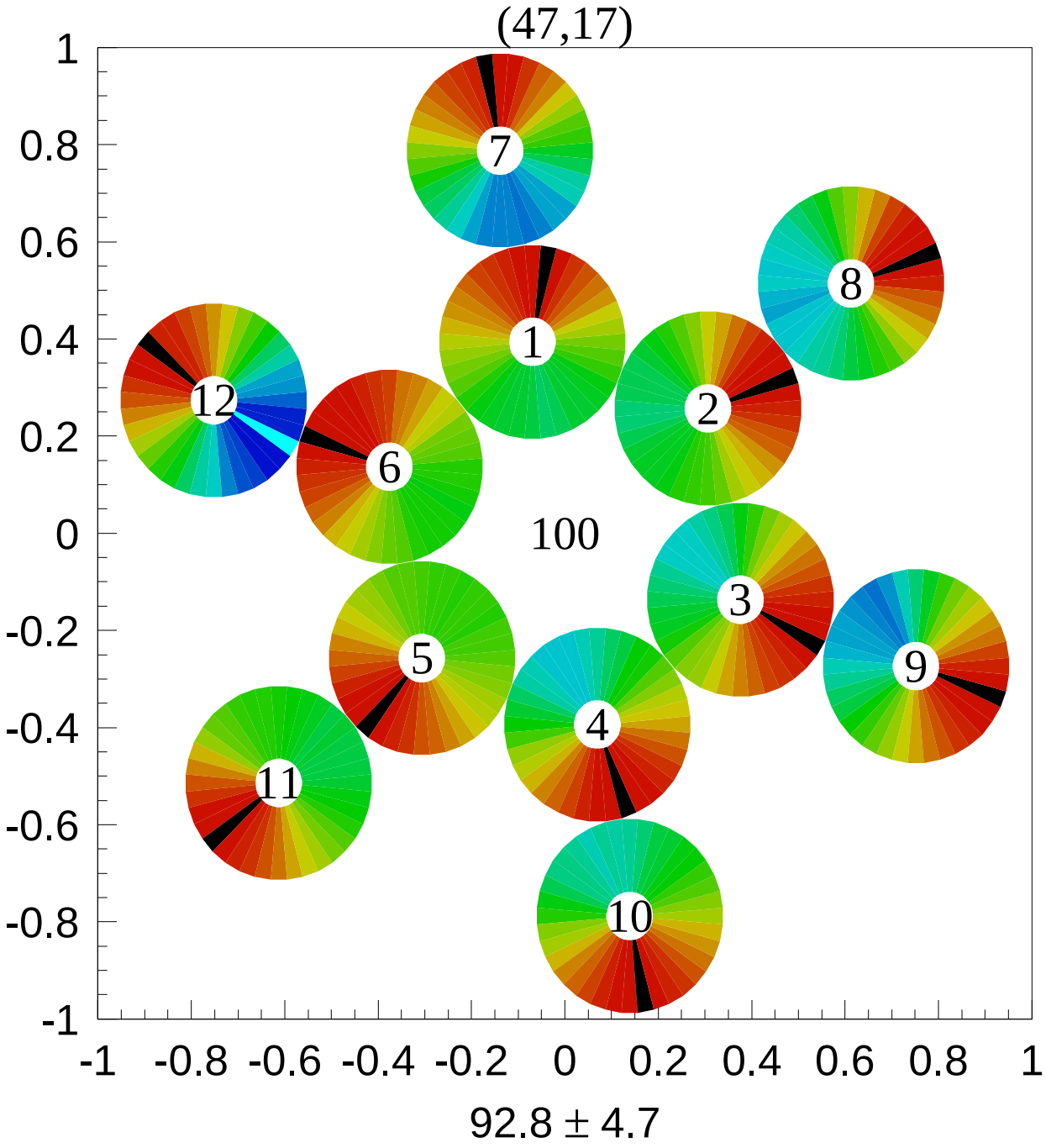

(47,15)
tilted LEDs
110 120 119 125 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 117 123 126 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

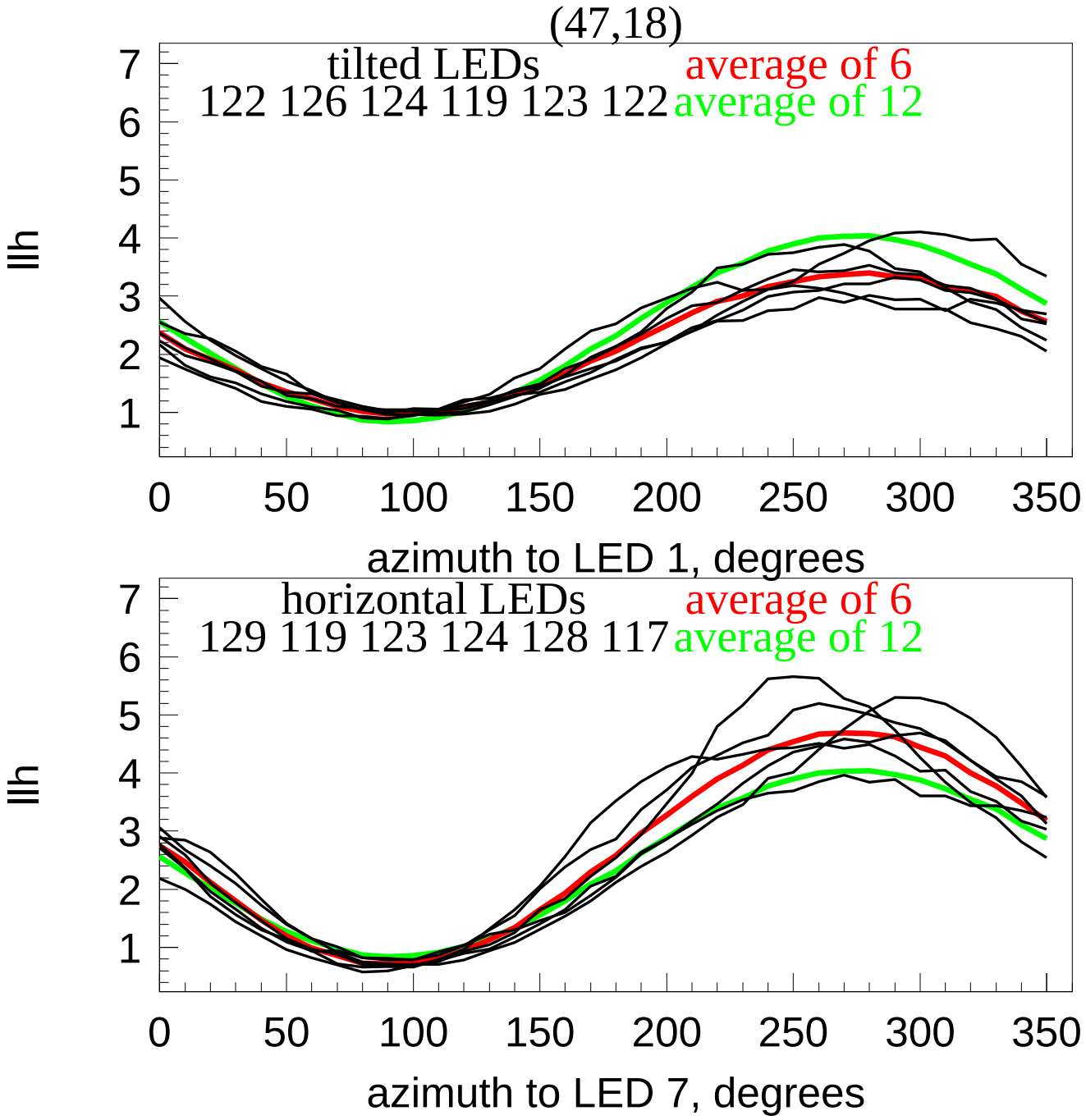

(47,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242.6 ± 5.4

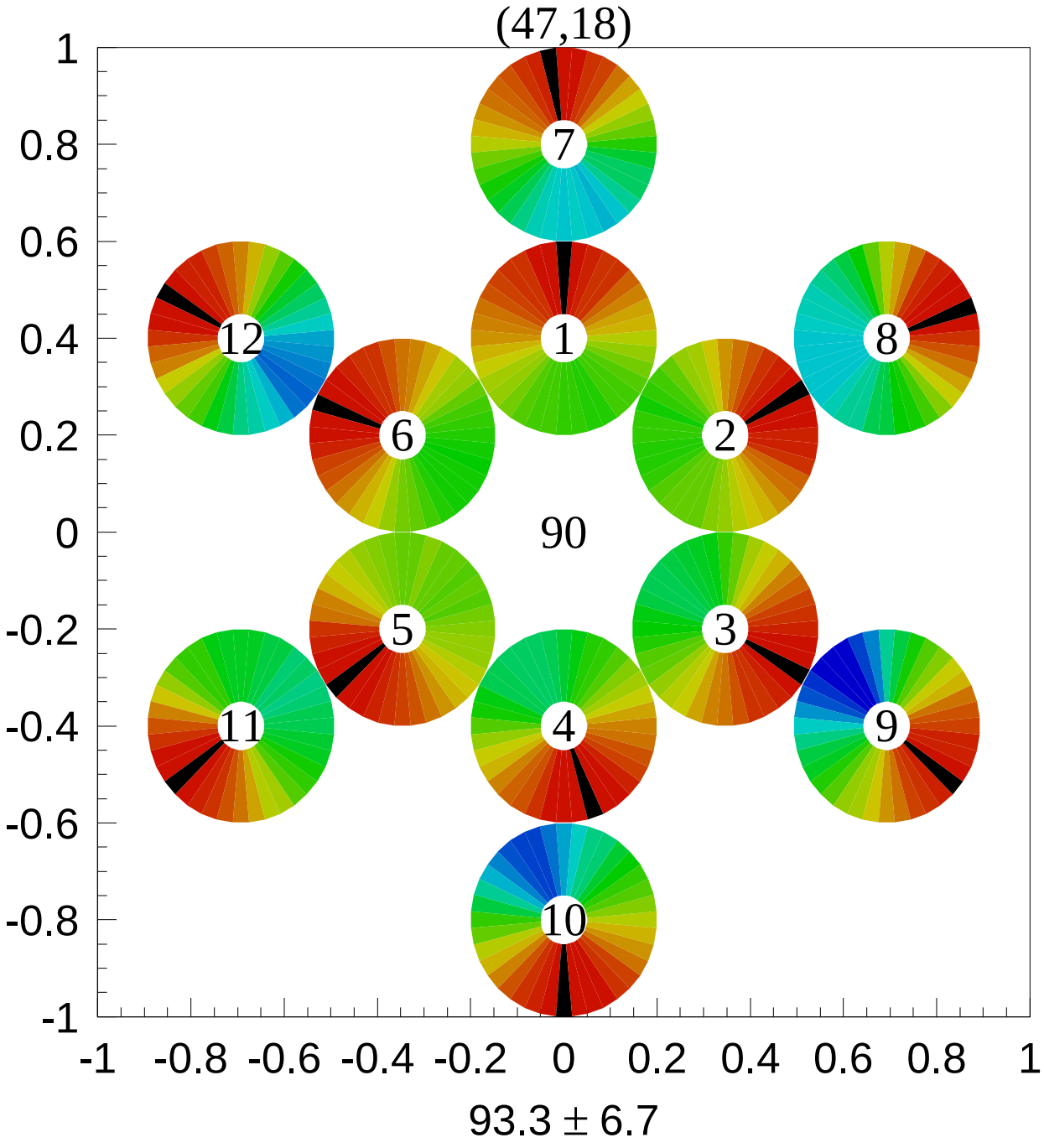

(47,16)
tilted LEDs
117 122 120 117 115 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 119 119 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

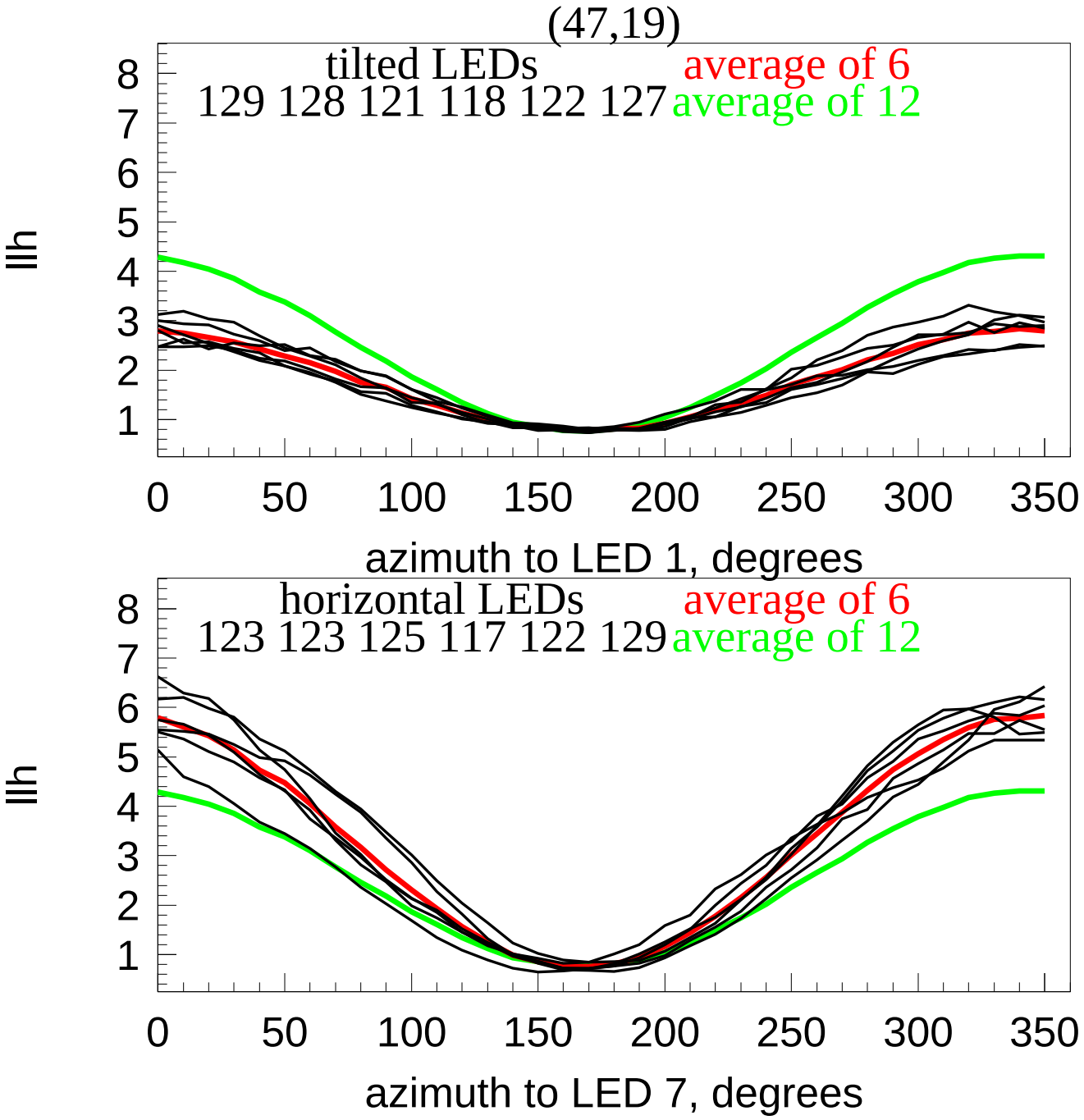

(47,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
239.2 ± 4.7

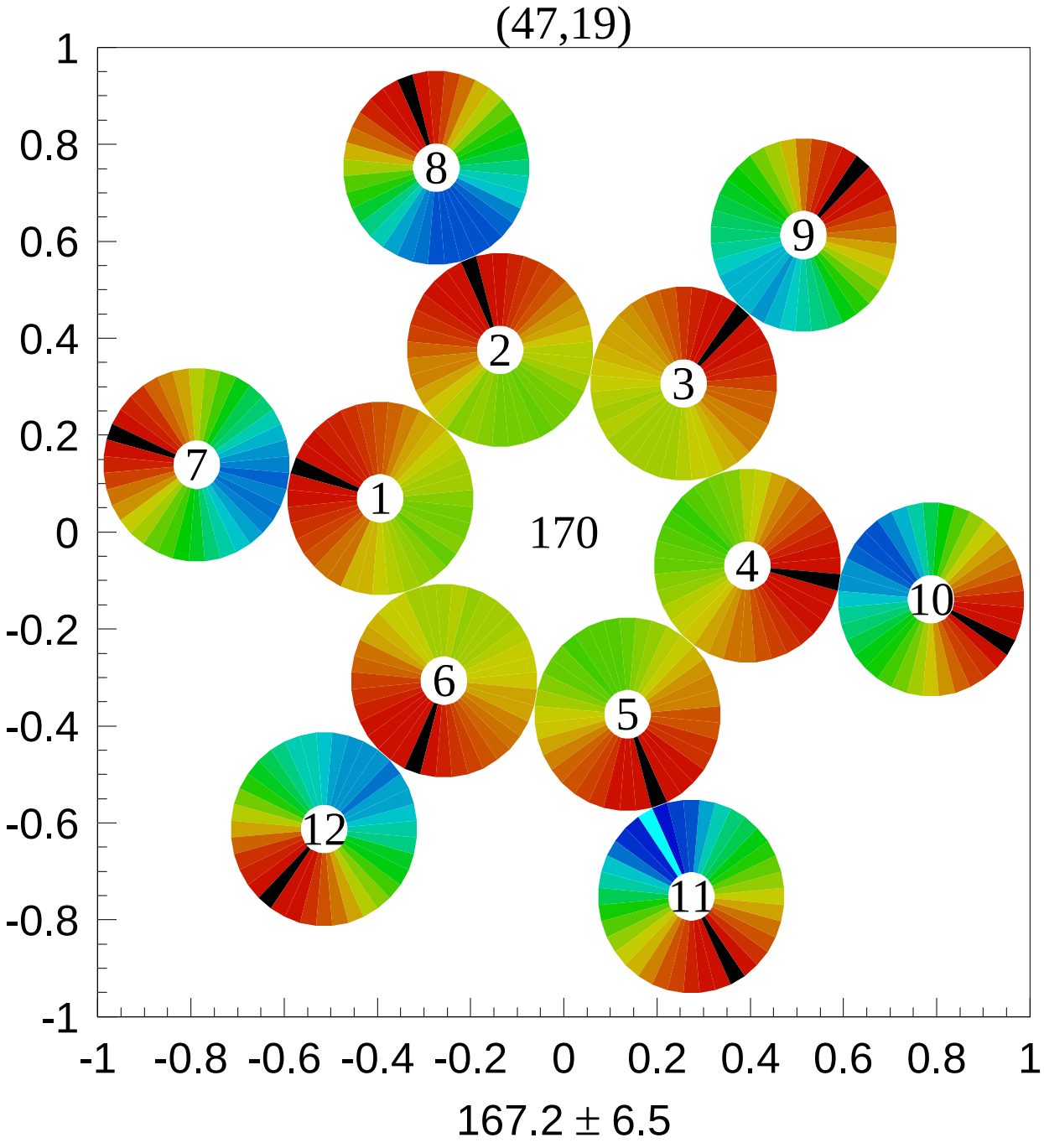

(47,17)
tilted LEDs
119 124 121 121 124 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 119 123 119 121 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

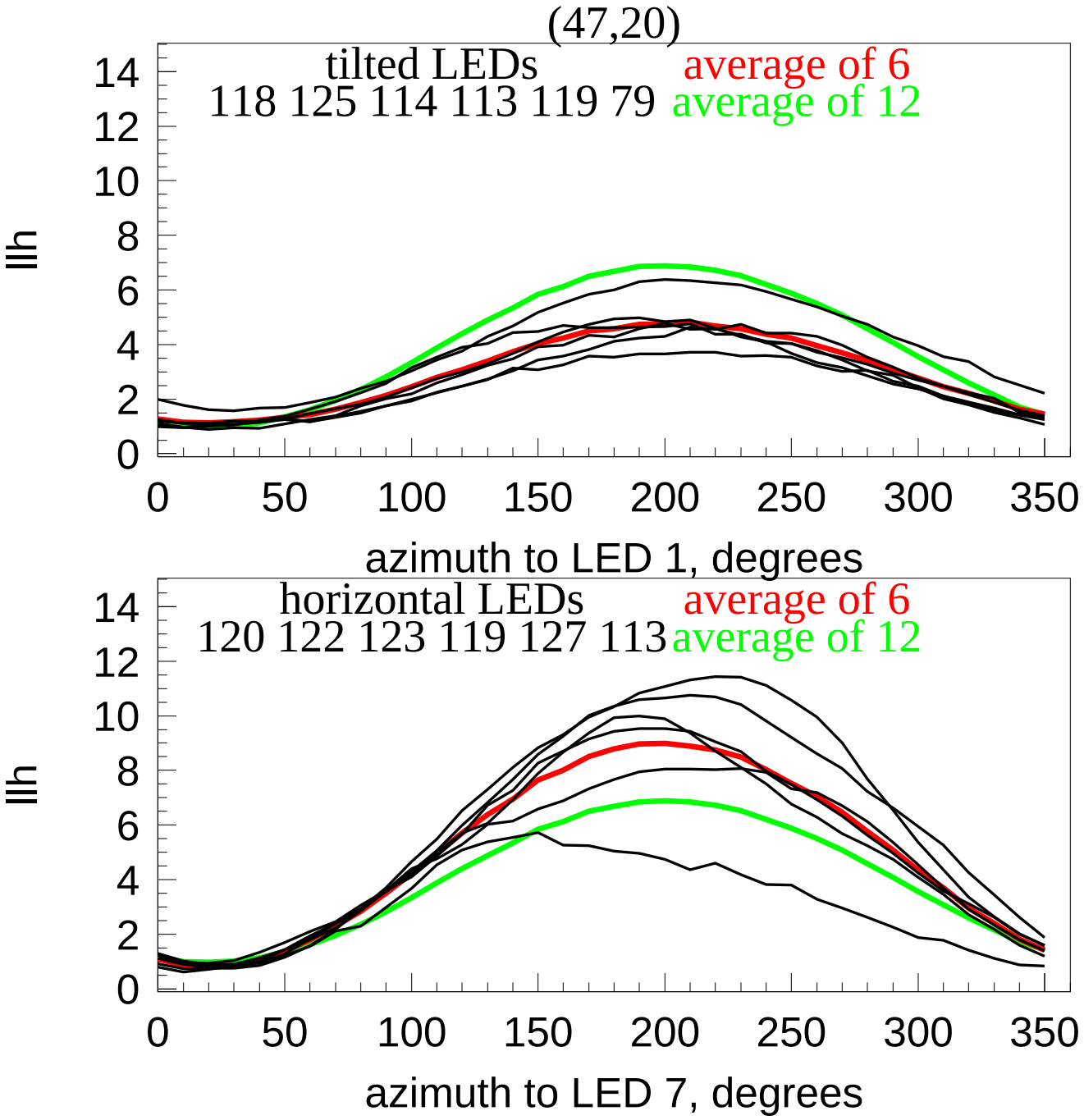

(47,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
92.8 ± 4.7

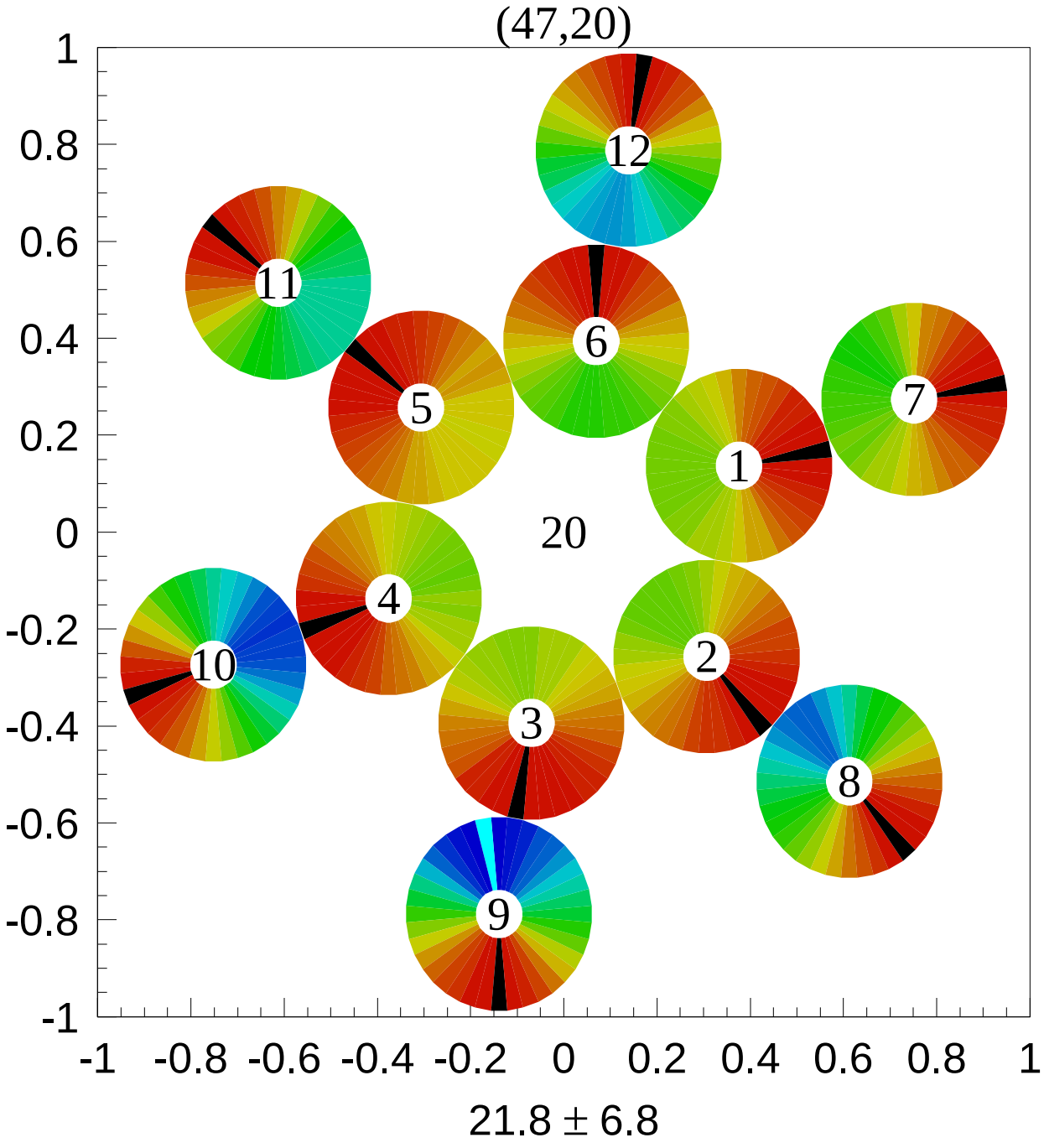

(47,18)
tilted LEDs
122 126 124 119 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 119 123 124 128 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

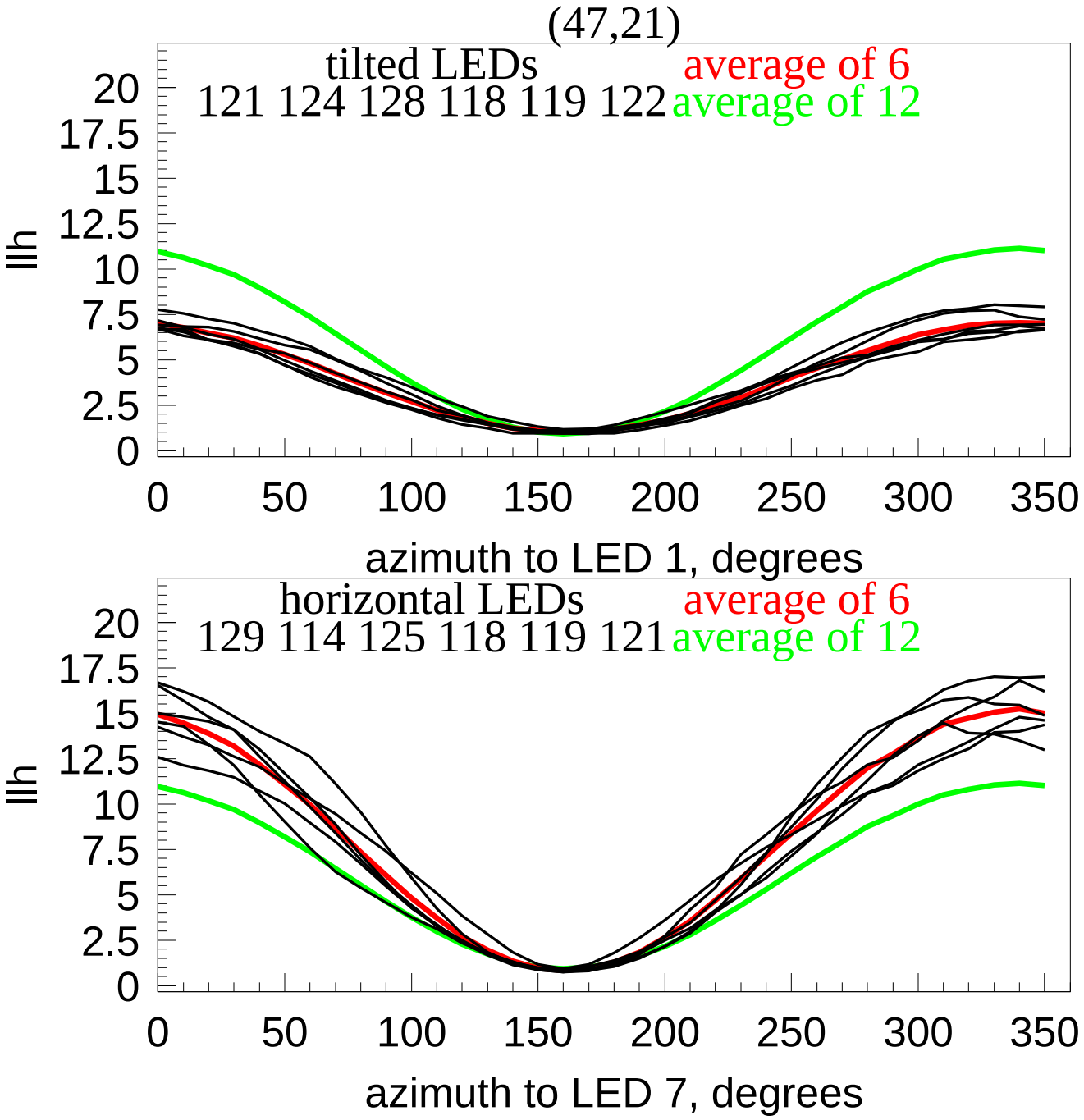

(47,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
93.3 ± 6.7

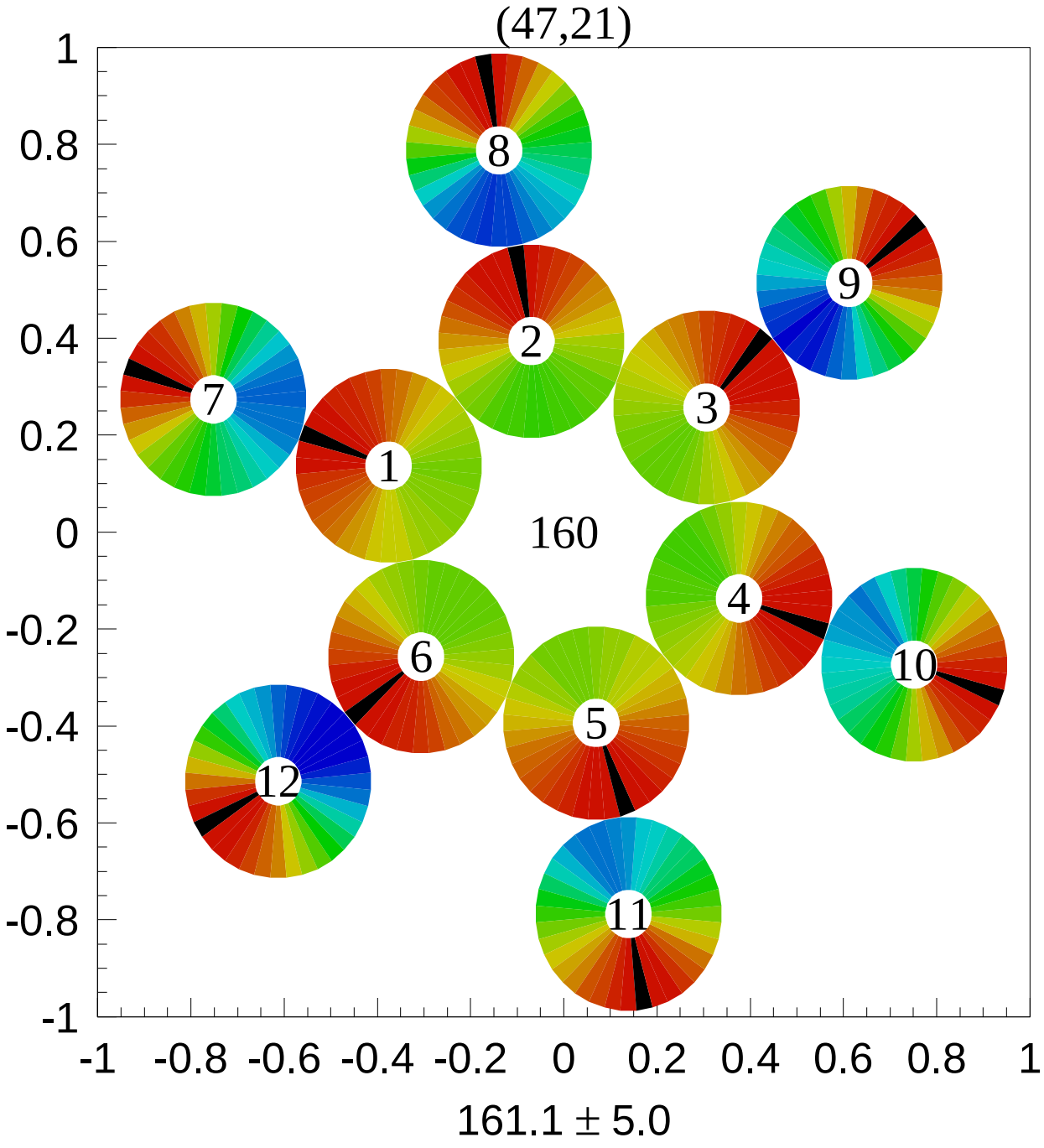

(47,19)
tilted LEDs
129 128 121 118 122 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 125 117 122 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

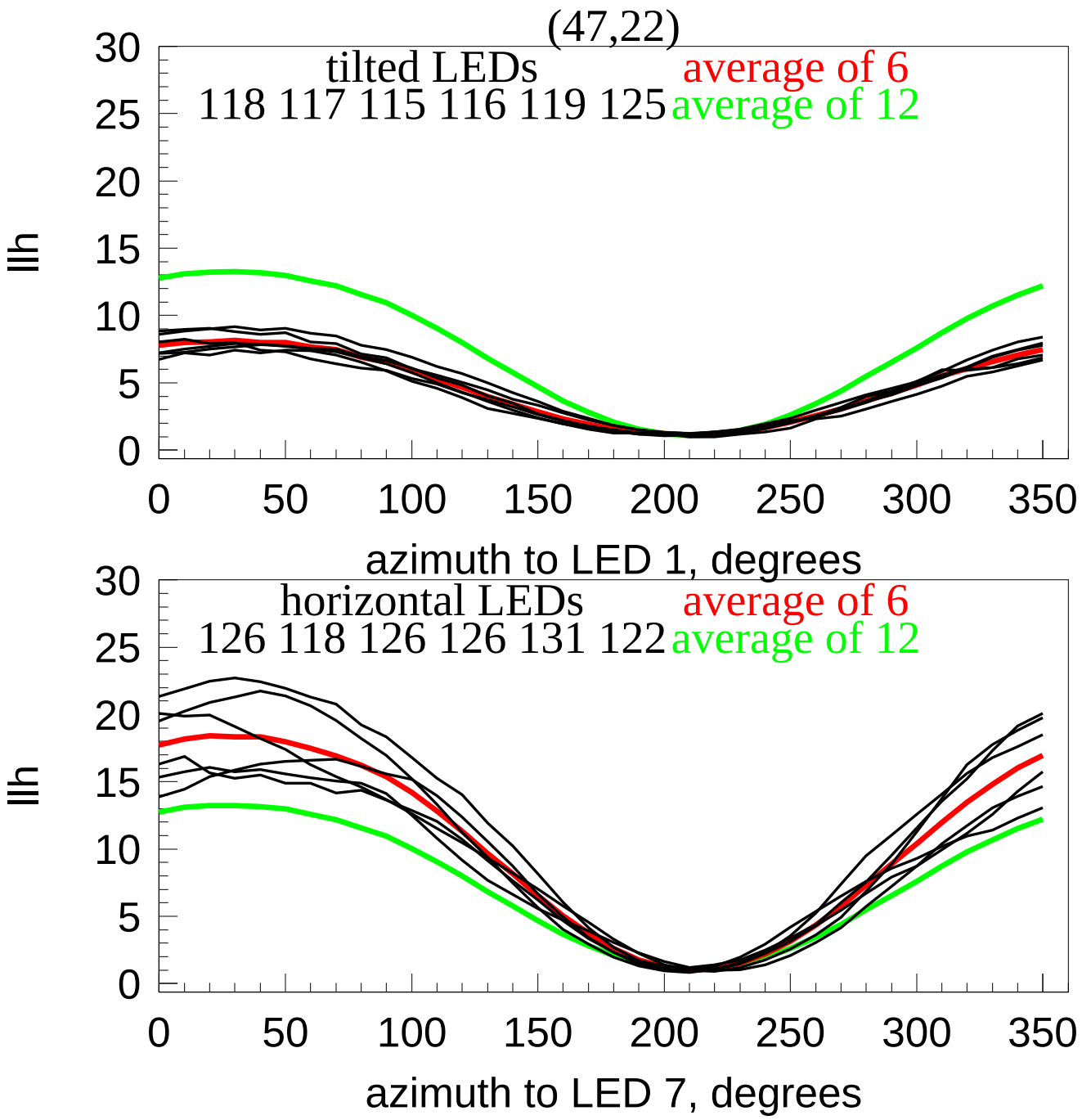

(47,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
167.2 ± 6.5

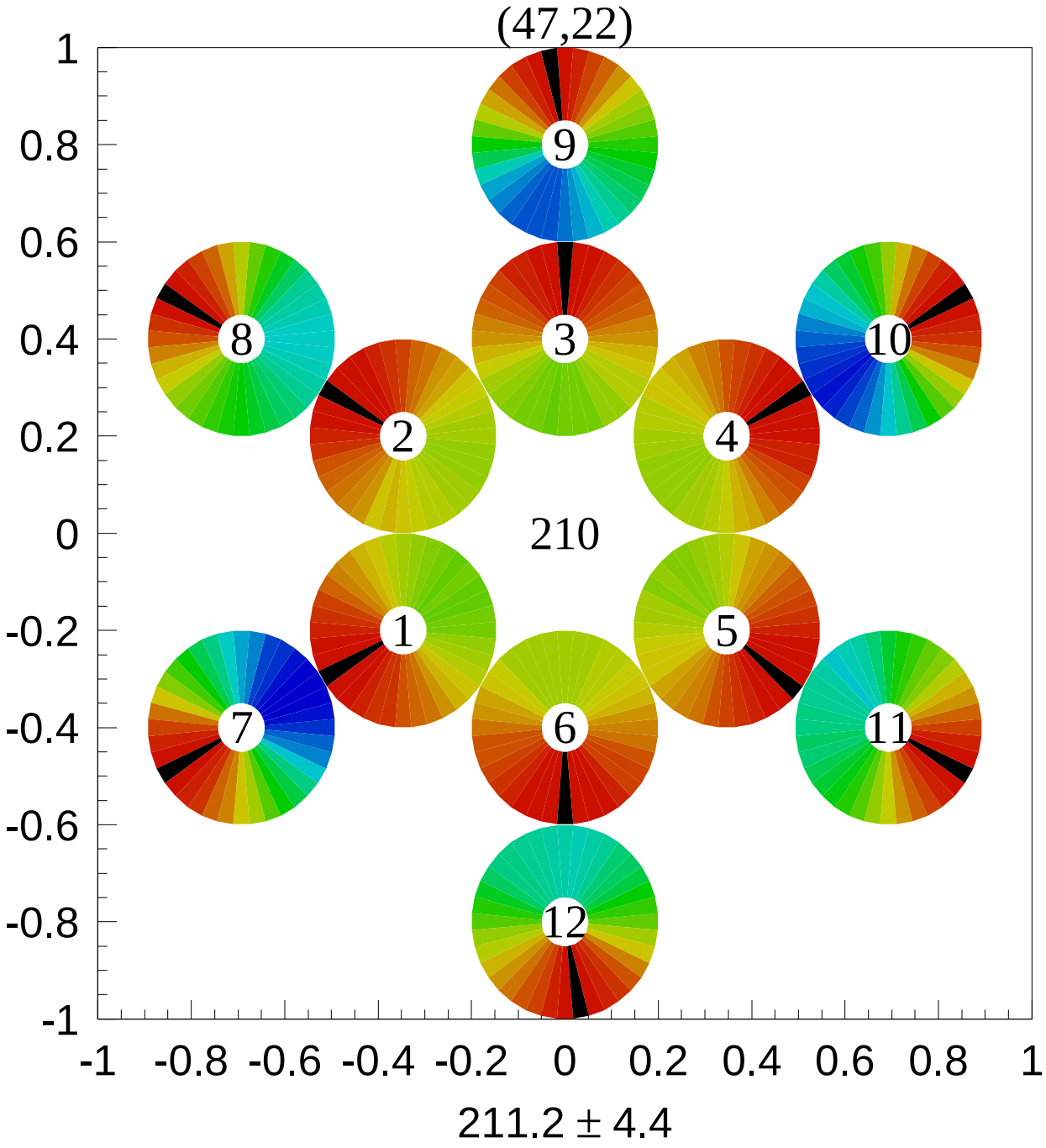

(47,20)
tilted LEDs
118 125 114 113 119 79
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 123 119 127 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

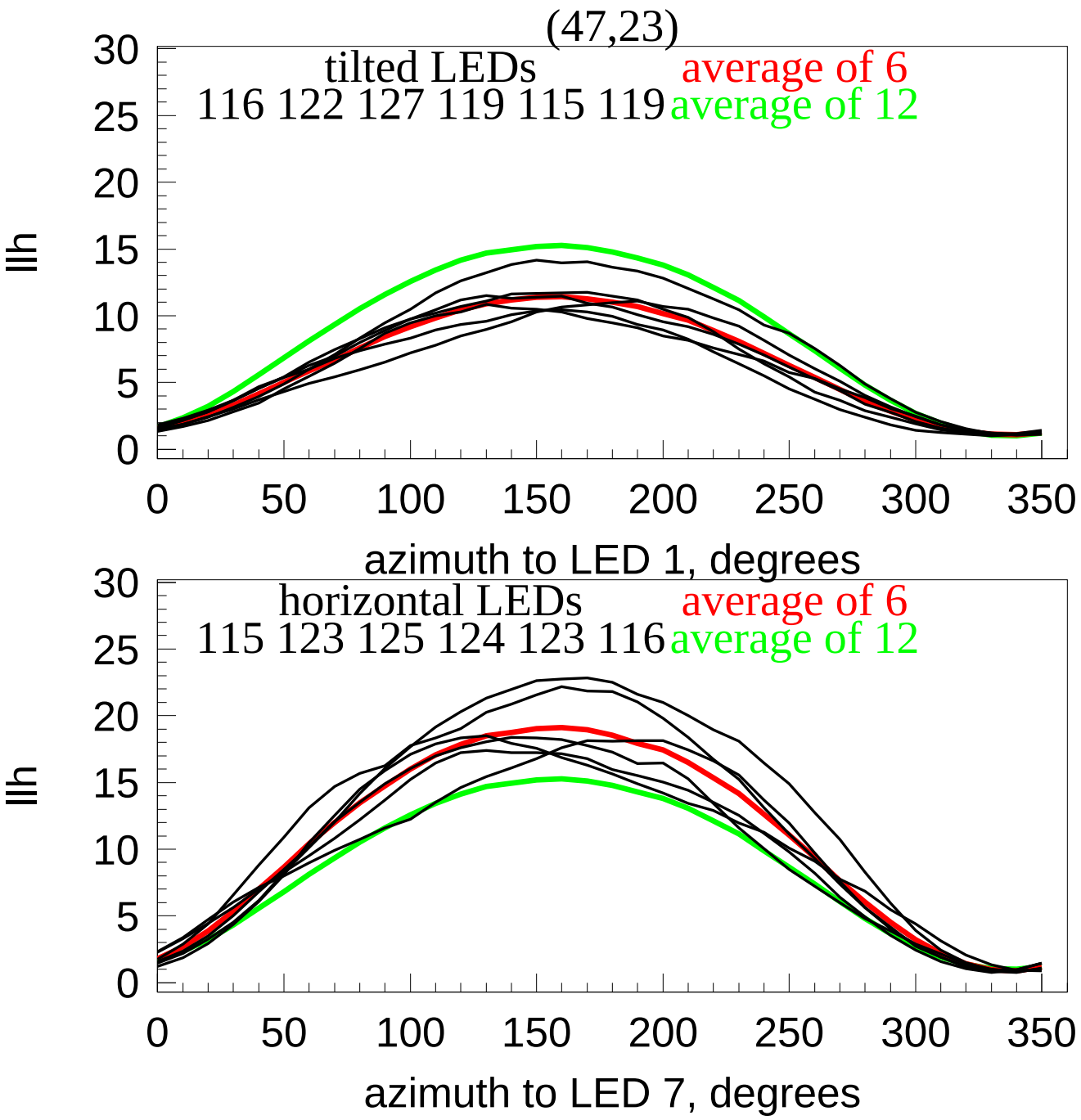

(47,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
21.8 ± 6.8
12
11
6
5
7
1
20
4
10
2
3
8
9

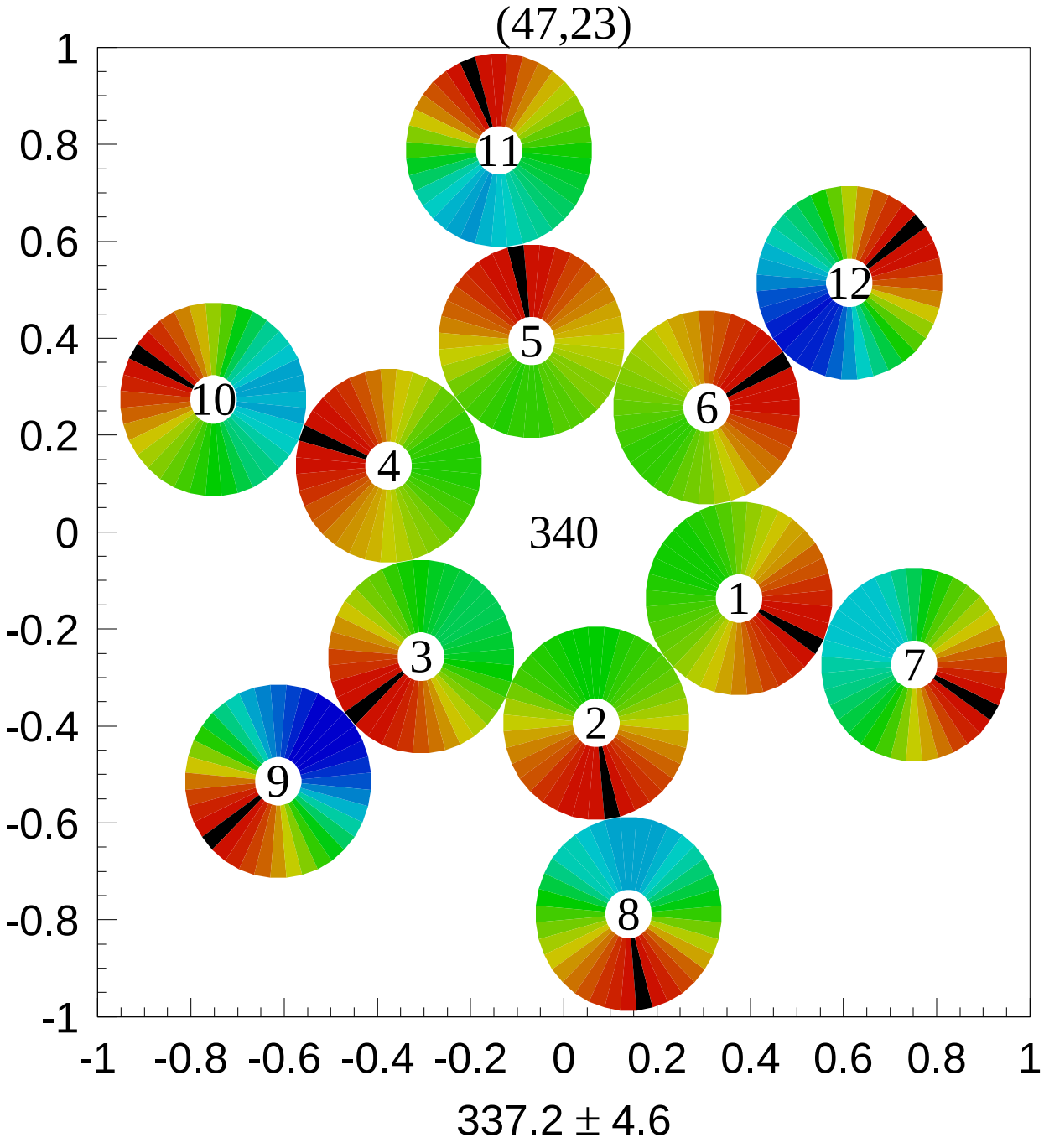

(47,21)
tilted LEDs
121 124 128 118 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 114 125 118 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

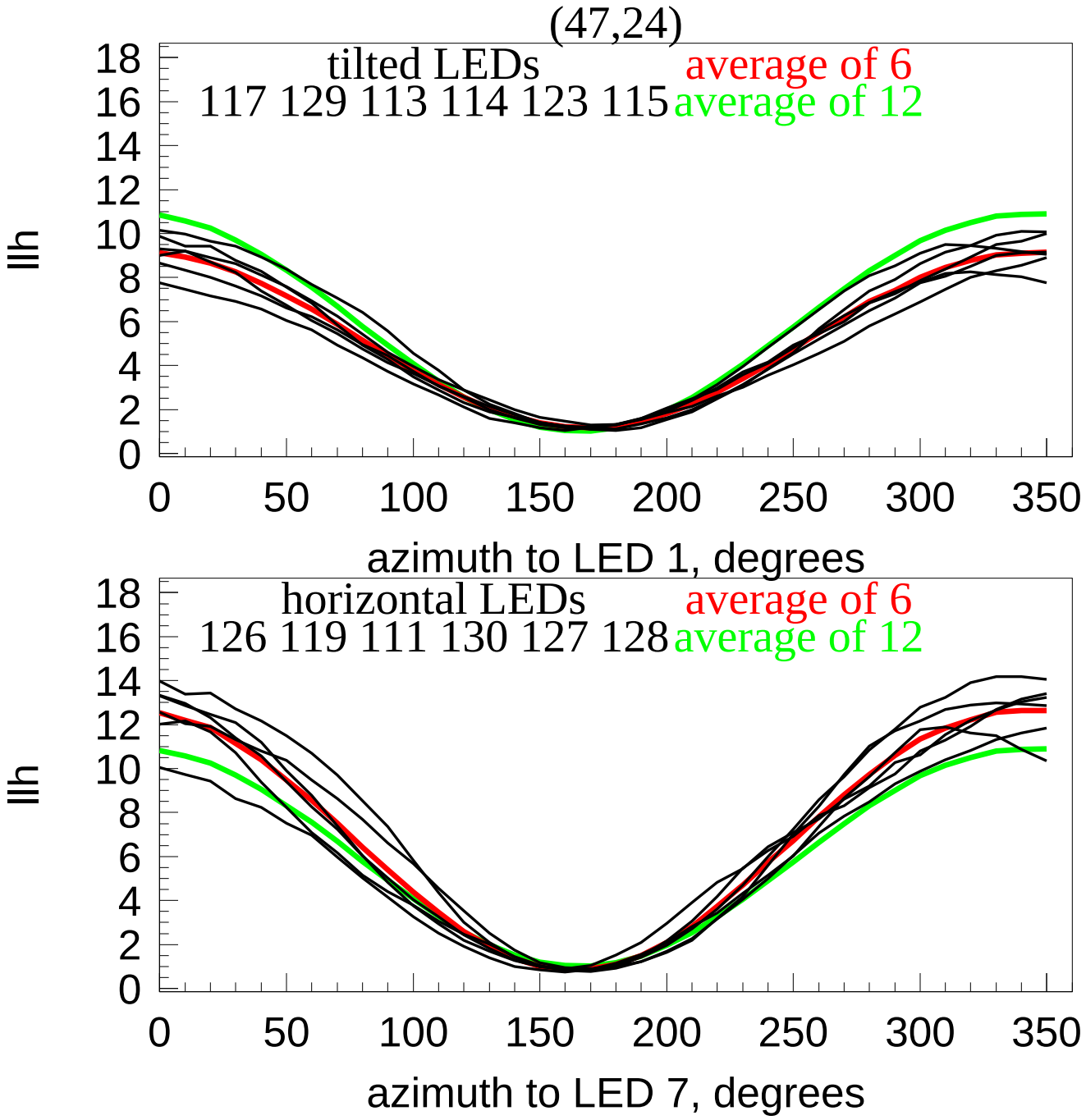

(47,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
161.1 ± 5.0

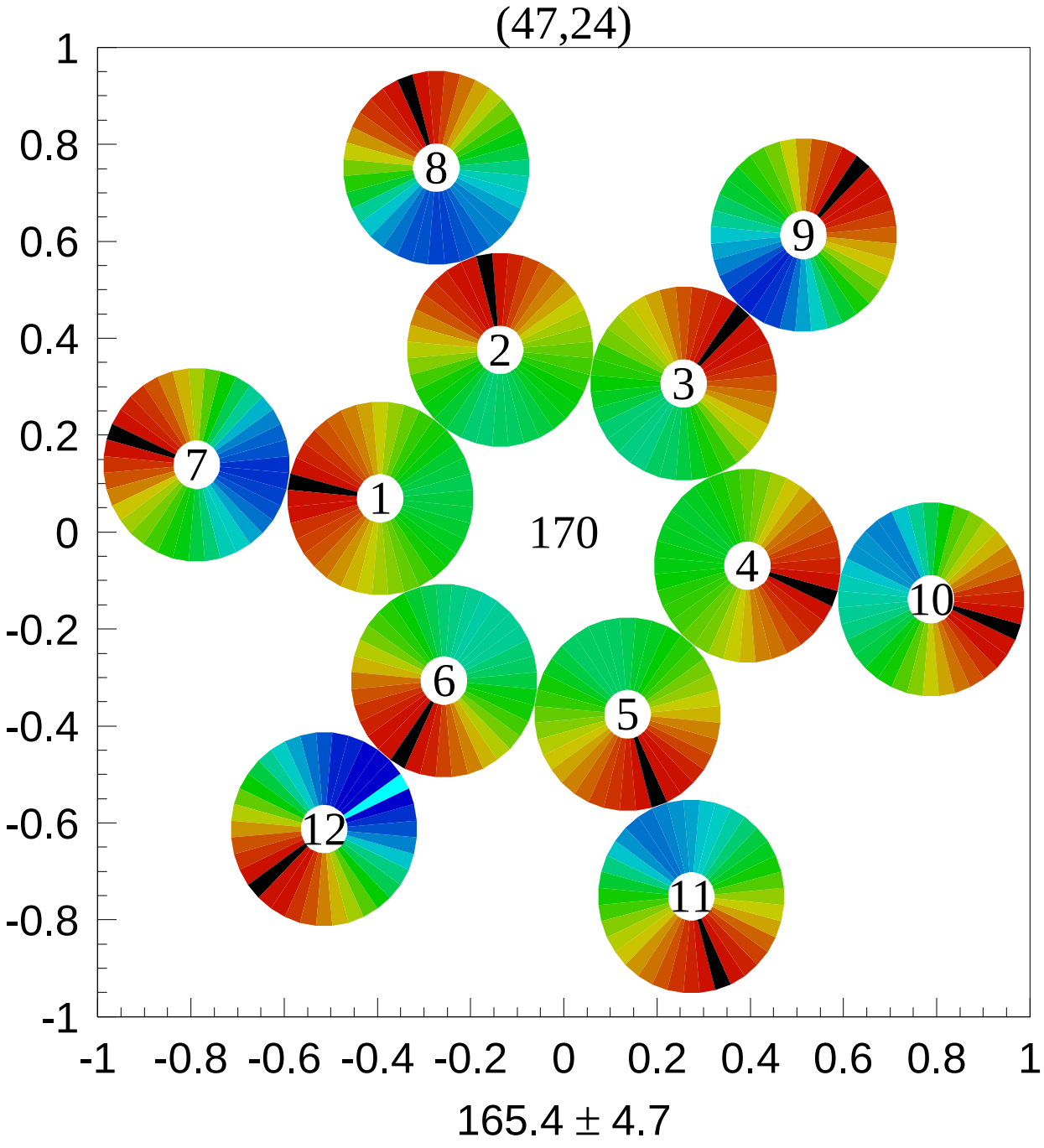

(47,22)
tilted LEDs
118 117 115 116 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 118 126 126 131 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

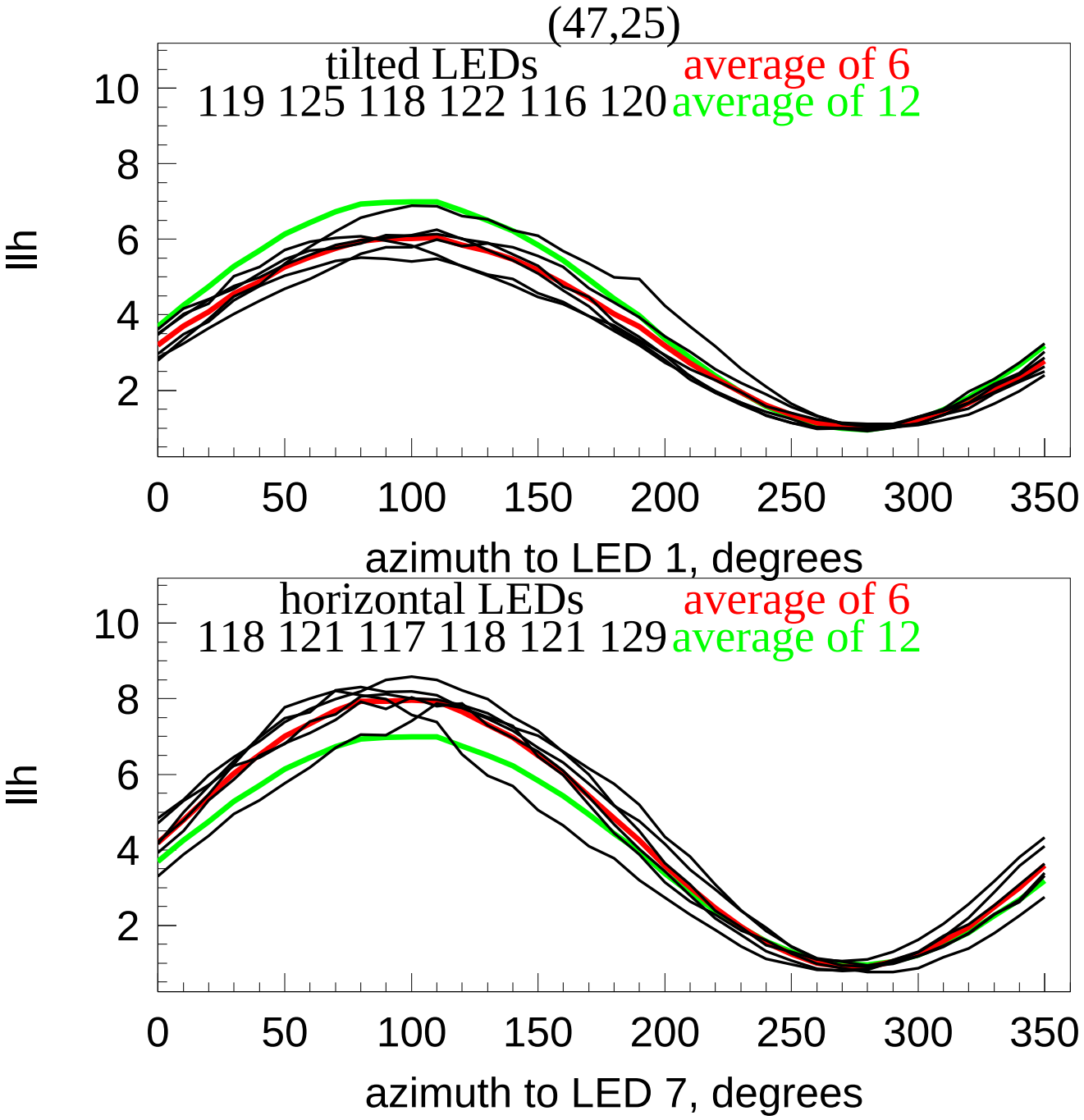

(47,22)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.2 ± 4.4

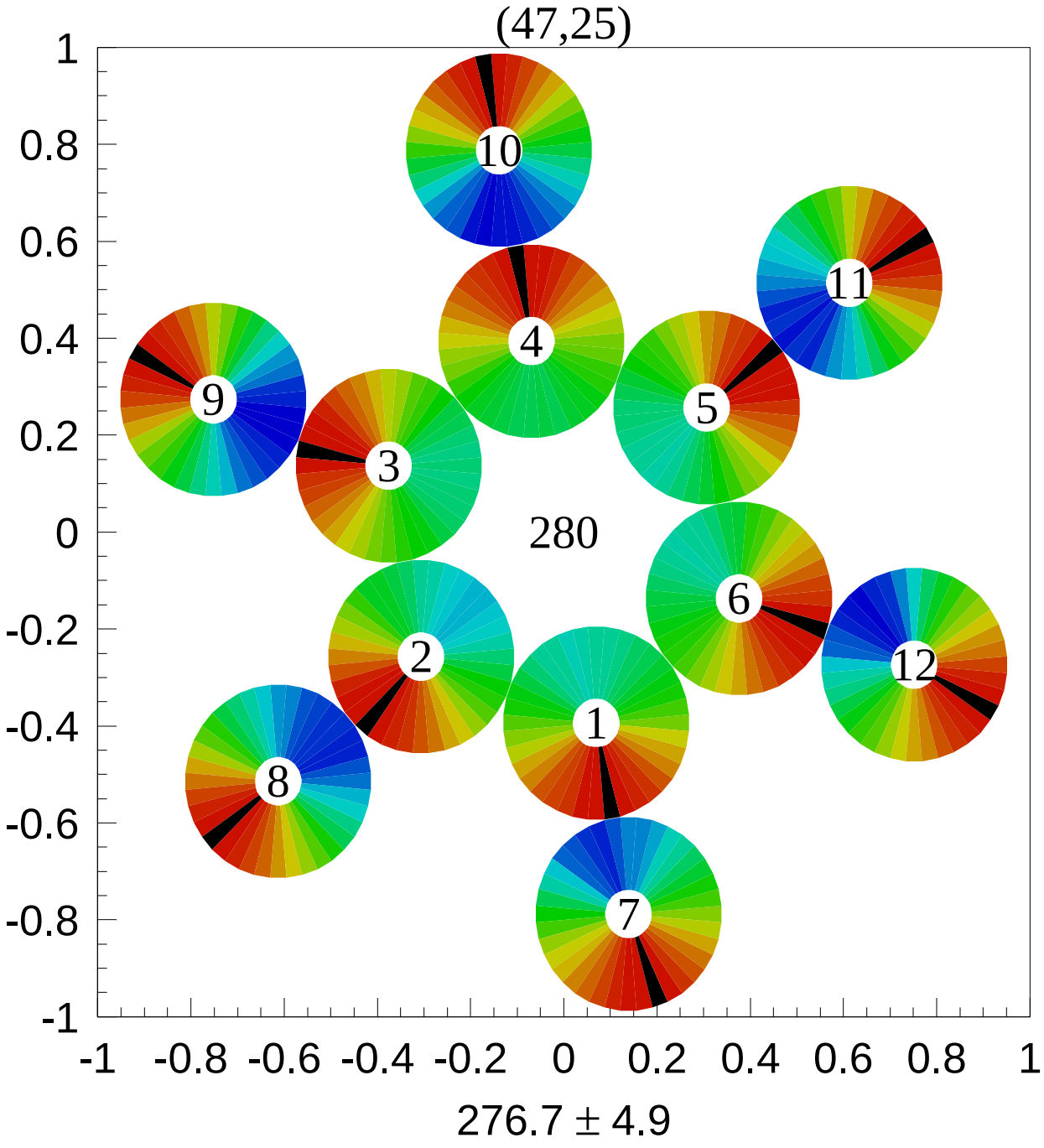

(47,23)
tilted LEDs
116 122 127 119 115 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 123 125 124 123 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

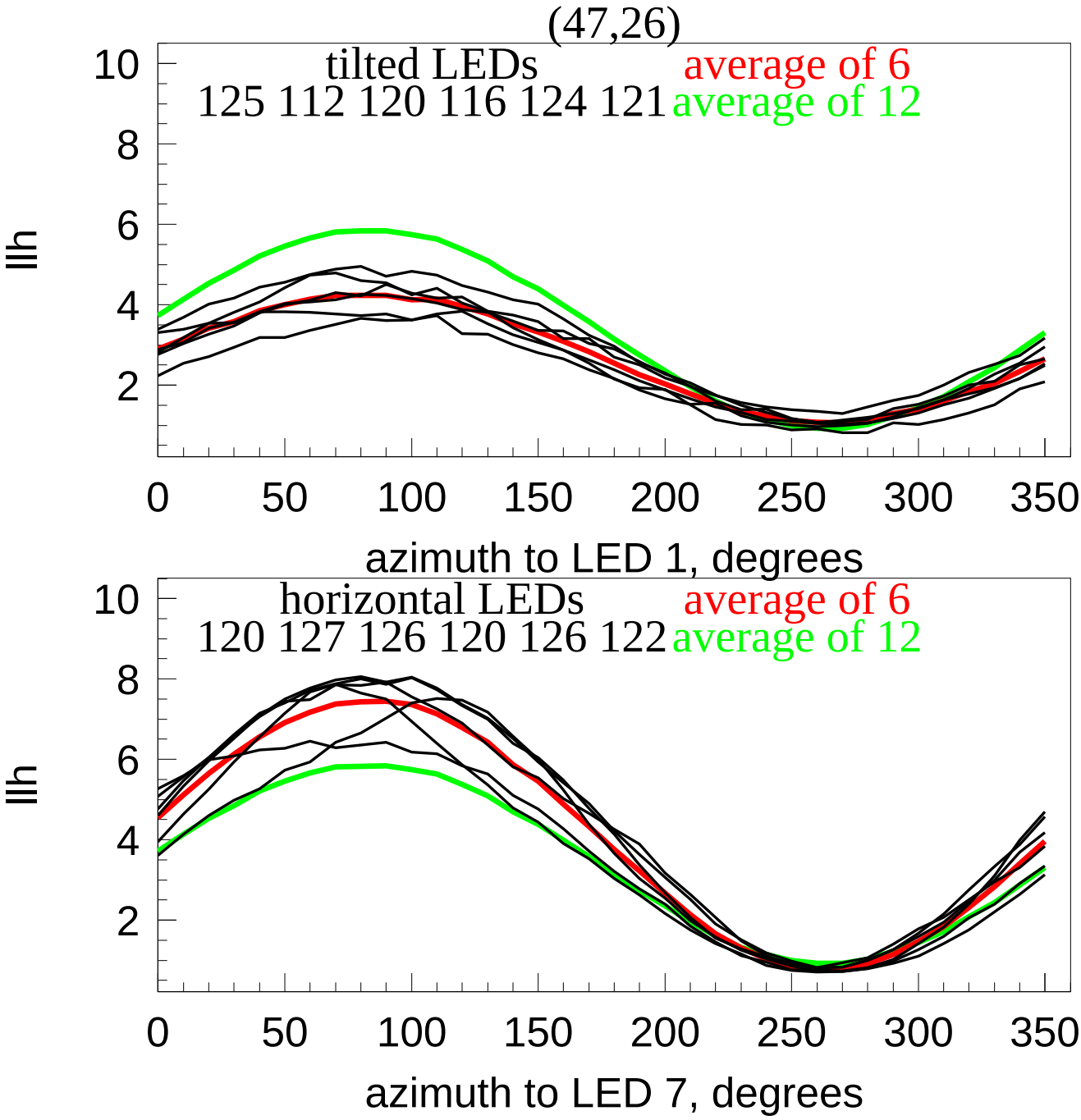

(47,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
3
7
2
9
8
337.2 ± 4.6

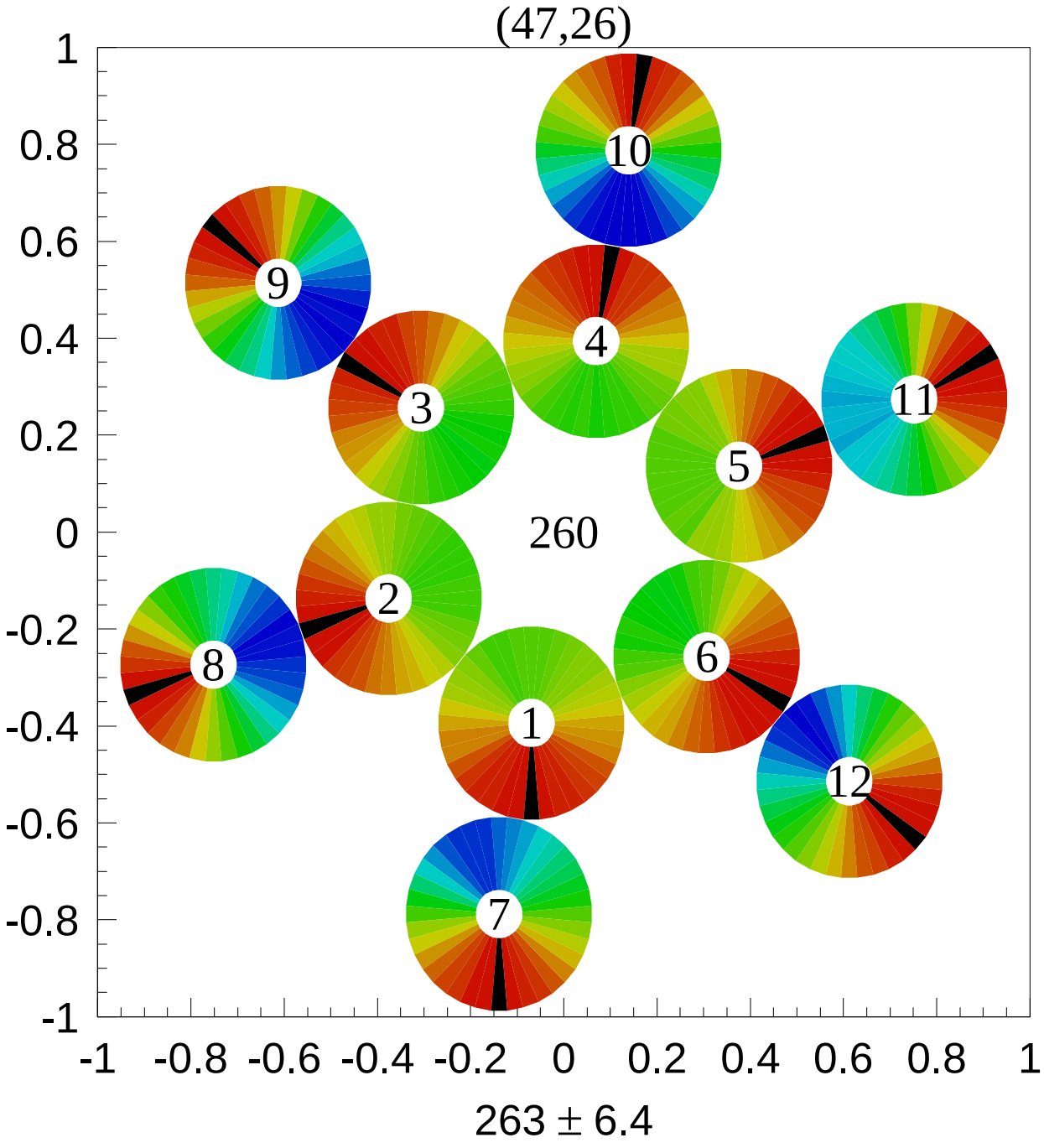

(47,24)
tilted LEDs
117 129 113 114 123 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 111 130 127 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

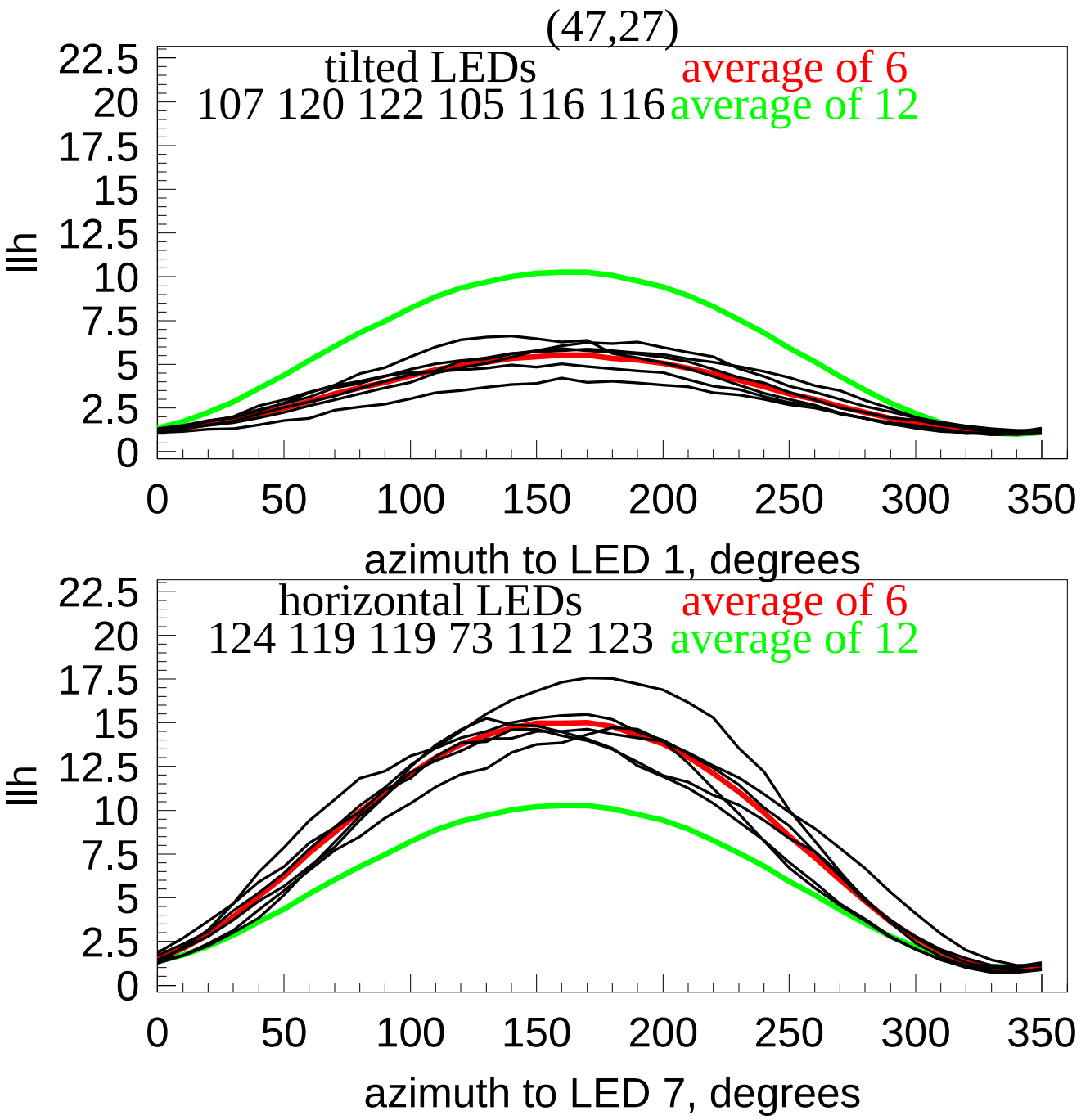

(47,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
165.4 ± 4.7

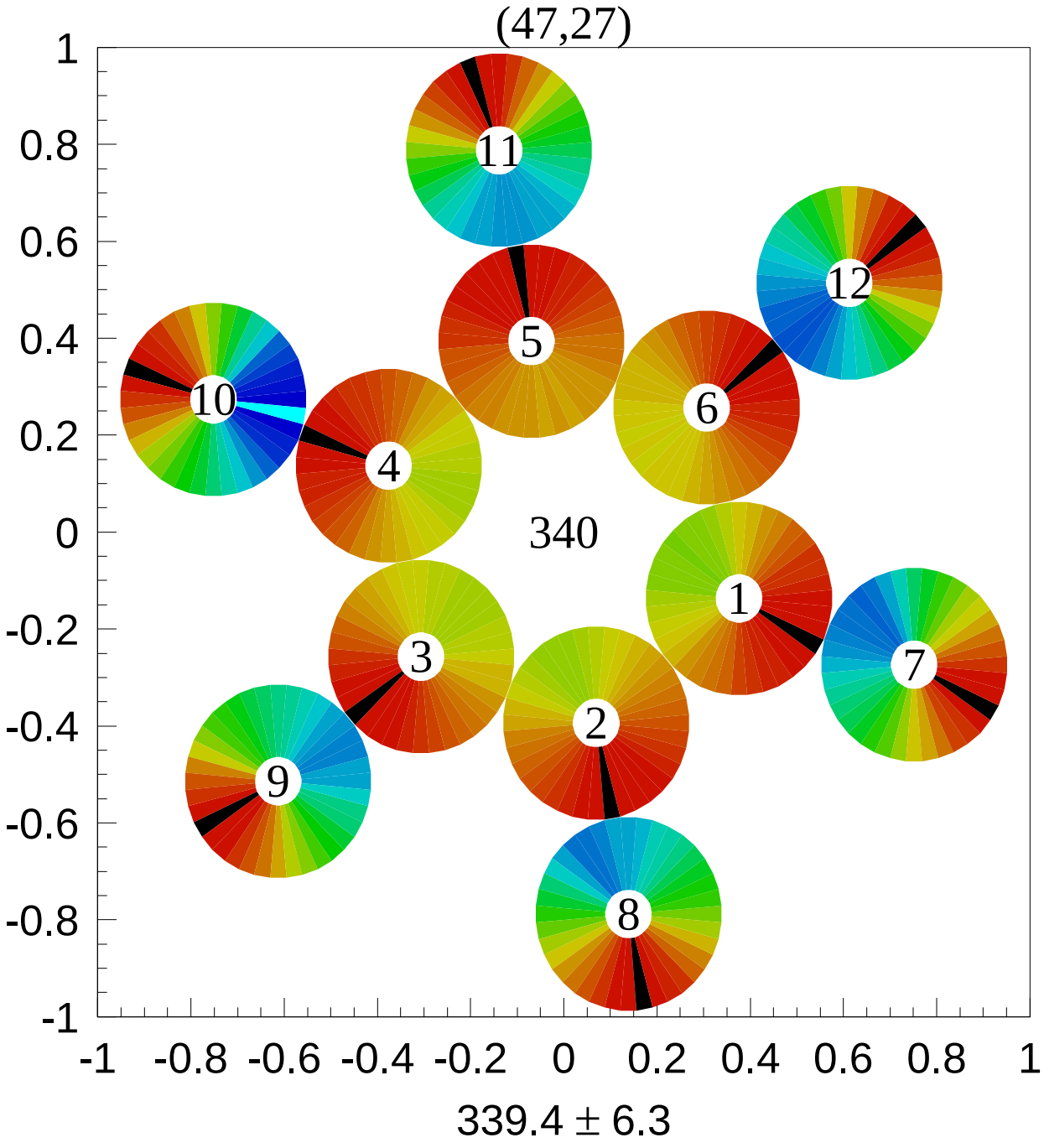

(47,25)
tilted LEDs
119 125 118 122 116 120
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 121 117 118 121 129
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

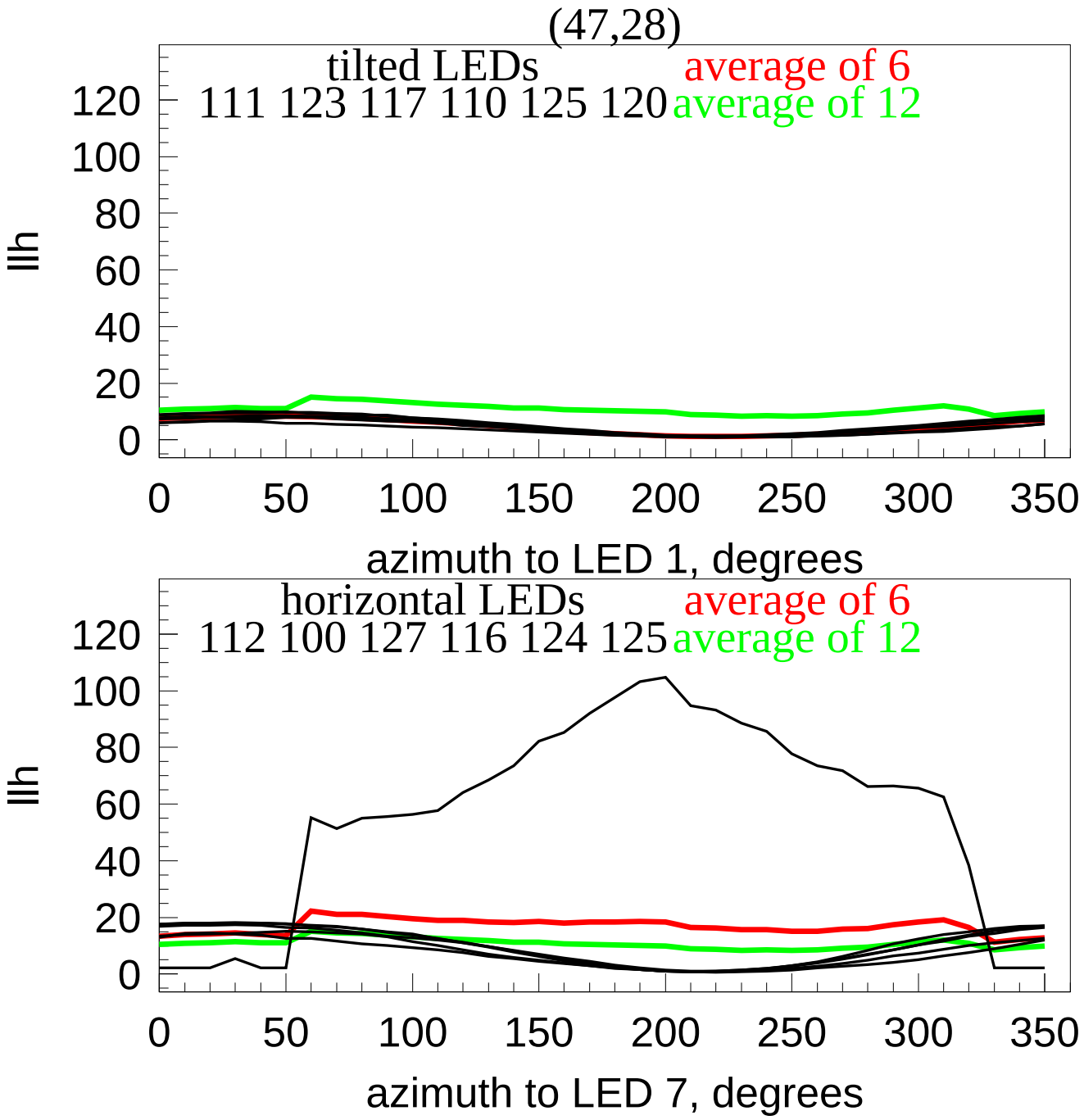

(47,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
276.7 ± 4.9

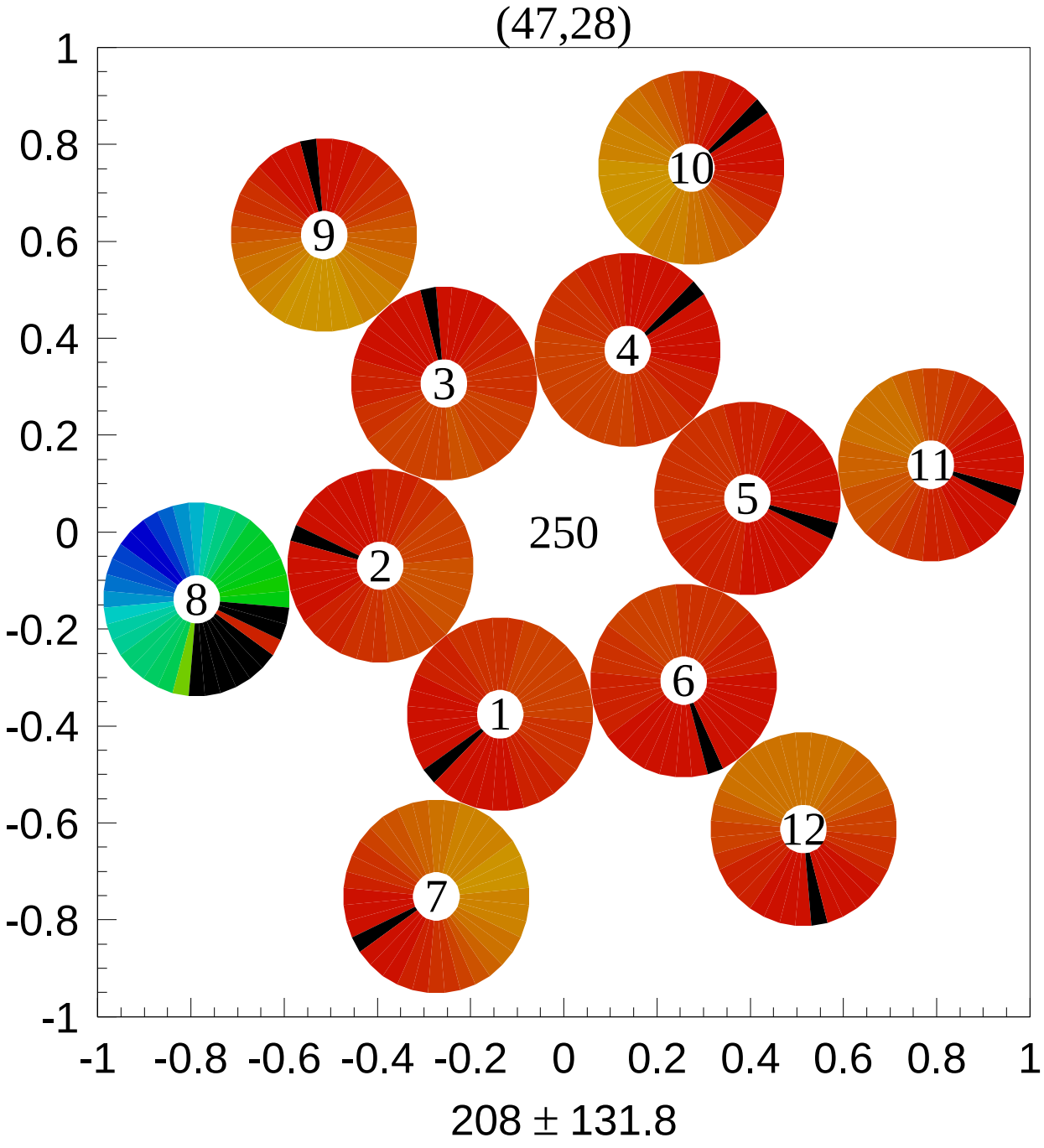

(47,26)
tilted LEDs
125 112 120 116 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 127 126 120 126 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

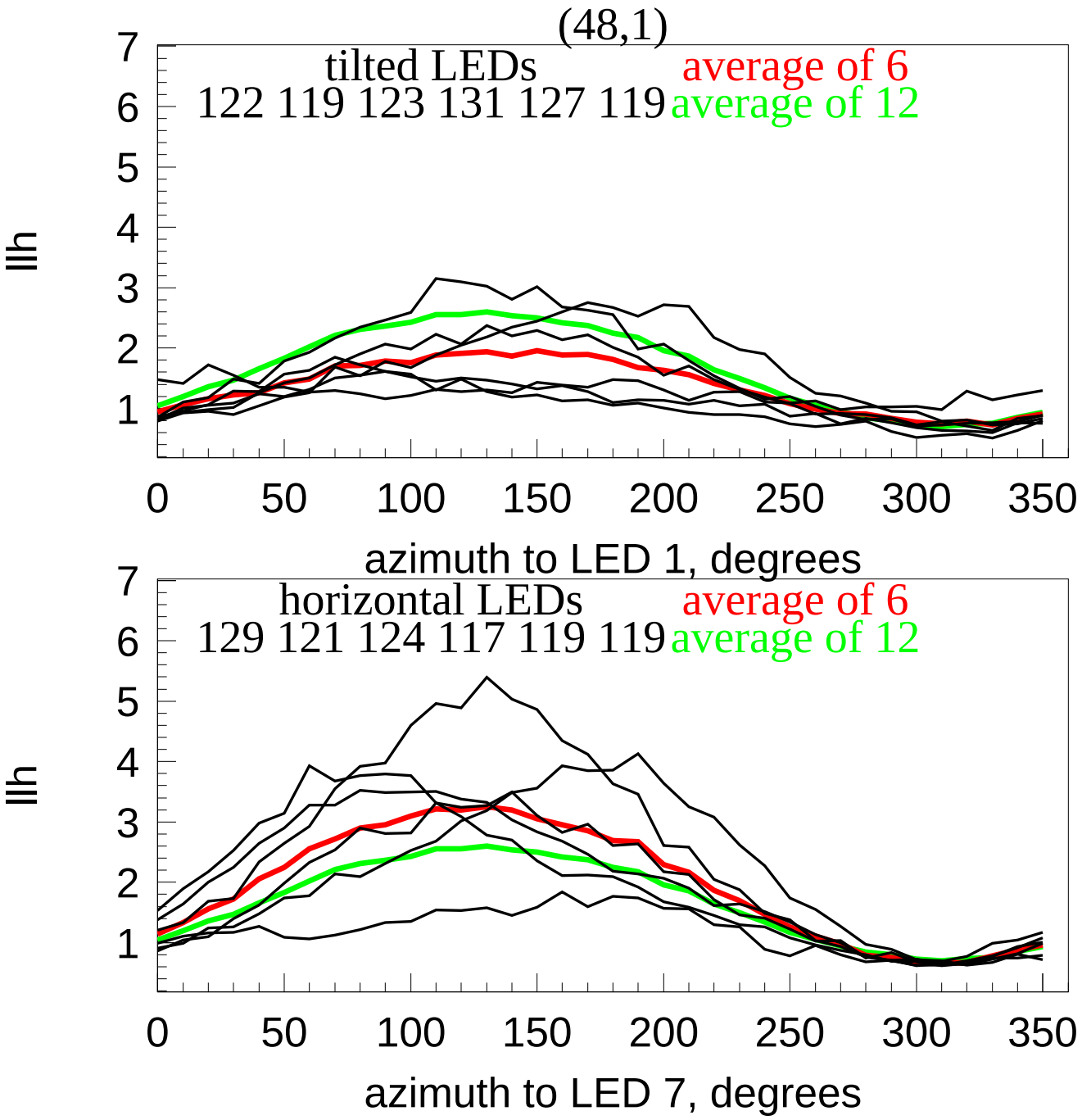

(47,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
263 ± 6.4

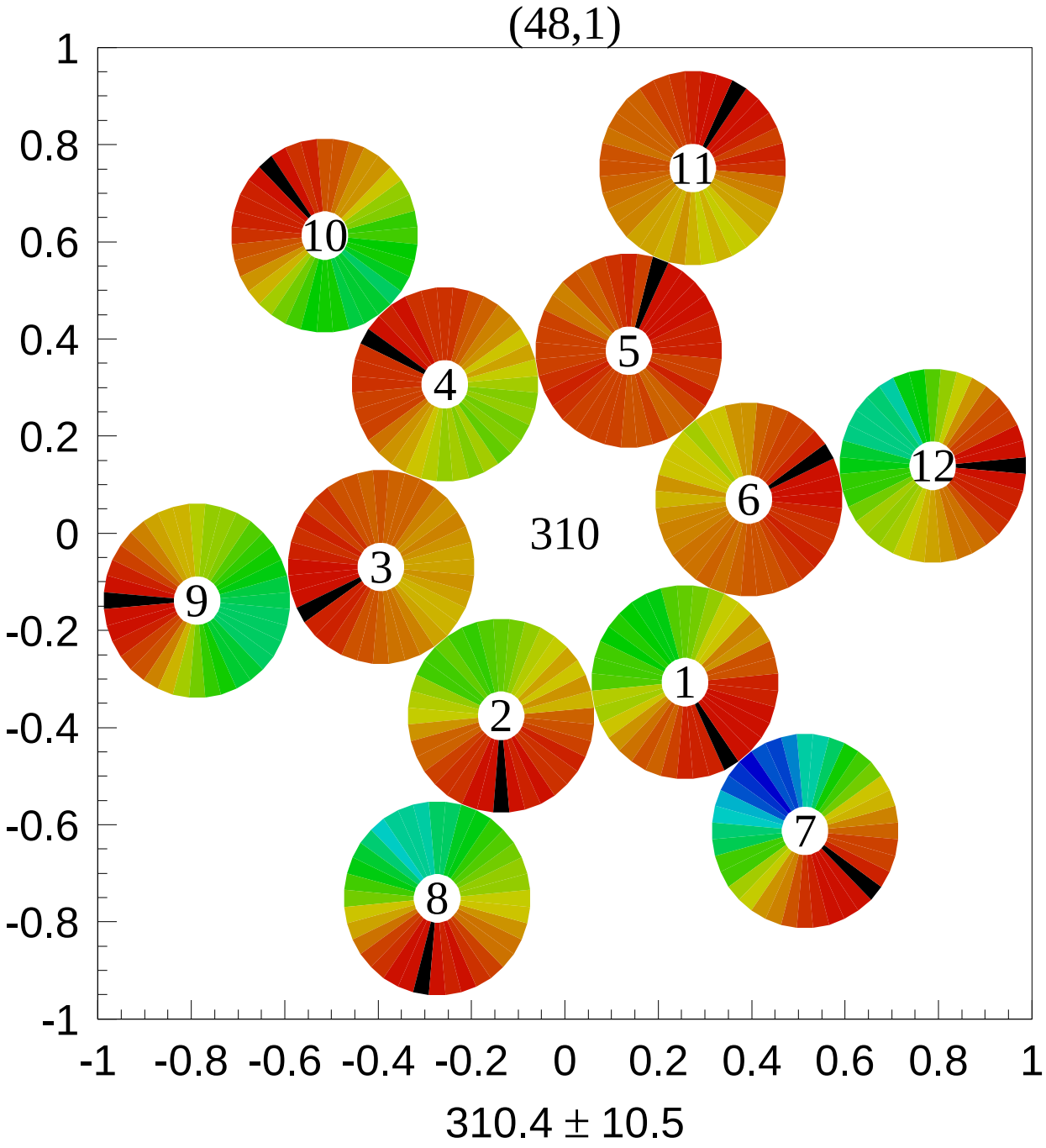

(47,27)
tilted LEDs
107 120 122 105 116 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 119 73 112 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

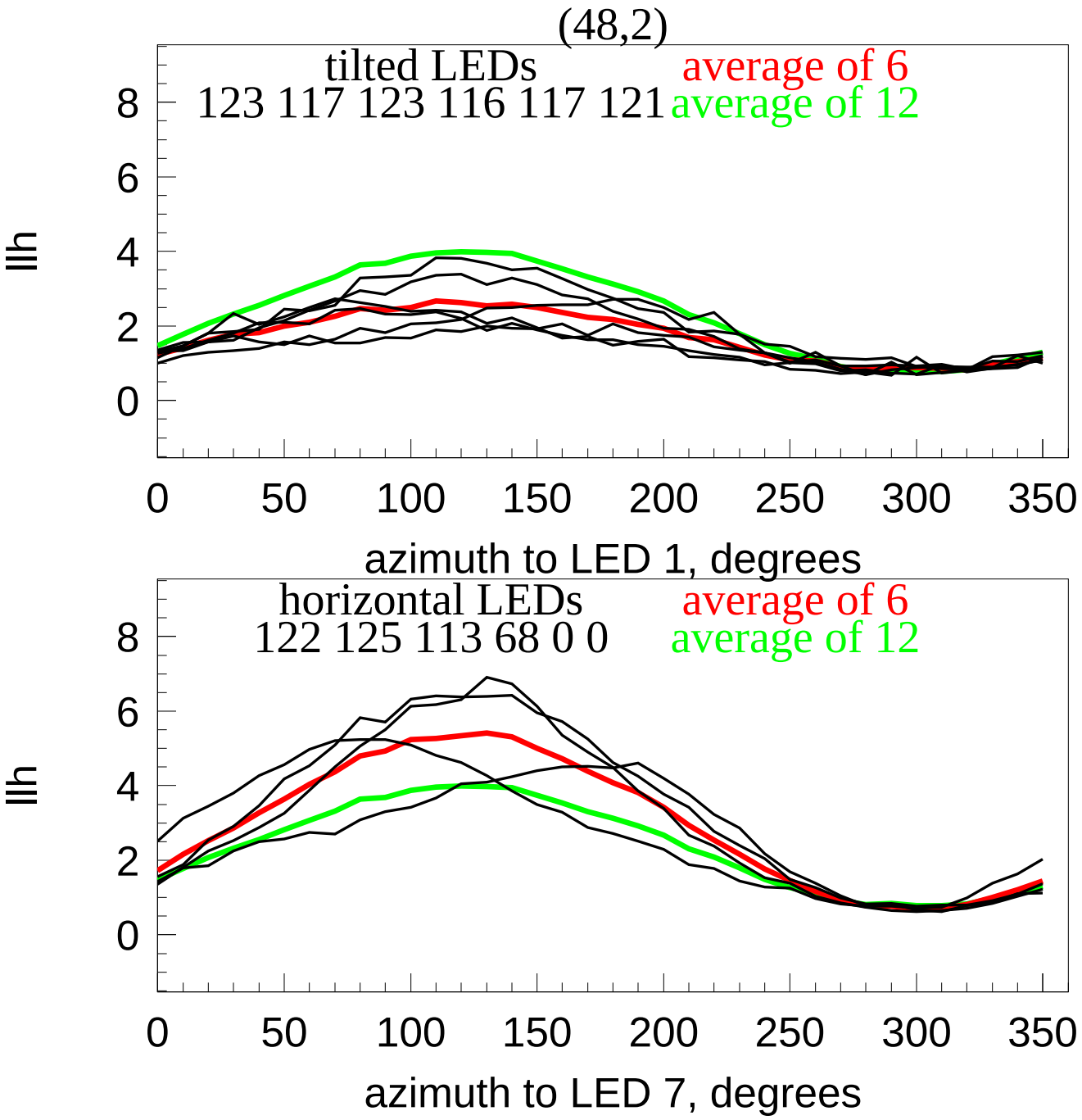

(47,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
3
7
2
9
8
339.4 ± 6.3

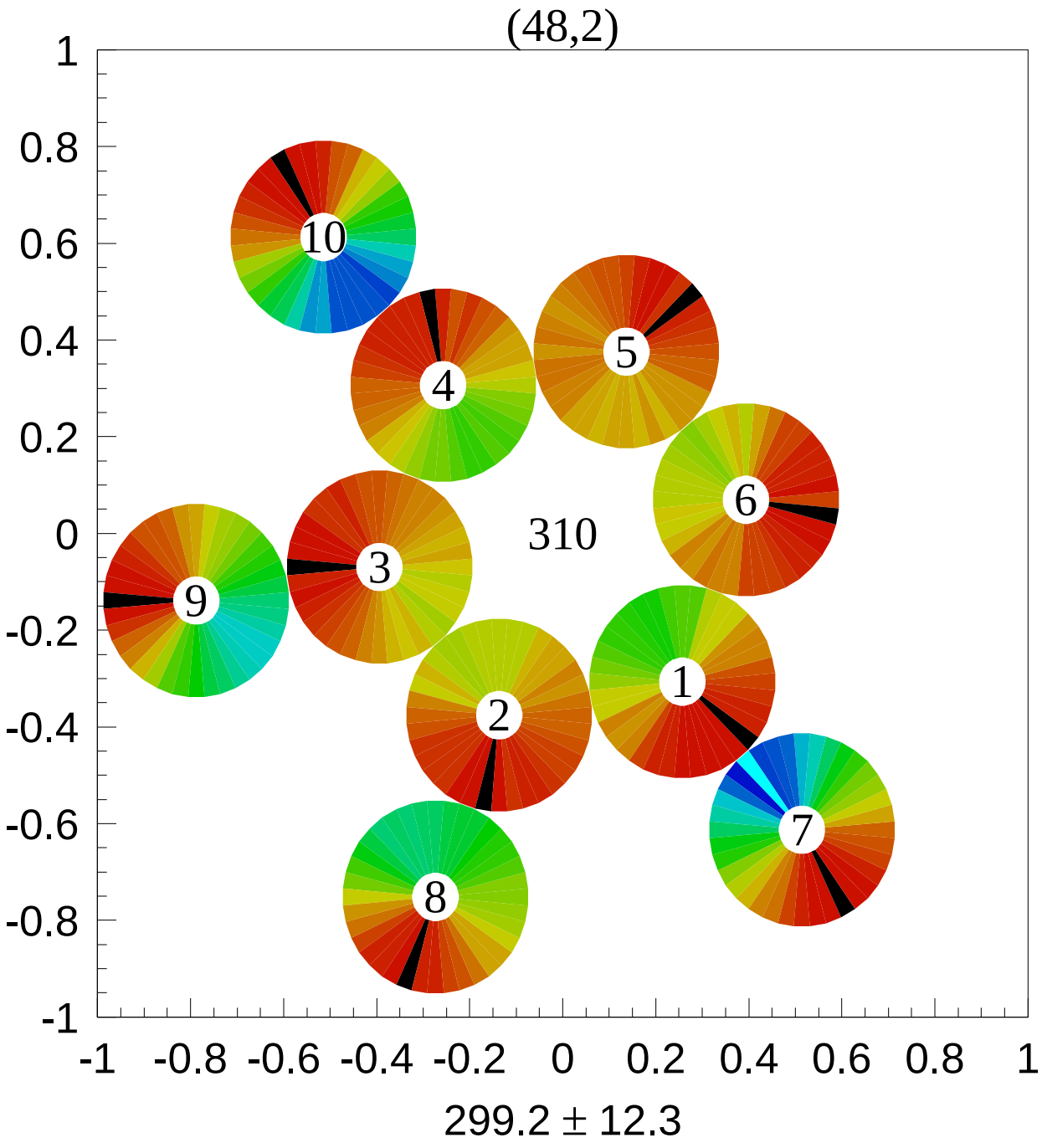

(47,28)
tilted LEDs
111 123 117 110 125 120
average of 6
average of 12
llh
120
100
80
60
40
20
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
112 100 127 116 124 125
average of 6
average of 12
llh
120
100
80
60
40
20
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

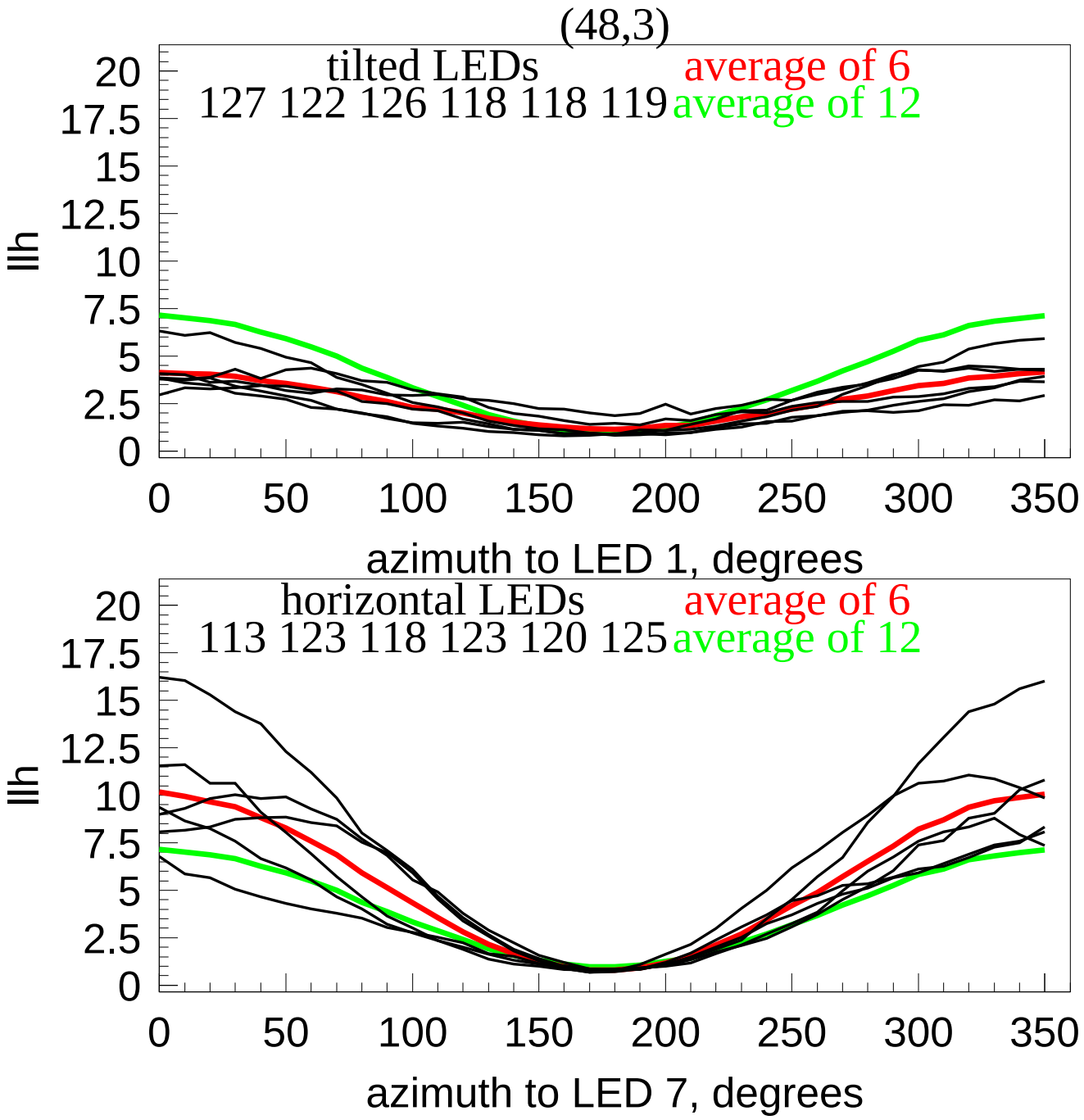

(47,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
208 ± 131.8

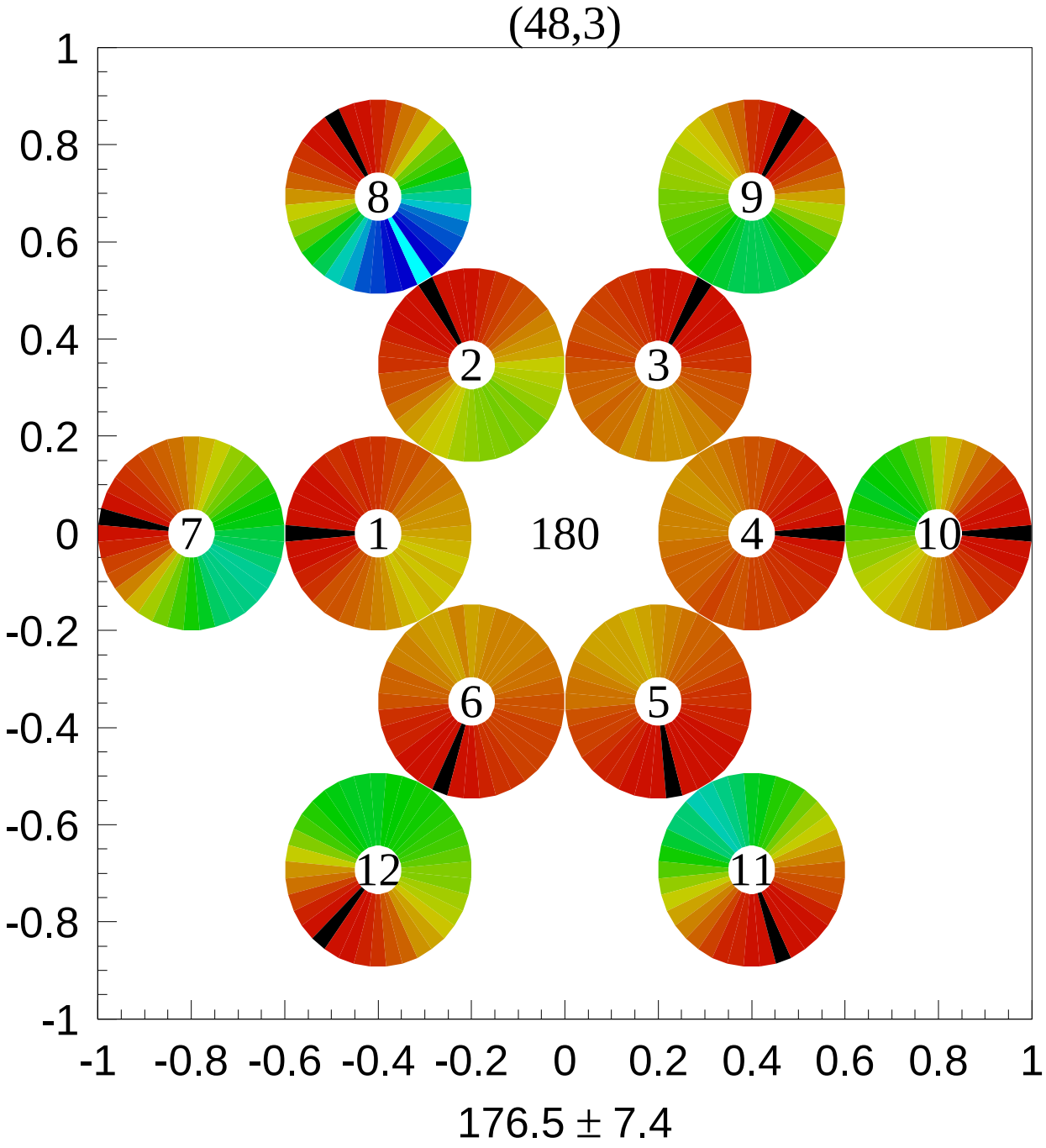

(48,1)
tilted LEDs
122 119 123 131 127 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 121 124 117 119 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

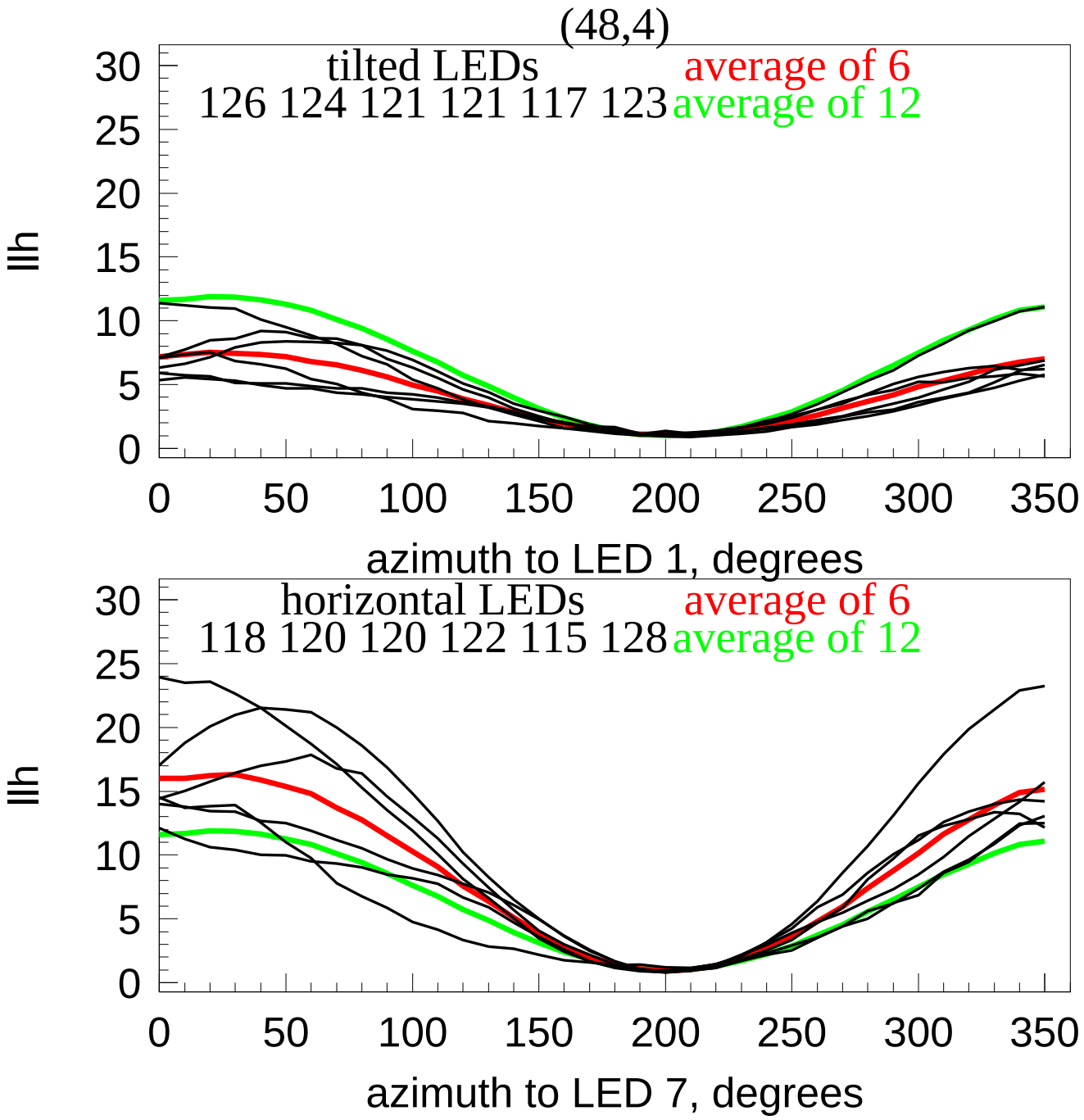

(48,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
310
1
2
3
4
5
6
7
8
9
10
11
12
310.4 ± 10.5

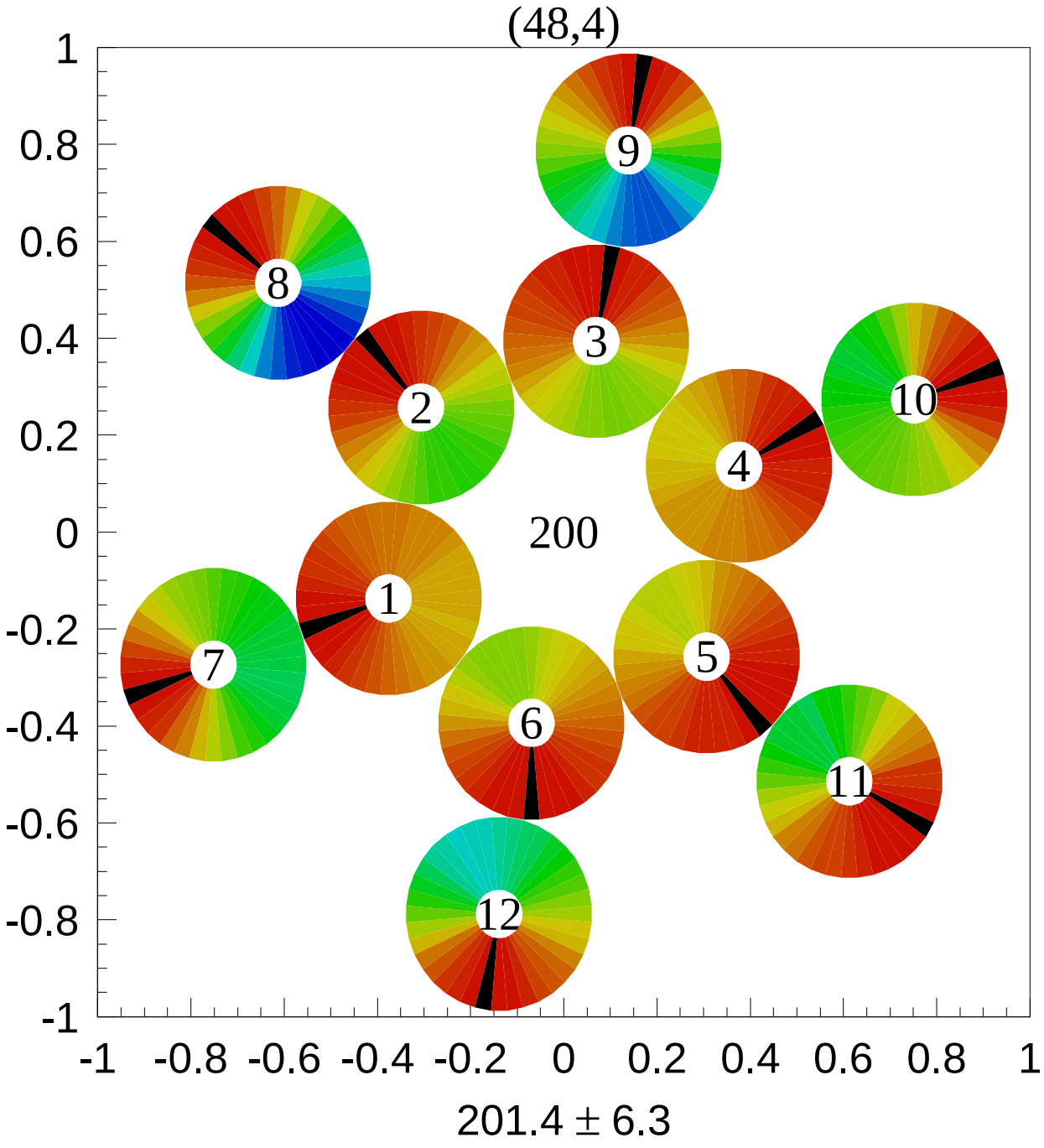

(48,2)
tilted LEDs
123 117 123 116 117 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 113 68 0 0
average of 6
average of 12
llh
azimuth to LED 7, degrees

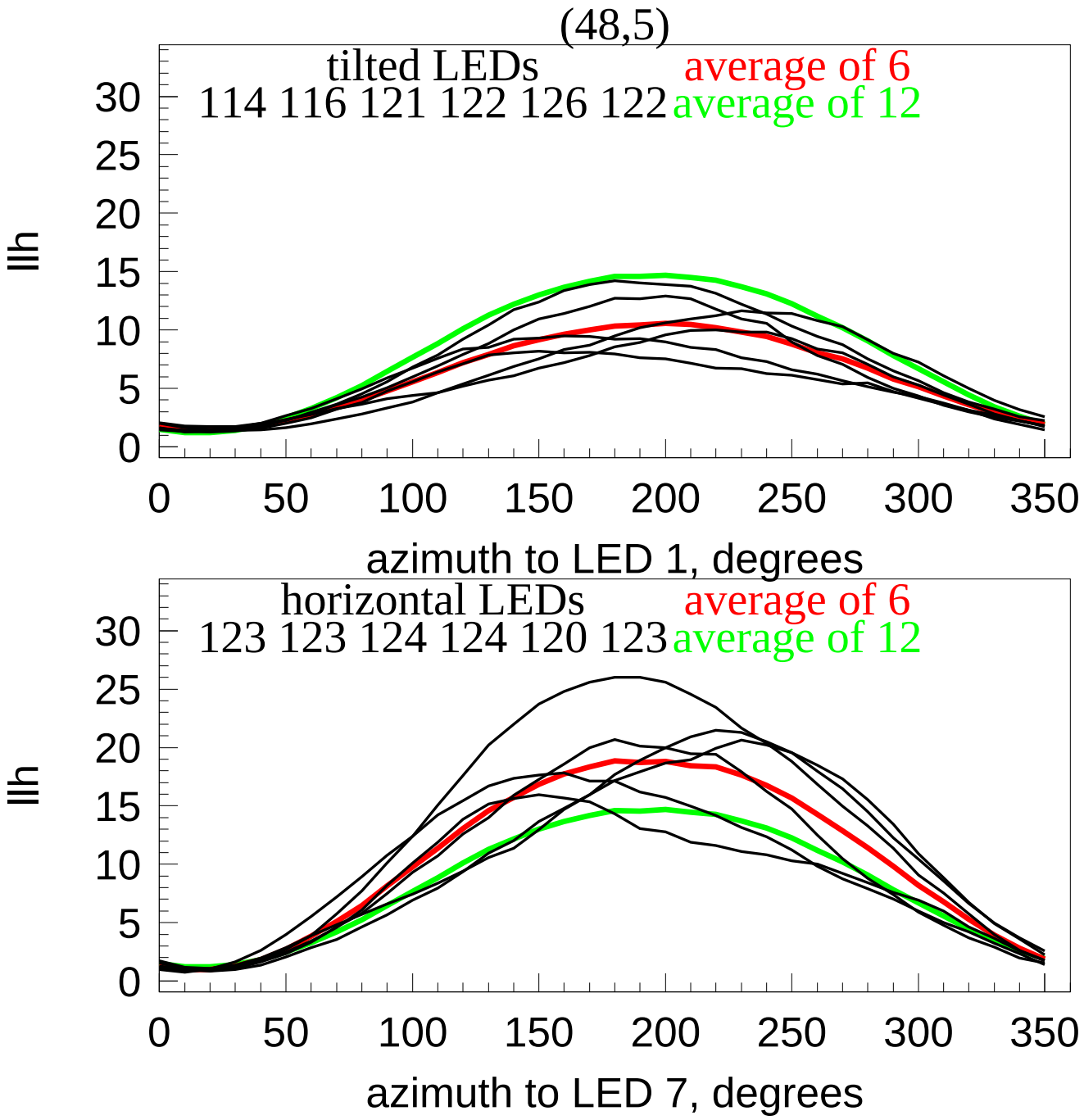

(48,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
4
5
6
310
3
9
2
1
7
8
299.2 ± 12.3

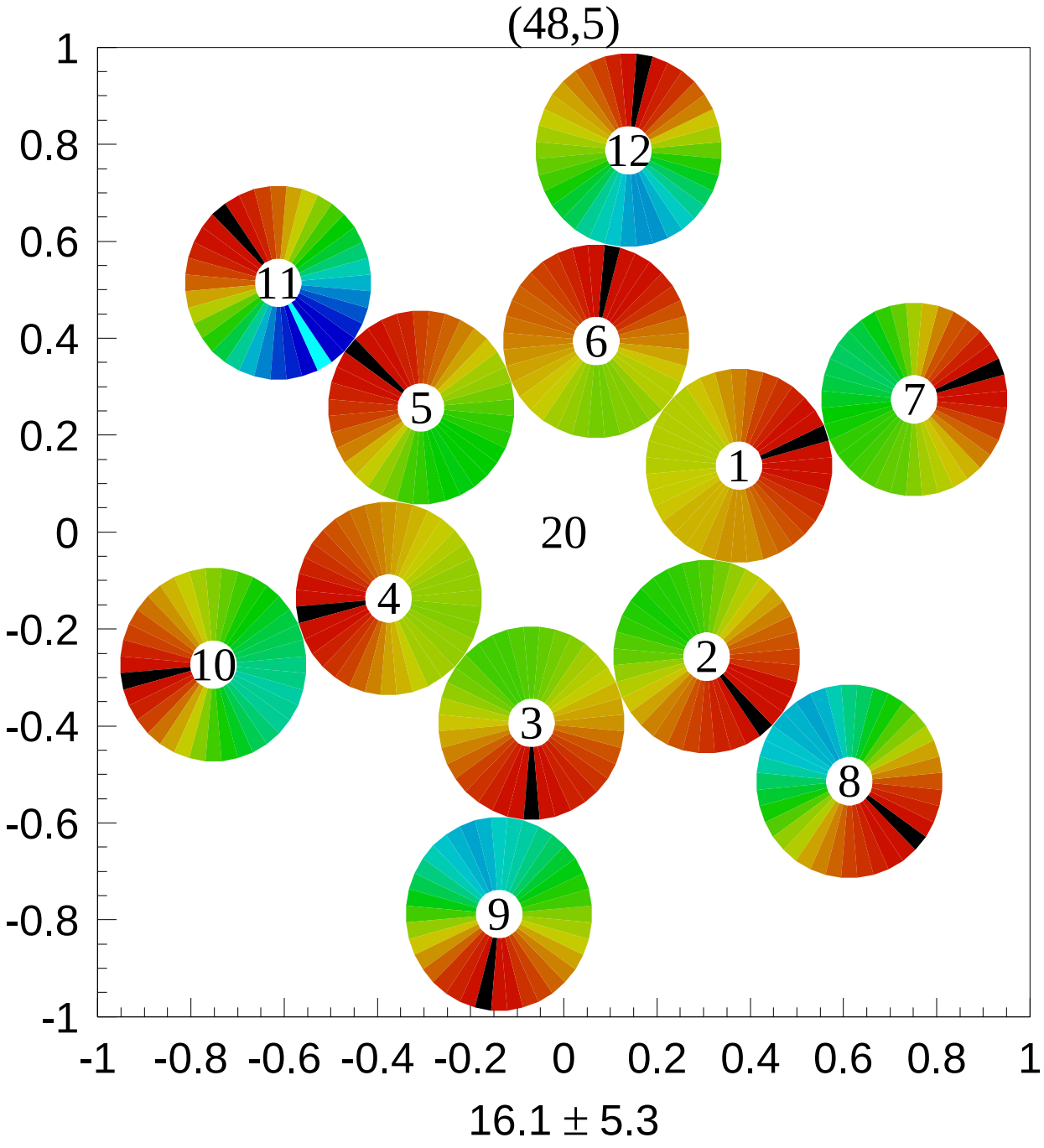

(48,3)
tilted LEDs
127 122 126 118 118 119
average of 6
average of 12
Ilh
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
113 123 118 123 120 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

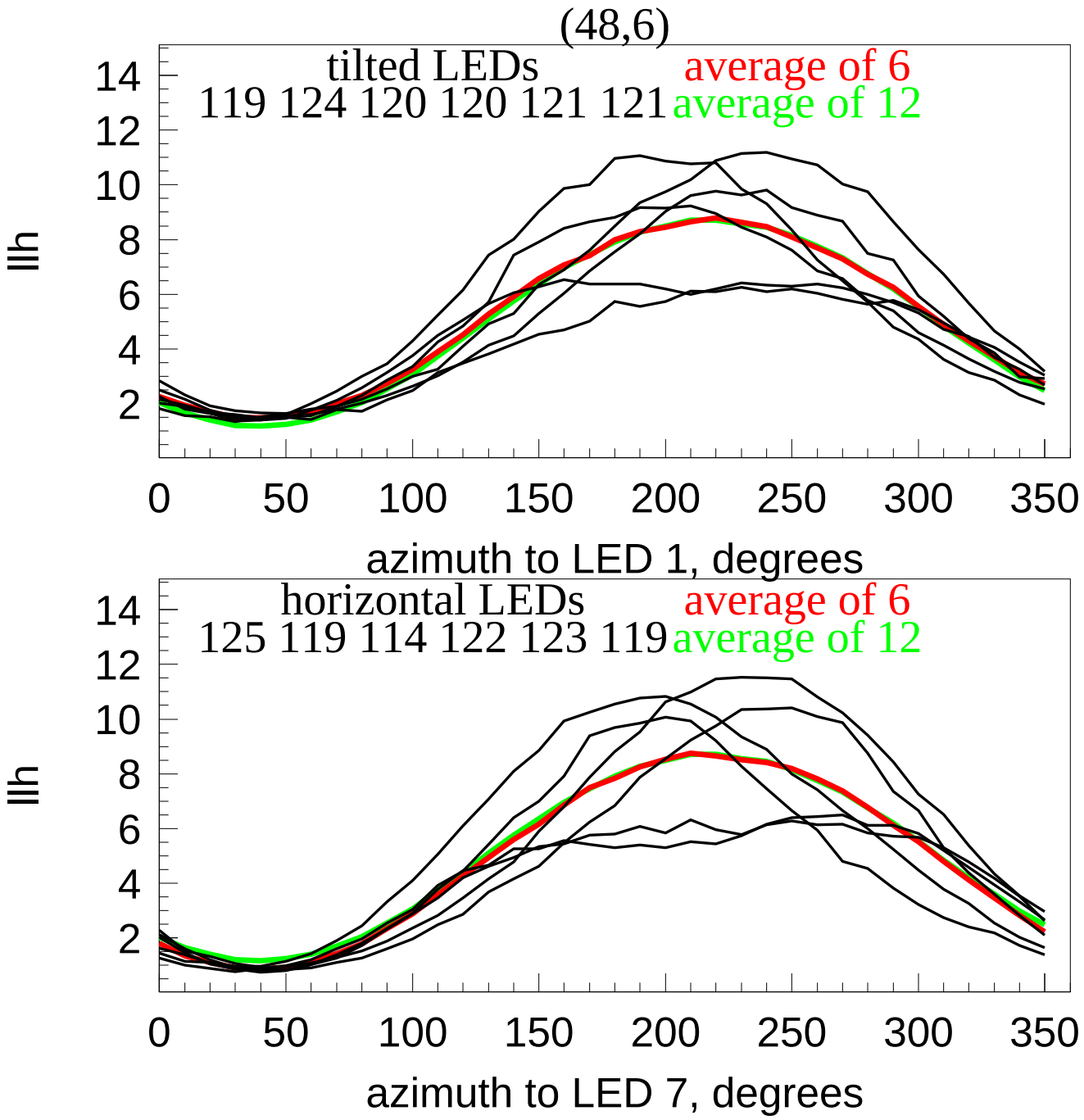

(48,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
176.5 ± 7.4

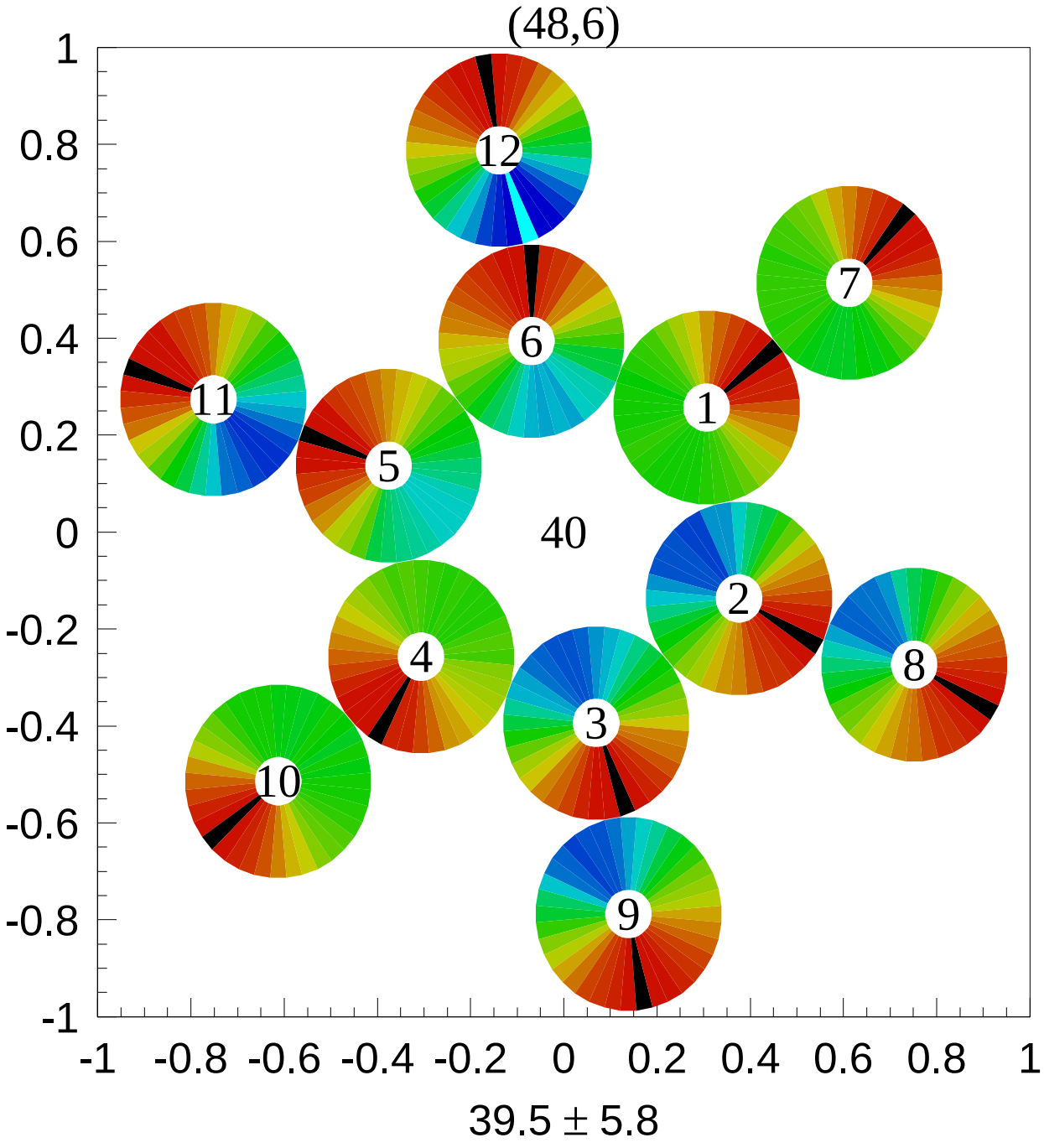

(48,4)
tilted LEDs
126 124 121 121 117 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 120 120 122 115 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

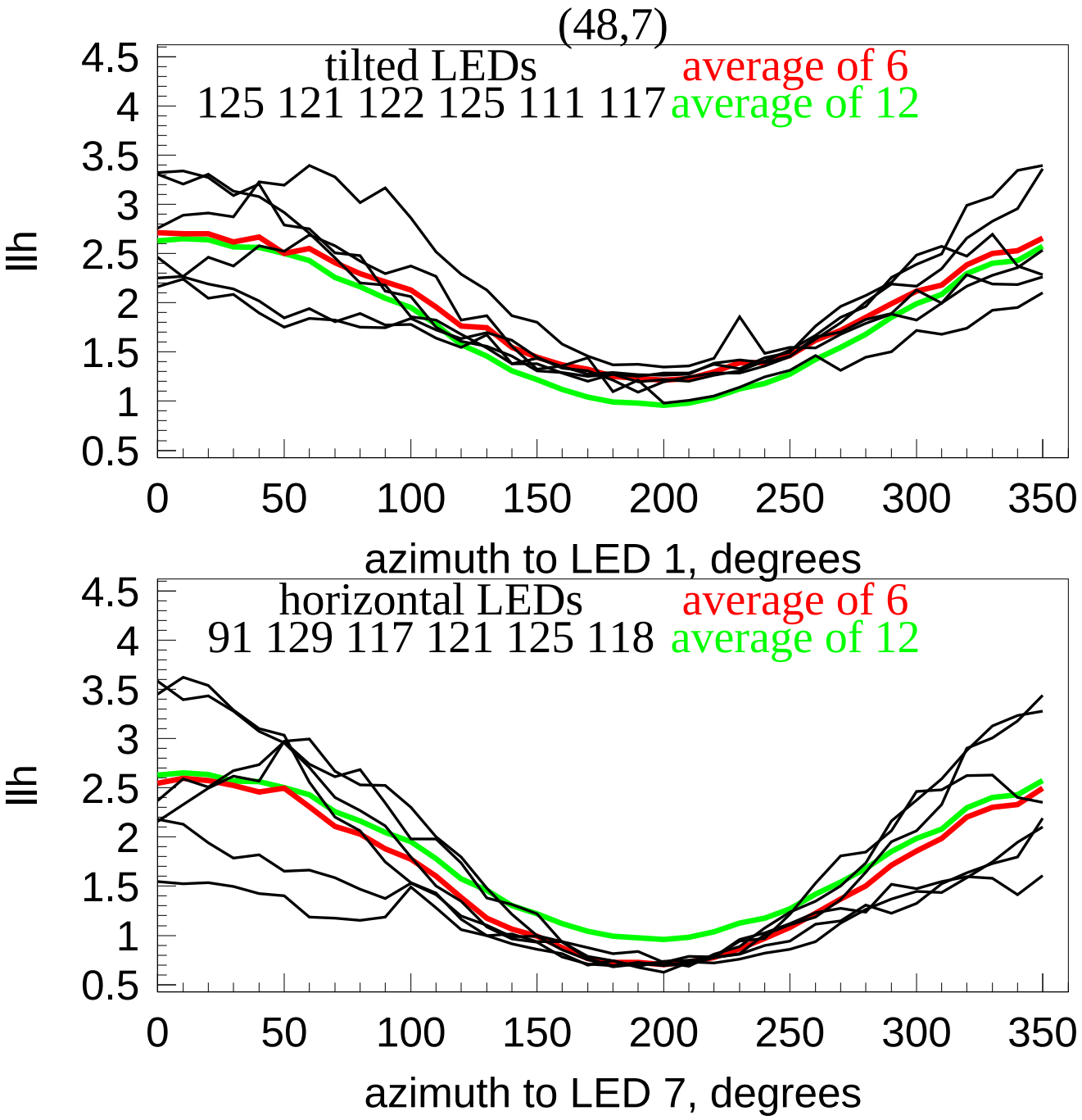

(48,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
200
1
2
3
4
5
6
7
8
9
10
11
12
201.4 ± 6.3

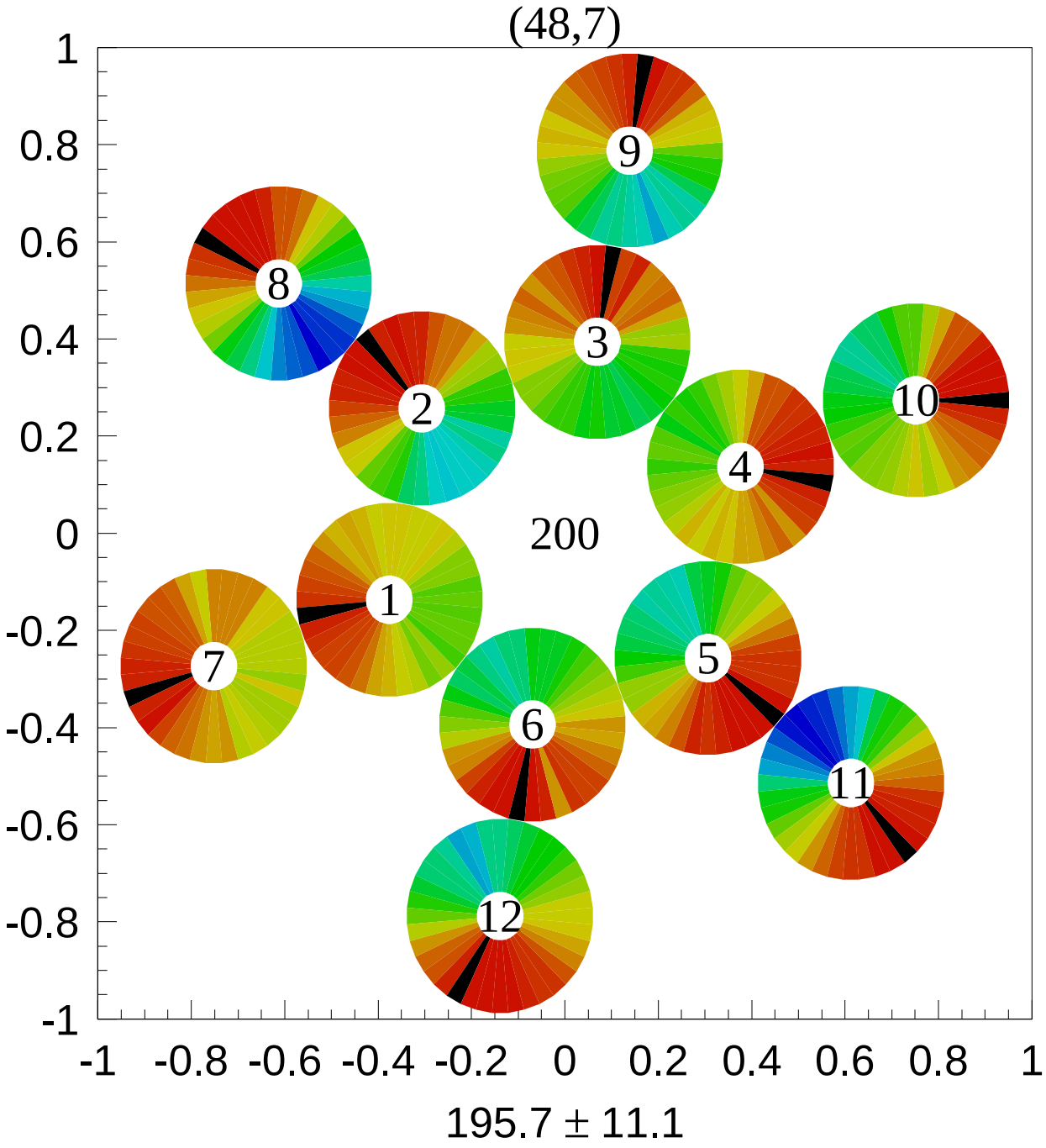

(48,5)
tilted LEDs
114 116 121 122 126 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 124 124 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

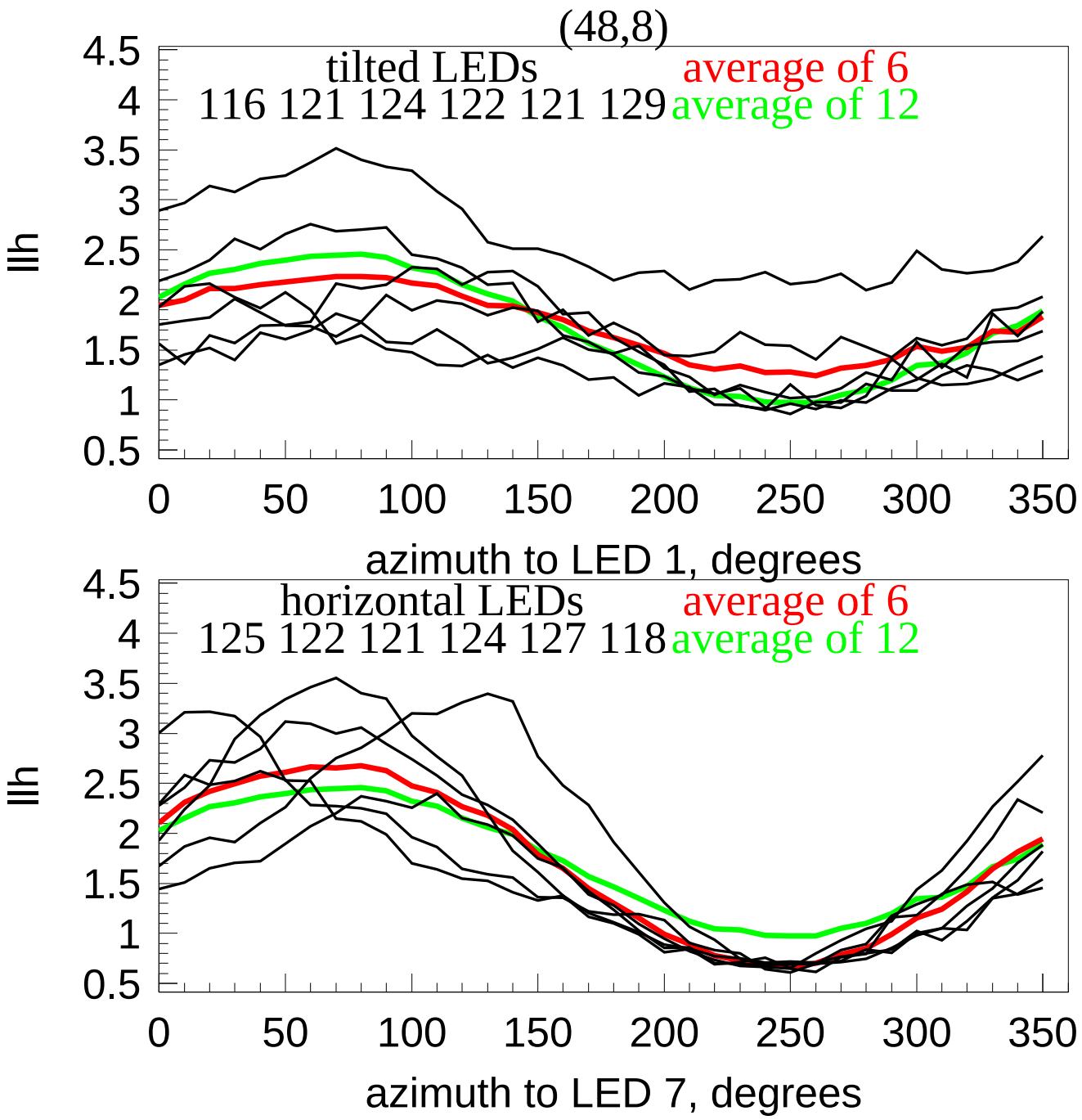

(48,5)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
16.1 ± 5.3

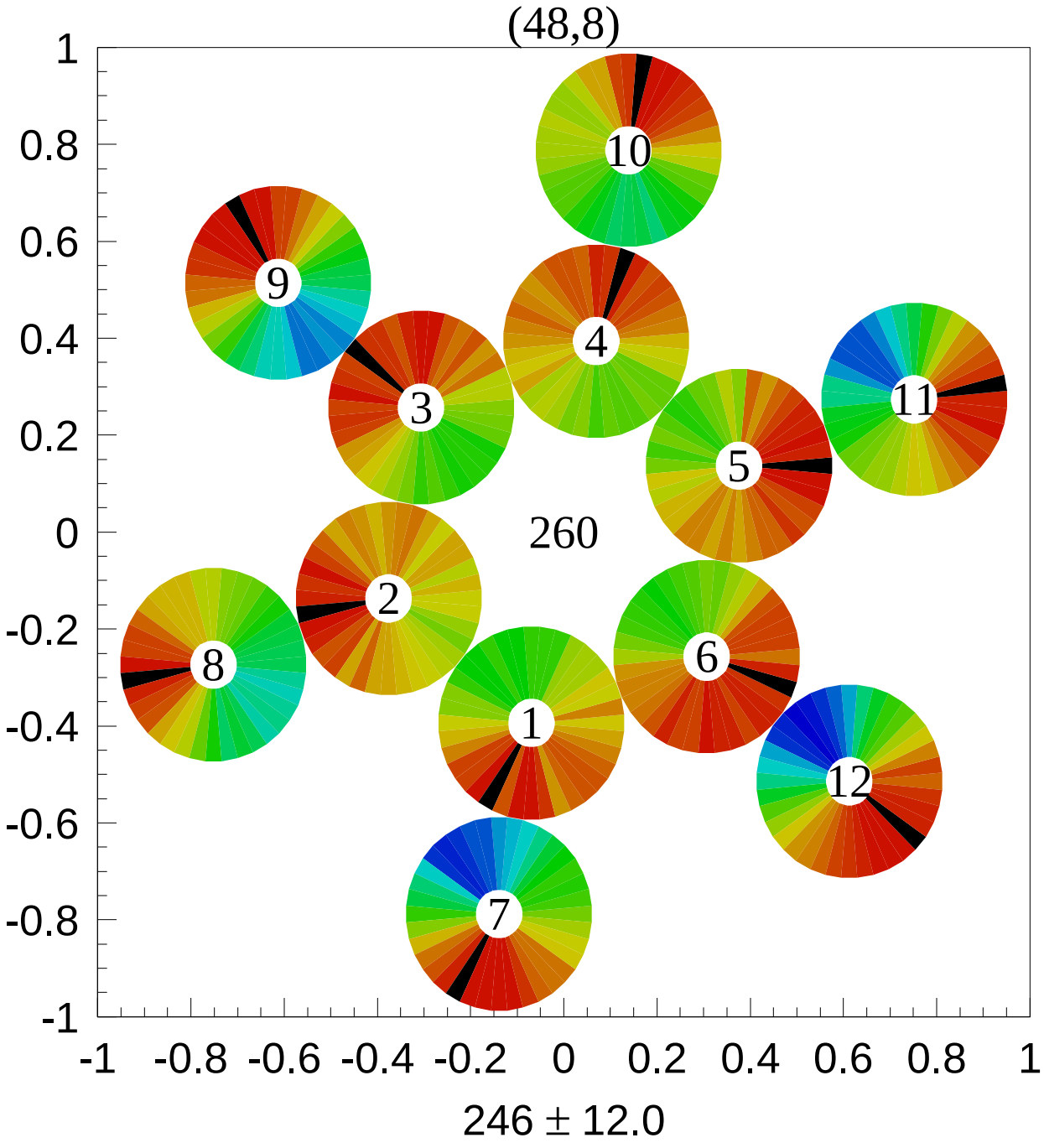

(48,6)
tilted LEDs
119 124 120 120 121 121
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 119 114 122 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

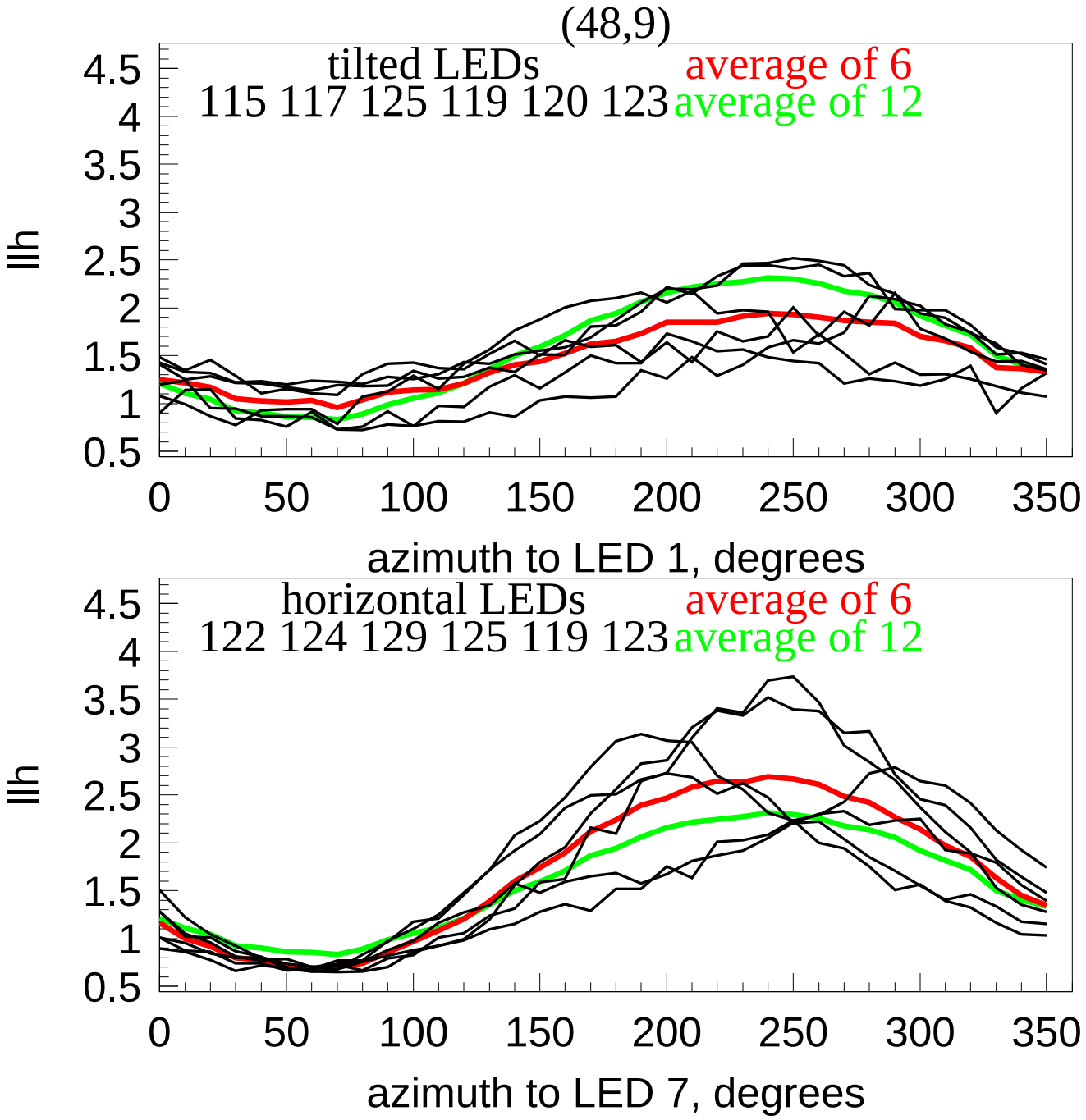

(48,6)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
39.5 ± 5.8

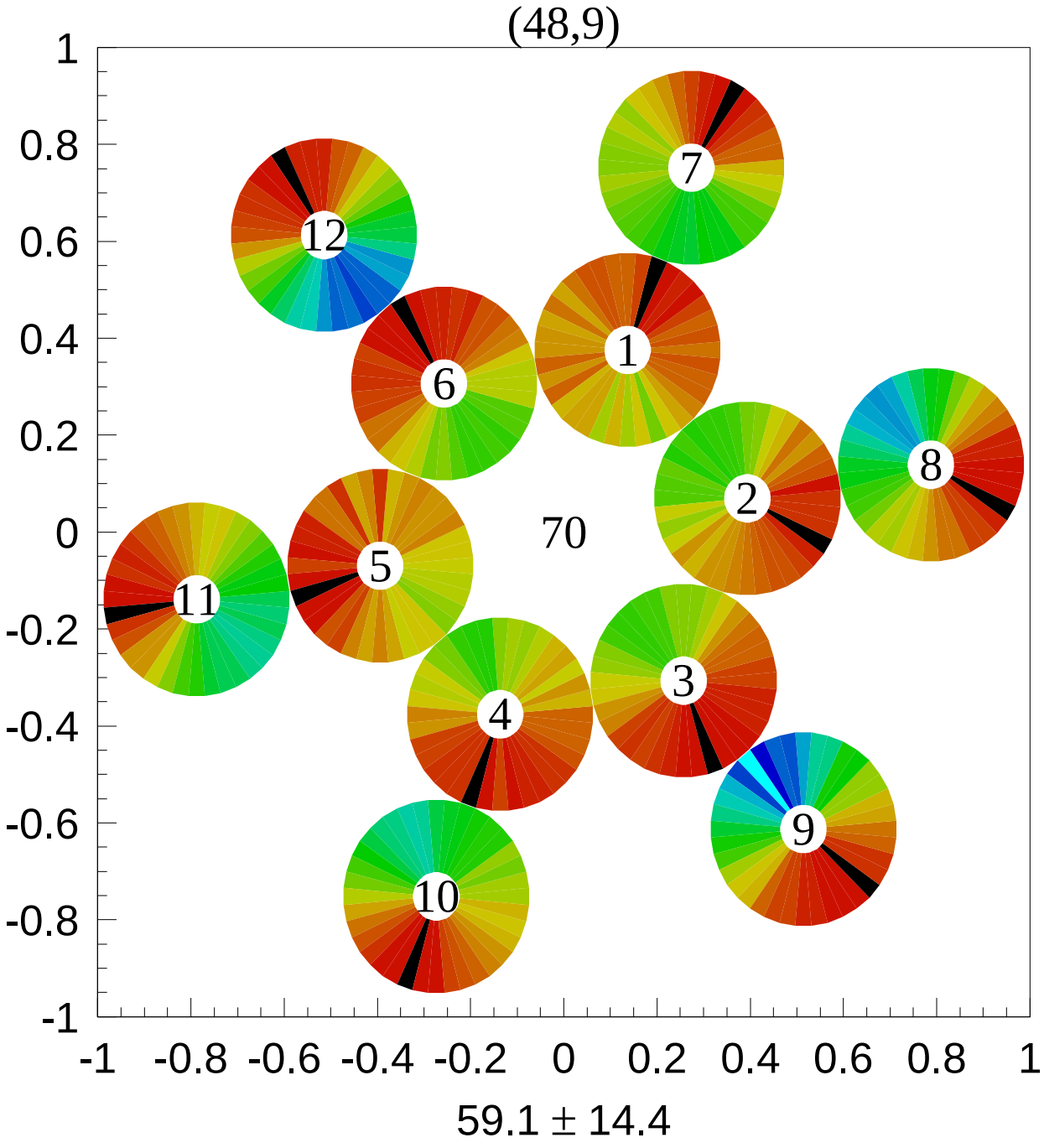

(48,7)
tilted LEDs
125 121 122 125 111 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
91 129 117 121 125 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

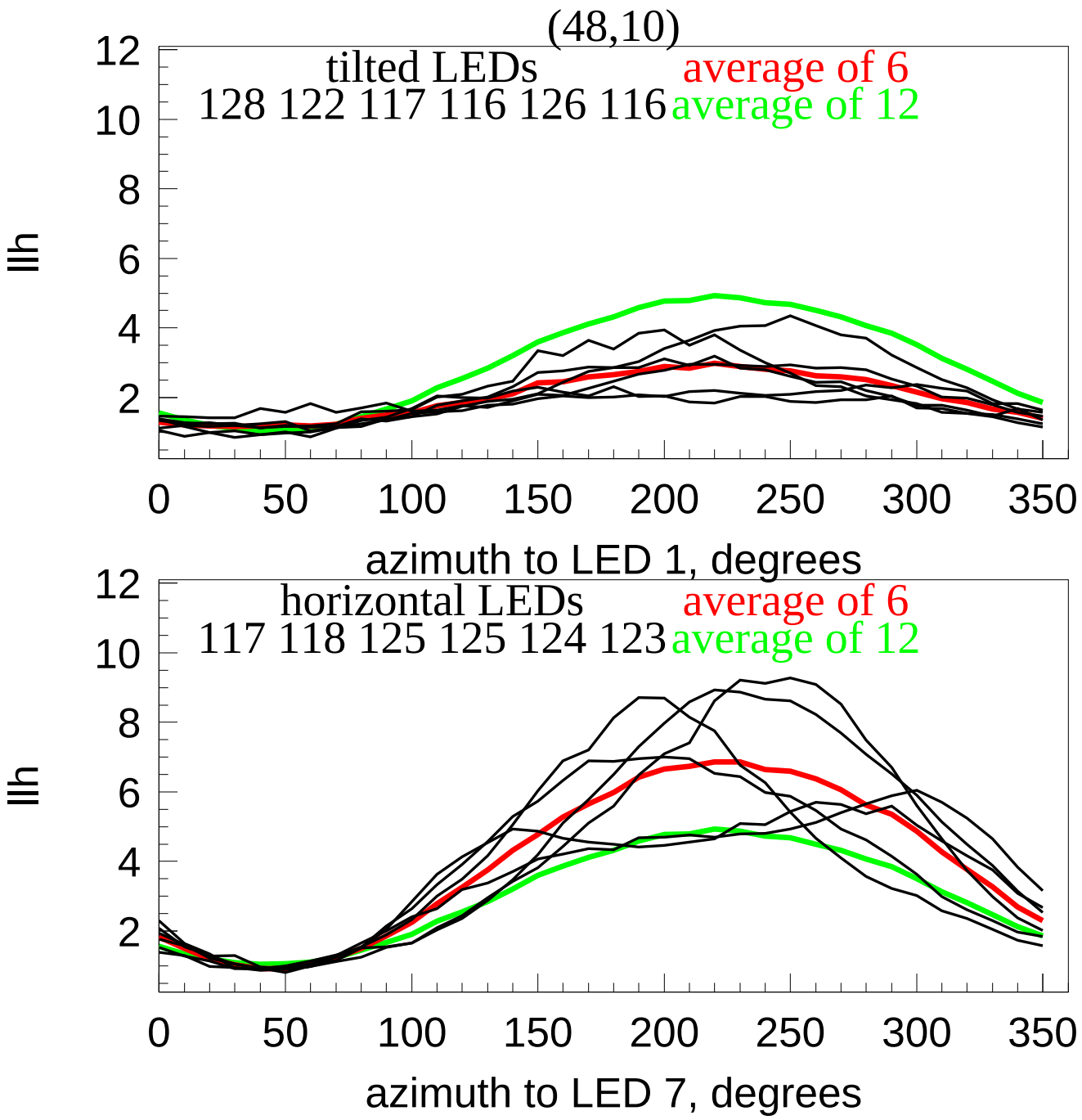

(48,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
195.7 ± 11.1

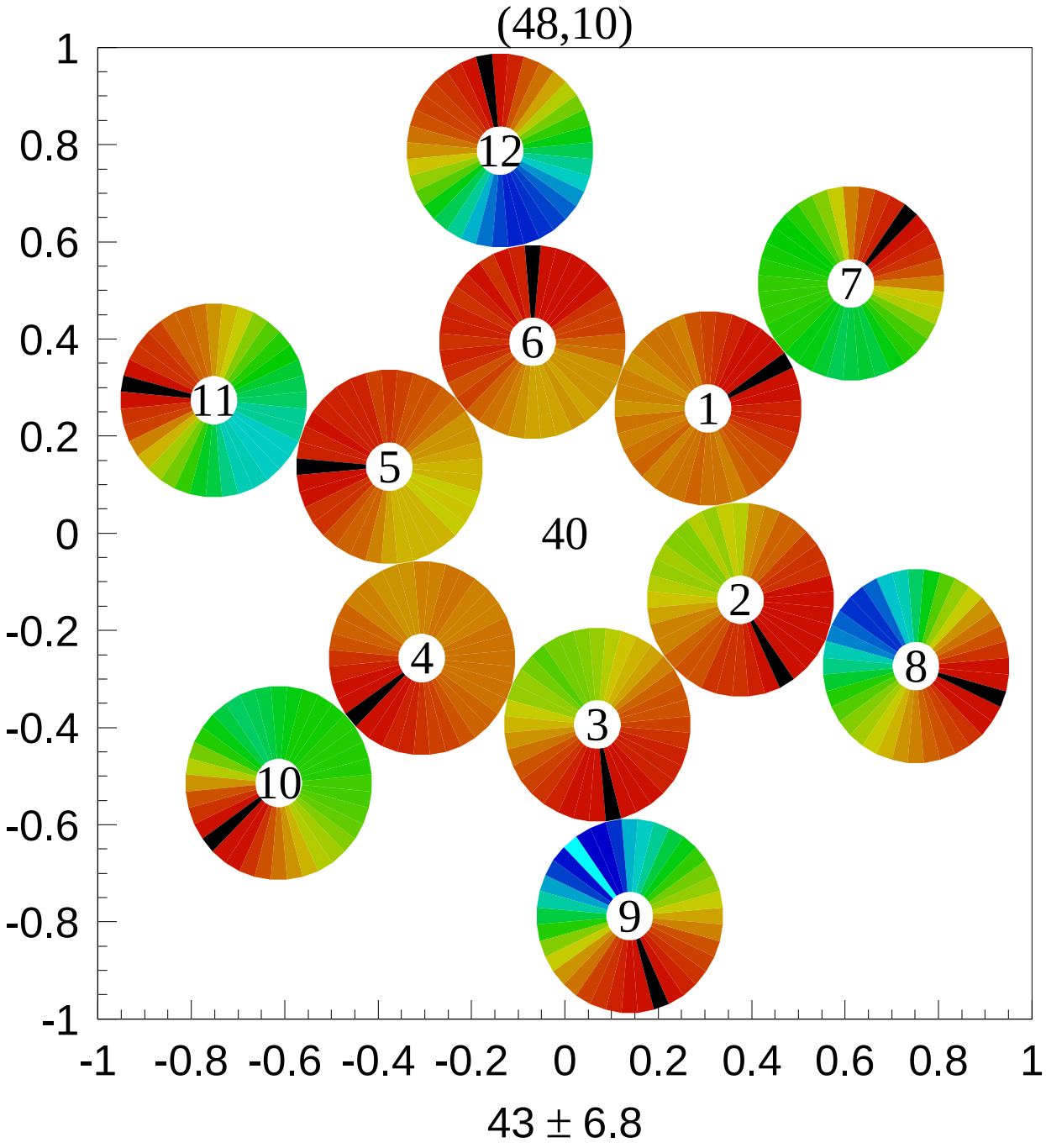

(48,8)
tilted LEDs
116 121 124 122 121 129
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 122 121 124 127 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

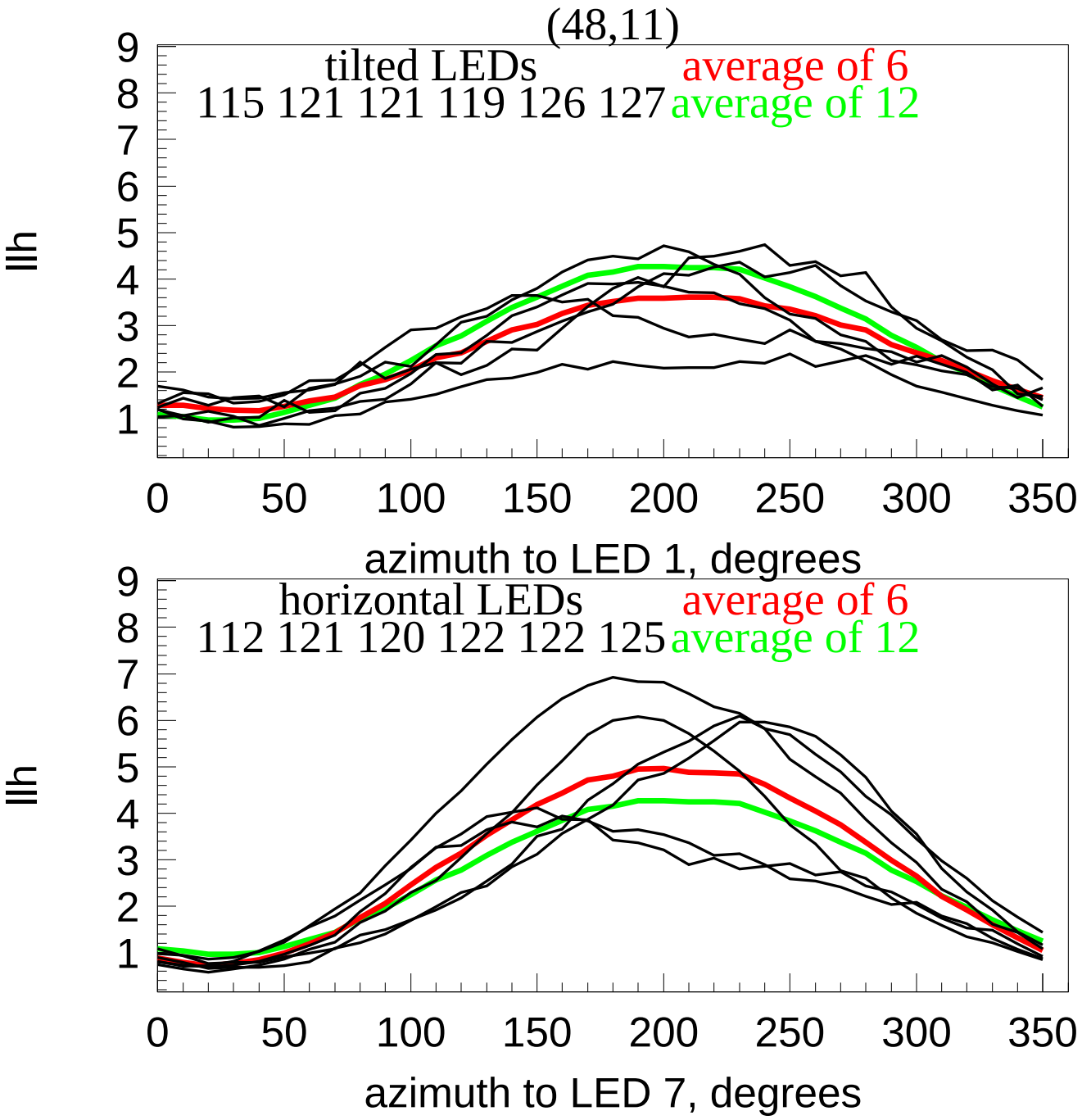

(48,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
246 ± 12.0
260
1
2
3
4
5
6
7
8
9
10
11
12

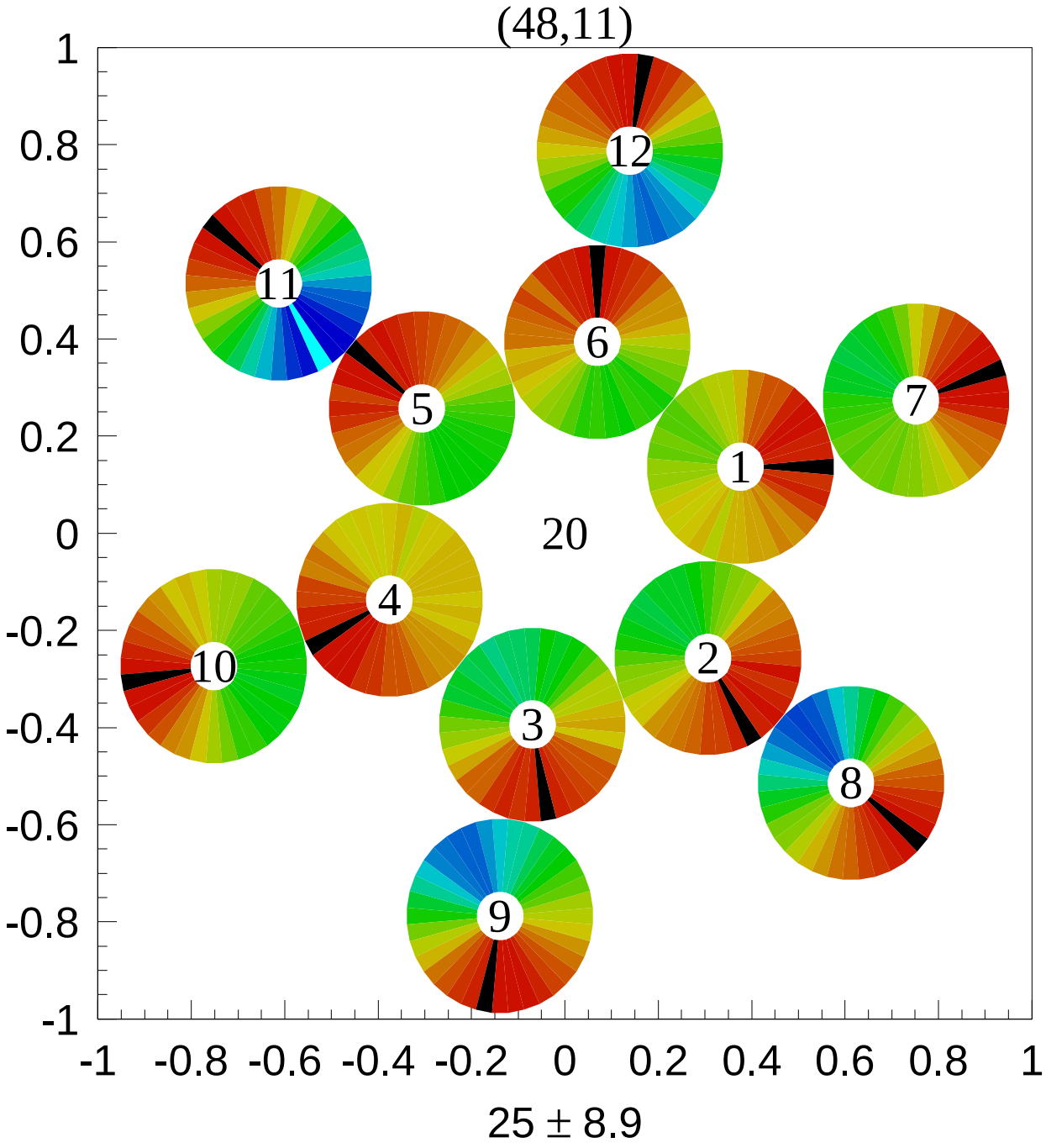

(48,9)
tilted LEDs
115 117 125 119 120 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 124 129 125 119 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

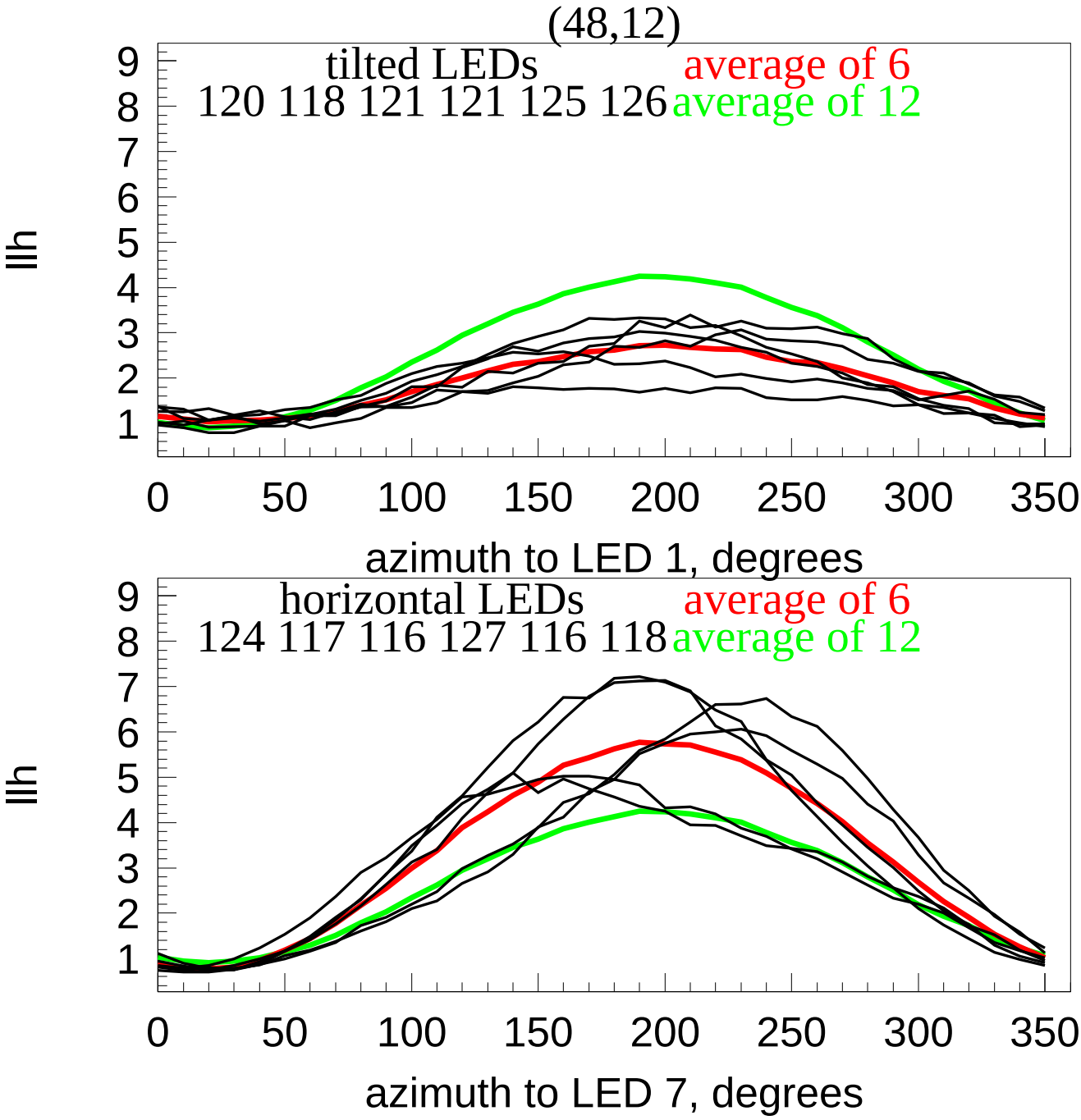

(48,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
70
5
11
3
4
9
10
59.1 ± 14.4

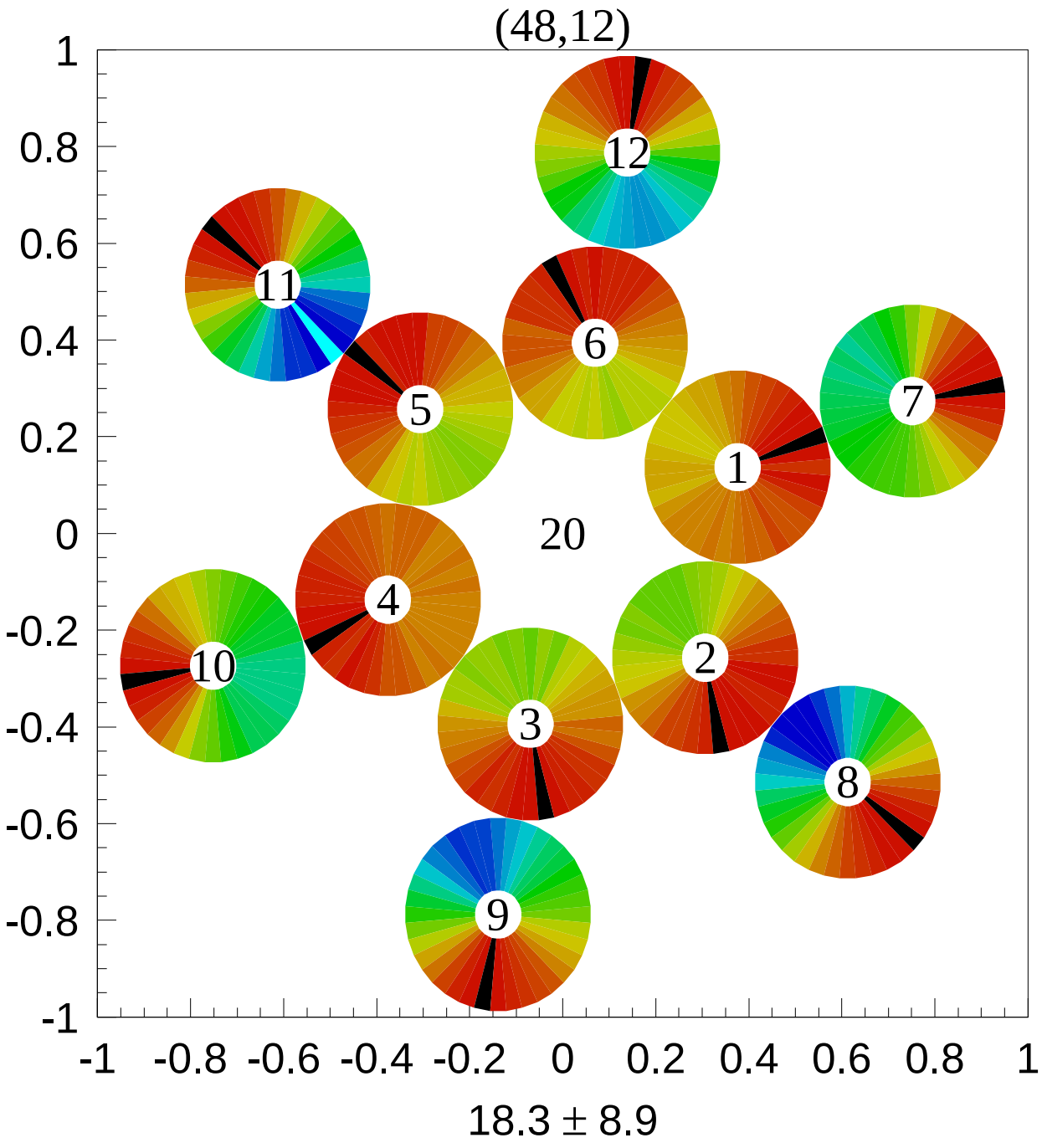

(48,10)
tilted LEDs
128 122 117 116 126 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 125 125 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

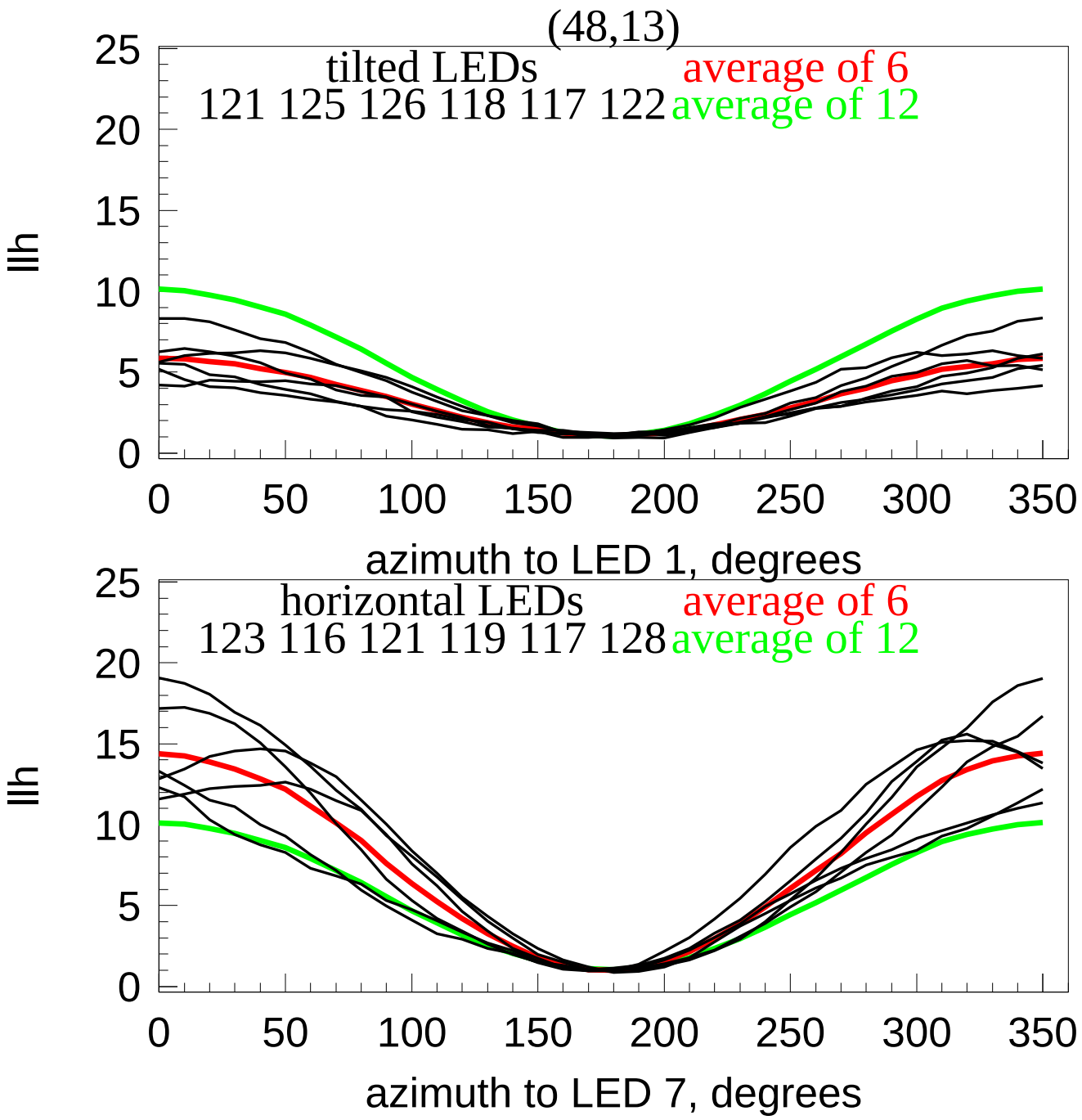

(48,10)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
43 ± 6.8

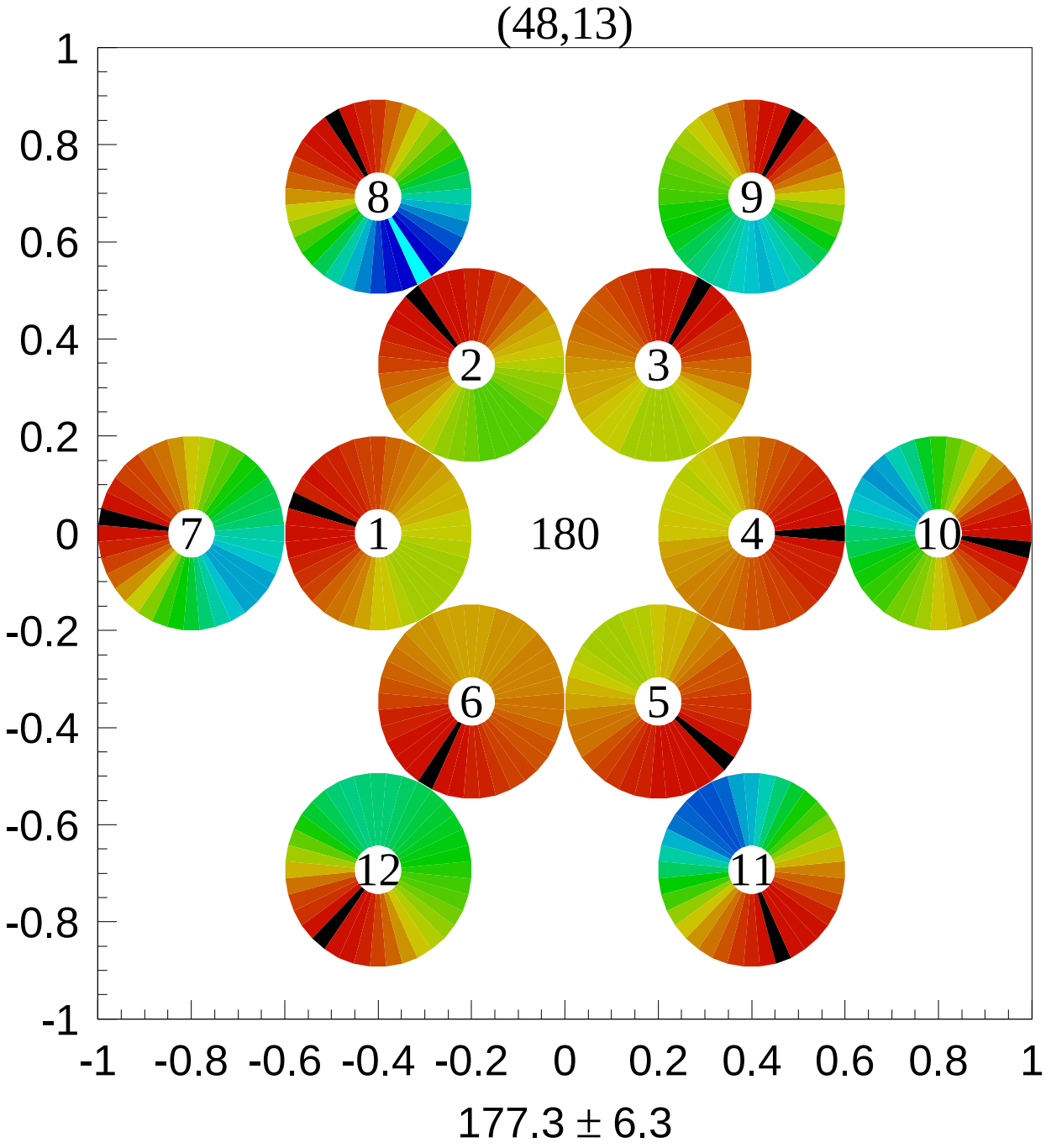

(48,11)
tilted LEDs
115 121 121 119 126 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 121 120 122 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

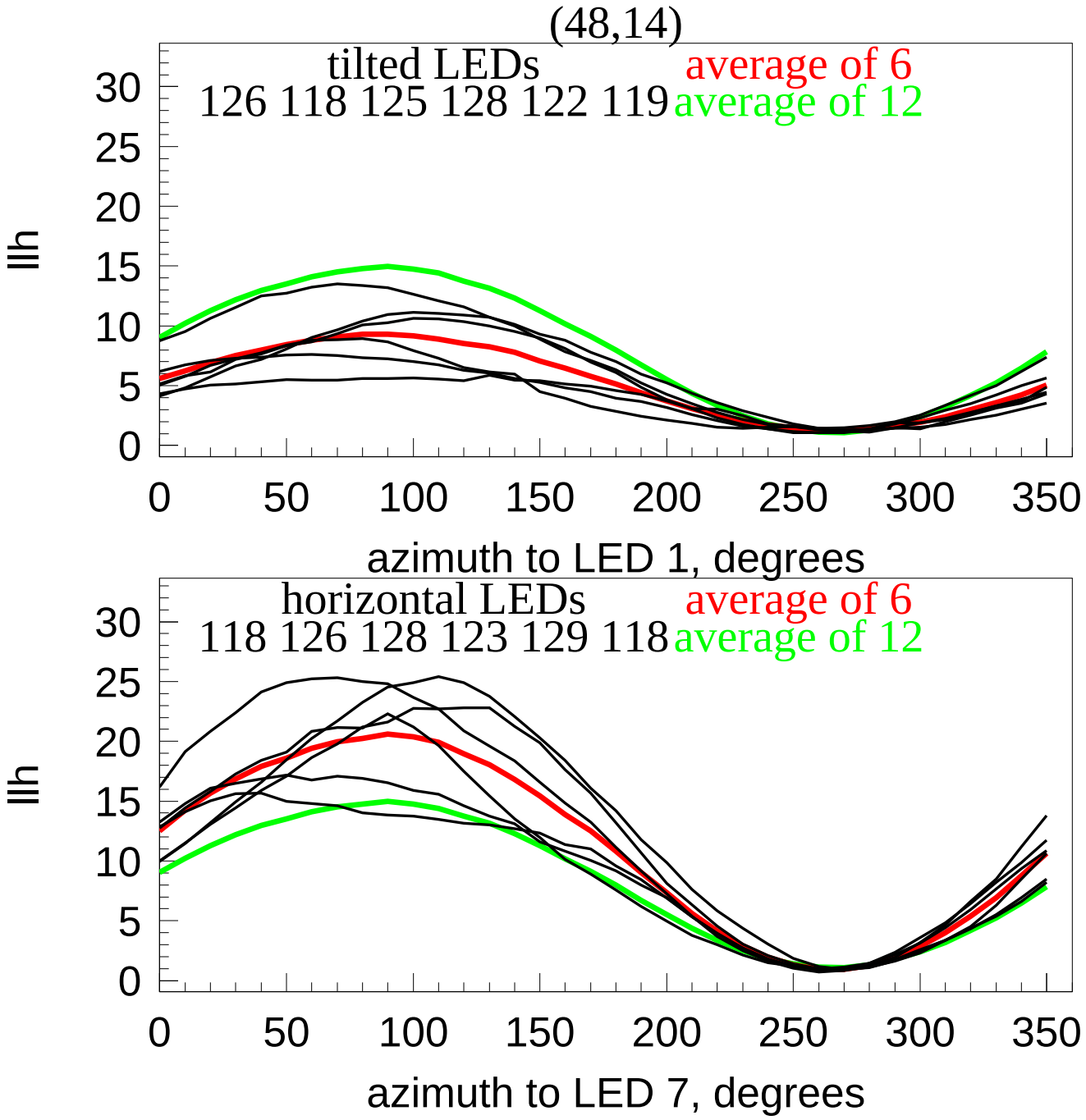

(48,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
25 ± 8.9

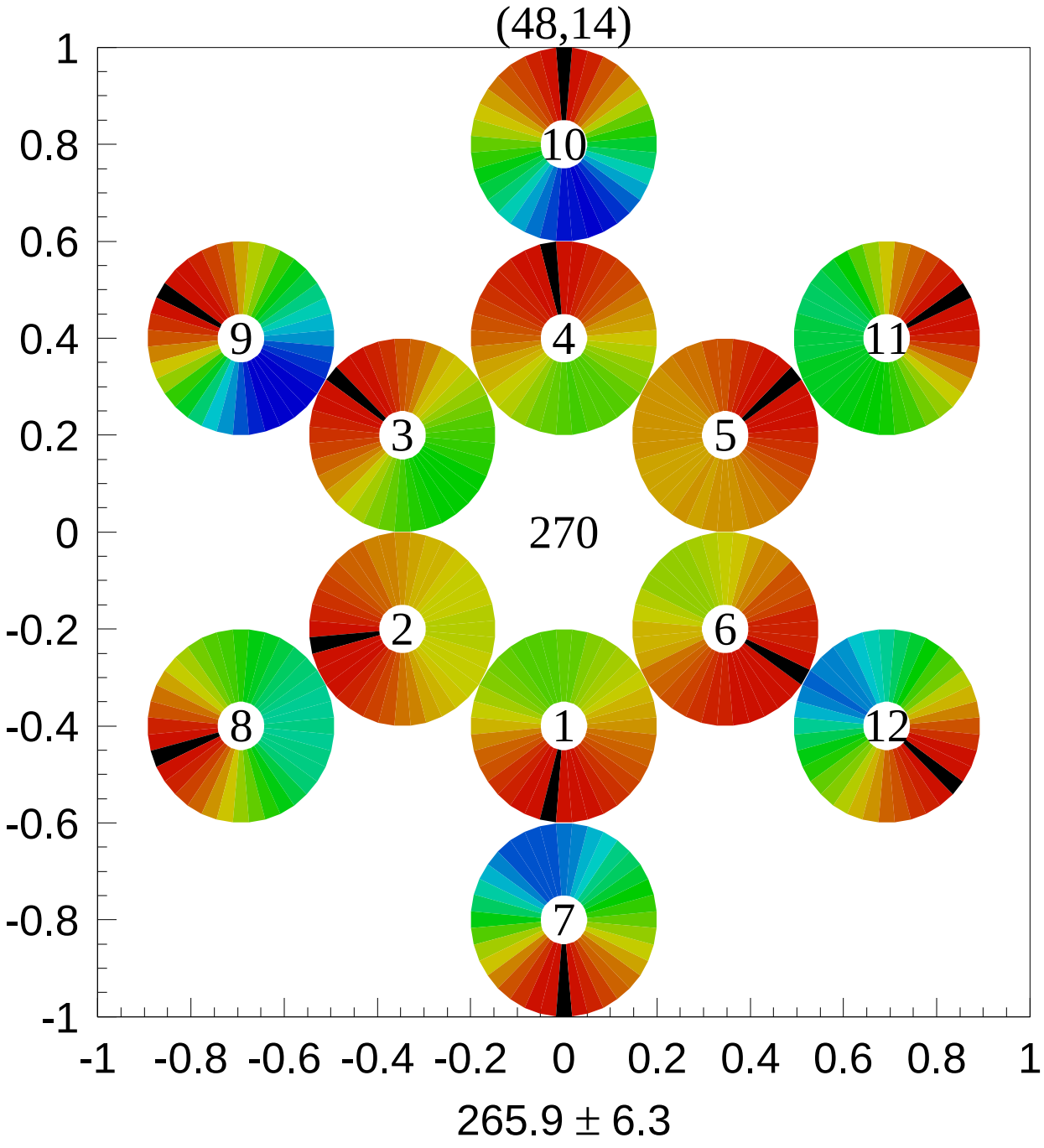

(48,12)
tilted LEDs
120 118 121 121 125 126
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 117 116 127 116 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

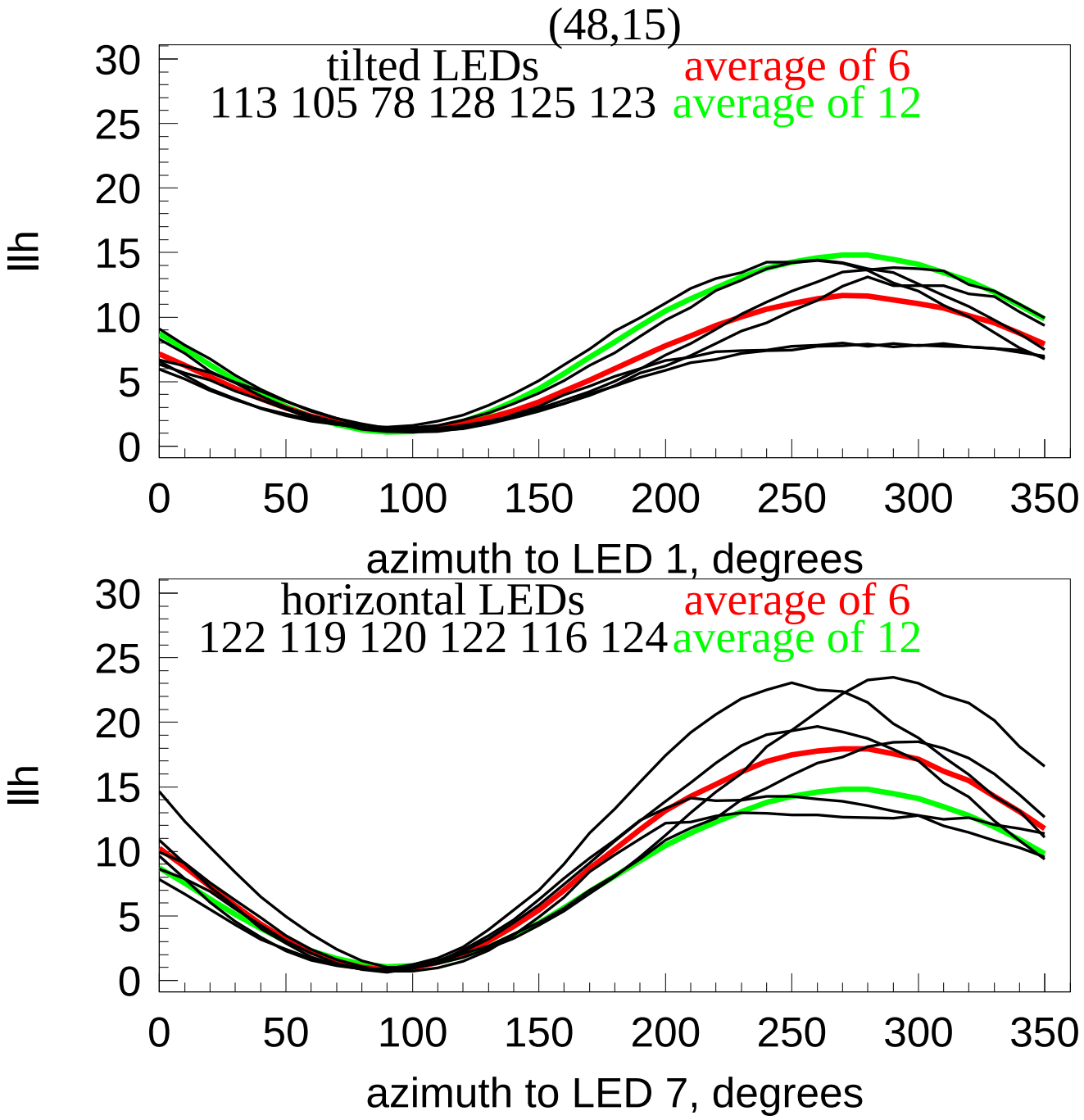

(48,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
18.3 ± 8.9

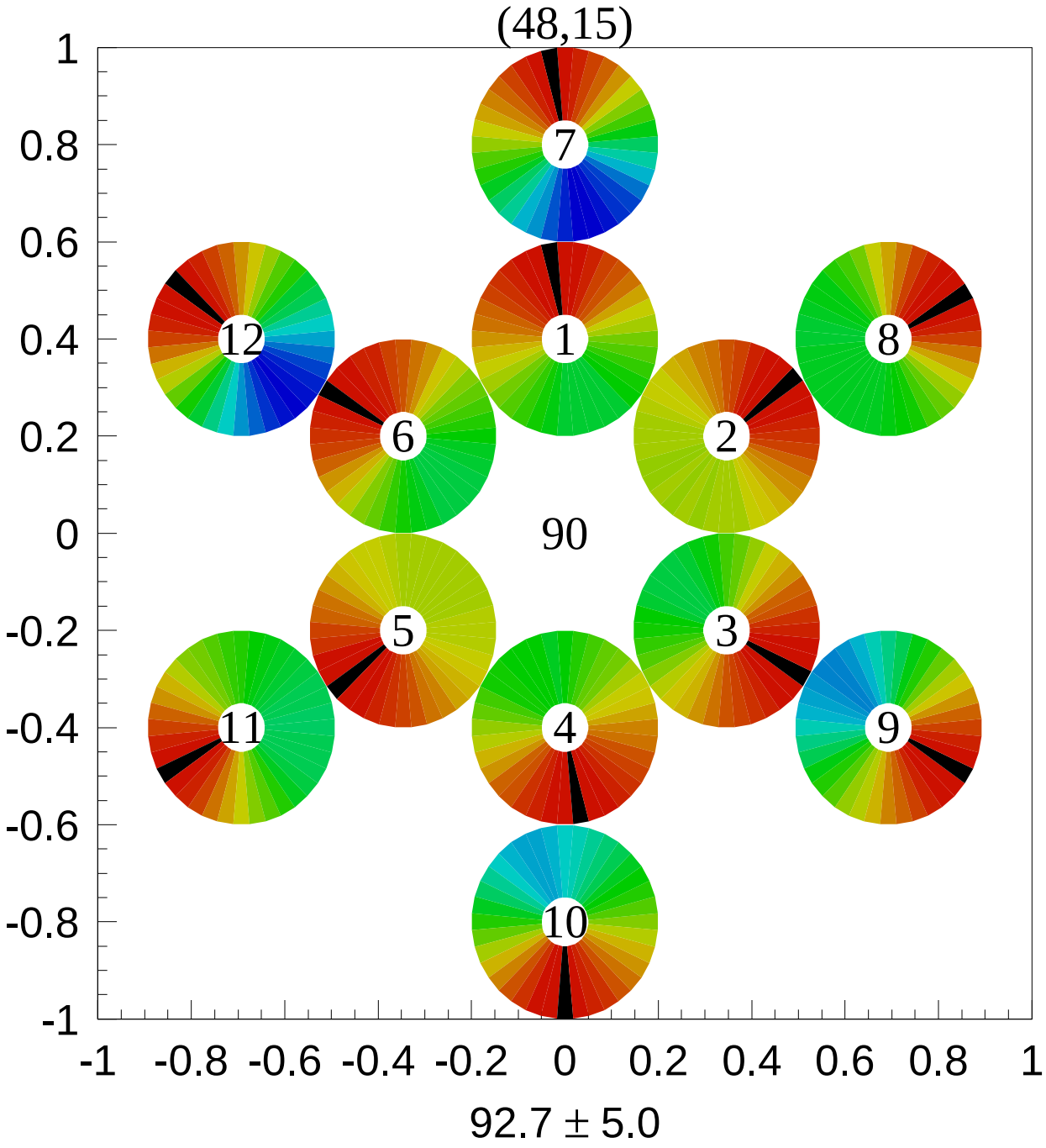

(48,13)
tilted LEDs
121 125 126 118 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 116 121 119 117 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

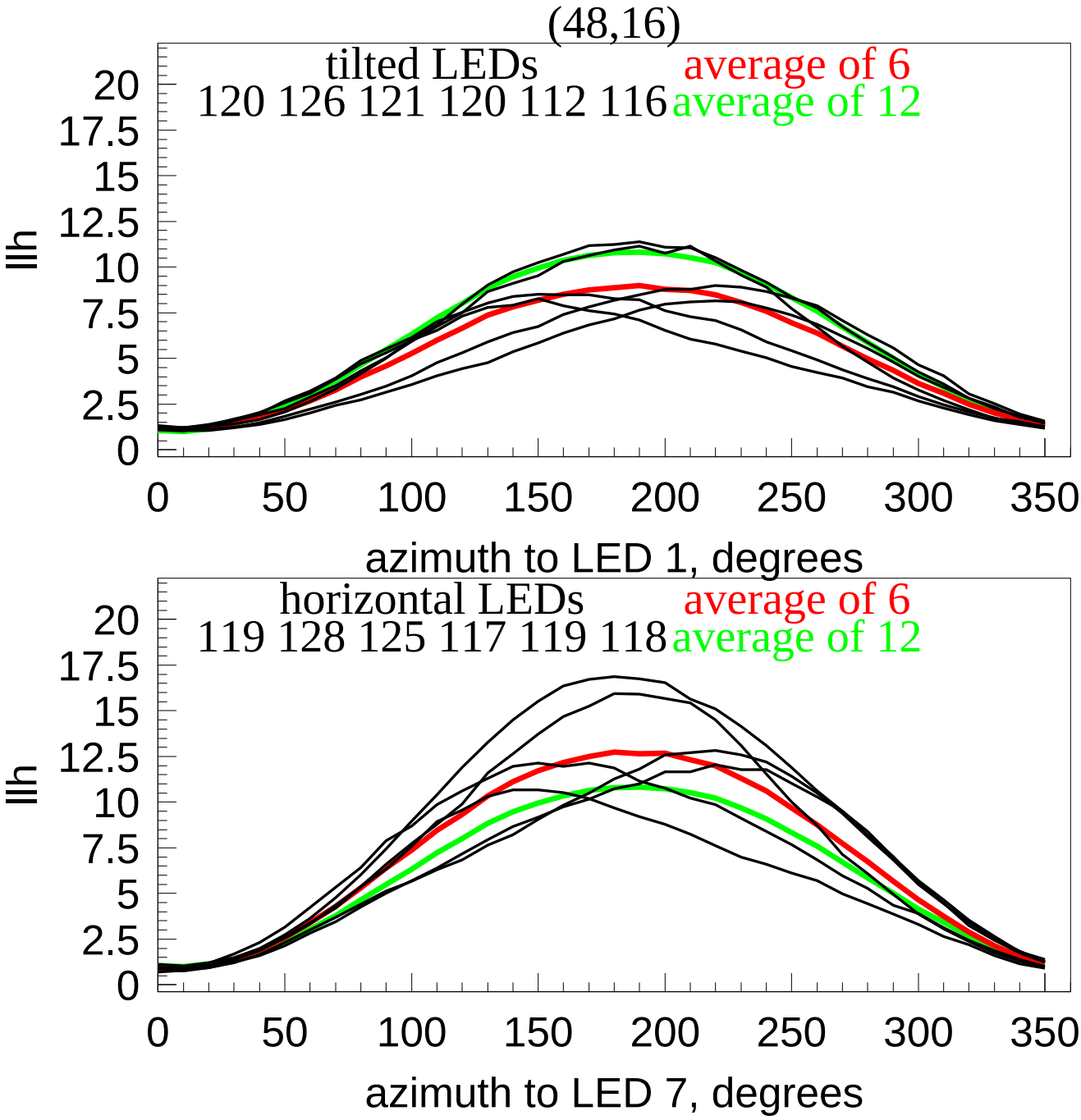

(48,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
177.3 ± 6.3

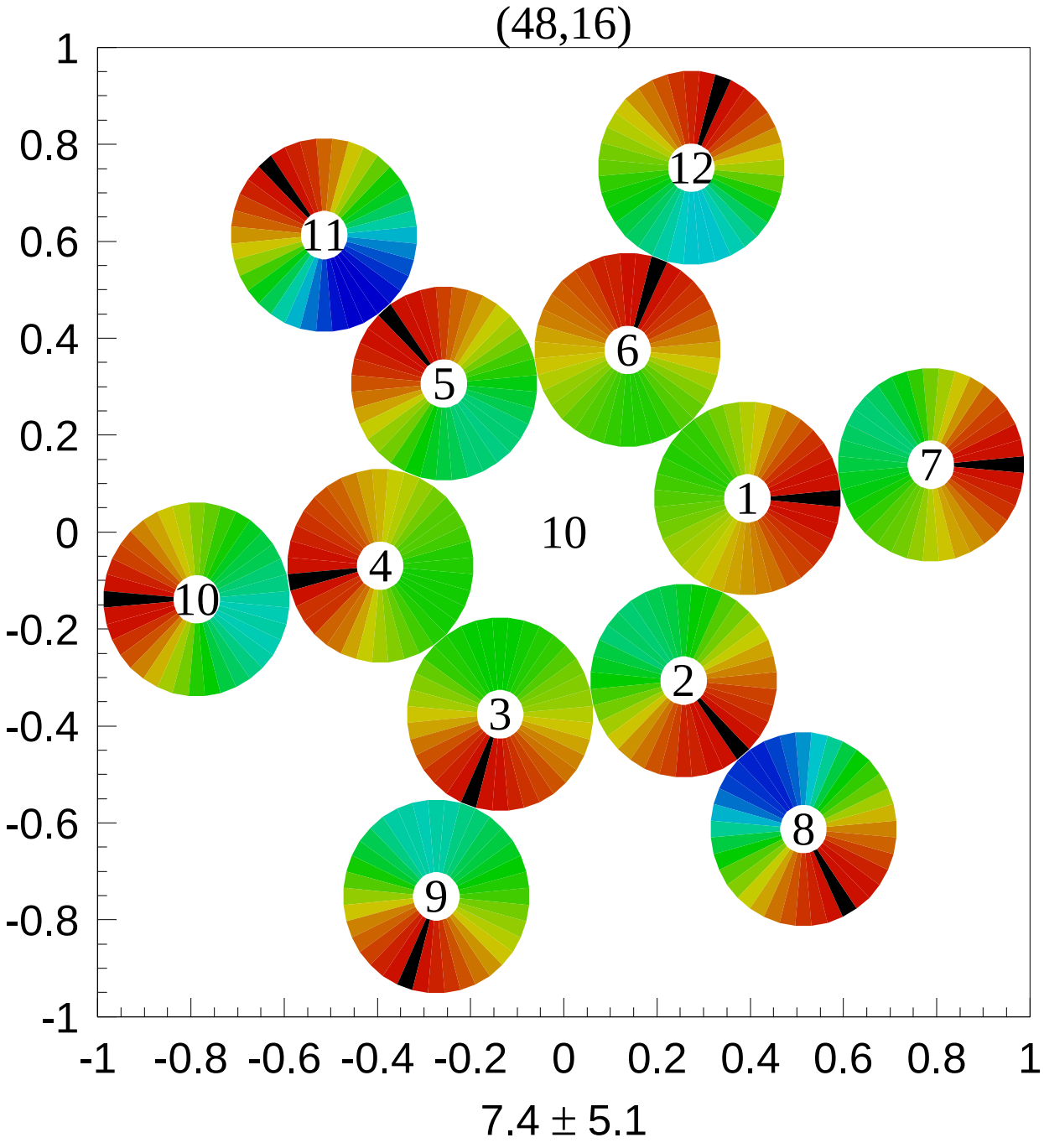

(48,14)
tilted LEDs
126 118 125 128 122 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 126 128 123 129 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

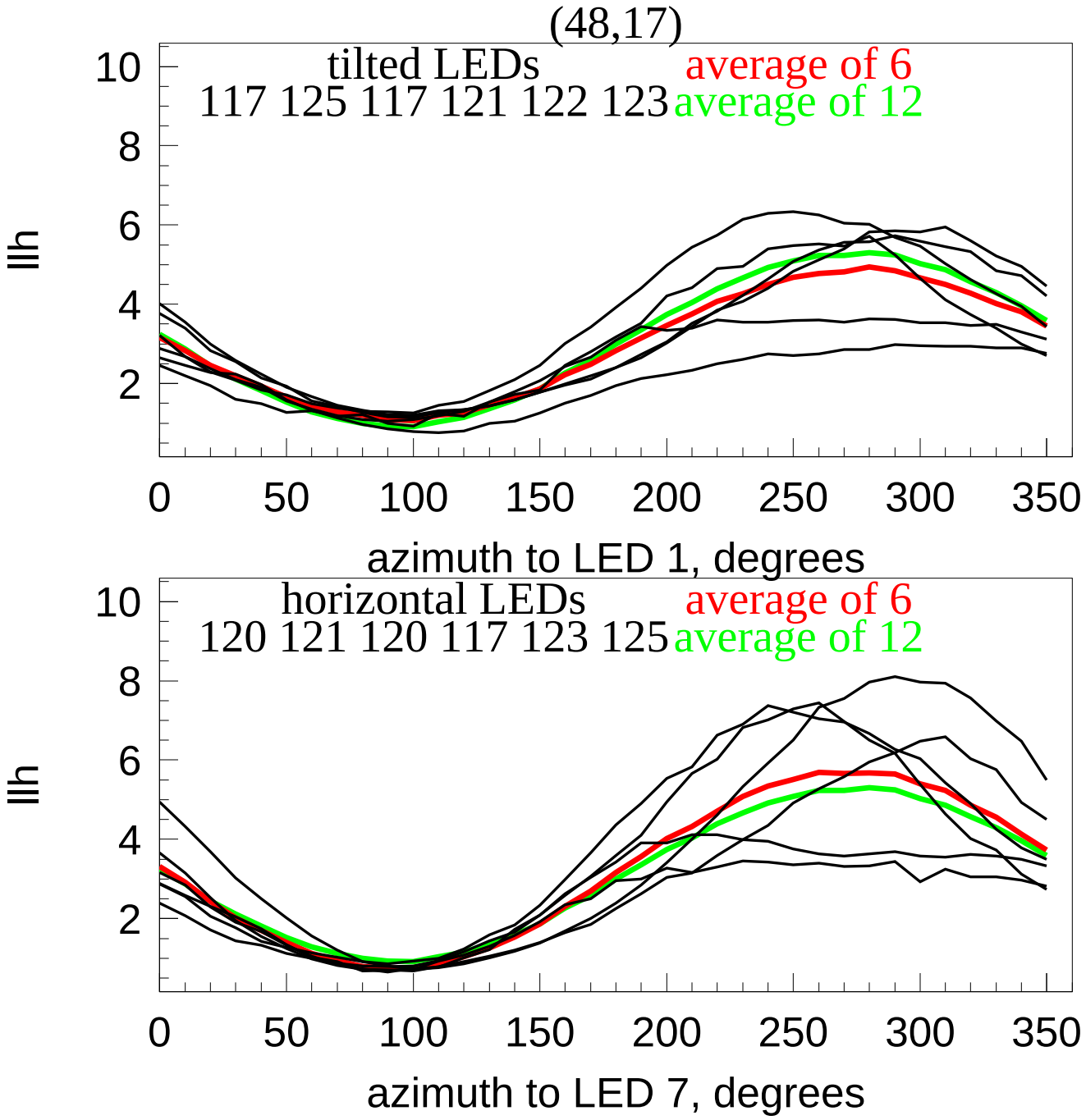

(48,14)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
265.9 ± 6.3

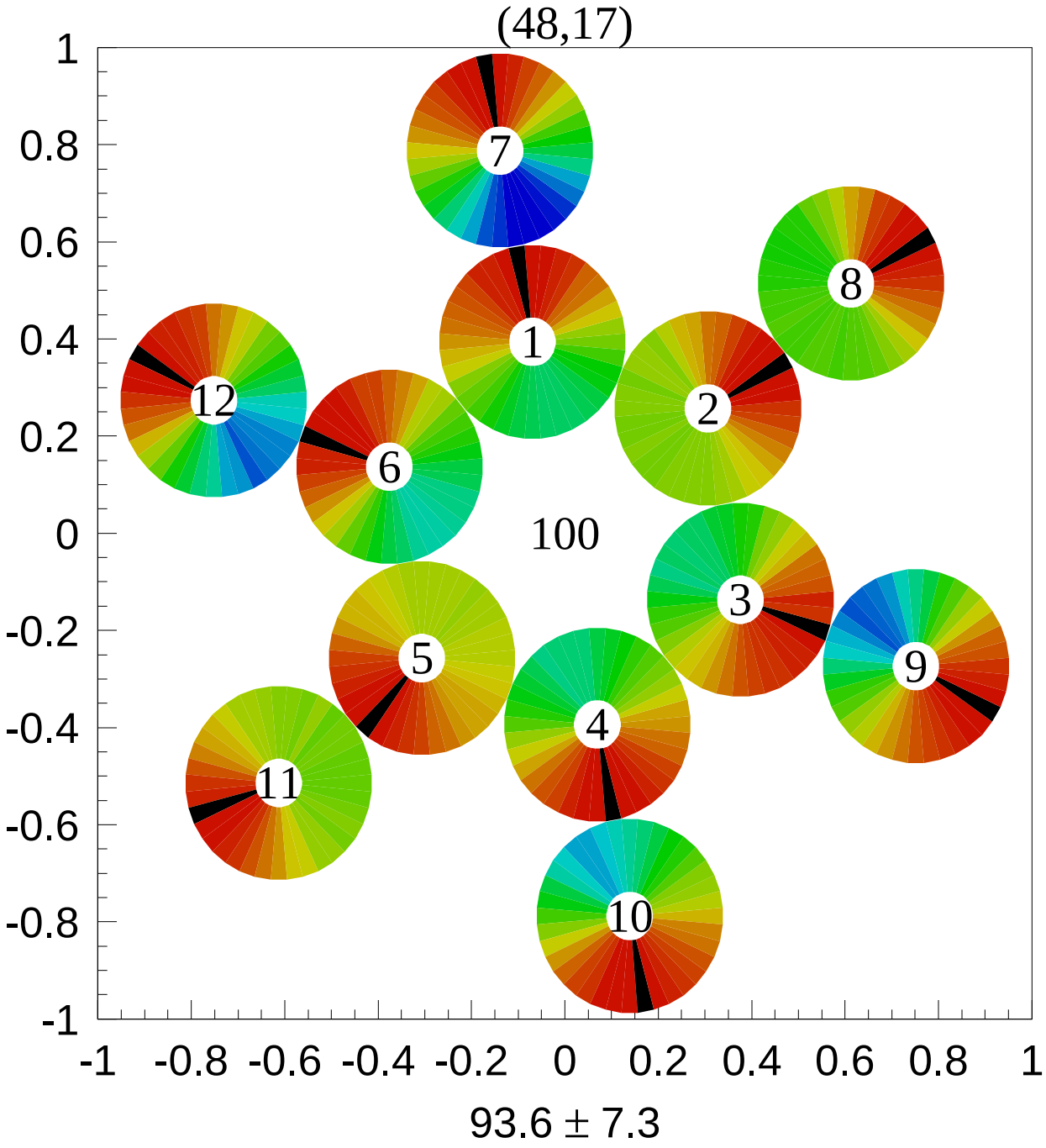

(48,15)
tilted LEDs
113 105 78 128 125 123
average of 6
average of 12
30
25
20
15
10
5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 119 120 122 116 124
average of 6
average of 12
30
25
20
15
10
5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

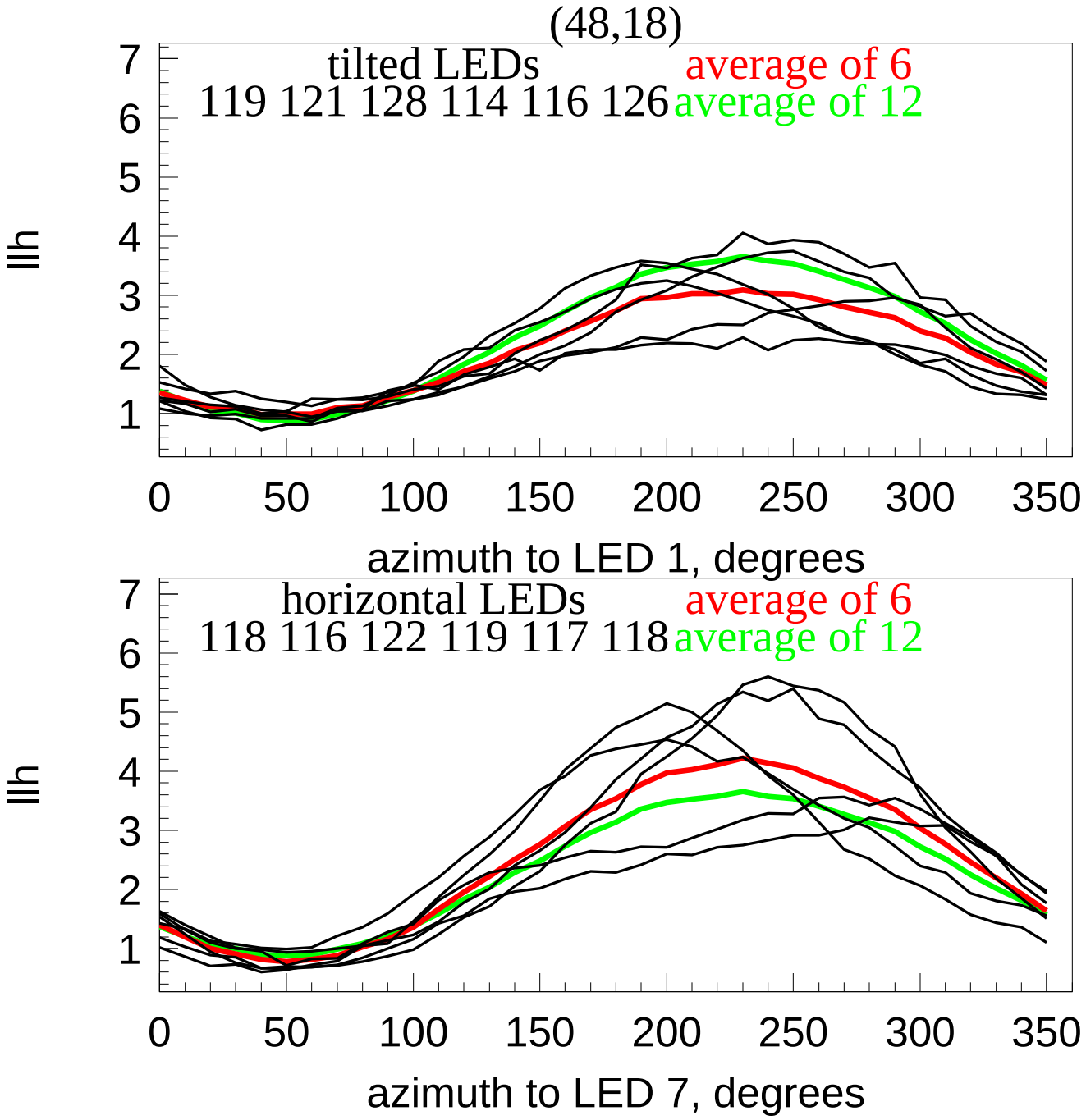

(48,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
92.7 ± 5.0

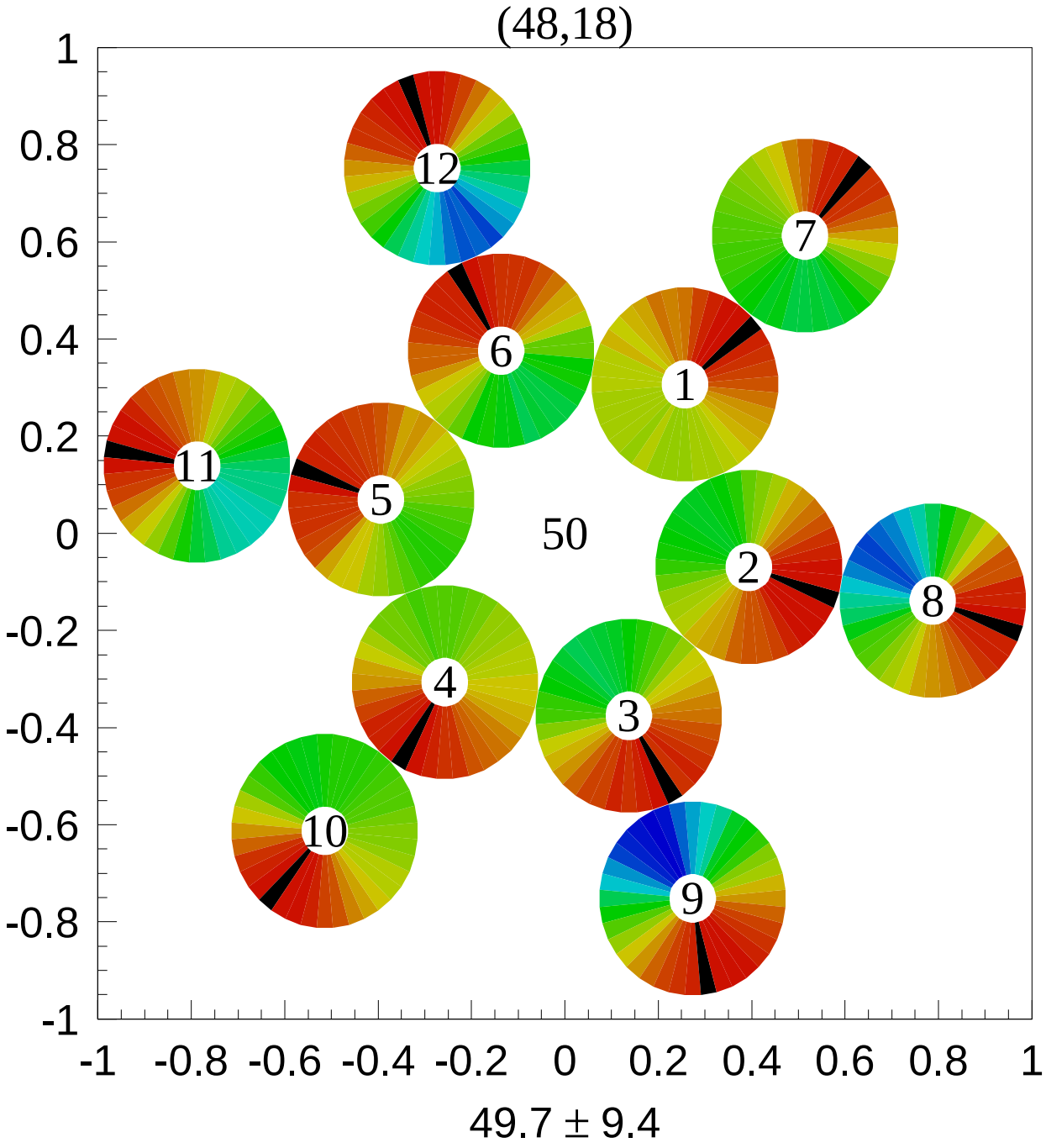

(48,16)
tilted LEDs
120 126 121 120 112 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 128 125 117 119 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

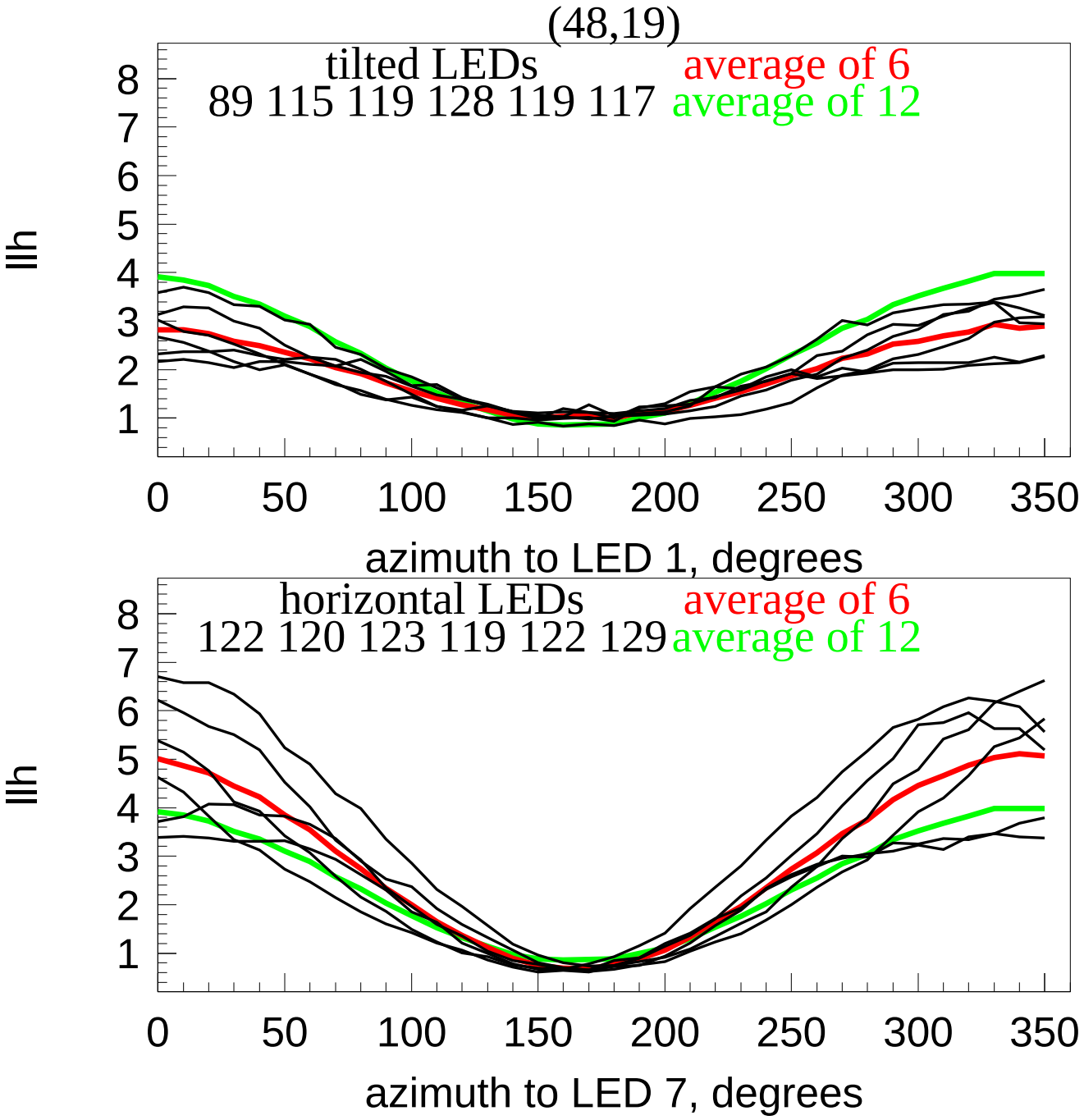

(48,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
7.4 ± 5.1

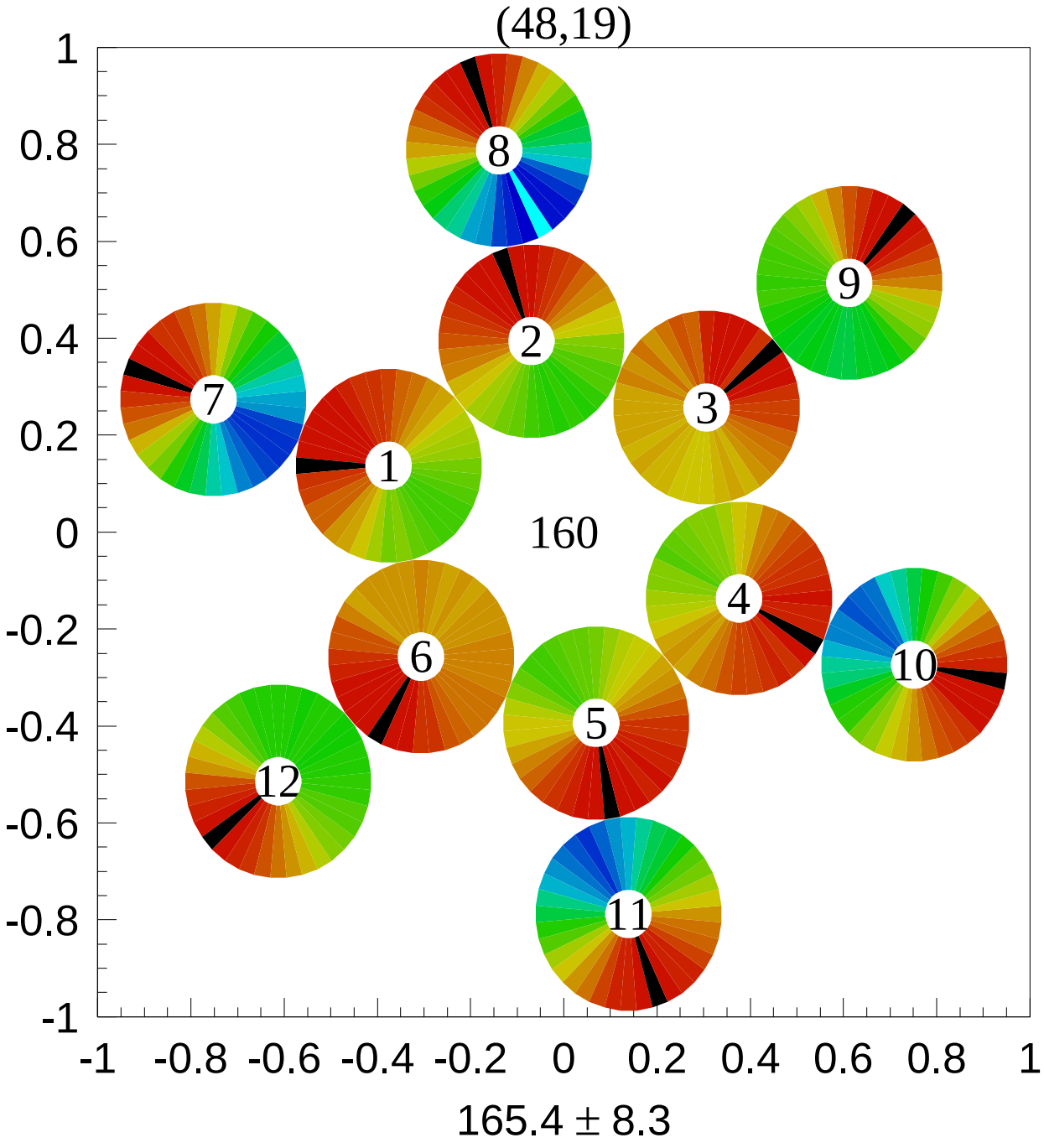

(48,17)
tilted LEDs
117 125 117 121 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 120 117 123 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

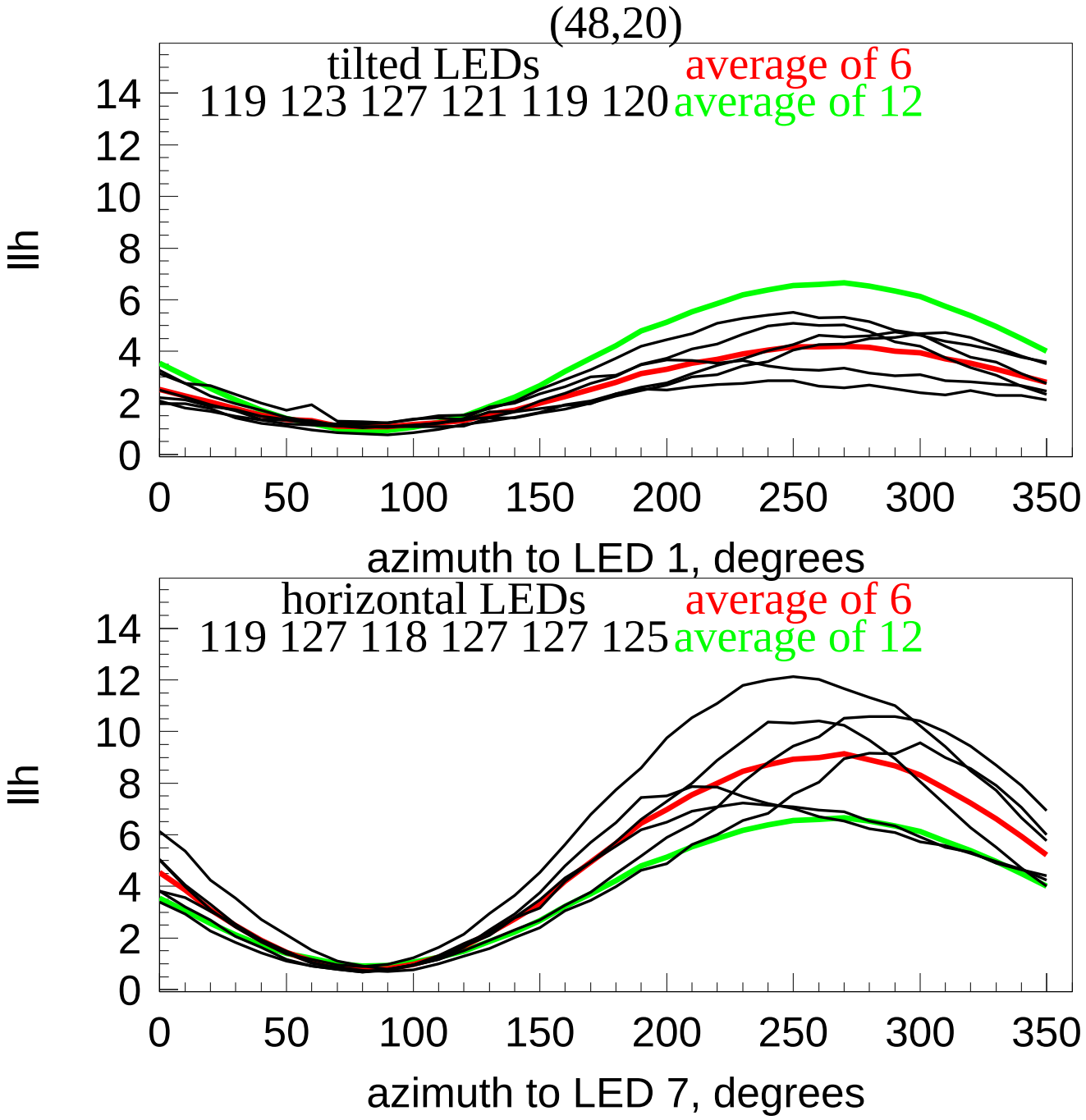

(48,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
93.6 ± 7.3

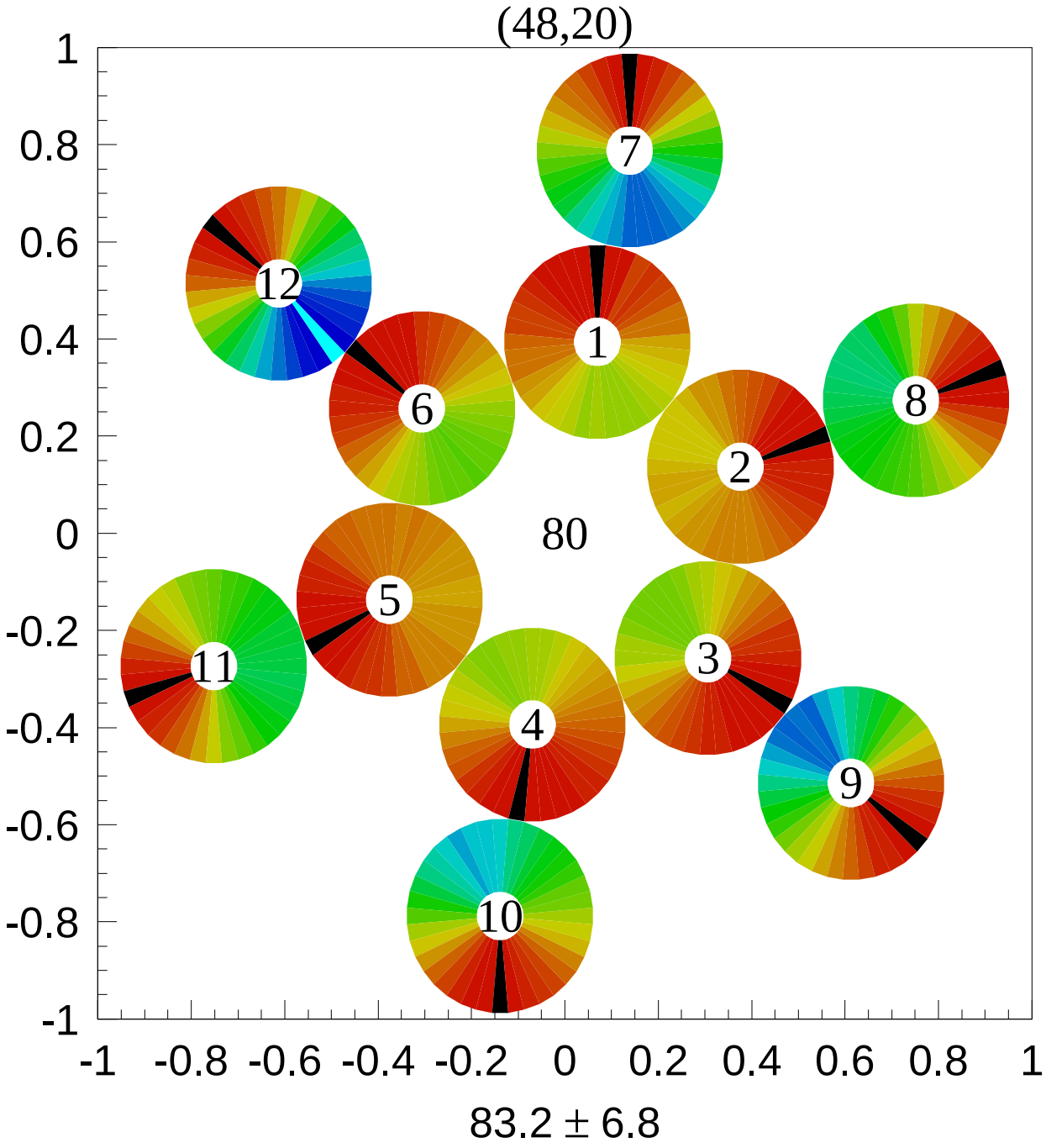

(48,18)
tilted LEDs
119 121 128 114 116 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 116 122 119 117 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

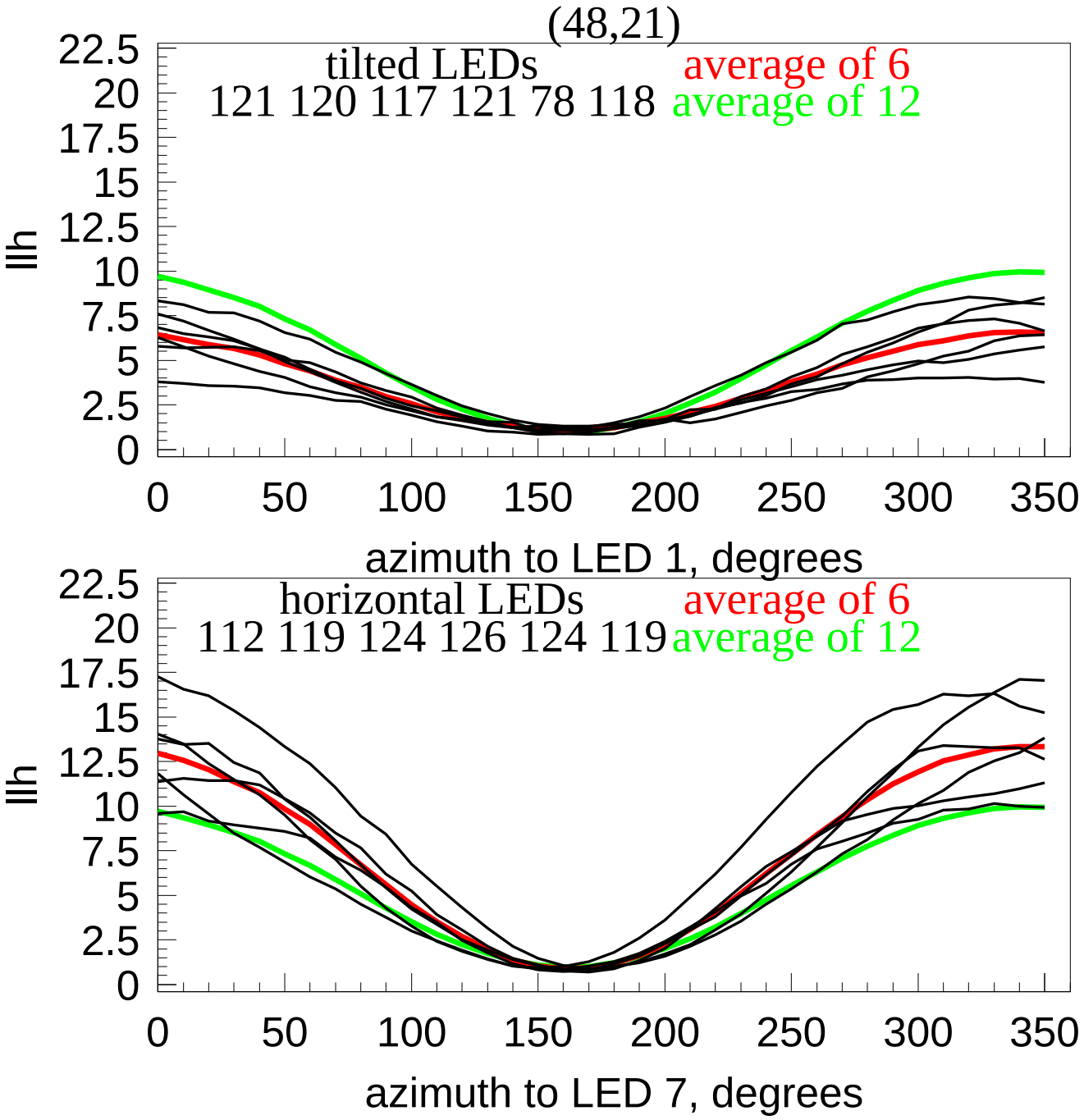

(48,18)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
49.7 ± 9.4

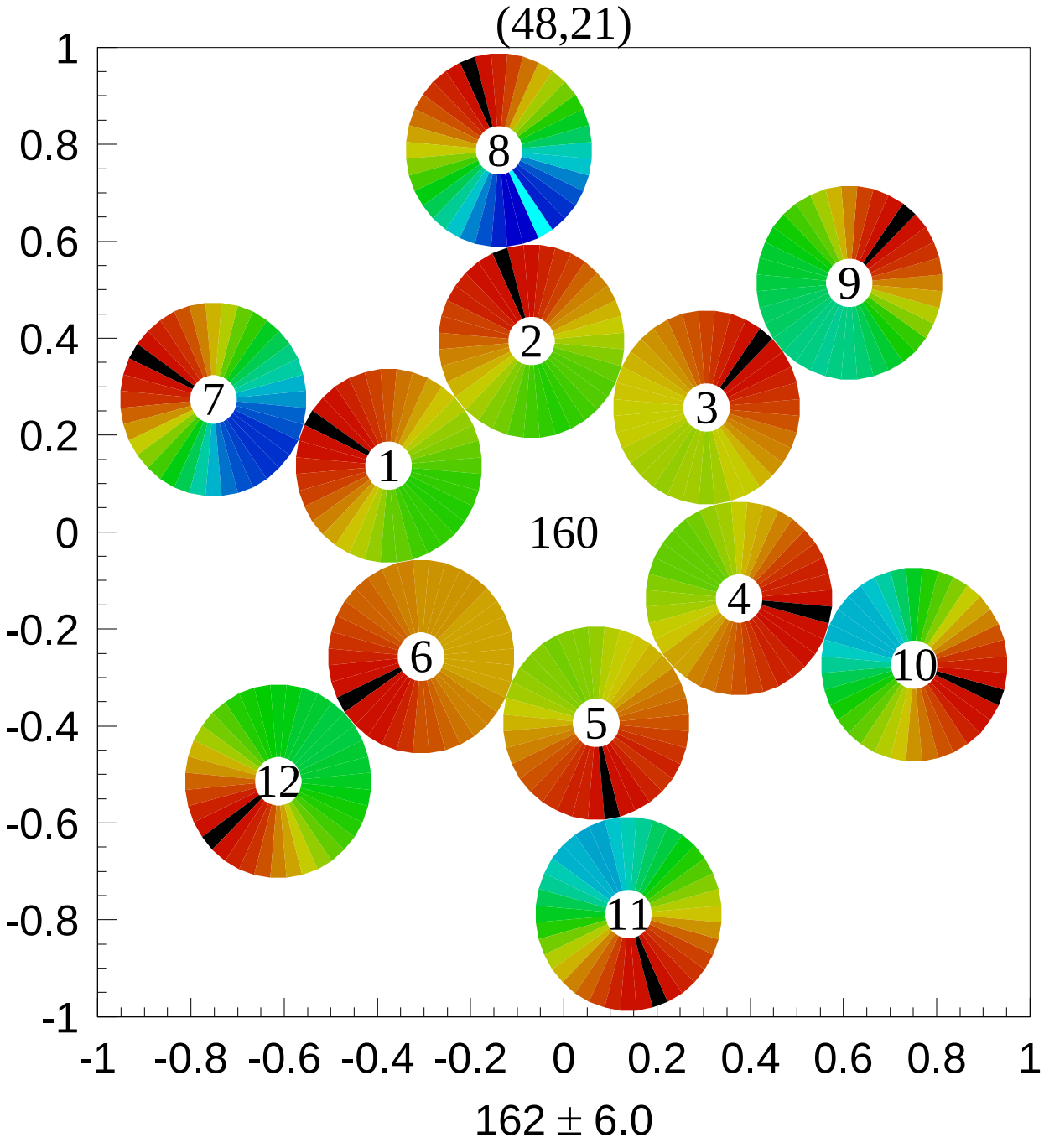

(48,19)
tilted LEDs
89 115 119 128 119 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 120 123 119 122 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

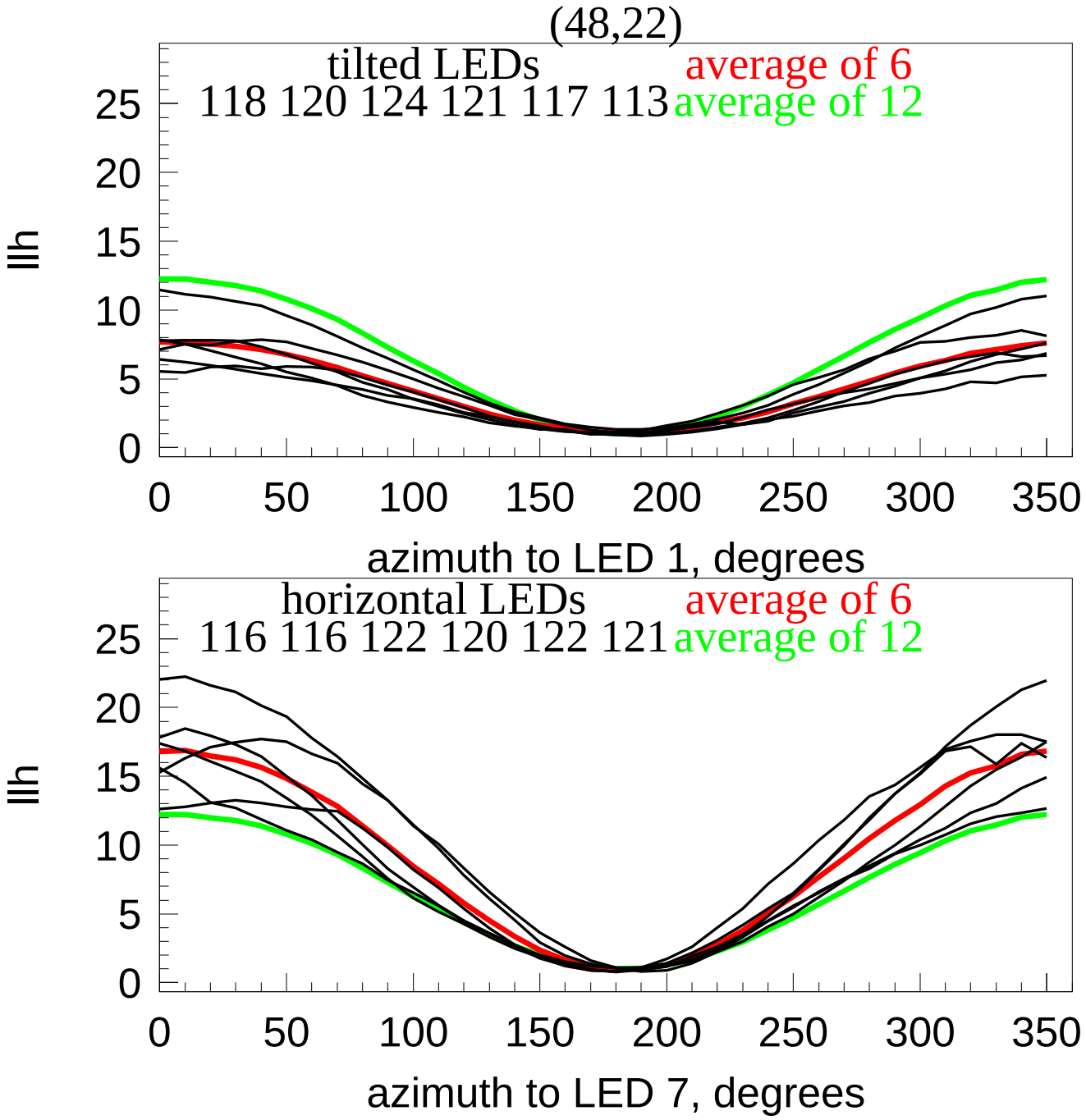

(48,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
165.4 ± 8.3
160
1
2
3
4
5
6
7
8
9
10
11
12

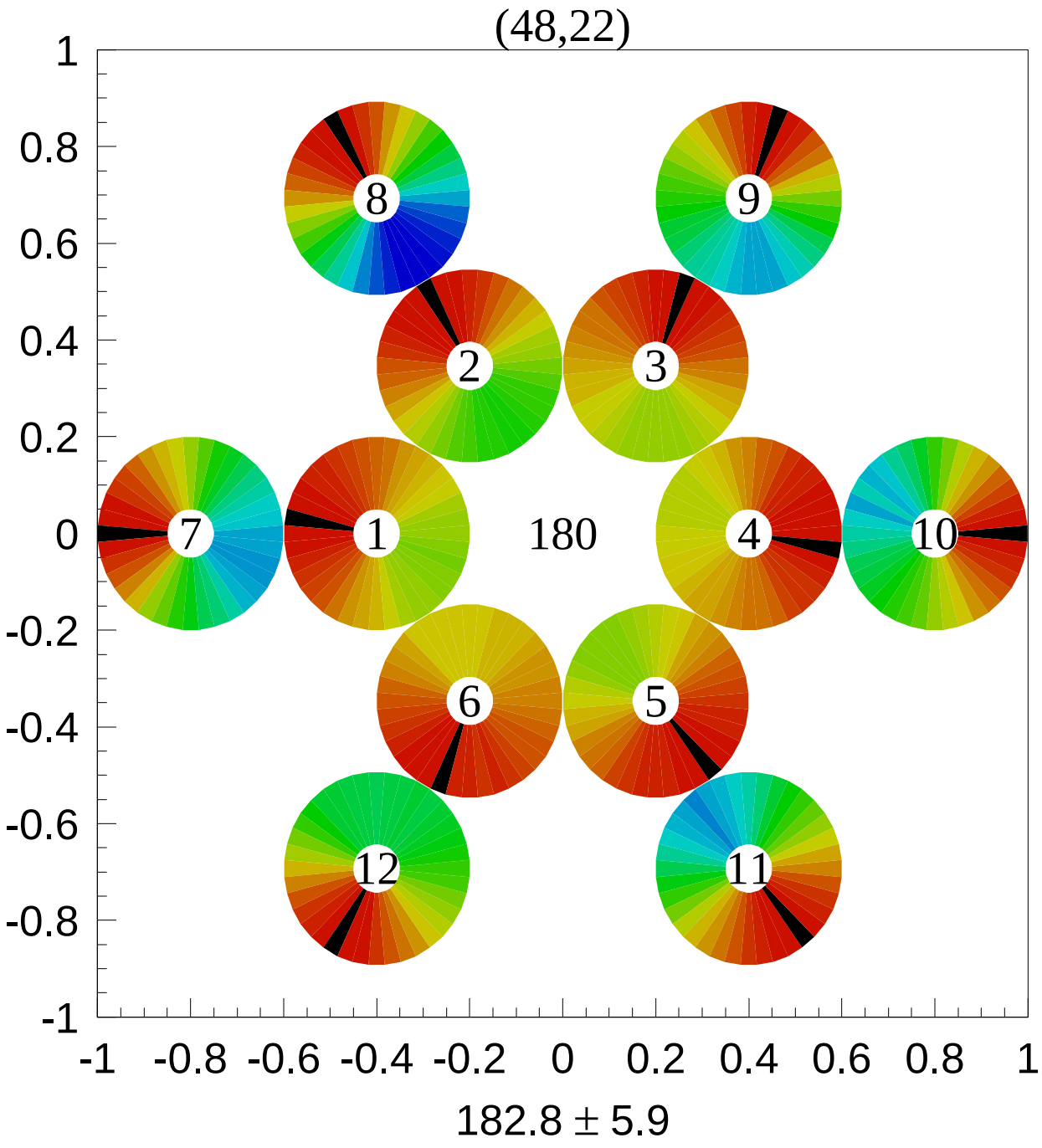

(48,20)
tilted LEDs
119 123 127 121 119 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 127 118 127 127 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

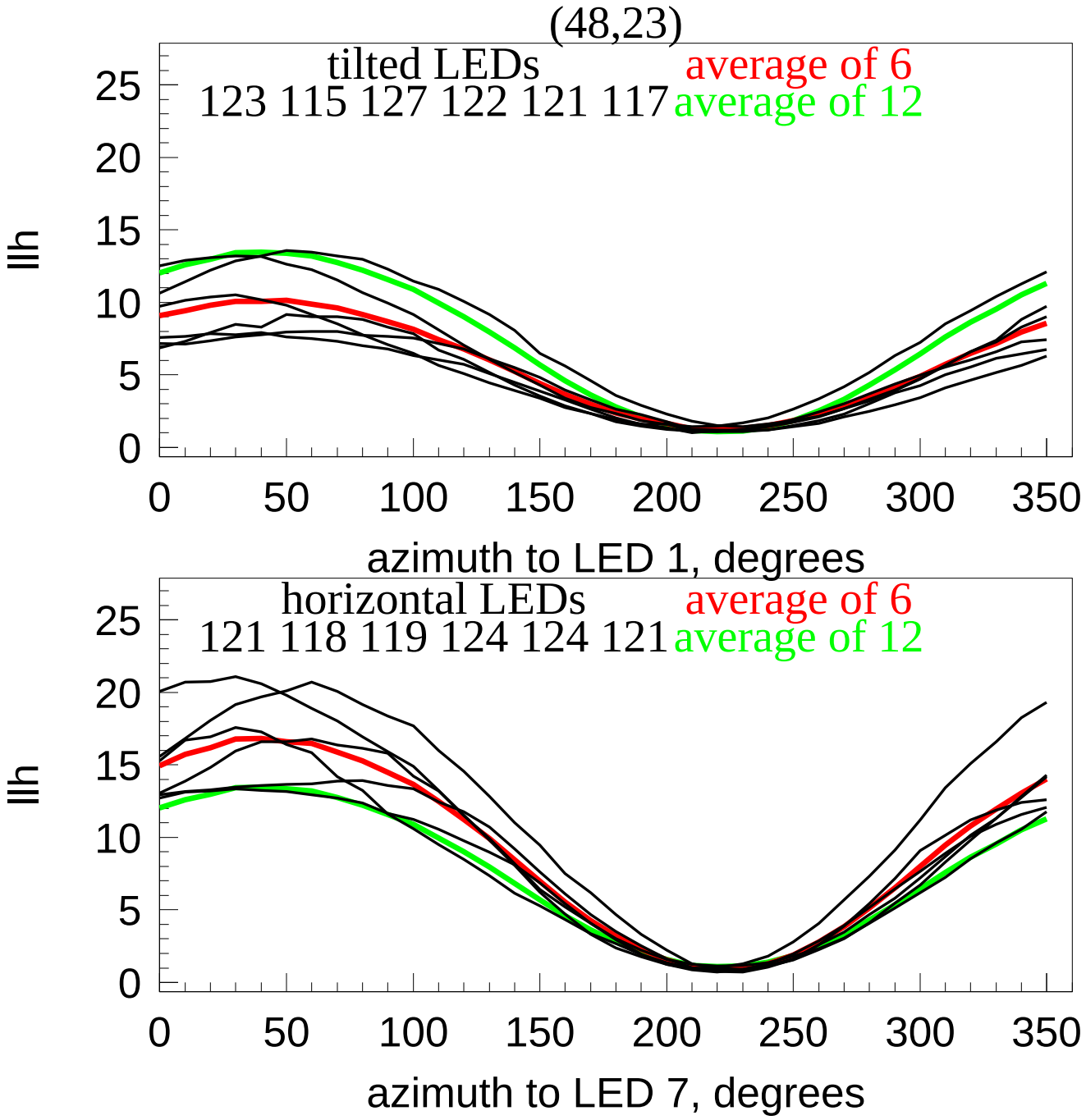

(48,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
83.2 ± 6.8

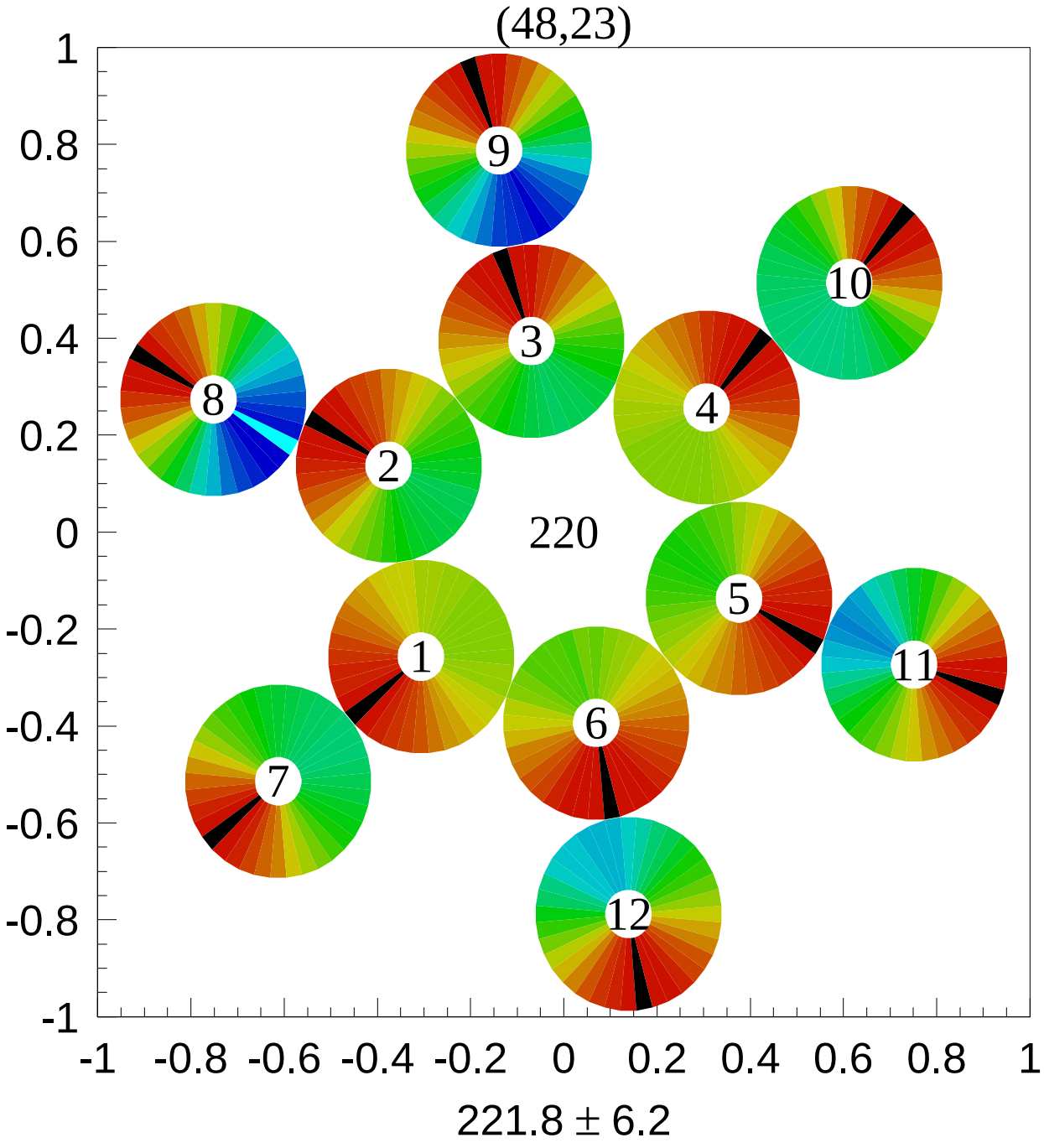

(48,21)
tilted LEDs
121 120 117 121 78 118
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
112 119 124 126 124 119
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

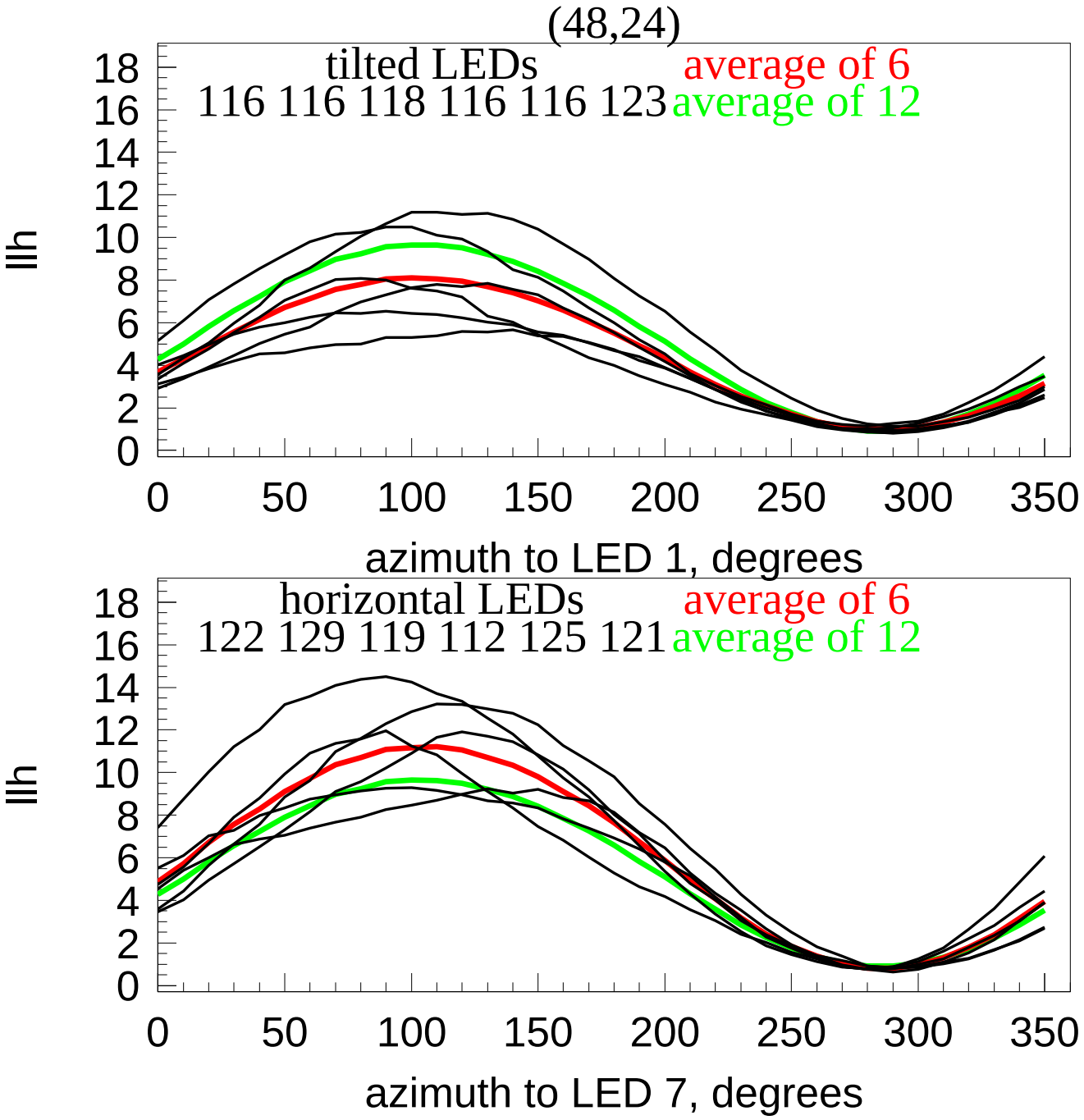

(48,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
162 ± 6.0

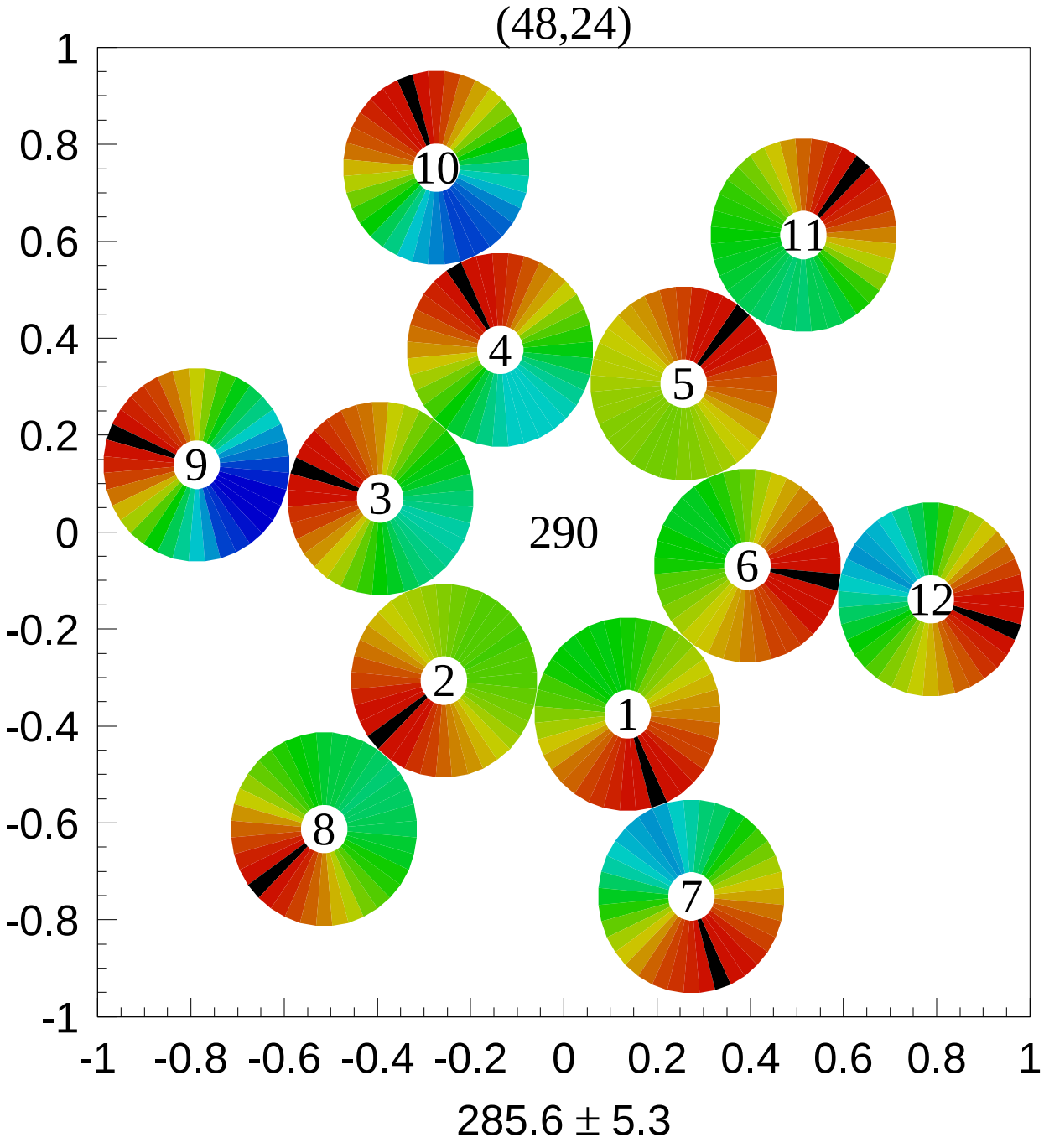

(48,22)
tilted LEDs
118 120 124 121 117 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 116 122 120 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

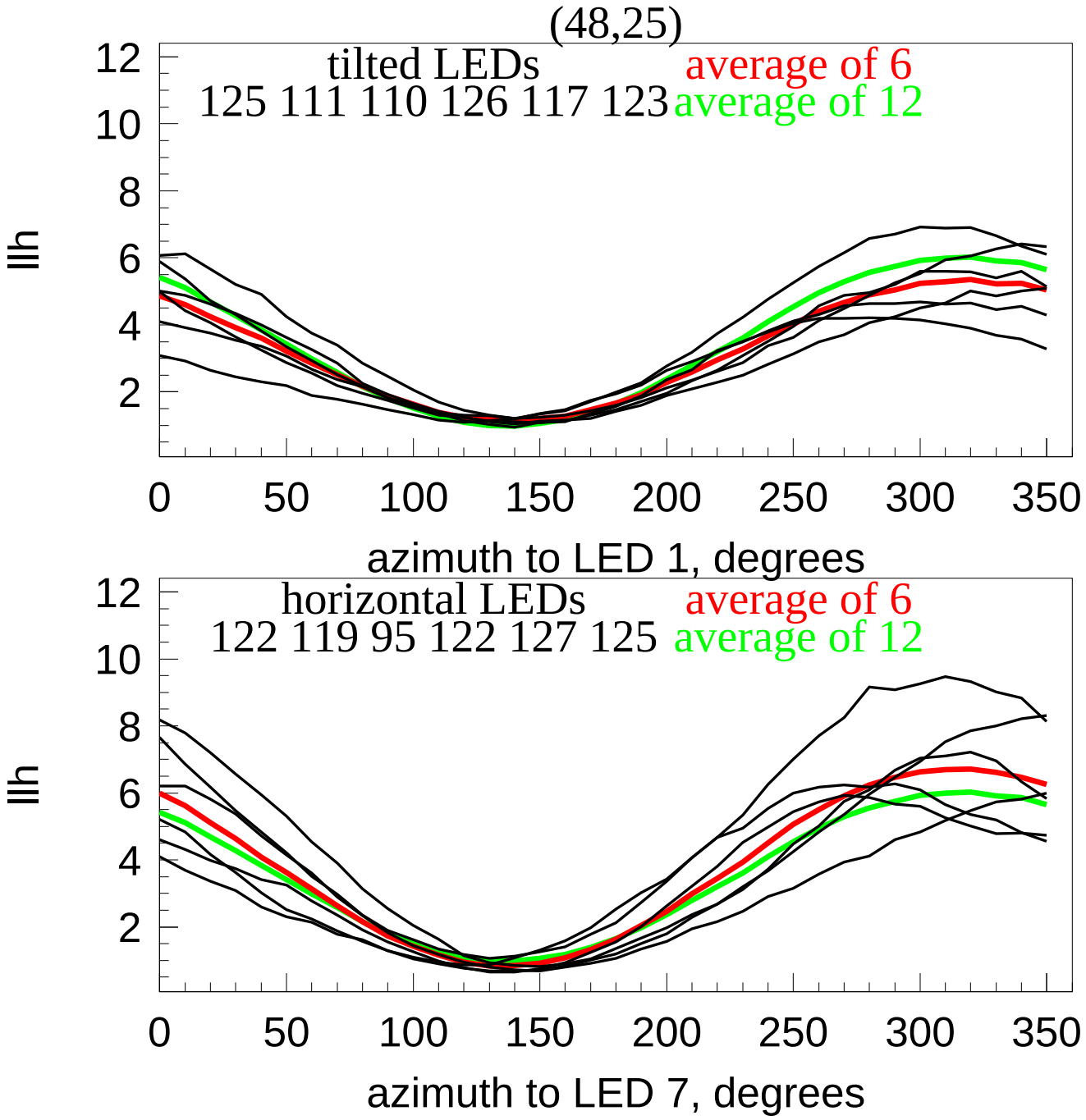

(48,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
182.8 ± 5.9

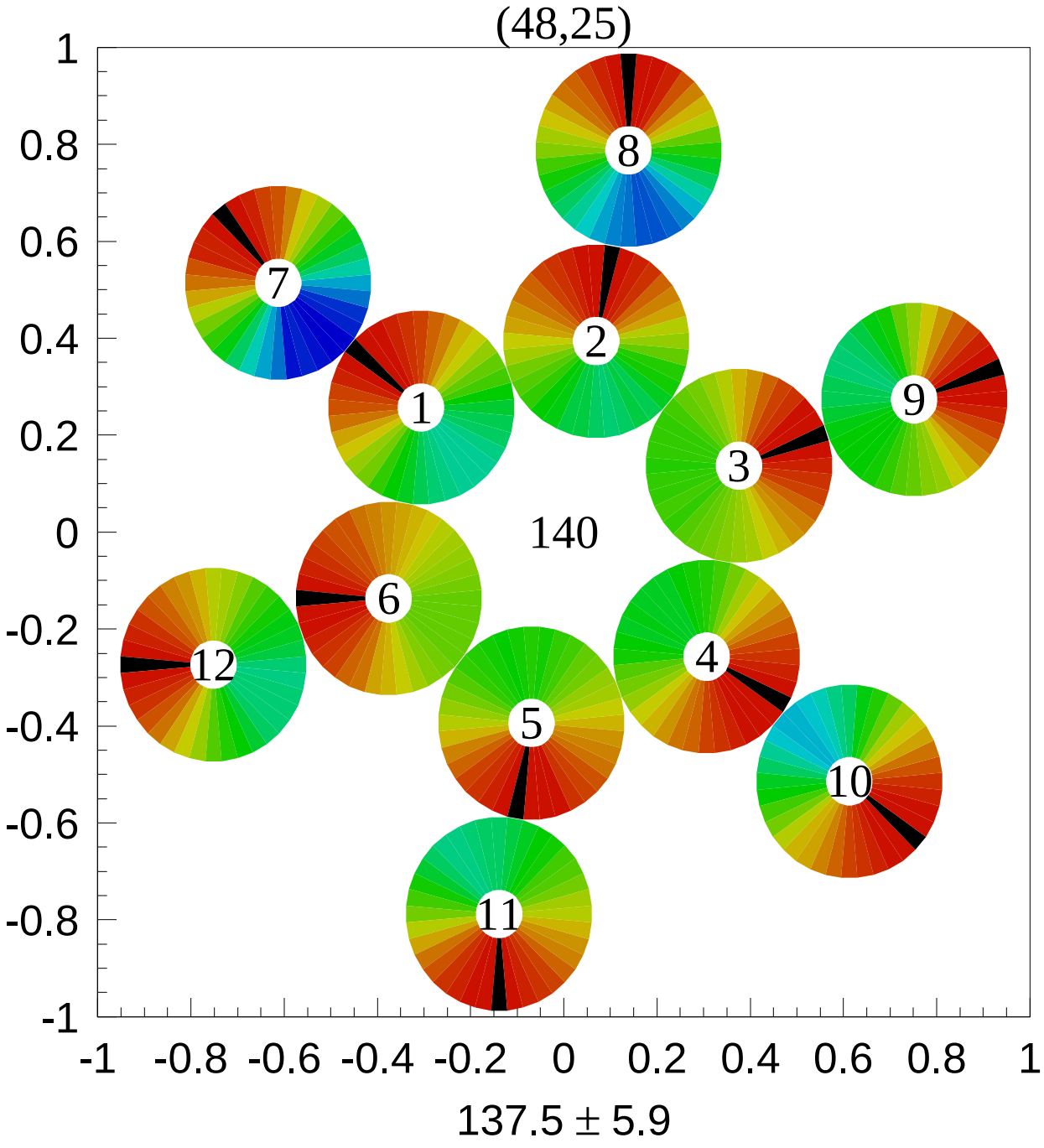

(48,23)
tilted LEDs
123 115 127 122 121 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 118 119 124 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

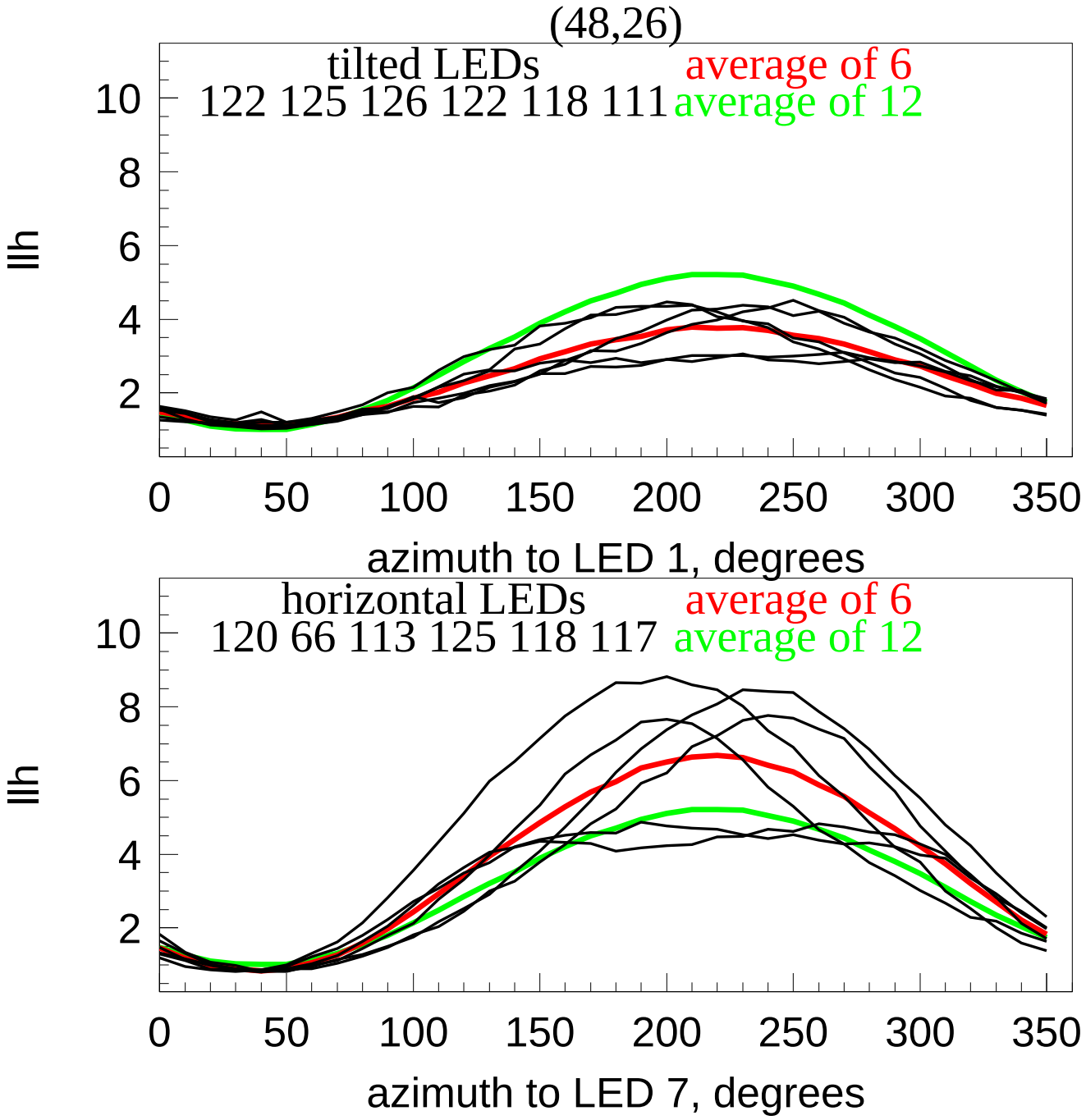

(48,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
221.8 ± 6.2

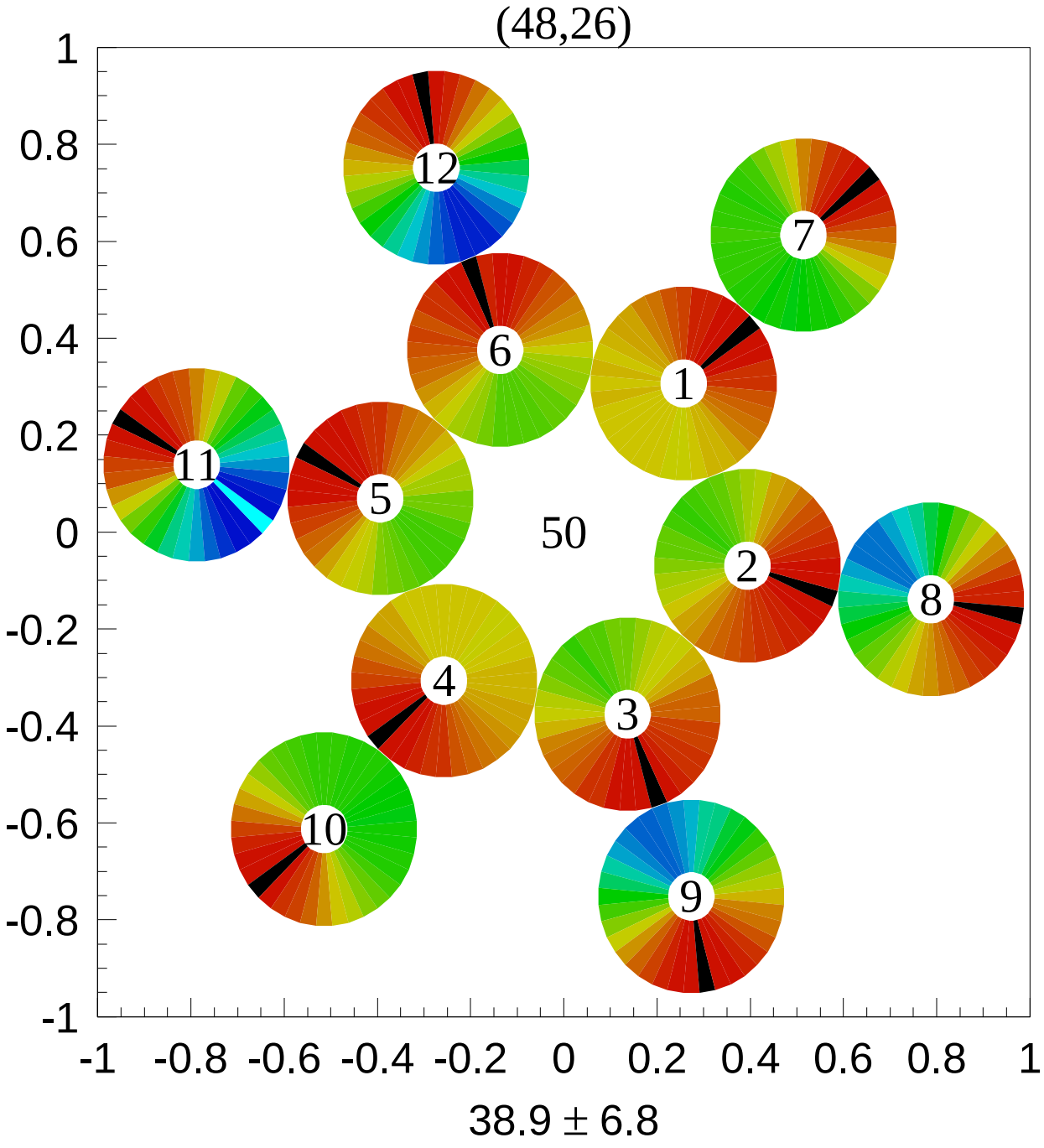

(48,24)
tilted LEDs
116 116 118 116 116 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 129 119 112 125 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

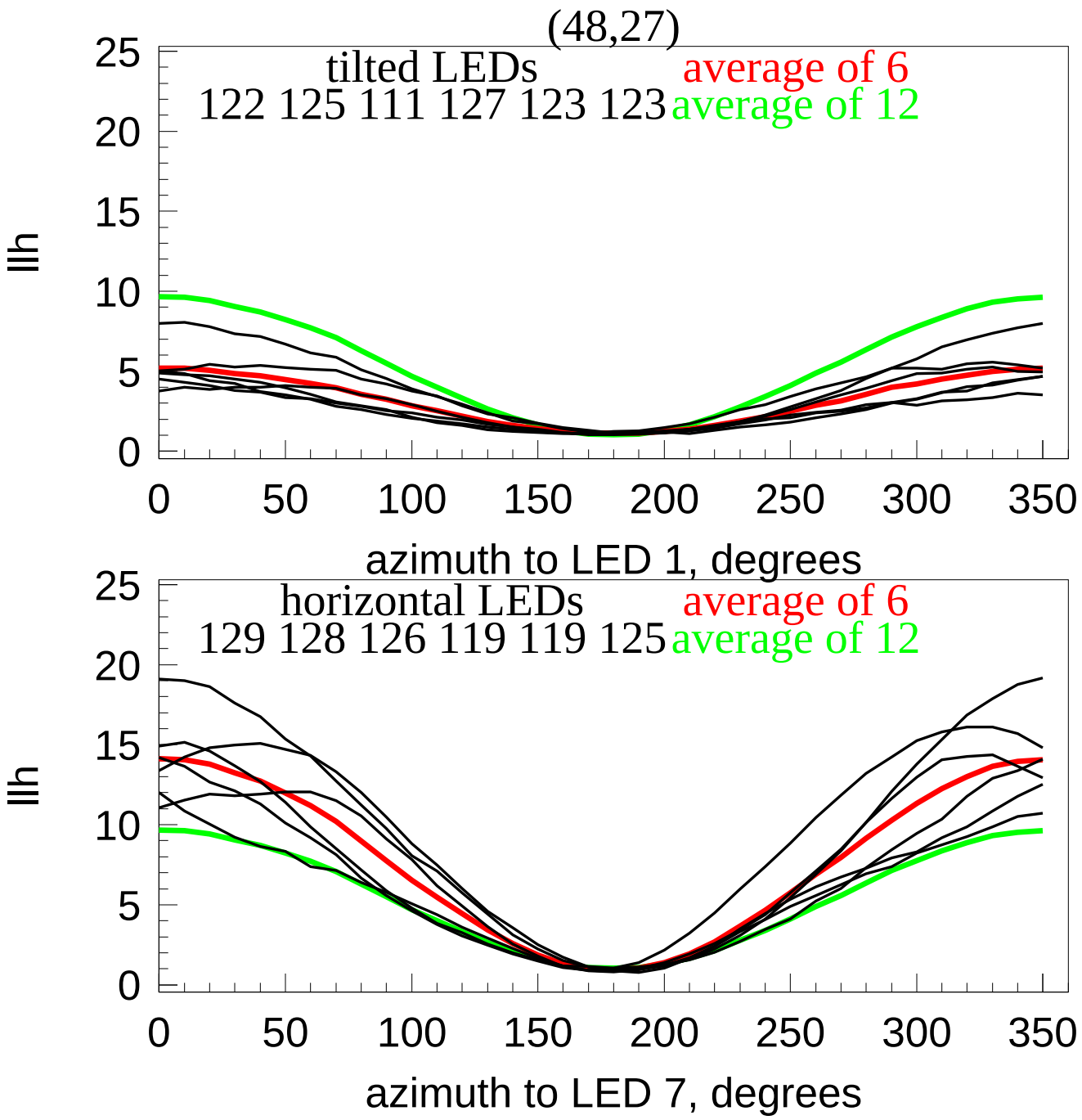

(48,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
285.6 ± 5.3

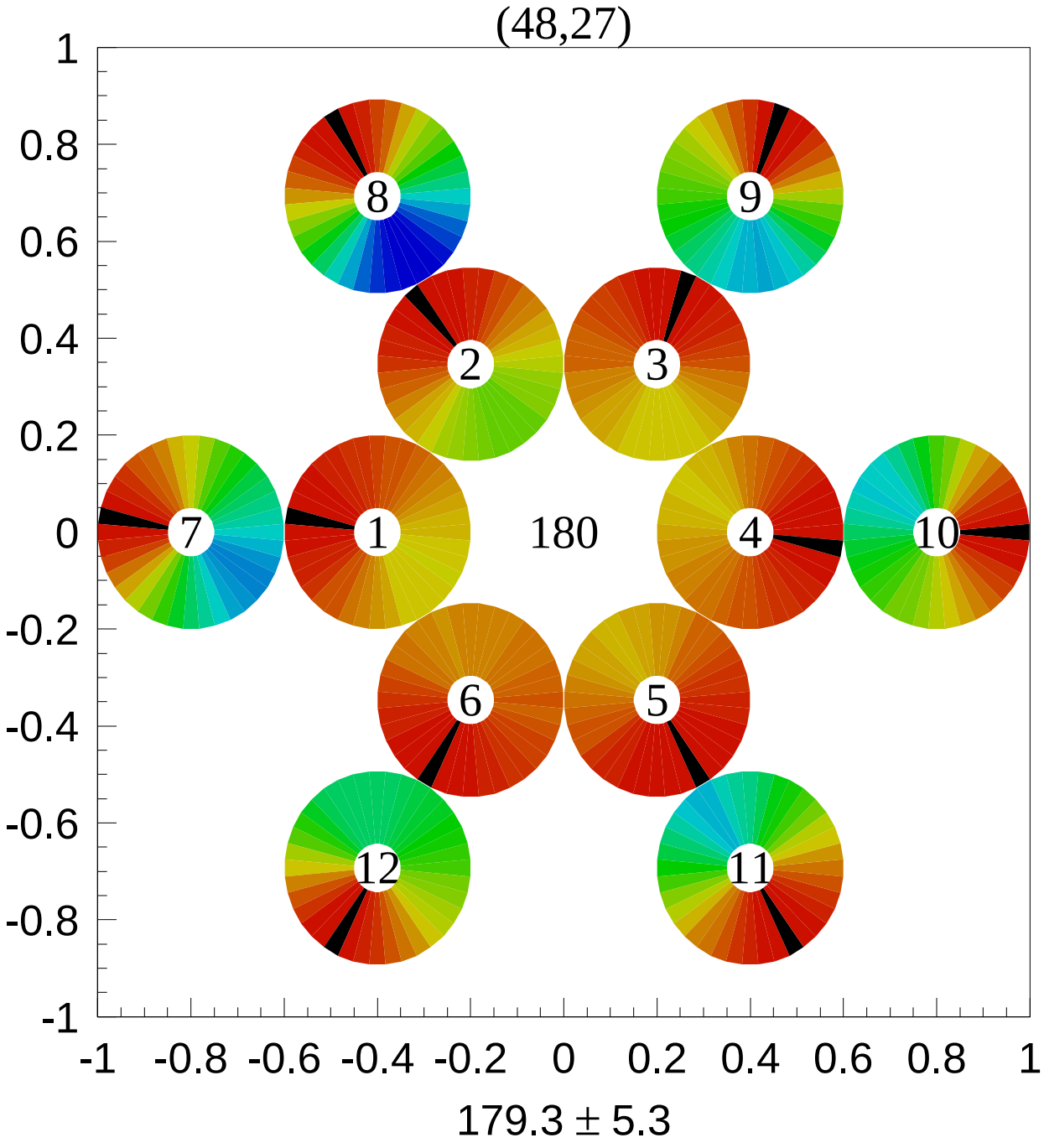

(48,25)
tilted LEDs
125 111 110 126 117 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 119 95 122 127 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

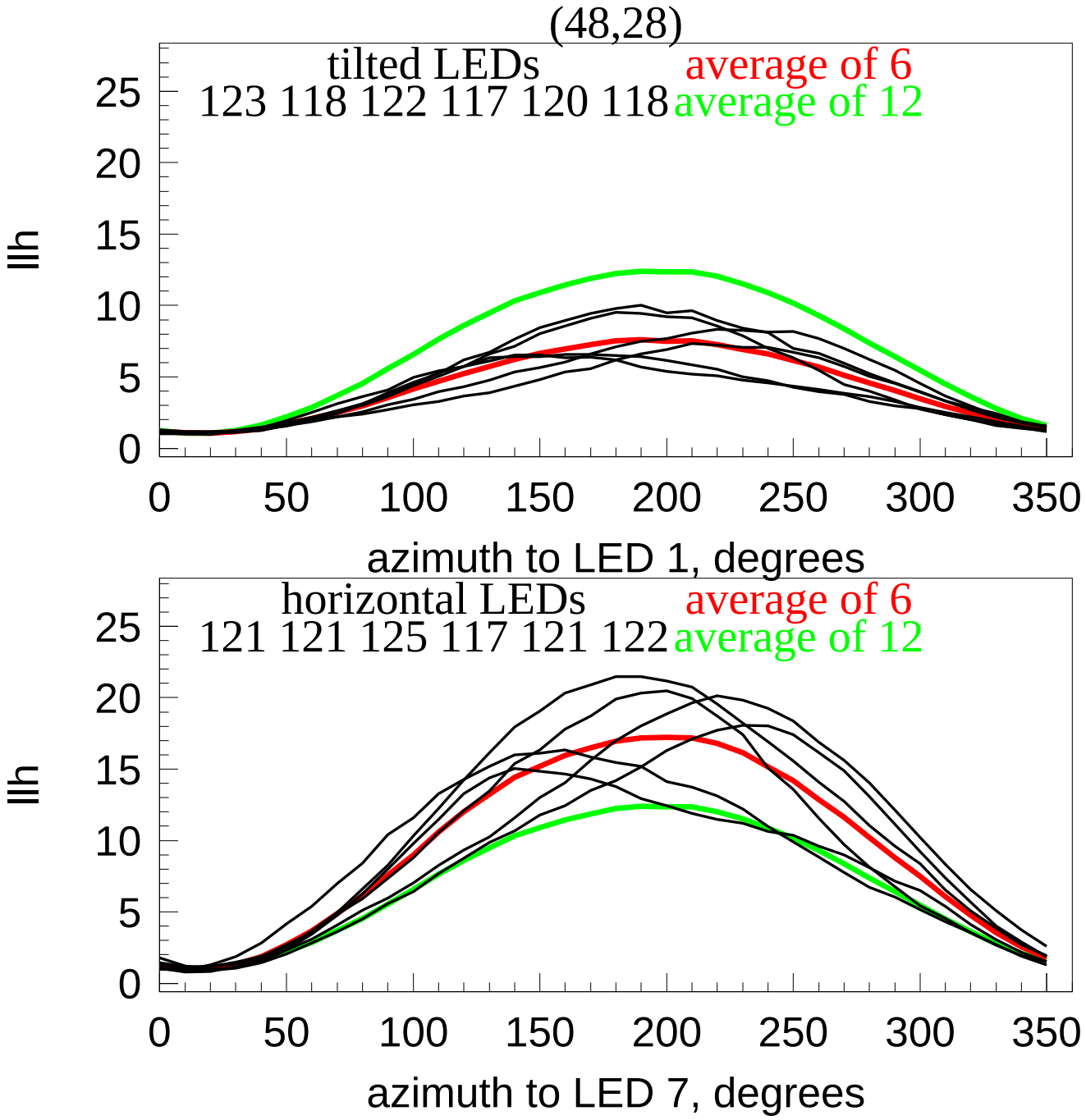

(48,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
137.5 ± 5.9
140
1
2
3
4
5
6
7
8
9
10
11
12

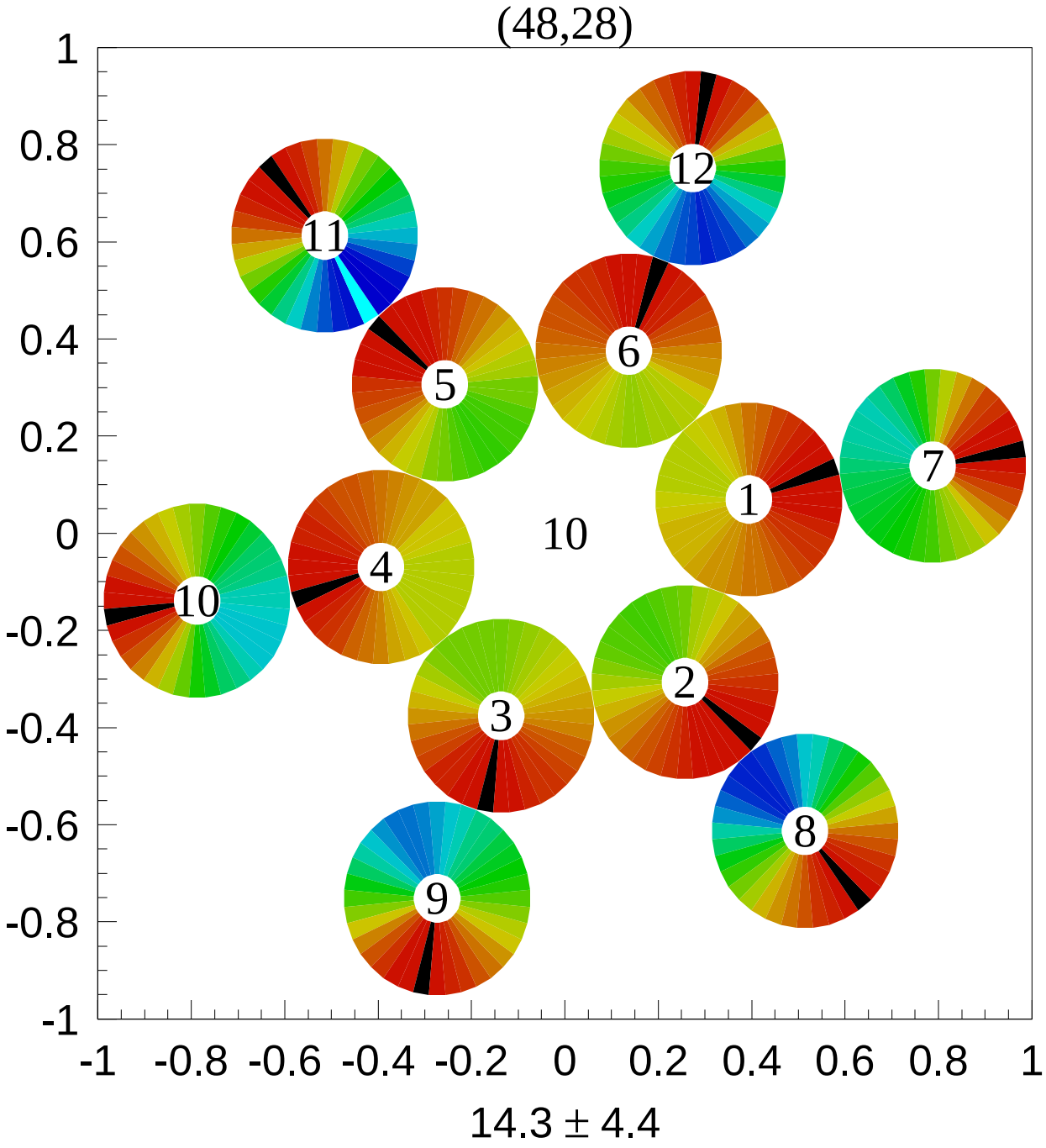

(48,26)
tilted LEDs
122 125 126 122 118 111
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 66 113 125 118 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

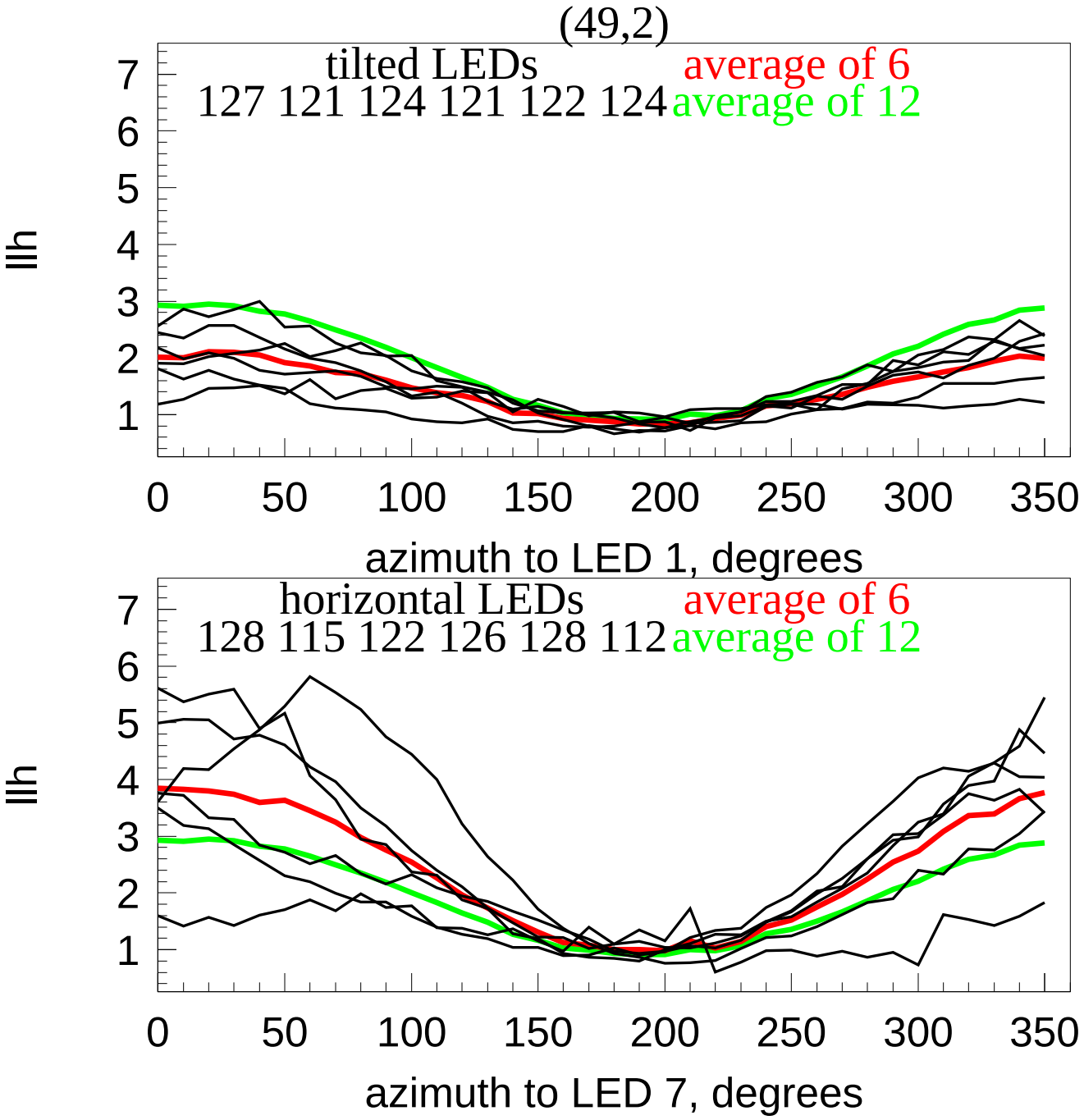

(48,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
38.9 ± 6.8

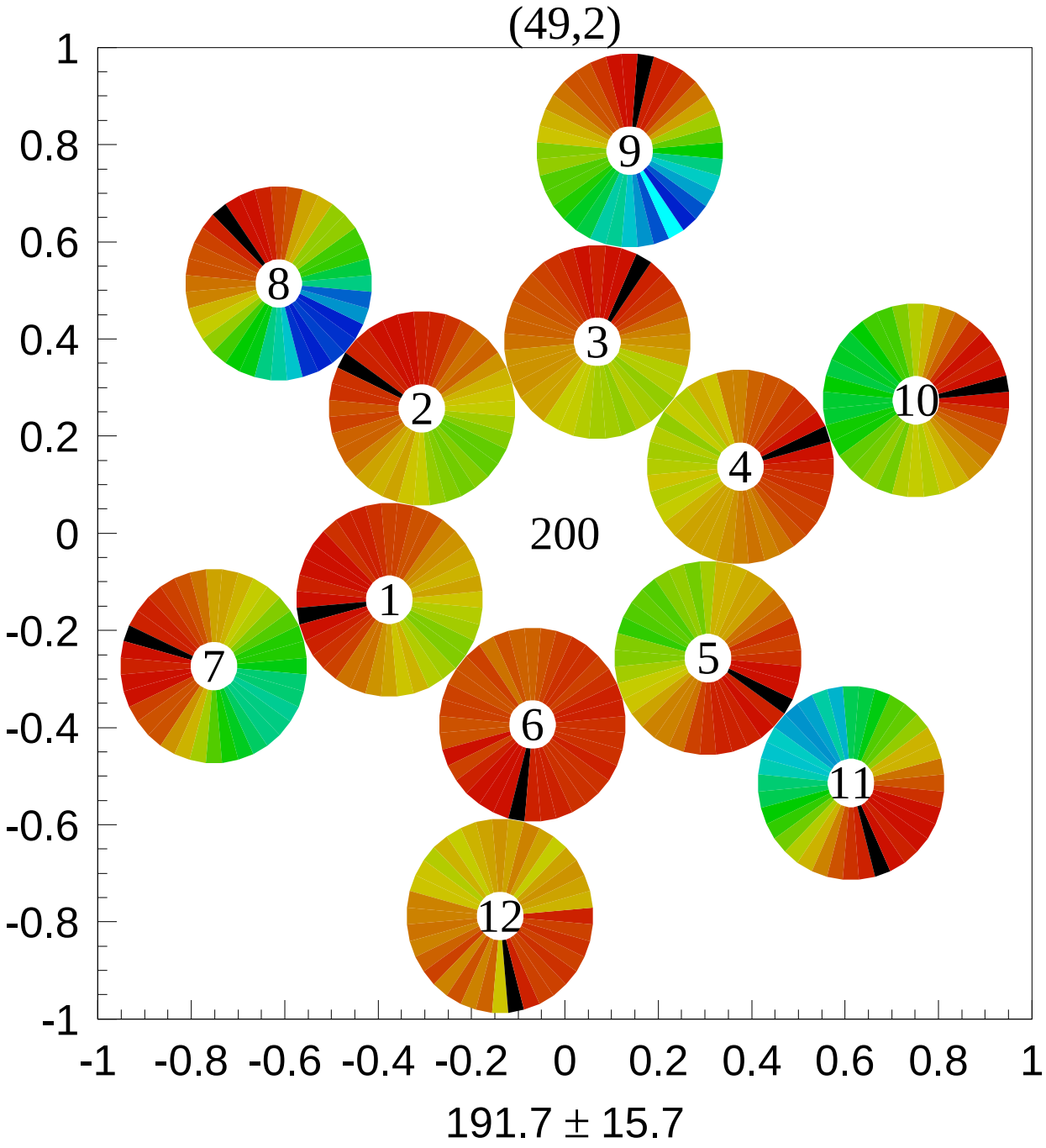

(48,27)
tilted LEDs
122 125 111 127 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 128 126 119 119 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

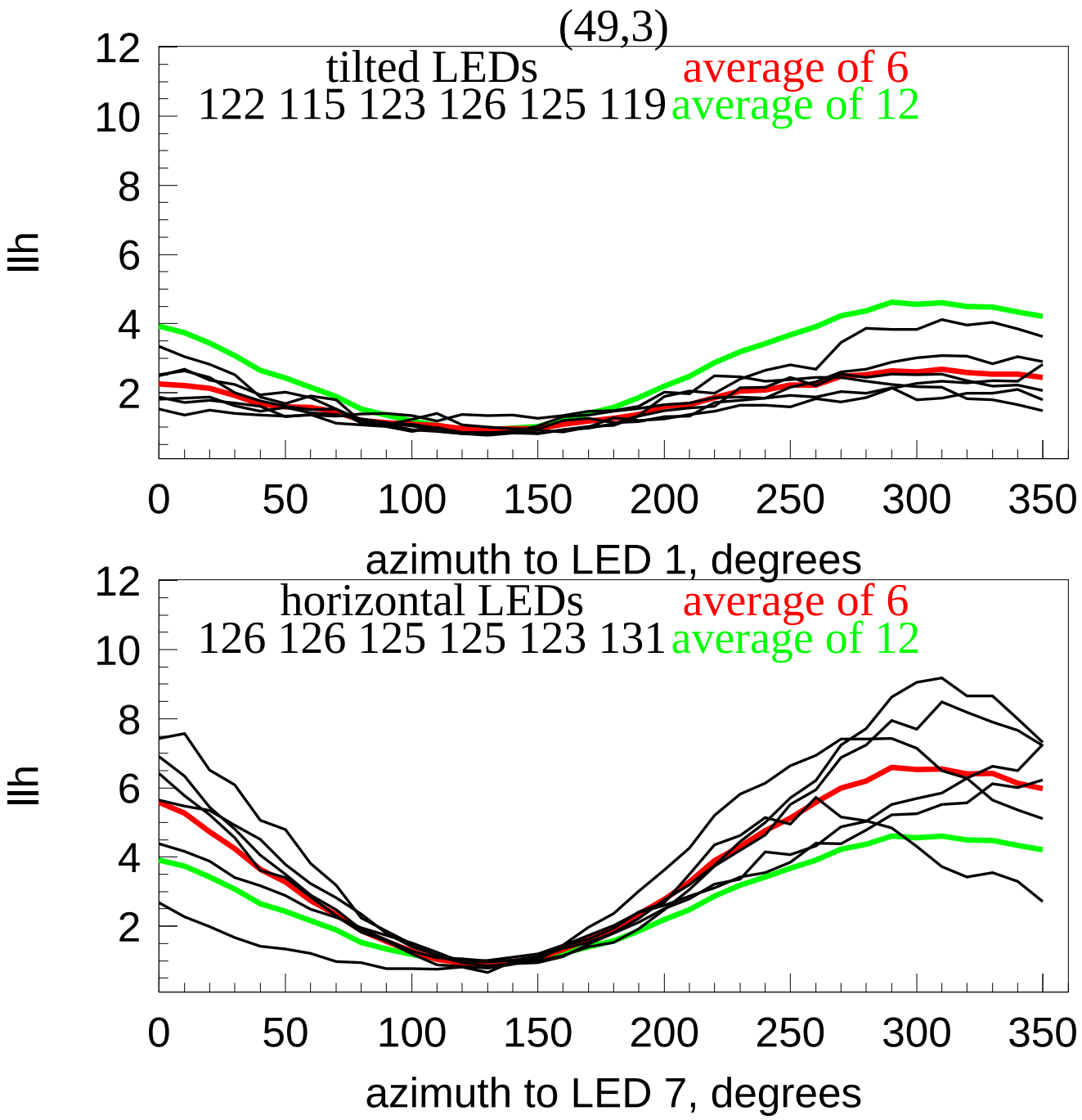

(48,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
179.3 ± 5.3

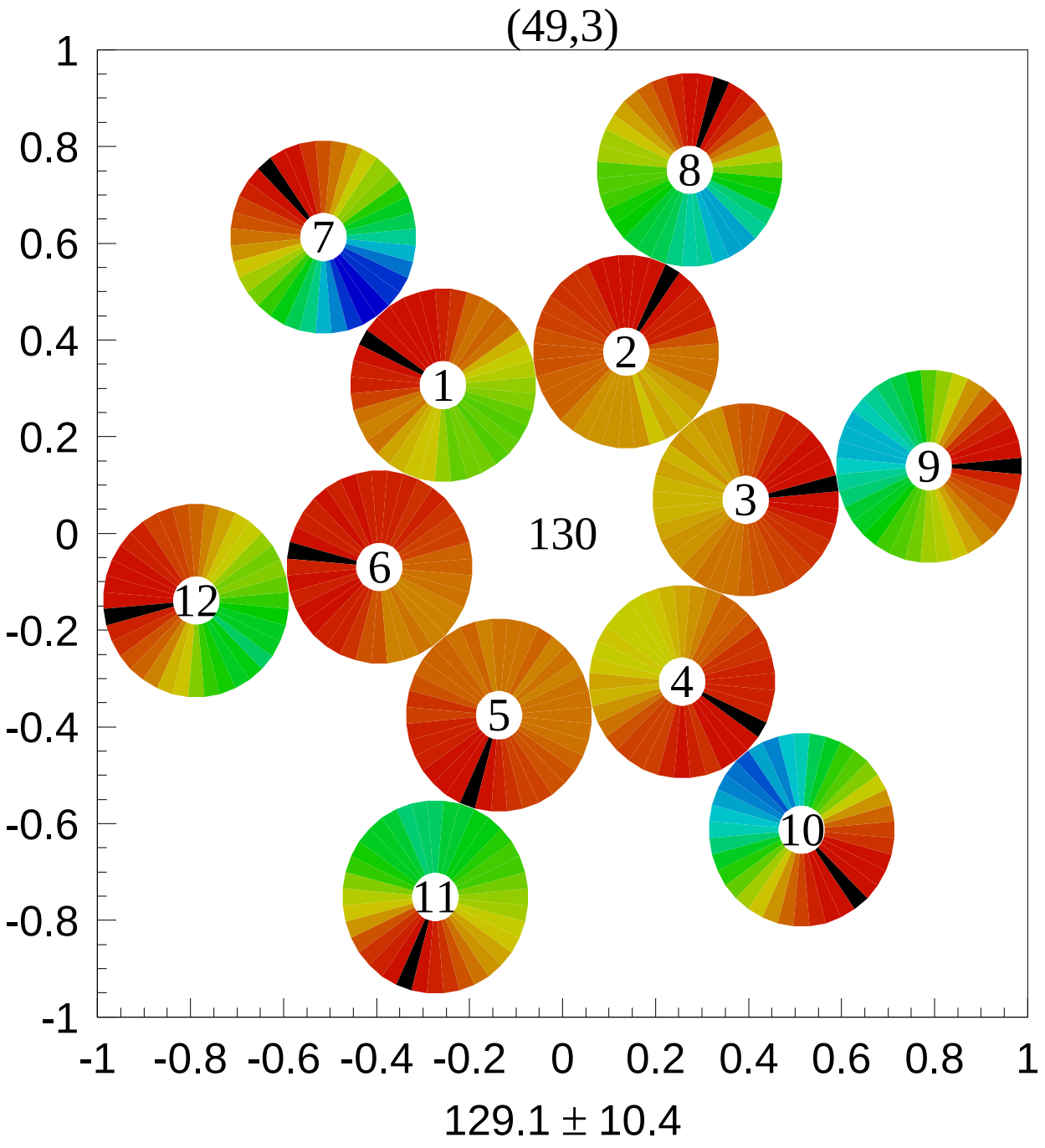

(48,28)
tilted LEDs
123 118 122 117 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 125 117 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

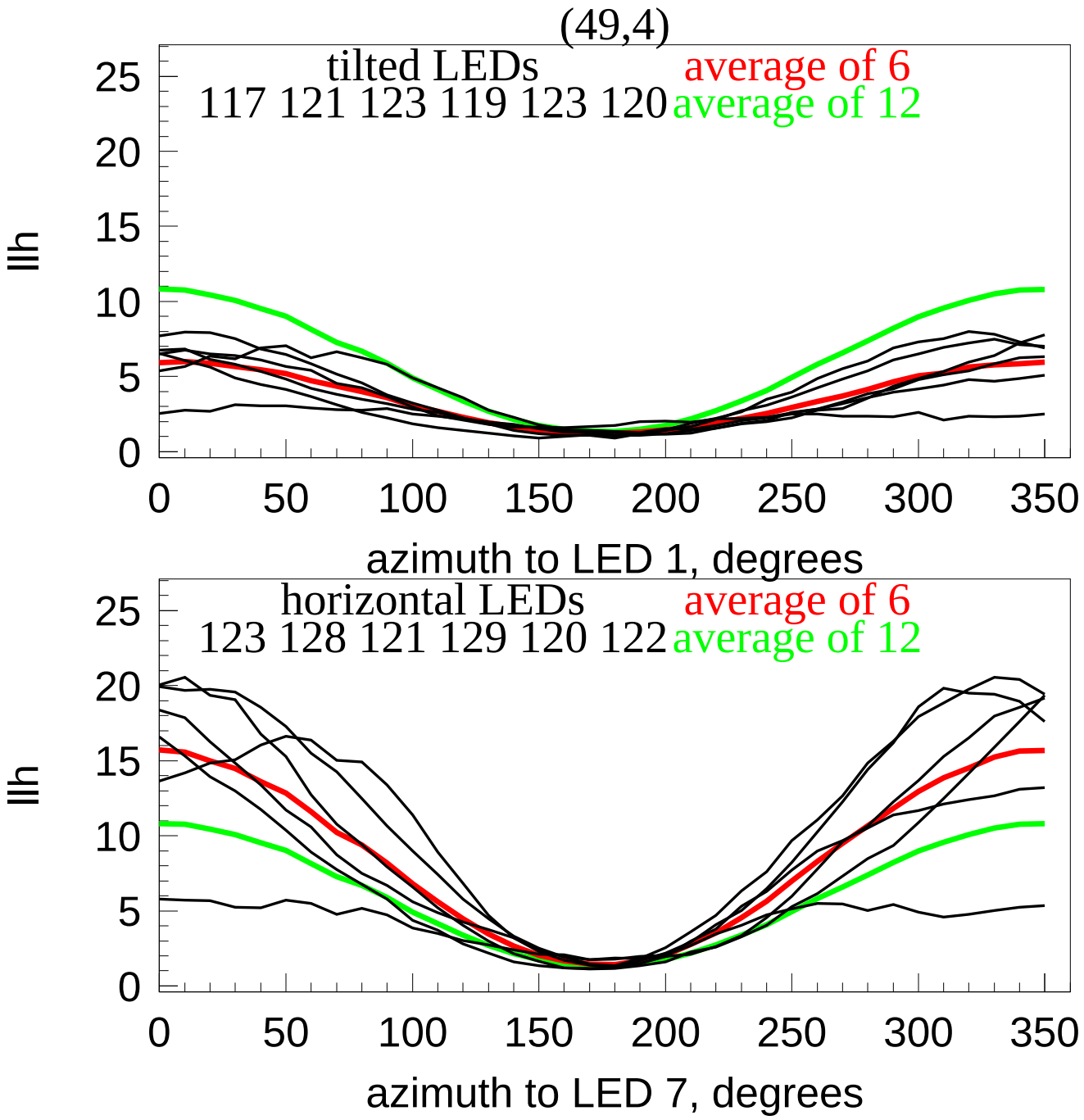

(48,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
14.3 ± 4.4
12
11
6
5
7
1
10
4
10
2
3
8
9

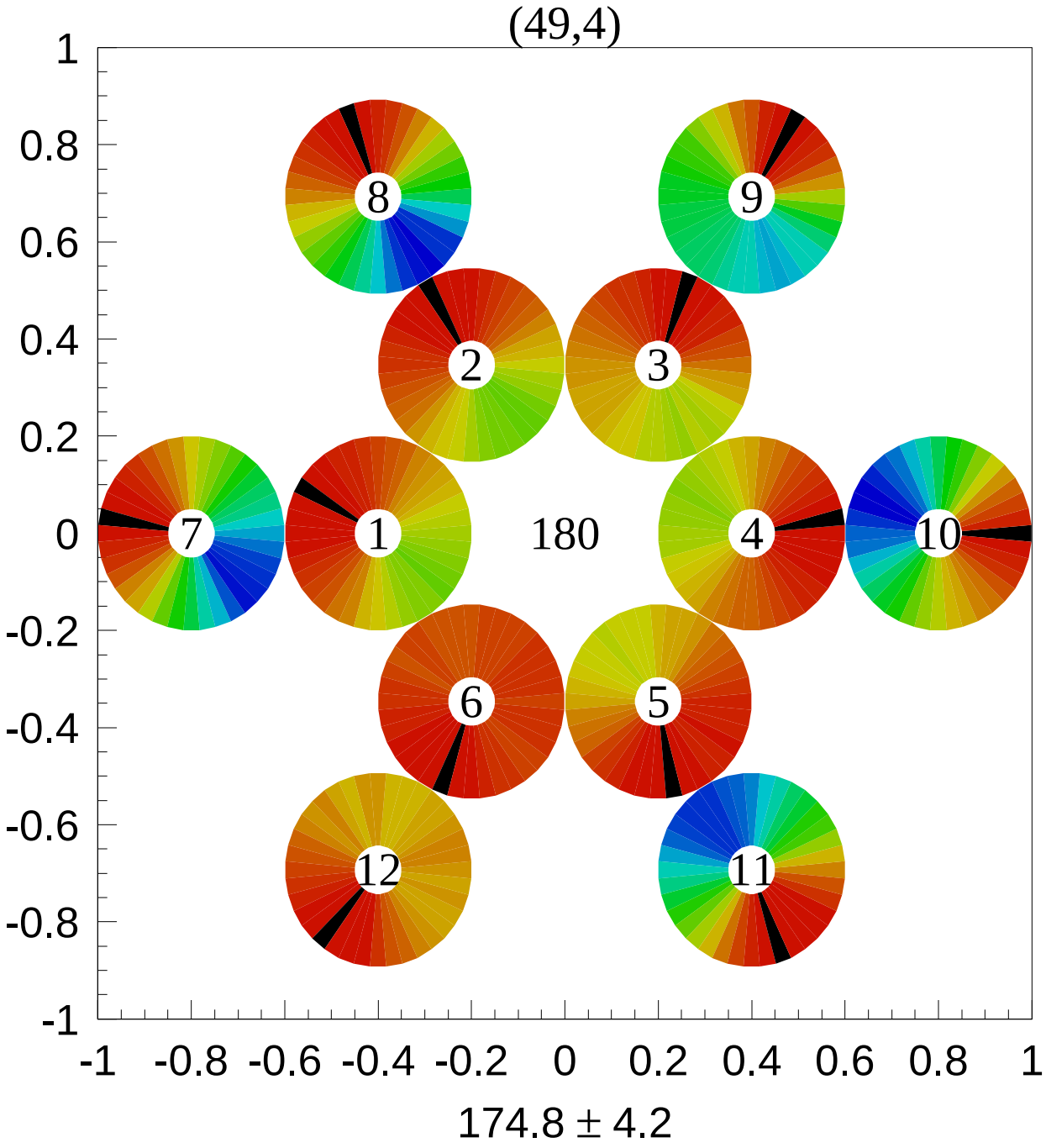

(49,2)
tilted LEDs
127 121 124 121 122 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 115 122 126 128 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

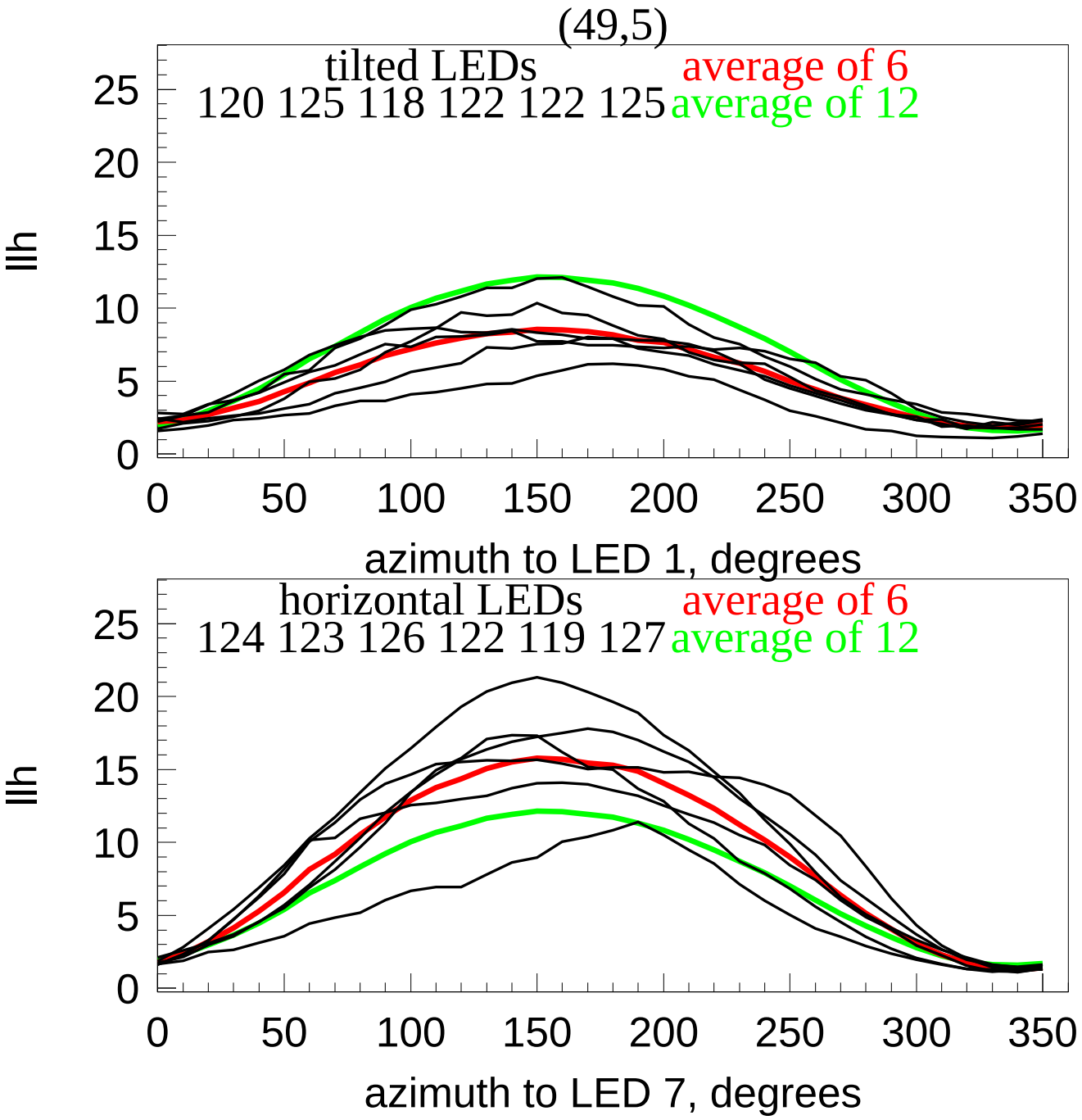

(49,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
200
1
2
3
4
5
6
7
8
9
10
11
12
191.7 ± 15.7

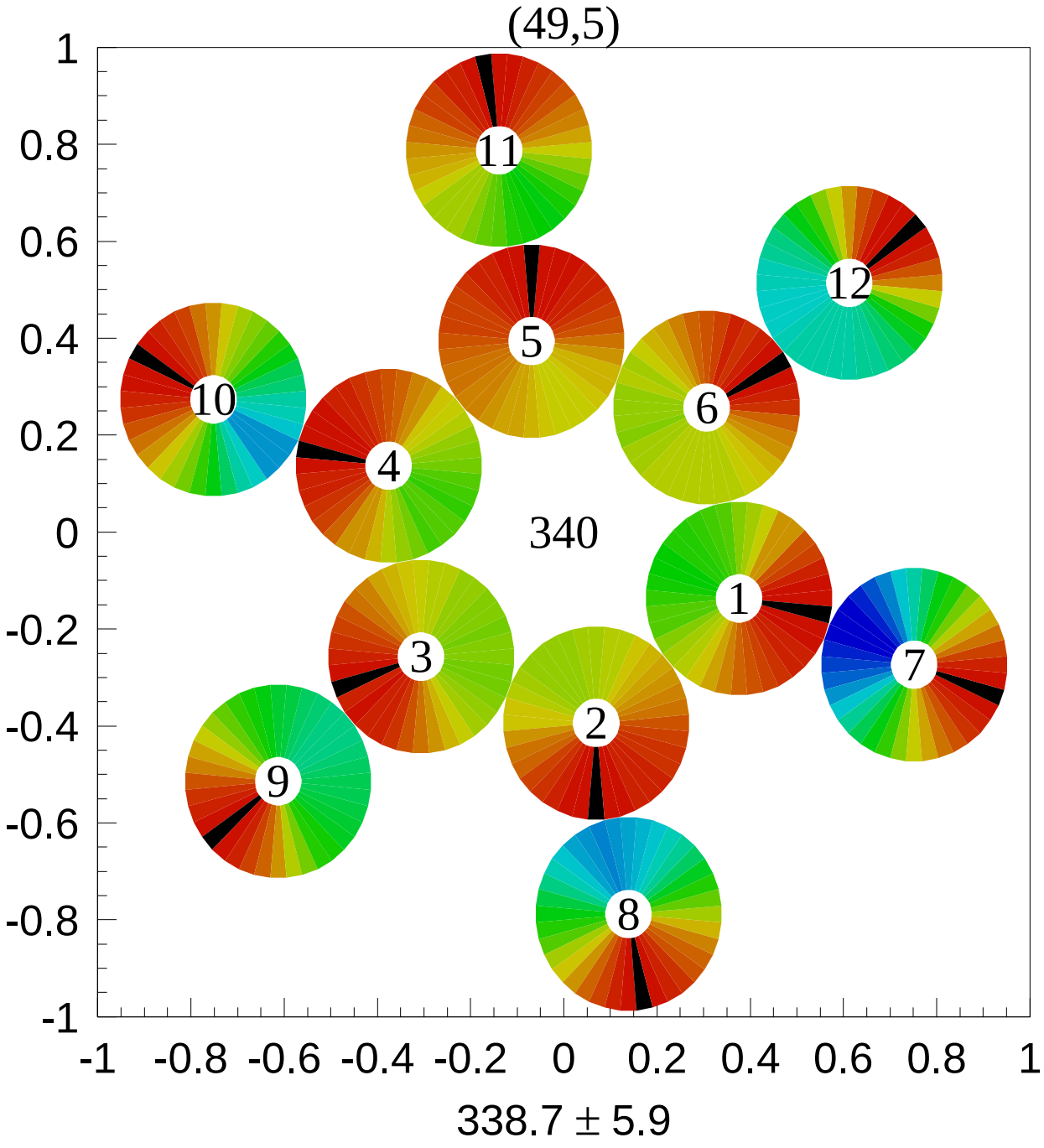

(49,3)
tilted LEDs
122 115 123 126 125 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 126 125 125 123 131
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

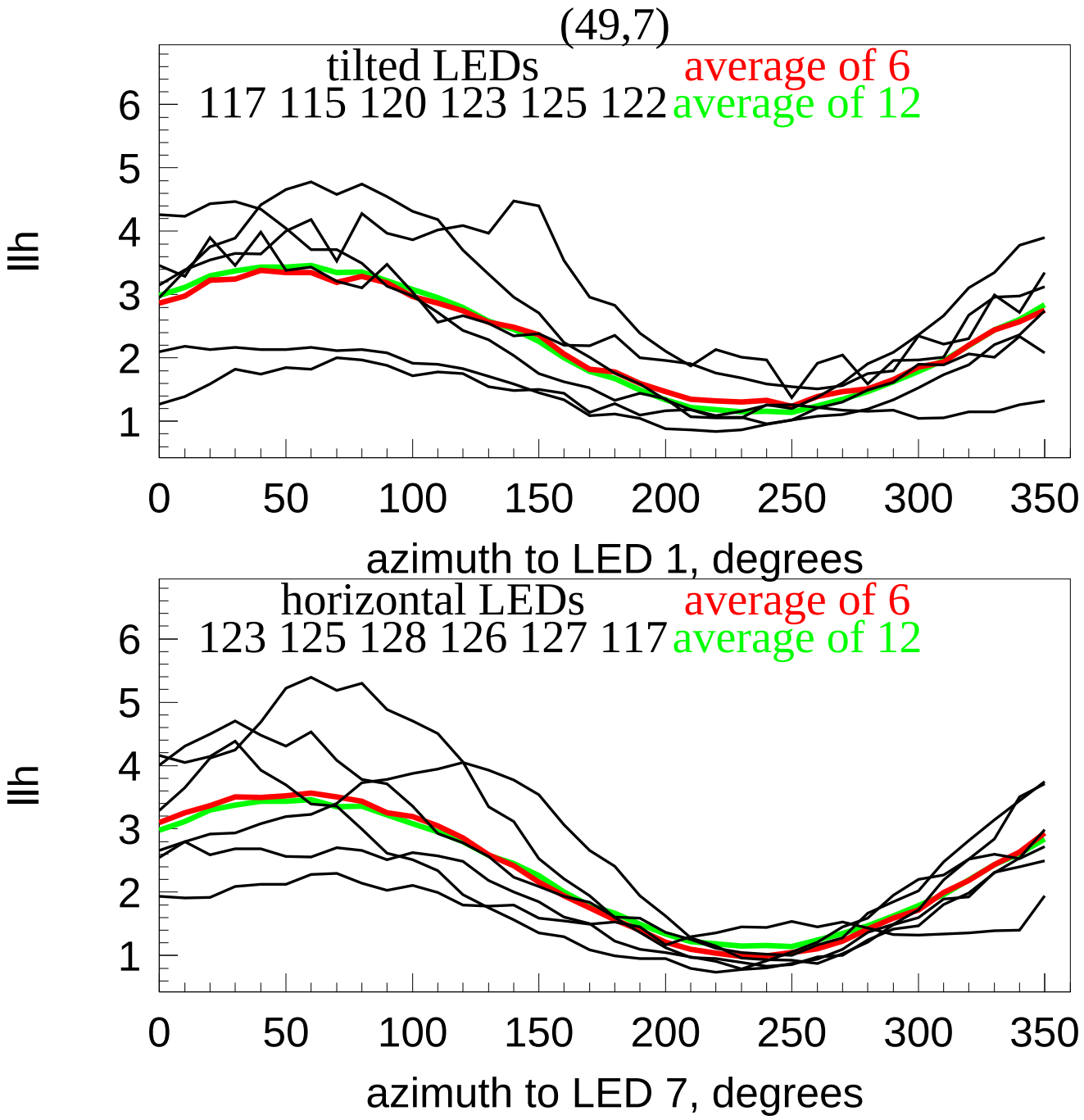

(49,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
129.1 ± 10.4

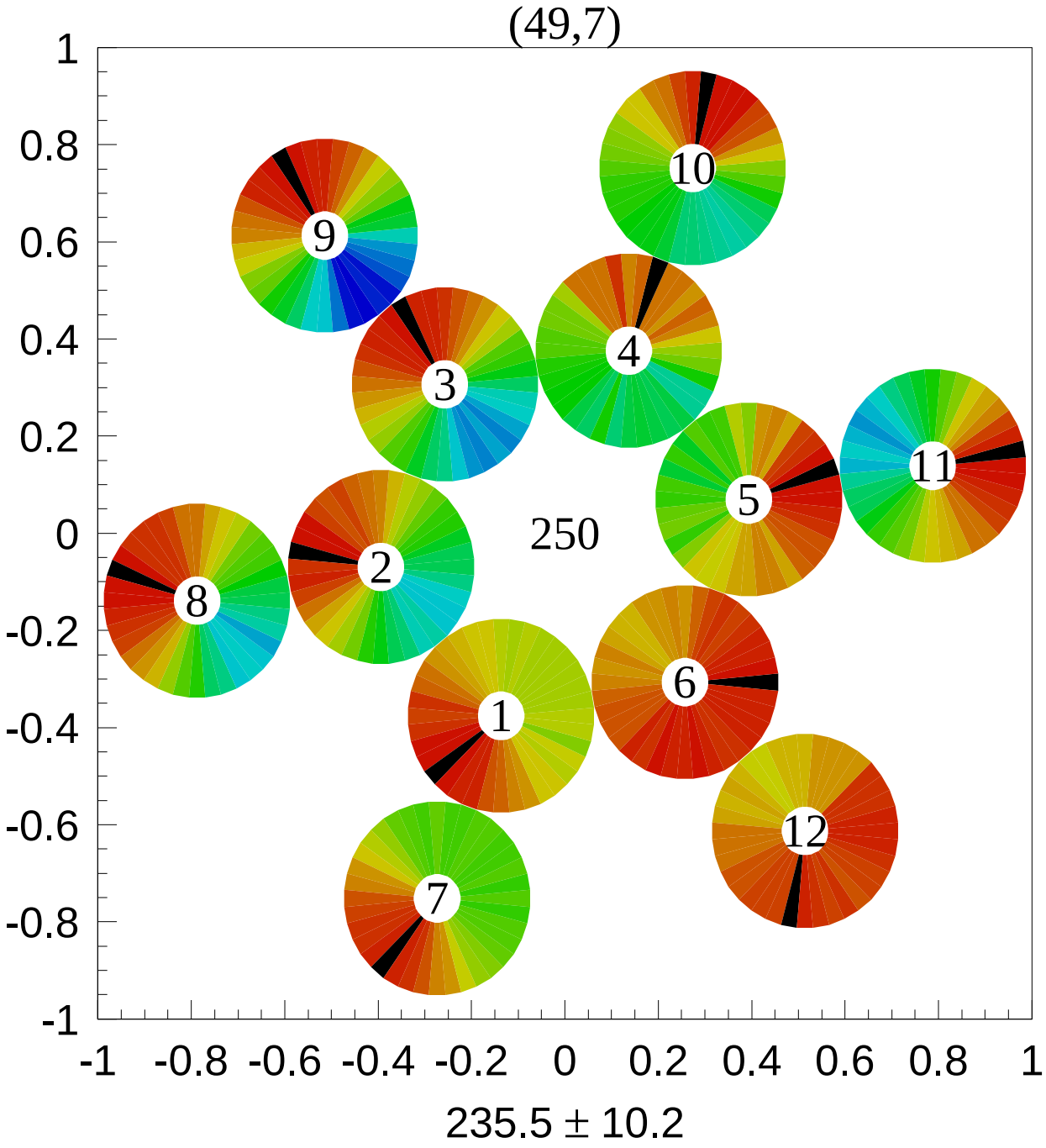

(49,4)
tilted LEDs
117 121 123 119 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 128 121 129 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

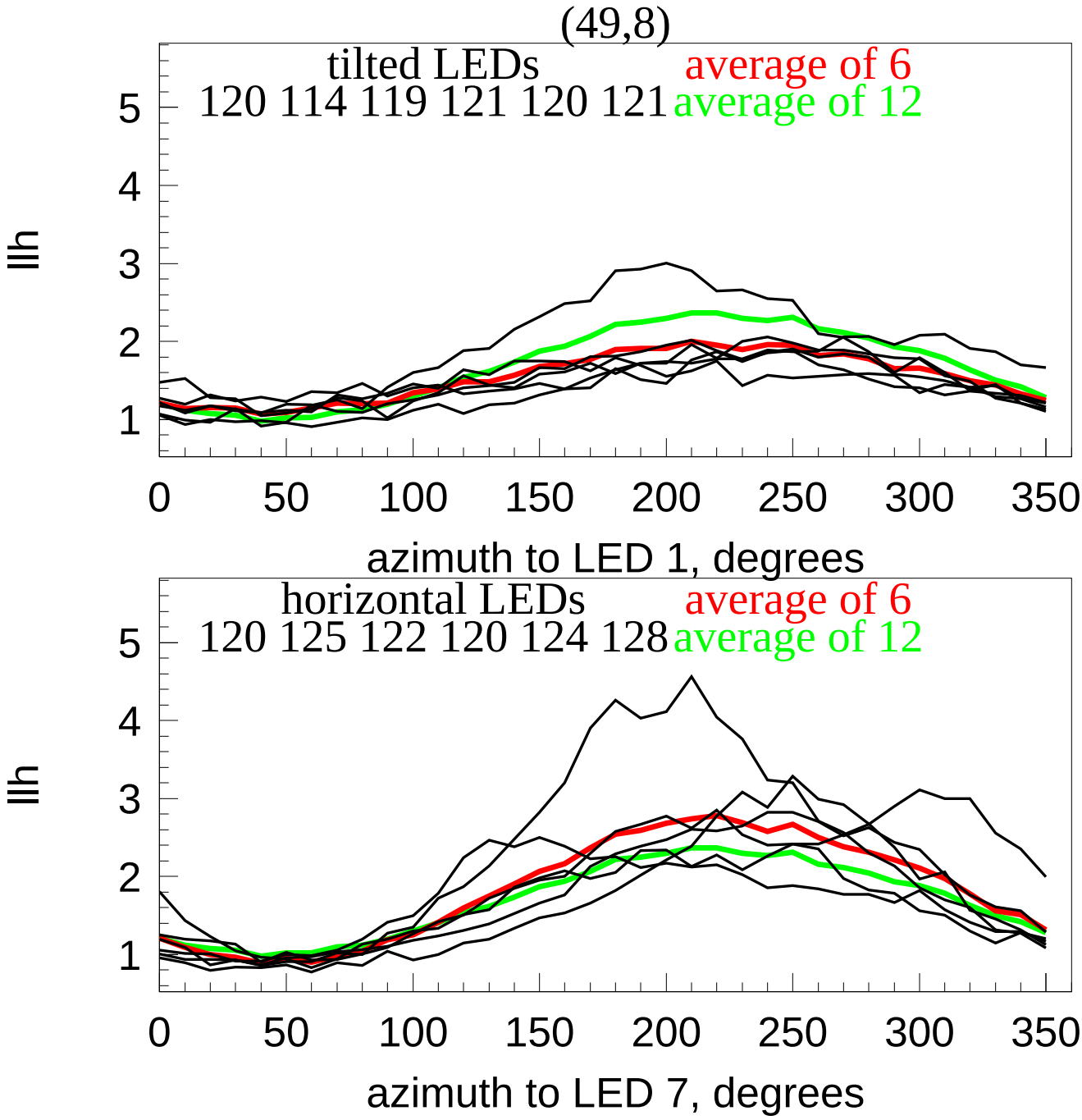

(49,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
174.8 ± 4.2

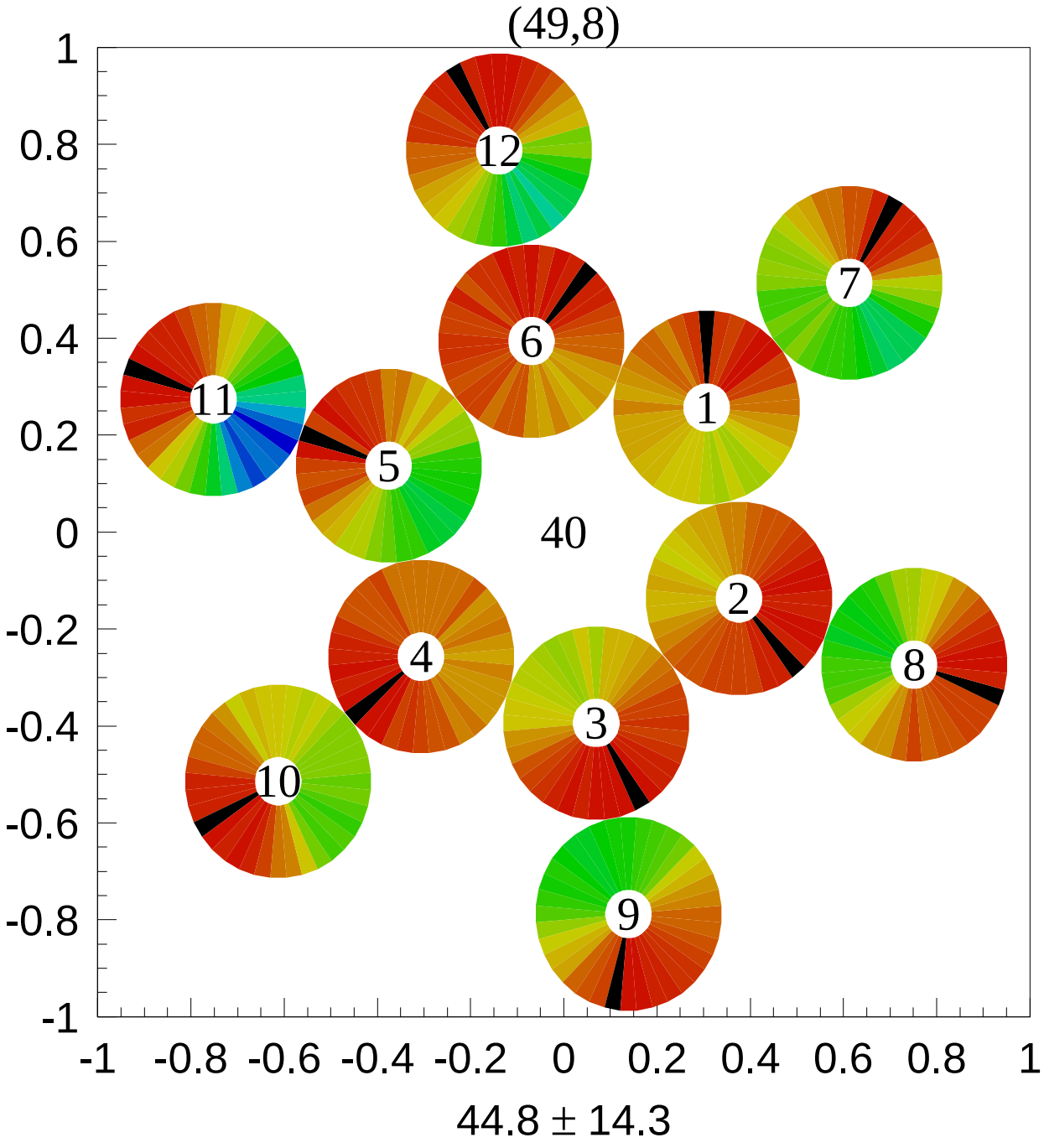

(49,5)
tilted LEDs
120 125 118 122 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 126 122 119 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

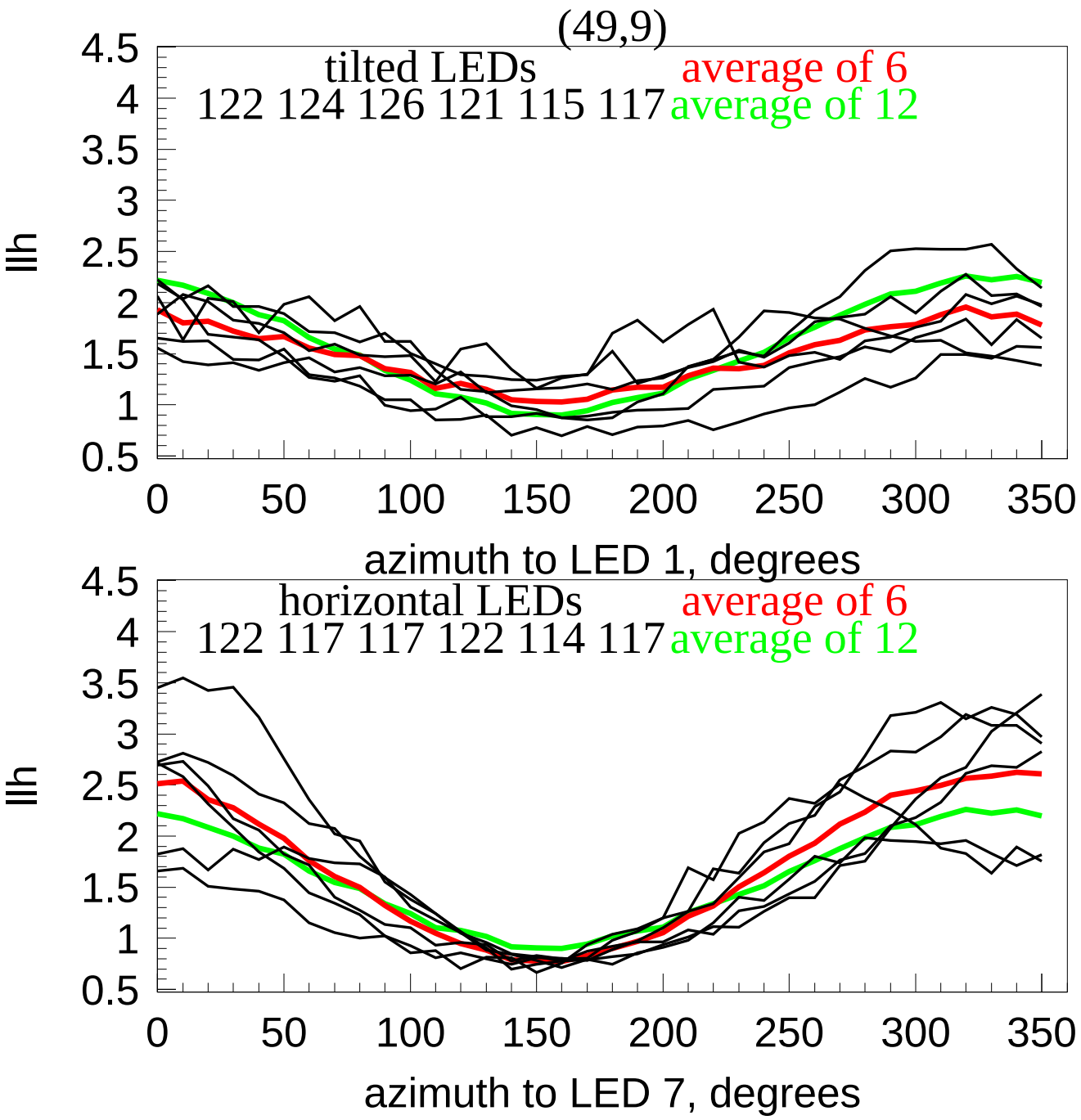

(49,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
338.7 ± 5.9

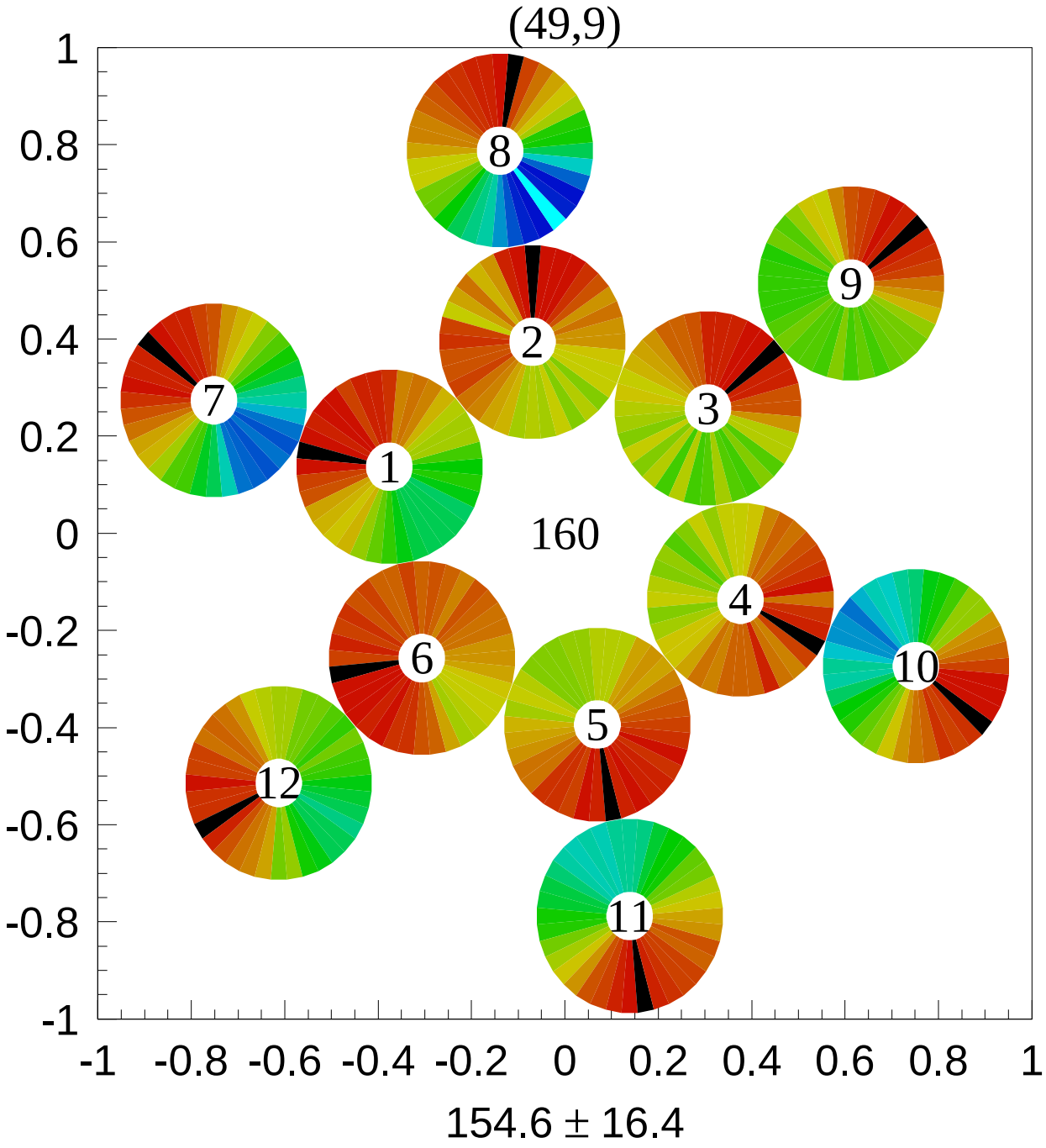

(49,7)
tilted LEDs
117 115 120 123 125 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 128 126 127 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

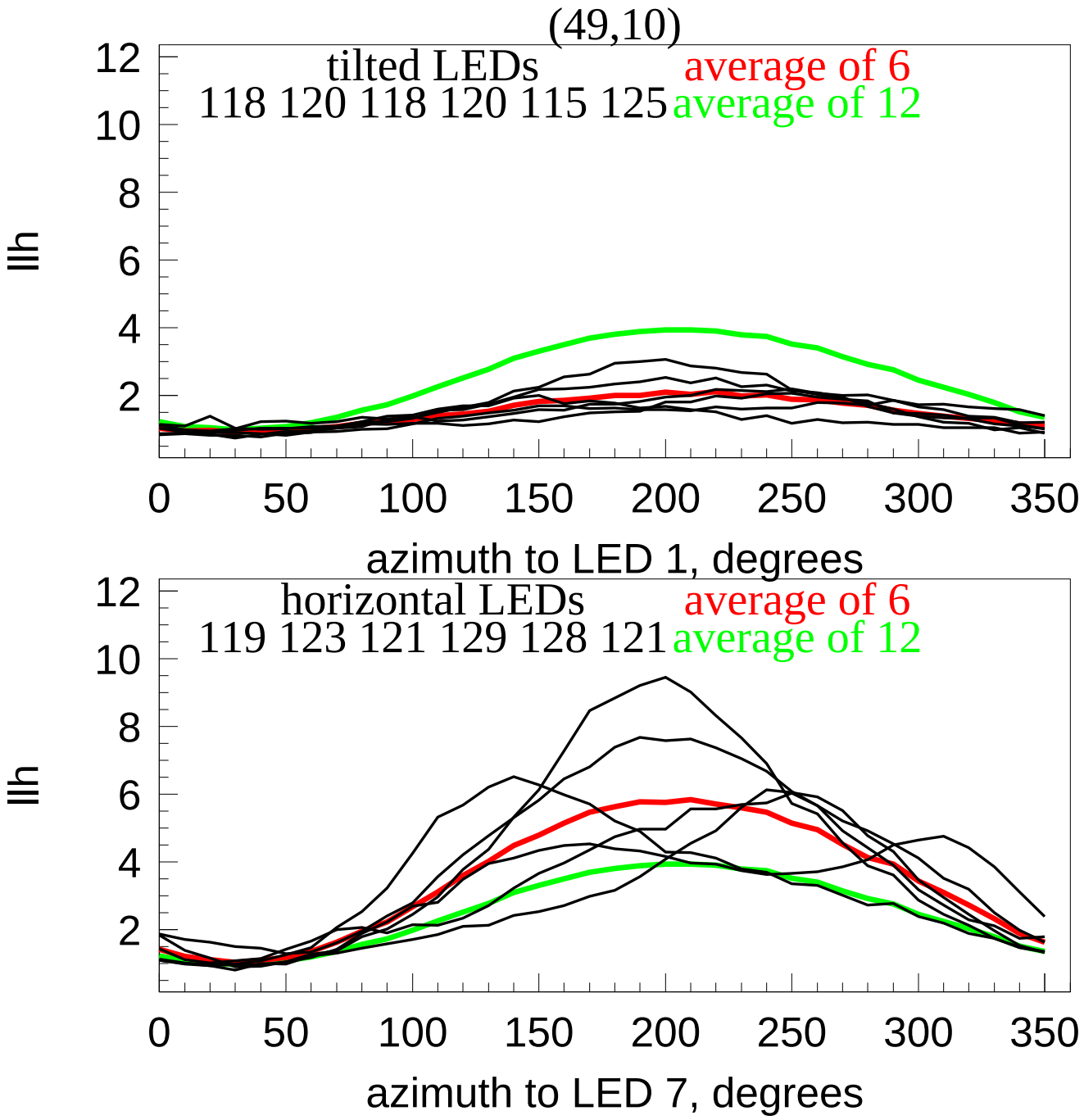

(49,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
235.5 ± 10.2
250
1
2
3
4
5
6
7
8
9
10
11
12

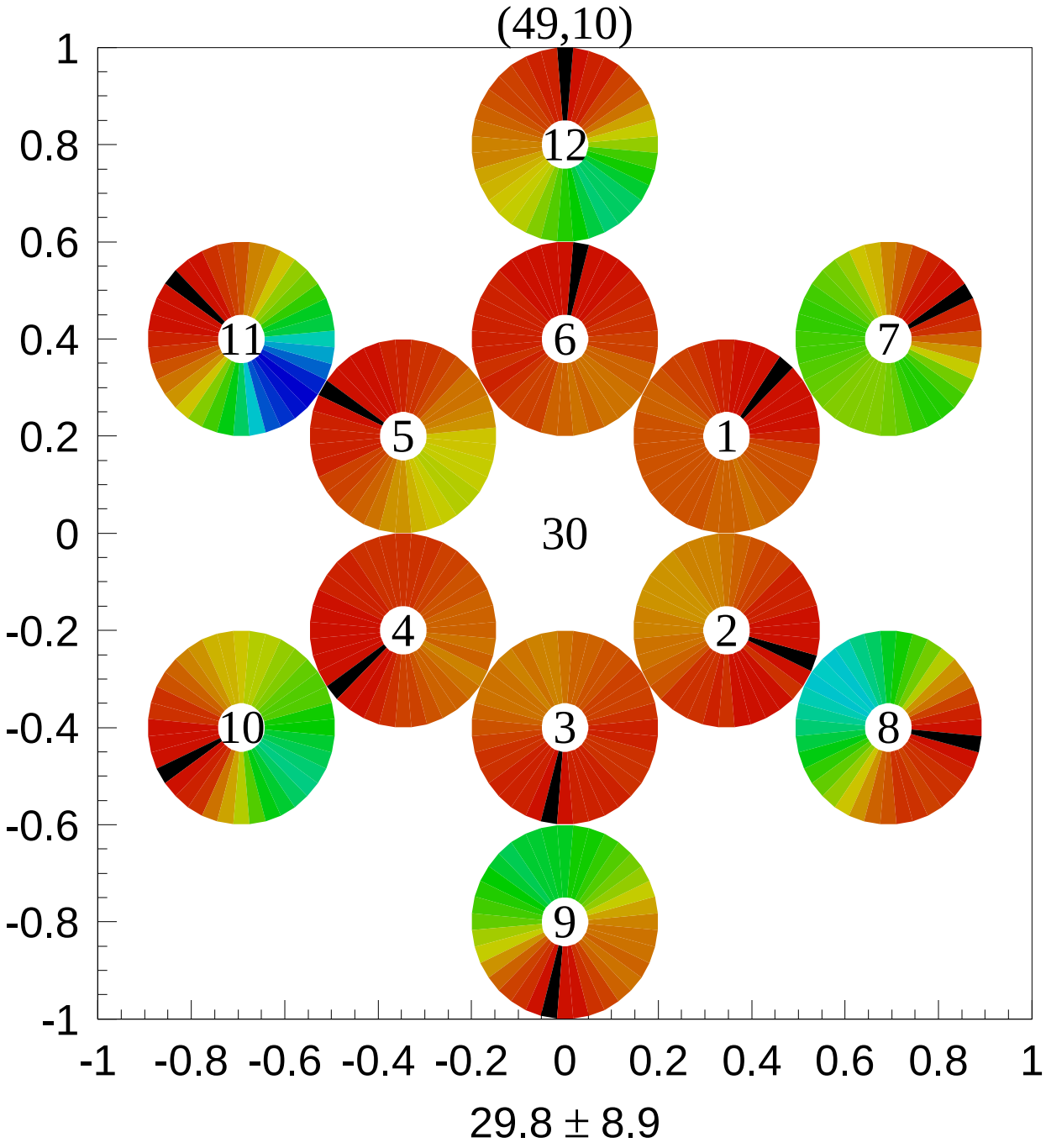

(49,8)
tilted LEDs
120 114 119 121 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 125 122 120 124 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

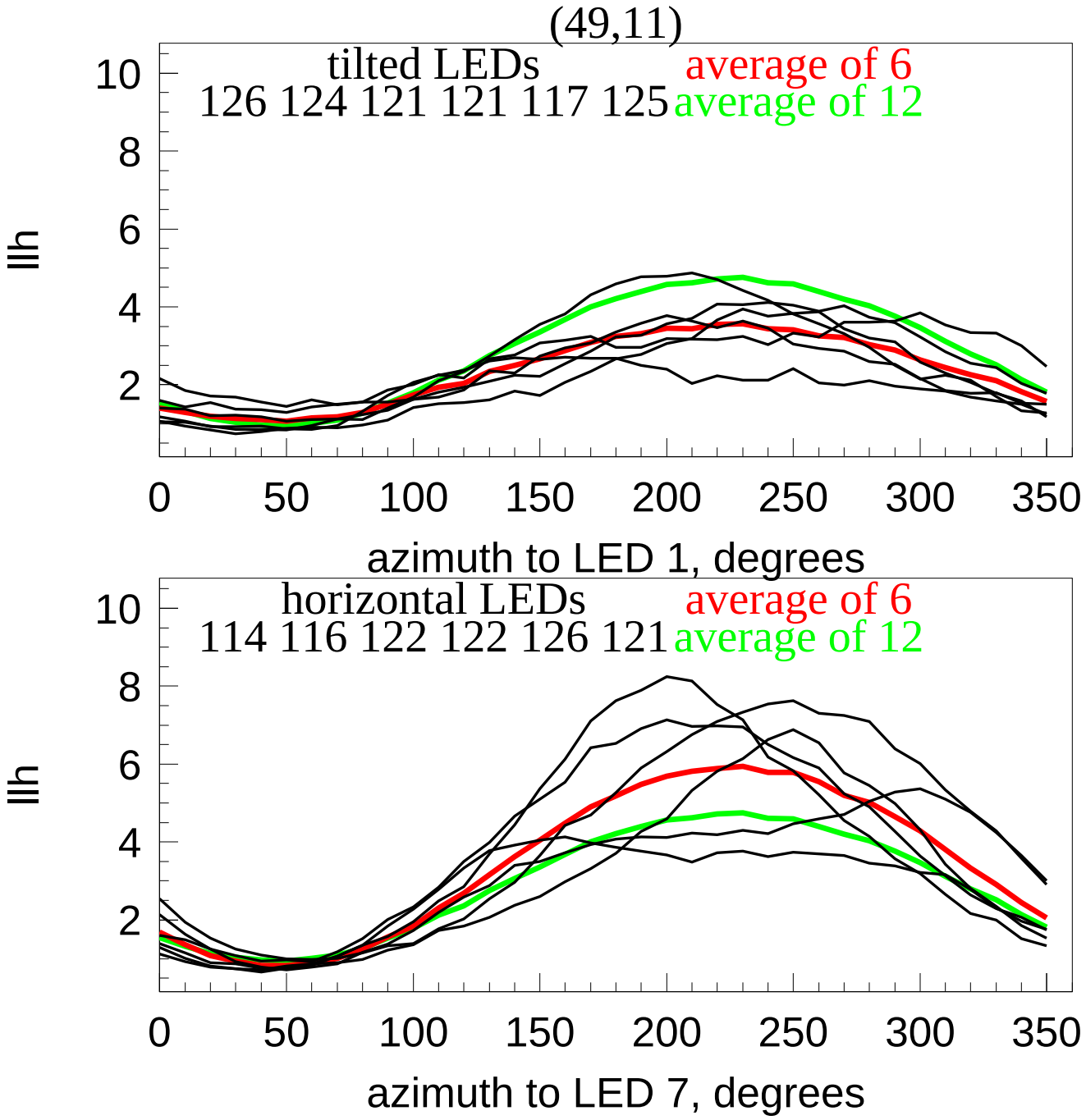

(49,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
44.8 ± 14.3

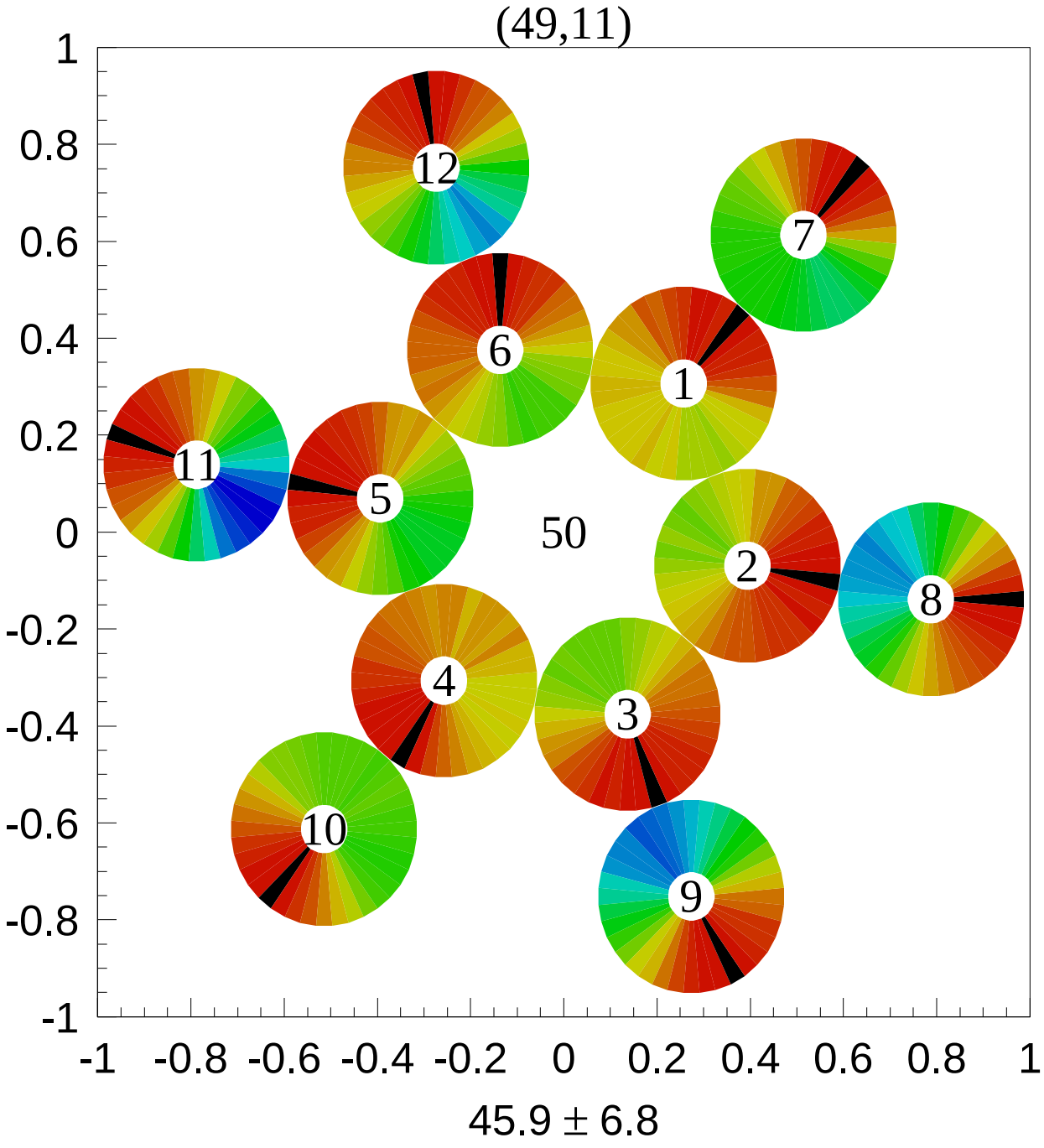

(49,9)
tilted LEDs
122 124 126 121 115 117
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 117 117 122 114 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

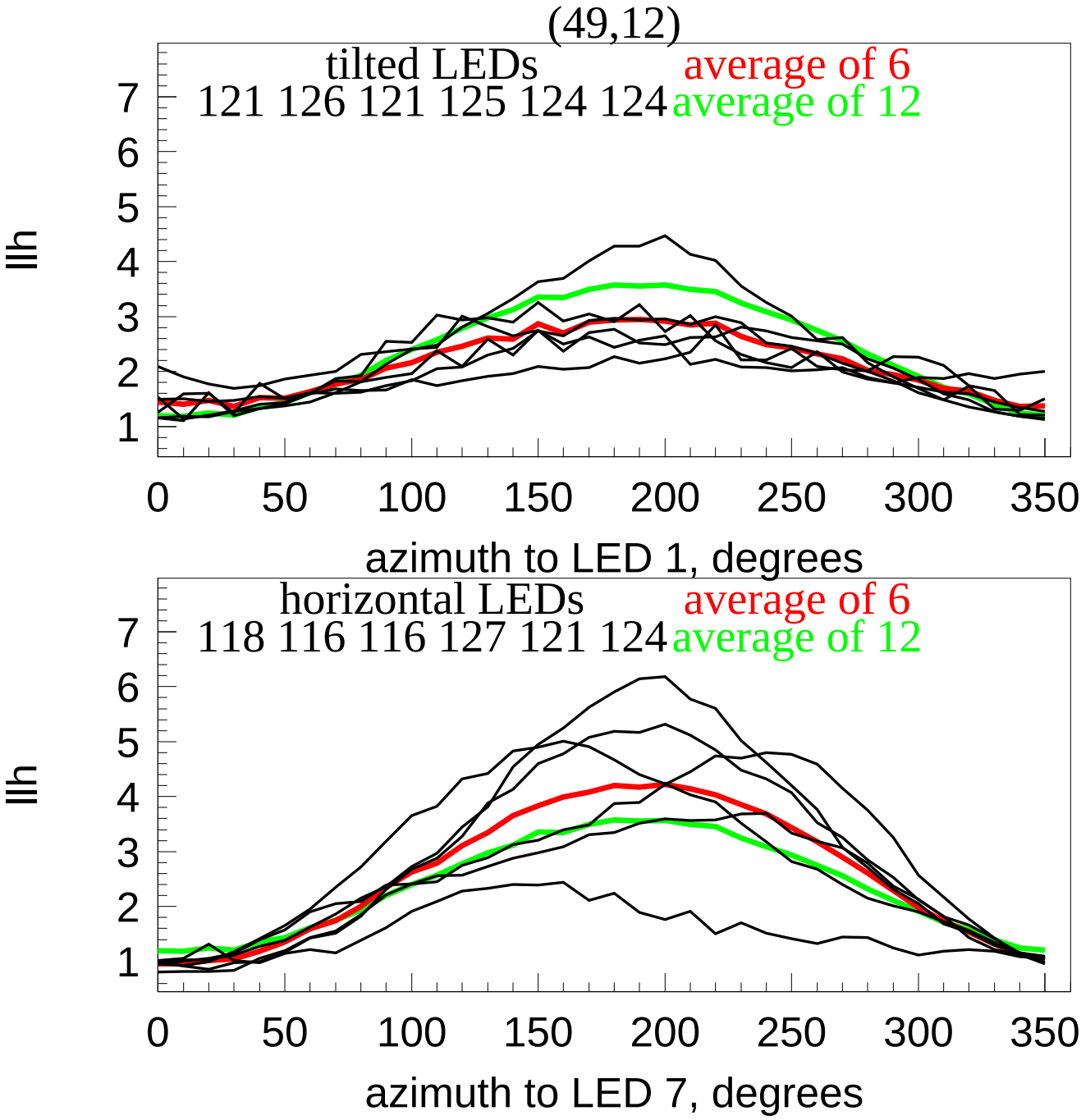

(49,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
154.6 ± 16.4

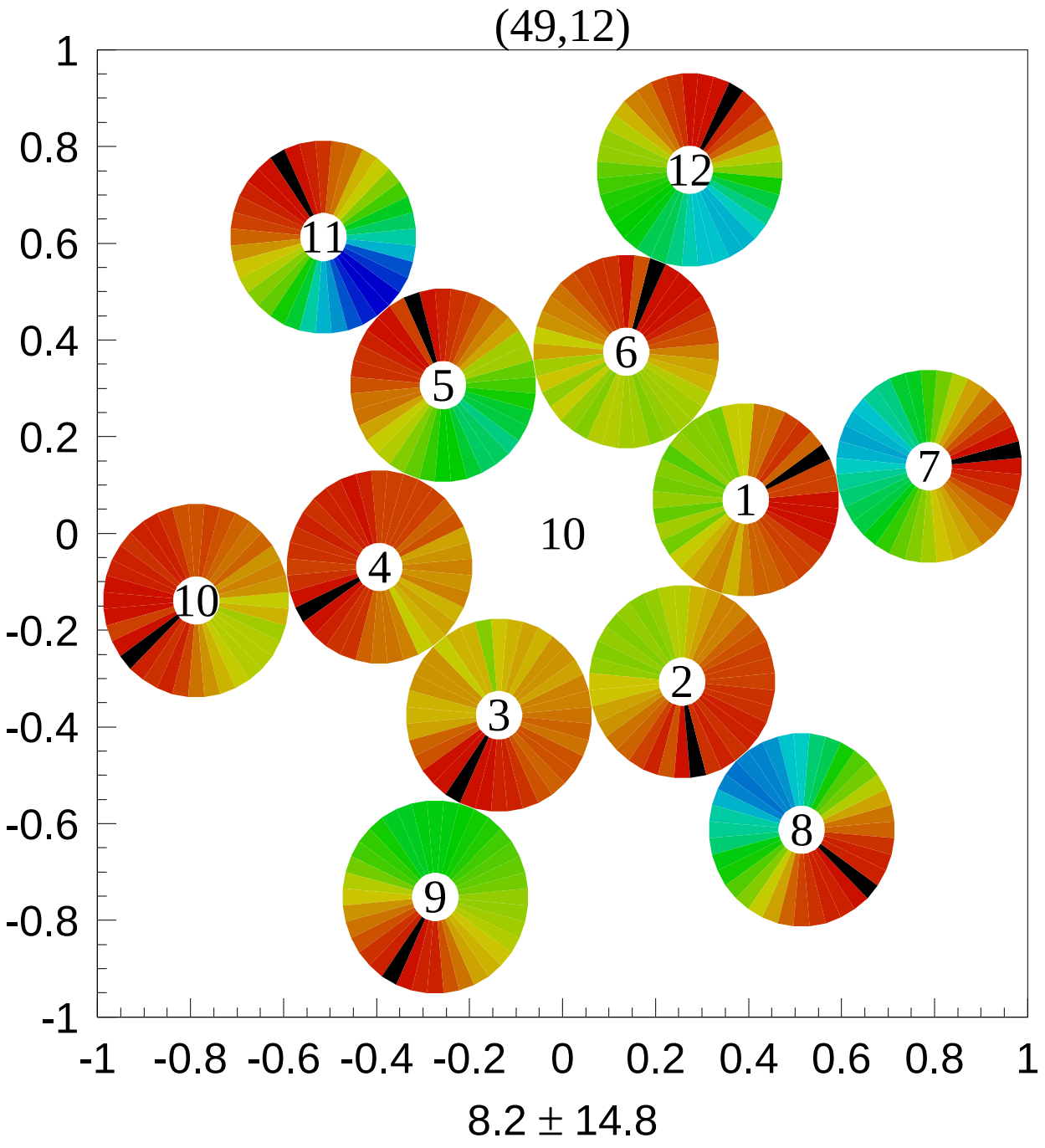

(49,10)
tilted LEDs
118 120 118 120 115 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 123 121 129 128 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

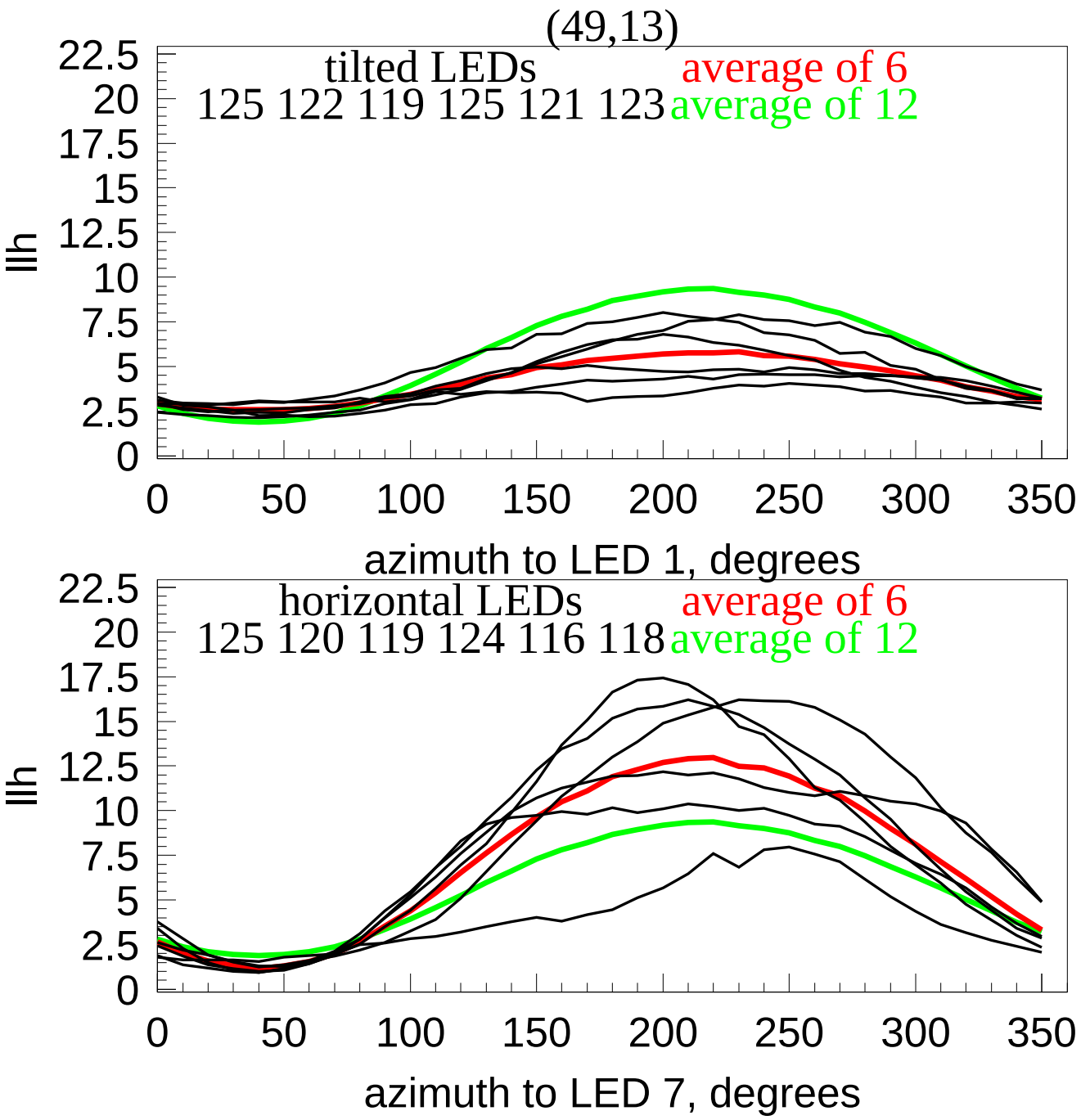

(49,10)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
29.8 ± 8.9

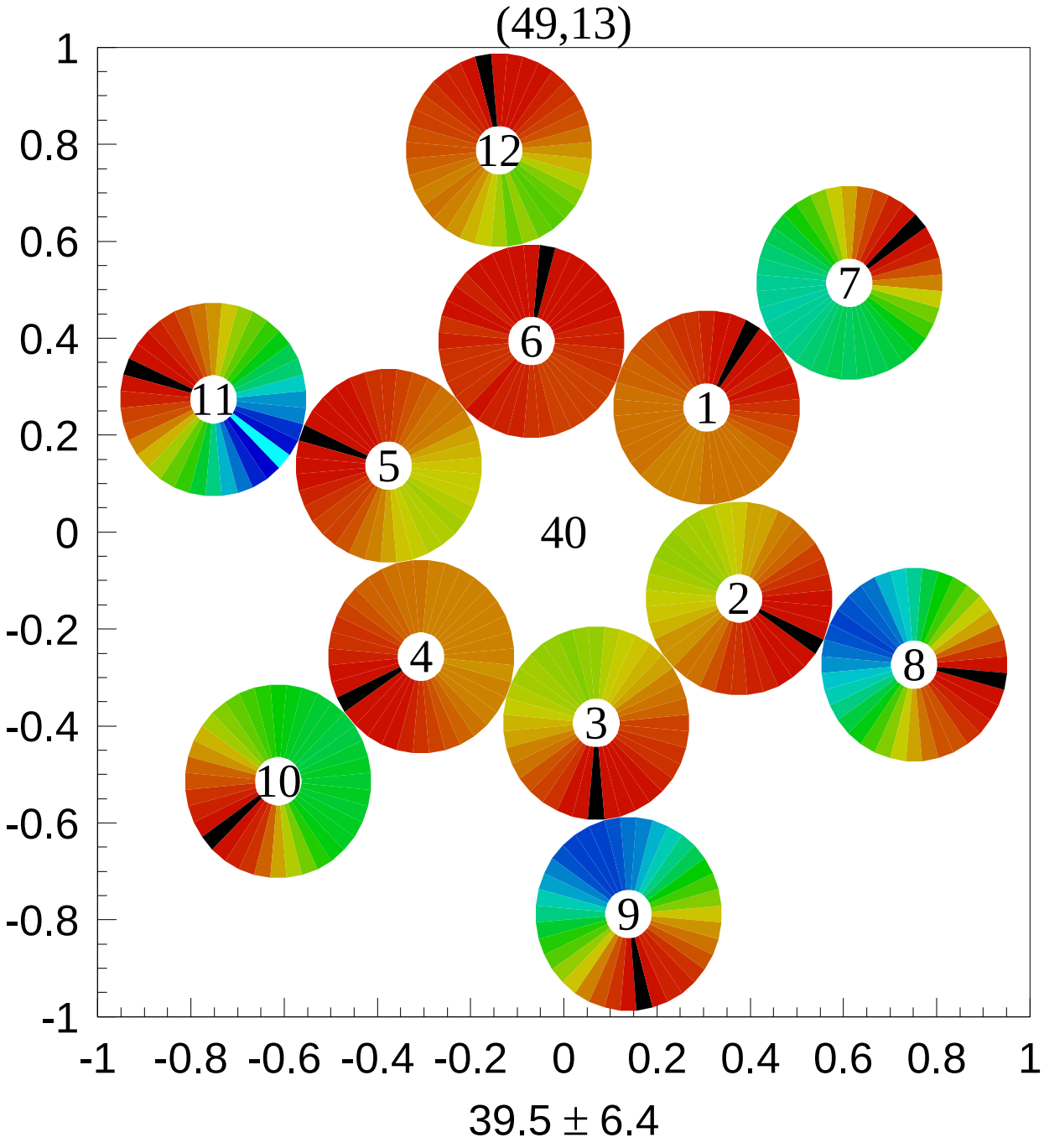

(49,11)
tilted LEDs
126 124 121 121 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 116 122 122 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

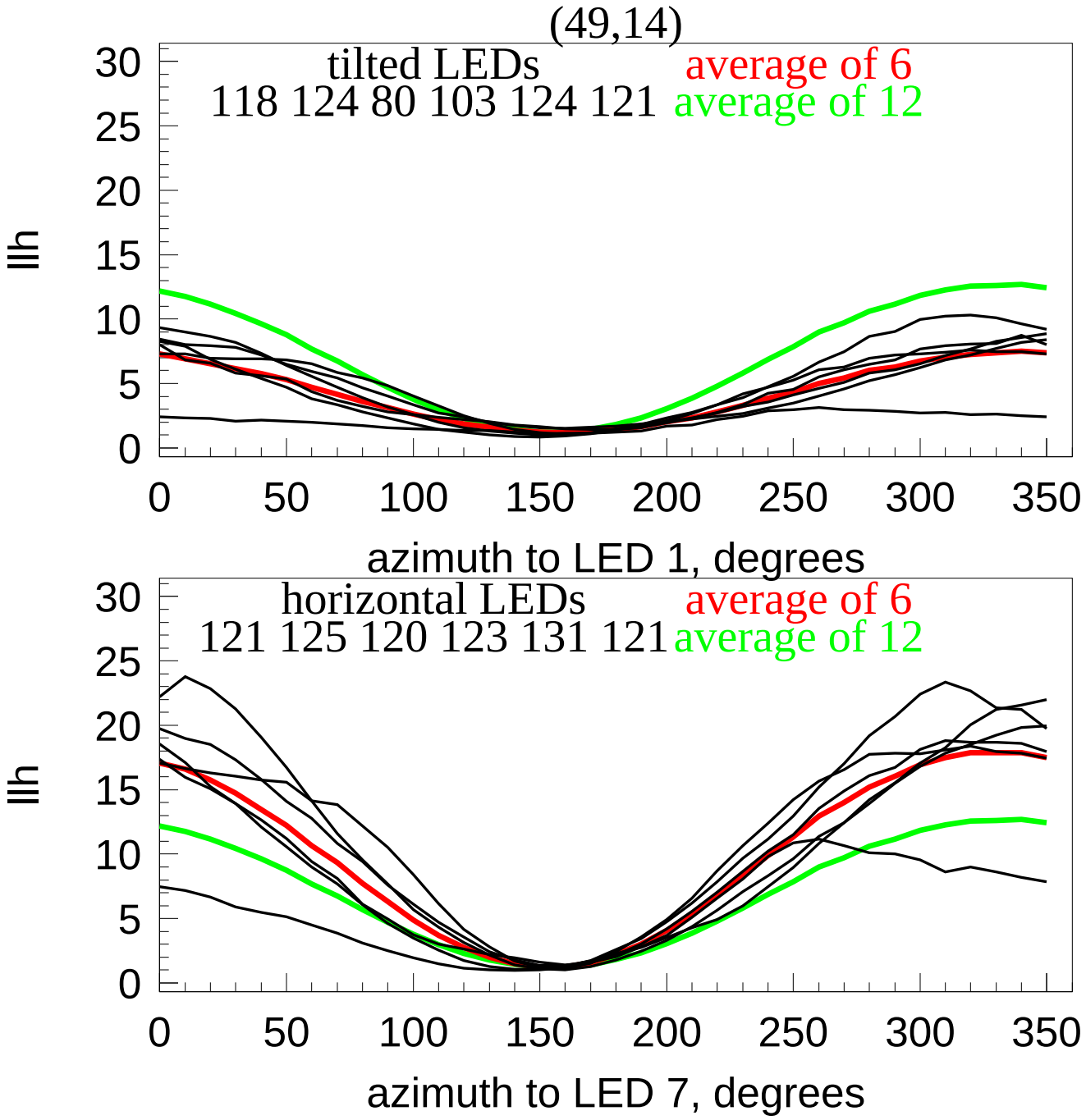

(49,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
45.9 ± 6.8

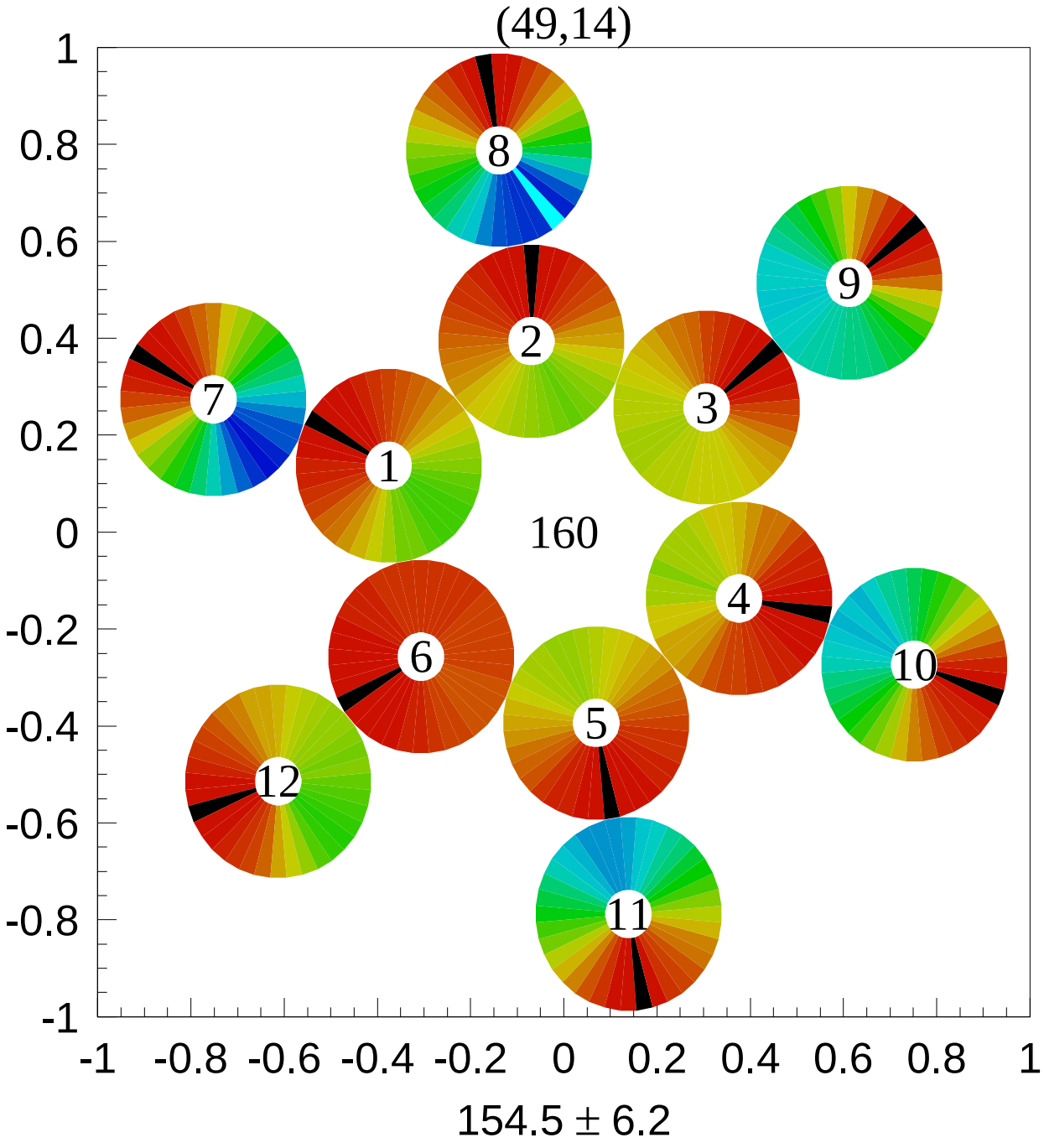

(49,12)
tilted LEDs
121 126 121 125 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 116 116 127 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

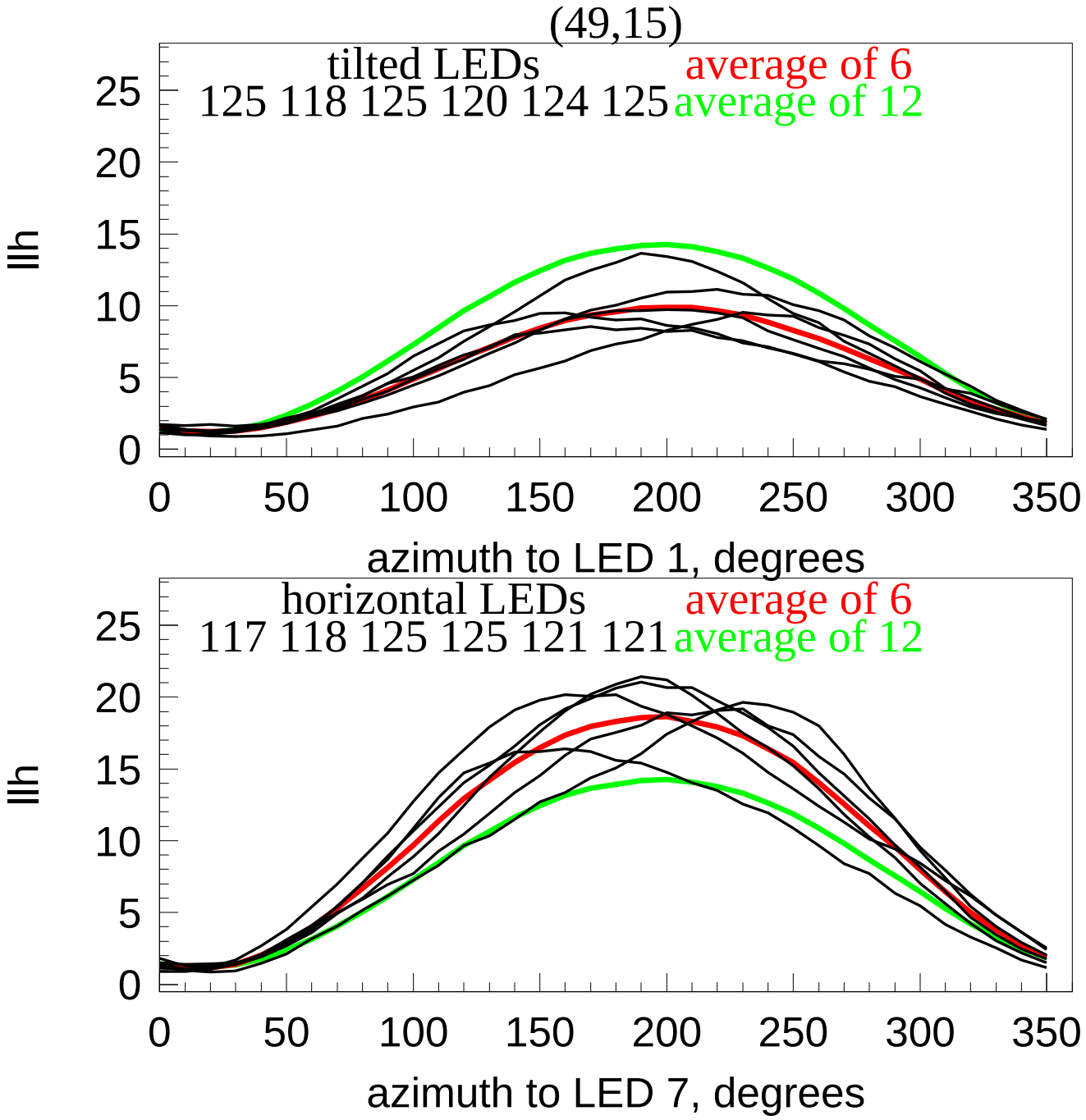

(49,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8.2 ± 14.8
12
11
6
5
7
1
10
4
10
2
3
8
9

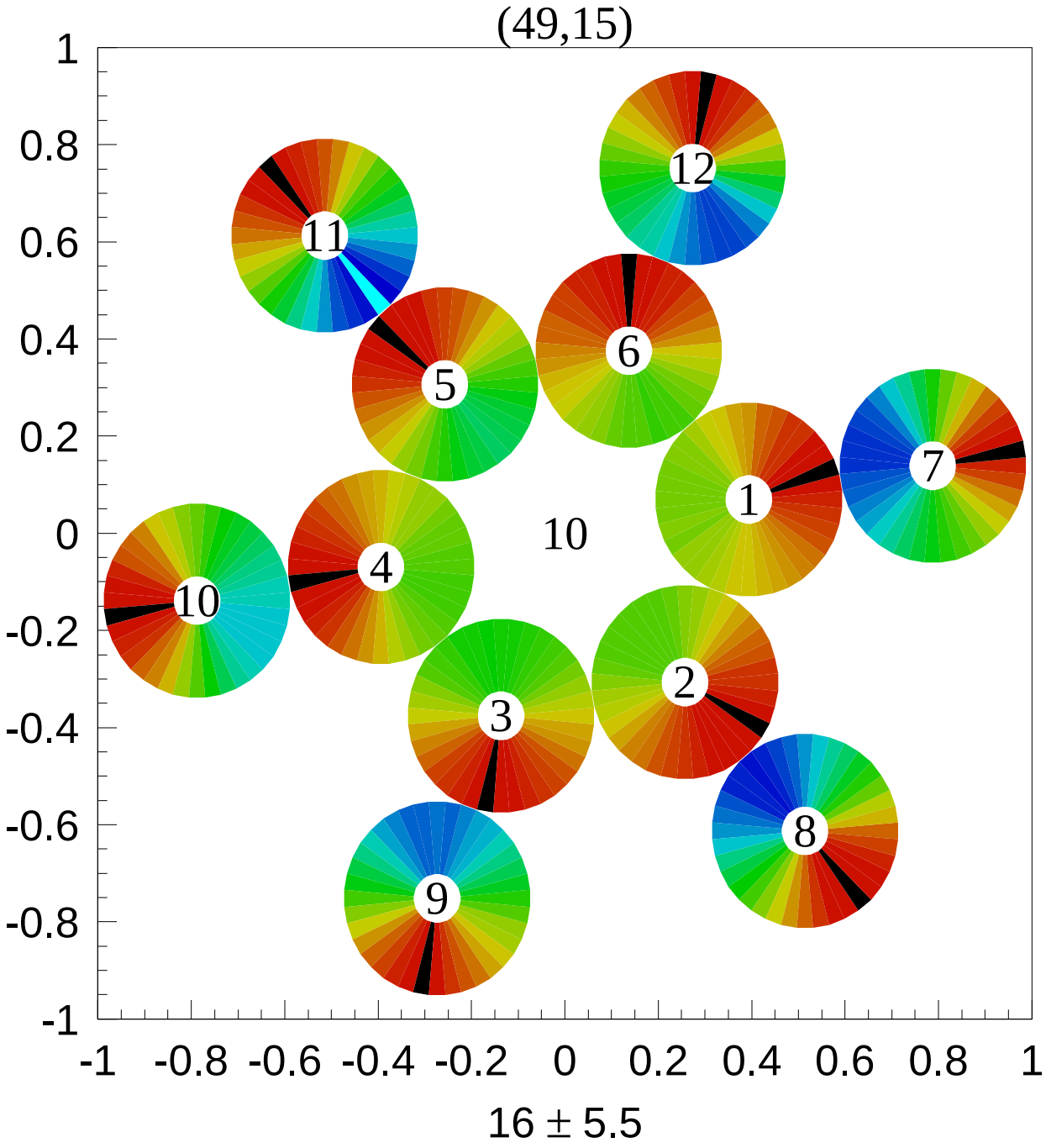

(49,13)
tilted LEDs
125 122 119 125 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 119 124 116 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

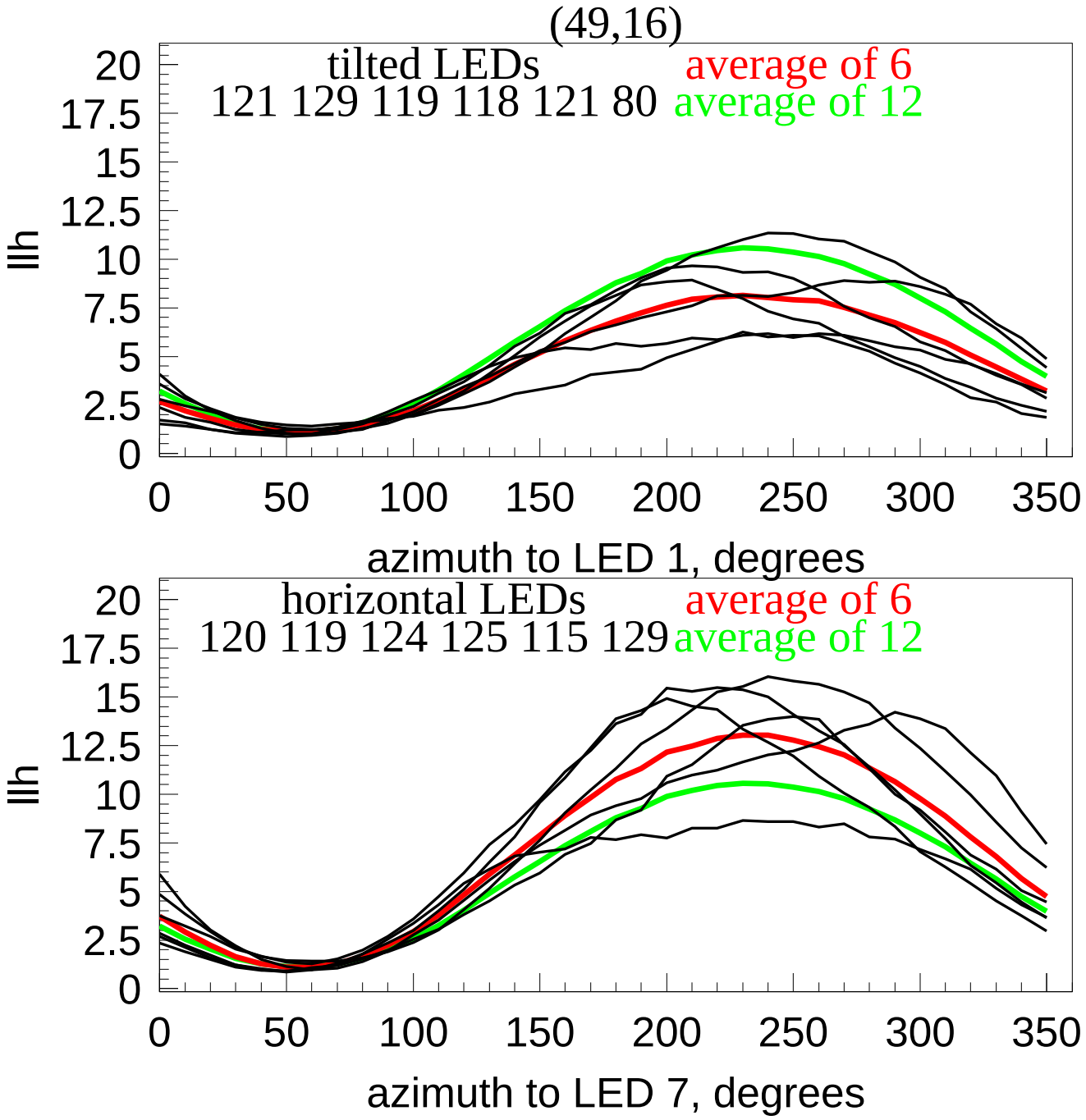

(49,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
39.5 ± 6.4

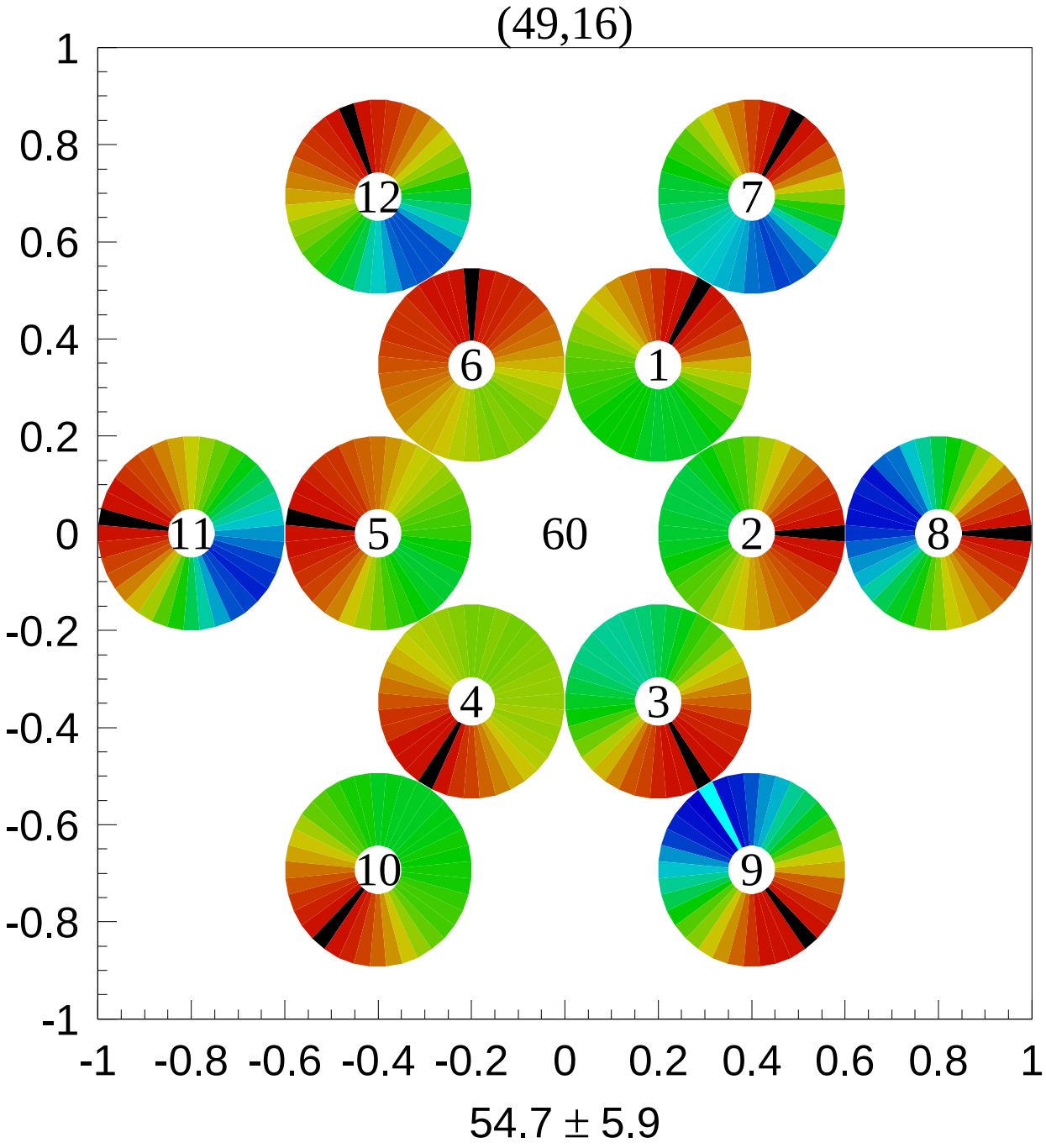

(49,14)
tilted LEDs
118 124 80 103 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 120 123 131 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

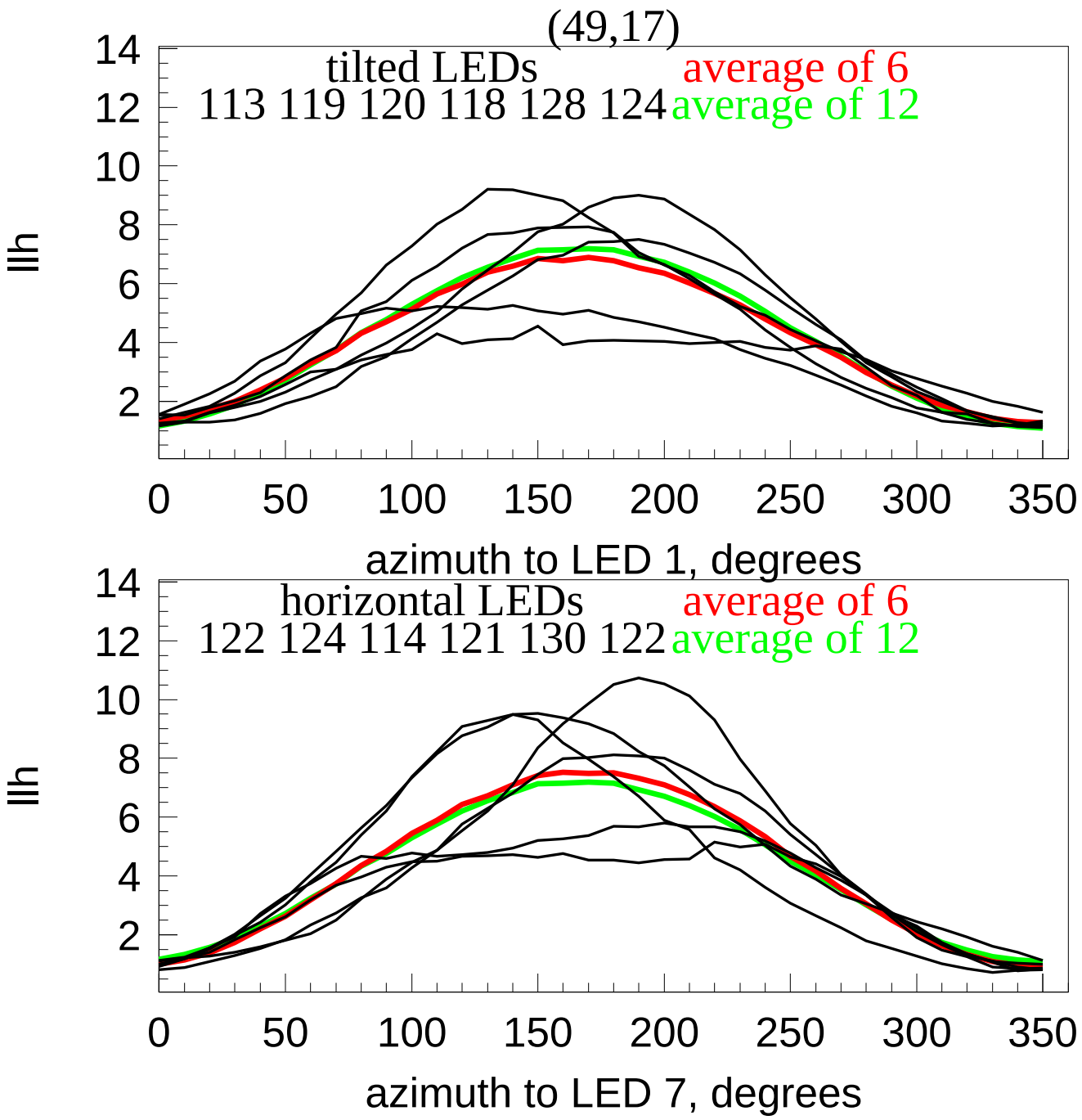

(49,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
154.5 ± 6.2

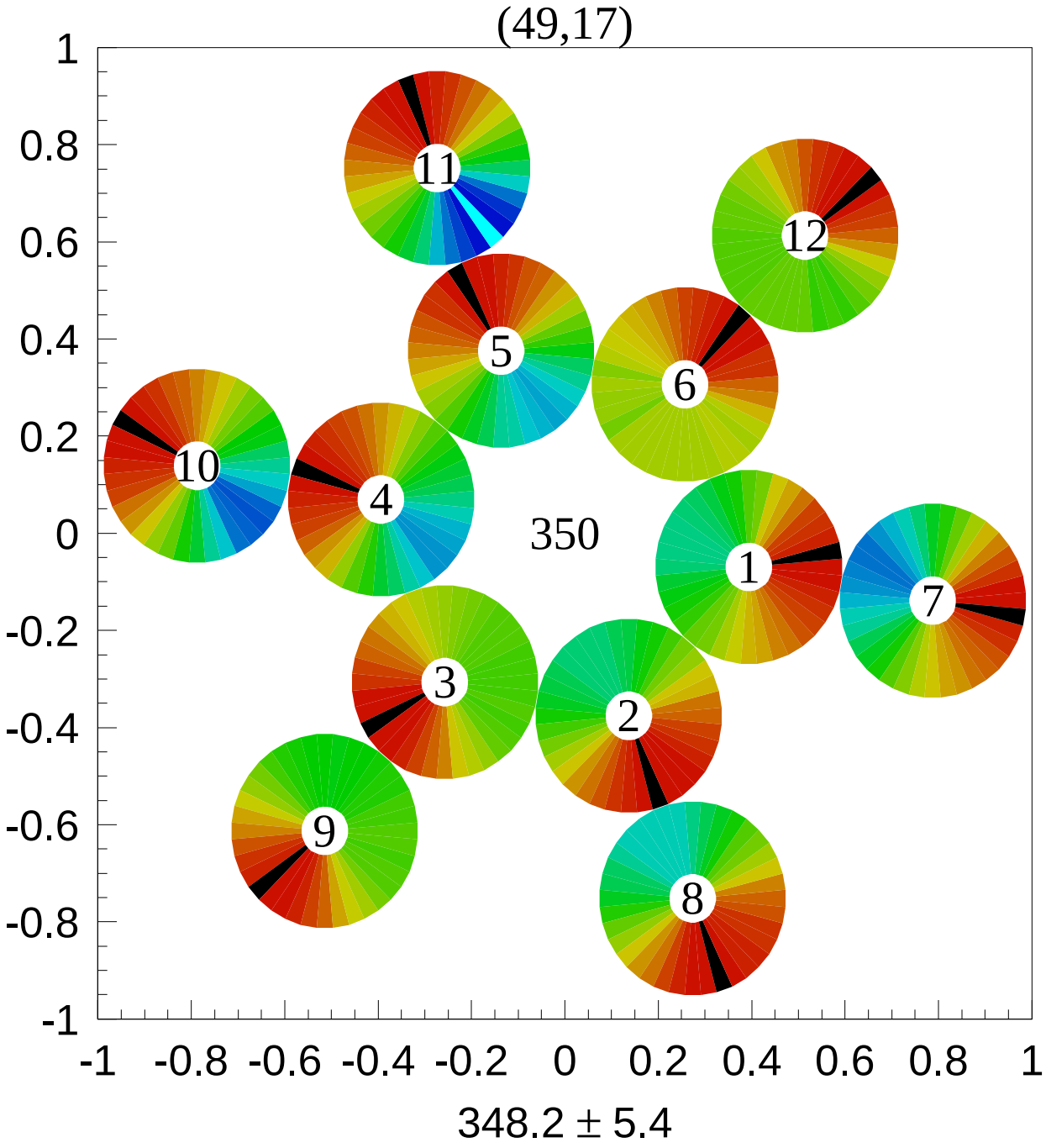

(49,15)
tilted LEDs
125 118 125 120 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 125 125 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

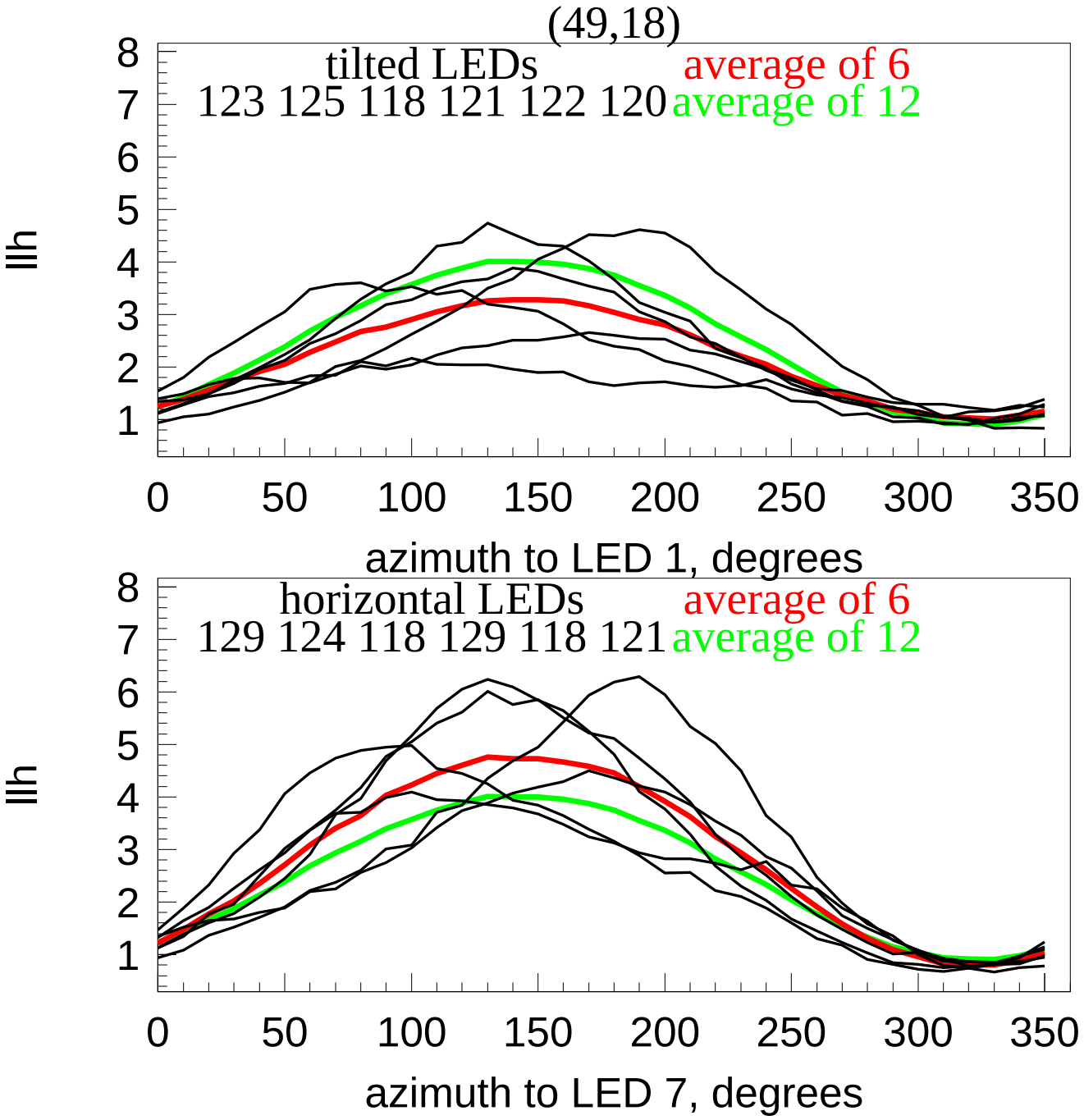

(49,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
16 ± 5.5
12
11
6
5
7
1
10
4
10
2
3
8
9

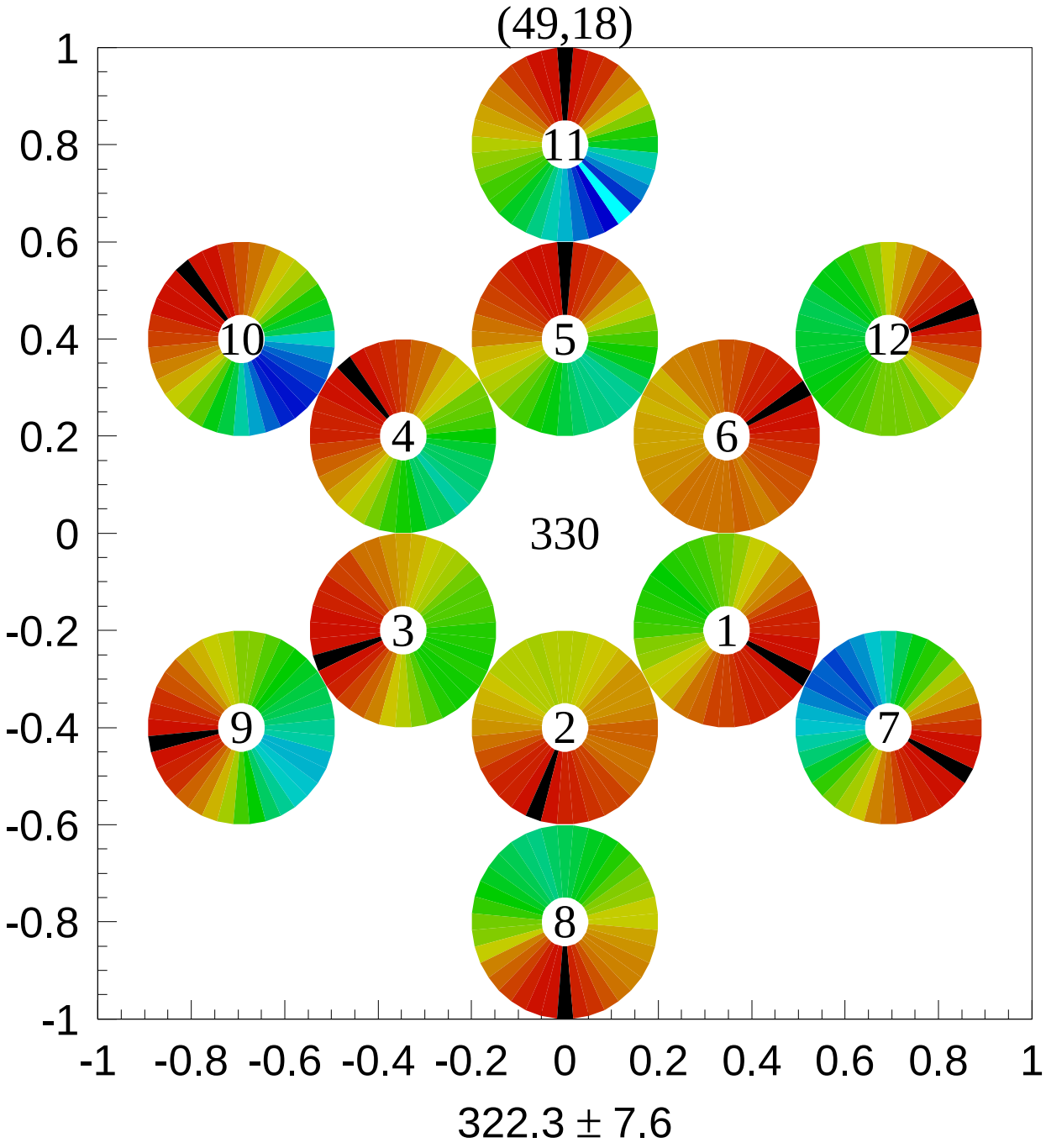

(49,16)
tilted LEDs
121 129 119 118 121 80
average of 6
average of 12
Ilh
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 119 124 125 115 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

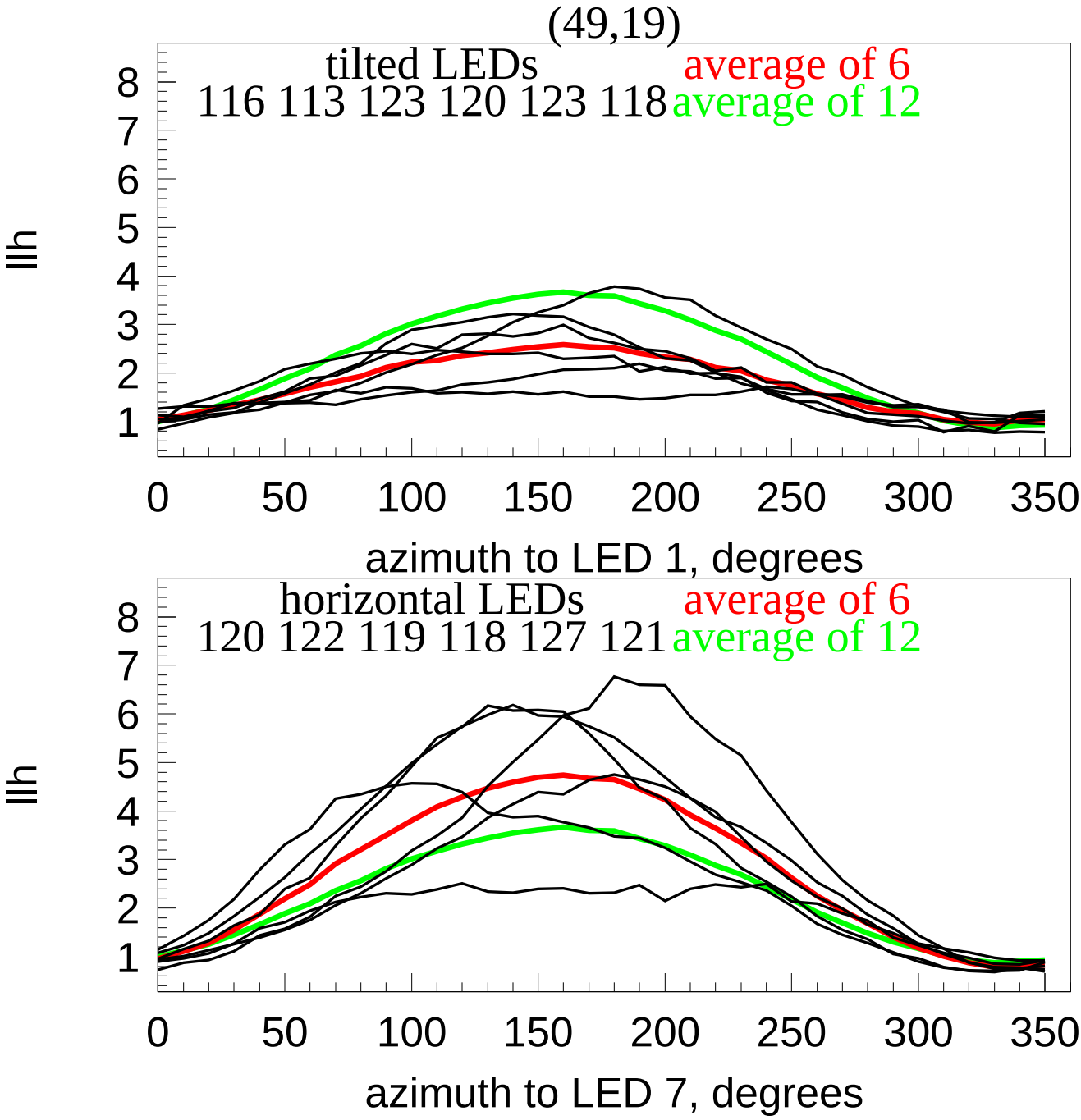

(49,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
54.7 ± 5.9

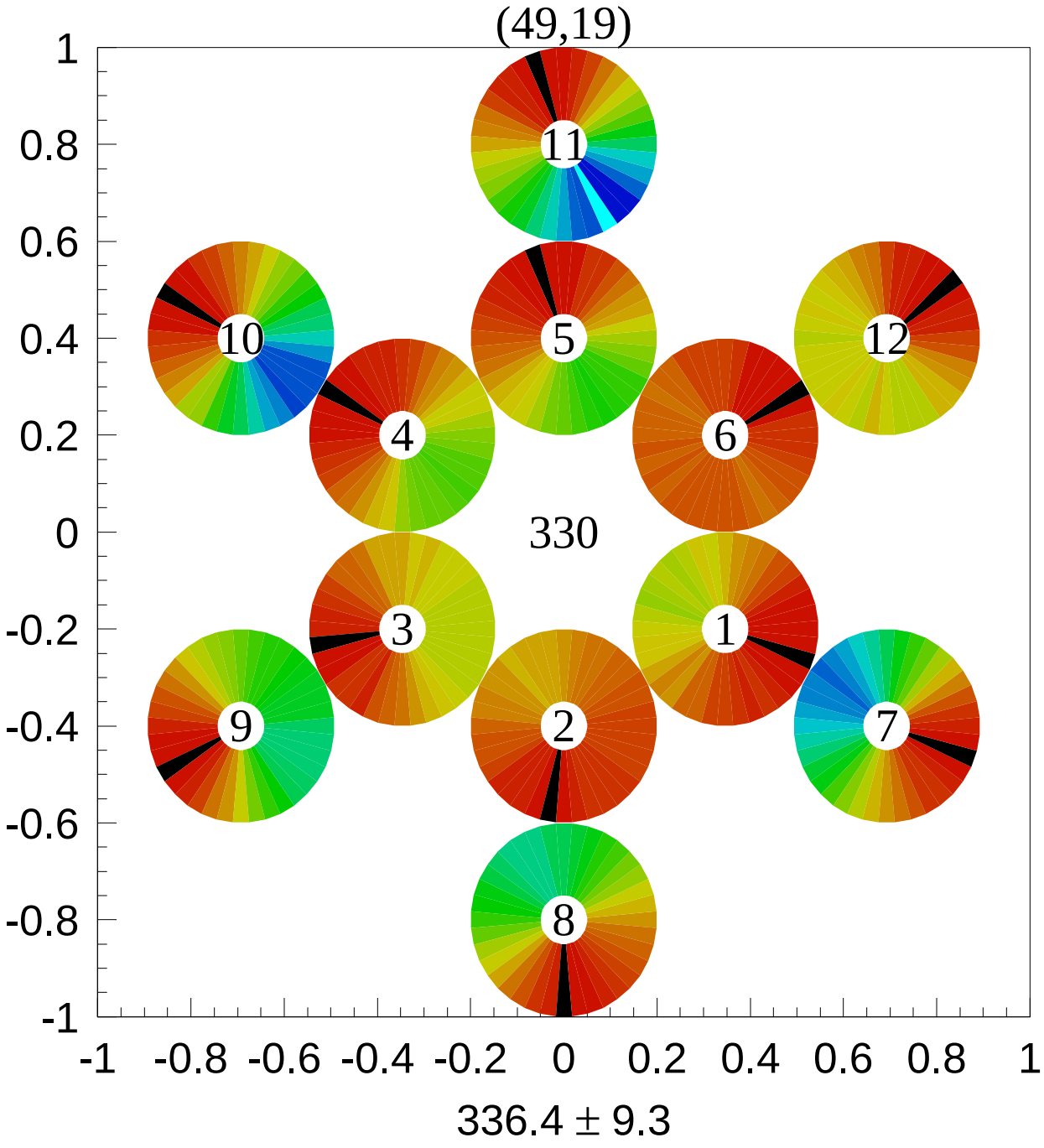

(49,17)
tilted LEDs
113 119 120 118 128 124
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 124 114 121 130 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

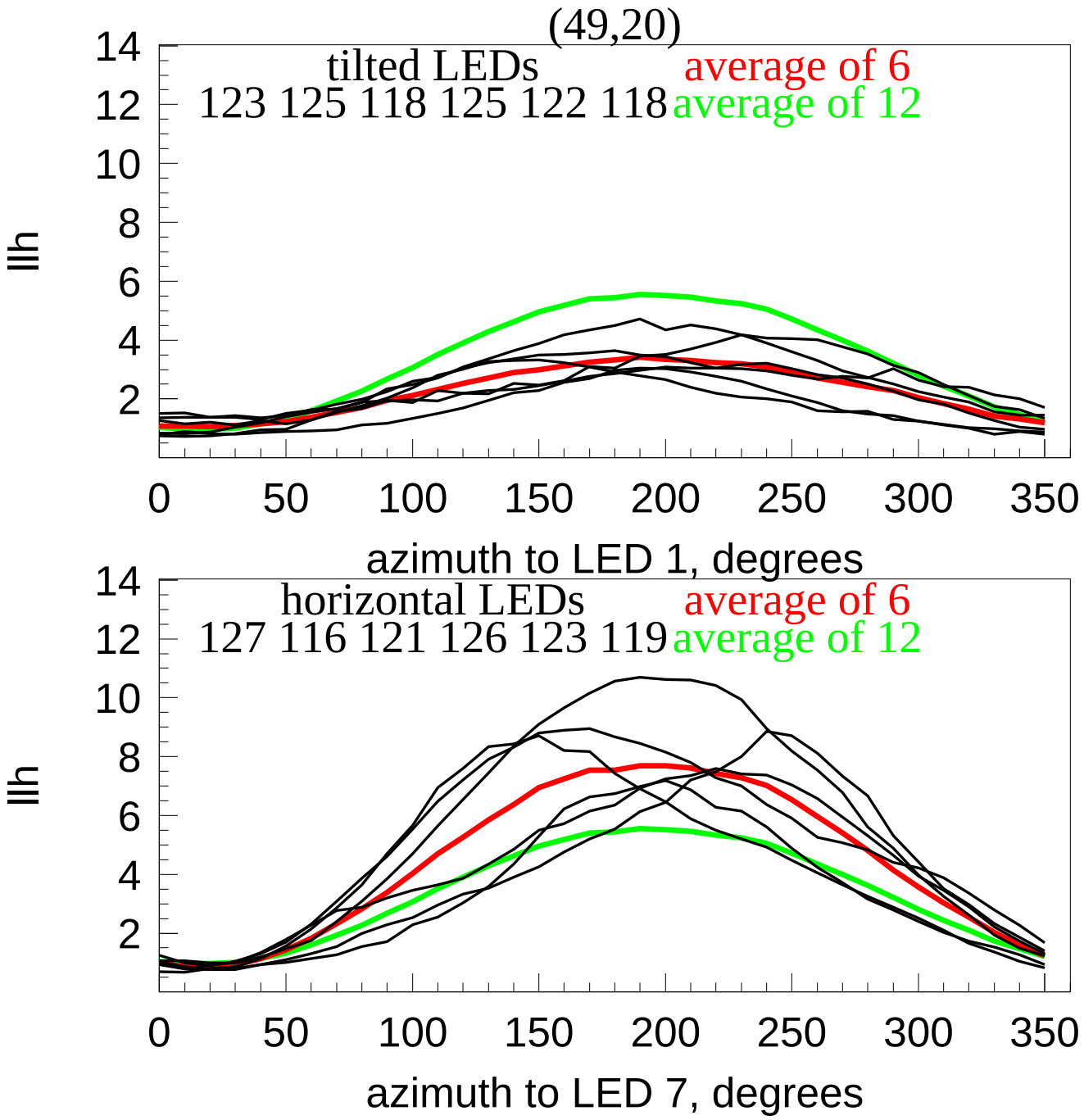

(49,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
348.2 ± 5.4

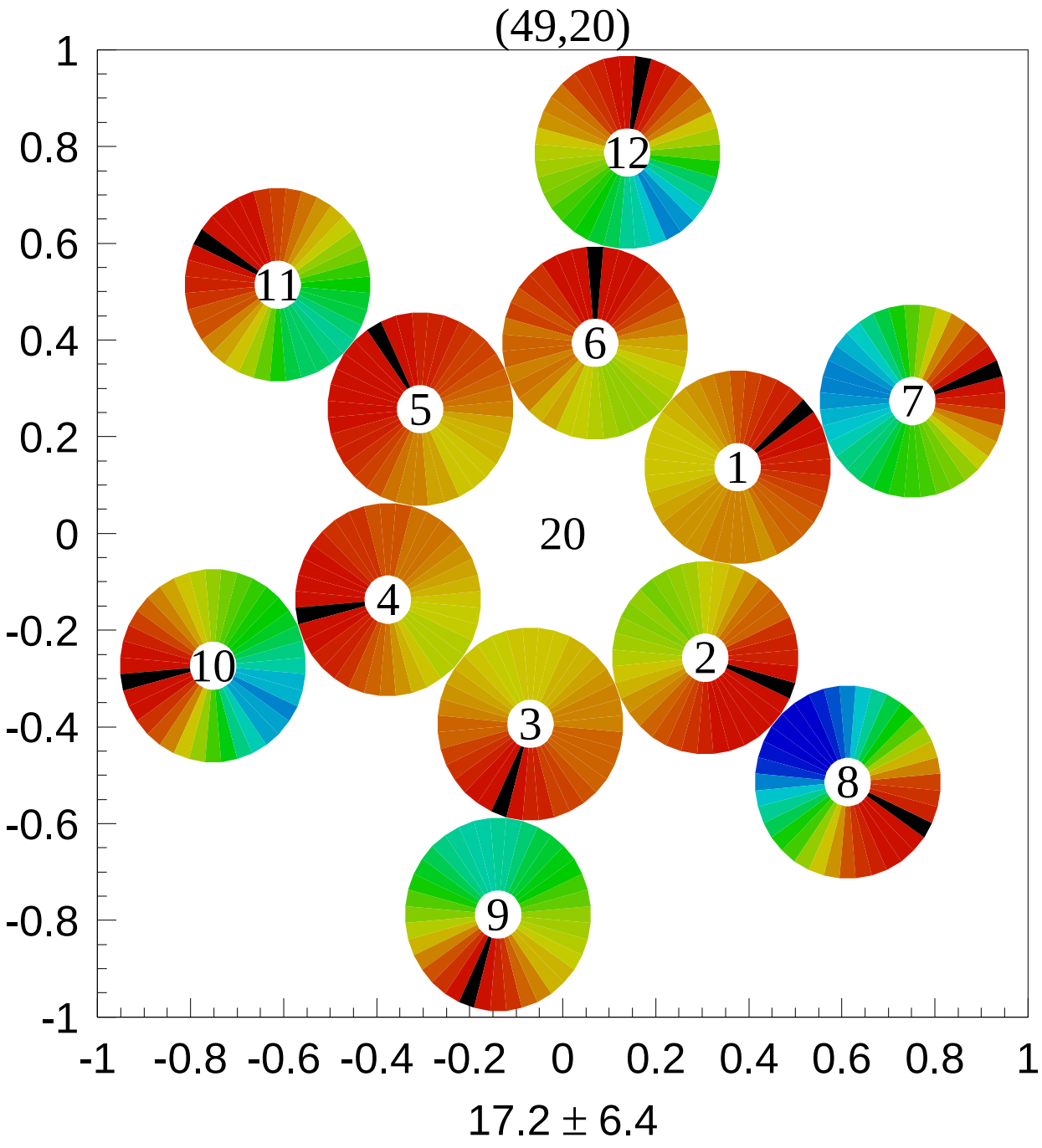

(49,18)
tilted LEDs
123 125 118 121 122 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 124 118 129 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

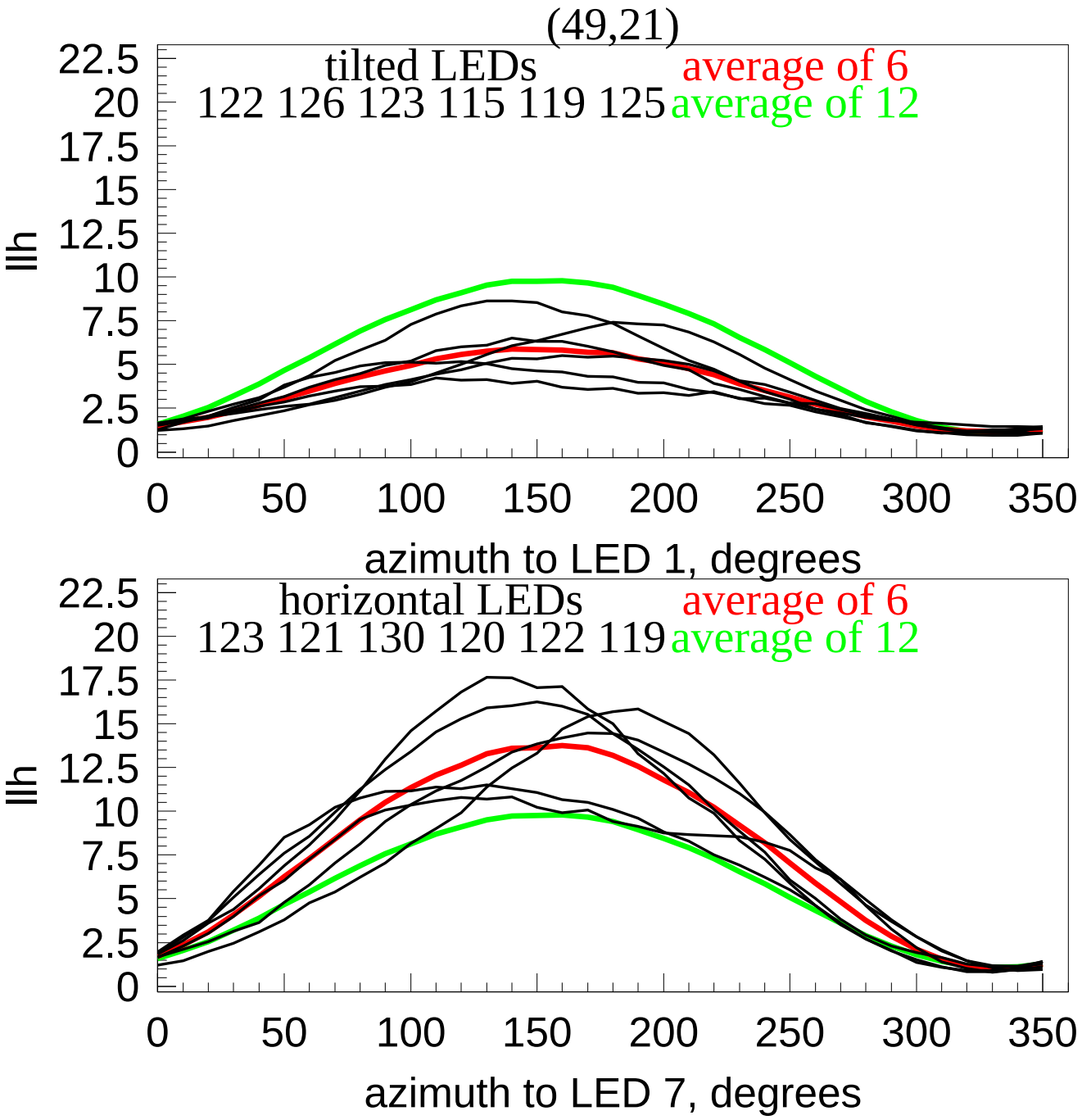

(49,18)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
322.3 ± 7.6

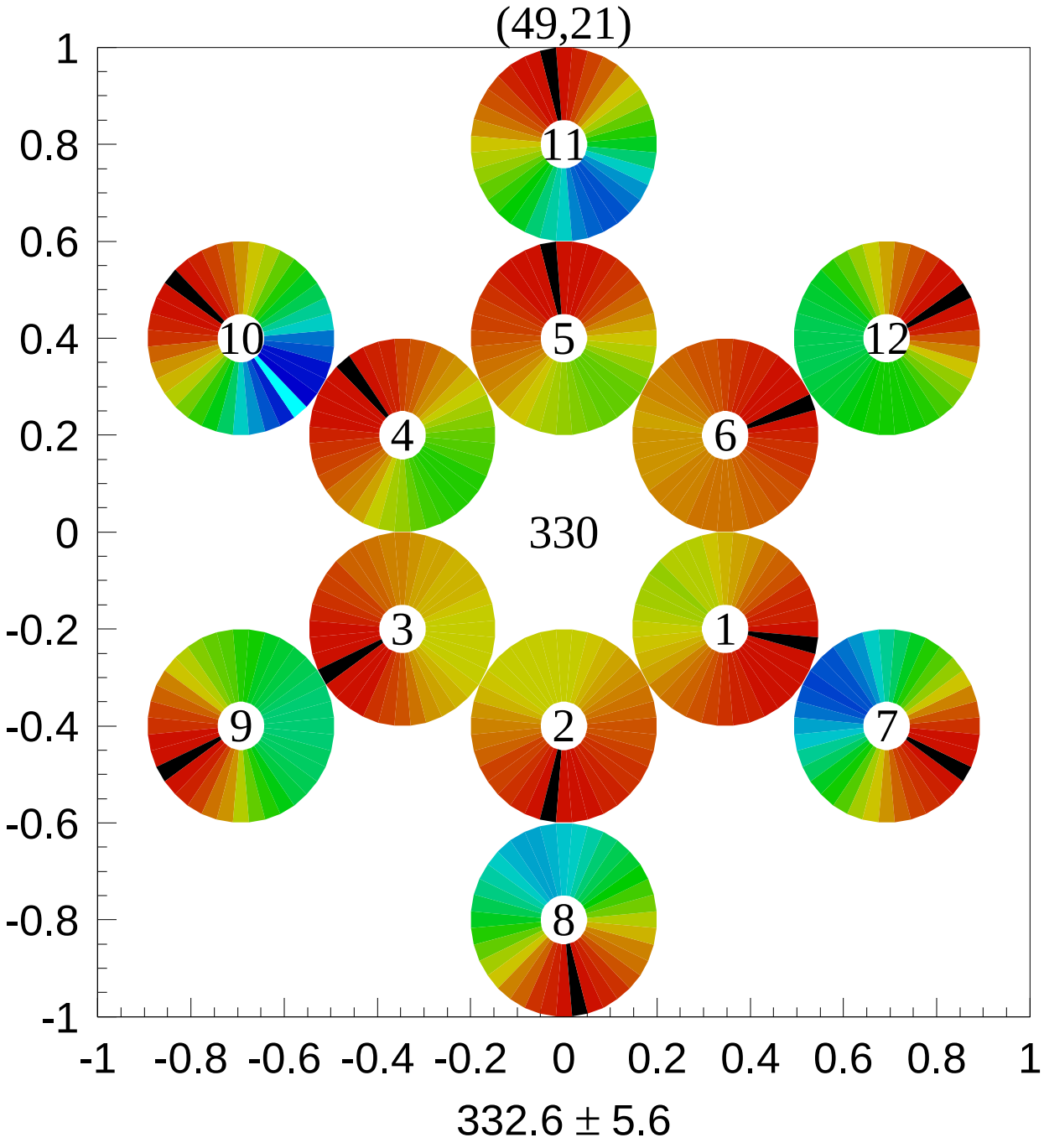

(49,19)
tilted LEDs
116 113 123 120 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 119 118 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

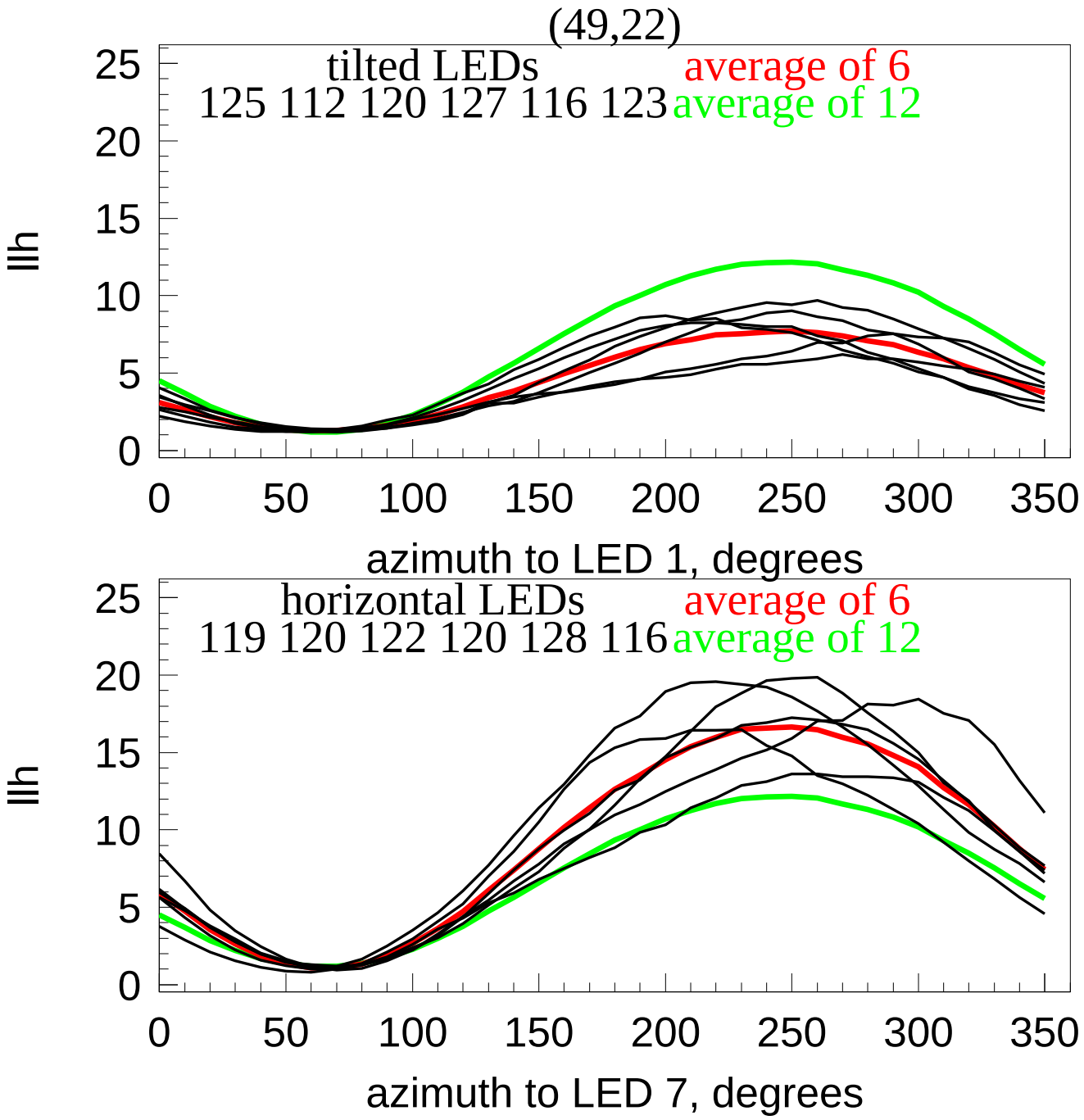

(49,19)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
336.4 ± 9.3

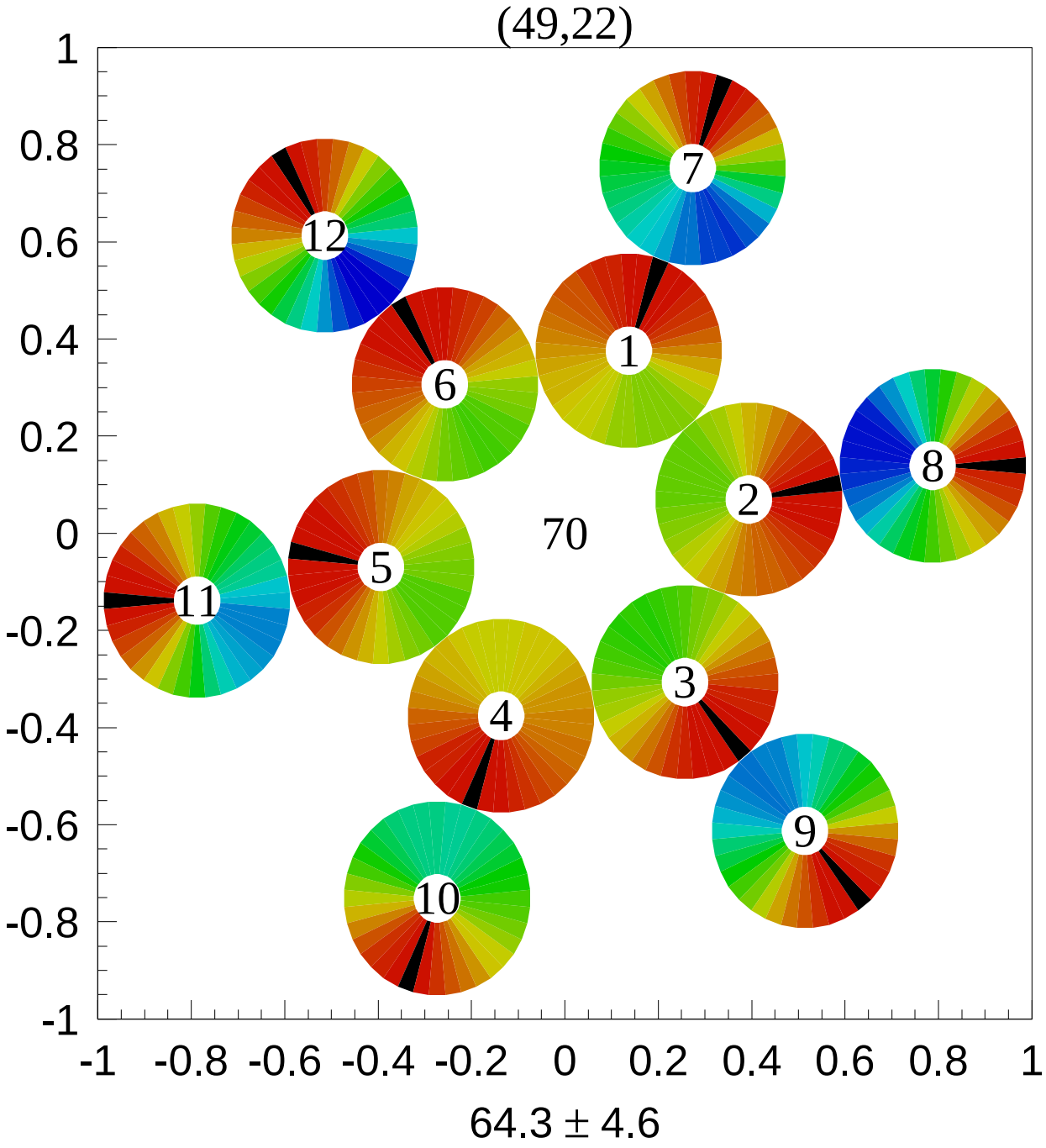

(49,20)
tilted LEDs
123 125 118 125 122 118
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 116 121 126 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

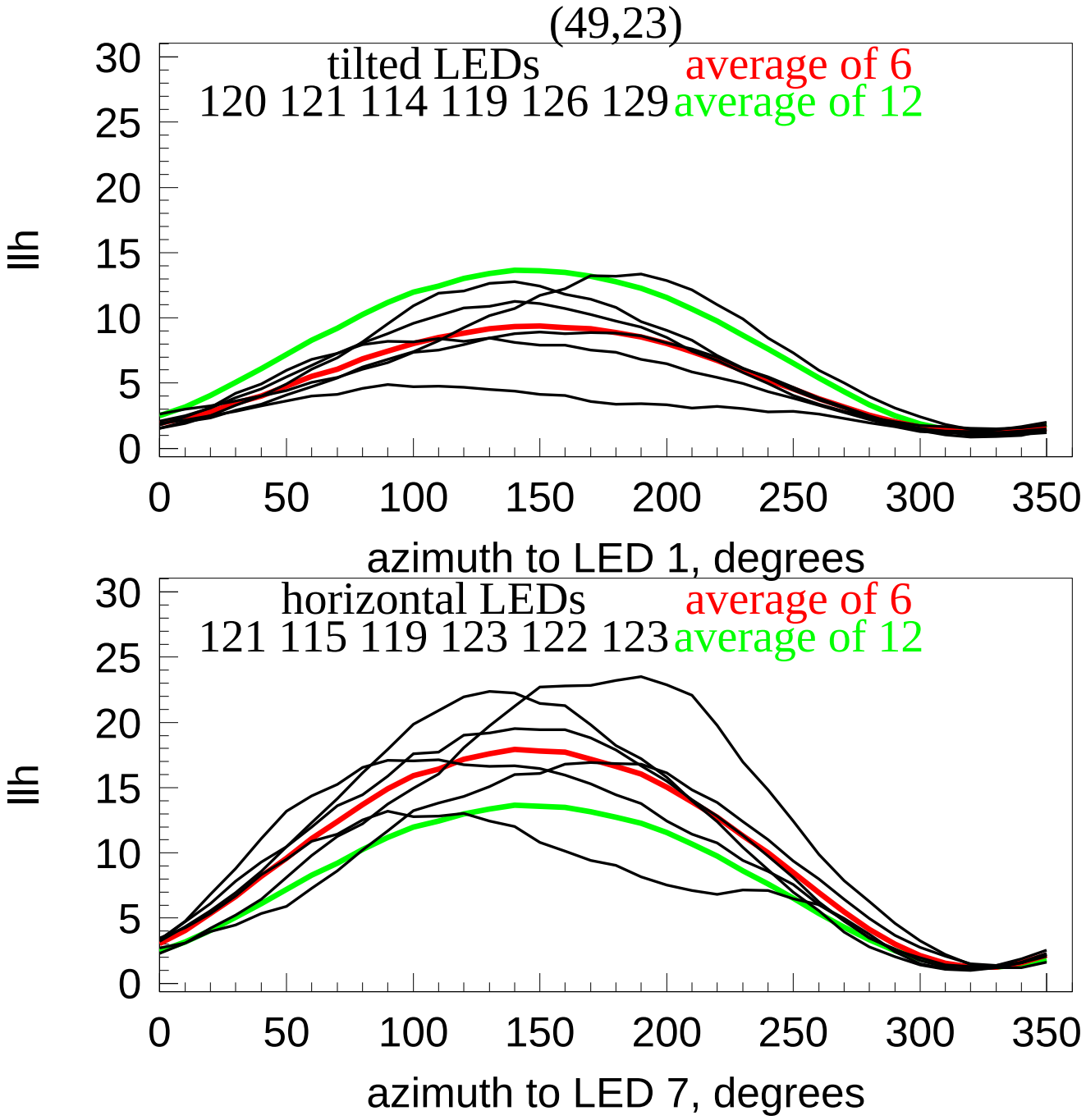

(49,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
17.2 ± 6.4

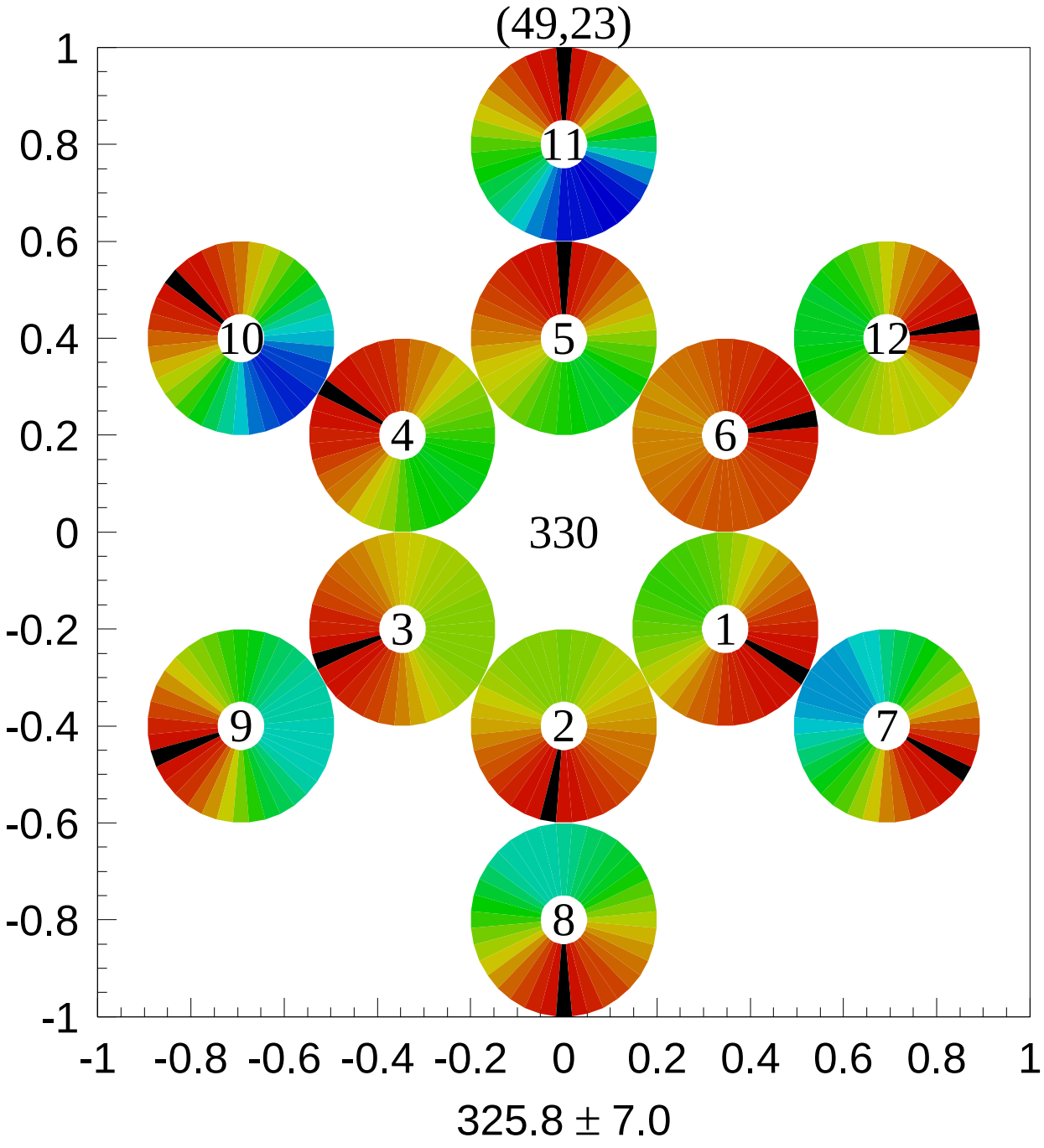

(49,21)
tilted LEDs
122 126 123 115 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 130 120 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

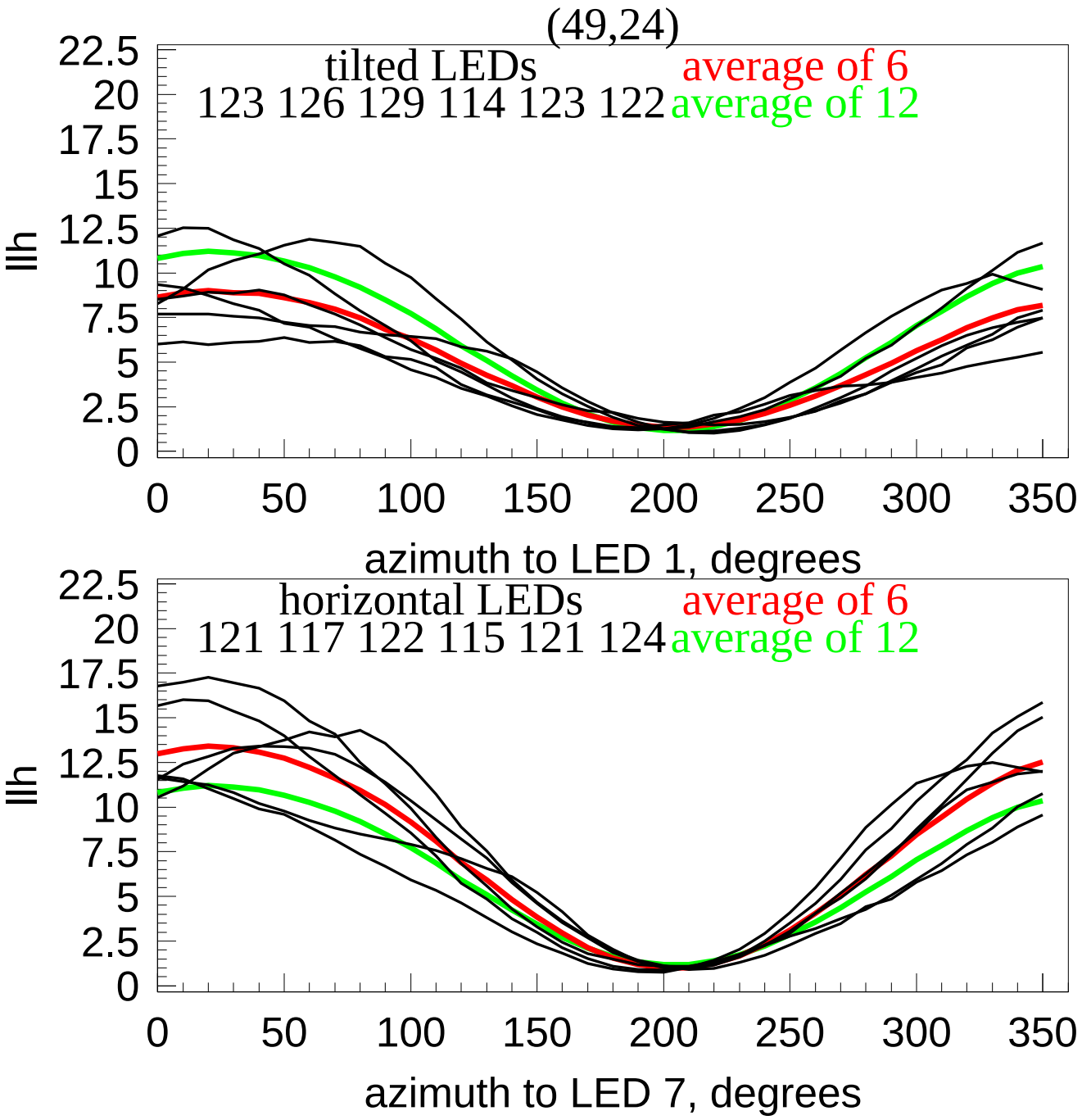

(49,21)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
332.6 ± 5.6

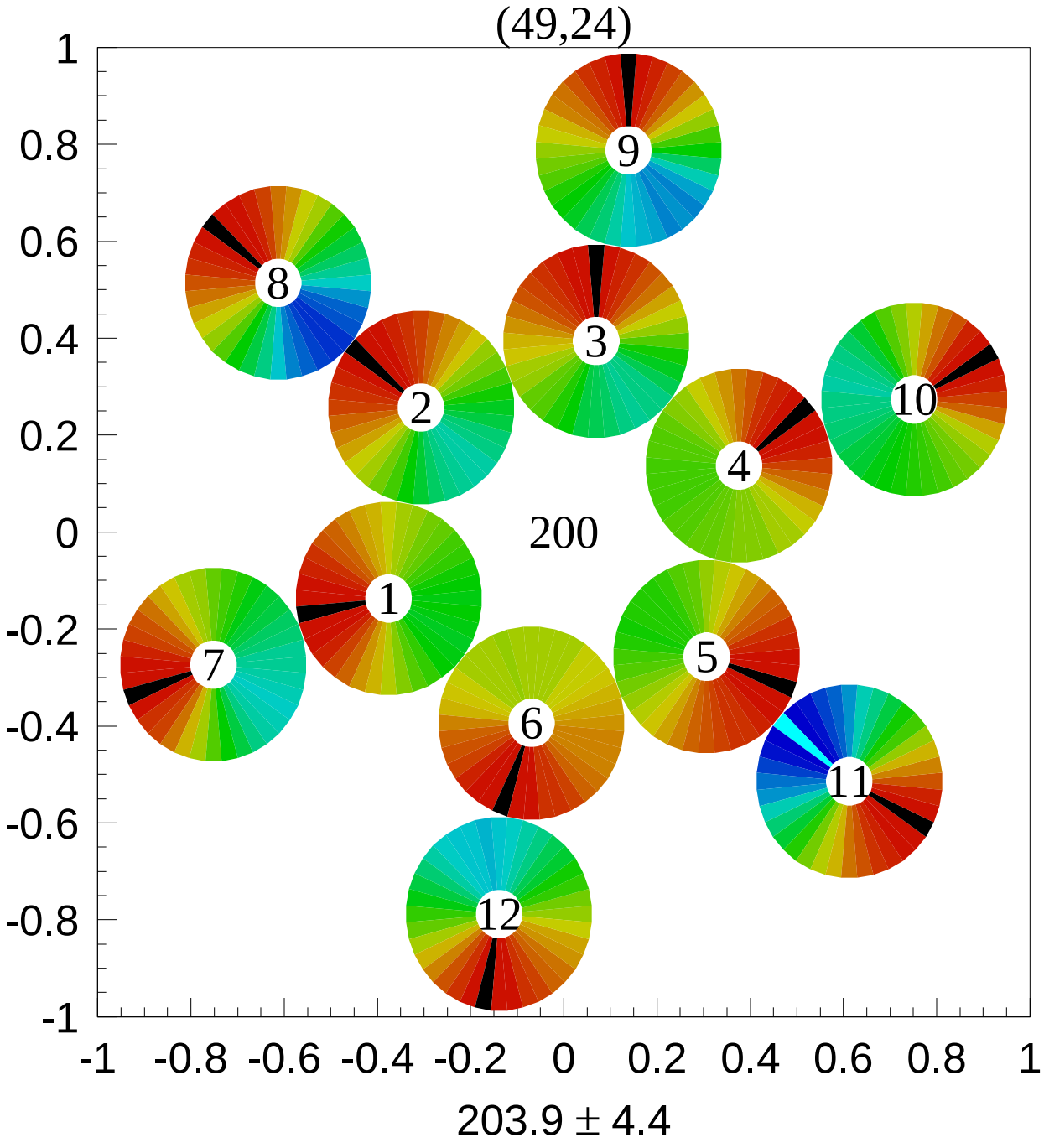

(49,22)
tilted LEDs
125 112 120 127 116 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 122 120 128 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

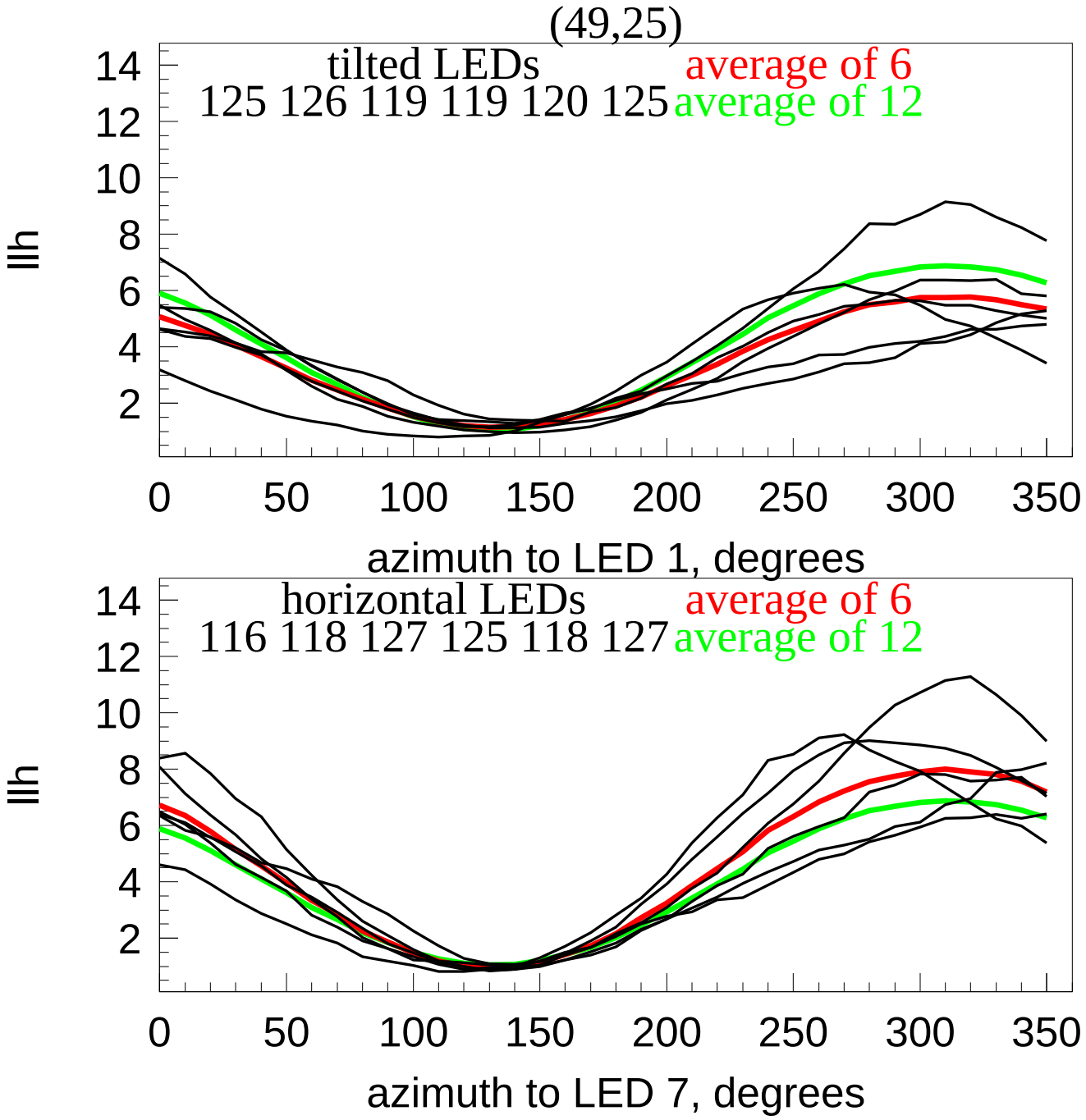

(49,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
64.3 ± 4.6

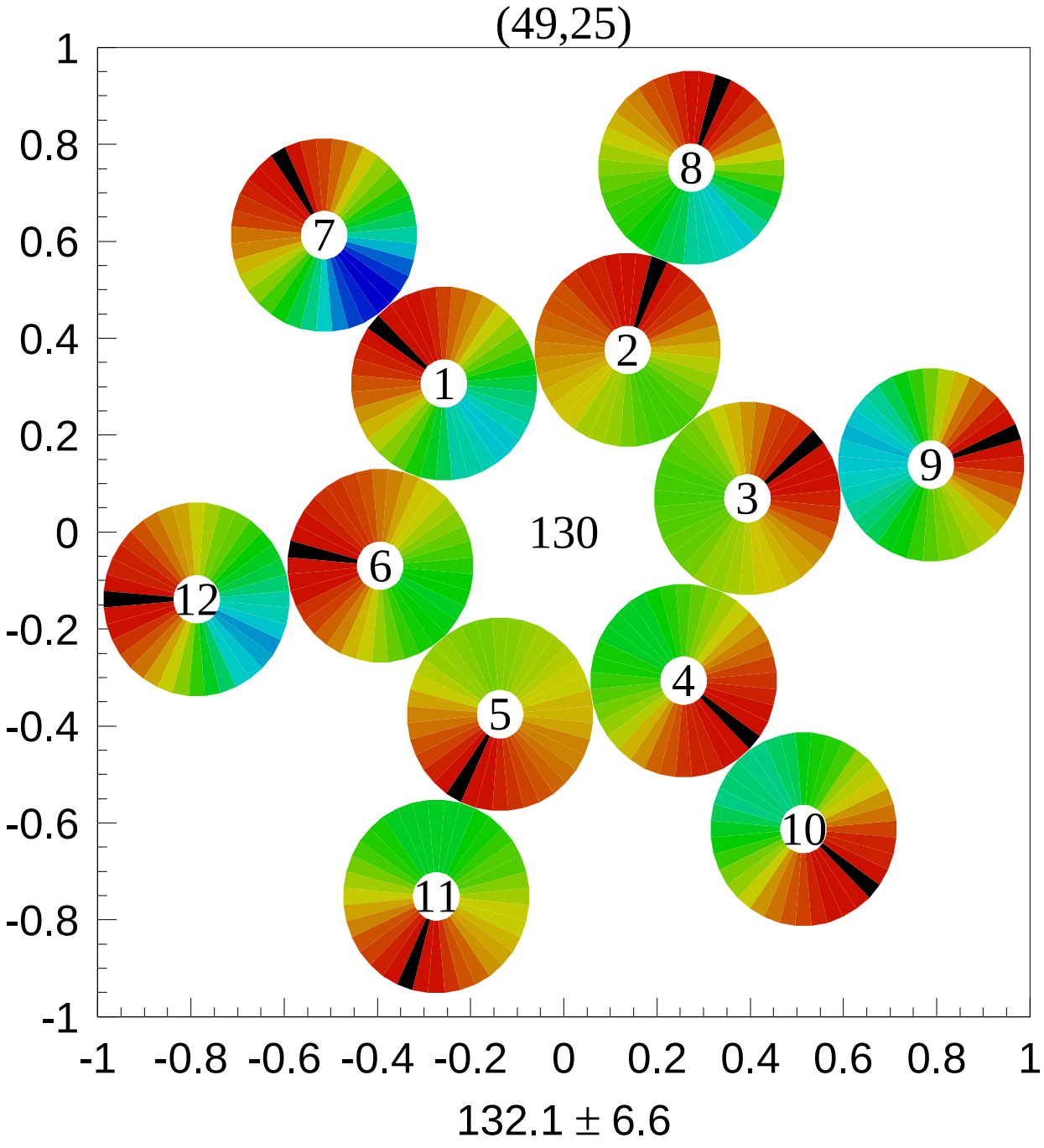

(49,23)
tilted LEDs
120 121 114 119 126 129
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 115 119 123 122 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

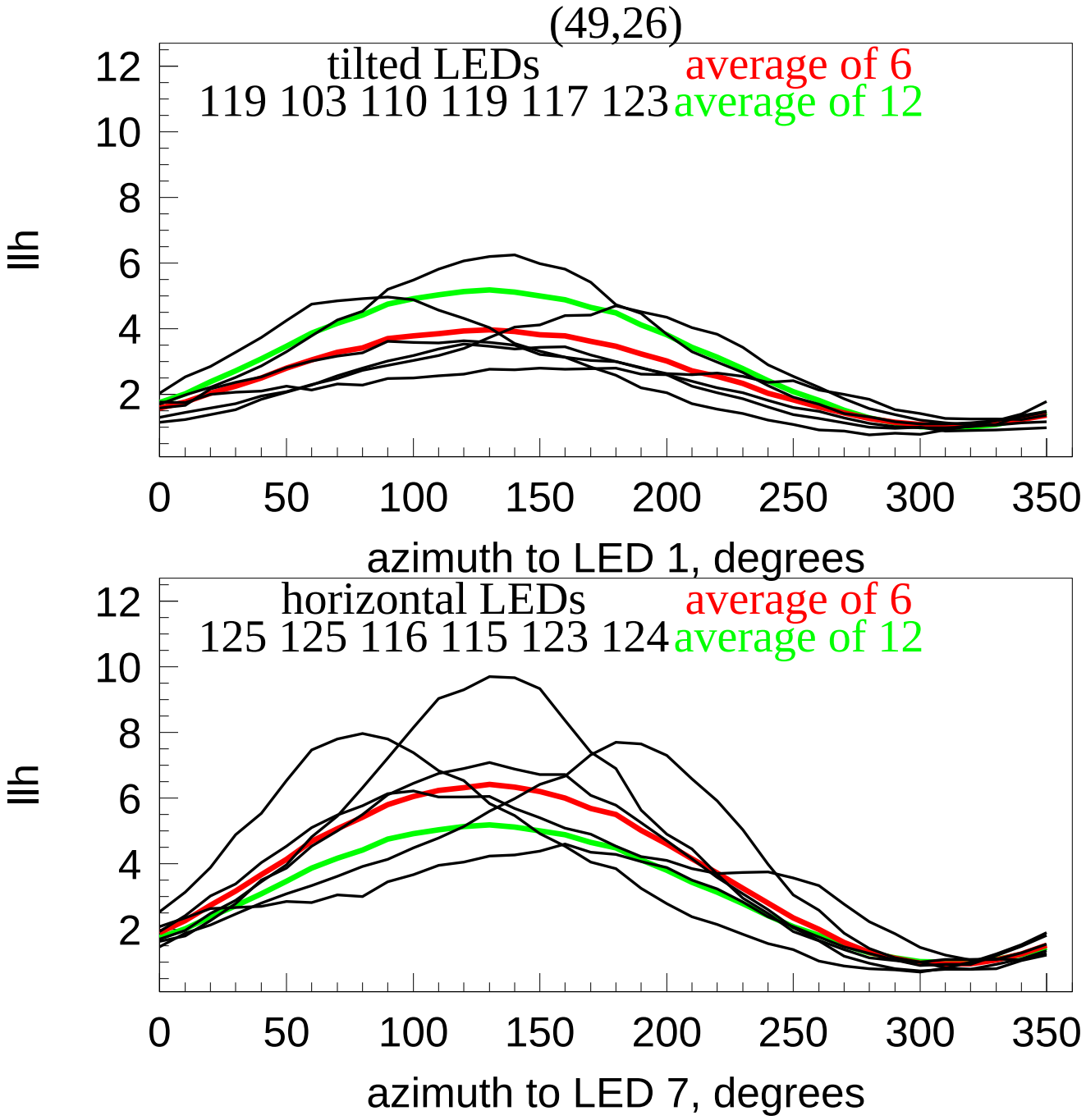

(49,23)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
325.8 ± 7.0

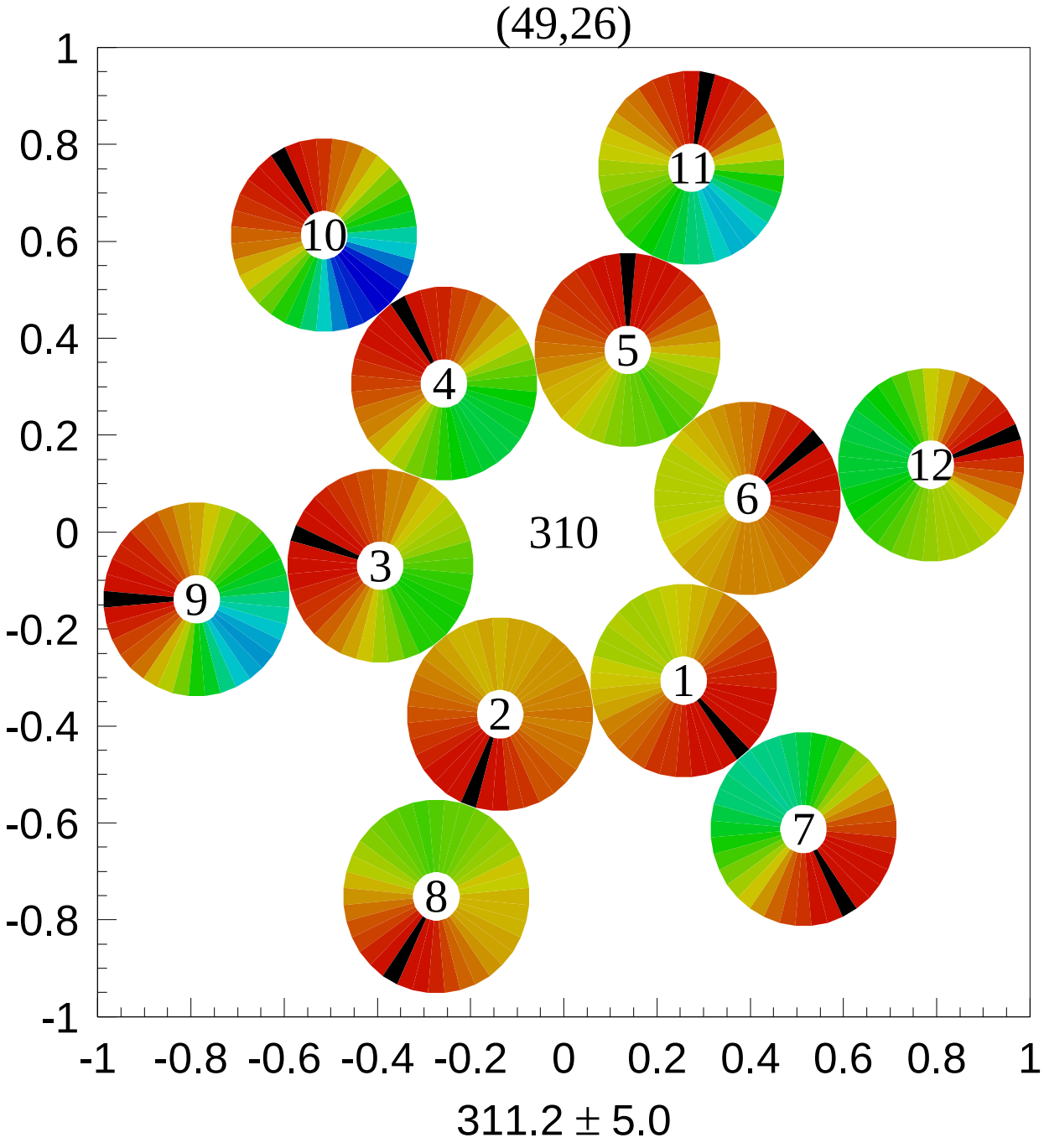

(49,24)
tilted LEDs
123 126 129 114 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 117 122 115 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

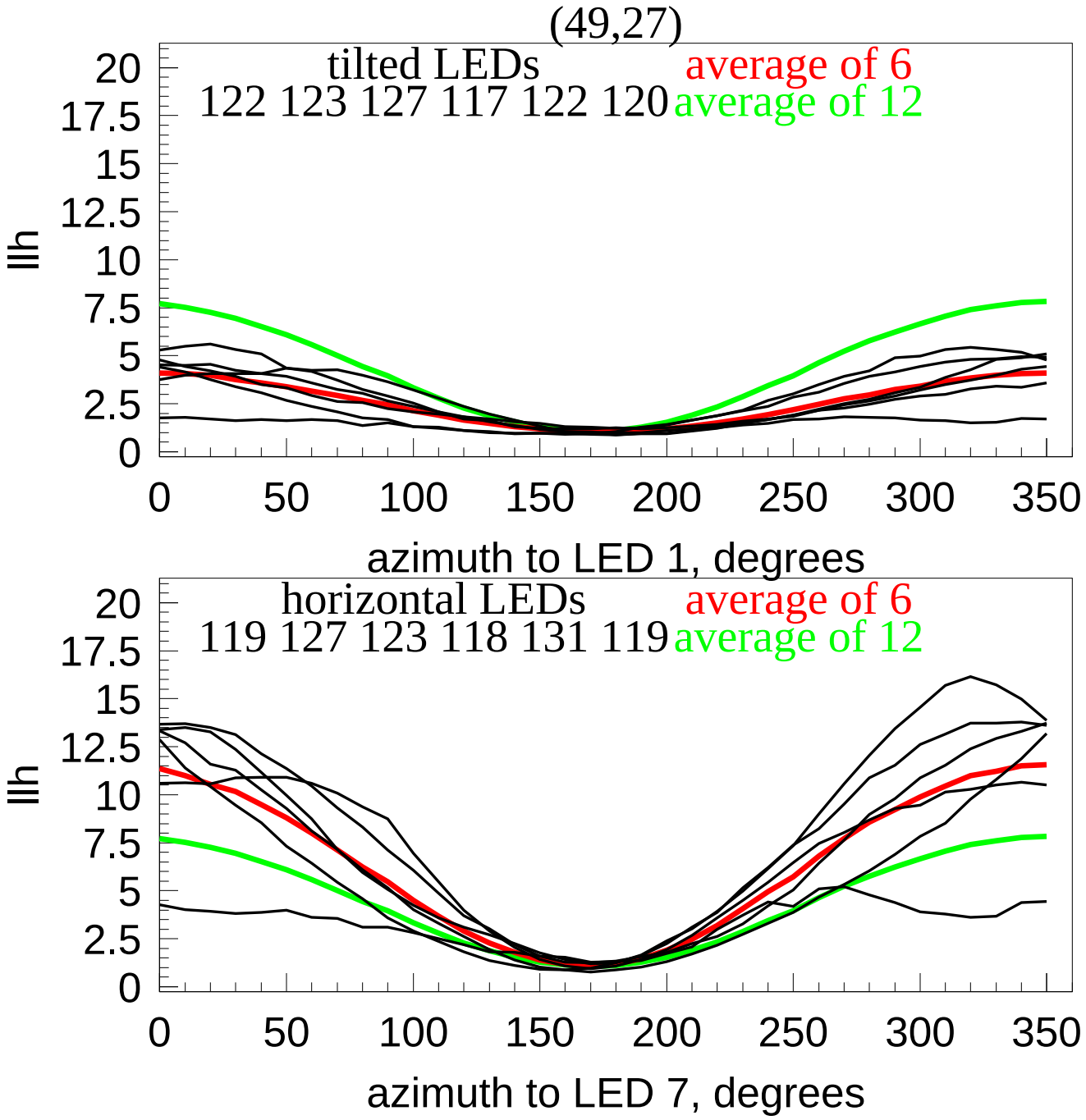

(49,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
203.9 ± 4.4

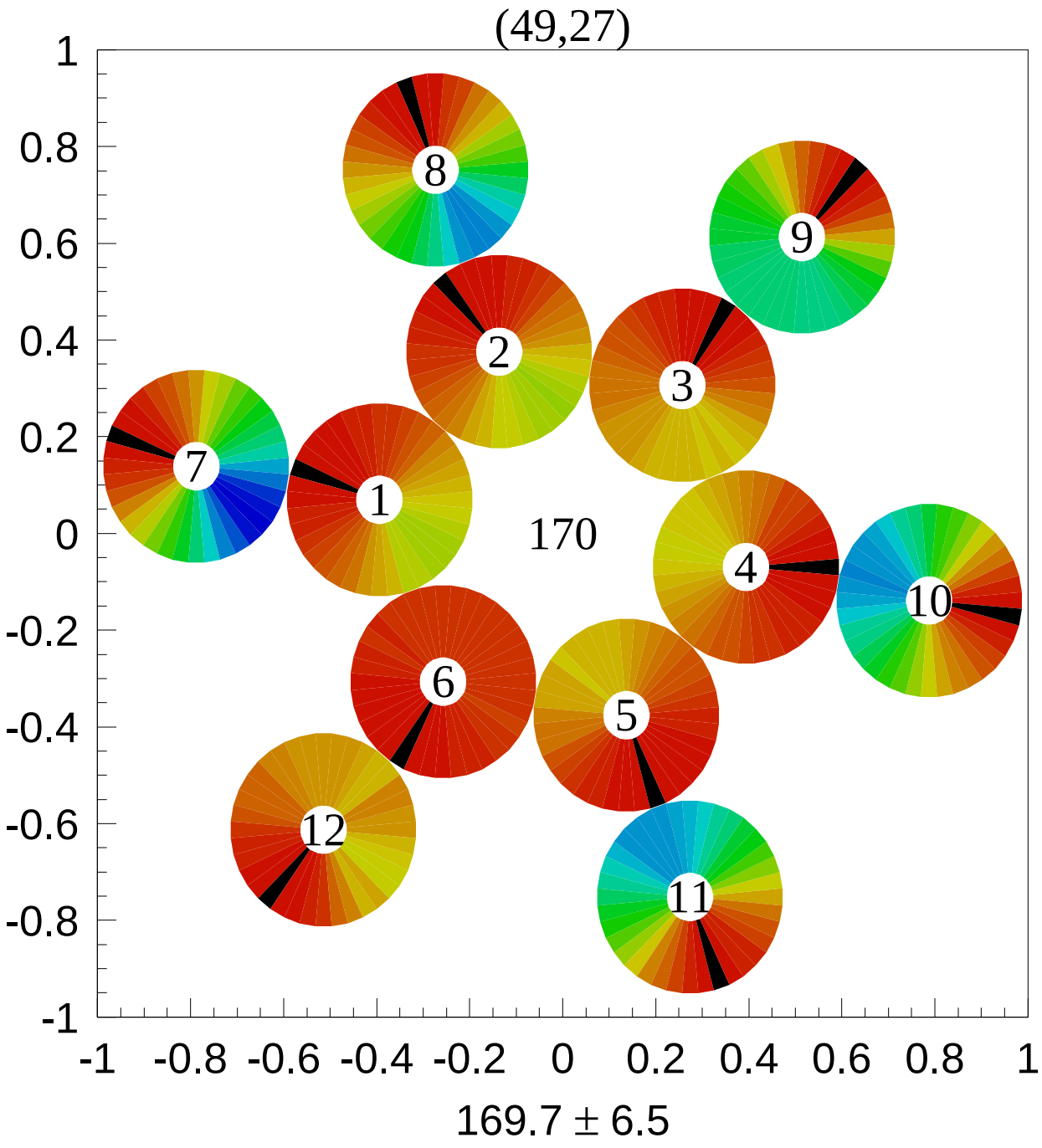

(49,25)
tilted LEDs
125 126 119 119 120 125
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 118 127 125 118 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

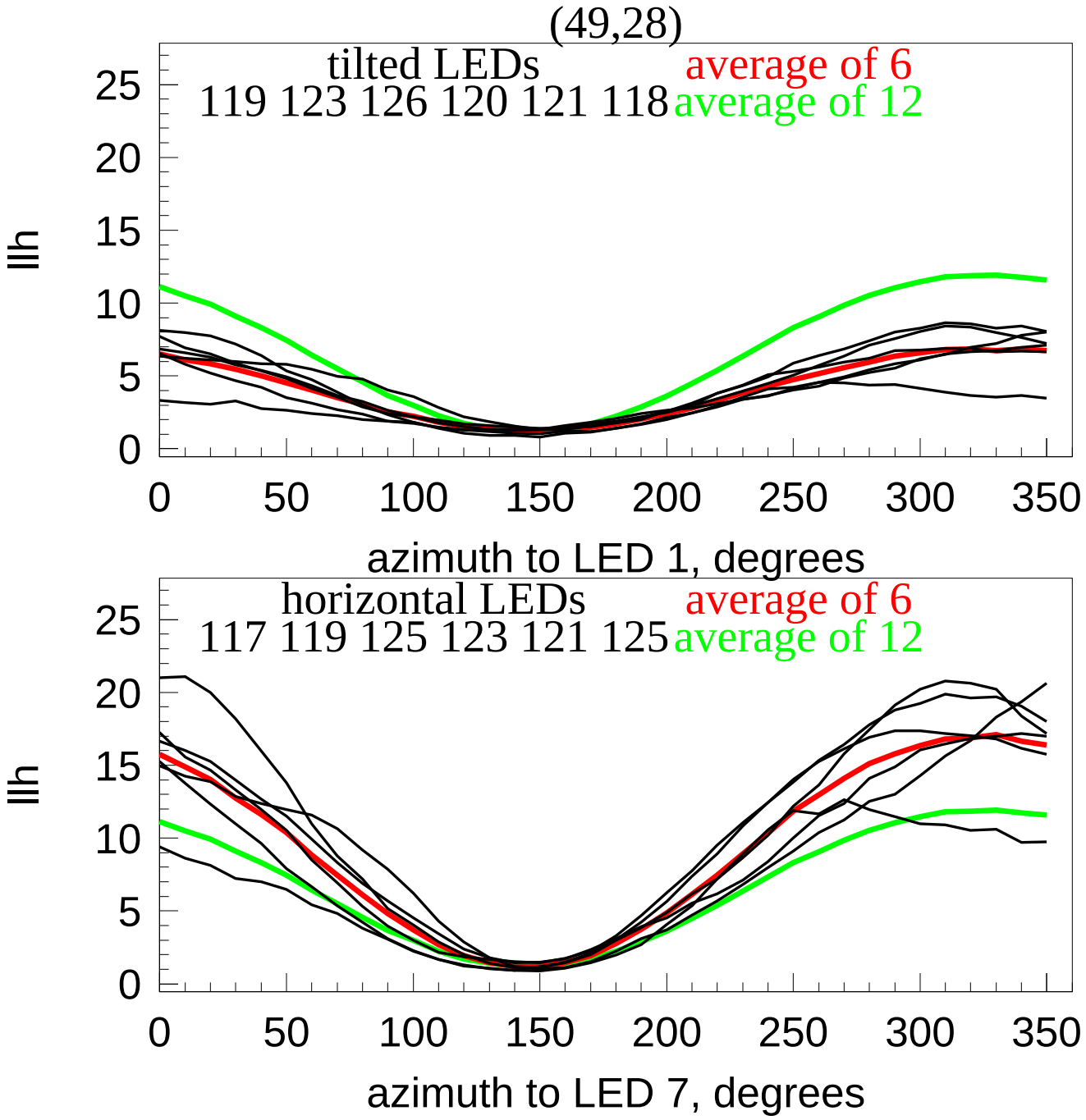

(49,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
132.1 ± 6.6
130
1
2
3
4
5
6
7
8
9
10
11
12

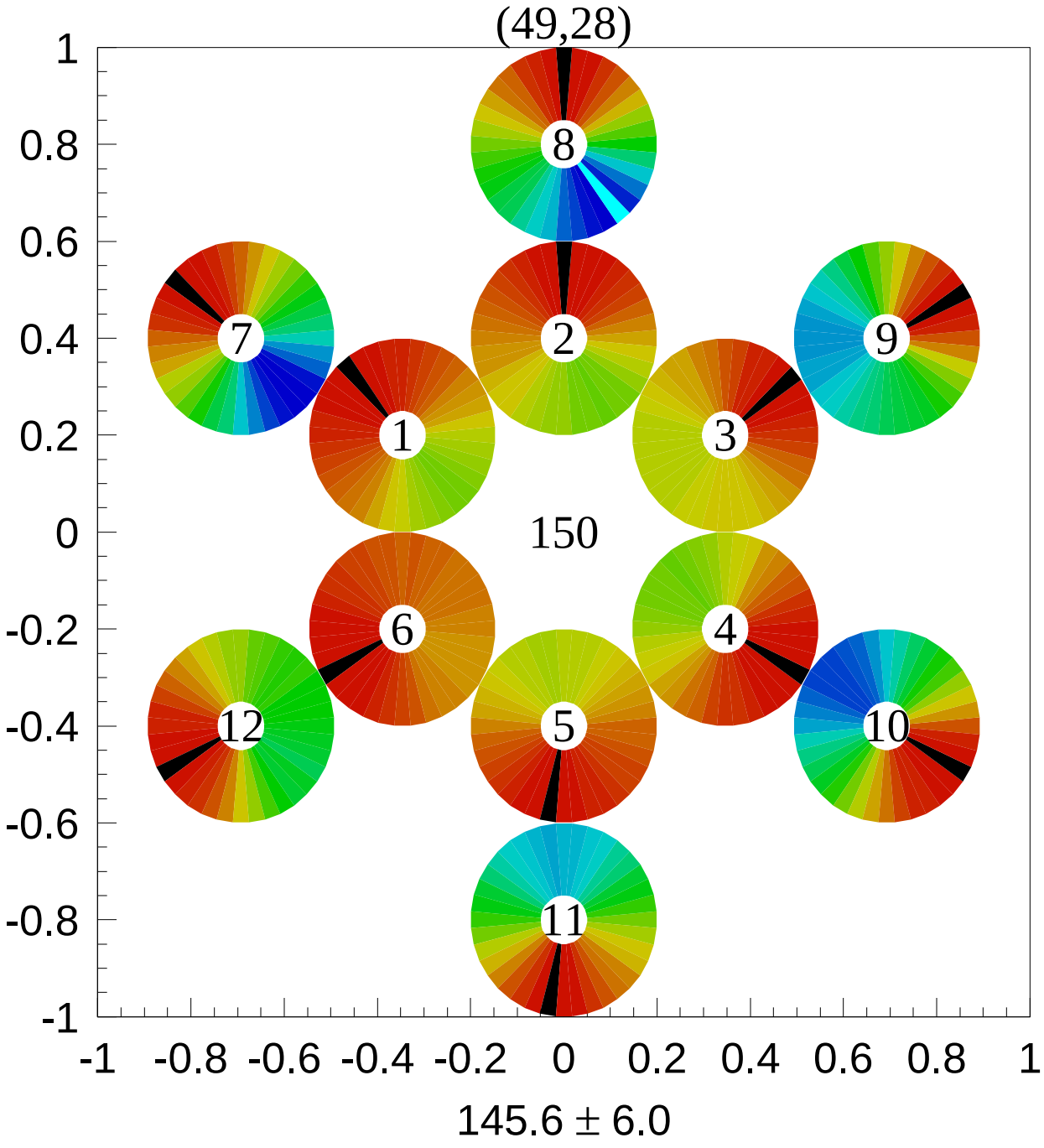

(49,26)
tilted LEDs
119 103 110 119 117 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 116 115 123 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

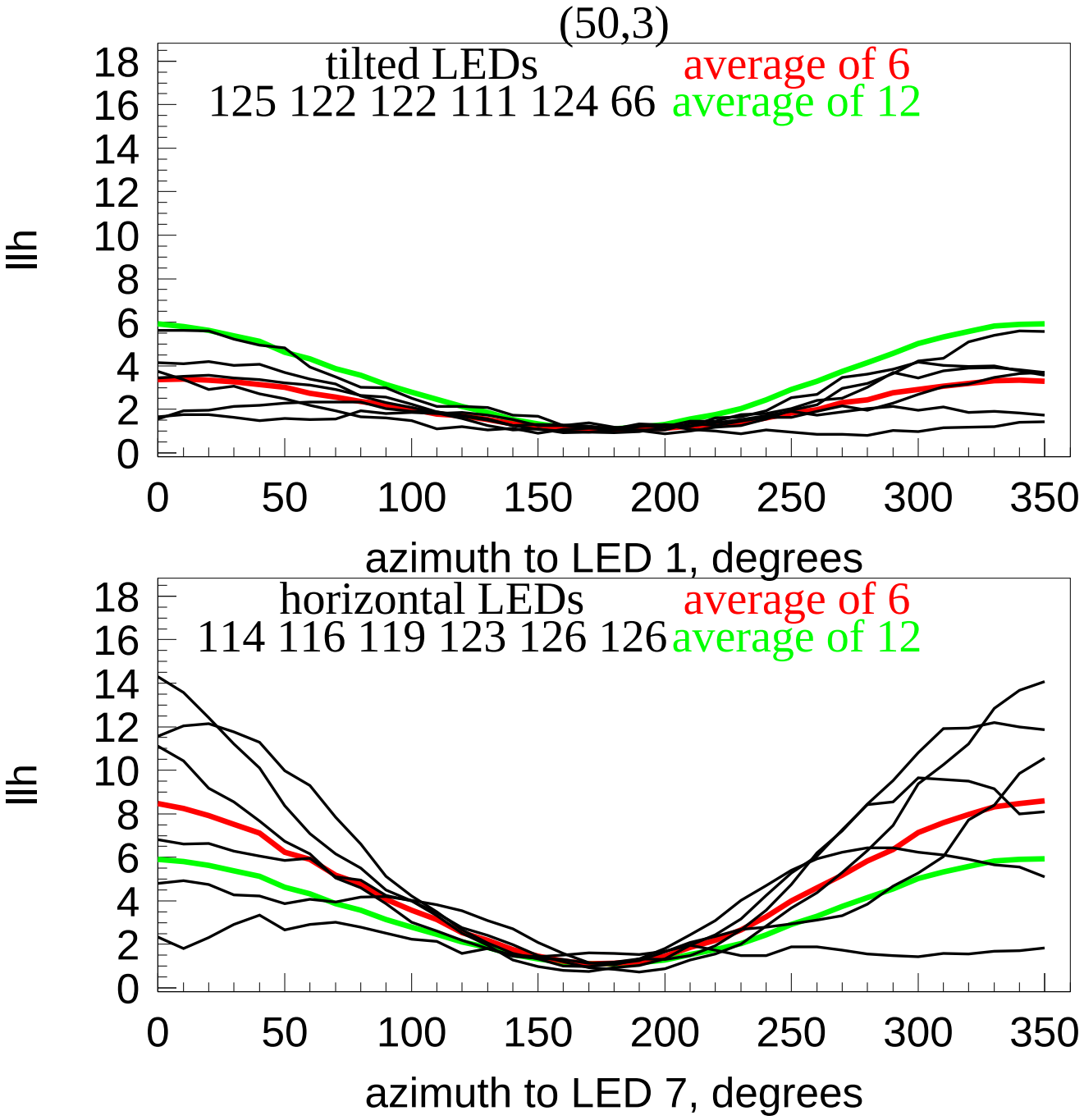

(49,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
311.2 ± 5.0

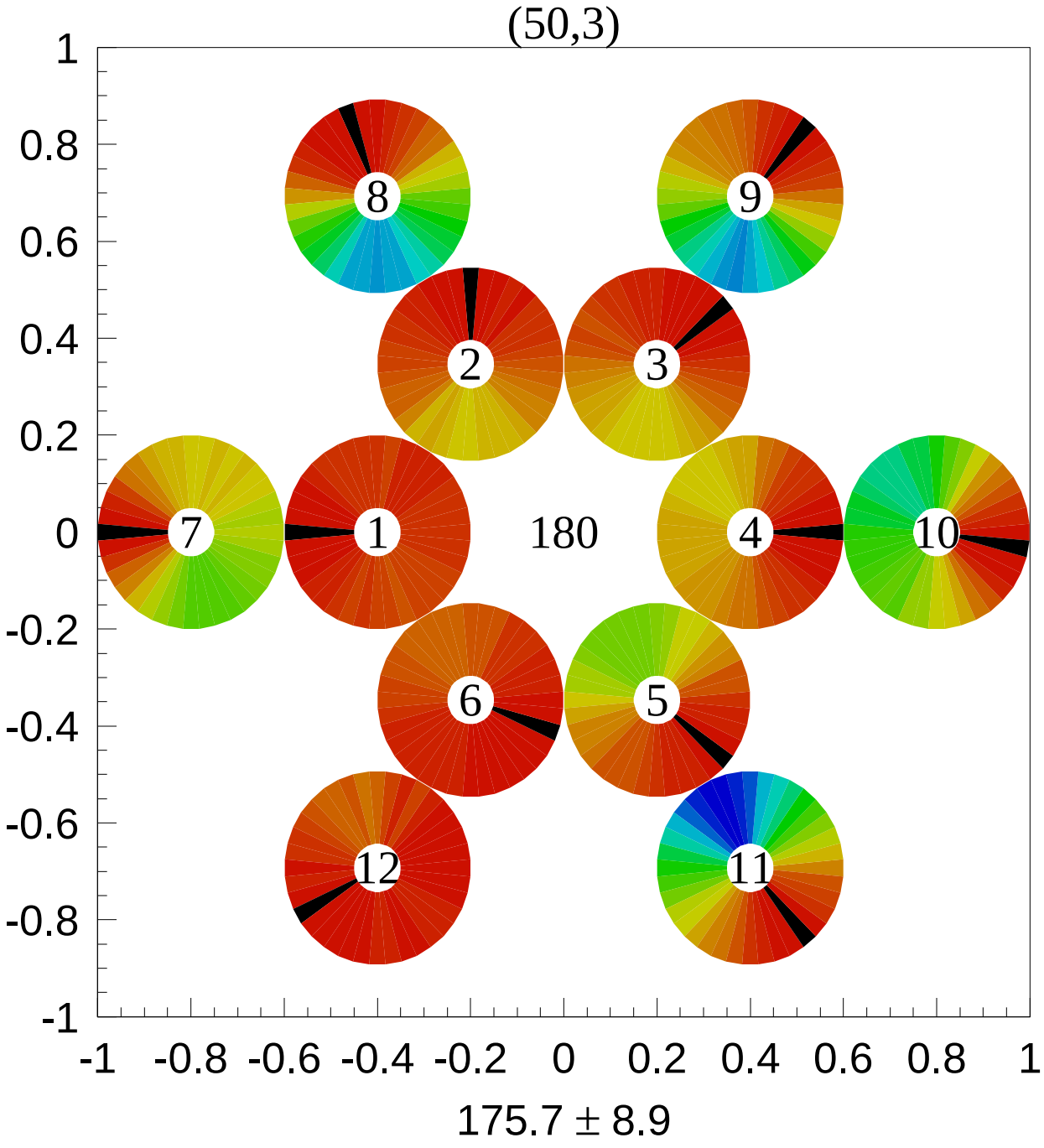

(49,27)
tilted LEDs
122 123 127 117 122 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 127 123 118 131 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

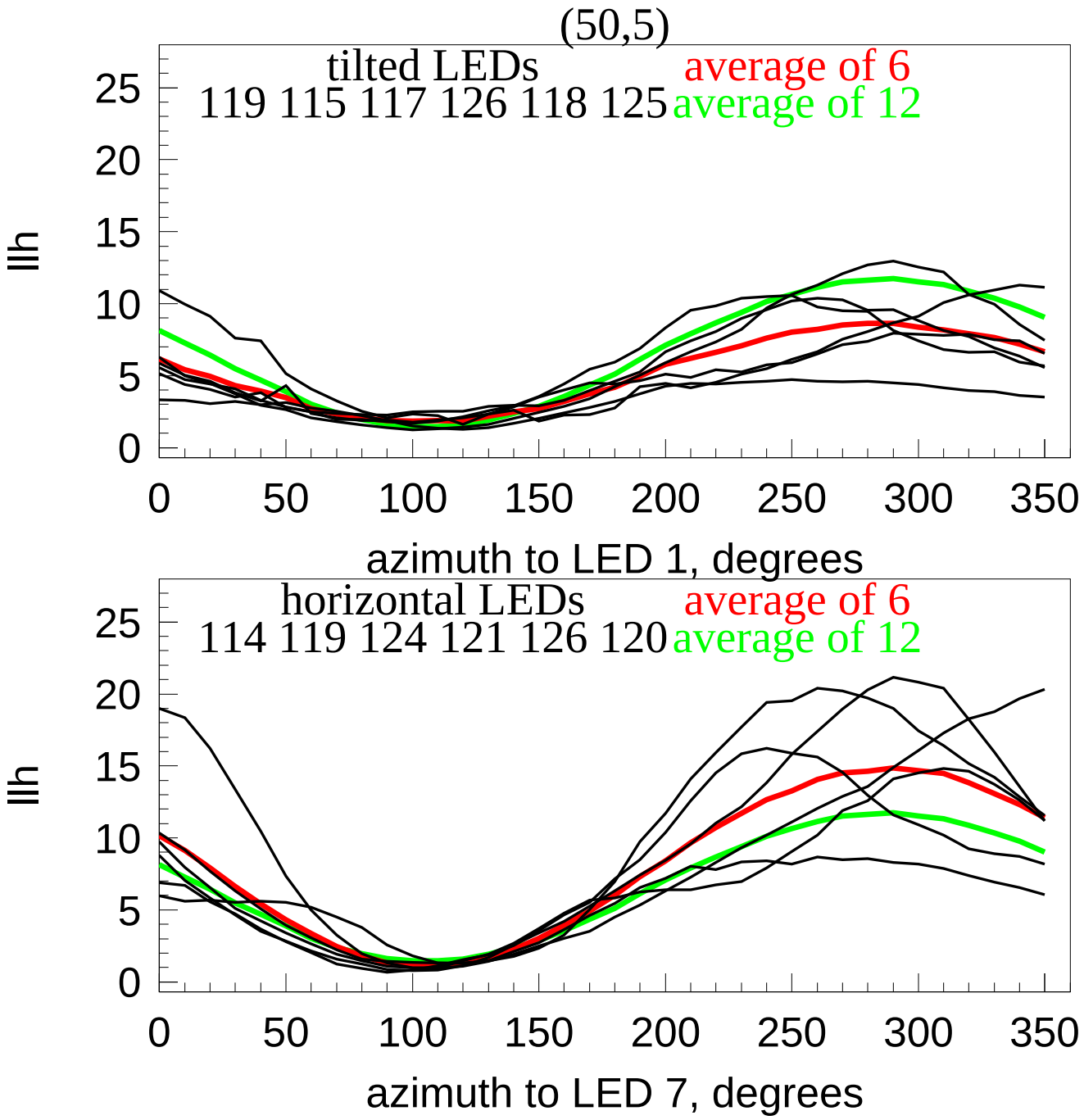

(49,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
169.7 ± 6.5

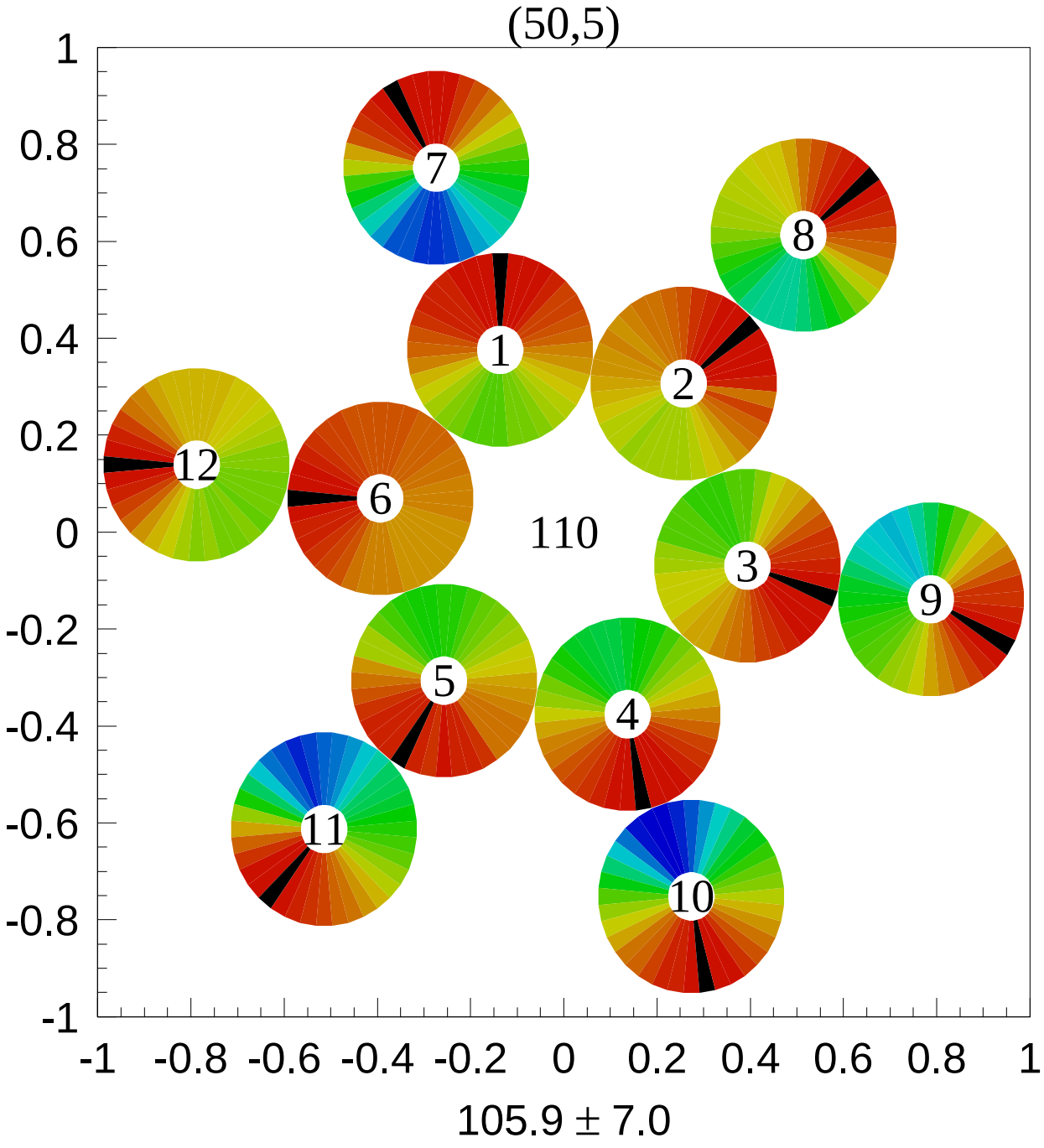

(49,28)
tilted LEDs
119 123 126 120 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 125 123 121 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

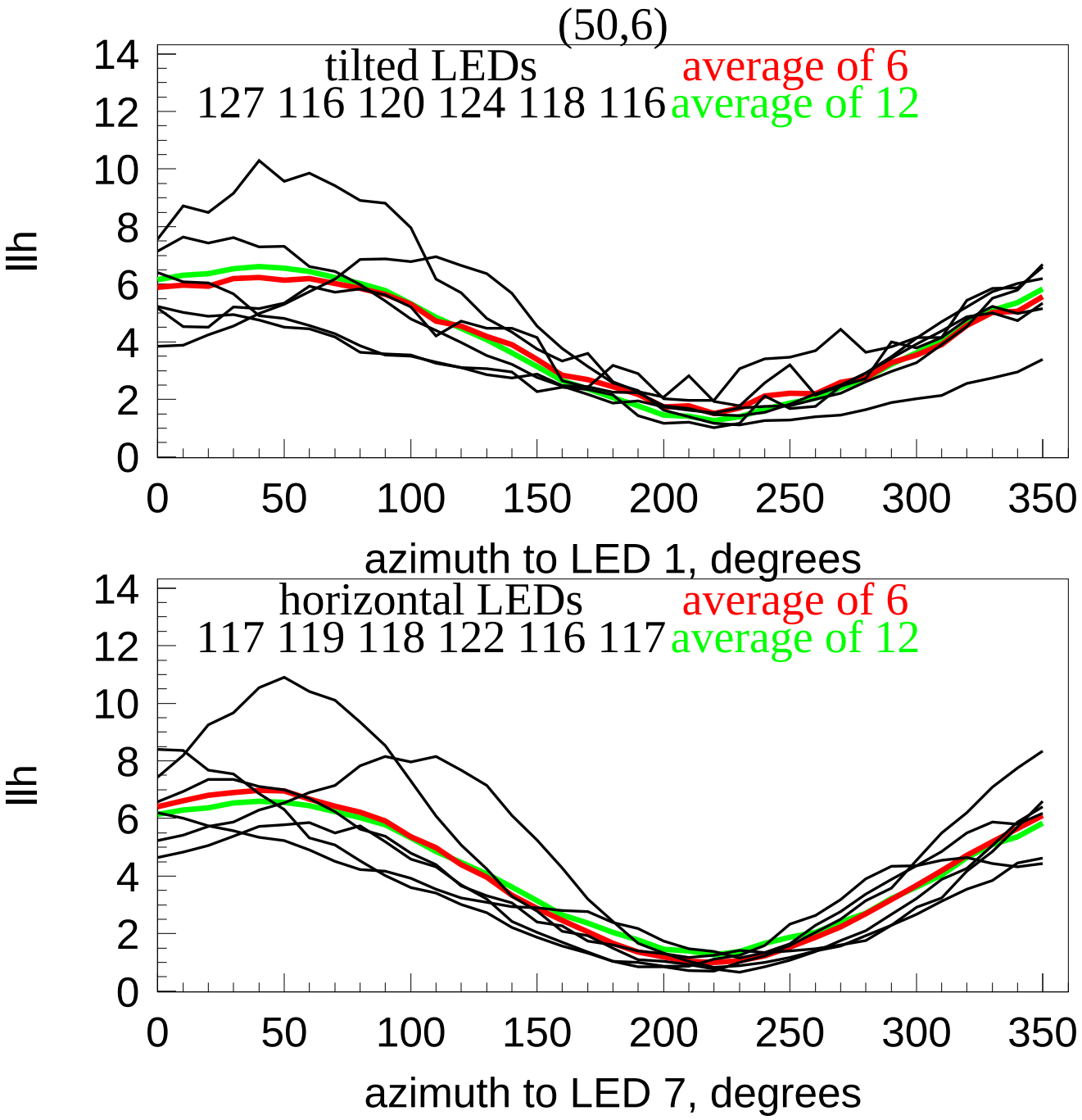

(49,28)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
145.6 ± 6.0

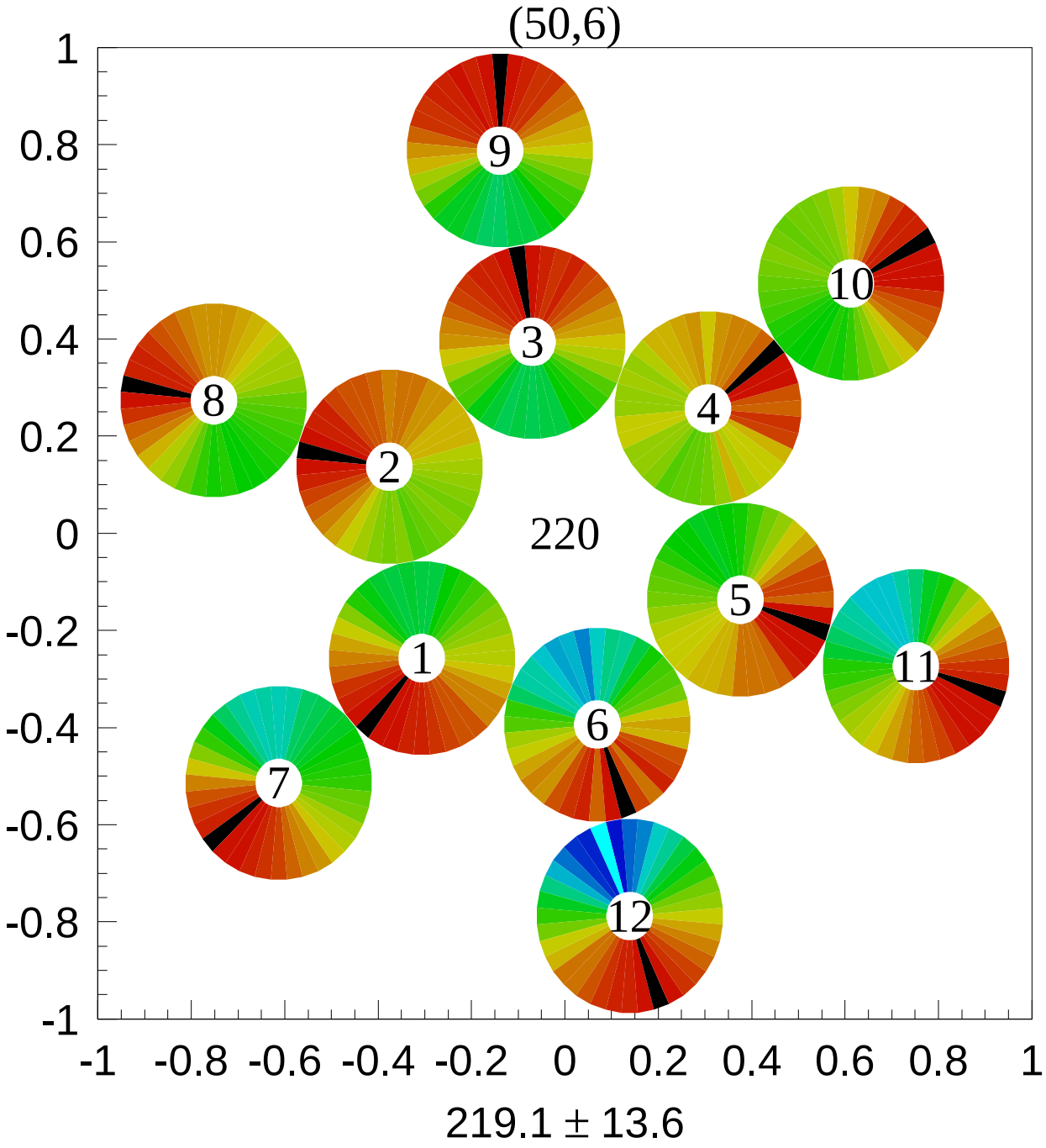

(50,3)
tilted LEDs
125 122 122 111 124 66
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 116 119 123 126 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

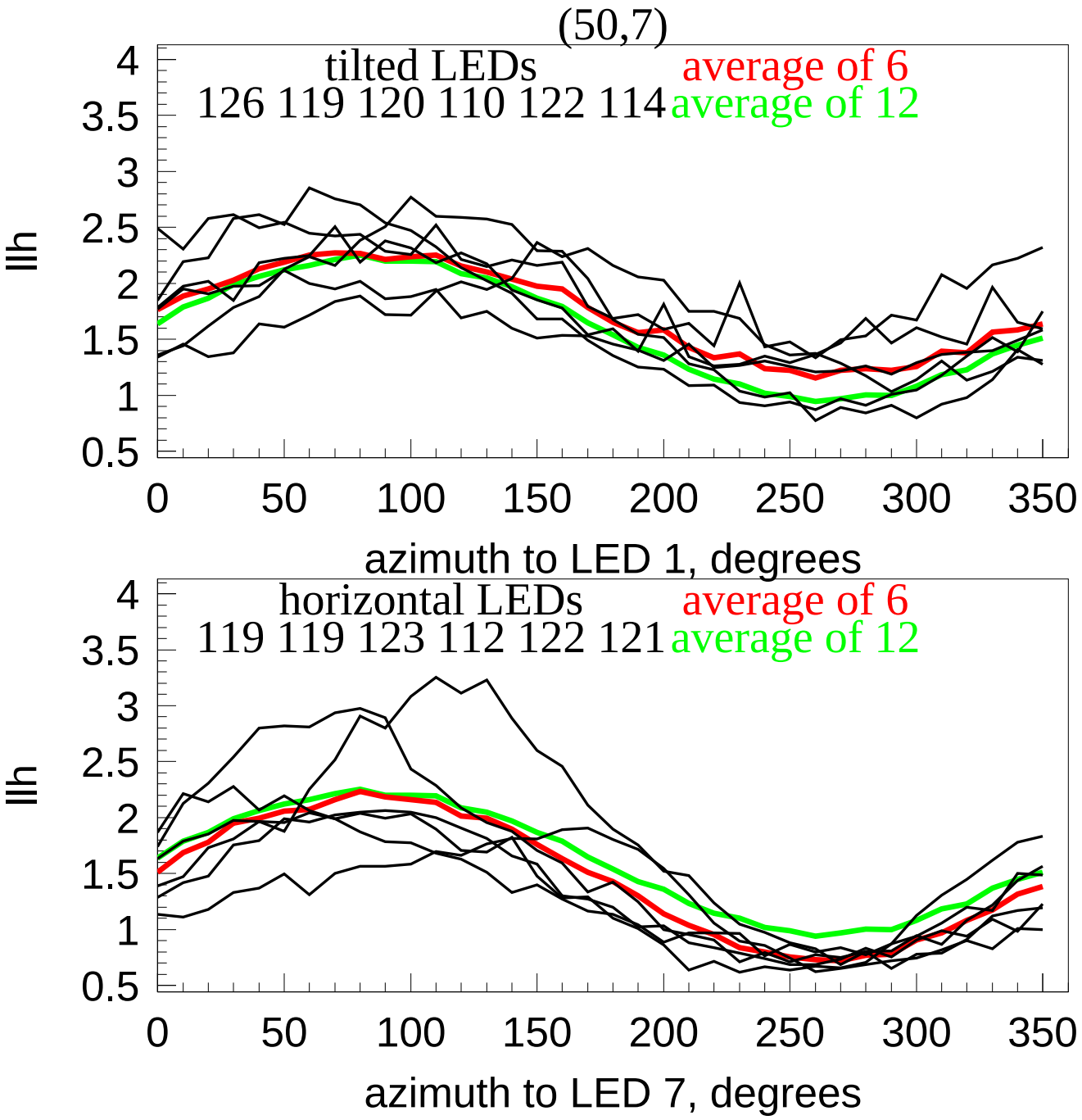

(50,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
175.7 ± 8.9

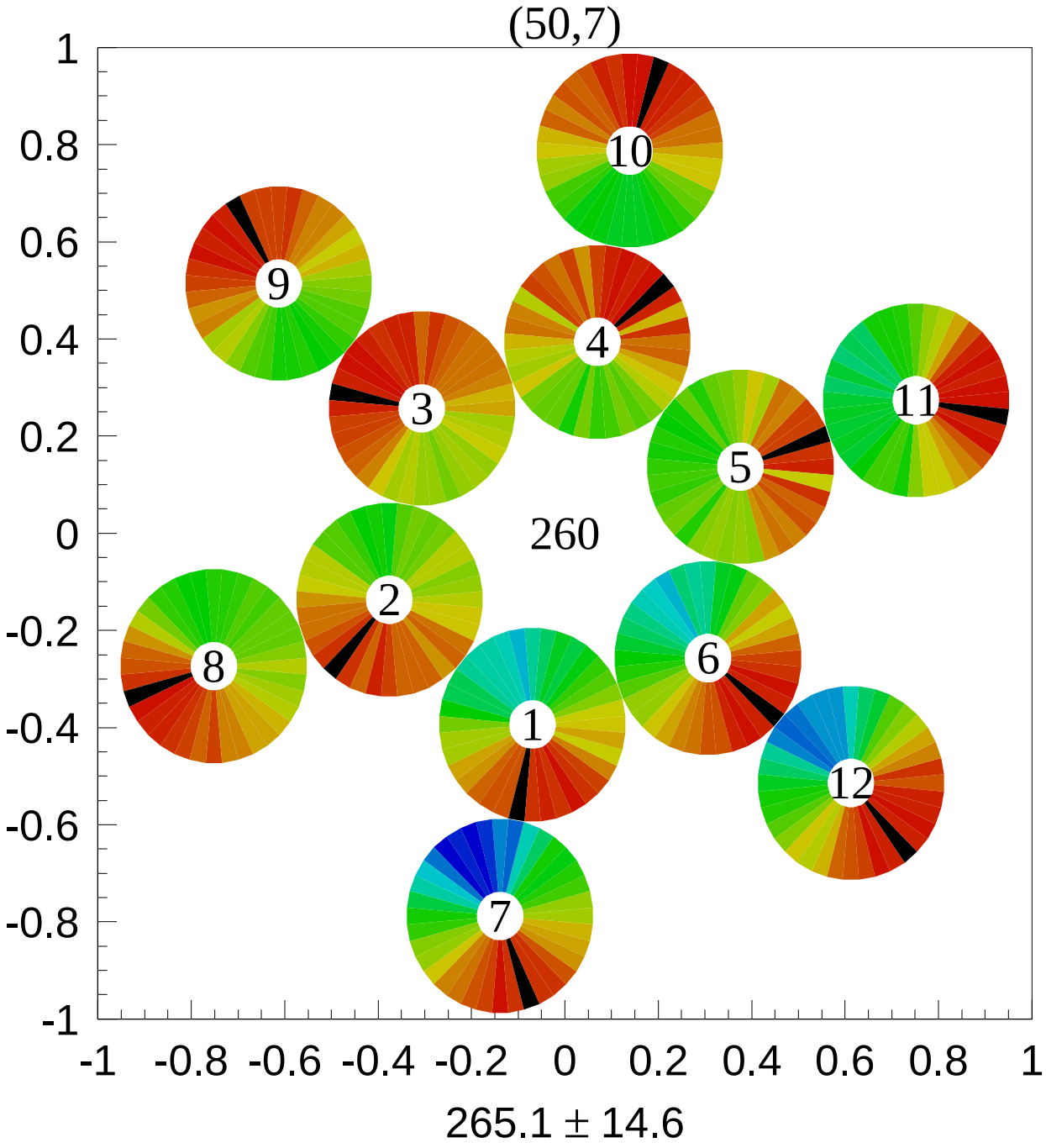

(50,5)
tilted LEDs
119 115 117 126 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 119 124 121 126 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

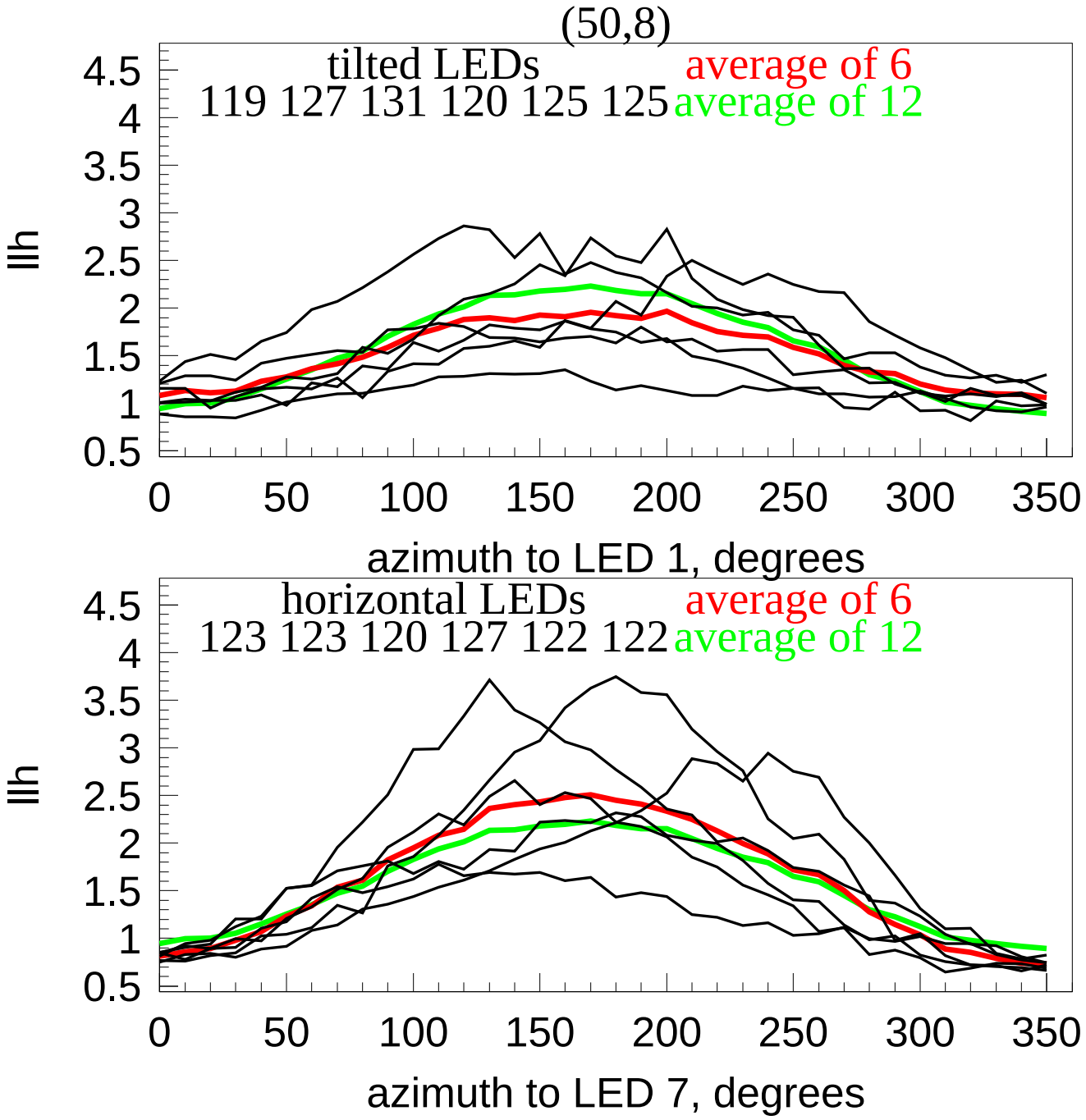

(50,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
105.9 ± 7.0

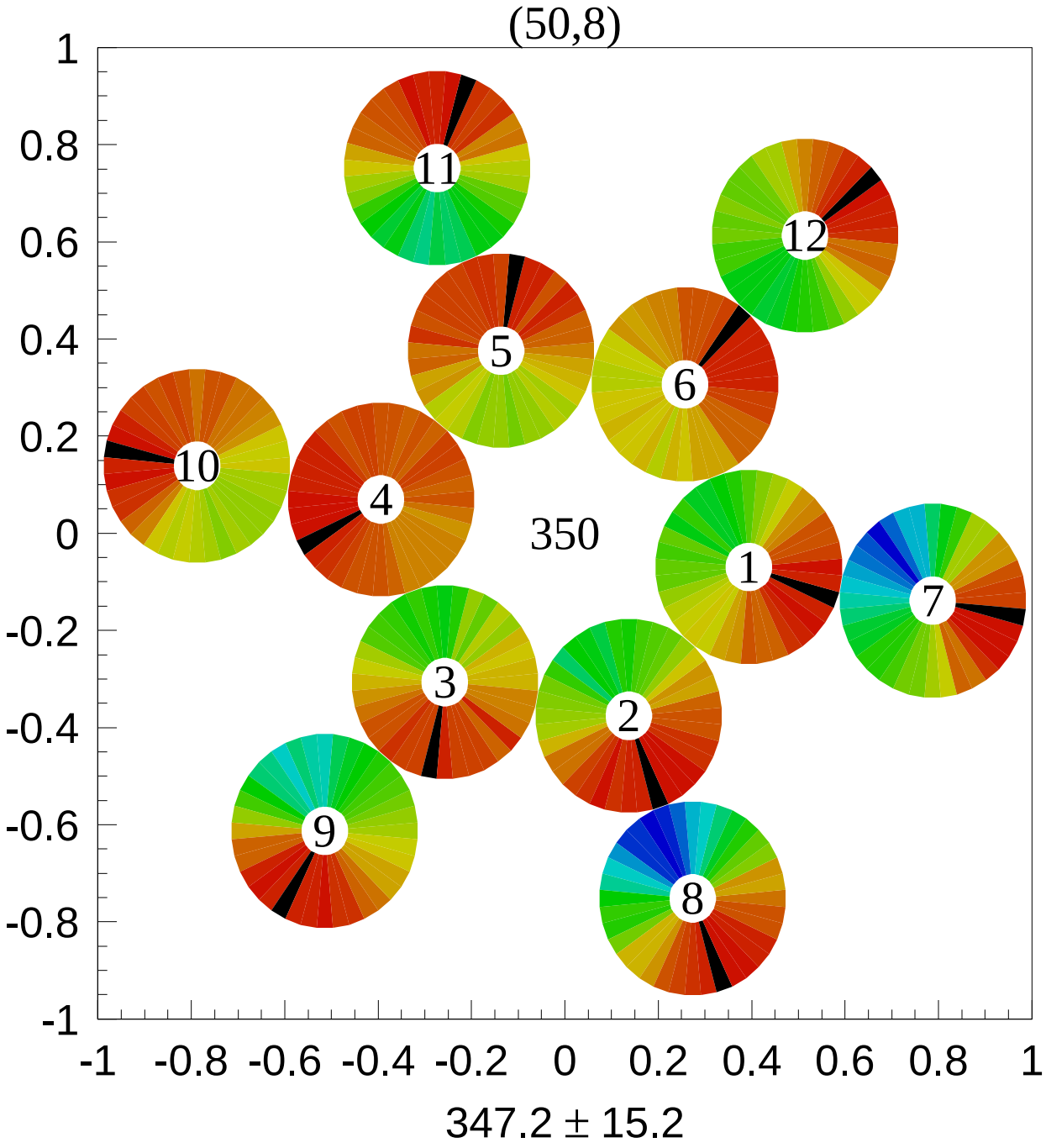

(50,6)
tilted LEDs
127 116 120 124 118 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 118 122 116 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

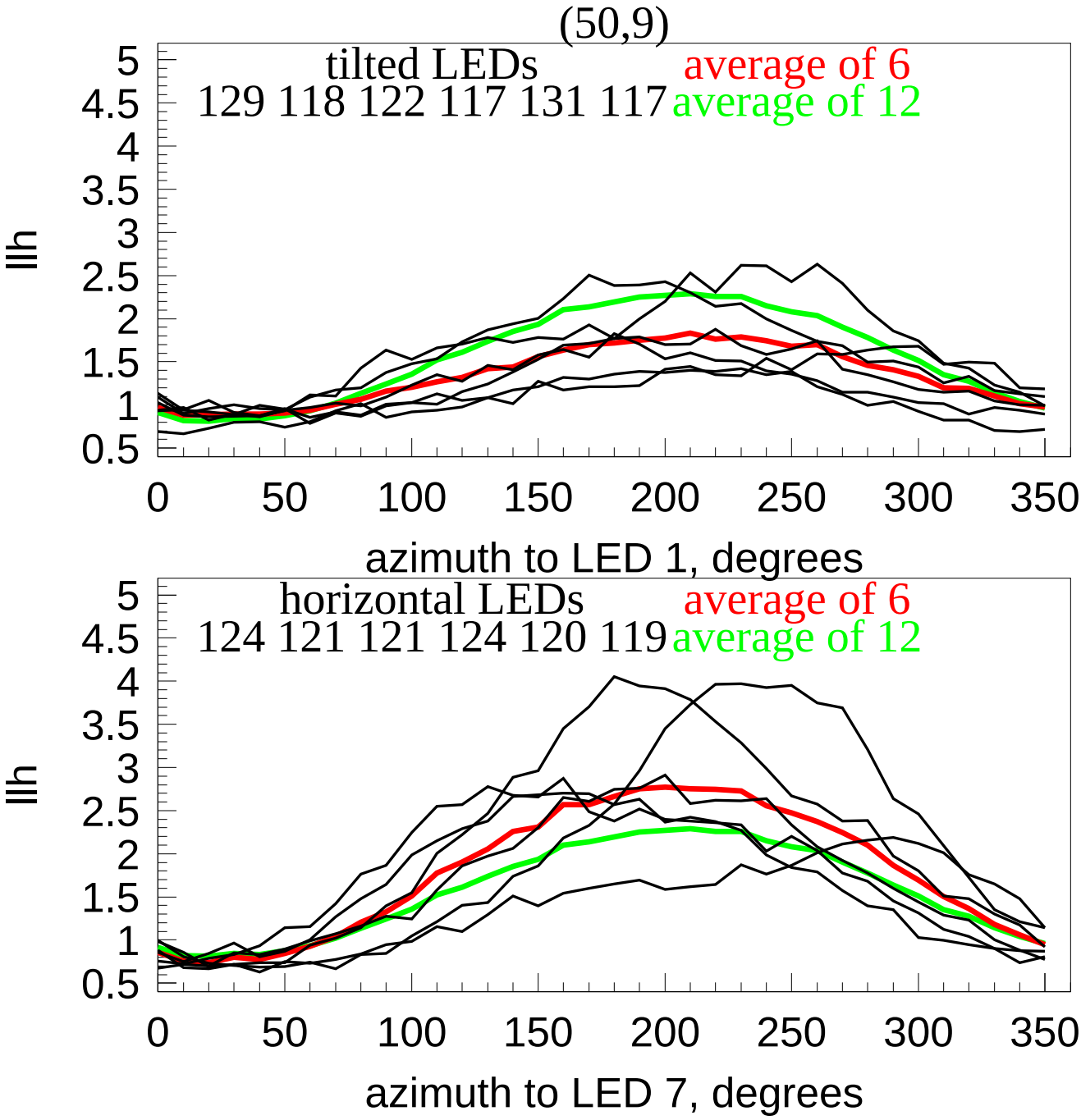

(50,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
219.1 ± 13.6

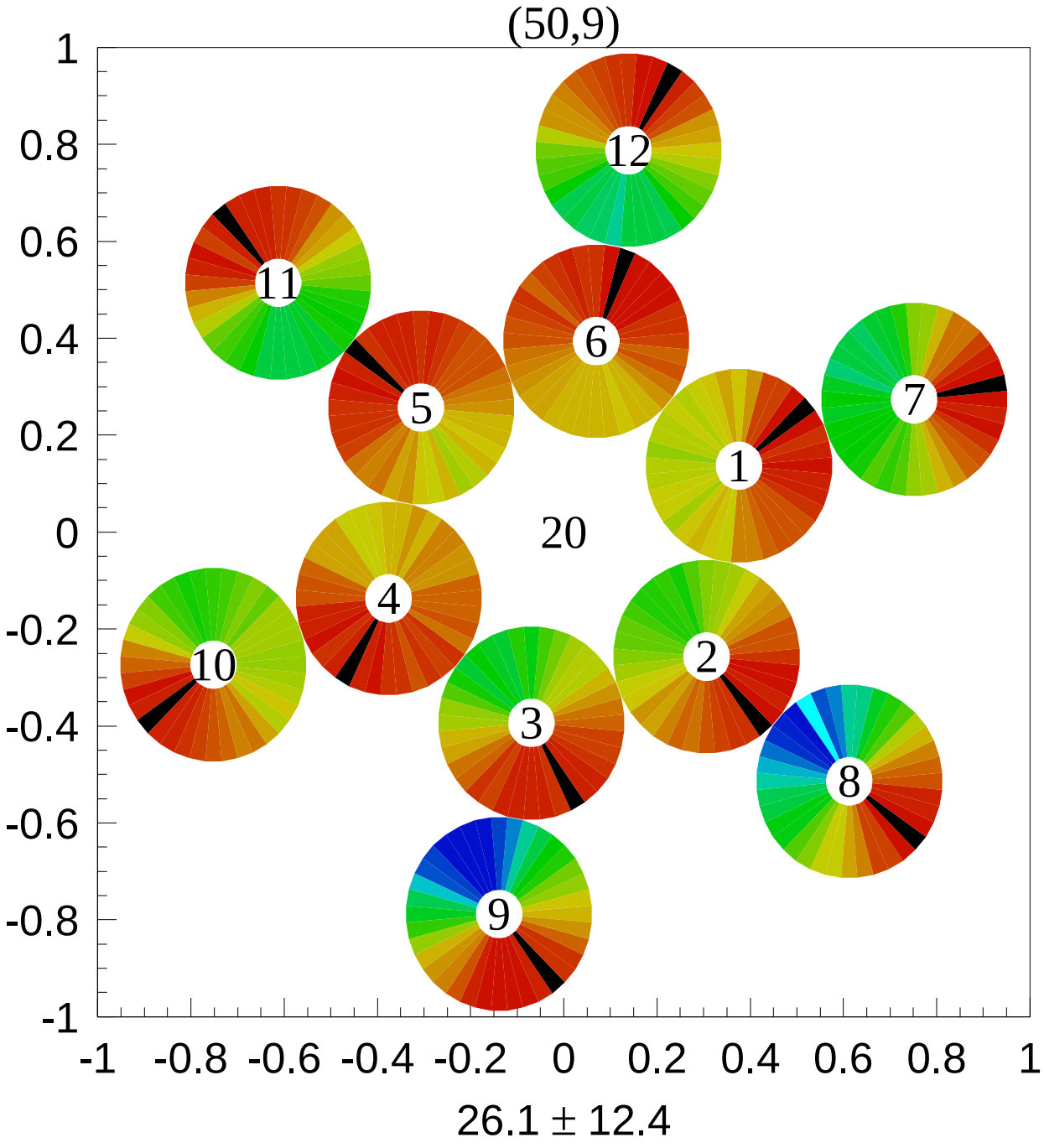

(50,7)
tilted LEDs
126 119 120 110 122 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 119 123 112 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

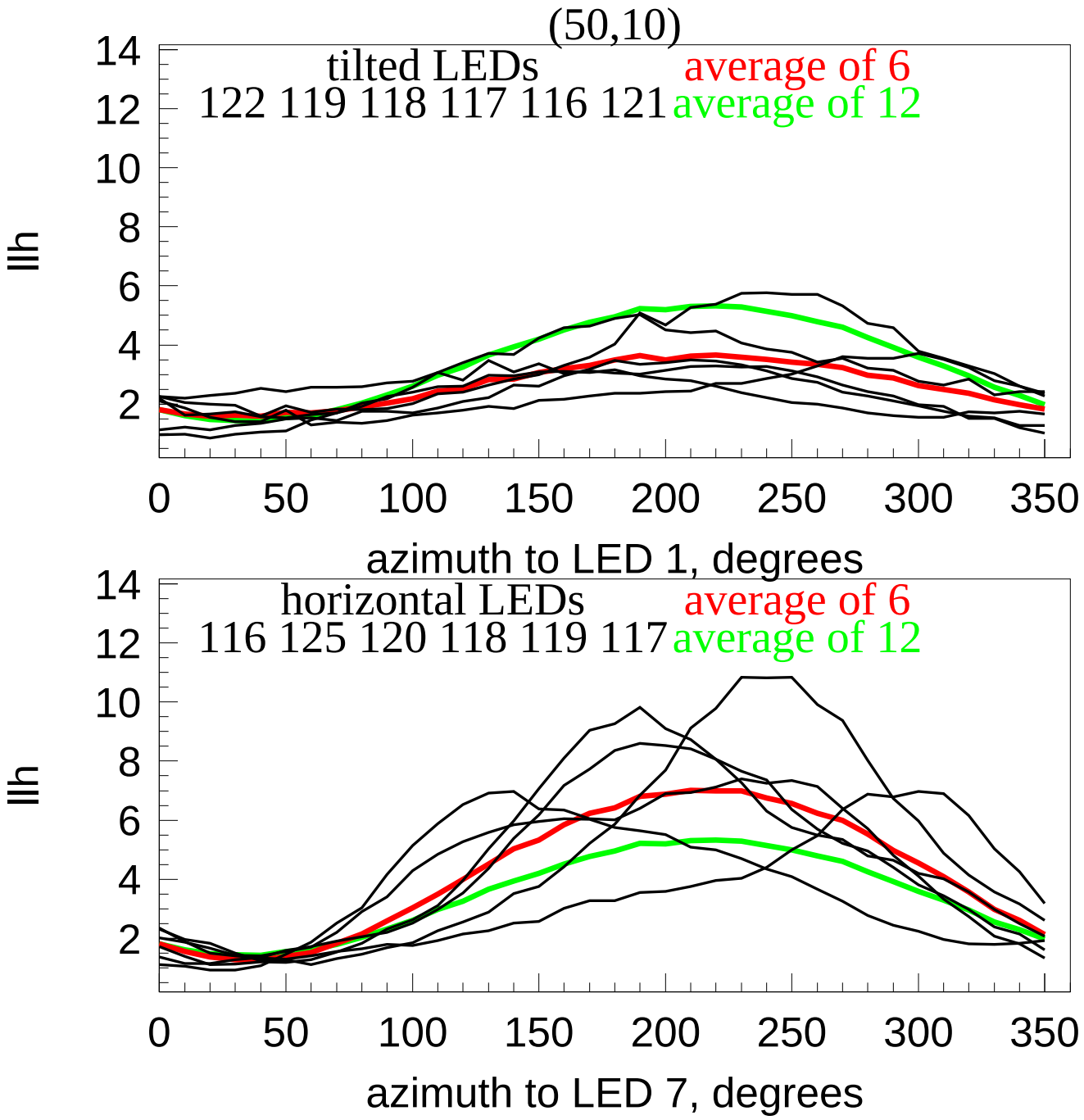

(50,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
265.1 ± 14.6

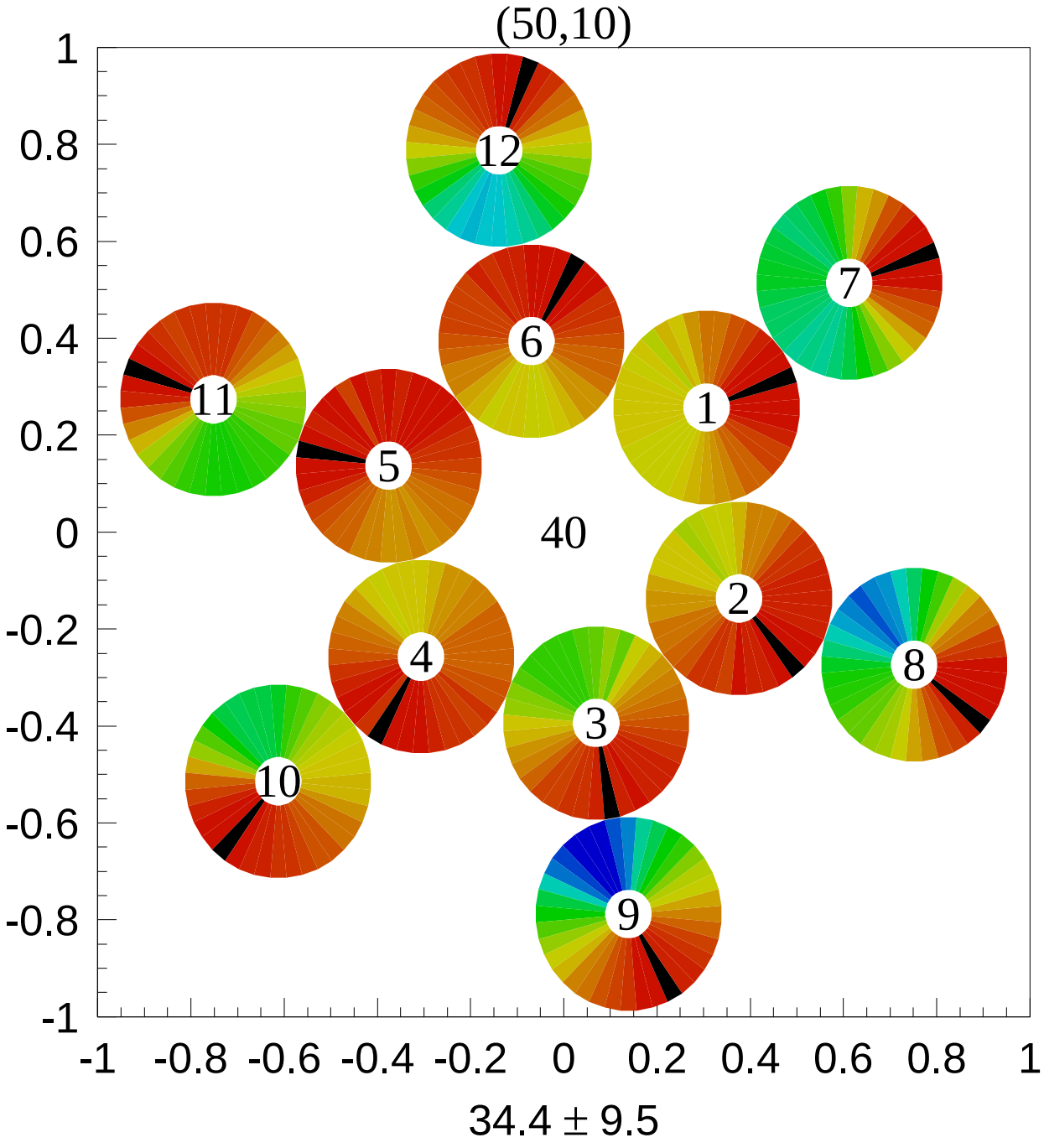

(50,8)
tilted LEDs
119 127 131 120 125 125
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 123 120 127 122 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

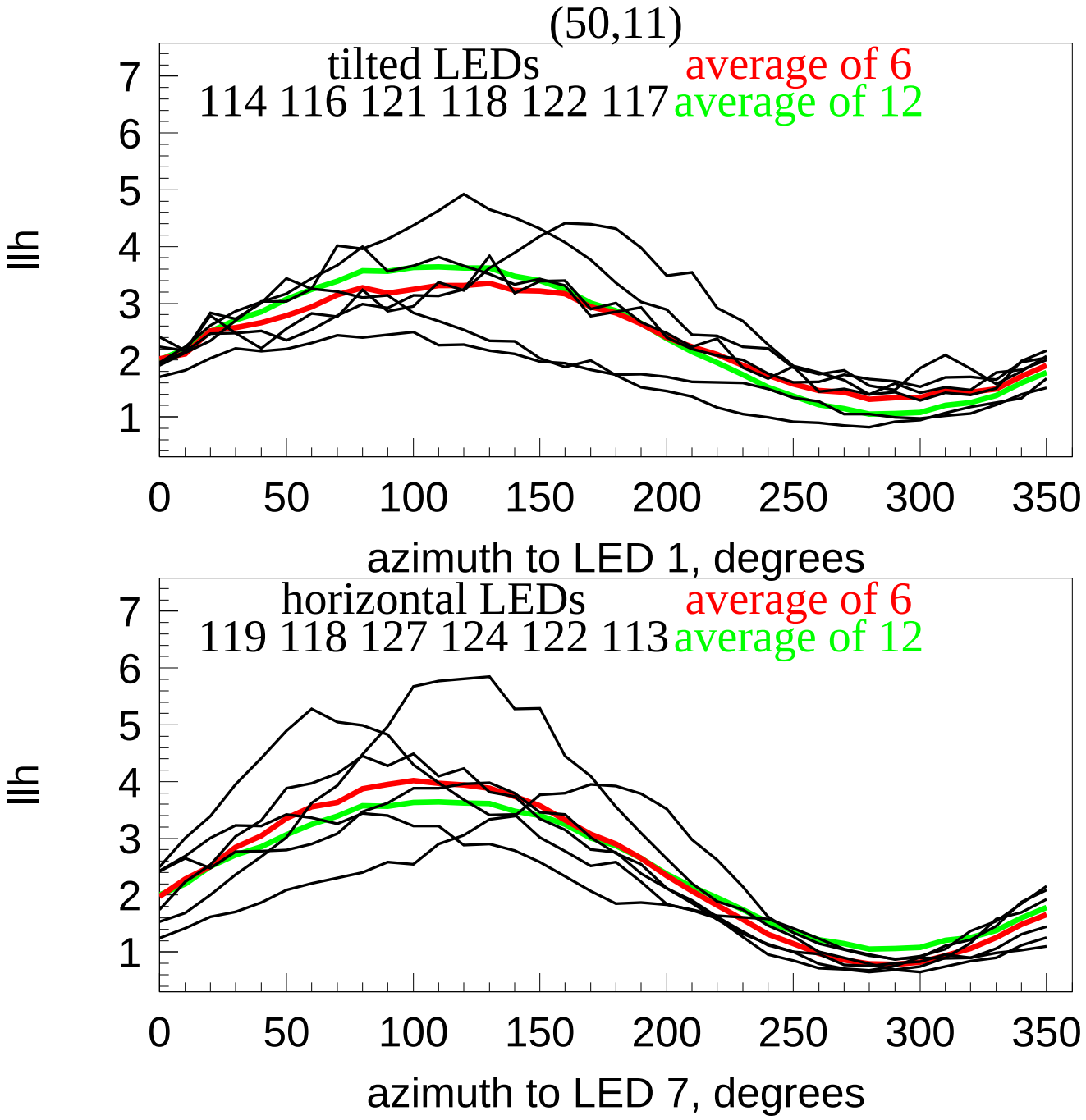

(50,8)
11
12
5
6
10
4
350
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
347.2 ± 15.2

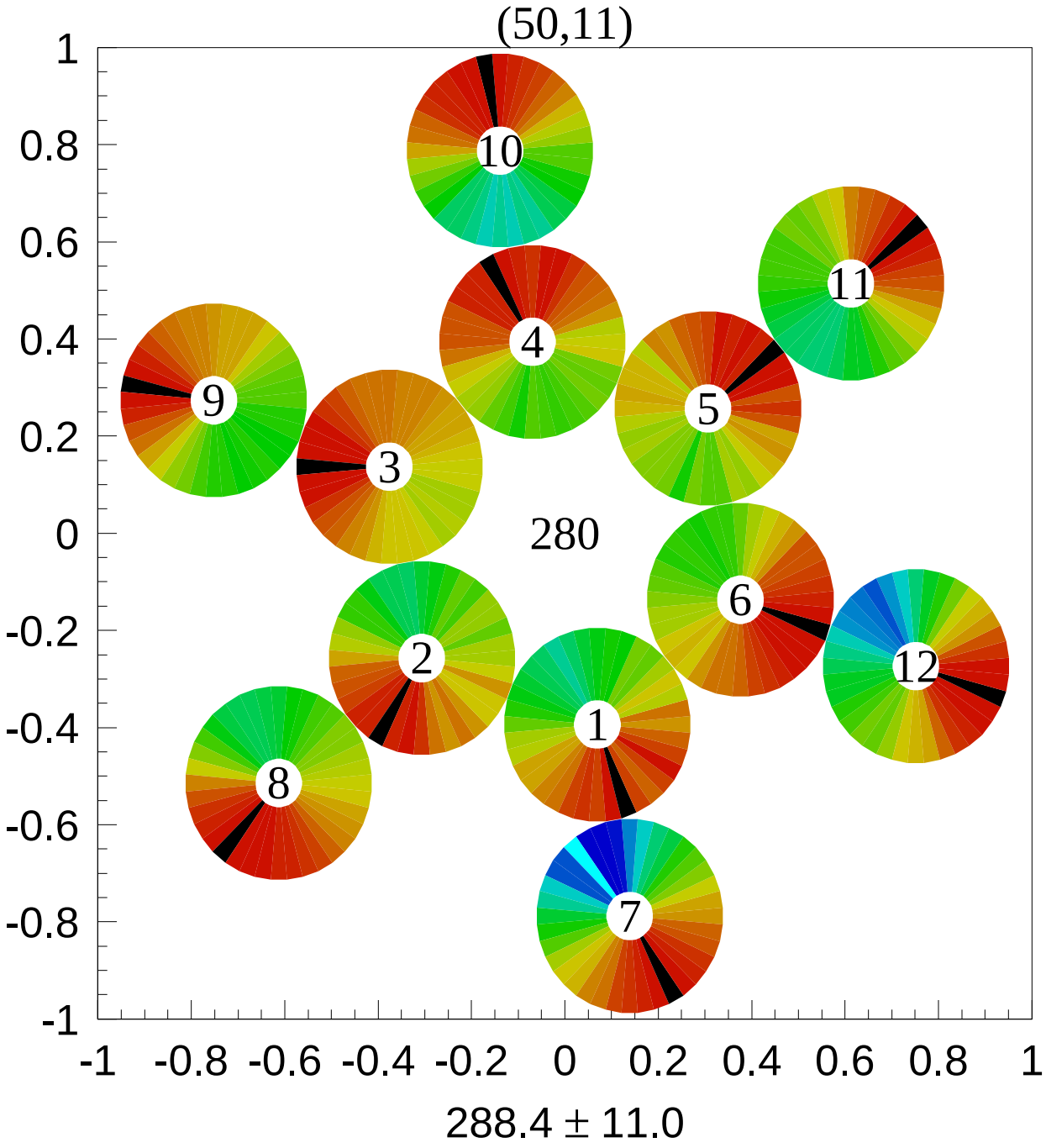

(50,9)
tilted LEDs
129 118 122 117 131 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 121 124 120 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

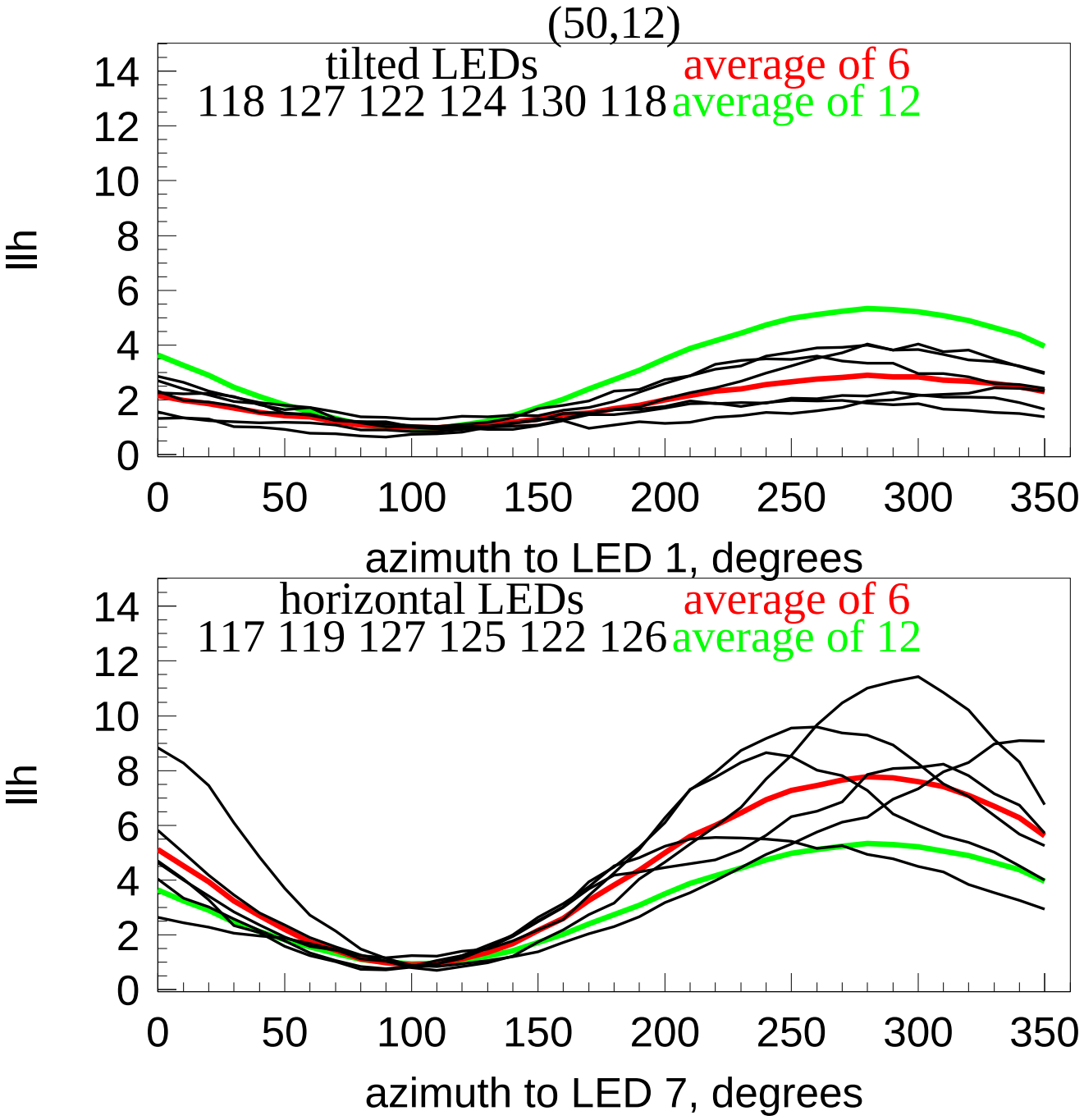

(50,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
26.1 ± 12.4

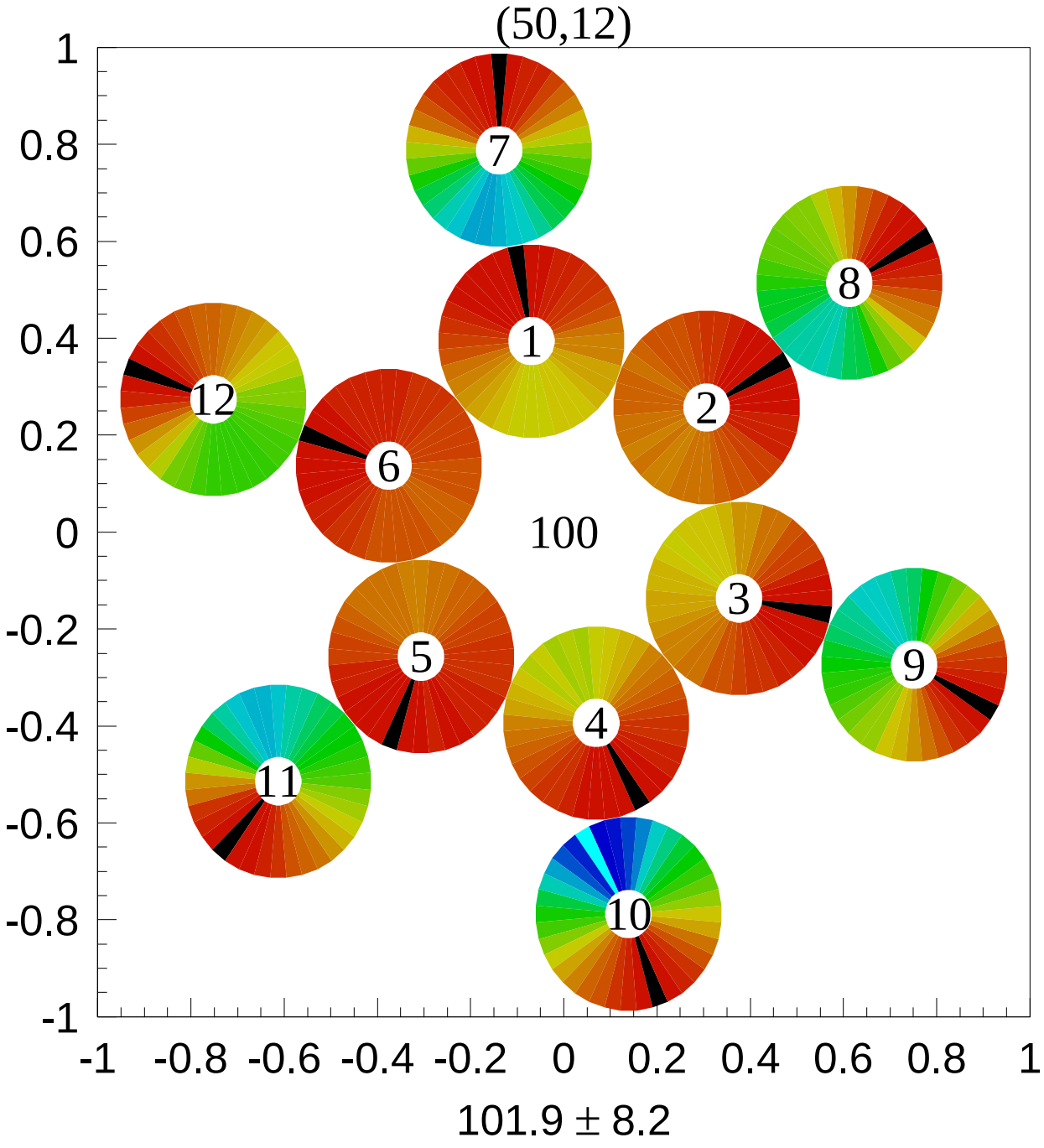

(50,10)
tilted LEDs
122 119 118 117 116 121
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 125 120 118 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

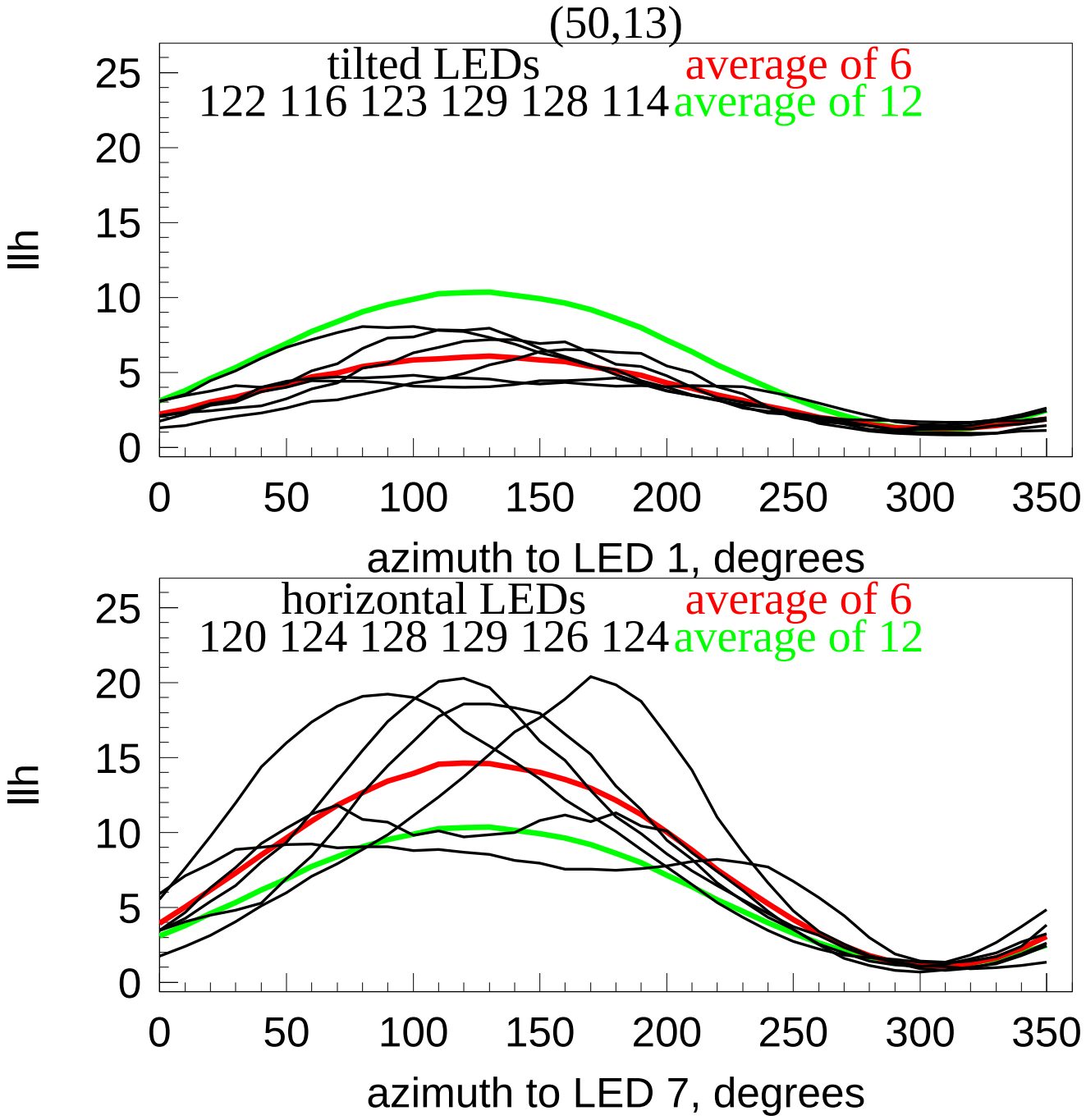

(50,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
7
6
11
1
5
40
2
8
4
3
10
9
34.4 ± 9.5

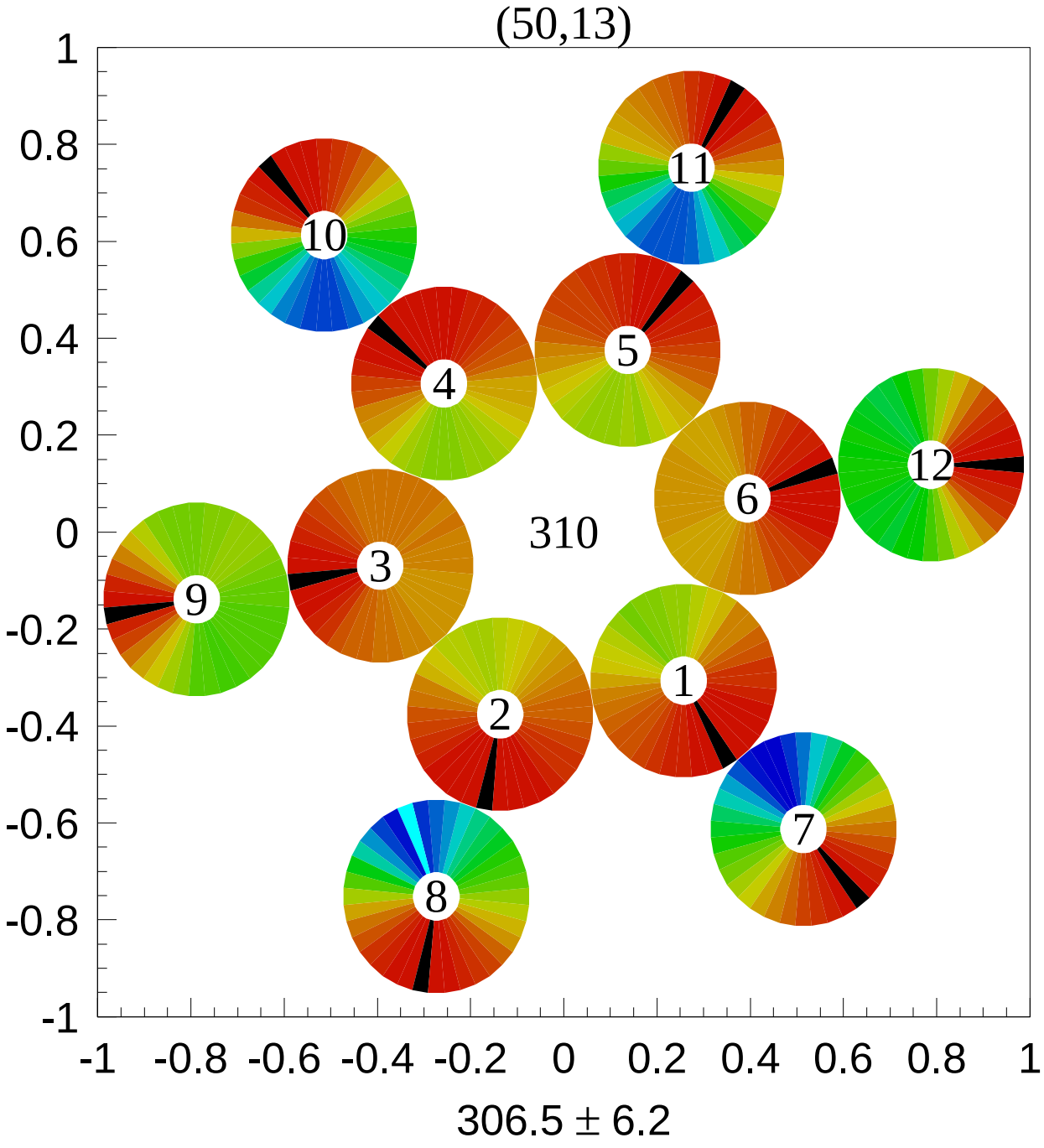

(50,11)
tilted LEDs
114 116 121 118 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 127 124 122 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

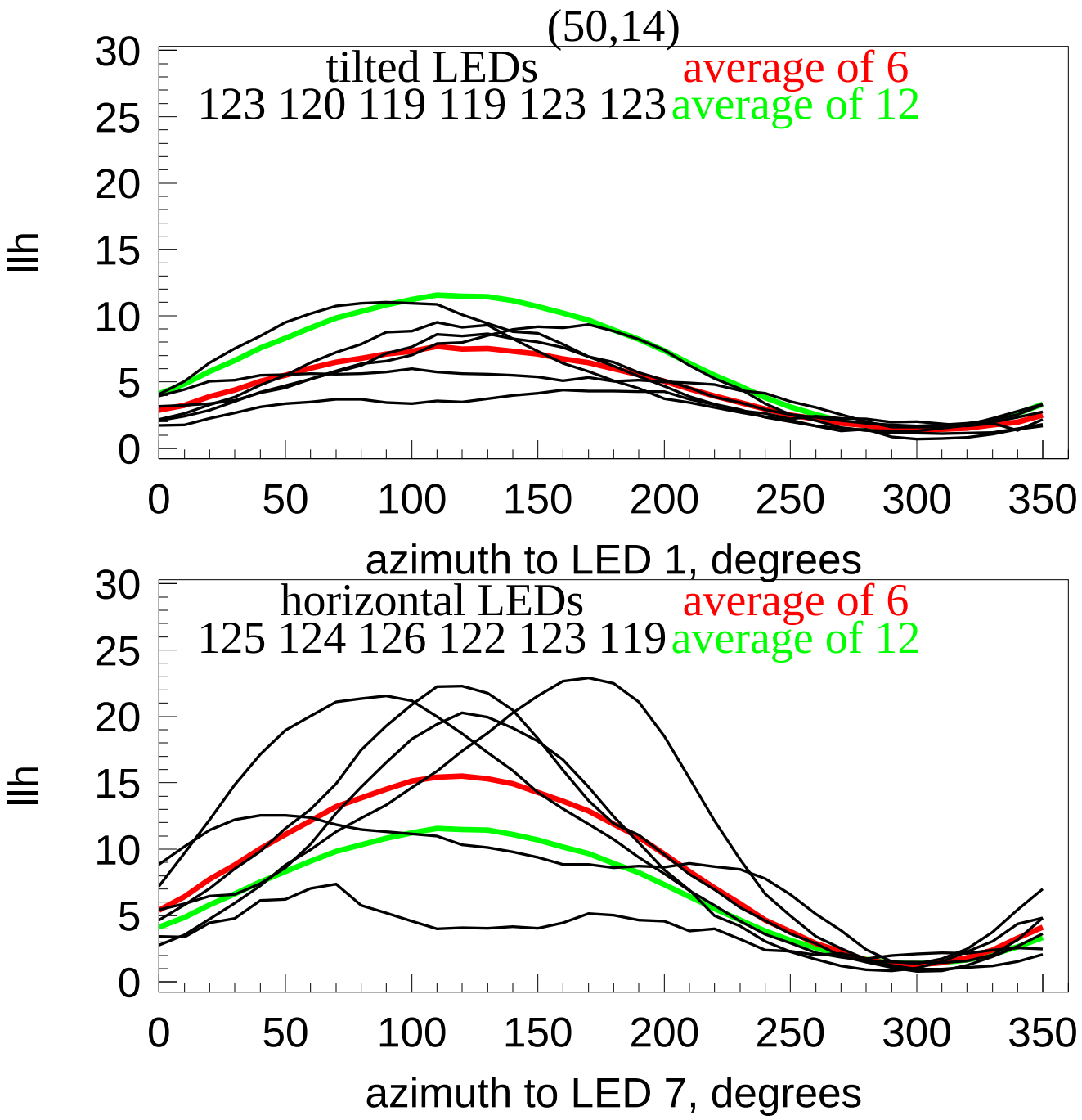

(50,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
288.4 ± 11.0
10
11
4
9
5
3
280
6
12
2
1
8
7

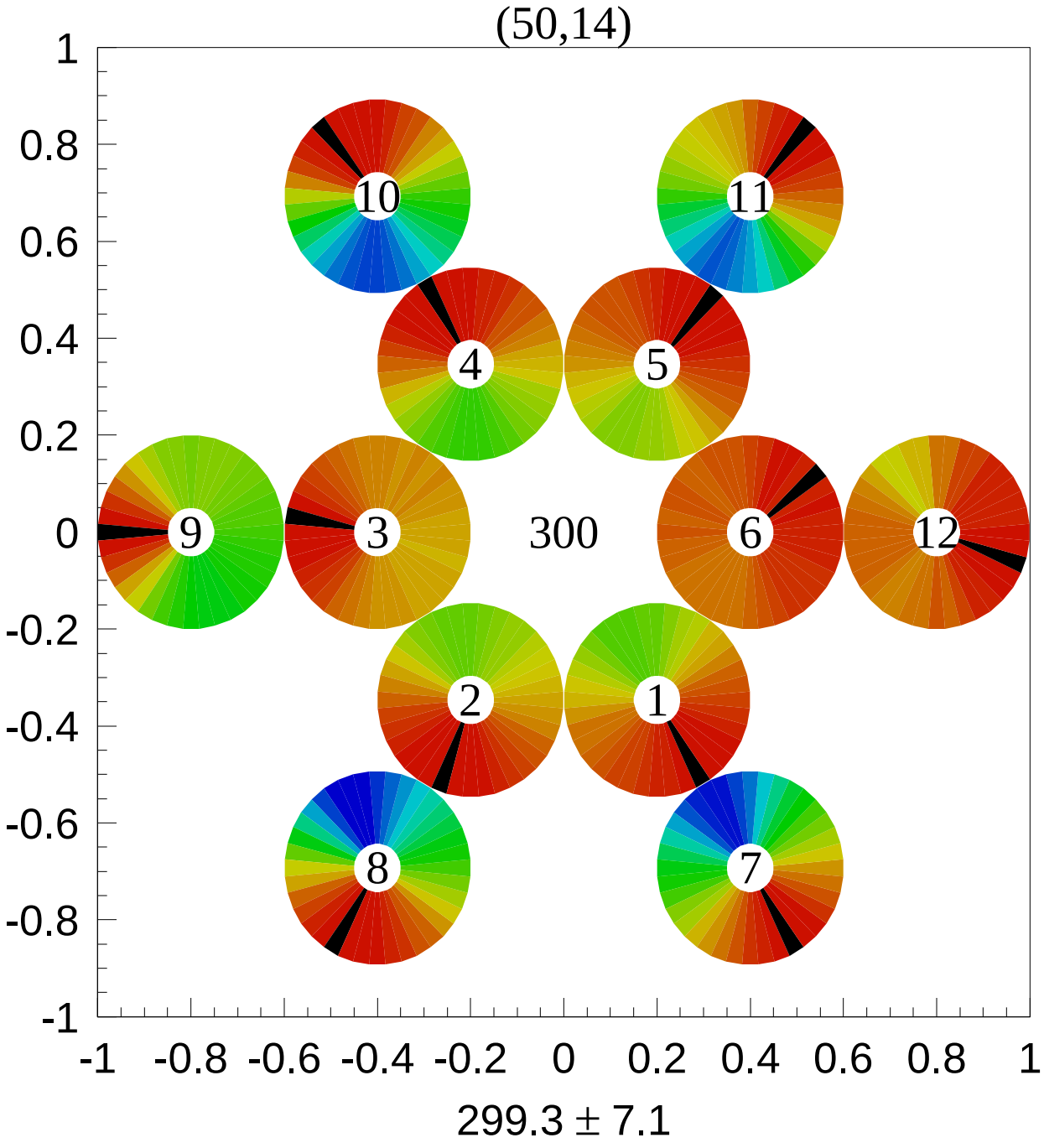

(50,12)
tilted LEDs
118 127 122 124 130 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 119 127 125 122 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

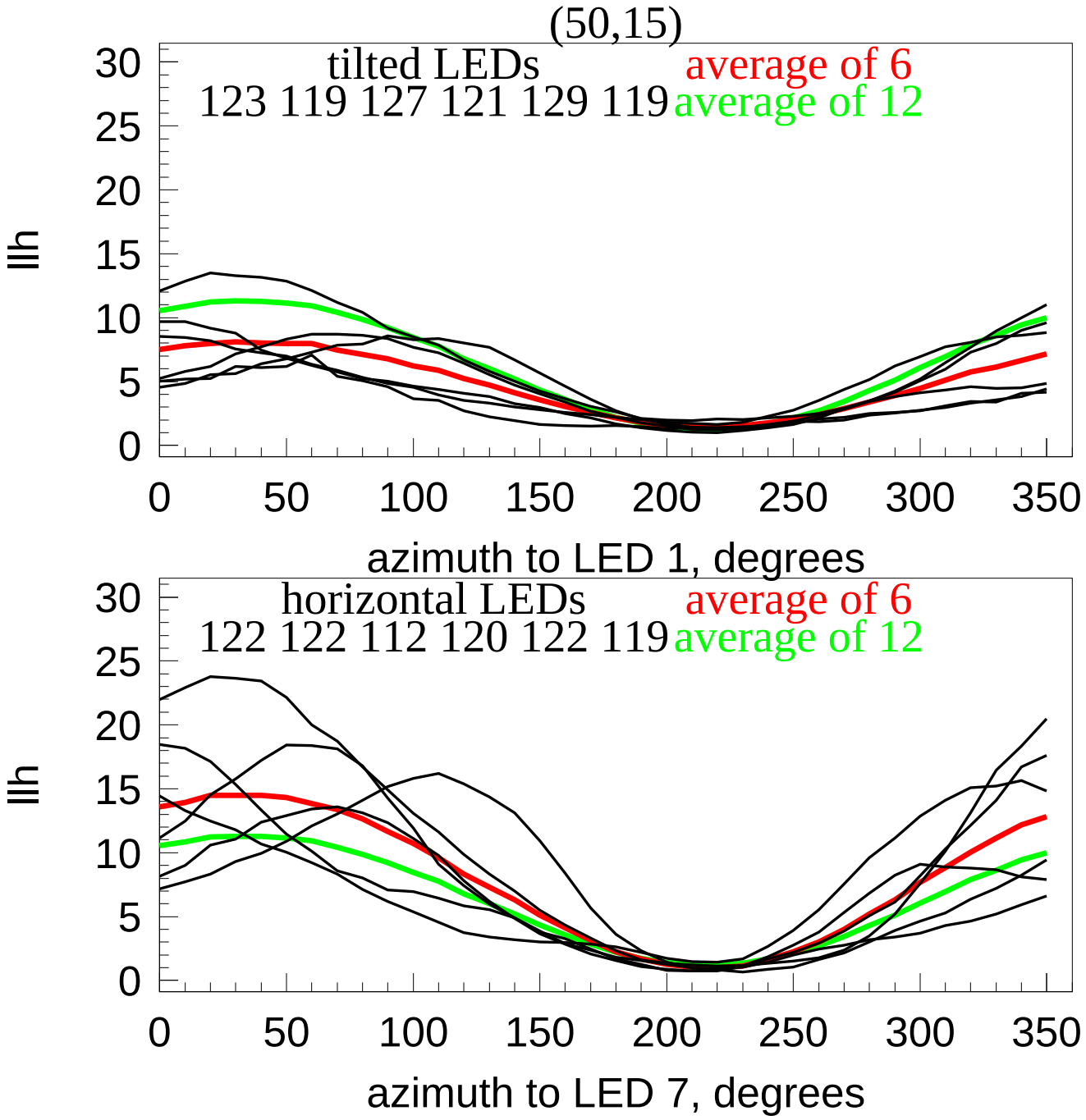

(50,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
1
8
12
2
6
100
3
5
9
4
11
10
101.9 ± 8.2

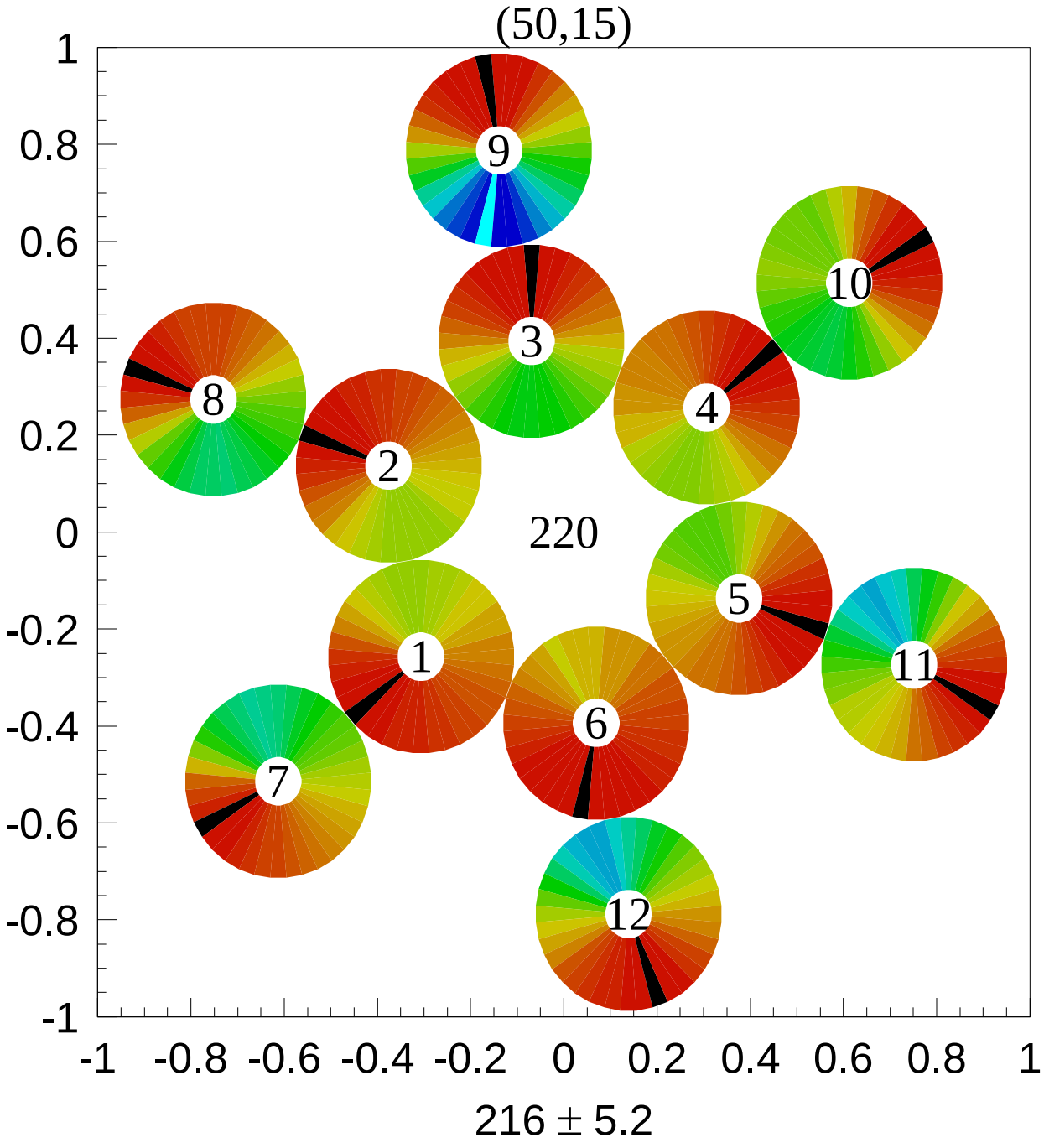

(50,13)
tilted LEDs
122 116 123 129 128 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 124 128 129 126 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

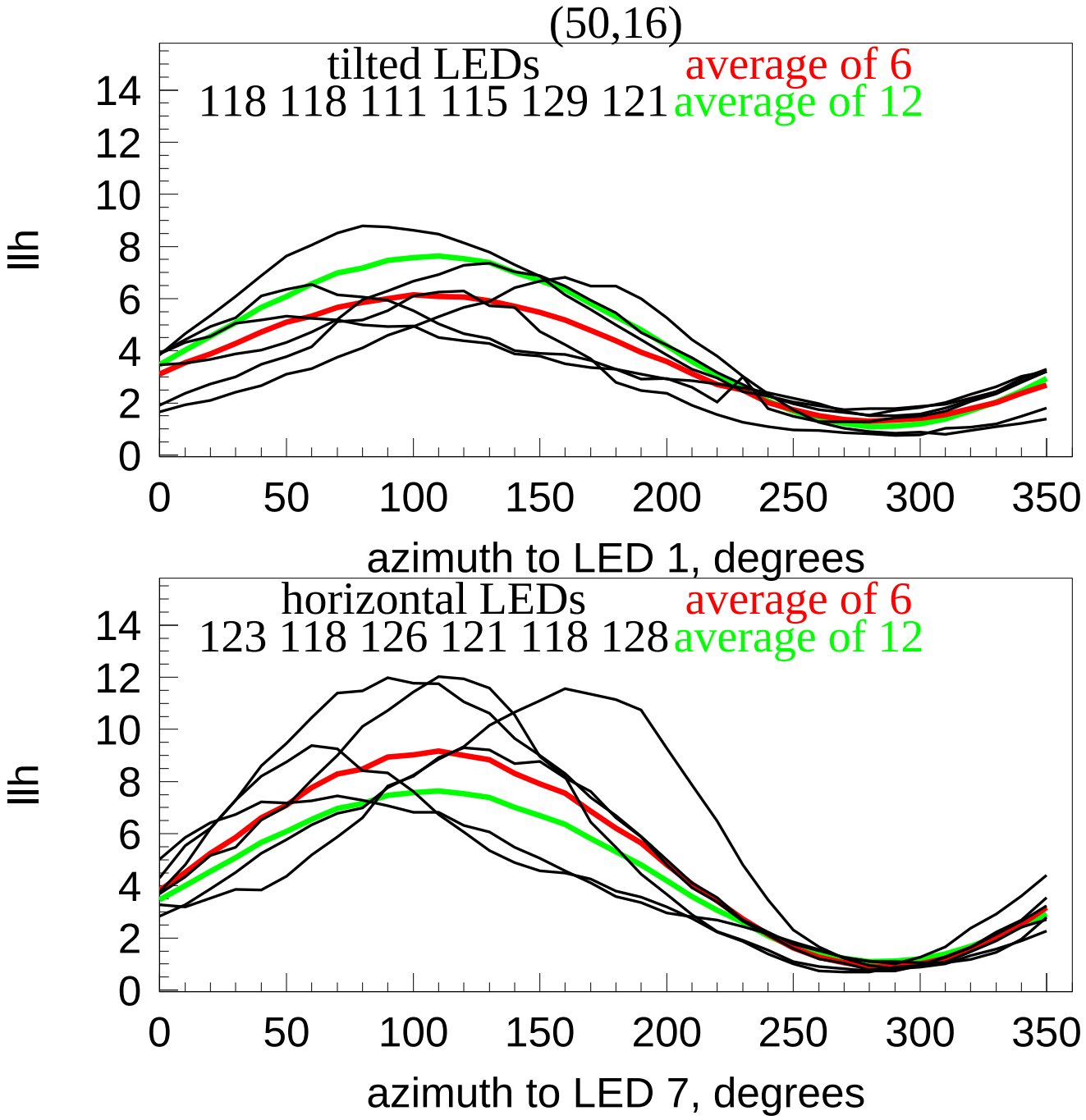

(50,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
306.5 ± 6.2

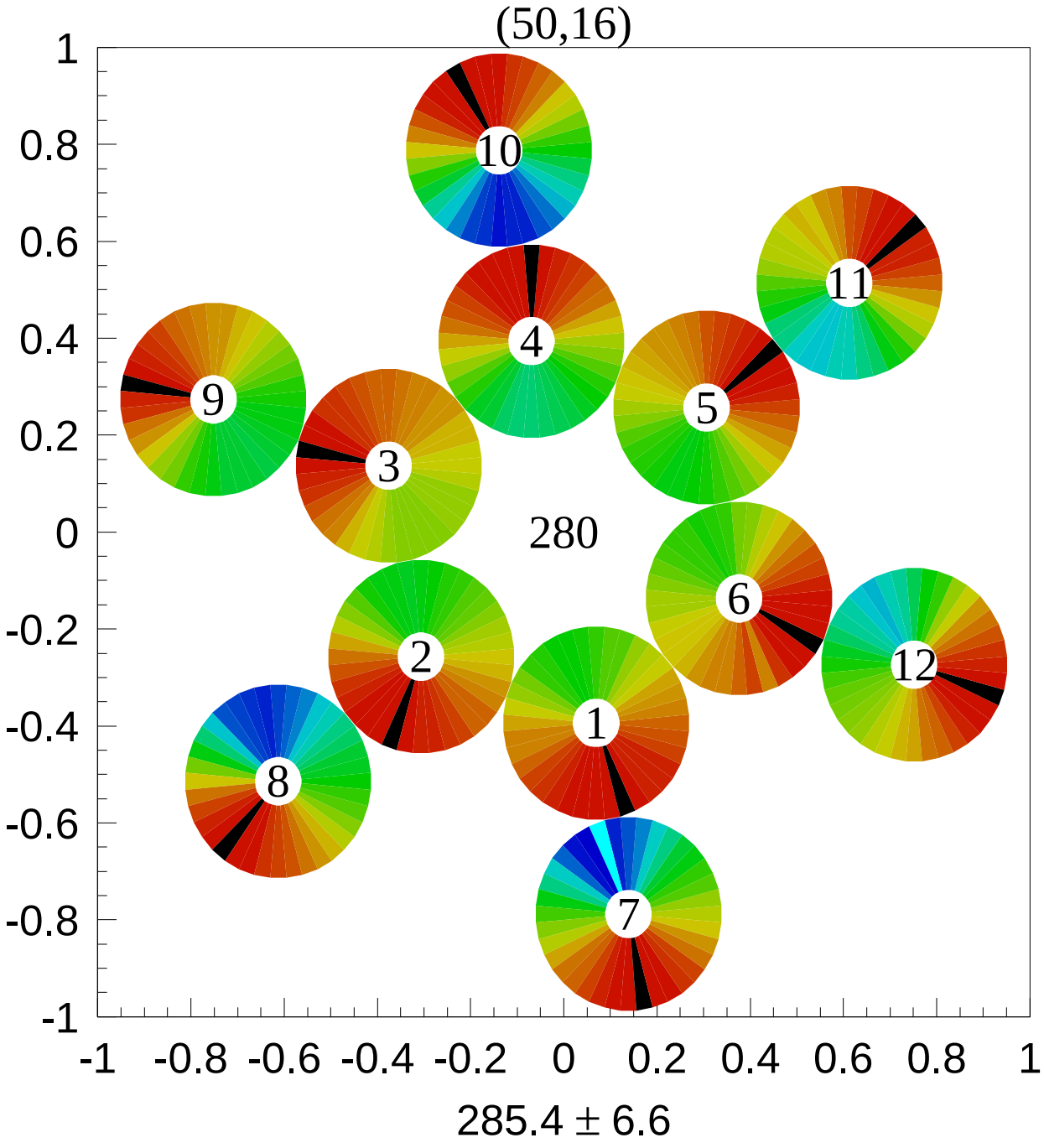

(50,14)
tilted LEDs
123 120 119 119 123 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 124 126 122 123 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

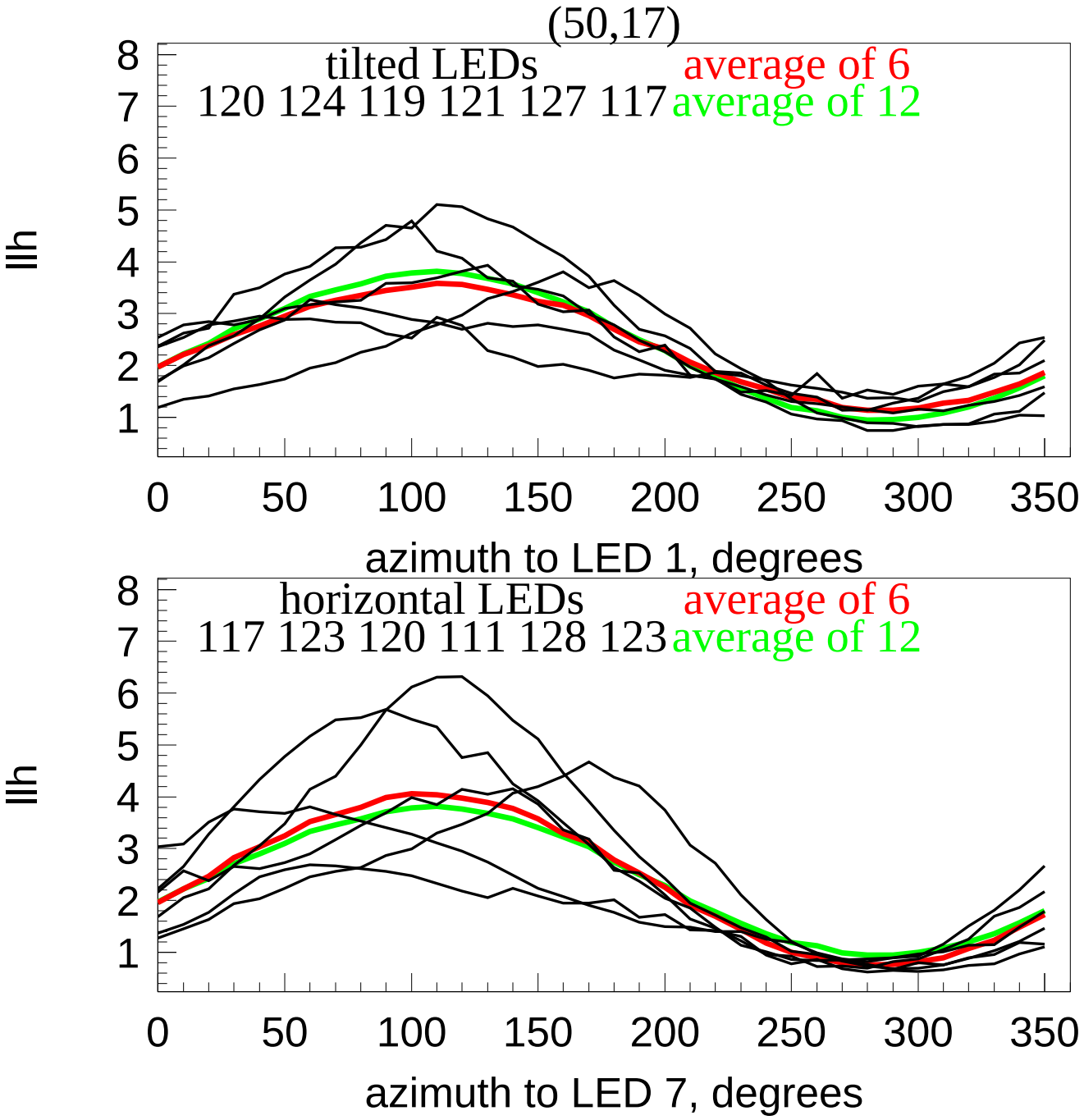

(50,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
299.3 ± 7.1

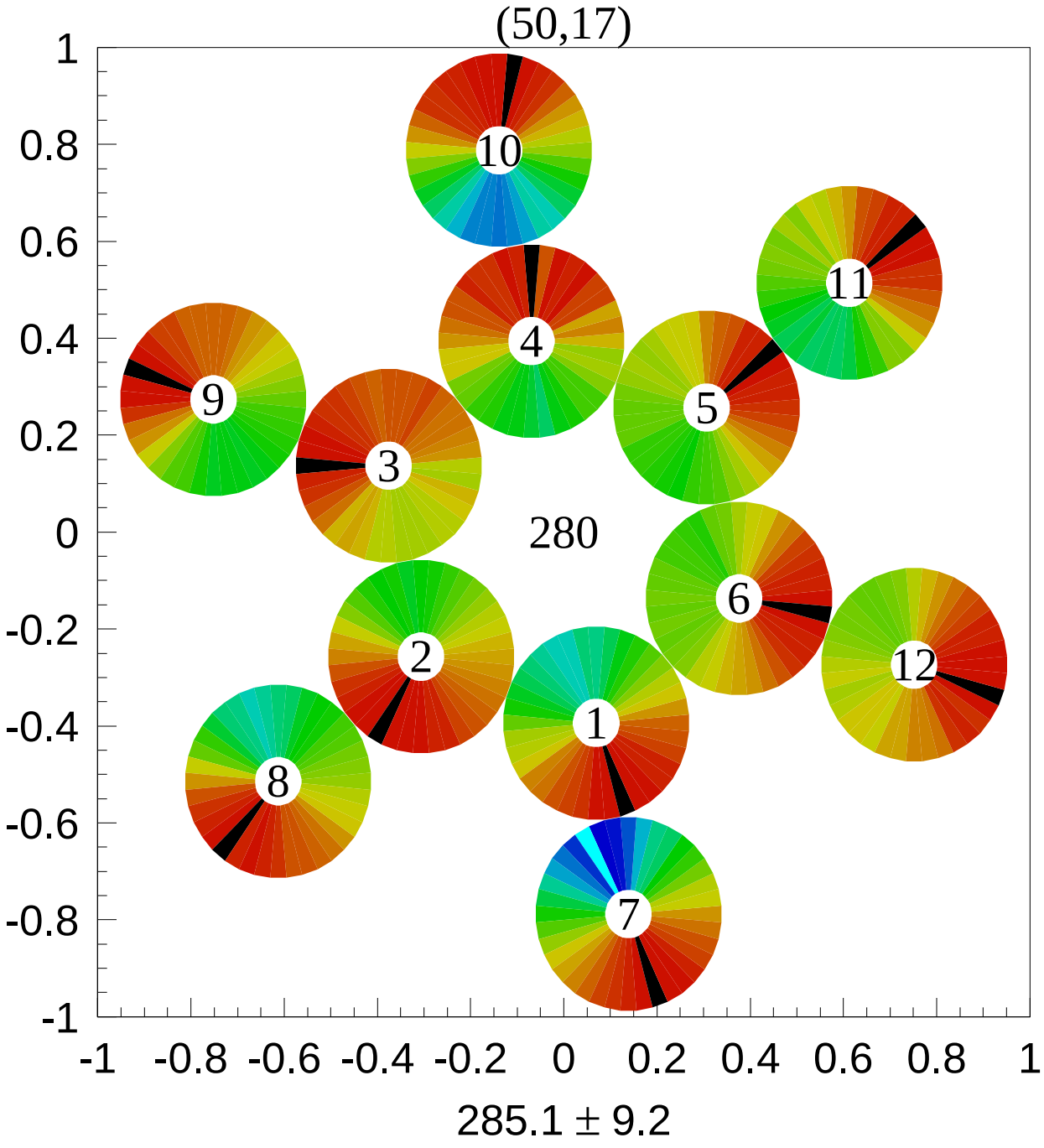

(50,15)
tilted LEDs
123 119 127 121 129 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 112 120 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

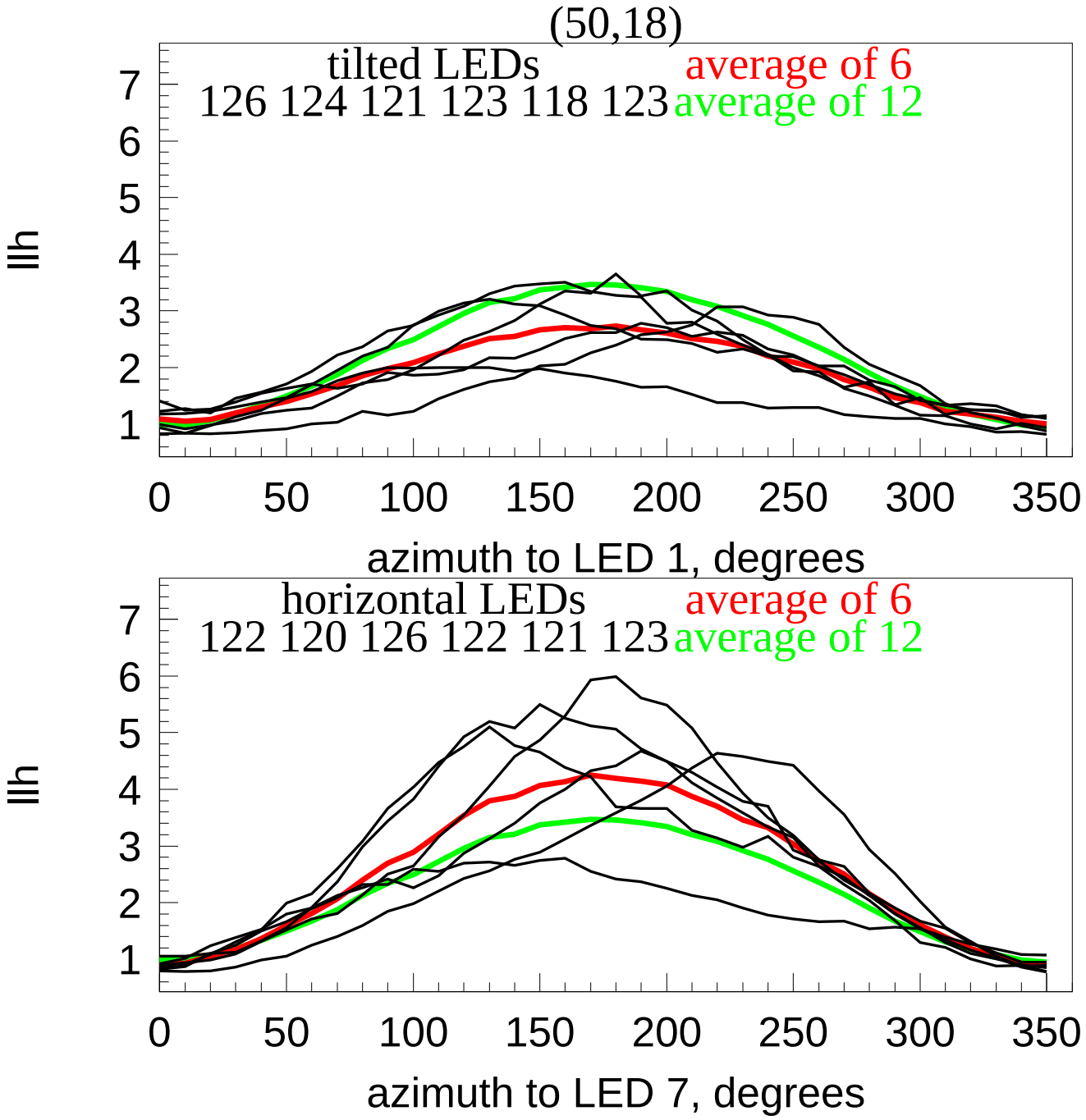

(50,15)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
216 ± 5.2

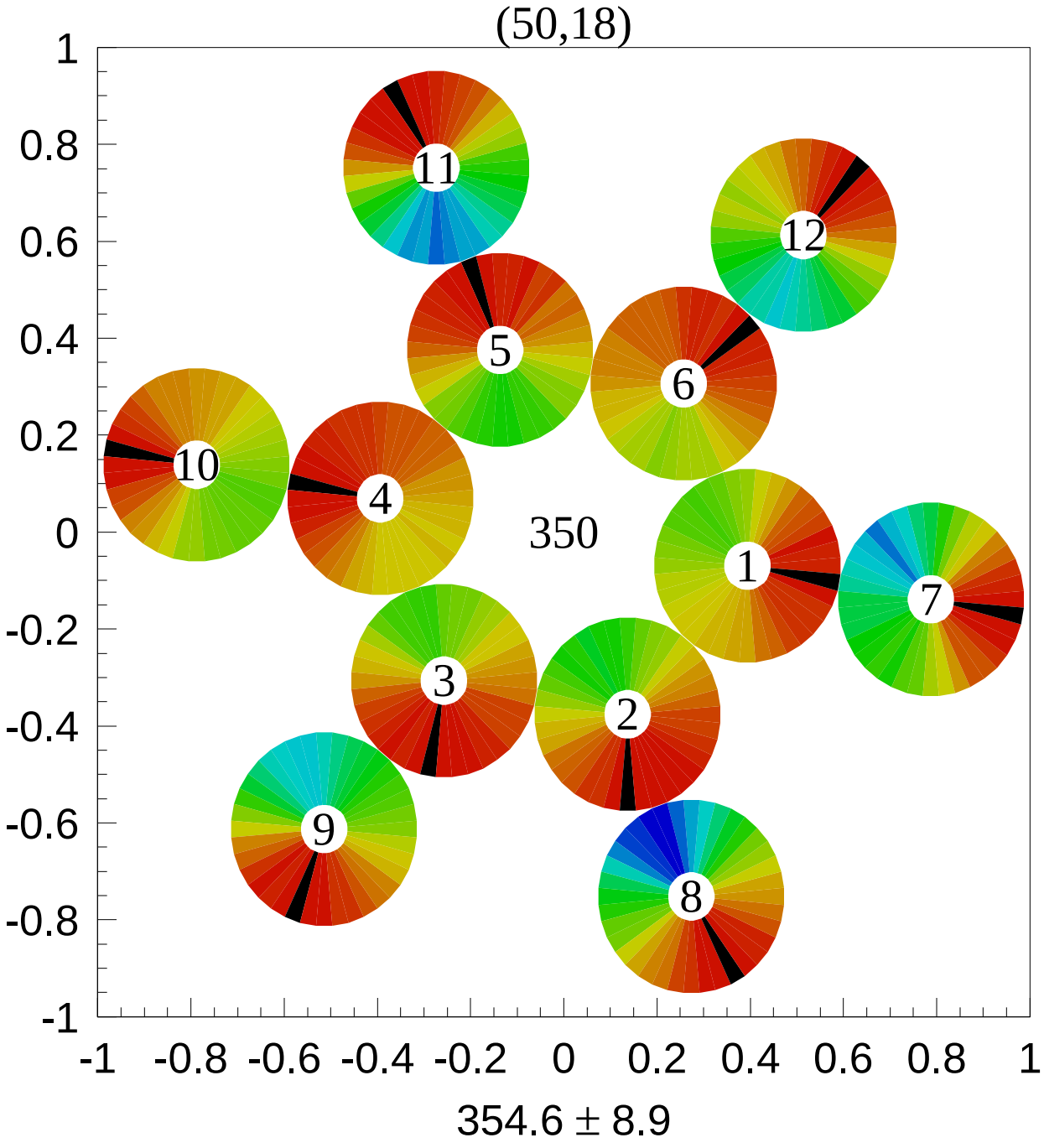

(50,16)
tilted LEDs
118 118 111 115 129 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 126 121 118 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

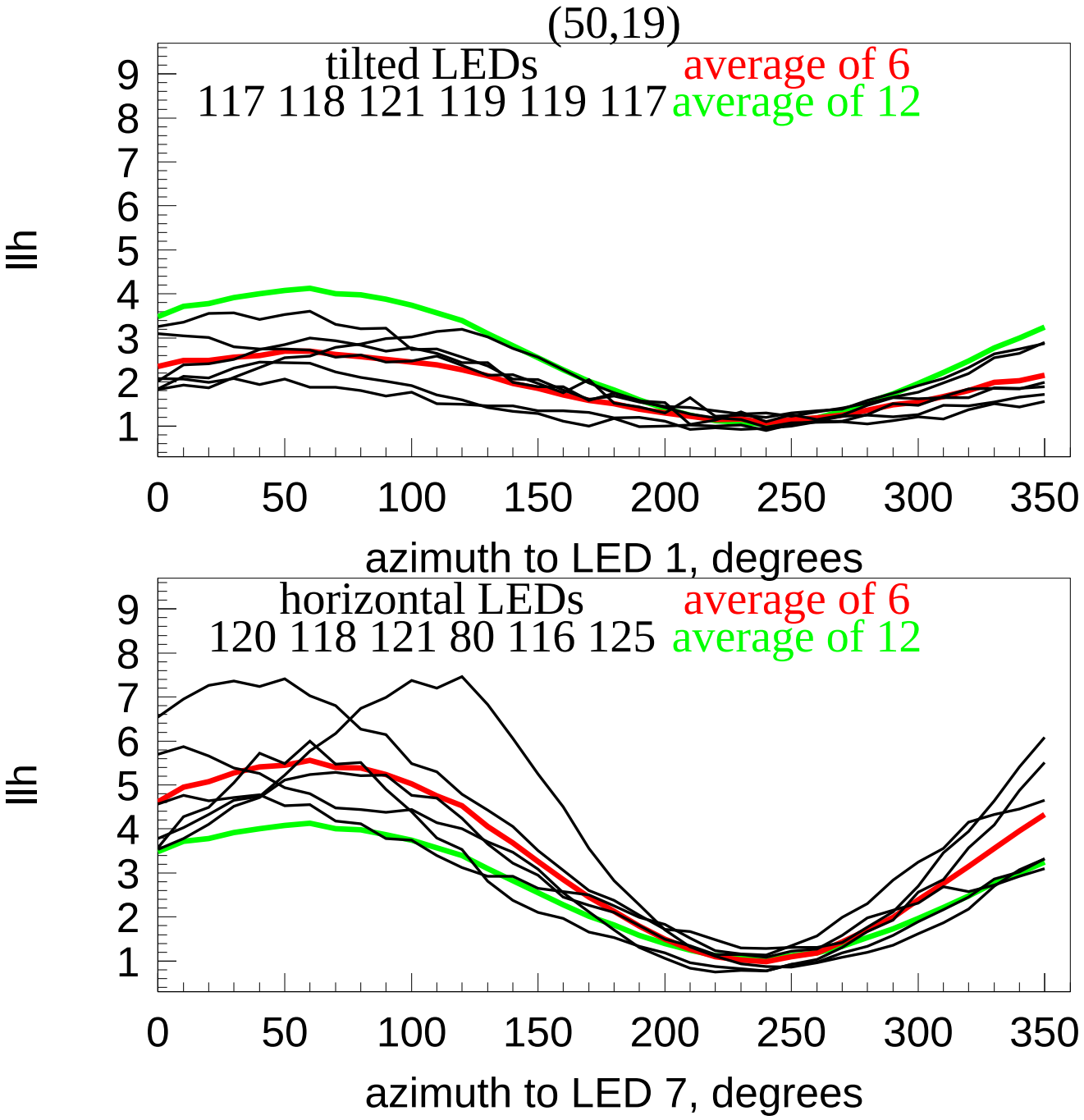

(50,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
285.4 ± 6.6

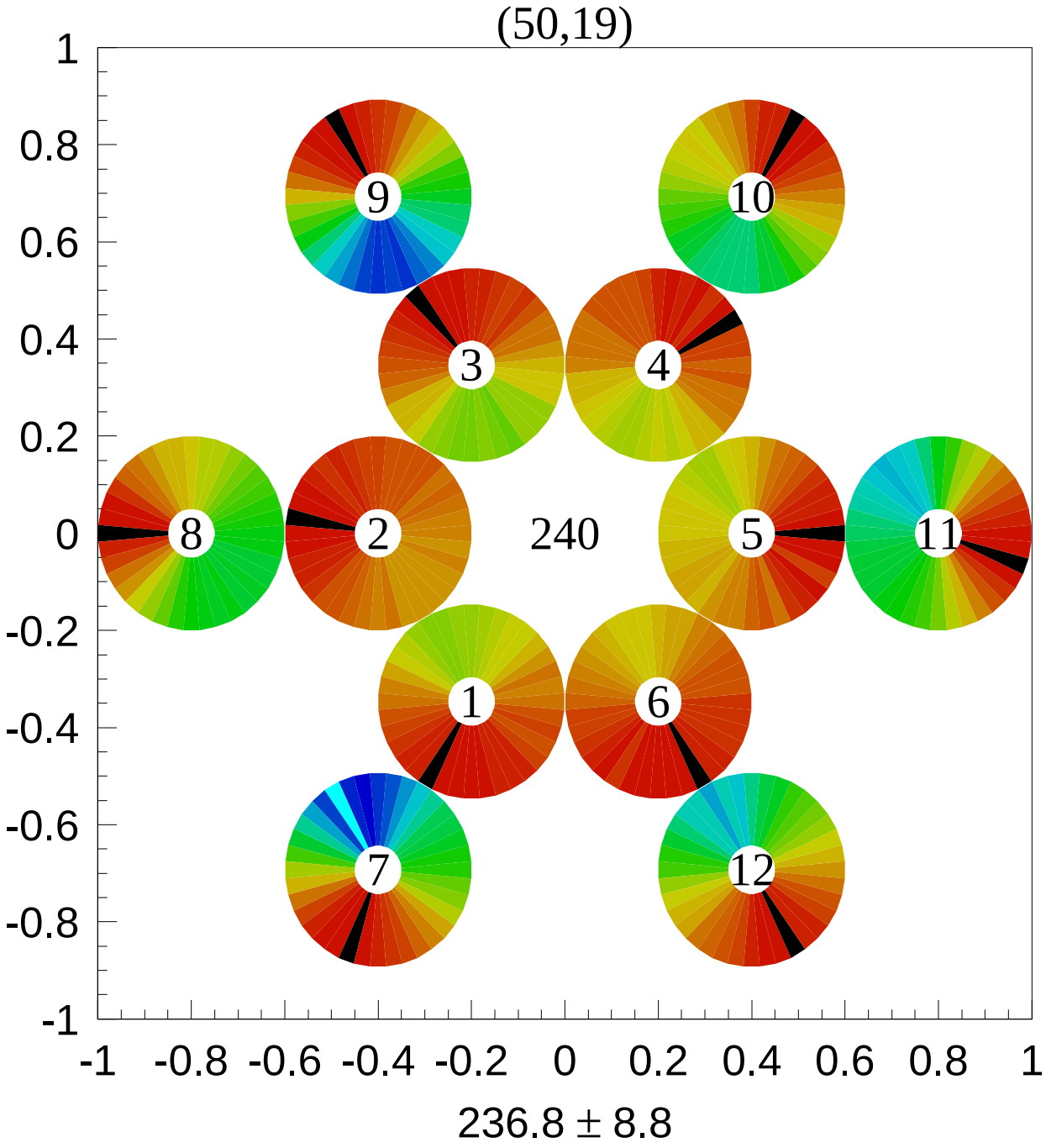

(50,17)
tilted LEDs
120 124 119 121 127 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 123 120 111 128 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

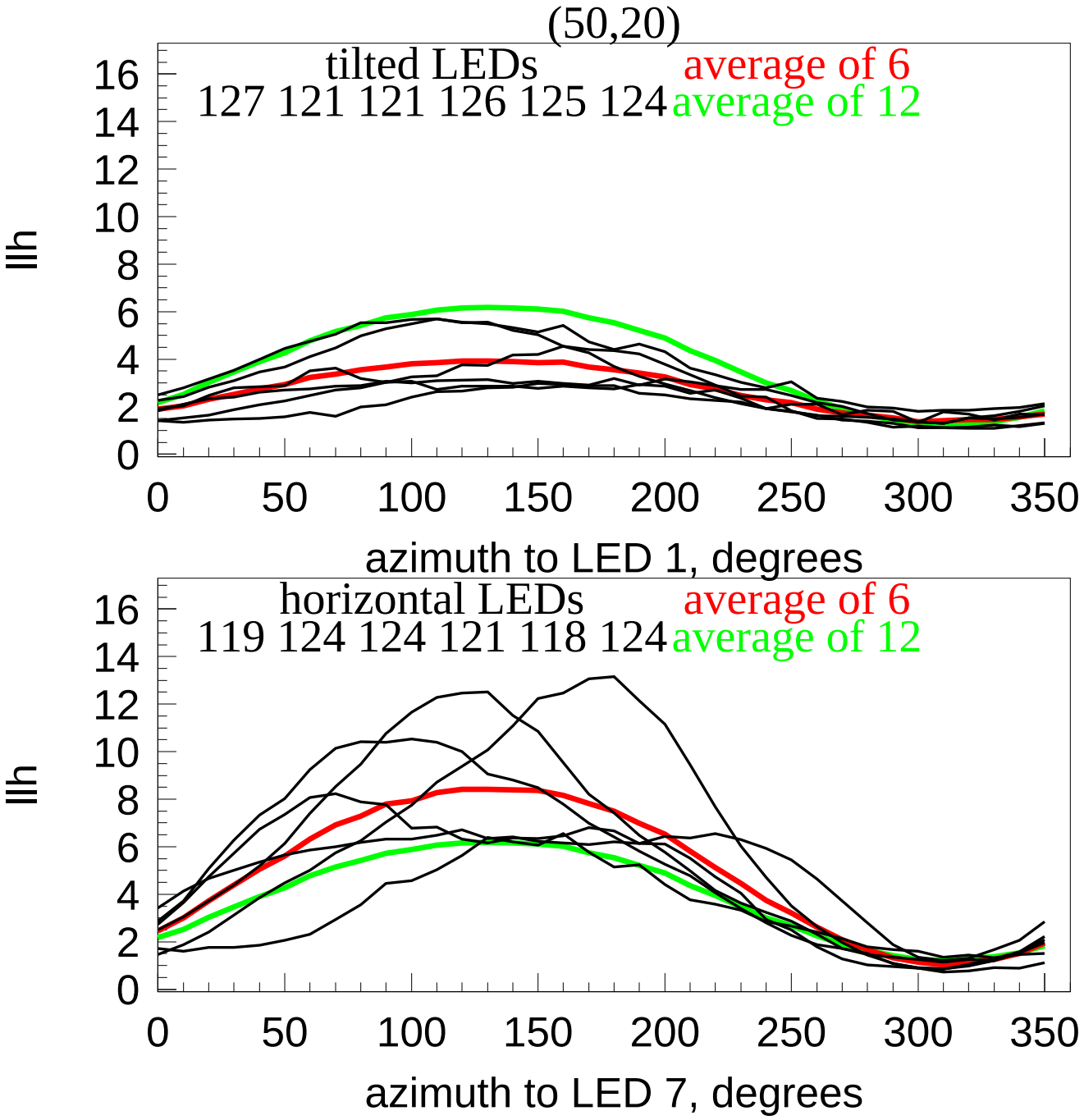

(50,17)
10
11
4
9
5
3
280
6
12
2
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
285.1 ± 9.2

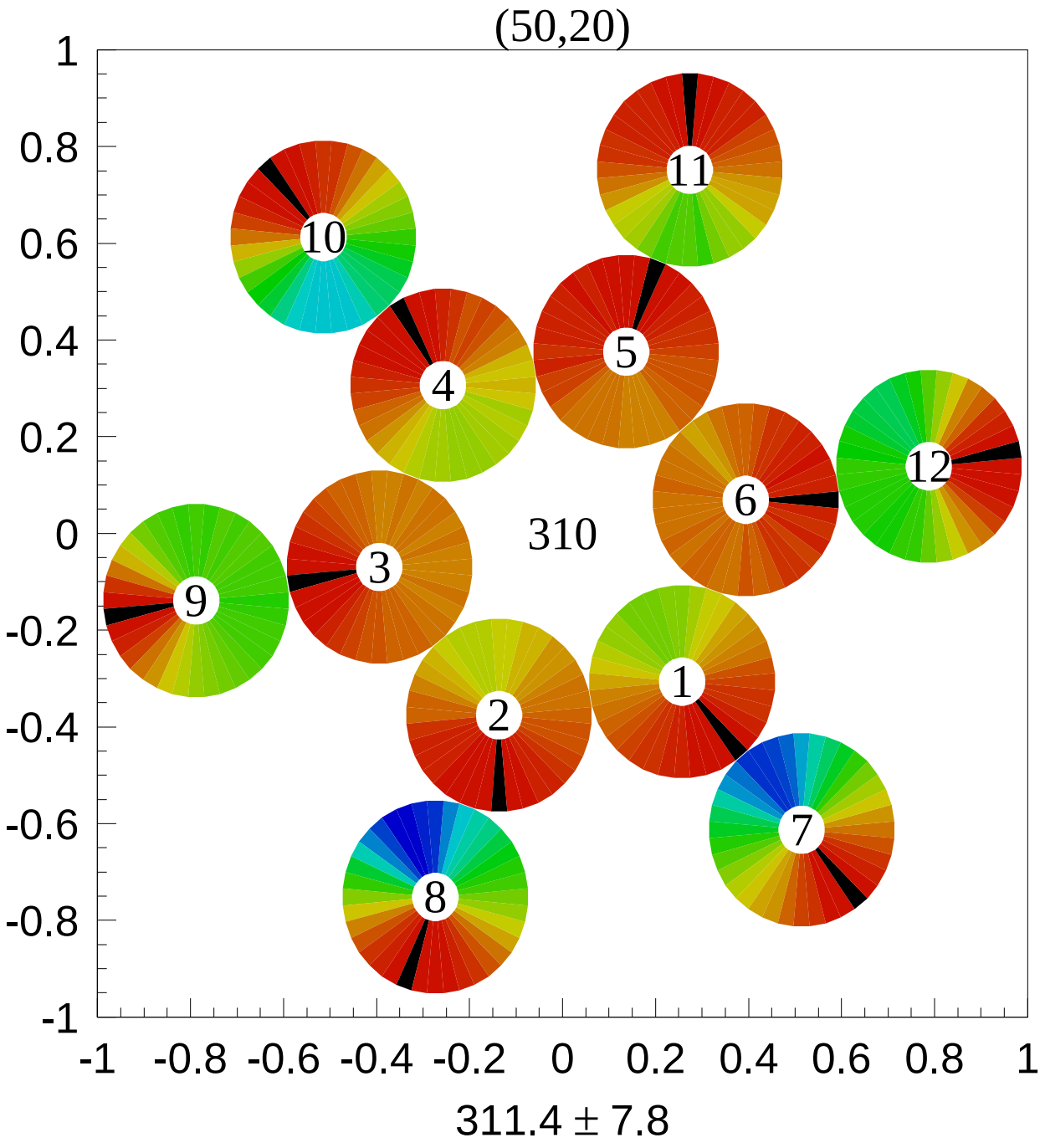

(50,18)
tilted LEDs
126 124 121 123 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 120 126 122 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

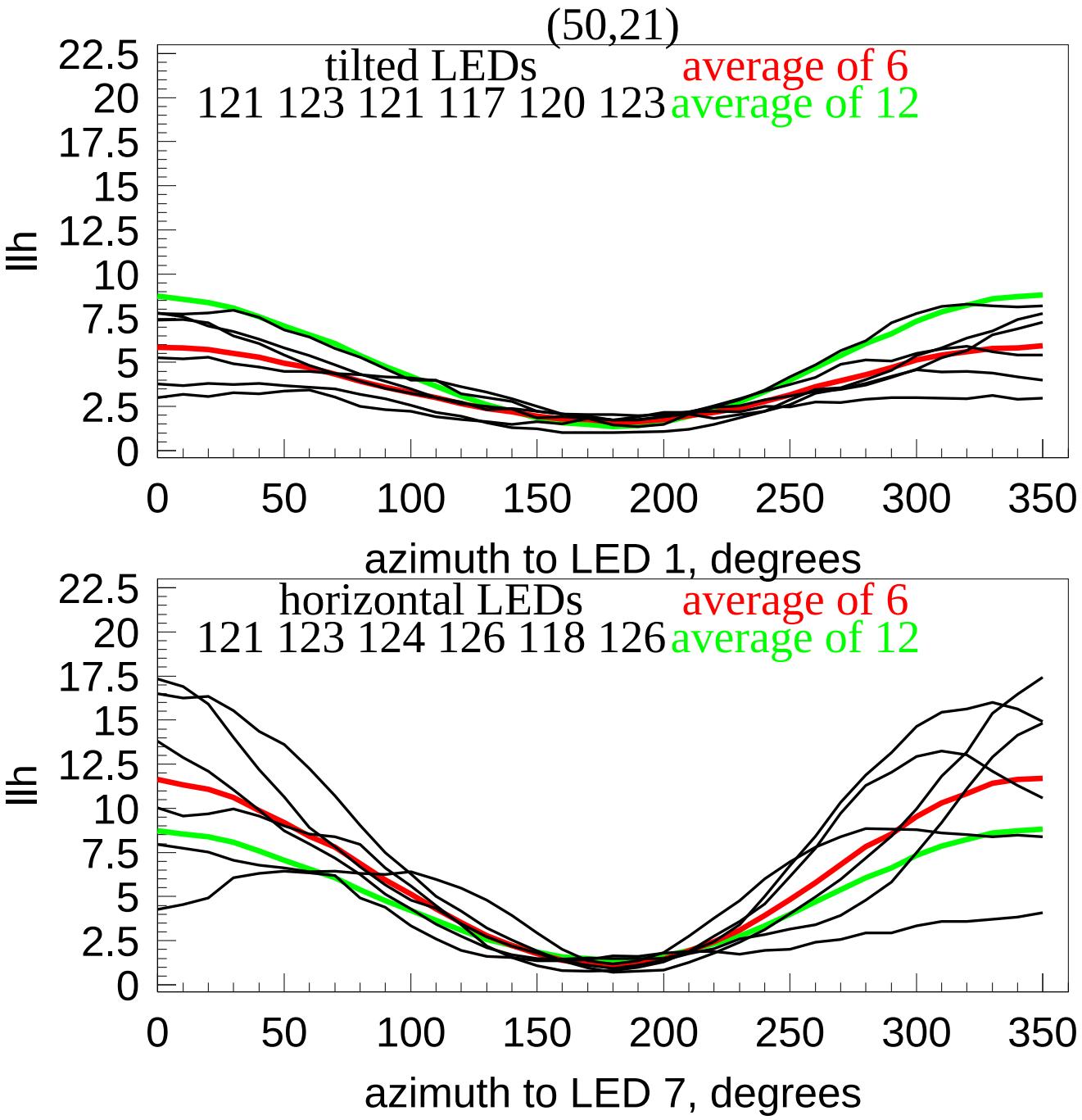

(50,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
354.6 ± 8.9

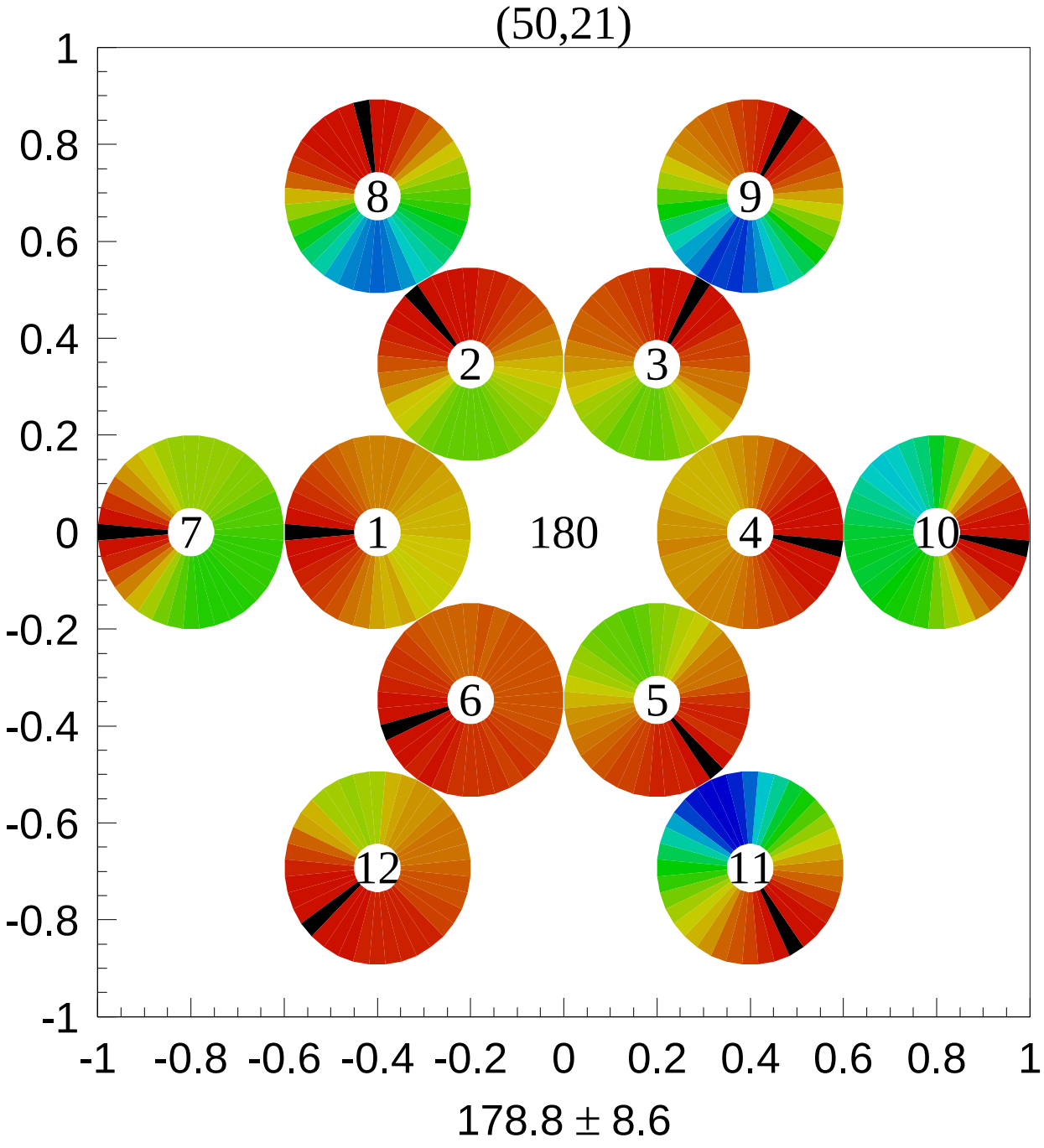

(50,19)
tilted LEDs
117 118 121 119 119 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 118 121 80 116 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

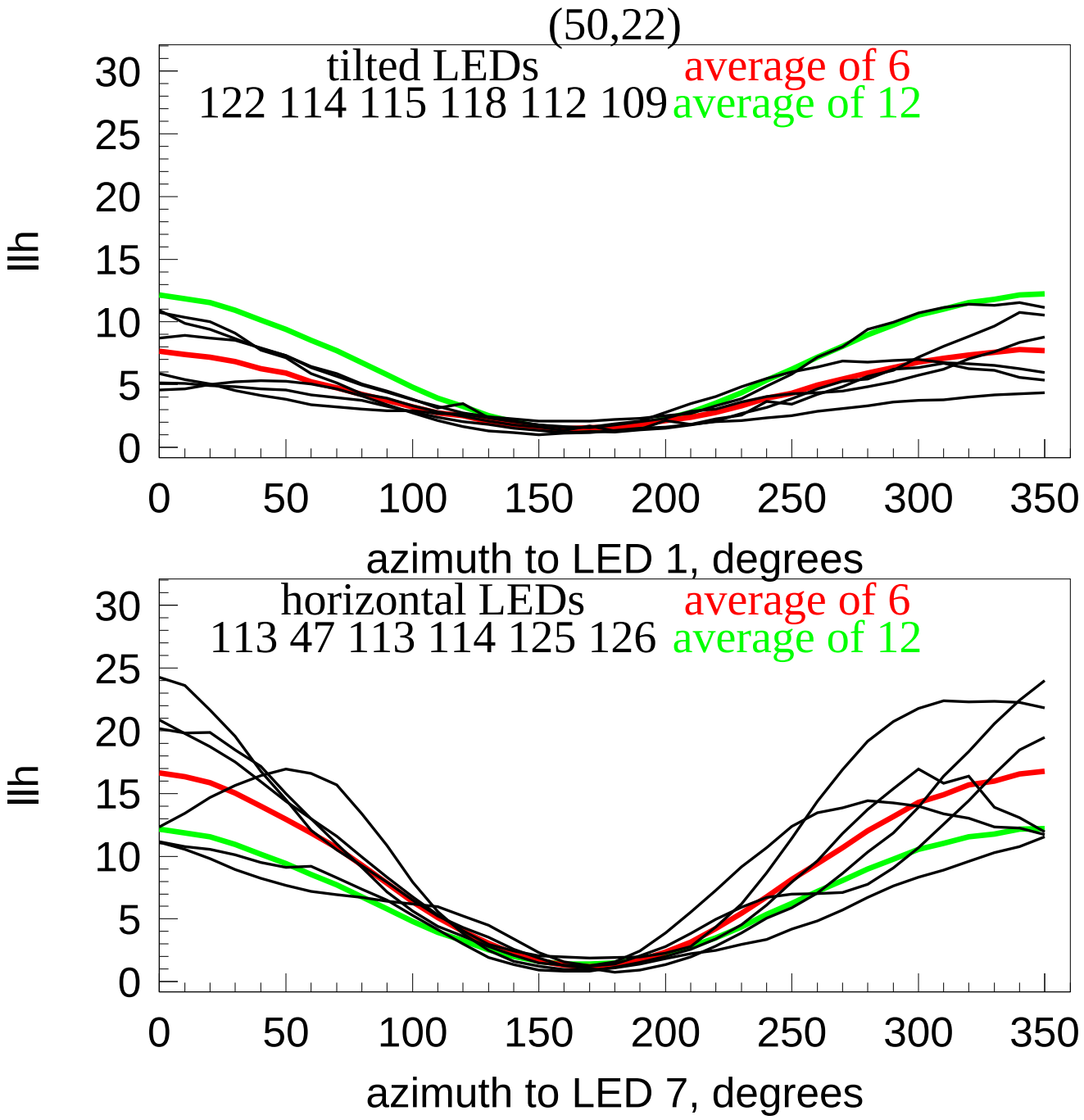

(50,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
236.8 ± 8.8

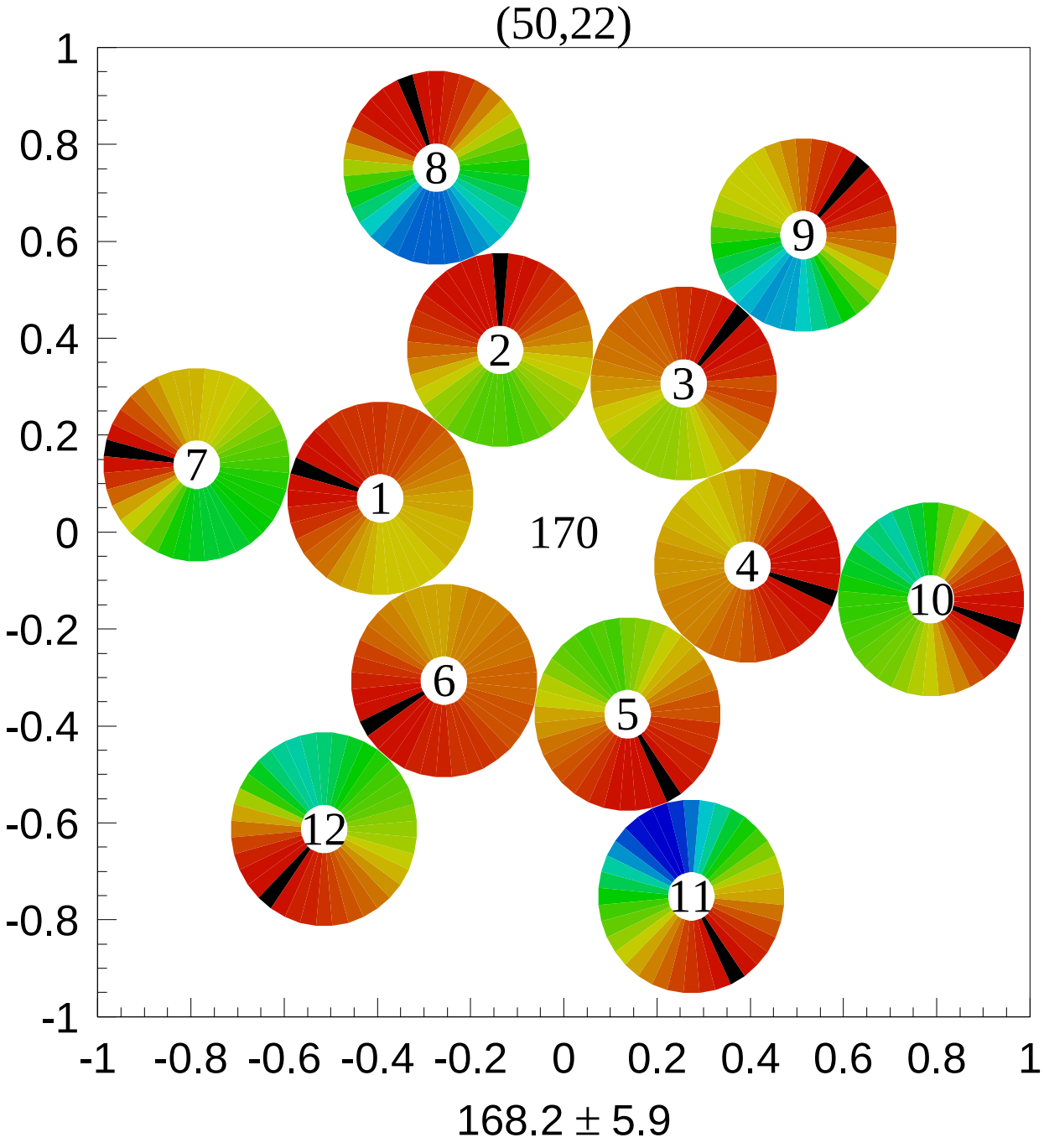

(50,20)
tilted LEDs
127 121 121 126 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 124 124 121 118 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

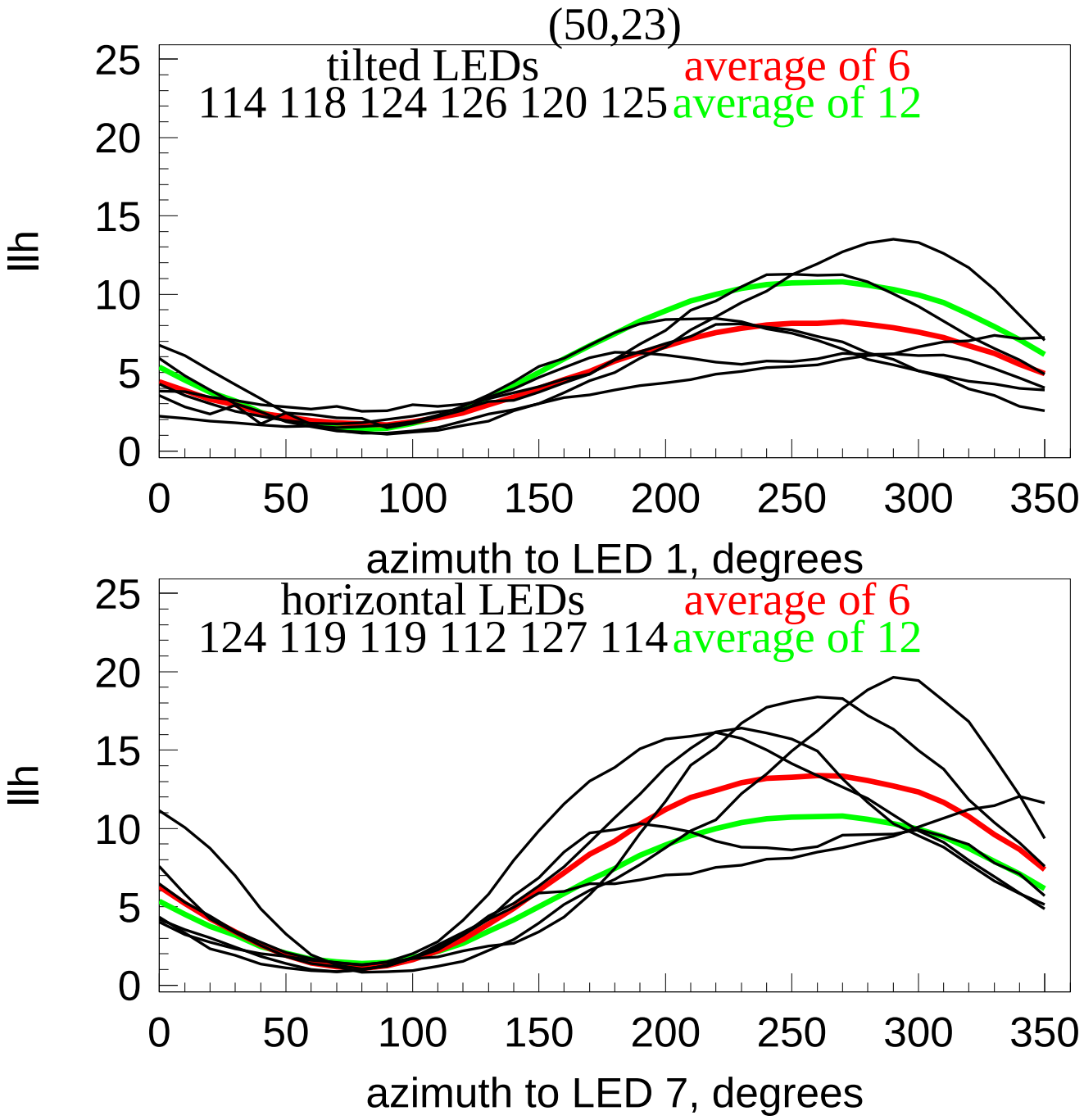

(50,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
311.4 ± 7.8

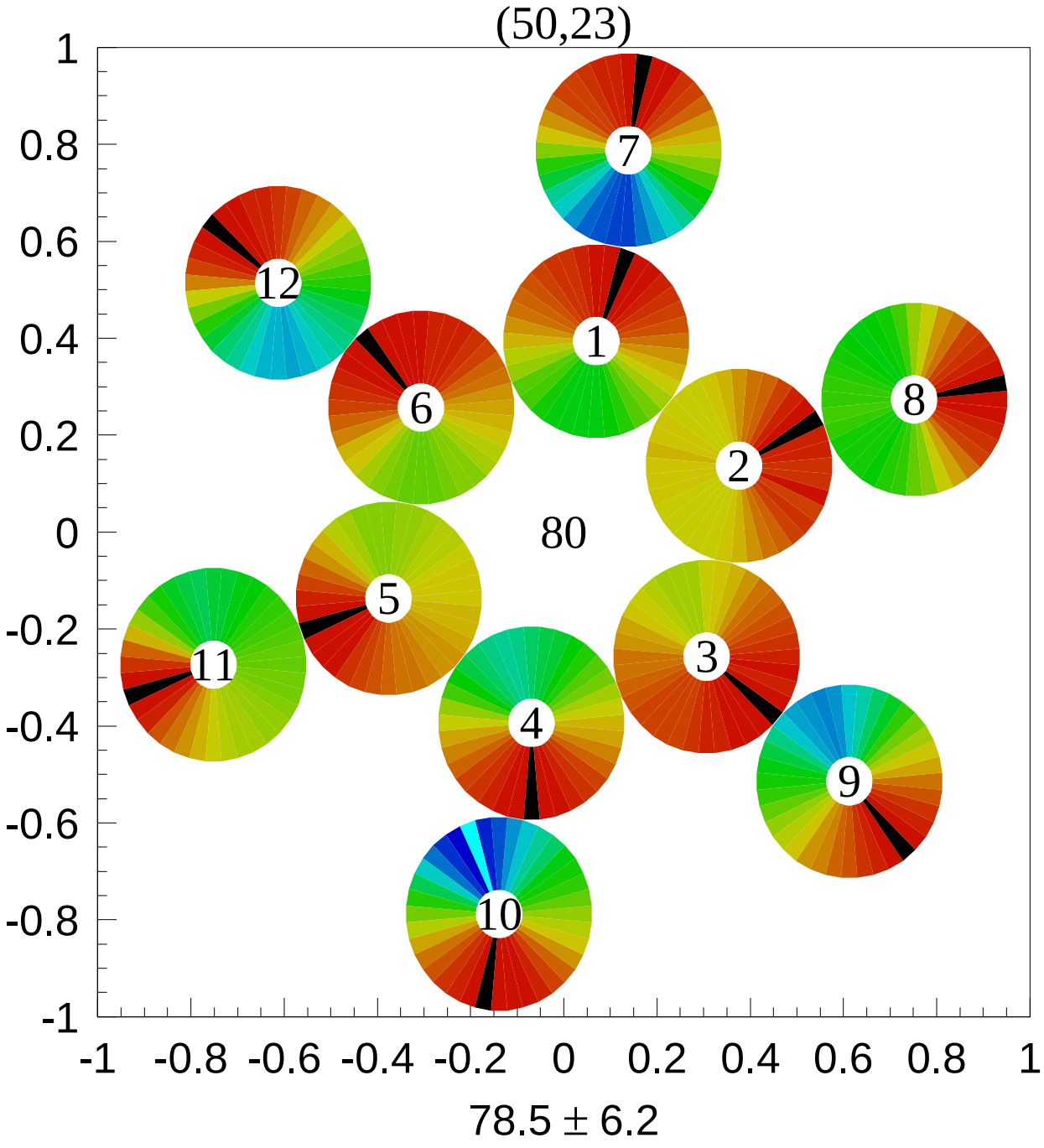

(50,21)
tilted LEDs
121 123 121 117 120 123
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 123 124 126 118 126
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

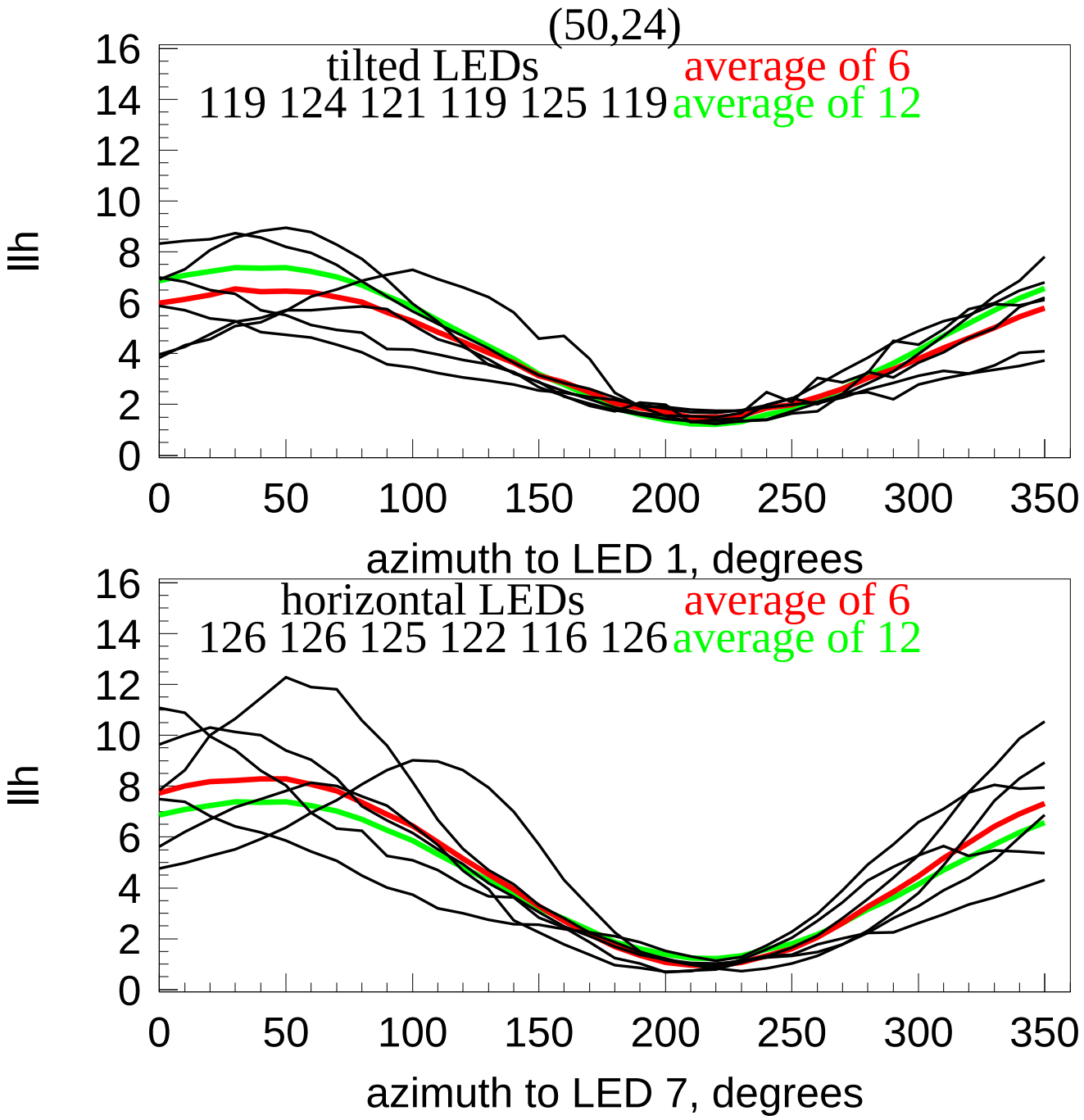

(50,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
178.8 ± 8.6
8
9
2
3
7
1
180
4
10
6
5
12
11

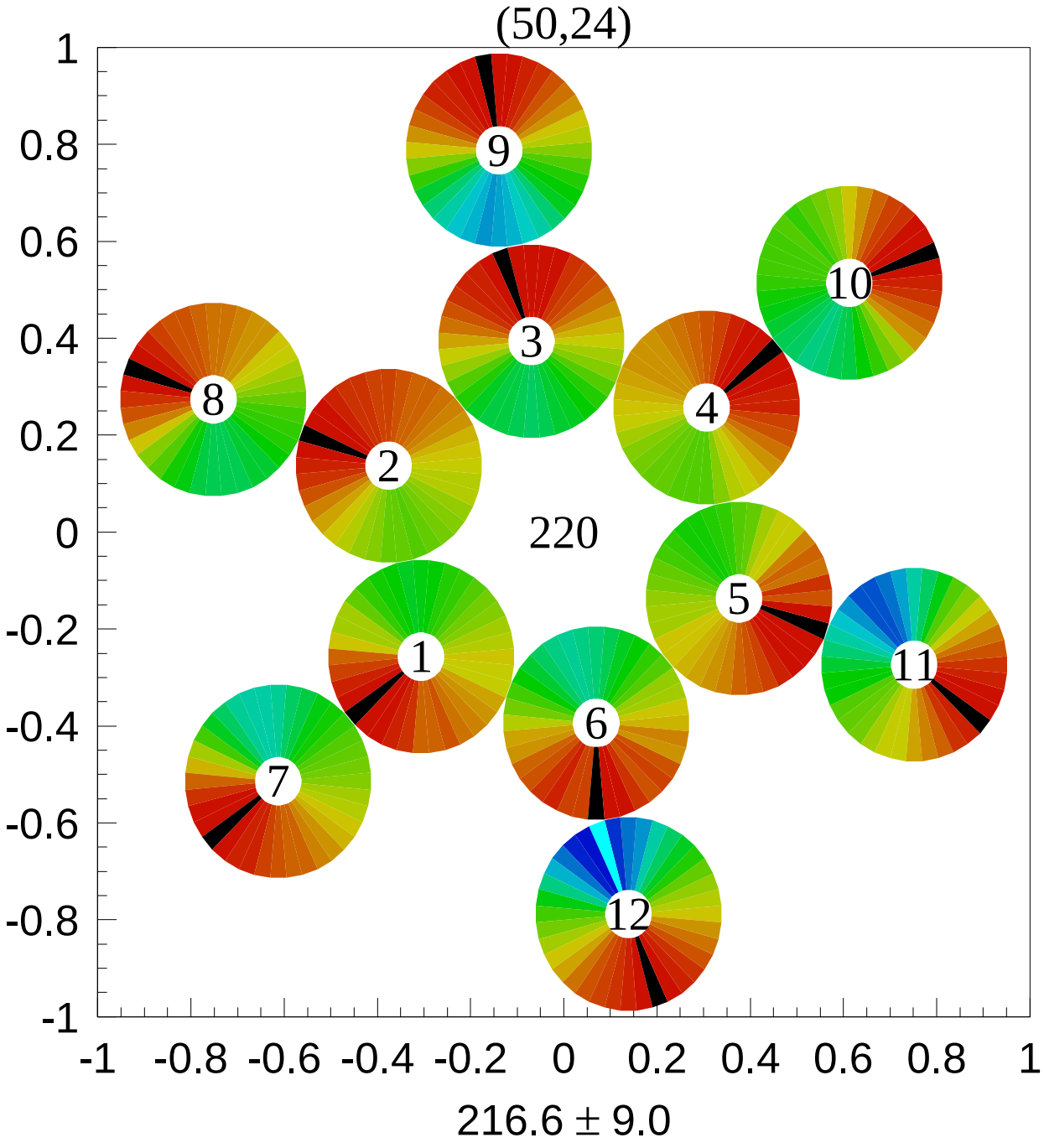

(50,22)
tilted LEDs
122 114 115 118 112 109
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
113 47 113 114 125 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

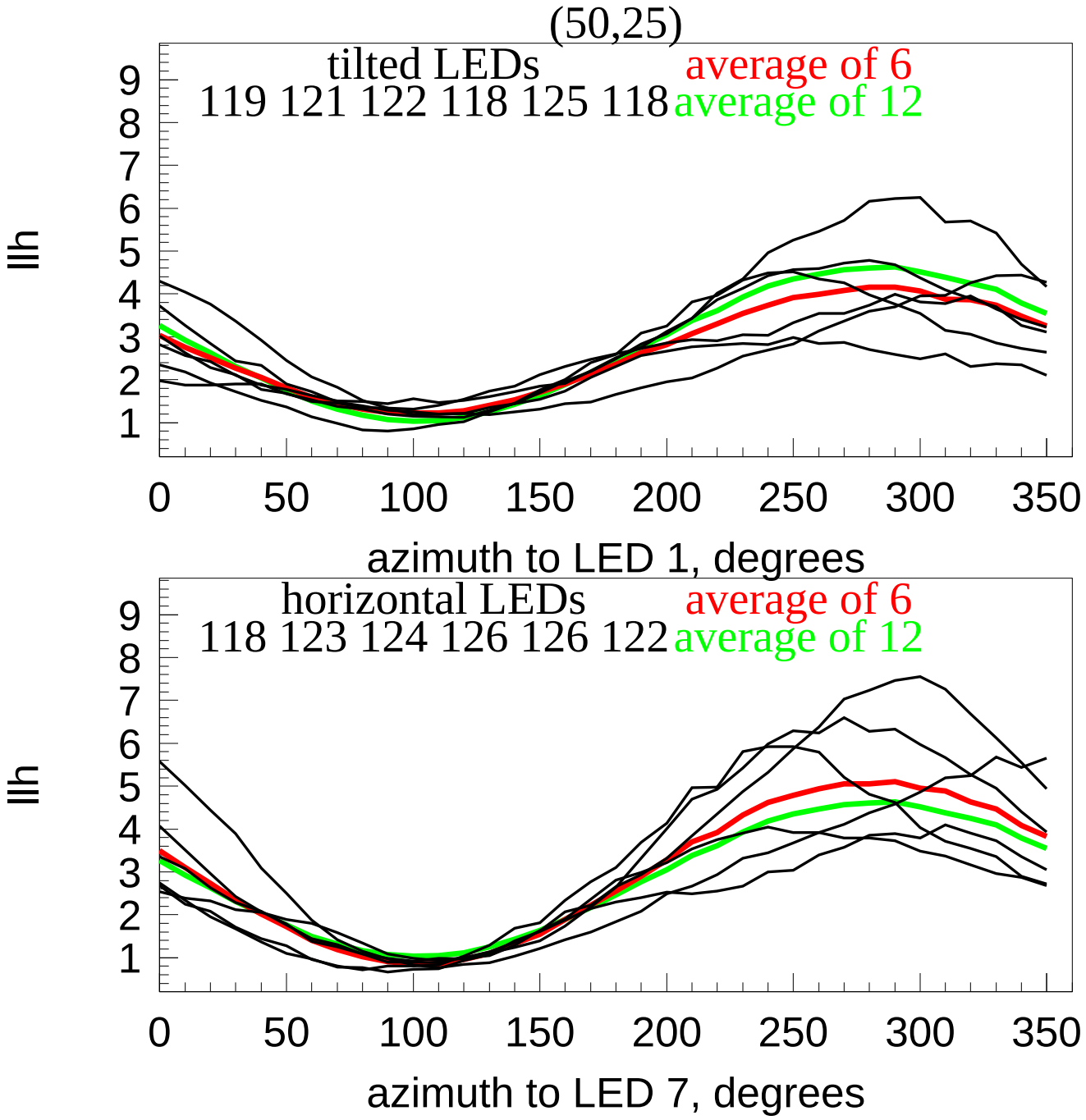

(50,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
168.2 ± 5.9

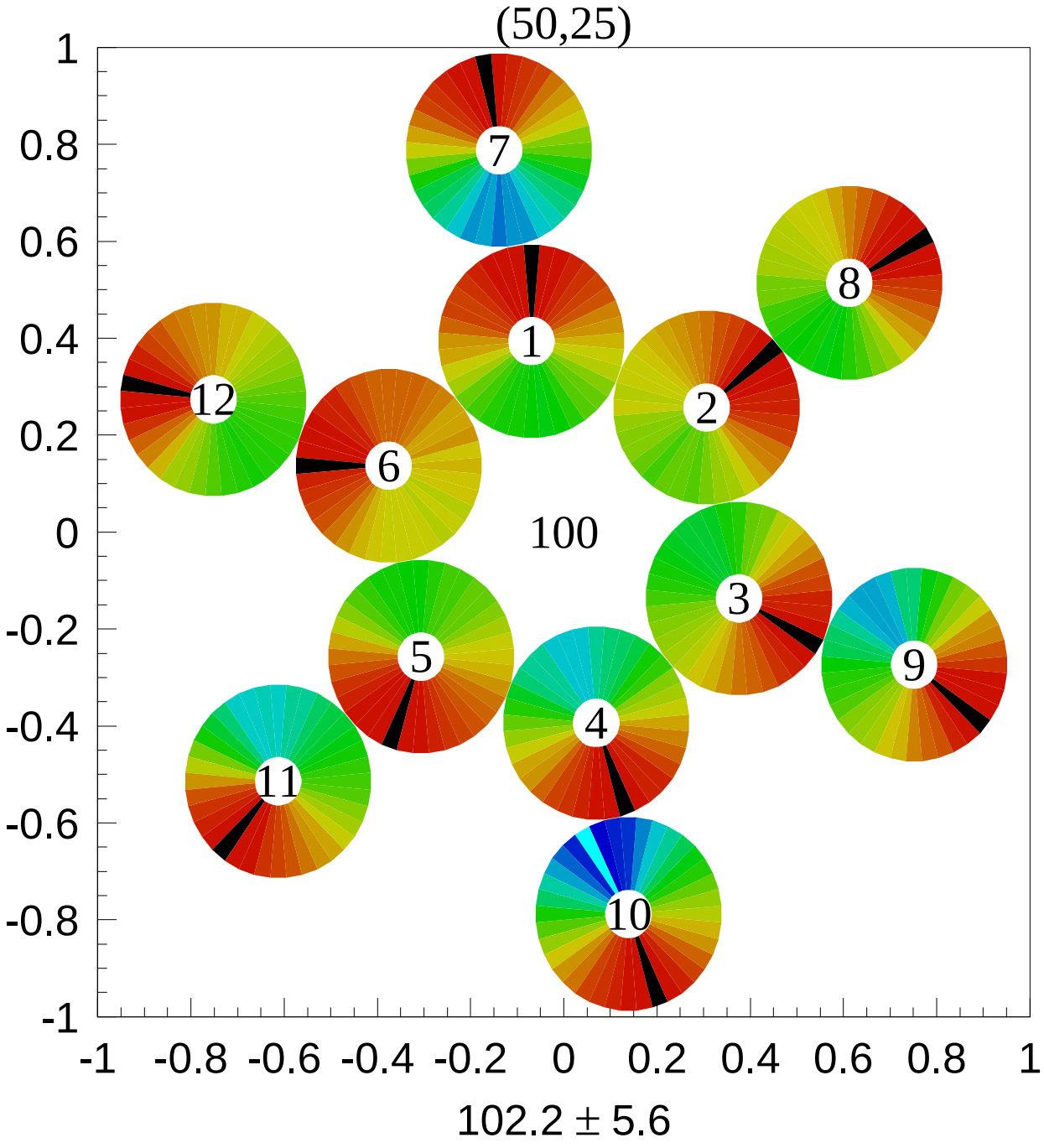

(50,23)
tilted LEDs
114 118 124 126 120 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 119 112 127 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

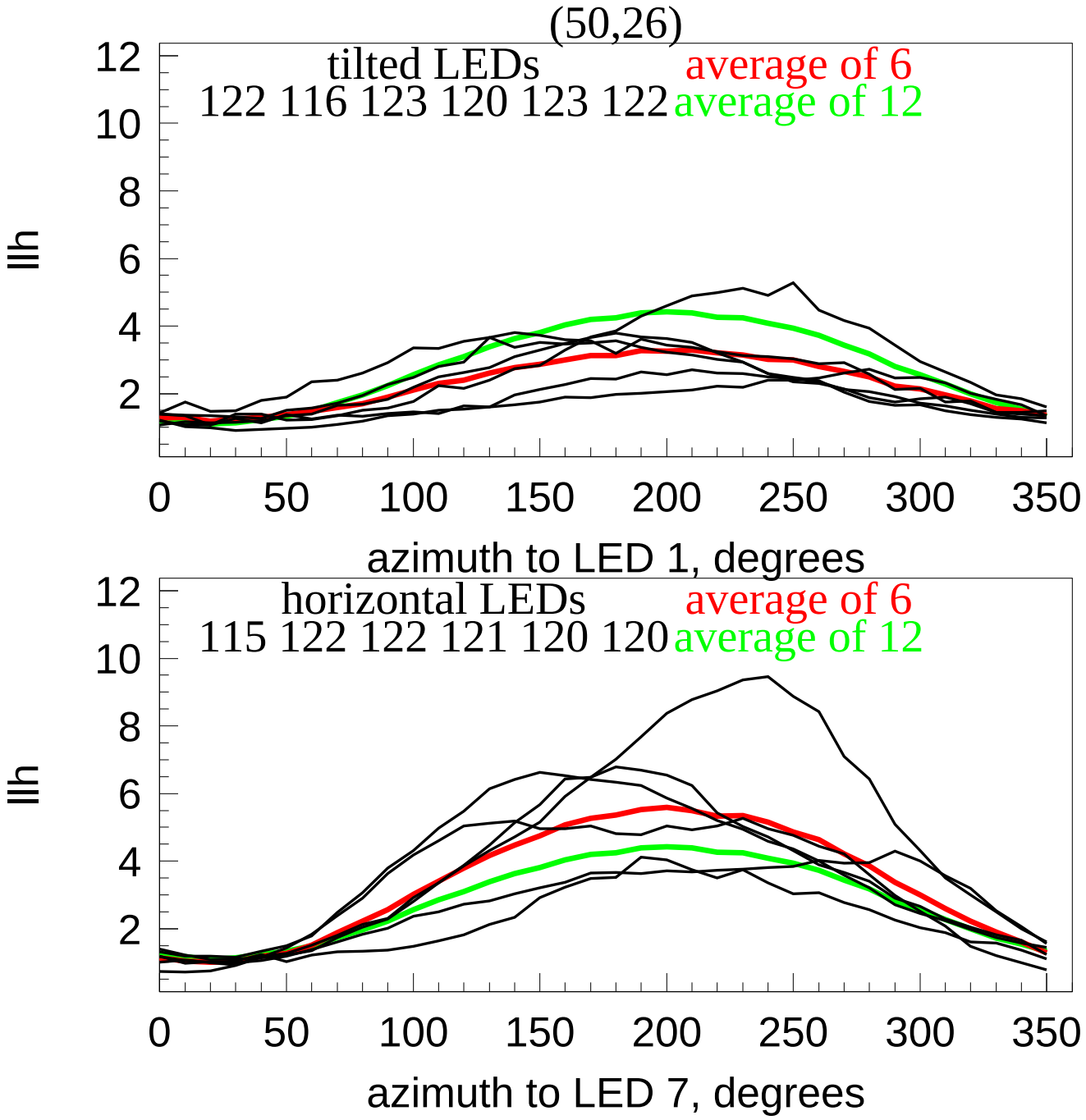

(50,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
78.5 ± 6.2

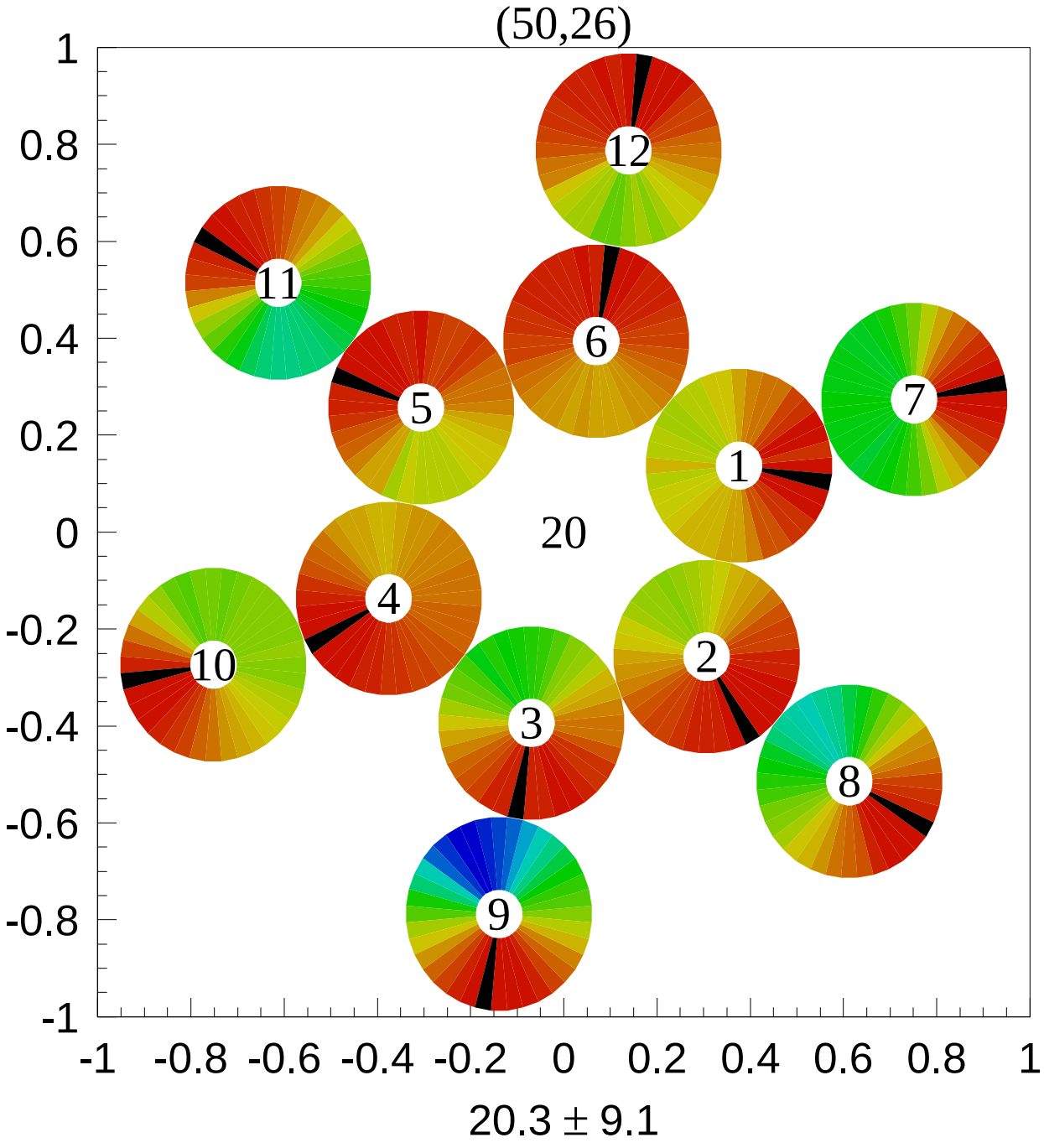

(50,24)
tilted LEDs
119 124 121 119 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 125 122 116 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

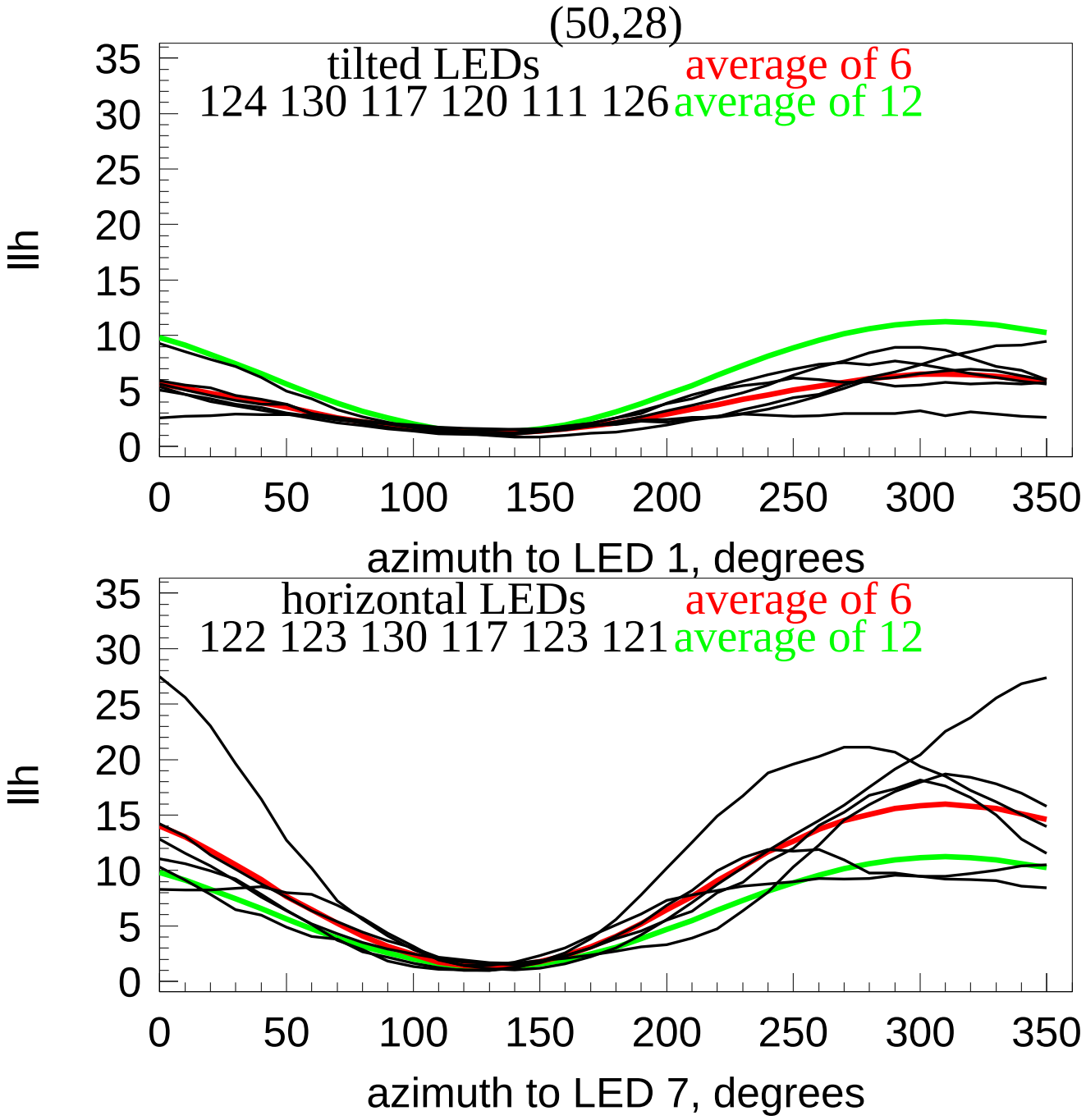

(50,24)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
216.6 ± 9.0

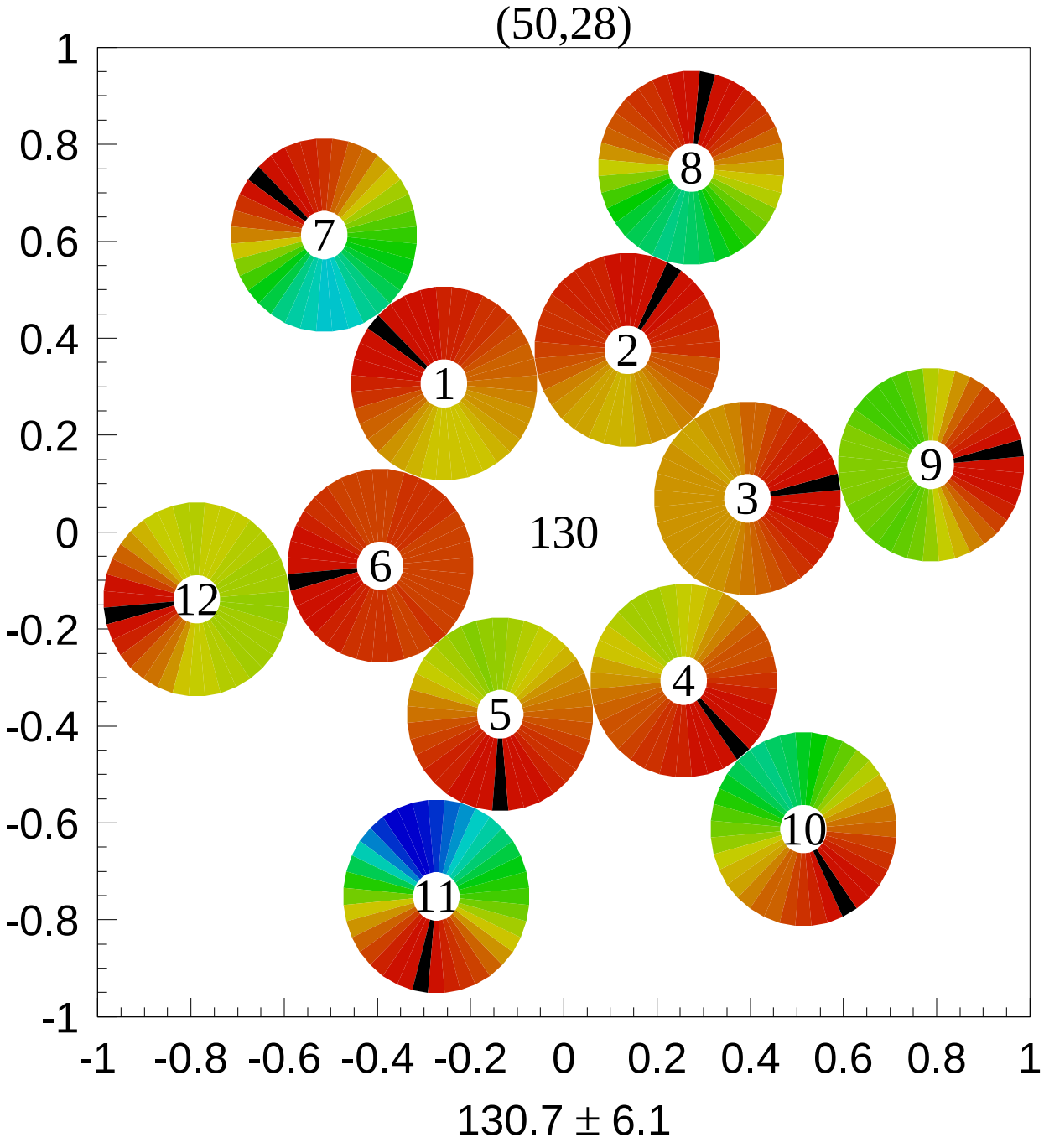

(50,25)
tilted LEDs
119 121 122 118 125 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 123 124 126 126 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

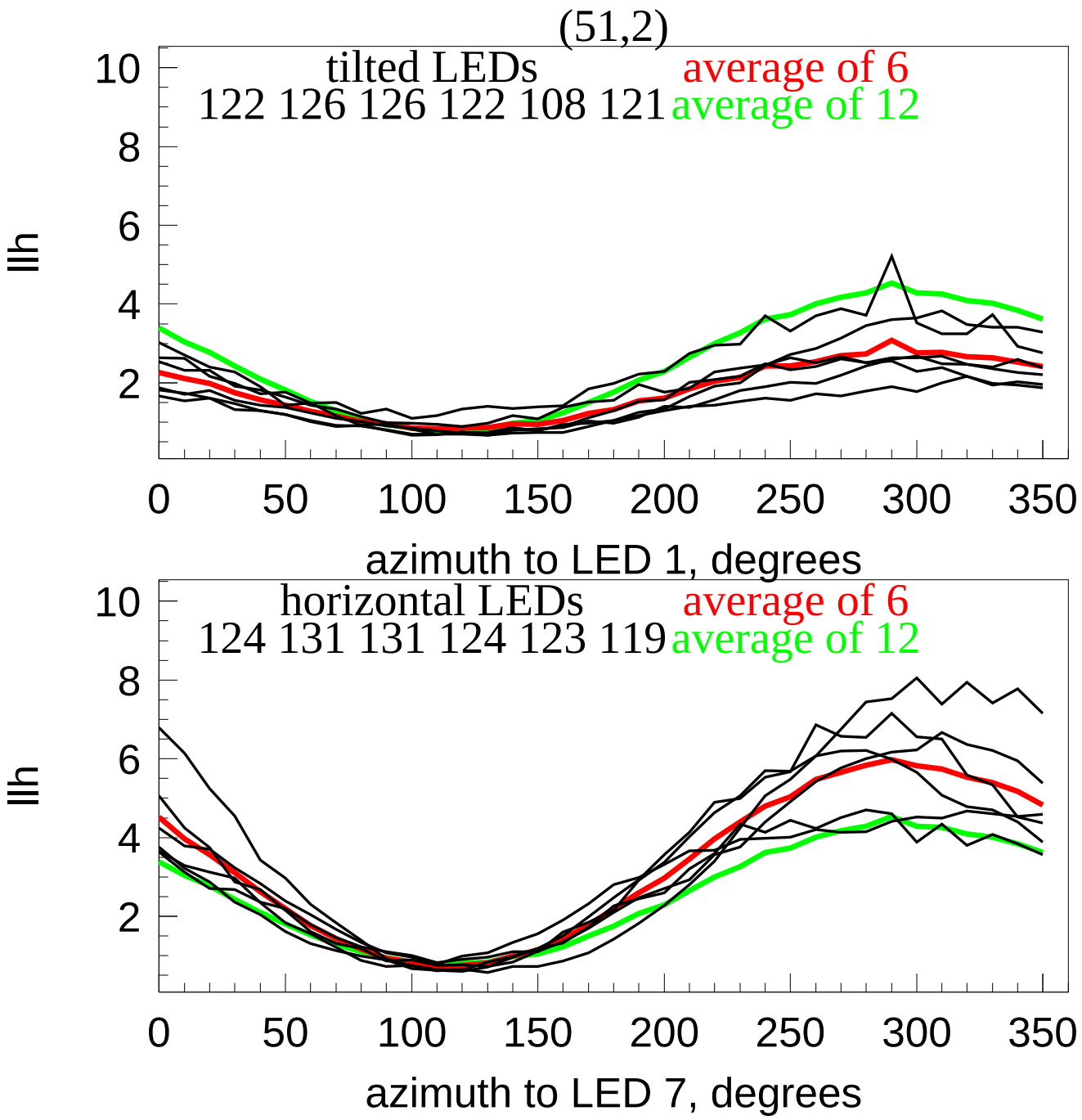

(50,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
102.2 ± 5.6

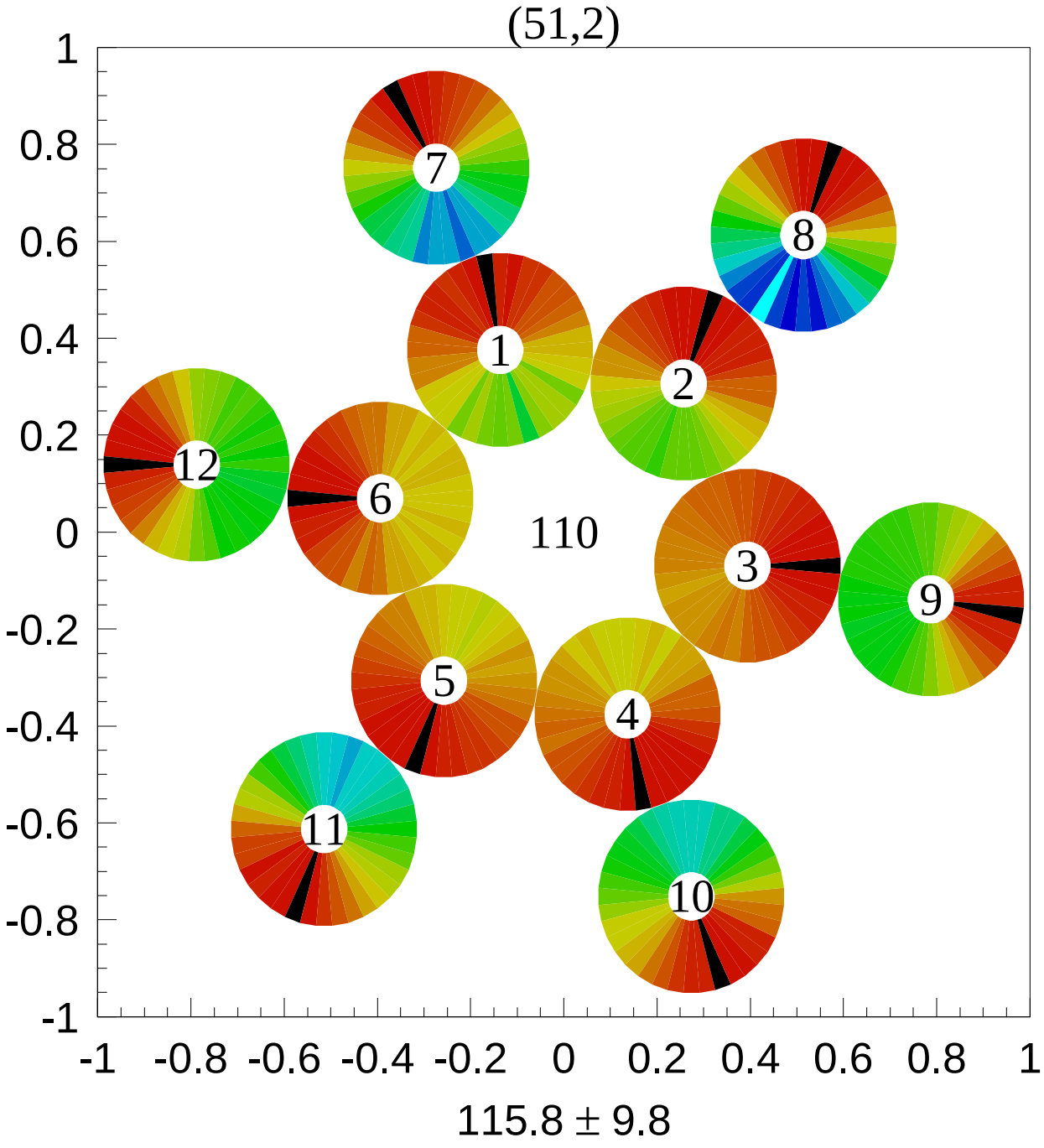

(50,26)
tilted LEDs
122 116 123 120 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 122 122 121 120 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

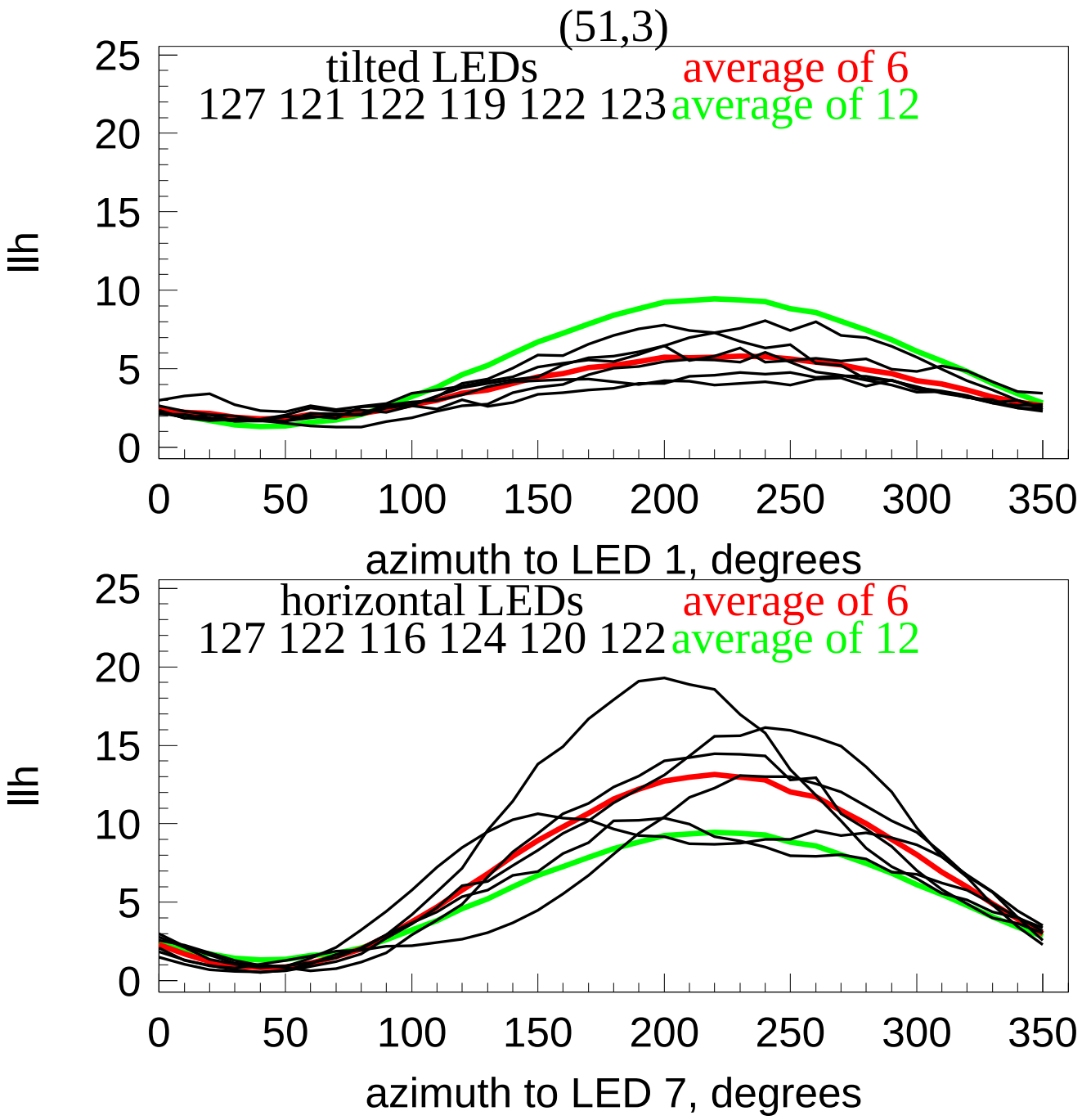

(50,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
20.3 ± 9.1

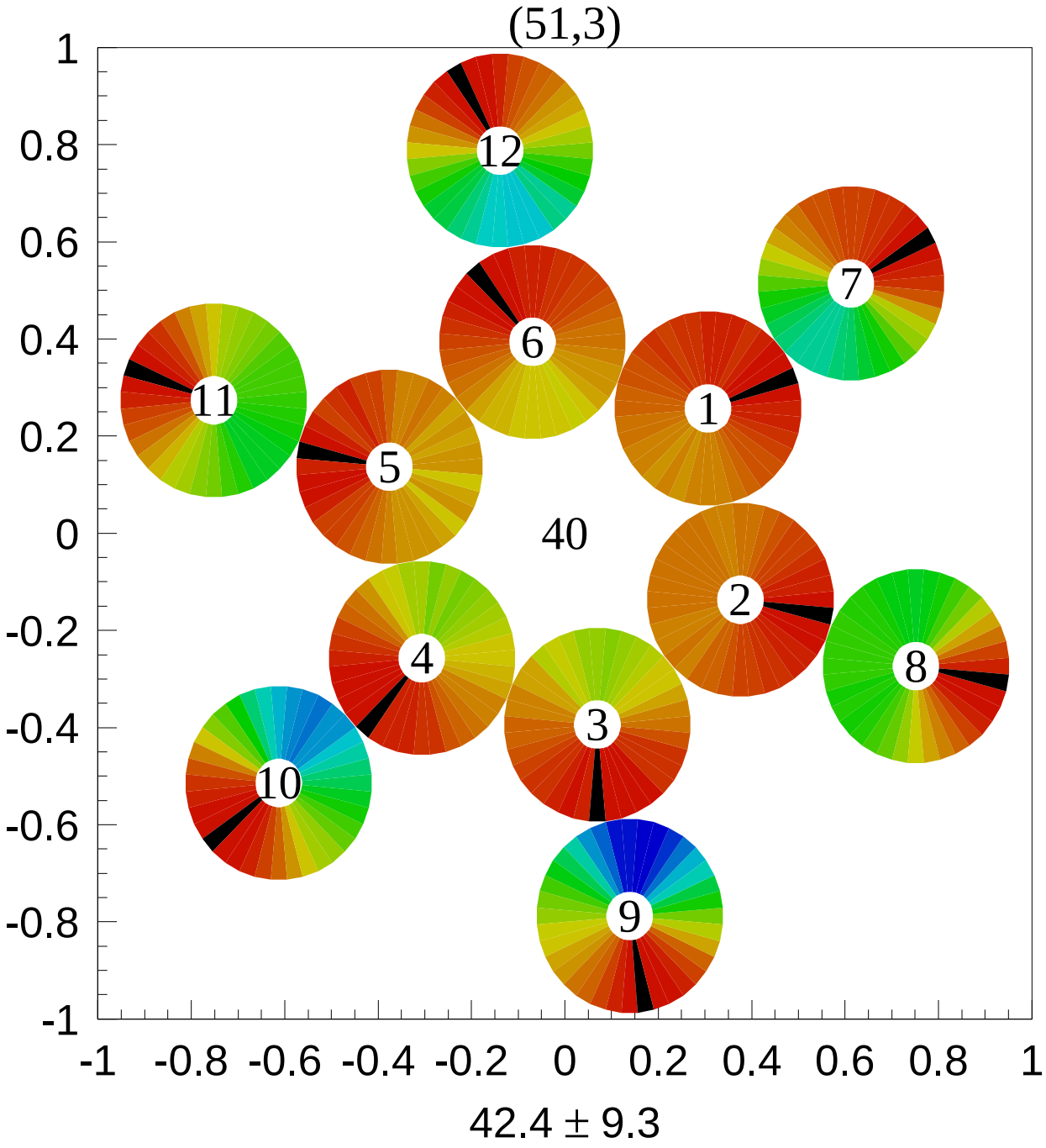

(50,28)
tilted LEDs
124 130 117 120 111 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 130 117 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

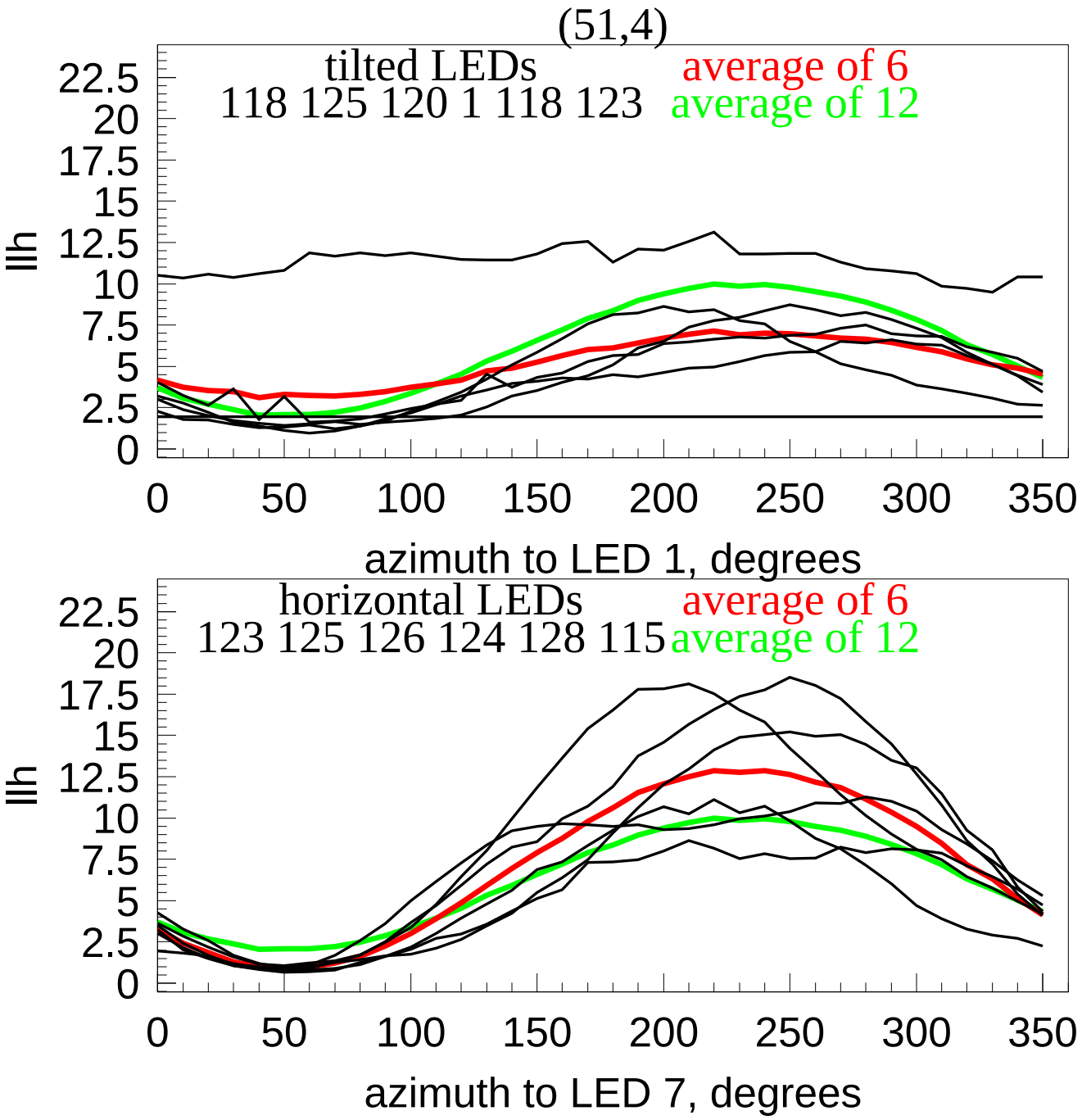

(50,28)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
130.7 ± 6.1

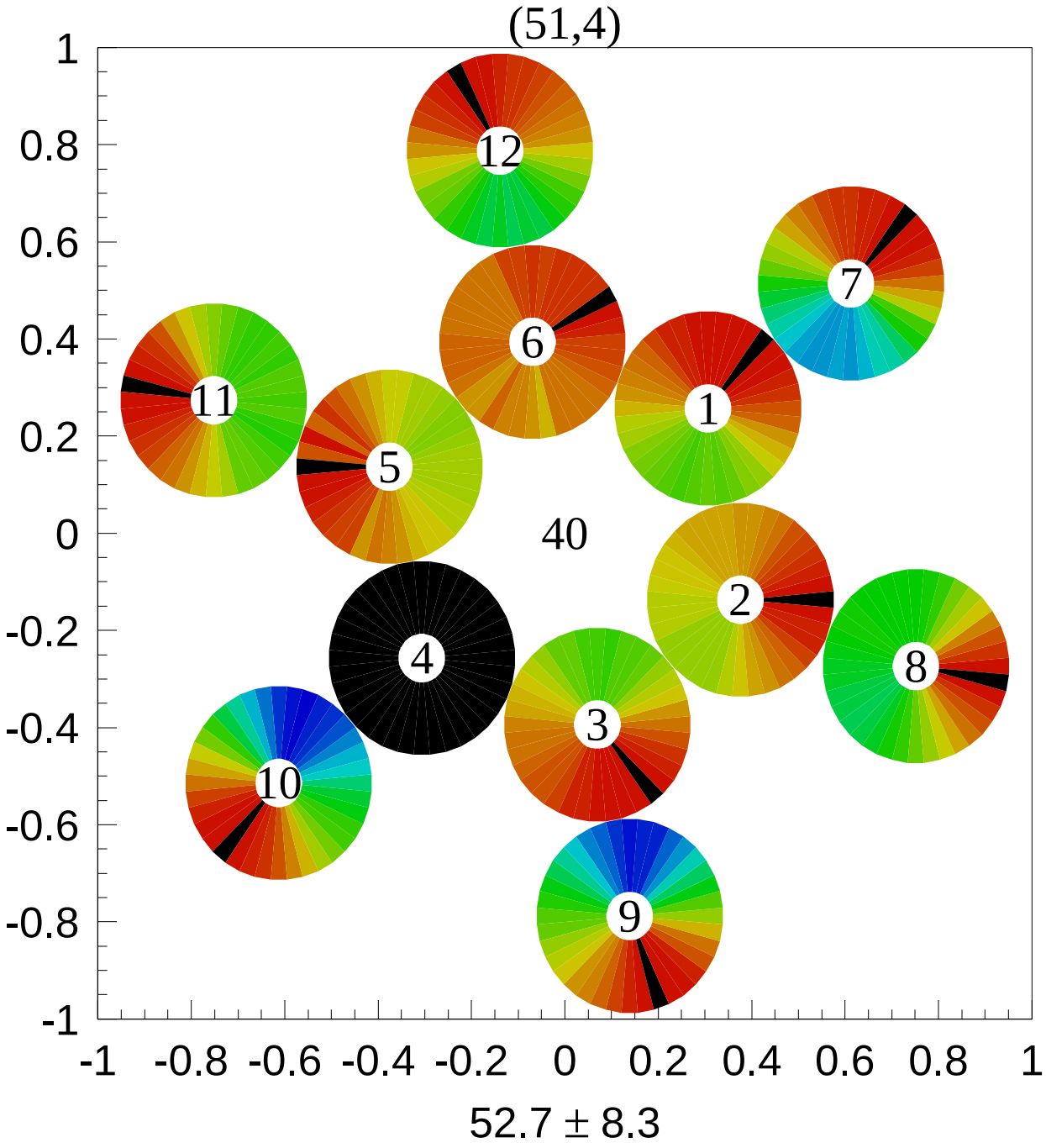

(51,2)
tilted LEDs
122 126 126 122 108 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 131 131 124 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

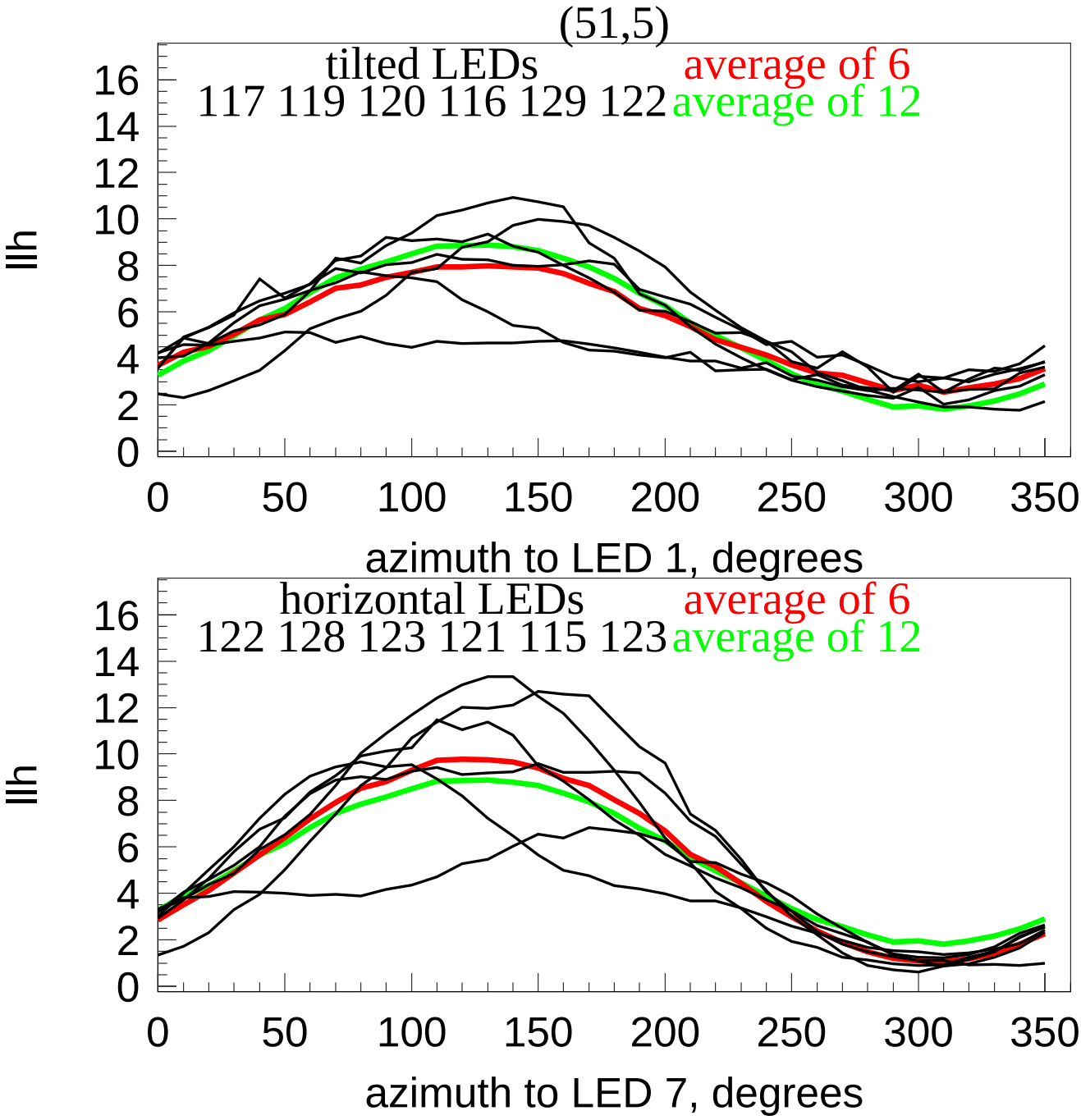

(51,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
115.8 ± 9.8

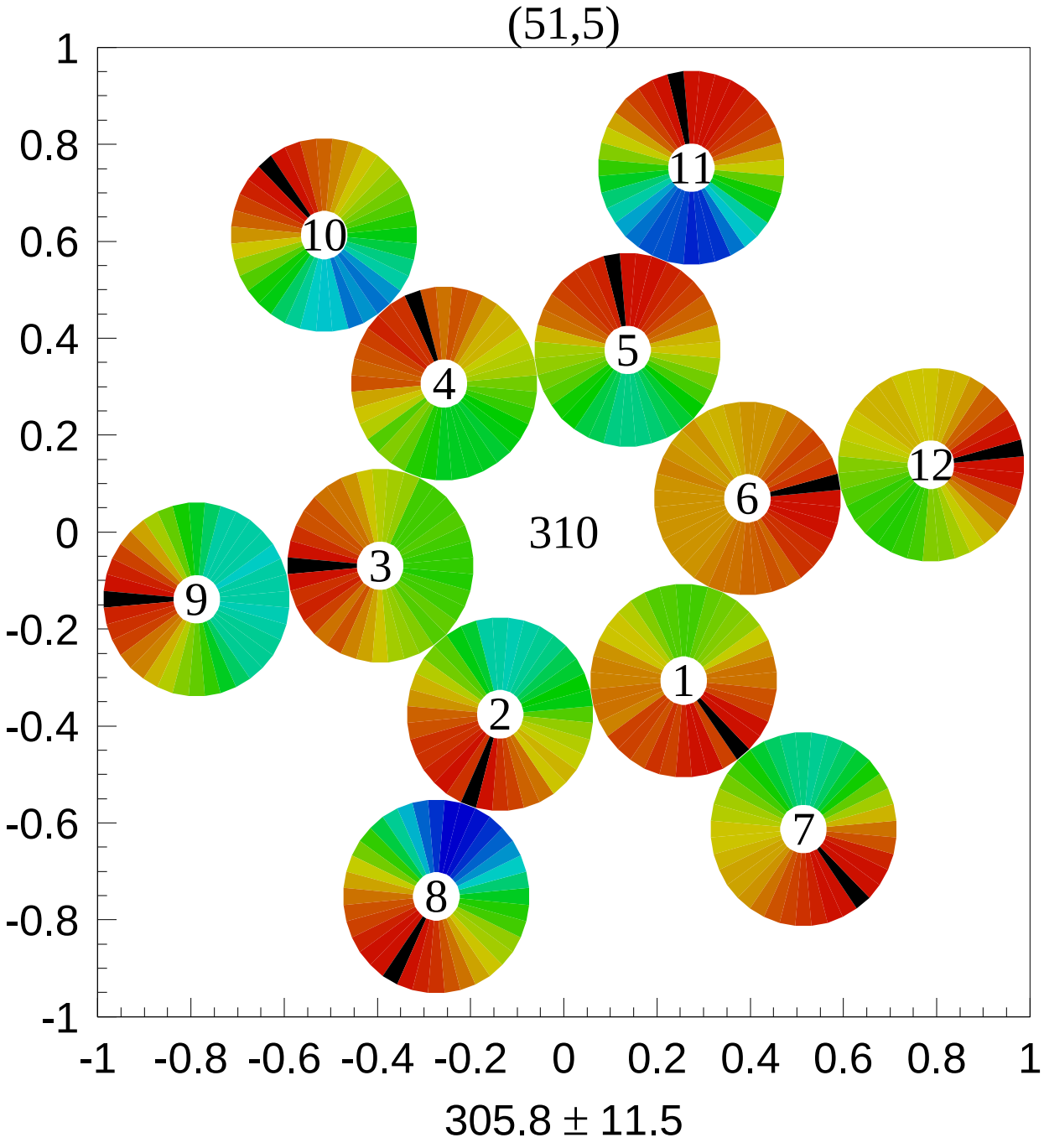

(51,3)
tilted LEDs
127 121 122 119 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 116 124 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

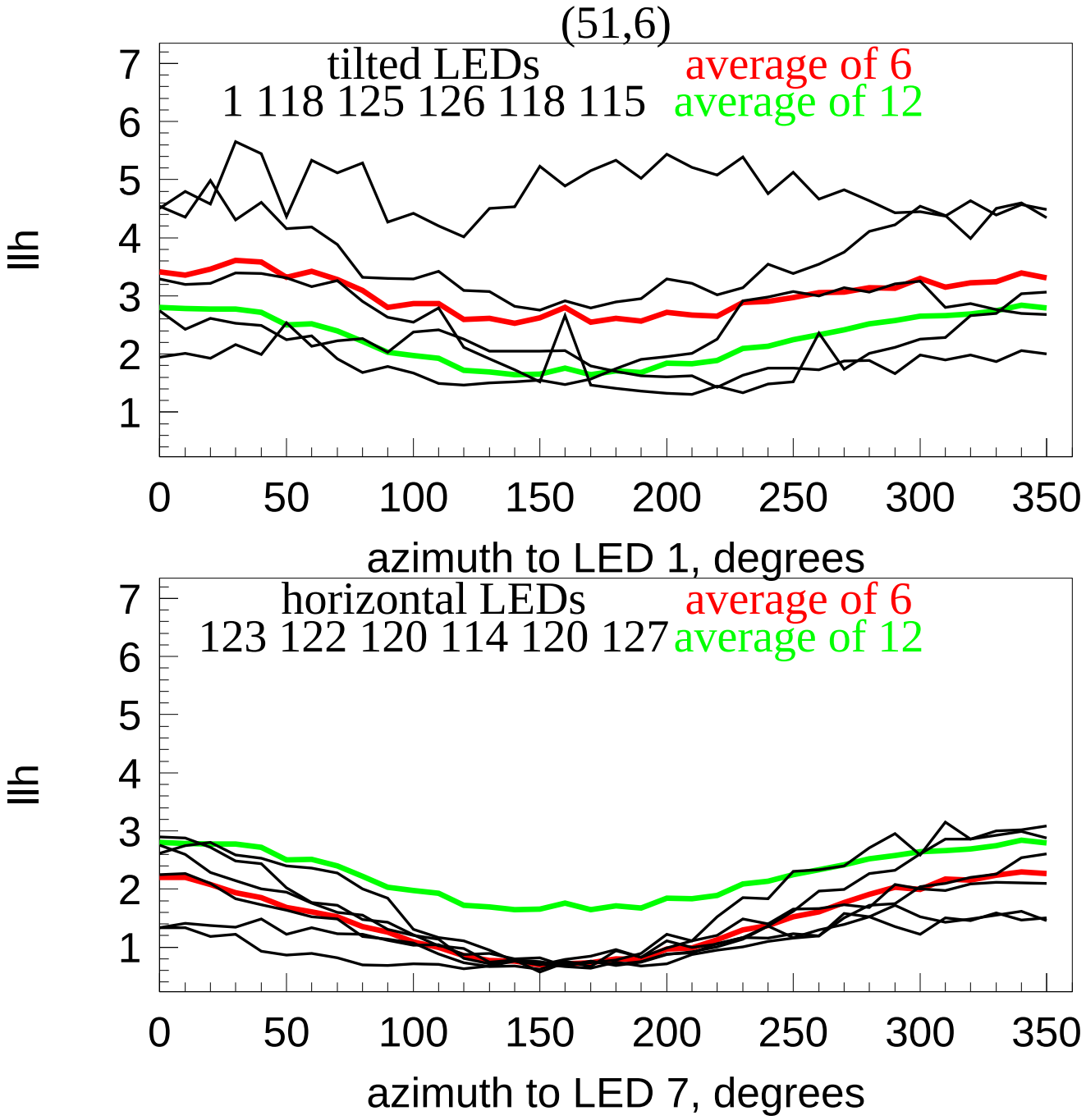

(51,3)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
42.4 ± 9.3

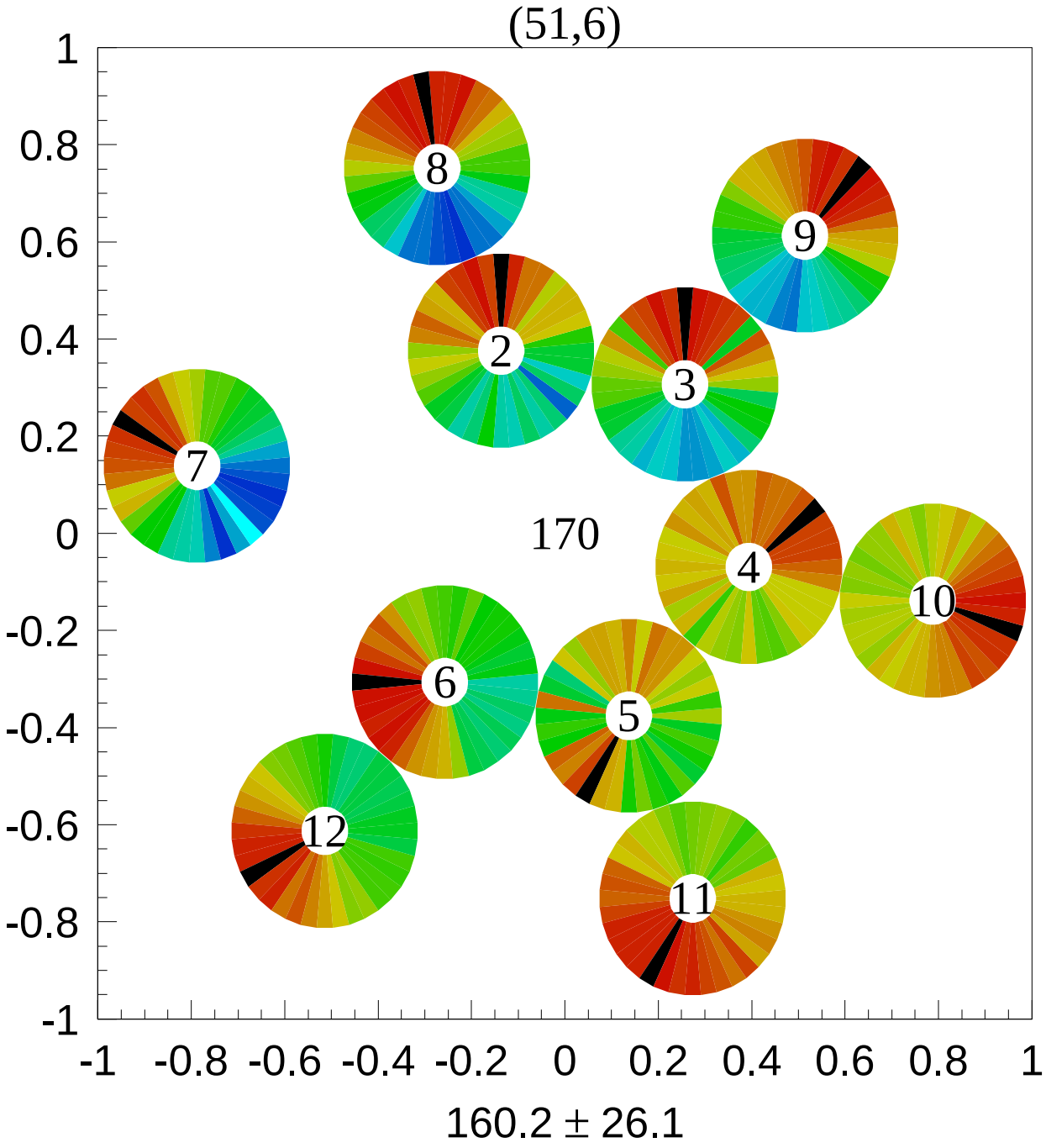

(51,4)
tilted LEDs
118 125 120 1 118 123
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 125 126 124 128 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

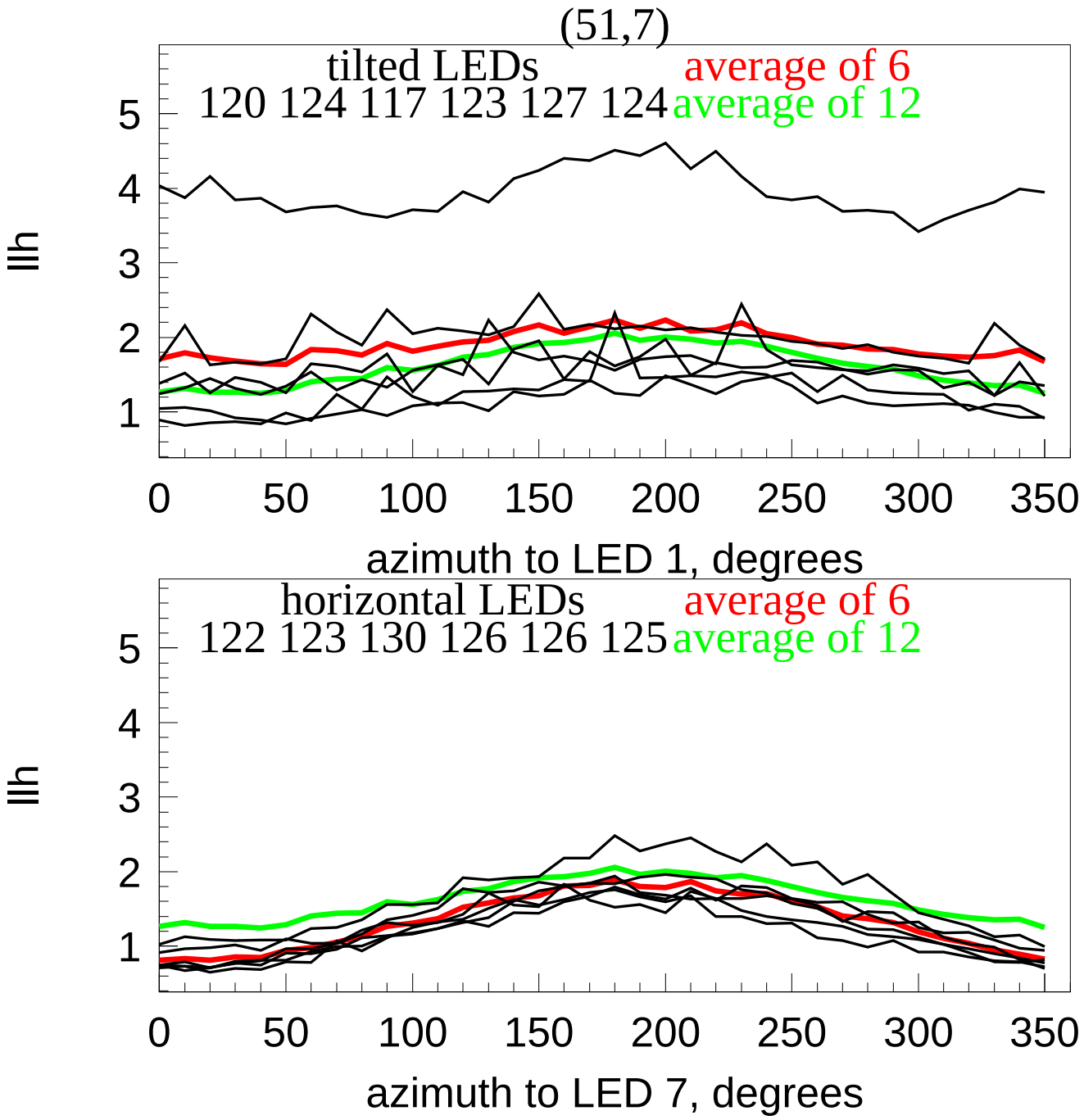

(51,4)
12
7
6
1
11
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
52.7 ± 8.3

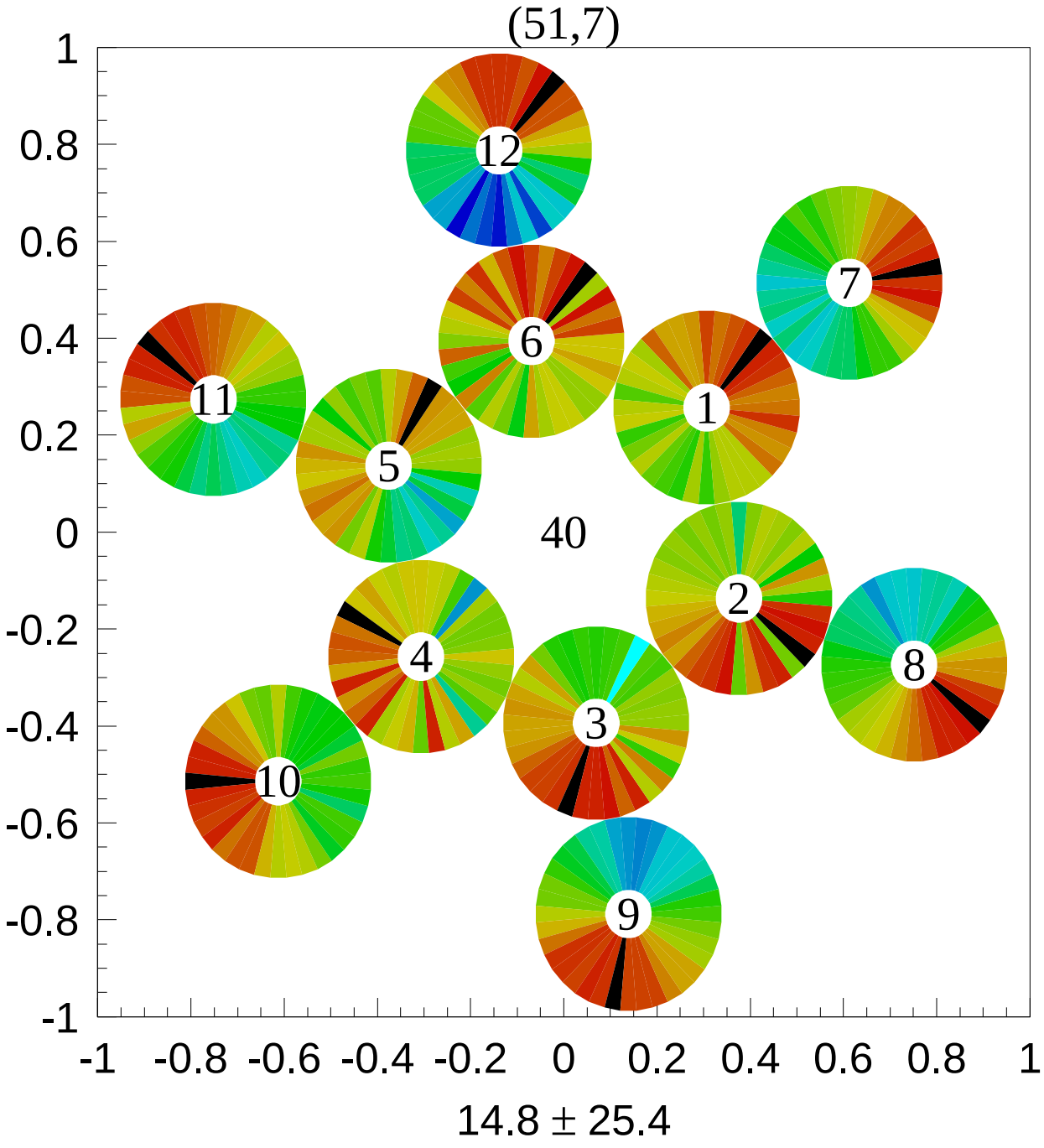

(51,5)
tilted LEDs
117 119 120 116 129 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 128 123 121 115 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

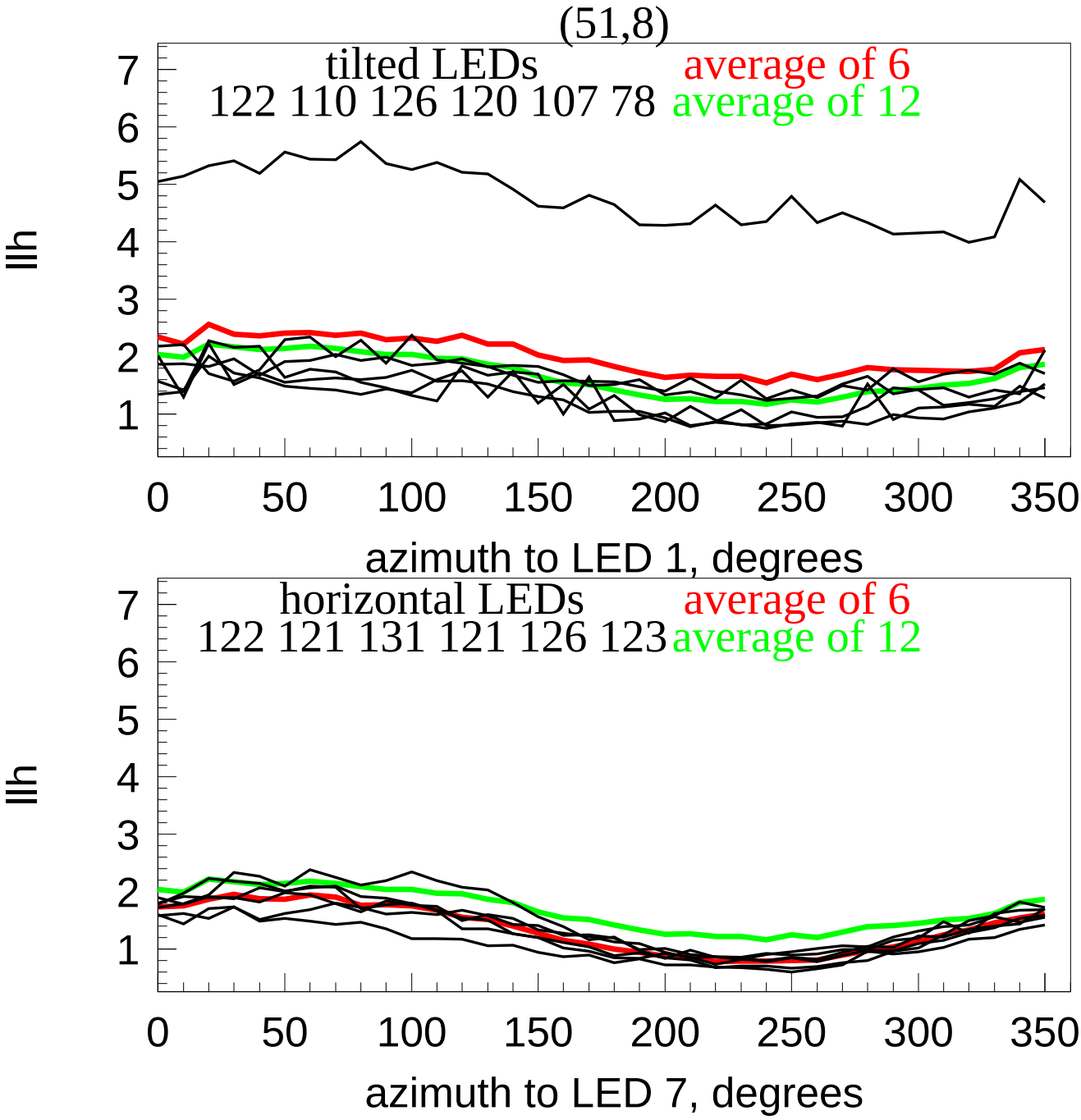

(51,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
305.8 ± 11.5
310
1
2
3
4
5
6
7
8
9
10
11
12

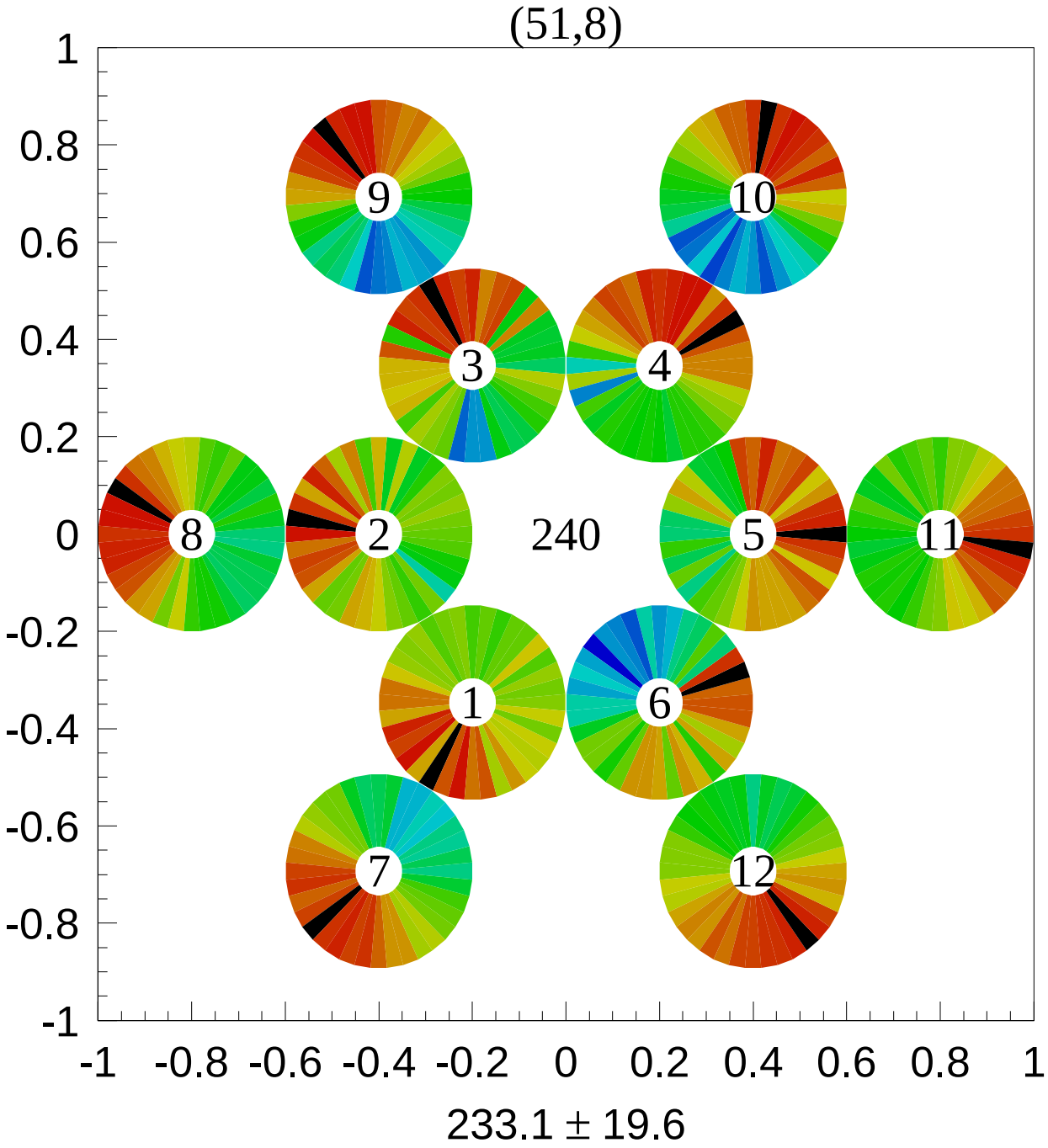

(51,6)
tilted LEDs
1 118 125 126 118 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 120 114 120 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

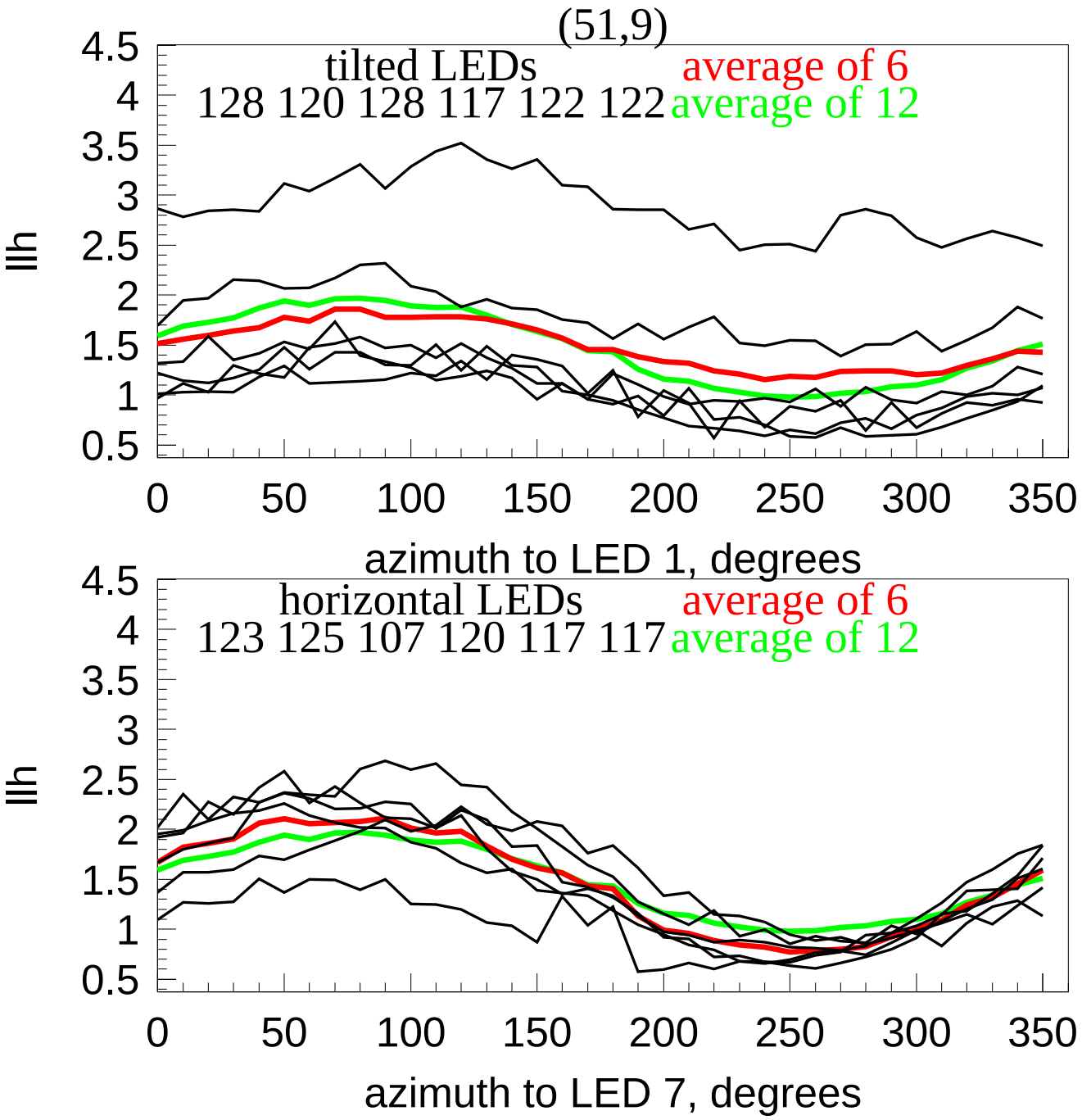

(51,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
160.2 ± 26.1
8
9
2
3
7
170
4
10
6
5
12
11

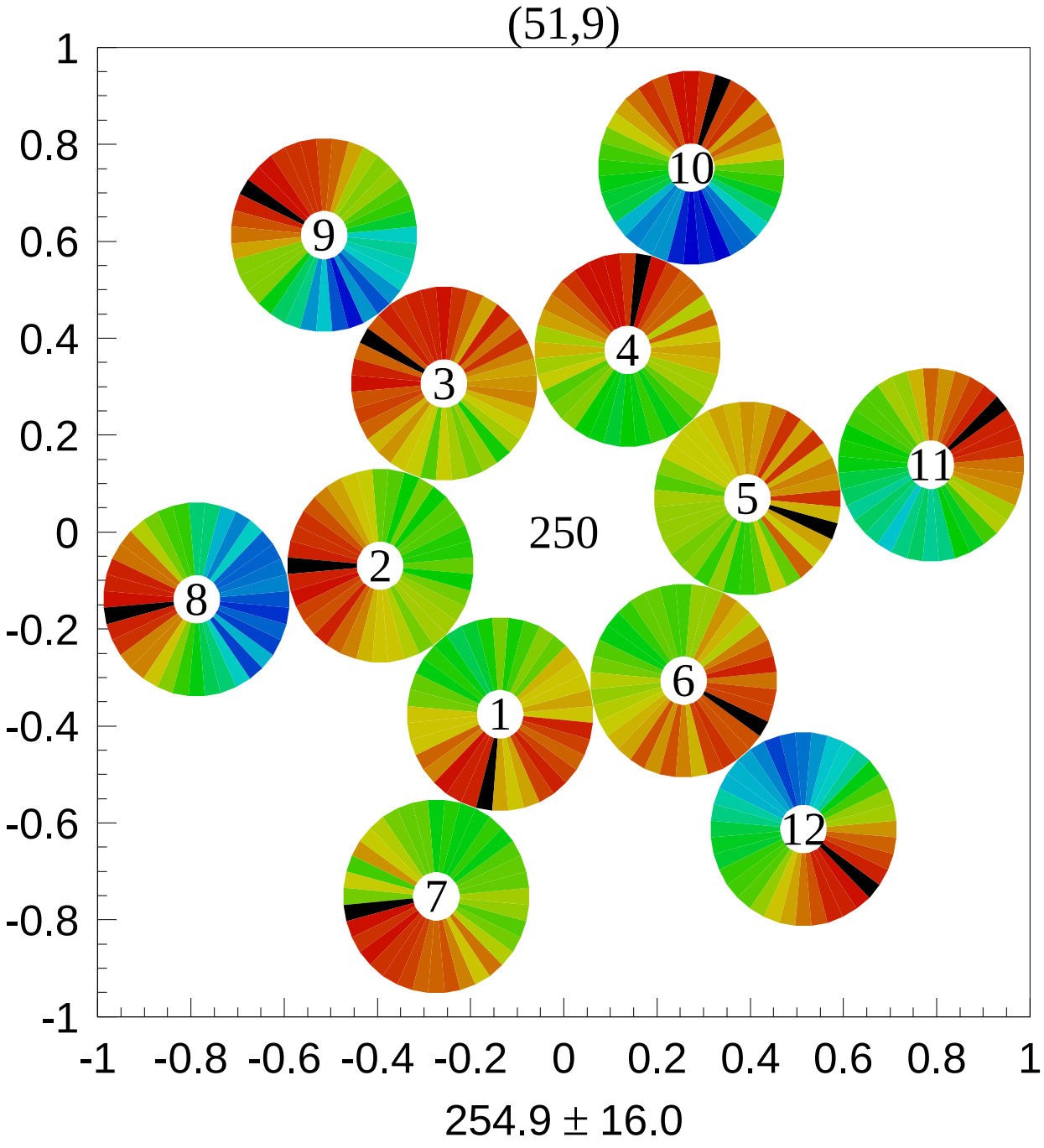

(51,7)
tilted LEDs
120 124 117 123 127 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 130 126 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

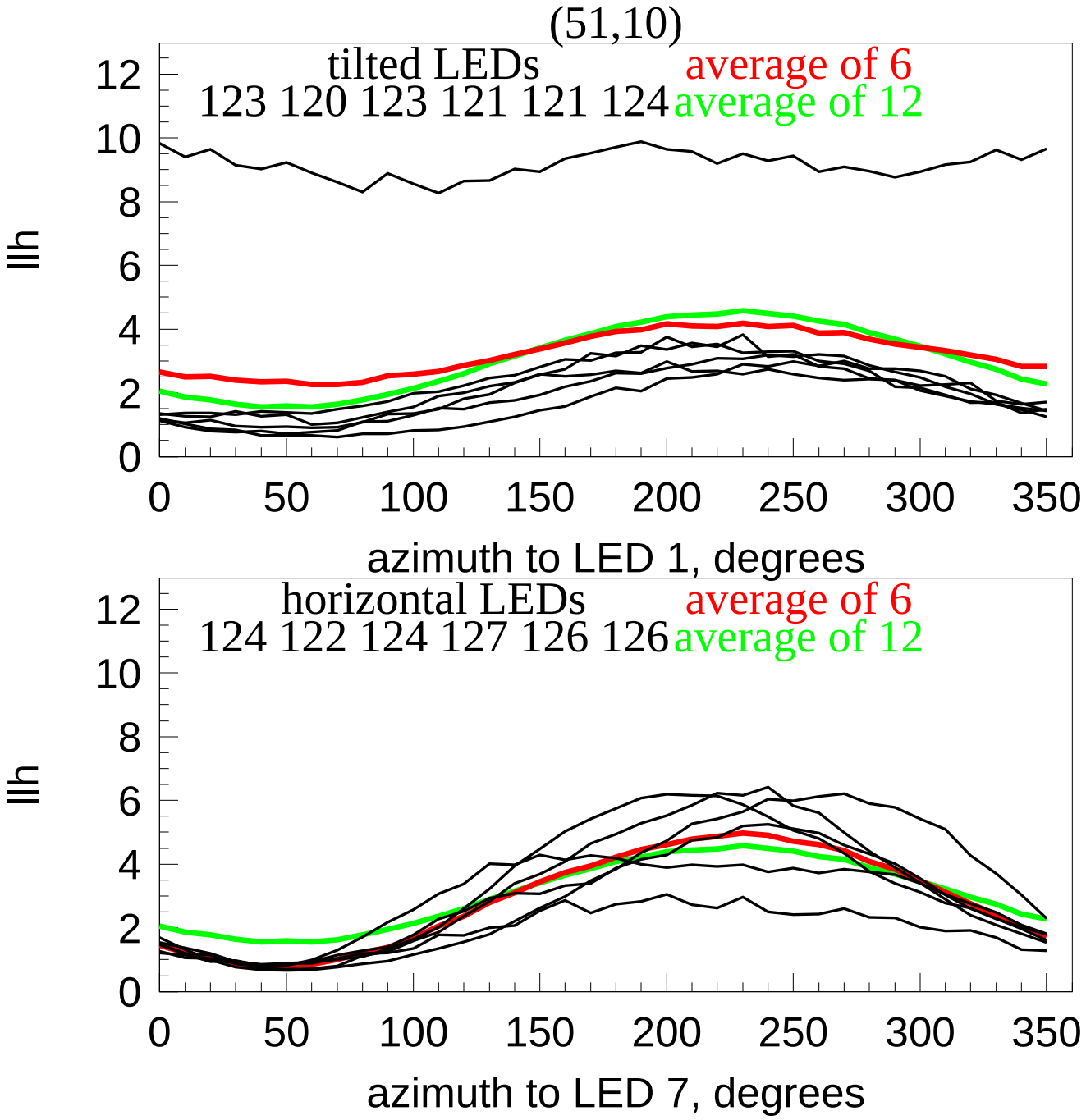

(51,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
14.8 ± 25.4
12
7
6
11
1
5
40
2
8
4
3
10
9

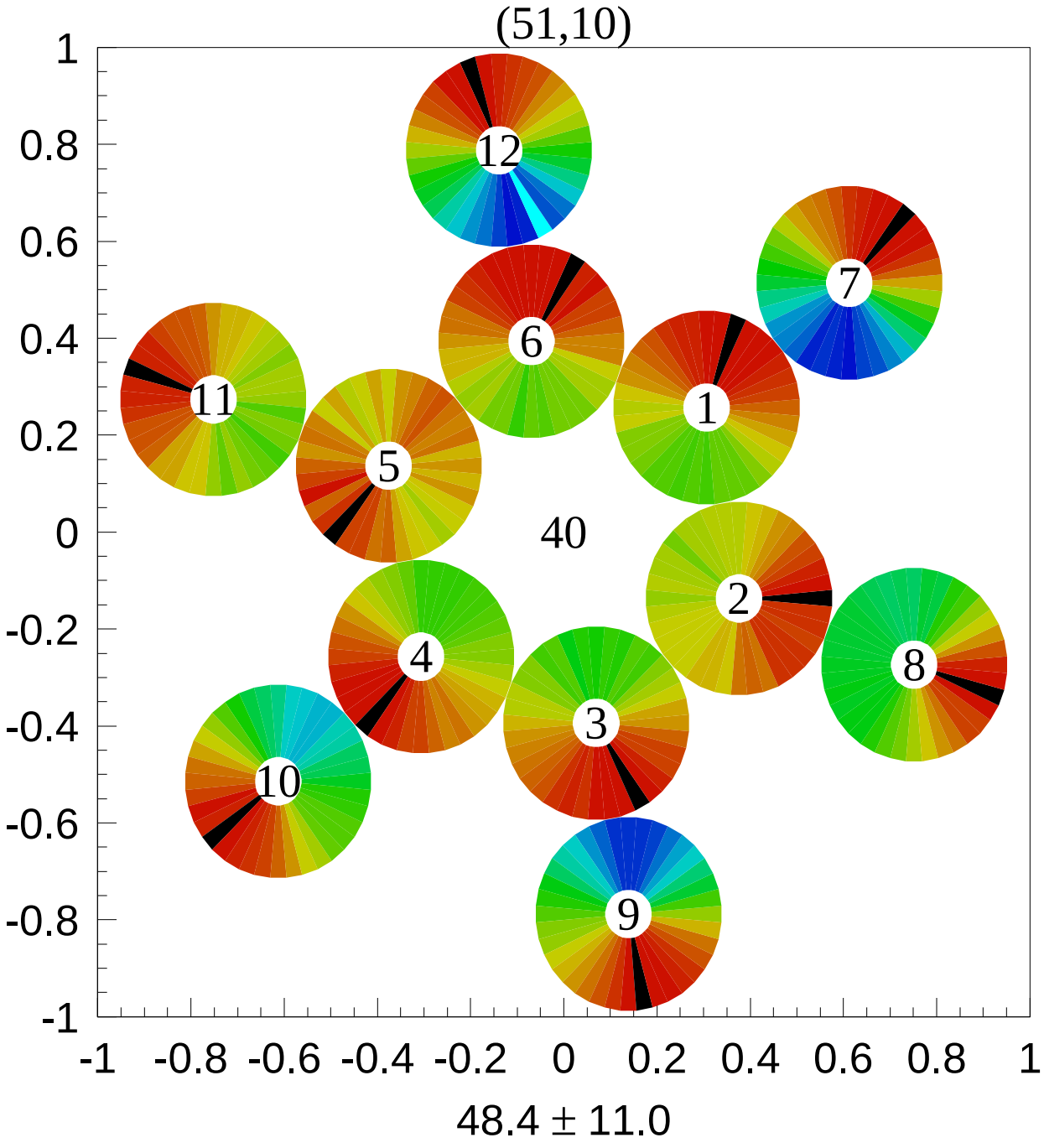

(51,8)
tilted LEDs
122 110 126 120 107 78
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 131 121 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

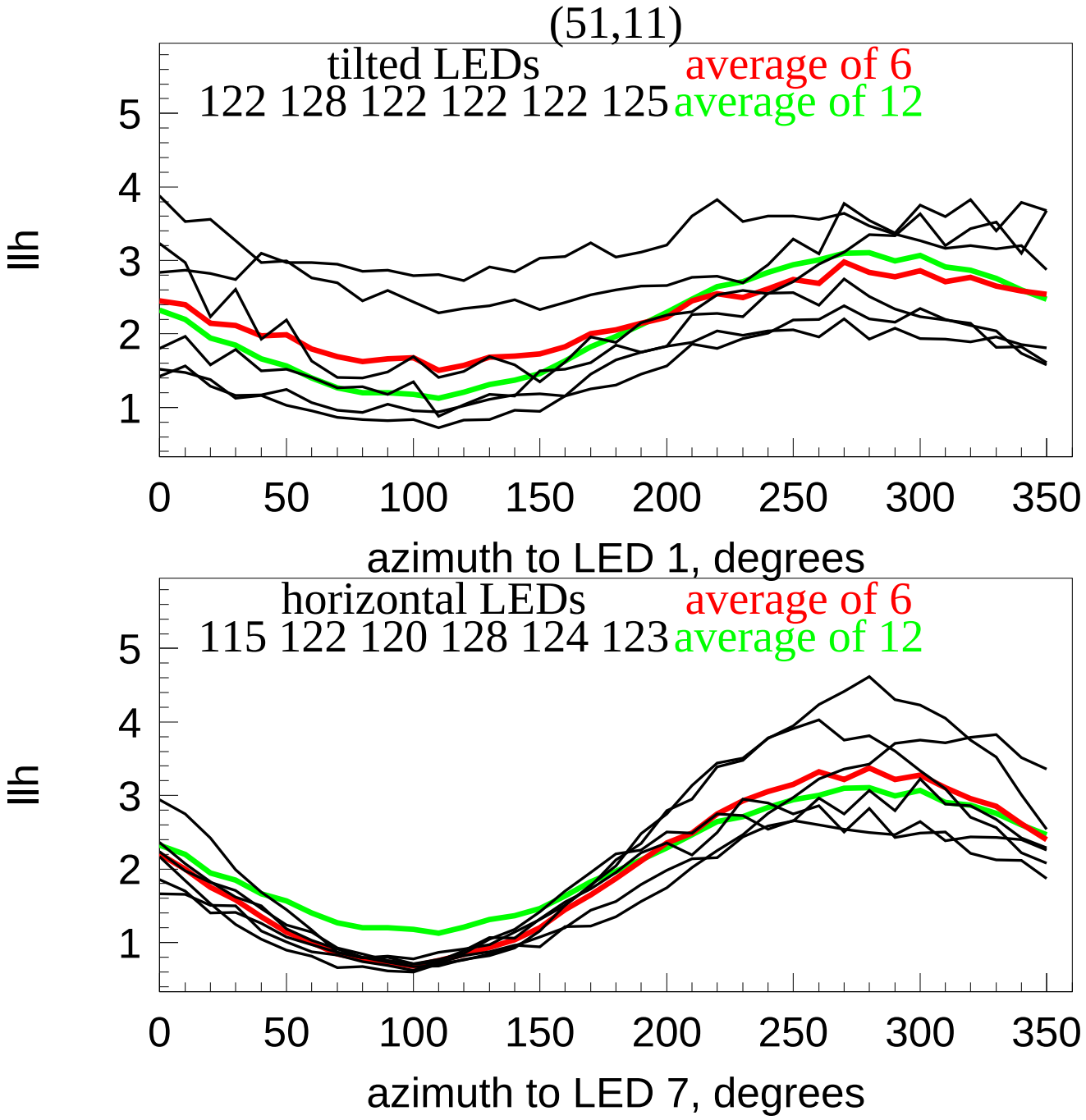

(51,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
233.1 ± 19.6

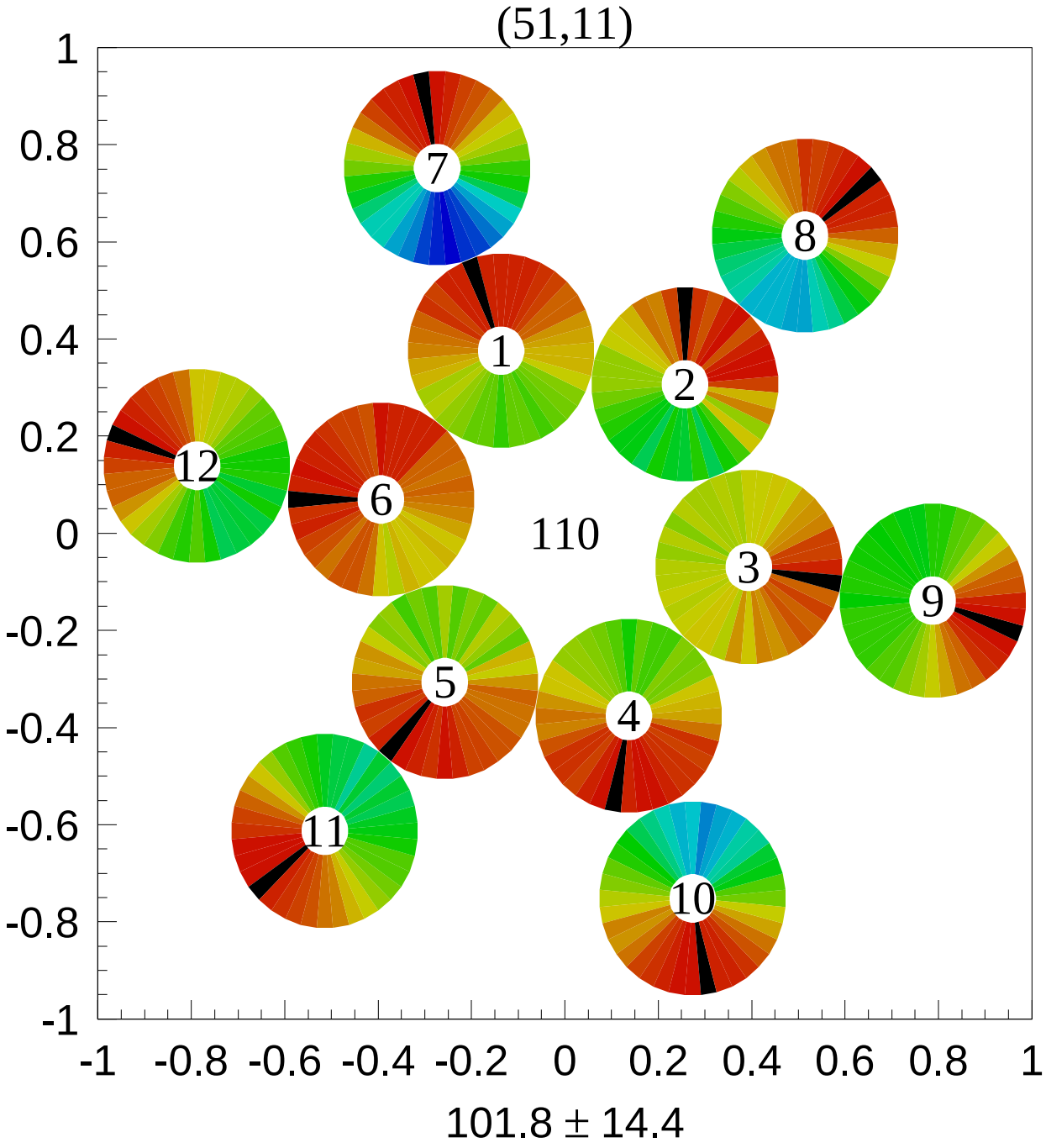

(51,9)
tilted LEDs
128 120 128 117 122 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 107 120 117 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

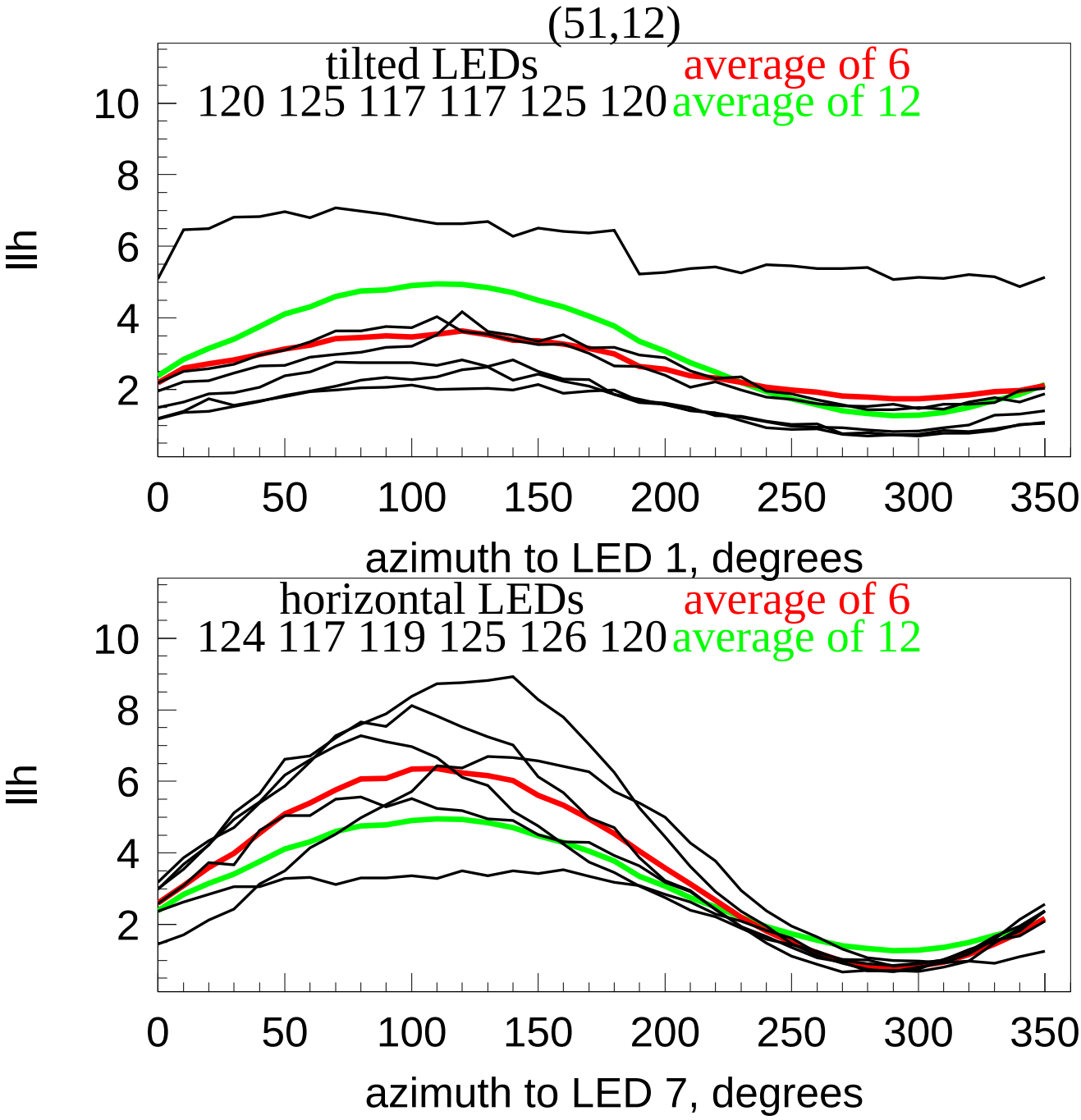

(51,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
254.9 ± 16.0
250
1
2
3
4
5
6
7
8
9
10
11
12

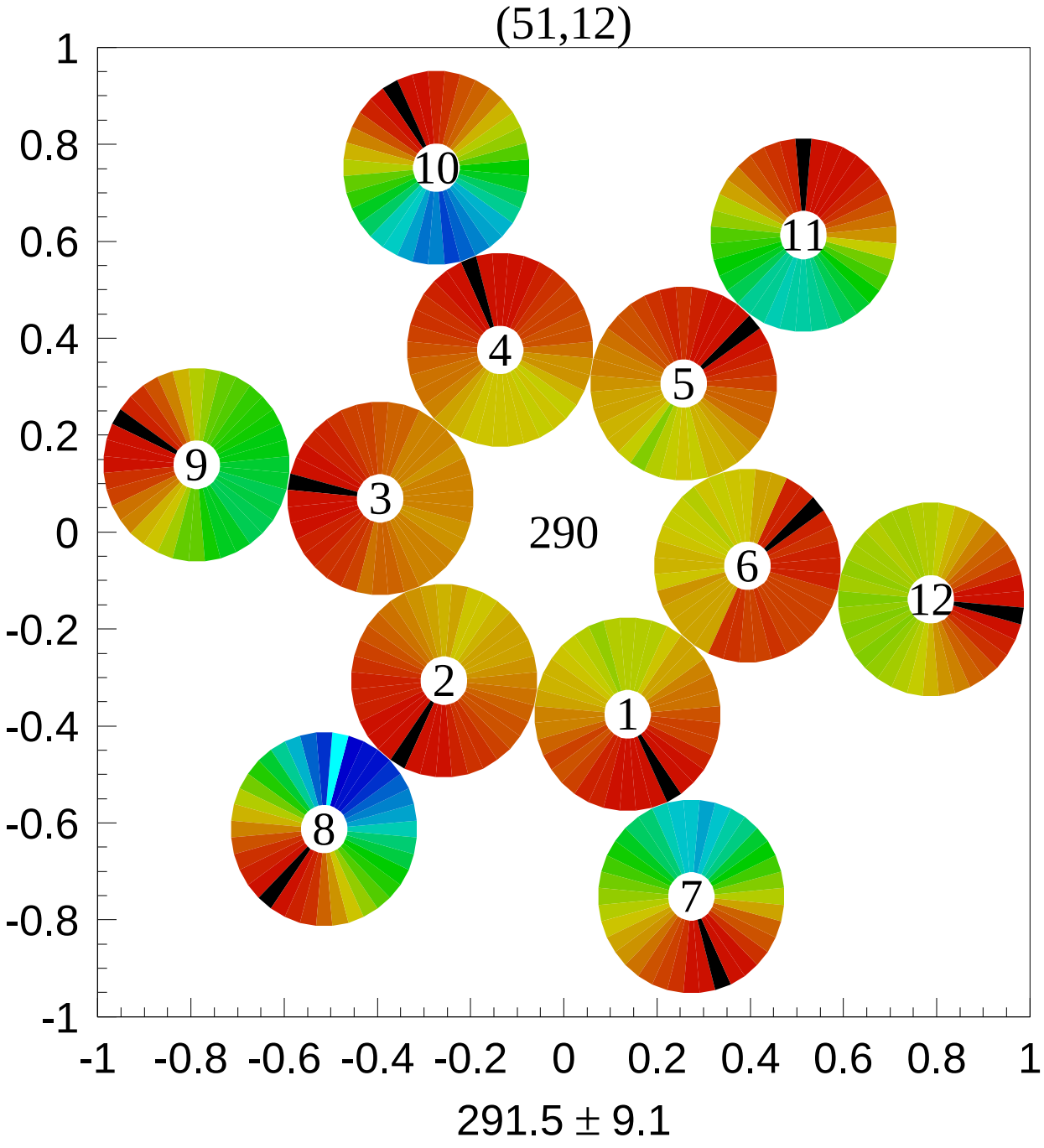

(51,10)
tilted LEDs
123 120 123 121 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 124 127 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

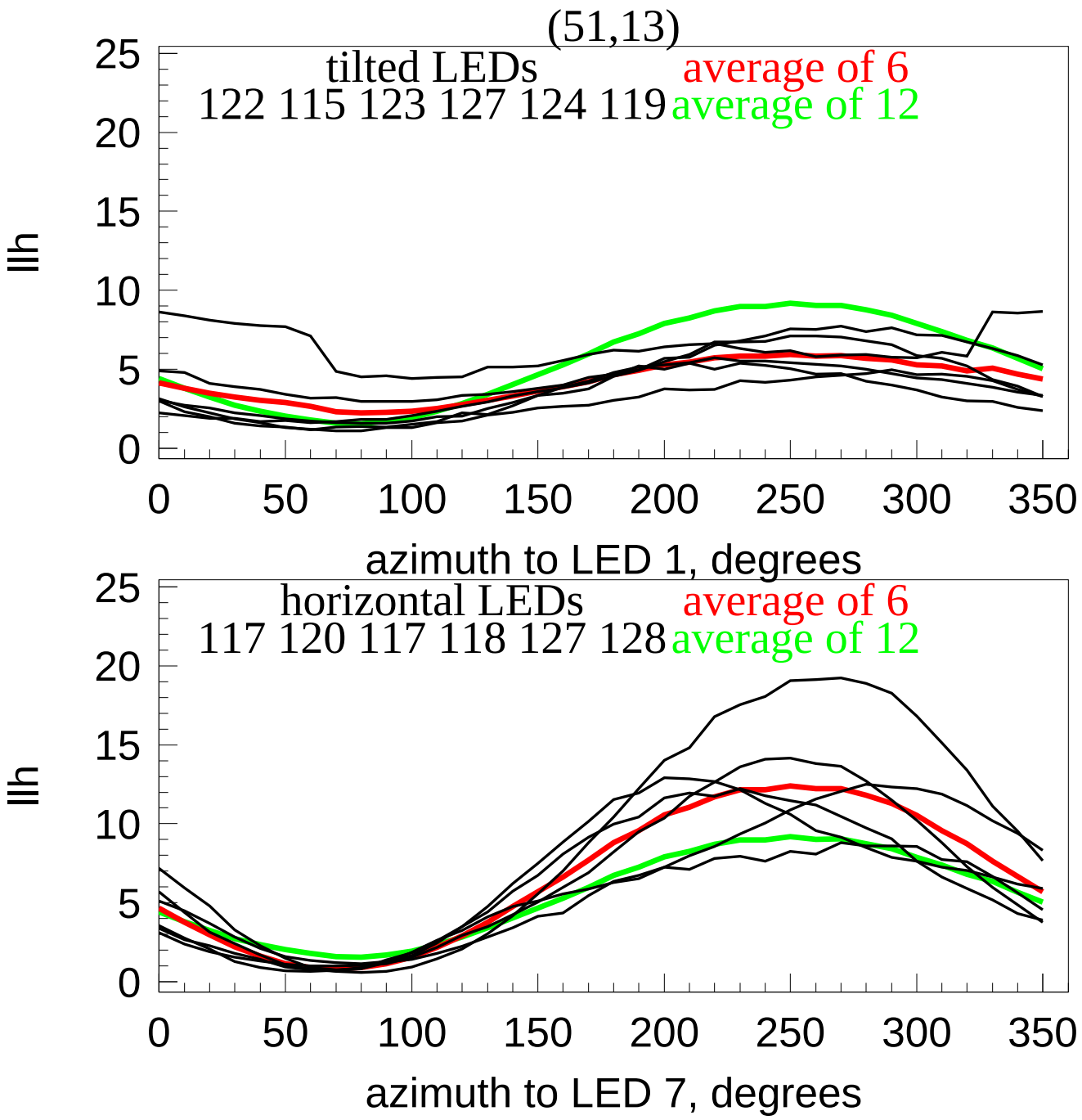

(51,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
4
8
3
10
9
48.4 ± 11.0

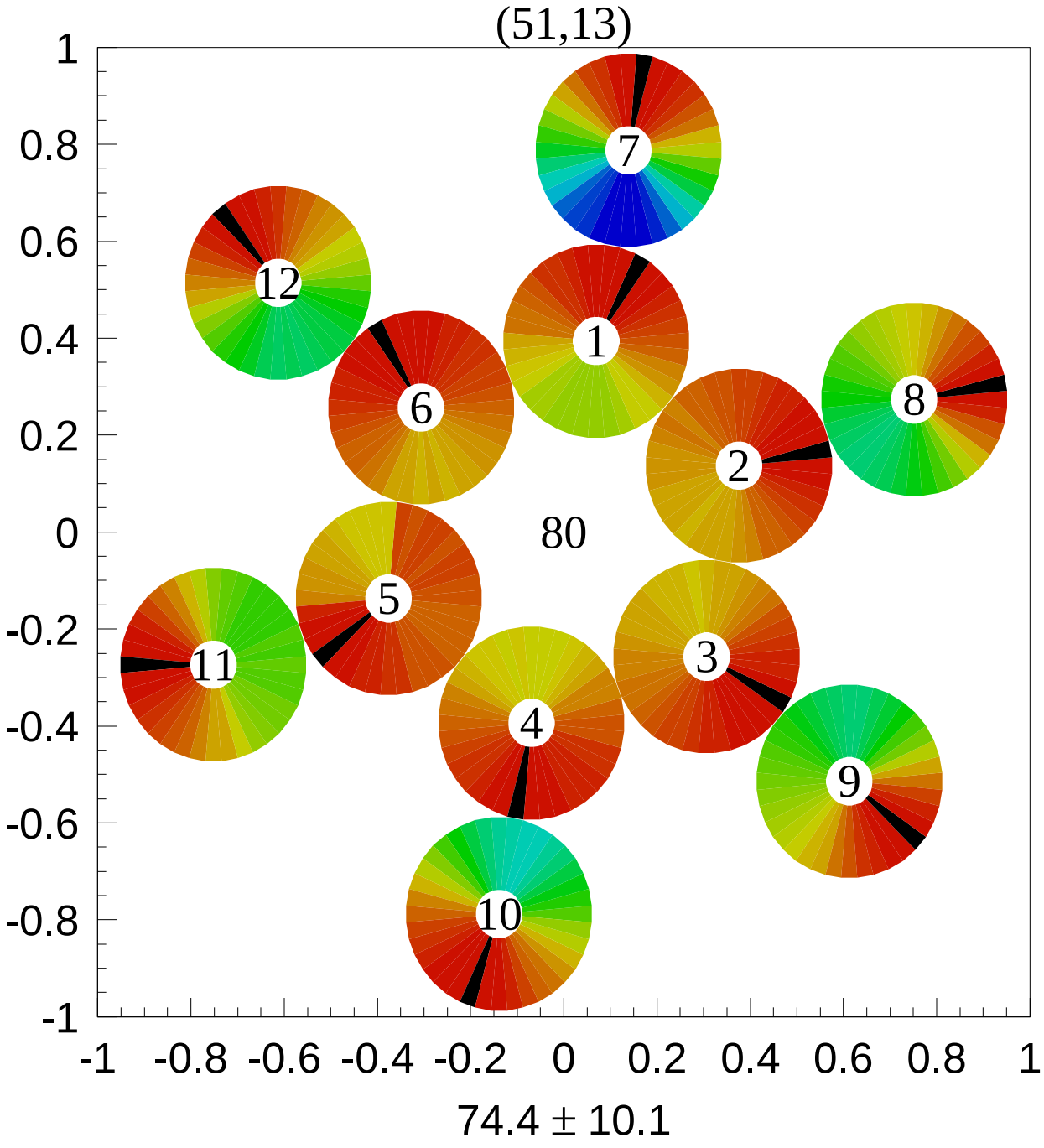

(51,11)
tilted LEDs
122 128 122 122 122 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 122 120 128 124 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

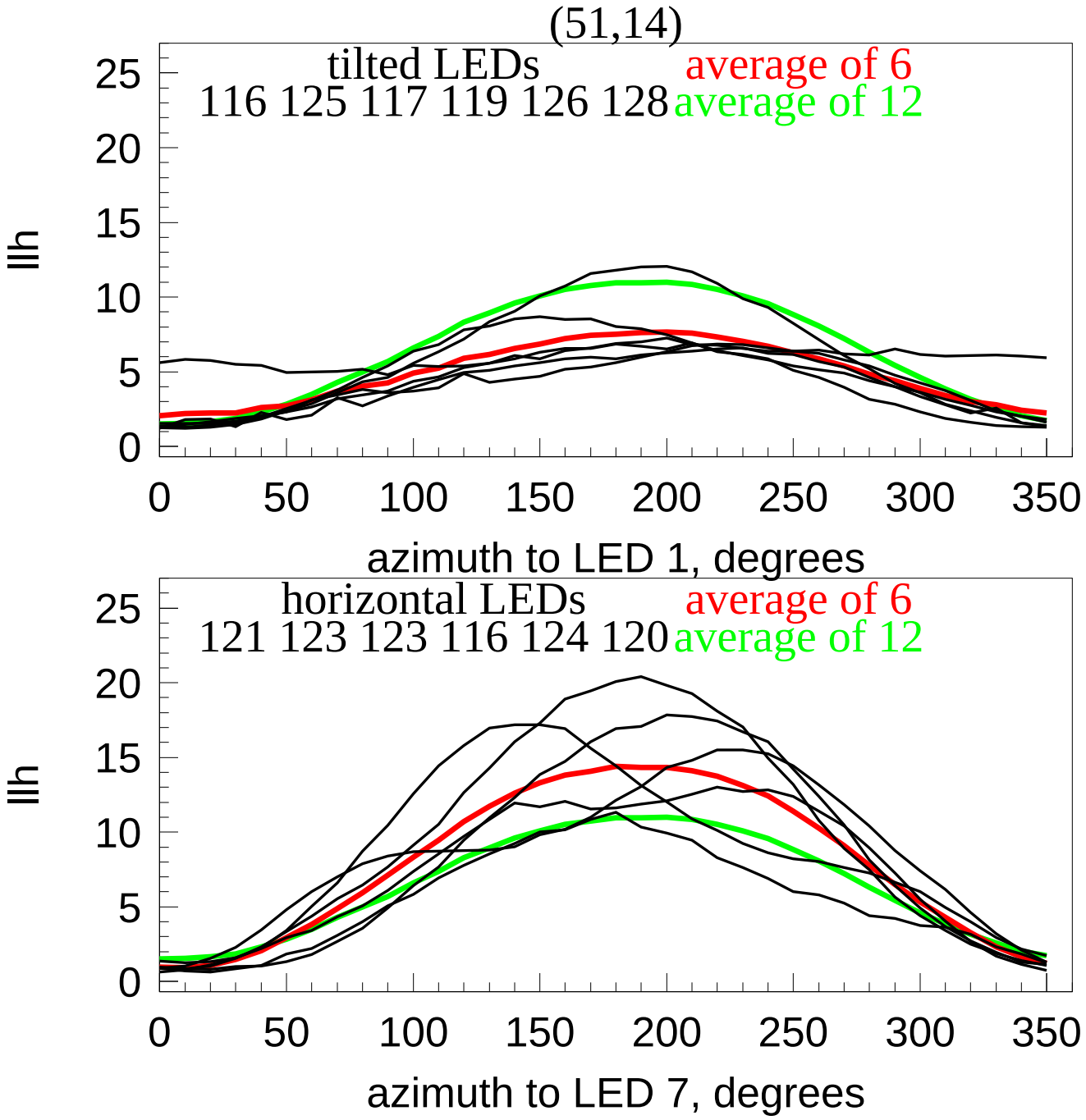

(51,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
101.8 ± 14.4

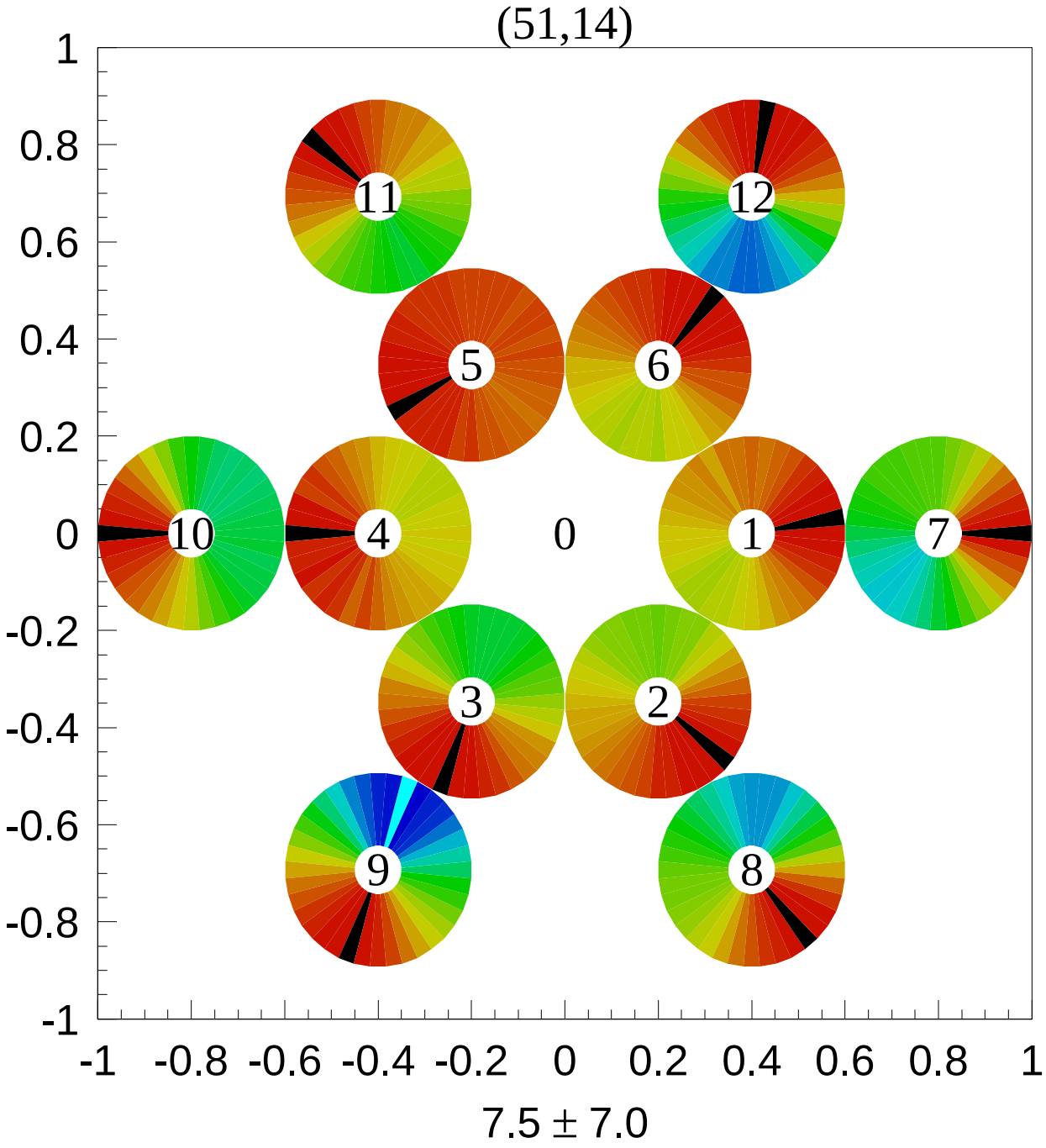

(51,12)
tilted LEDs
120 125 117 117 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 117 119 125 126 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

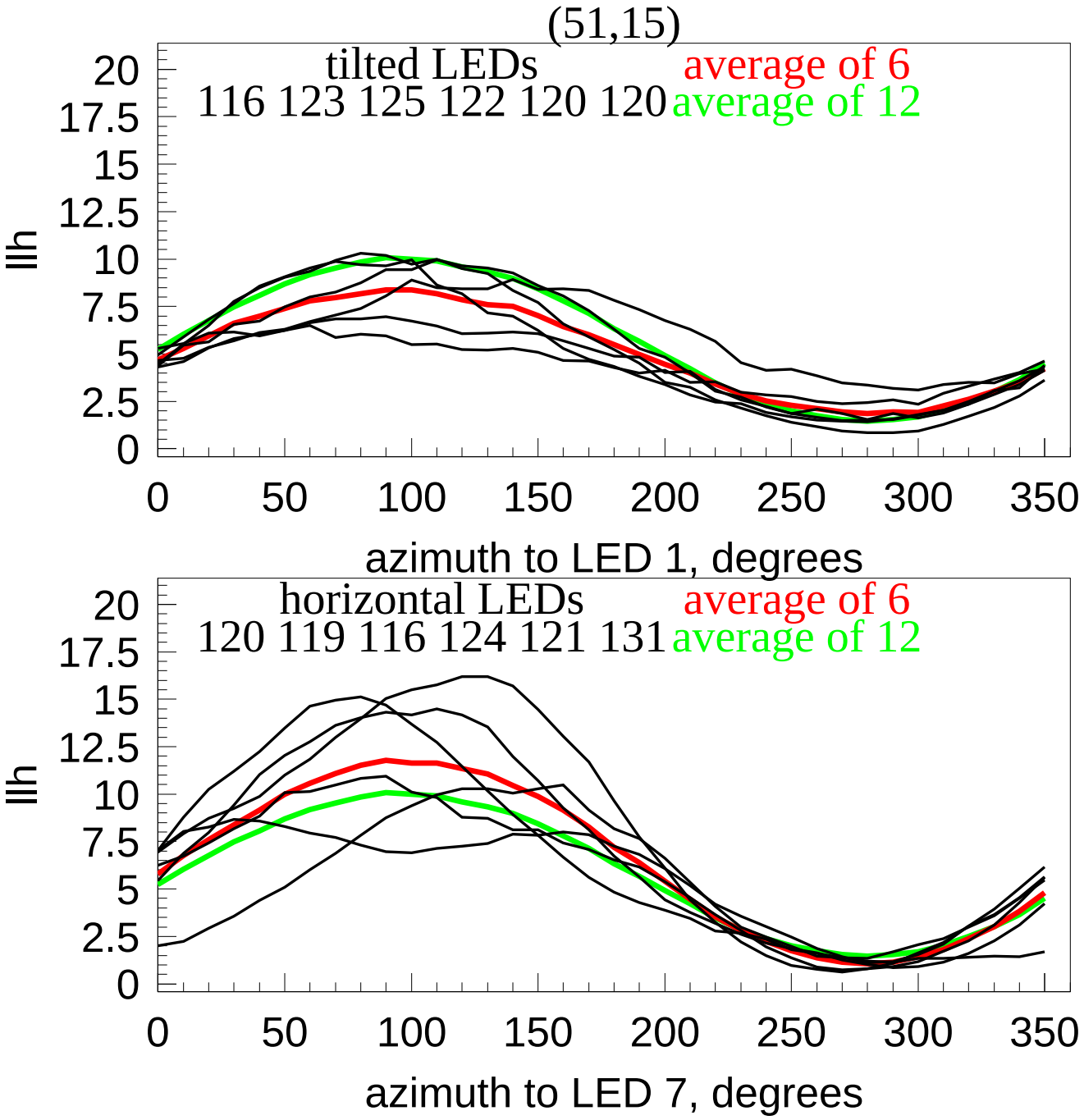

(51,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
291.5 ± 9.1

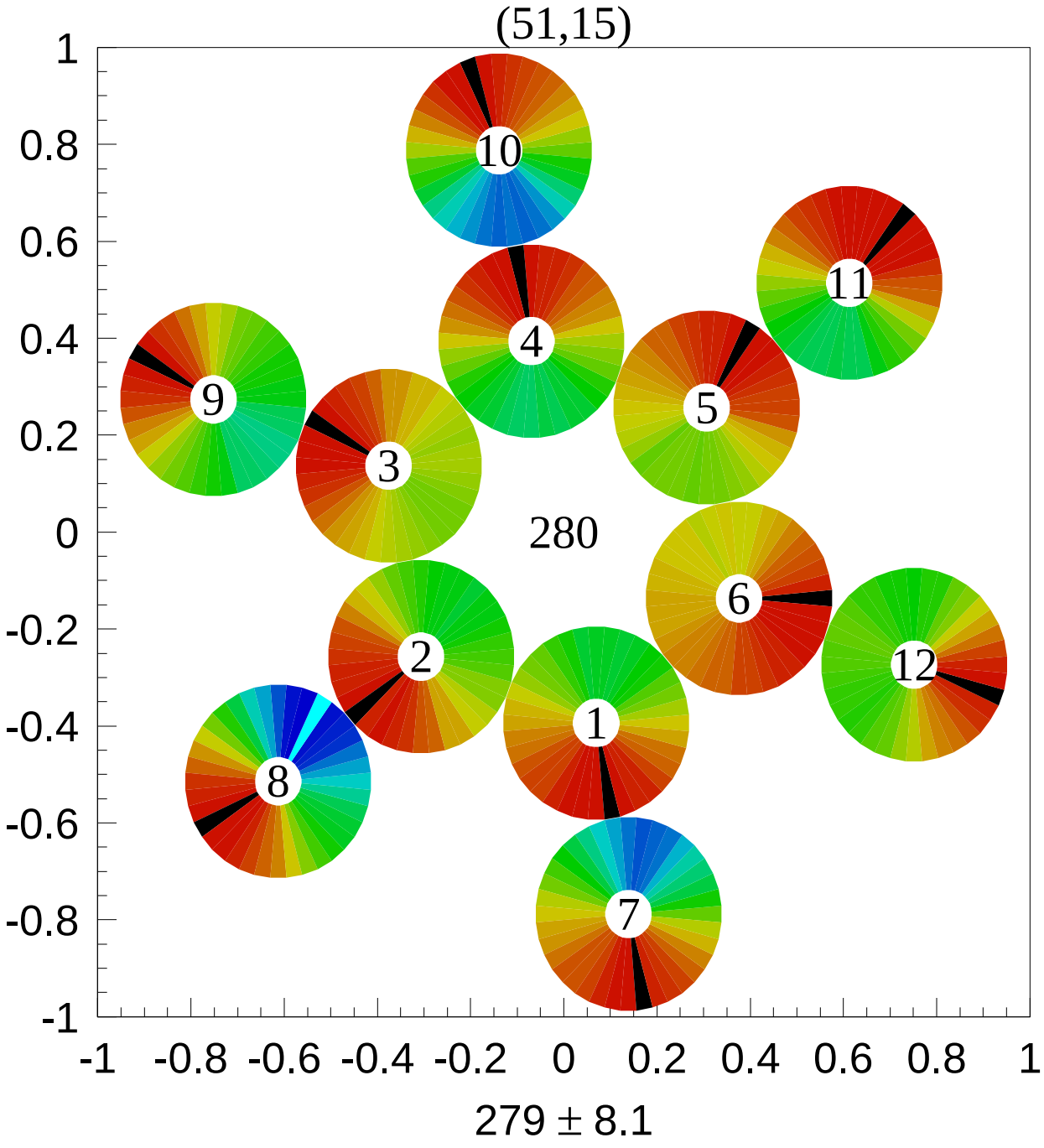

(51,13)
tilted LEDs
122 115 123 127 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 120 117 118 127 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

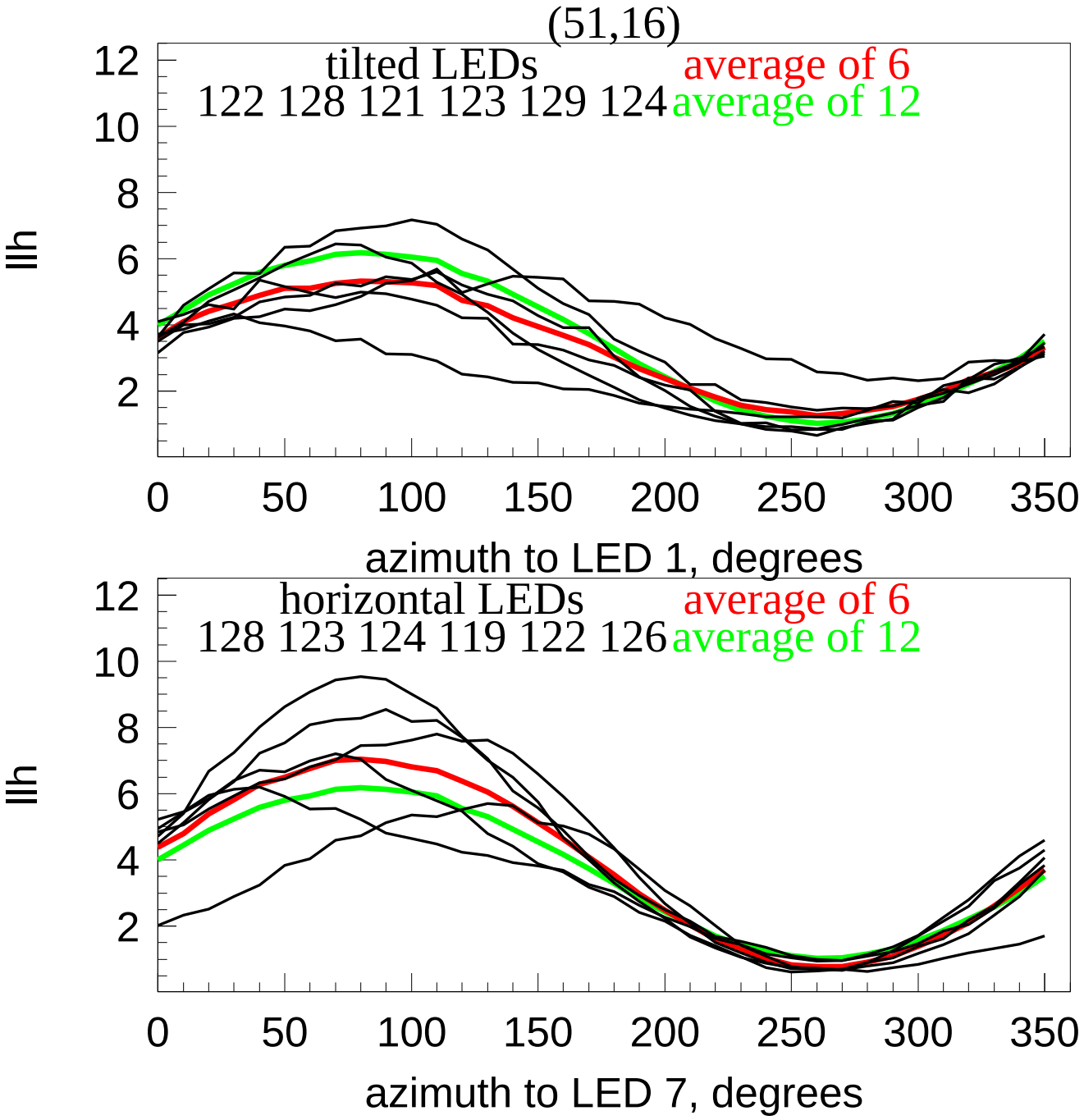

(51,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
74.4 ± 10.1

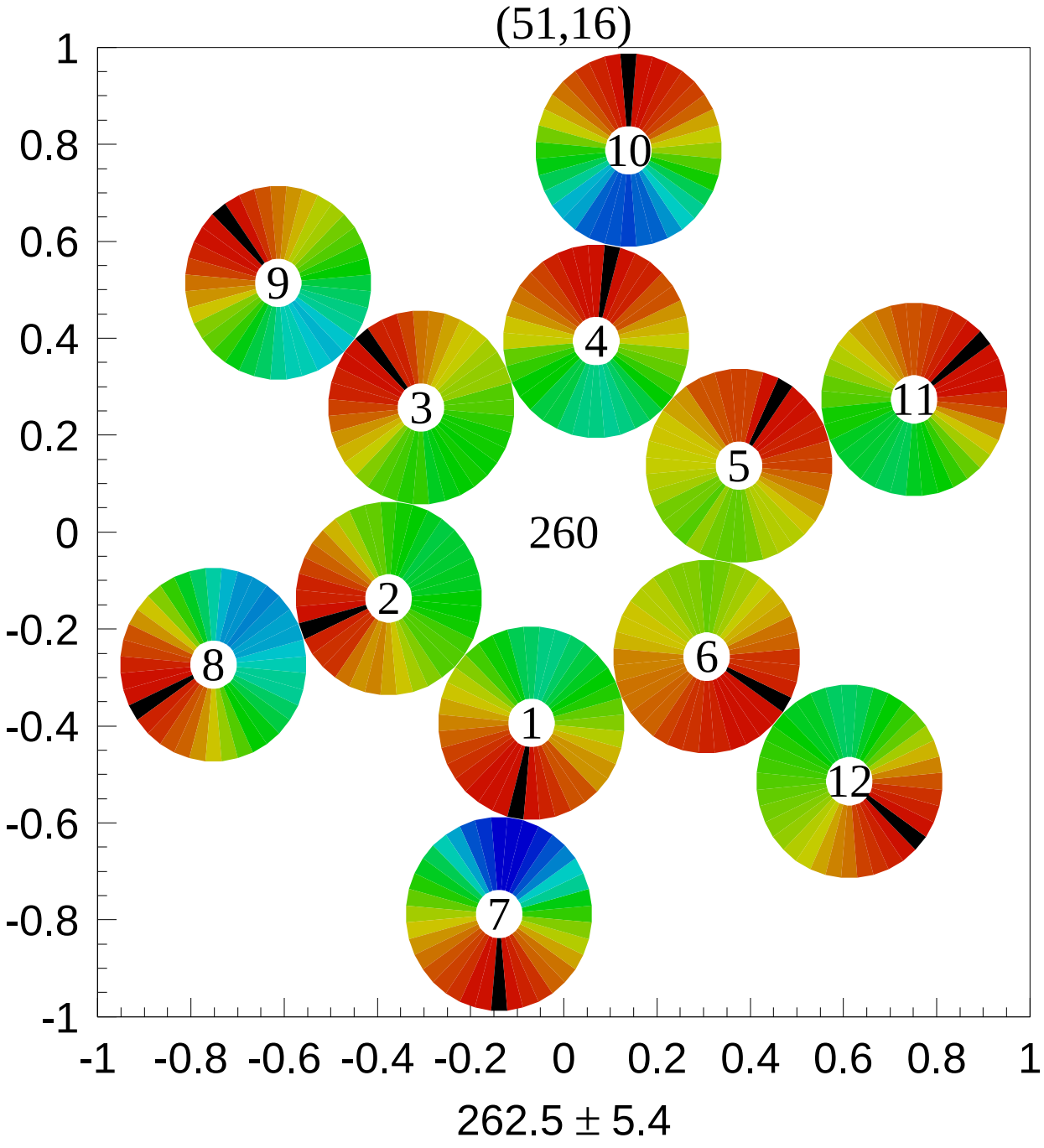

(51,14)
tilted LEDs
116 125 117 119 126 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 123 116 124 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

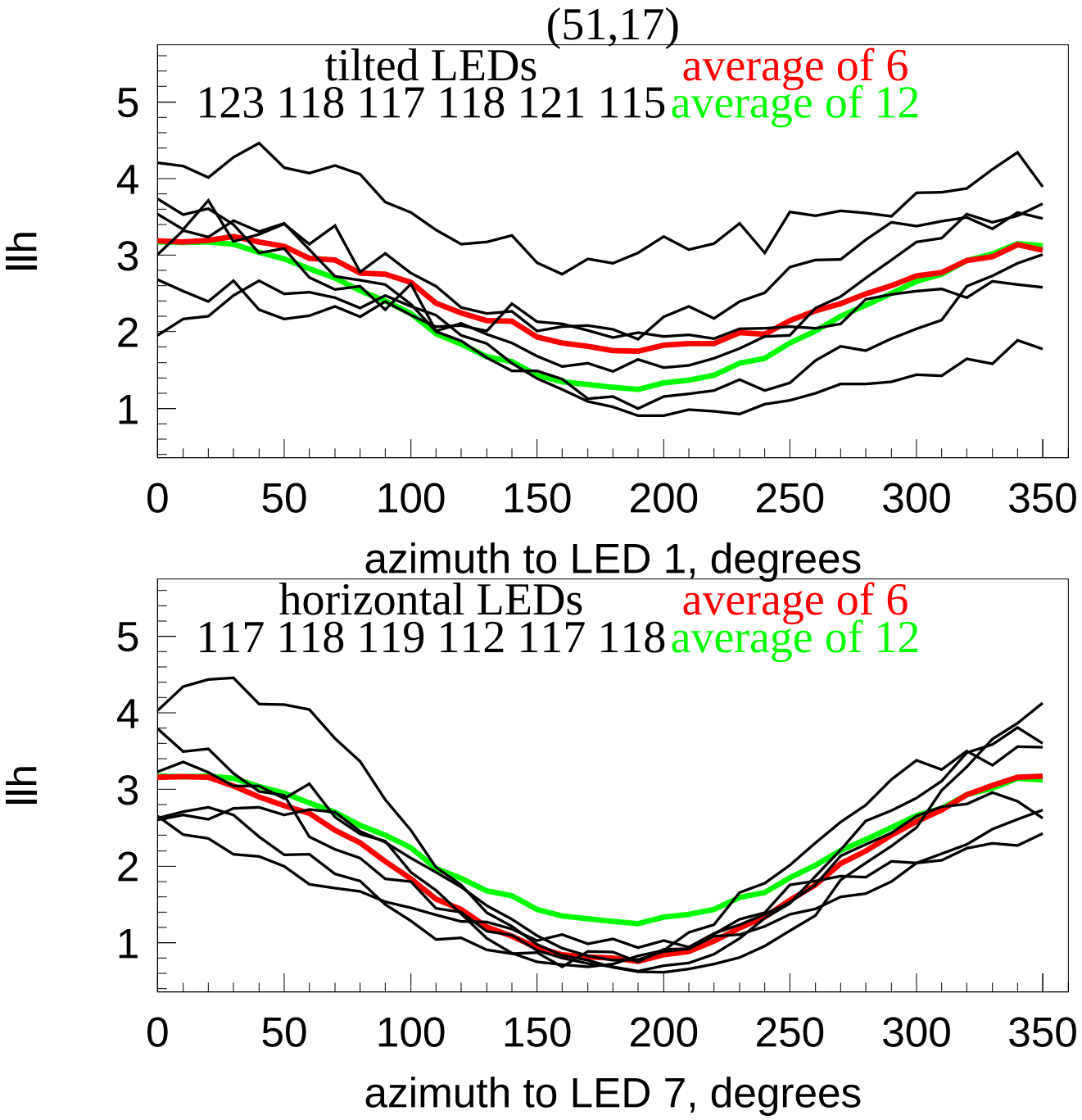

(51,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
7.5 ± 7.0

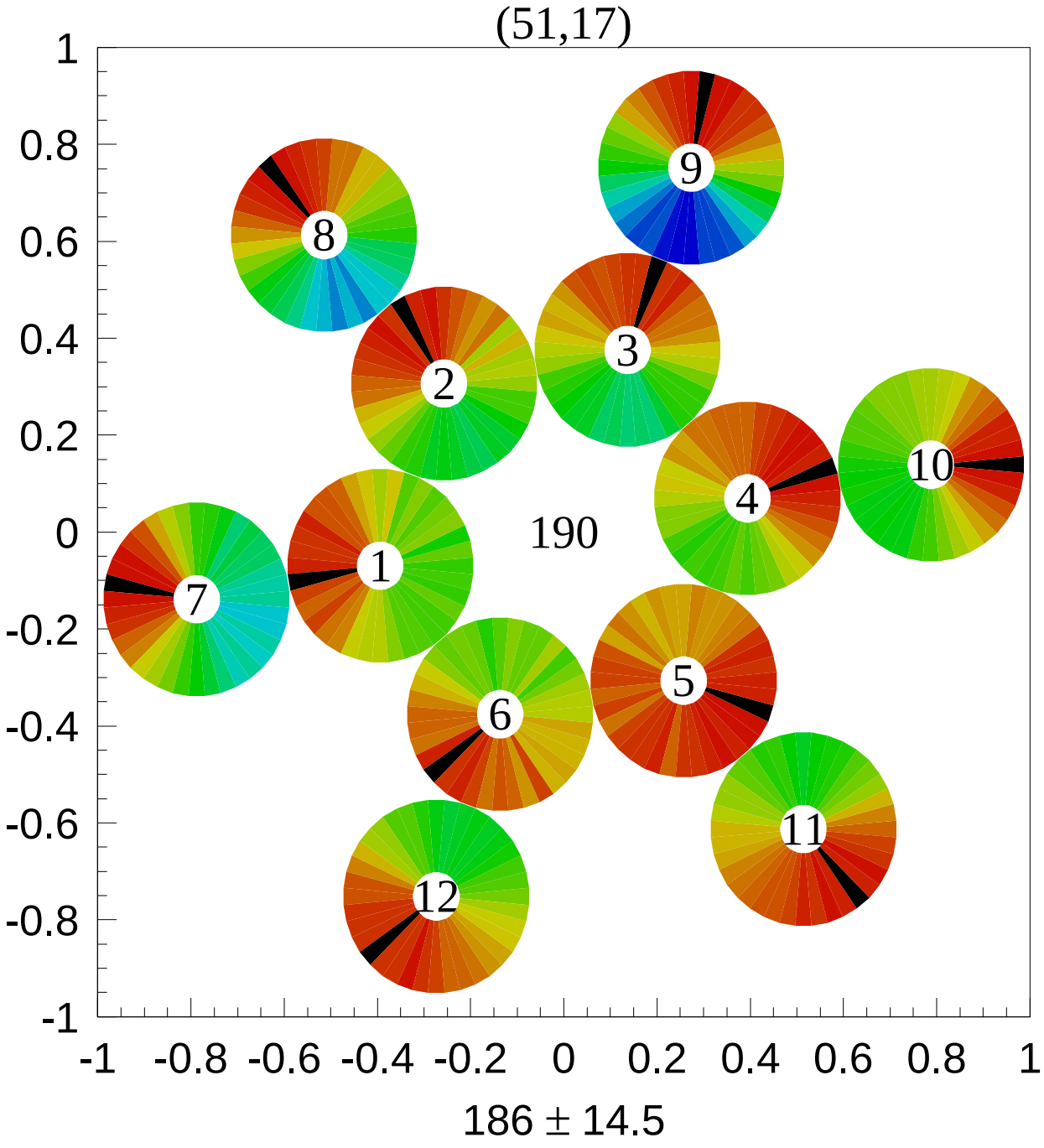

(51,15)
tilted LEDs
116 123 125 122 120 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 119 116 124 121 131
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

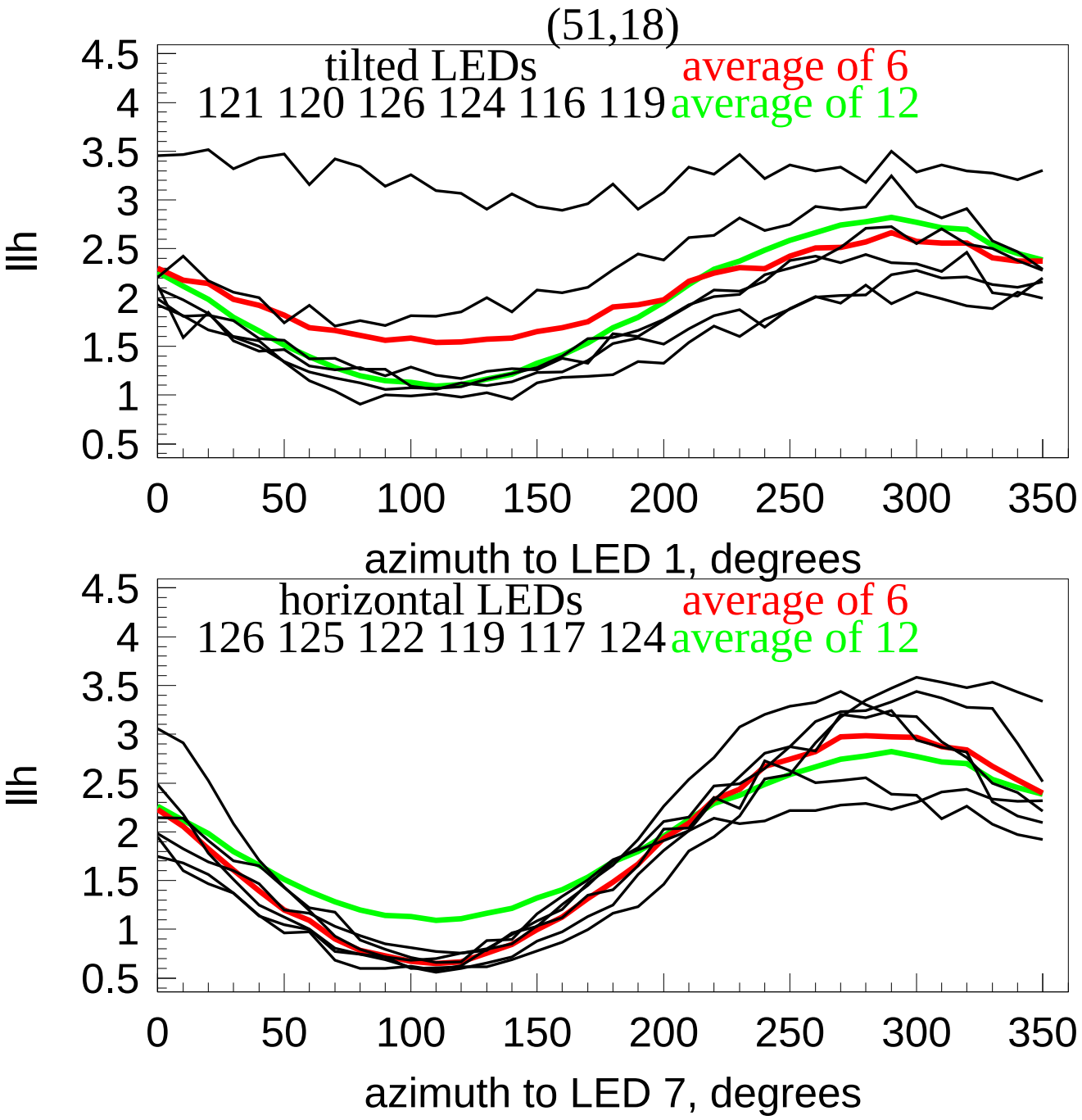

(51,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
279 ± 8.1

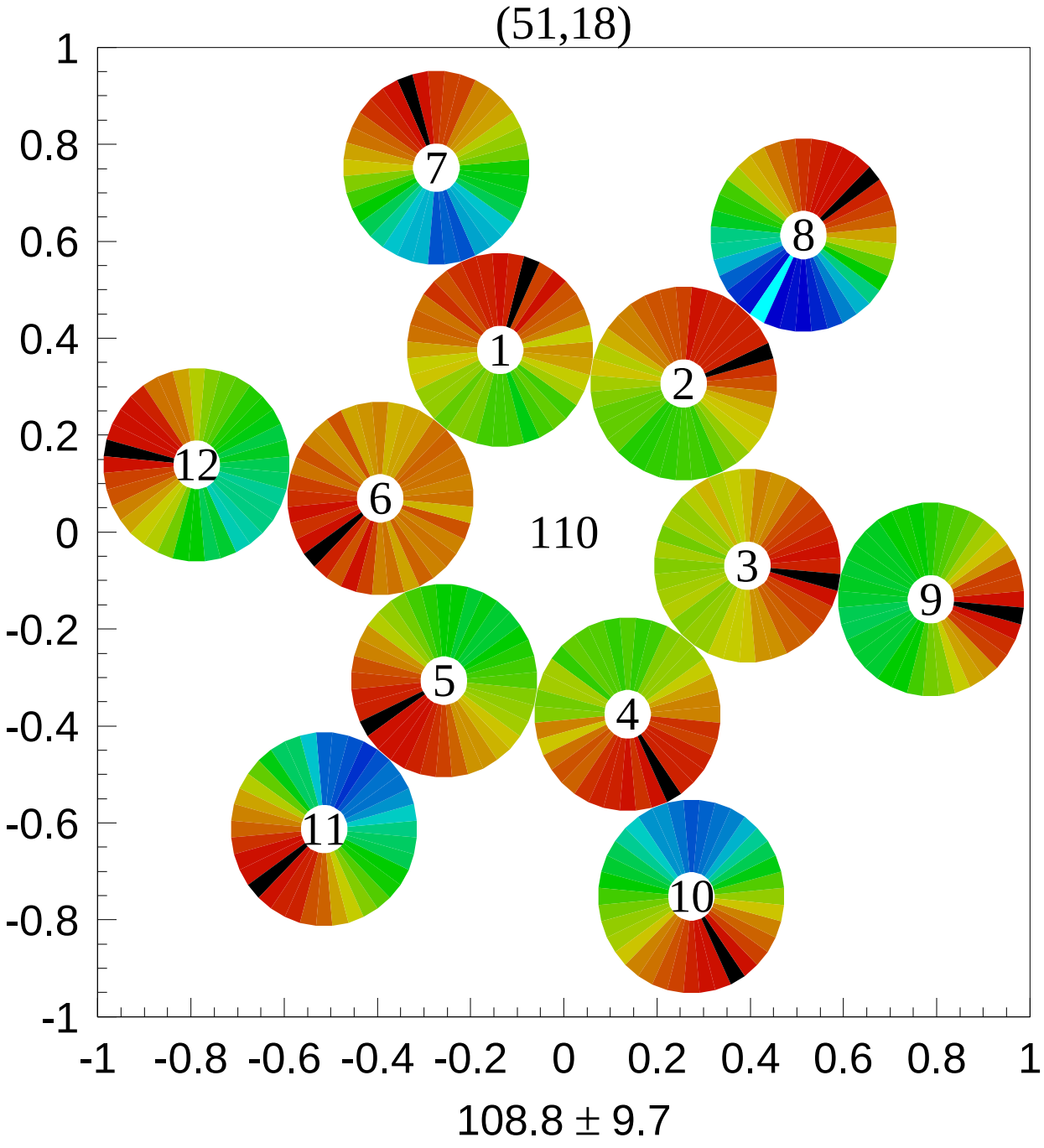

(51,16)
tilted LEDs
122 128 121 123 129 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 123 124 119 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

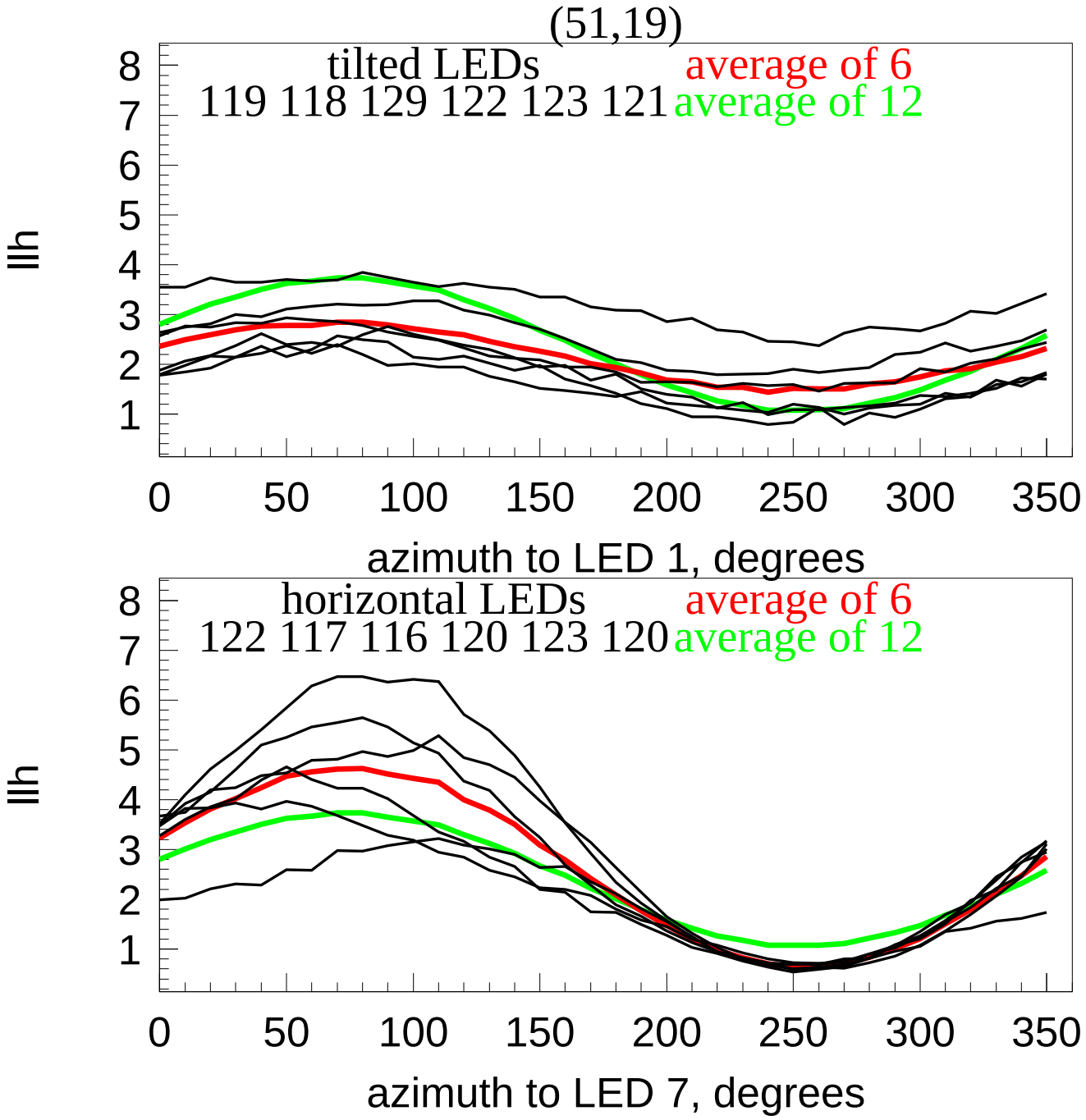

(51,16)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
262.5 ± 5.4

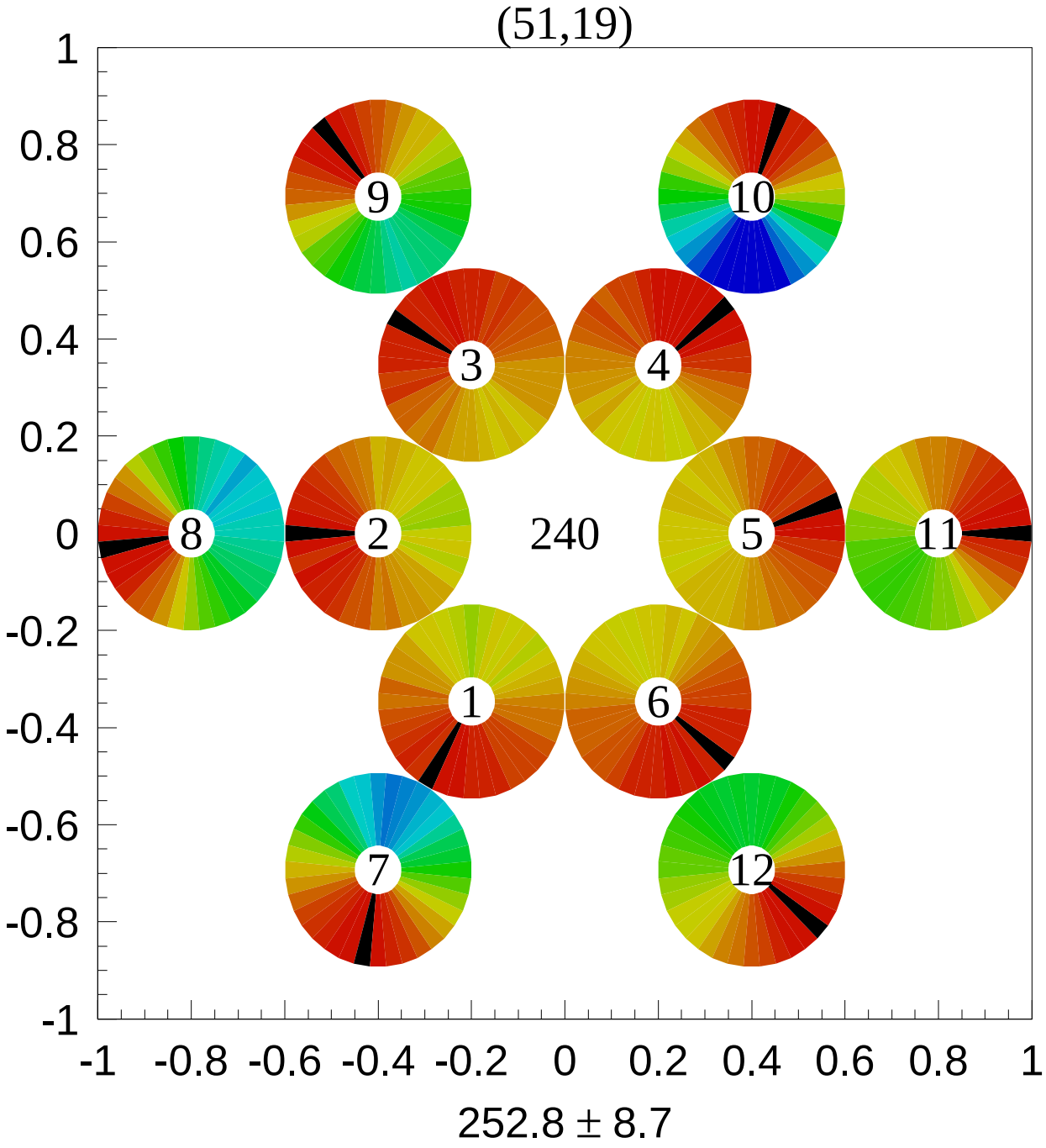

(51,17)
tilted LEDs
123 118 117 118 121 115
average of 6
average of 12
llh
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 118 119 112 117 118
average of 6
average of 12
llh
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

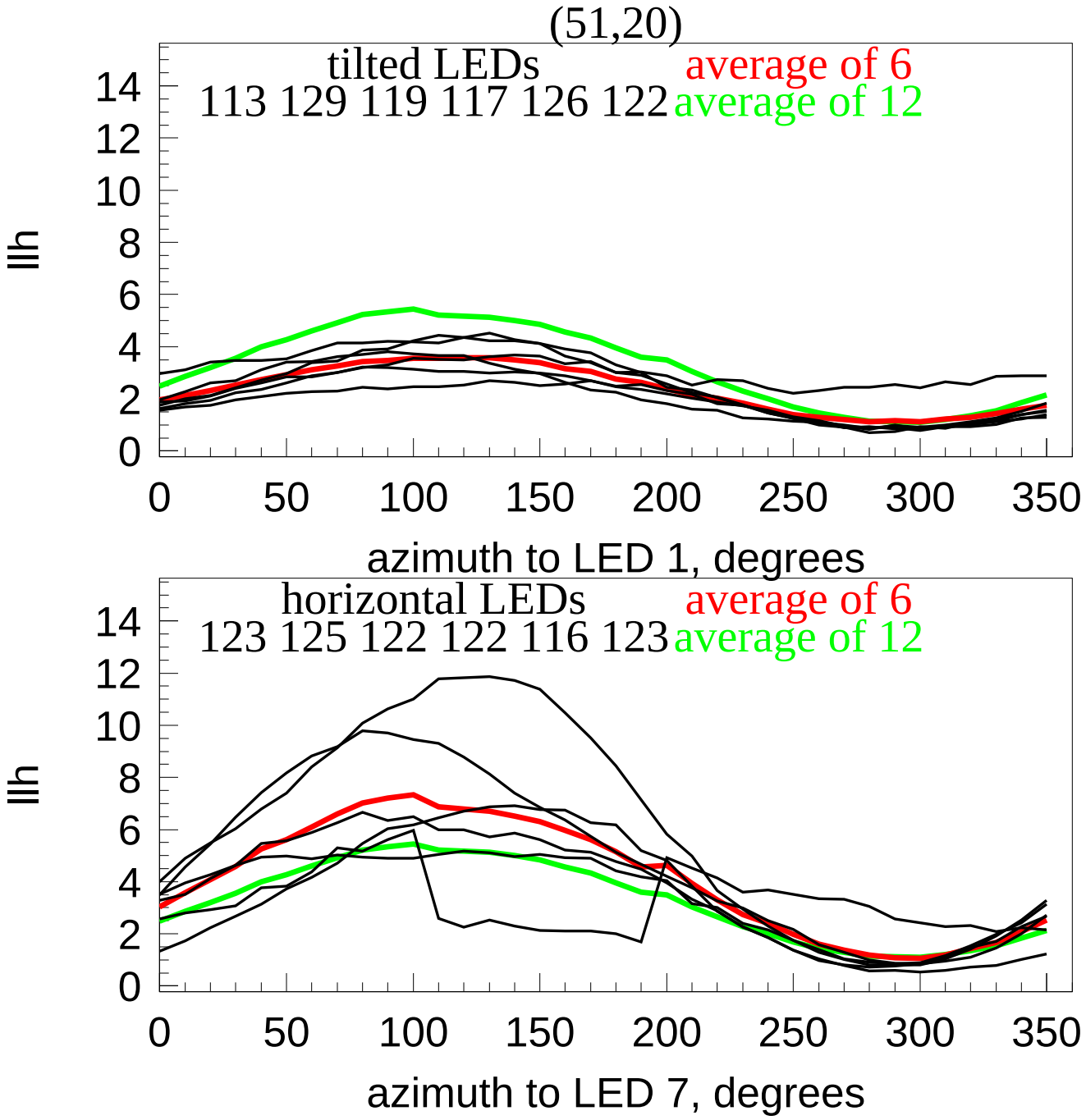

(51,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186 ± 14.5
190
1
2
3
4
5
6
7
8
9
10
11
12

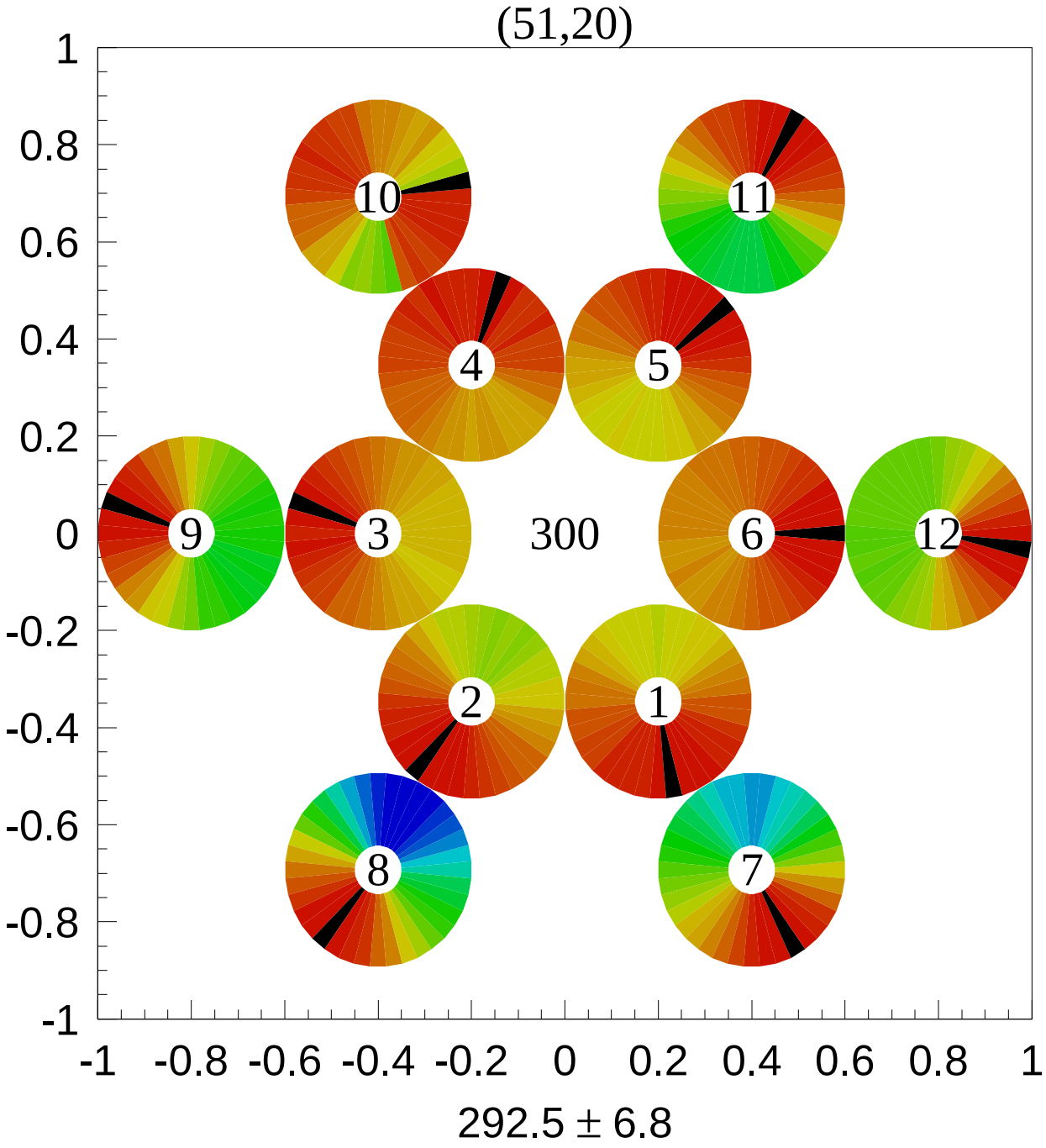

(51,18)
tilted LEDs
121 120 126 124 116 119
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 125 122 119 117 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

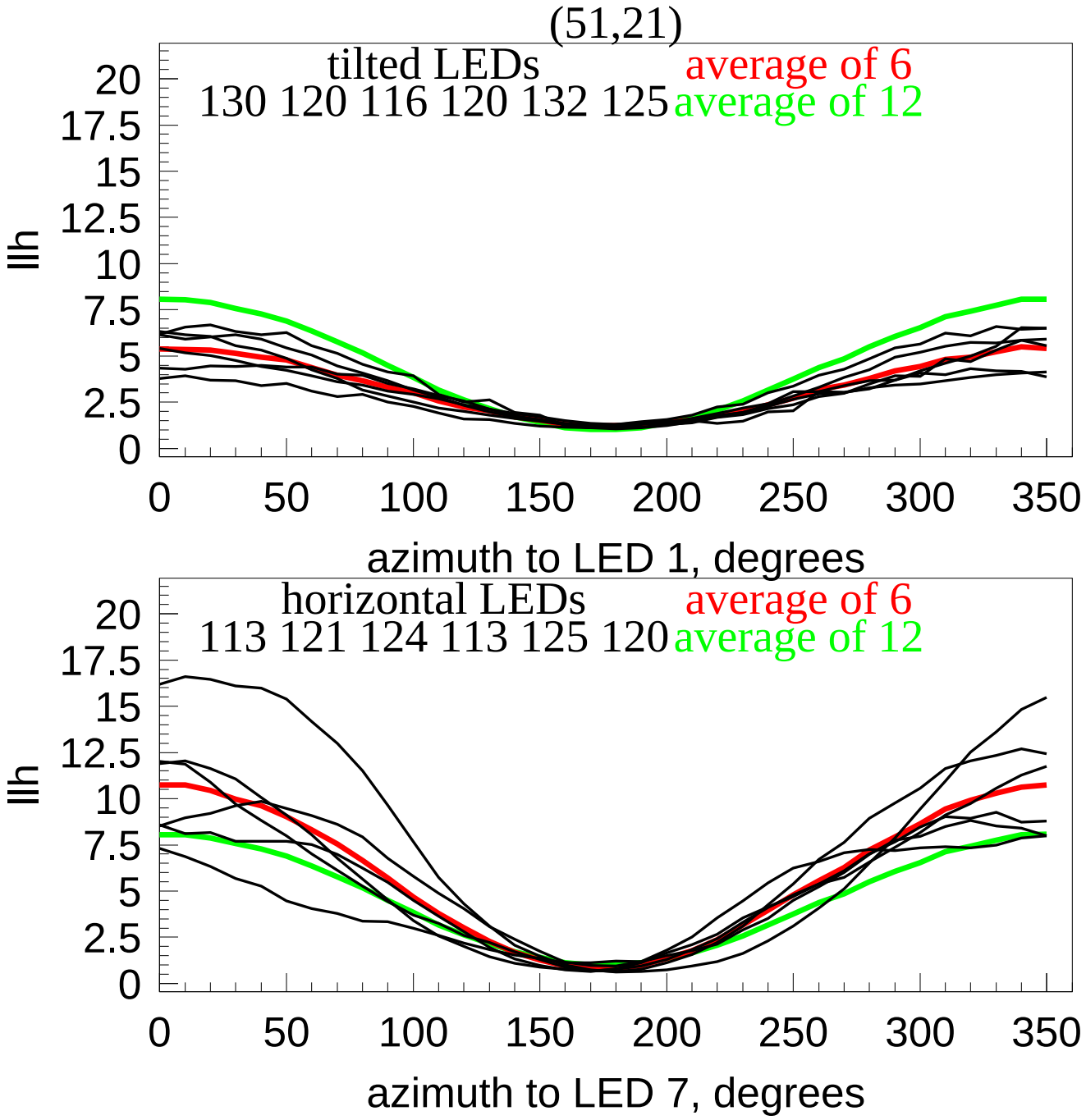

(51,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
108.8 ± 9.7

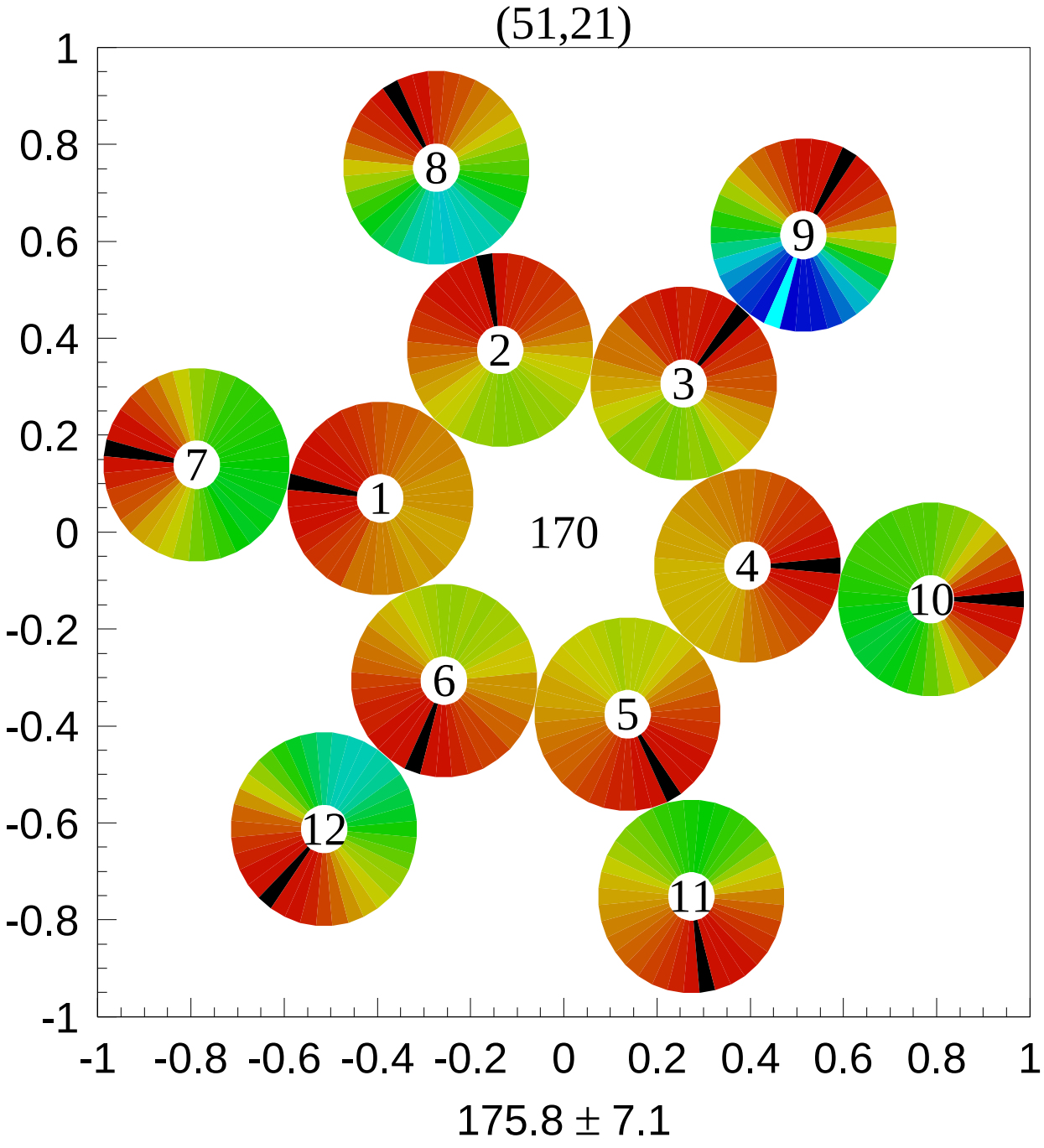

(51,19)
tilted LEDs
119 118 129 122 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 117 116 120 123 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

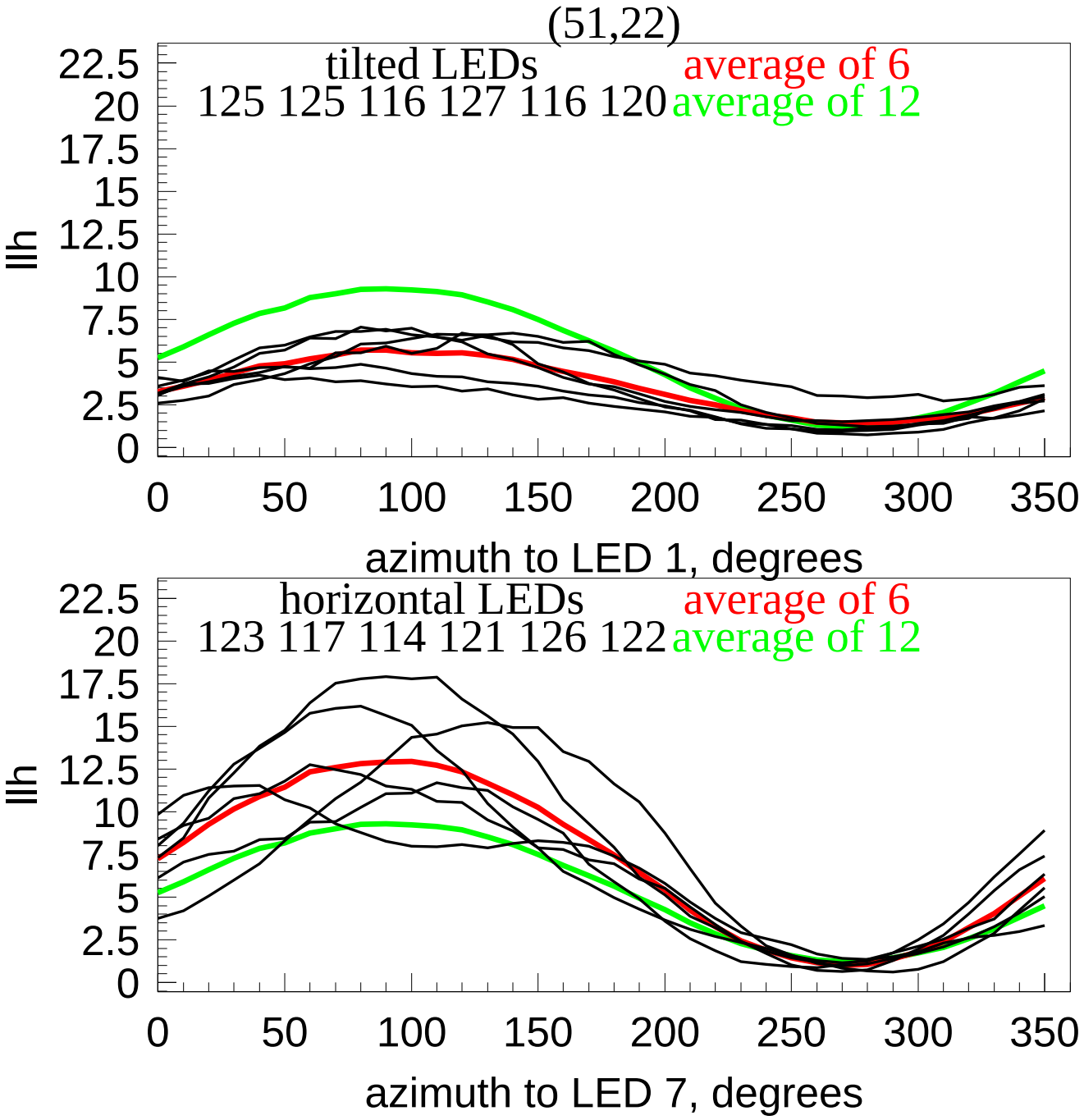

(51,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
252.8 ± 8.7

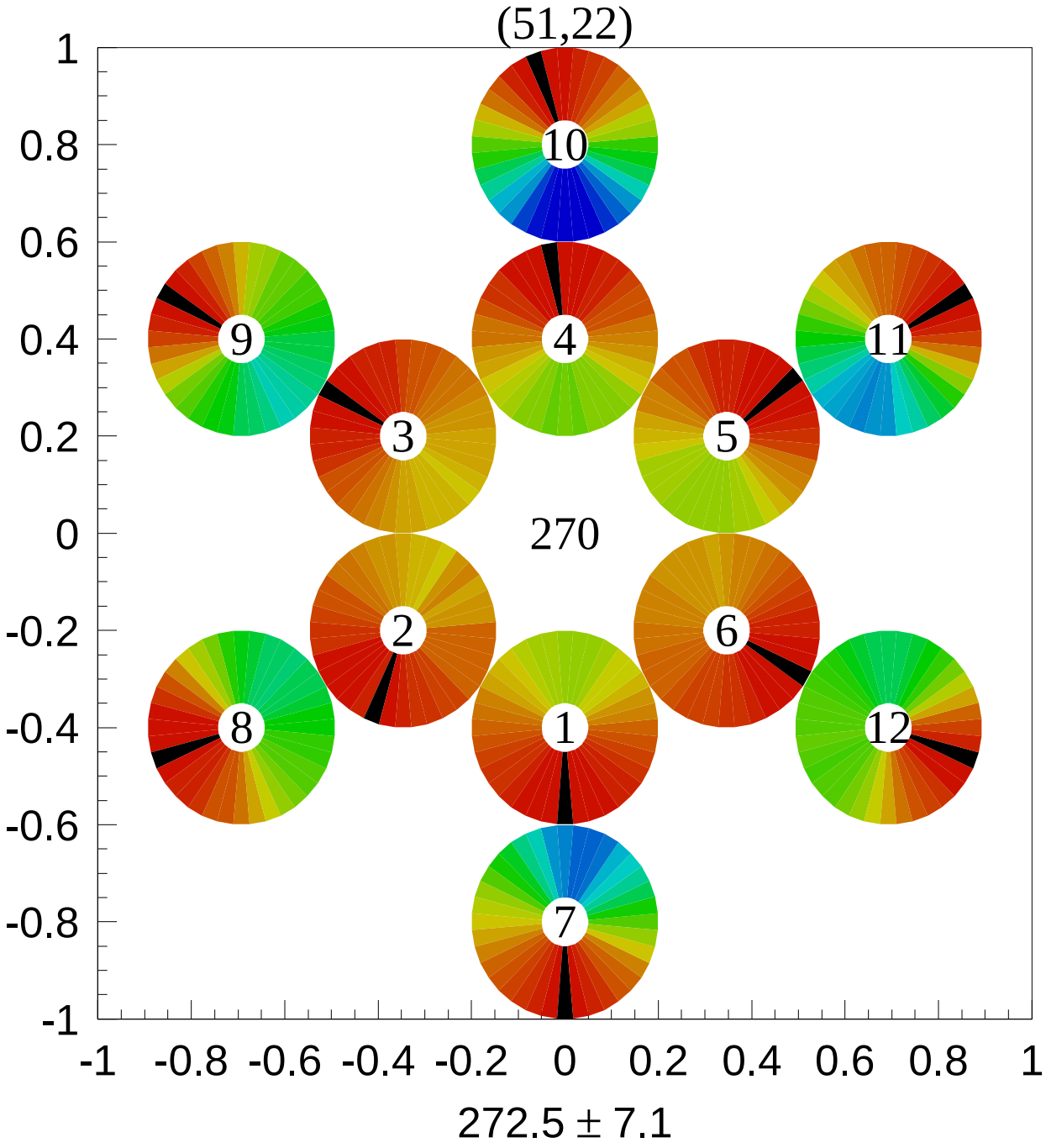

(51,20)
tilted LEDs
113 129 119 117 126 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 125 122 122 116 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

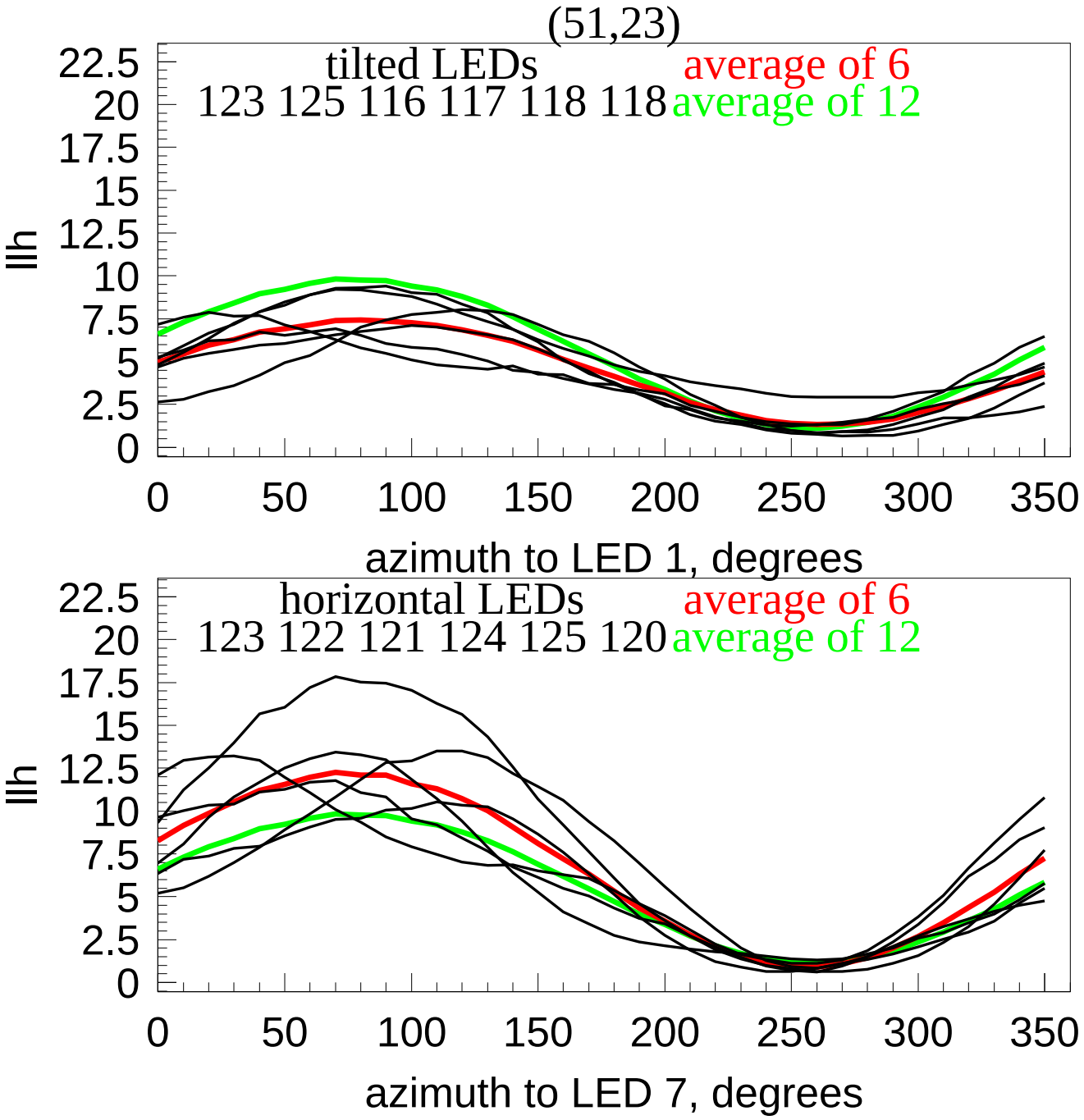

(51,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
292.5 ± 6.8

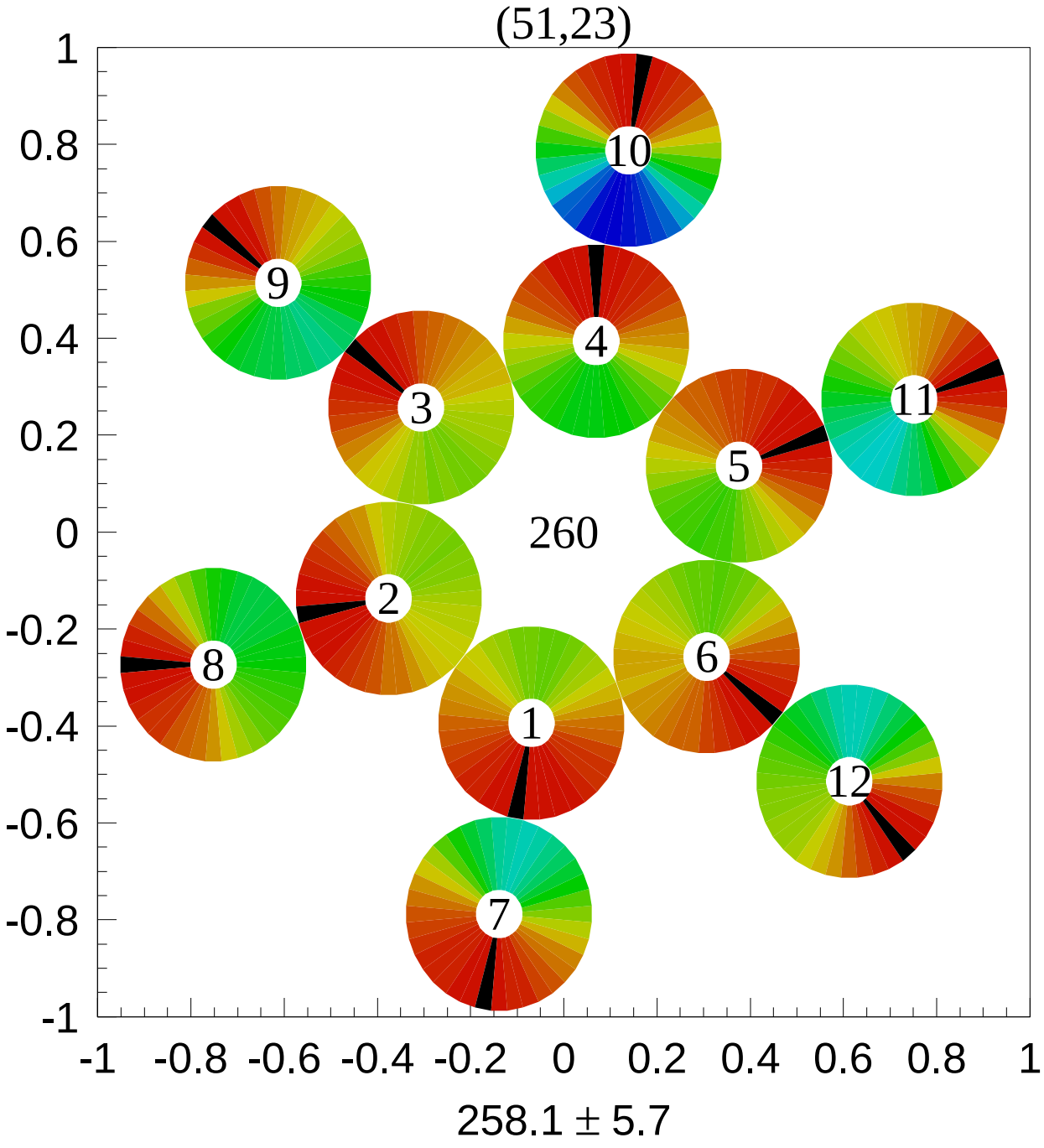

(51,21)
tilted LEDs
130 120 116 120 132 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 121 124 113 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

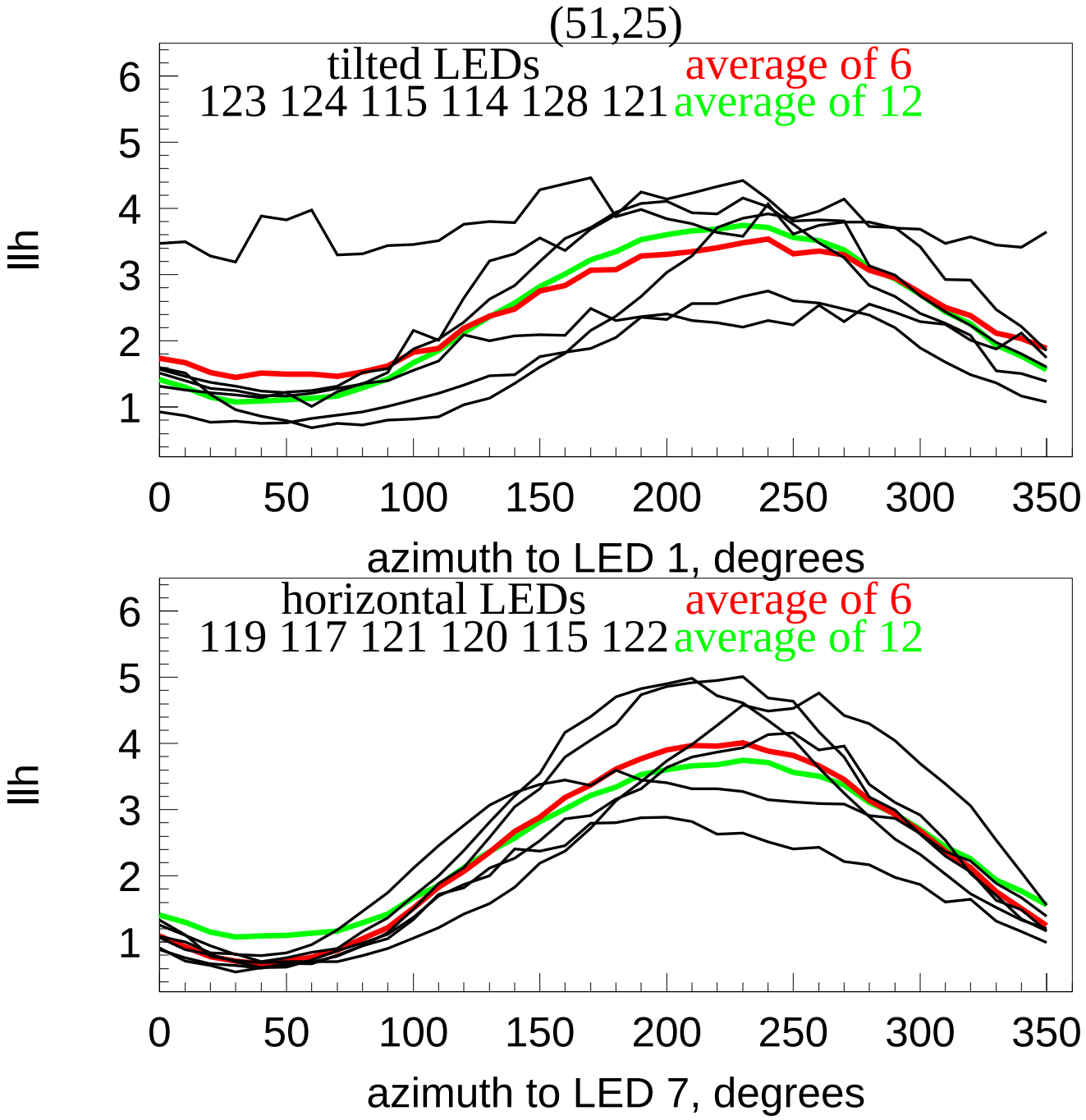

(51,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
175.8 ± 7.1

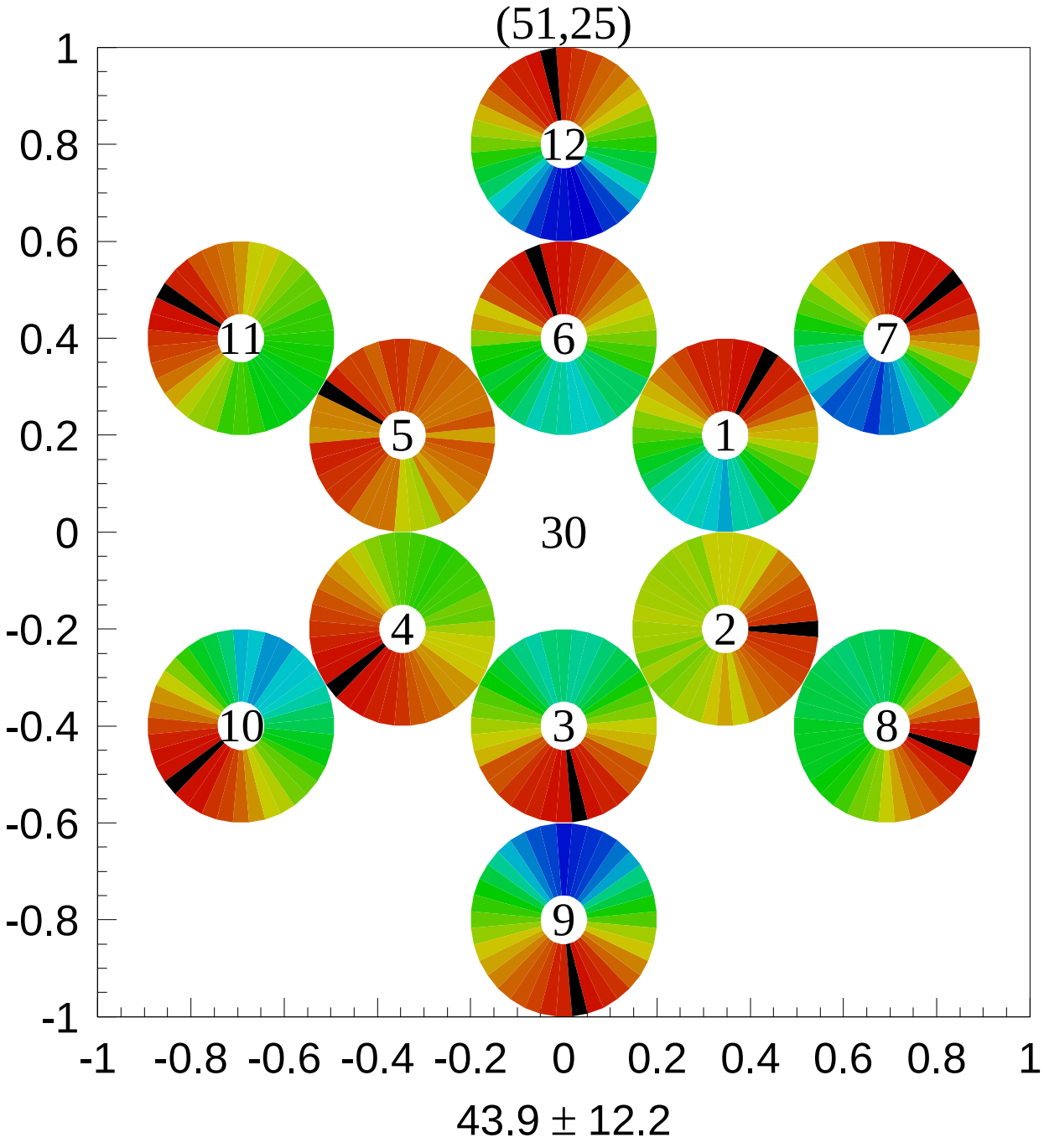

(51,22)
tilted LEDs
125 125 116 127 116 120
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 117 114 121 126 122
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

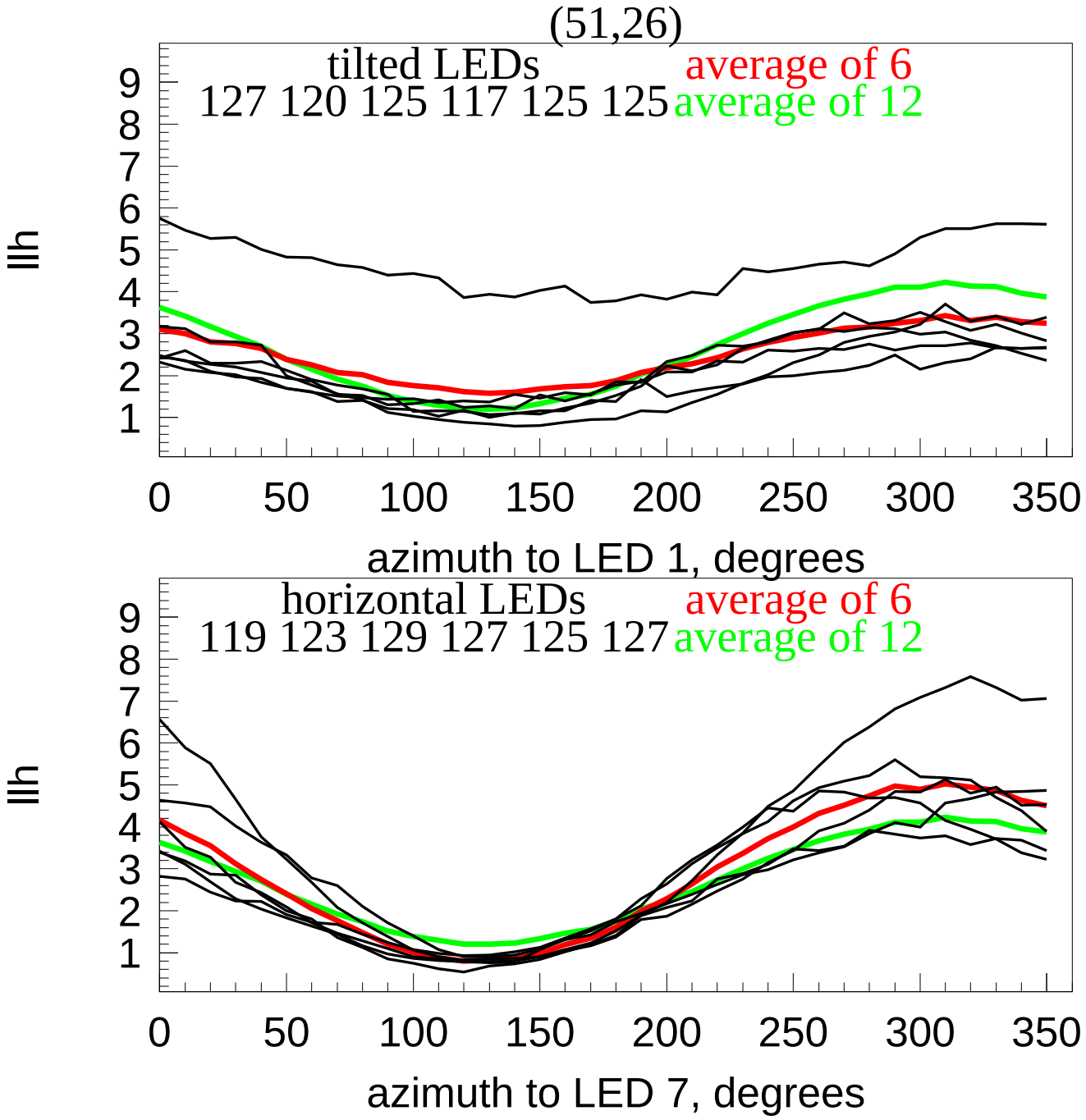

(51,22)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.5 ± 7.1

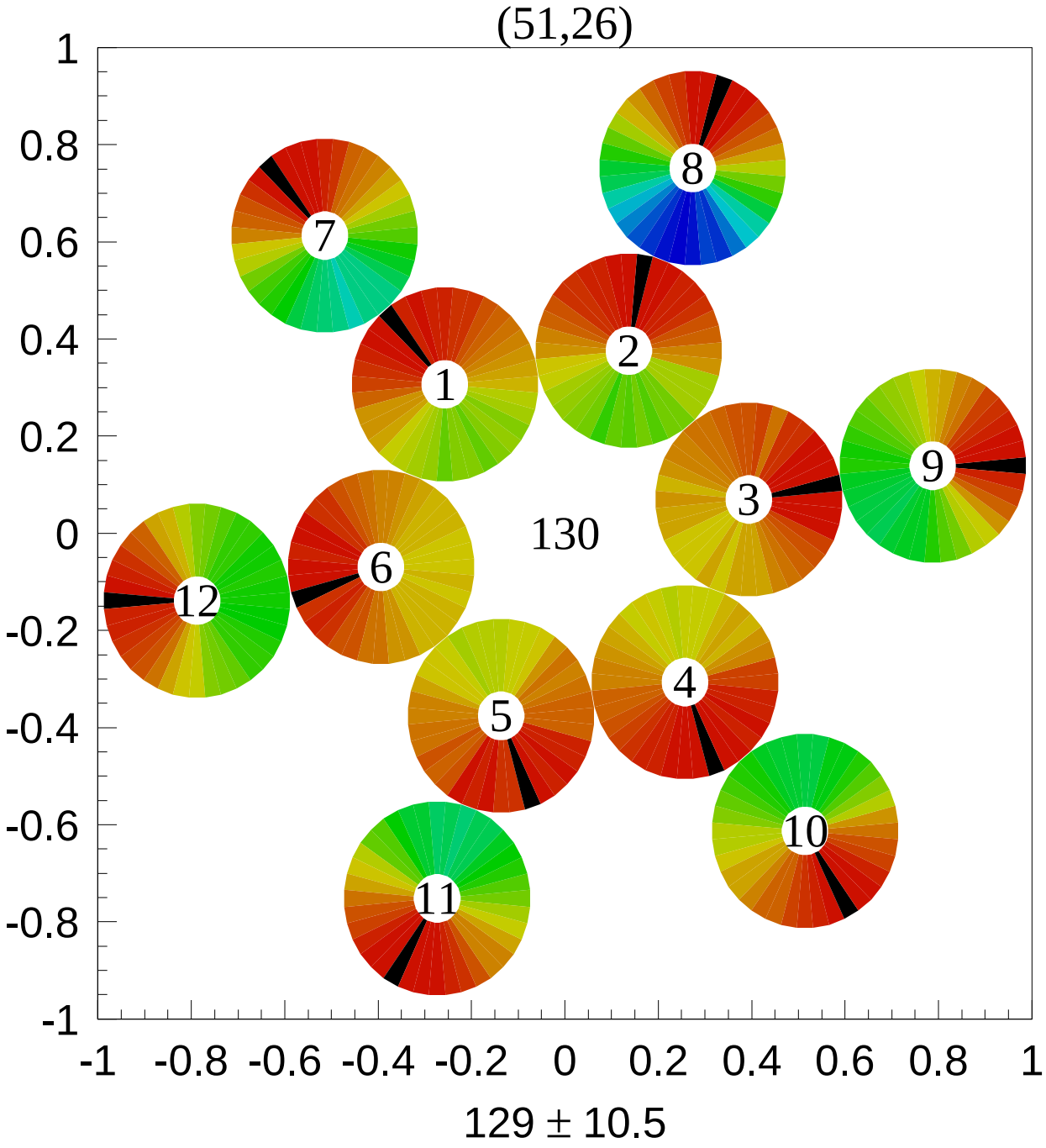

(51,23)
tilted LEDs
123 125 116 117 118 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 121 124 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

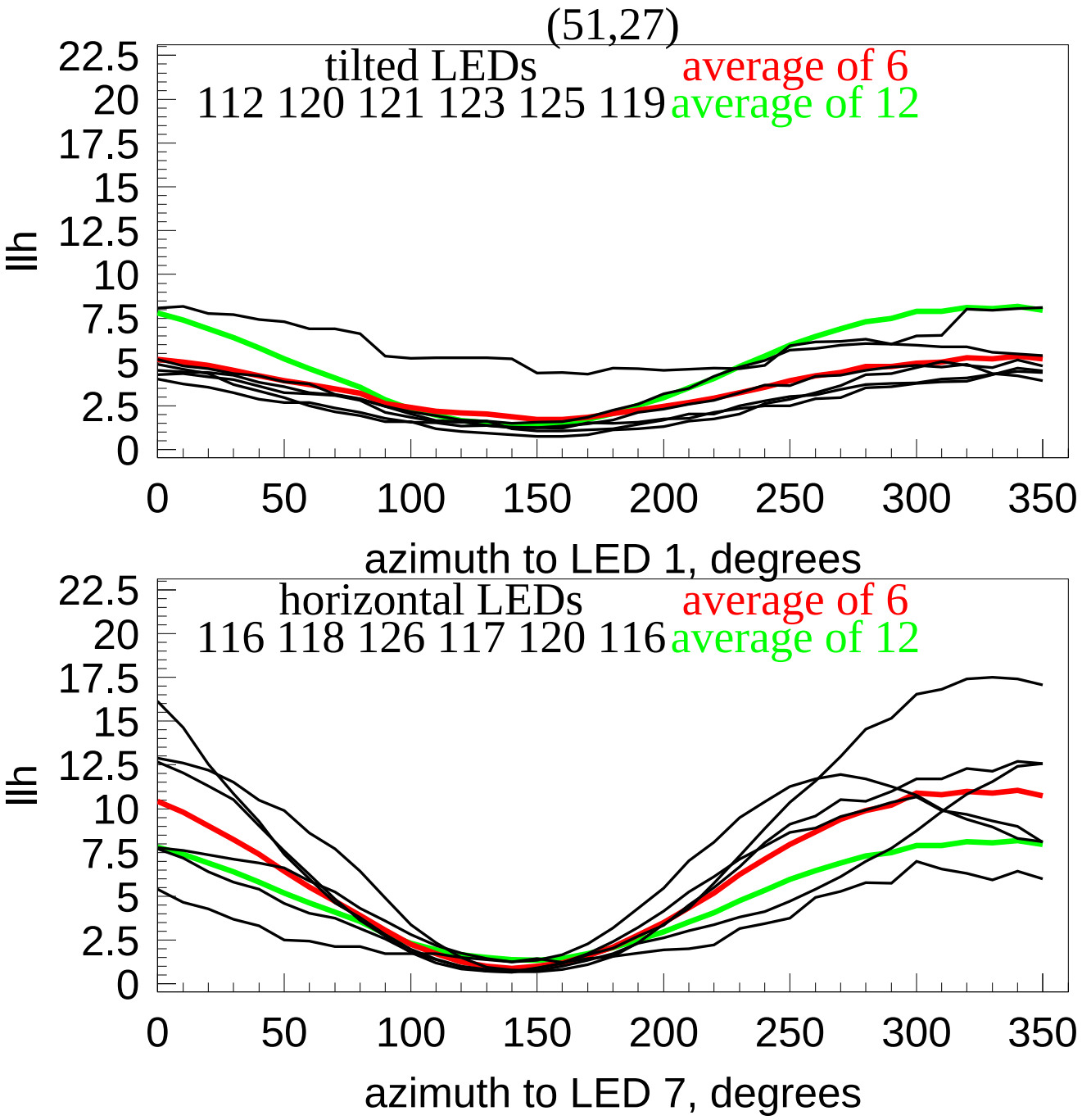

(51,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
258.1 ± 5.7

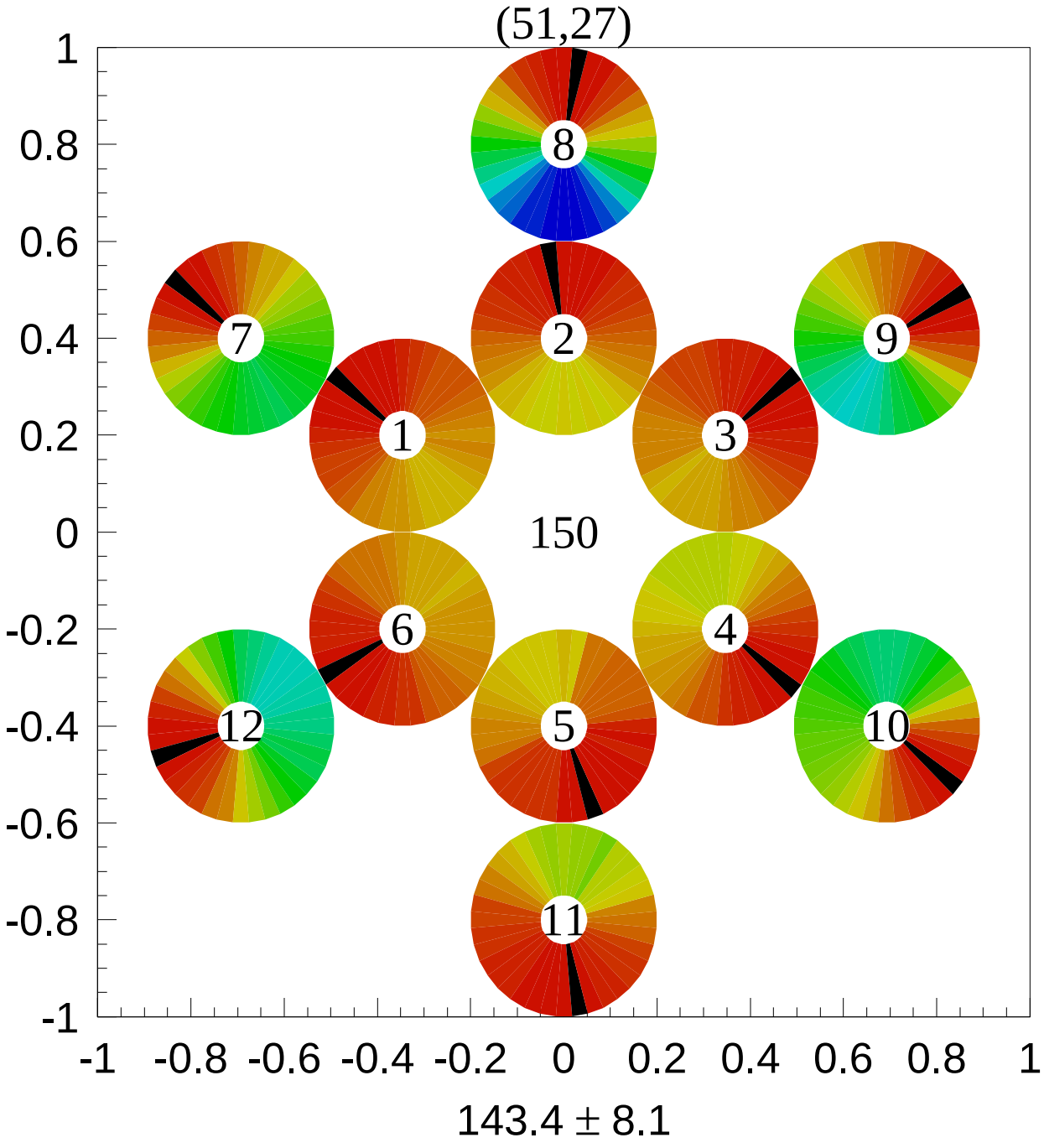

(51,25)
tilted LEDs
123 124 115 114 128 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 117 121 120 115 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

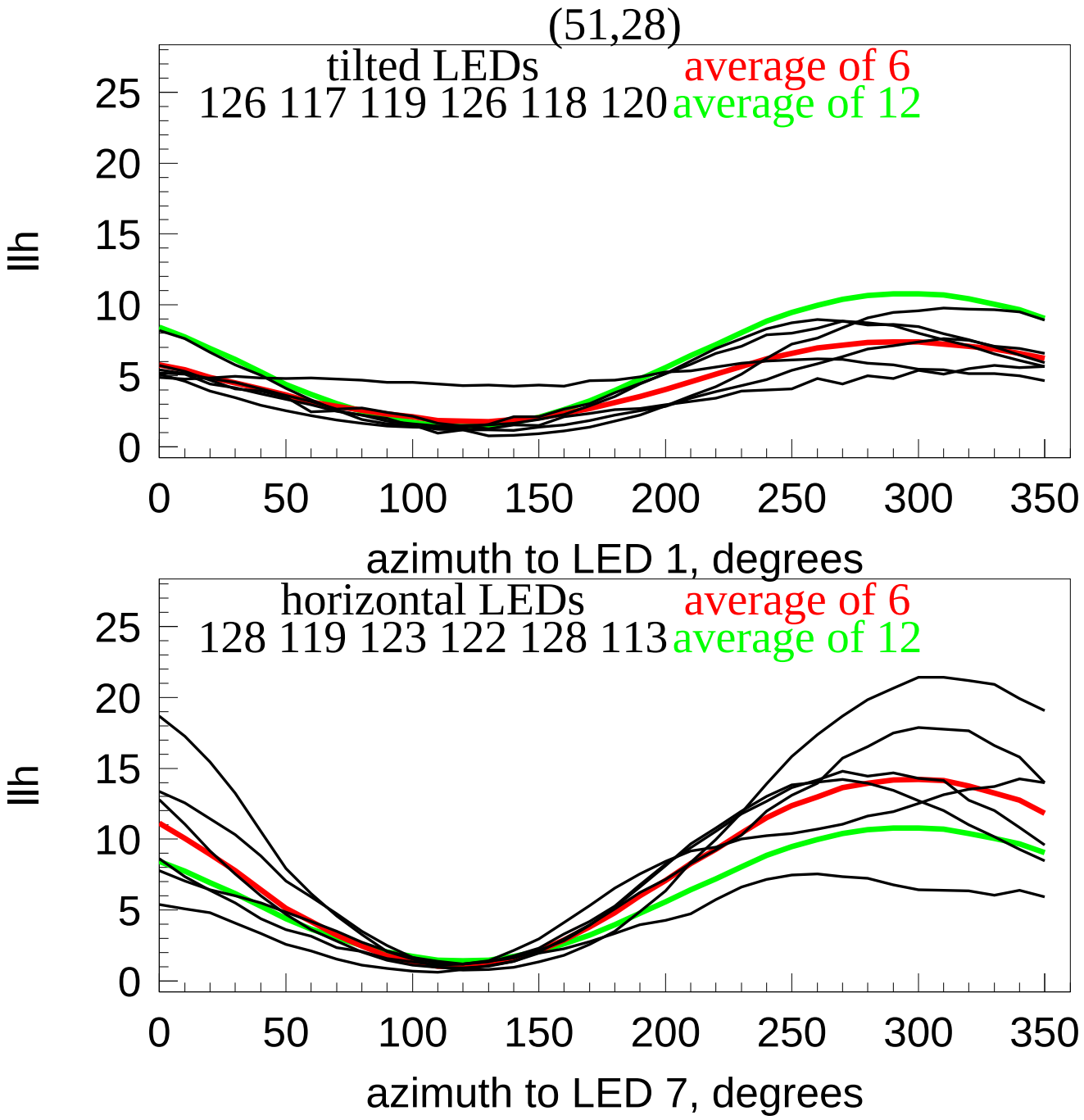

(51,25)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
43.9 ± 12.2

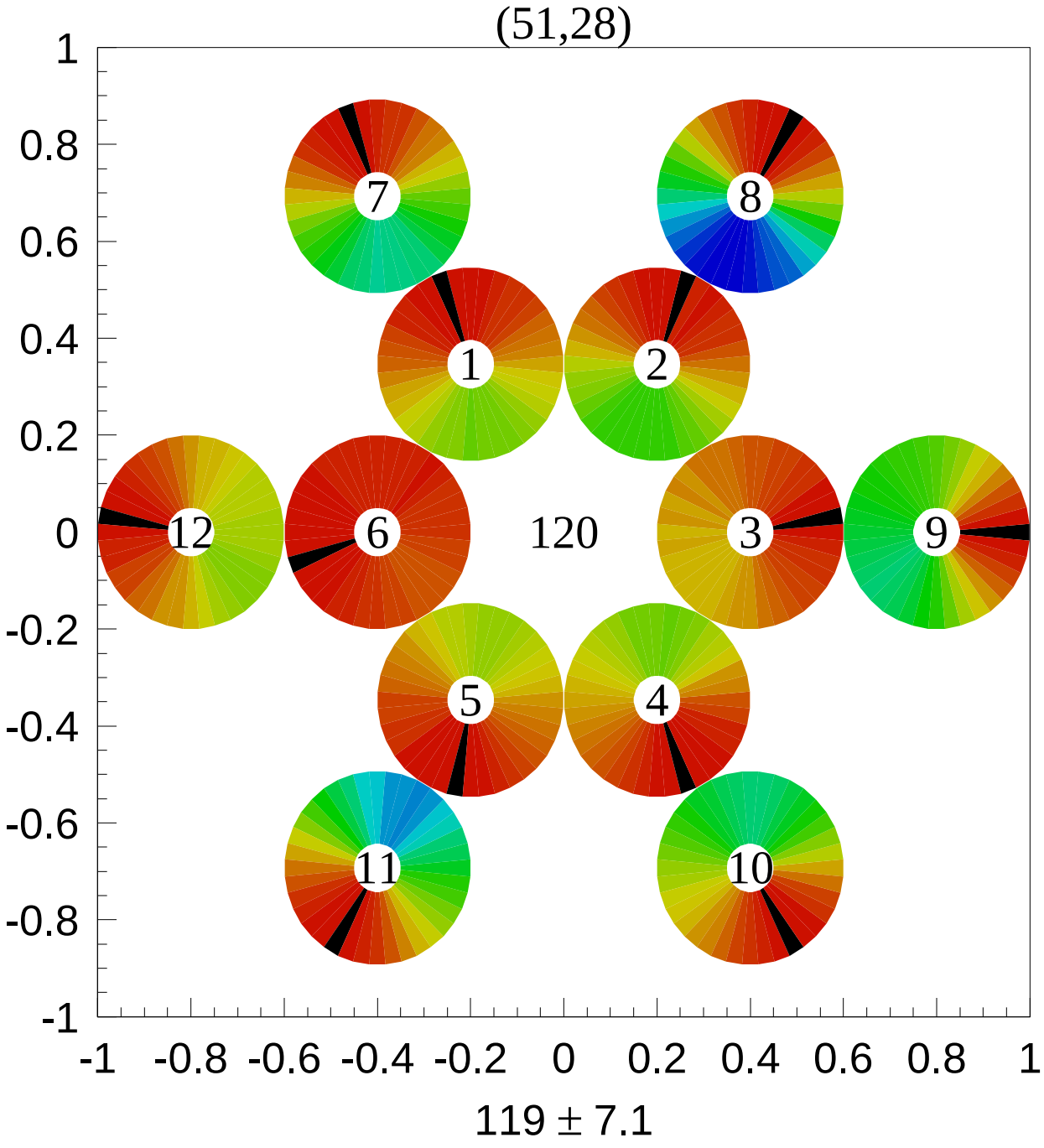

(51,26)
tilted LEDs
127 120 125 117 125 125
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 123 129 127 125 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

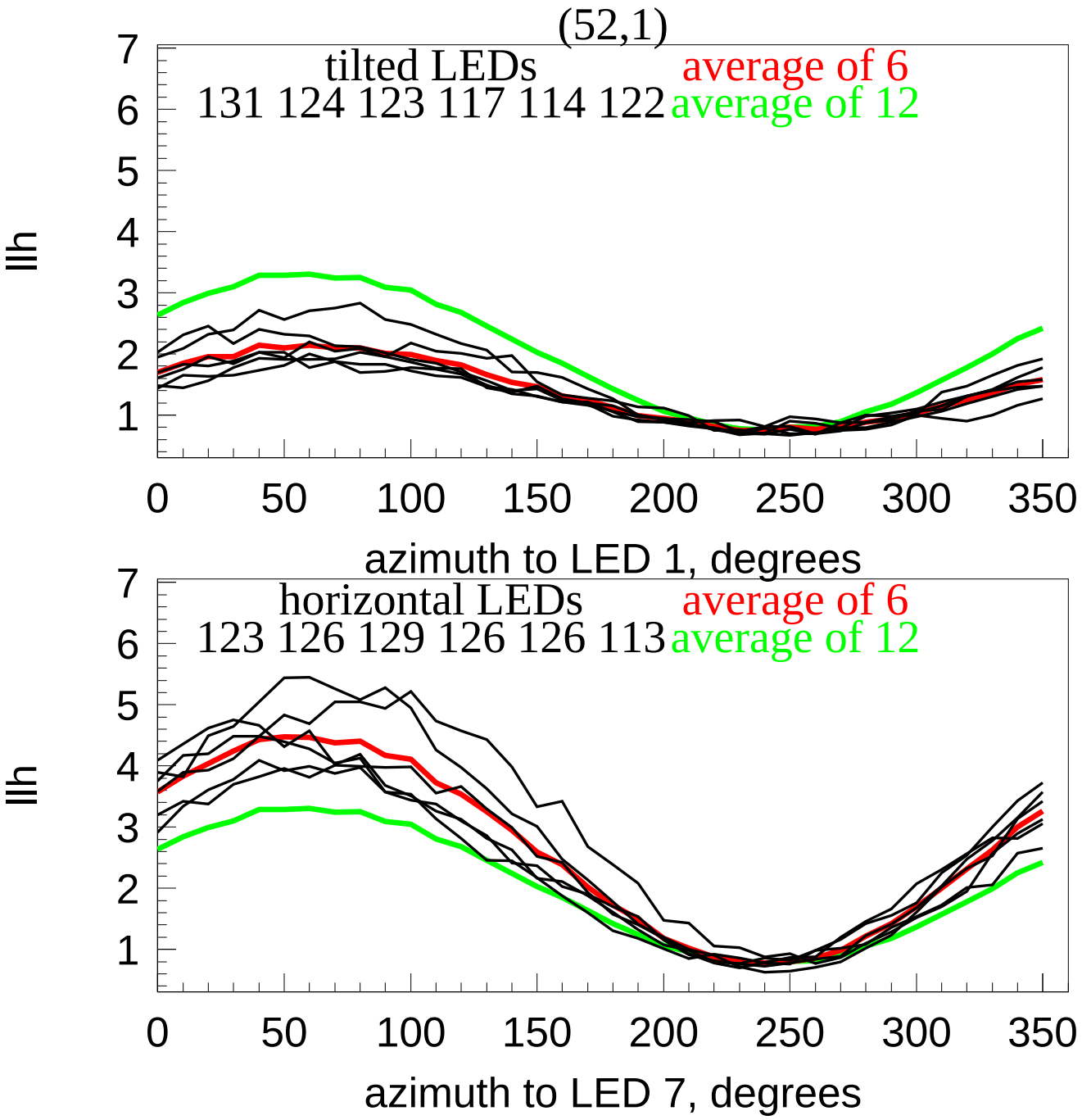

(51,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
129 ± 10.5
130
1
2
3
4
5
6
7
8
9
10
11
12

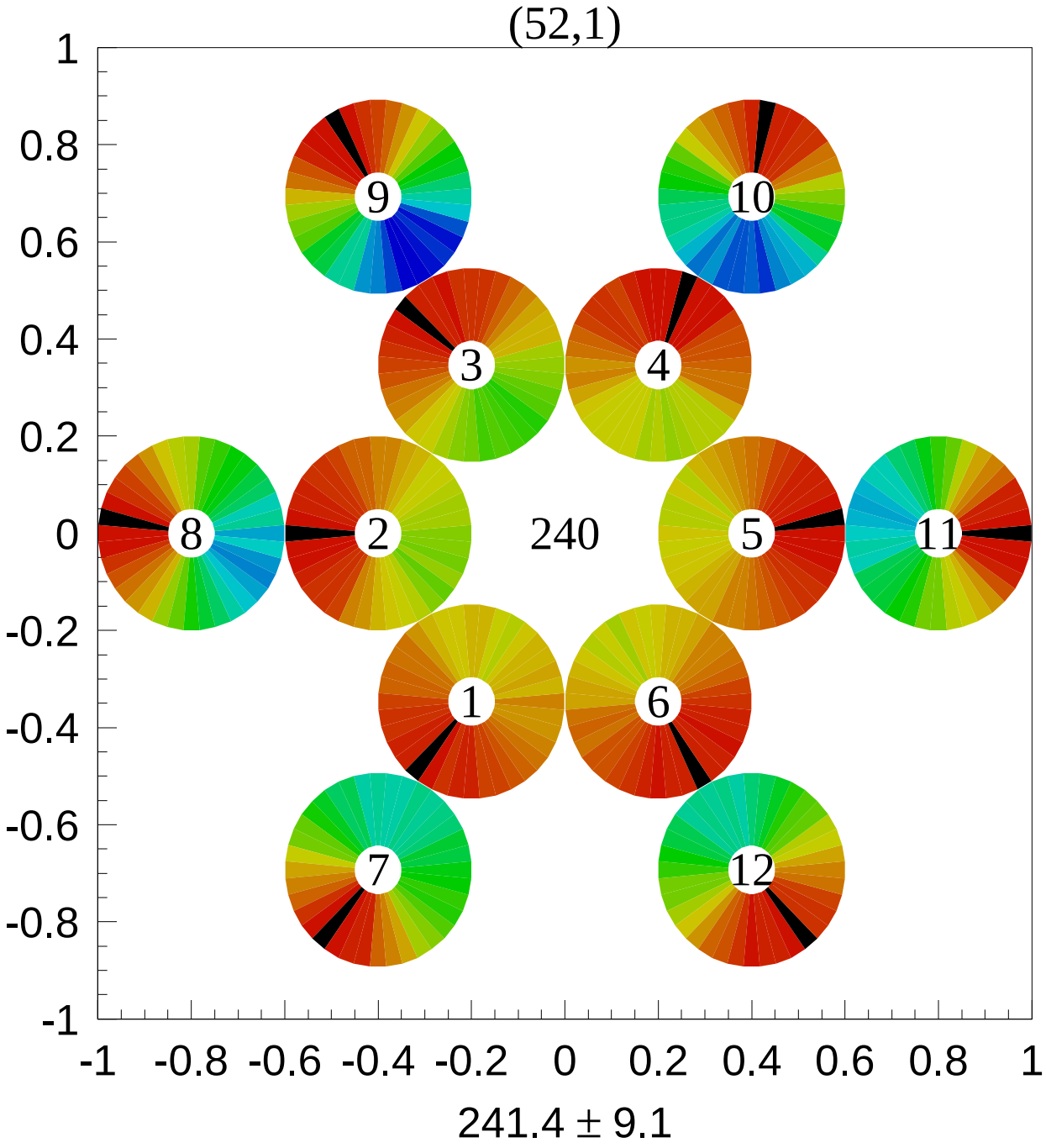

(51,27)
tilted LEDs
112 120 121 123 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 118 126 117 120 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

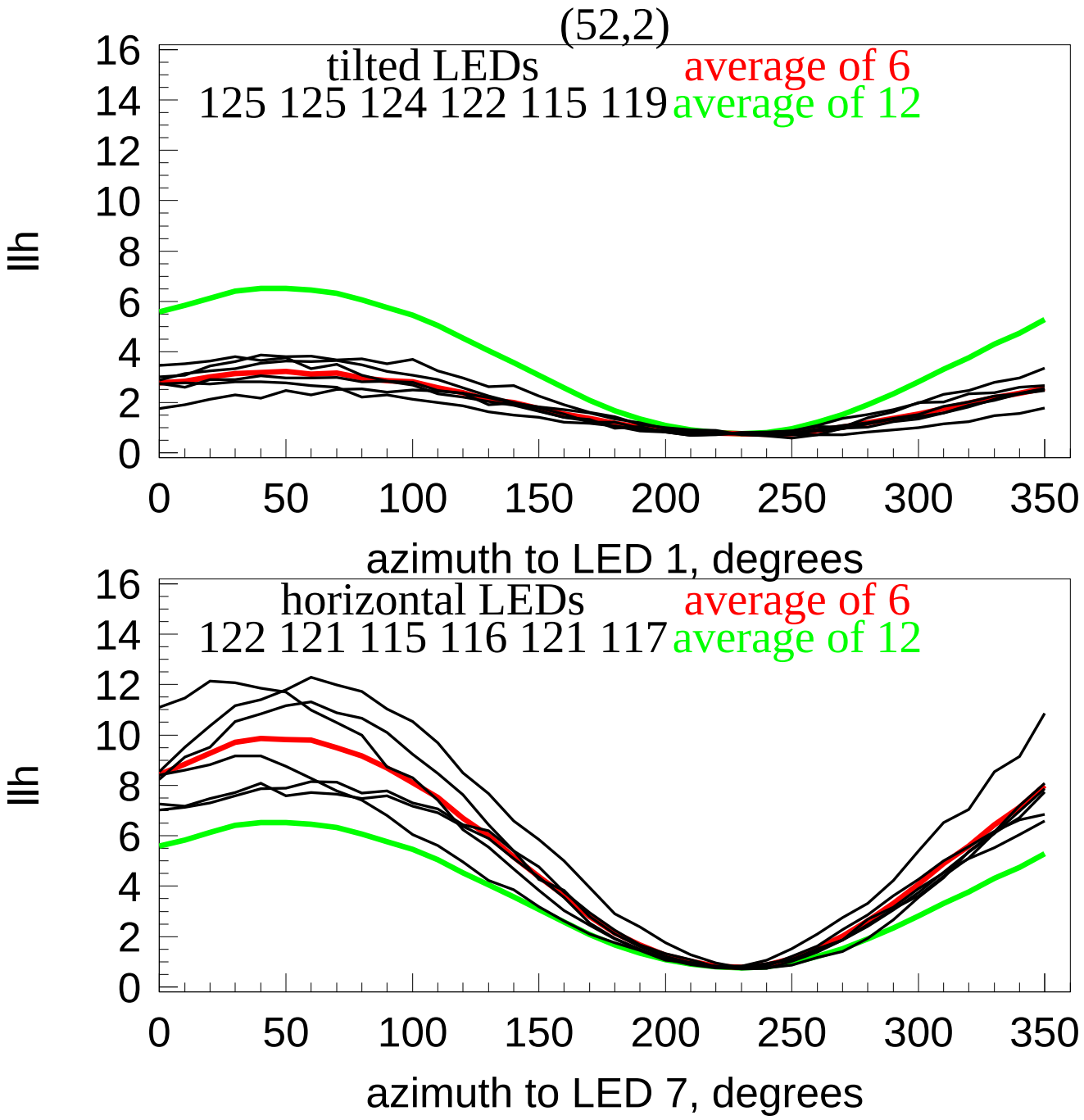

(51,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
143.4 ± 8.1

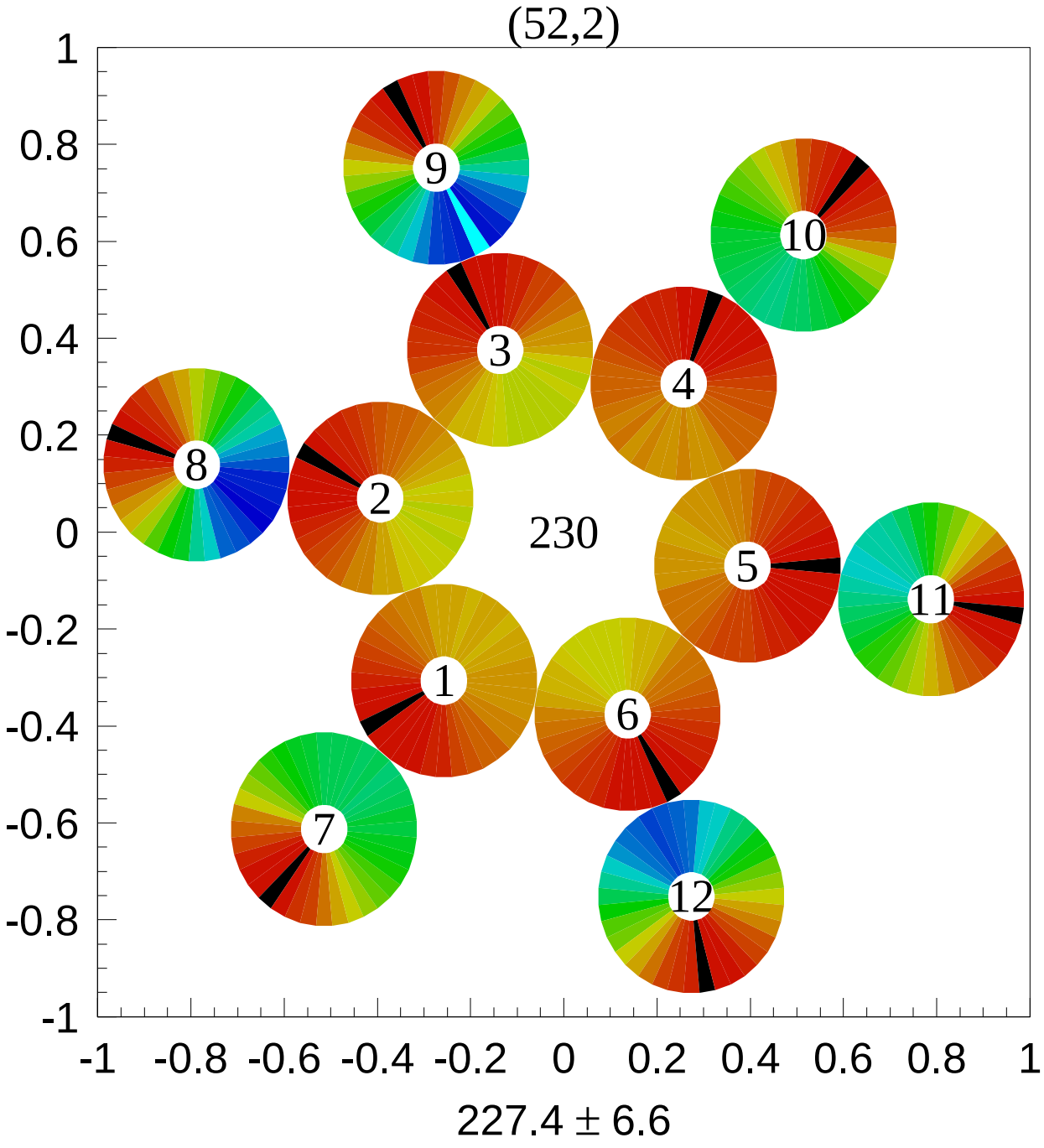

(51,28)
tilted LEDs
126 117 119 126 118 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 119 123 122 128 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

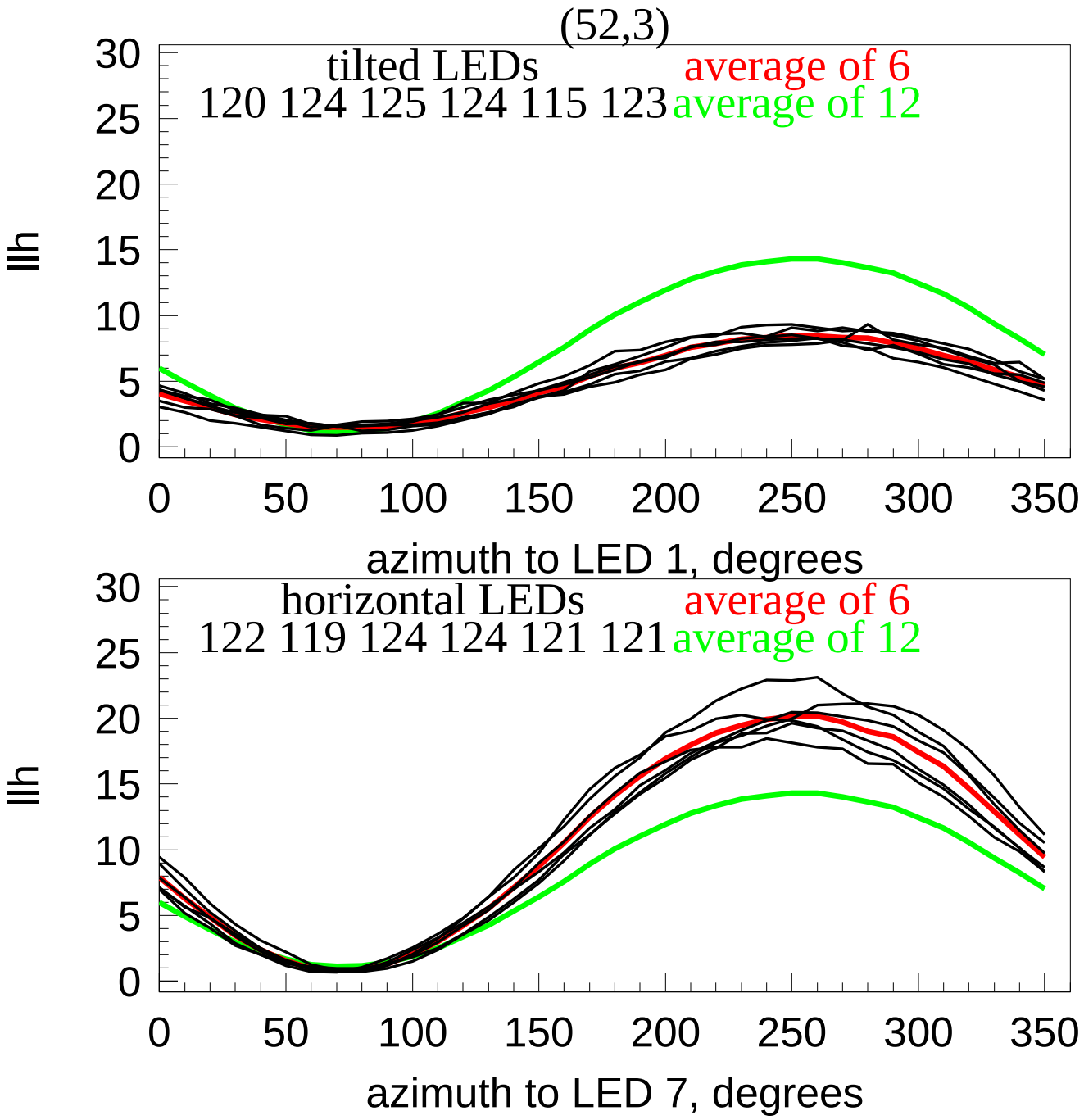

(51,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
119 ± 7.1

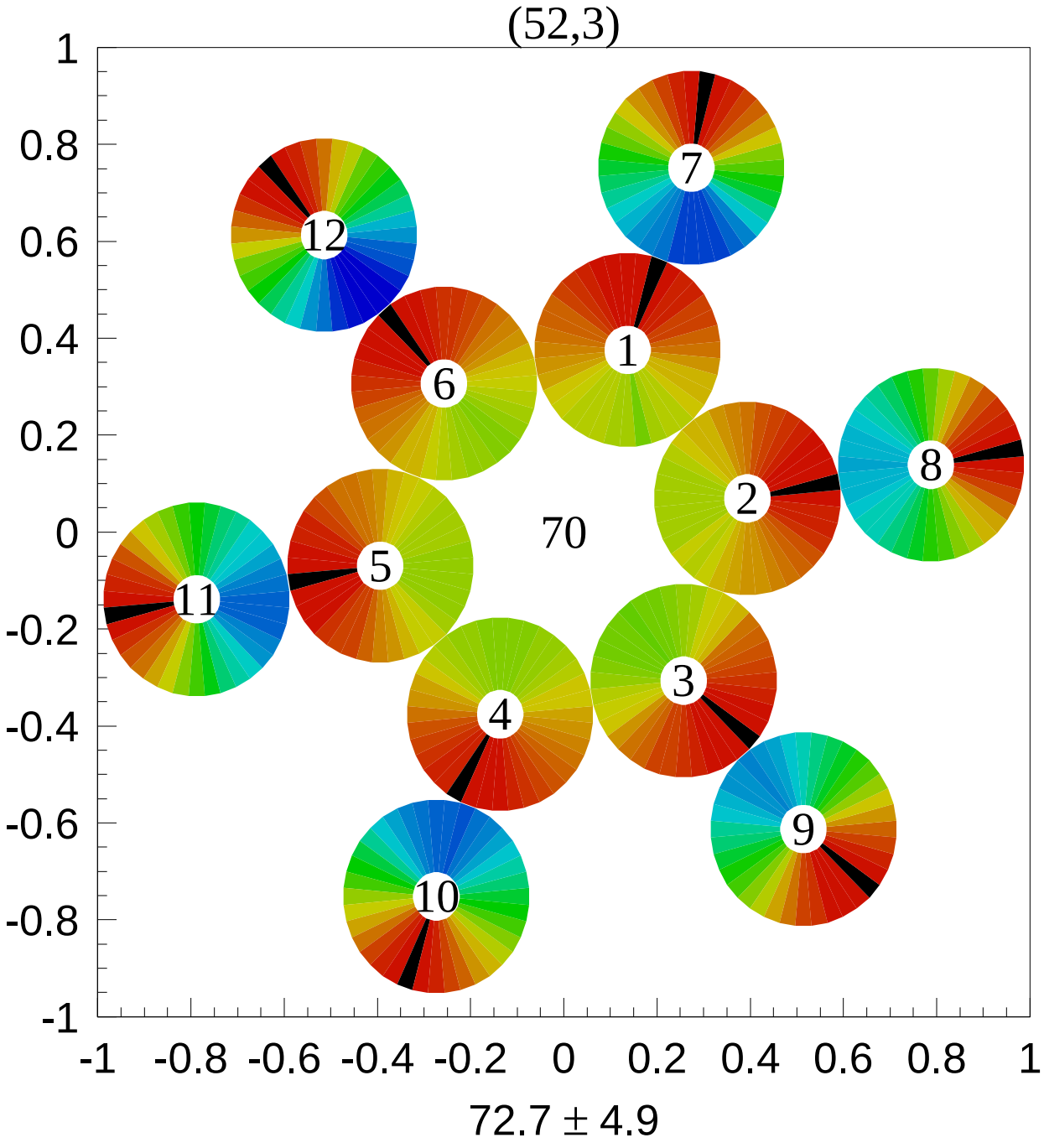

(52,1)
tilted LEDs
131 124 123 117 114 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 126 129 126 126 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

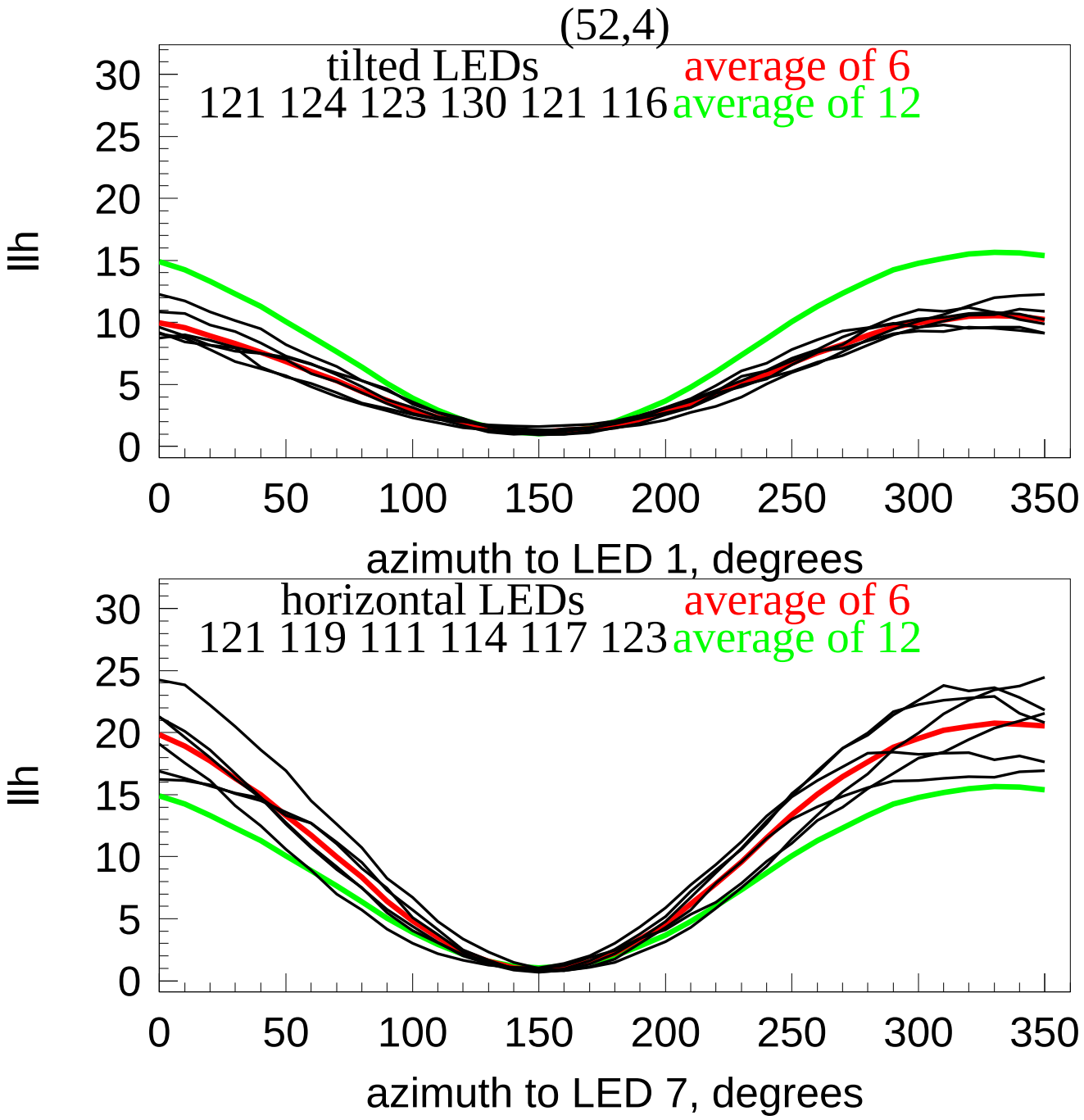

(52,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
241.4 ± 9.1

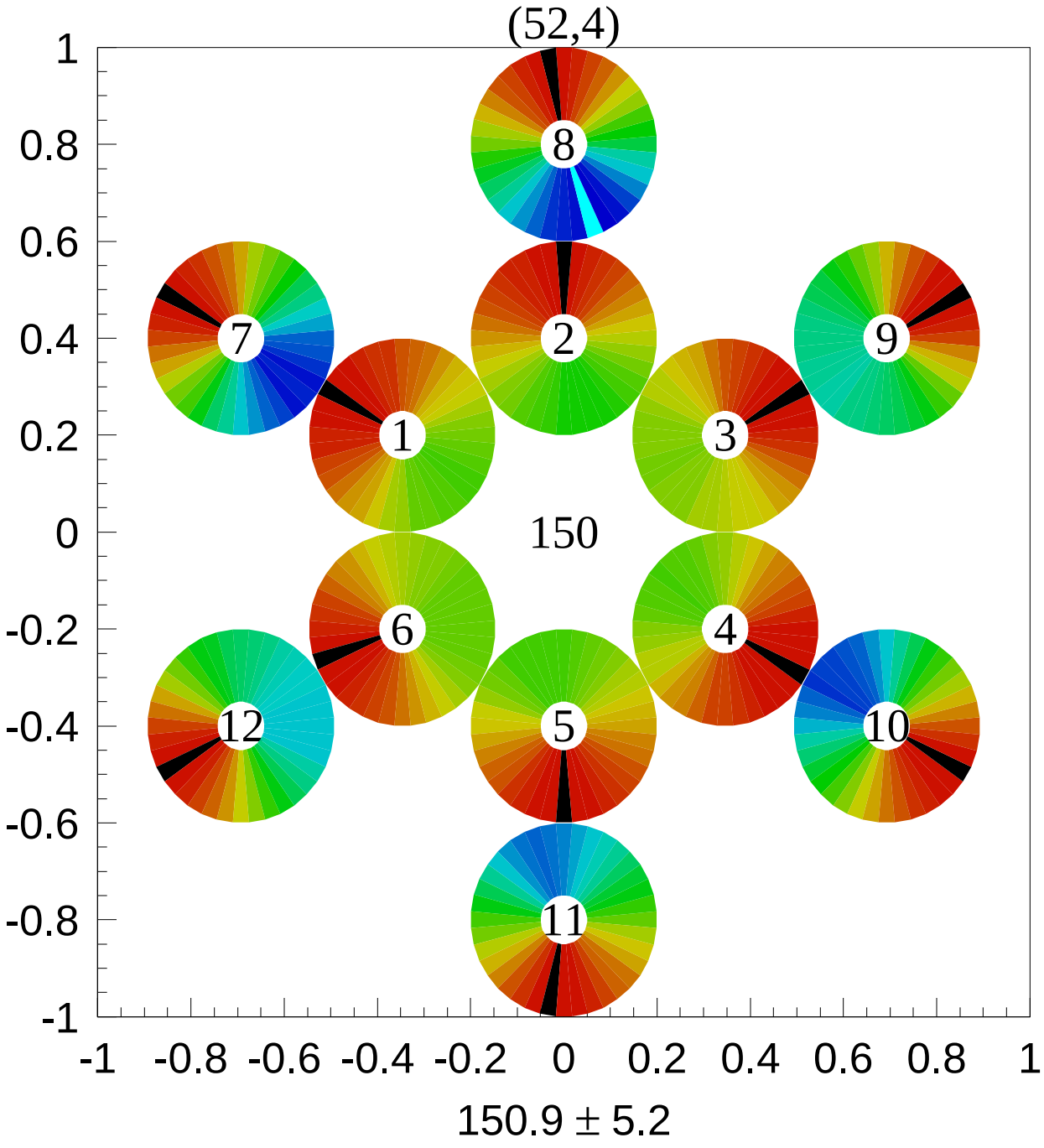

(52,2)
tilted LEDs
125 125 124 122 115 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 115 116 121 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

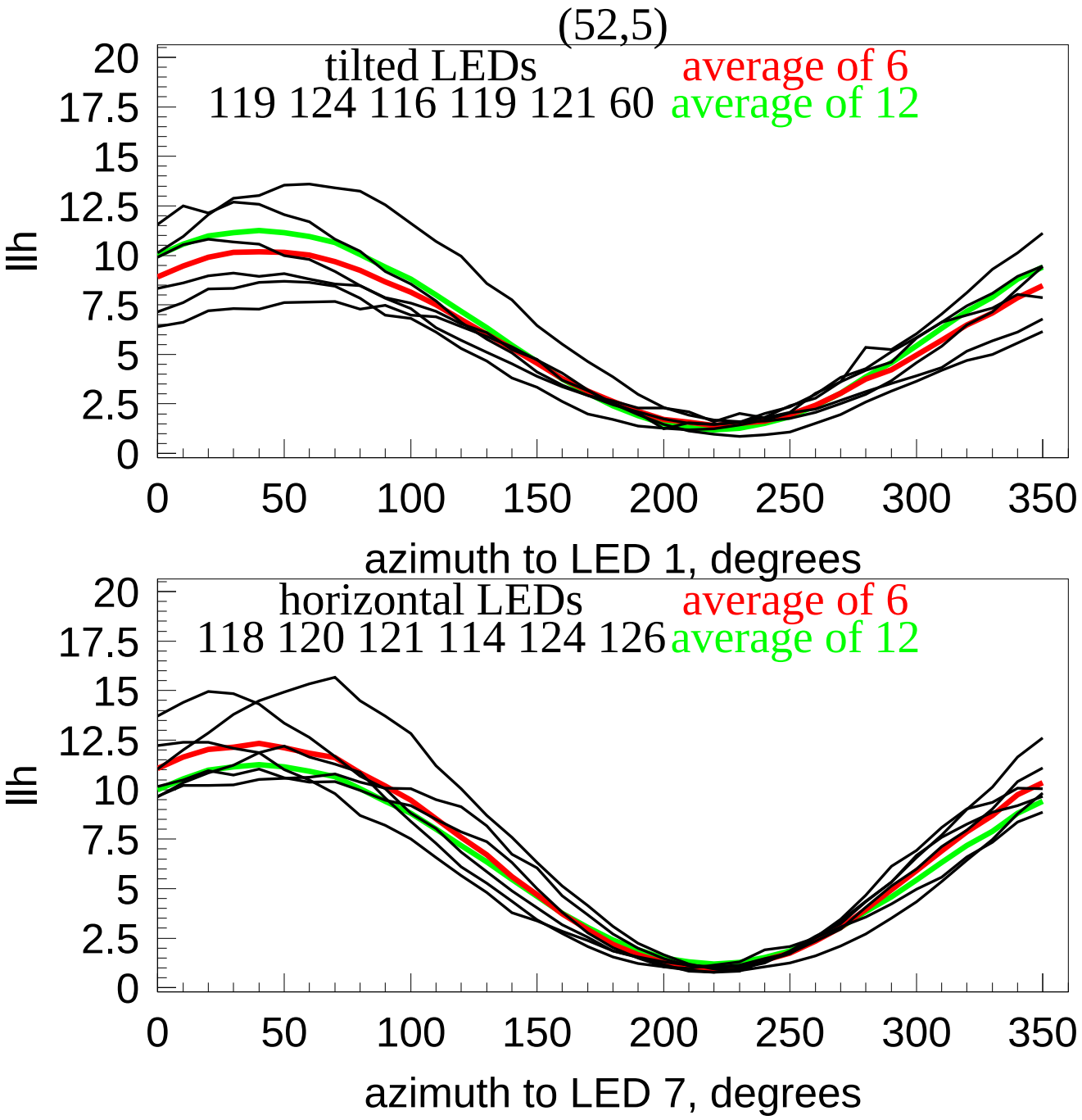

(52,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
227.4 ± 6.6

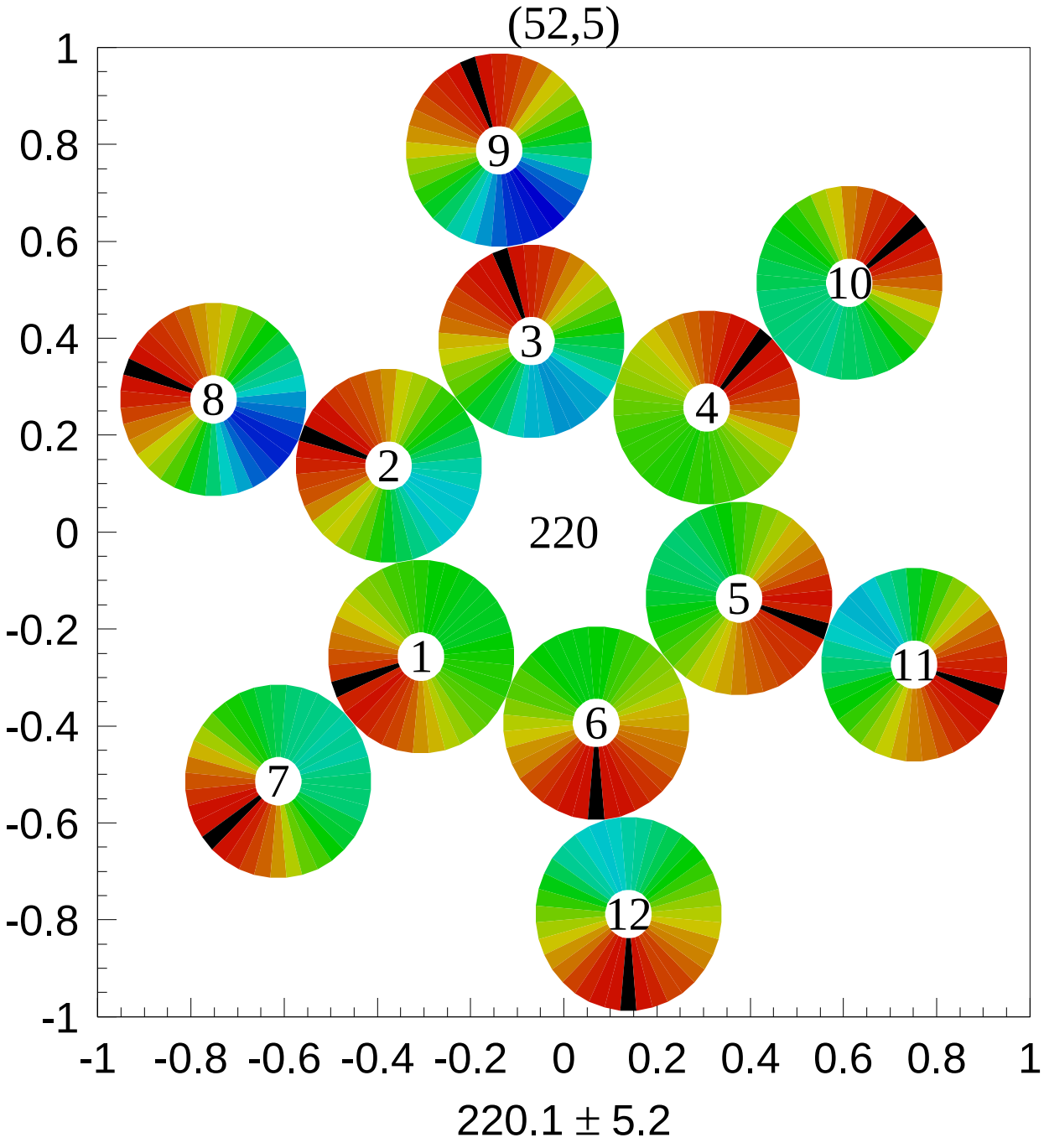

(52,3)
tilted LEDs
120 124 125 124 115 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 124 124 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

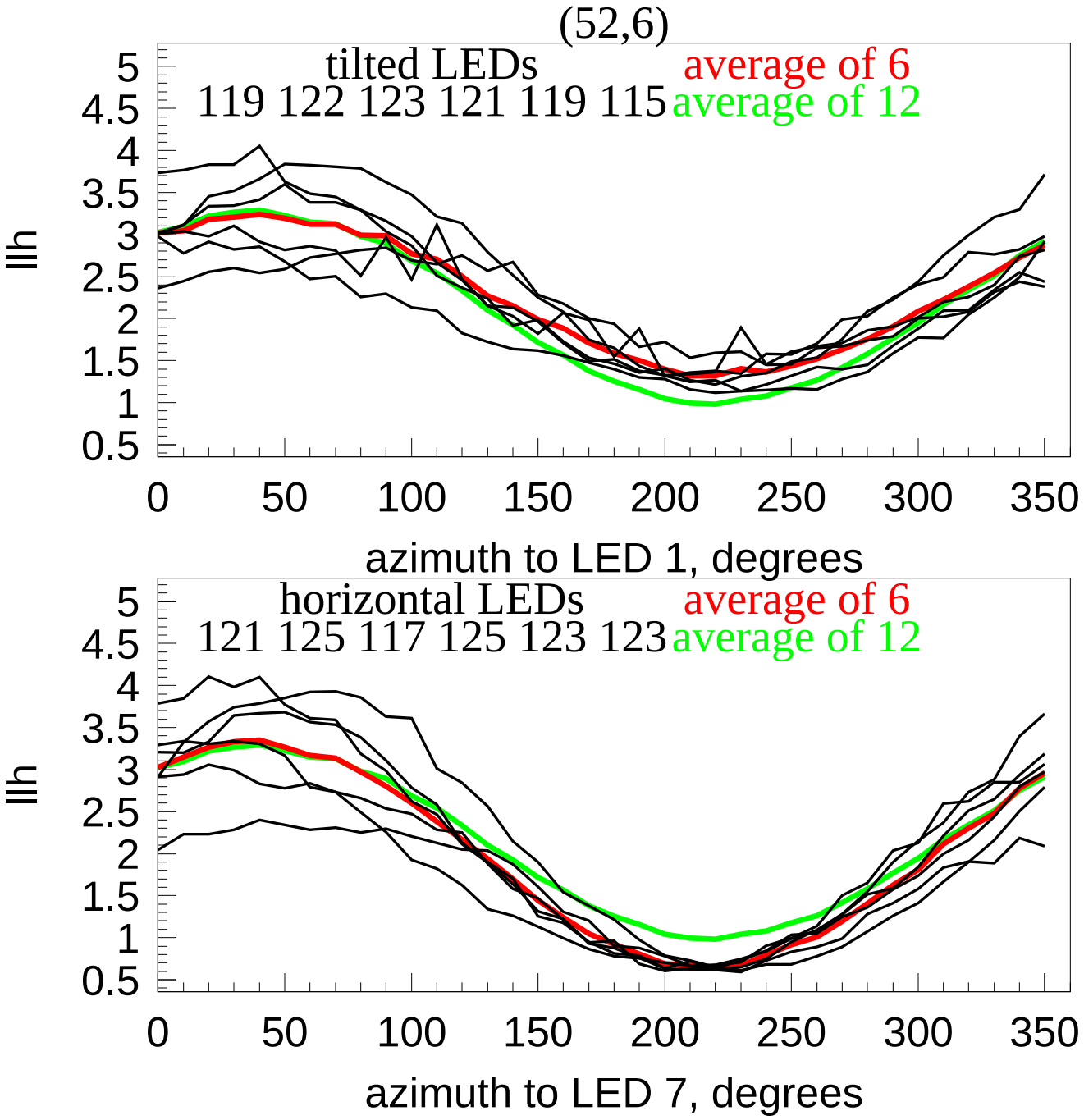

(52,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
72.7 ± 4.9

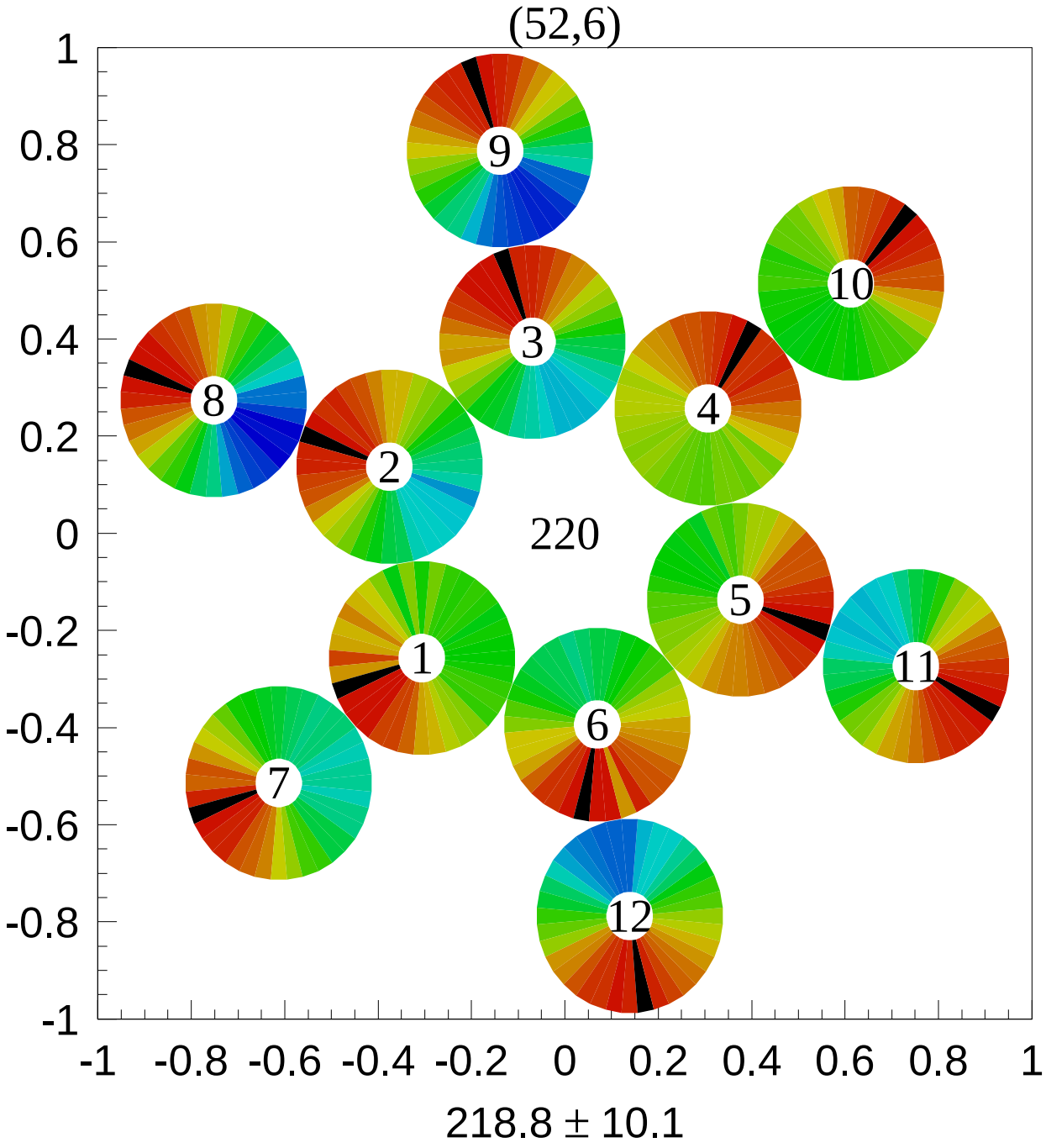

(52,4)
tilted LEDs
121 124 123 130 121 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 119 111 114 117 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

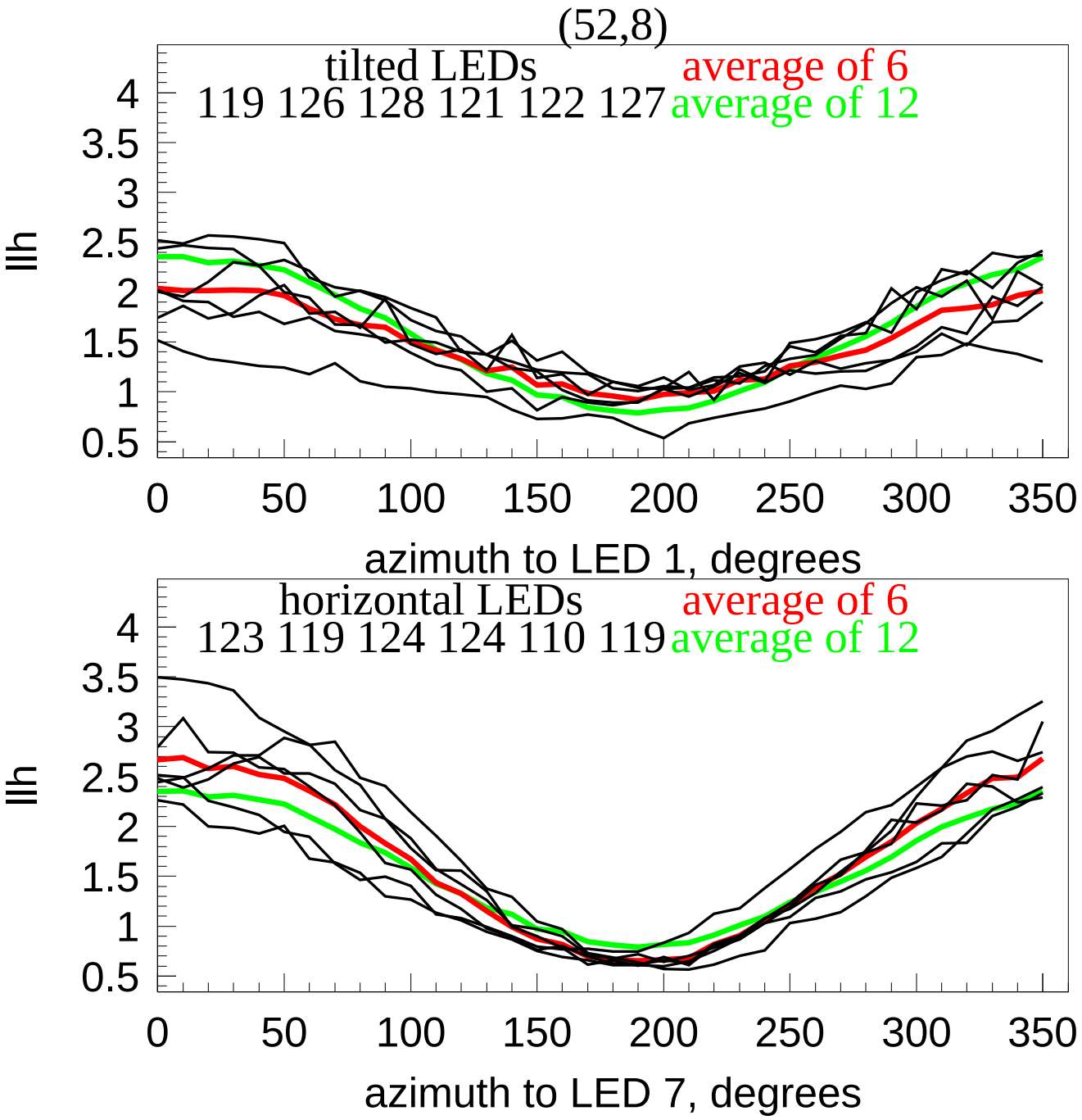

(52,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
150.9 ± 5.2

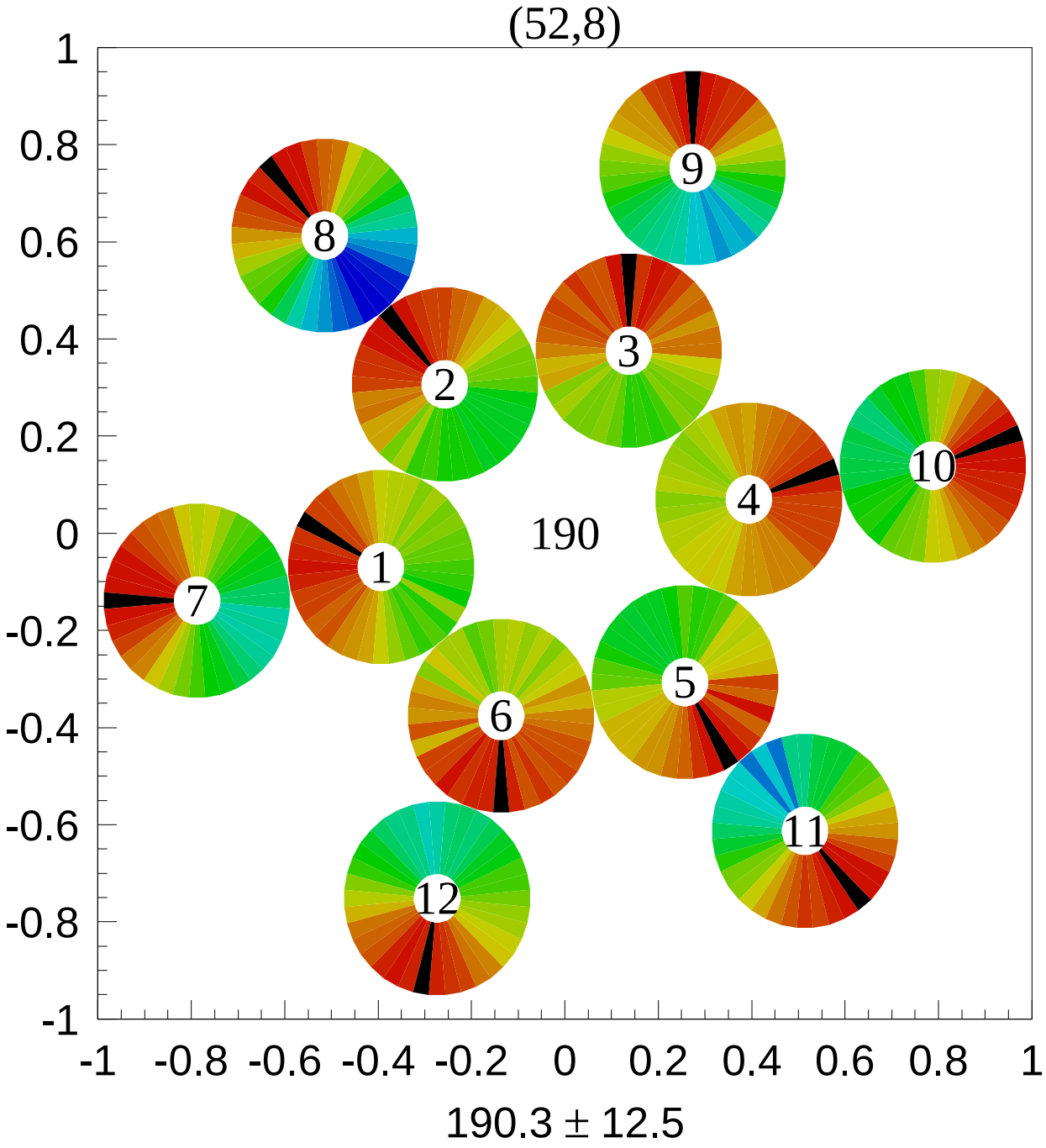

(52,5)
tilted LEDs
119 124 116 119 121 60
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 121 114 124 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

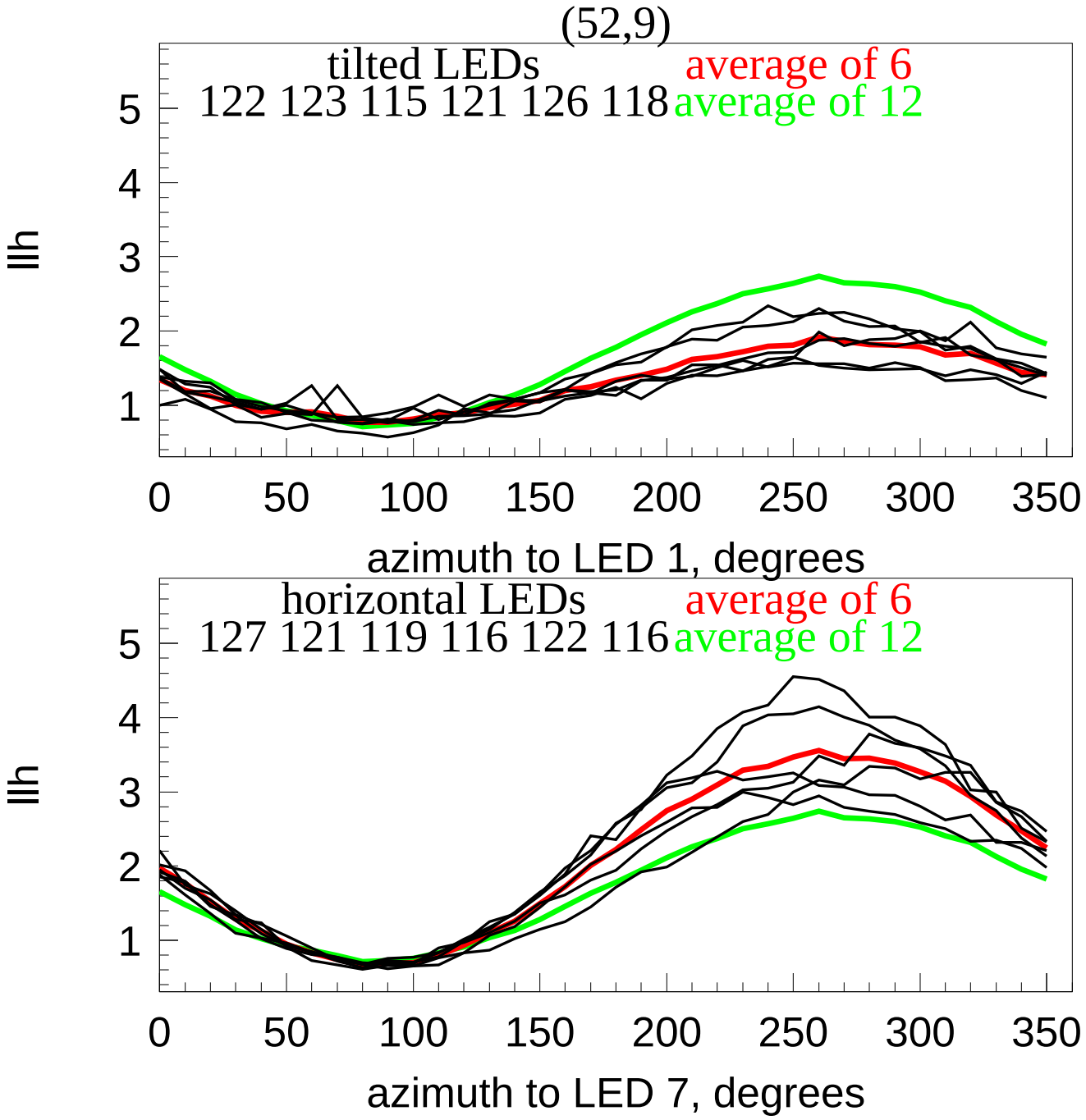

(52,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
220.1 ± 5.2

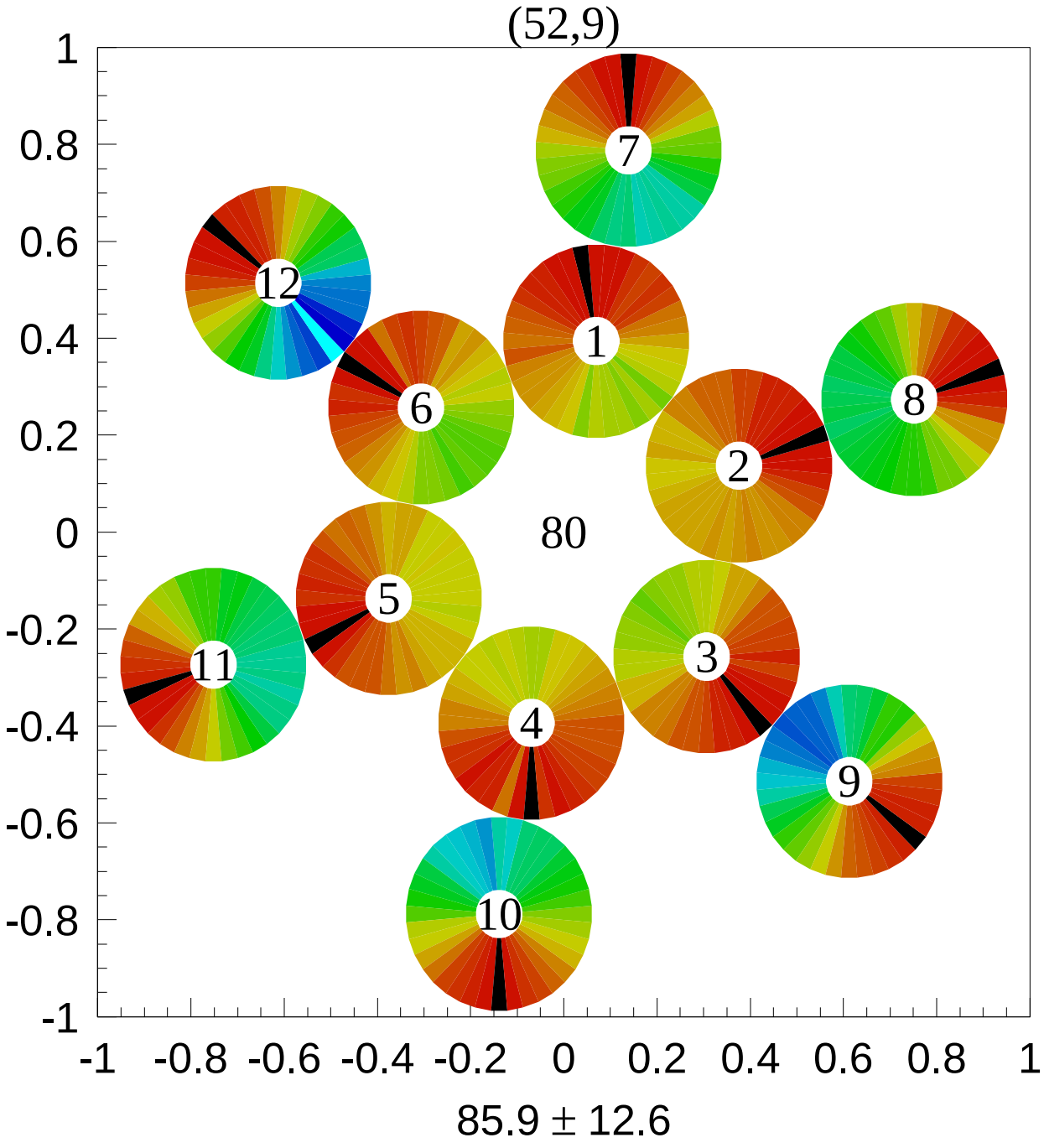

(52,6)
tilted LEDs
119 122 123 121 119 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 117 125 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

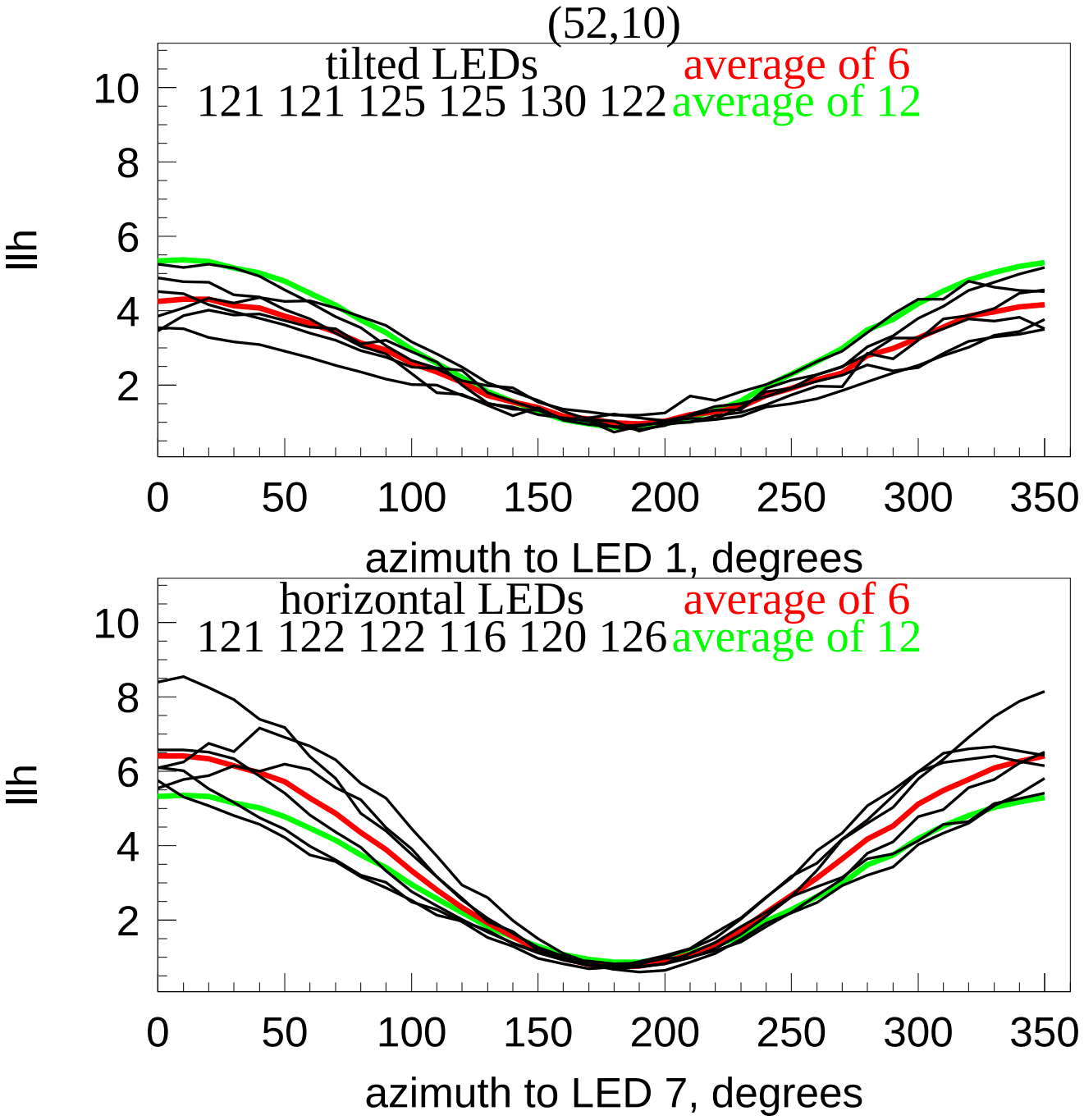

(52,6)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
218.8 ± 10.1

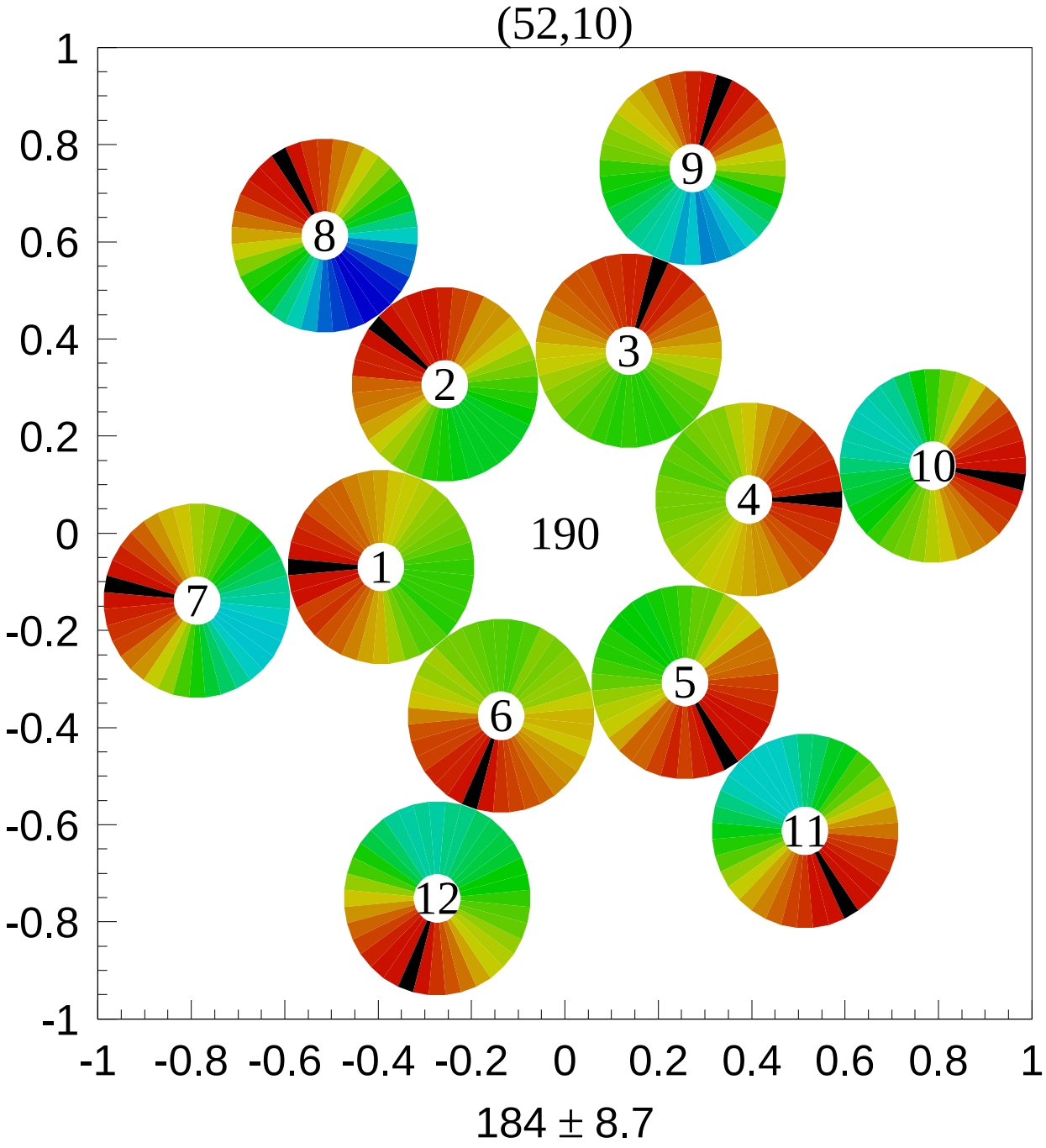

(52,8)
tilted LEDs
119 126 128 121 122 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 124 124 110 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

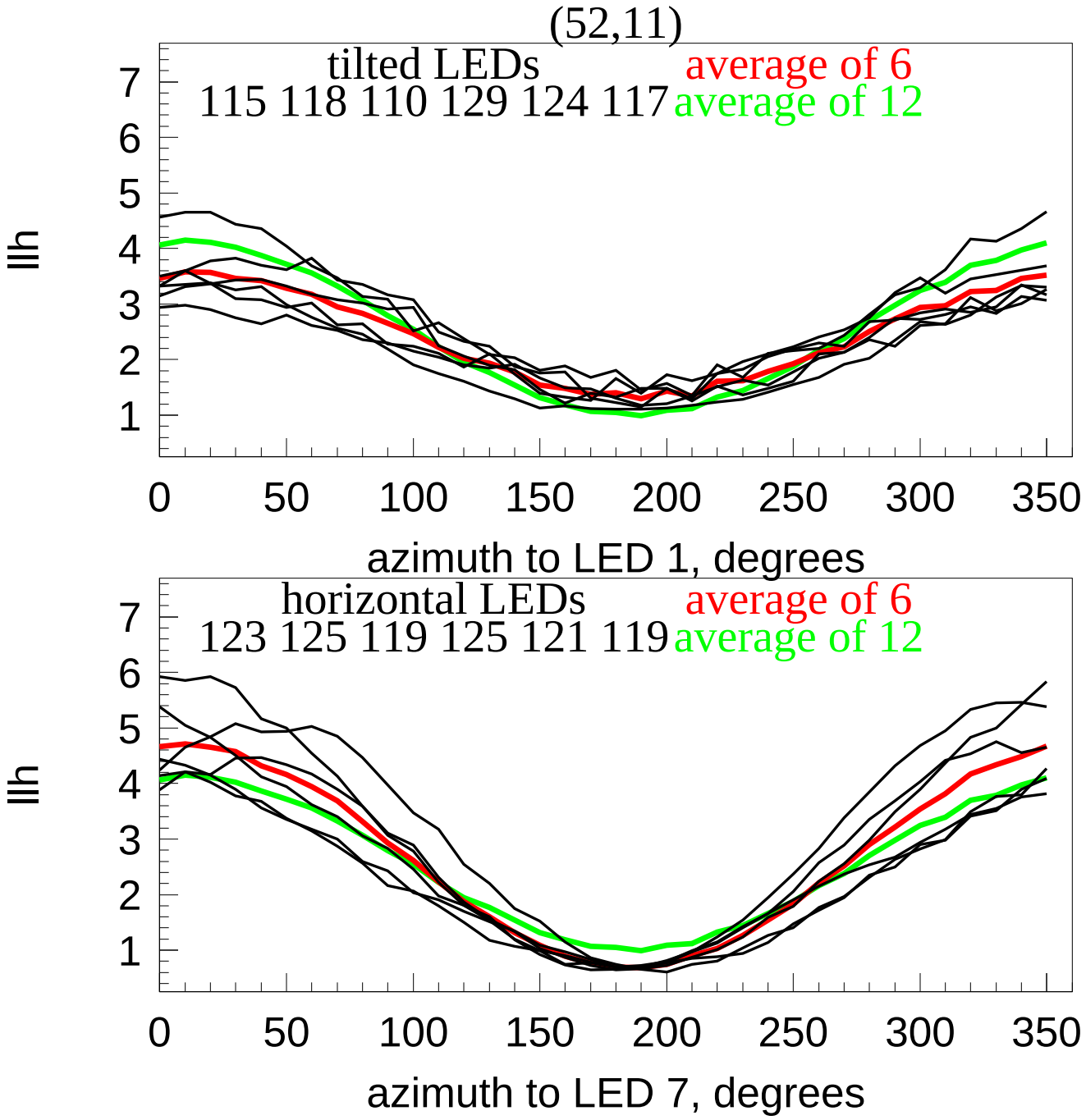

(52,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
190.3 ± 12.5

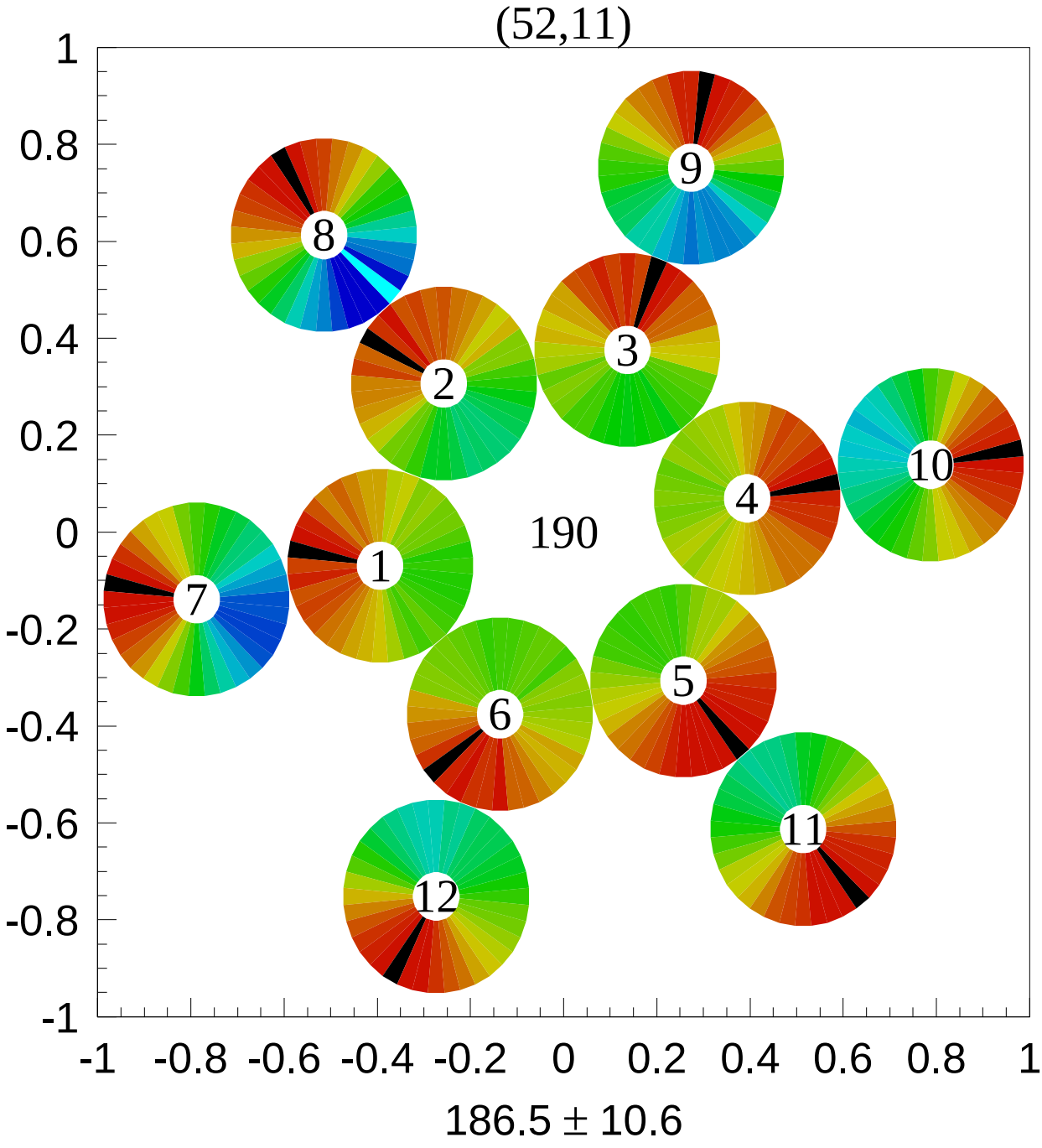

(52,9)
tilted LEDs
122 123 115 121 126 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 121 119 116 122 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

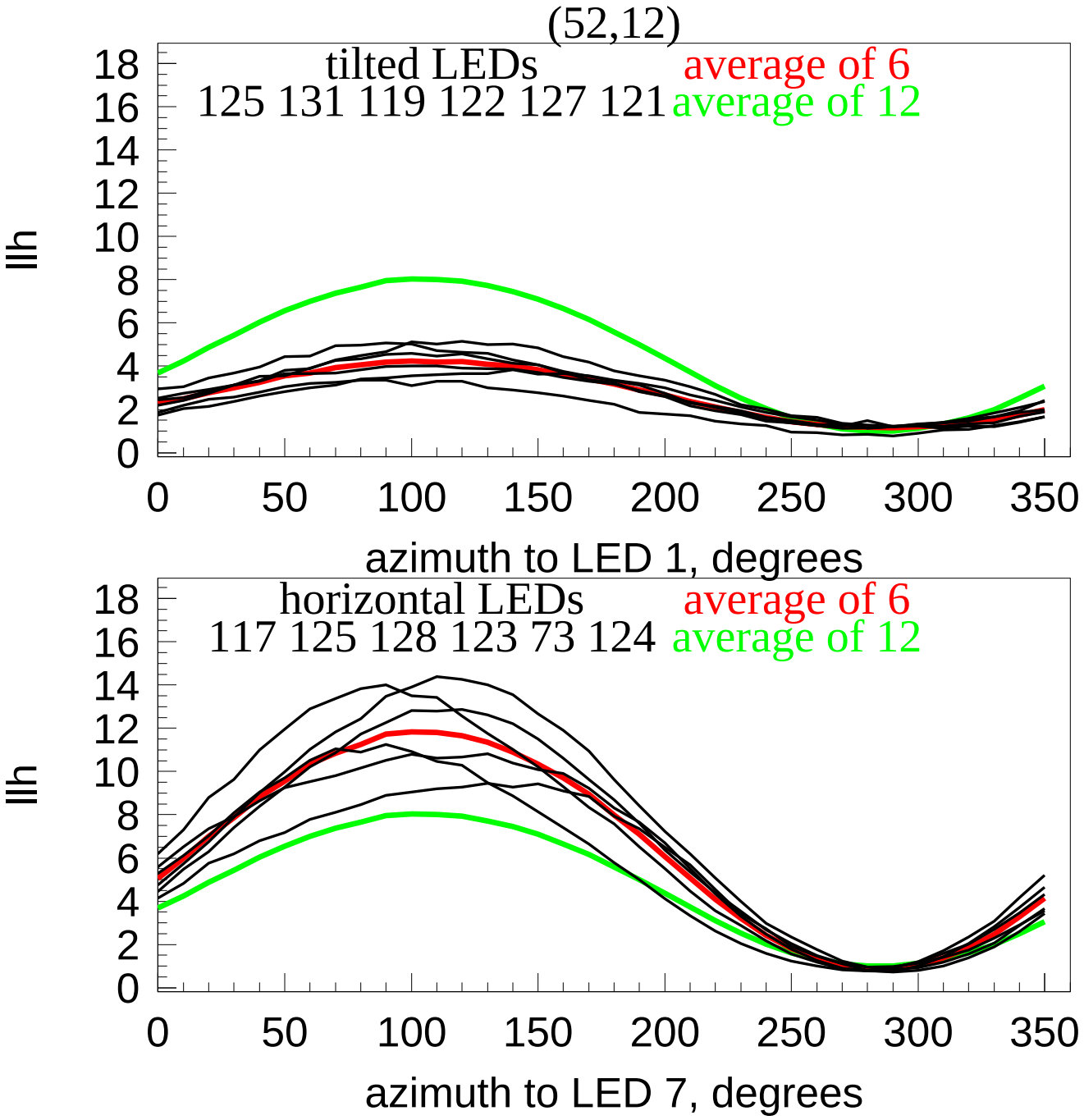

(52,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
85.9 ± 12.6

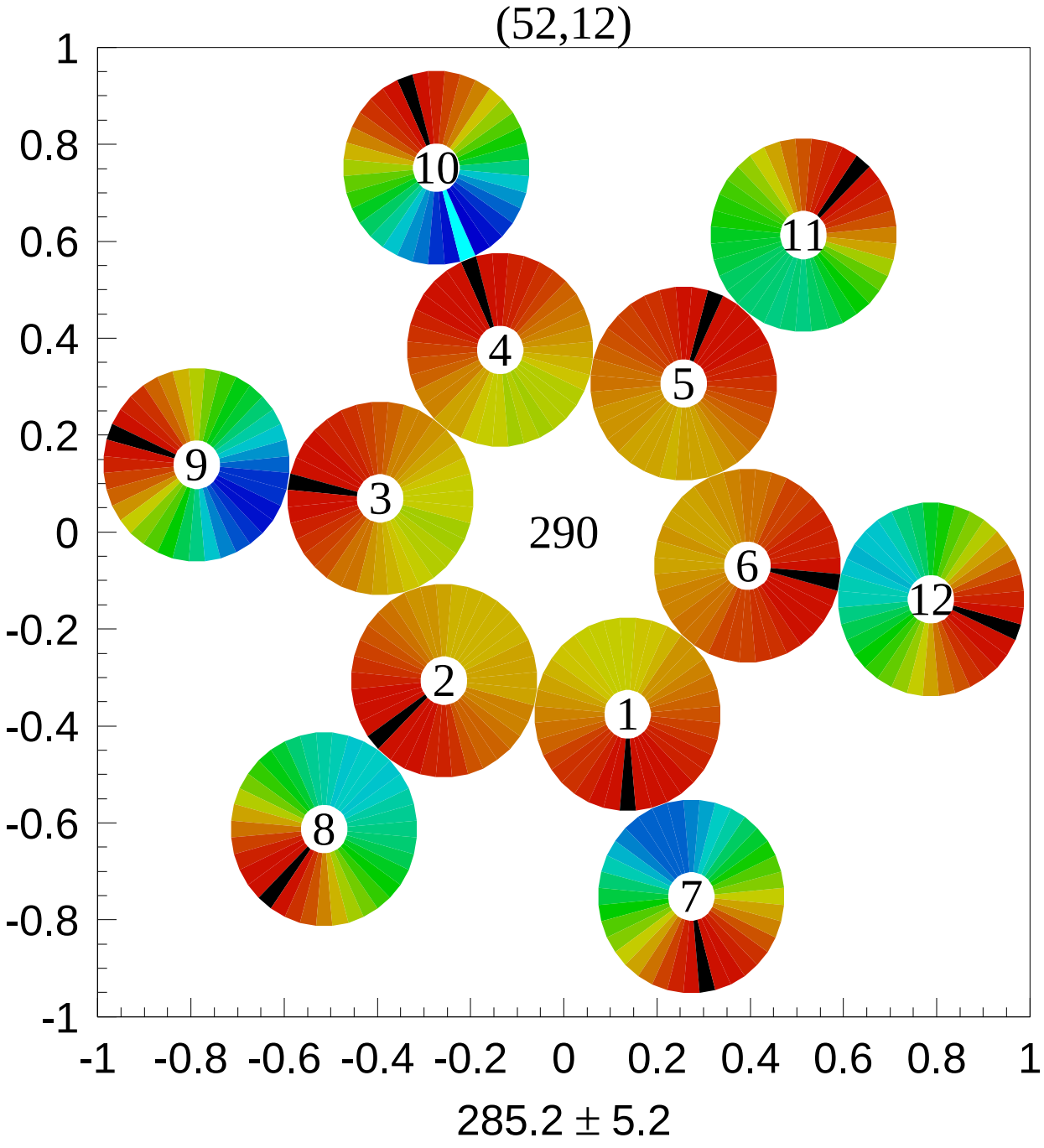

(52,10)
tilted LEDs
121 121 125 125 130 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 122 116 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

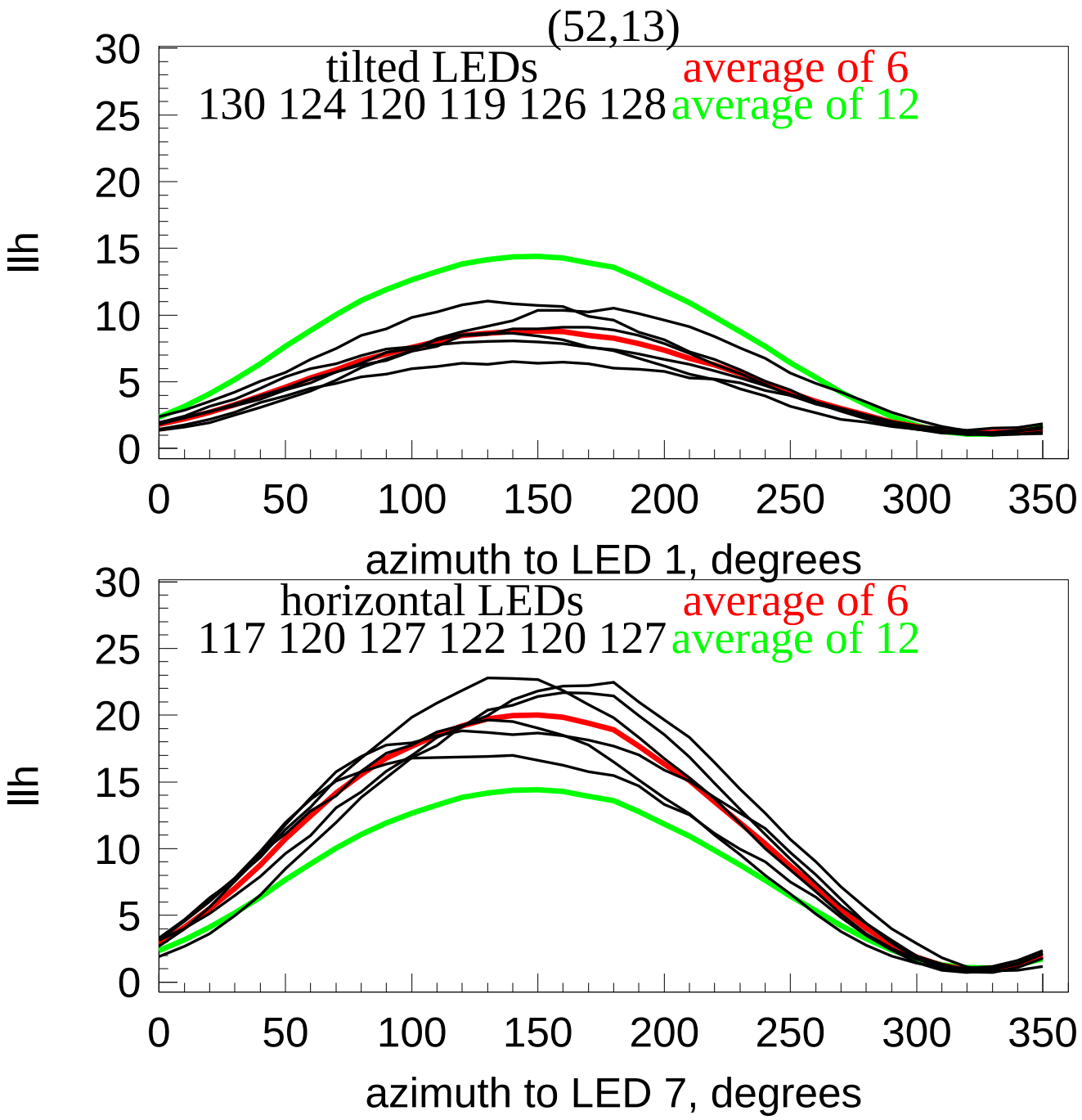

(52,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
184 ± 8.7

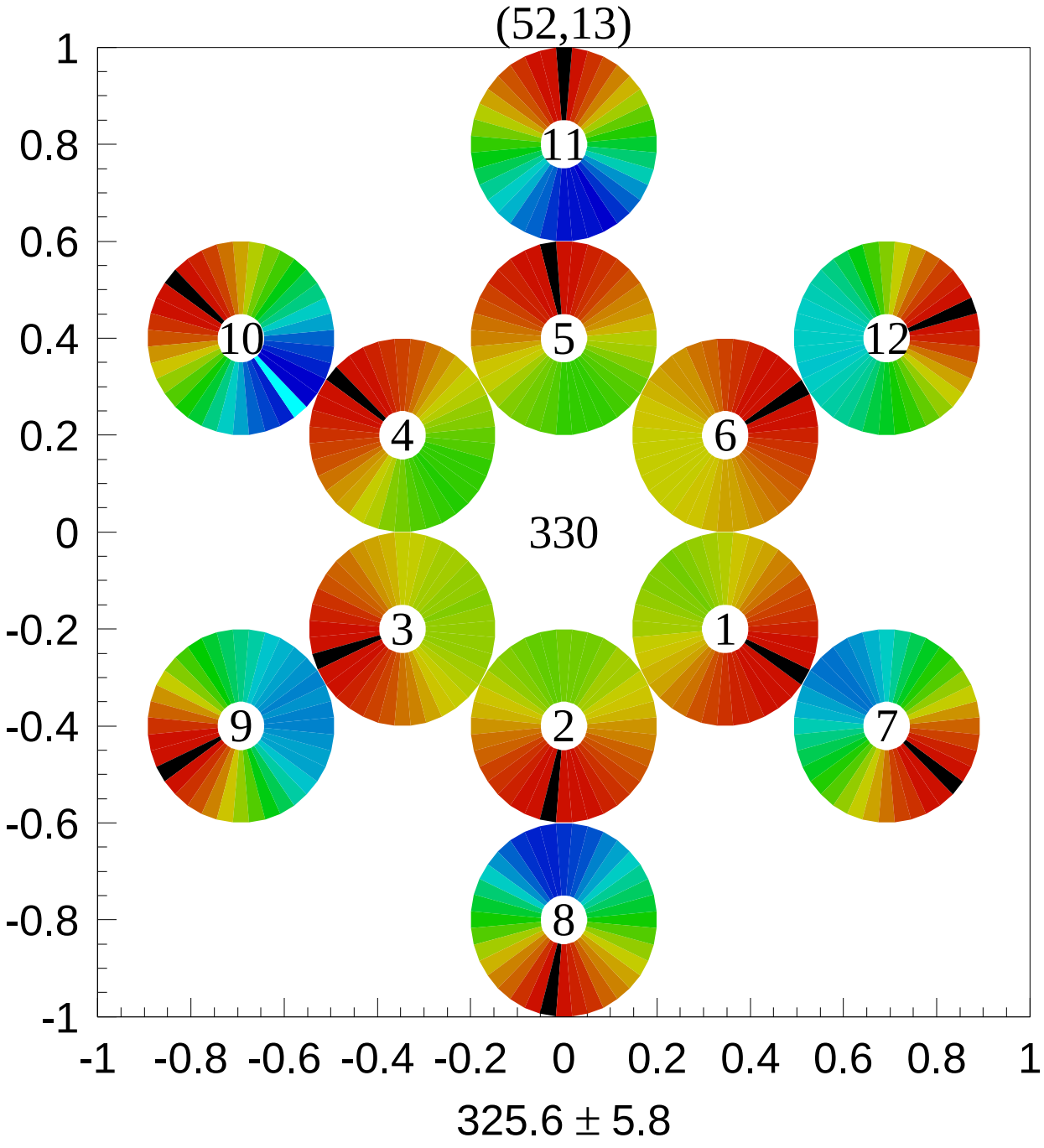

(52,11)
tilted LEDs
115 118 110 129 124 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 119 125 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

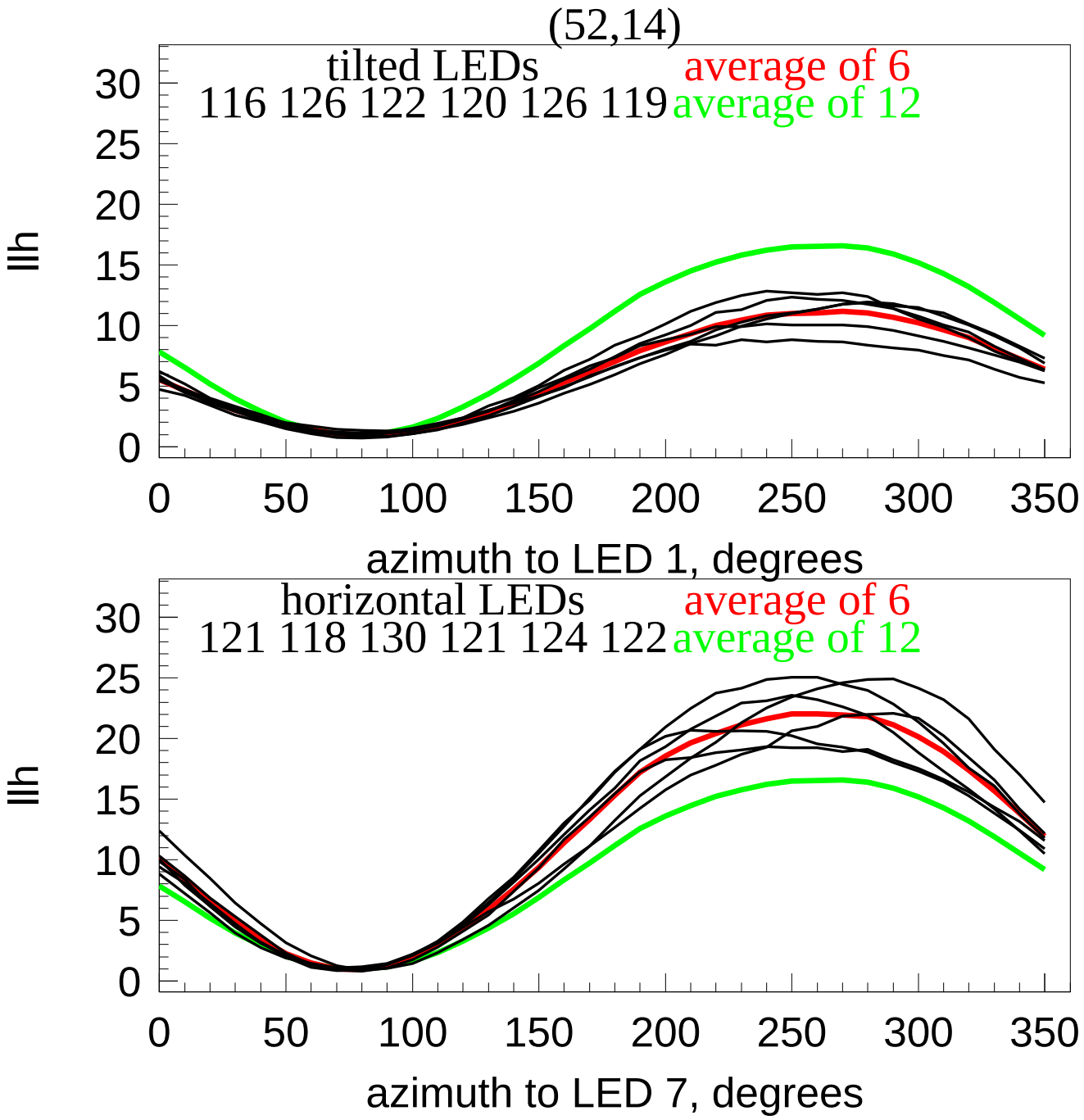

(52,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.5 ± 10.6
190
1
2
3
4
5
6
7
8
9
10
11
12

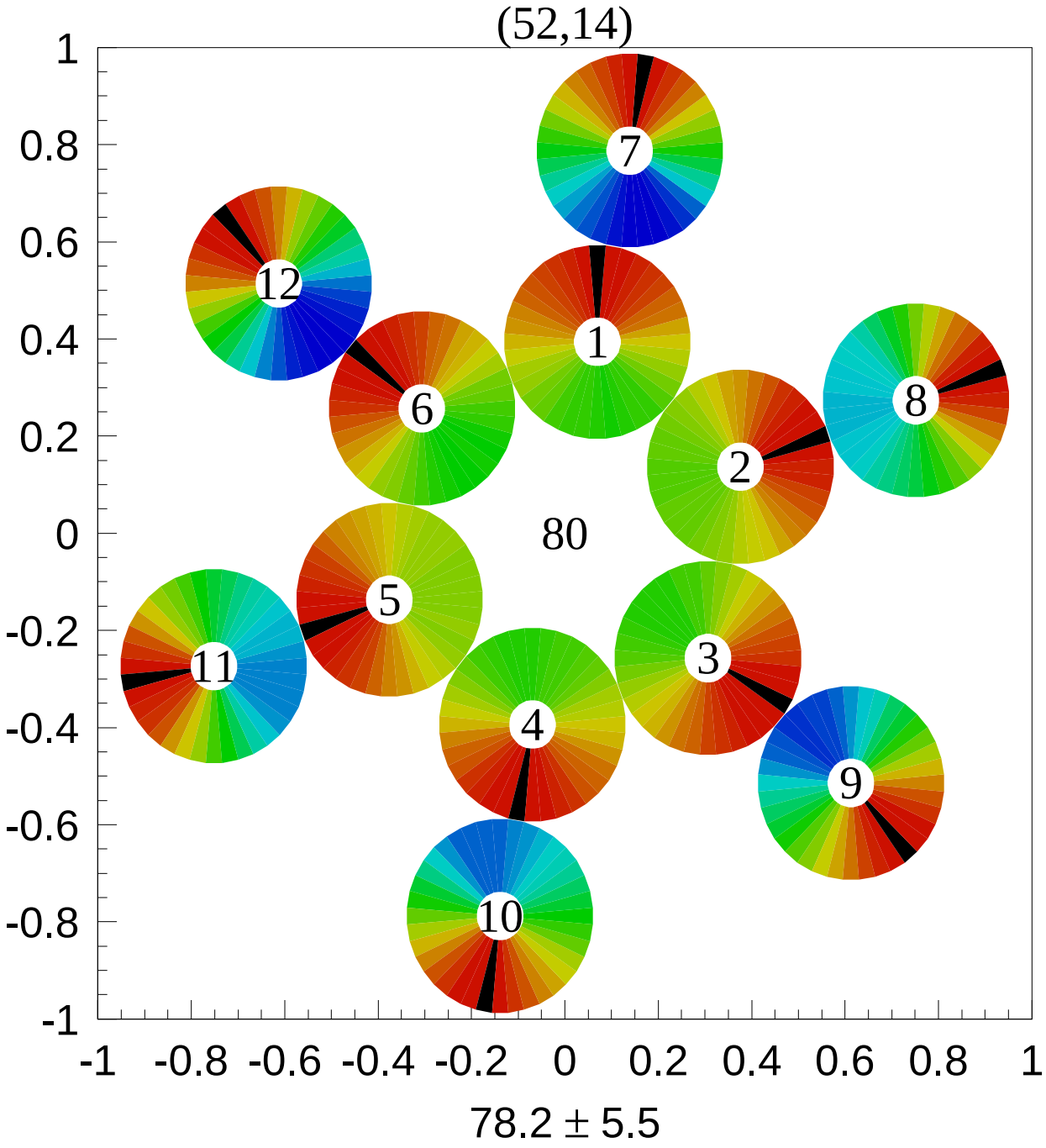

(52,12)
tilted LEDs
125 131 119 122 127 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 125 128 123 73 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

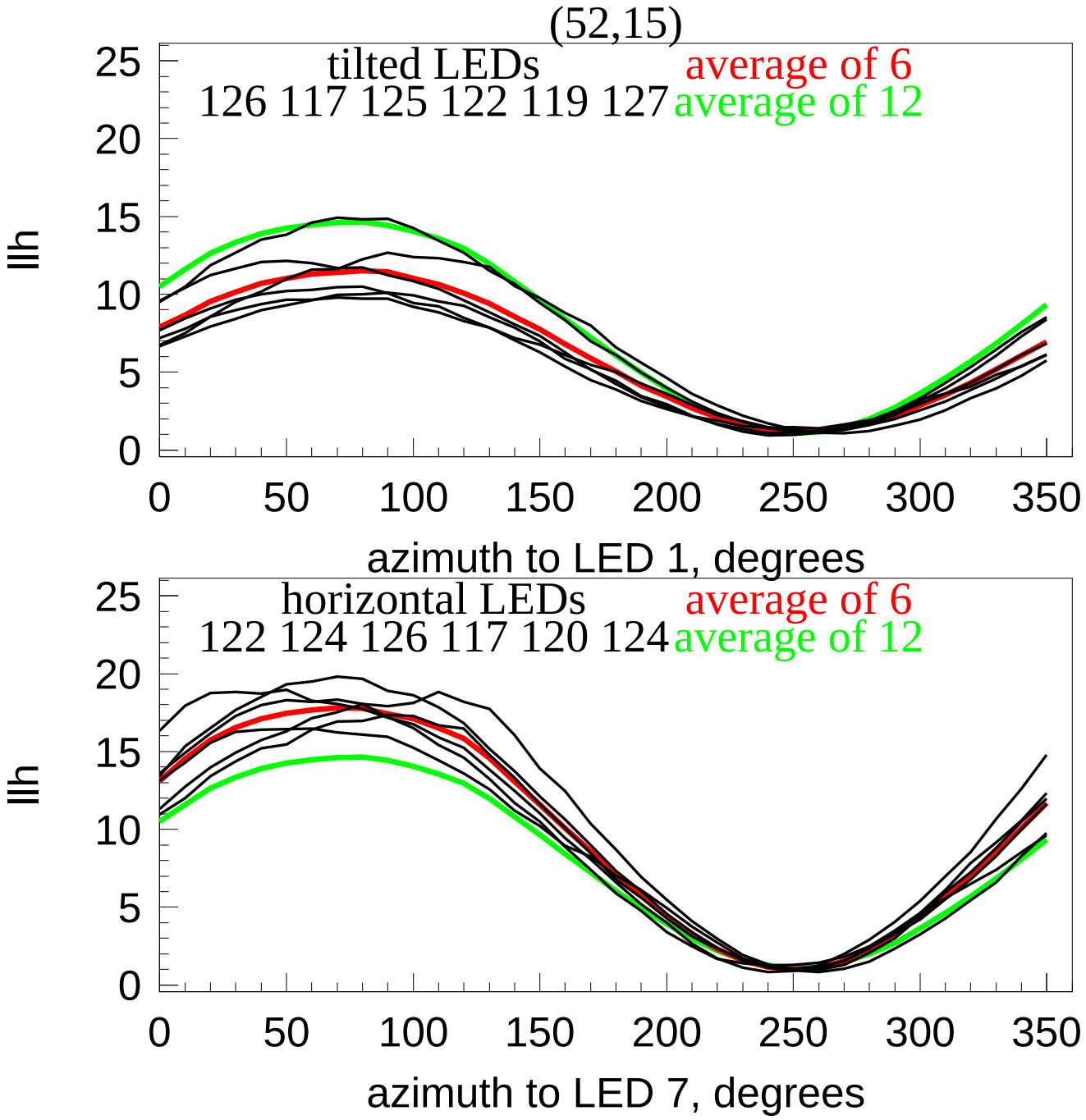

(52,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
285.2 ± 5.2

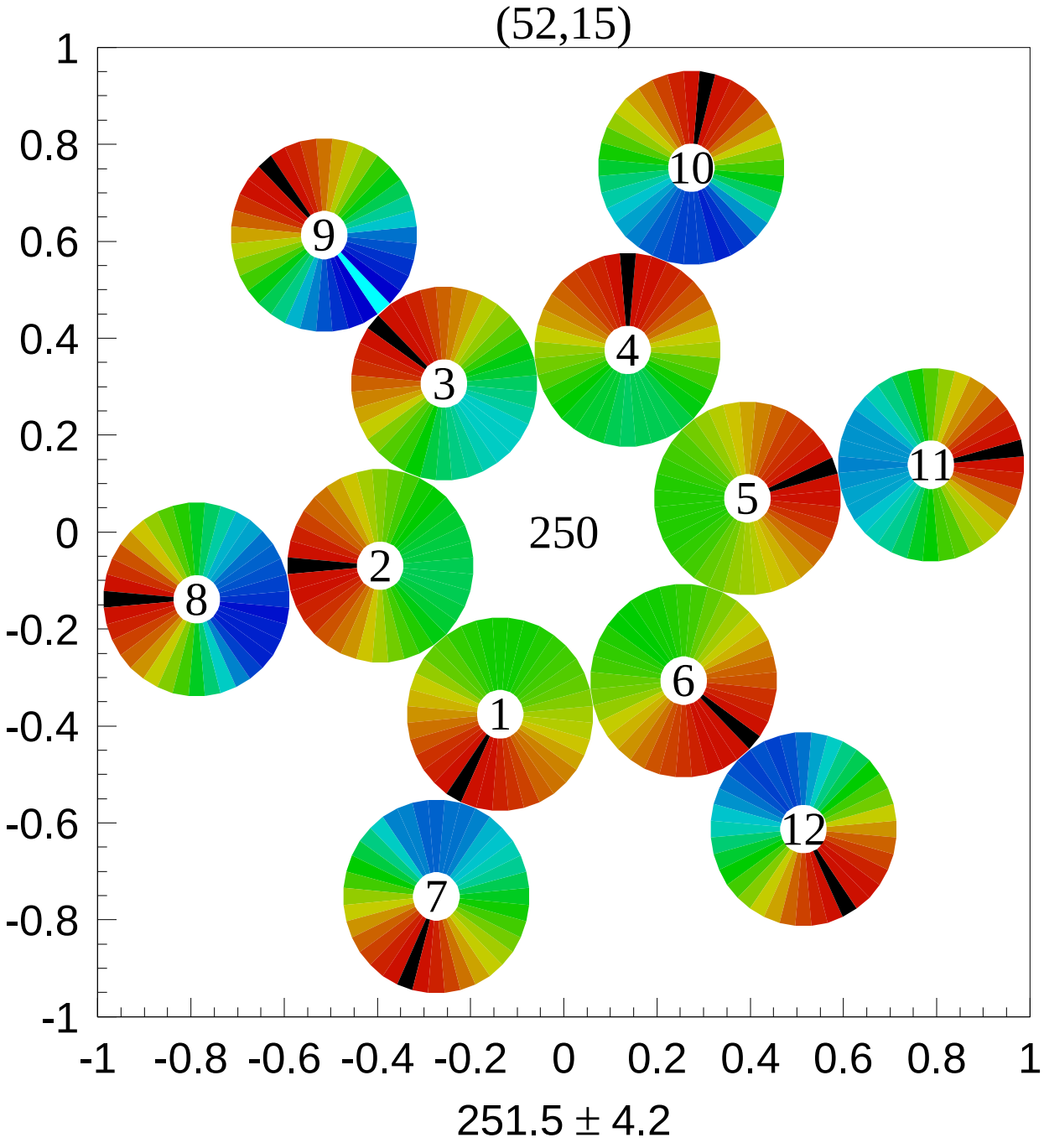

(52,13)
tilted LEDs
130 124 120 119 126 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 120 127 122 120 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

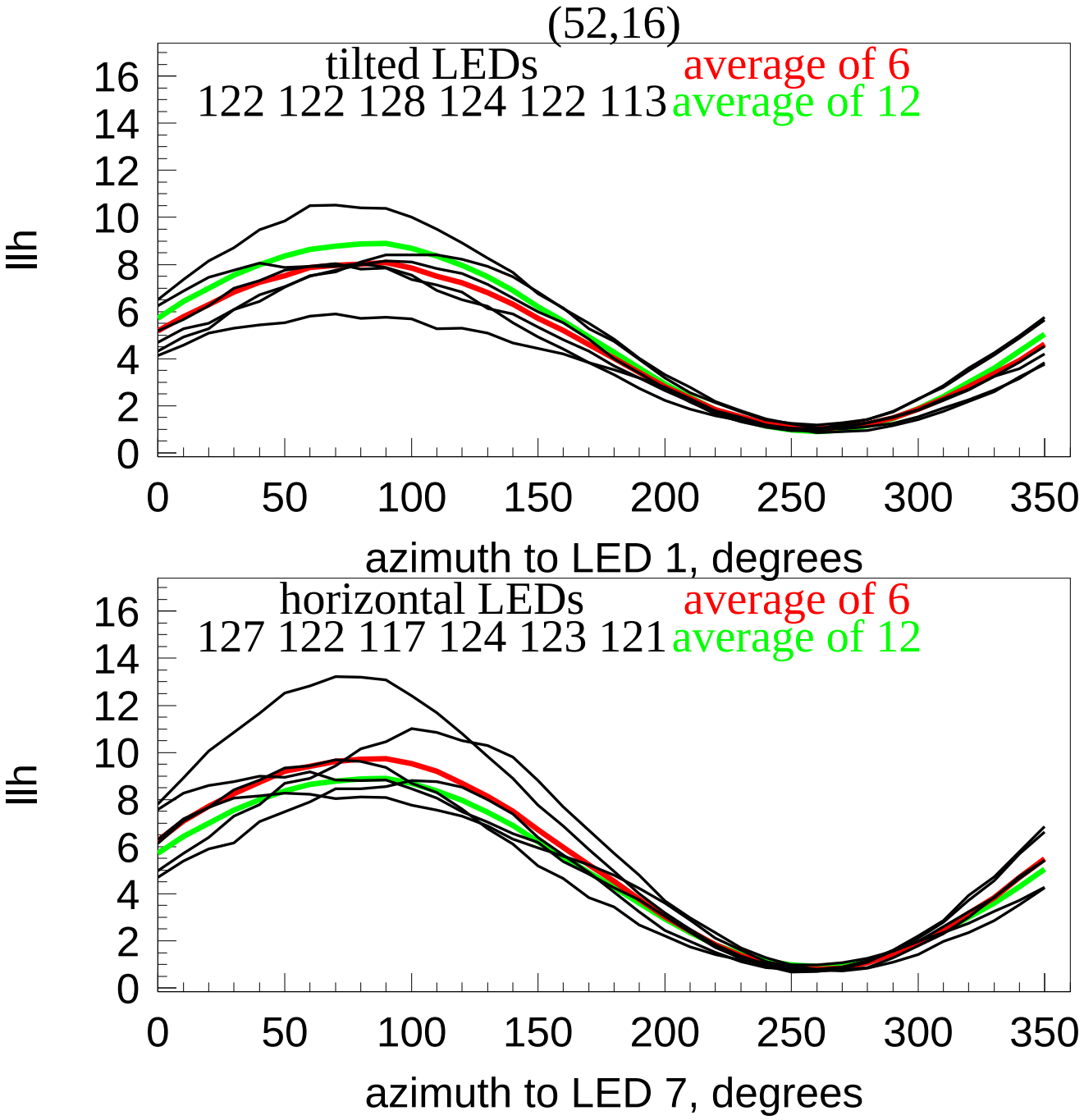

(52,13)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
325.6 ± 5.8

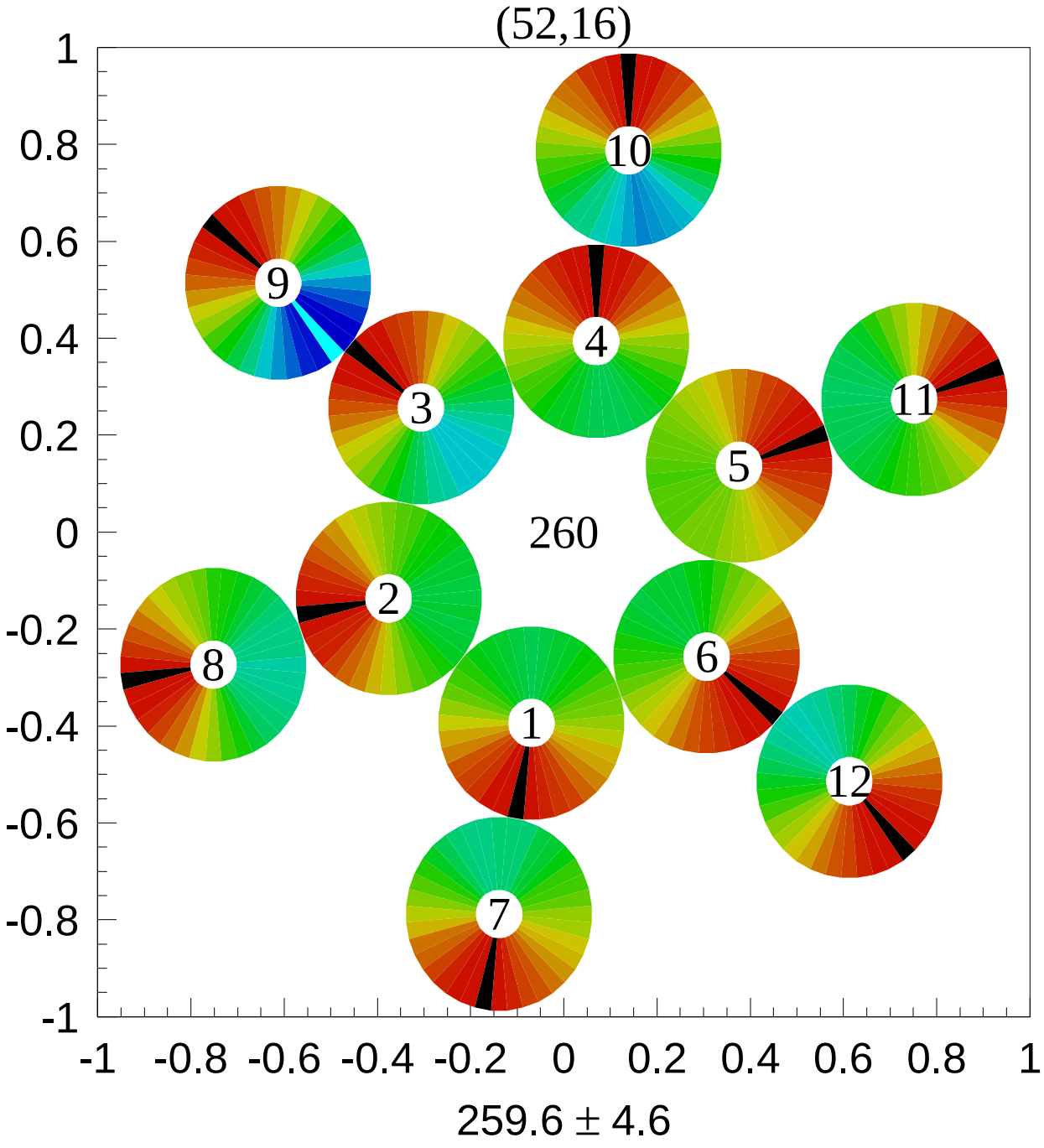

(52,14)
tilted LEDs
116 126 122 120 126 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 118 130 121 124 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

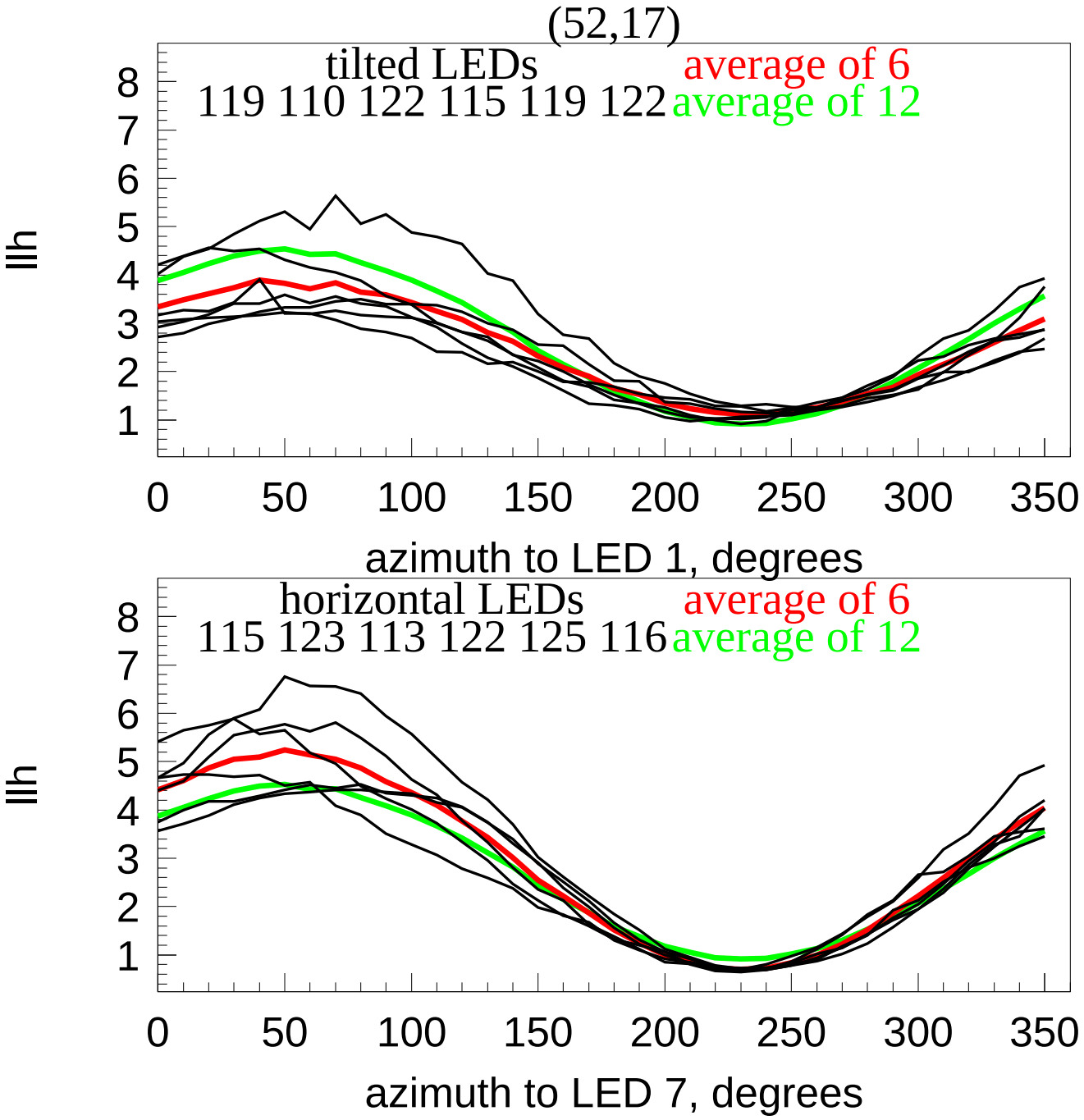

(52,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
78.2 ± 5.5

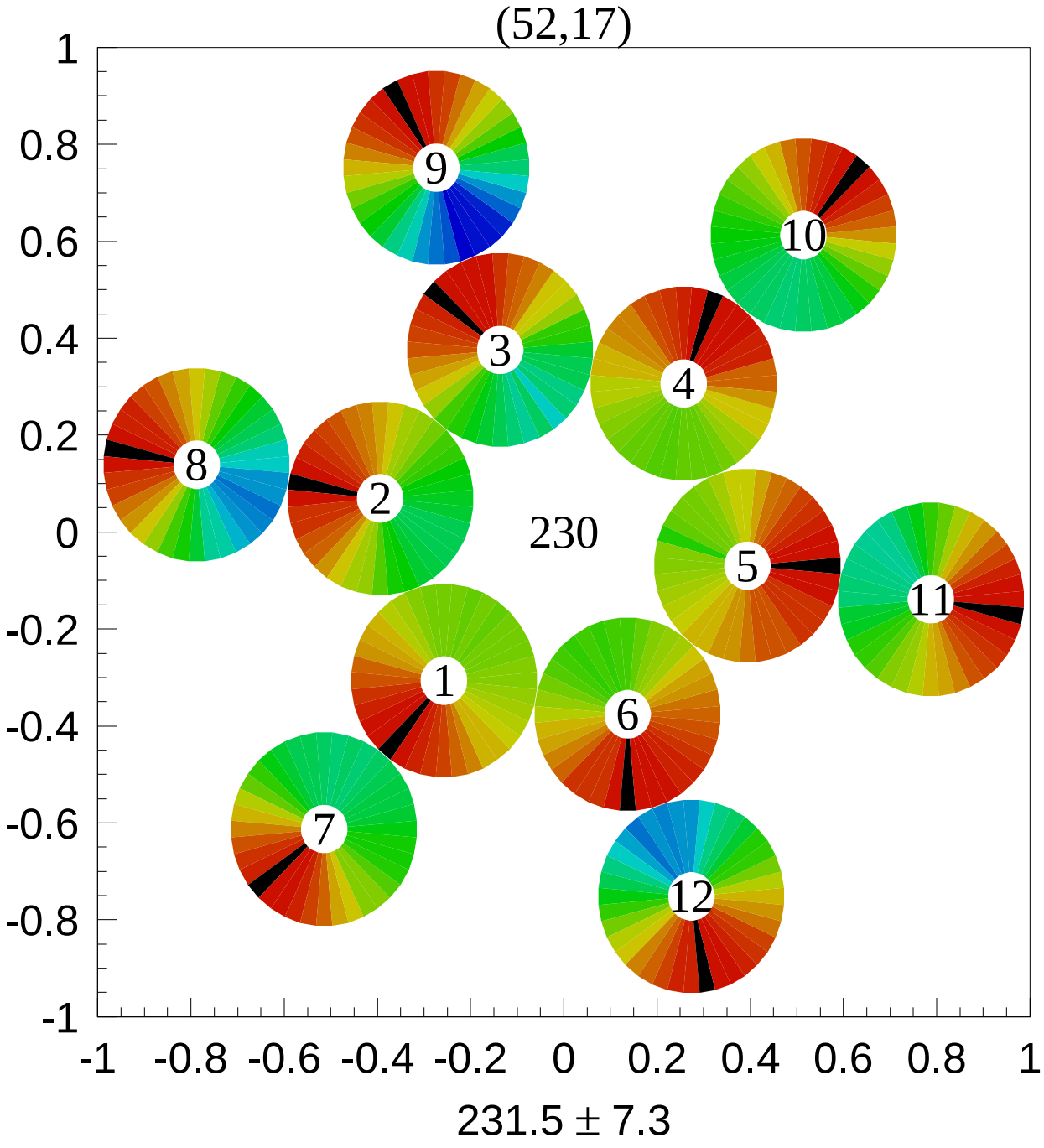

(52,15)
tilted LEDs
126 117 125 122 119 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 126 117 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

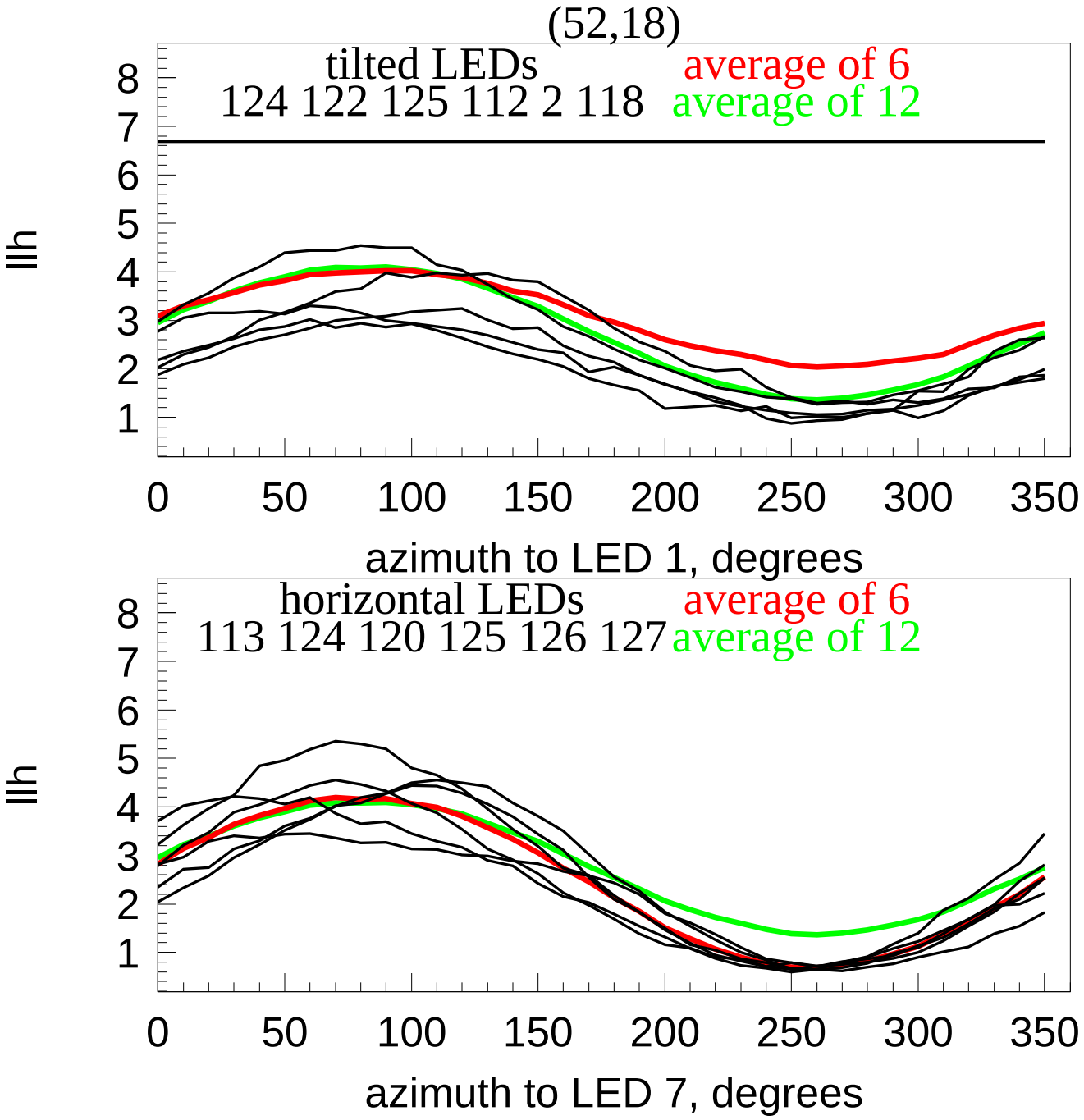

(52,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
251.5 ± 4.2

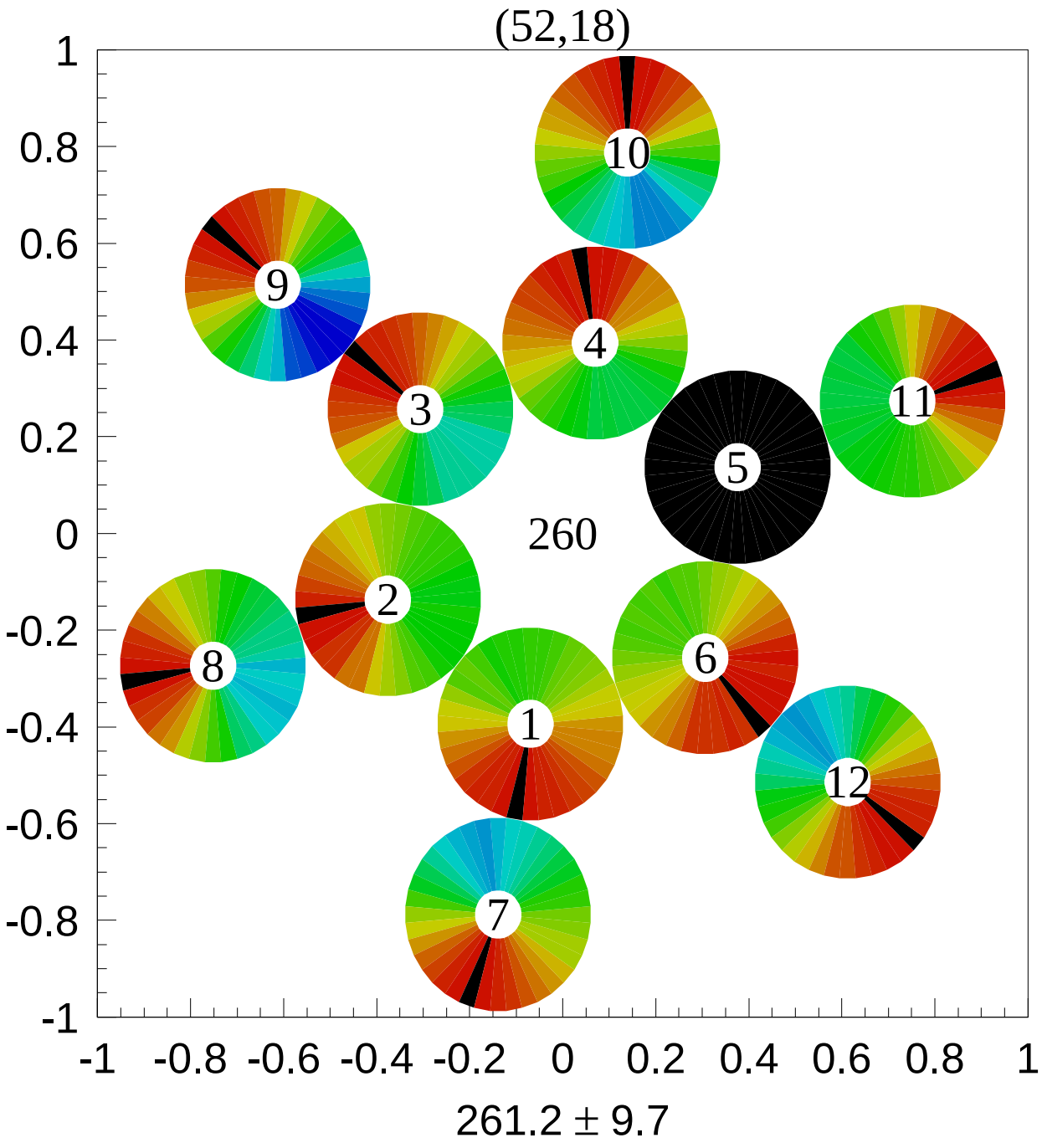

(52,16)
tilted LEDs
122 122 128 124 122 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 117 124 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

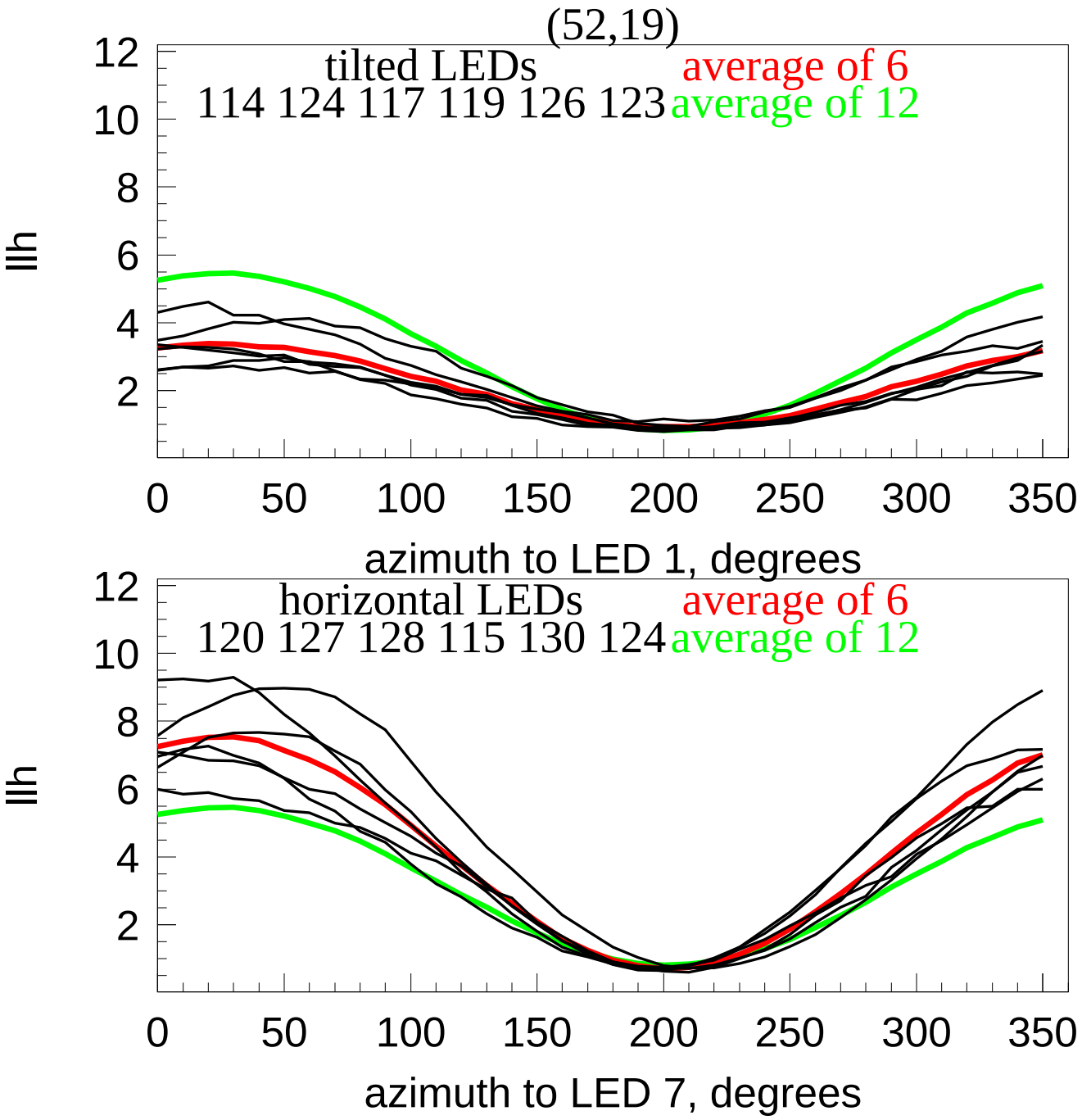

(52,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
259.6 ± 4.6

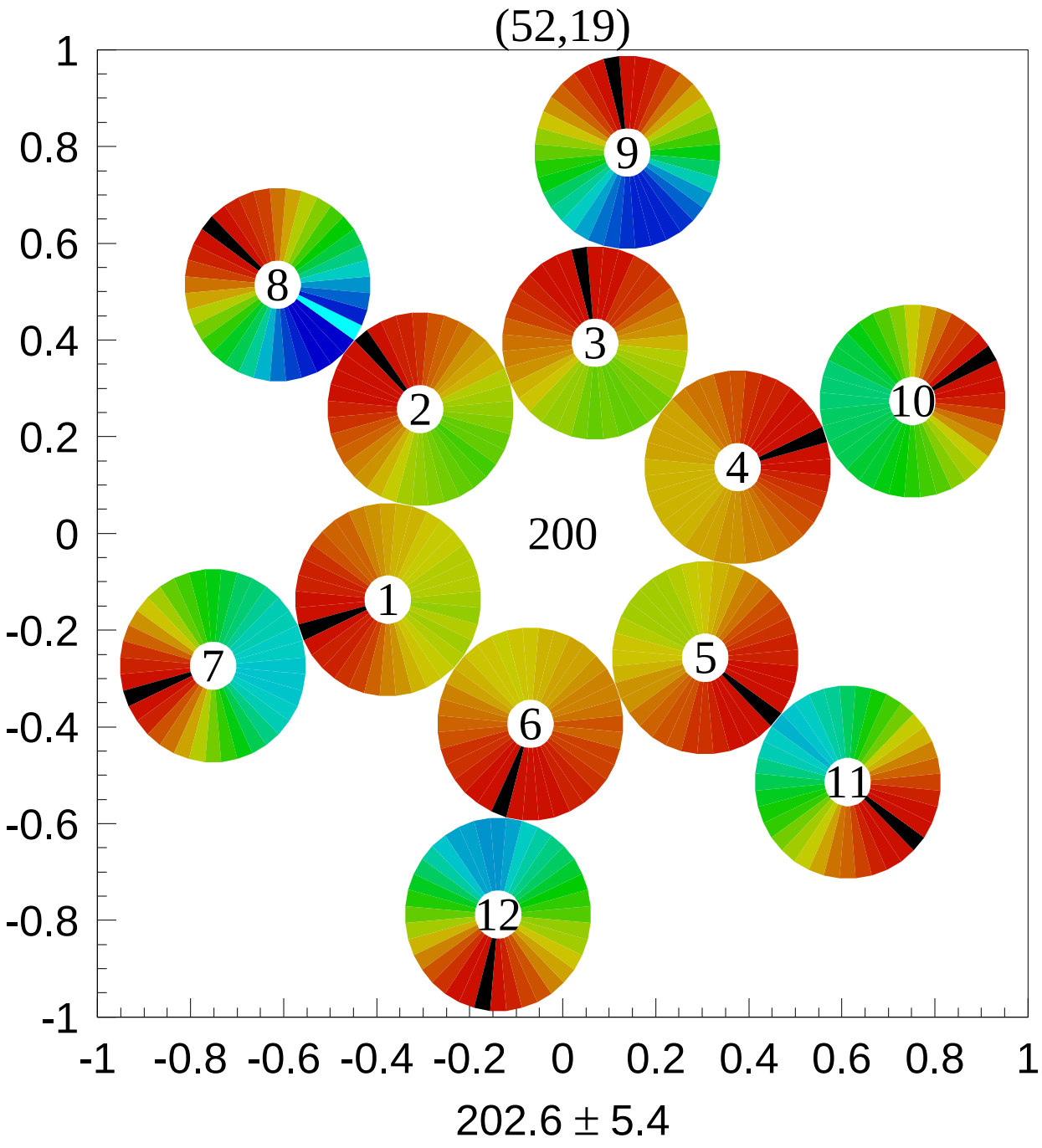

(52,17)
tilted LEDs
119 110 122 115 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 123 113 122 125 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

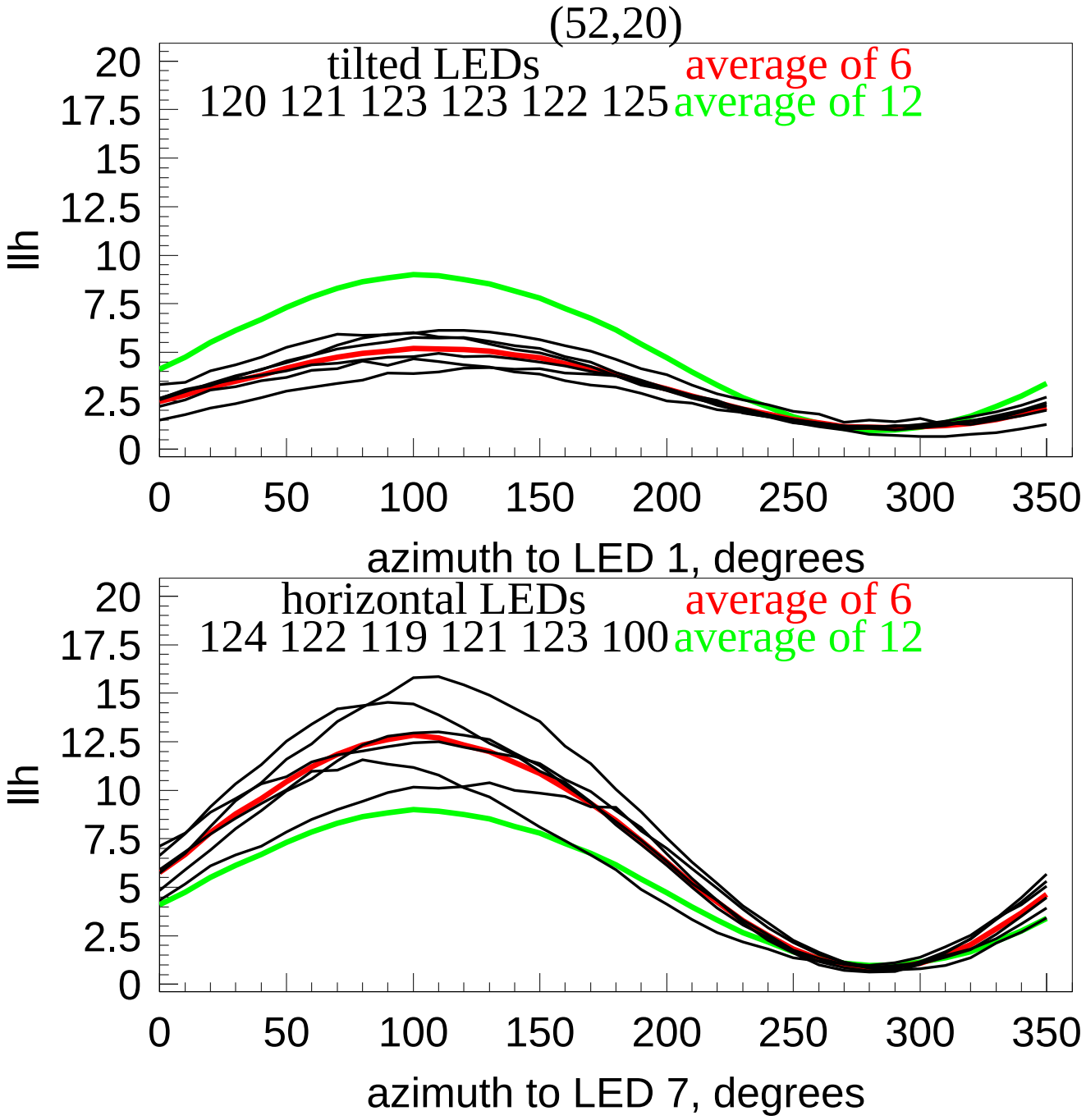

(52,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.5 ± 7.3

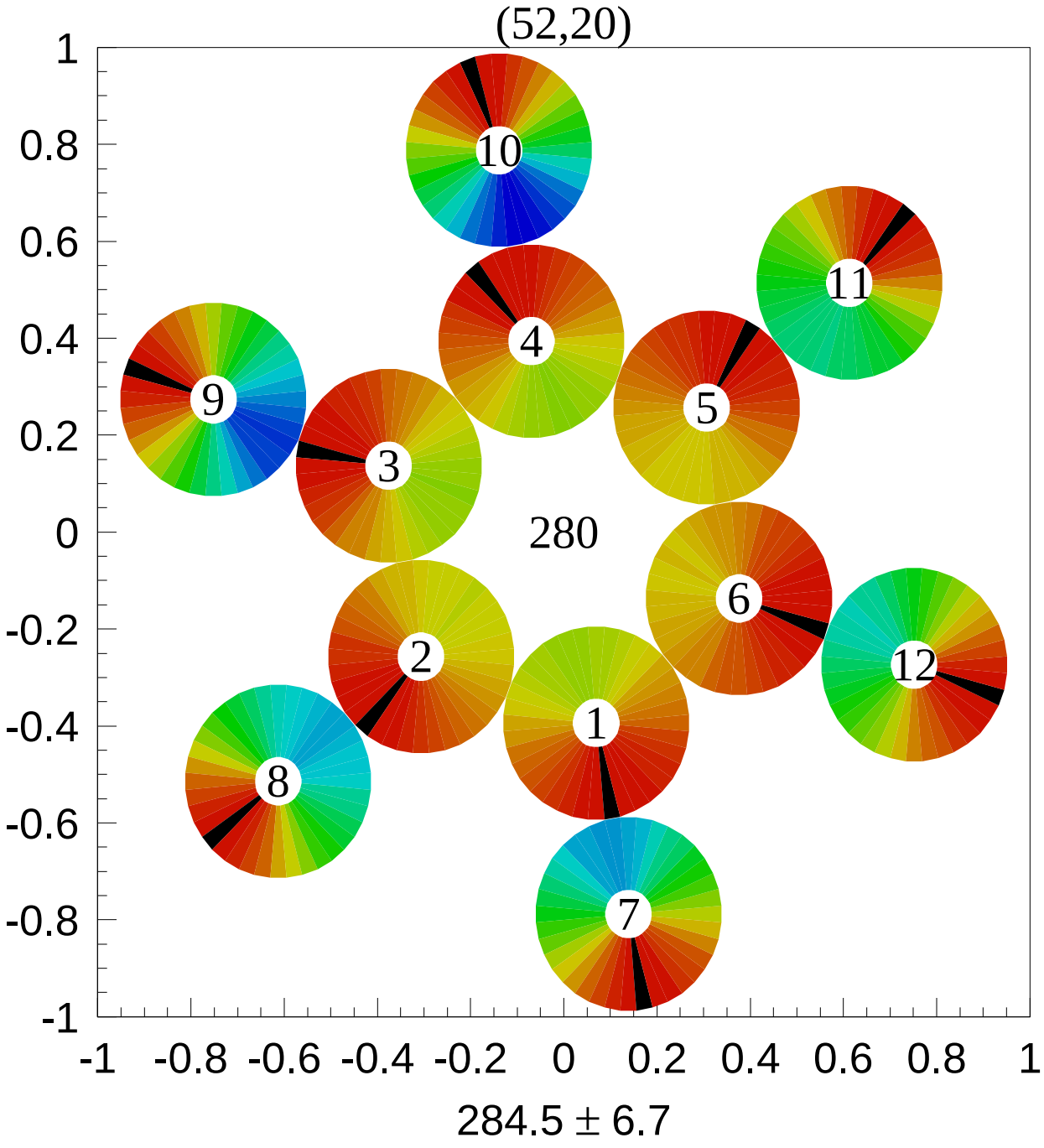

(52,18)
tilted LEDs
124 122 125 112 2 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 124 120 125 126 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

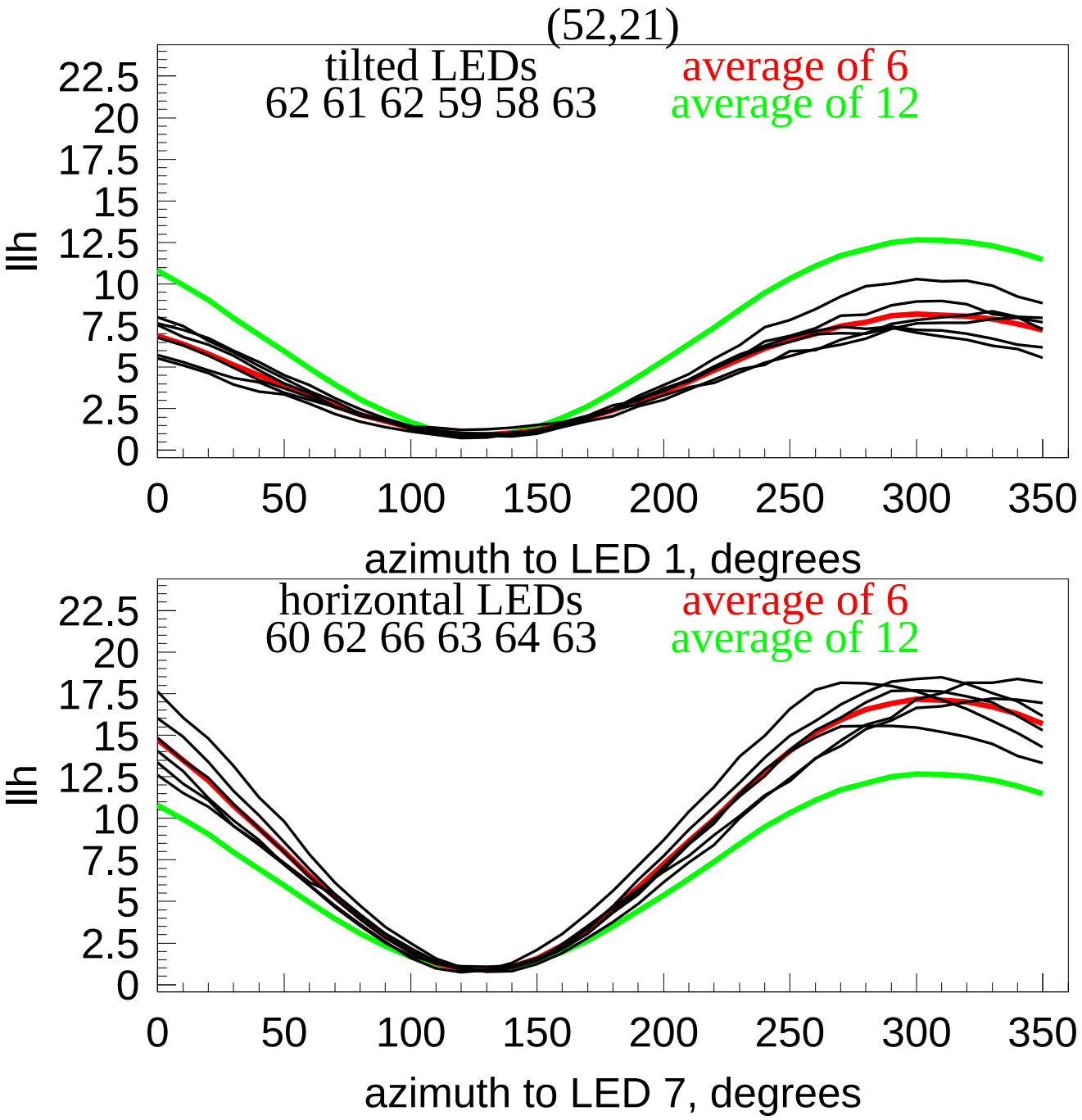

(52,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
261.2 ± 9.7

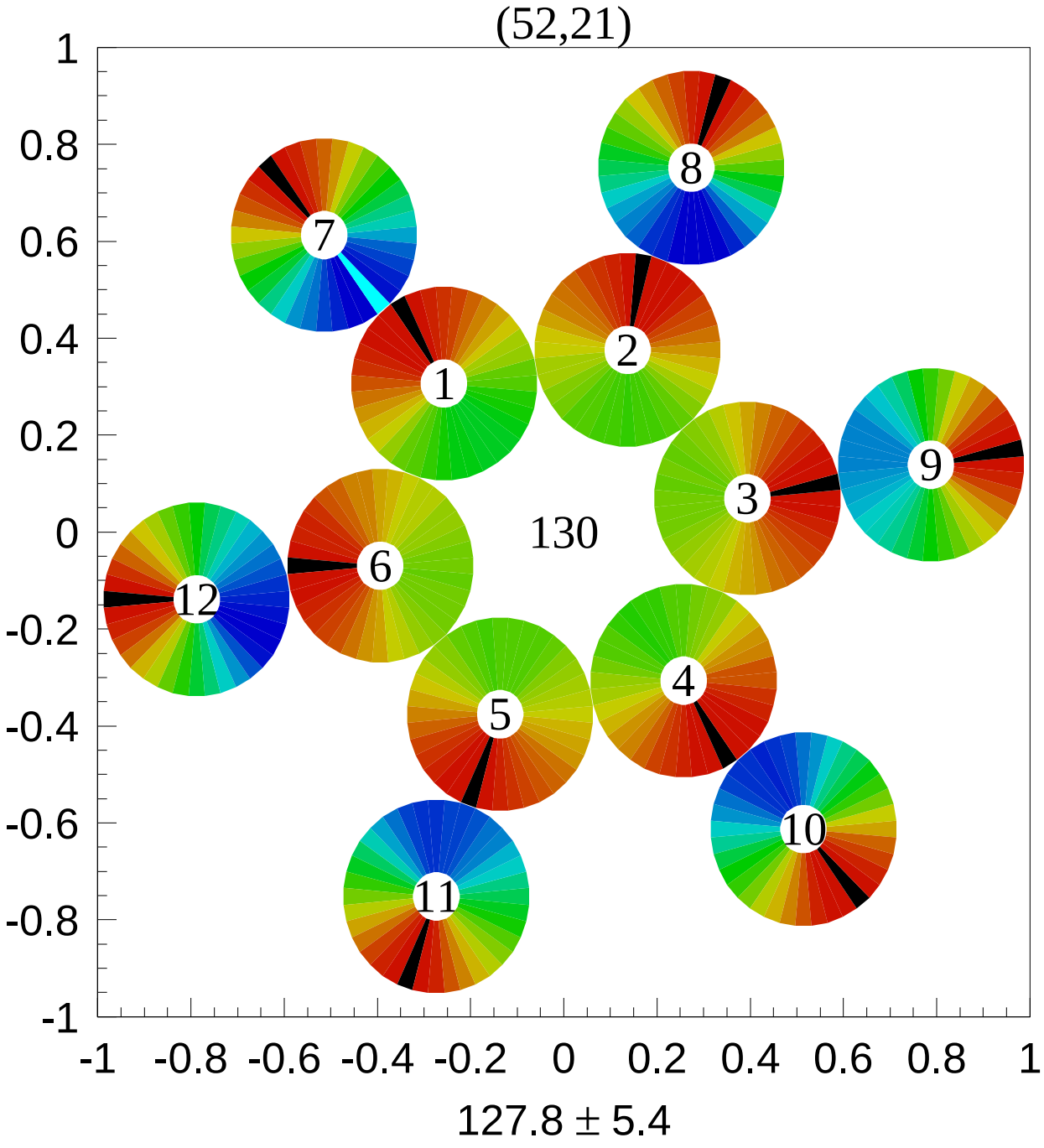

(52,19)
tilted LEDs
114 124 117 119 126 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 127 128 115 130 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

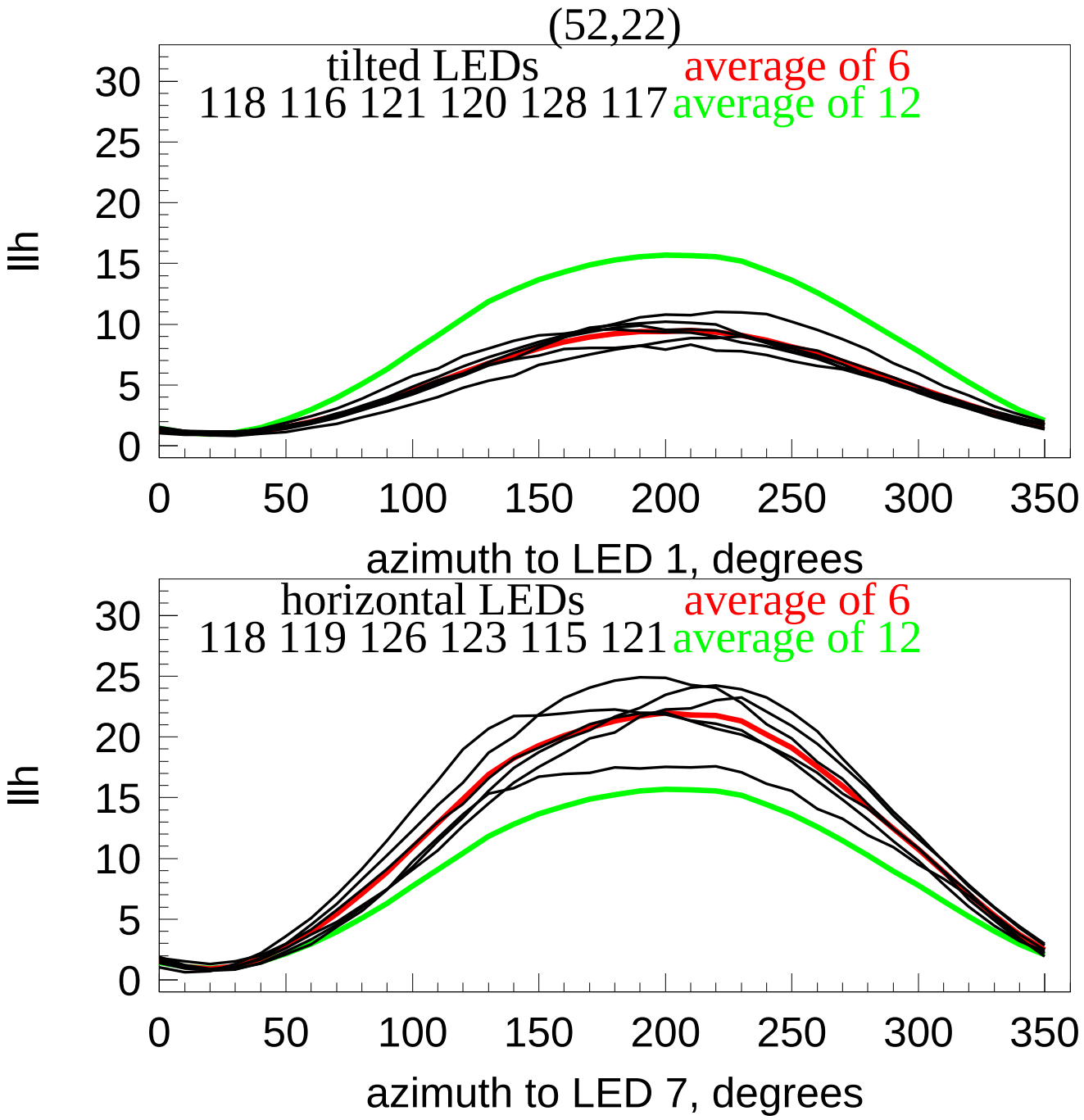

(52,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
202.6 ± 5.4

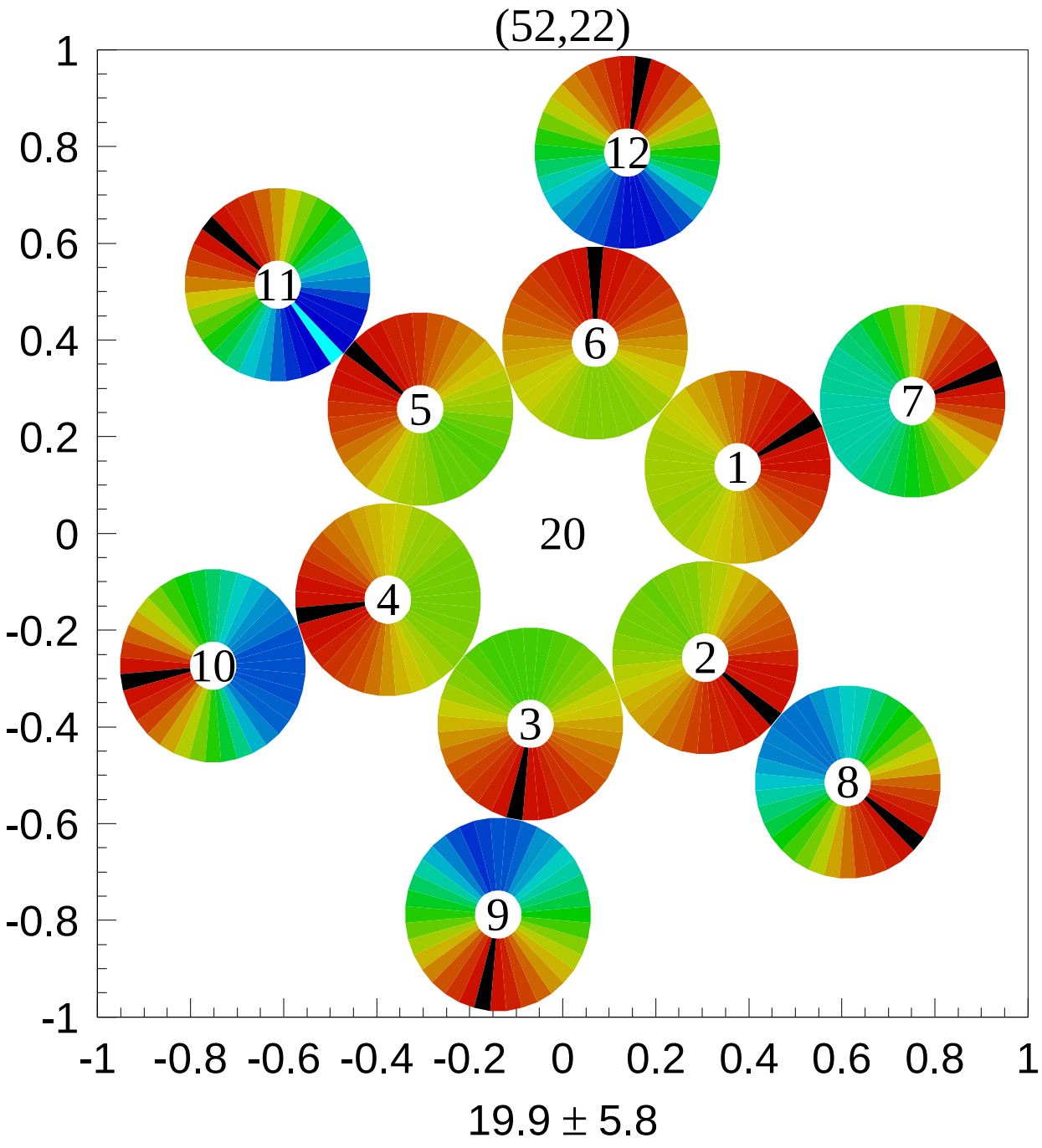

(52,20)
tilted LEDs
120 121 123 123 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 119 121 123 100
average of 6
average of 12
llh
azimuth to LED 7, degrees

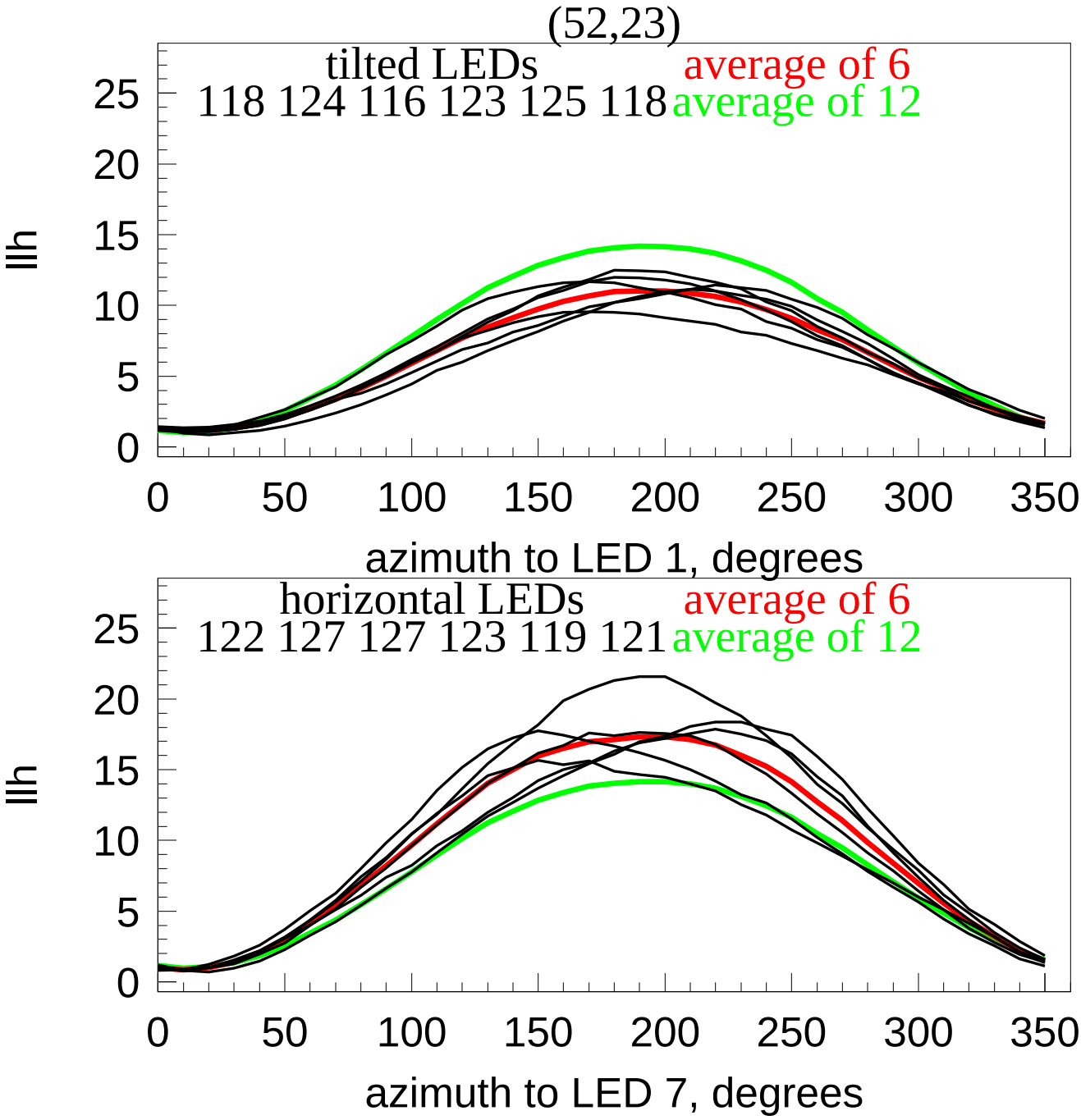

(52,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
284.5 ± 6.7

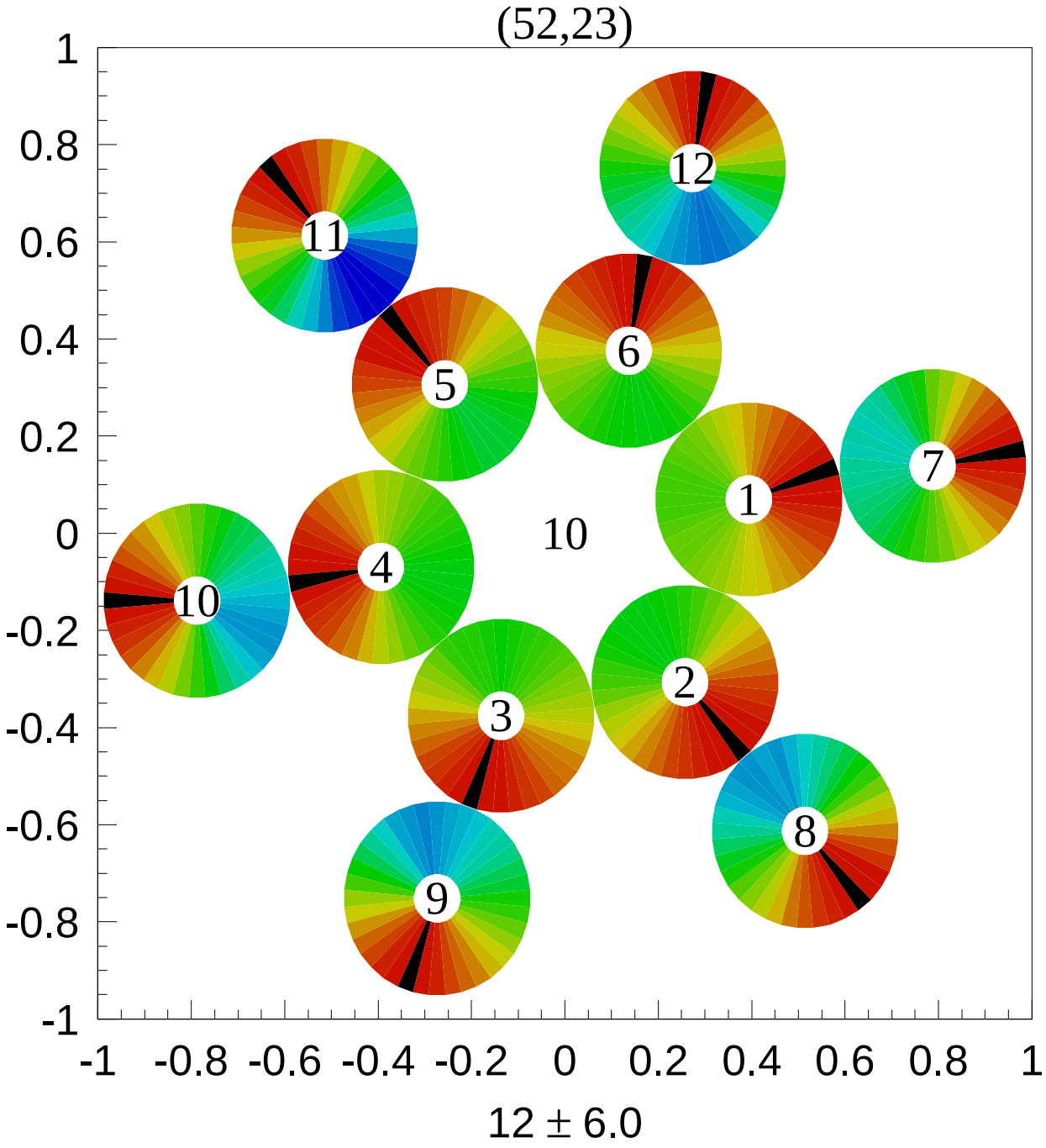

(52,21)
tilted LEDs
62 61 62 59 58 63
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
60 62 66 63 64 63
average of 6
average of 12
llh
azimuth to LED 7, degrees

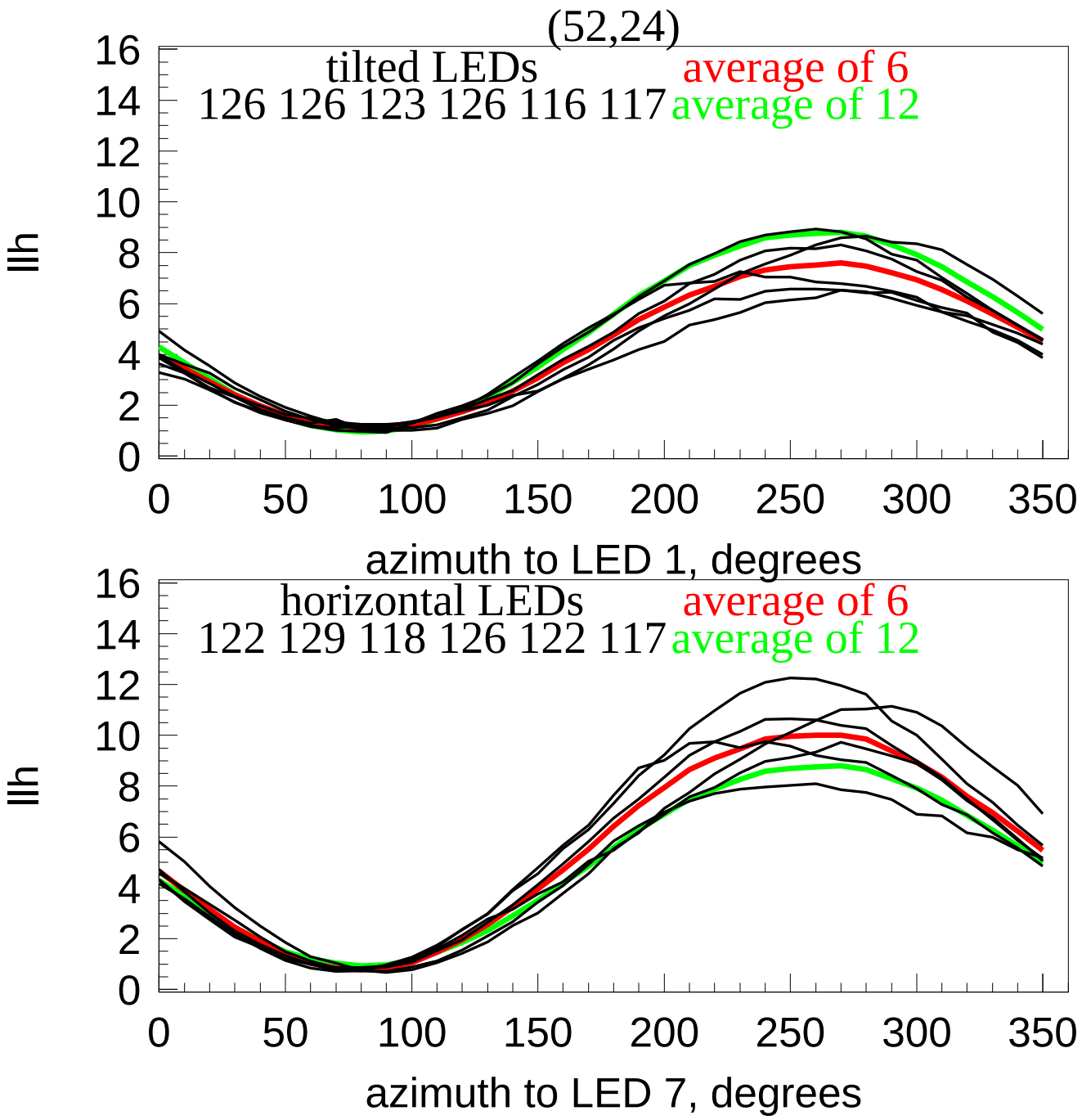

(52,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
127.8 ± 5.4

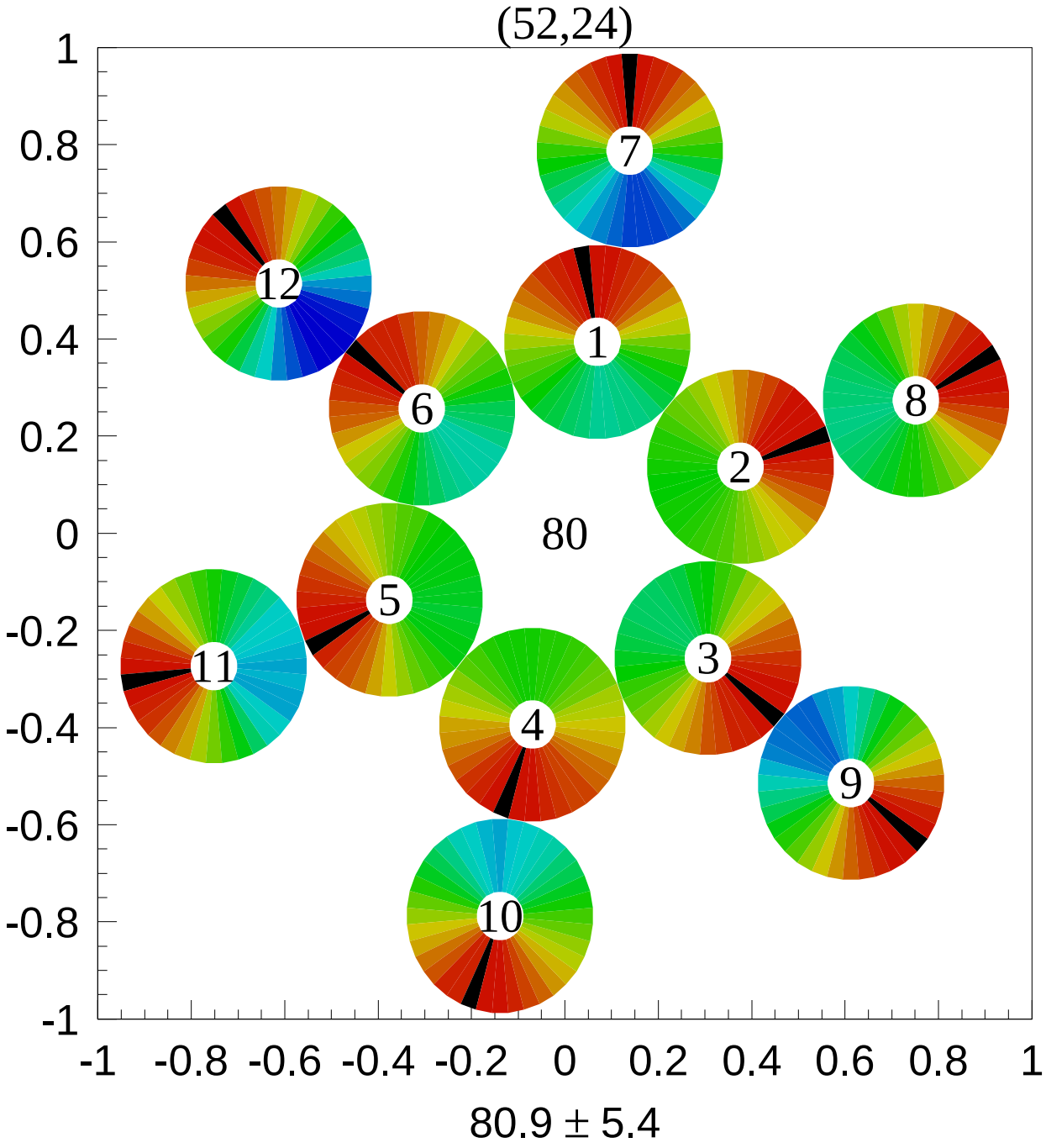

(52,22)
tilted LEDs
118 116 121 120 128 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 119 126 123 115 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

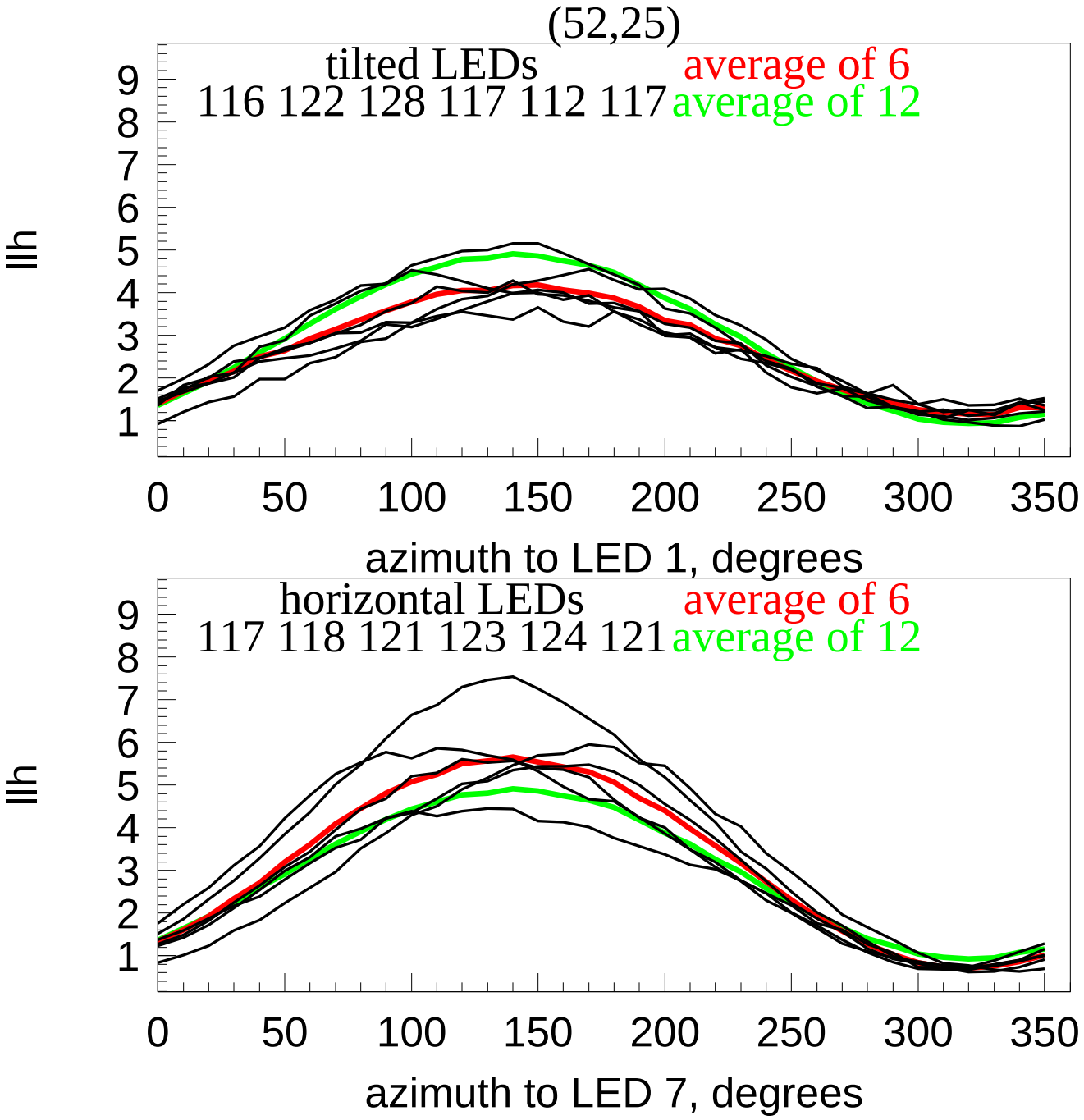

(52,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
19.9 ± 5.8

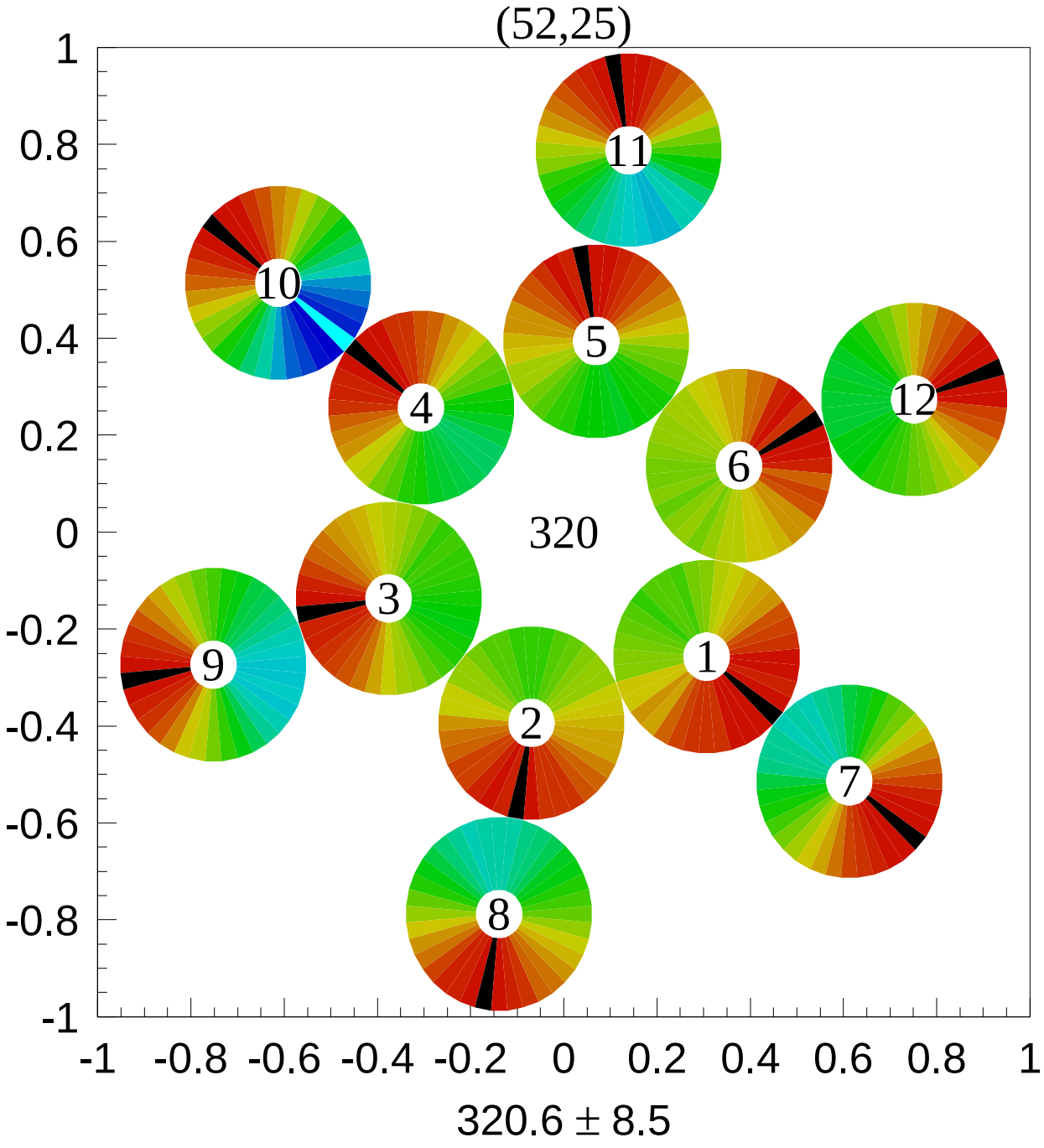

(52,23)
tilted LEDs
118 124 116 123 125 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 127 127 123 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

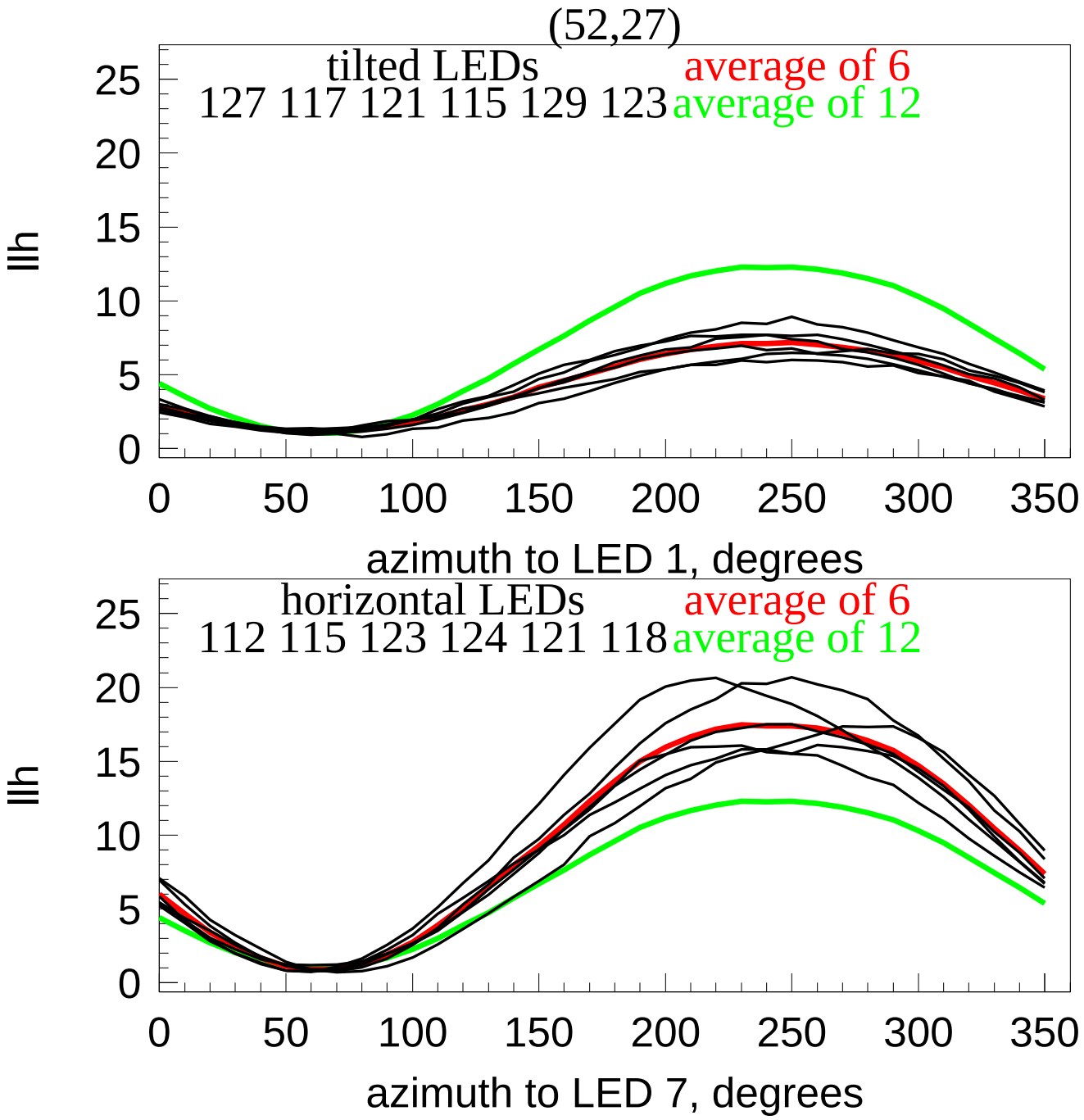

(52,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12 ± 6.0
12
11
6
5
7
1
10
4
10
2
3
8
9

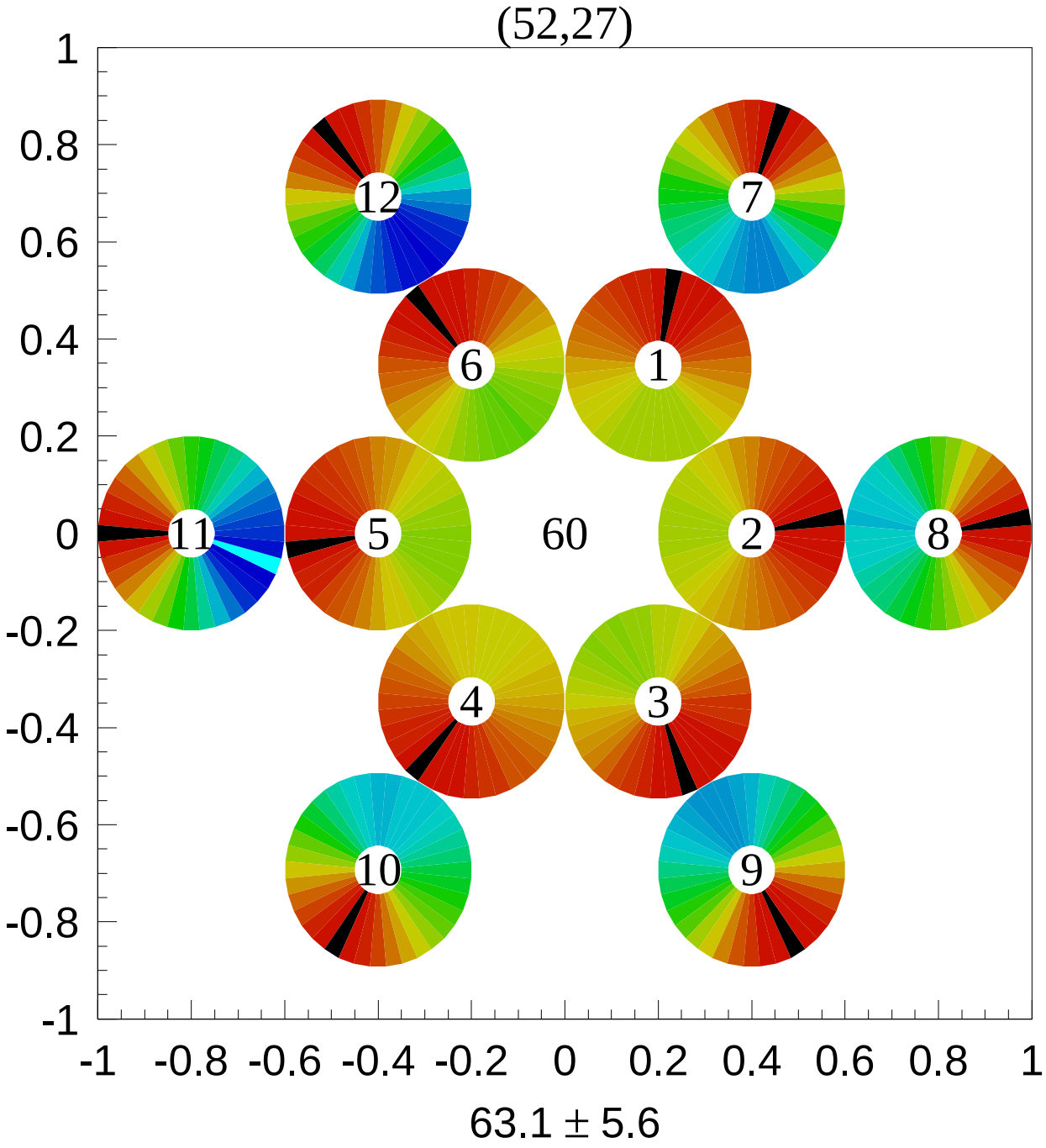

(52,24)
tilted LEDs
126 126 123 126 116 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 129 118 126 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

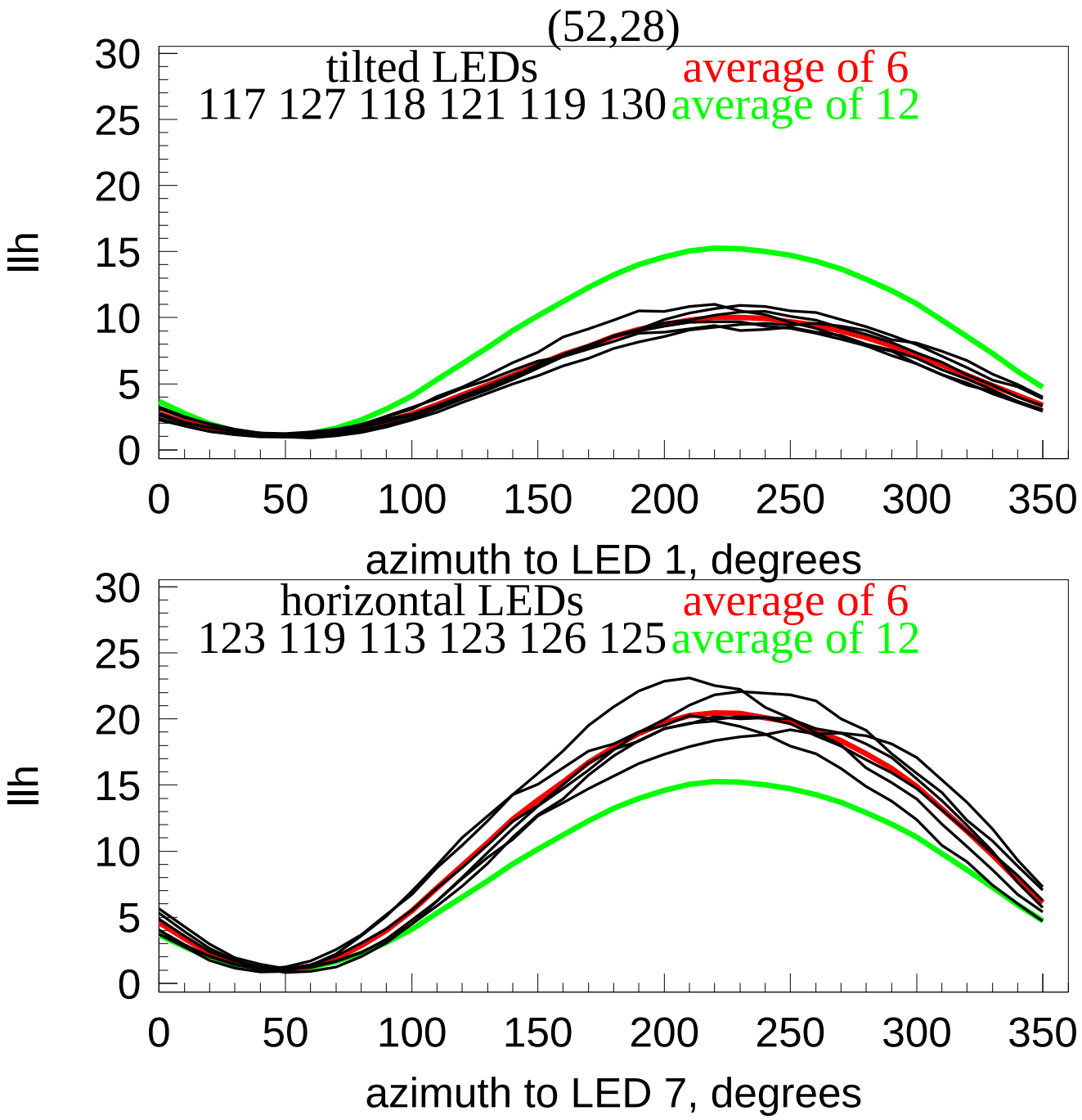

(52,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
80.9 ± 5.4
80
1
2
3
4
5
6
7
8
9
10
11
12

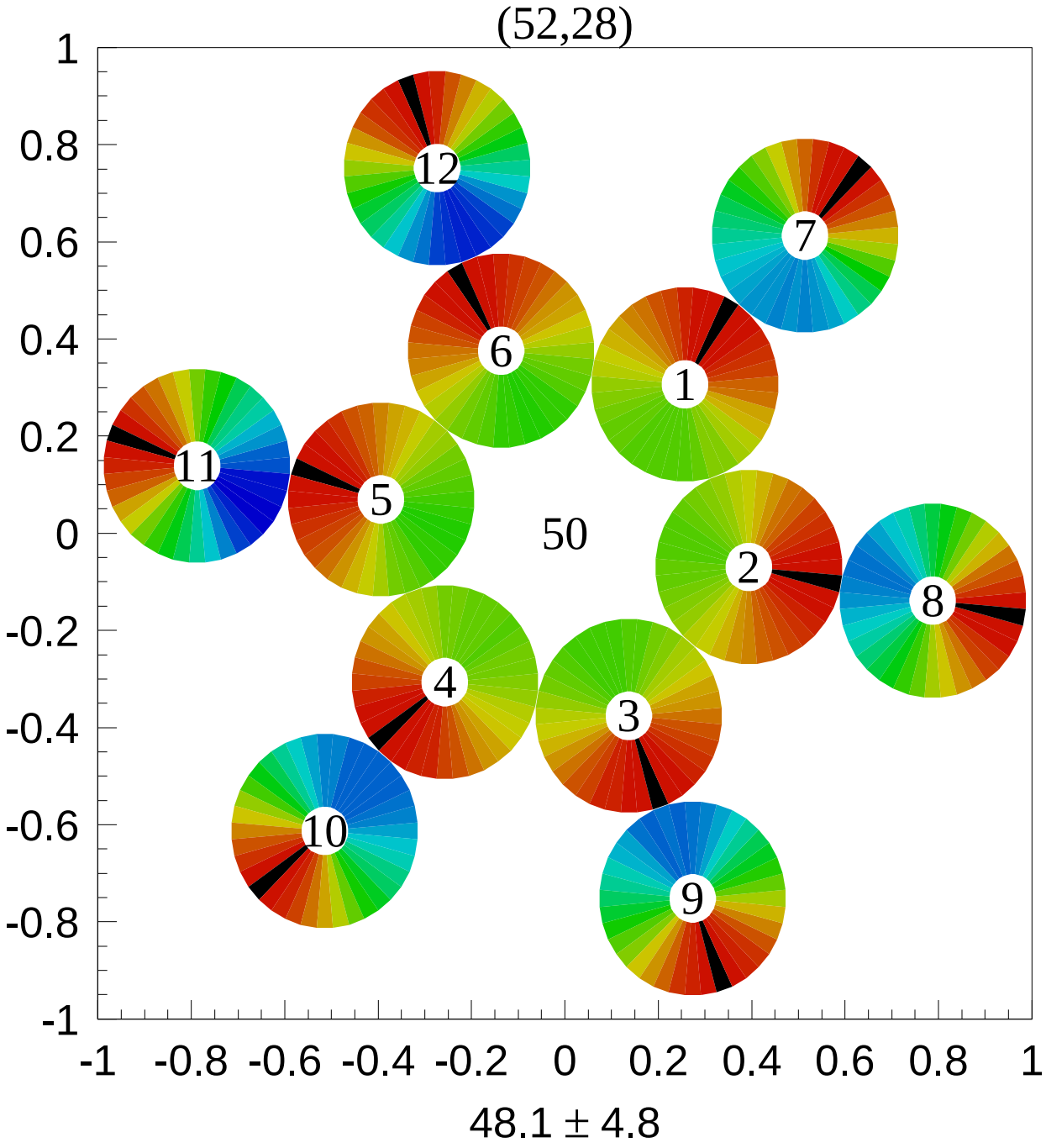

(52,25)
tilted LEDs
116 122 128 117 112 117
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 118 121 123 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

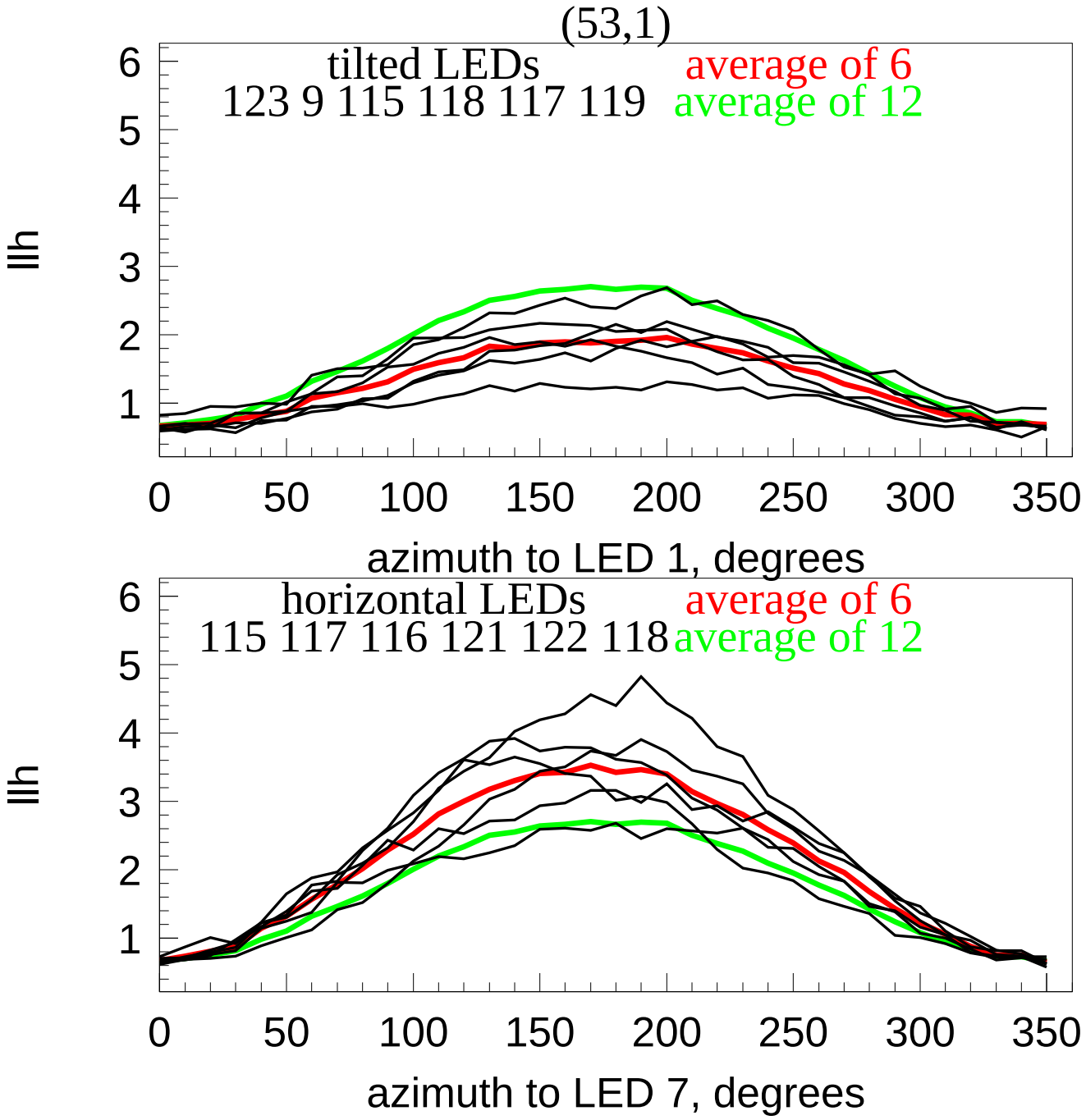

(52,25)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
320.6 ± 8.5

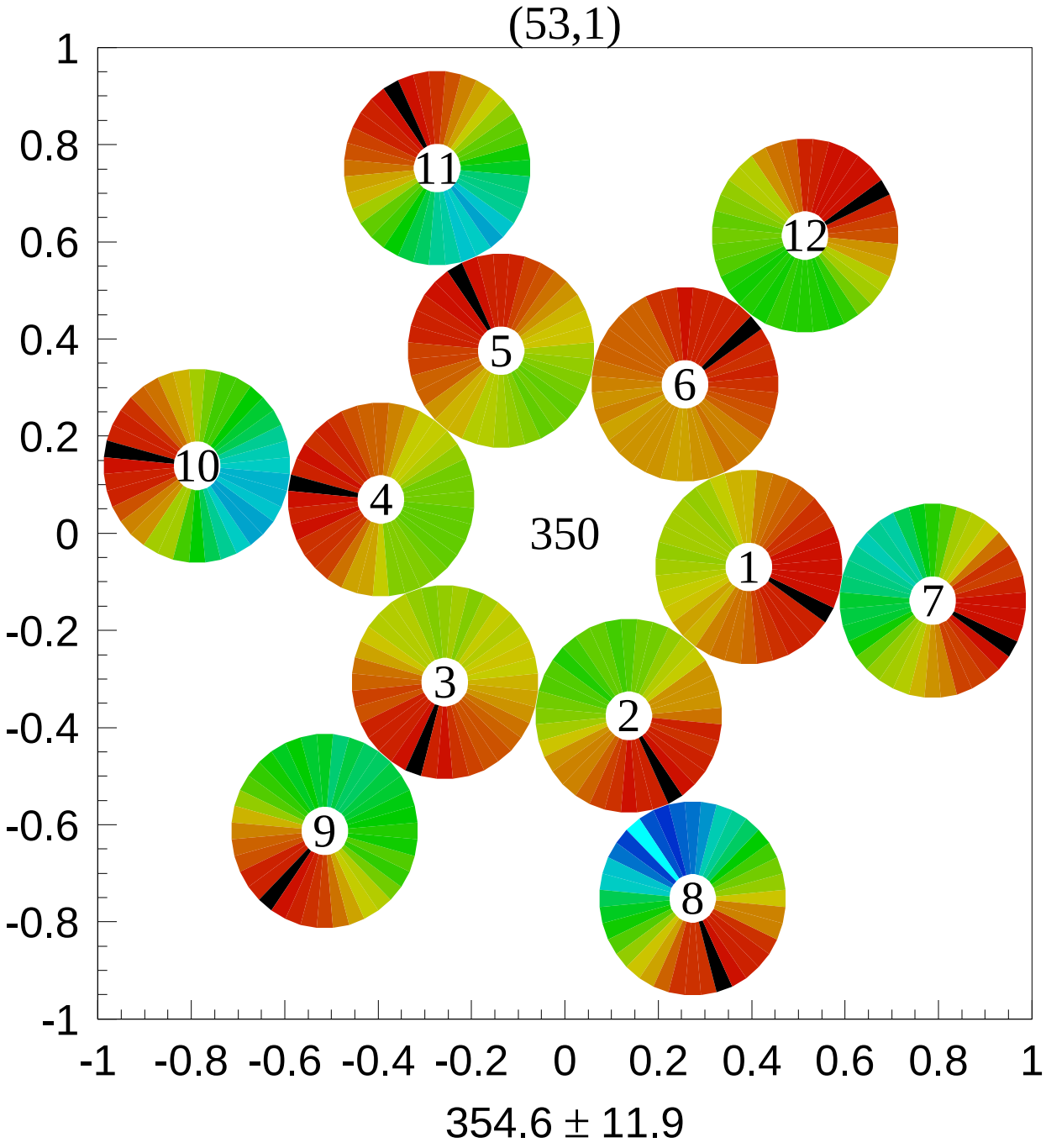

(52,27)
tilted LEDs
127 117 121 115 129 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 115 123 124 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

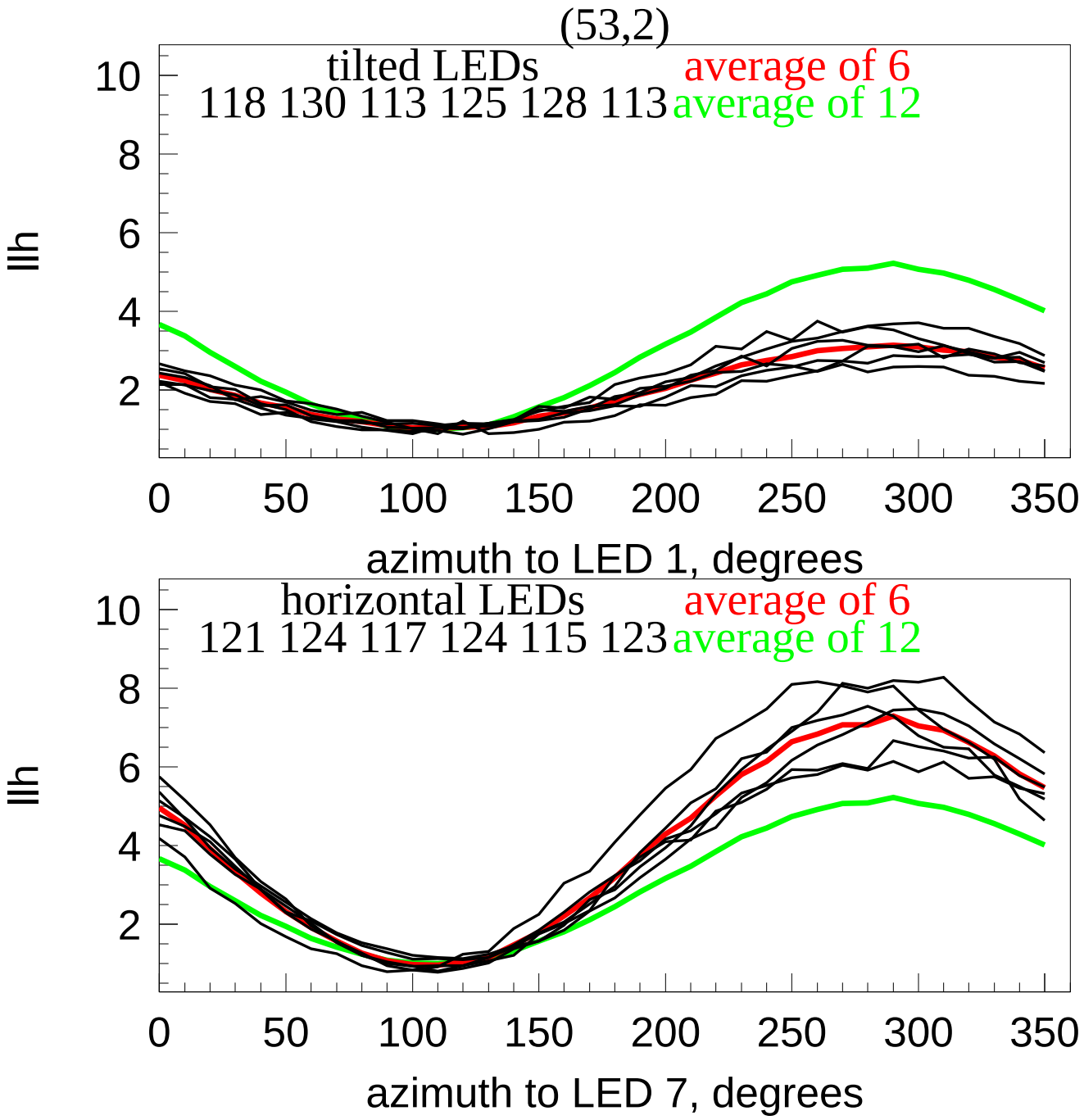

(52,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
63.1 ± 5.6

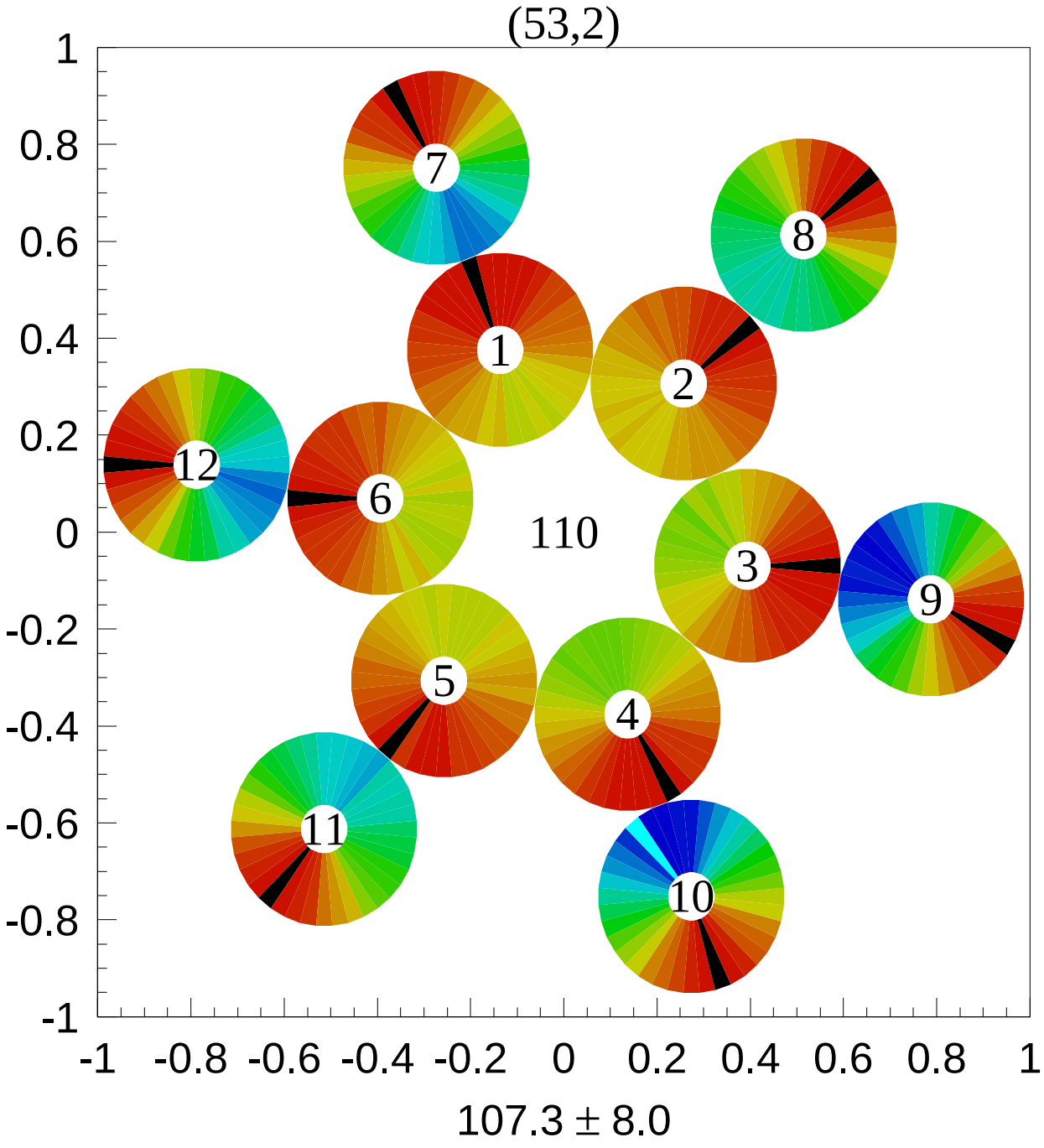

(52,28)
tilted LEDs
117 127 118 121 119 130
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 119 113 123 126 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

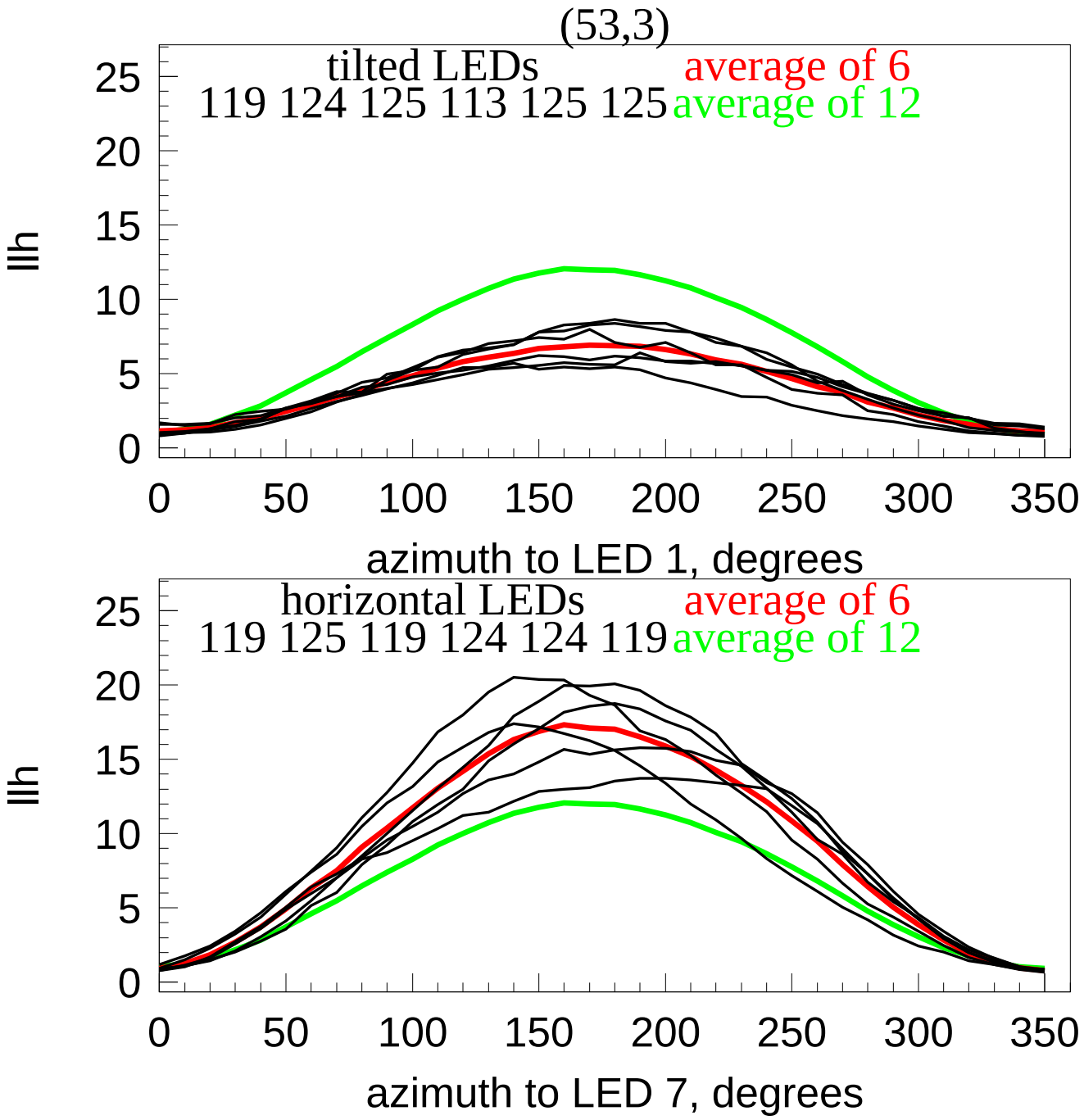

(52,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
48.1 ± 4.8

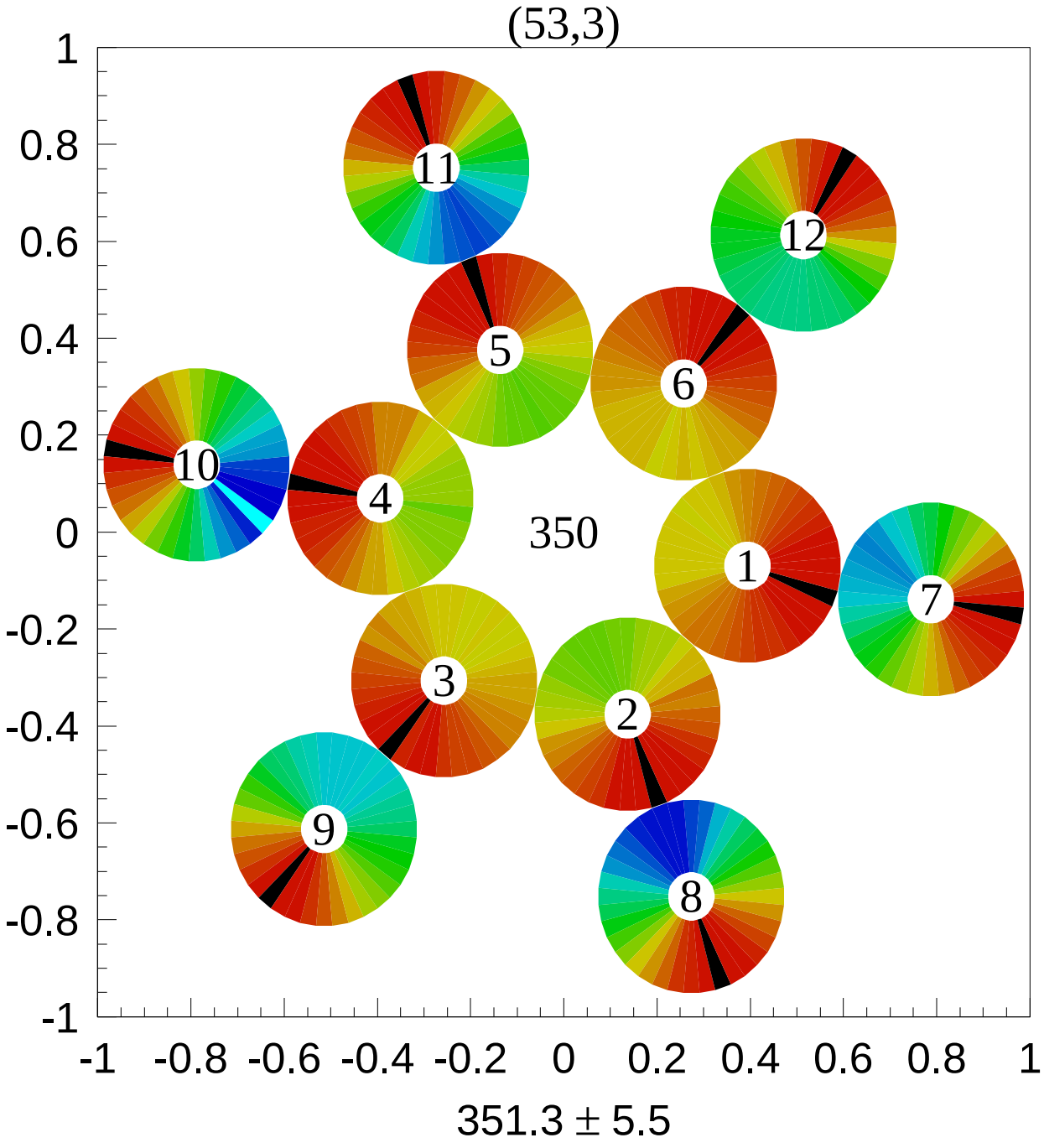

(53,1)
tilted LEDs
123 9 115 118 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 117 116 121 122 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

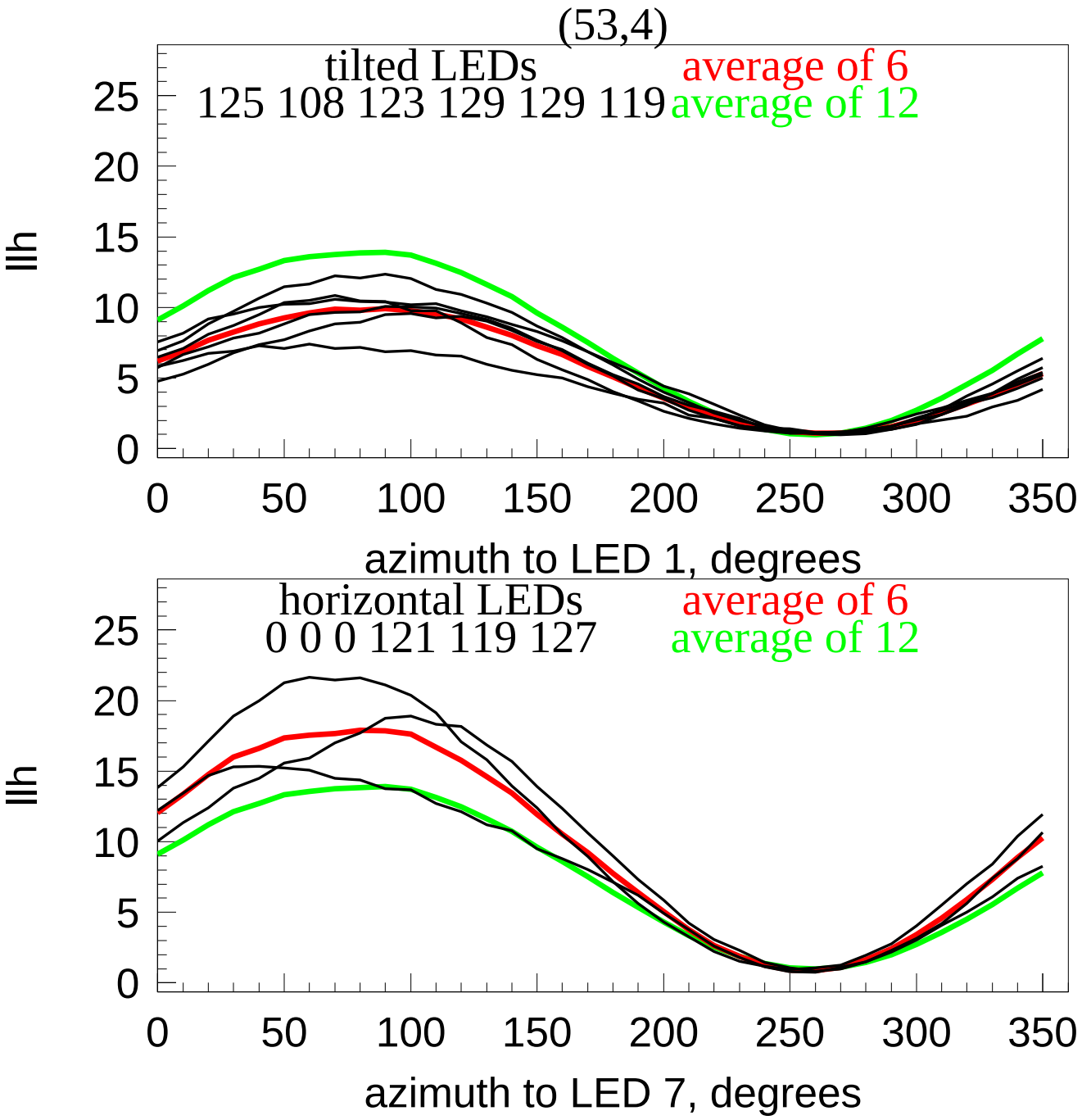

(53,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
354.6 ± 11.9

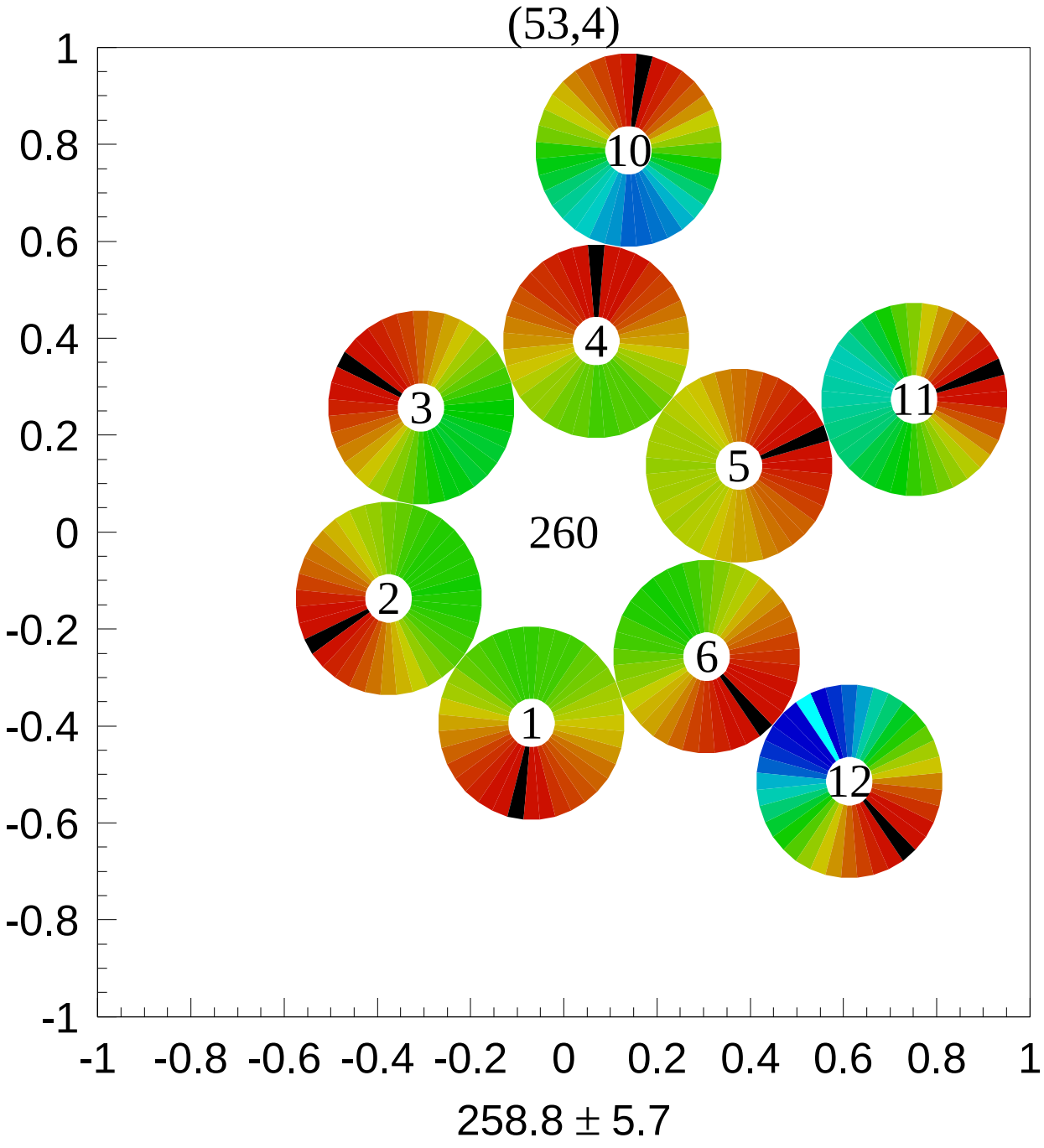

(53,2)
tilted LEDs
118 130 113 125 128 113
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 124 117 124 115 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

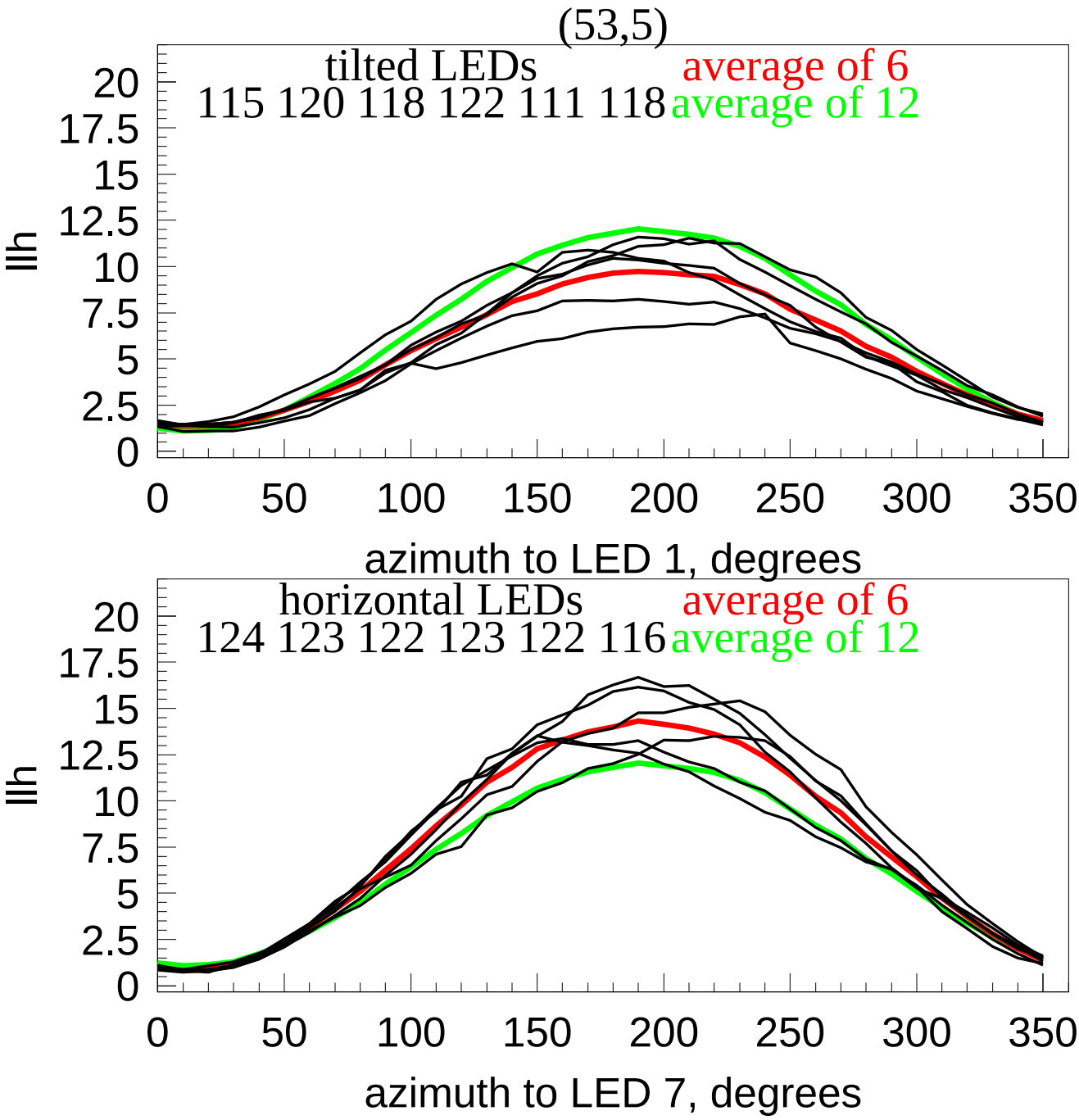

(53,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
107.3 ± 8.0

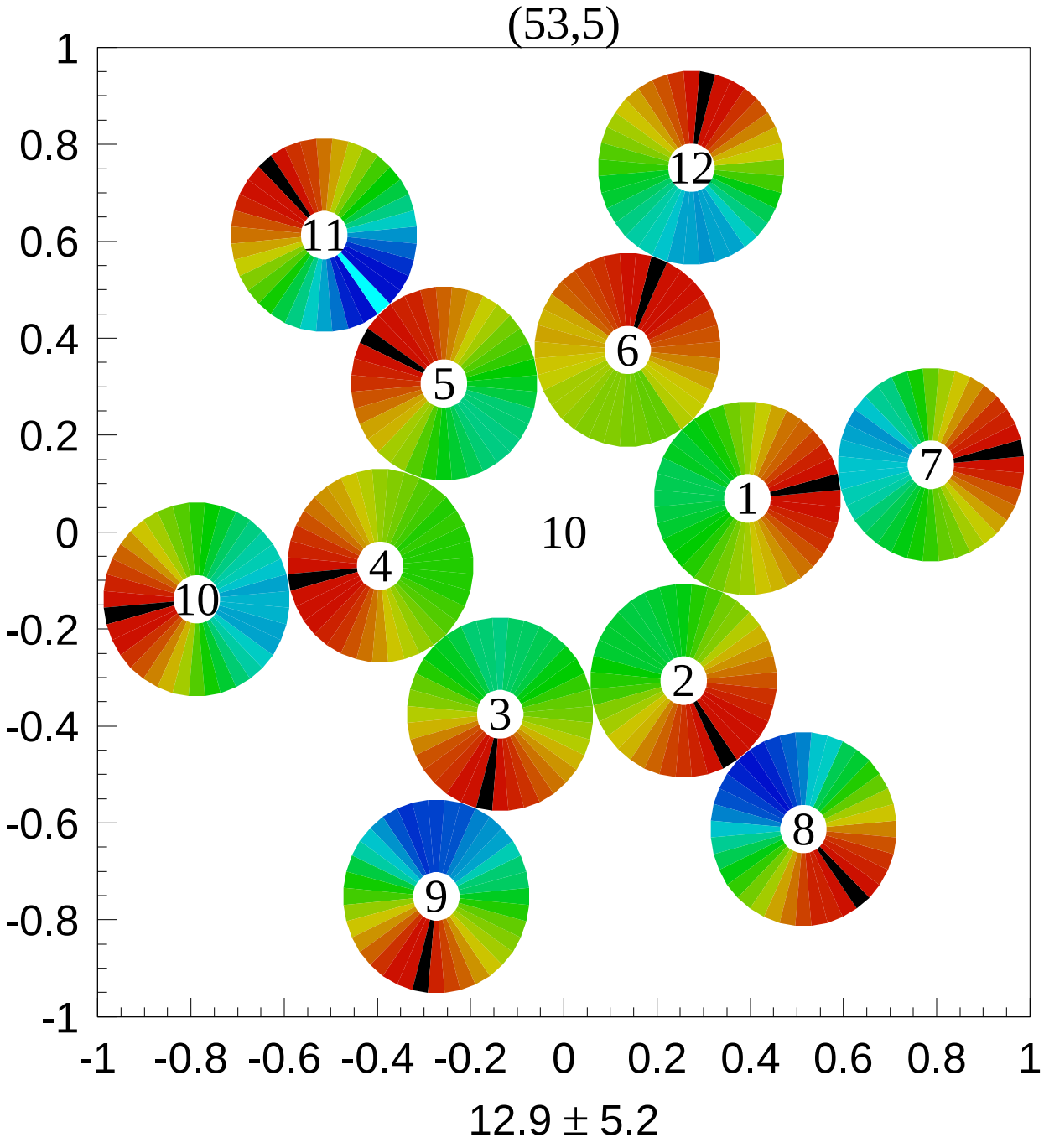

(53,3)
tilted LEDs
119 124 125 113 125 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 125 119 124 124 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

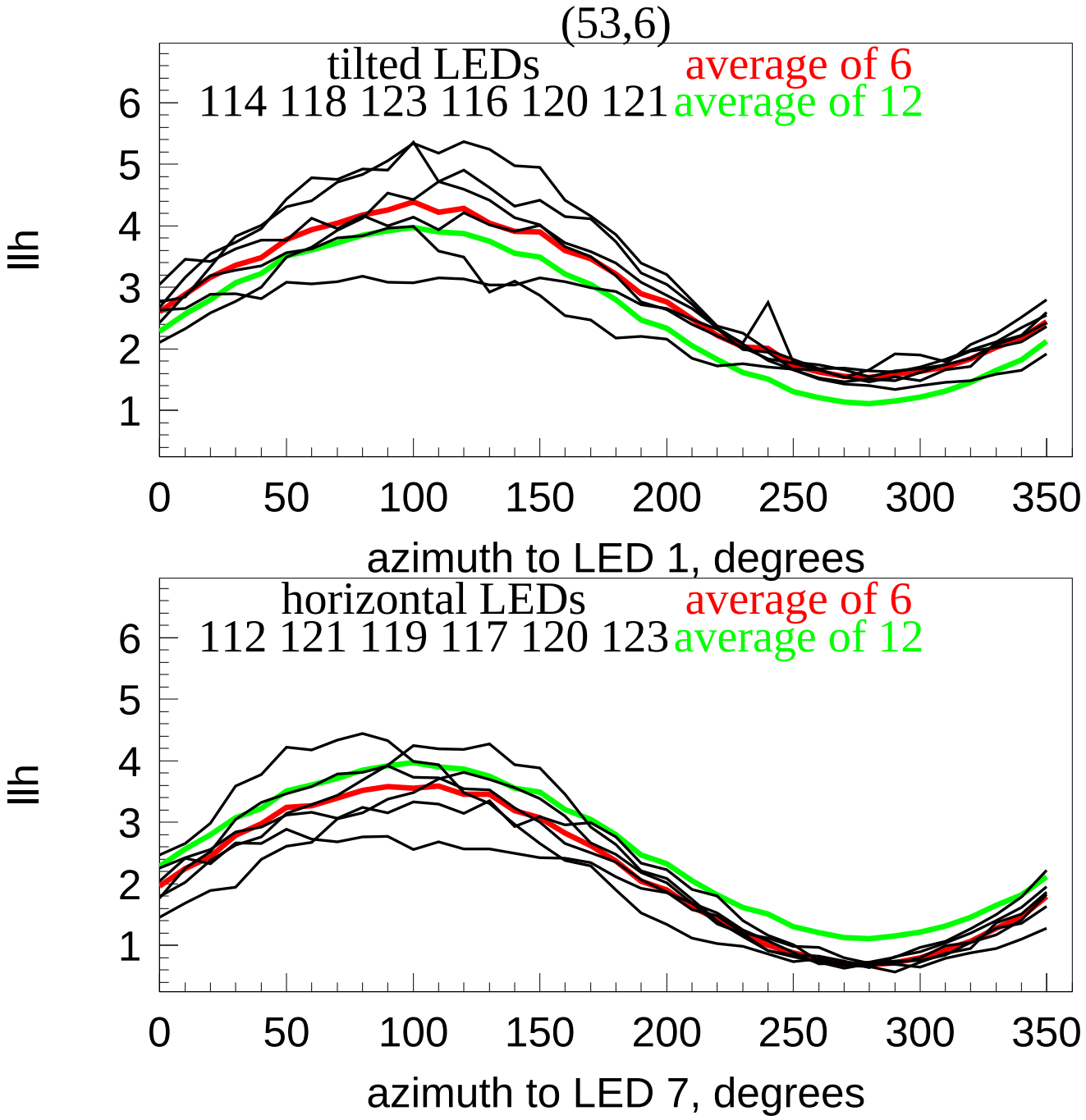

(53,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
351.3 ± 5.5

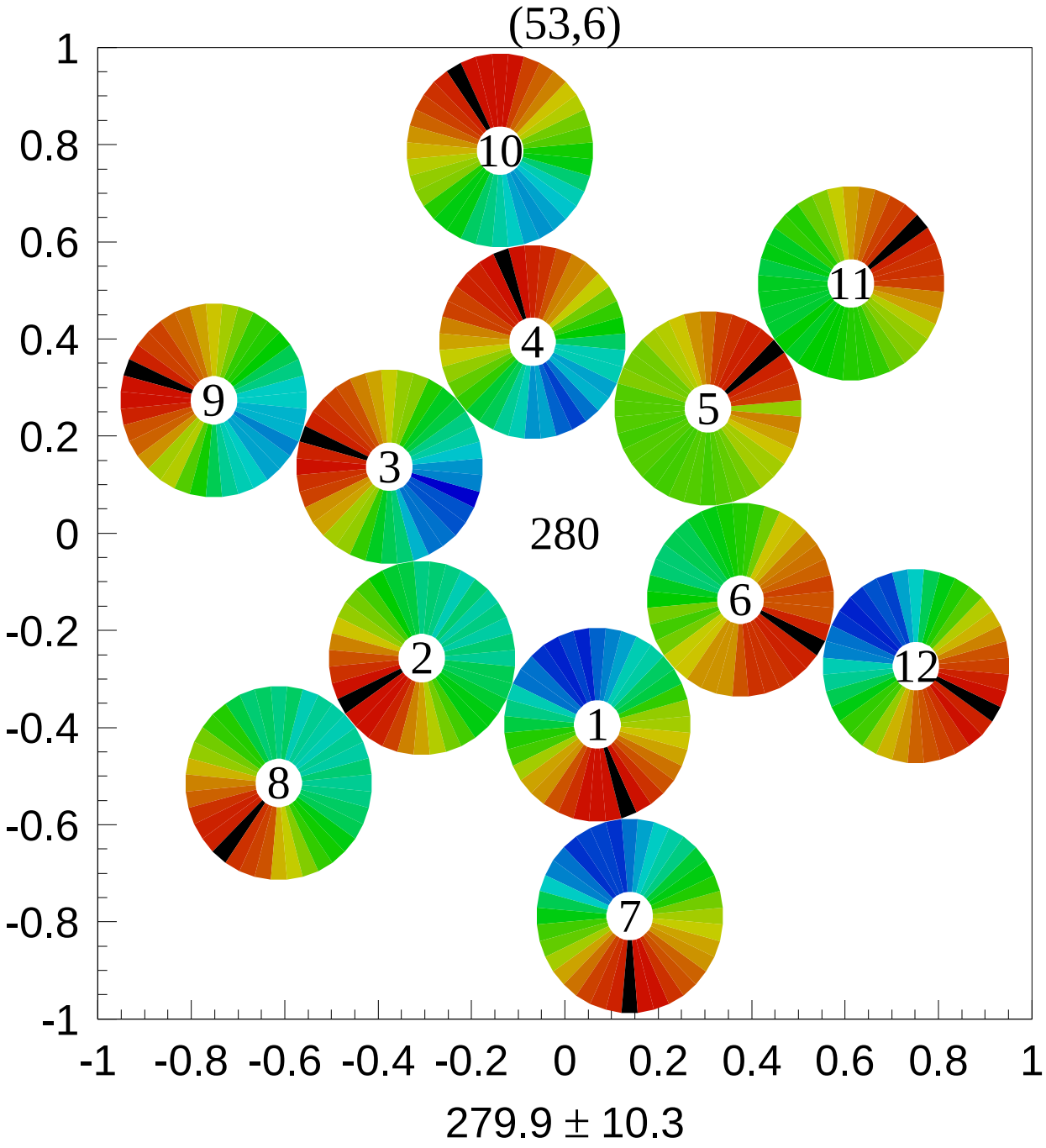

(53,4)
tilted LEDs
125 108 123 129 129 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
0 0 0 121 119 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

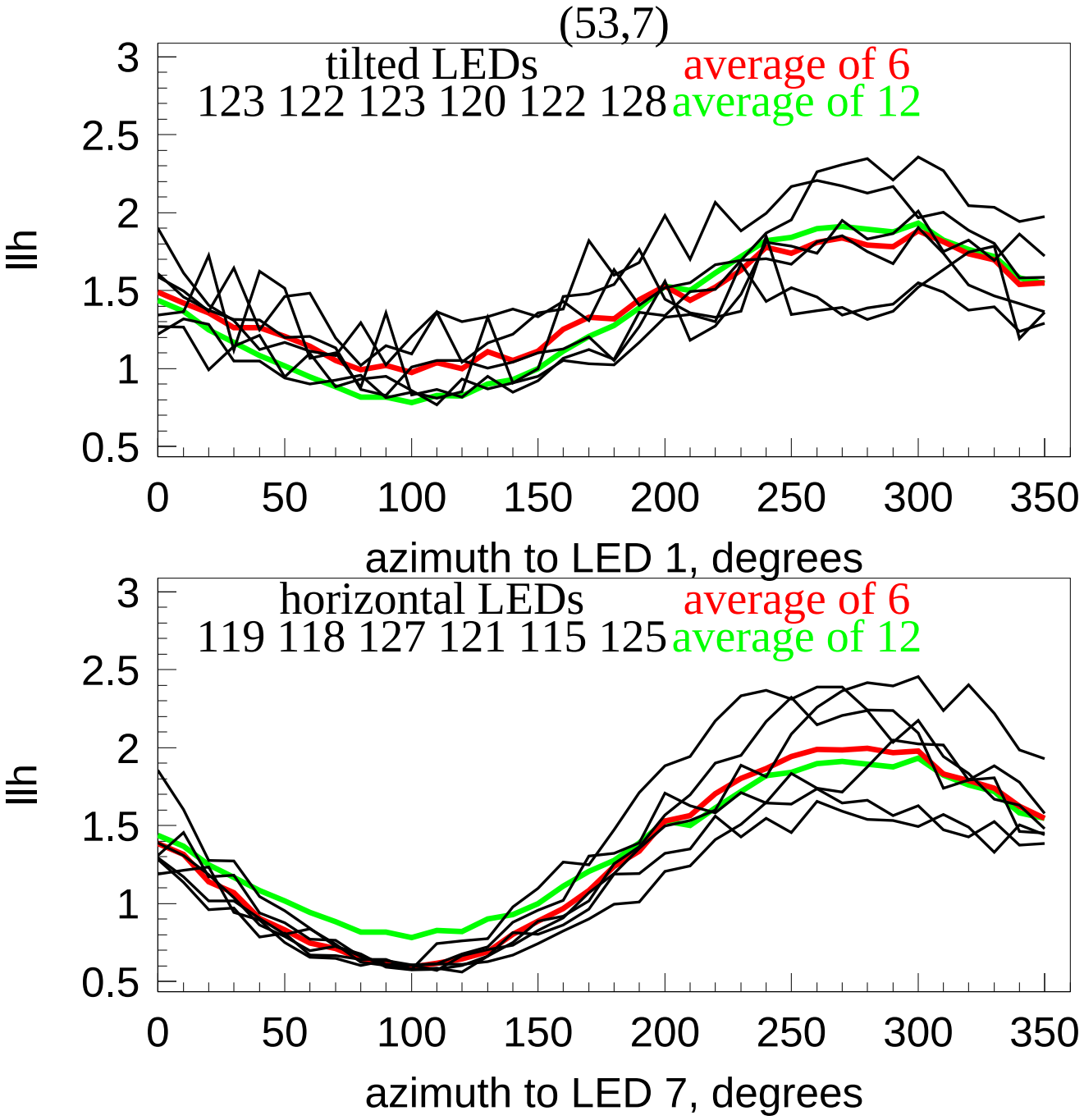

(53,4)
10
4
3
11
5
260
2
6
1
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
258.8 ± 5.7

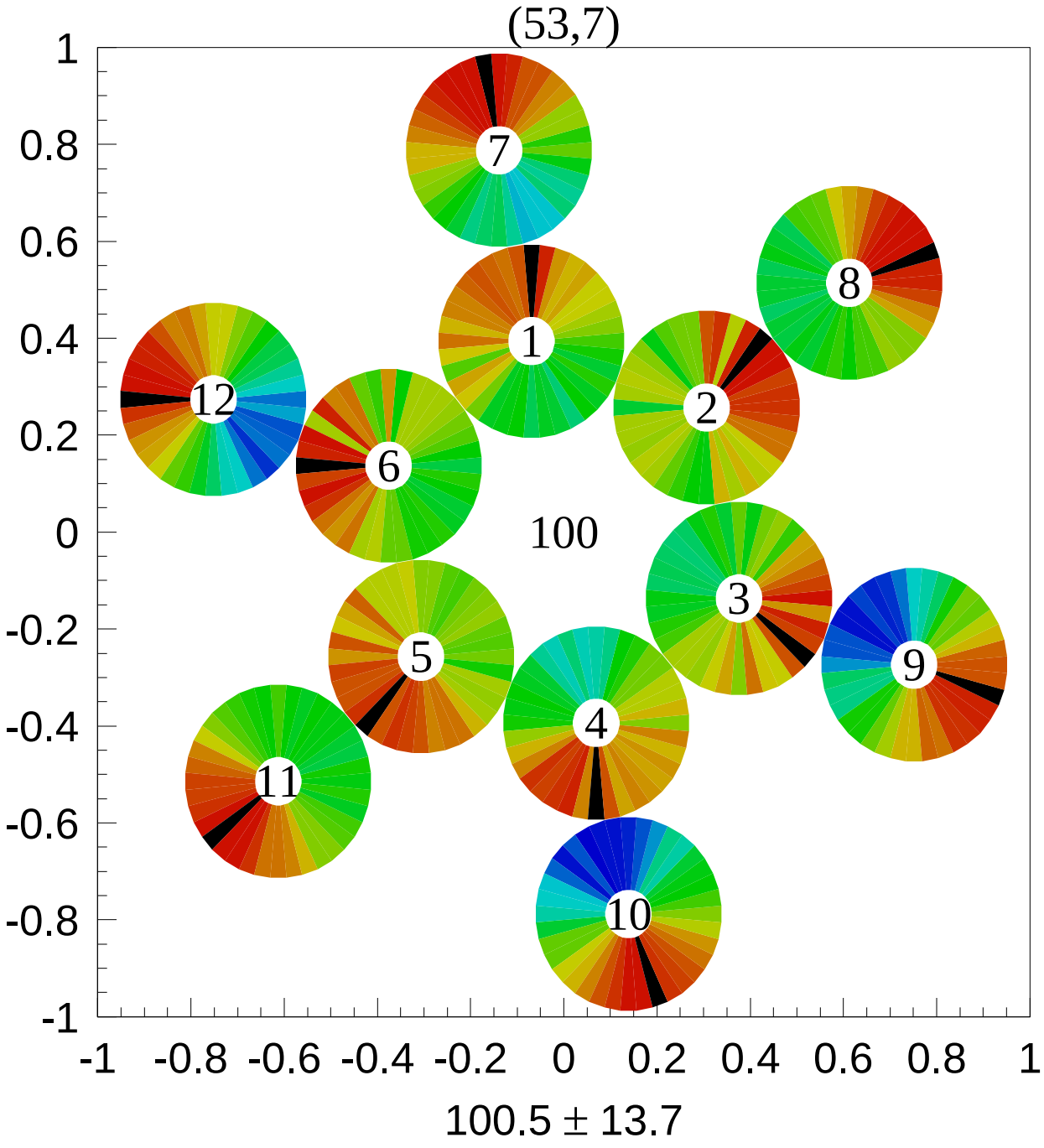

(53,5)
tilted LEDs
115 120 118 122 111 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 122 123 122 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

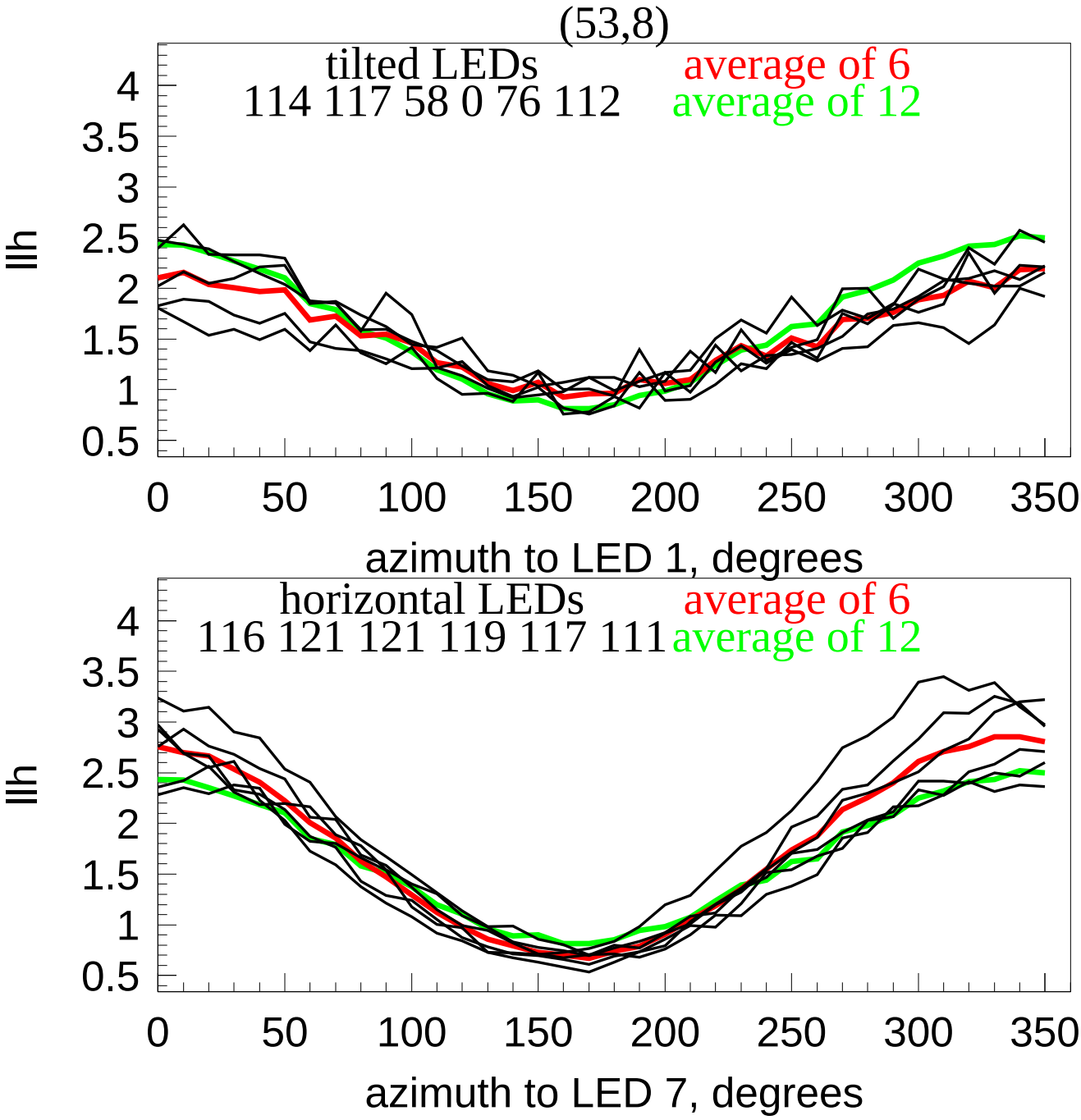

(53,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12.9 ± 5.2
12
11
6
5
7
1
10
4
10
2
3
8
9

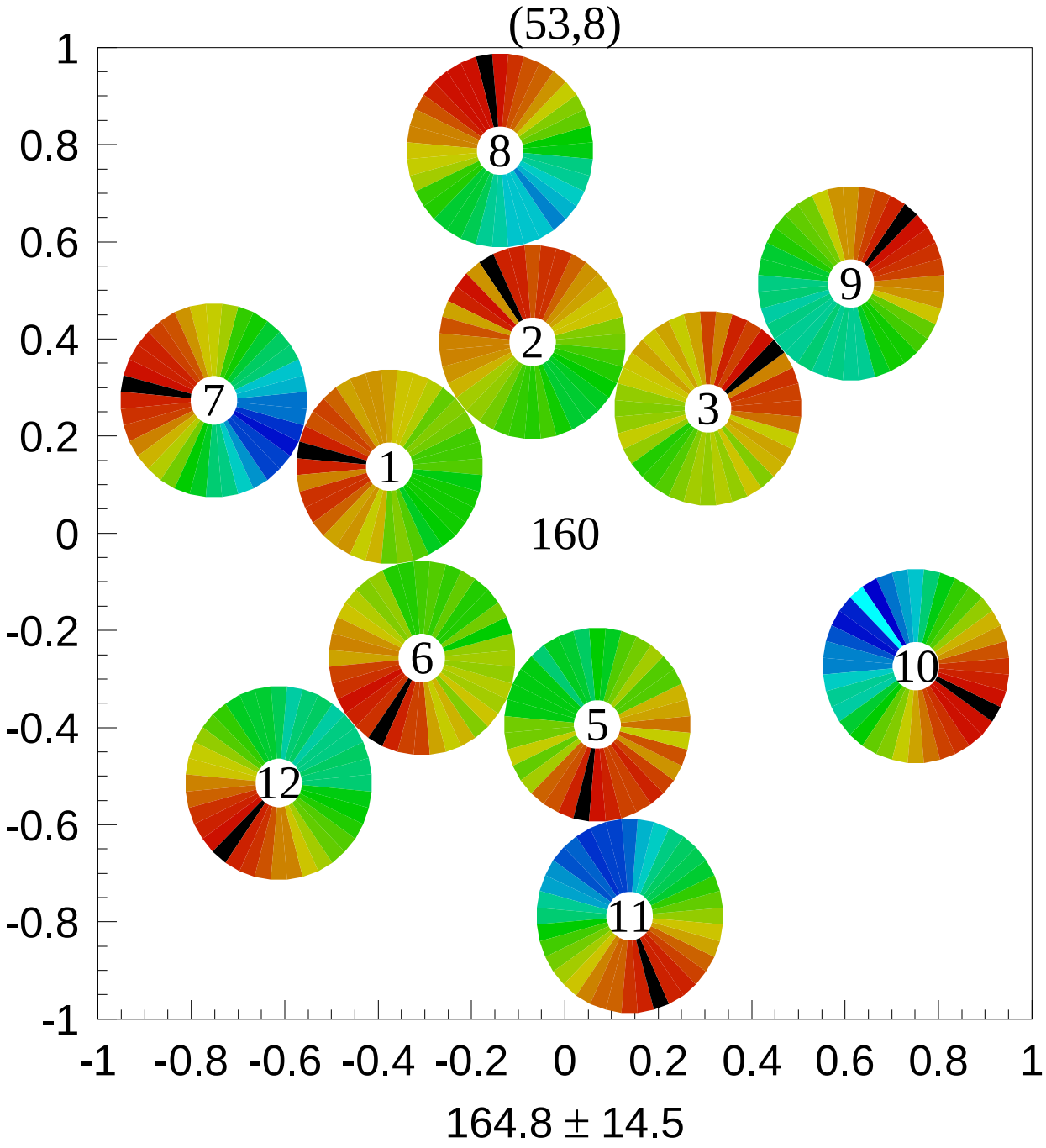

(53,6)
tilted LEDs
114 118 123 116 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 121 119 117 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

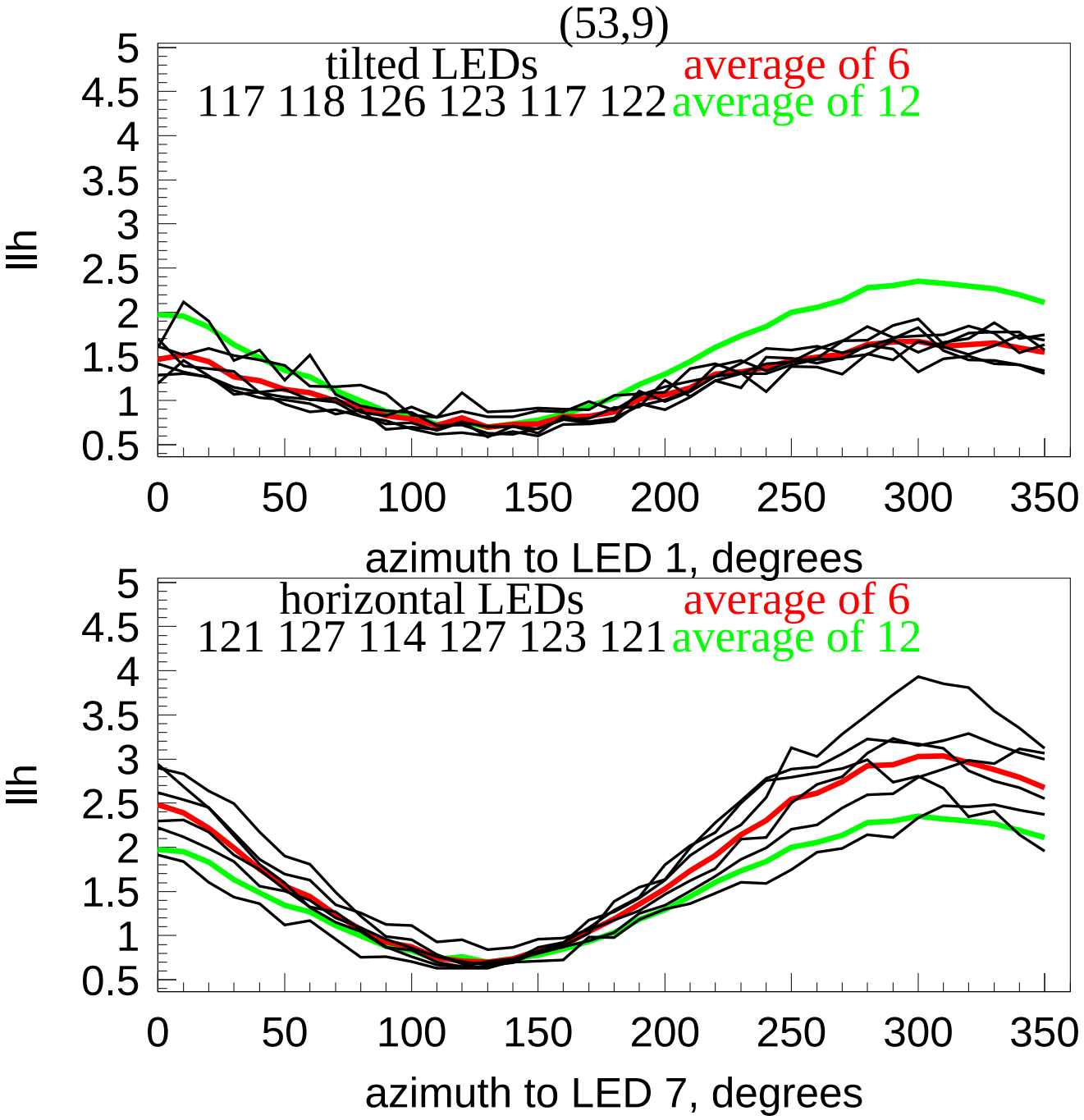

(53,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
279.9 ± 10.3

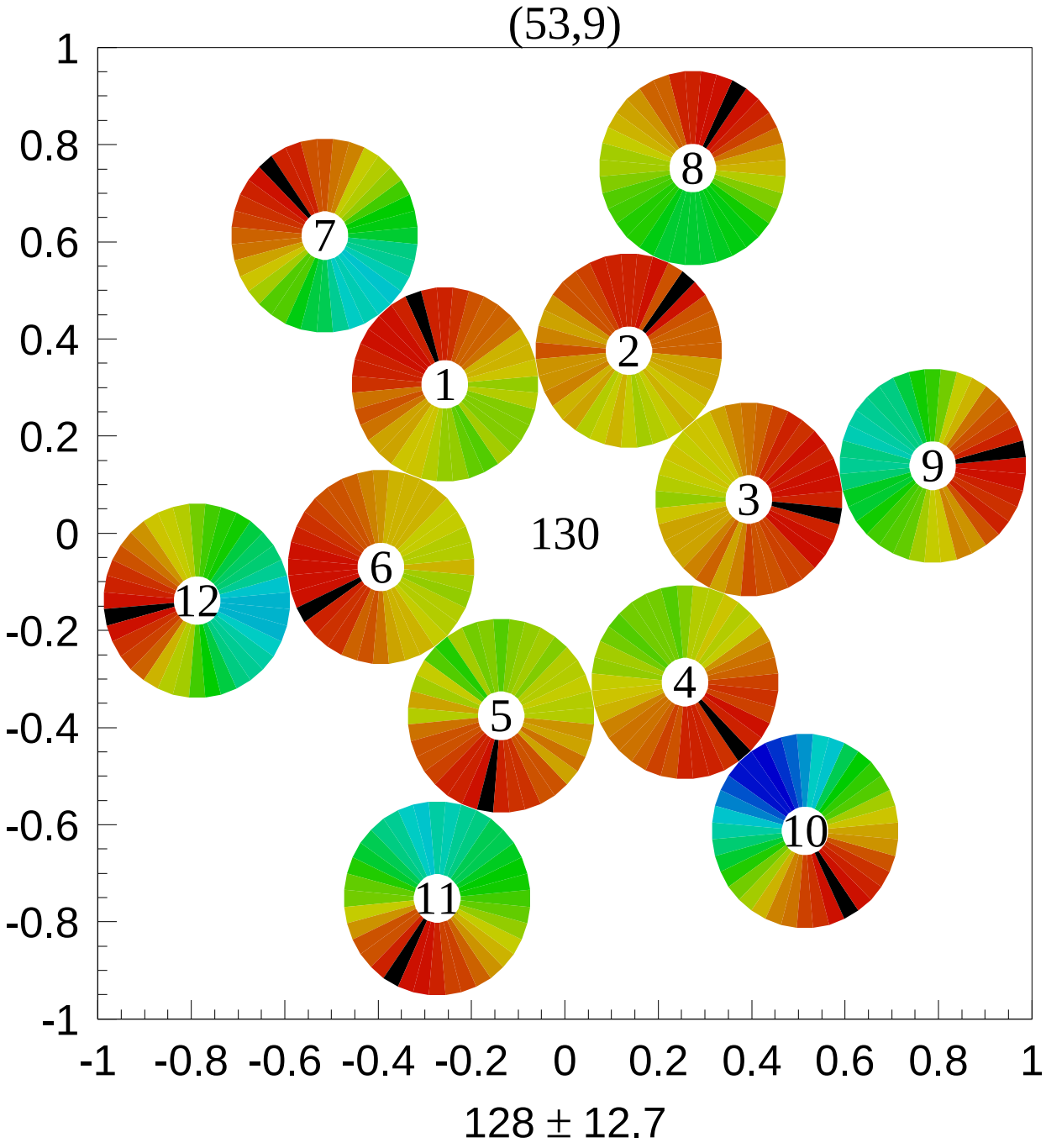

(53,7)
tilted LEDs
123 122 123 120 122 128
average of 6
average of 12
llh
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 118 127 121 115 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

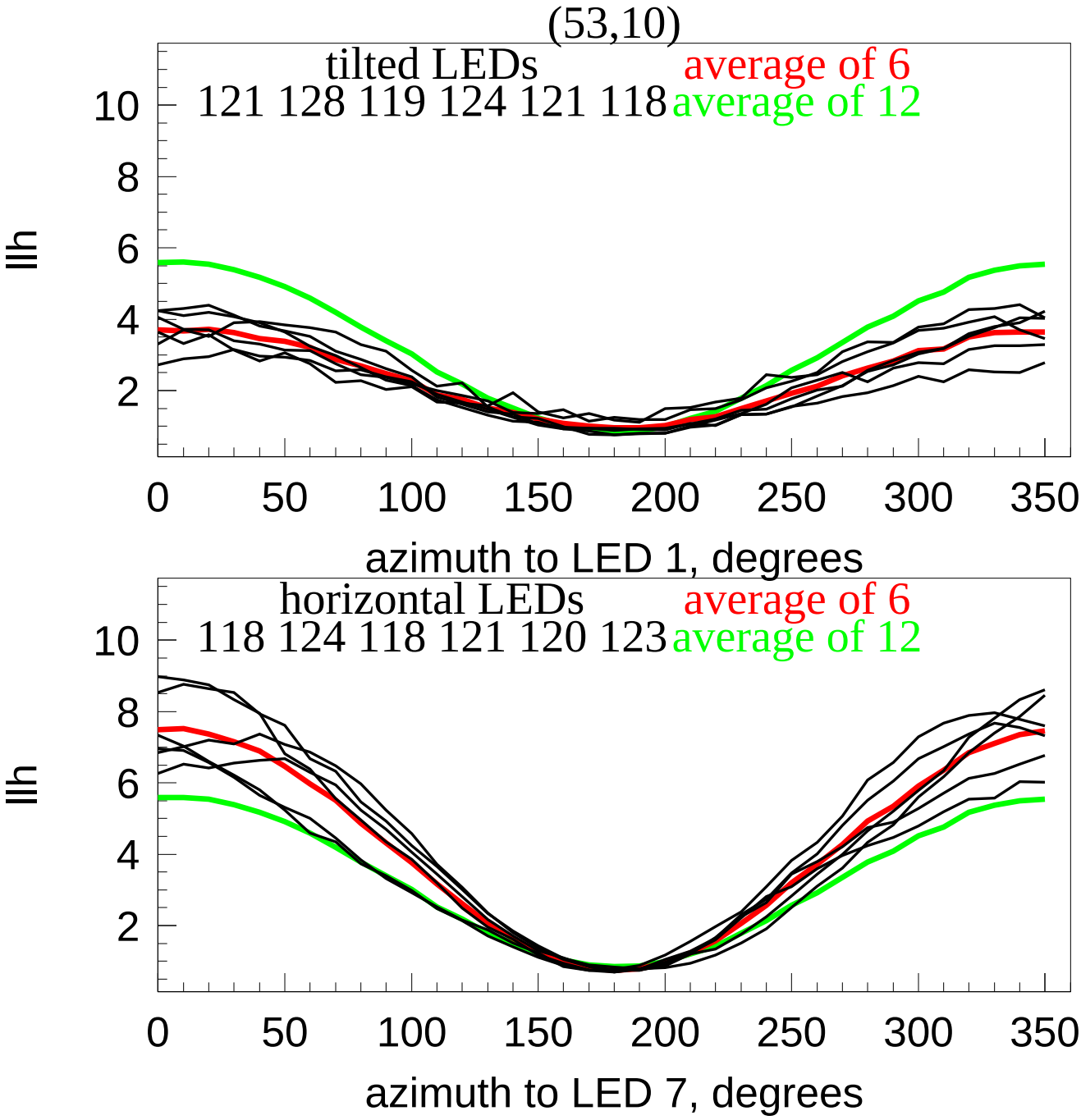

(53,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
100.5 ± 13.7

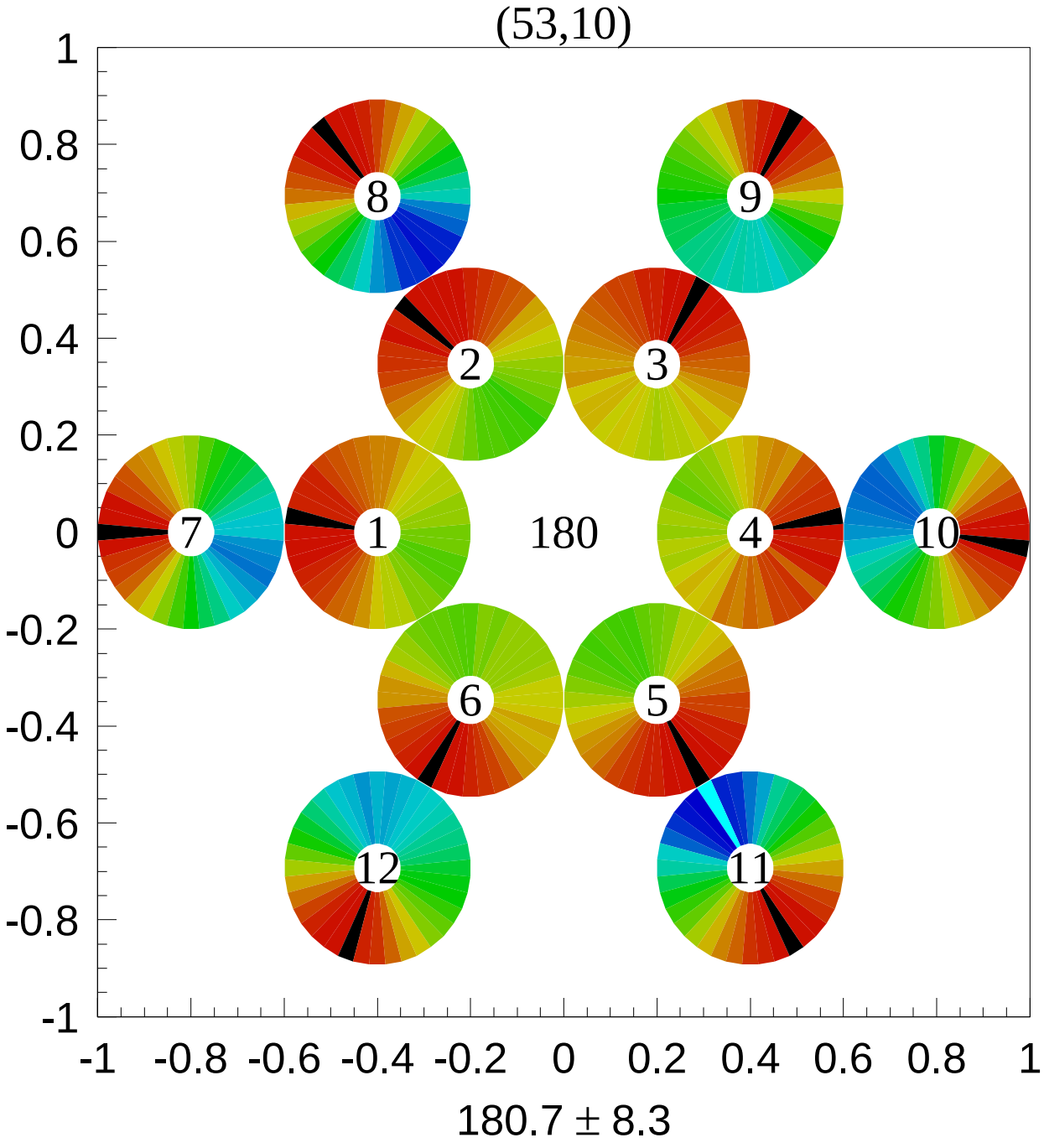

(53,8)
tilted LEDs
114 117 58 0 76 112
average of 6
average of 12
Ilh
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 121 121 119 117 111
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

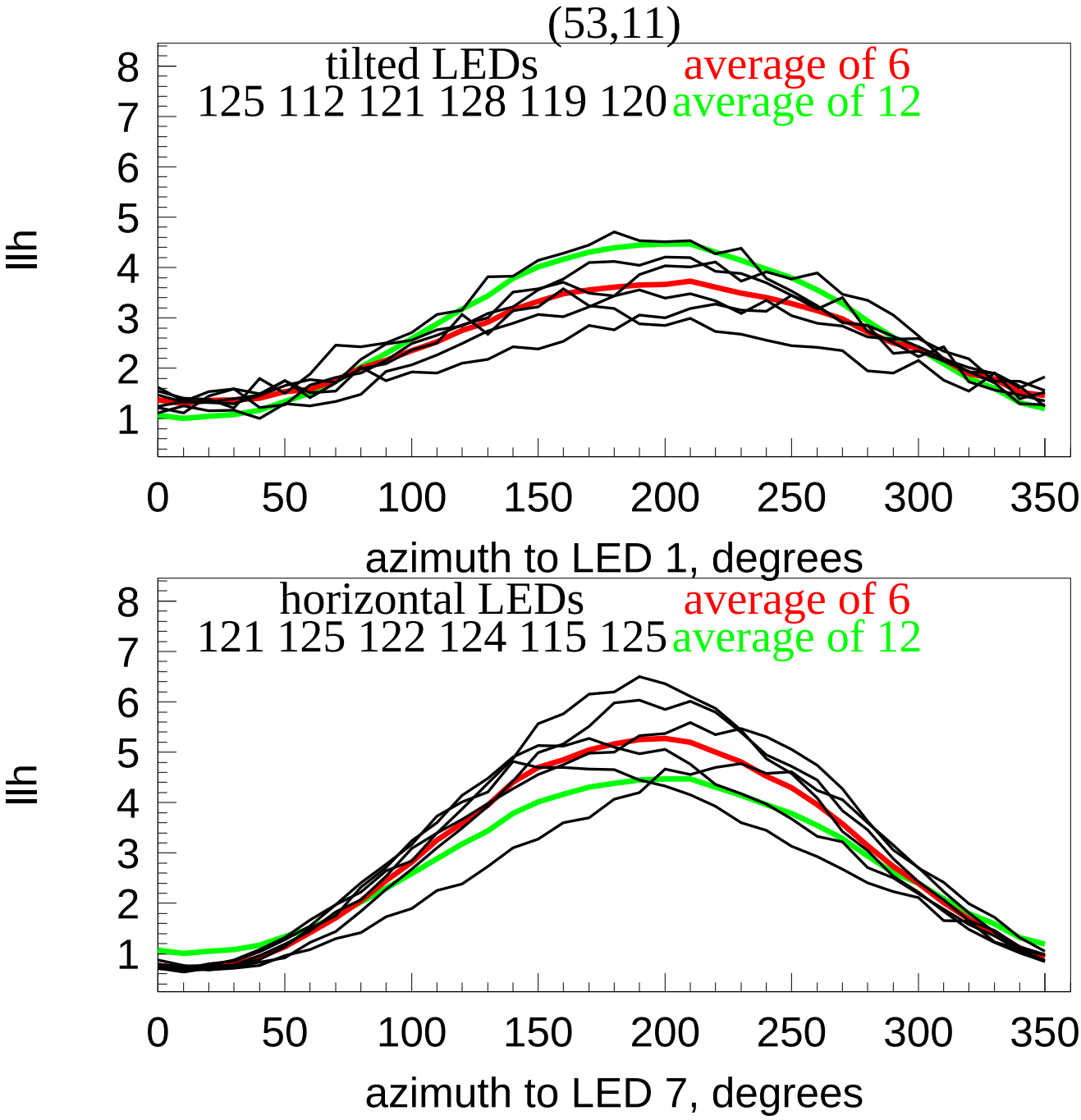

(53,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
6
10
5
12
11
164.8 ± 14.5

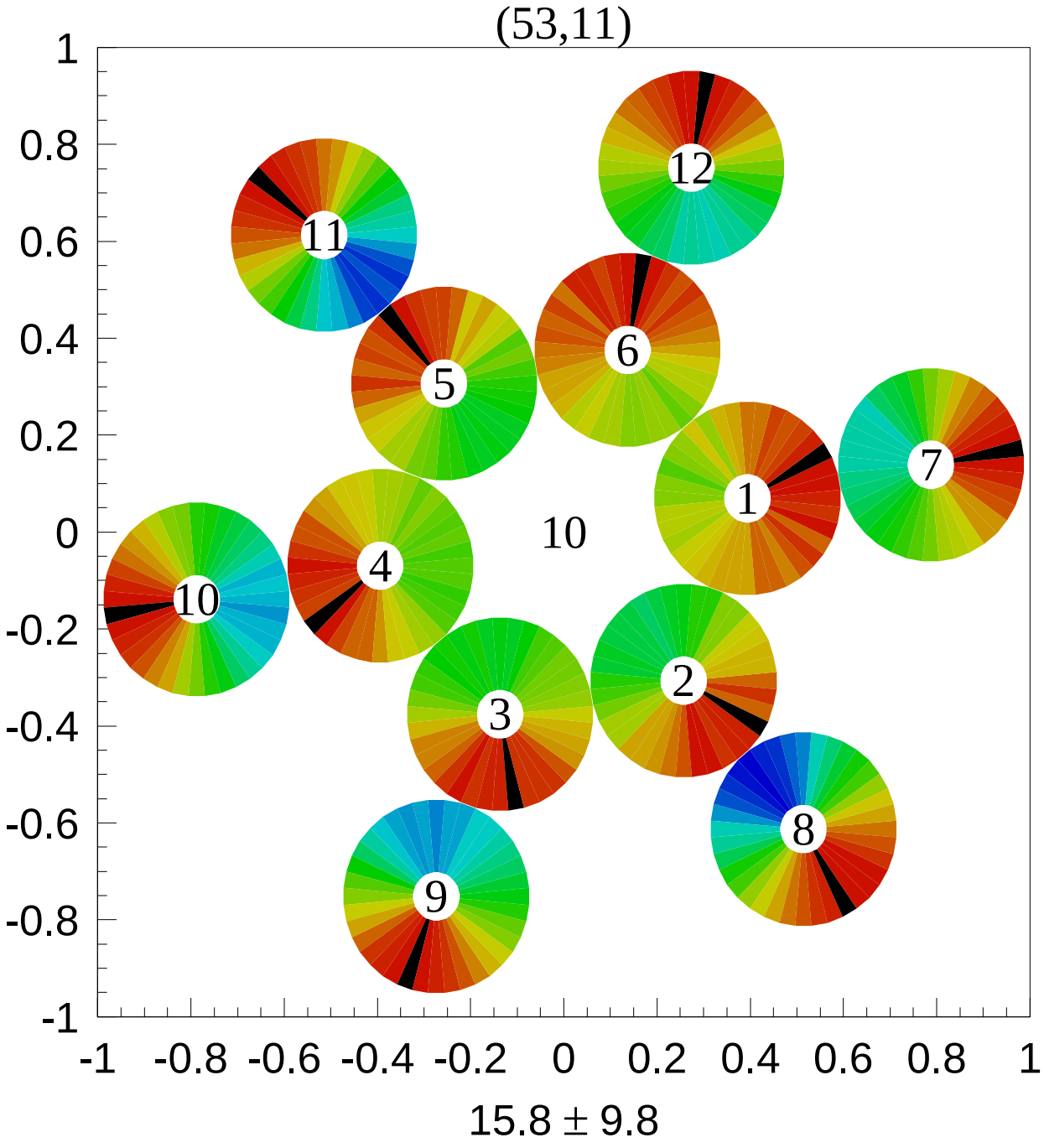

(53,9)
tilted LEDs
117 118 126 123 117 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 127 114 127 123 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

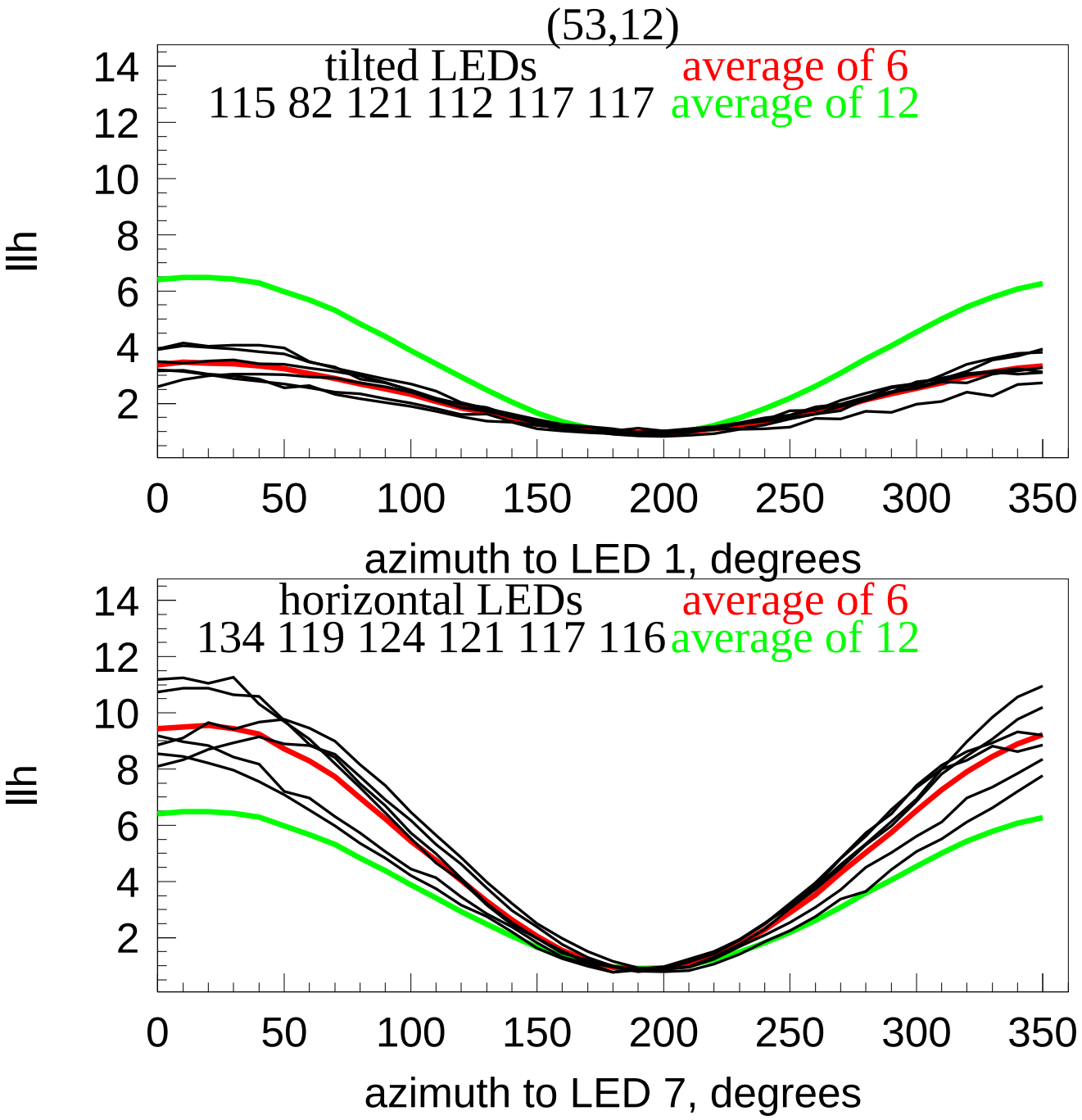

(53,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
128 ± 12.7
130
1
2
3
4
5
6
7
8
9
10
11
12

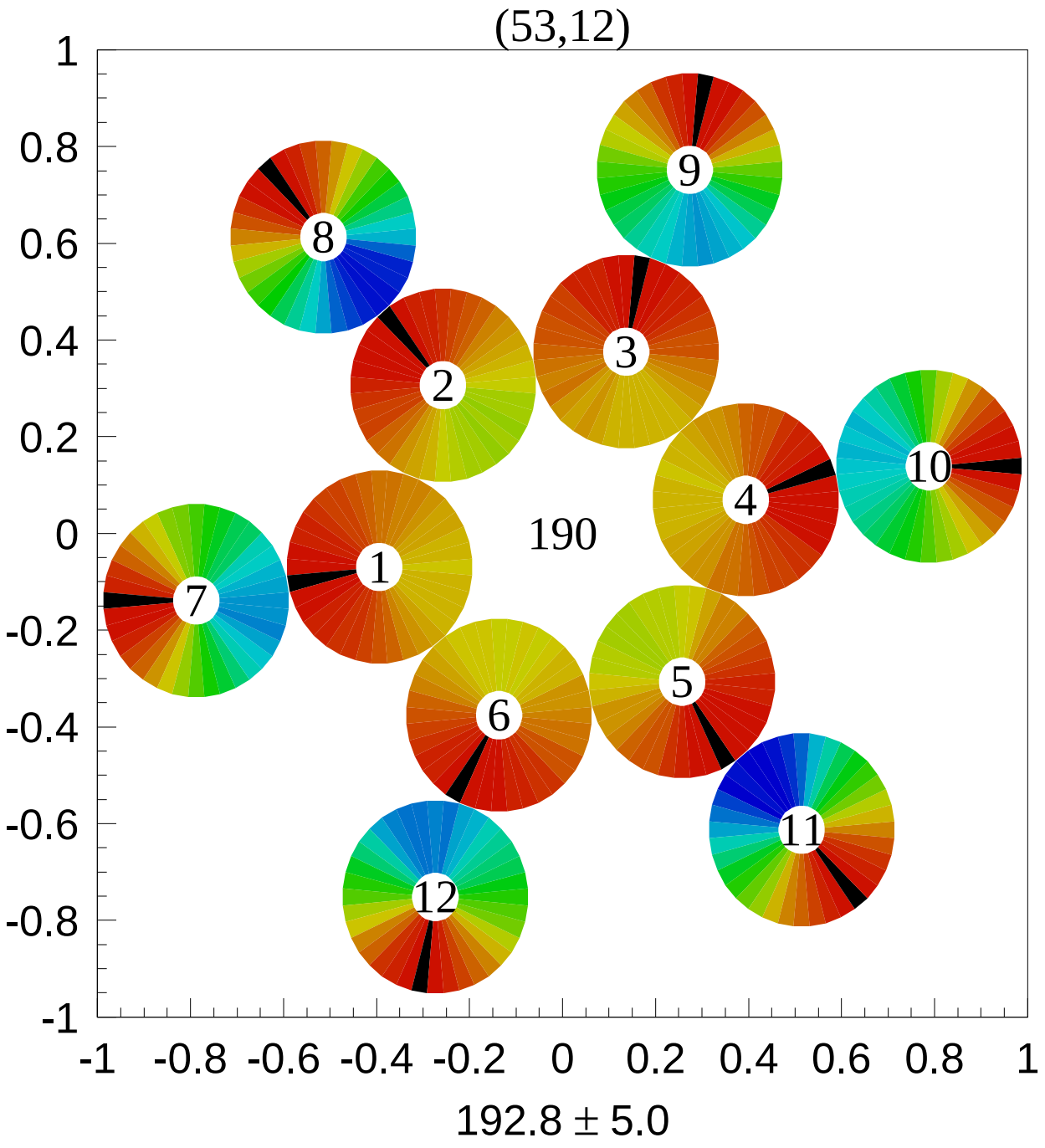

(53,10)
tilted LEDs
121 128 119 124 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 124 118 121 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

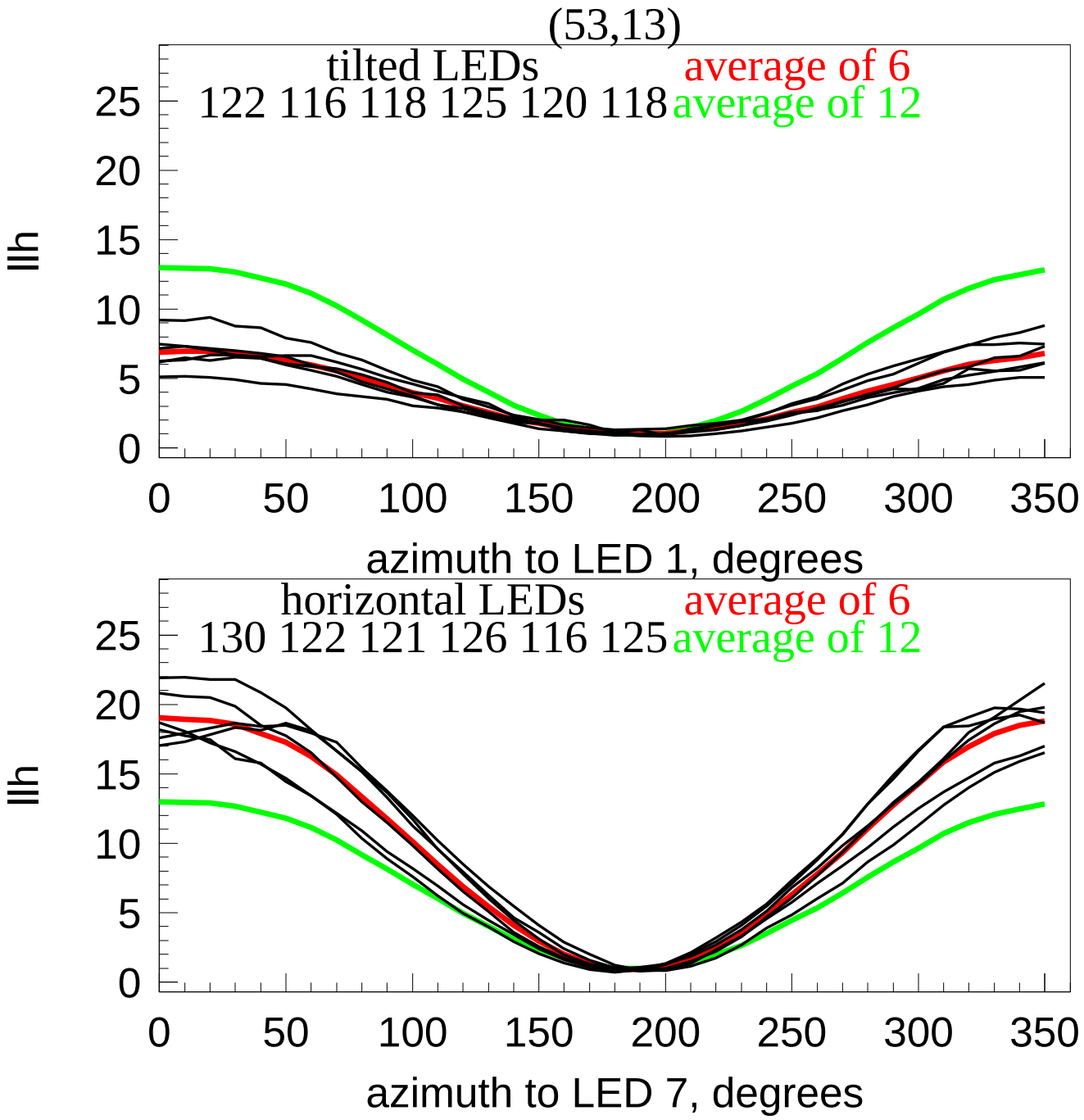

(53,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
180.7 ± 8.3
8
9
2
3
7
1
180
4
10
6
5
12
11

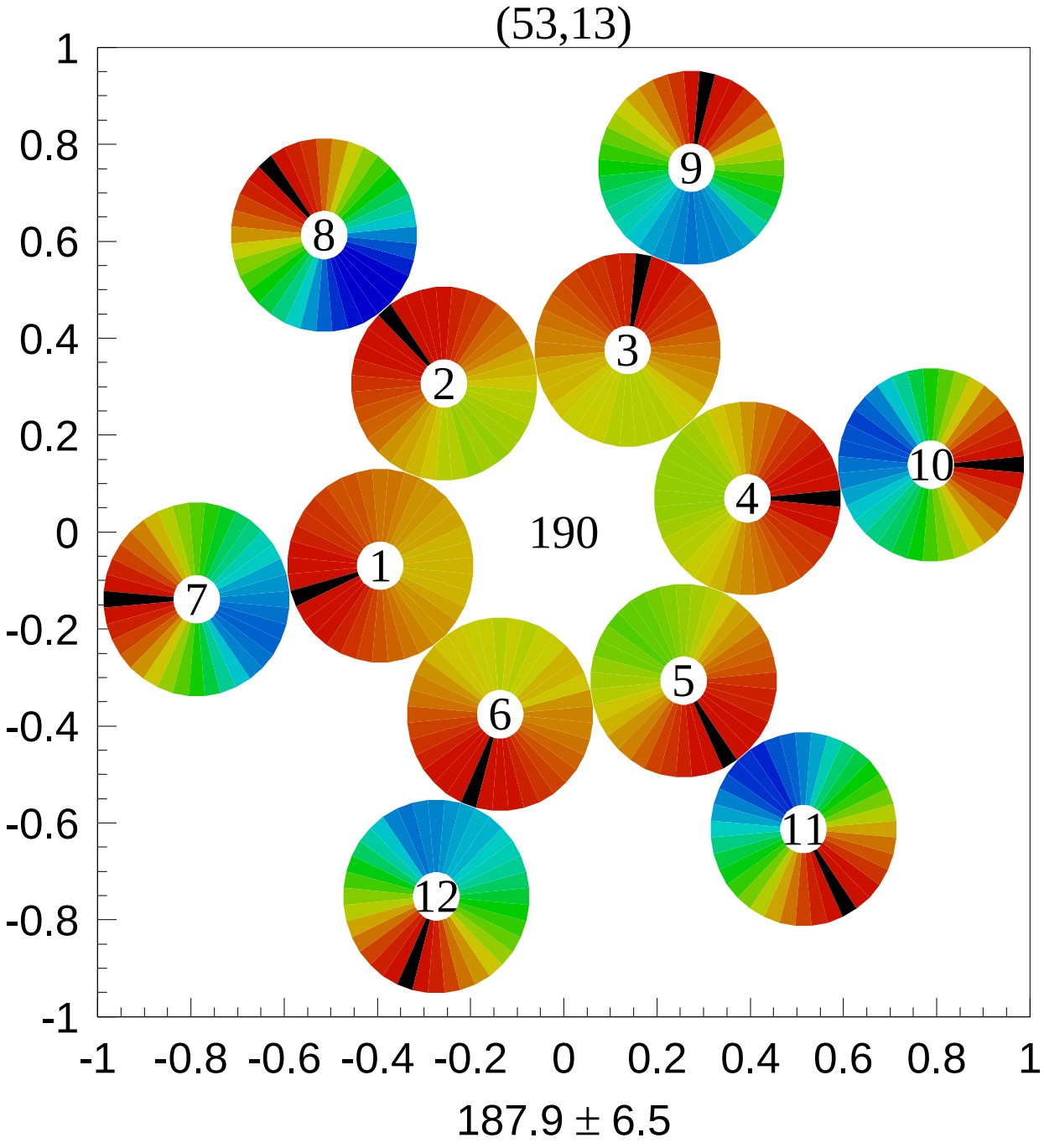

(53,11)
tilted LEDs
125 112 121 128 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 122 124 115 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

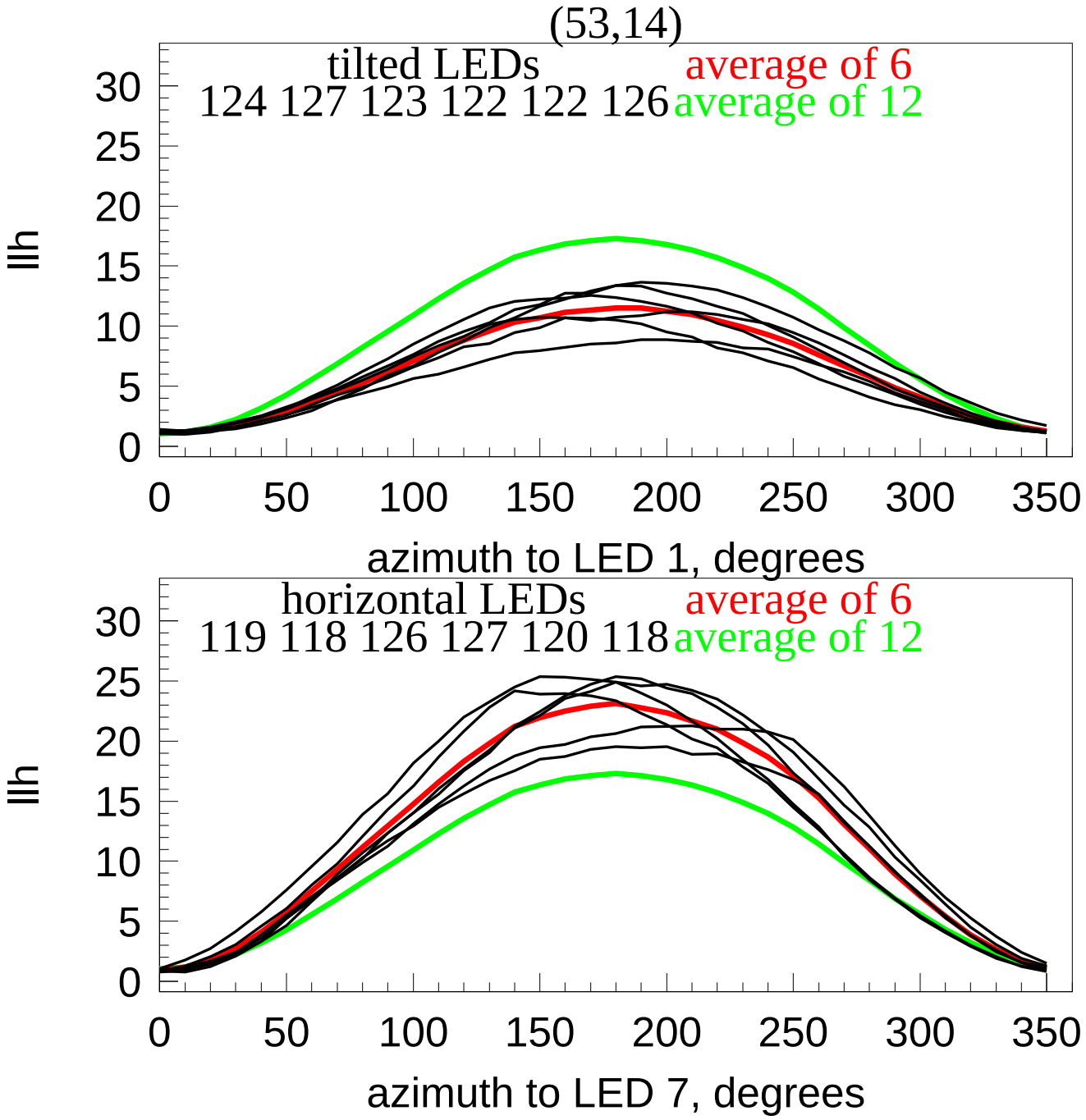

(53,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
15.8 ± 9.8
12
11
6
5
7
1
10
4
10
2
3
8
9

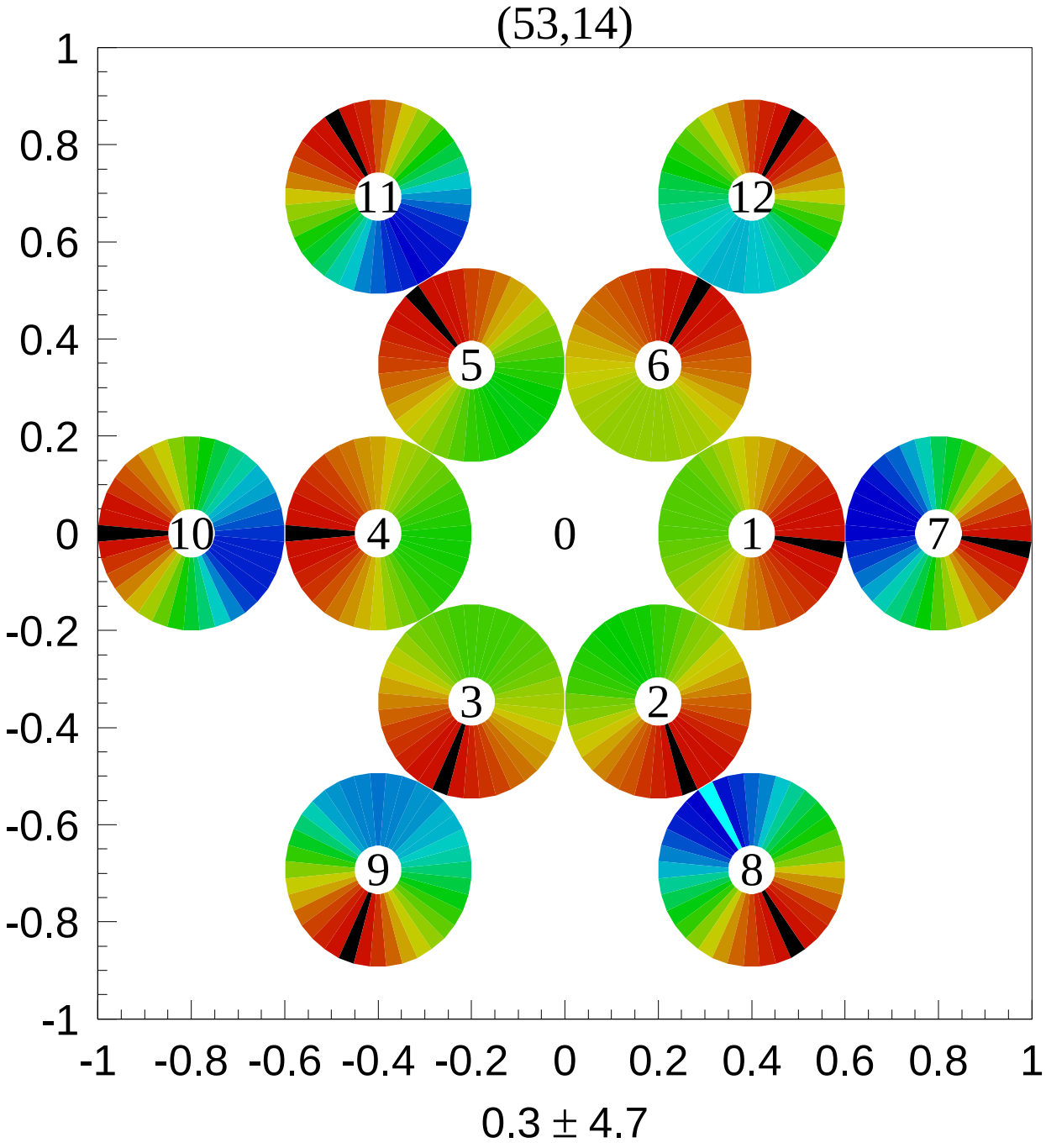

(53,12)
tilted LEDs
115 82 121 112 117 117
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
134 119 124 121 117 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

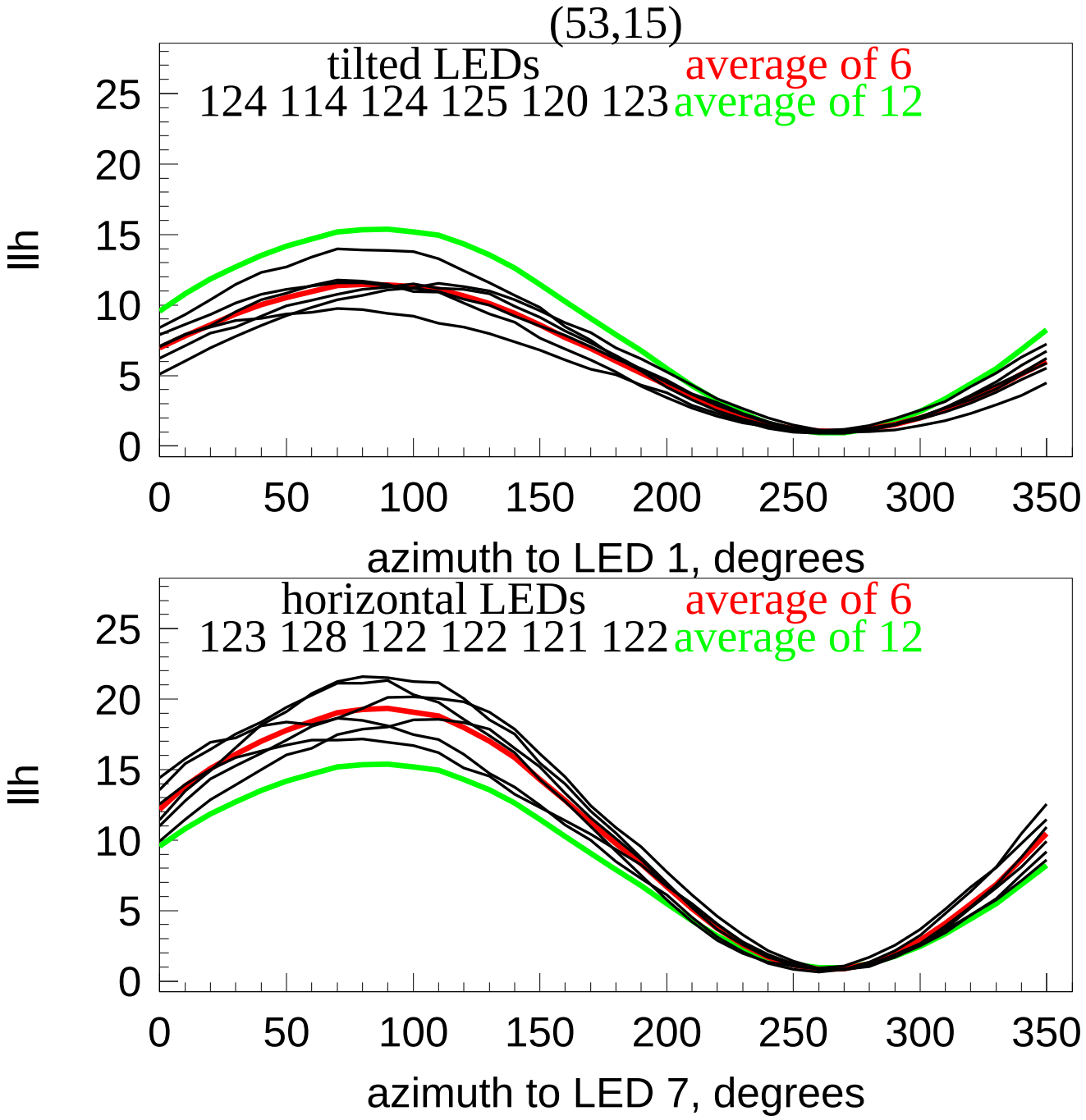

(53,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
192.8 ± 5.0
190
1
2
3
4
5
6
7
8
9
10
11
12

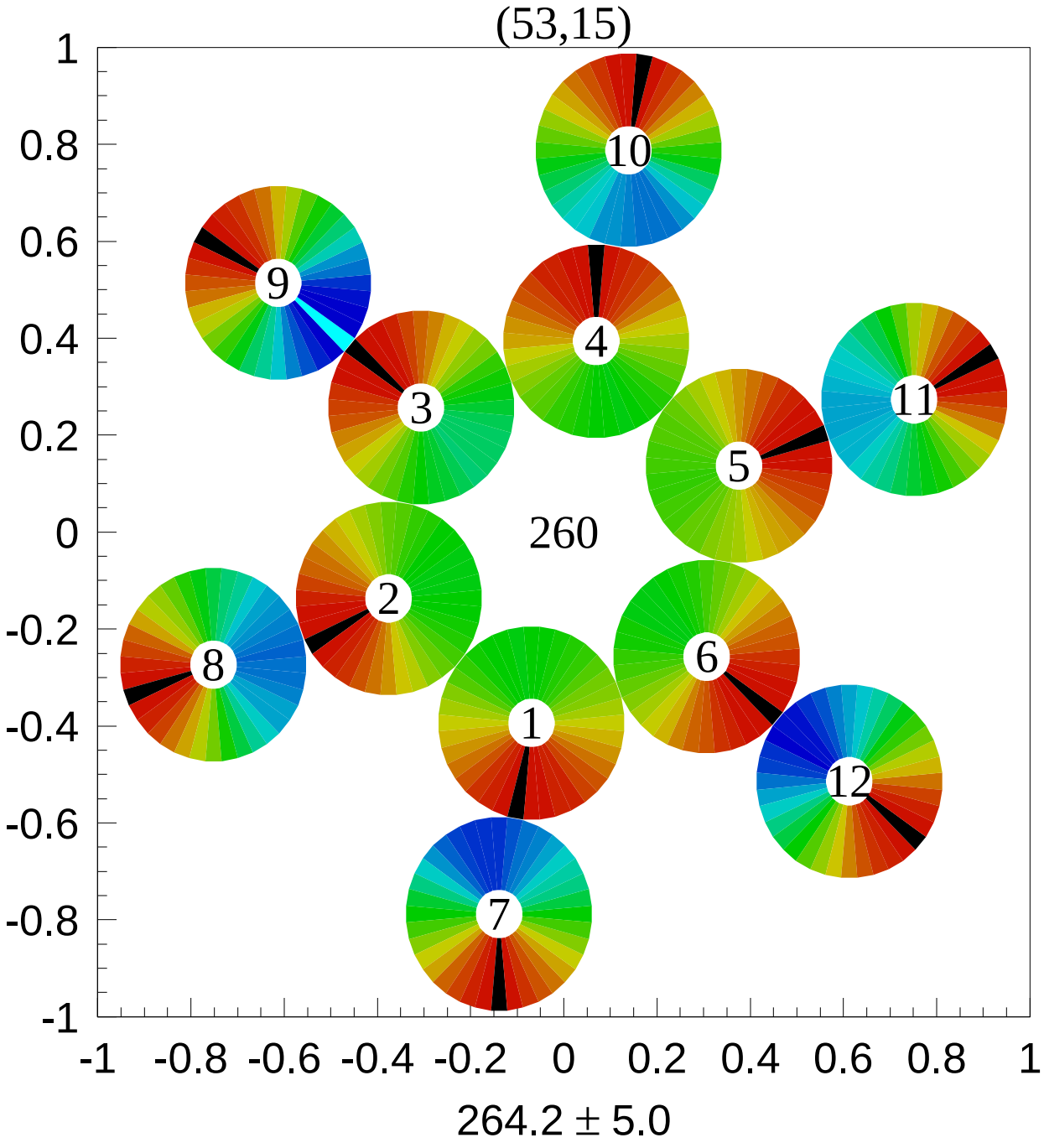

(53,13)
tilted LEDs
122 116 118 125 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 122 121 126 116 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

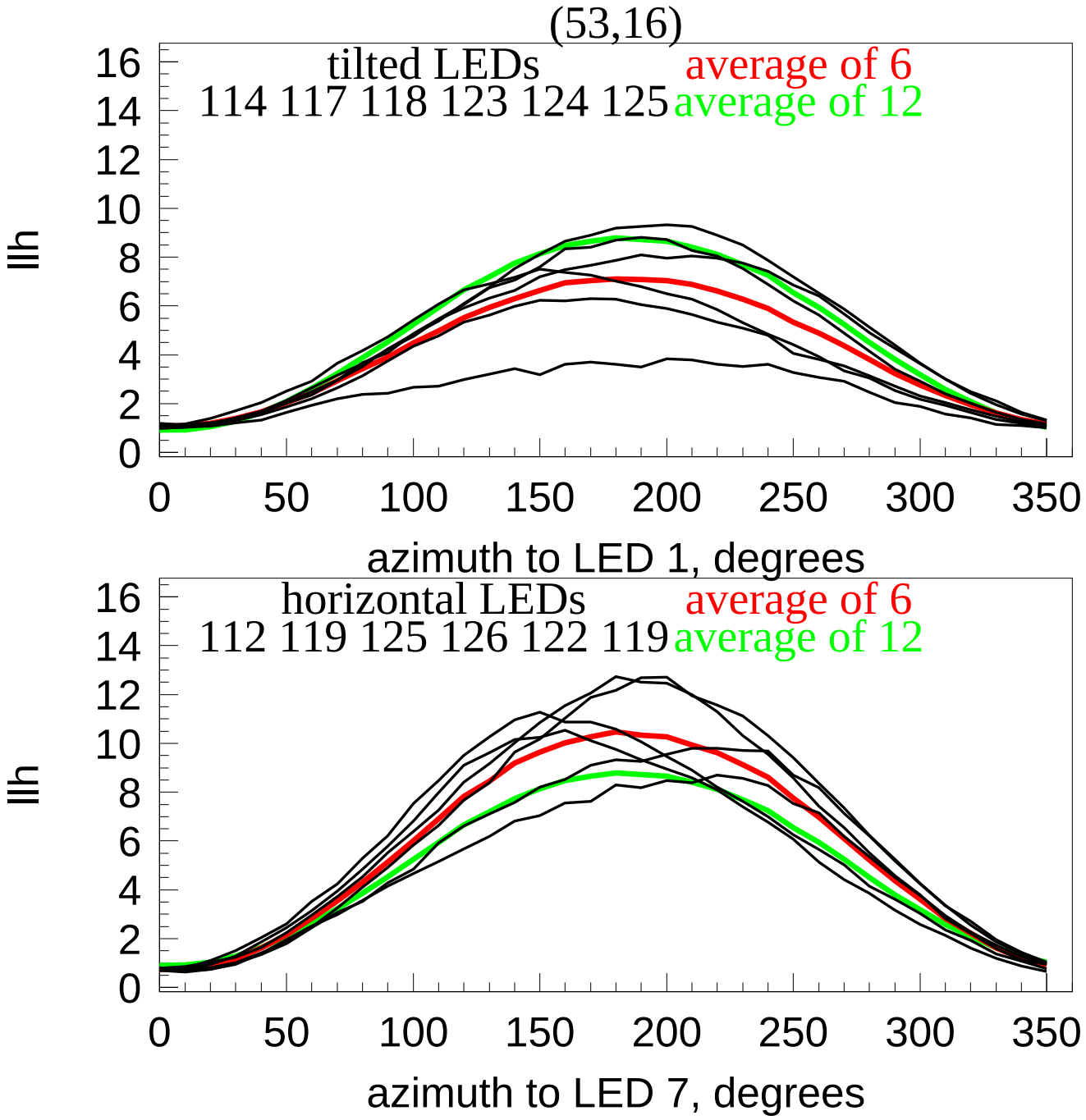

(53,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
187.9 ± 6.5
190
1
2
3
4
5
6
7
8
9
10
11
12

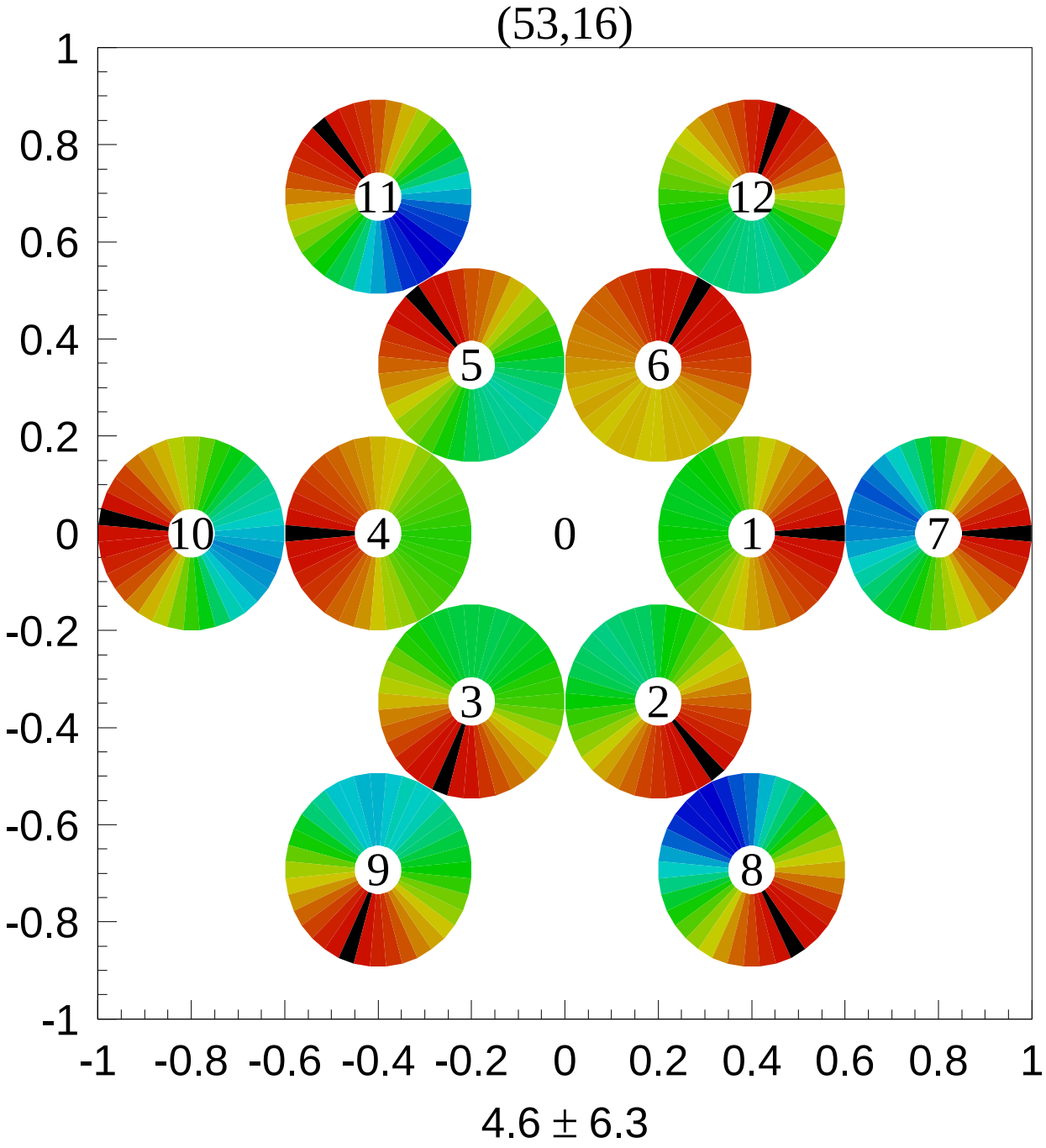

(53,14)
tilted LEDs
124 127 123 122 122 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 118 126 127 120 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

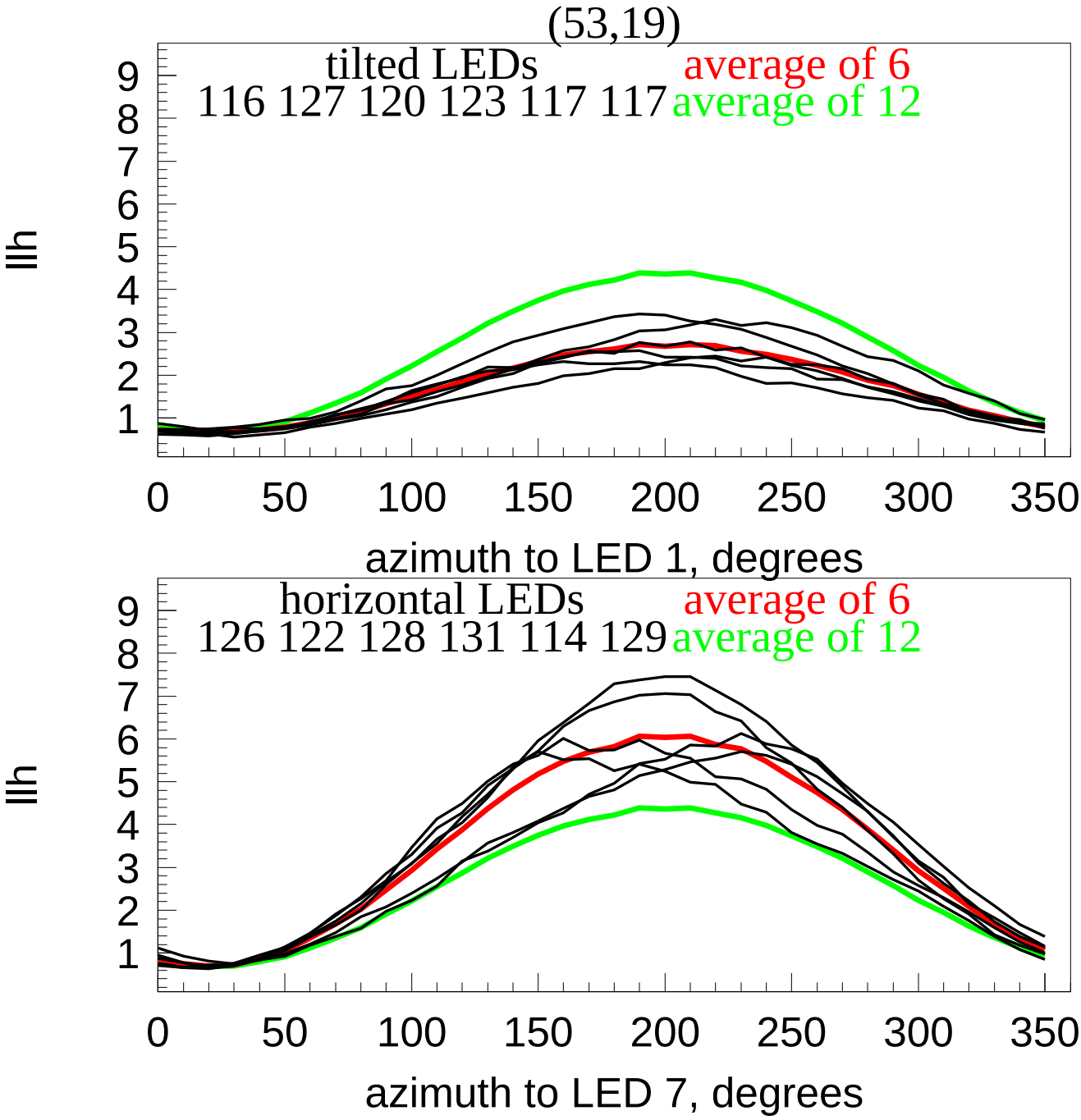

(53,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
0.3 ± 4.7
11
12
5
6
10
4
0
1
7
3
2
9
8

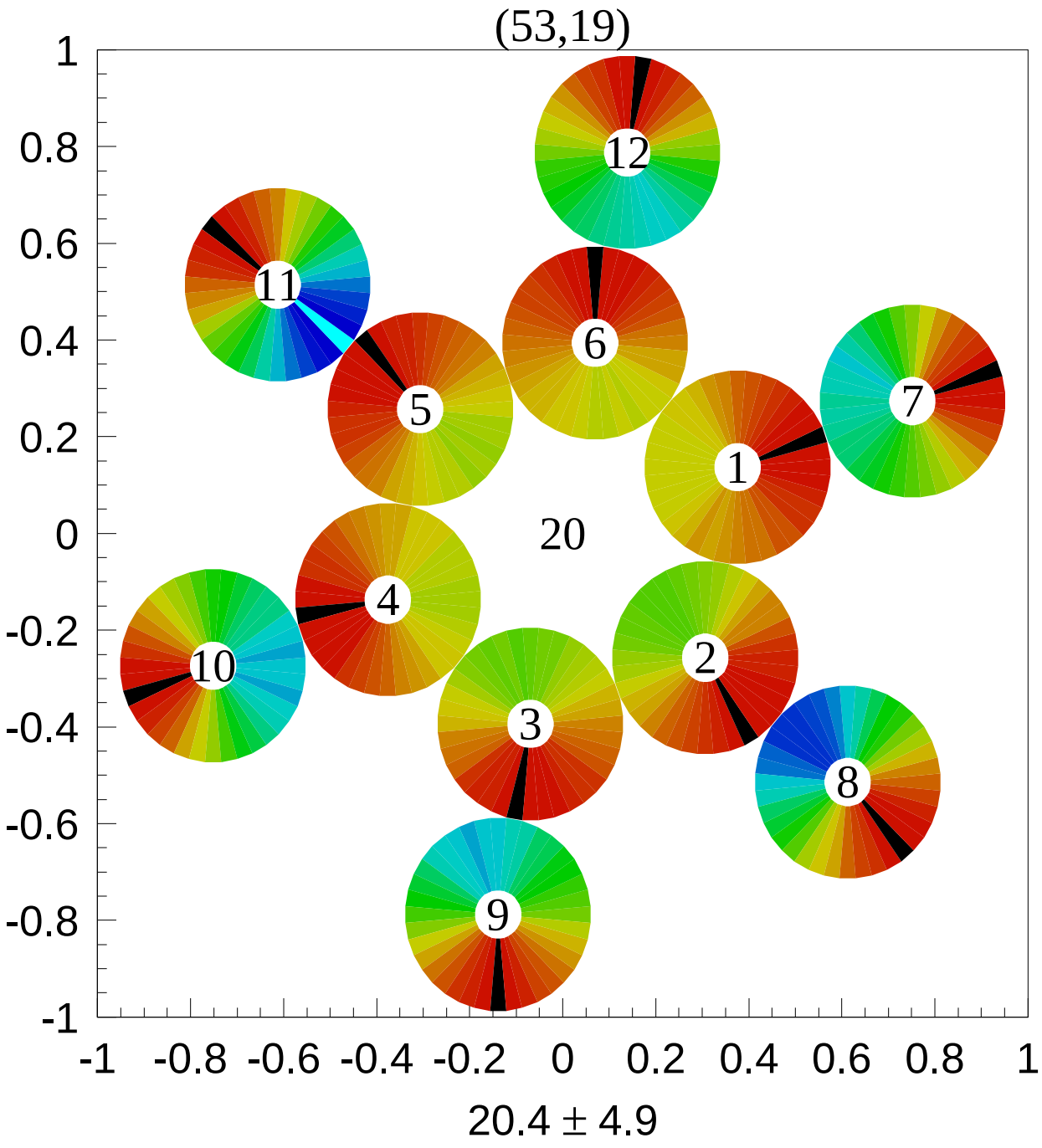

(53,15)
tilted LEDs
124 114 124 125 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 128 122 122 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

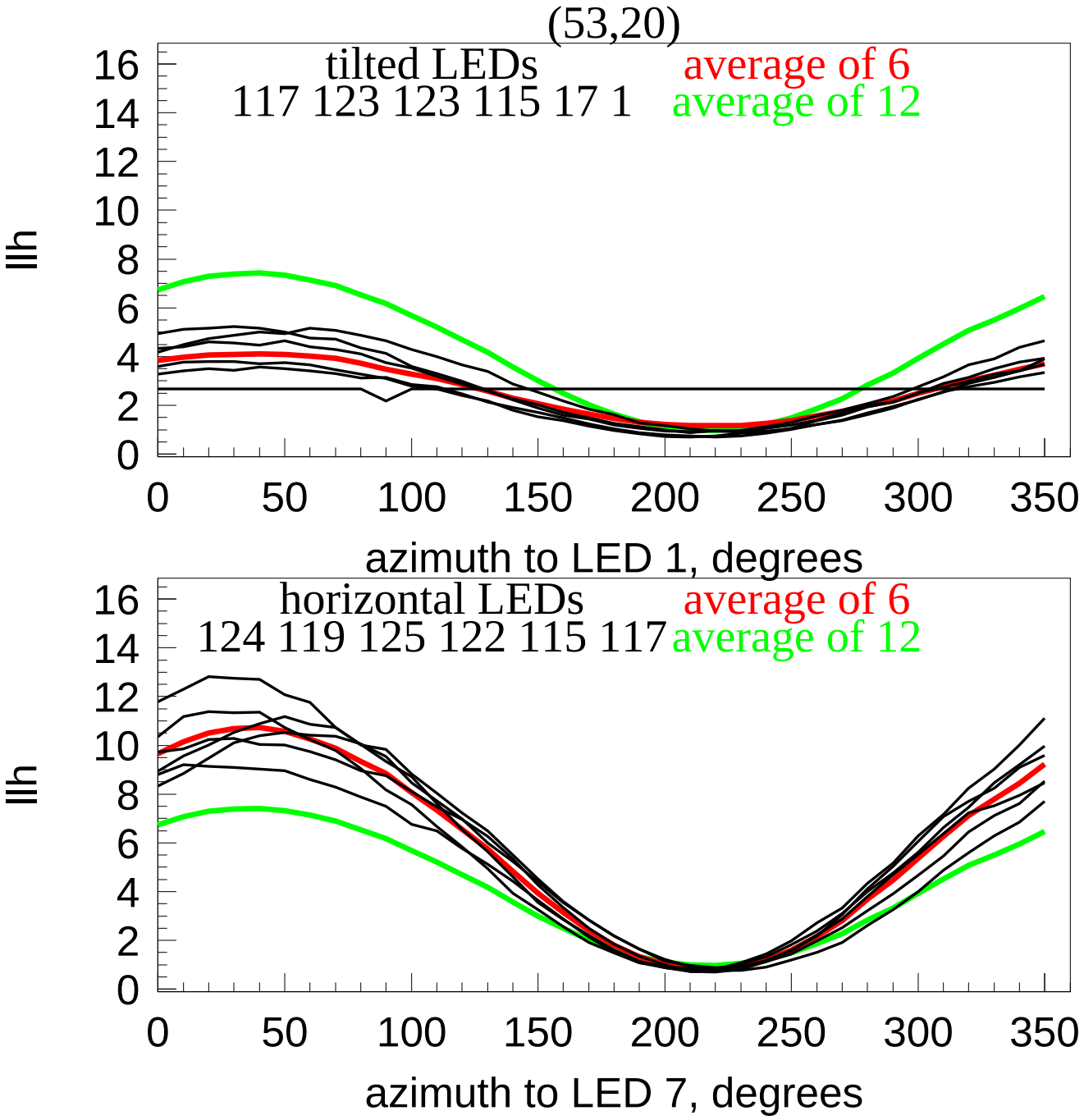

(53,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
264.2 ± 5.0

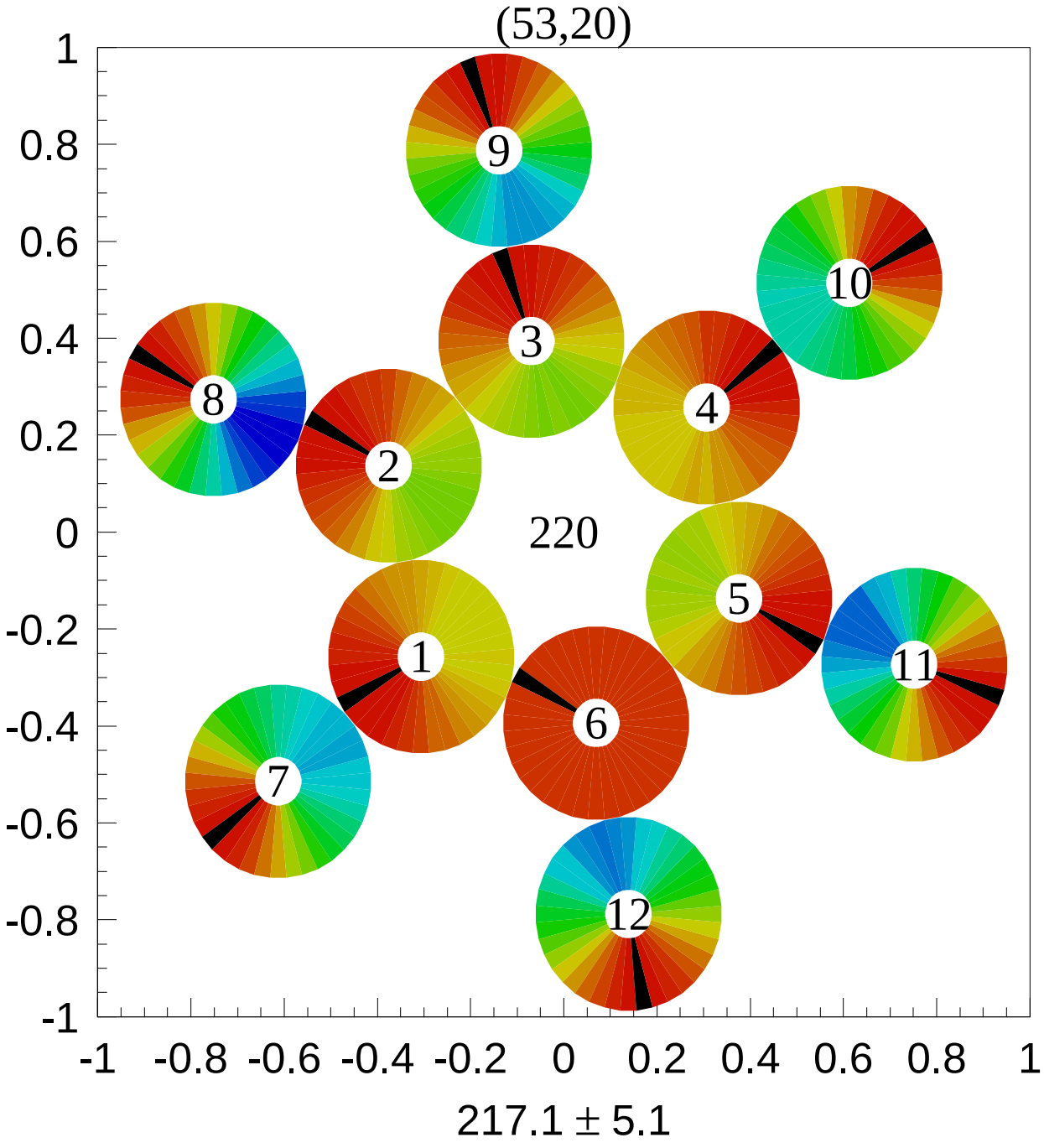

(53,16)
tilted LEDs
114 117 118 123 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 119 125 126 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

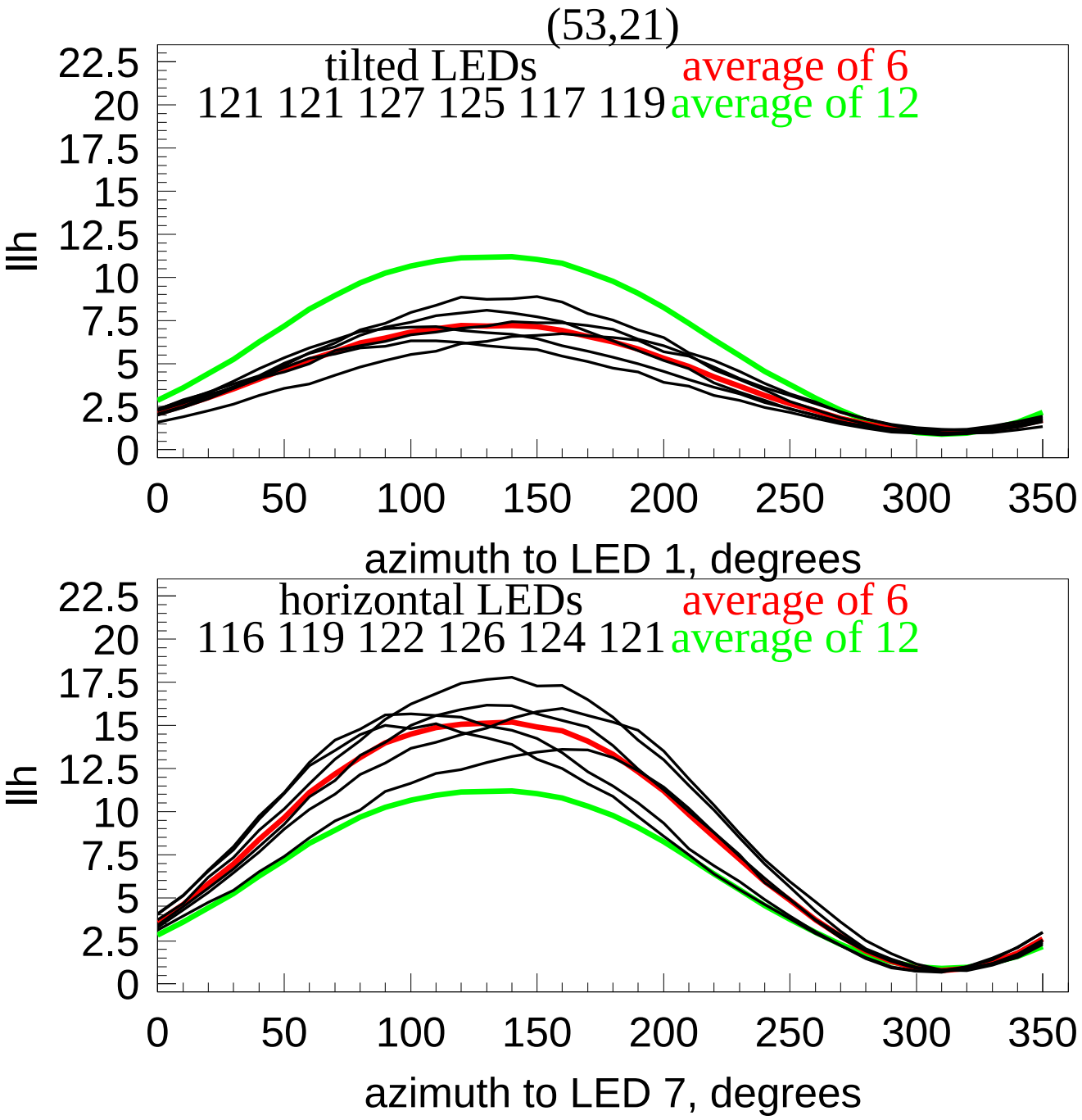

(53,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
4.6 ± 6.3

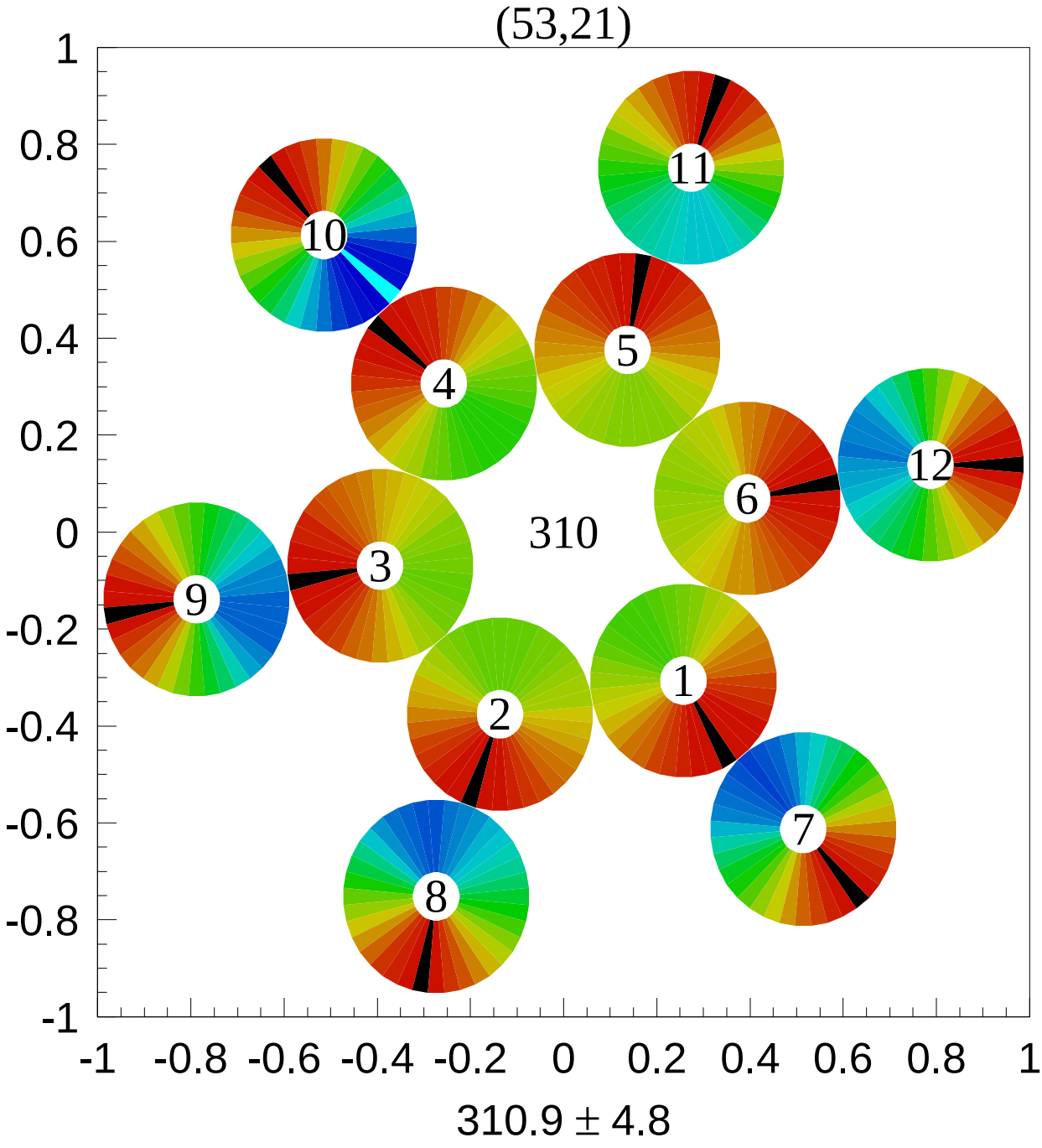

(53,19)
tilted LEDs
116 127 120 123 117 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 122 128 131 114 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

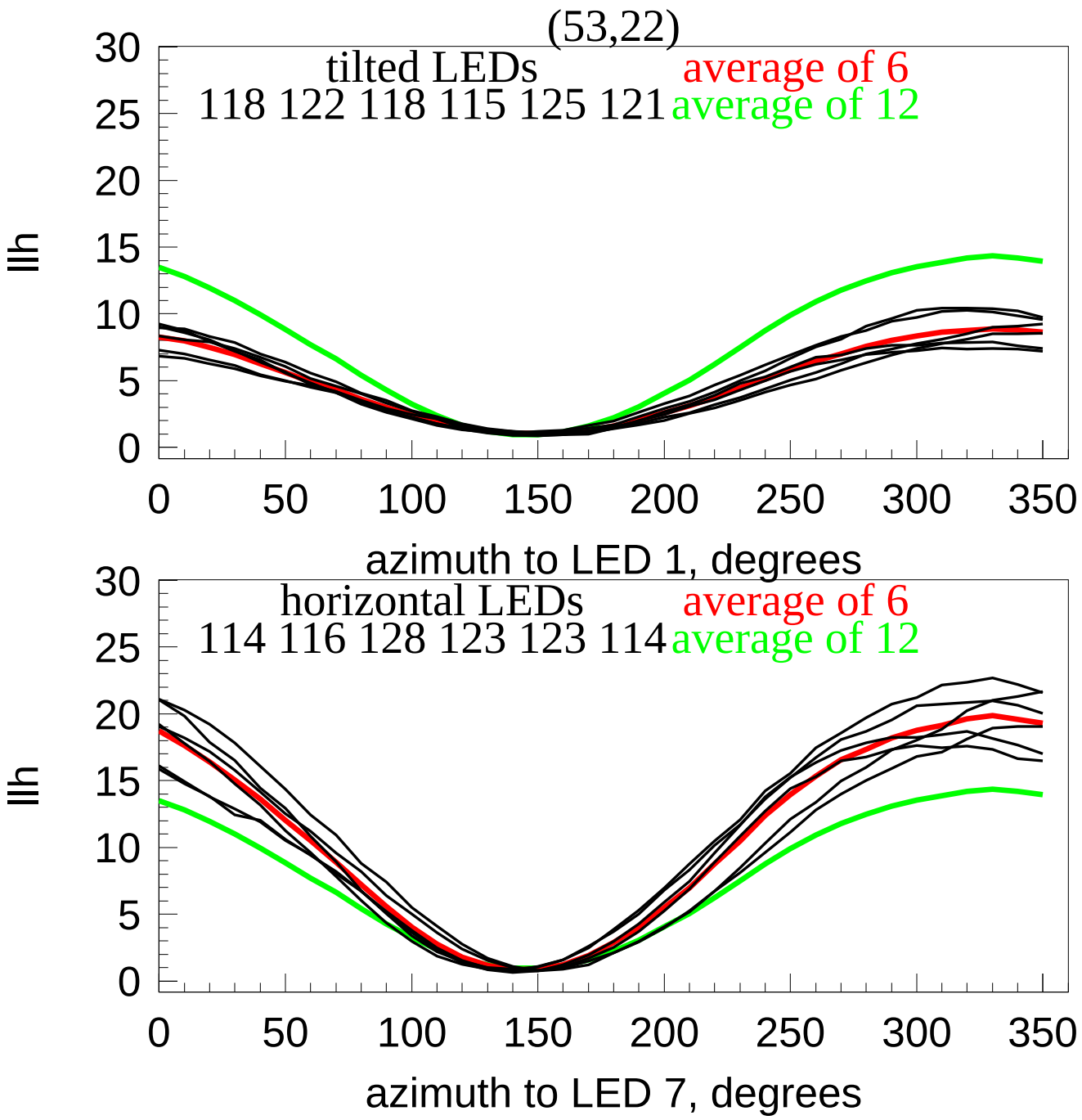

(53,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
20.4 ± 4.9

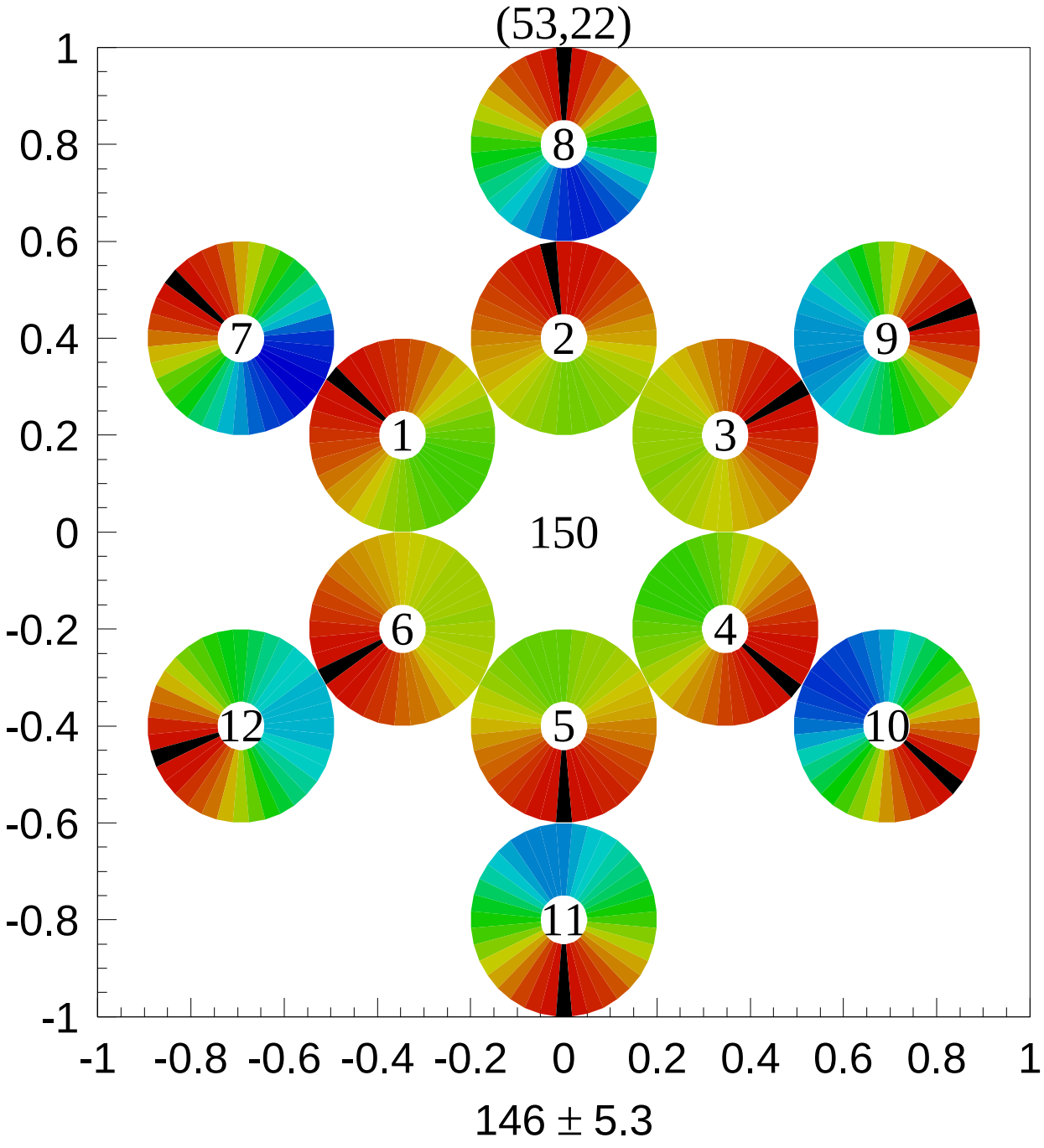

(53,20)
tilted LEDs
117 123 123 115 17 1
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 125 122 115 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

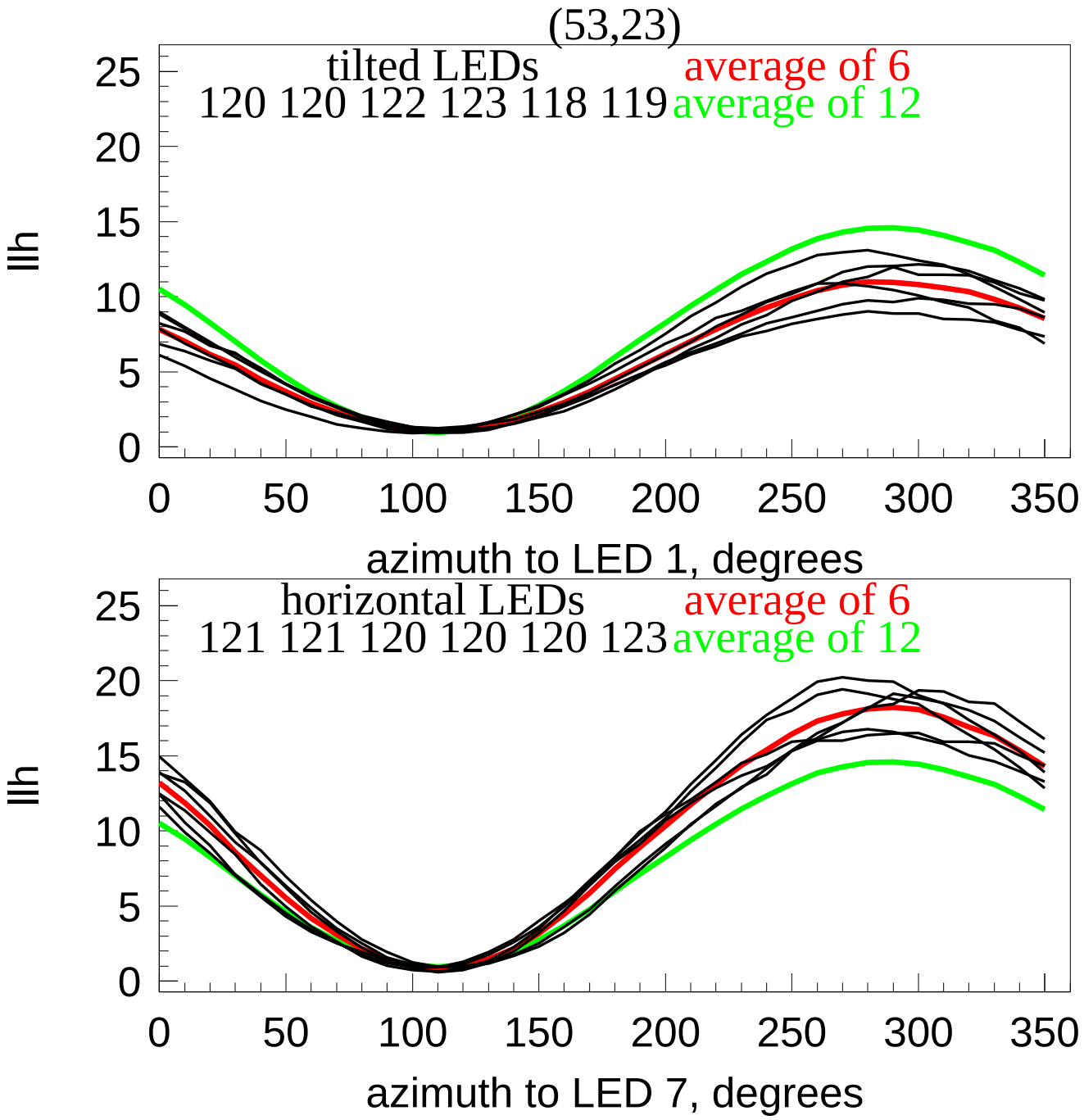

(53,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
217.1 ± 5.1

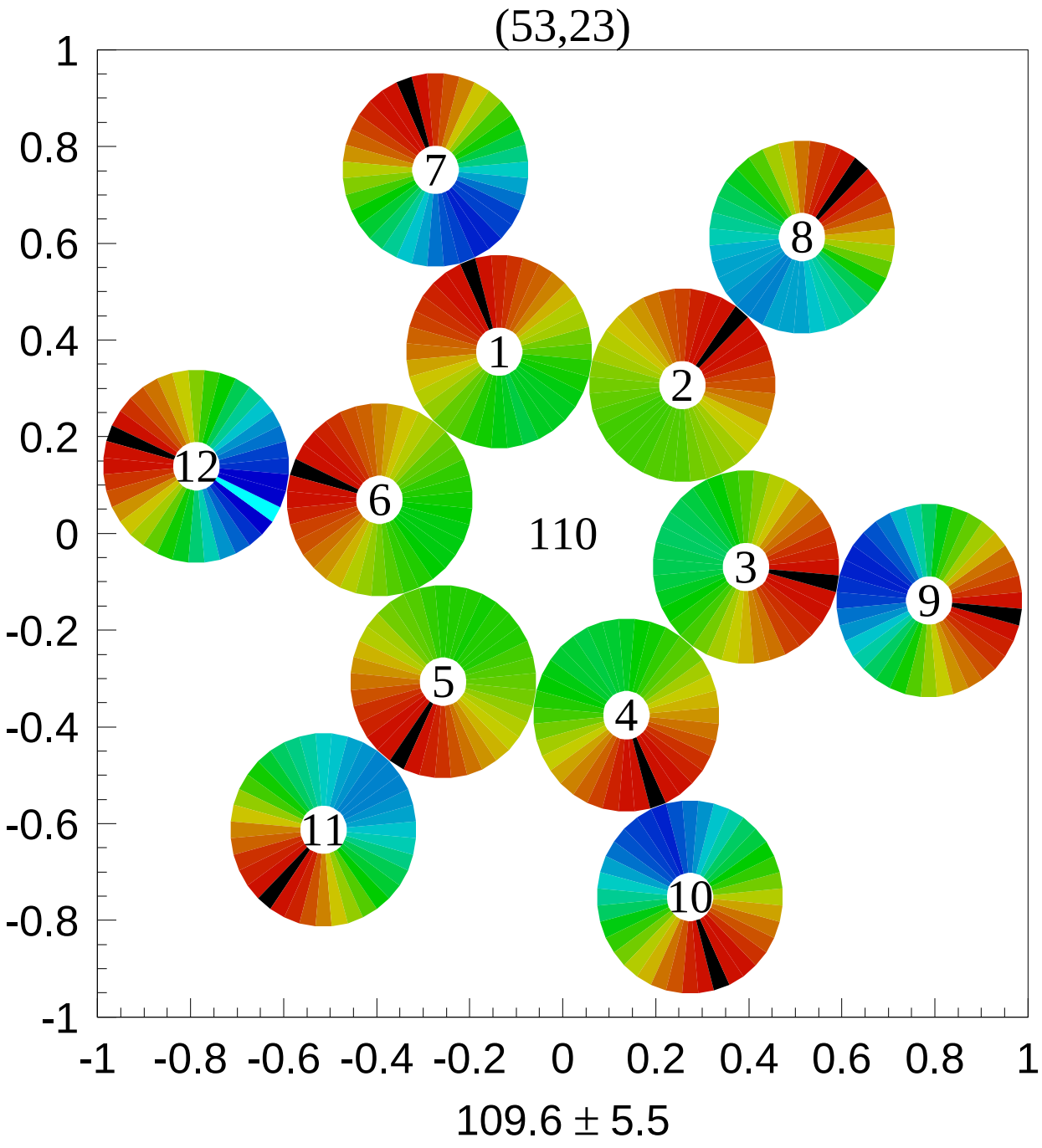

(53,21)
tilted LEDs
121 121 127 125 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 119 122 126 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

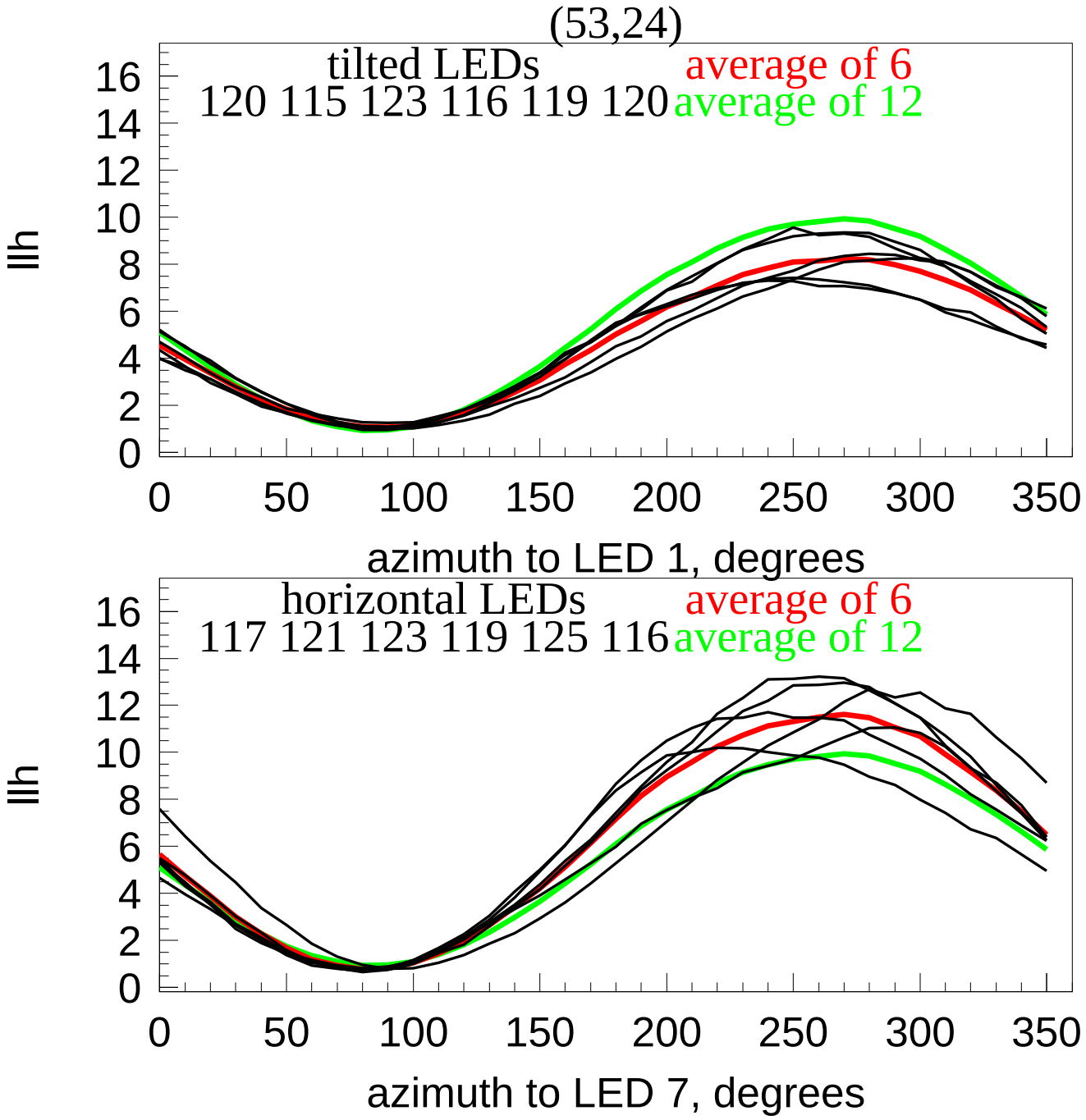

(53,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
310
310.9 ± 4.8
1
2
3
4
5
6
7
8
9
10
11
12

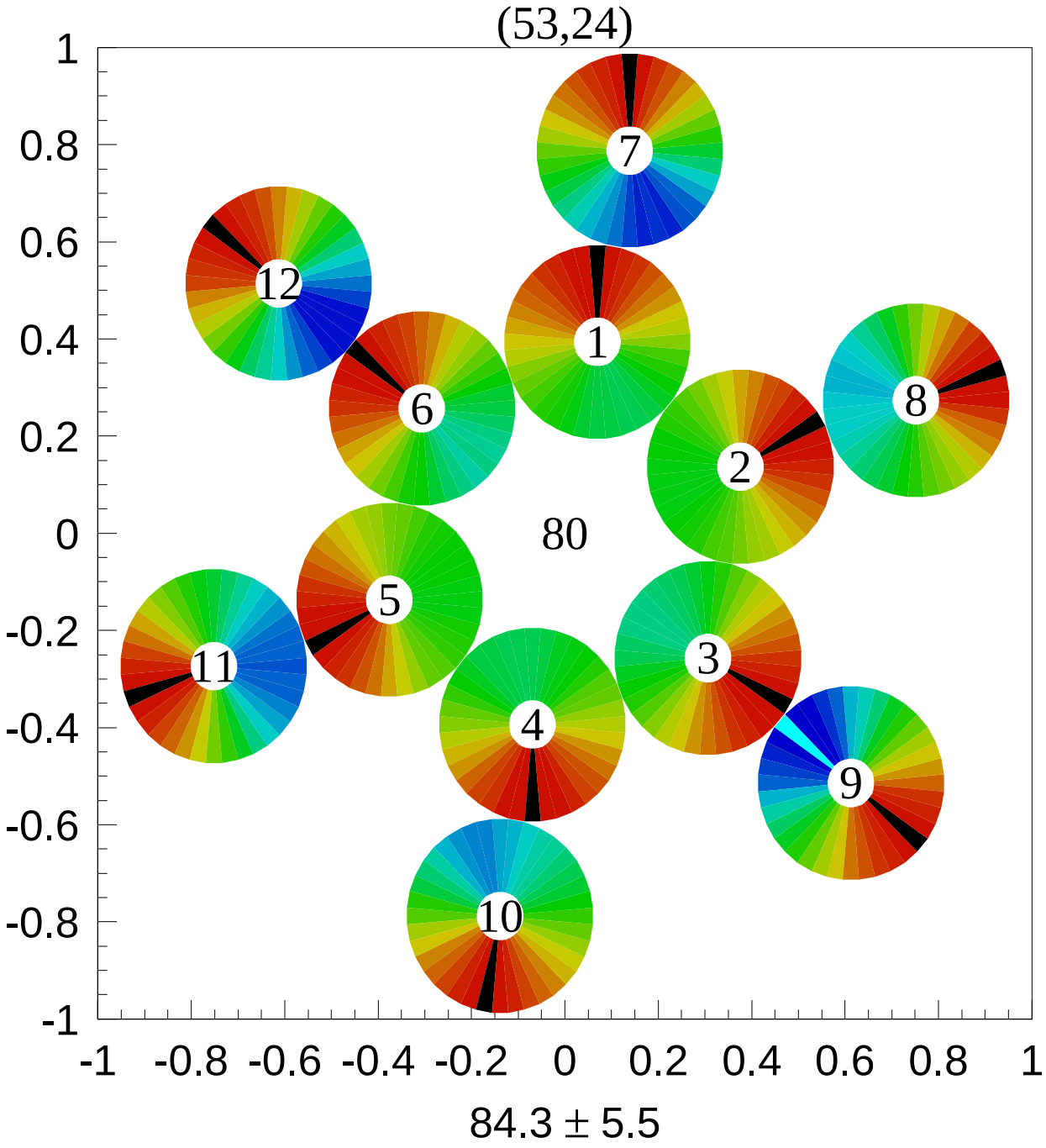

(53,22)
tilted LEDs
118 122 118 115 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 116 128 123 123 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

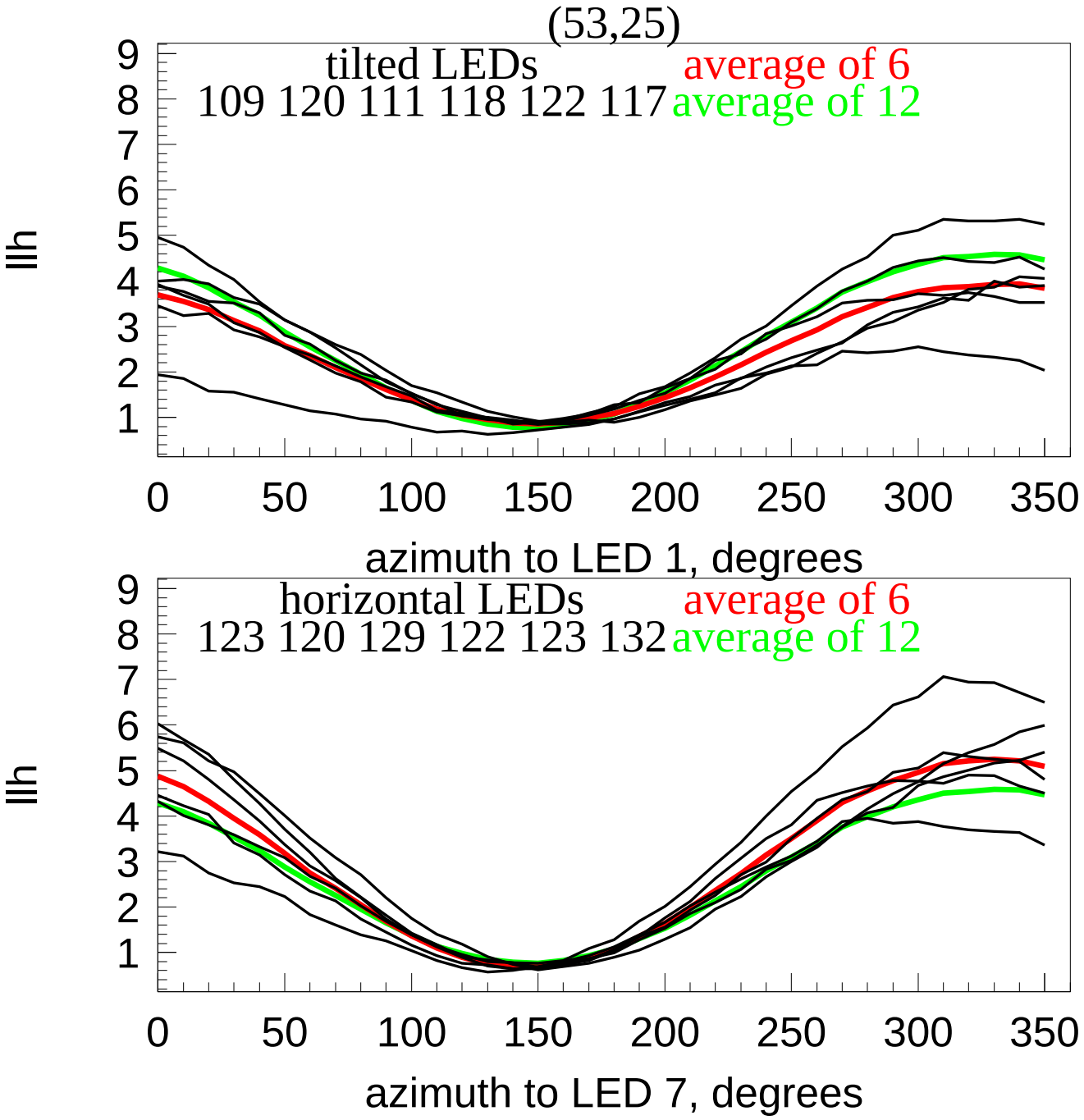

(53,22)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
146 ± 5.3

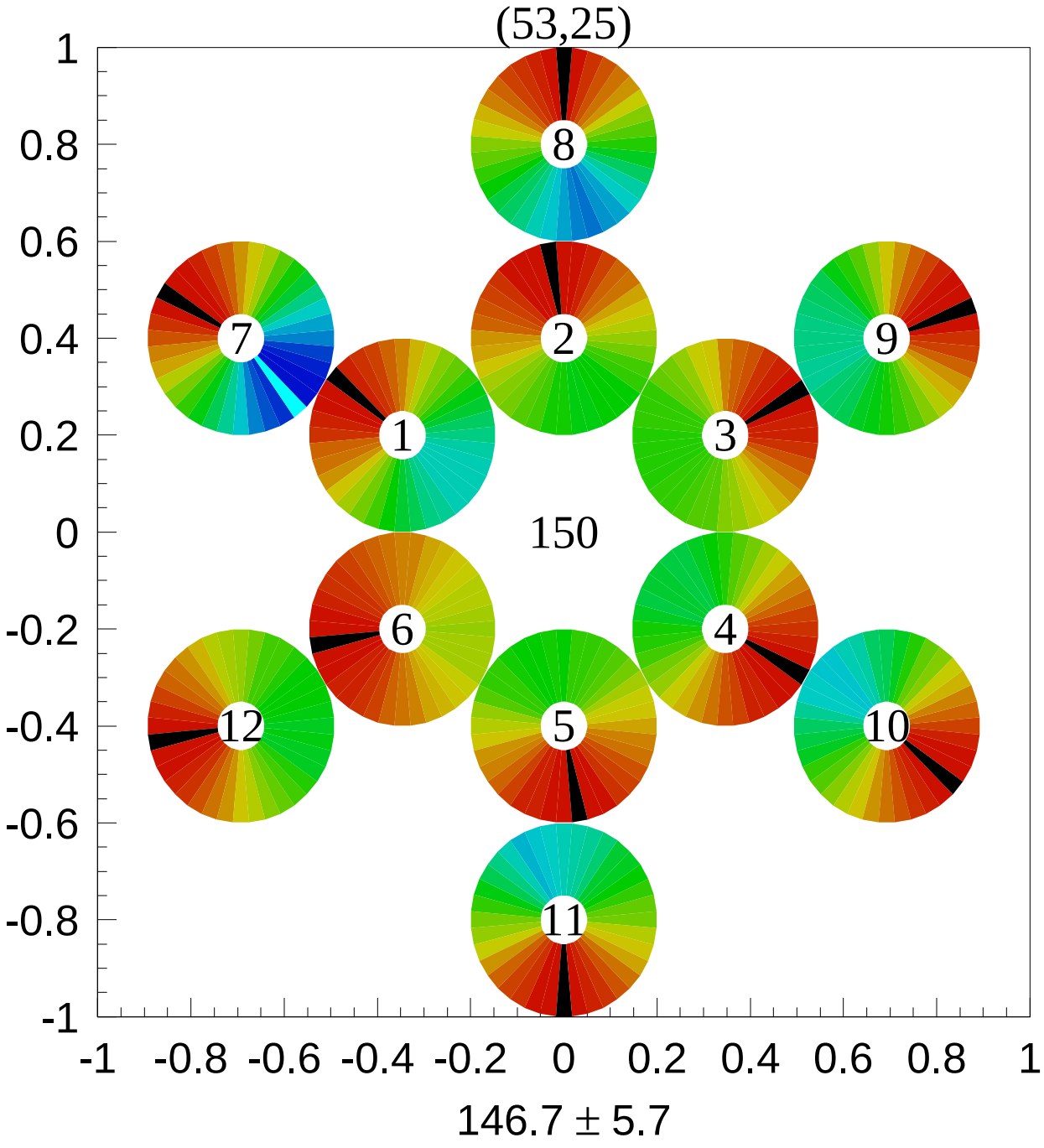

(53,23)
tilted LEDs
120 120 122 123 118 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 120 120 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

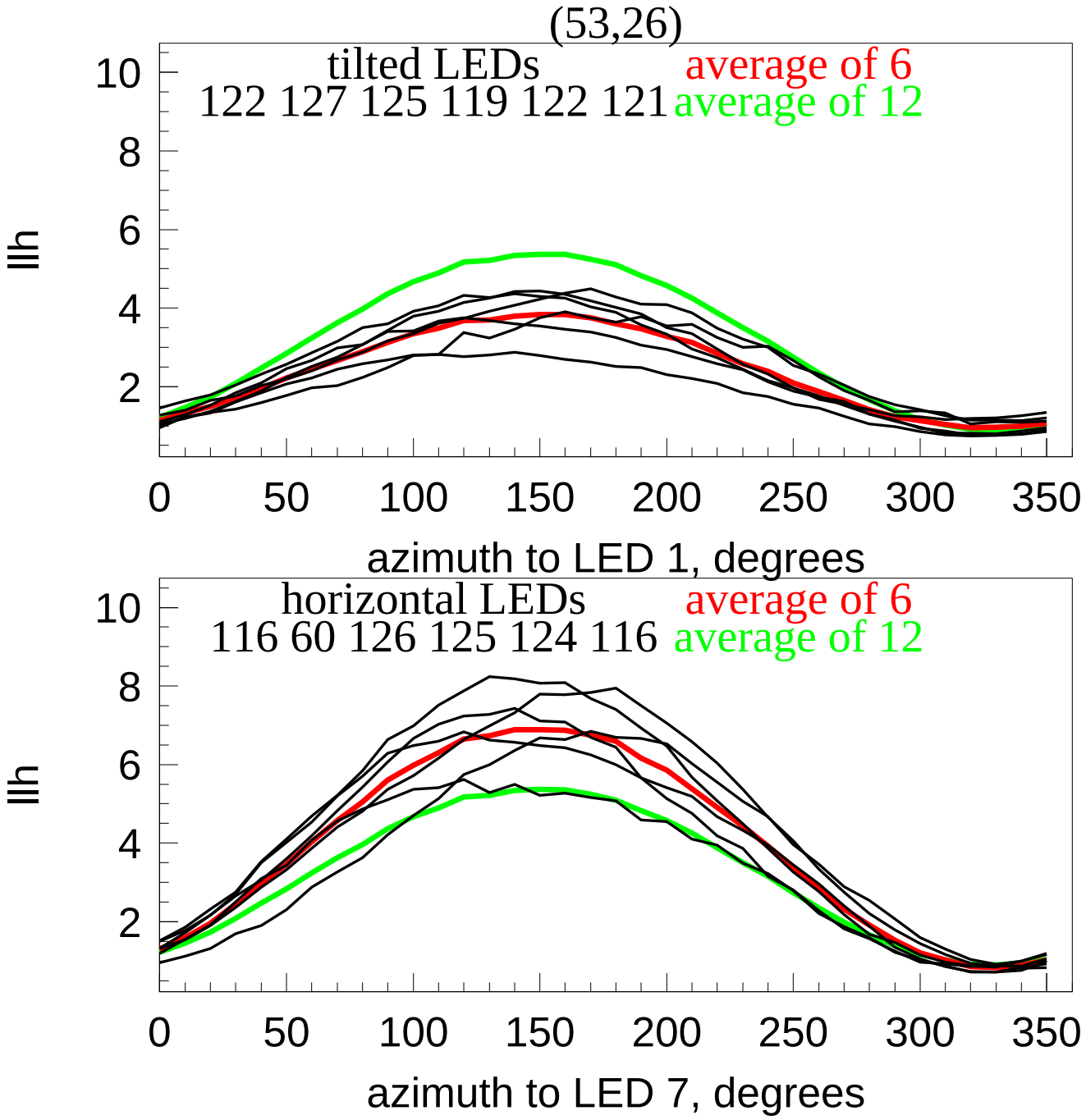

(53,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
109.6 ± 5.5

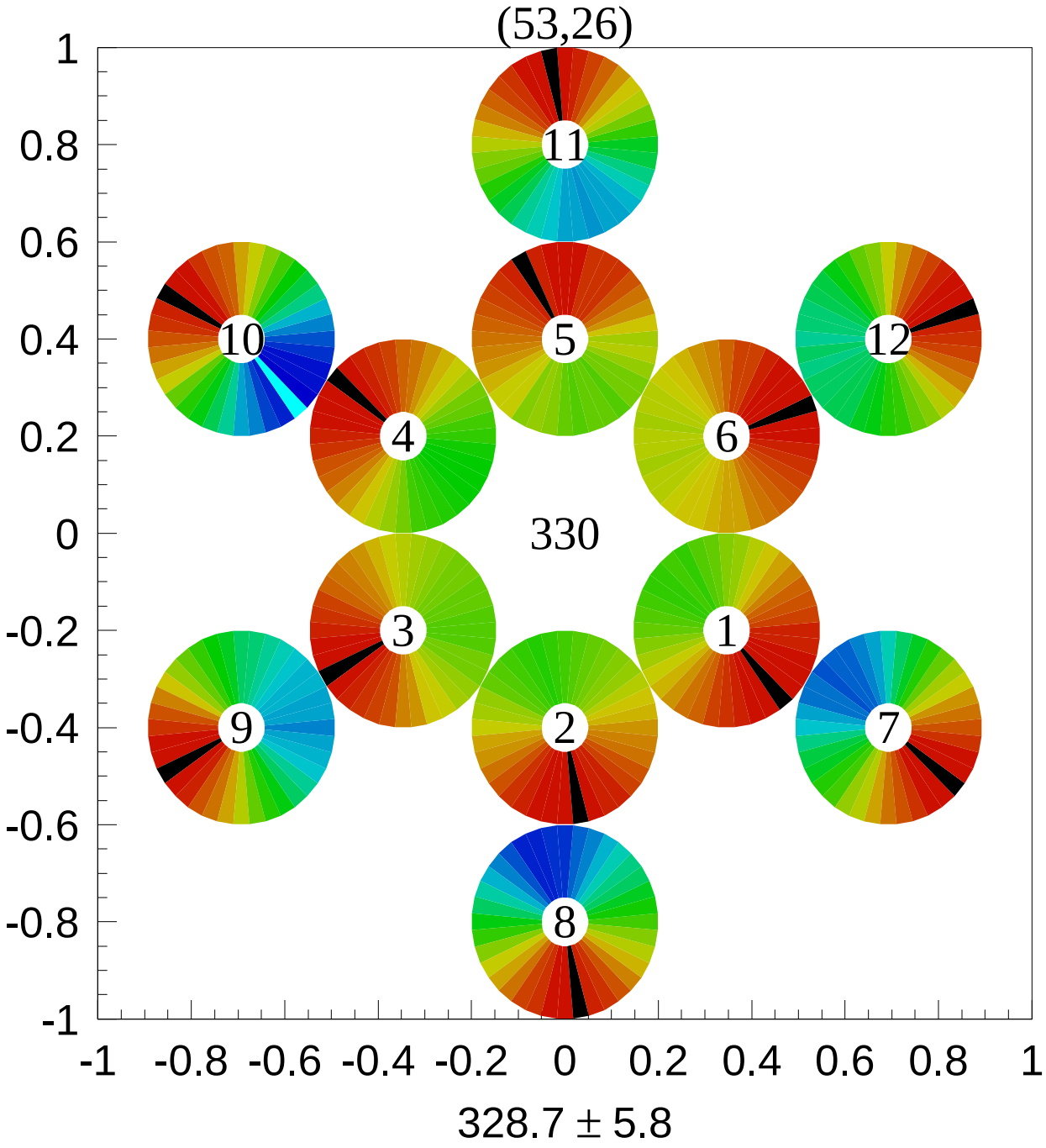

(53,24)
tilted LEDs
120 115 123 116 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 121 123 119 125 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

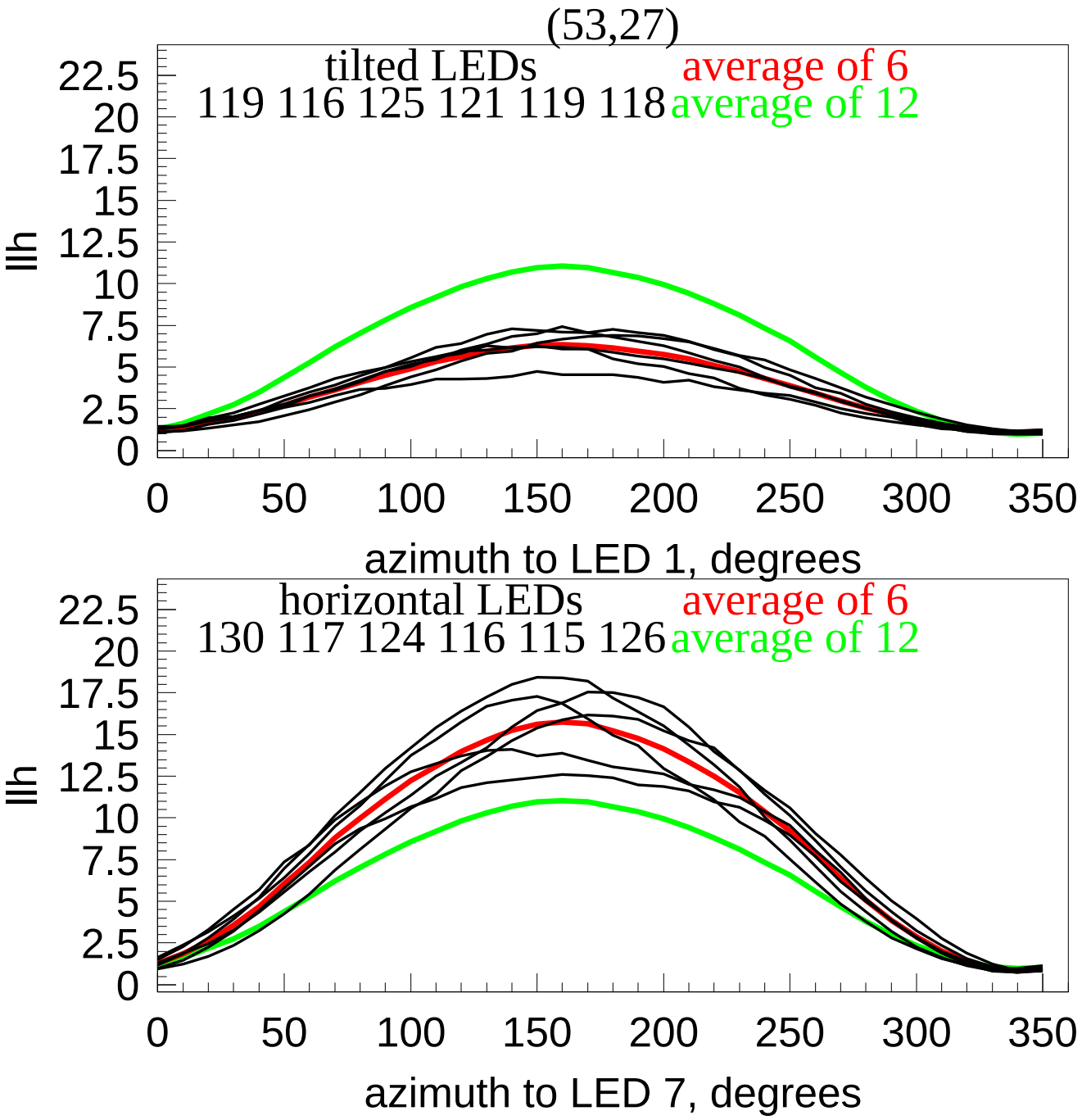

(53,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
84.3 ± 5.5

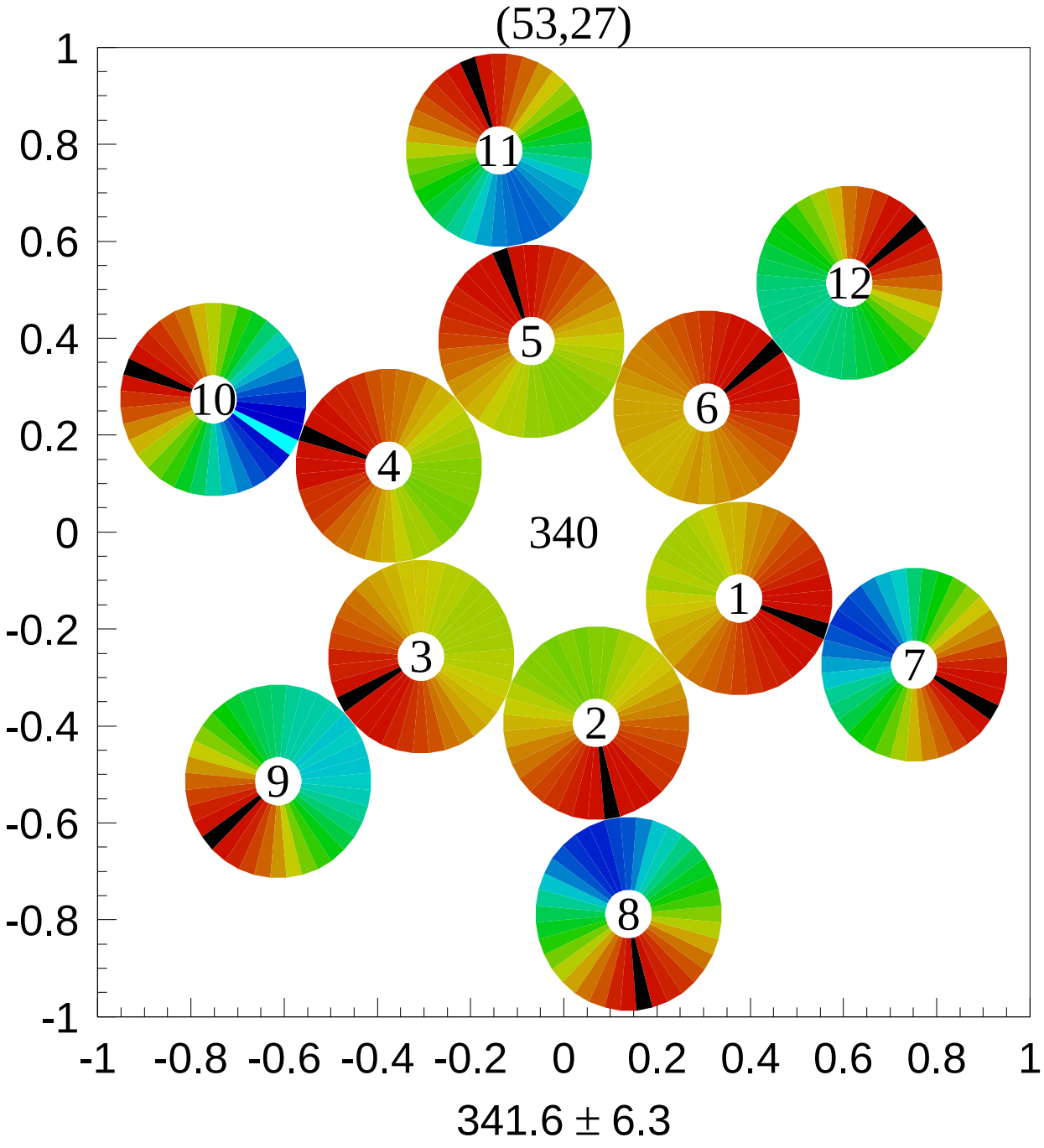

(53,25)
tilted LEDs
109 120 111 118 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 129 122 123 132
average of 6
average of 12
llh
azimuth to LED 7, degrees

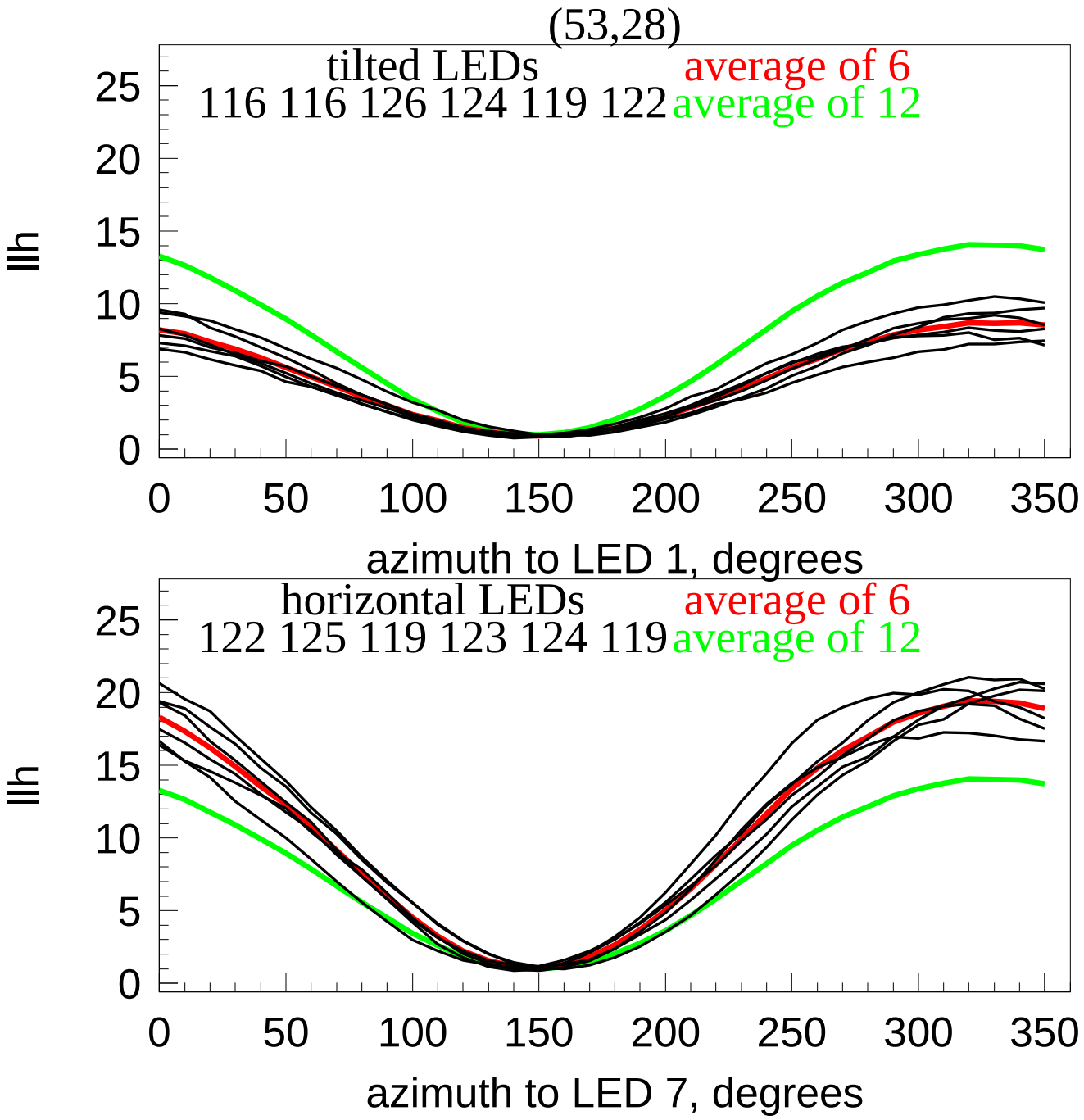

(53,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
146.7 ± 5.7

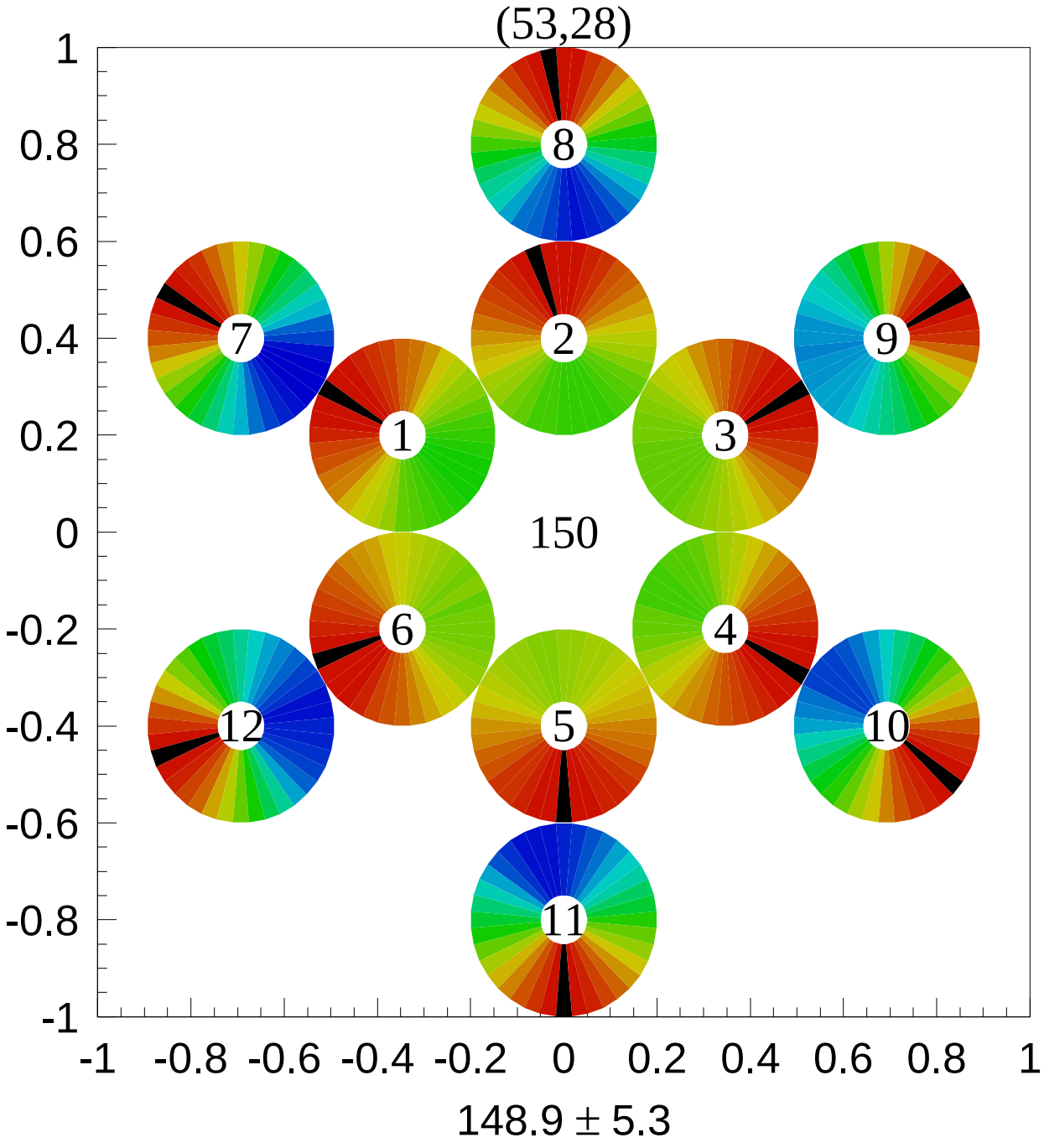

(53,26)
tilted LEDs
122 127 125 119 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 60 126 125 124 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

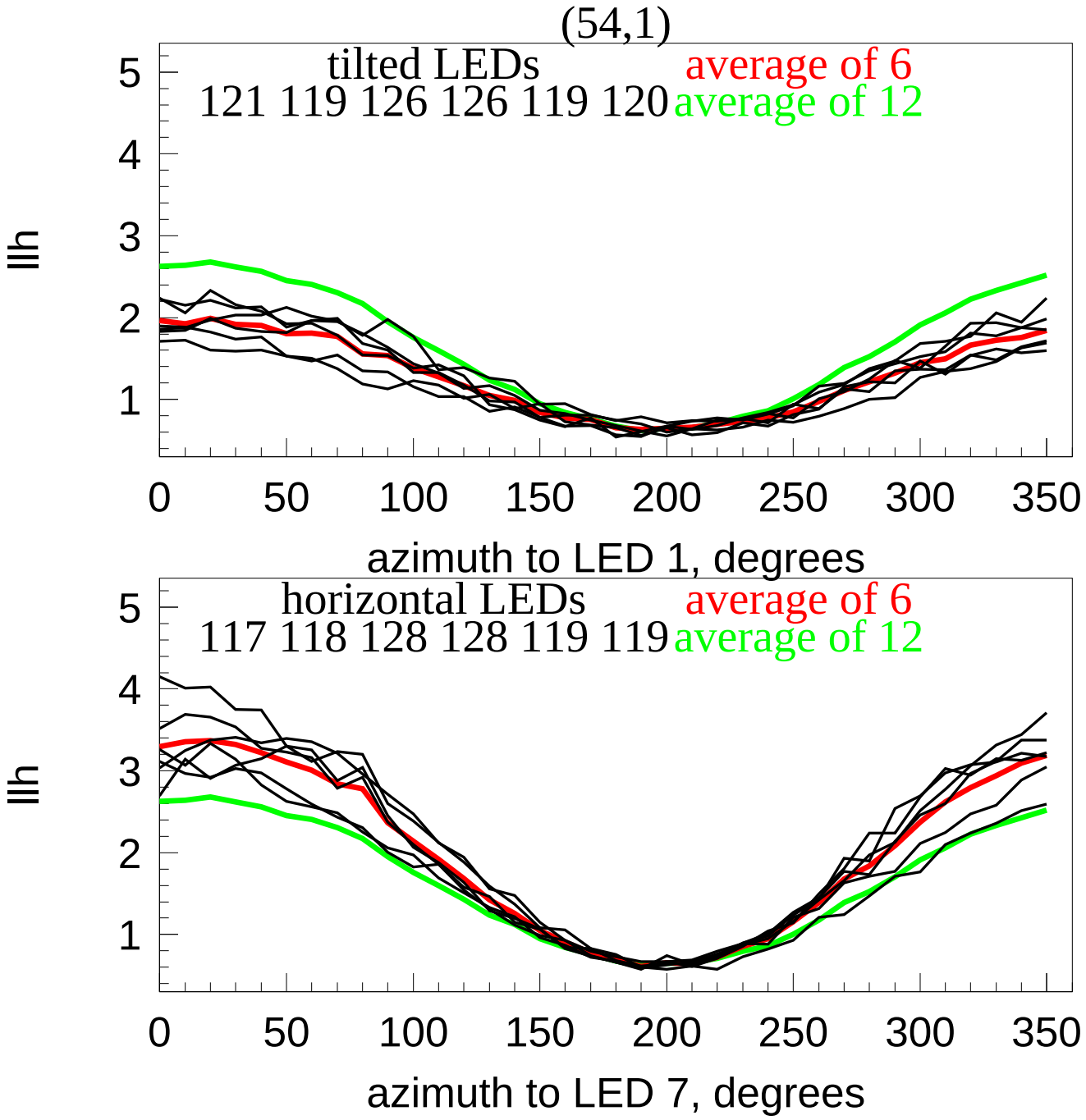

(53,26)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
328.7 ± 5.8

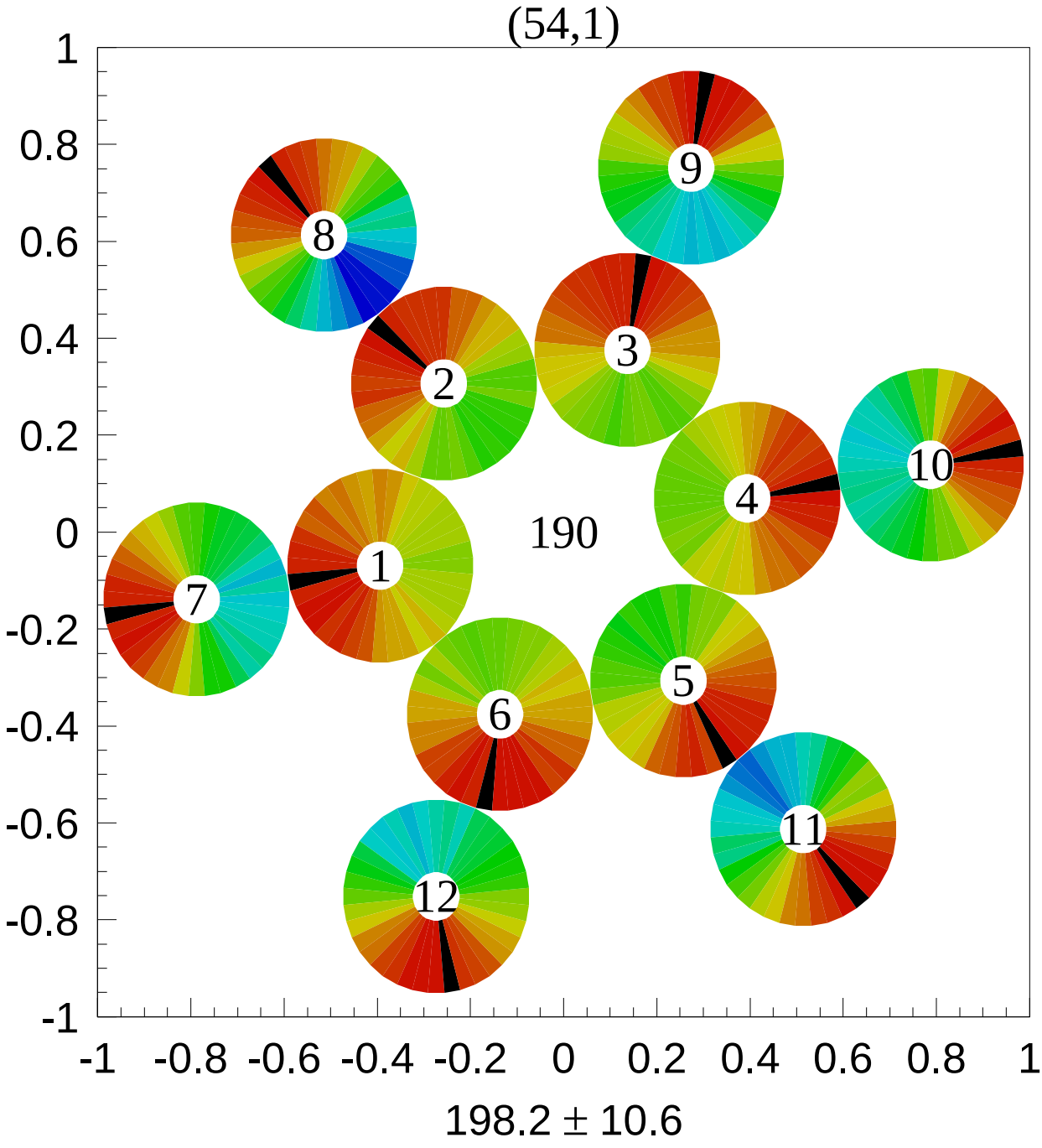

(53,27)
tilted LEDs
119 116 125 121 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 117 124 116 115 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

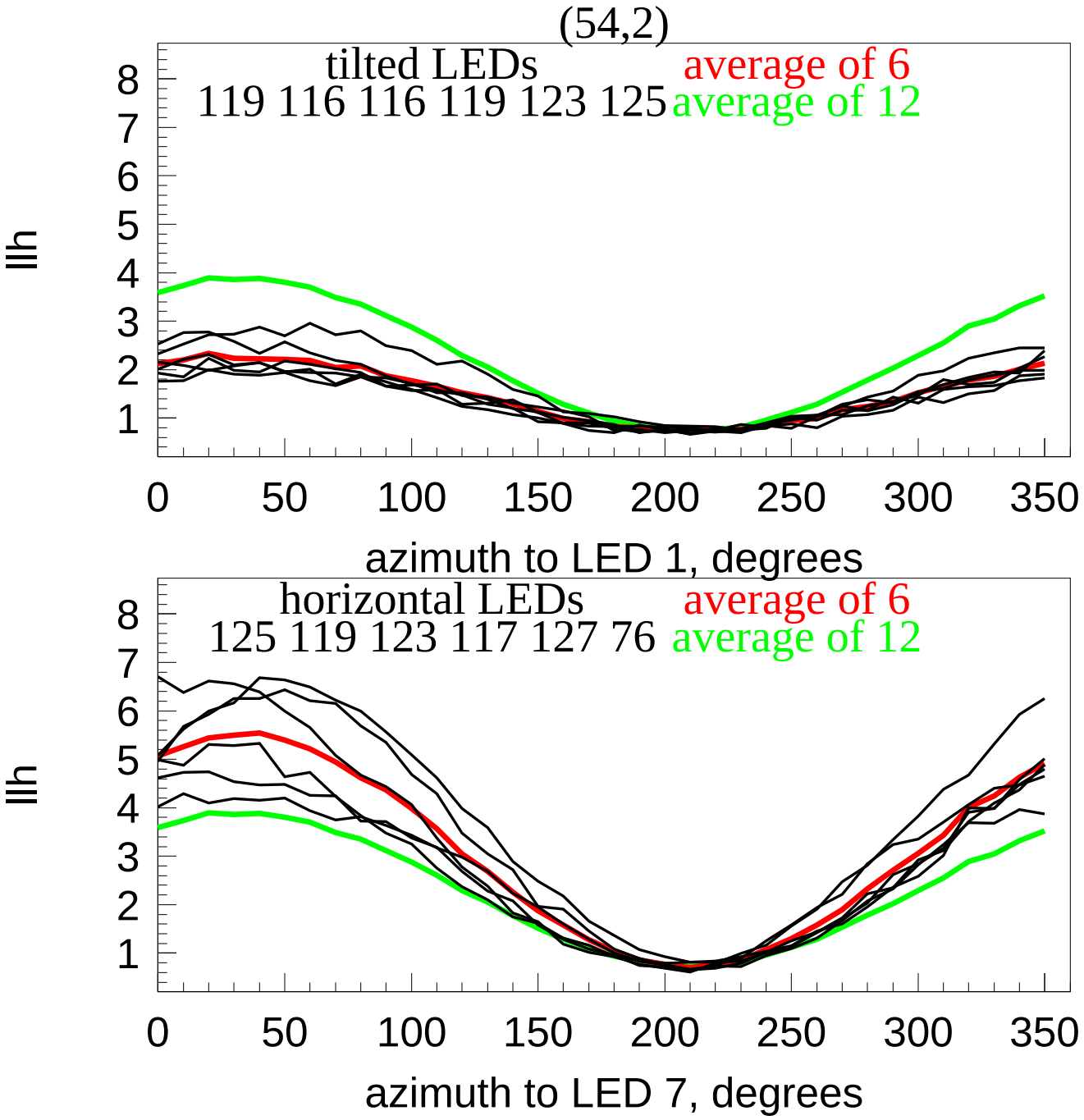

(53,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
340
1
7
3
2
9
8
341.6 ± 6.3

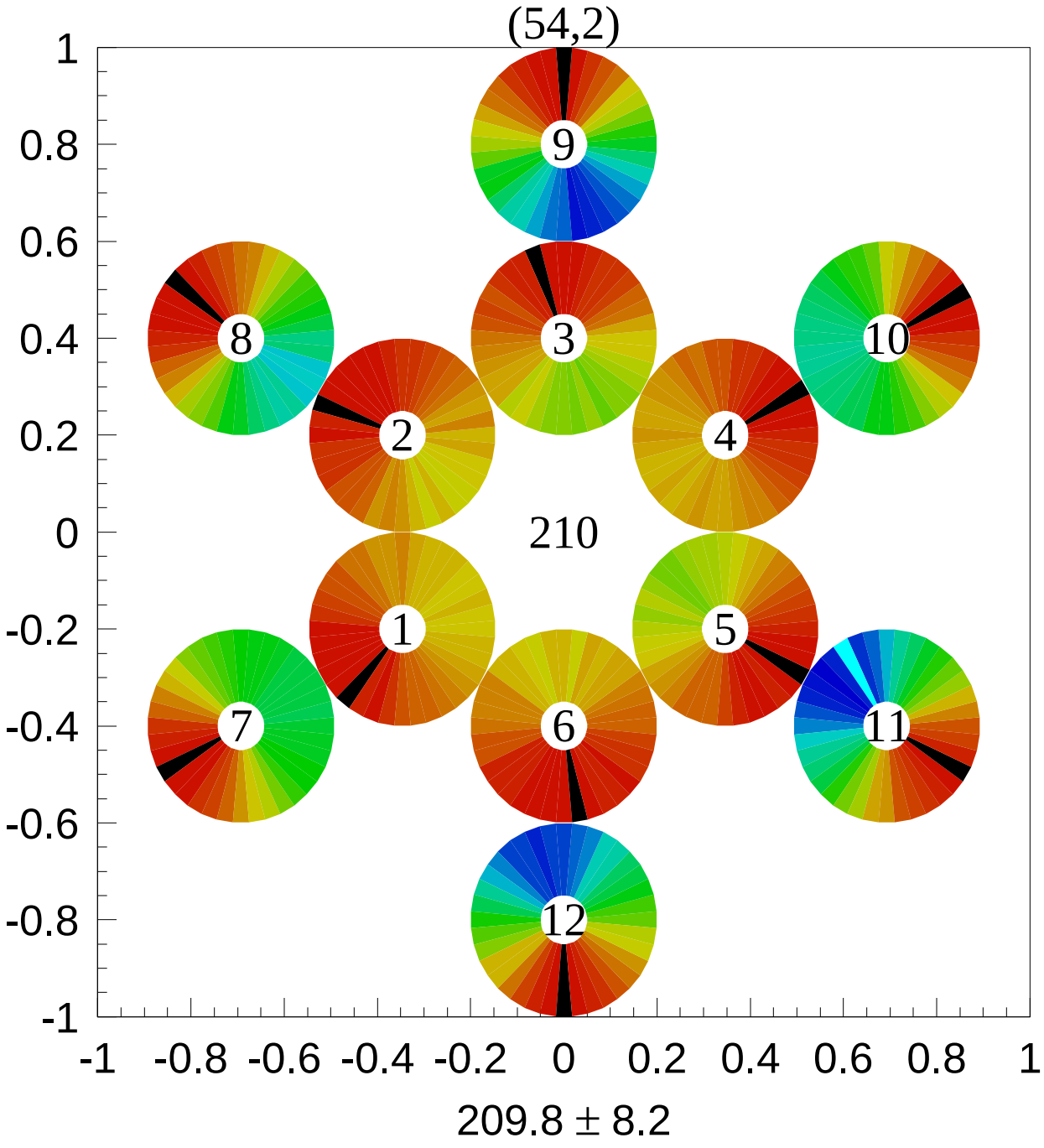

(53,28)
tilted LEDs
116 116 126 124 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 119 123 124 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

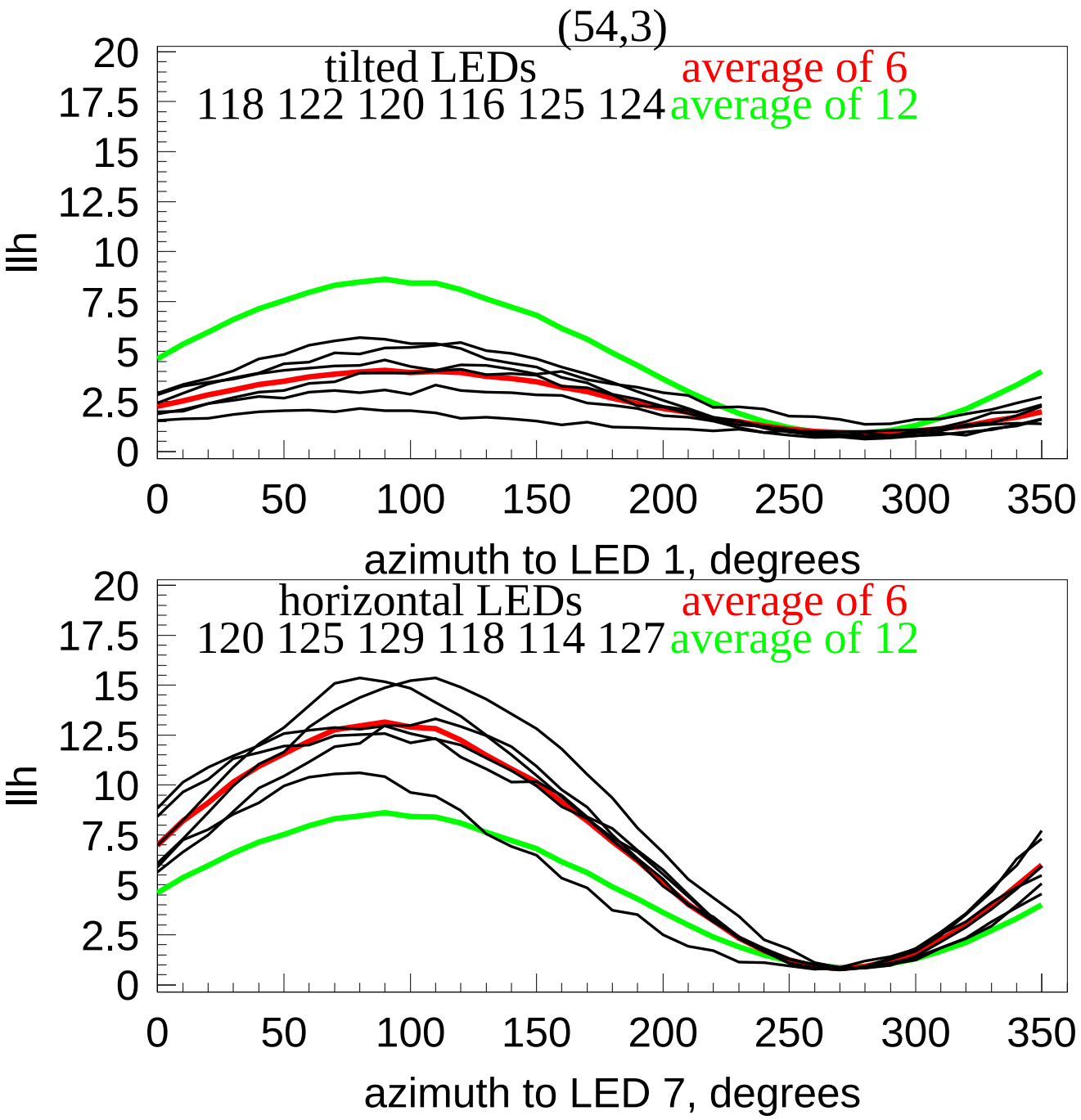

(53,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
148.9 ± 5.3

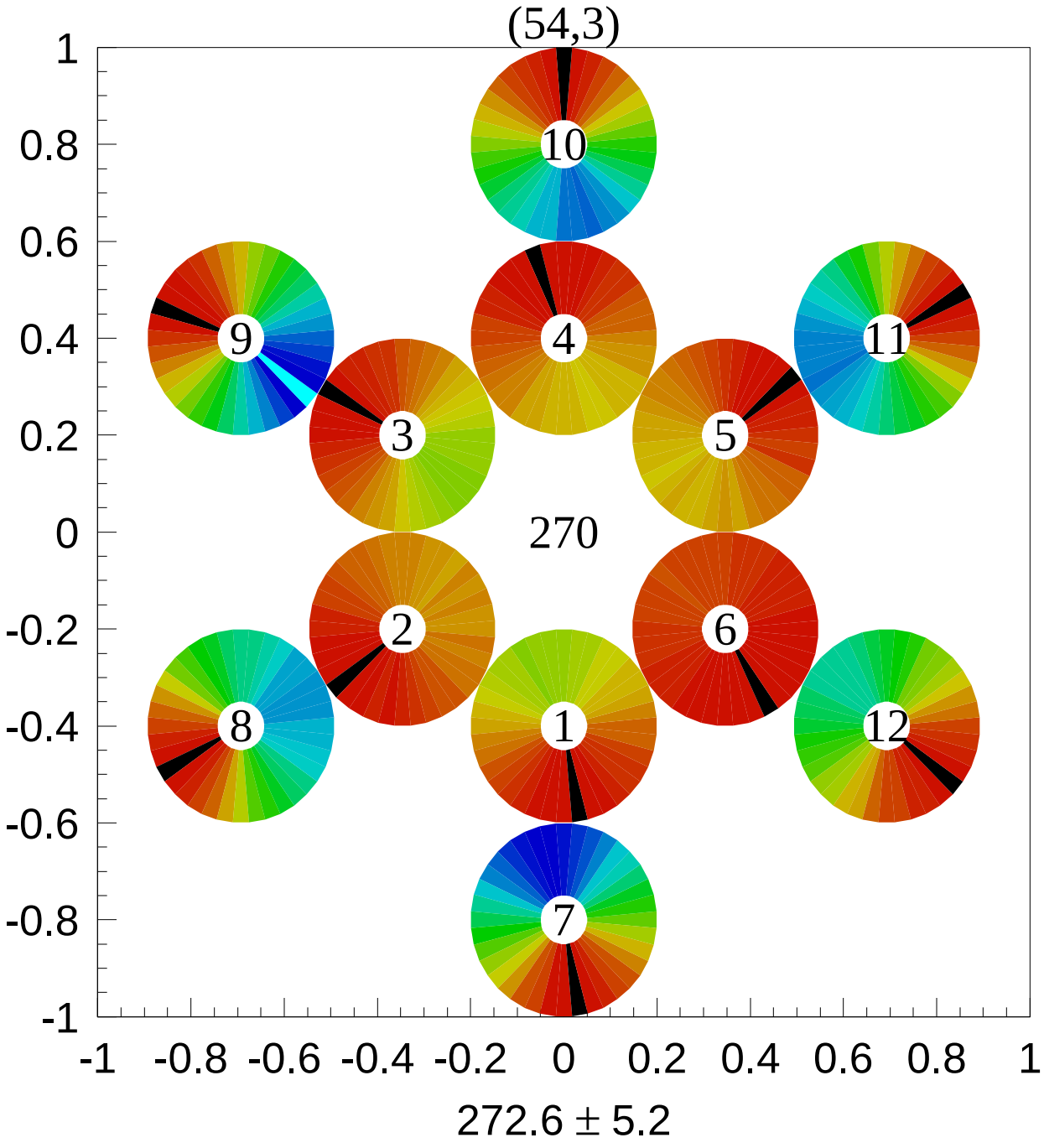

(54,1)
tilted LEDs
121 119 126 126 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 128 128 119 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

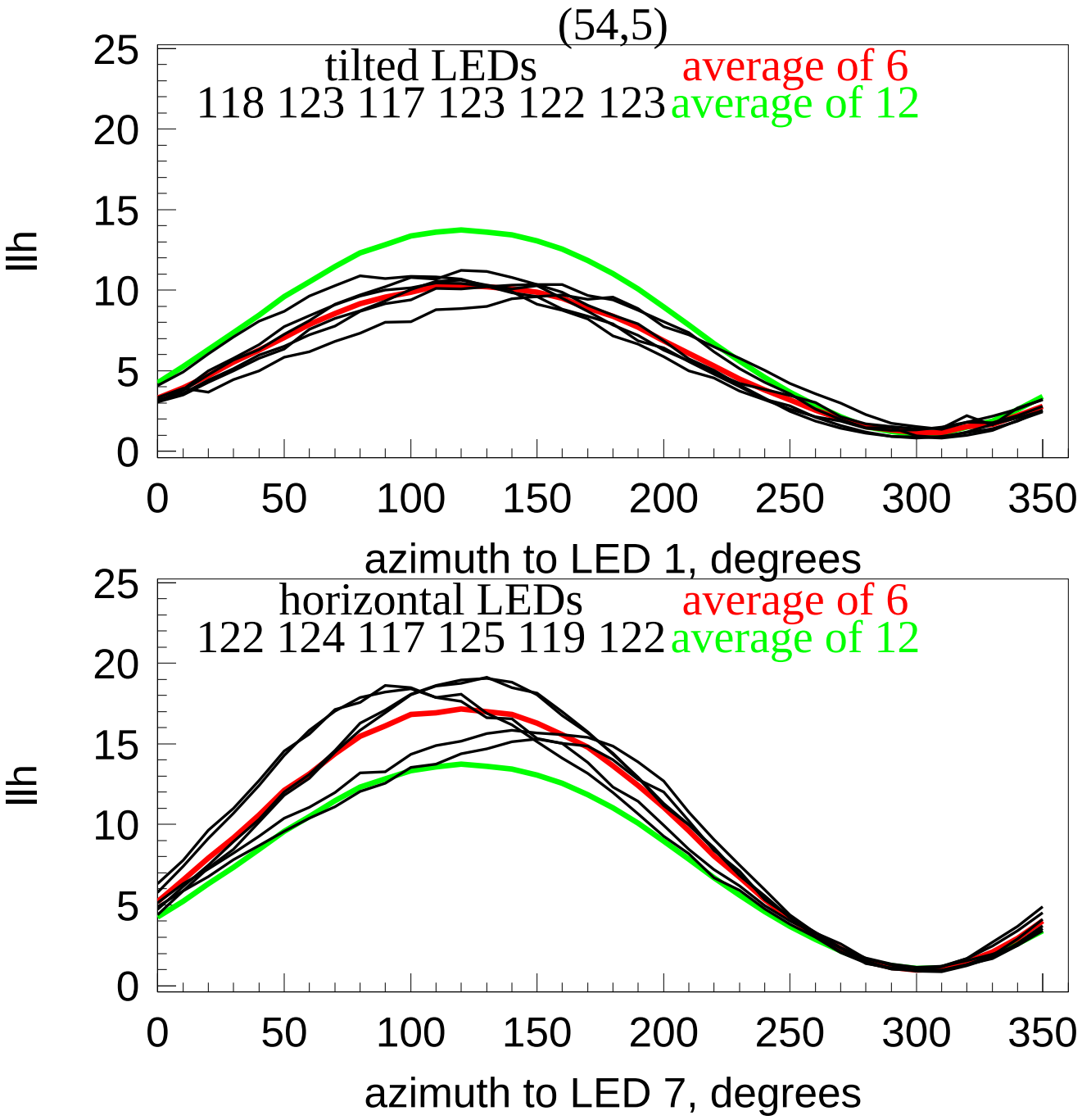

(54,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
198.2 ± 10.6
190
1
2
3
4
5
6
7
8
9
10
11
12

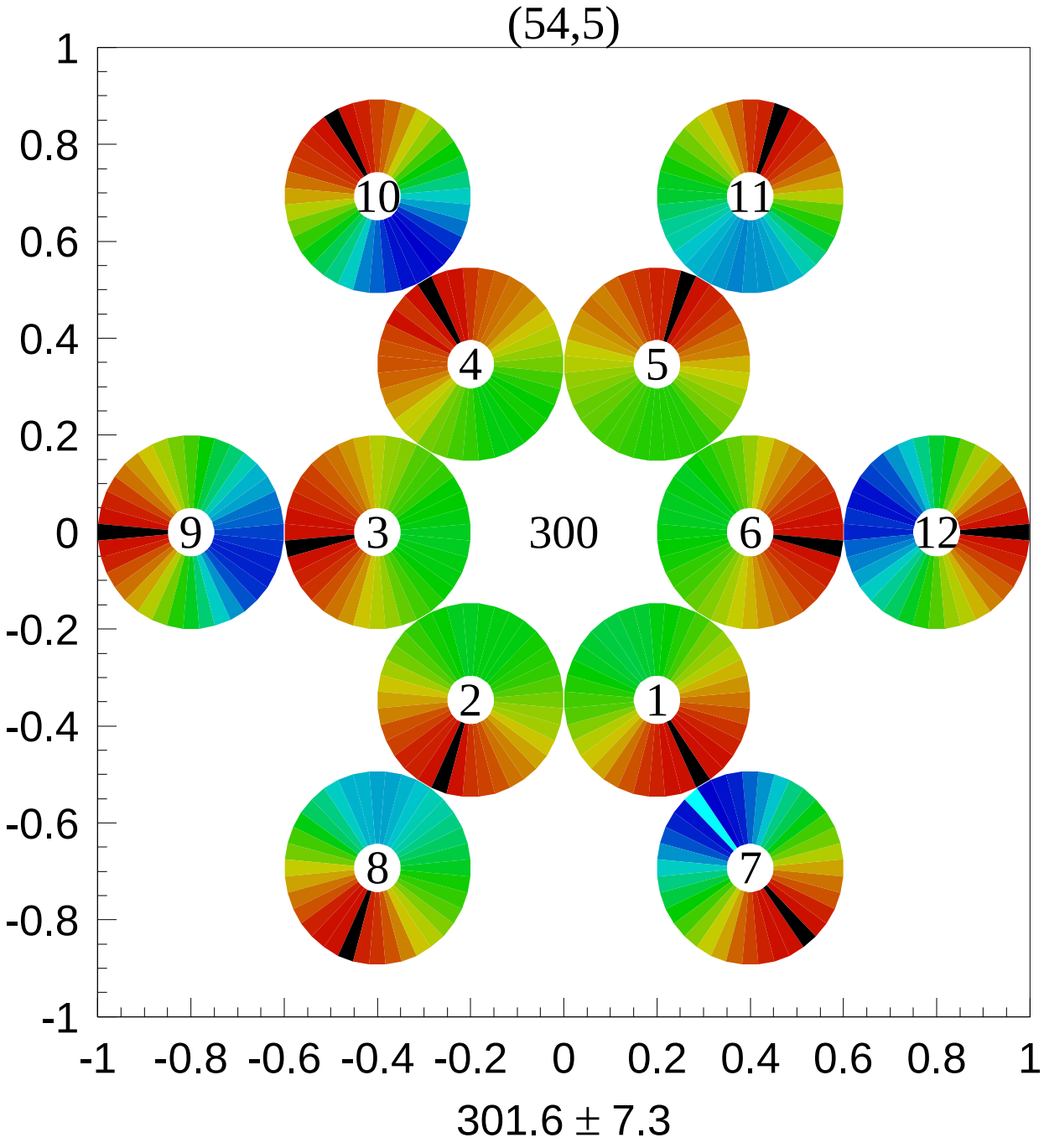

(54,2)
tilted LEDs
119 116 116 119 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 119 123 117 127 76
average of 6
average of 12
llh
azimuth to LED 7, degrees

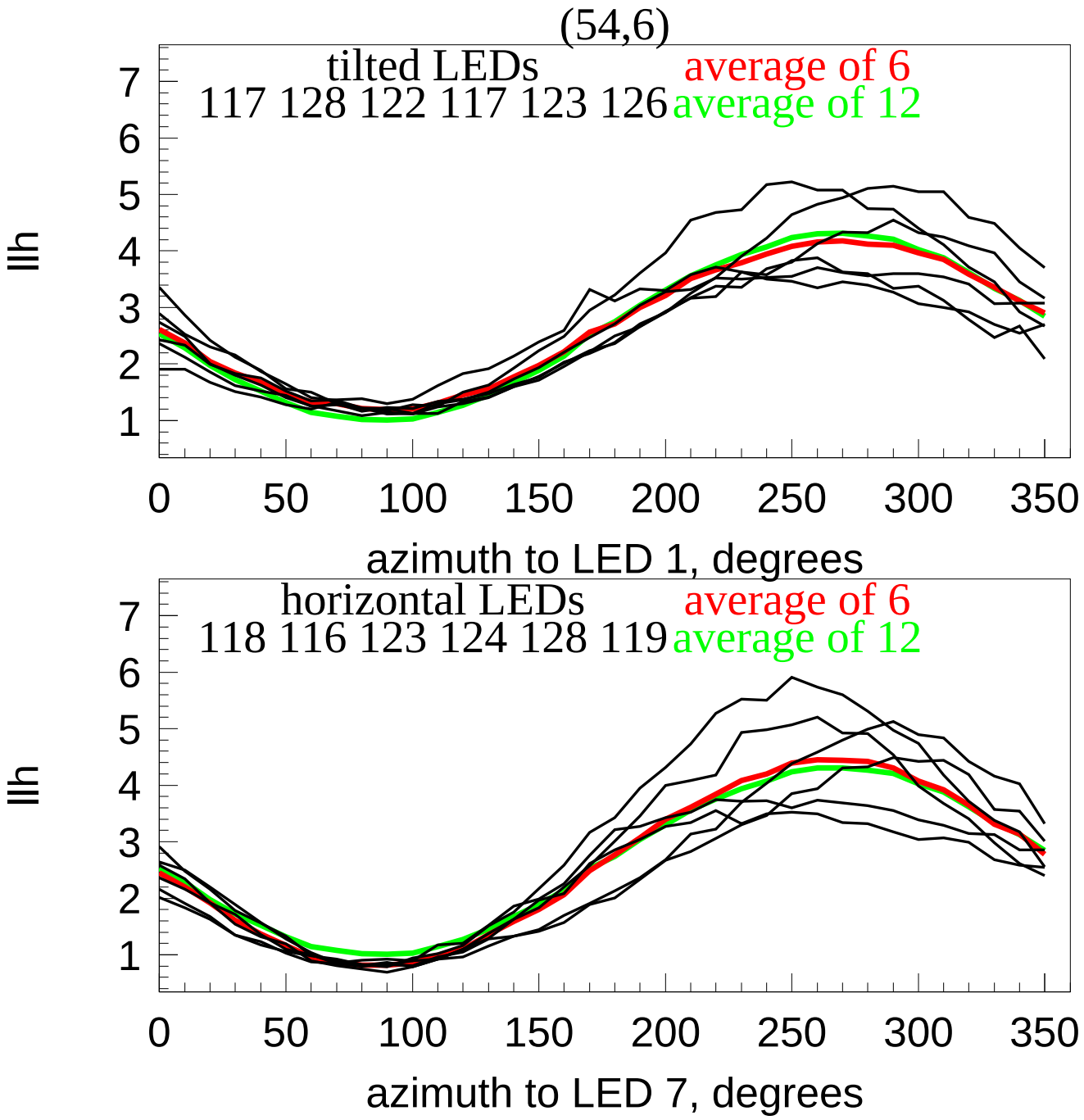

(54,2)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
209.8 ± 8.2

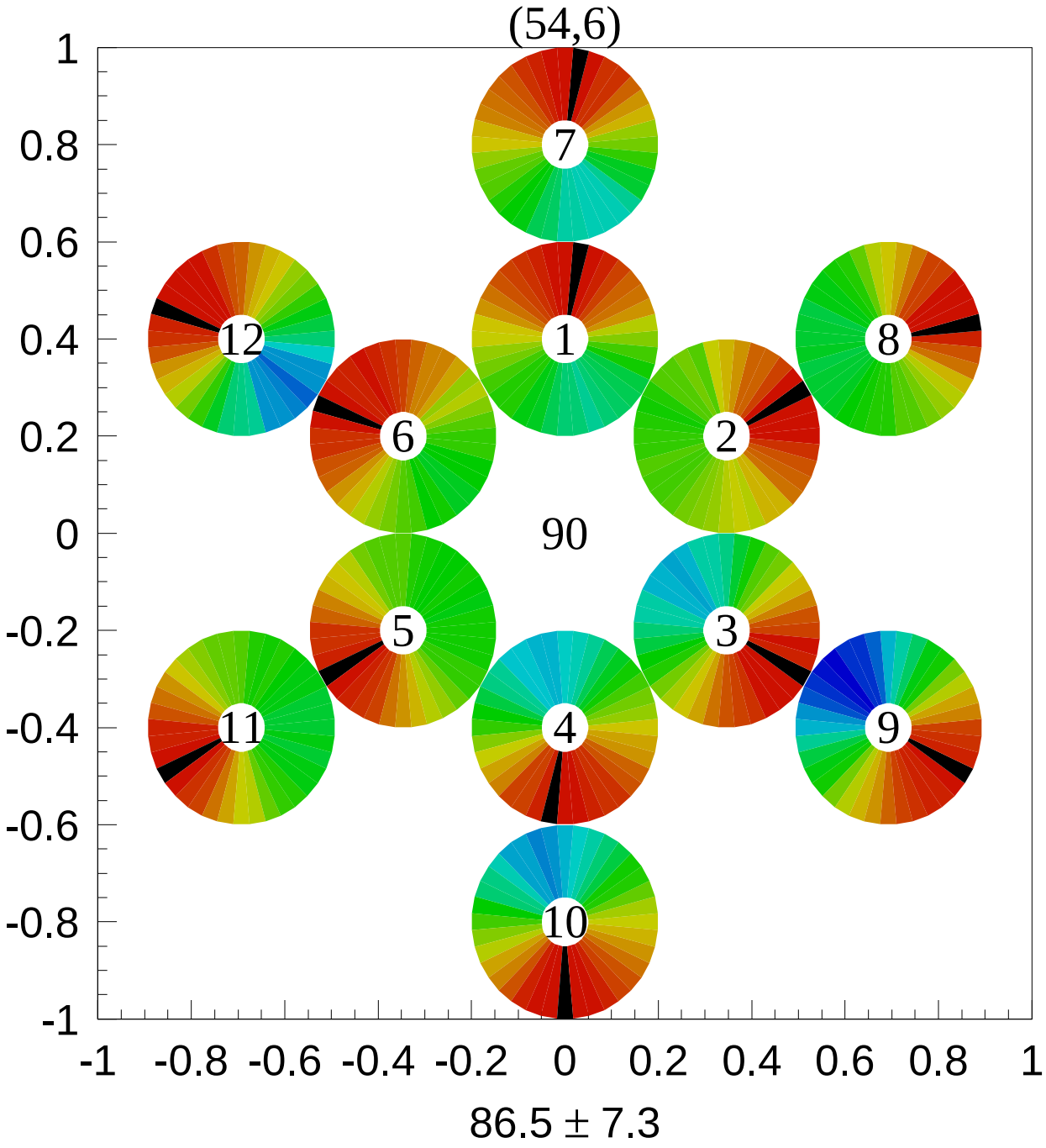

(54,3)
tilted LEDs
118 122 120 116 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 125 129 118 114 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

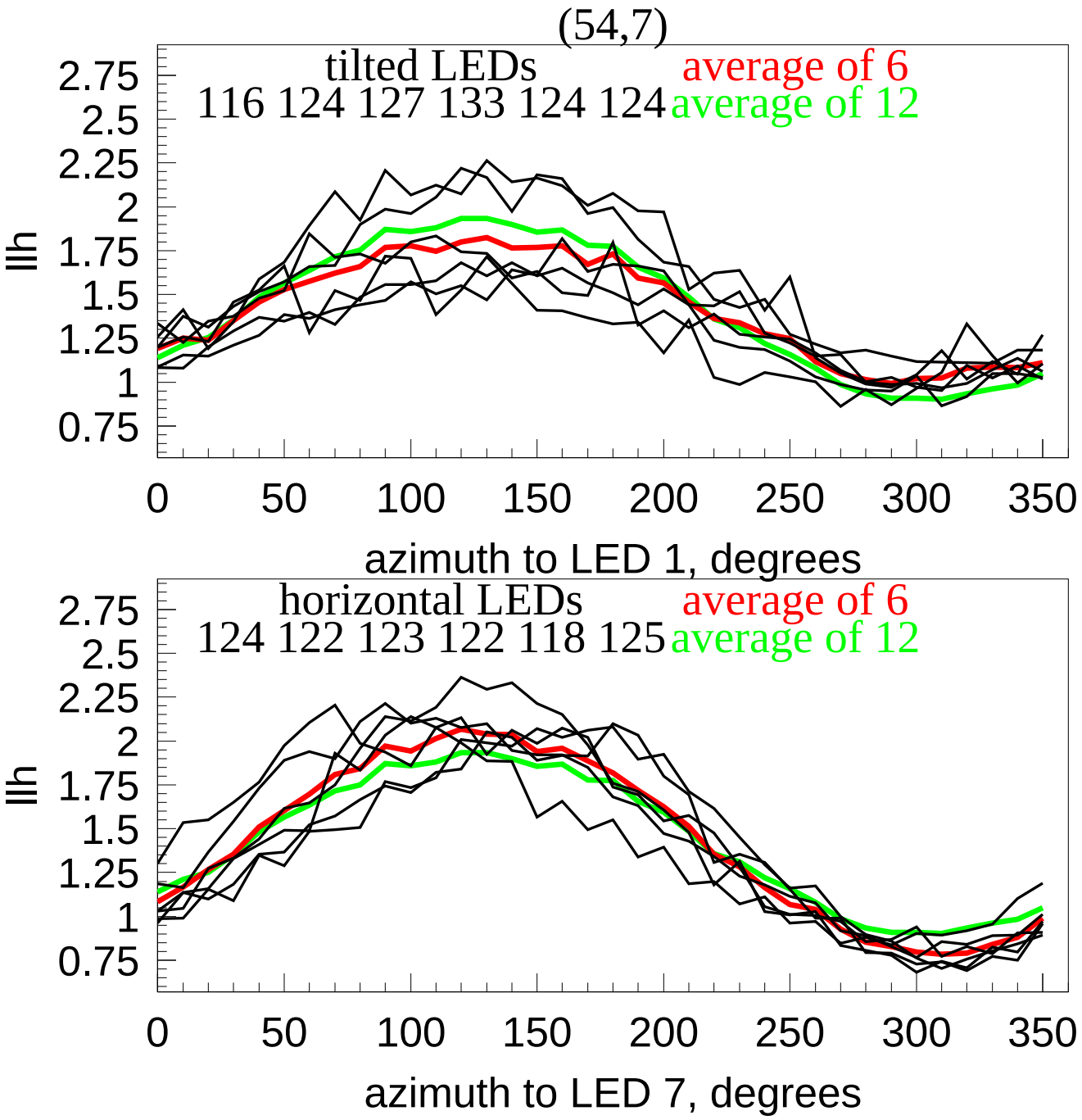

(54,3)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.6 ± 5.2

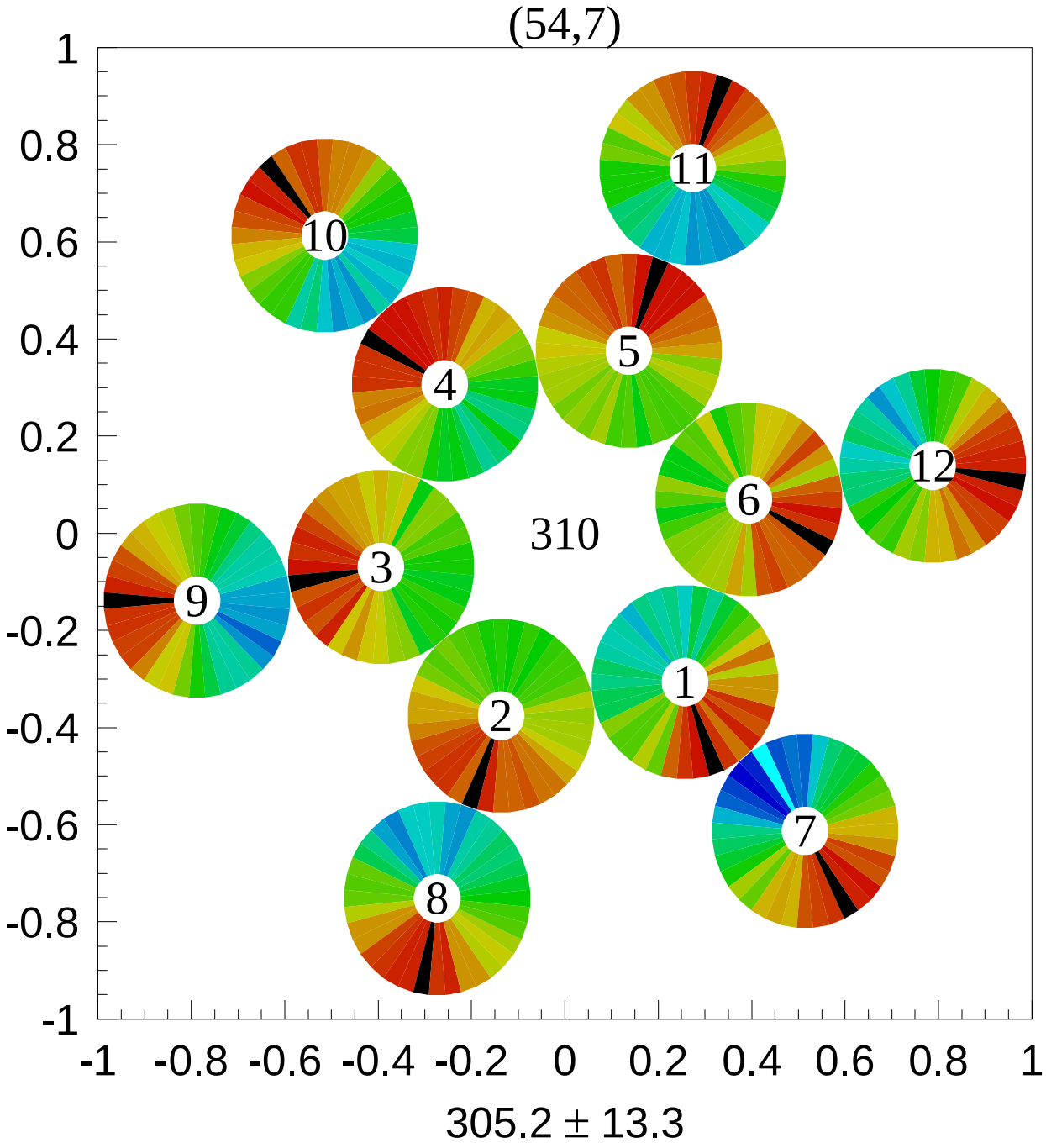

(54,5)
tilted LEDs
118 123 117 123 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 117 125 119 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

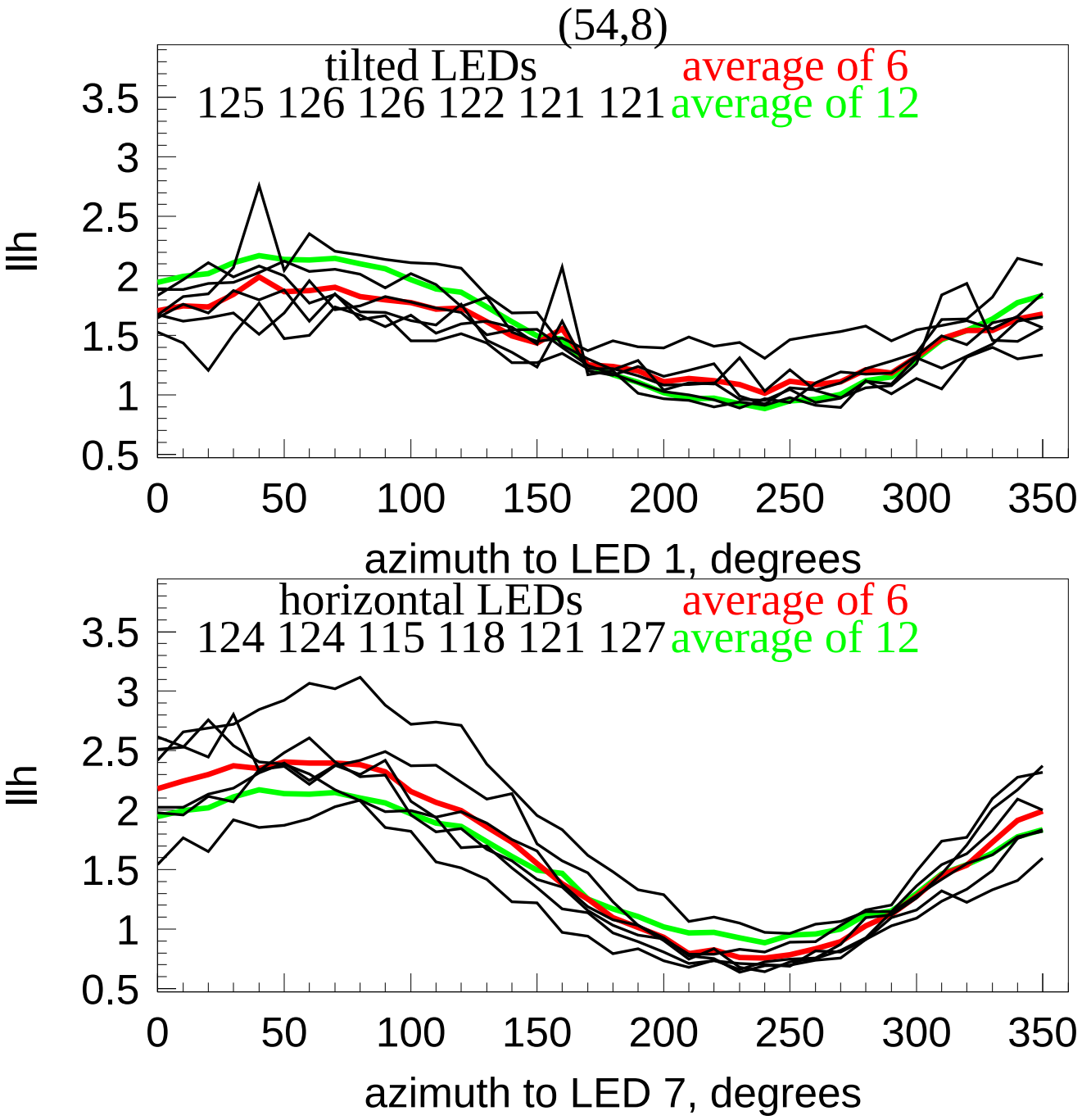

(54,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
301.6 ± 7.3

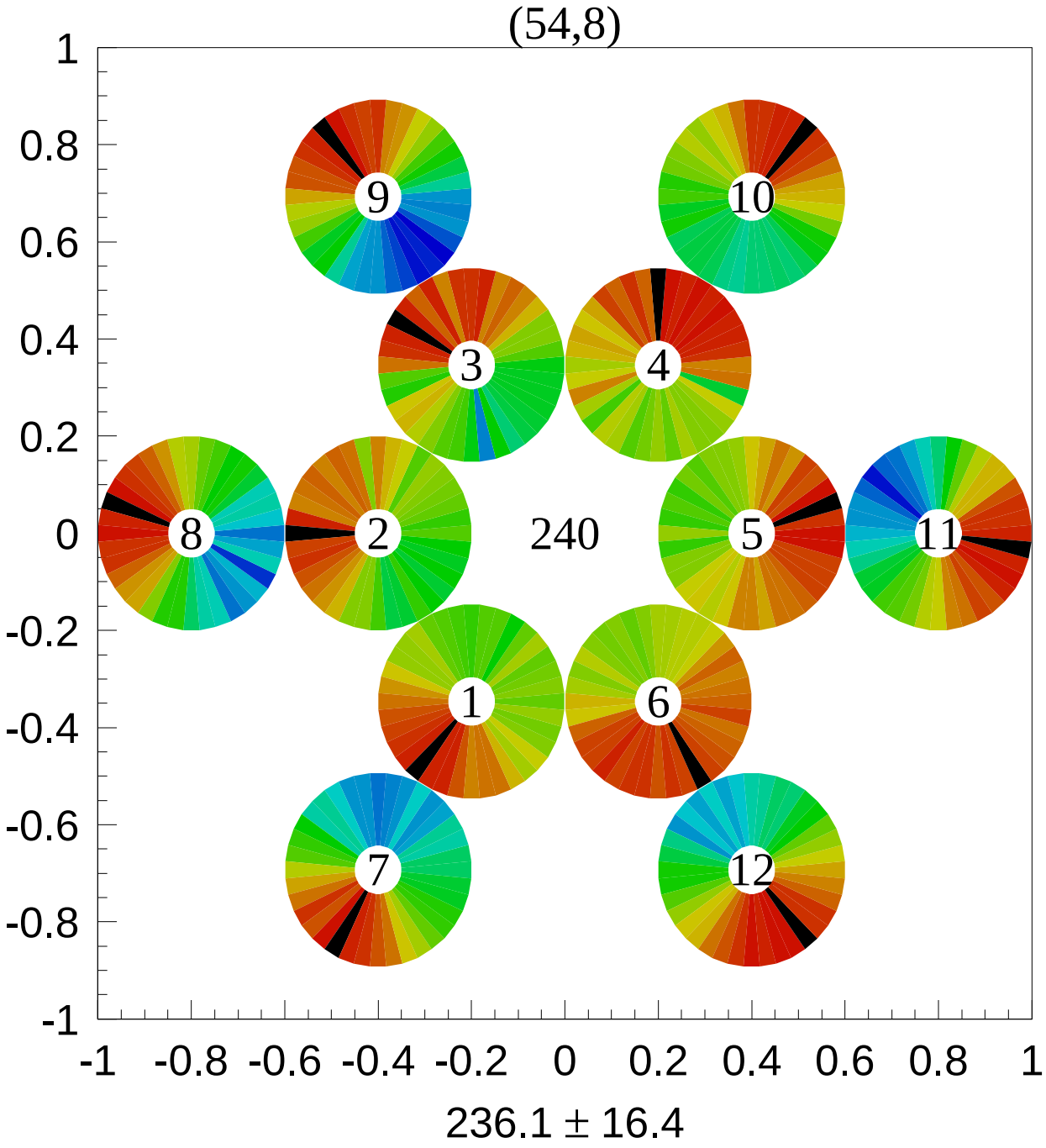

(54,6)
tilted LEDs
117 128 122 117 123 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 116 123 124 128 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

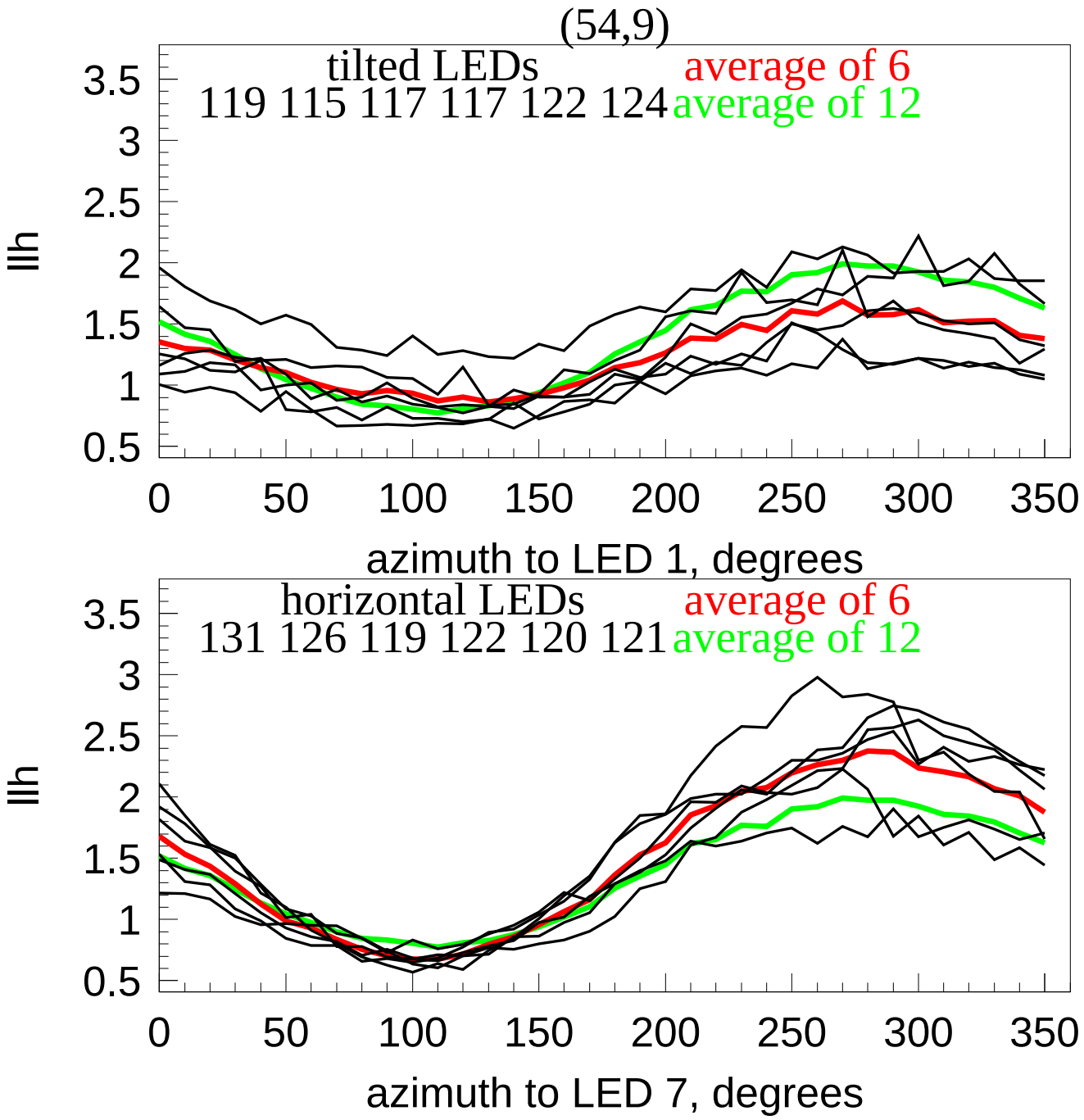

(54,6)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
86.5 ± 7.3

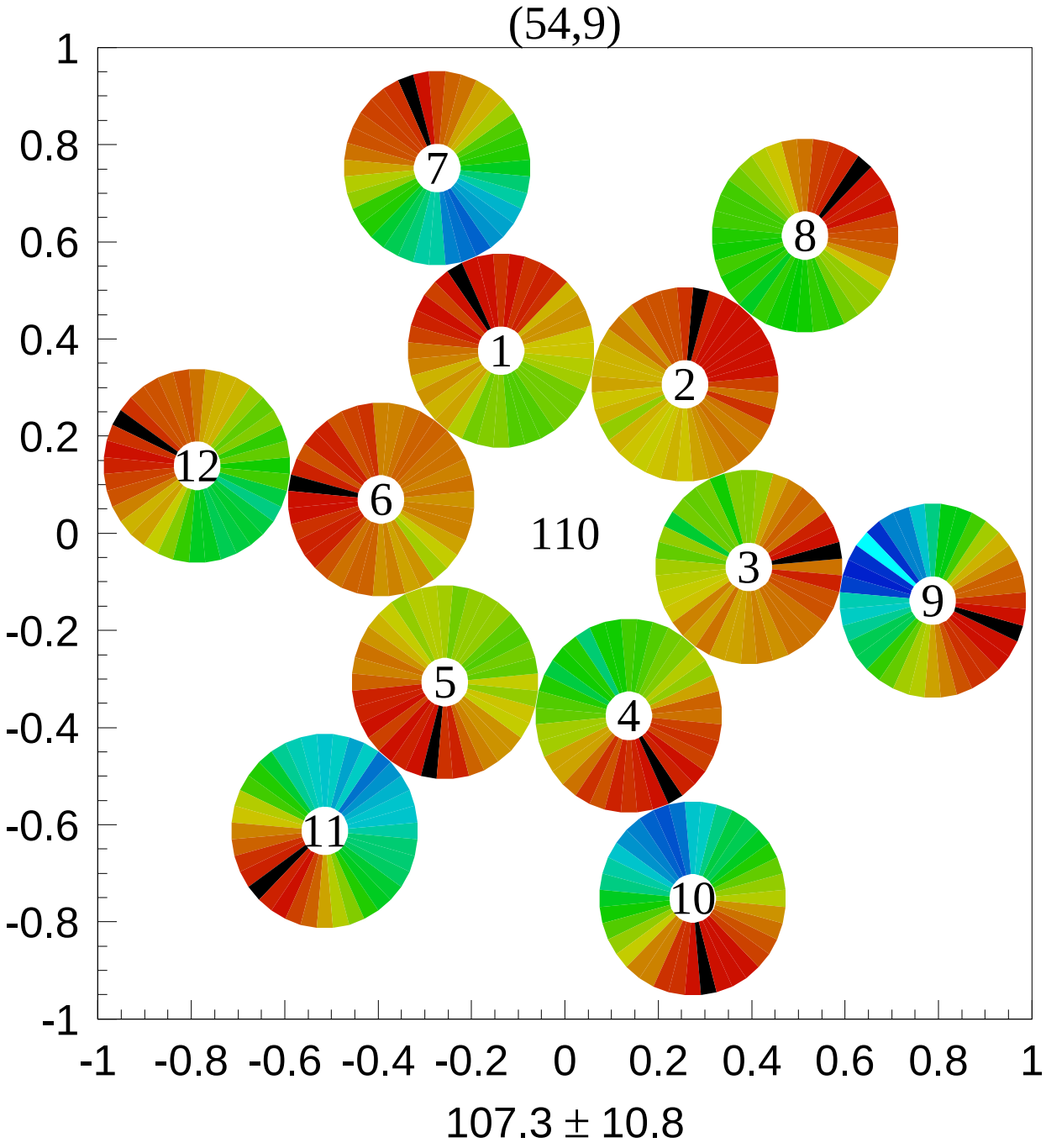

(54,7)
tilted LEDs
116 124 127 133 124 124
average of 6
average of 12
IIh
2.75
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 122 123 122 118 125
average of 6
average of 12
IIh
azimuth to LED 7, degrees

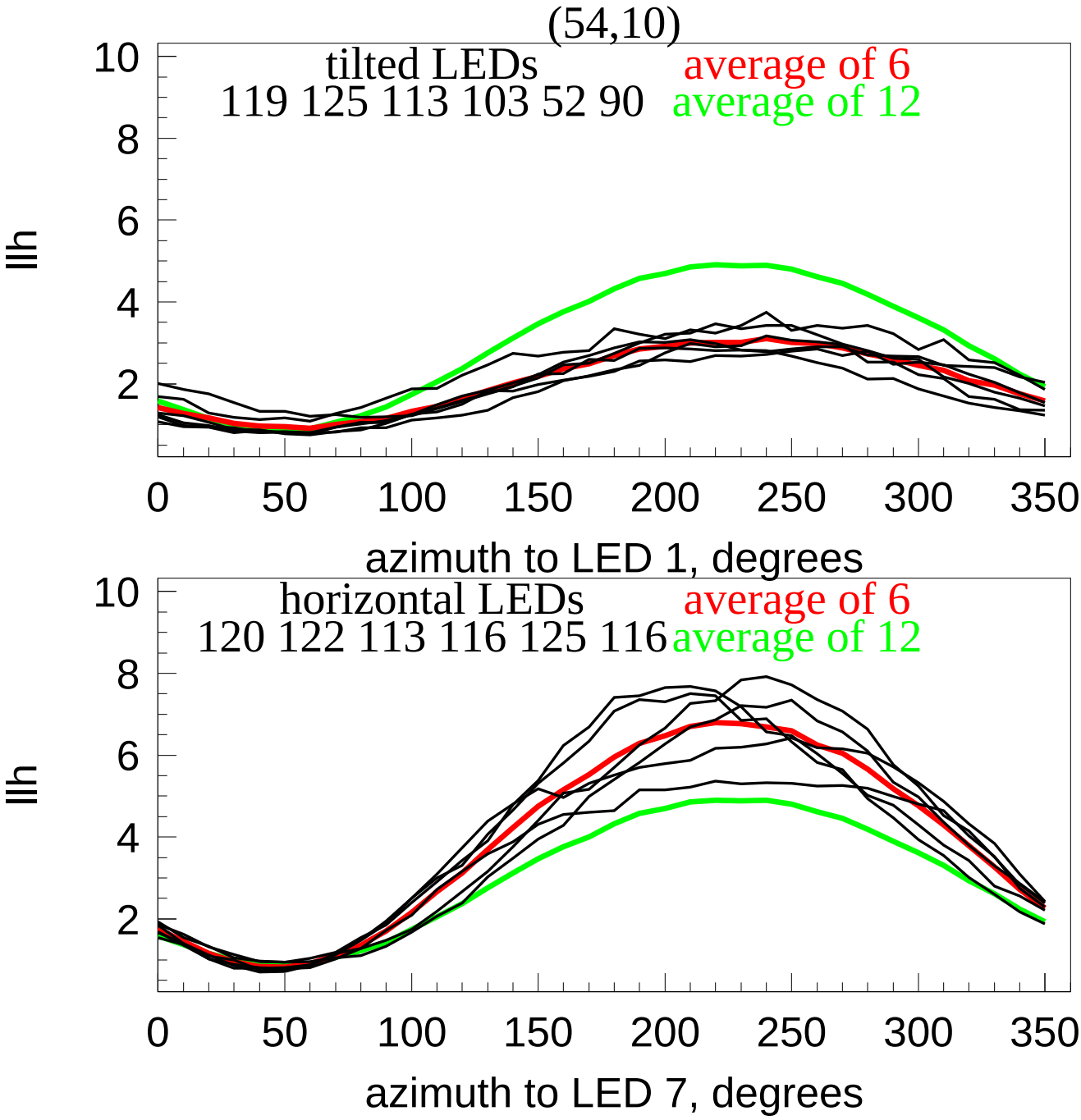

(54,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
305.2 ± 13.3

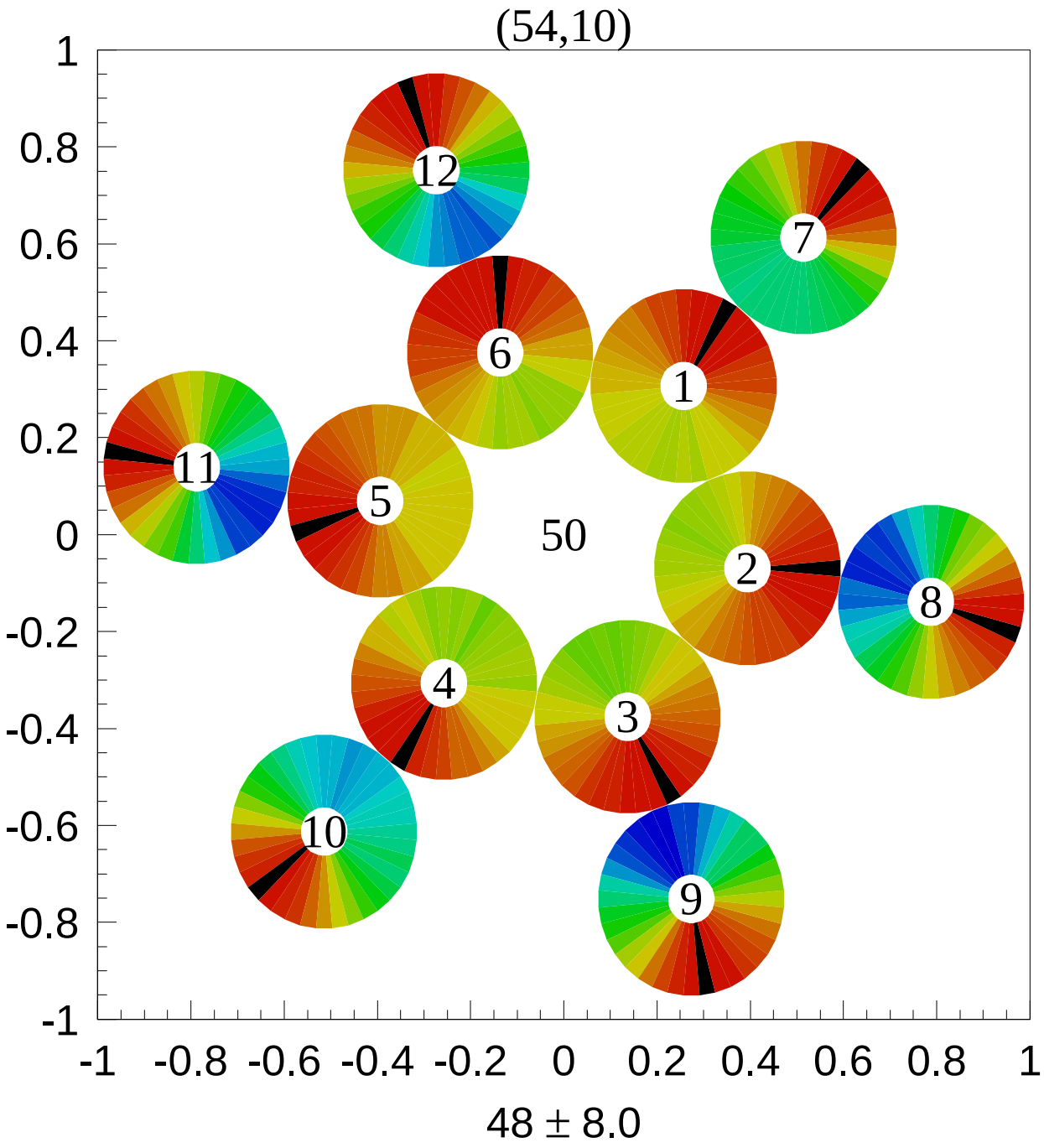

(54,8)
tilted LEDs
125 126 126 122 121 121
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 124 115 118 121 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

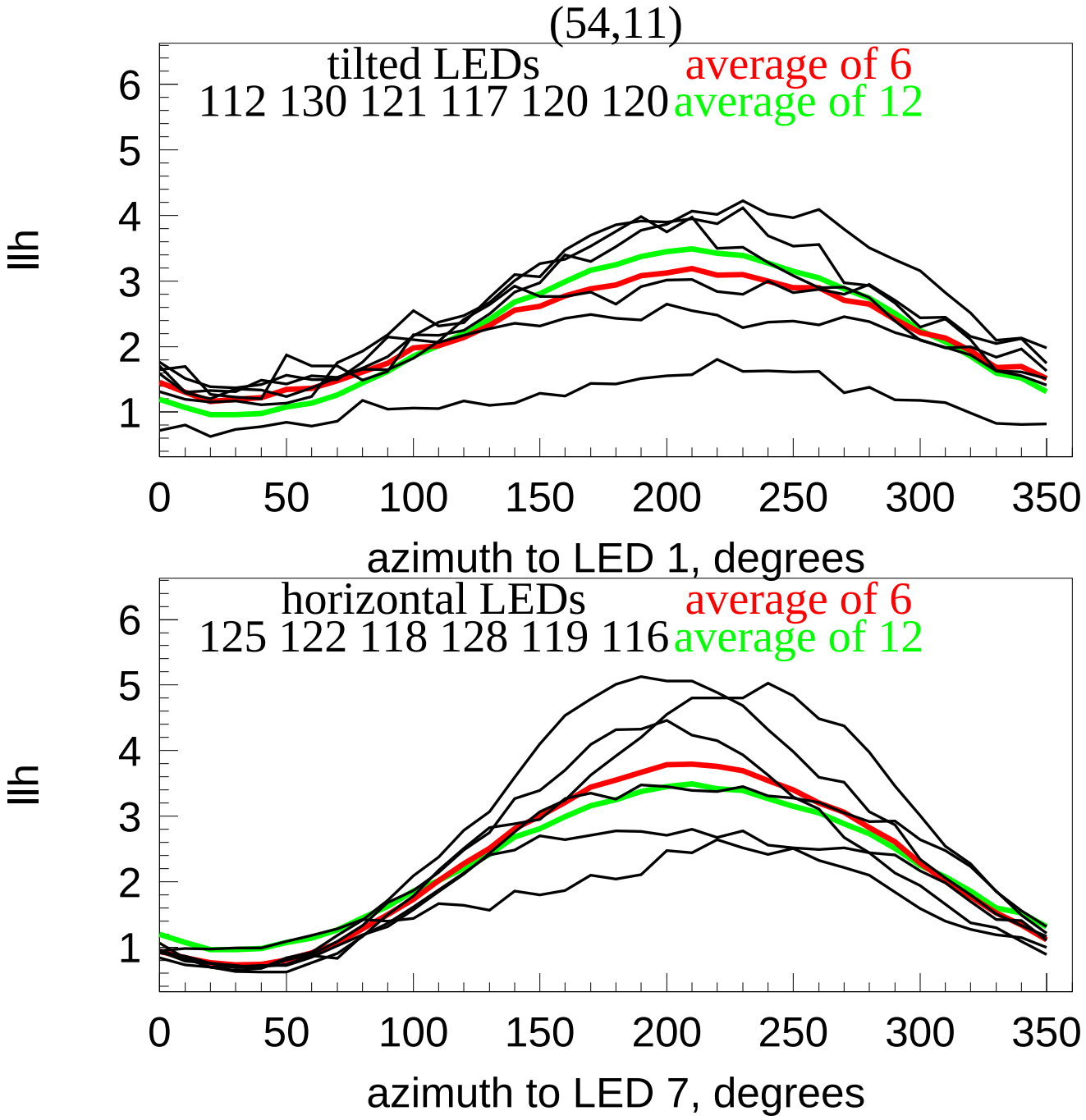

(54,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
236.1 ± 16.4

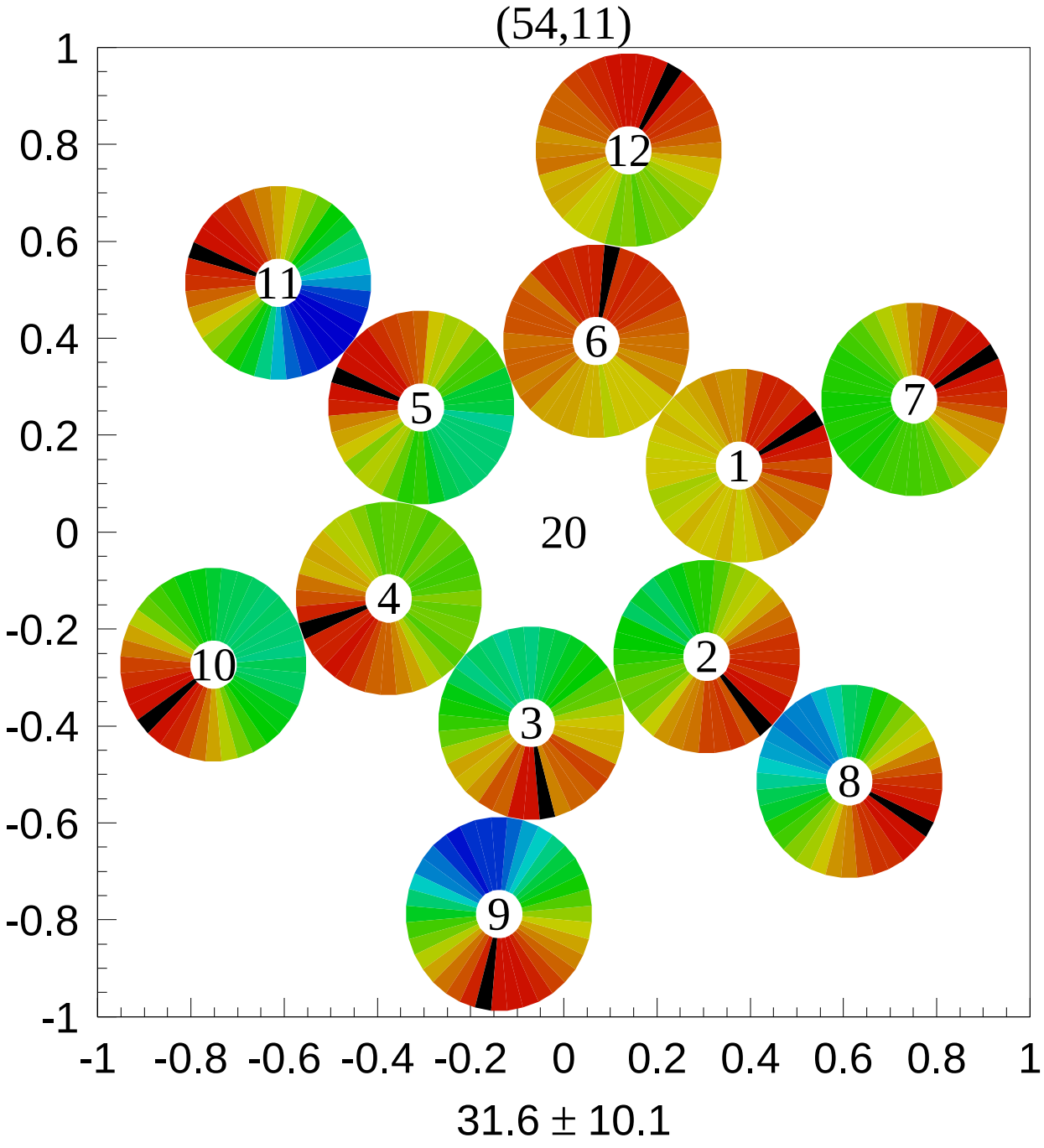

(54,9)
tilted LEDs
119 115 117 117 122 124
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
131 126 119 122 120 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

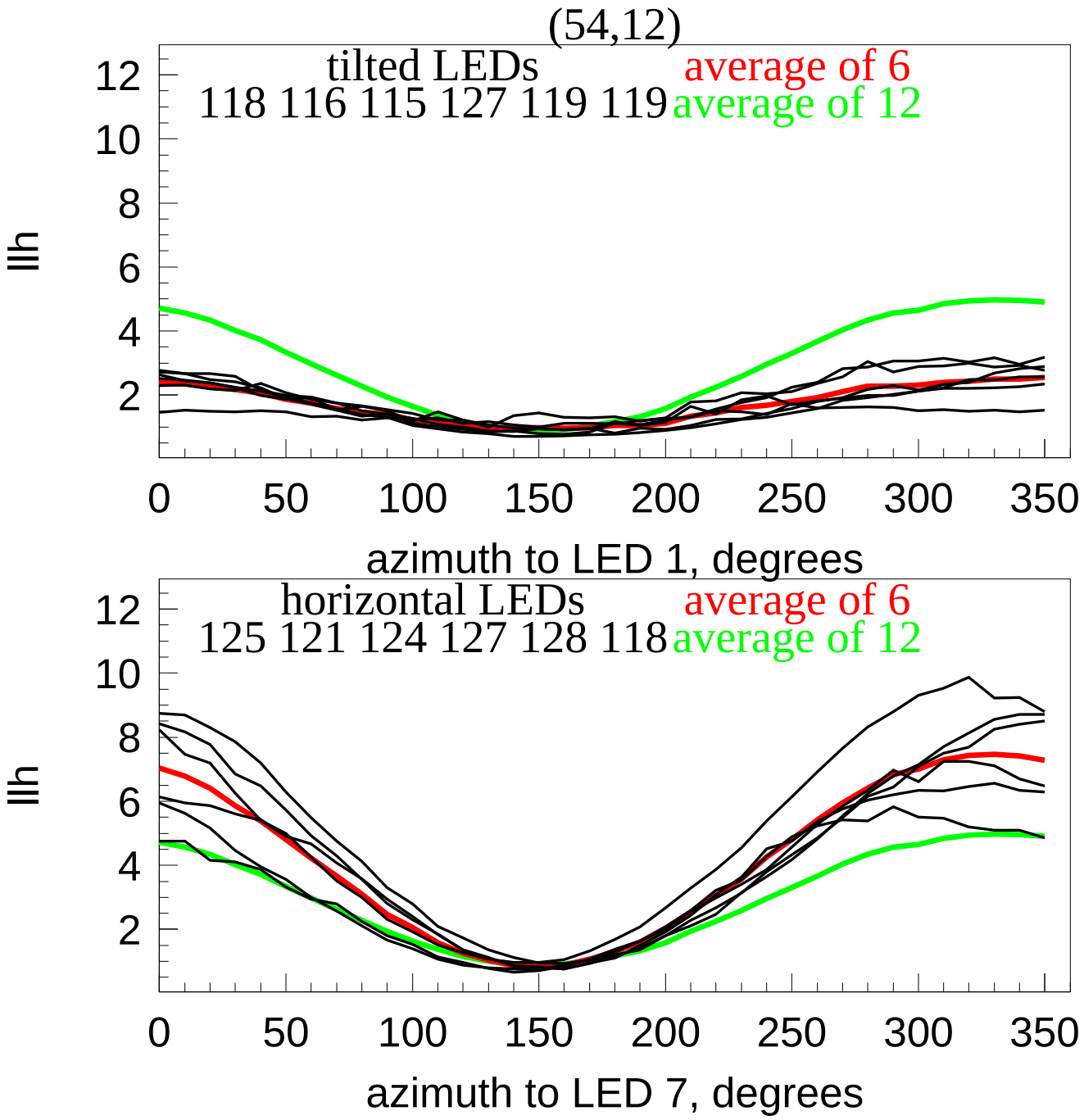

(54,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
107.3 ± 10.8

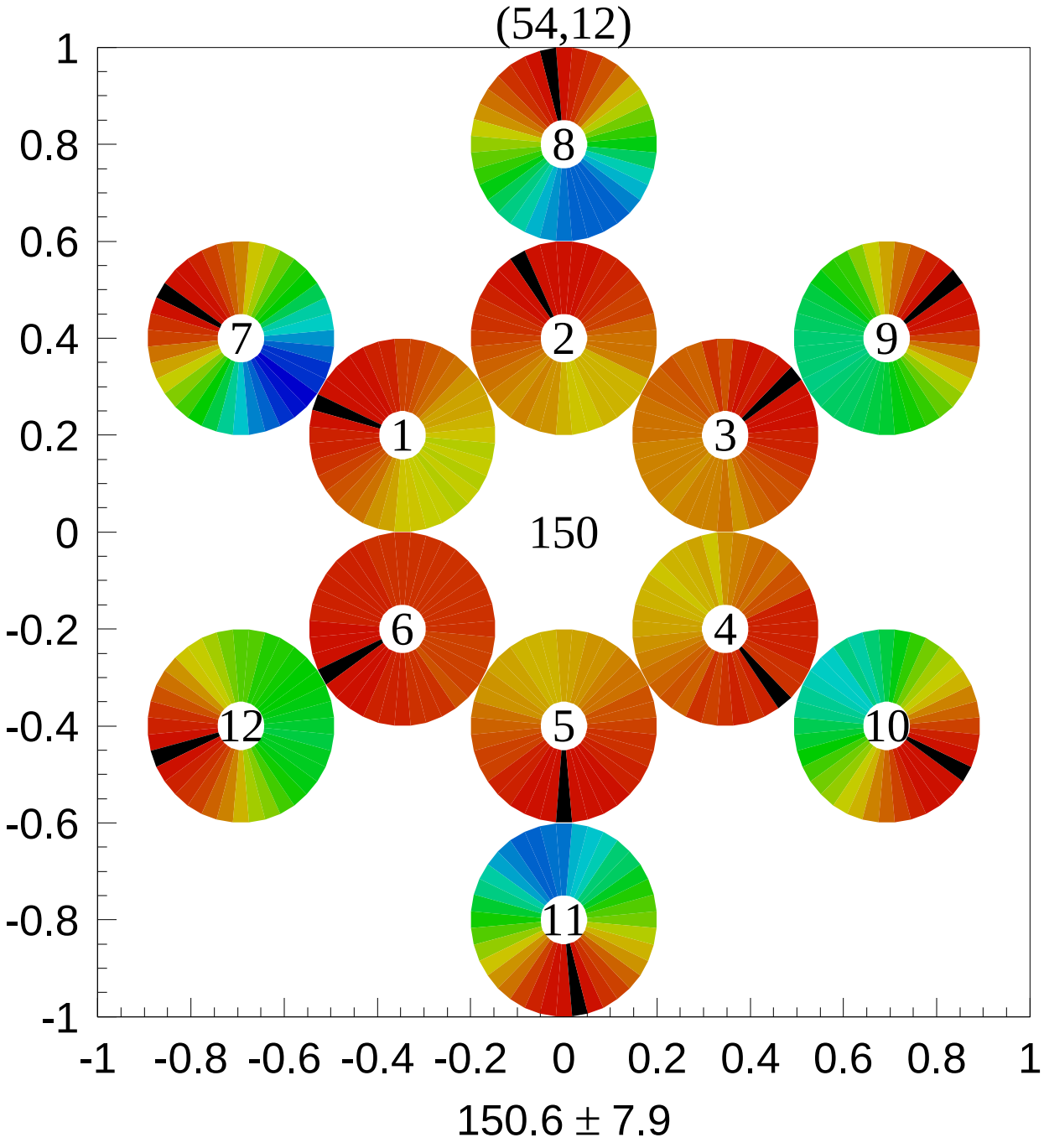

(54,10)
tilted LEDs
119 125 113 103 52 90
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 113 116 125 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

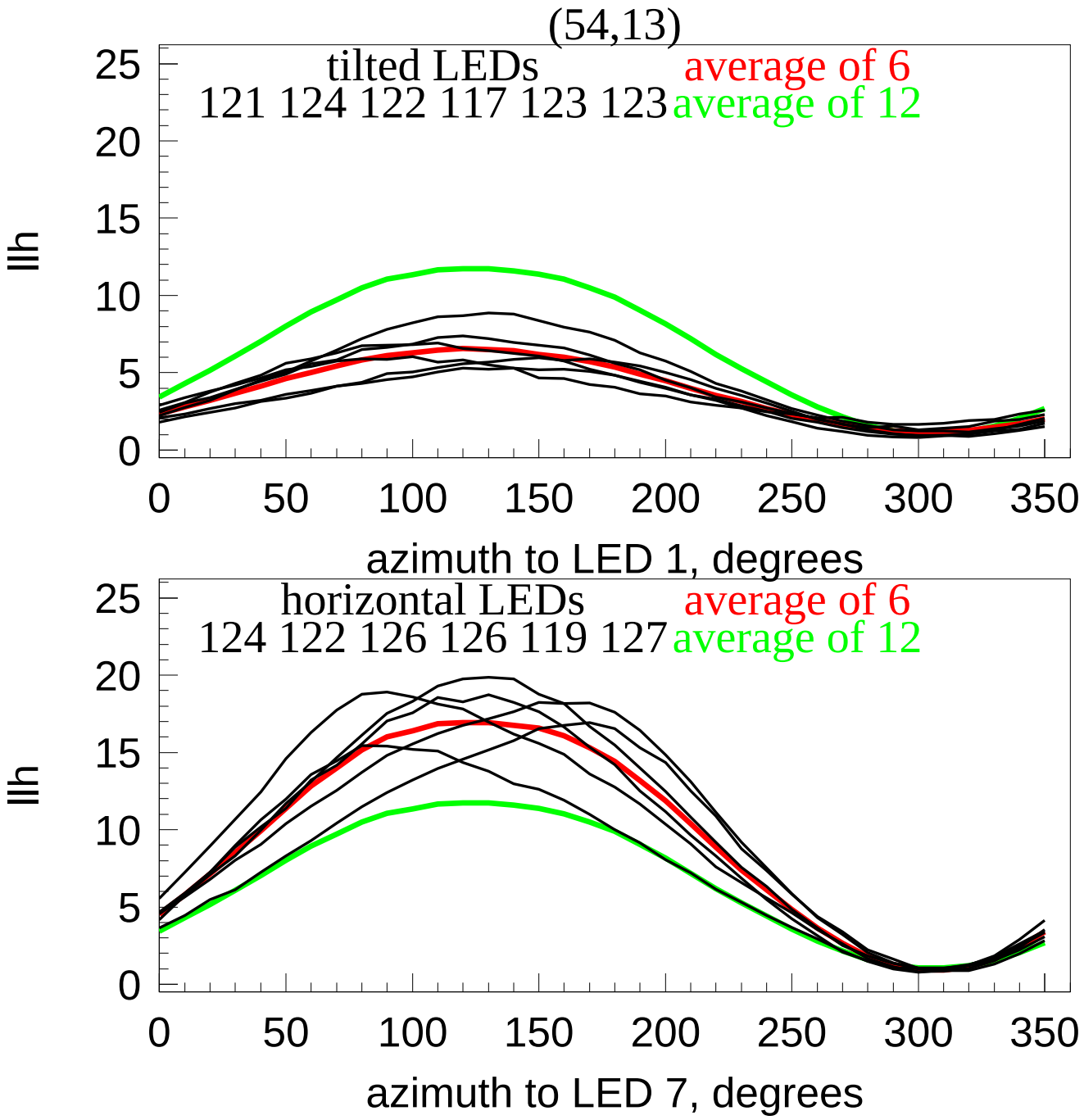

(54,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
48 ± 8.0

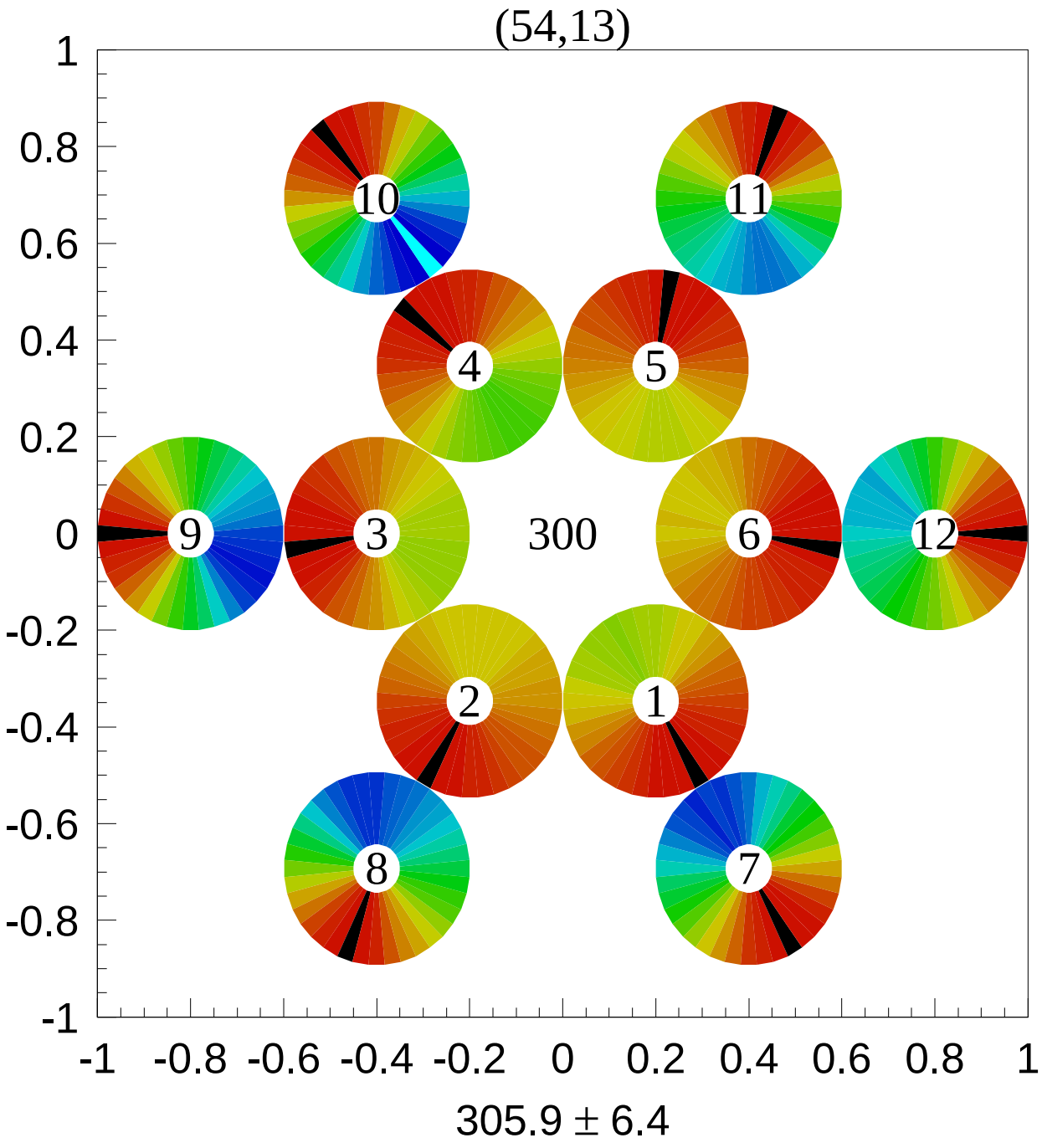

(54,11)
tilted LEDs
112 130 121 117 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 118 128 119 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

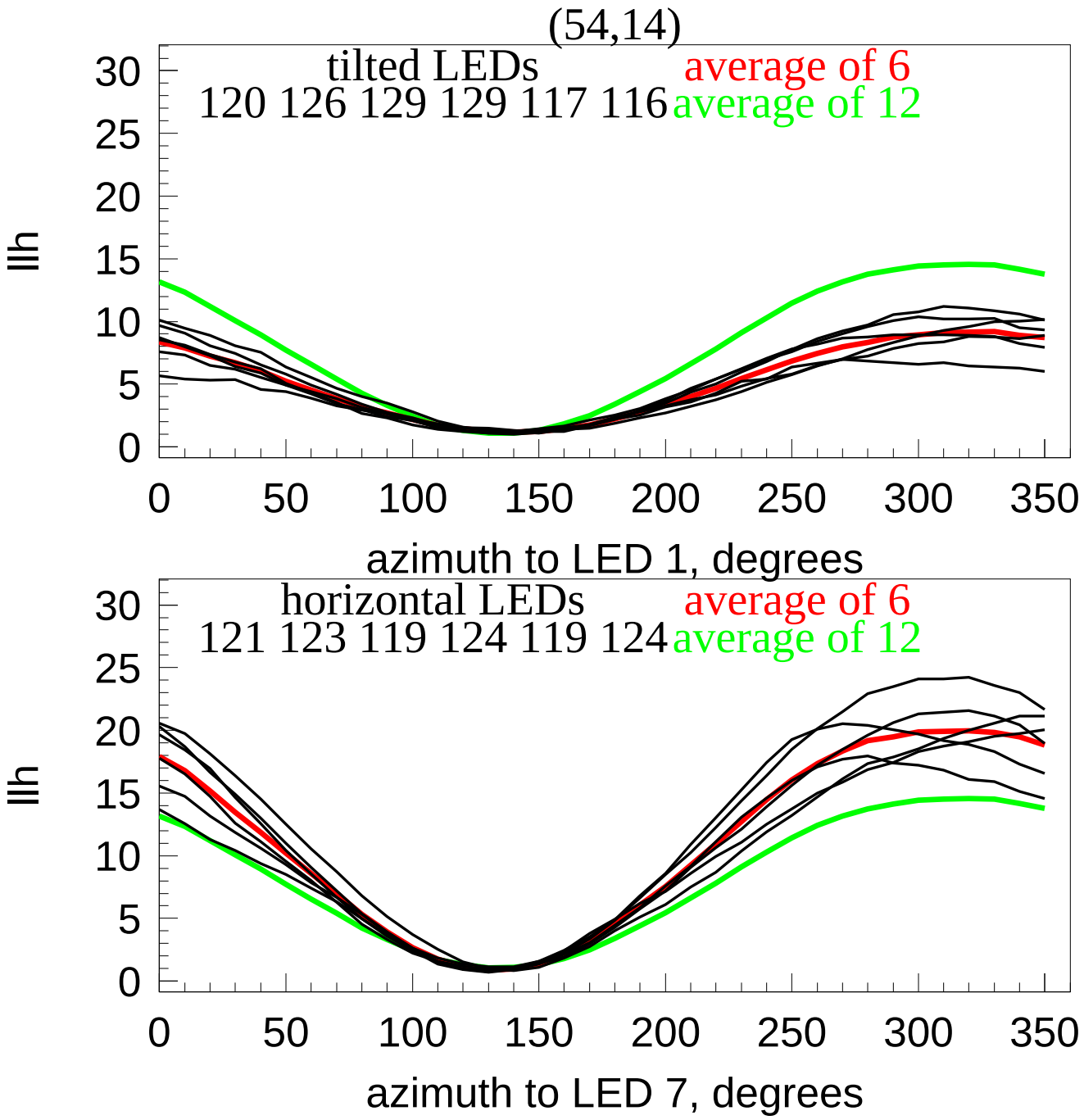

(54,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
31.6 ± 10.1

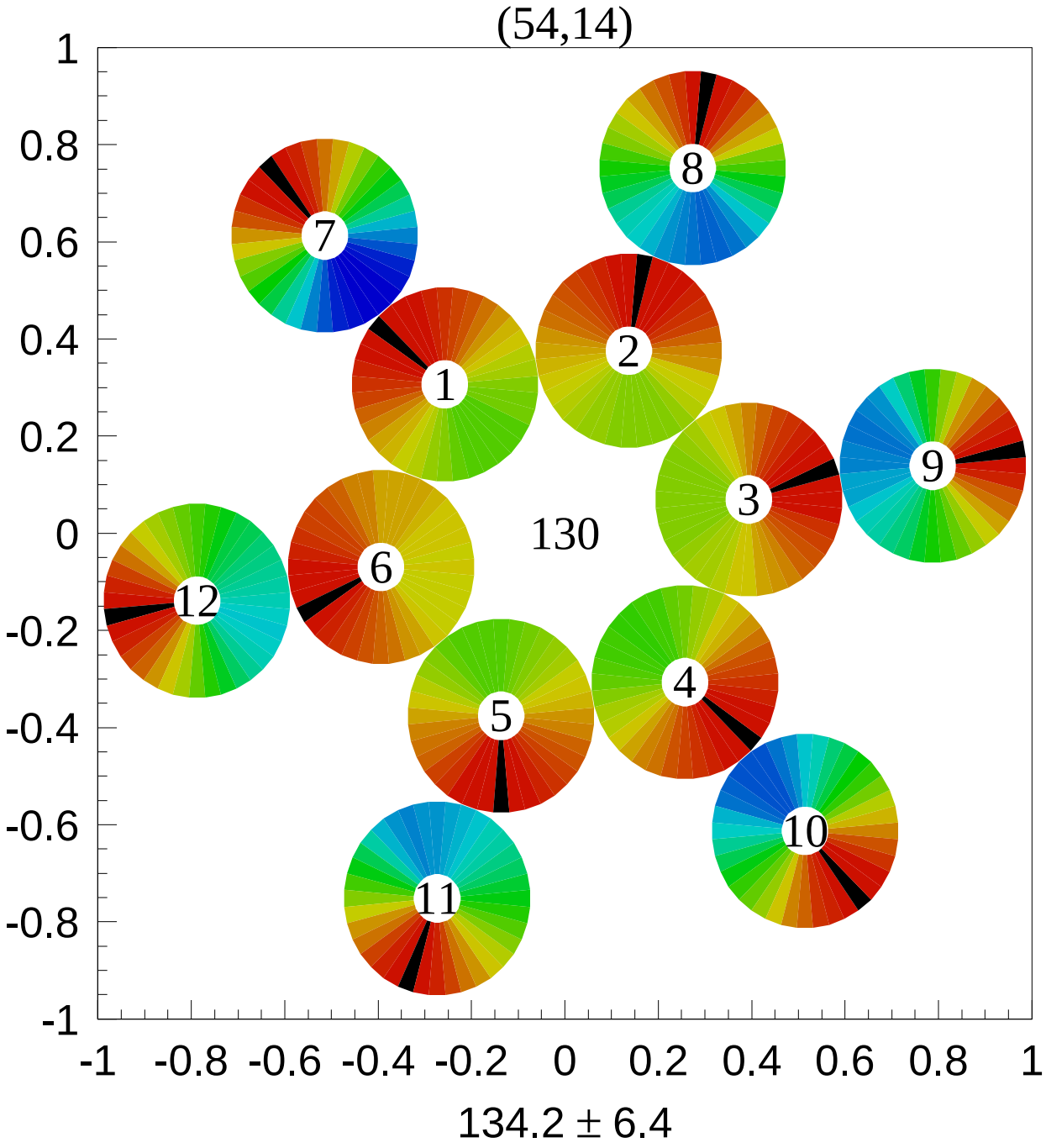

(54,12)
tilted LEDs
118 116 115 127 119 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 121 124 127 128 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

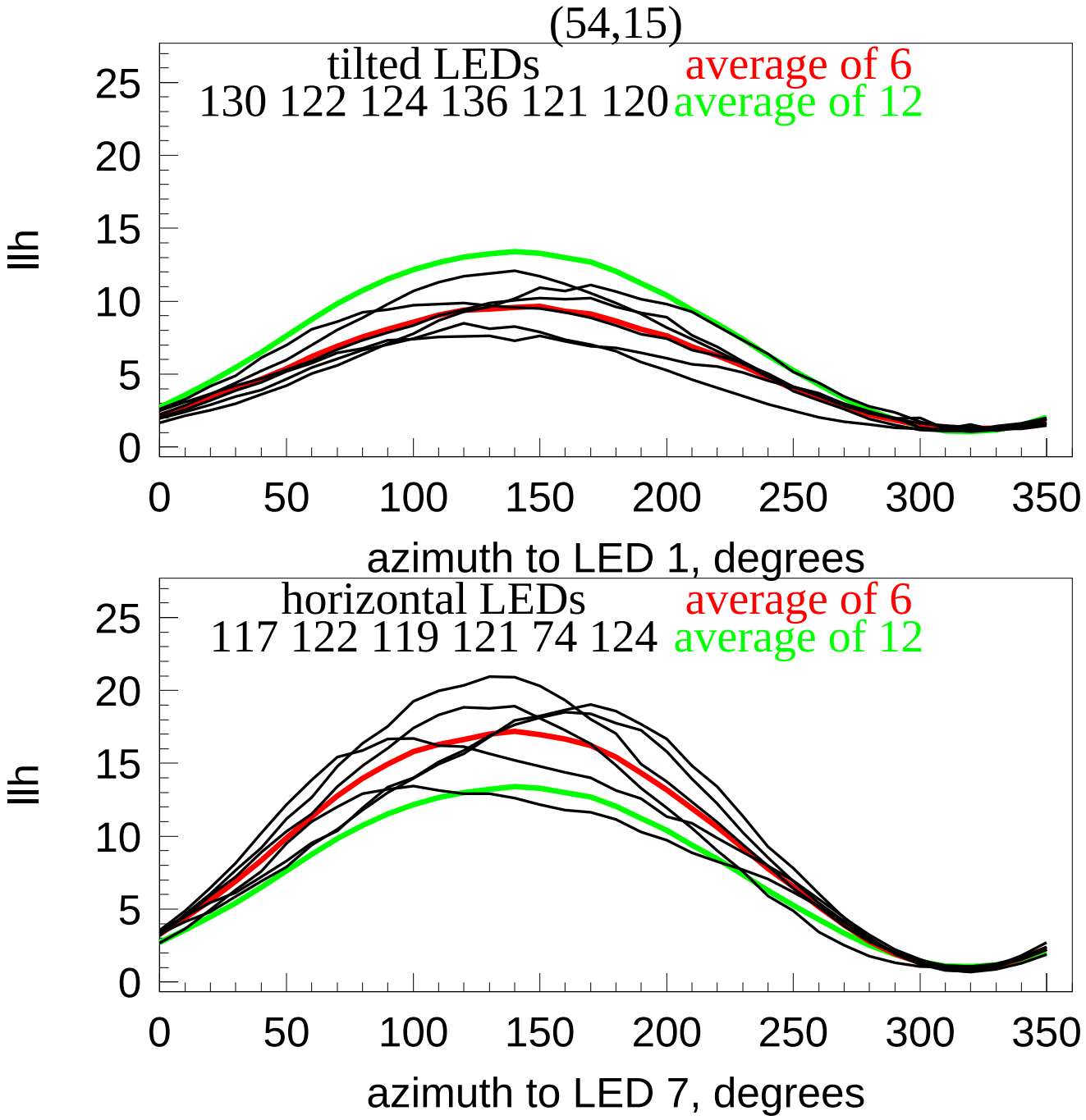

(54,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
150.6 ± 7.9

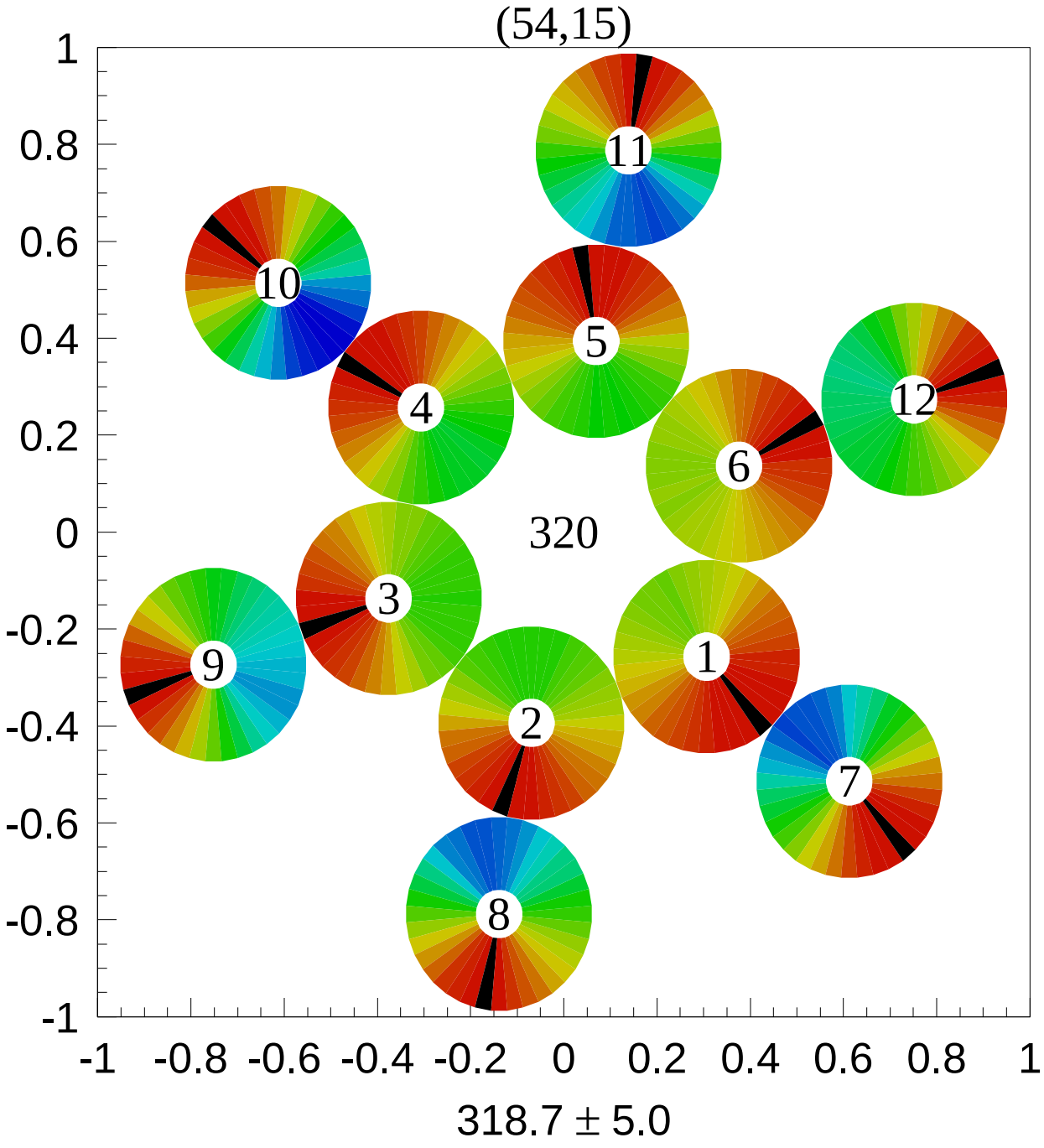

(54,13)
tilted LEDs
121 124 122 117 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 126 126 119 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

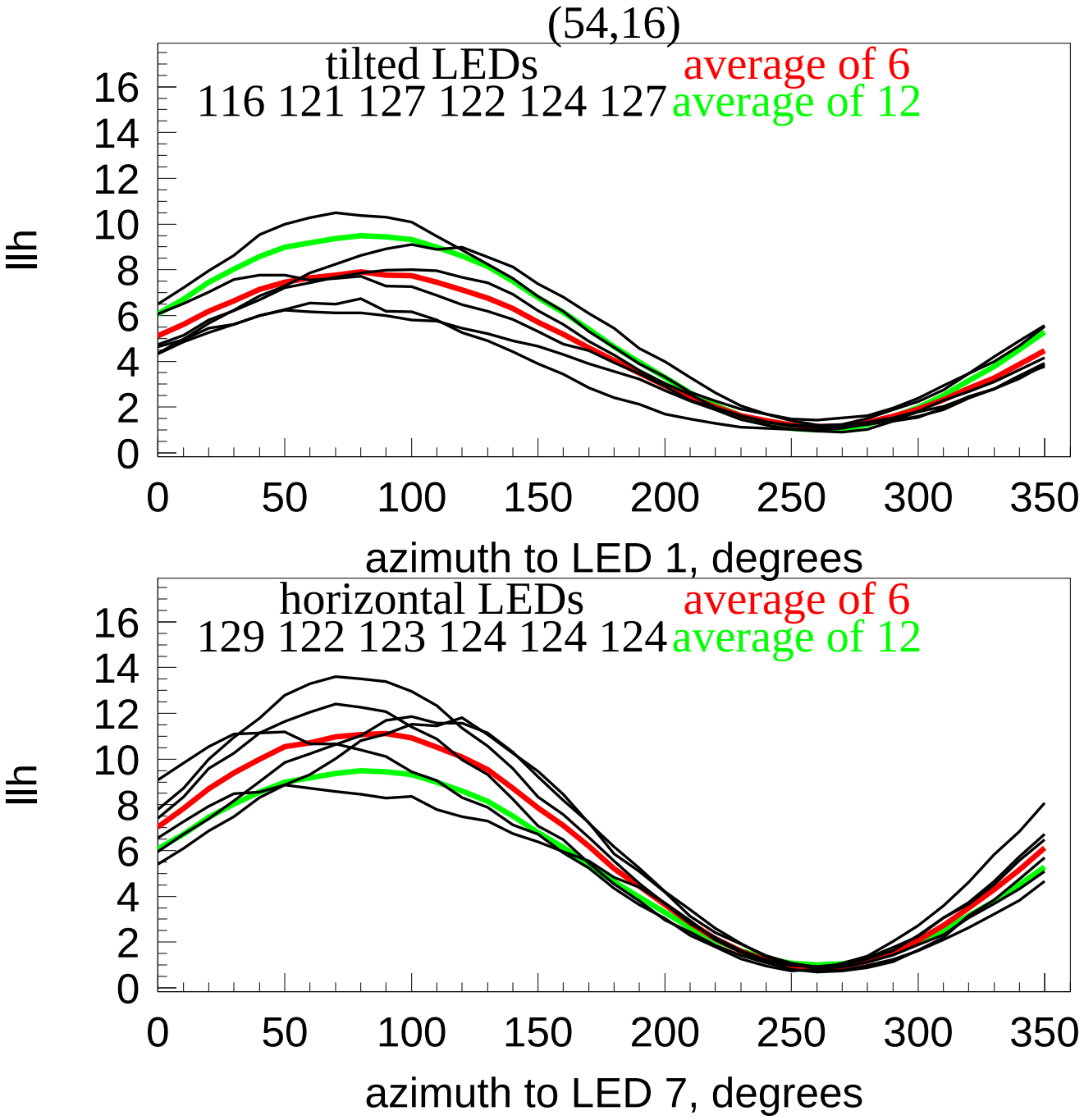

(54,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
305.9 ± 6.4

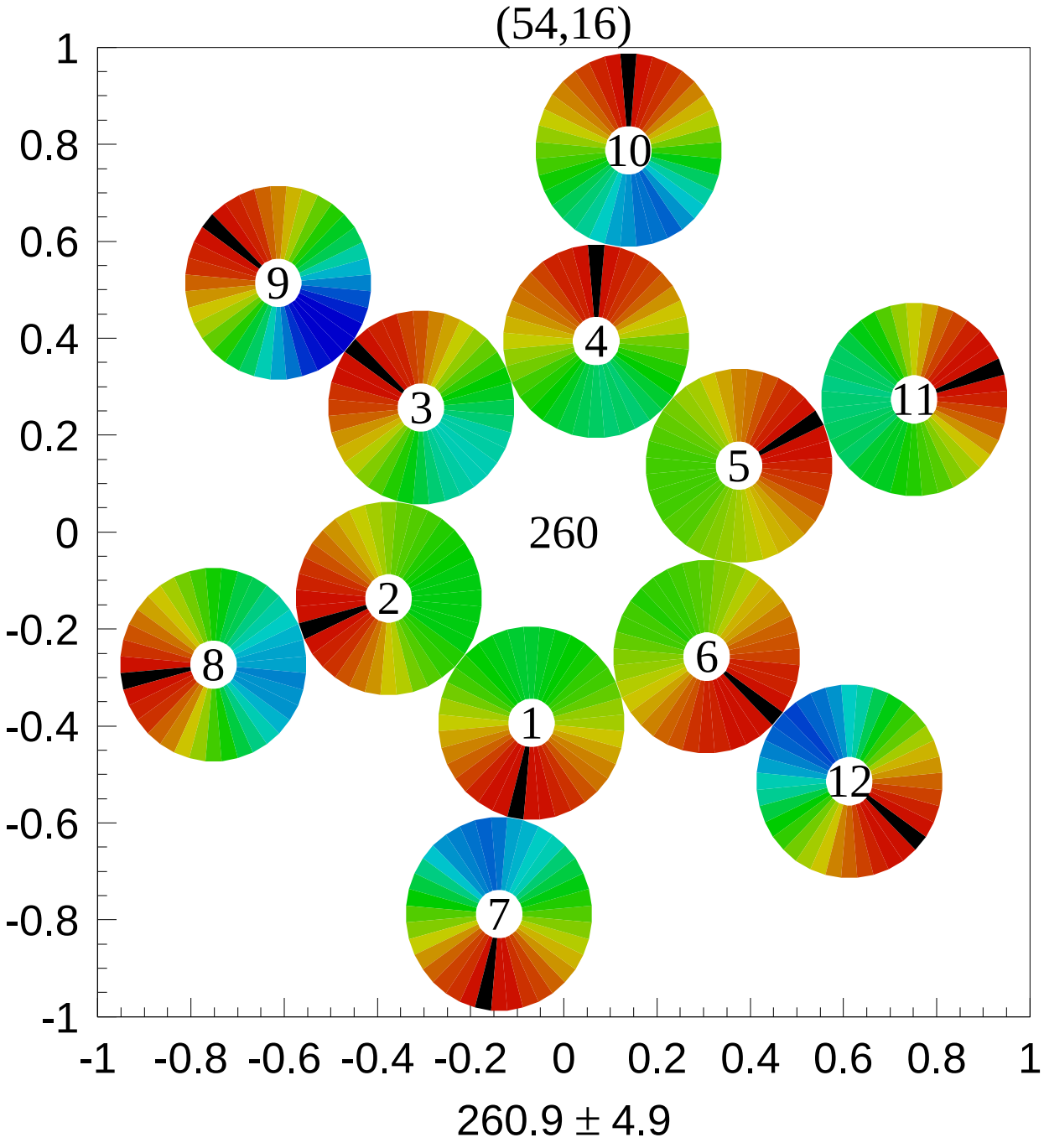

(54,14)
tilted LEDs
120 126 129 129 117 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 123 119 124 119 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

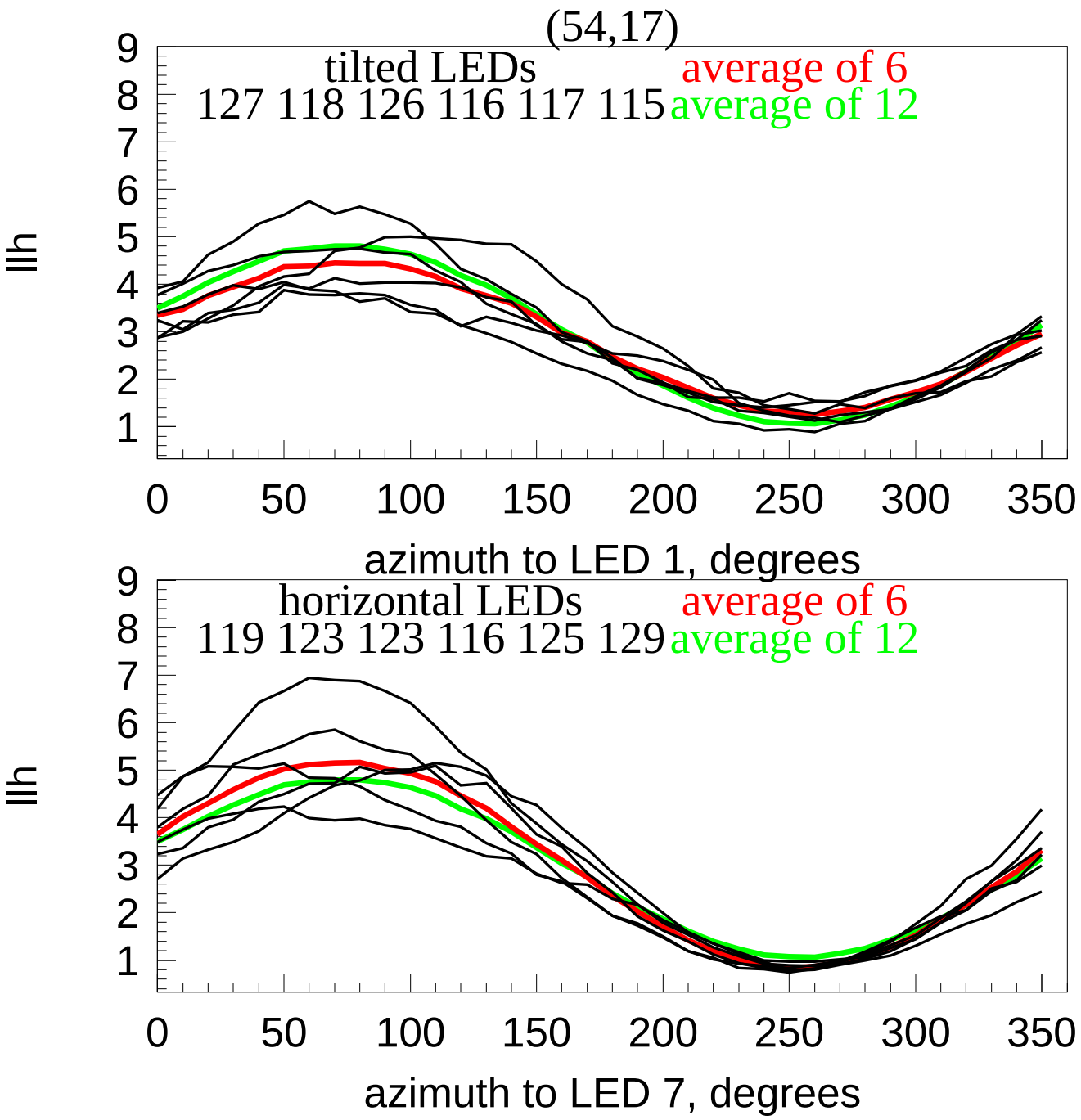

(54,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
134.2 ± 6.4
130
1
2
3
4
5
6
7
8
9
10
11
12

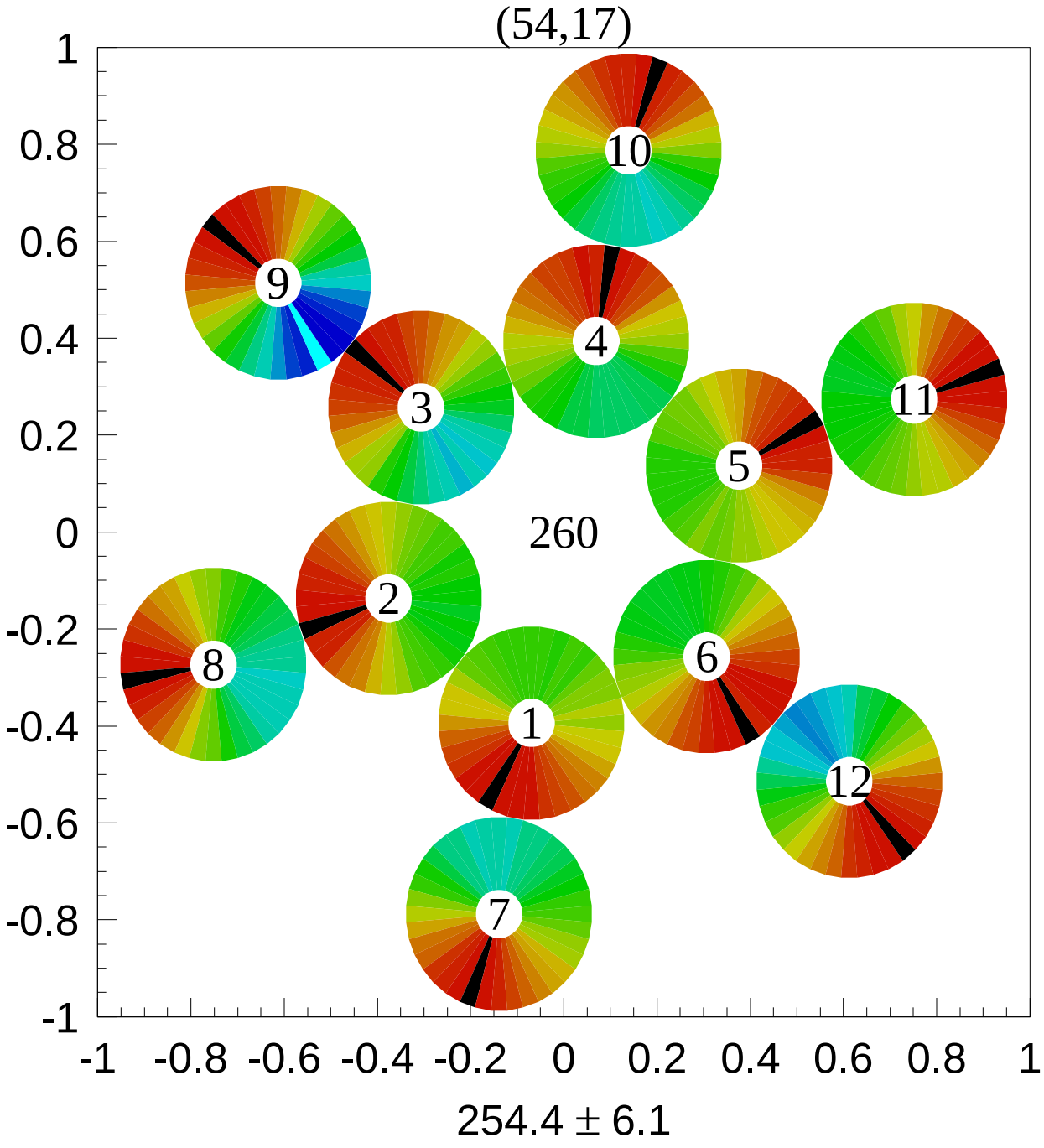

(54,15)
tilted LEDs
130 122 124 136 121 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 119 121 74 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

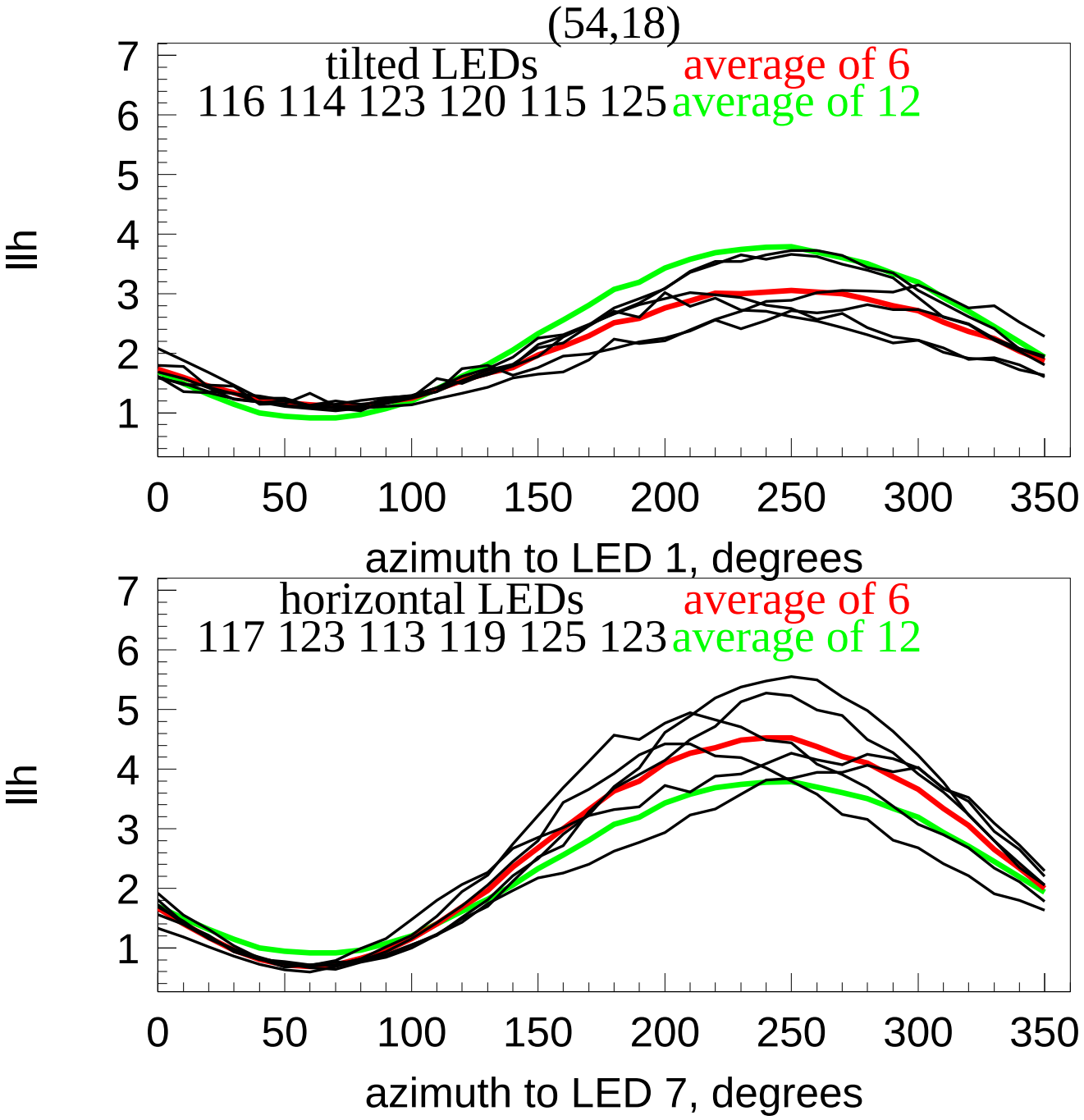

(54,15)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
318.7 ± 5.0

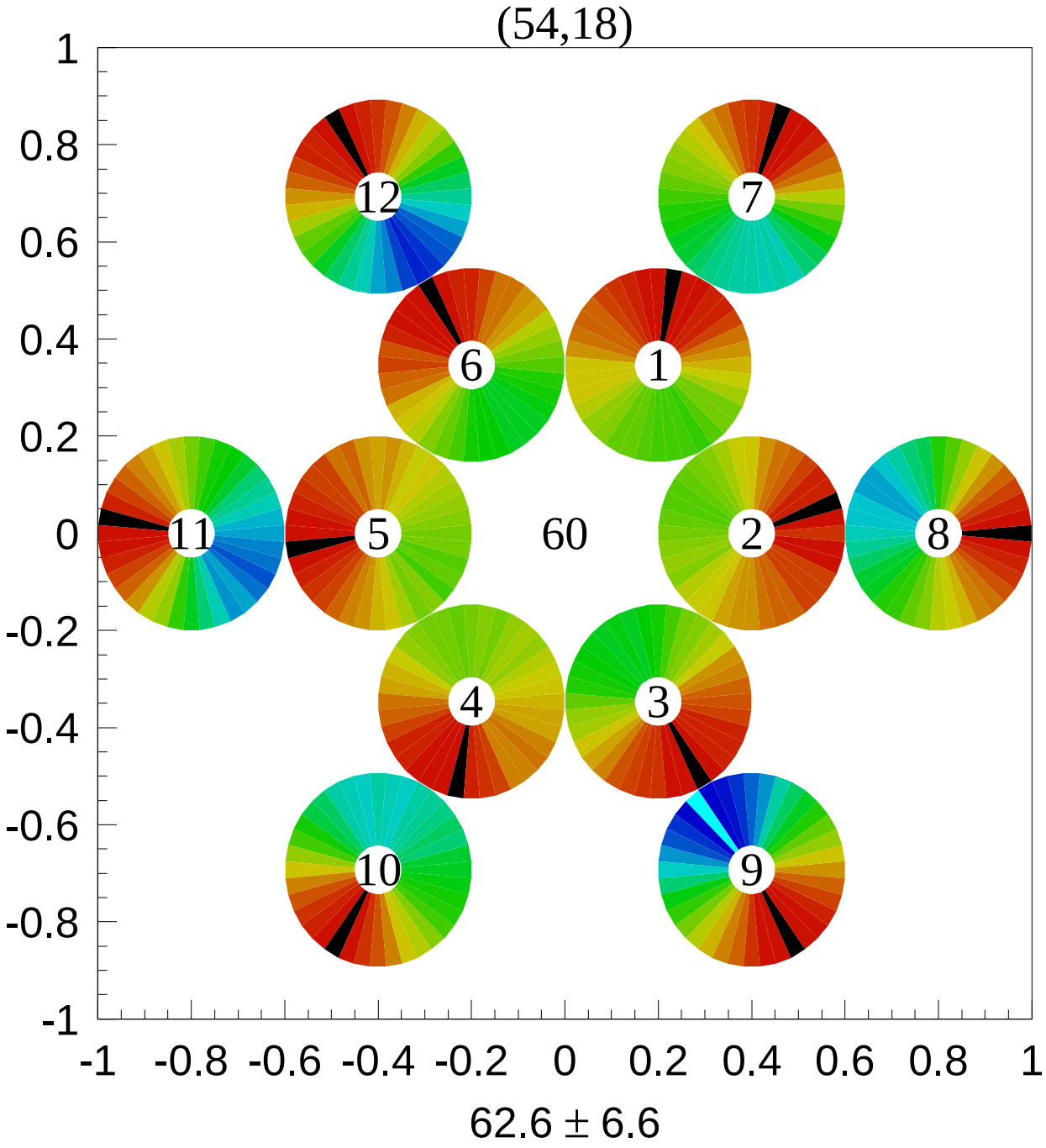

(54,16)
tilted LEDs
116 121 127 122 124 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 122 123 124 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

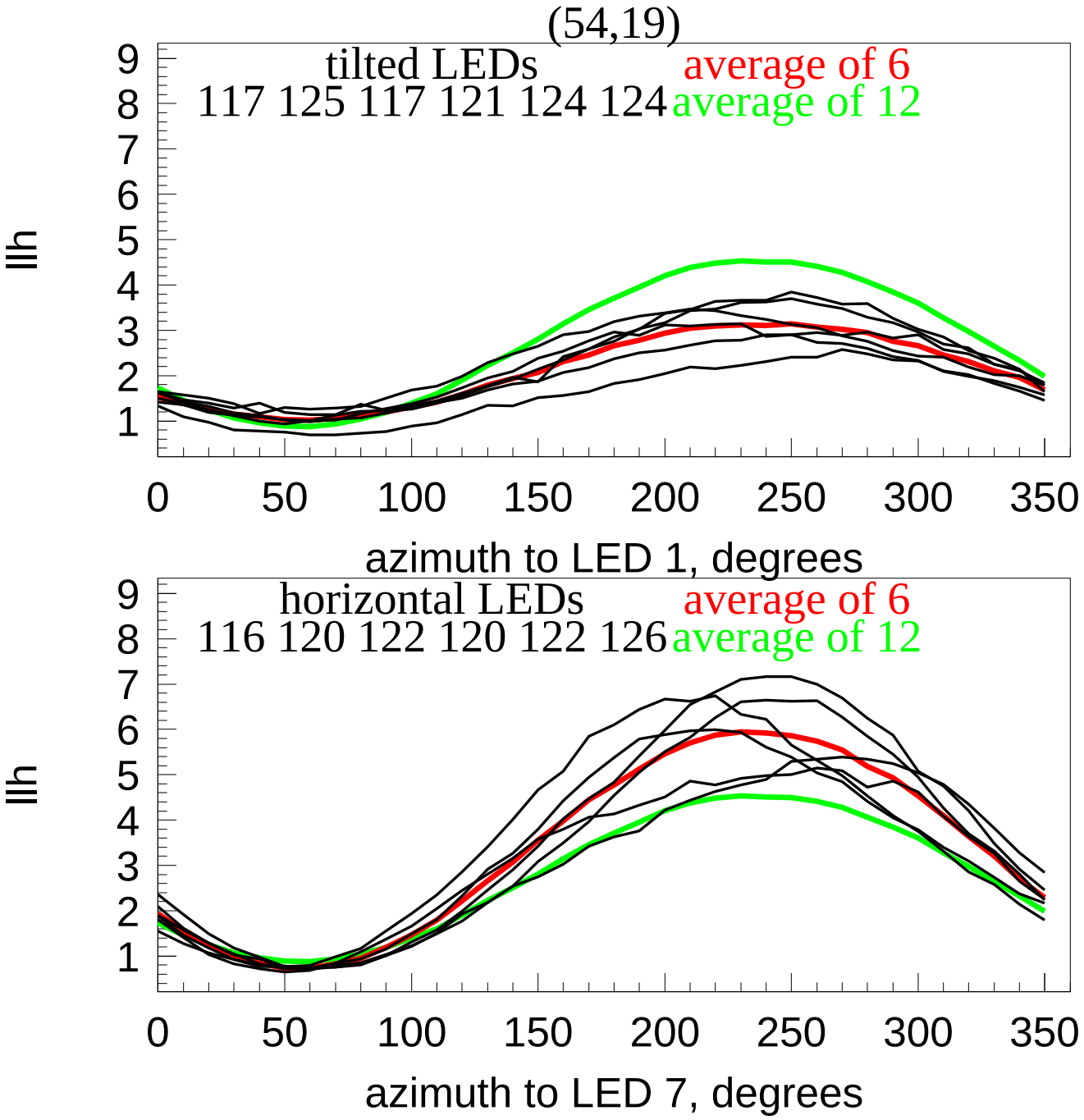

(54,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
260
260.9 ± 4.9
1
2
3
4
5
6
7
8
9
10
11
12

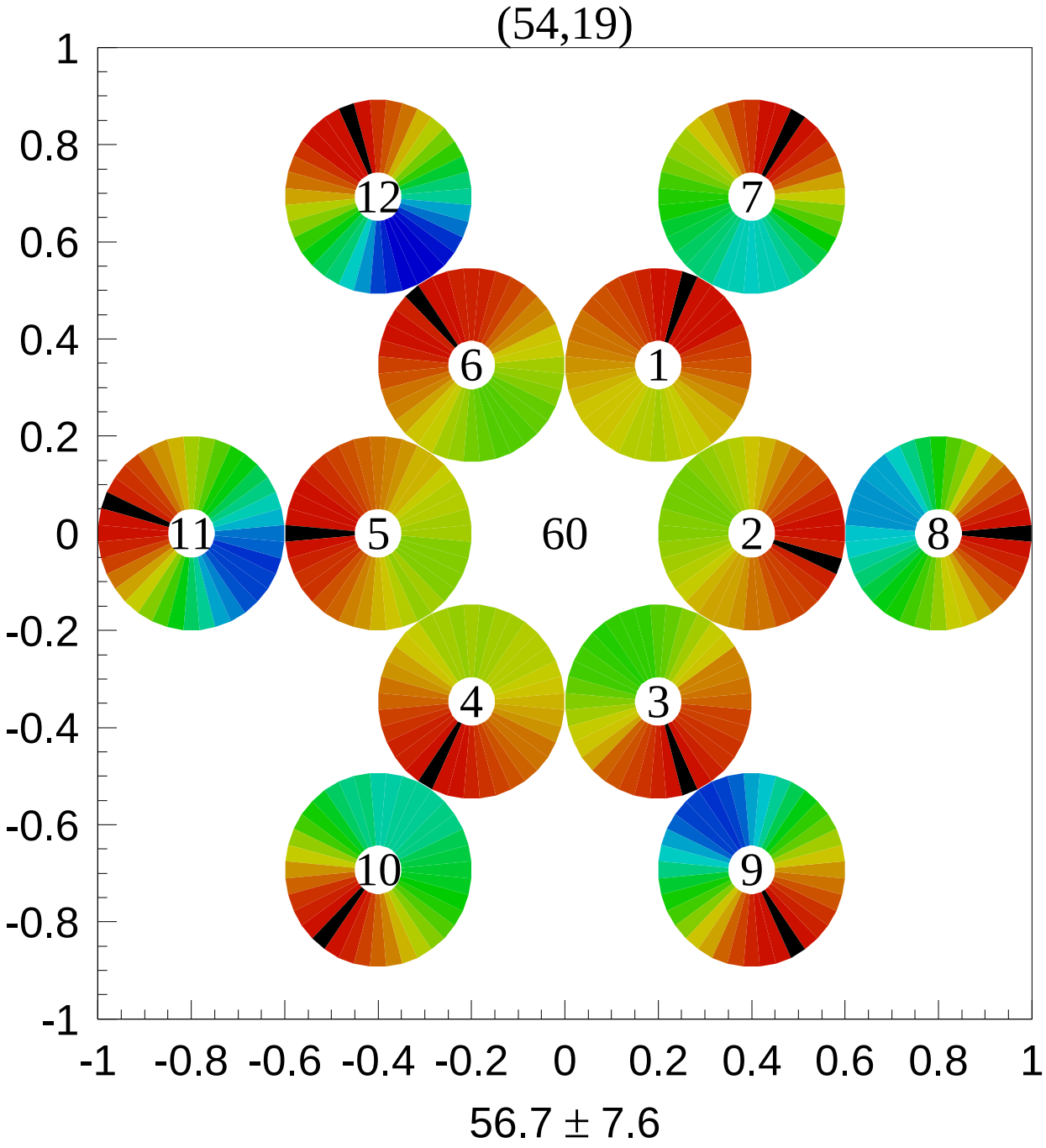

(54,17)
tilted LEDs
127 118 126 116 117 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 123 116 125 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

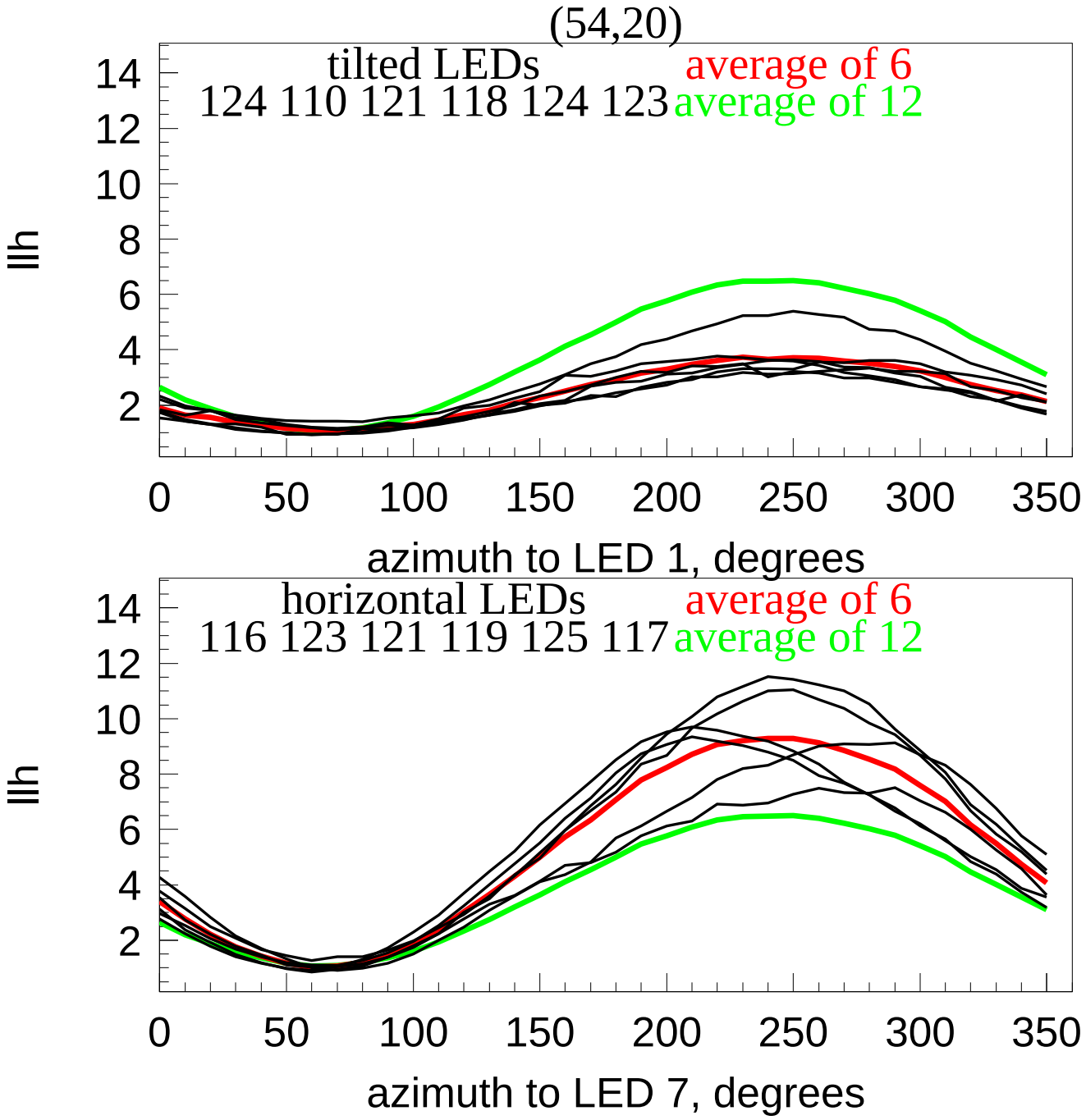

(54,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
254.4 ± 6.1

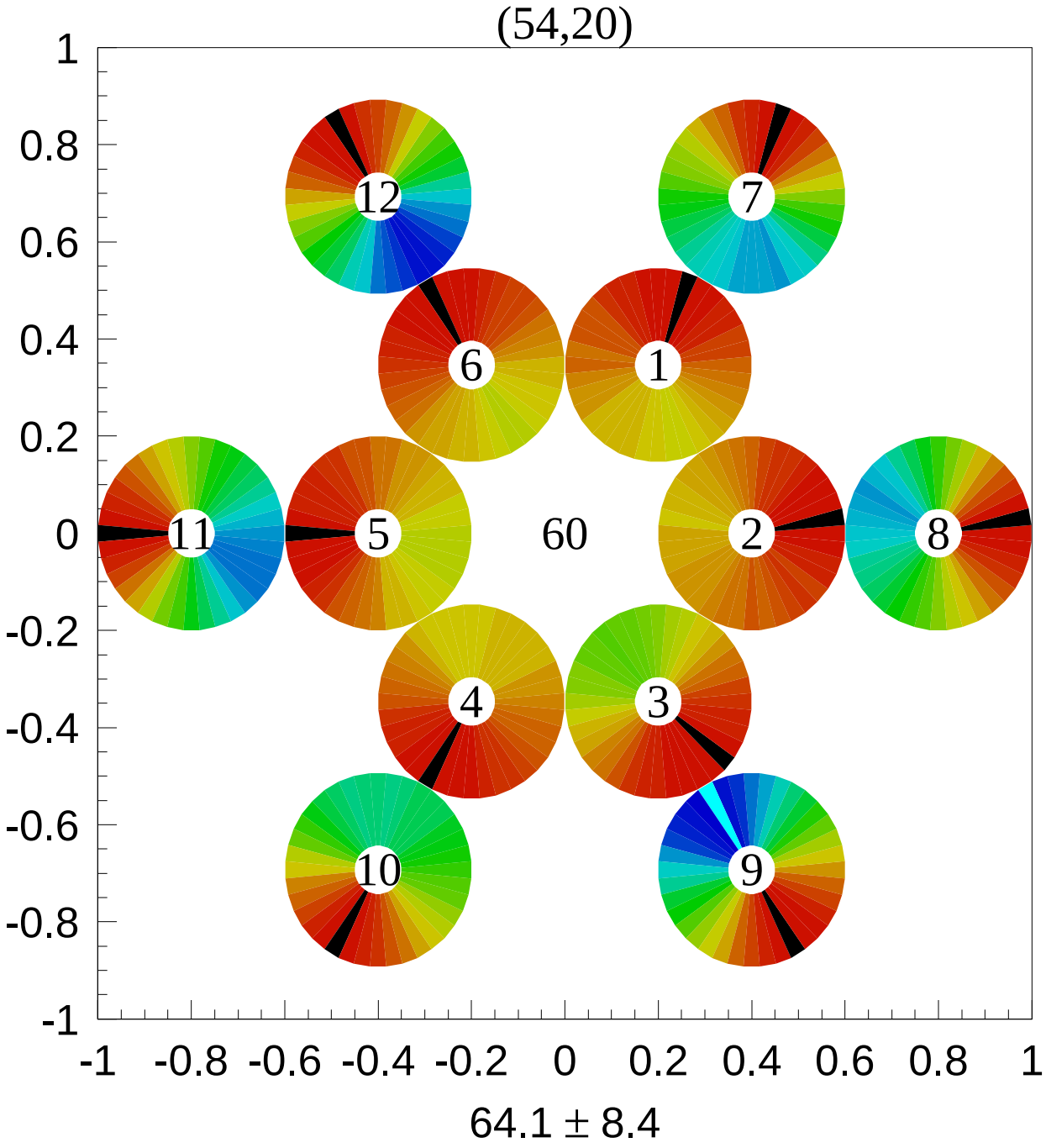

(54,18)
tilted LEDs
116 114 123 120 115 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 123 113 119 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

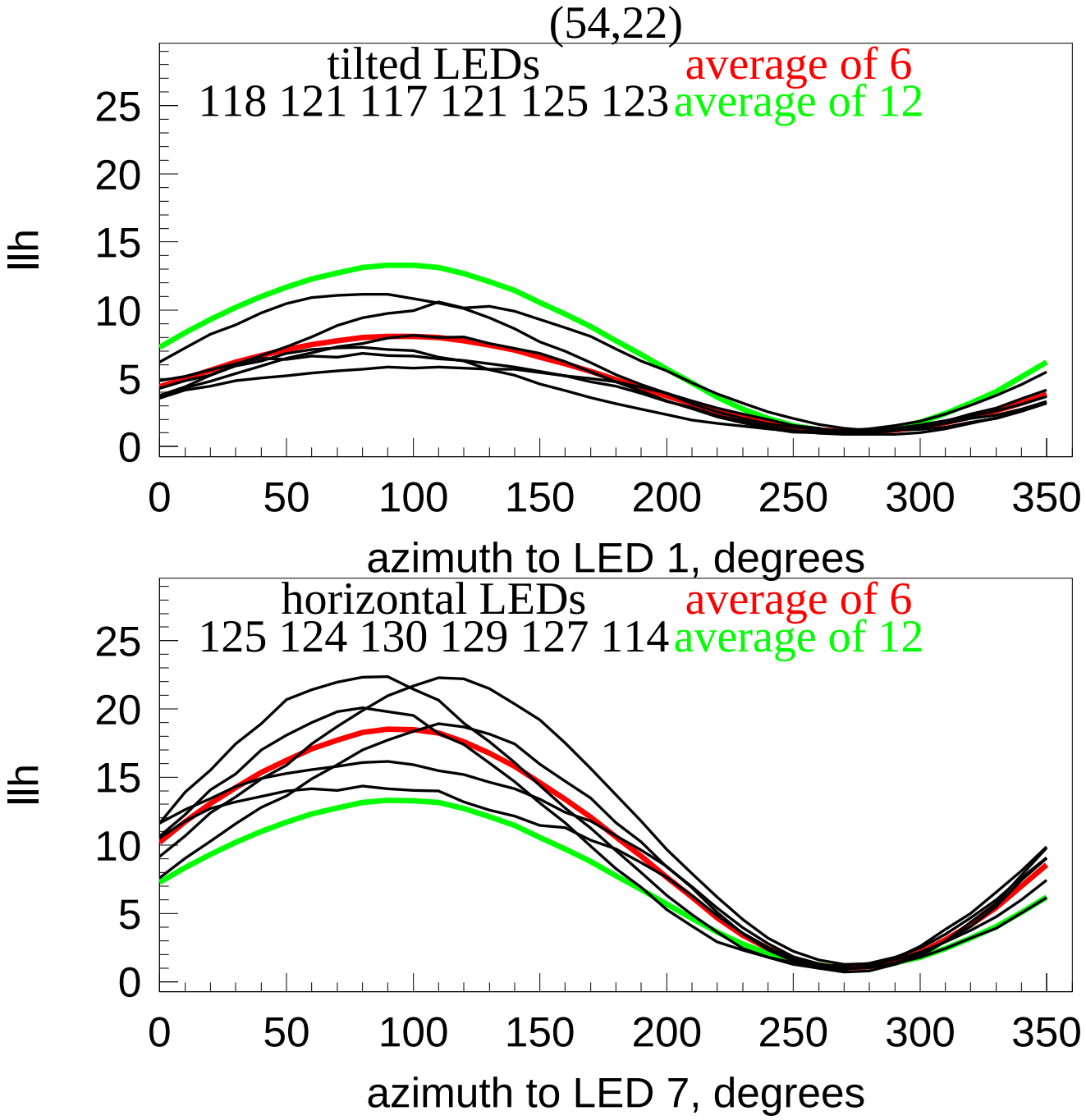

(54,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
62.6 ± 6.6

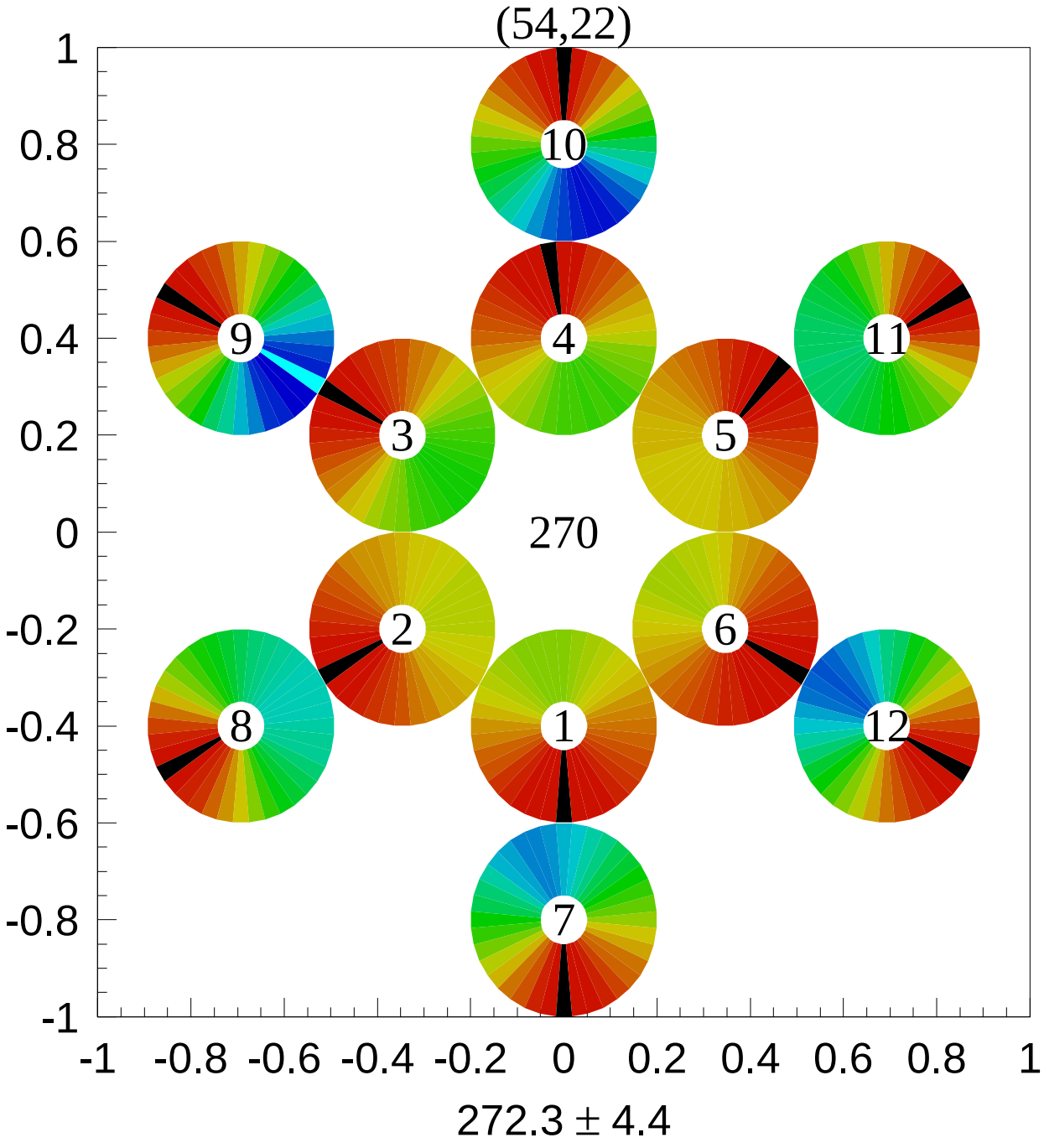

(54,19)
tilted LEDs
117 125 117 121 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 120 122 120 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

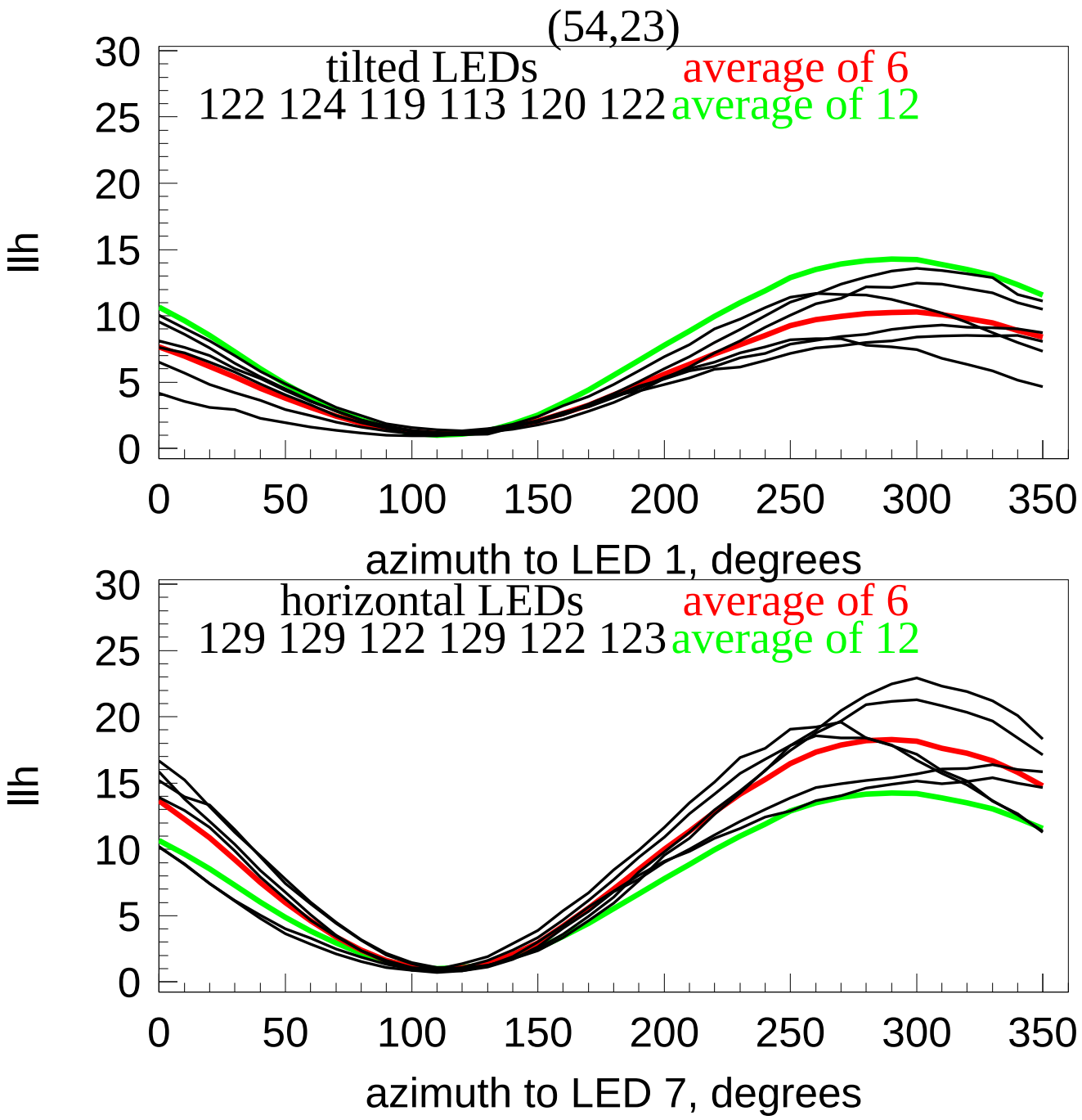

(54,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
56.7 ± 7.6

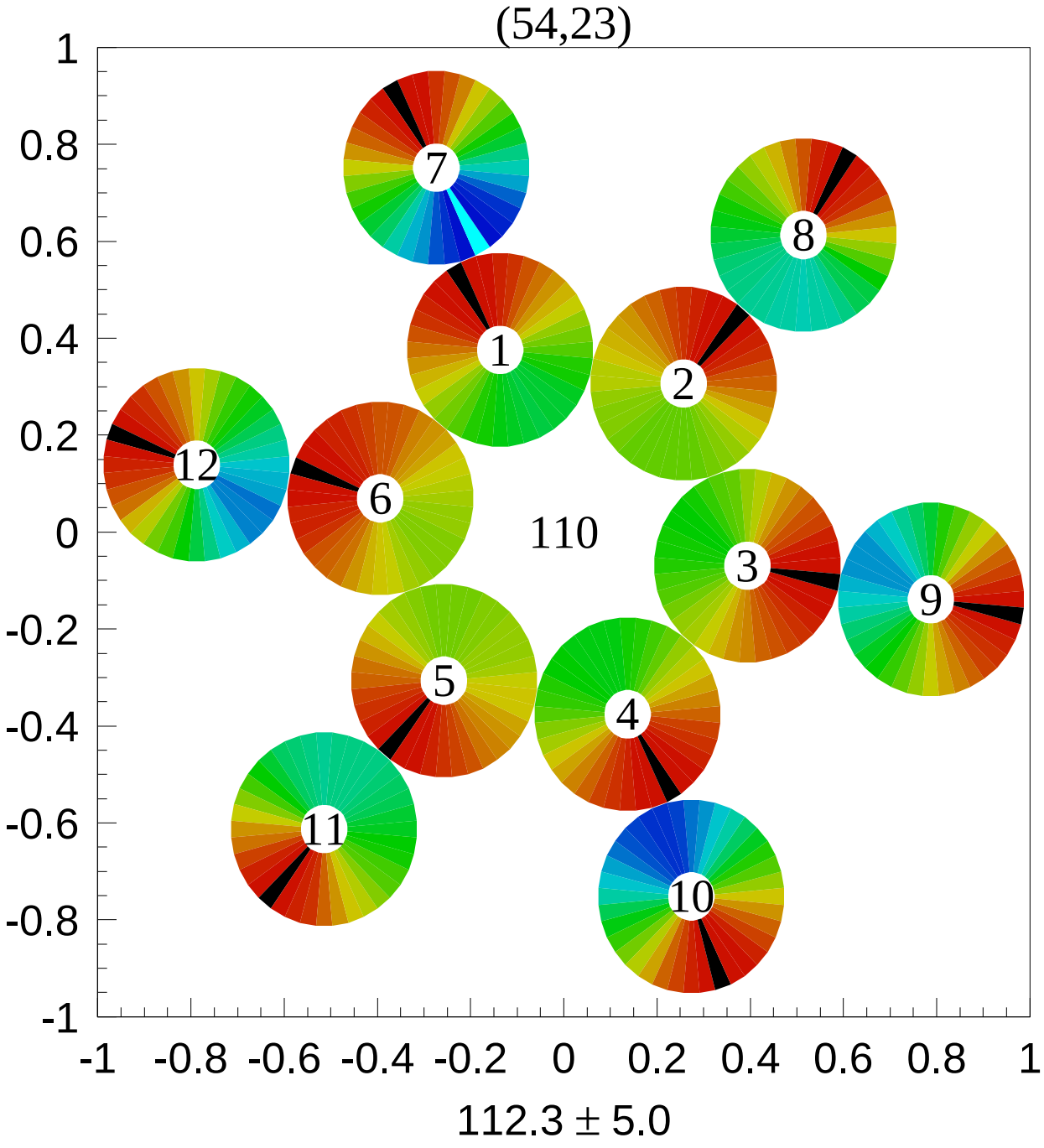

(54,20)
tilted LEDs
124 110 121 118 124 123
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 123 121 119 125 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

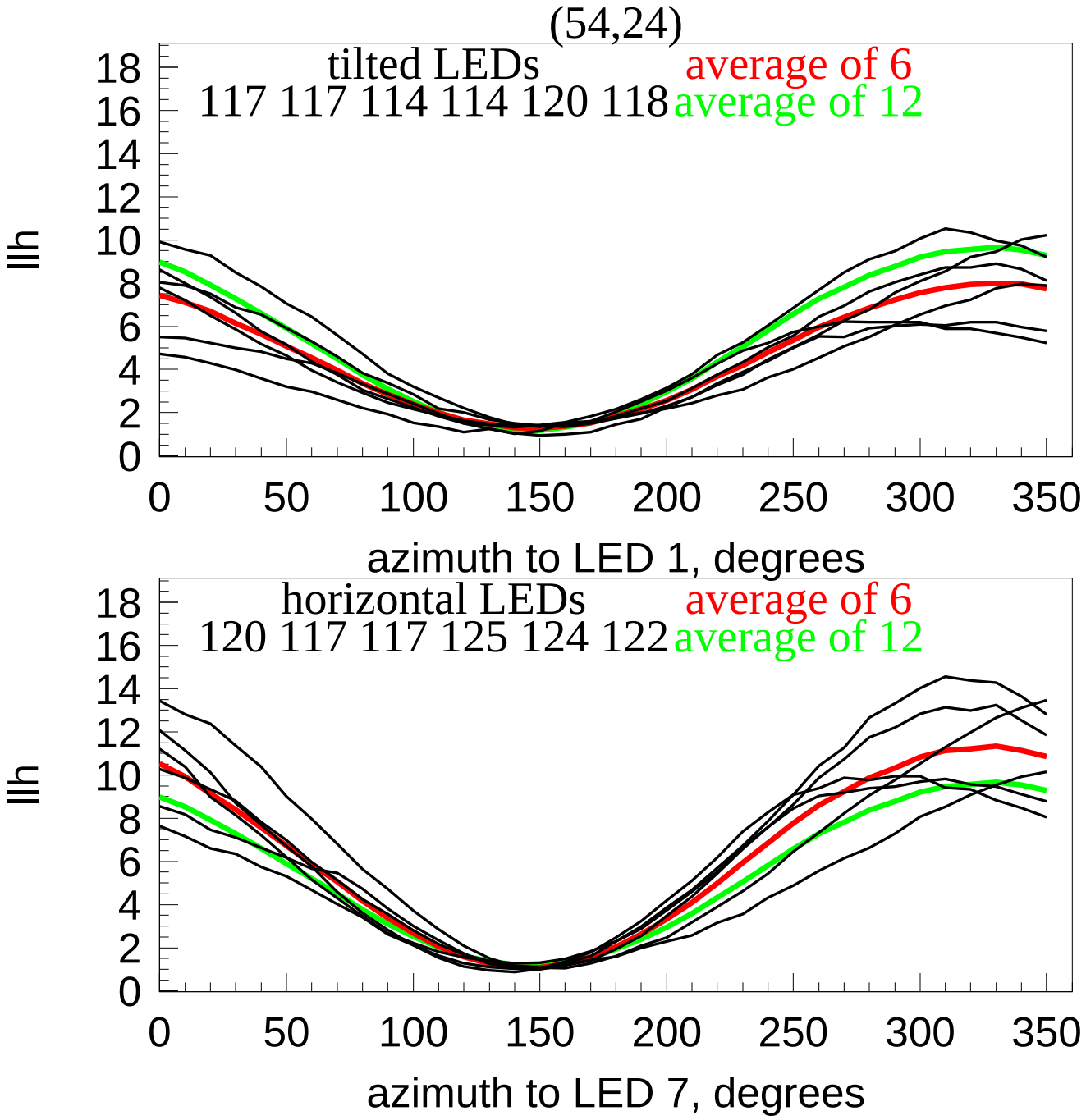

(54,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
64.1 ± 8.4

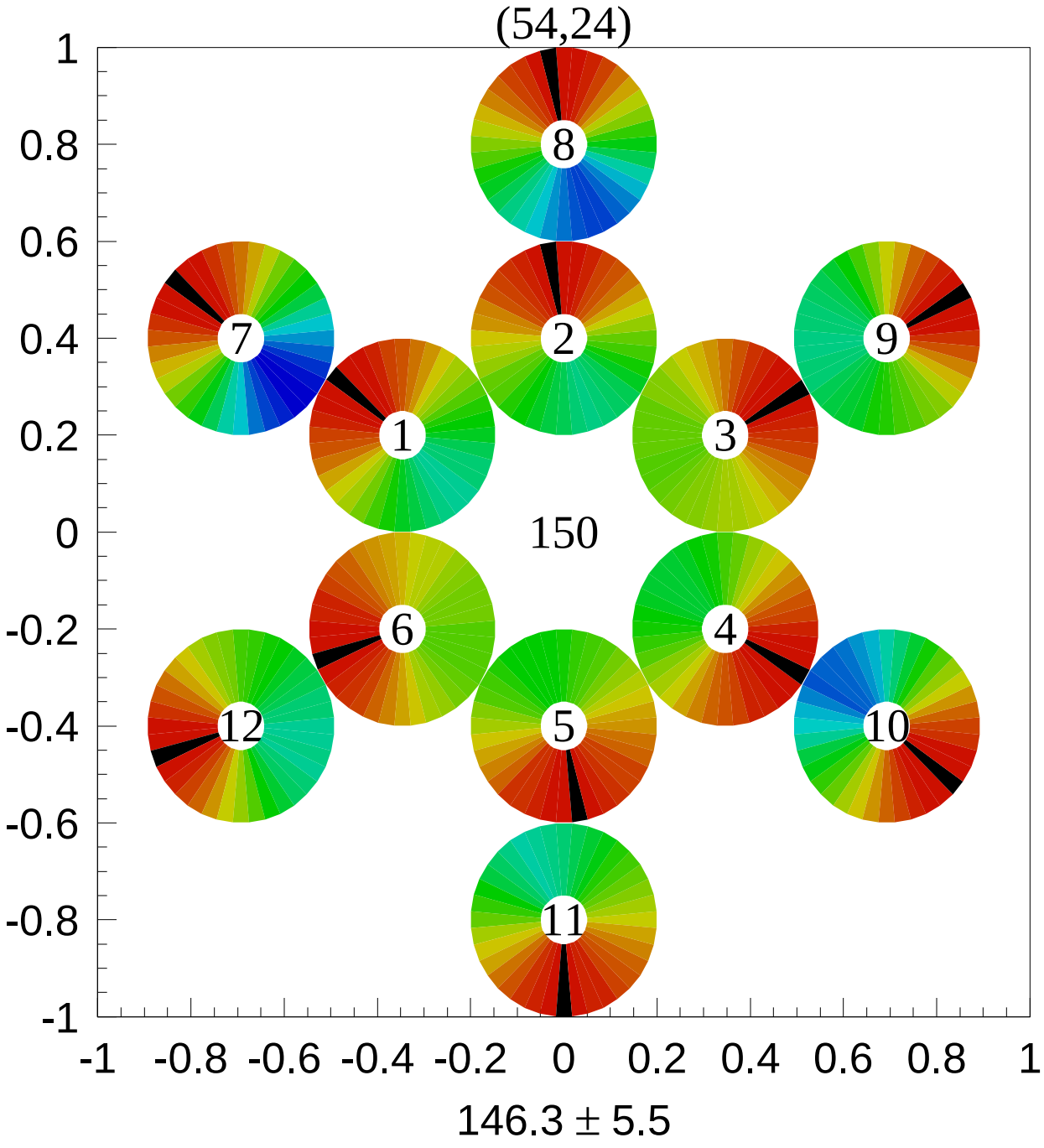

(54,22)
tilted LEDs
118 121 117 121 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 130 129 127 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

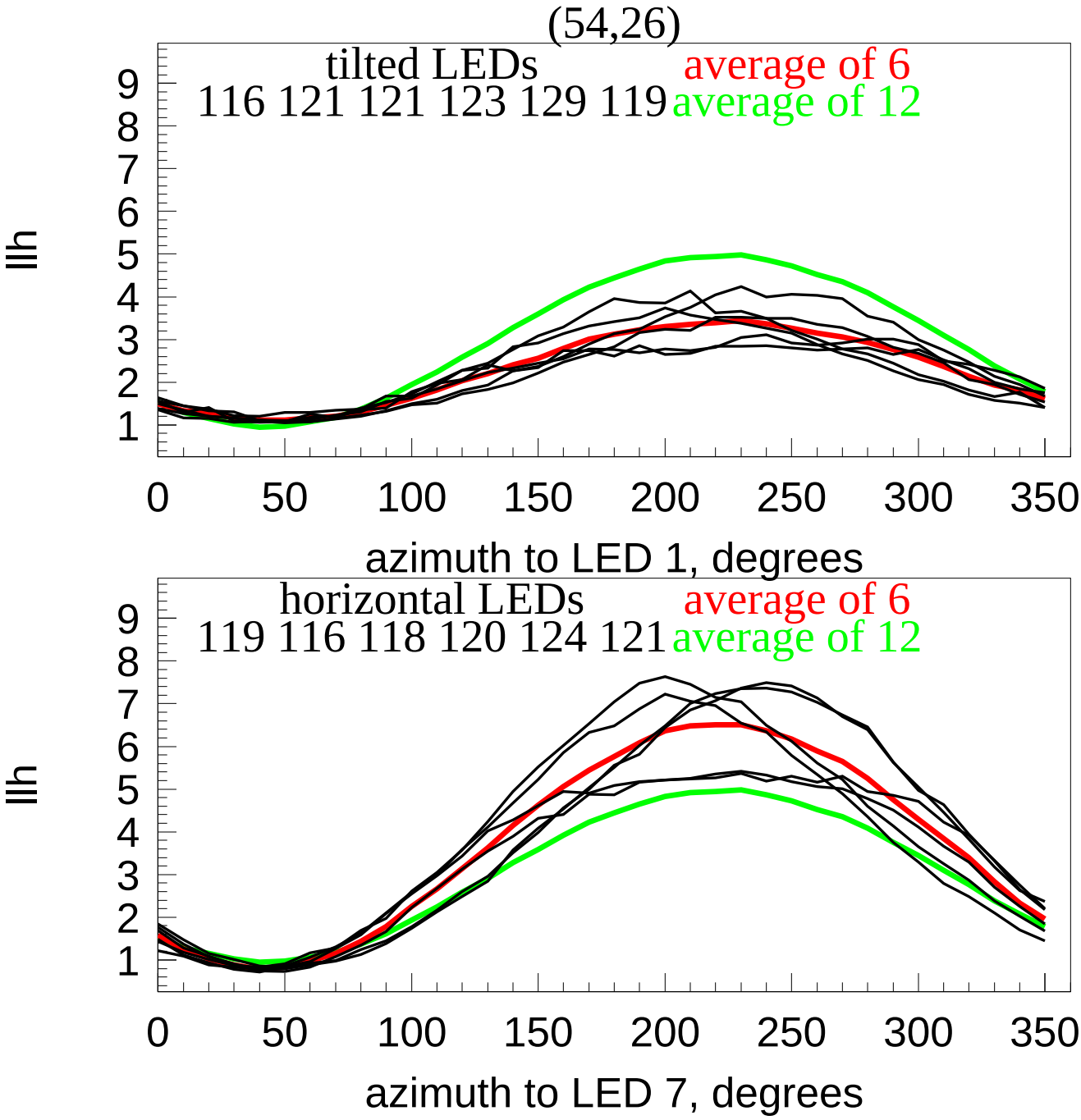

(54,22)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.3 ± 4.4

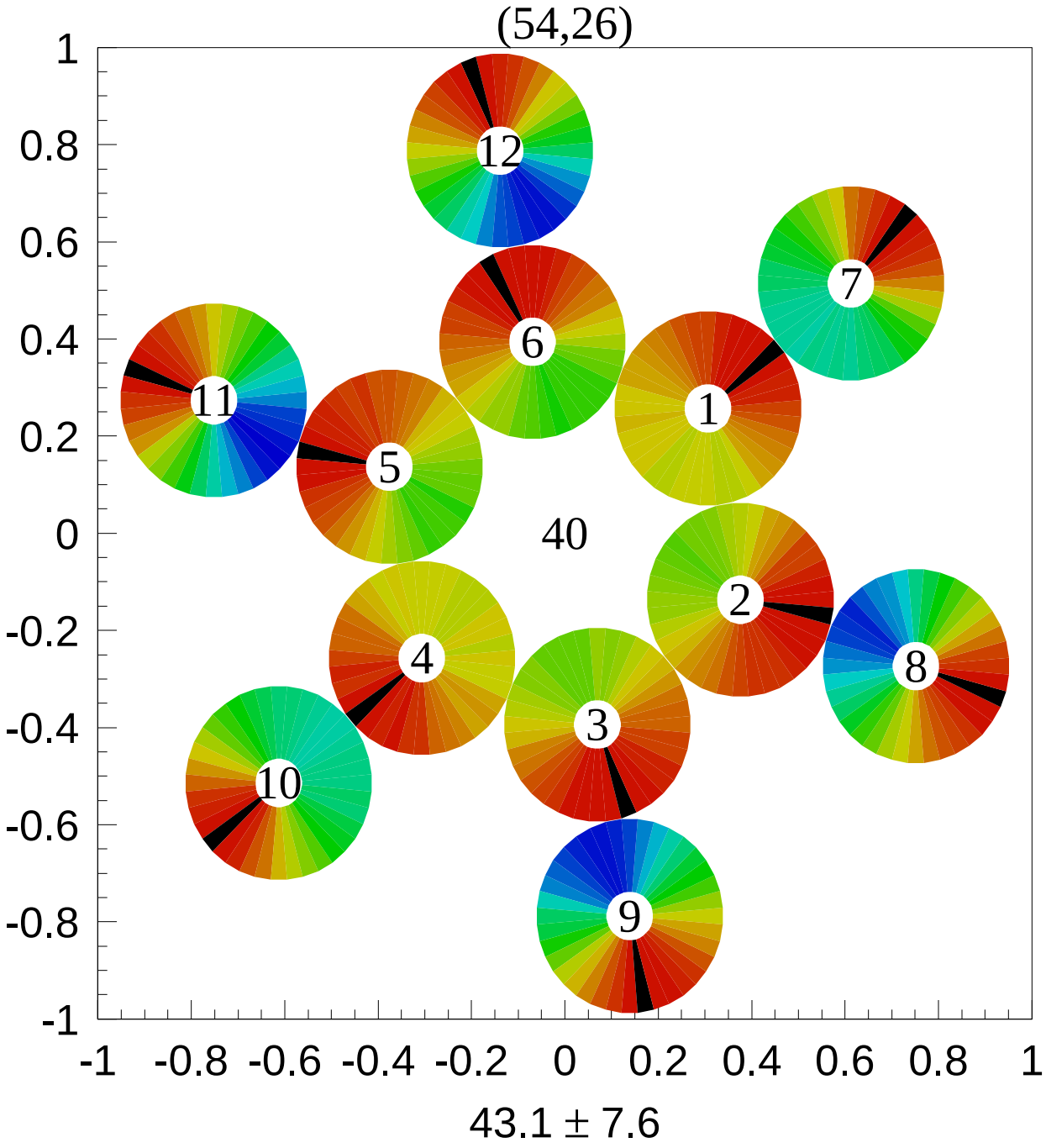

(54,23)
tilted LEDs
122 124 119 113 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 129 122 129 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

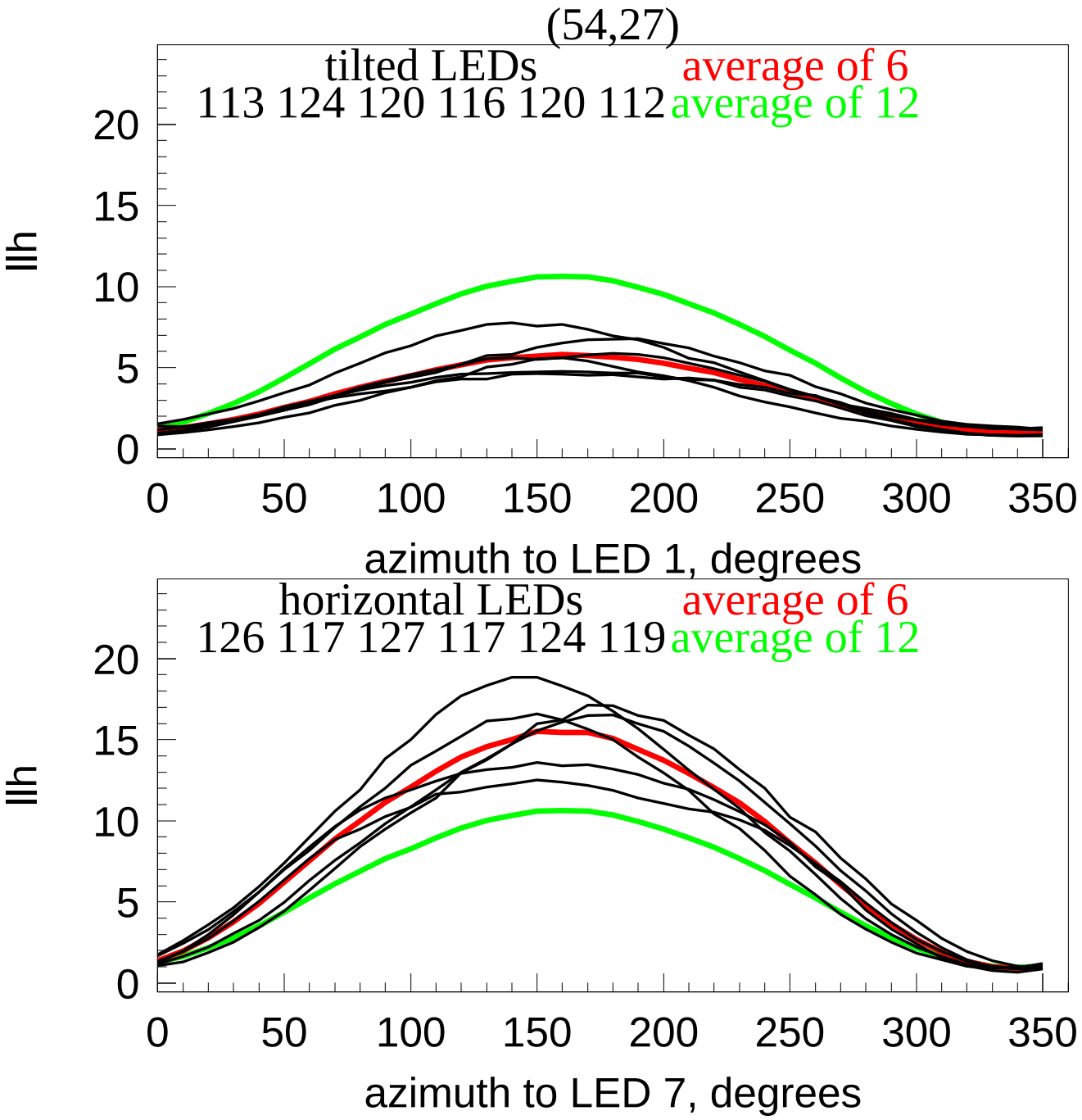

(54,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112.3 ± 5.0

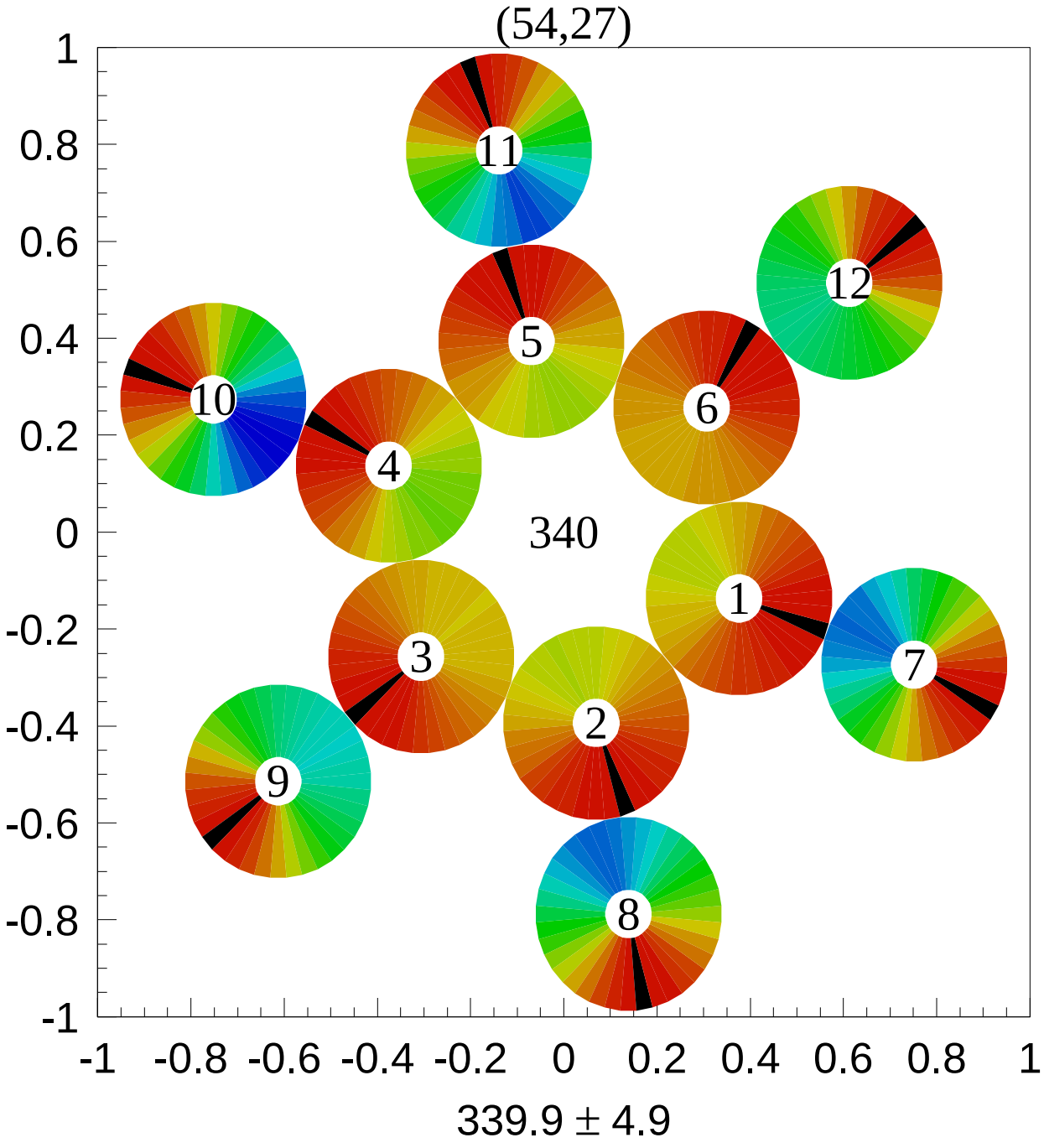

(54,24)
tilted LEDs
117 117 114 114 120 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 117 117 125 124 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

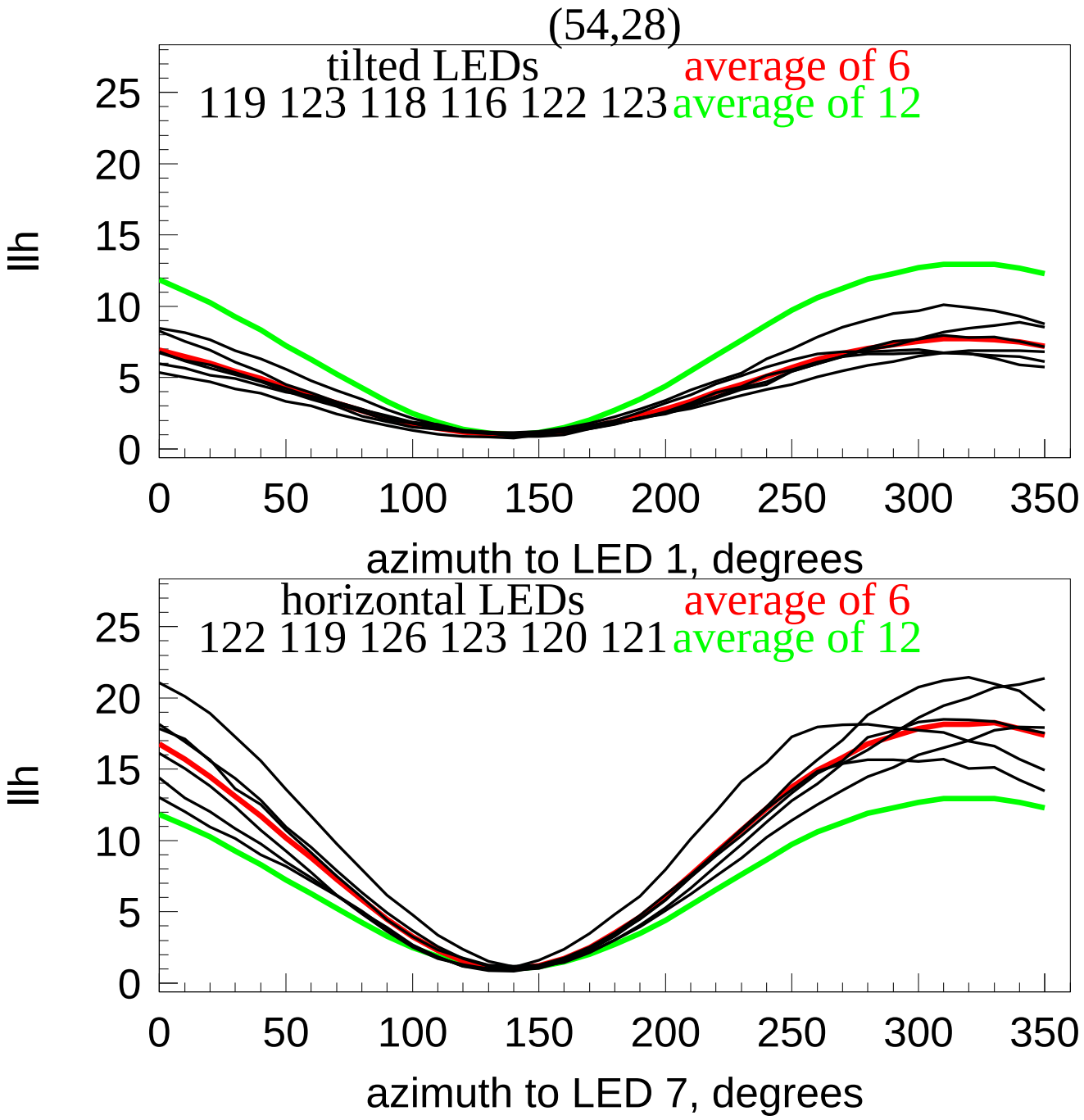

(54,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
7
2
9
1
3
150
6
4
12
5
10
11
146.3 ± 5.5

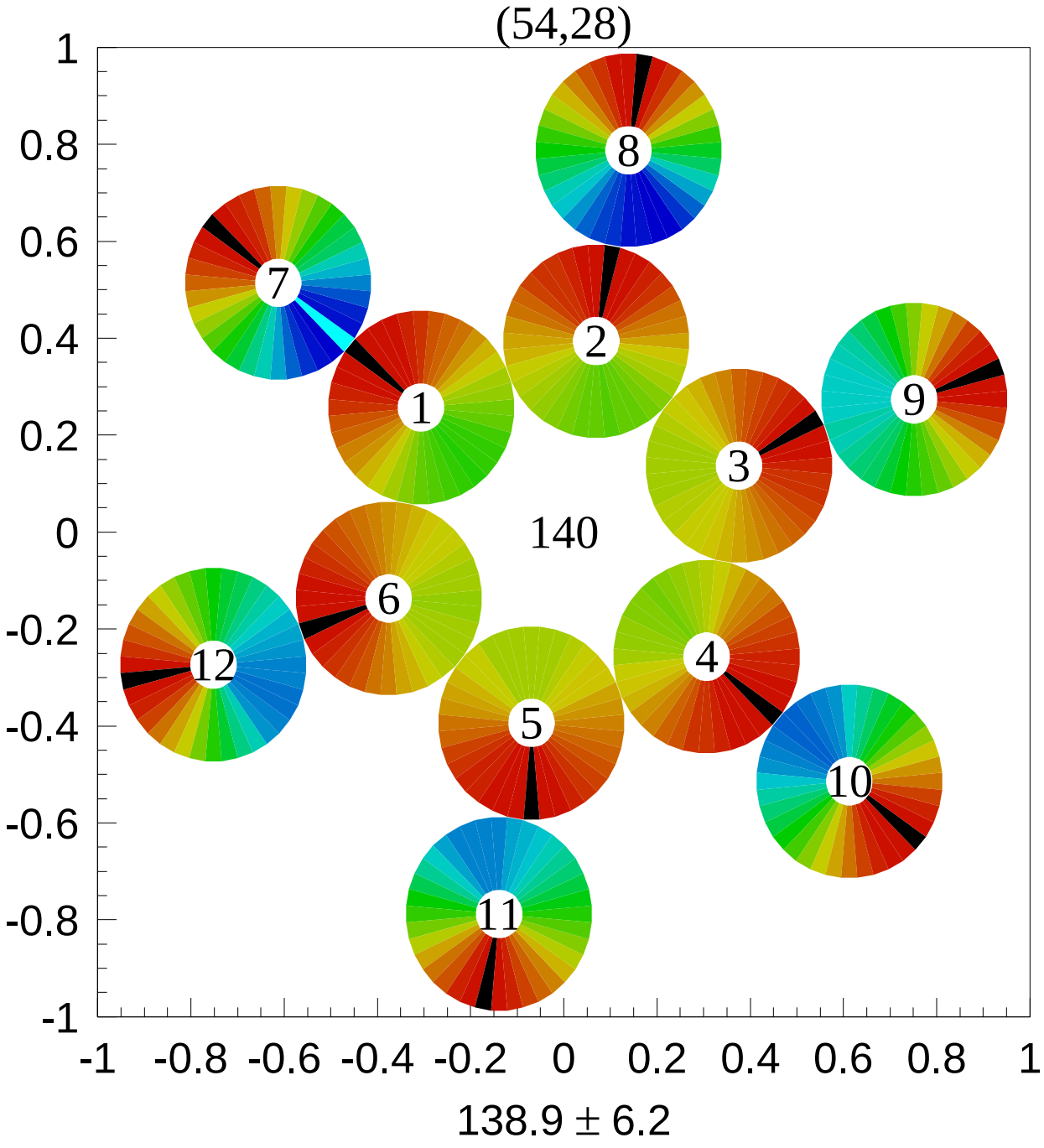

(54,26)
tilted LEDs
116 121 121 123 129 119
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 116 118 120 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

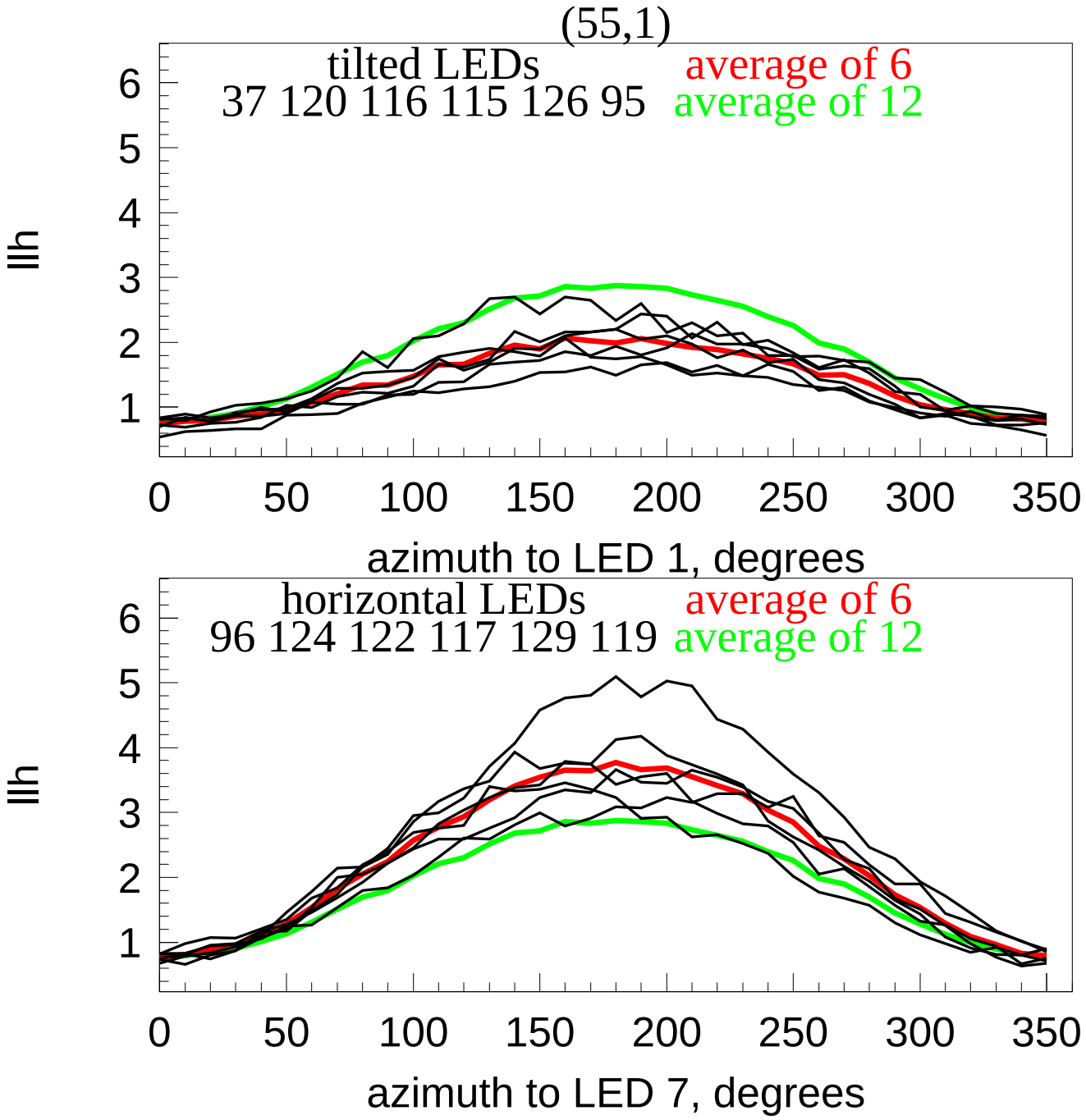

(54,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
43.1 ± 7.6

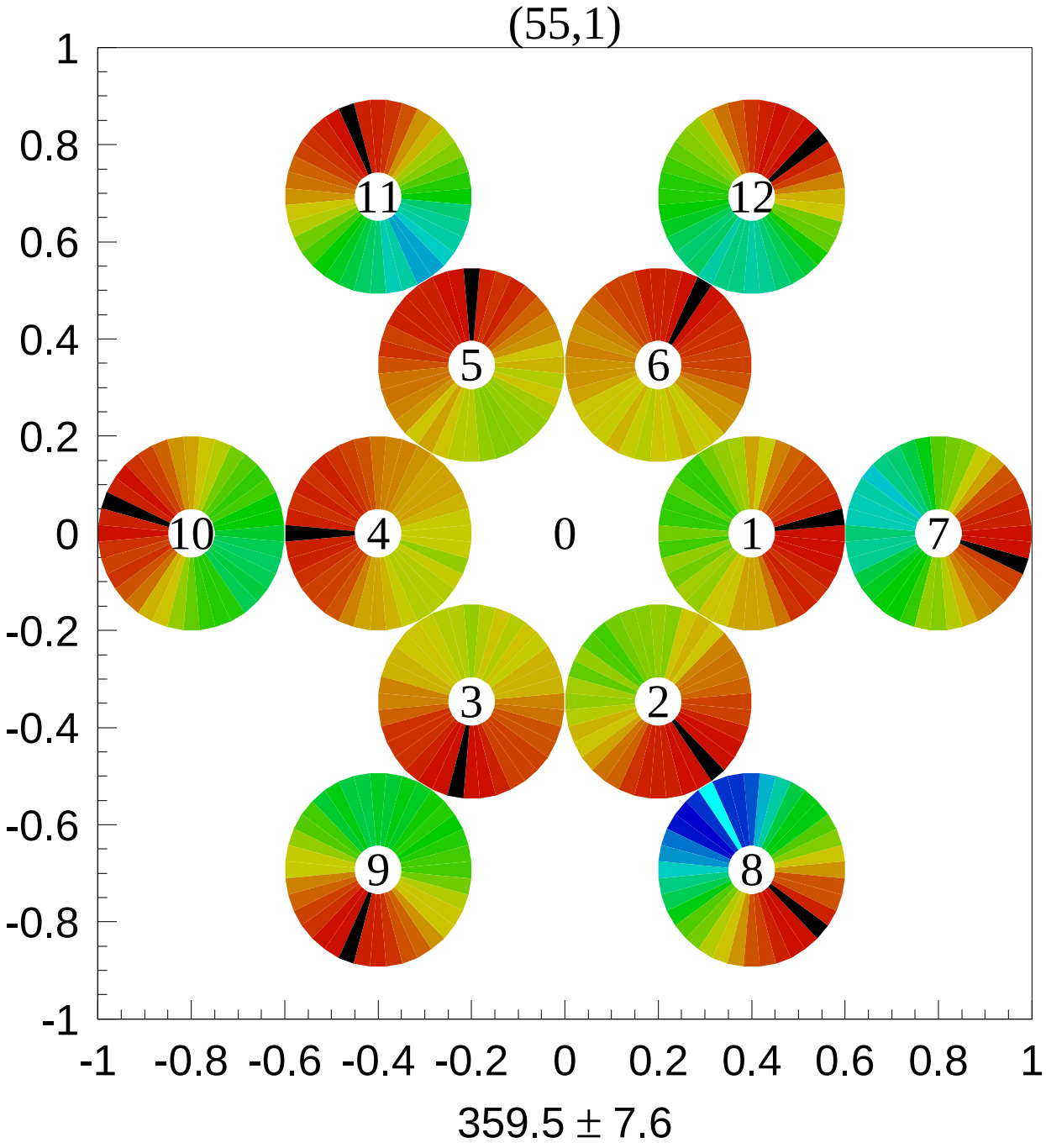

(54,27)
tilted LEDs
113 124 120 116 120 112
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 117 127 117 124 119
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

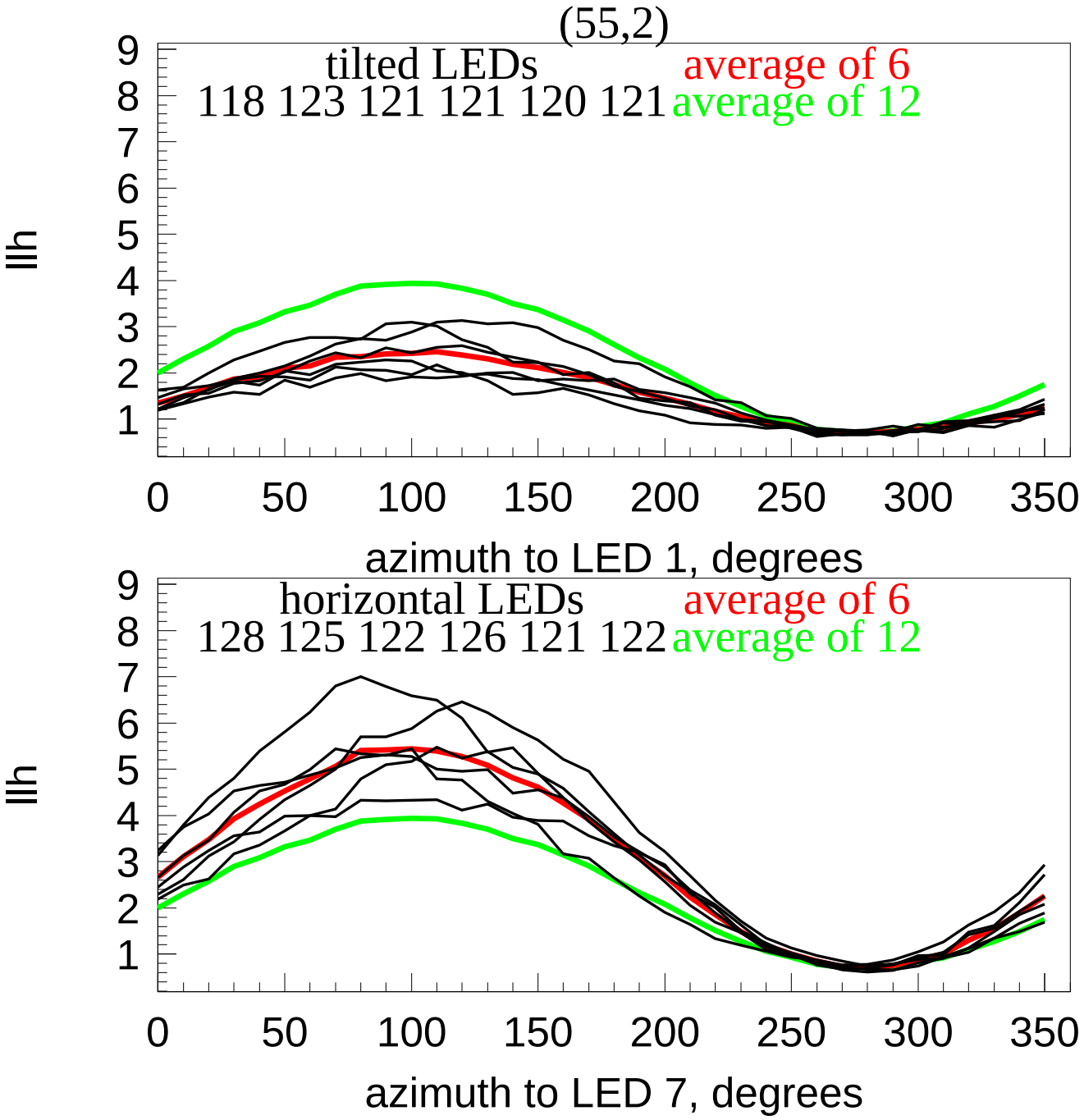

(54,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
339.9 ± 4.9

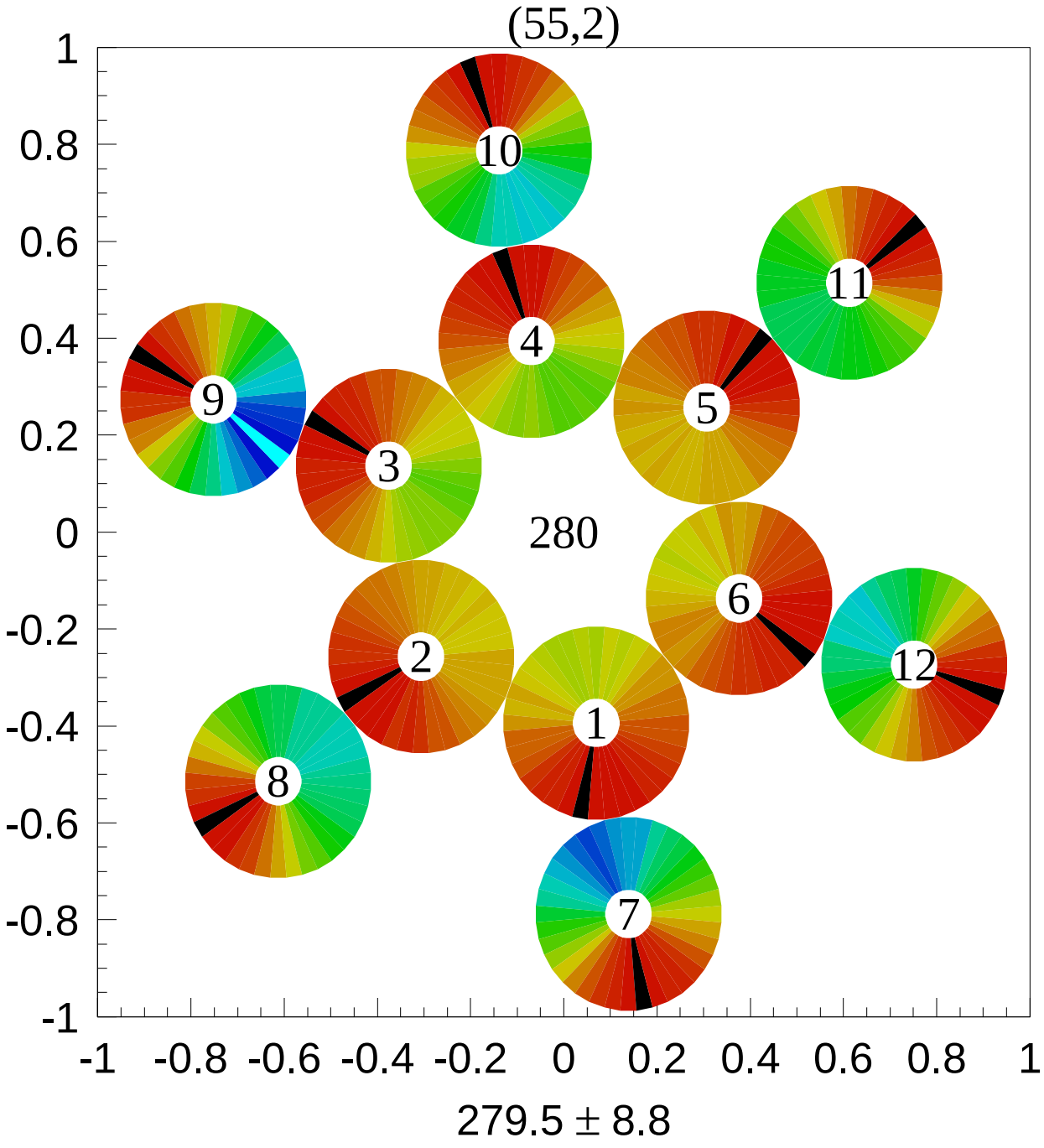

(54,28)
tilted LEDs
119 123 118 116 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 126 123 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

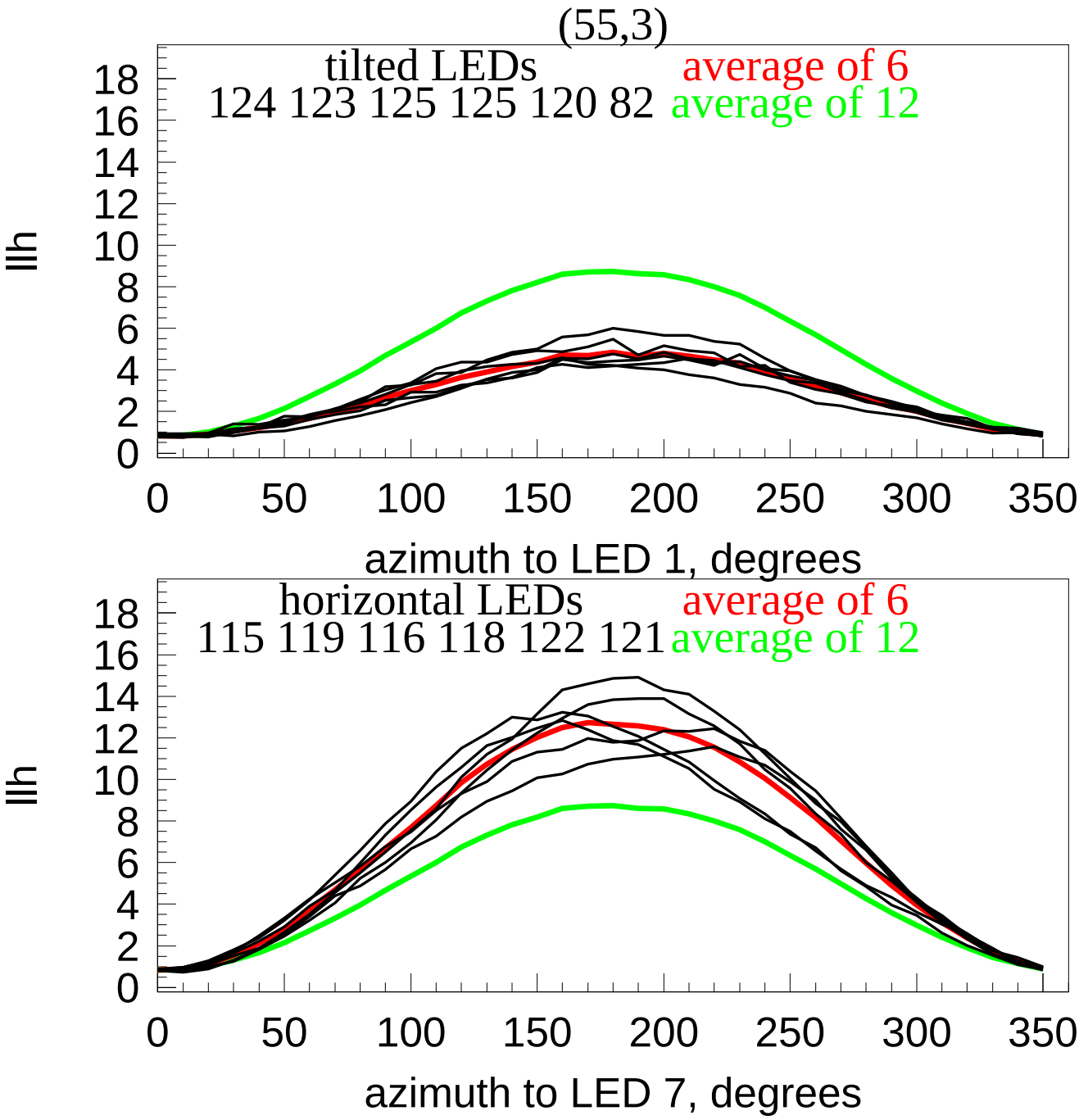

(54,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
138.9 ± 6.2
140
1
2
3
4
5
6
7
8
9
10
11
12

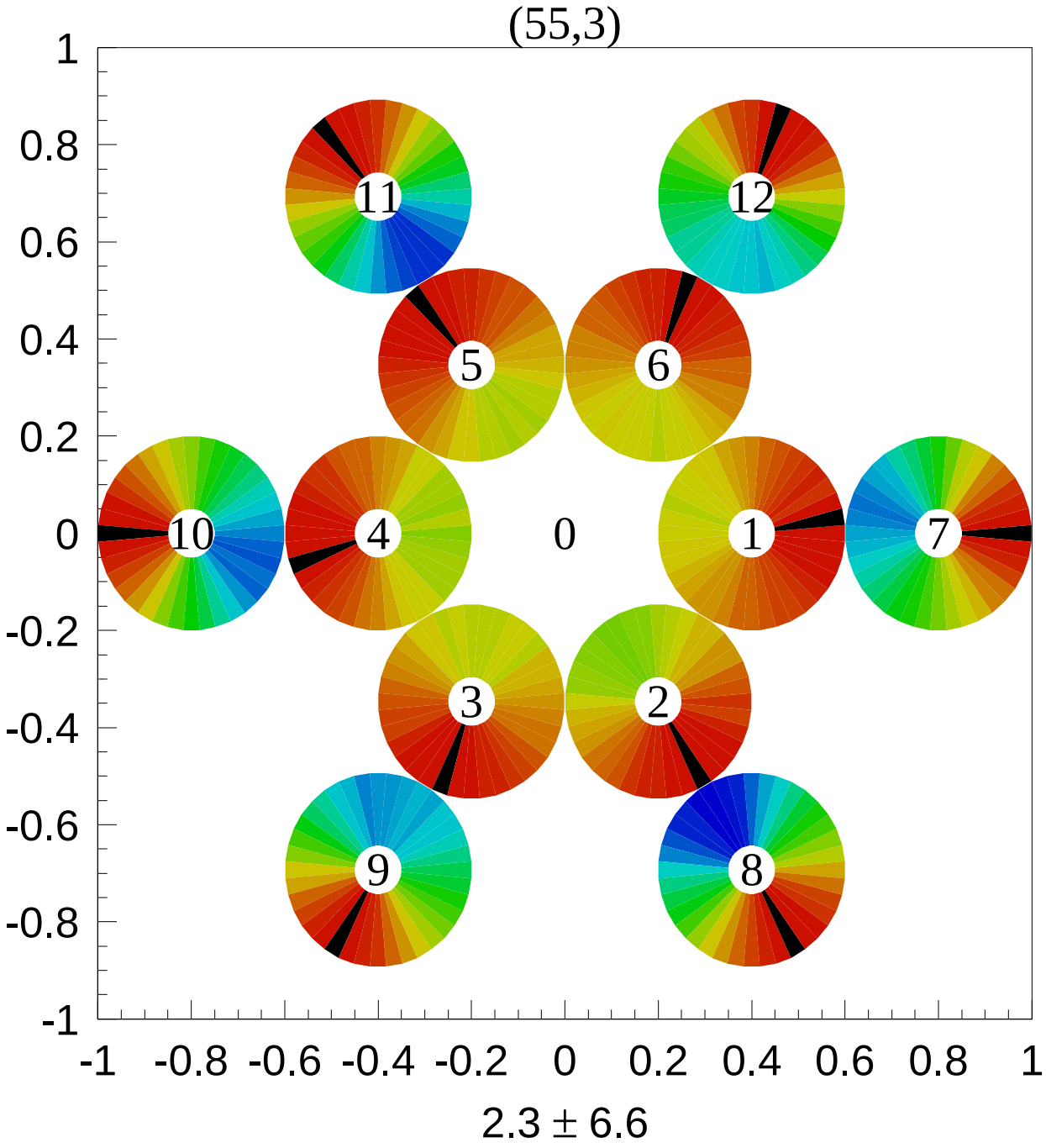

(55,1)
tilted LEDs
37 120 116 115 126 95
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
96 124 122 117 129 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

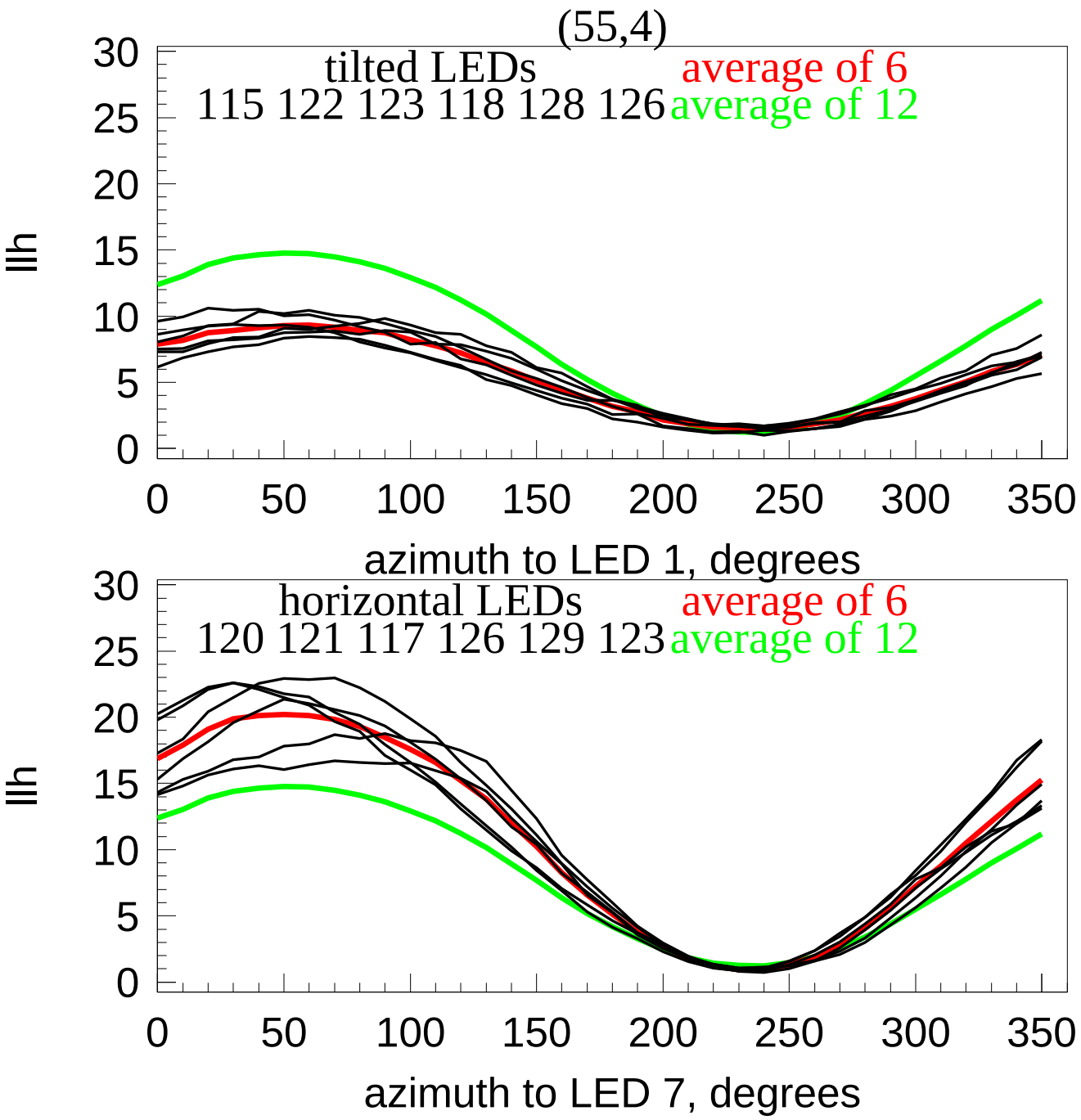

(55,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.5 ± 7.6

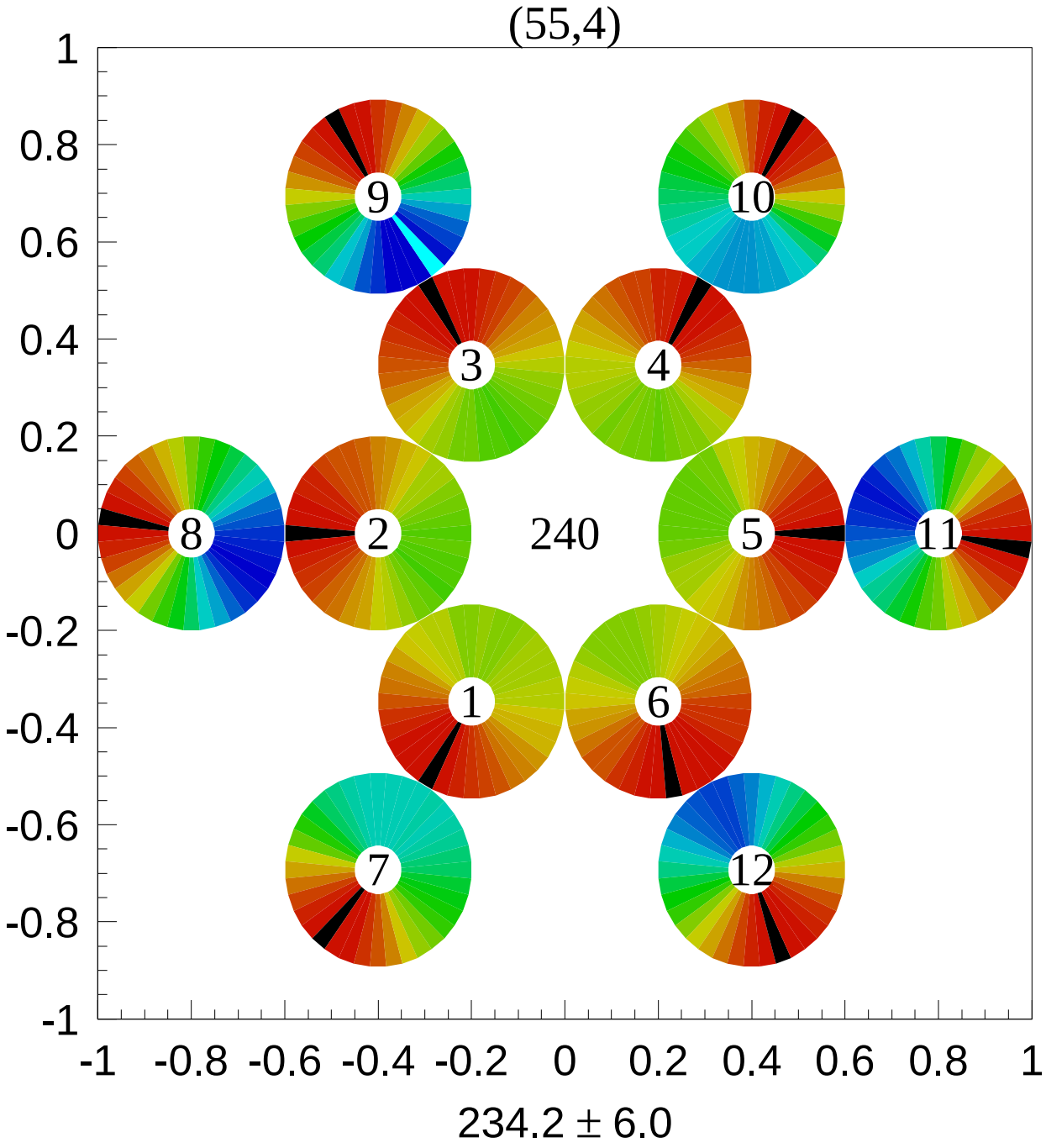

(55,2)
tilted LEDs
118 123 121 121 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 125 122 126 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

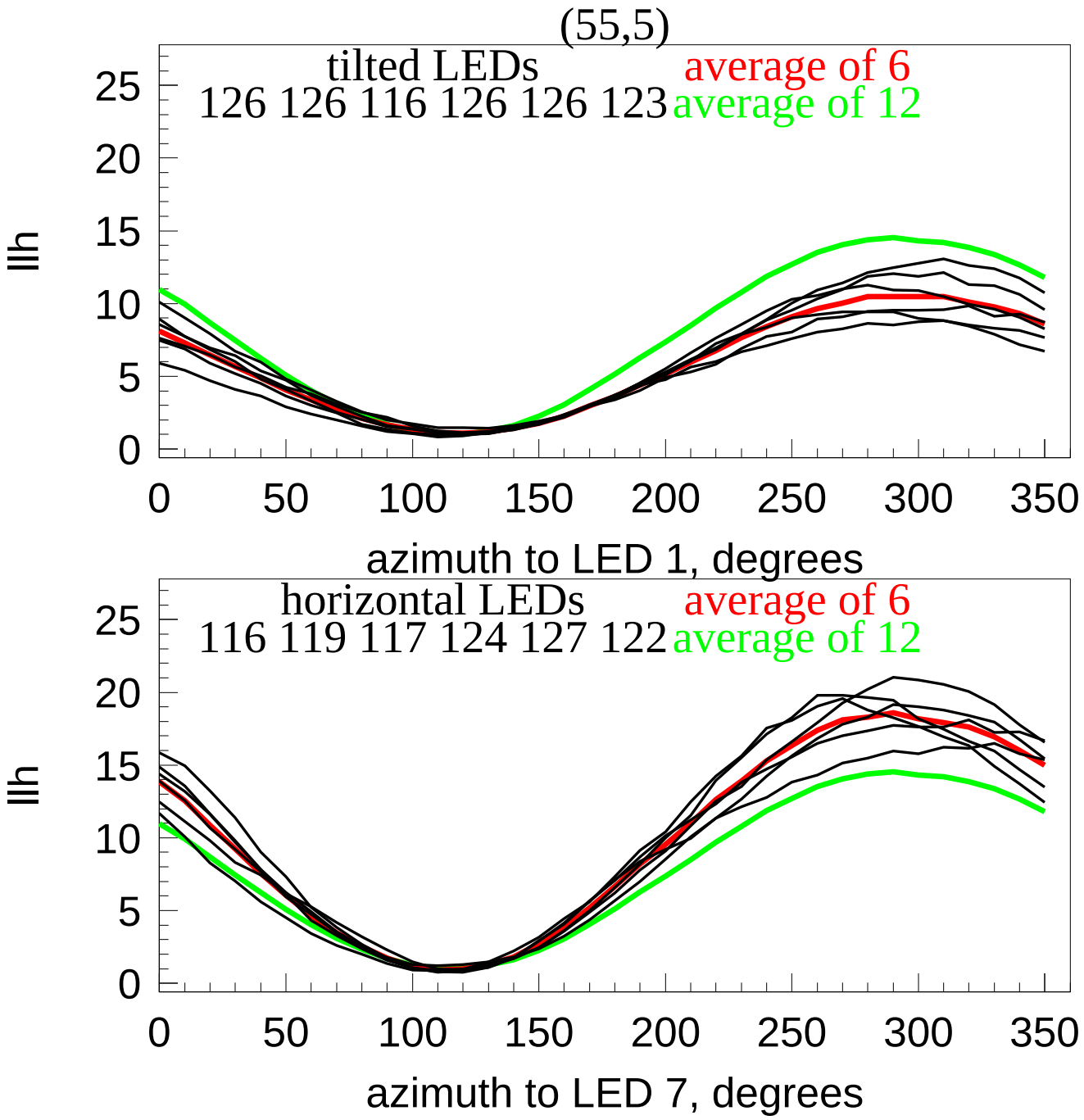

(55,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
279.5 ± 8.8

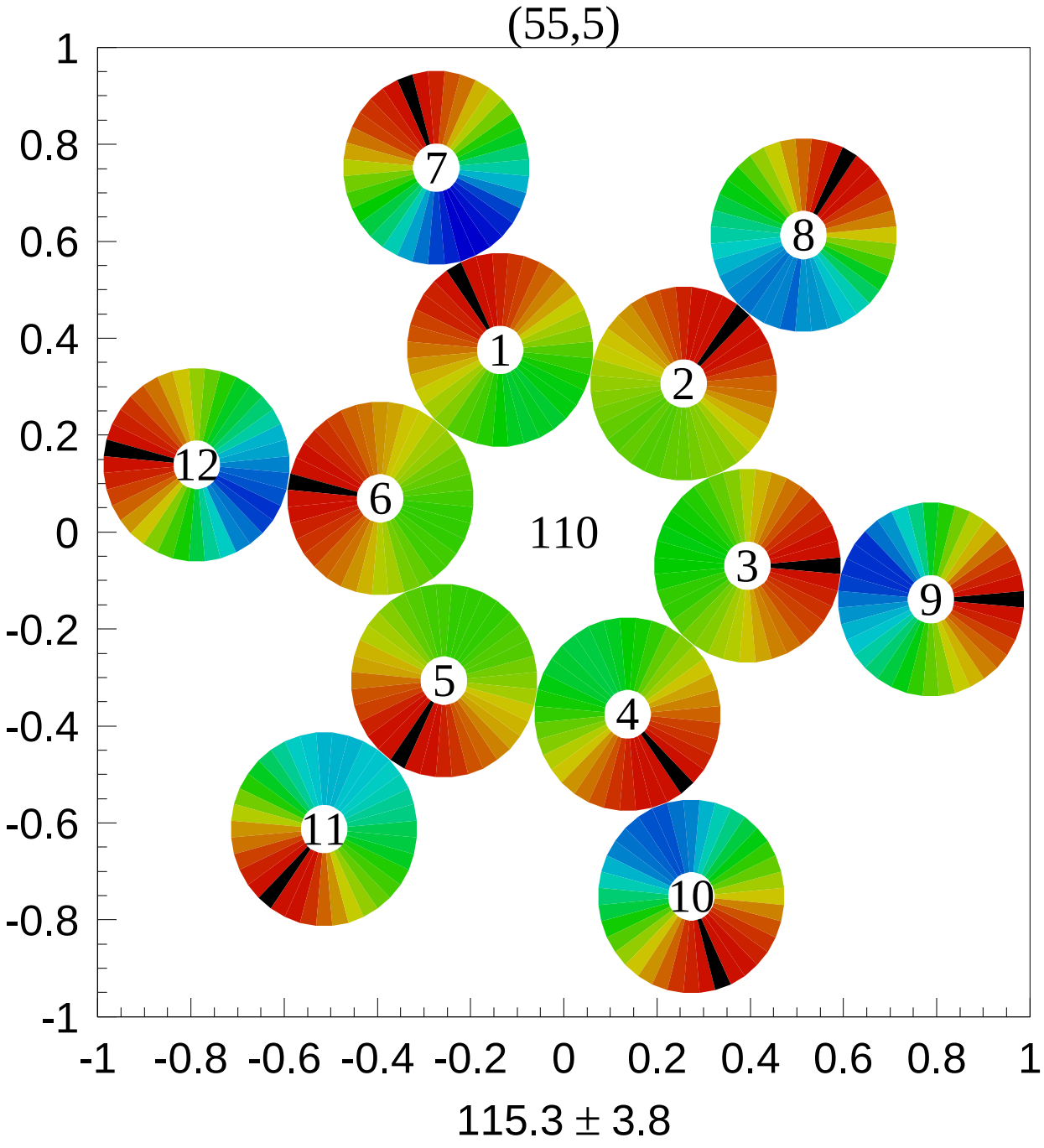

(55,3)
tilted LEDs
124 123 125 125 120 82
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 119 116 118 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

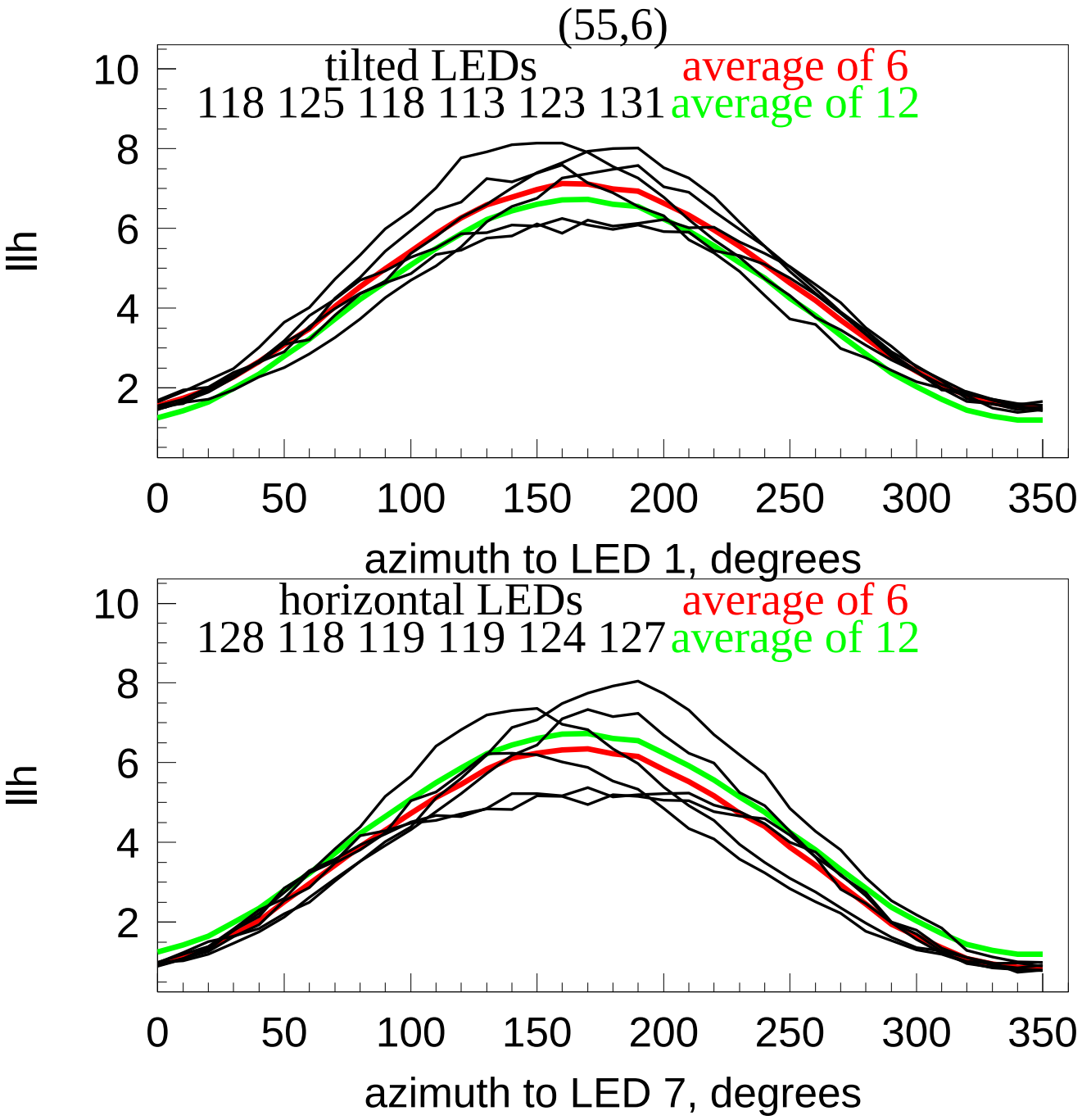

(55,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
2.3 ± 6.6
11
12
5
6
10
4
0
1
7
3
2
9
8

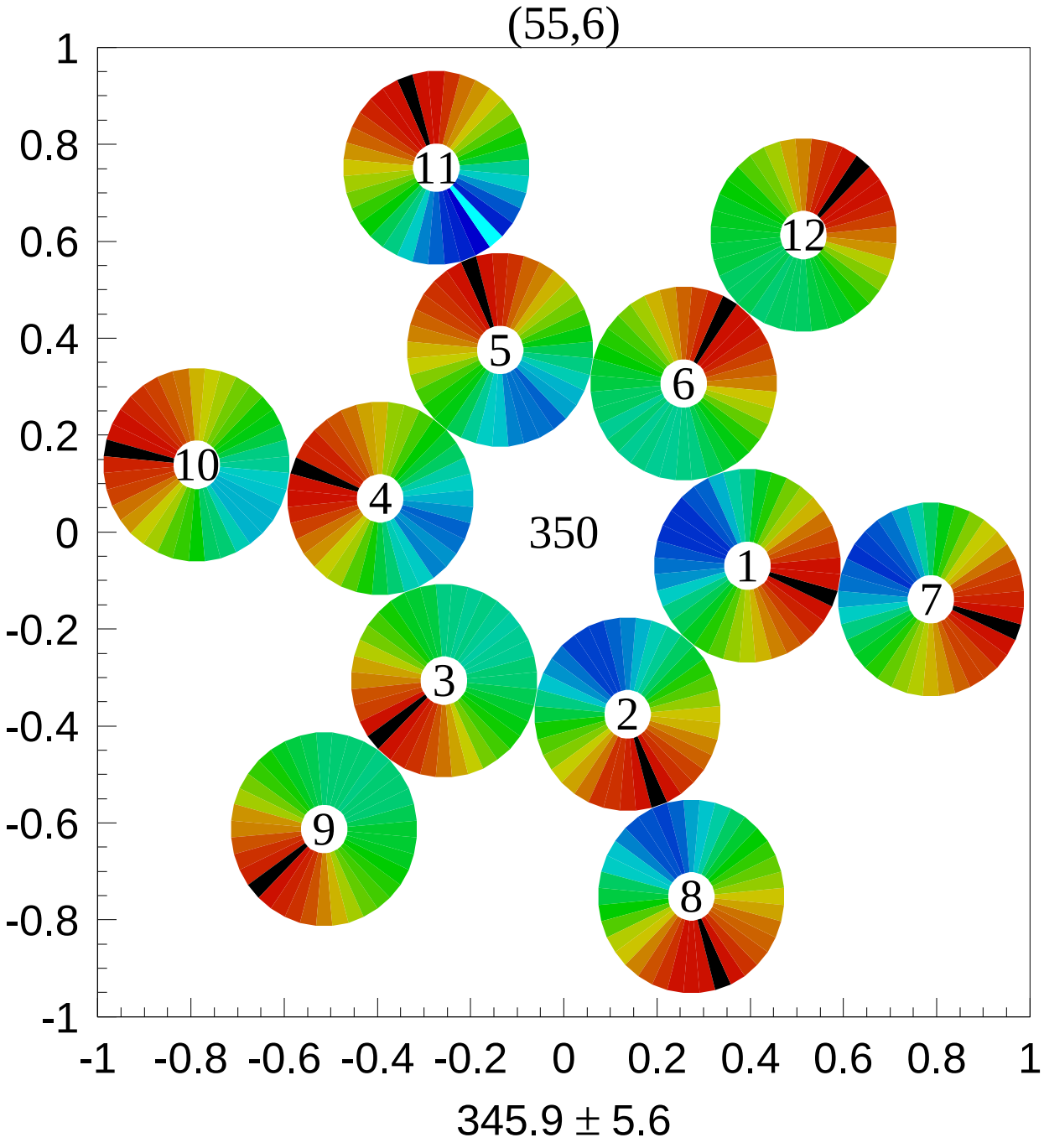

(55,4)
tilted LEDs
115 122 123 118 128 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 117 126 129 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

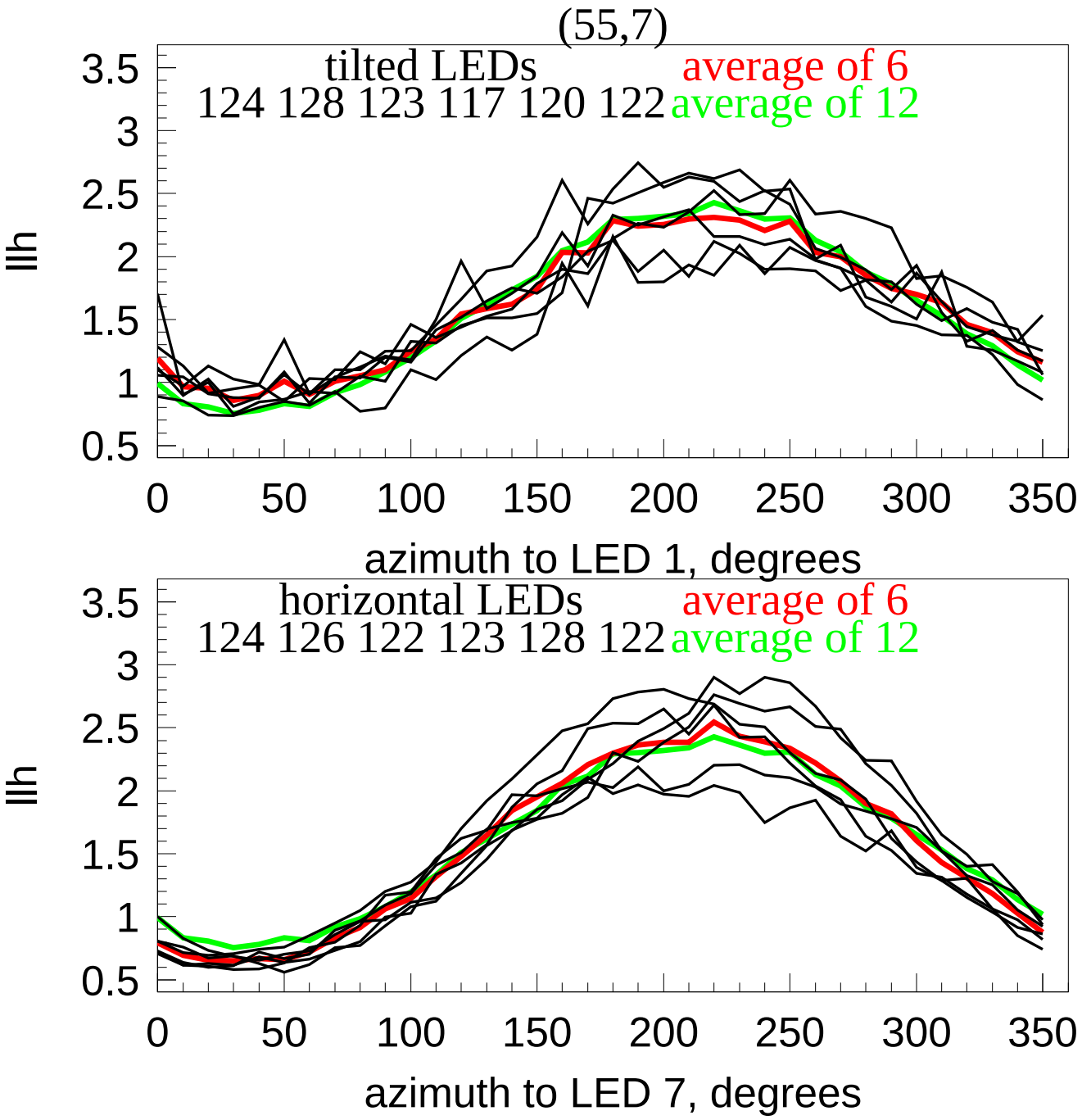

(55,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
234.2 ± 6.0

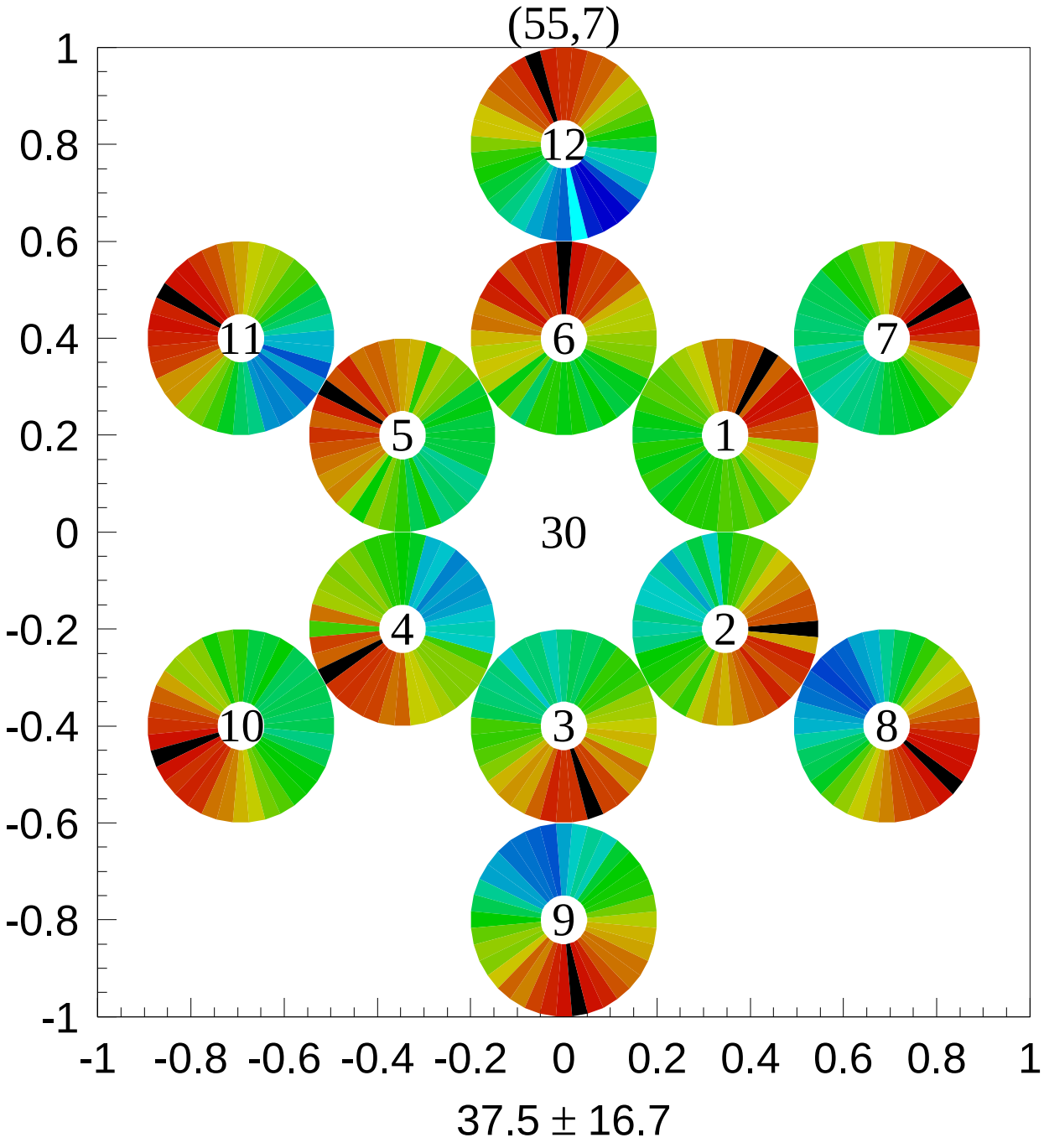

(55,5)
tilted LEDs
126 126 116 126 126 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 119 117 124 127 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

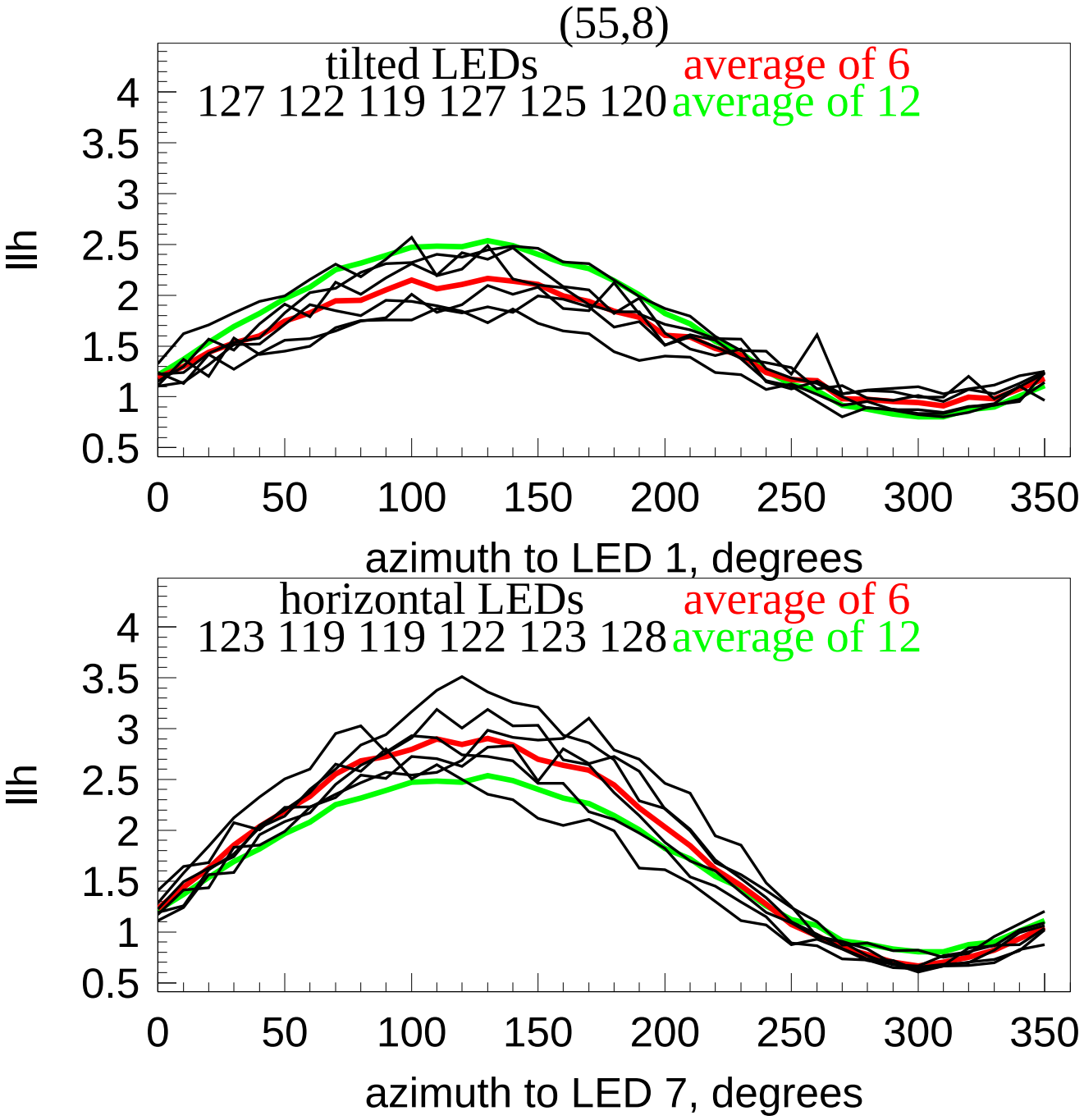

(55,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
115.3 ± 3.8

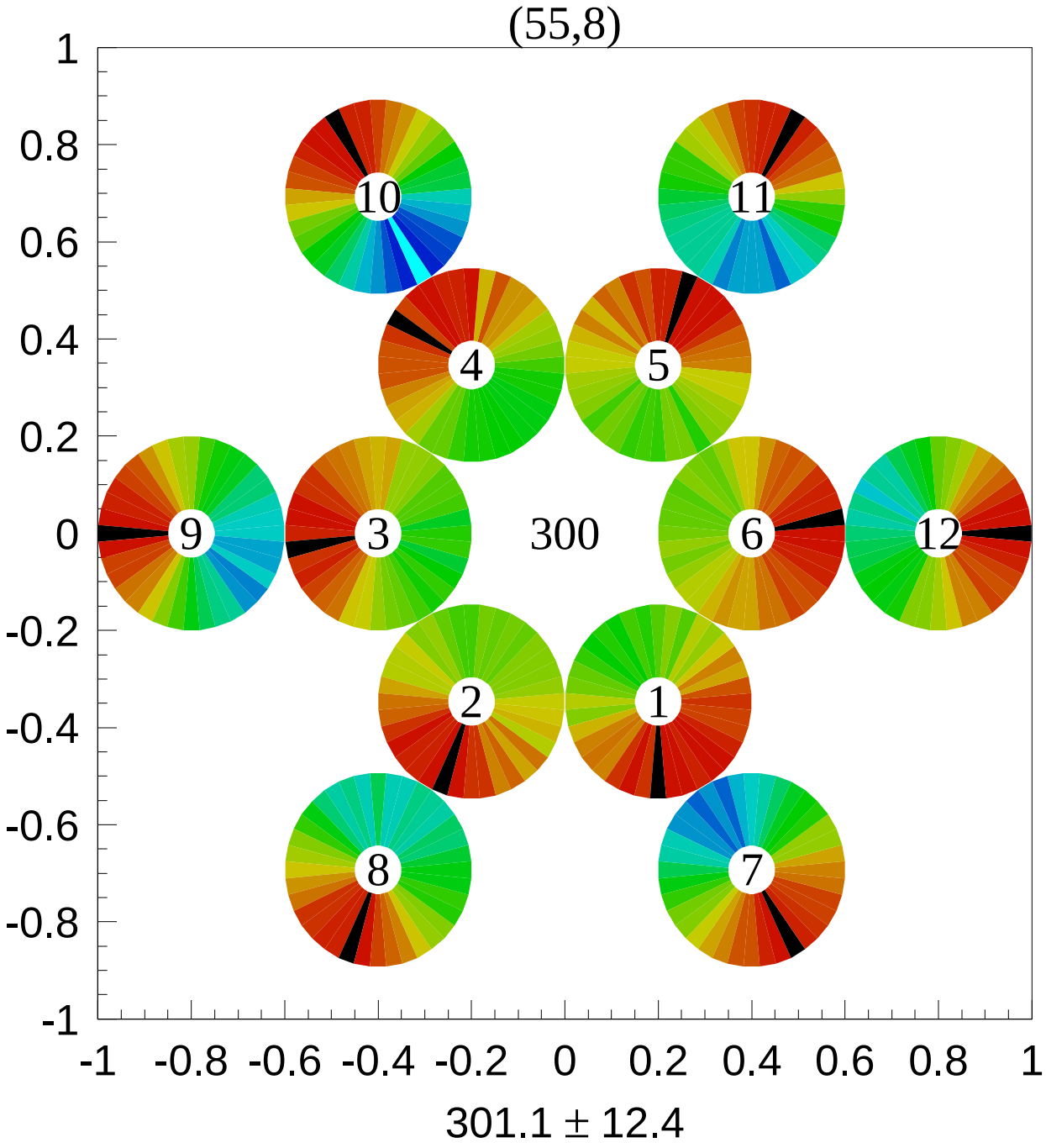

(55,6)
tilted LEDs
118 125 118 113 123 131
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 118 119 119 124 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

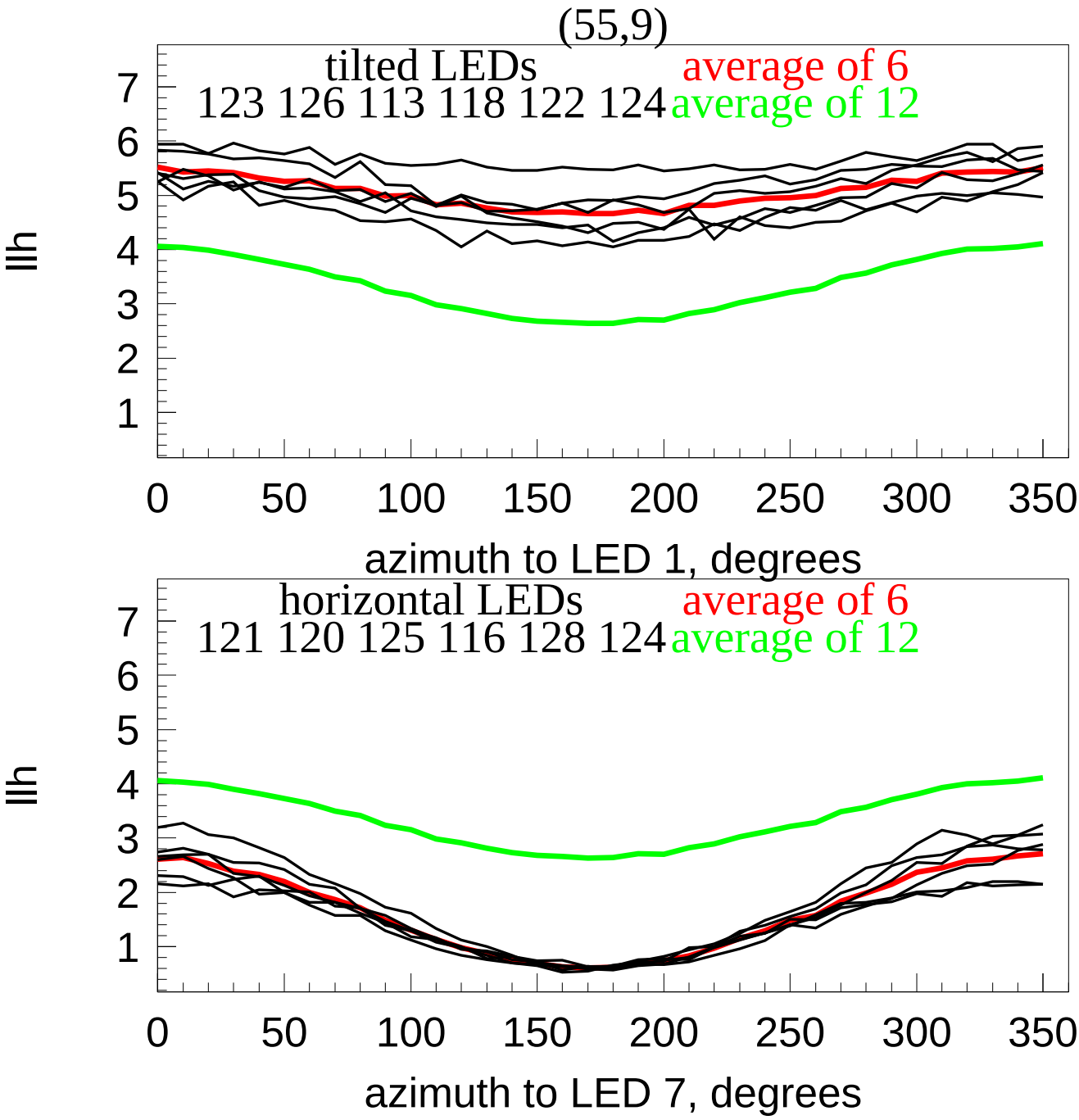

(55,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
345.9 ± 5.6

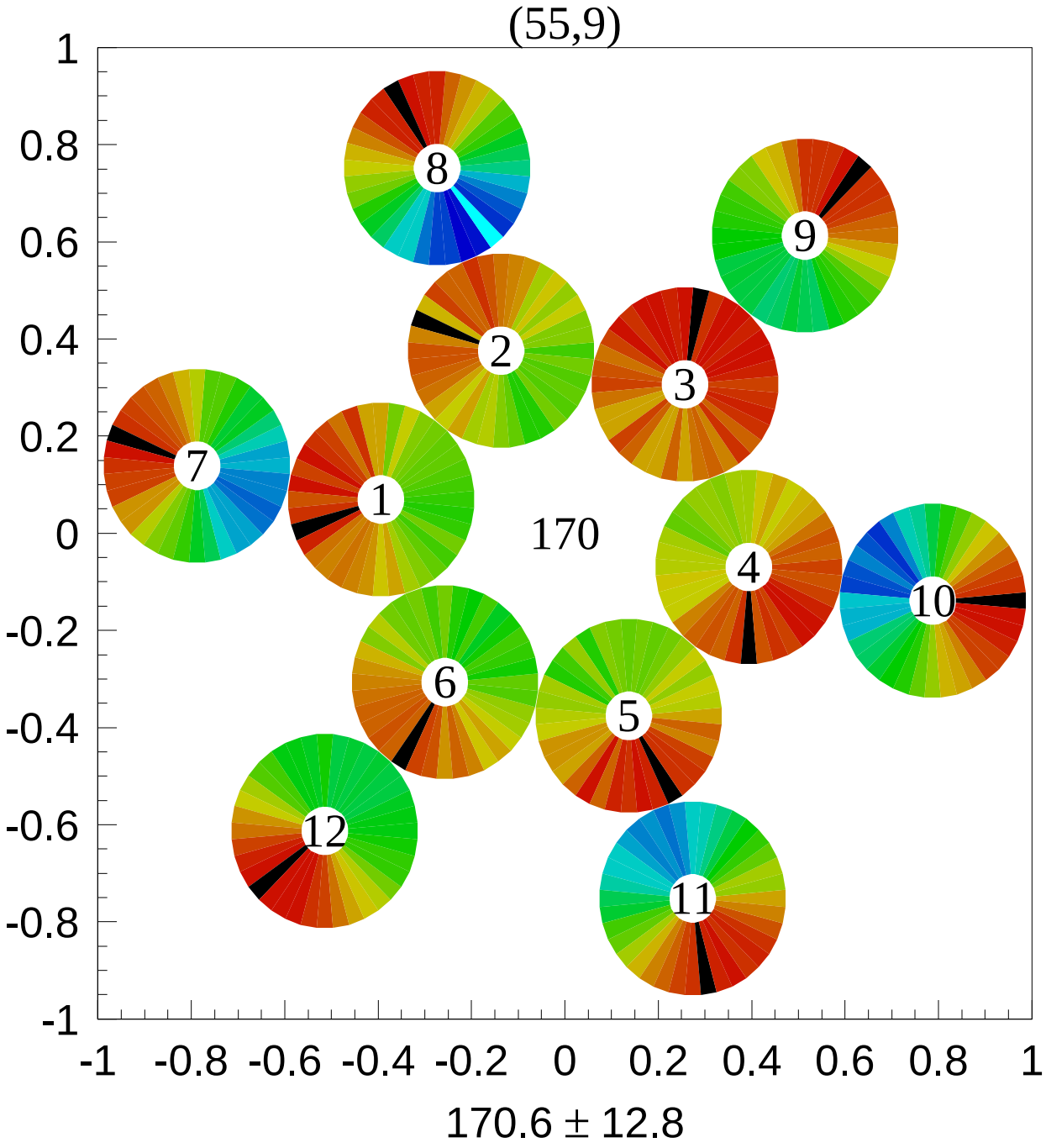

(55,7)
tilted LEDs
124 128 123 117 120 122
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 126 122 123 128 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

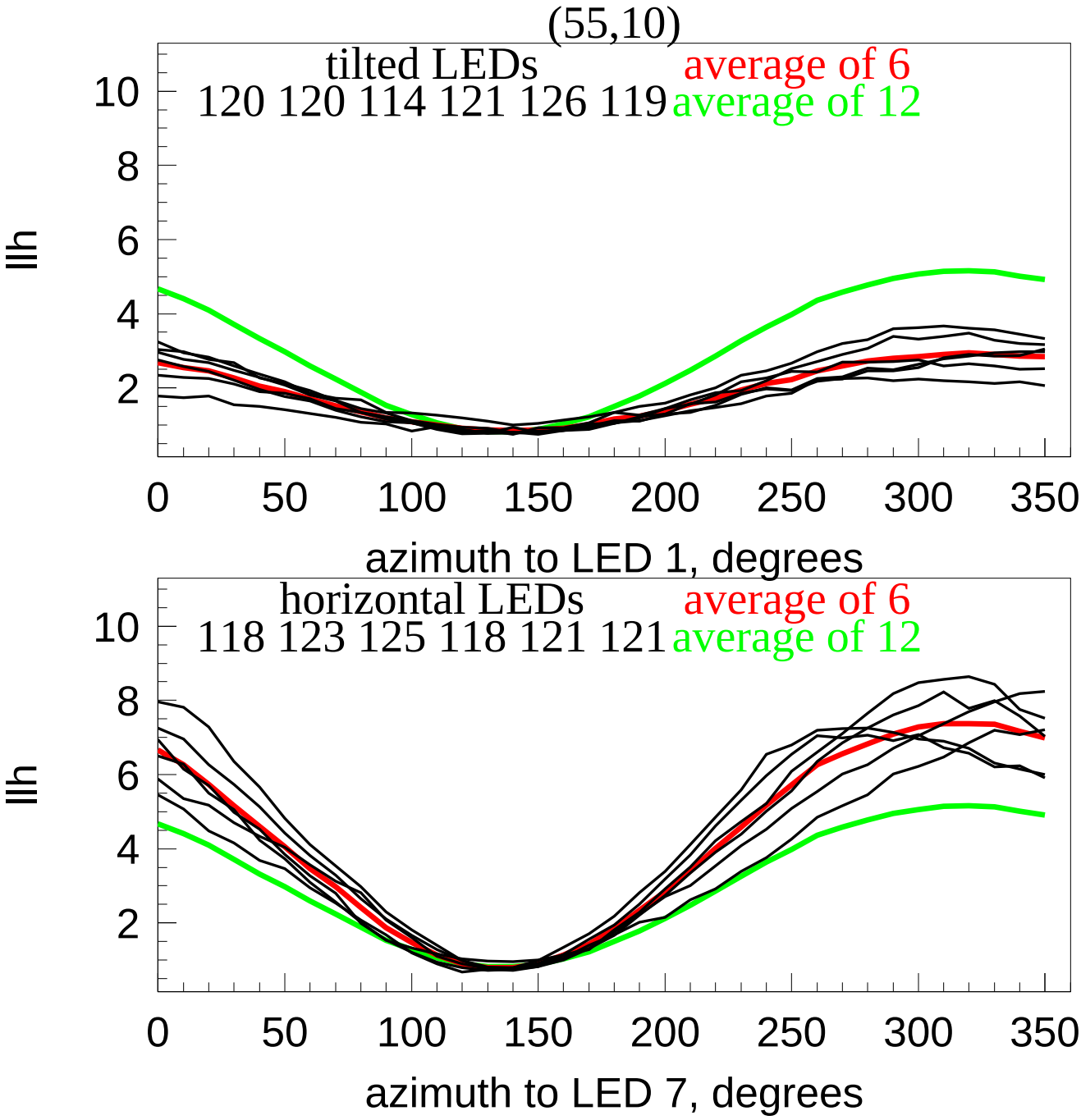

(55,7)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
37.5 ± 16.7

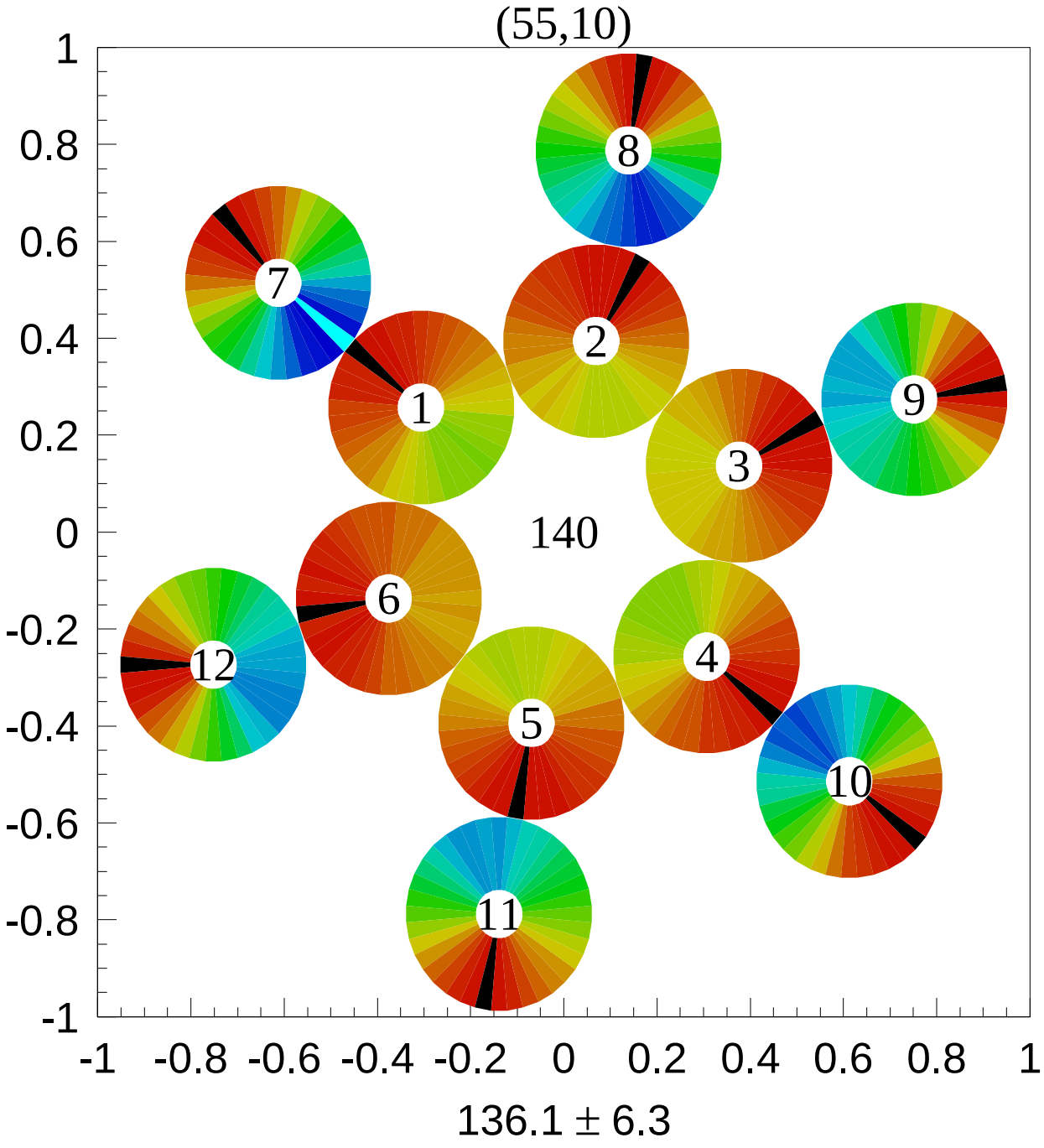

(55,8)
tilted LEDs
127 122 119 127 125 120
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
123 119 119 122 123 128
average of 6
average of 12
IIh
azimuth to LED 7, degrees

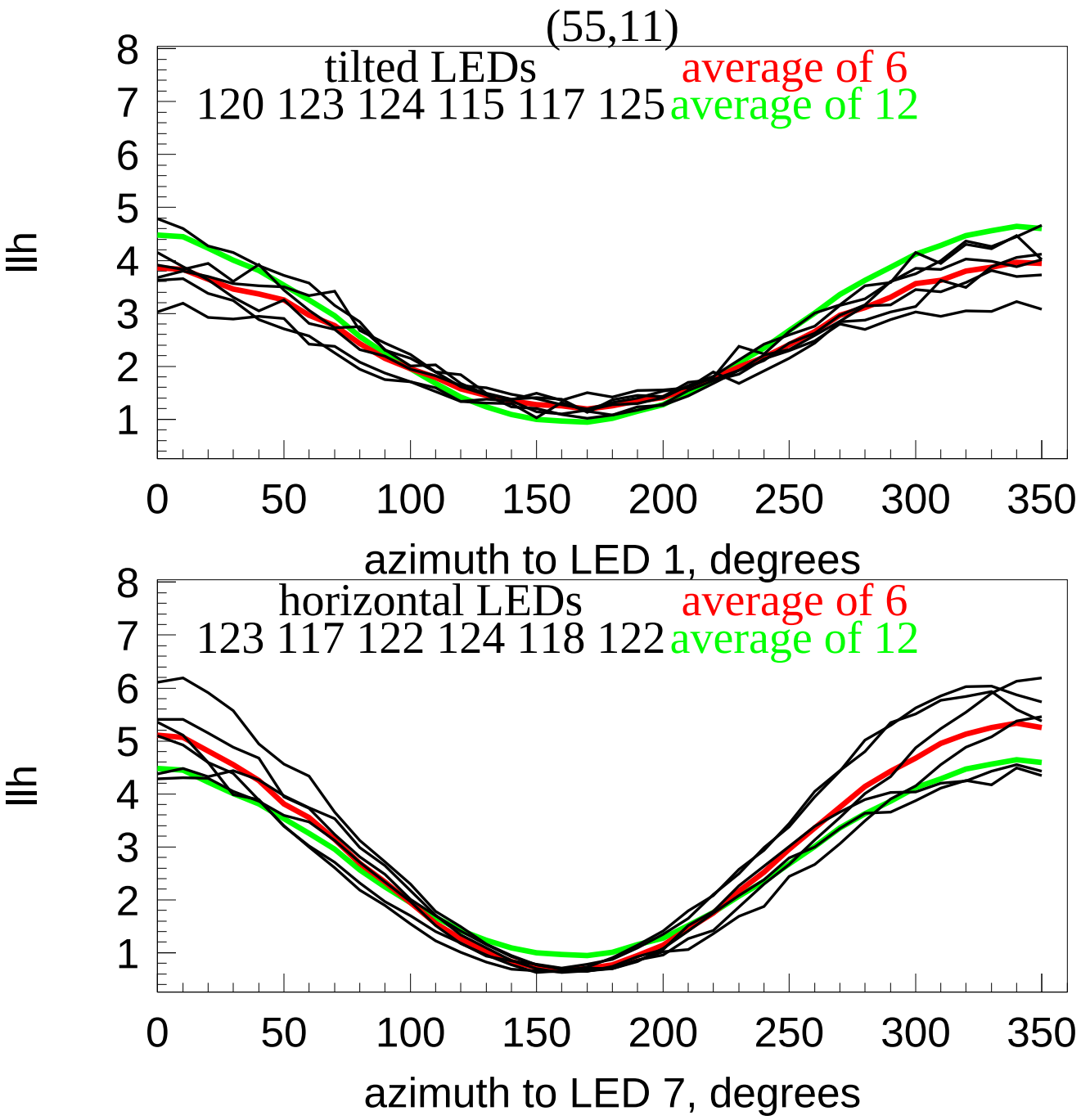

(55,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
301.1 ± 12.4

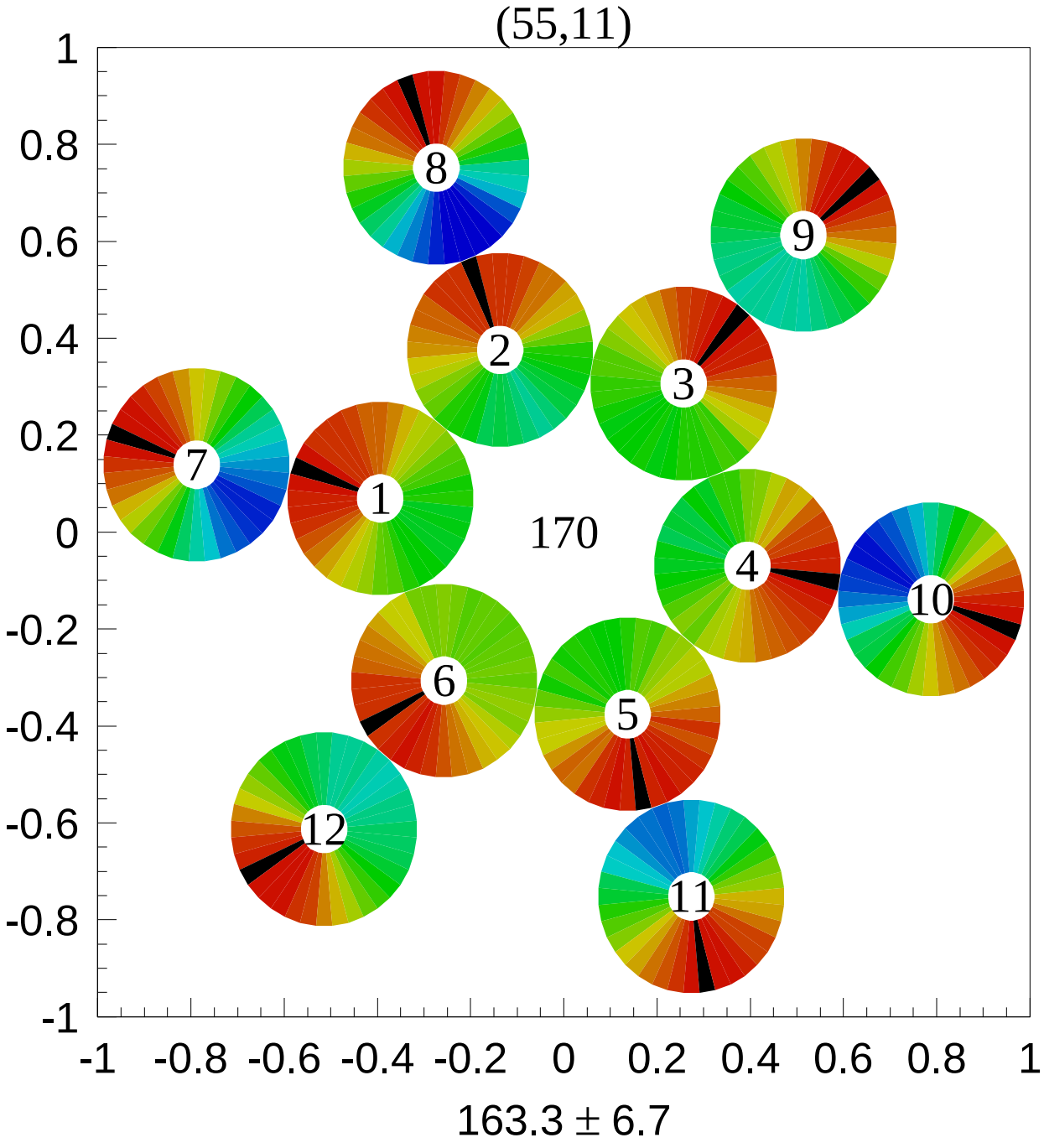

(55,9)
tilted LEDs
123 126 113 118 122 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 125 116 128 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

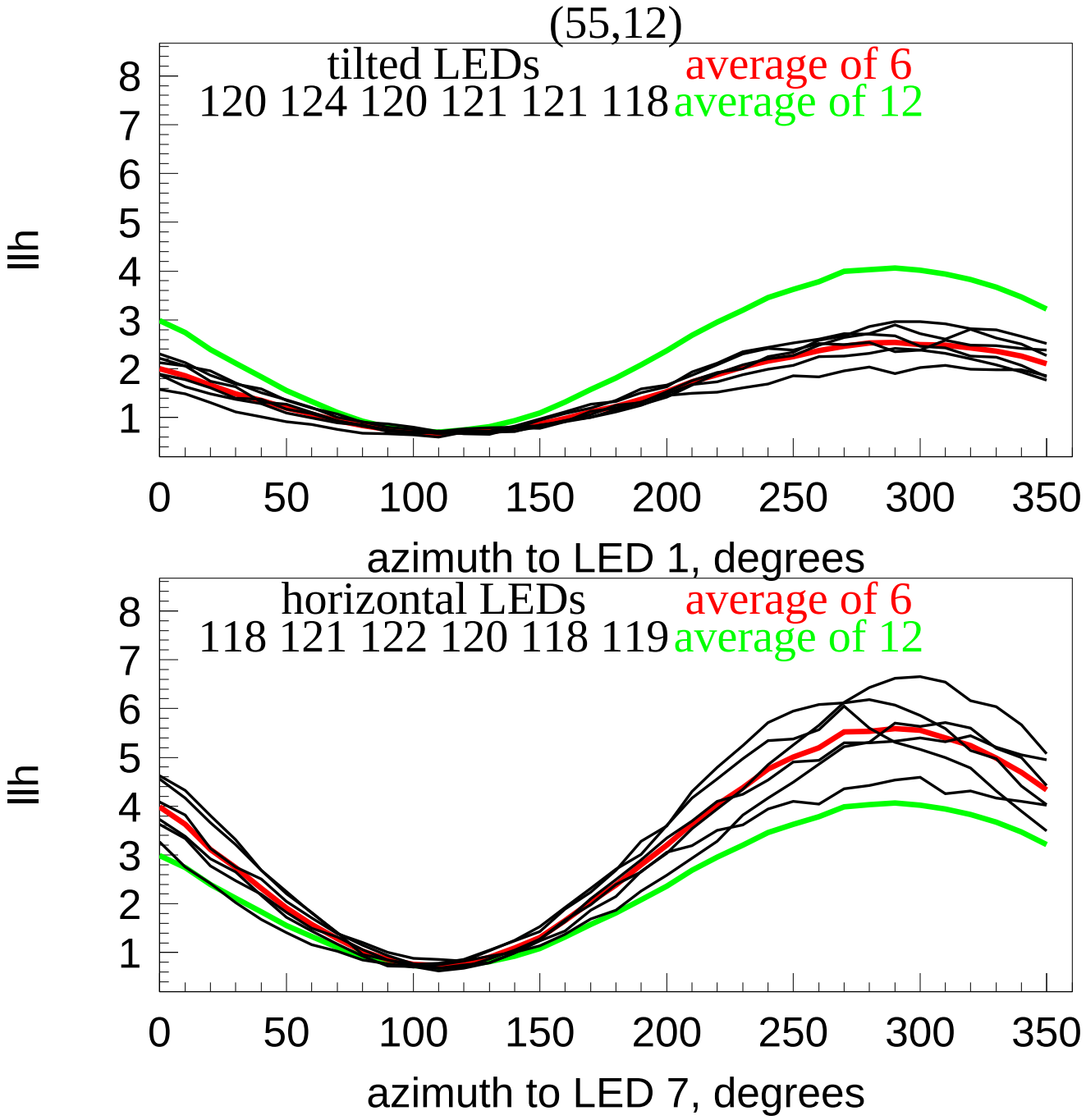

(55,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
170
8
9
2
3
7
1
4
10
6
5
12
11
170.6 ± 12.8

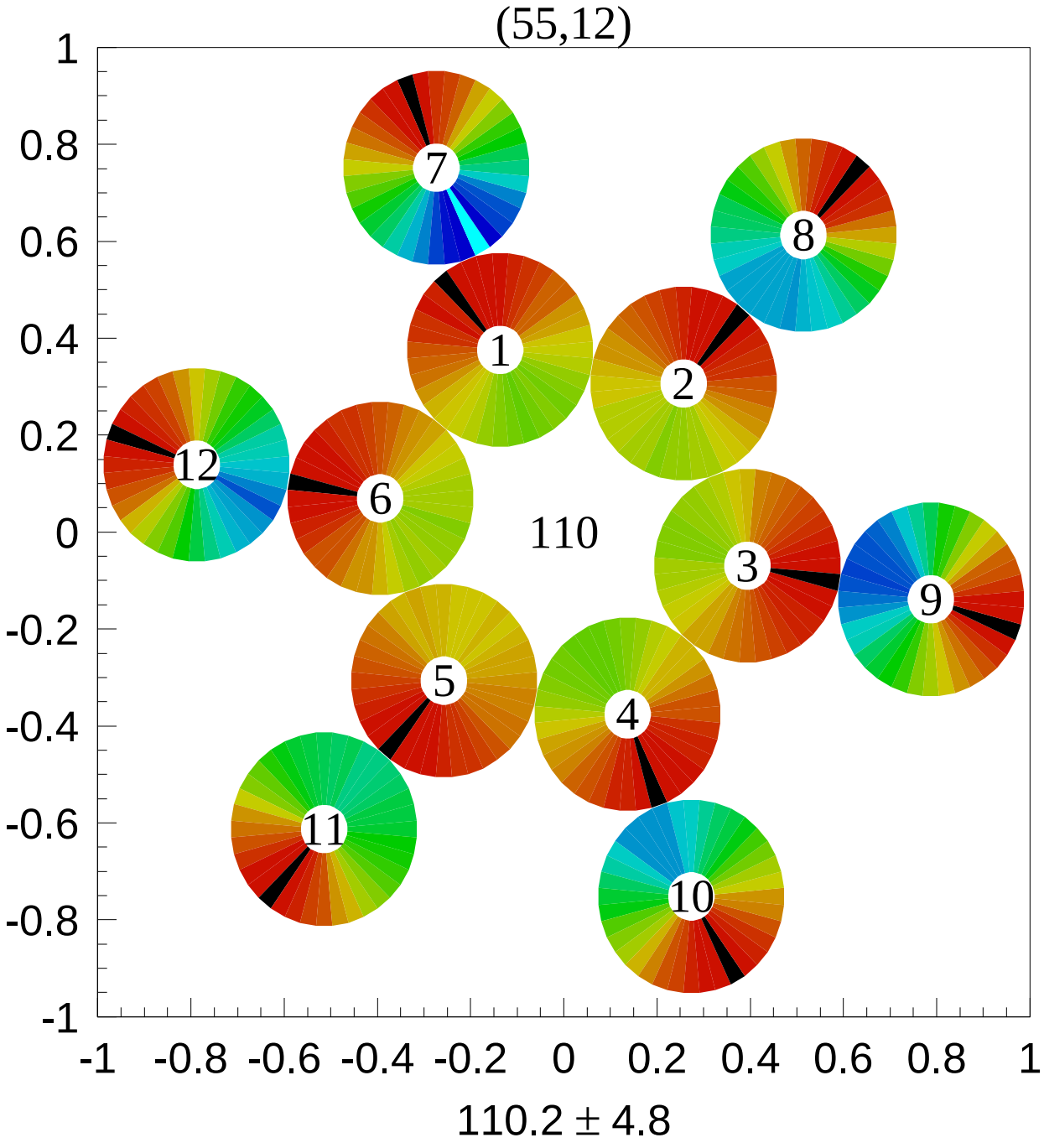

(55,10)
tilted LEDs
120 120 114 121 126 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 123 125 118 121 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

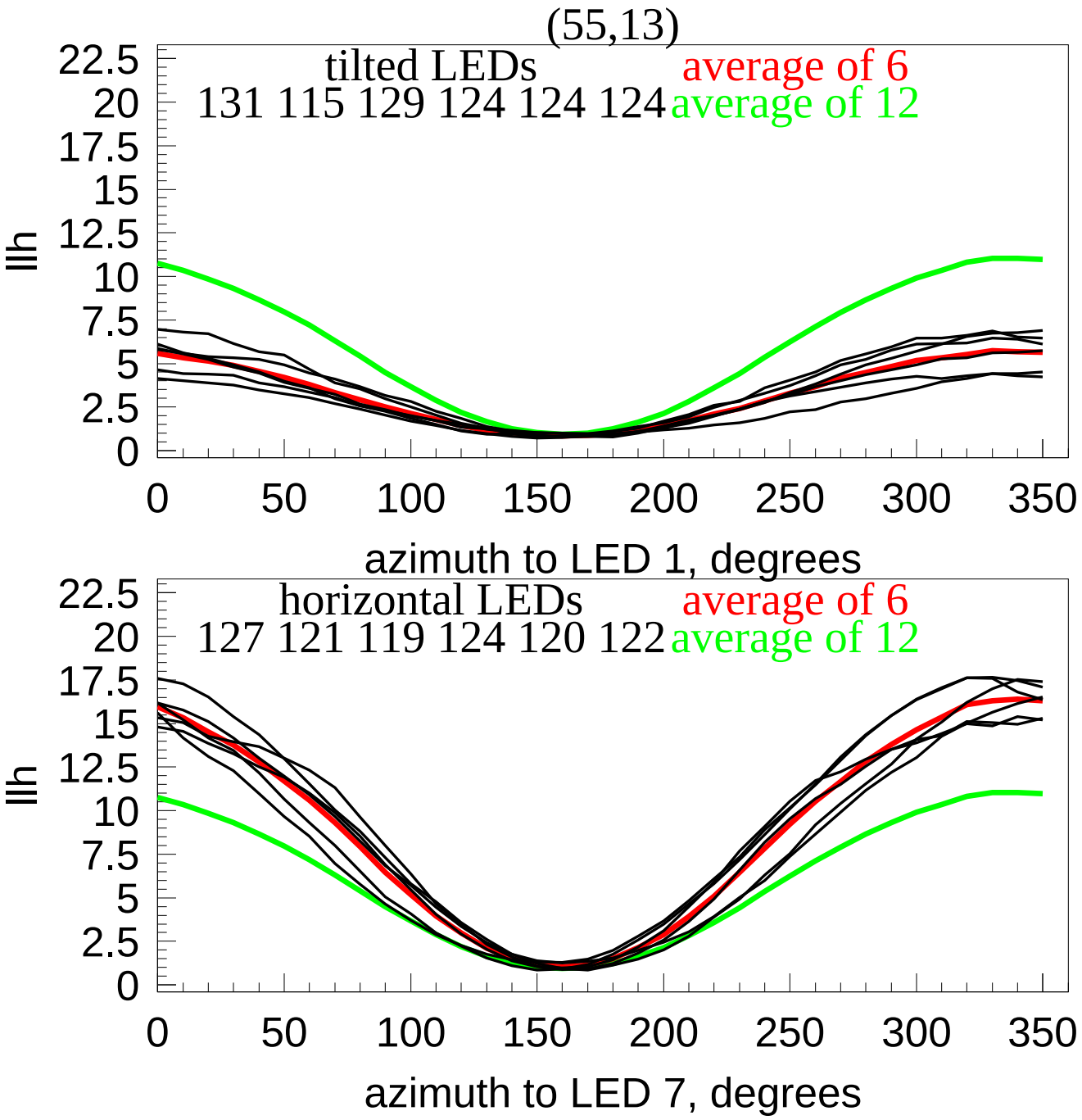

(55,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
136.1 ± 6.3
140
1
2
3
4
5
6
7
8
9
10
11
12

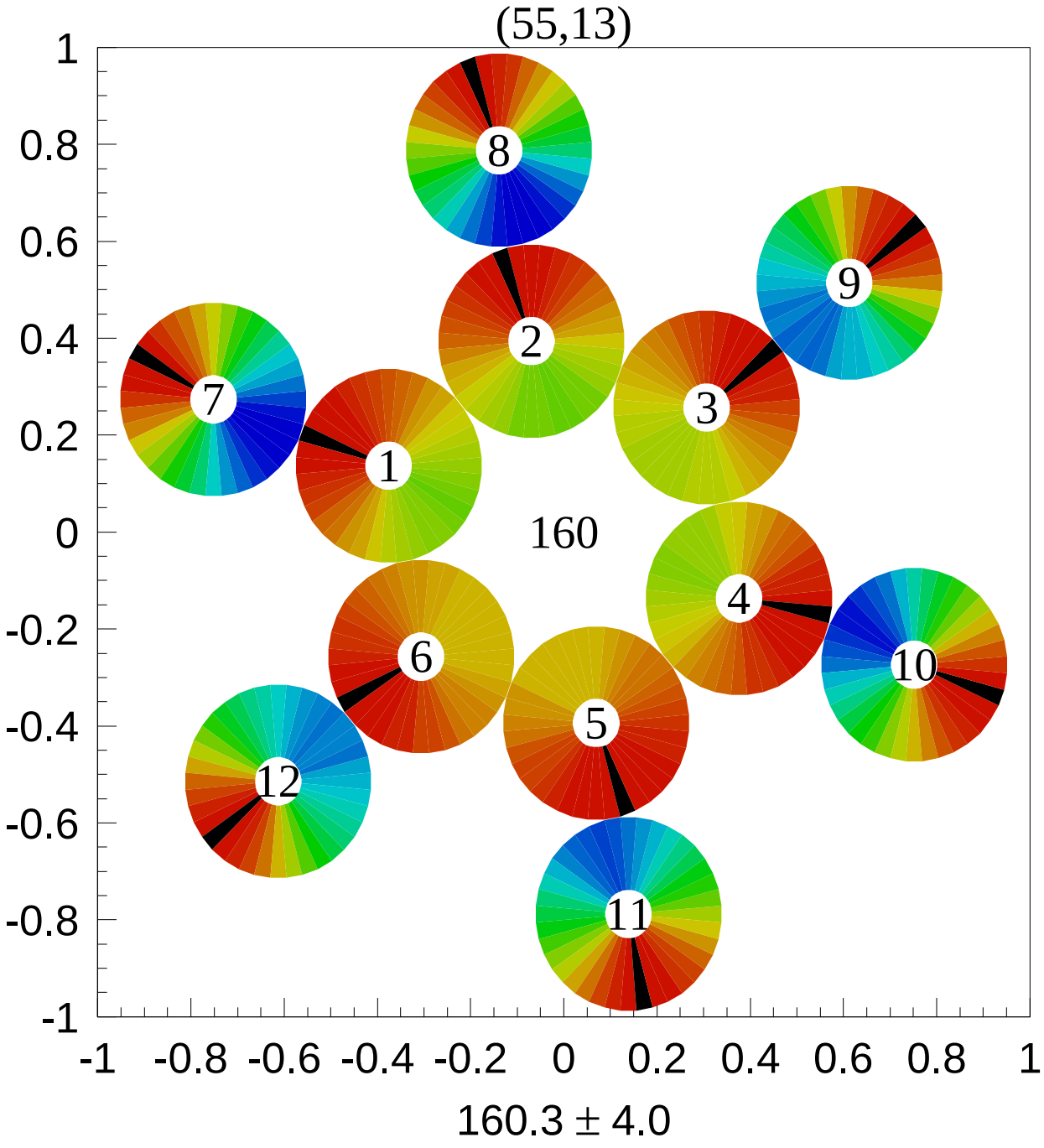

(55,11)
tilted LEDs
120 123 124 115 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 117 122 124 118 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

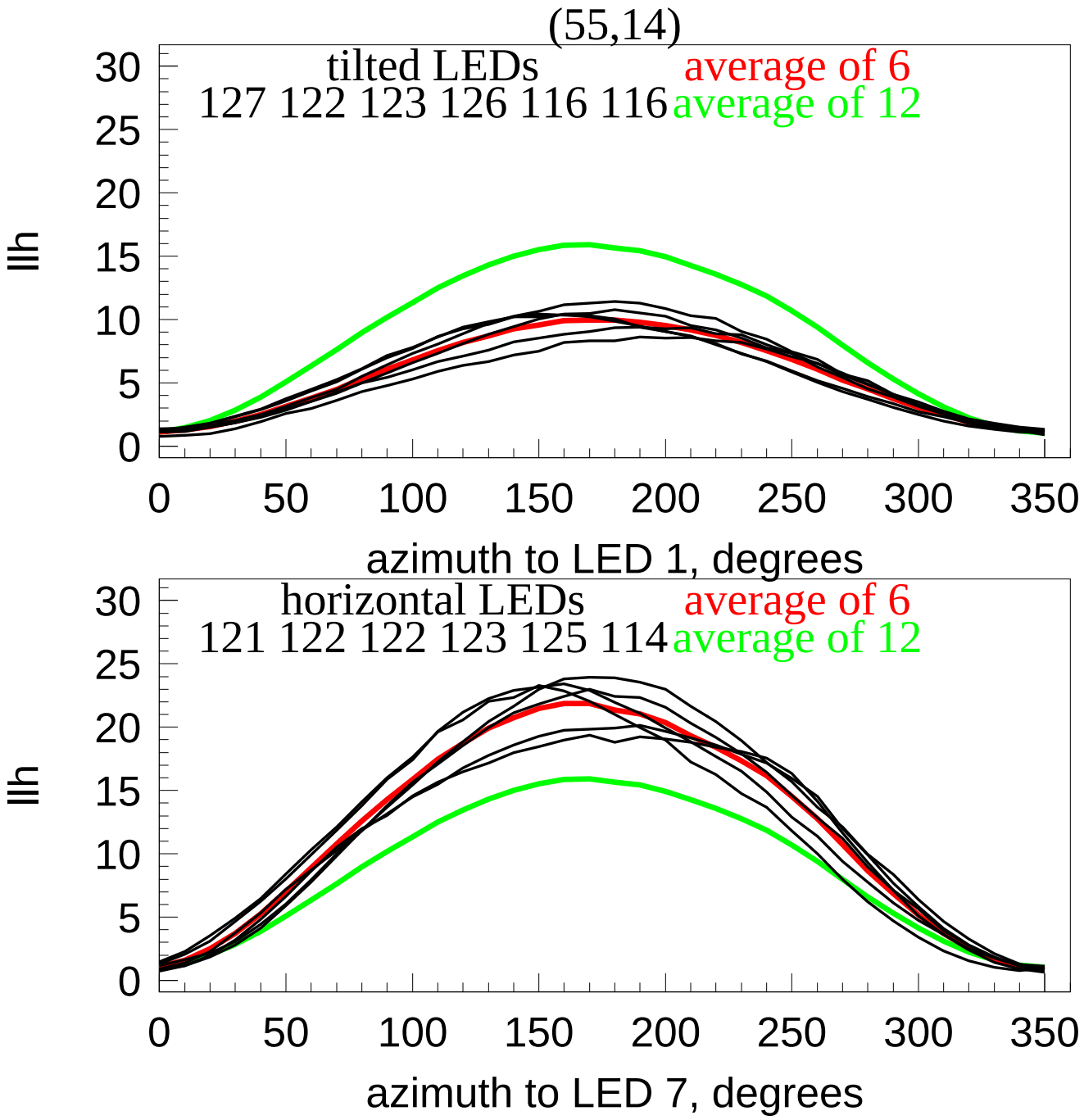

(55,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
163.3 ± 6.7

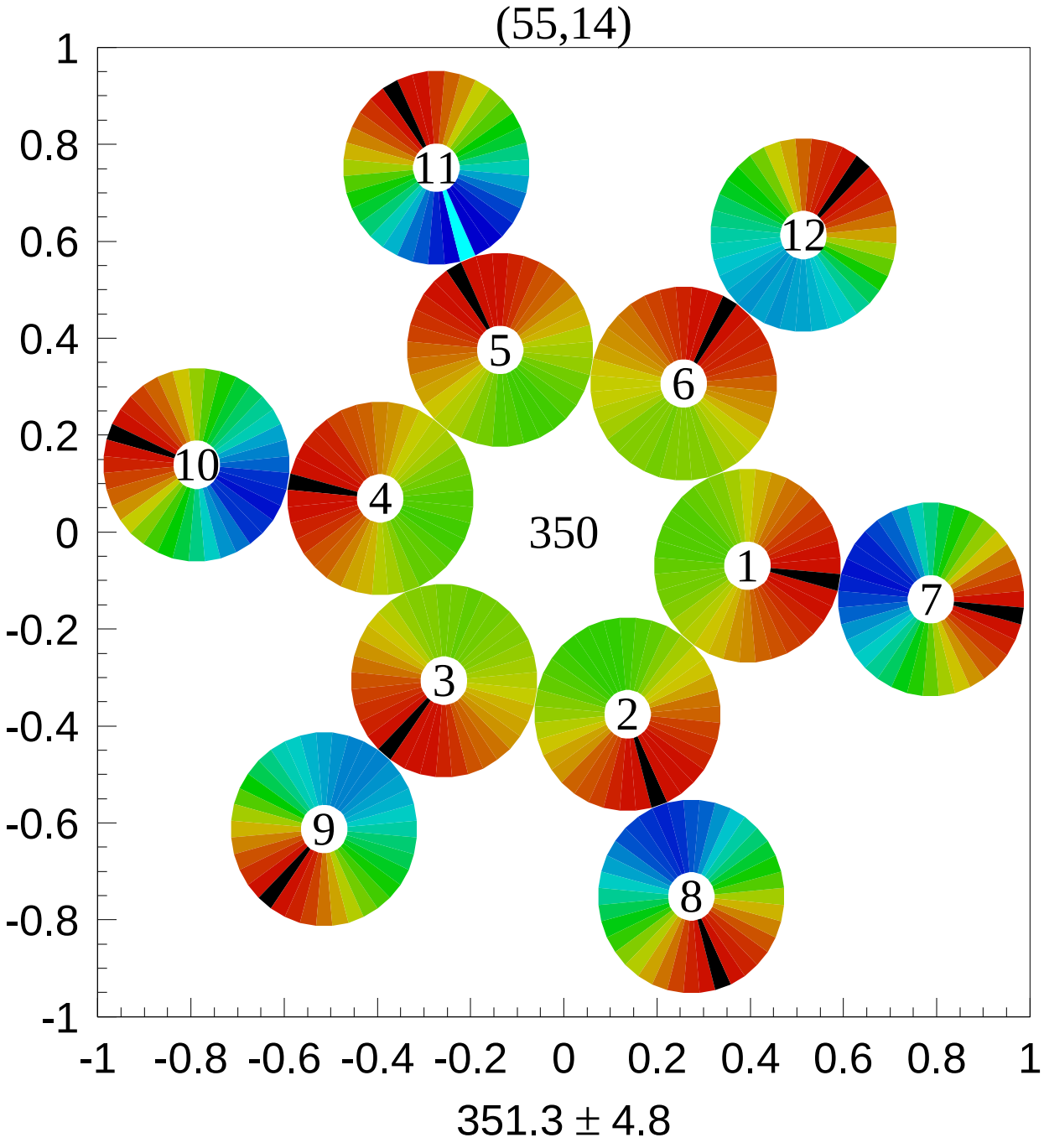

(55,12)
tilted LEDs
120 124 120 121 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 122 120 118 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

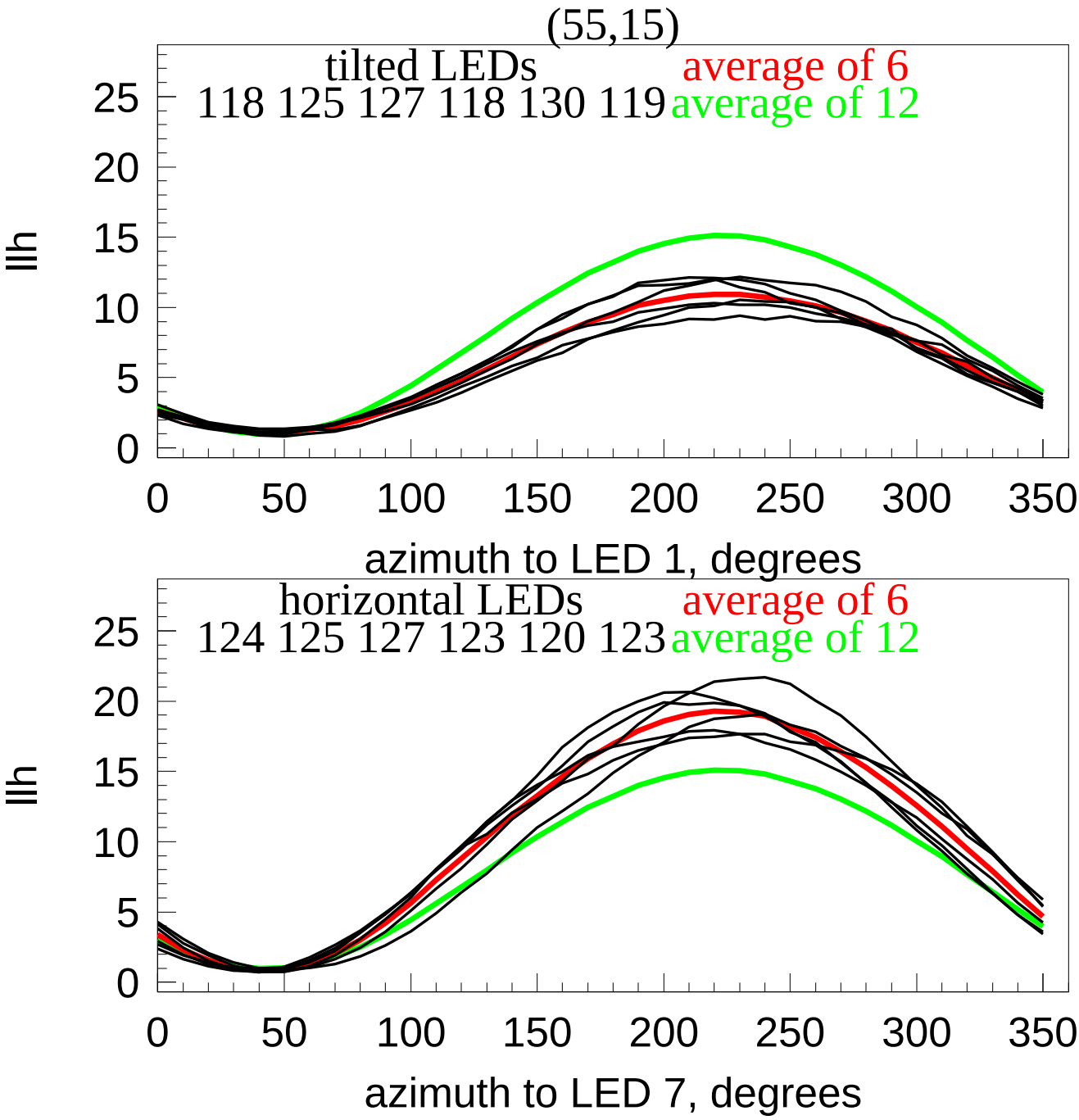

(55,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
110.2 ± 4.8

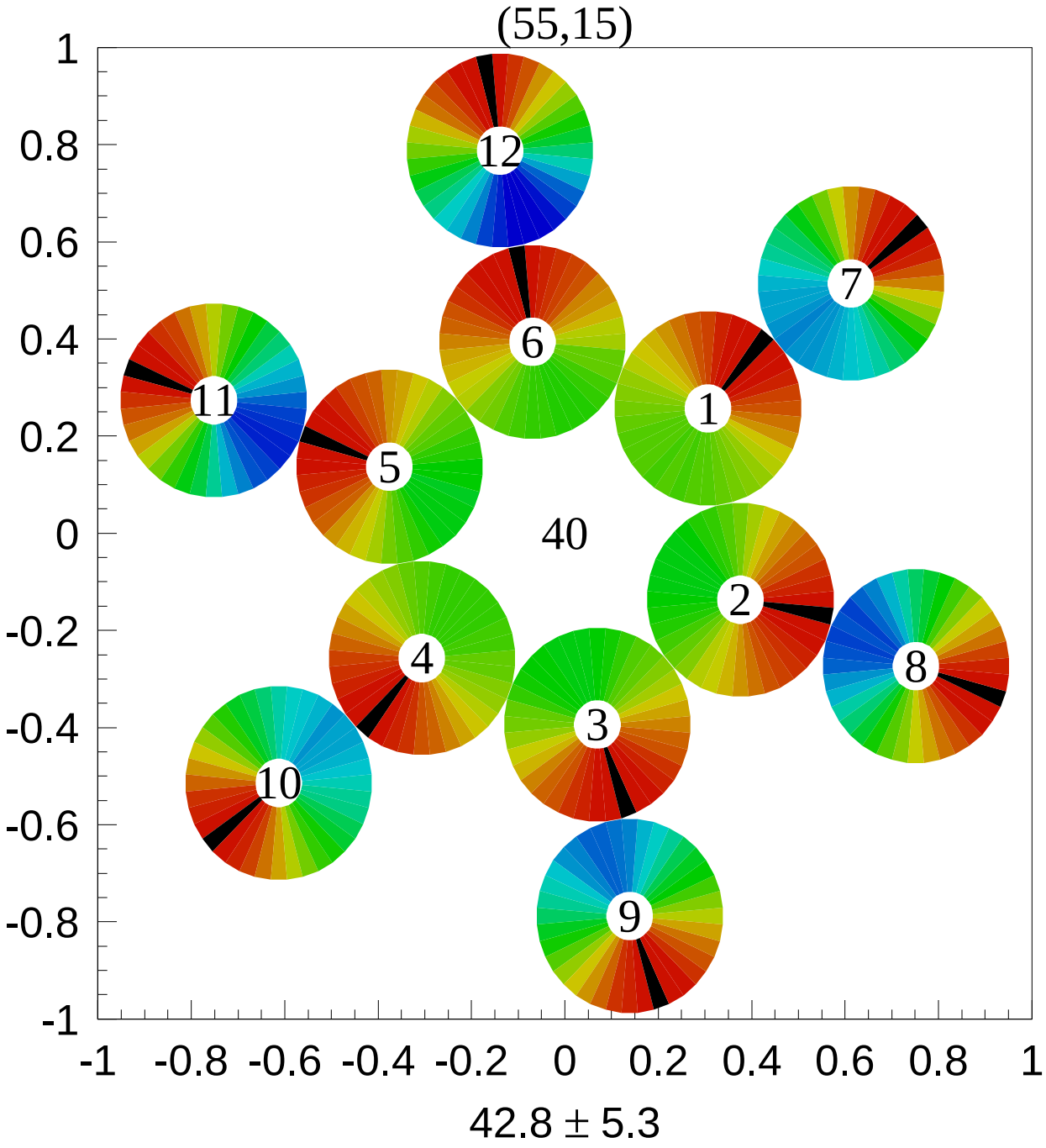

(55,13)
tilted LEDs
131 115 129 124 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 121 119 124 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

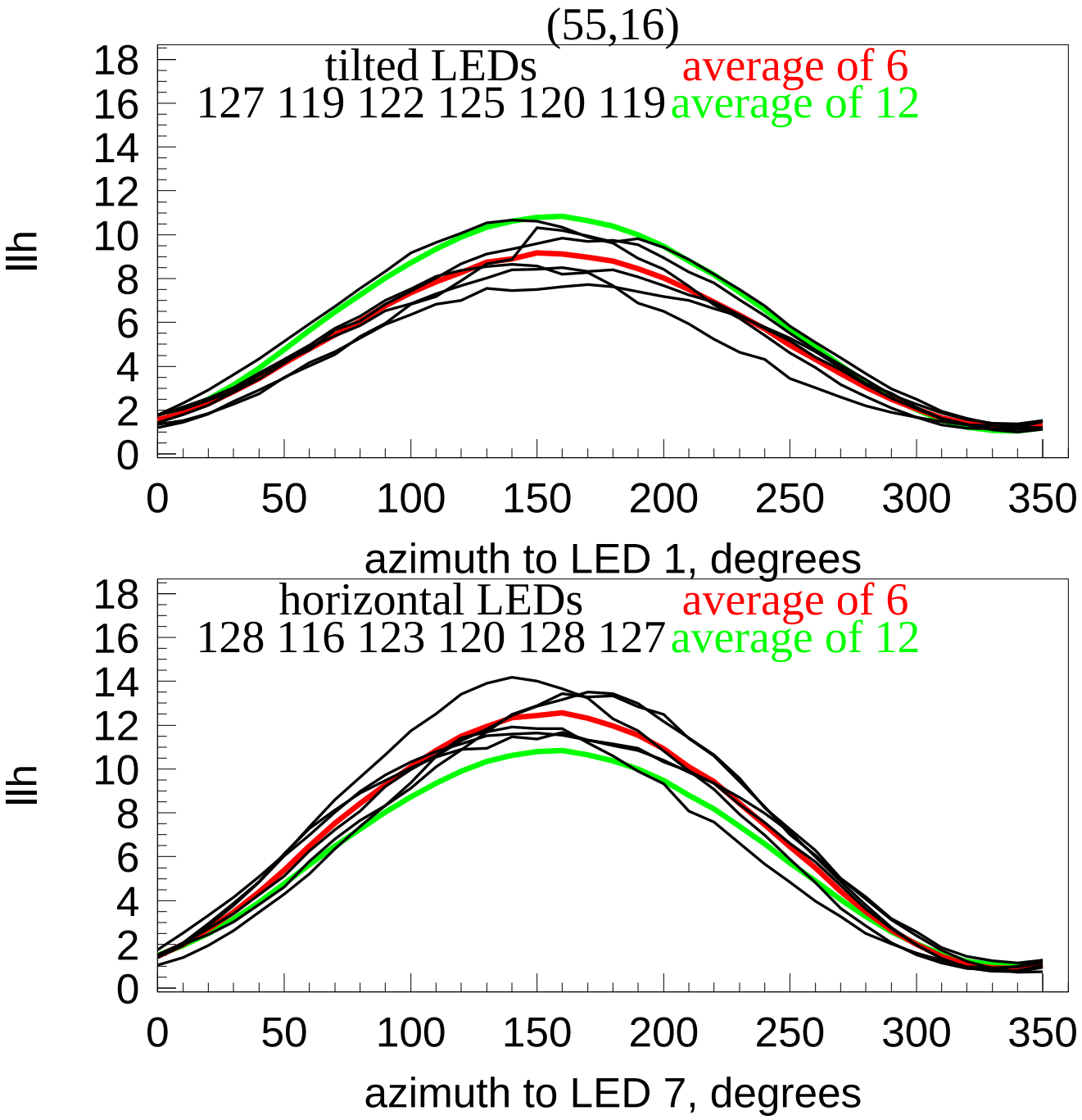

(55,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
160
160.3 ± 4.0
1
2
3
4
5
6
7
8
9
10
11
12

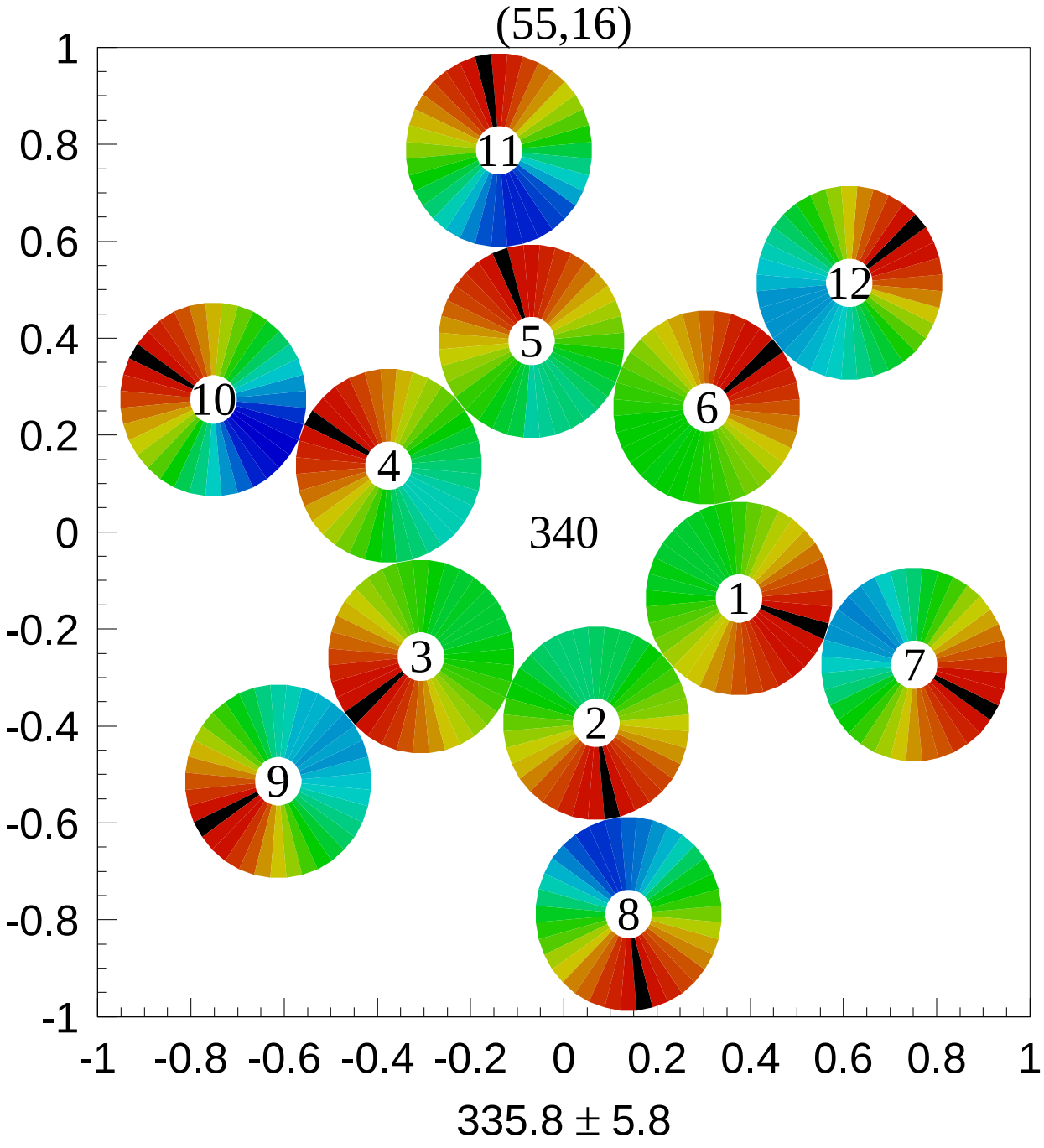

(55,14)
tilted LEDs
127 122 123 126 116 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 122 122 123 125 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

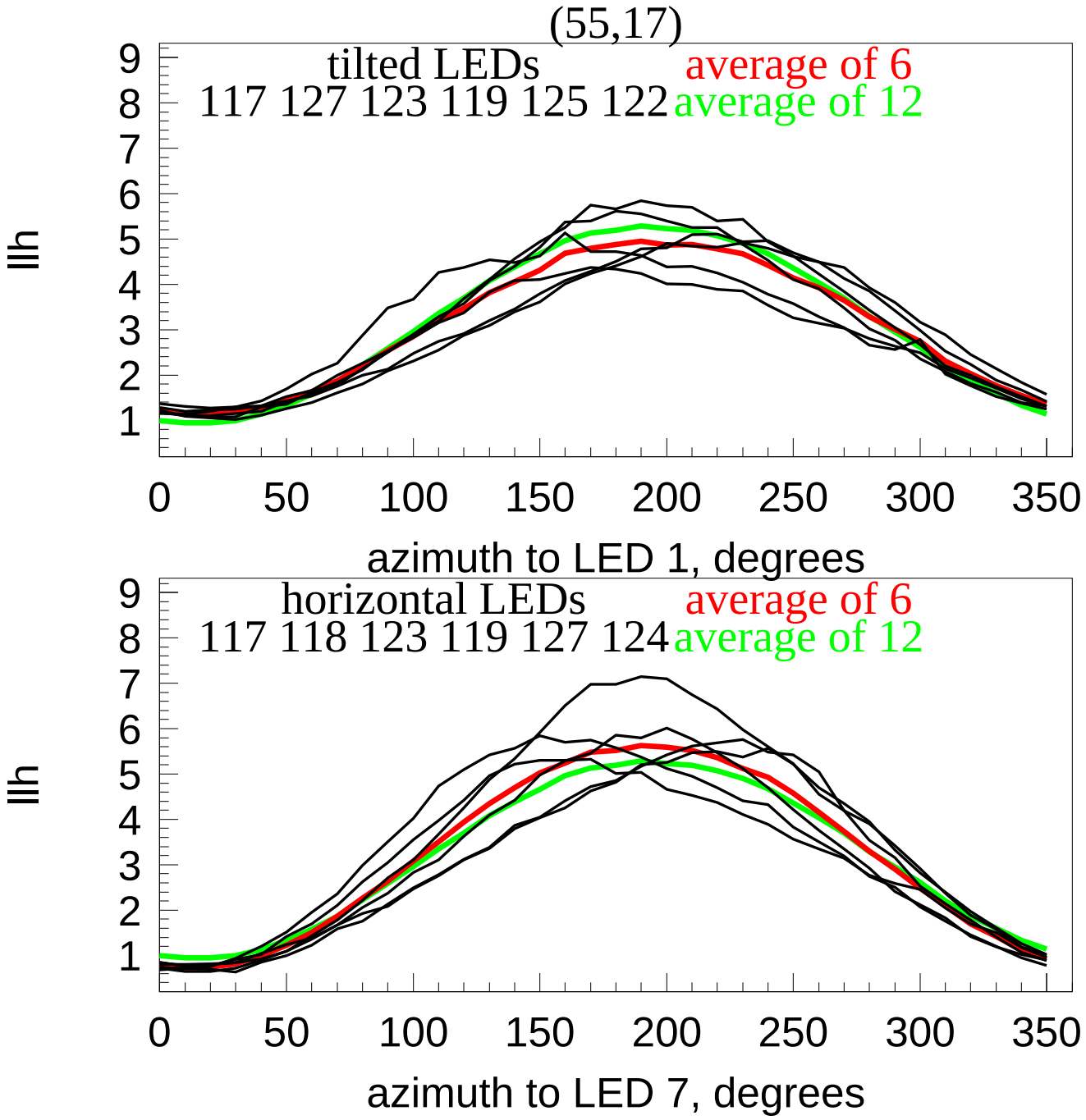

(55,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
351.3 ± 4.8

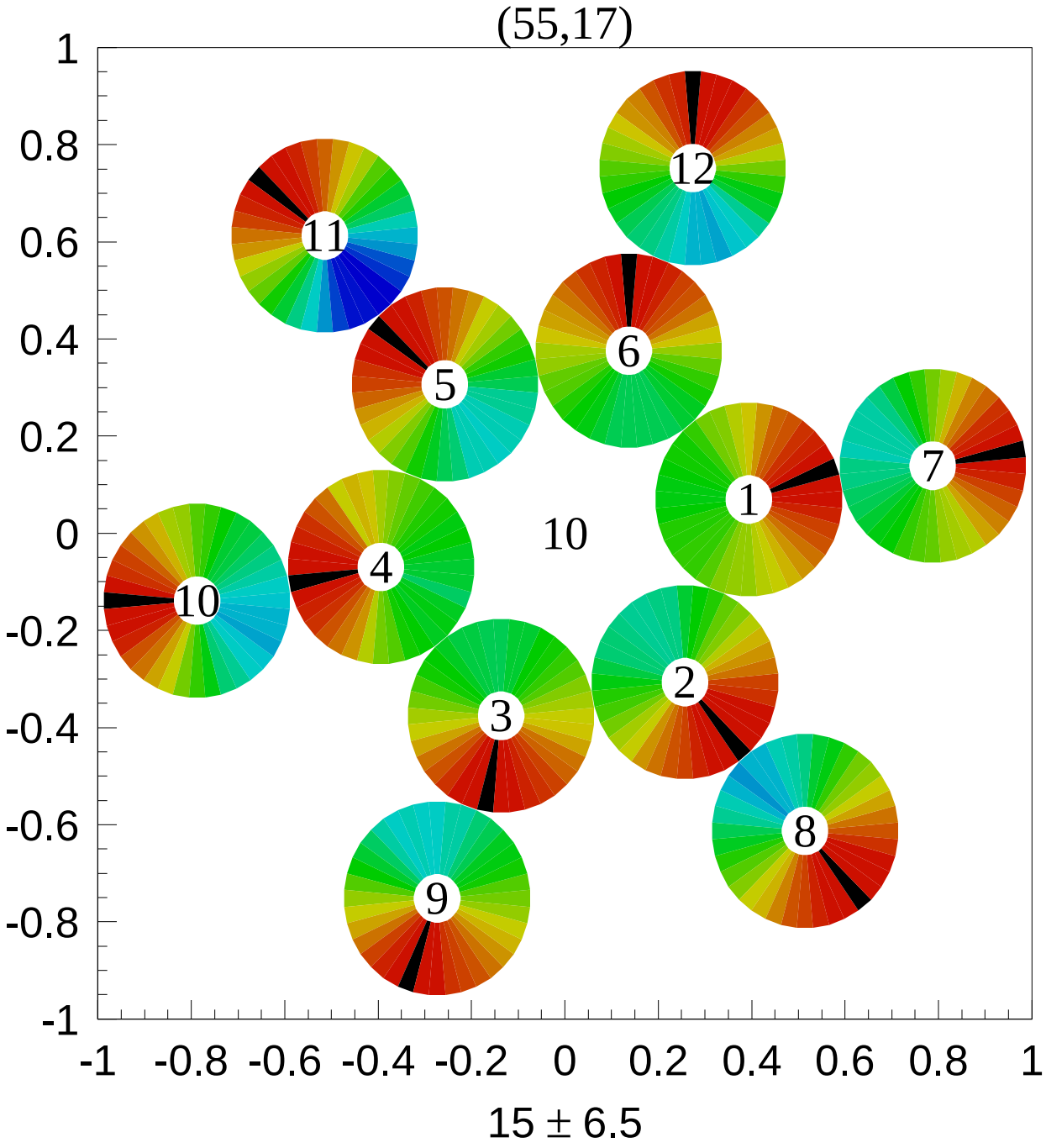

(55,15)
tilted LEDs
118 125 127 118 130 119
average of 6
average of 12
25
20
15
10
5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 125 127 123 120 123
average of 6
average of 12
25
20
15
10
5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

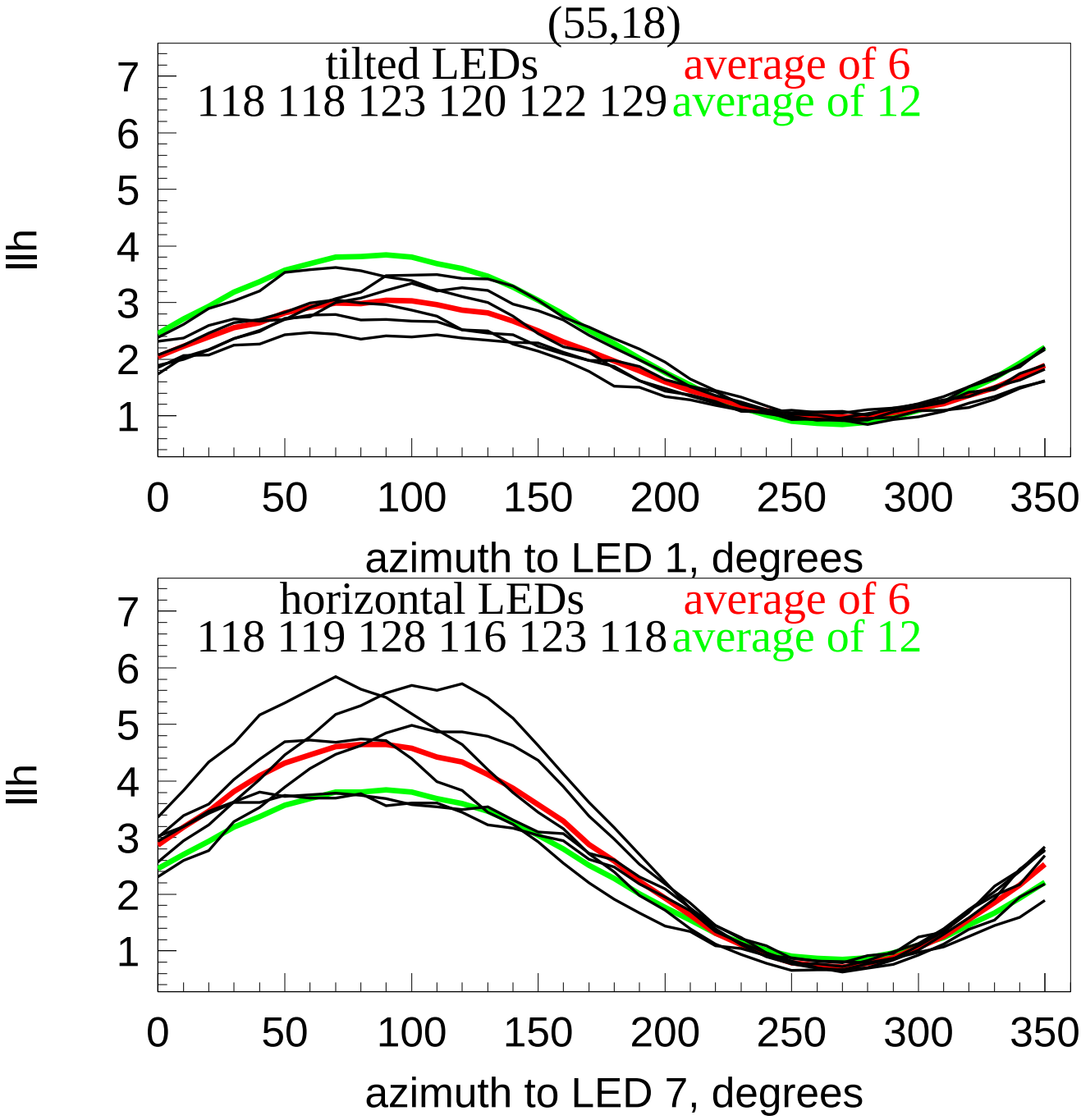

(55,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
42.8 ± 5.3

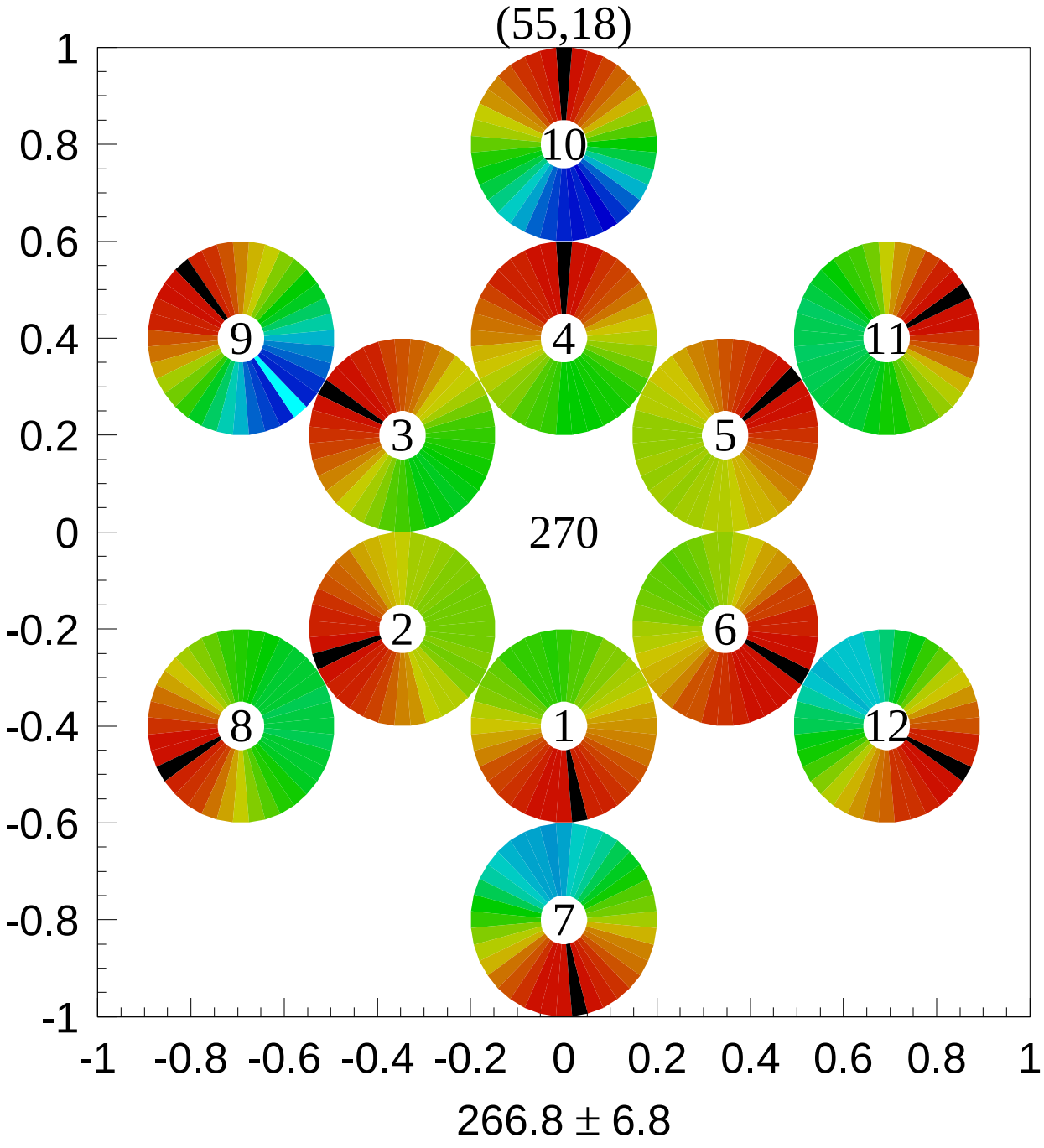

(55,16)
tilted LEDs
127 119 122 125 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 116 123 120 128 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

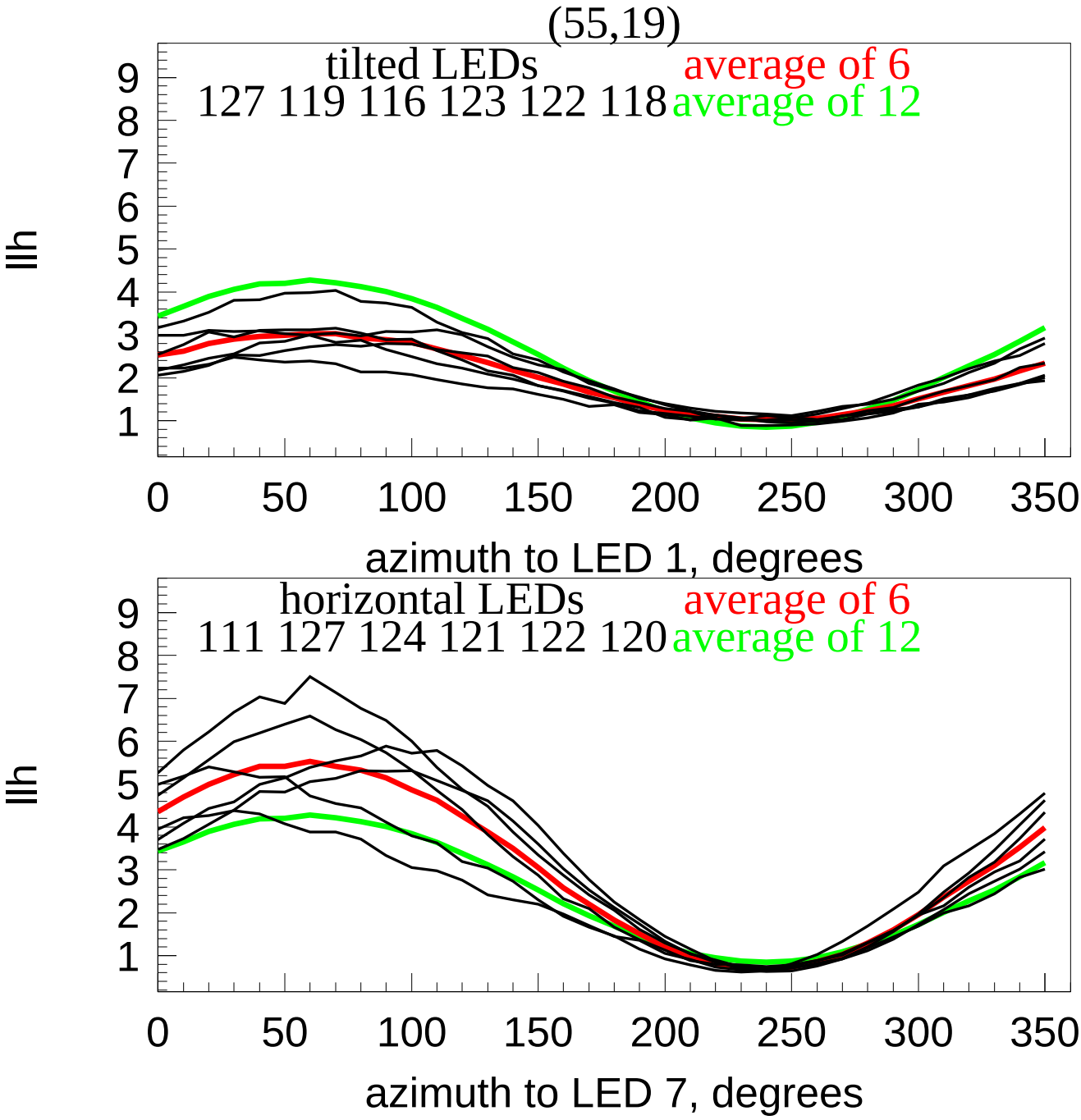

(55,16)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
335.8 ± 5.8

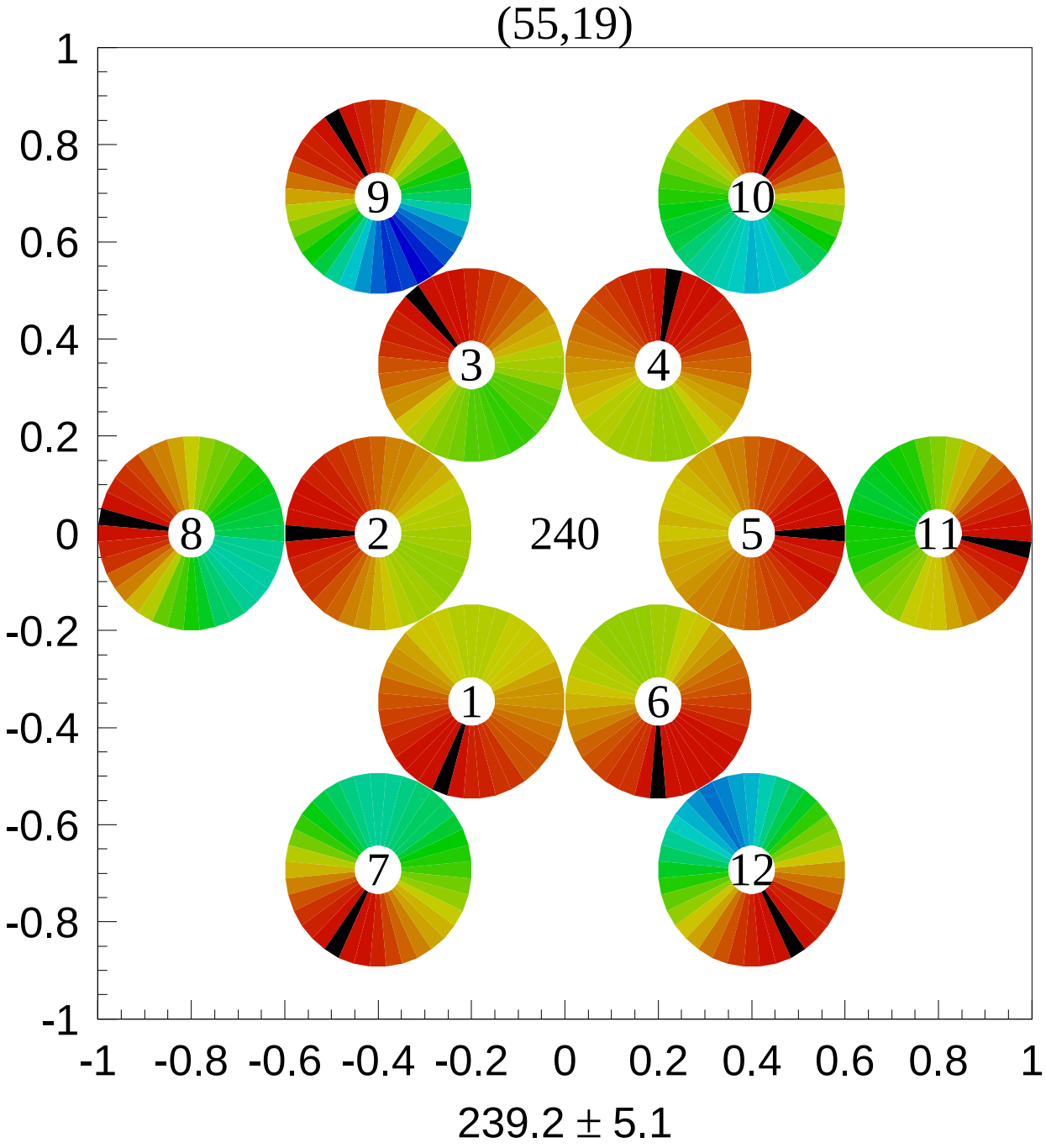

(55,17)
tilted LEDs
117 127 123 119 125 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 123 119 127 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

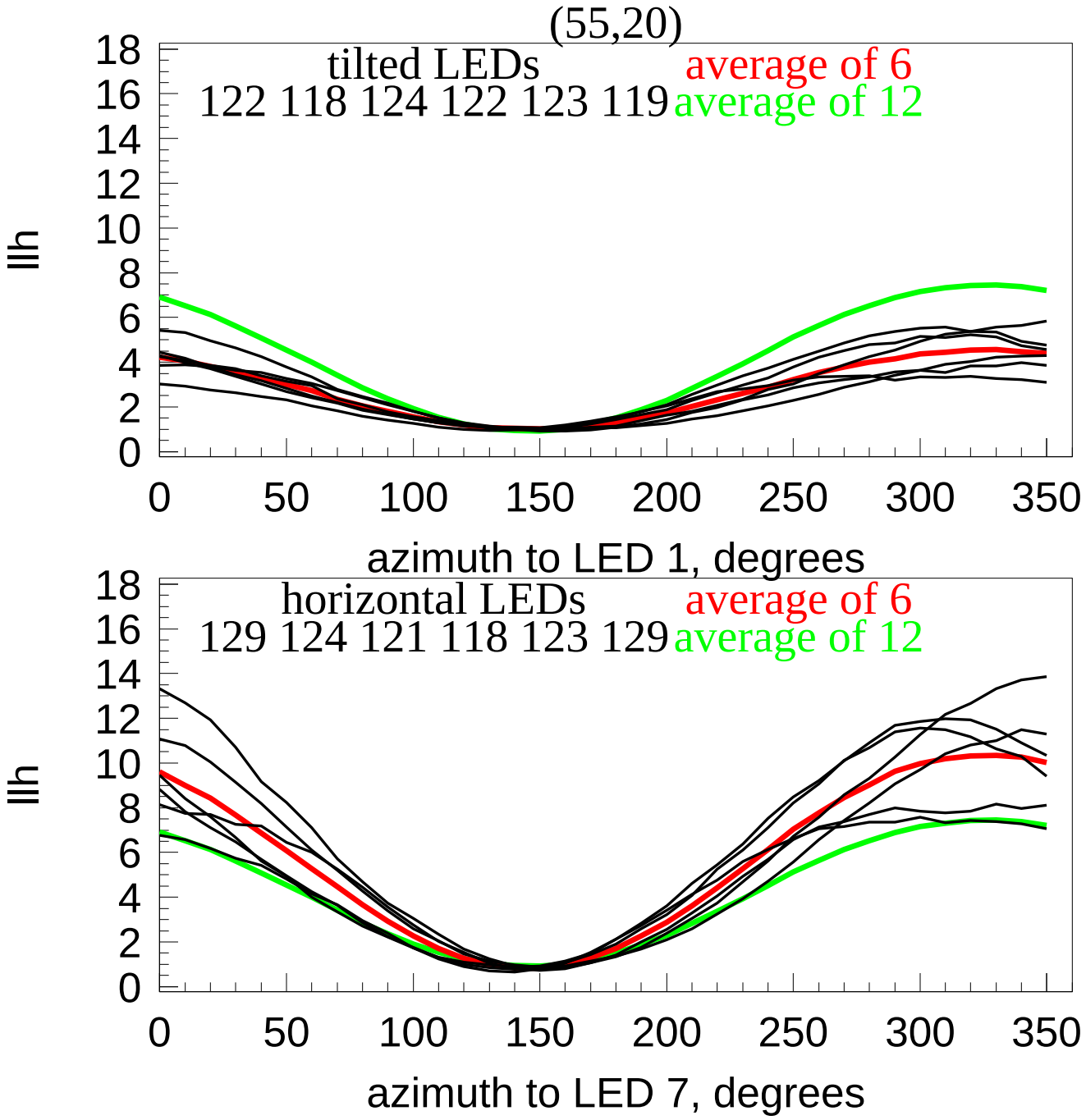

(55,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
15 ± 6.5
12
11
6
5
7
1
10
4
10
2
3
8
9

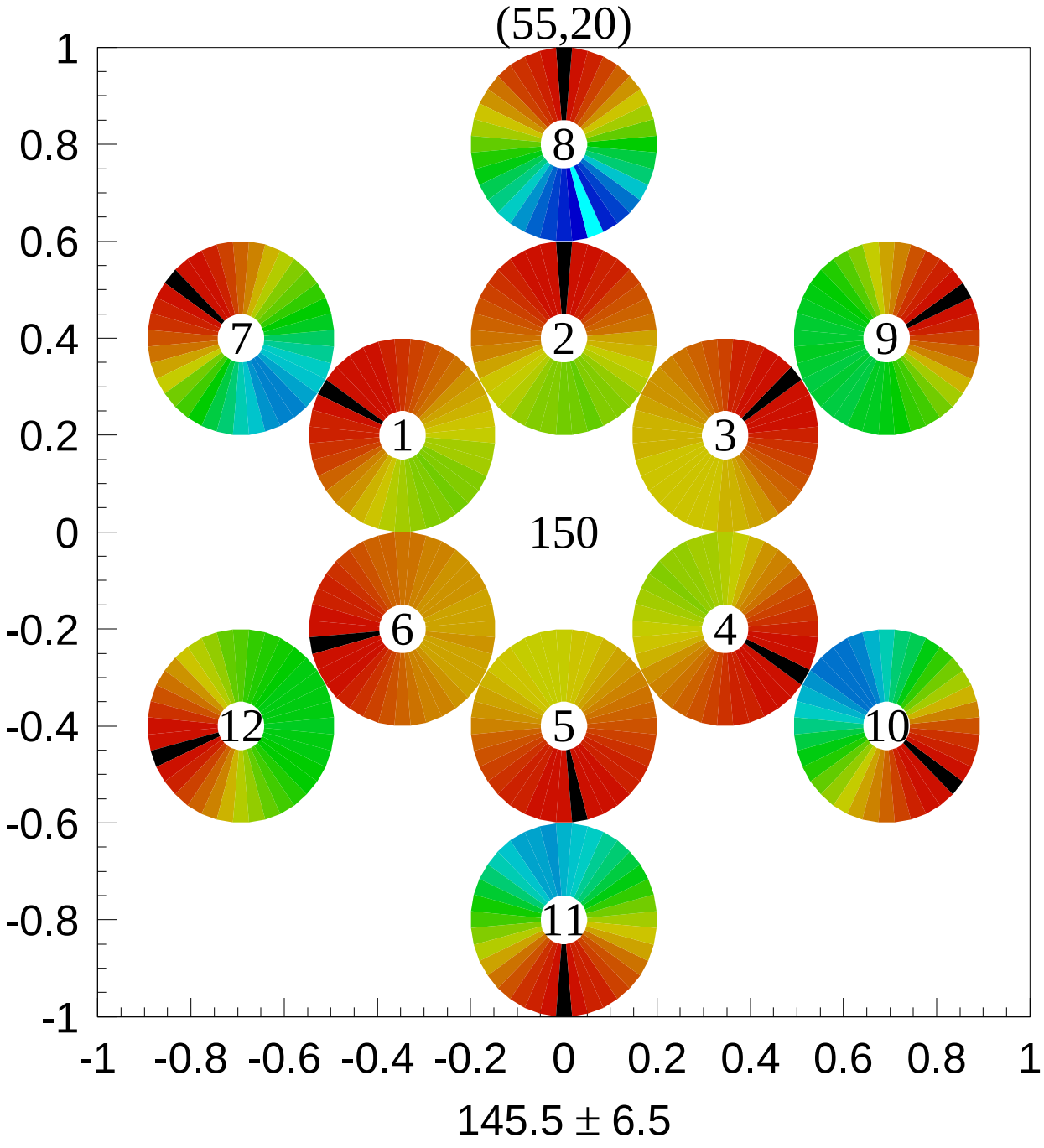

(55,18)
tilted LEDs
118 118 123 120 122 129
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 119 128 116 123 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

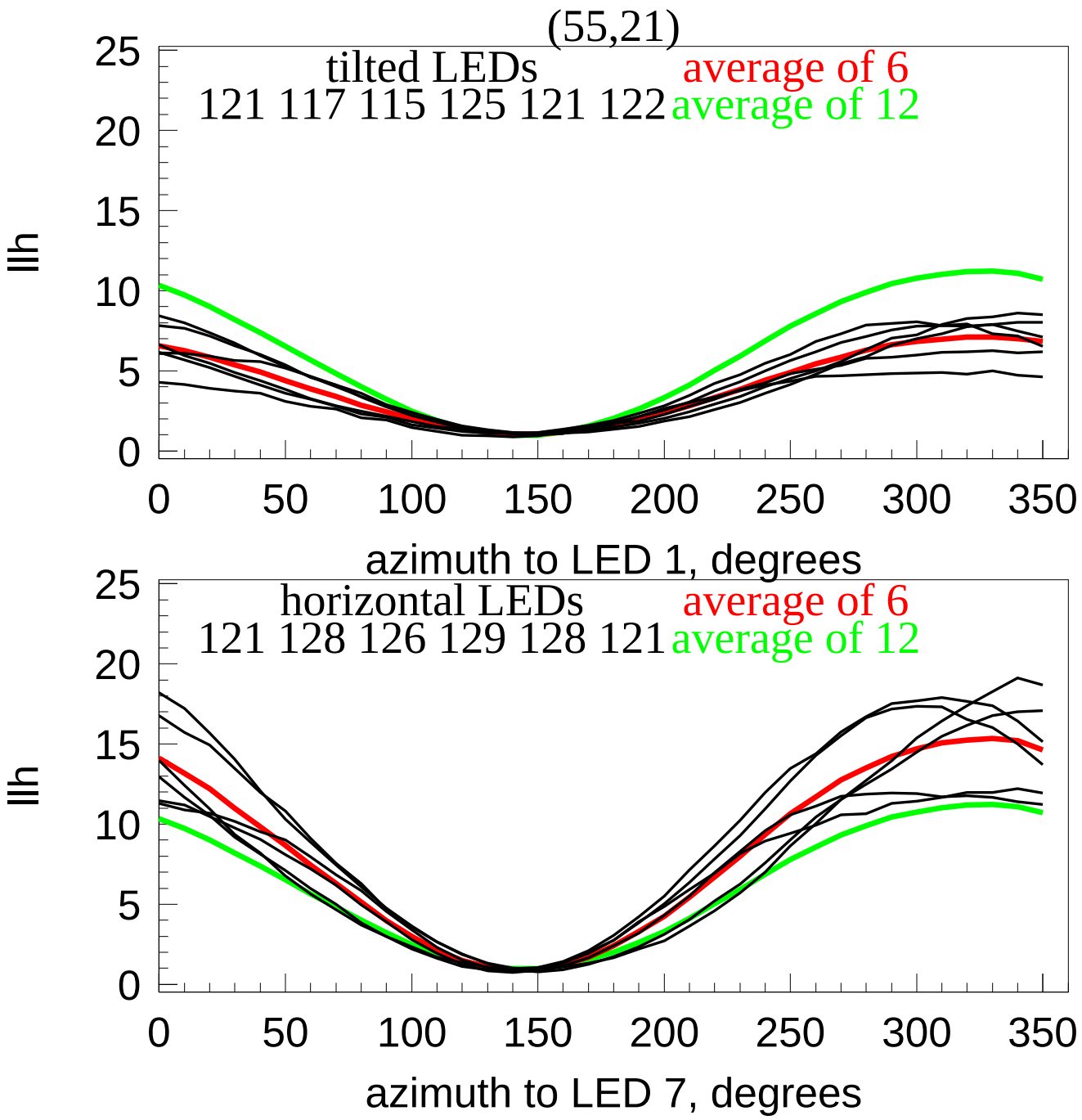

(55,18)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
266.8 ± 6.8

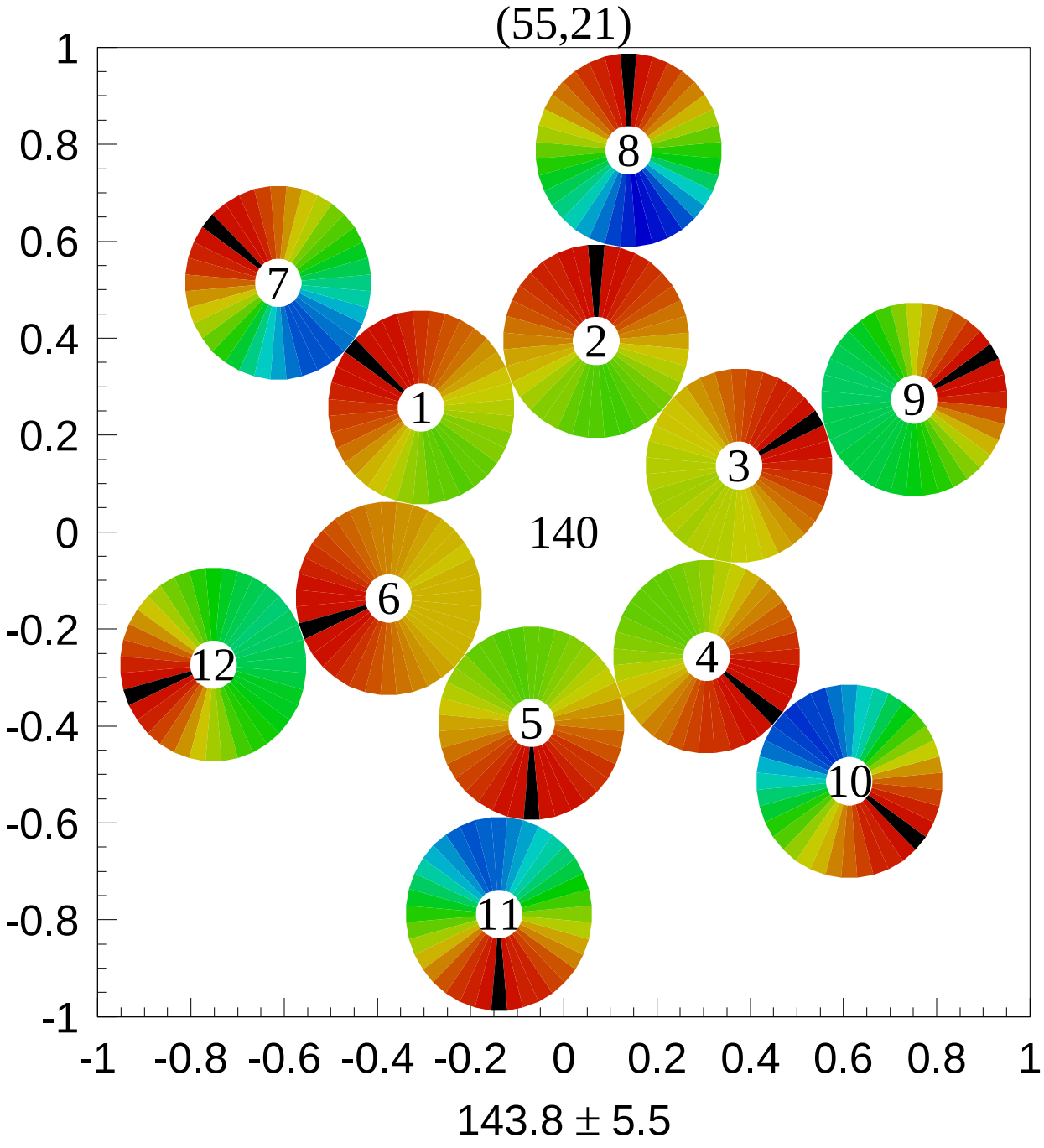

(55,19)
tilted LEDs
127 119 116 123 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 127 124 121 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

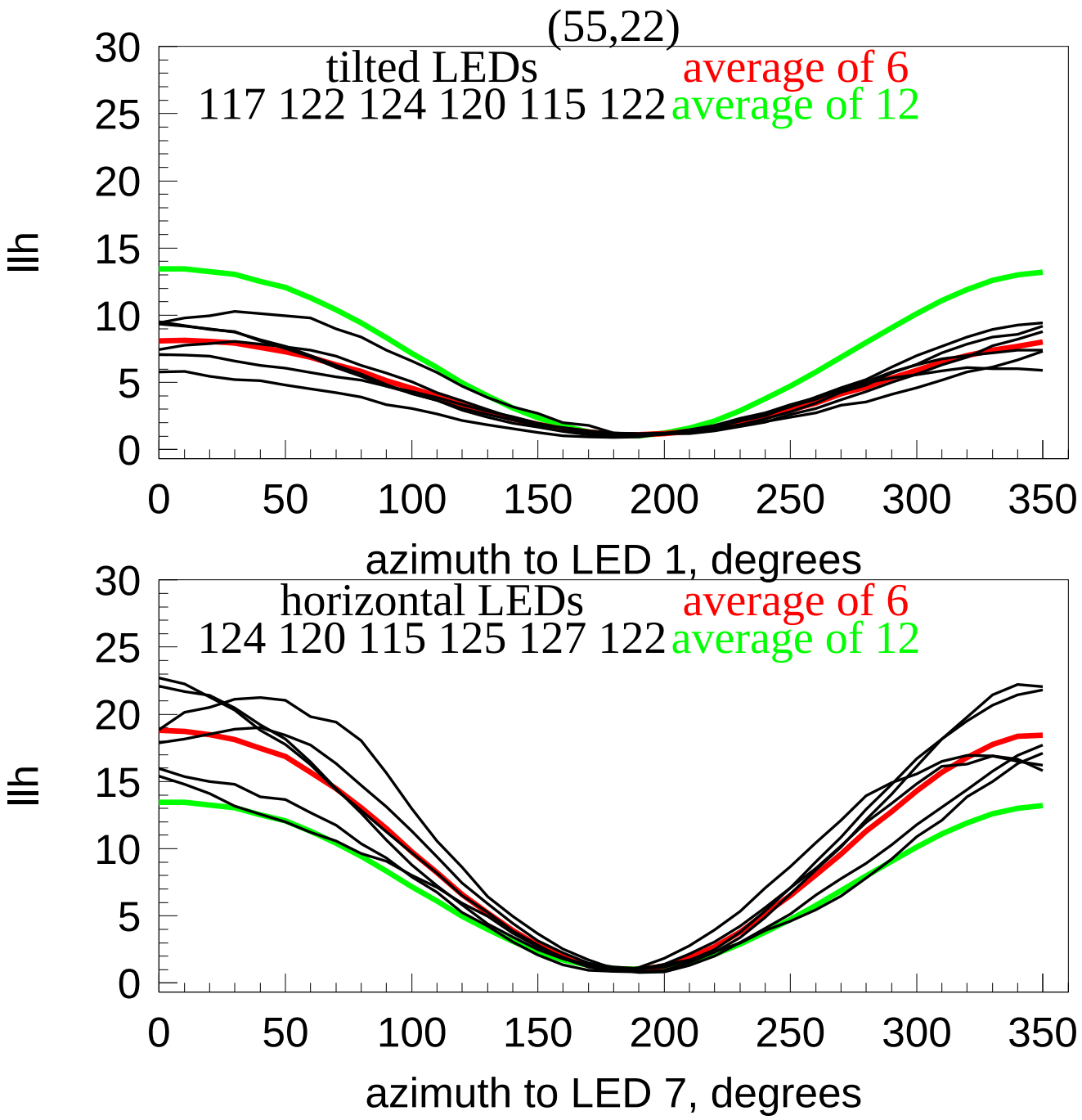

(55,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
239.2 ± 5.1

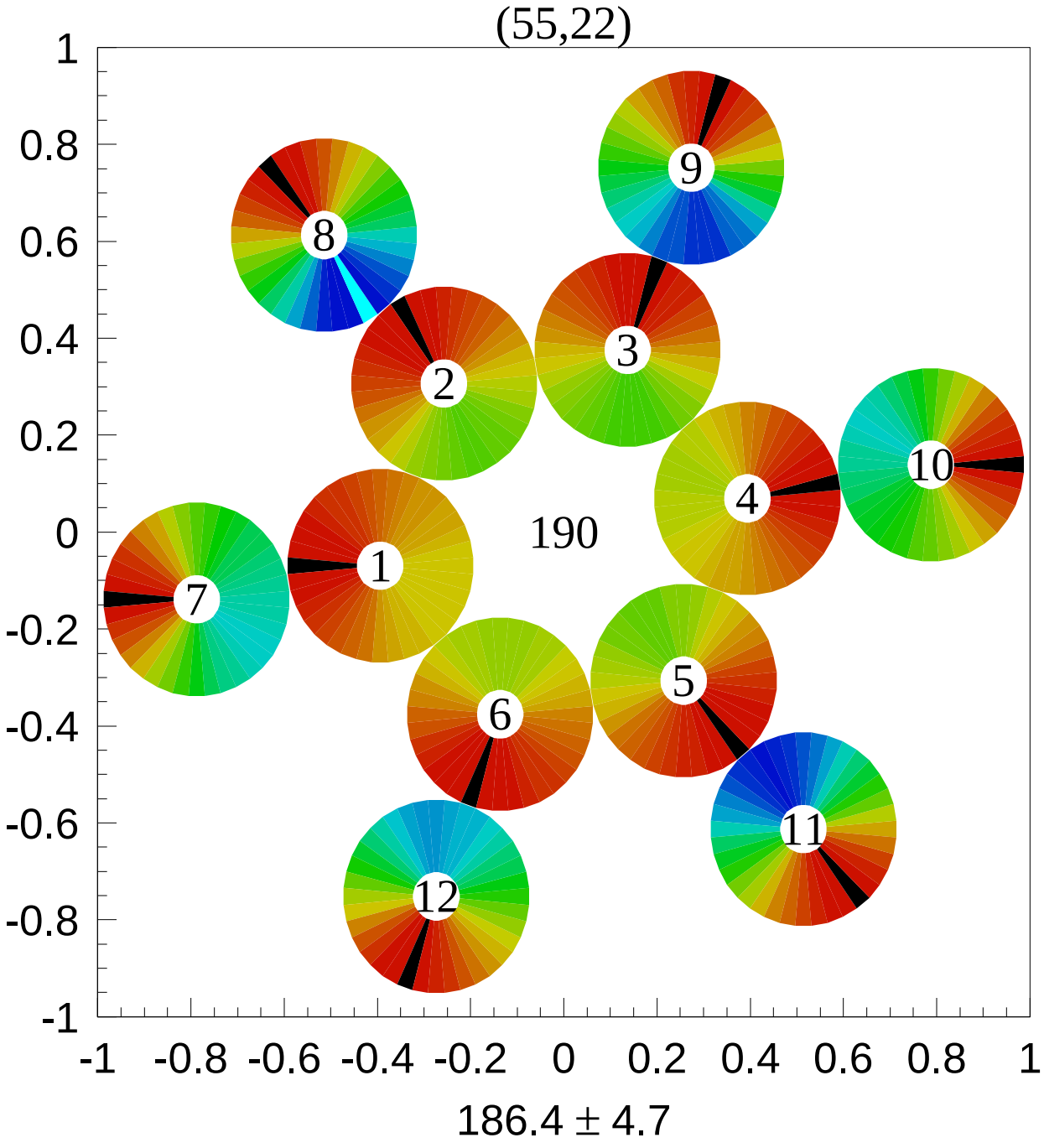

(55,20)
tilted LEDs
122 118 124 122 123 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 124 121 118 123 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

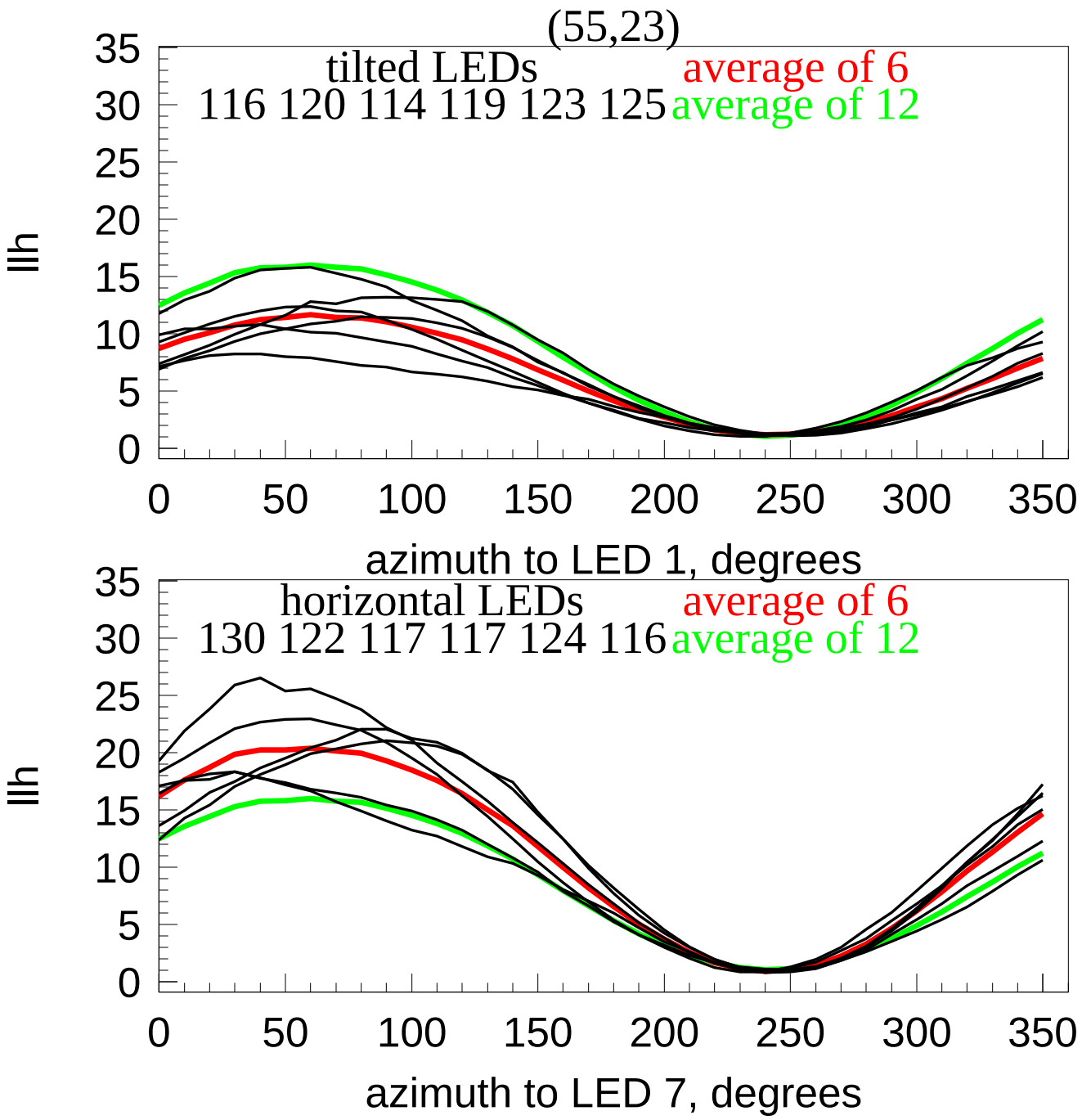

(55,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
145.5 ± 6.5

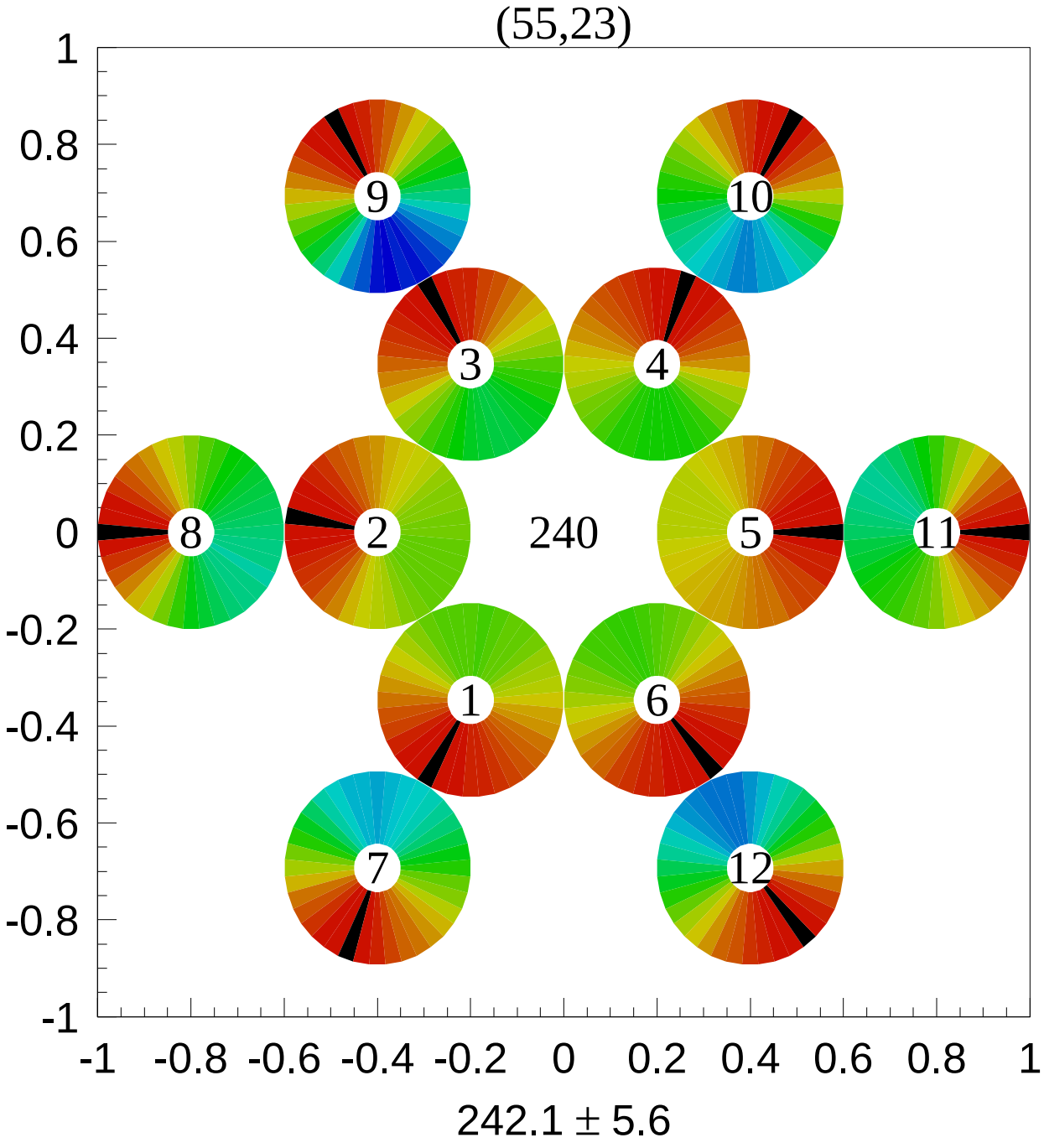

(55,21)
tilted LEDs
121 117 115 125 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 128 126 129 128 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

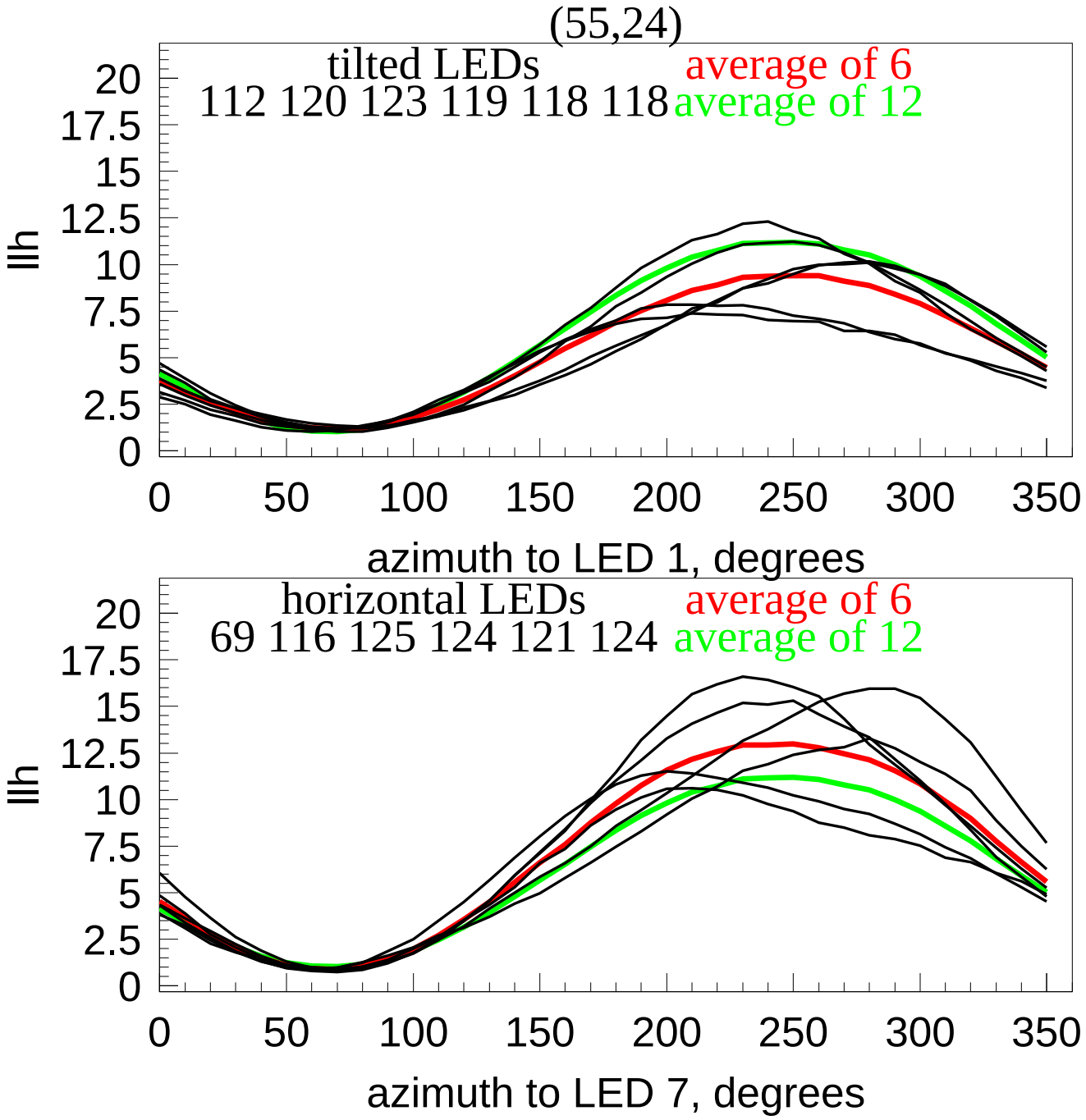

(55,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
140
143.8 ± 5.5
1
2
3
4
5
6
7
8
9
10
11
12

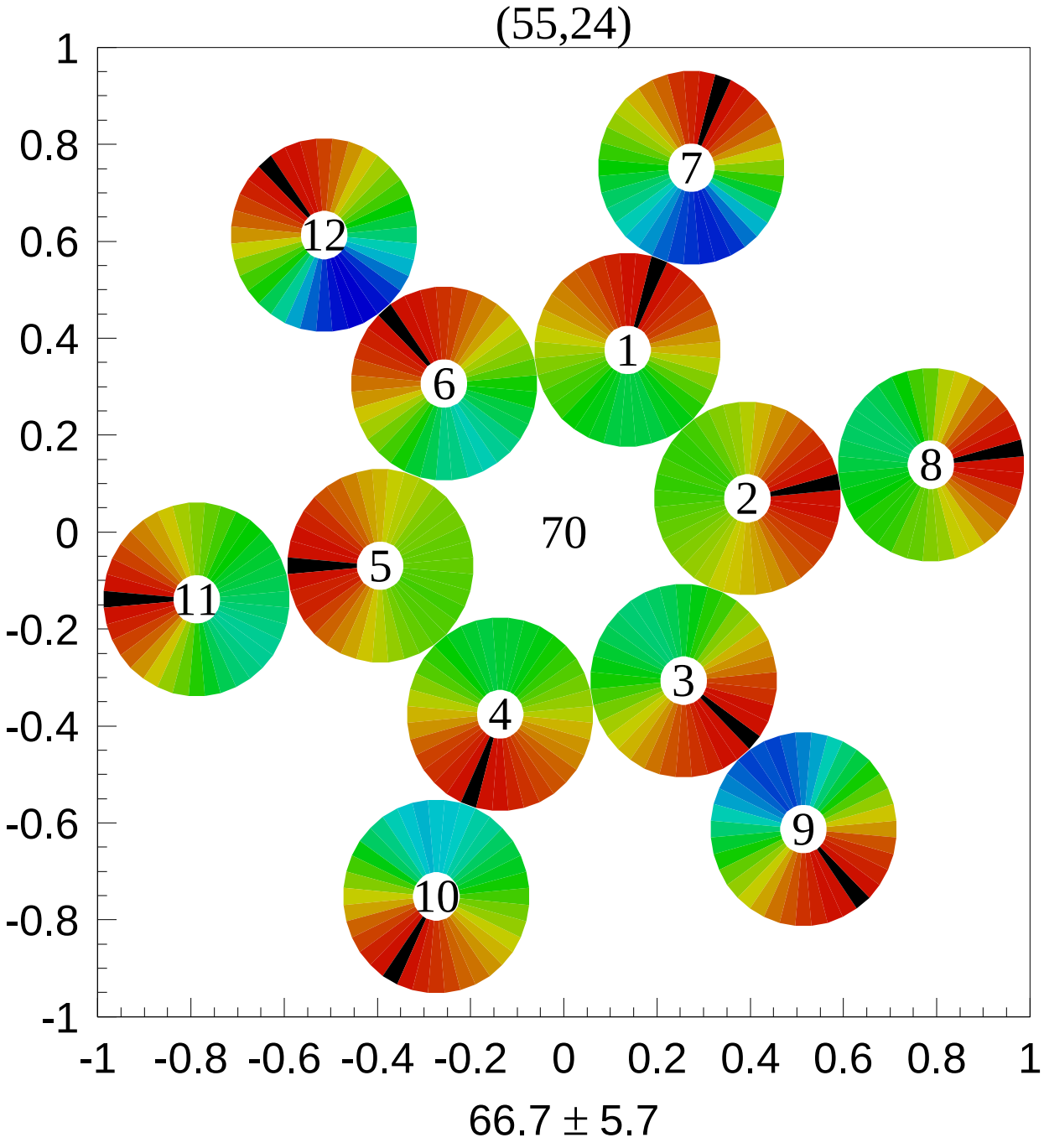

(55,22)
tilted LEDs
117 122 124 120 115 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 120 115 125 127 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

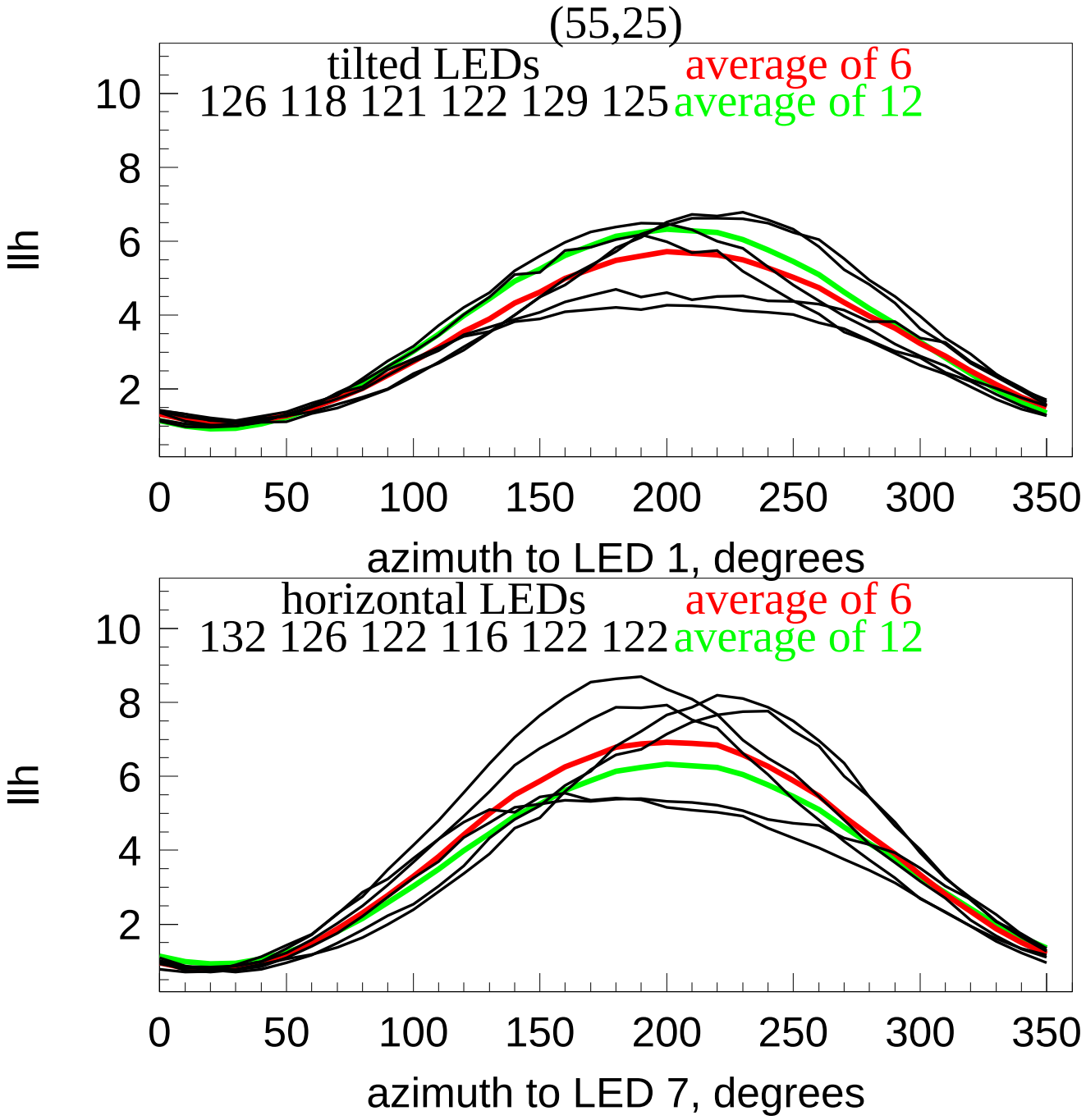

(55,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.4 ± 4.7
190
1
2
3
4
5
6
7
8
9
10
11
12

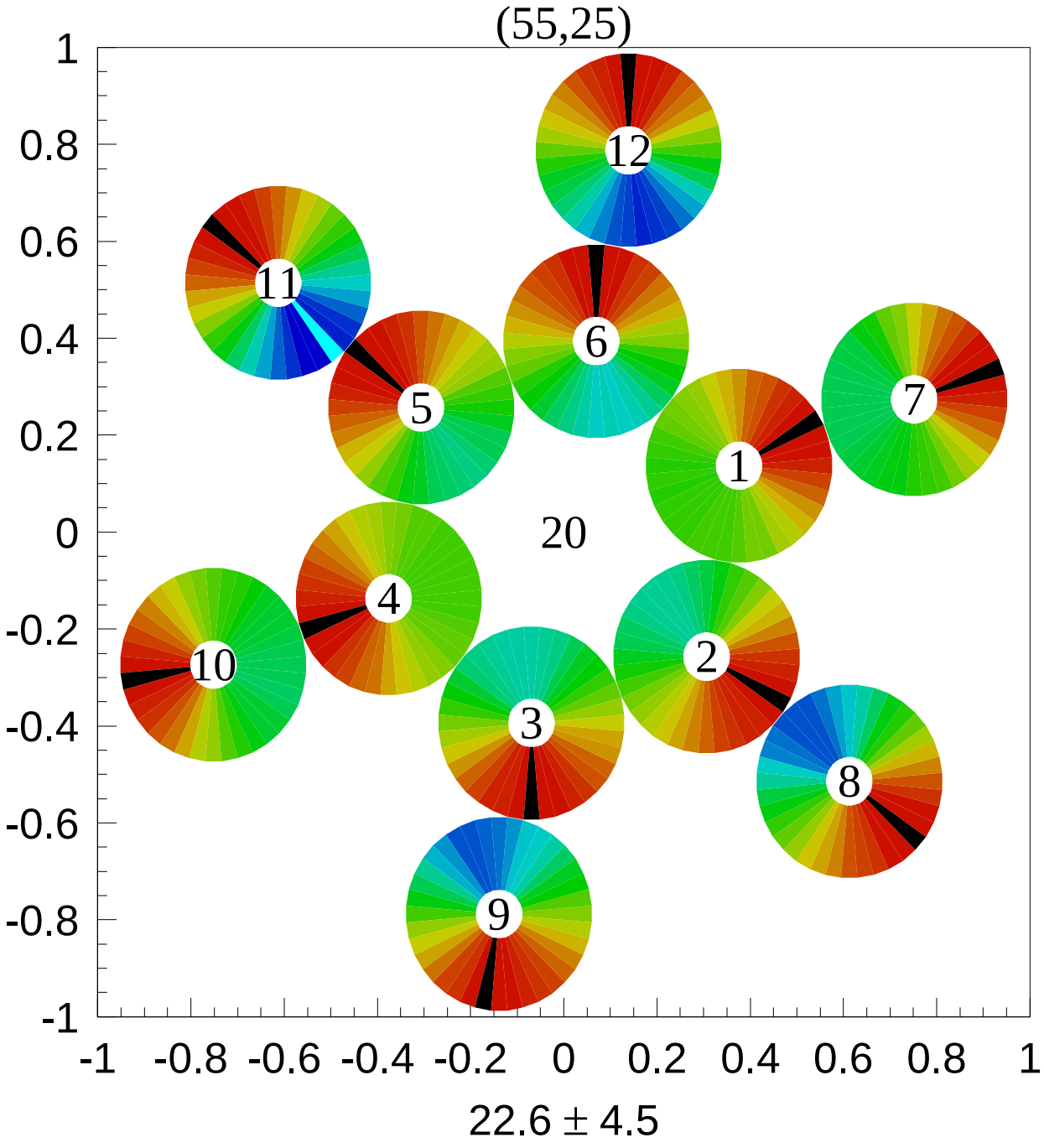

(55,23)
tilted LEDs
116 120 114 119 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 122 117 117 124 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

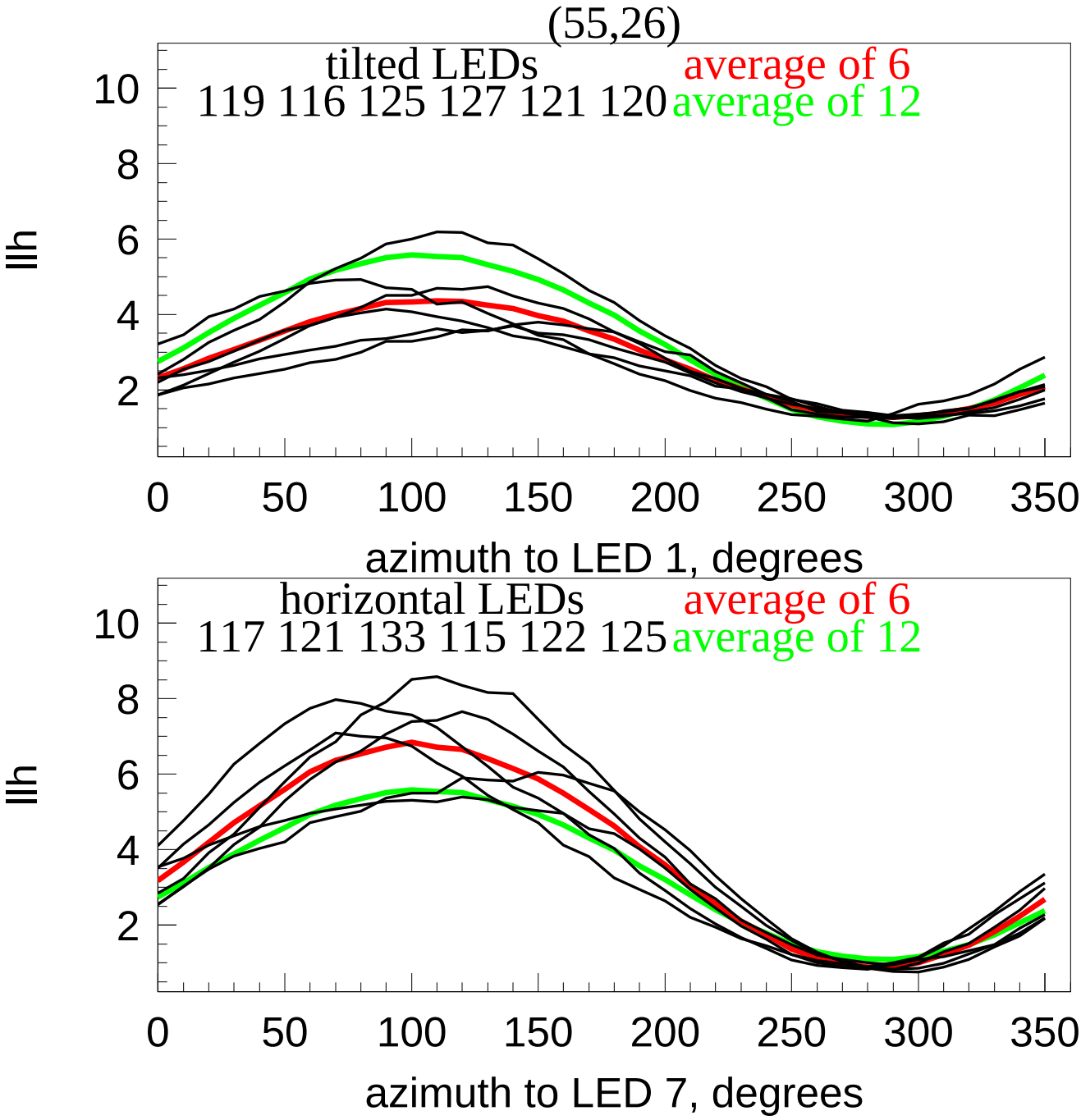

(55,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242.1 ± 5.6

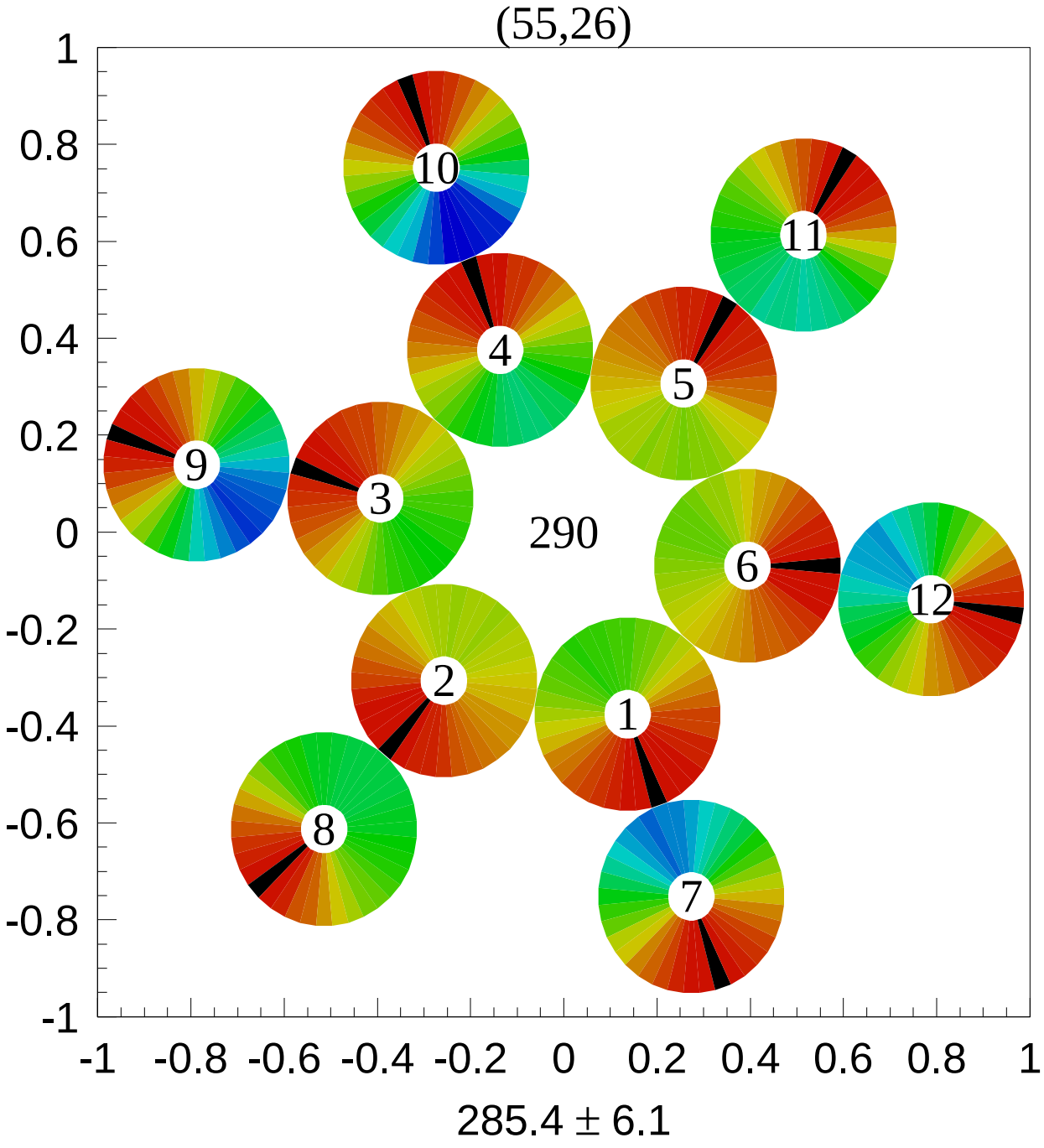

(55,24)
tilted LEDs
112 120 123 119 118 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
69 116 125 124 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

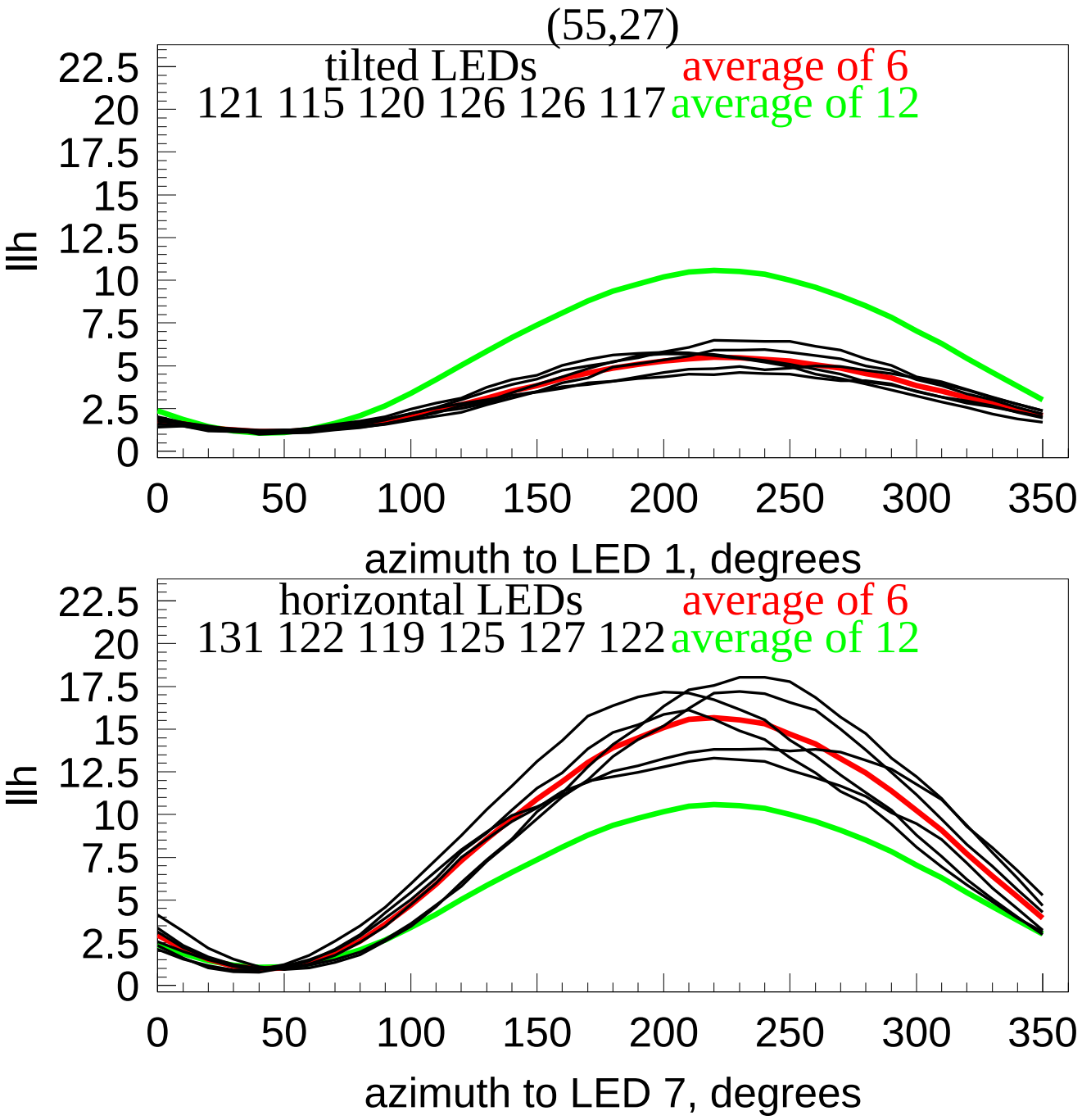

(55,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
66.7 ± 5.7

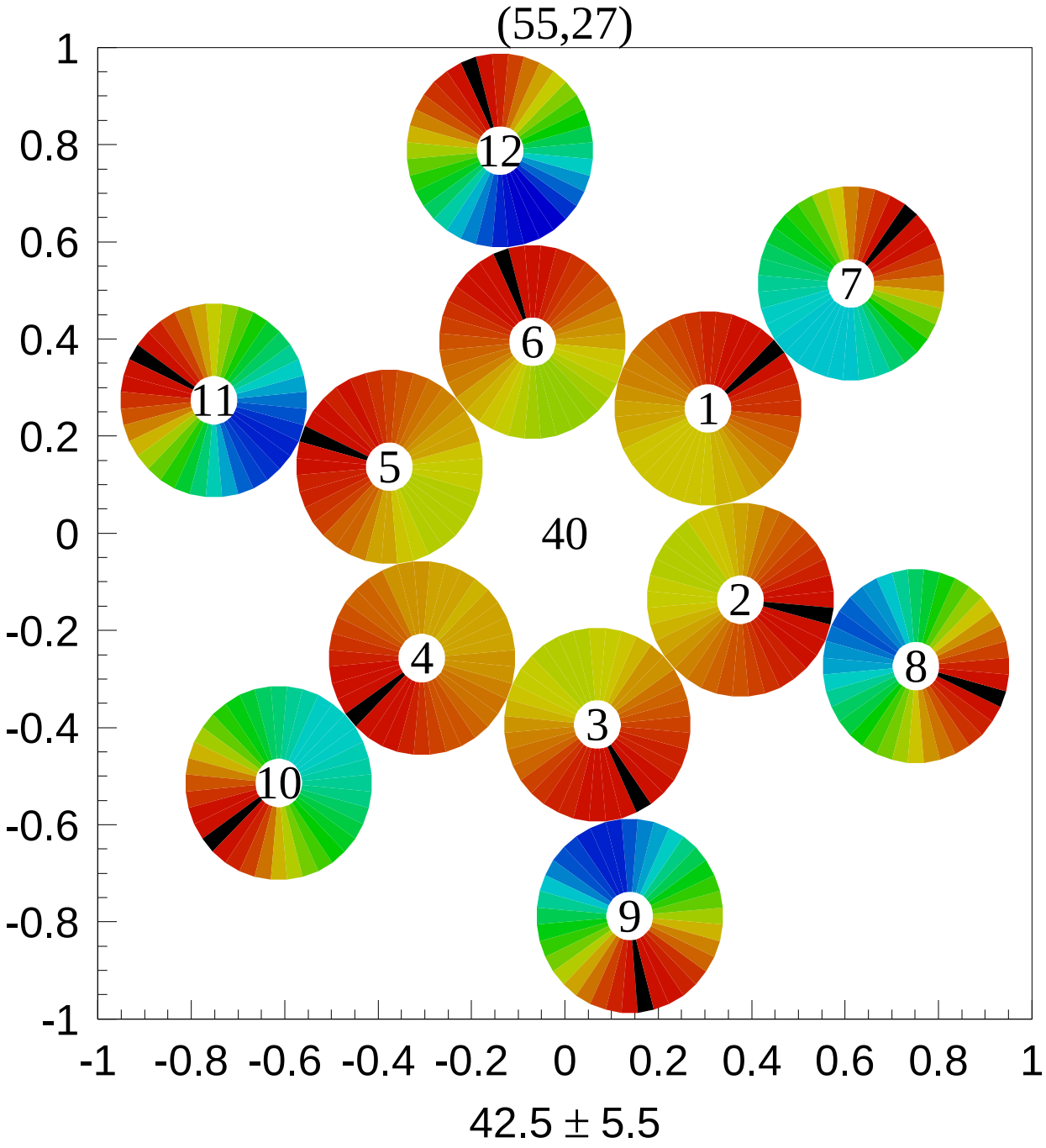

(55,25)
tilted LEDs
126 118 121 122 129 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
132 126 122 116 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

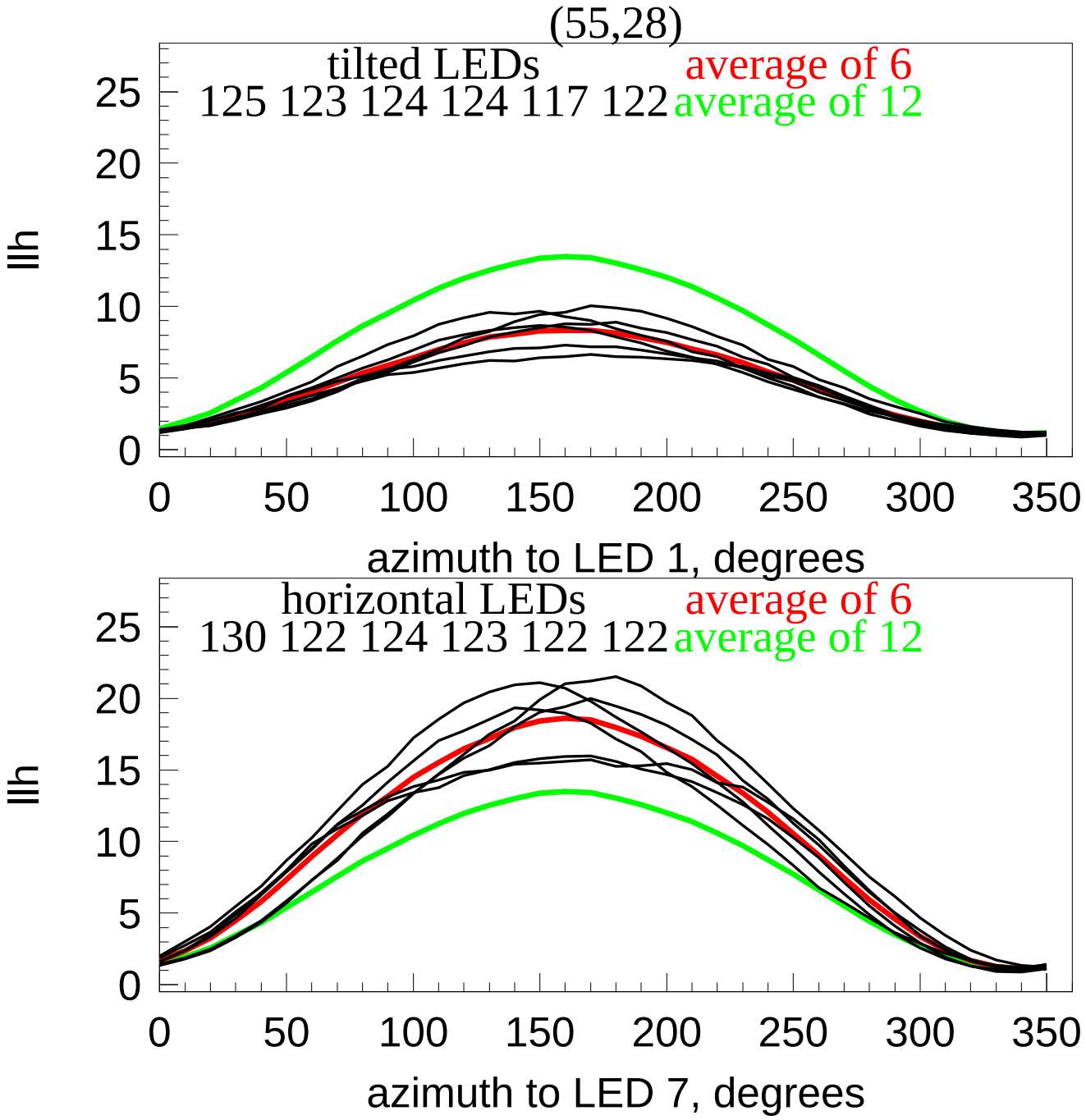

(55,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
22.6 ± 4.5

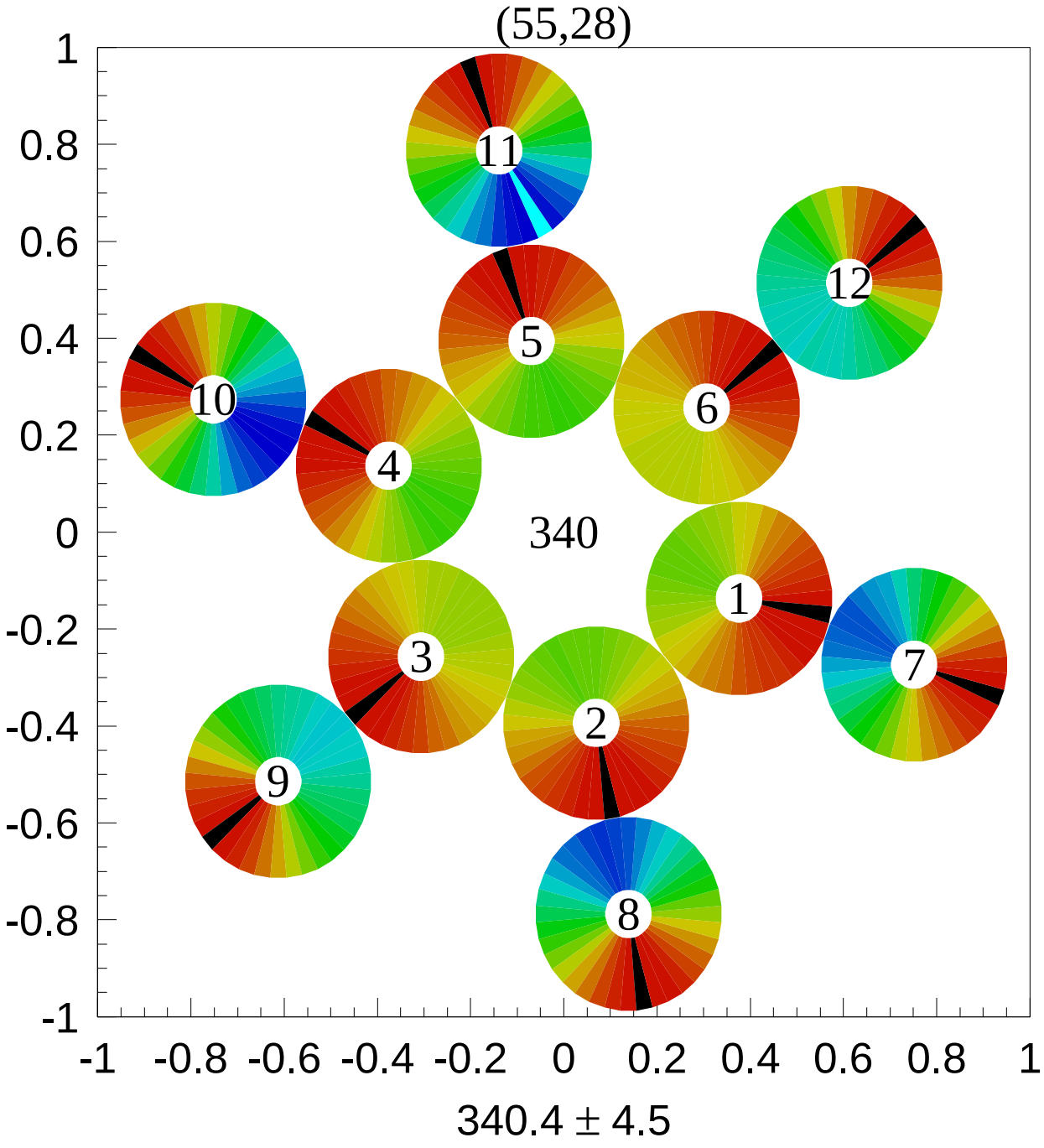

(55,26)
tilted LEDs
119 116 125 127 121 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 121 133 115 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

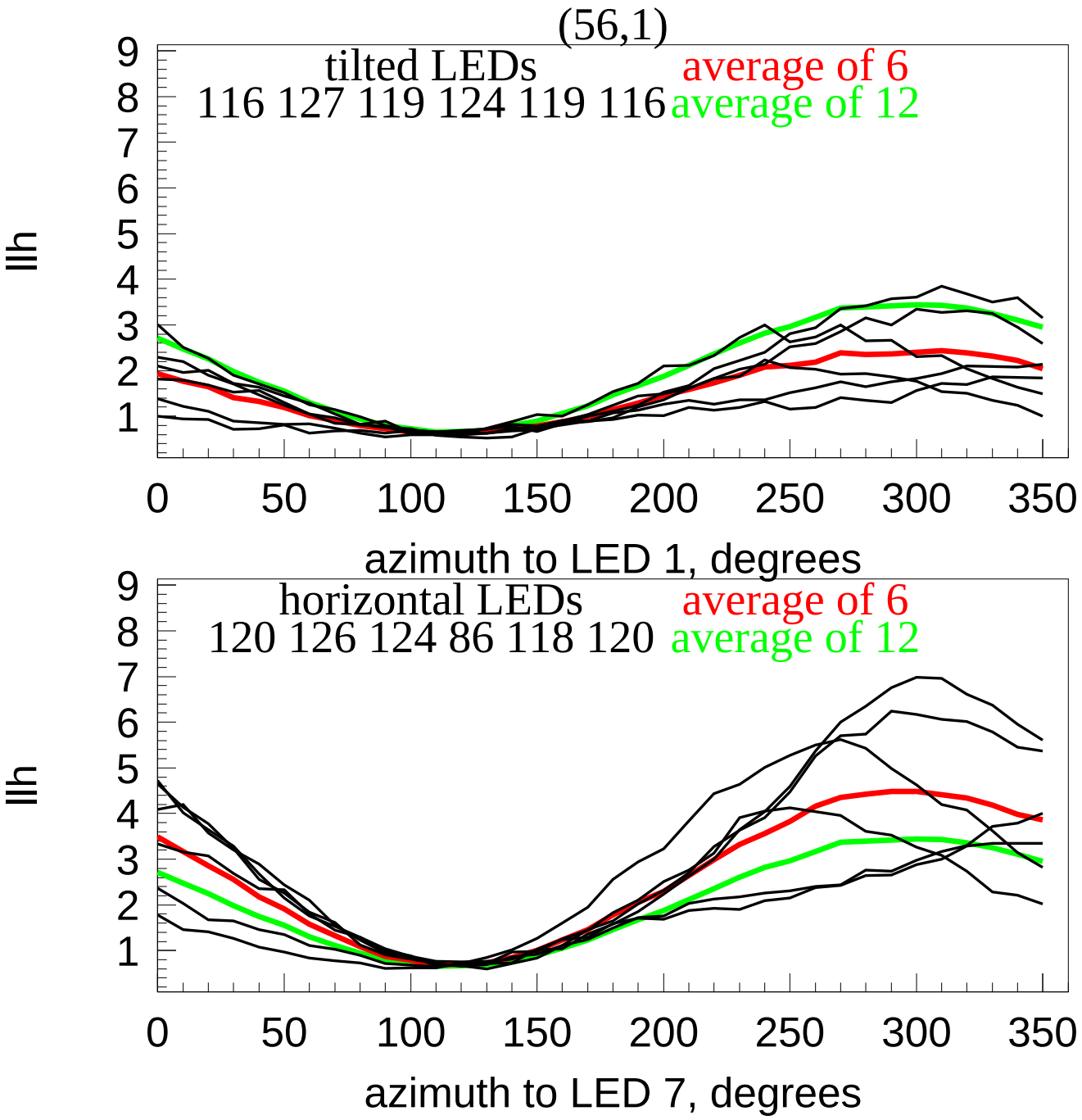

(55,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
285.4 ± 6.1

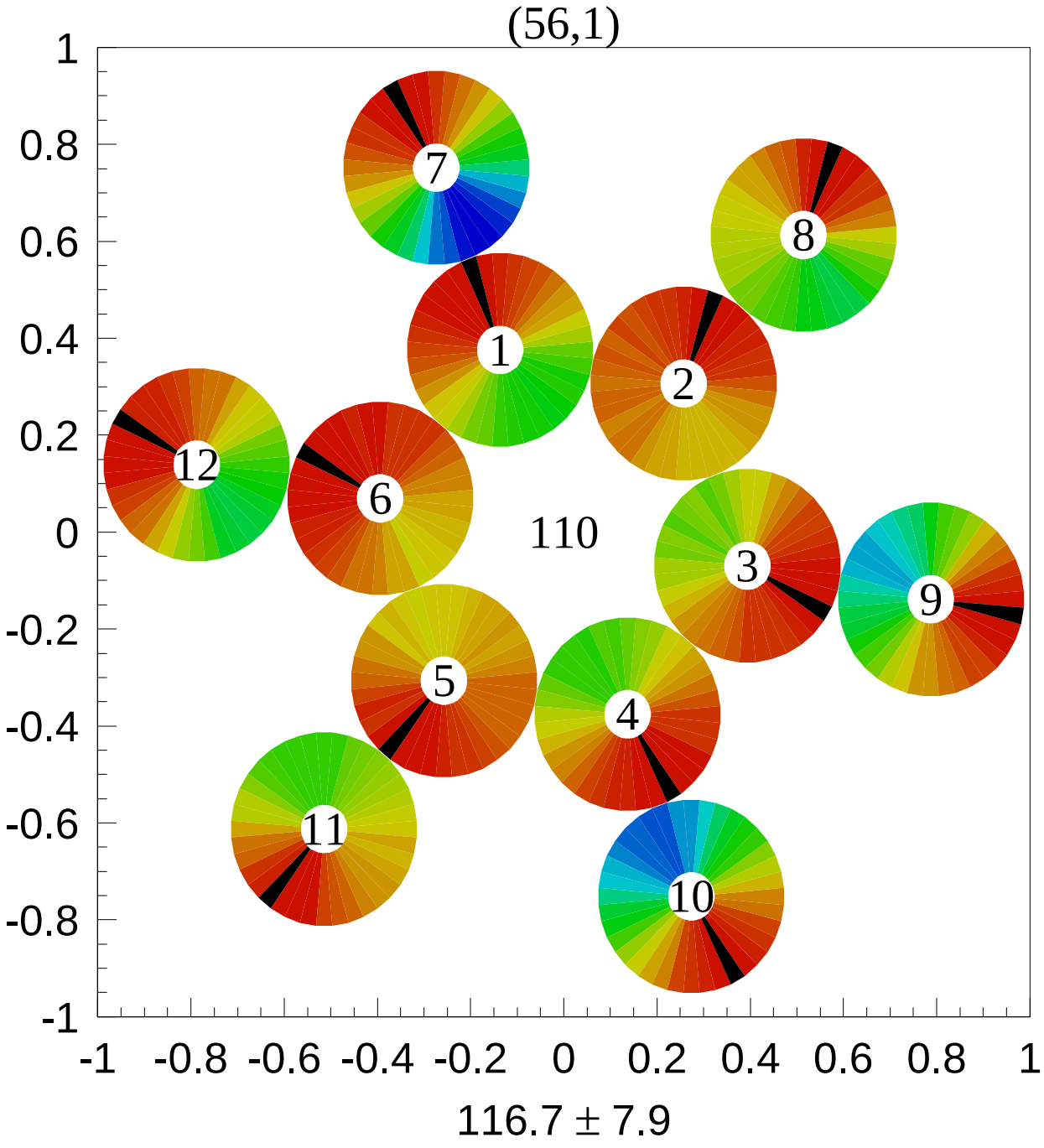

(55,27)
tilted LEDs
121 115 120 126 126 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 122 119 125 127 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

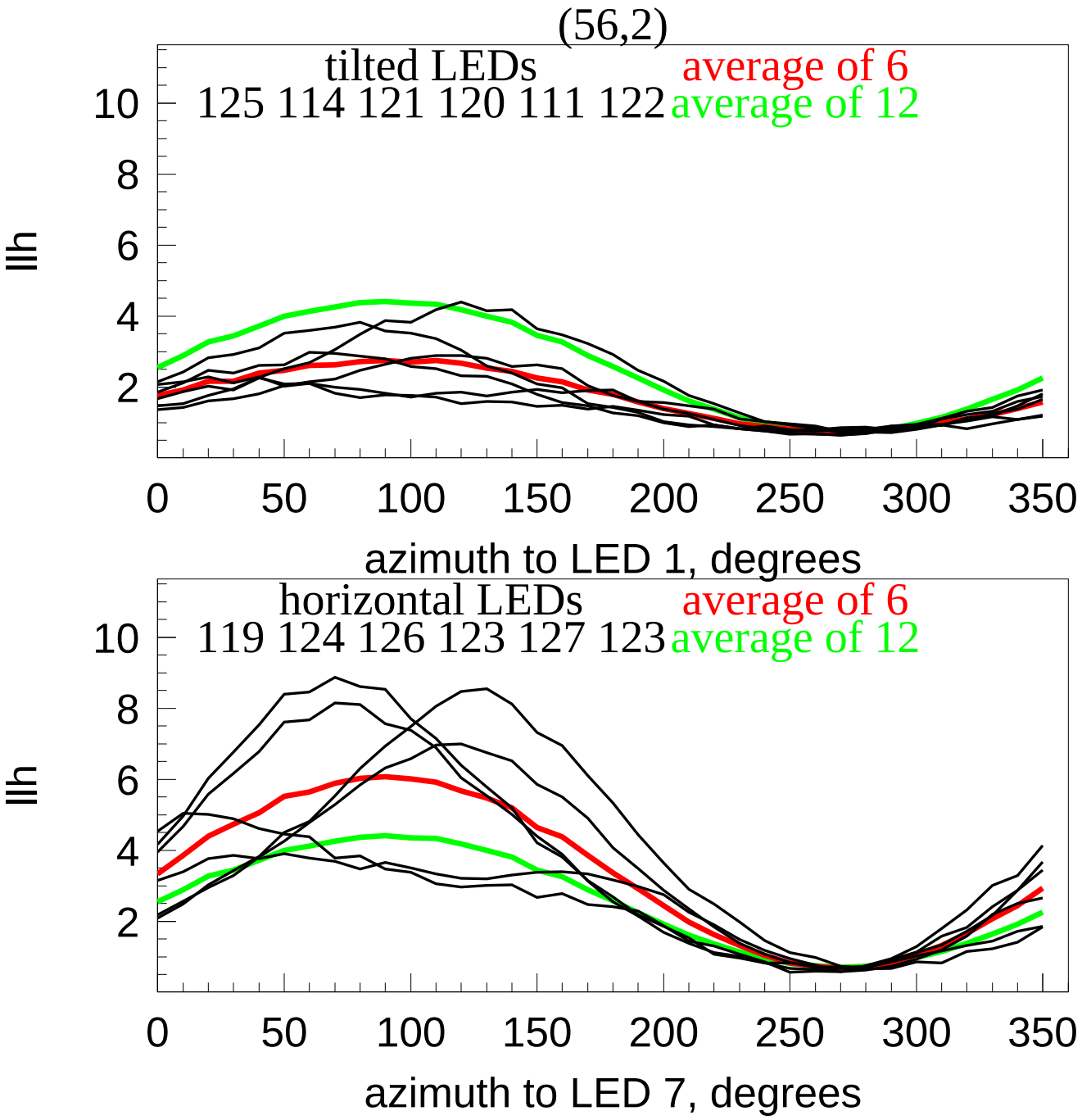

(55,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
42.5 ± 5.5

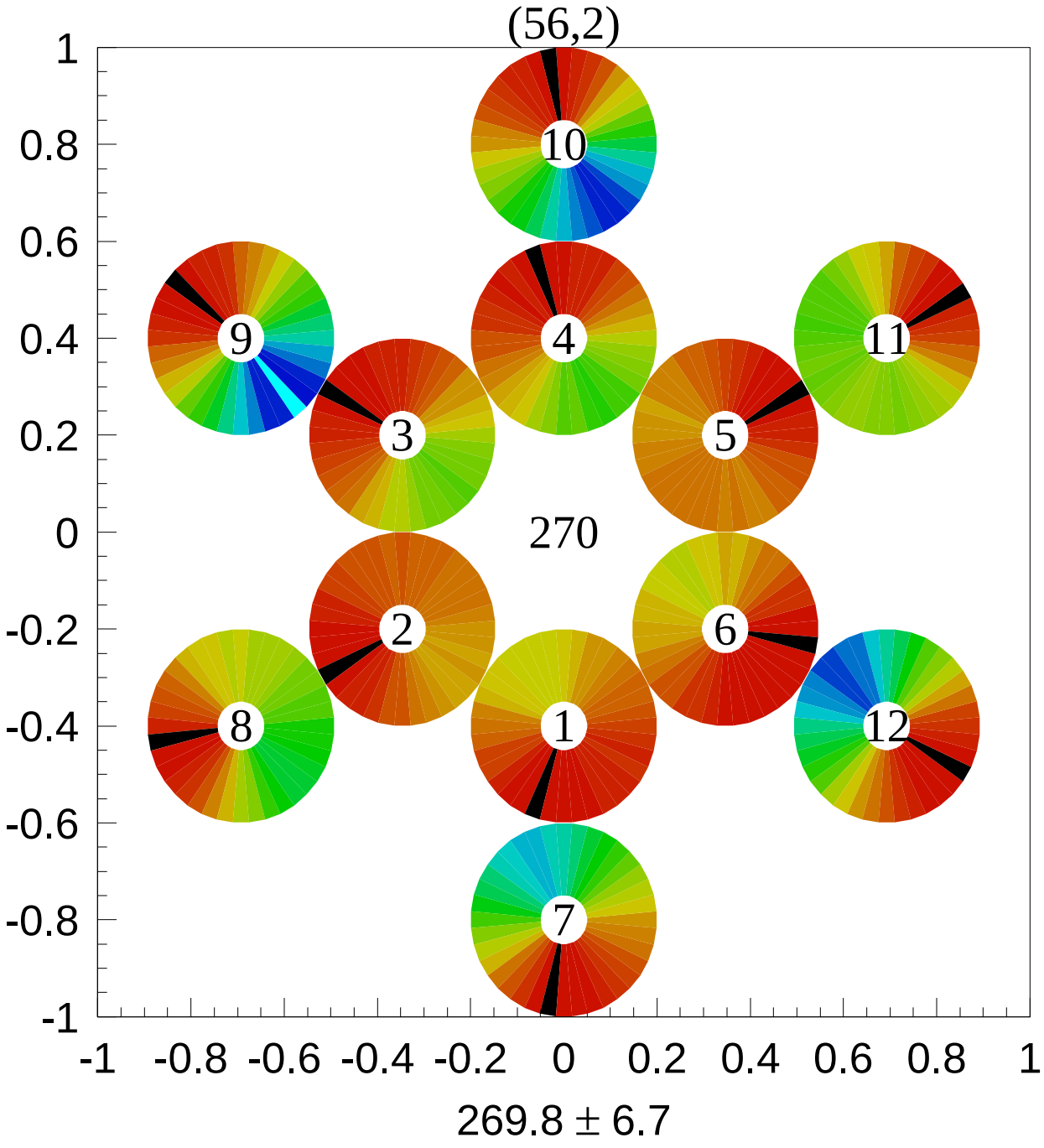

(55,28)
tilted LEDs
125 123 124 124 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 122 124 123 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

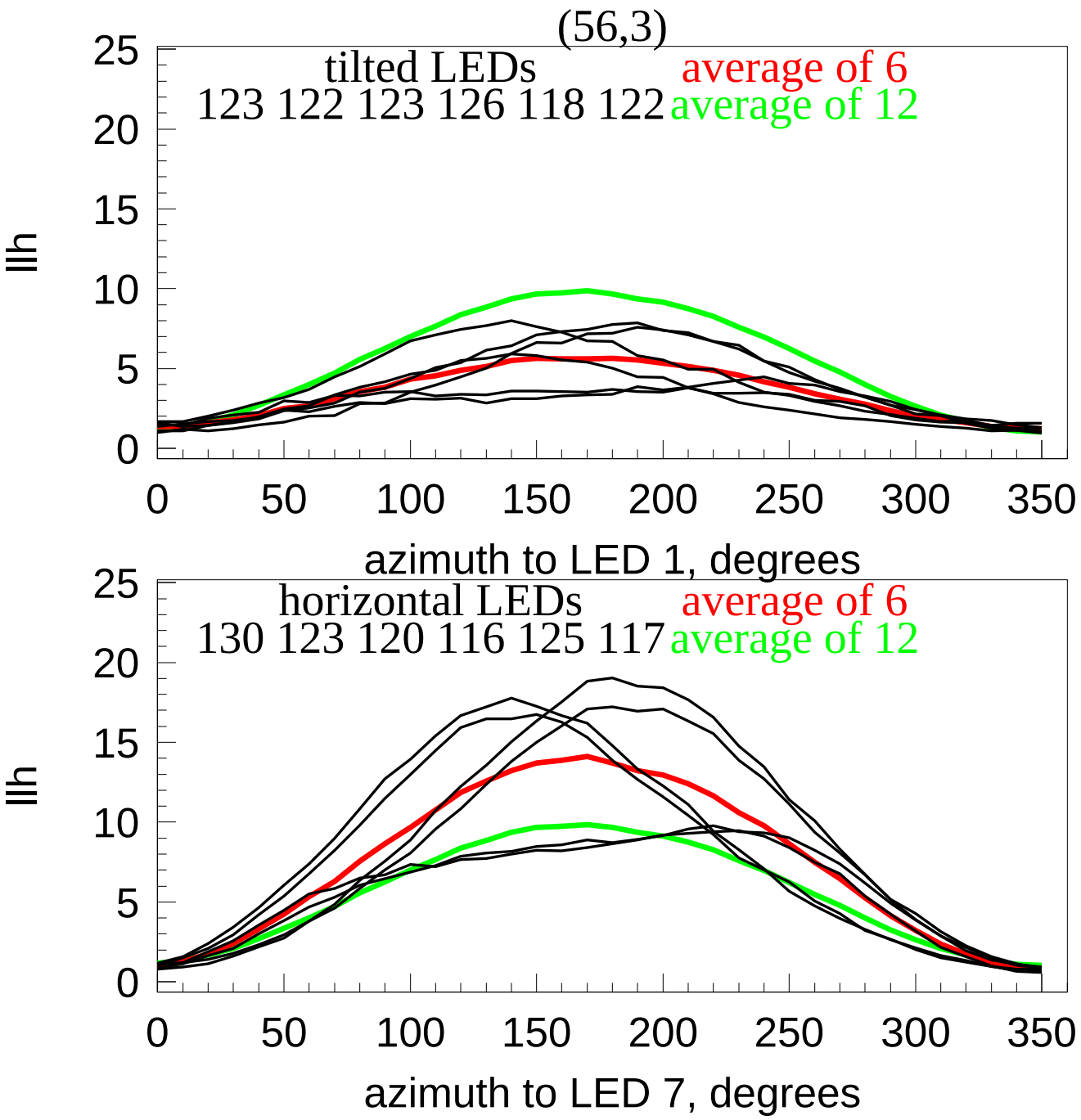

(55,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
340.4 ± 4.5

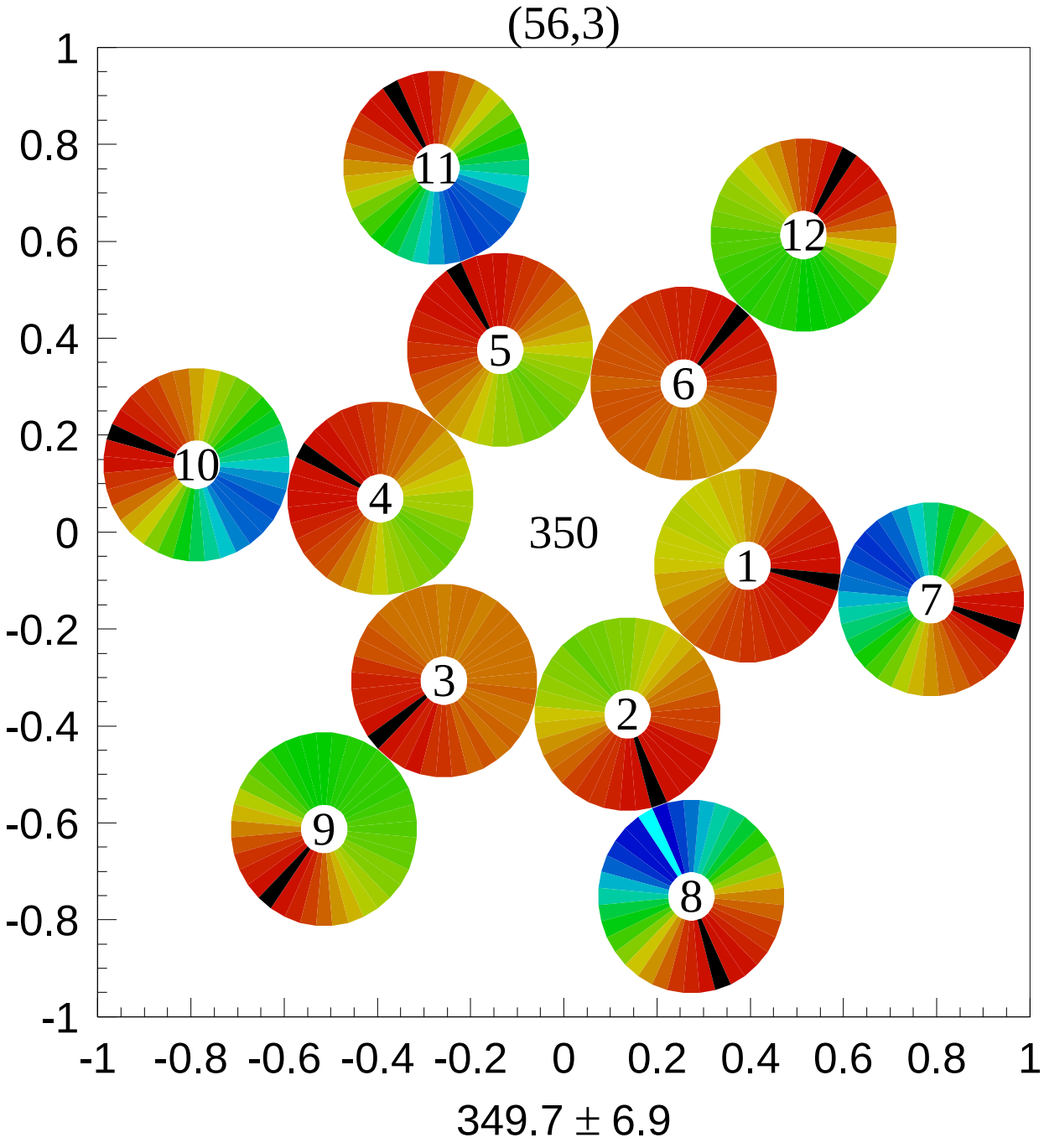

(56,1)
tilted LEDs
116 127 119 124 119 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 126 124 86 118 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

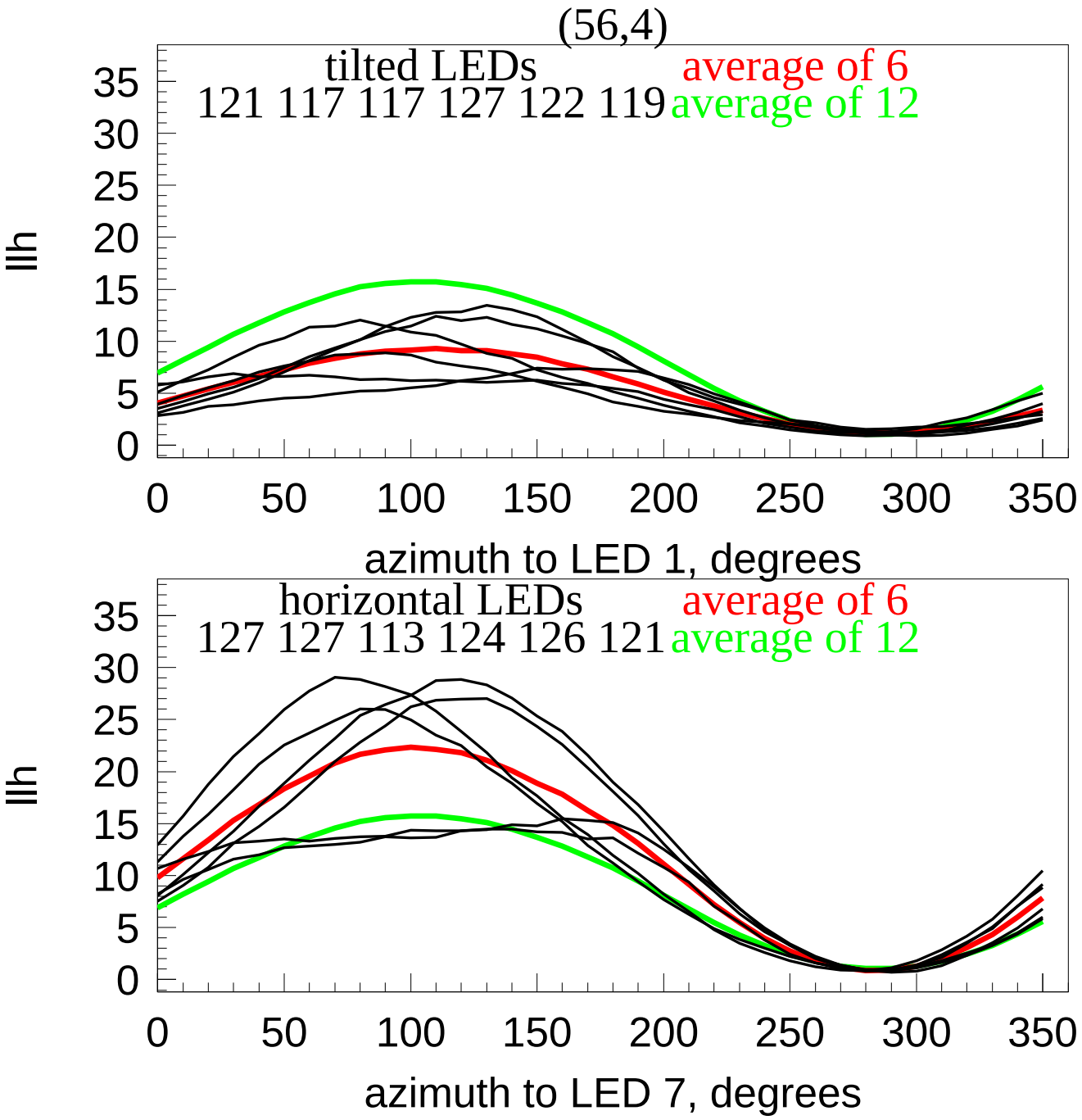

(56,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
116.7 ± 7.9

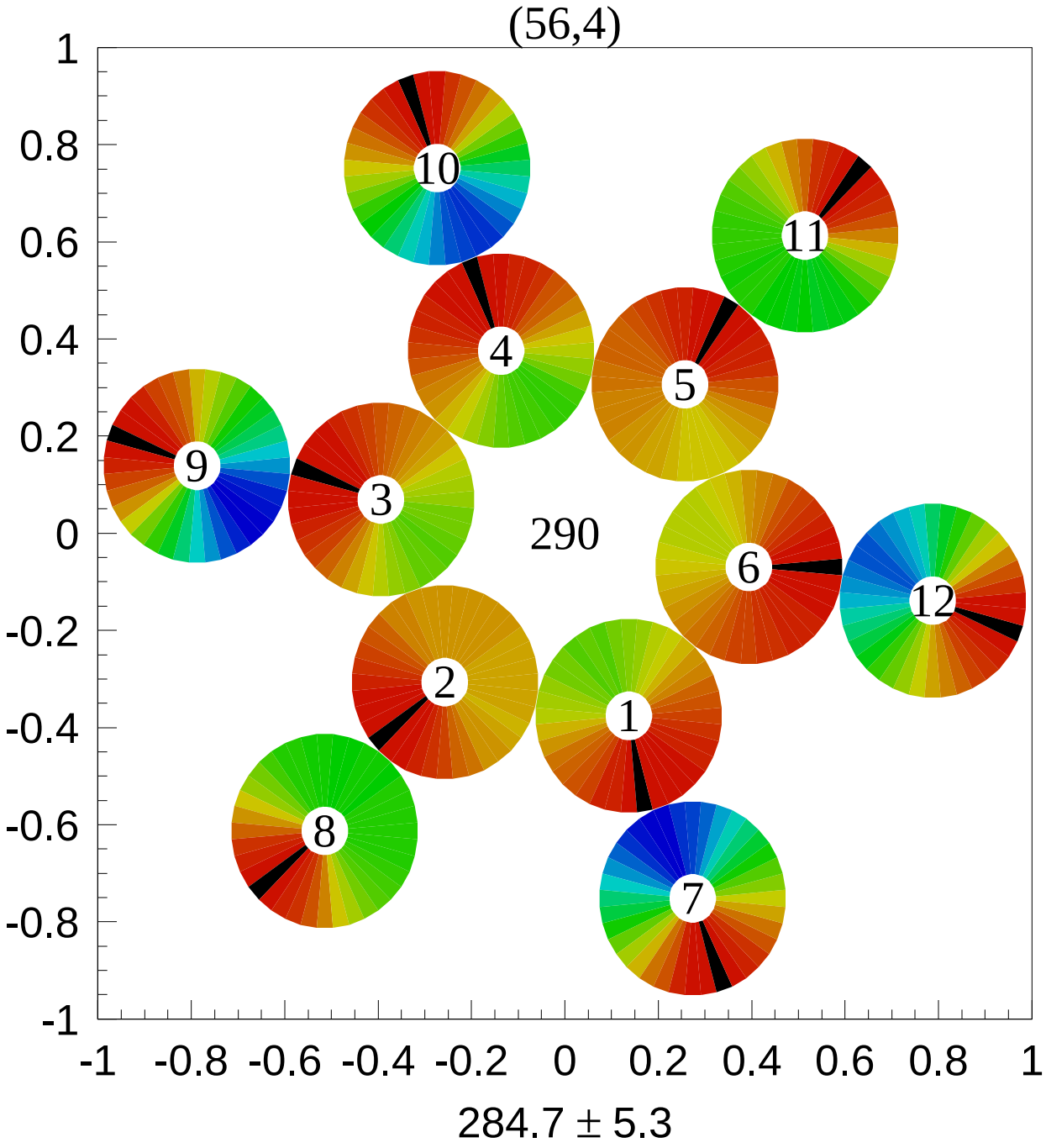

(56,2)
tilted LEDs
125 114 121 120 111 122
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 124 126 123 127 123
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

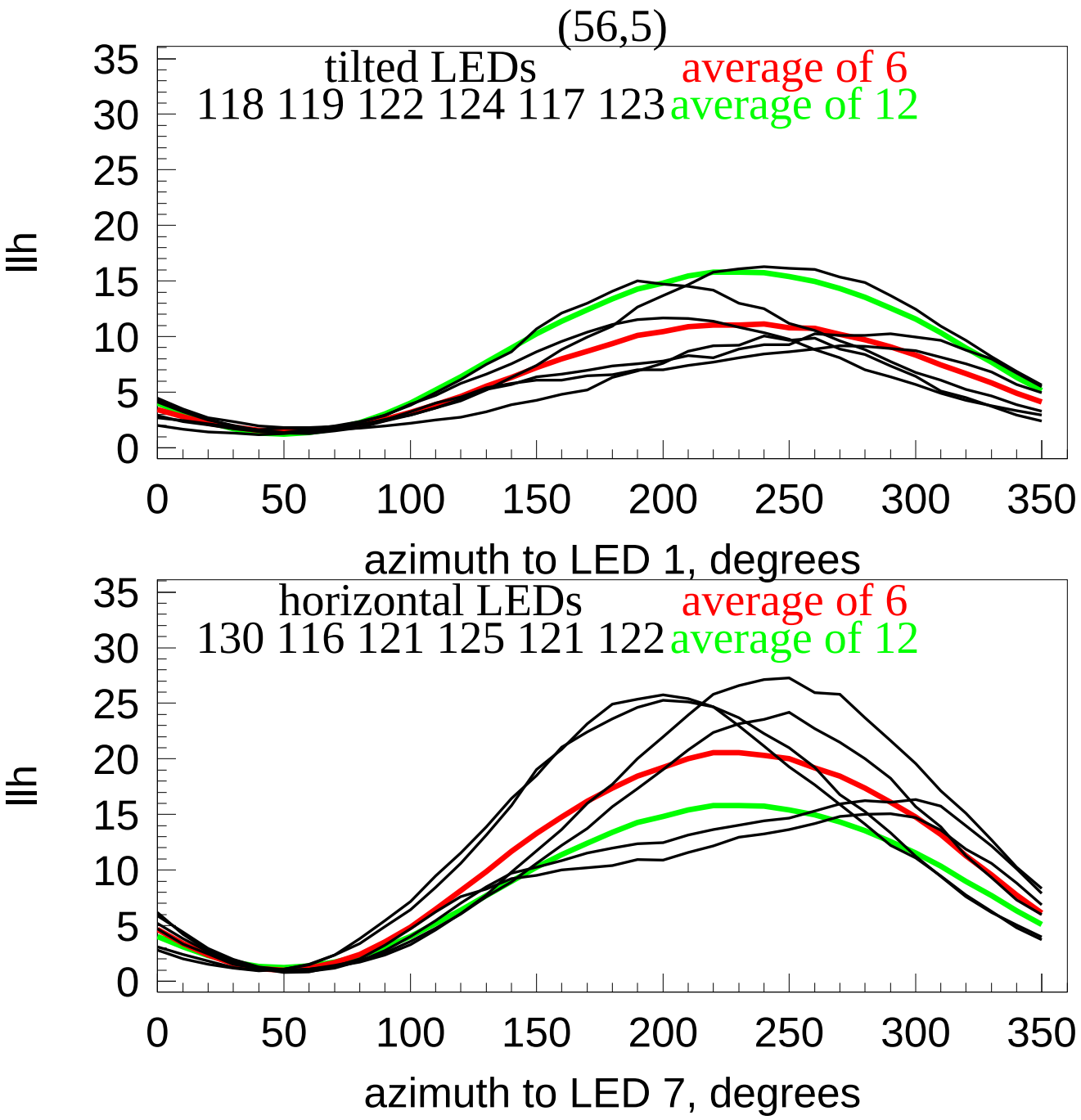

(56,2)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
269.8 ± 6.7

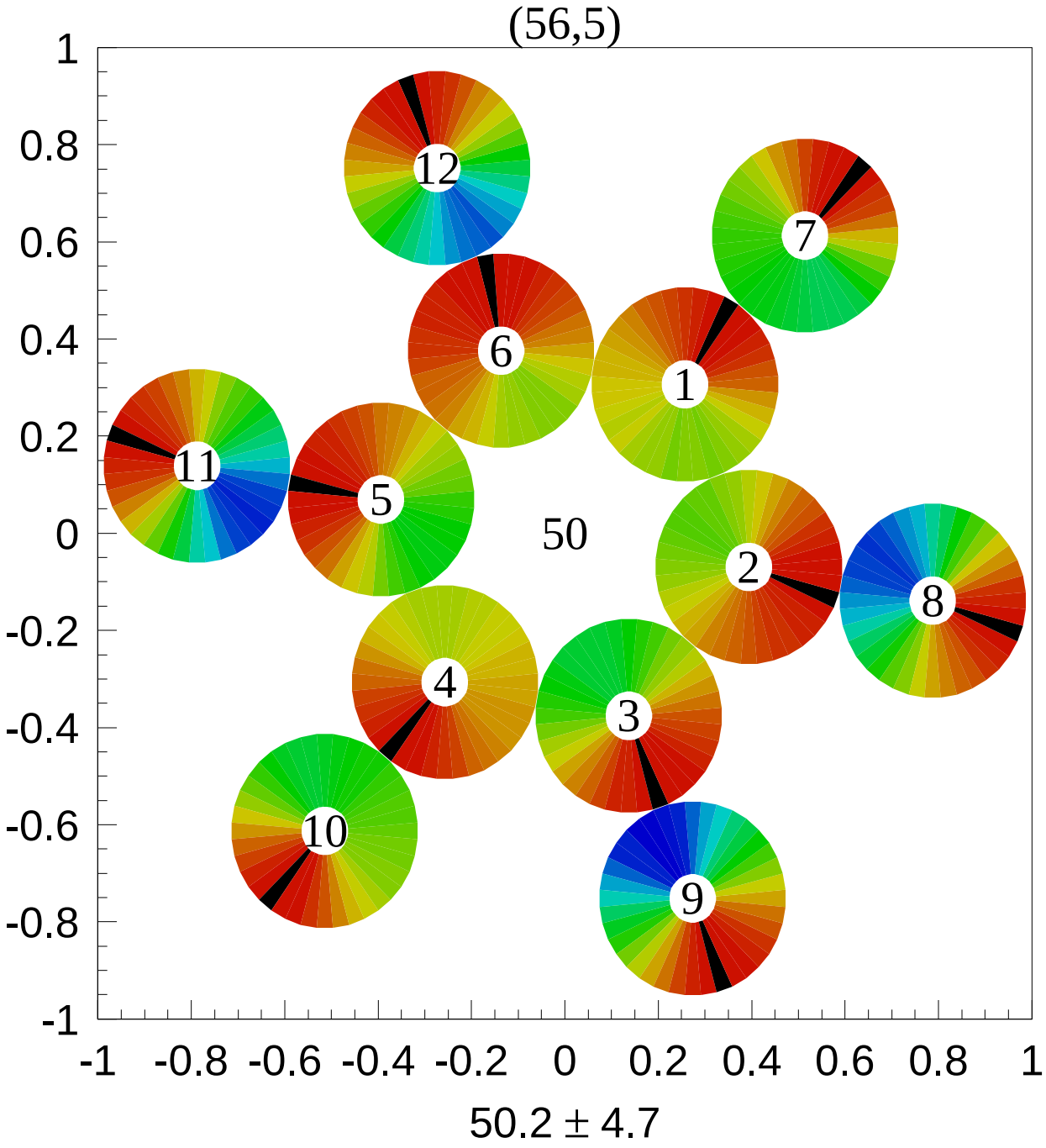

(56,3)
tilted LEDs
123 122 123 126 118 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 123 120 116 125 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

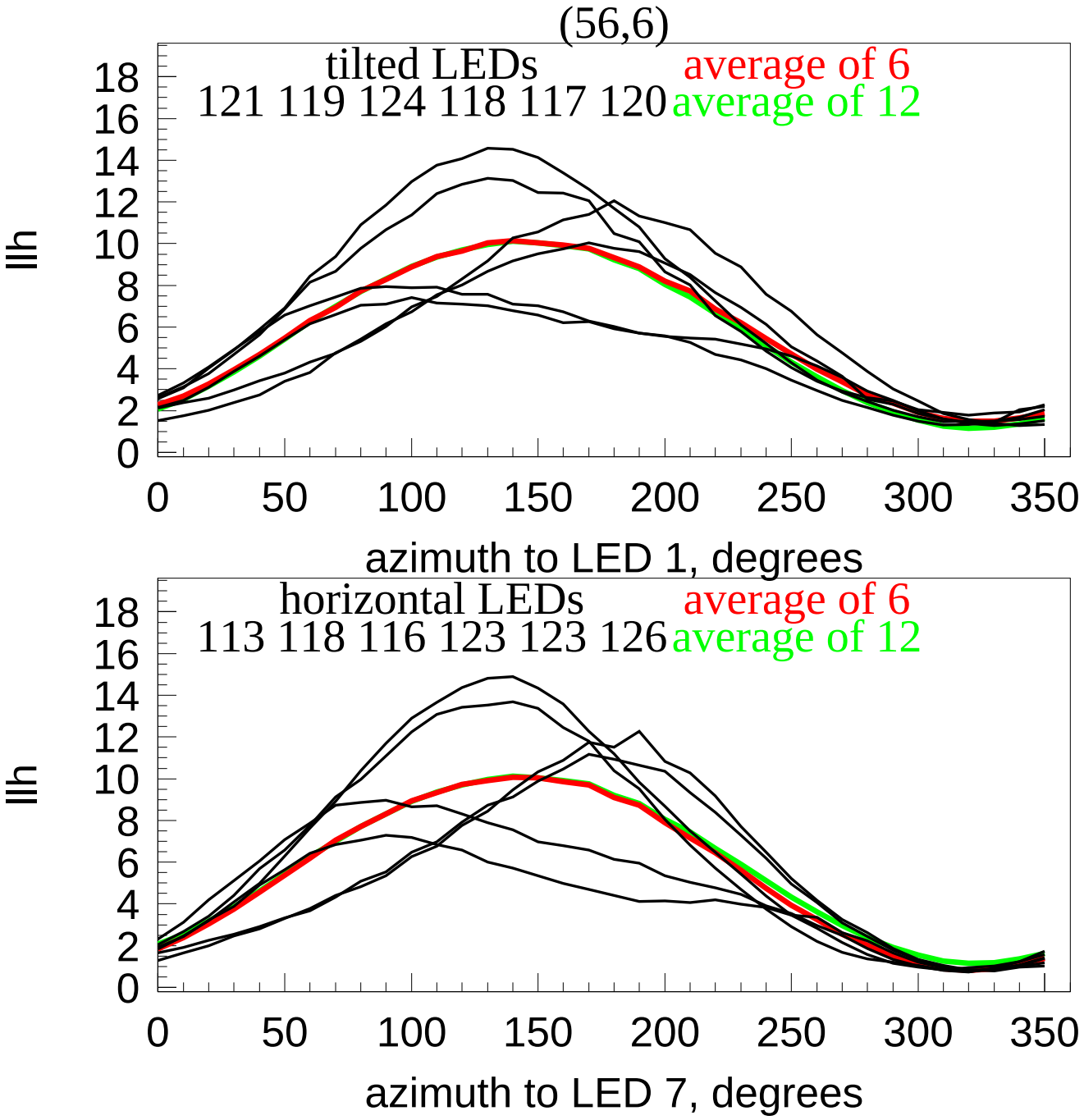

(56,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
349.7 ± 6.9

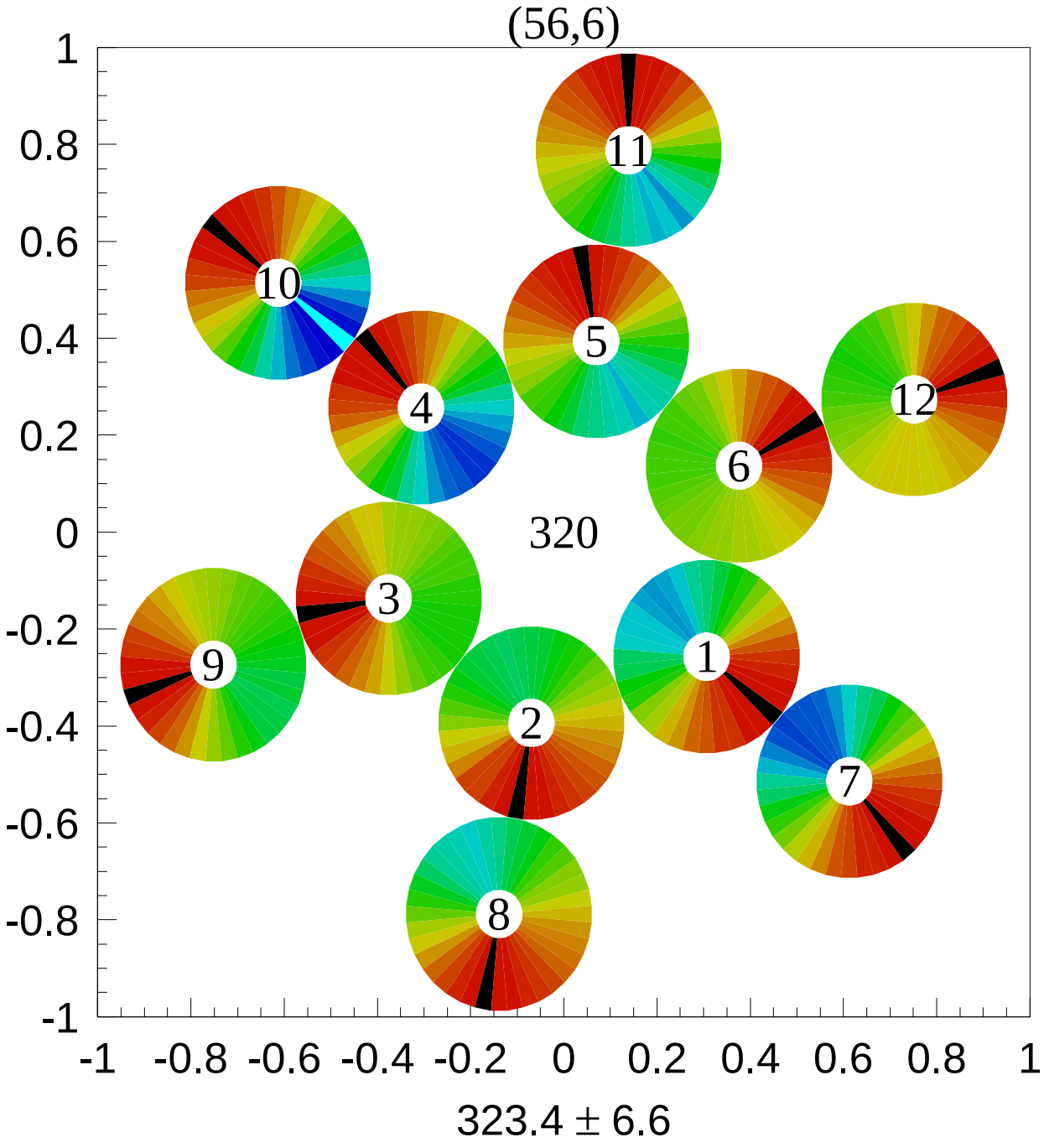

(56,4)
tilted LEDs
121 117 117 127 122 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 127 113 124 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

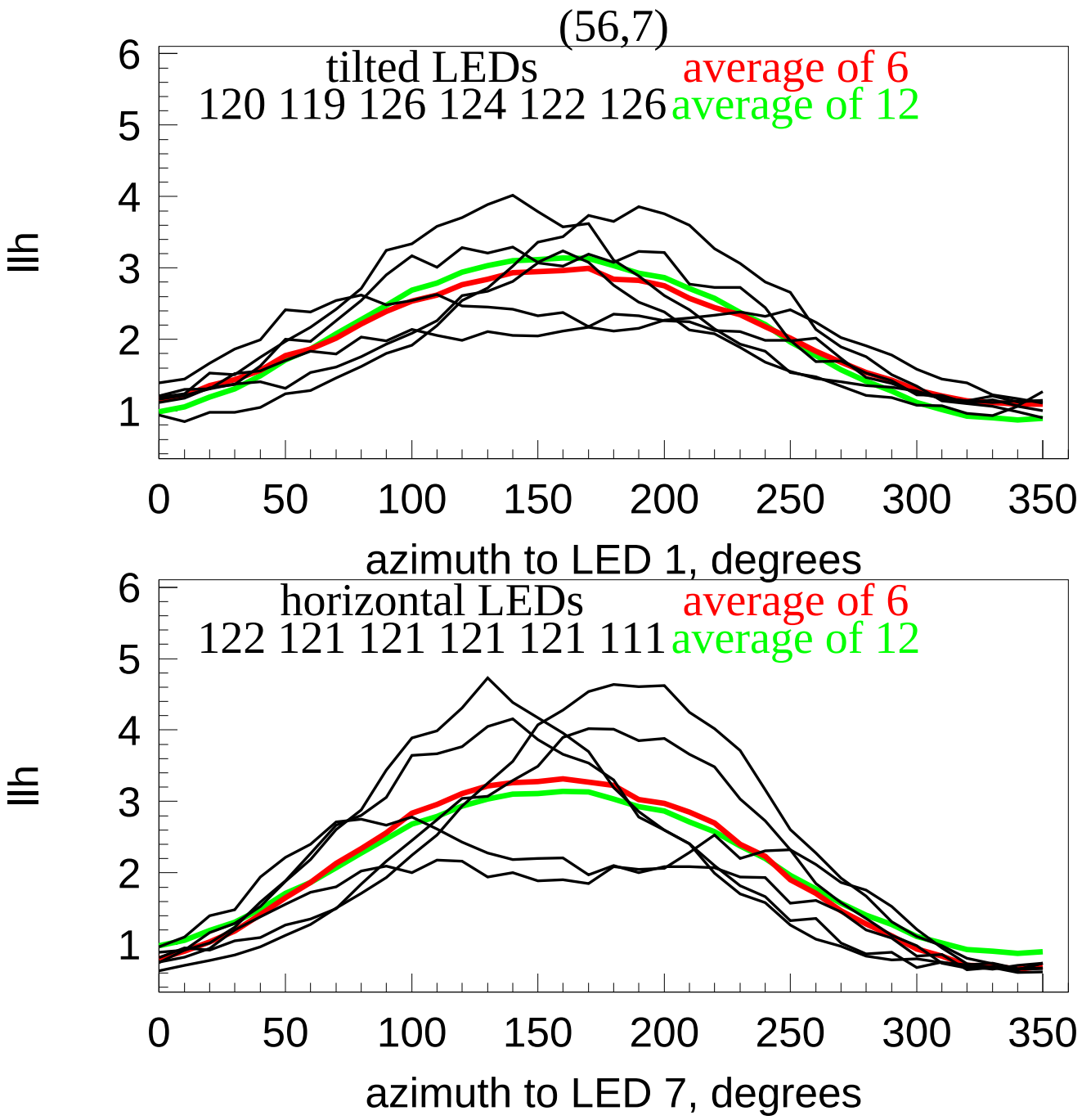

(56,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
284.7 ± 5.3

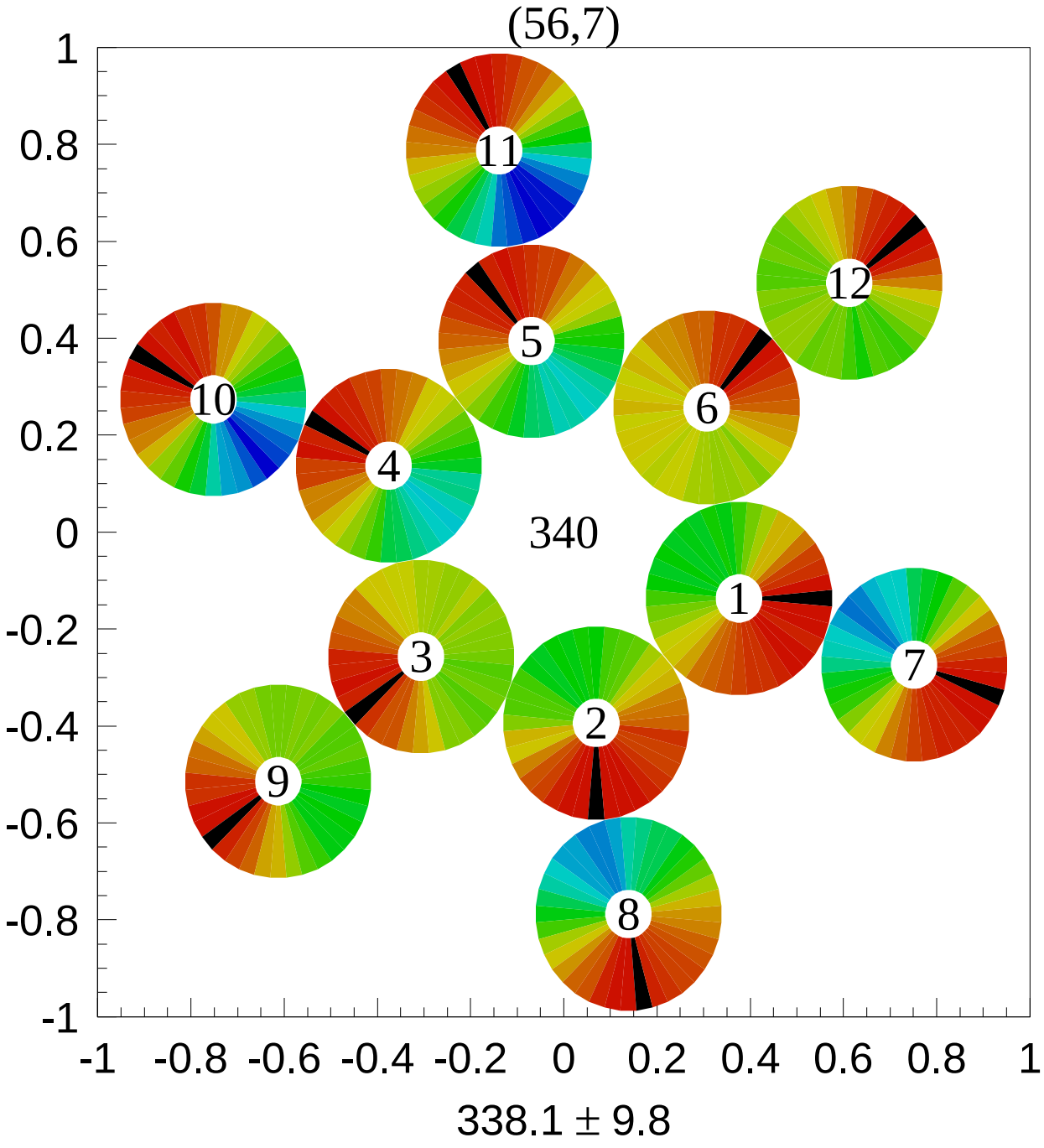

(56,5)
tilted LEDs
118 119 122 124 117 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 116 121 125 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

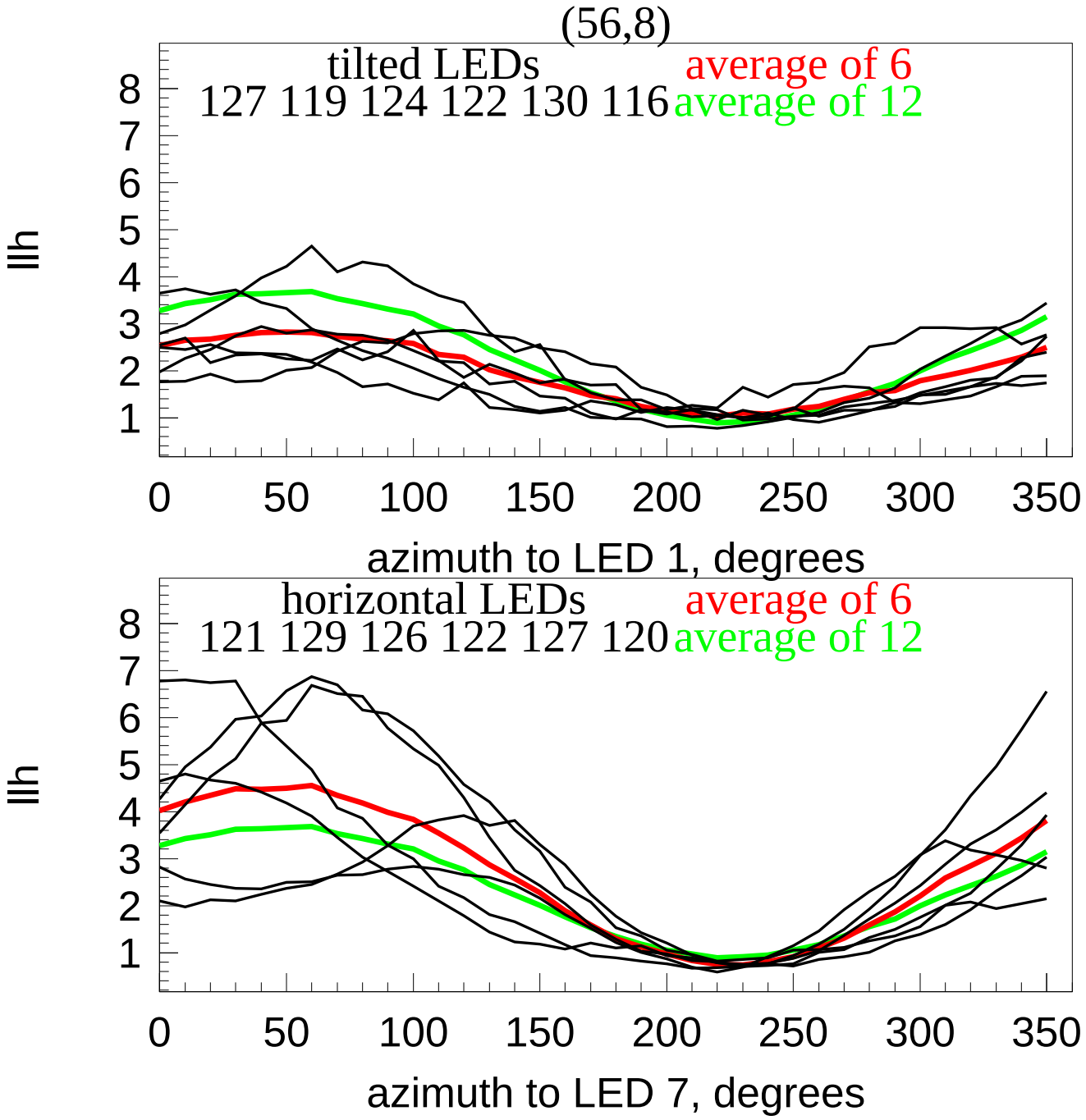

(56,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
50.2 ± 4.7

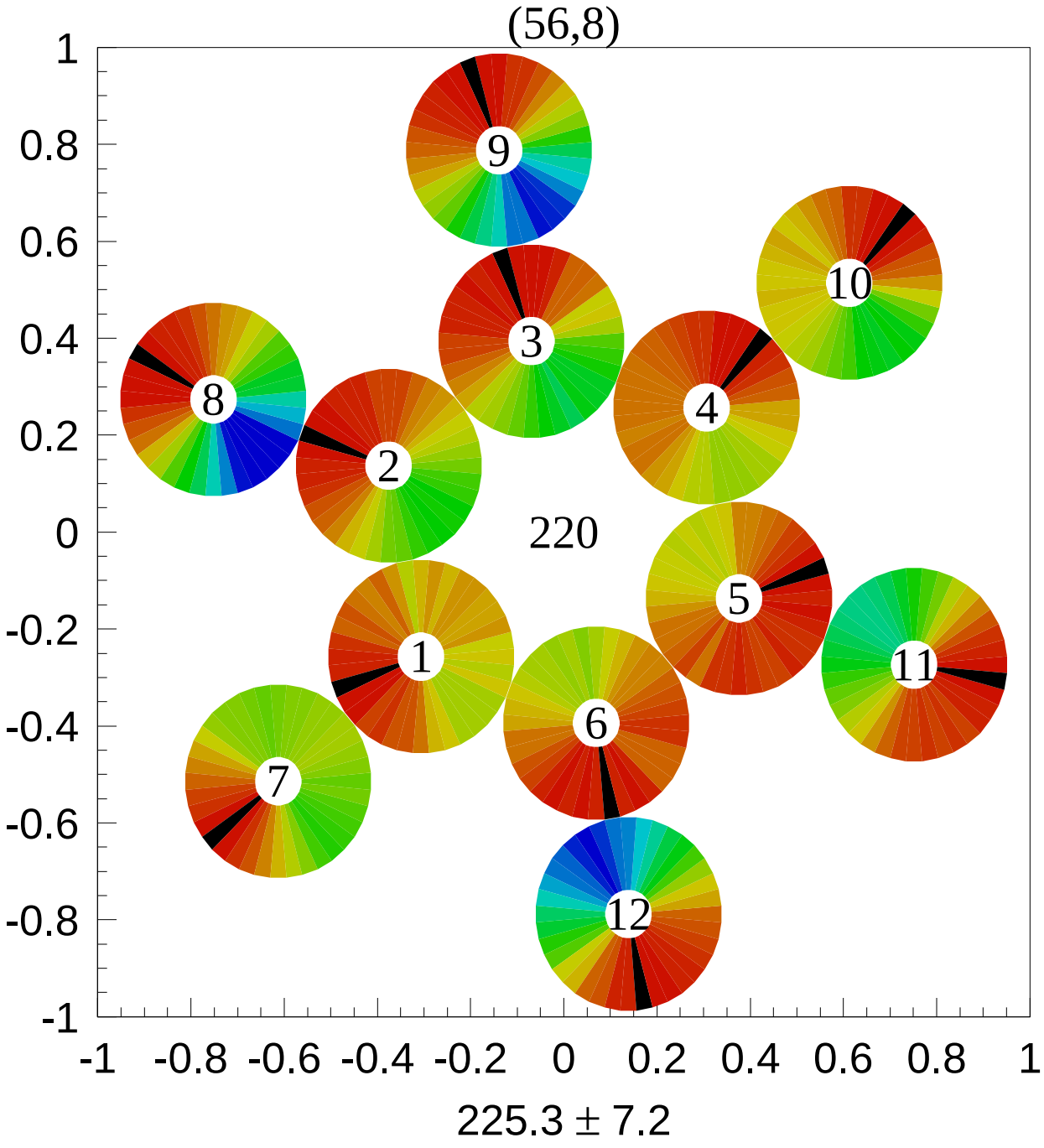

(56,6)
tilted LEDs
121 119 124 118 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 118 116 123 123 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

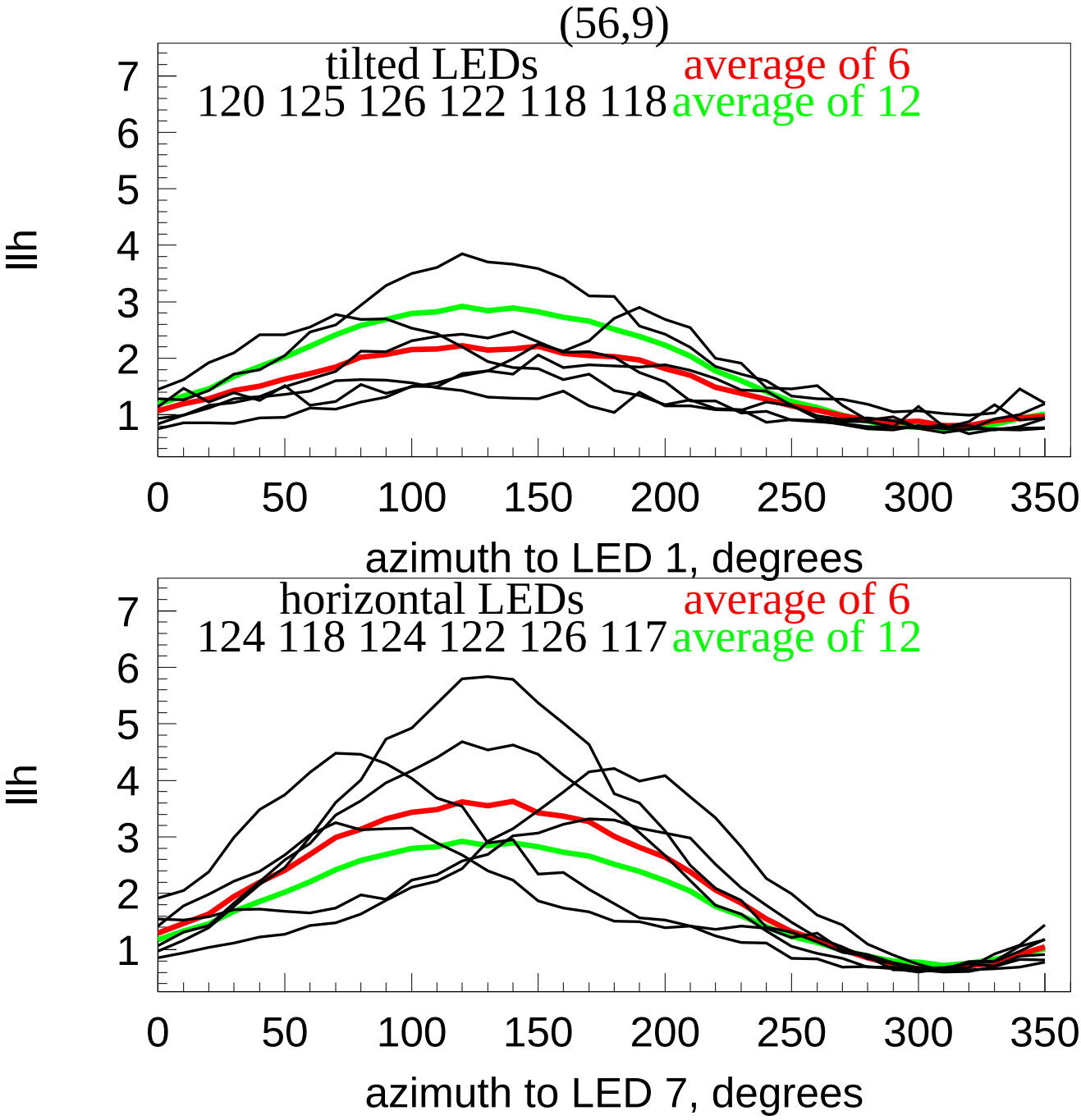

(56,6)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
323.4 ± 6.6

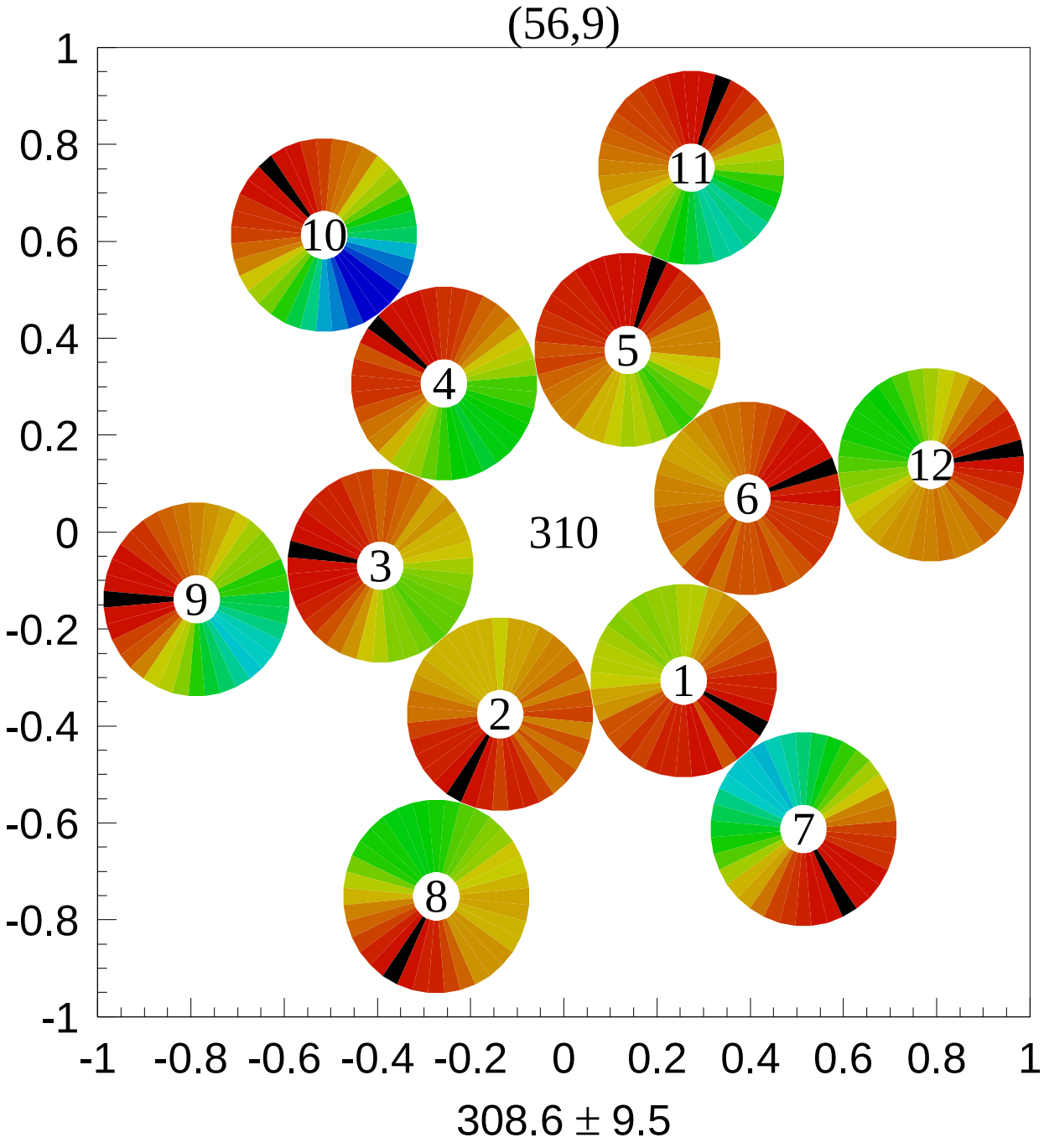

(56,7)
tilted LEDs
120 119 126 124 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 121 121 121 111
average of 6
average of 12
llh
azimuth to LED 7, degrees

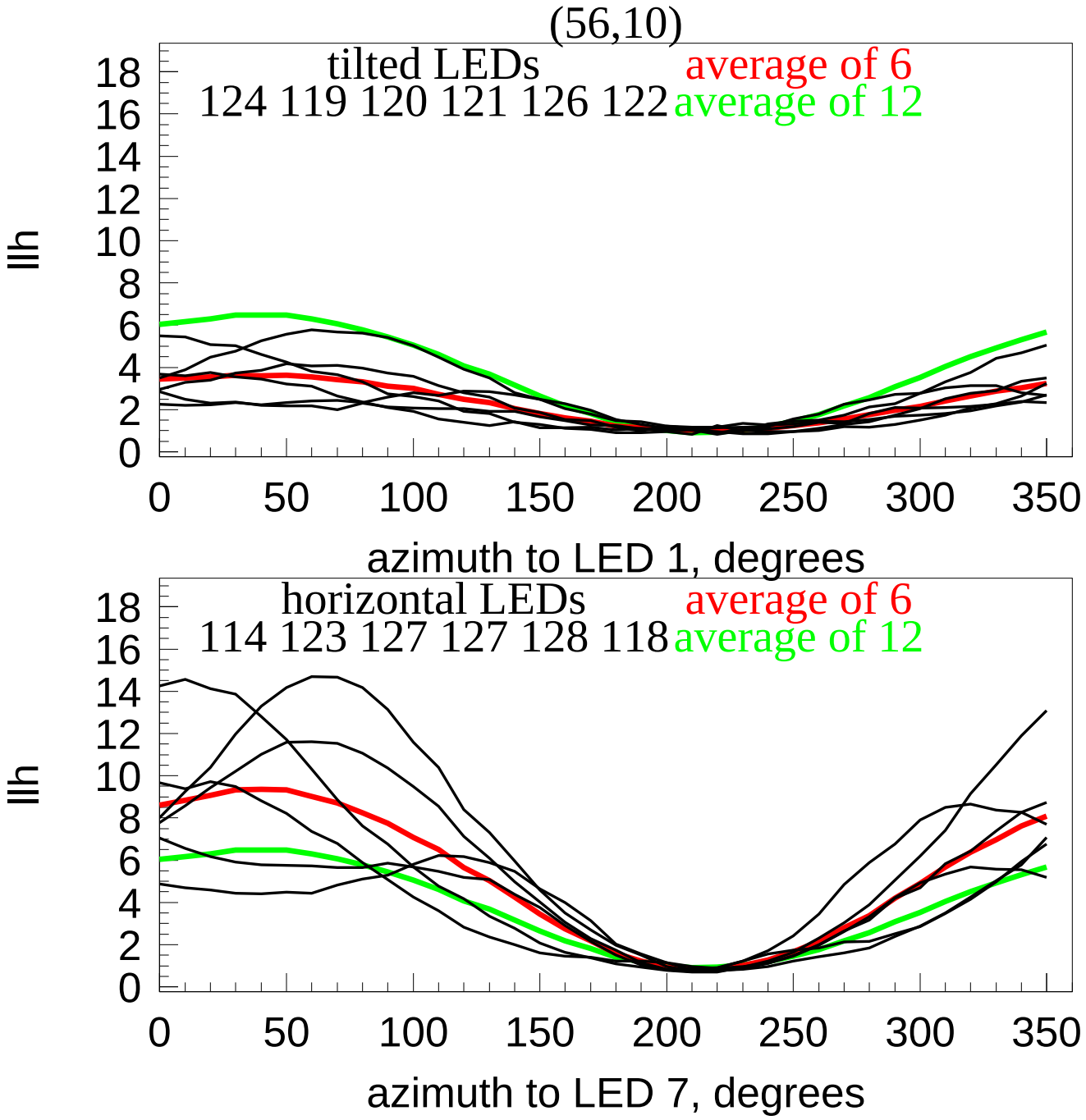

(56,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
338.1 ± 9.8

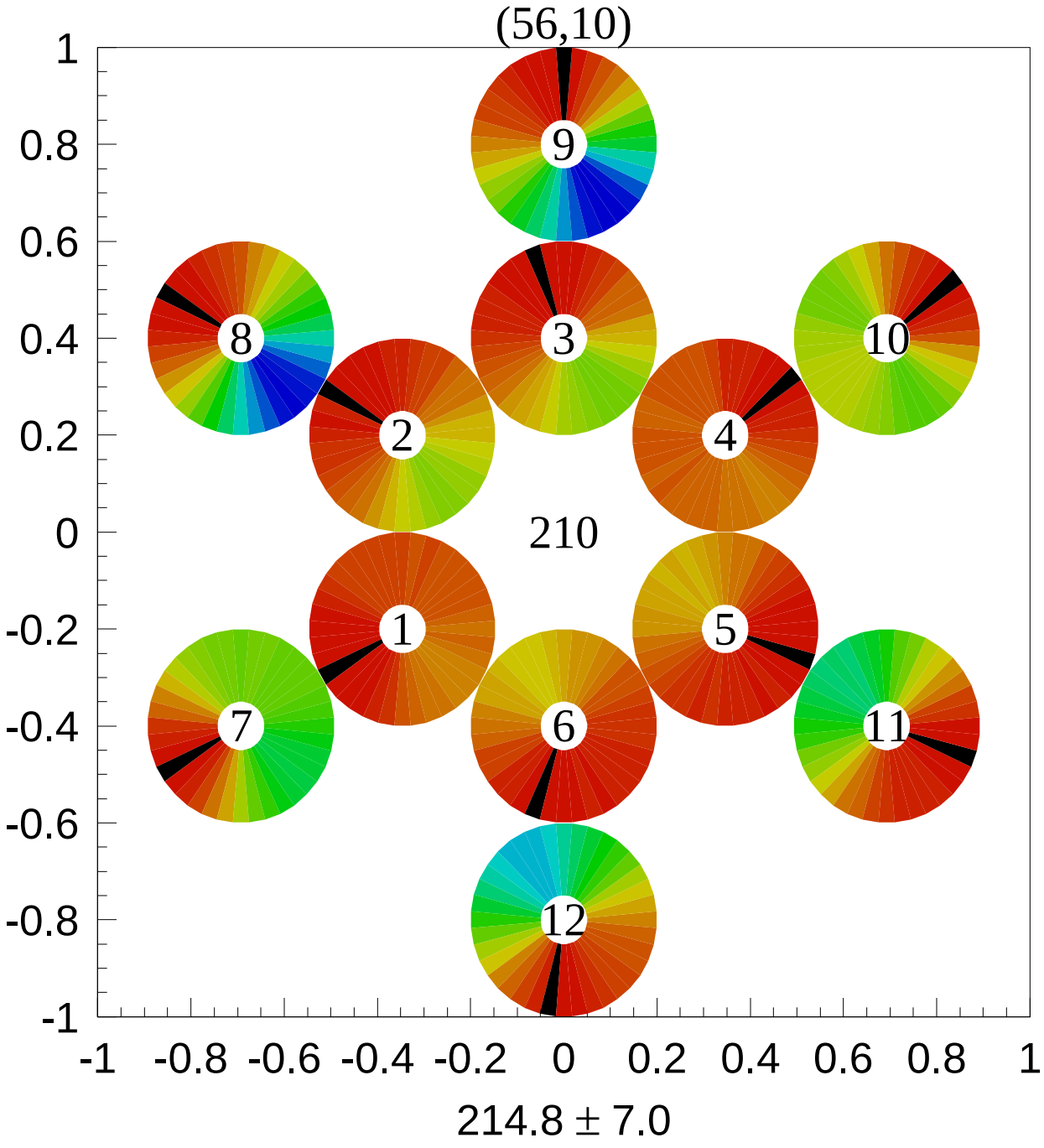

(56,8)
tilted LEDs
127 119 124 122 130 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 129 126 122 127 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

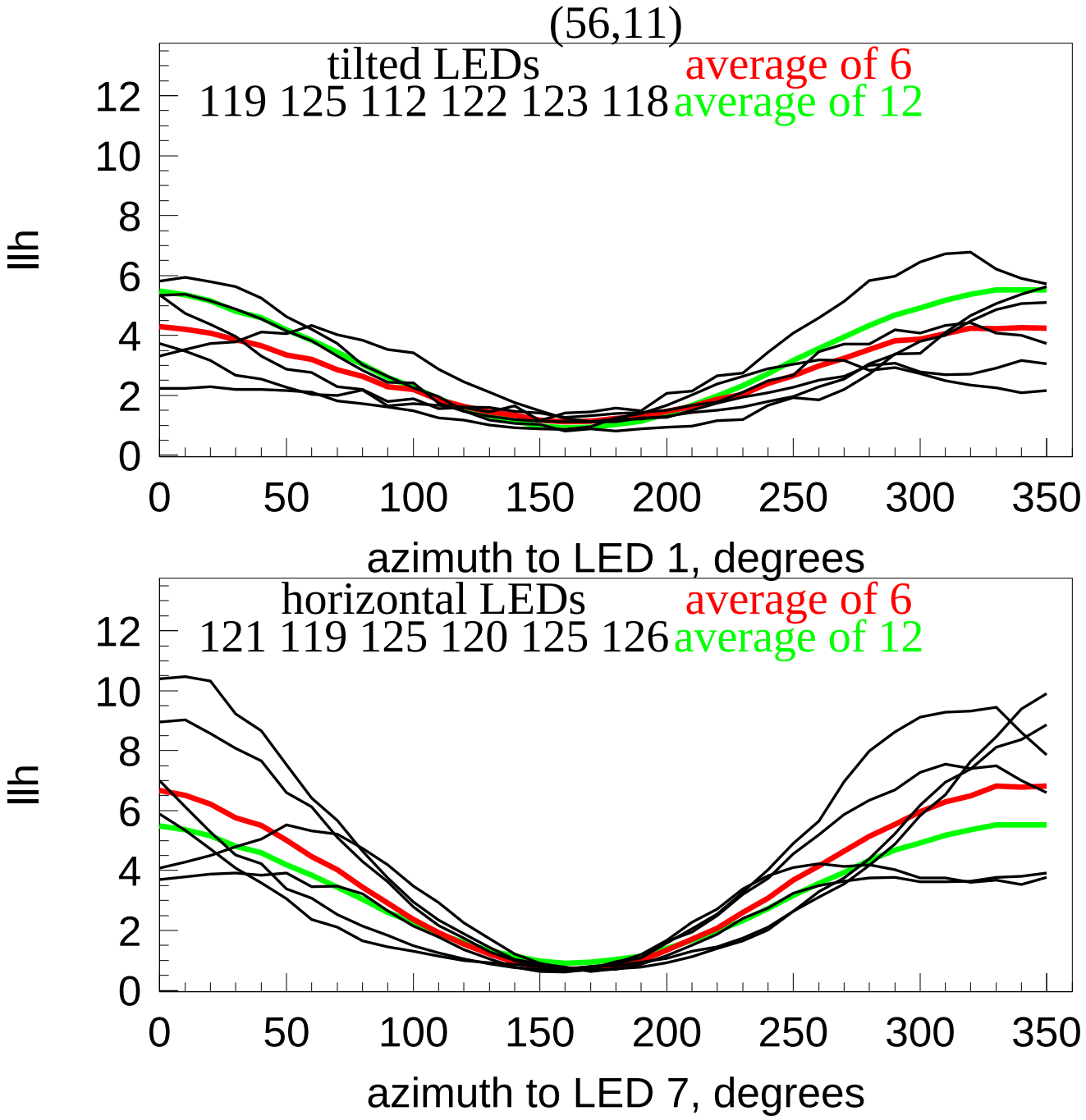

(56,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
225.3 ± 7.2

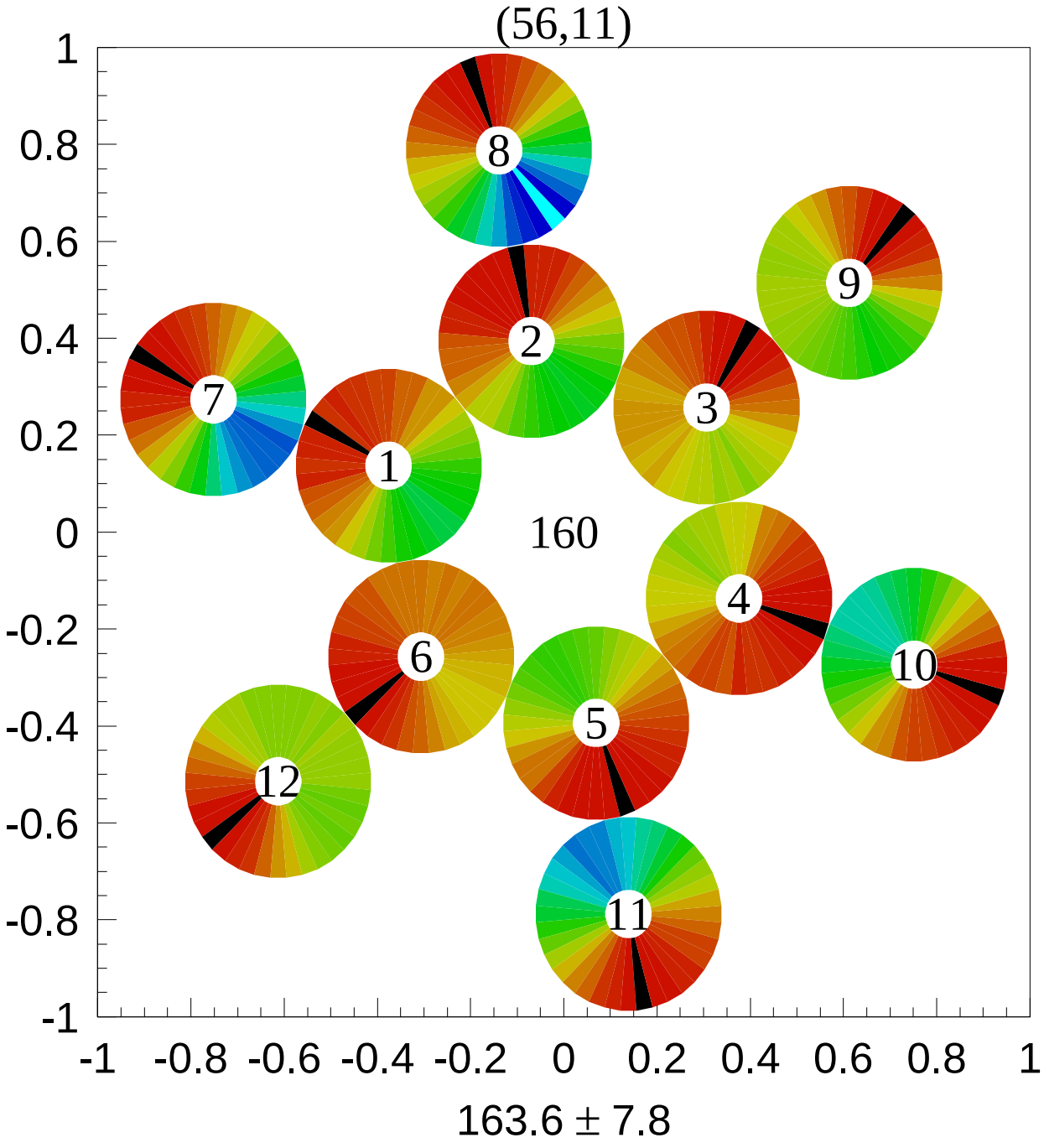

(56,9)
tilted LEDs
120 125 126 122 118 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 118 124 122 126 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

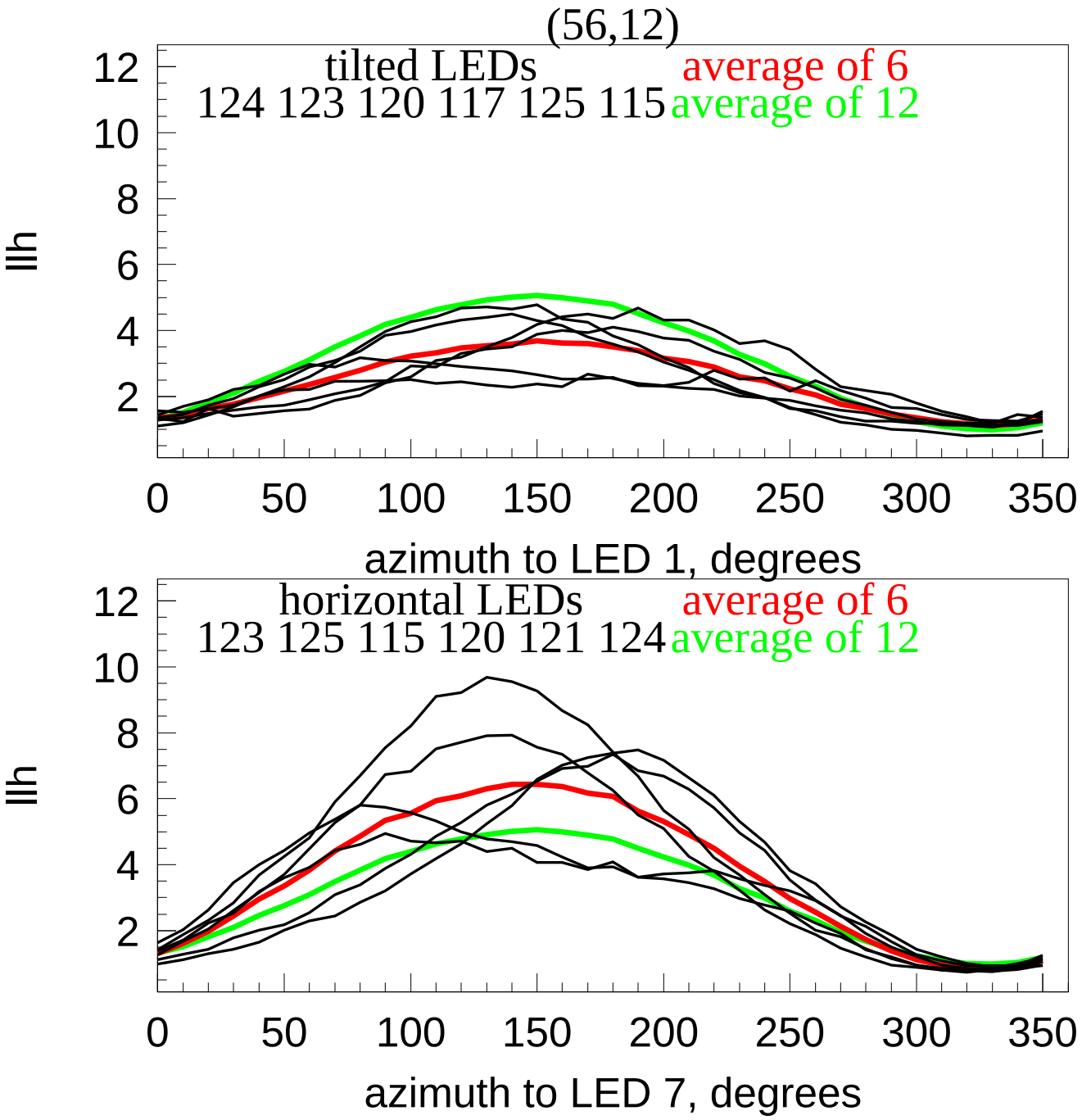

(56,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
308.6 ± 9.5

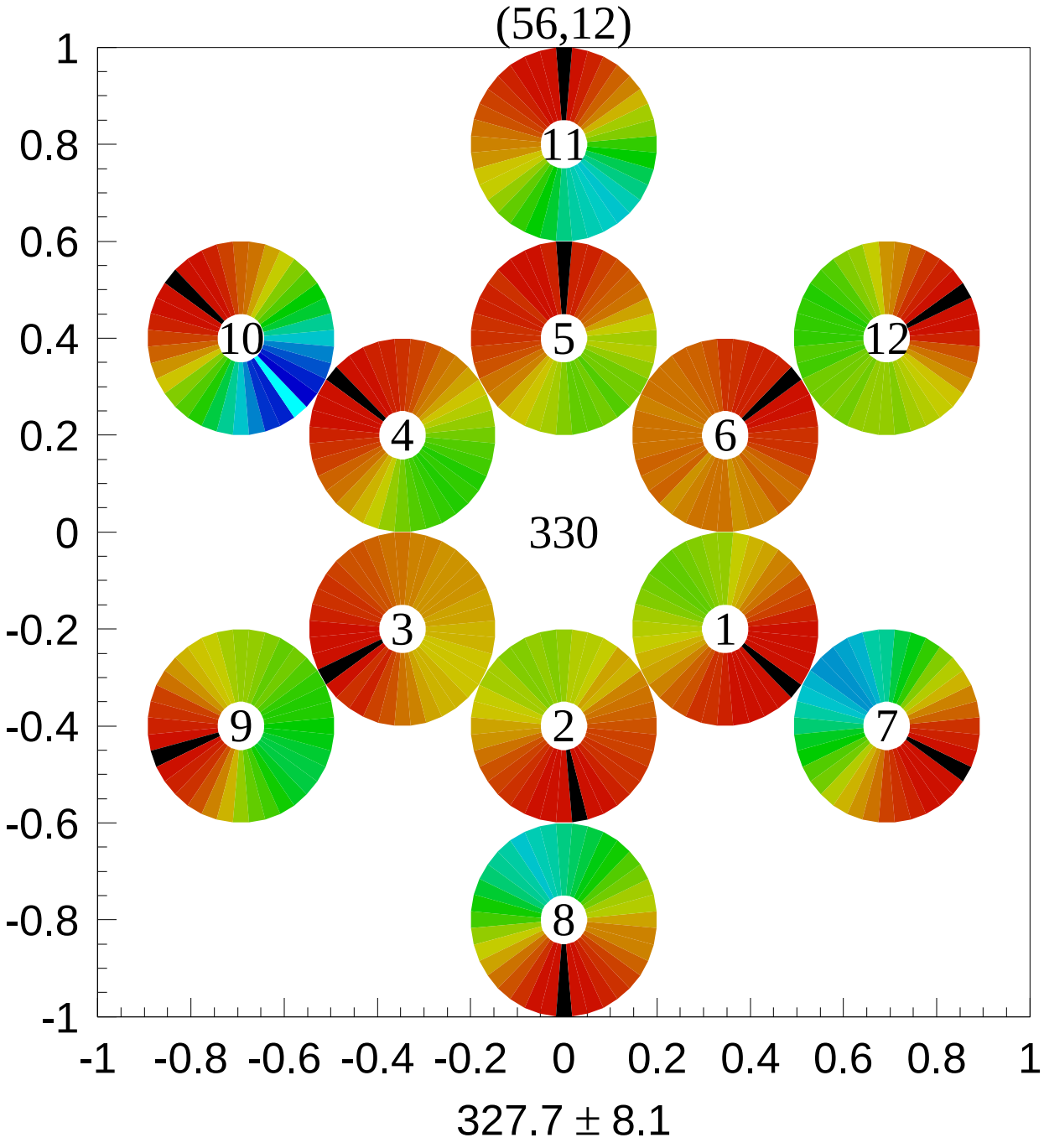

(56,10)
tilted LEDs
124 119 120 121 126 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 123 127 127 128 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

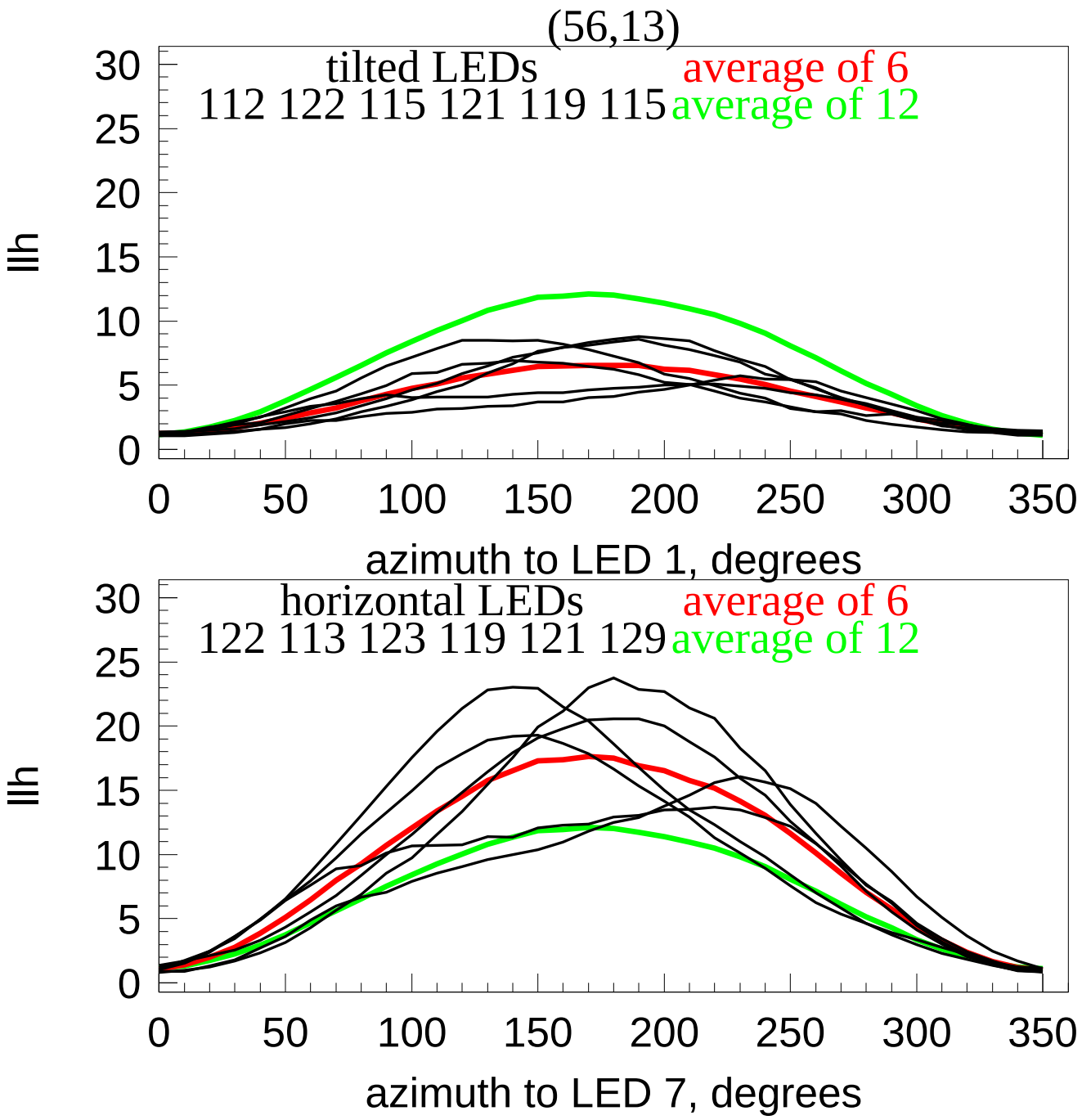

(56,10)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
214.8 ± 7.0

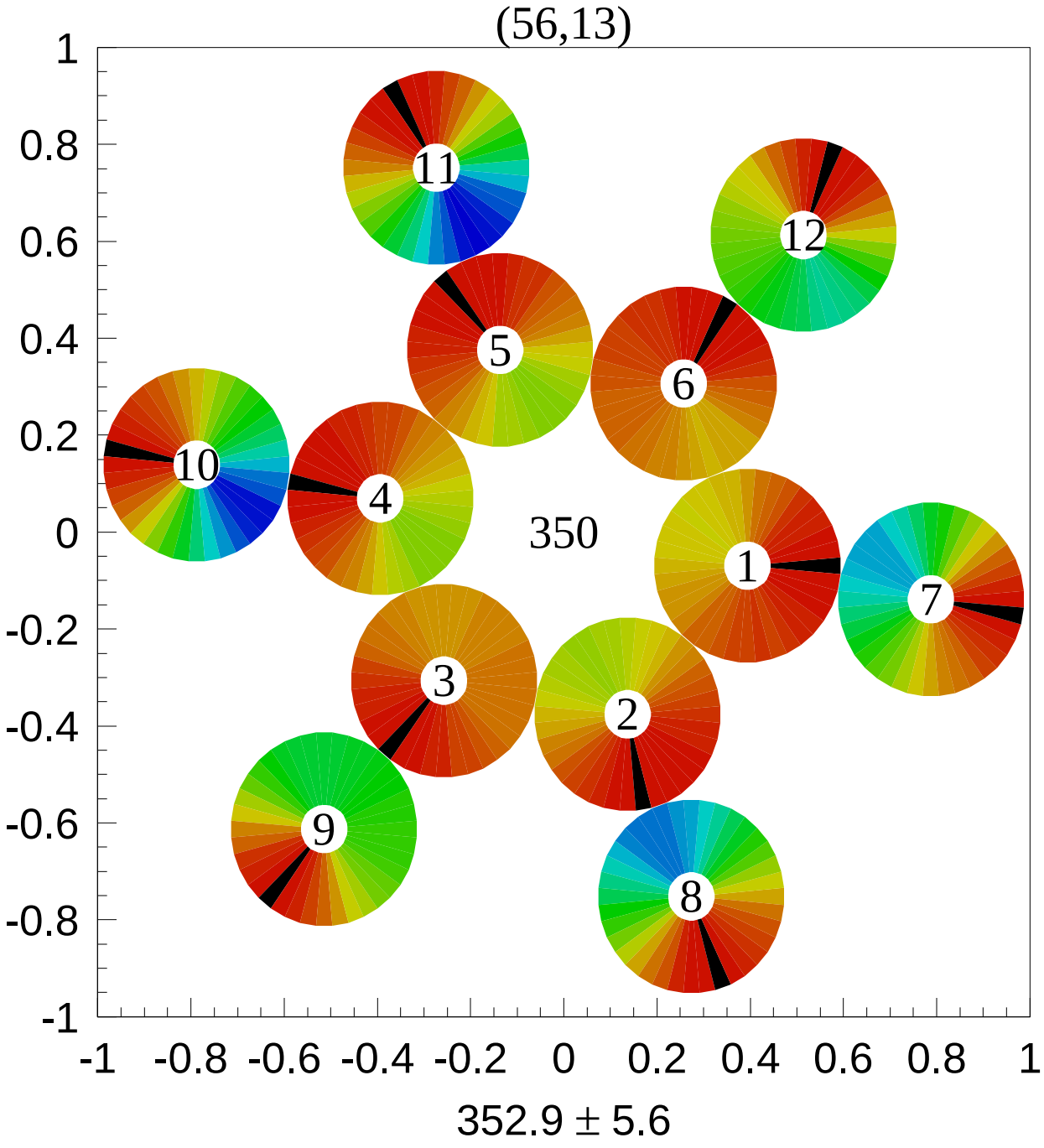

(56,11)
tilted LEDs
119 125 112 122 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 125 120 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

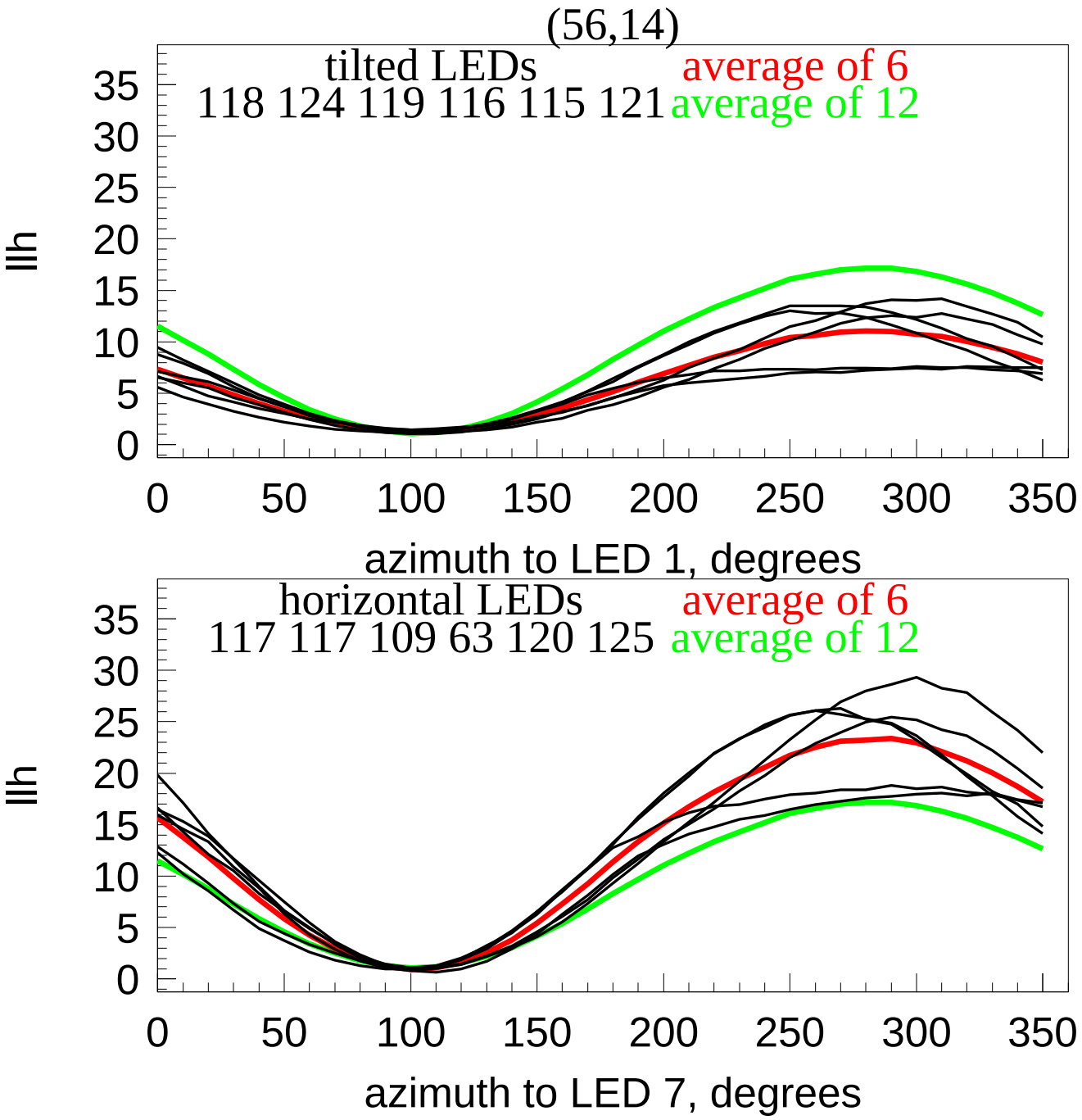

(56,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
163.6 ± 7.8

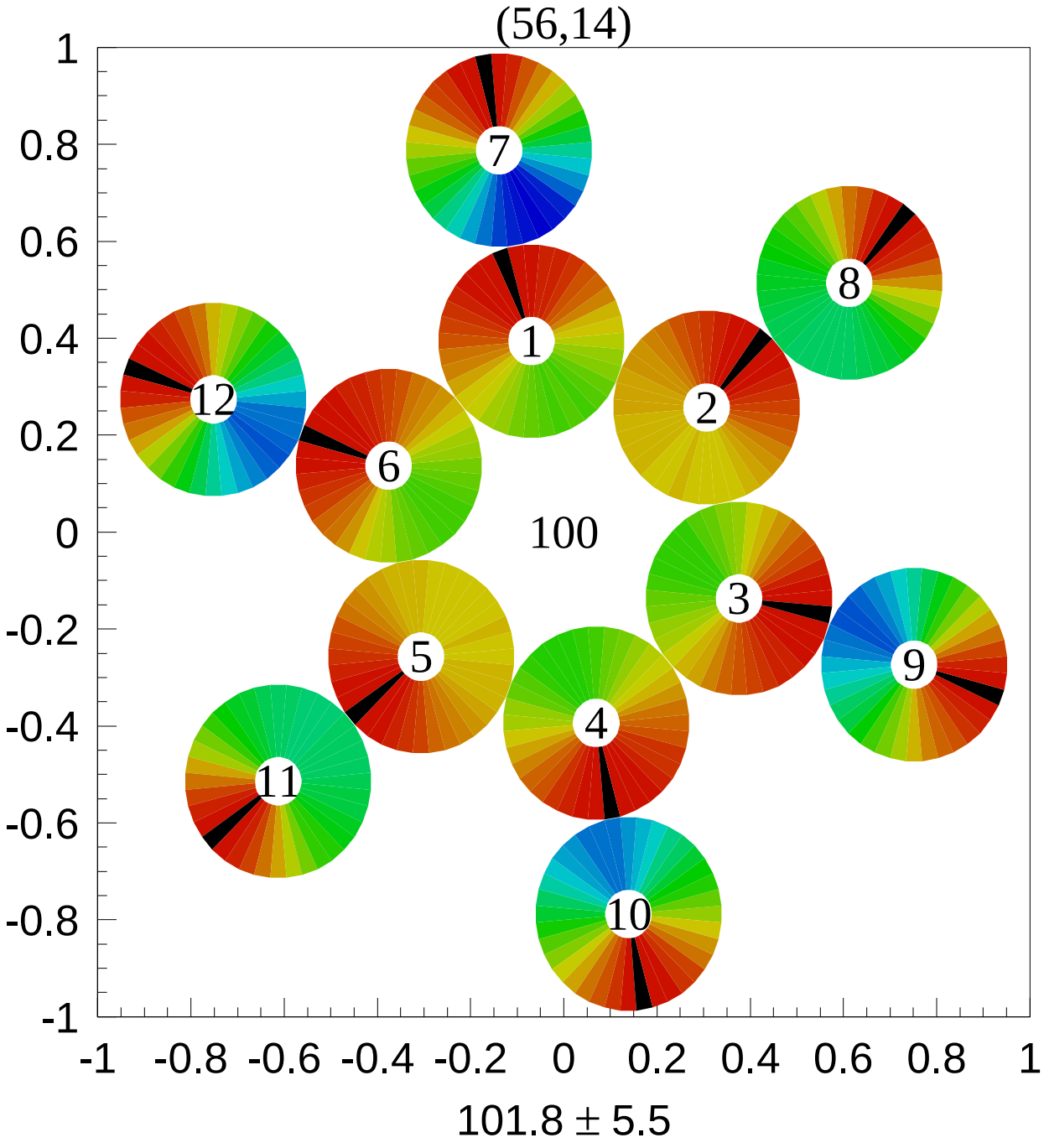

(56,12)
tilted LEDs
124 123 120 117 125 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 115 120 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

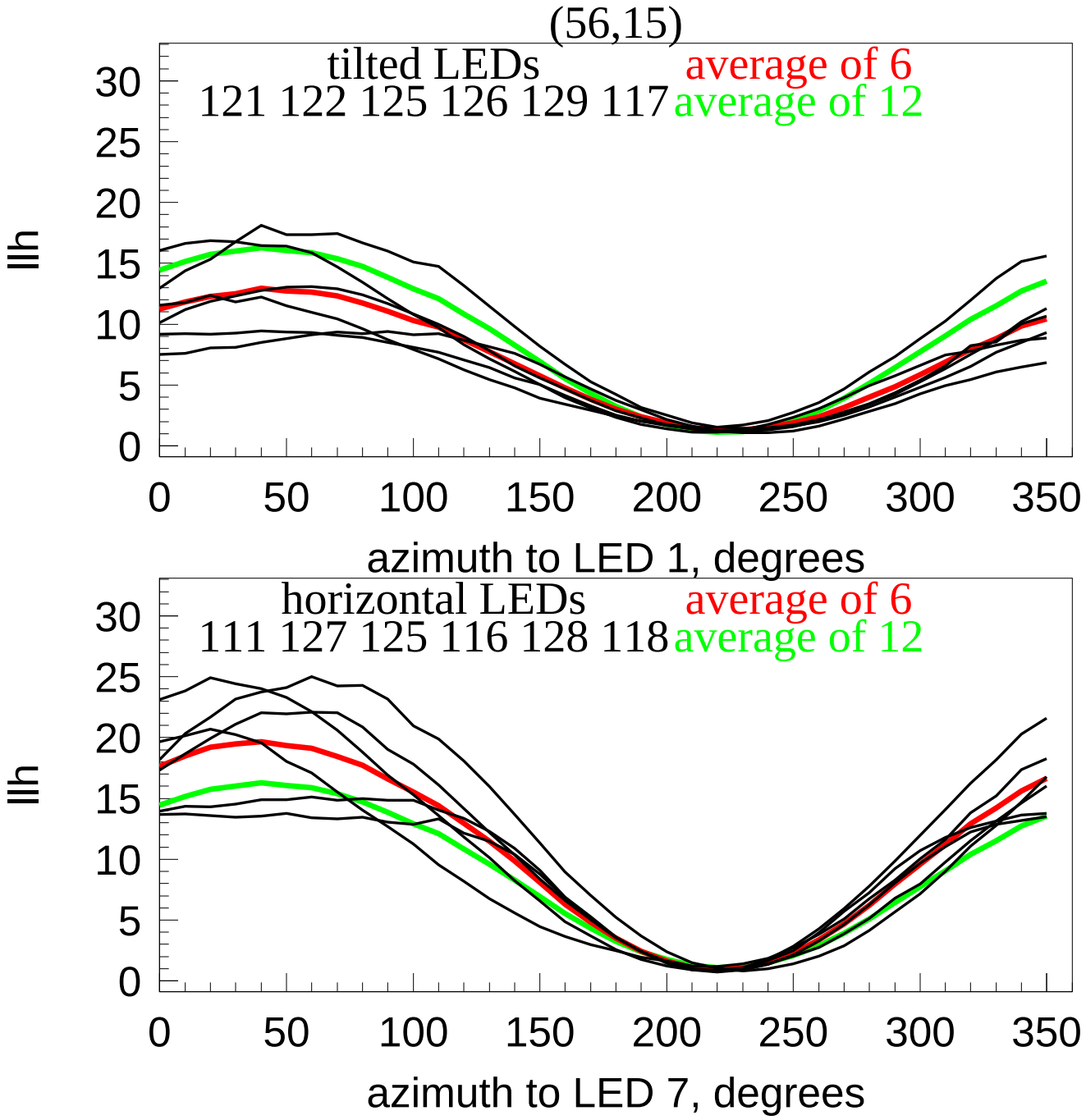

(56,12)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
327.7 ± 8.1

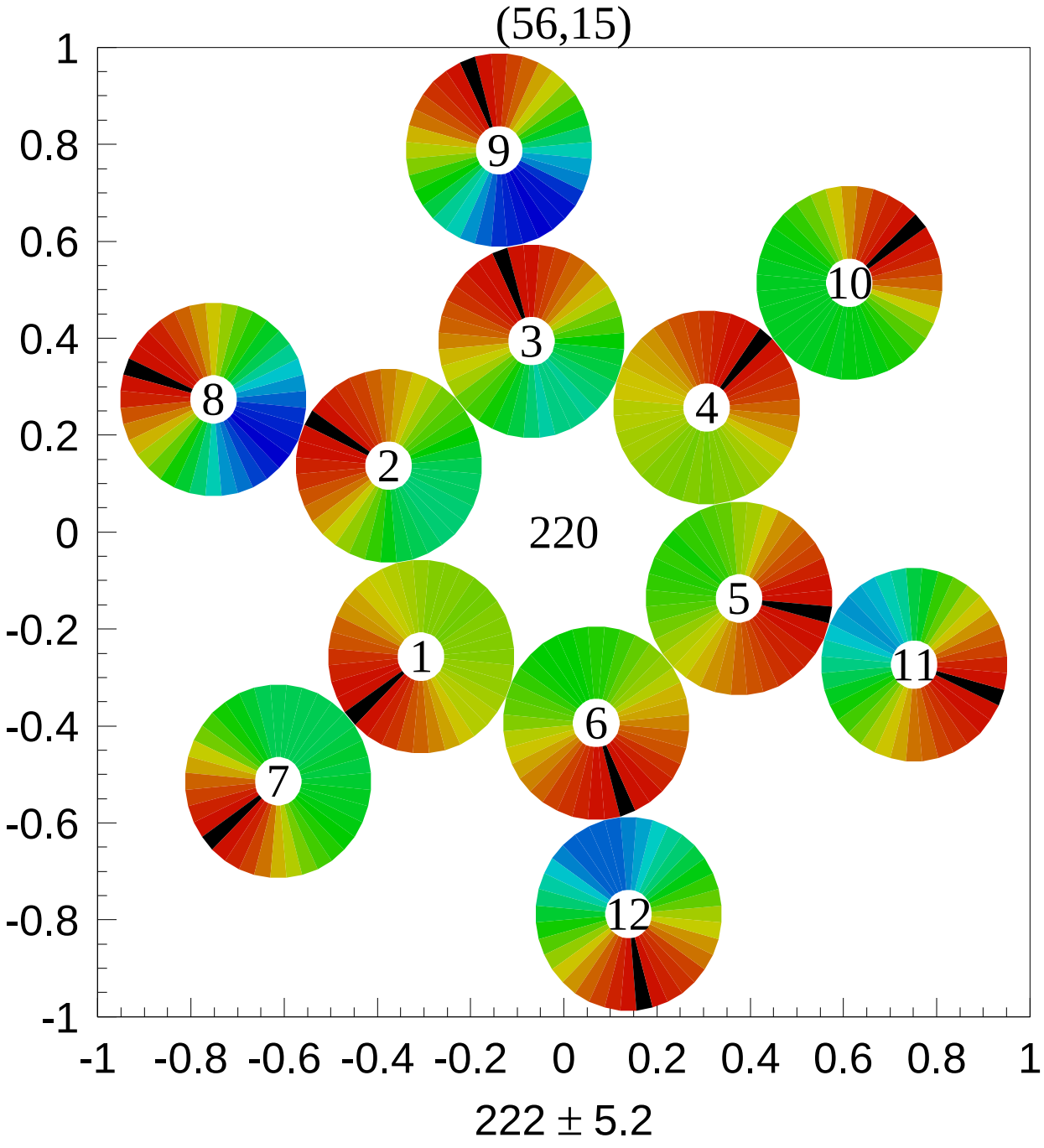

(56,13)
tilted LEDs
112 122 115 121 119 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 113 123 119 121 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

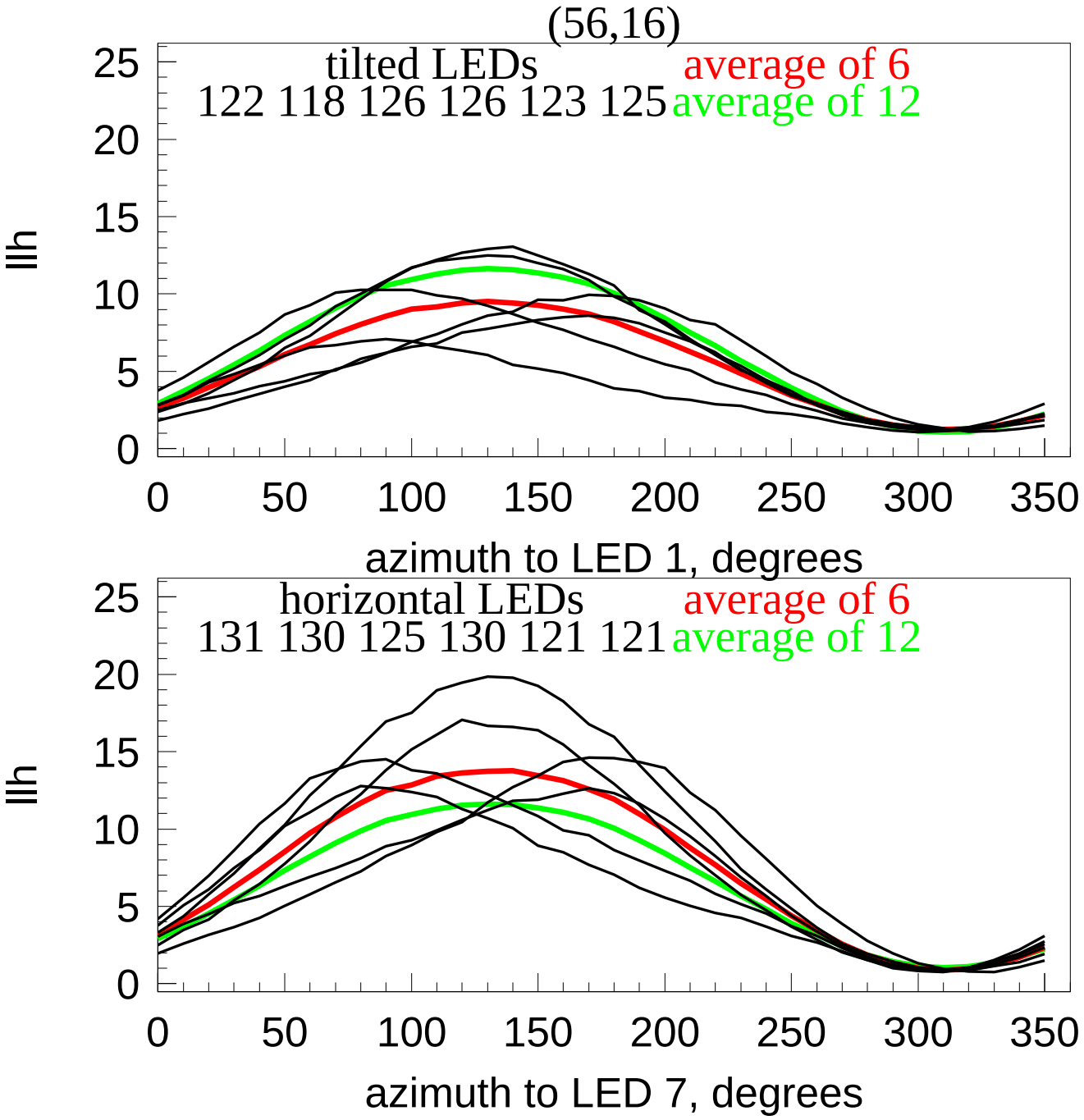

(56,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
352.9 ± 5.6

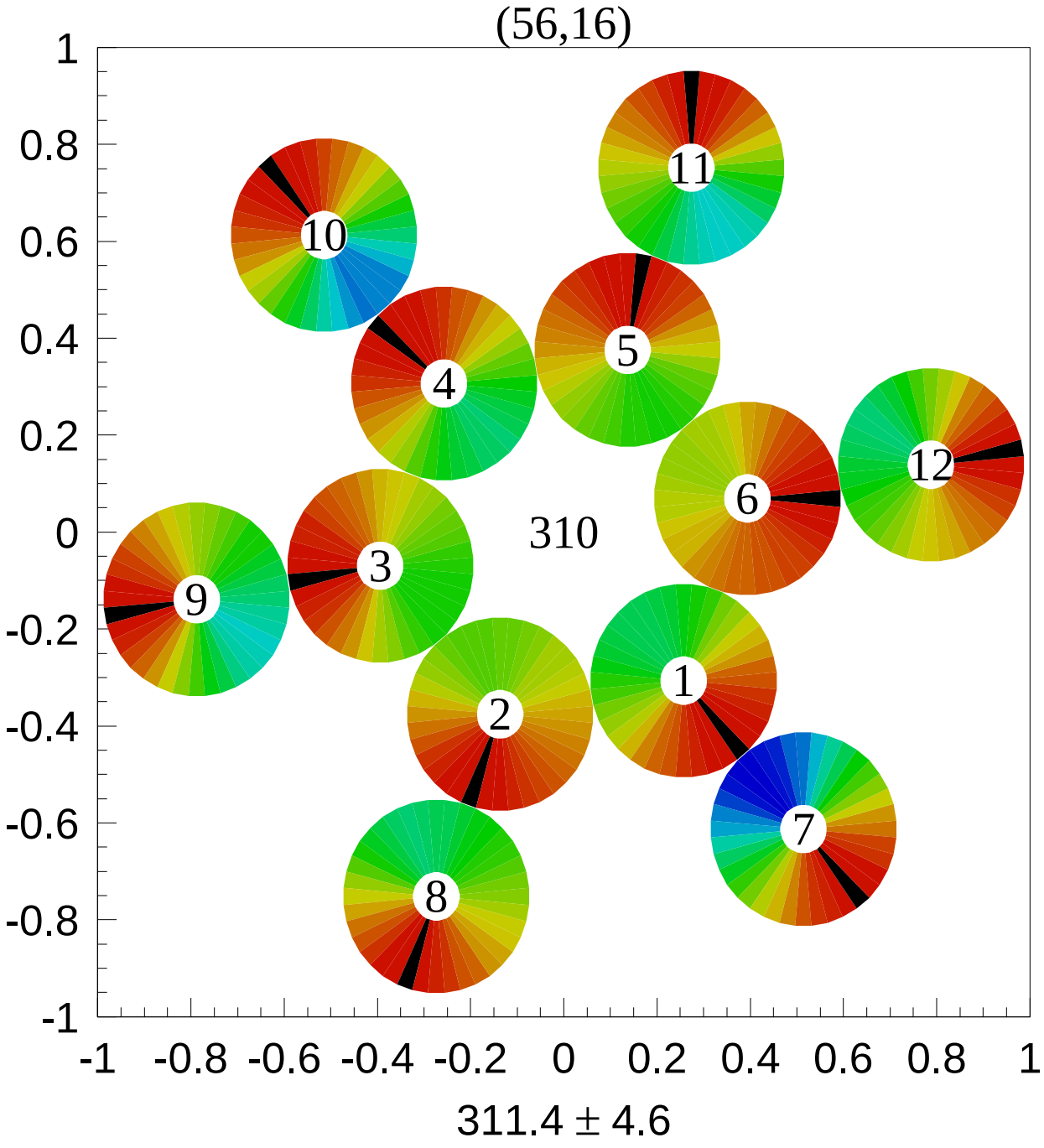

(56,14)
tilted LEDs
118 124 119 116 115 121
average of 6
average of 12
llh
35
30
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 117 109 63 120 125
average of 6
average of 12
llh
35
30
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

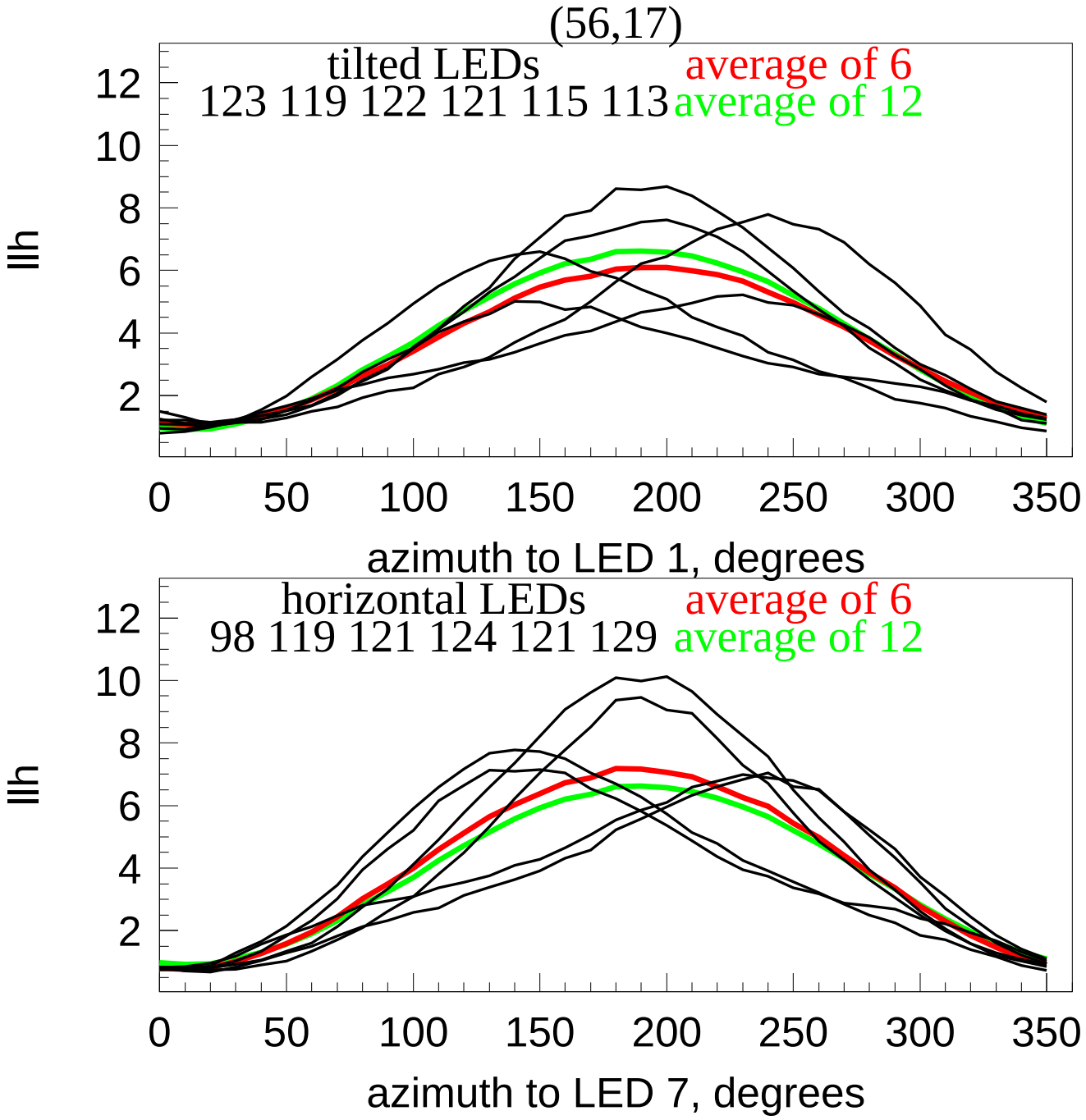

(56,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
101.8 ± 5.5

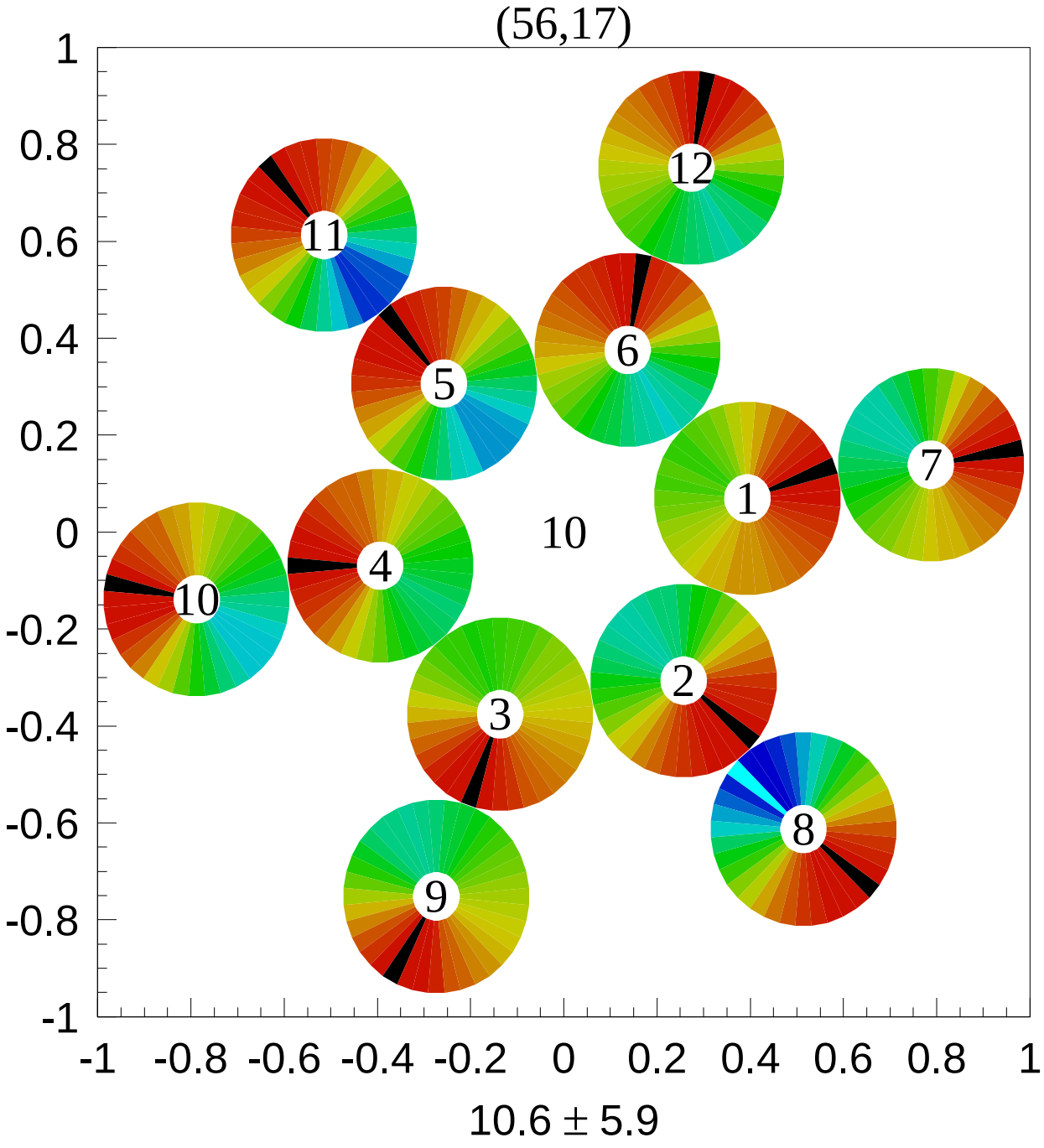

(56,15)
tilted LEDs
121 122 125 126 129 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
111 127 125 116 128 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

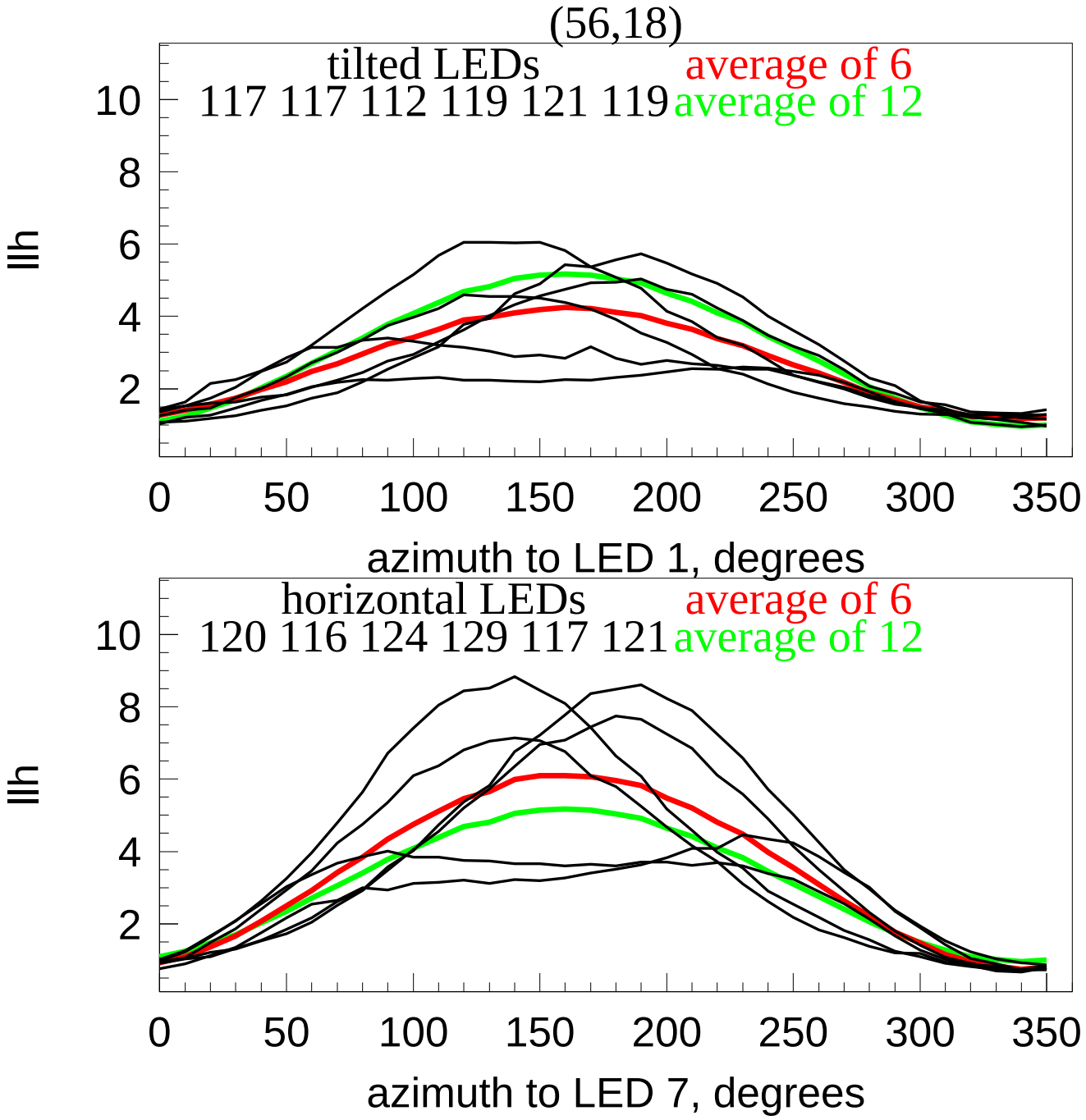

(56,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
222 ± 5.2

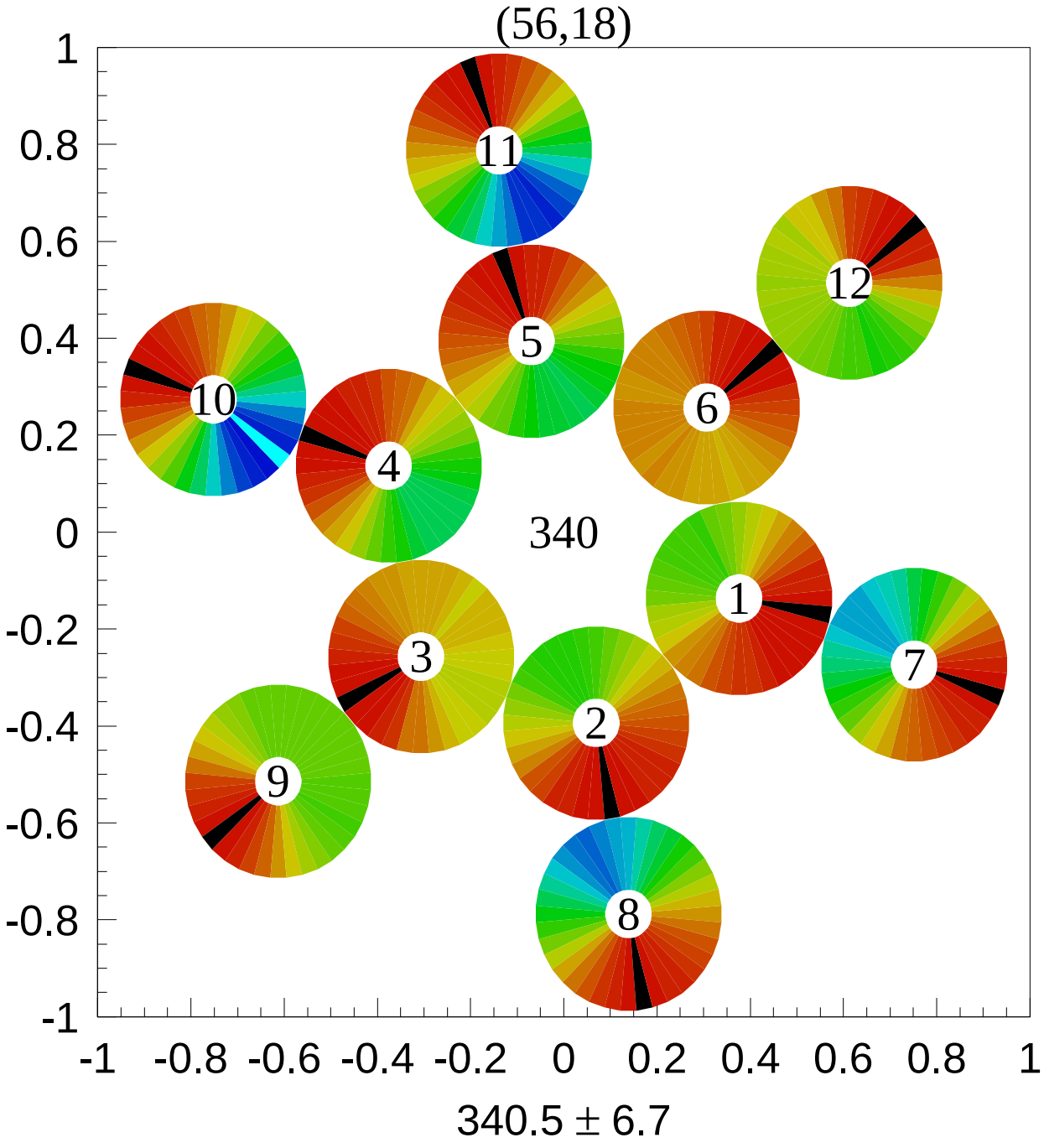

(56,16)
tilted LEDs
122 118 126 126 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 130 125 130 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

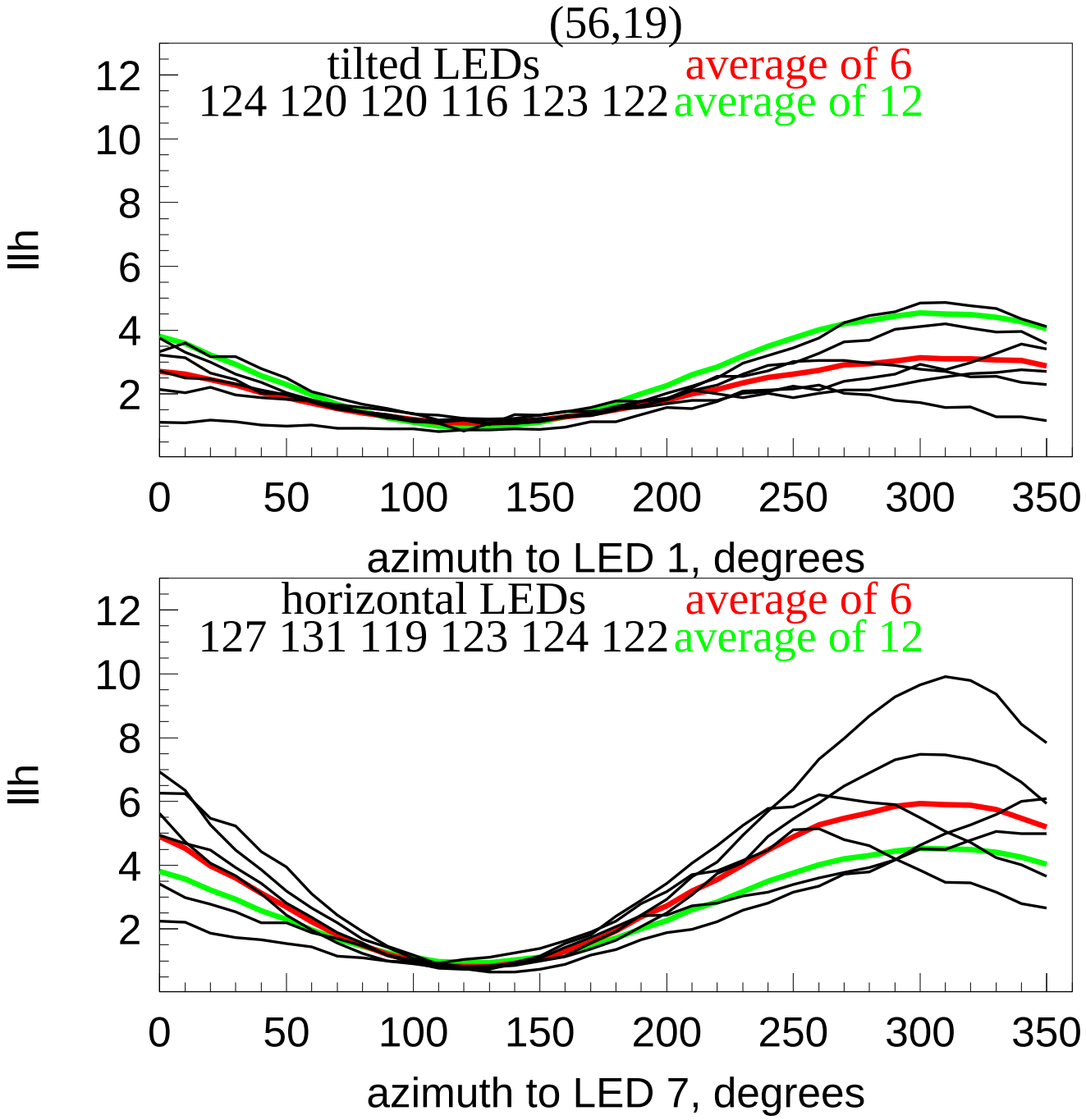

(56,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
311.4 ± 4.6

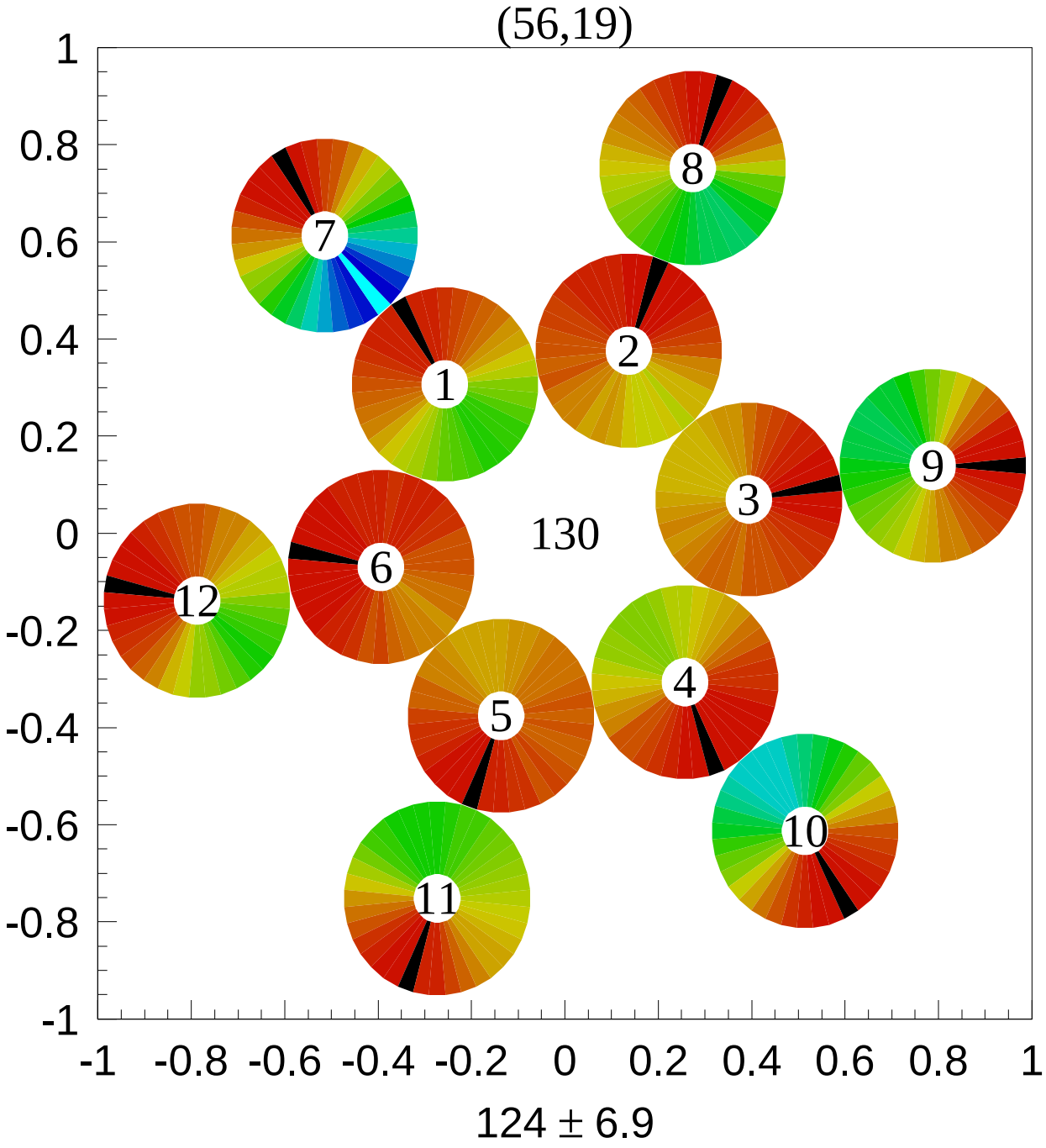

(56,17)
tilted LEDs
123 119 122 121 115 113
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
98 119 121 124 121 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

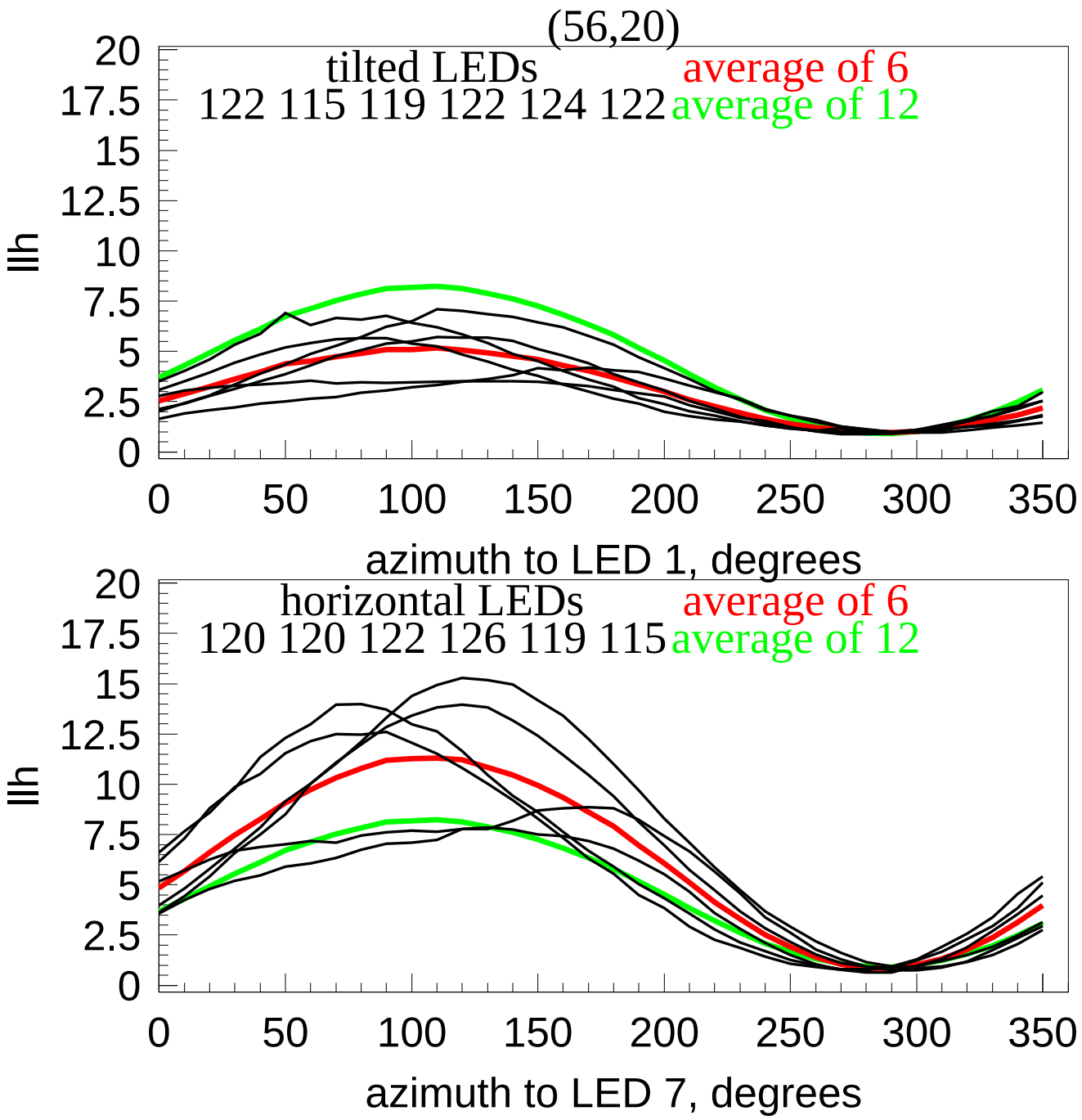

(56,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10.6 ± 5.9
12
11
6
5
7
1
10
4
10
2
3
8
9

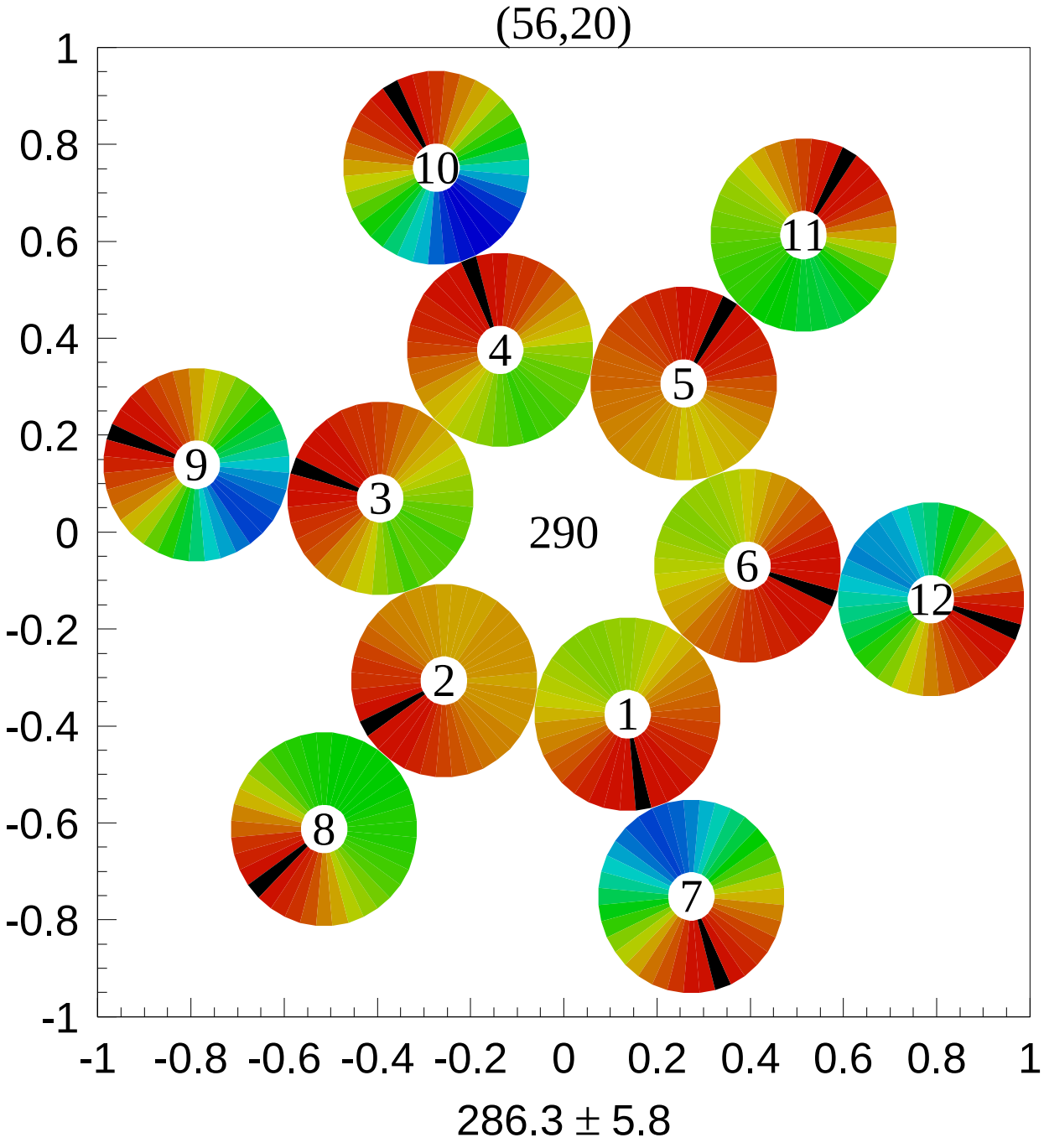

(56,18)
tilted LEDs
117 117 112 119 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 116 124 129 117 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

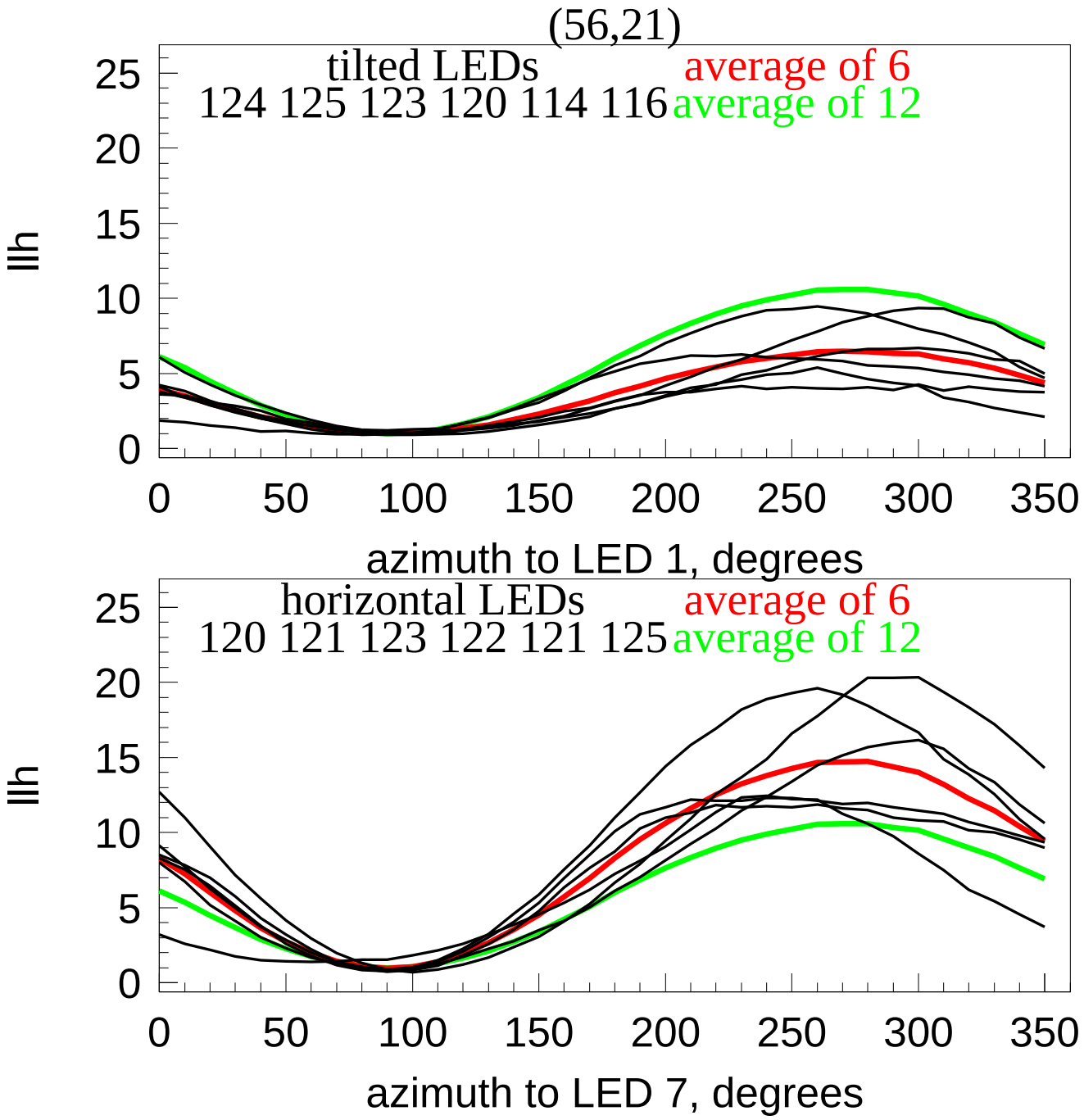

(56,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
340.5 ± 6.7

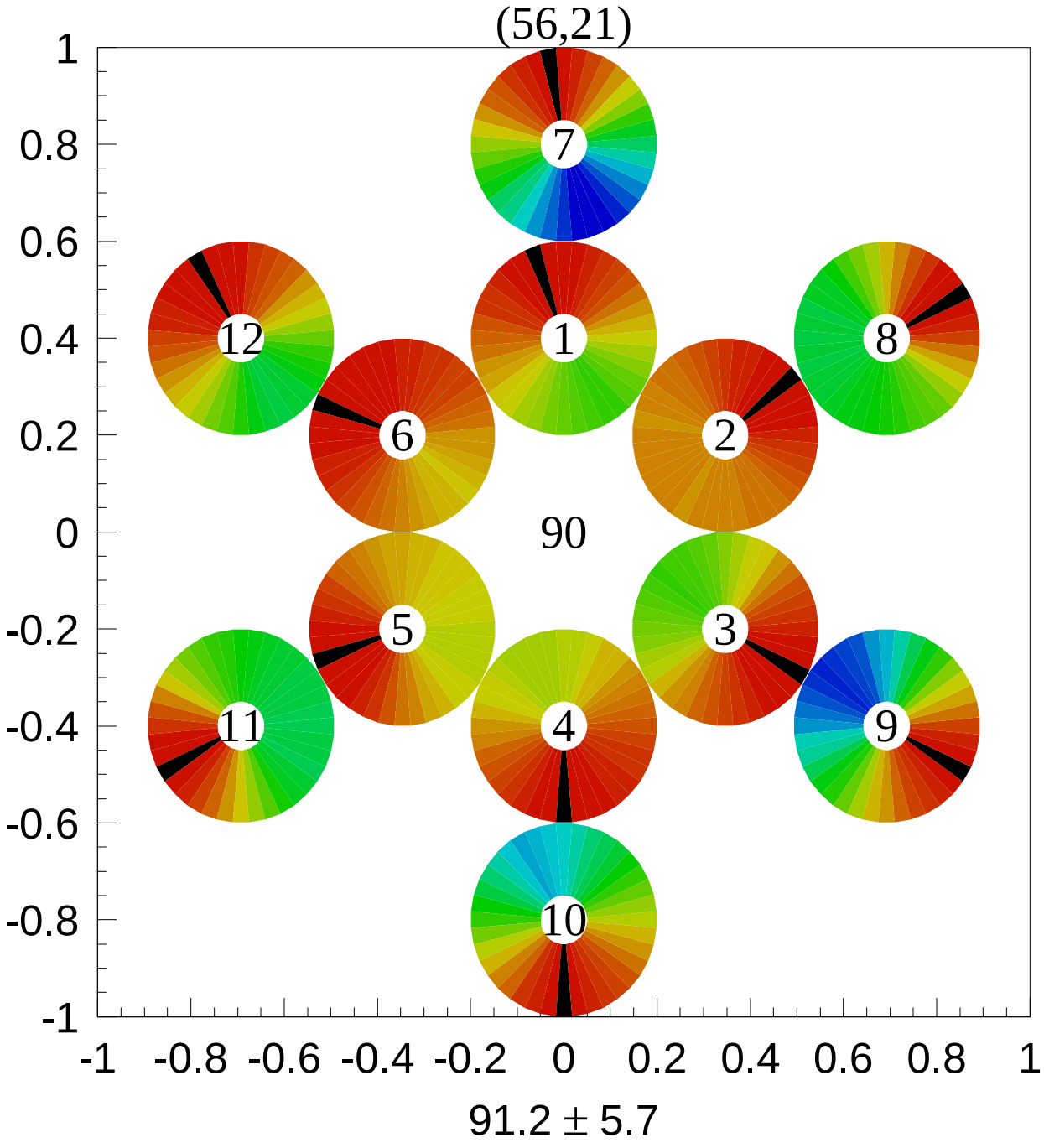

(56,19)
tilted LEDs
124 120 120 116 123 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 131 119 123 124 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

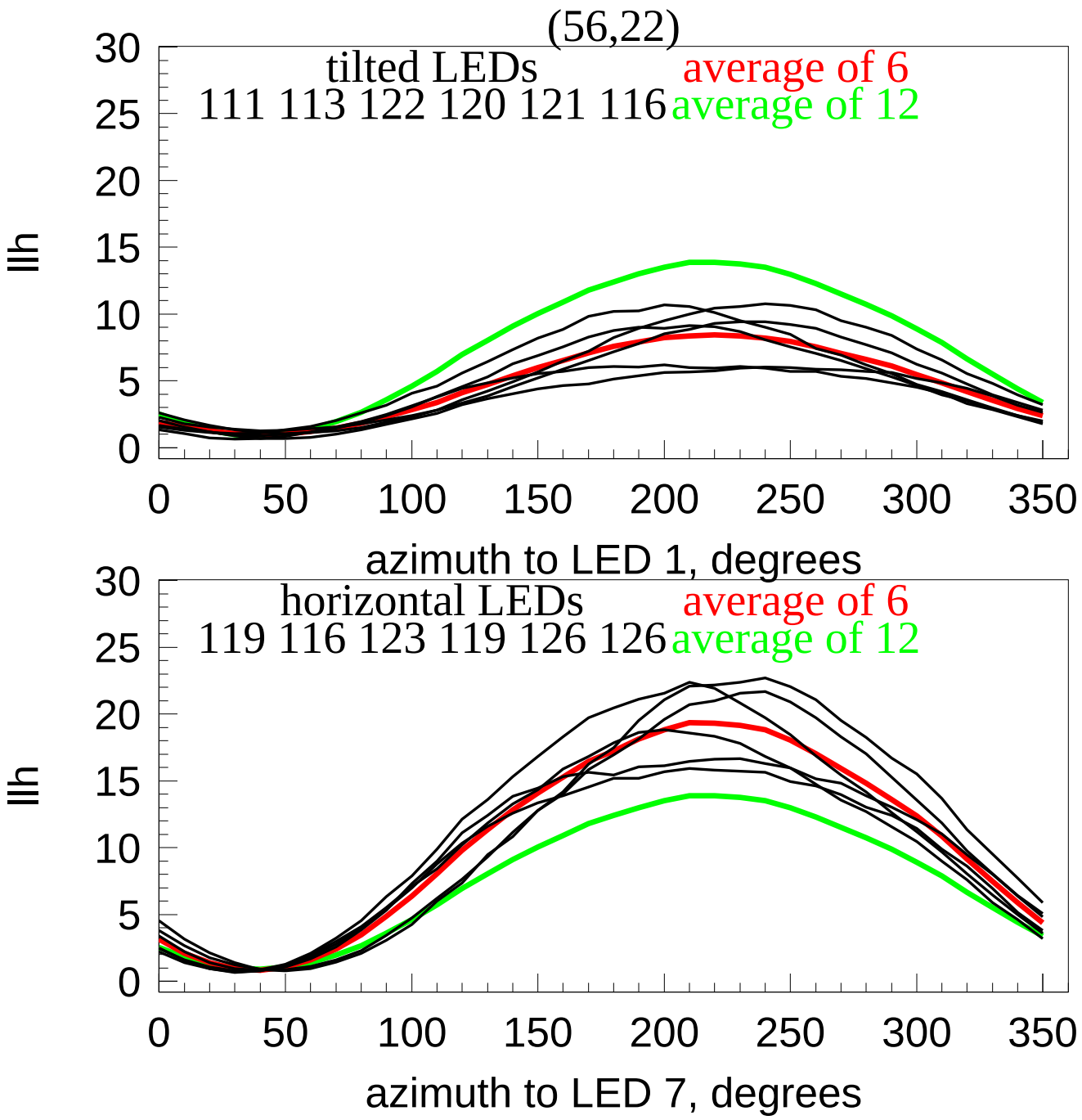

(56,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
124 ± 6.9
130
1
2
3
4
5
6
7
8
9
10
11
12

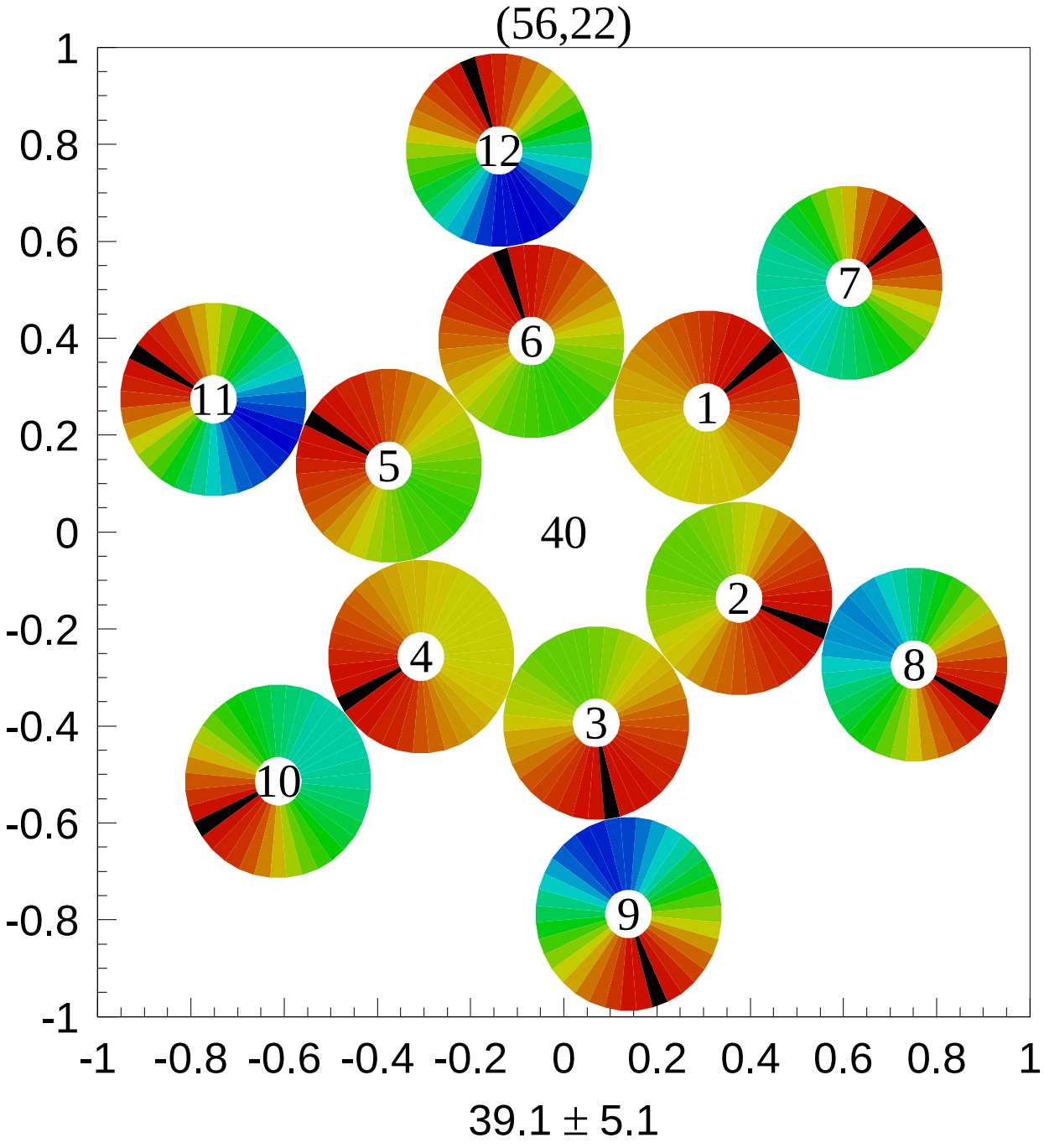

(56,20)
tilted LEDs
122 115 119 122 124 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 120 122 126 119 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

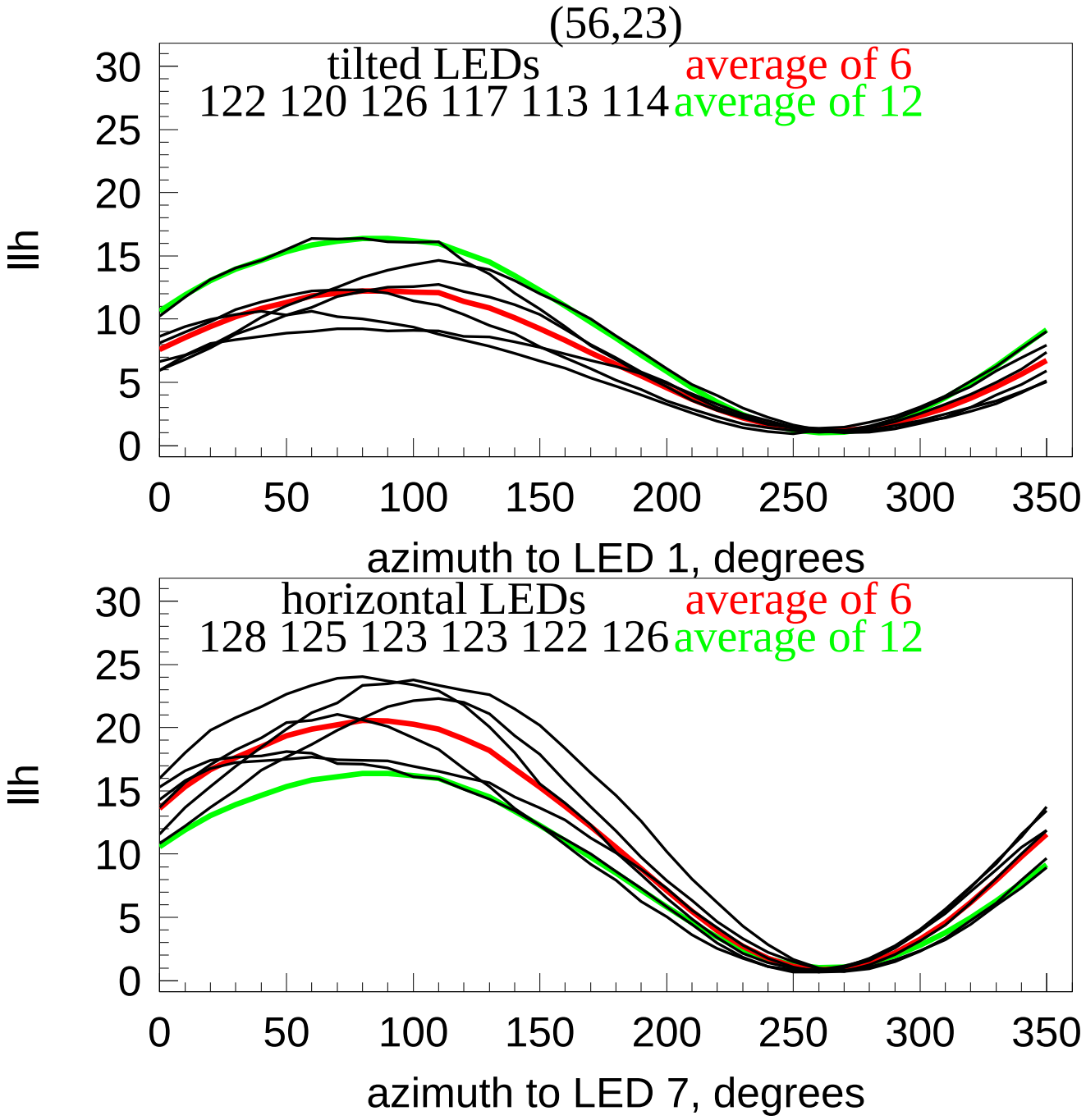

(56,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
286.3 ± 5.8

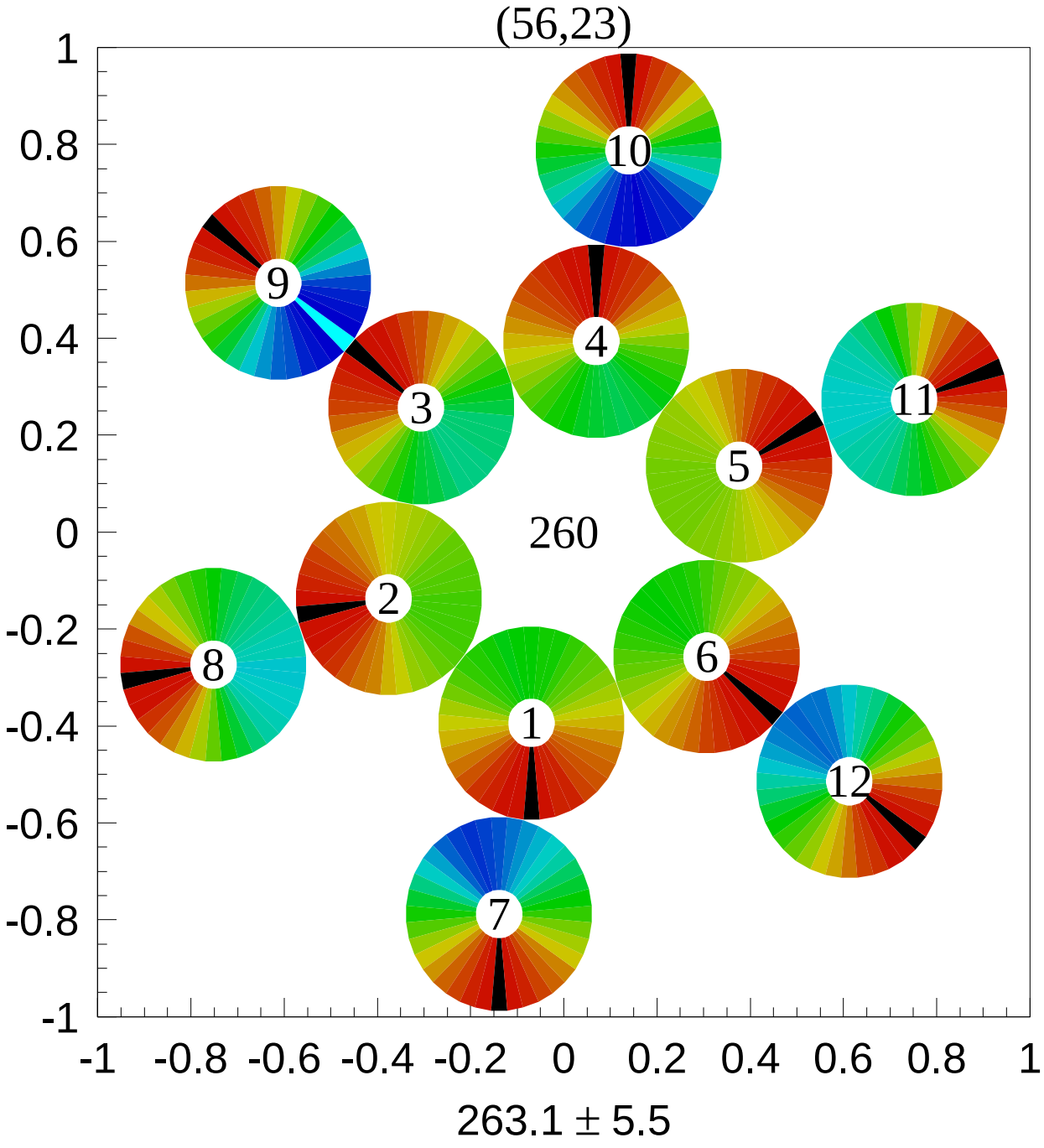

(56,21)
tilted LEDs
124 125 123 120 114 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 123 122 121 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

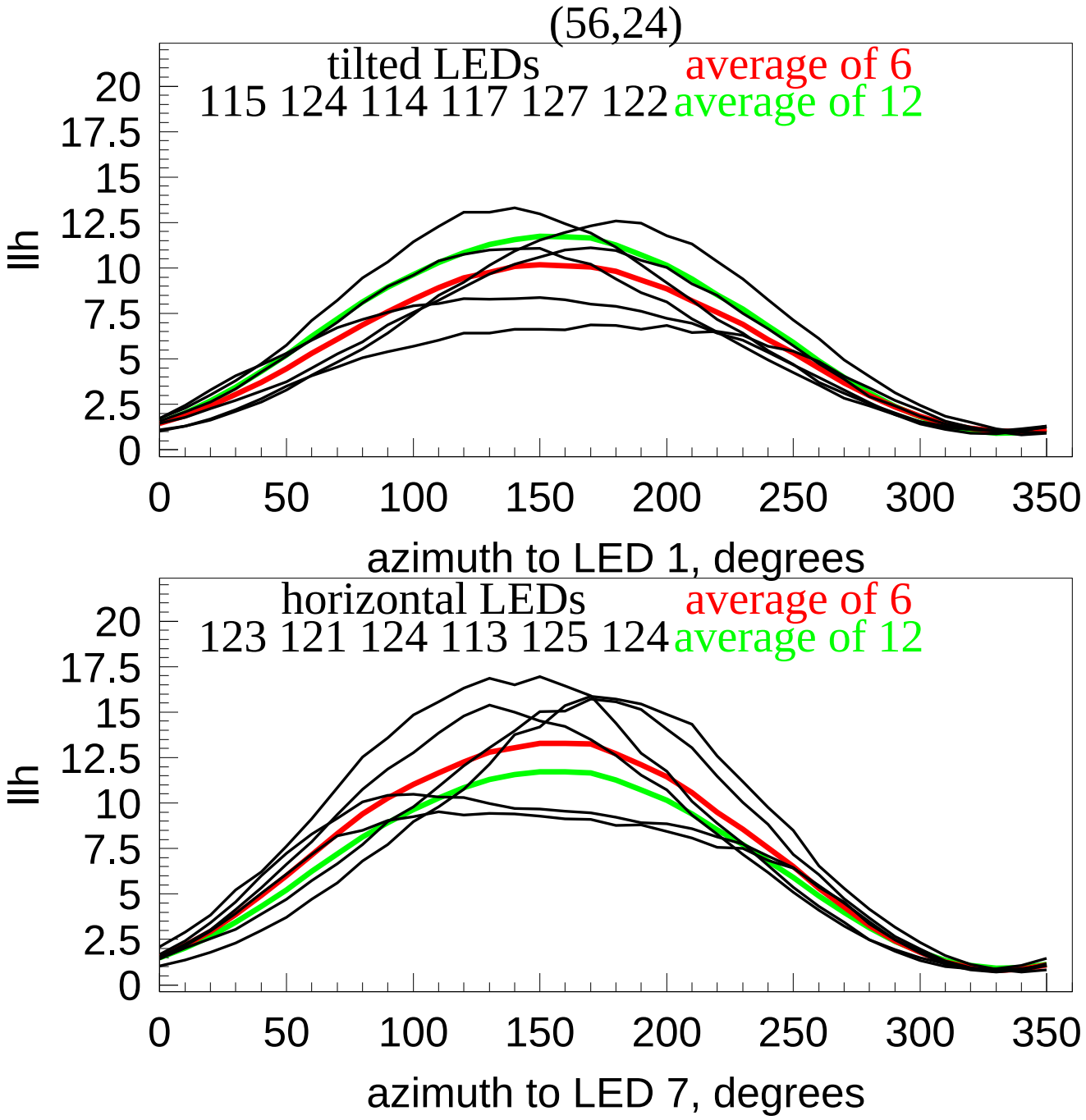

(56,21)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
91.2 ± 5.7

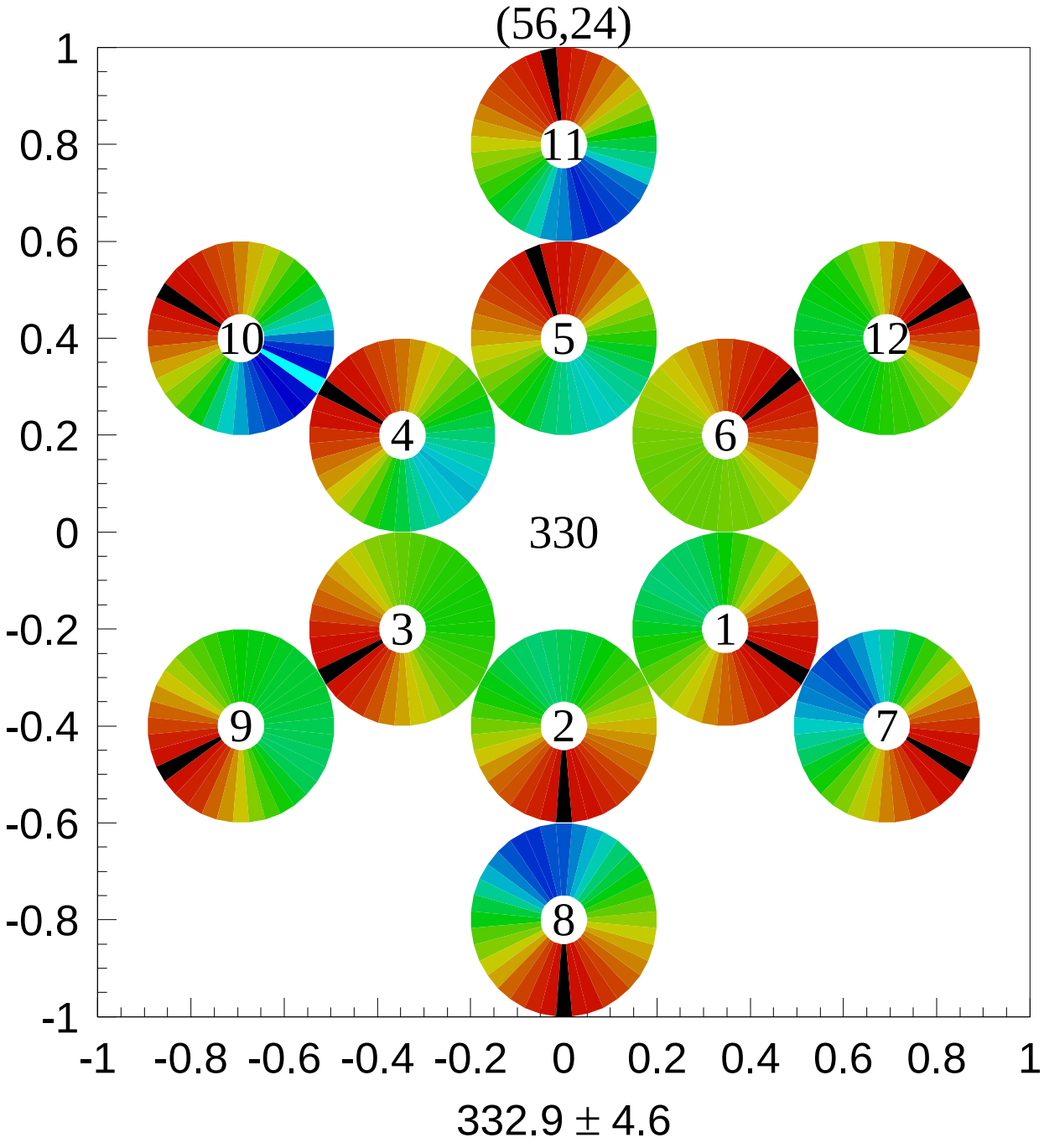

(56,22)
tilted LEDs
111 113 122 120 121 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 116 123 119 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

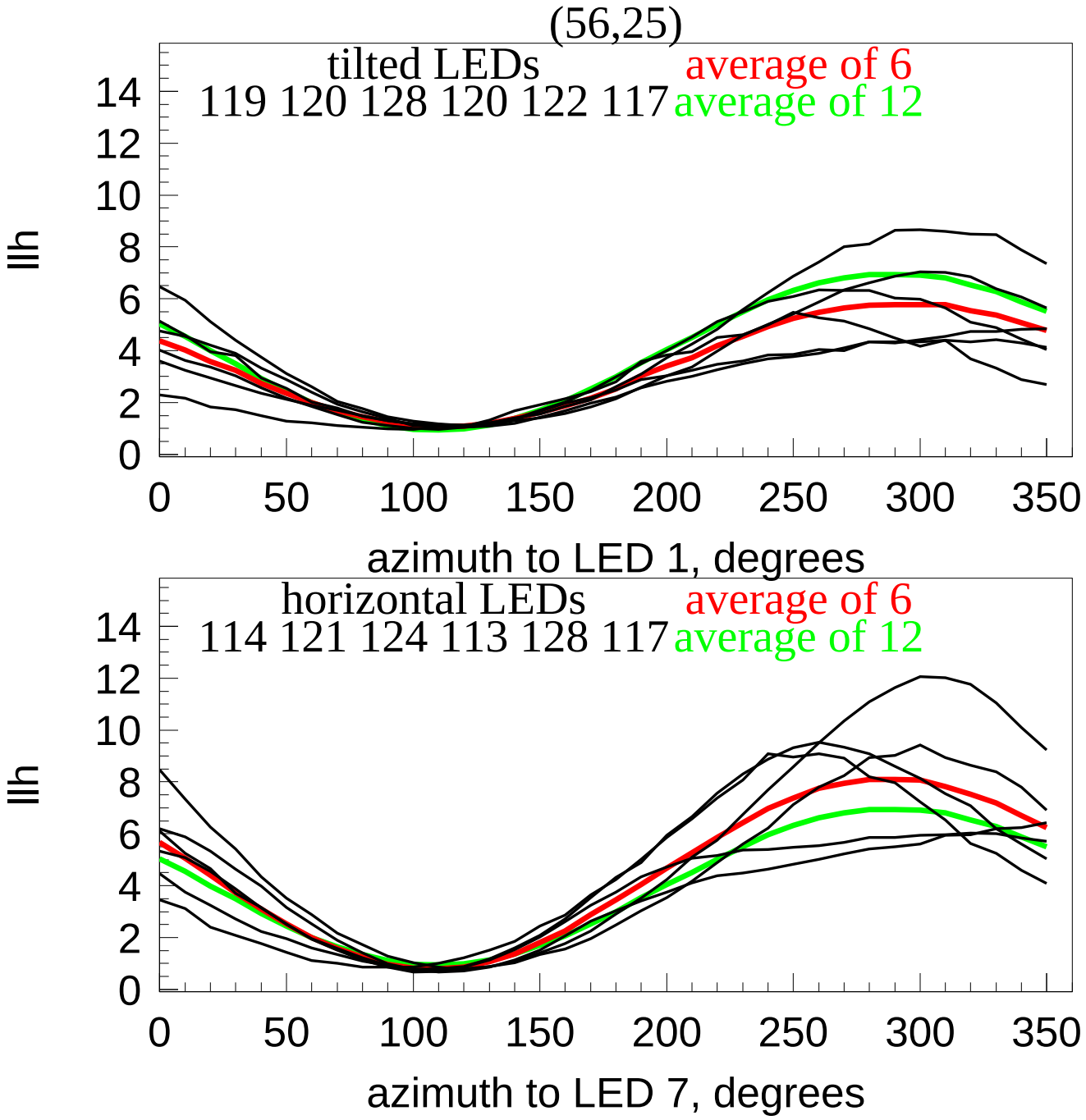

(56,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
39.1 ± 5.1

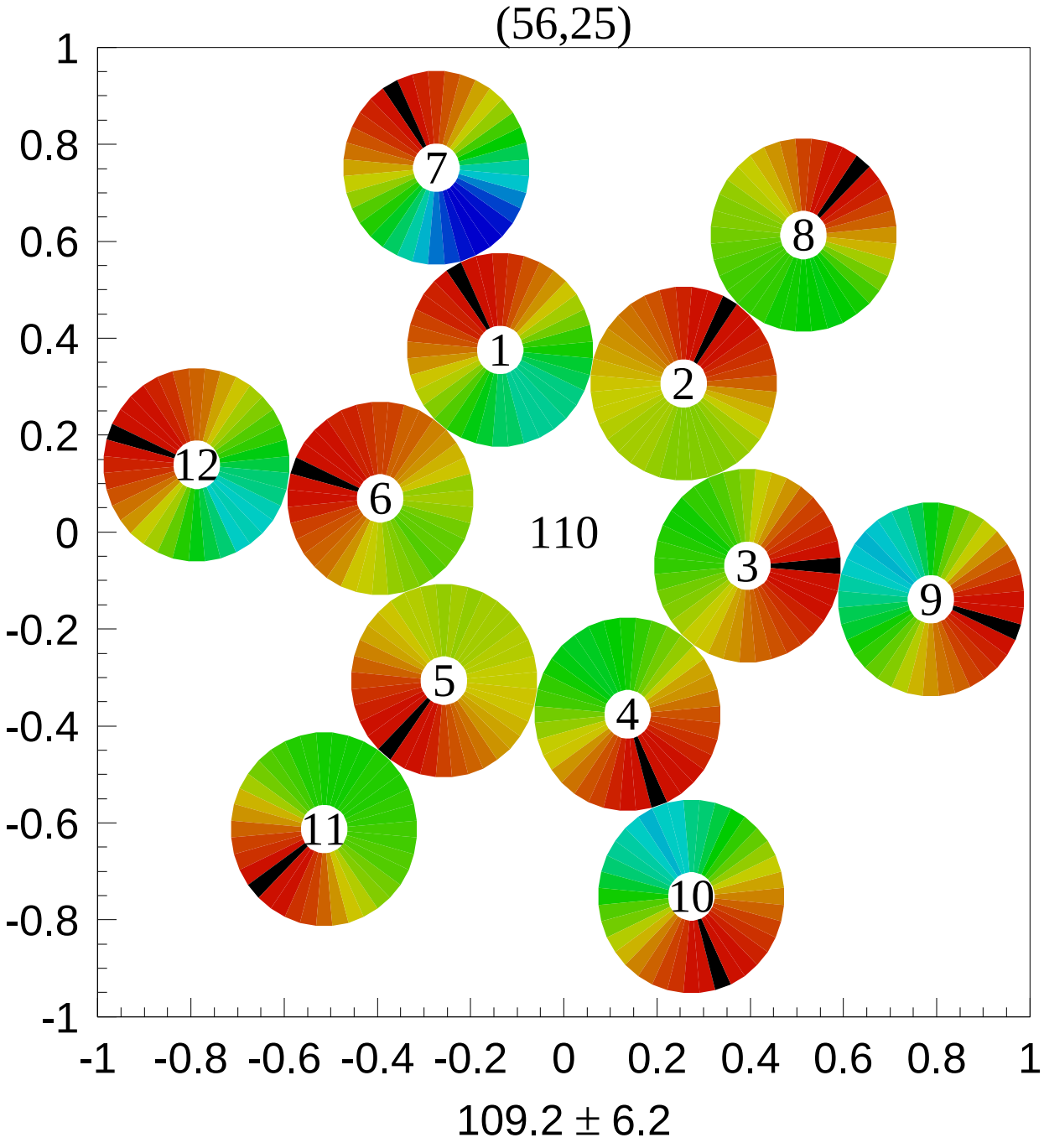

(56,23)
tilted LEDs
122 120 126 117 113 114
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 125 123 123 122 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

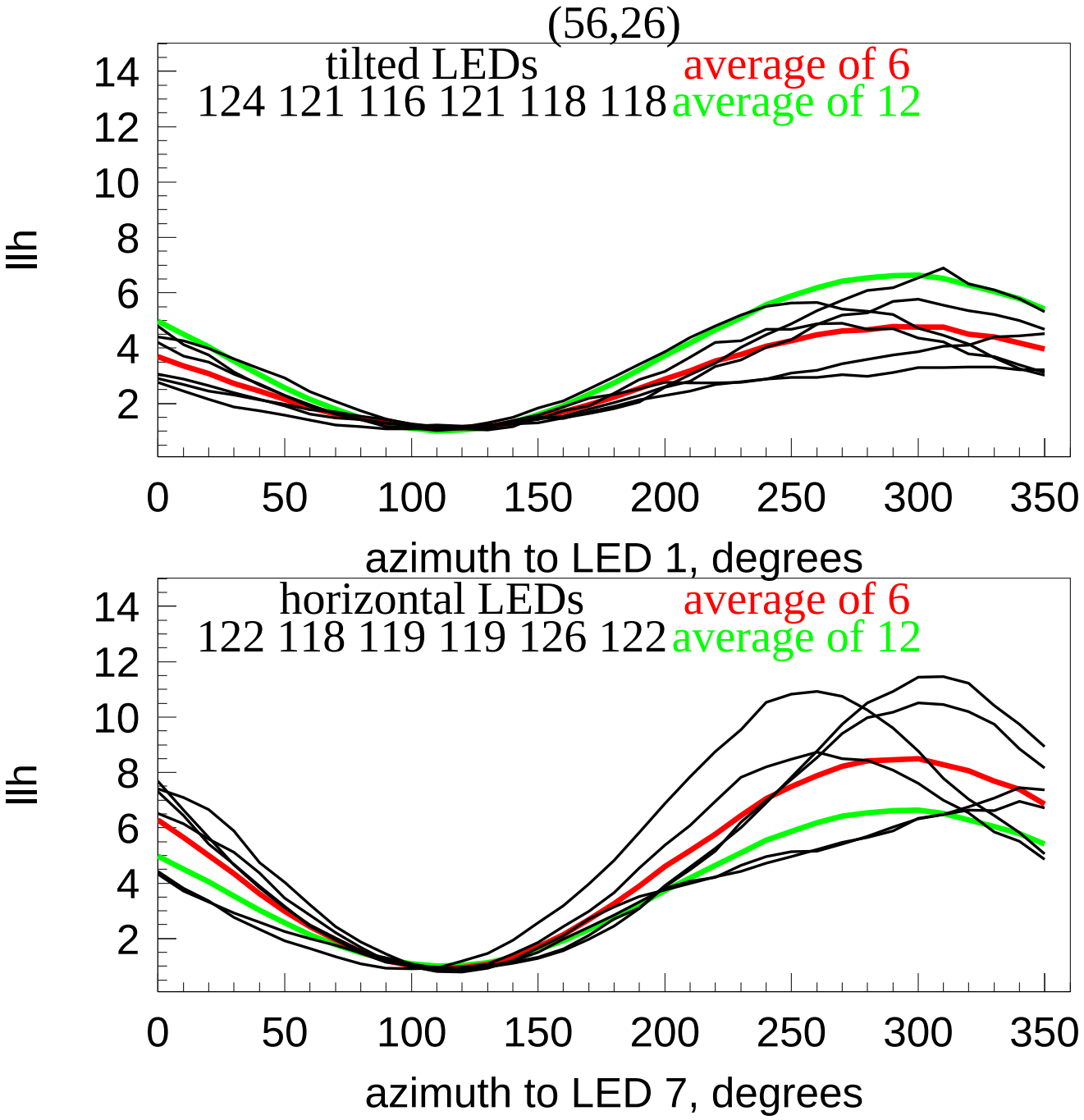

(56,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
263.1 ± 5.5

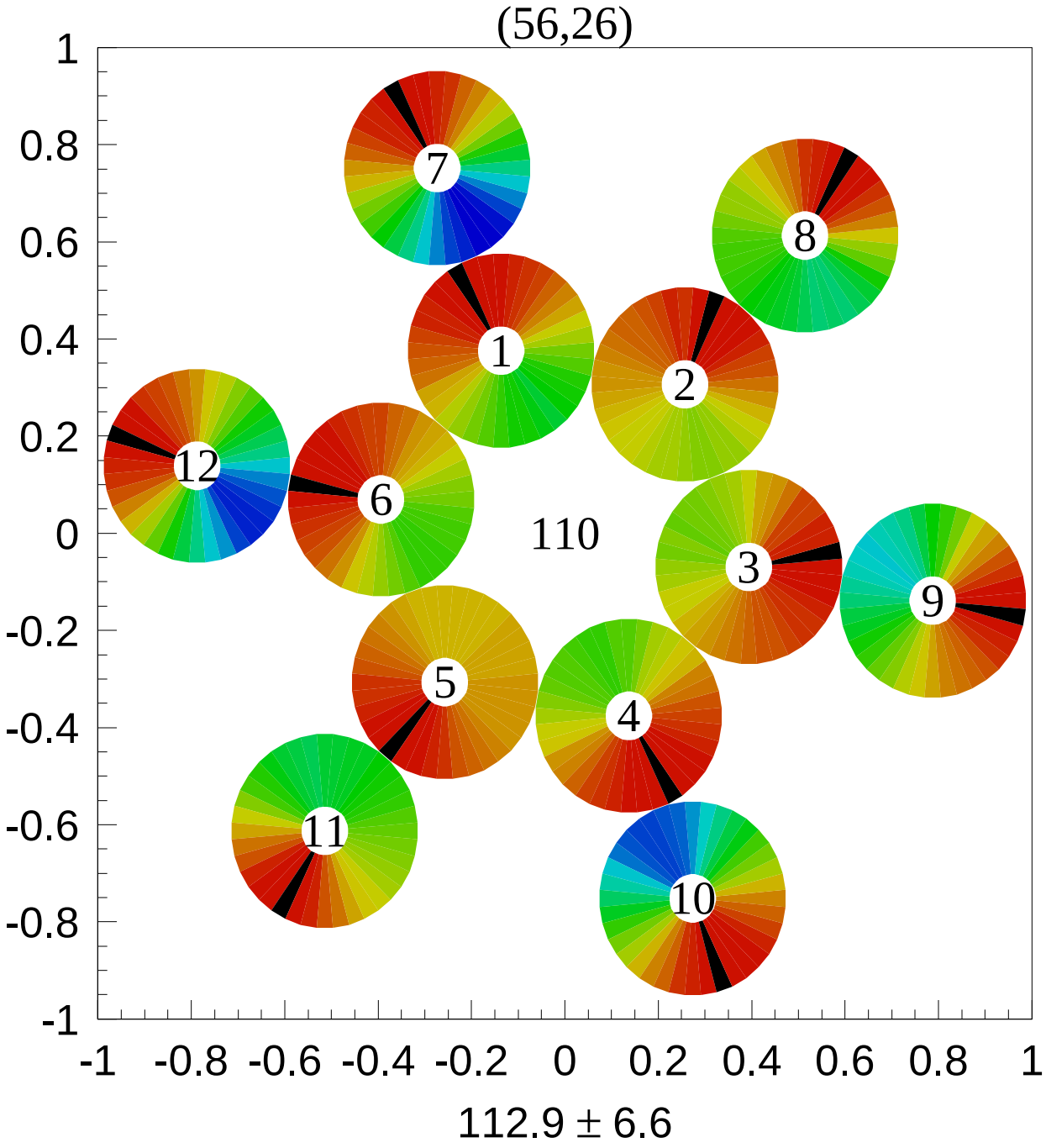

(56,24)
tilted LEDs
115 124 114 117 127 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 124 113 125 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

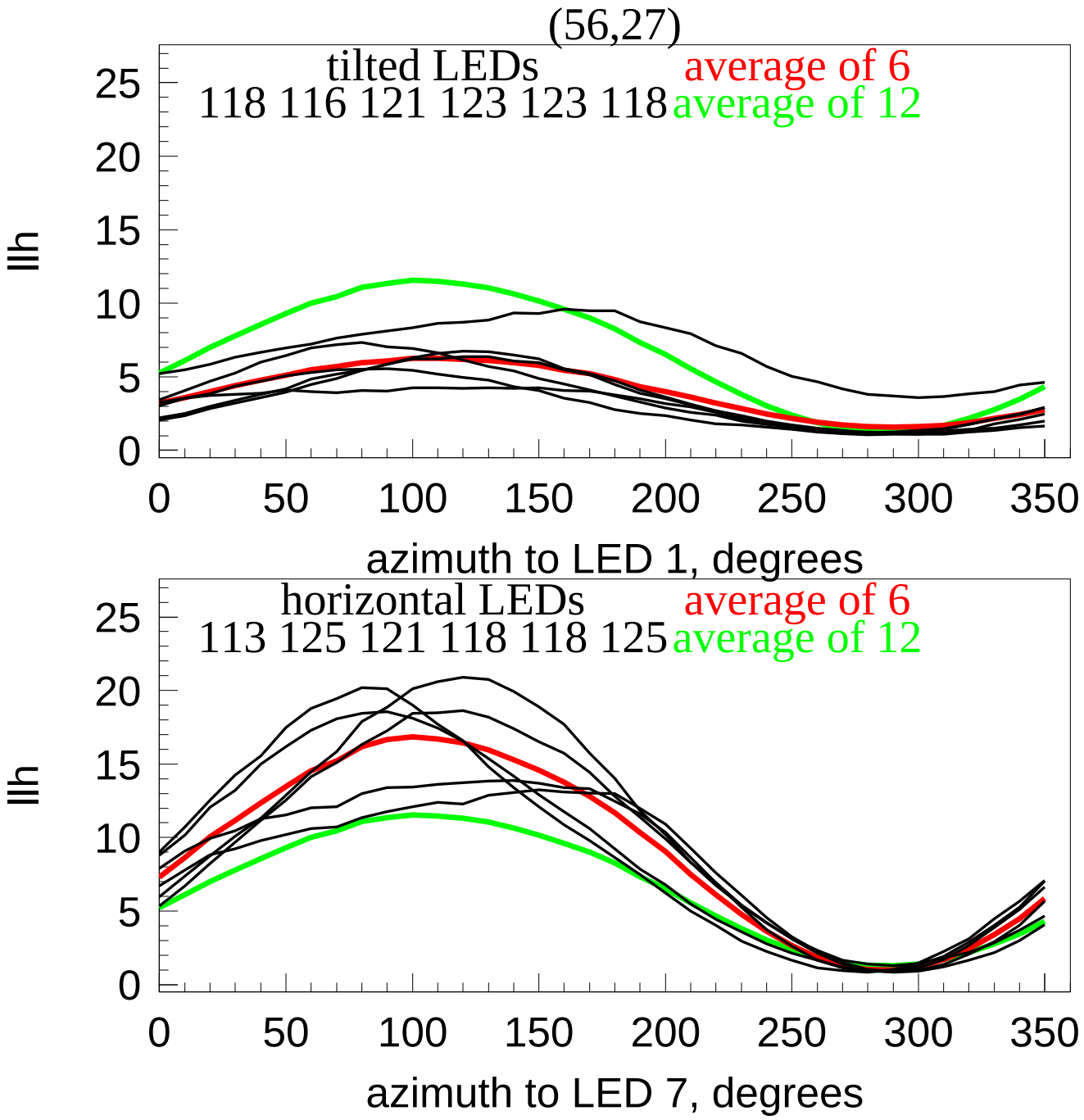

(56,24)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
332.9 ± 4.6

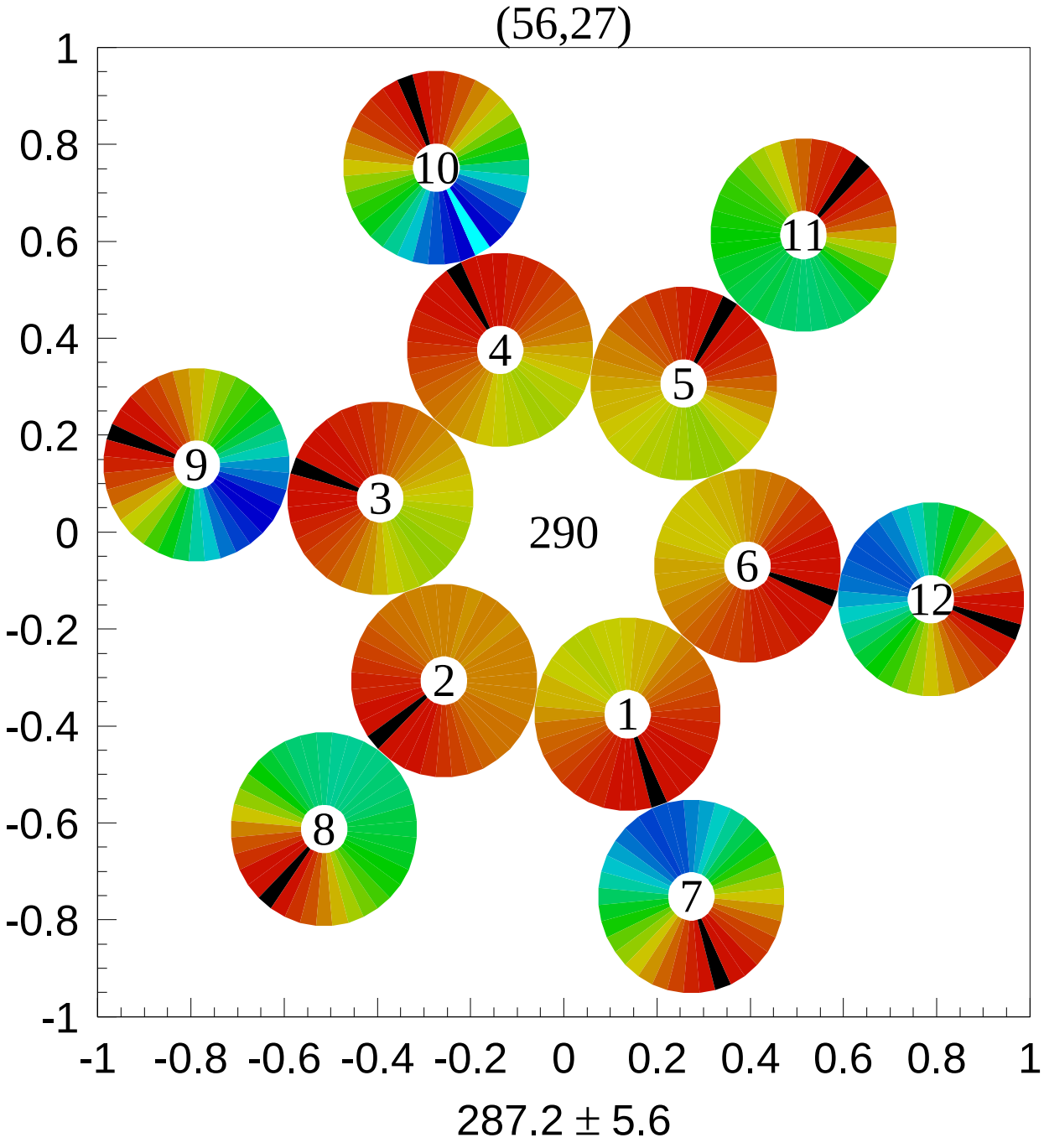

(56,25)
tilted LEDs
119 120 128 120 122 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 121 124 113 128 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

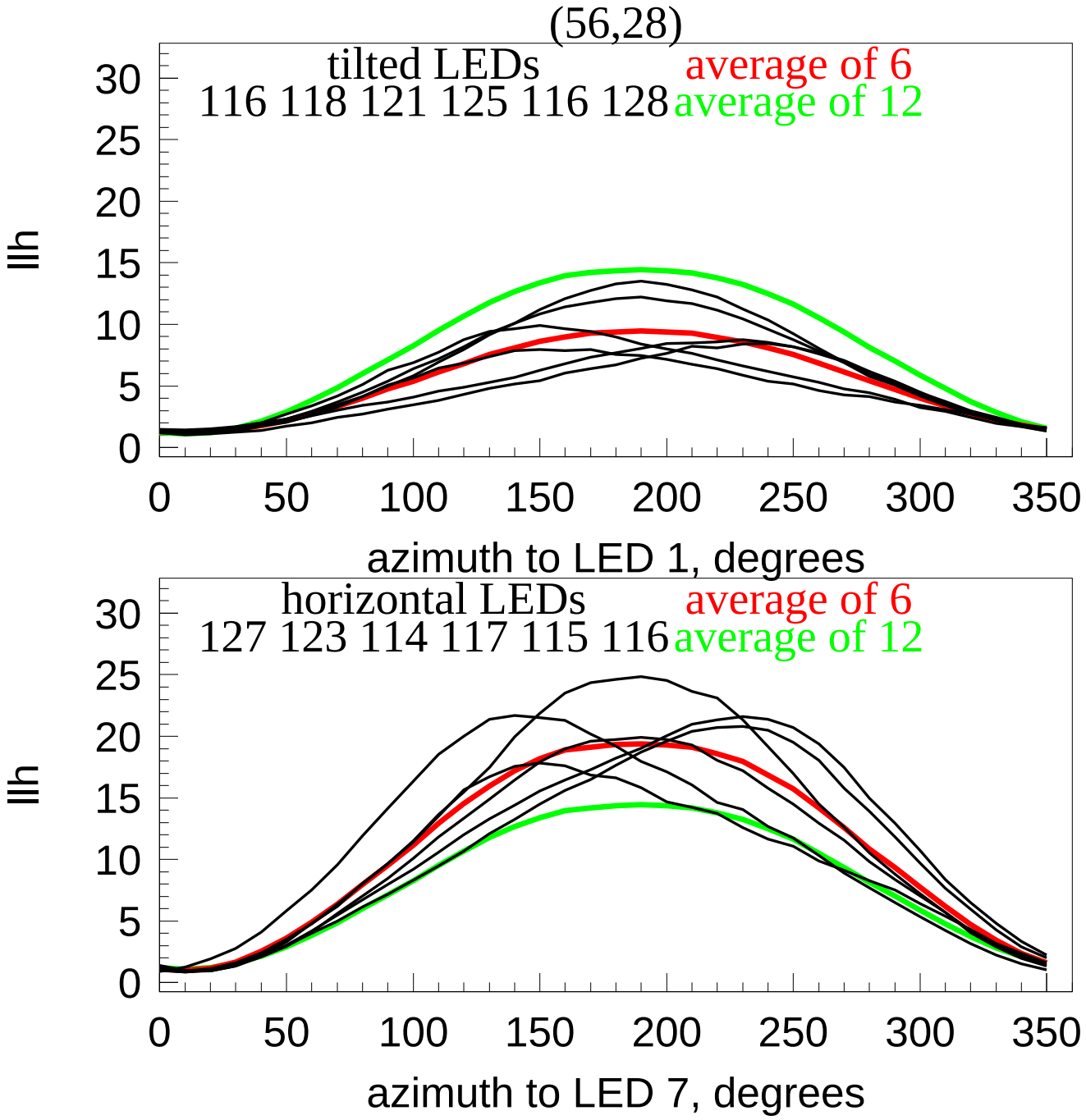

(56,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
109.2 ± 6.2

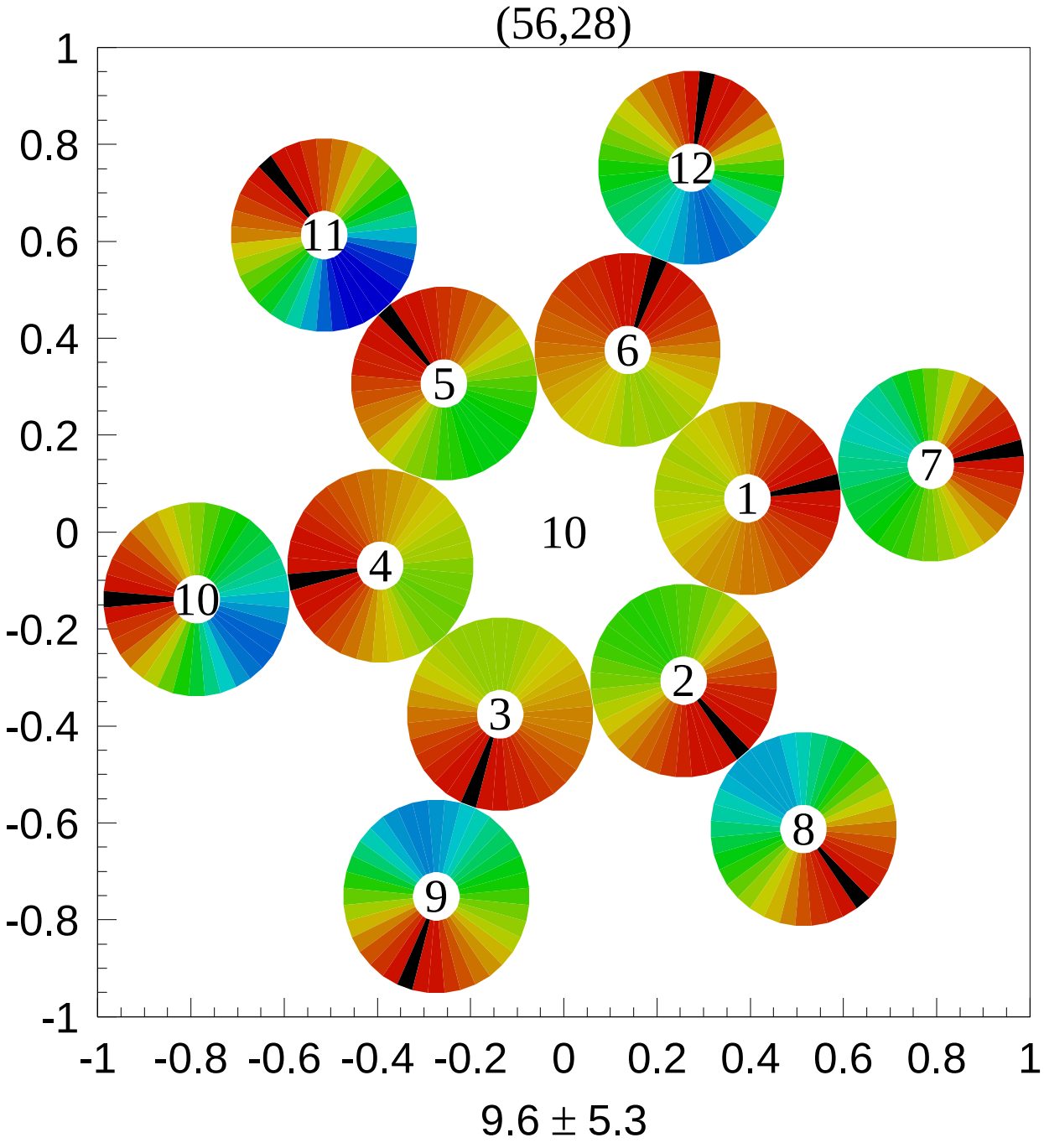

(56,26)
tilted LEDs
124 121 116 121 118 118
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 118 119 119 126 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

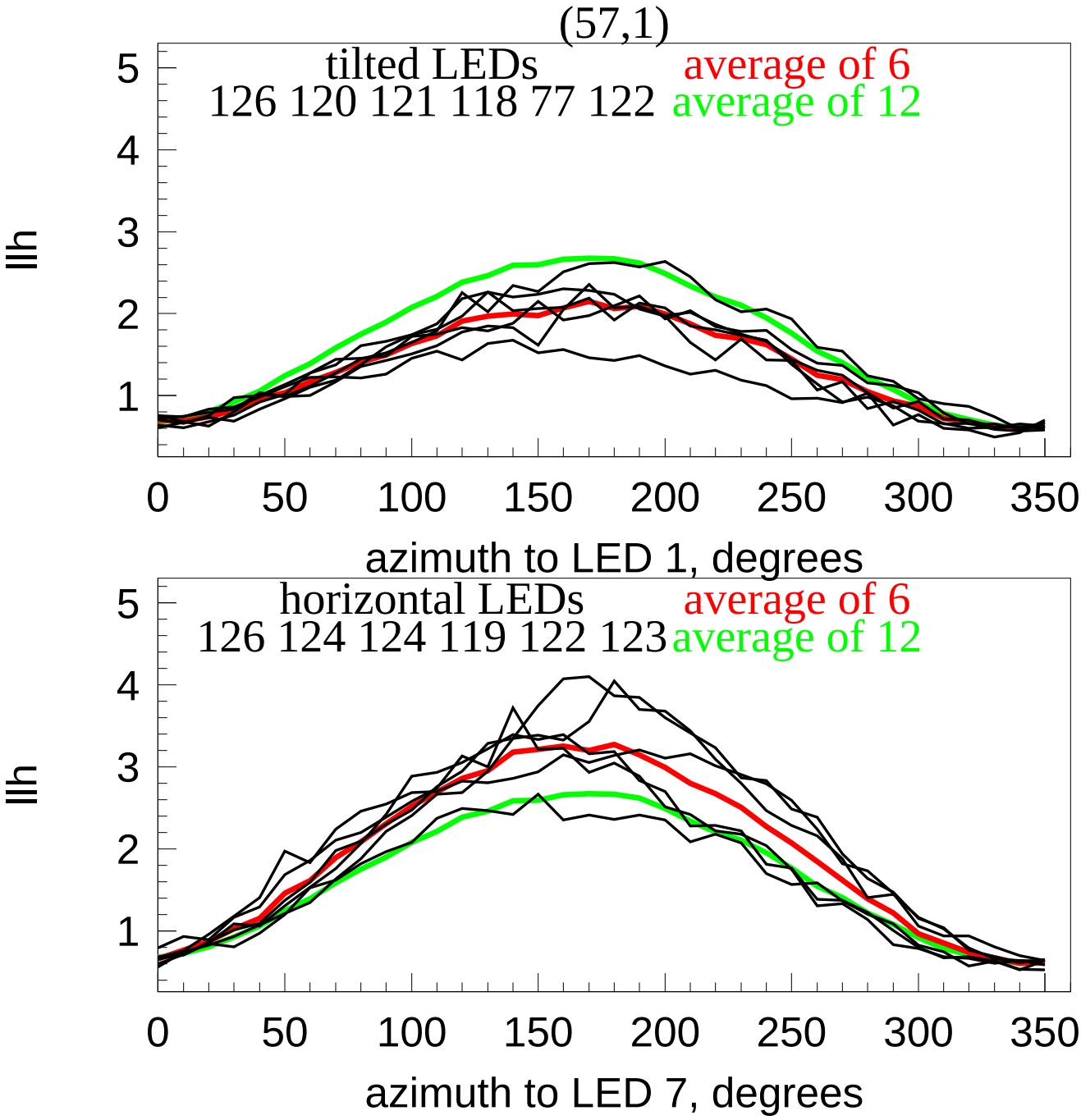

(56,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112.9 ± 6.6

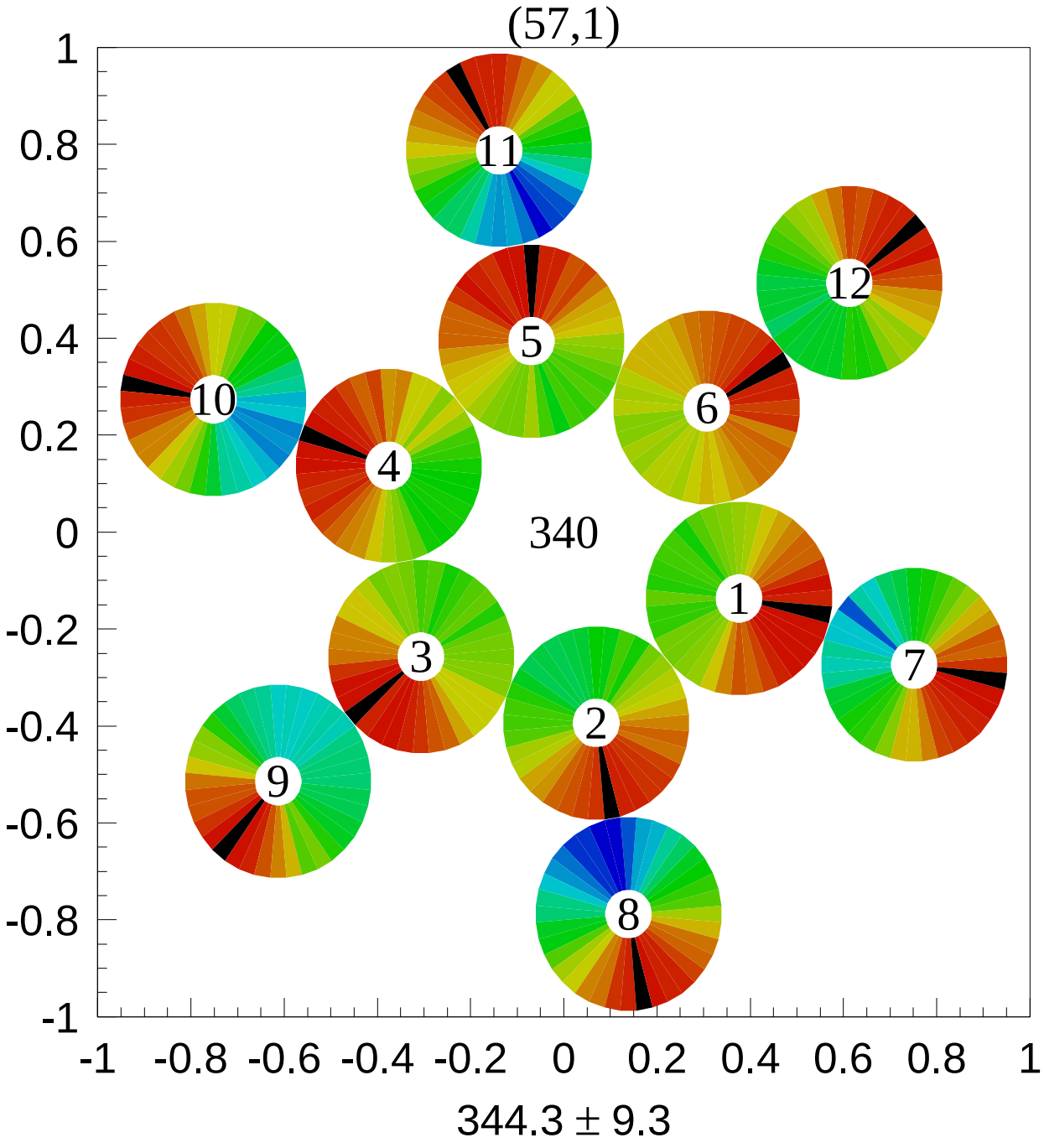

(56,27)
tilted LEDs
118 116 121 123 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 125 121 118 118 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

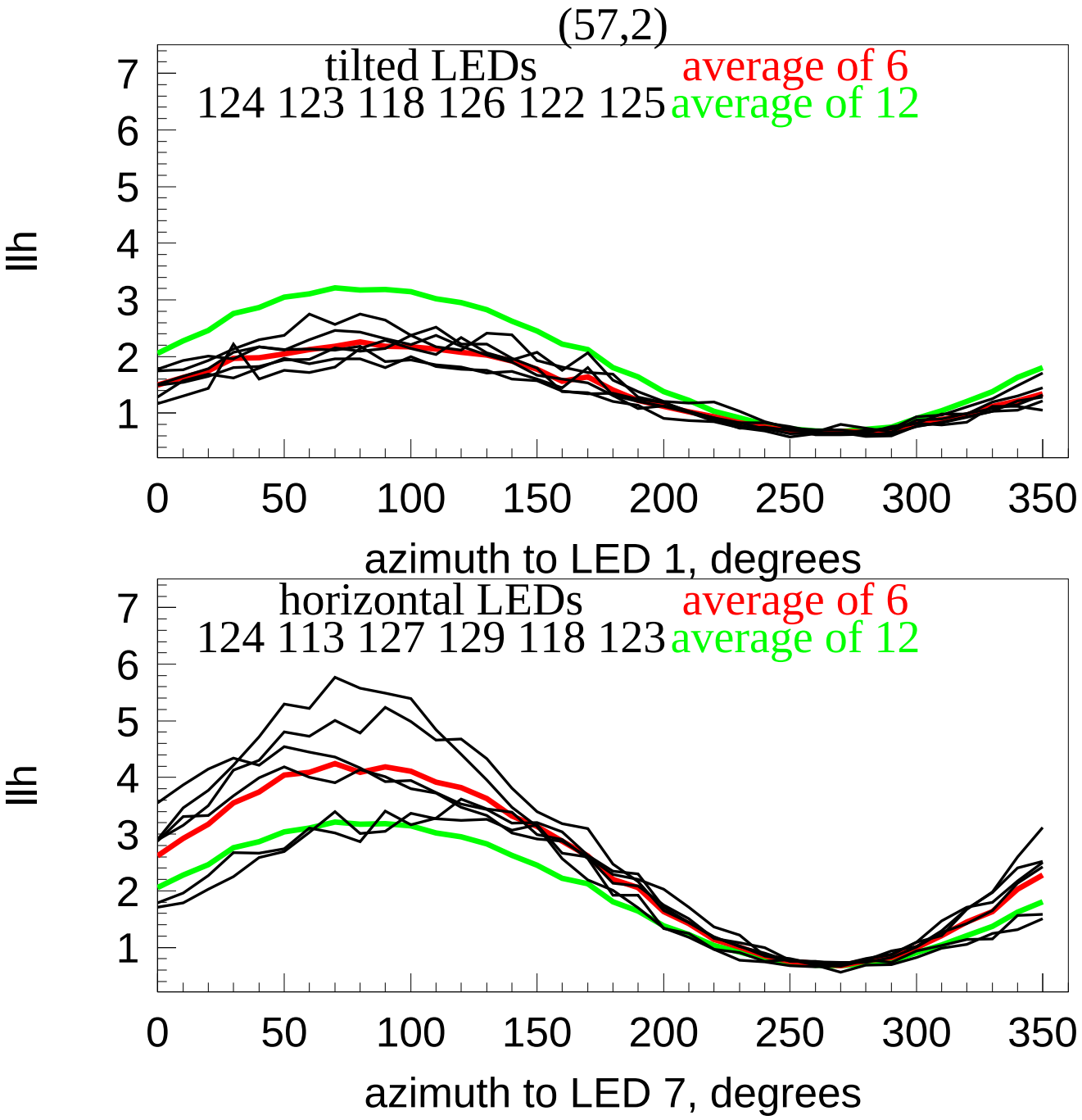

(56,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
287.2 ± 5.6

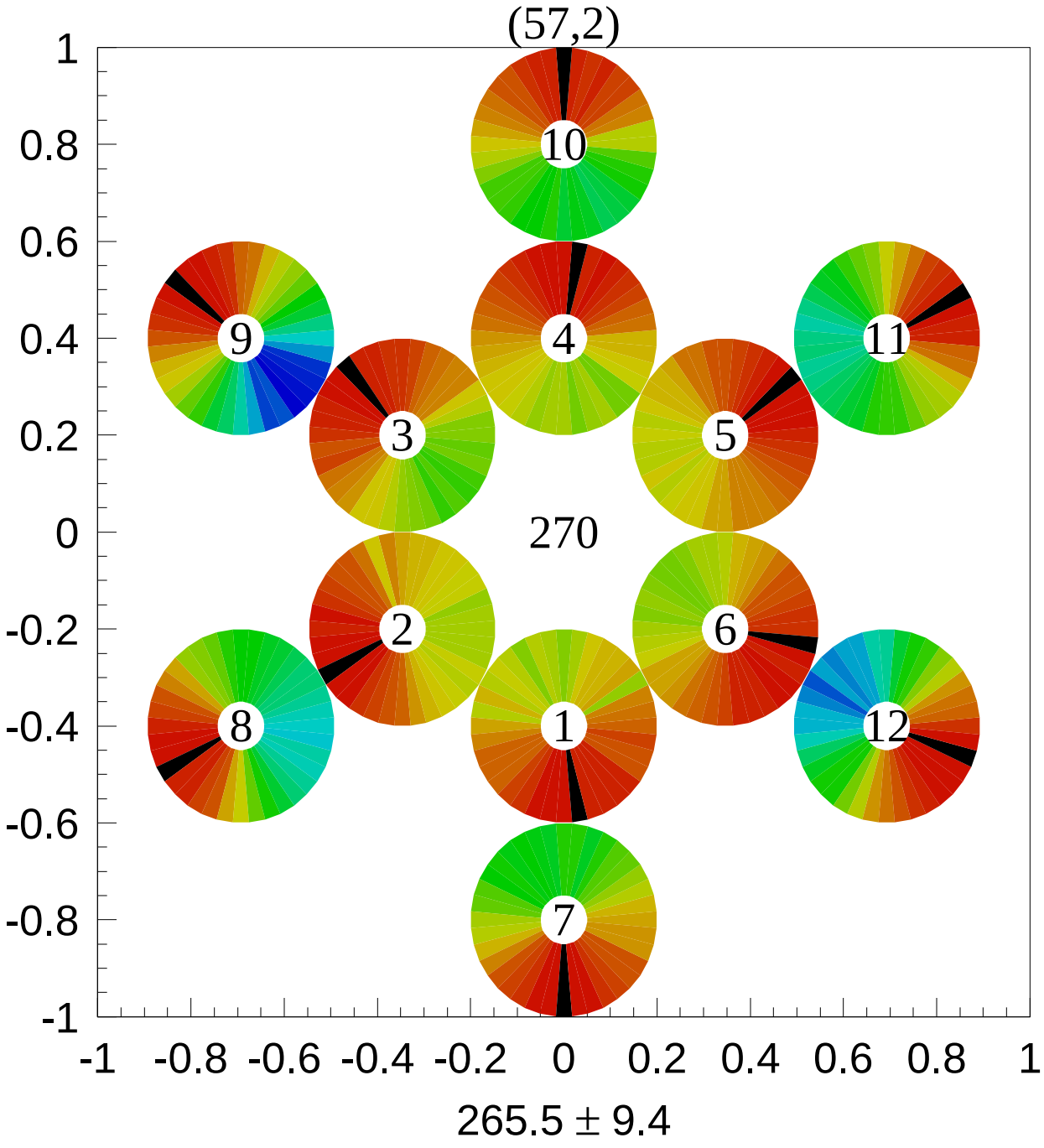

(56,28)
tilted LEDs
116 118 121 125 116 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 123 114 117 115 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

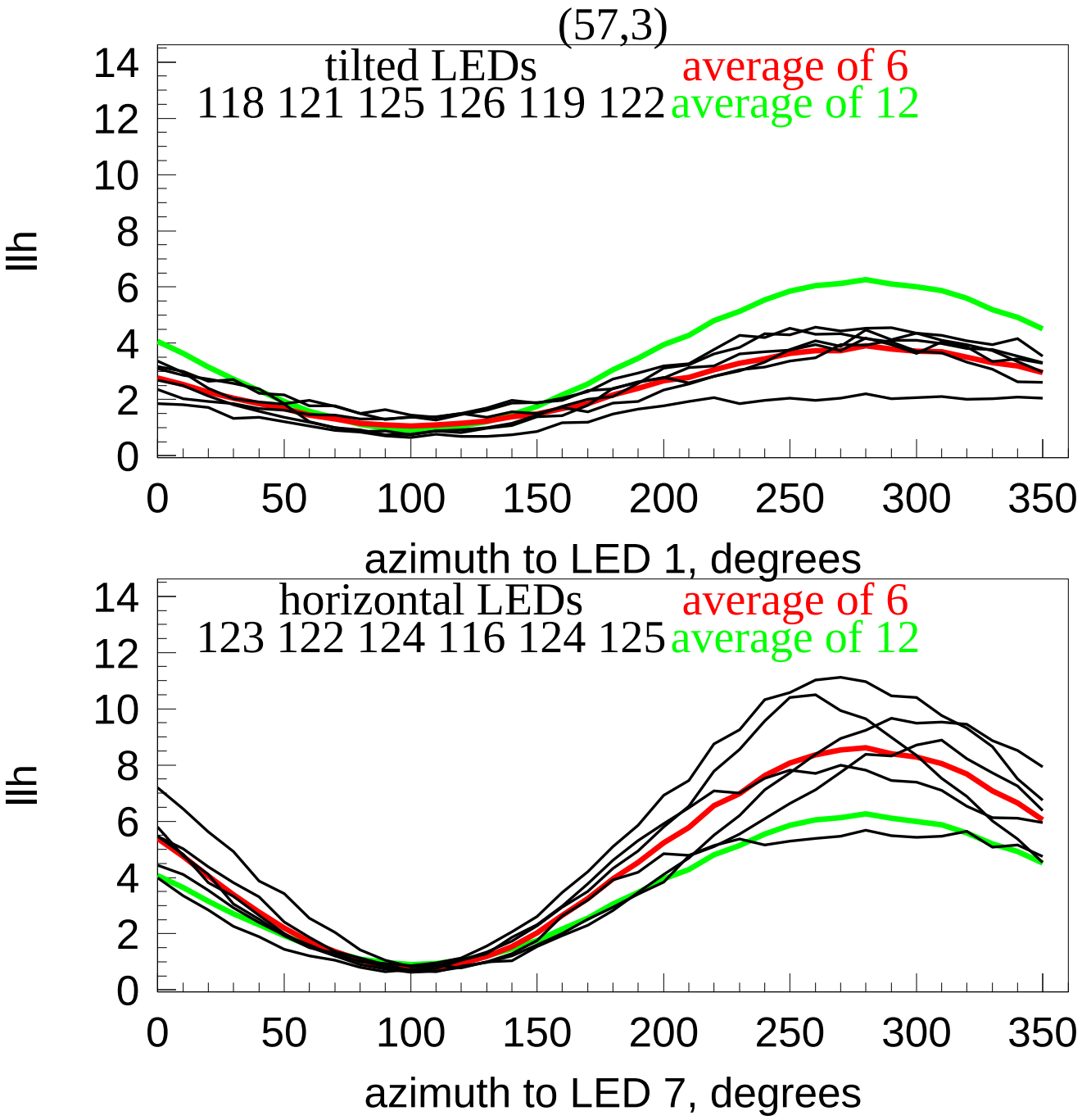

(56,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
9.6 ± 5.3

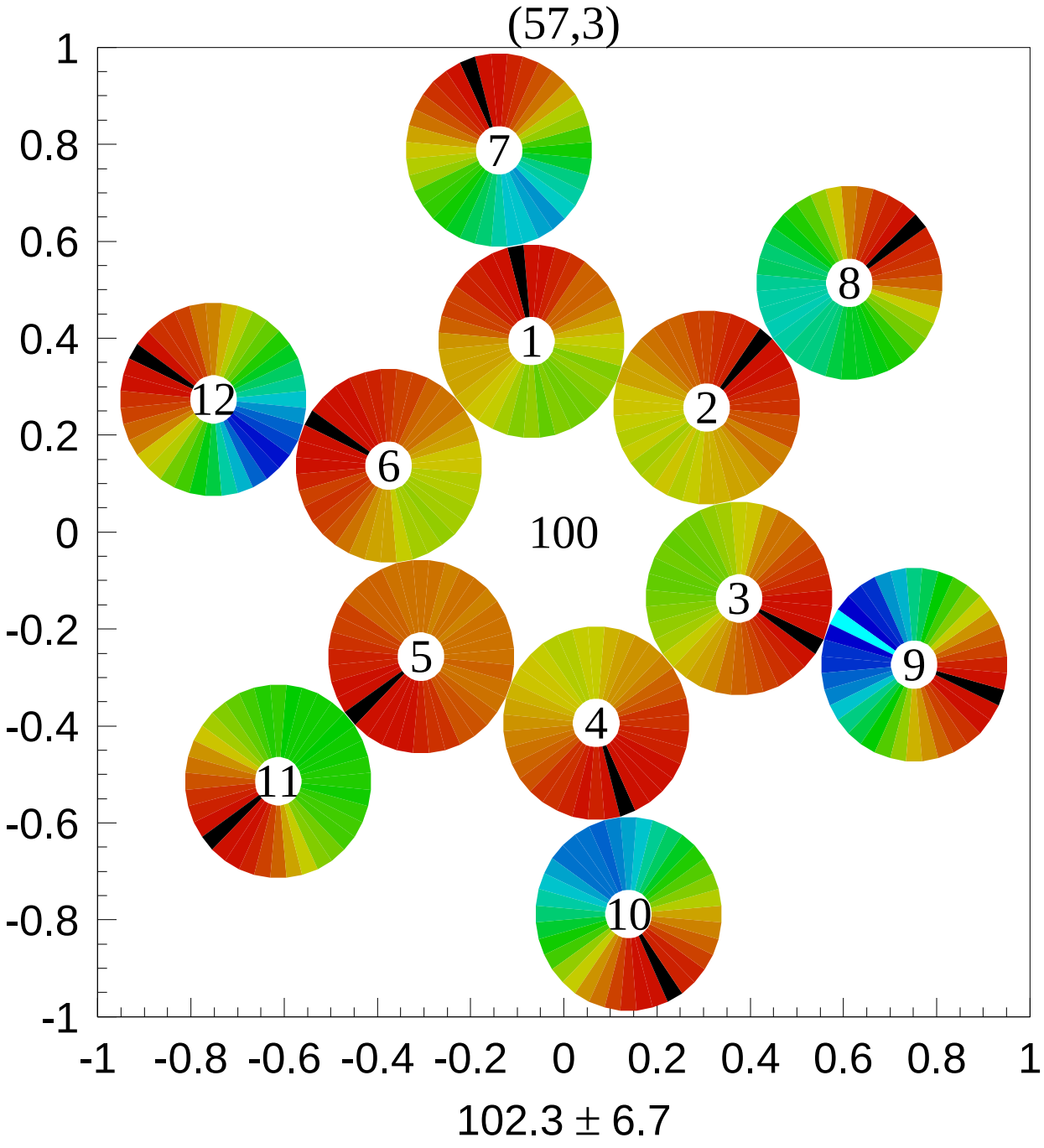

(57,1)
tilted LEDs
126 120 121 118 77 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 124 124 119 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

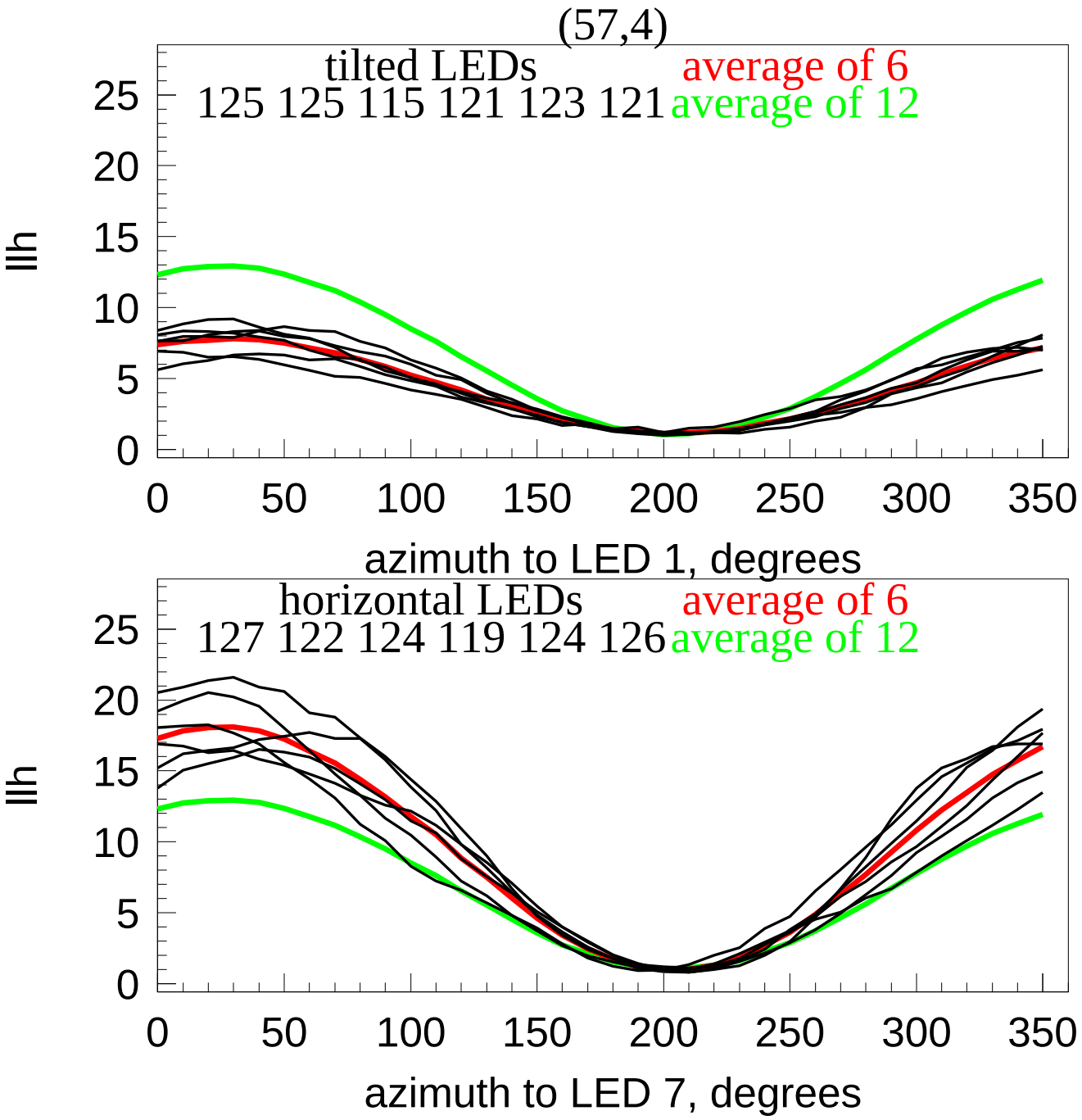

(57,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
344.3 ± 9.3

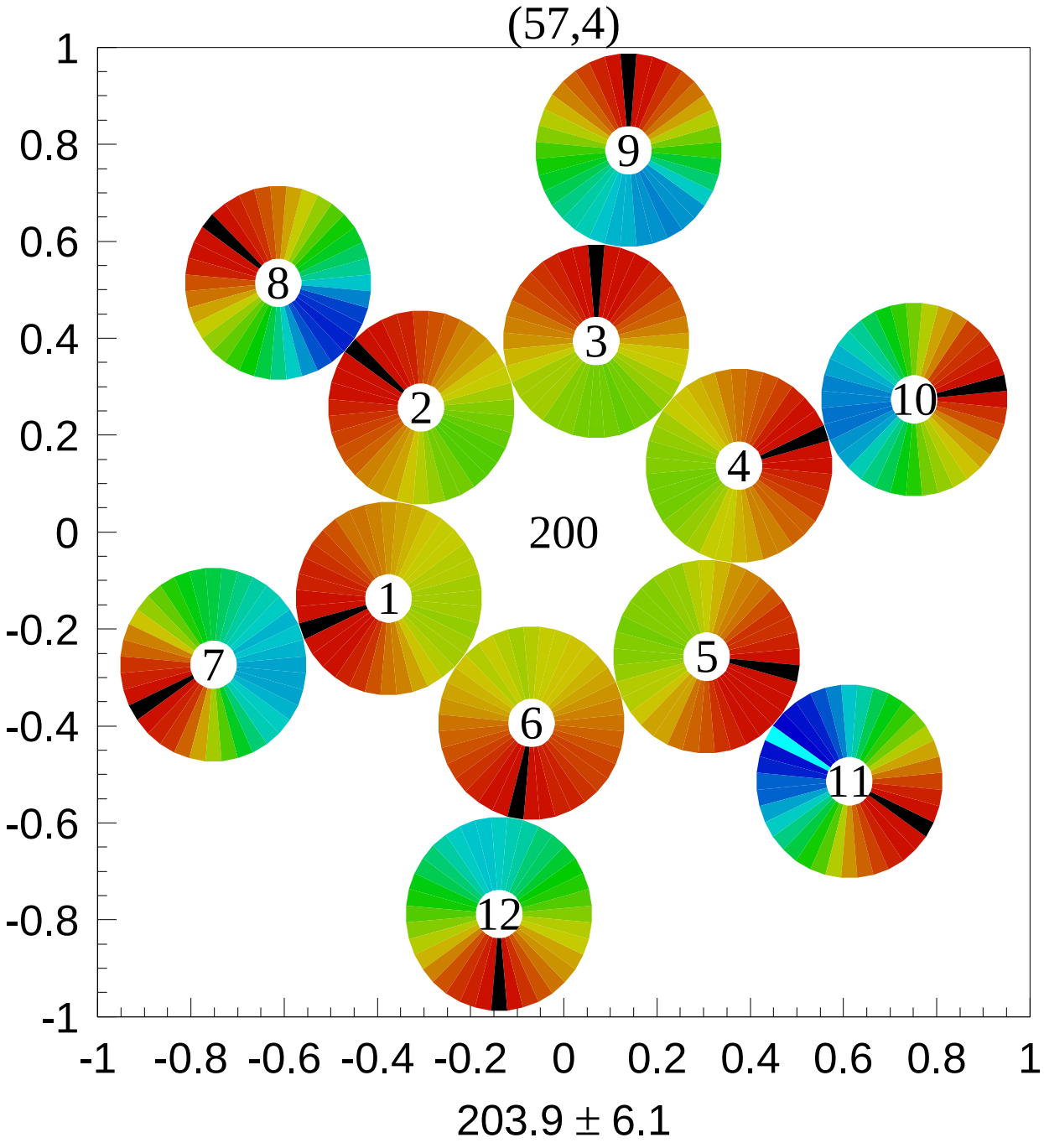

(57,2)
tilted LEDs
124 123 118 126 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 113 127 129 118 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

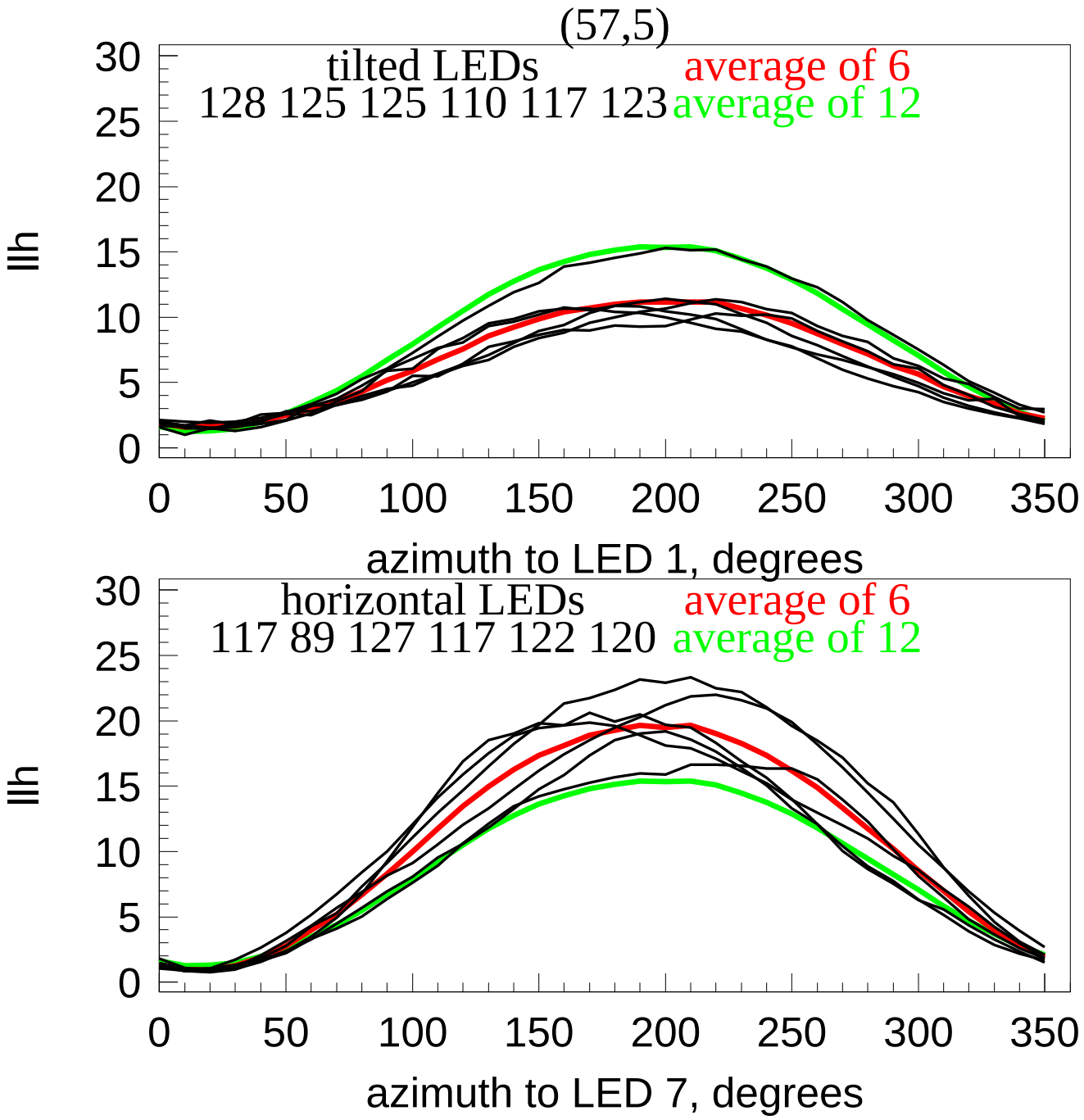

(57,2)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
265.5 ± 9.4

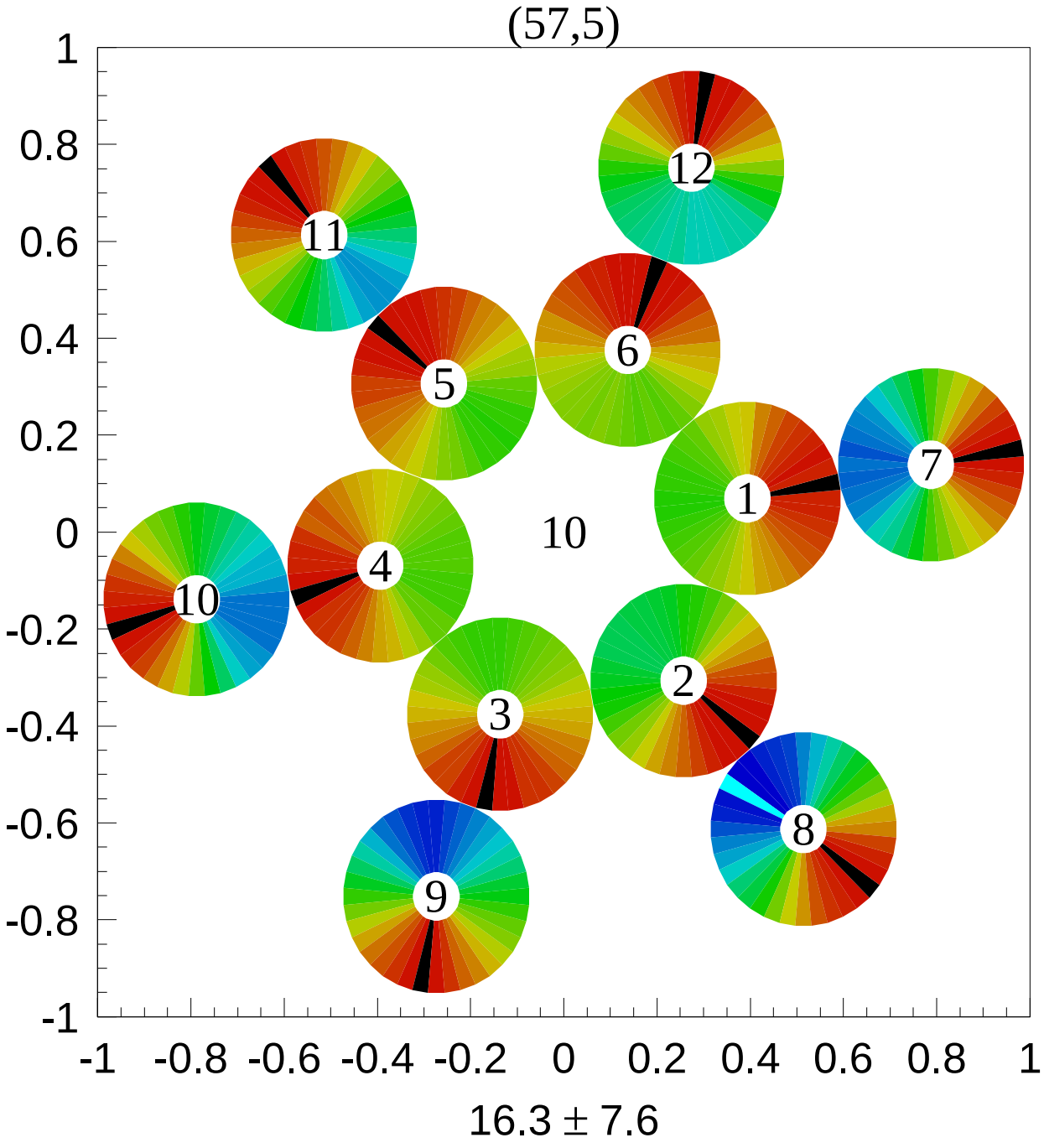

(57,3)
tilted LEDs
118 121 125 126 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 124 116 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

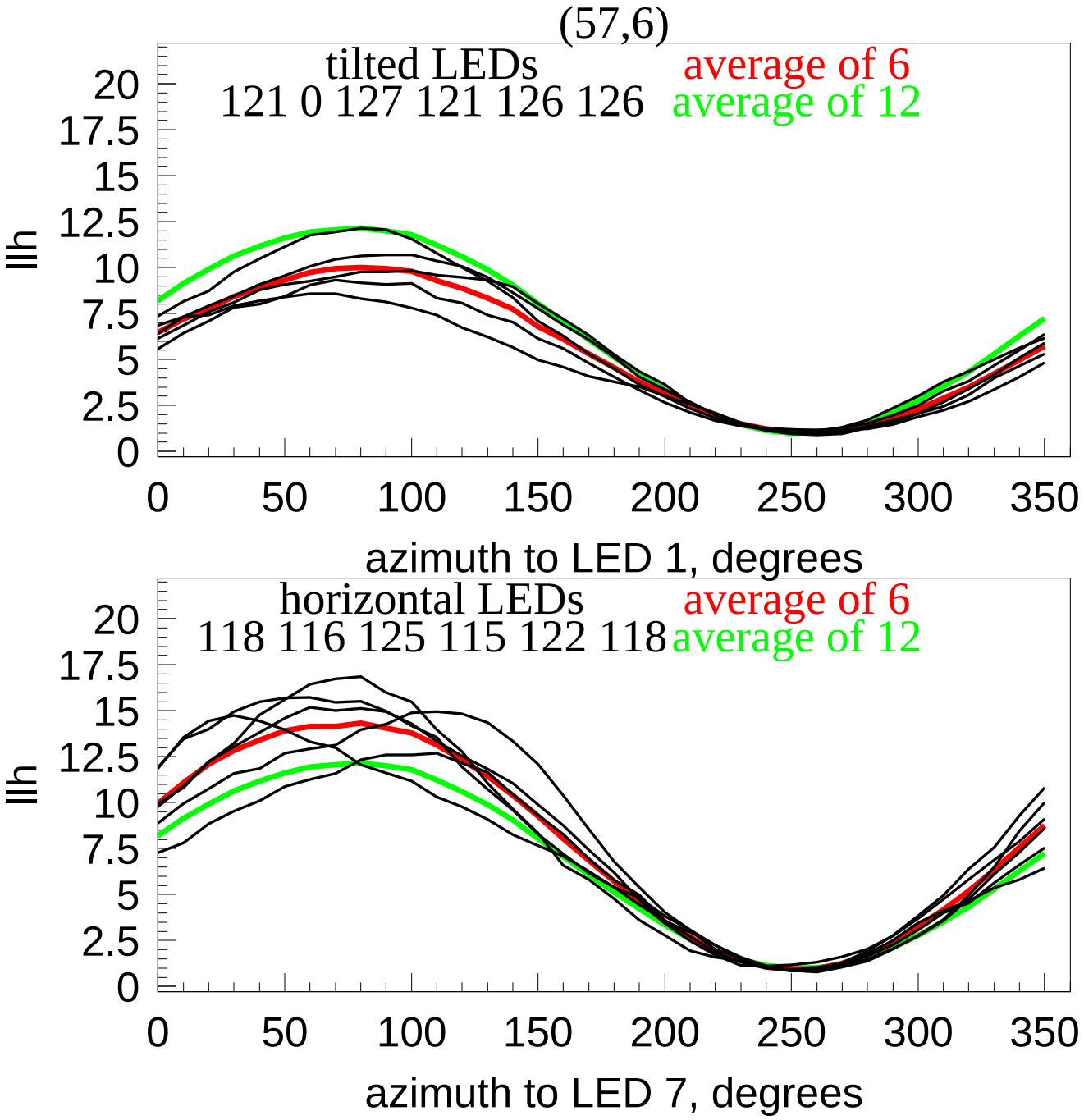

(57,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
102.3 ± 6.7

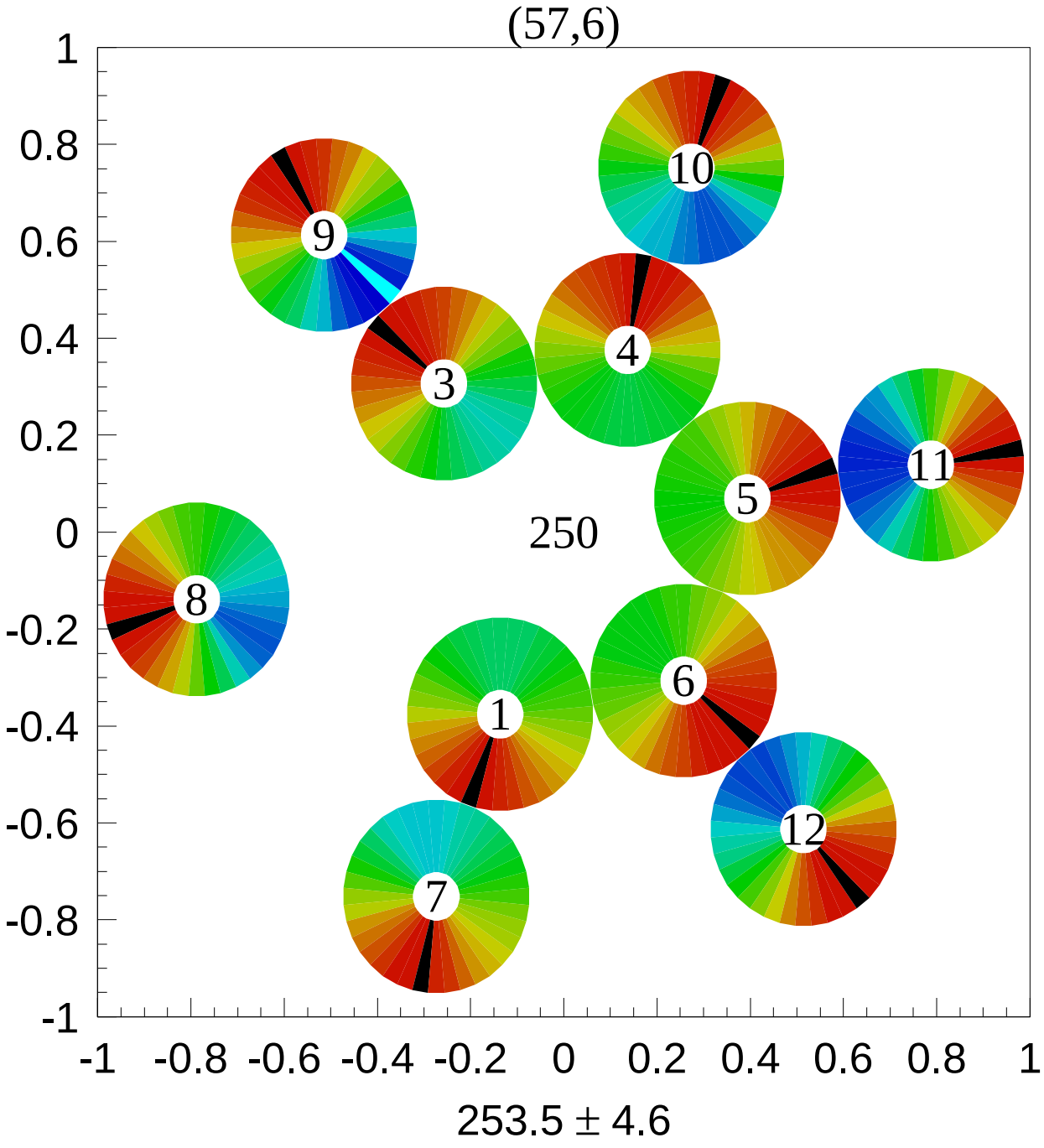

(57,4)
tilted LEDs
125 125 115 121 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 124 119 124 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

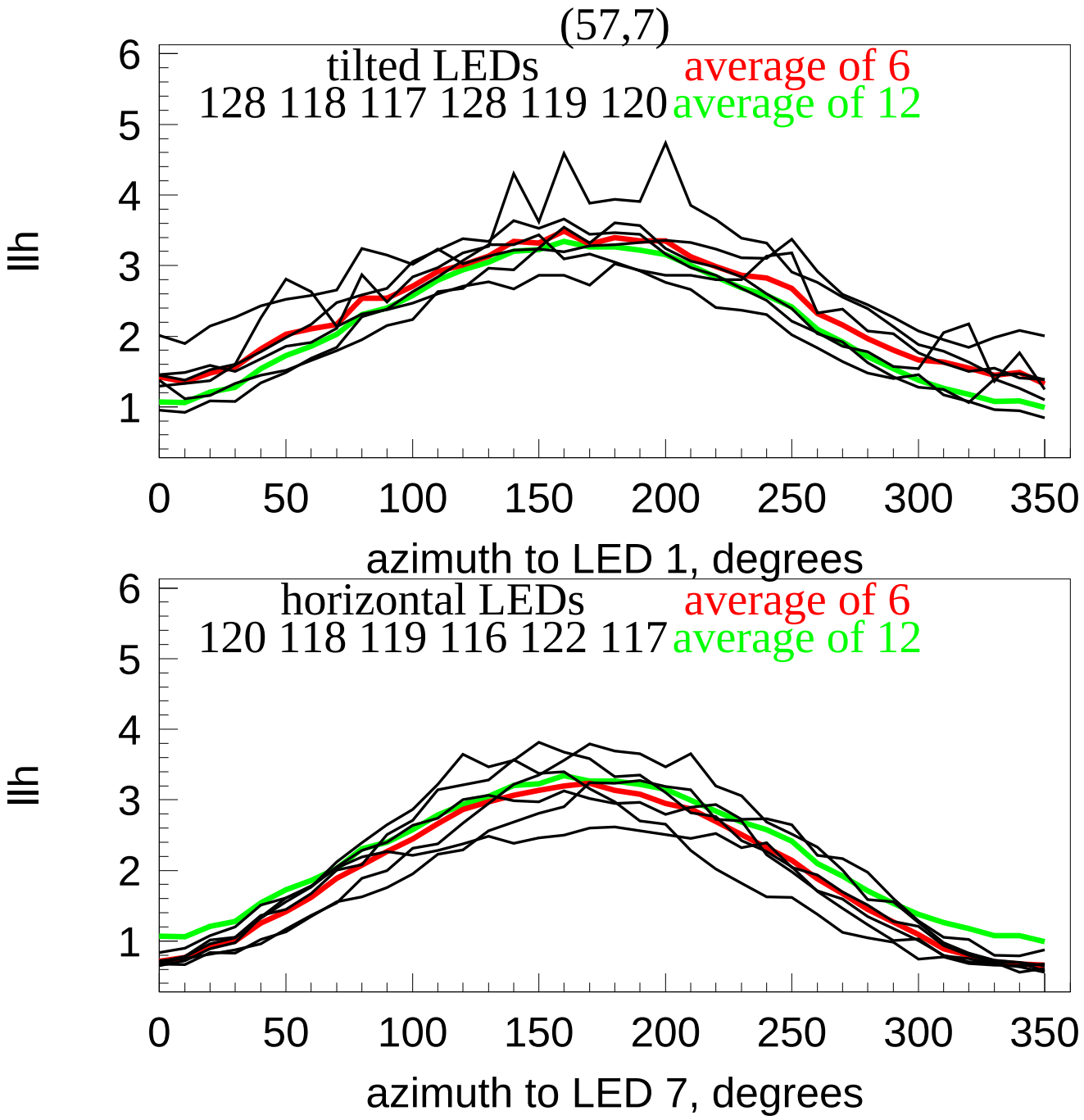

(57,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
203.9 ± 6.1

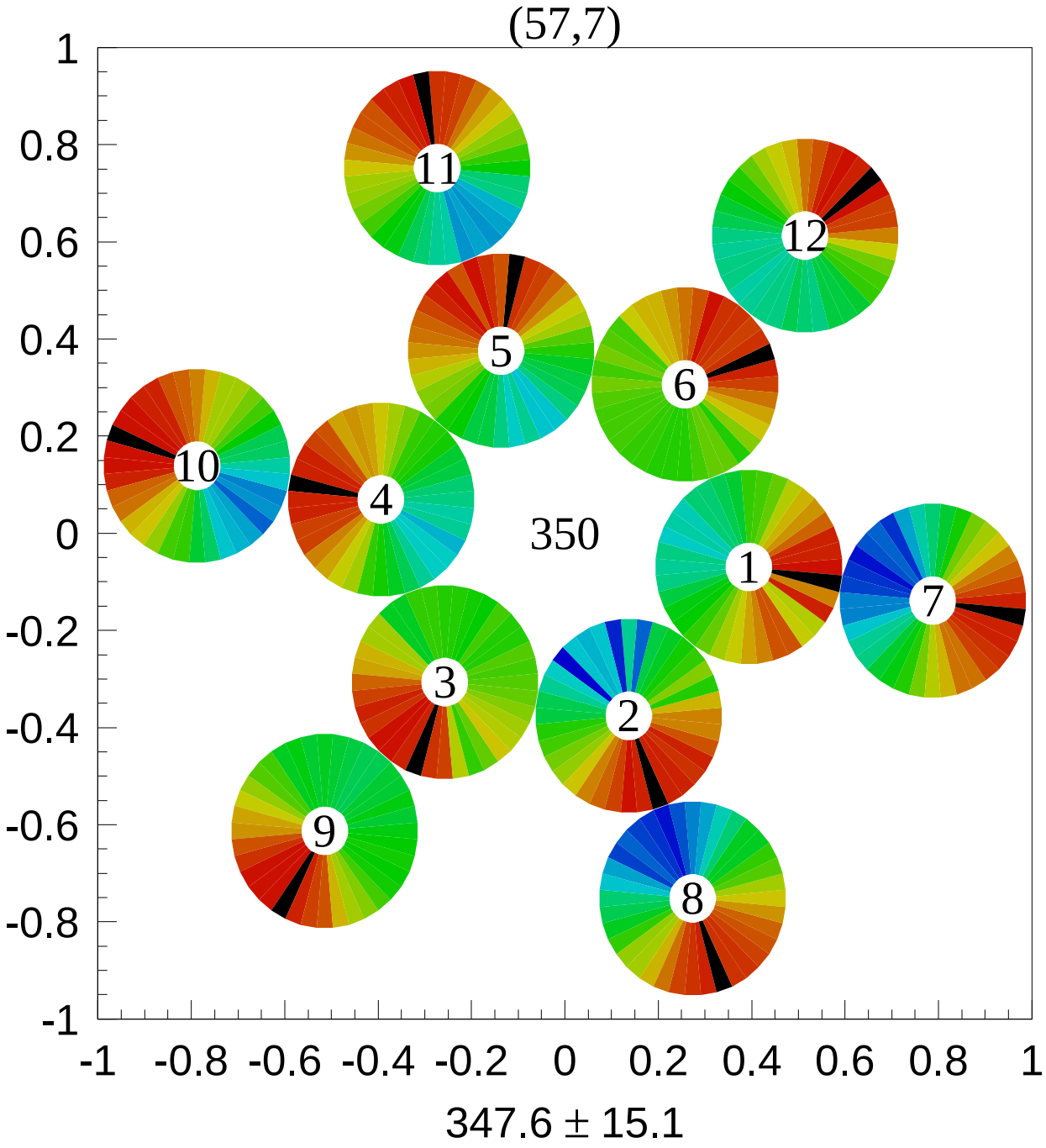

(57,5)
tilted LEDs
128 125 125 110 117 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 89 127 117 122 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

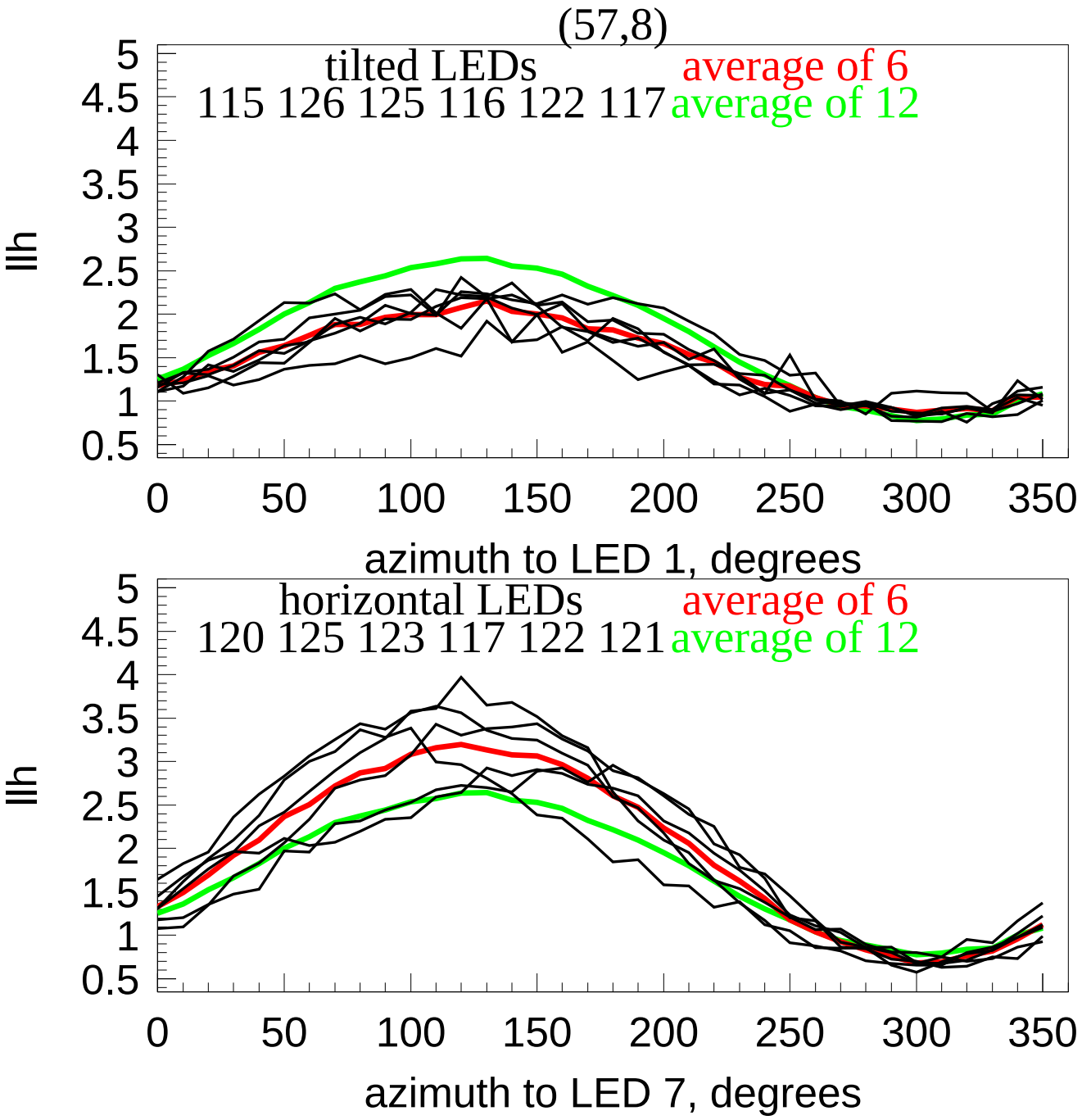

(57,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
16.3 ± 7.6
12
11
6
5
7
1
10
4
10
2
3
8
9

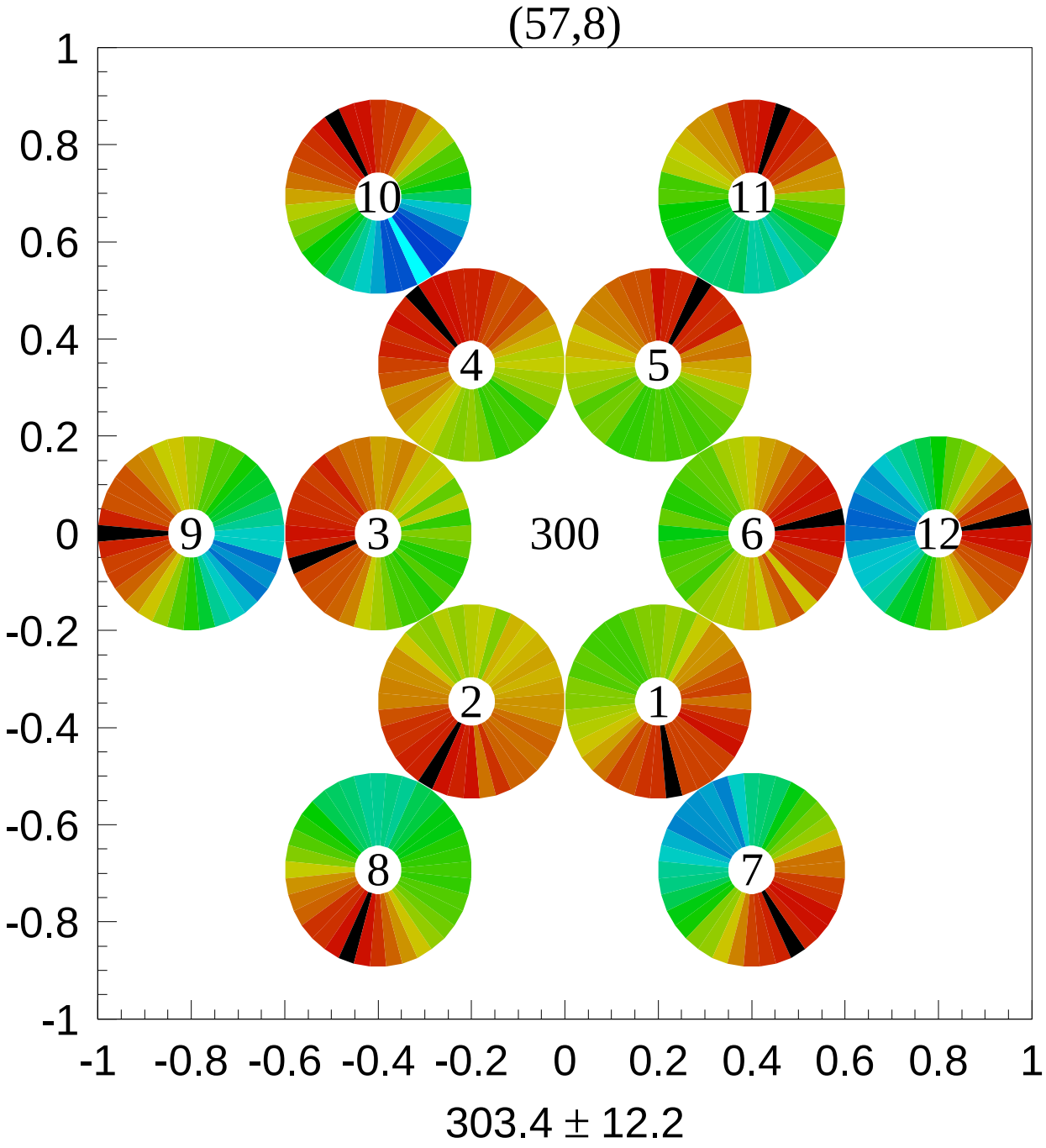

(57,6)
tilted LEDs
121 0 127 121 126 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 116 125 115 122 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

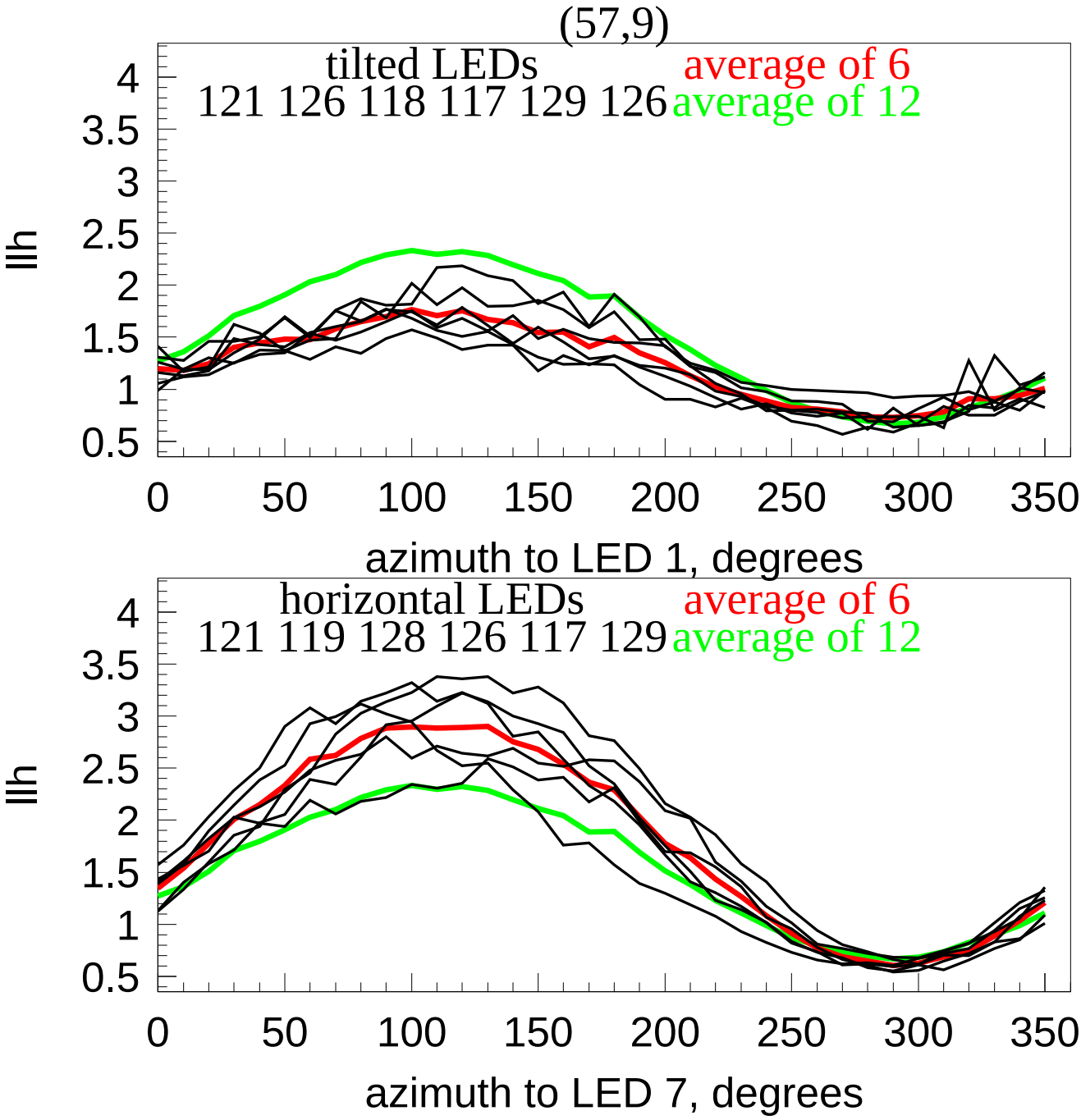

(57,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
250
8
6
1
12
7
253.5 ± 4.6

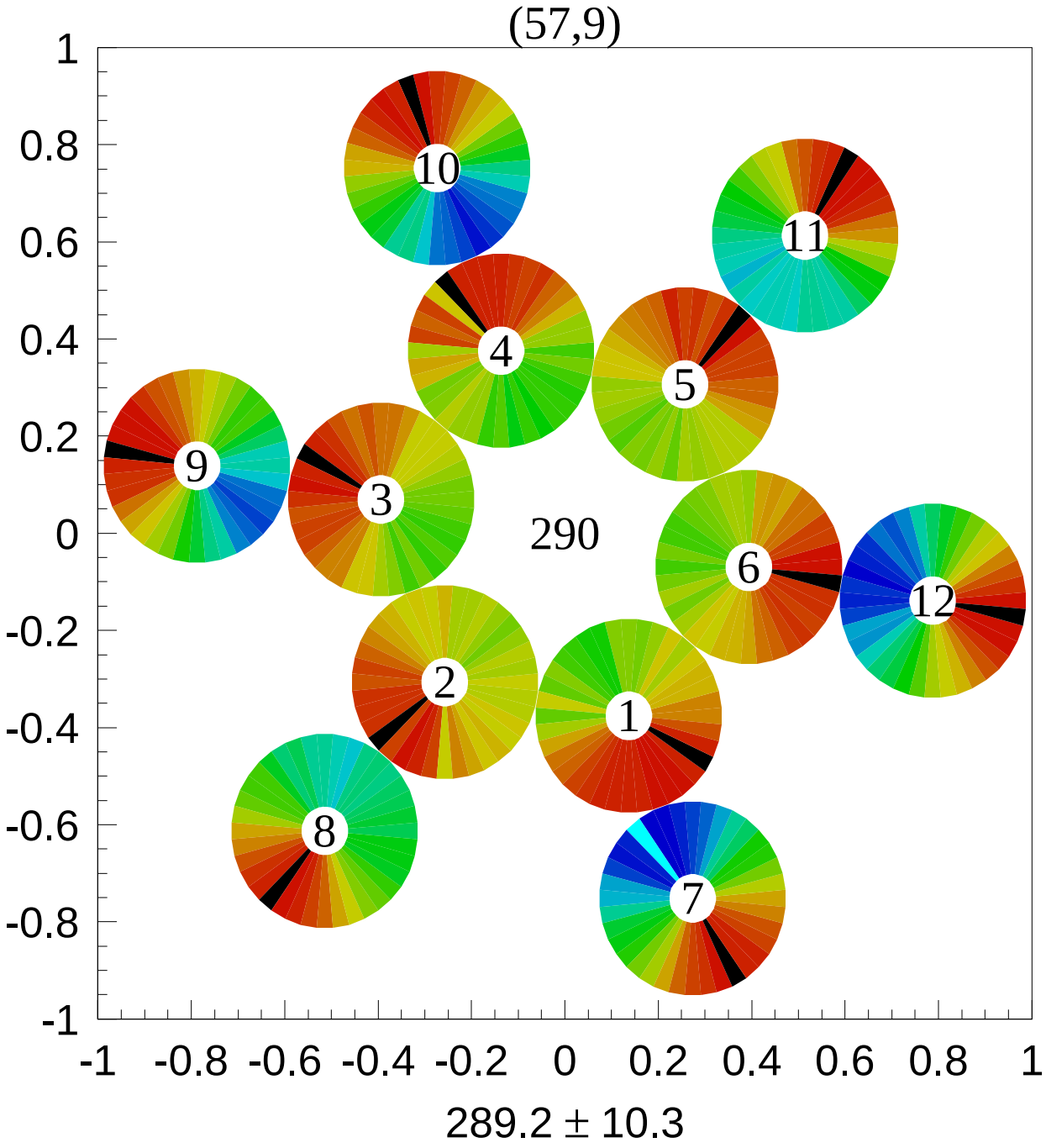

(57,7)
tilted LEDs
128 118 117 128 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 118 119 116 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

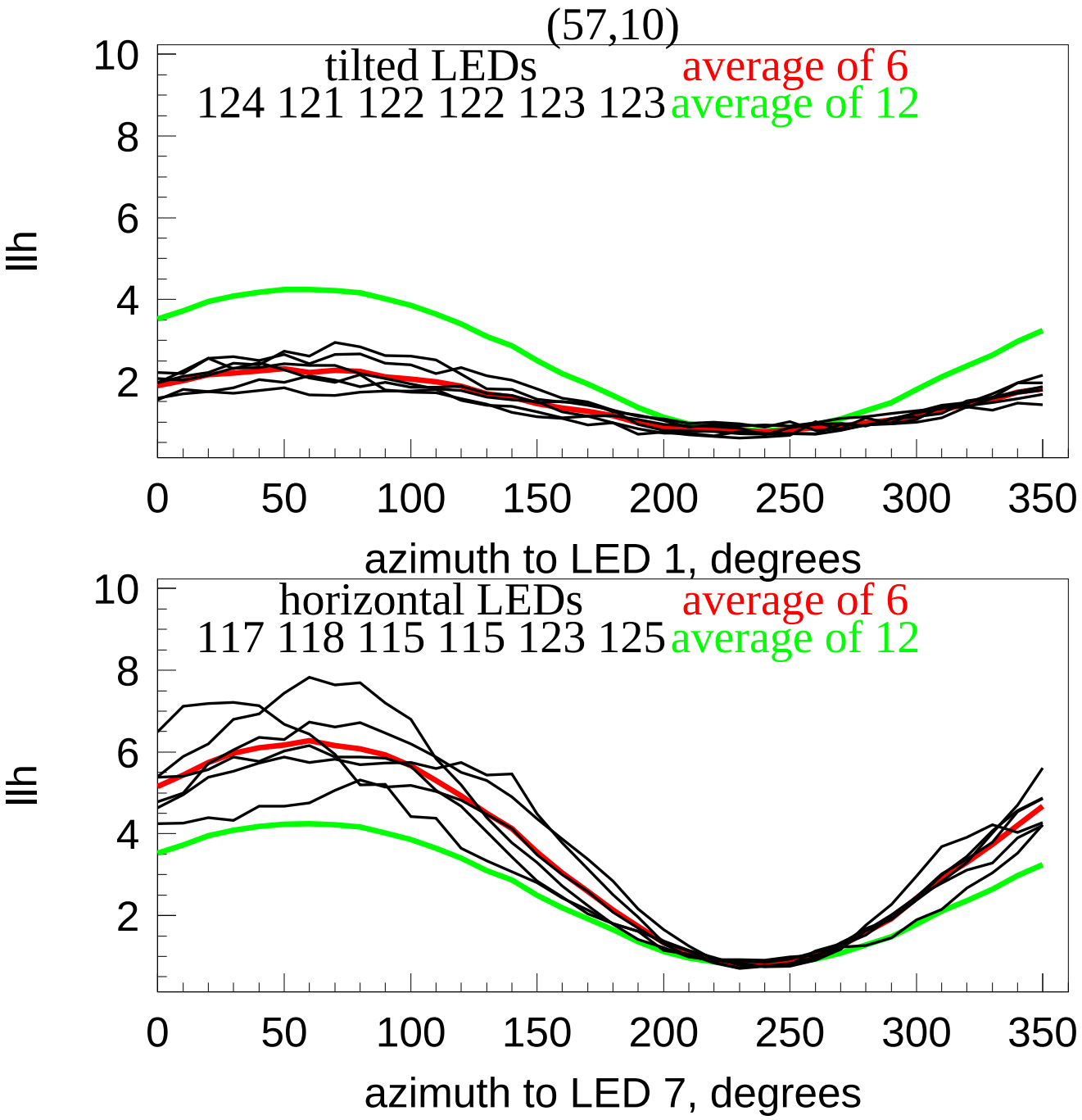

(57,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
347.6 ± 15.1

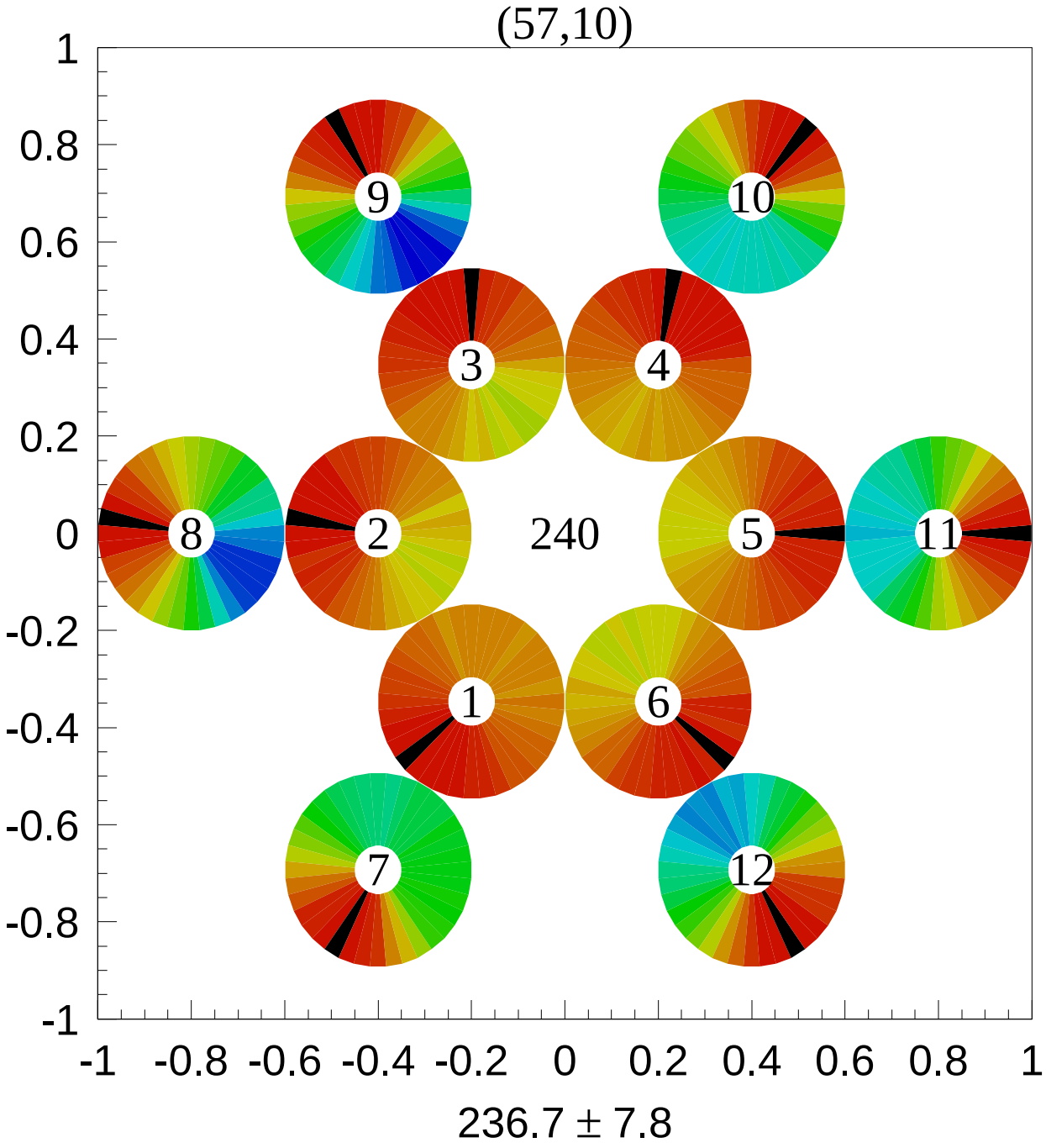

(57,8)
tilted LEDs
115 126 125 116 122 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 125 123 117 122 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

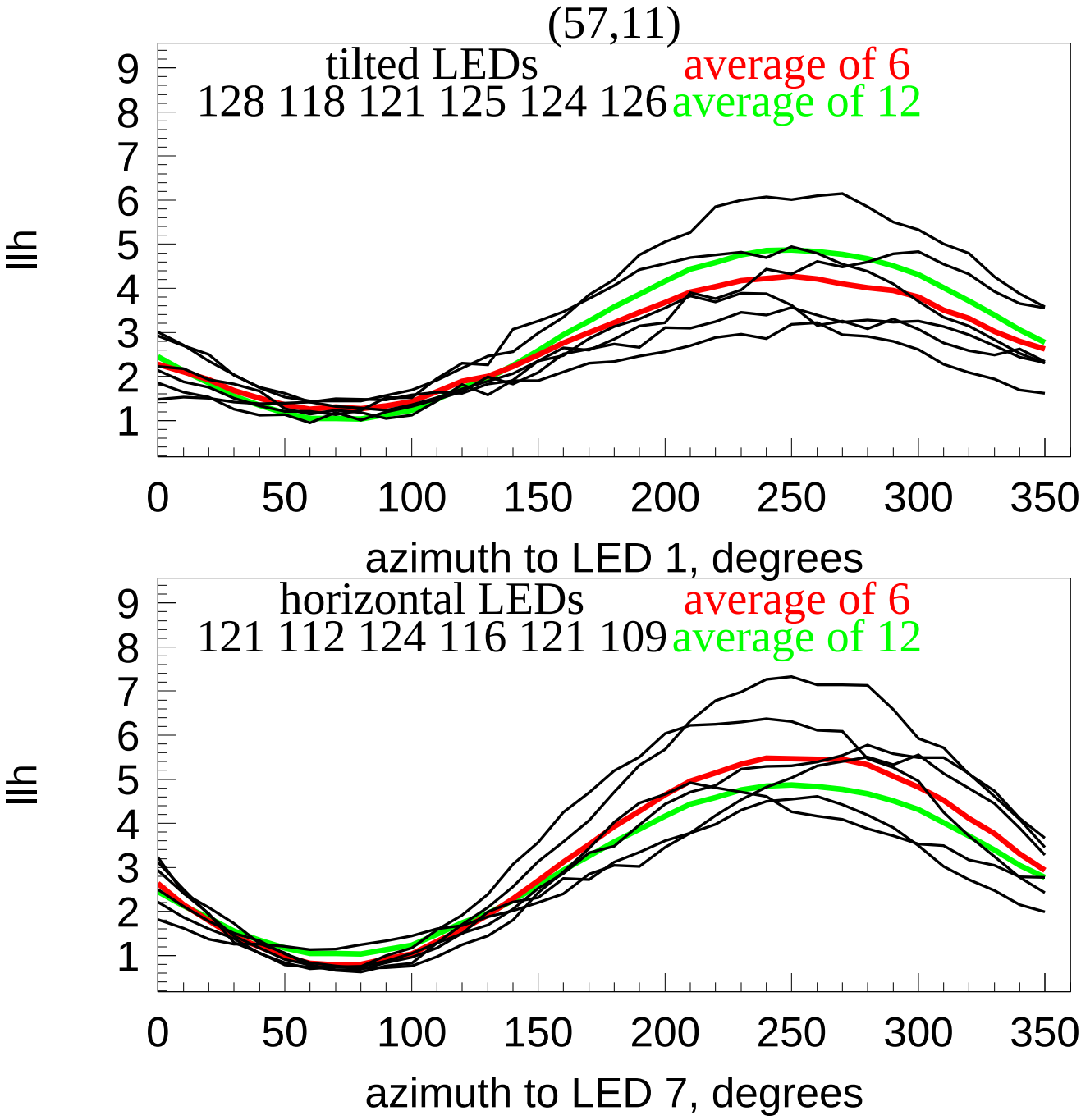

(57,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
303.4 ± 12.2

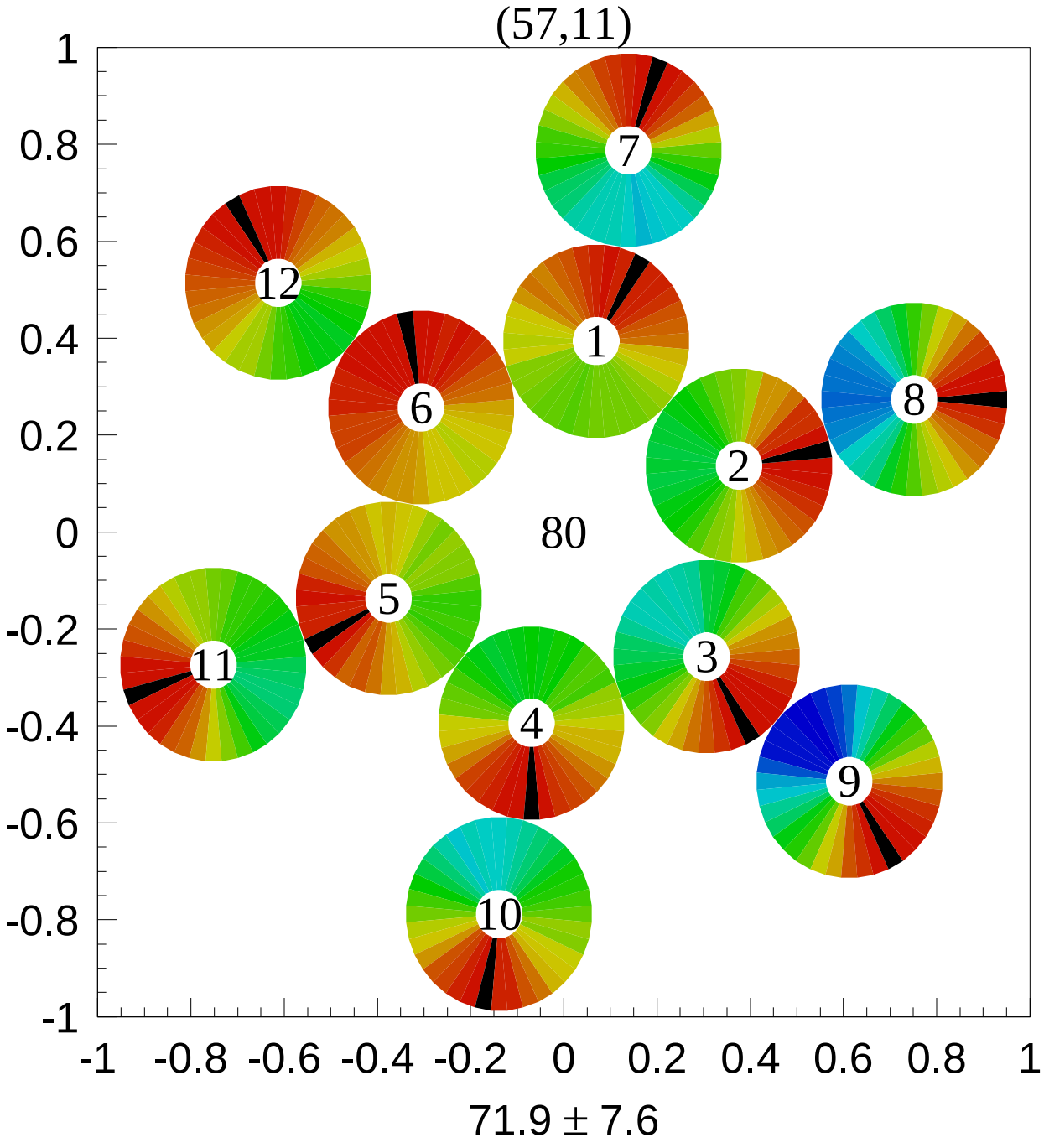

(57,9)
tilted LEDs
121 126 118 117 129 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 128 126 117 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

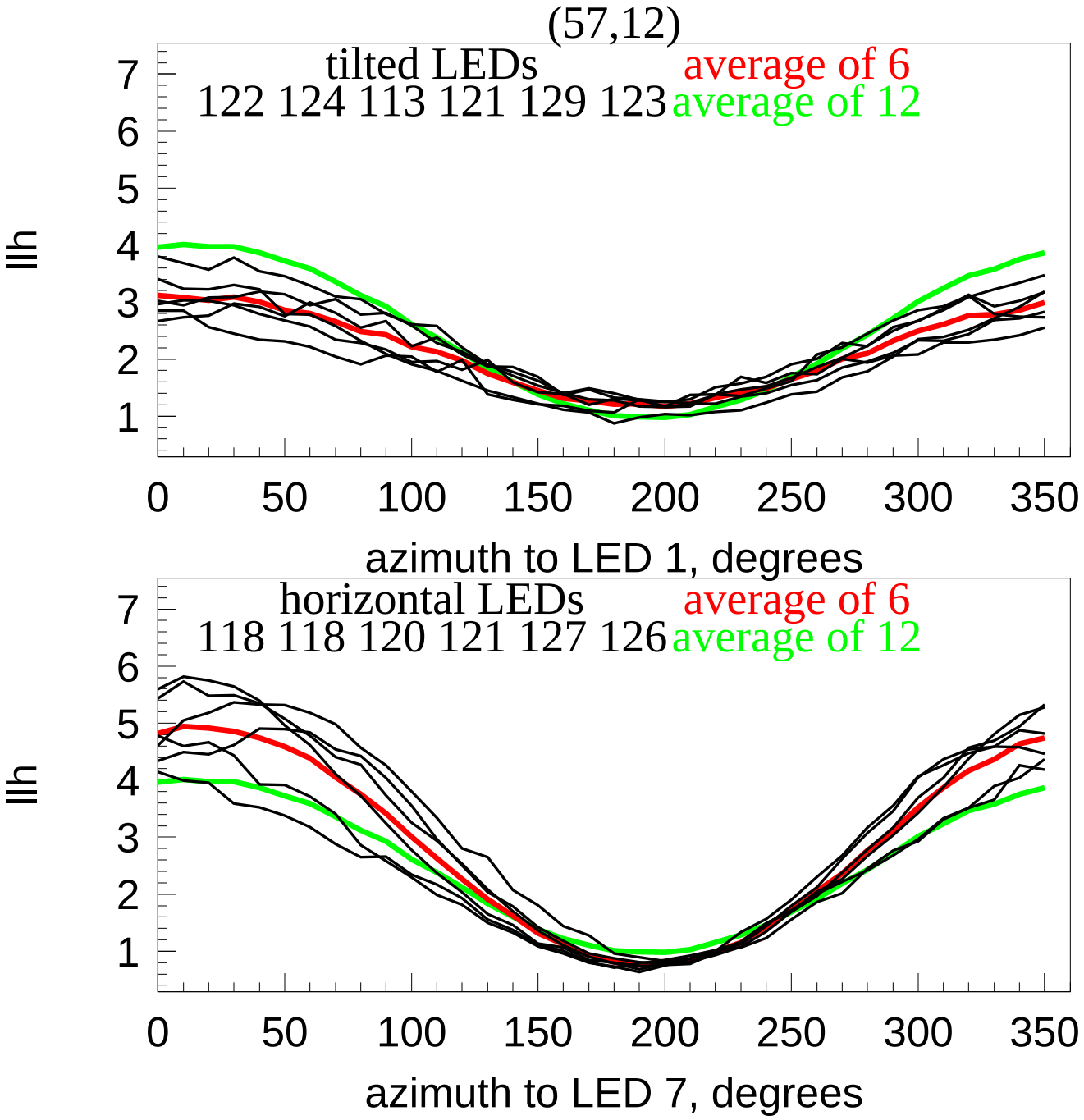

(57,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
289.2 ± 10.3

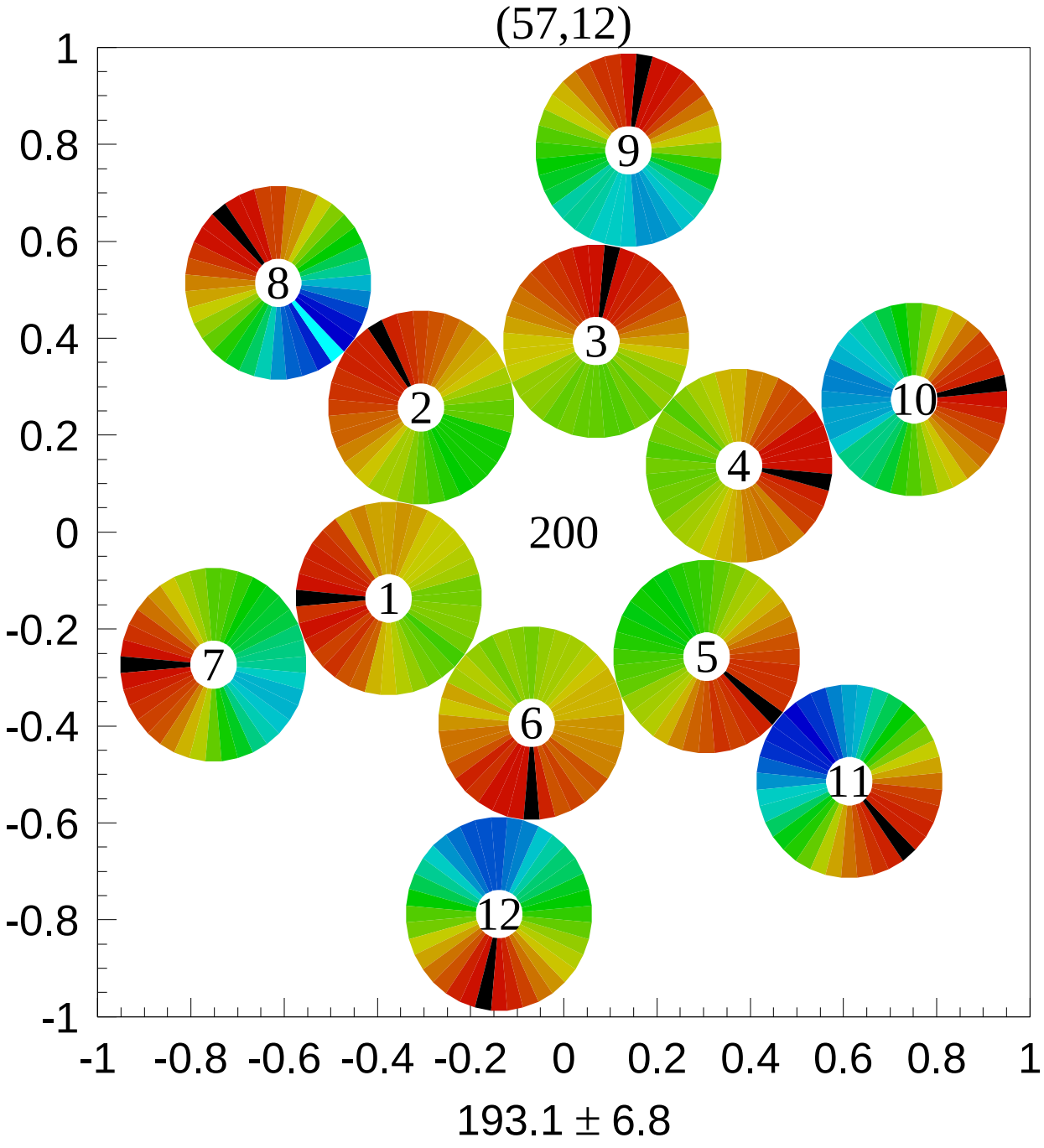

(57,10)
tilted LEDs
124 121 122 122 123 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 118 115 115 123 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

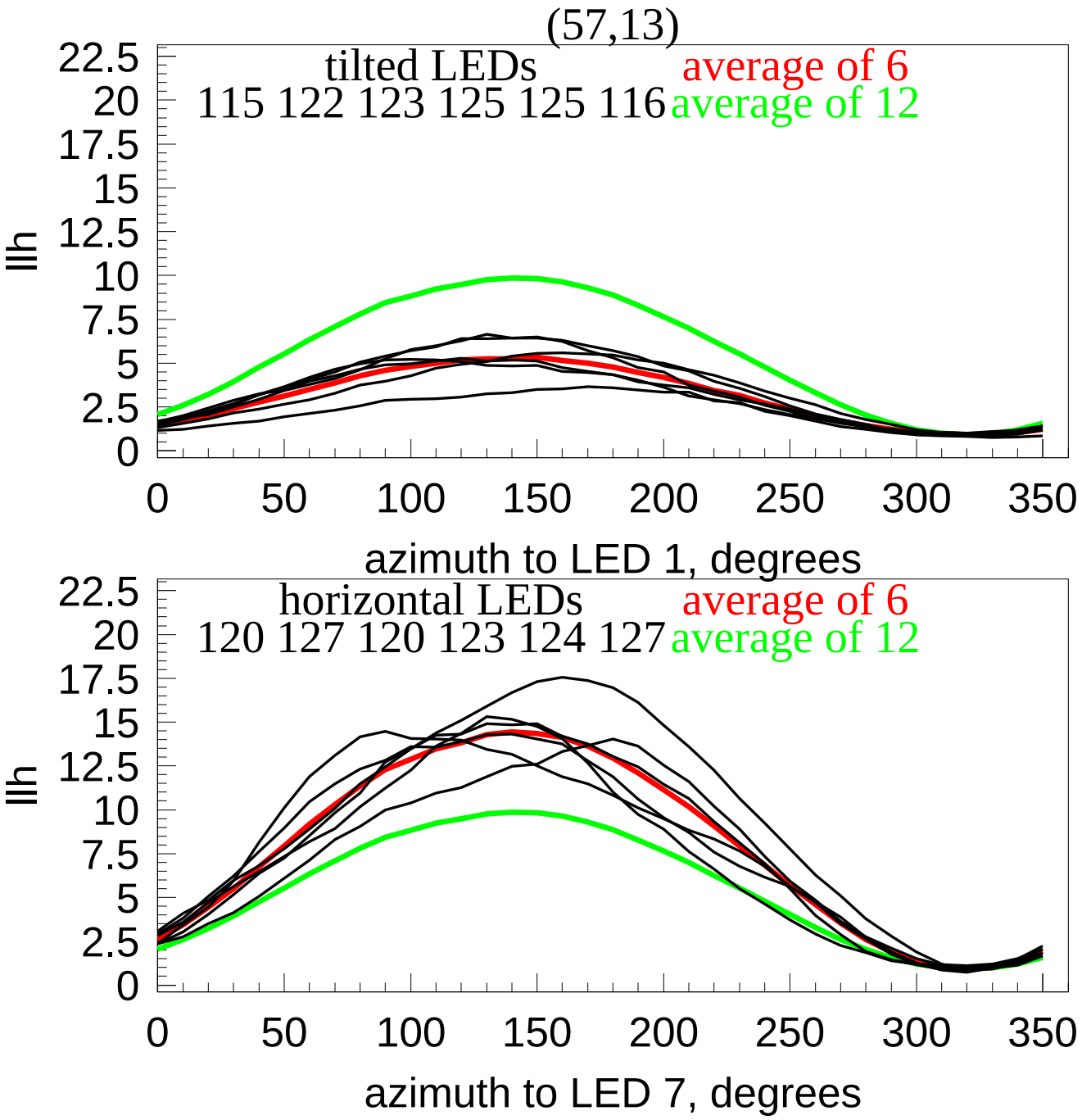

(57,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
236.7 ± 7.8

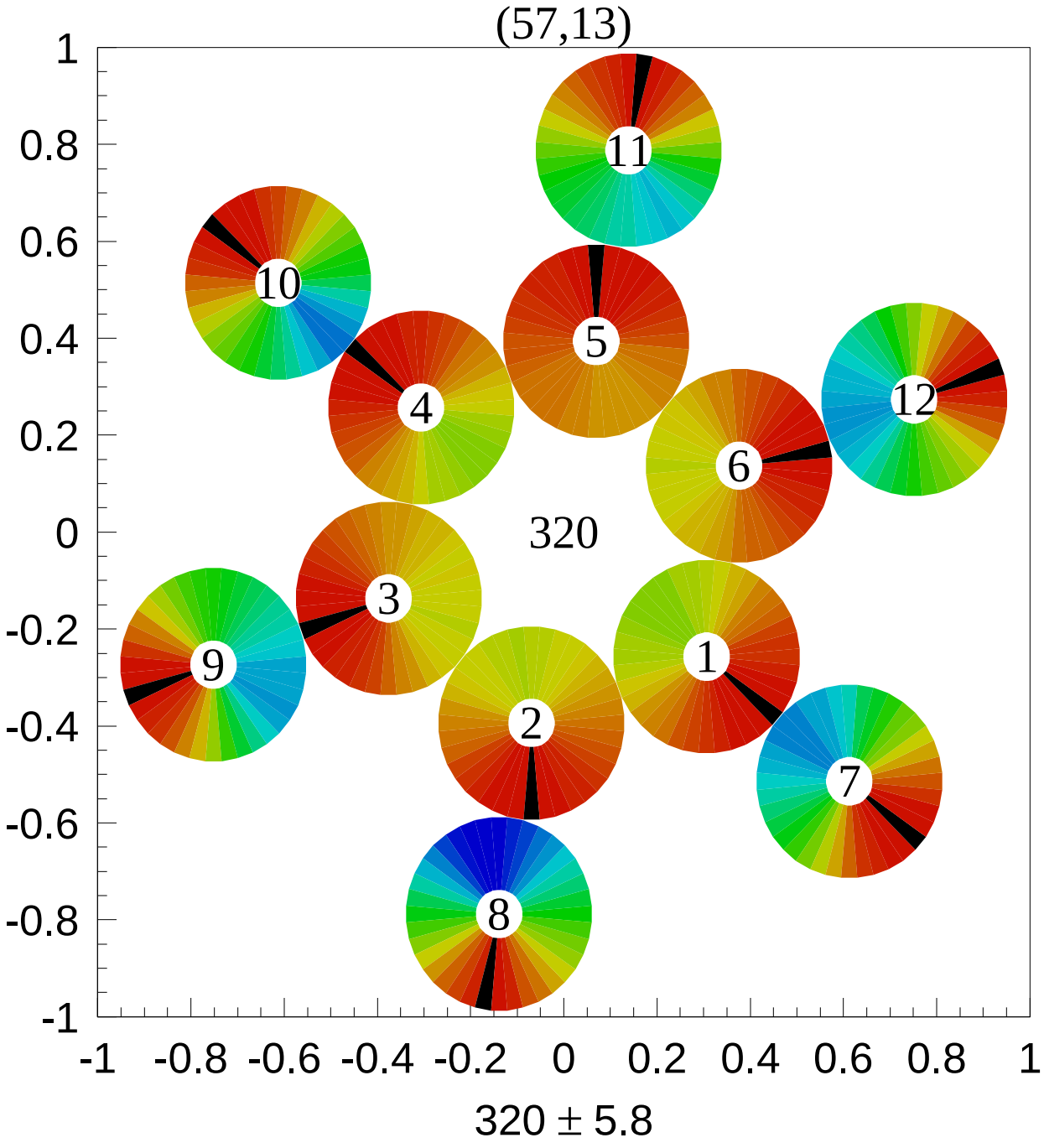

(57,11)
tilted LEDs
128 118 121 125 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 112 124 116 121 109
average of 6
average of 12
llh
azimuth to LED 7, degrees

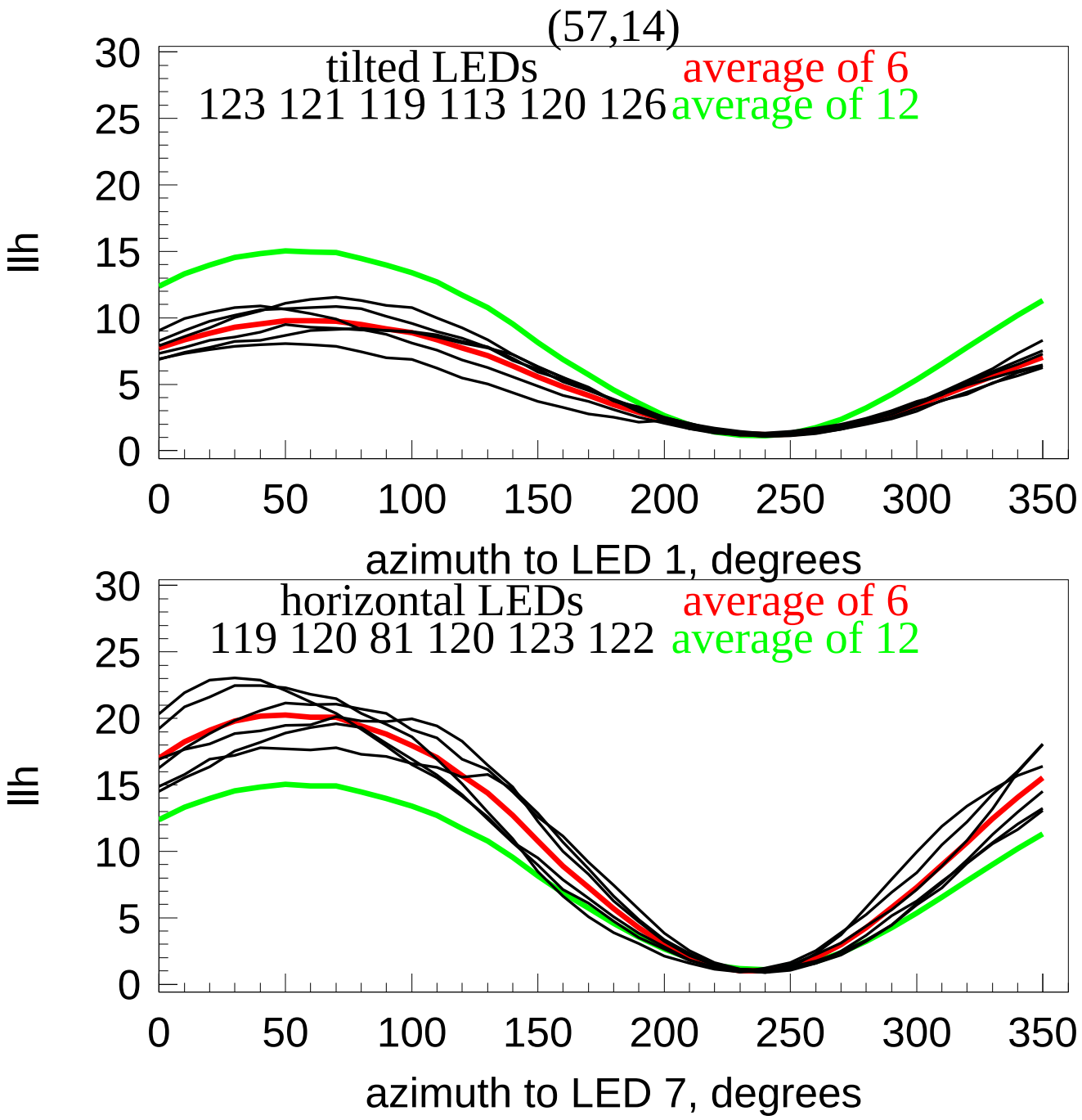

(57,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
71.9 ± 7.6

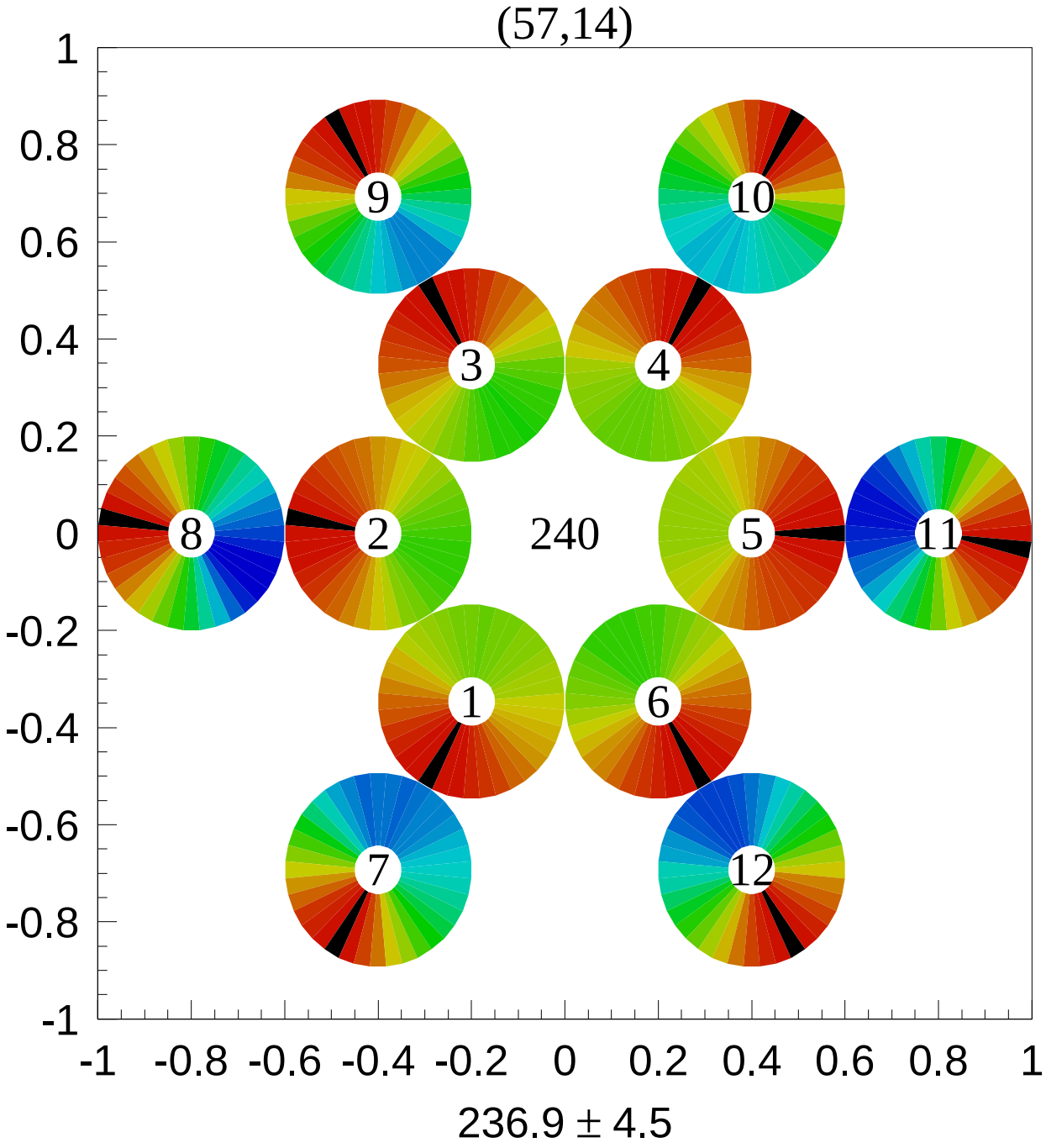

(57,12)
tilted LEDs
122 124 113 121 129 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 118 120 121 127 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

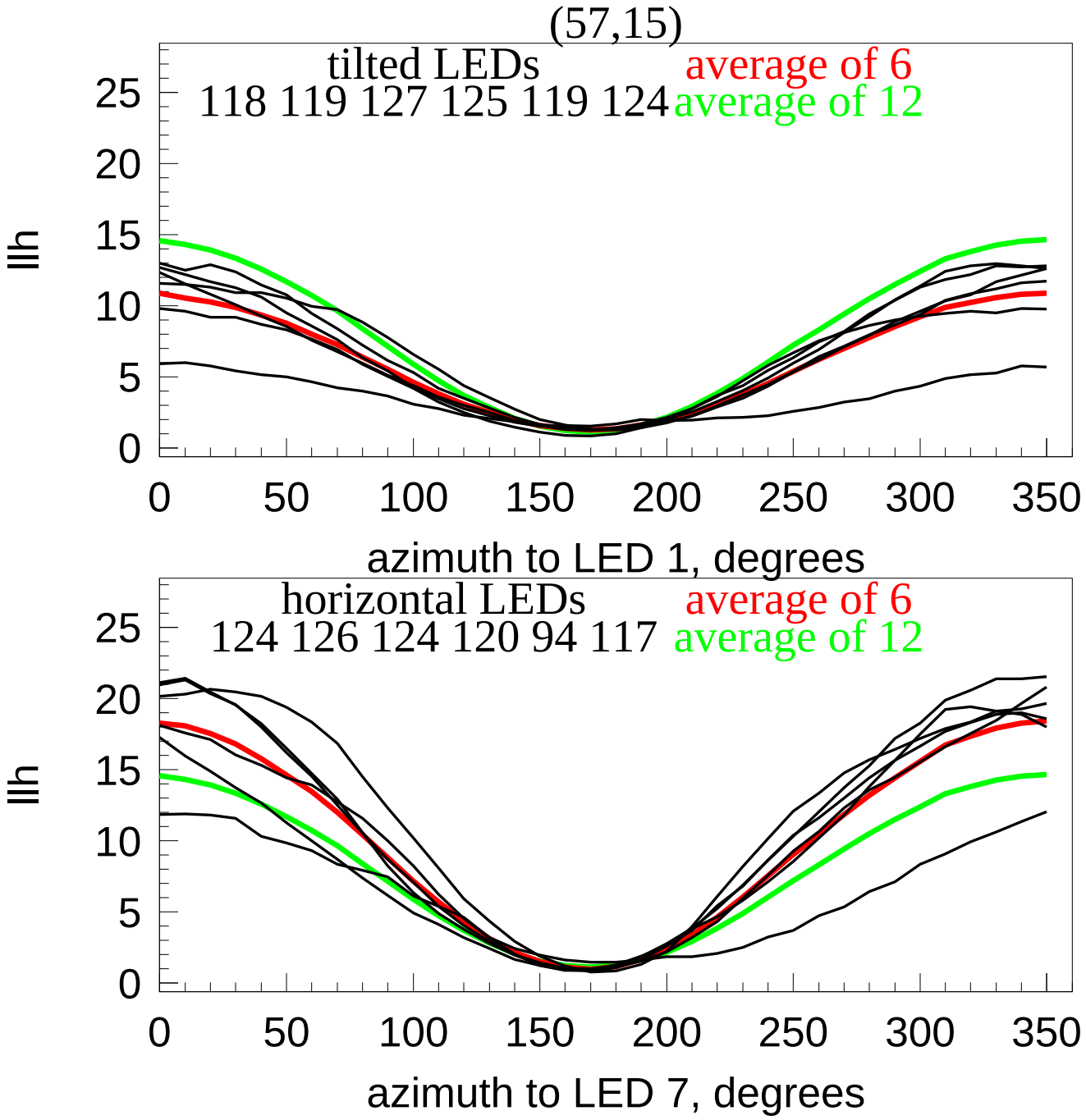

(57,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
193.1 ± 6.8
200
1
2
3
4
5
6
7
8
9
10
11
12

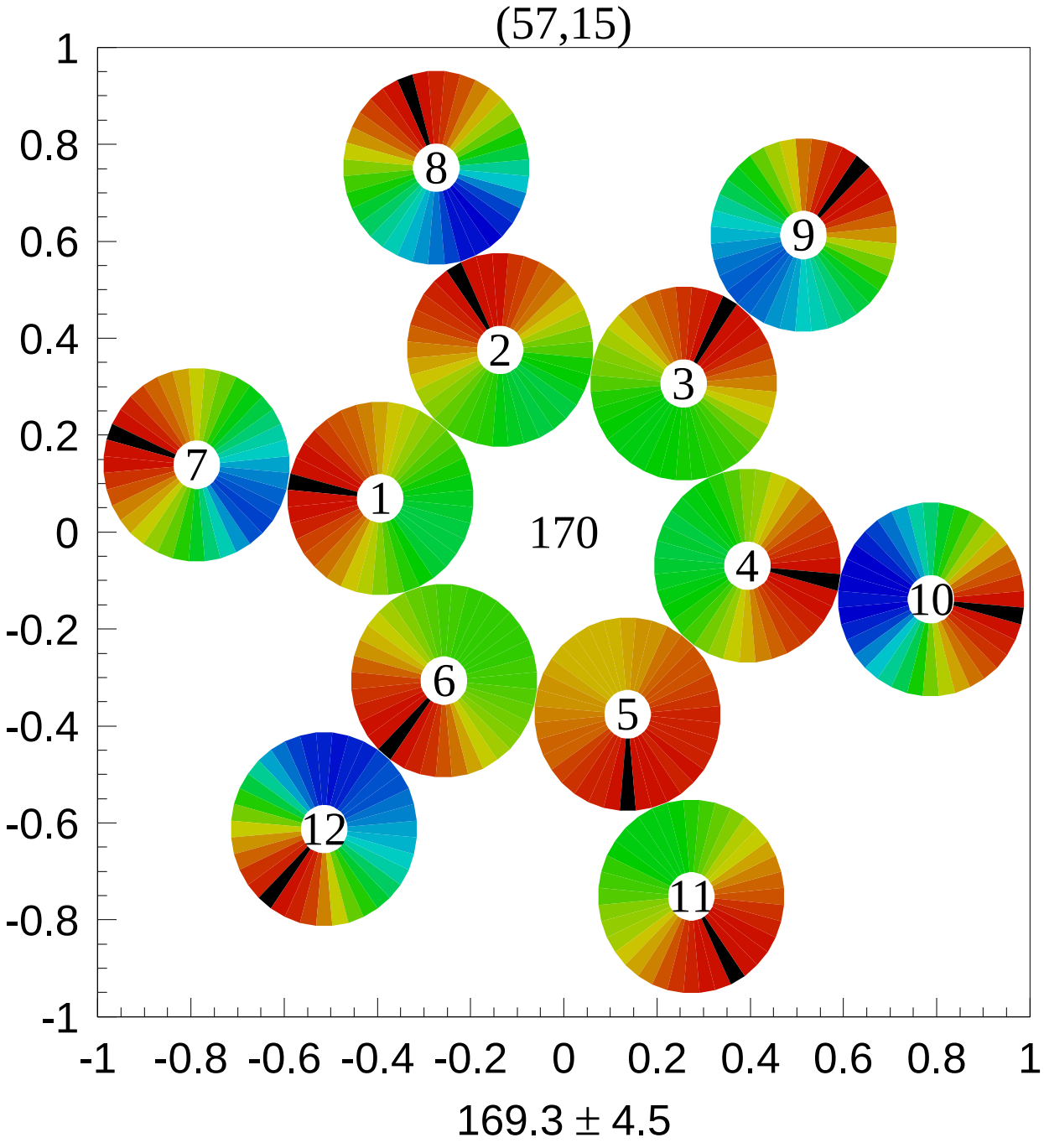

(57,13)
tilted LEDs
115 122 123 125 125 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 127 120 123 124 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

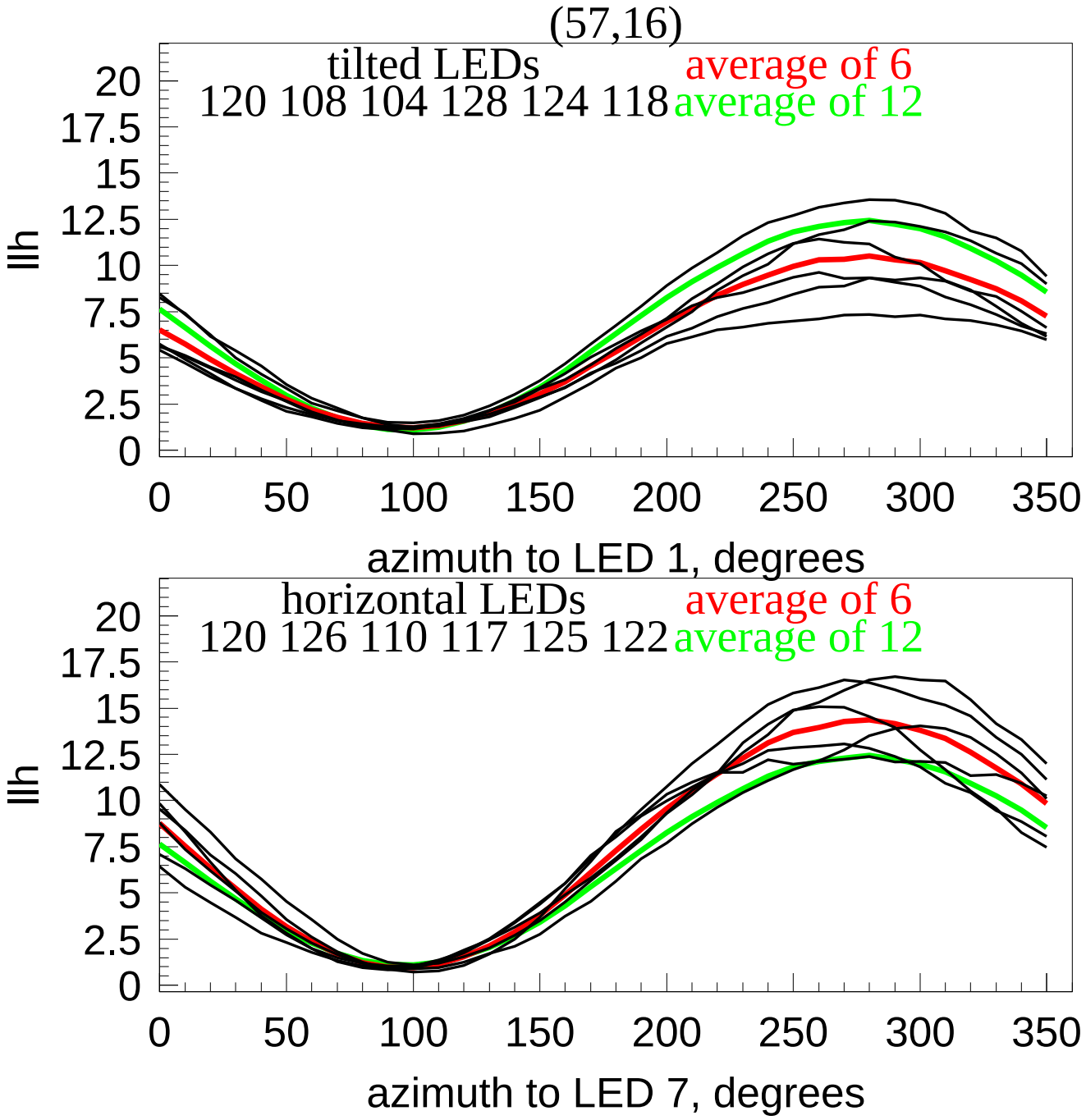

(57,13)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
320 ± 5.8

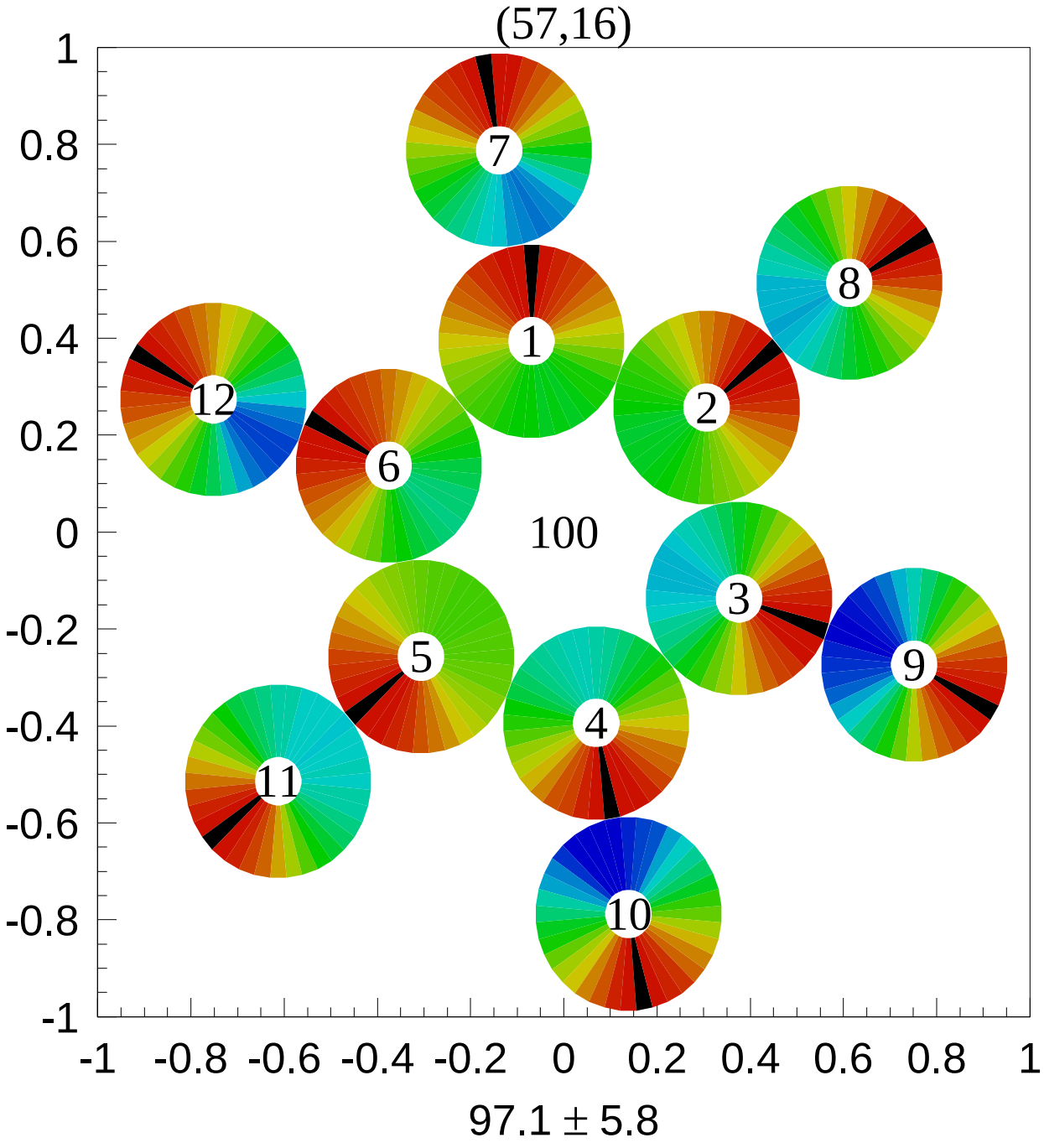

(57,14)
tilted LEDs
123 121 119 113 120 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 81 120 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

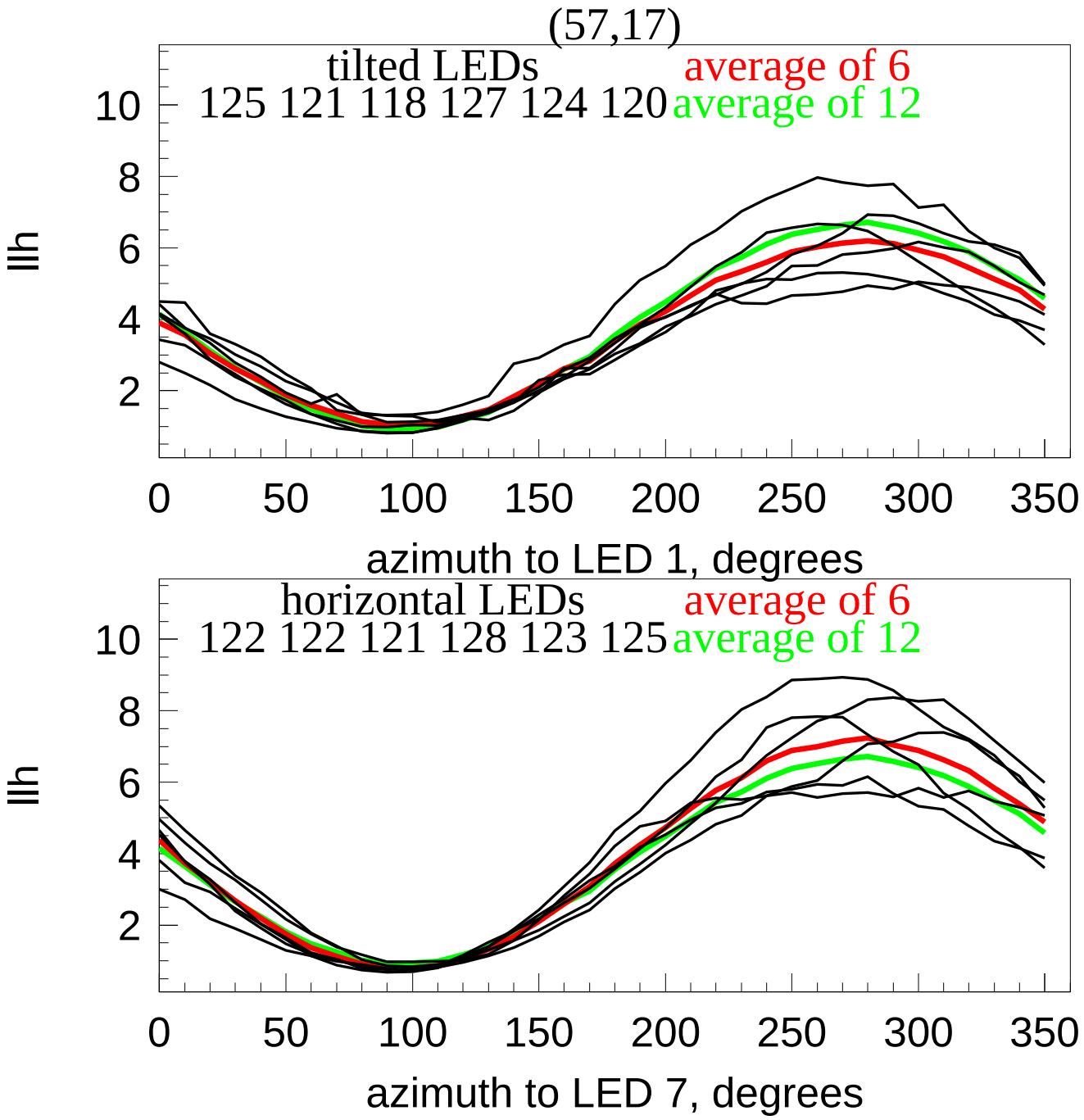

(57,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
236.9 ± 4.5

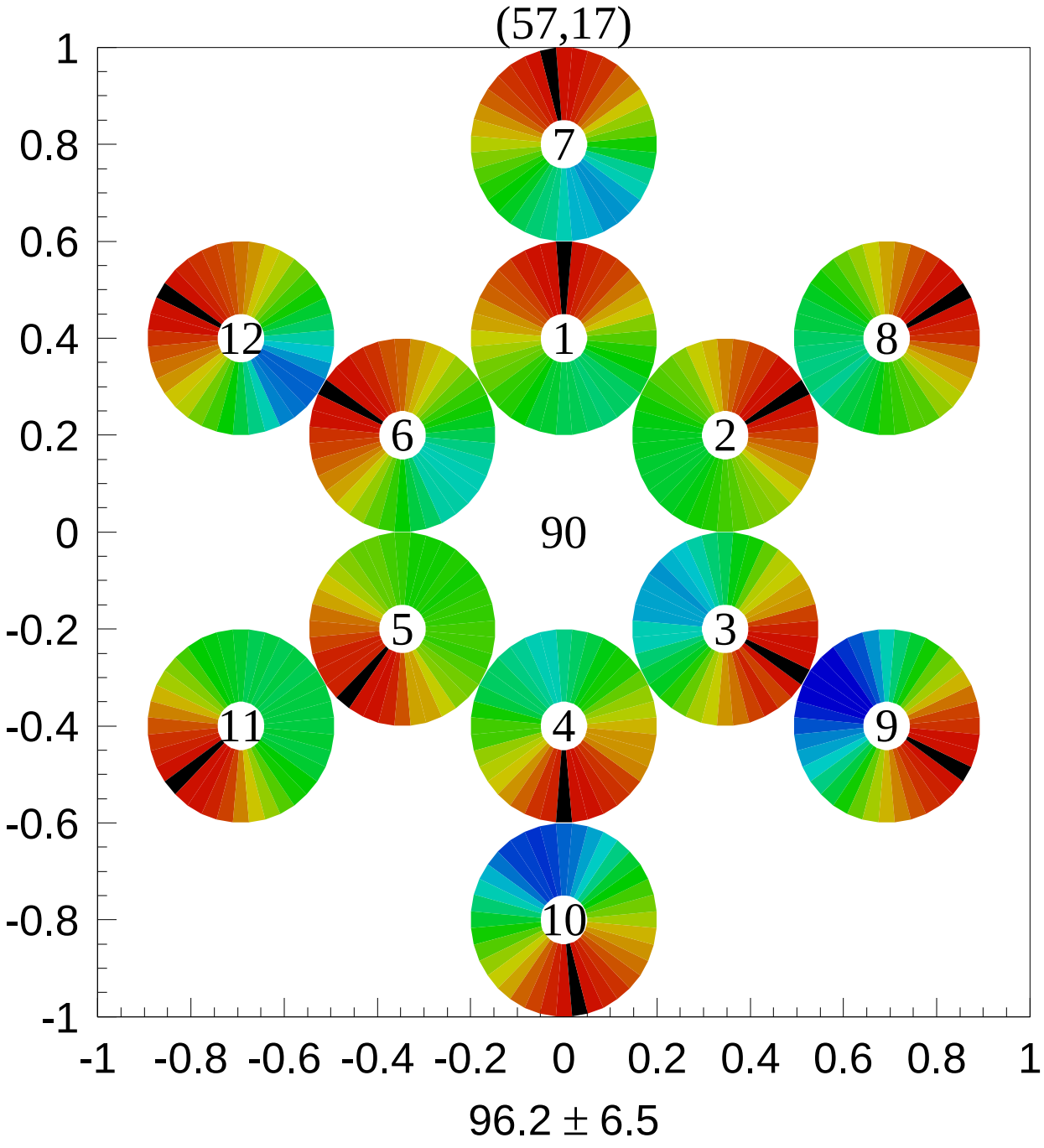

(57,15)
tilted LEDs
118 119 127 125 119 124
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 126 124 120 94 117
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

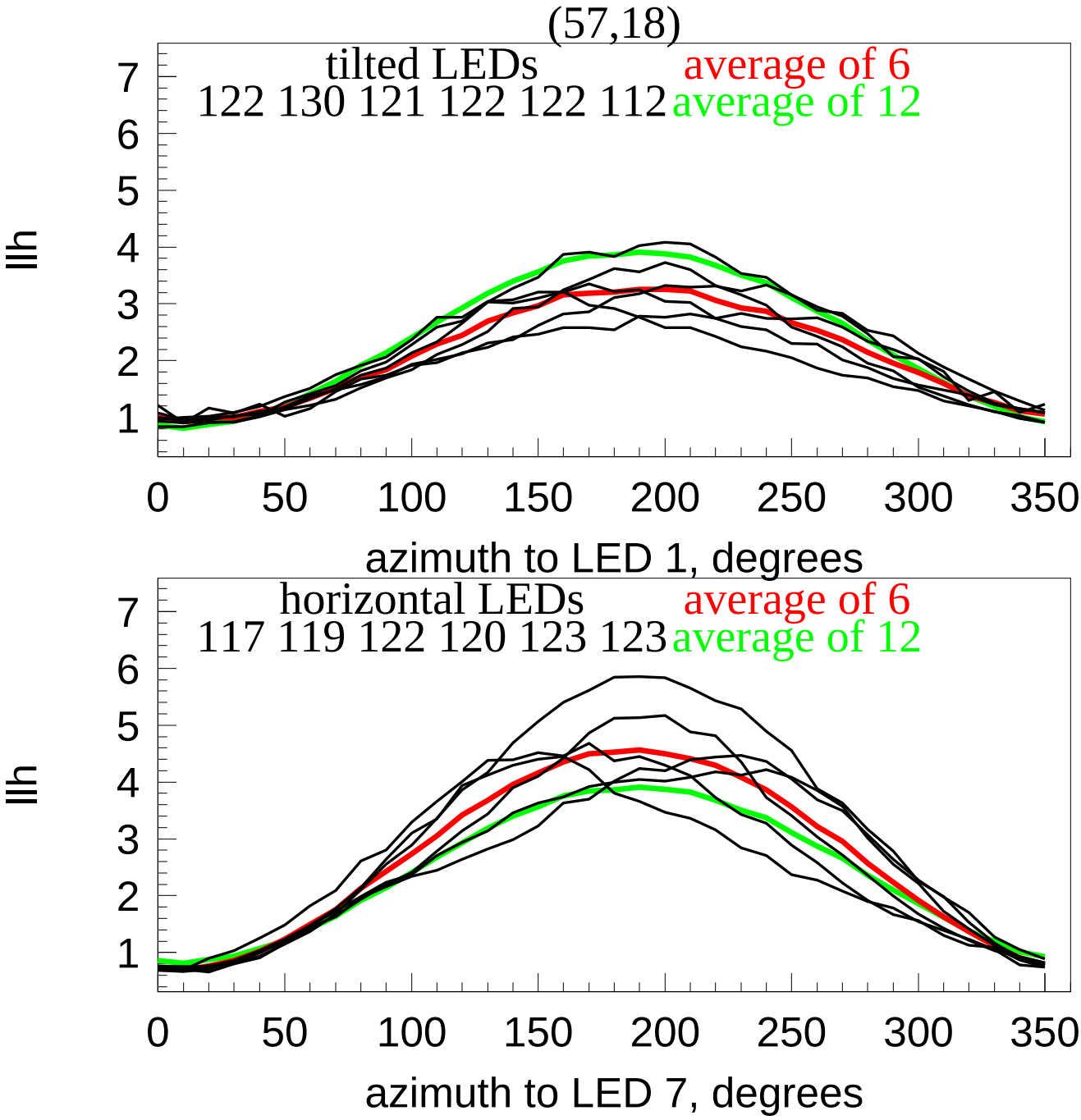

(57,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
169.3 ± 4.5

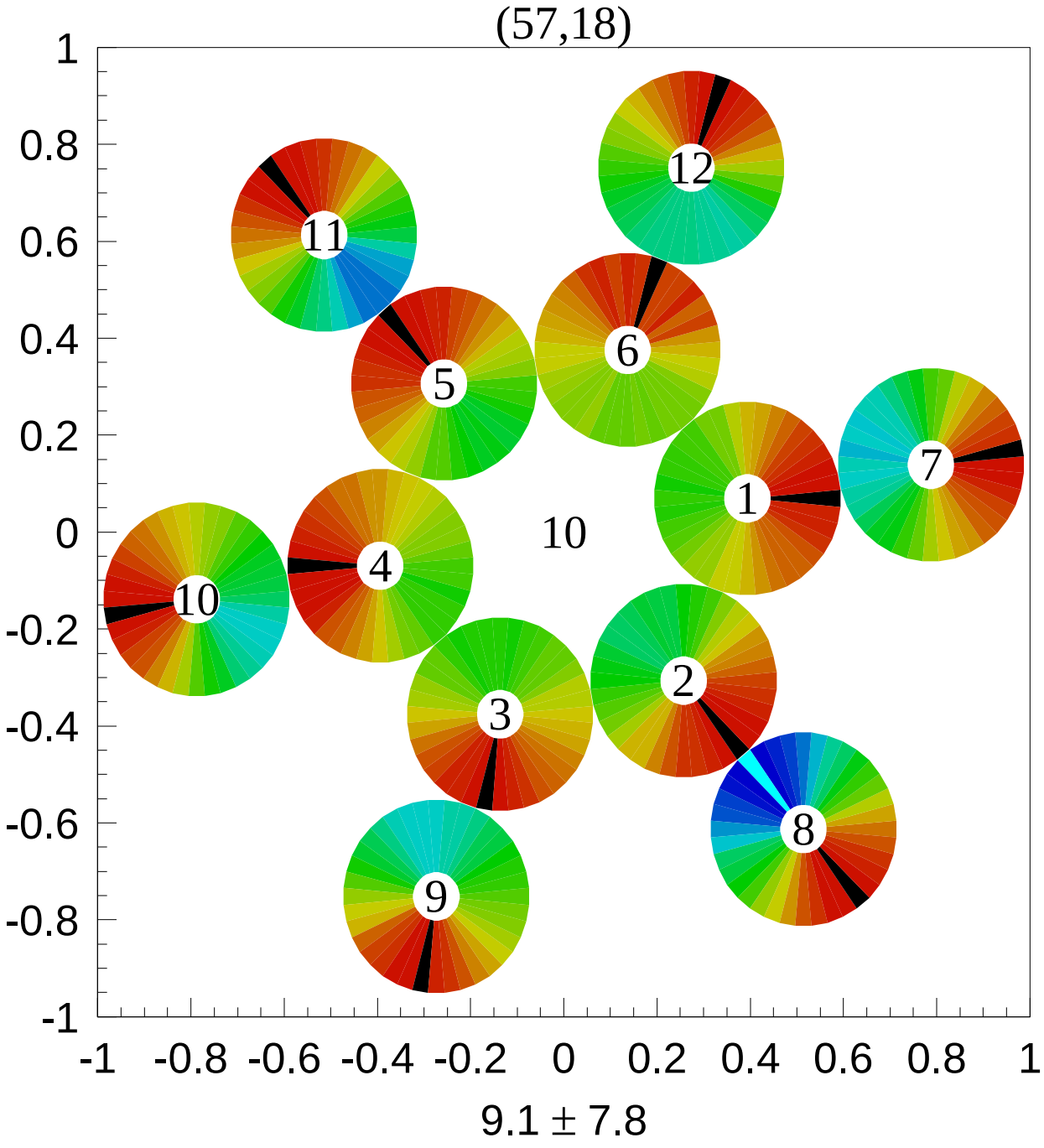

(57,16)
tilted LEDs
120 108 104 128 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 126 110 117 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

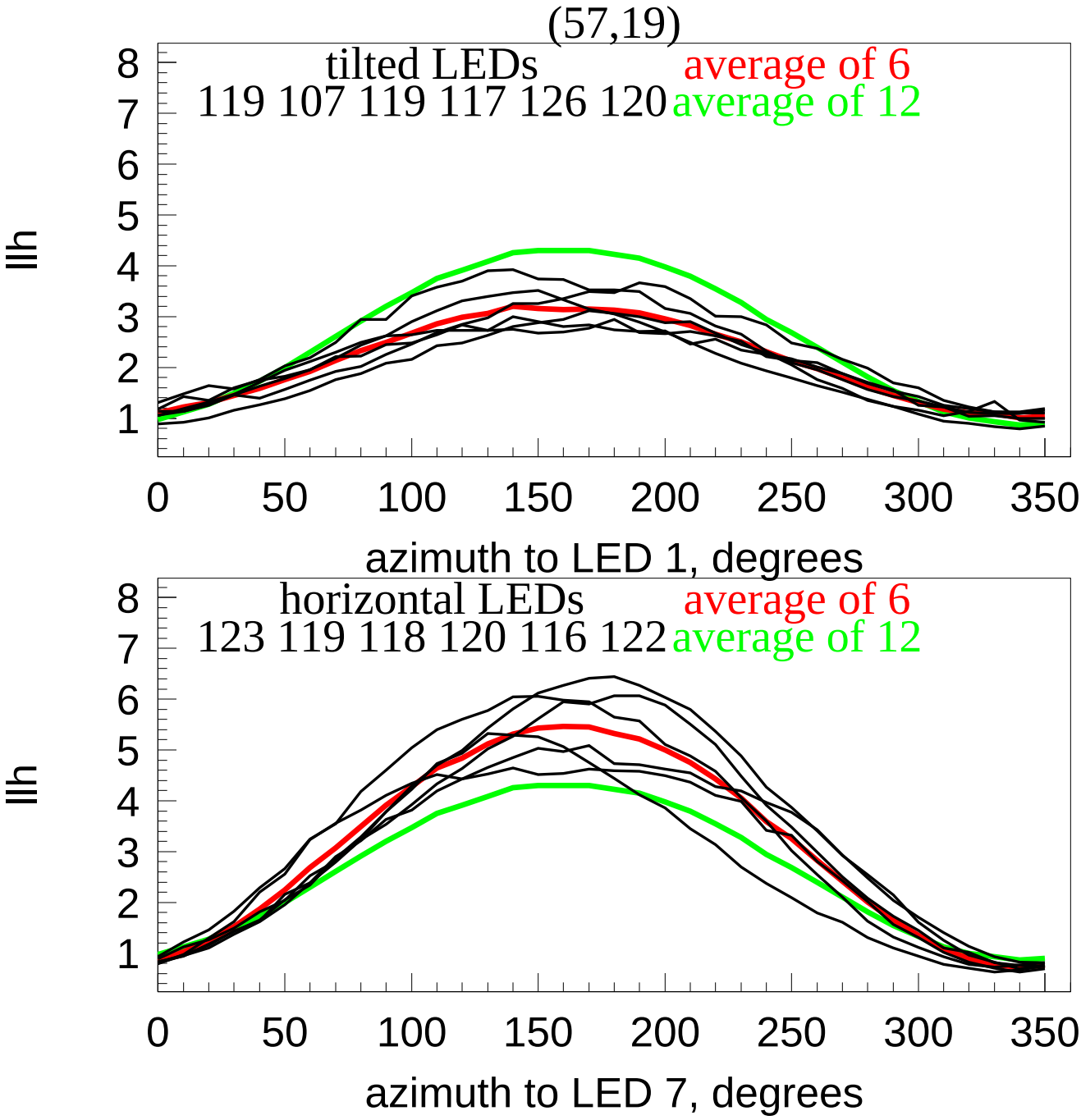

(57,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
97.1 ± 5.8

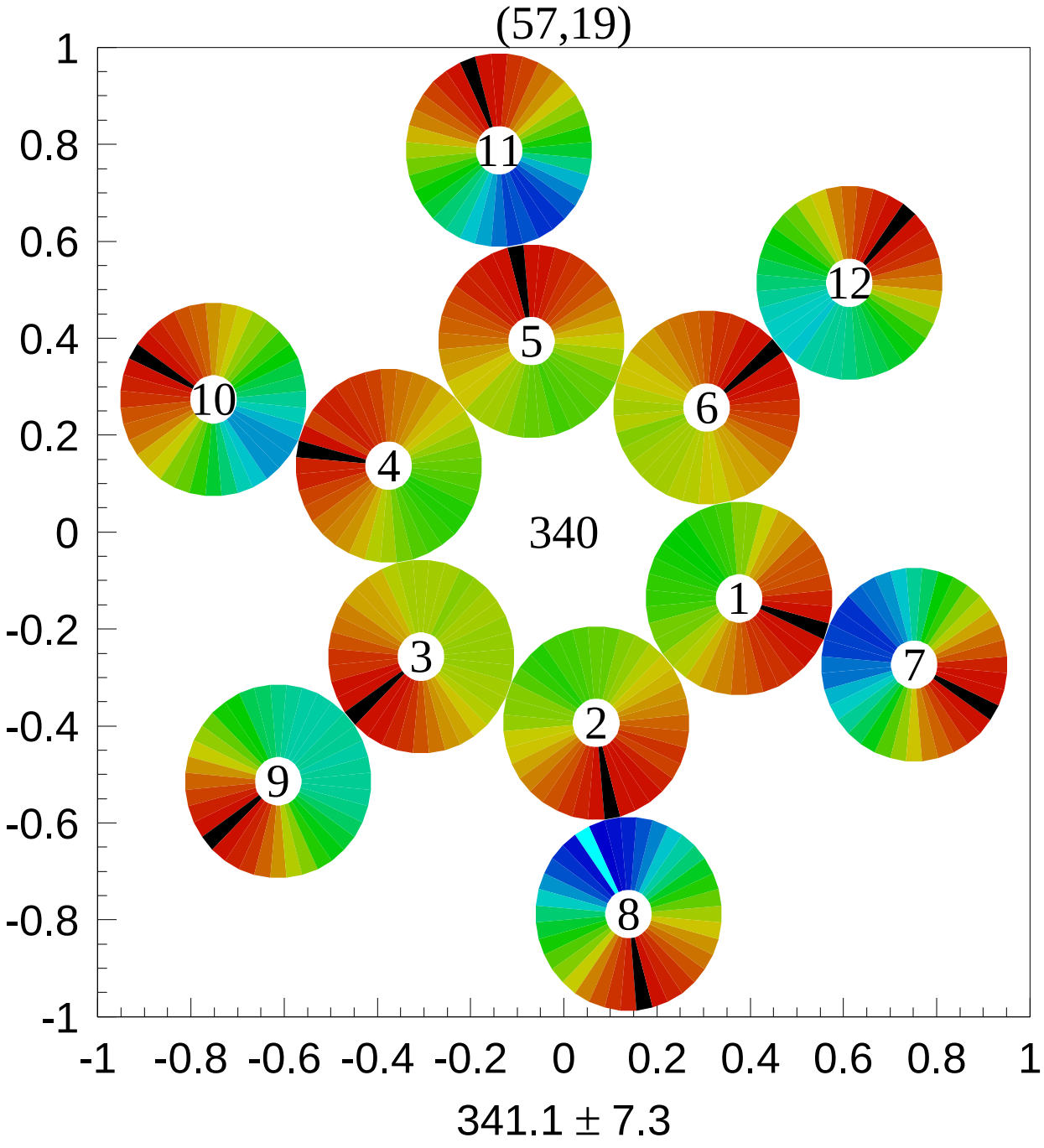

(57,17)
tilted LEDs
125 121 118 127 124 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 122 121 128 123 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

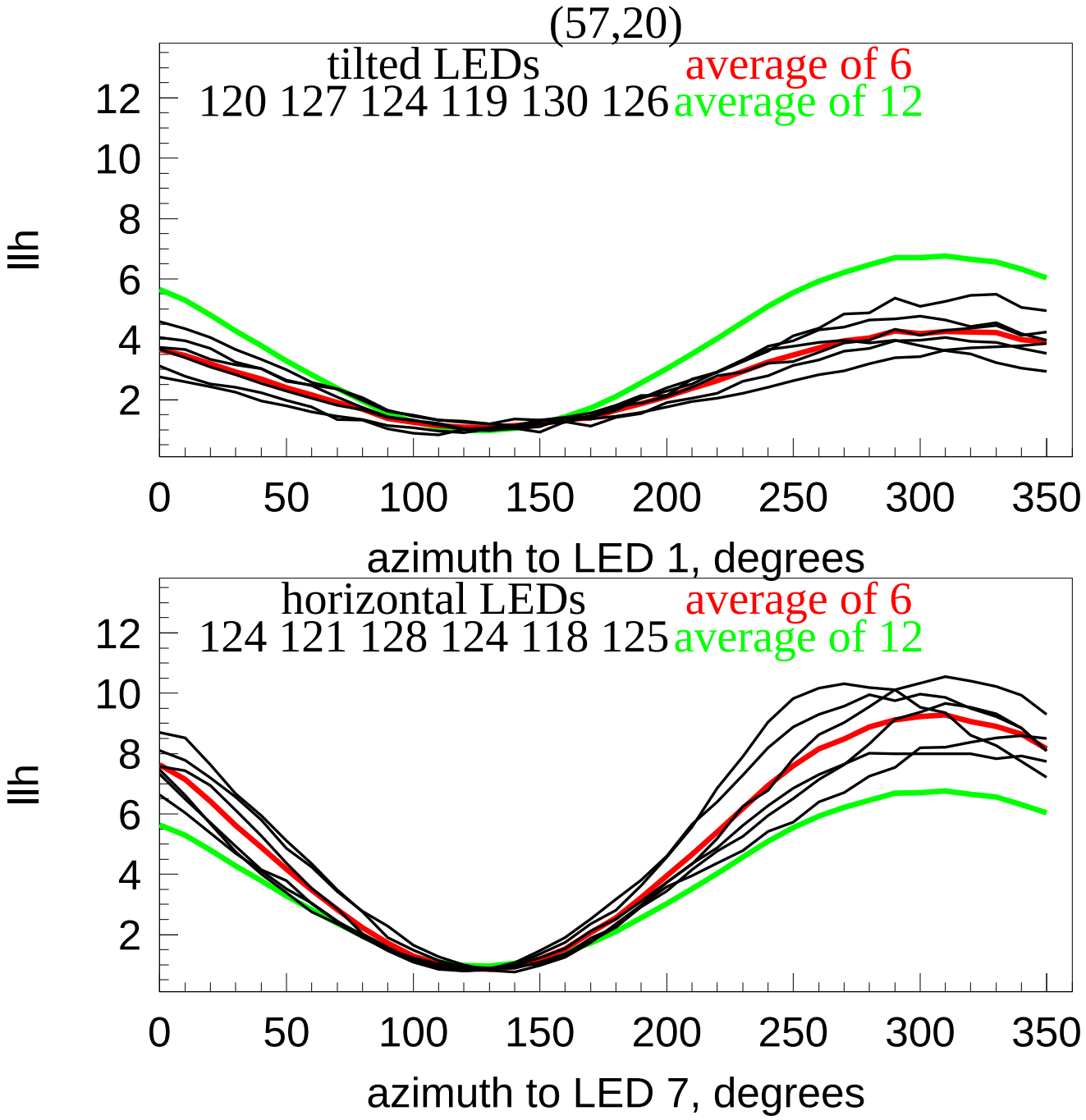

(57,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
96.2 ± 6.5

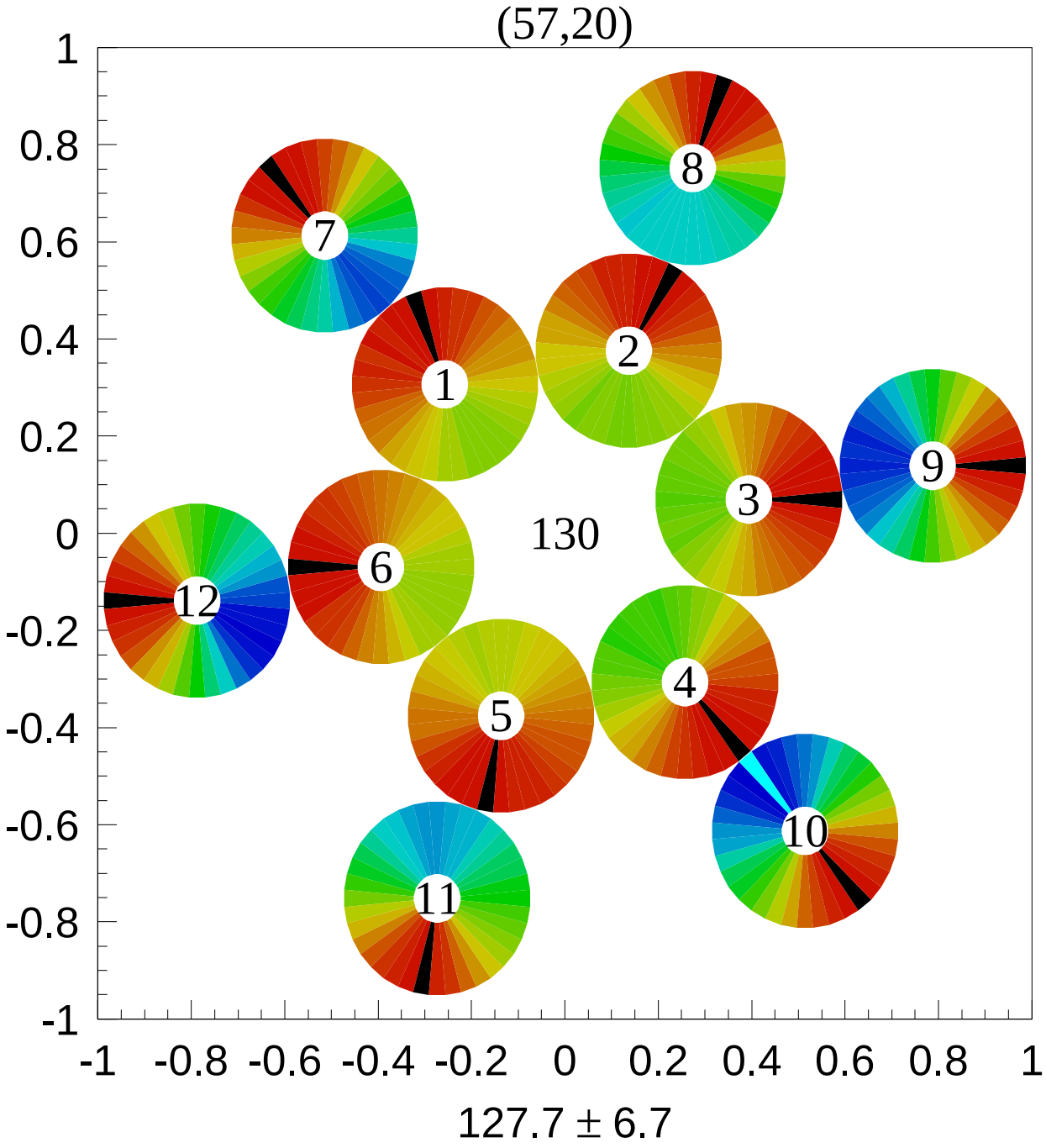

(57,18)
tilted LEDs
122 130 121 122 122 112
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 119 122 120 123 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

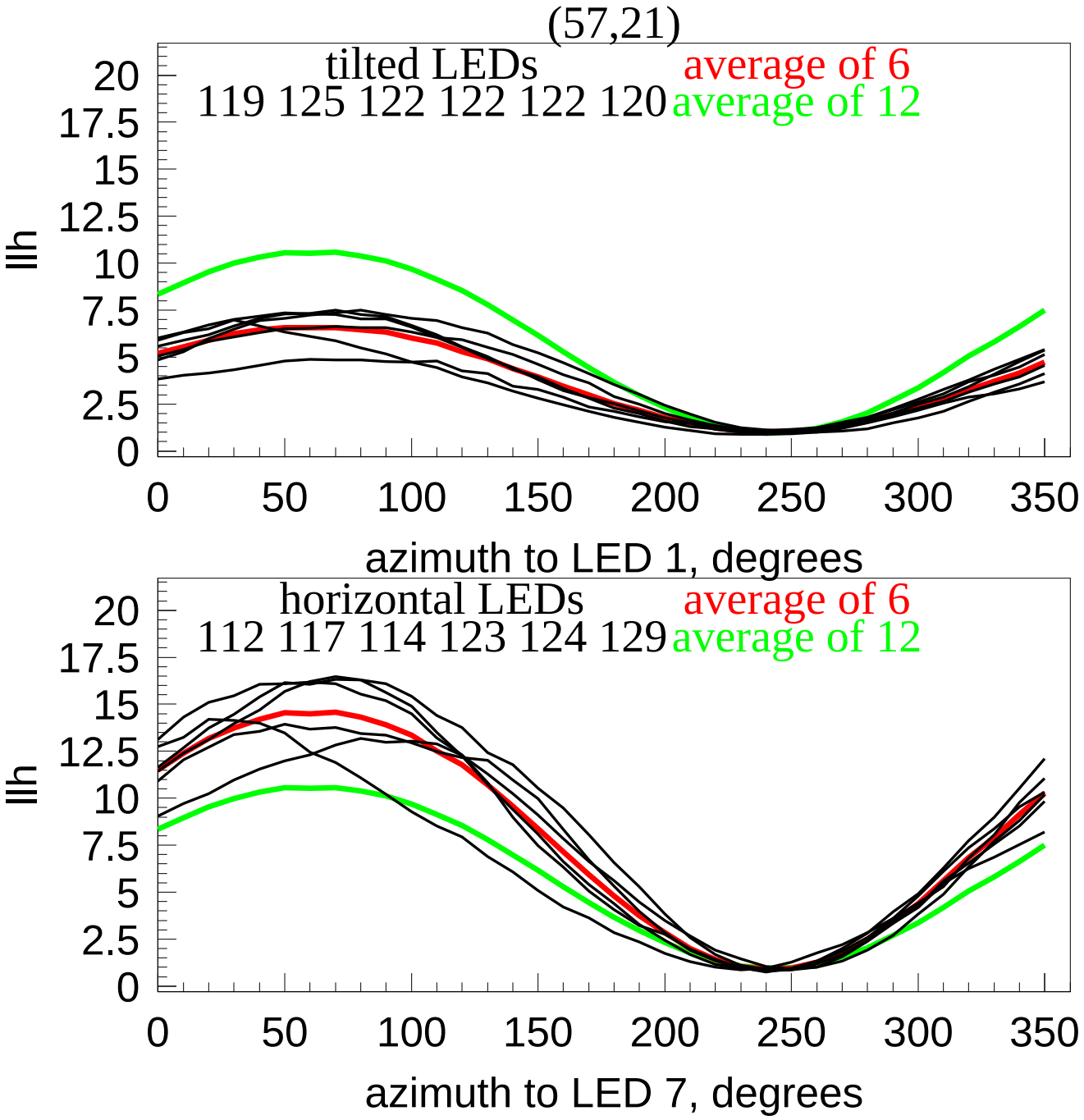

(57,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9.1 ± 7.8
12
11
6
5
7
1
10
4
10
2
3
8
9

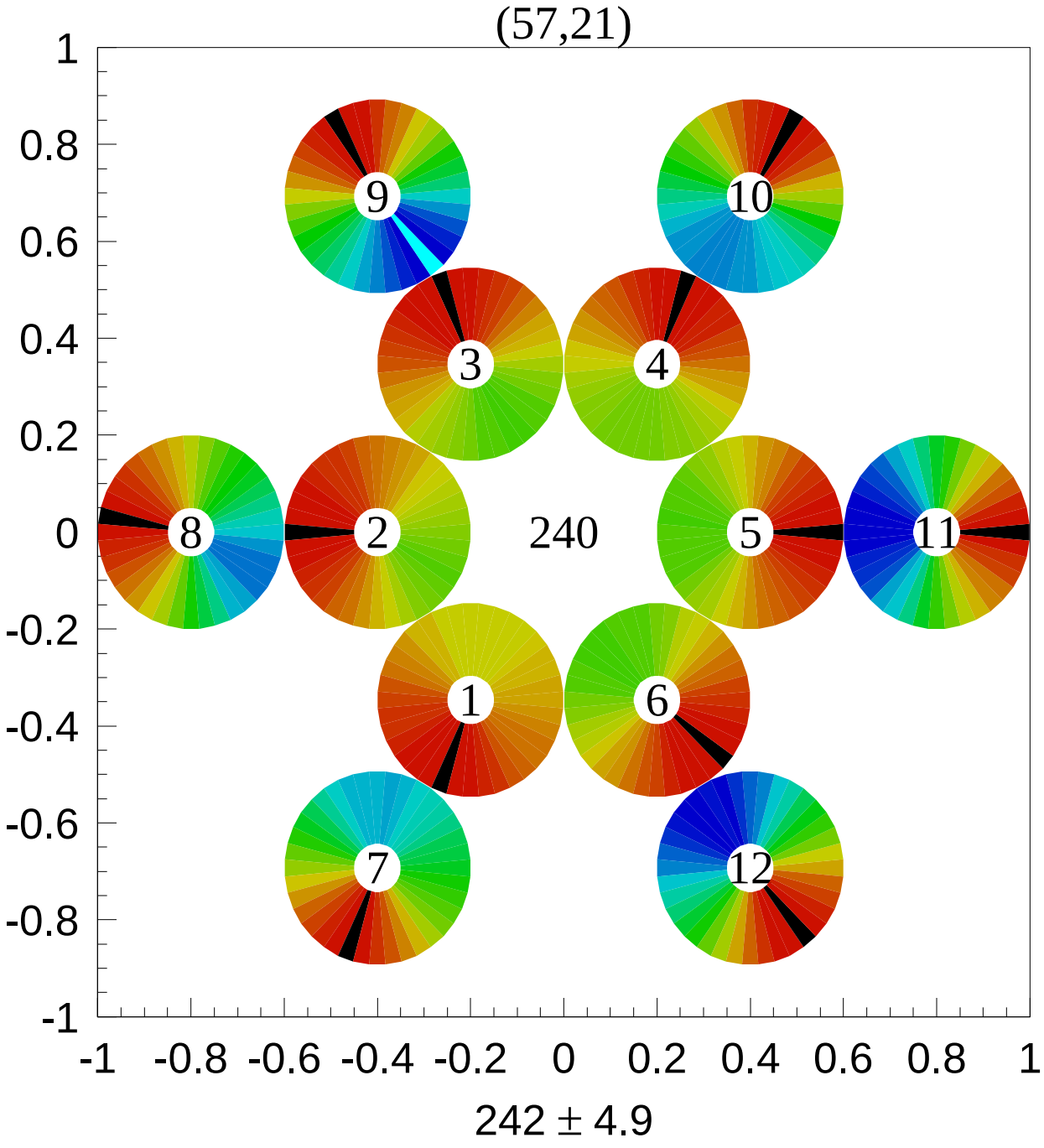

(57,19)
tilted LEDs
119 107 119 117 126 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 118 120 116 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

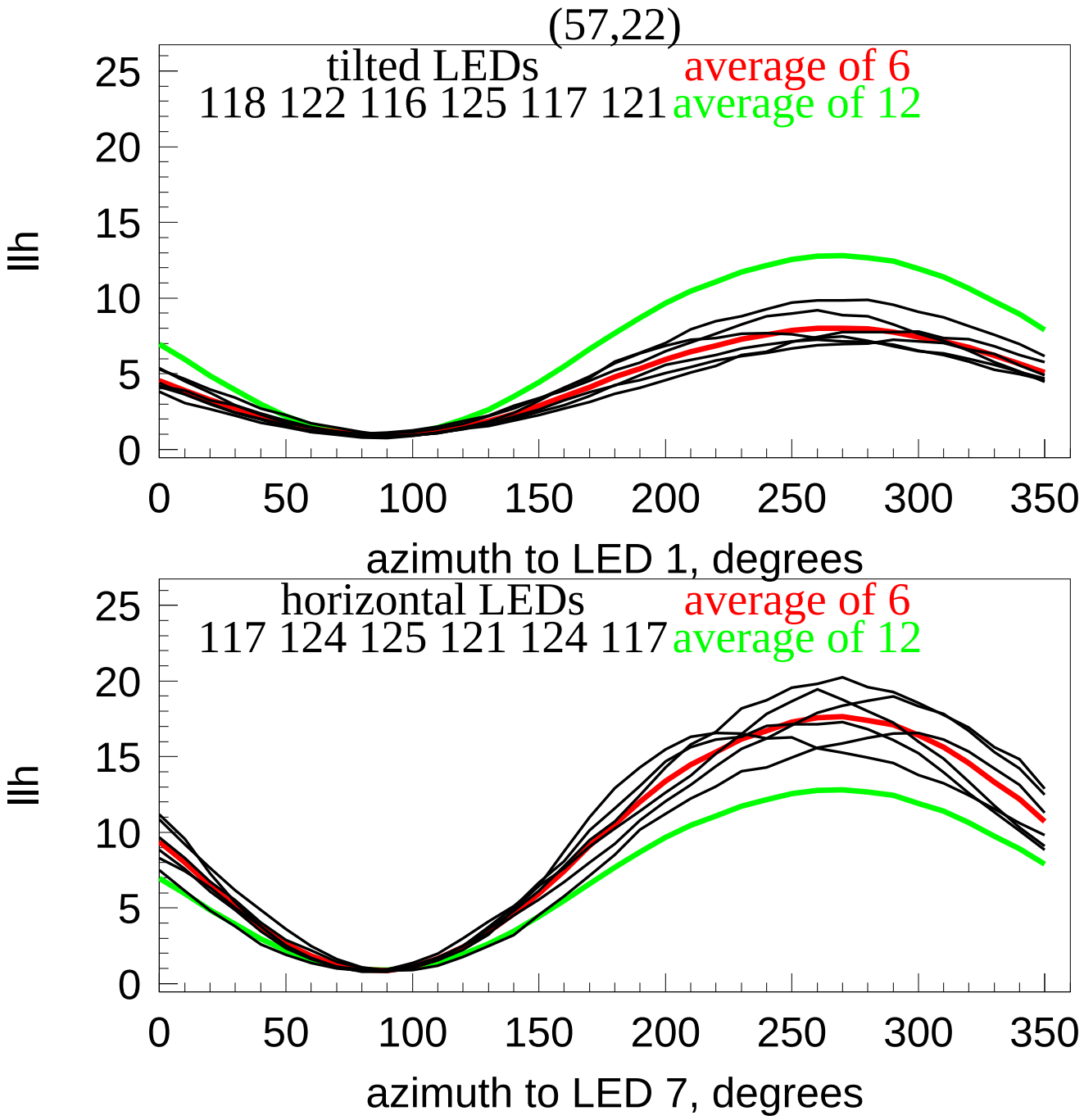

(57,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
341.1 ± 7.3

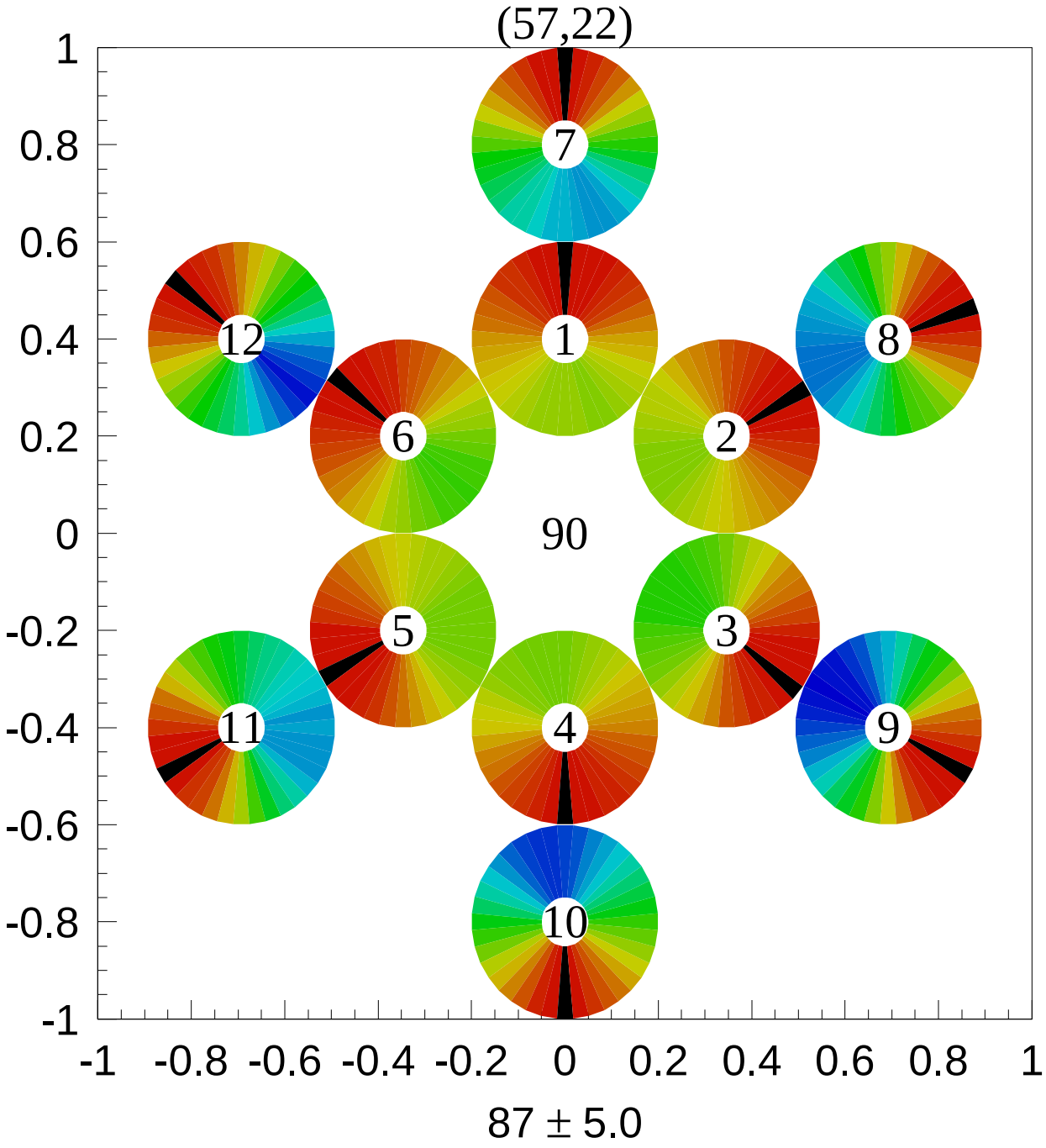

(57,20)
tilted LEDs
120 127 124 119 130 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 121 128 124 118 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

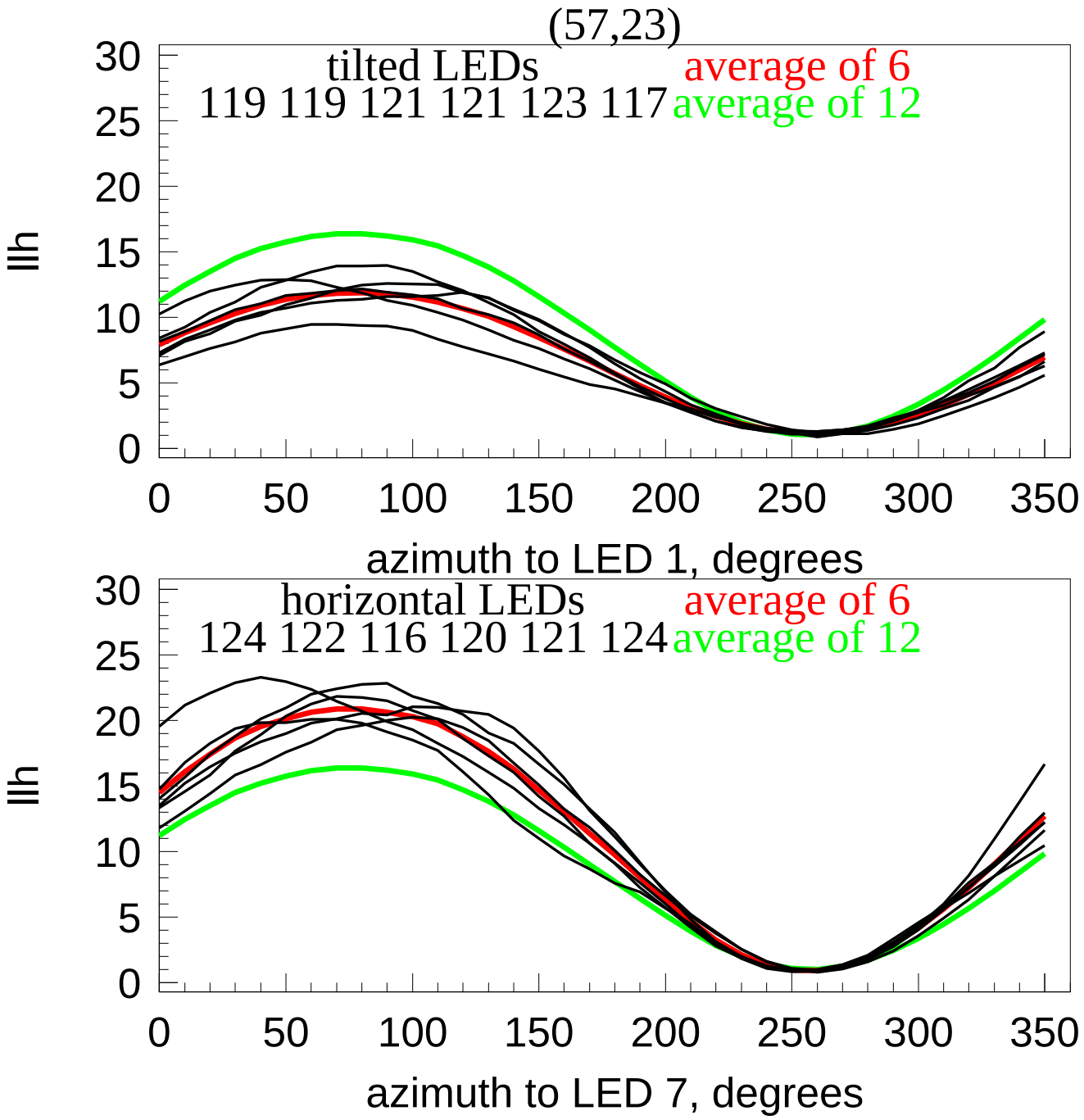

(57,20)
1
2
3
4
5
6
7
8
9
10
11
12
130
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
127.7 ± 6.7

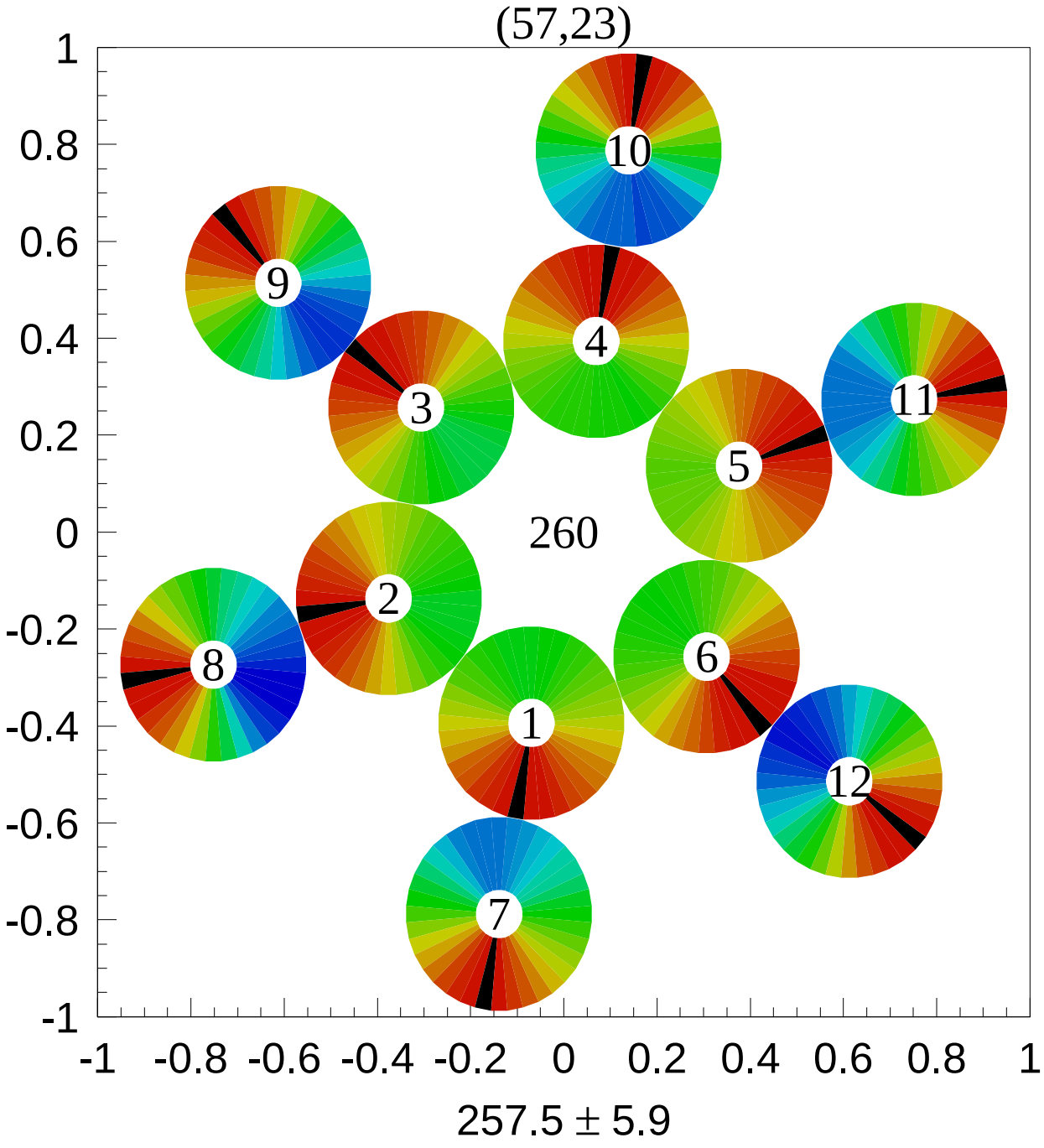

(57,21)
tilted LEDs
119 125 122 122 122 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 117 114 123 124 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

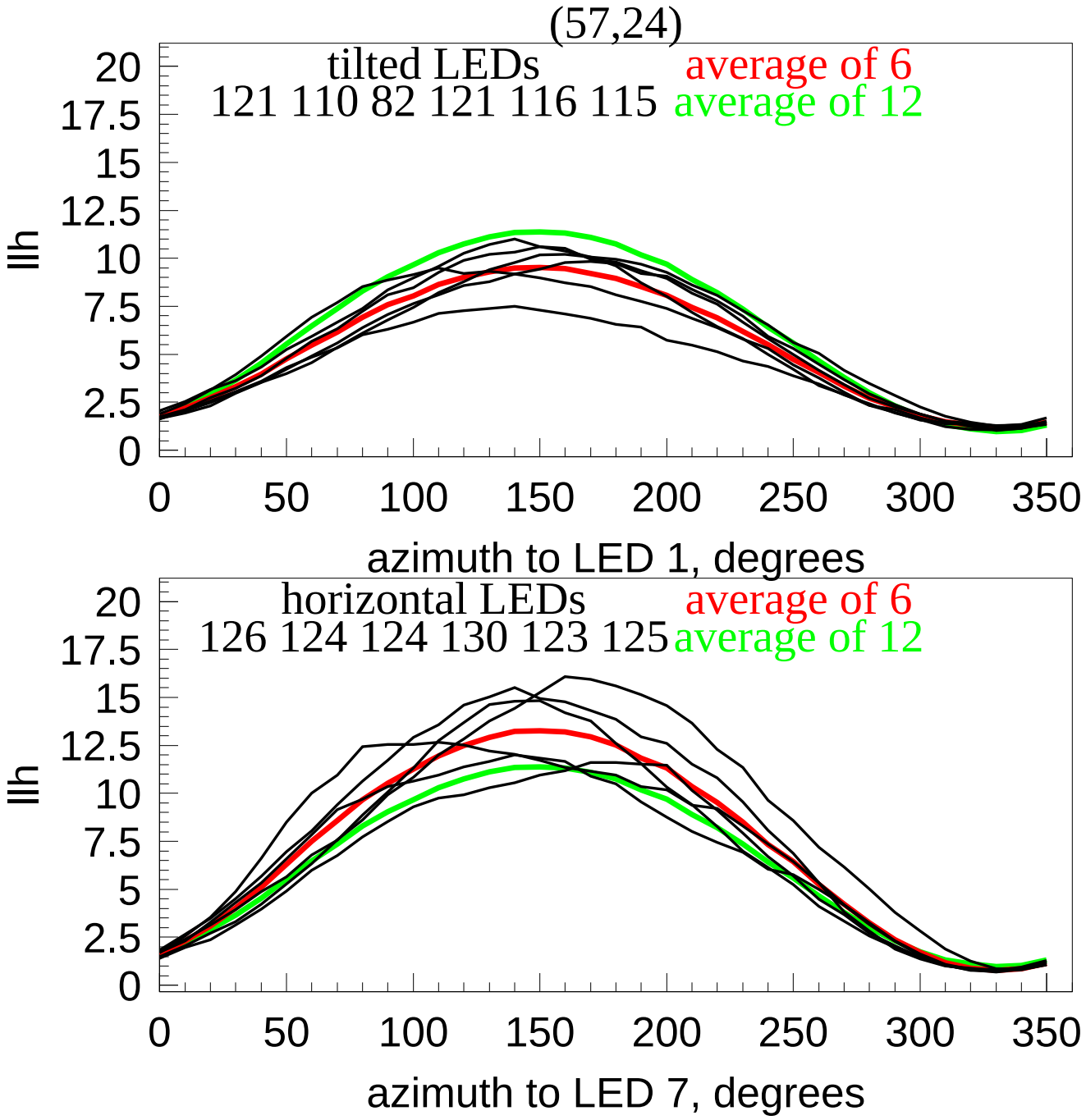

(57,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242 ± 4.9

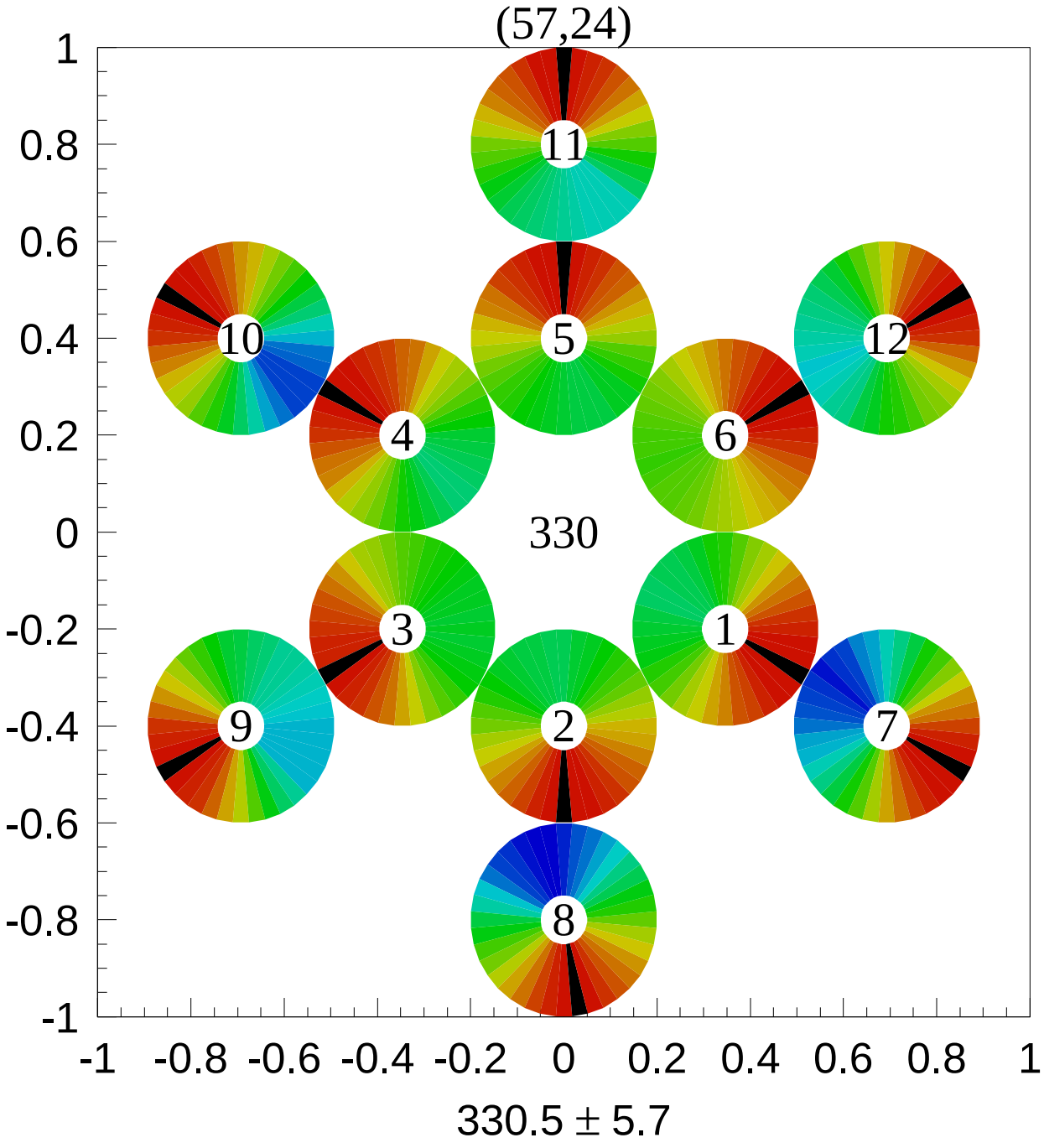

(57,22)
tilted LEDs
118 122 116 125 117 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 124 125 121 124 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

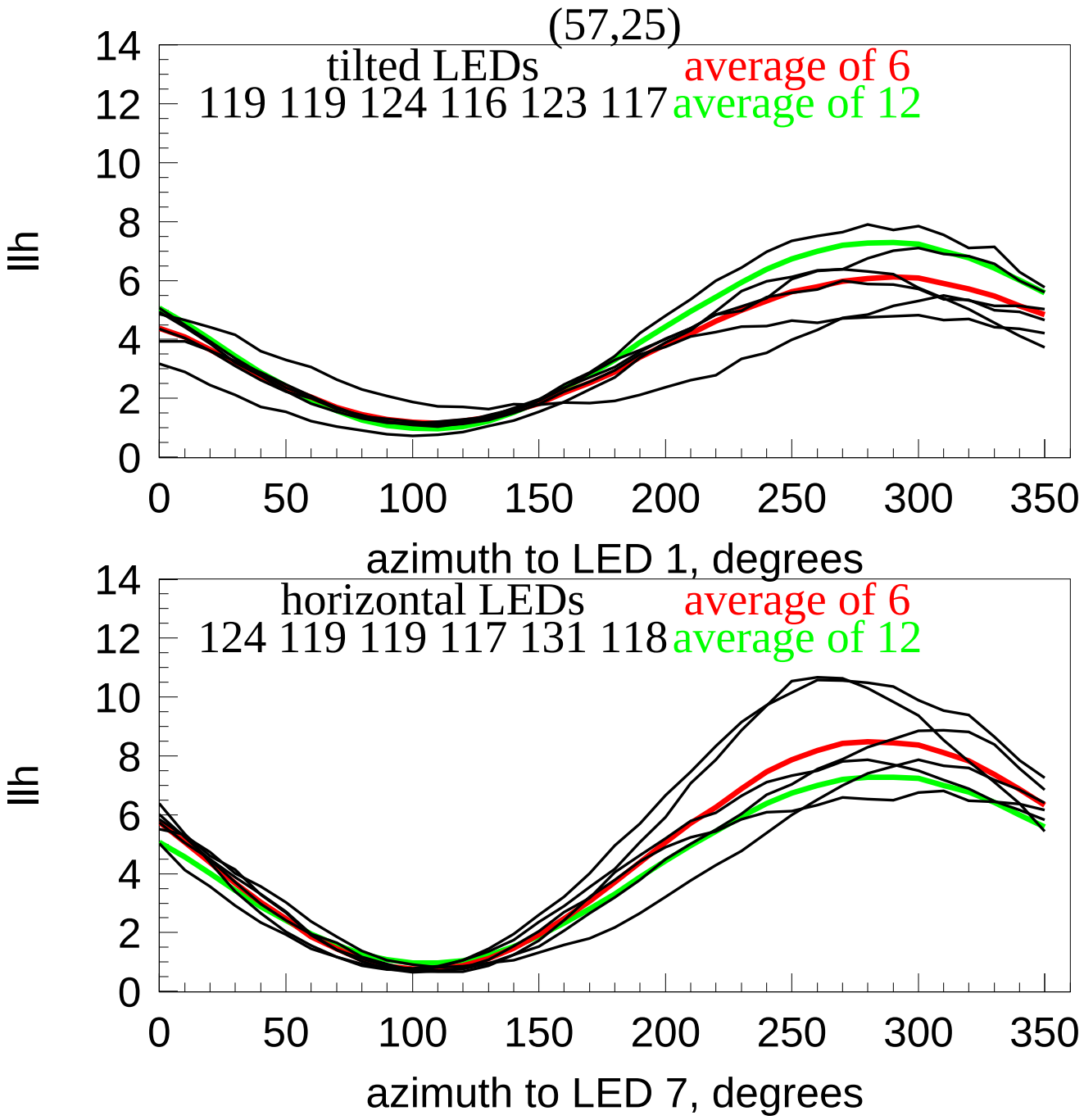

(57,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
87 ± 5.0

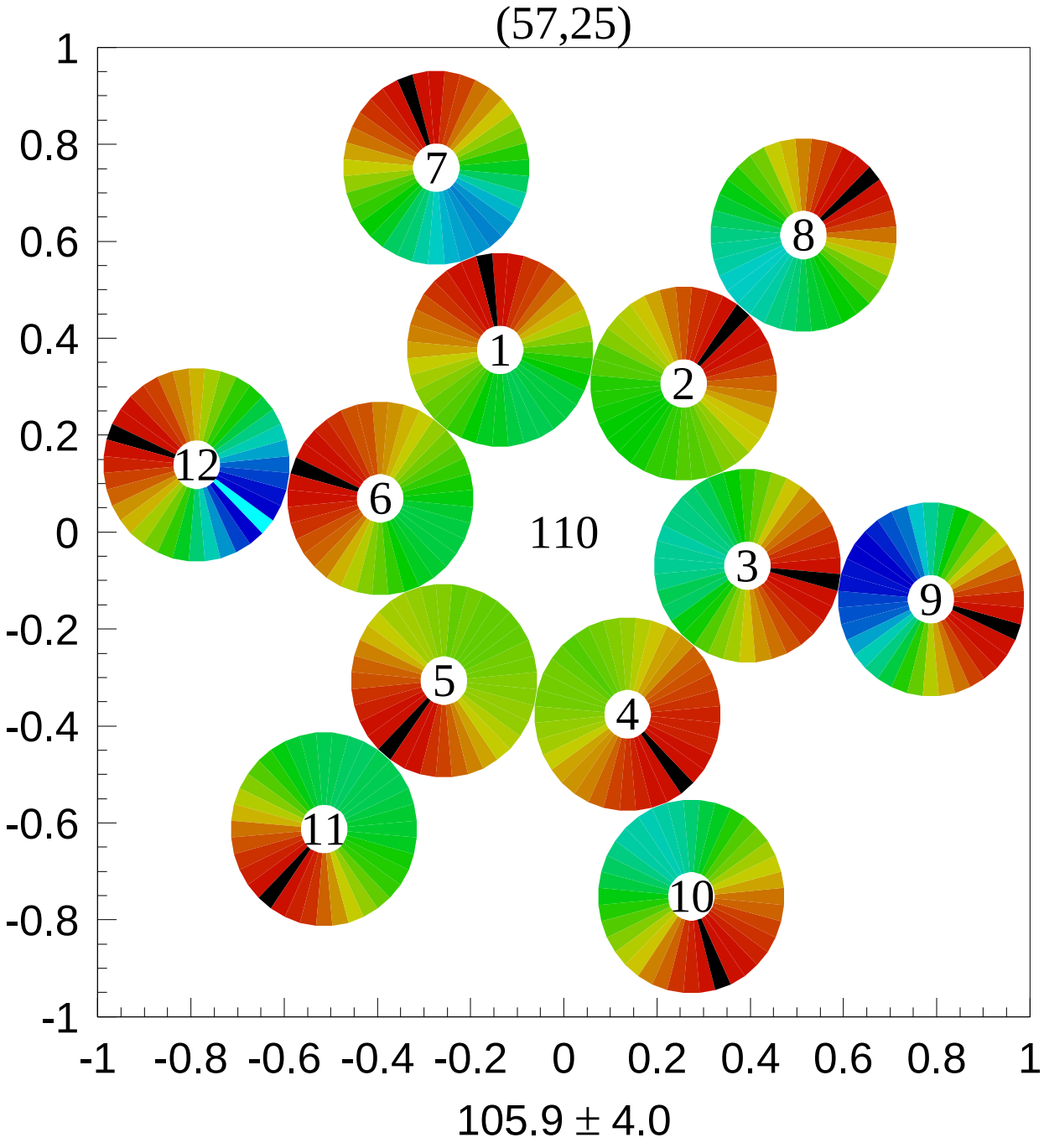

(57,23)
tilted LEDs
119 119 121 121 123 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 116 120 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

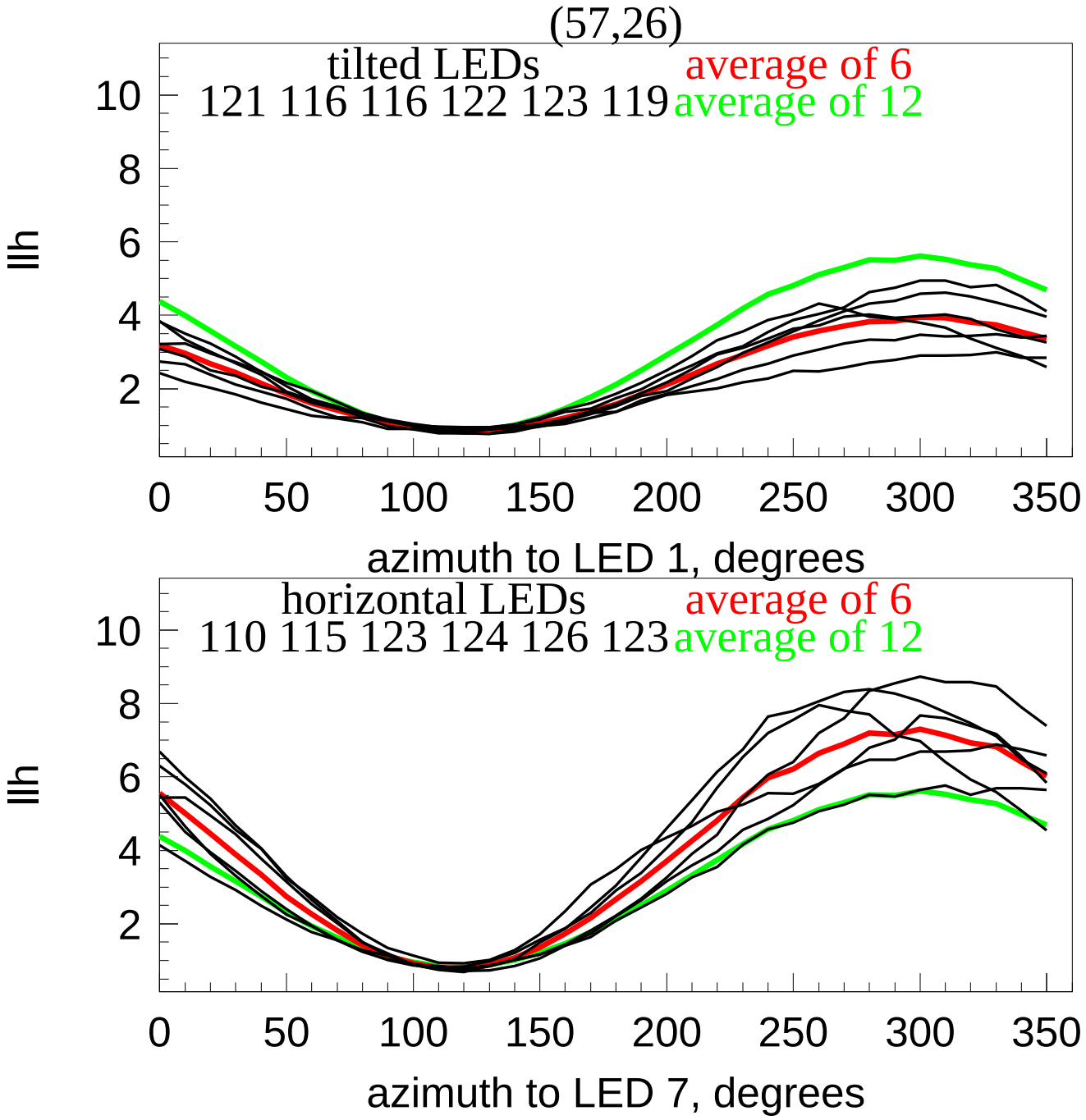

(57,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
257.5 ± 5.9
260
1
2
3
4
5
6
7
8
9
10
11
12

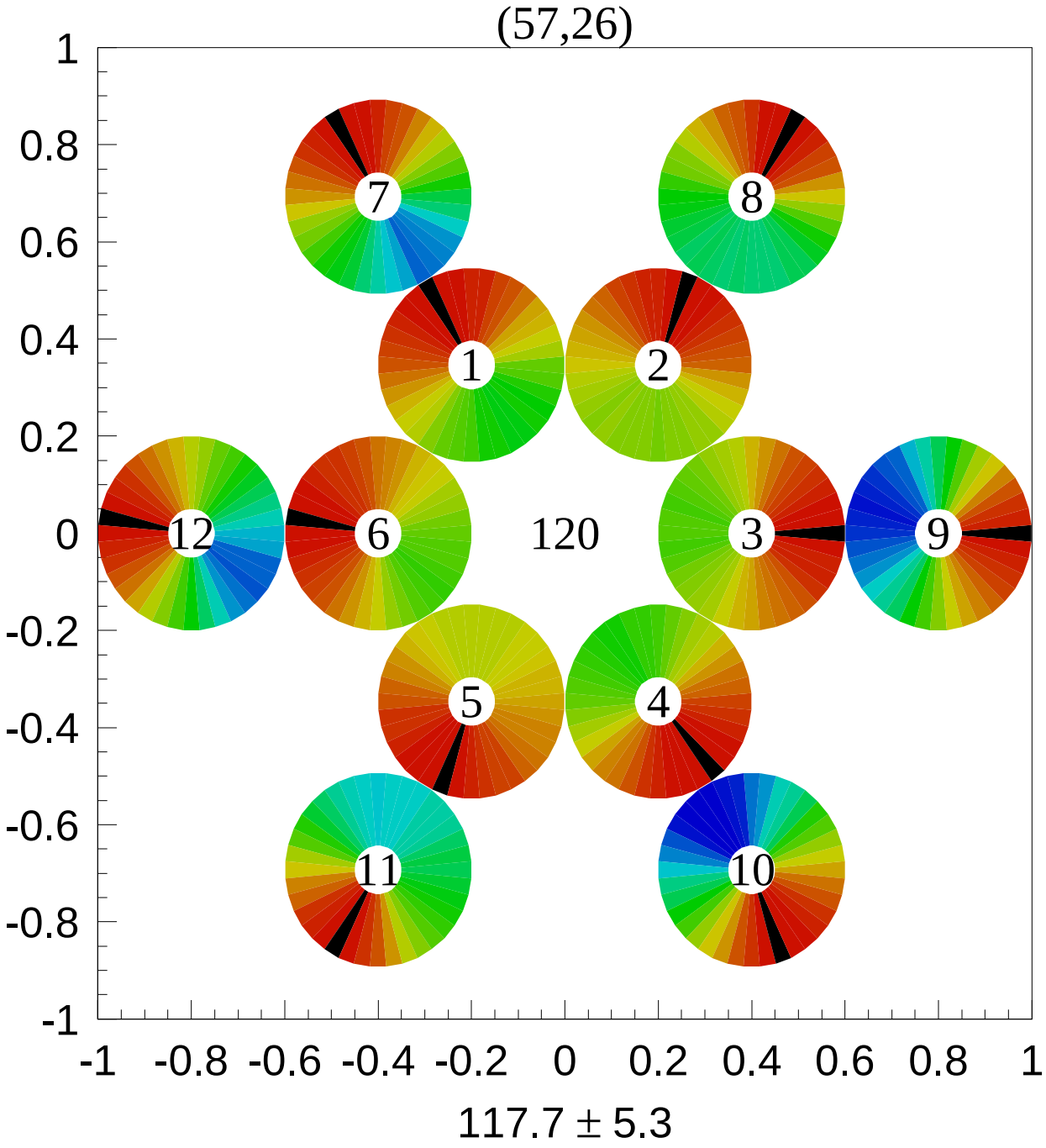

(57,24)
tilted LEDs
121 110 82 121 116 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 124 124 130 123 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

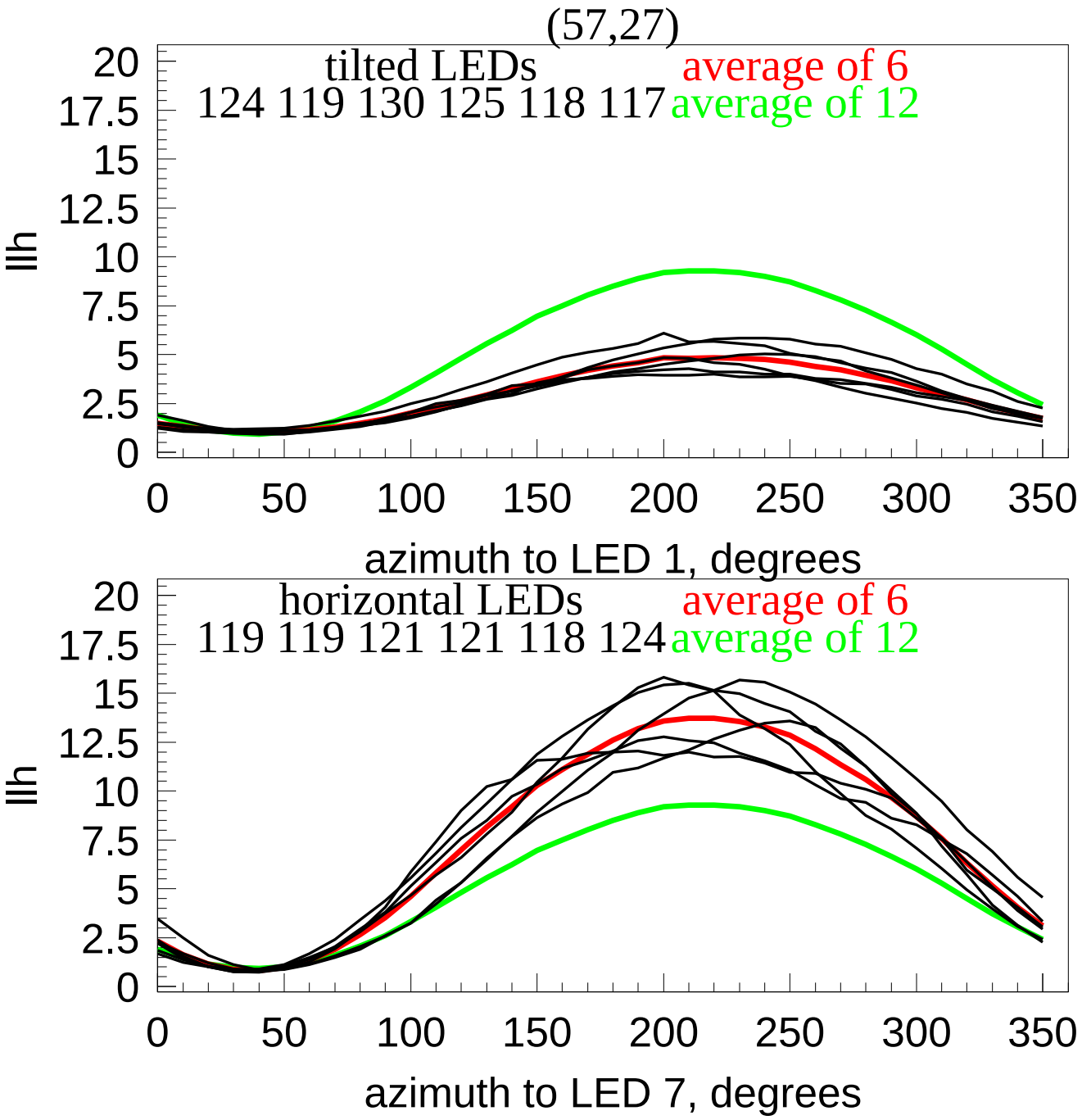

(57,24)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
330.5 ± 5.7

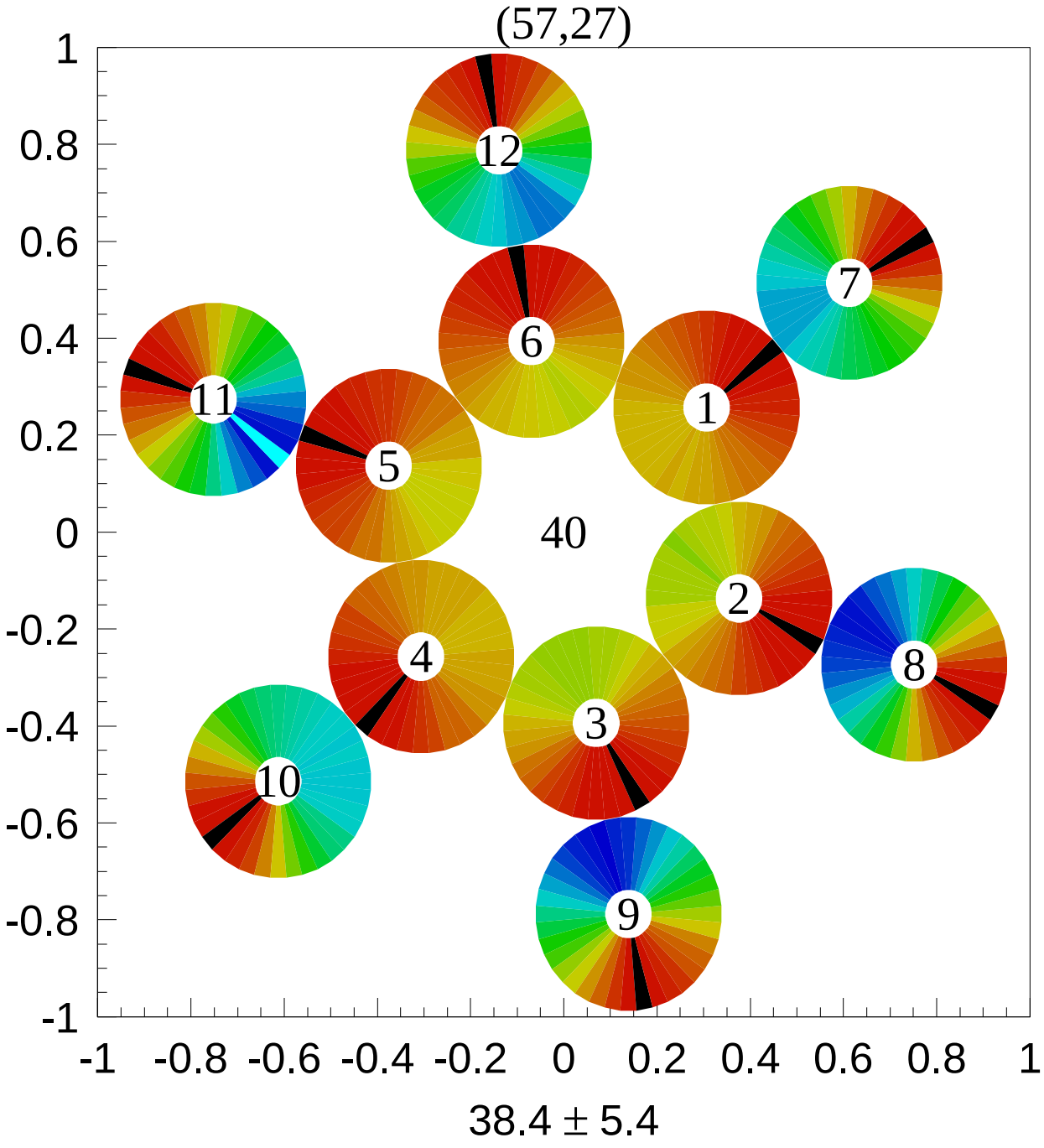

(57,25)
tilted LEDs
119 119 124 116 123 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 119 119 117 131 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

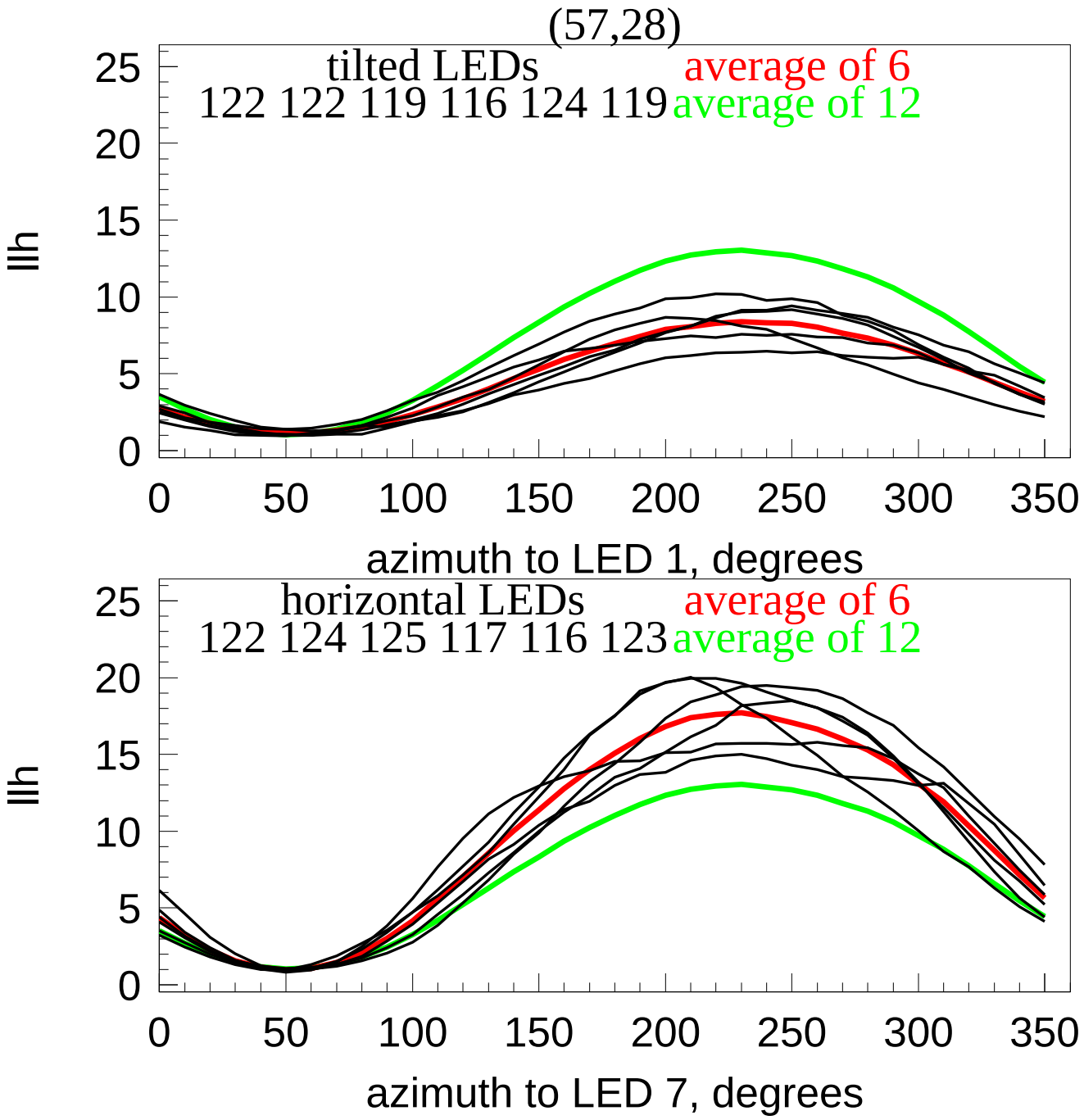

(57,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
105.9 ± 4.0

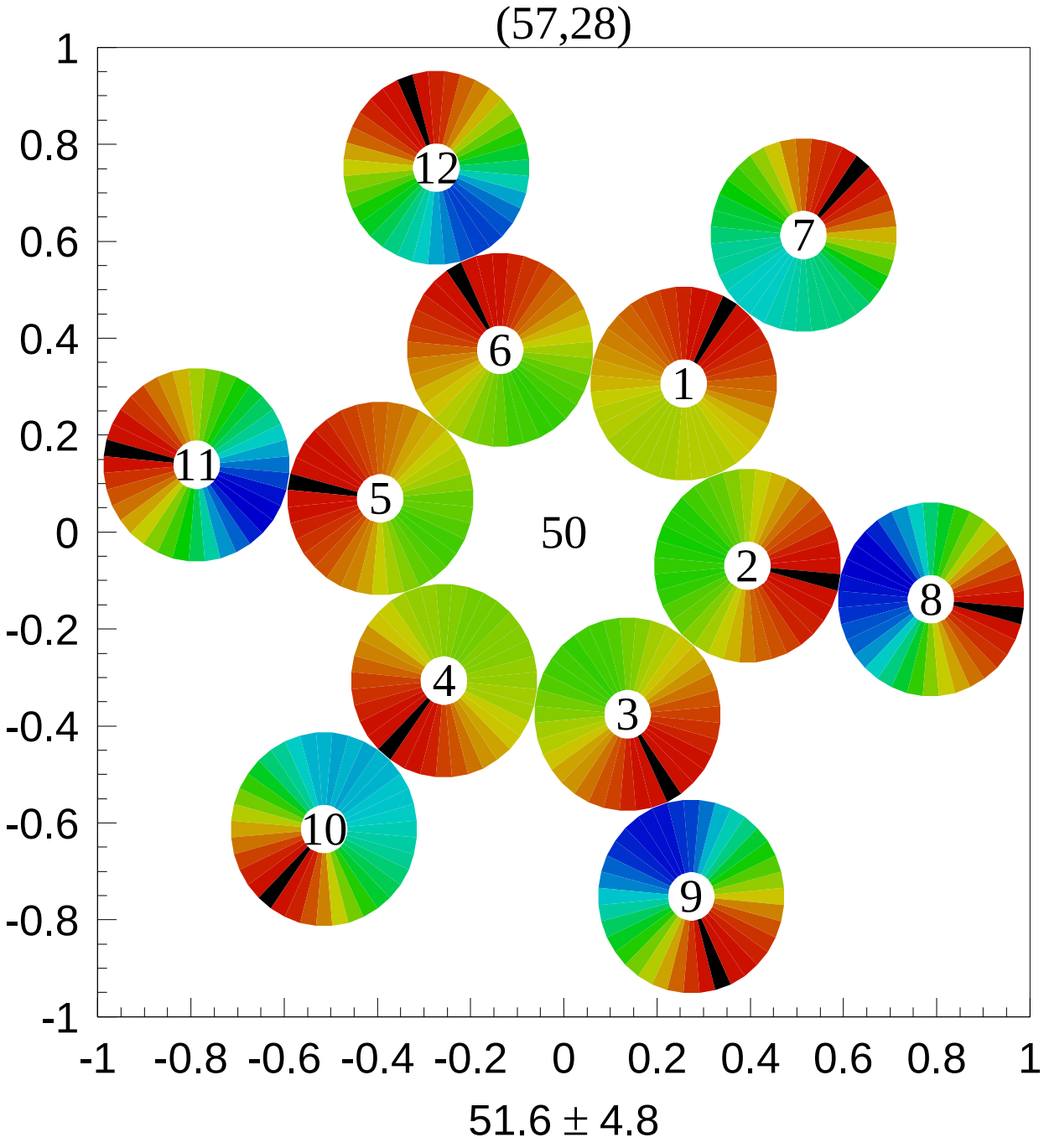

(57,26)
tilted LEDs
121 116 116 122 123 119
average of 6
average of 12
10
8
6
4
2
Ilh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
110 115 123 124 126 123
average of 6
average of 12
10
8
6
4
2
Ilh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

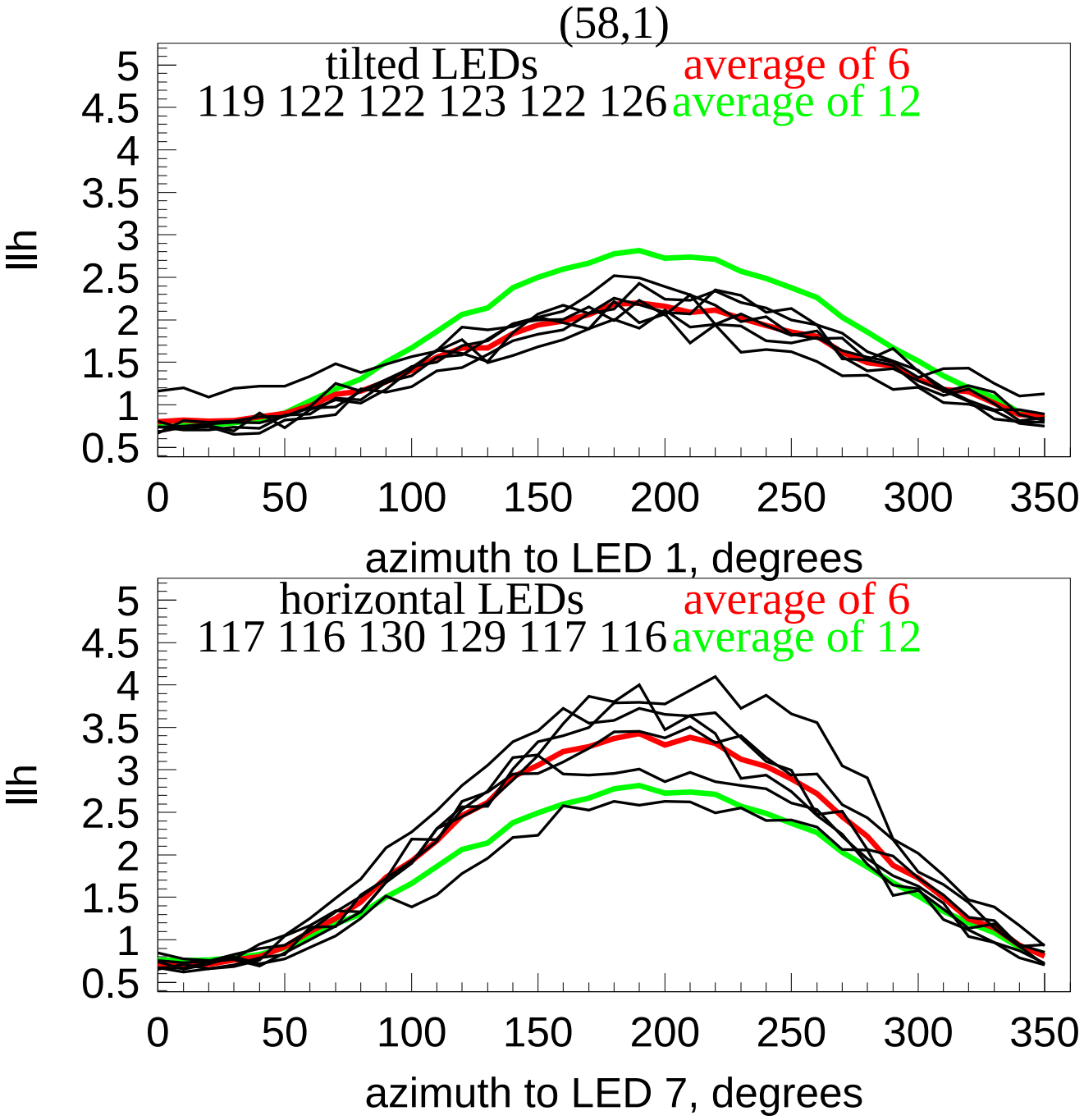

(57,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
117.7 ± 5.3

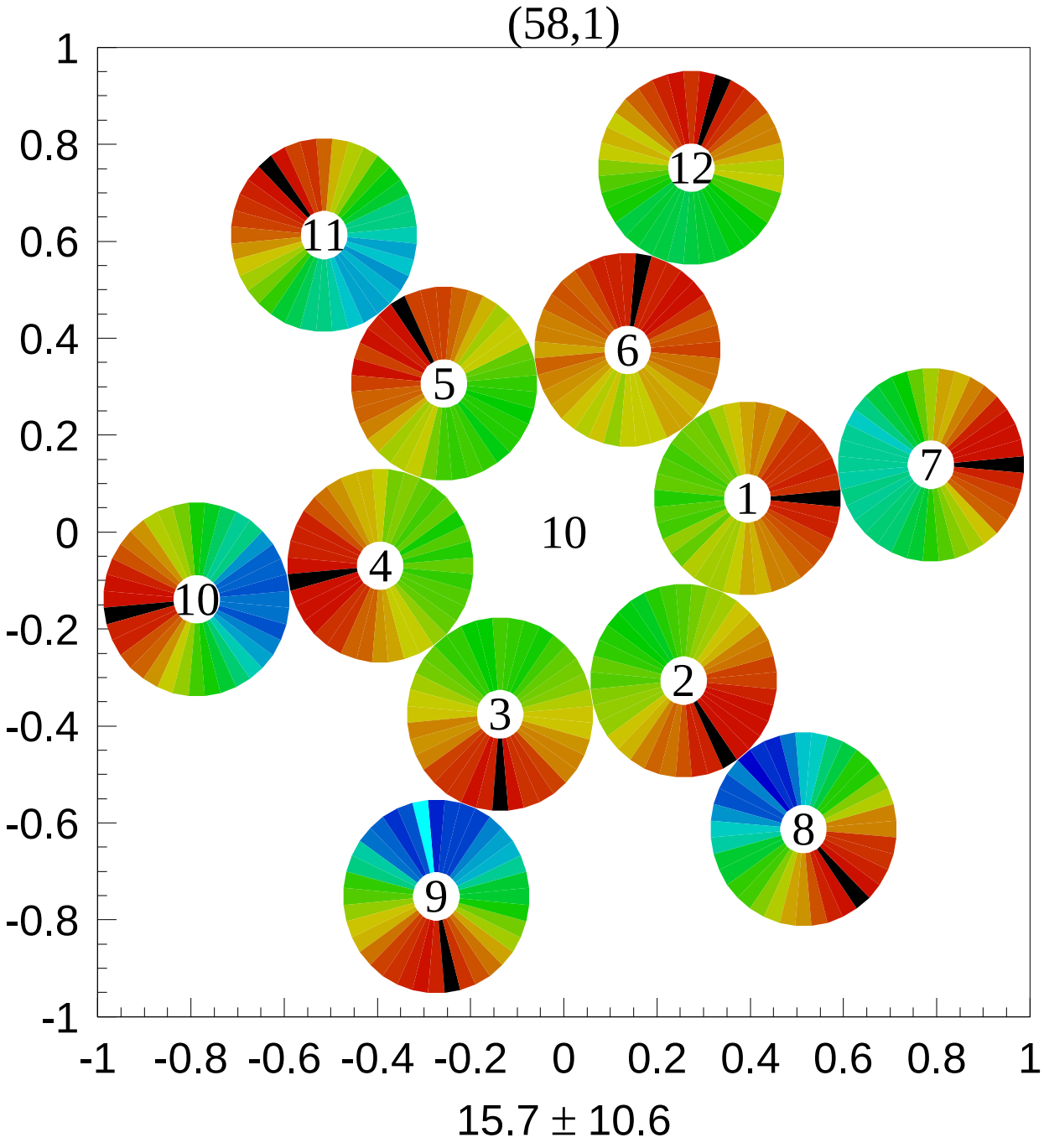

(57,27)
tilted LEDs
124 119 130 125 118 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 119 121 121 118 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

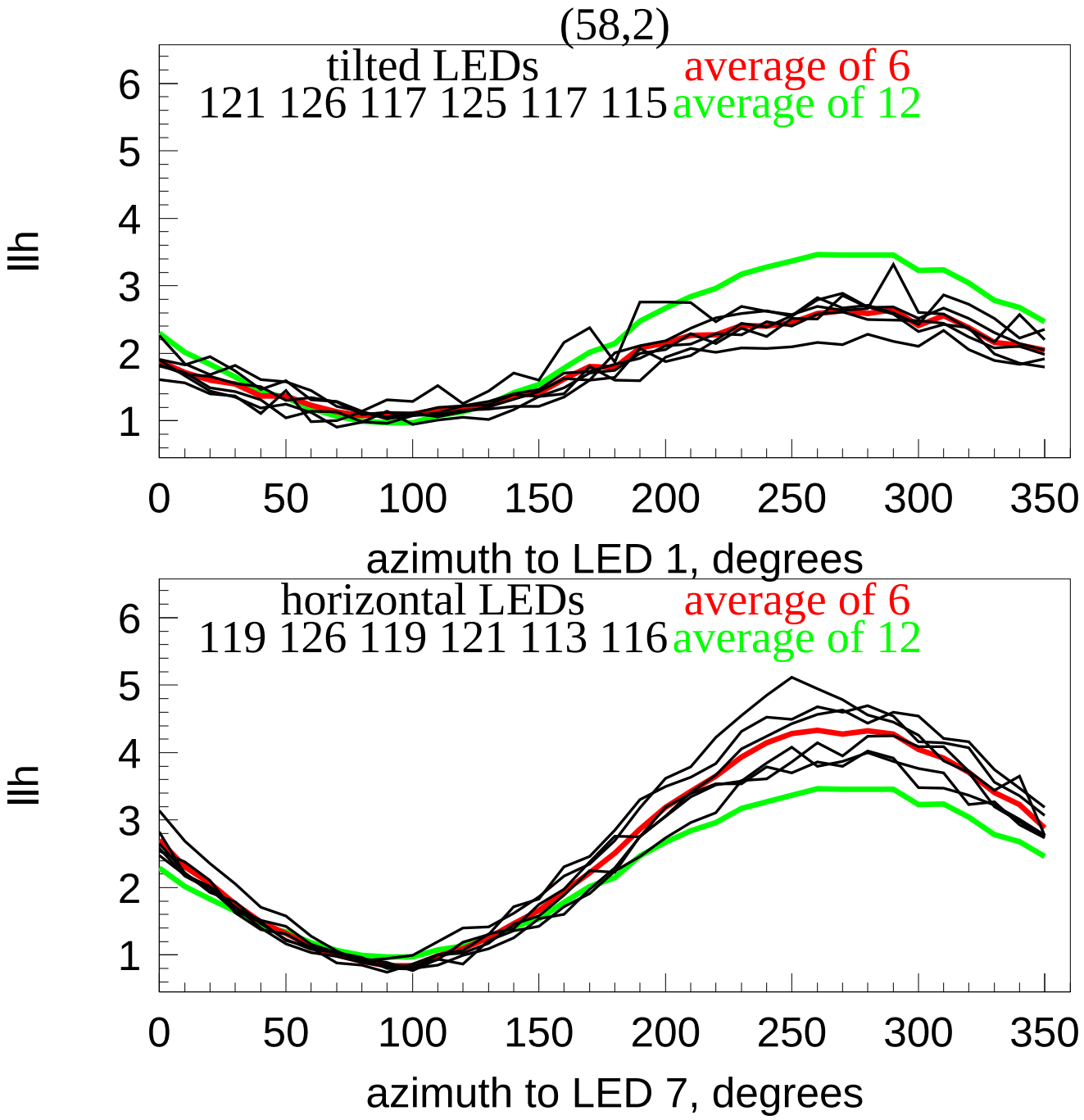

(57,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
38.4 ± 5.4

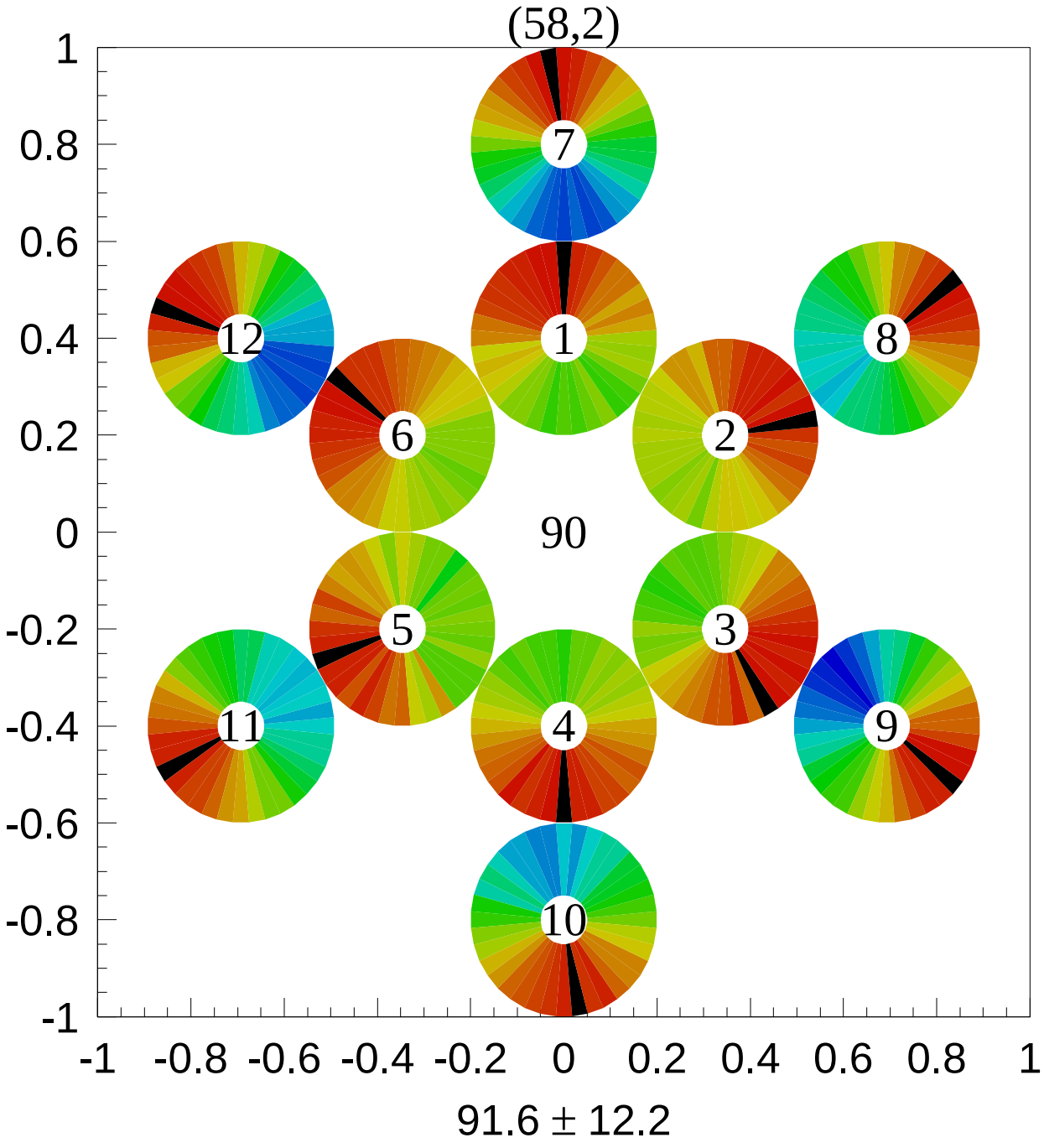

(57,28)
tilted LEDs
122 122 119 116 124 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 125 117 116 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

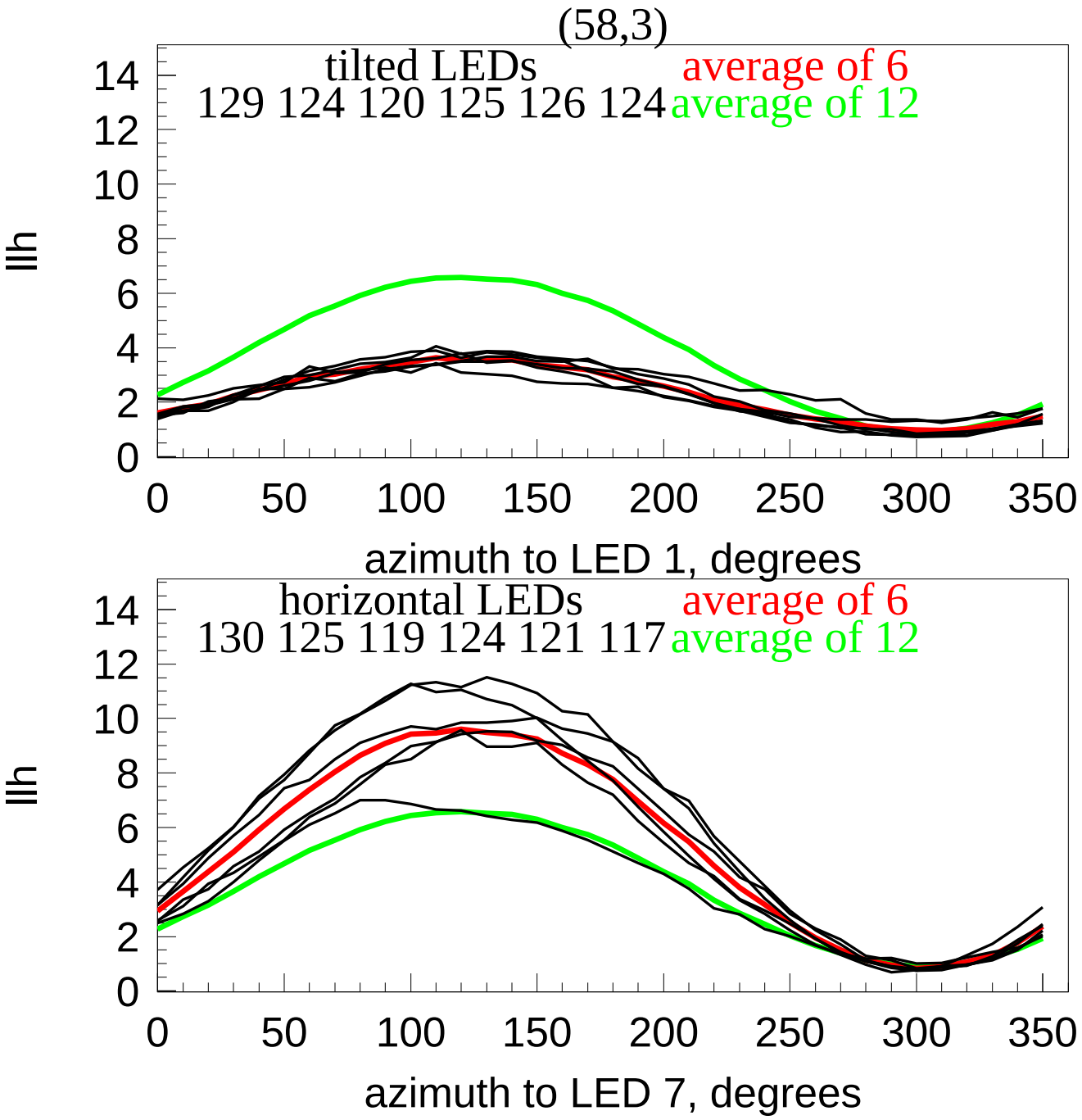

(57,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
51.6 ± 4.8

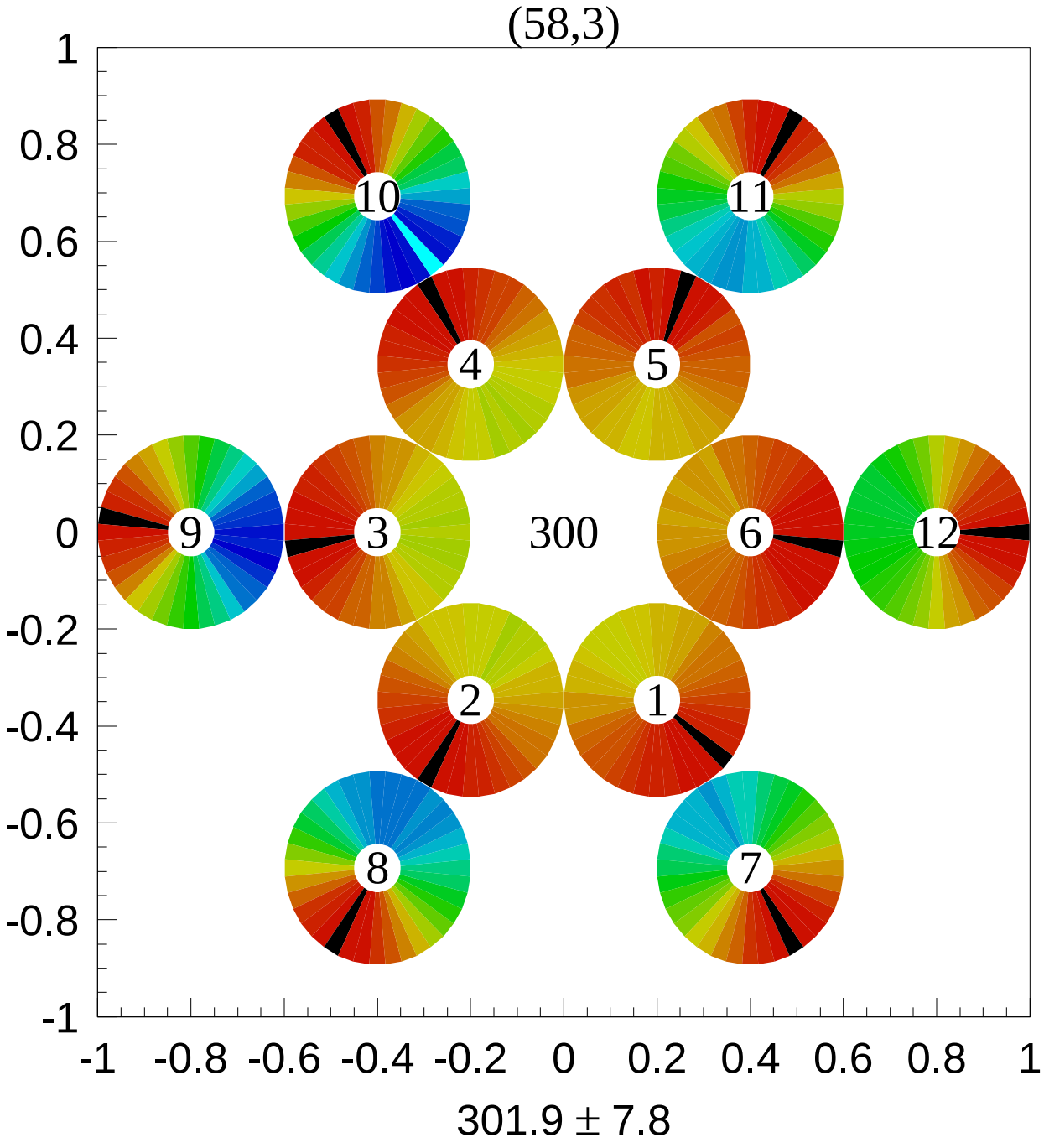

(58,1)
tilted LEDs
119 122 122 123 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 116 130 129 117 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

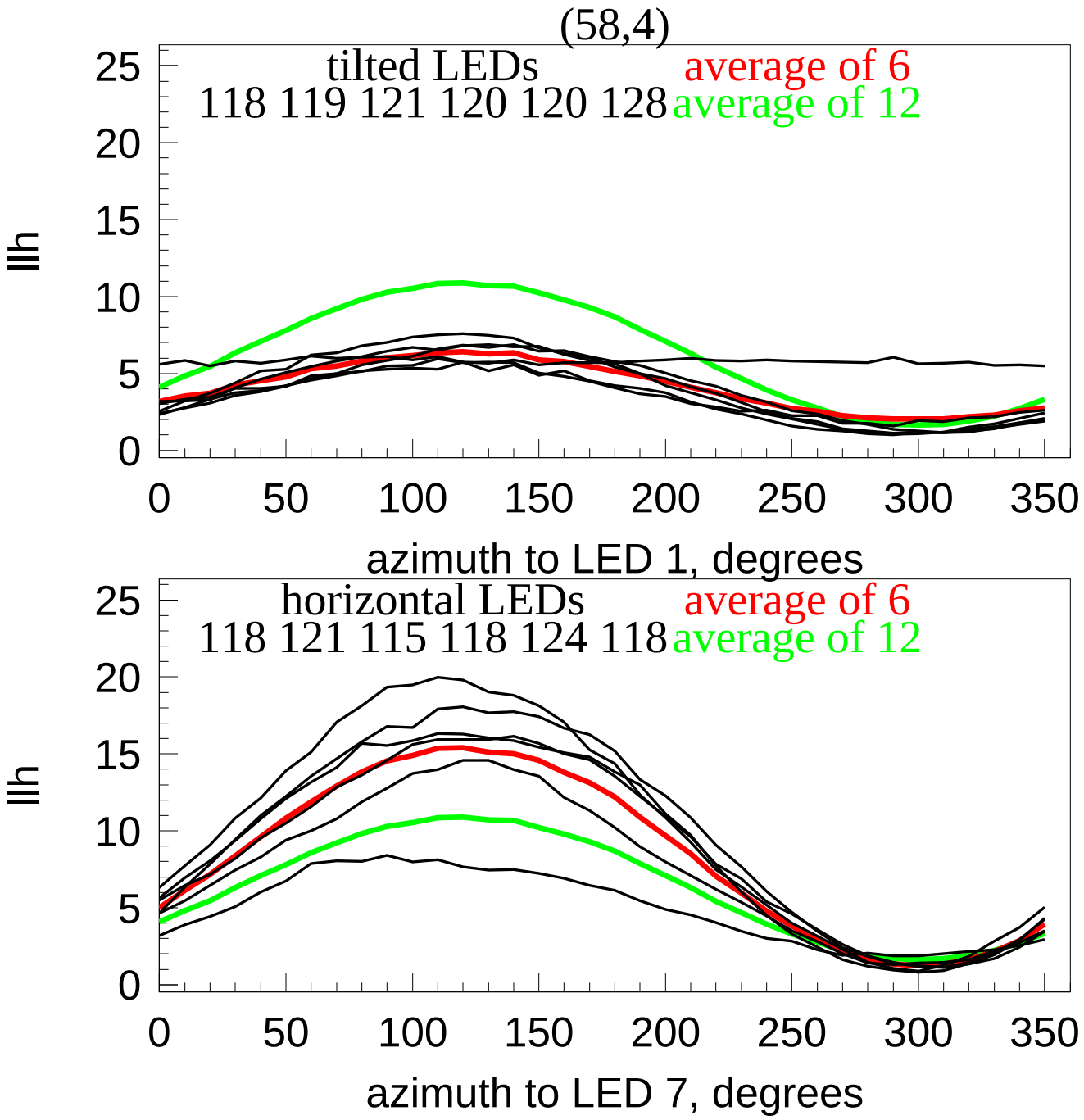

(58,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
15.7 ± 10.6
12
11
6
5
7
1
10
4
10
2
3
8
9

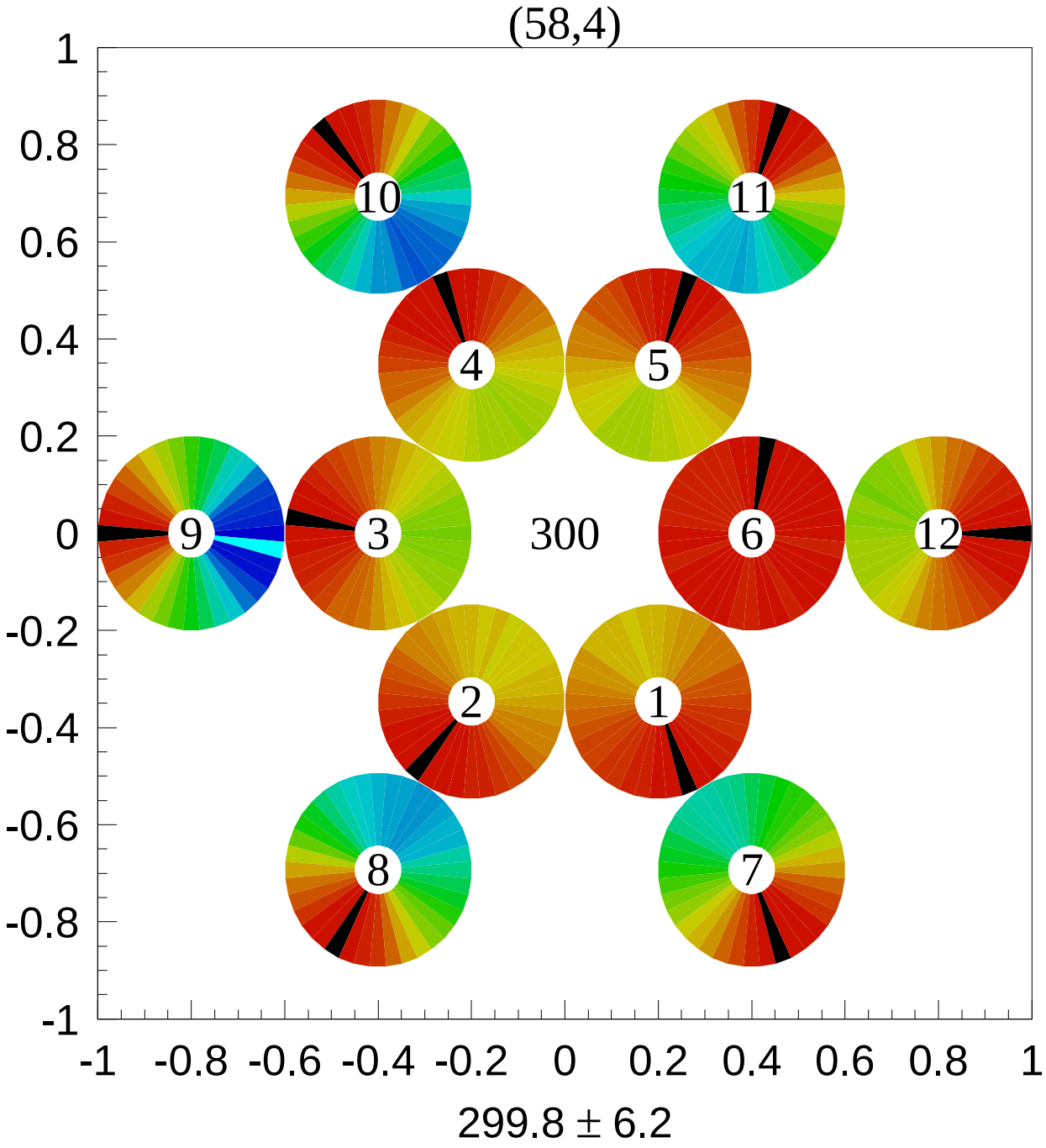

(58,2)
tilted LEDs
121 126 117 125 117 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 119 121 113 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

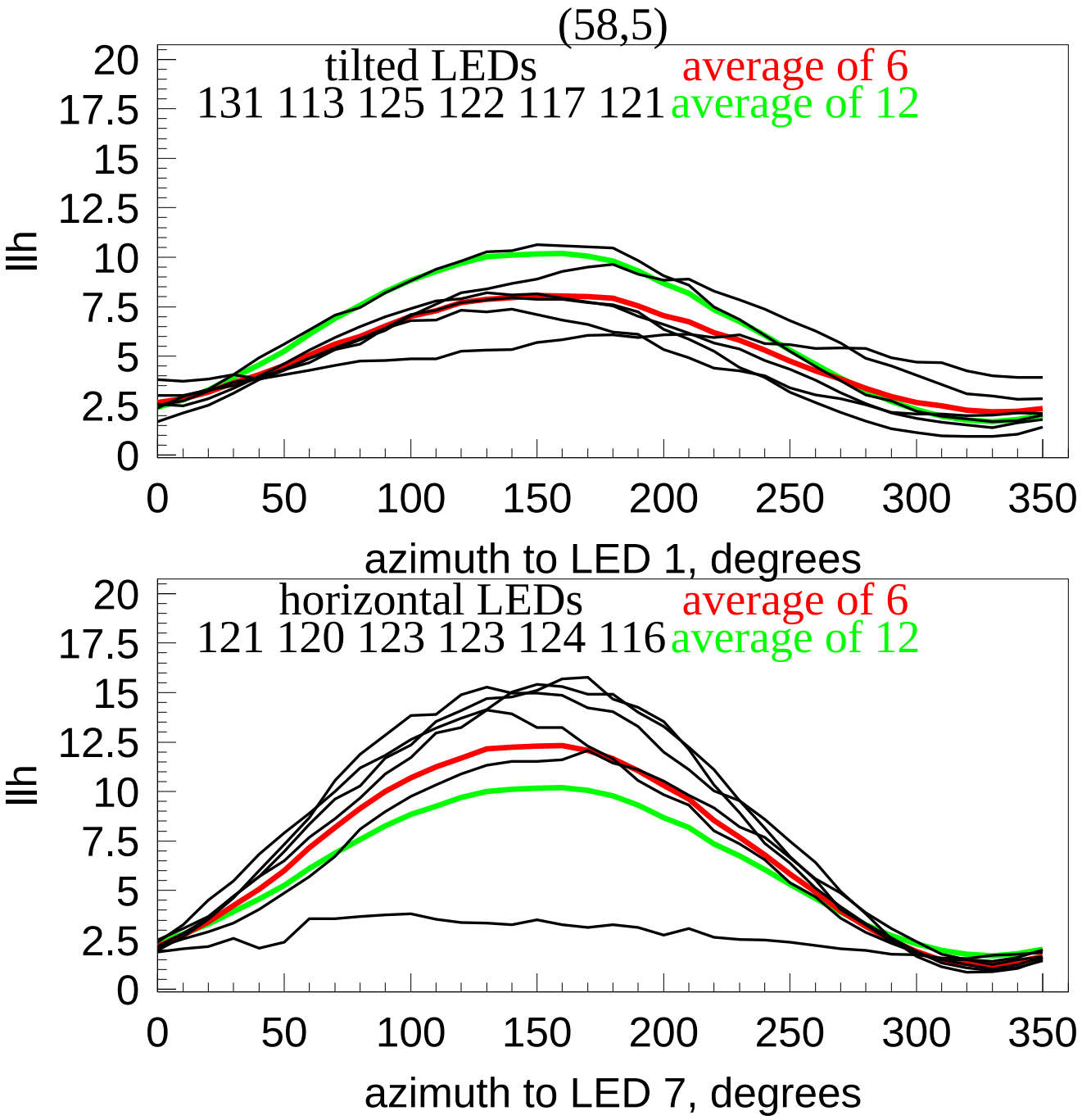

(58,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
91.6 ± 12.2

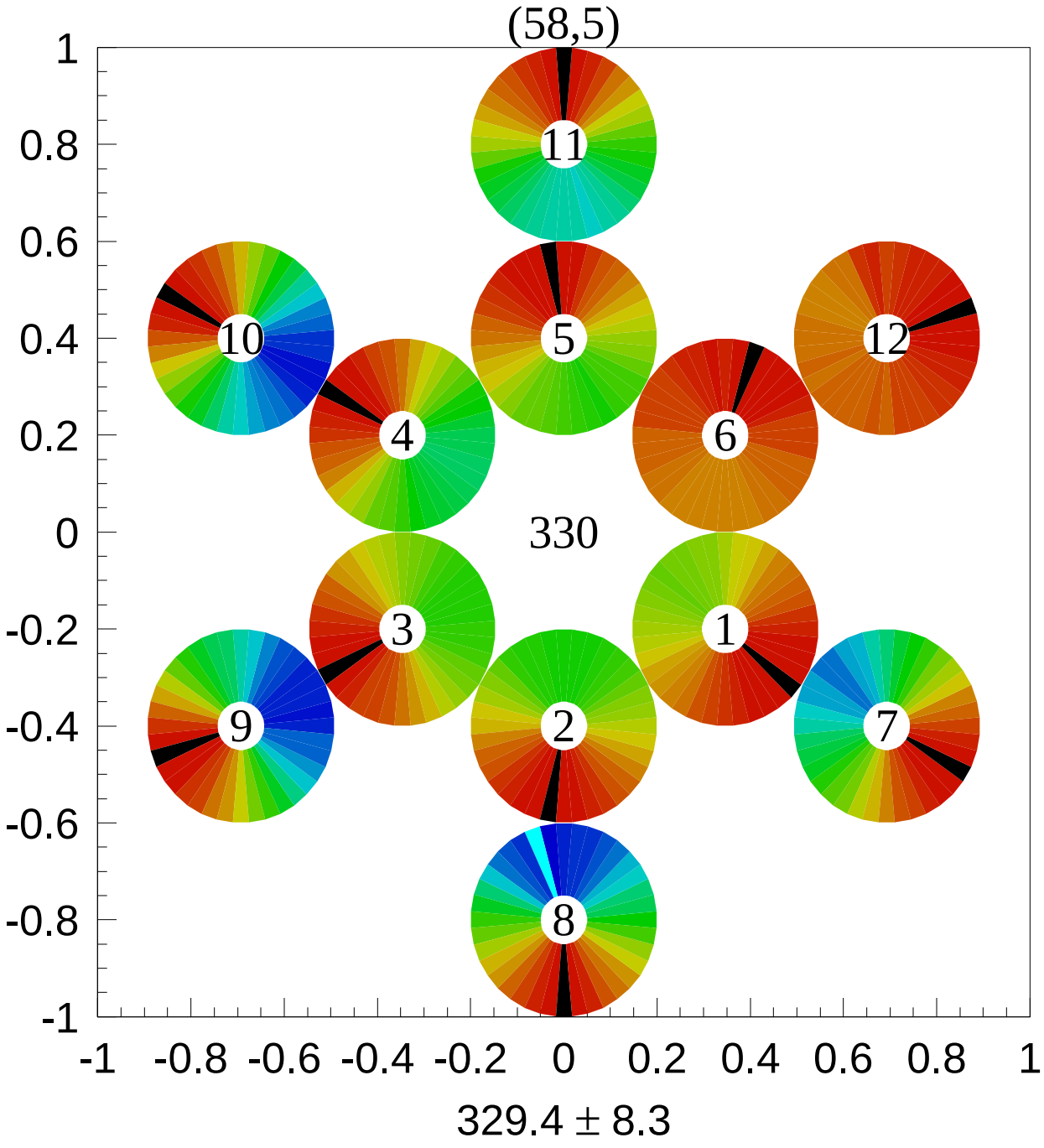

(58,3)
tilted LEDs
129 124 120 125 126 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 125 119 124 121 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

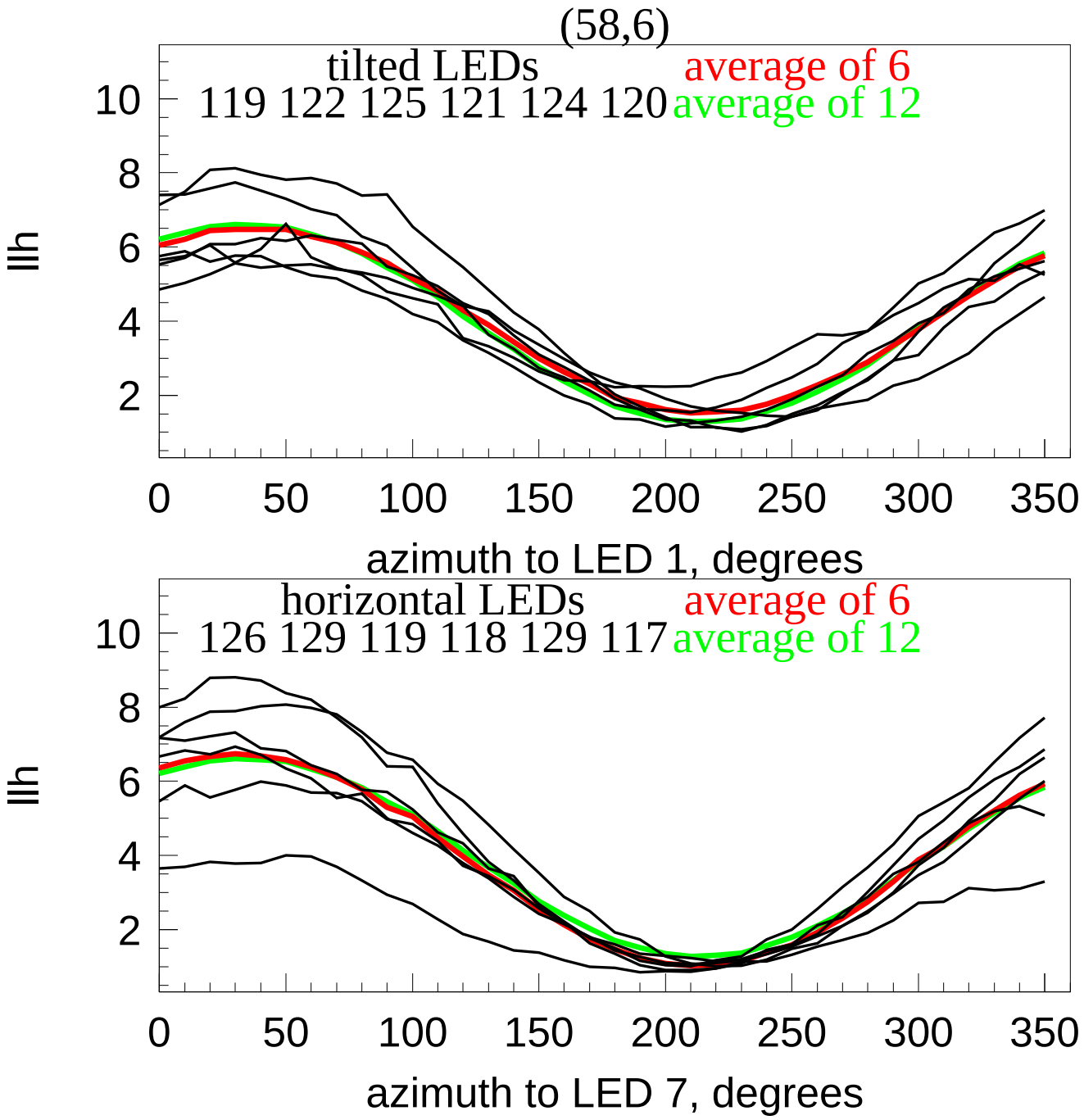

(58,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
301.9 ± 7.8

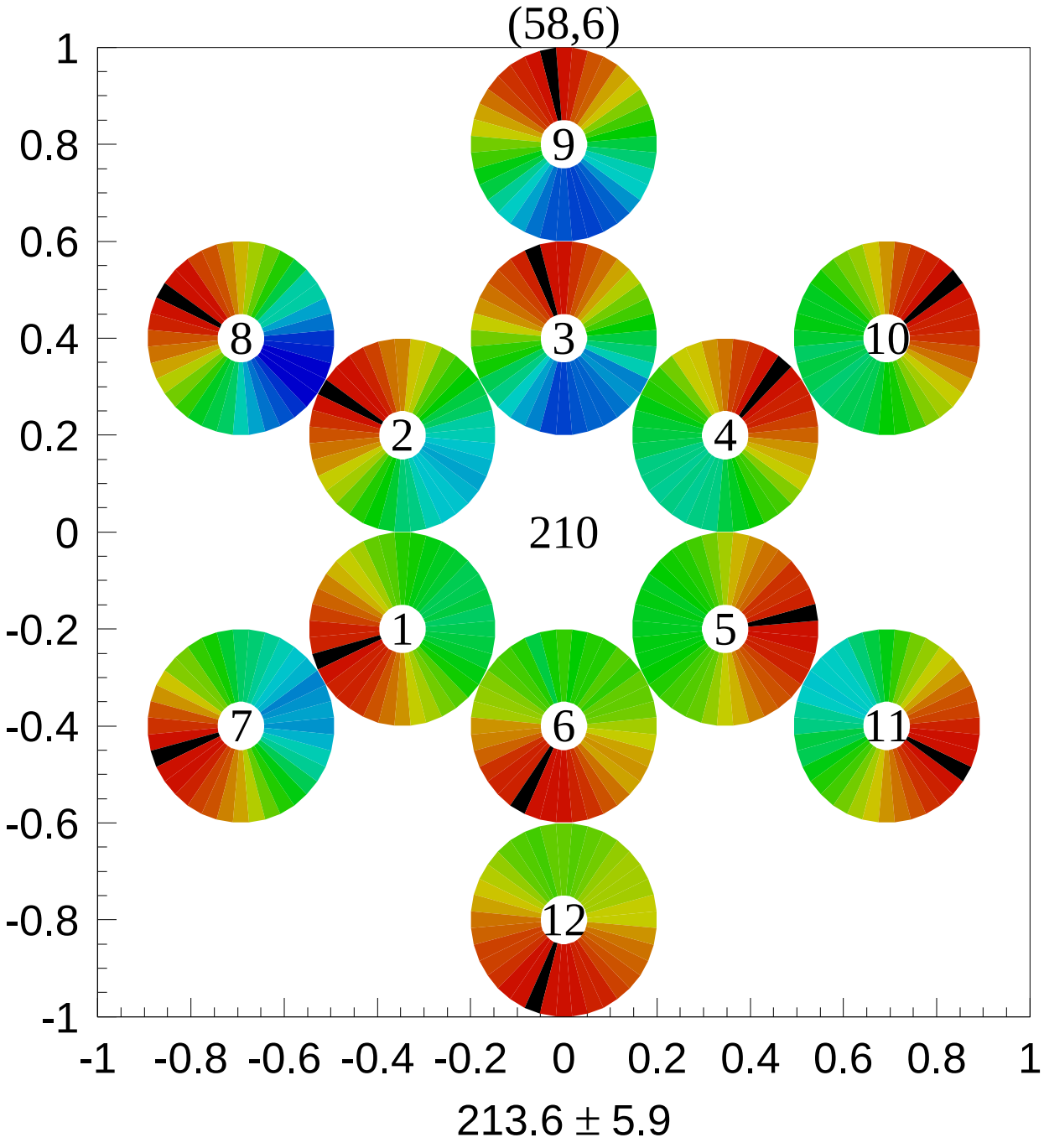

(58,4)
tilted LEDs
118 119 121 120 120 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 115 118 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

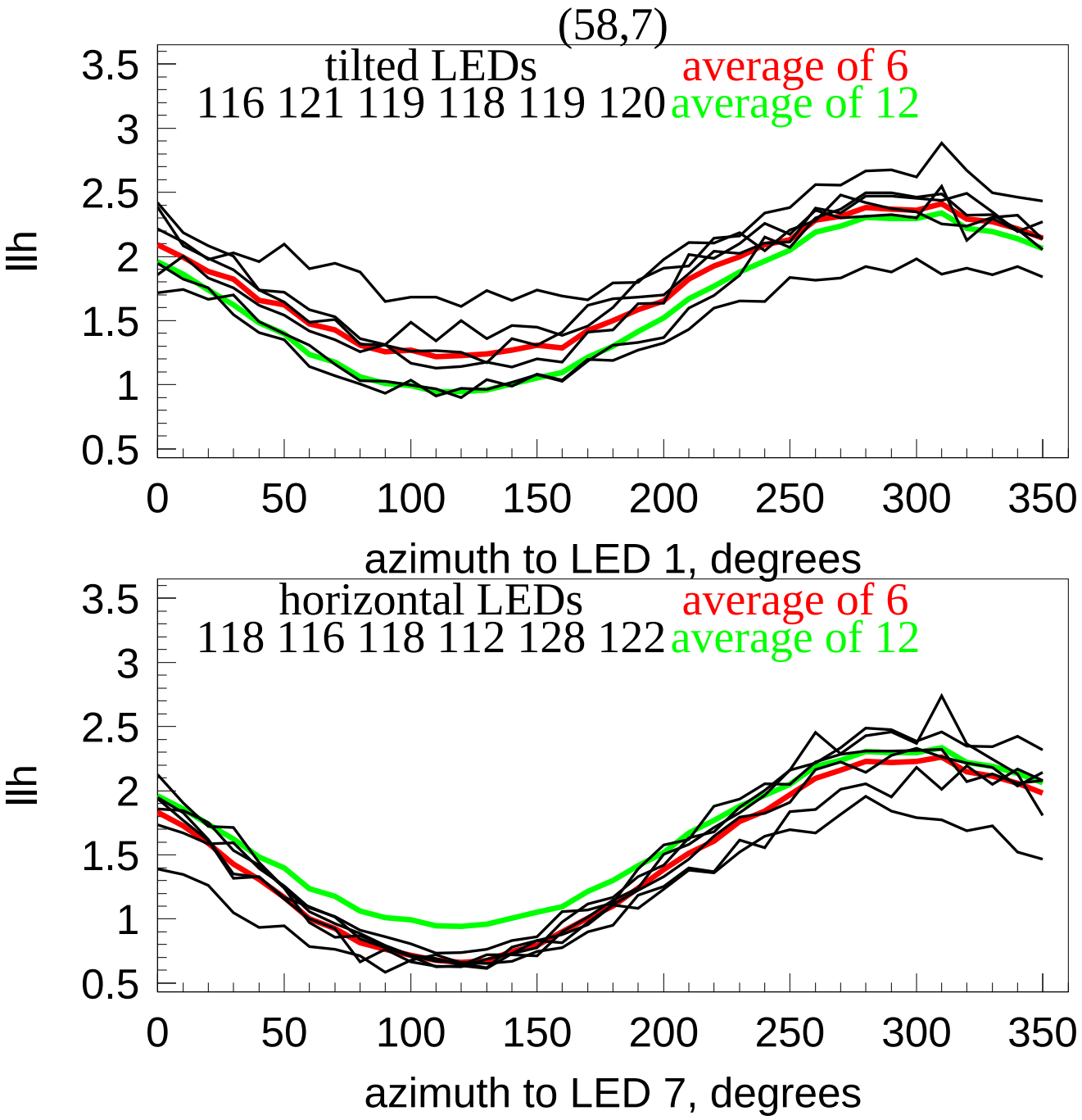

(58,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
299.8 ± 6.2

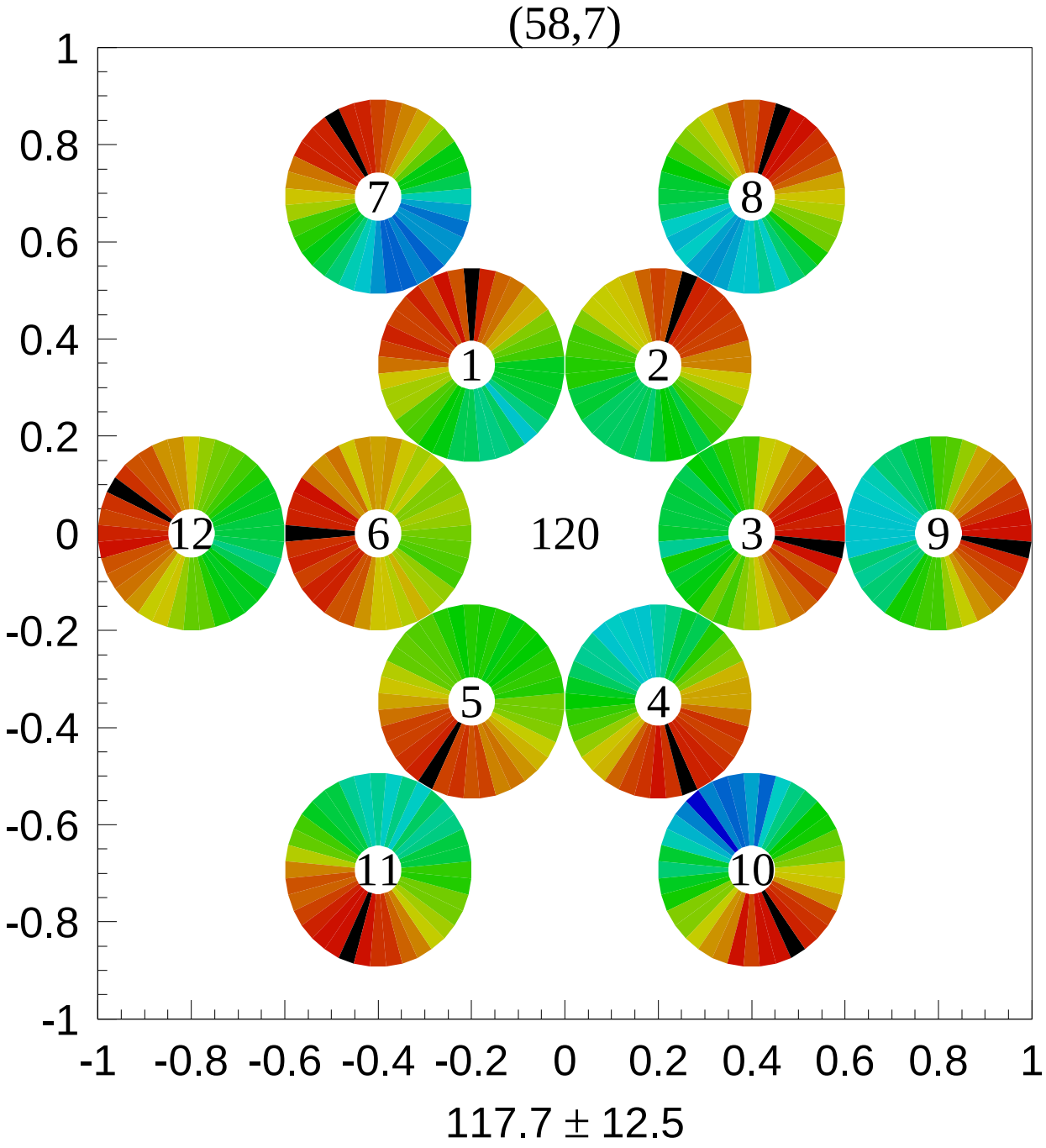

(58,5)
tilted LEDs
131 113 125 122 117 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 120 123 123 124 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

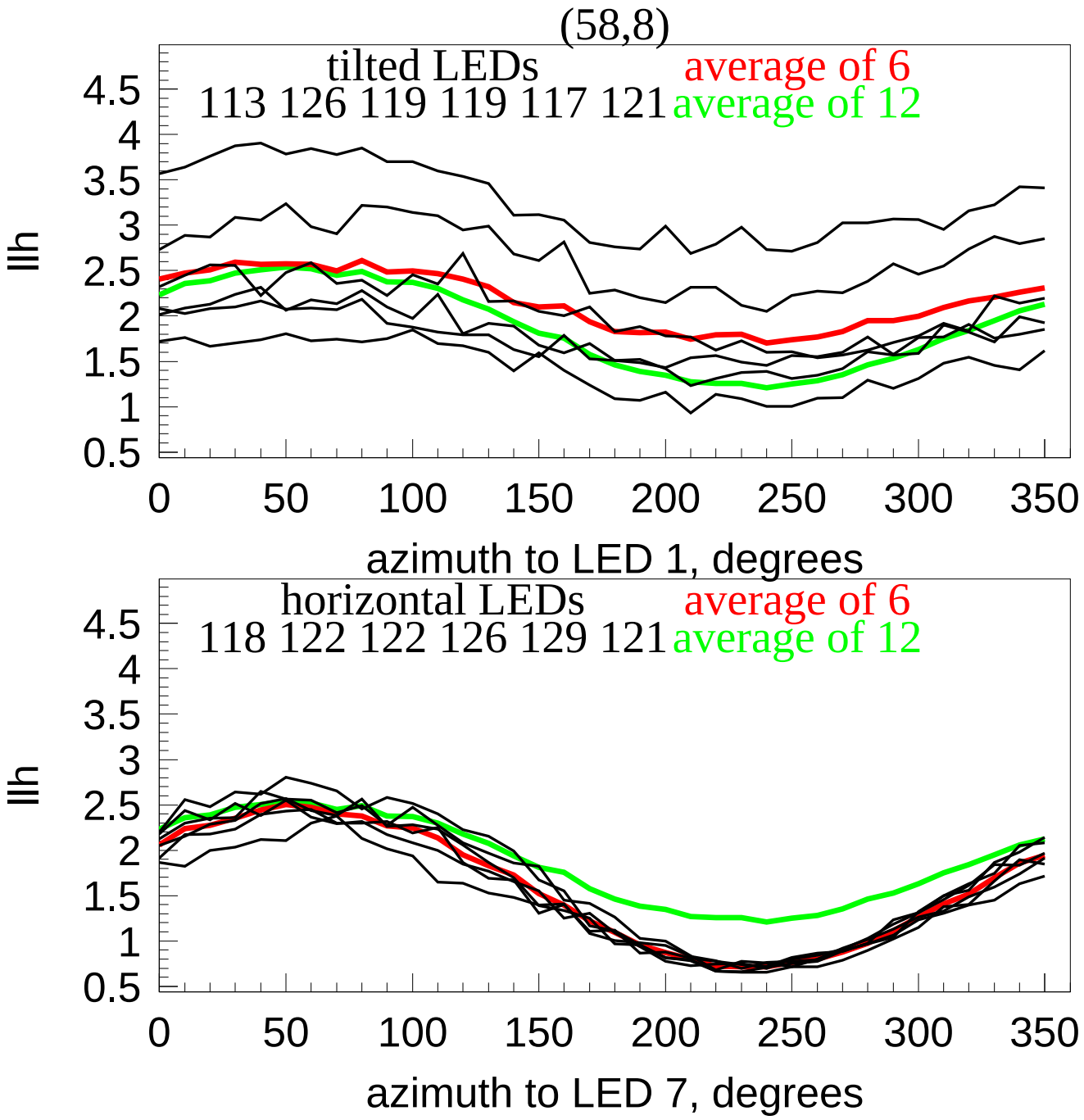

(58,5)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
329.4 ± 8.3

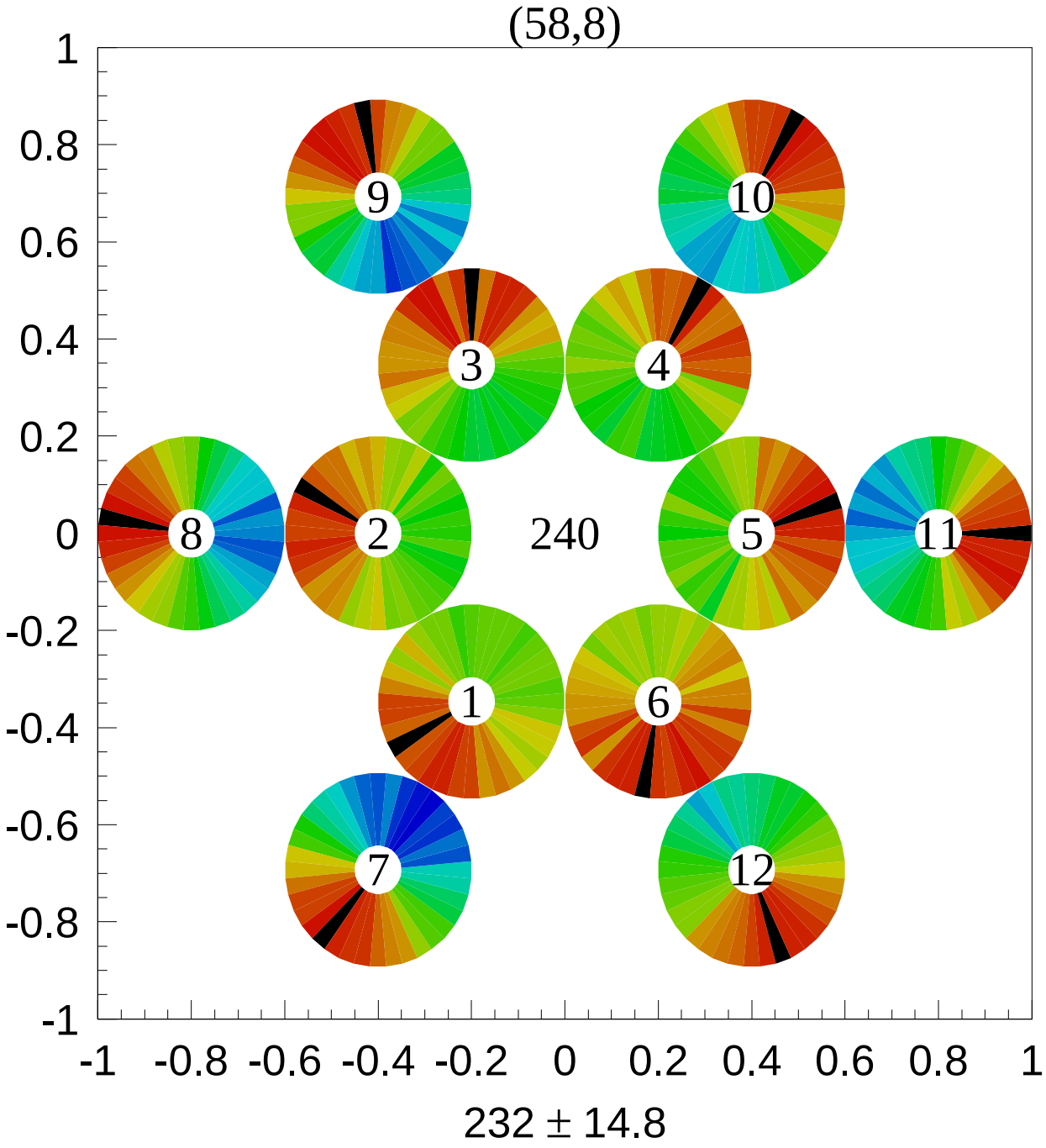

(58,6)
tilted LEDs
119 122 125 121 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 129 119 118 129 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

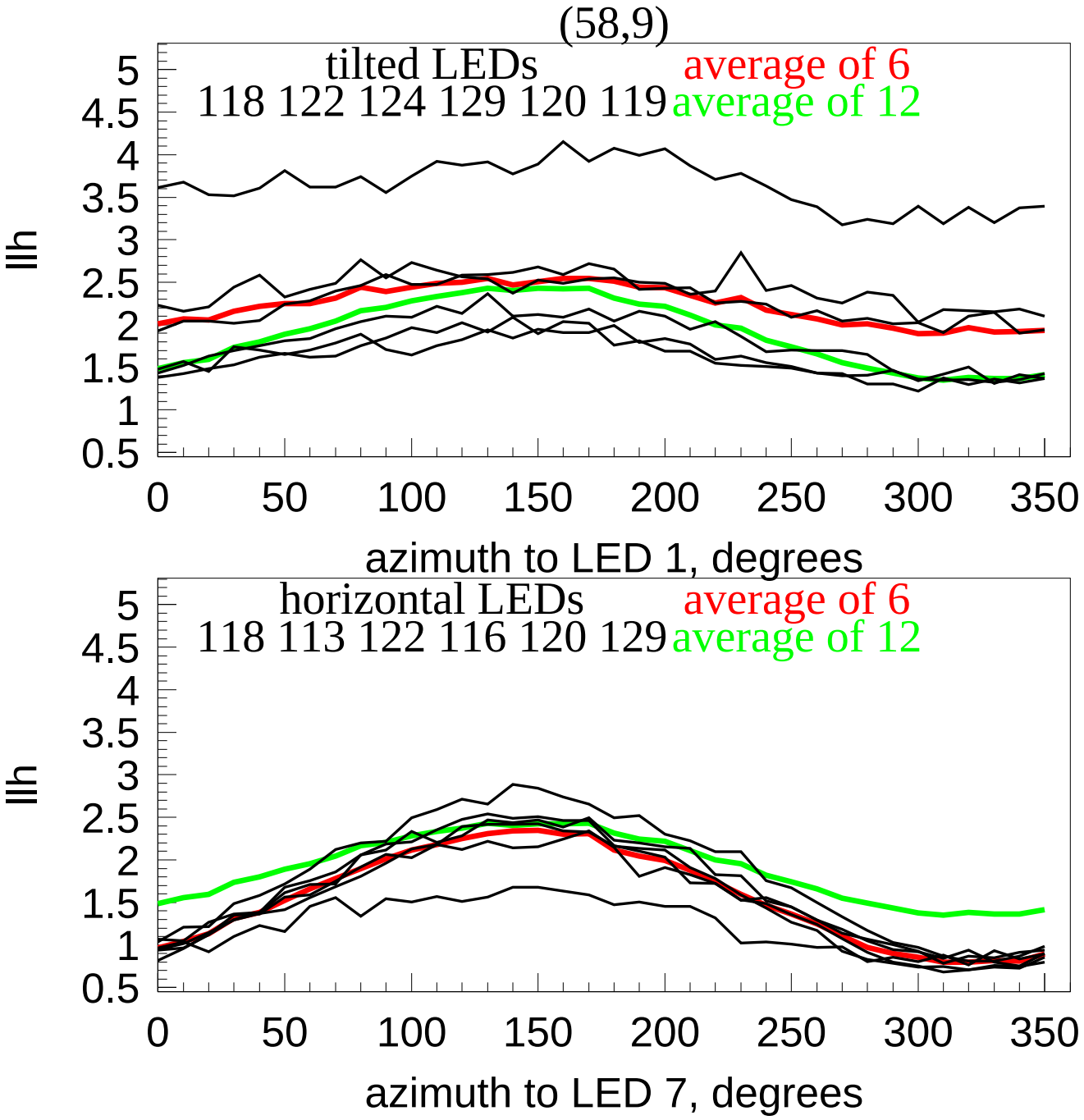

(58,6)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
213.6 ± 5.9

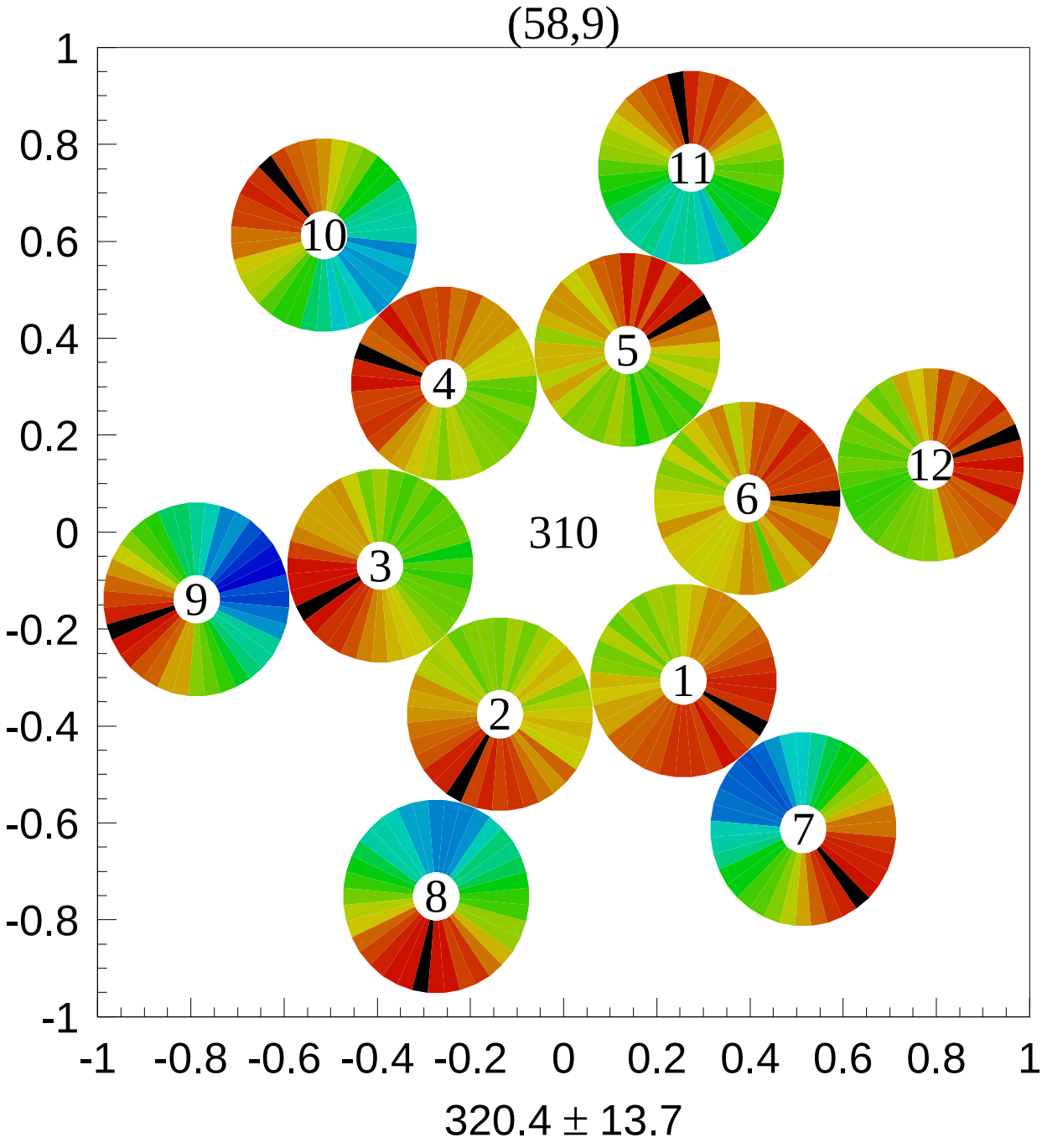

(58,7)
tilted LEDs
116 121 119 118 119 120
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 116 118 112 128 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

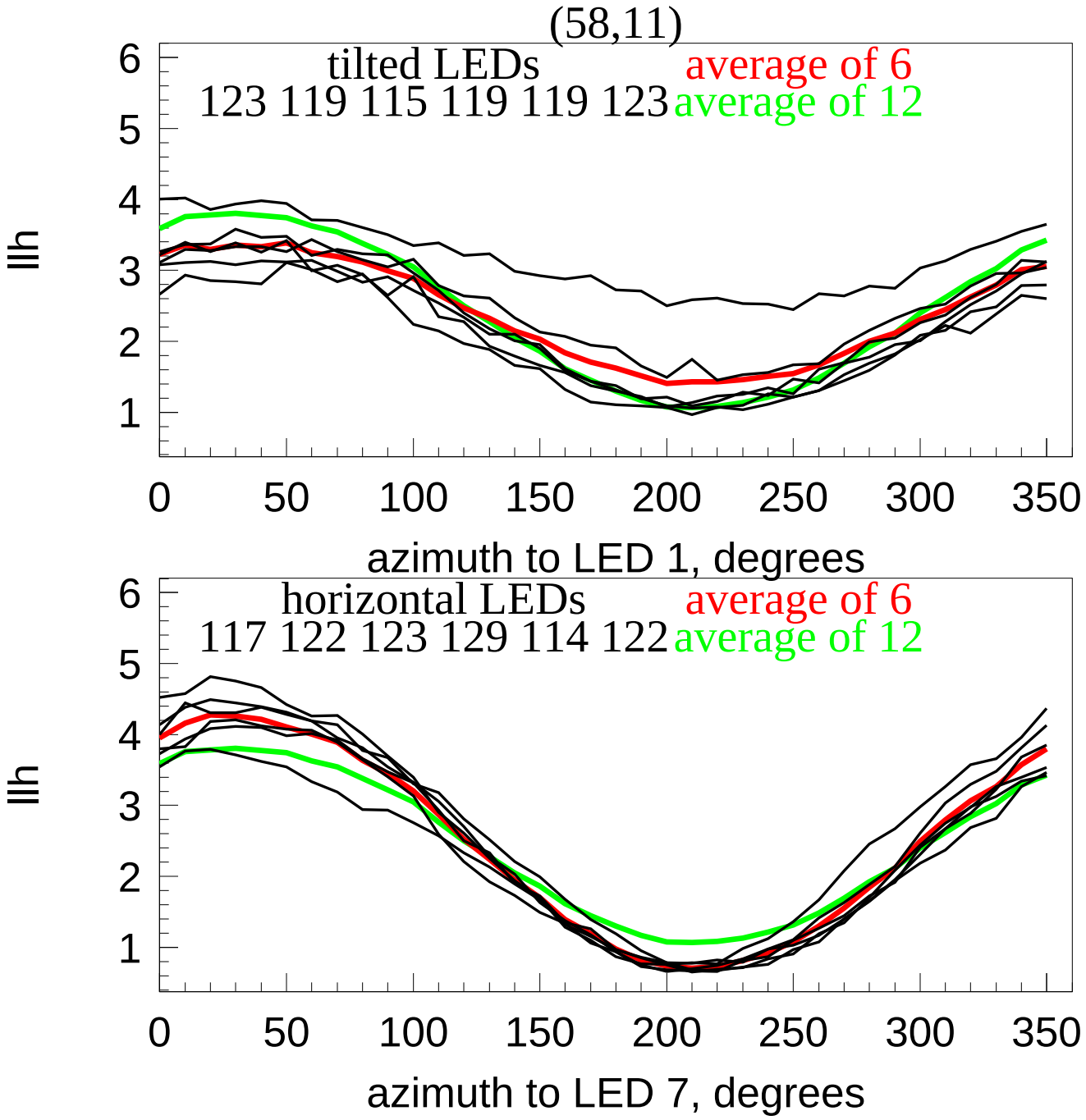

(58,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
117.7 ± 12.5

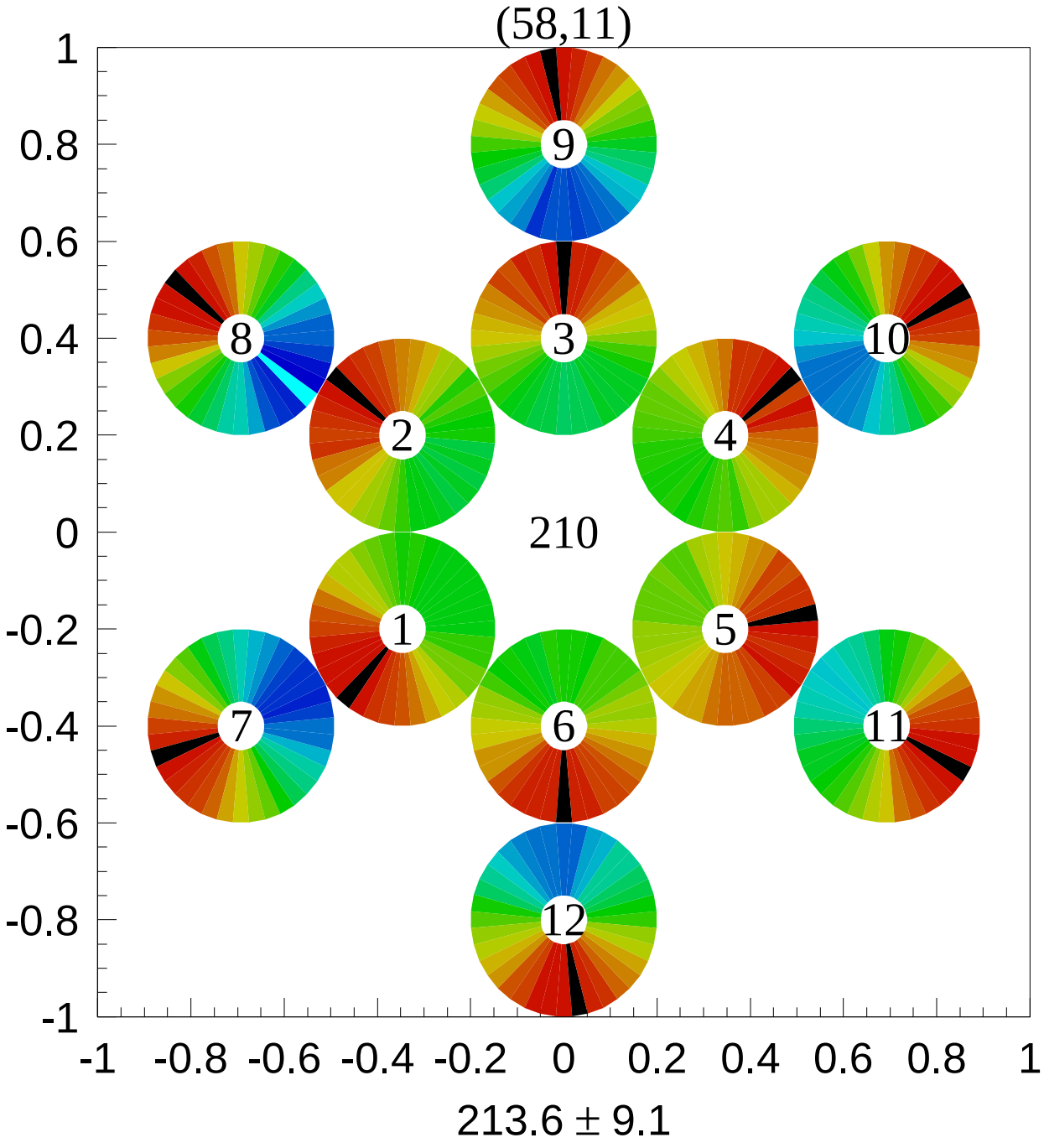

(58,8)
tilted LEDs
113 126 119 119 117 121
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 122 122 126 129 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

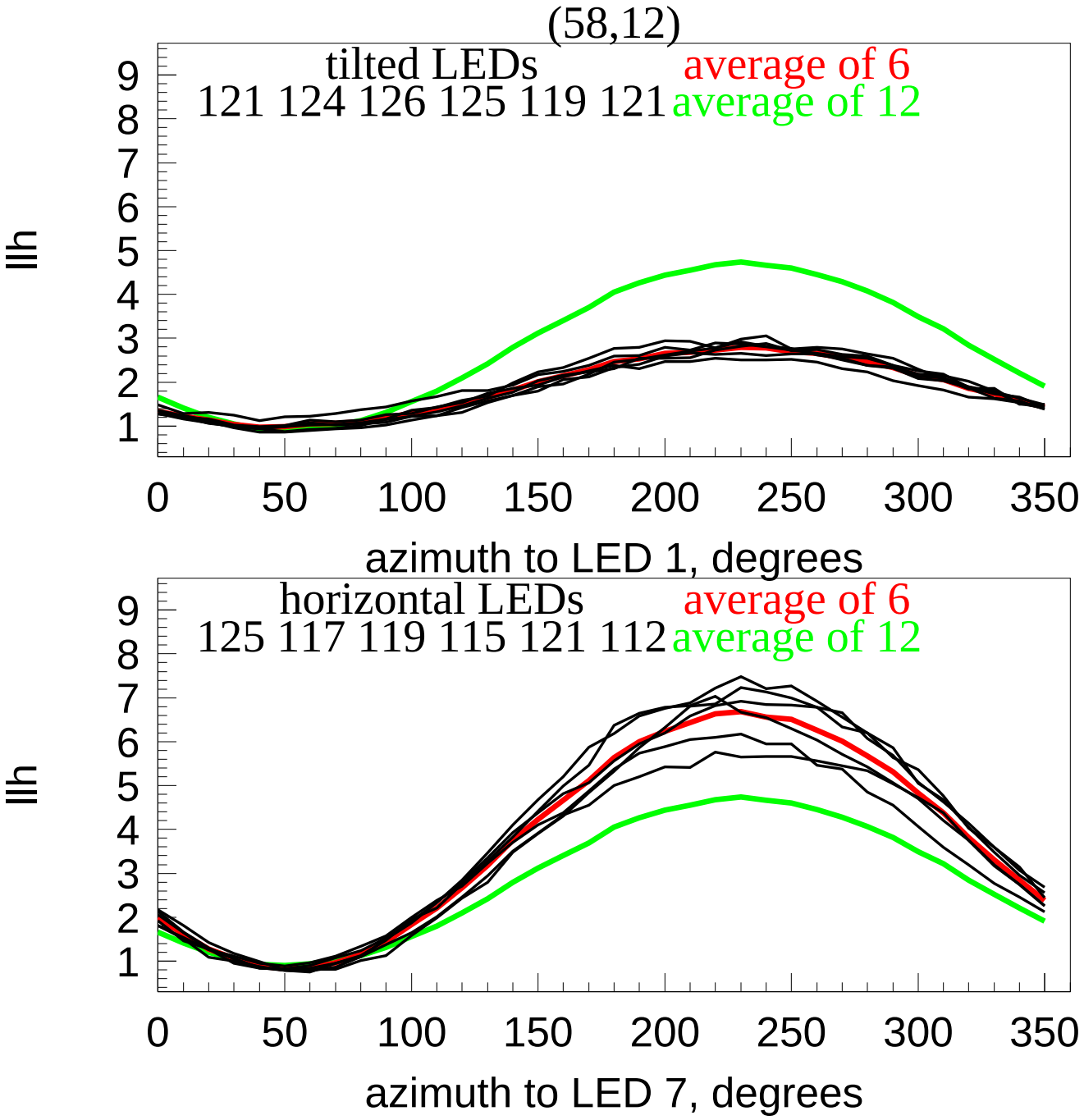

(58,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
232 ± 14.8

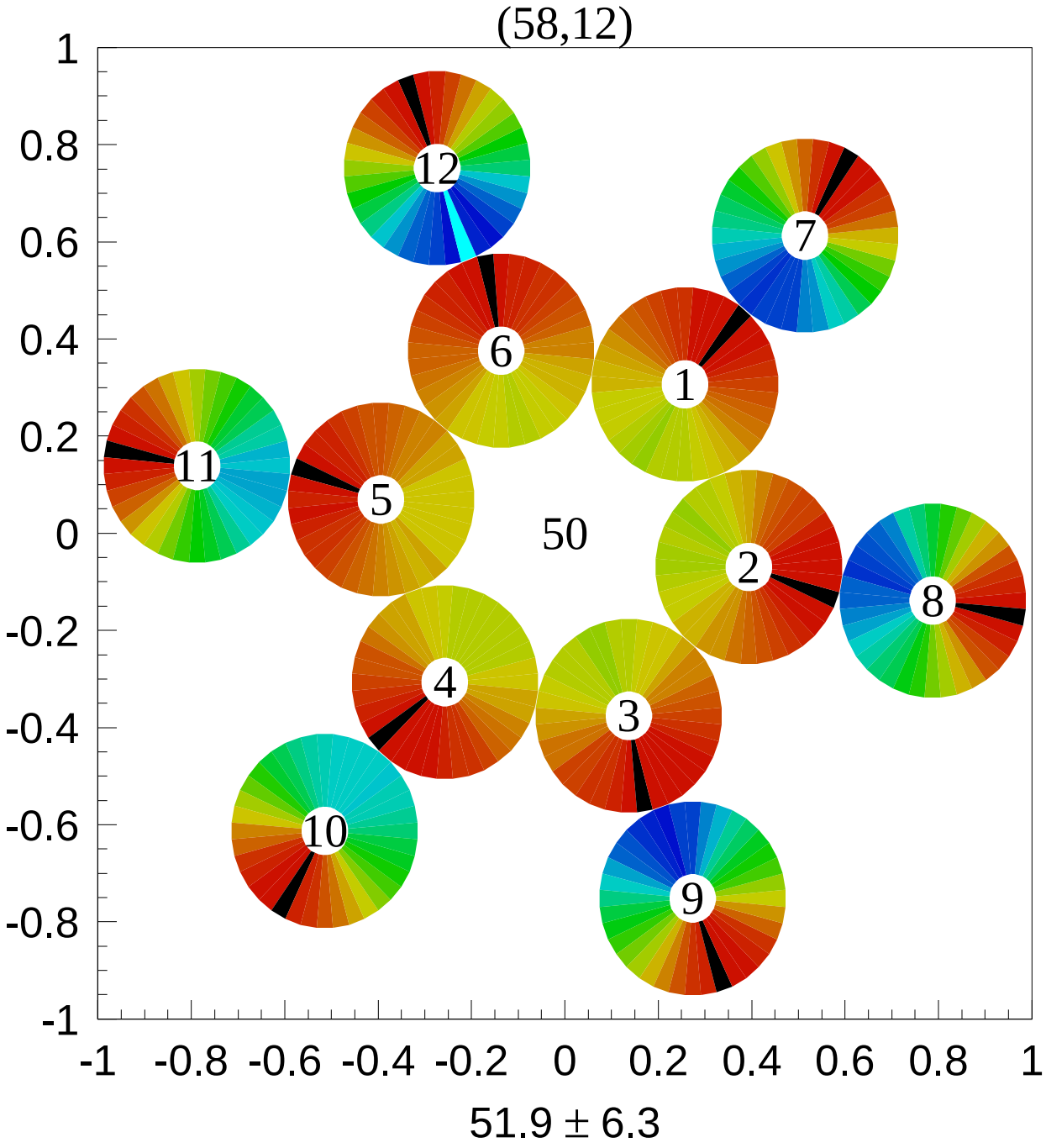

(58,9)
tilted LEDs
118 122 124 129 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 113 122 116 120 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

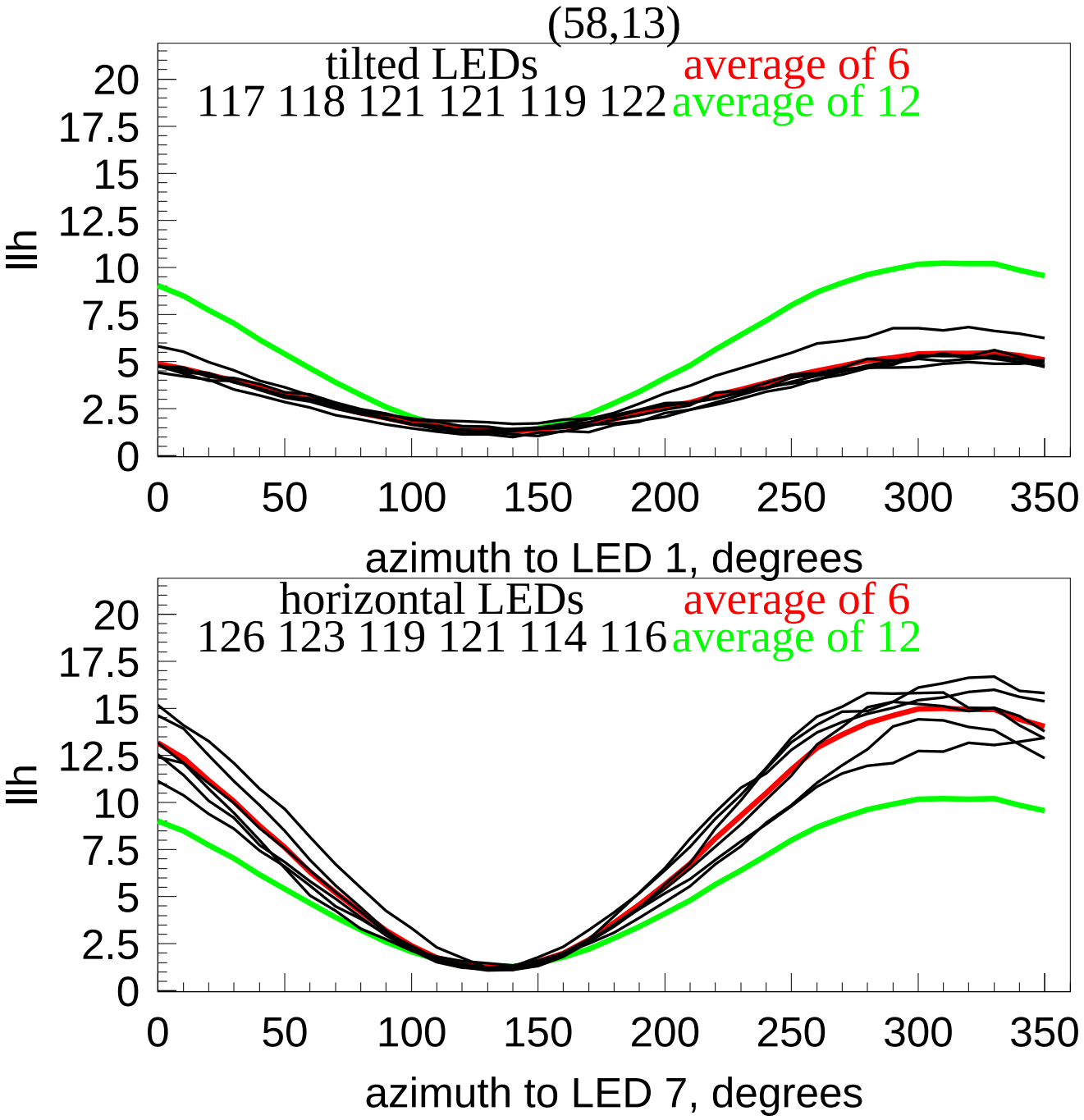

(58,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
310
3
9
1
2
7
8
320.4 ± 13.7

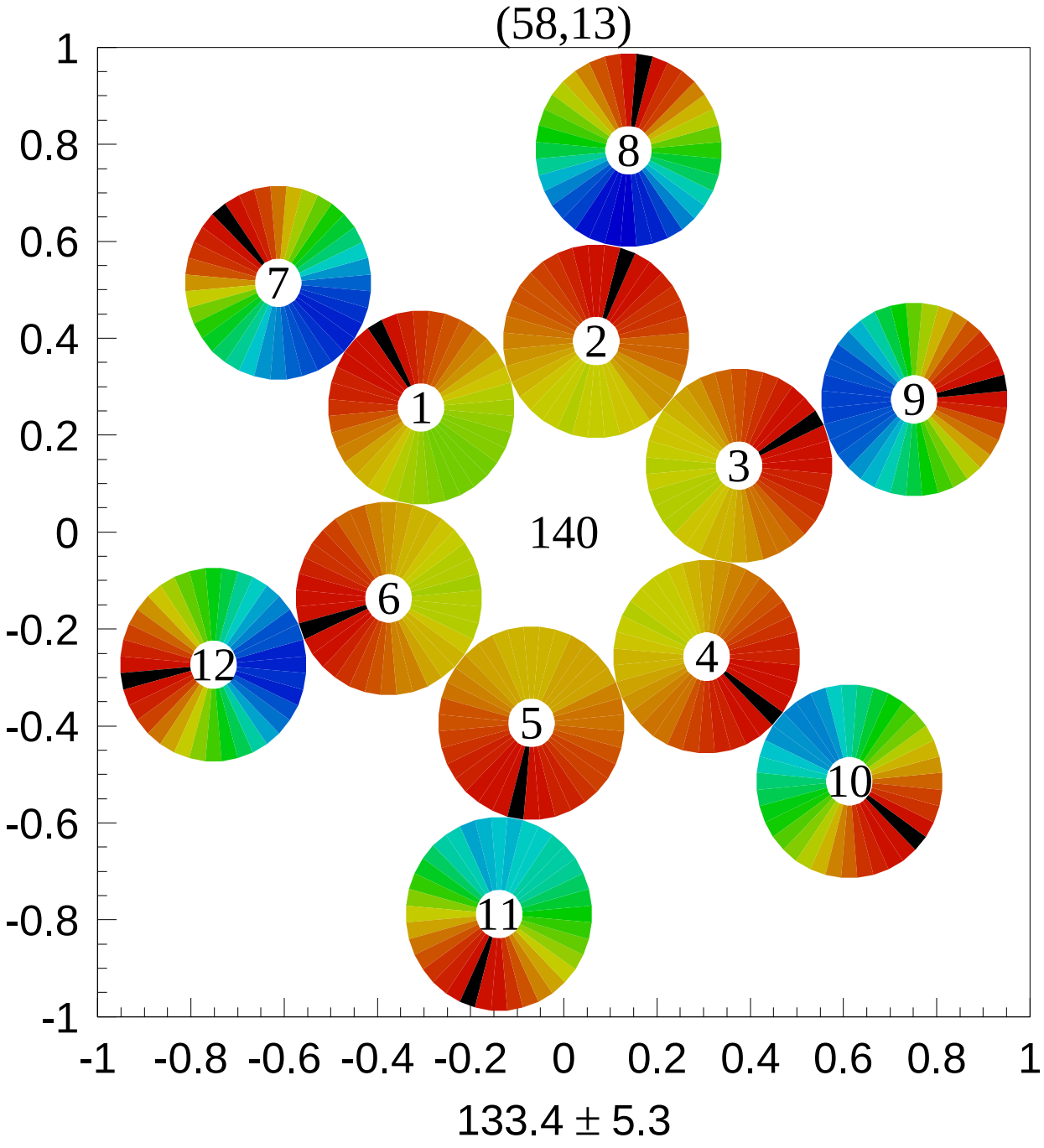

(58,11)
tilted LEDs
123 119 115 119 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 122 123 129 114 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

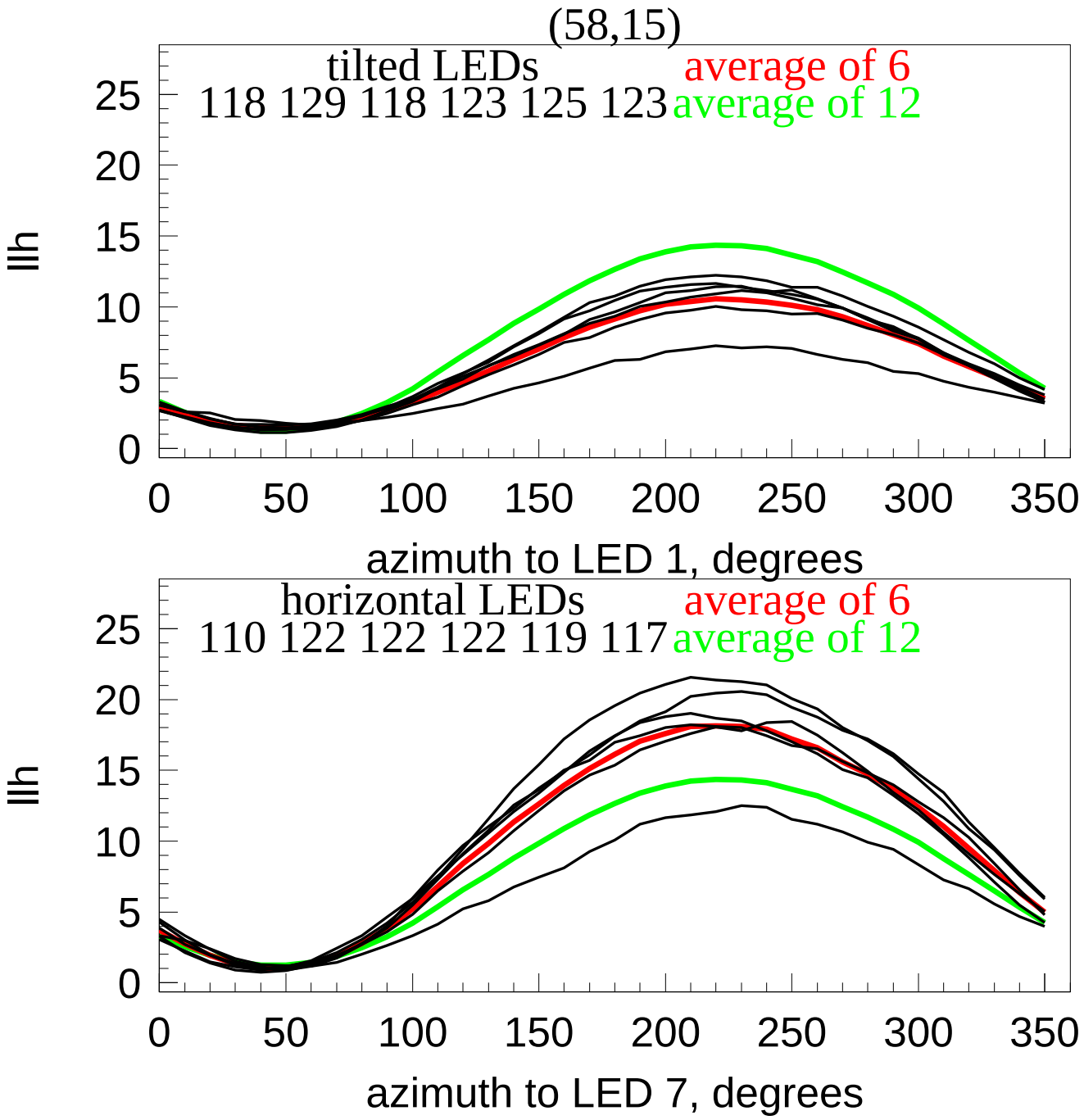

(58,11)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
213.6 ± 9.1

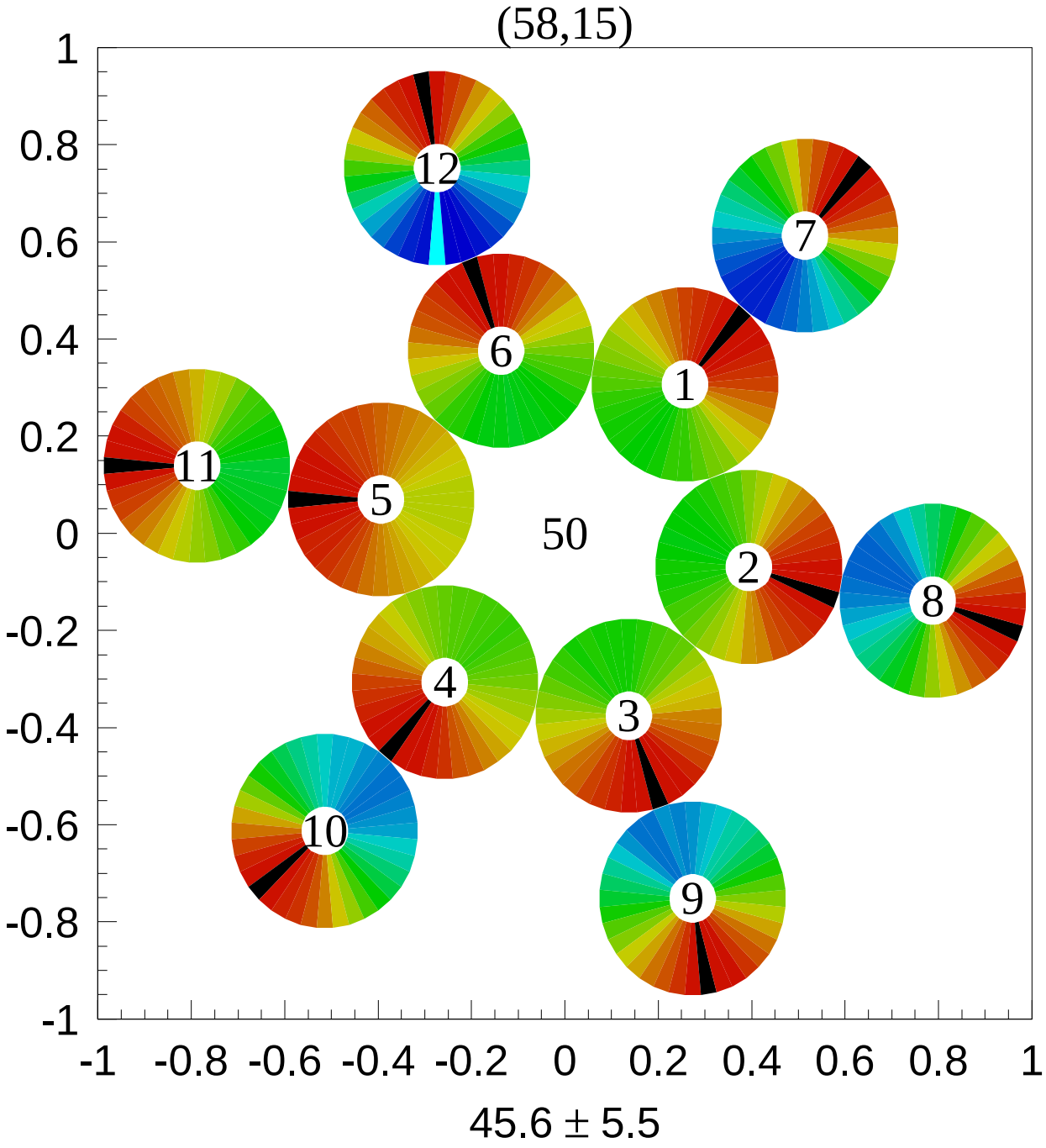

(58,12)
tilted LEDs
121 124 126 125 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 117 119 115 121 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

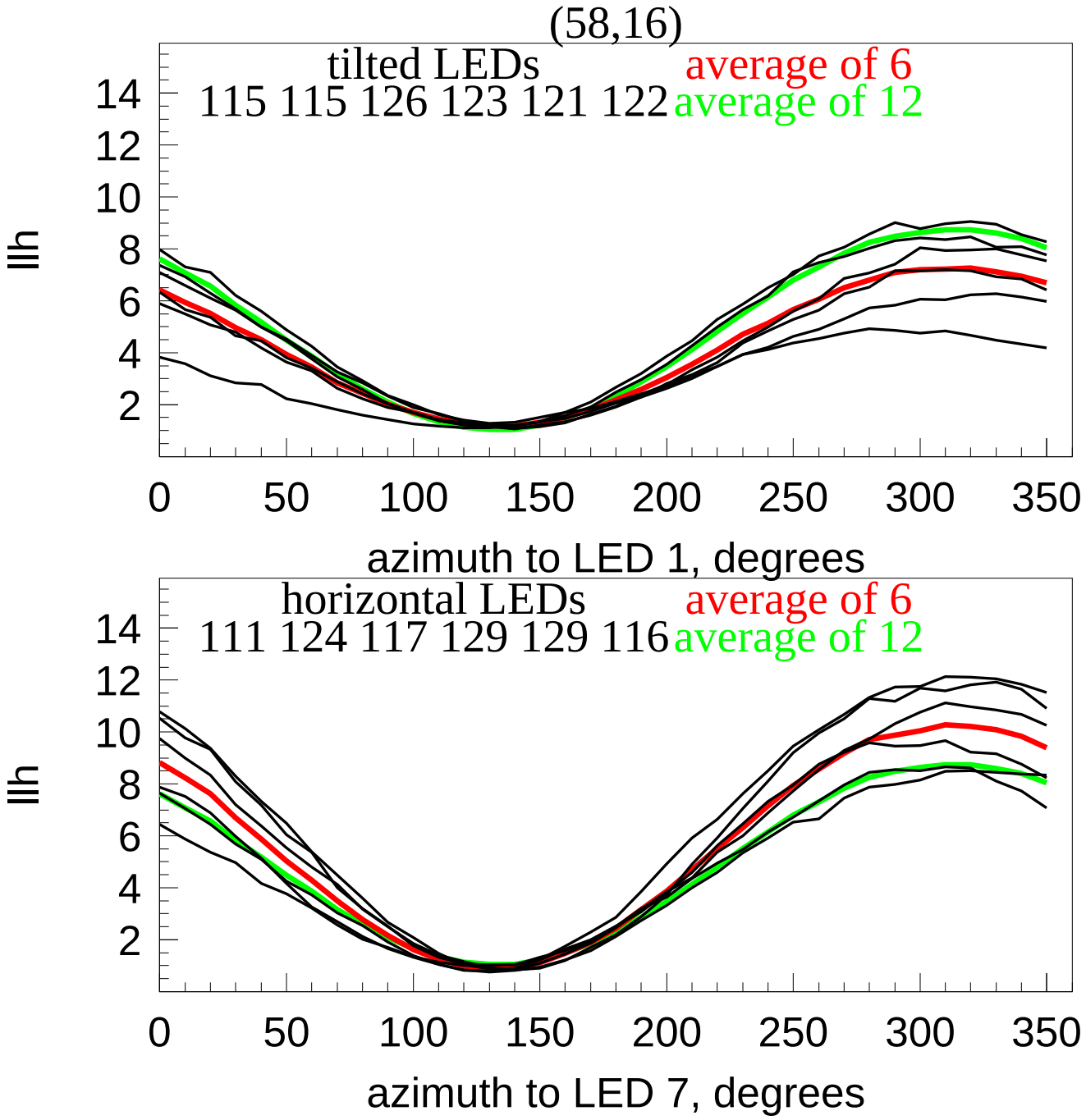

(58,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
51.9 ± 6.3

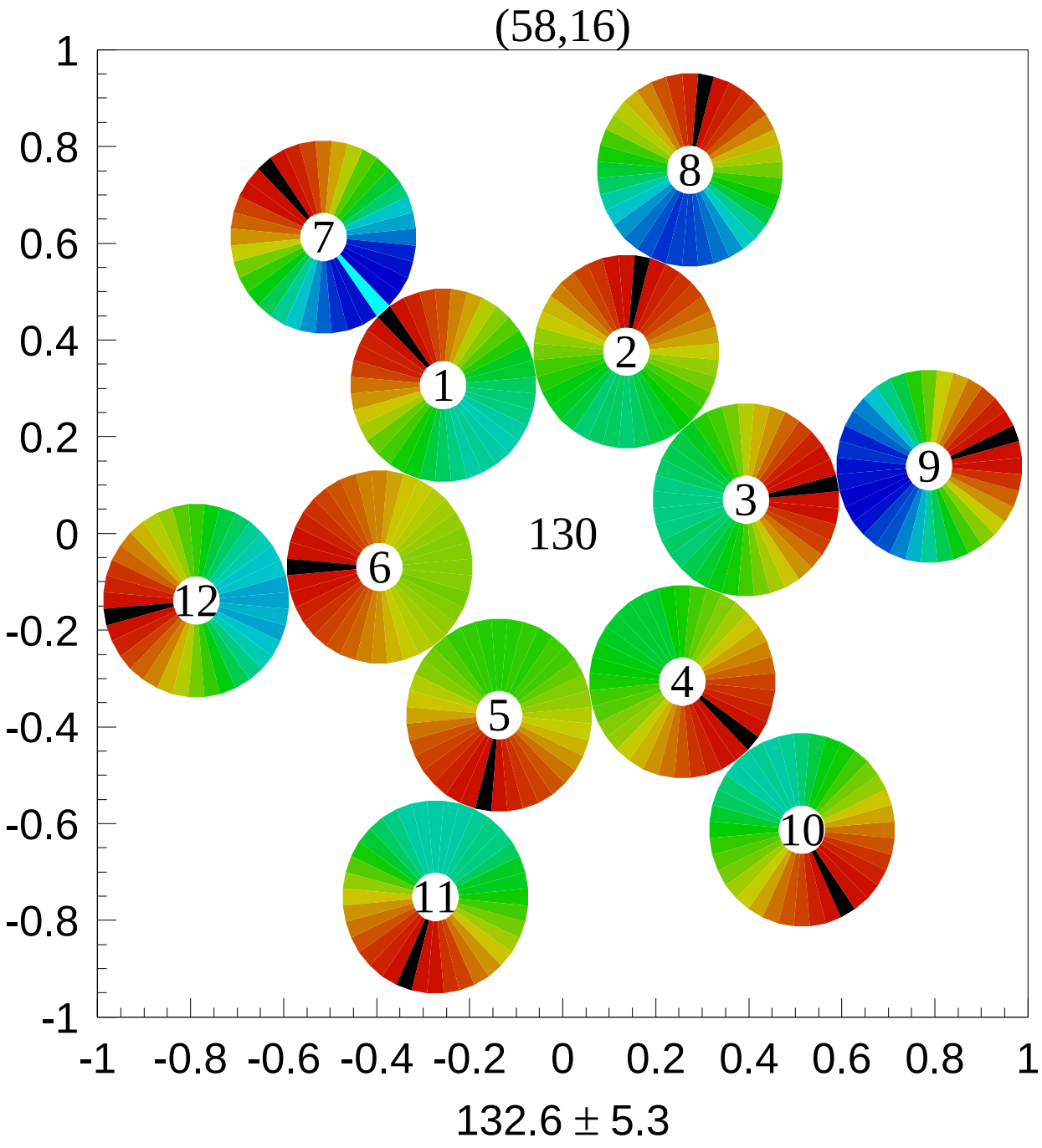

(58,13)
tilted LEDs
117 118 121 121 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 123 119 121 114 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

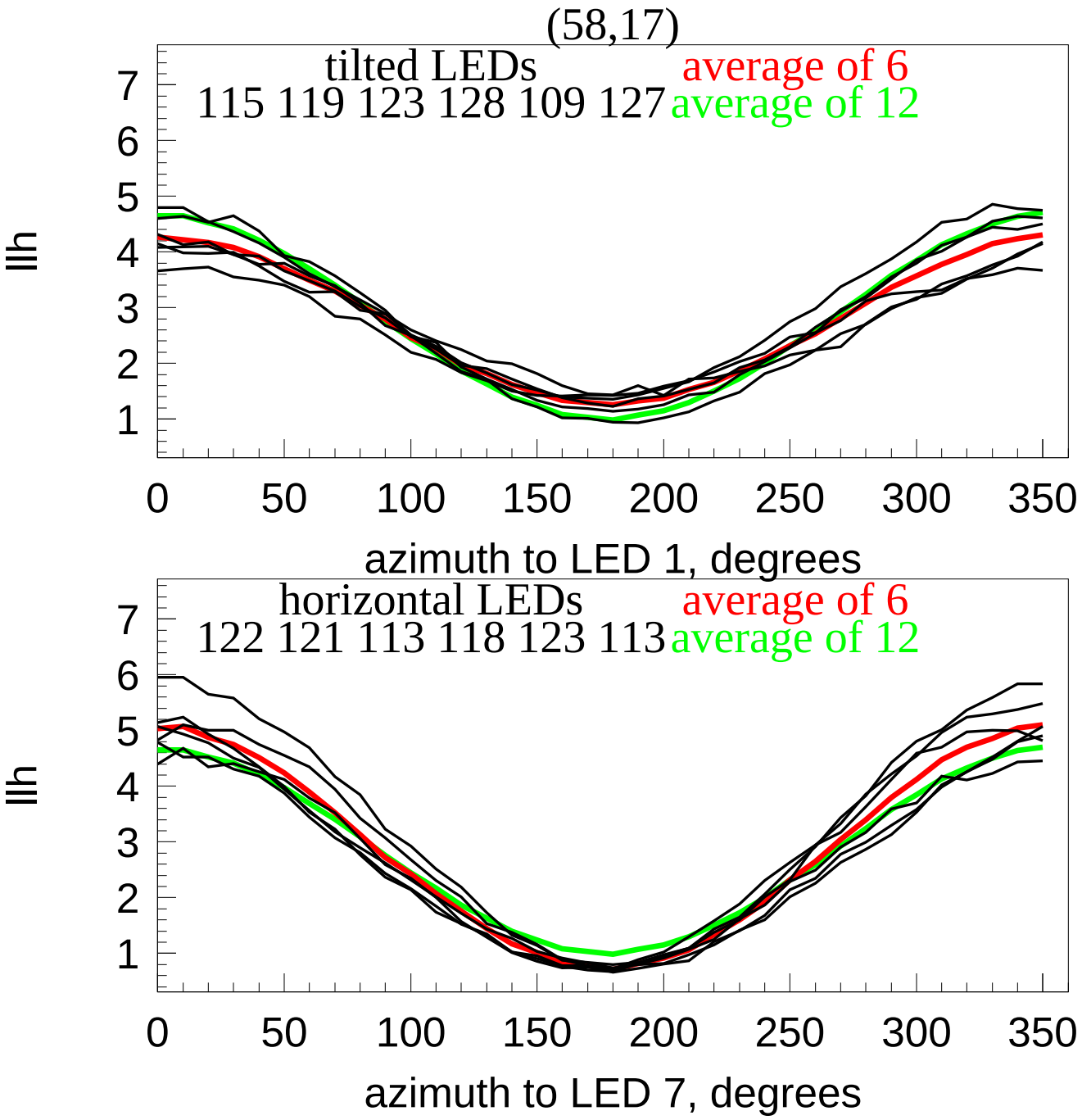

(58,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
133.4 ± 5.3
140
1
2
3
4
5
6
7
8
9
10
11
12

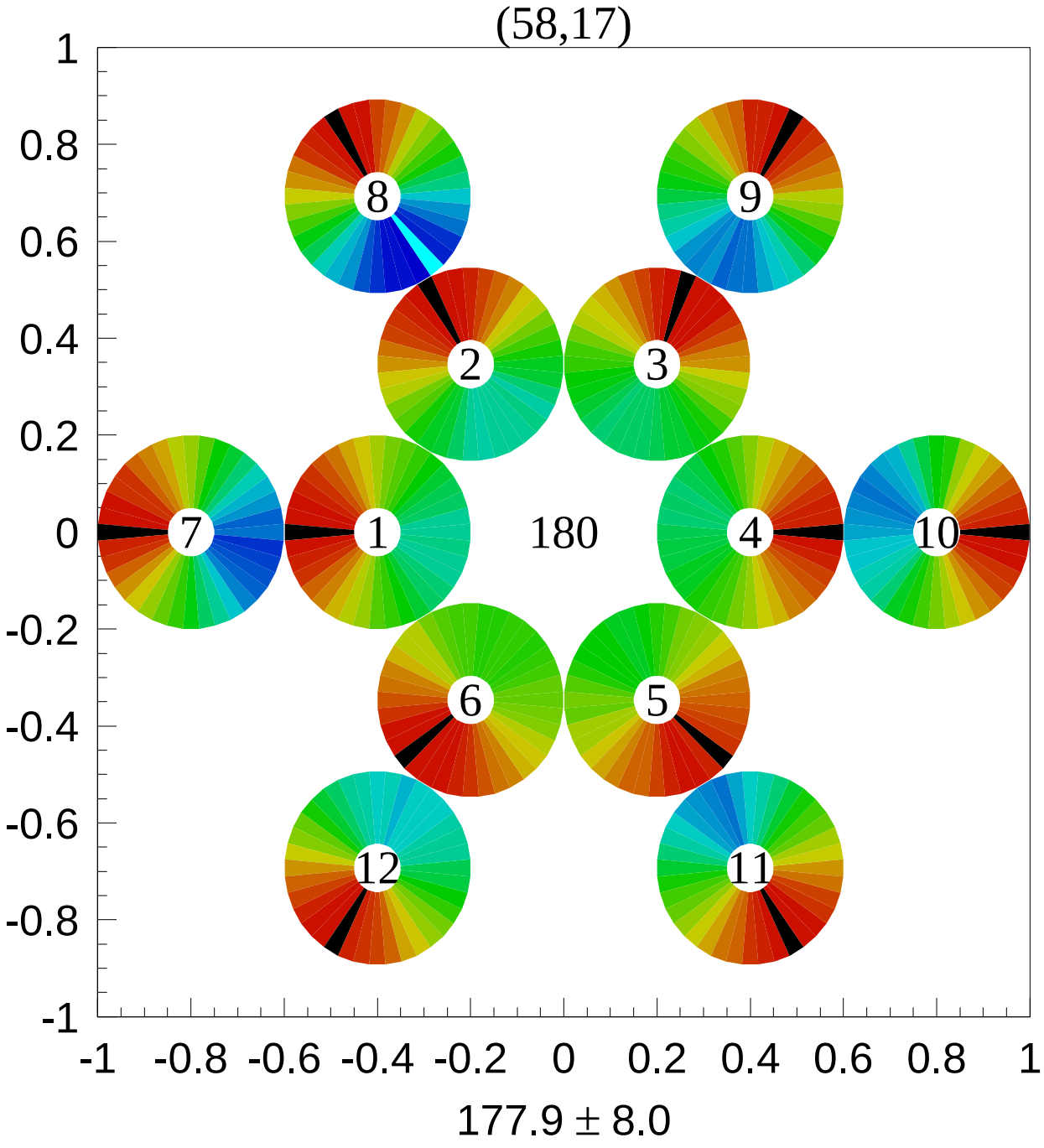

(58,15)
tilted LEDs
118 129 118 123 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
110 122 122 122 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

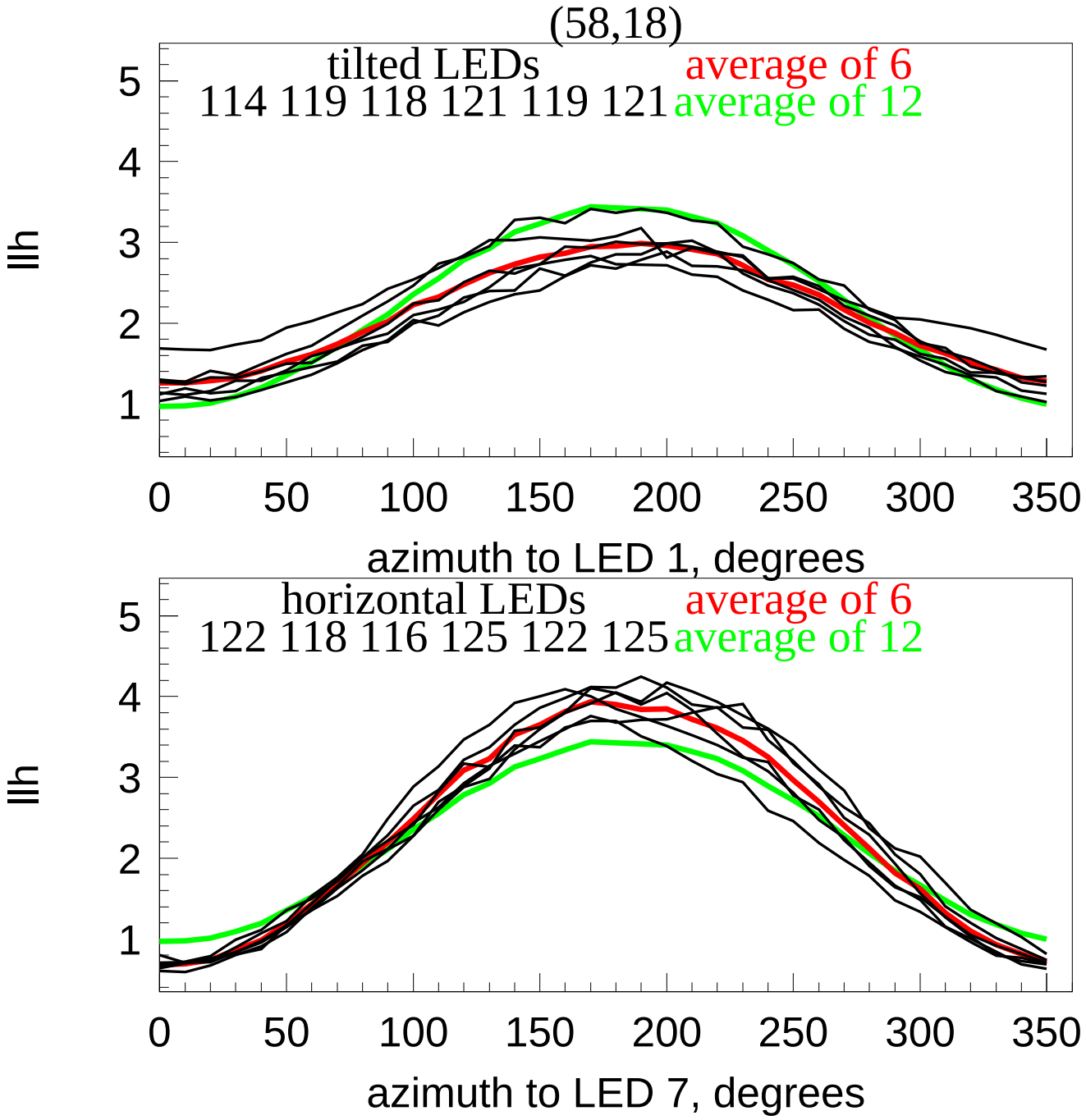

(58,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
45.6 ± 5.5

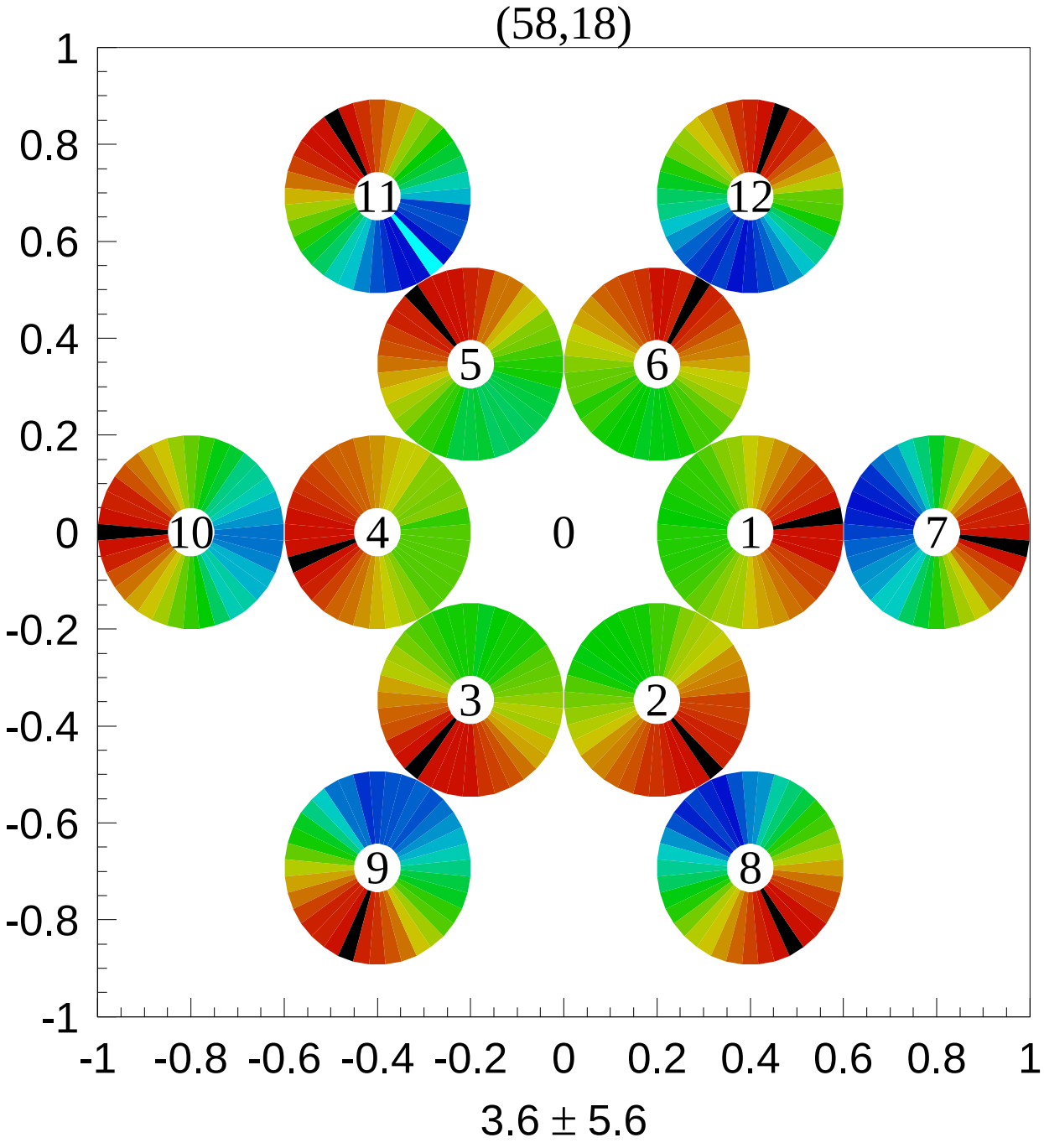

(58,16)
tilted LEDs
115 115 126 123 121 122
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
111 124 117 129 129 116
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

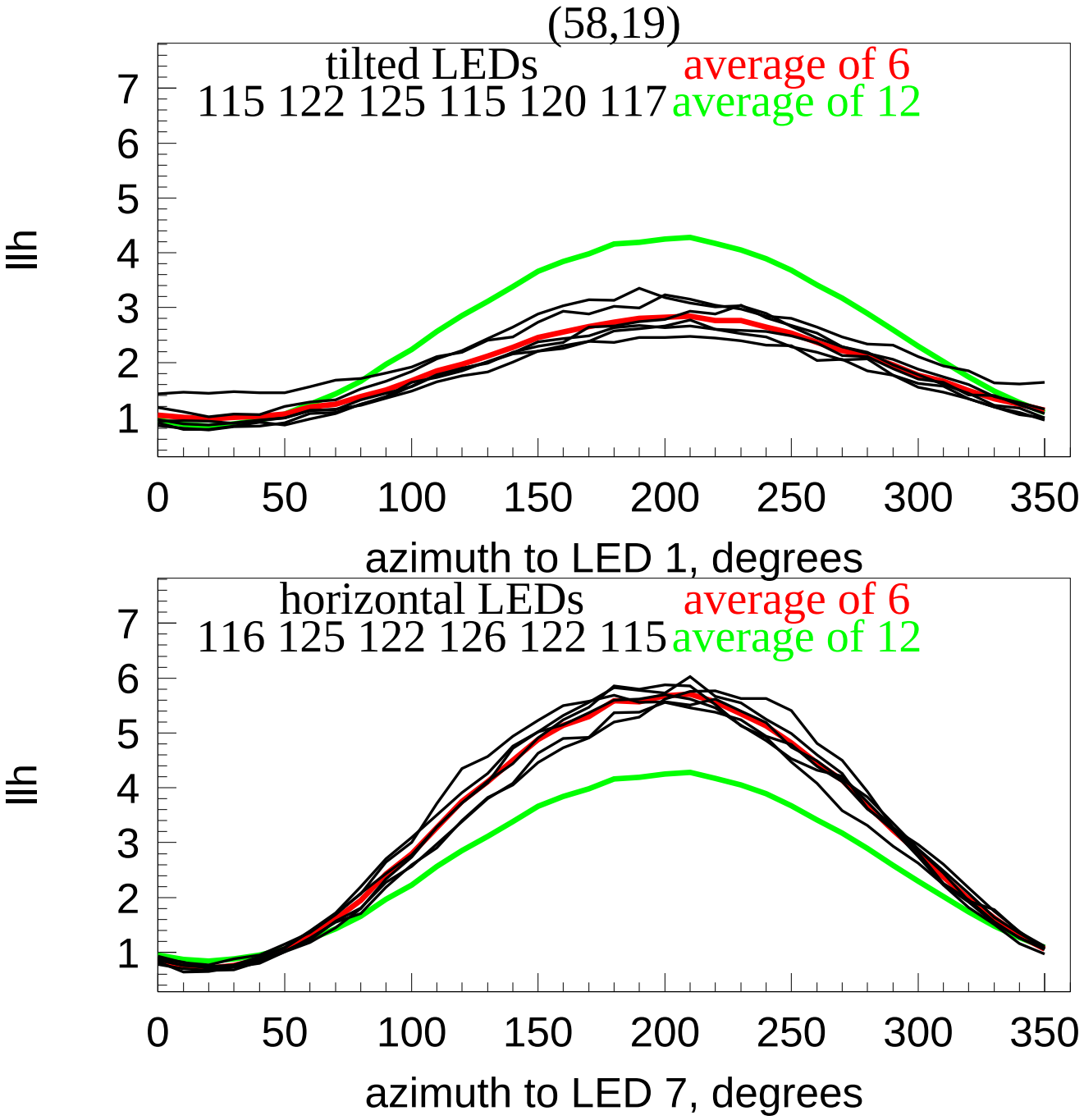

(58,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
132.6 ± 5.3

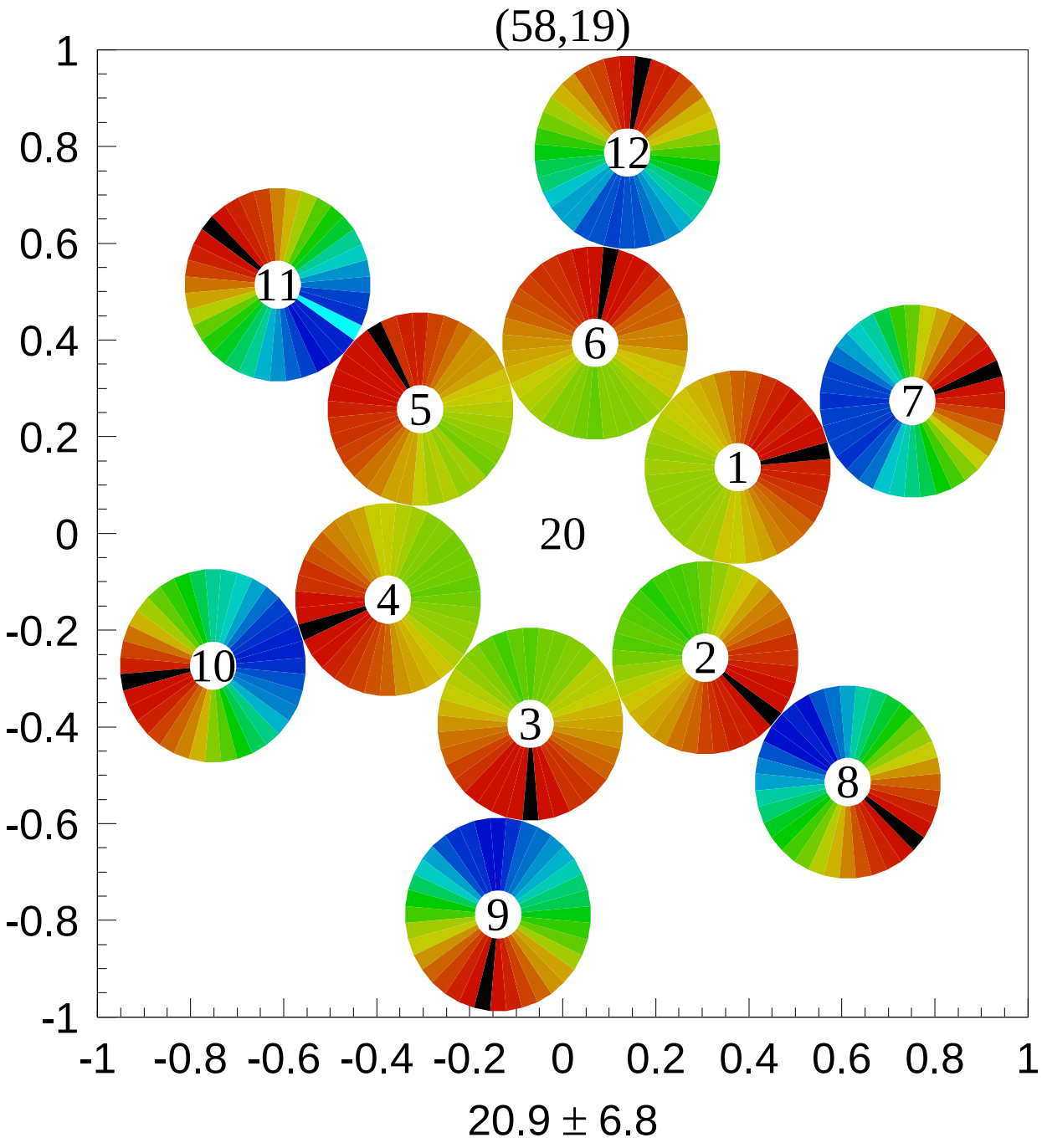

(58,17)
tilted LEDs
115 119 123 128 109 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 113 118 123 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

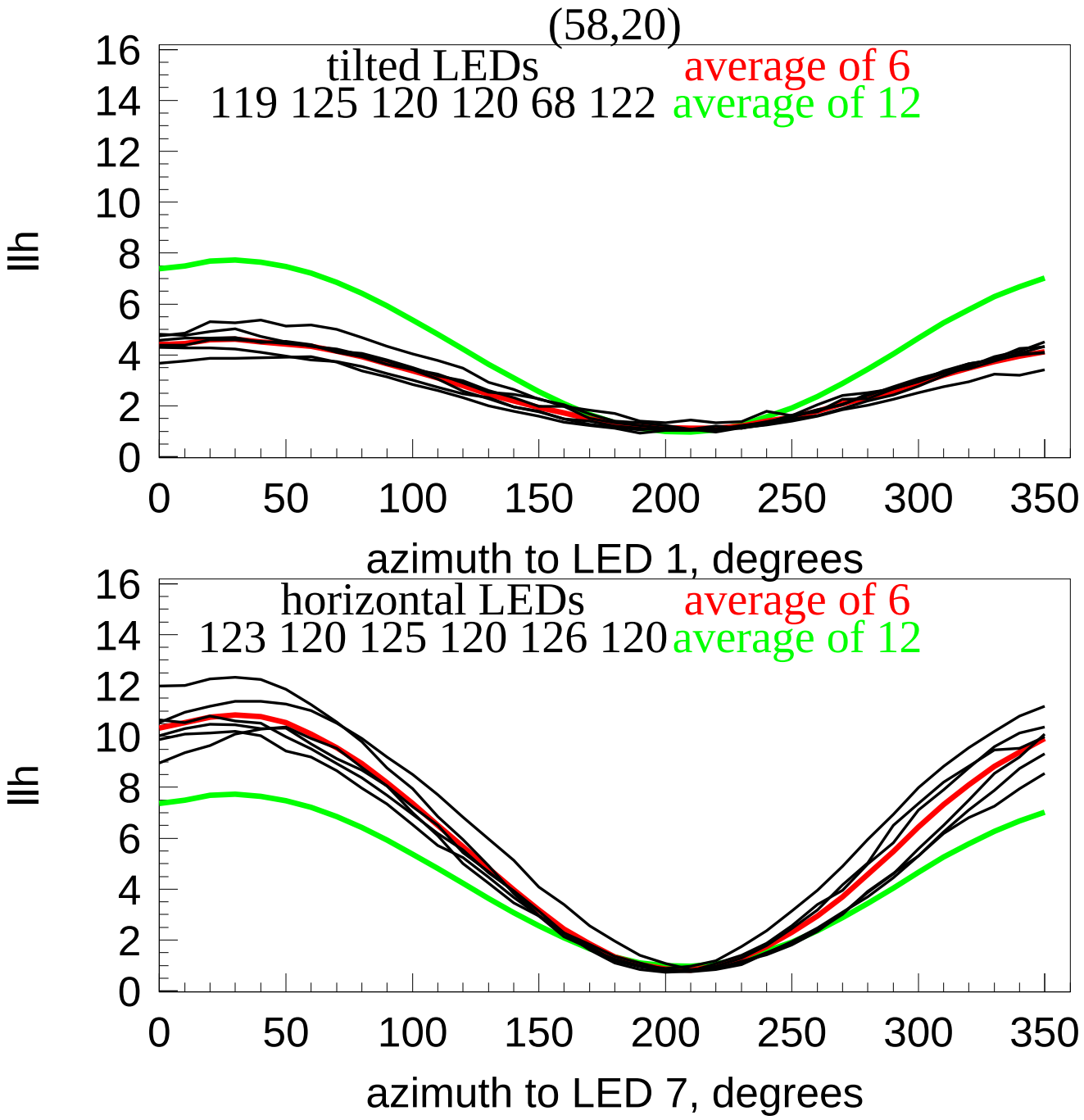

(58,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
177.9 ± 8.0
8
9
2
3
7
1
180
4
10
6
5
12
11

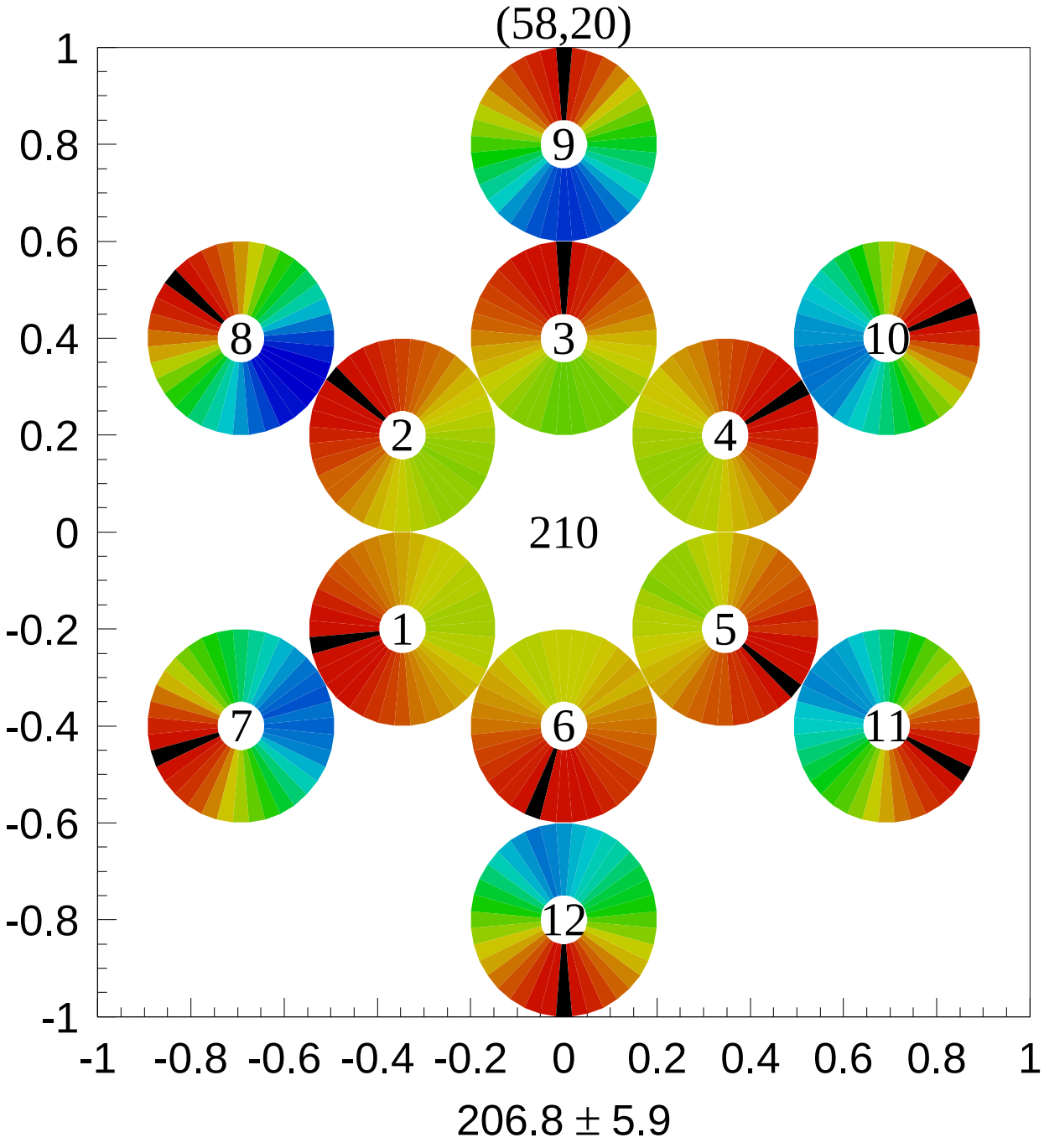

(58,18)
tilted LEDs
114 119 118 121 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 118 116 125 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

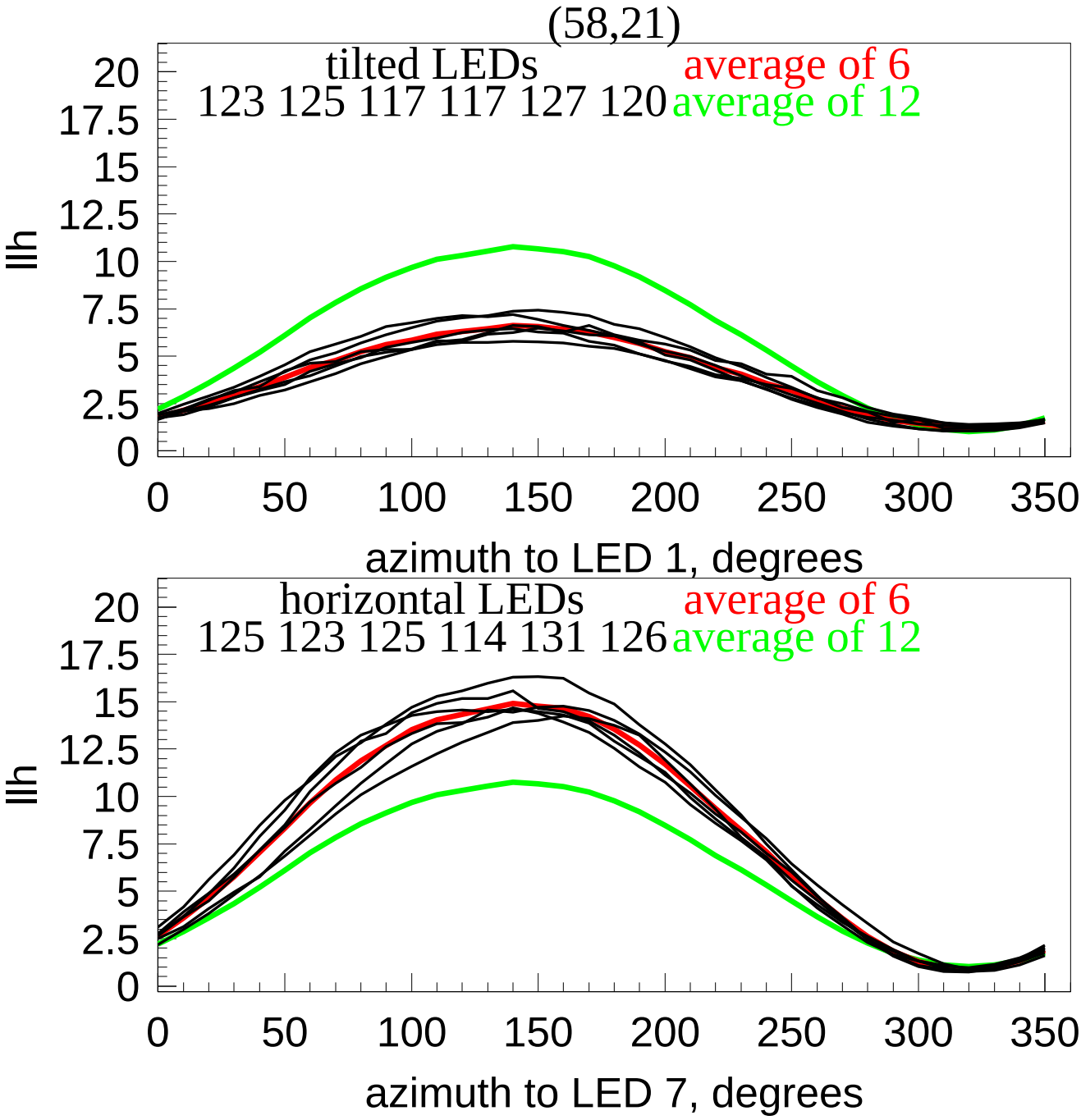

(58,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
3.6 ± 5.6
11
12
5
6
10
4
0
1
7
3
2
9
8

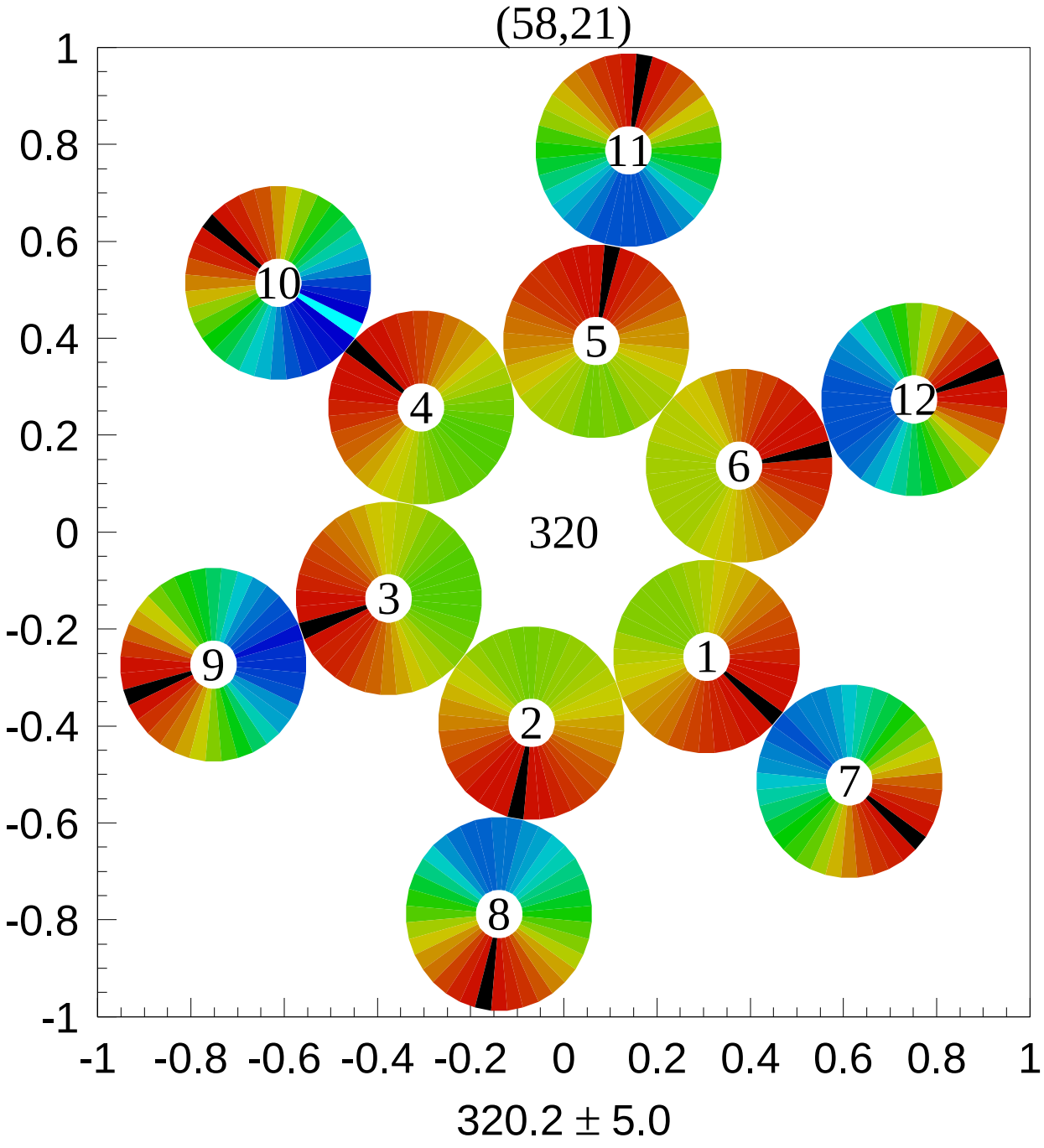

(58,19)
tilted LEDs
115 122 125 115 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 125 122 126 122 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

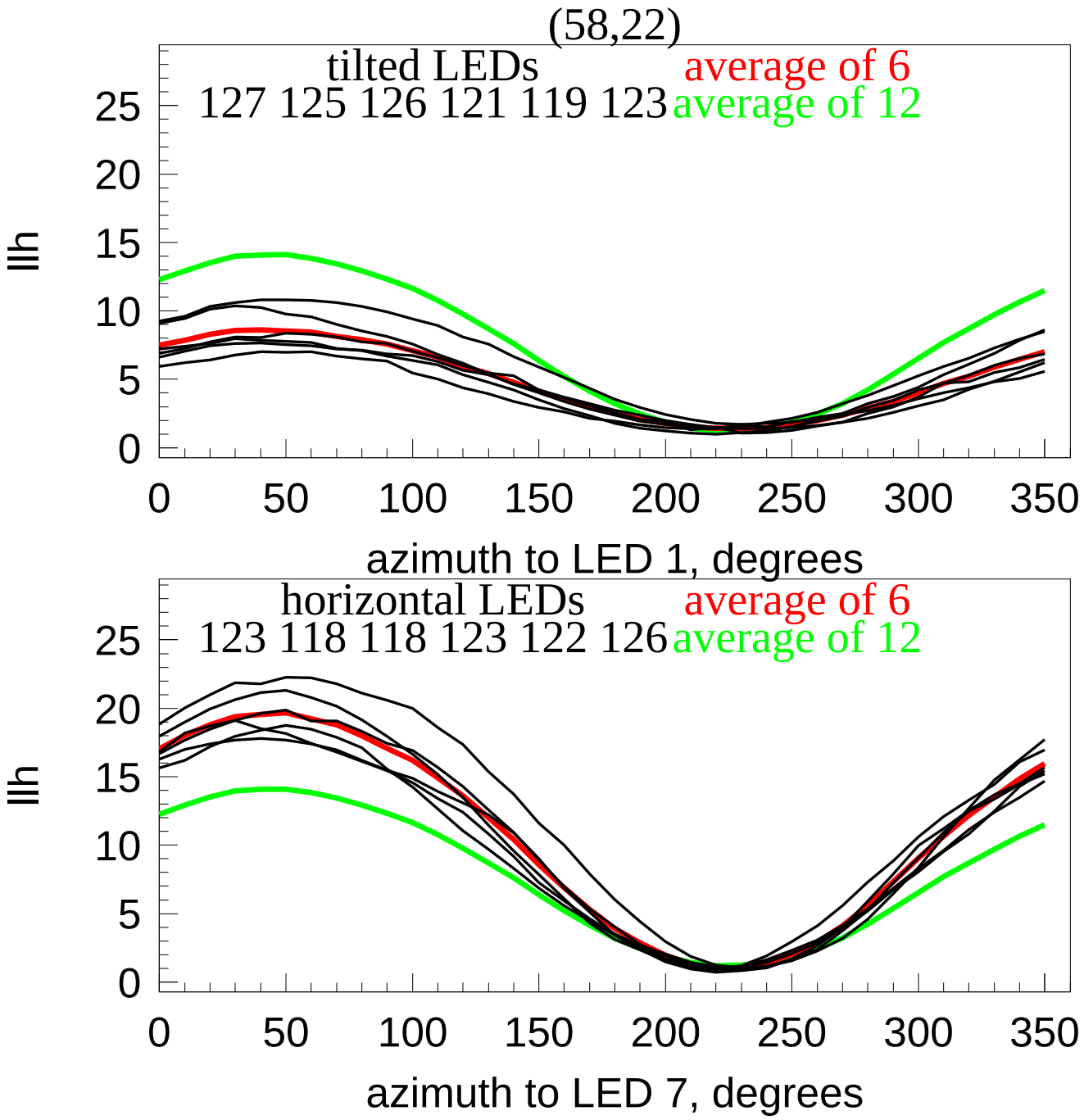

(58,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
20.9 ± 6.8
12
11
6
5
7
1
20
4
10
2
3
8
9

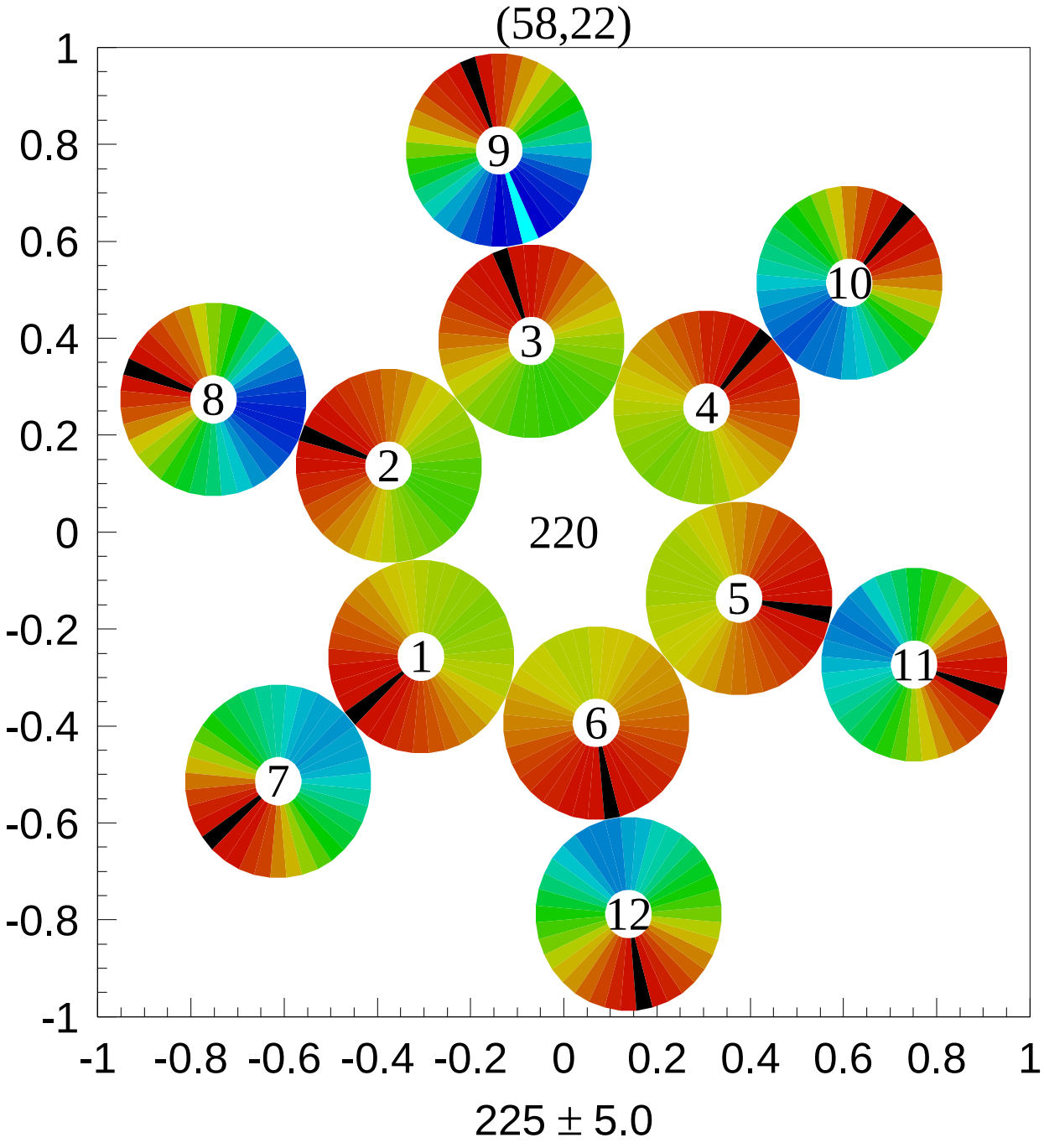

(58,20)
tilted LEDs
119 125 120 120 68 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 120 125 120 126 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

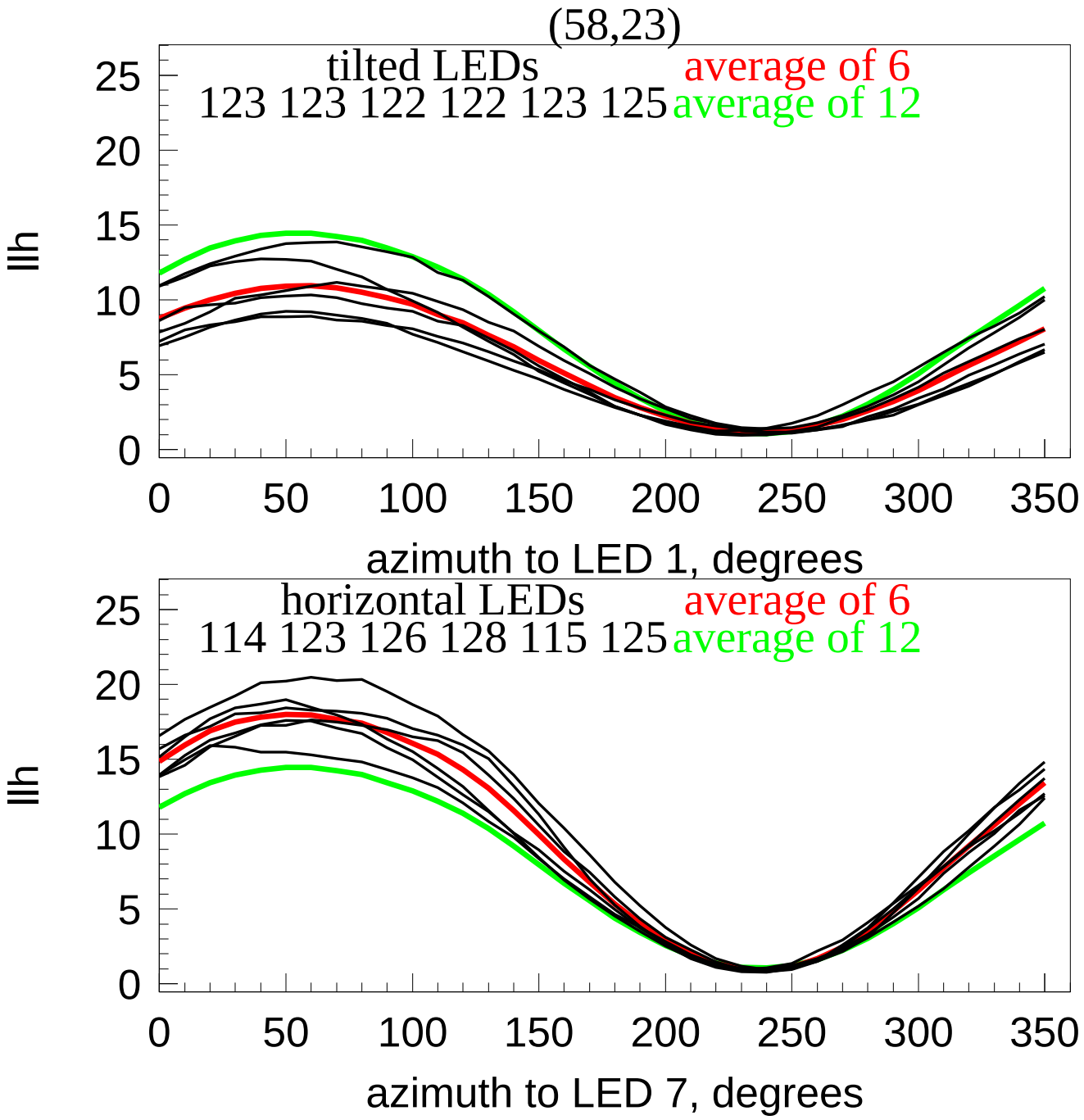

(58,20)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
206.8 ± 5.9

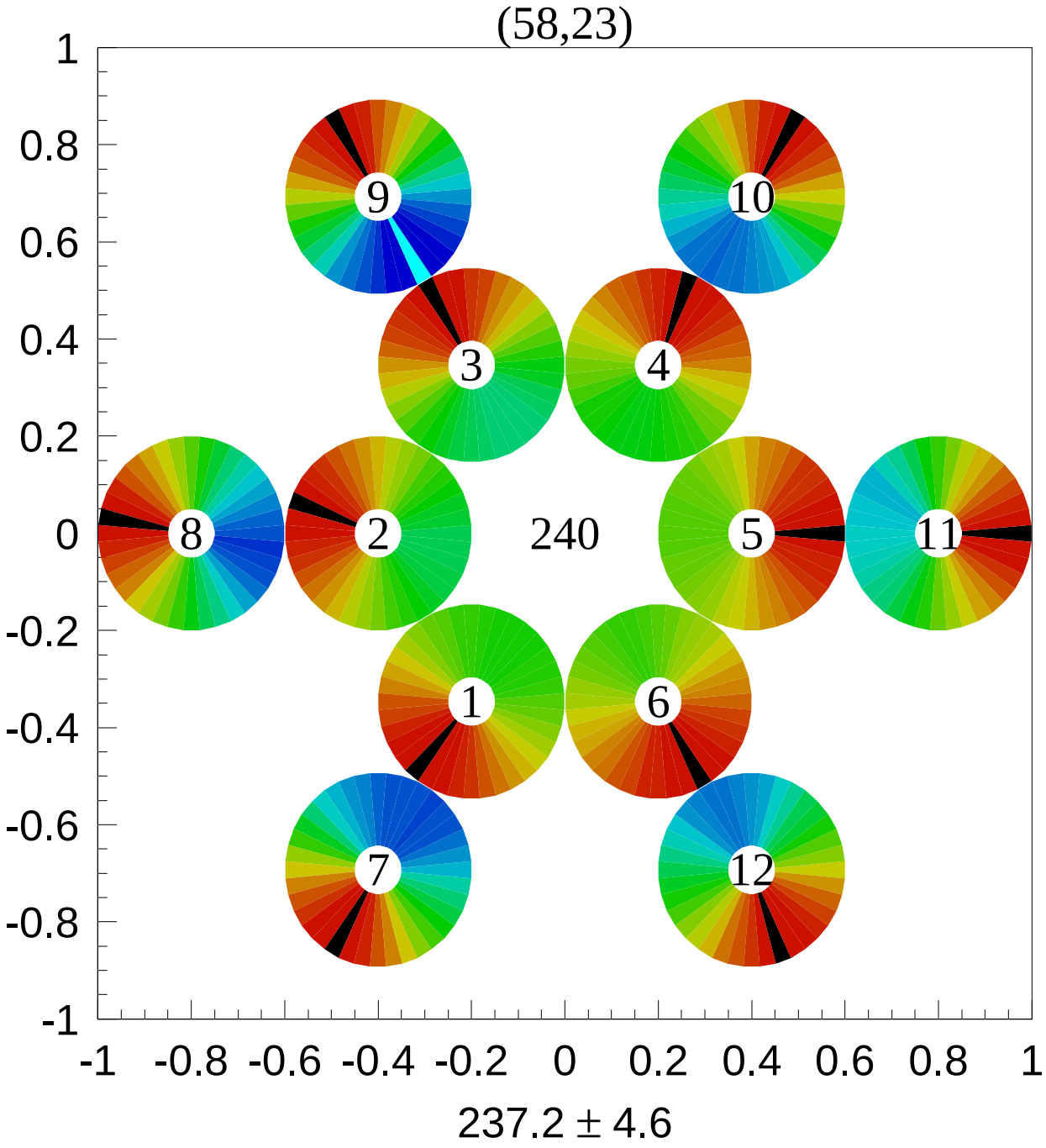

(58,21)
tilted LEDs
123 125 117 117 127 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 123 125 114 131 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

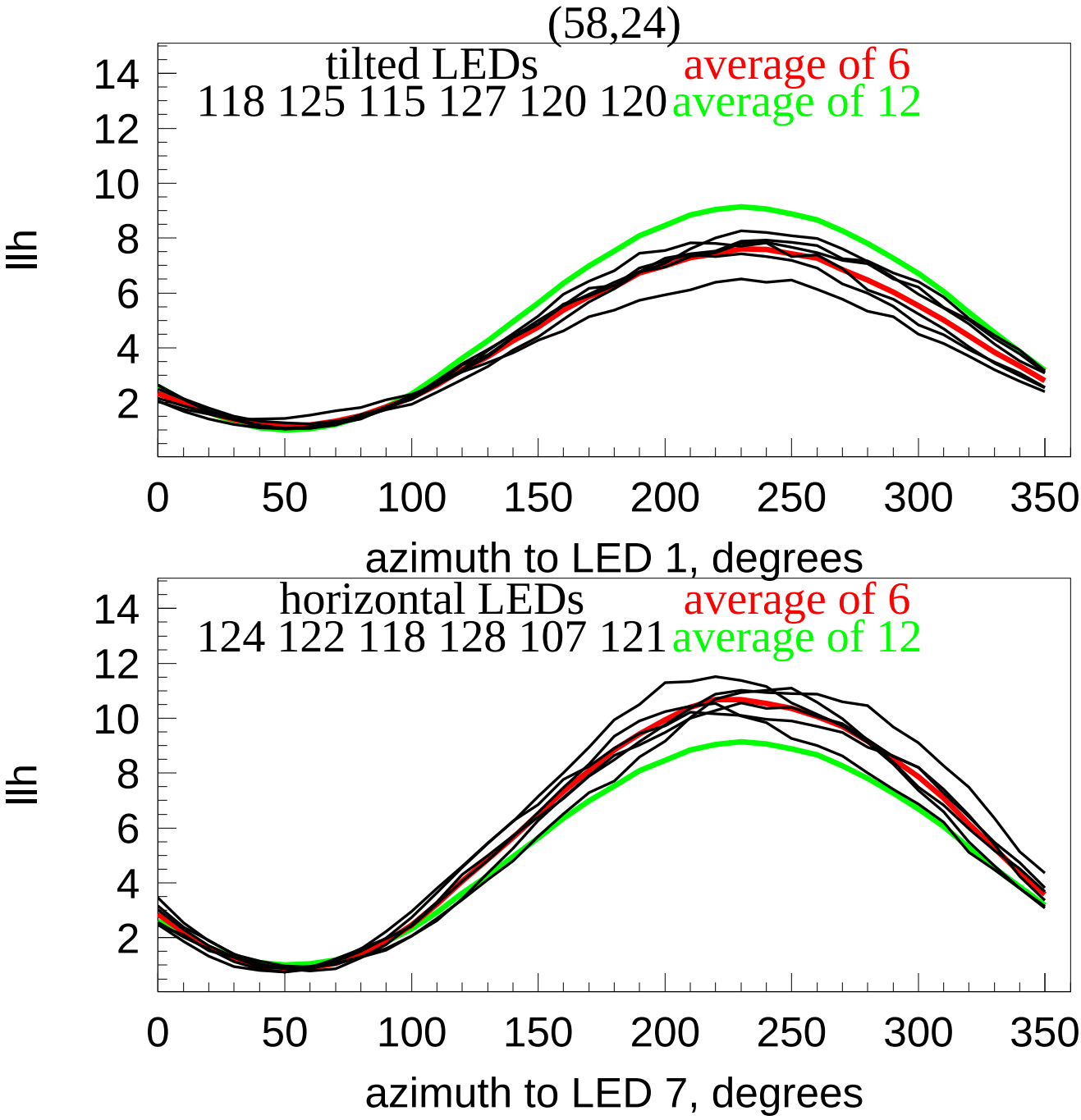

(58,21)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
320.2 ± 5.0

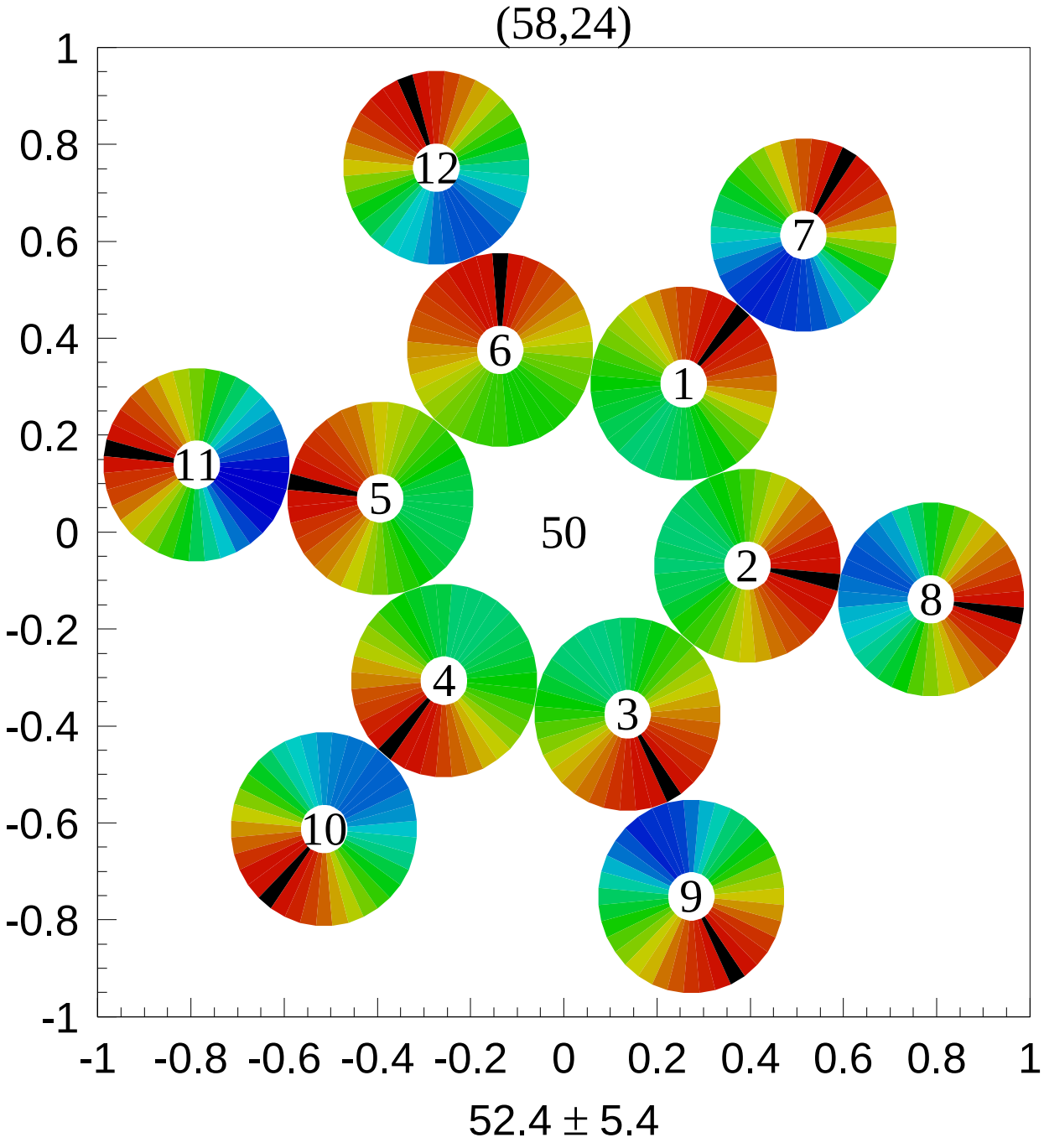

(58,22)
tilted LEDs
127 125 126 121 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 118 123 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

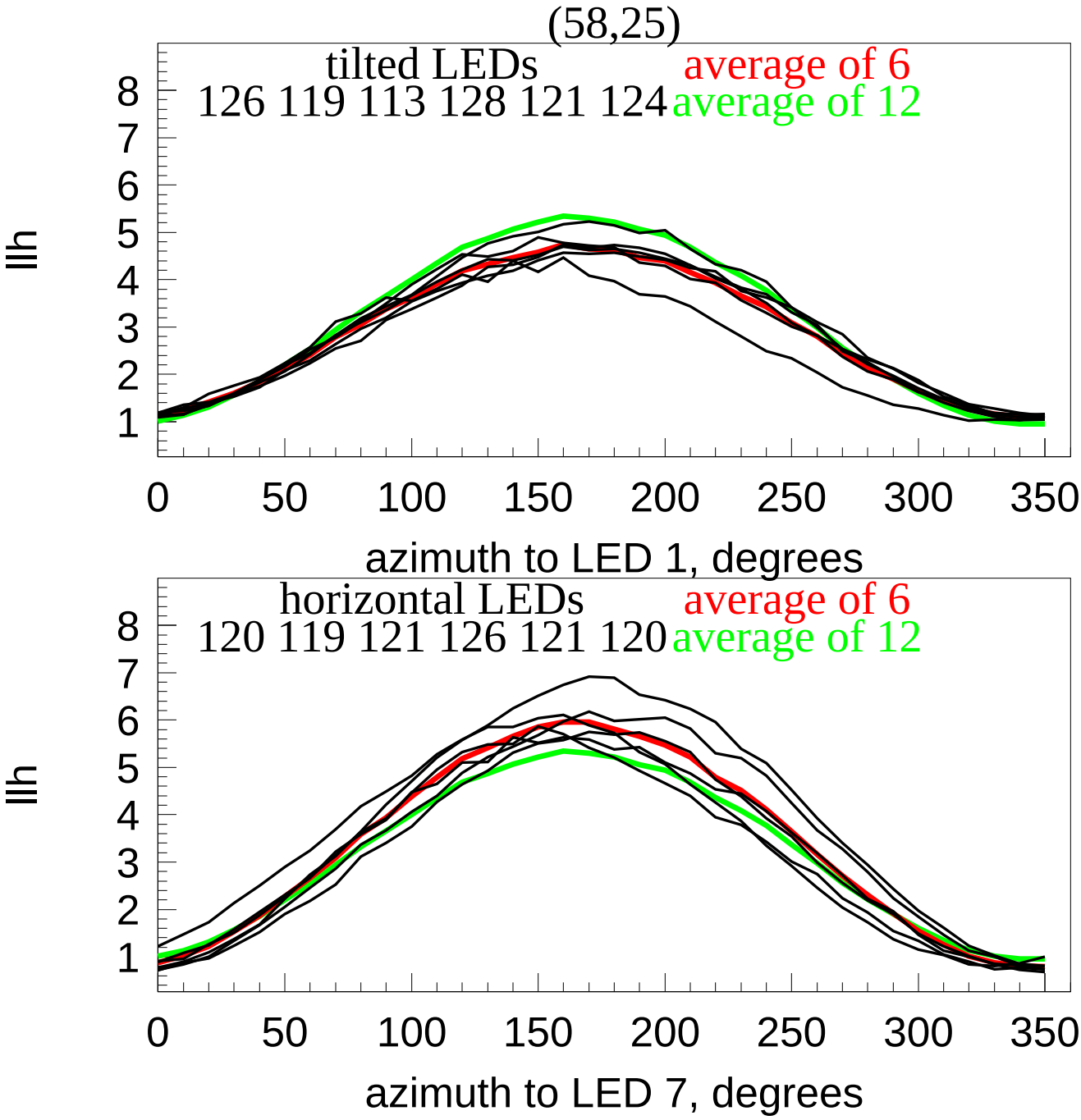

(58,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
225 ± 5.0
220
1
2
3
4
5
6
7
8
9
10
11
12

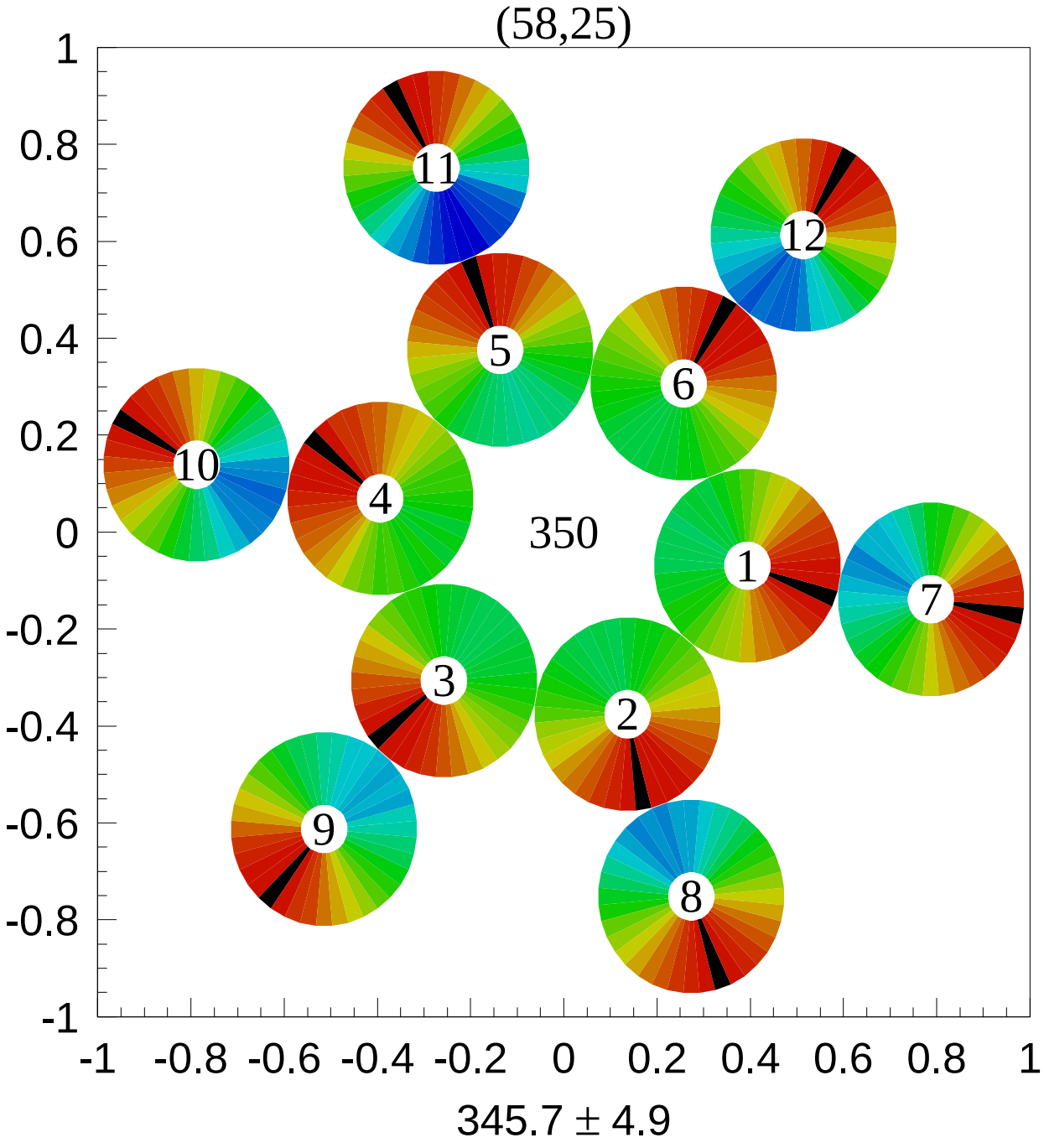

(58,23)
tilted LEDs
123 123 122 122 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 123 126 128 115 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

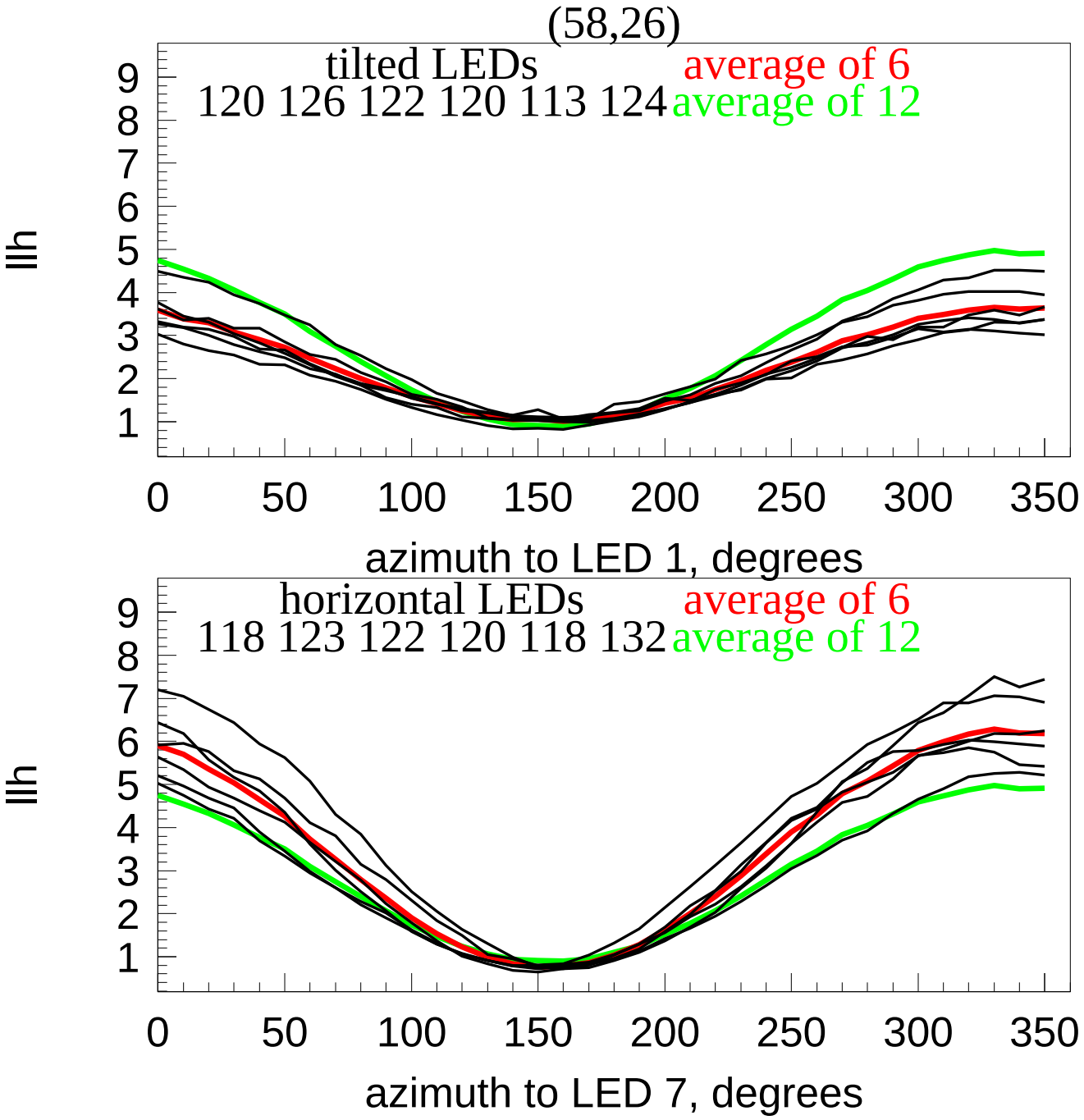

(58,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
237.2 ± 4.6

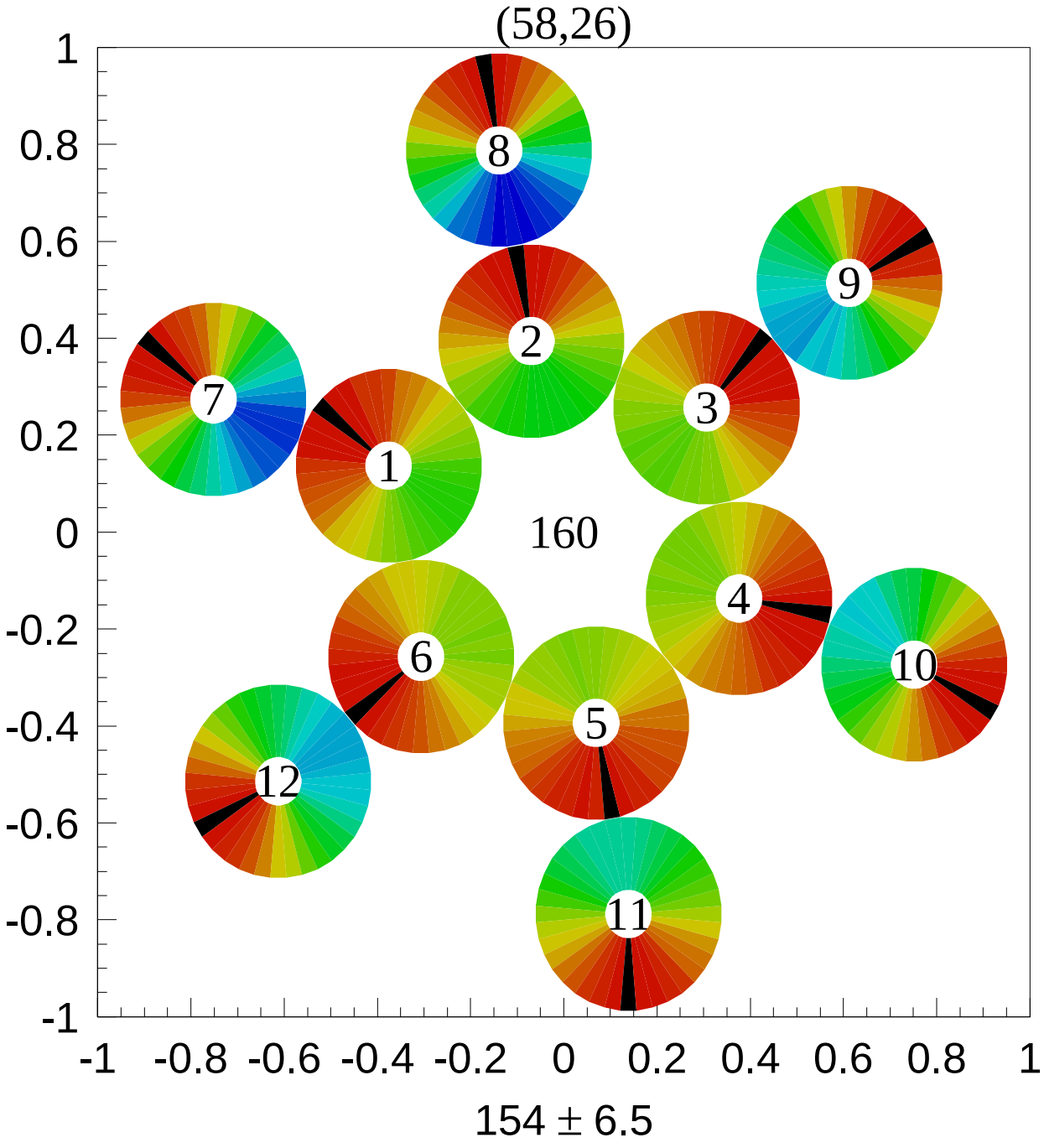

(58,24)
tilted LEDs
118 125 115 127 120 120
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 122 118 128 107 121
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

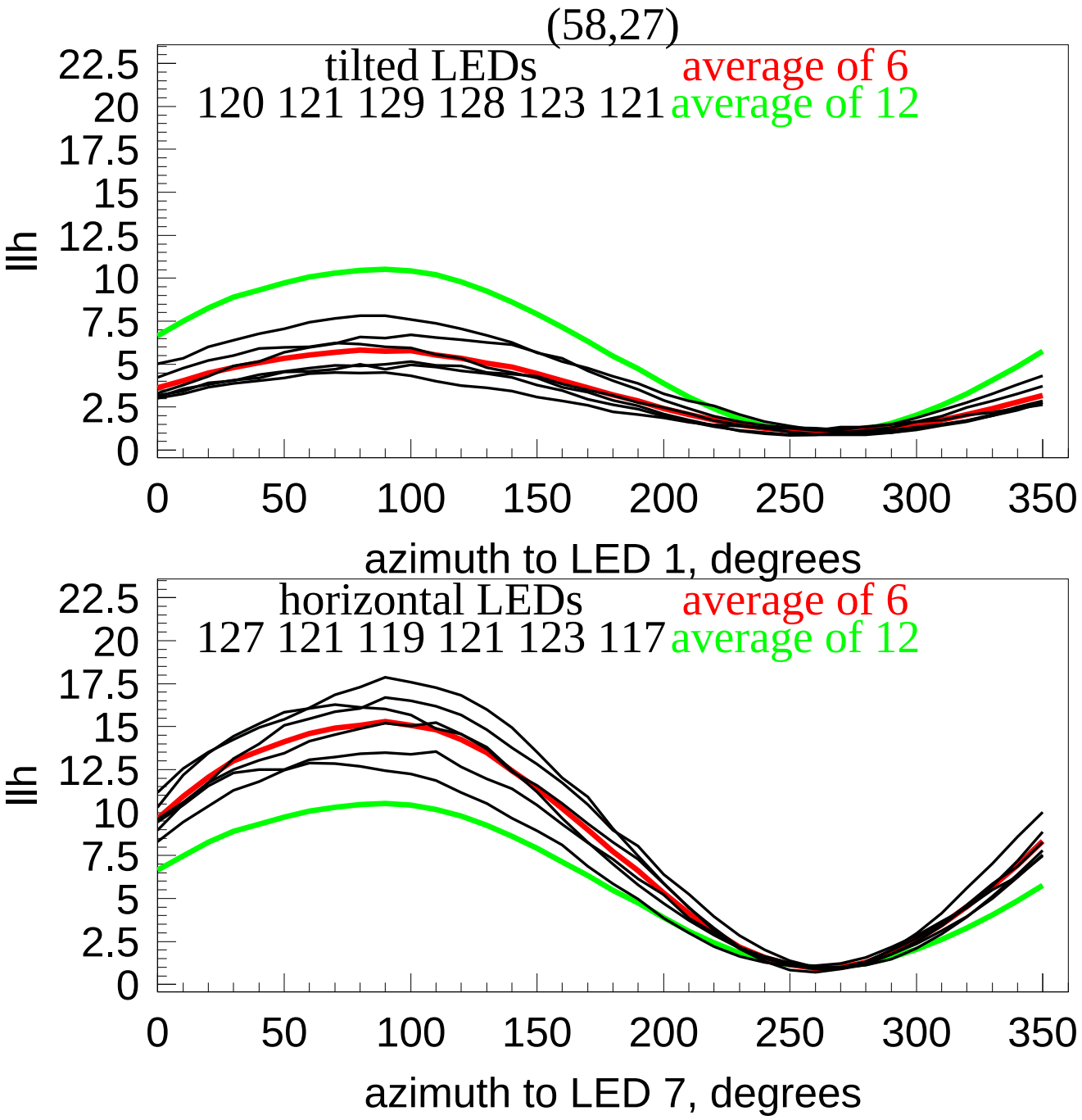

(58,24)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
52.4 ± 5.4

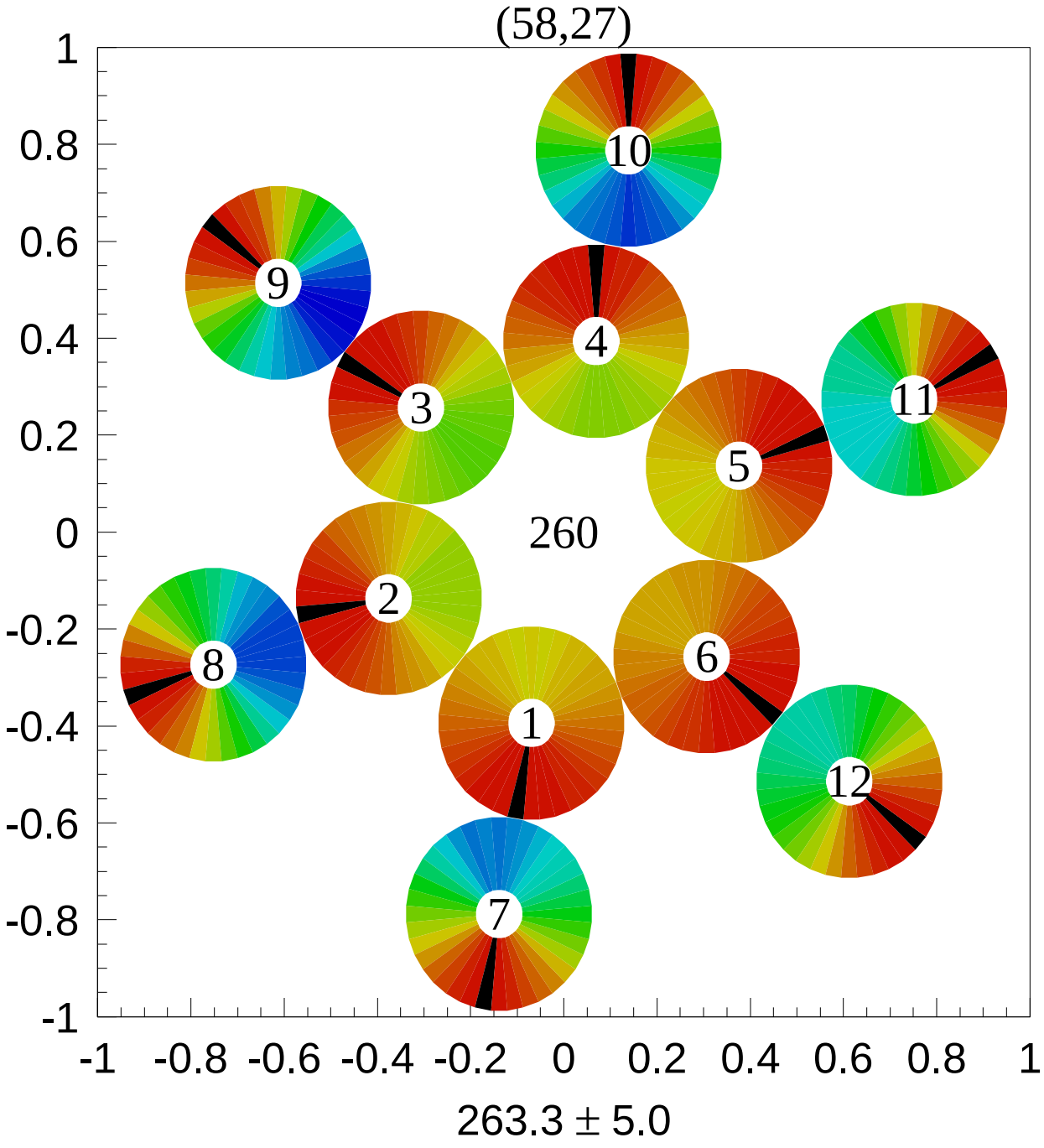

(58,25)
tilted LEDs
126 119 113 128 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 119 121 126 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

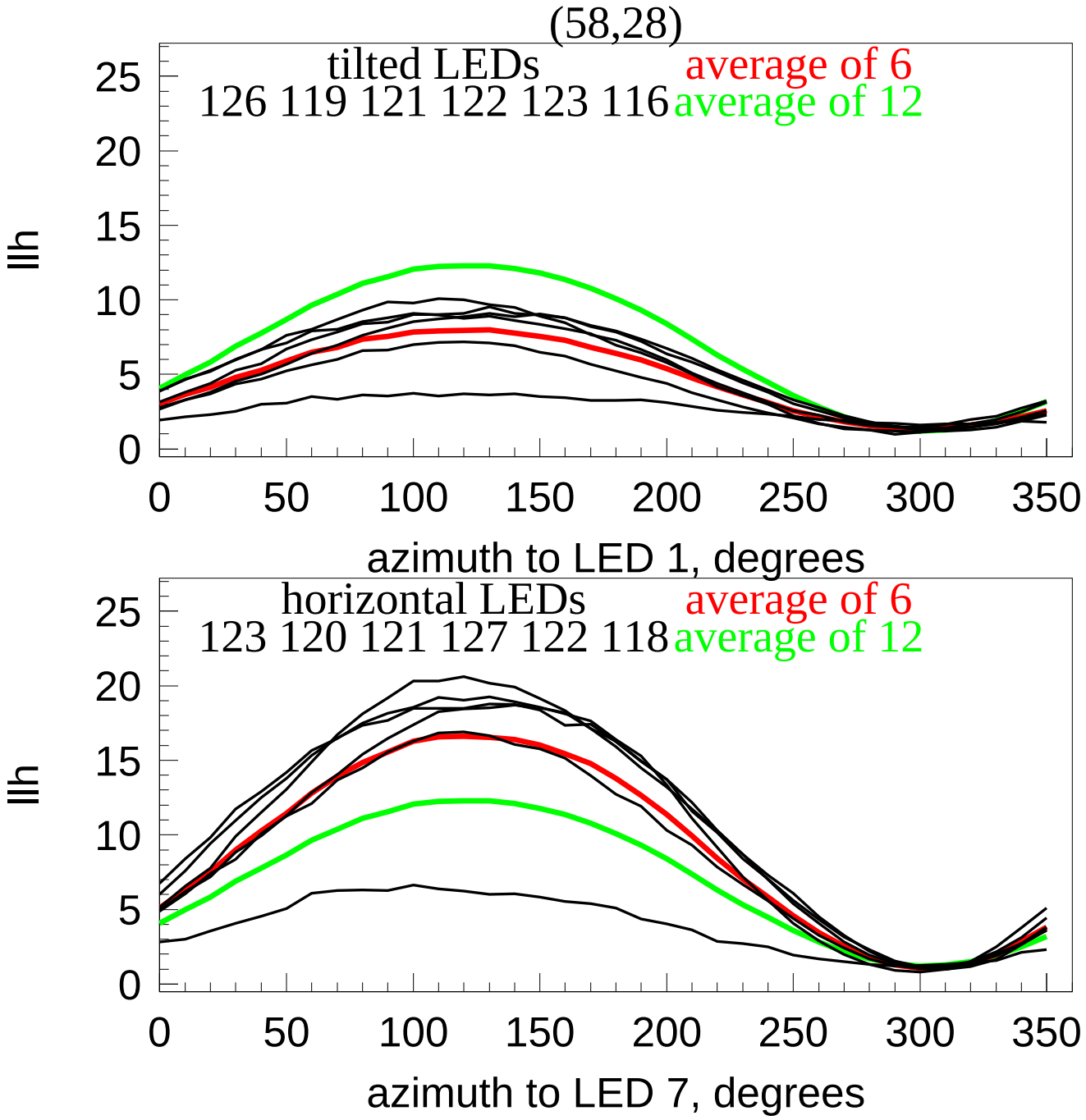

(58,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
345.7 ± 4.9

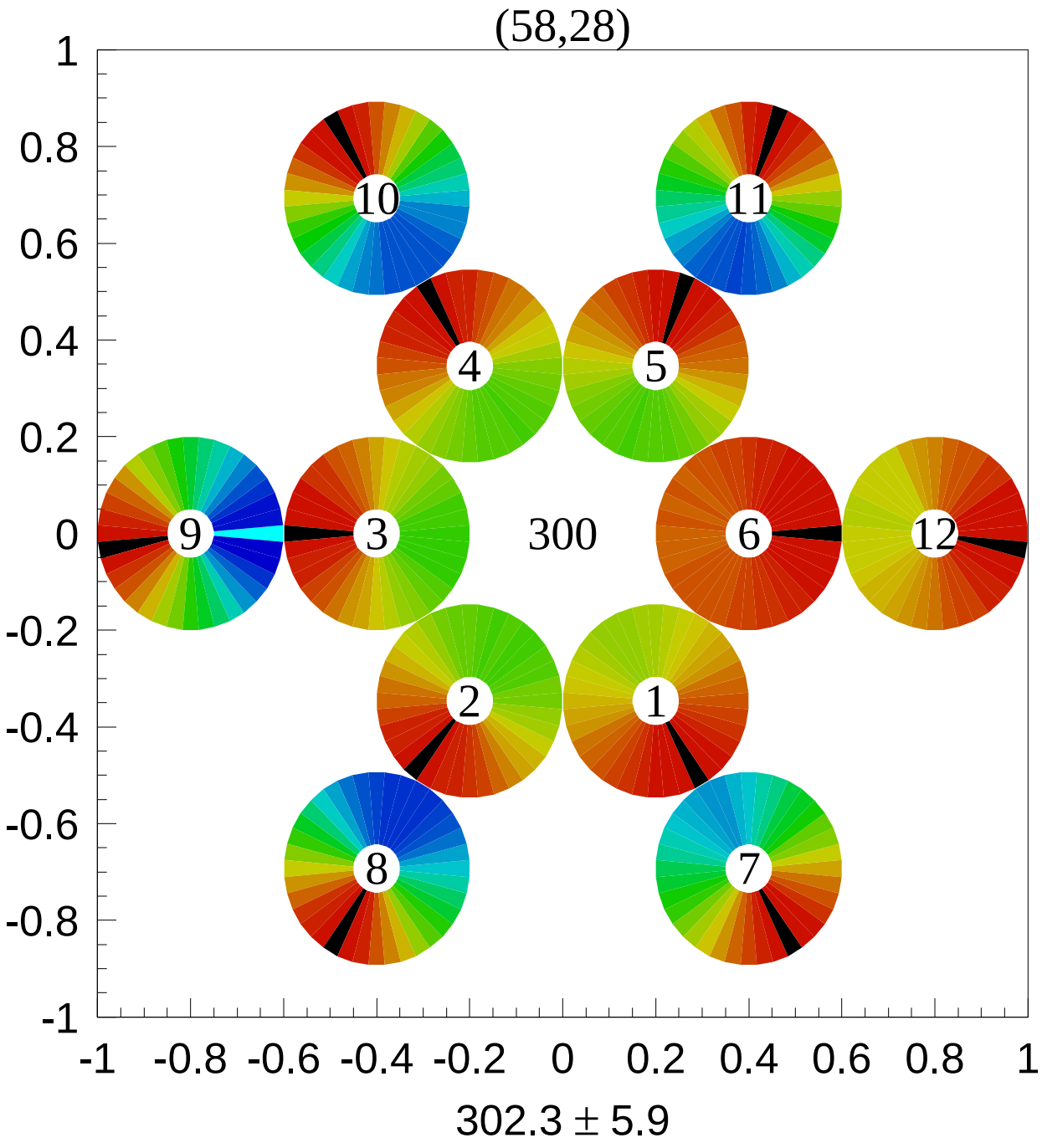

(58,26)
tilted LEDs
120 126 122 120 113 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 123 122 120 118 132
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

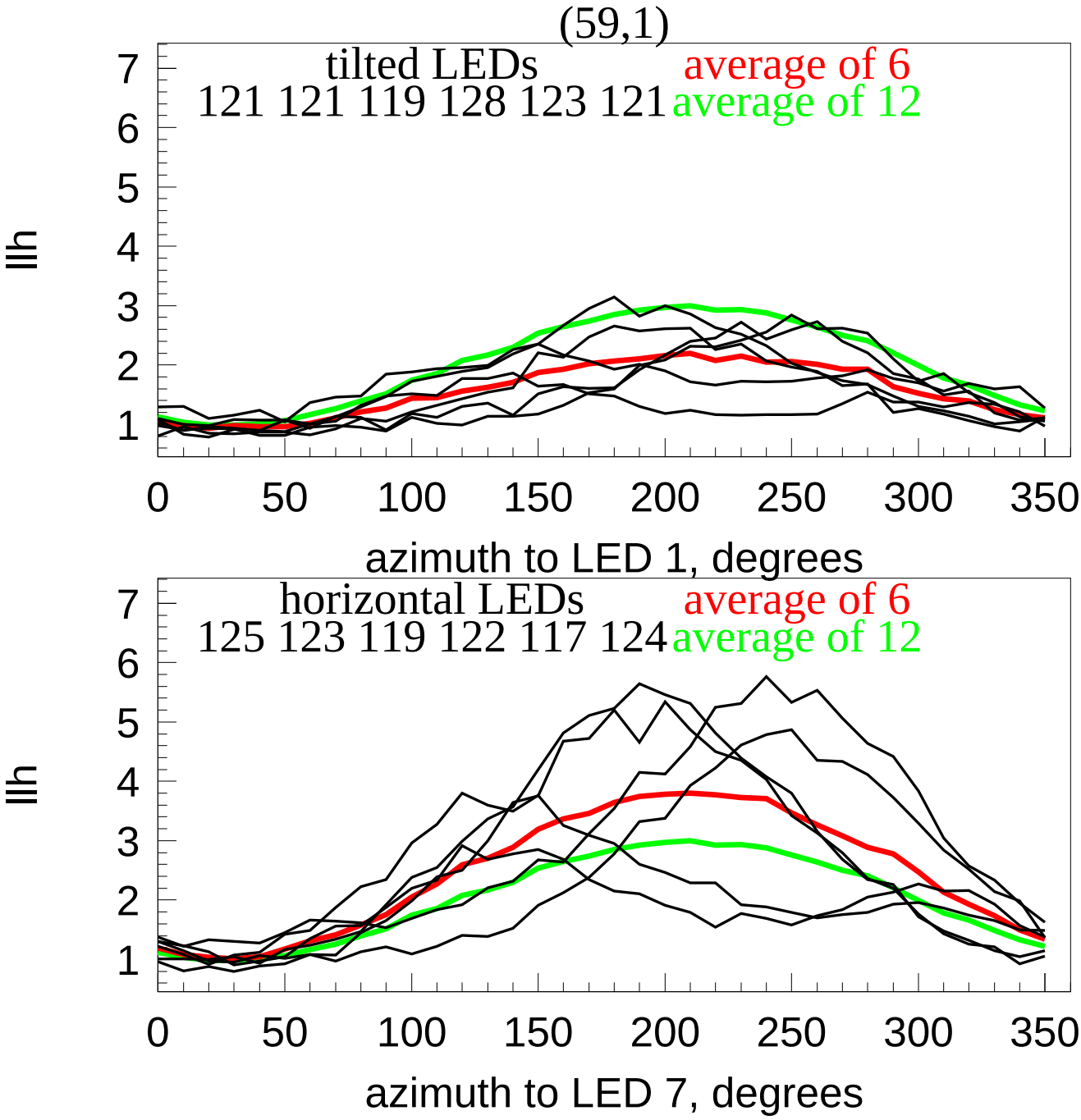

(58,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
154 ± 6.5

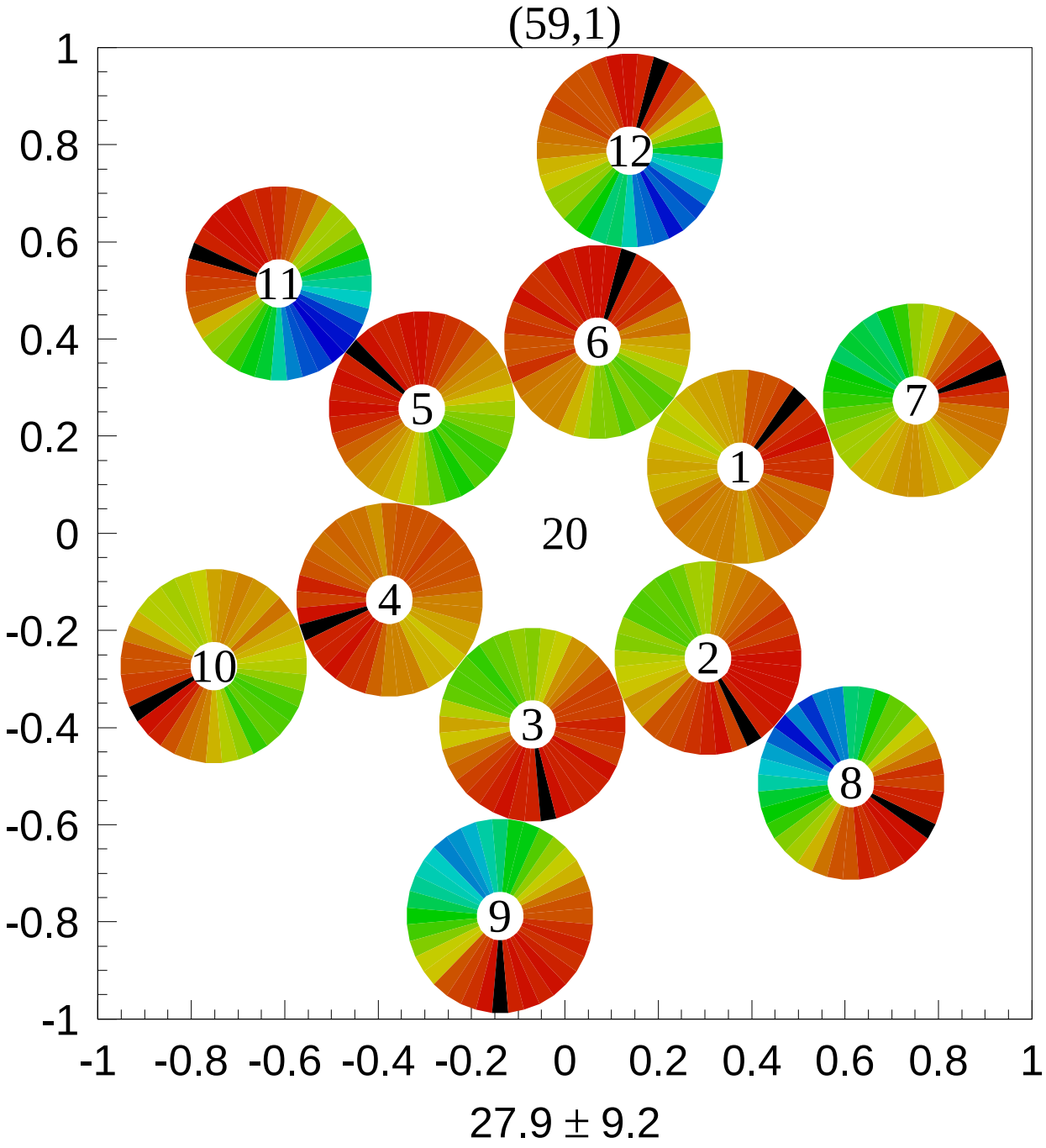

(58,27)
tilted LEDs
120 121 129 128 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 121 119 121 123 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

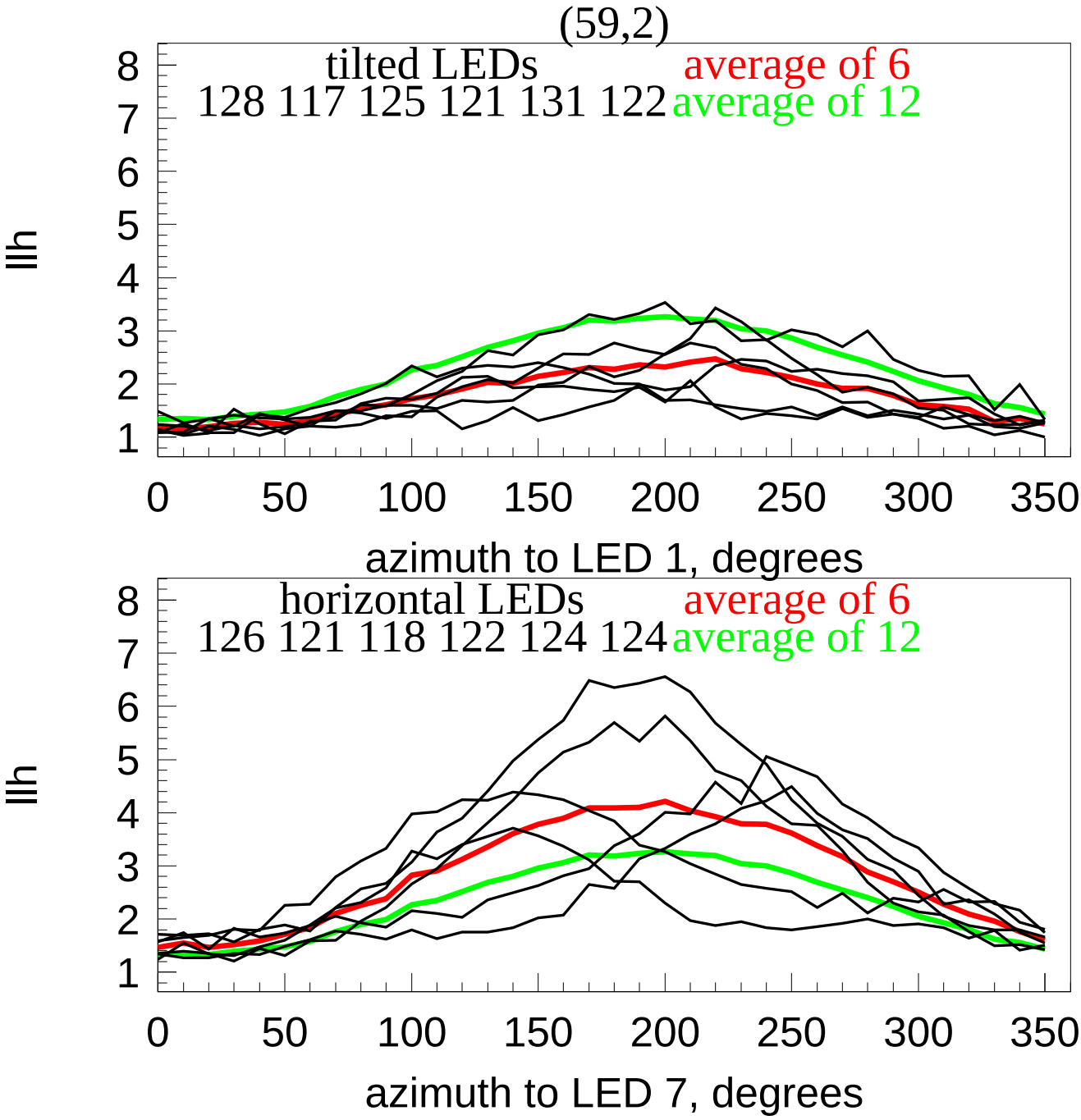

(58,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
263.3 ± 5.0
260
1
2
3
4
5
6
7
8
9
10
11
12

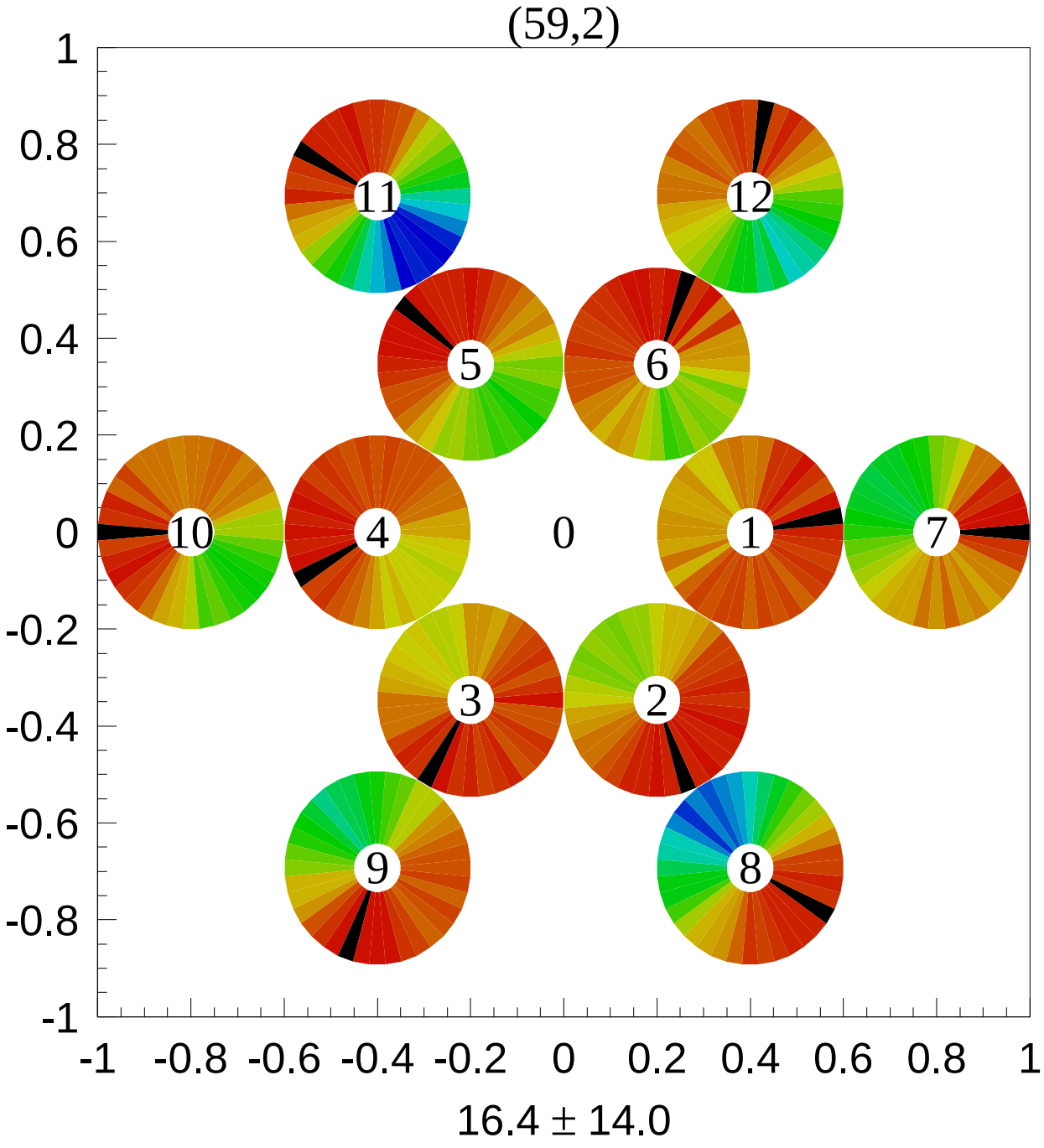

(58,28)
tilted LEDs
126 119 121 122 123 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 121 127 122 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

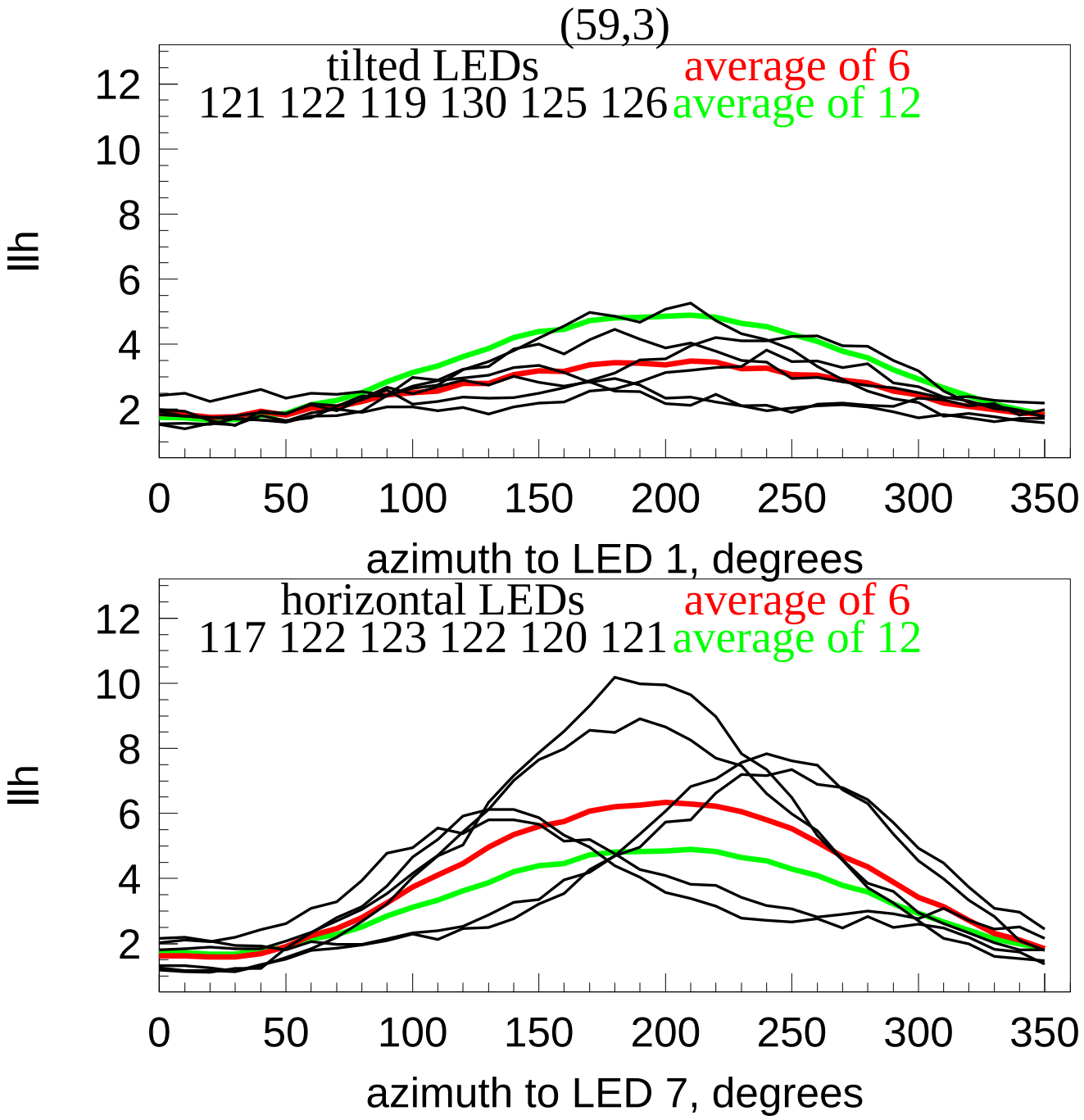

(58,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
302.3 ± 5.9

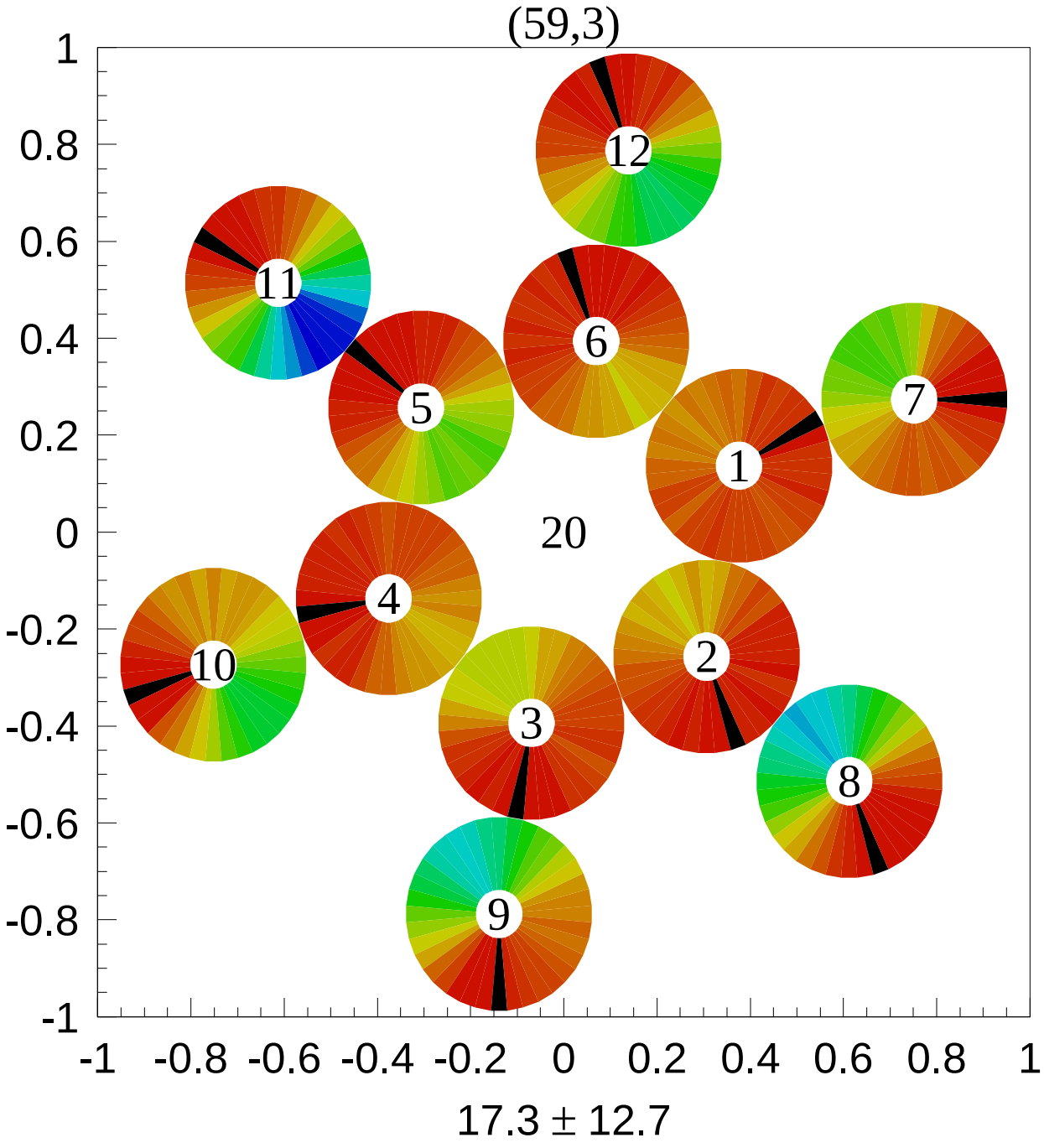

(59,1)
tilted LEDs
121 121 119 128 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 119 122 117 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

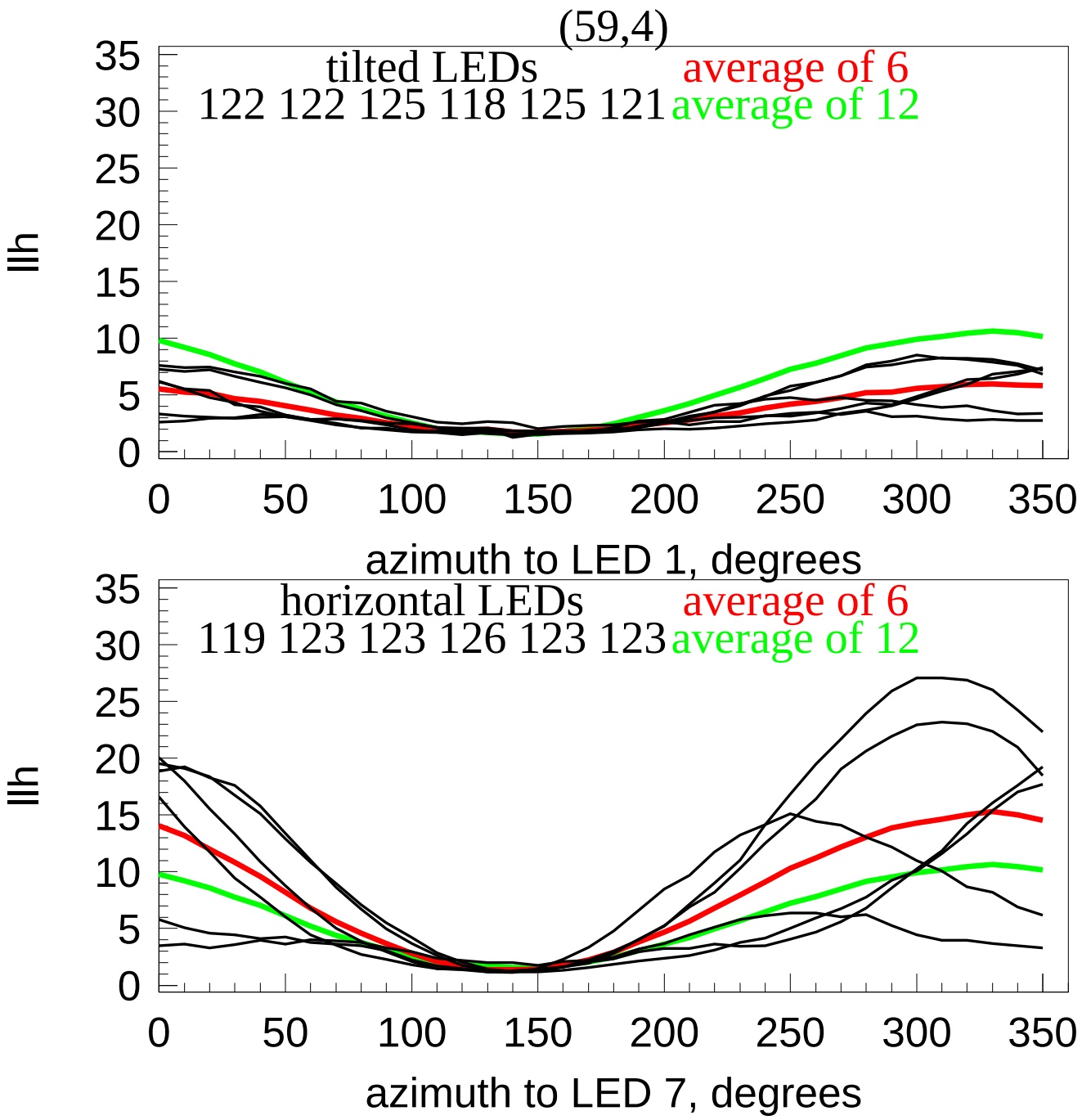

(59,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
27.9 ± 9.2

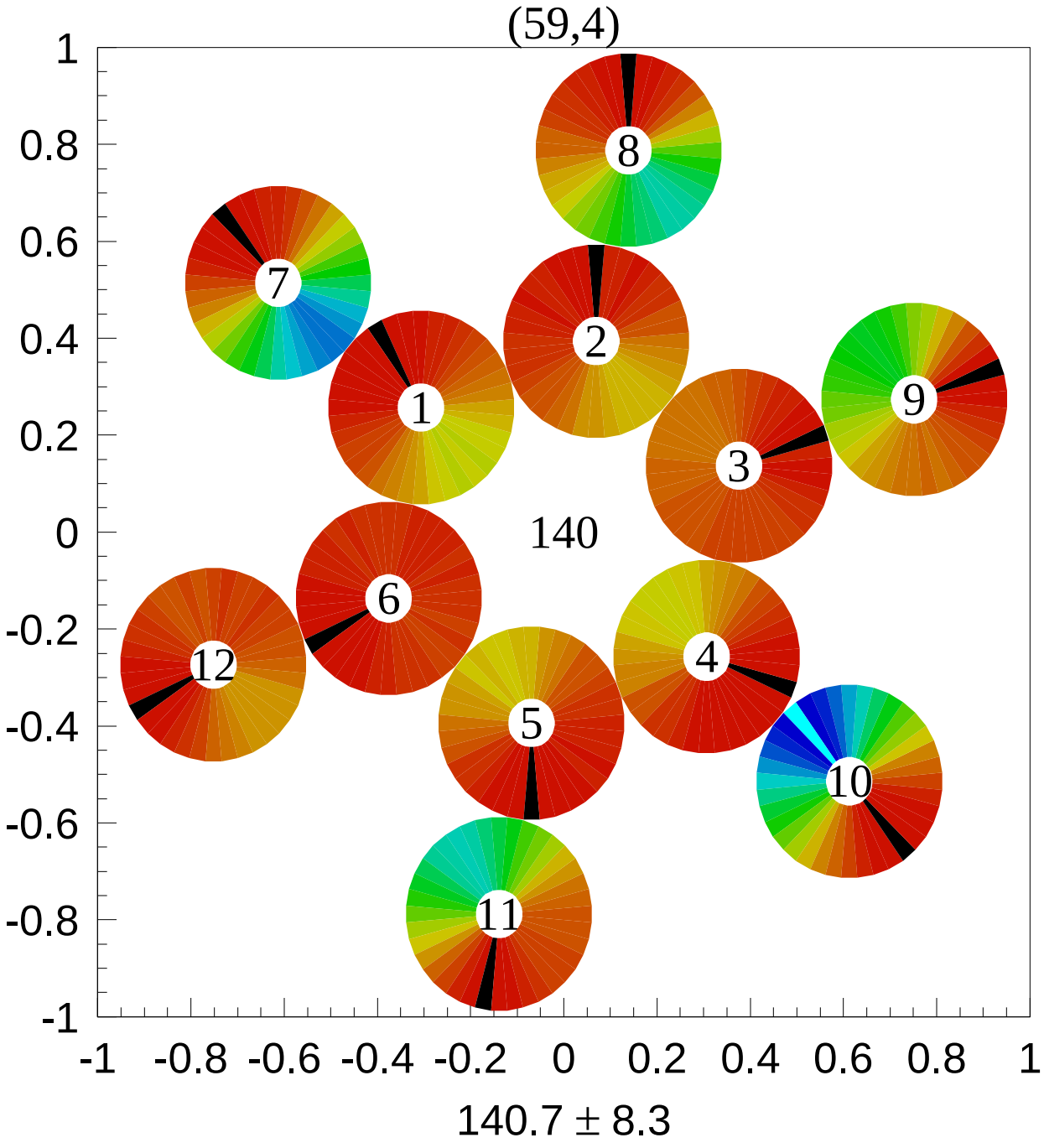

(59,2)
tilted LEDs
128 117 125 121 131 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 121 118 122 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

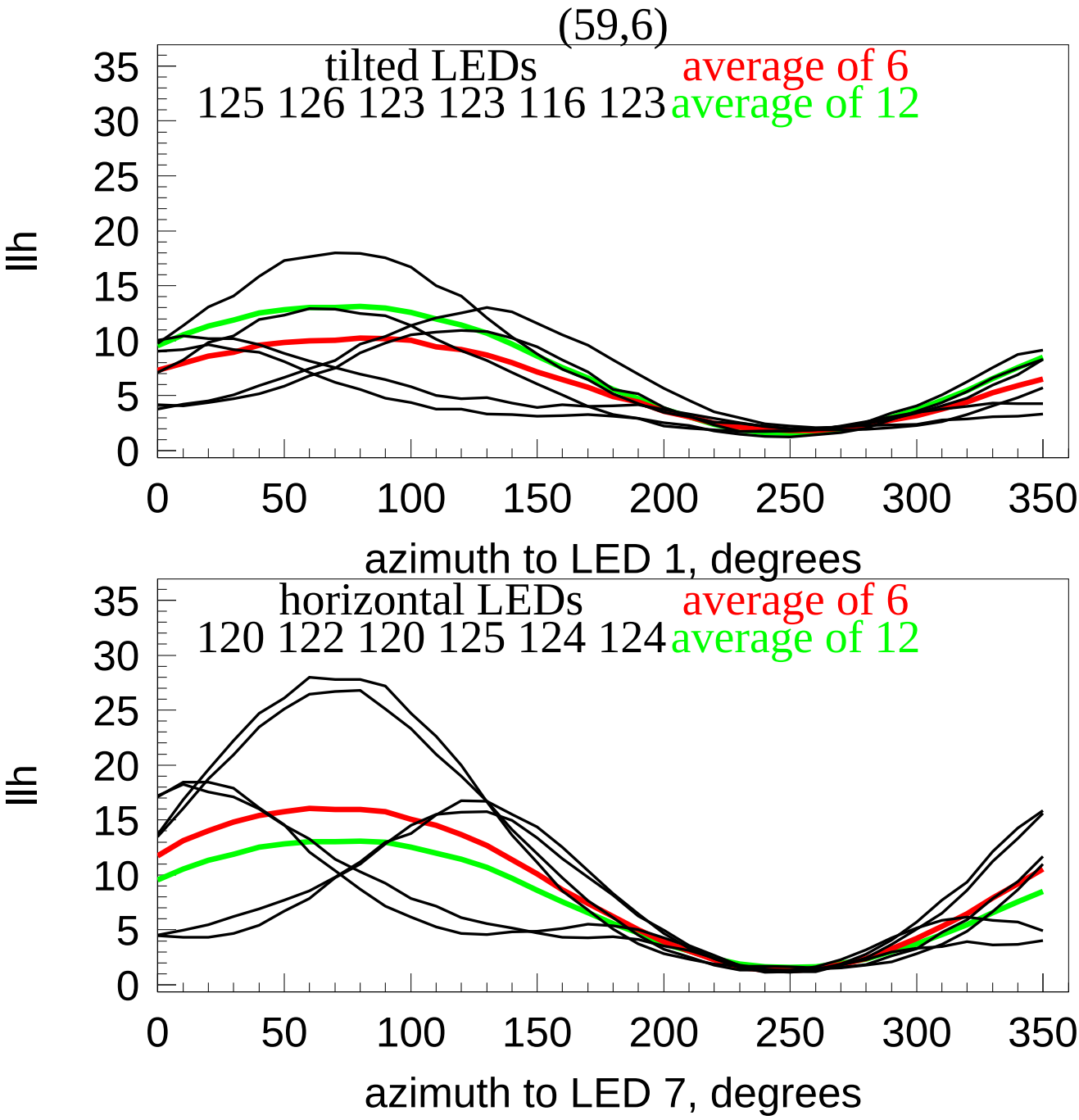

(59,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
16.4 ± 14.0
11
12
5
6
10
4
0
1
7
3
2
9
8

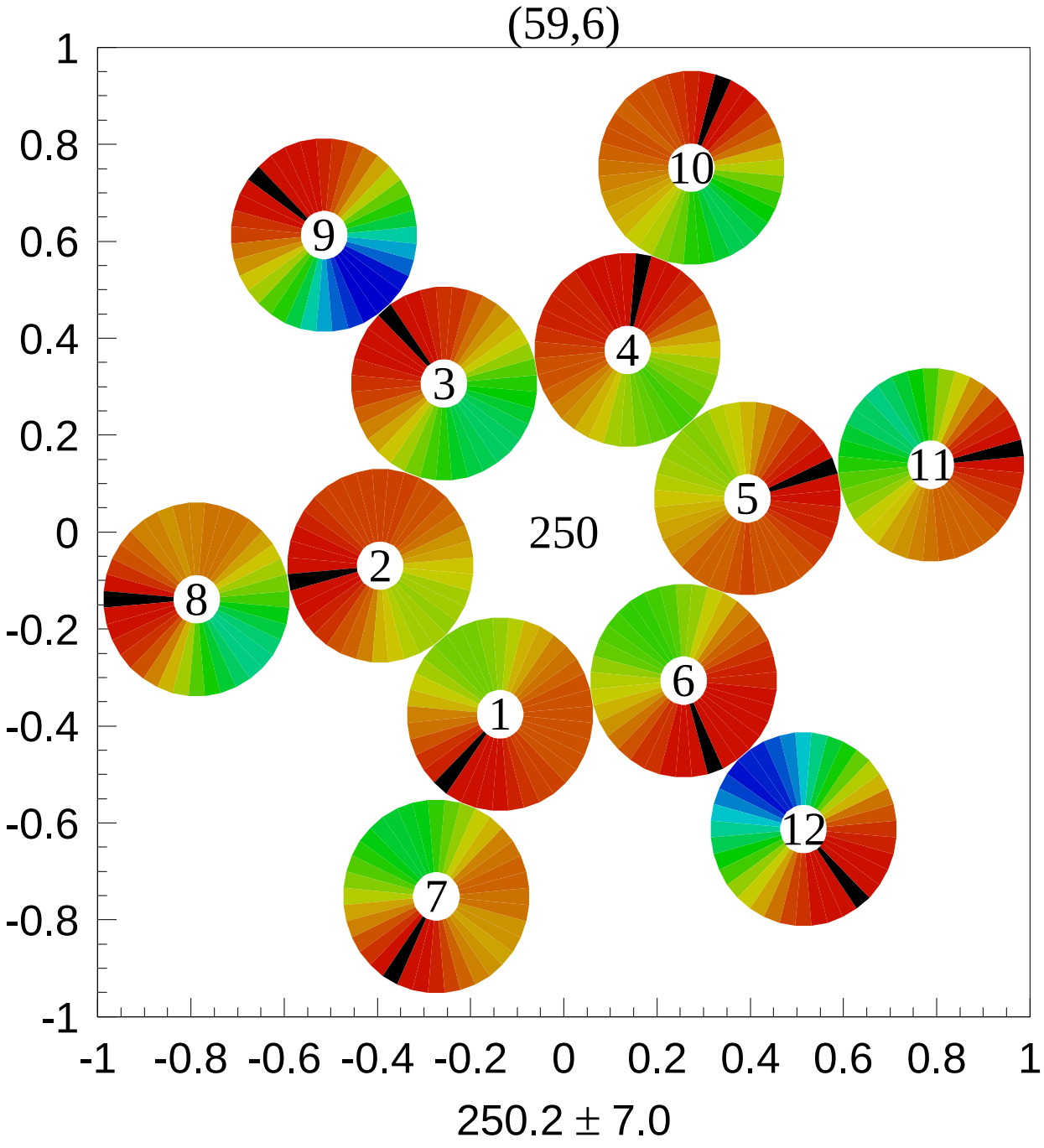

(59,3)
tilted LEDs
121 122 119 130 125 126
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 122 123 122 120 121
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

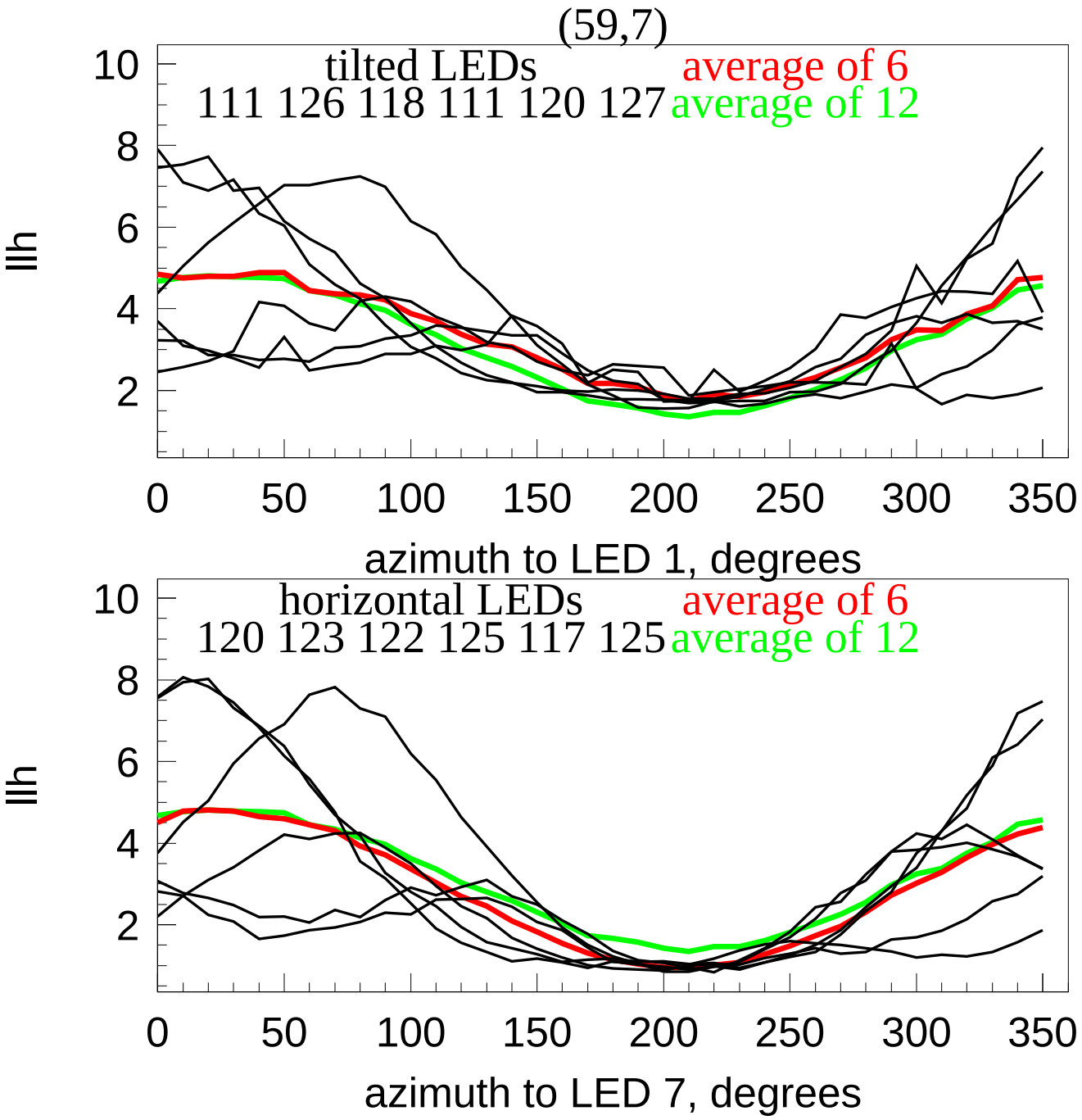

(59,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
17.3 ± 12.7

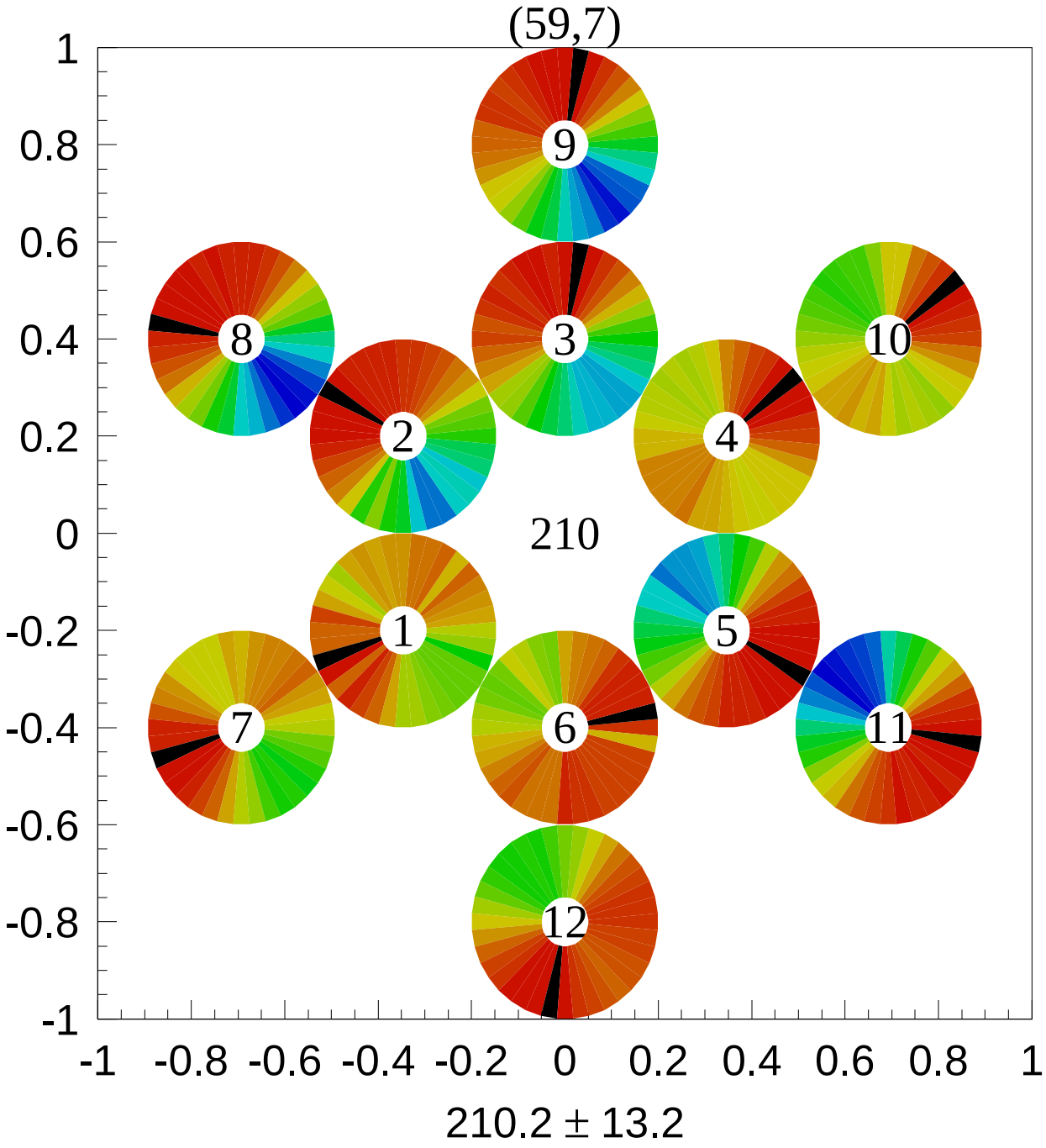

(59,4)
tilted LEDs
122 122 125 118 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 123 126 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

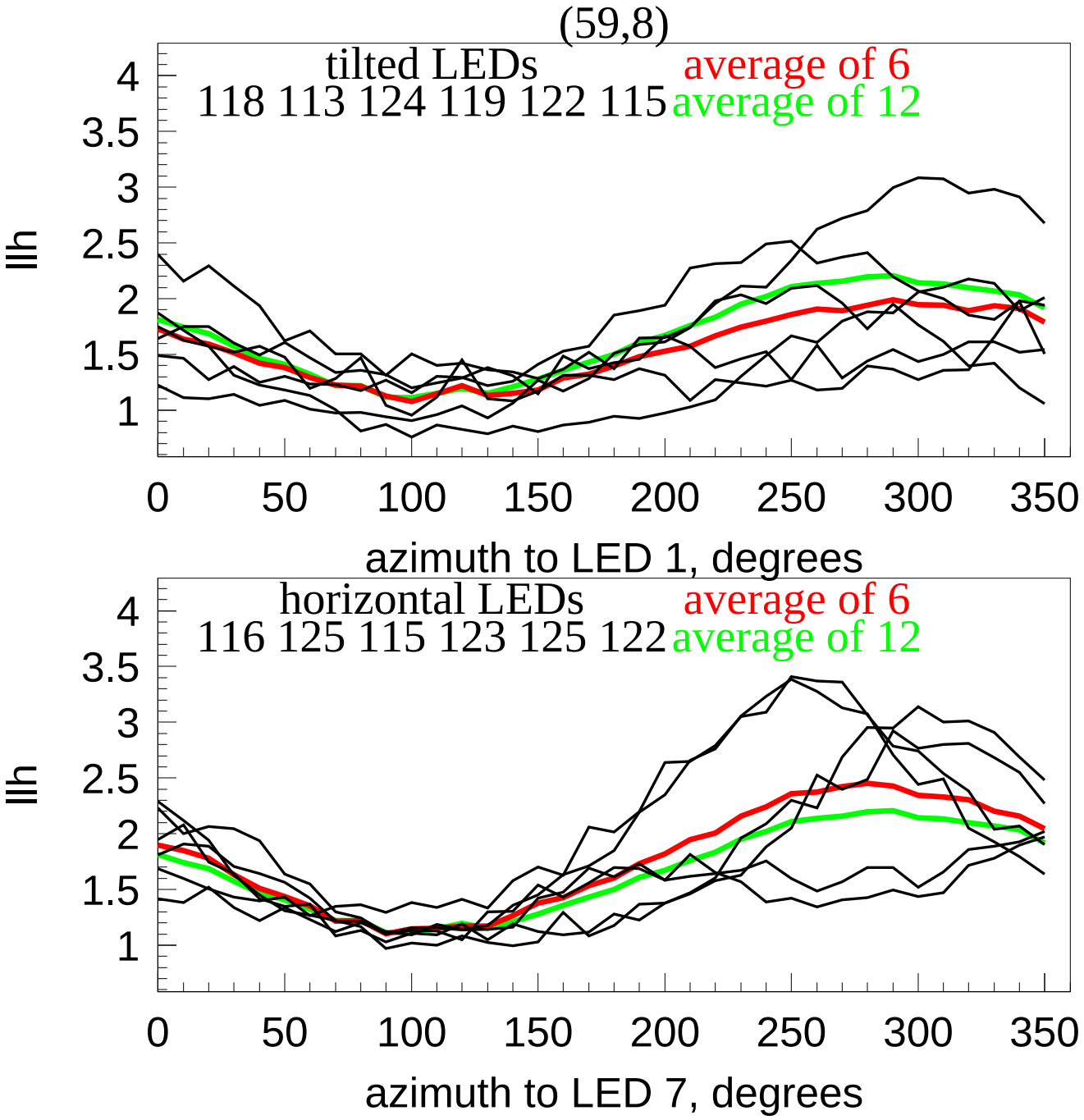

(59,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
140
140.7 ± 8.3
1
2
3
4
5
6
7
8
9
10
11
12

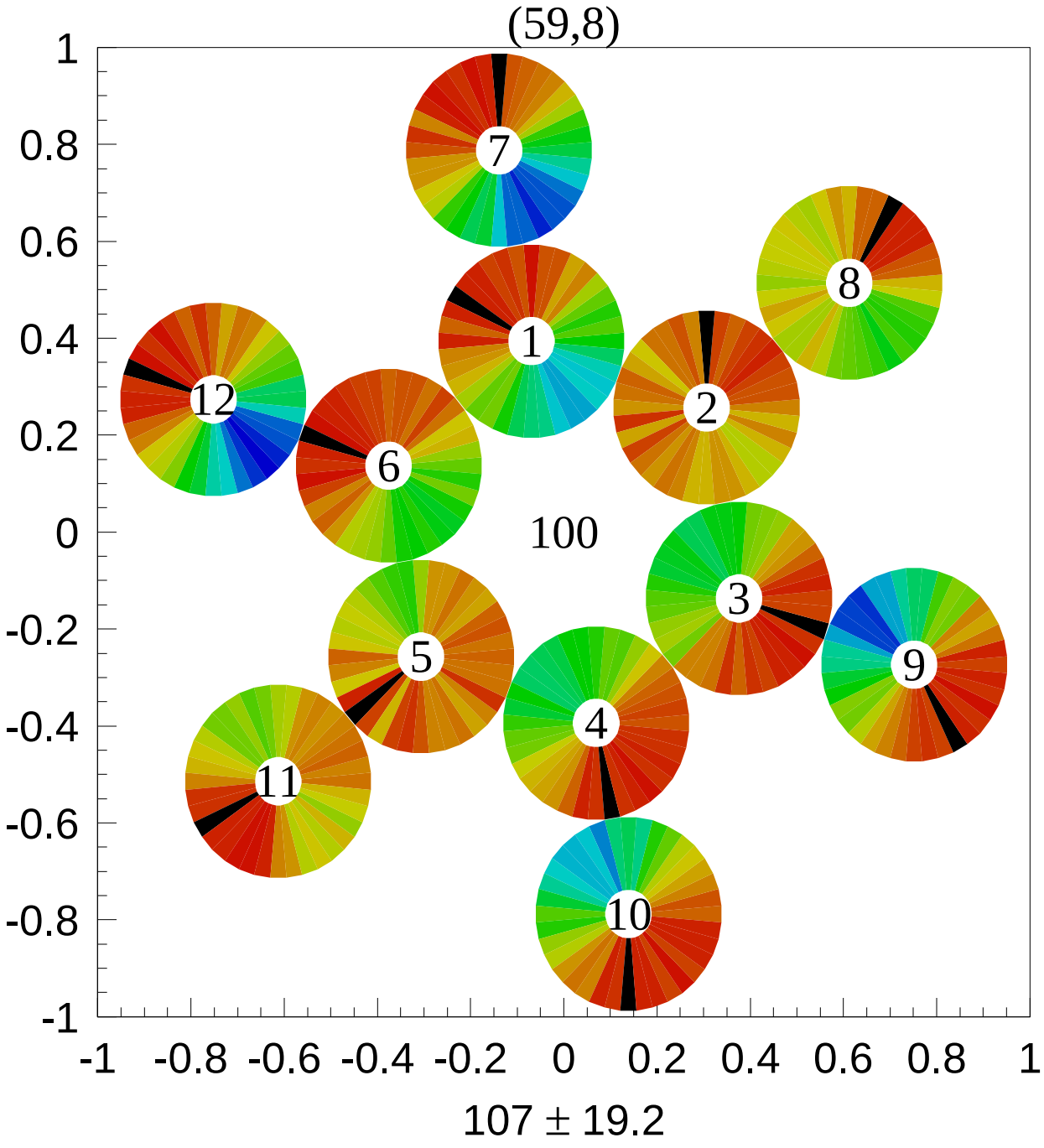

(59,6)
tilted LEDs
125 126 123 123 116 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 120 125 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

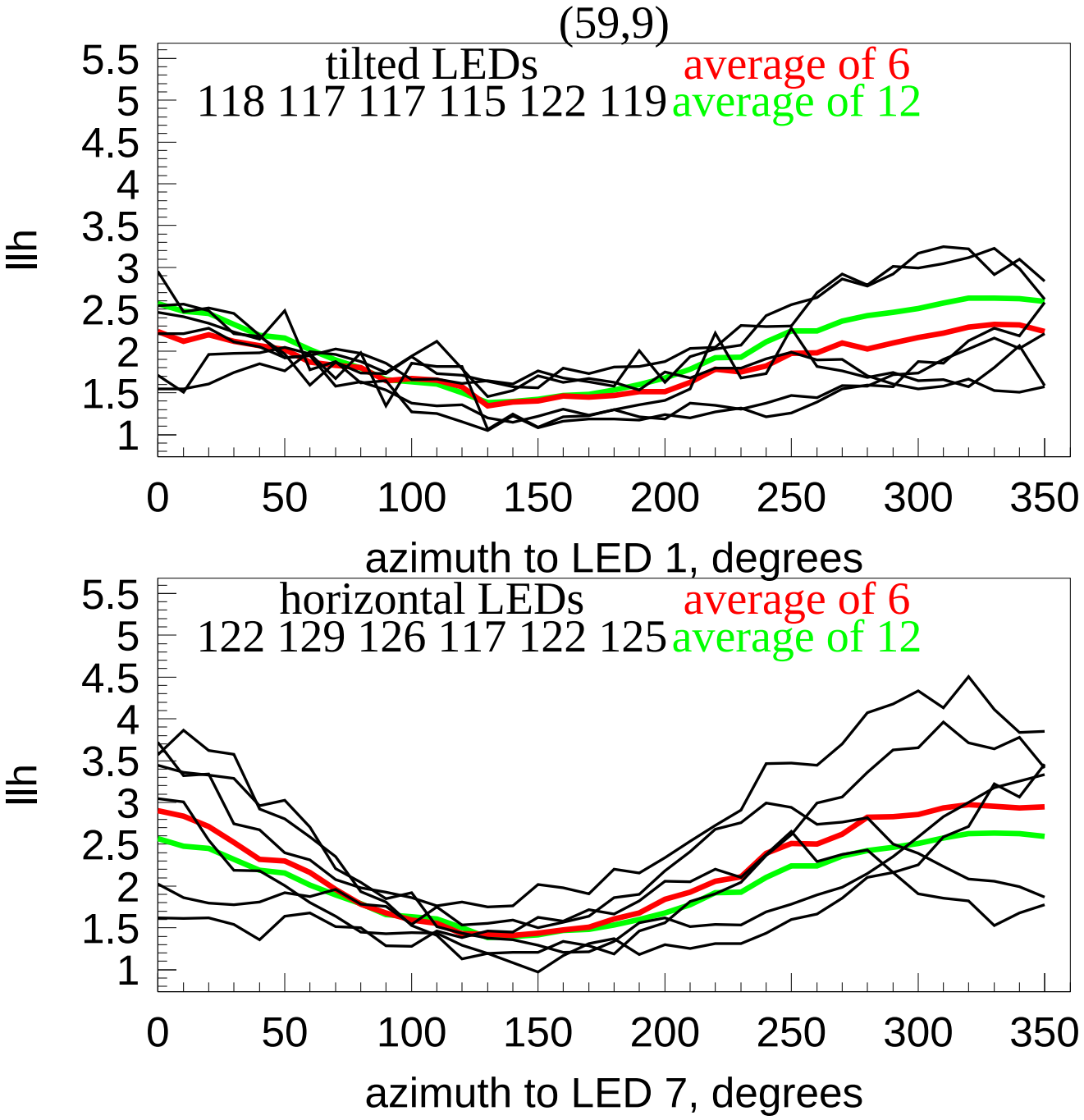

(59,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
250.2 ± 7.0
1
2
3
4
5
6
7
8
9
10
11
12

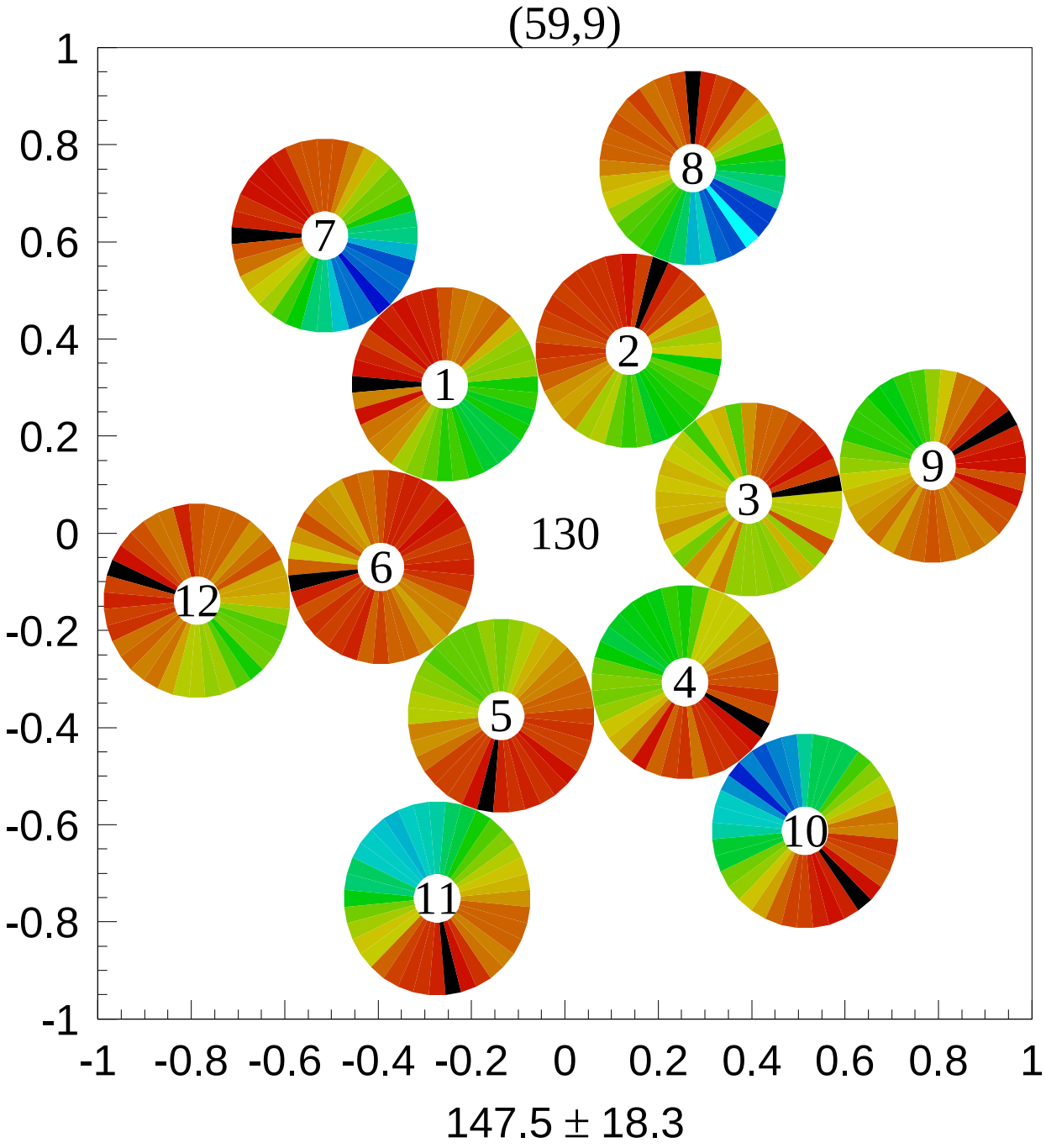

(59,7)
tilted LEDs
111 126 118 111 120 127
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 123 122 125 117 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

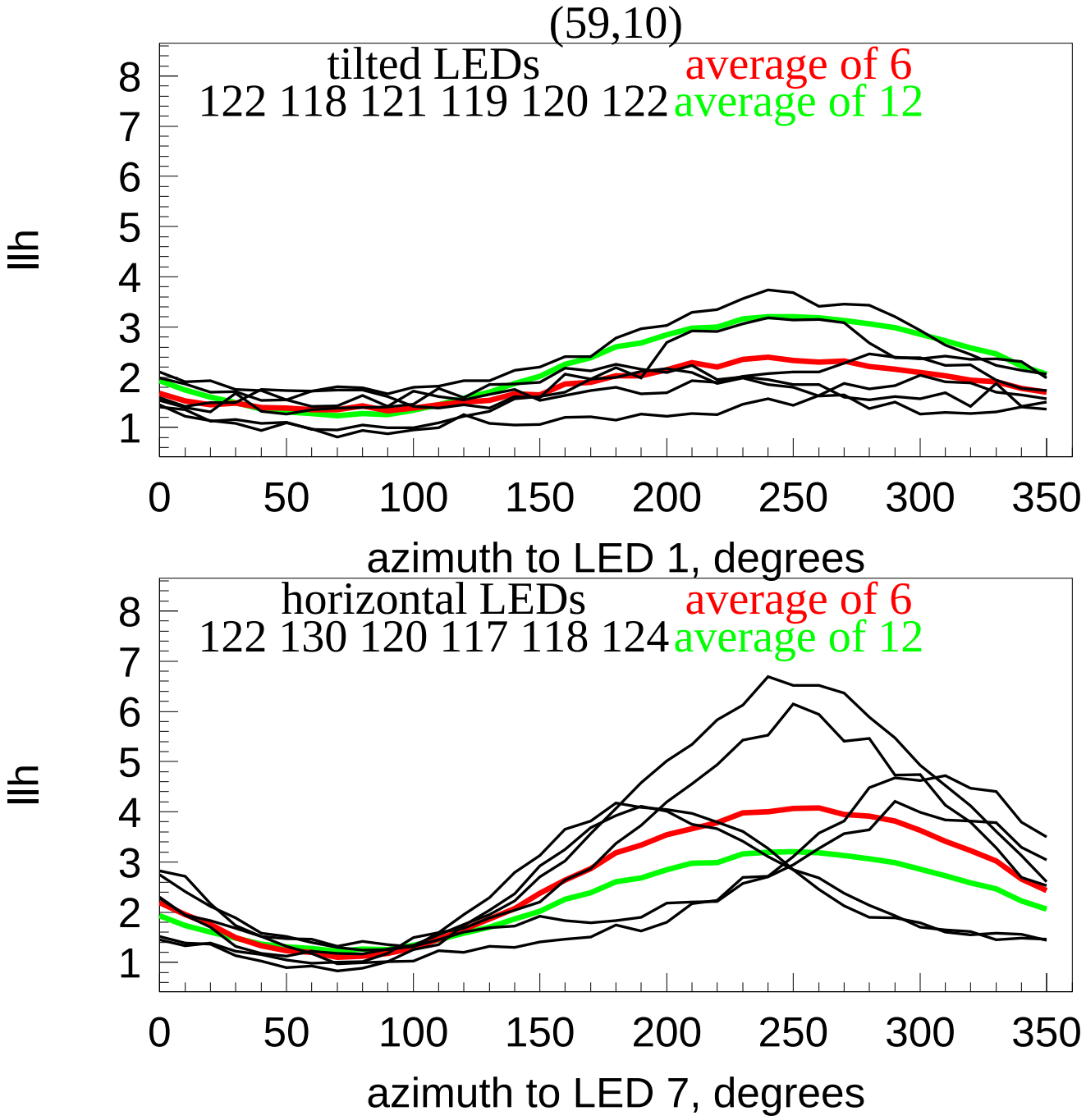

(59,7)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
210.2 ± 13.2

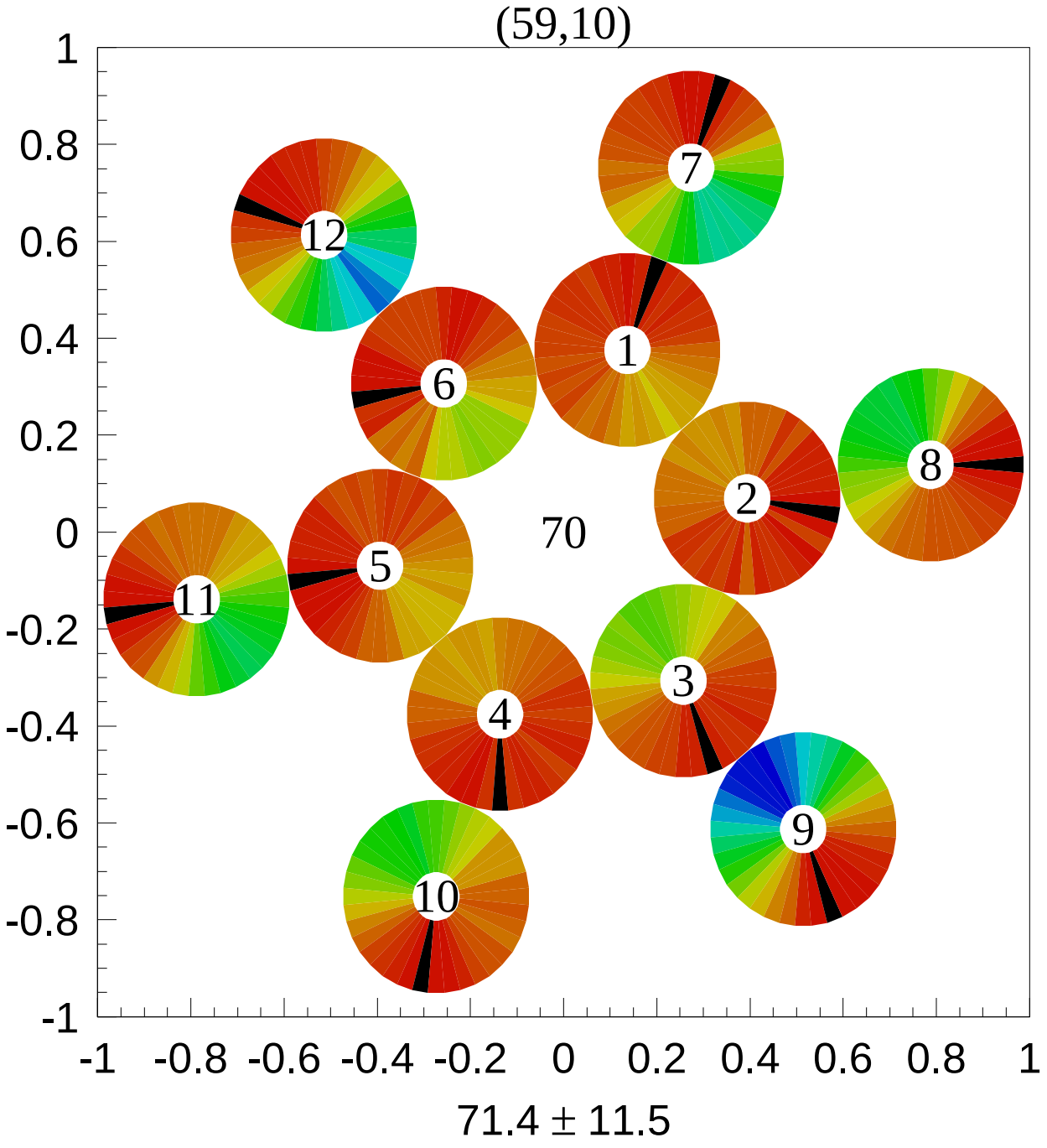

(59,8)
tilted LEDs
118 113 124 119 122 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 125 115 123 125 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

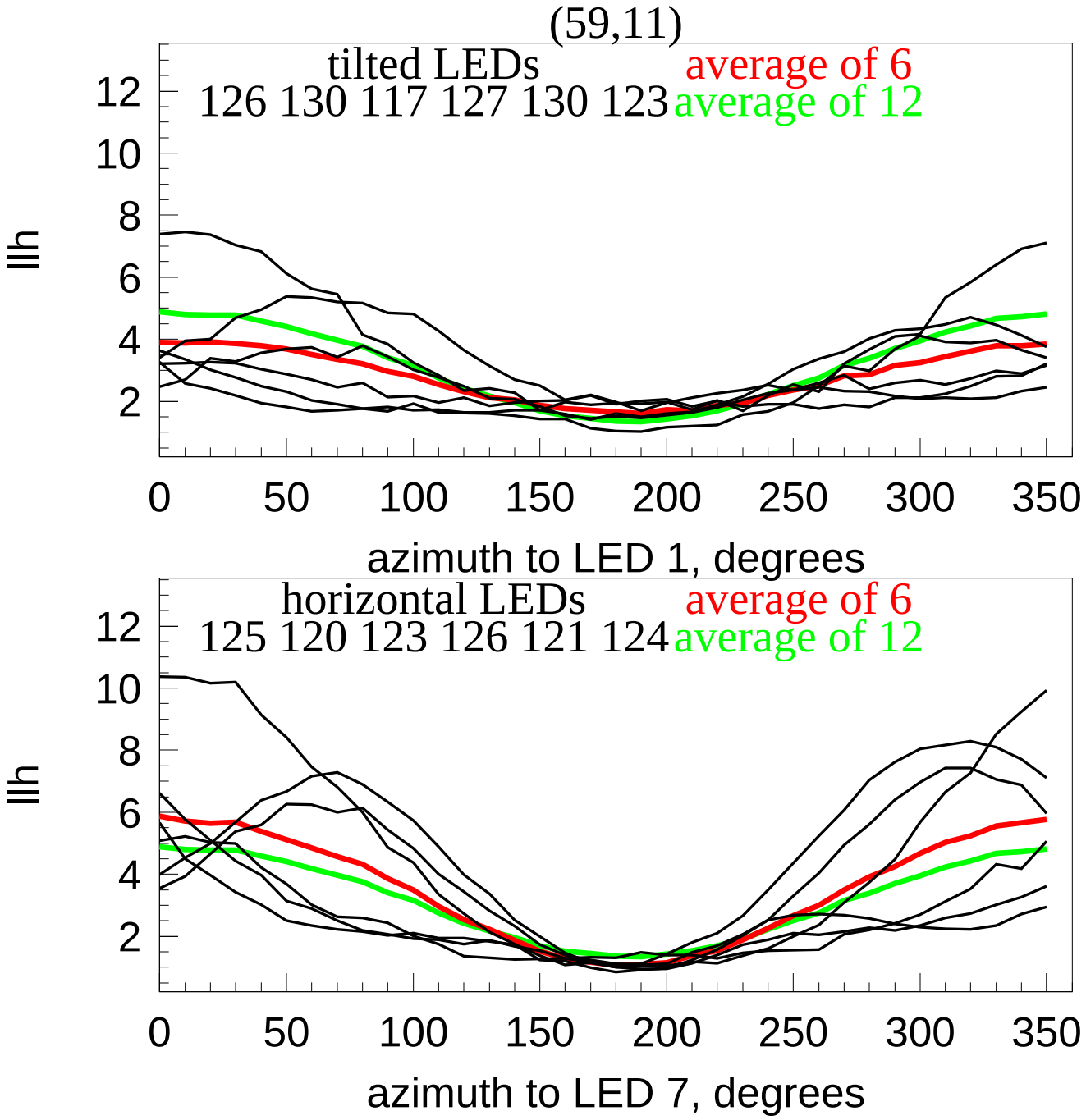

(59,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
107 ± 19.2

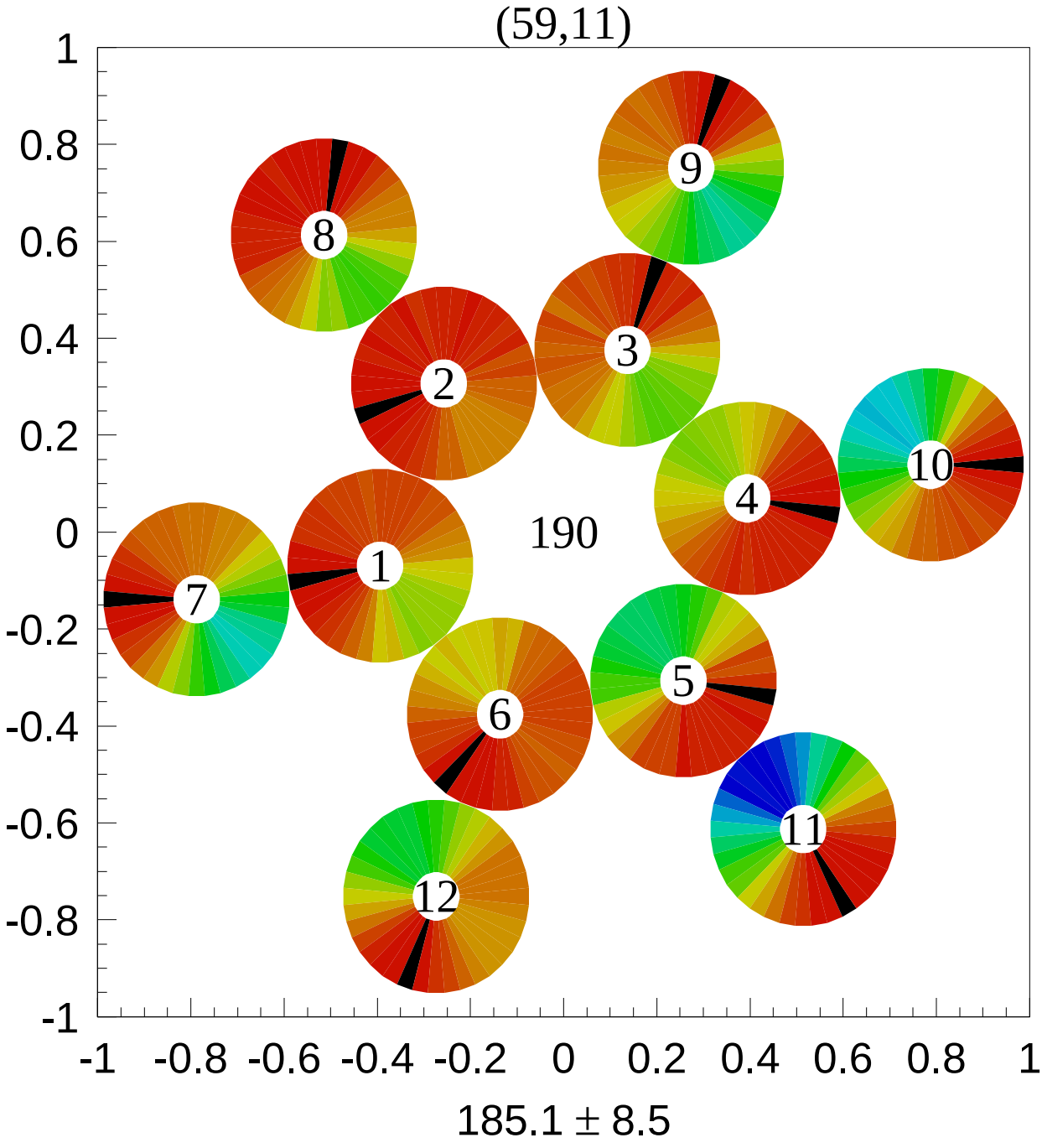

(59,9)
tilted LEDs
118 117 117 115 122 119
average of 6
average of 12
llh
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 129 126 117 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

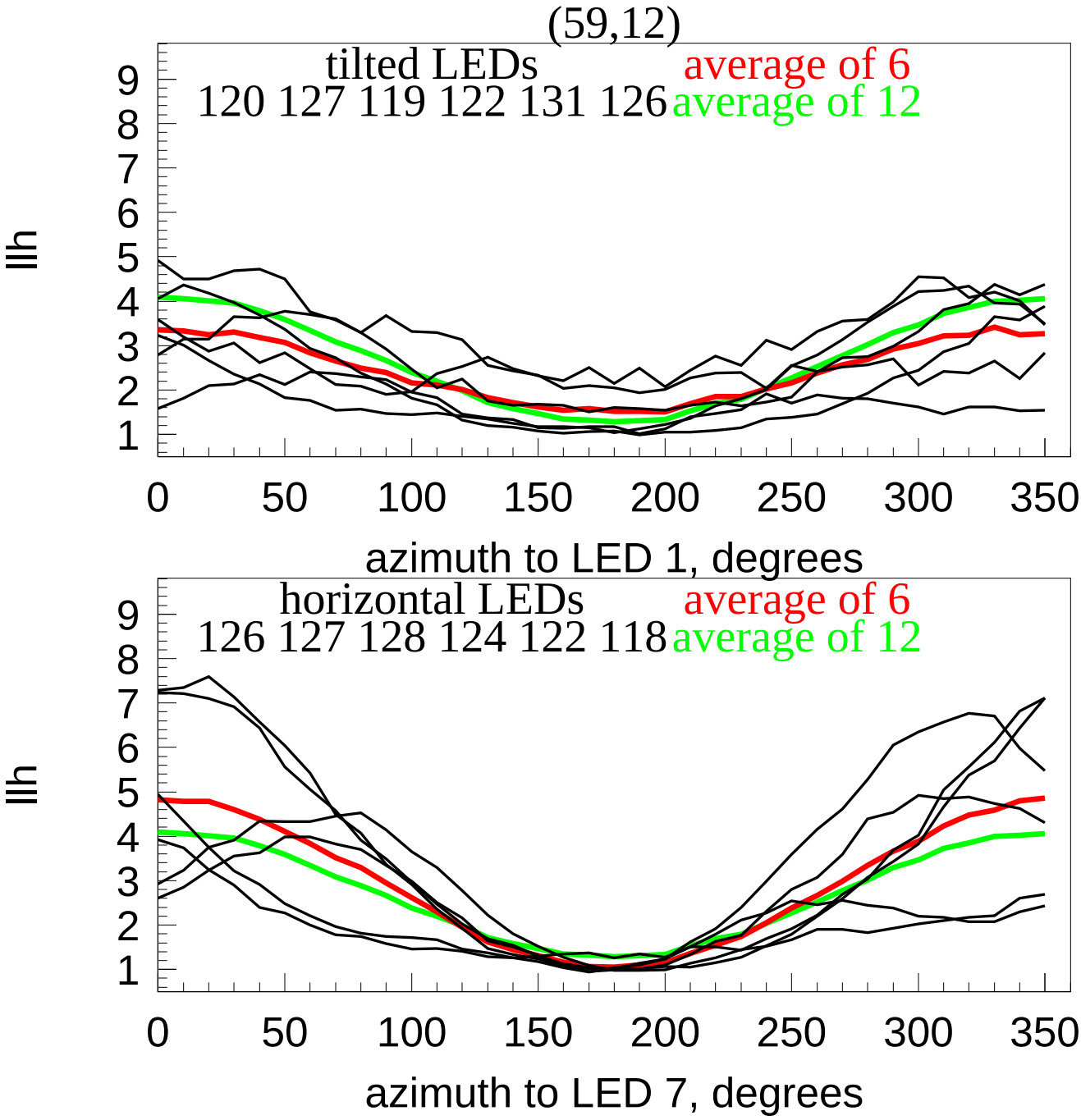

(59,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
147.5 ± 18.3
130
1
2
3
4
5
6
7
8
9
10
11
12

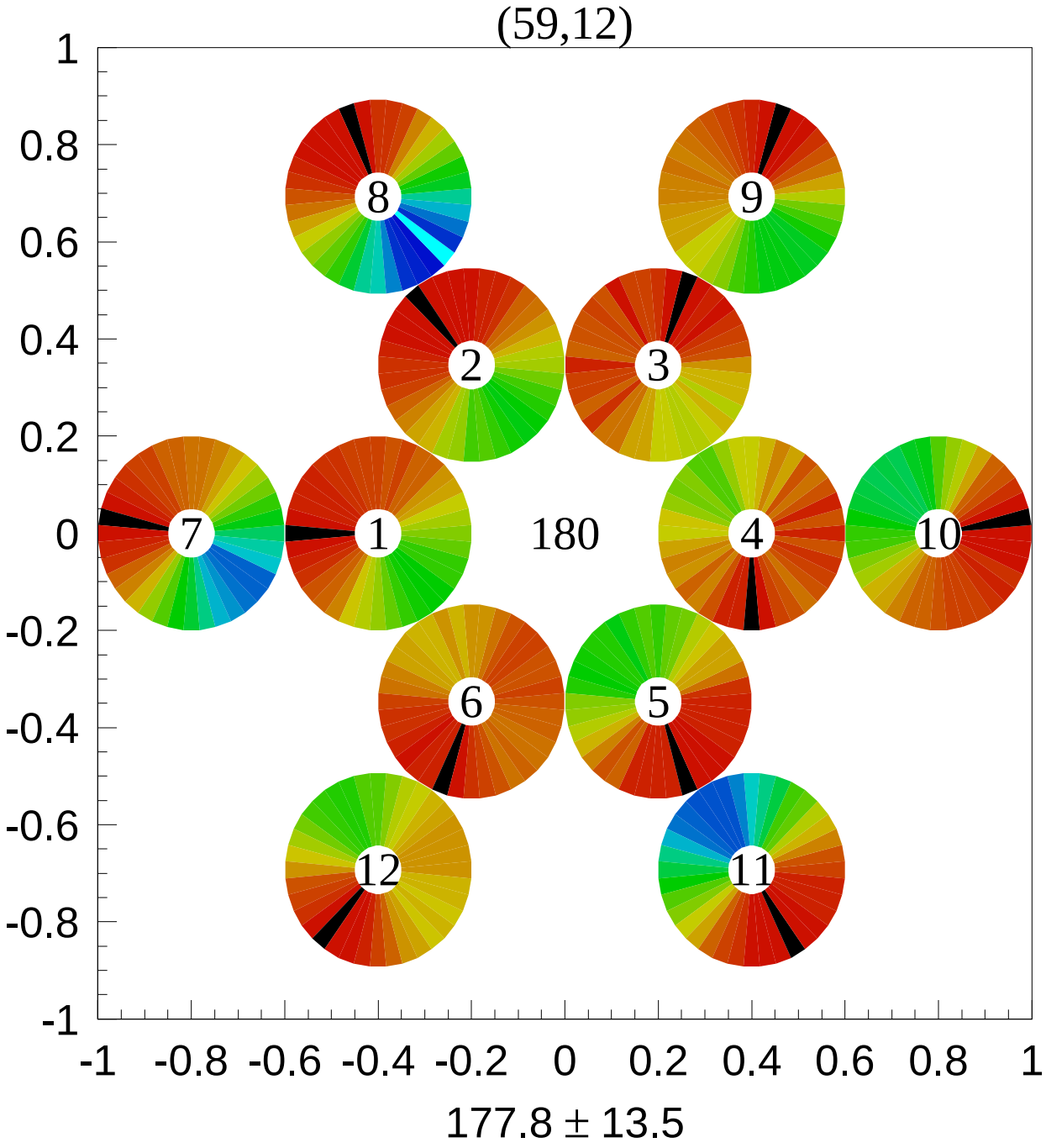

(59,10)
tilted LEDs
122 118 121 119 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 130 120 117 118 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

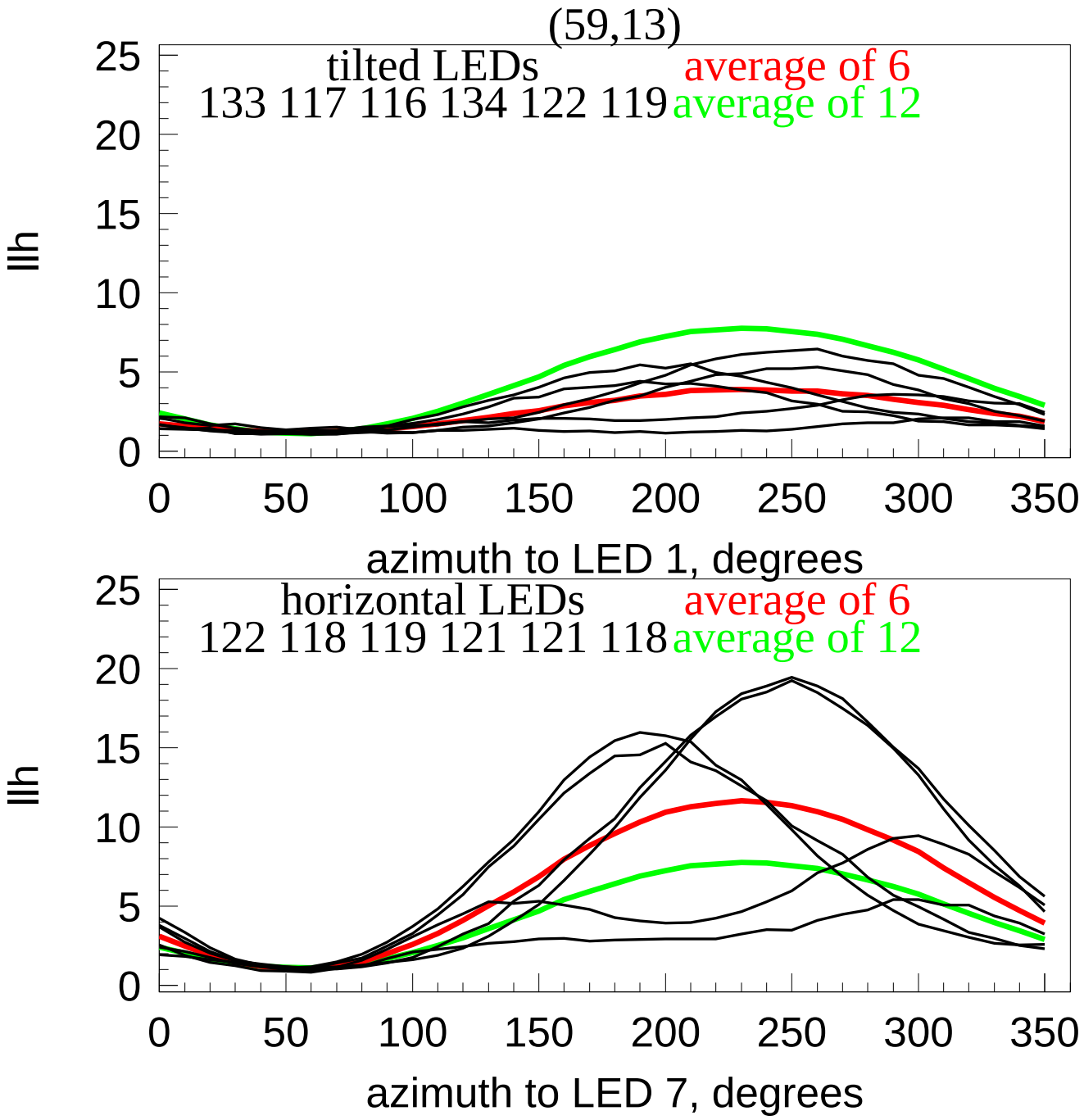

(59,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
70
5
11
3
4
9
10
71.4 ± 11.5

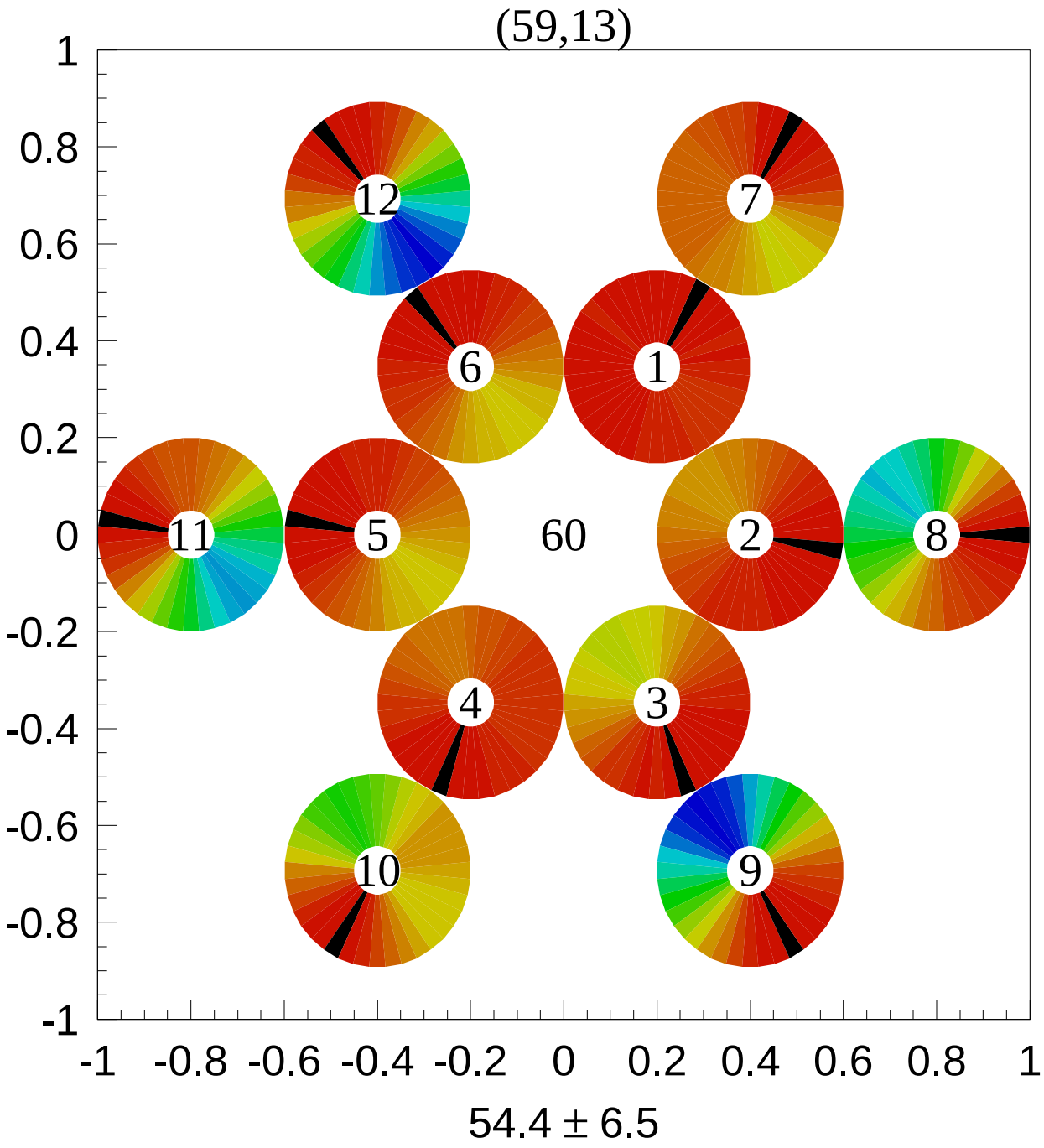

(59,11)
tilted LEDs
126 130 117 127 130 123
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 120 123 126 121 124
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

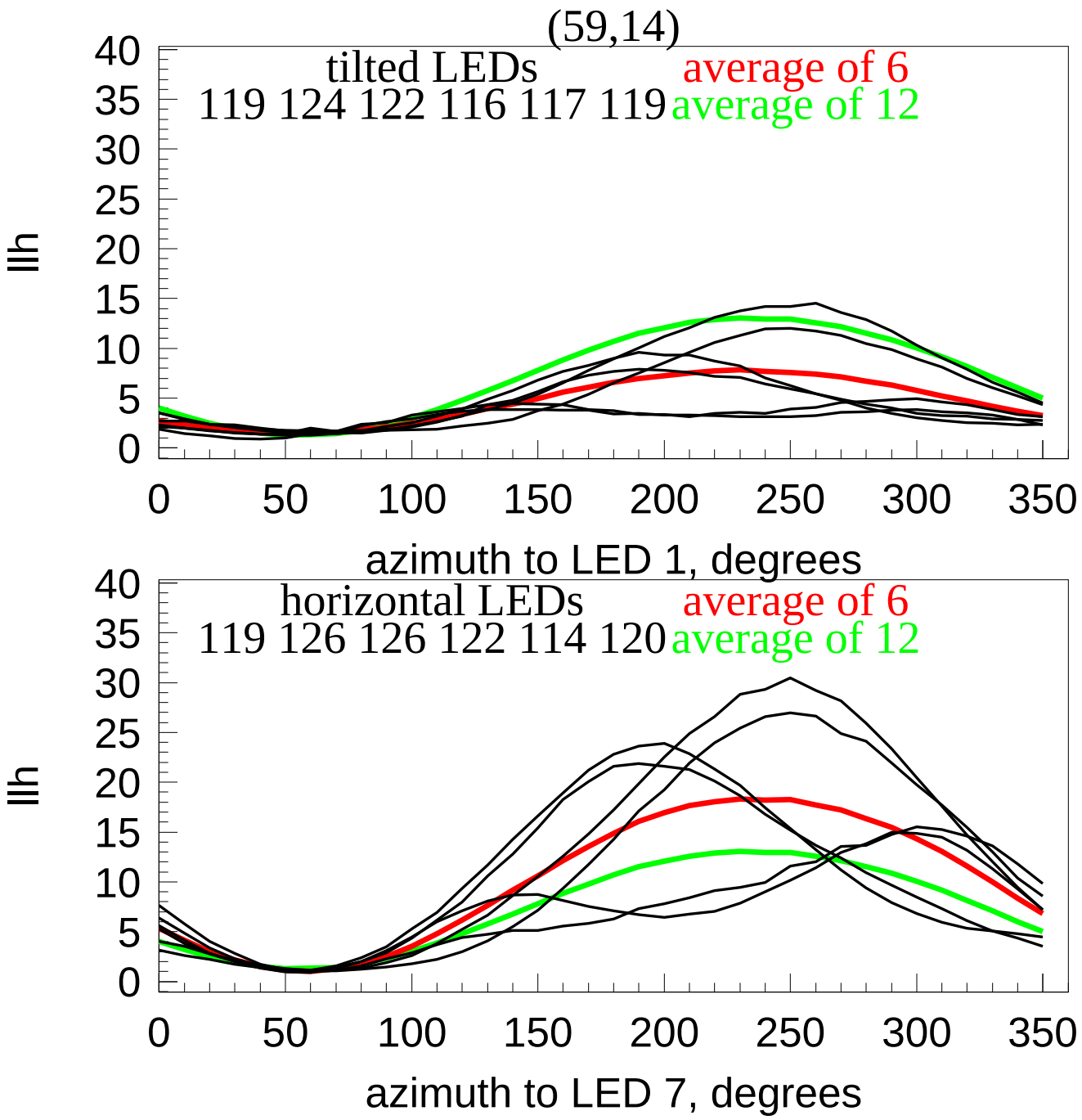

(59,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
185.1 ± 8.5
190
1
2
3
4
5
6
7
8
9
10
11
12

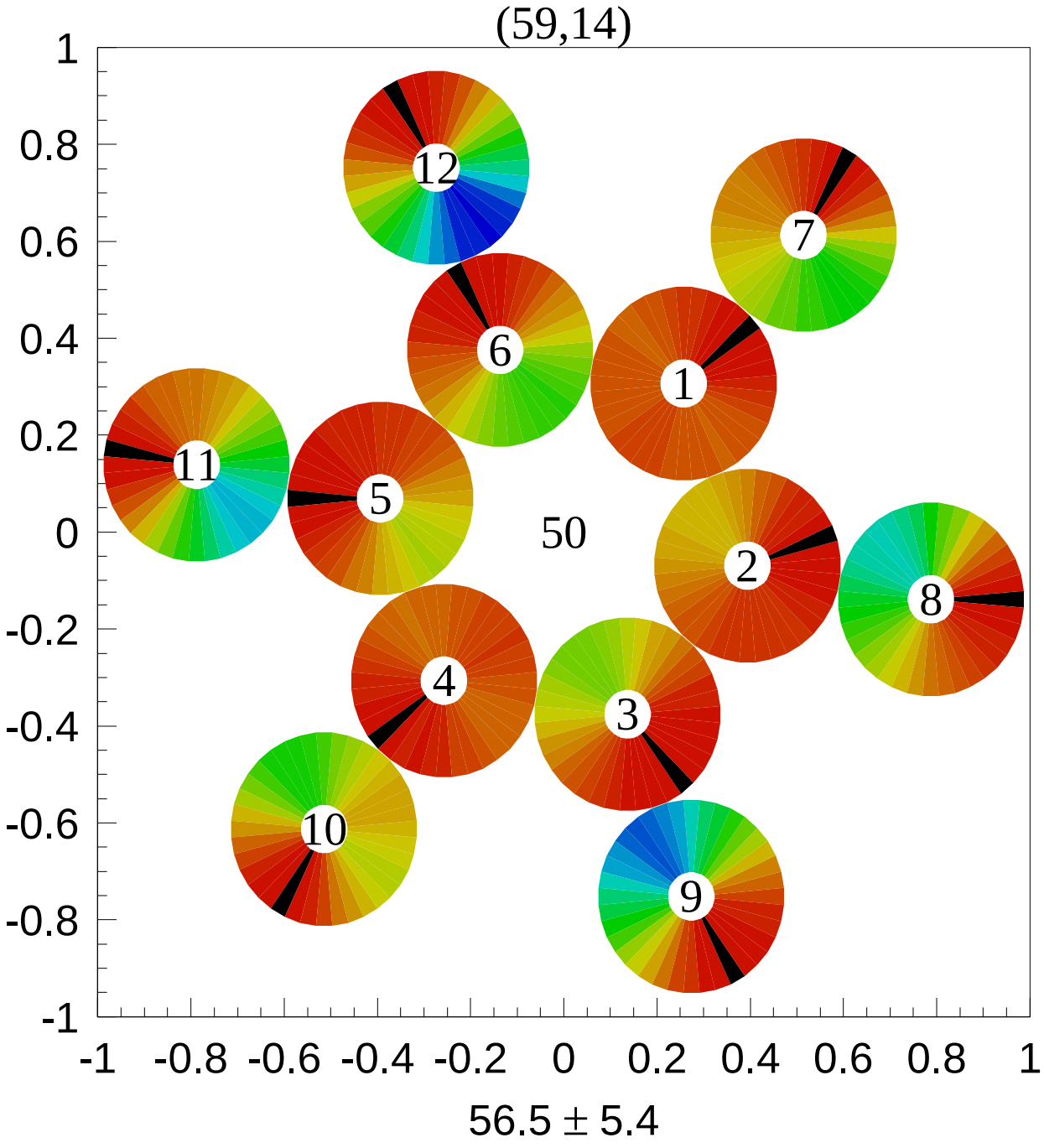

(59,12)
tilted LEDs
120 127 119 122 131 126
average of 6
average of 12
Ilh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 127 128 124 122 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

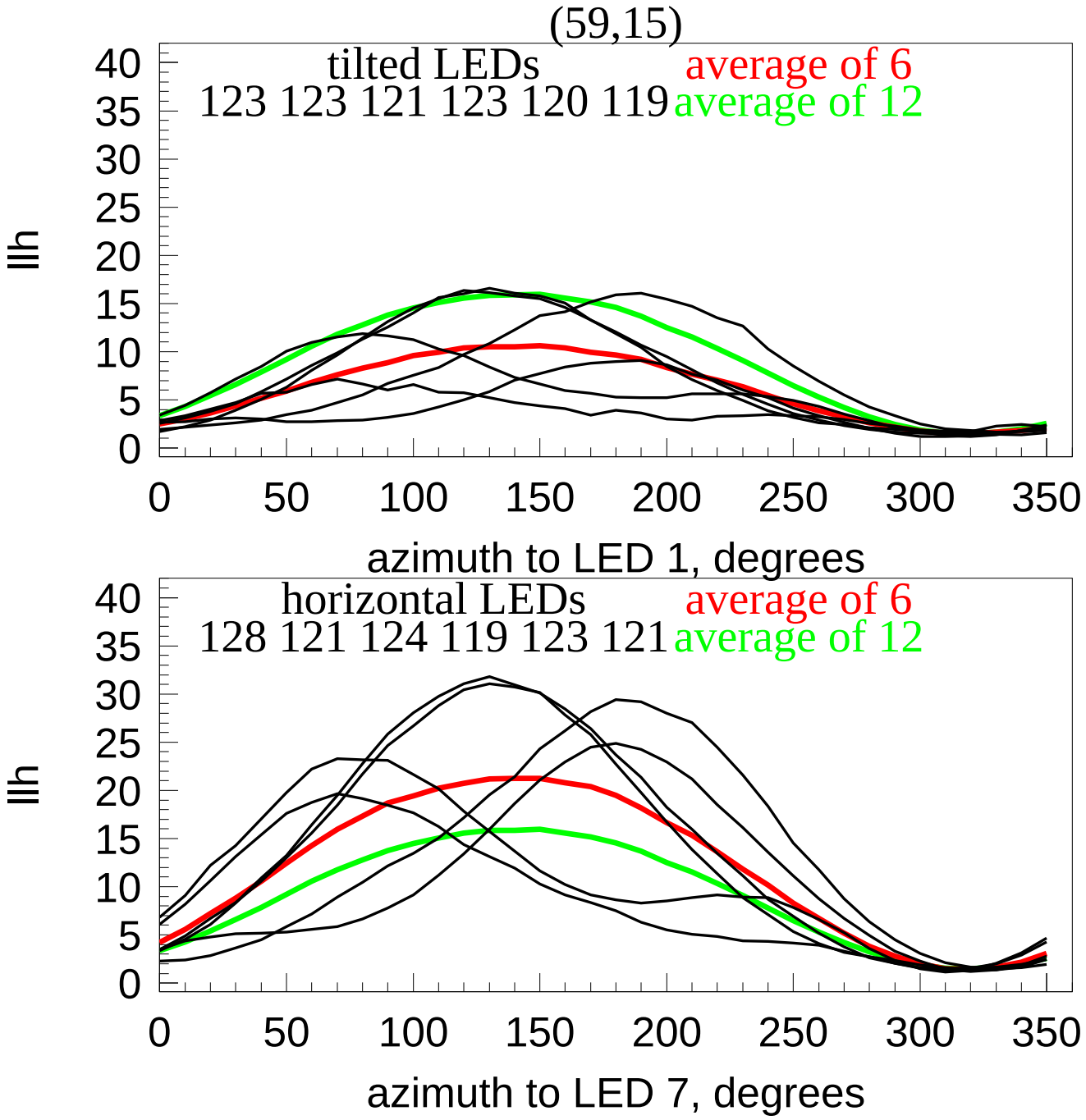

(59,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
177.8 ± 13.5

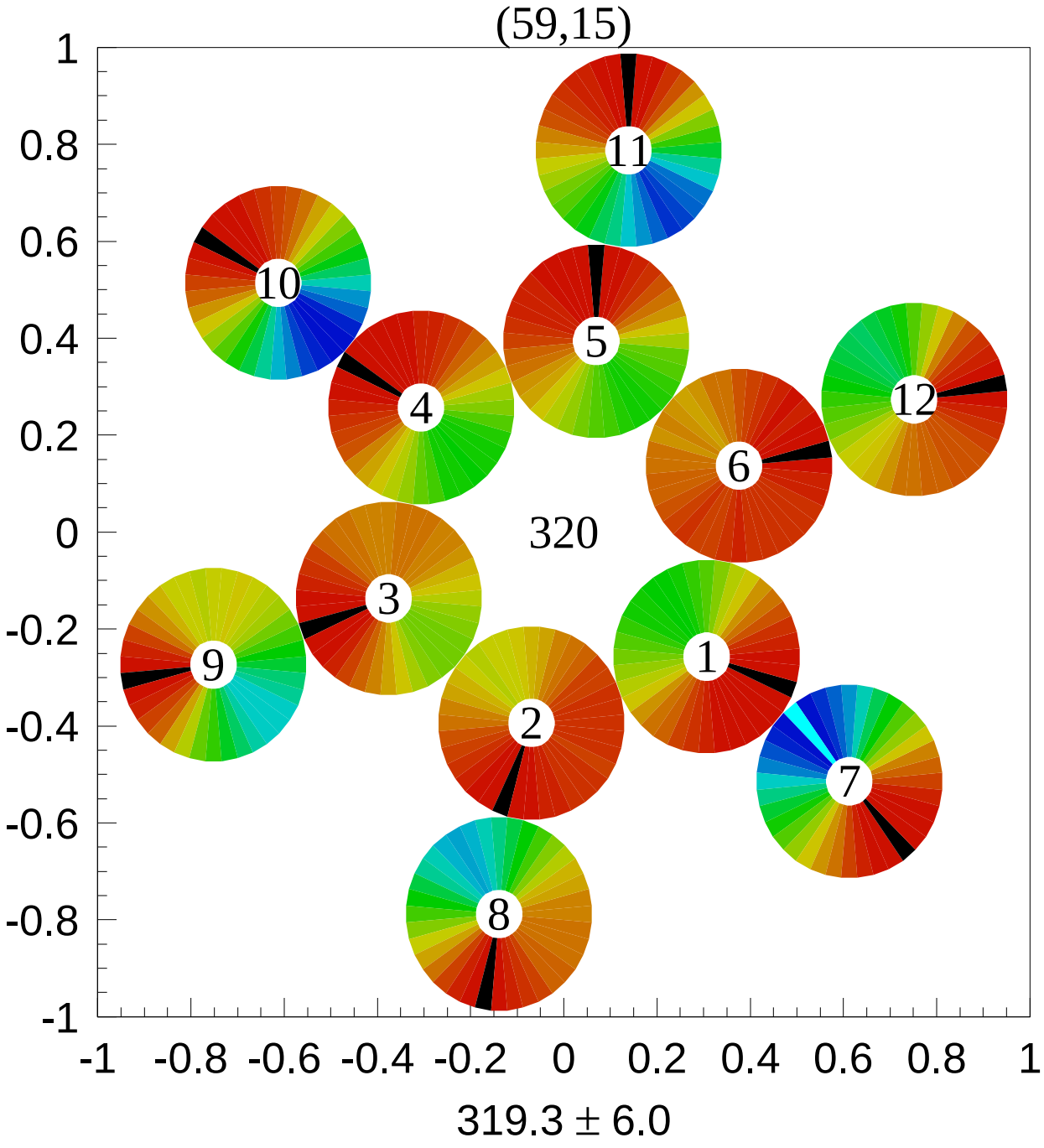

(59,13)
tilted LEDs
133 117 116 134 122 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 118 119 121 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

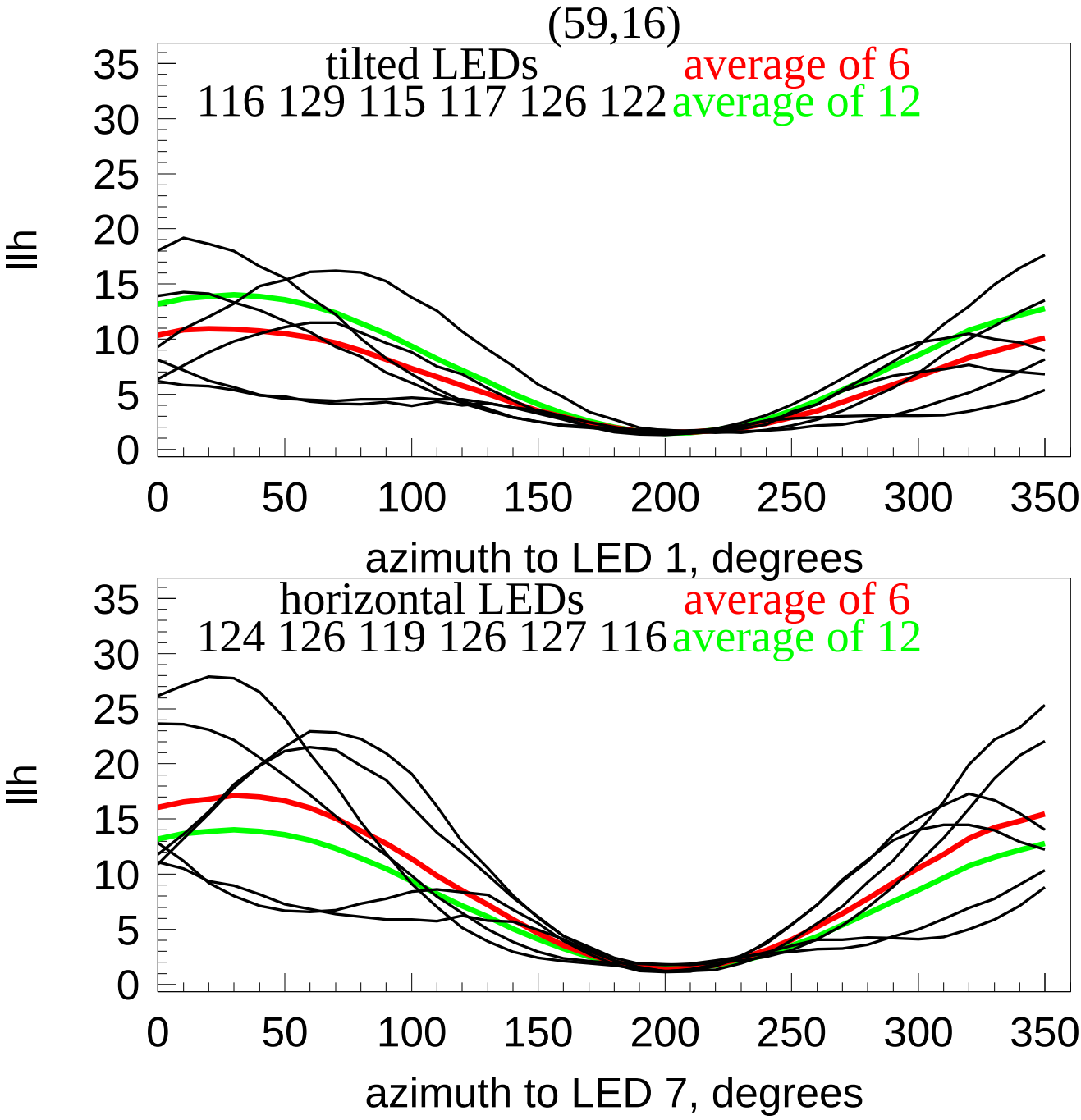

(59,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
54.4 ± 6.5

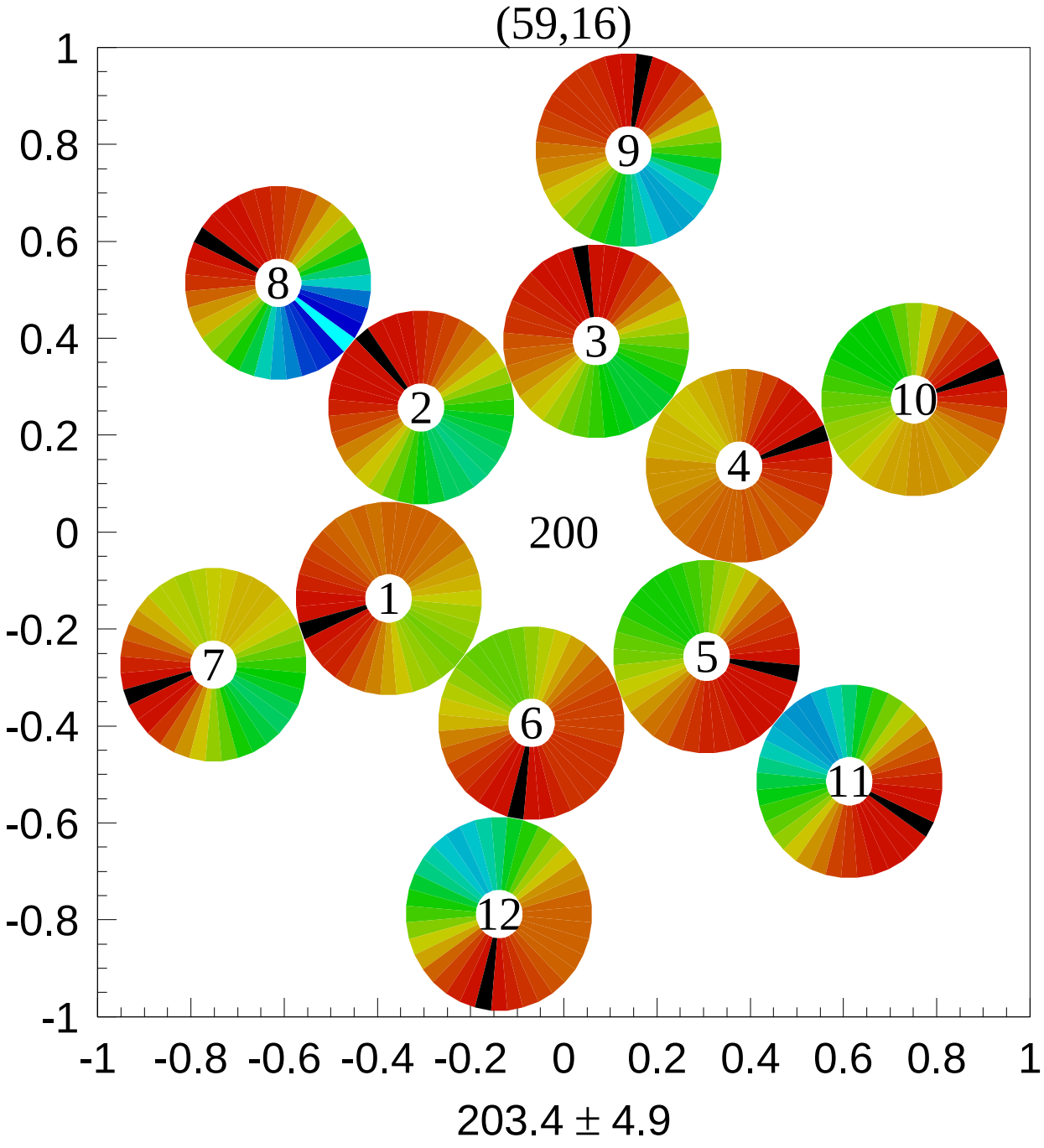

(59,14)
tilted LEDs
119 124 122 116 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 126 122 114 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

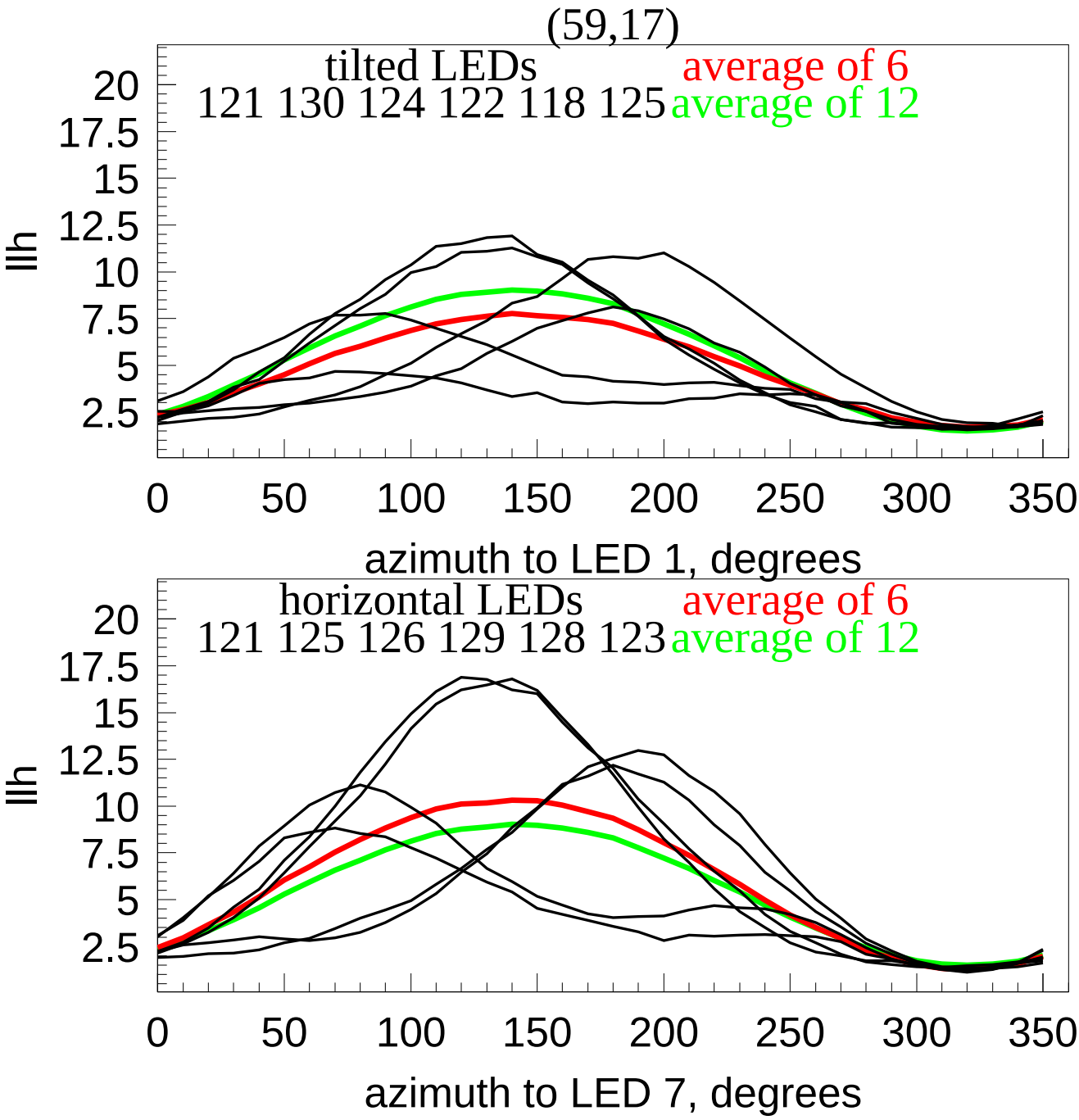

(59,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
56.5 ± 5.4

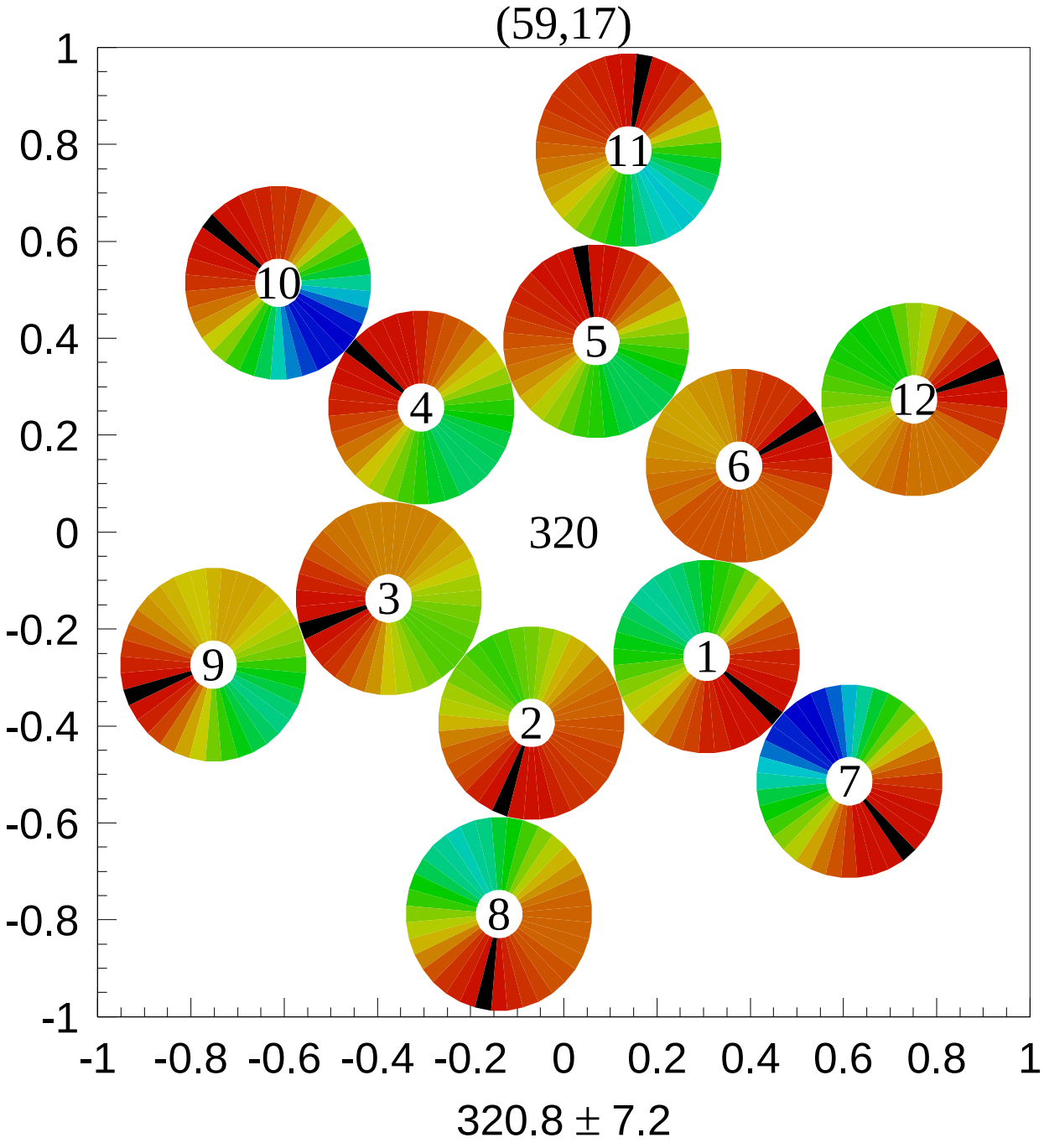

(59,15)
tilted LEDs
123 123 121 123 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 121 124 119 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

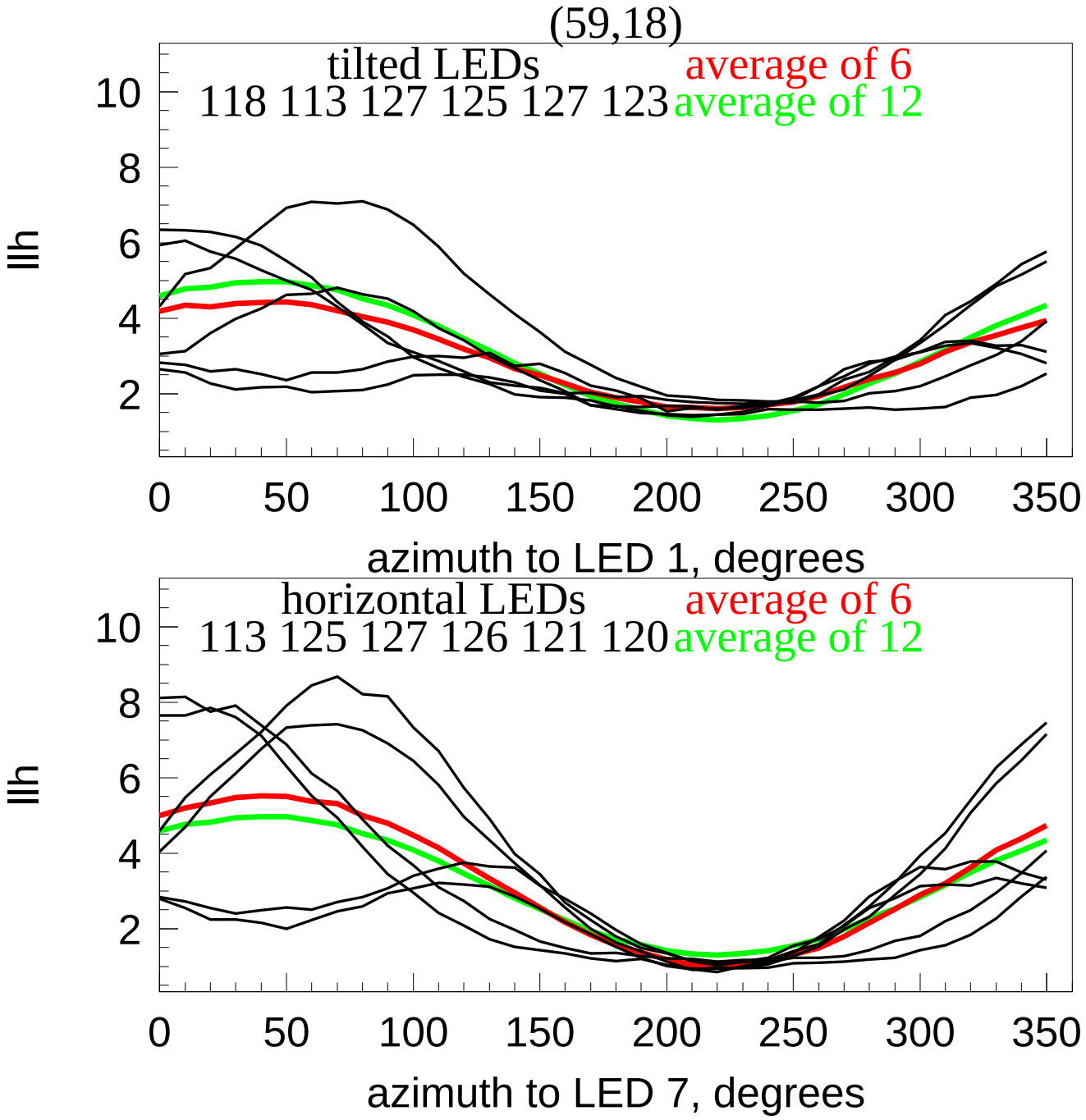

(59,15)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
319.3 ± 6.0

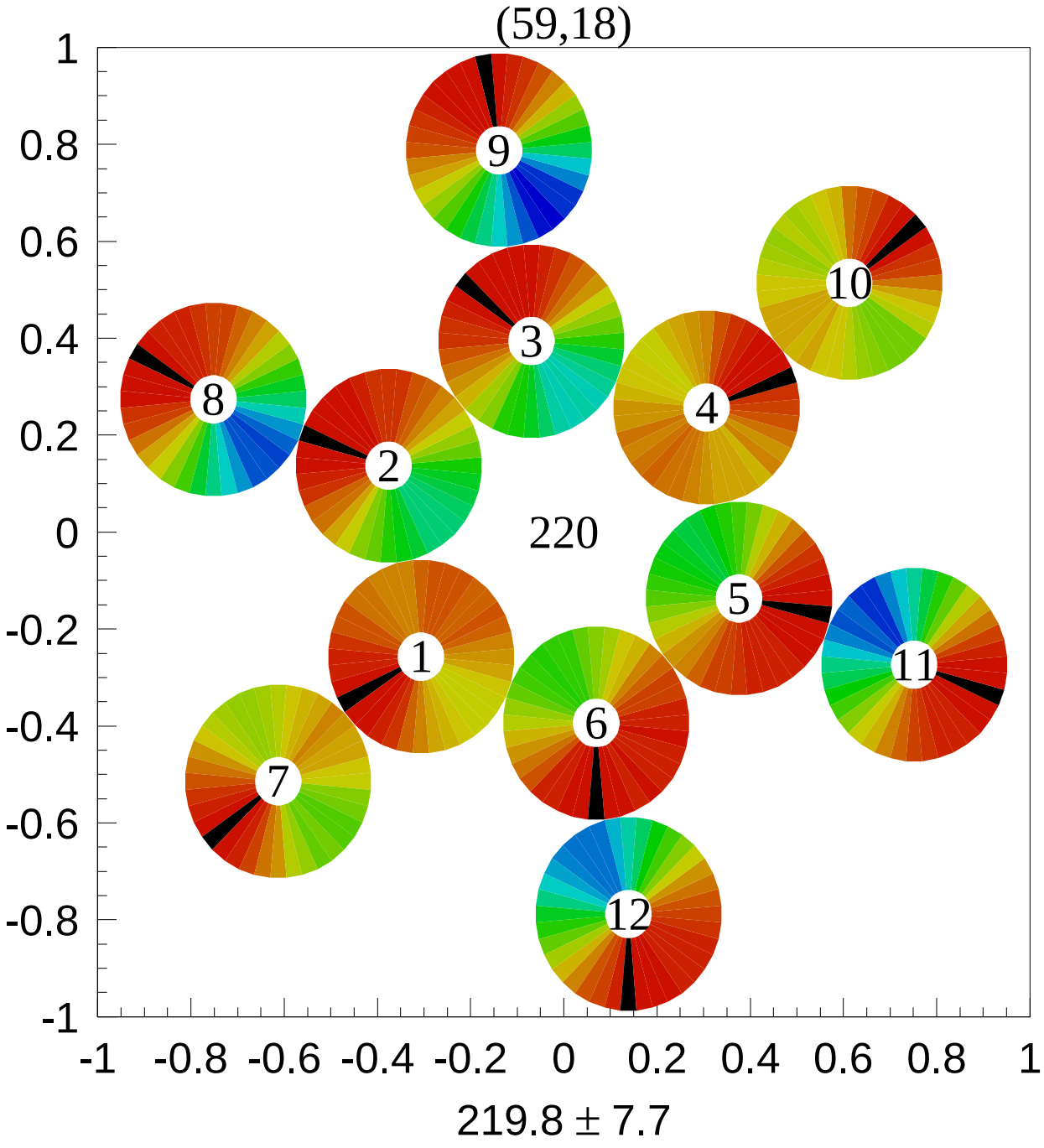

(59,16)
tilted LEDs
116 129 115 117 126 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 126 119 126 127 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

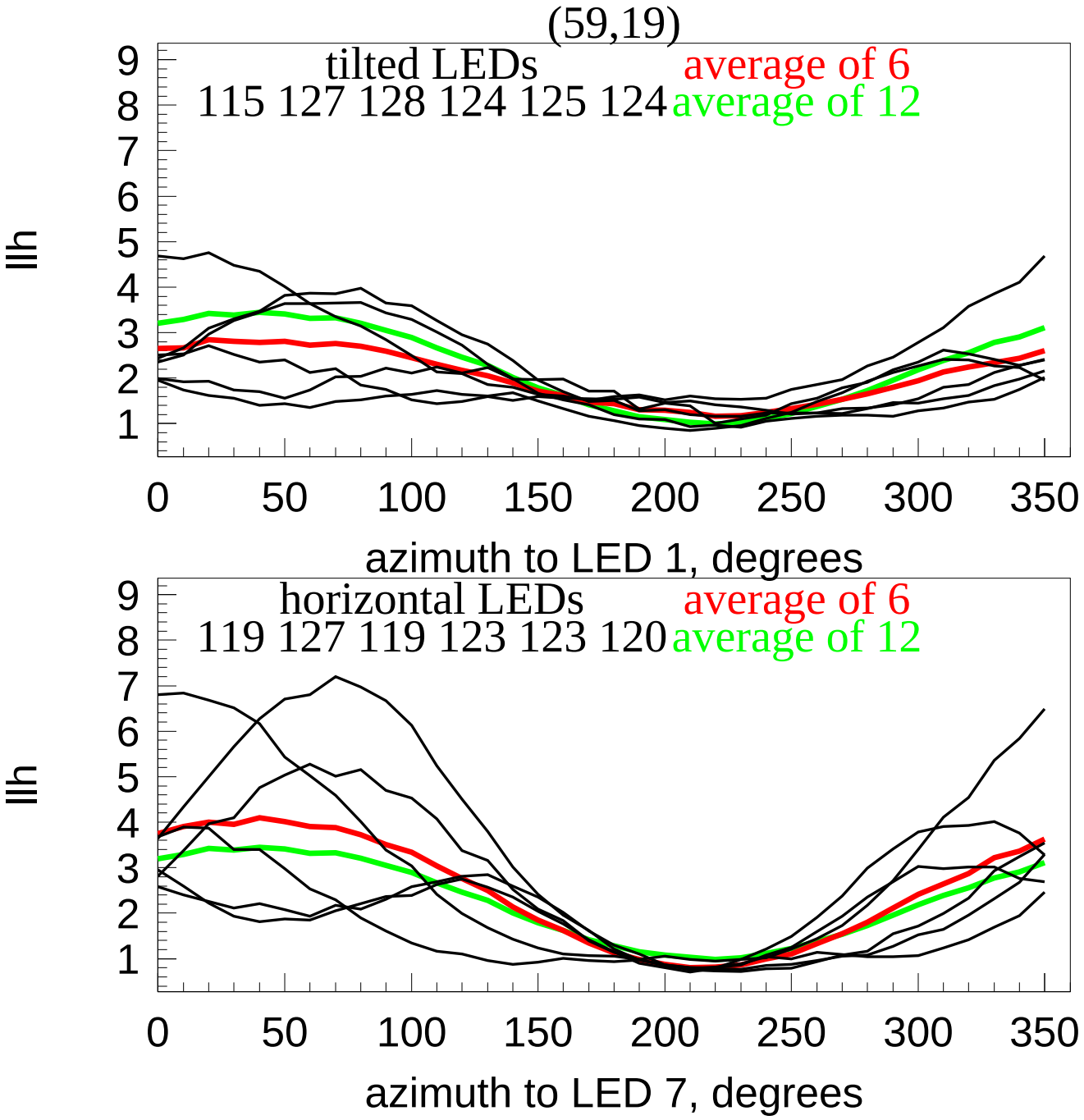

(59,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
200
1
2
3
4
5
6
7
8
9
10
11
12
203.4 ± 4.9

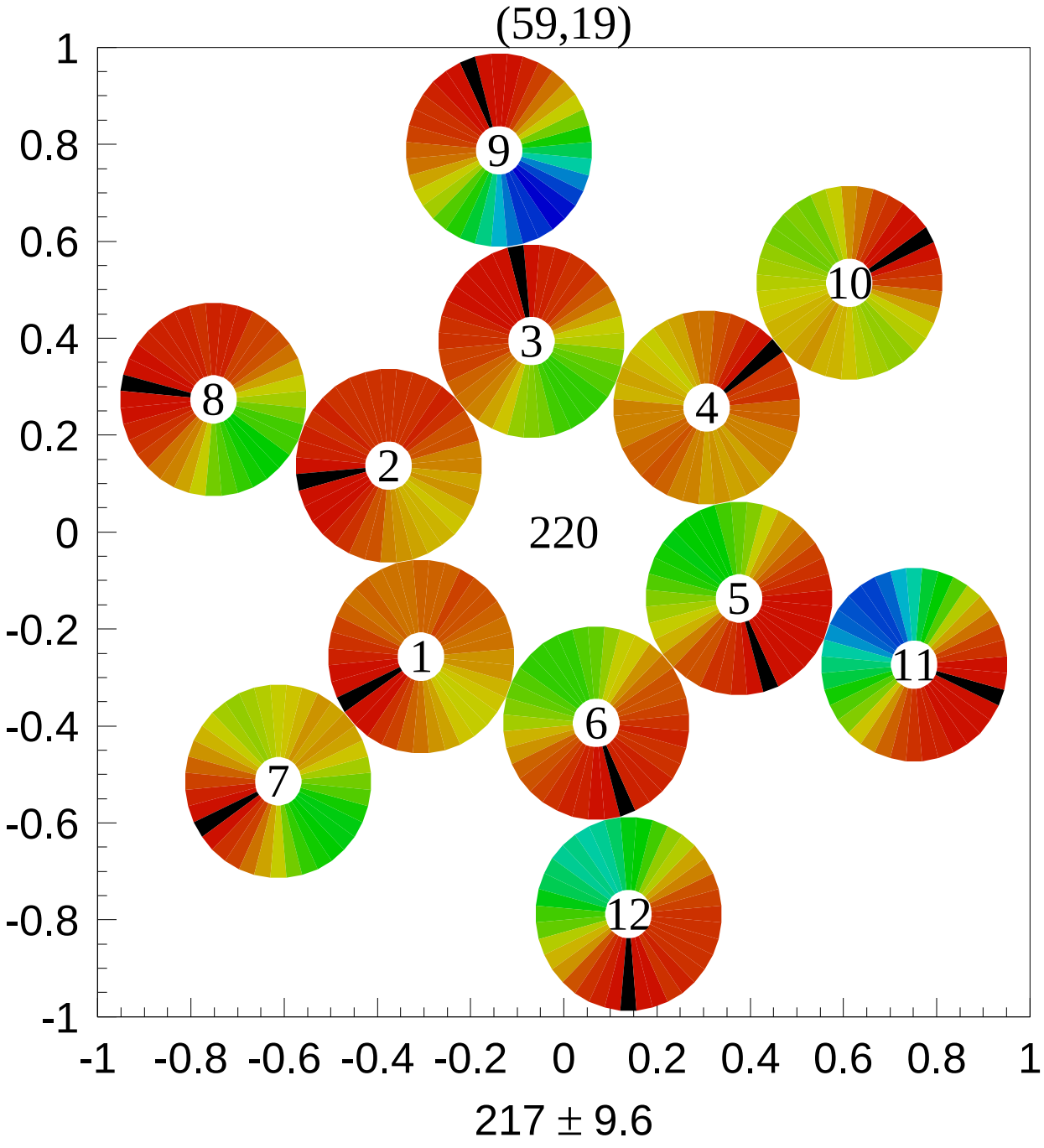

(59,17)
tilted LEDs
121 130 124 122 118 125
average of 6
average of 12
llh
20
17.5
15
12.5
10
7.5
5
2.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 125 126 129 128 123
average of 6
average of 12
llh
20
17.5
15
12.5
10
7.5
5
2.5
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

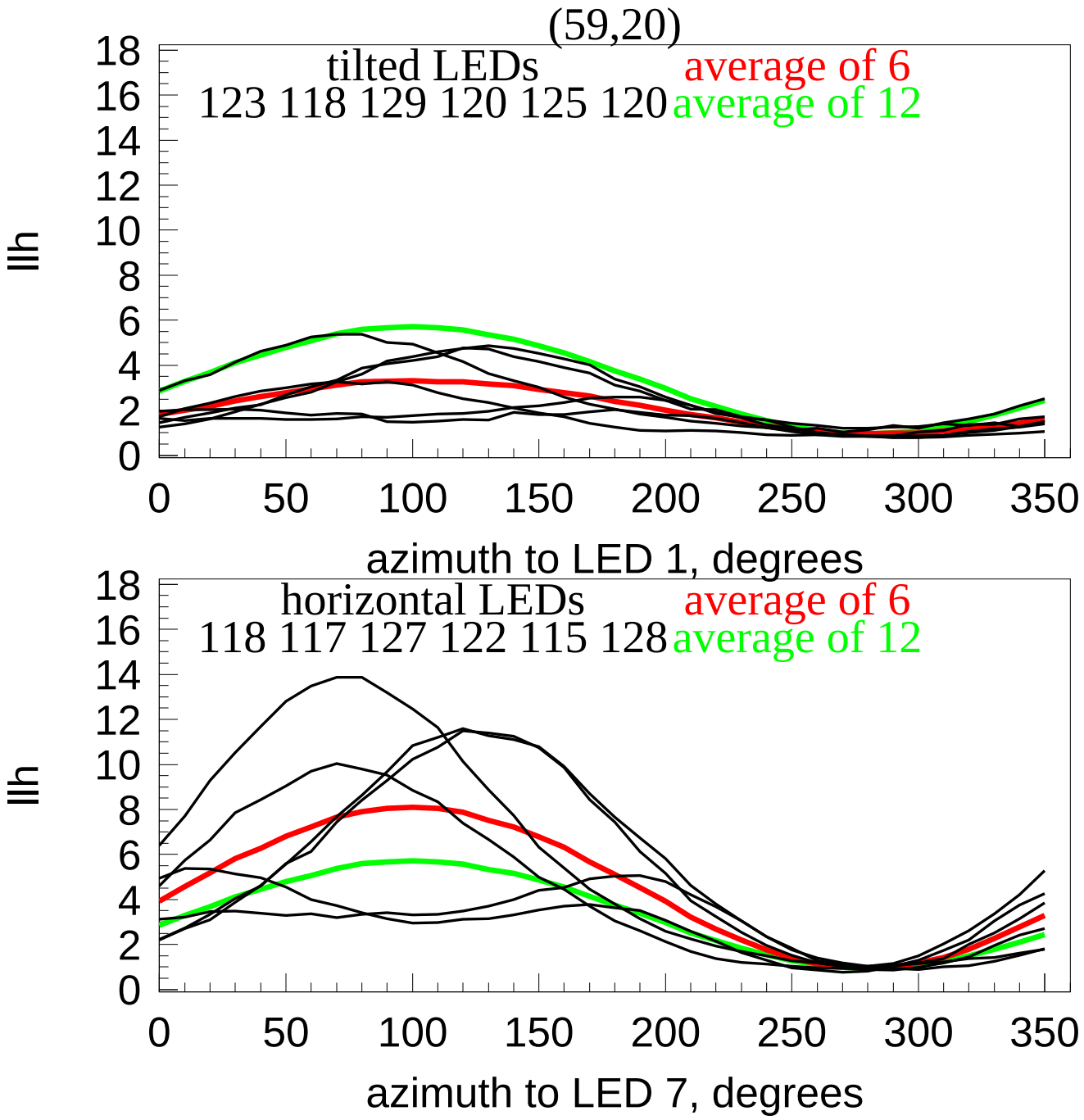

(59,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
320
11
10
5
4
12
6
3
9
1
2
7
8
320.8 ± 7.2

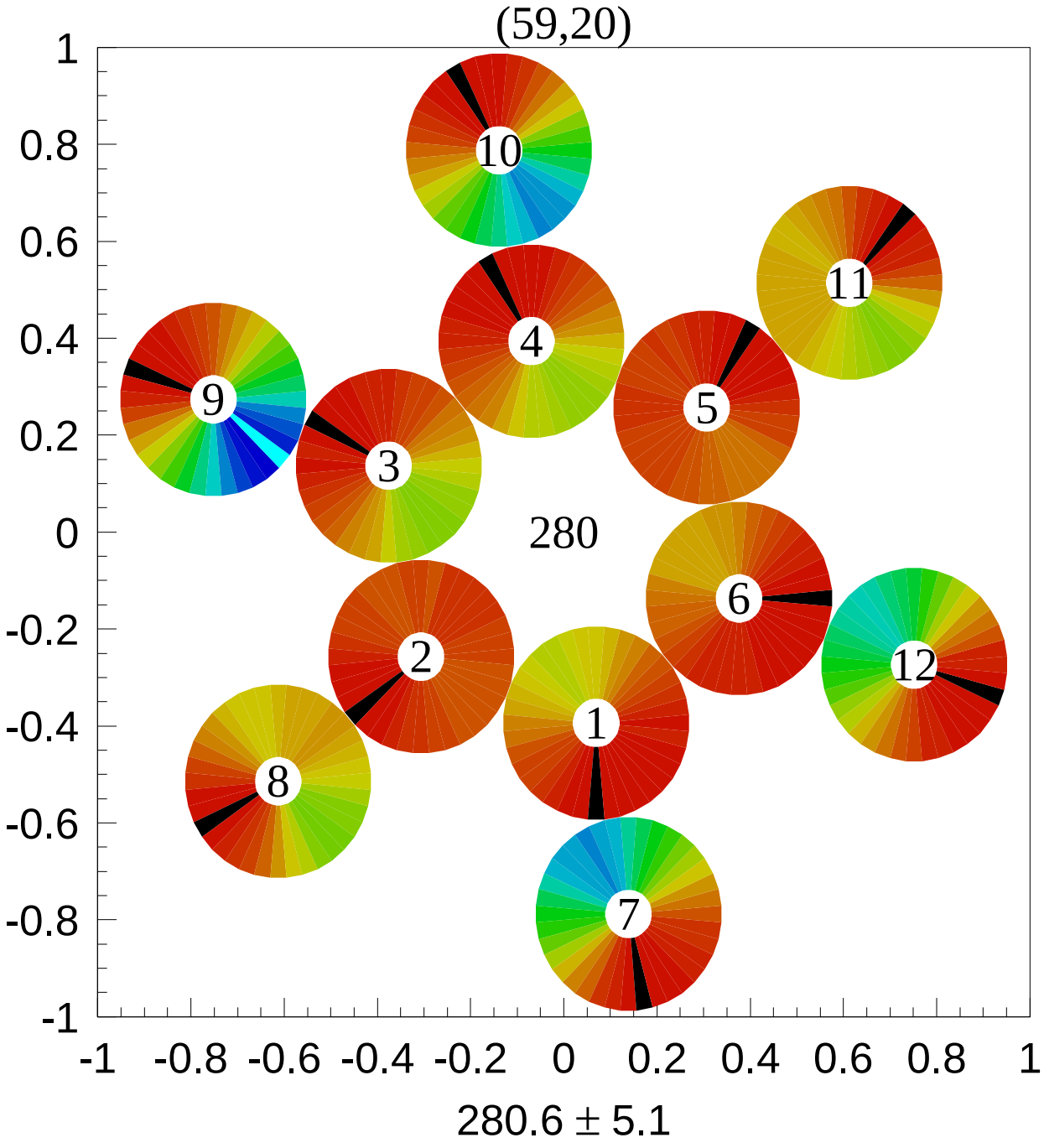

(59,18)
tilted LEDs
118 113 127 125 127 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 125 127 126 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

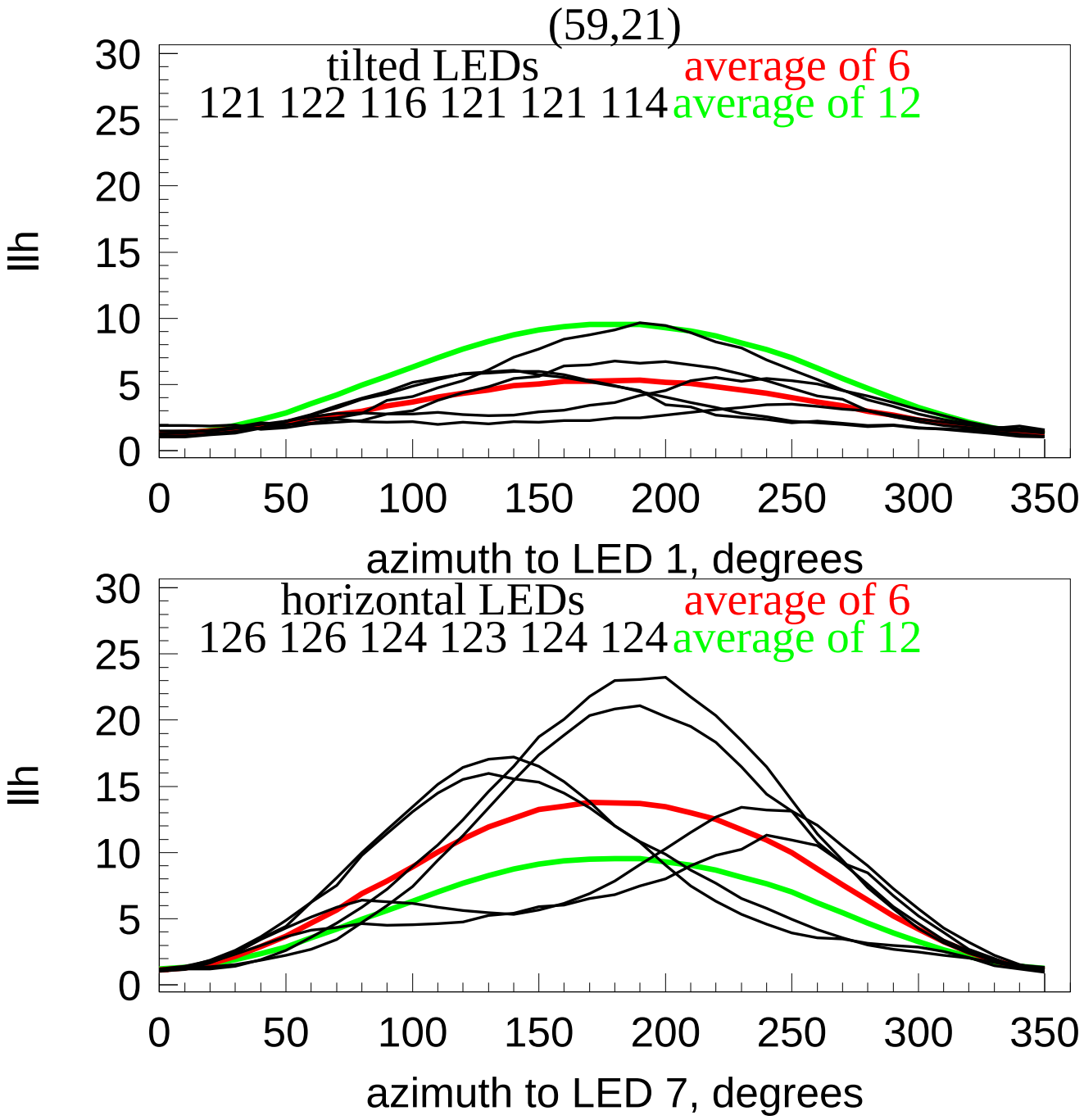

(59,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
219.8 ± 7.7

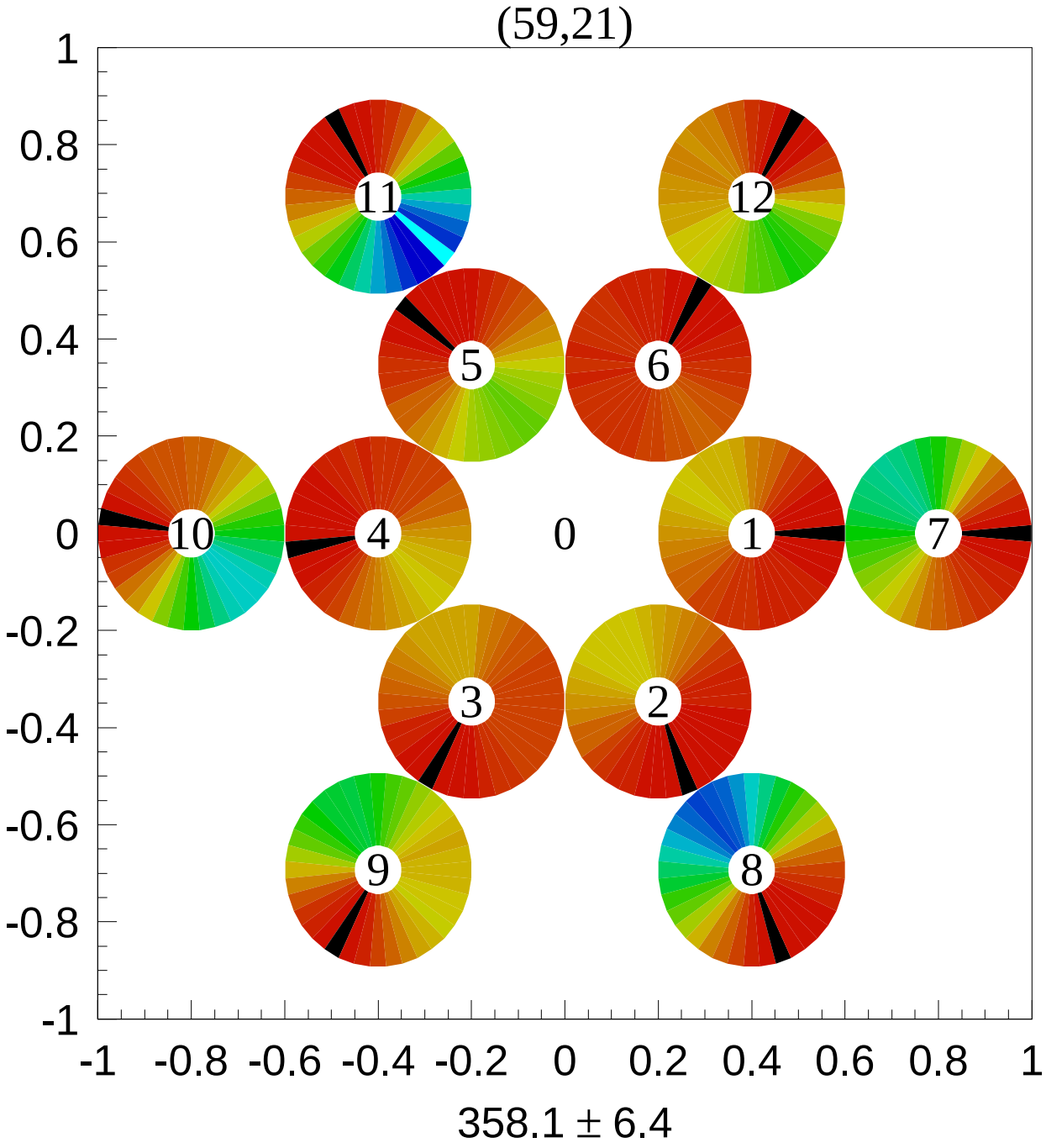

(59,19)
tilted LEDs
115 127 128 124 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 127 119 123 123 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

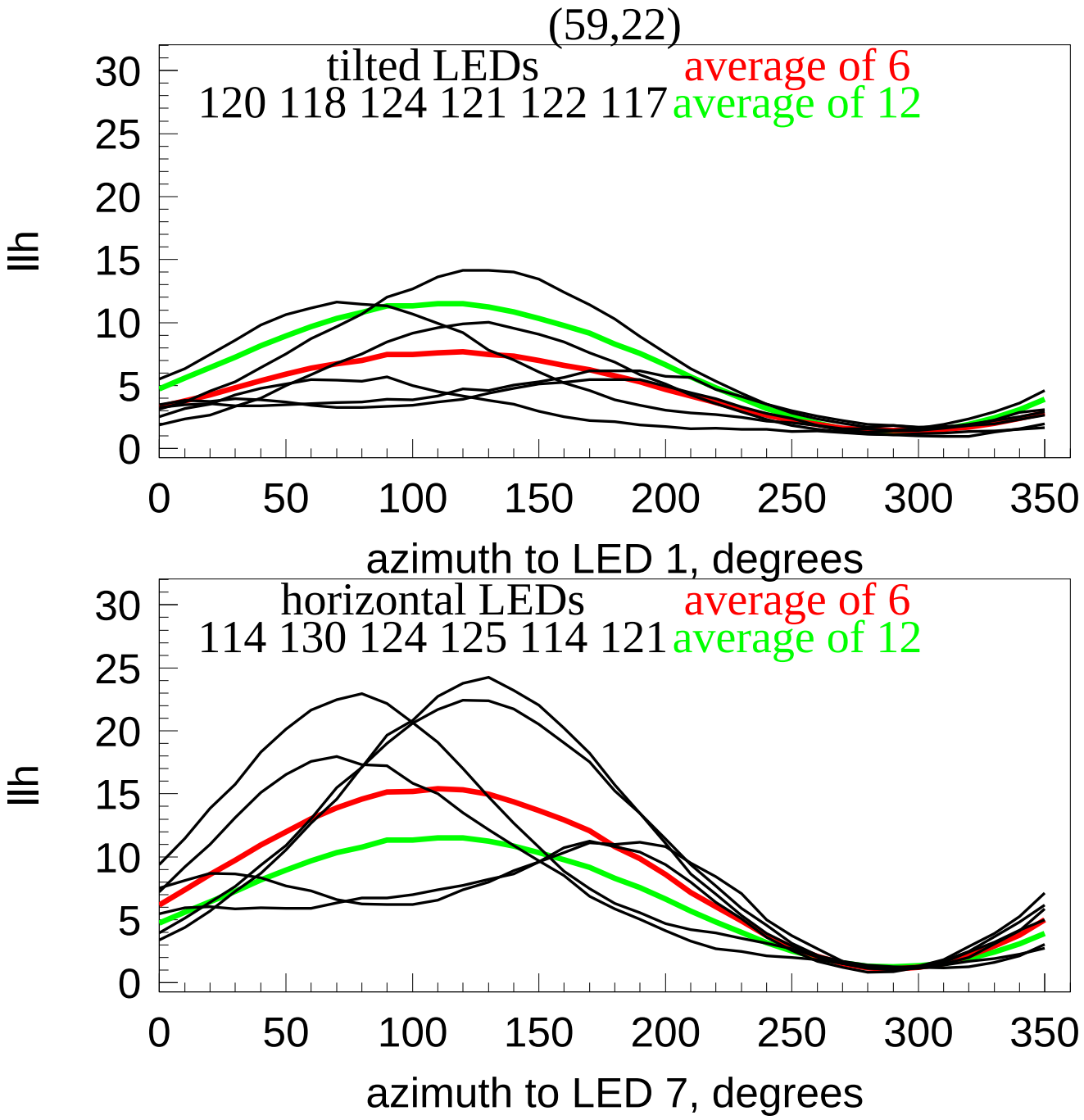

(59,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
217 ± 9.6

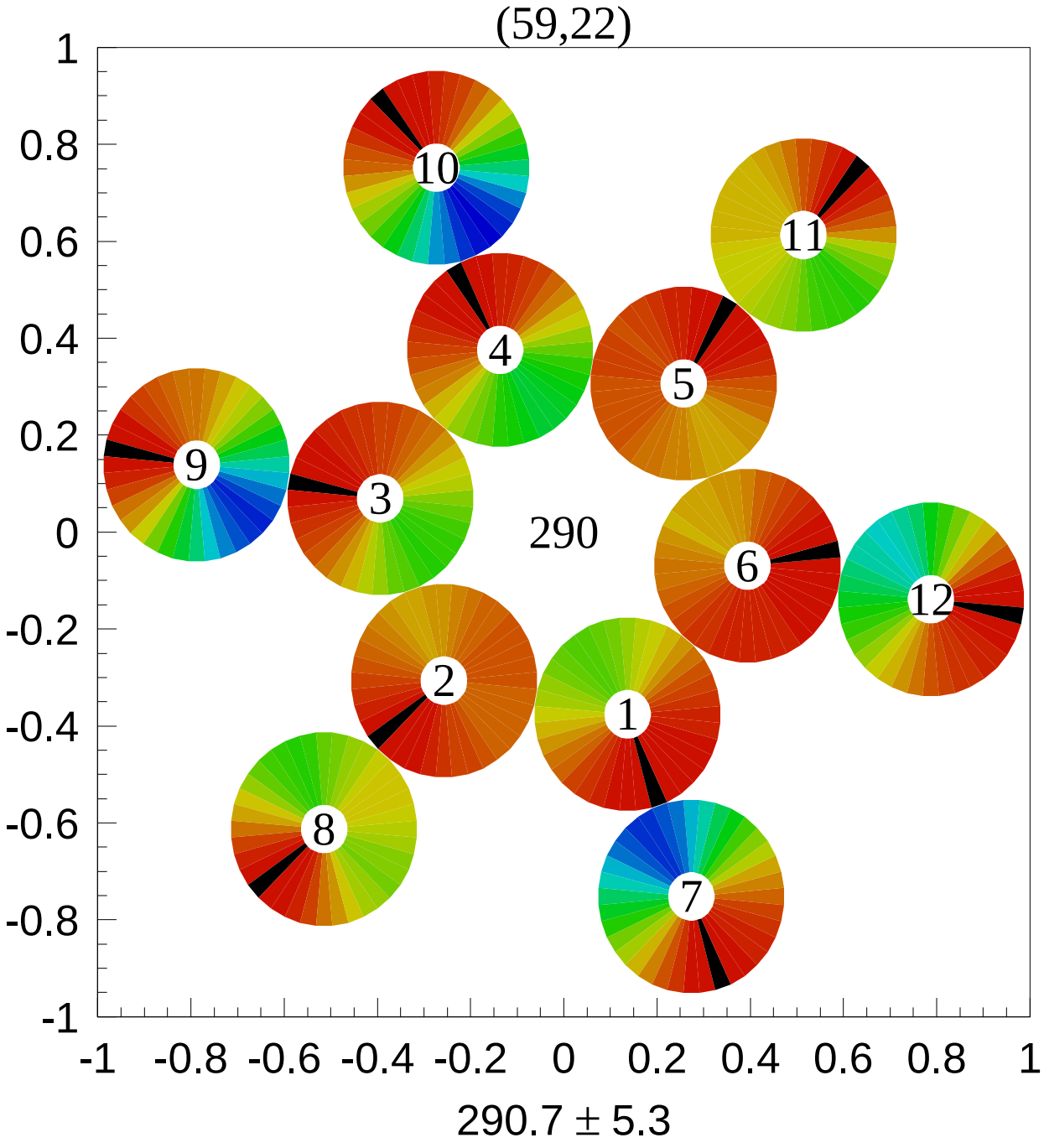

(59,20)
tilted LEDs
123 118 129 120 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 117 127 122 115 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

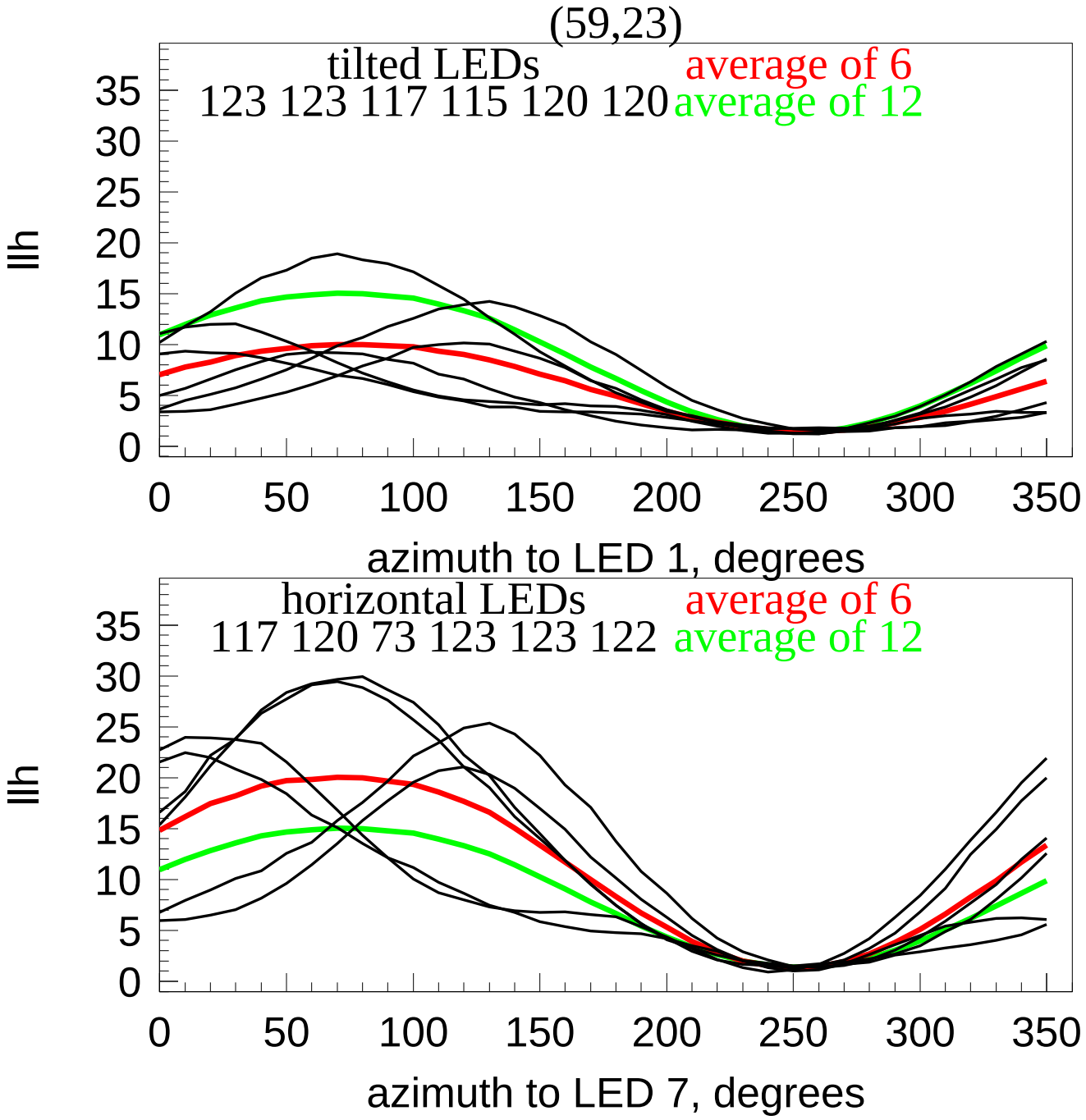

(59,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
280
280.6 ± 5.1
1
2
3
4
5
6
7
8
9
10
11
12

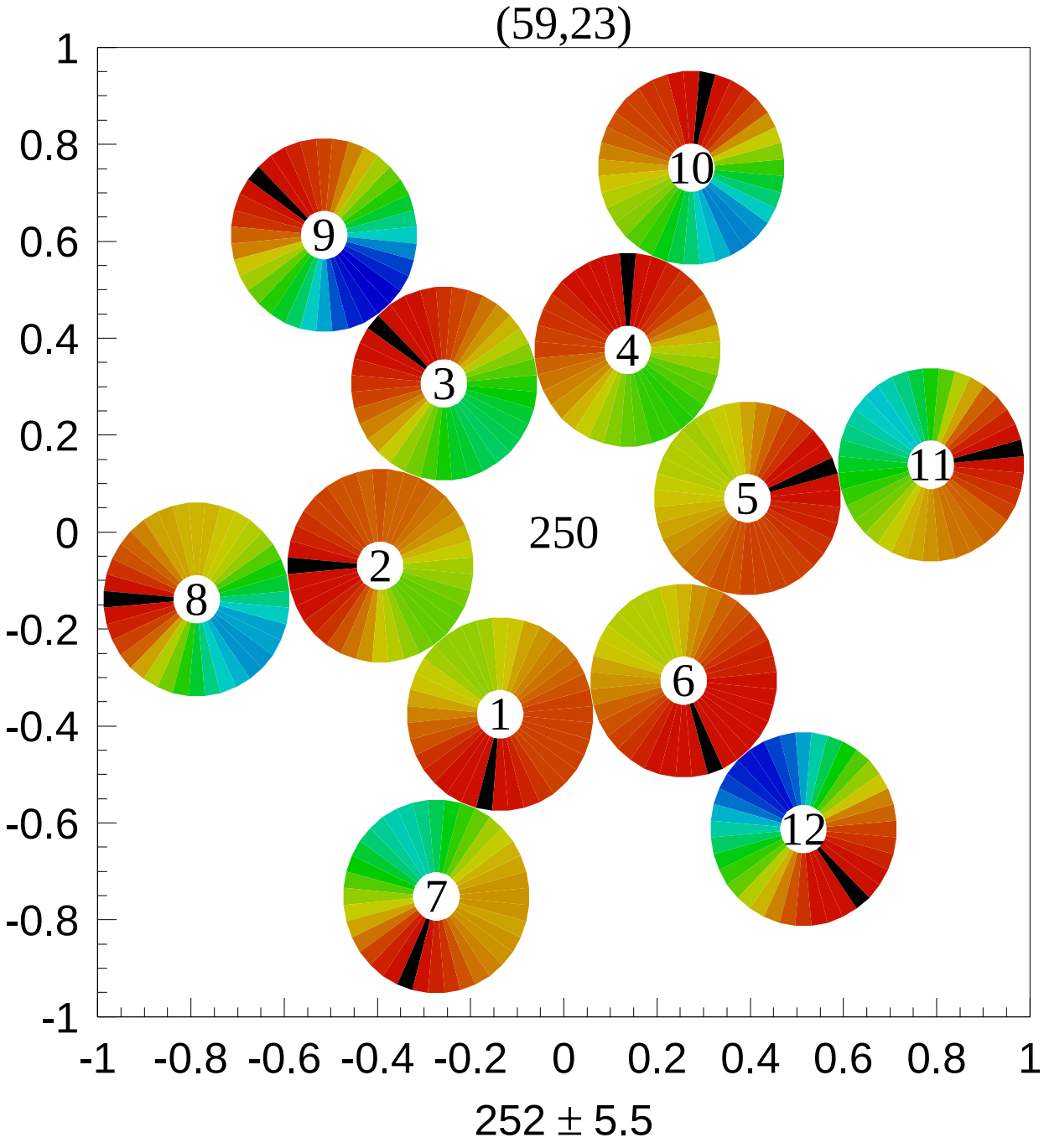

(59,21)
tilted LEDs
121 122 116 121 121 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 124 123 124 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

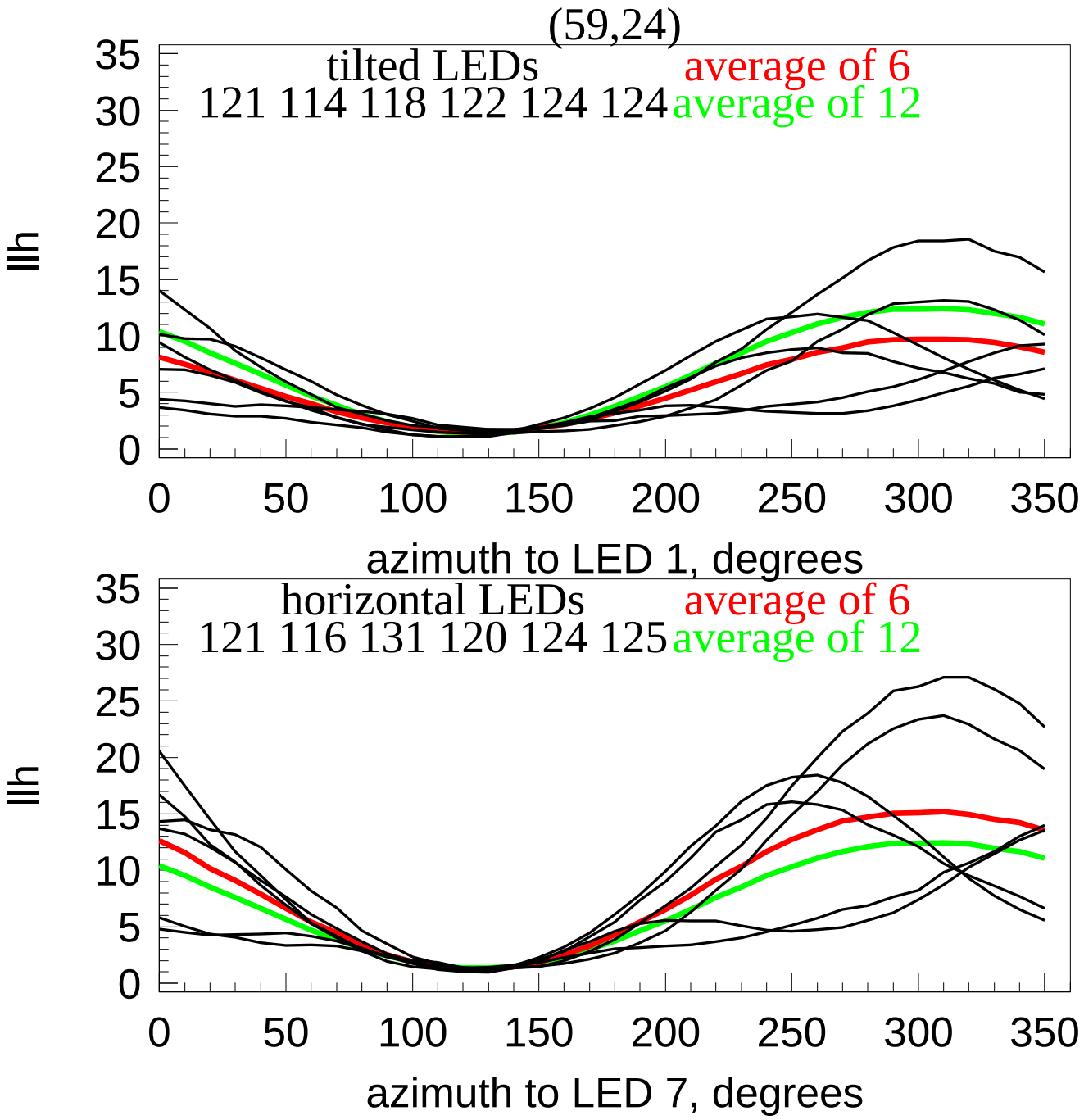

(59,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
358.1 ± 6.4

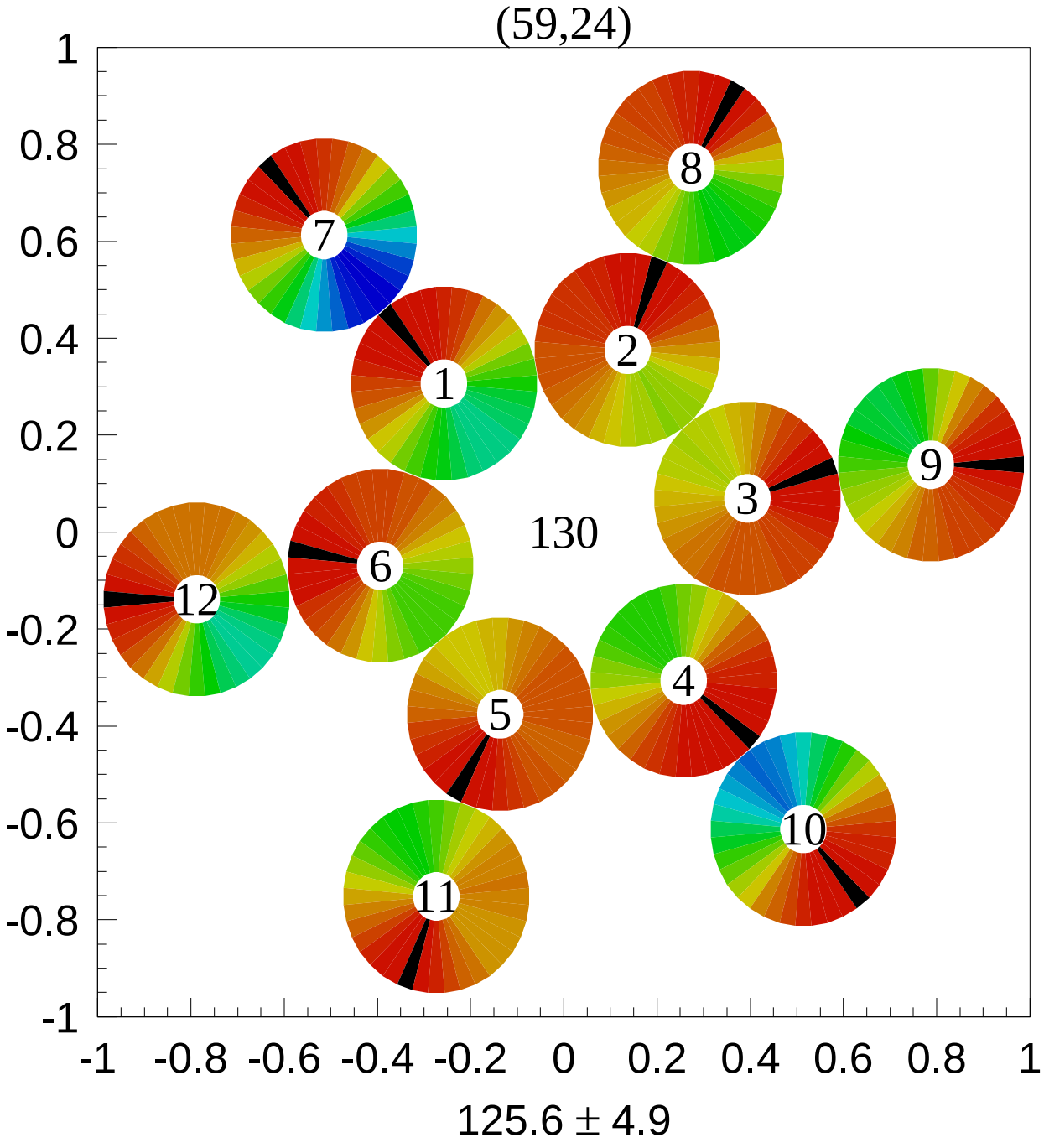

(59,22)
tilted LEDs
120 118 124 121 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 130 124 125 114 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

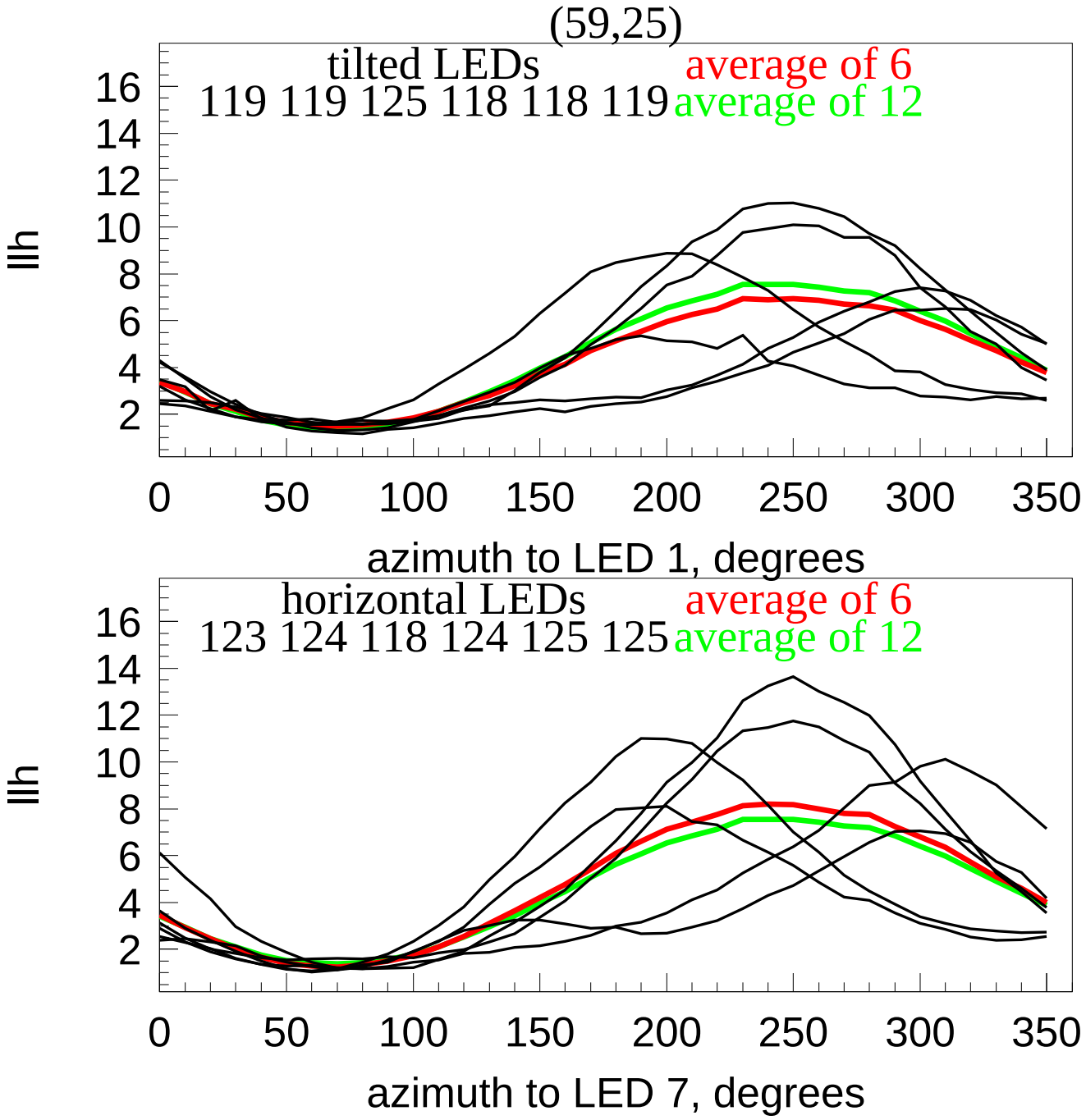

(59,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
290
290.7 ± 5.3
10
11
4
5
9
3
6
12
2
1
8
7

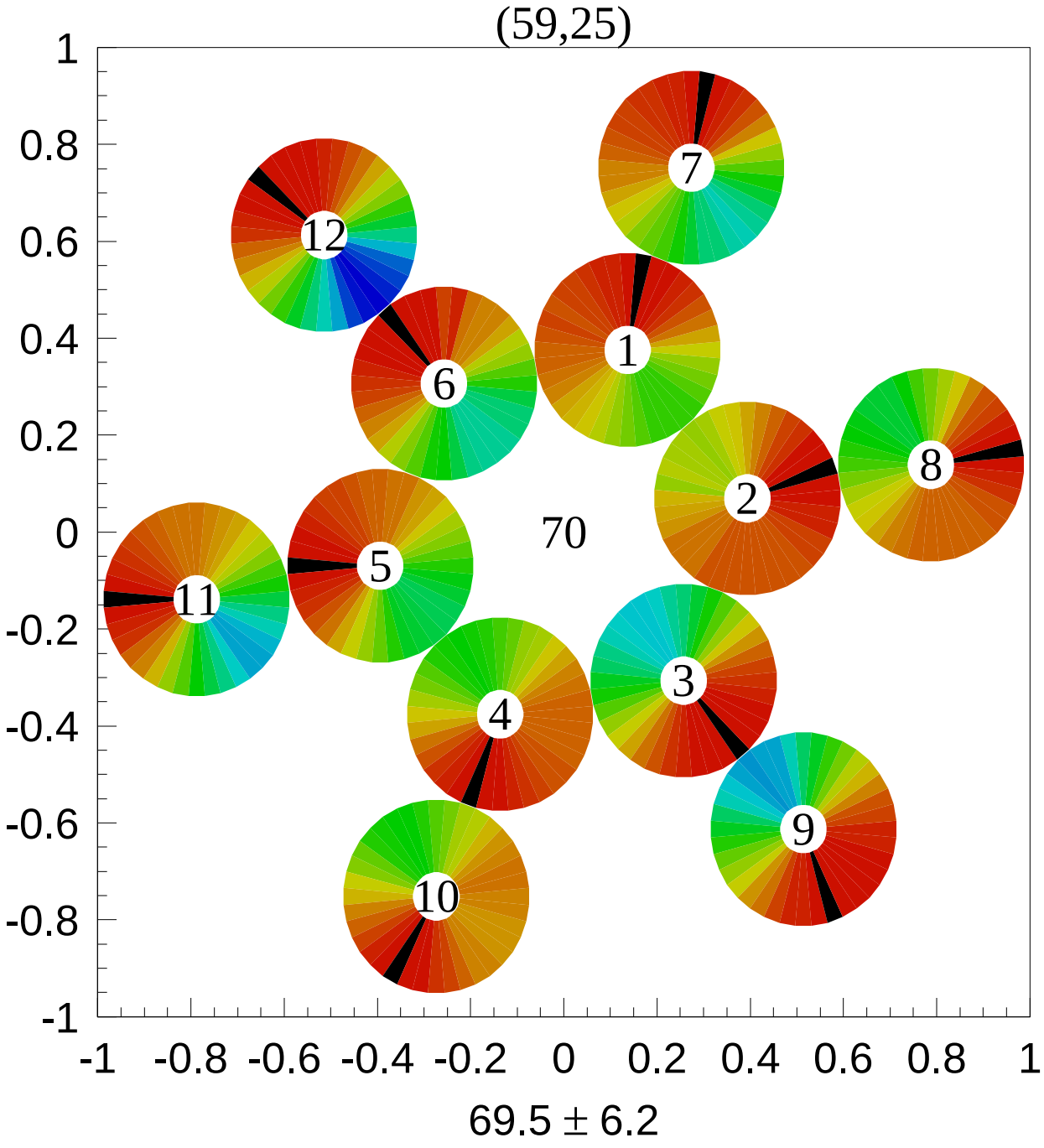

(59,23)
tilted LEDs
123 123 117 115 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 120 73 123 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

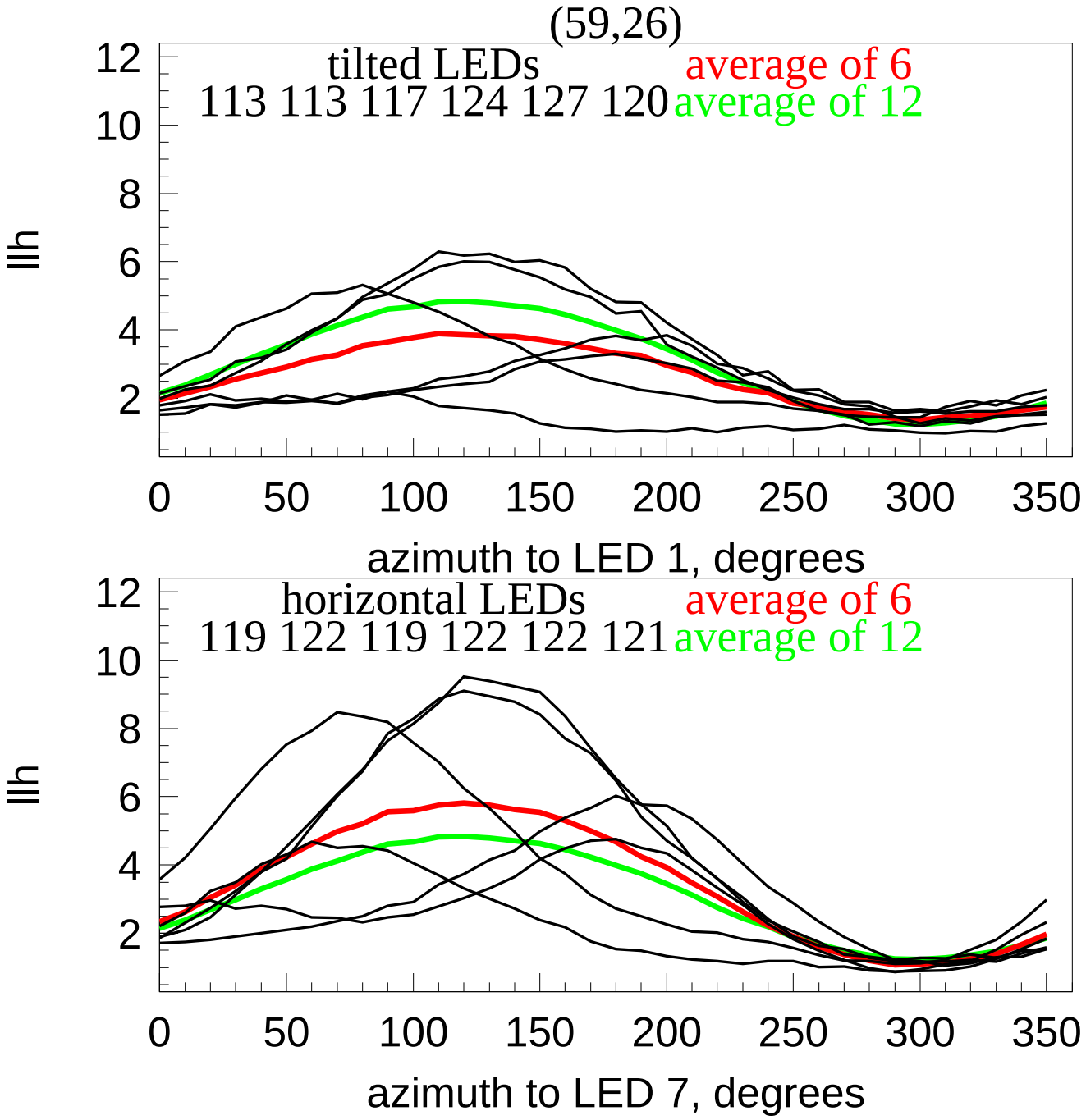

(59,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
252 ± 5.5
250
1
2
3
4
5
6
7
8
9
10
11
12

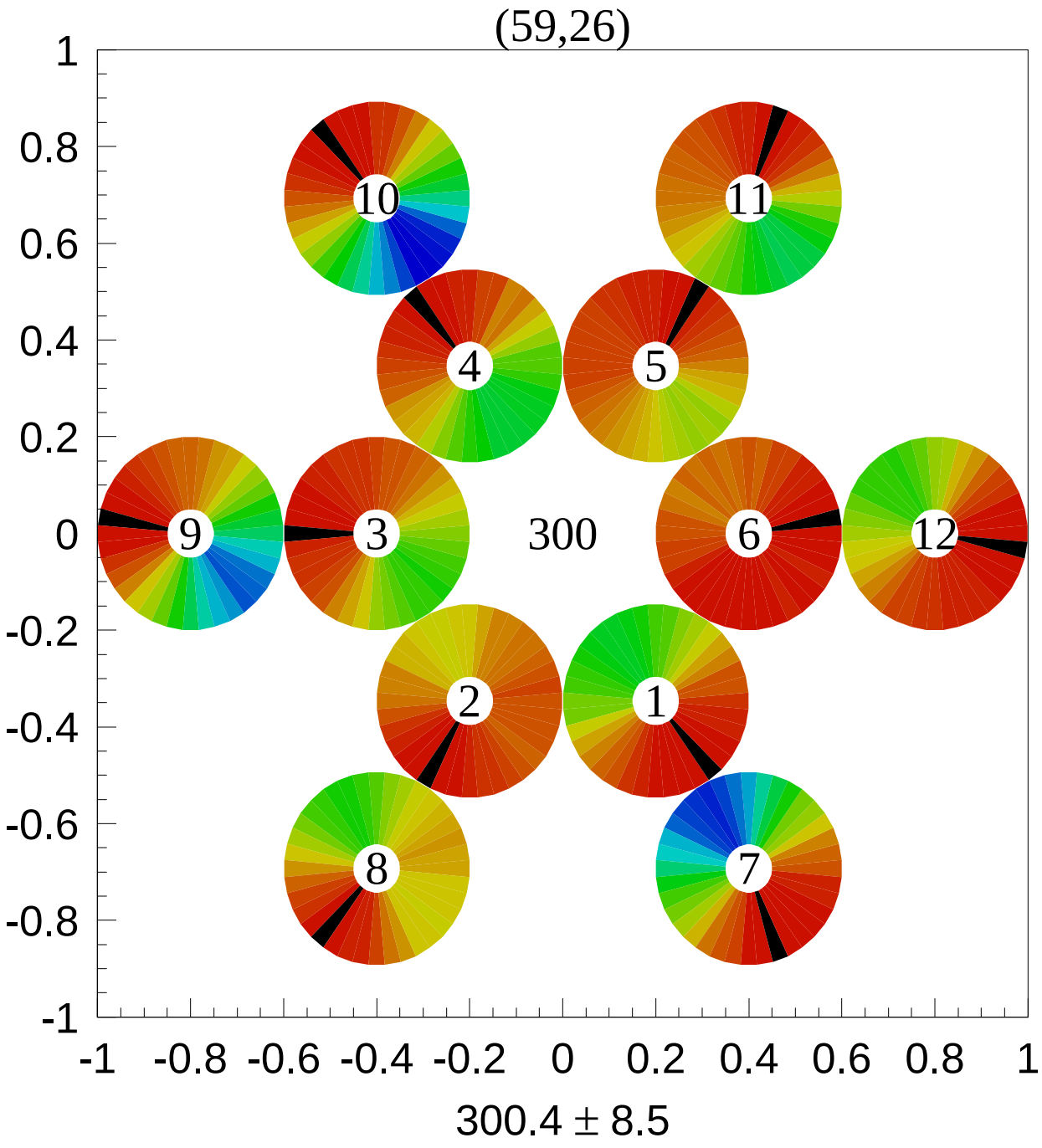

(59,24)
tilted LEDs
121 114 118 122 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 116 131 120 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

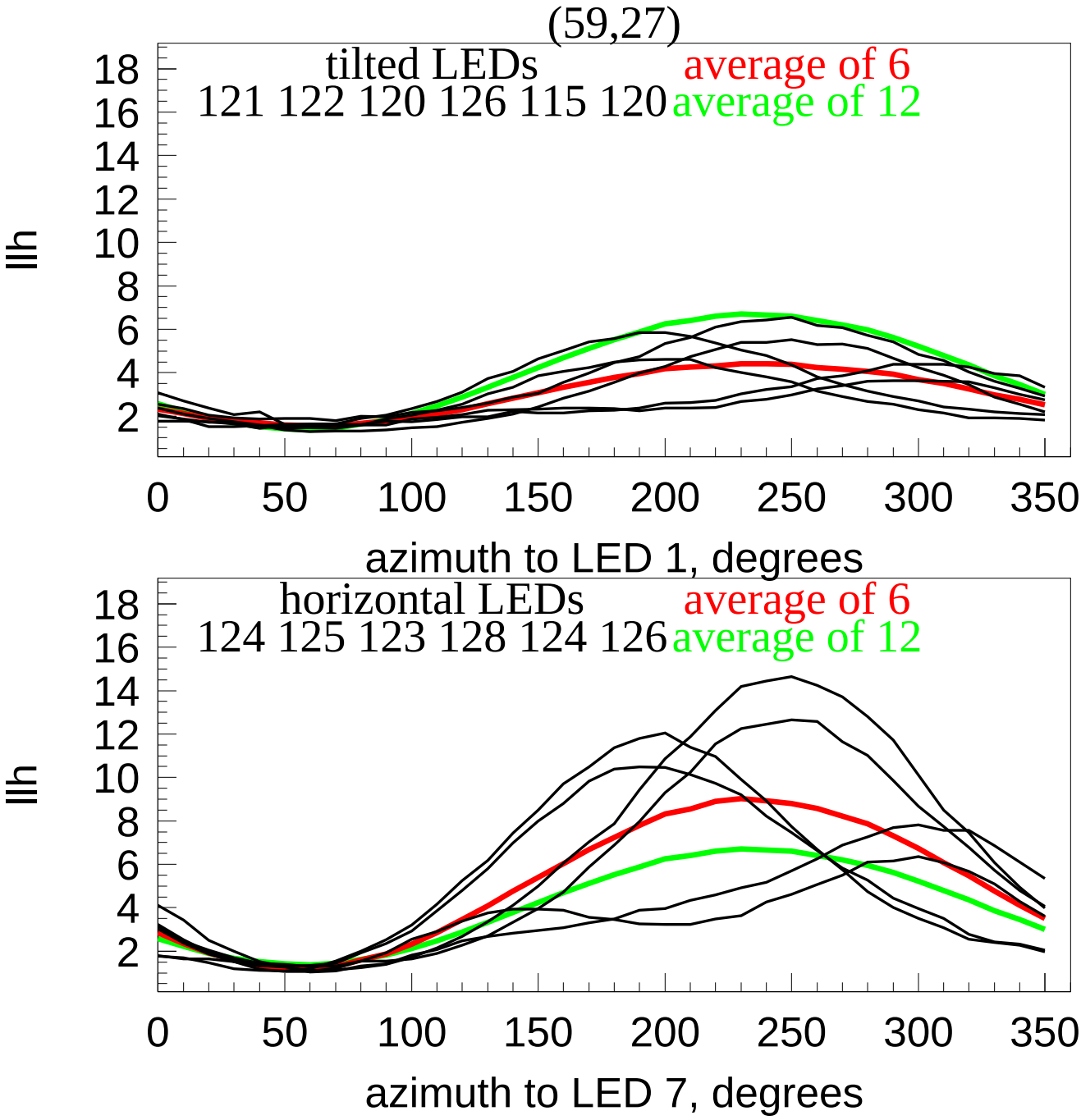

(59,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
125.6 ± 4.9
130
1
2
3
4
5
6
7
8
9
10
11
12

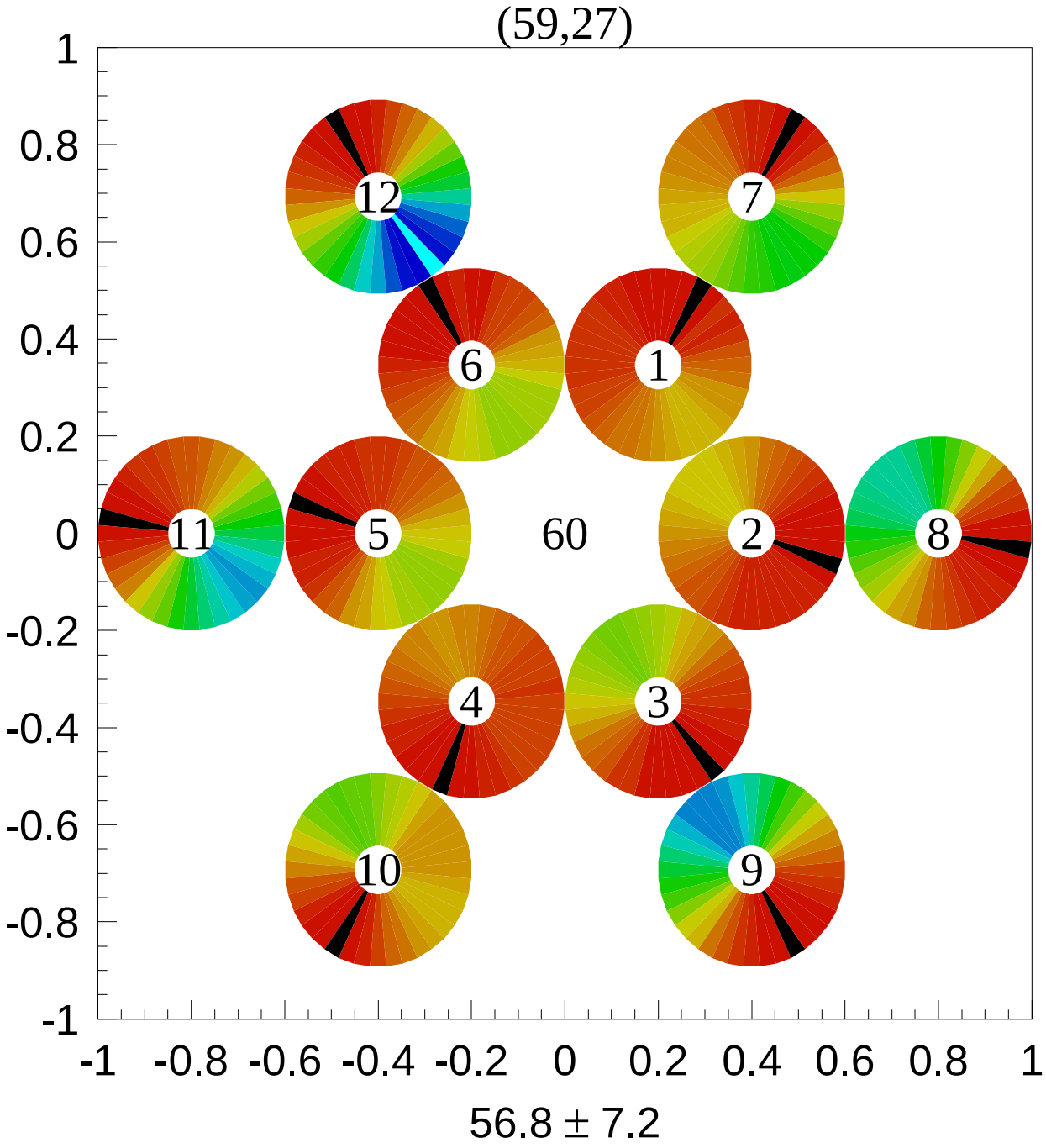

(59,25)
tilted LEDs
119 119 125 118 118 119
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 124 118 124 125 125
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

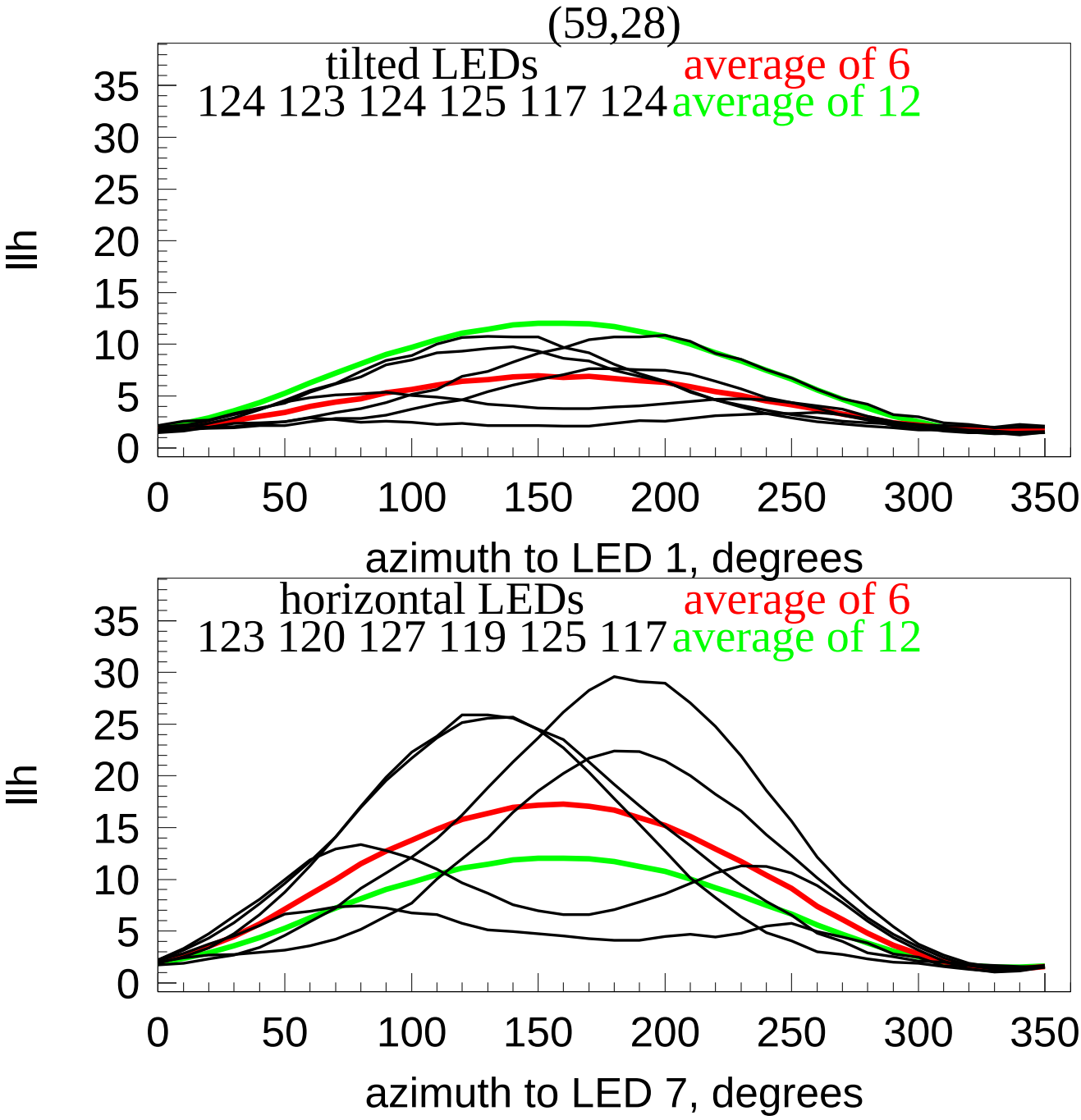

(59,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
2
8
70
5
11
3
4
9
10
69.5 ± 6.2

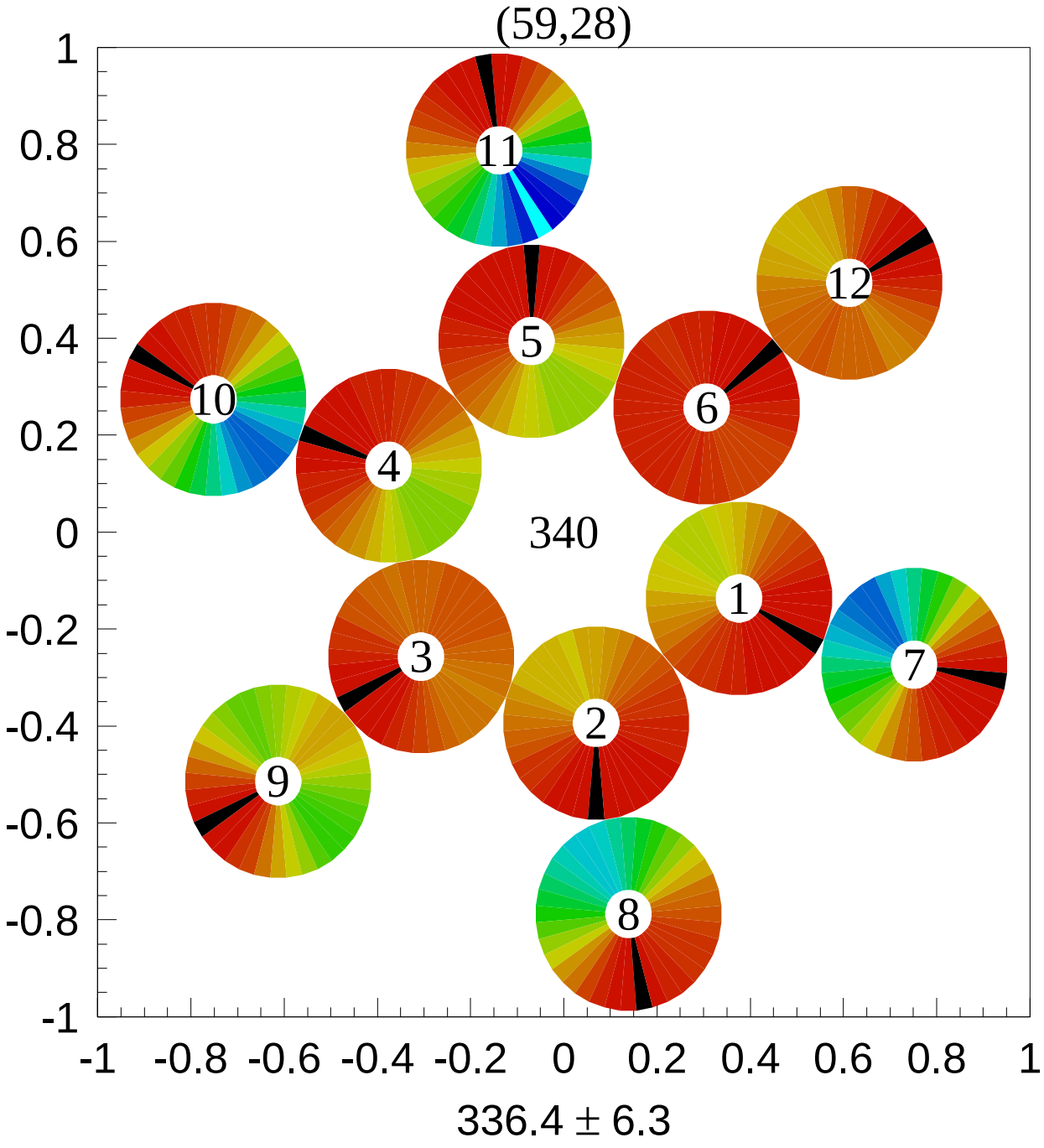

(59,26)
tilted LEDs
113 113 117 124 127 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 119 122 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

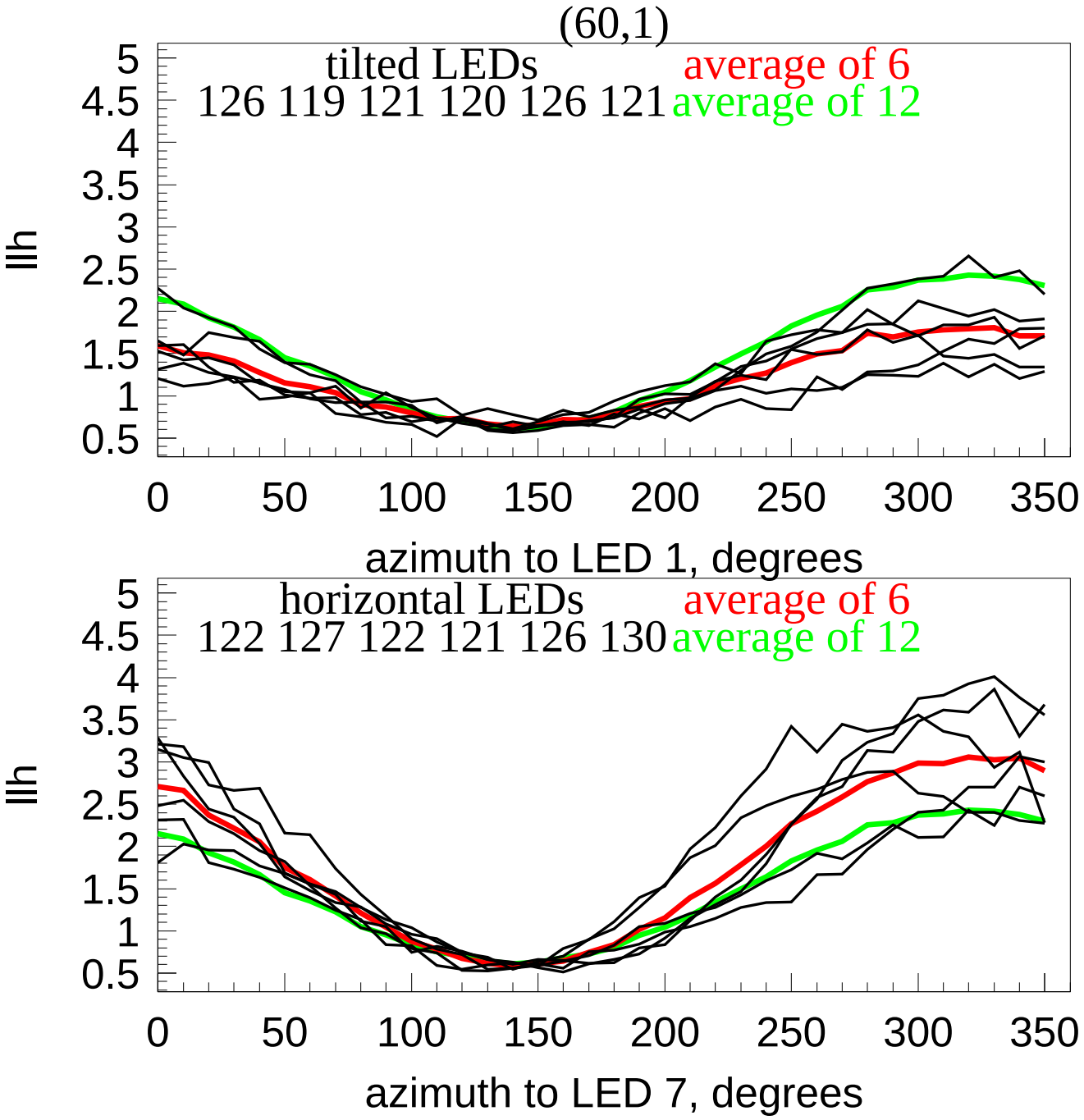

(59,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
300.4 ± 8.5

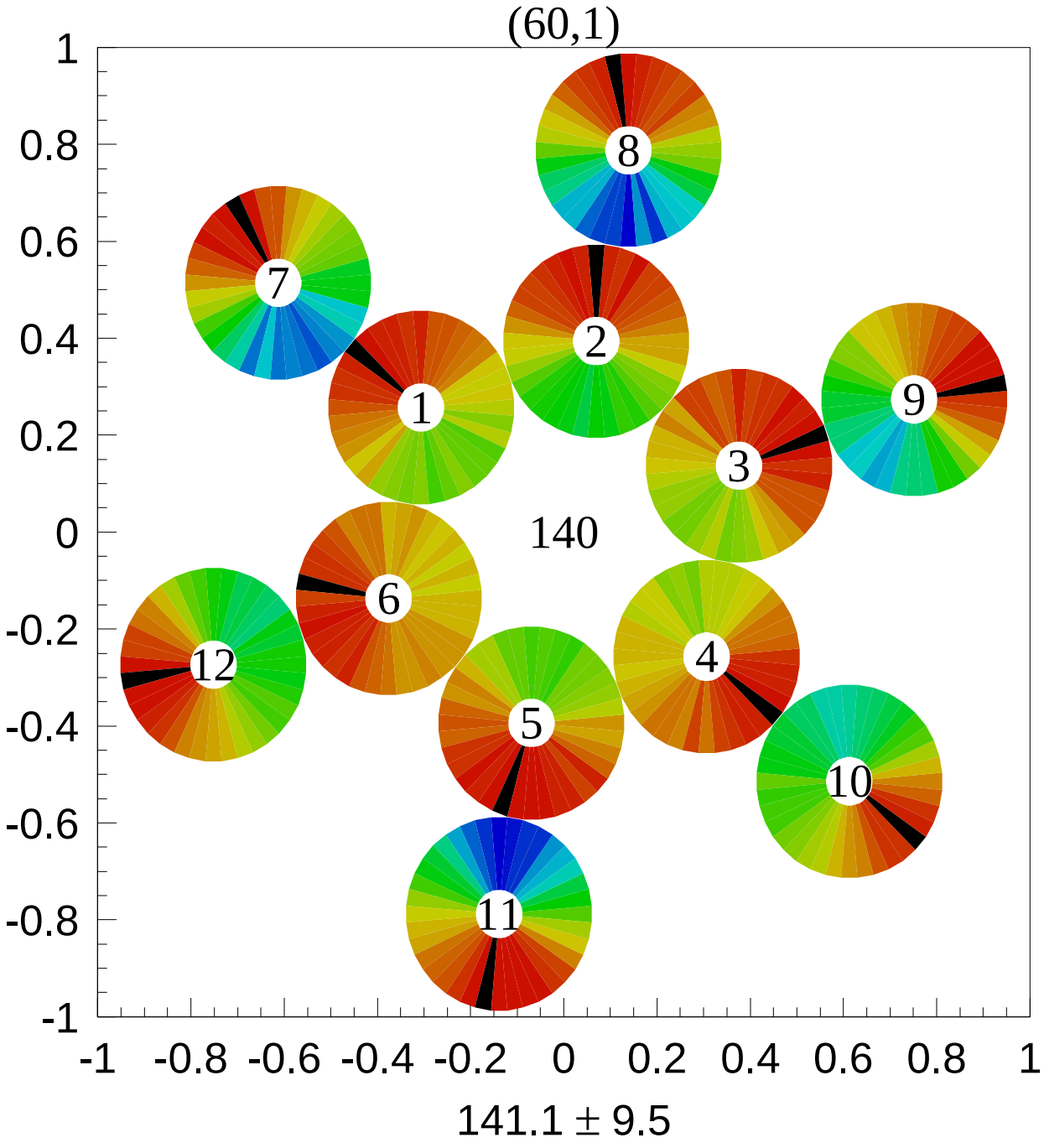

(59,27)
tilted LEDs
121 122 120 126 115 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 125 123 128 124 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

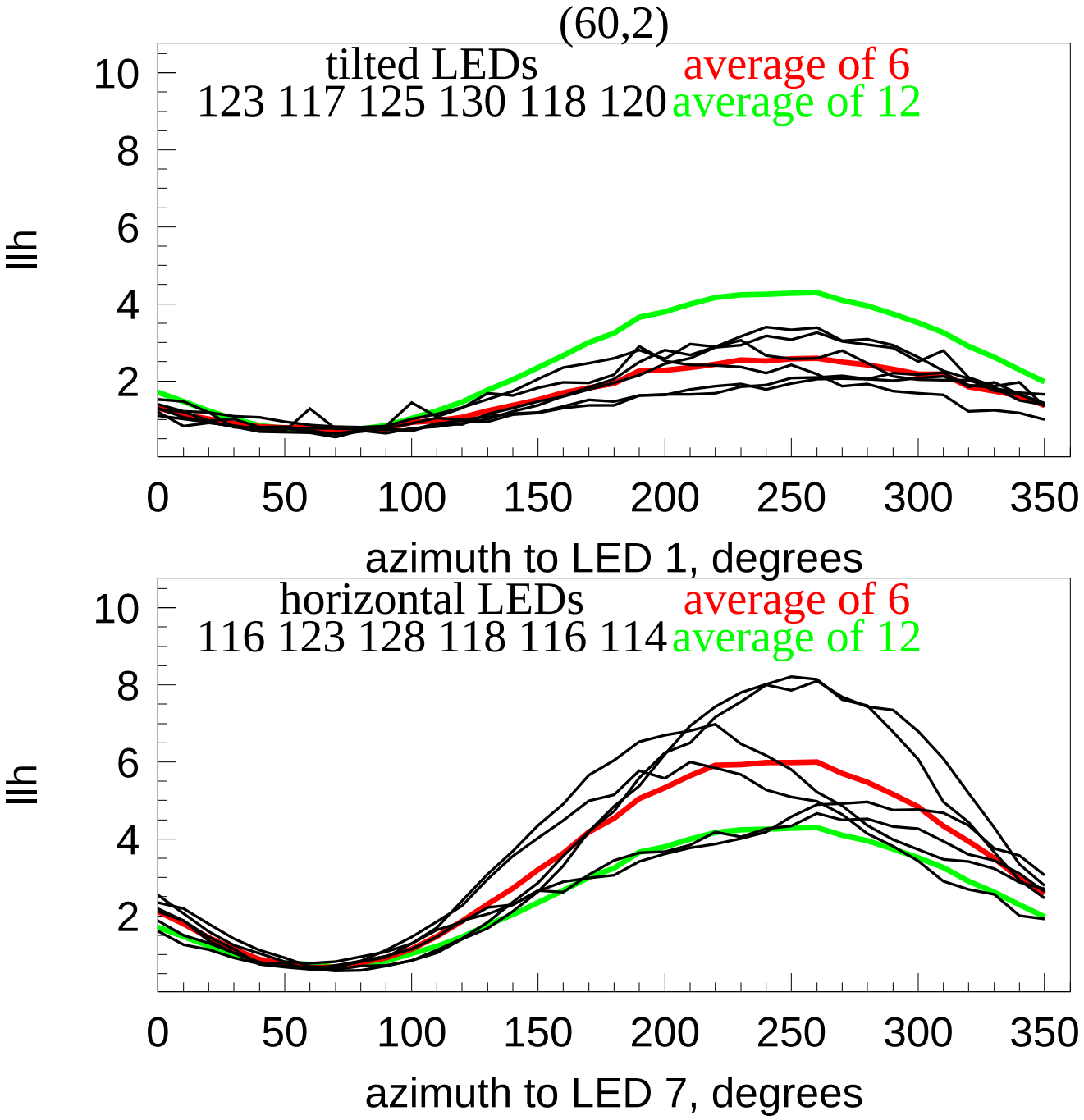

(59,27)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
56.8 ± 7.2

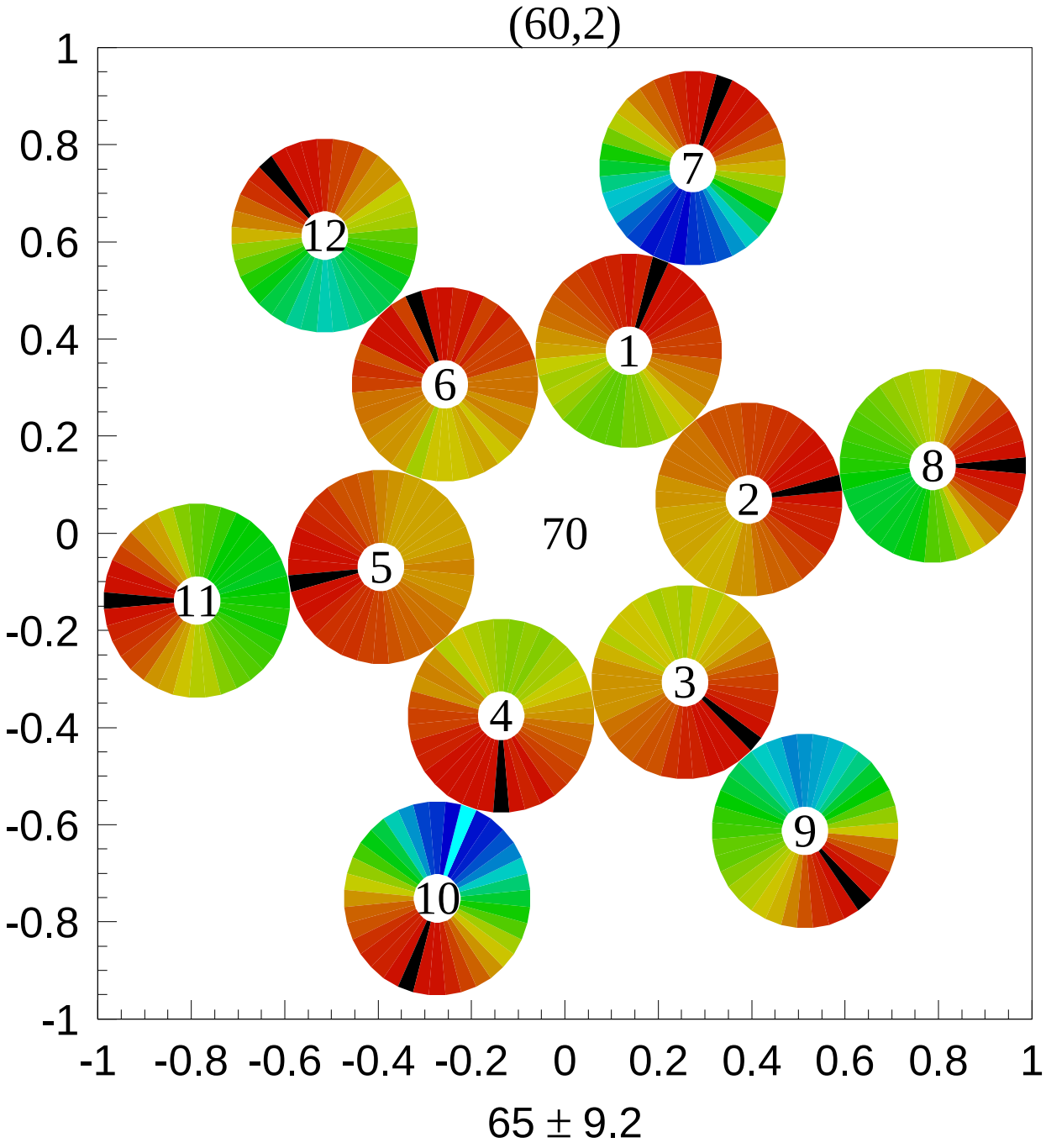

(59,28)
tilted LEDs
124 123 124 125 117 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 127 119 125 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

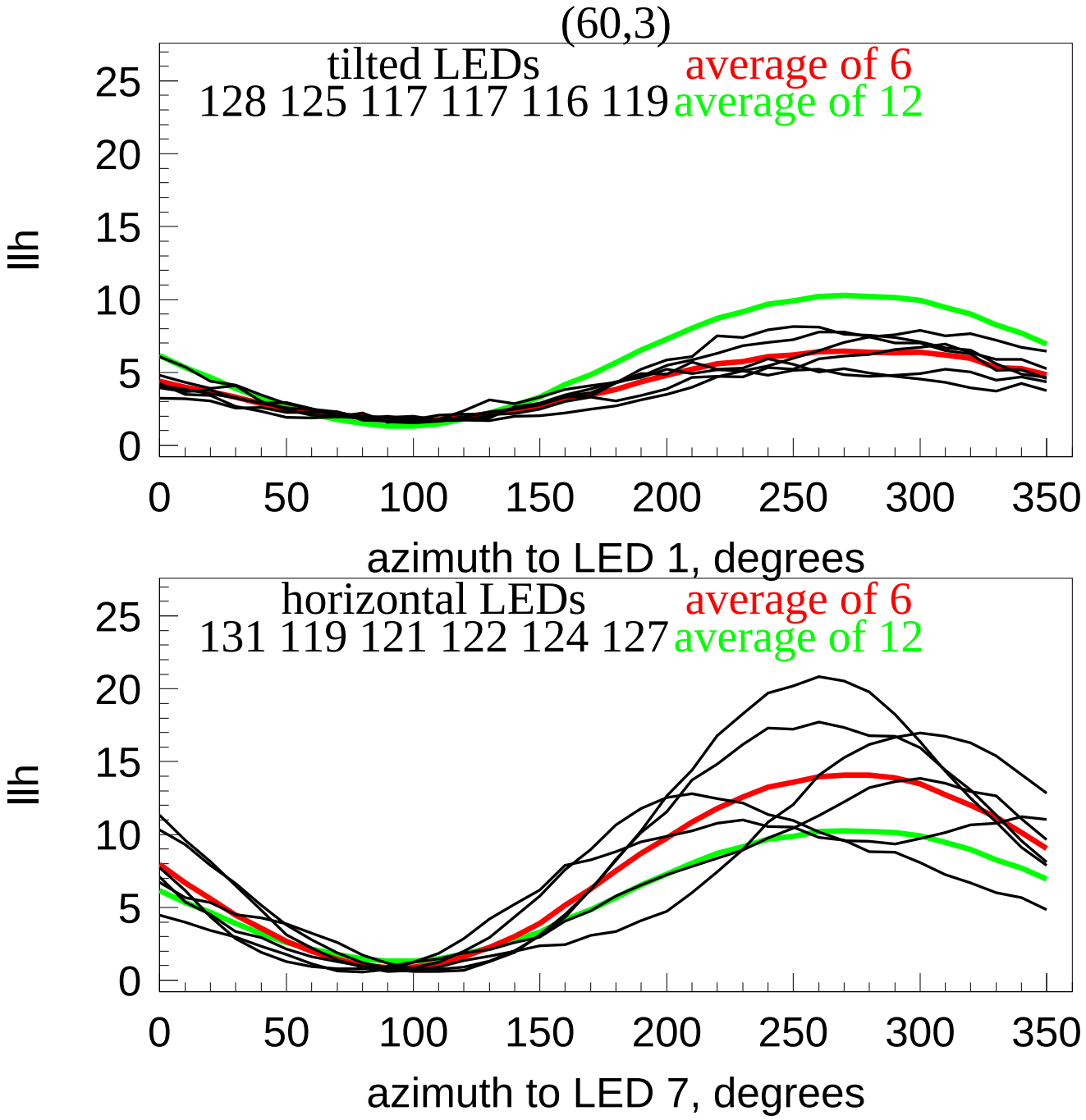

(59,28)
11
12
5
6
10
4
340
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
336.4 ± 6.3

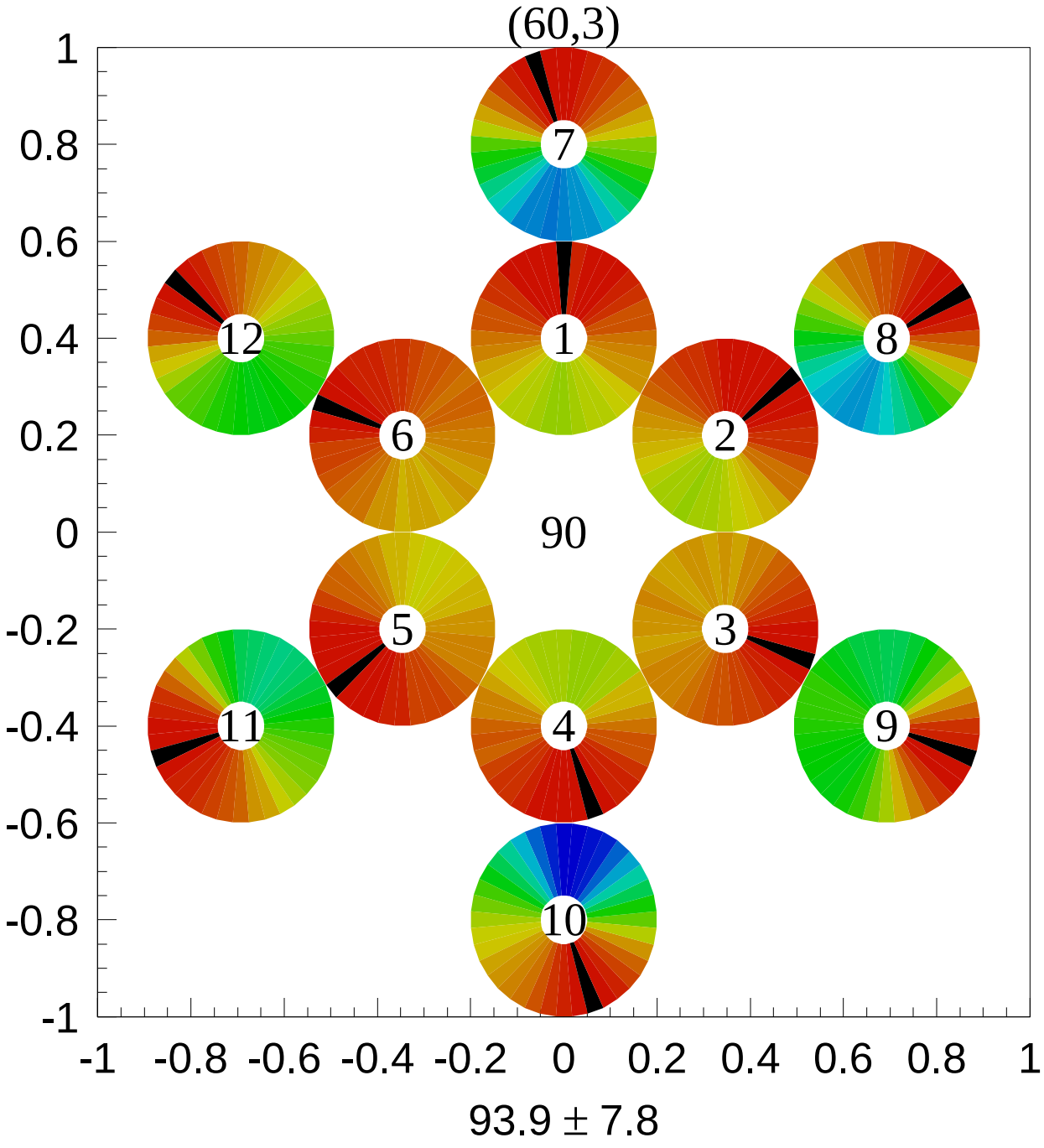

(60,1)
tilted LEDs
126 119 121 120 126 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 127 122 121 126 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

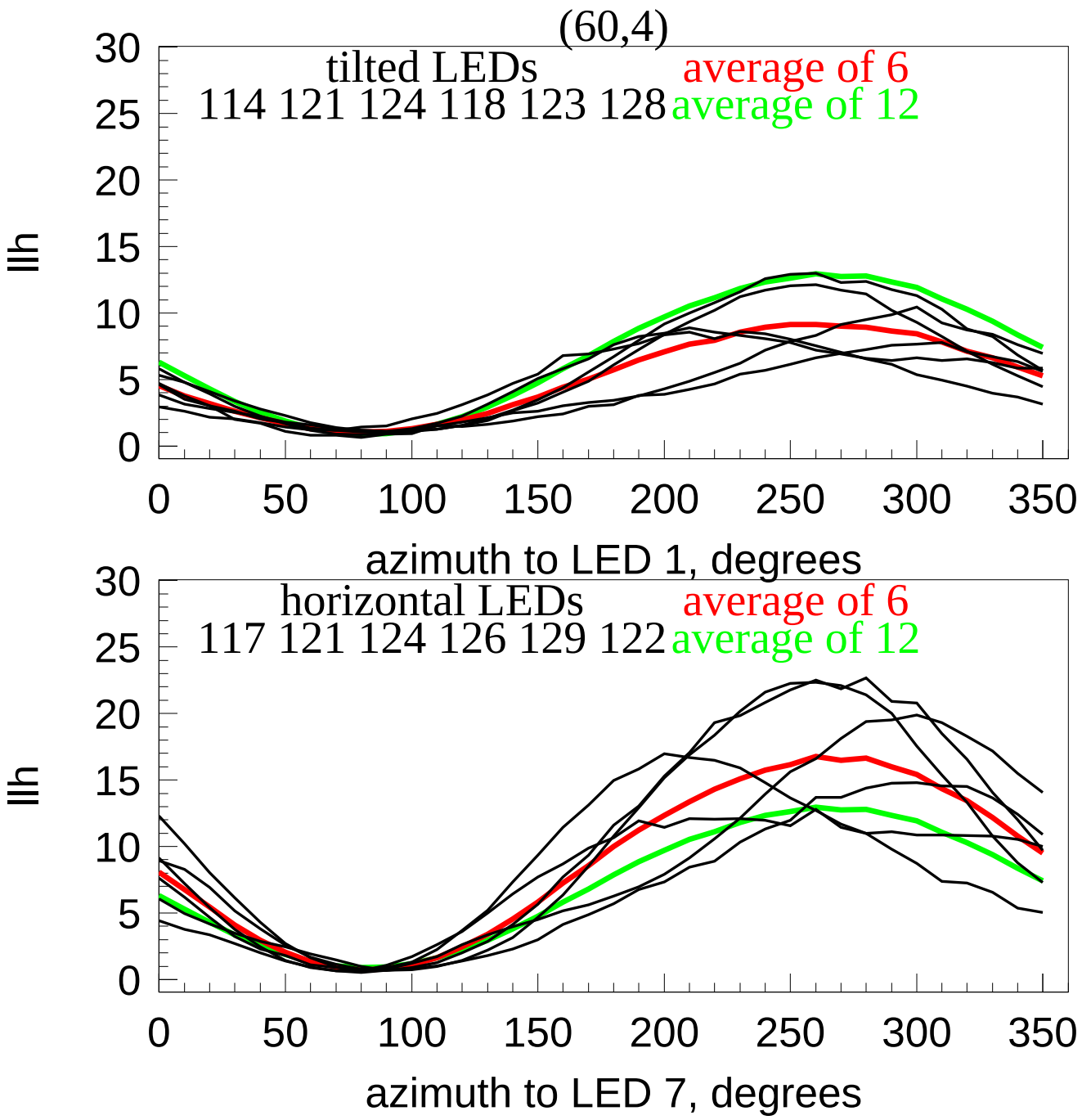

(60,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
141.1 ± 9.5
140
1
2
3
4
5
6
7
8
9
10
11
12

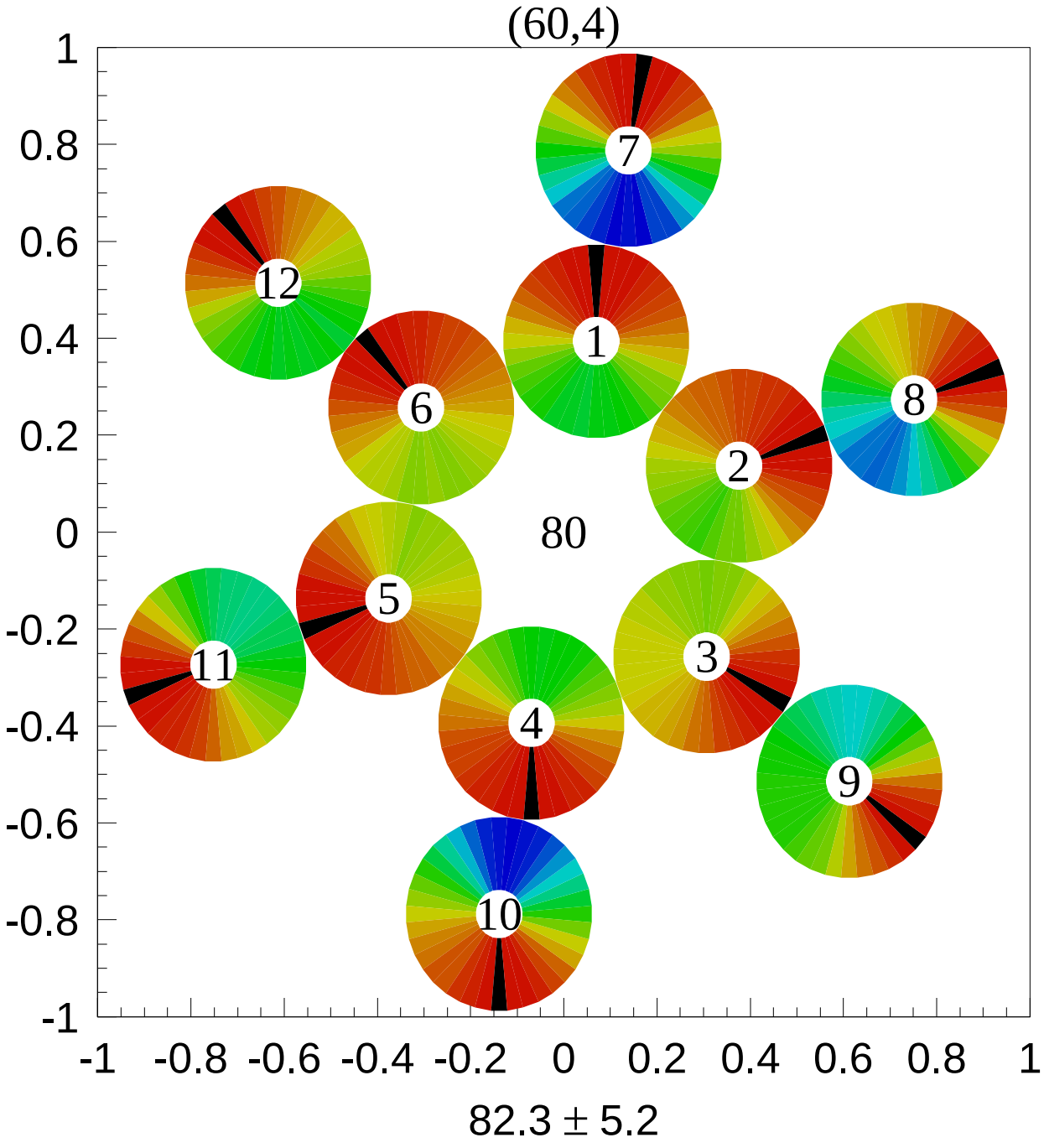

(60,2)
tilted LEDs
123 117 125 130 118 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 123 128 118 116 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

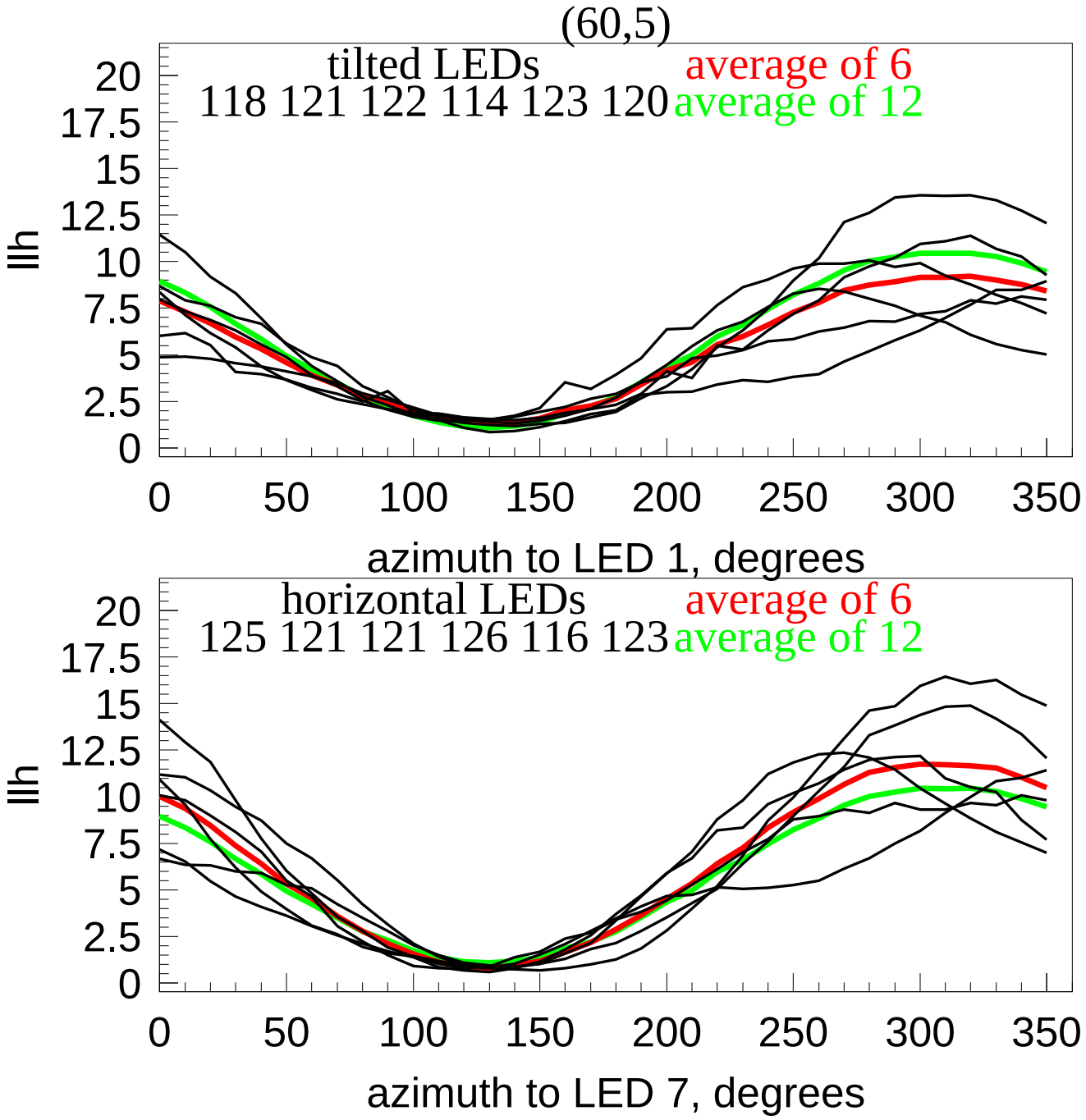

(60,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
11
70
4
3
9
10
65 ± 9.2

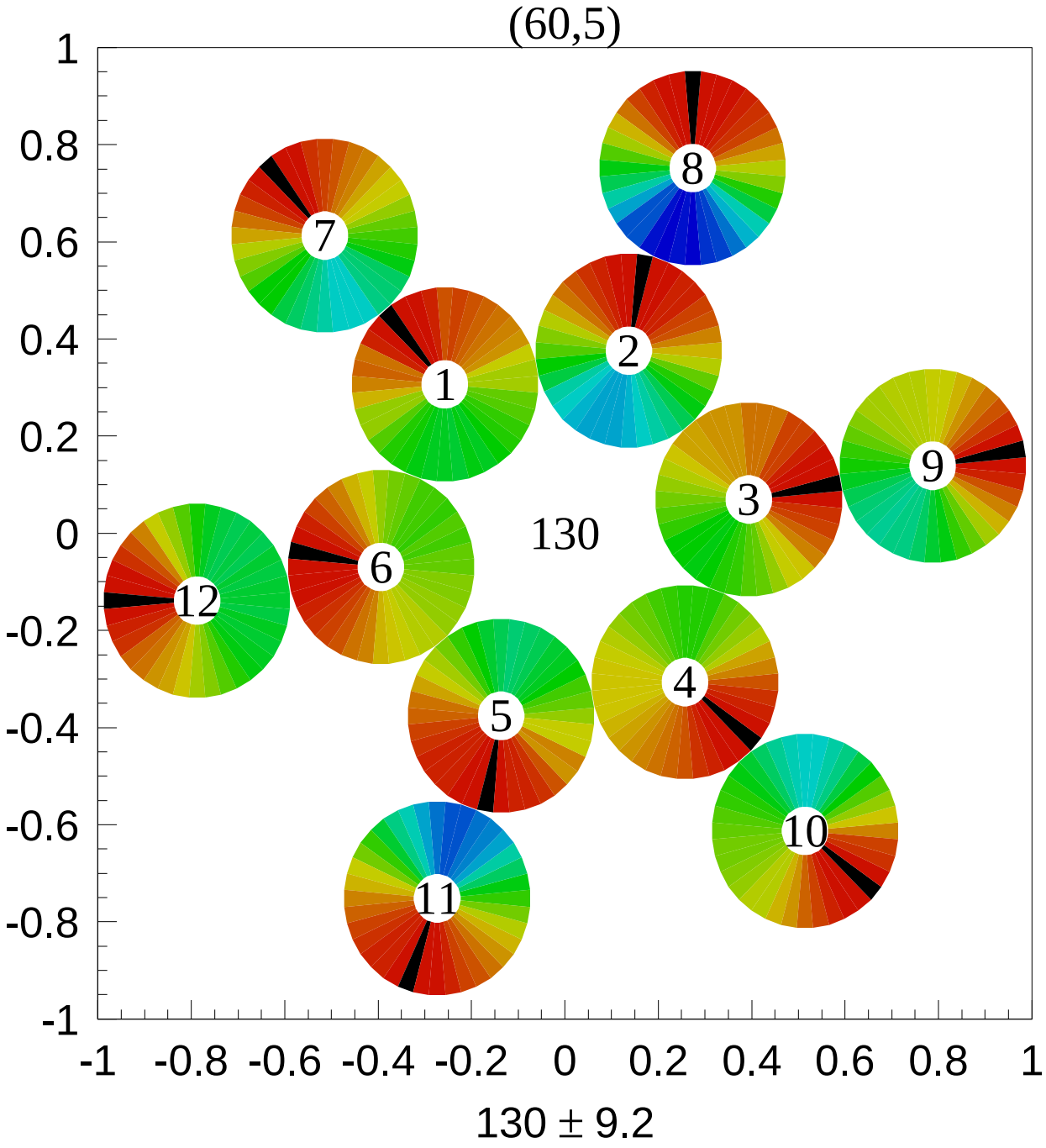

(60,3)
tilted LEDs
128 125 117 117 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 119 121 122 124 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

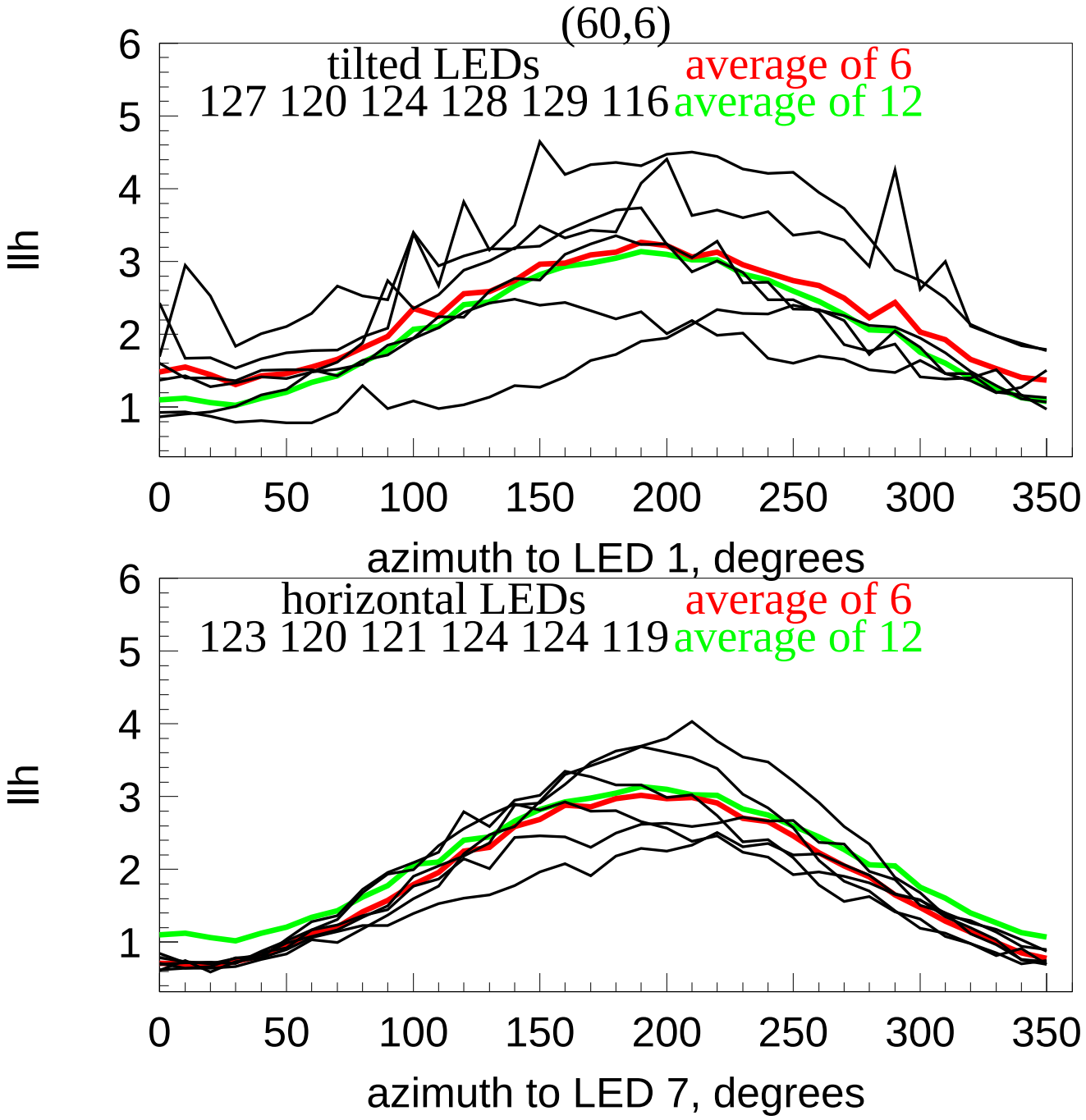

(60,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
93.9 ± 7.8

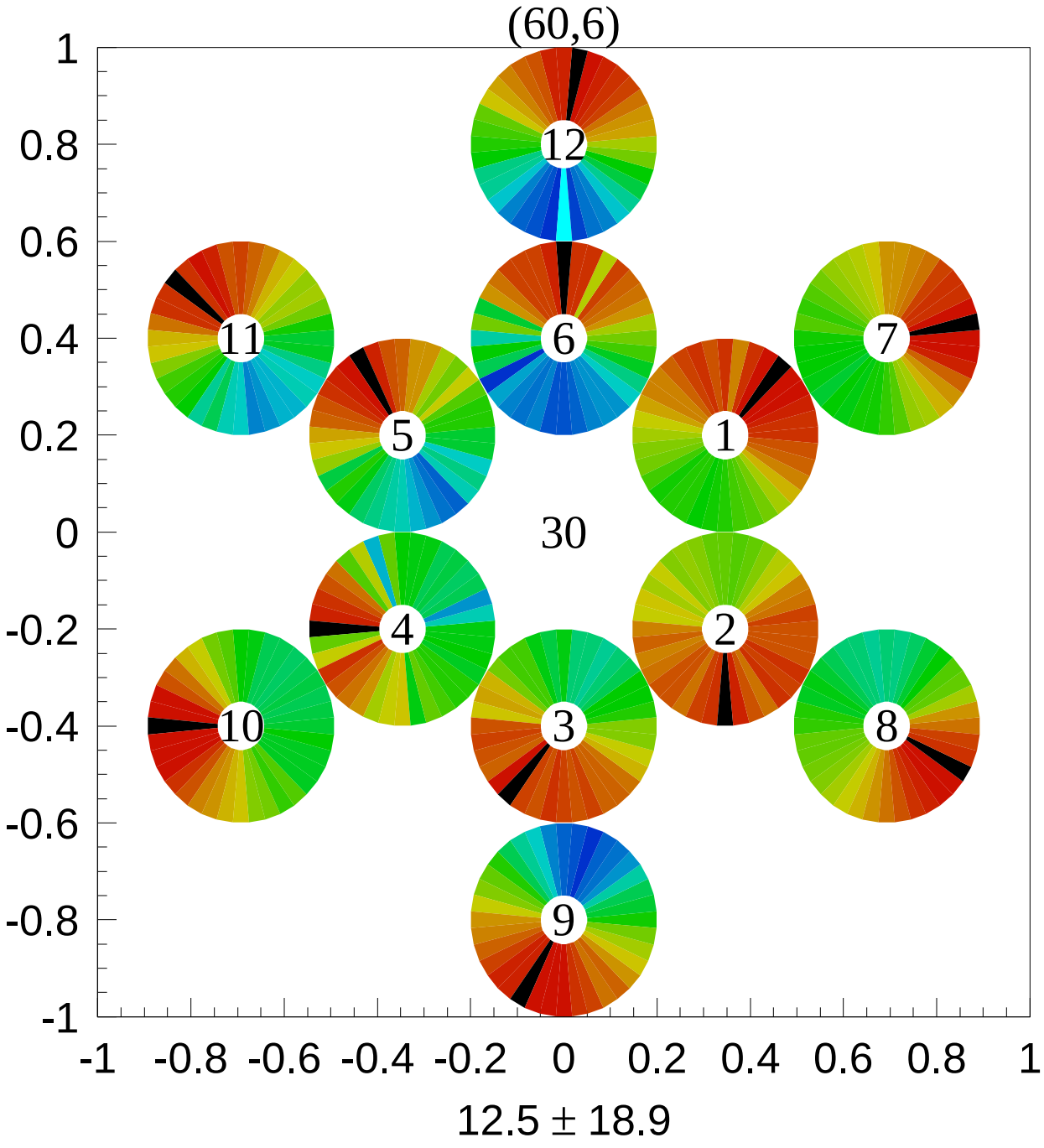

(60,4)
tilted LEDs
114 121 124 118 123 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 121 124 126 129 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

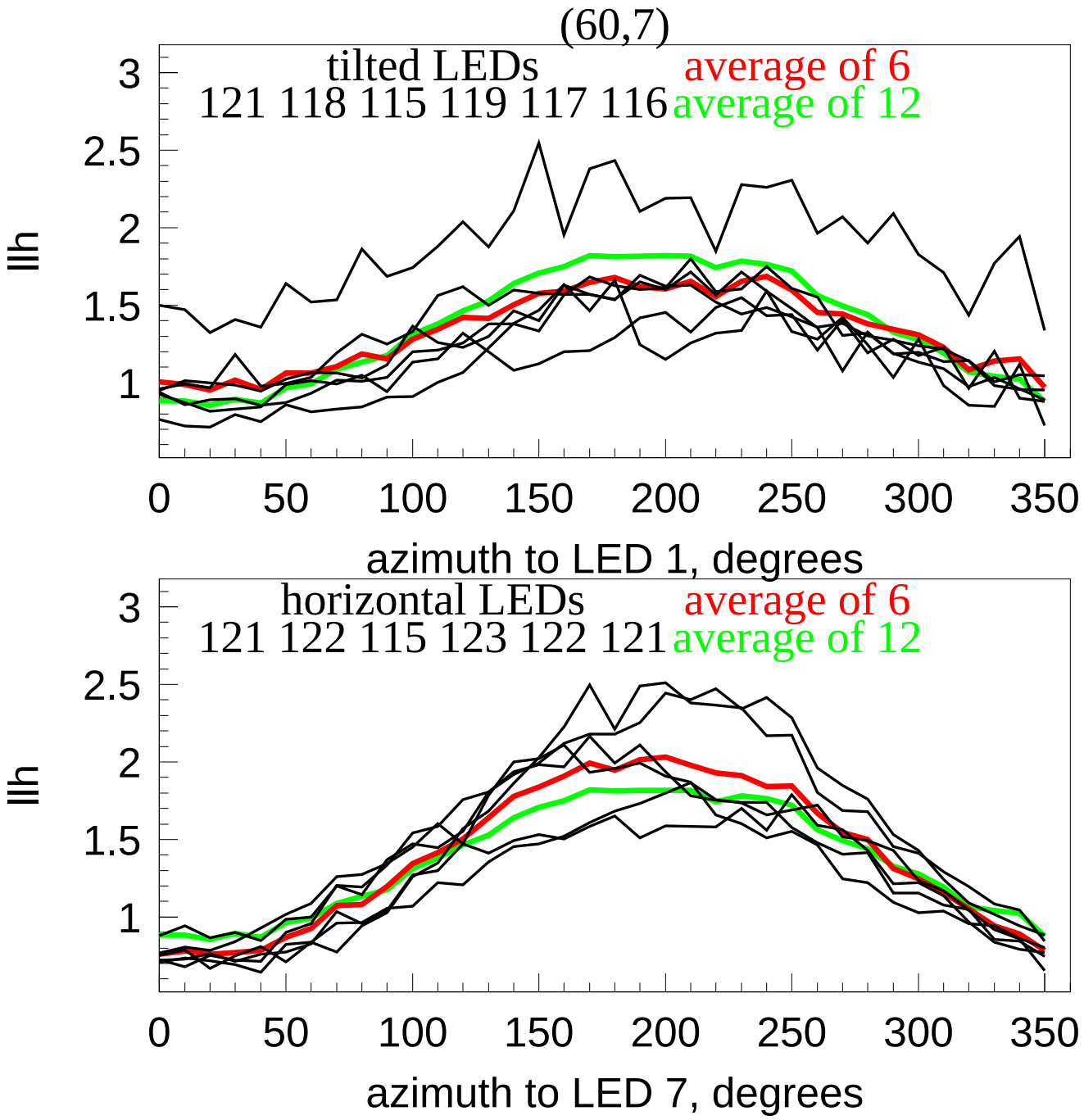

(60,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
82.3 ± 5.2

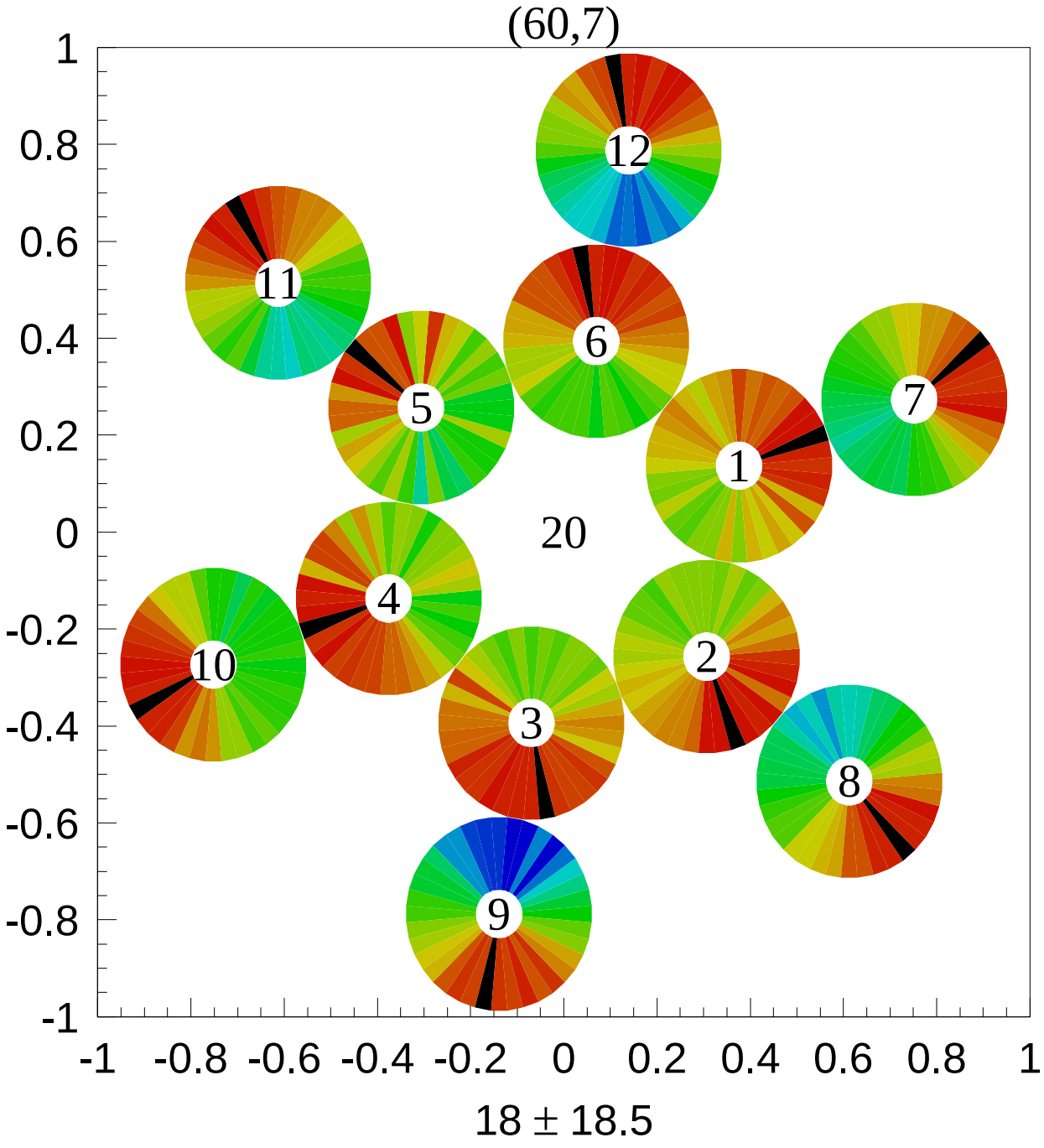

(60,5)
tilted LEDs
118 121 122 114 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 121 126 116 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

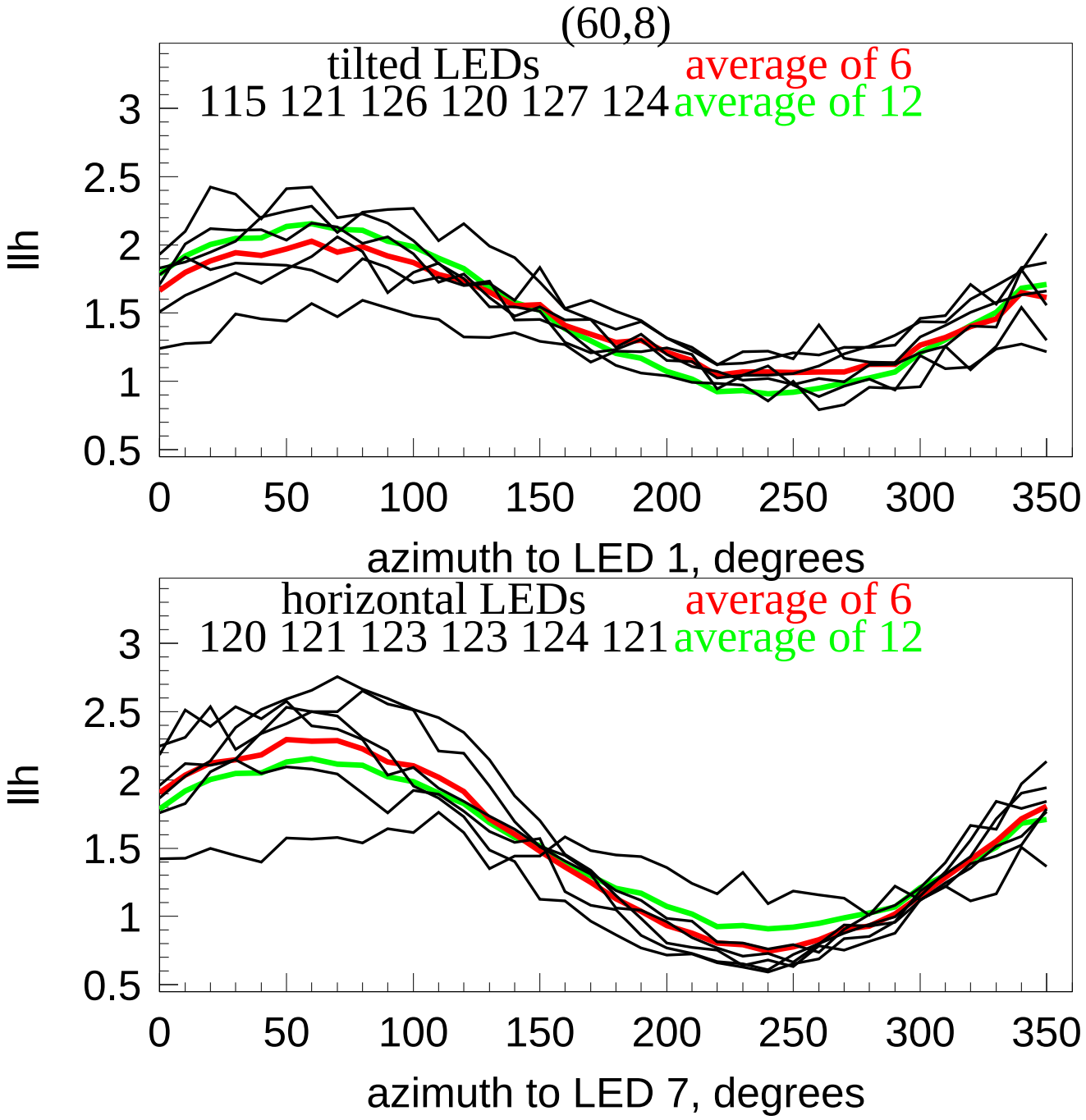

(60,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
130
130 ± 9.2
1
2
3
4
5
6
7
8
9
10
11
12

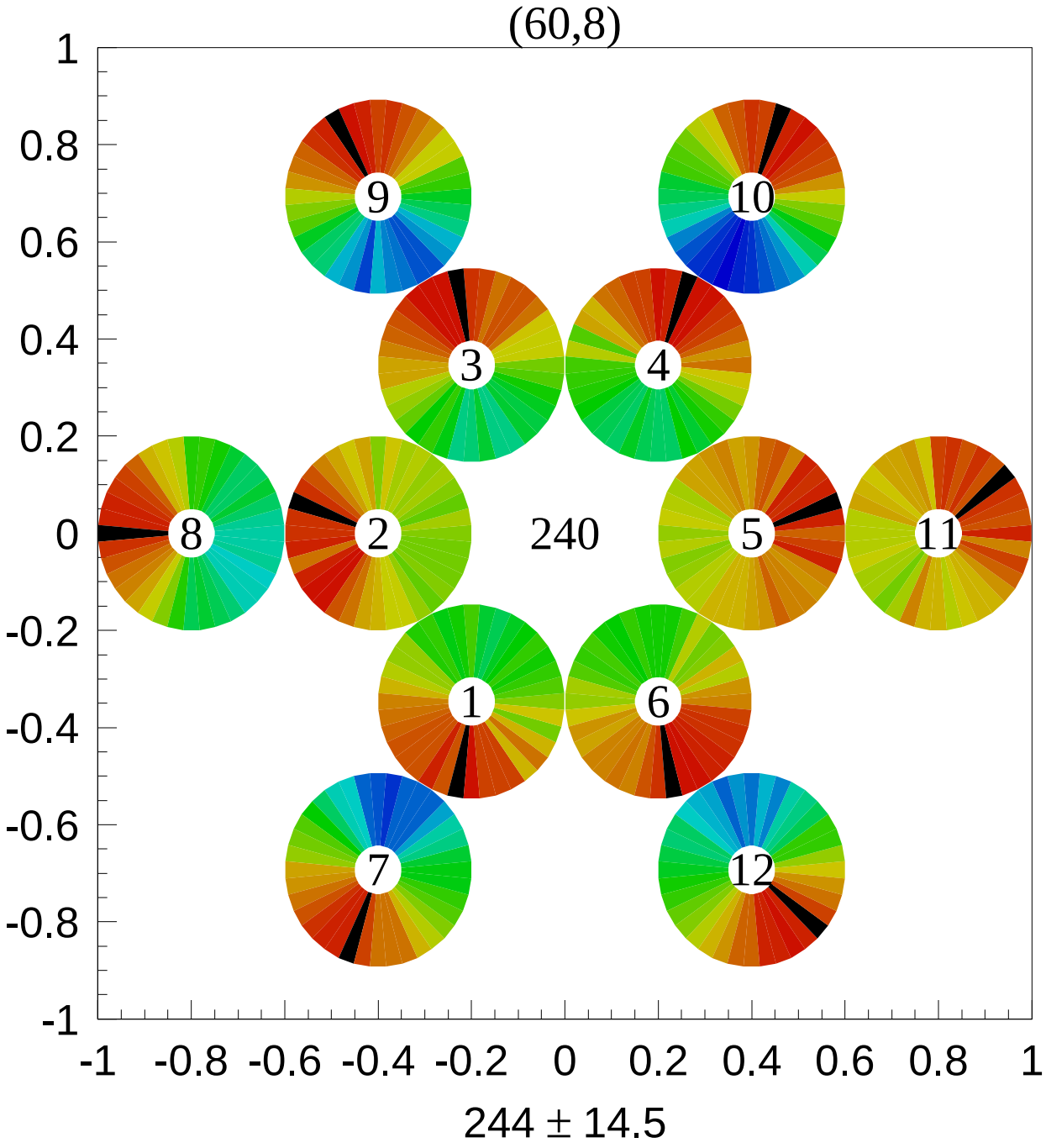

(60,6)
tilted LEDs
127 120 124 128 129 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 120 121 124 124 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

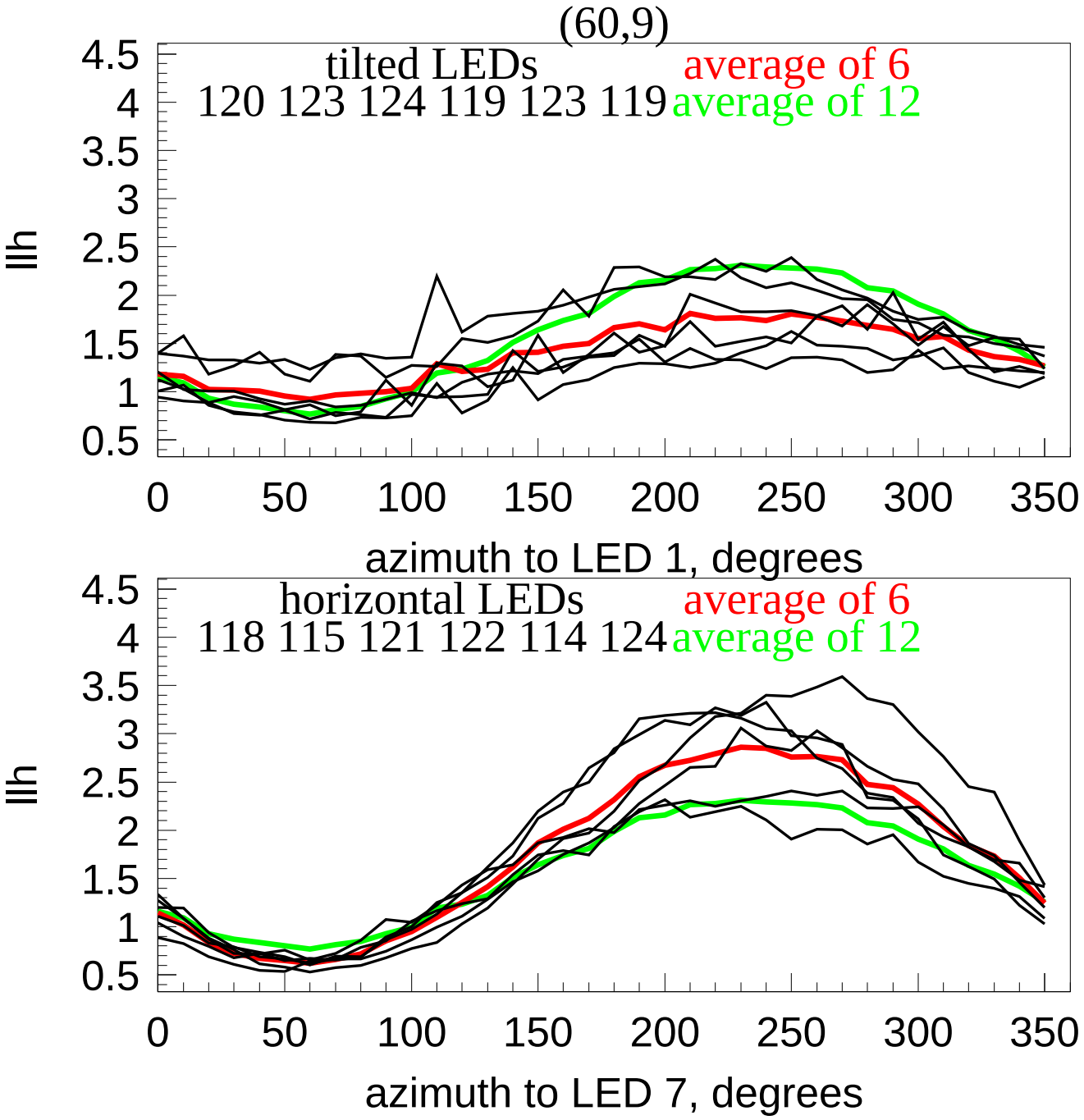

(60,6)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12.5 ± 18.9

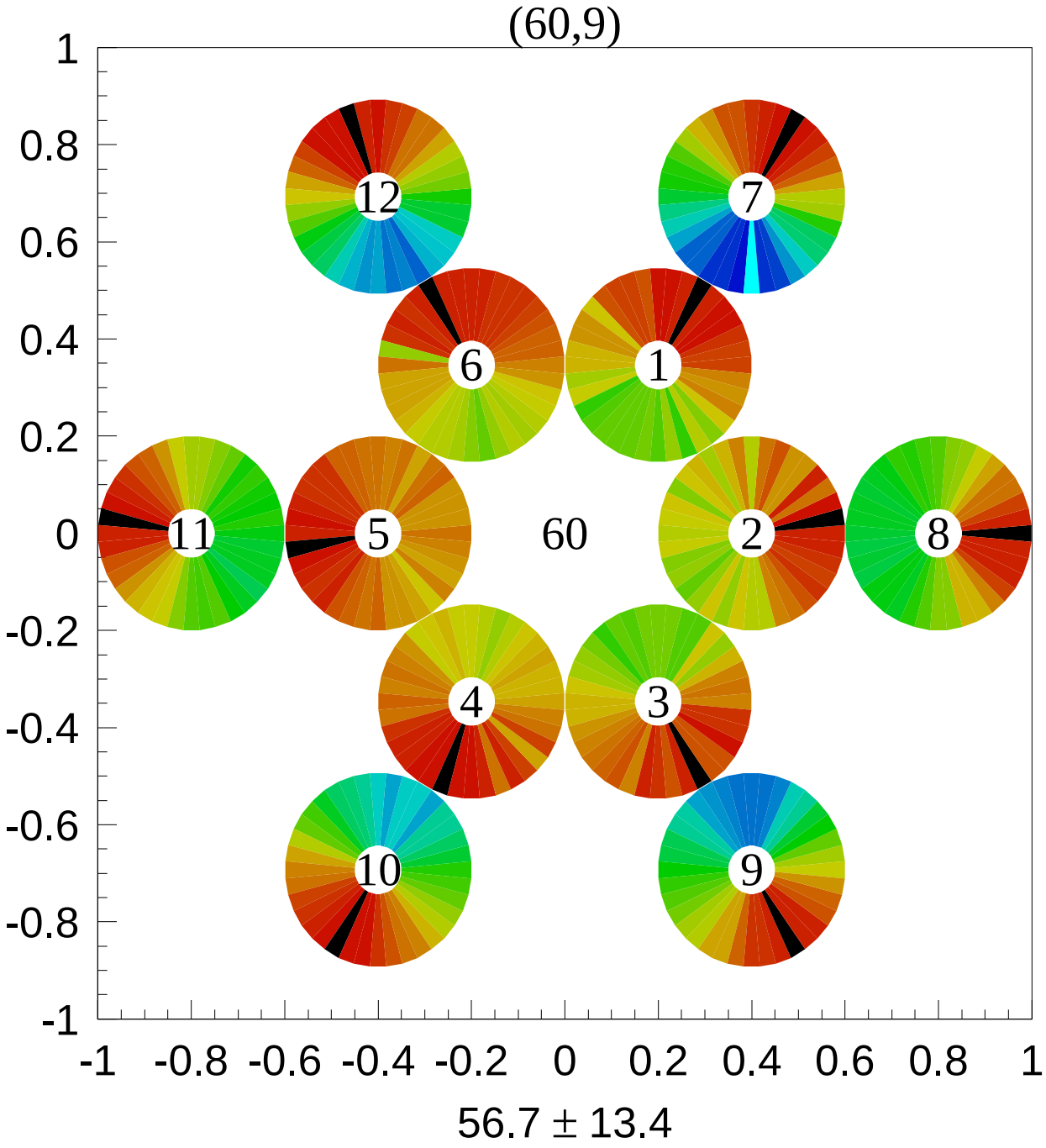

(60,7)
tilted LEDs
121 118 115 119 117 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 115 123 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

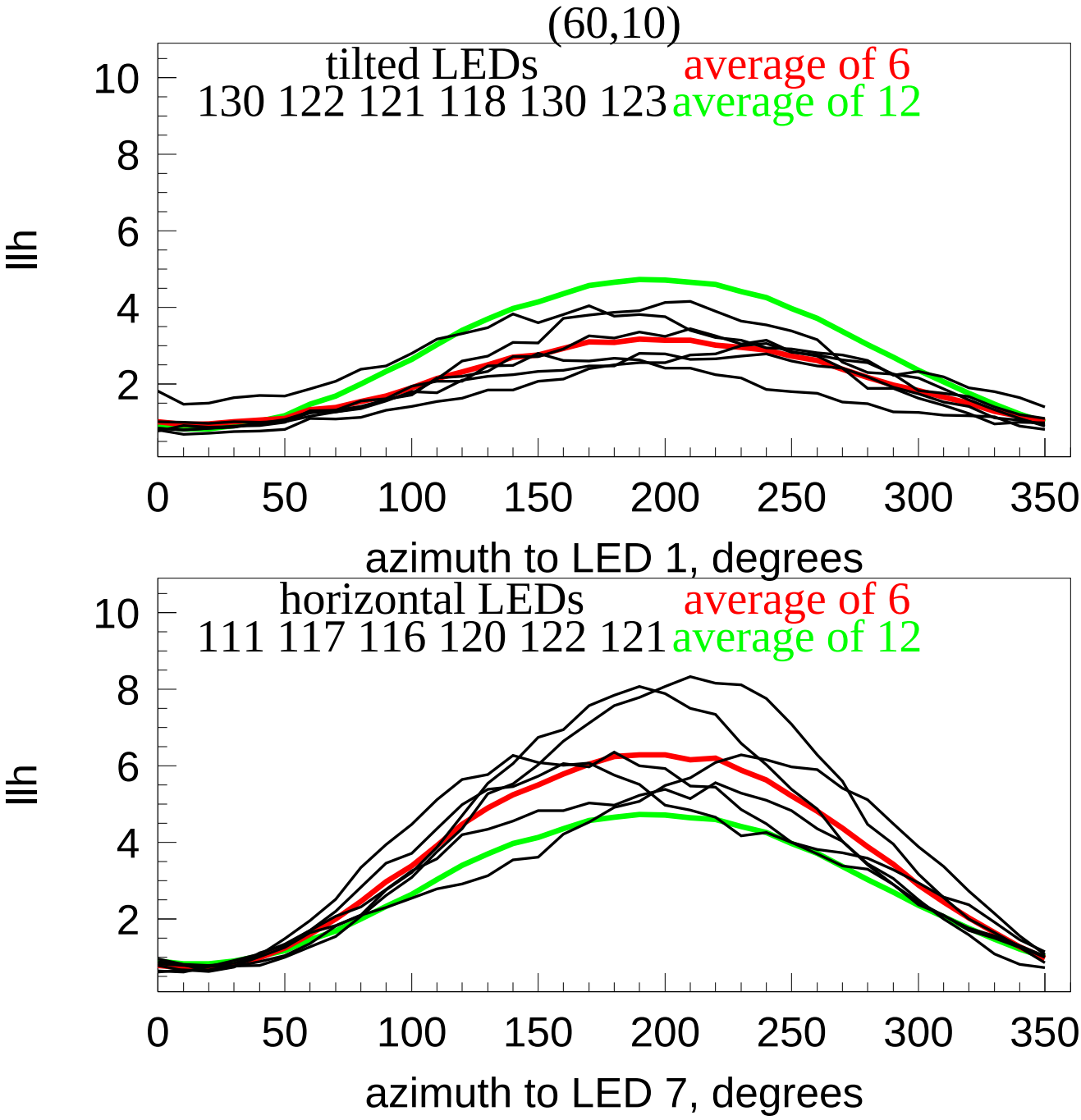

(60,7)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
18 ± 18.5

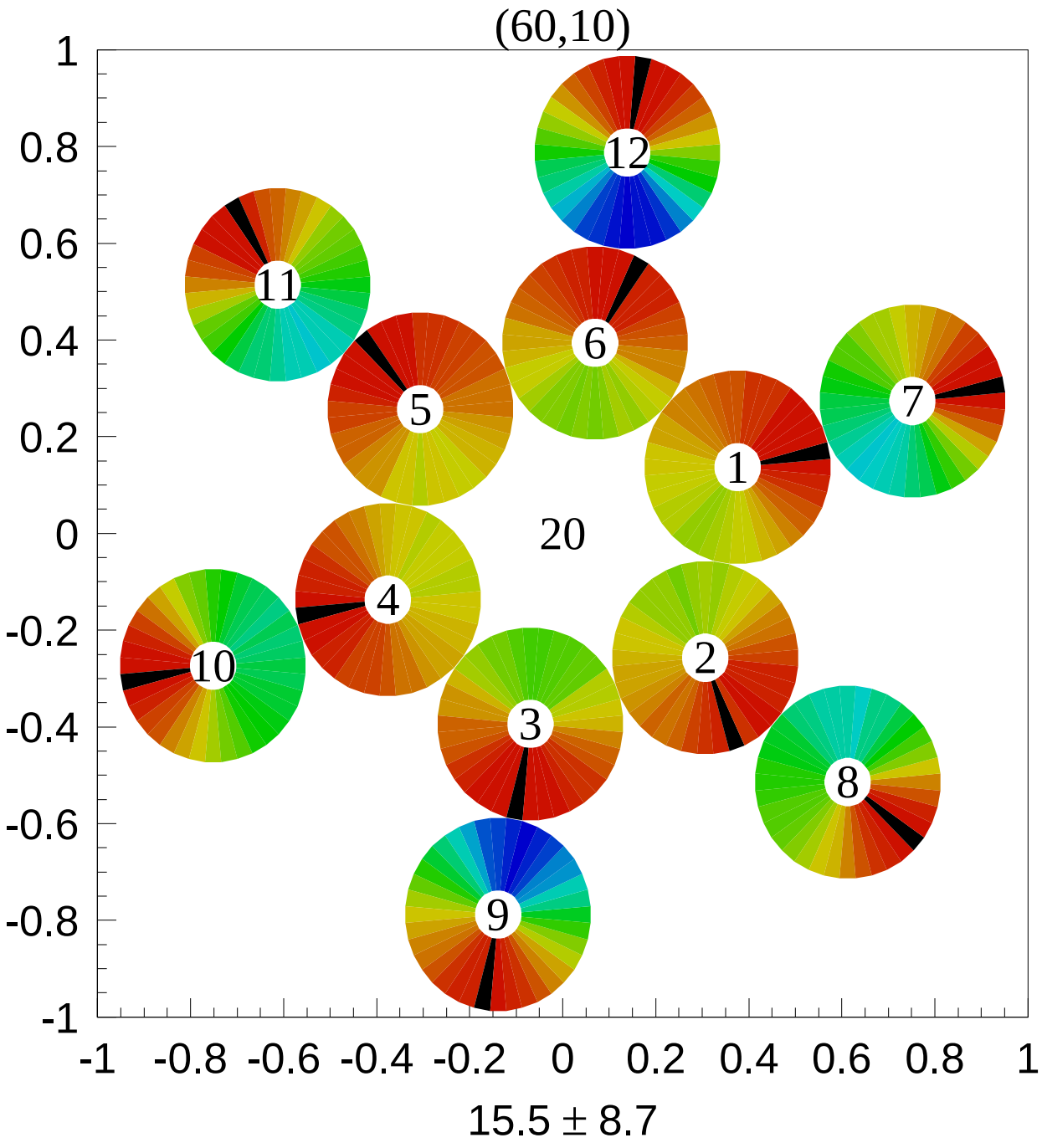

(60,8)
tilted LEDs
115 121 126 120 127 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 121 123 123 124 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

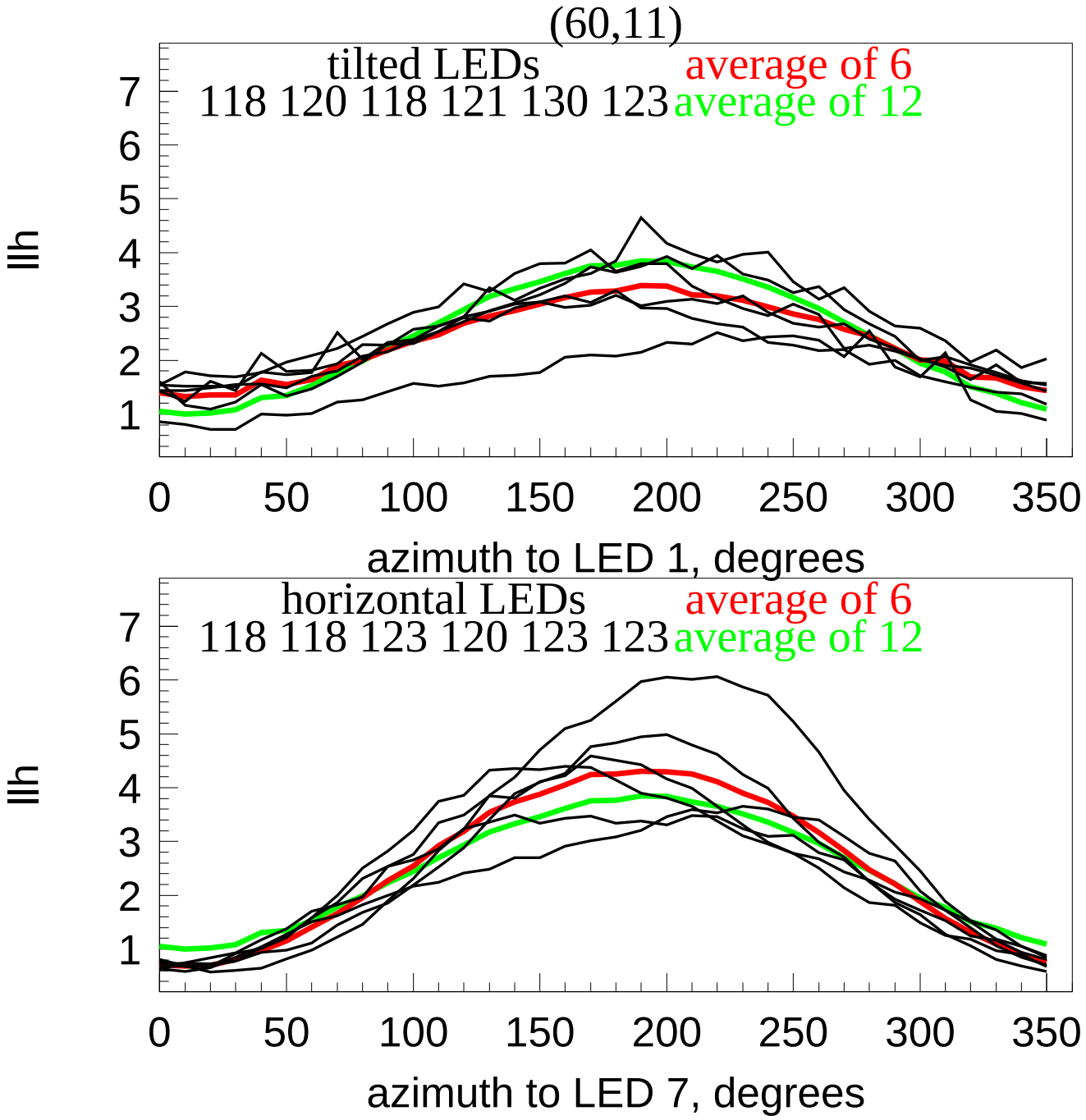

(60,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
244 ± 14.5

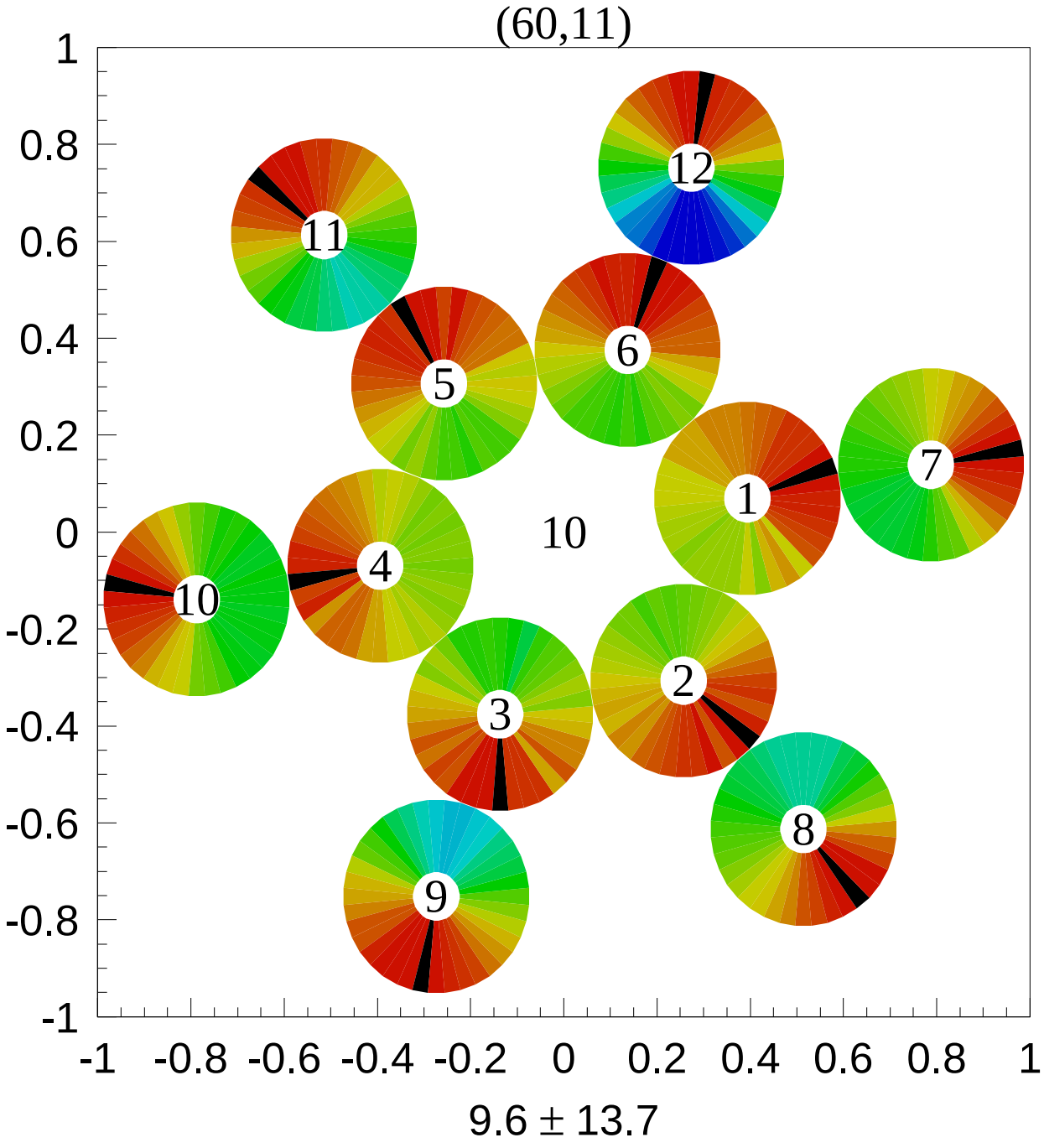

(60,9)
tilted LEDs
120 123 124 119 123 119
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 115 121 122 114 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

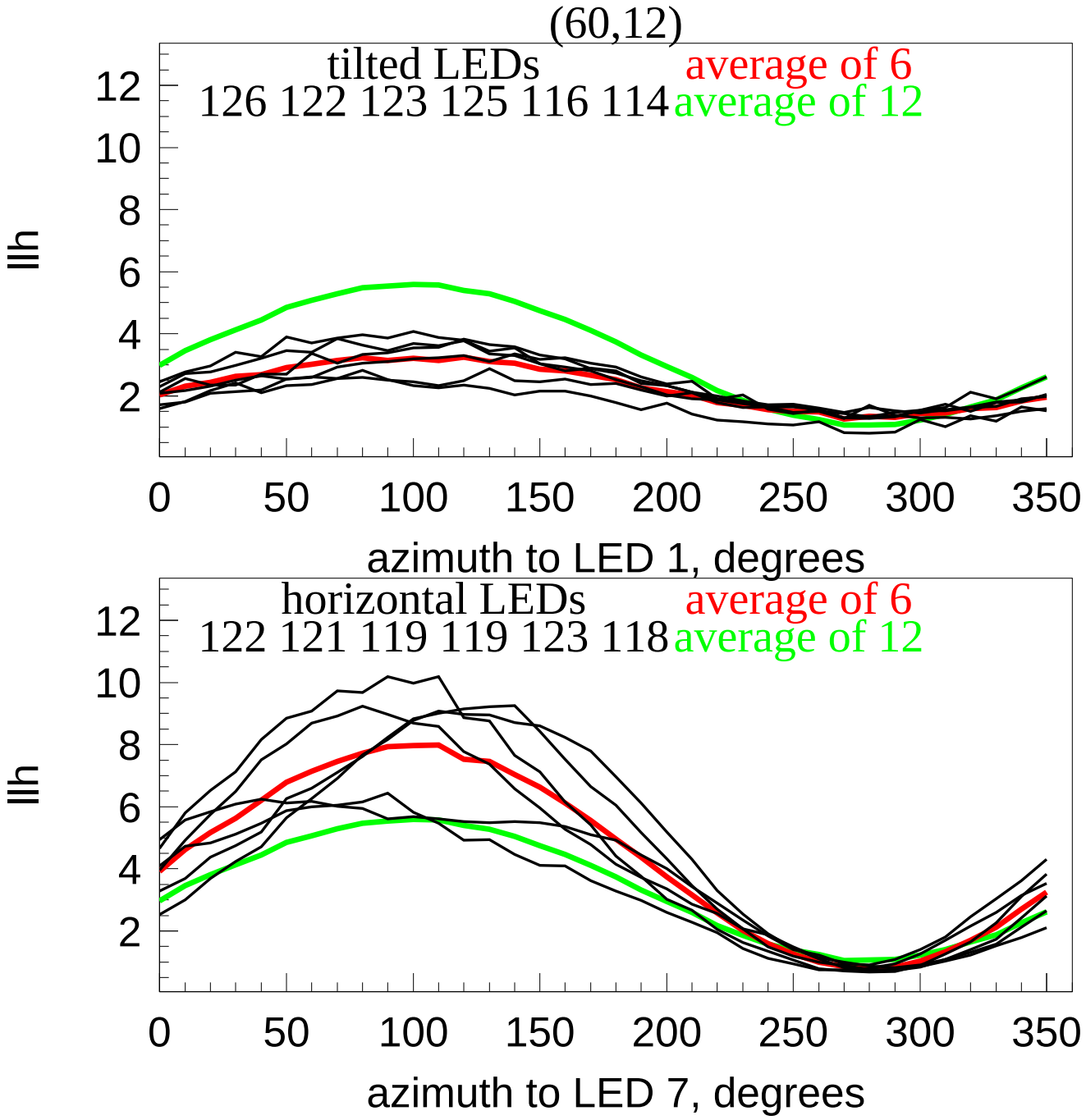

(60,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
56.7 ± 13.4

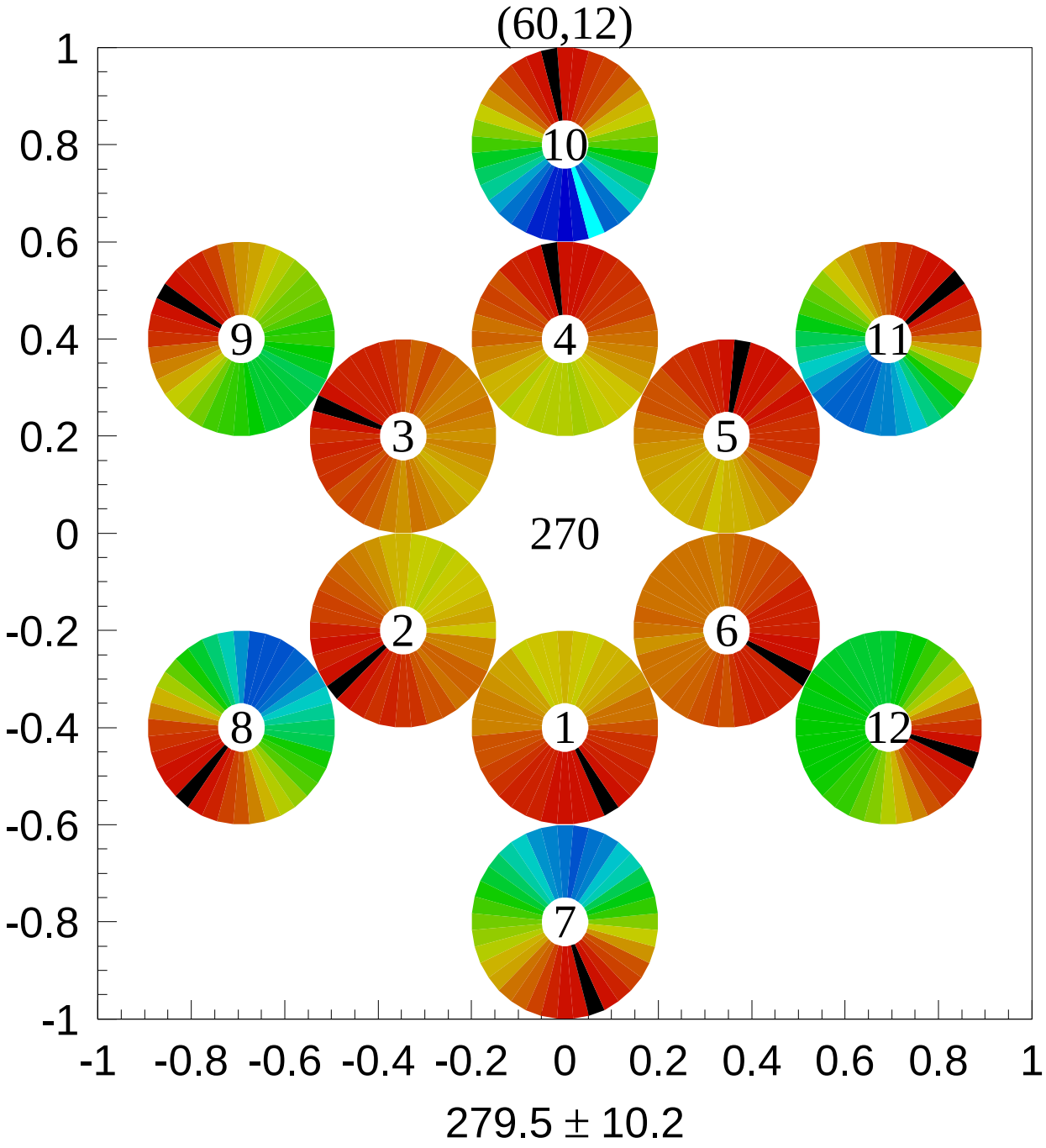

(60,10)
tilted LEDs
130 122 121 118 130 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 117 116 120 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

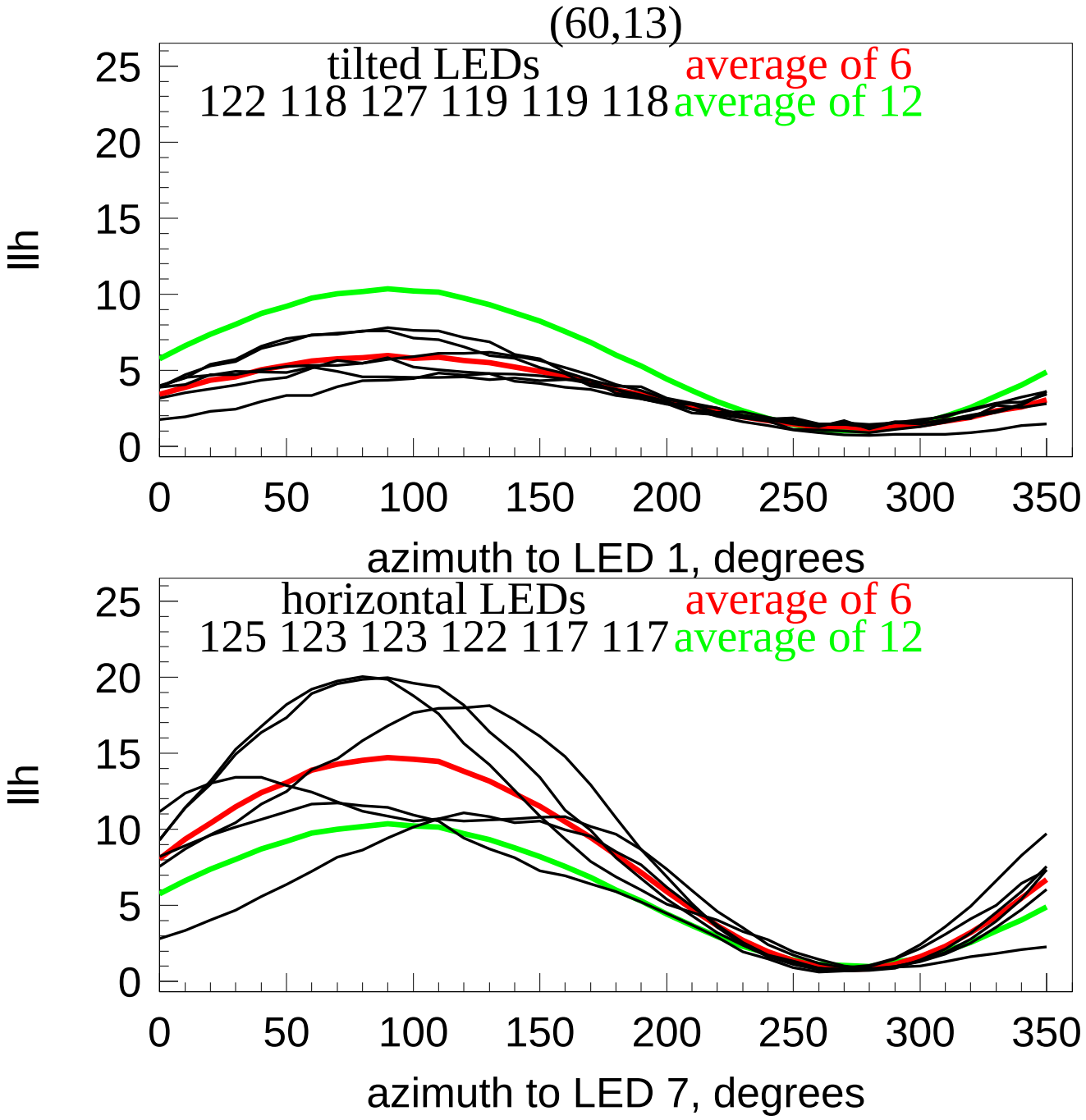

(60,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
15.5 ± 8.7

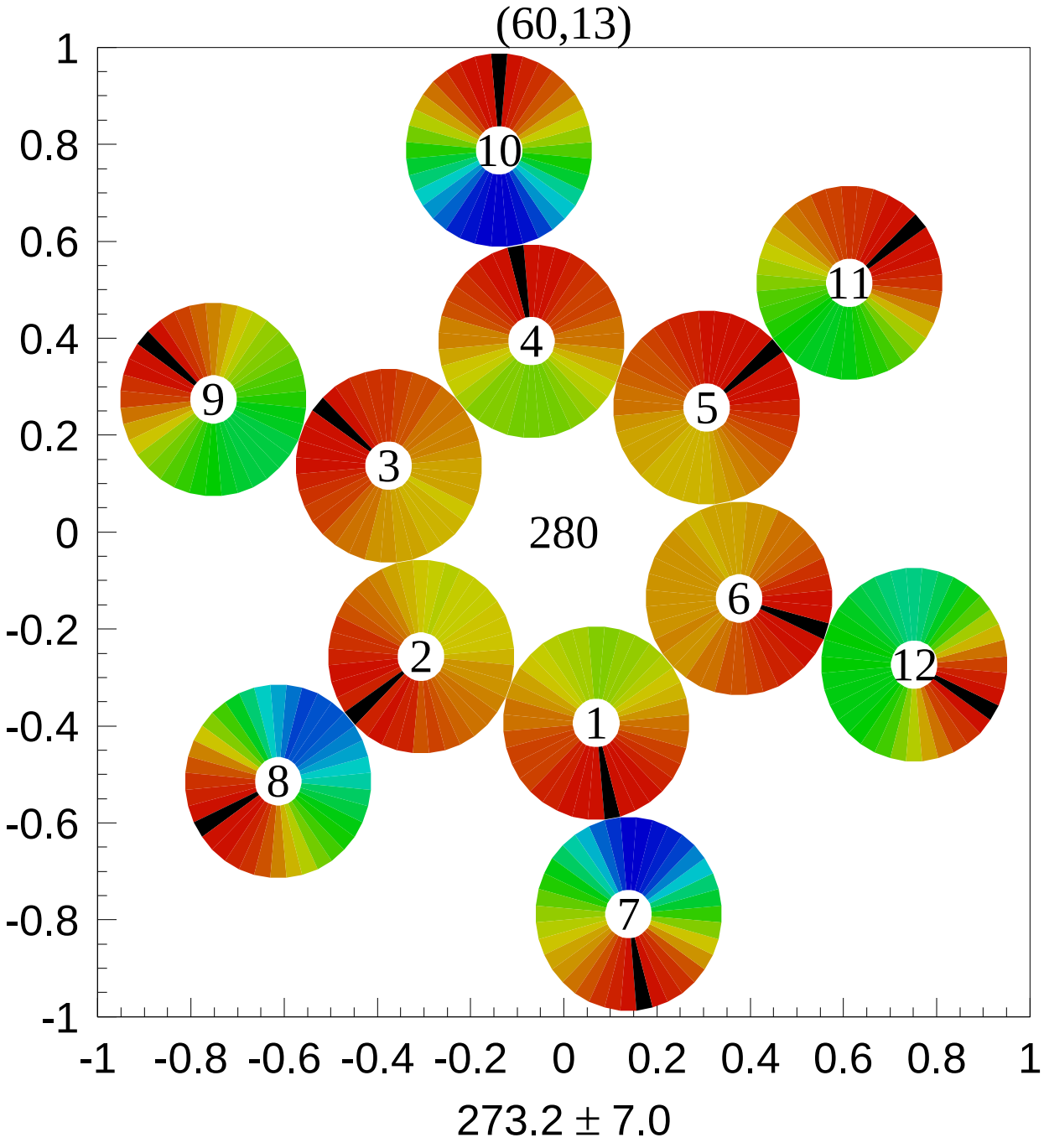

(60,11)
tilted LEDs
118 120 118 121 130 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 118 123 120 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

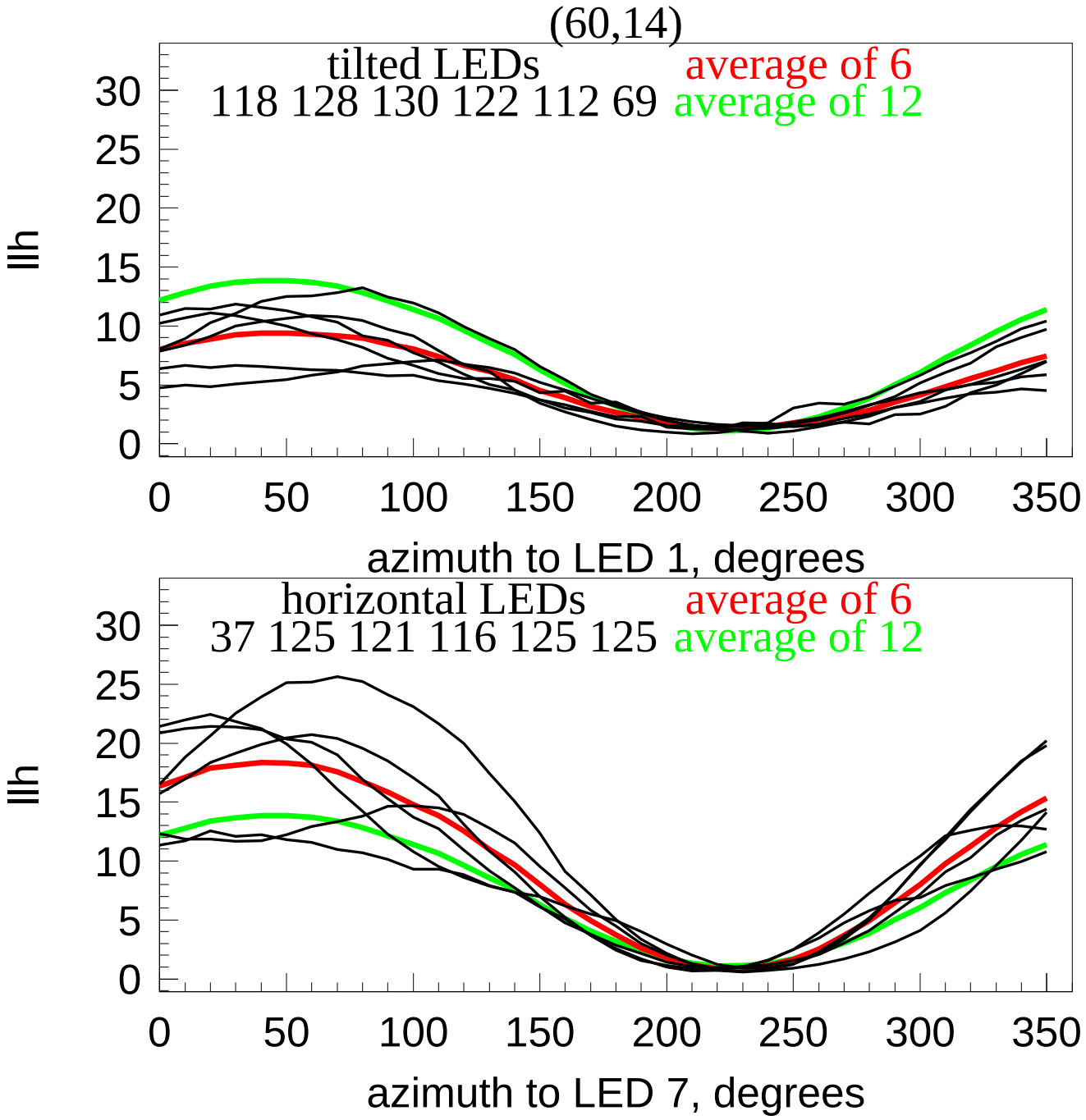

(60,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
9.6 ± 13.7

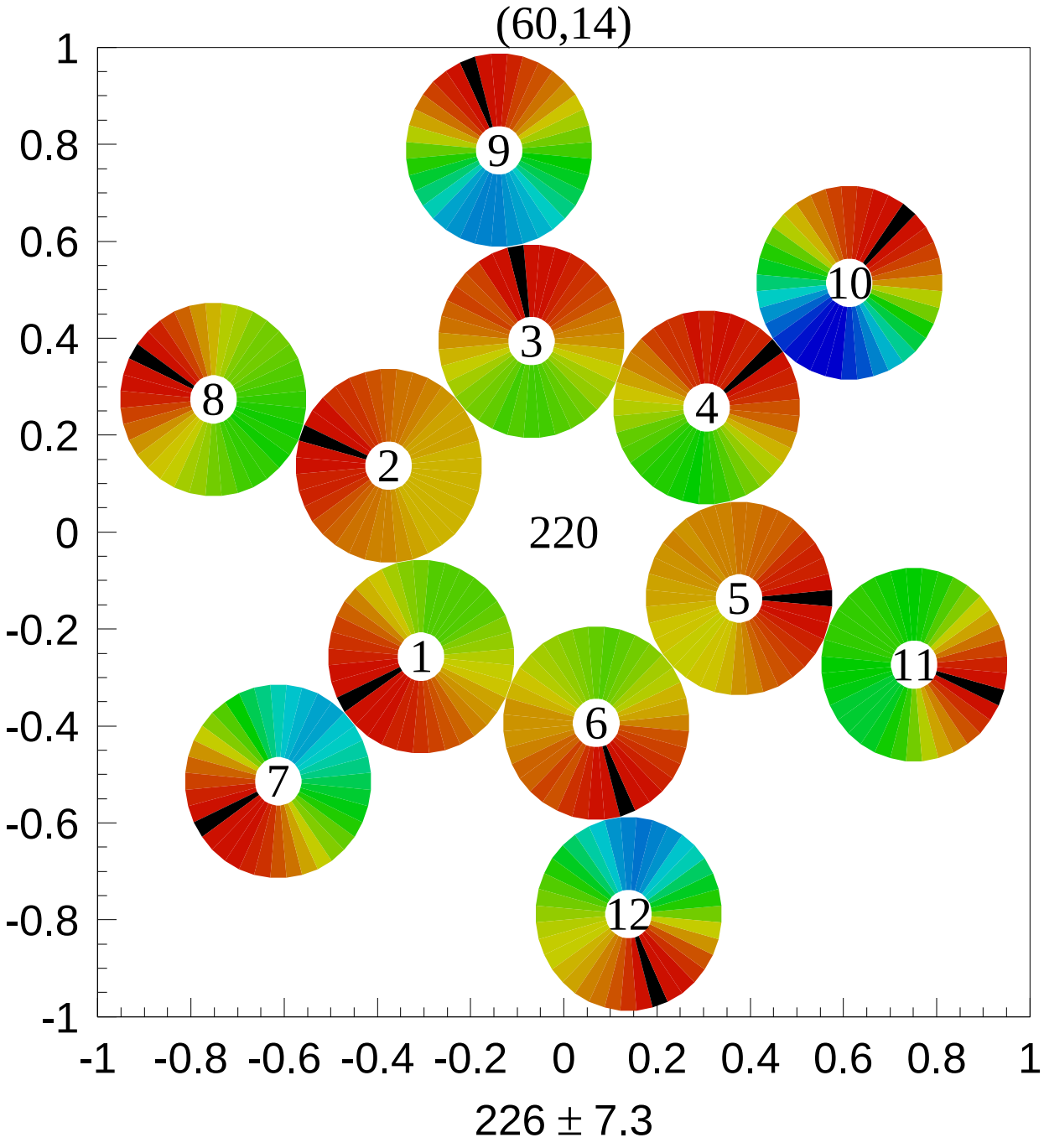

(60,12)
tilted LEDs
126 122 123 125 116 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 119 119 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

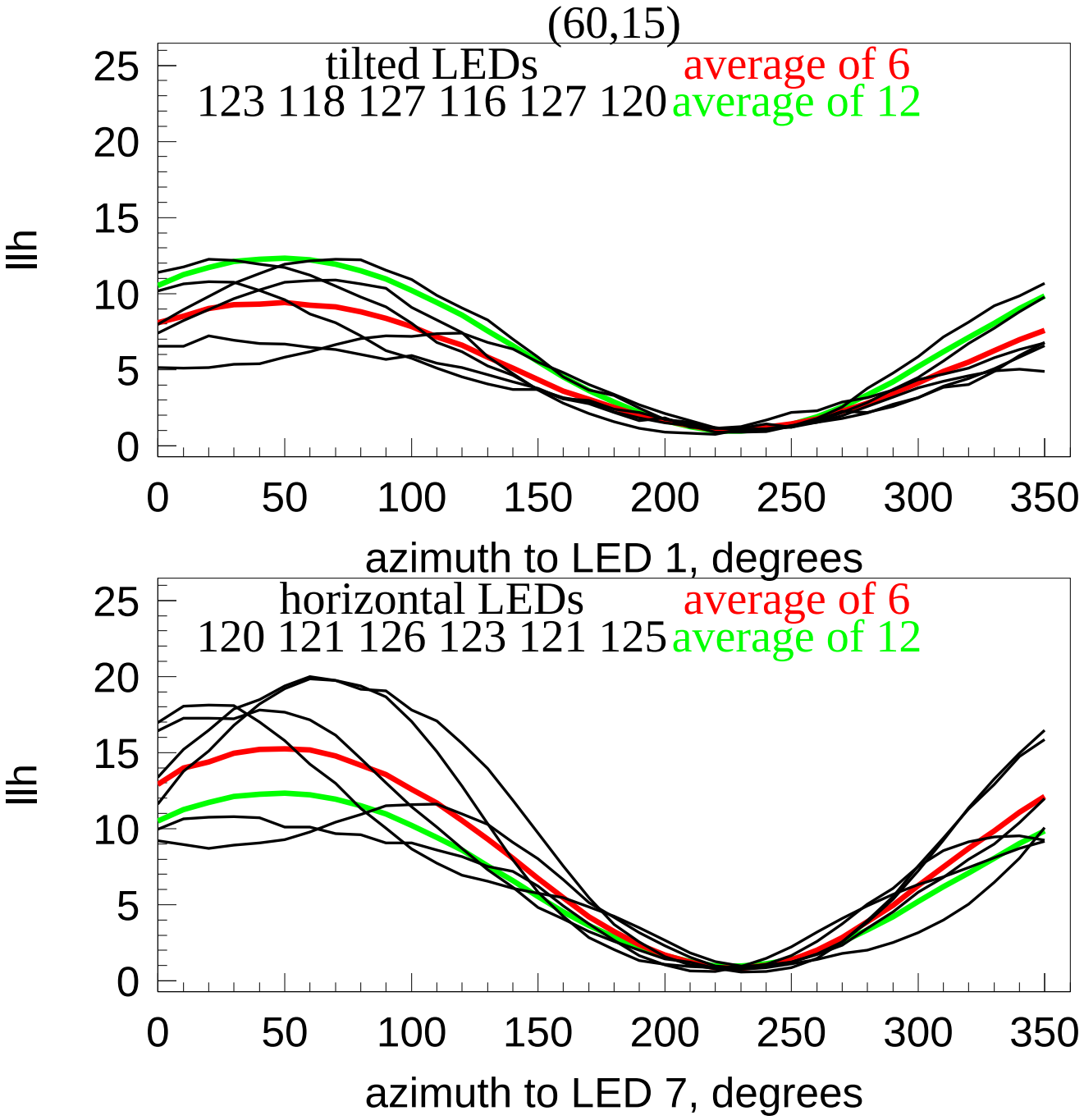

(60,12)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
279.5 ± 10.2

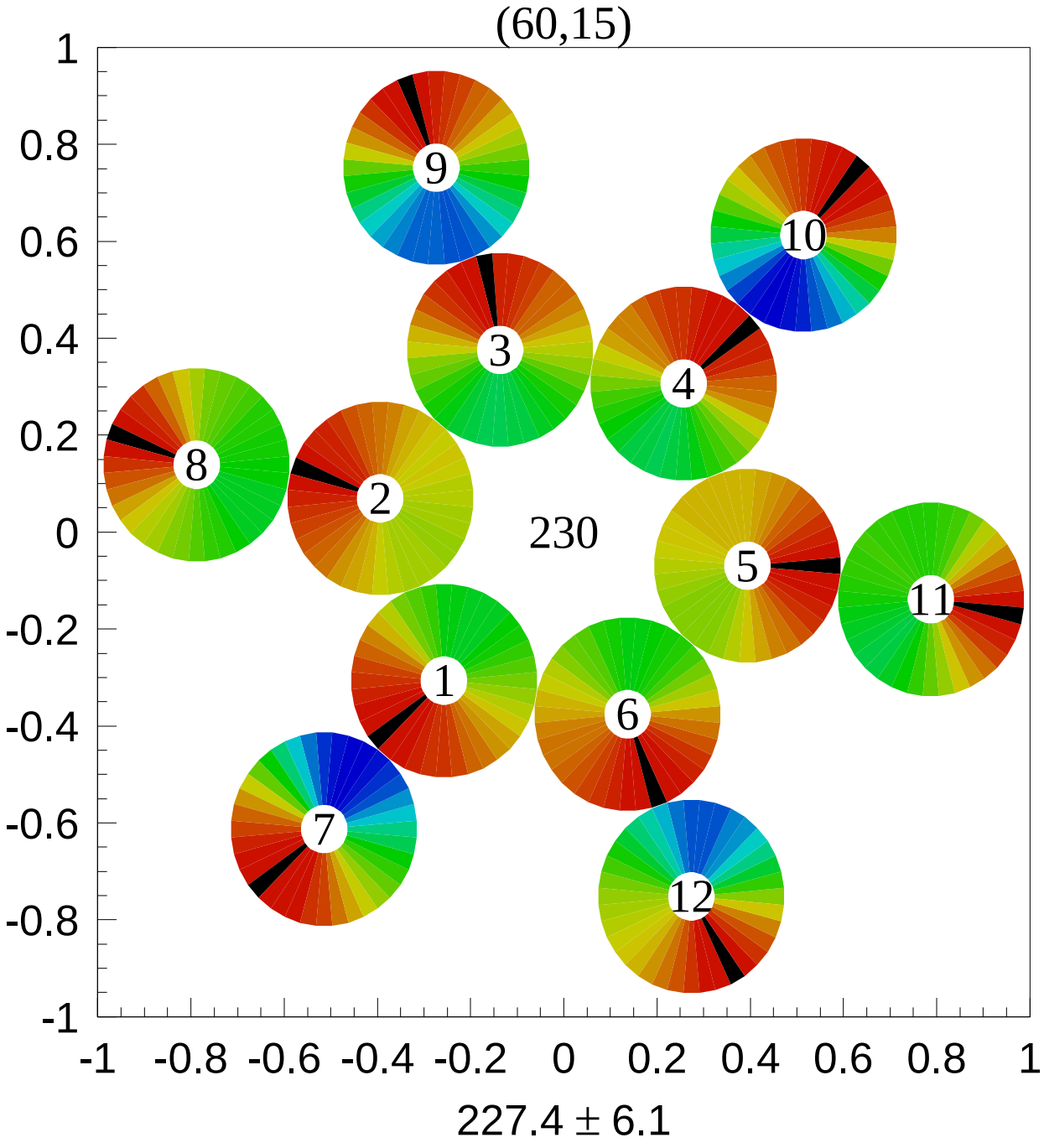

(60,13)
tilted LEDs
122 118 127 119 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 123 122 117 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

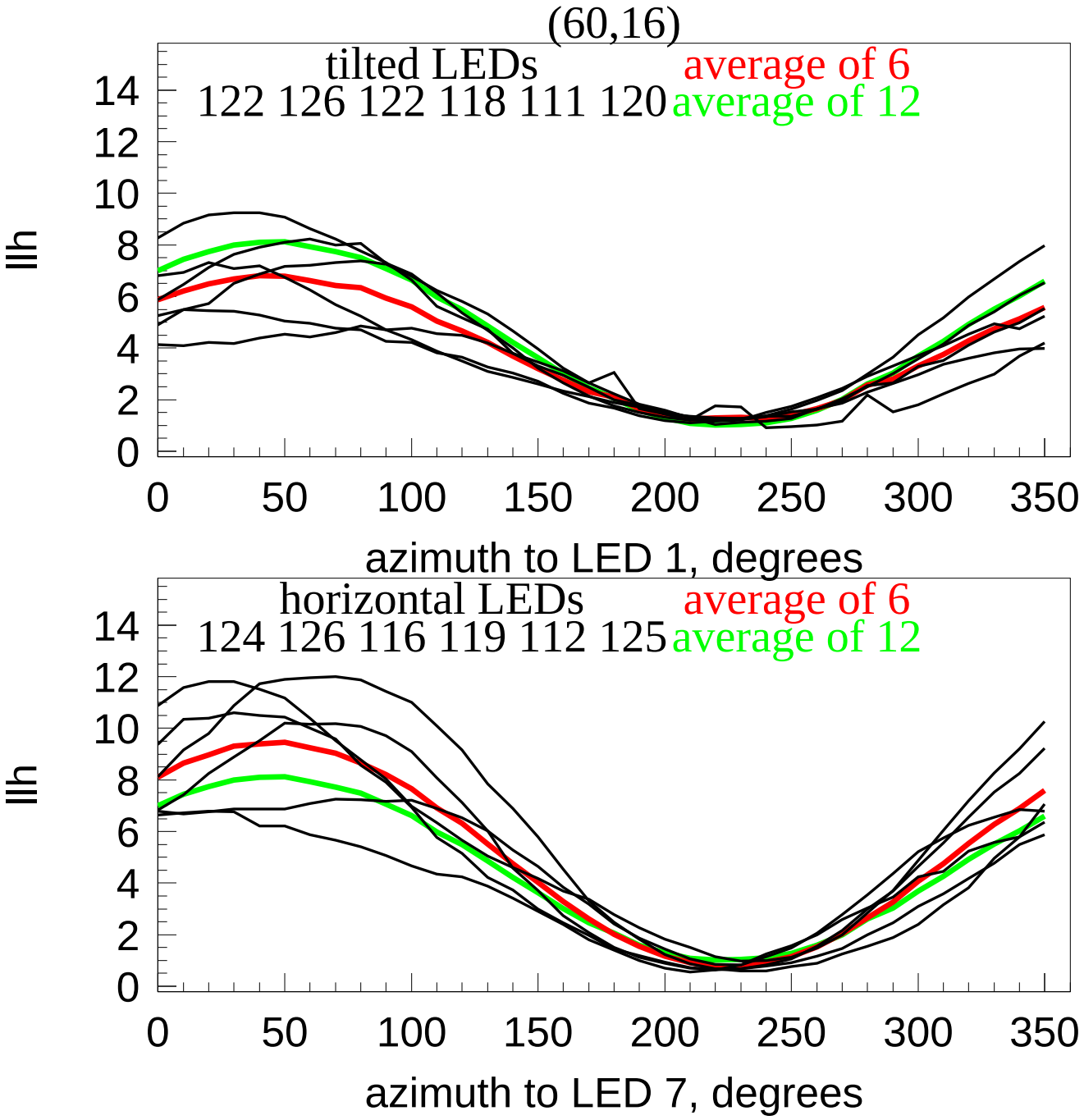

(60,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
273.2 ± 7.0

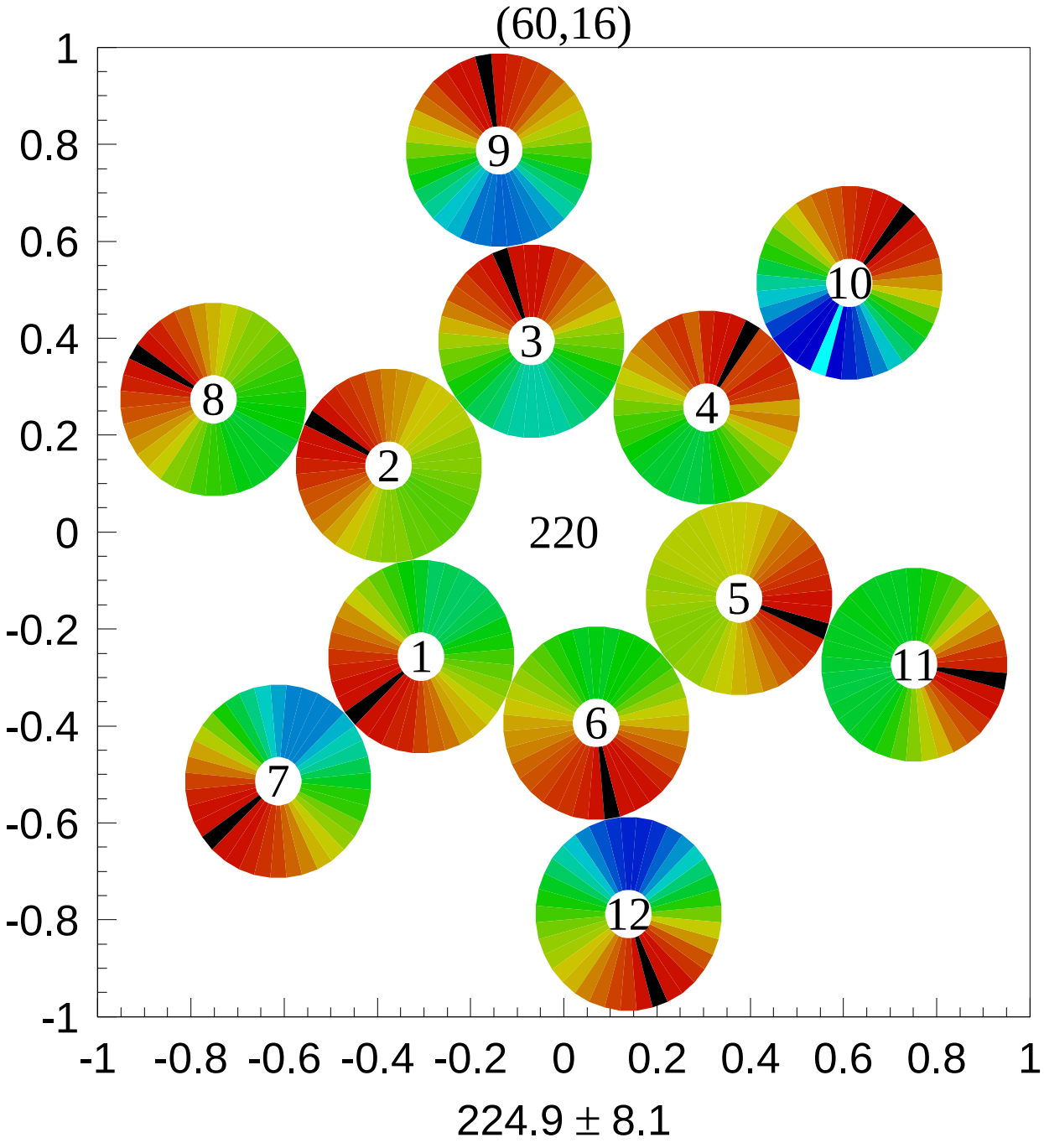

(60,14)
tilted LEDs
118 128 130 122 112 69
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
37 125 121 116 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

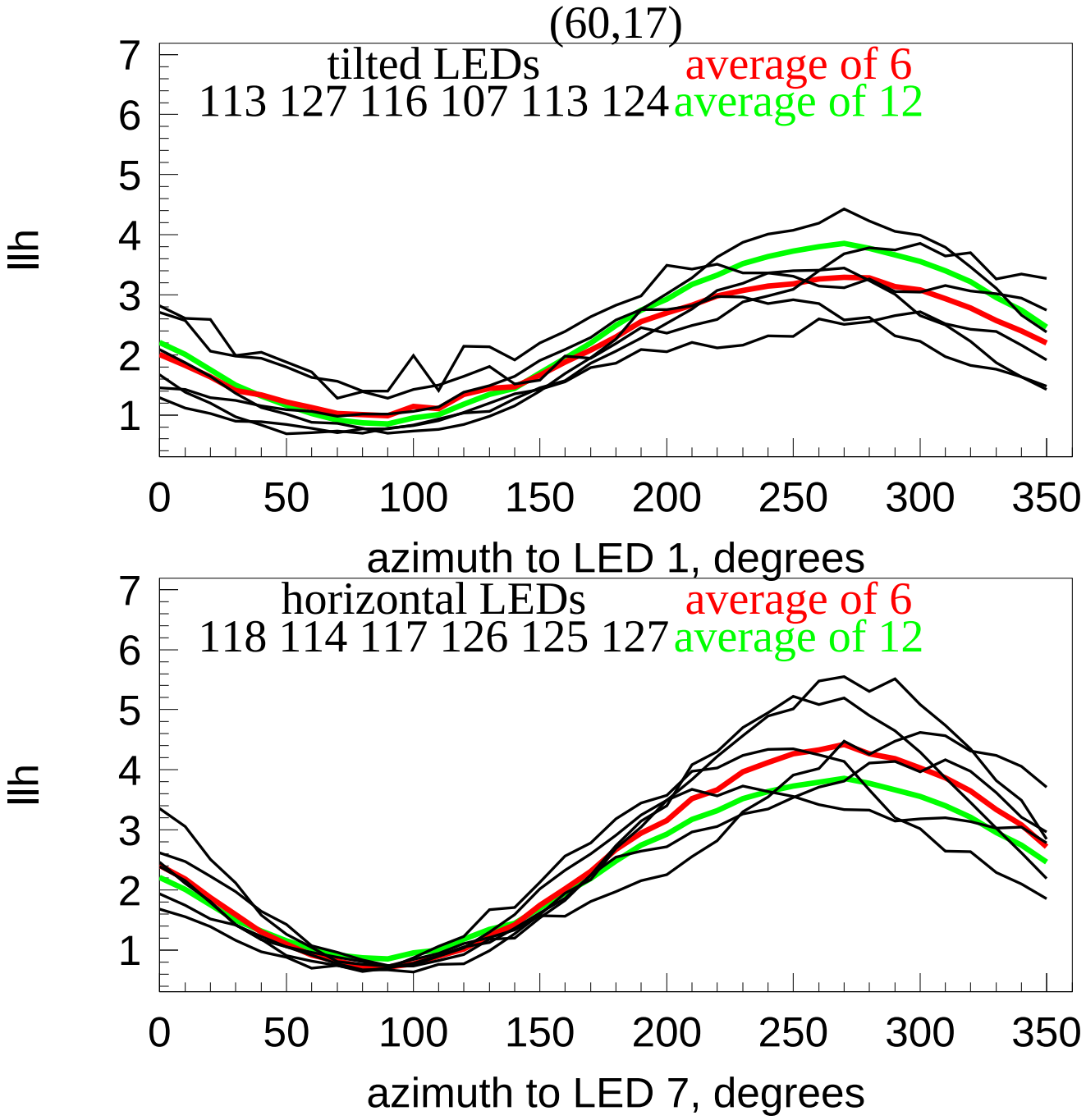

(60,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
226 ± 7.3

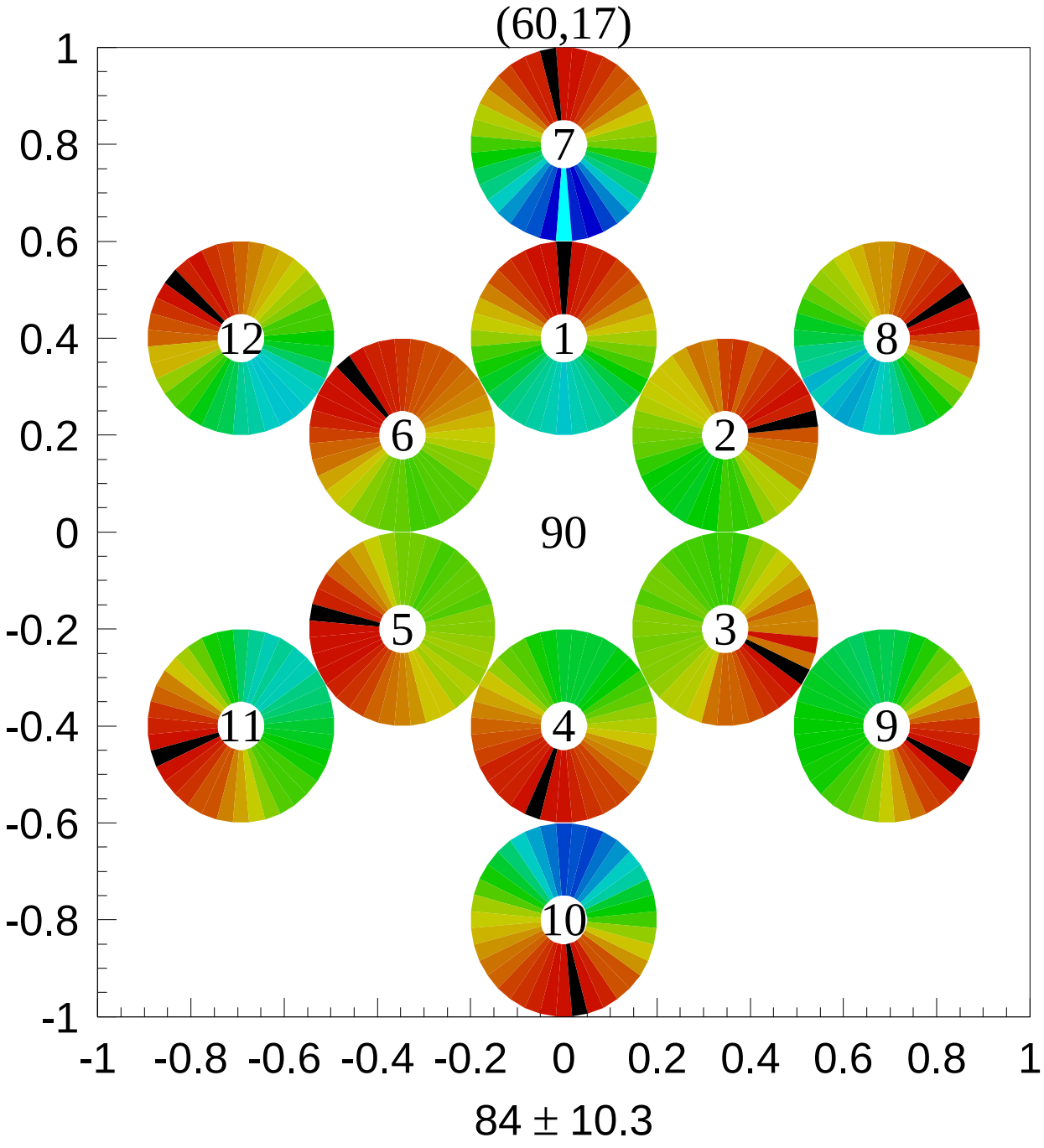

(60,15)
tilted LEDs
123 118 127 116 127 120
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 121 126 123 121 125
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

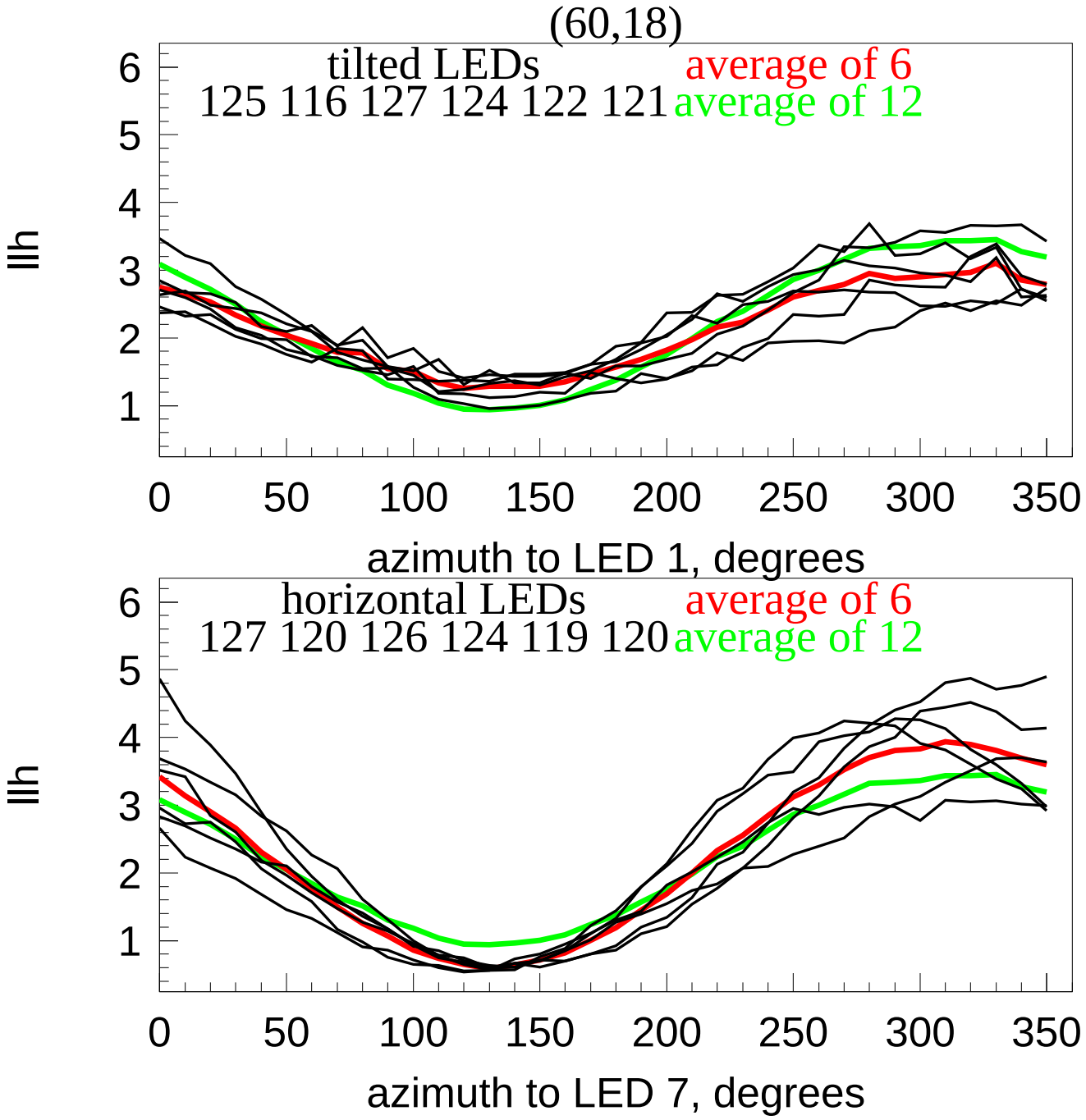

(60,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
227.4 ± 6.1

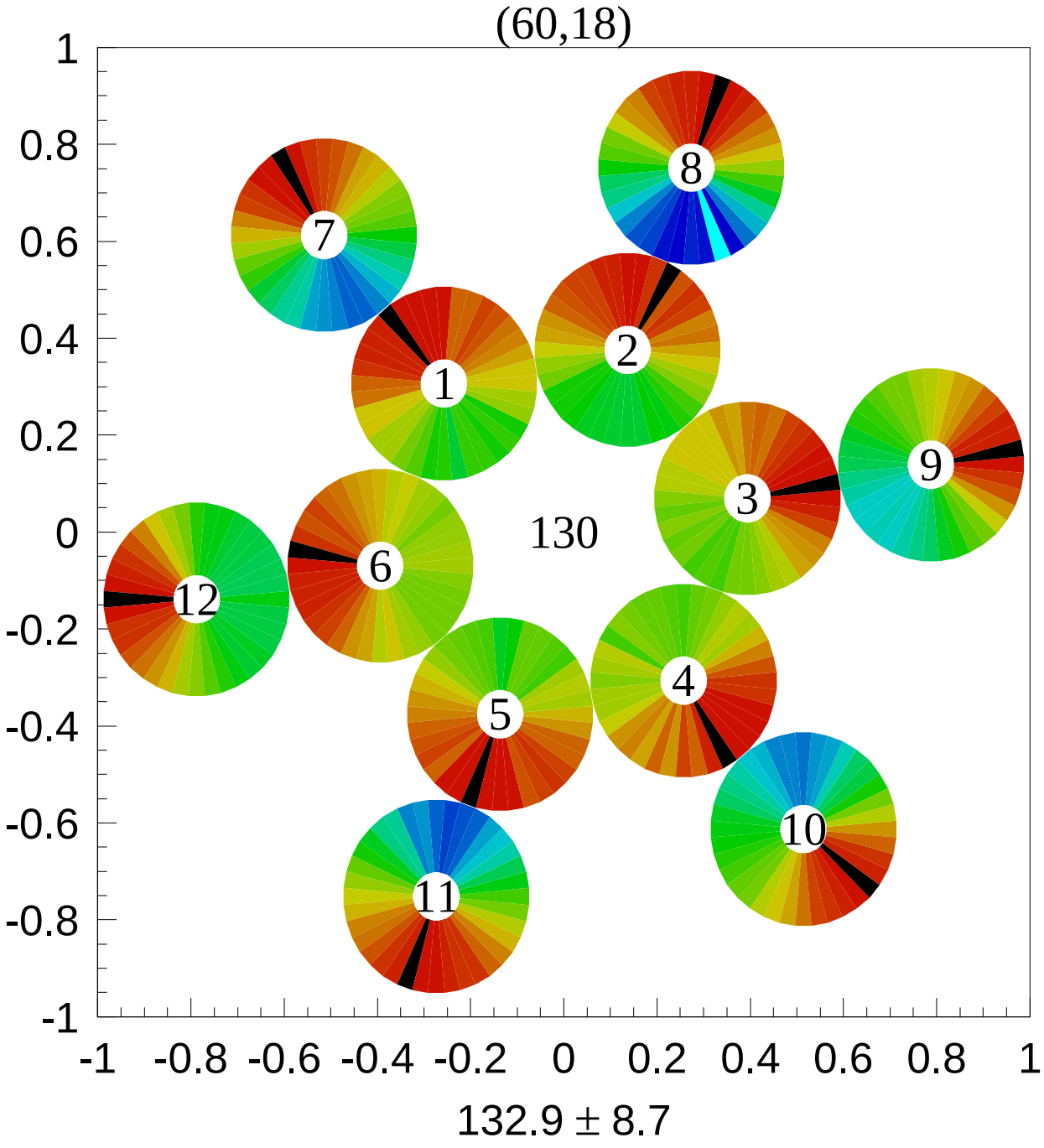

(60,16)
tilted LEDs
122 126 122 118 111 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 126 116 119 112 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

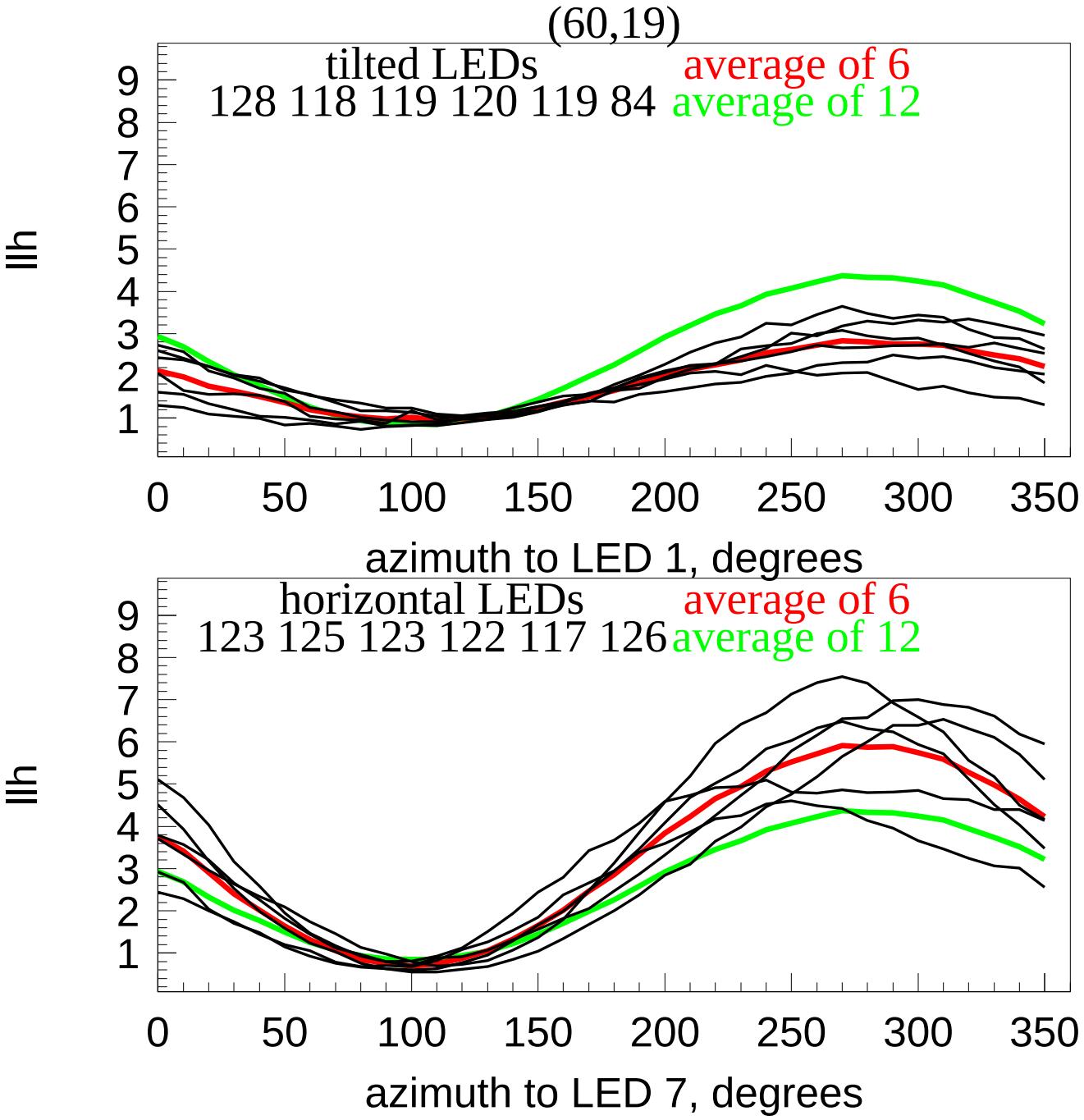

(60,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
11
1
6
7
12
224.9 ± 8.1

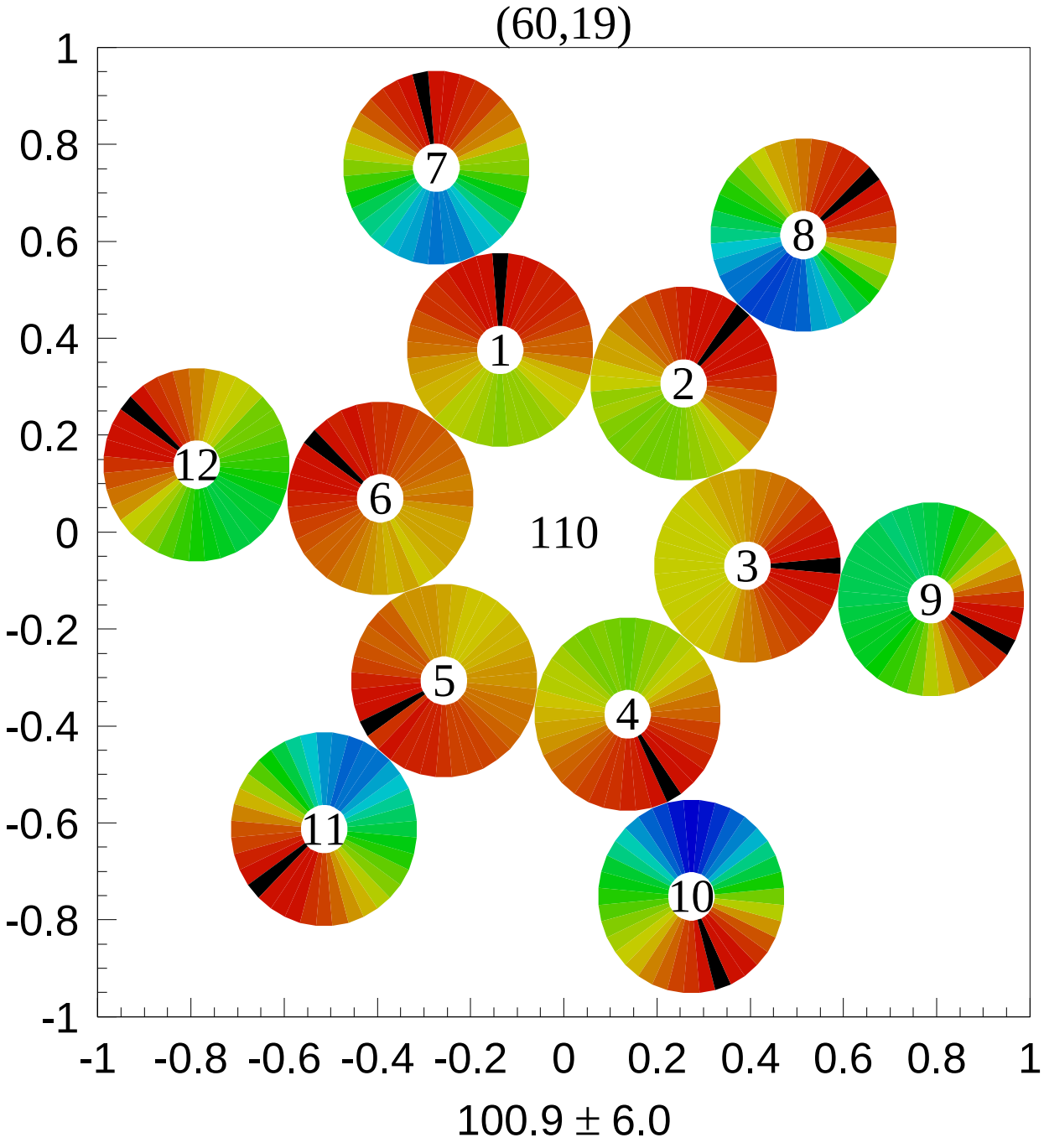

(60,17)
tilted LEDs
113 127 116 107 113 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 114 117 126 125 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

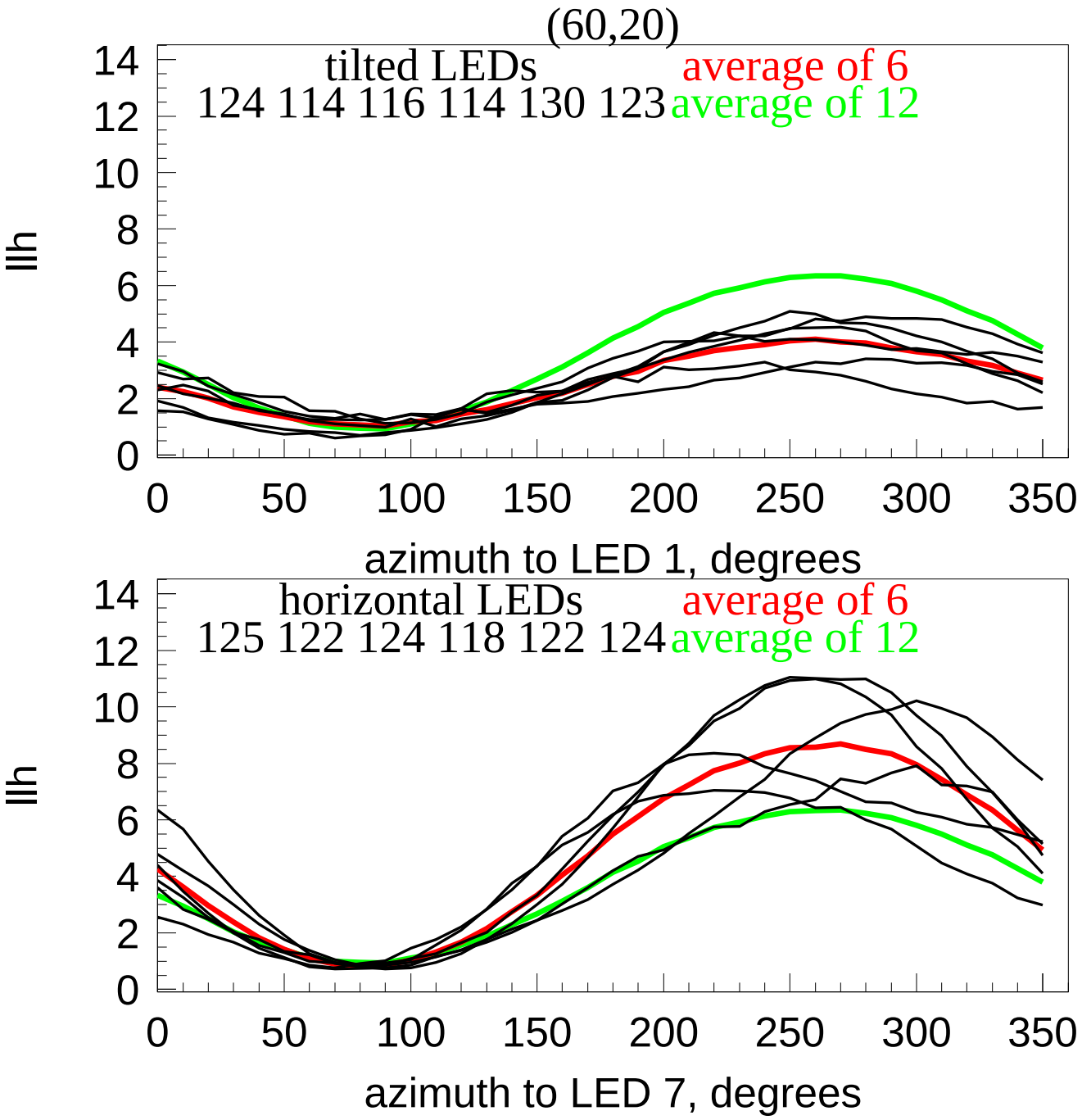

(60,17)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
84 ± 10.3

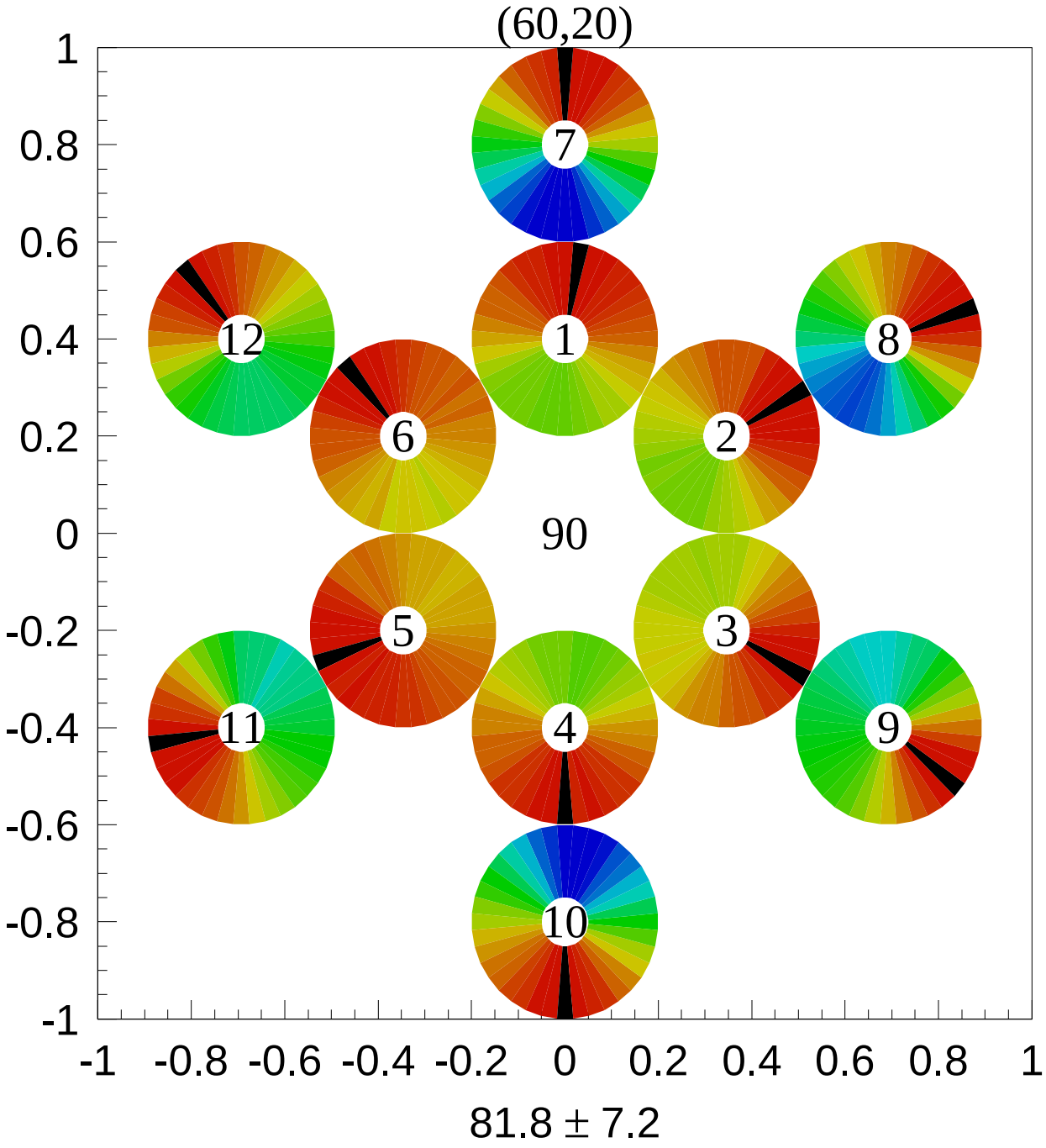

(60,18)
tilted LEDs
125 116 127 124 122 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 120 126 124 119 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

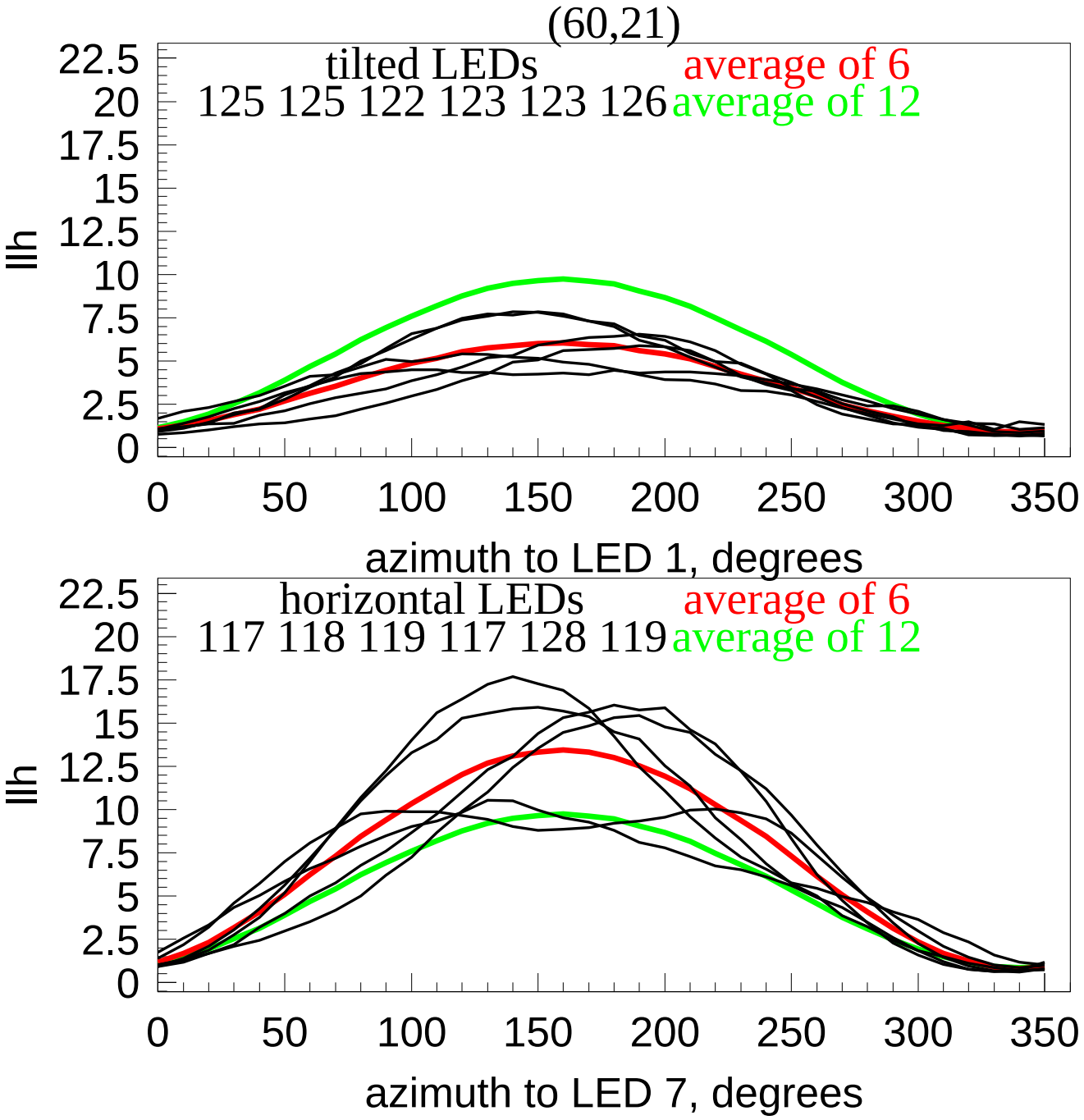

(60,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
132.9 ± 8.7

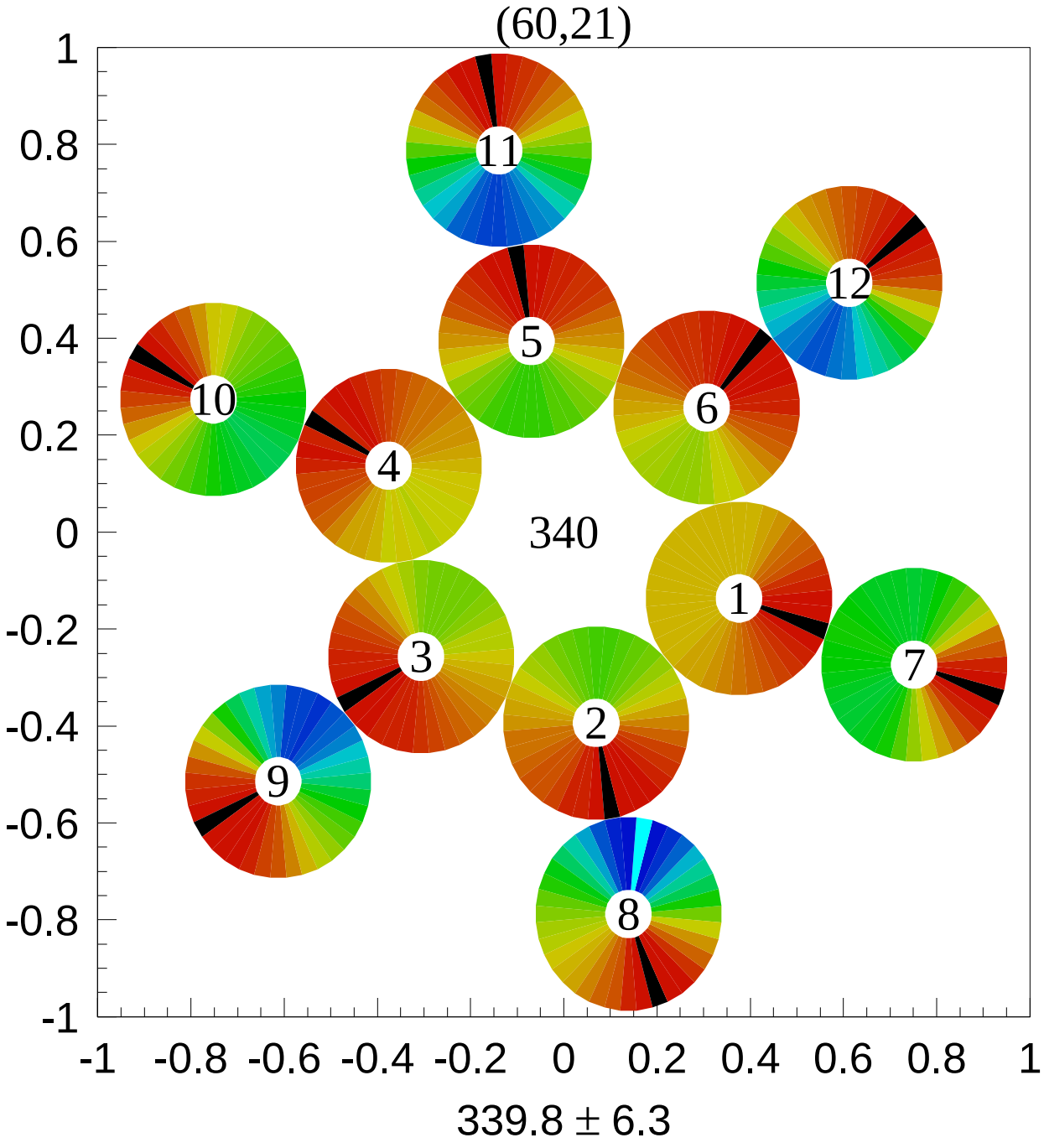

(60,19)
tilted LEDs
128 118 119 120 119 84
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 125 123 122 117 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

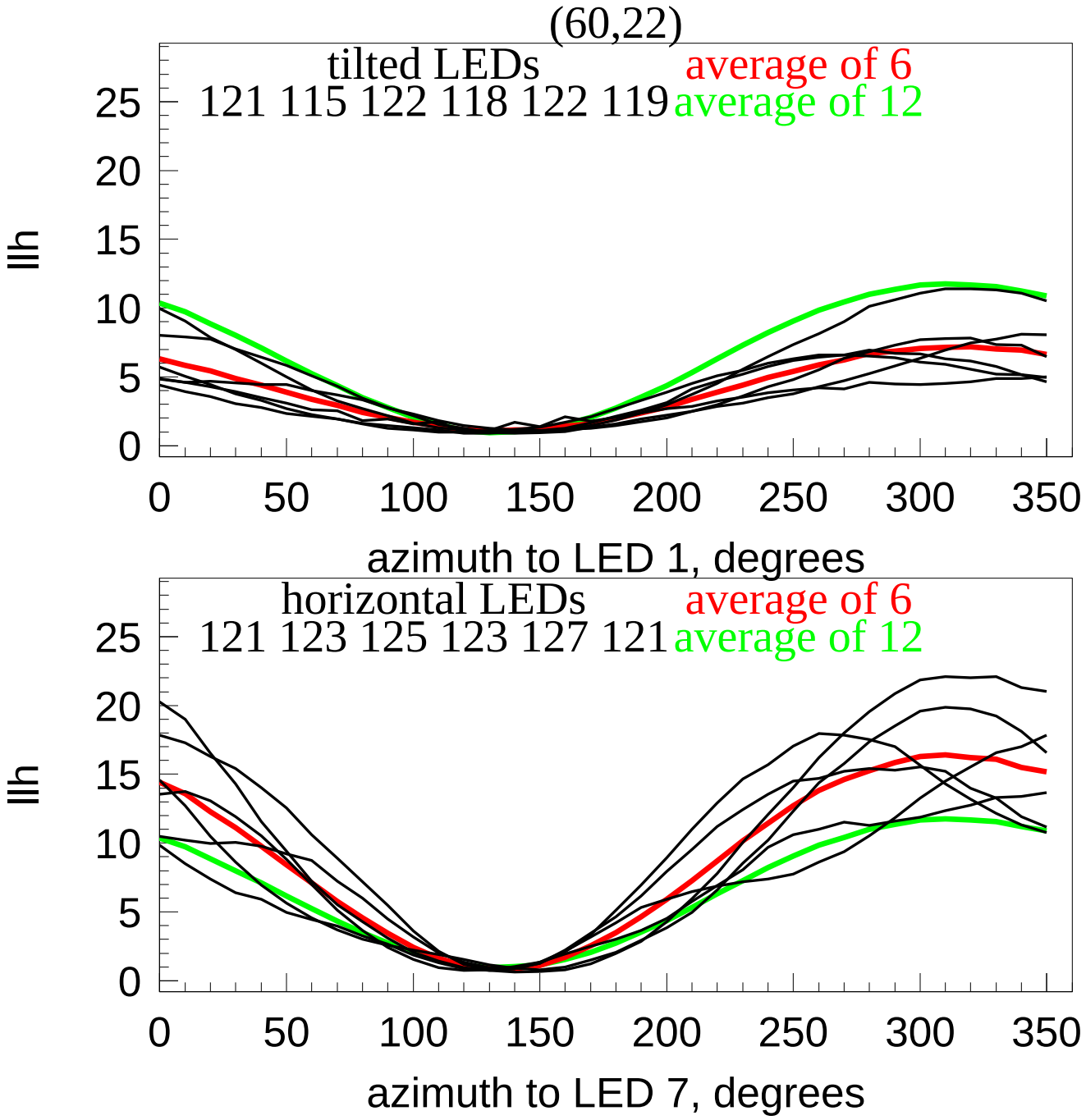

(60,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
100.9 ± 6.0
7
8
1
2
12
6
110
3
9
5
4
11
10

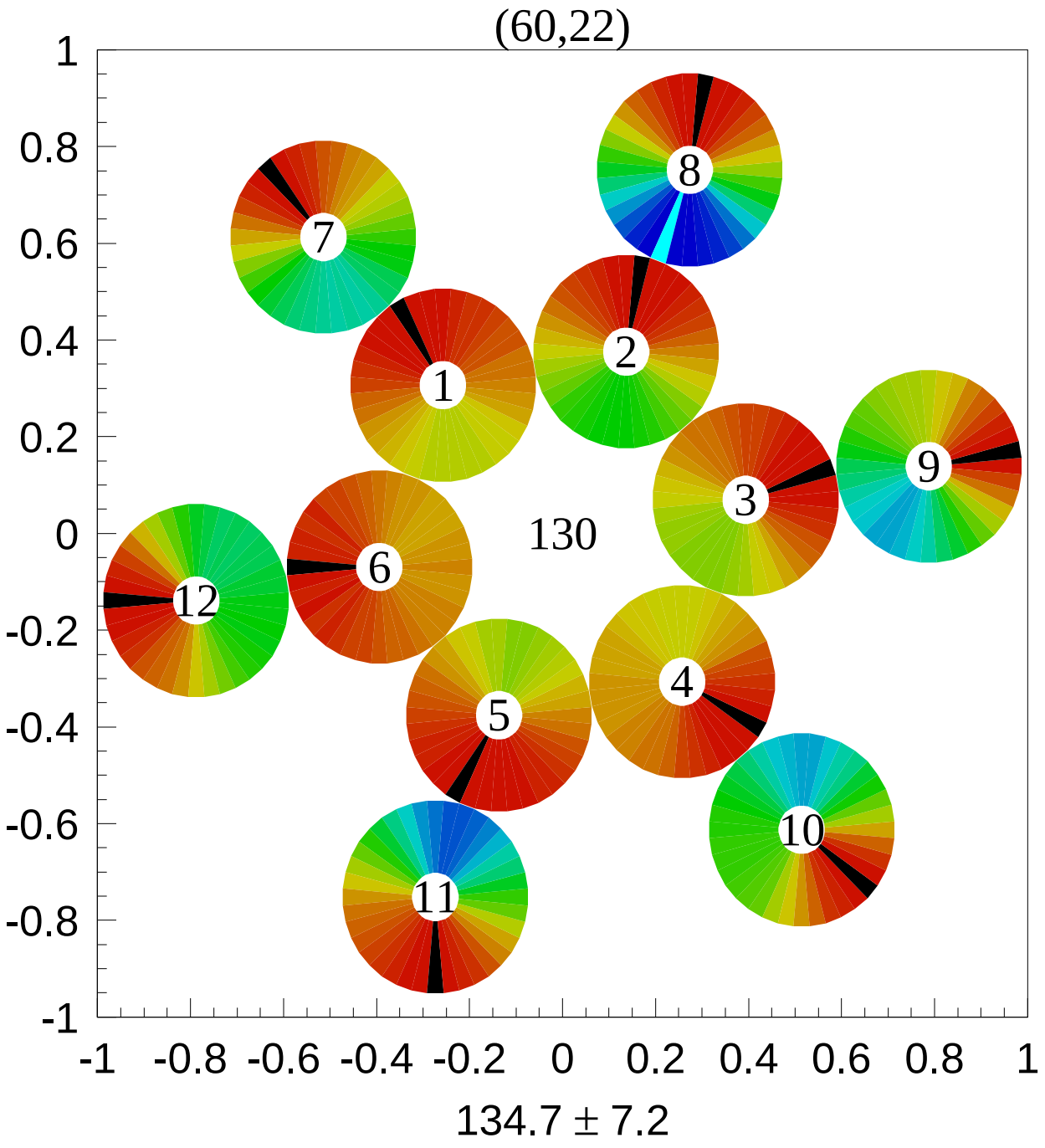

(60,20)
tilted LEDs
124 114 116 114 130 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 122 124 118 122 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

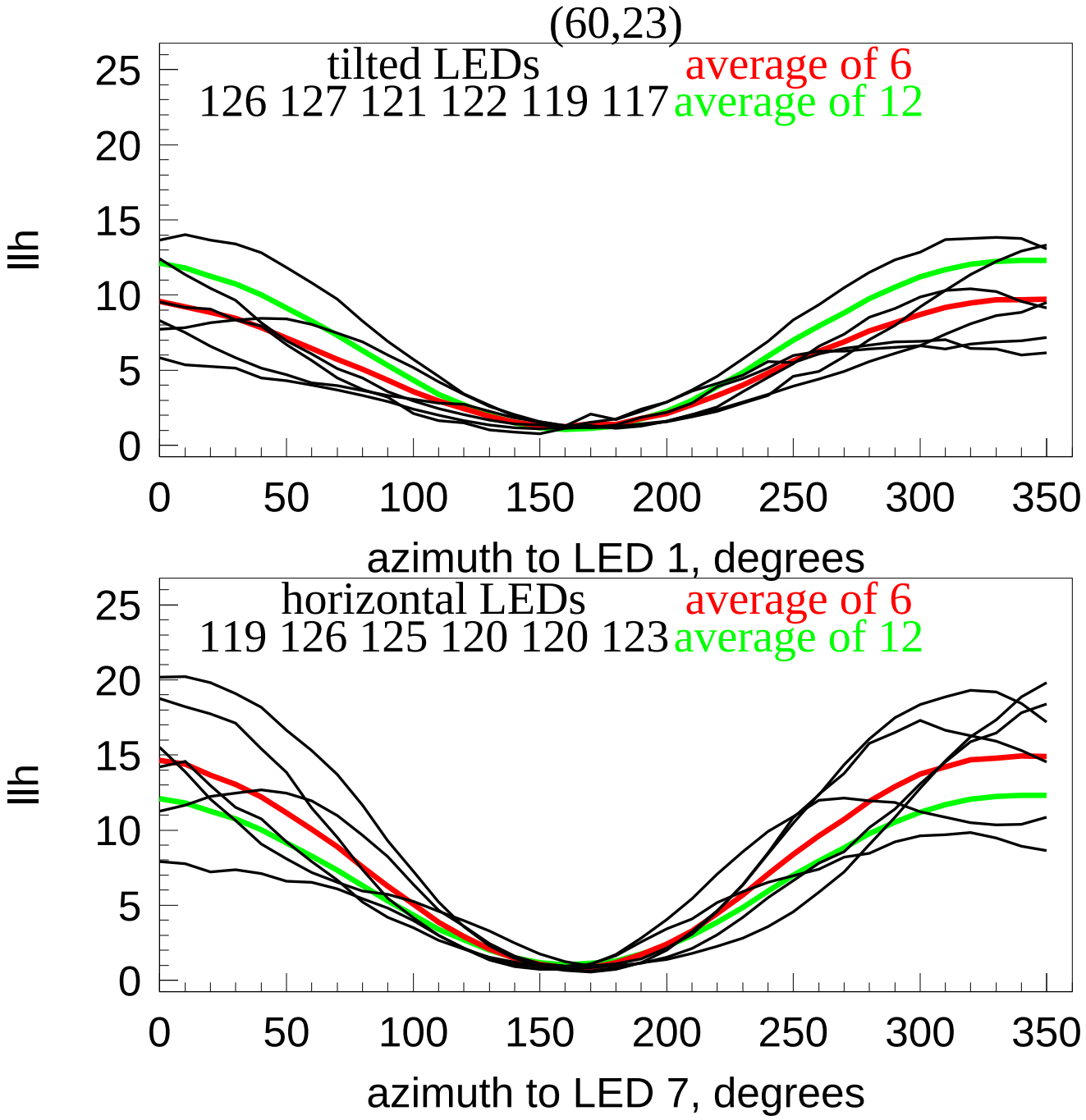

(60,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
81.8 ± 7.2

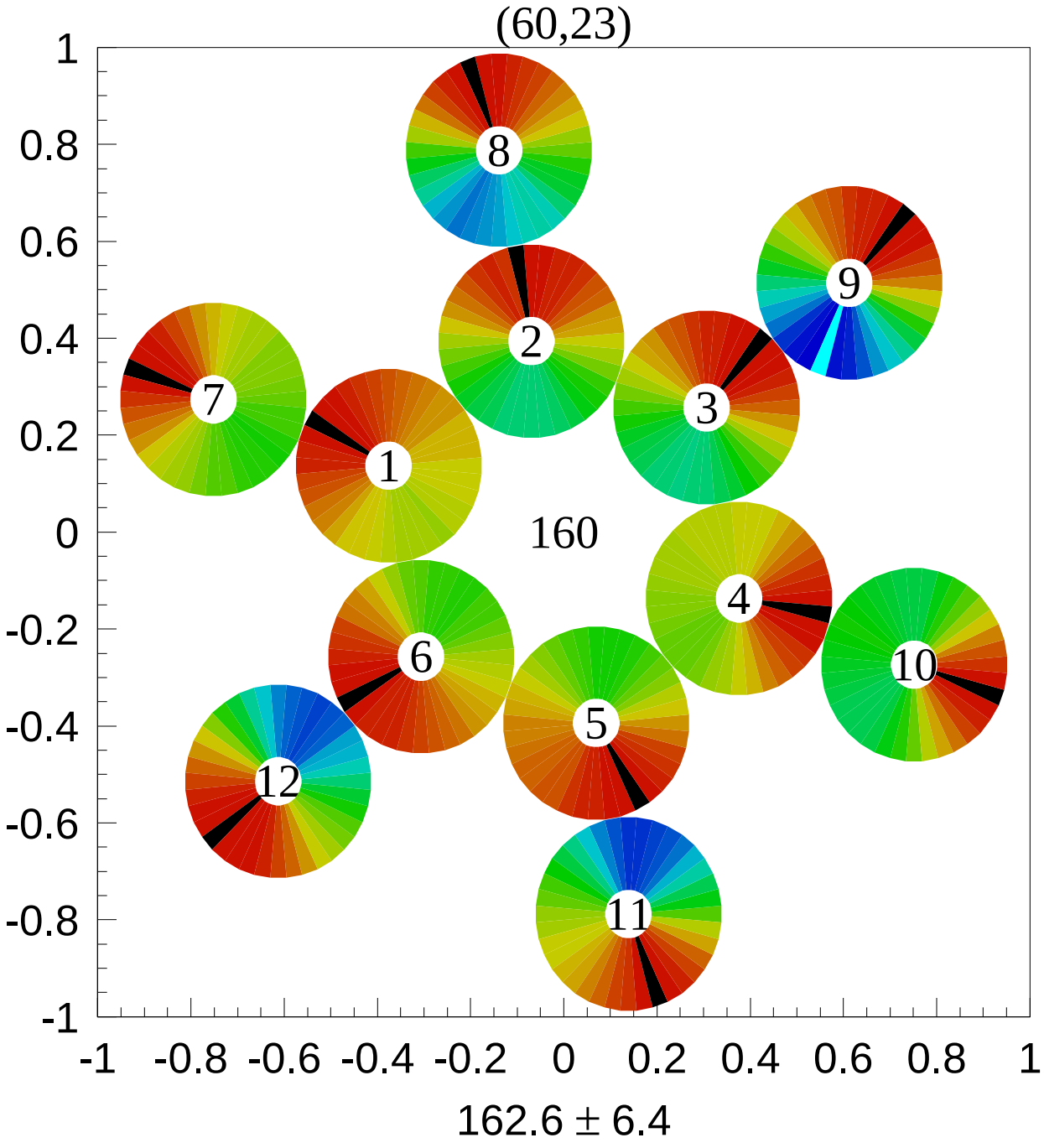

(60,21)
tilted LEDs
125 125 122 123 123 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 119 117 128 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

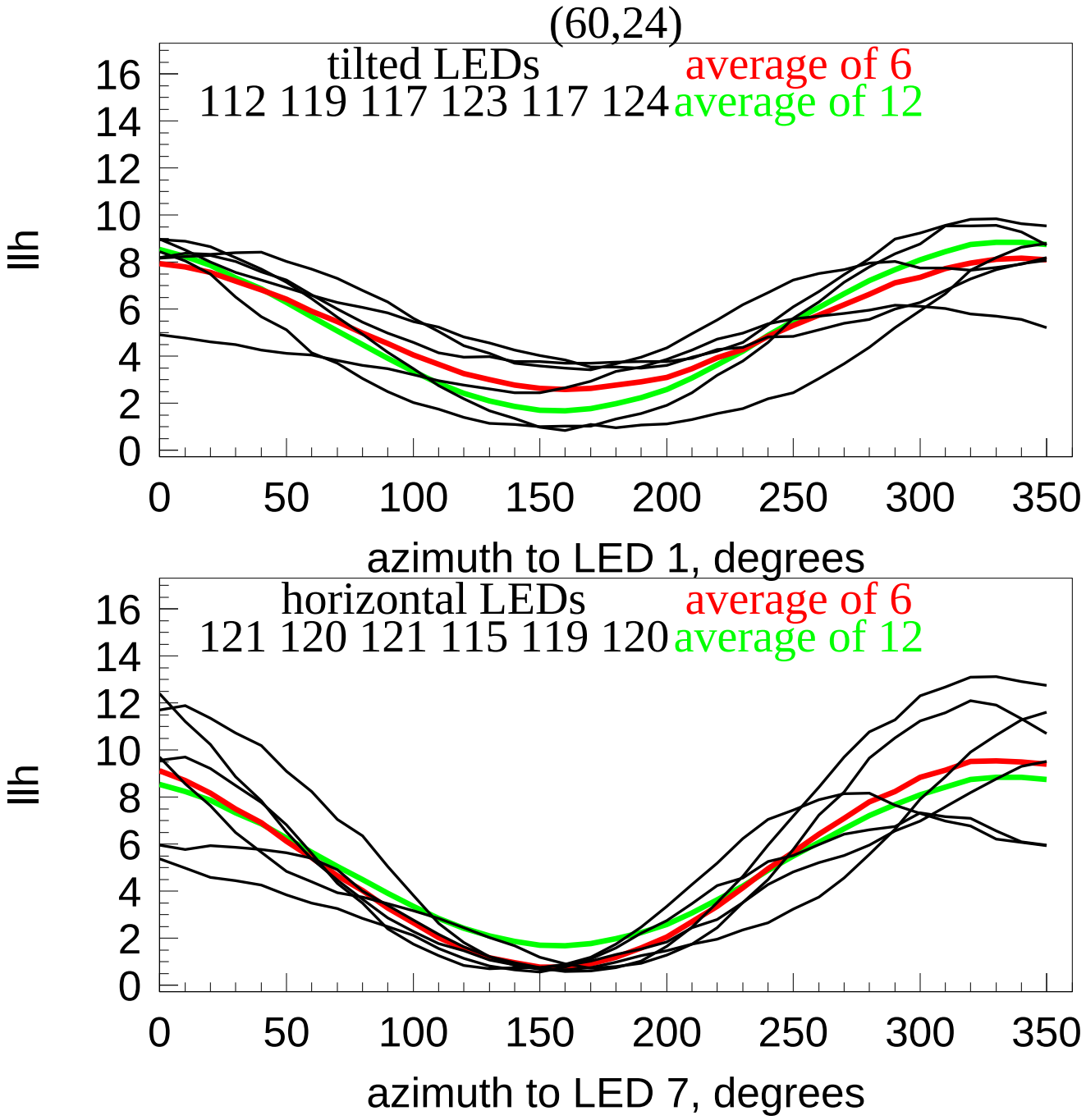

(60,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
339.8 ± 6.3

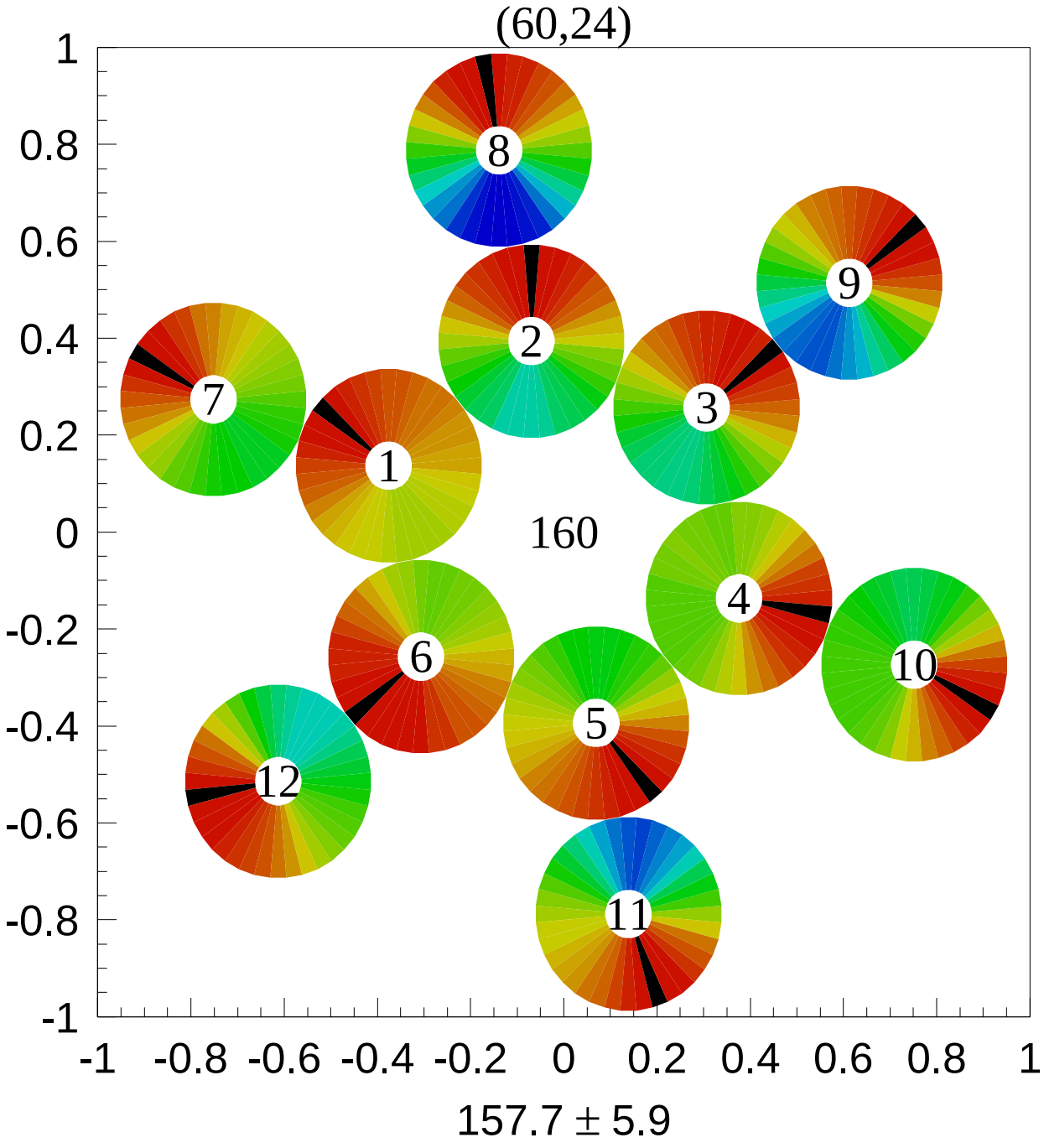

(60,22)
tilted LEDs
121 115 122 118 122 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 125 123 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

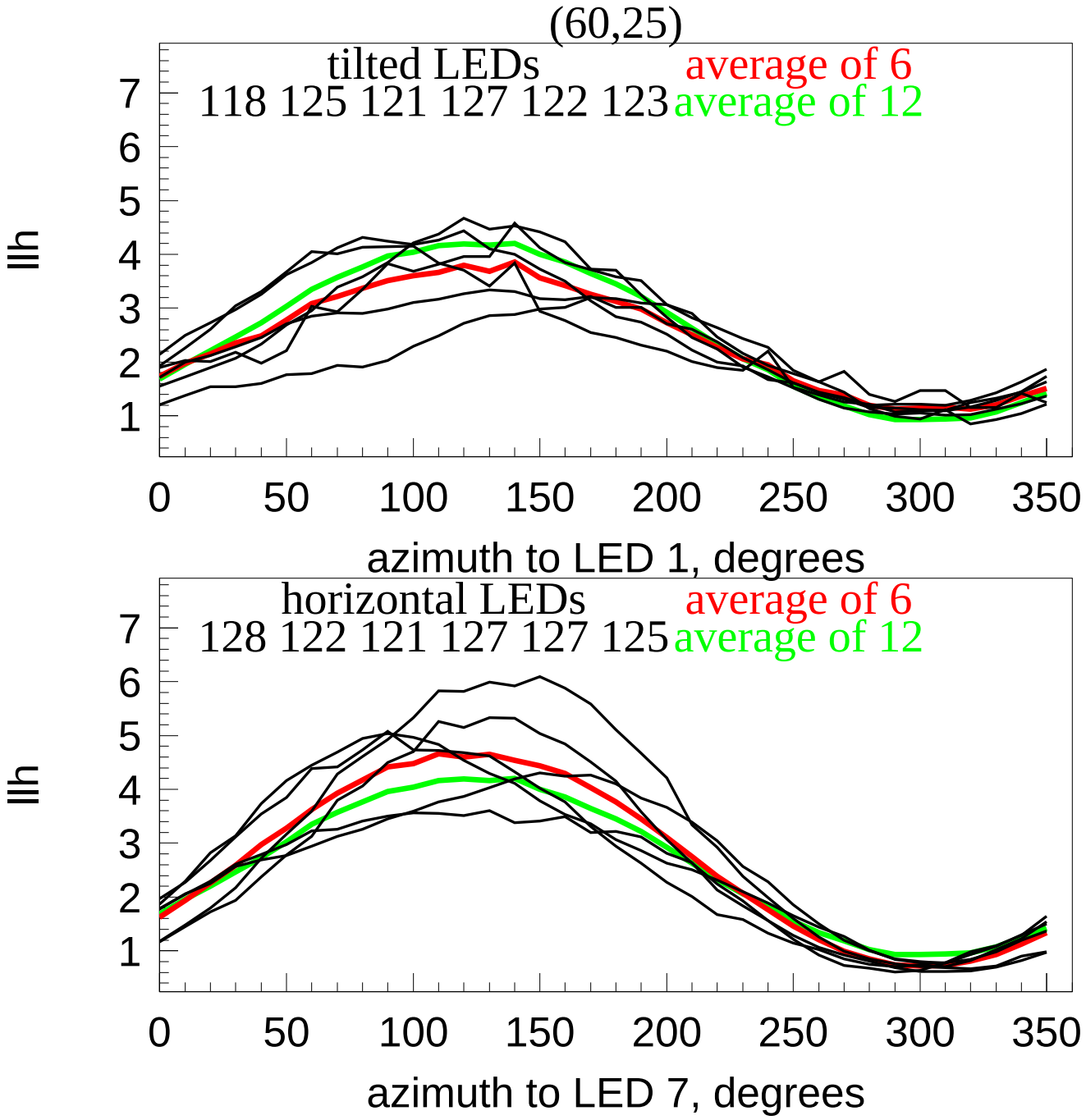

(60,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
134.7 ± 7.2

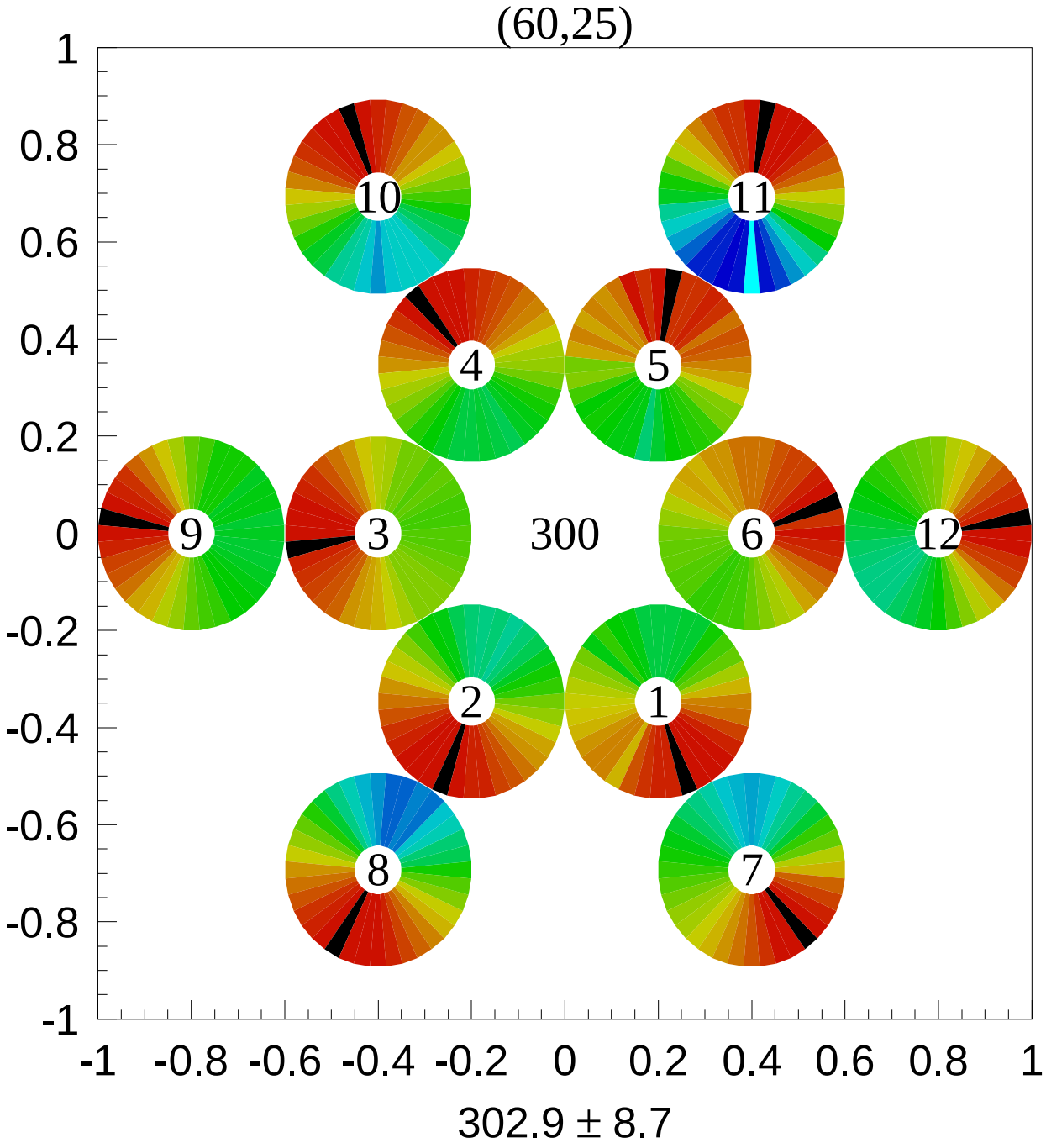

(60,23)
tilted LEDs
126 127 121 122 119 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 125 120 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

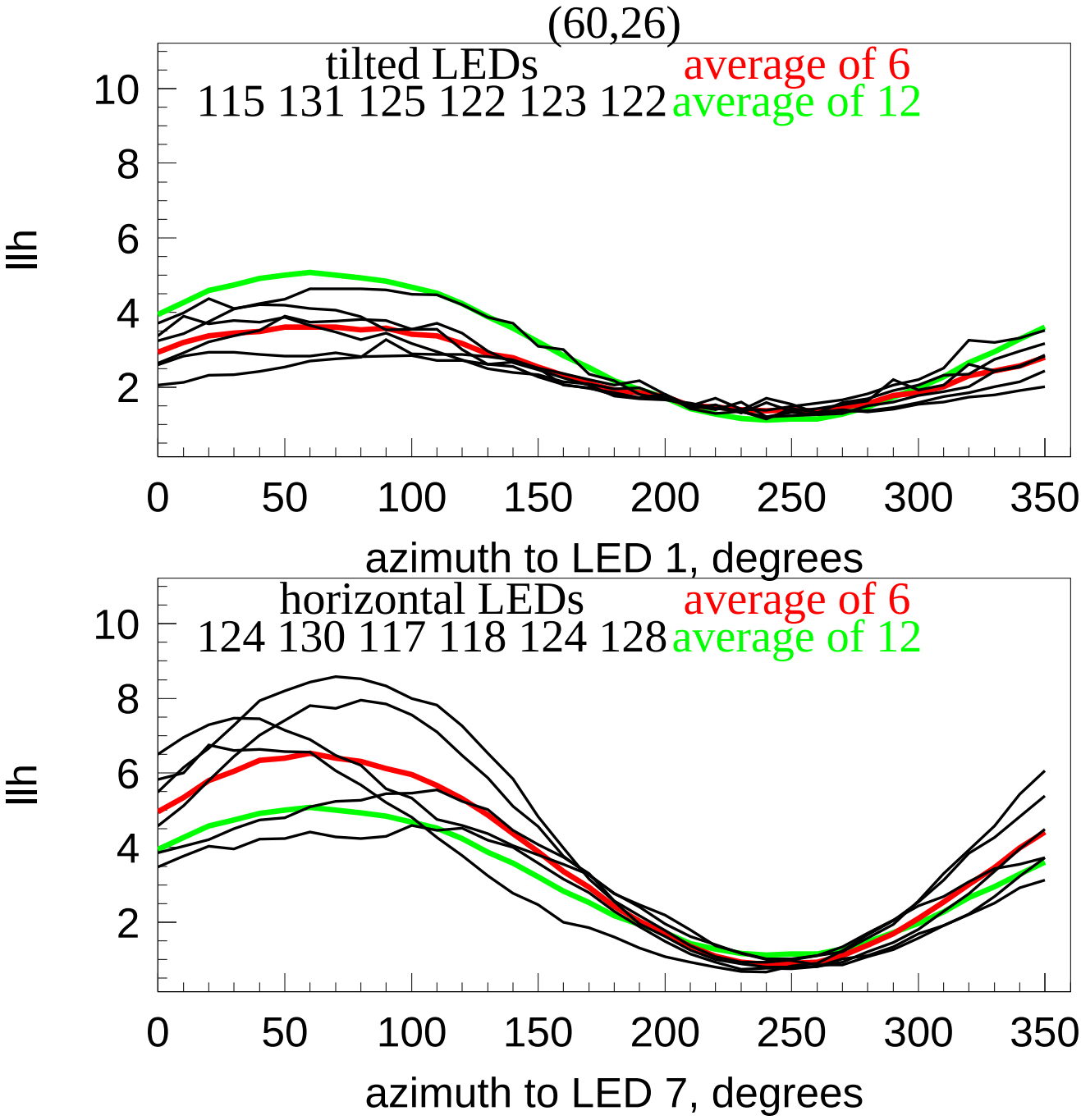

(60,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
162.6 ± 6.4

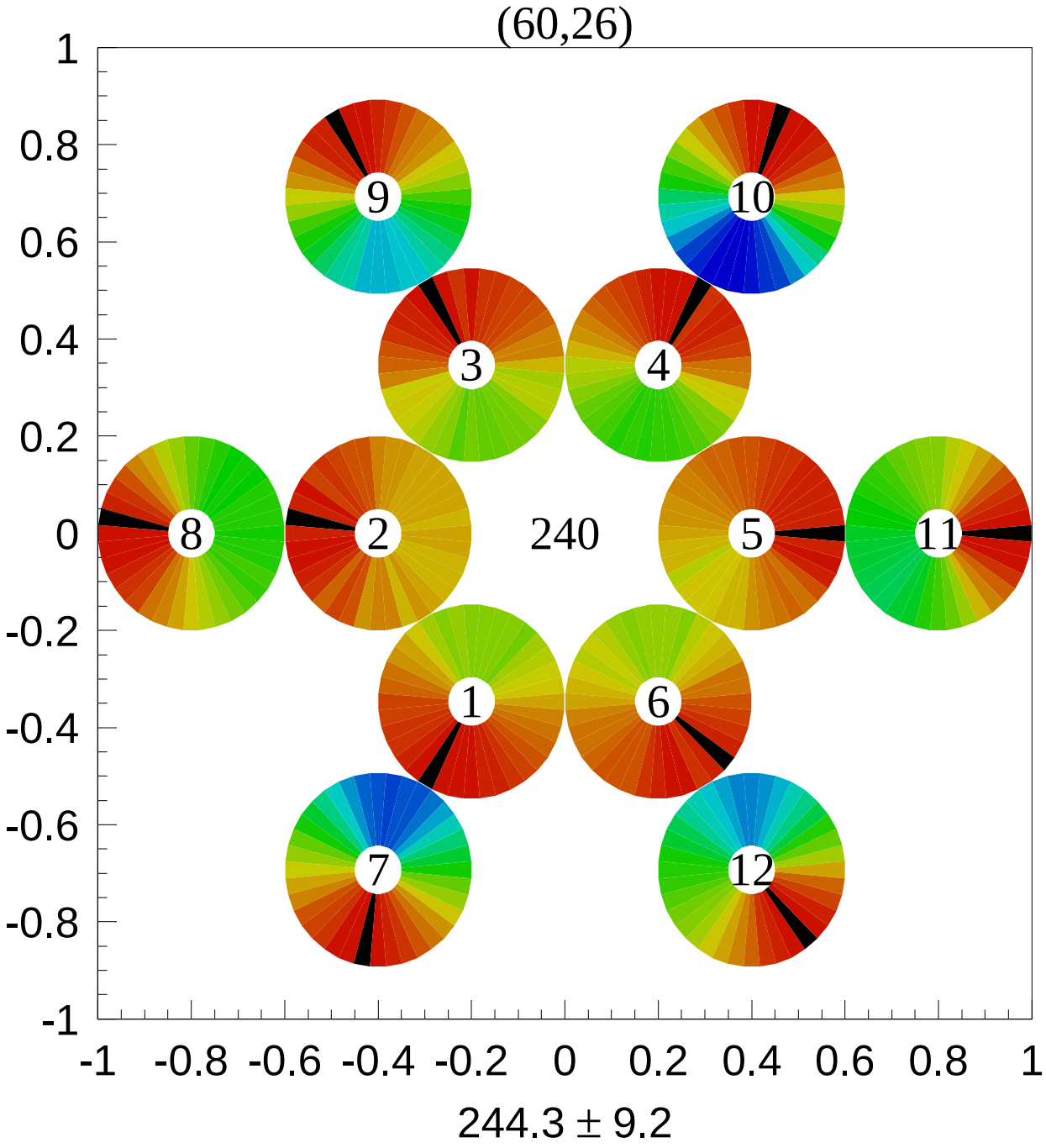

(60,24)
tilted LEDs
112 119 117 123 117 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 121 115 119 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

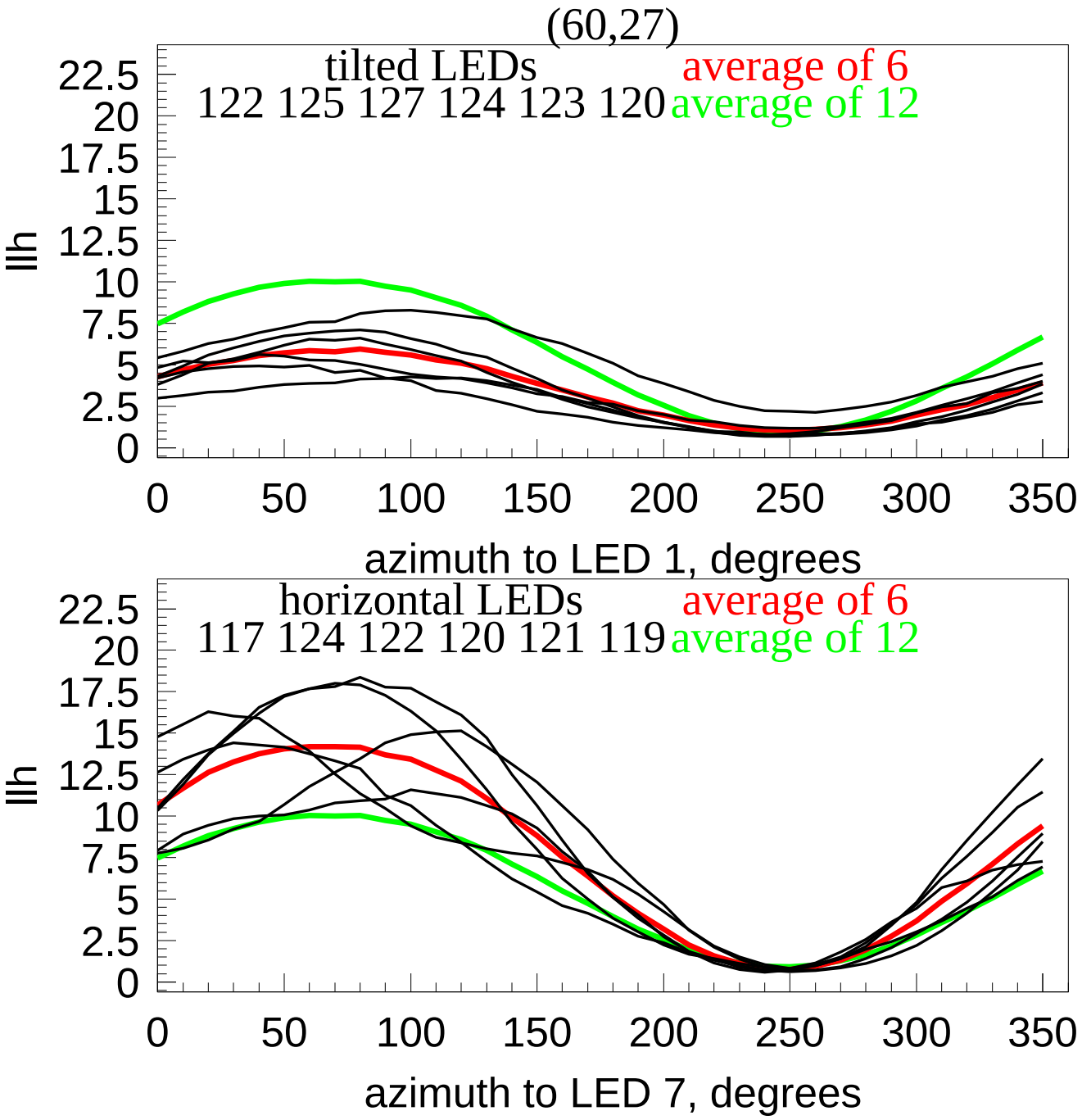

(60,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
157.7 ± 5.9

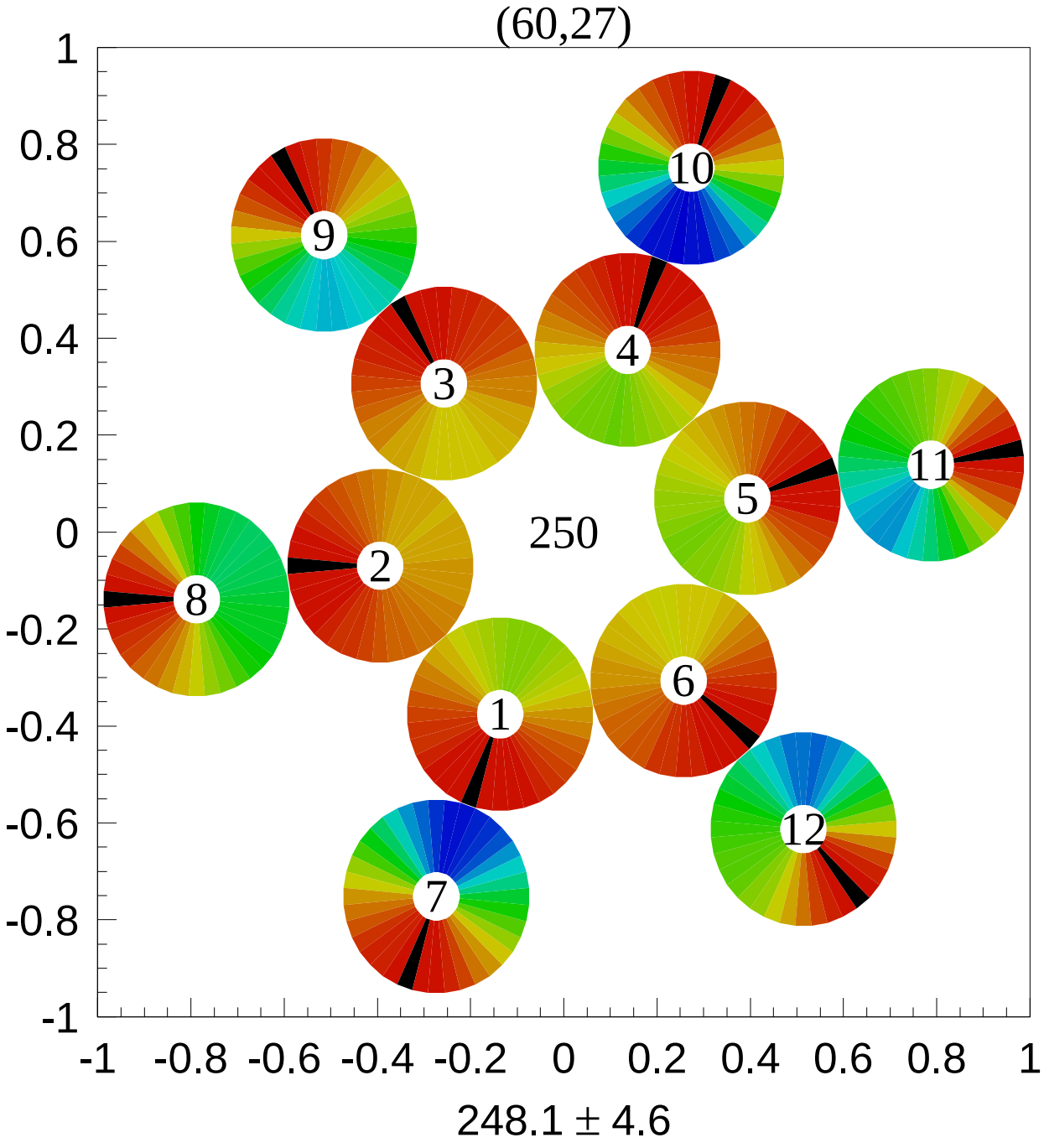

(60,25)
tilted LEDs
118 125 121 127 122 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 122 121 127 127 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

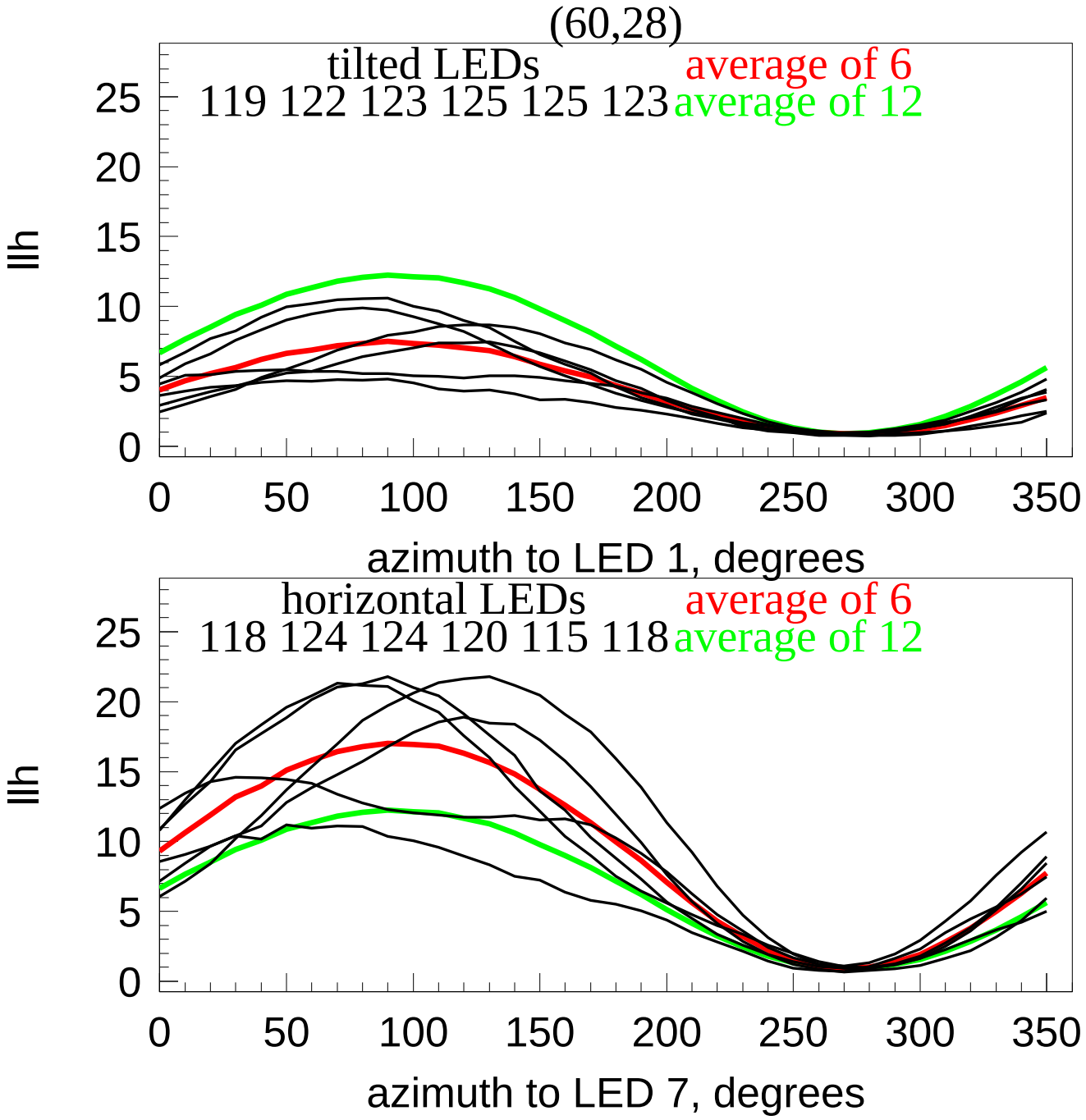

(60,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
302.9 ± 8.7

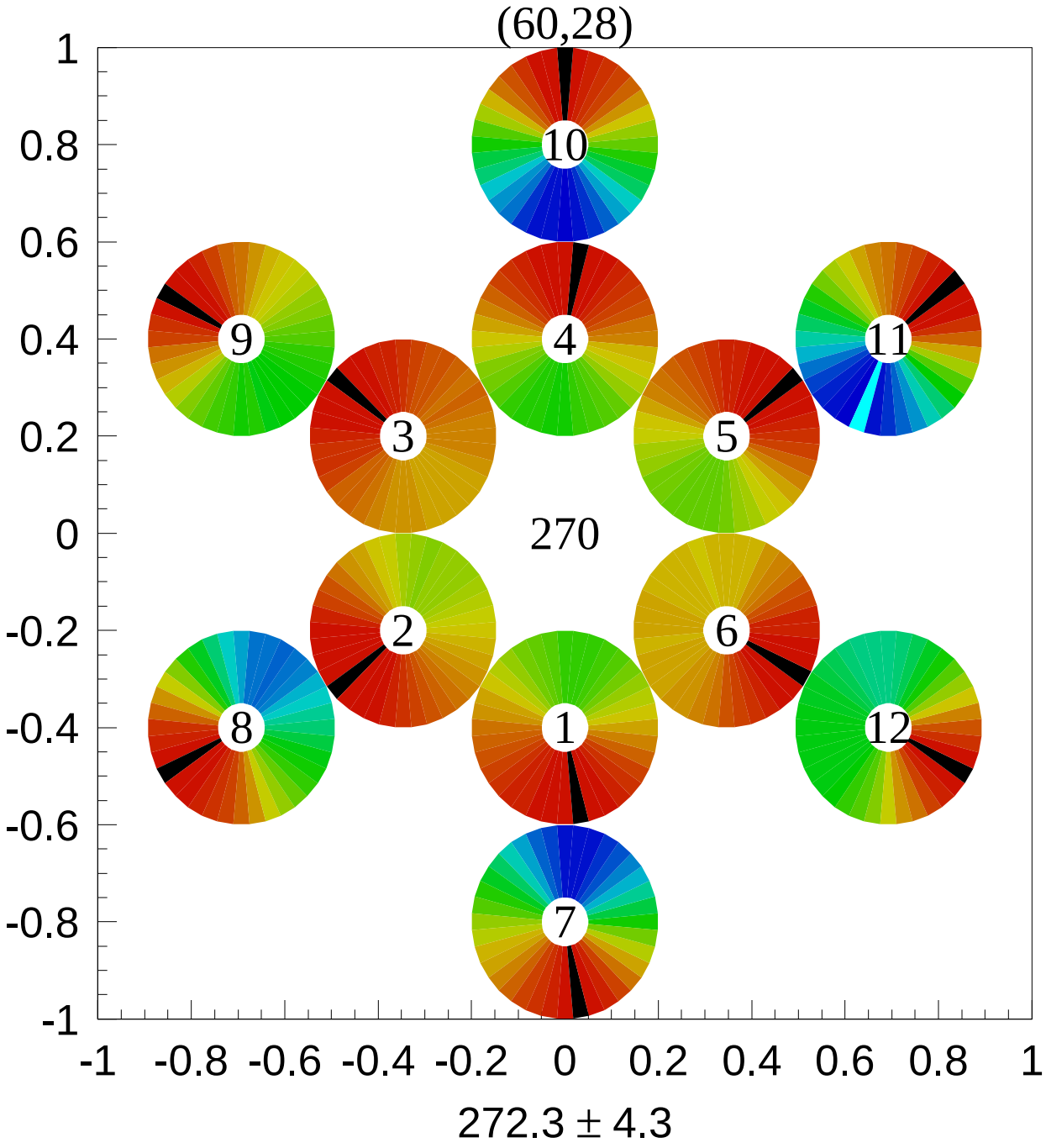

(60,26)
tilted LEDs
115 131 125 122 123 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 130 117 118 124 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

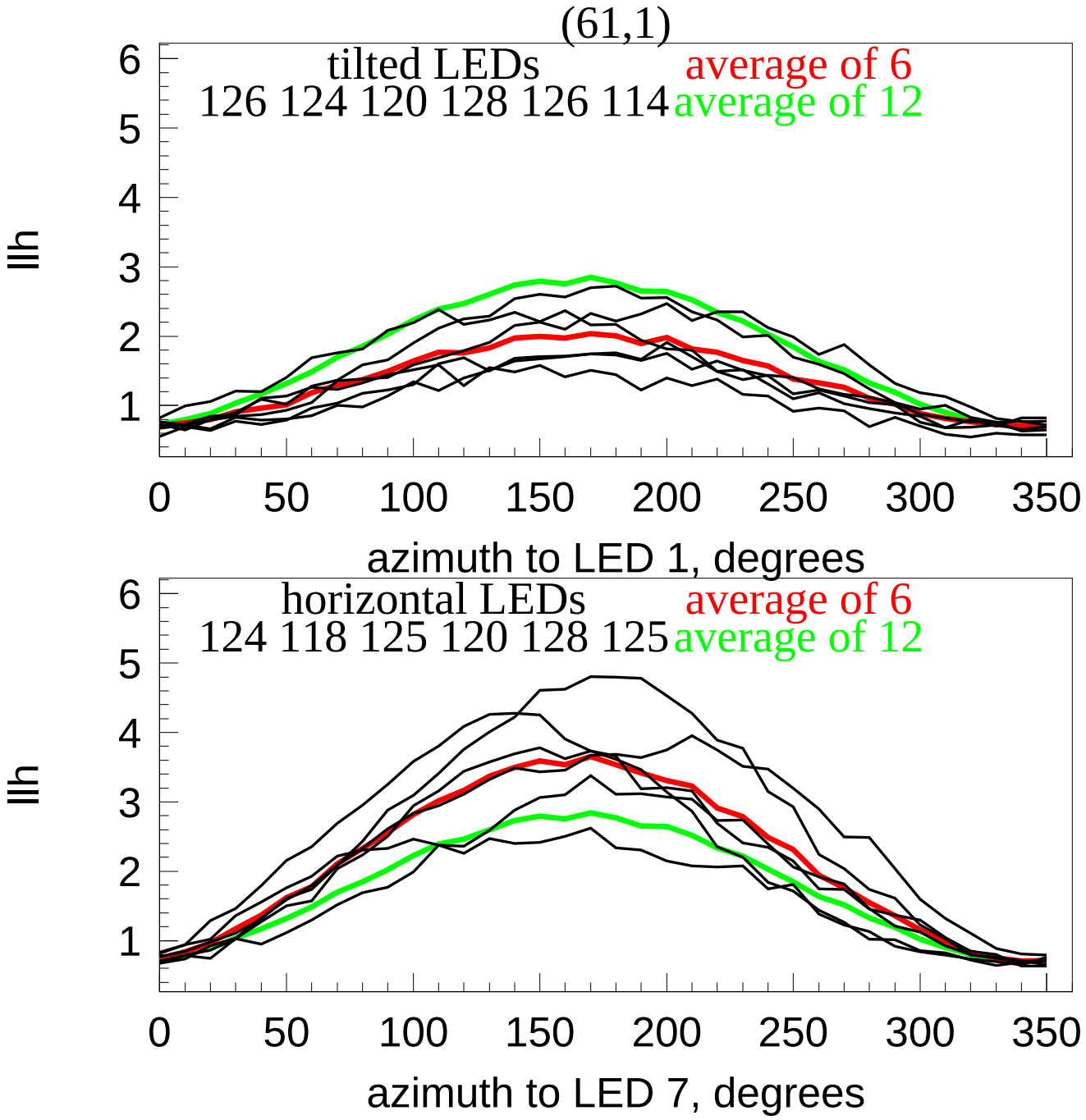

(60,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
244.3 ± 9.2

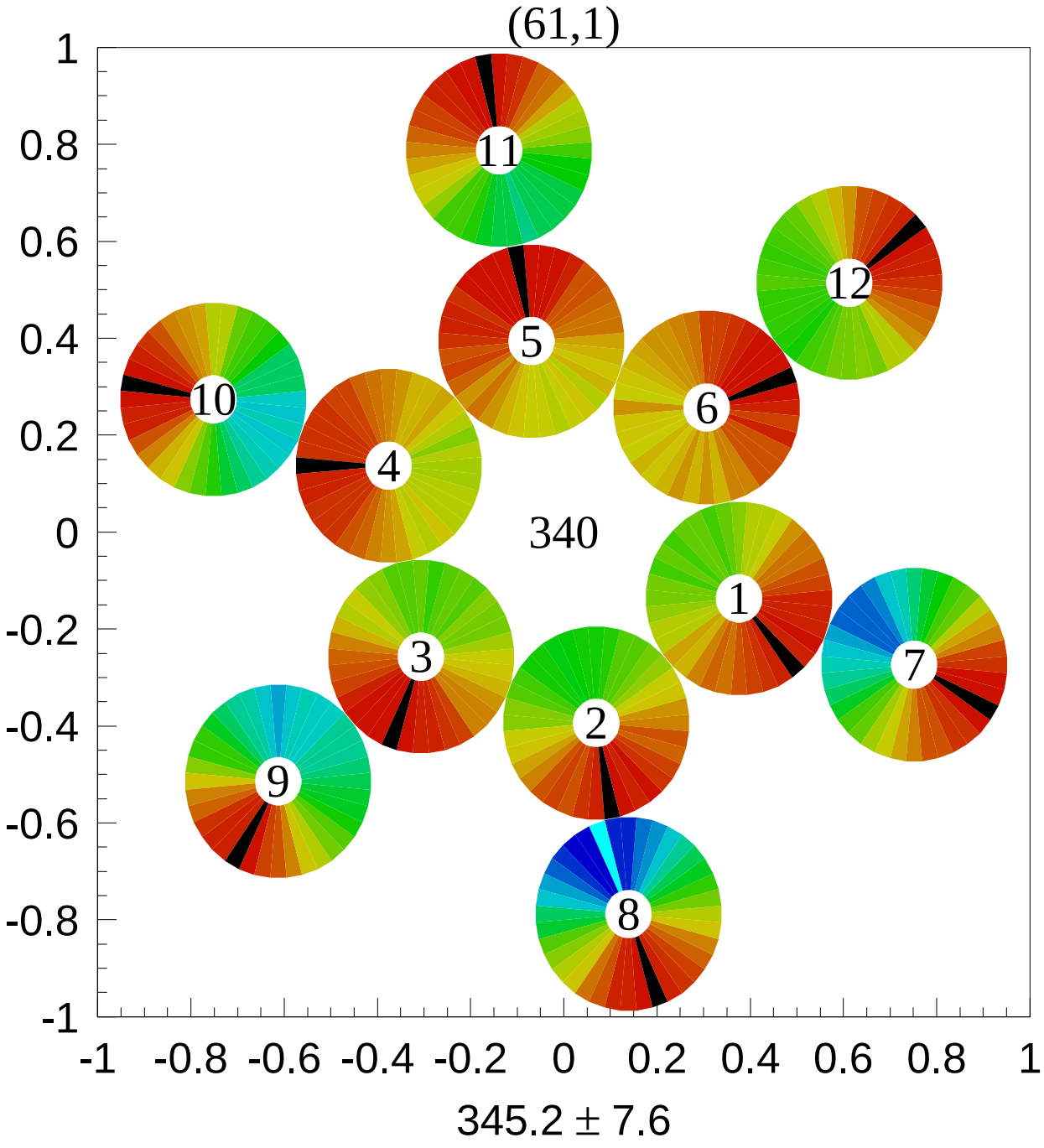

(60,27)
tilted LEDs
122 125 127 124 123 120
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 124 122 120 121 119
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

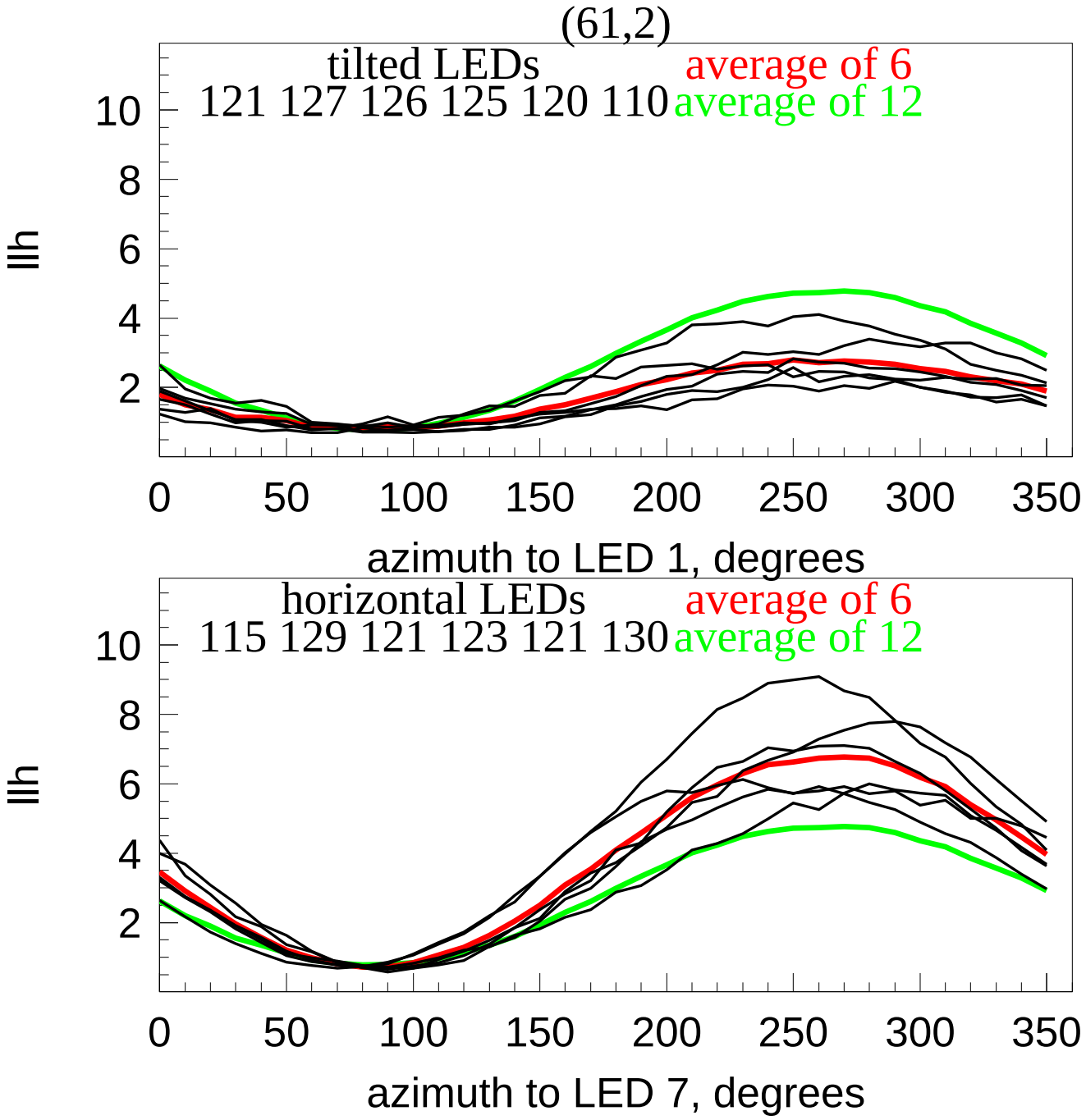

(60,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
248.1 ± 4.6

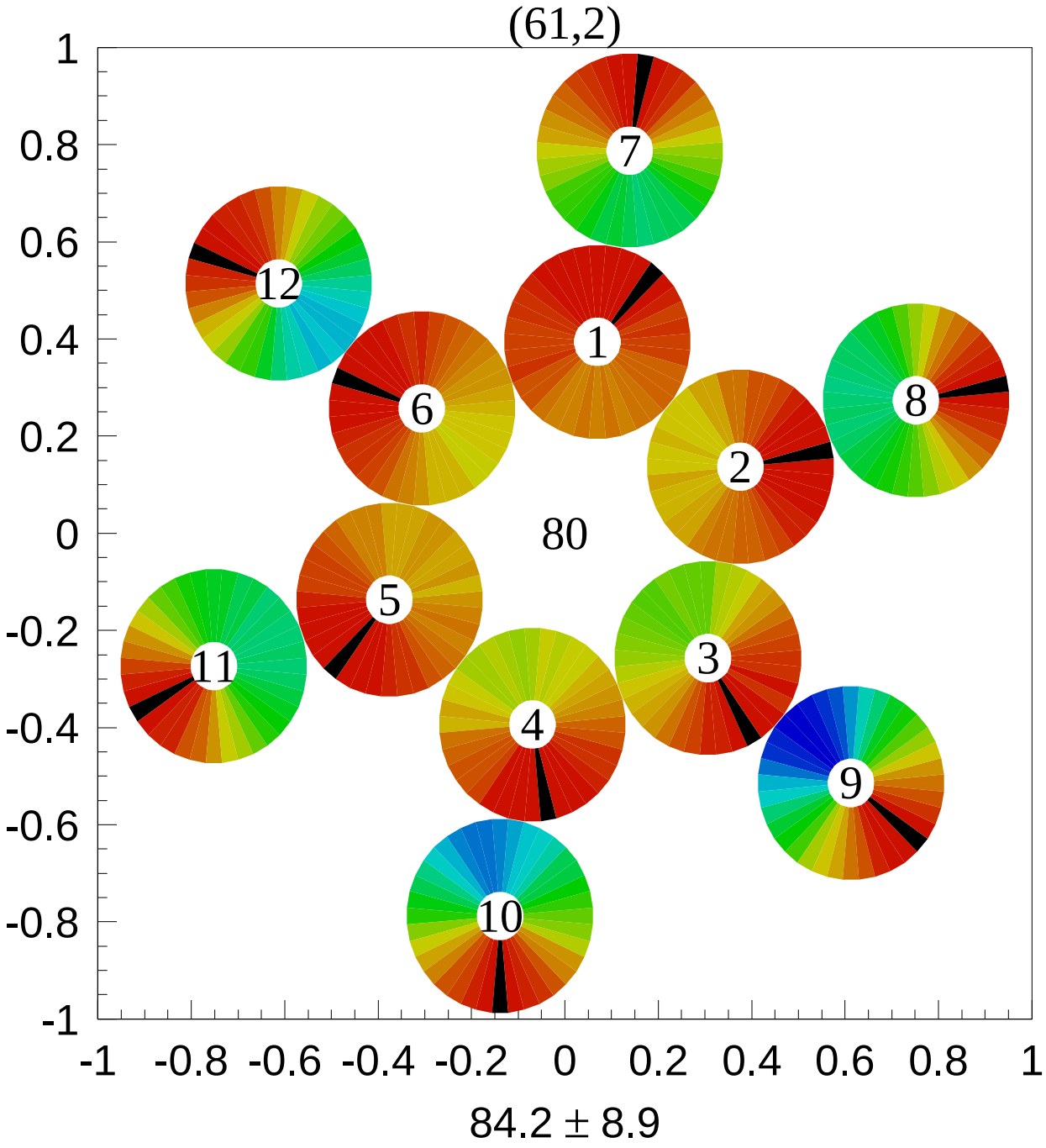

(60,28)
tilted LEDs
119 122 123 125 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 124 124 120 115 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

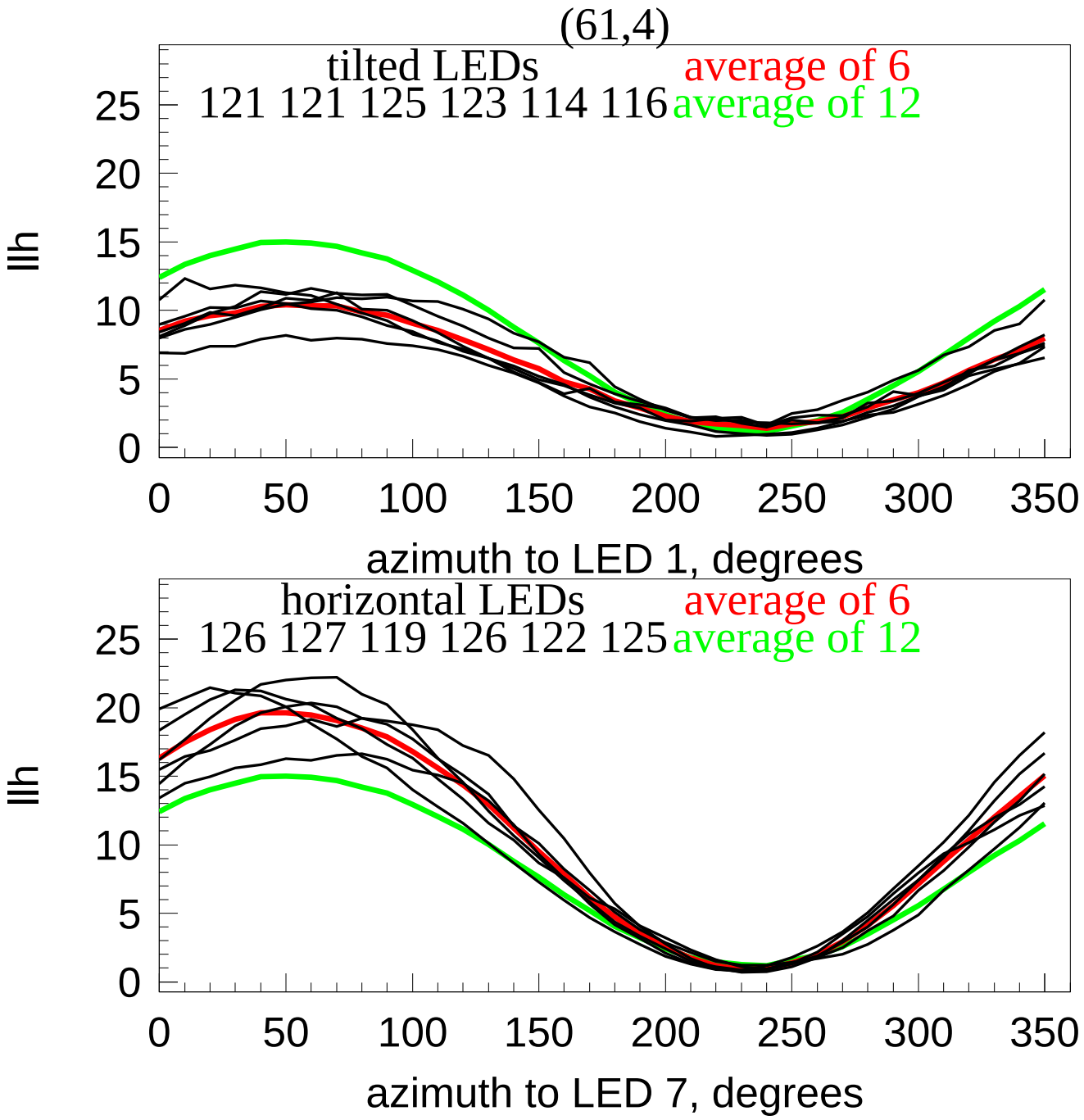

(60,28)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.3 ± 4.3

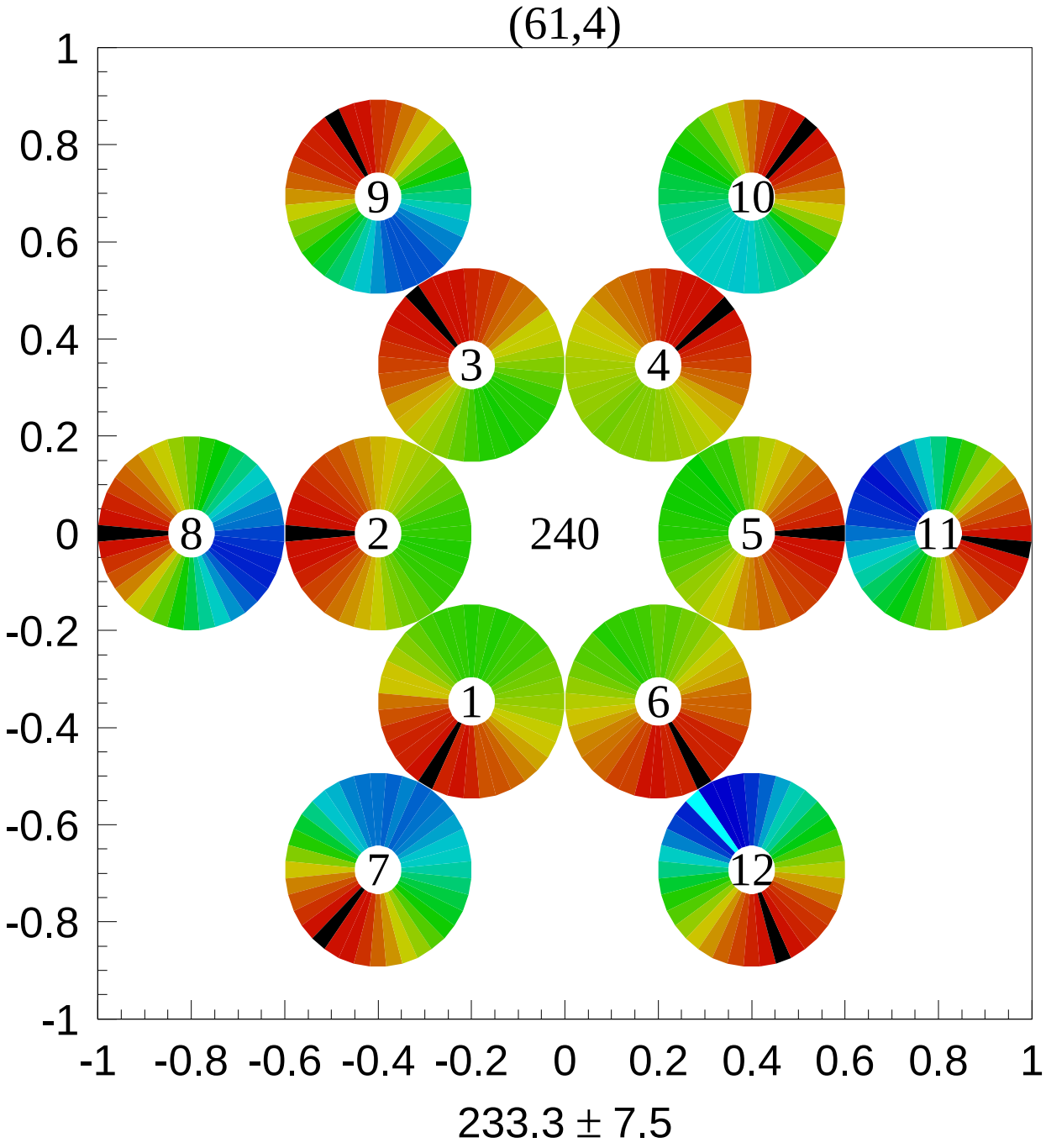

(61,1)
tilted LEDs
126 124 120 128 126 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 118 125 120 128 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

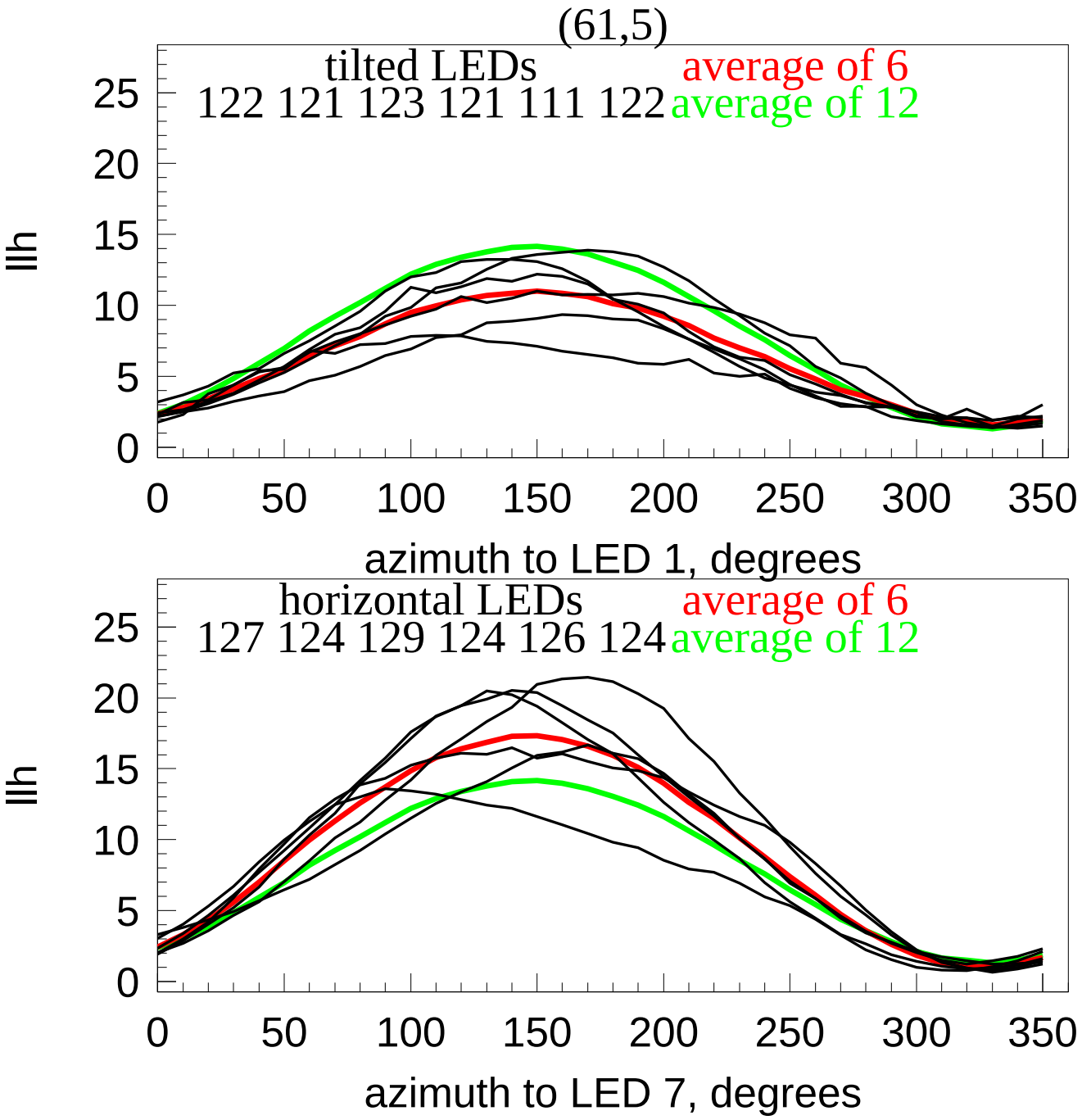

(61,1)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
345.2 ± 7.6

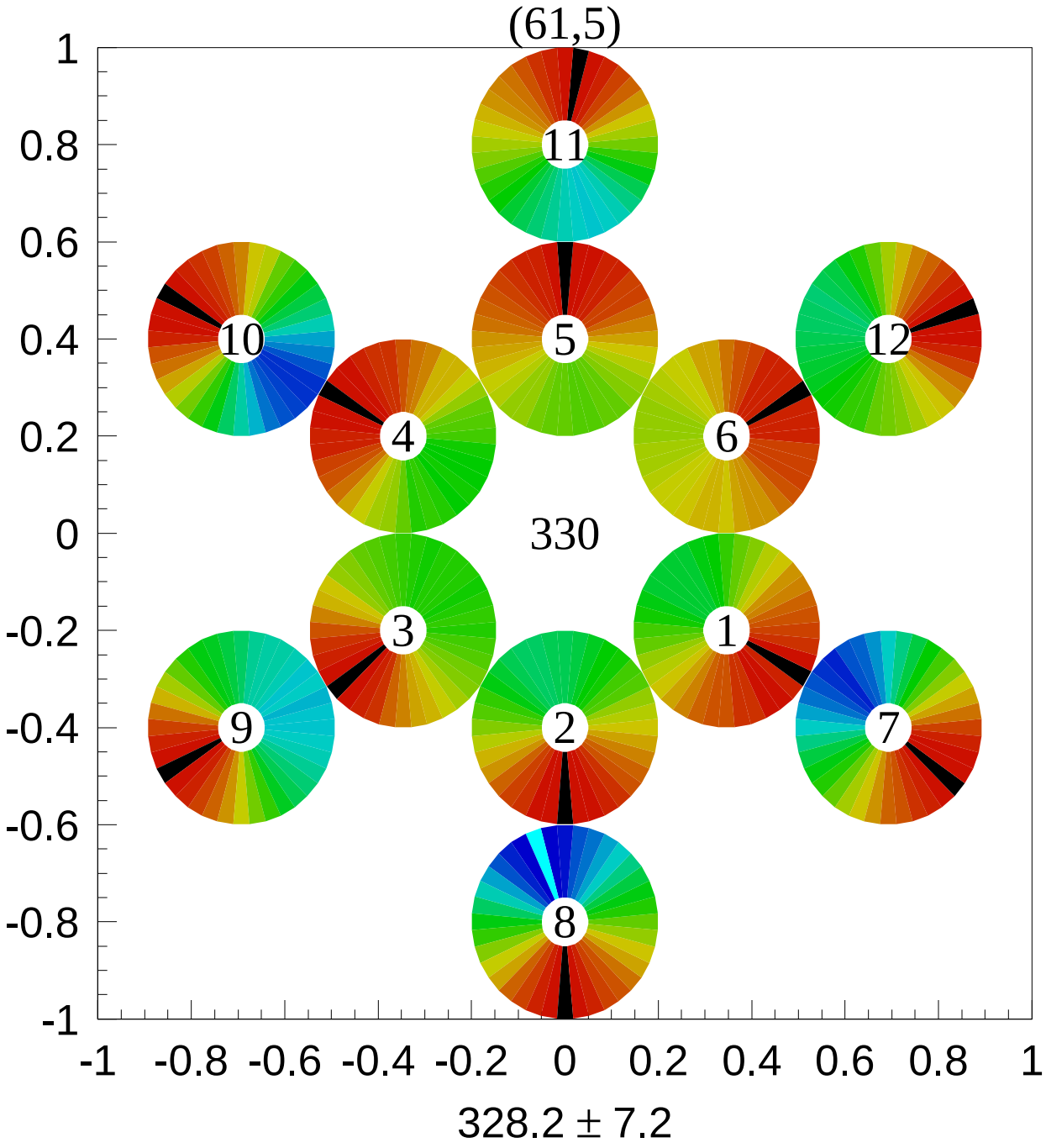

(61,2)
tilted LEDs
121 127 126 125 120 110
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 129 121 123 121 130
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

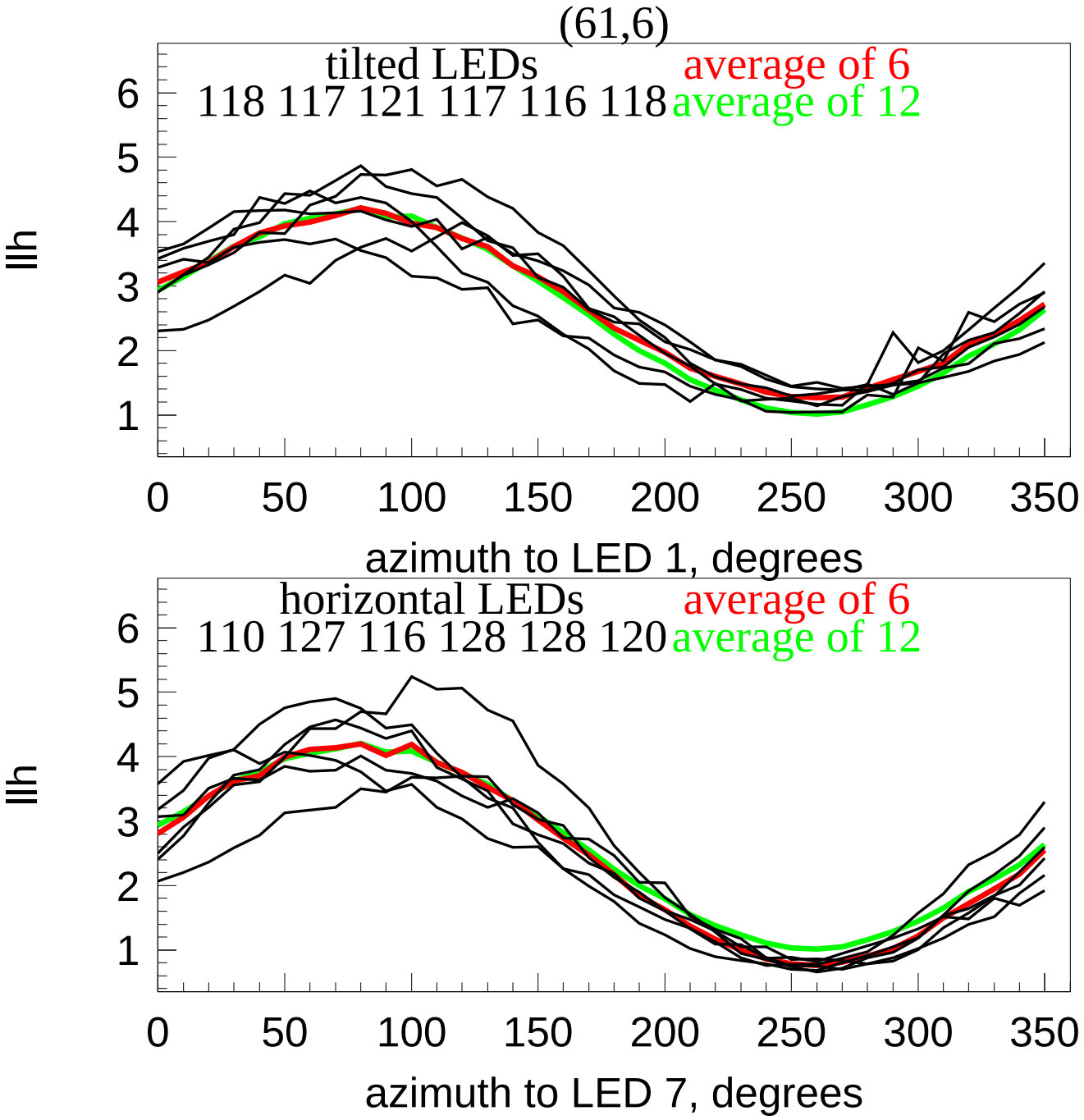

(61,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
84.2 ± 8.9

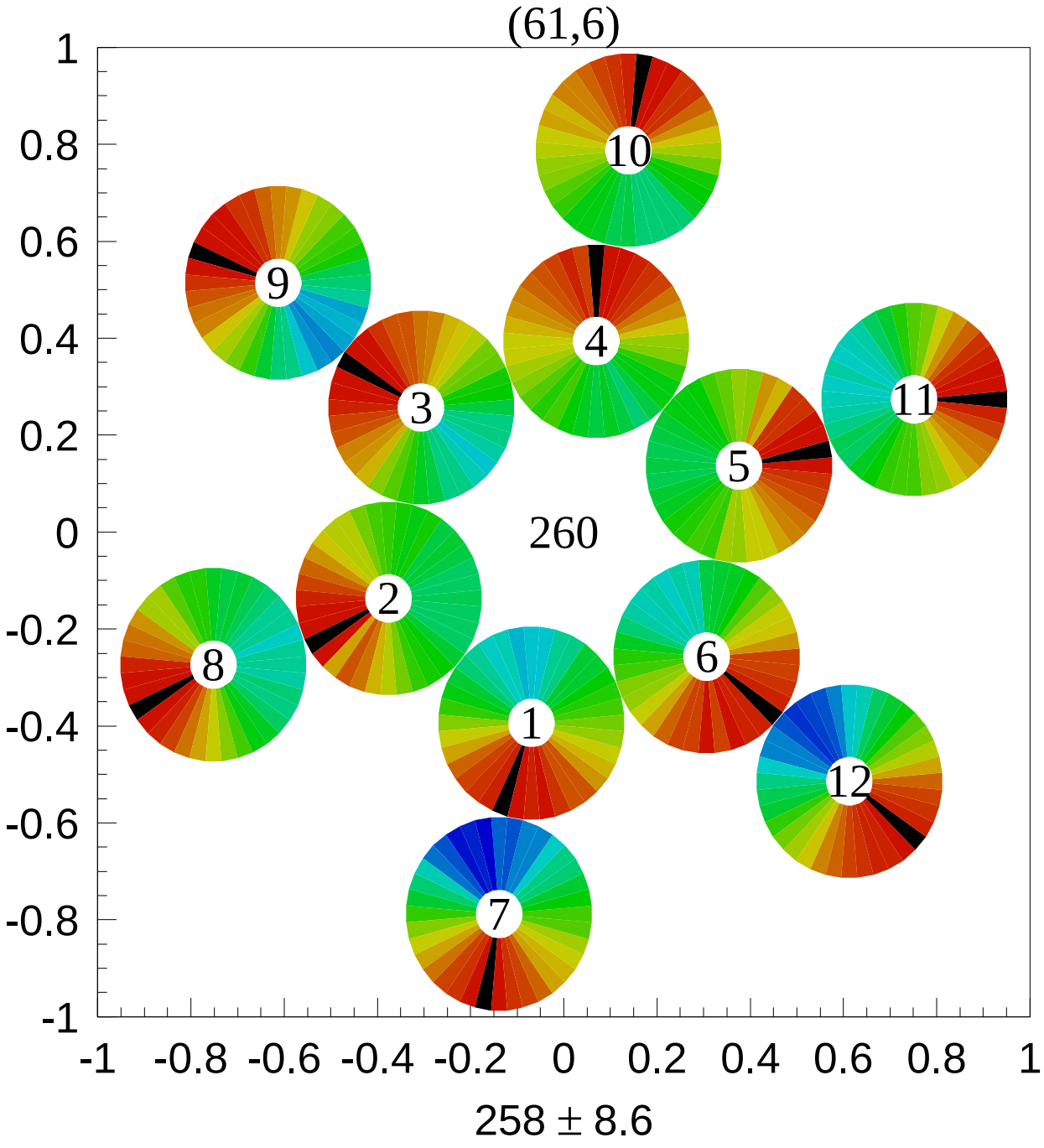

(61,4)
tilted LEDs
121 121 125 123 114 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 127 119 126 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

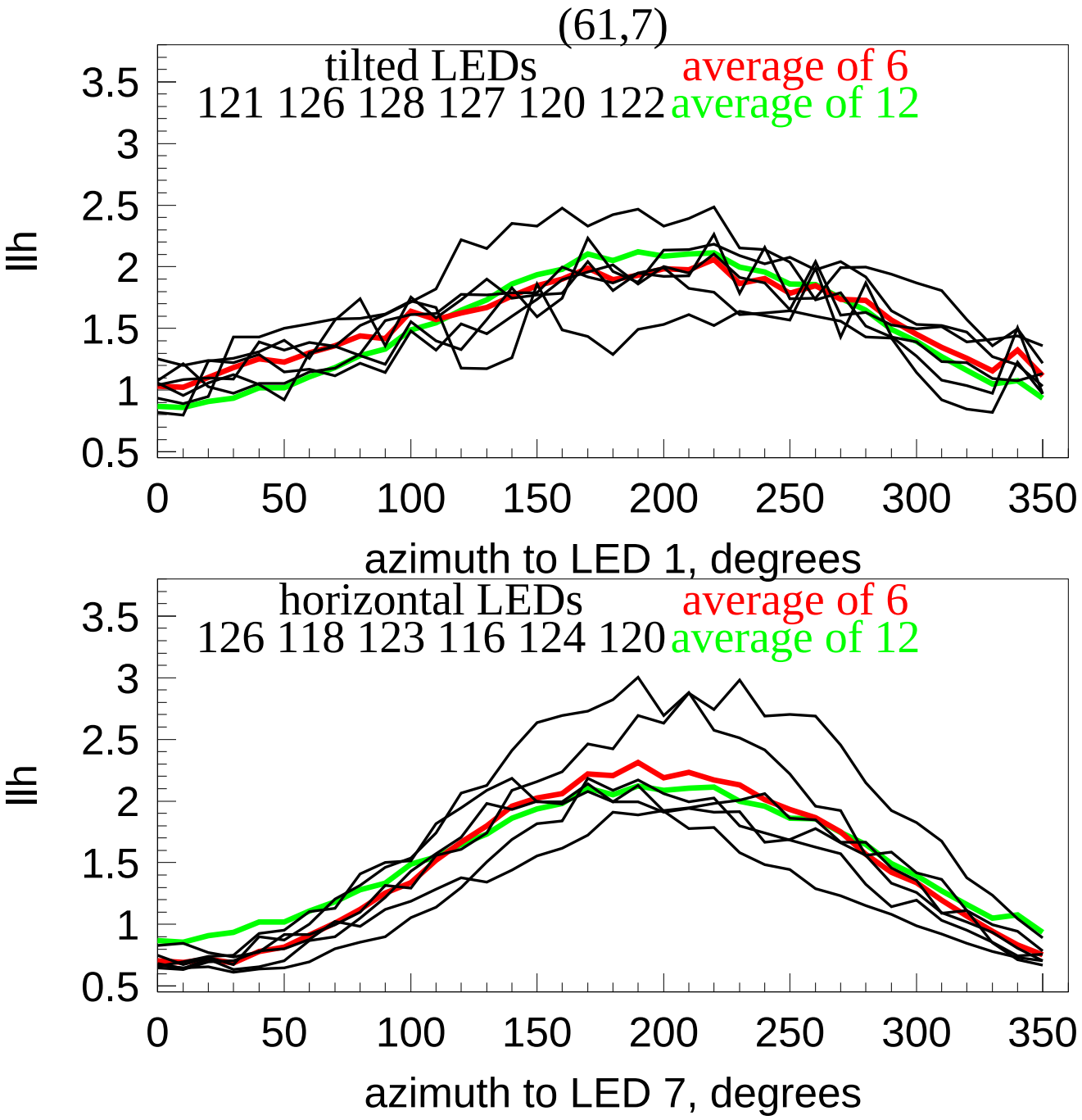

(61,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
233.3 ± 7.5

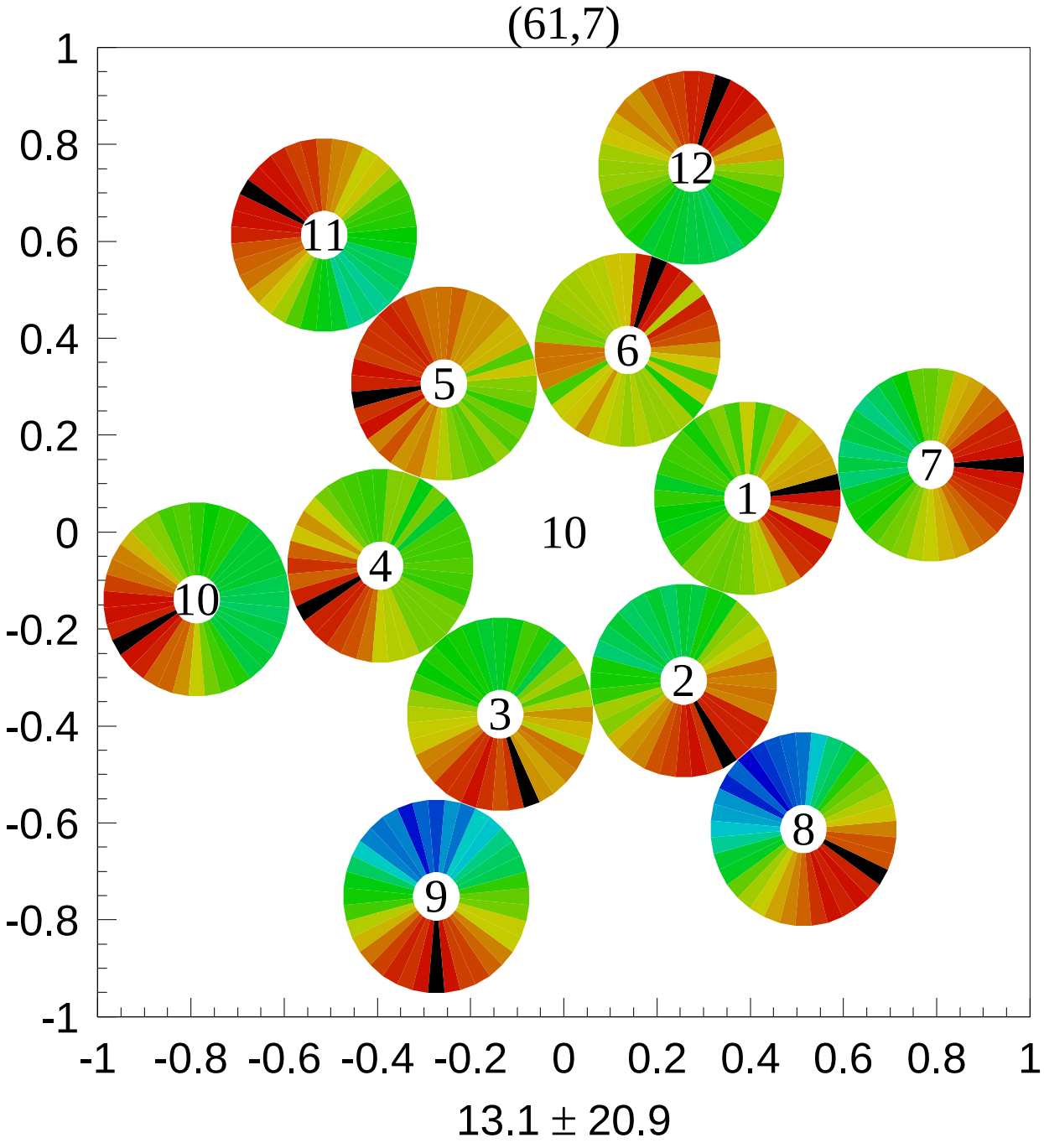

(61,5)
tilted LEDs
122 121 123 121 111 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 124 129 124 126 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

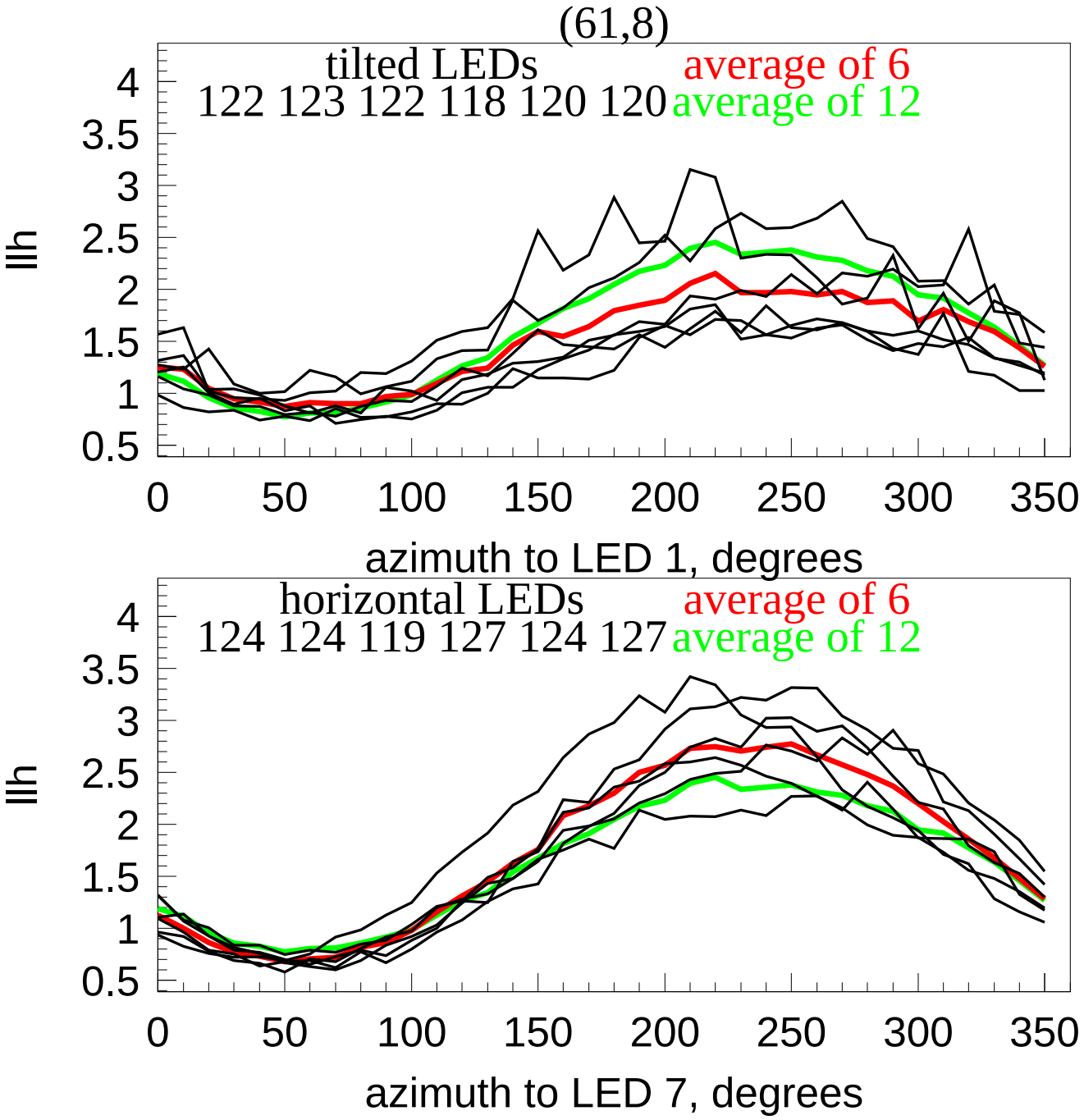

(61,5)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
328.2 ± 7.2

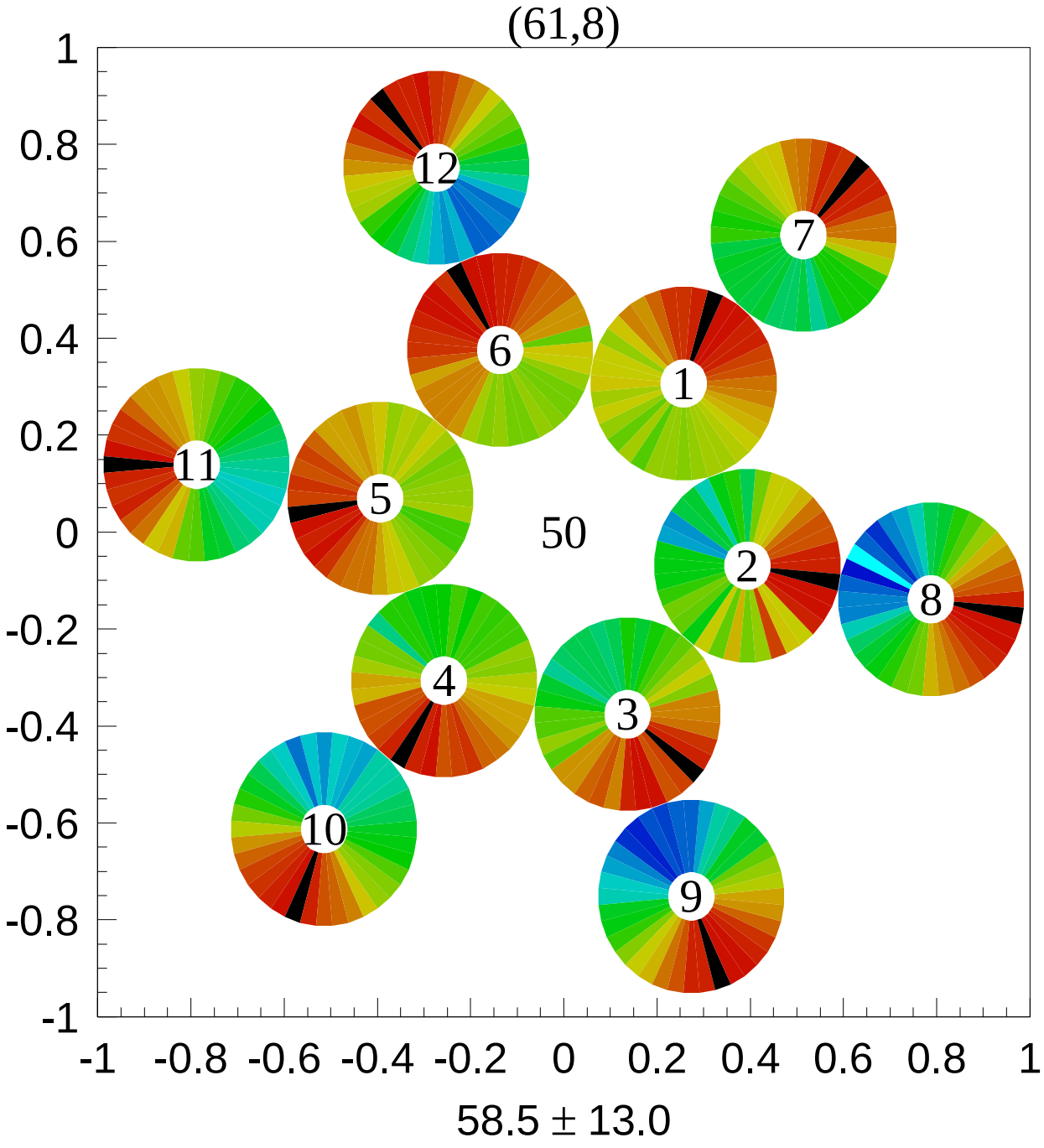

(61,6)
tilted LEDs
118 117 121 117 116 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
110 127 116 128 128 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

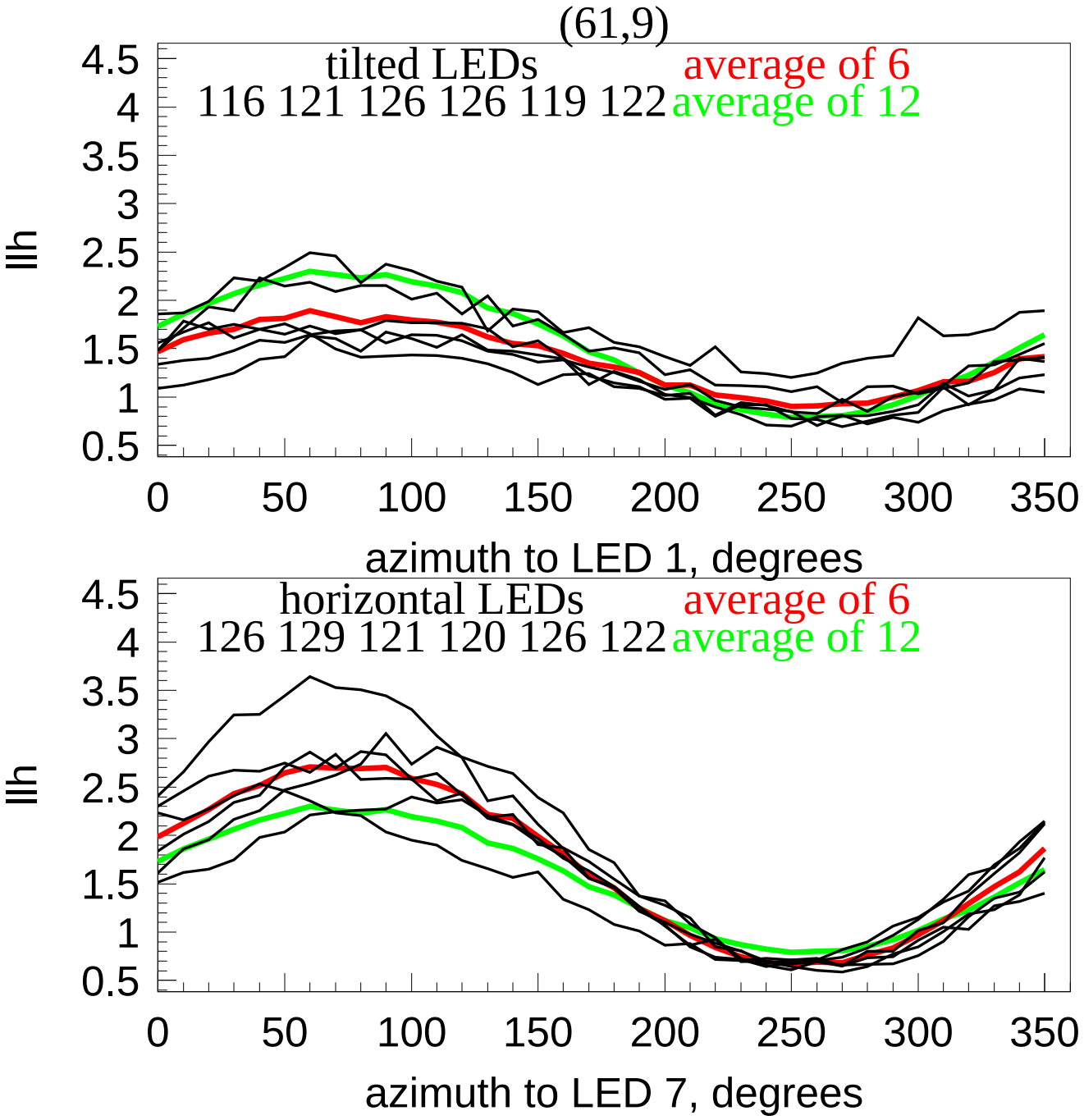

(61,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
258 ± 8.6

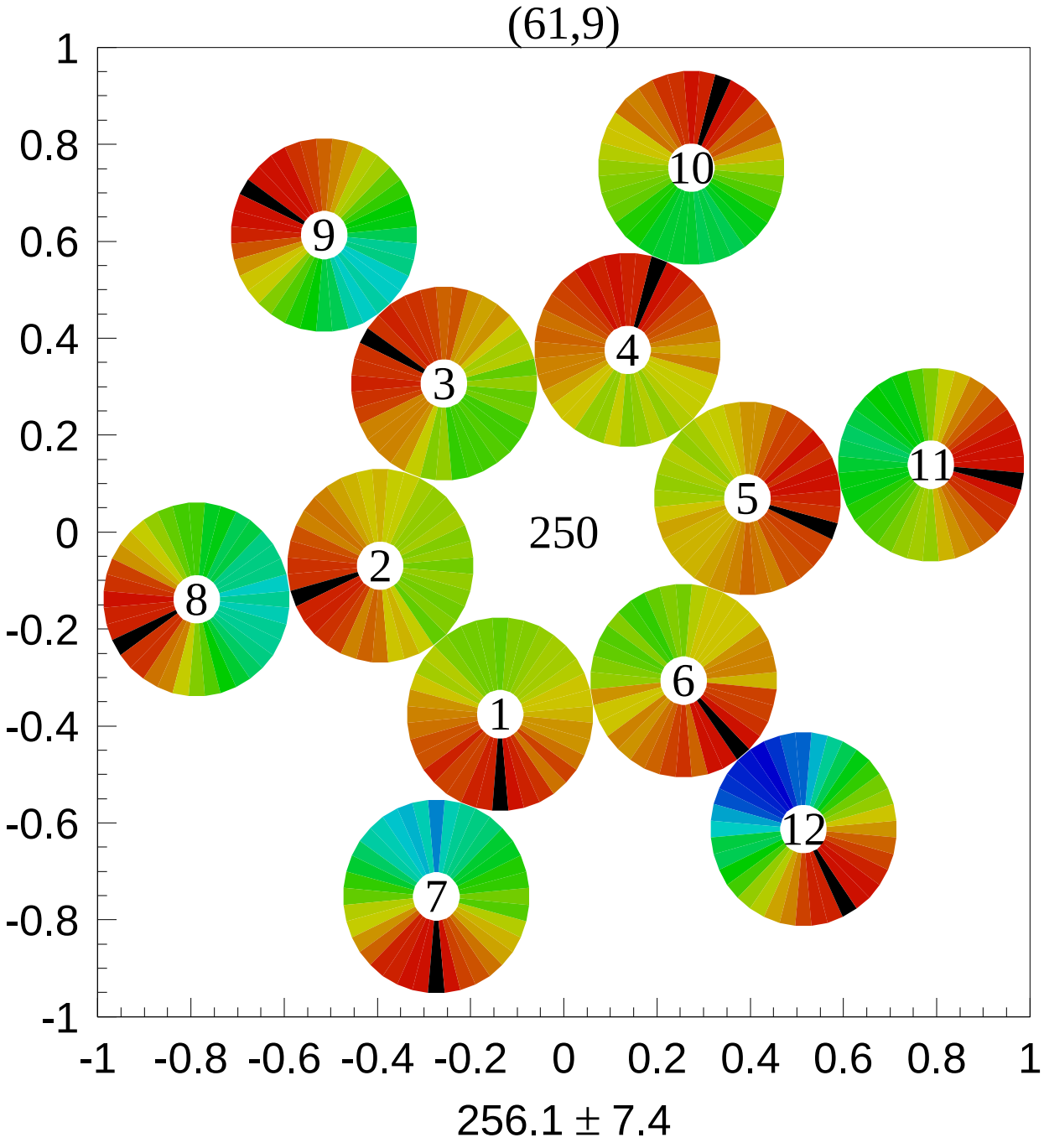

(61,7)
tilted LEDs
121 126 128 127 120 122
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 118 123 116 124 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

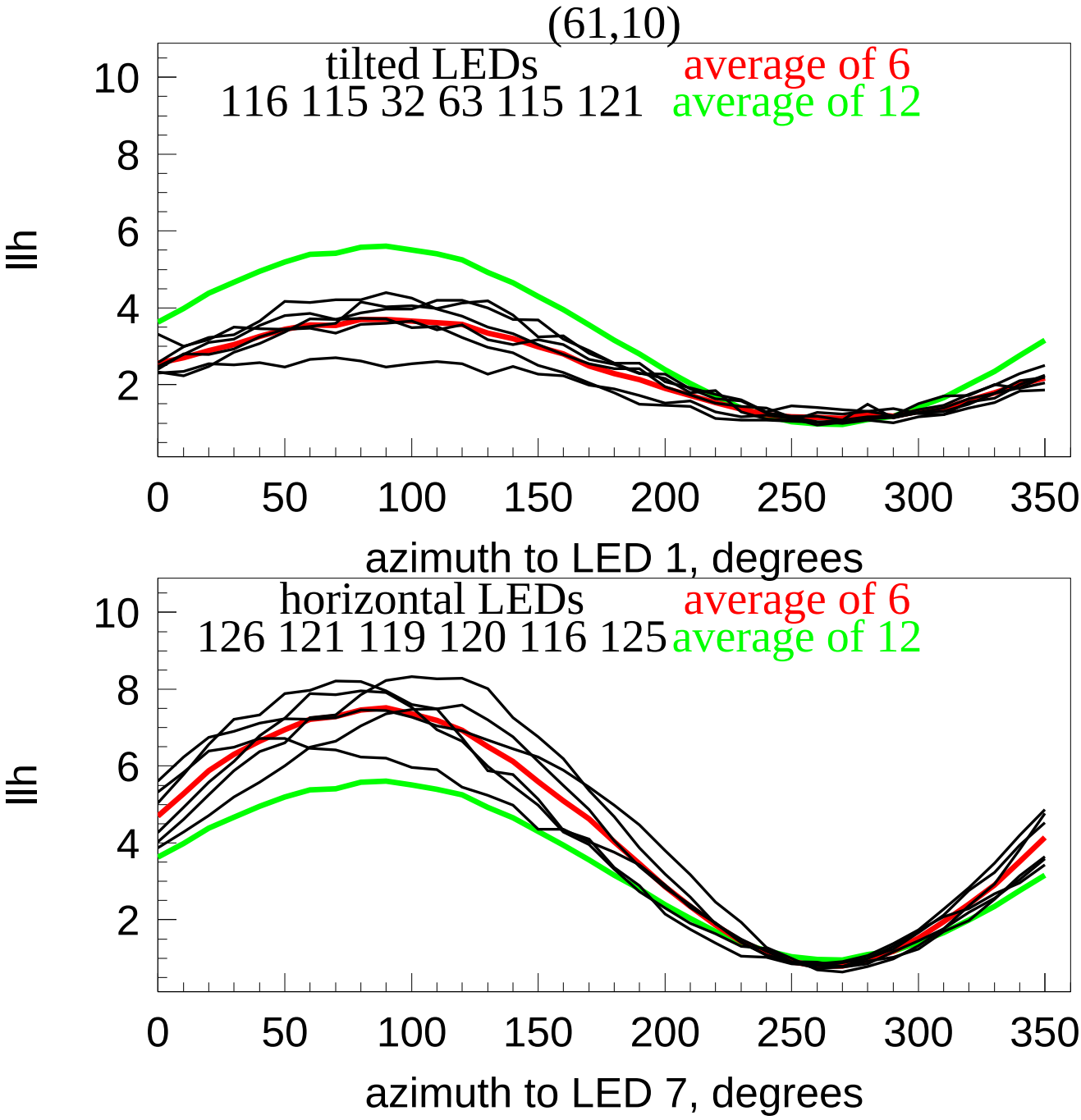

(61,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
13.1 ± 20.9
12
11
6
5
7
1
10
4
10
2
3
8
9

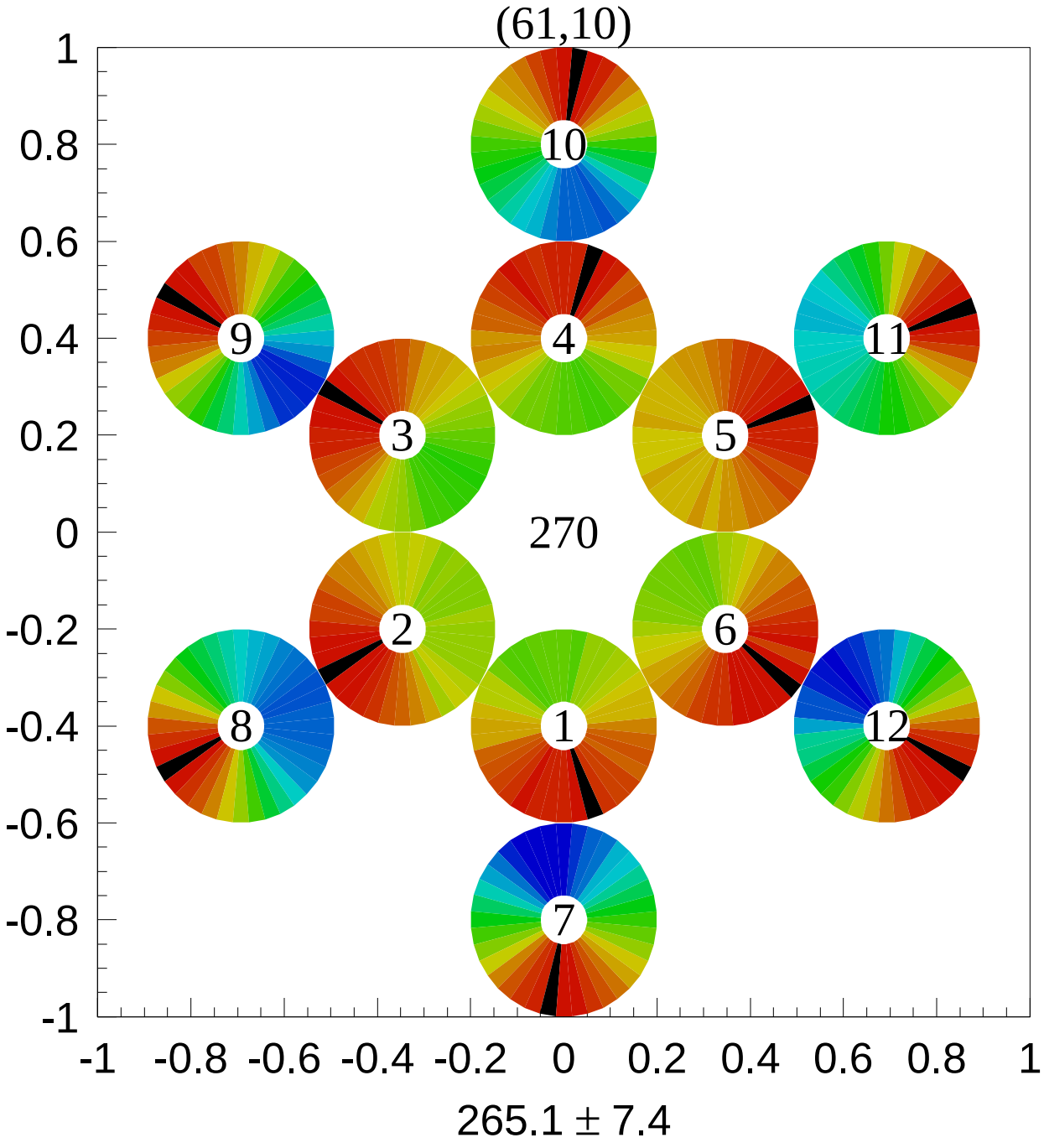

(61,8)
tilted LEDs
122 123 122 118 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 119 127 124 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

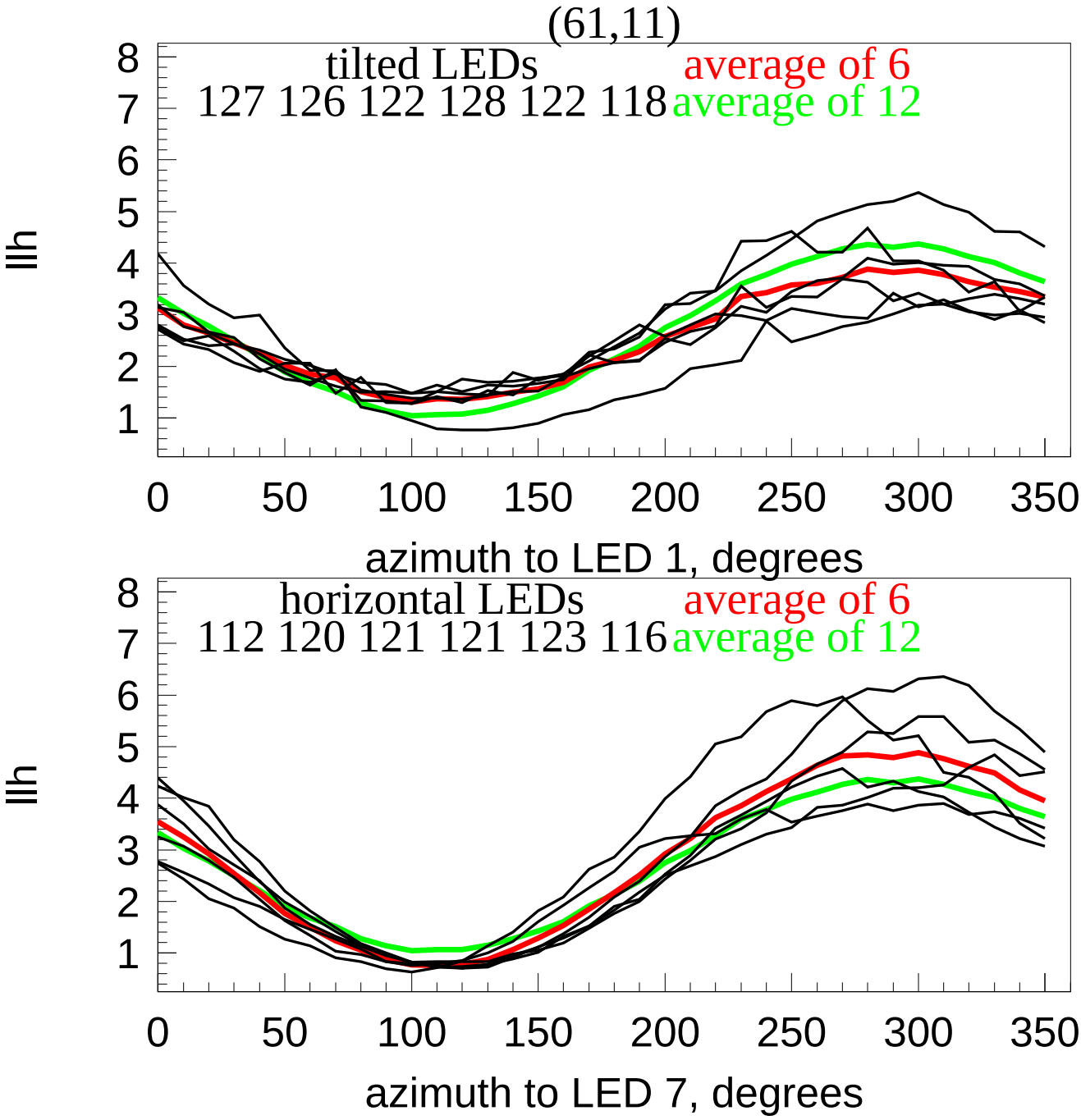

(61,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
58.5 ± 13.0

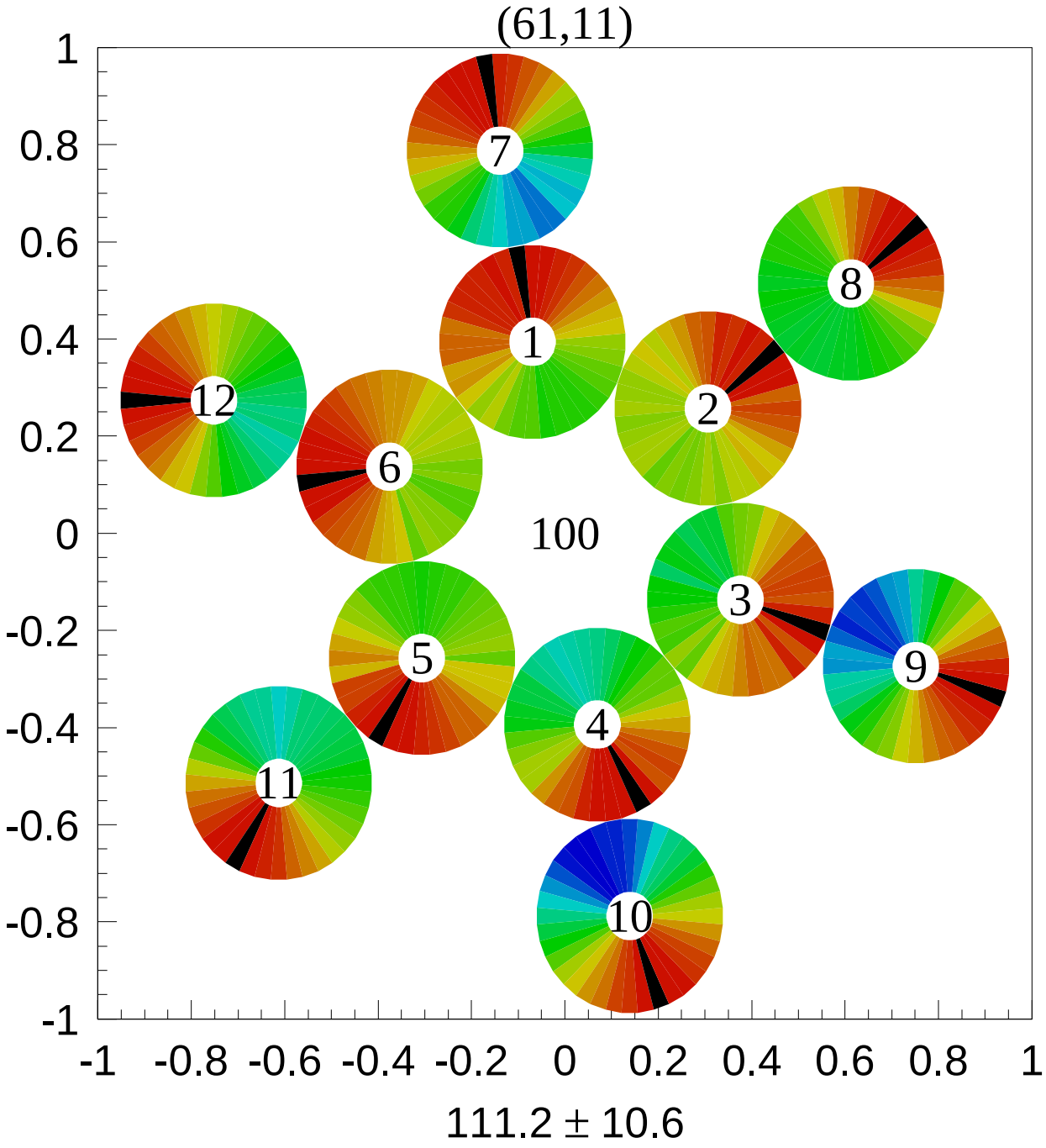

(61,9)
tilted LEDs
116 121 126 126 119 122
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 129 121 120 126 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

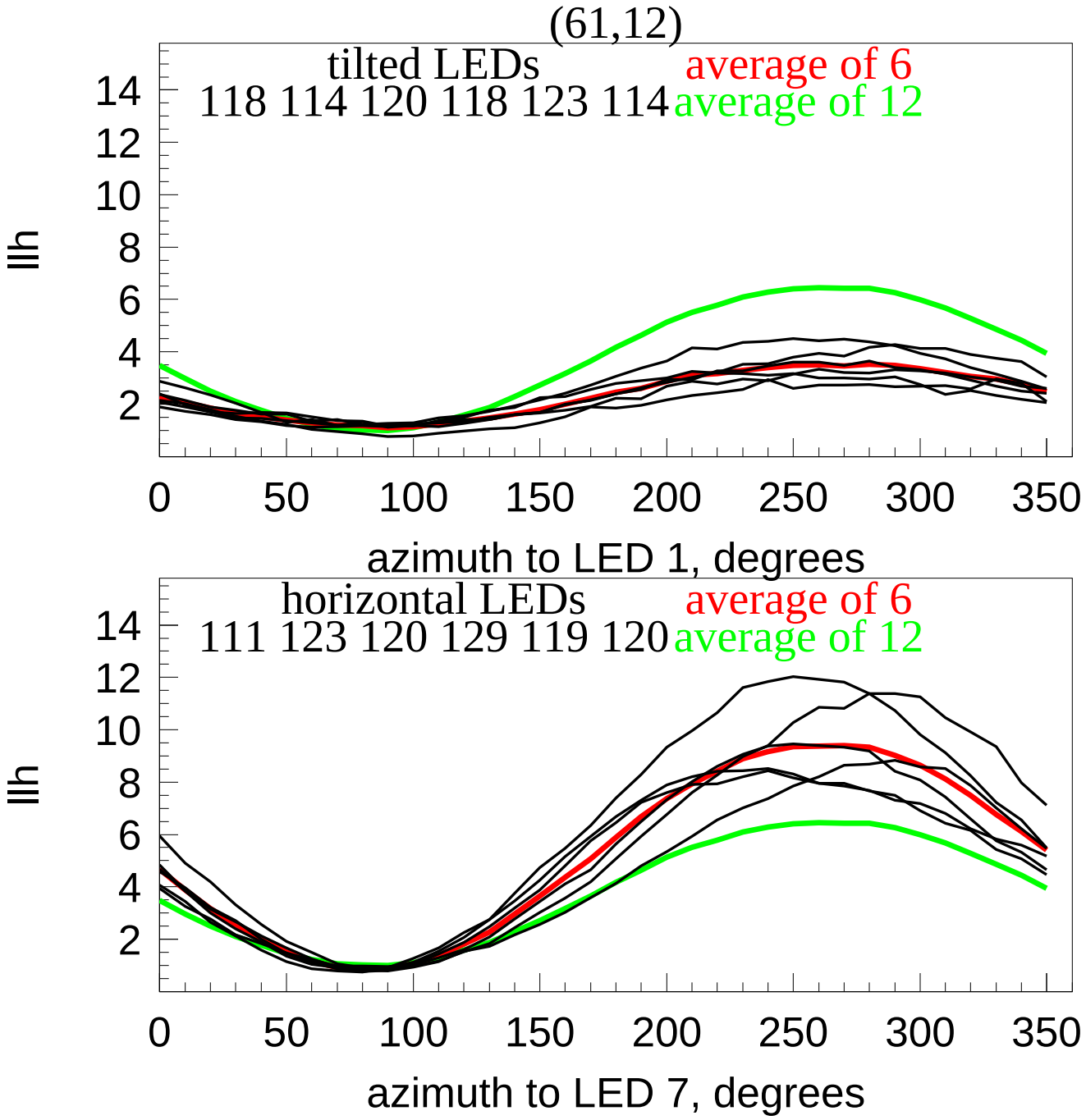

(61,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
256.1 ± 7.4

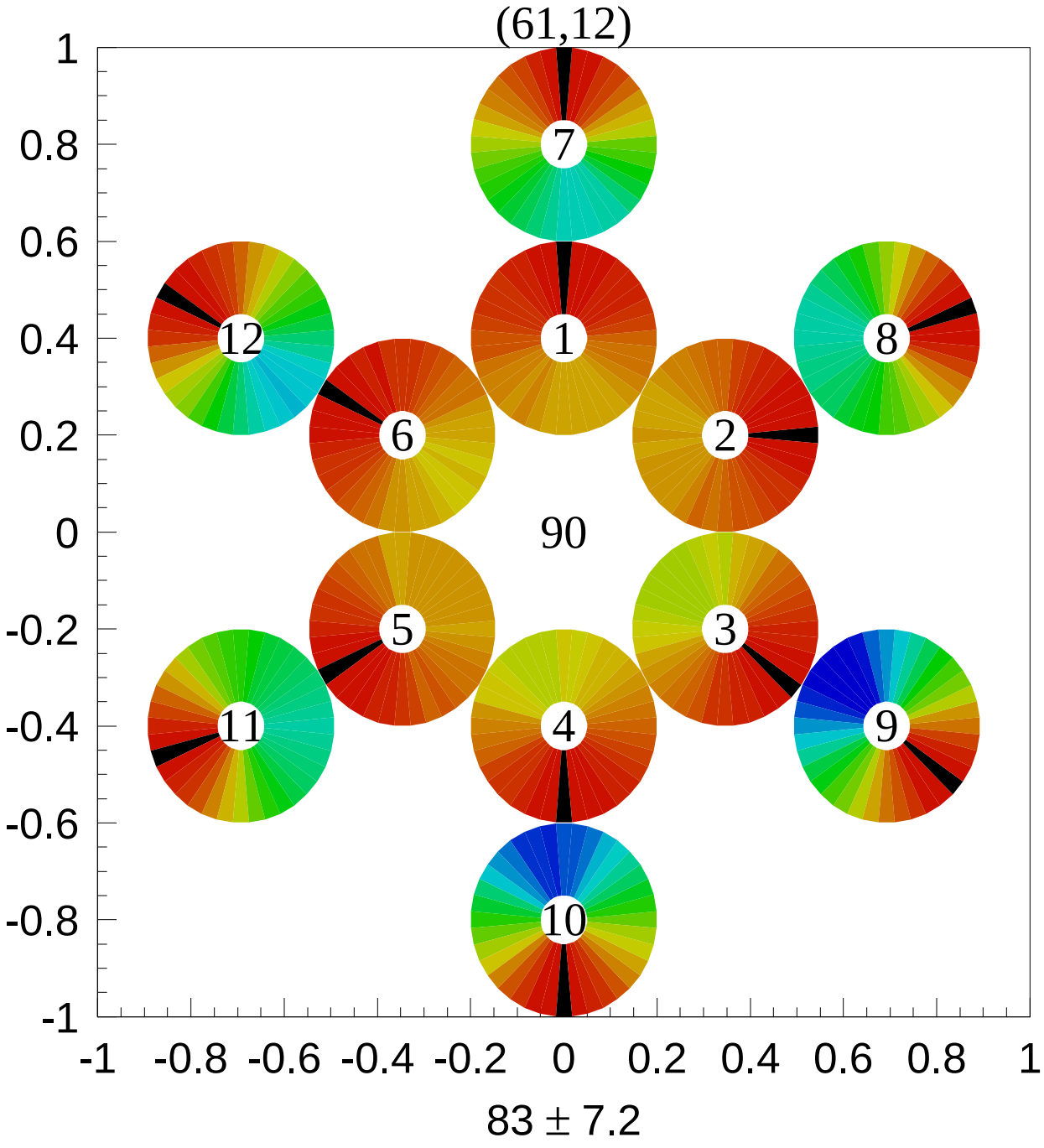

(61,10)
tilted LEDs
116 115 32 63 115 121
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 121 119 120 116 125
average of 6
average of 12
llh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

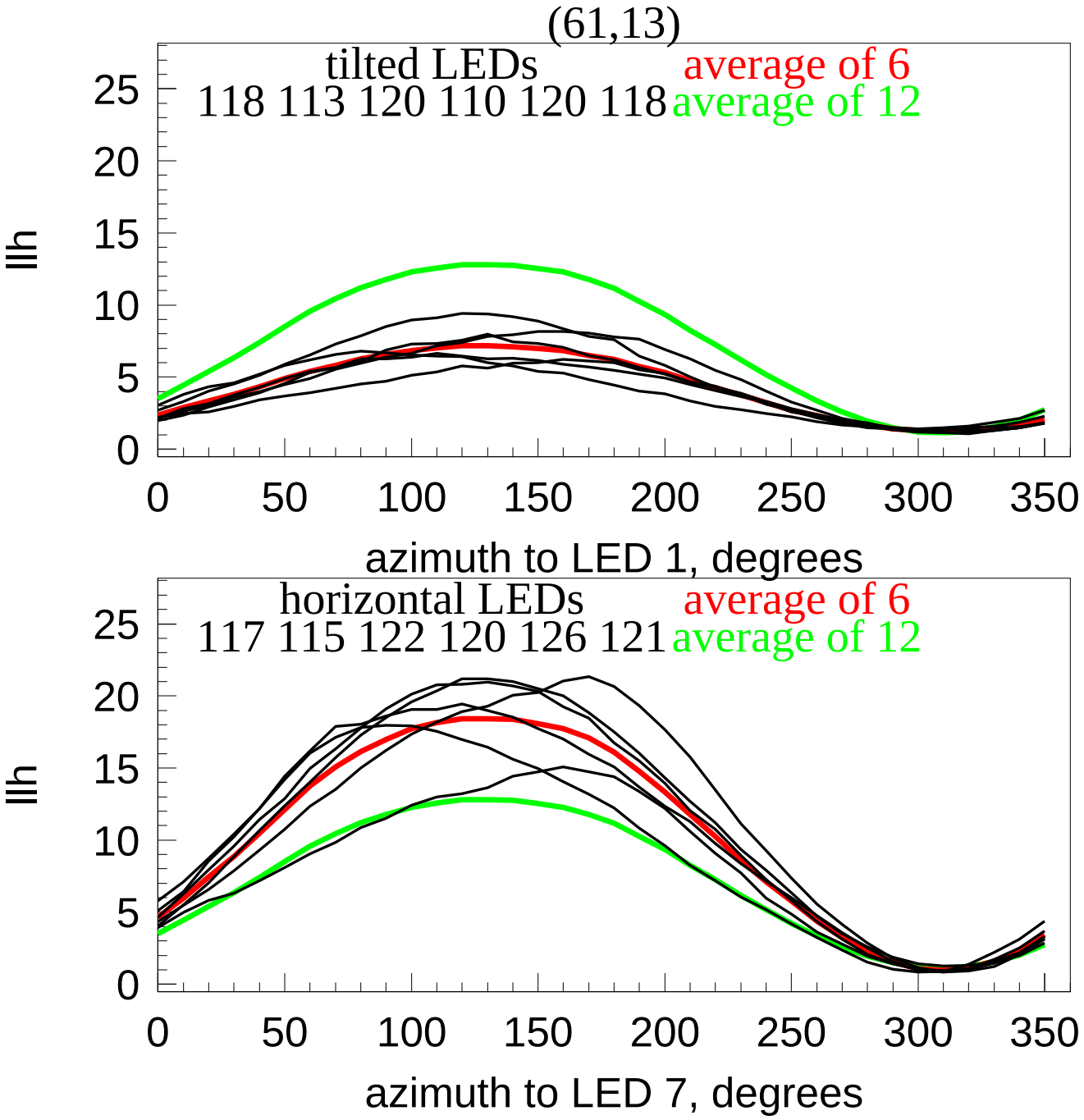

(61,10)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
265.1 ± 7.4

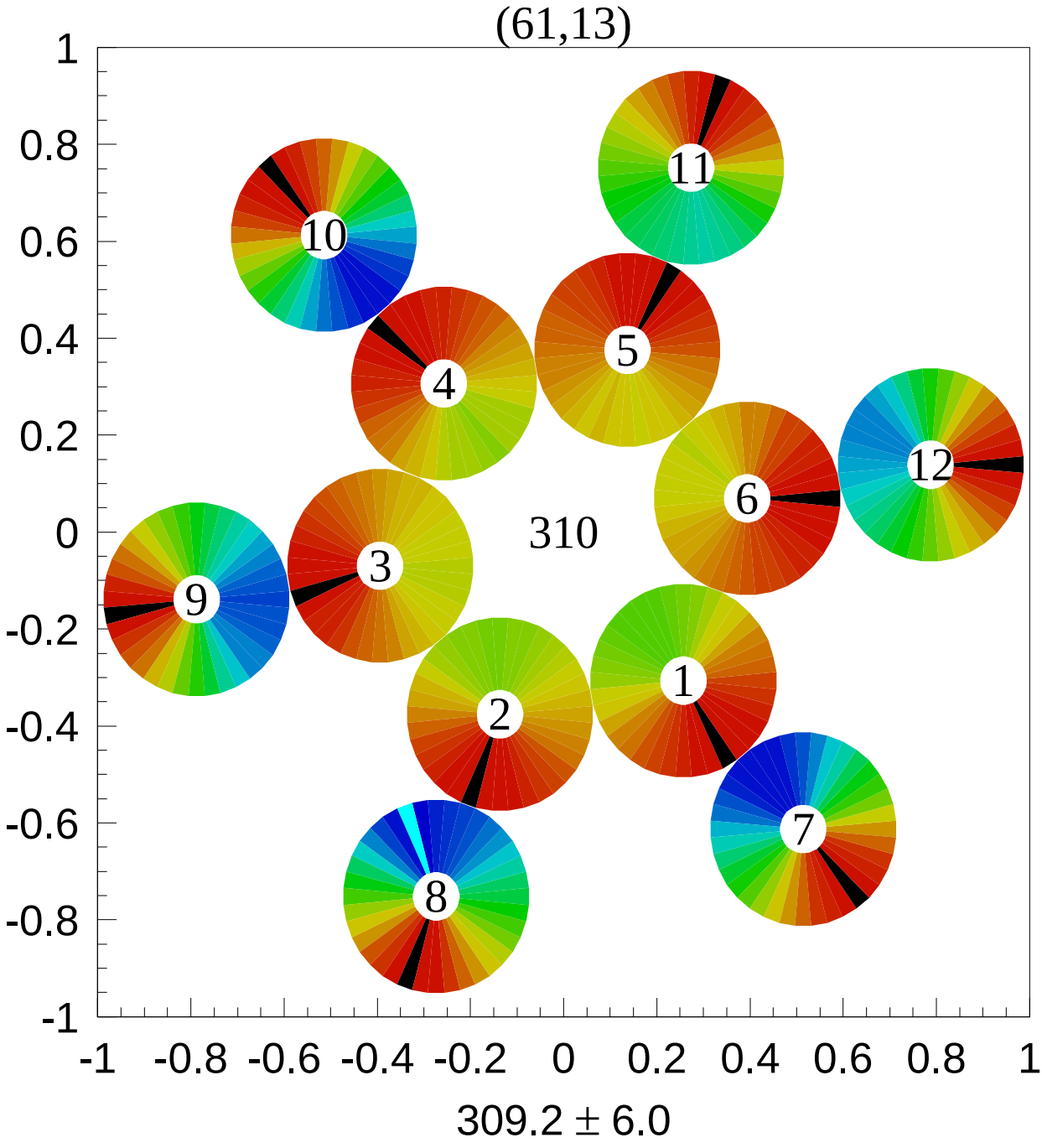

(61,11)
tilted LEDs
127 126 122 128 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 120 121 121 123 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

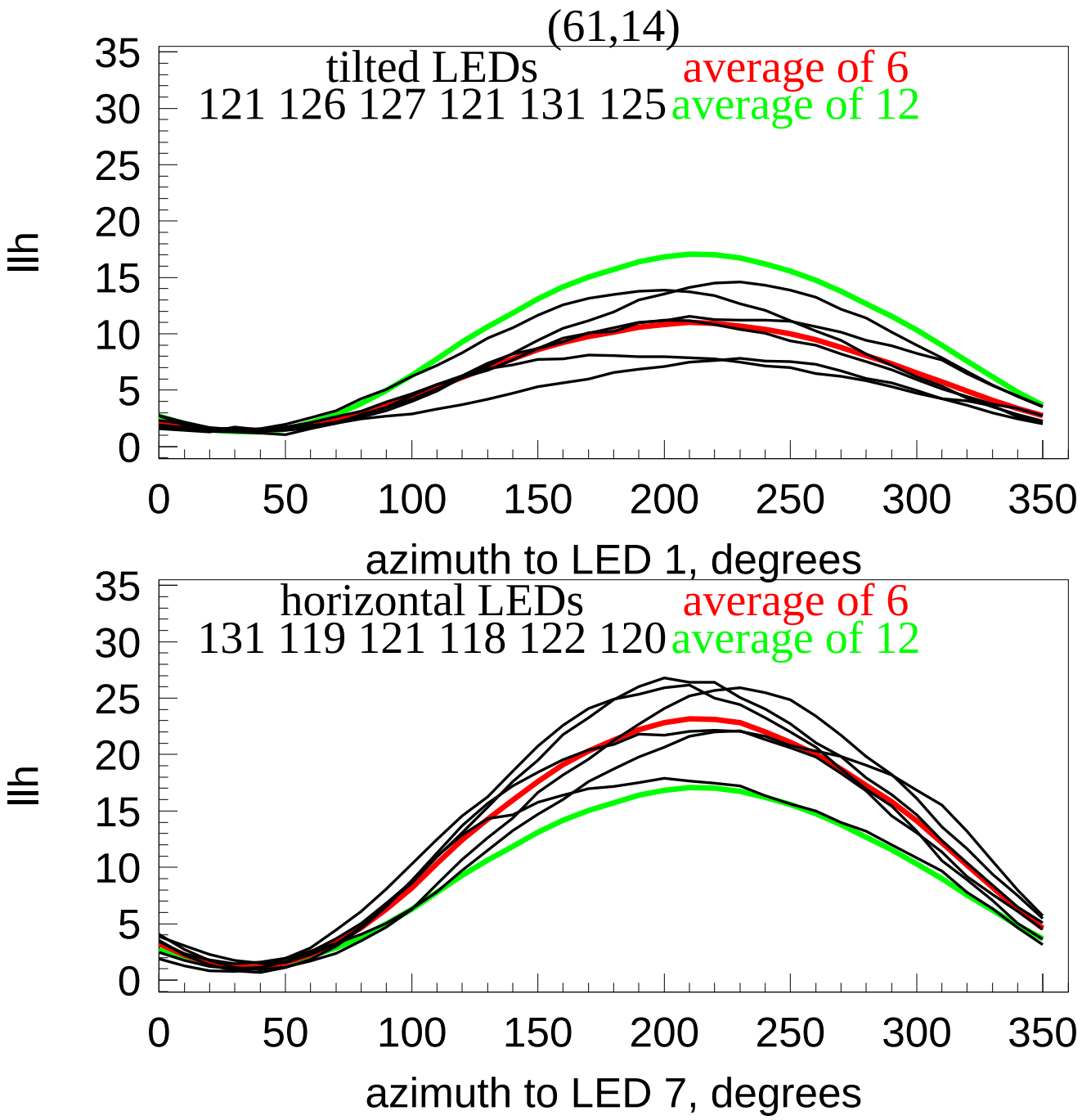

(61,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
111.2 ± 10.6

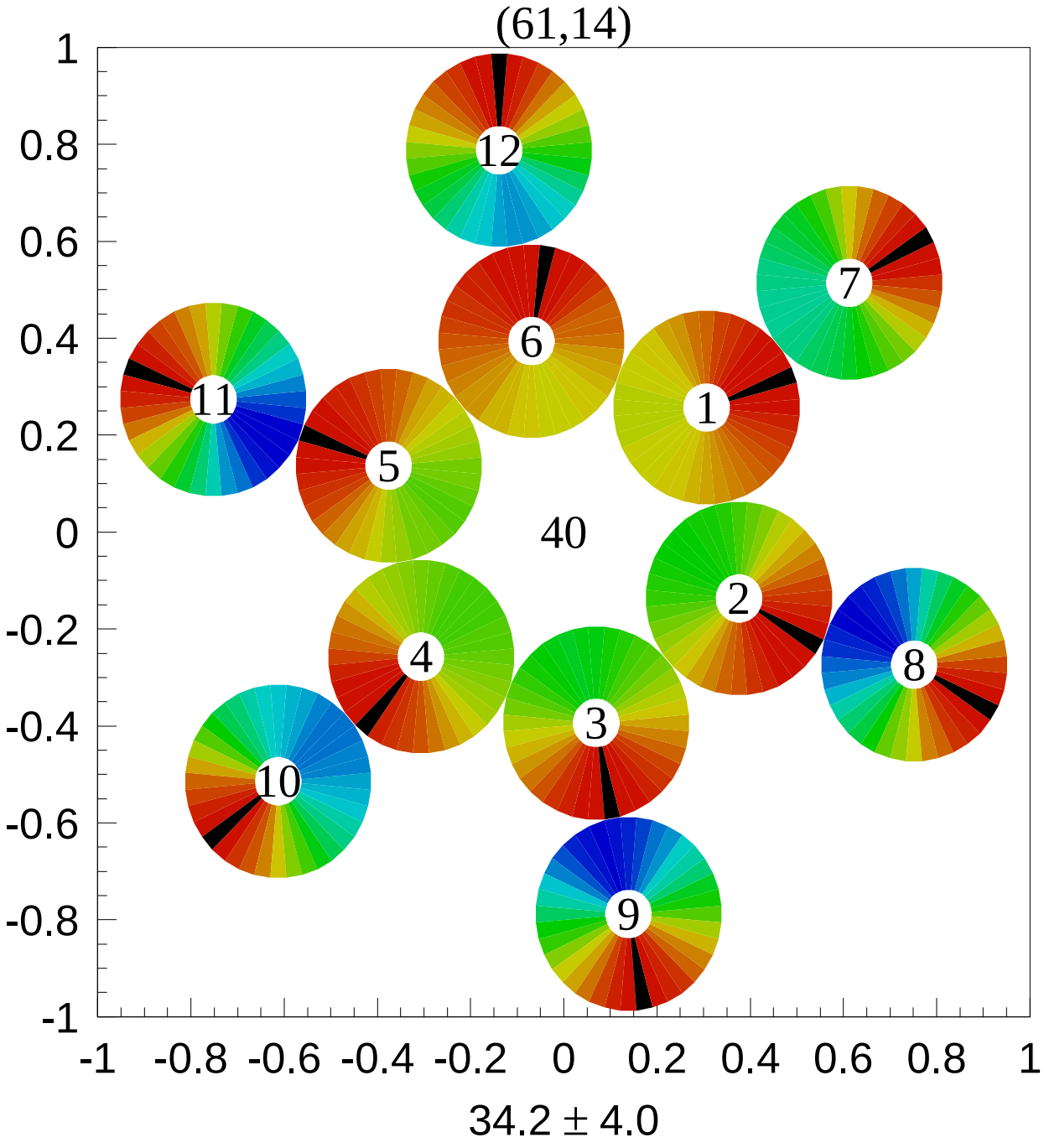

(61,12)
tilted LEDs
118 114 120 118 123 114
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
111 123 120 129 119 120
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

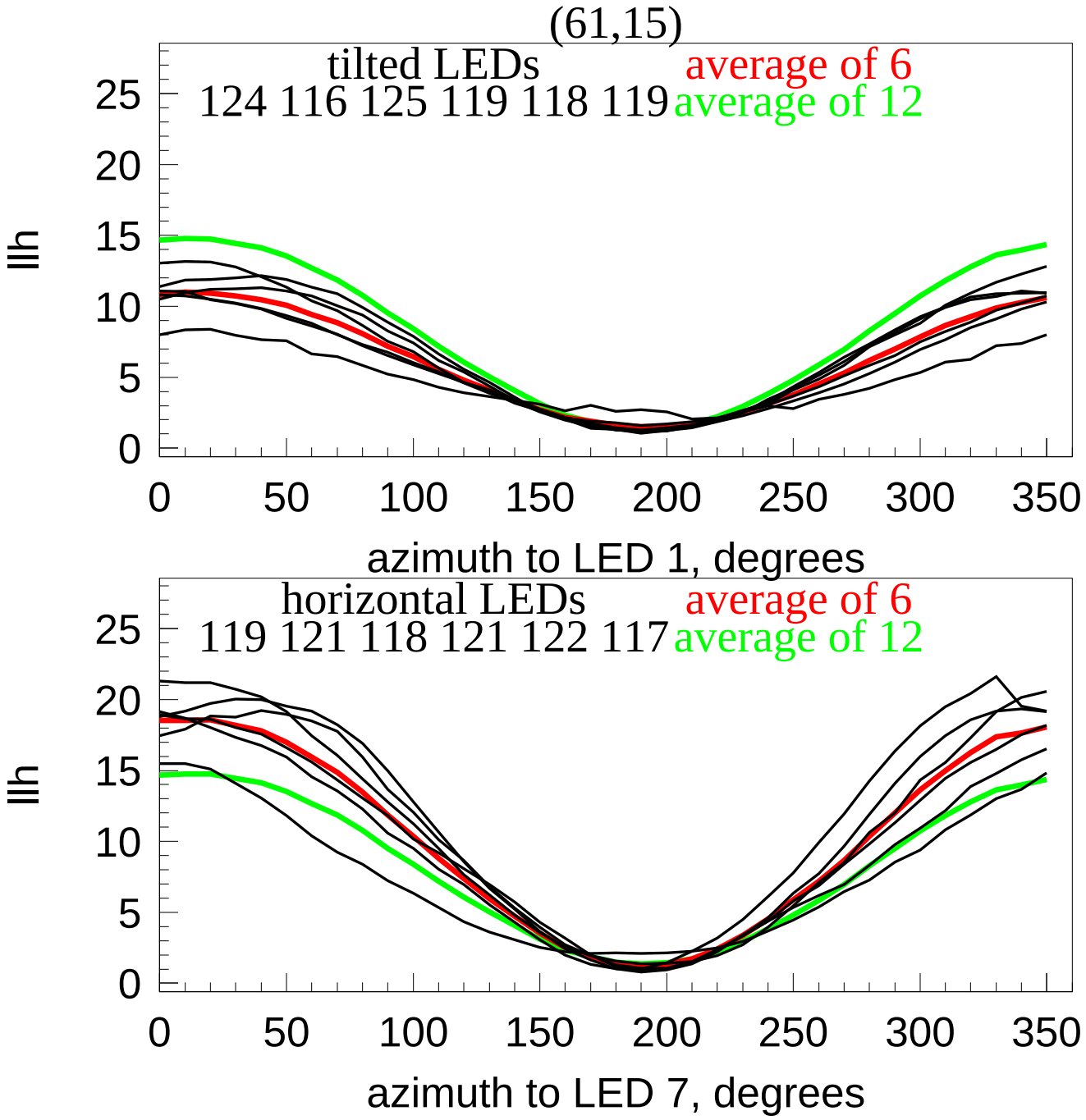

(61,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
83 ± 7.2

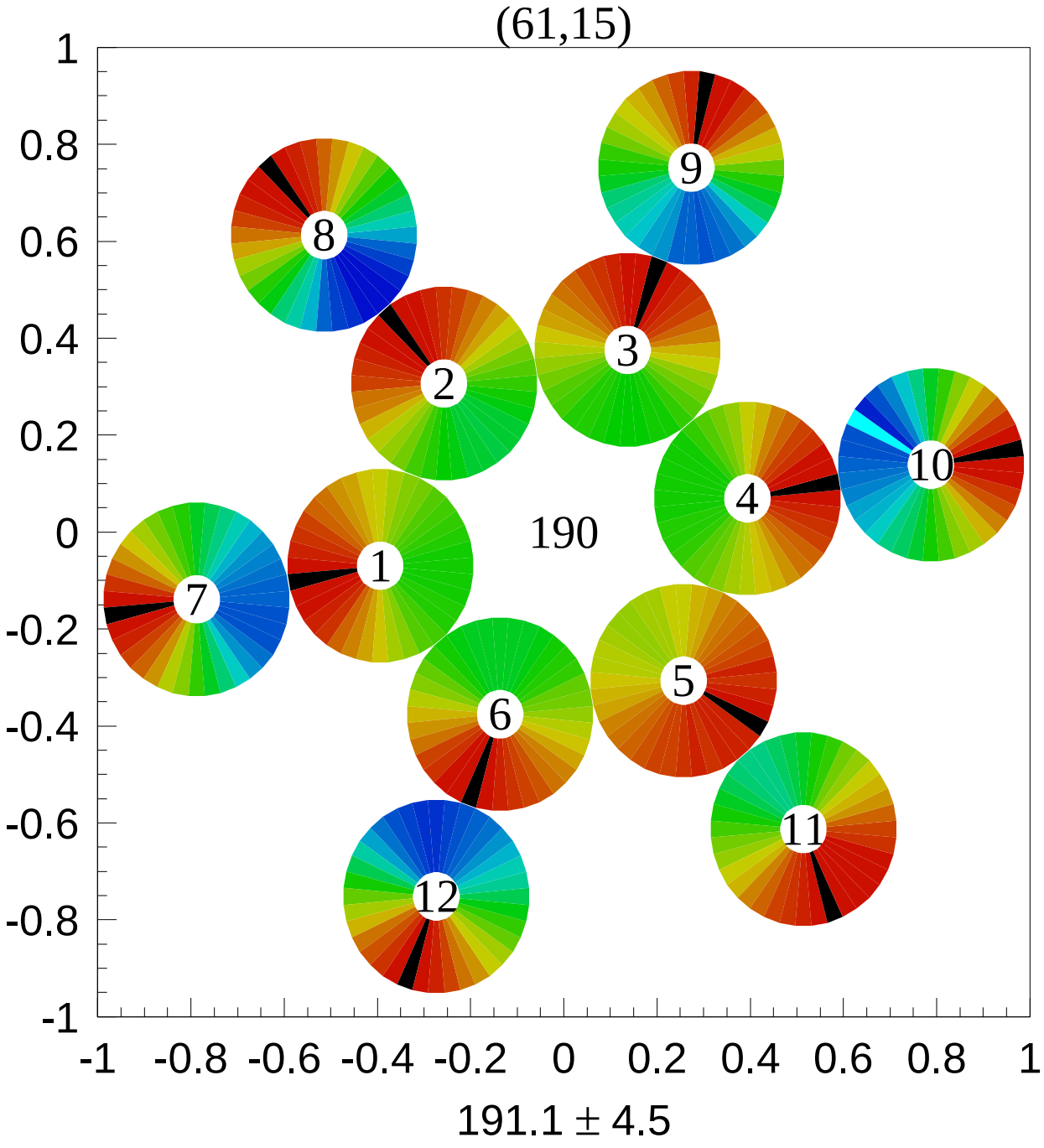

(61,13)
tilted LEDs
118 113 120 110 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 115 122 120 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

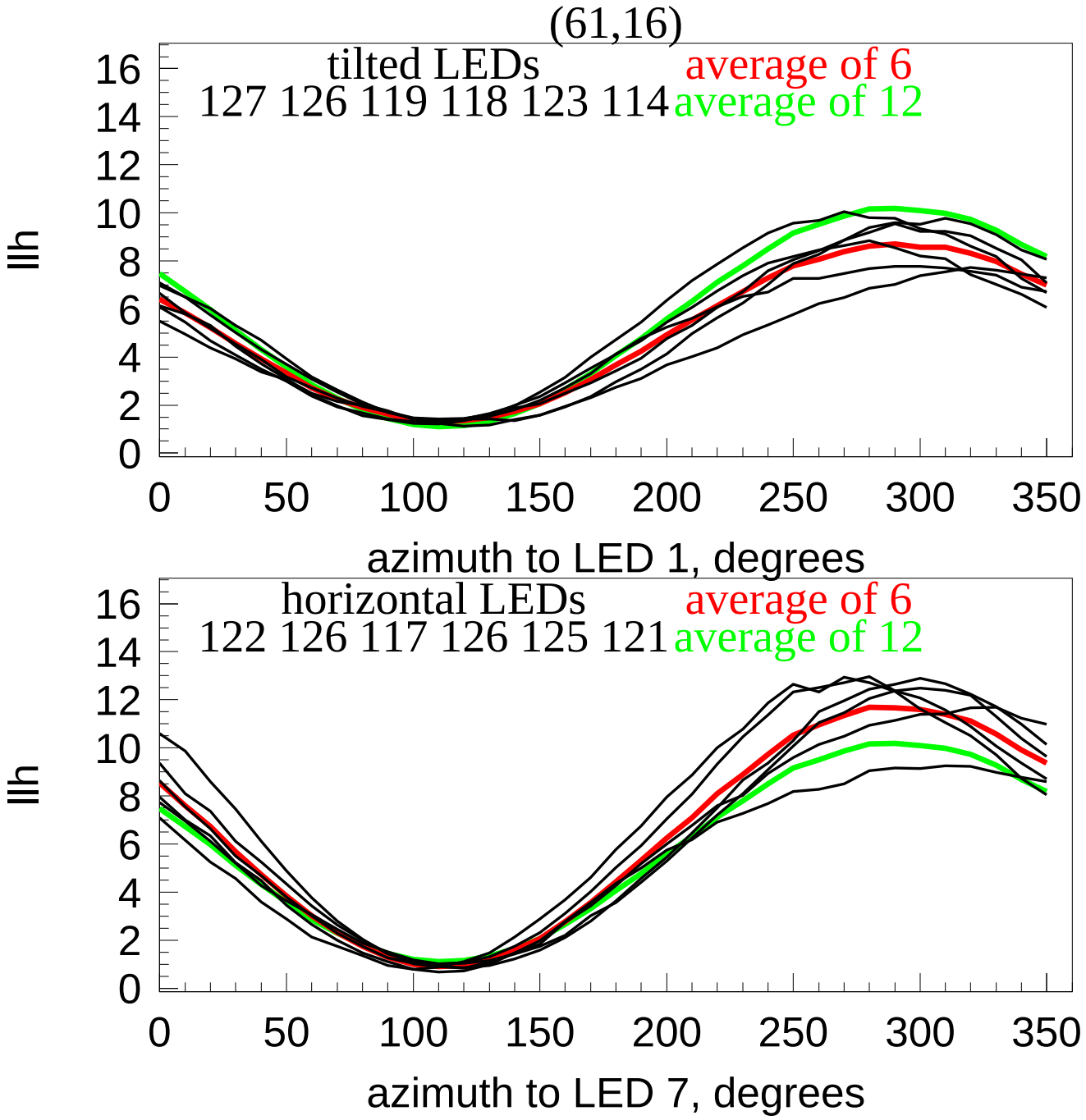

(61,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
309.2 ± 6.0

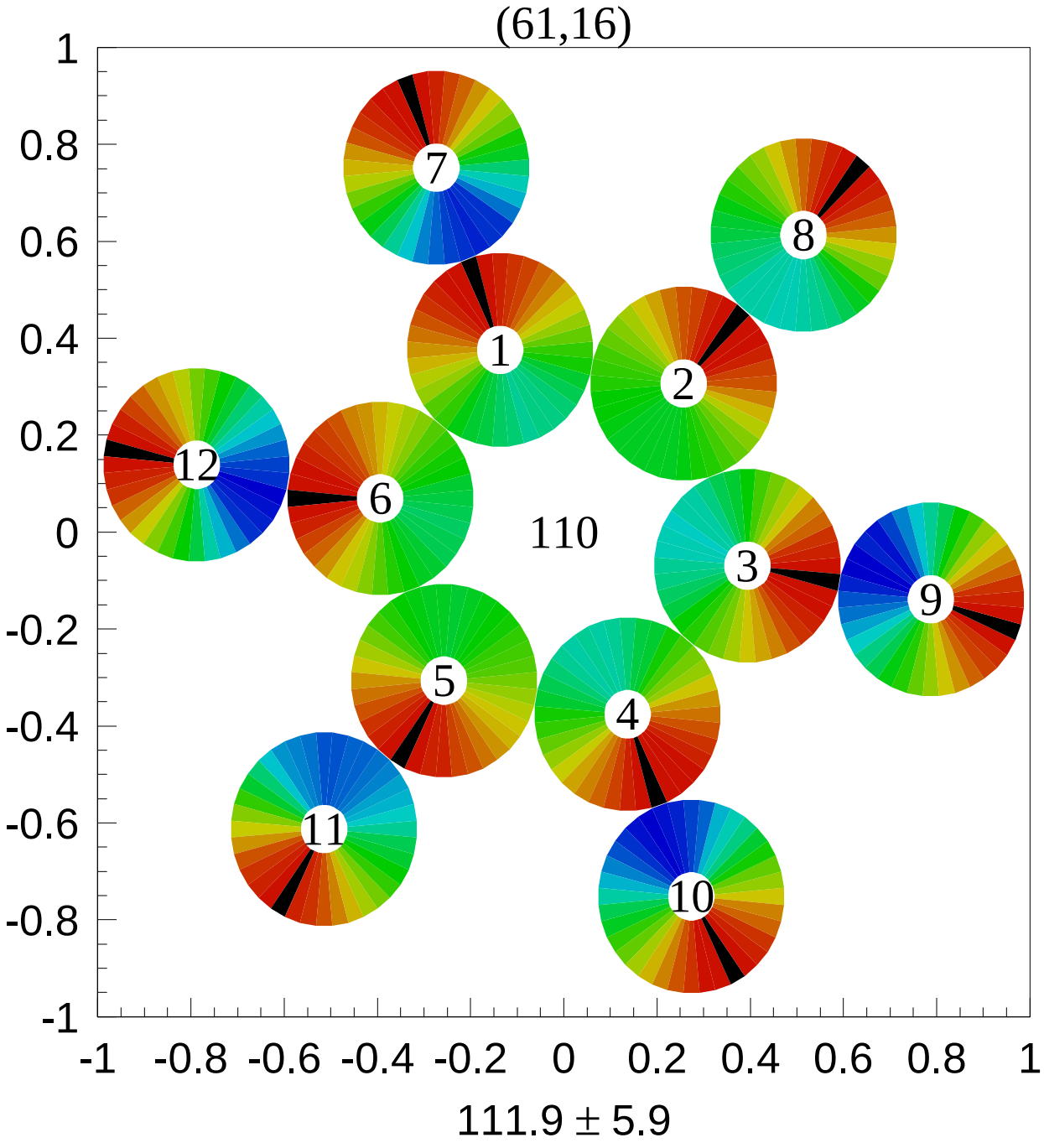

(61,14)
tilted LEDs
121 126 127 121 131 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 119 121 118 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

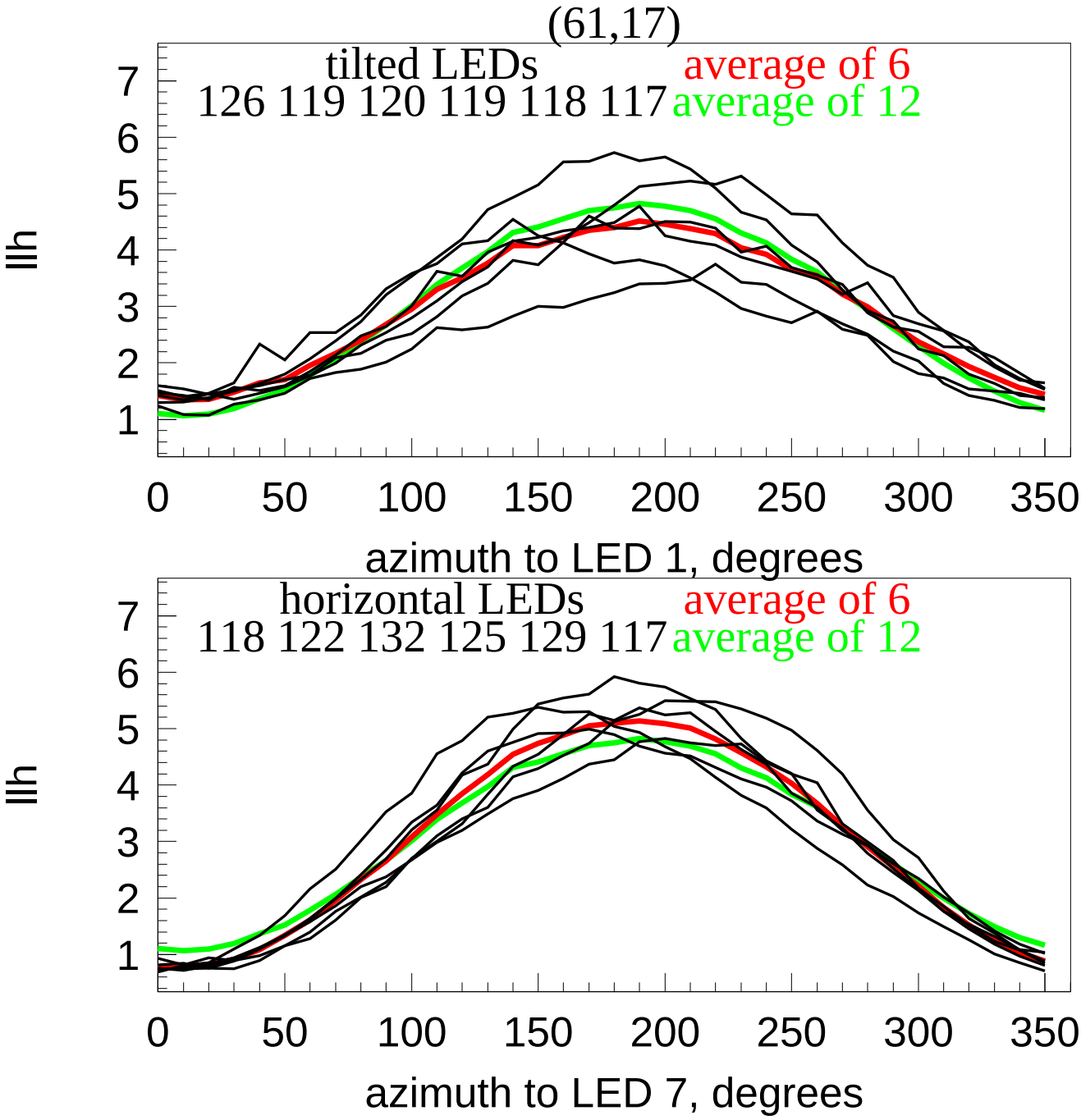

(61,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
34.2 ± 4.0

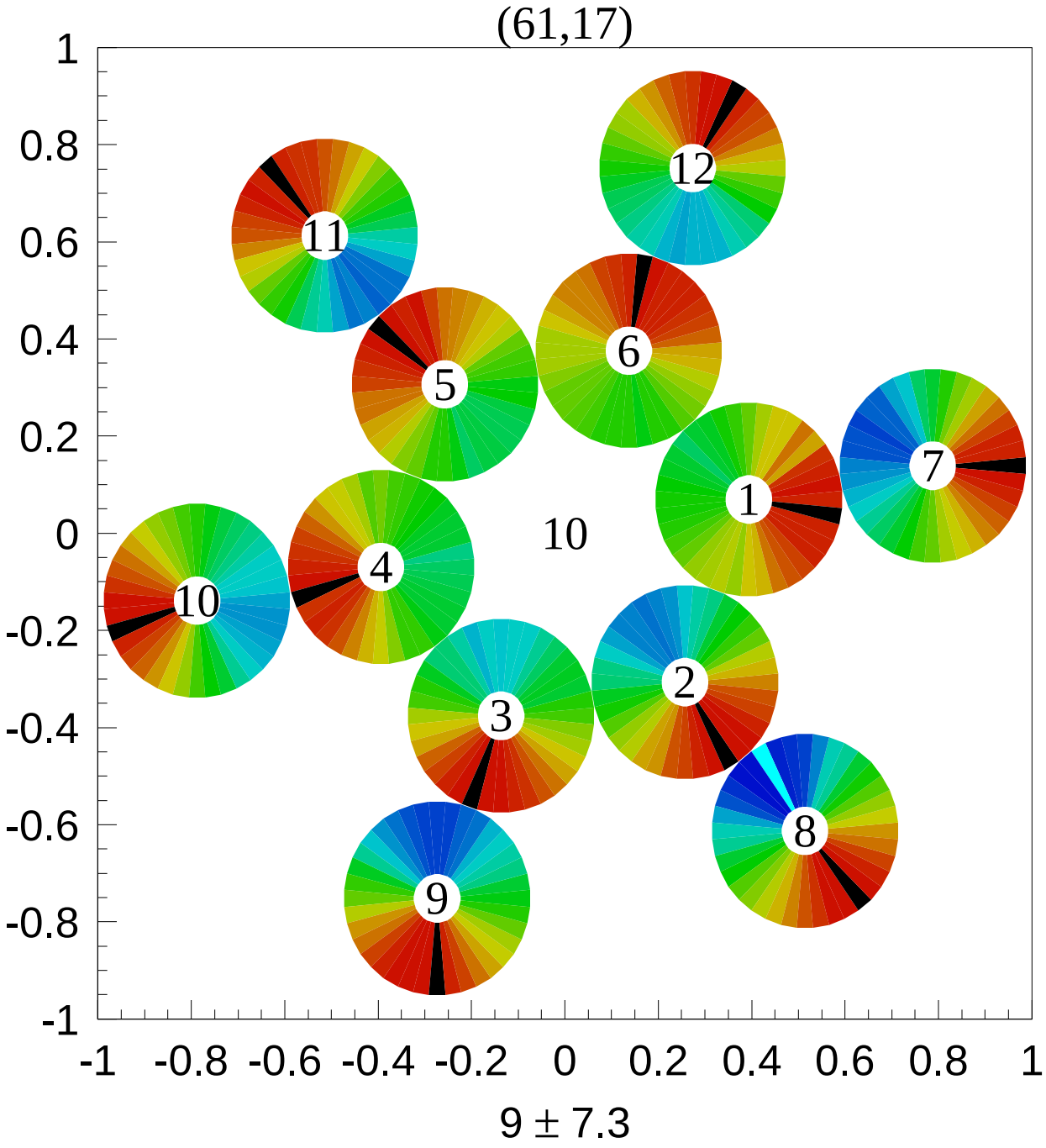

(61,15)
tilted LEDs
124 116 125 119 118 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 118 121 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

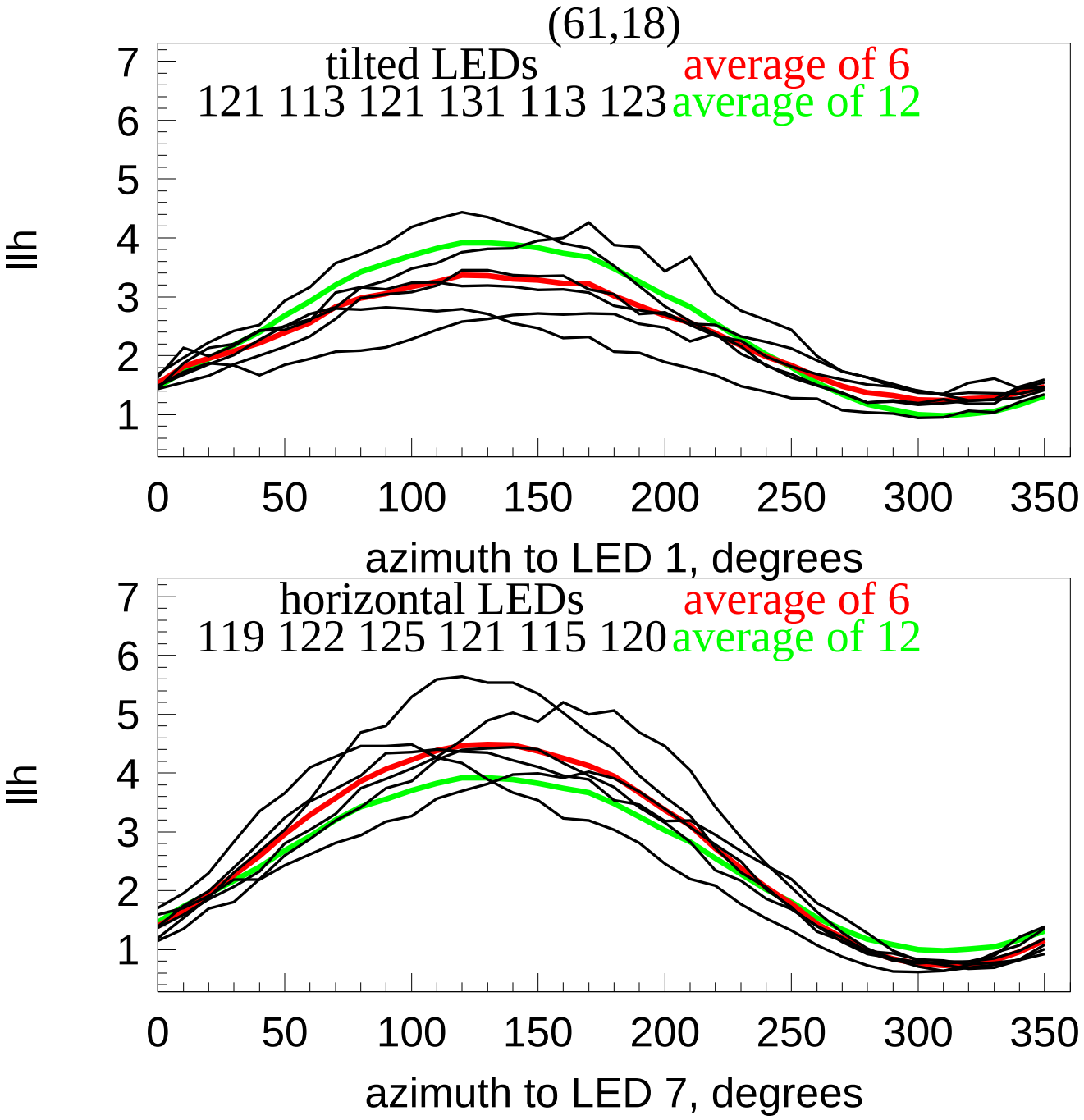

(61,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
191.1 ± 4.5

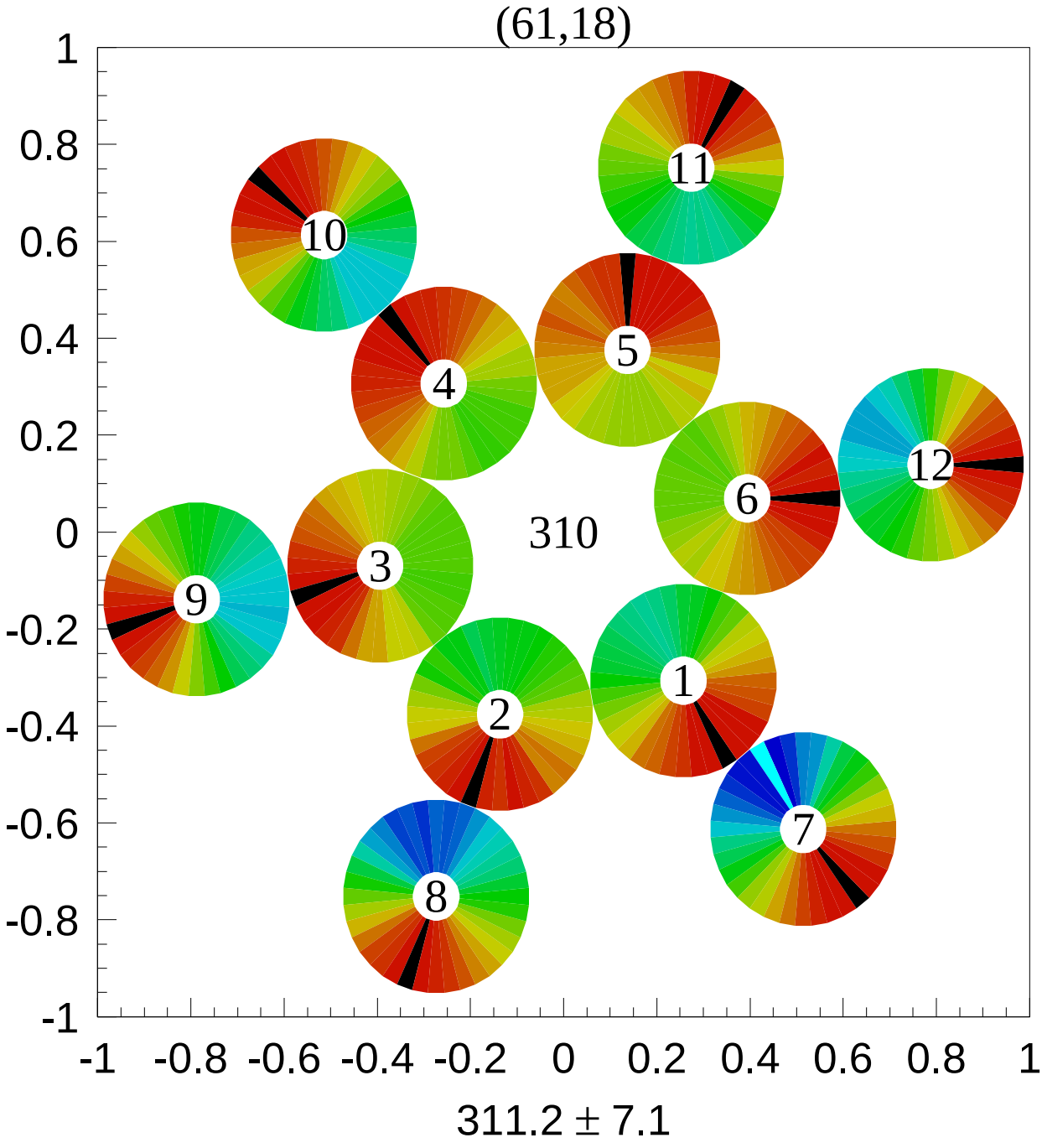

(61,16)
tilted LEDs
127 126 119 118 123 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 126 117 126 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

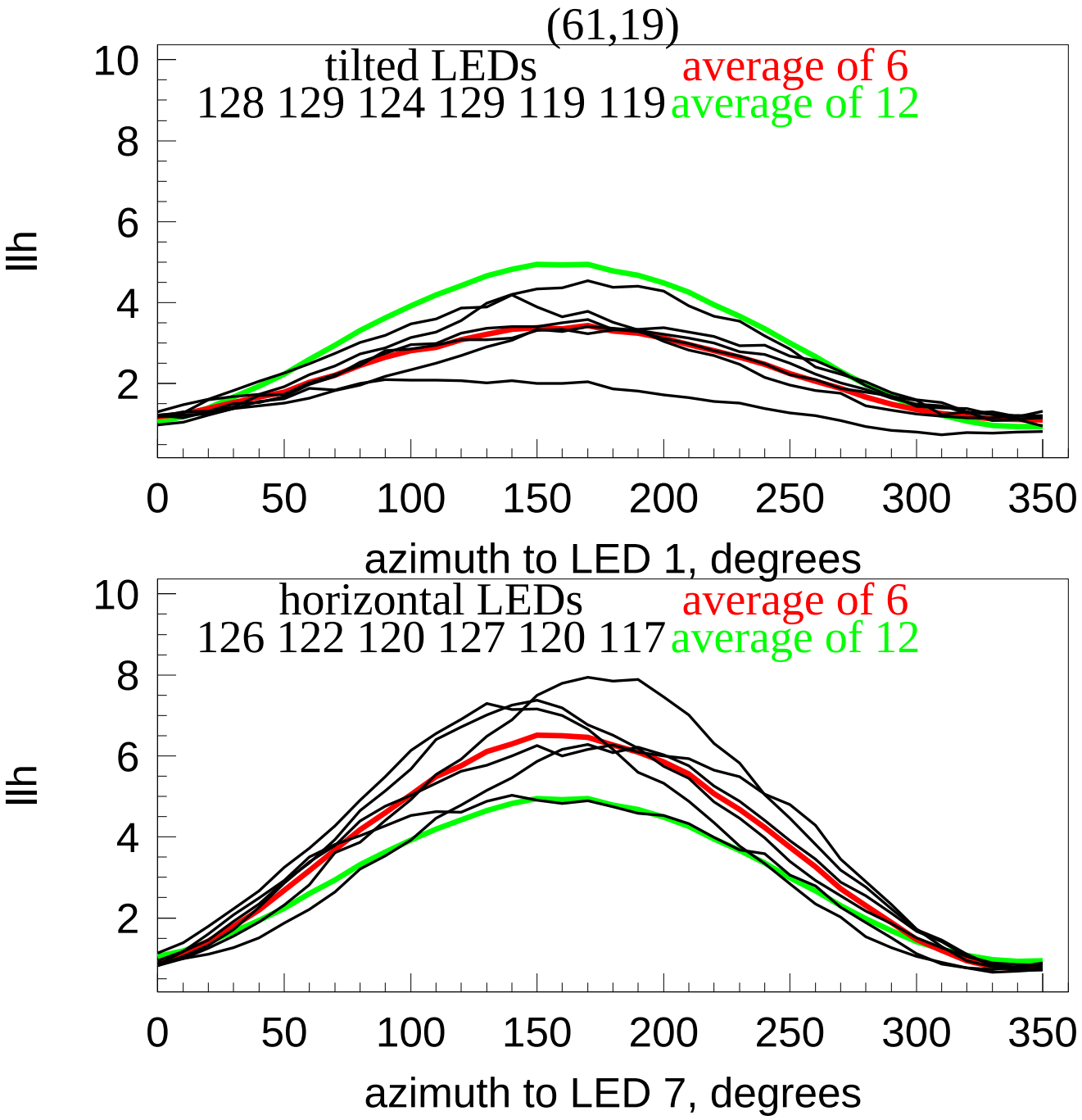

(61,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
111.9 ± 5.9

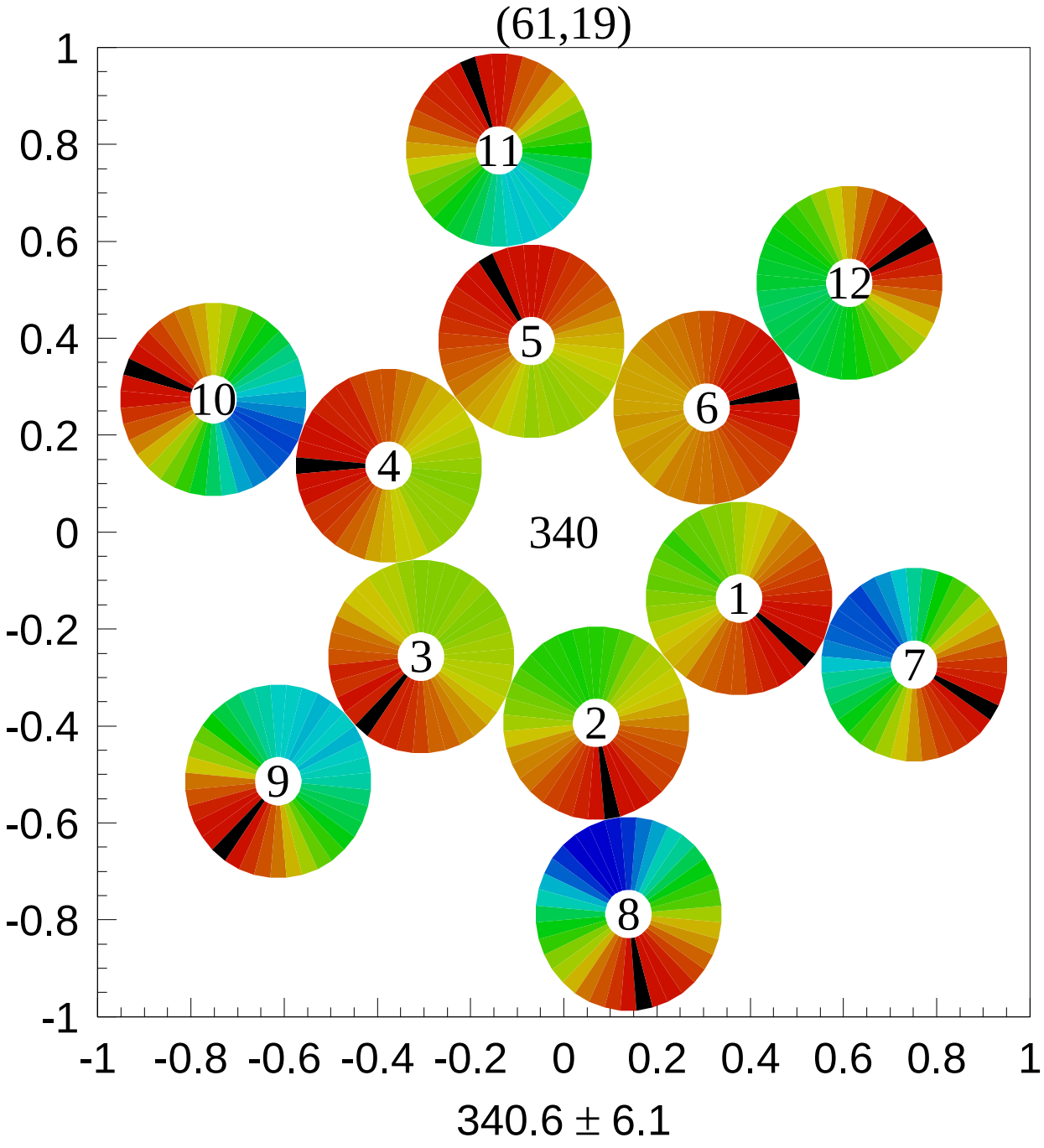

(61,17)
tilted LEDs
126 119 120 119 118 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 122 132 125 129 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

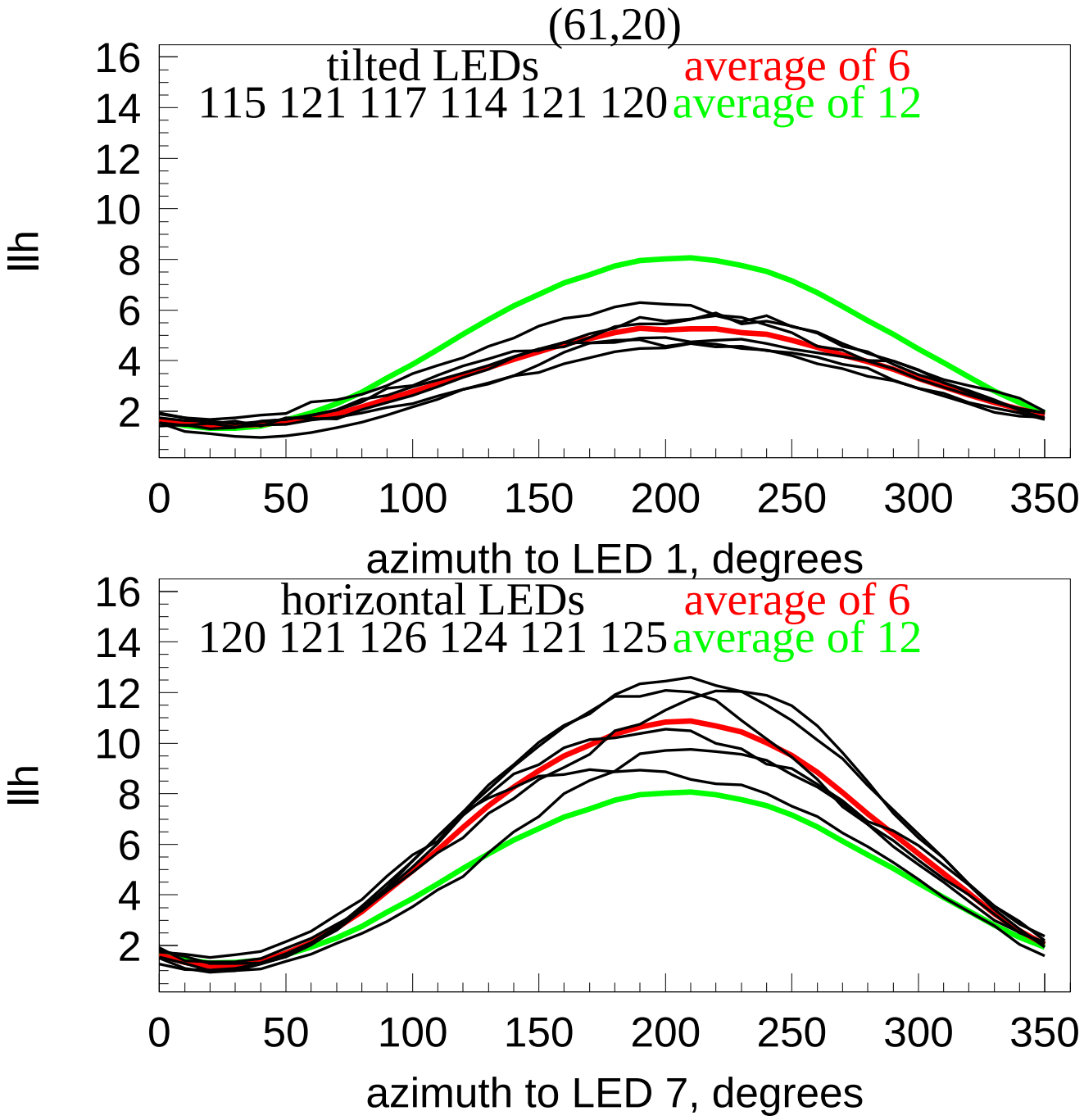

(61,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9 ± 7.3
12
11
6
5
7
1
10
4
10
2
3
8
9

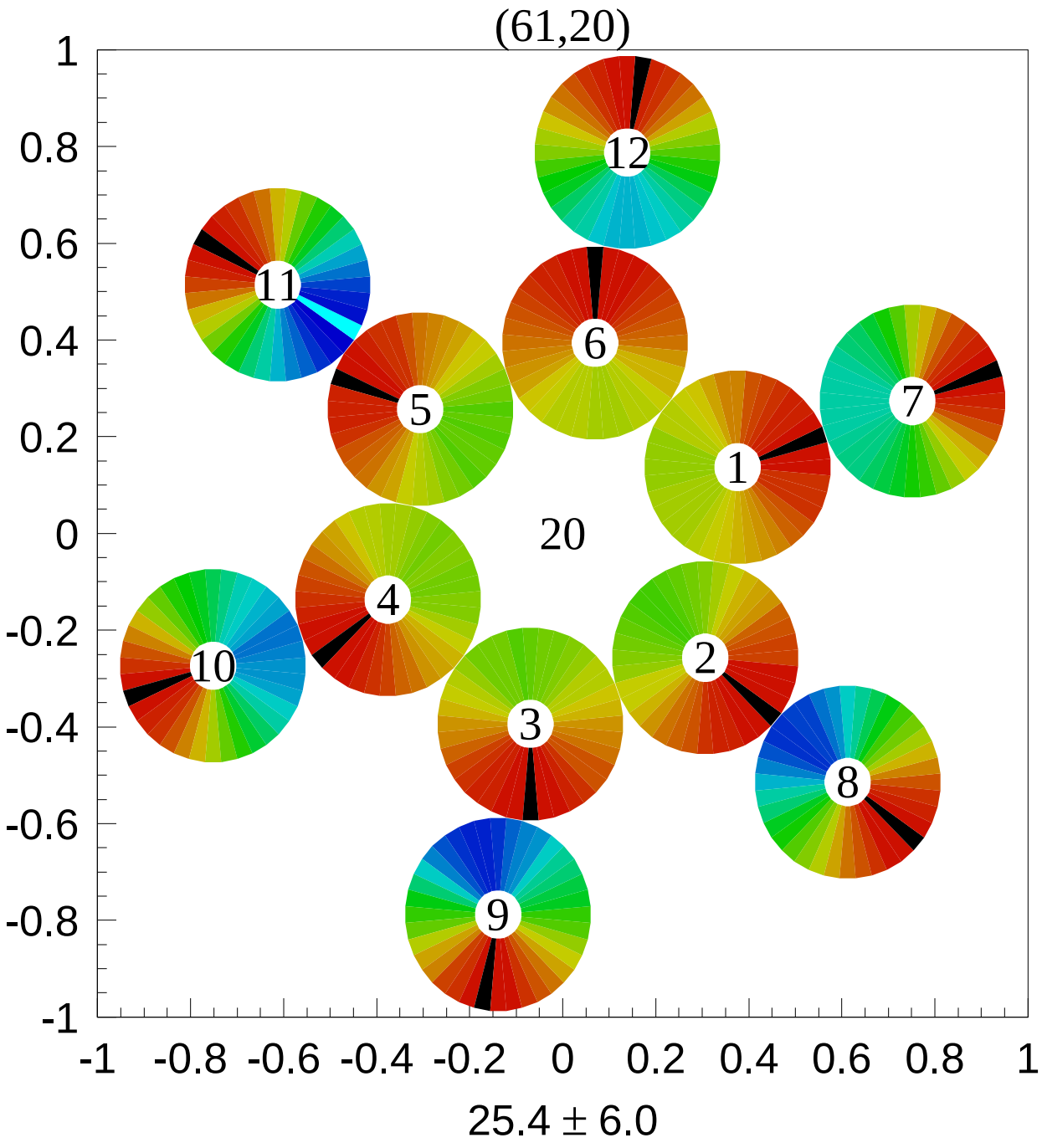

(61,18)
tilted LEDs
121 113 121 131 113 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 125 121 115 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

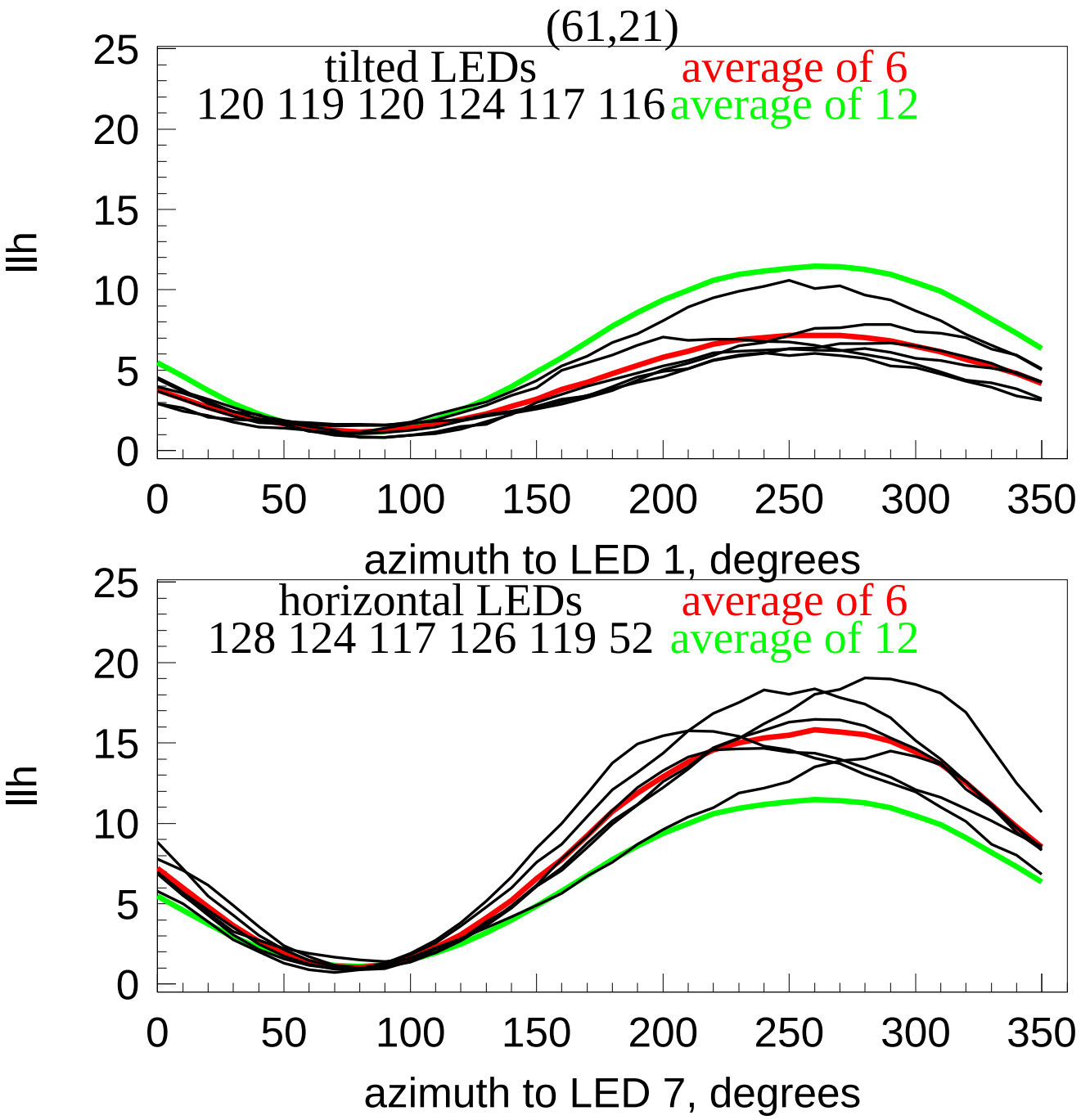

(61,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
311.2 ± 7.1

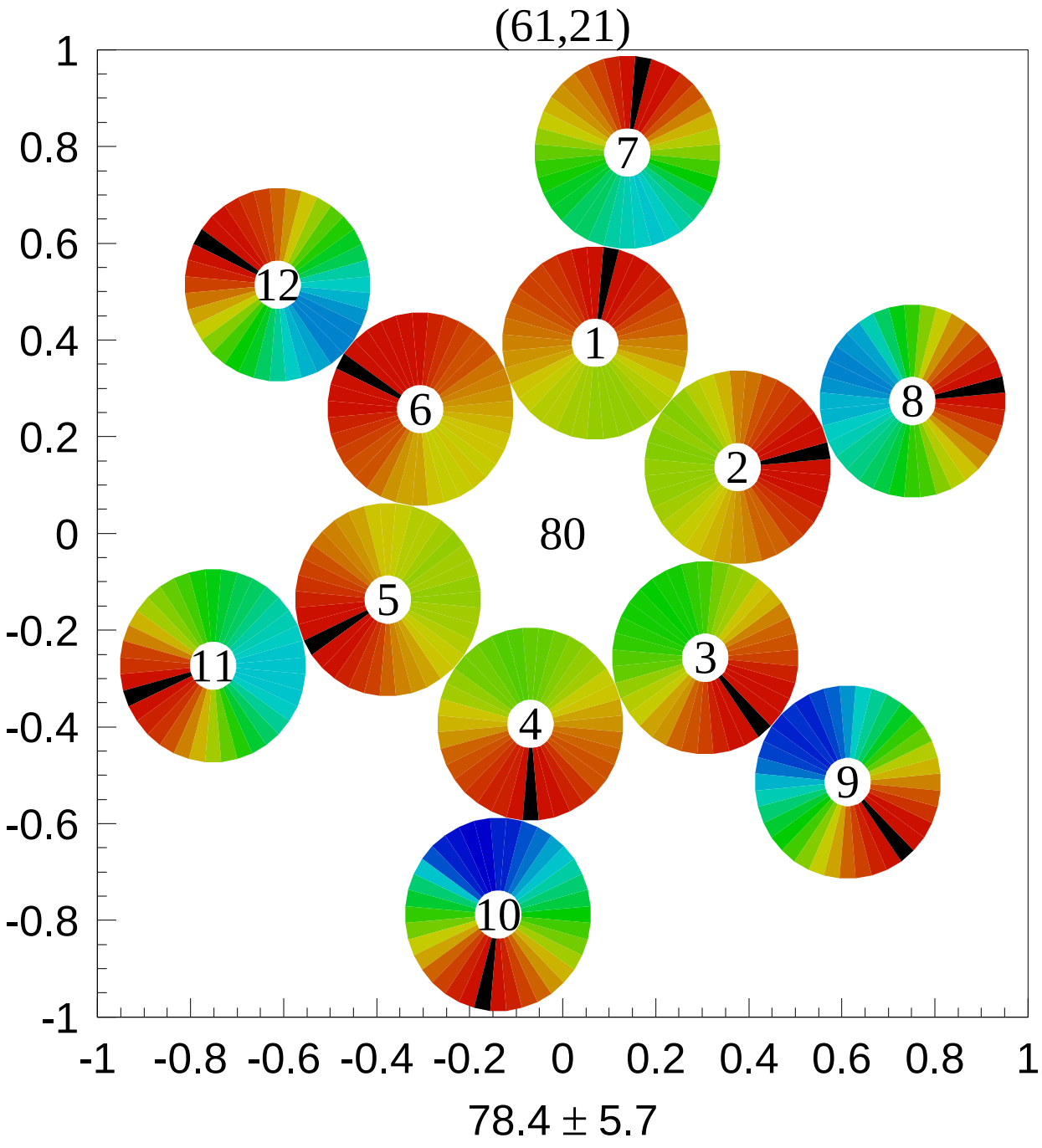

(61,19)
tilted LEDs
128 129 124 129 119 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 122 120 127 120 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

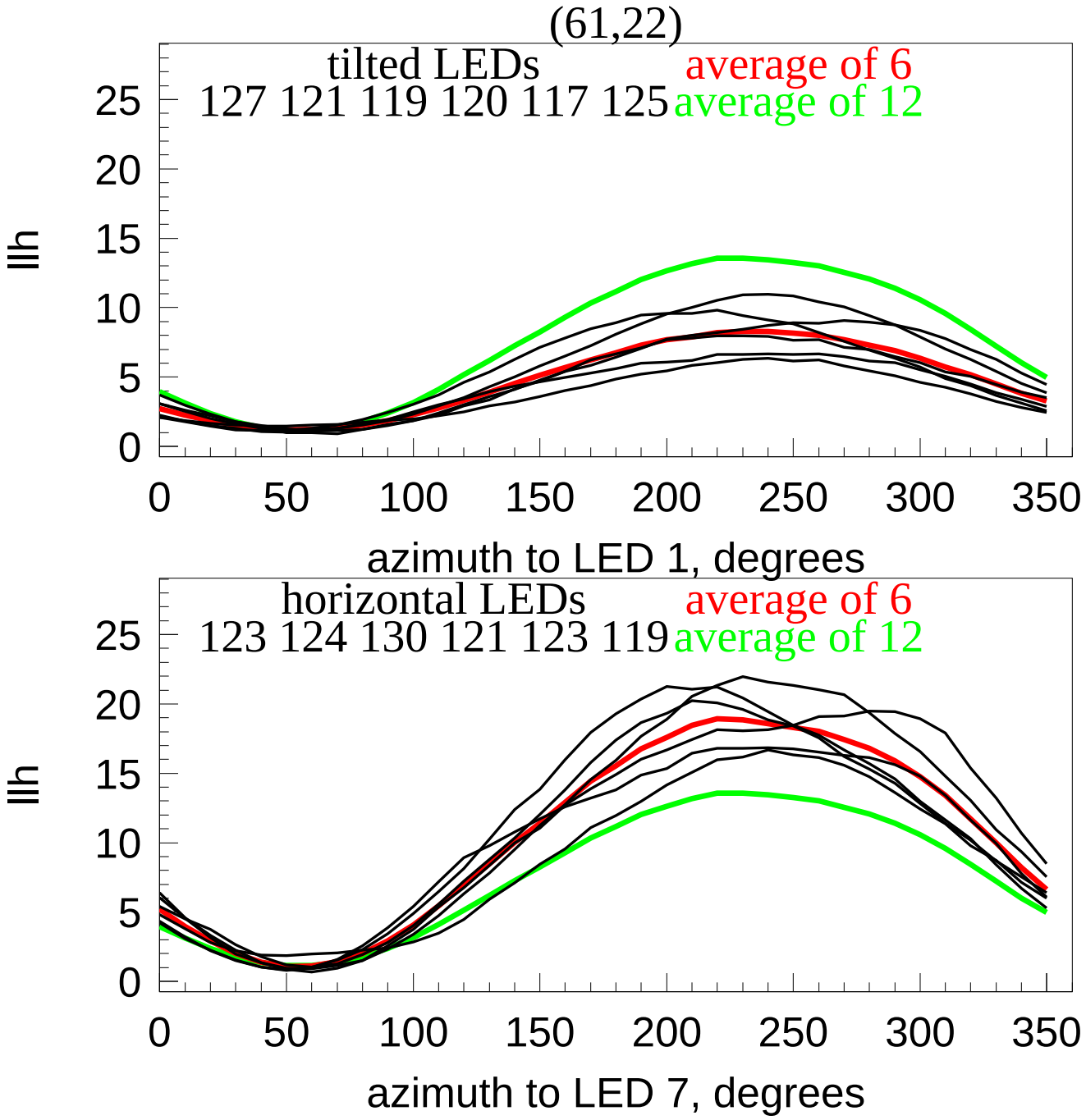

(61,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
340.6 ± 6.1

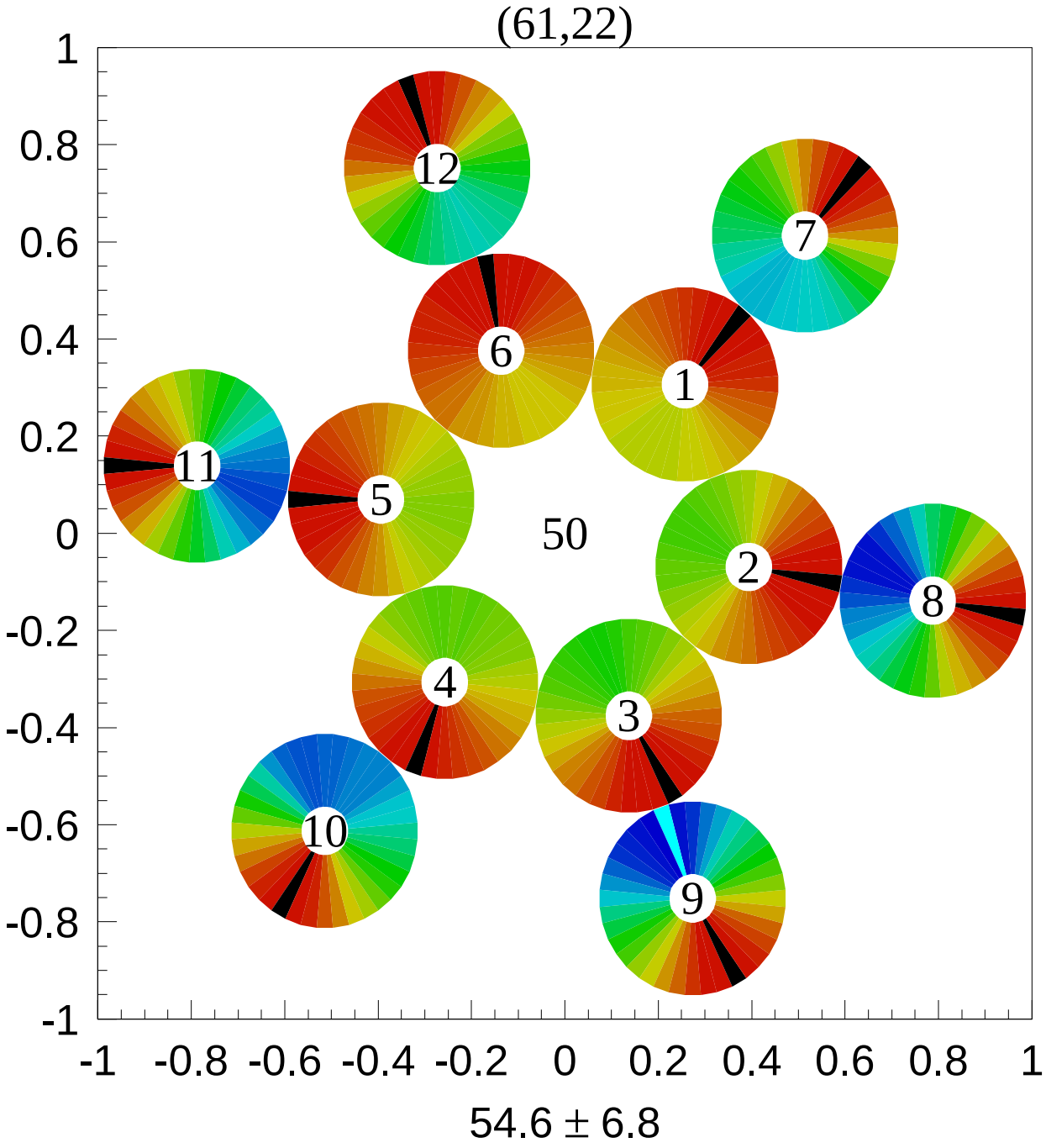

(61,20)
tilted LEDs
115 121 117 114 121 120
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 121 126 124 121 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

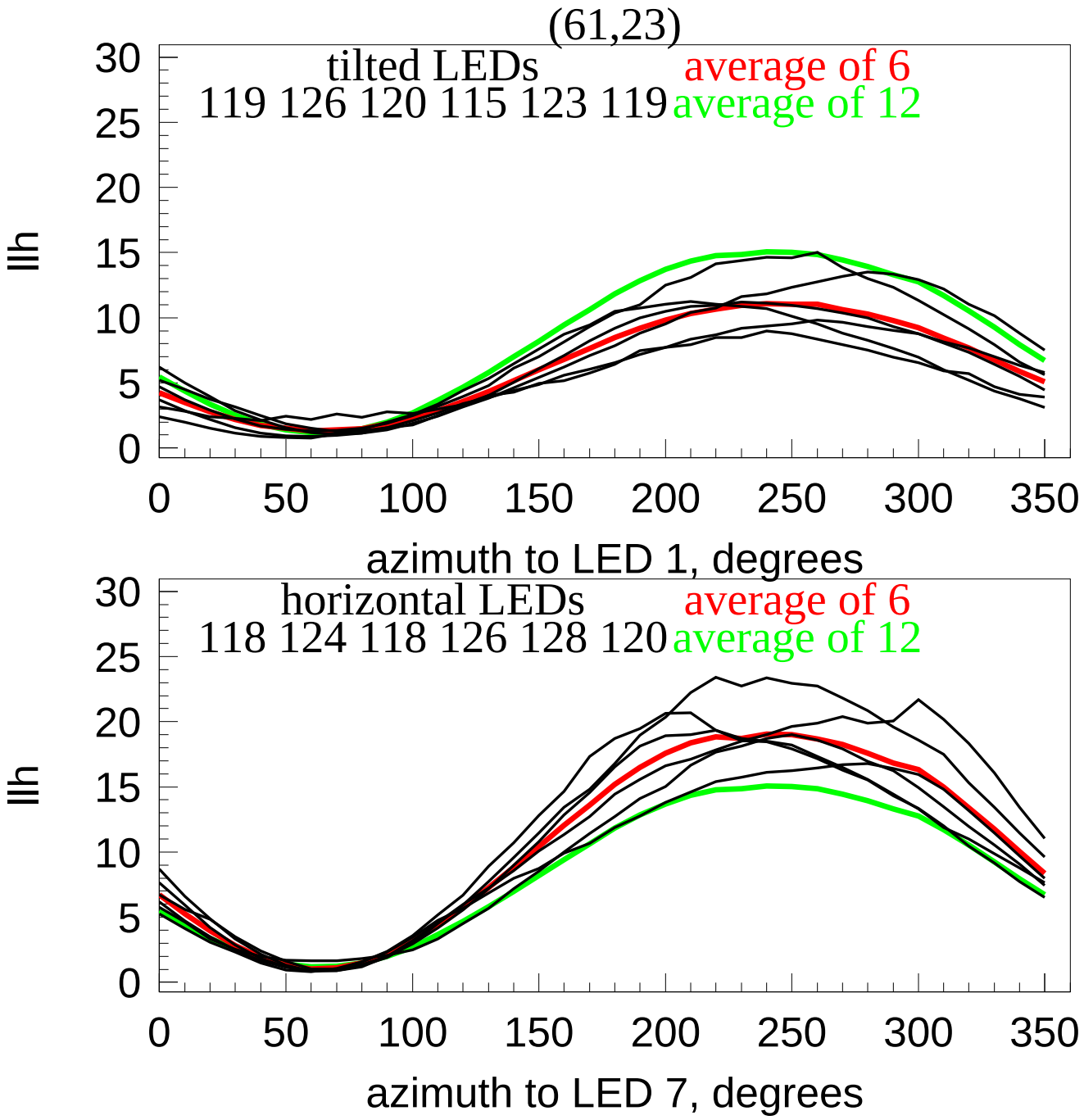

(61,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
25.4 ± 6.0
12
11
6
5
7
1
20
4
10
2
3
8
9

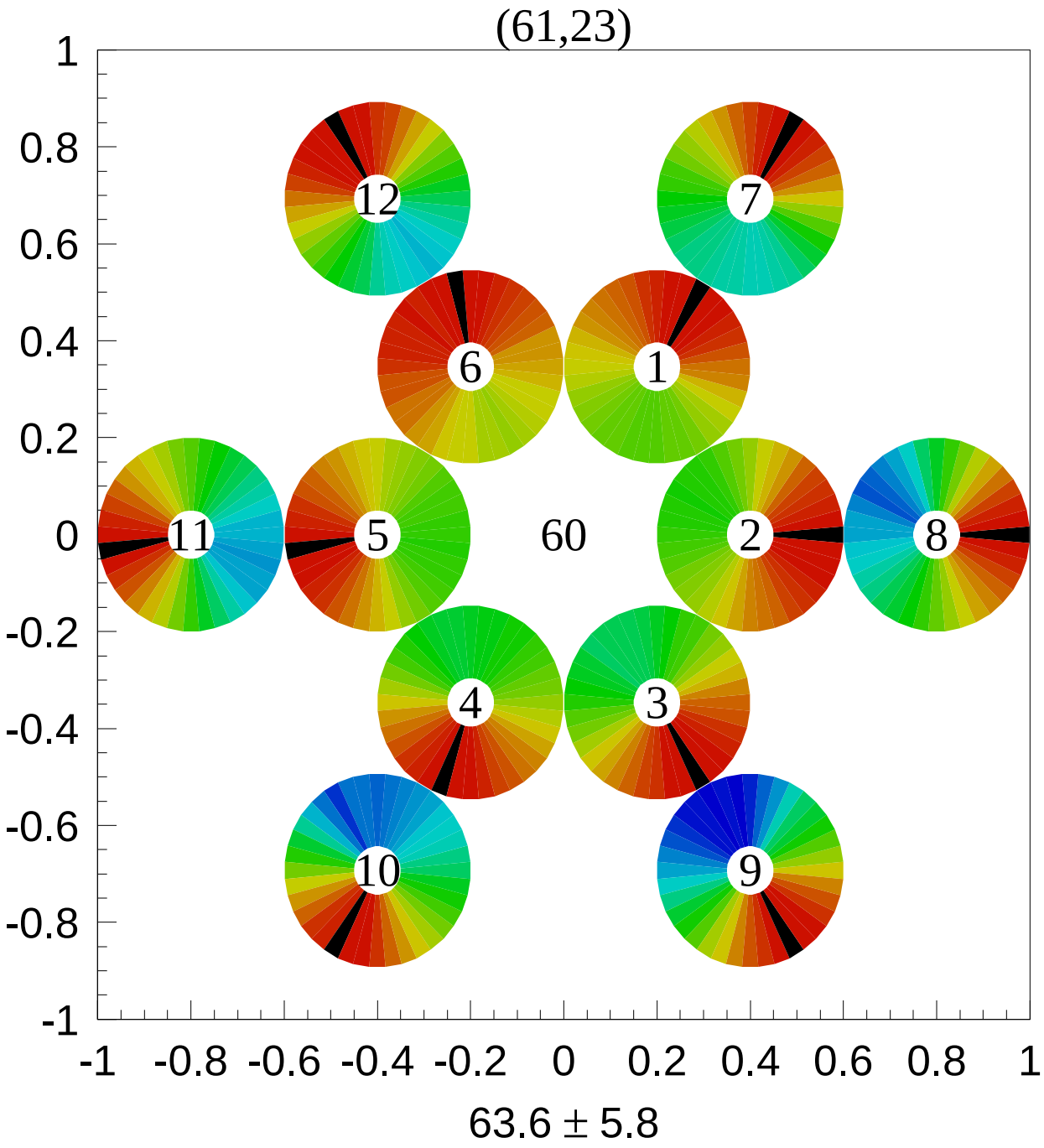

(61,21)
tilted LEDs
120 119 120 124 117 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 124 117 126 119 52
average of 6
average of 12
llh
azimuth to LED 7, degrees

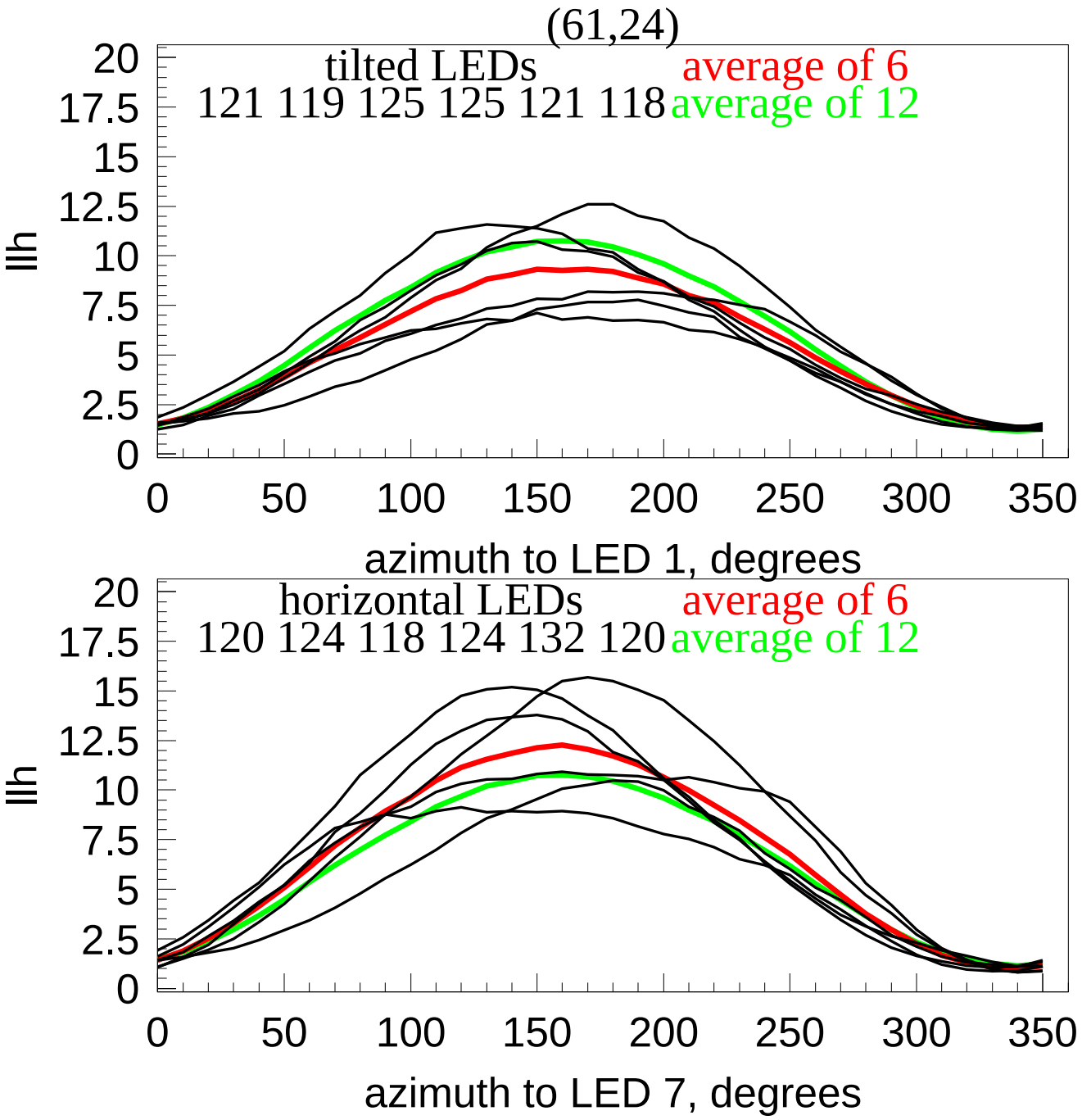

(61,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
78.4 ± 5.7

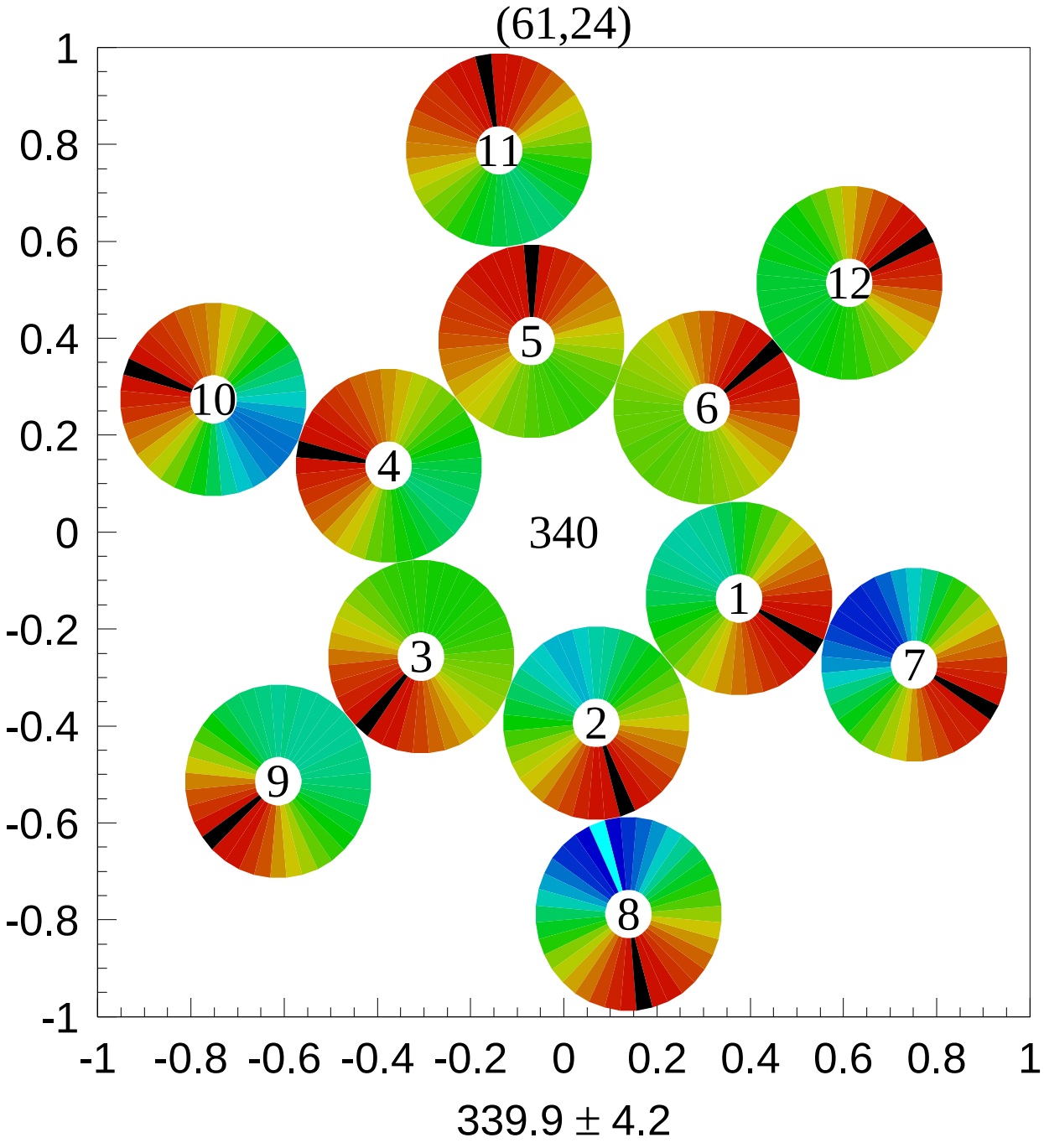

(61,22)
tilted LEDs
127 121 119 120 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 124 130 121 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

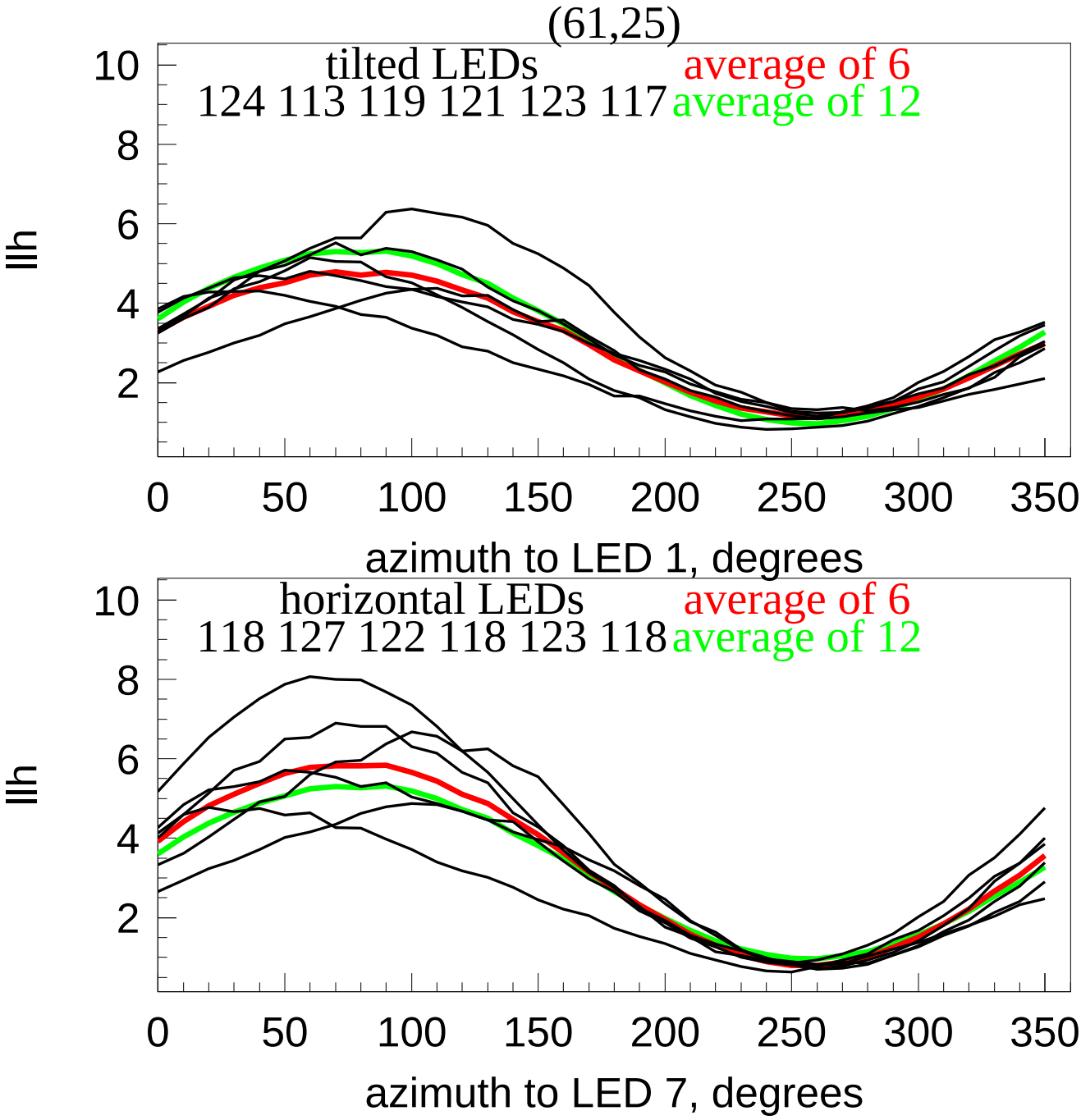

(61,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
54.6 ± 6.8

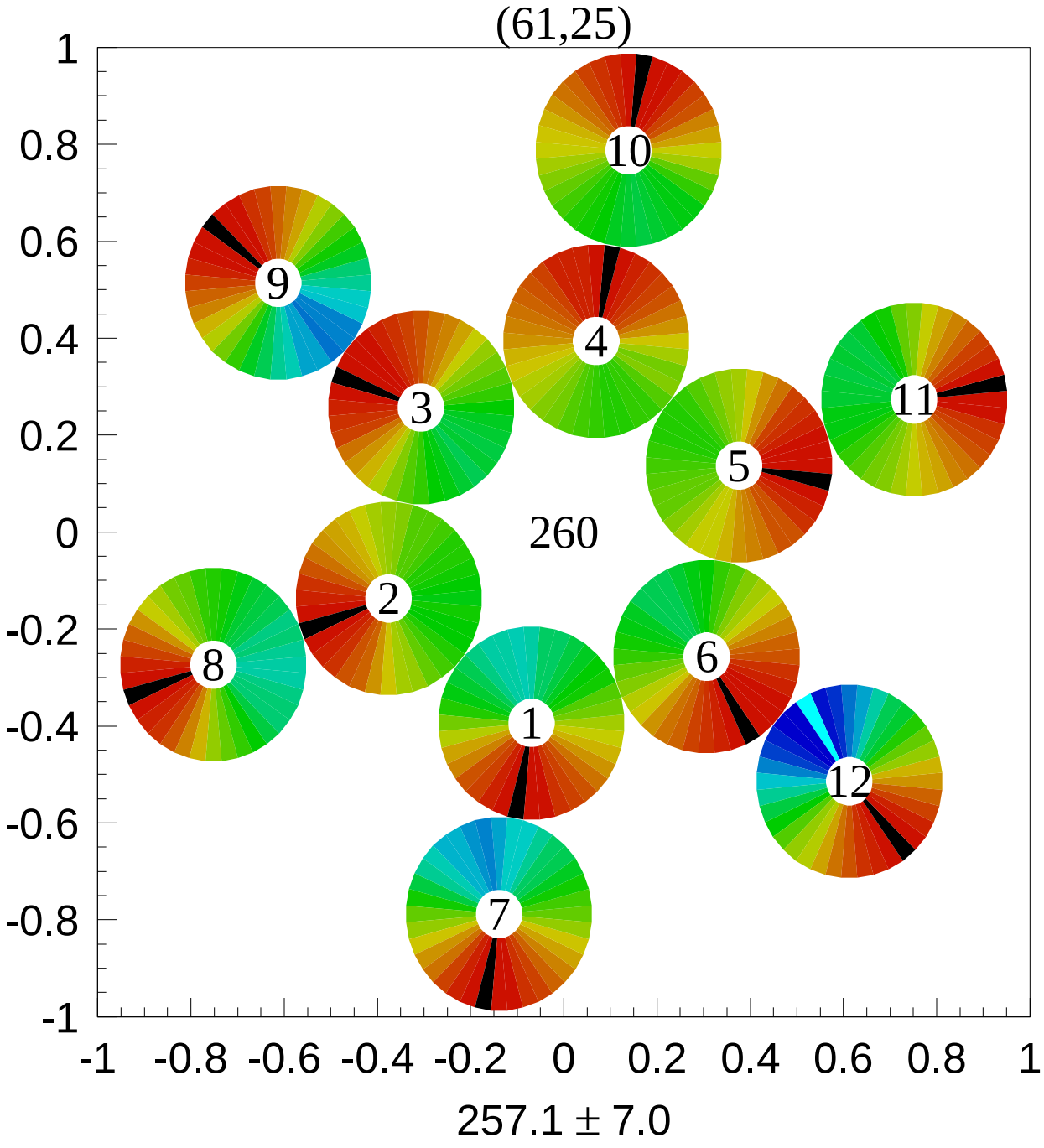

(61,23)
tilted LEDs
119 126 120 115 123 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 124 118 126 128 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

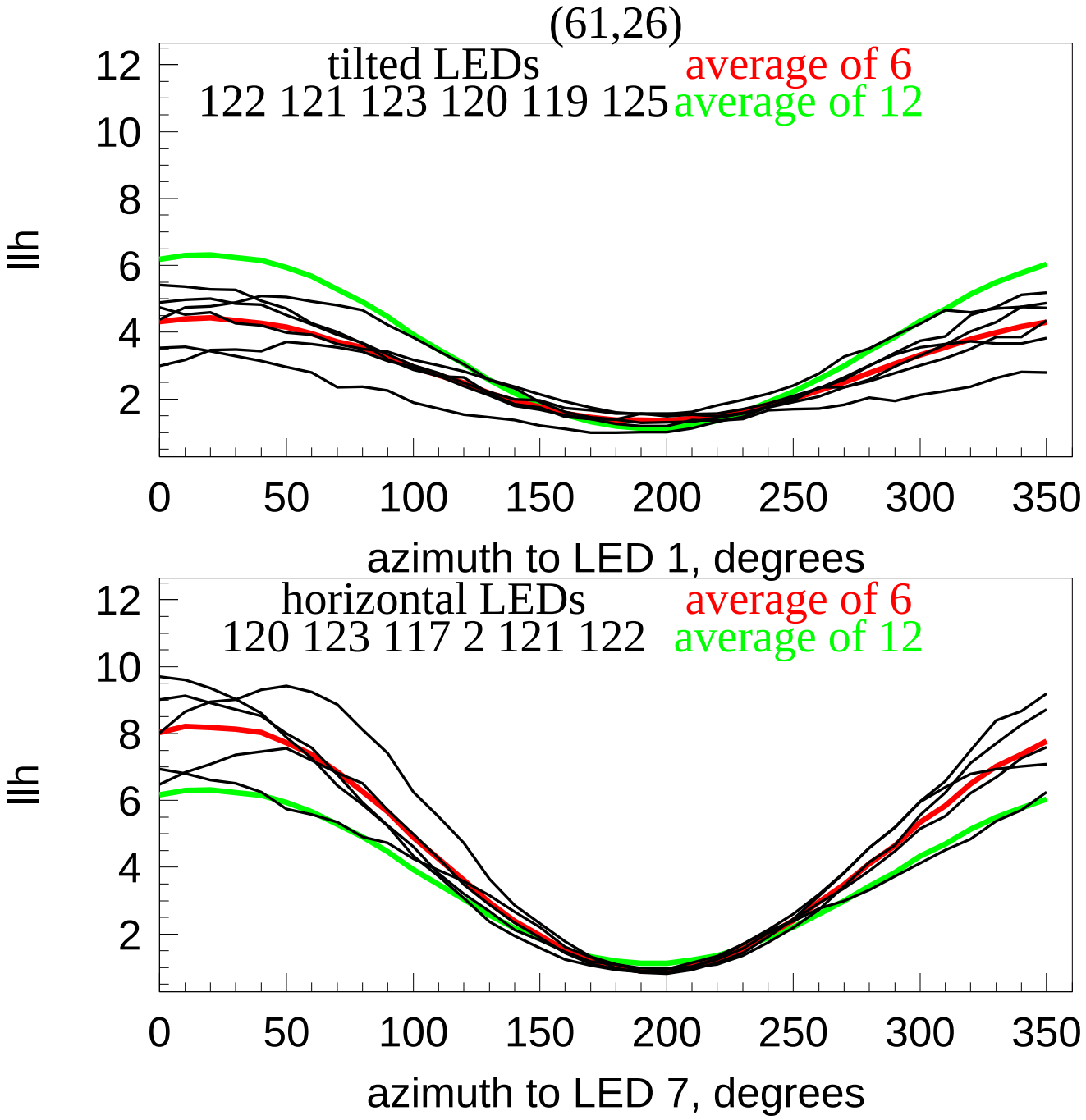

(61,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
63.6 ± 5.8

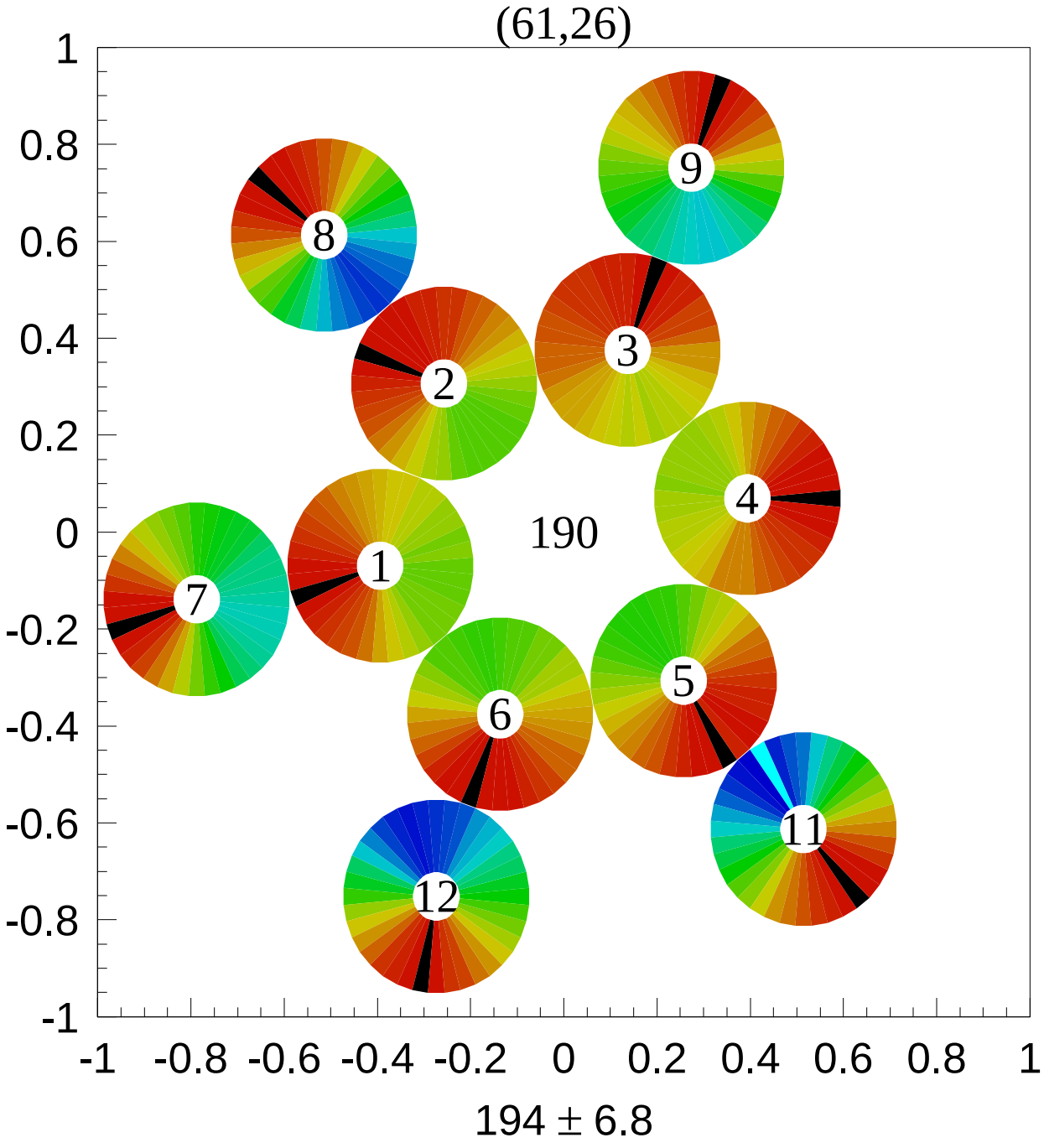

(61,24)
tilted LEDs
121 119 125 125 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 124 118 124 132 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

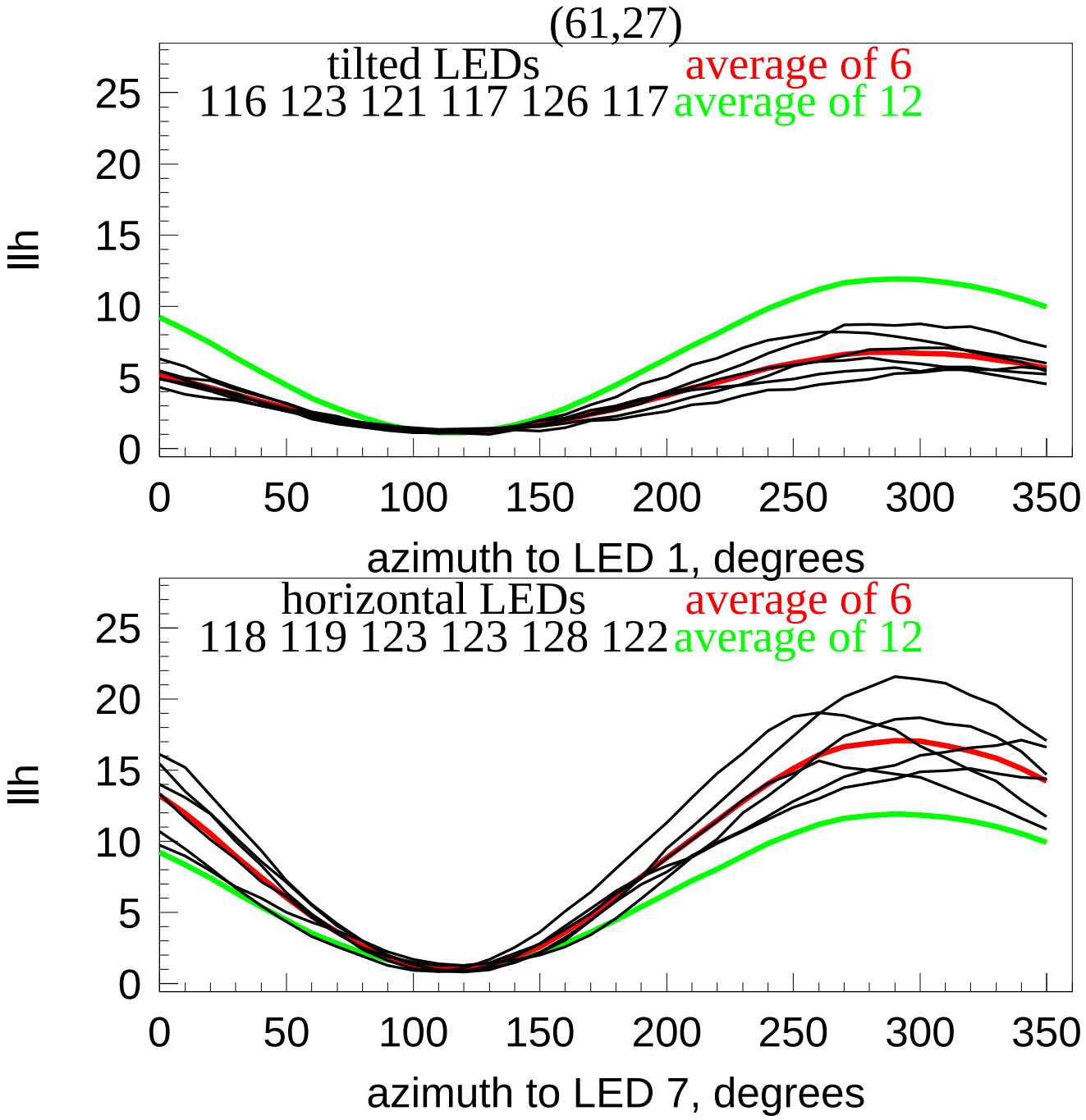

(61,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
3
7
2
9
8
339.9 ± 4.2

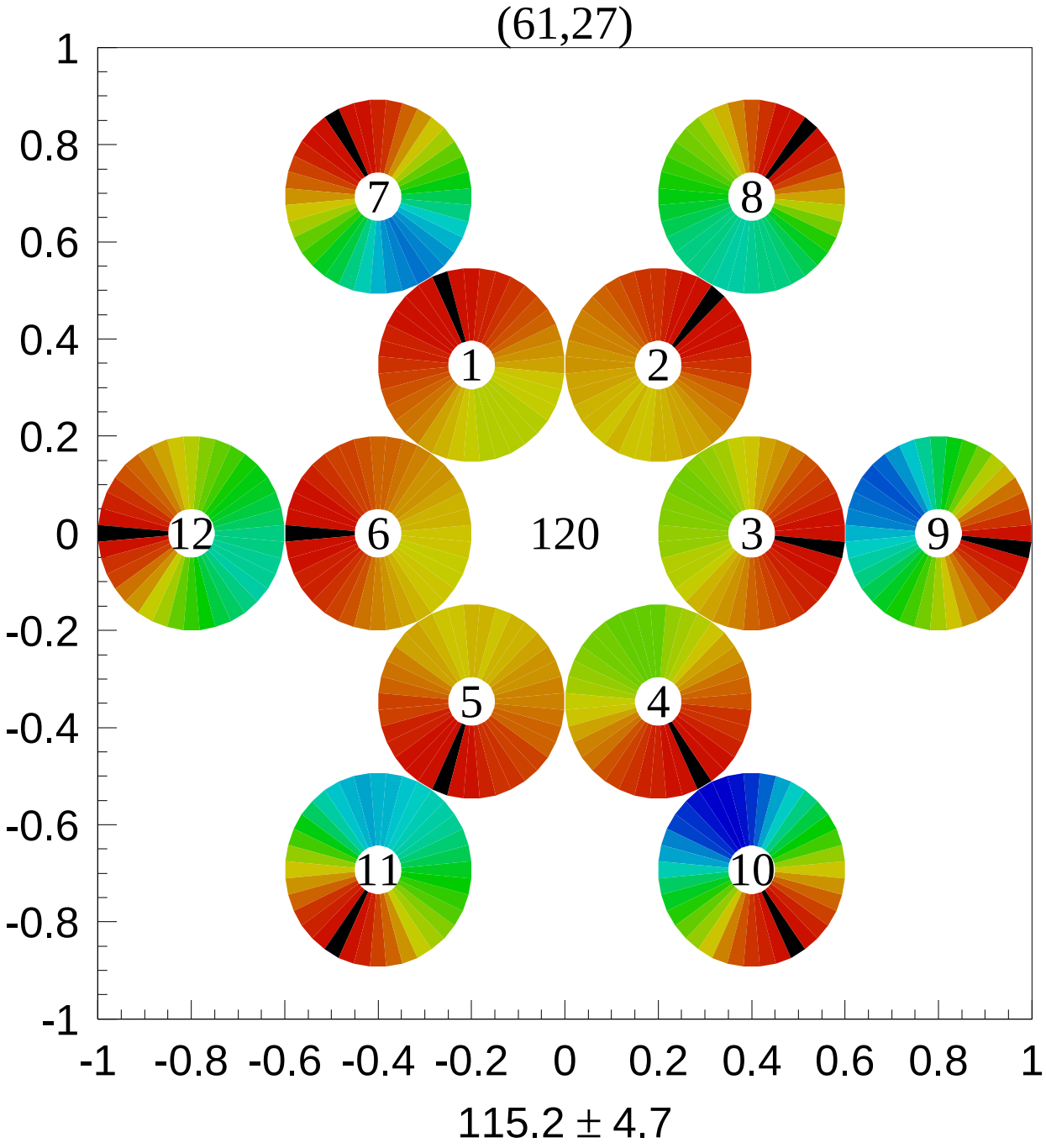

(61,25)
tilted LEDs
124 113 119 121 123 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 127 122 118 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

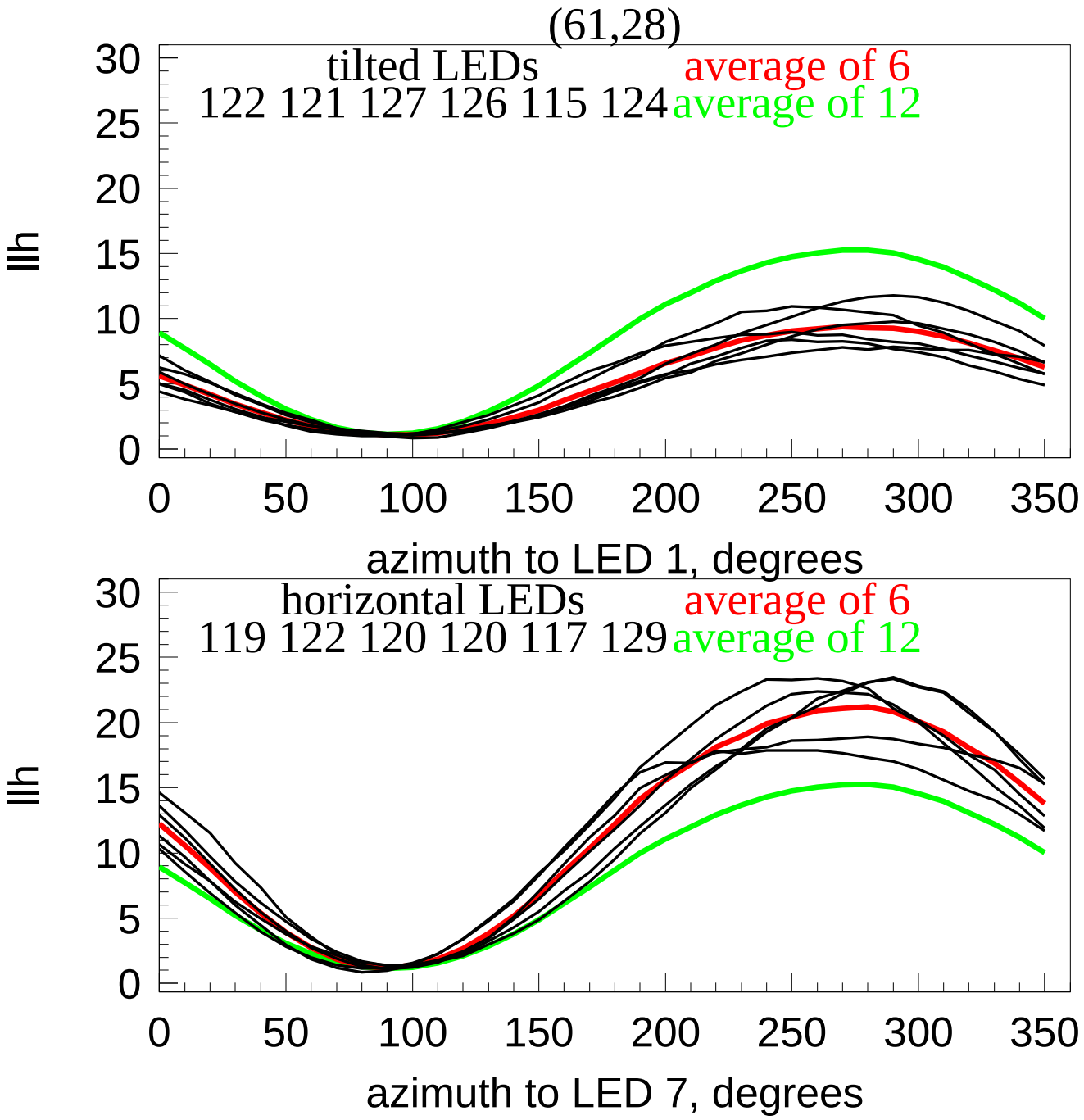

(61,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
257.1 ± 7.0

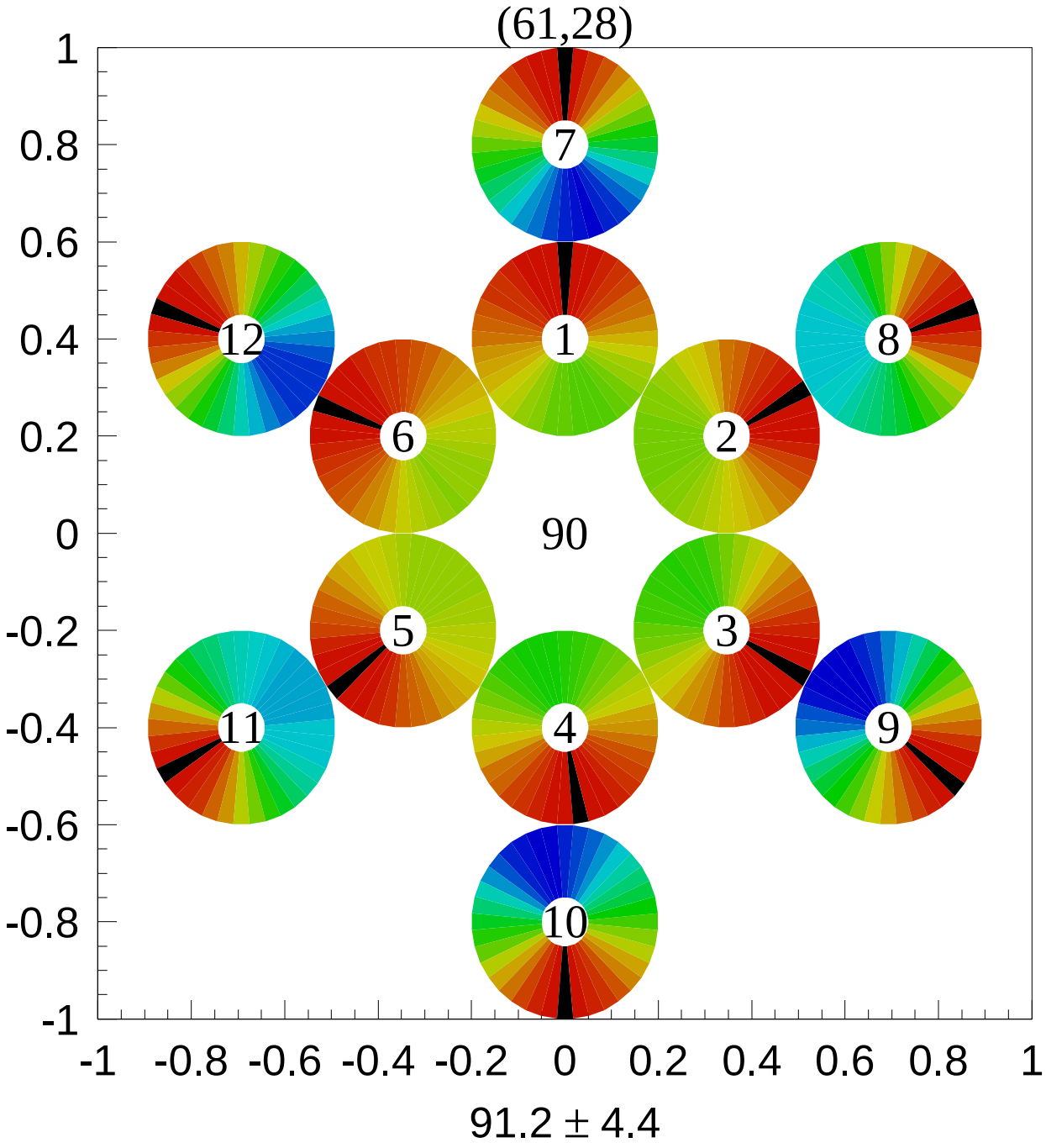

(61,26)
tilted LEDs
122 121 123 120 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 123 117 2 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

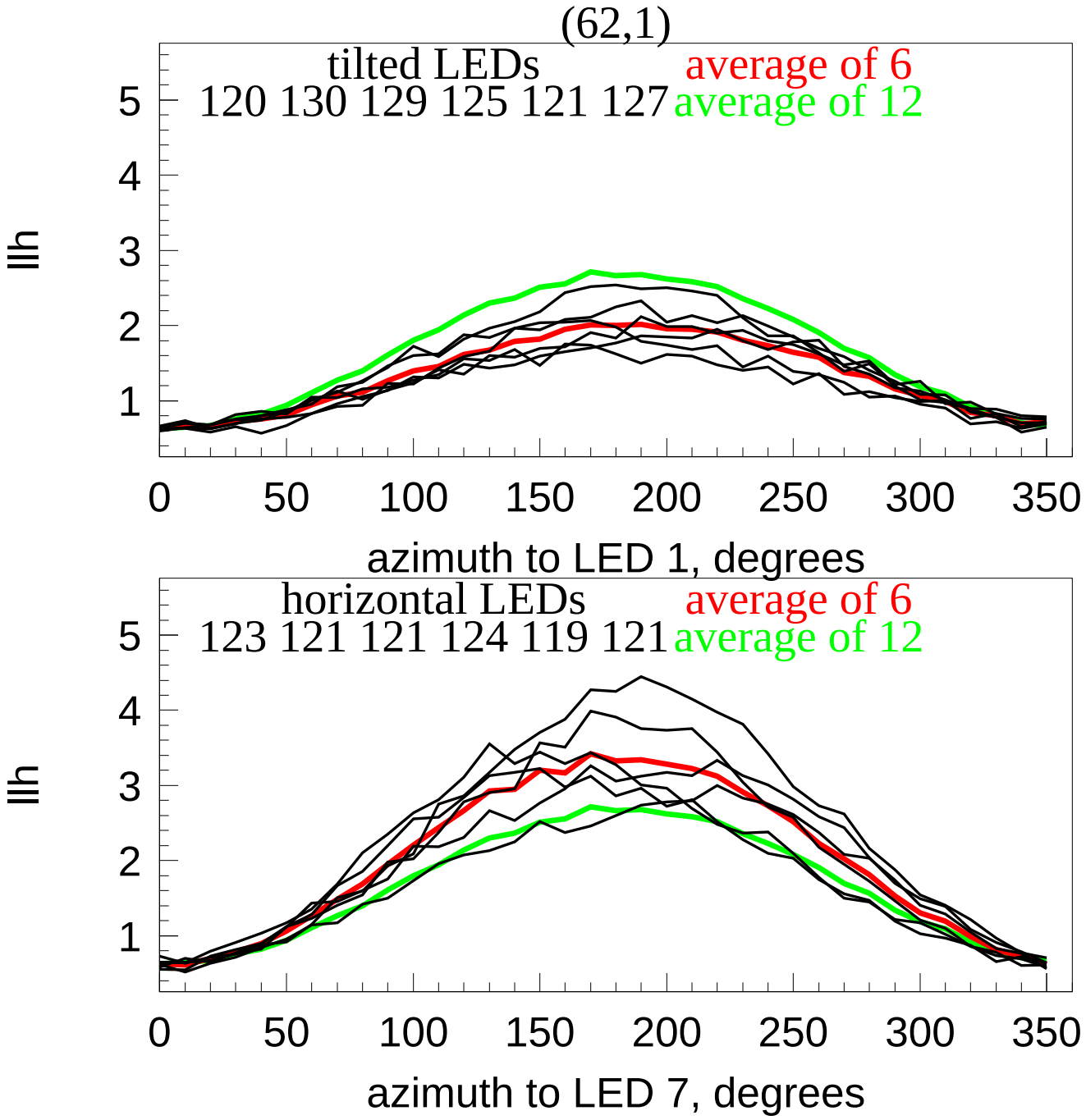

(61,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
194 ± 6.8
190
1
2
3
4
5
6
7
8
9
11
12

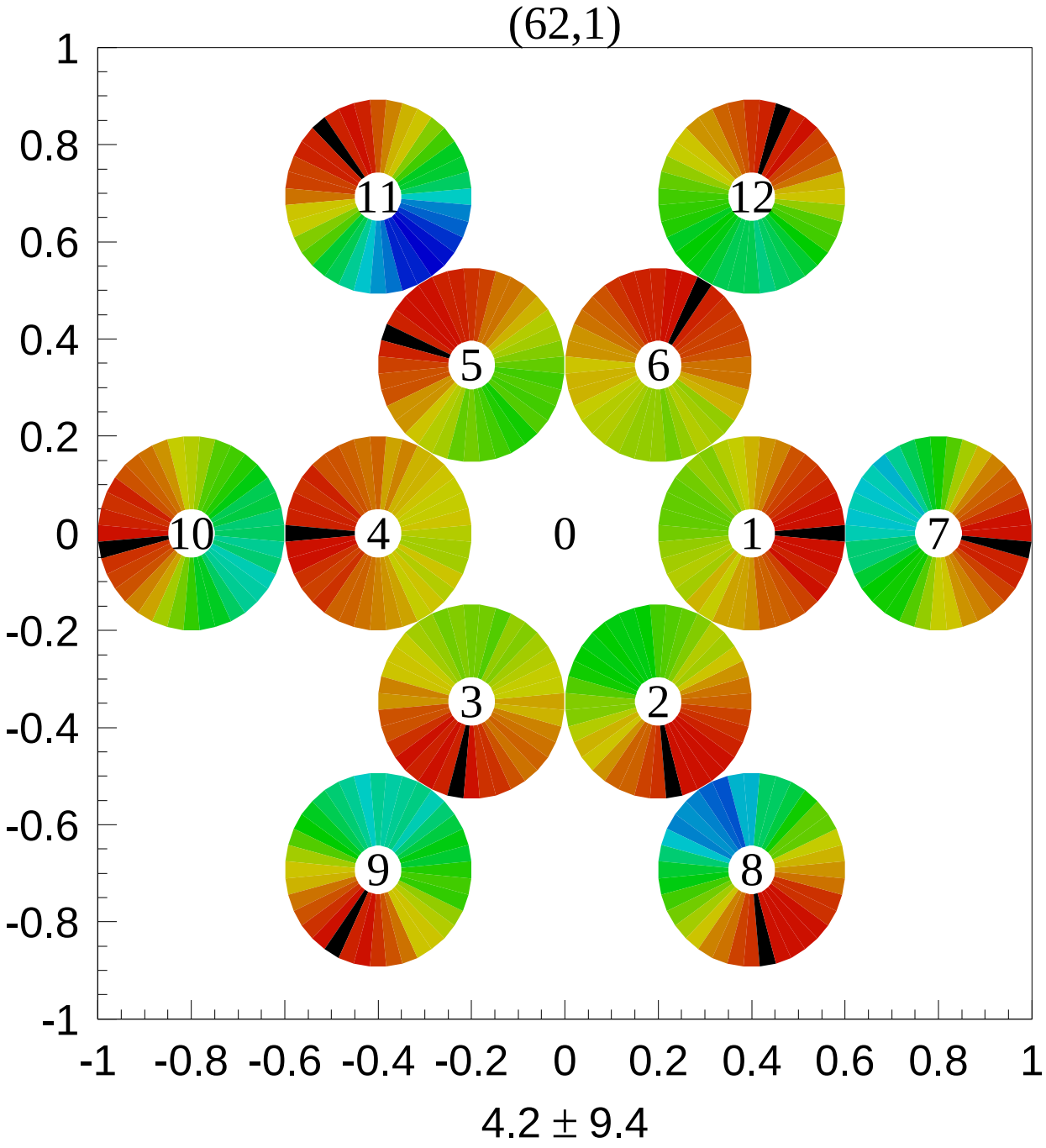

(61,27)
tilted LEDs
116 123 121 117 126 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 119 123 123 128 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

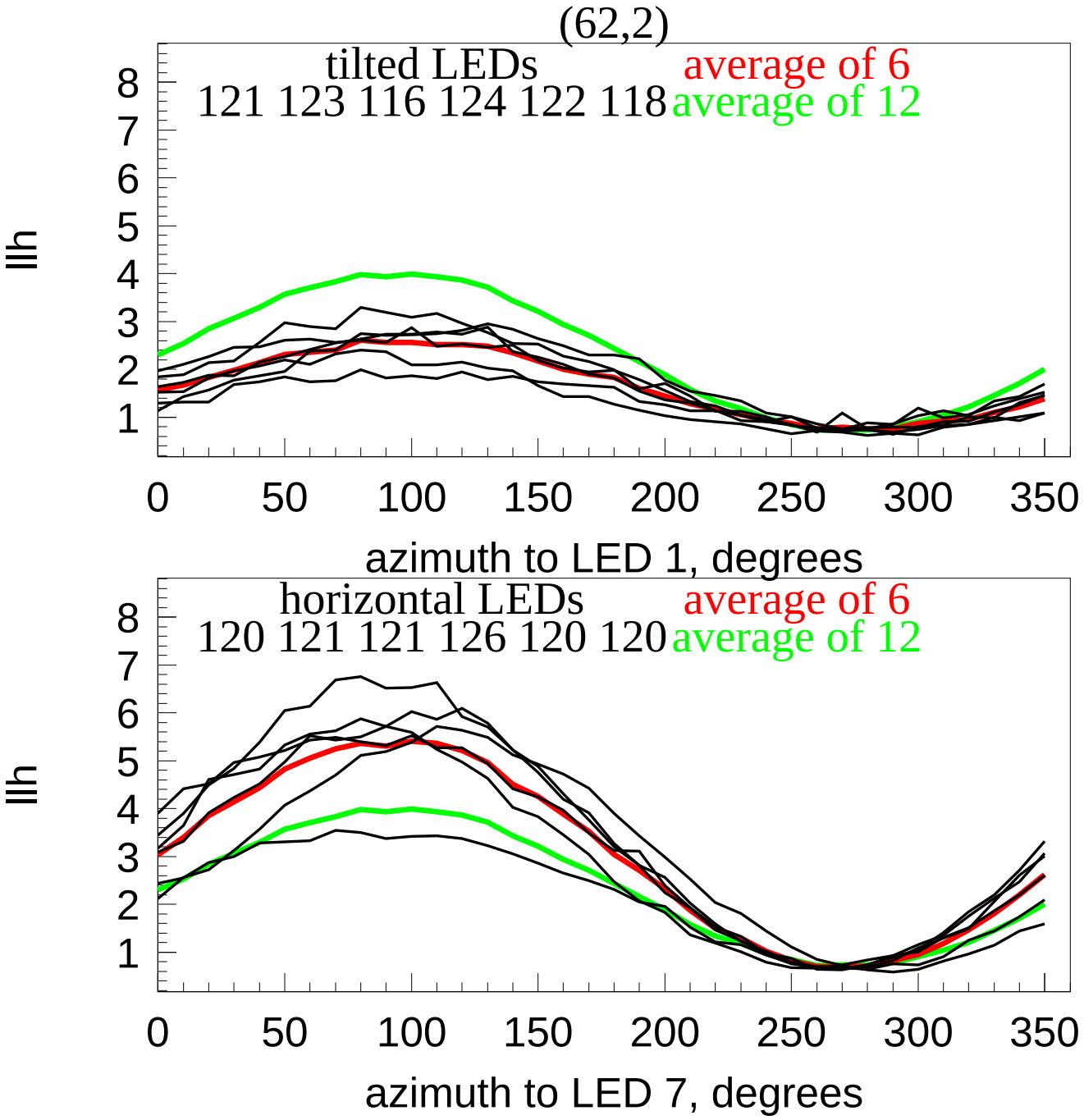

(61,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
115.2 ± 4.7

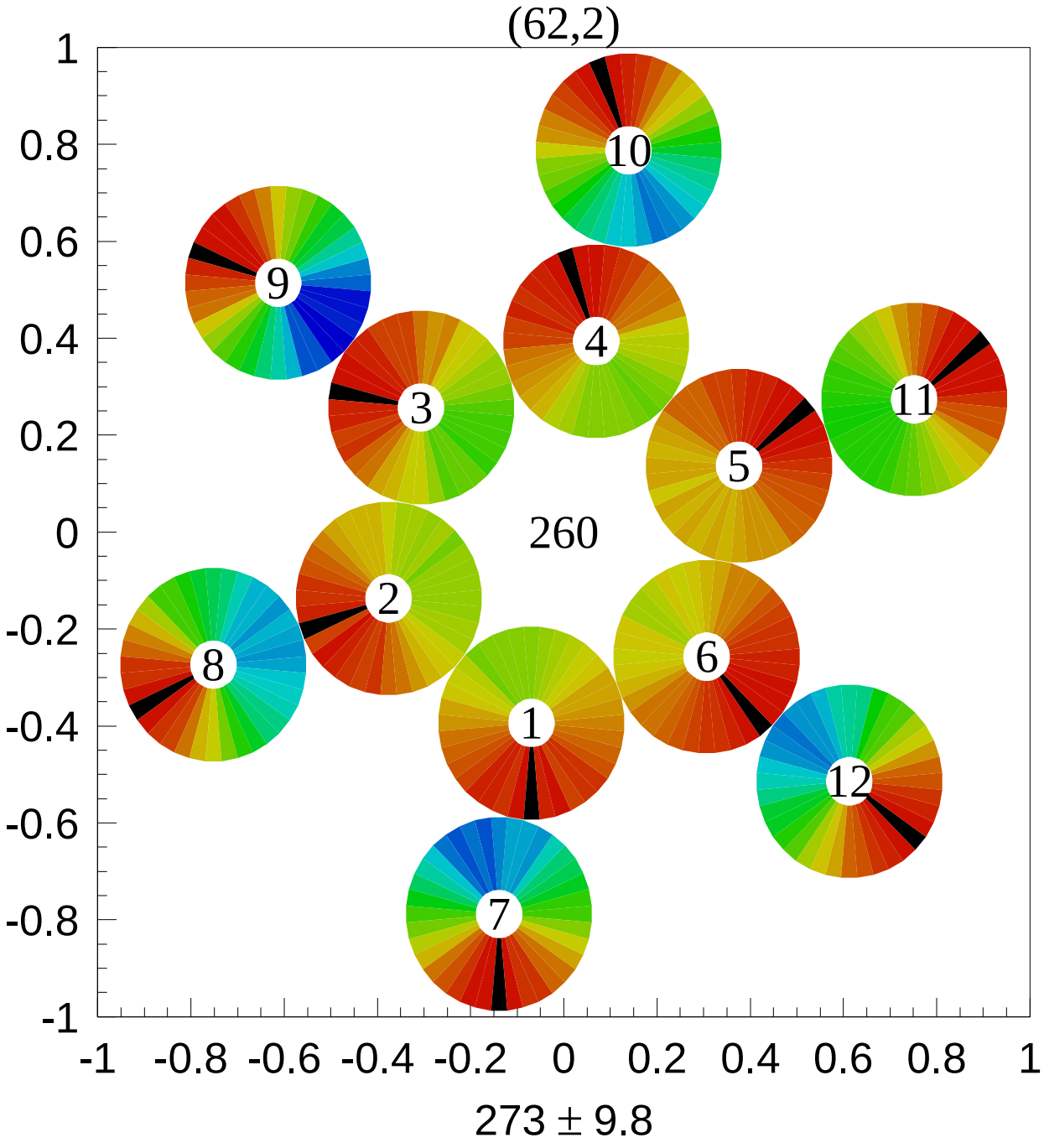

(61,28)
tilted LEDs
122 121 127 126 115 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 122 120 120 117 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

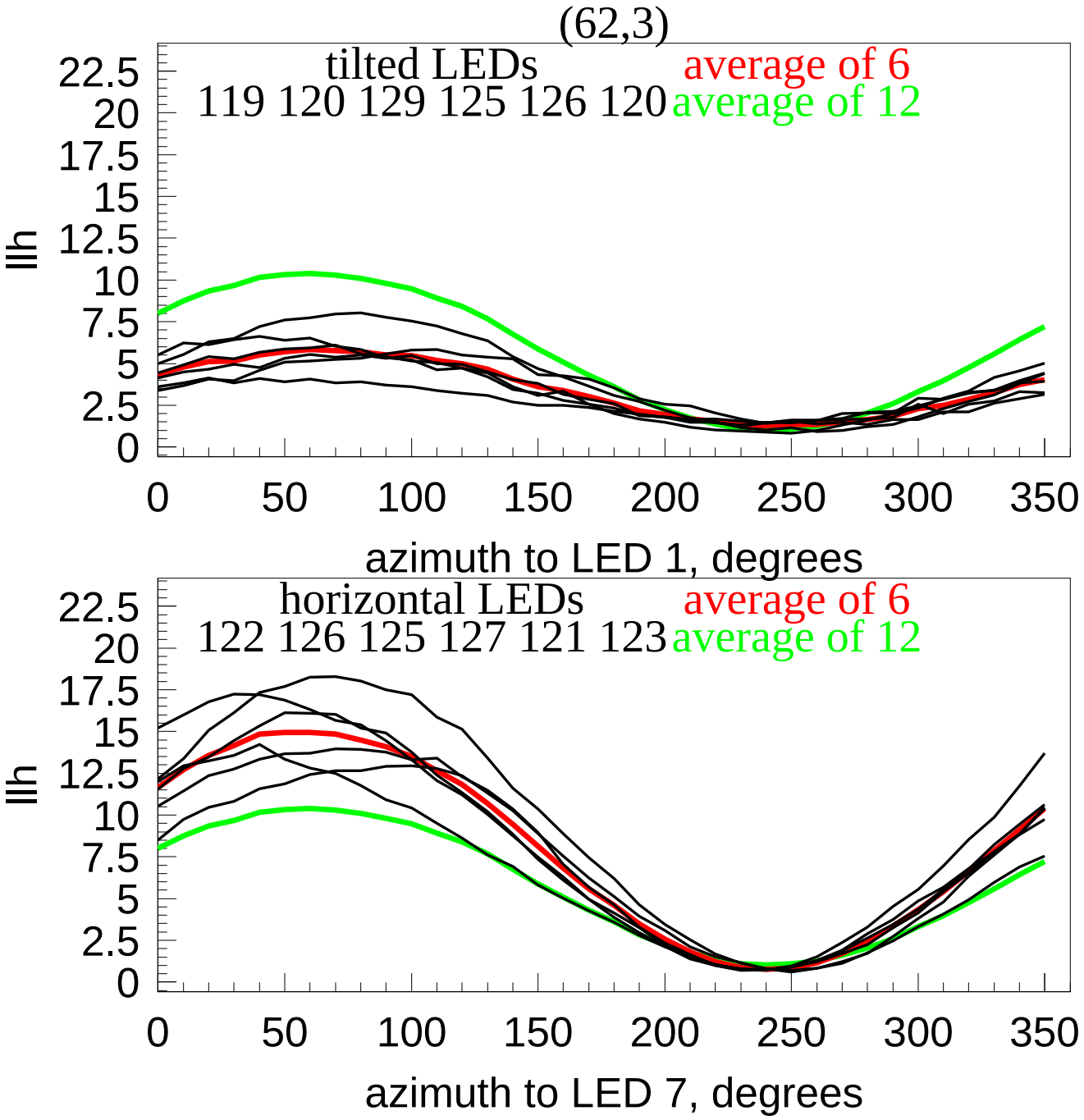

(61,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
91.2 ± 4.4

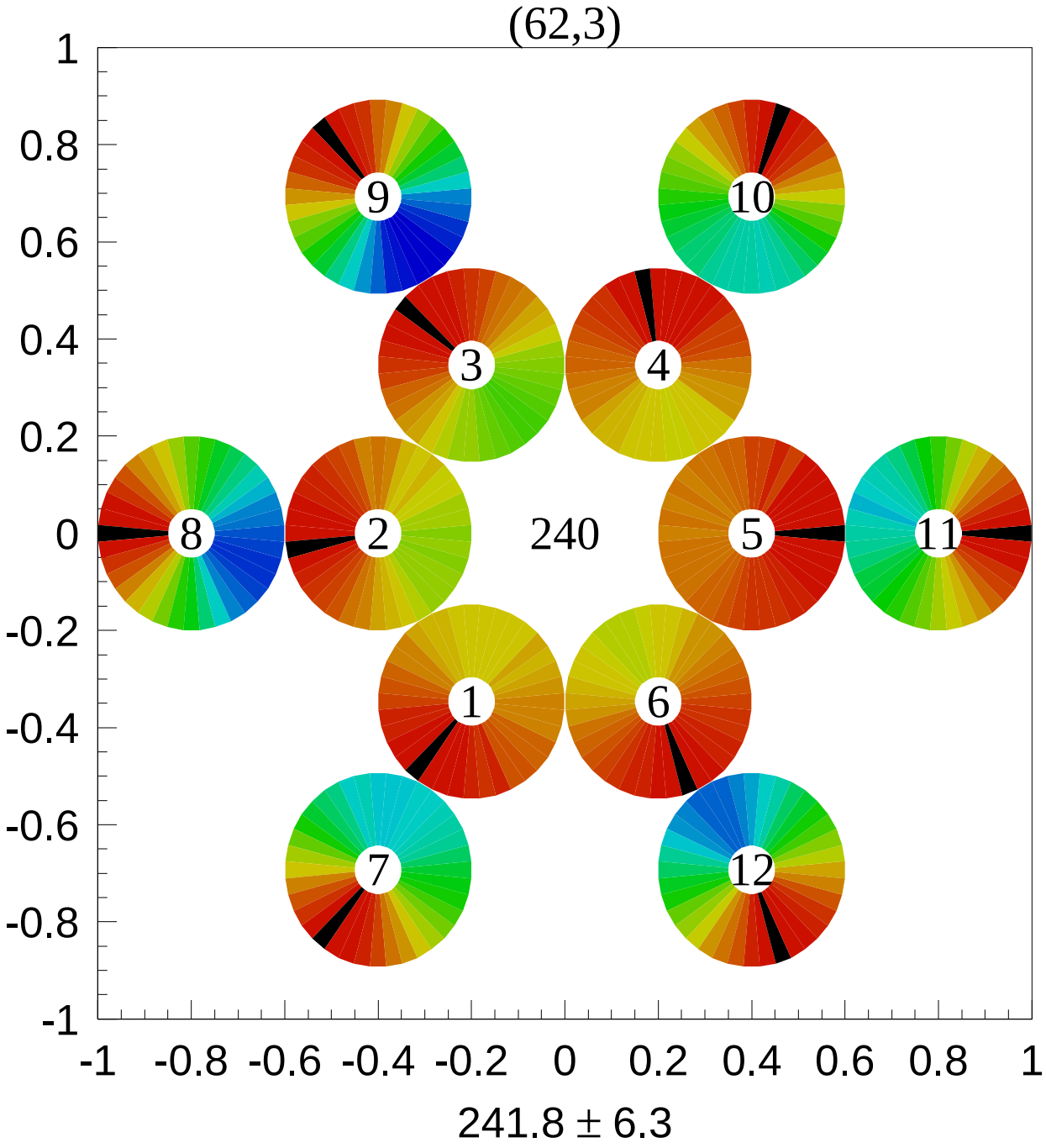

(62,1)
tilted LEDs
120 130 129 125 121 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 121 124 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

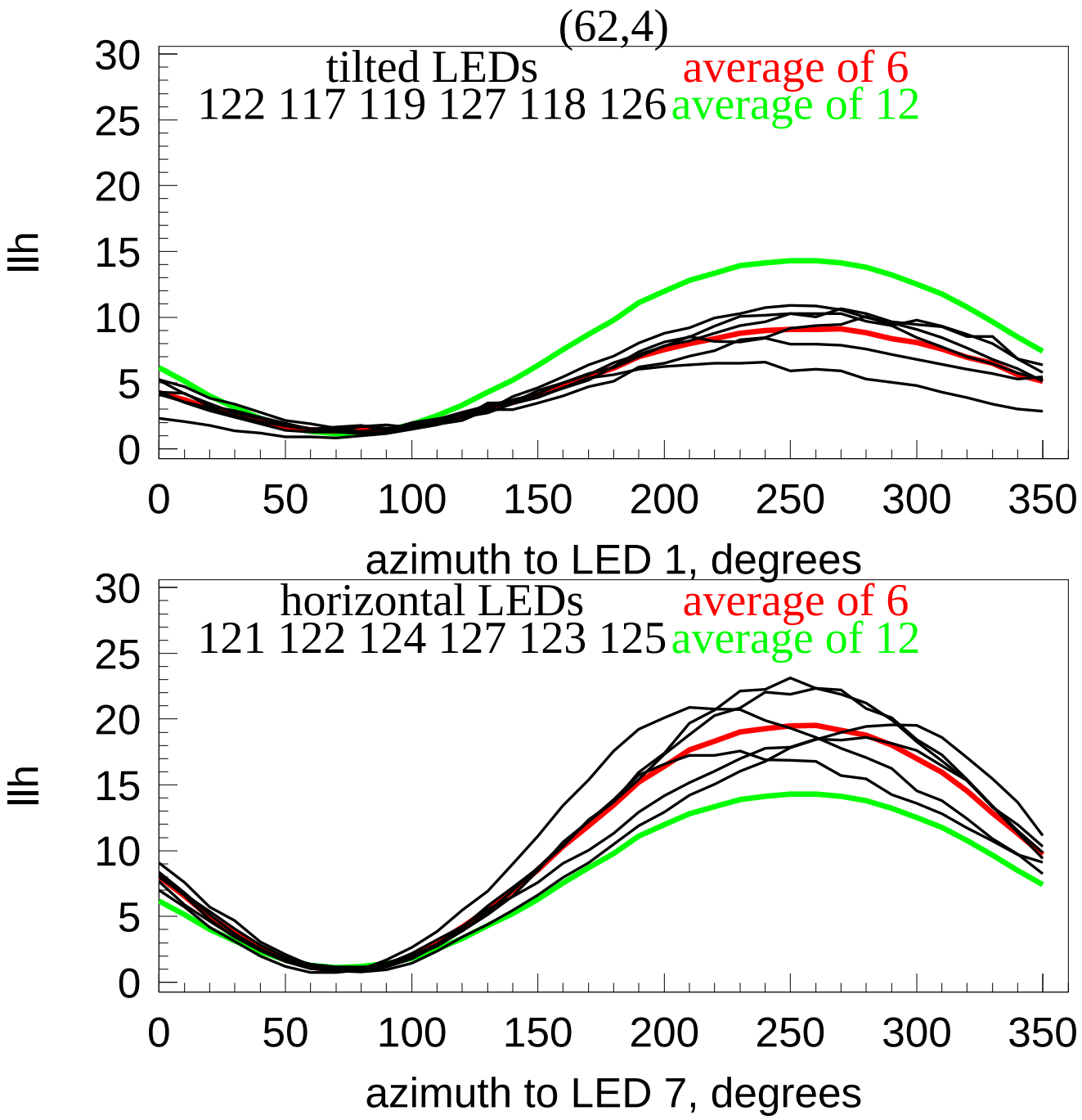

(62,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
4.2 ± 9.4

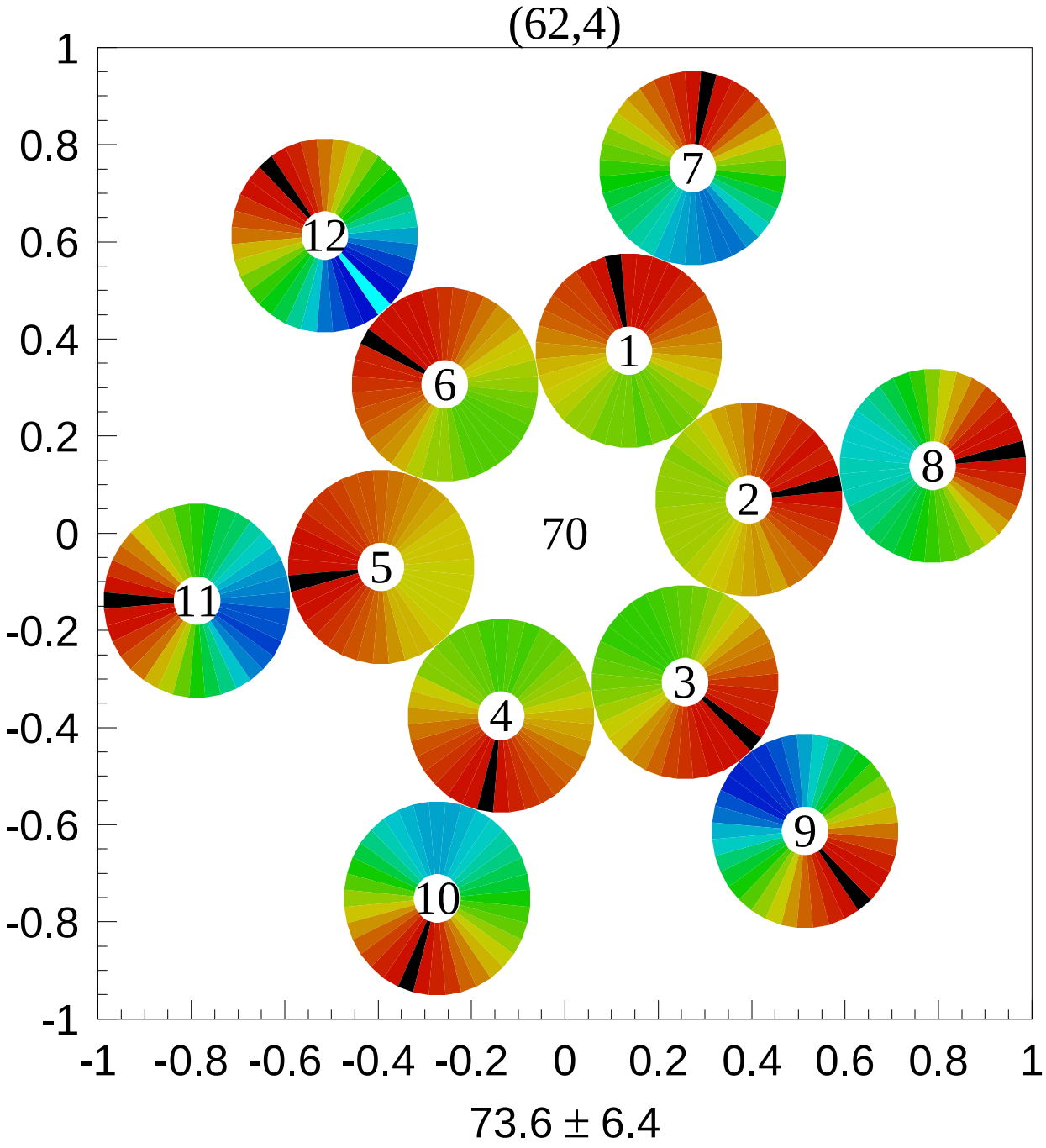

(62,2)
tilted LEDs
121 123 116 124 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 121 126 120 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

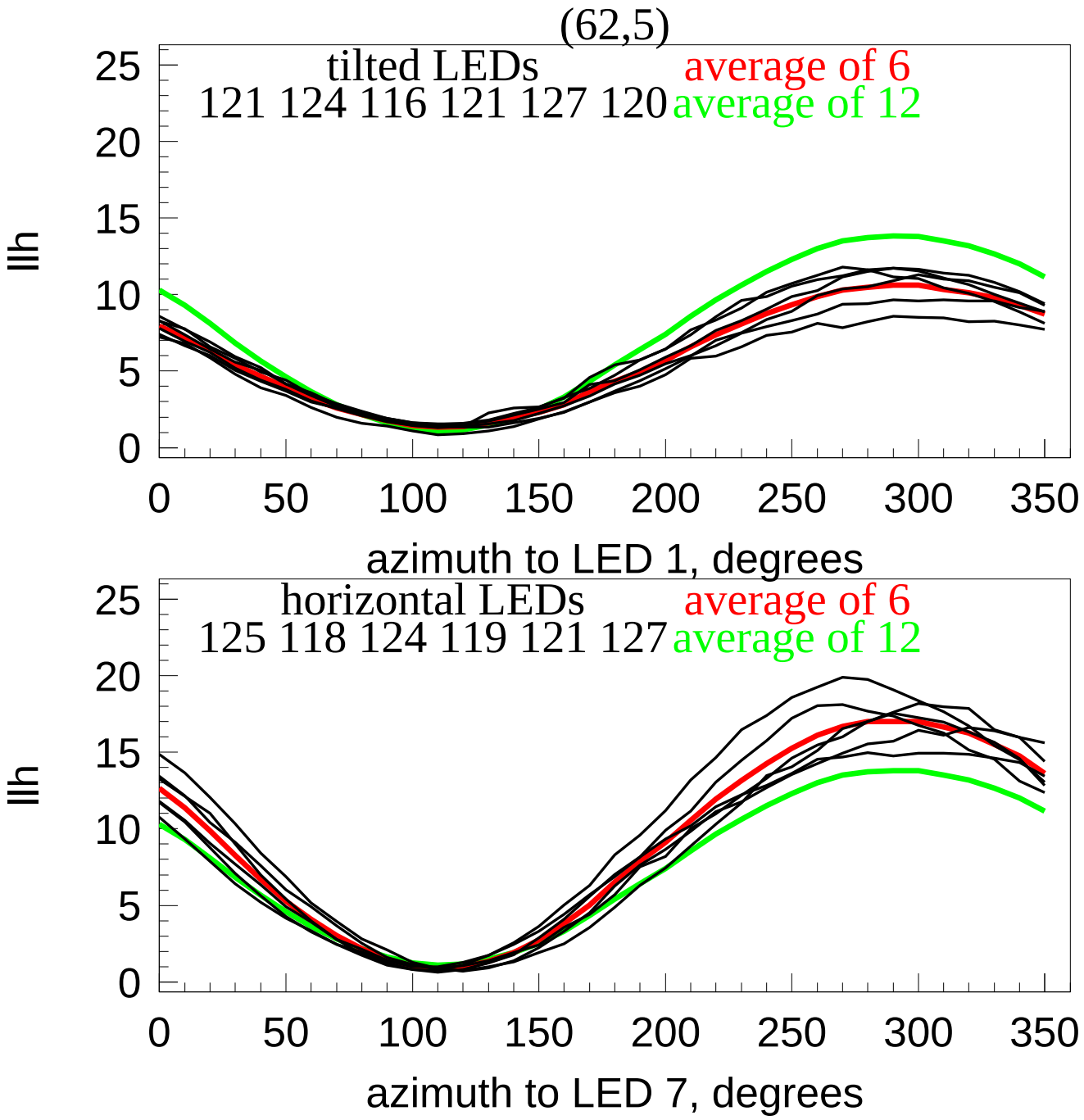

(62,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
273 ± 9.8

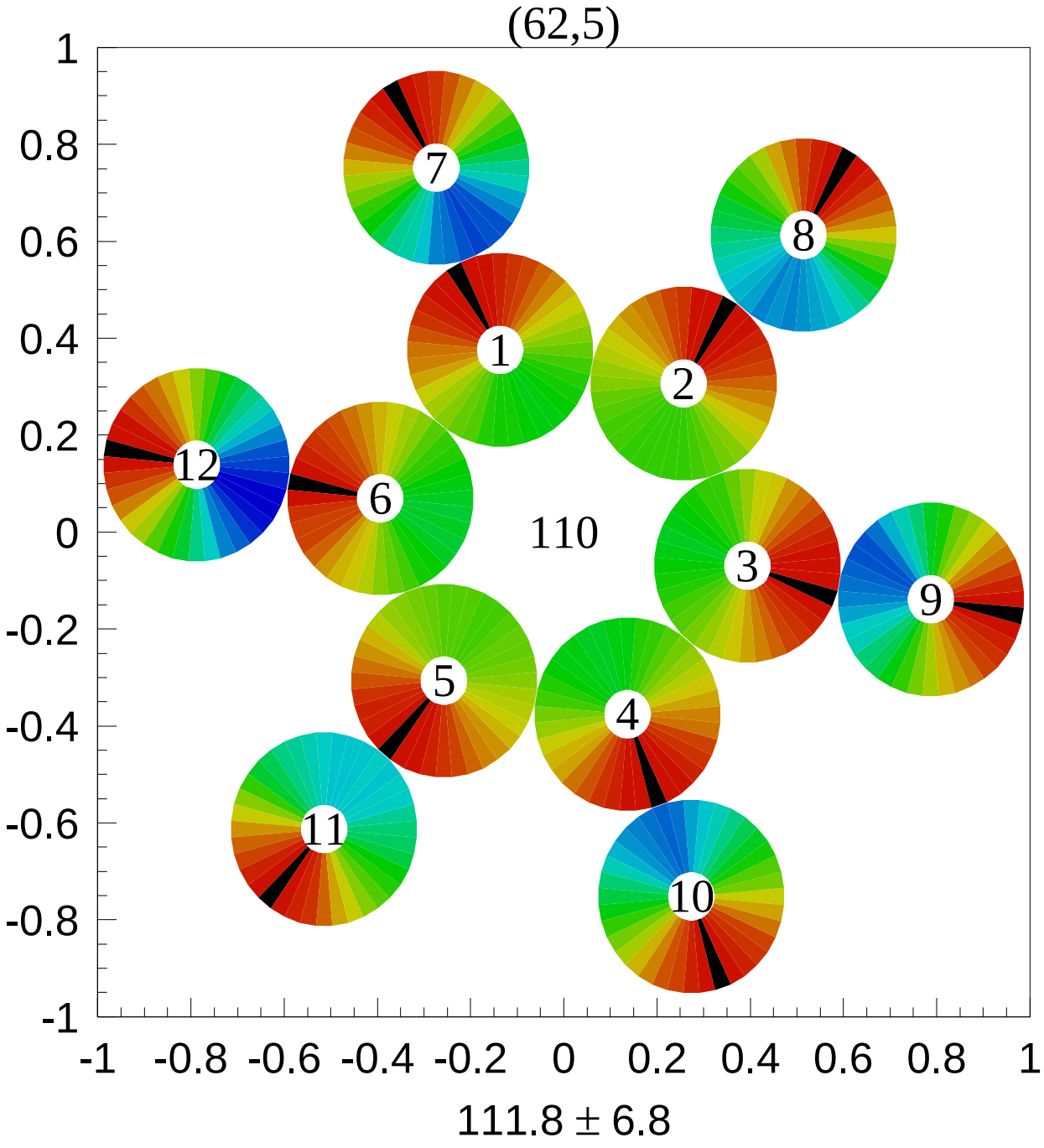

(62,3)
tilted LEDs
119 120 129 125 126 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 126 125 127 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

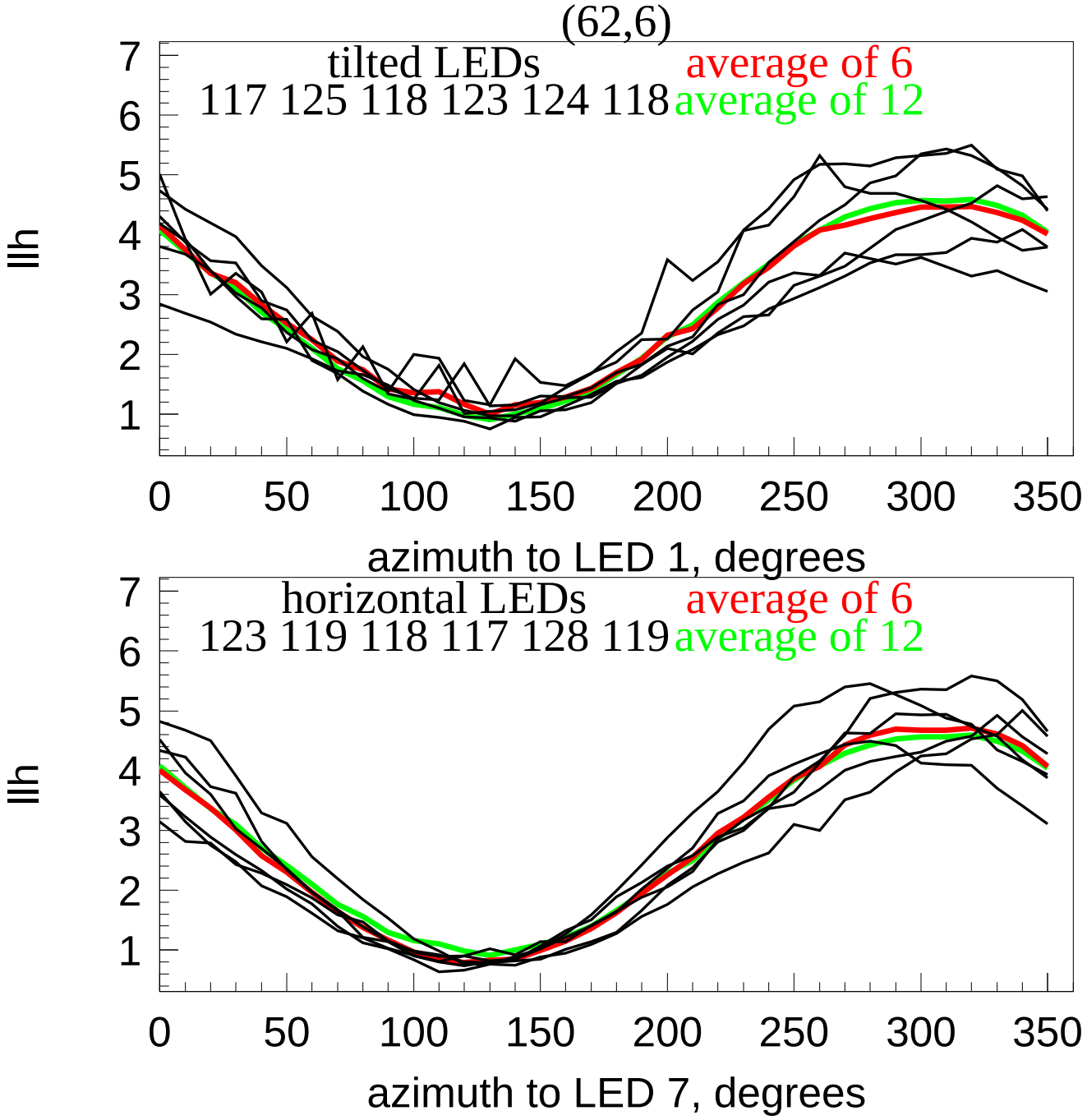

(62,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
241.8 ± 6.3

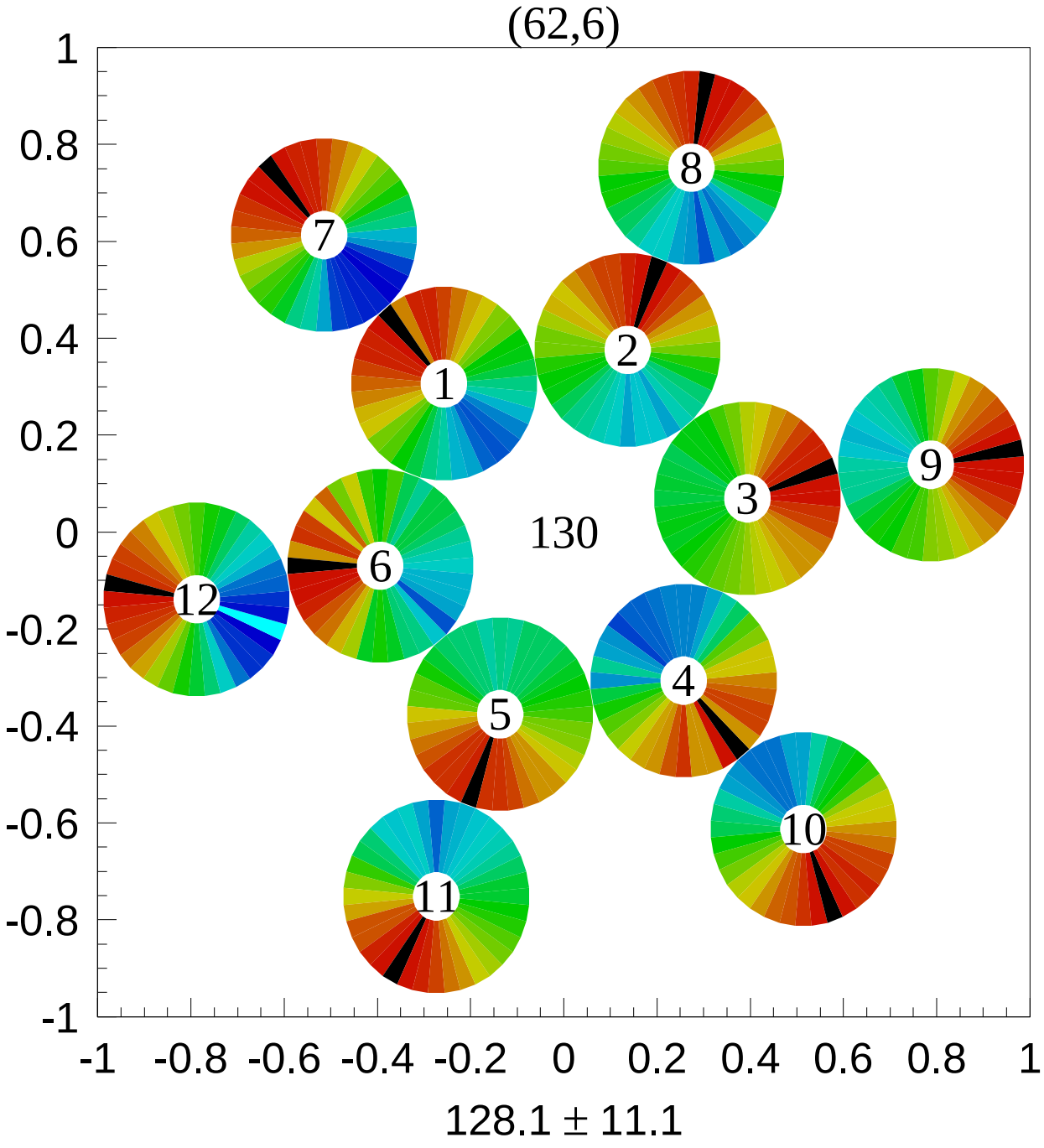

(62,4)
tilted LEDs
122 117 119 127 118 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 122 124 127 123 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

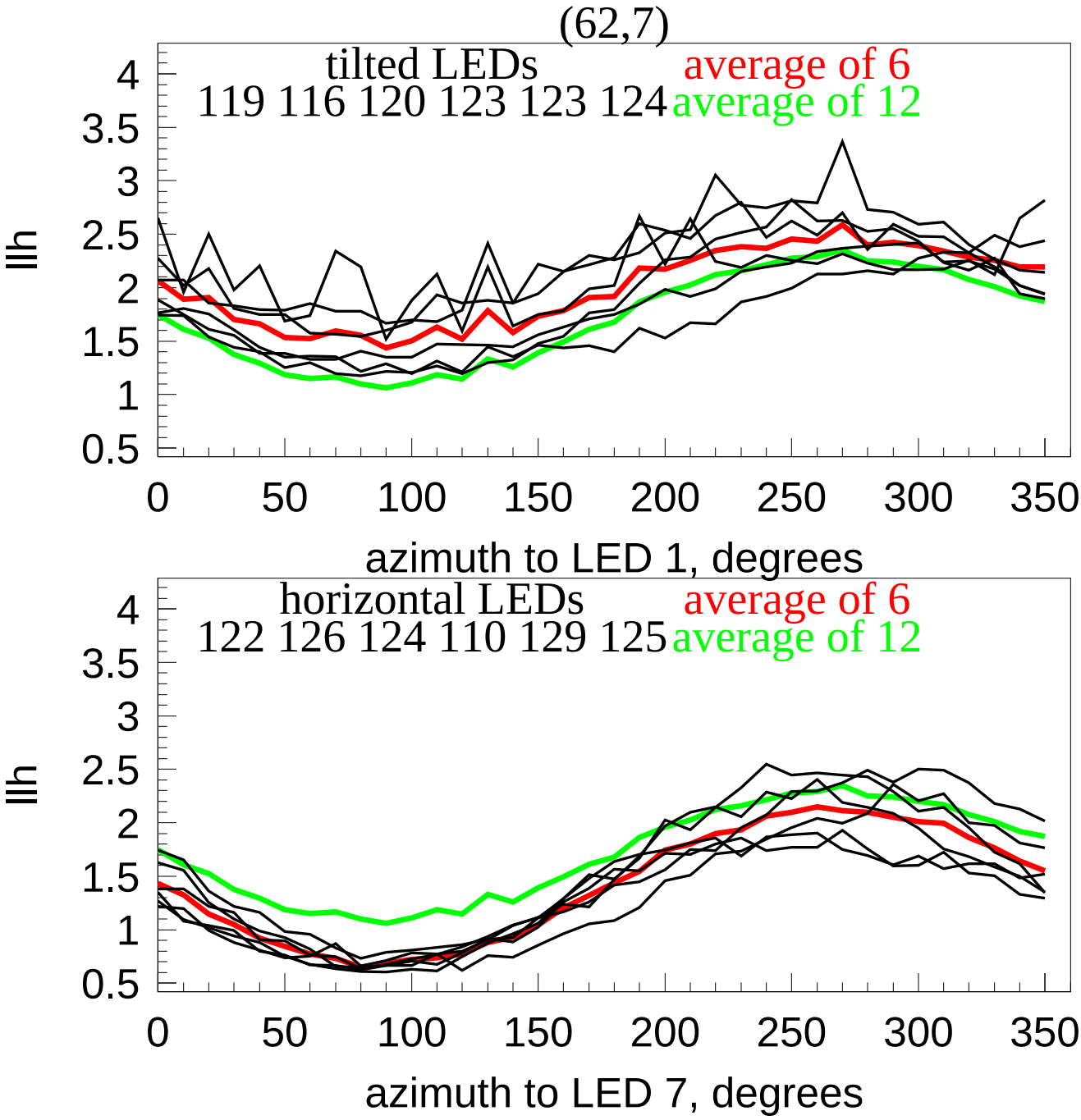

(62,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
73.6 ± 6.4

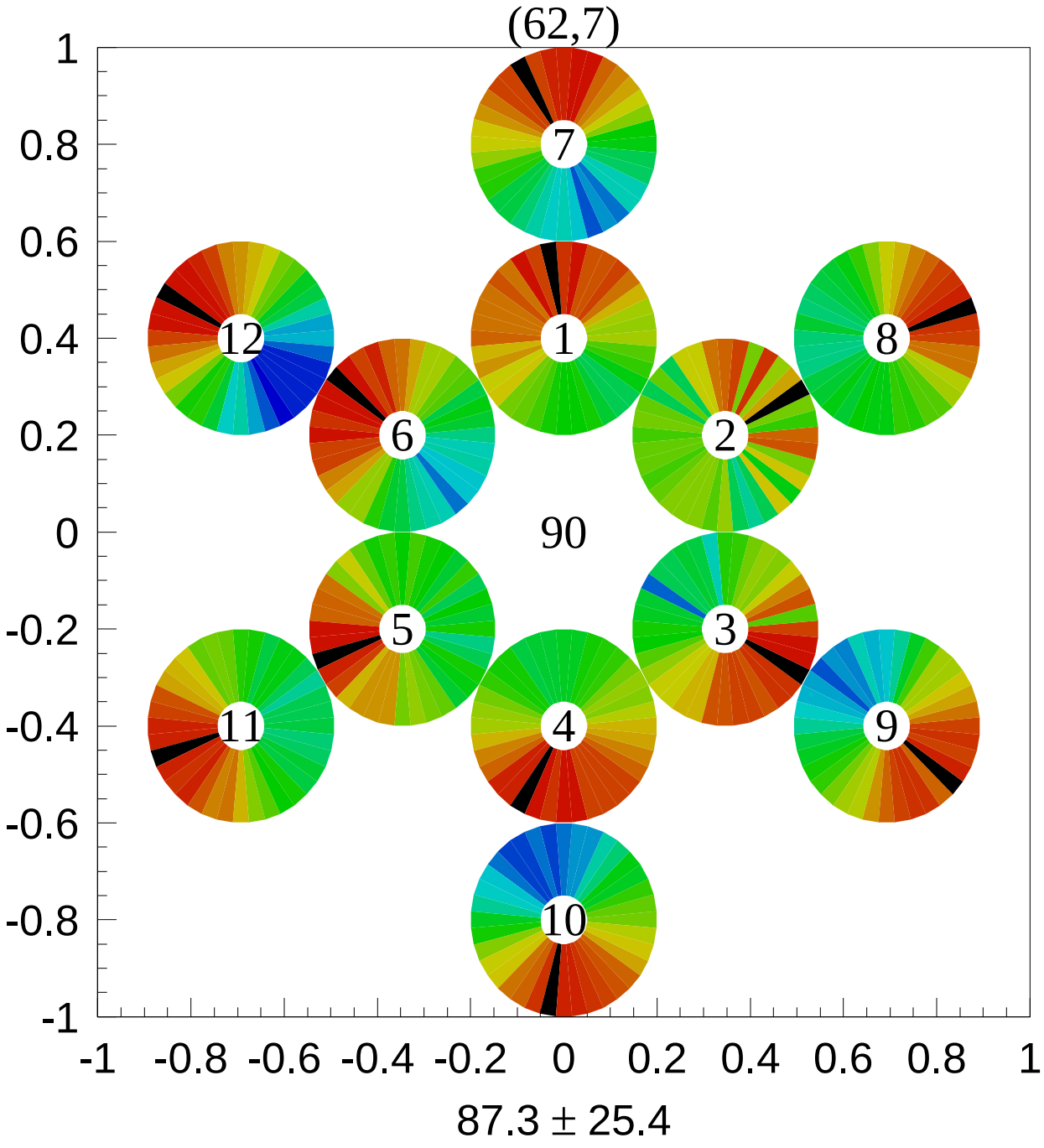

(62,5)
tilted LEDs
121 124 116 121 127 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 118 124 119 121 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

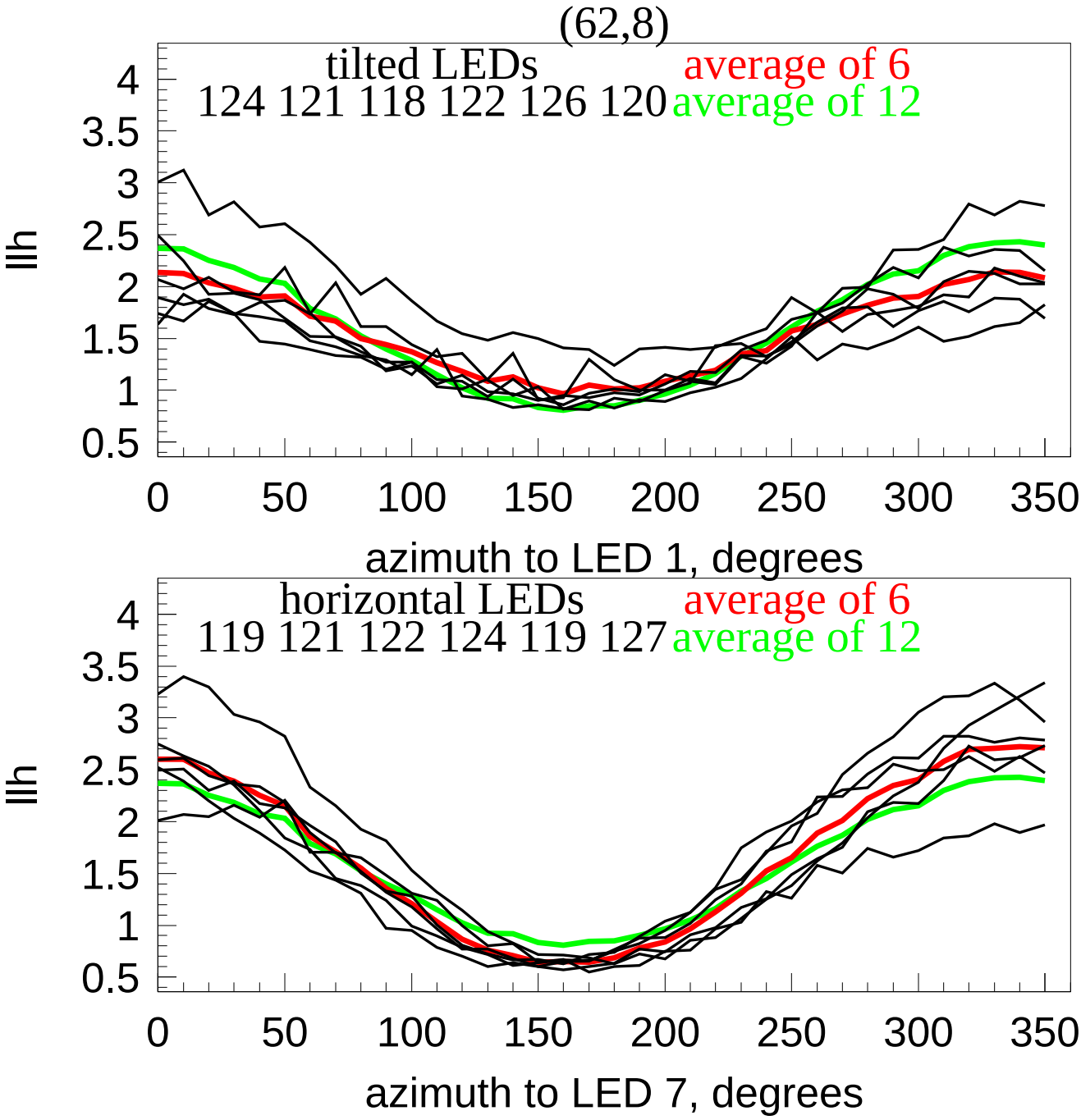

(62,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
111.8 ± 6.8

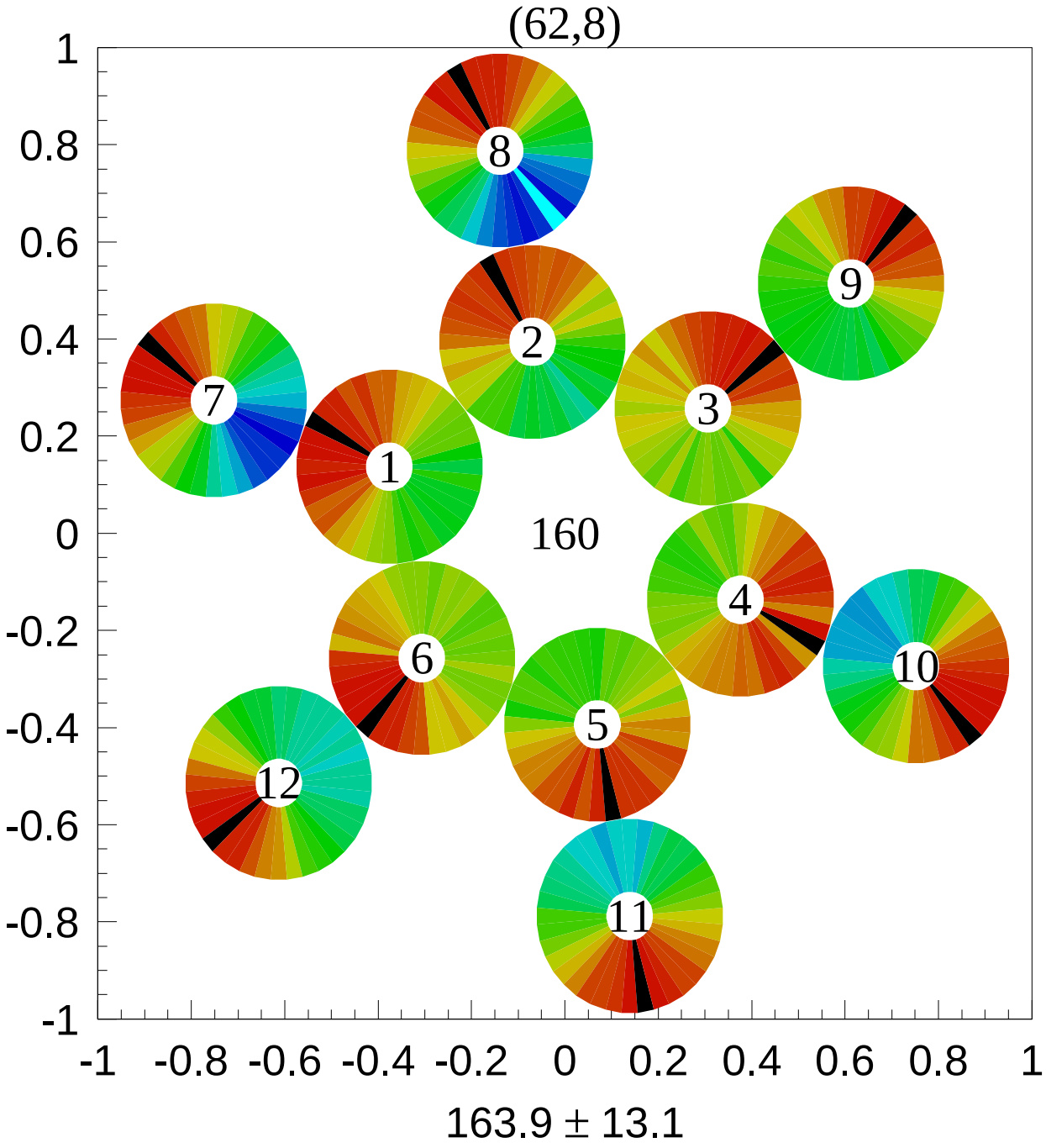

(62,6)
tilted LEDs
117 125 118 123 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 118 117 128 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

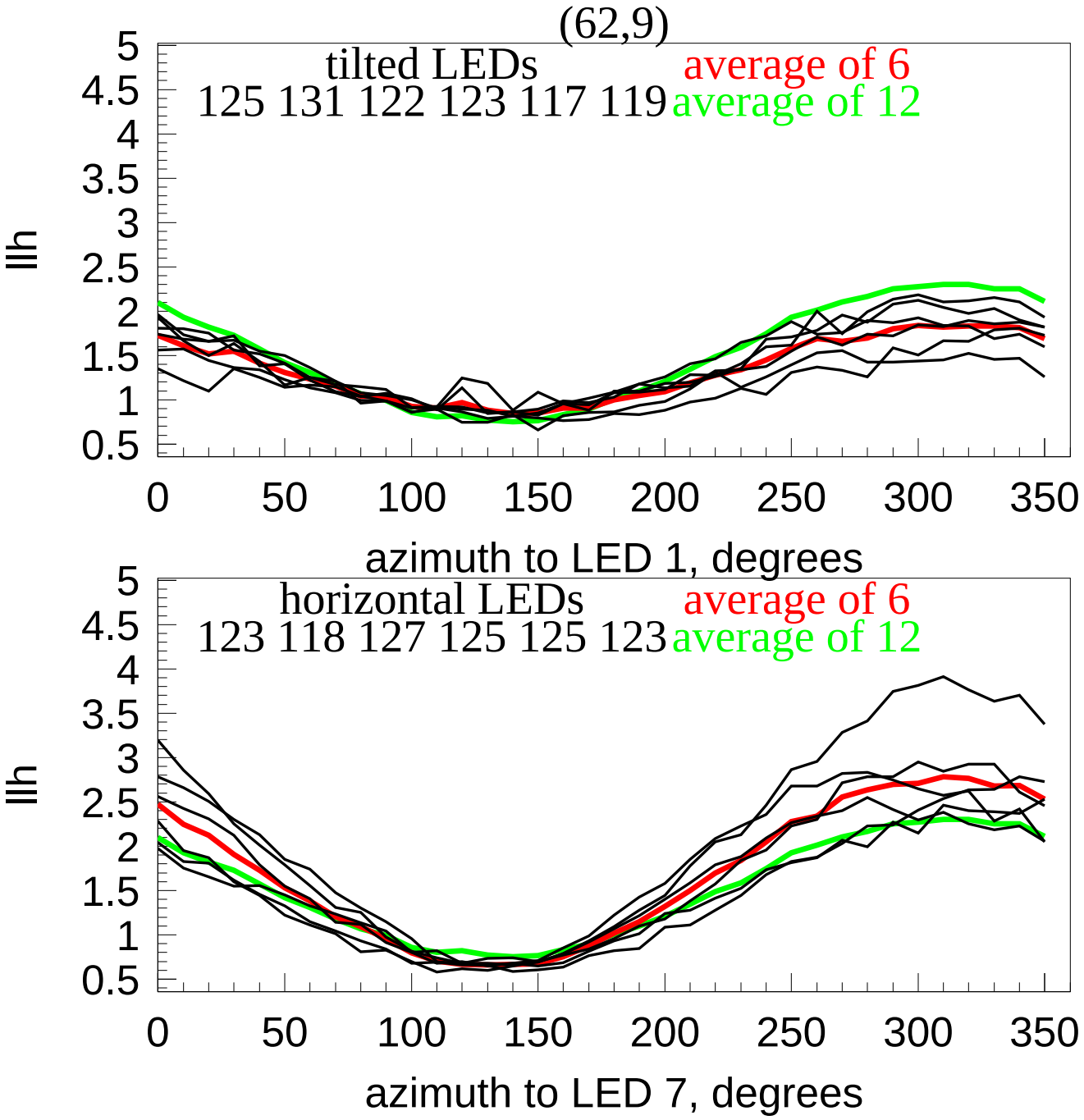

(62,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
128.1 ± 11.1
130
1
2
3
4
5
6
7
8
9
10
11
12

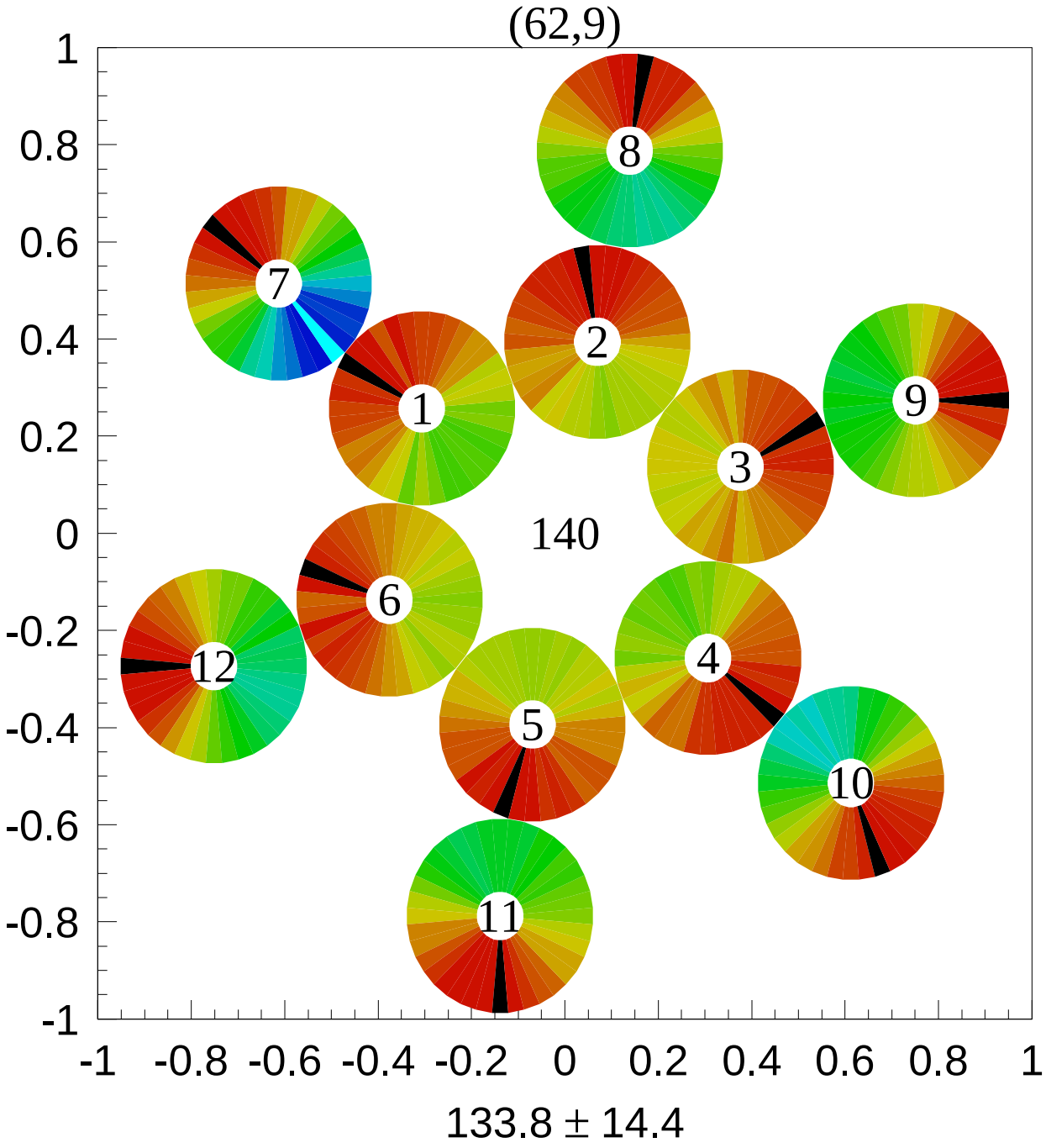

(62,7)
tilted LEDs
119 116 120 123 123 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 126 124 110 129 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

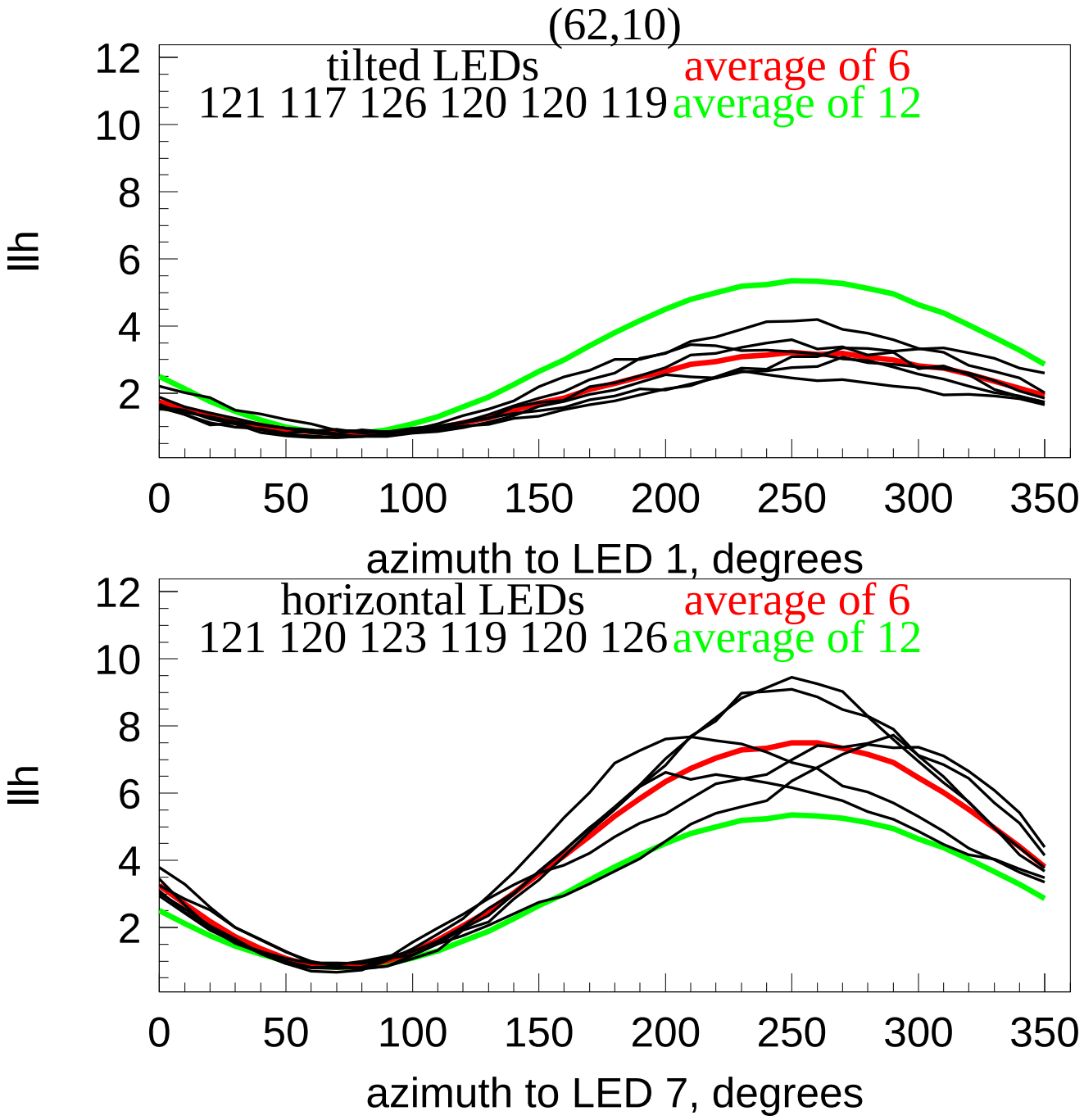

(62,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
87.3 ± 25.4

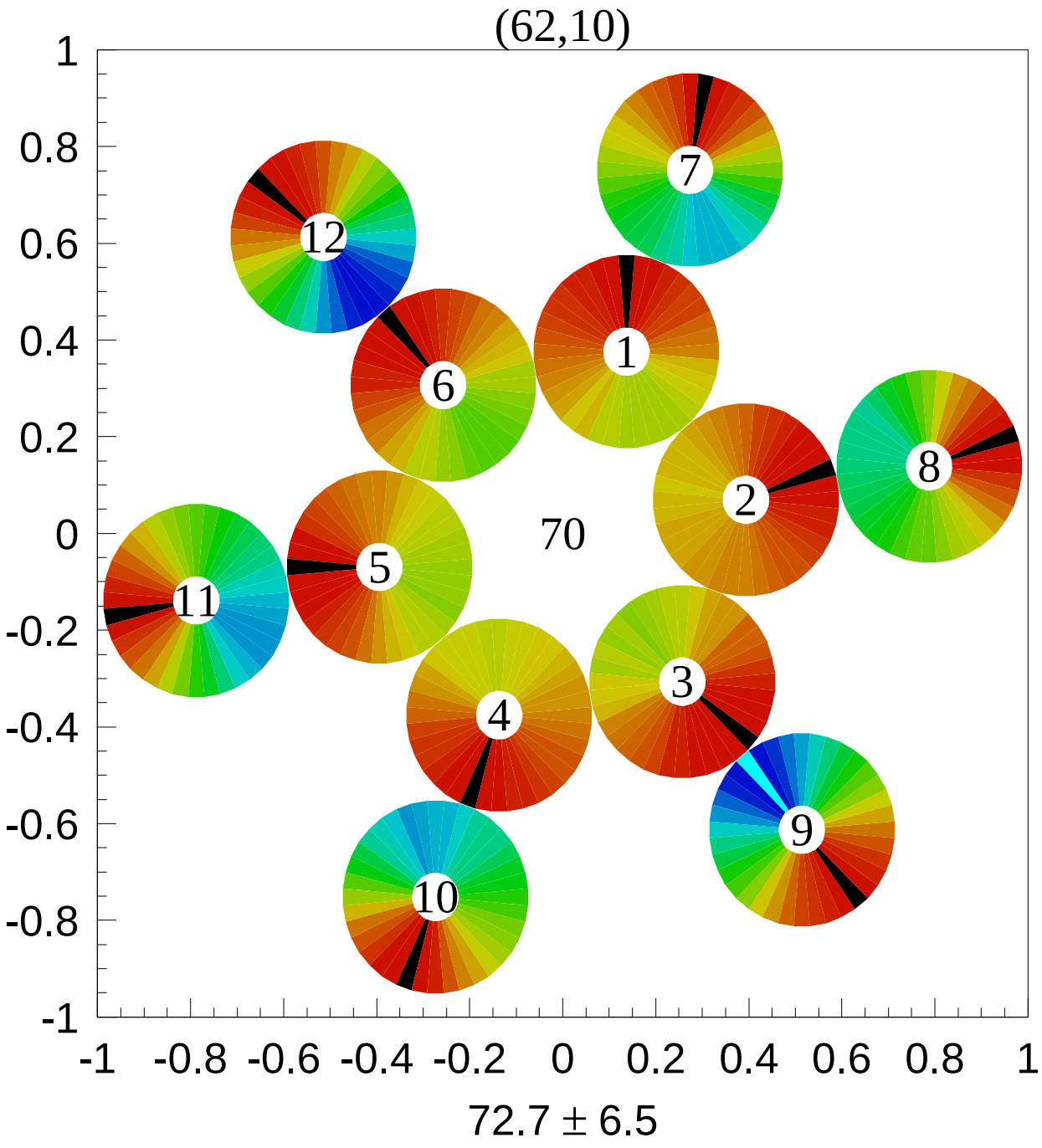

(62,8)
tilted LEDs
124 121 118 122 126 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 121 122 124 119 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

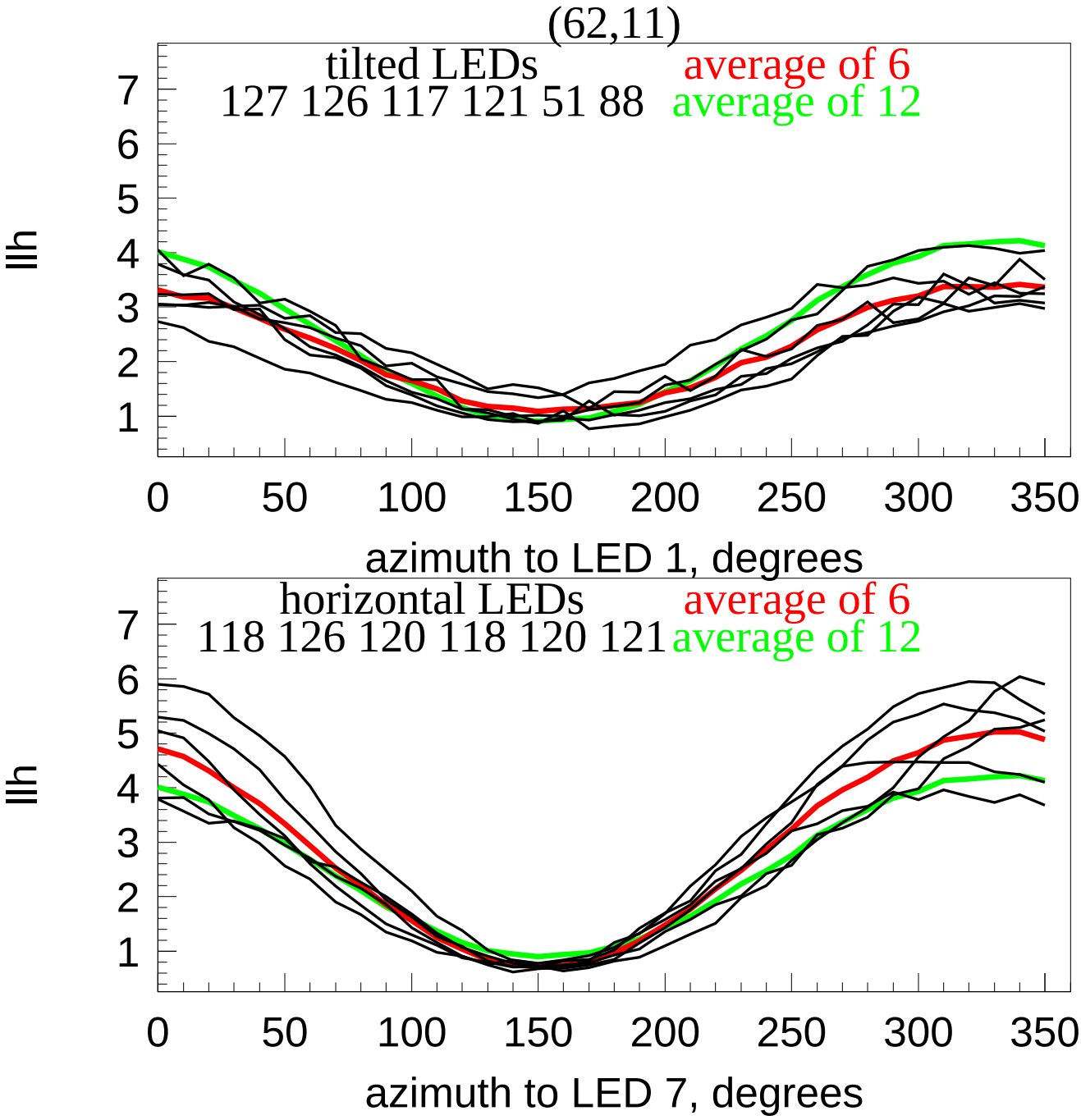

(62,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
163.9 ± 13.1

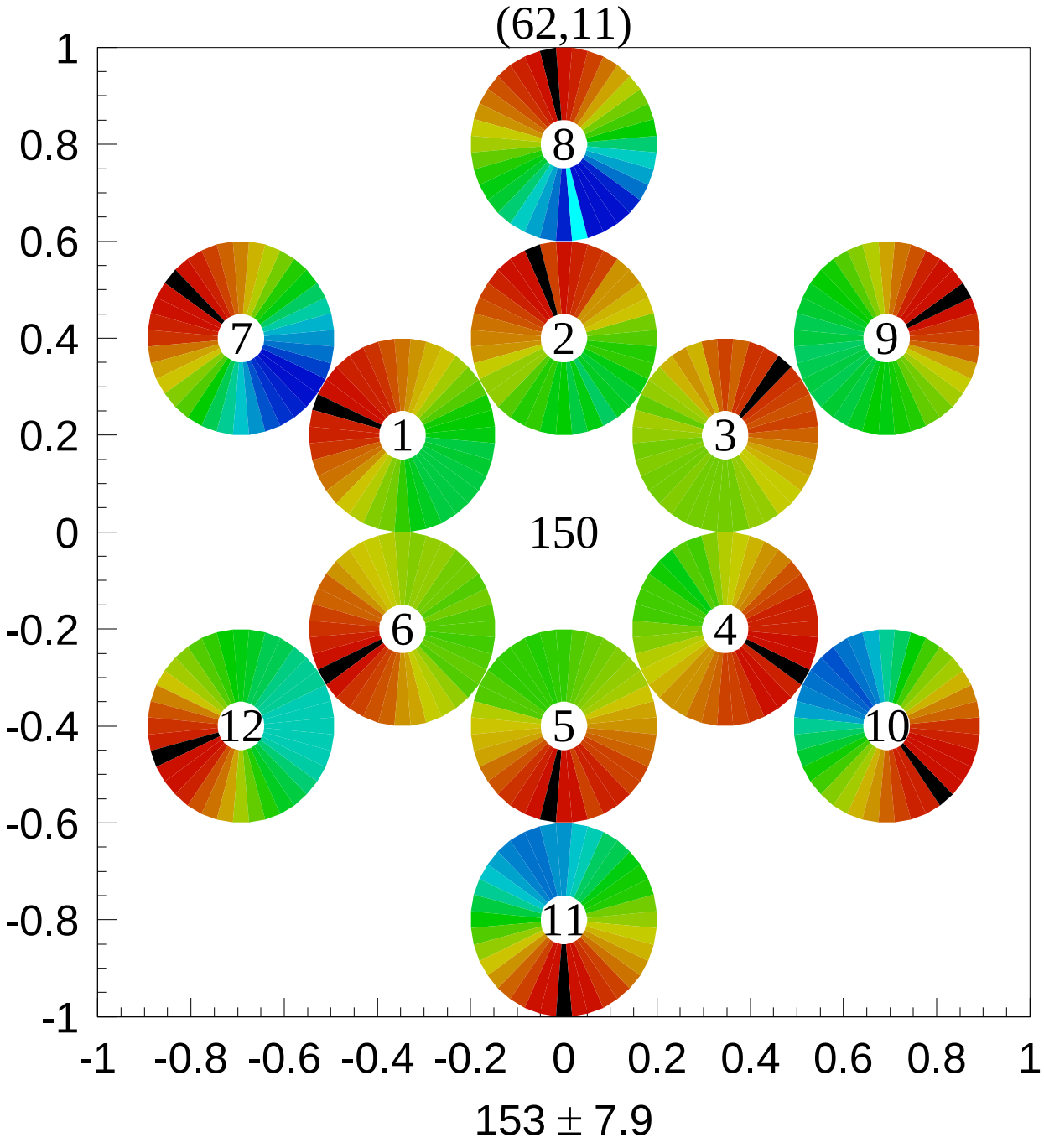

(62,9)
tilted LEDs
125 131 122 123 117 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 118 127 125 125 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

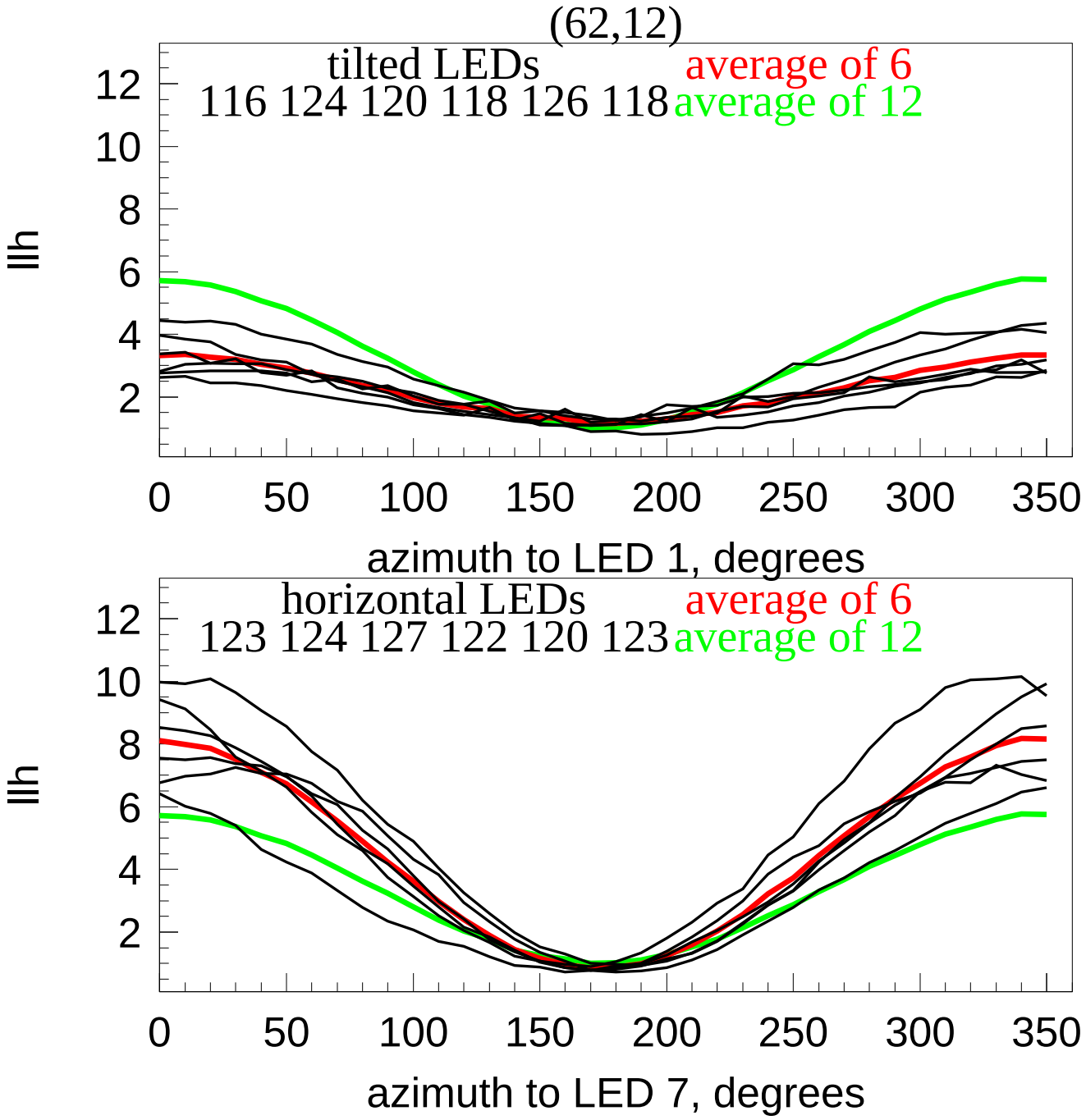

(62,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
133.8 ± 14.4
140
1
2
3
4
5
6
7
8
9
10
11
12

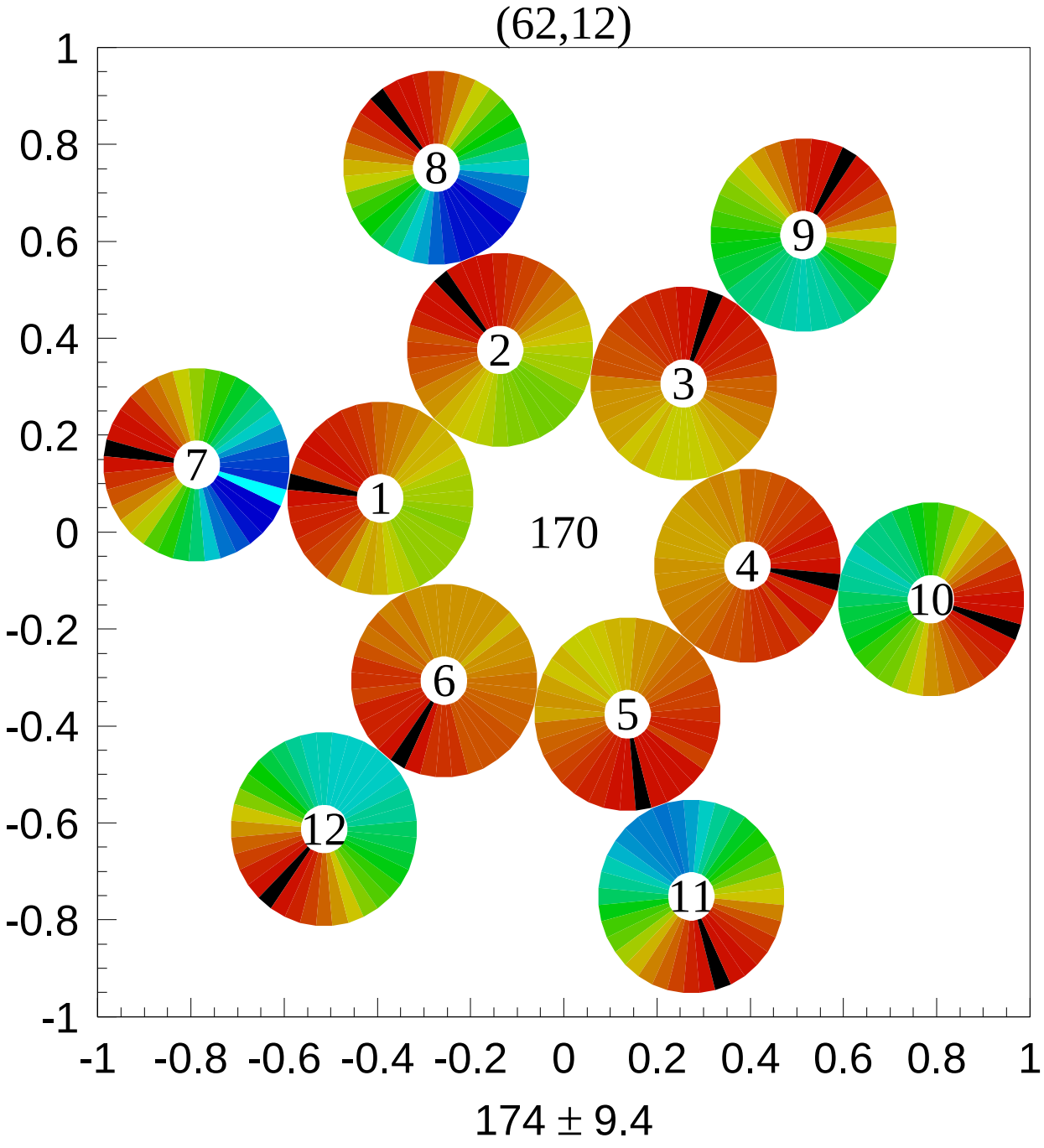

(62,10)
tilted LEDs
121 117 126 120 120 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 120 123 119 120 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

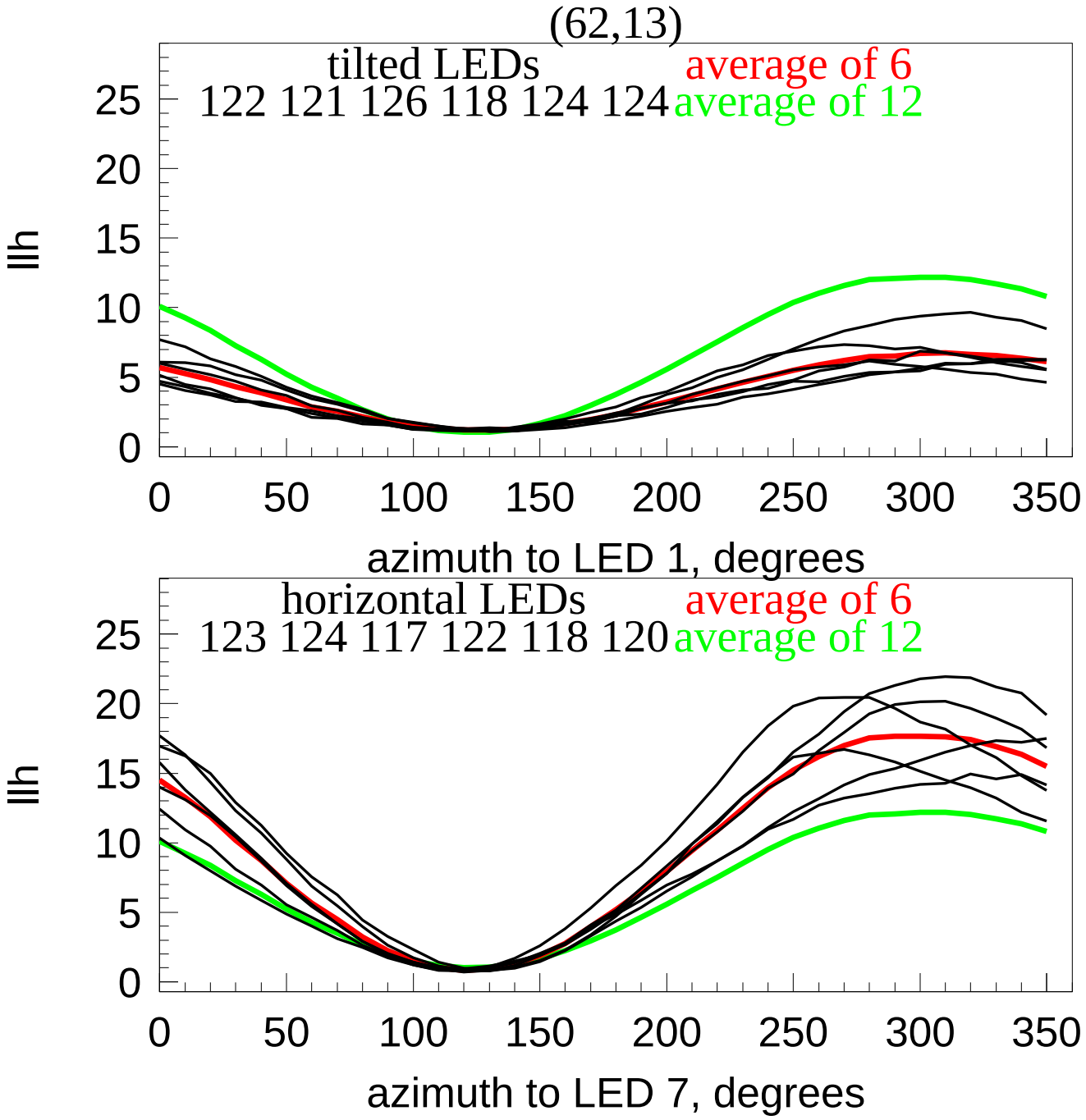

(62,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
70
5
11
4
3
9
10
72.7 ± 6.5

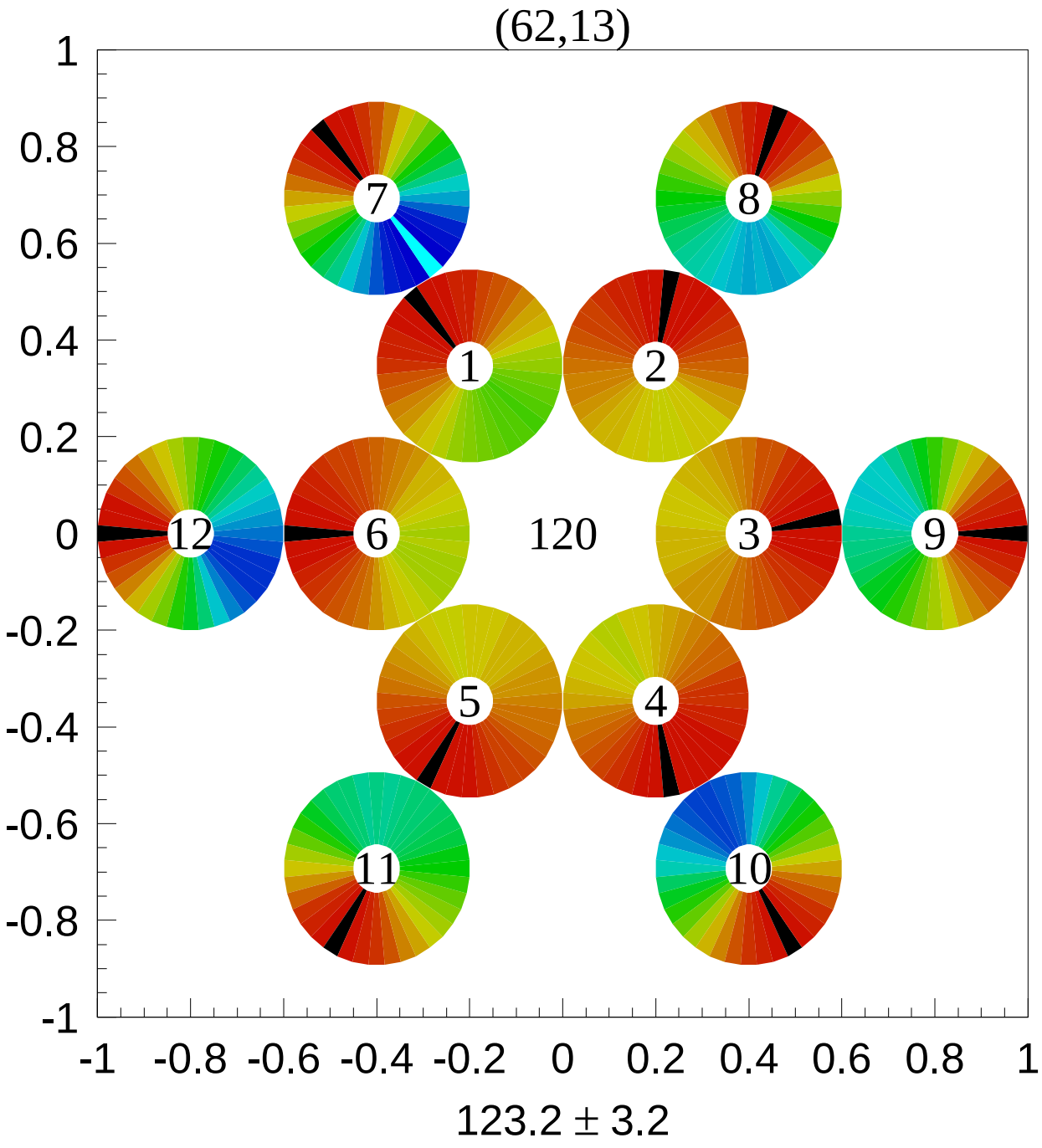

(62,11)
tilted LEDs
127 126 117 121 51 88
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 126 120 118 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

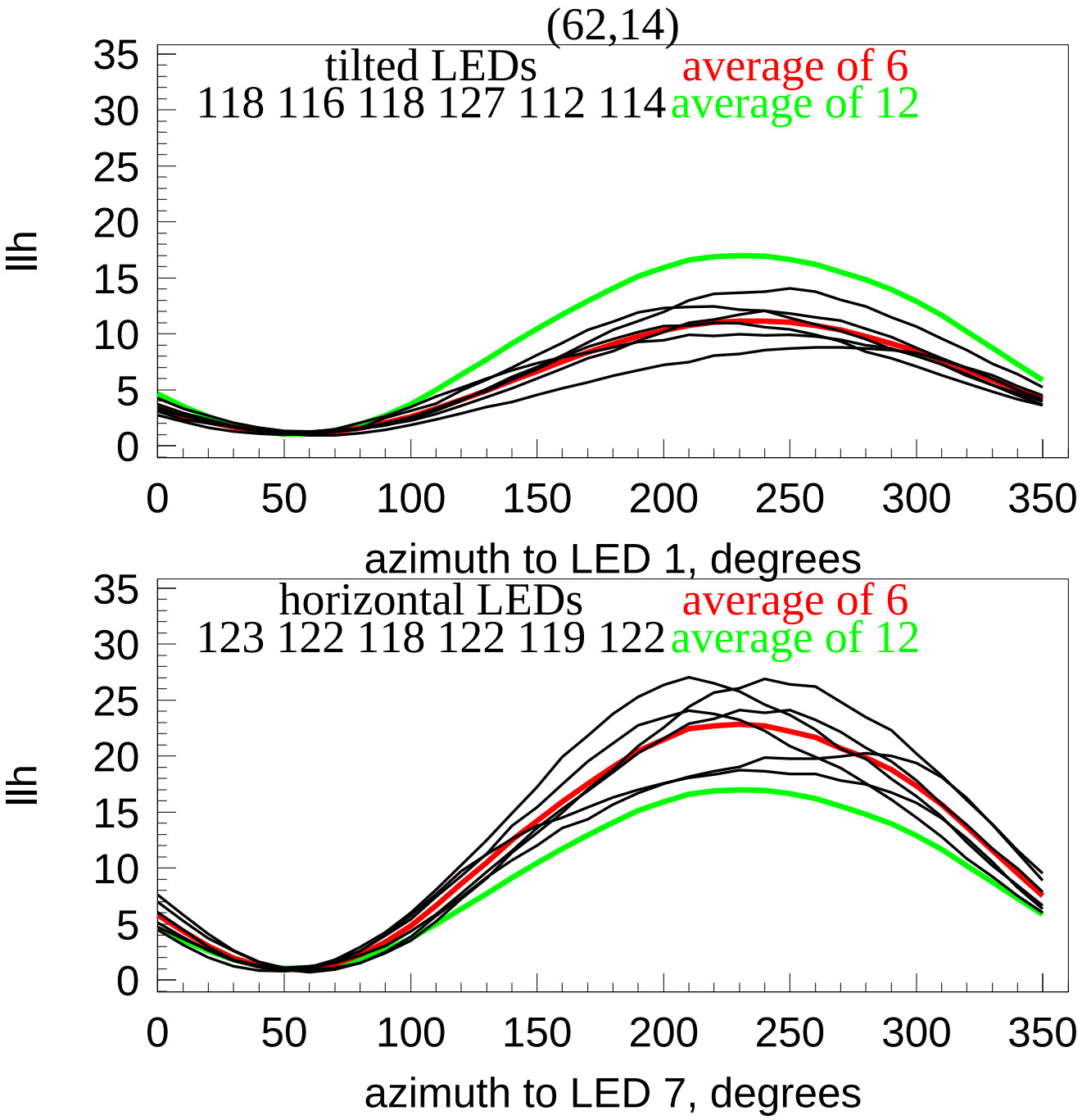

(62,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
153 ± 7.9

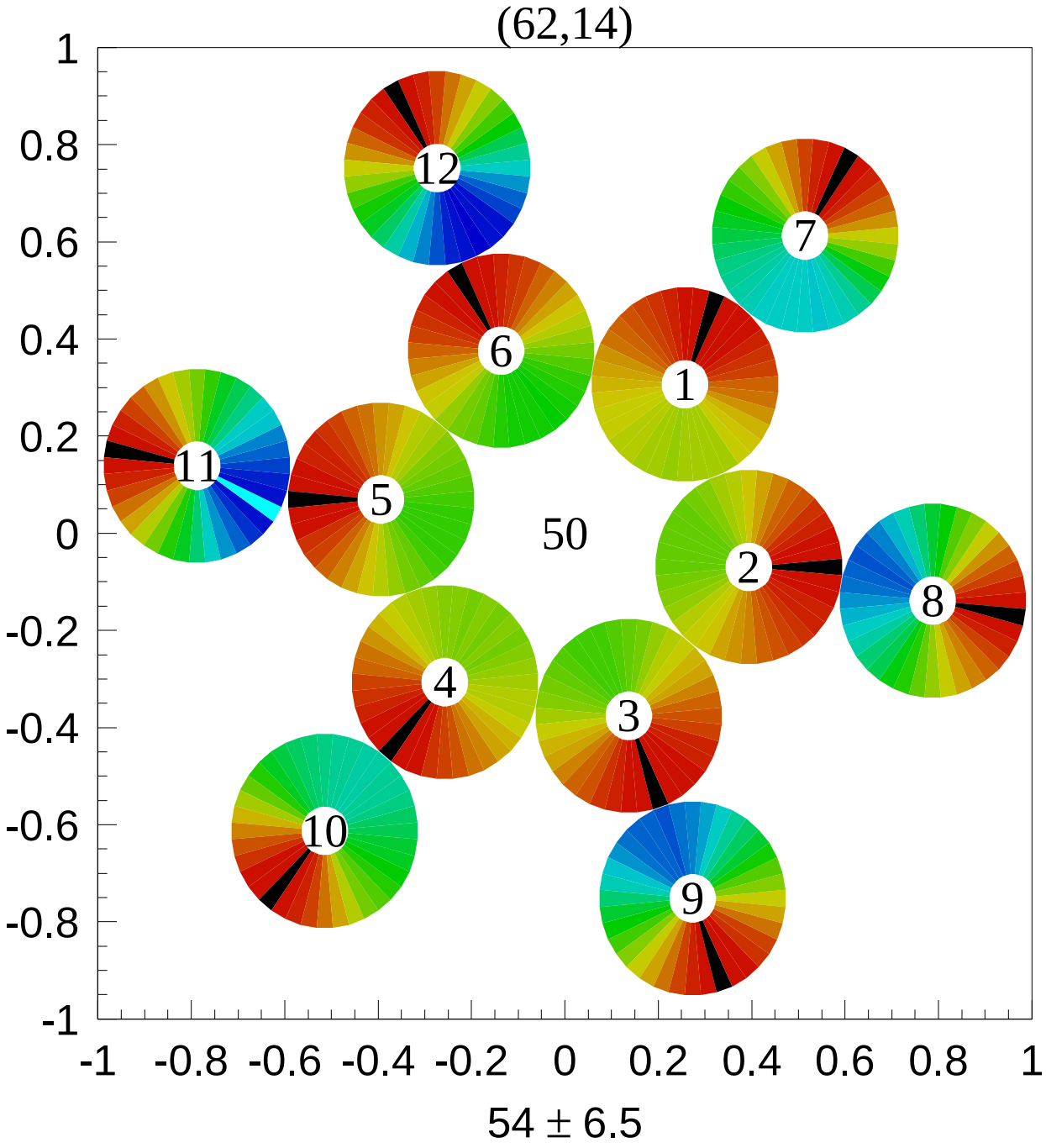

(62,12)
tilted LEDs
116 124 120 118 126 118
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 124 127 122 120 123
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

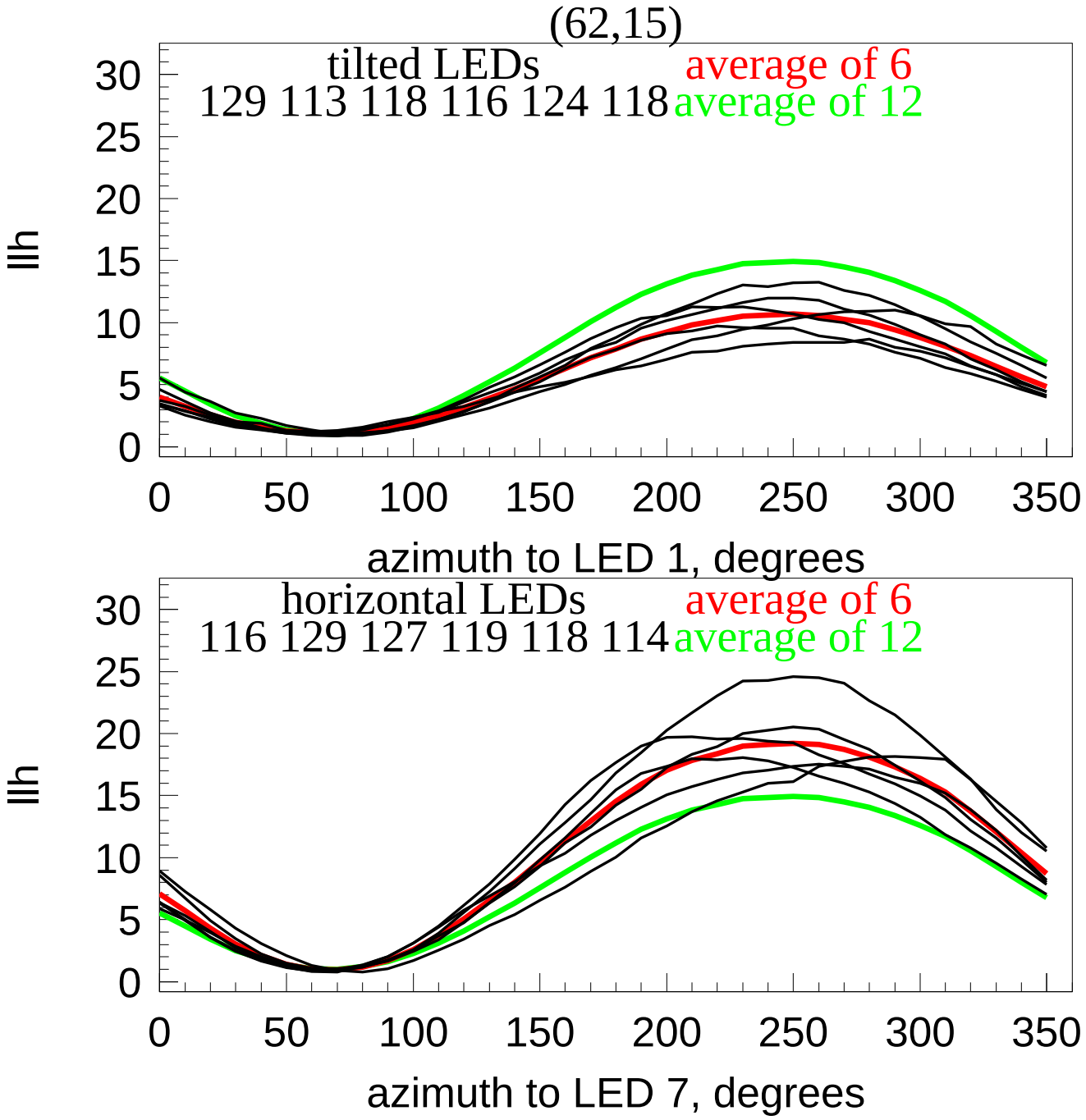

(62,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
174 ± 9.4

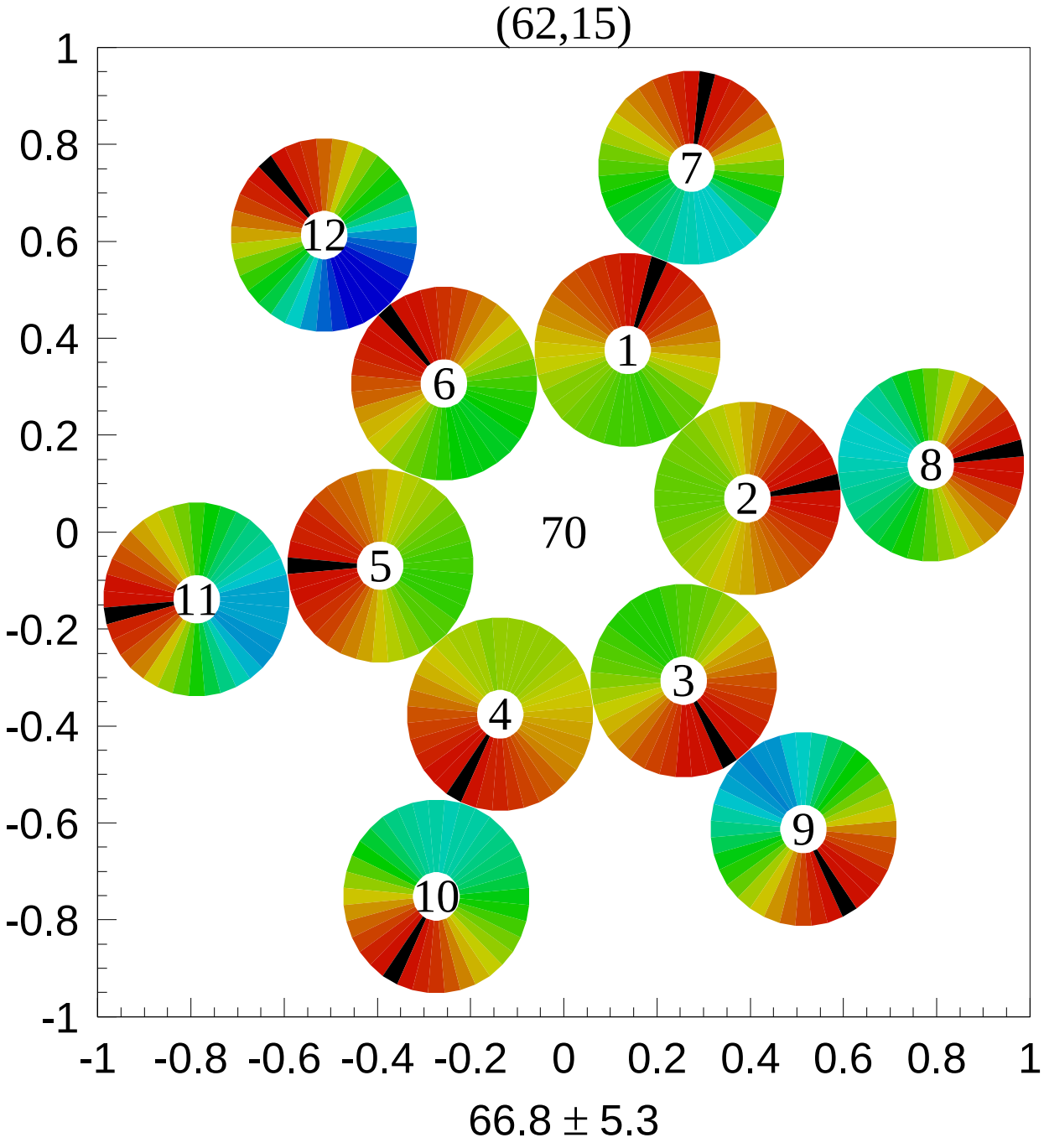

(62,13)
tilted LEDs
122 121 126 118 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 124 117 122 118 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

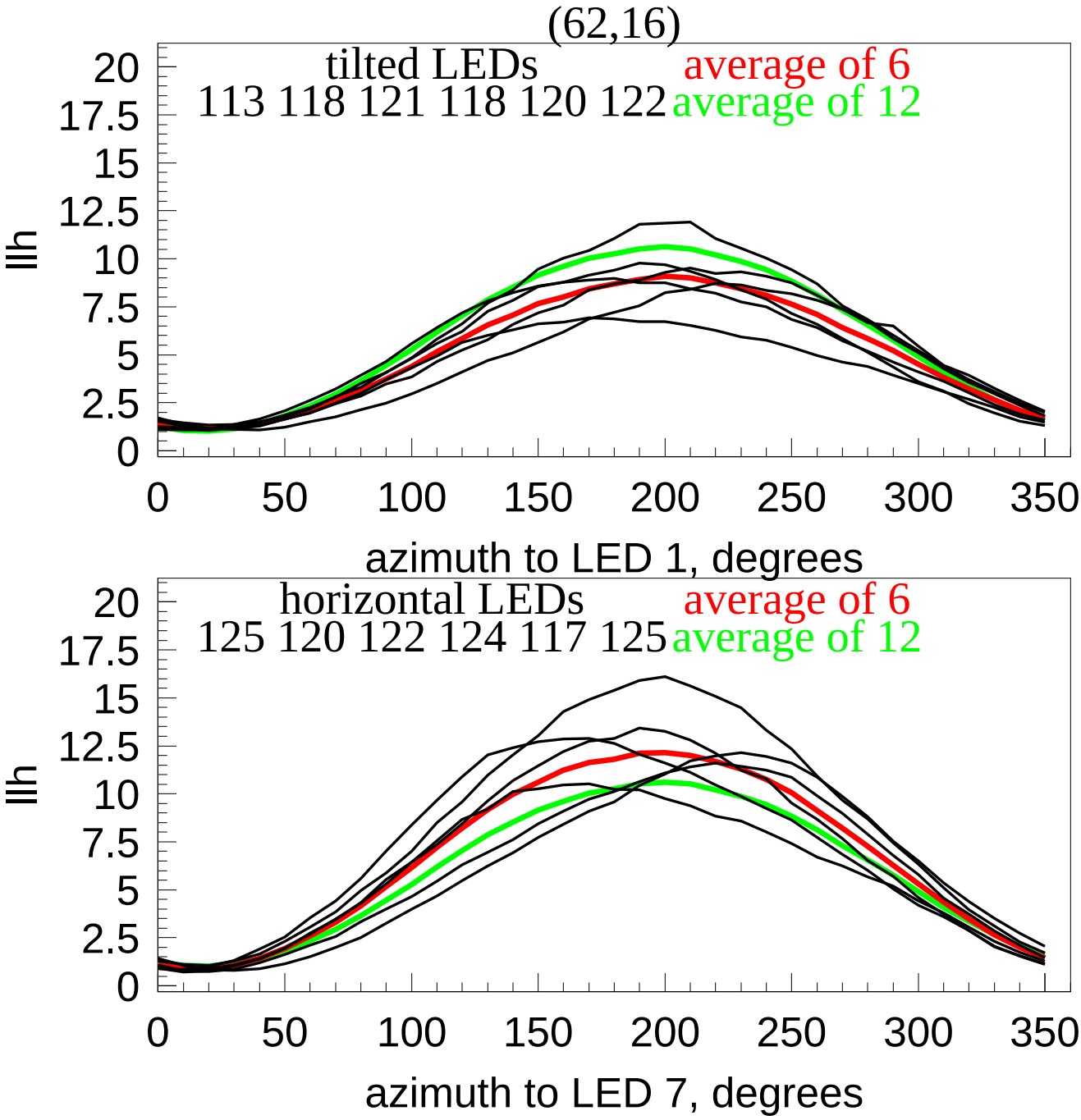

(62,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
123.2 ± 3.2

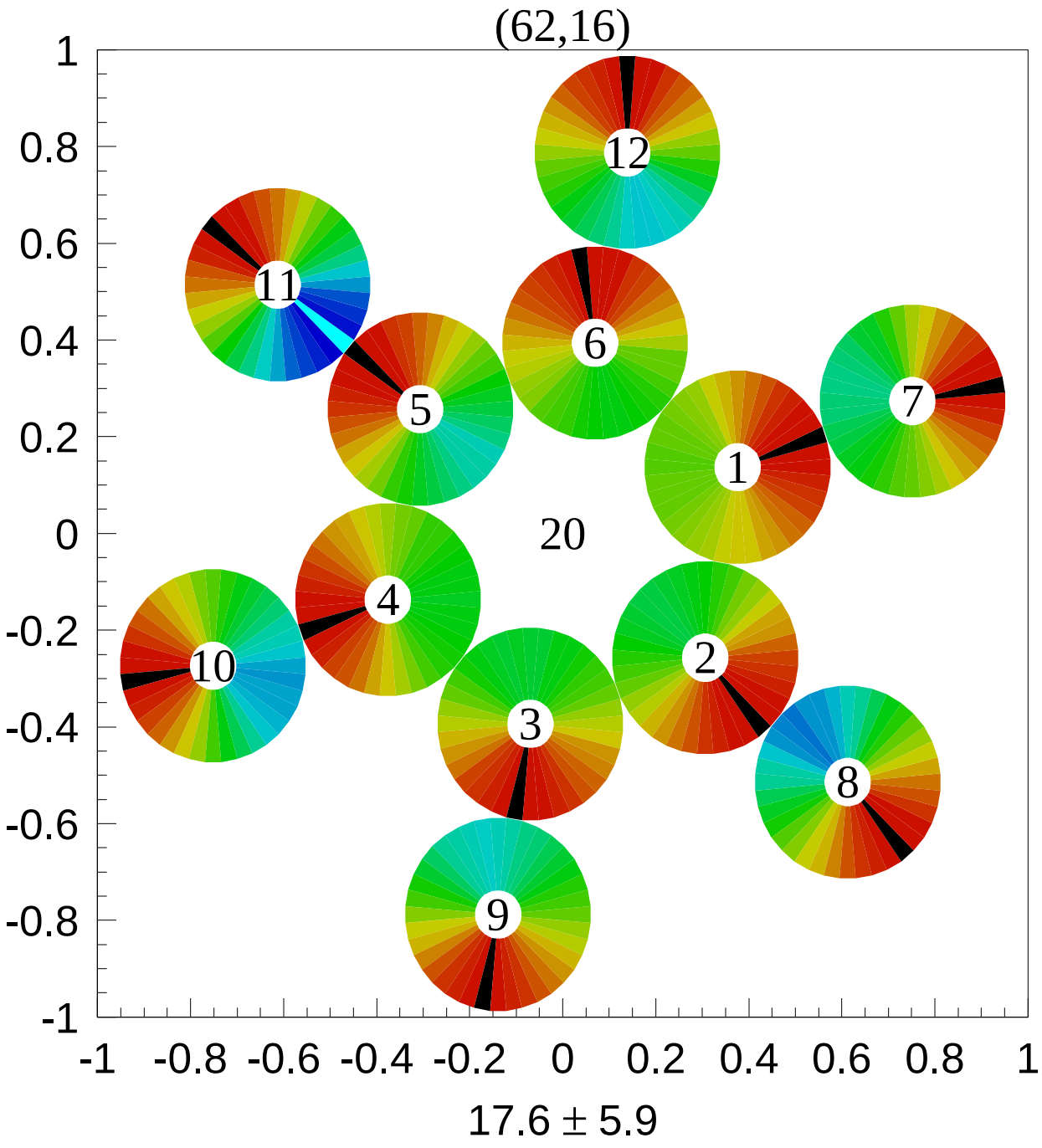

(62,14)
tilted LEDs
118 116 118 127 112 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 118 122 119 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

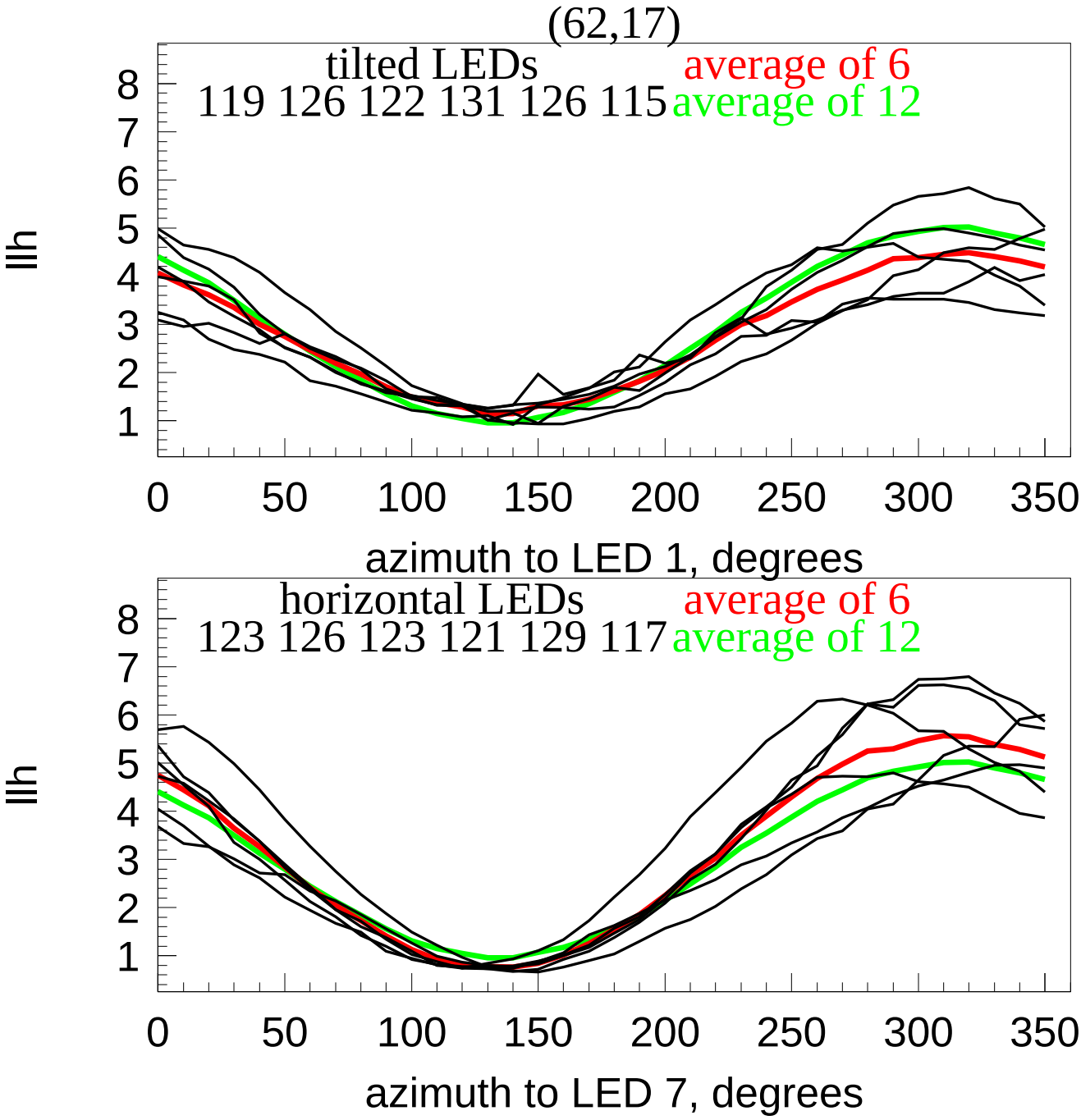

(62,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
54 ± 6.5

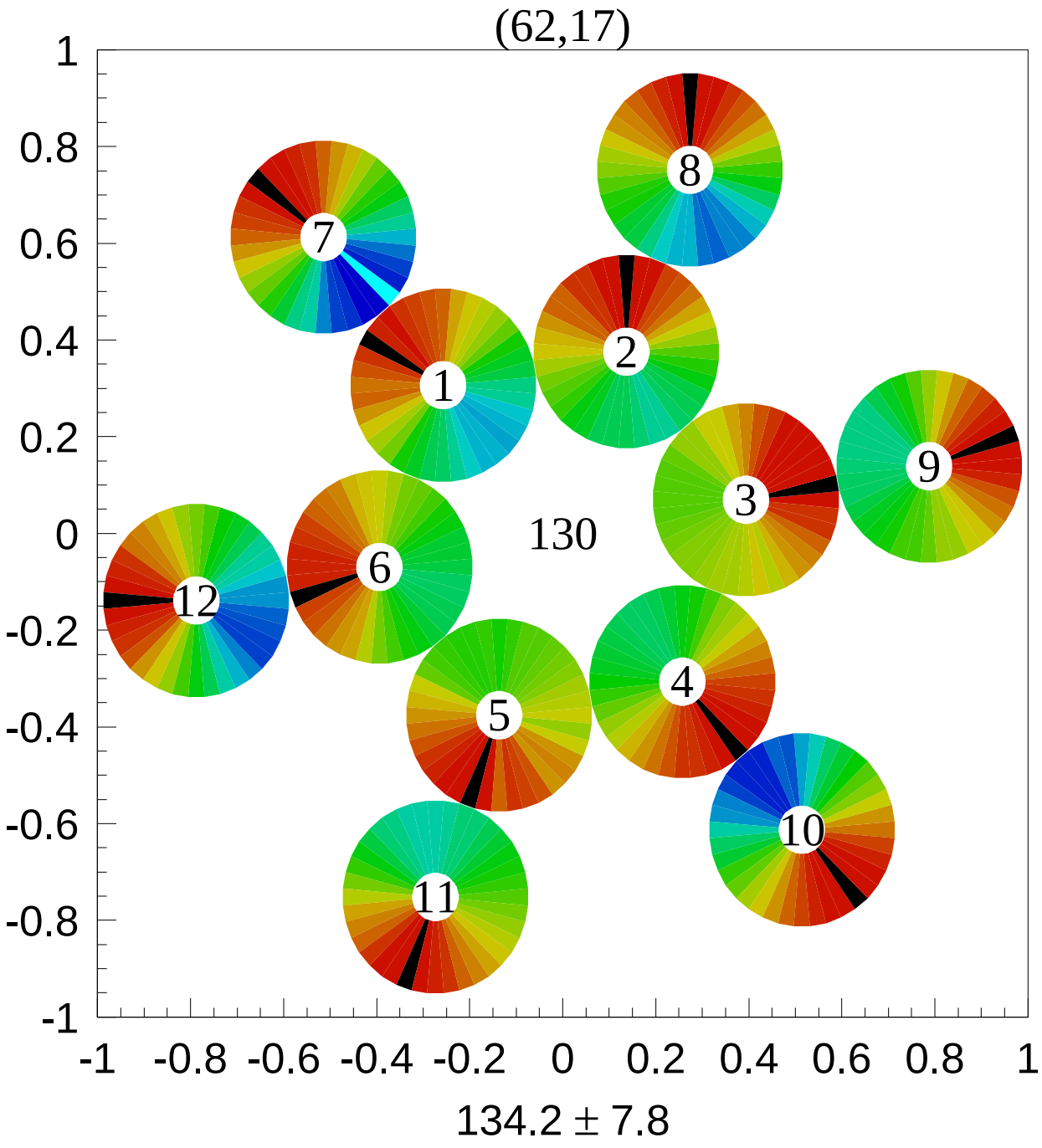

(62,15)
tilted LEDs
129 113 118 116 124 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 129 127 119 118 114
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

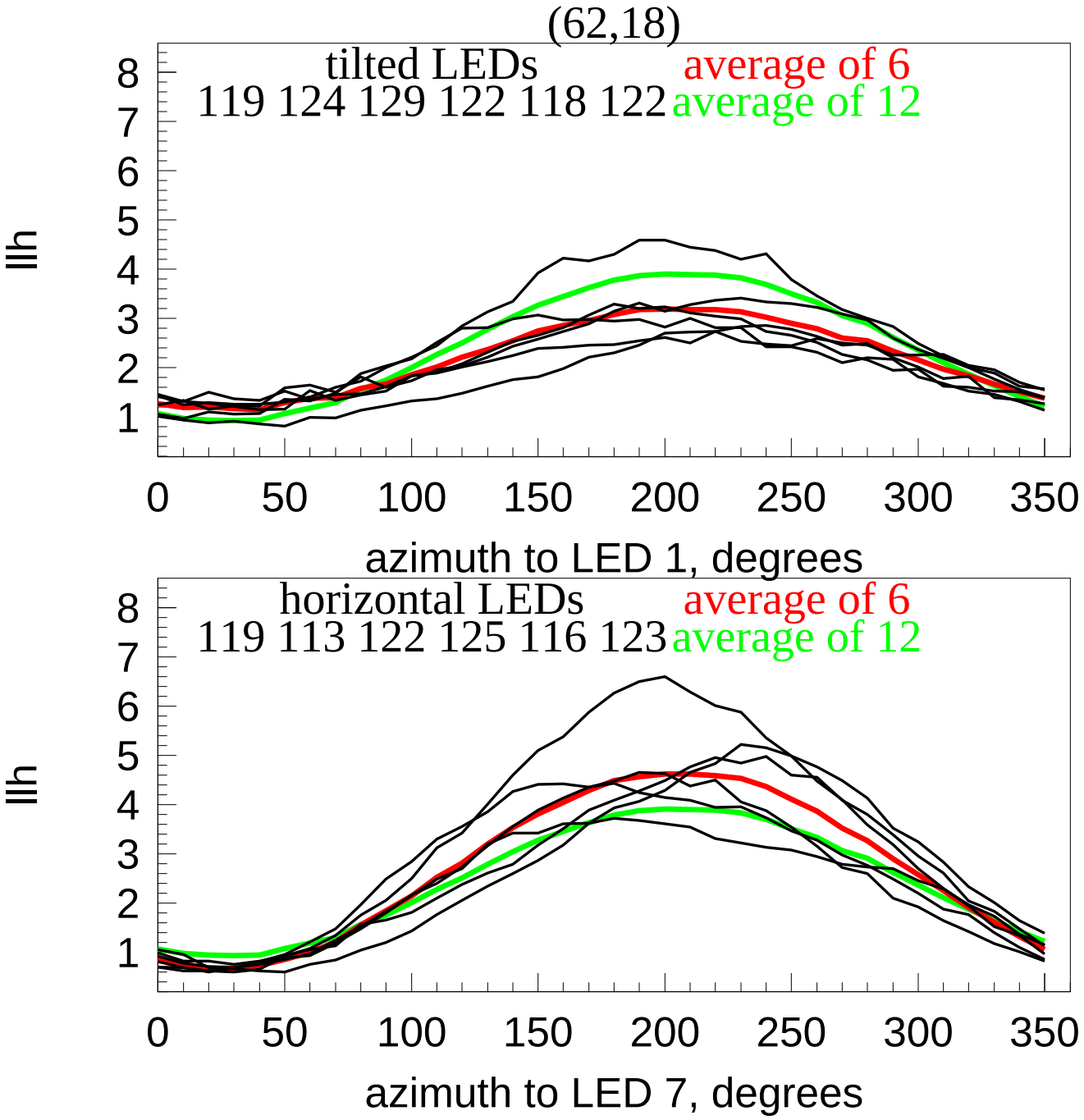

(62,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
66.8 ± 5.3

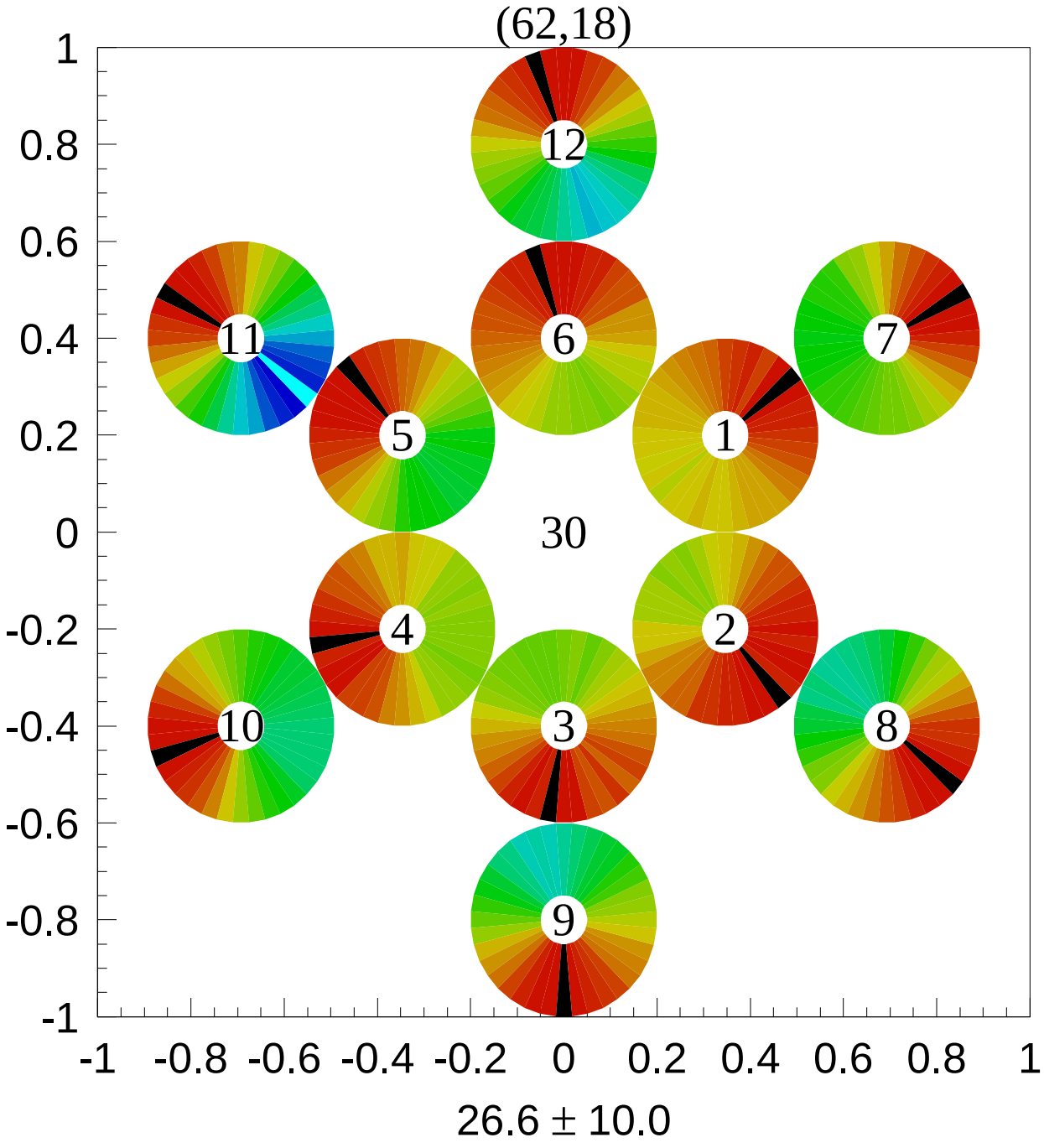

(62,16)
tilted LEDs
113 118 121 118 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 120 122 124 117 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

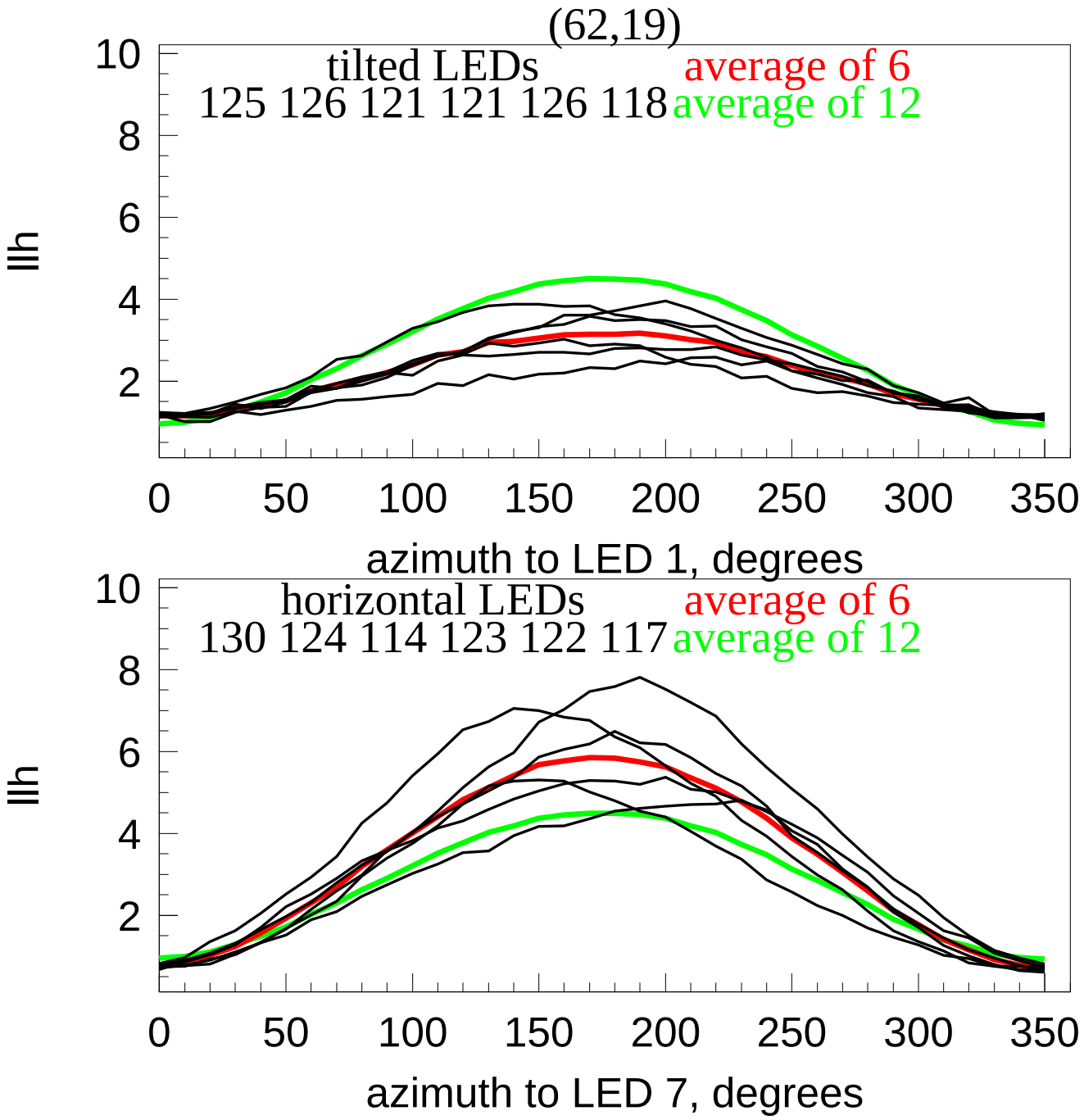

(62,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
17.6 ± 5.9

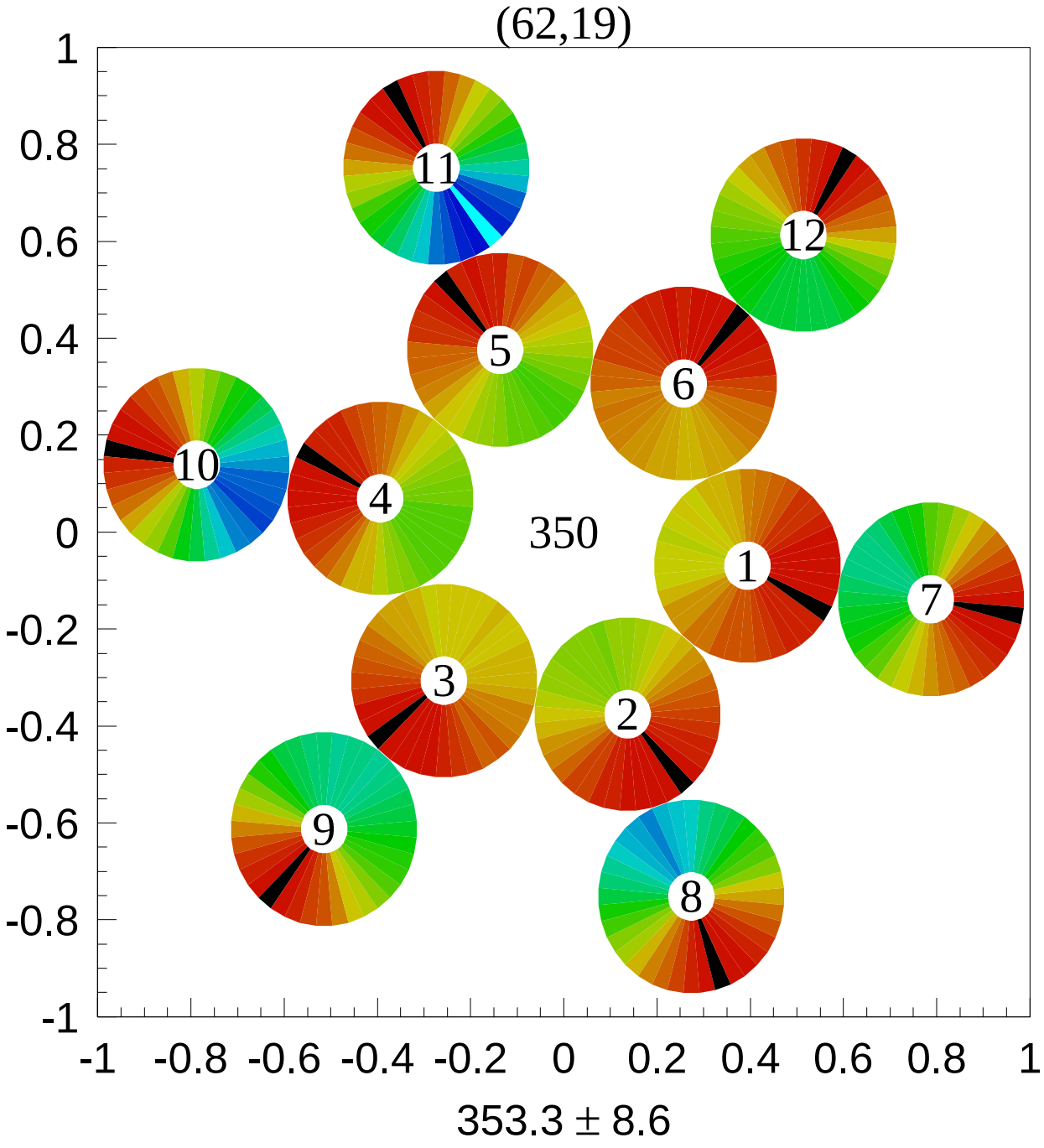

(62,17)
tilted LEDs
119 126 122 131 126 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 126 123 121 129 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

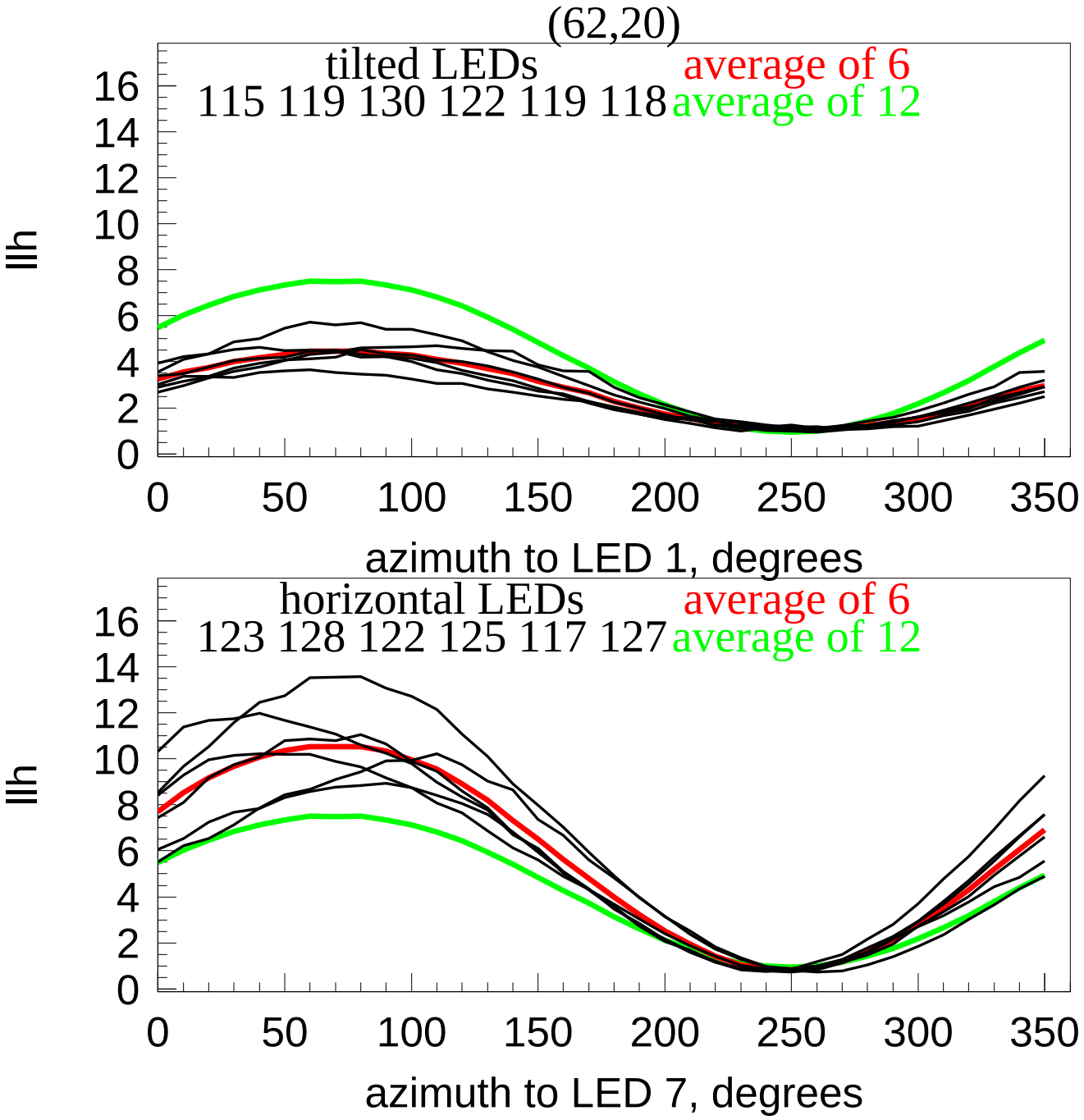

(62,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
134.2 ± 7.8
130
1
2
3
4
5
6
7
8
9
10
11
12

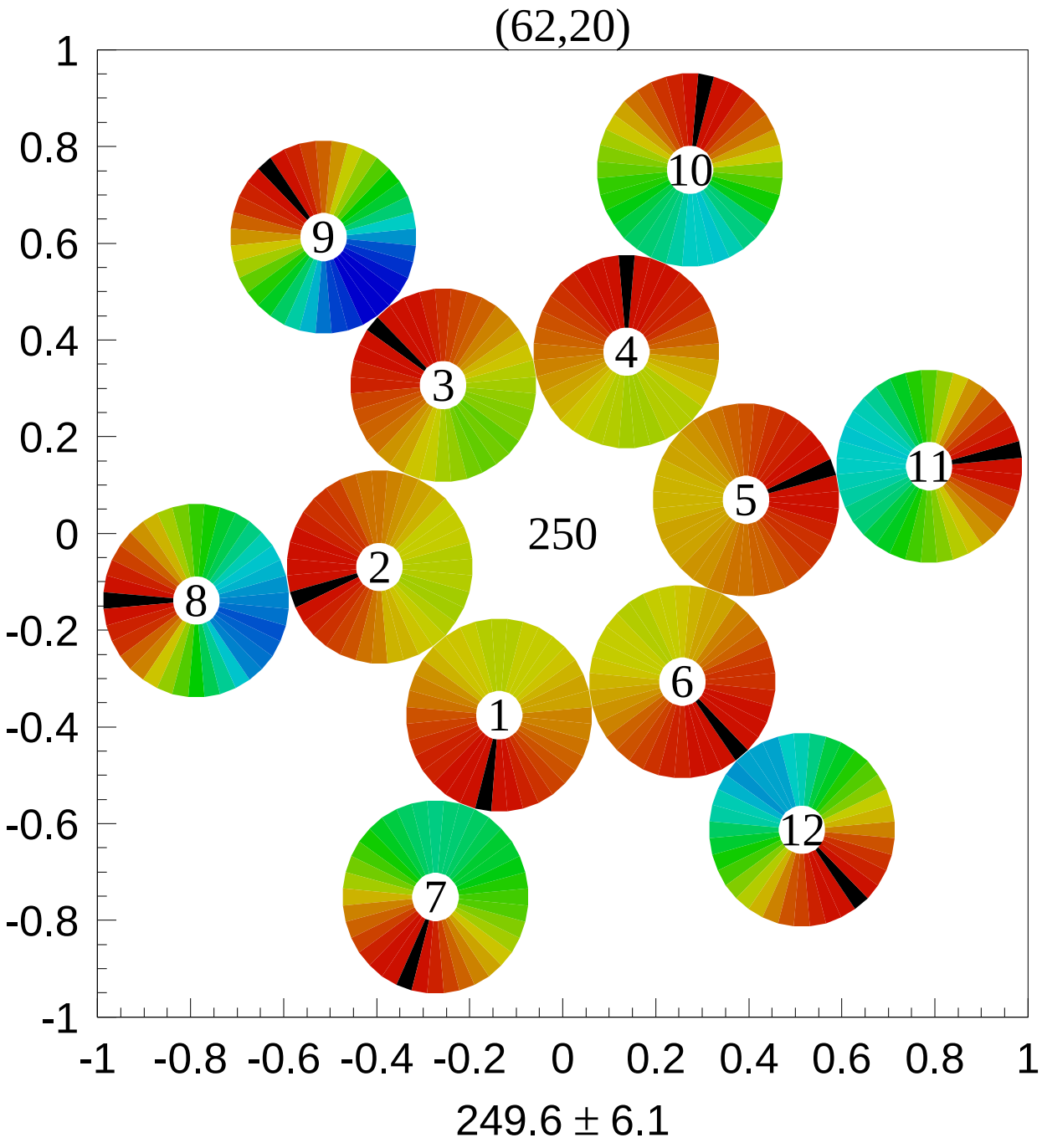

(62,18)
tilted LEDs
119 124 129 122 118 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 113 122 125 116 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

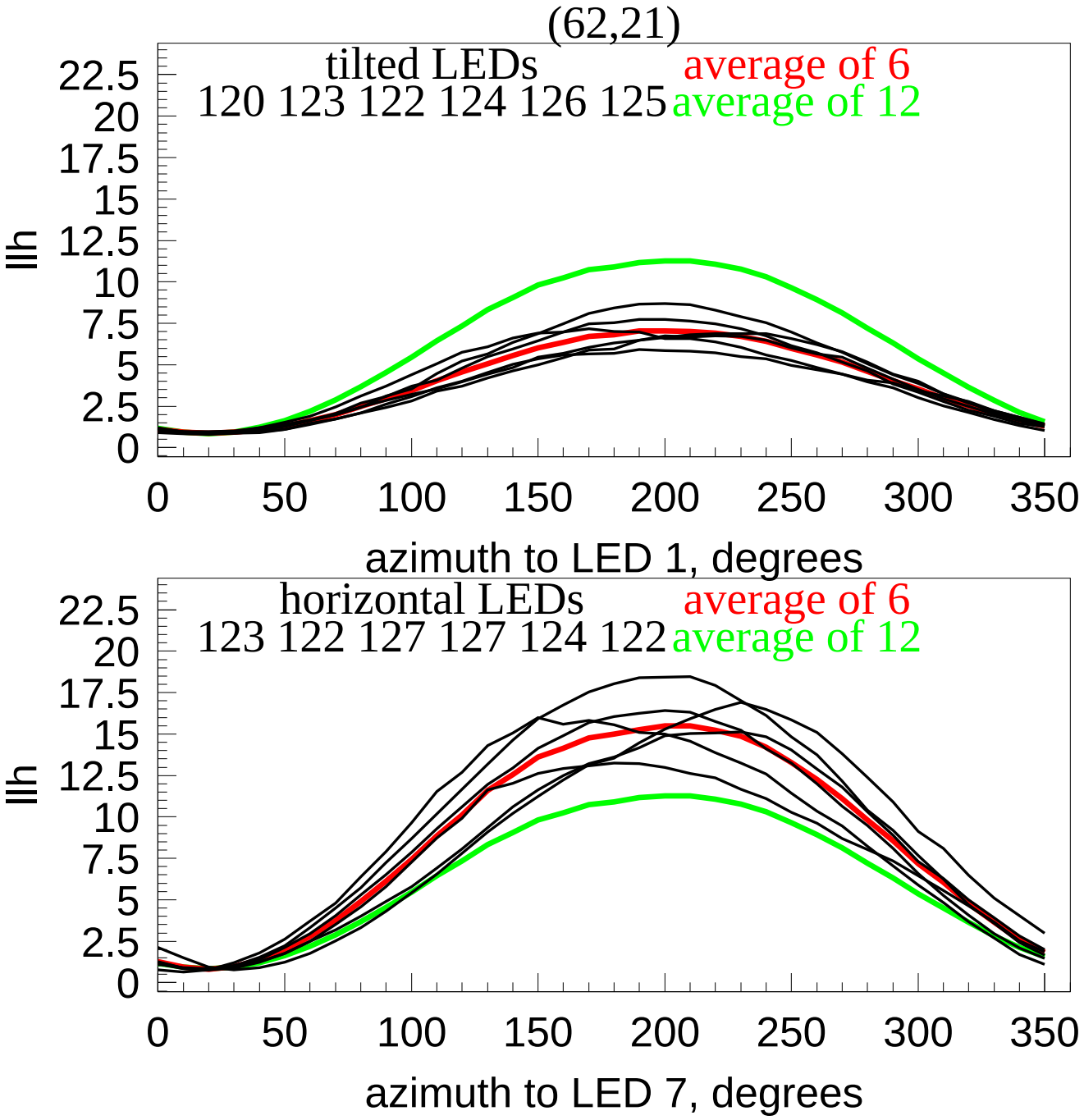

(62,18)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
26.6 ± 10.0

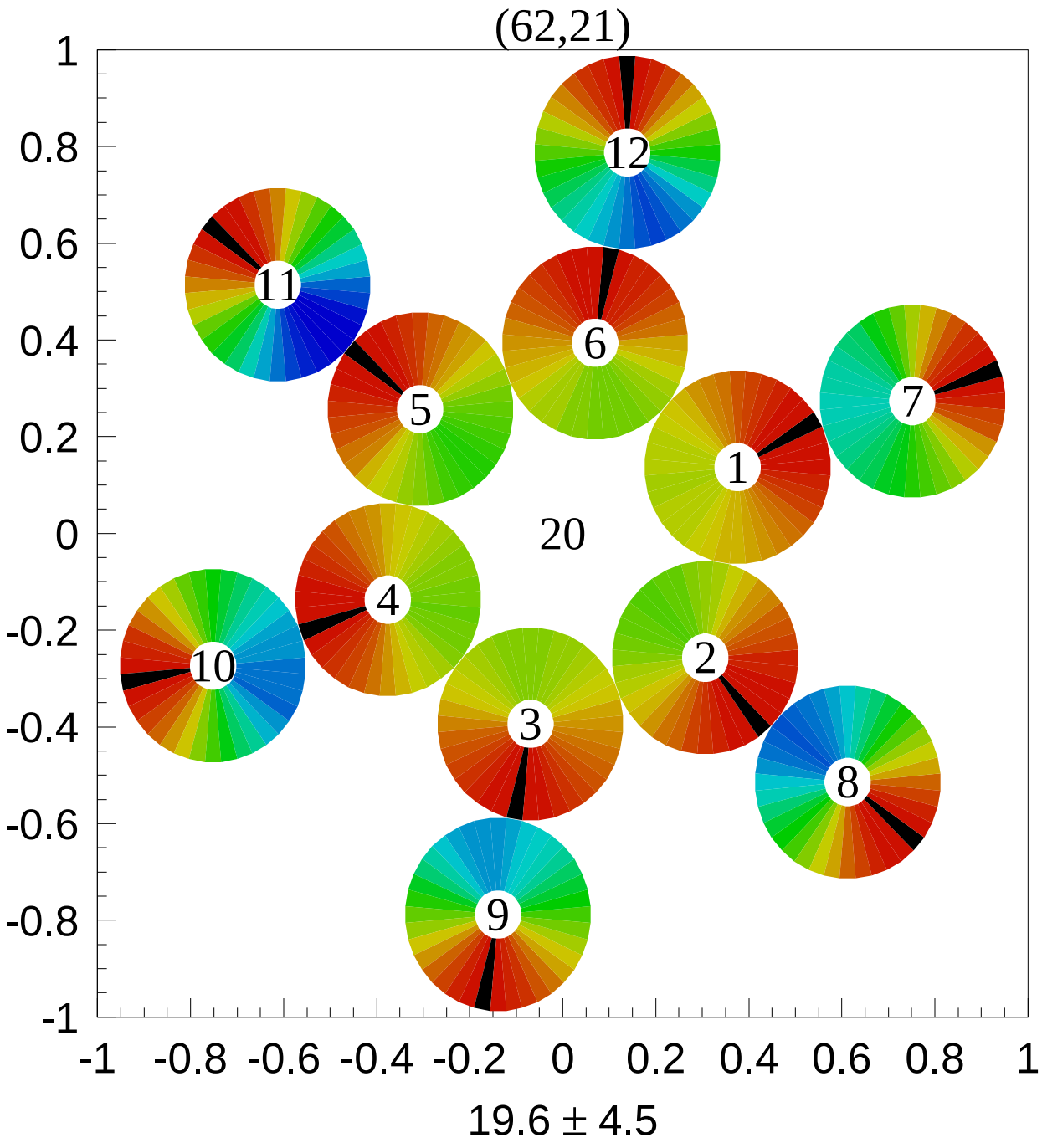

(62,19)
tilted LEDs
125 126 121 121 126 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 124 114 123 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

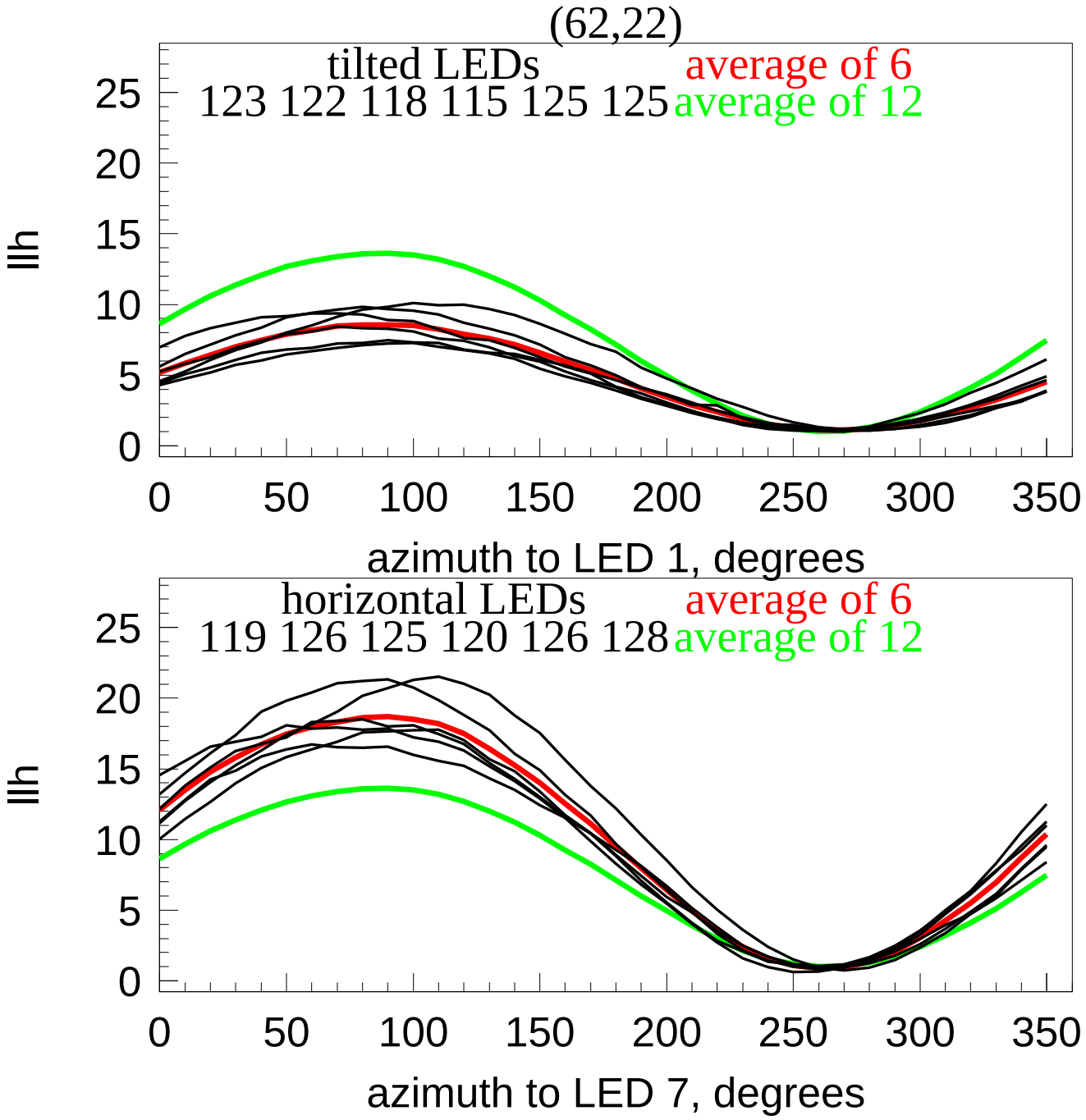

(62,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
353.3 ± 8.6

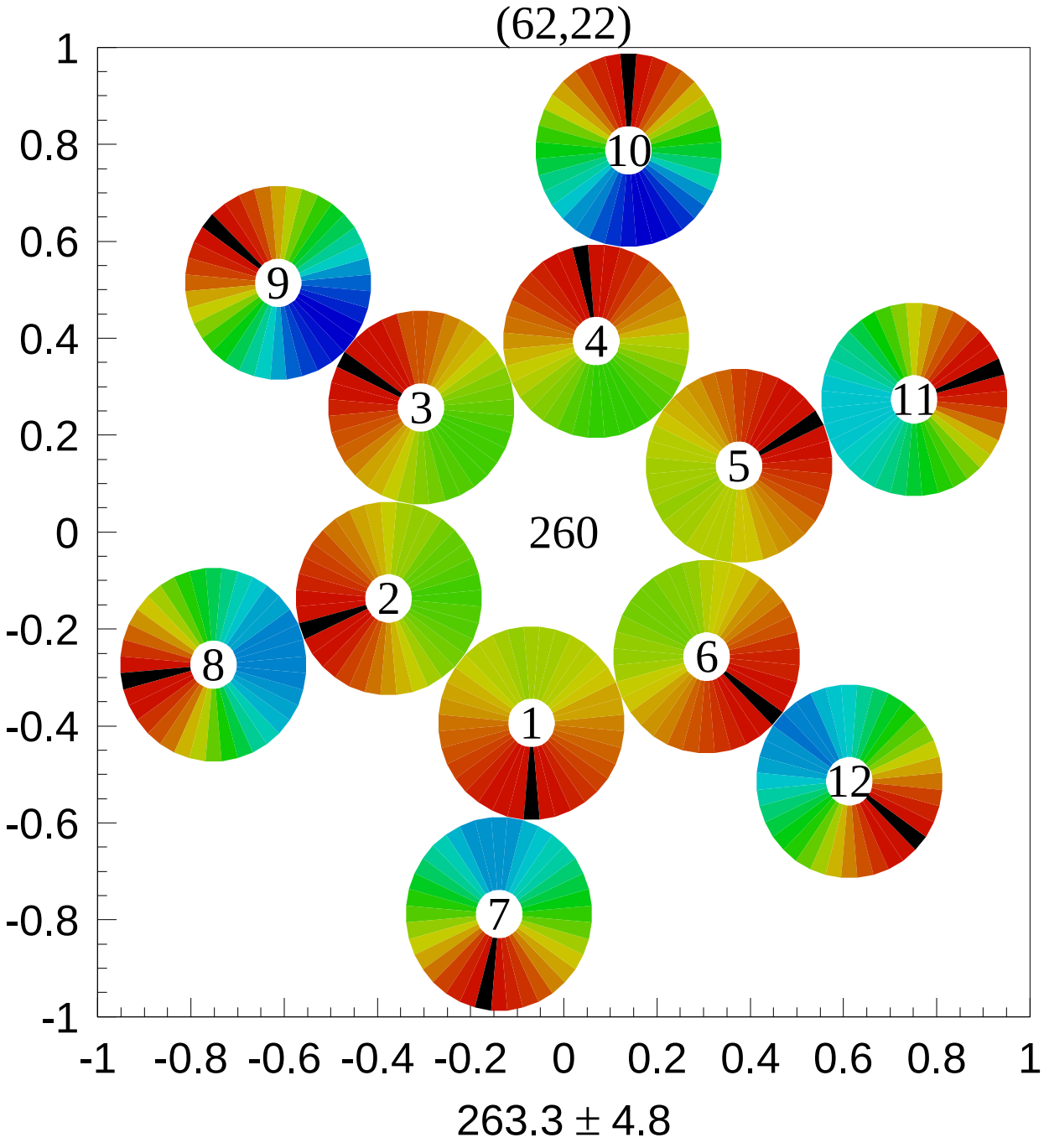

(62,20)
tilted LEDs
115 119 130 122 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 128 122 125 117 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

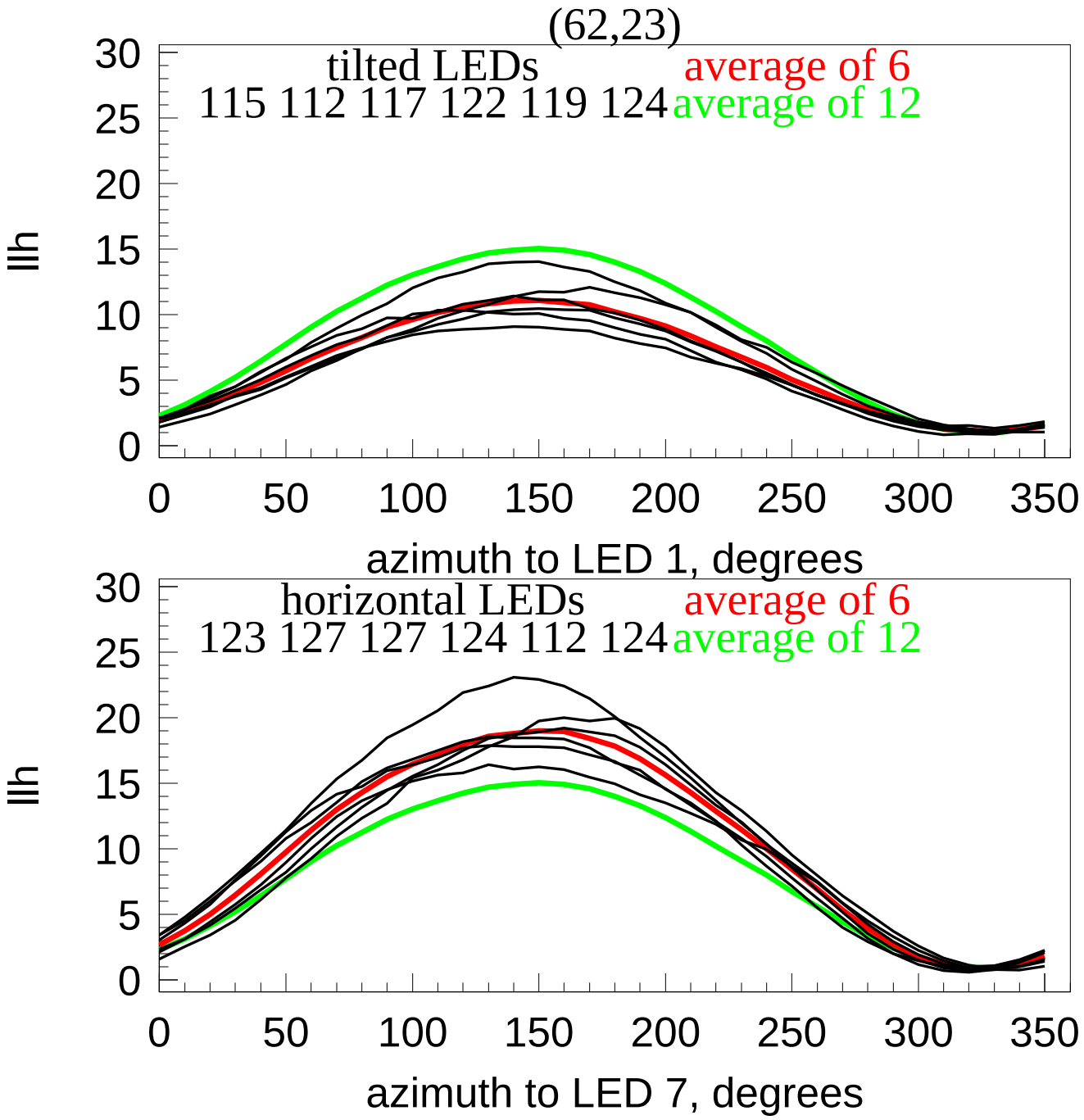

(62,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
6
1
12
7
249.6 ± 6.1

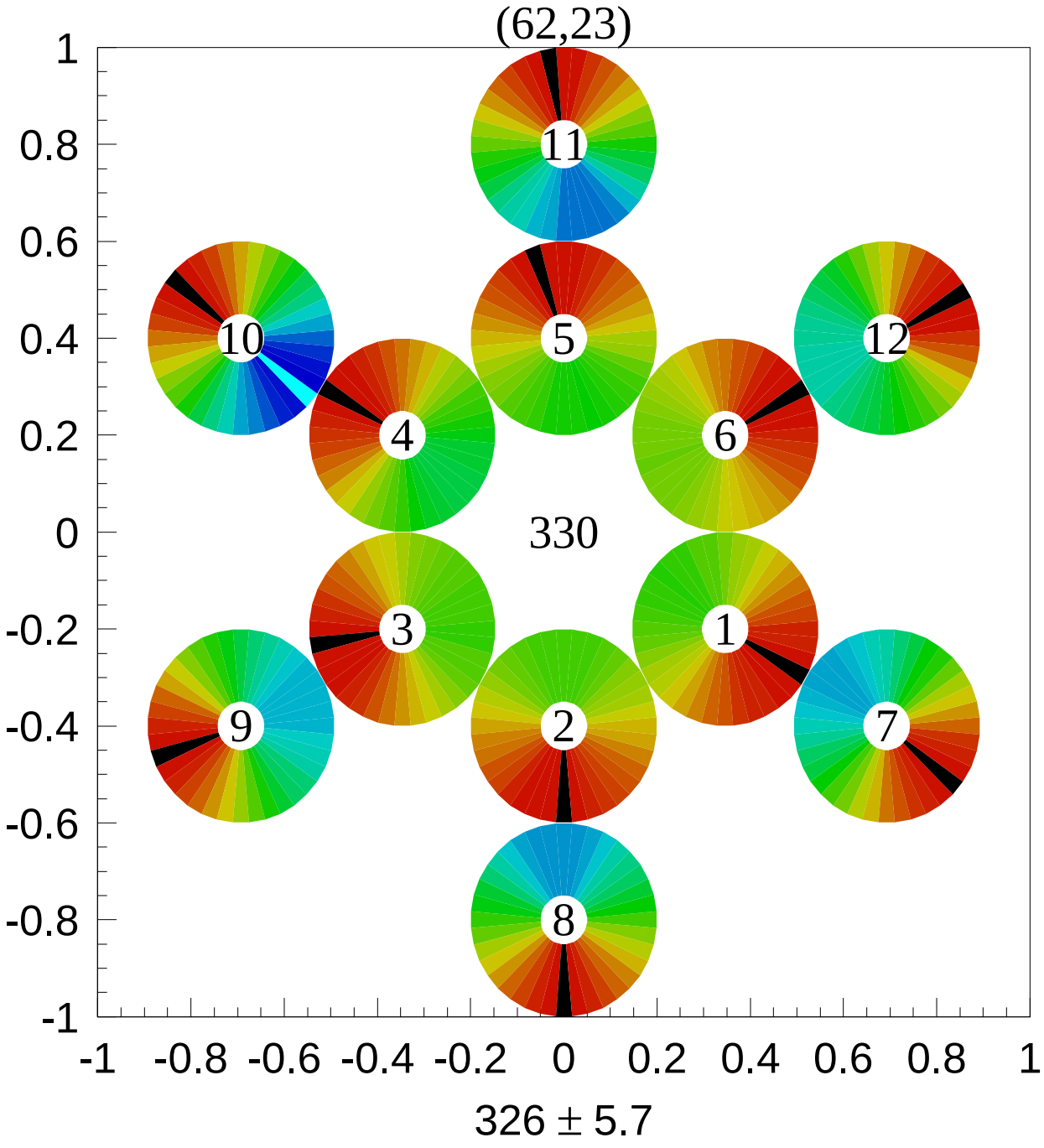

(62,21)
tilted LEDs
120 123 122 124 126 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 127 127 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

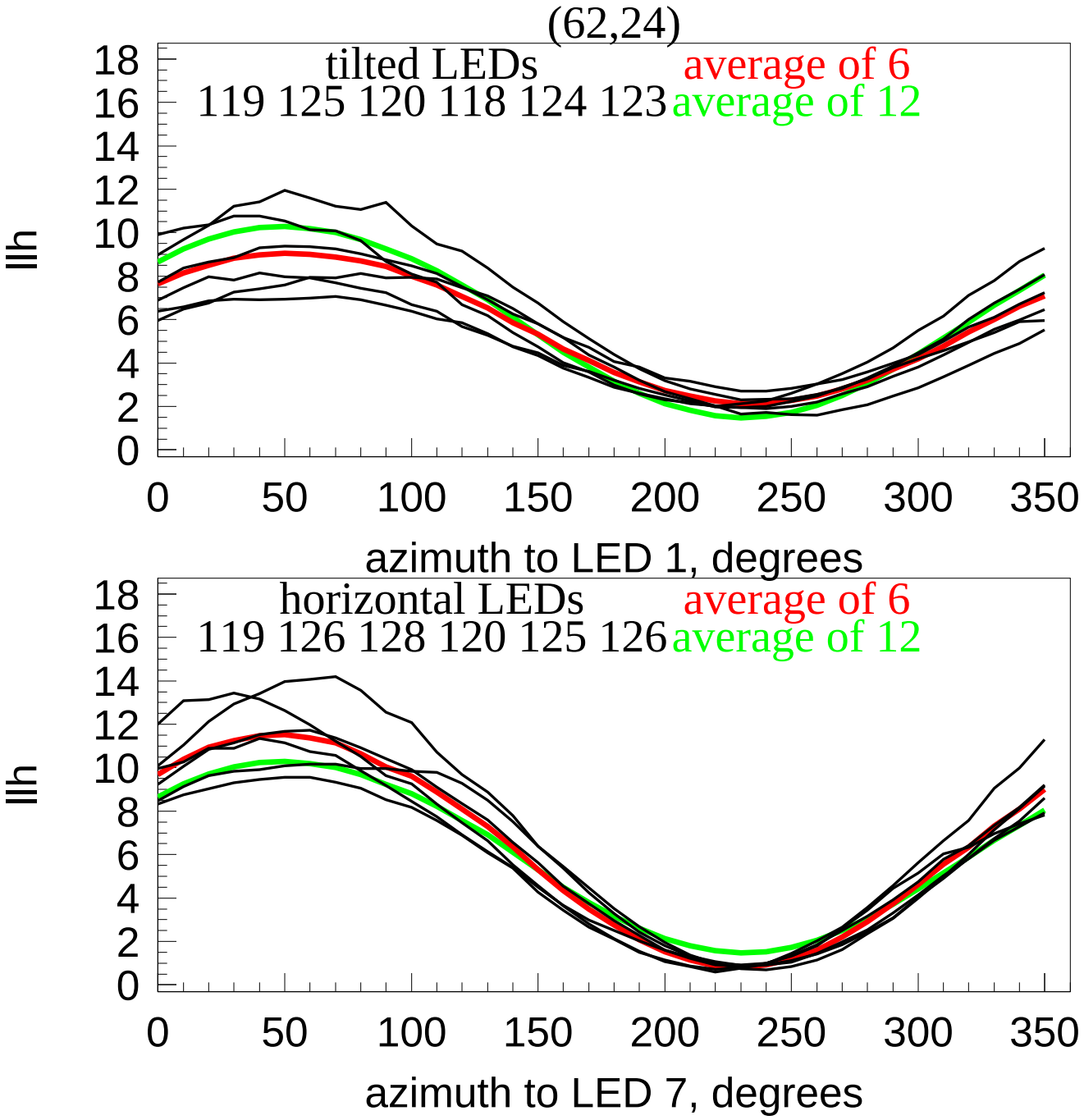

(62,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
19.6 ± 4.5

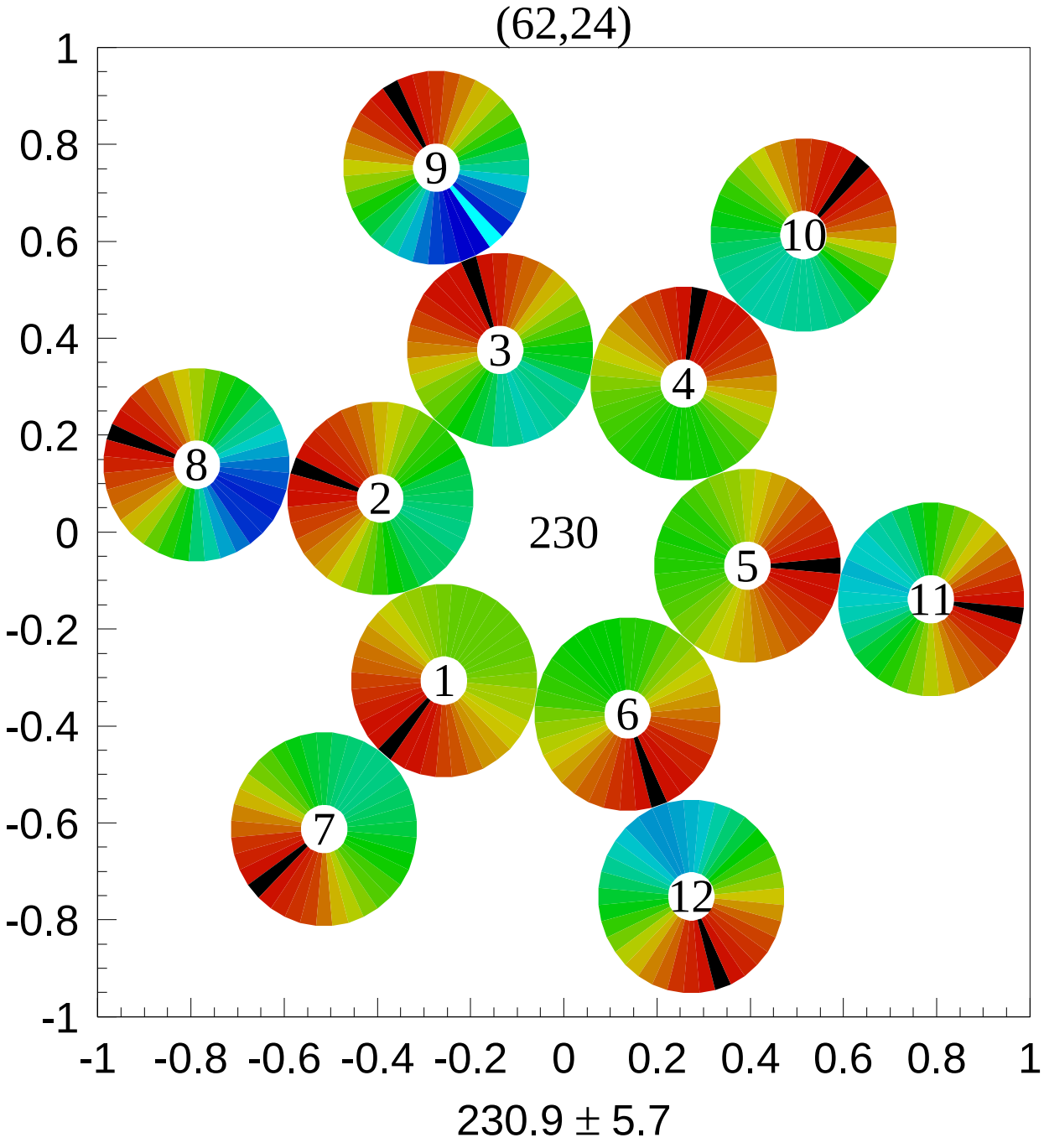

(62,22)
tilted LEDs
123 122 118 115 125 125
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 126 125 120 126 128
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

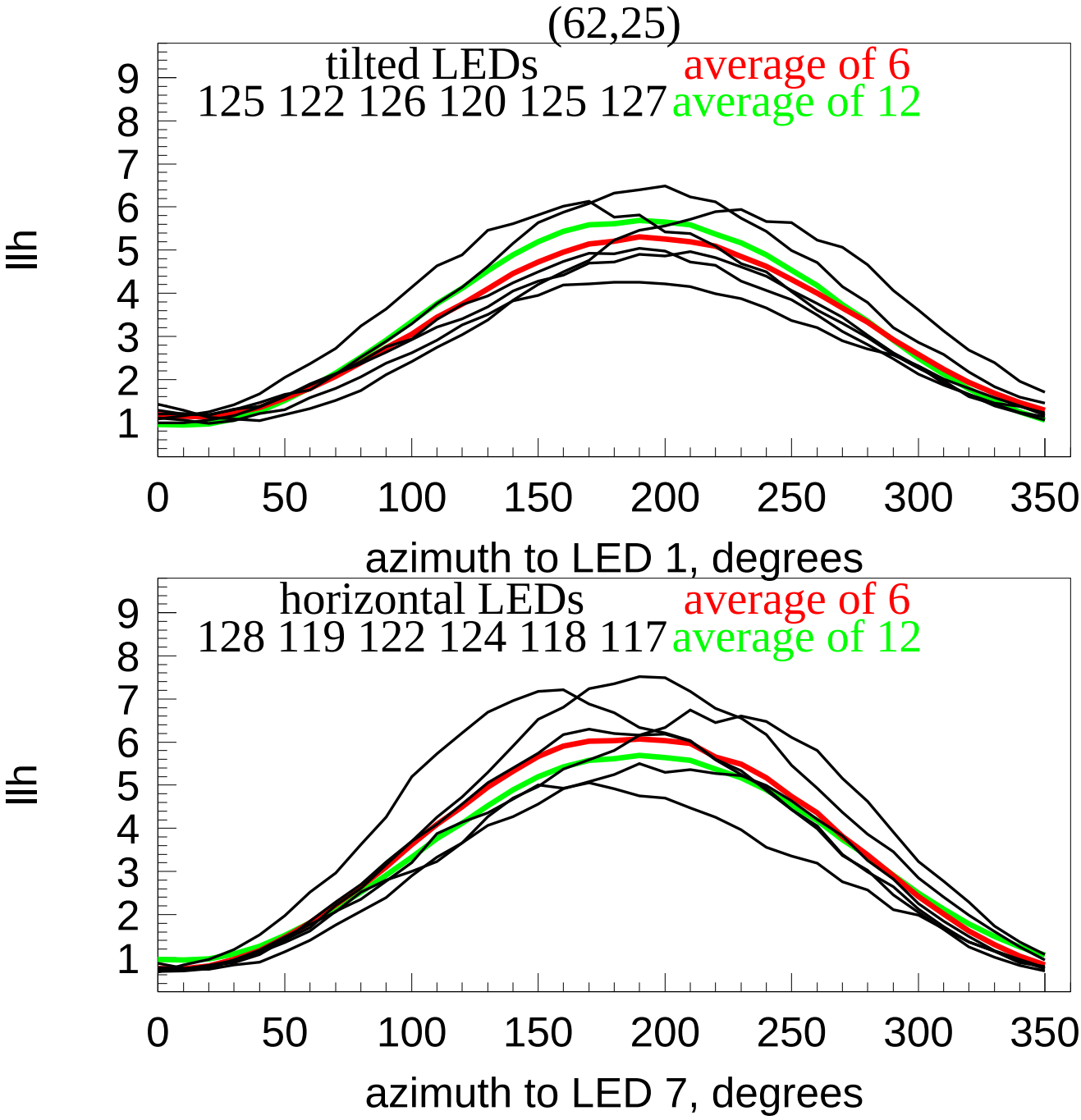

(62,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
263.3 ± 4.8

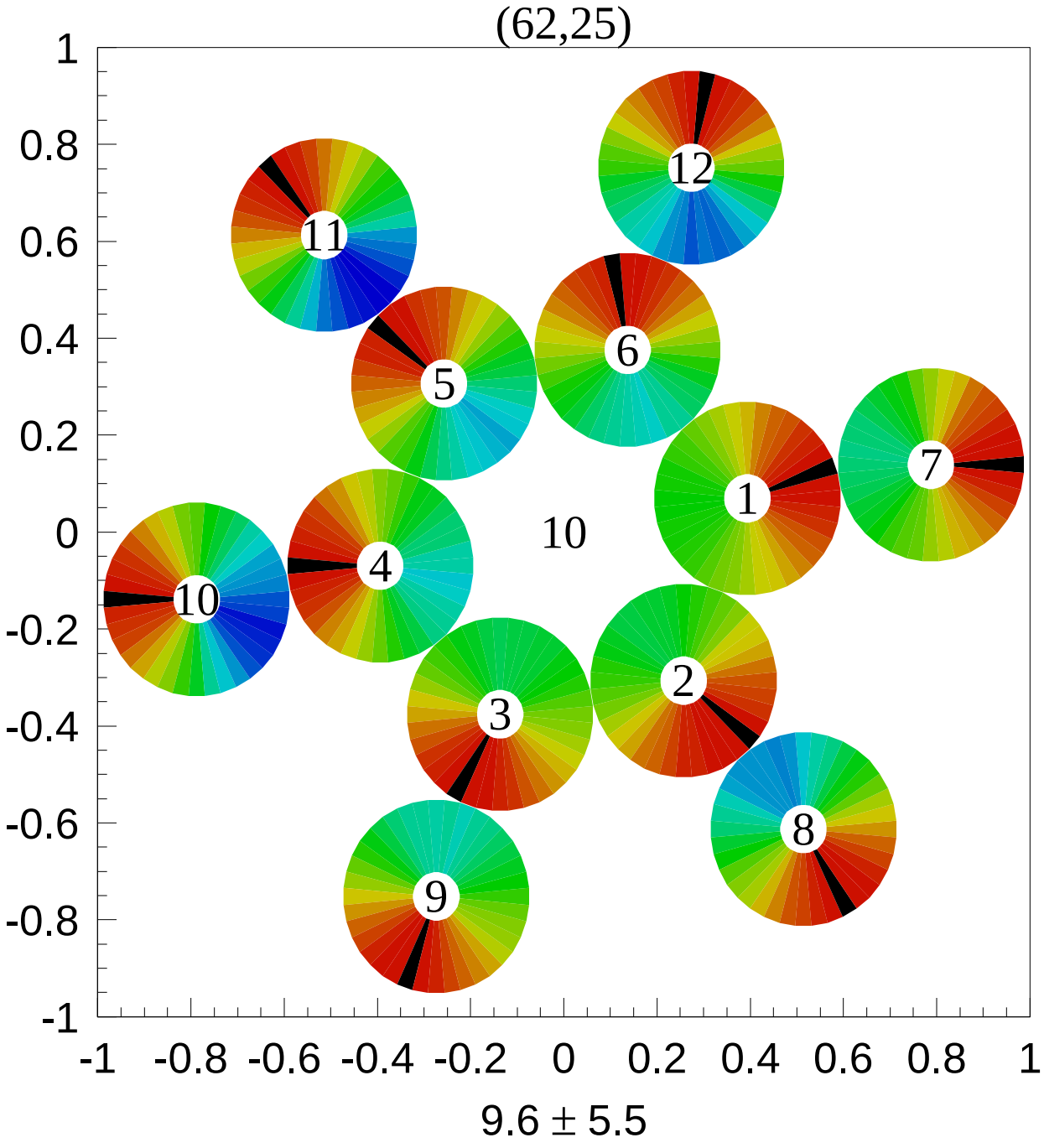

(62,23)
tilted LEDs
115 112 117 122 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 127 127 124 112 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

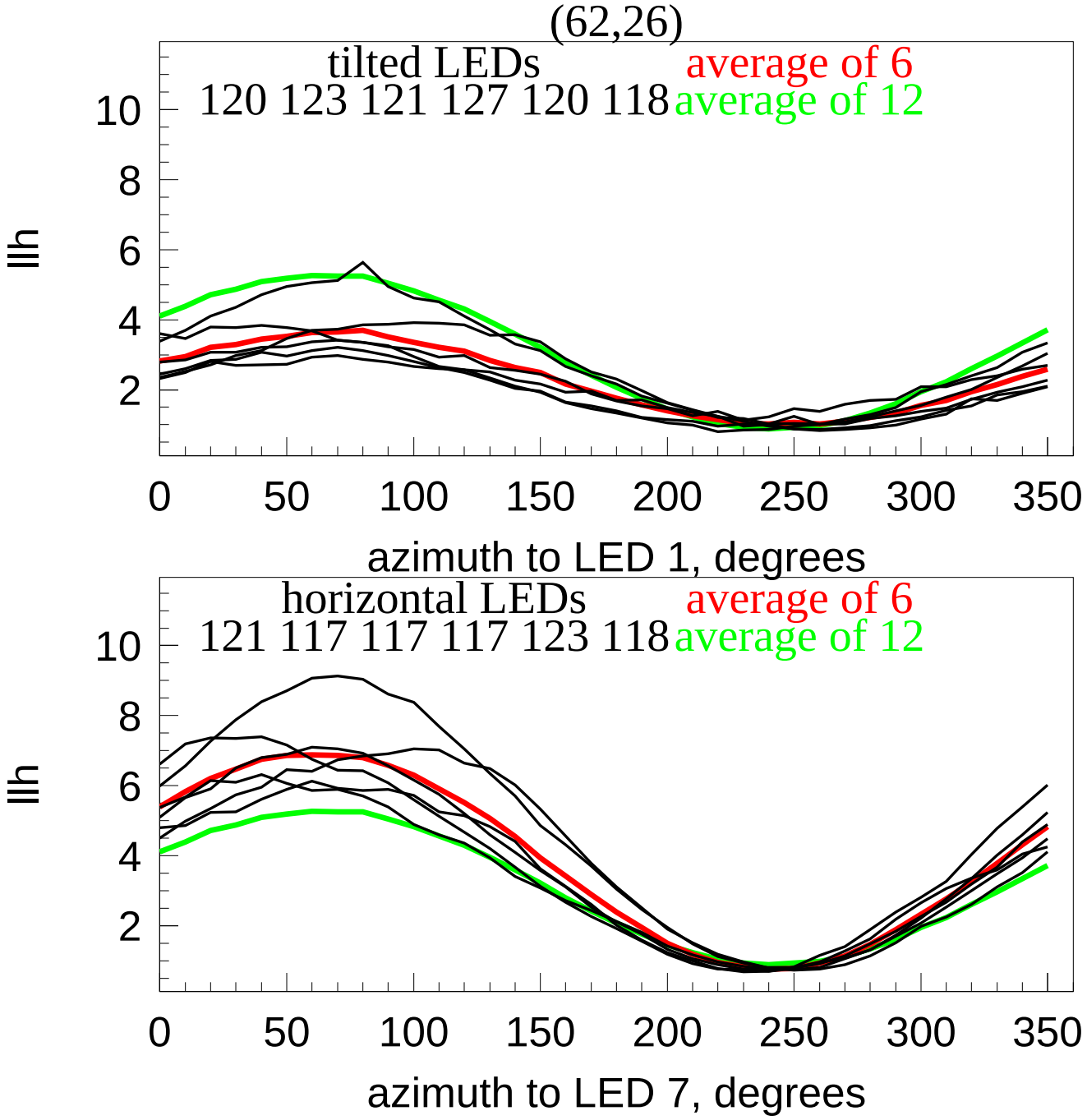

(62,23)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
326 ± 5.7

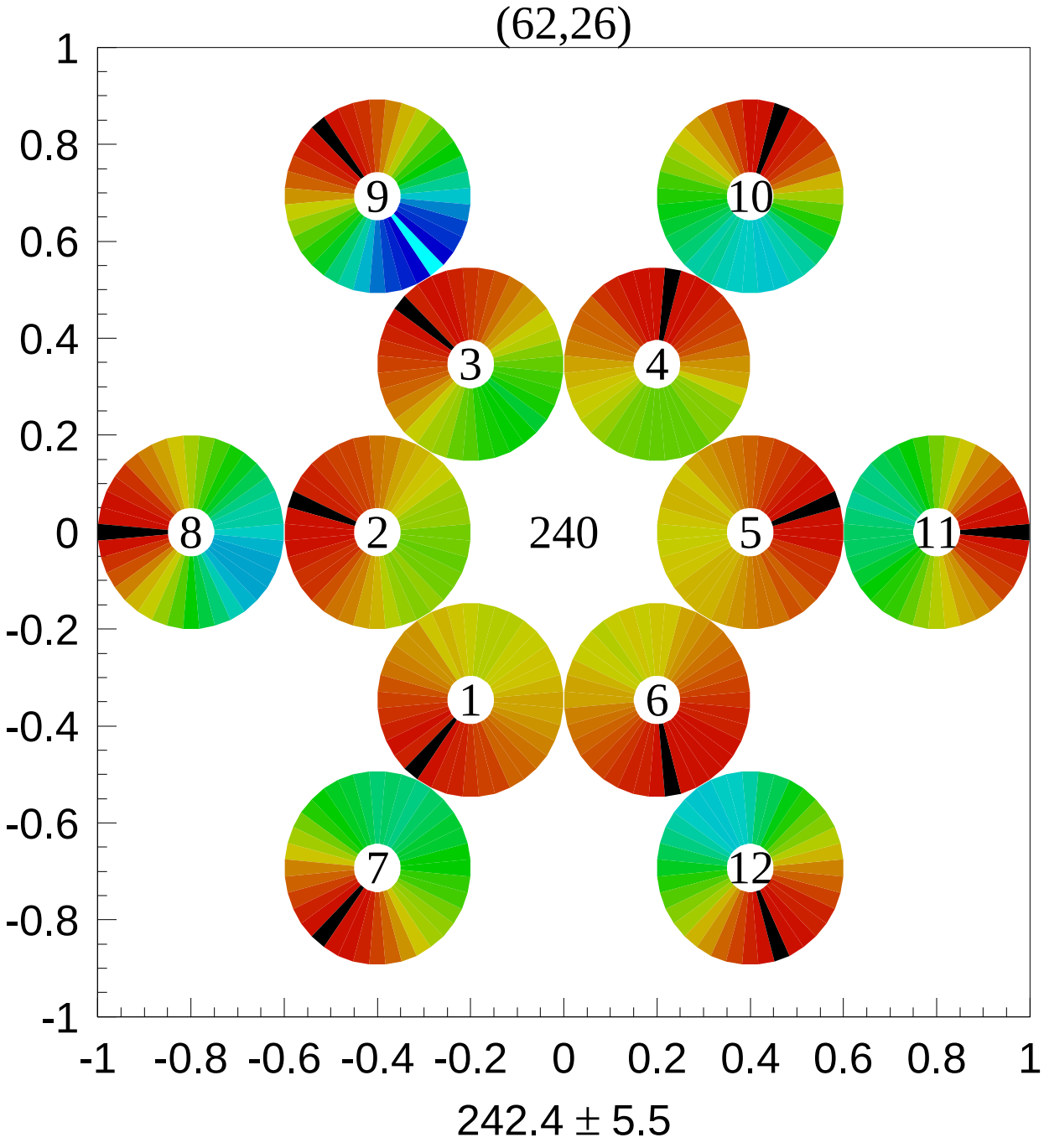

(62,24)
tilted LEDs
119 125 120 118 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 128 120 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

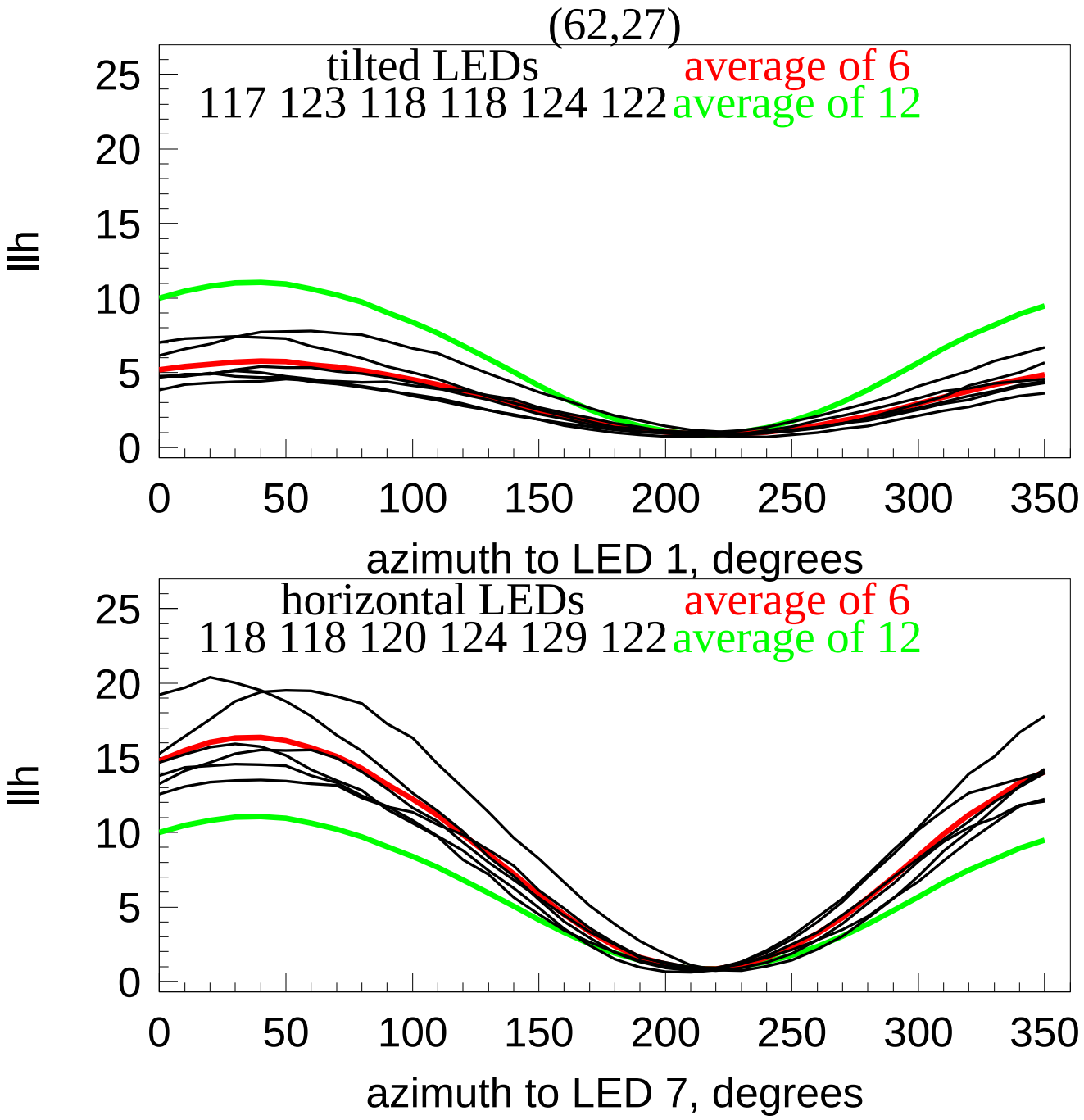

(62,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
230.9 ± 5.7

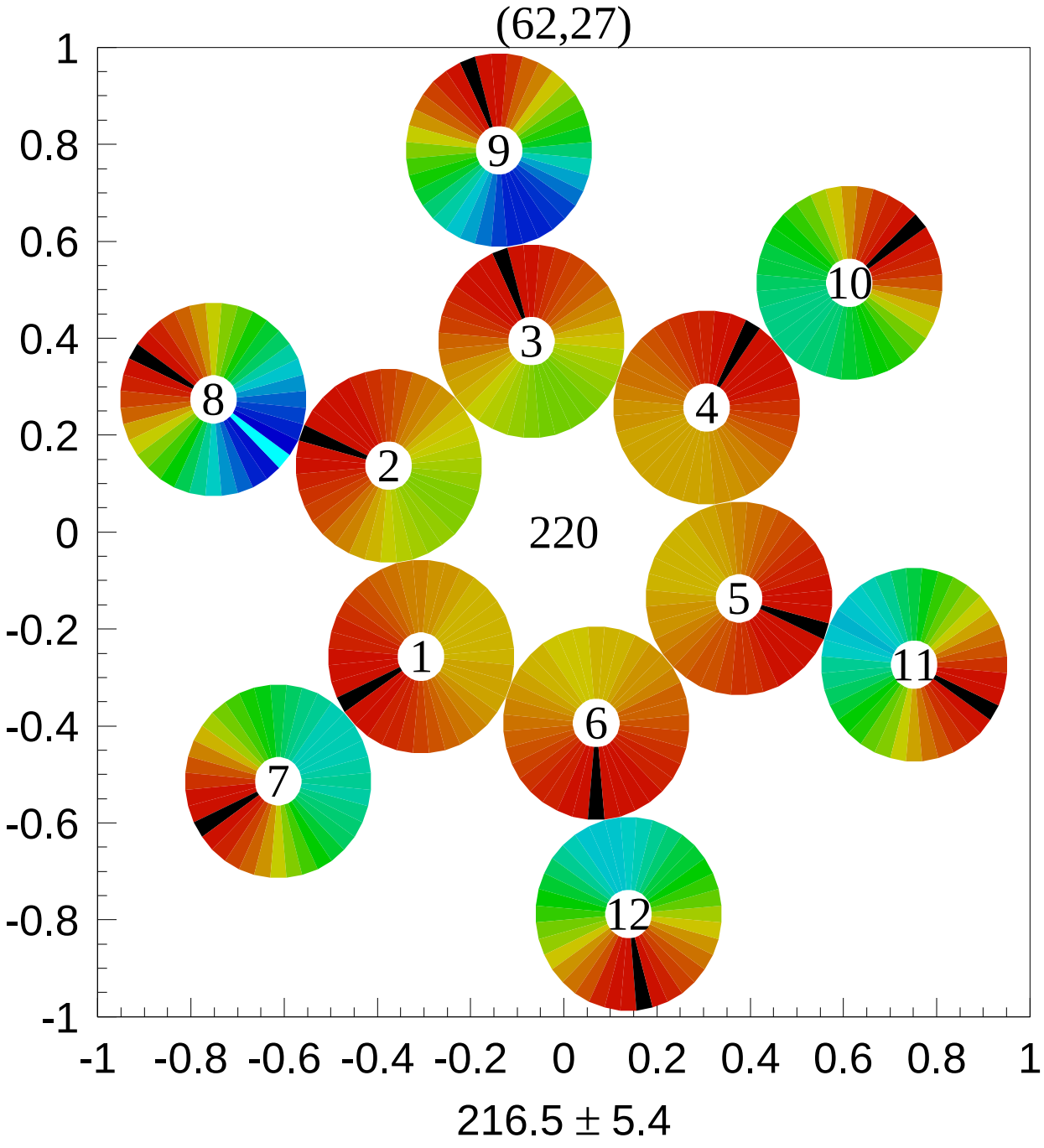

(62,25)
tilted LEDs
125 122 126 120 125 127
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
128 119 122 124 118 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

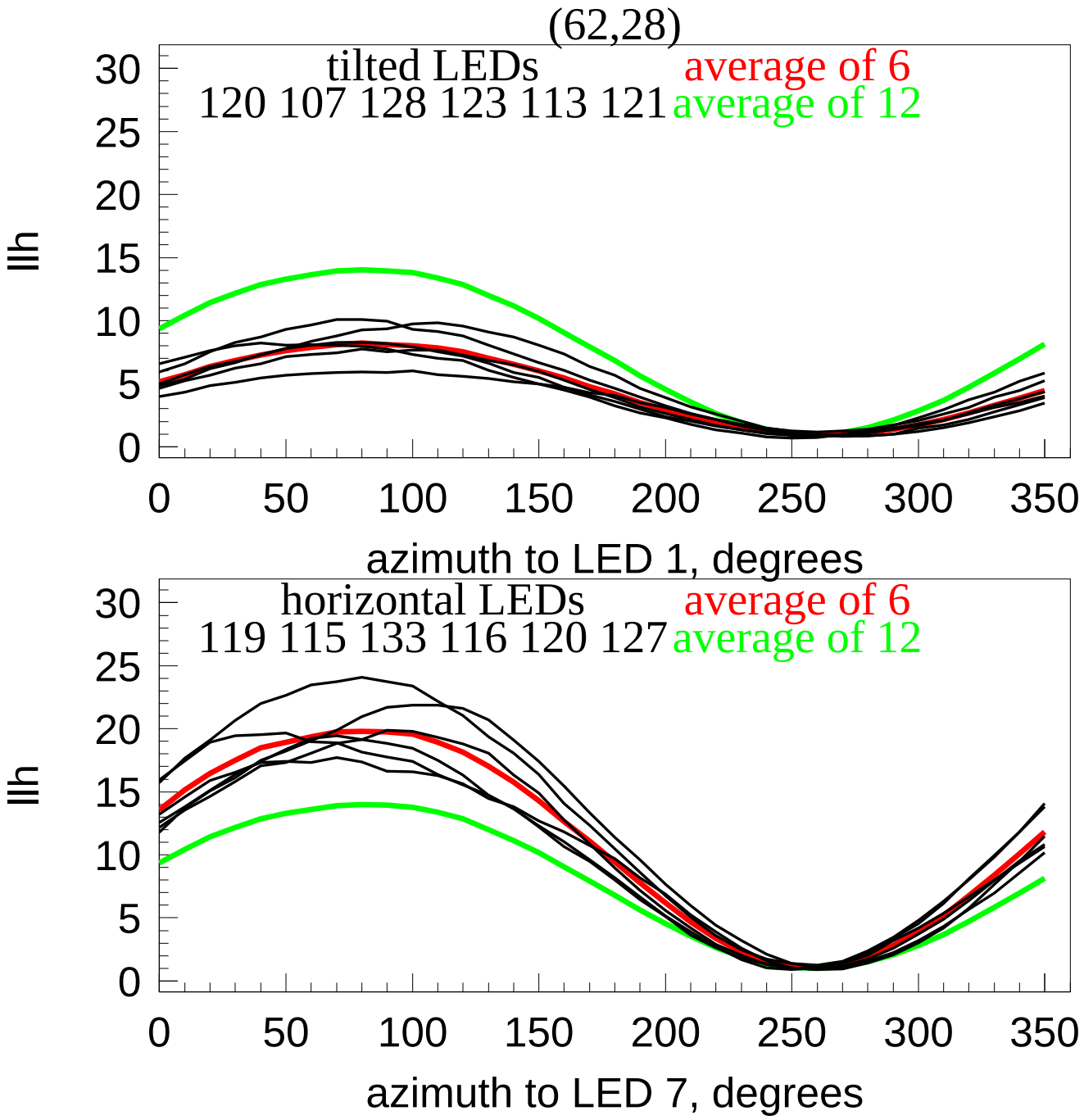

(62,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9.6 ± 5.5
12
11
6
5
7
1
10
4
10
2
3
8
9

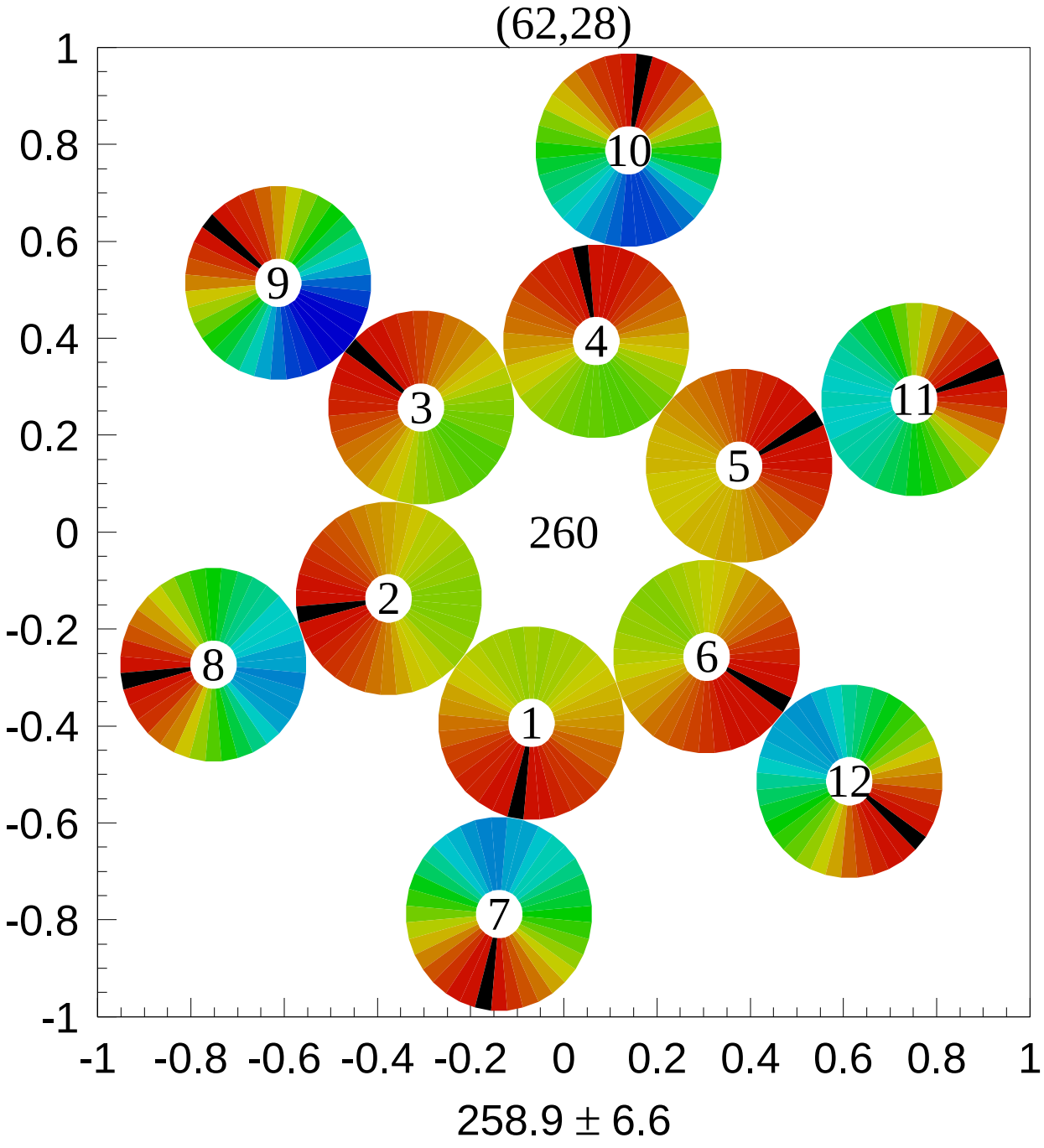

(62,26)
tilted LEDs
120 123 121 127 120 118
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 117 117 117 123 118
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

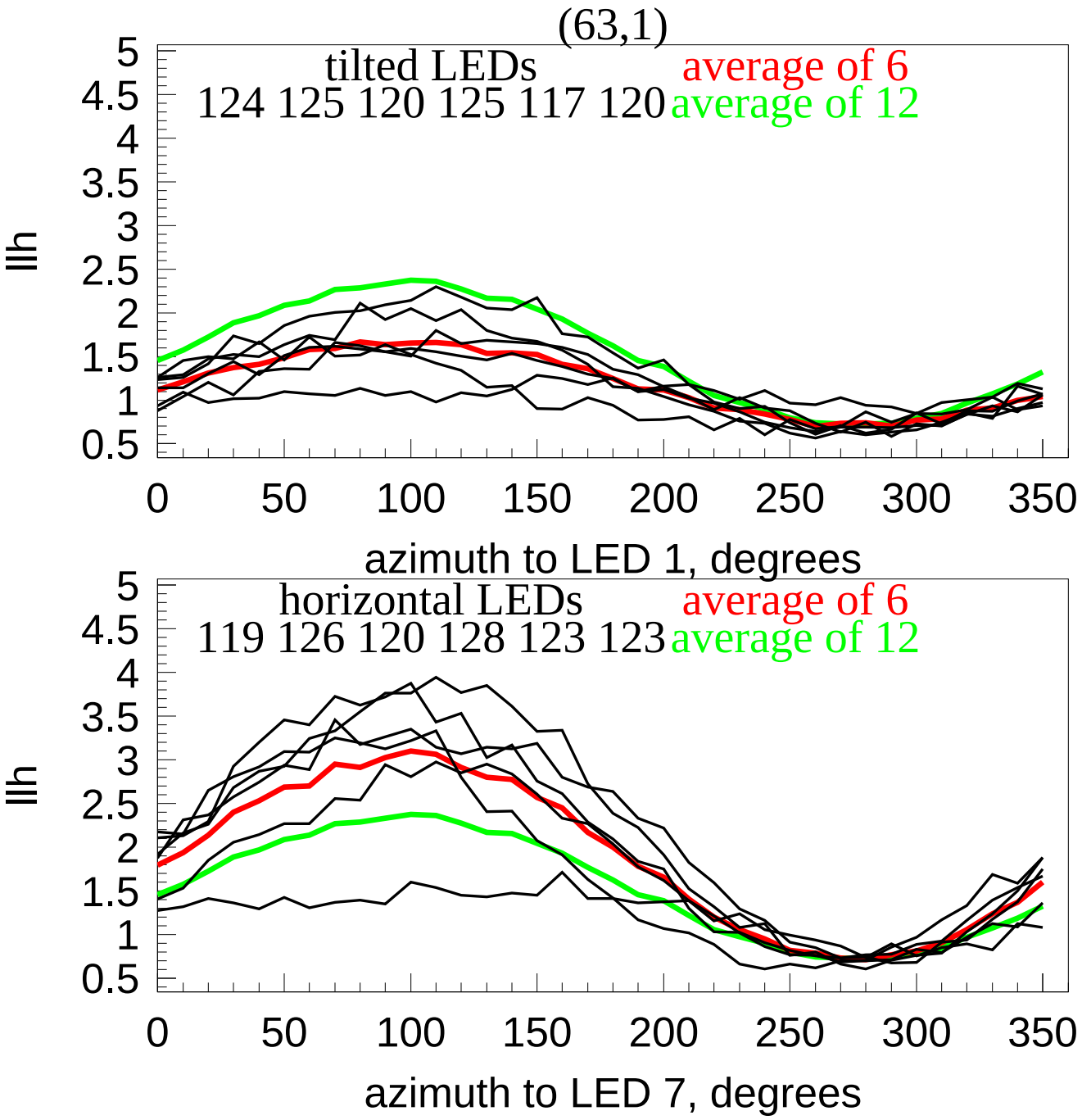

(62,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242.4 ± 5.5

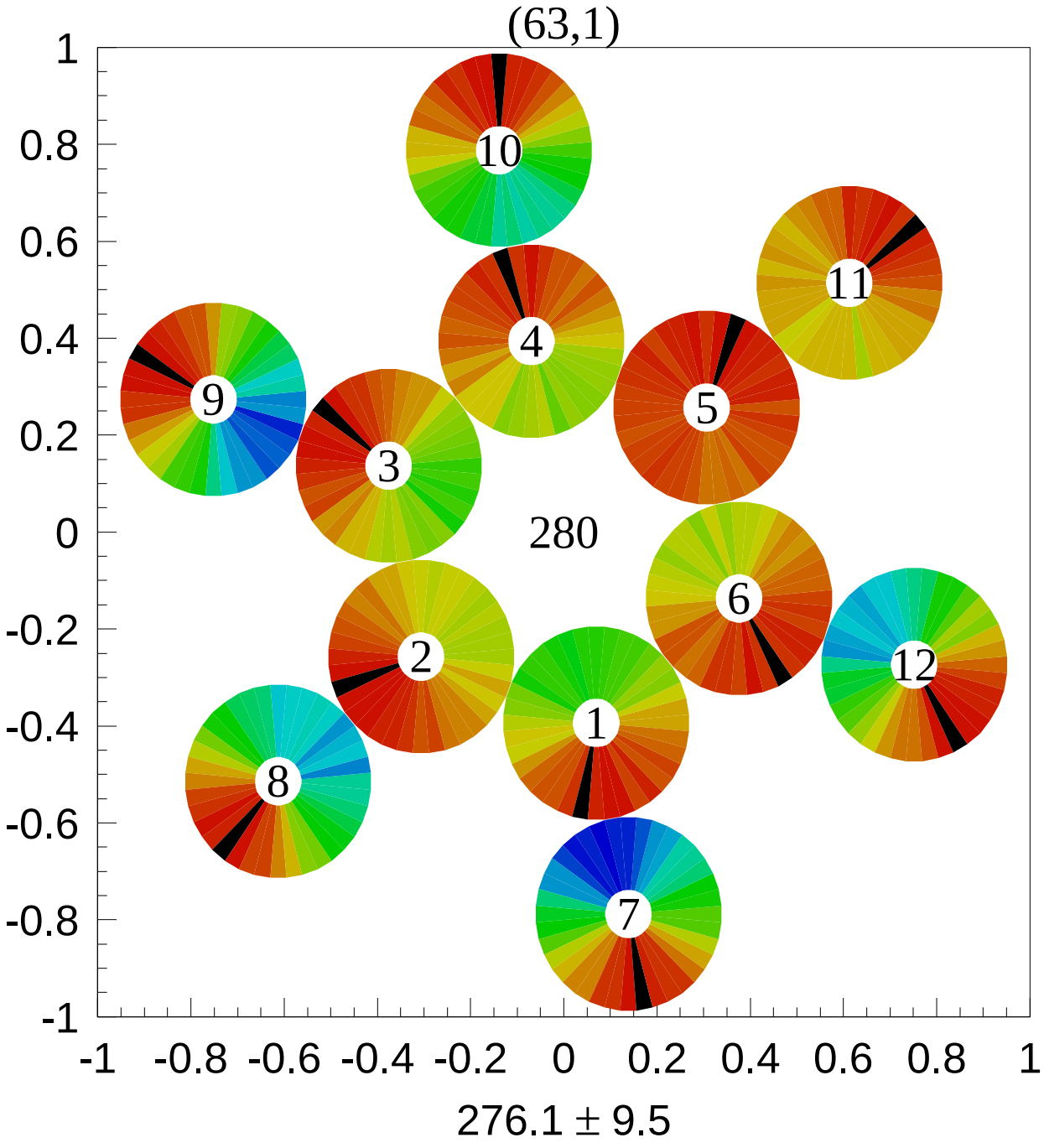

(62,27)
tilted LEDs
117 123 118 118 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 118 120 124 129 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

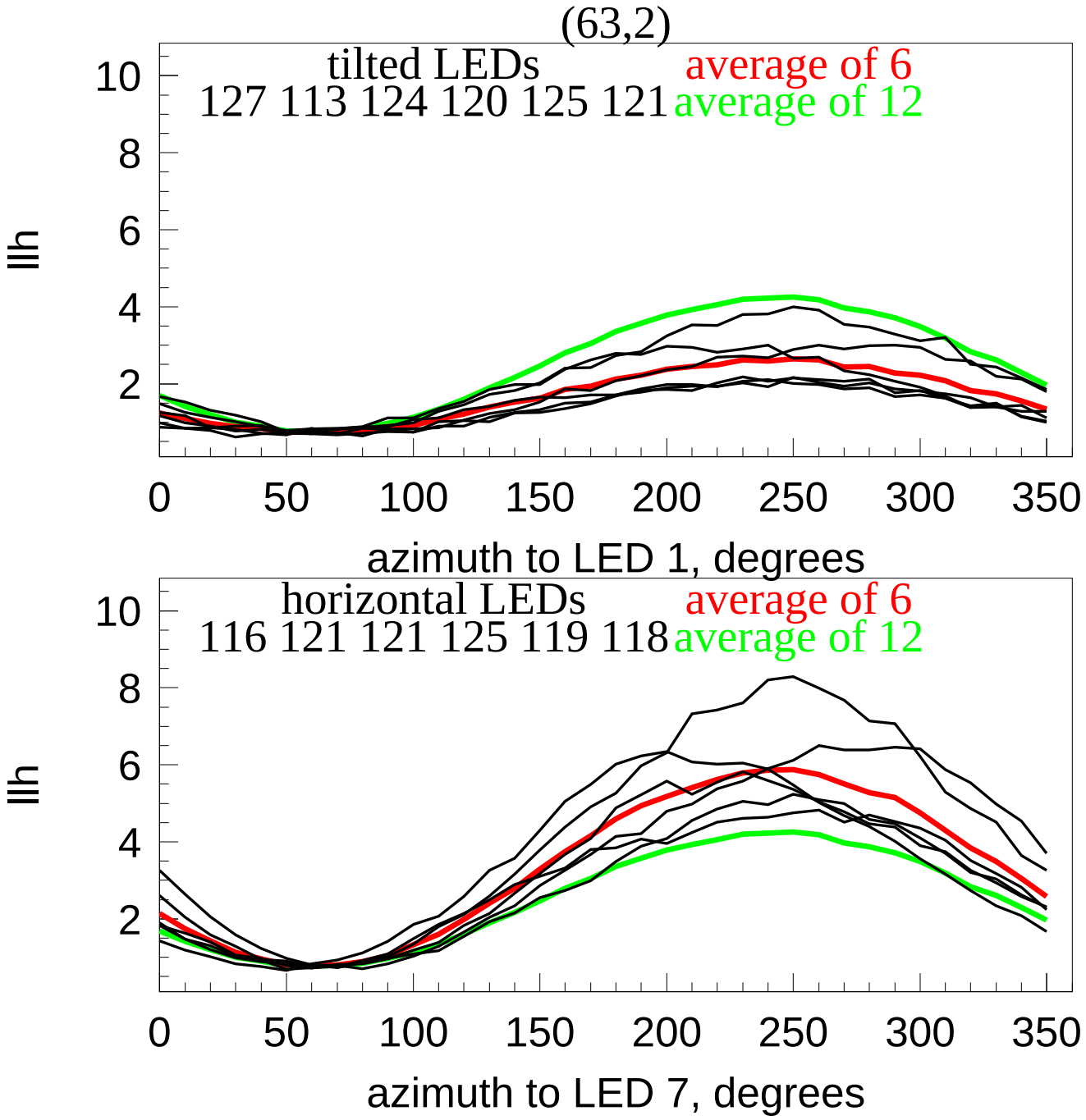

(62,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
216.5 ± 5.4

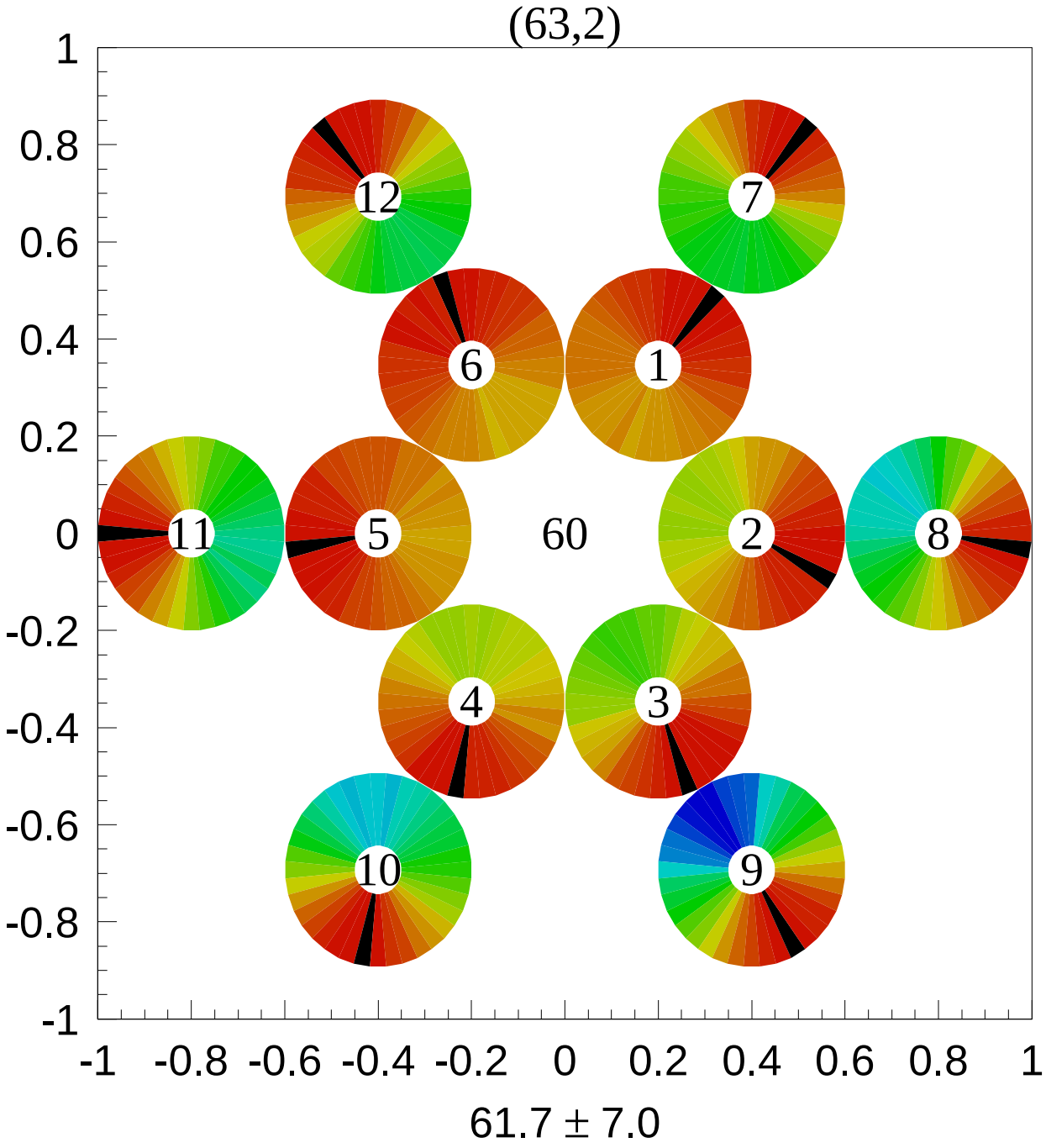

(62,28)
tilted LEDs
120 107 128 123 113 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 115 133 116 120 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

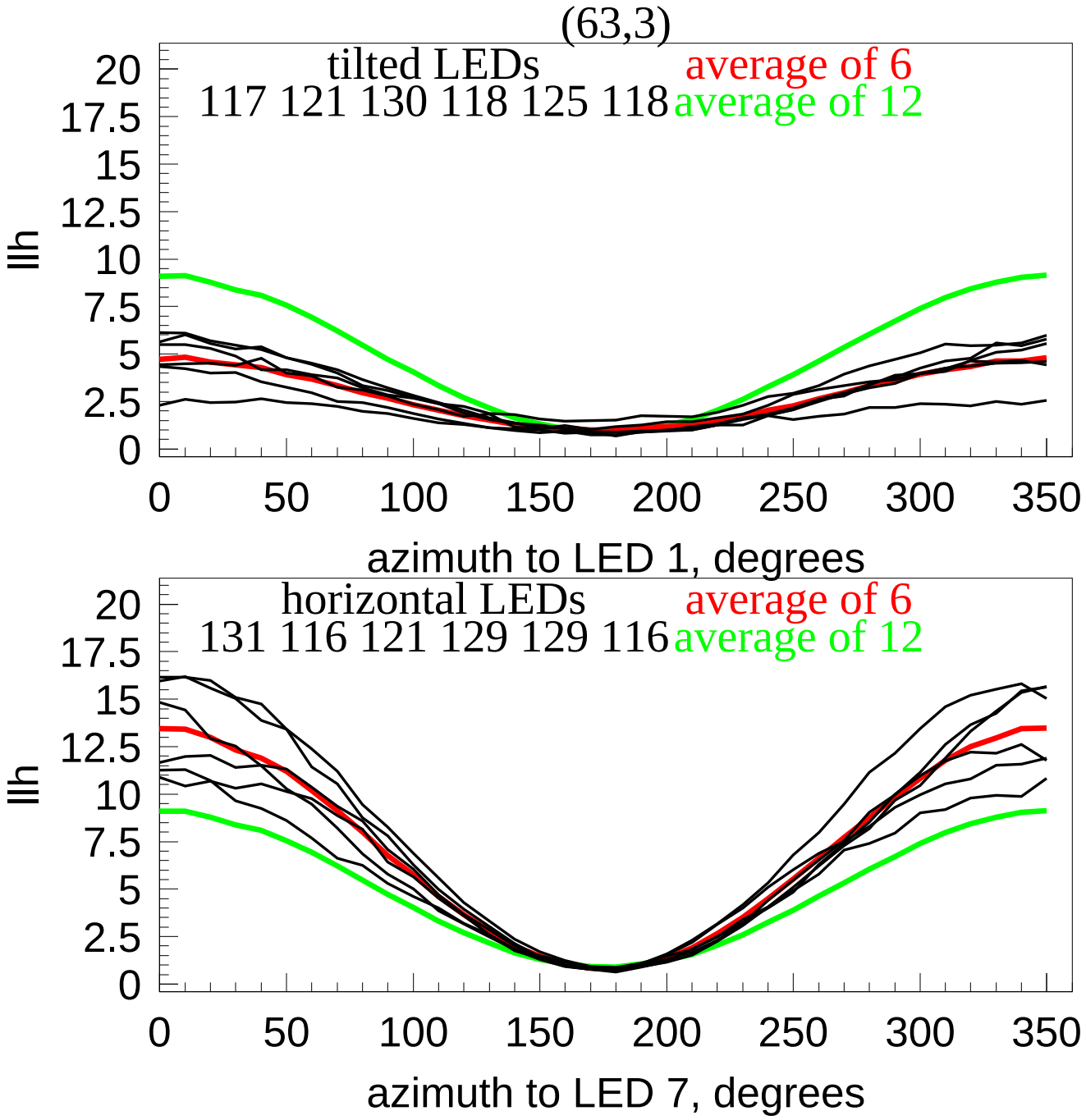

(62,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
258.9 ± 6.6

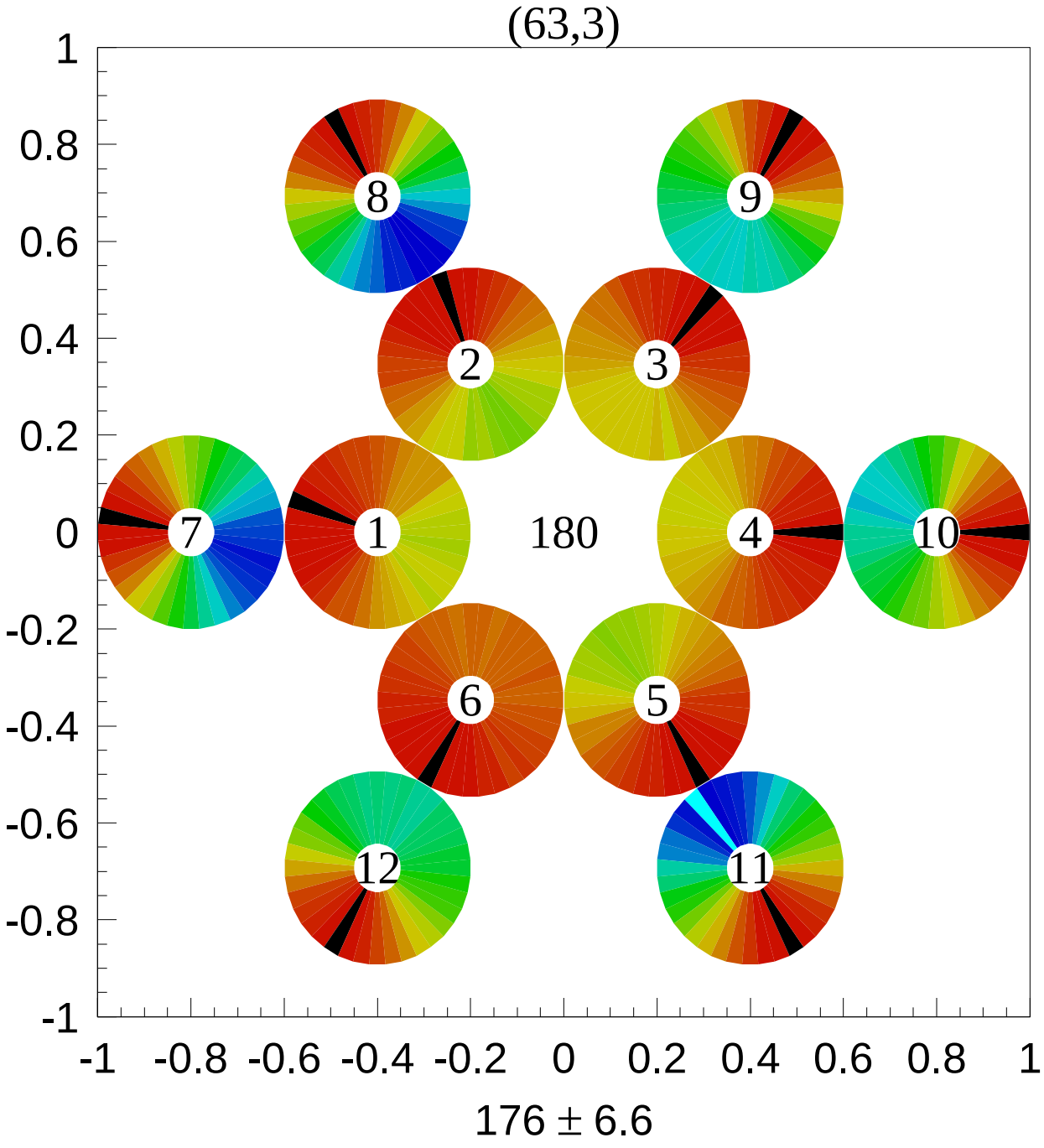

(63,1)
tilted LEDs
124 125 120 125 117 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 126 120 128 123 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

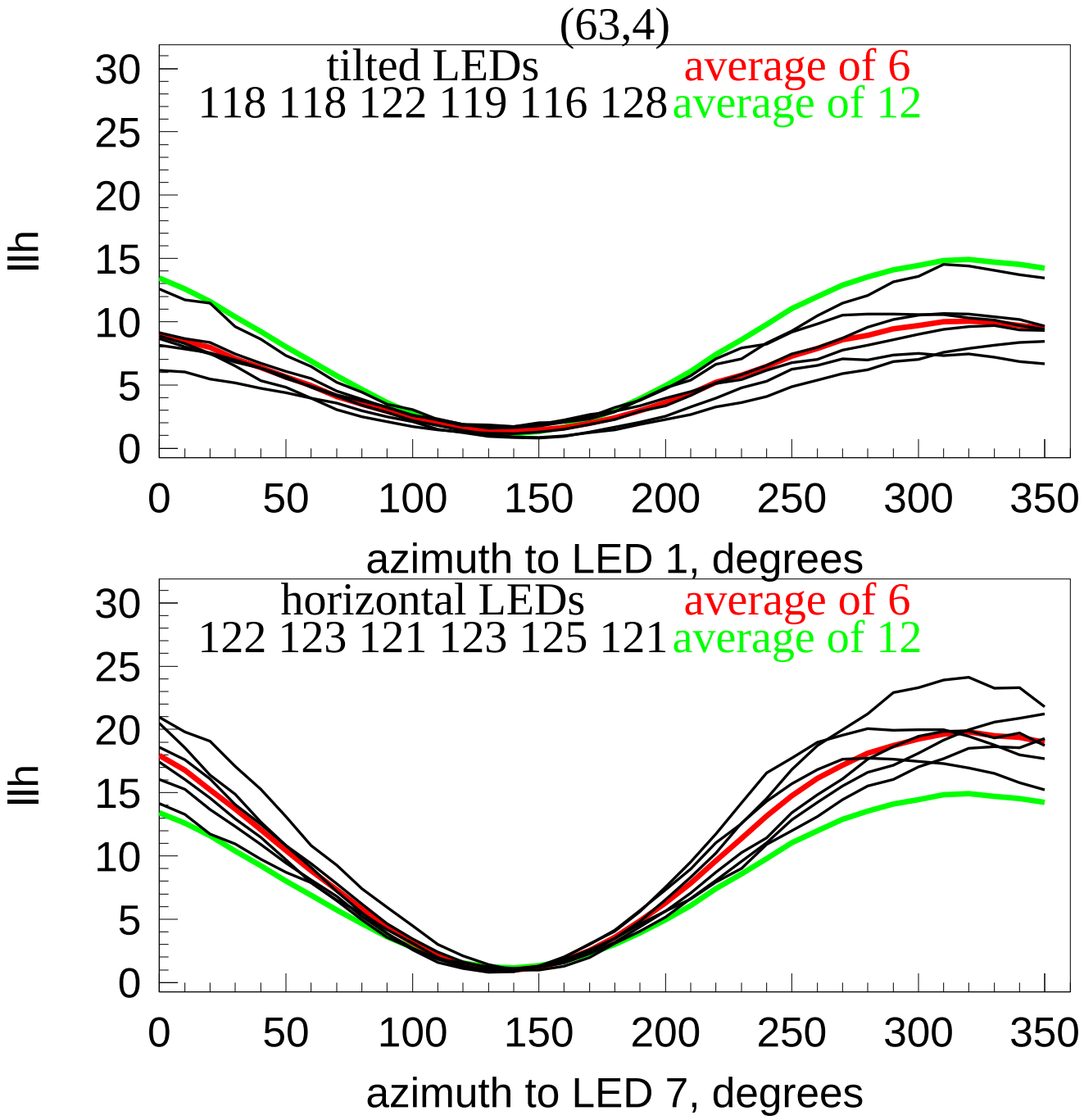

(63,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
276.1 ± 9.5

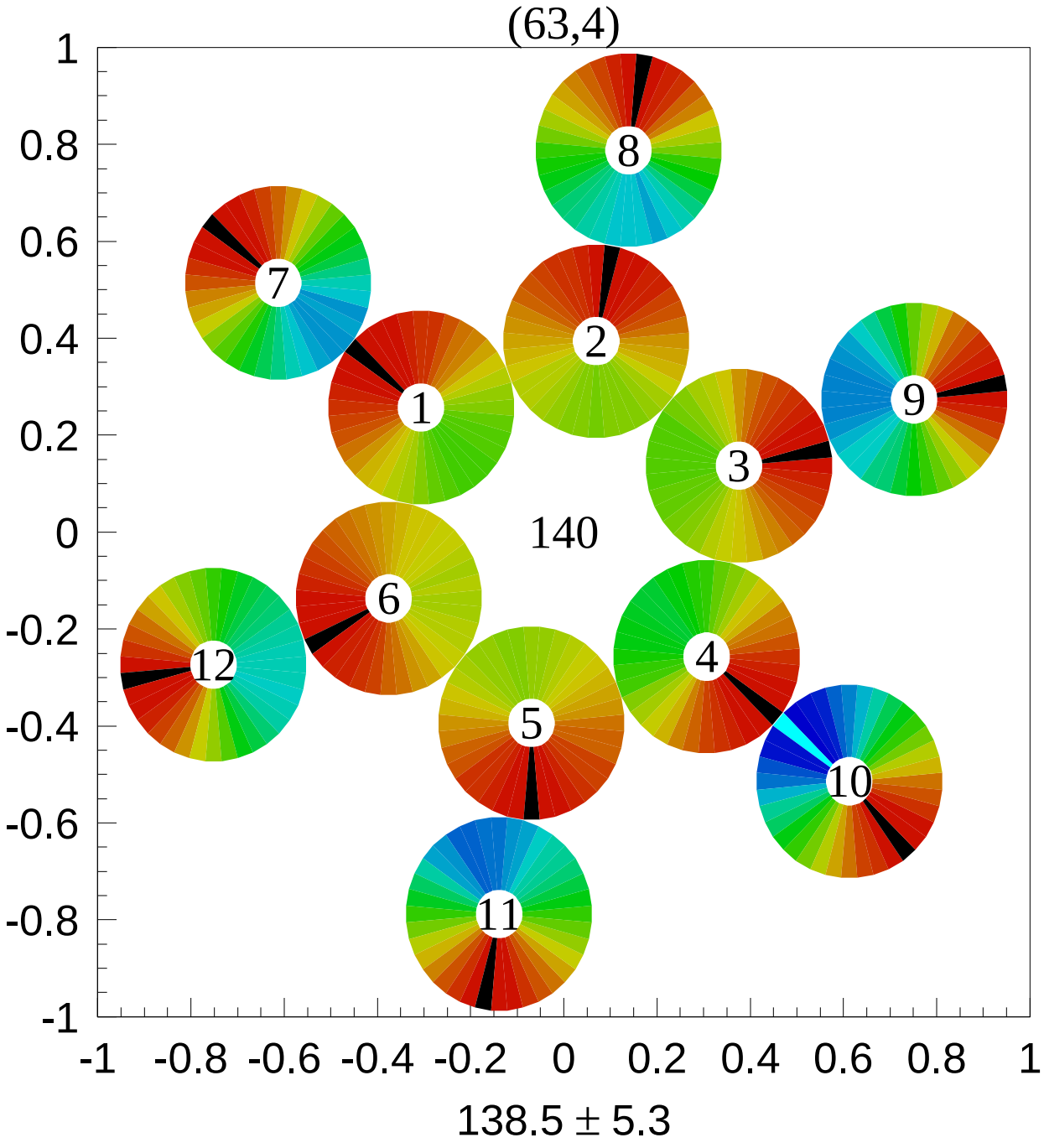

(63,2)
tilted LEDs
127 113 124 120 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 121 121 125 119 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

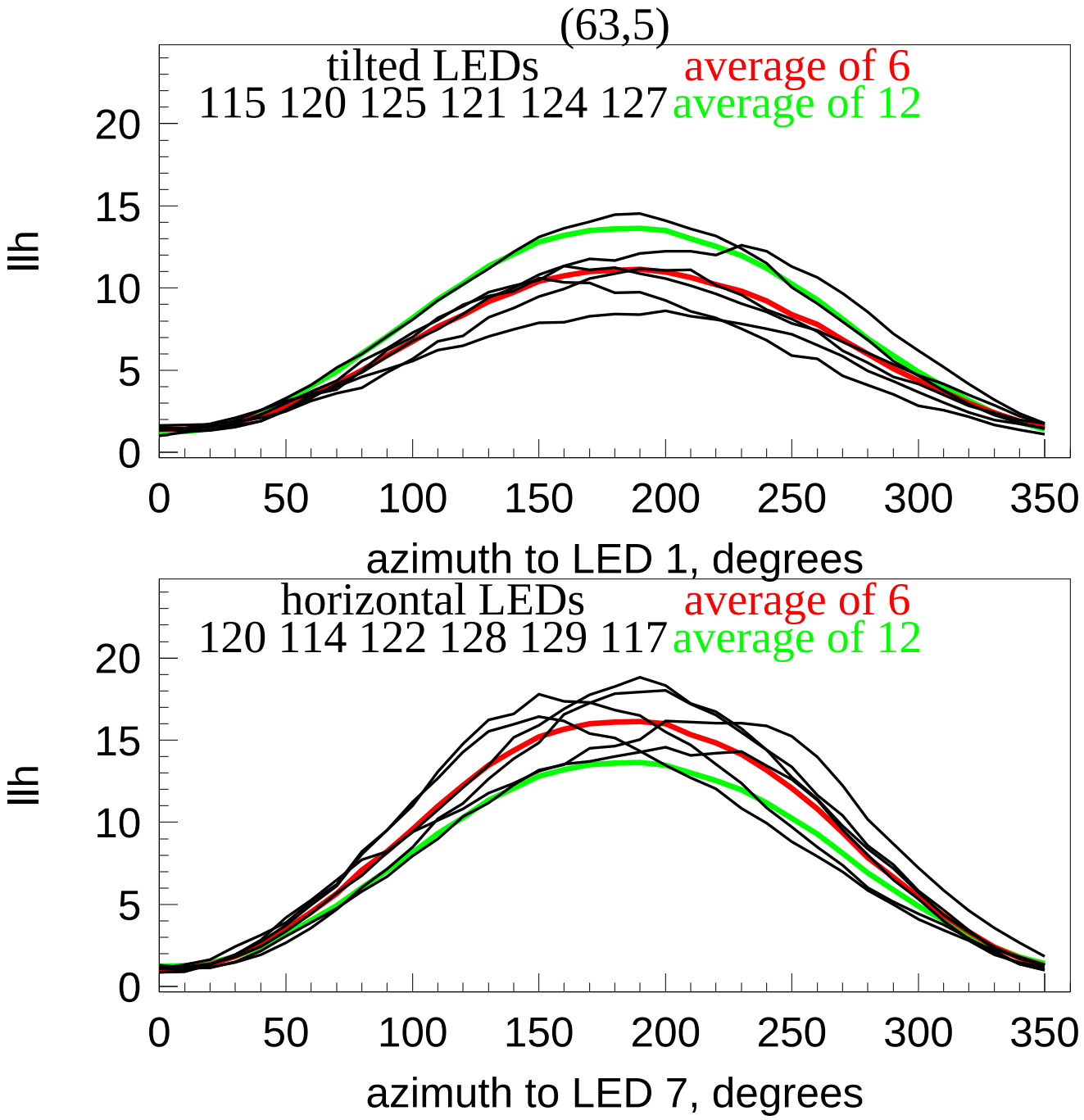

(63,2)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
61.7 ± 7.0

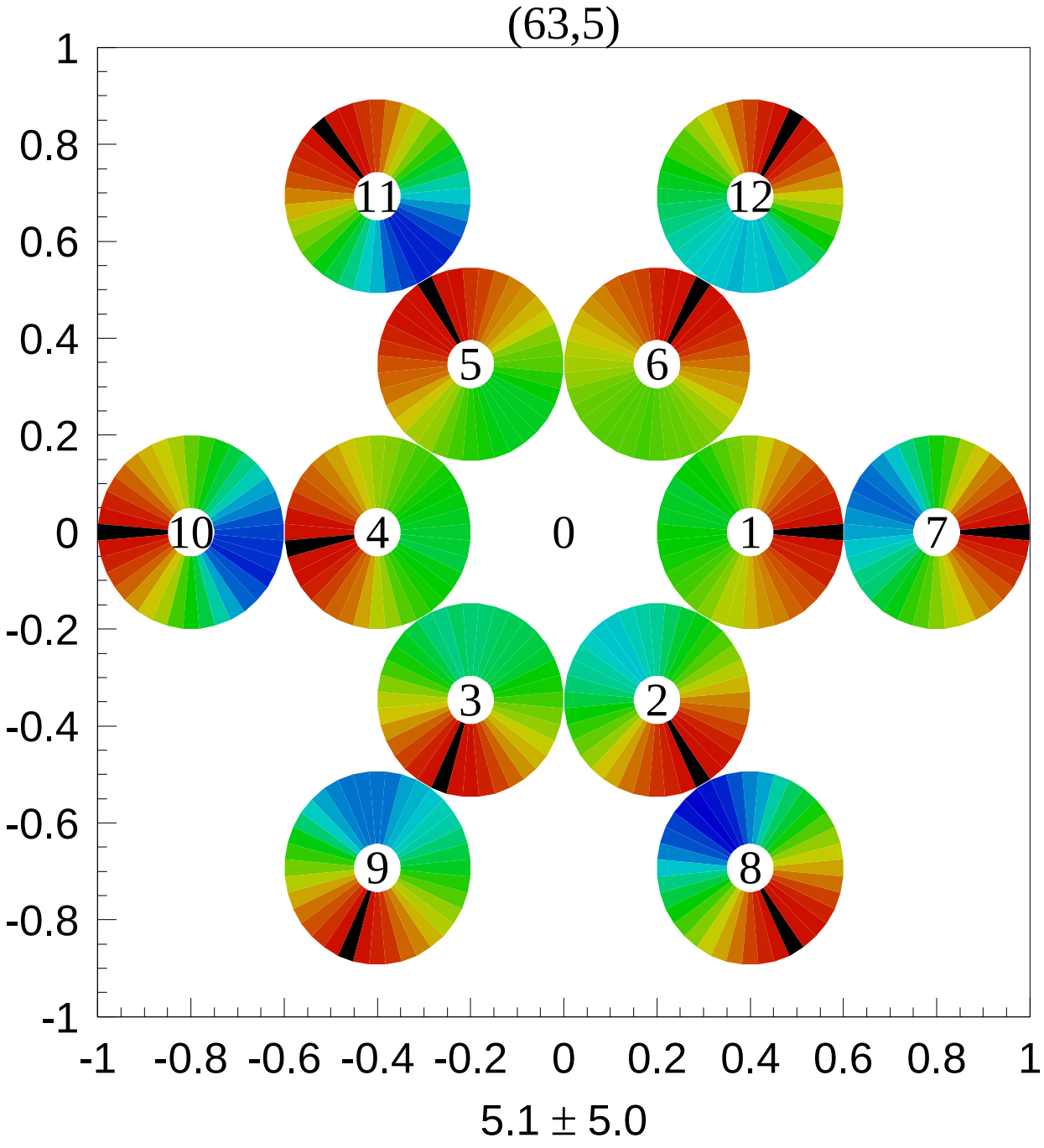

(63,3)
tilted LEDs
117 121 130 118 125 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 116 121 129 129 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

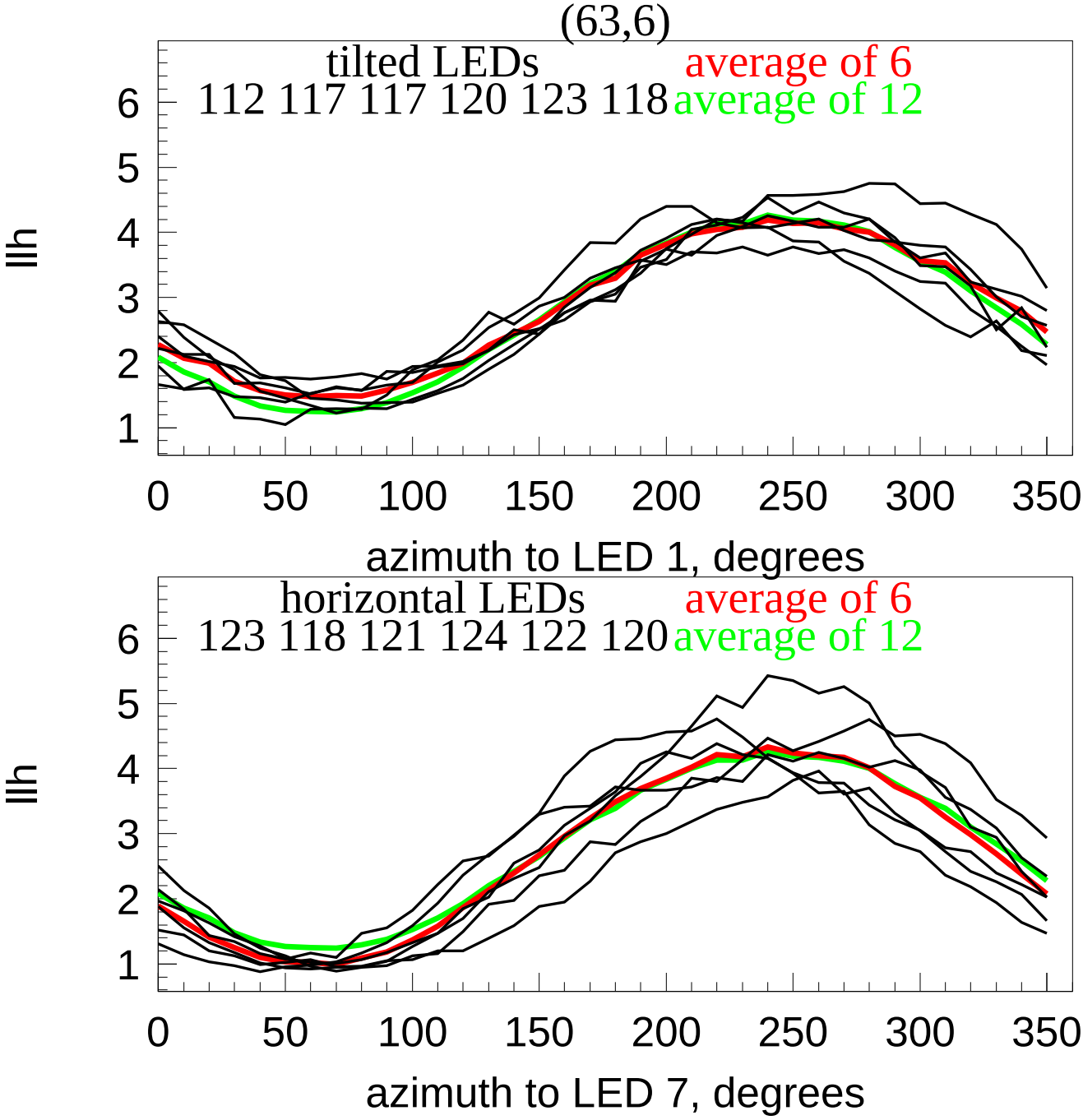

(63,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
176 ± 6.6

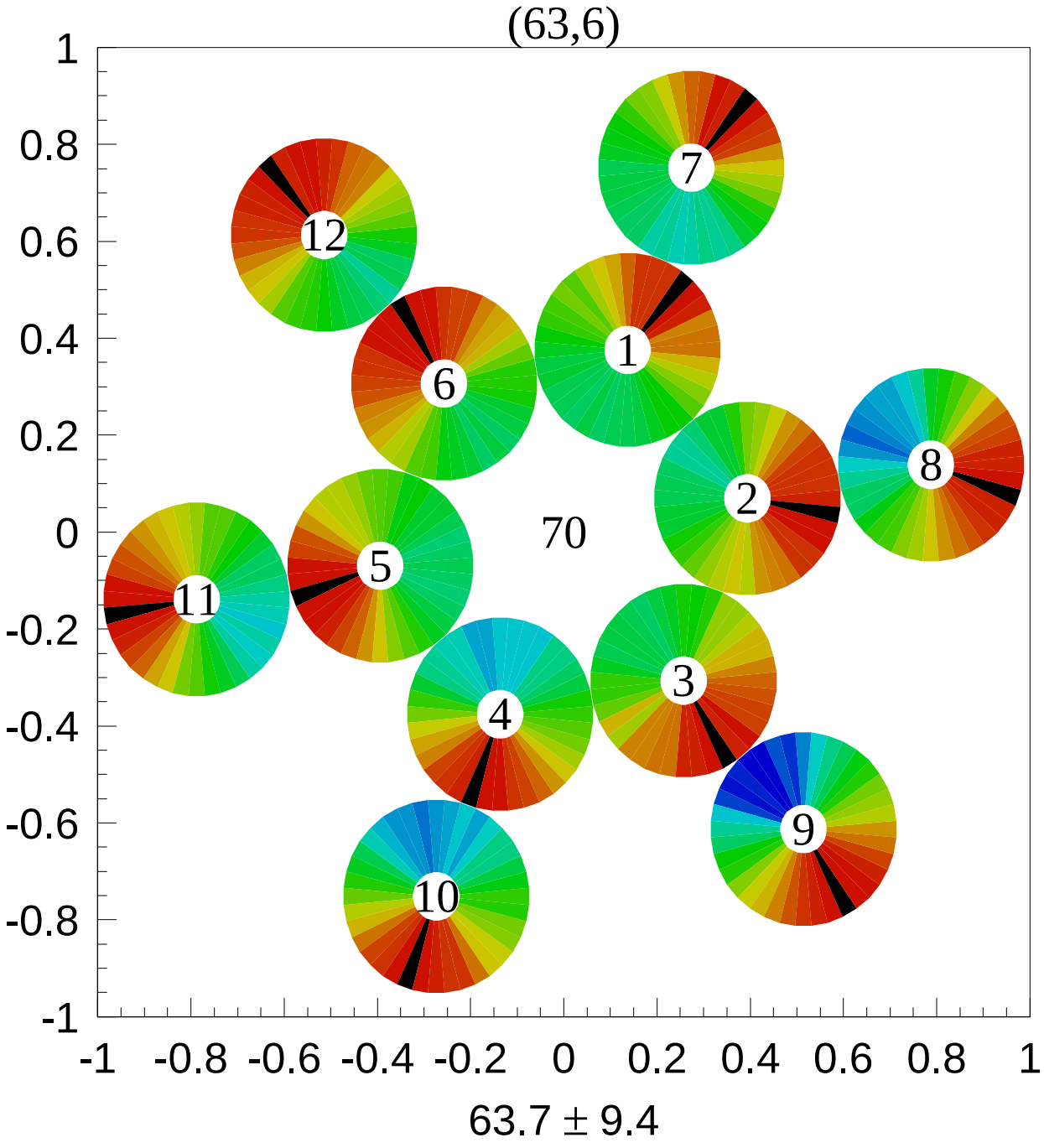

(63,4)
tilted LEDs
118 118 122 119 116 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 123 121 123 125 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

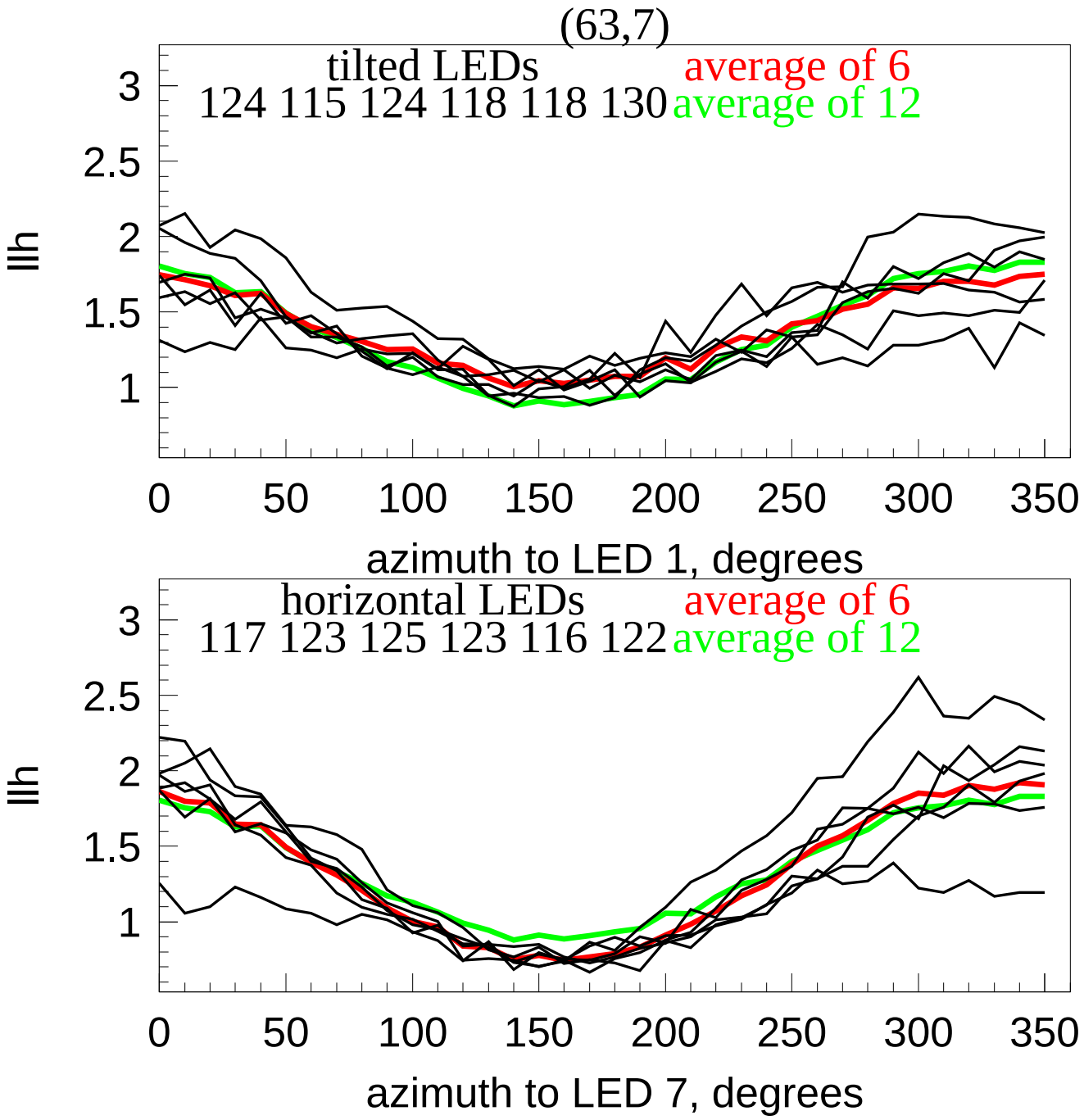

(63,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
138.5 ± 5.3
140
1
2
3
4
5
6
7
8
9
10
11
12

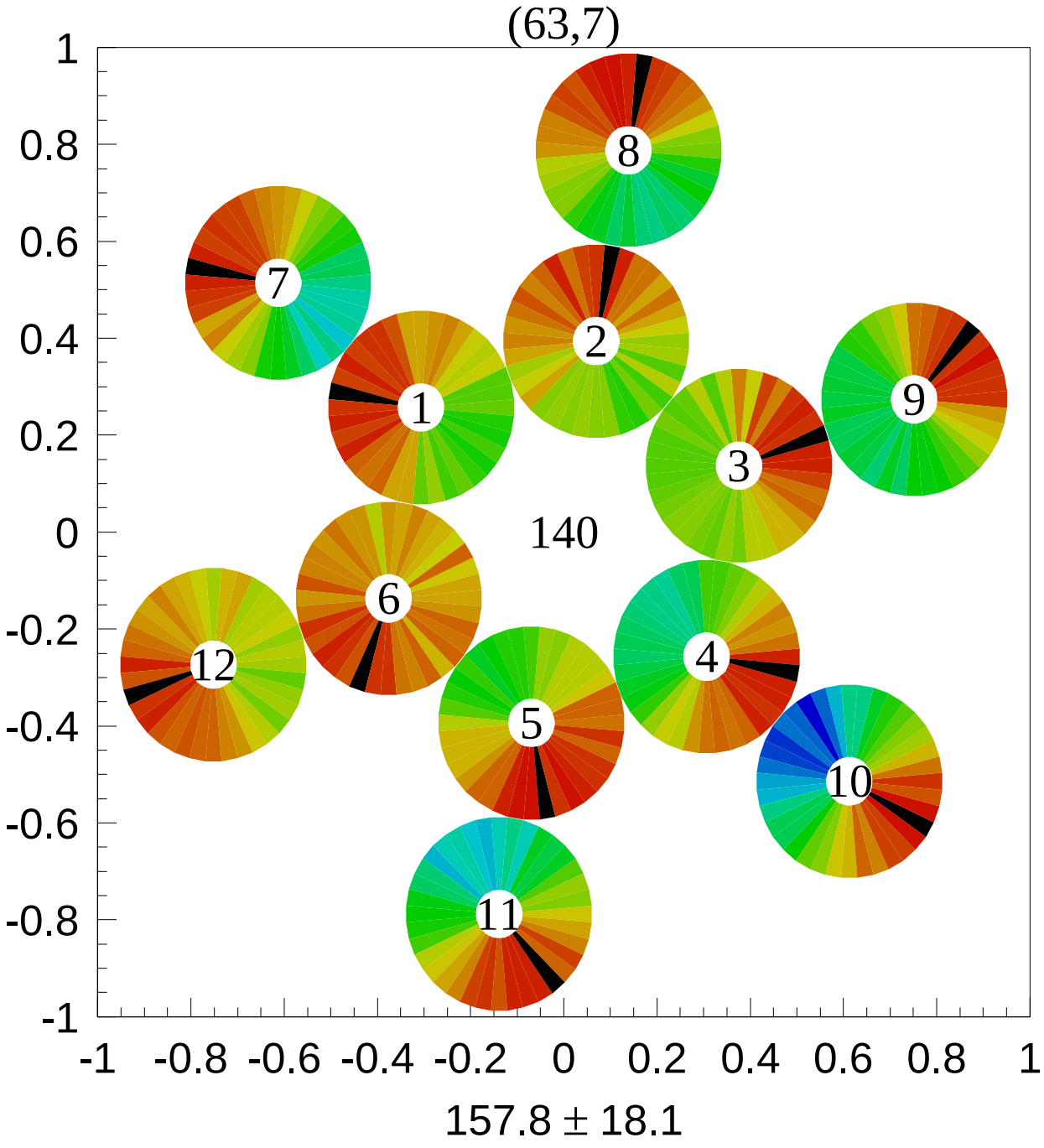

(63,5)
tilted LEDs
115 120 125 121 124 127
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 114 122 128 129 117
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

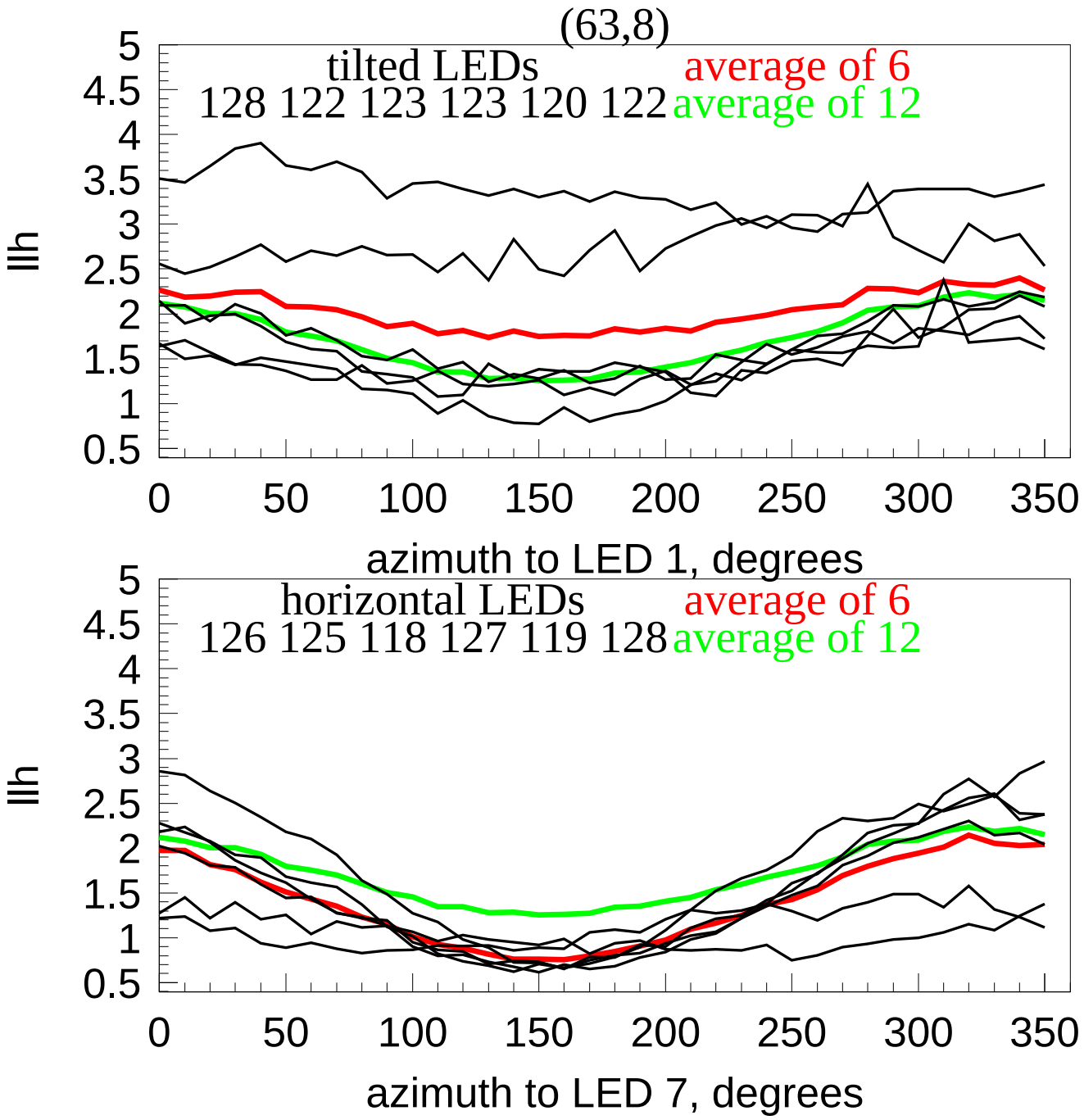

(63,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
5.1 ± 5.0
11
12
5
6
10
4
0
1
7
3
2
9
8

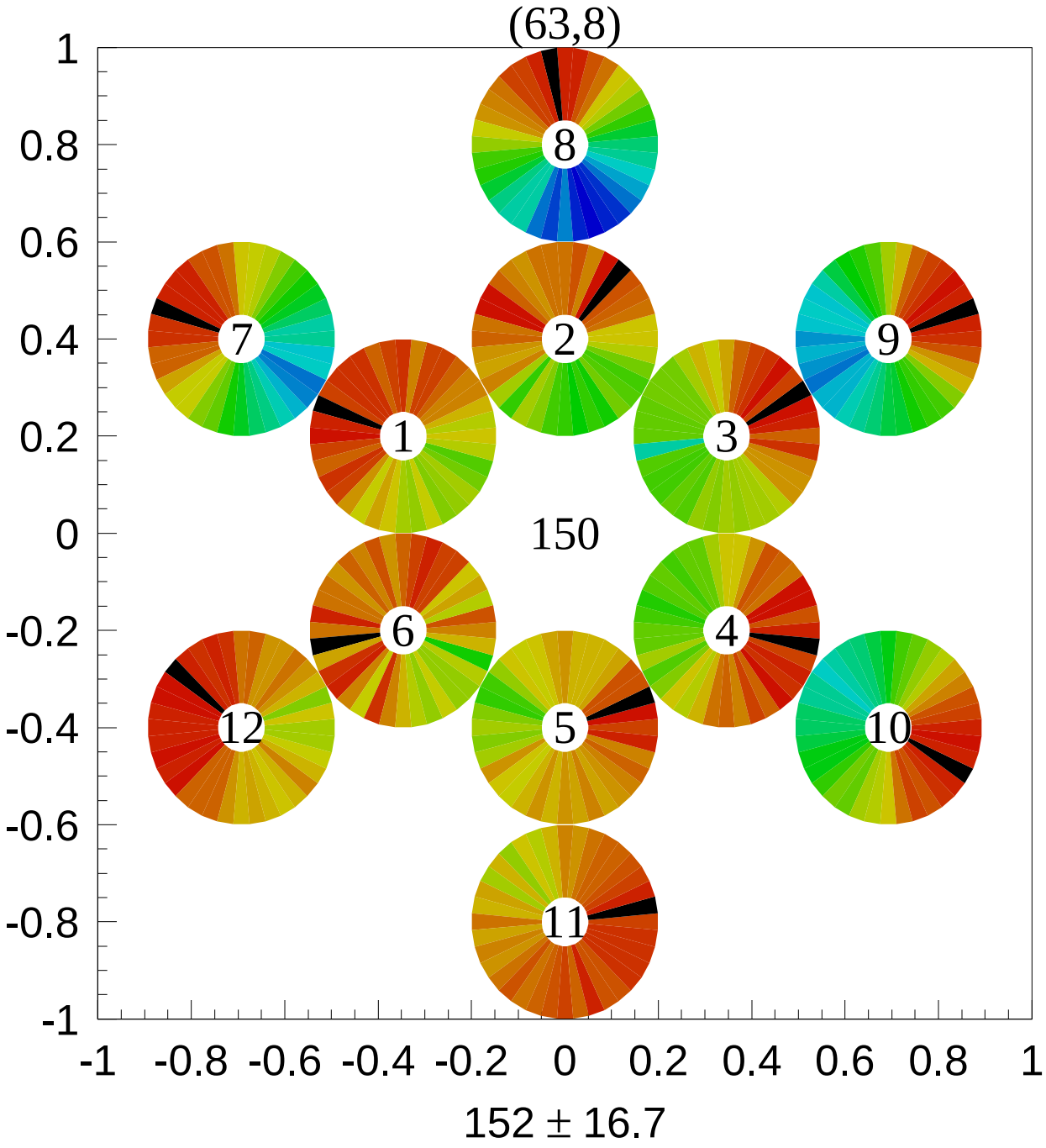

(63,6)
tilted LEDs
112 117 117 120 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 121 124 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

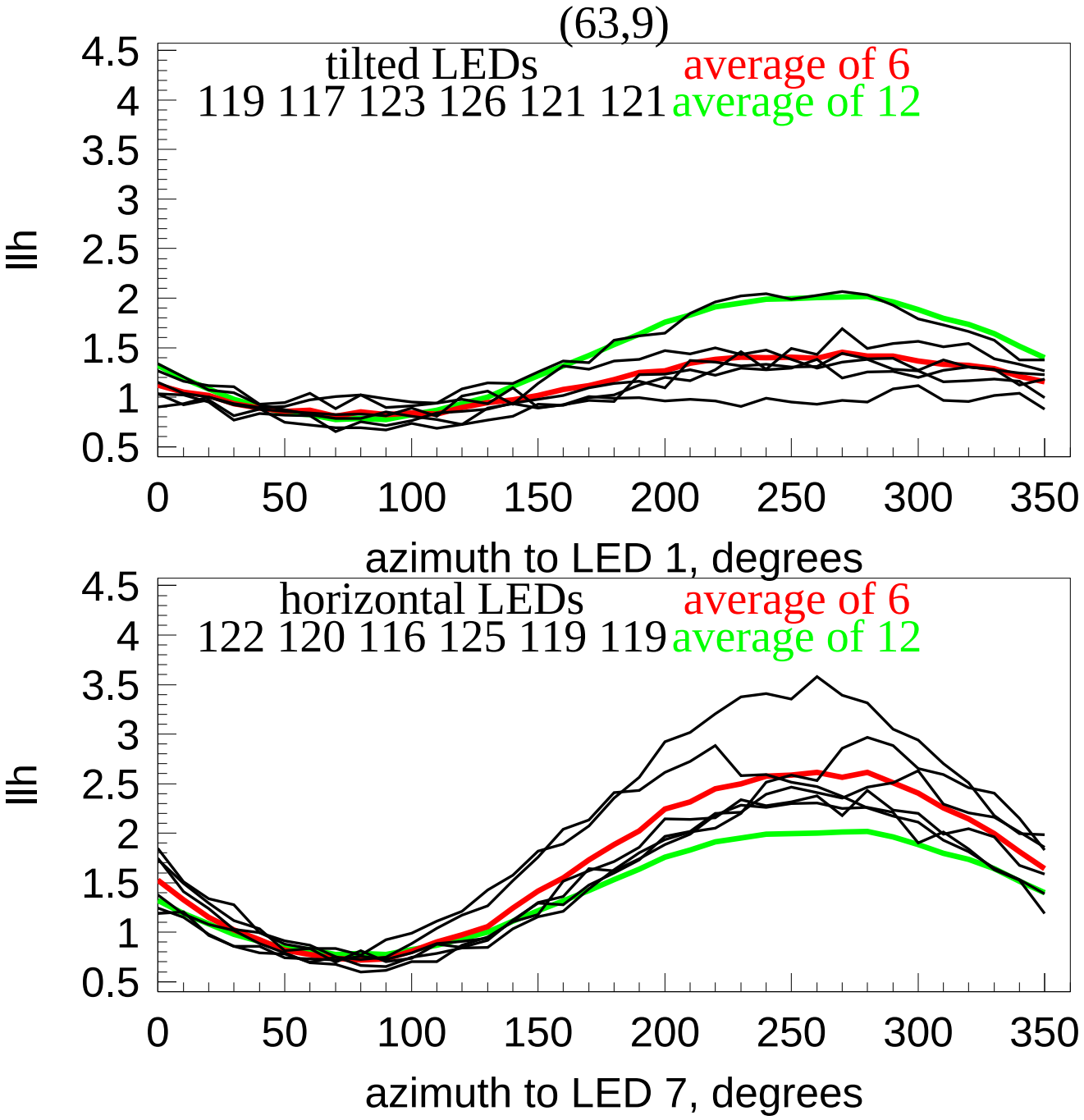

(63,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
63.7 ± 9.4
70
1
2
3
4
5
6
7
8
9
10
11
12

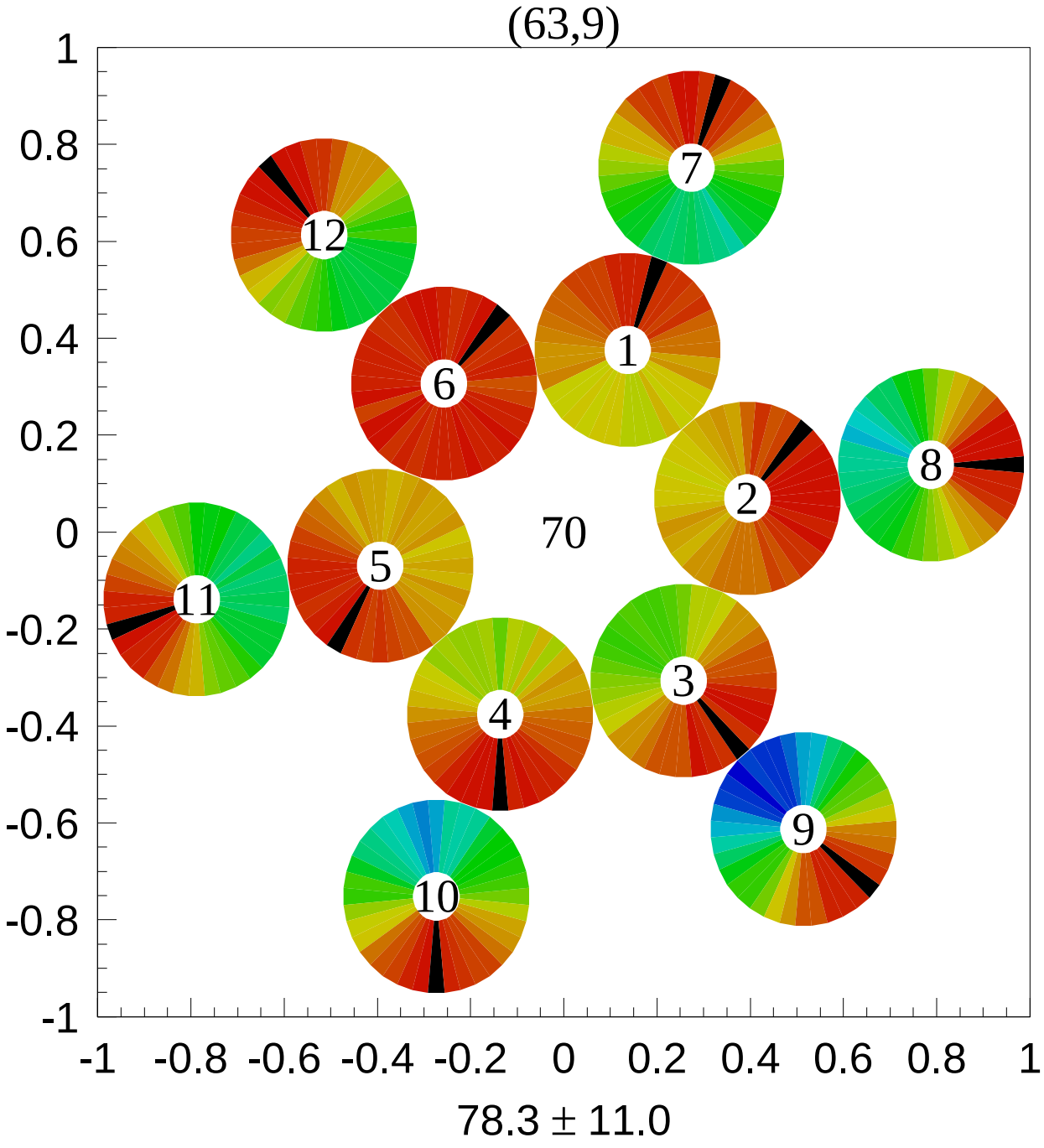

(63,7)
tilted LEDs
124 115 124 118 118 130
average of 6
average of 12
llh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 123 125 123 116 122
average of 6
average of 12
llh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

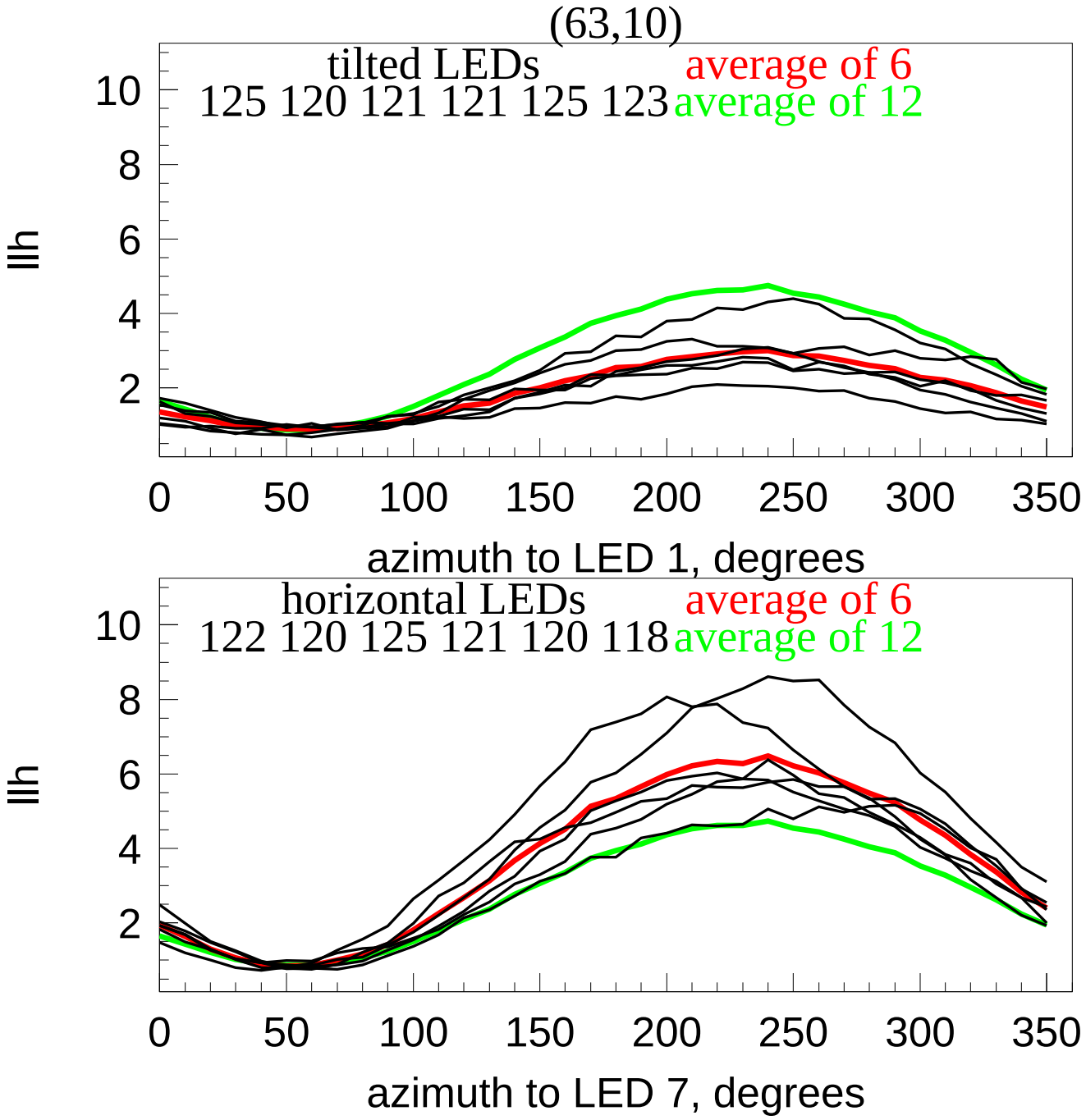

(63,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
157.8 ± 18.1
140
1
2
3
4
5
6
7
8
9
10
11
12

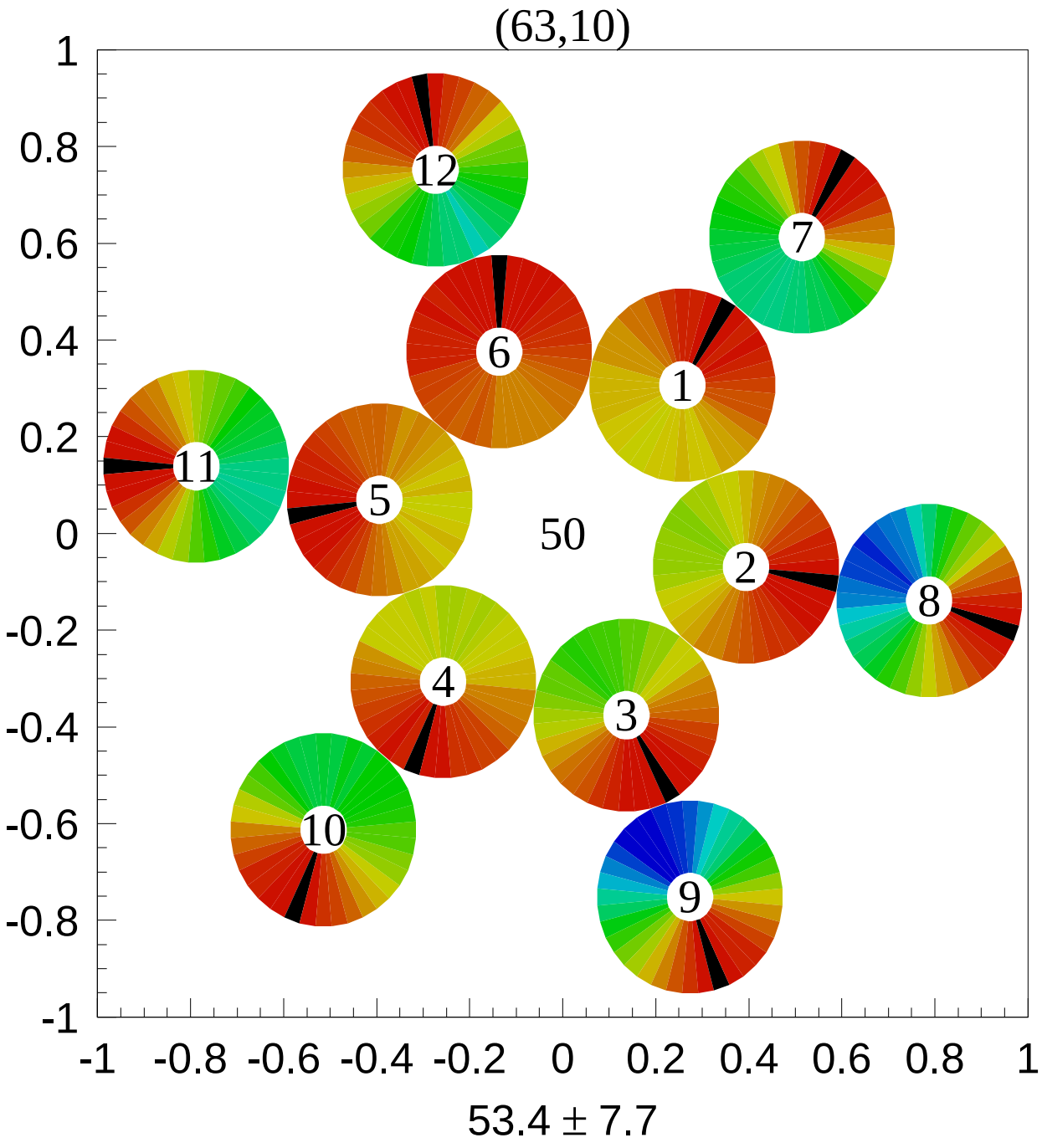

(63,8)
tilted LEDs
128 122 123 123 120 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 125 118 127 119 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

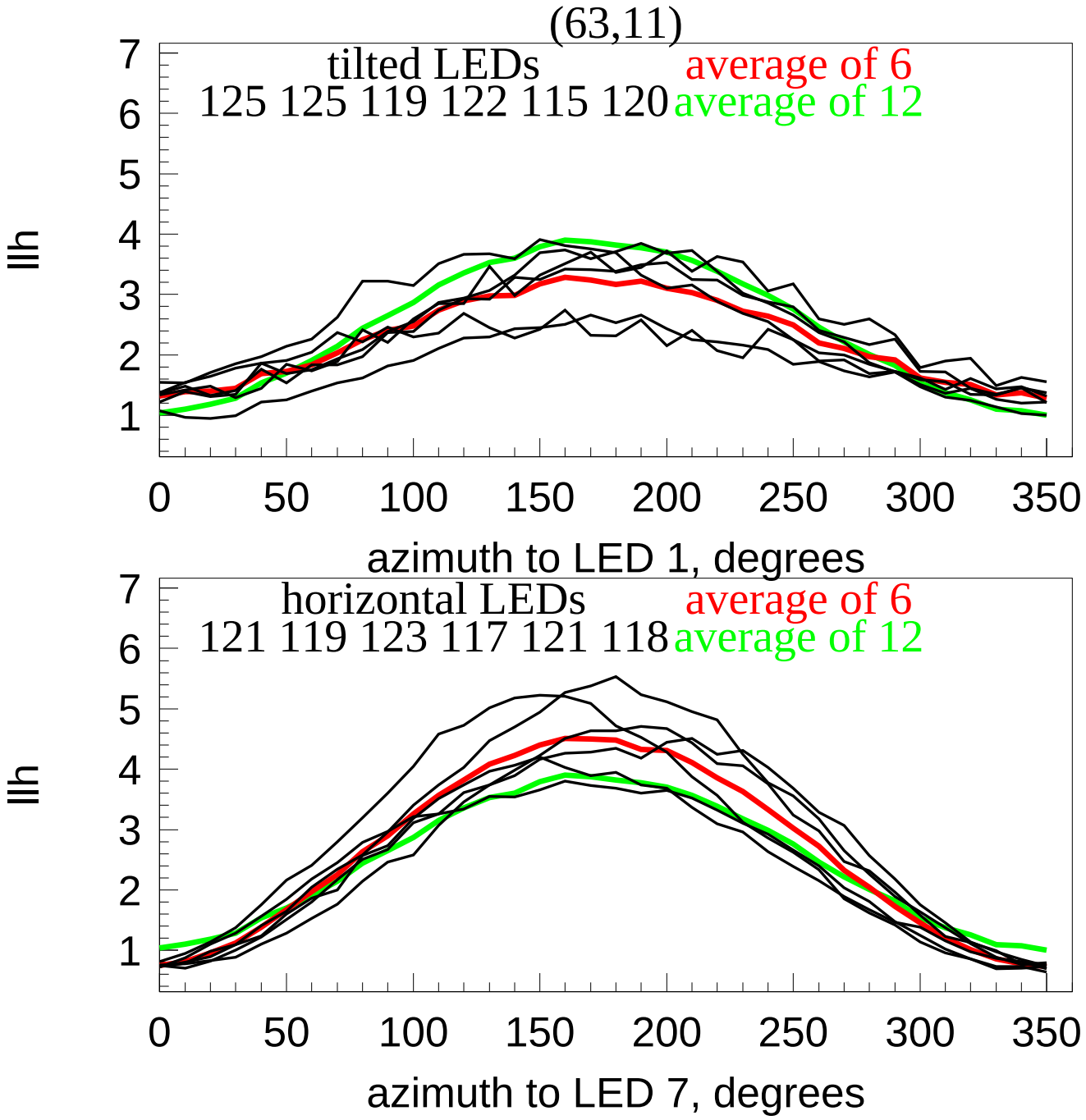

(63,8)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
152 ± 16.7

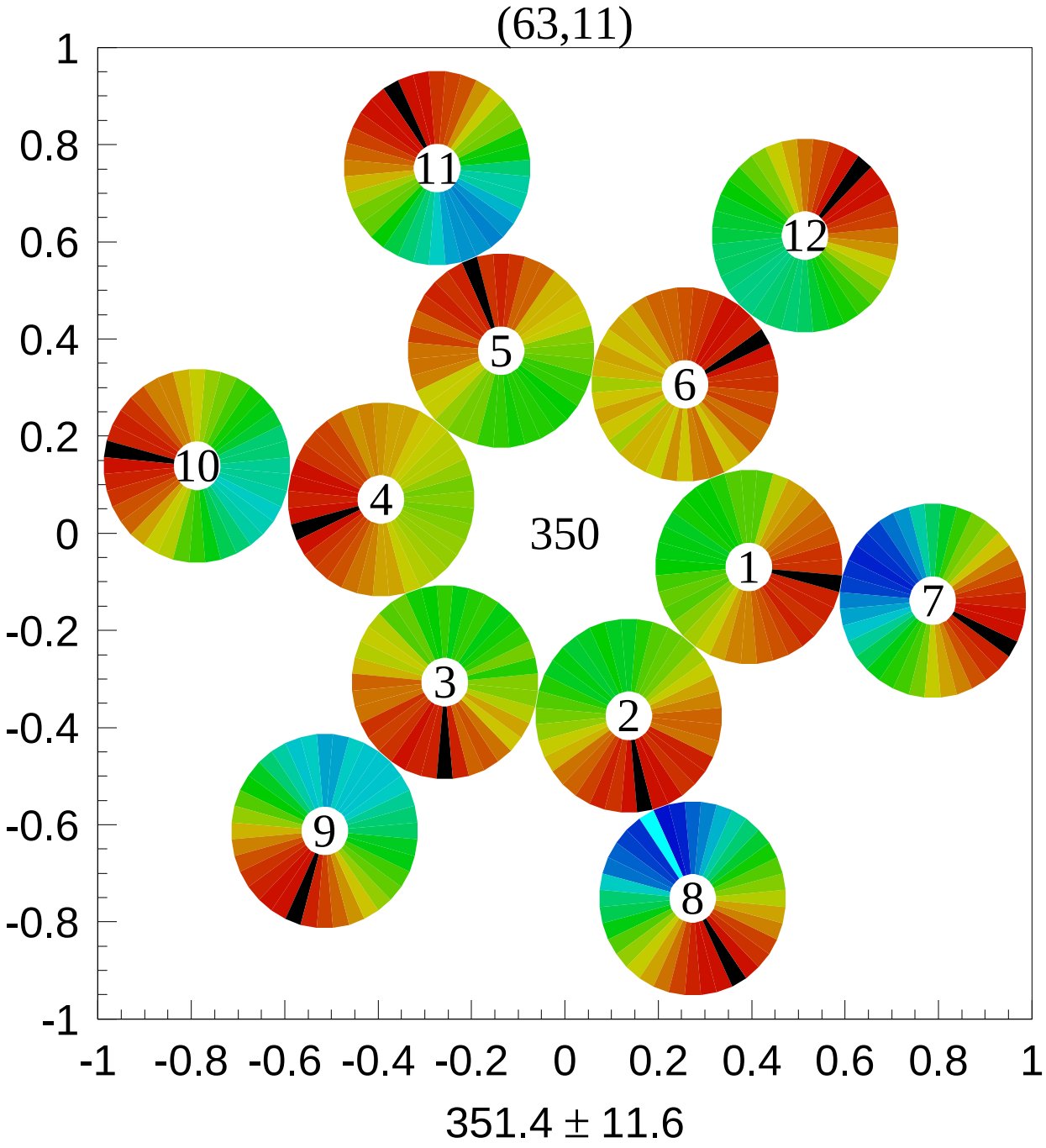

(63,9)
tilted LEDs
119 117 123 126 121 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 120 116 125 119 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

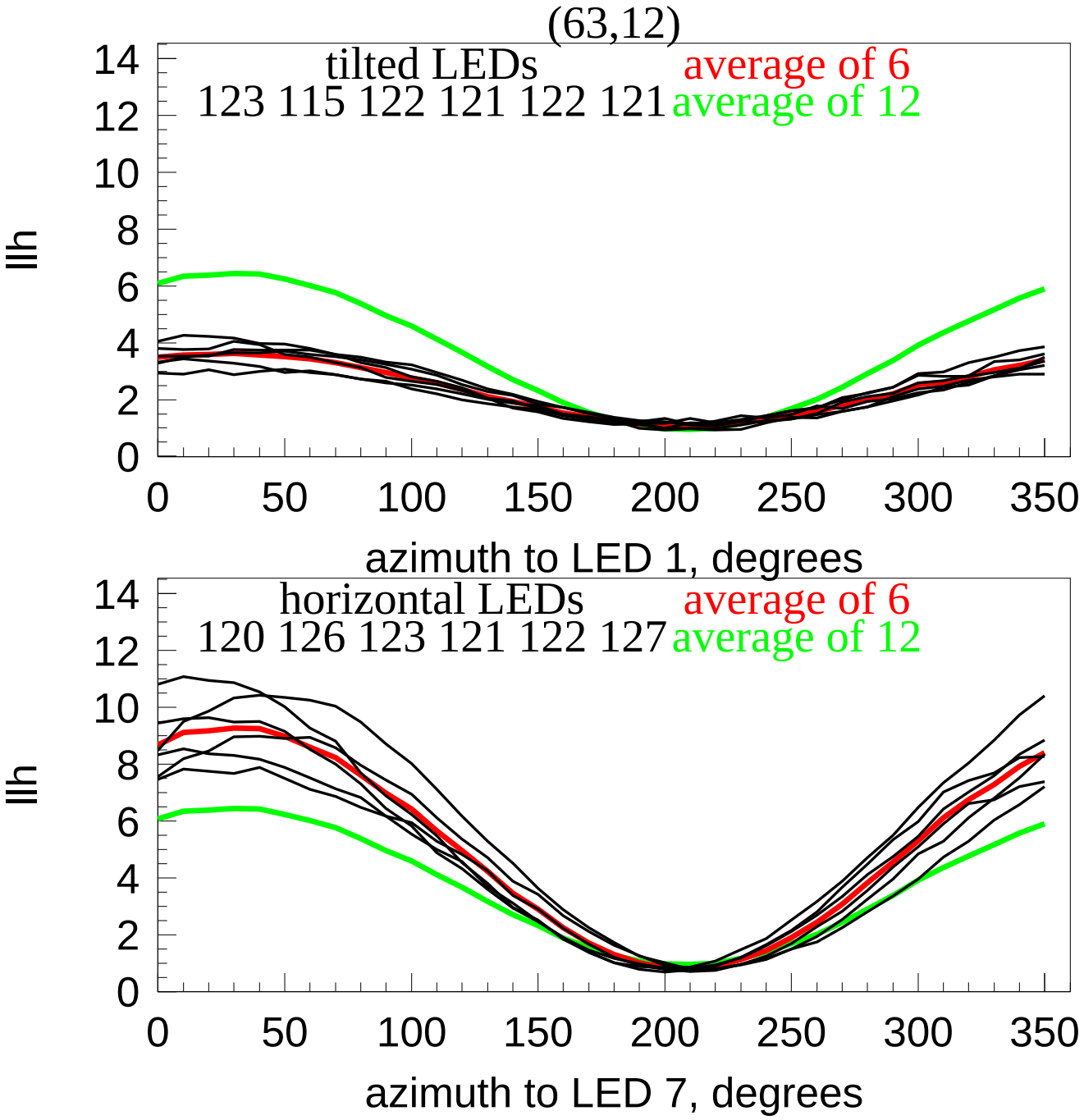

(63,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
3
4
9
10
78.3 ± 11.0

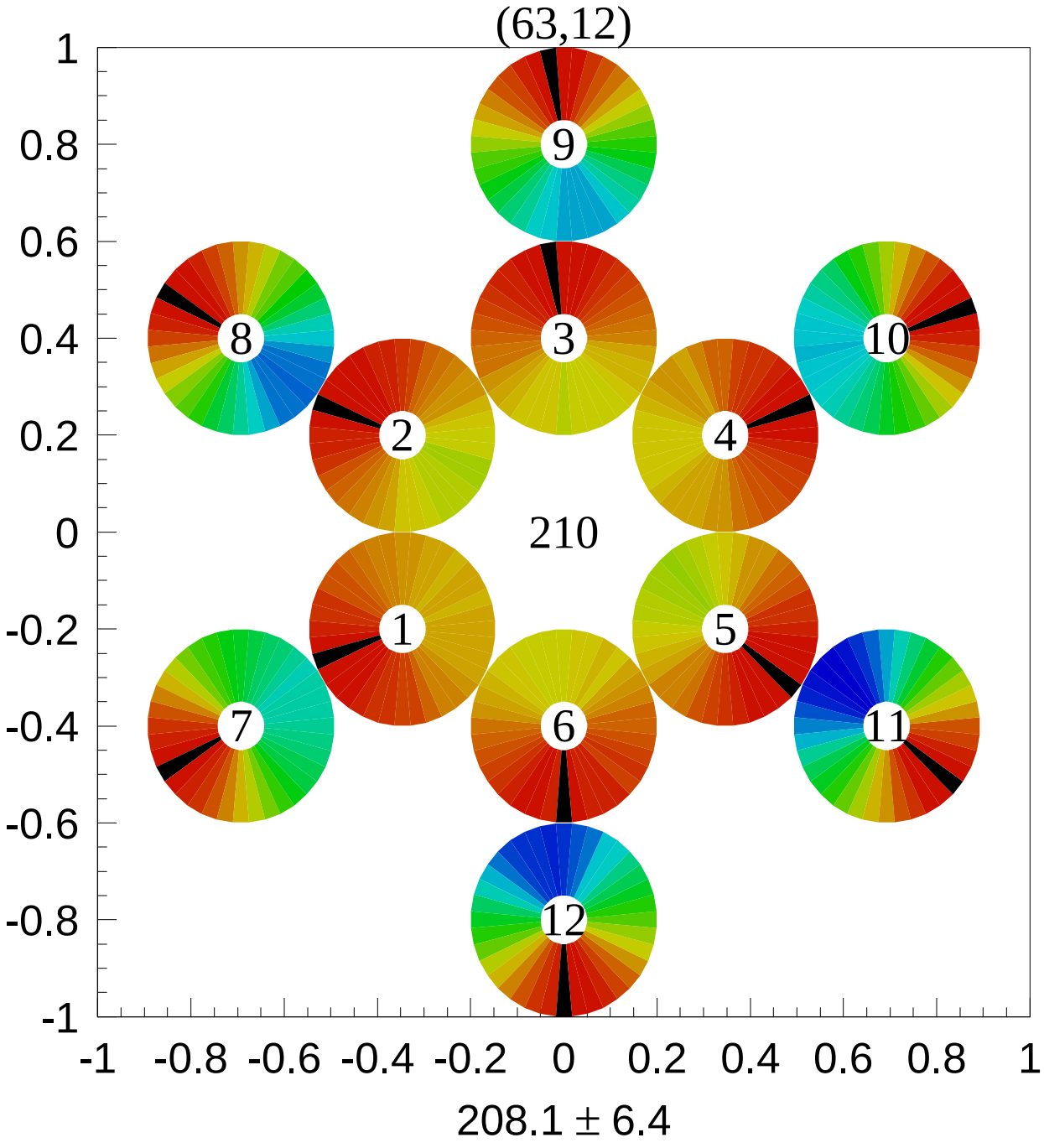

(63,10)
tilted LEDs
125 120 121 121 125 123
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 120 125 121 120 118
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

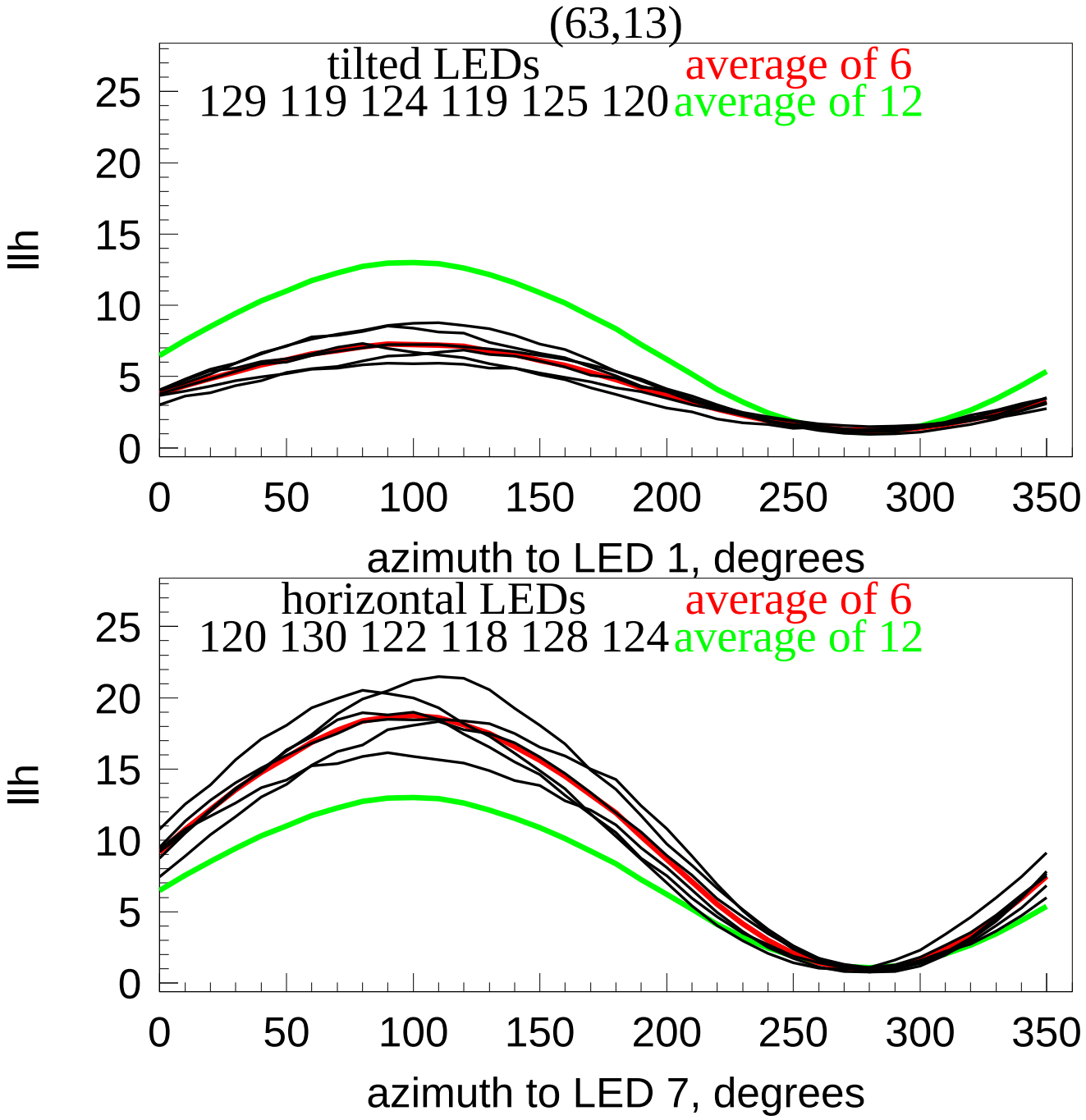

(63,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
53.4 ± 7.7

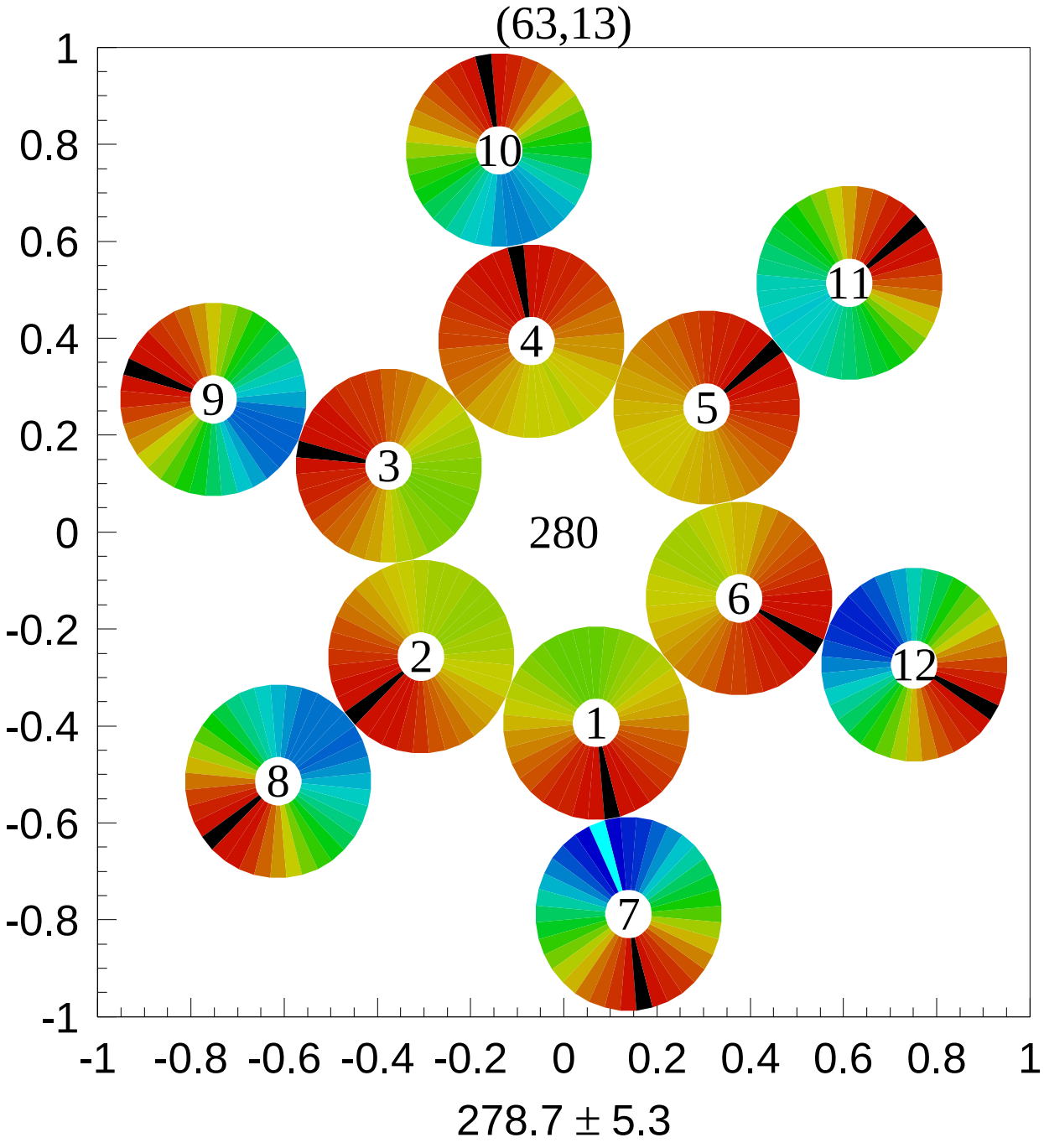

(63,11)
tilted LEDs
125 125 119 122 115 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 123 117 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

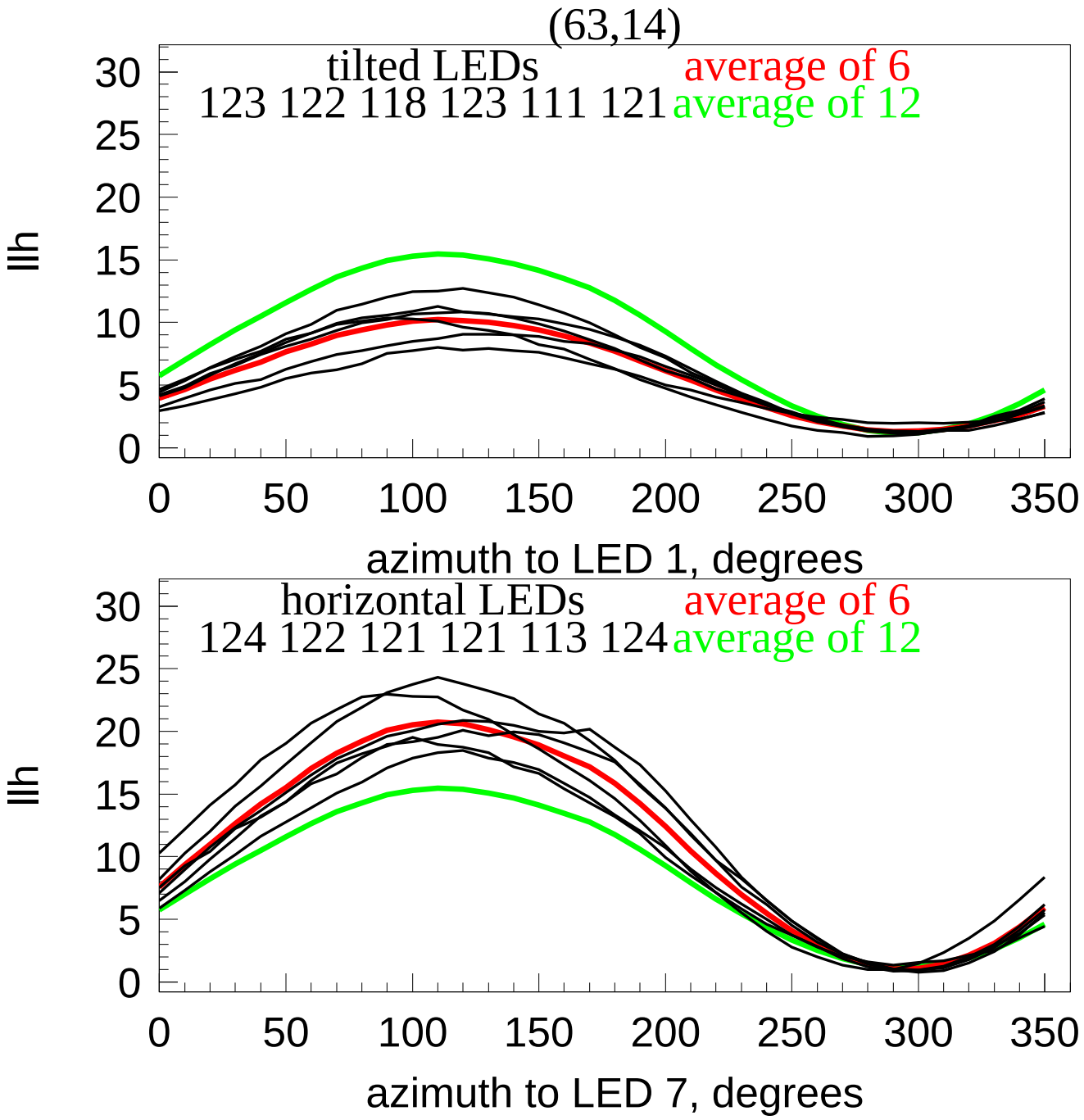

(63,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
351.4 ± 11.6

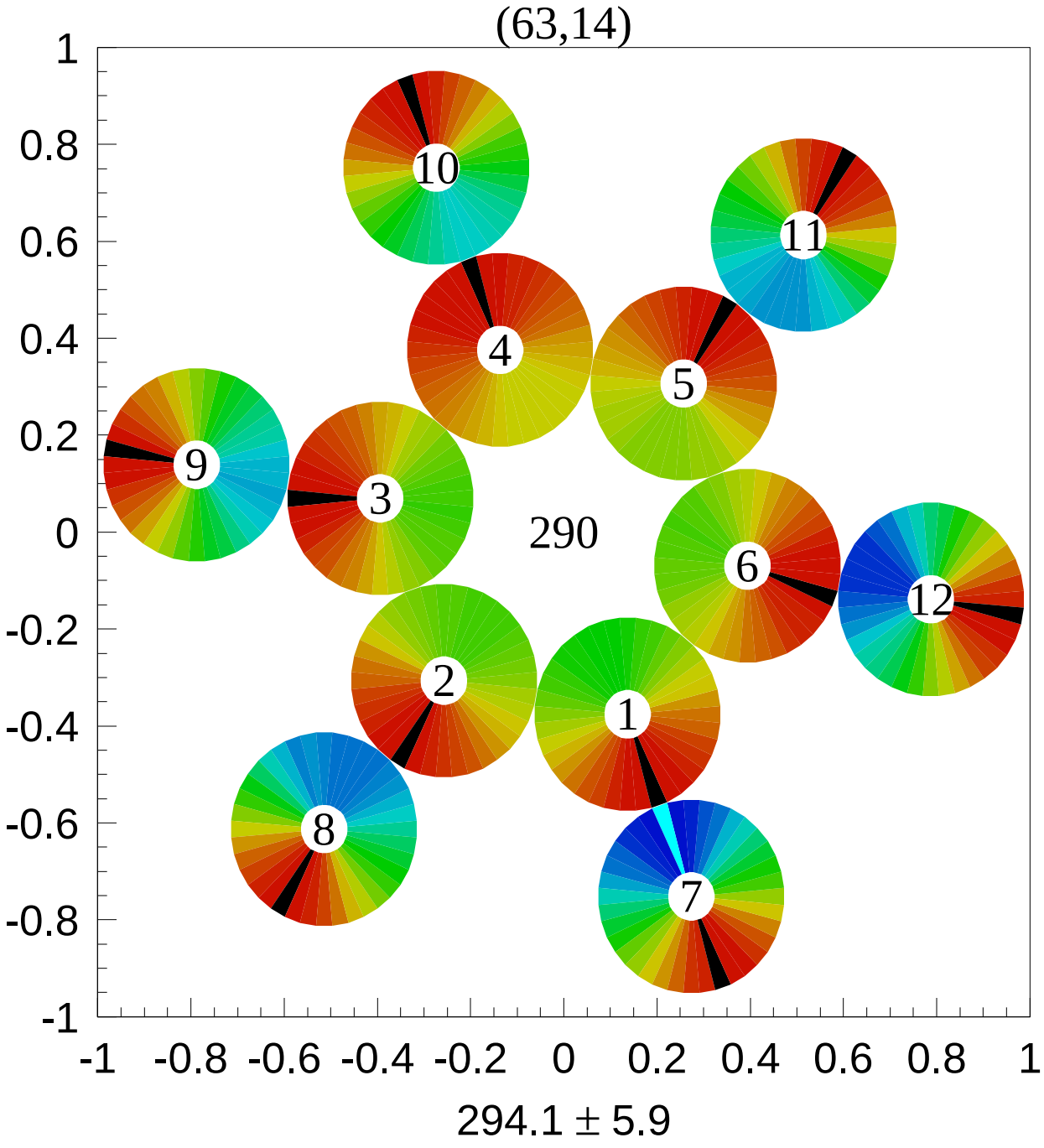

(63,12)
tilted LEDs
123 115 122 121 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 126 123 121 122 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

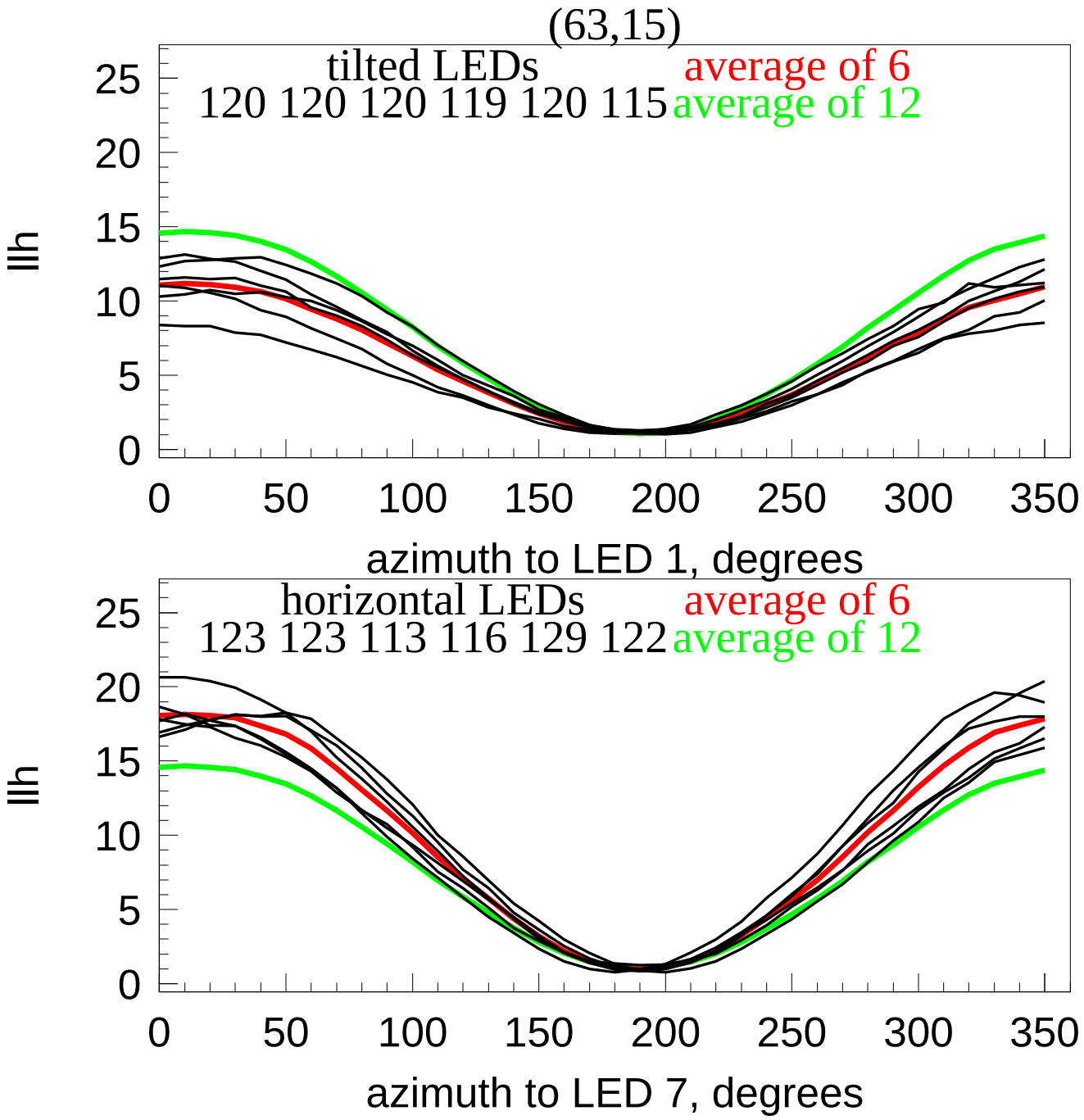

(63,12)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
208.1 ± 6.4

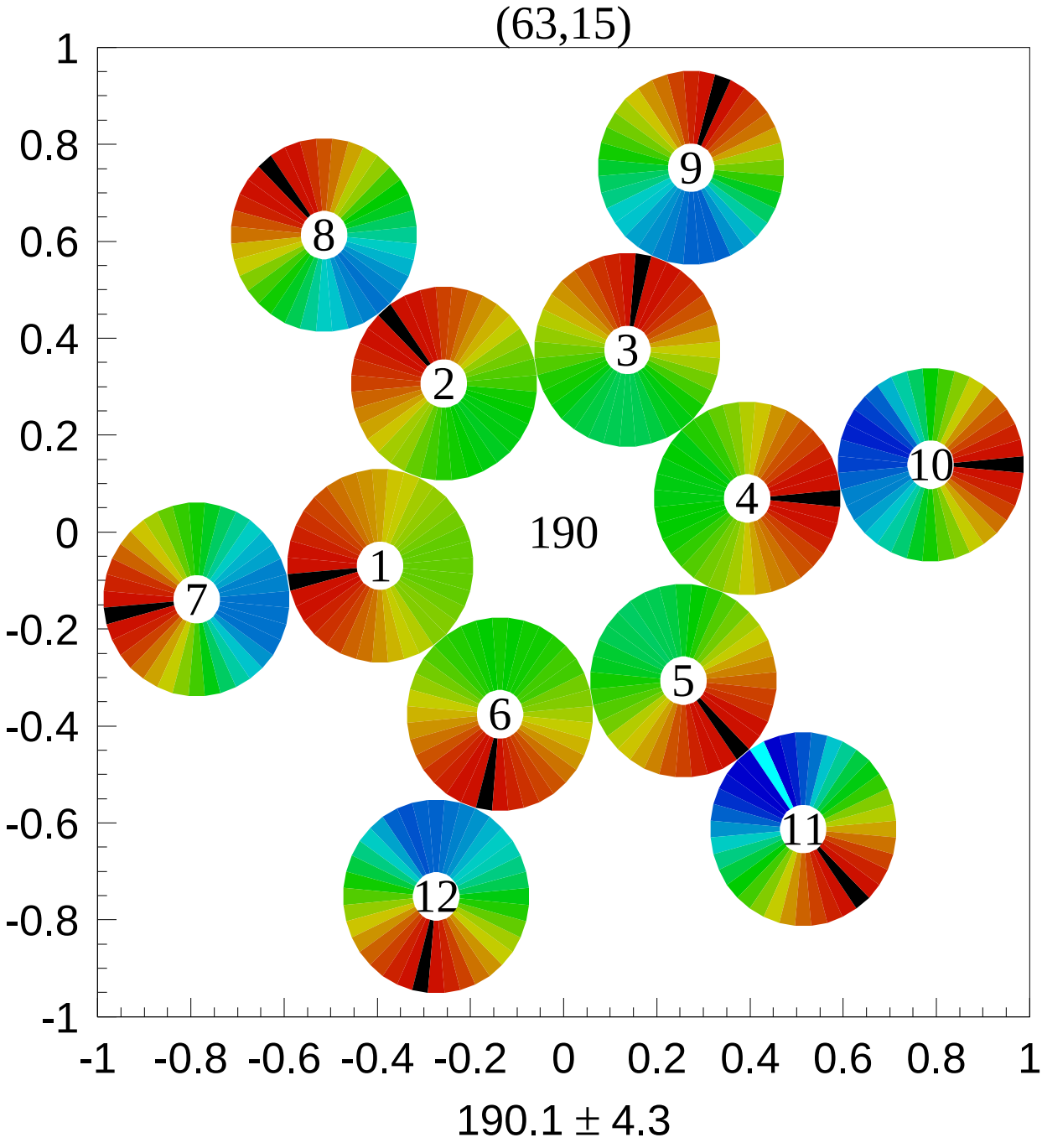

(63,13)
tilted LEDs
129 119 124 119 125 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 130 122 118 128 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

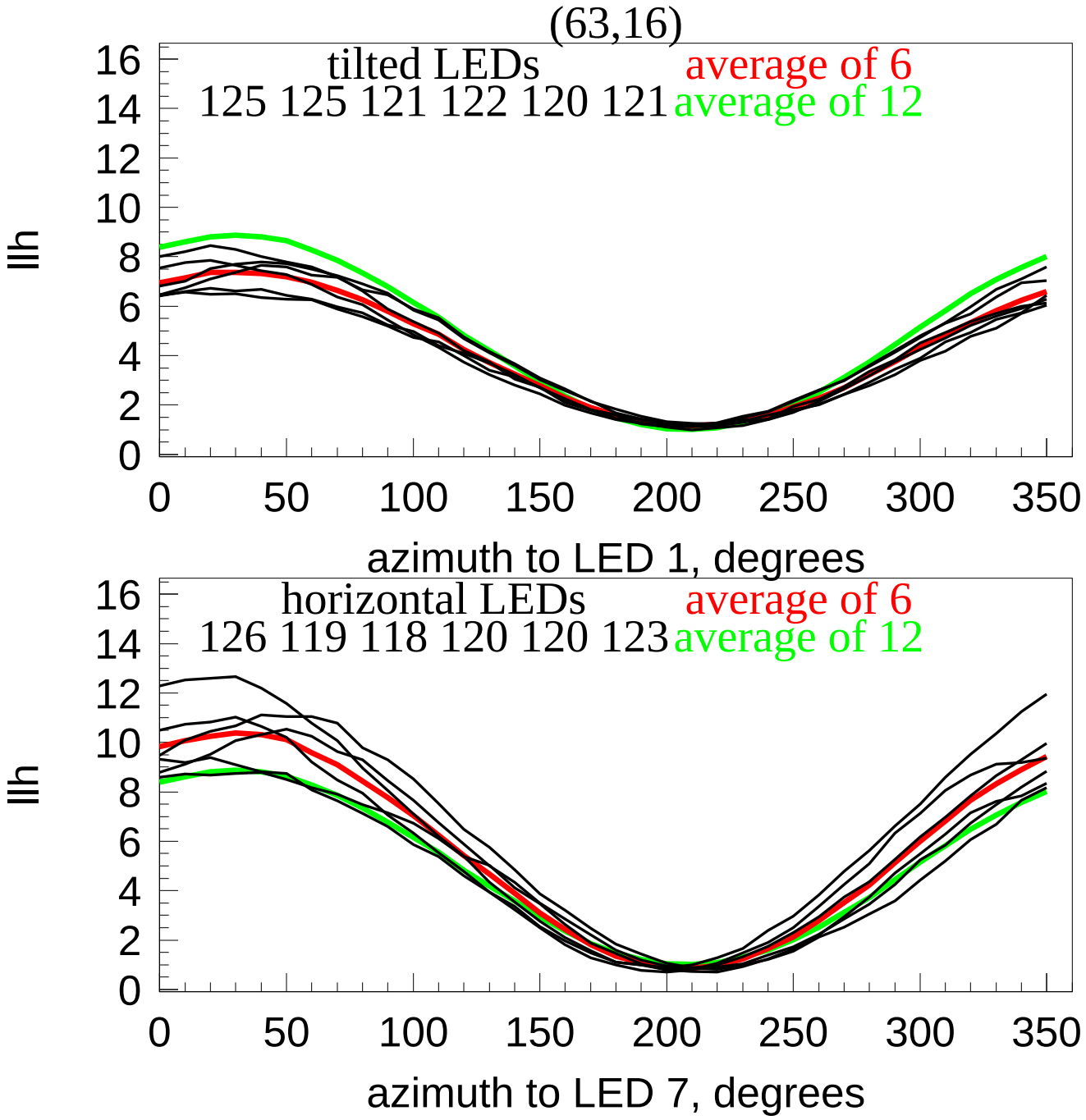

(63,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
278.7 ± 5.3

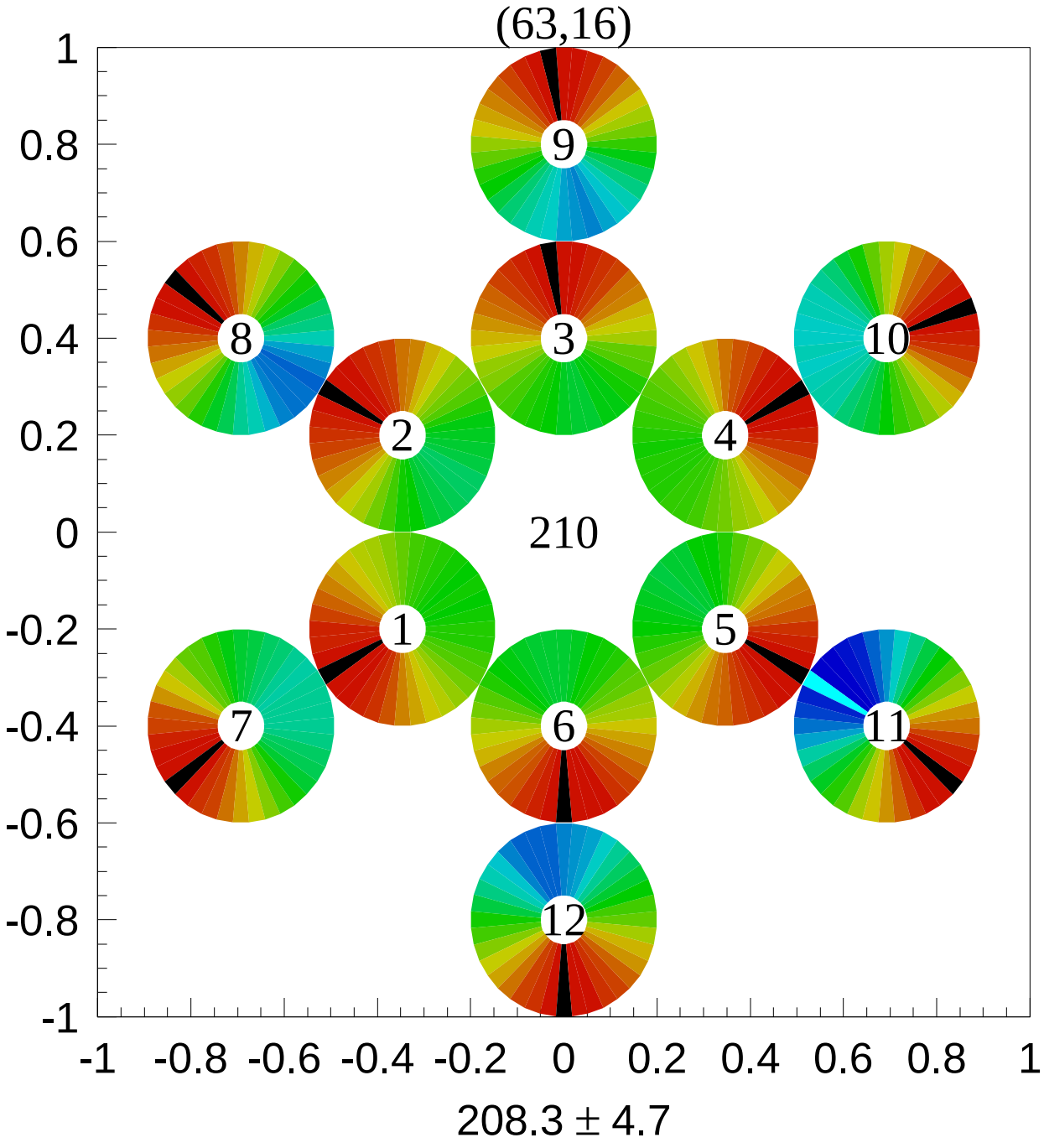

(63,14)
tilted LEDs
123 122 118 123 111 121
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
124 122 121 121 113 124
average of 6
average of 12
IIh
azimuth to LED 7, degrees

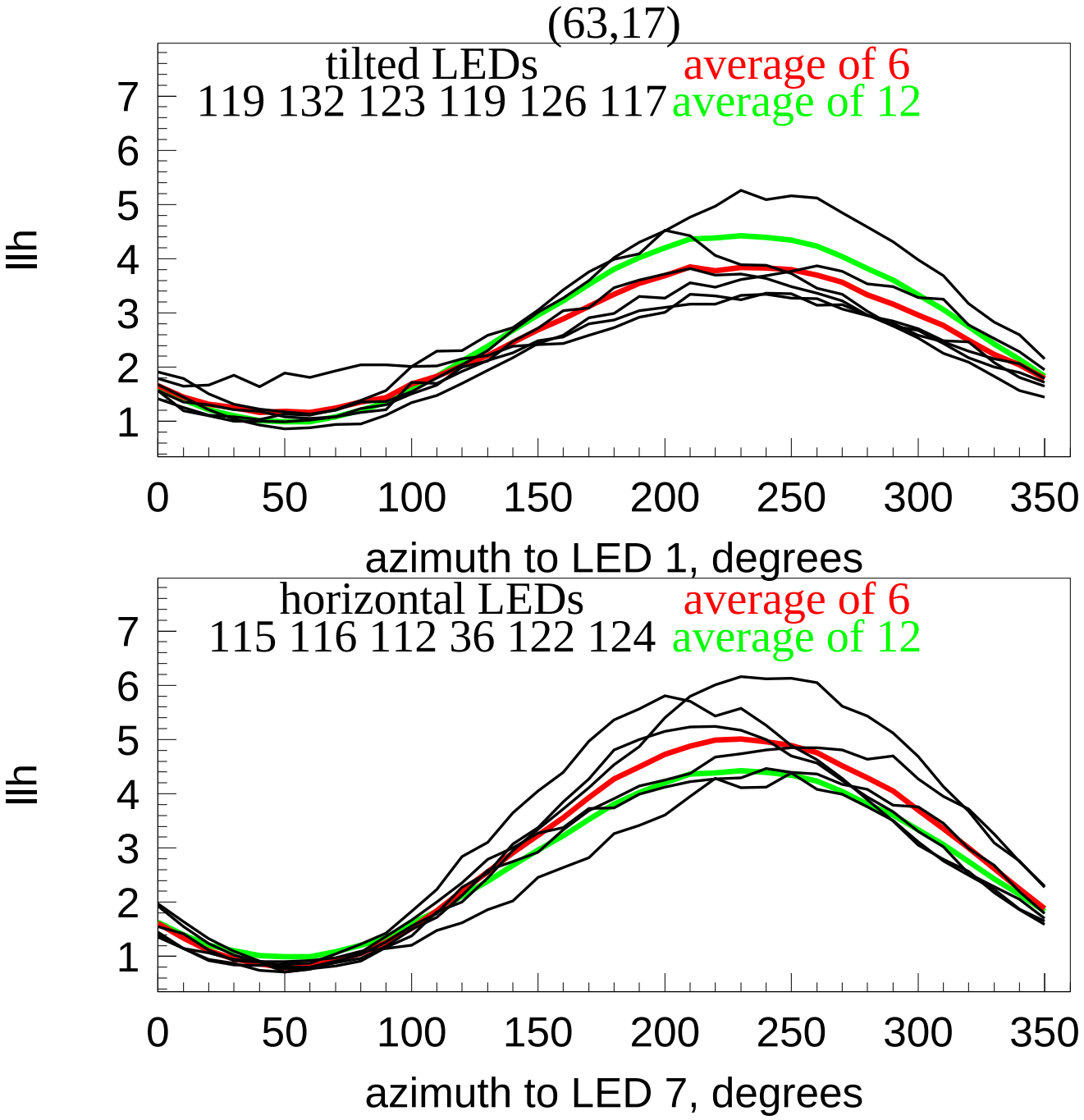

(63,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
294.1 ± 5.9

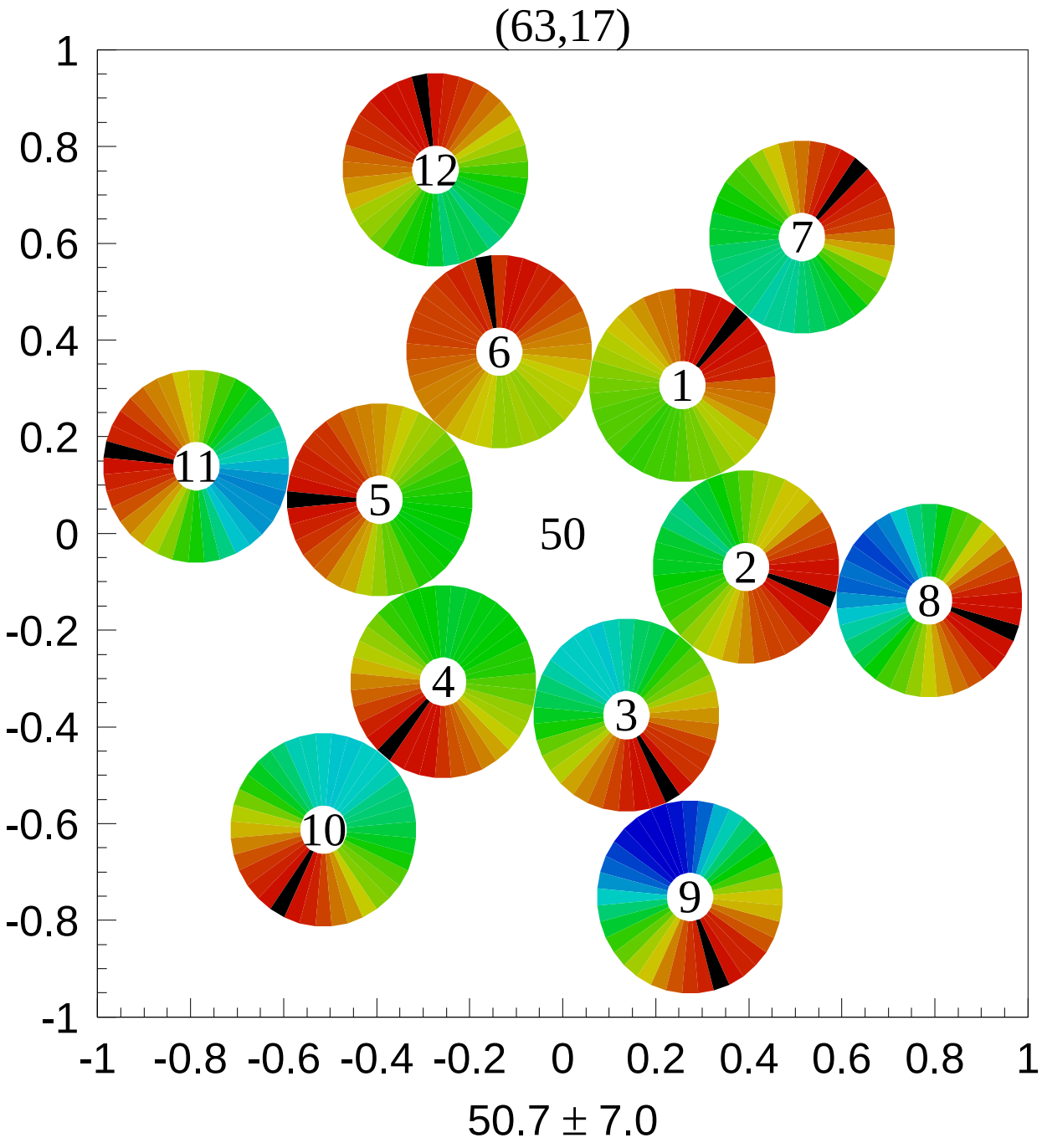

(63,15)
tilted LEDs
120 120 120 119 120 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 113 116 129 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

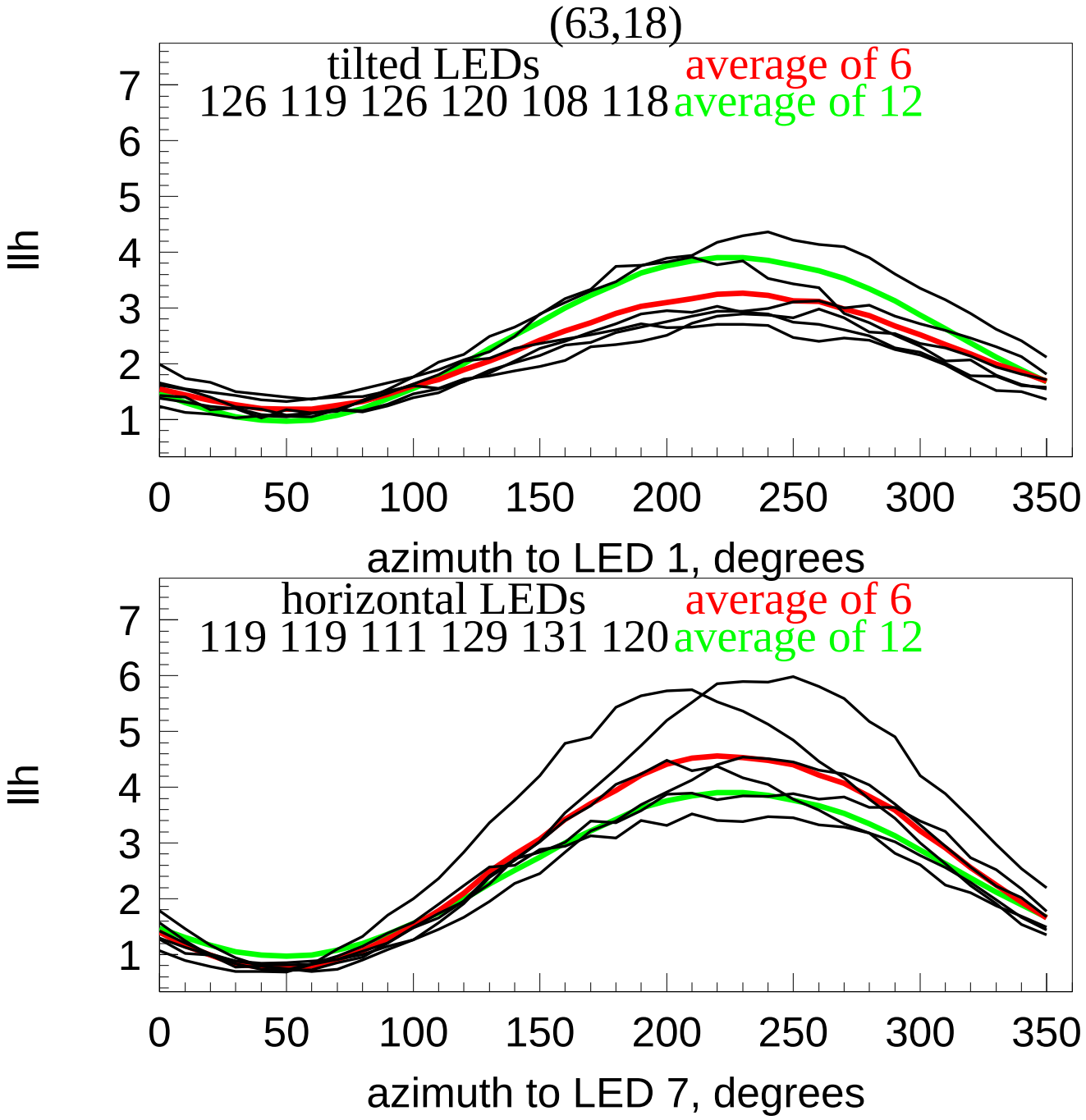

(63,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
190.1 ± 4.3

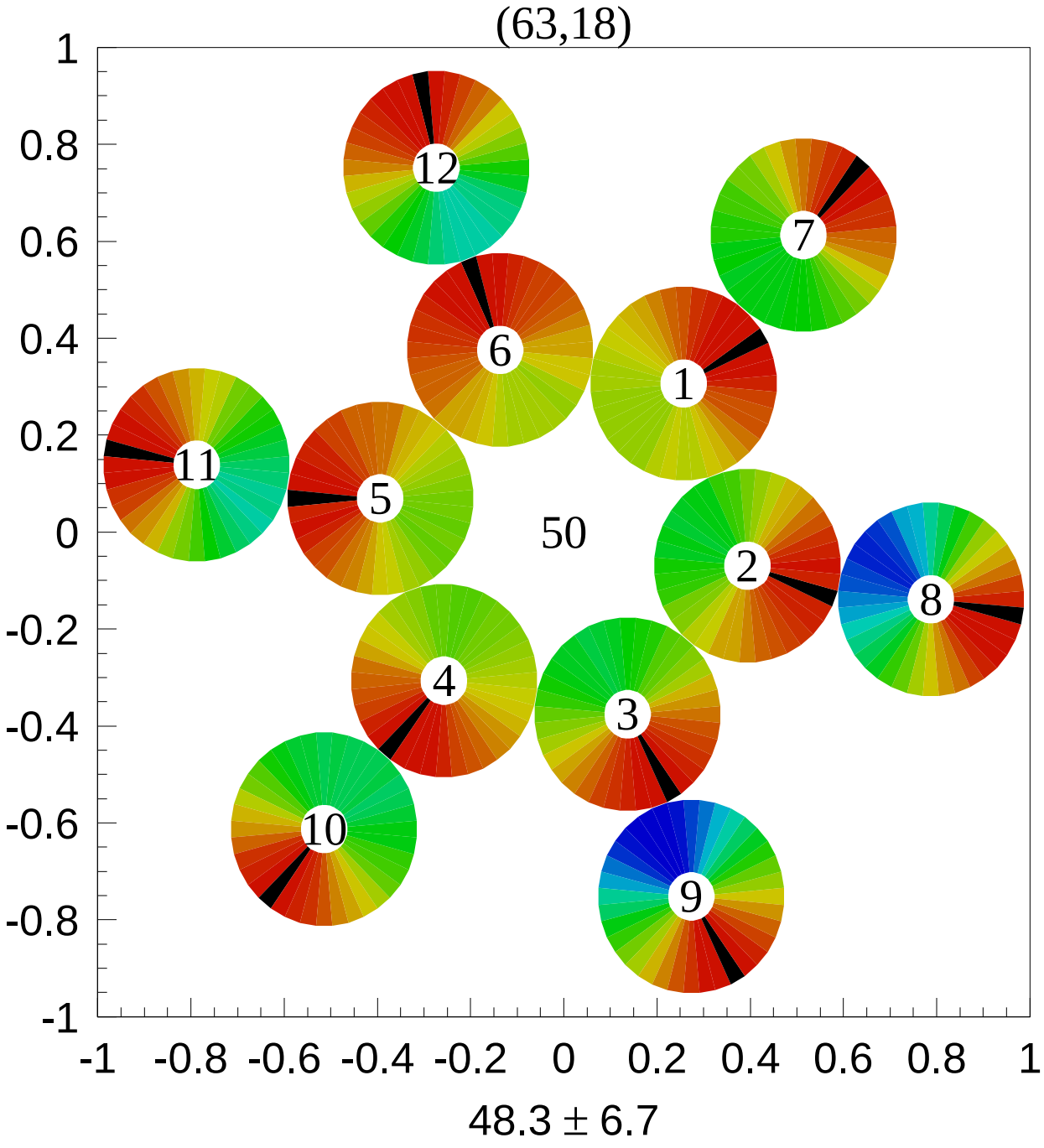

(63,16)
tilted LEDs
125 125 121 122 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 118 120 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

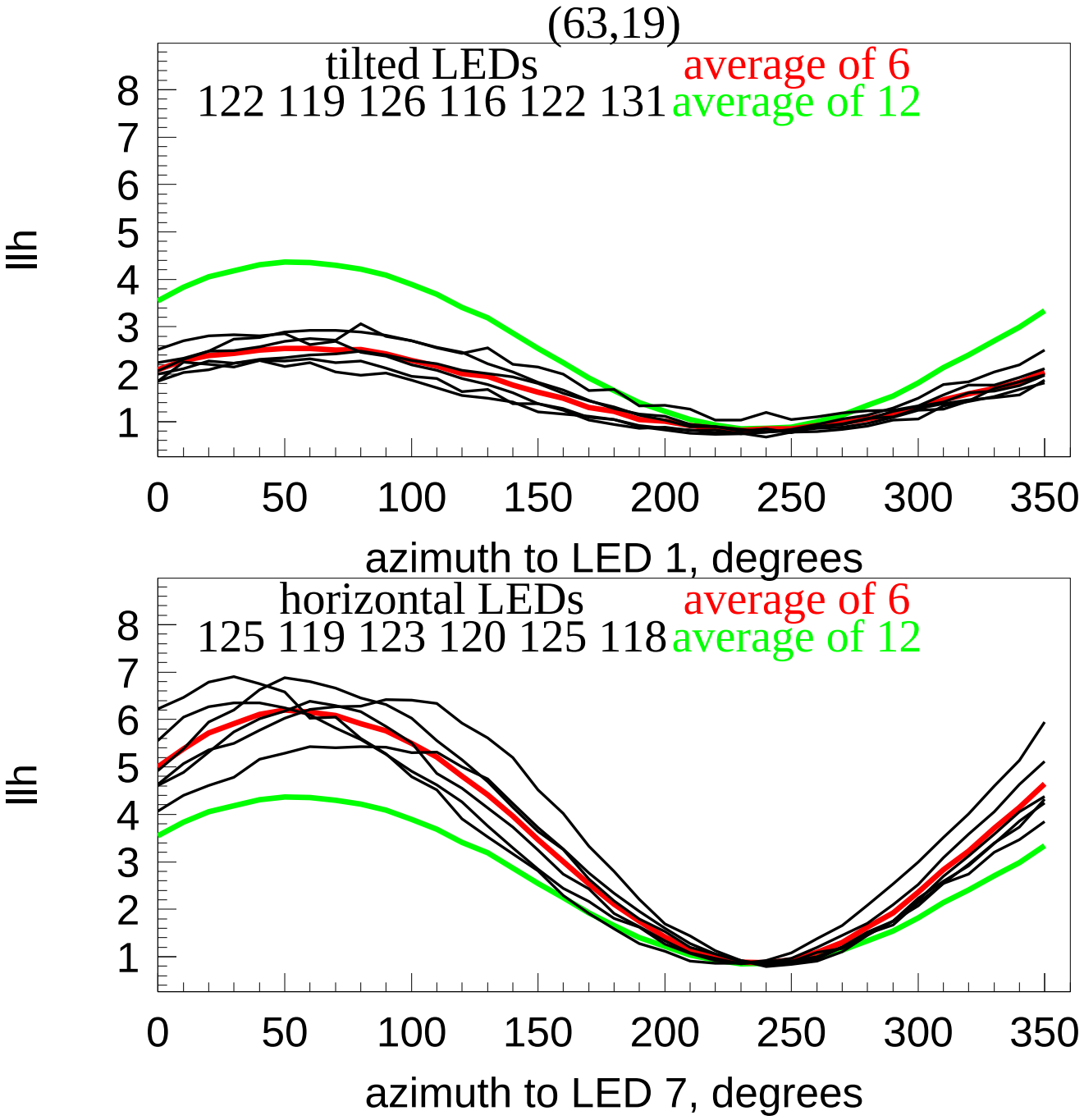

(63,16)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
208.3 ± 4.7

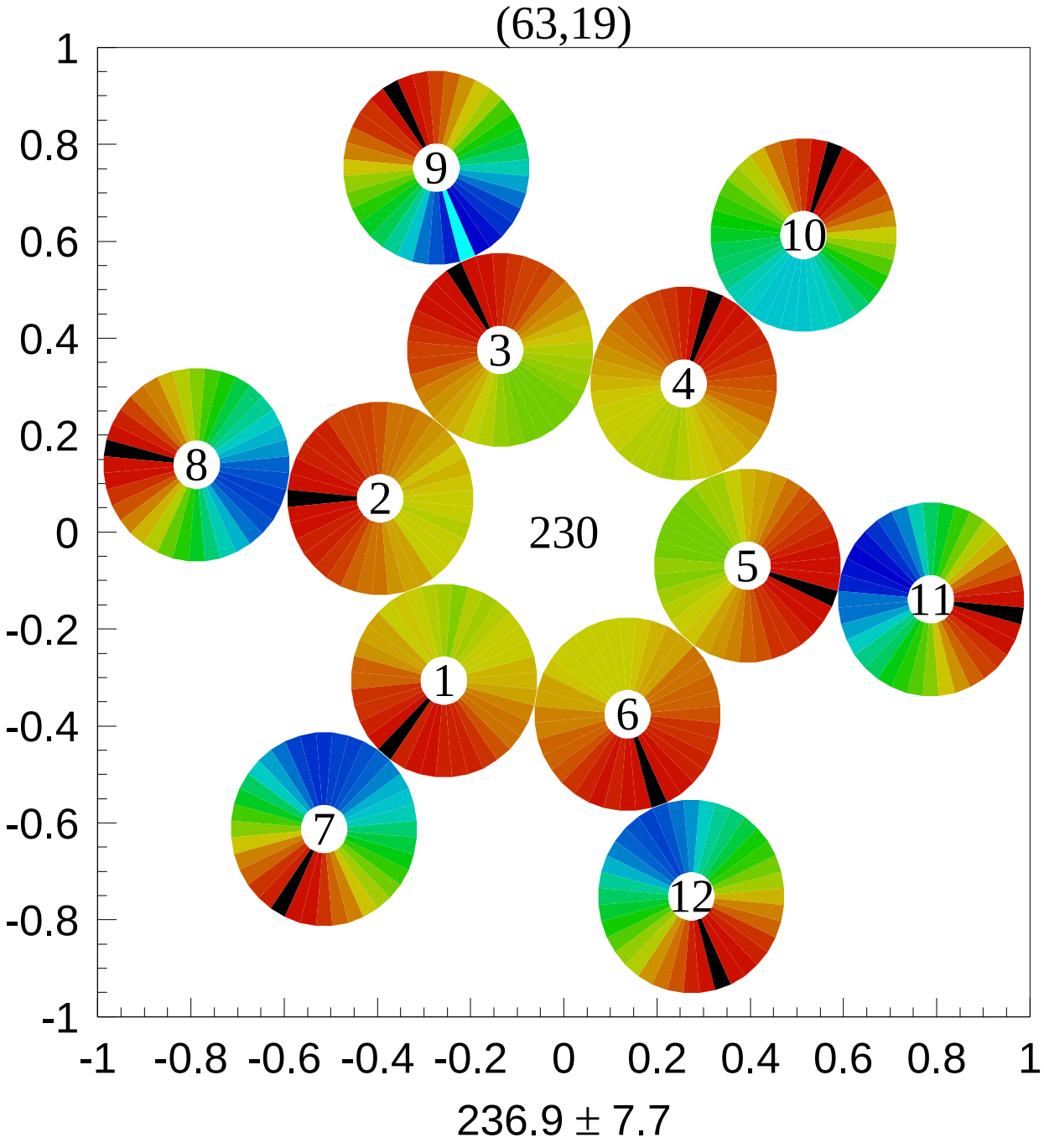

(63,17)
tilted LEDs
119 132 123 119 126 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 116 112 36 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

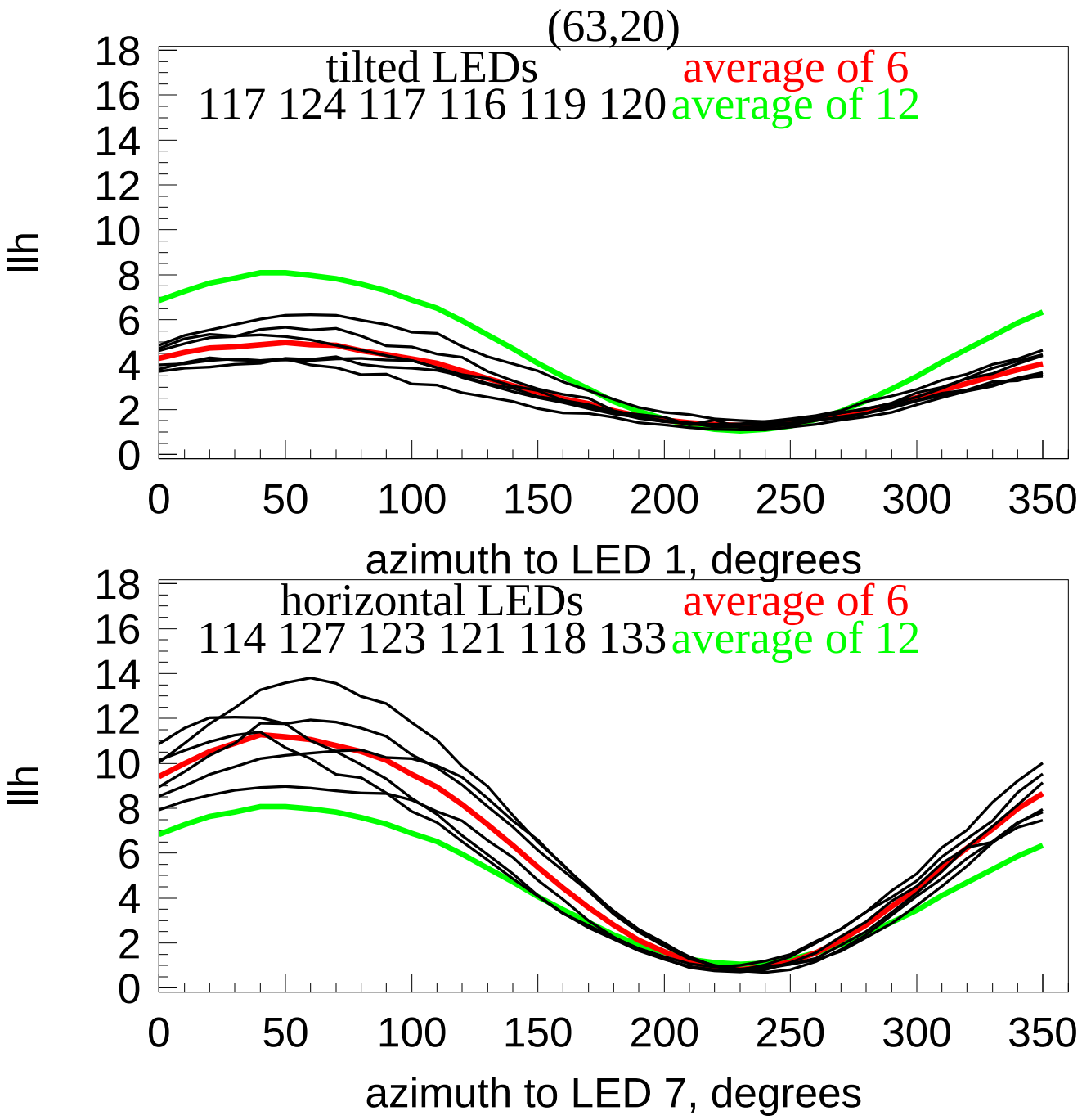

(63,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
50.7 ± 7.0

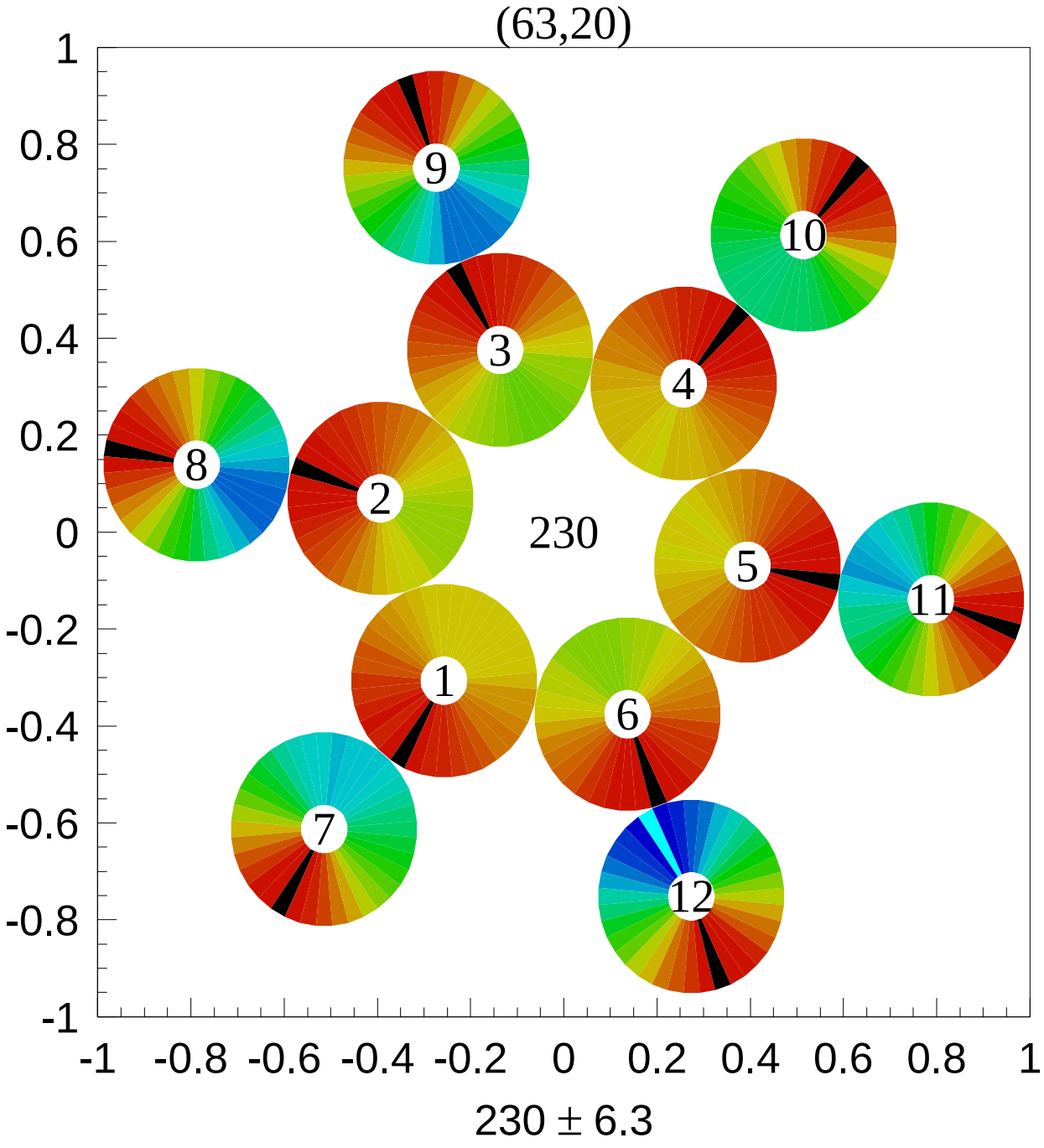

(63,18)
tilted LEDs
126 119 126 120 108 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 119 111 129 131 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

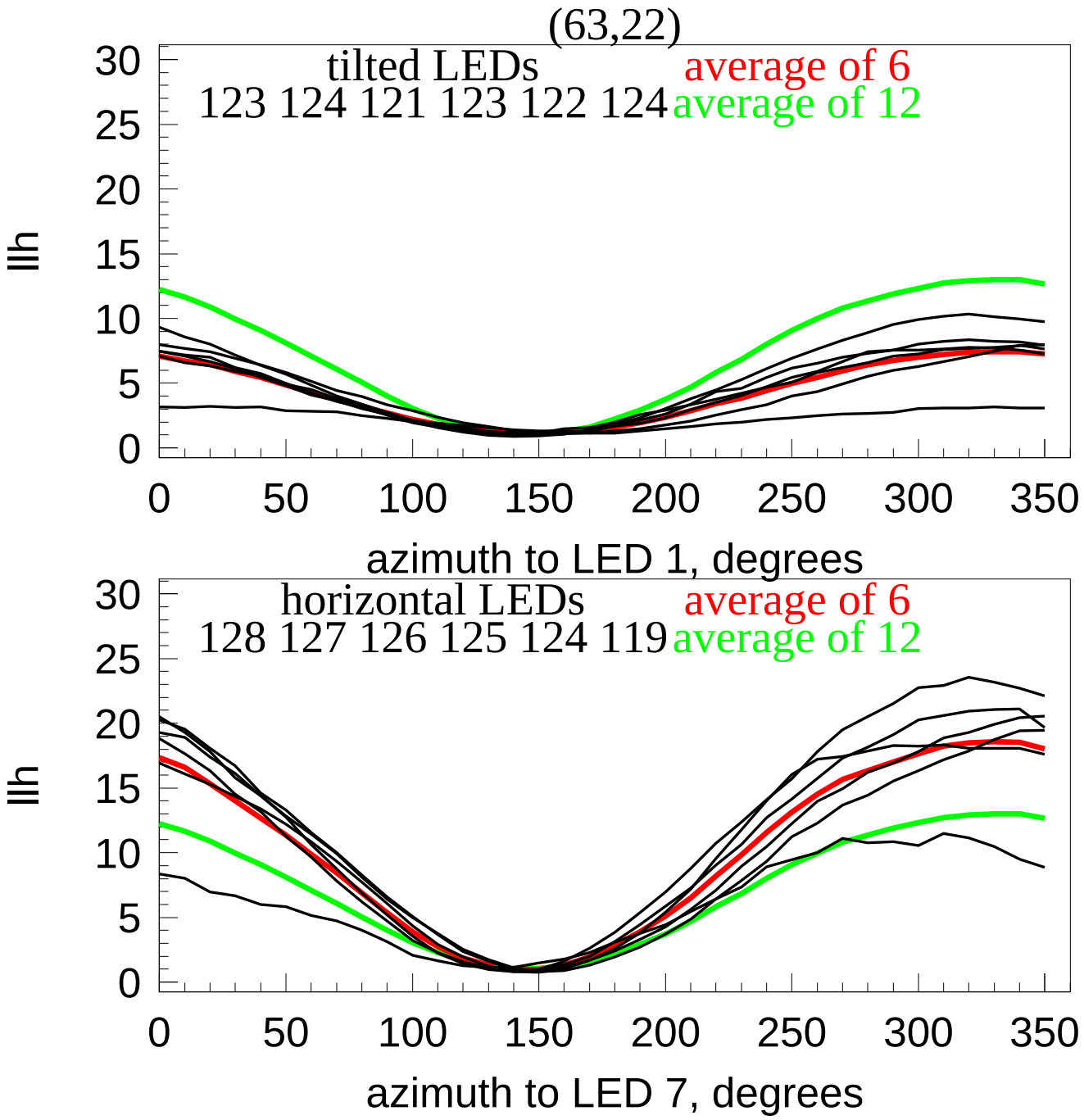

(63,18)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
48.3 ± 6.7

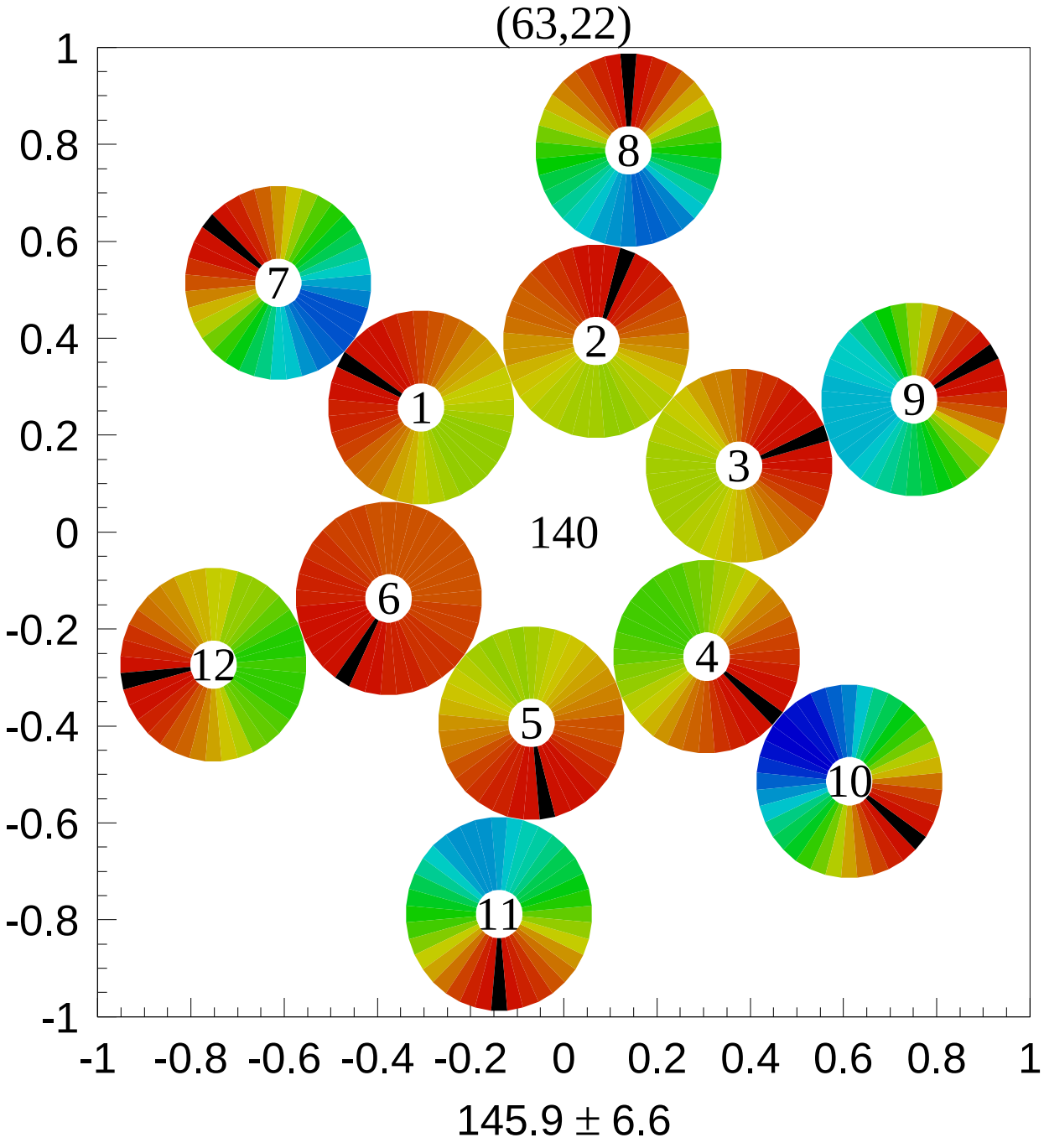

(63,19)
tilted LEDs
122 119 126 116 122 131
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 119 123 120 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

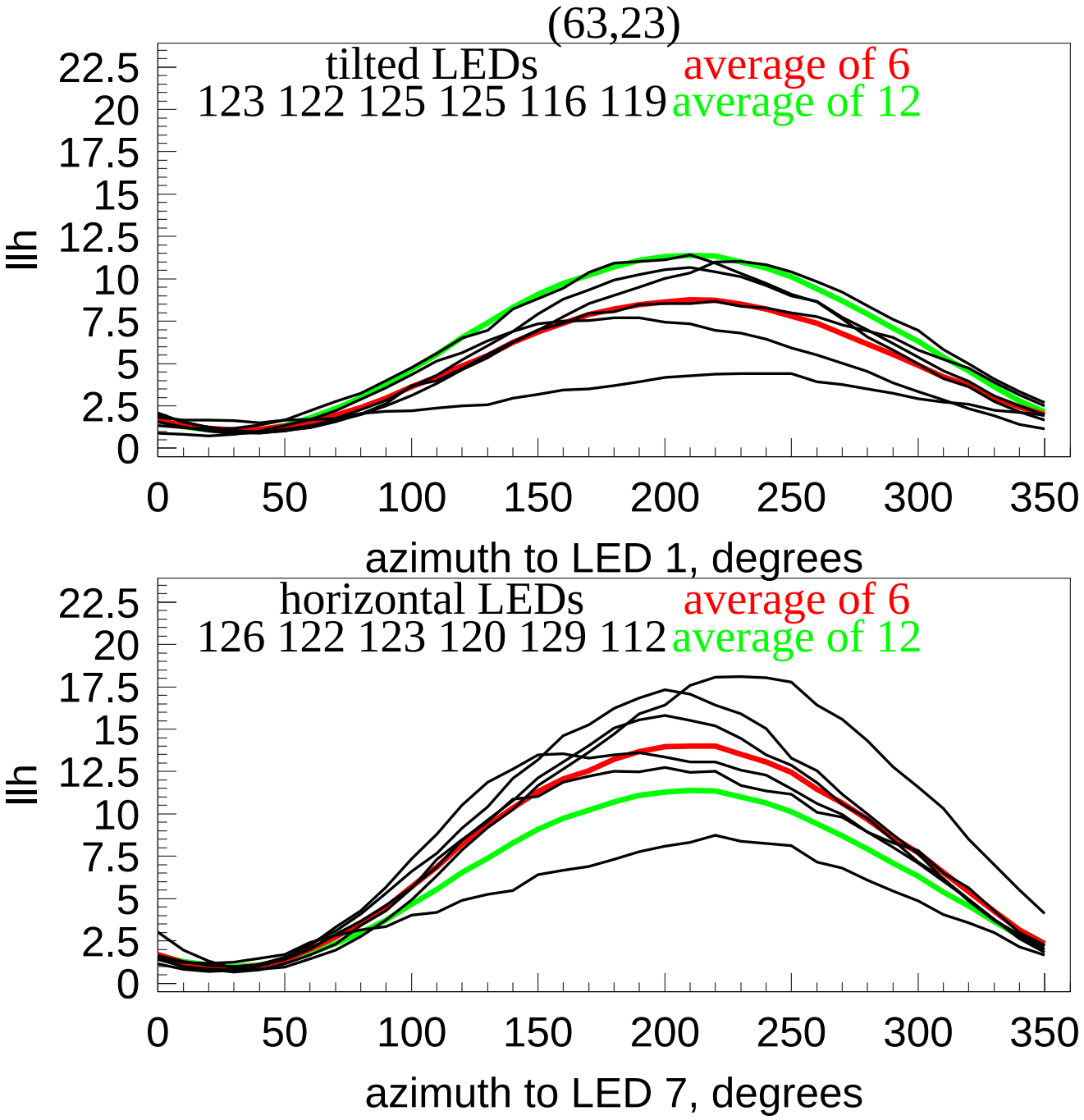

(63,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
236.9 ± 7.7

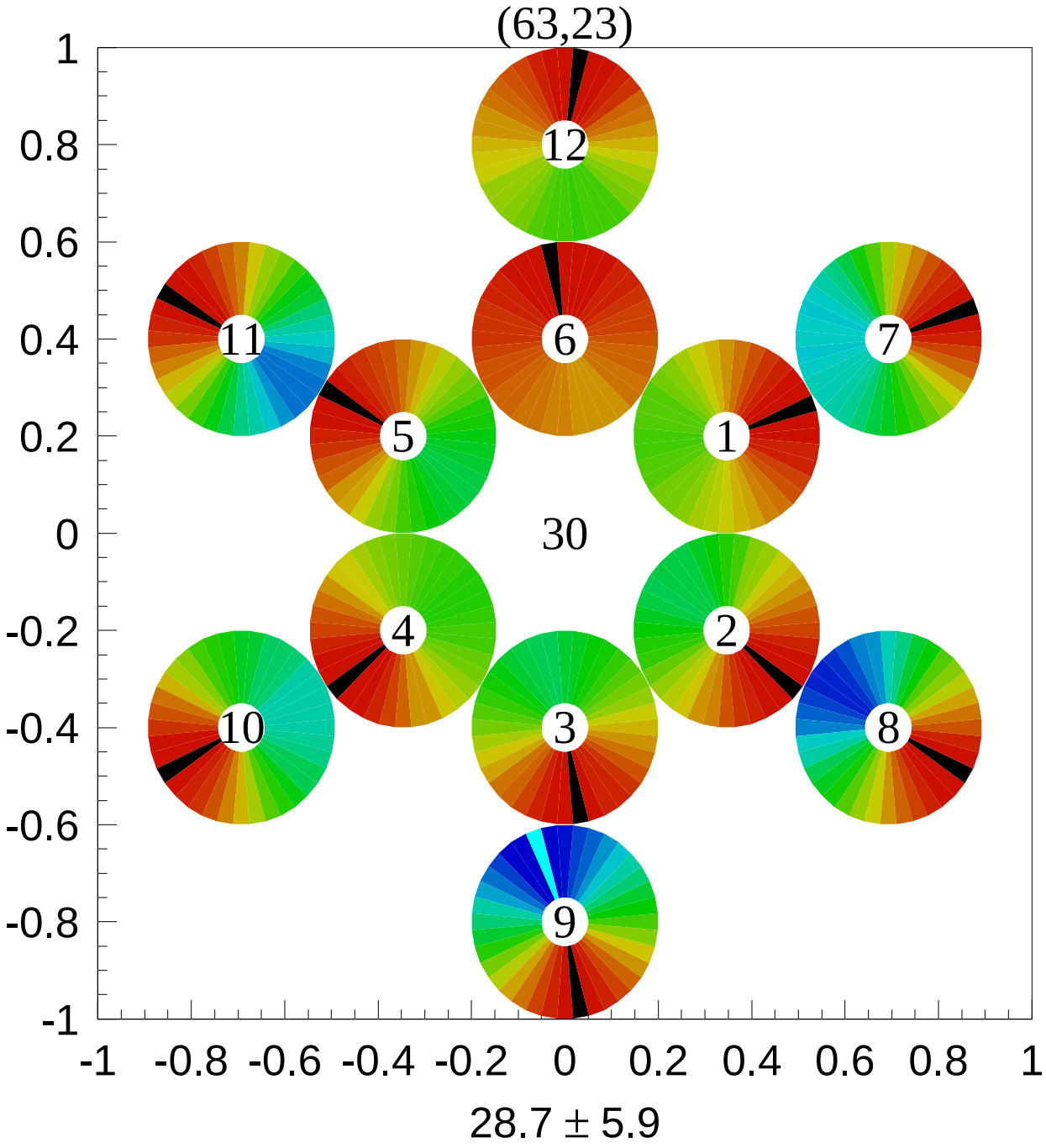

(63,20)
tilted LEDs
117 124 117 116 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 127 123 121 118 133
average of 6
average of 12
llh
azimuth to LED 7, degrees

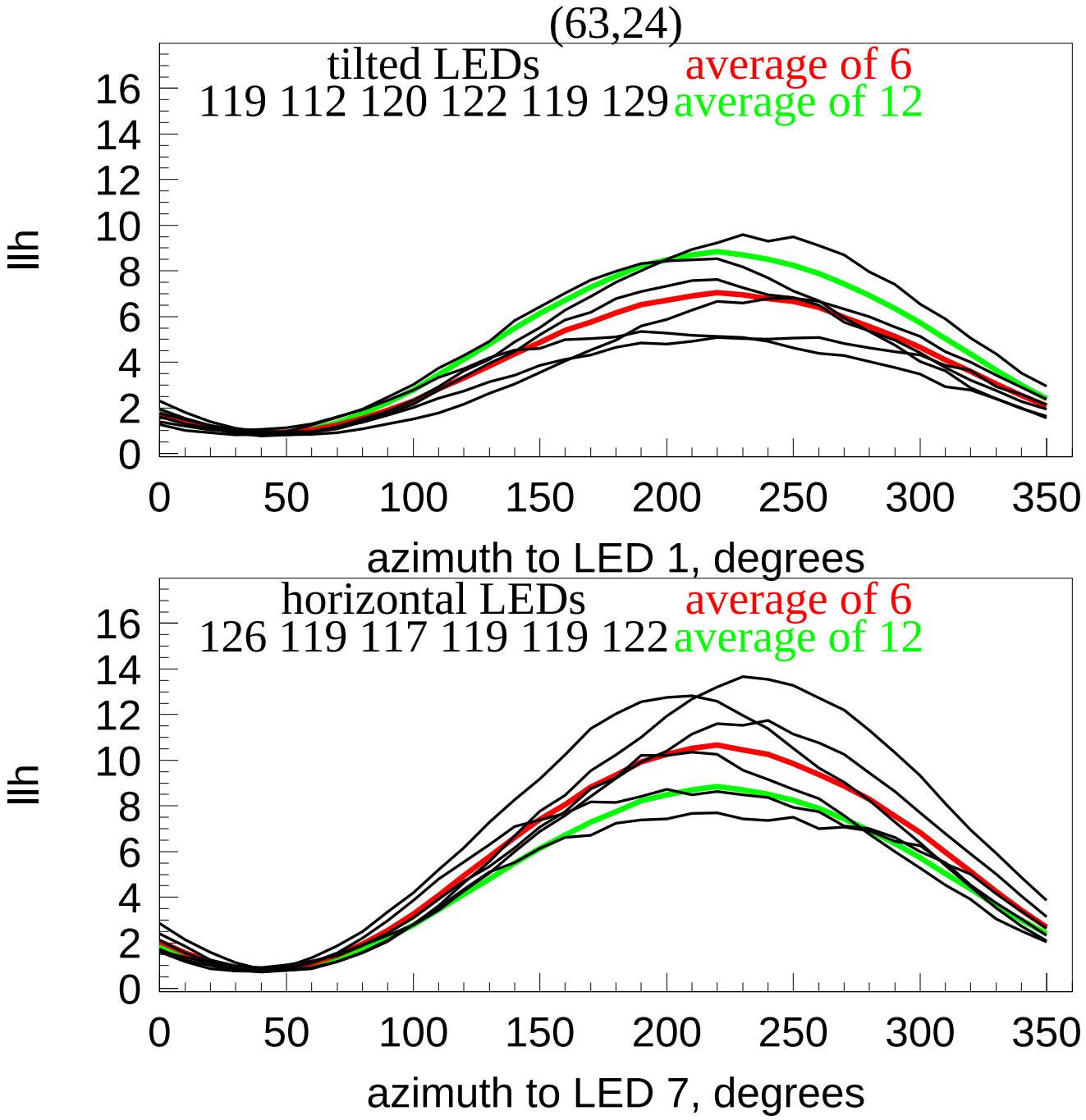

(63,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
230 ± 6.3
9
10
3
4
8
2
230
5
11
1
6
7
12

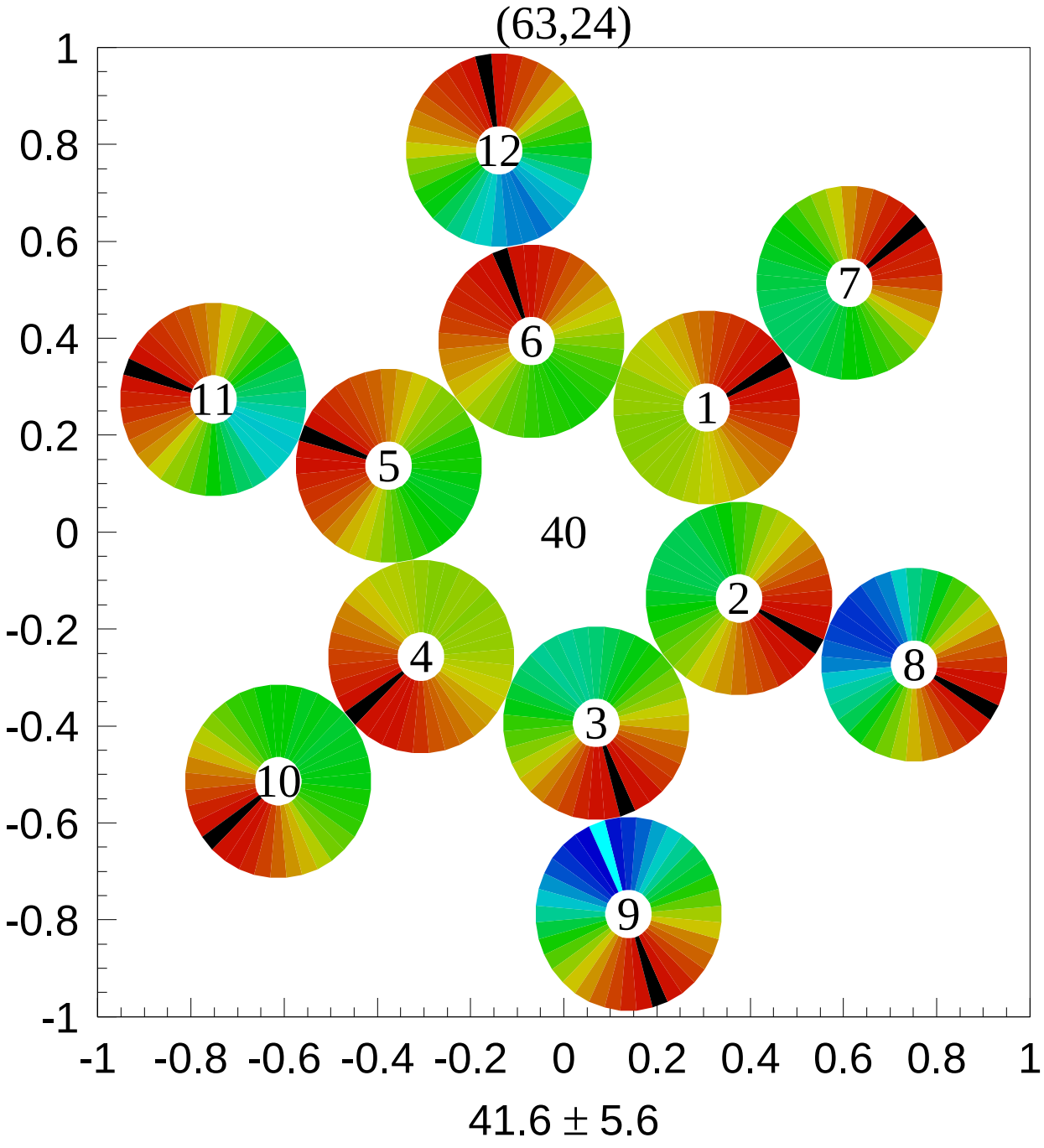

(63,22)
tilted LEDs
123 124 121 123 122 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 127 126 125 124 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

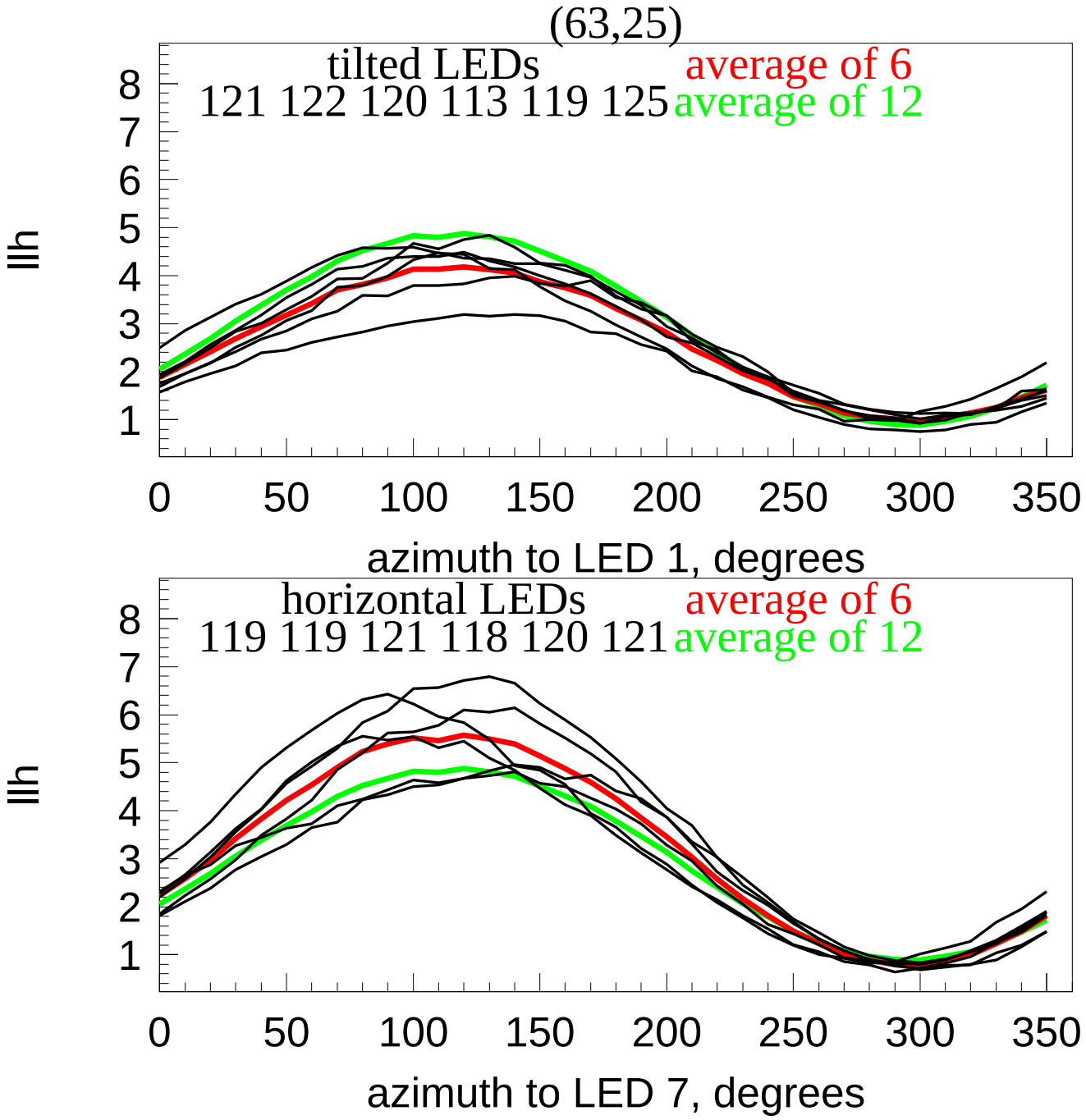

(63,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
145.9 ± 6.6

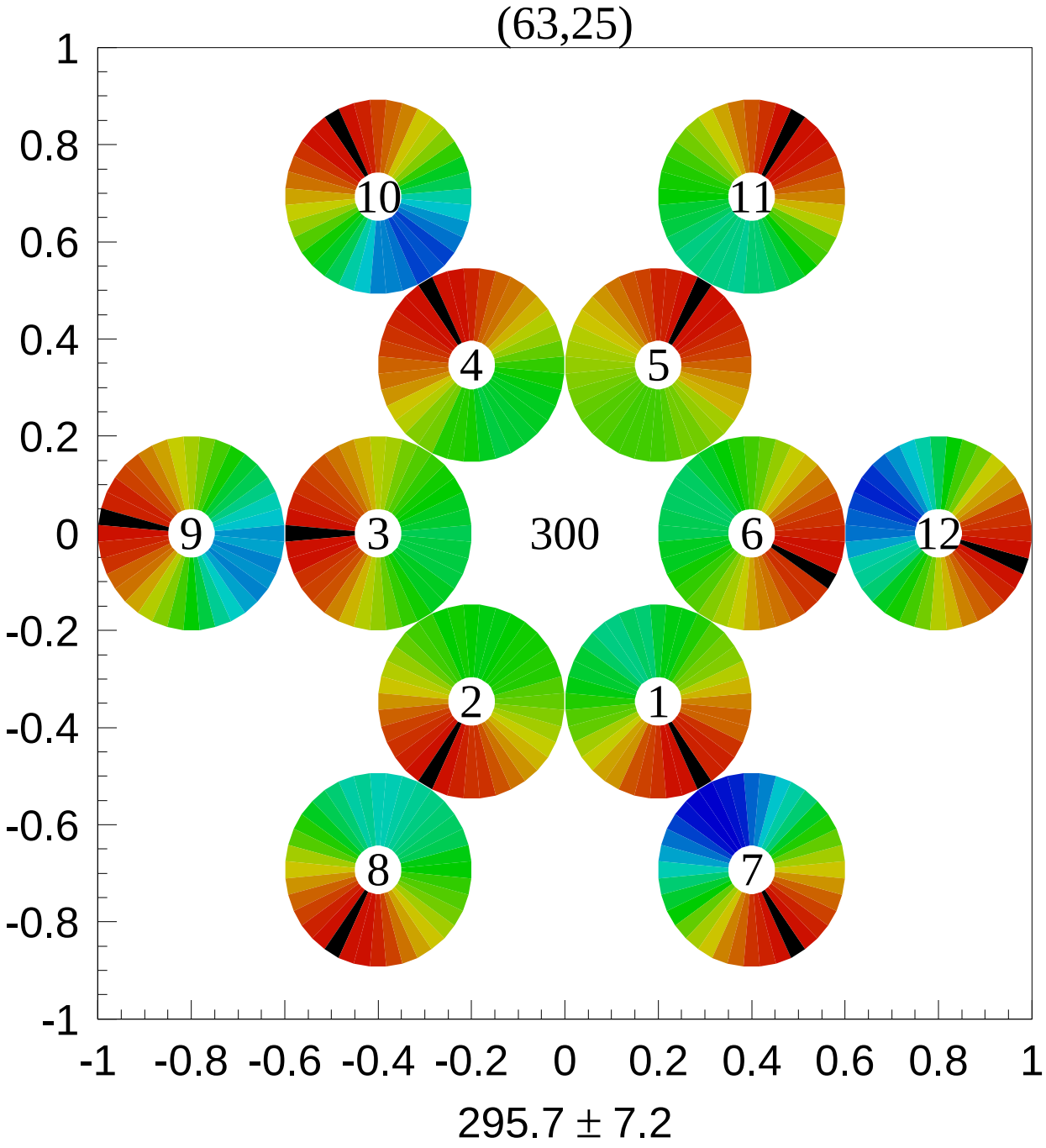

(63,23)
tilted LEDs
123 122 125 125 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 122 123 120 129 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

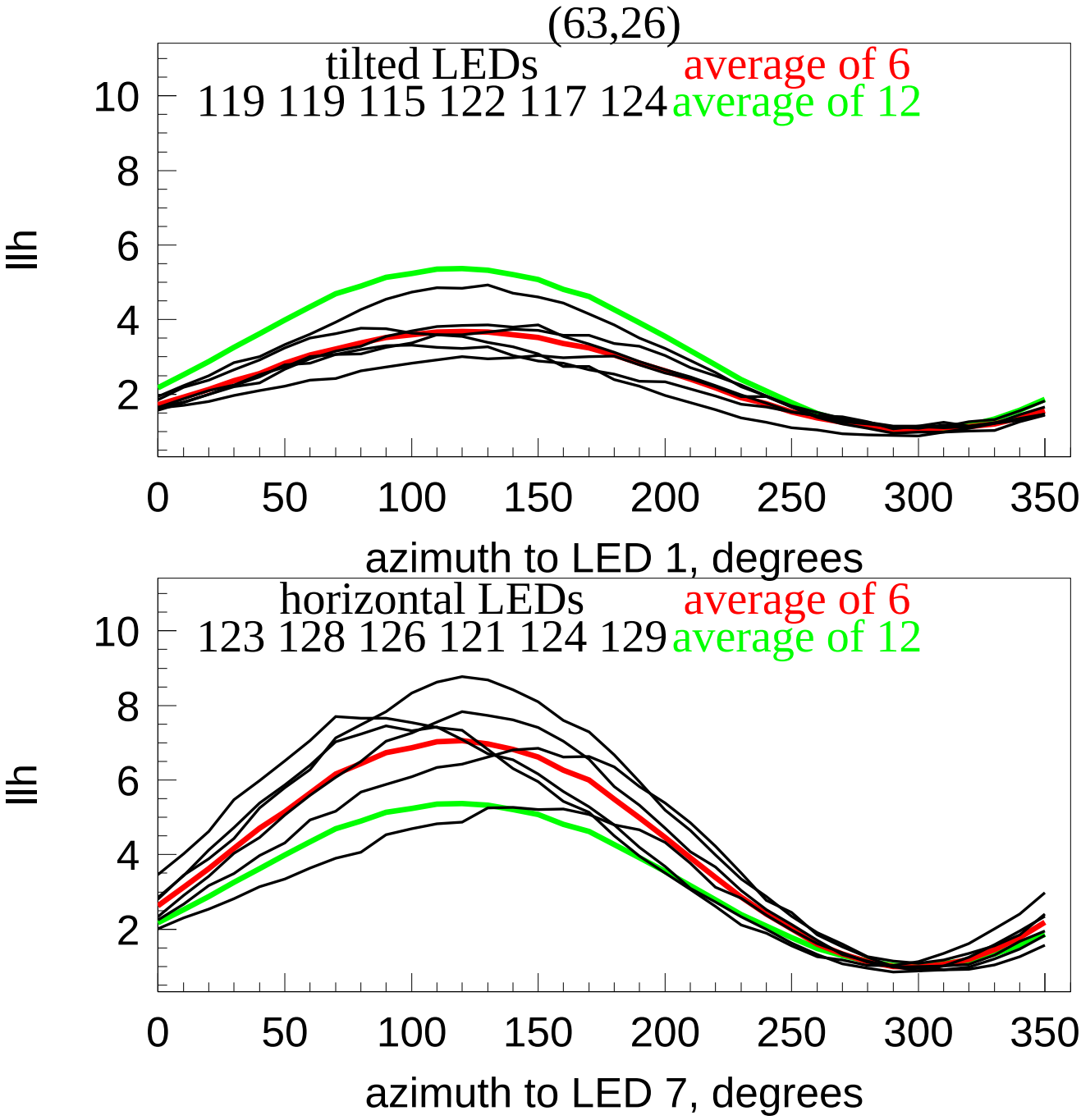

(63,23)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
28.7 ± 5.9

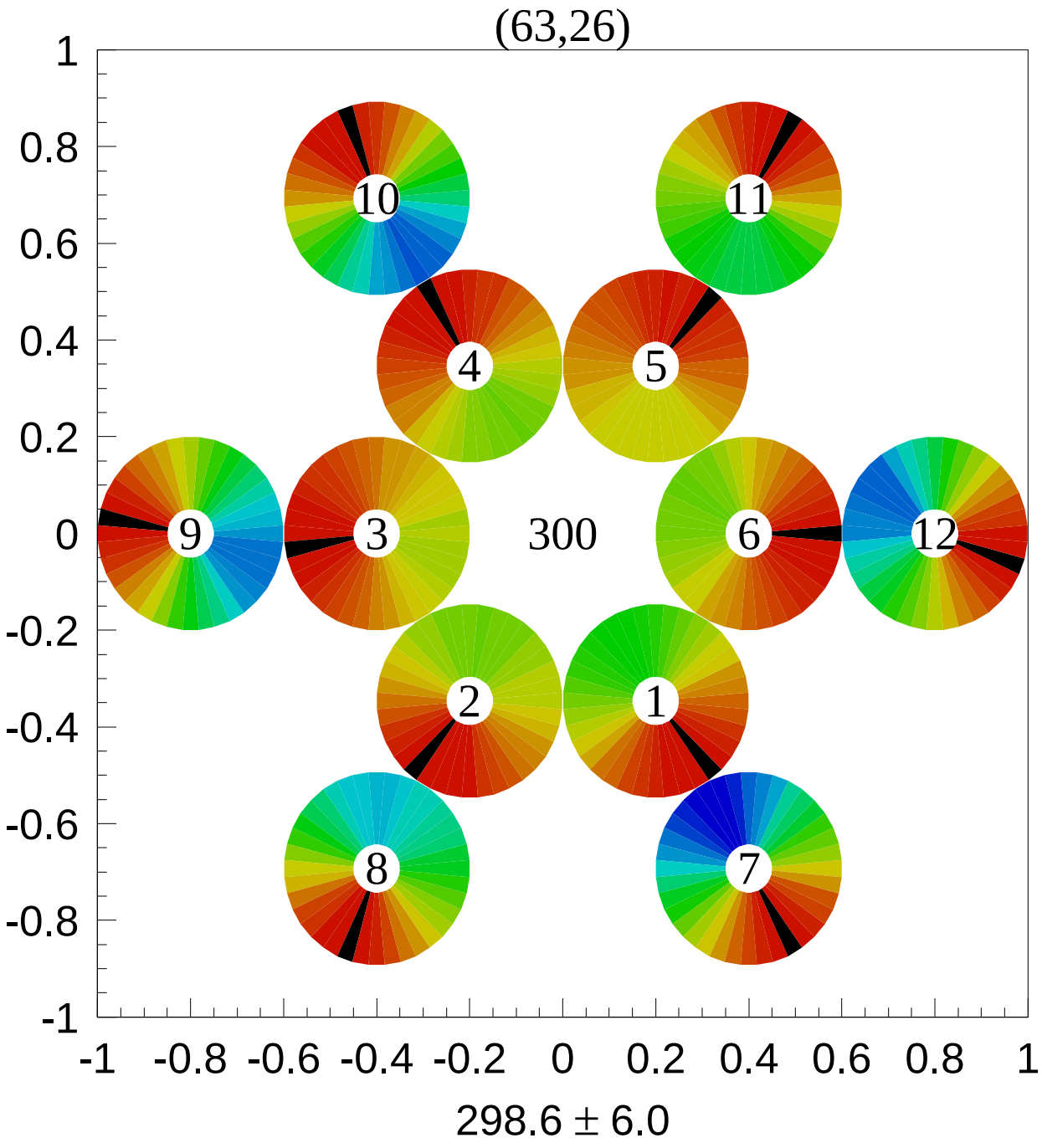

(63,24)
tilted LEDs
119 112 120 122 119 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 117 119 119 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

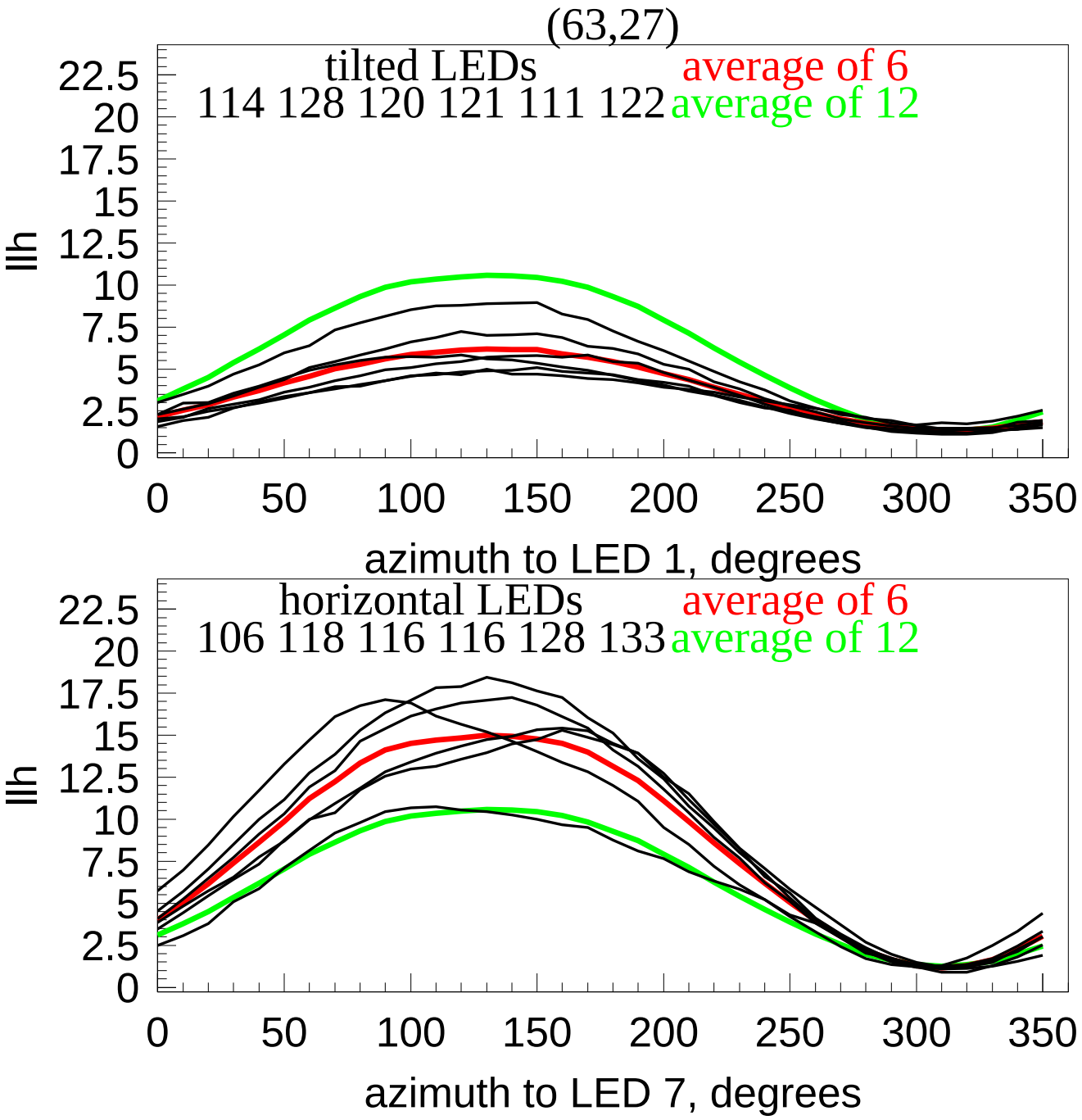

(63,24)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
41.6 ± 5.6

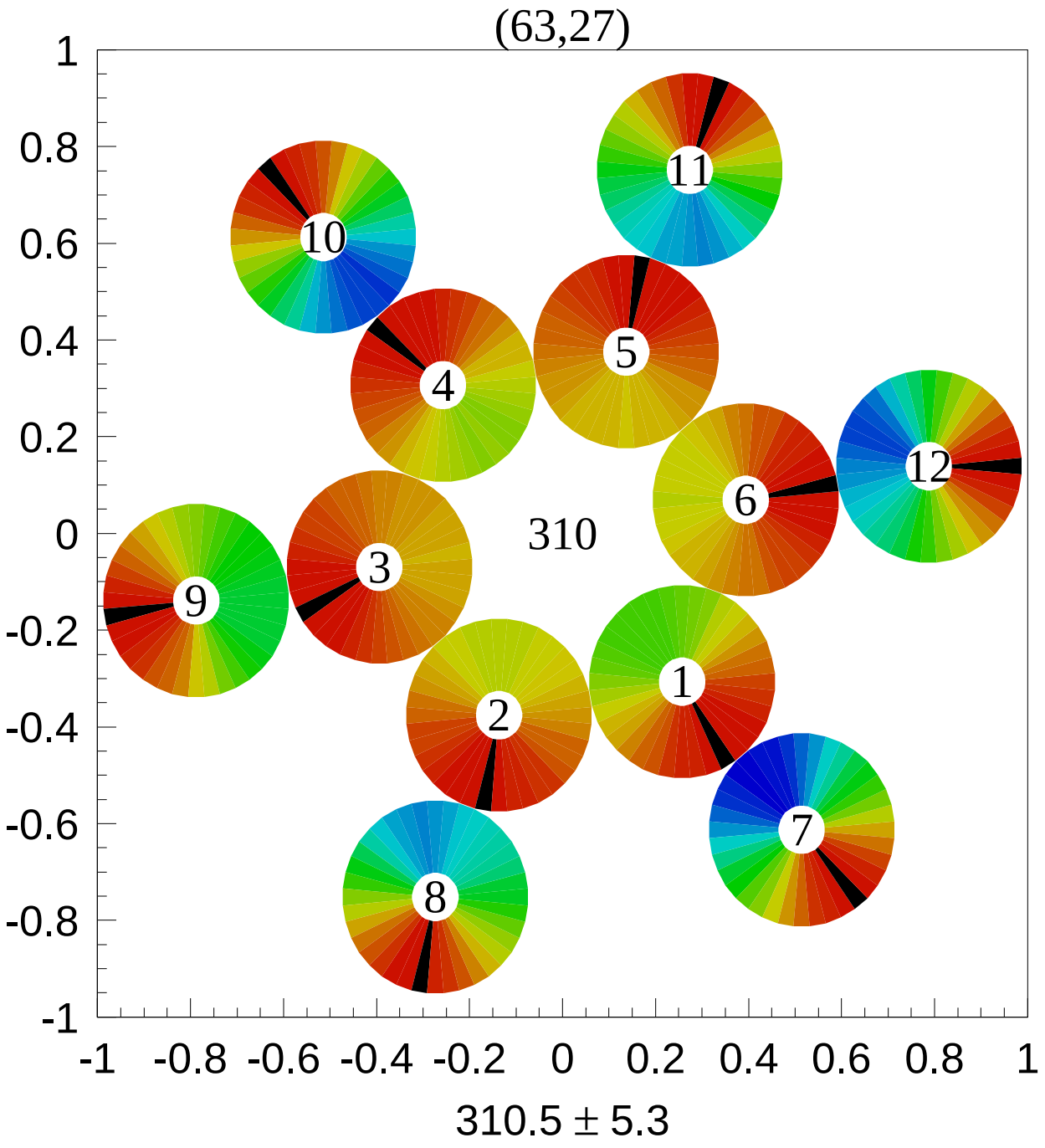

(63,25)
tilted LEDs
121 122 120 113 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 119 121 118 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

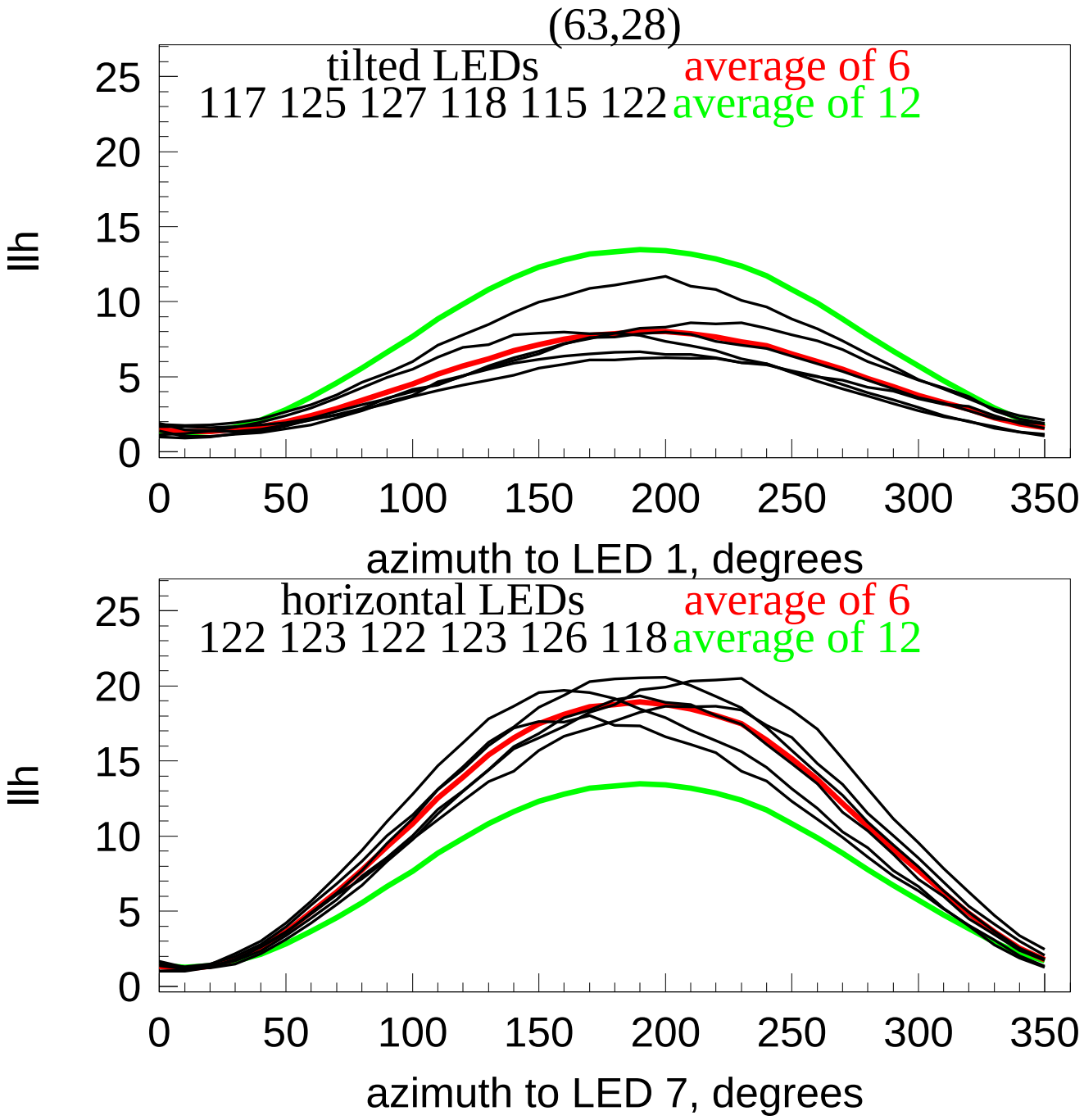

(63,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
295.7 ± 7.2

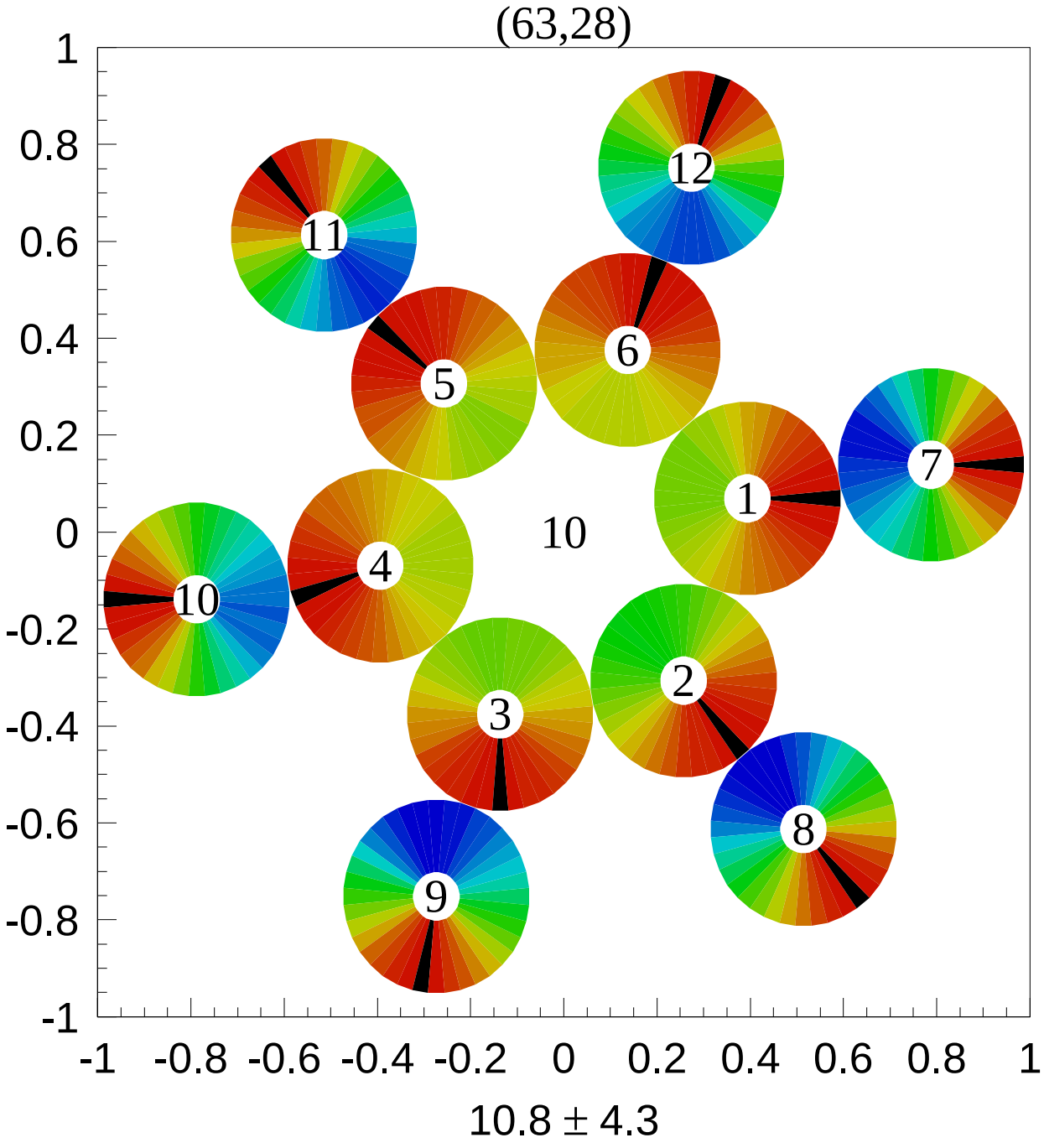

(63,26)
tilted LEDs
119 119 115 122 117 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 128 126 121 124 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

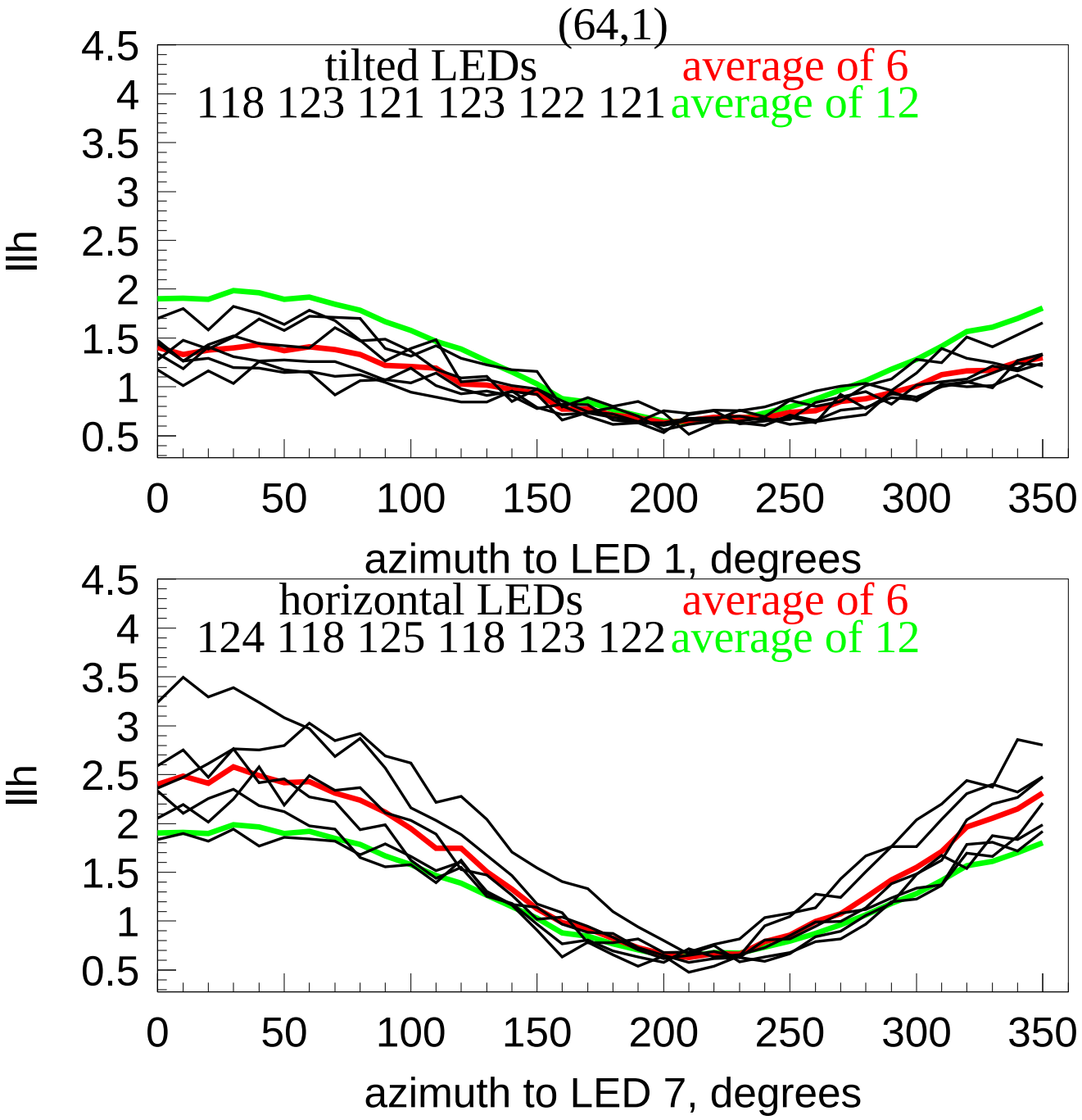

(63,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
298.6 ± 6.0

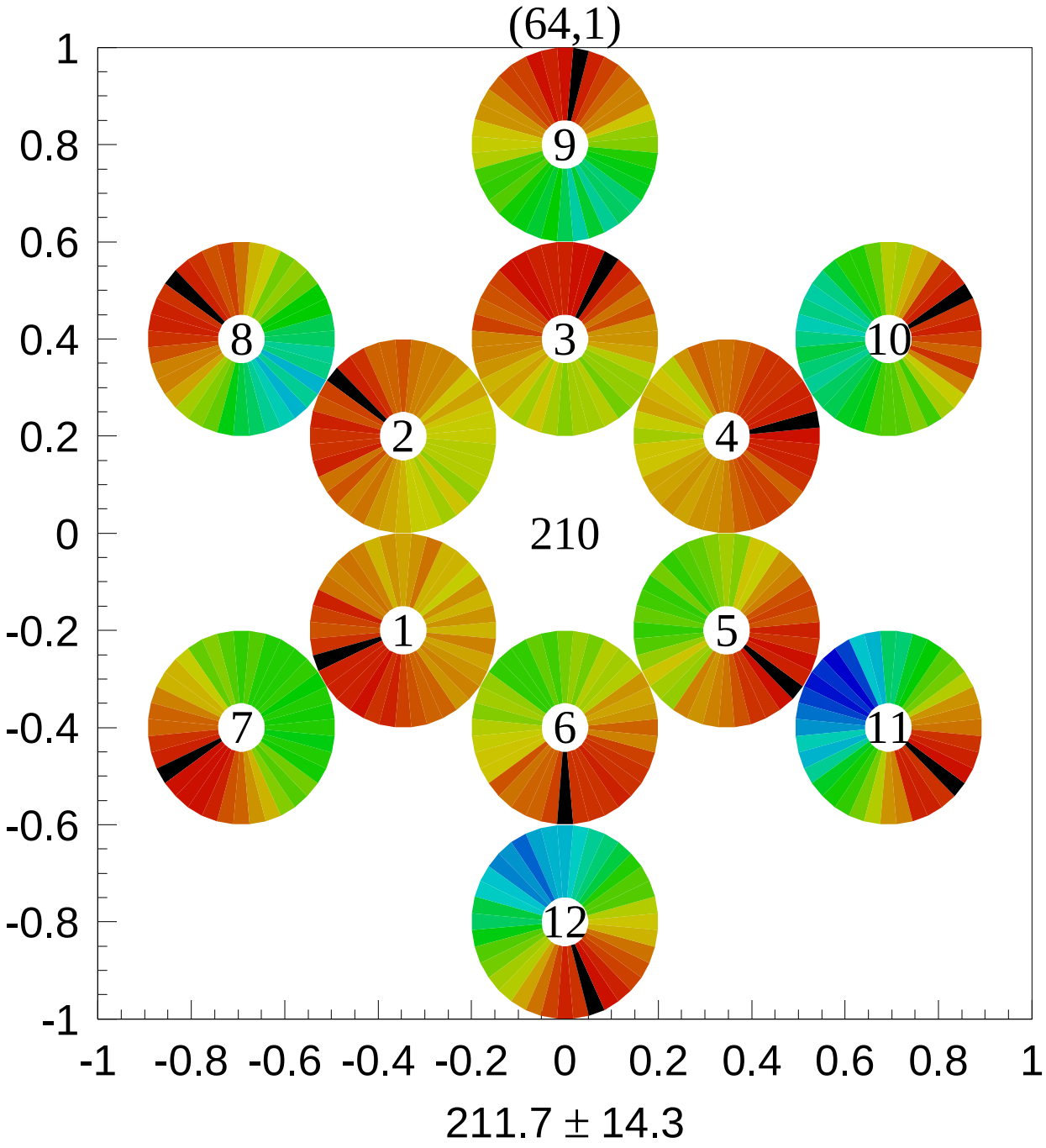

(63,27)
tilted LEDs
114 128 120 121 111 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
106 118 116 116 128 133
average of 6
average of 12
llh
azimuth to LED 7, degrees

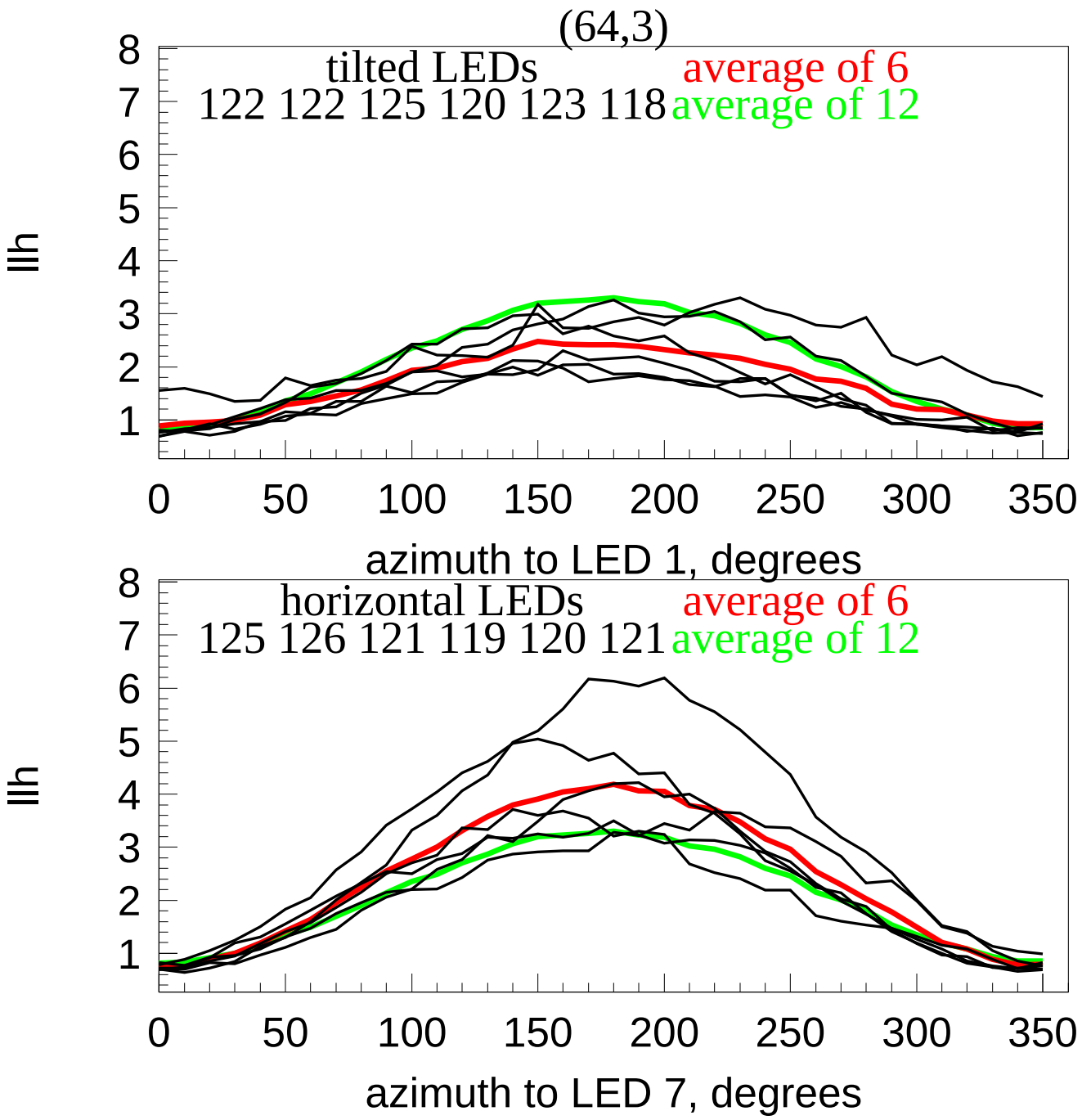

(63,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
310
310.5 ± 5.3
1
2
3
4
5
6
7
8
9
10
11
12

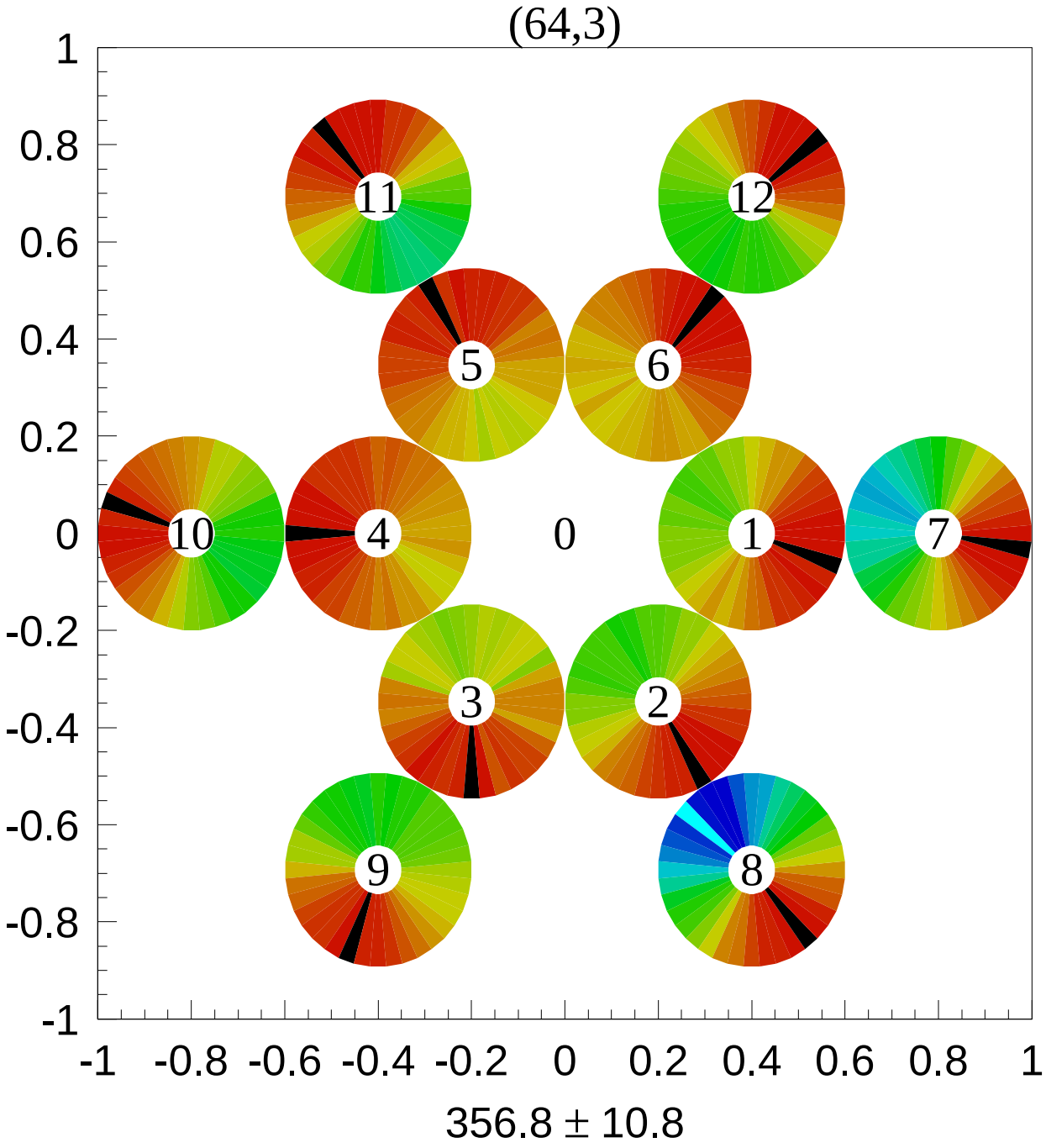

(63,28)
tilted LEDs
117 125 127 118 115 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 122 123 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

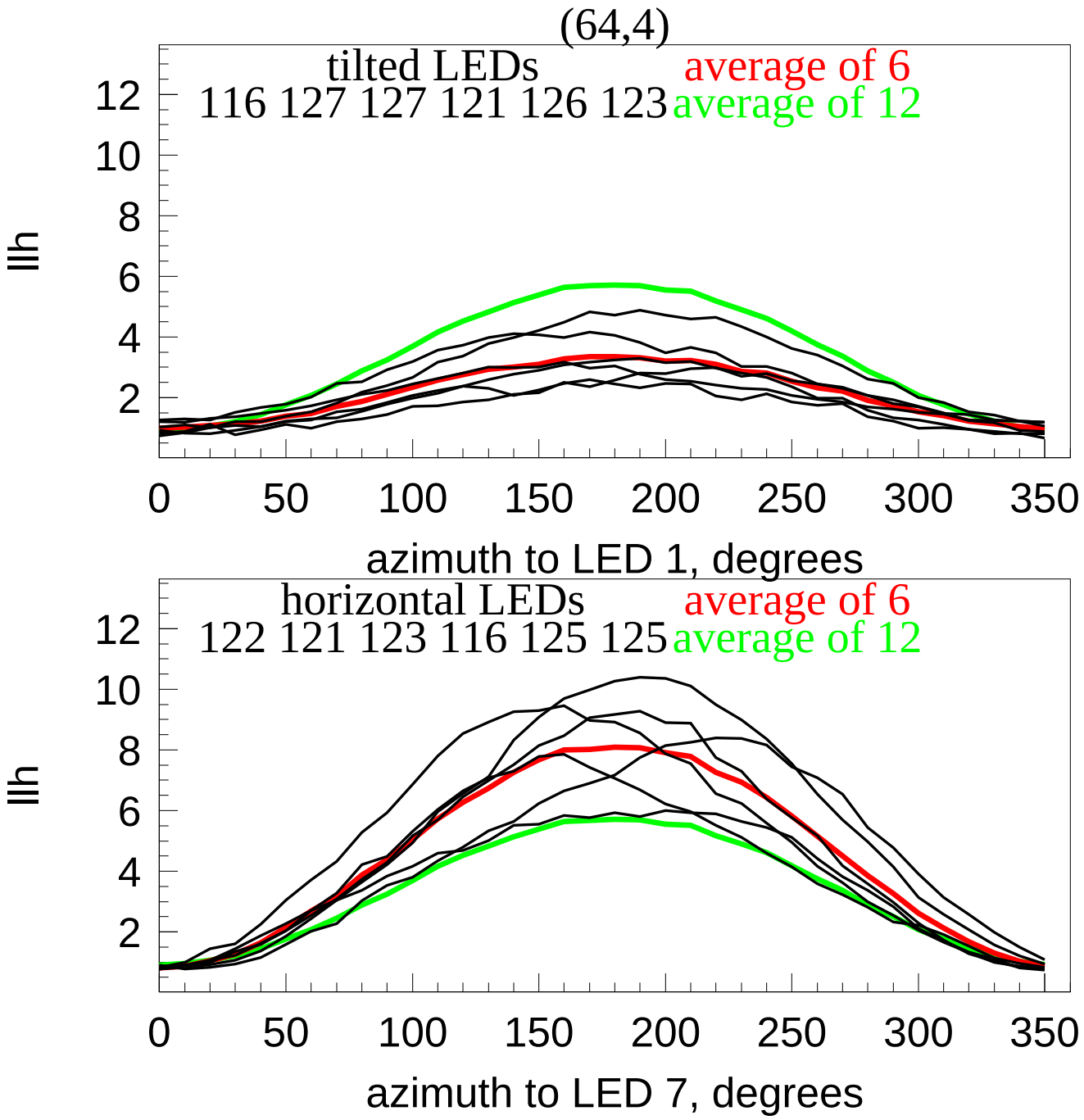

(63,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10.8 ± 4.3
12
11
6
5
7
1
10
4
10
2
3
8
9

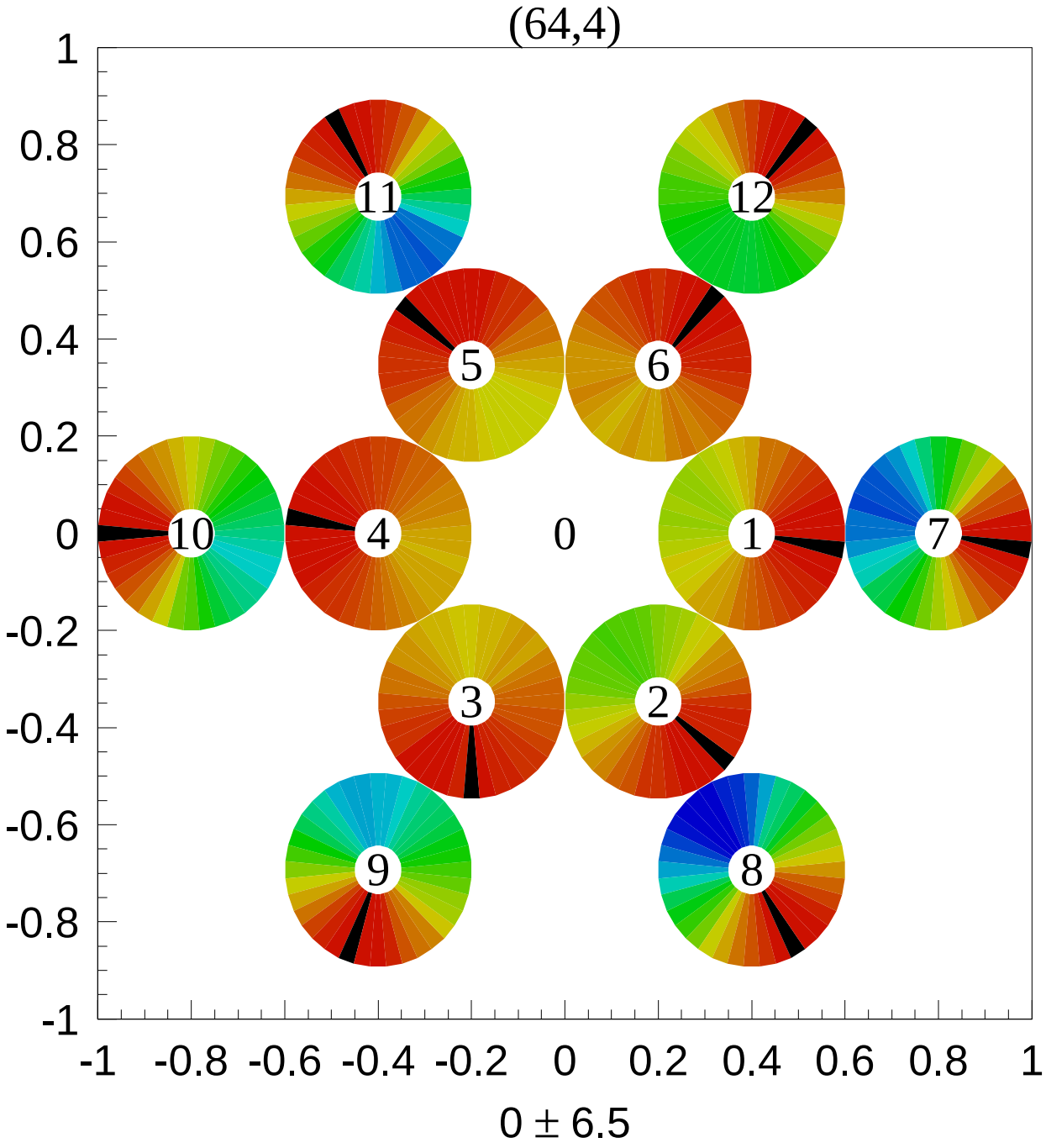

(64,1)
tilted LEDs
118 123 121 123 122 121
average of 6
average of 12
llh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 118 125 118 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

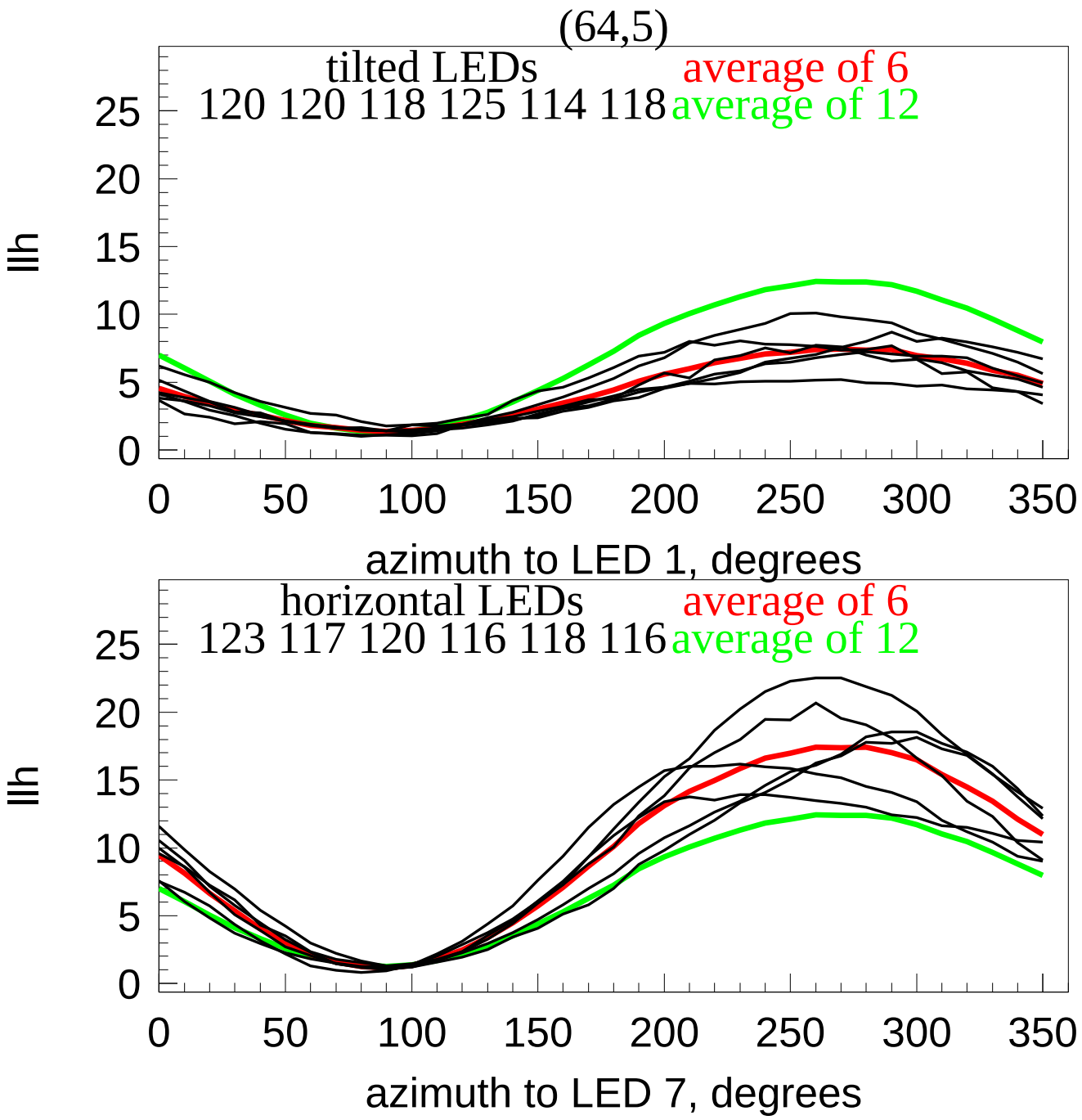

(64,1)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
211.7 ± 14.3

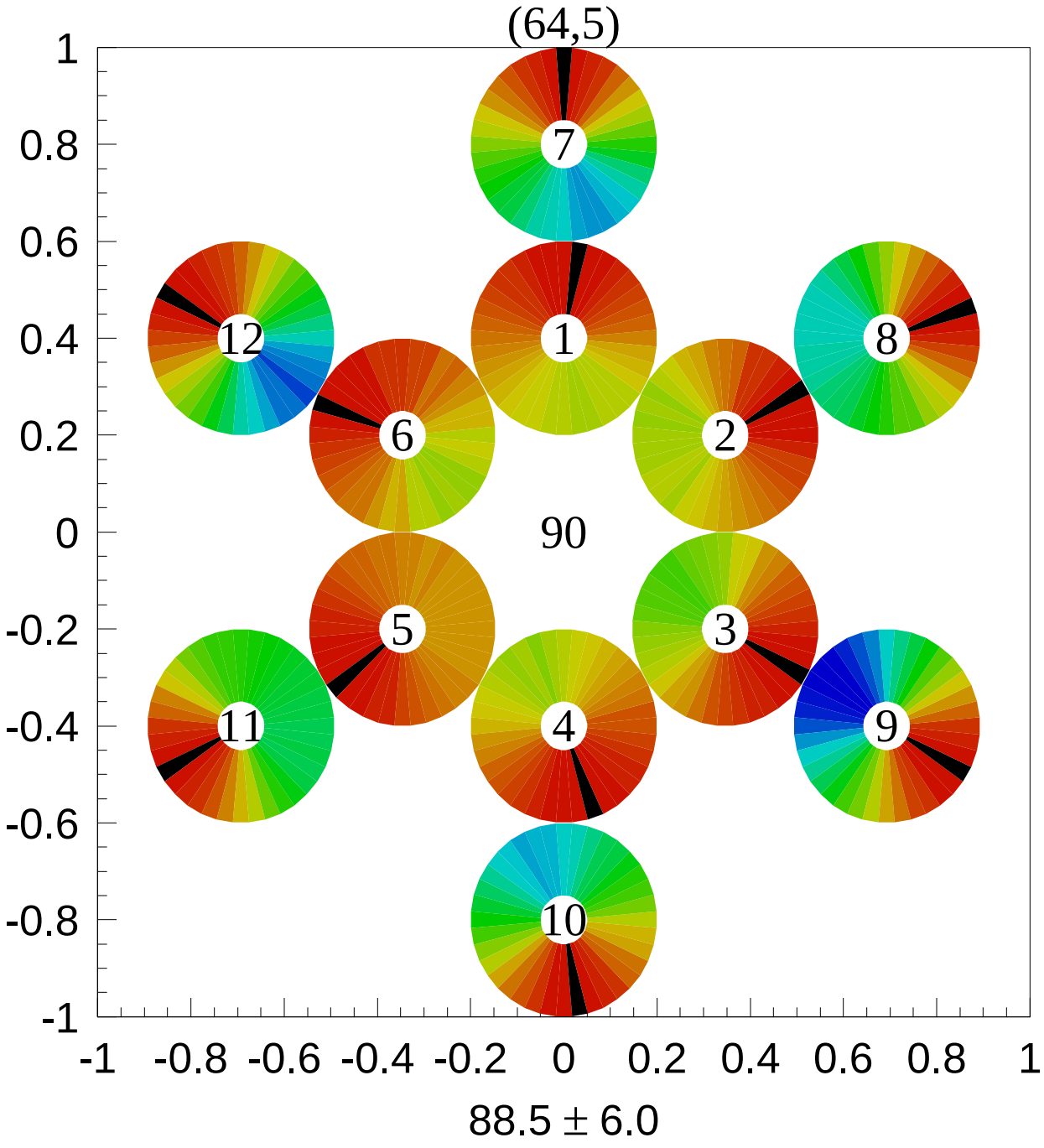

(64,3)
tilted LEDs
122 122 125 120 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 126 121 119 120 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

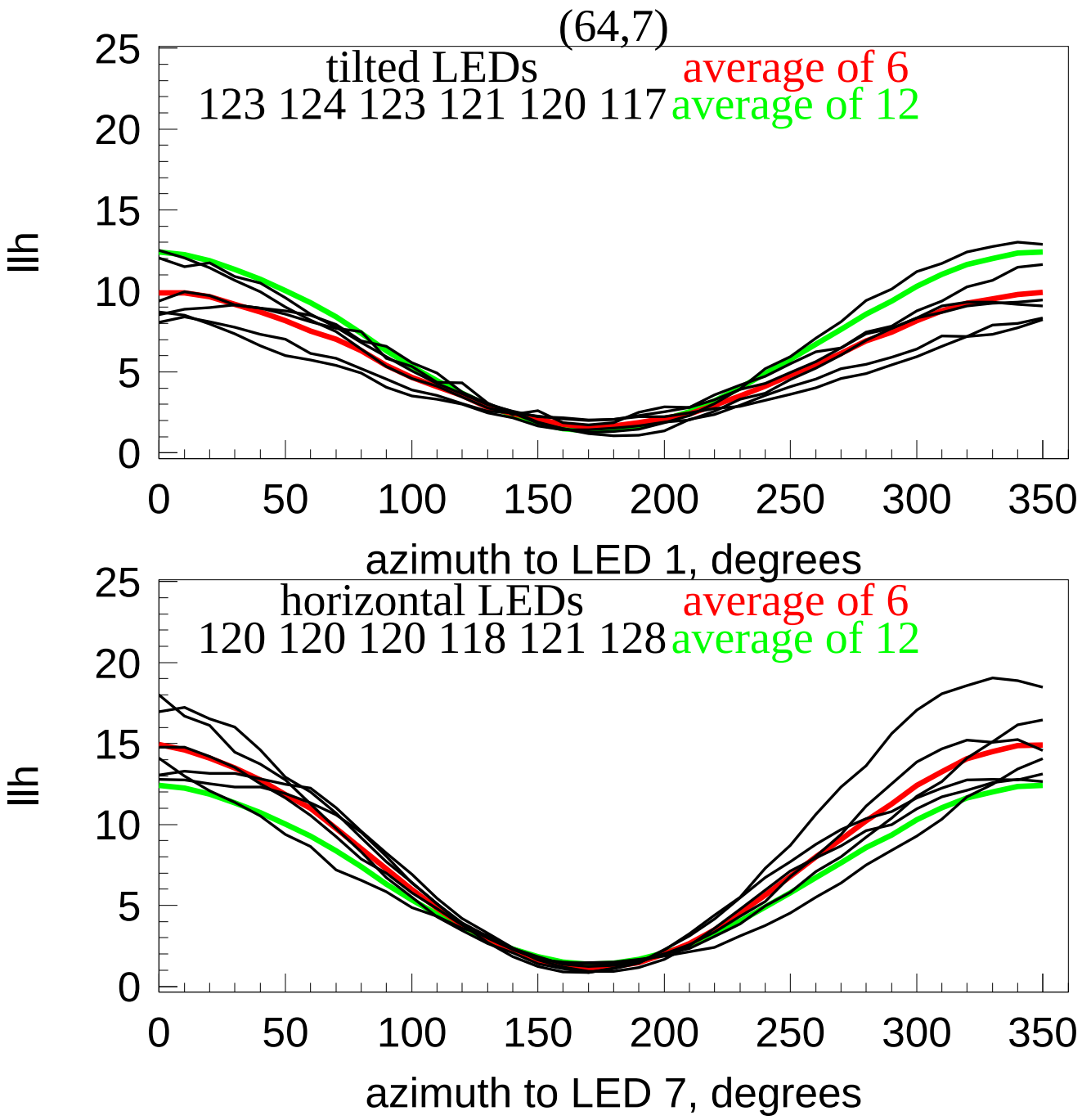

(64,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
356.8 ± 10.8
11
12
5
6
10
4
0
1
7
3
2
9
8

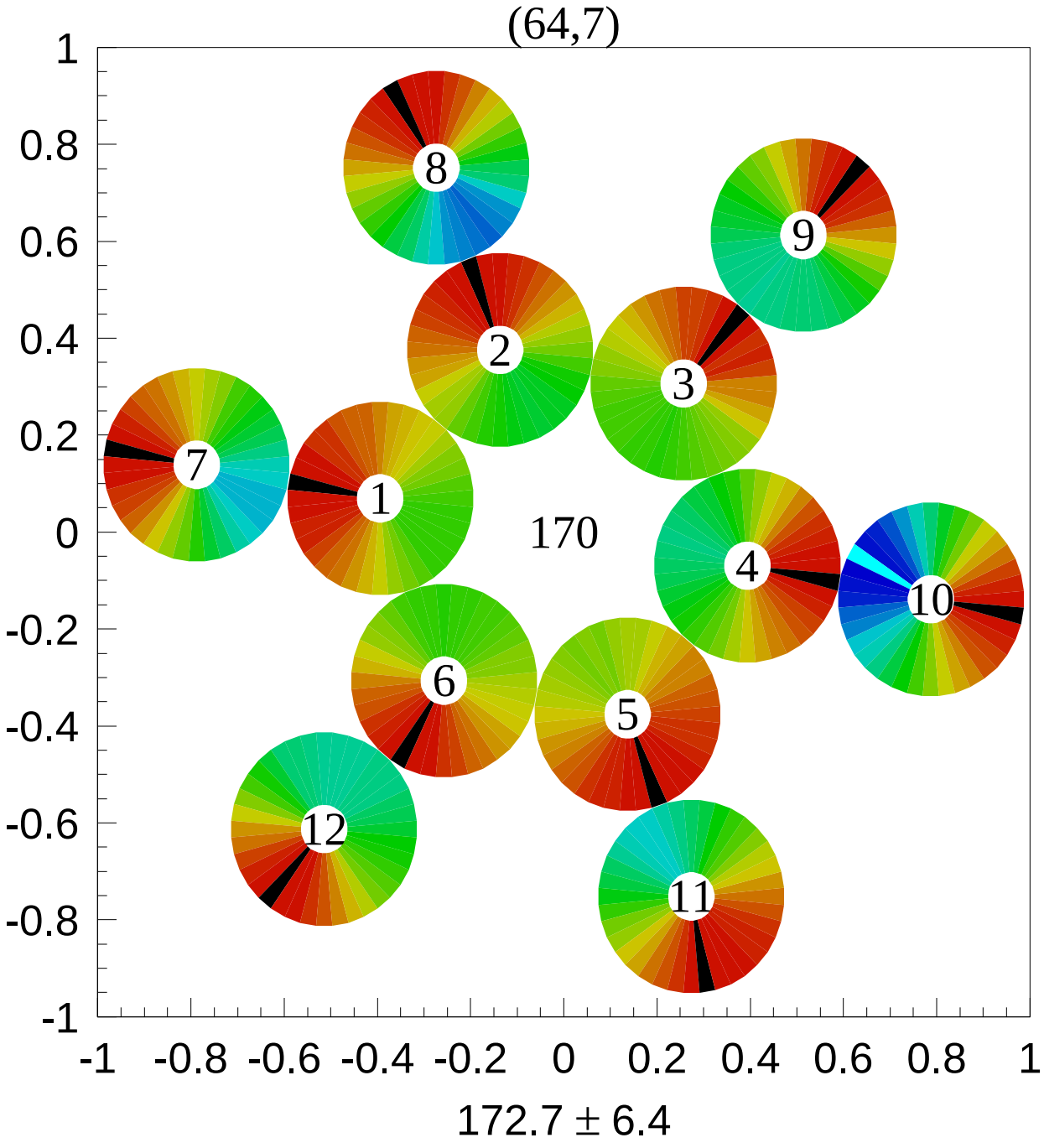

(64,4)
tilted LEDs
116 127 127 121 126 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 121 123 116 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

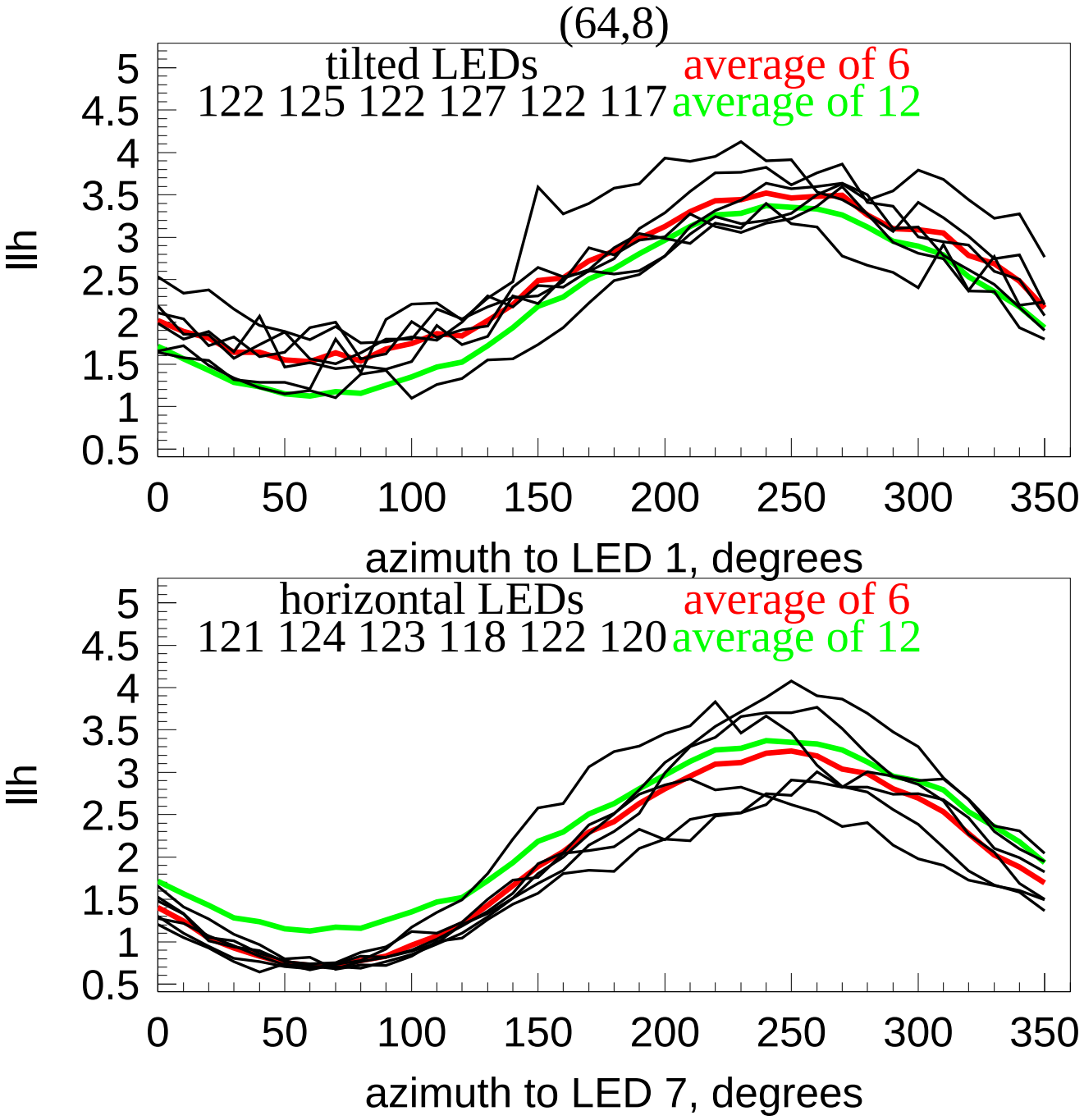

(64,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
0 ± 6.5
11
12
5
6
10
4
0
1
7
3
2
9
8

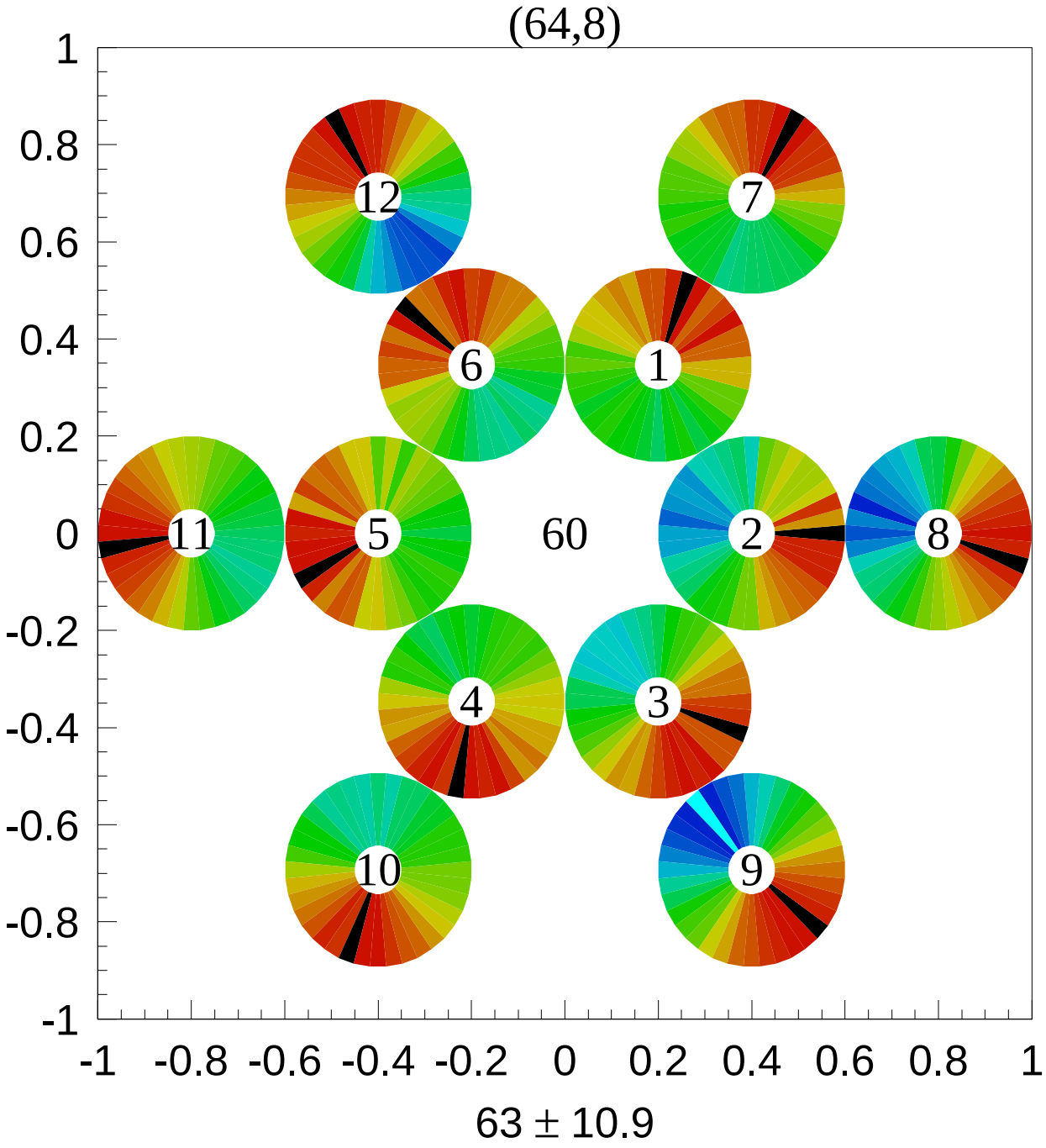

(64,5)
tilted LEDs
120 120 118 125 114 118
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 117 120 116 118 116
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

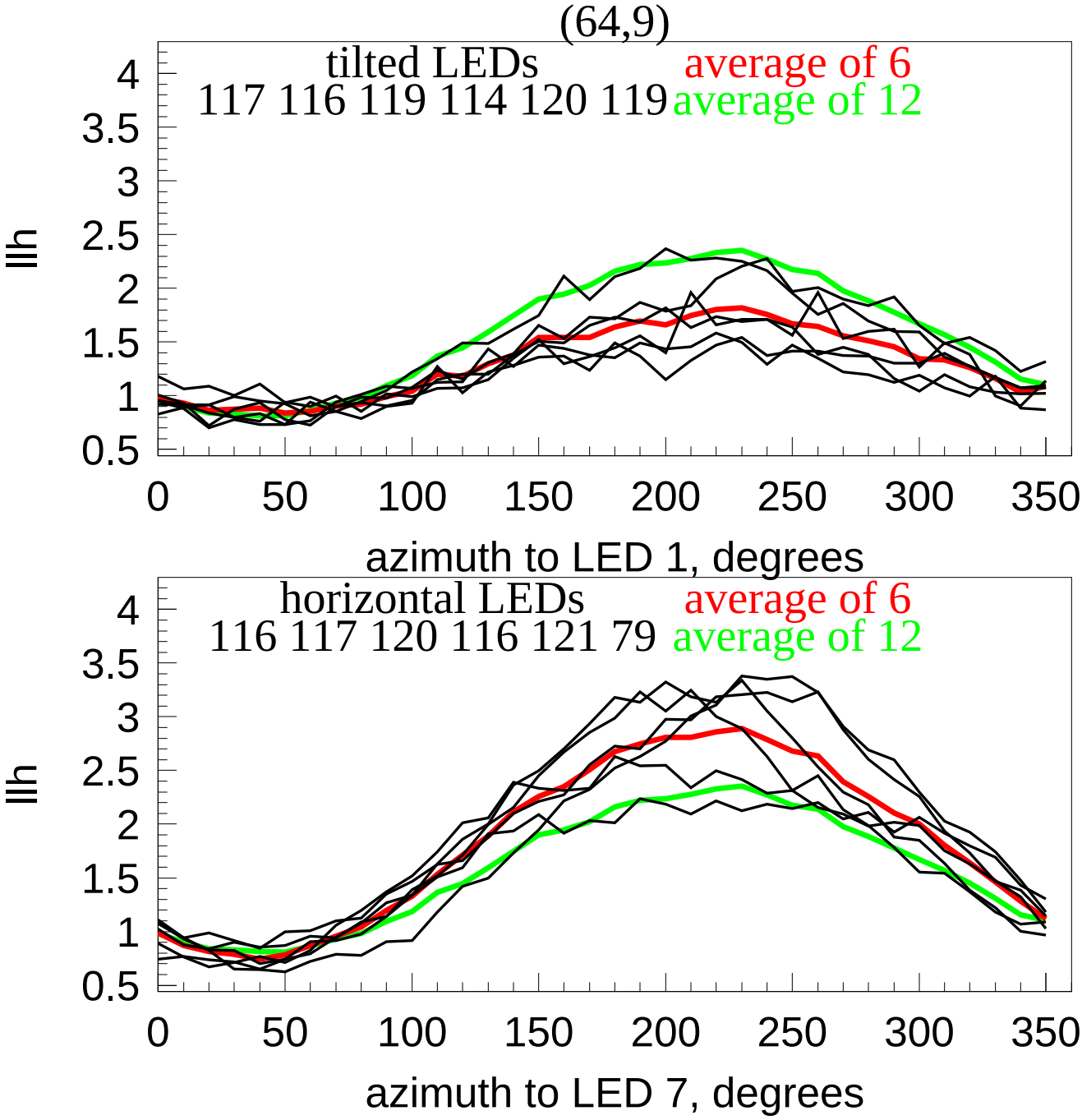

(64,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
88.5 ± 6.0

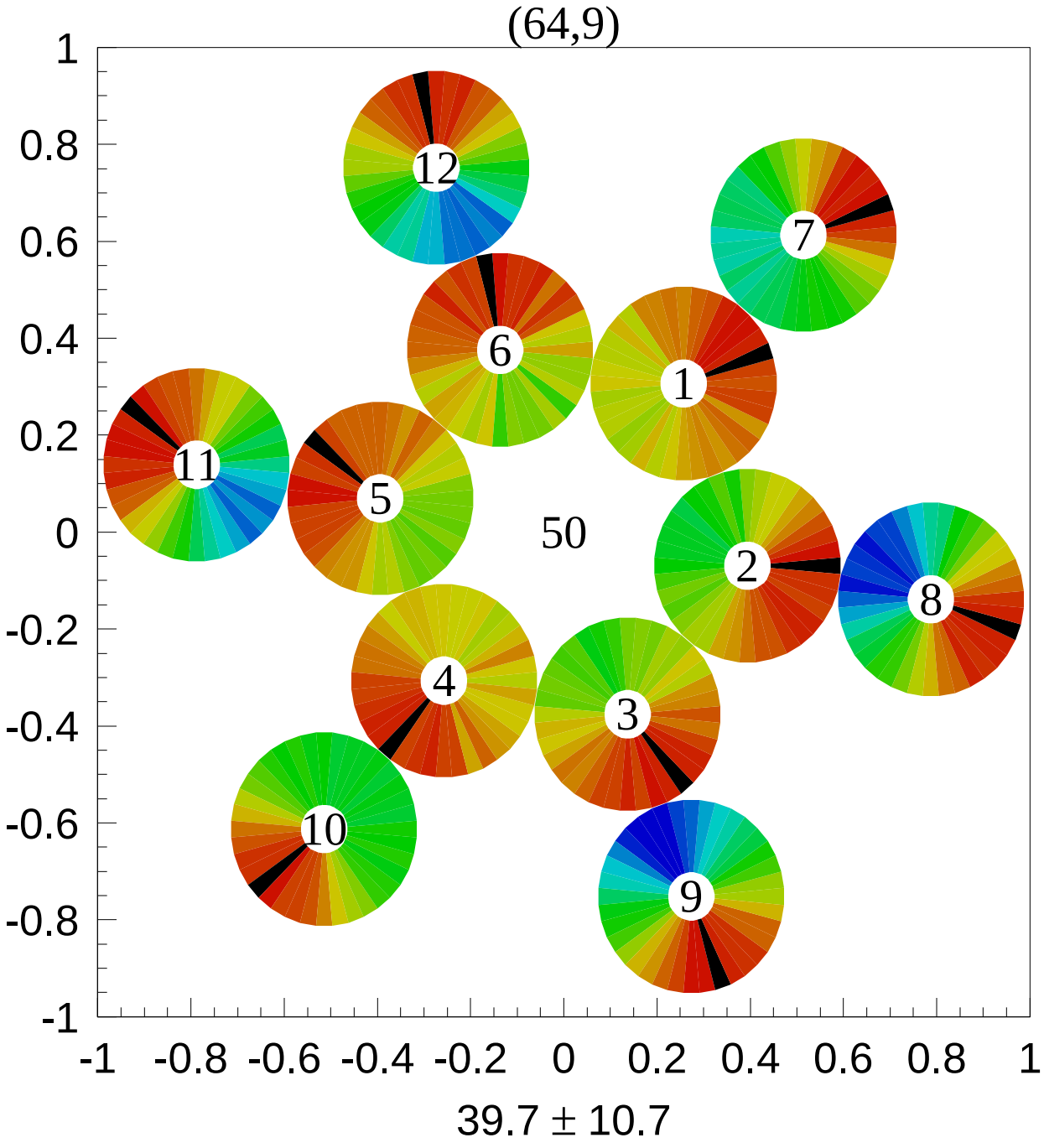

(64,7)
tilted LEDs
123 124 123 121 120 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 120 118 121 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

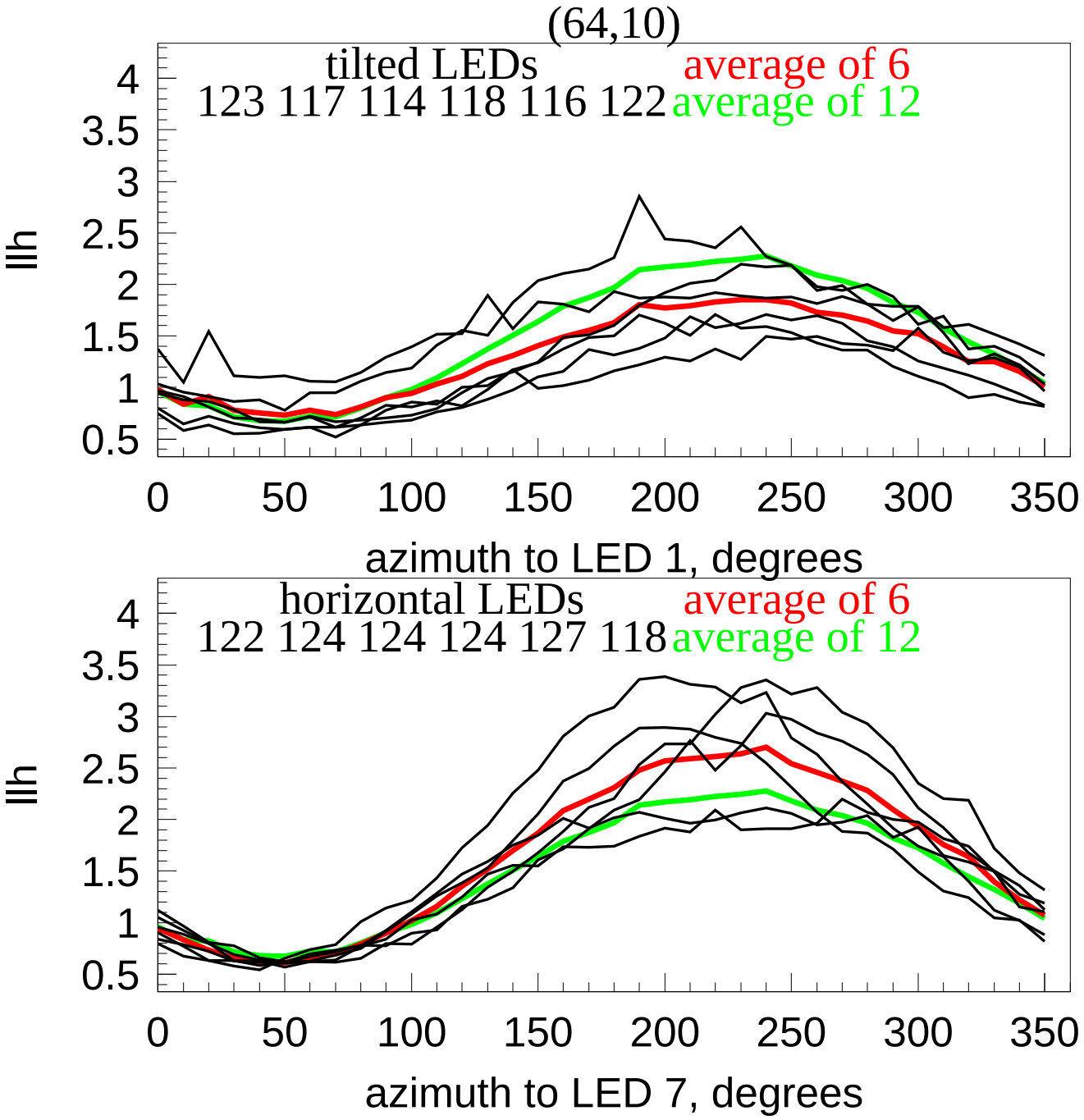

(64,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
172.7 ± 6.4

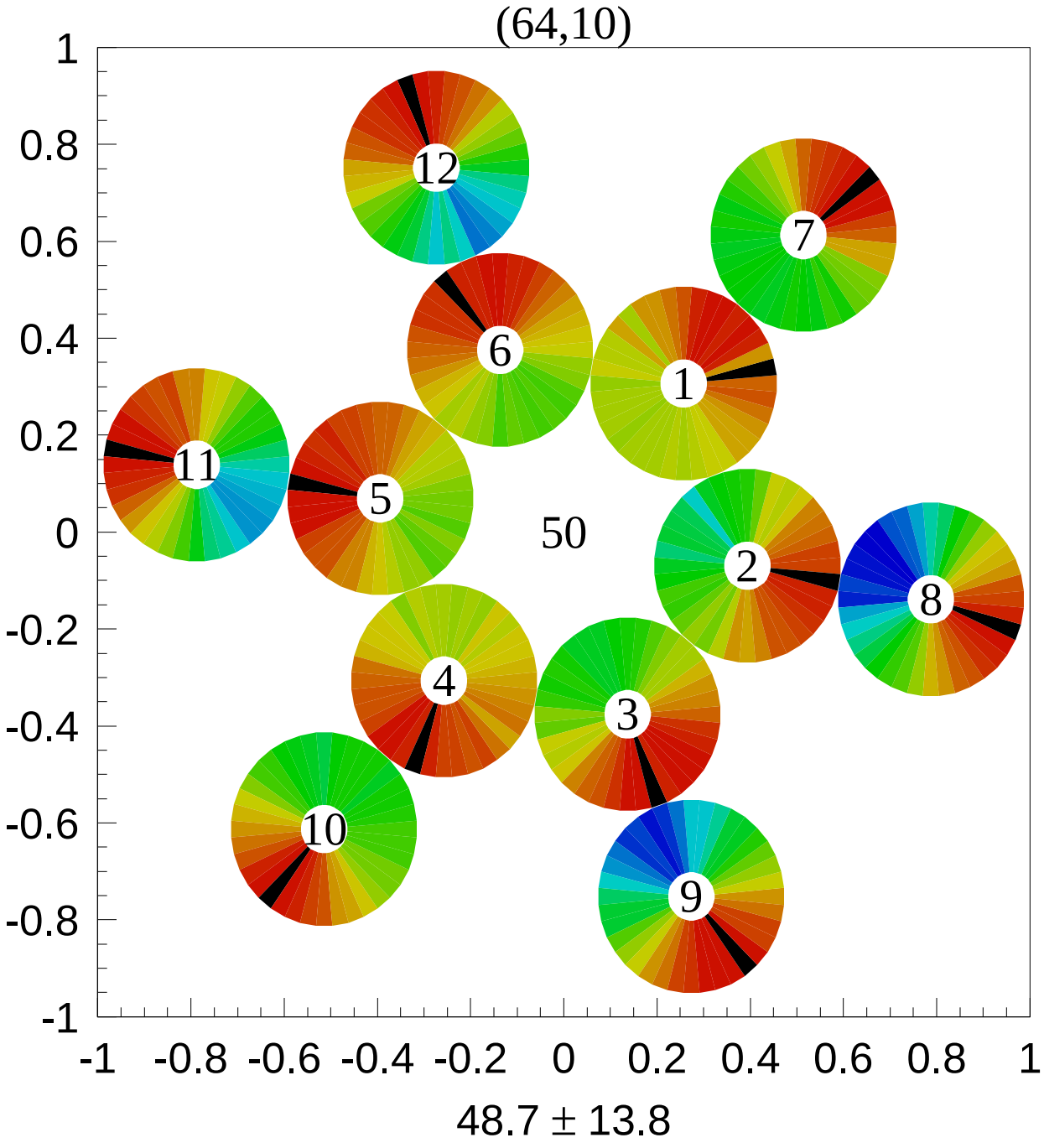

(64,8)
tilted LEDs
122 125 122 127 122 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 123 118 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

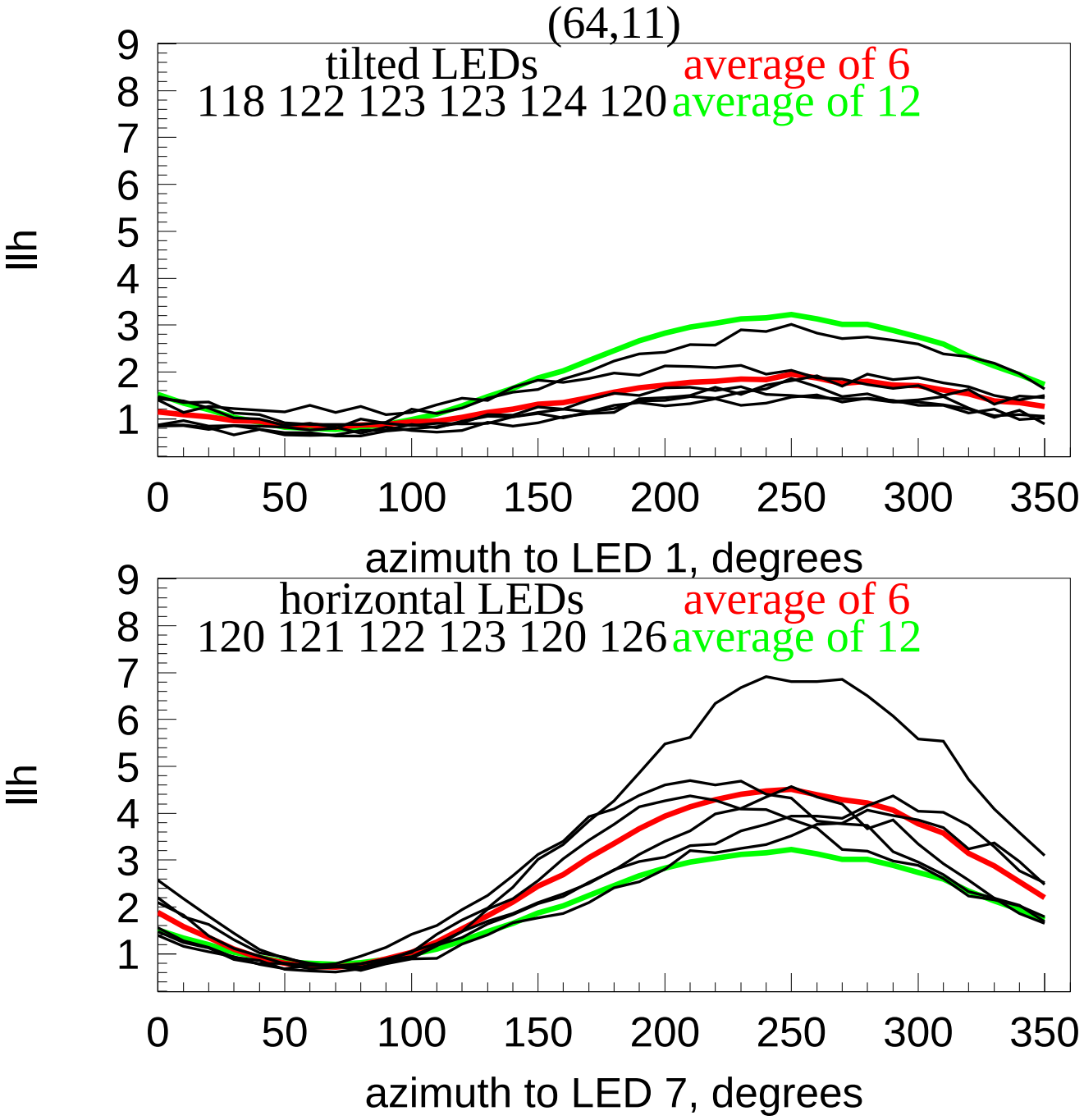

(64,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
63 ± 10.9

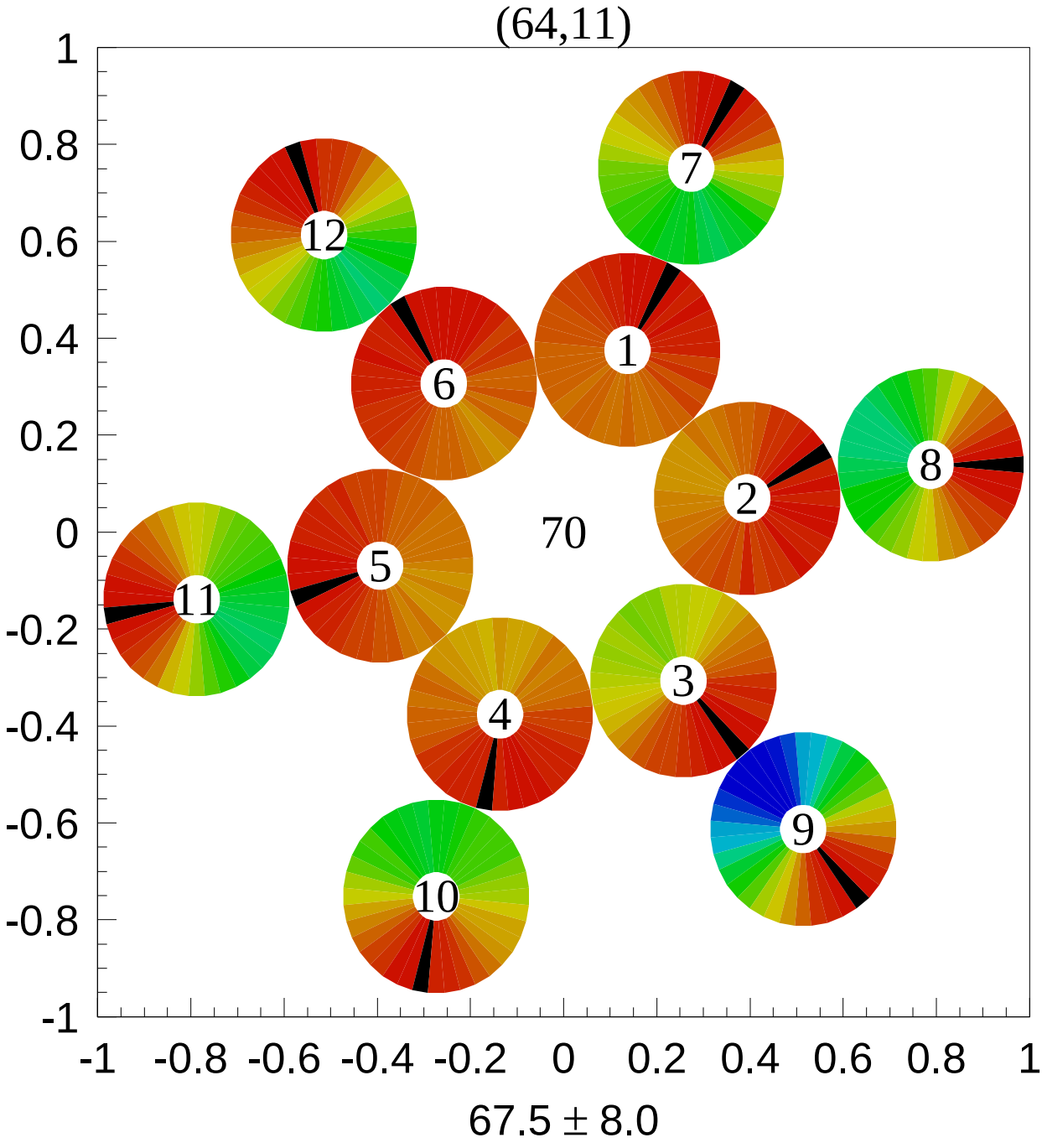

(64,9)
tilted LEDs
117 116 119 114 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 117 120 116 121 79
average of 6
average of 12
llh
azimuth to LED 7, degrees

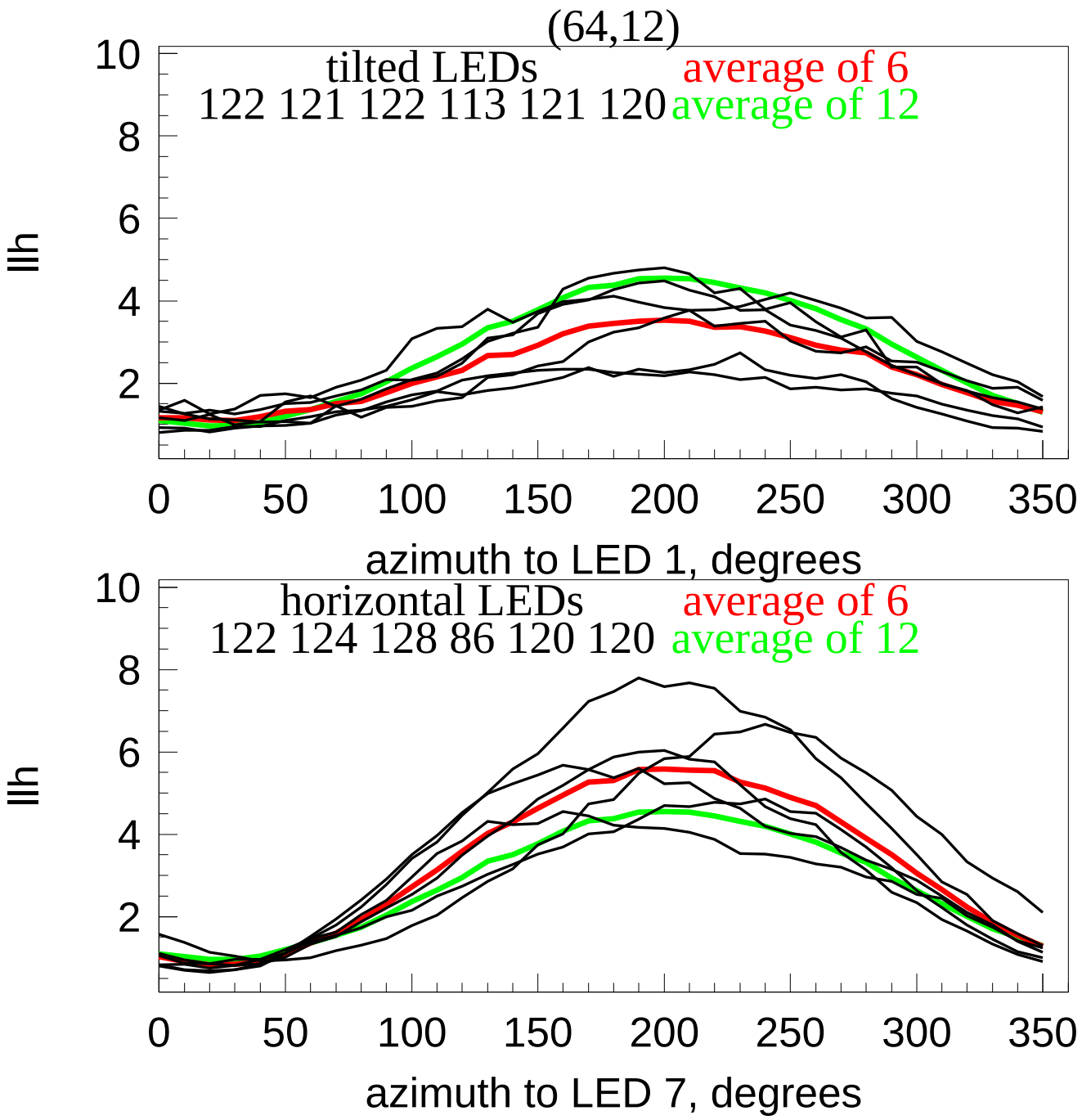

(64,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
39.7 ± 10.7

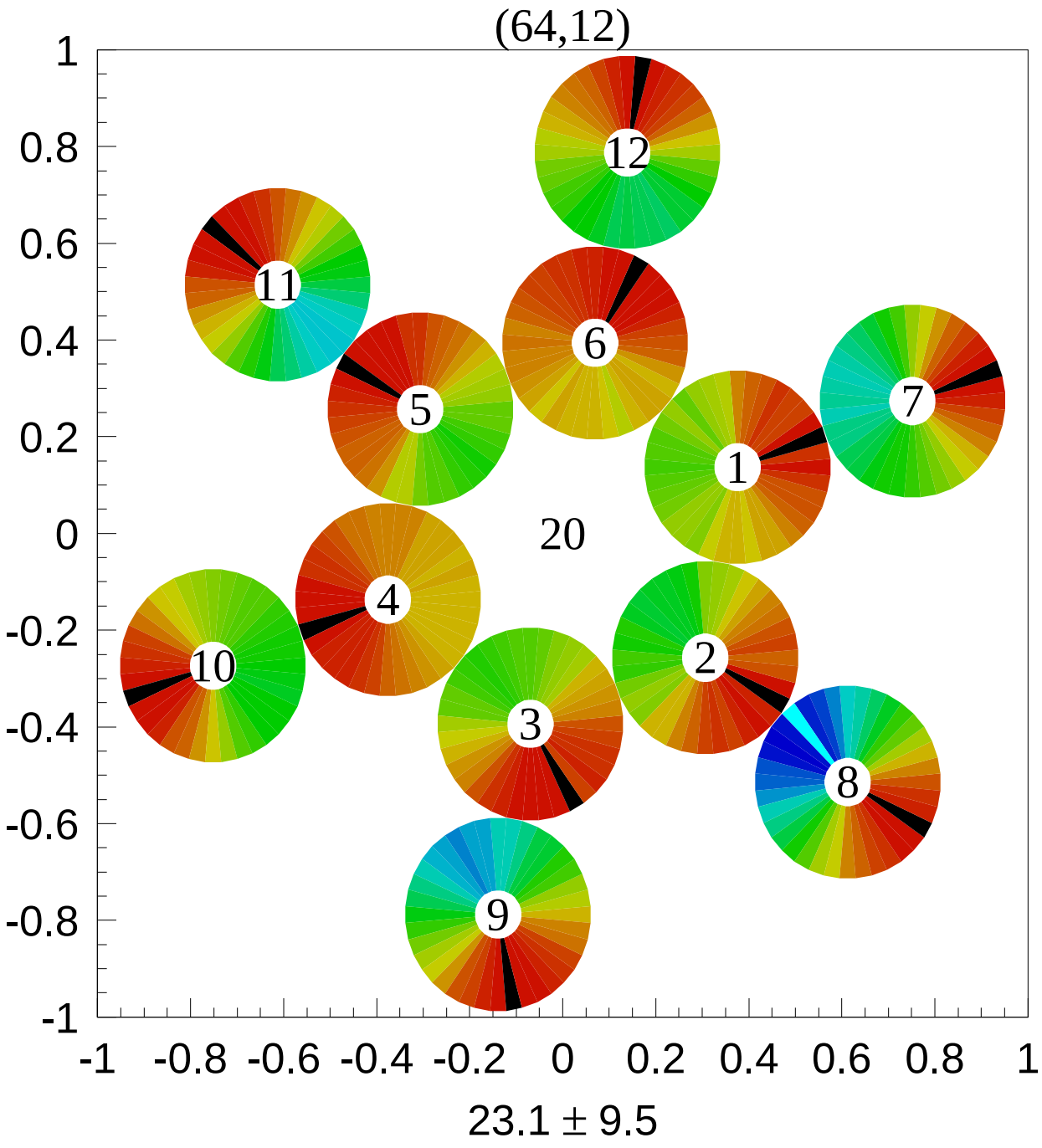

(64,10)
tilted LEDs
123 117 114 118 116 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 124 124 127 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

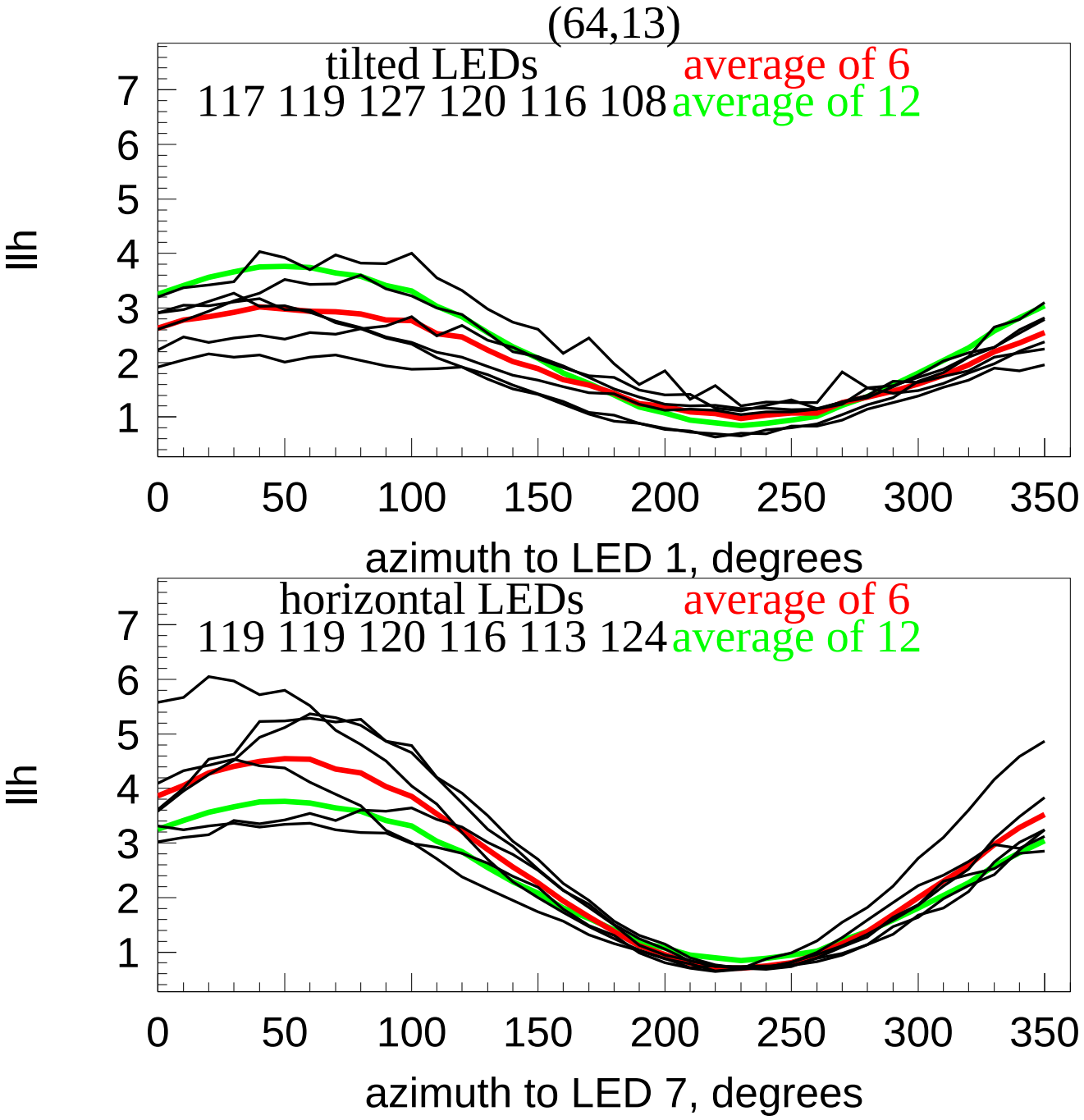

(64,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
48.7 ± 13.8

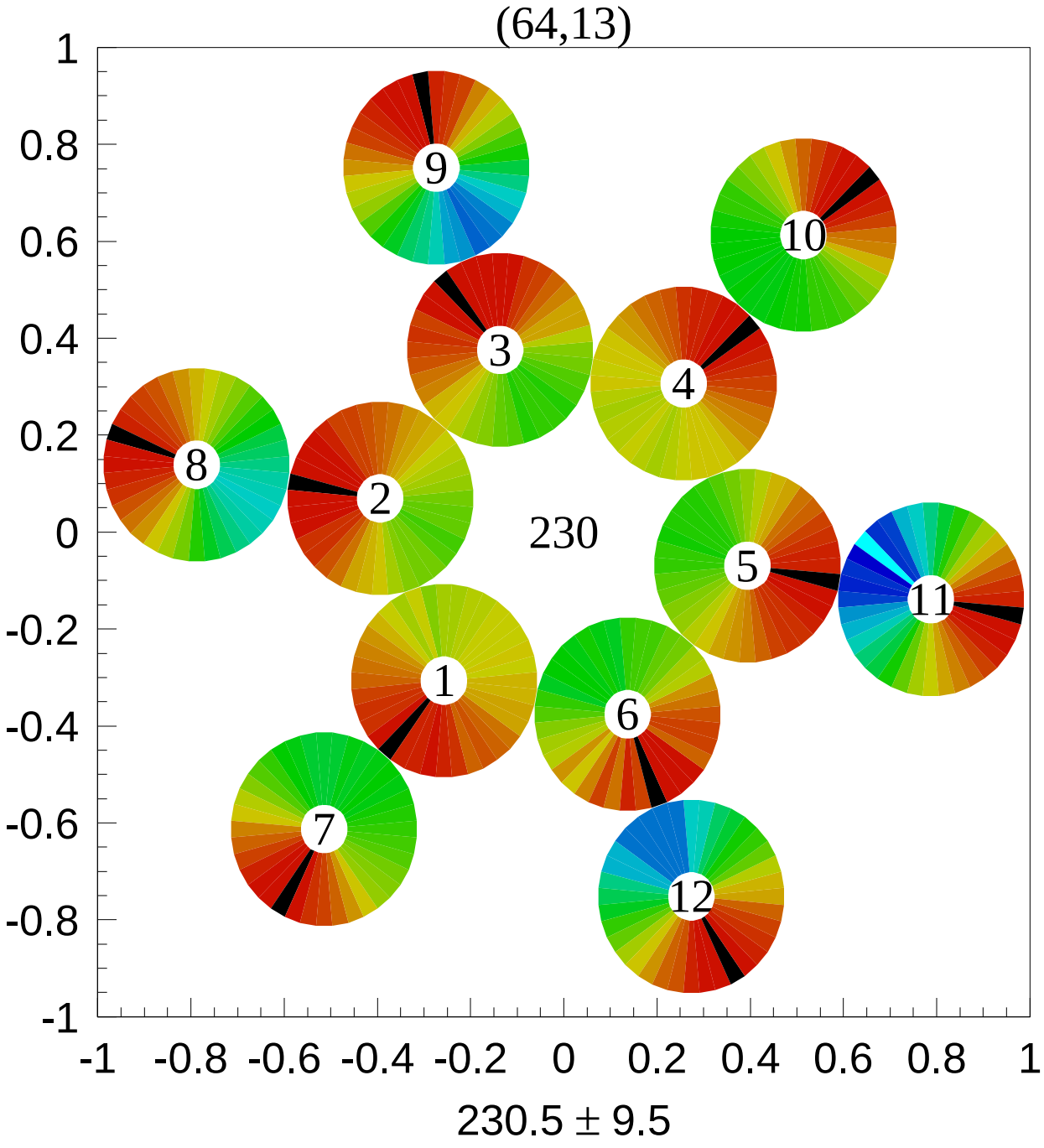

(64,11)
tilted LEDs
118 122 123 123 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 122 123 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

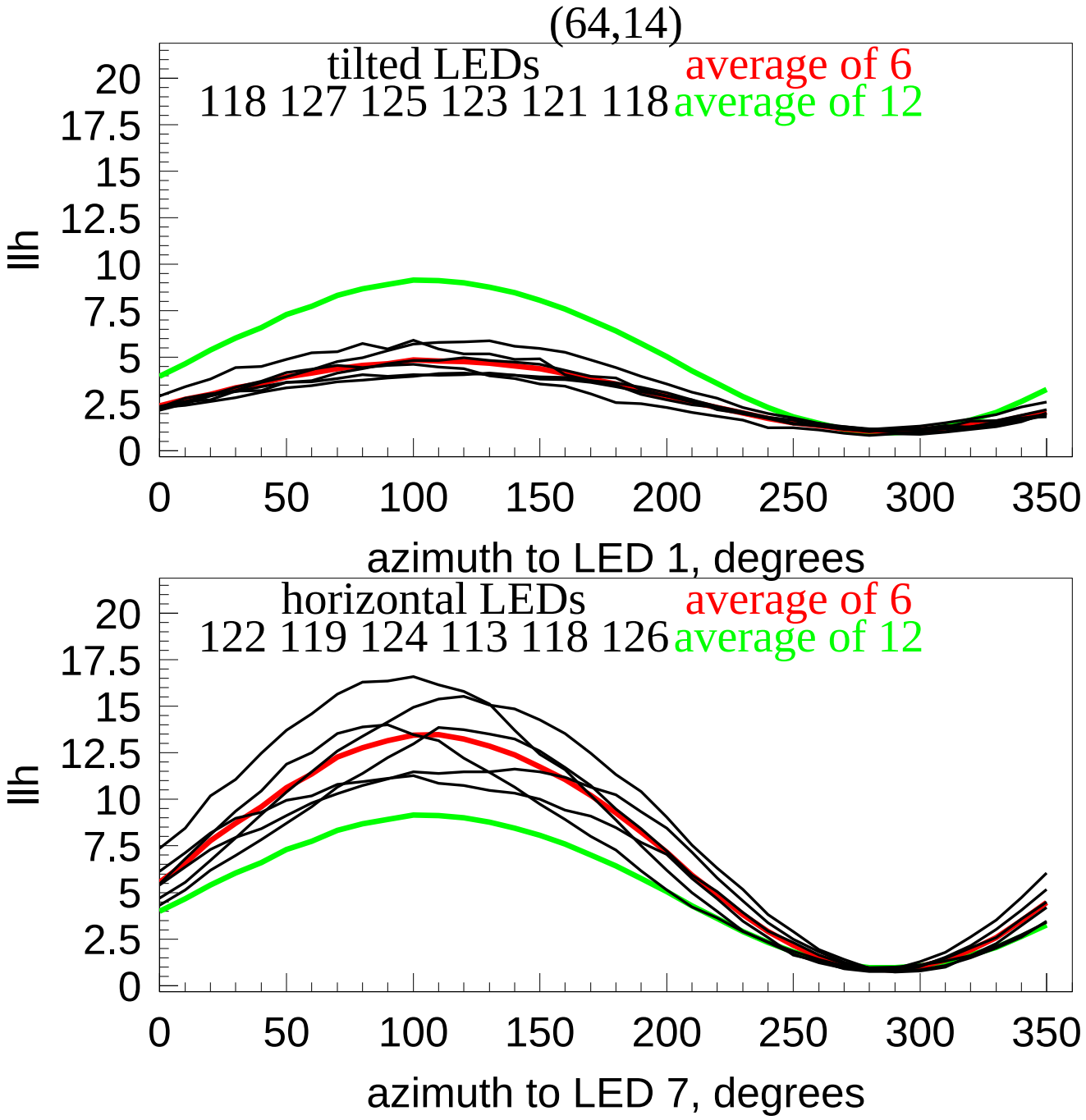

(64,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
67.5 ± 8.0
70
1
2
3
4
5
6
7
8
9
10
11
12

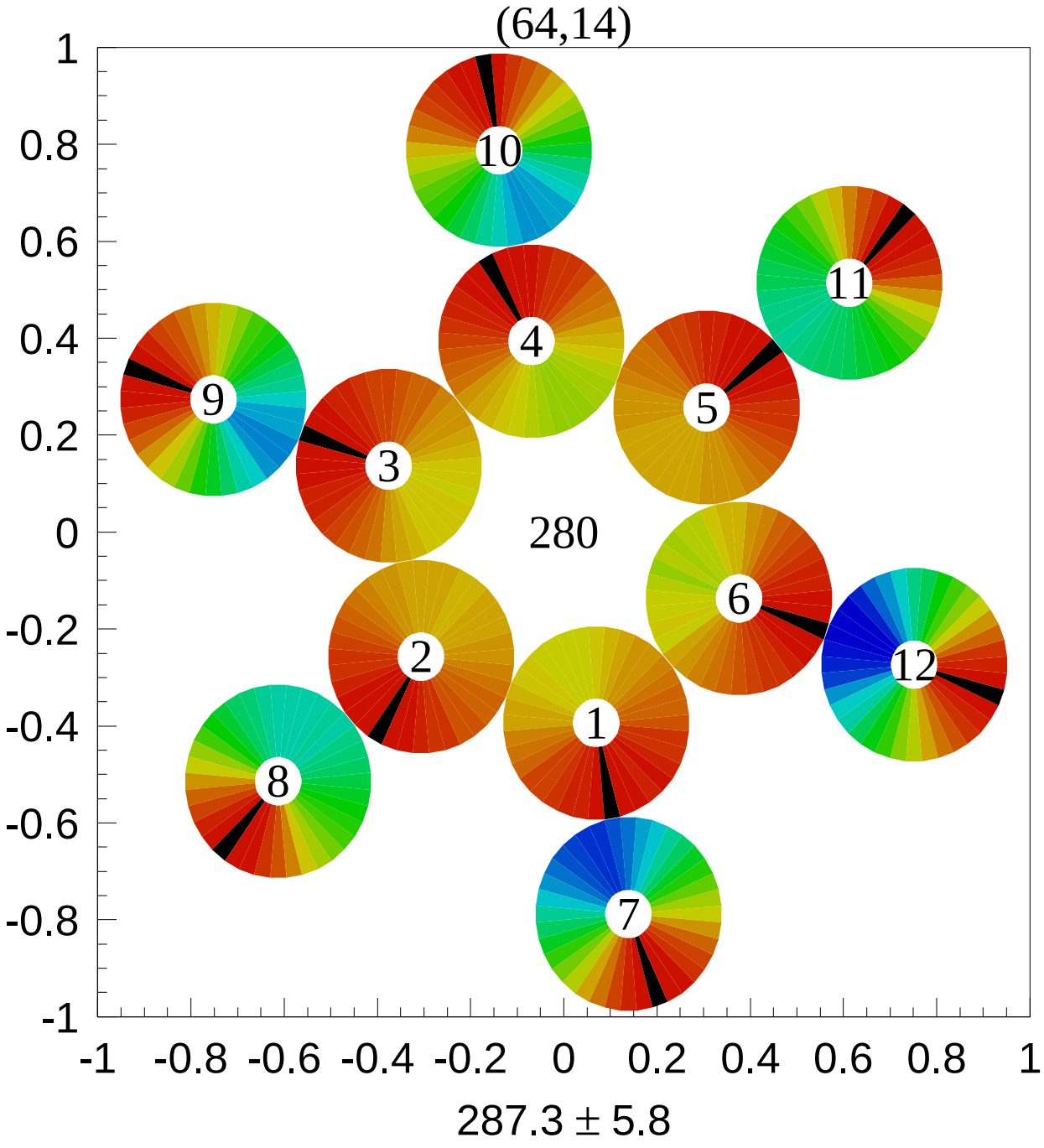

(64,12)
tilted LEDs
122 121 122 113 121 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 128 86 120 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

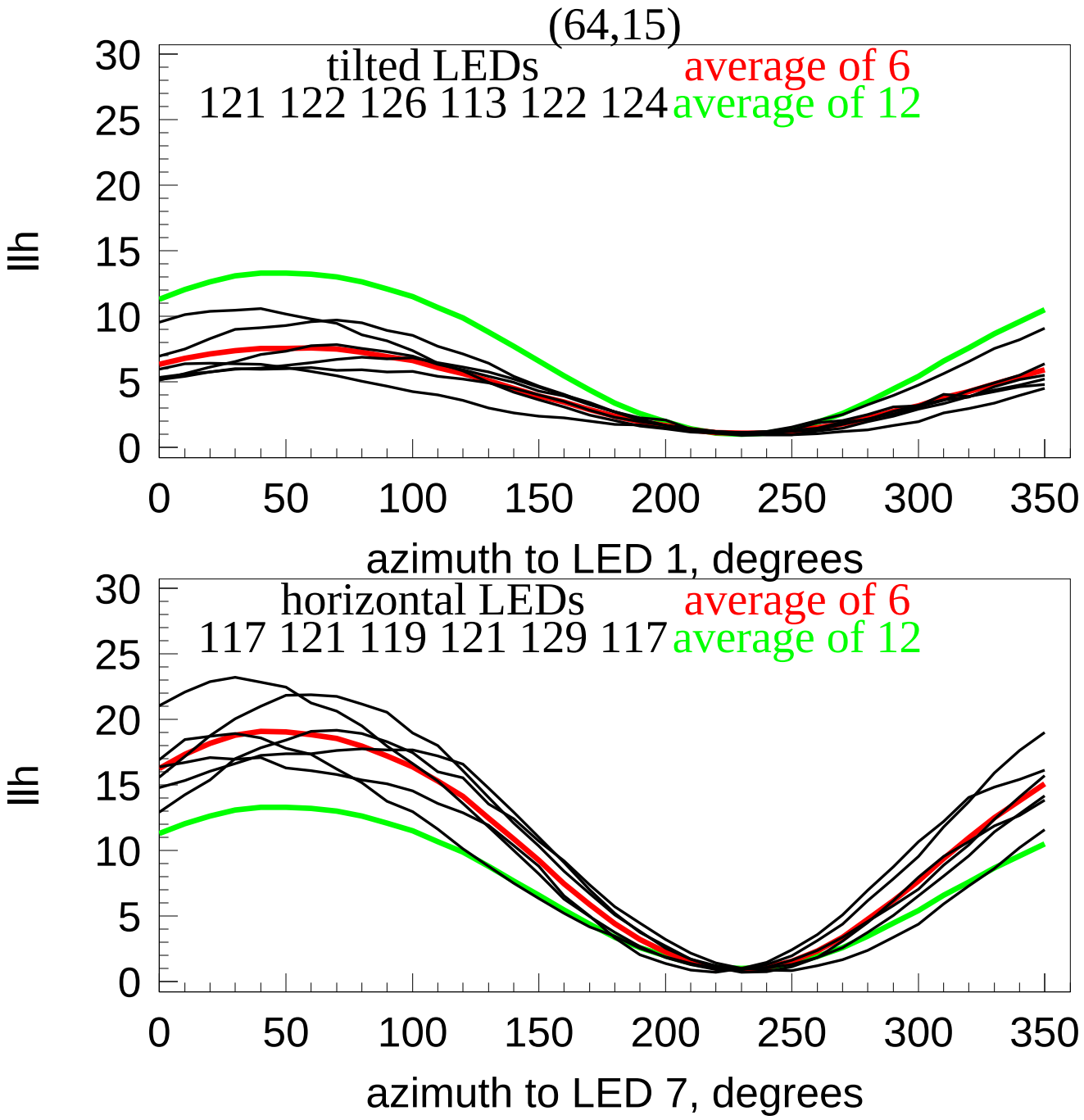

(64,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
23.1 ± 9.5

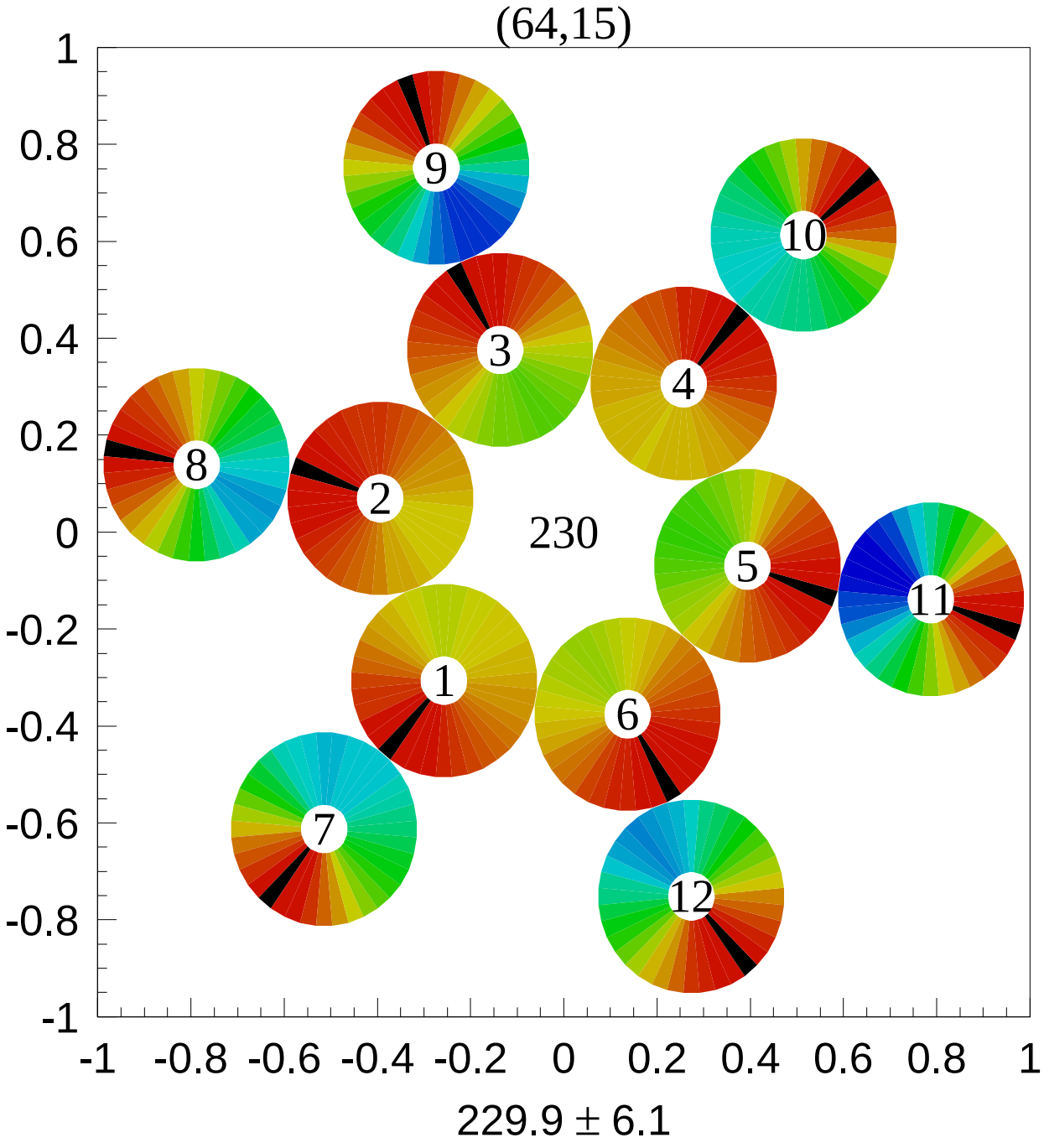

(64,13)
tilted LEDs
117 119 127 120 116 108
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 119 120 116 113 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

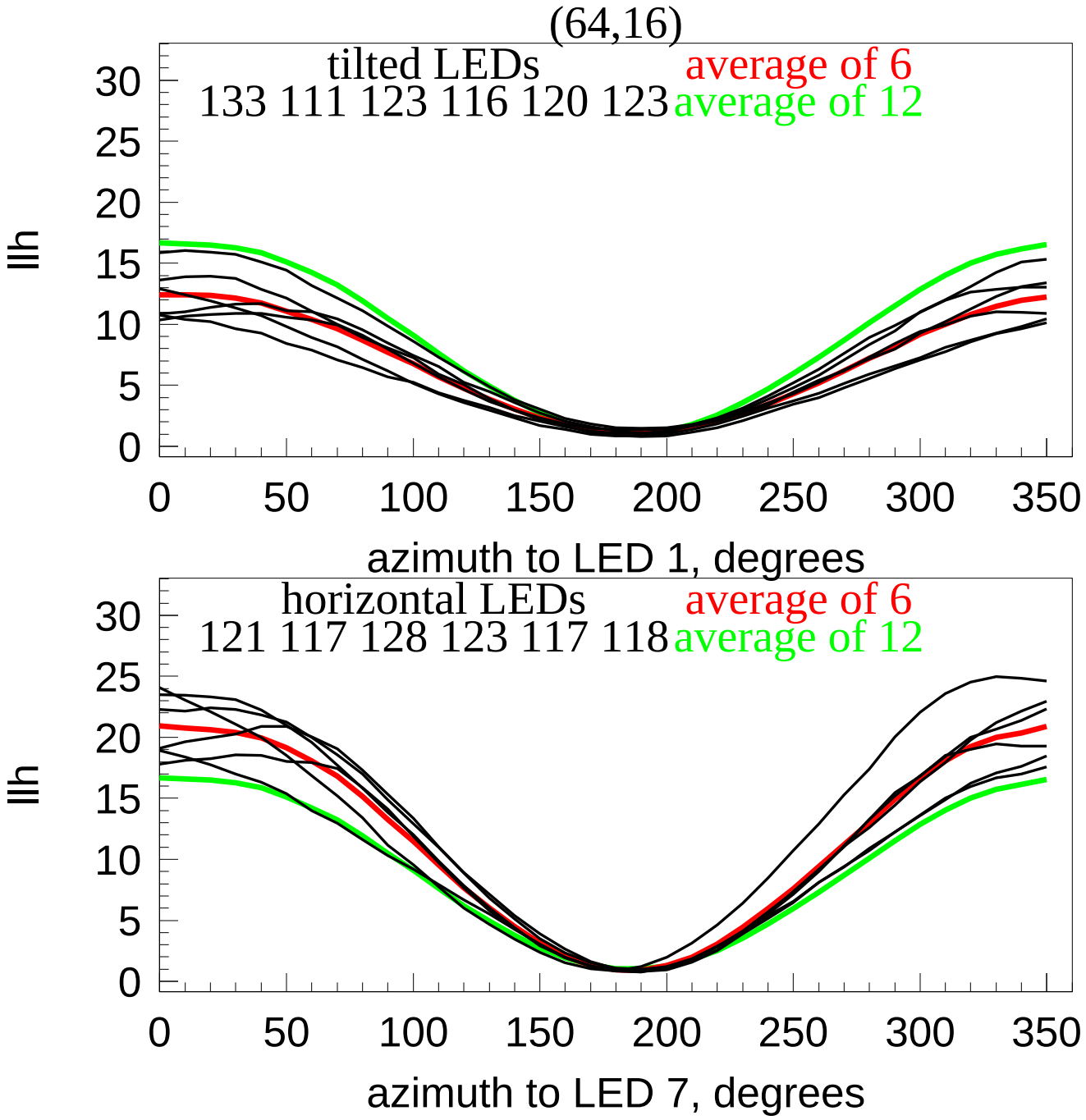

(64,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
230
230.5 ± 9.5
1
2
3
4
5
6
7
8
9
10
11
12

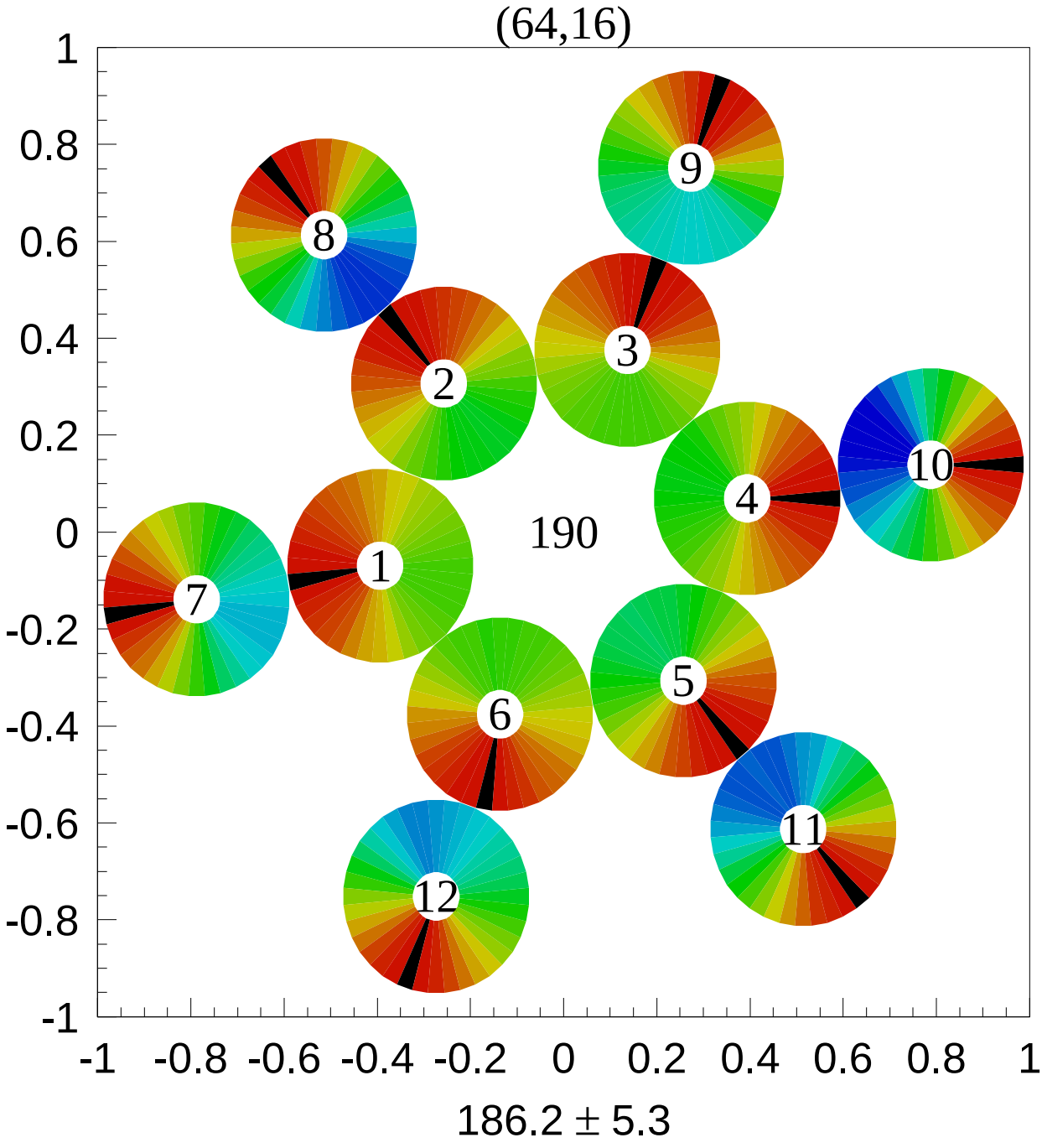

(64,14)
tilted LEDs
118 127 125 123 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 124 113 118 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

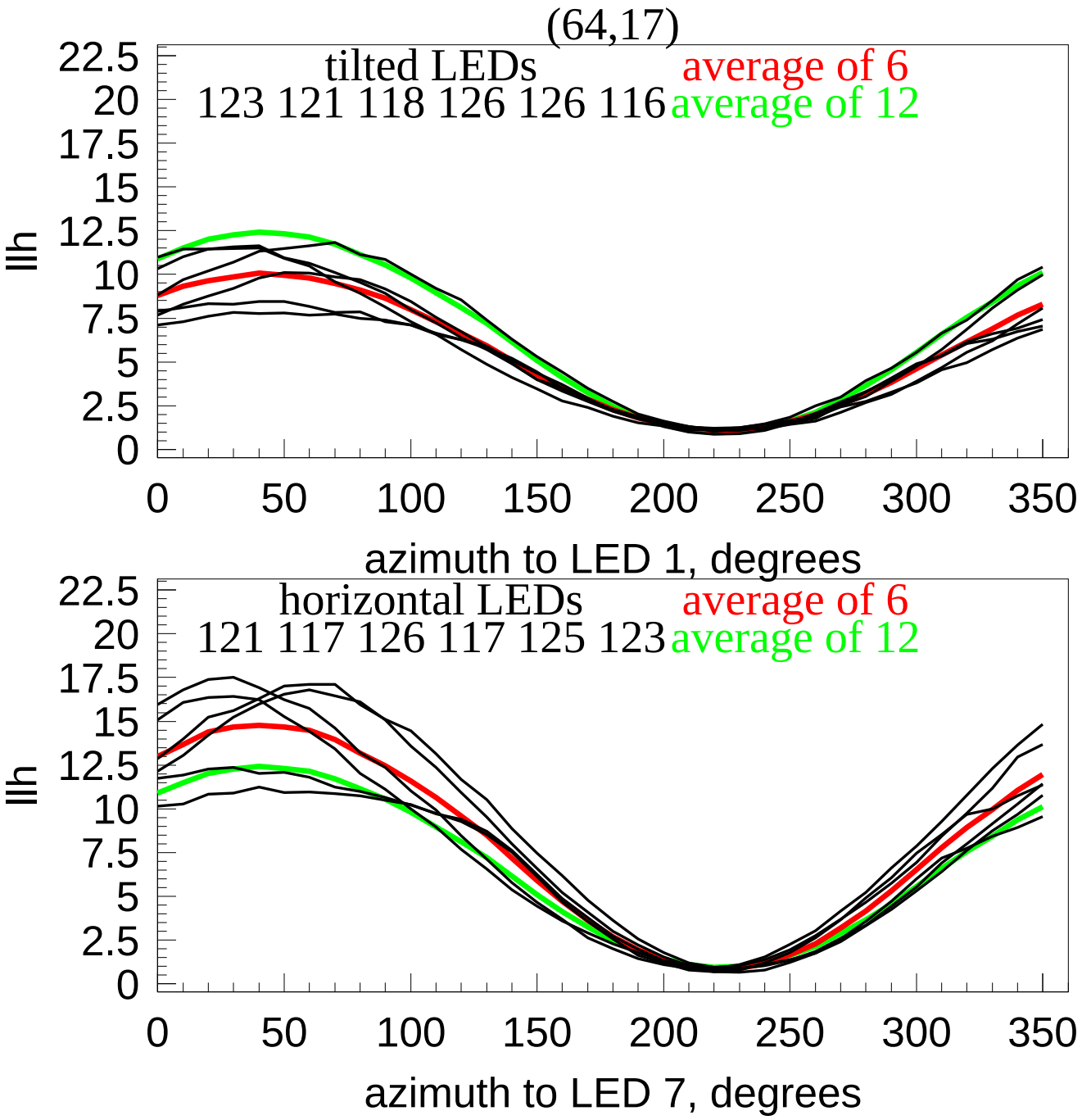

(64,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
287.3 ± 5.8

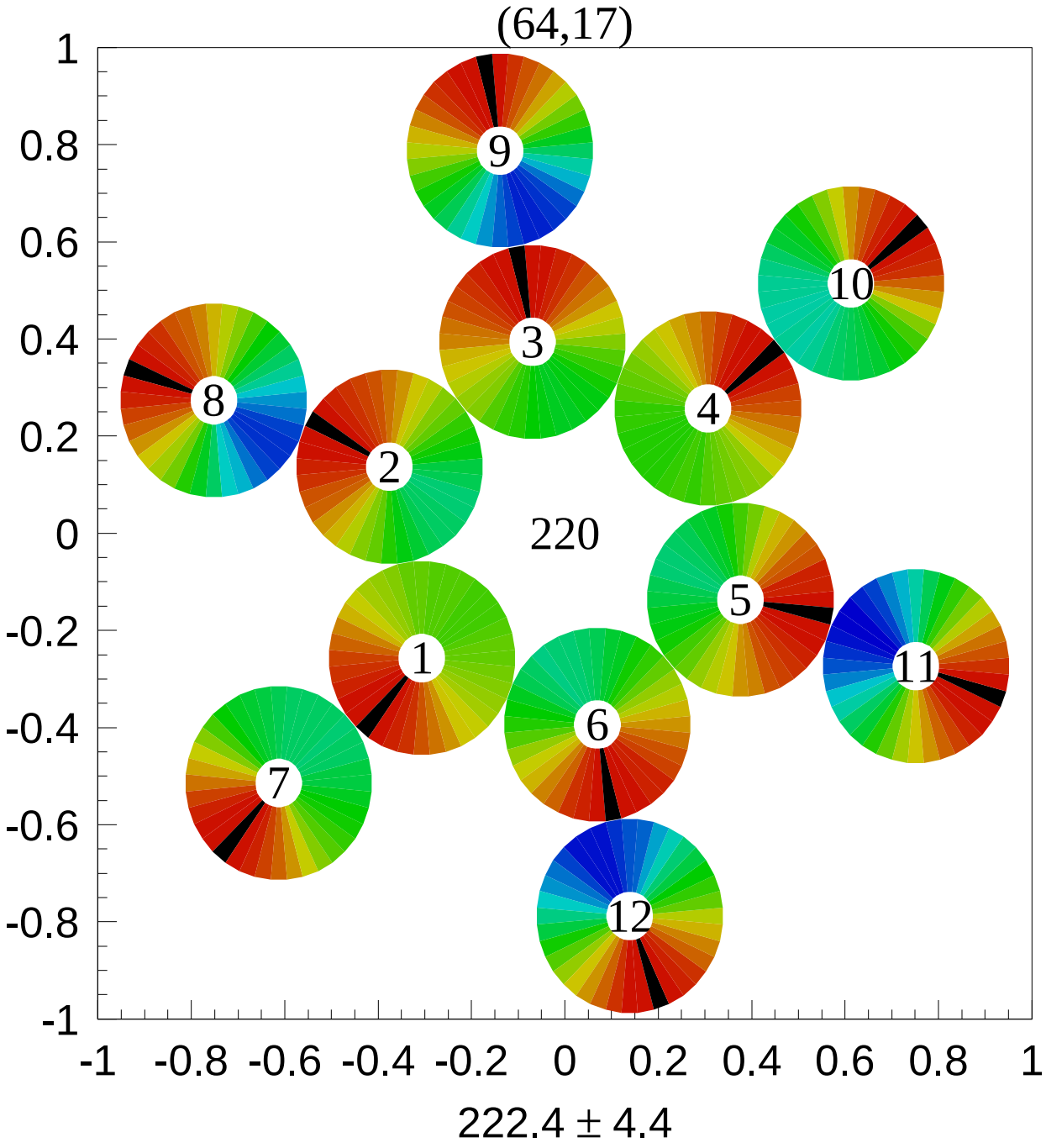

(64,15)
tilted LEDs
121 122 126 113 122 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 121 119 121 129 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

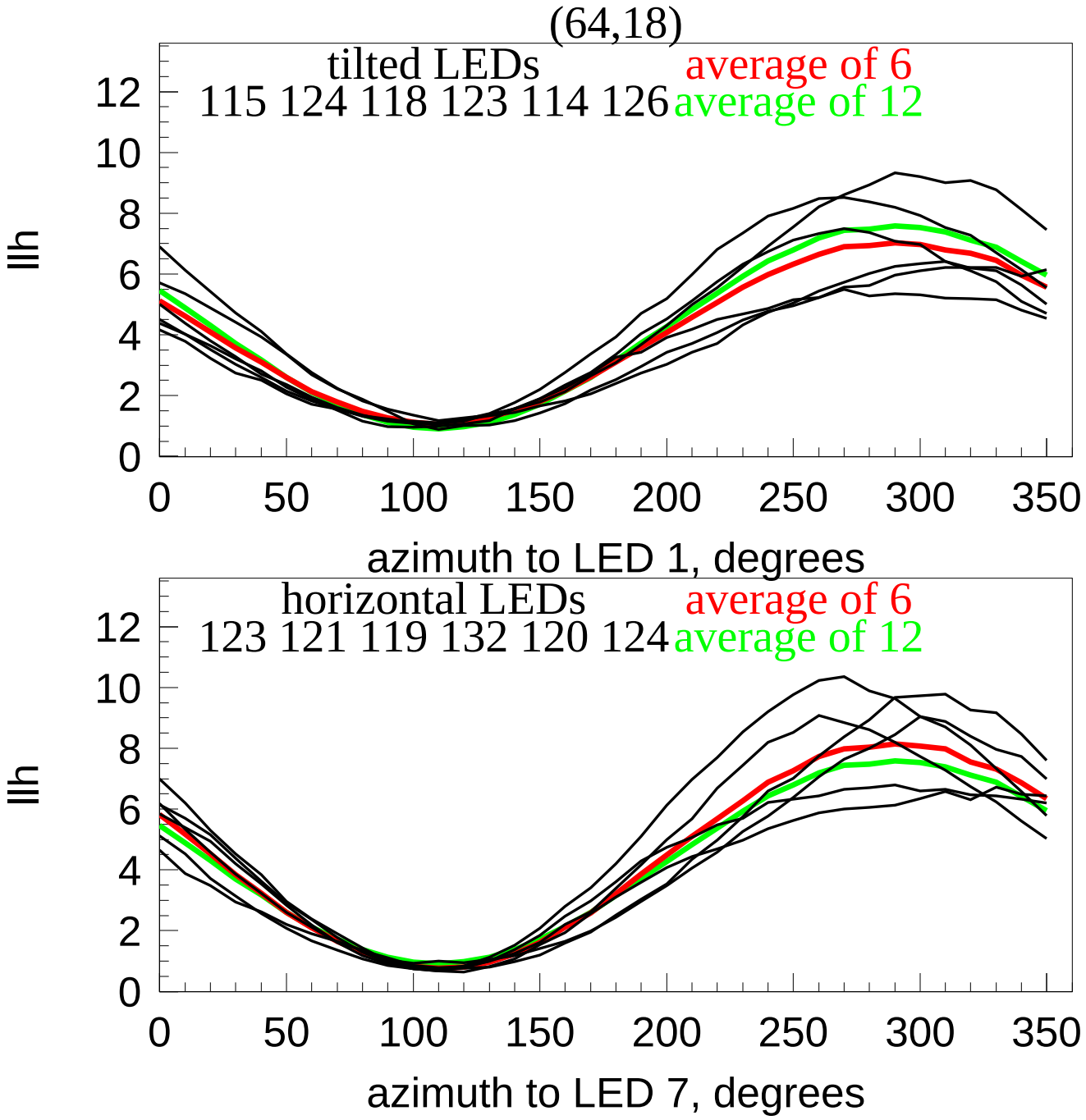

(64,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
229.9 ± 6.1

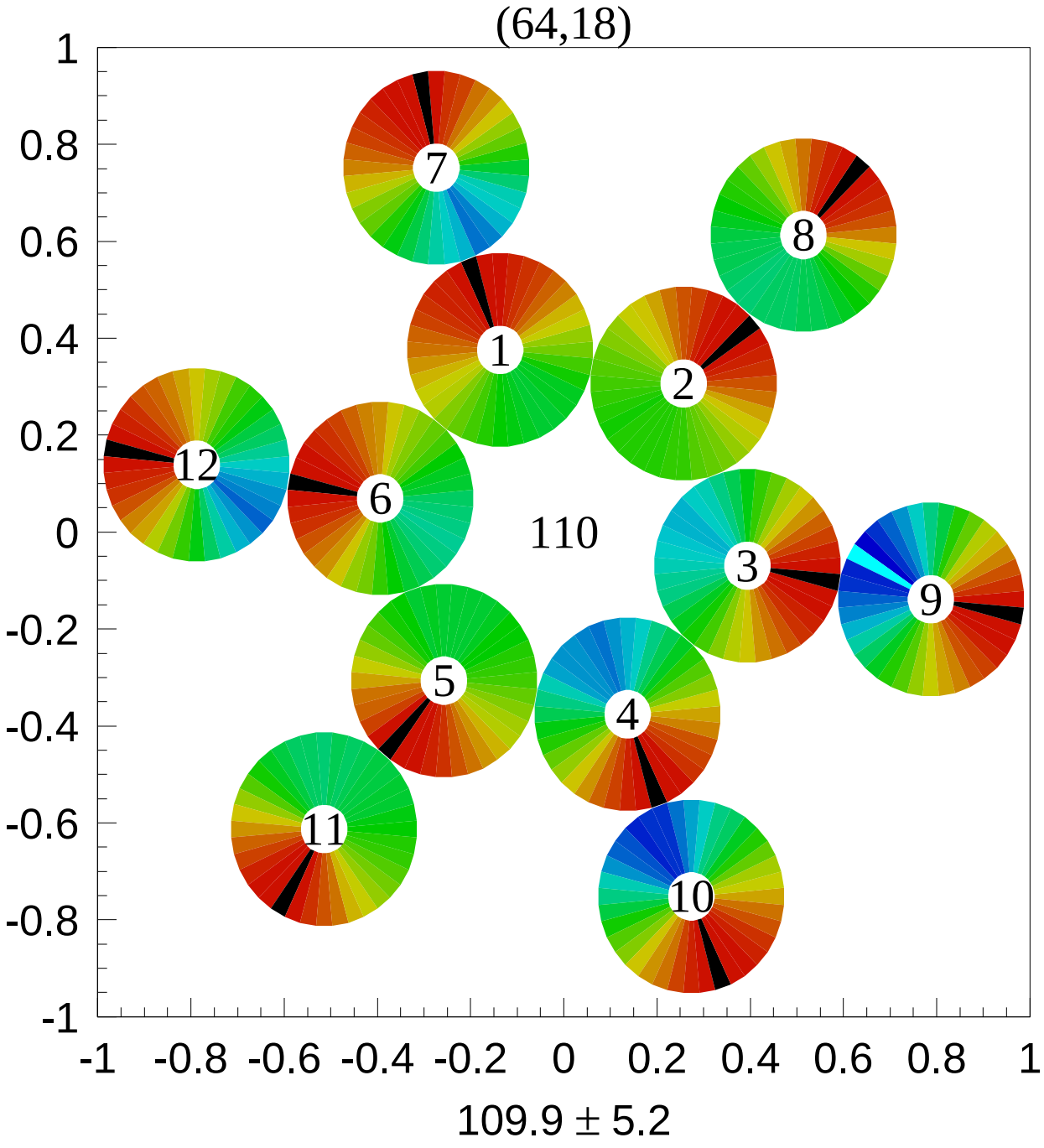

(64,16)
tilted LEDs
133 111 123 116 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 117 128 123 117 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

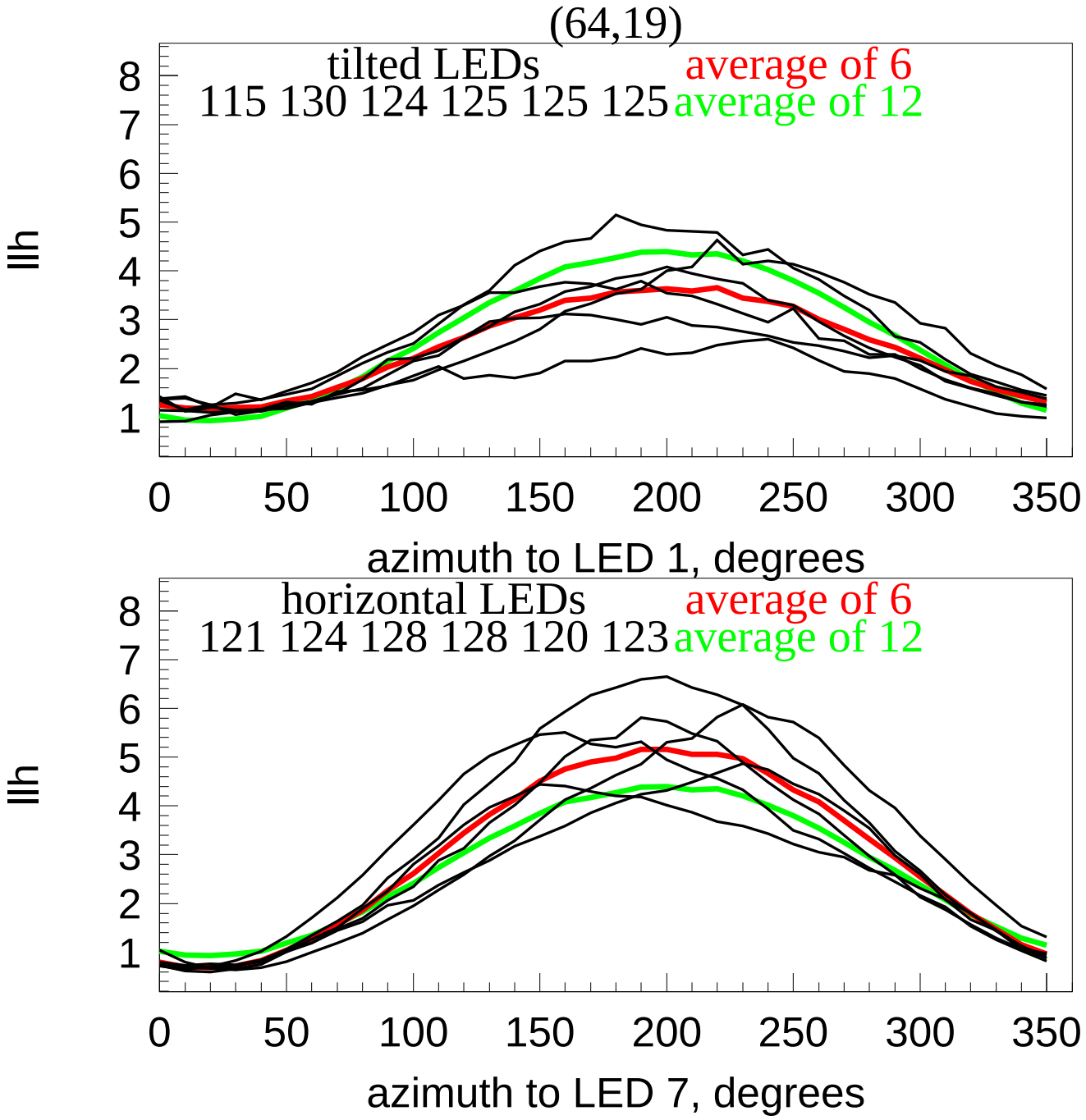

(64,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
186.2 ± 5.3

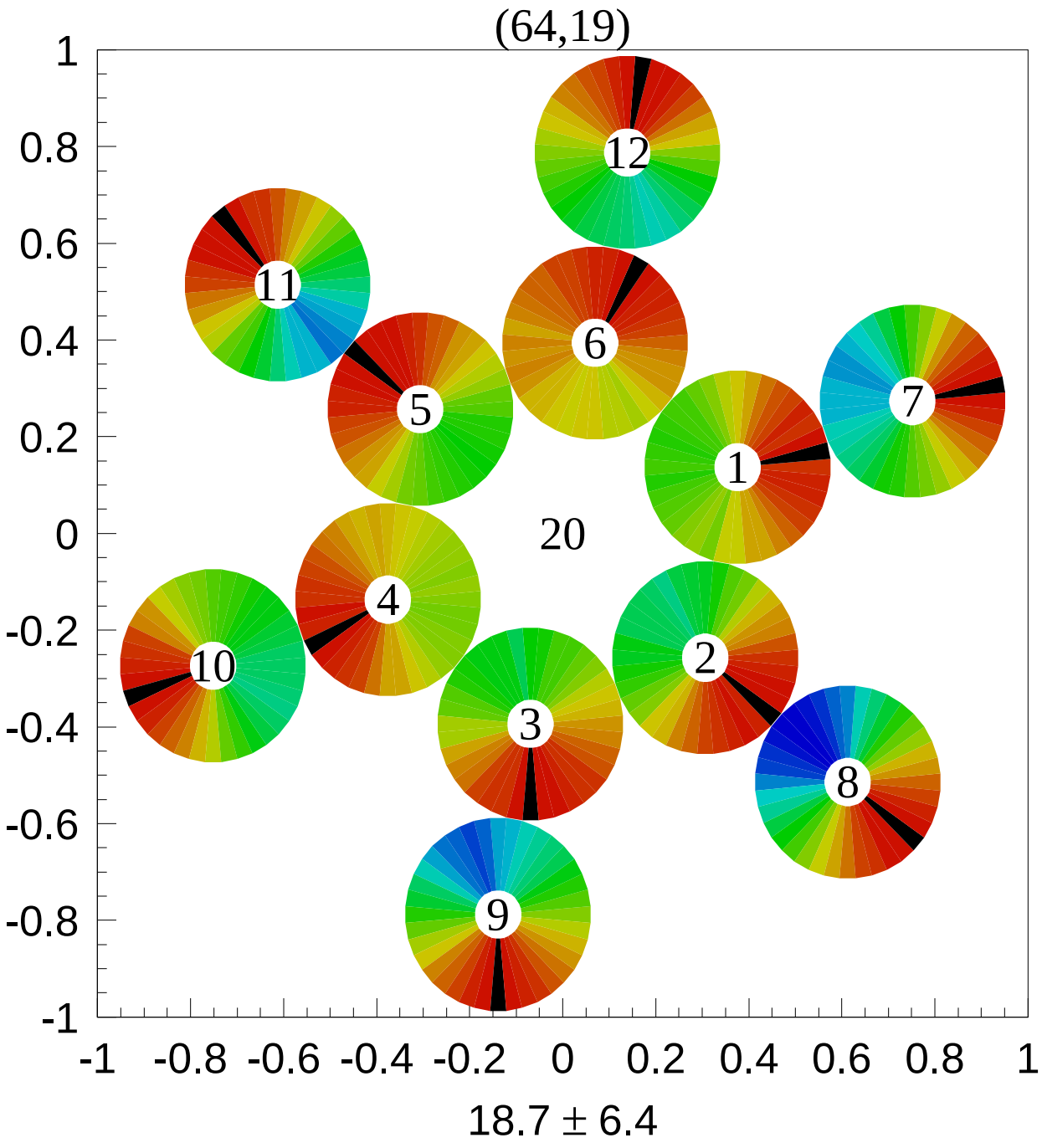

(64,17)
tilted LEDs
123 121 118 126 126 116
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 117 126 117 125 123
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

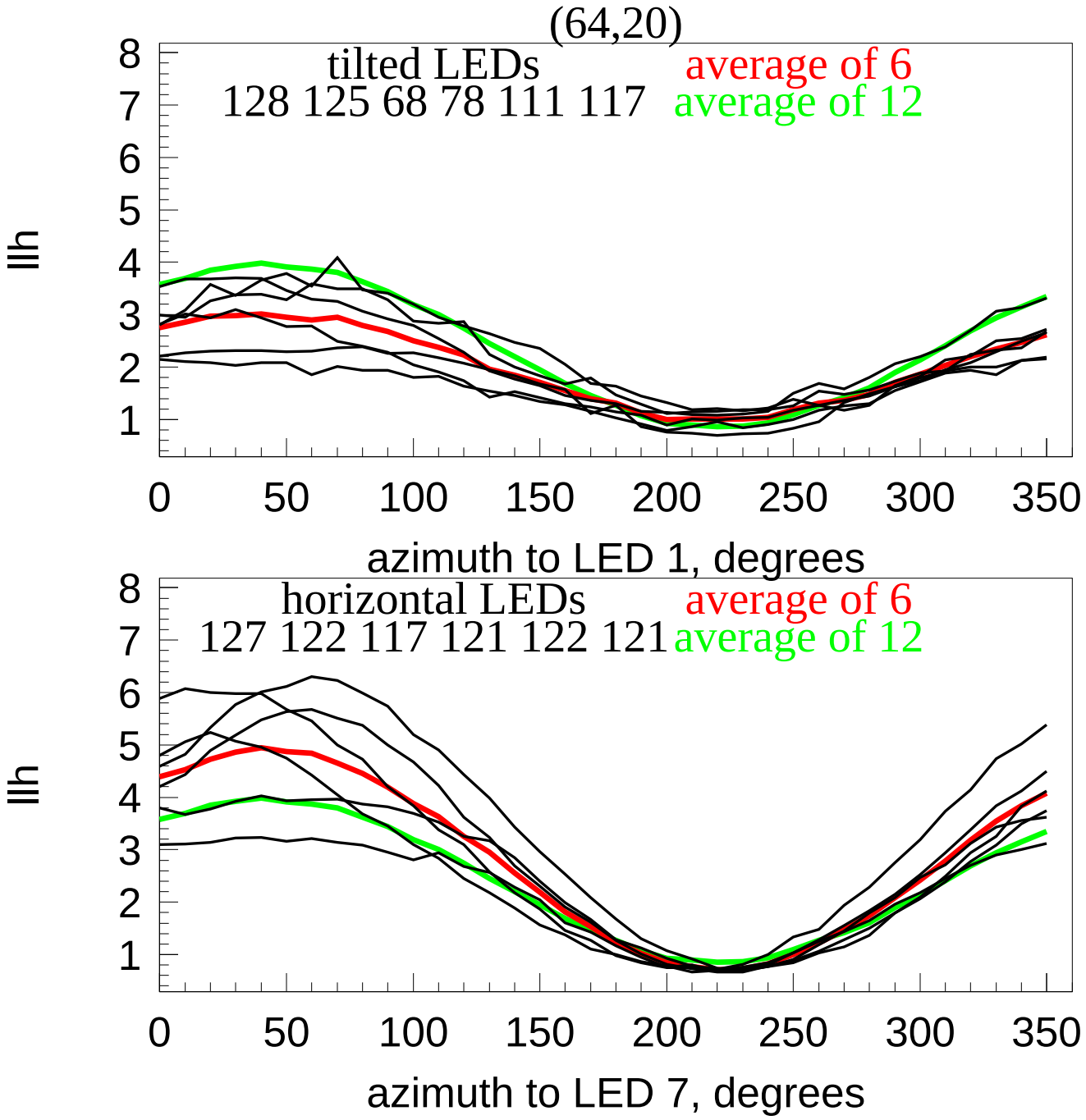

(64,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
222.4 ± 4.4

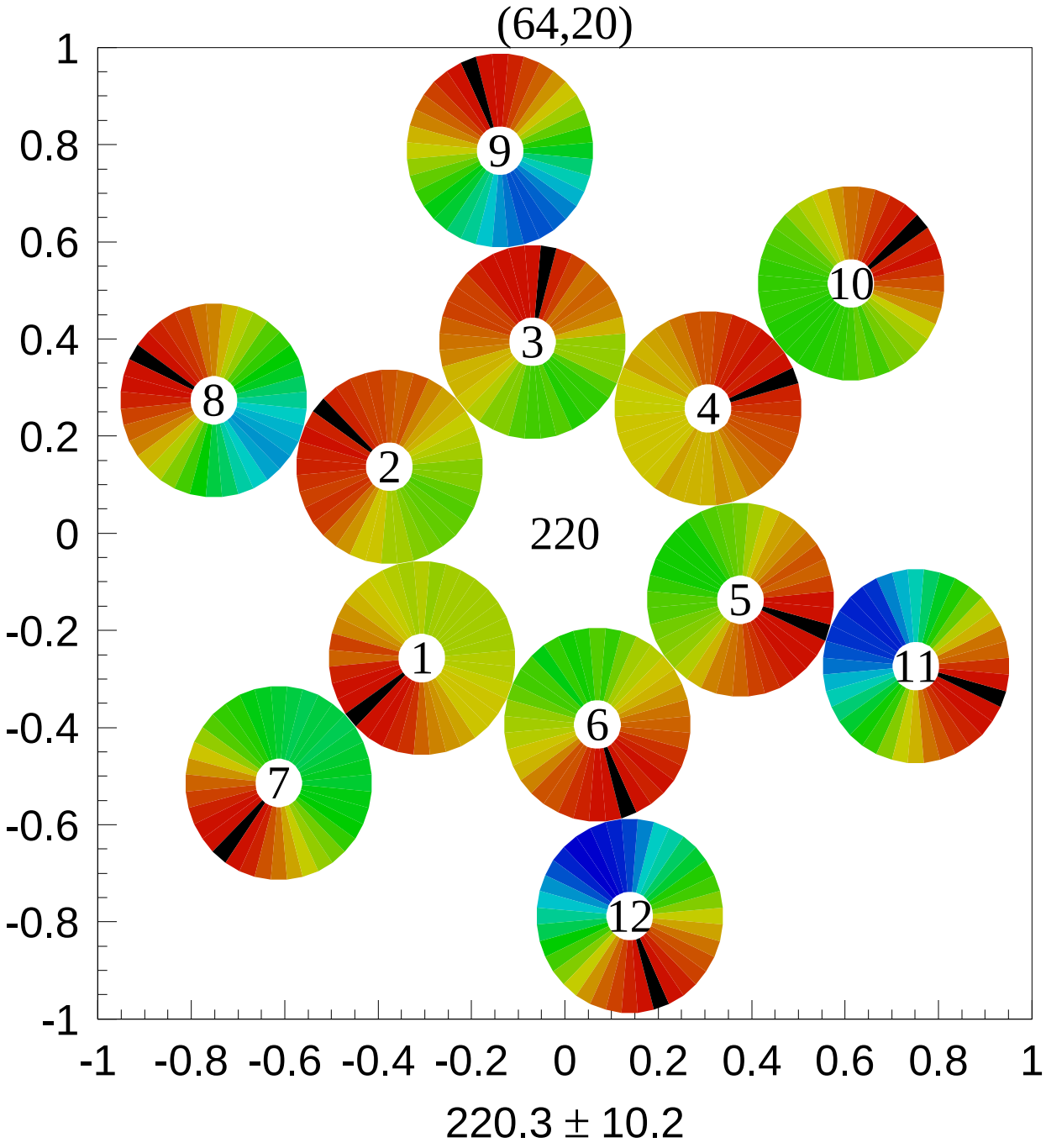

(64,18)
tilted LEDs
115 124 118 123 114 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 119 132 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

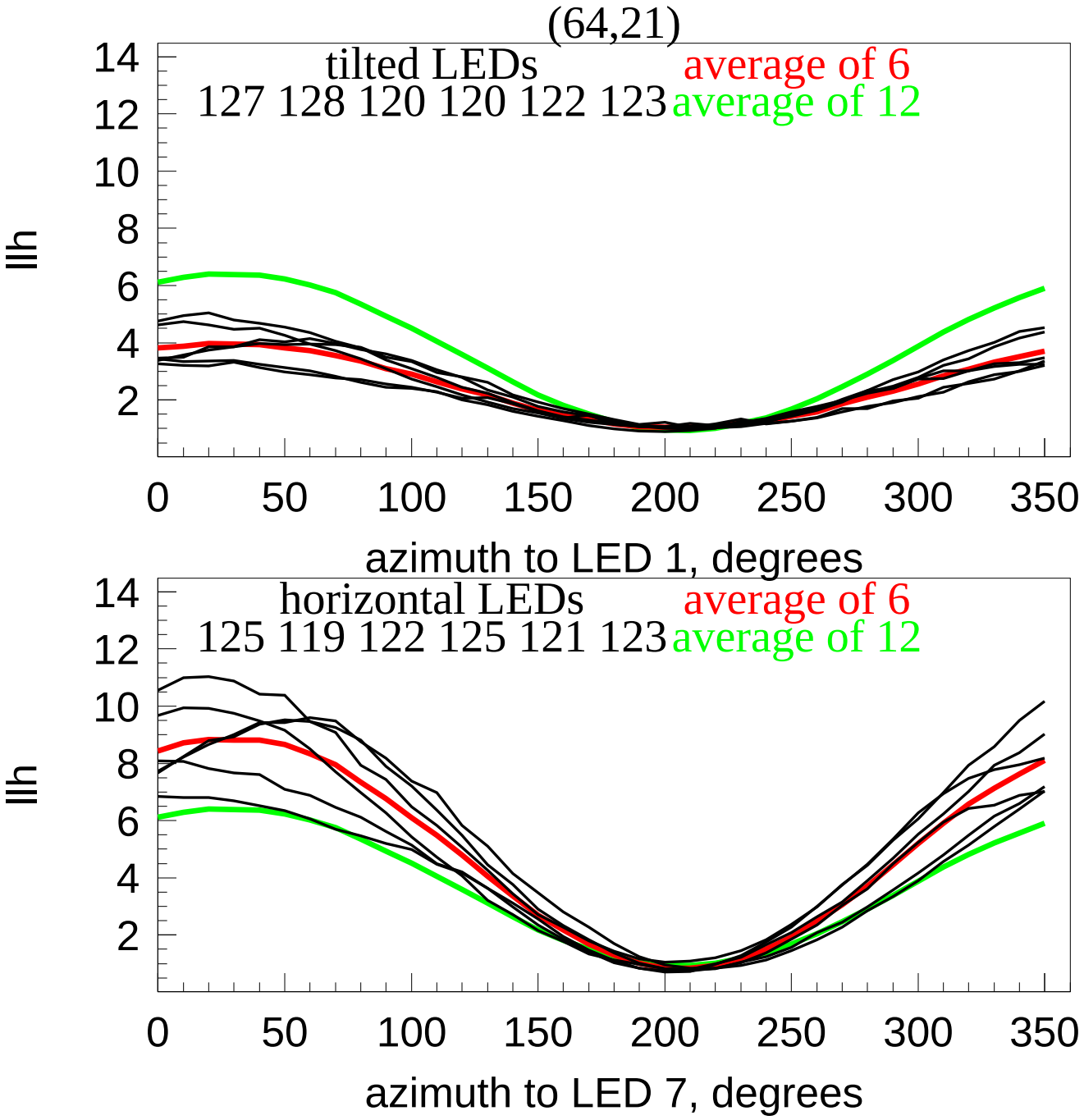

(64,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
109.9 ± 5.2

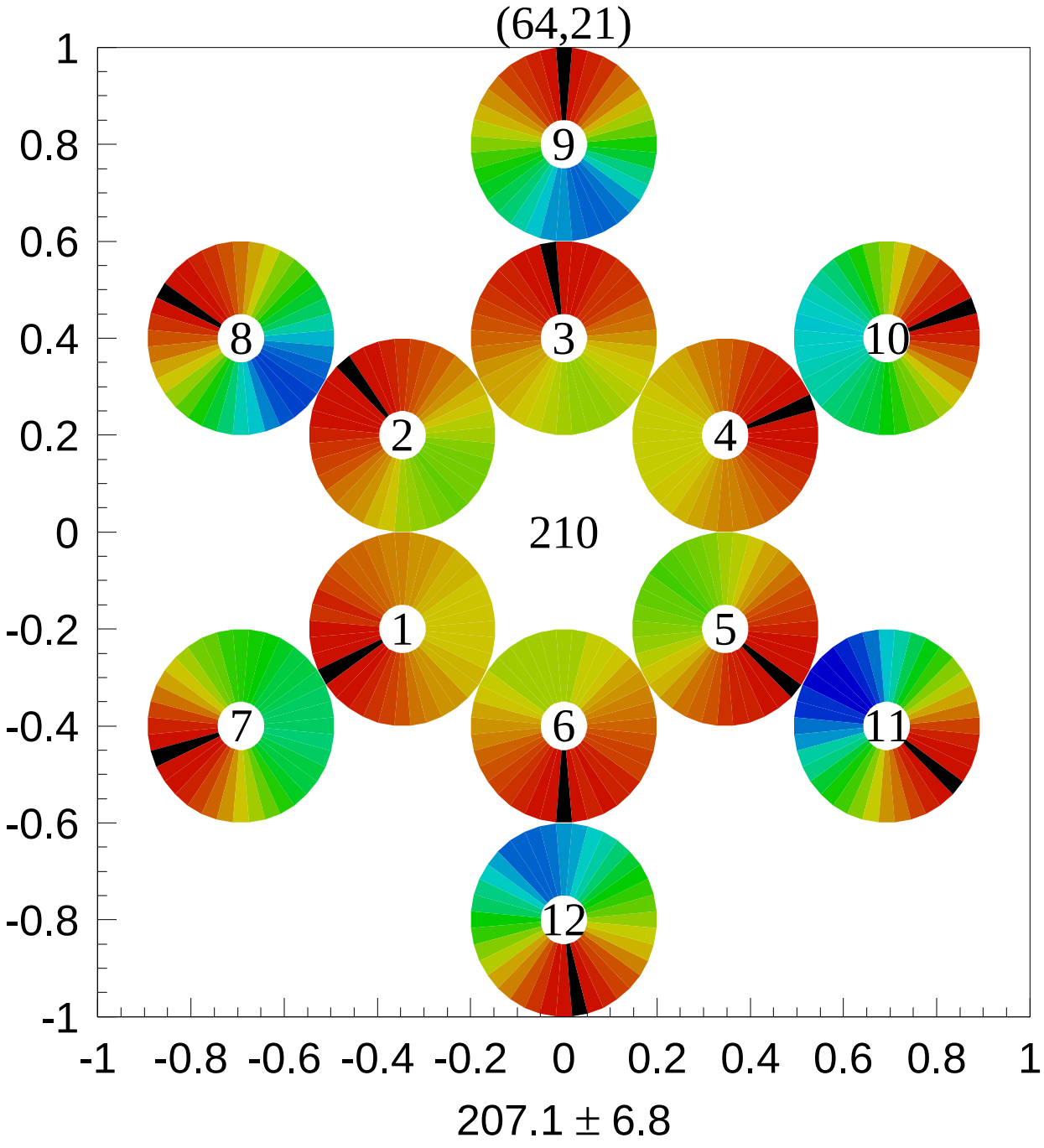

(64,19)
tilted LEDs
115 130 124 125 125 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 128 128 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

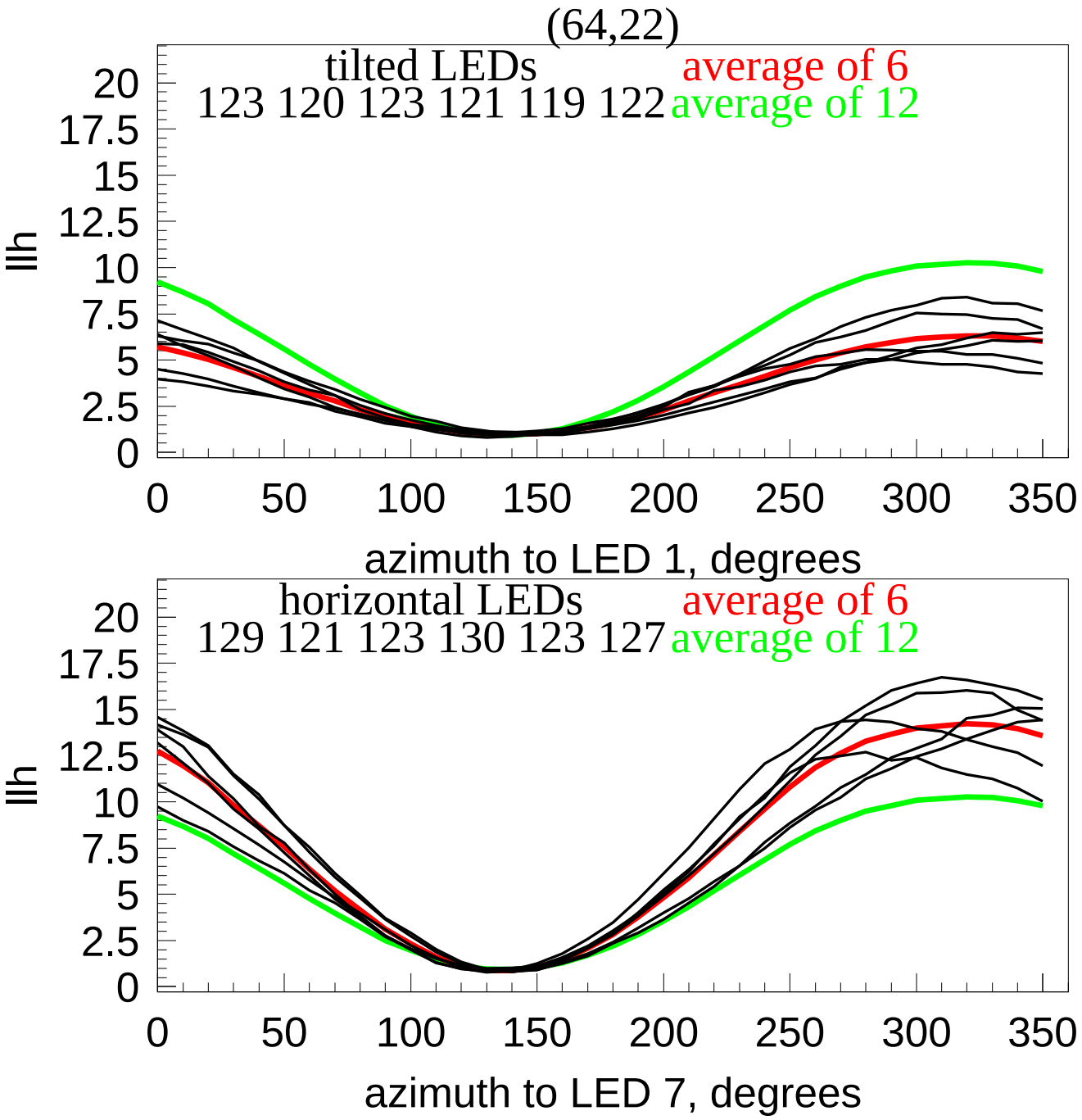

(64,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
18.7 ± 6.4

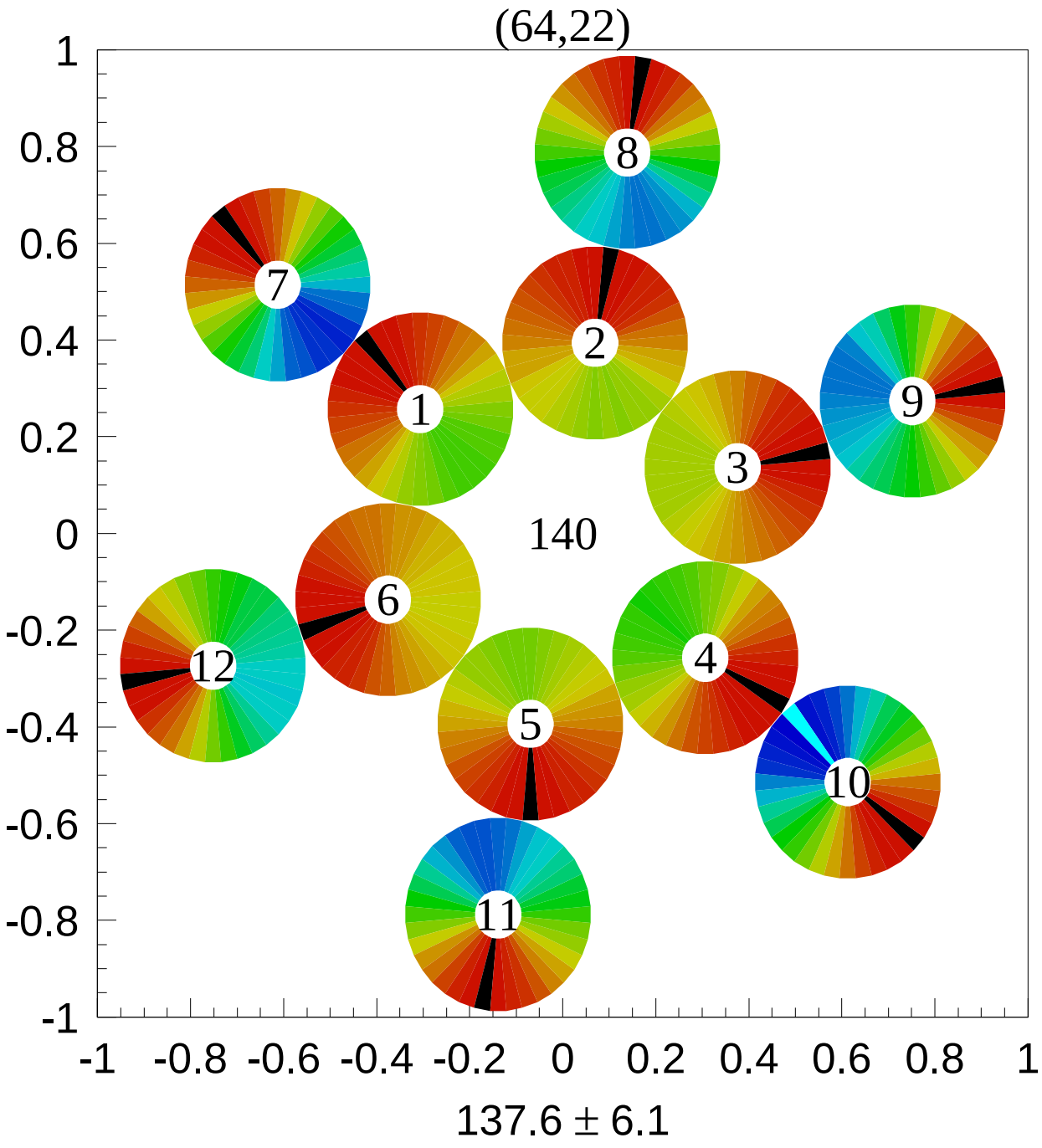

(64,20)
tilted LEDs
128 125 68 78 111 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 117 121 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

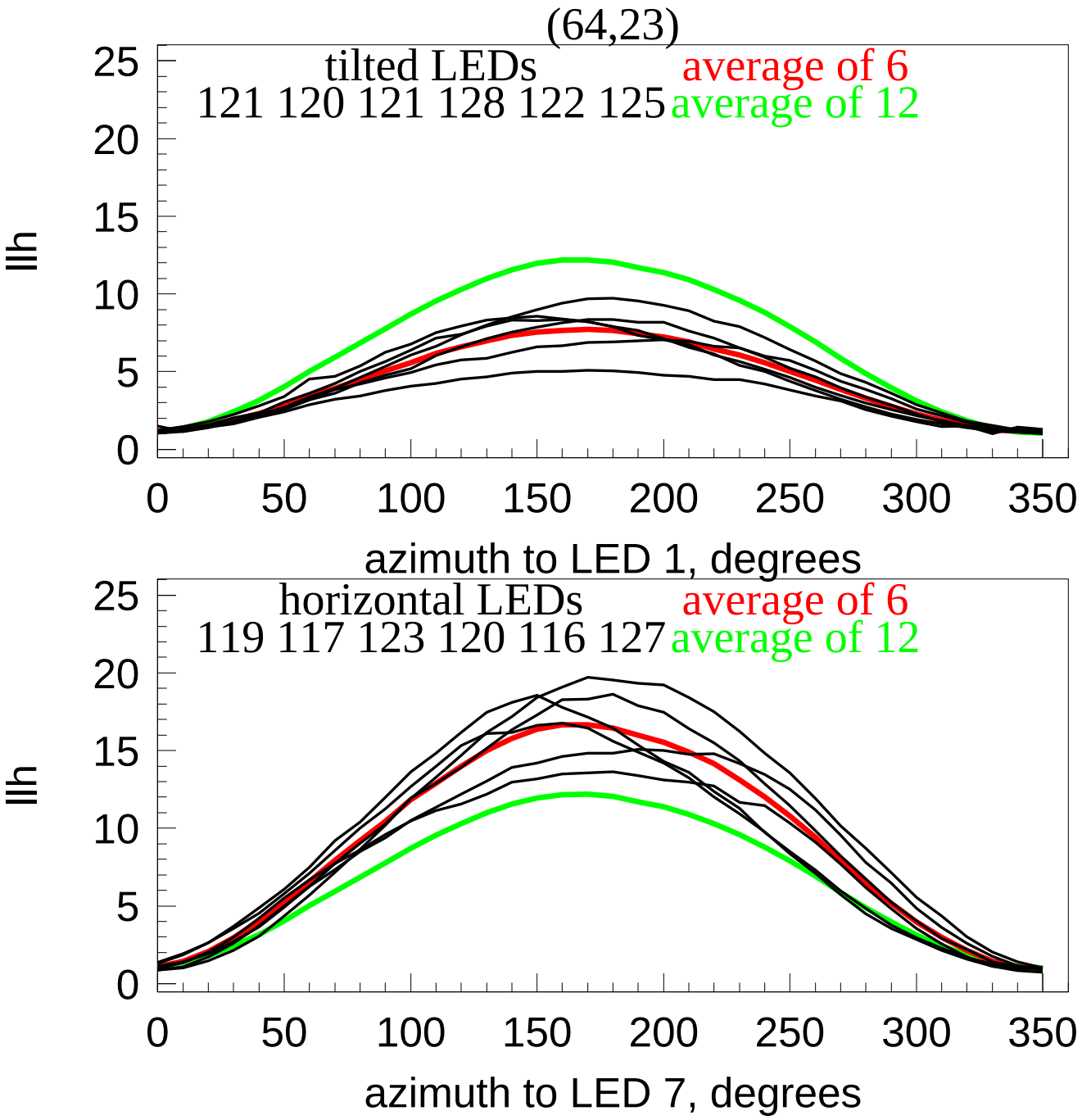

(64,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
220.3 ± 10.2

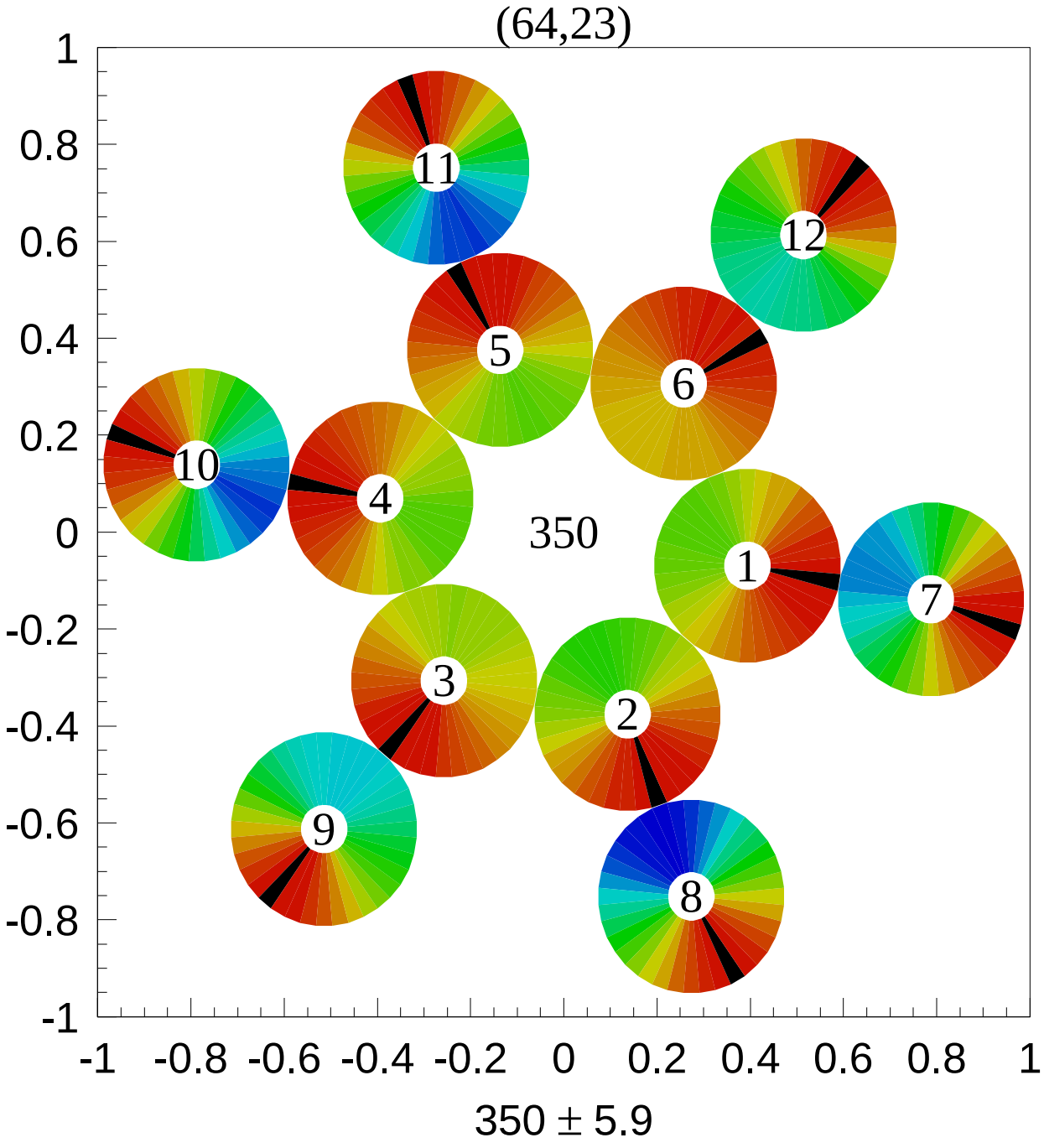

(64,21)
tilted LEDs
127 128 120 120 122 123
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 119 122 125 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

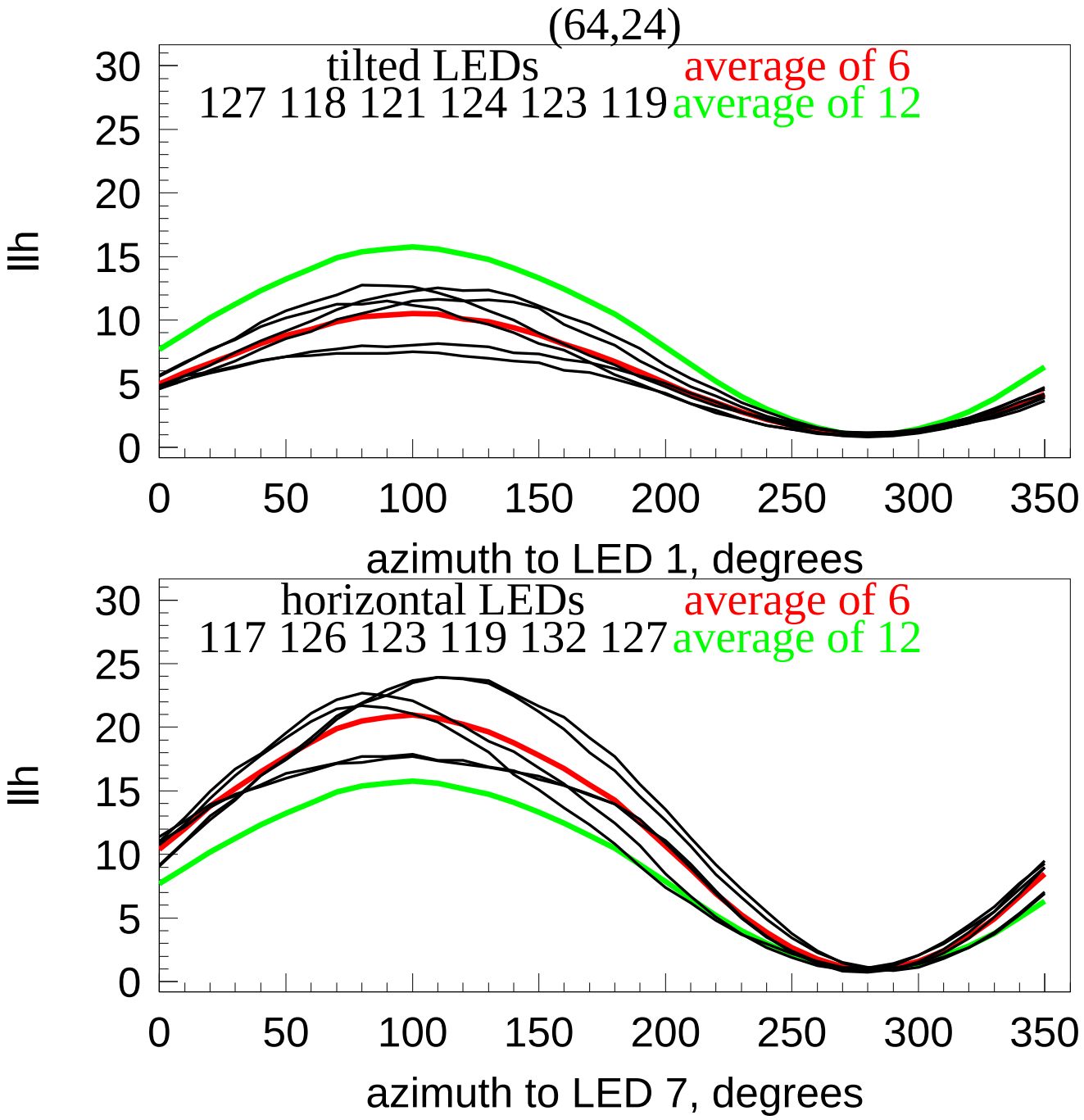

(64,21)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
207.1 ± 6.8

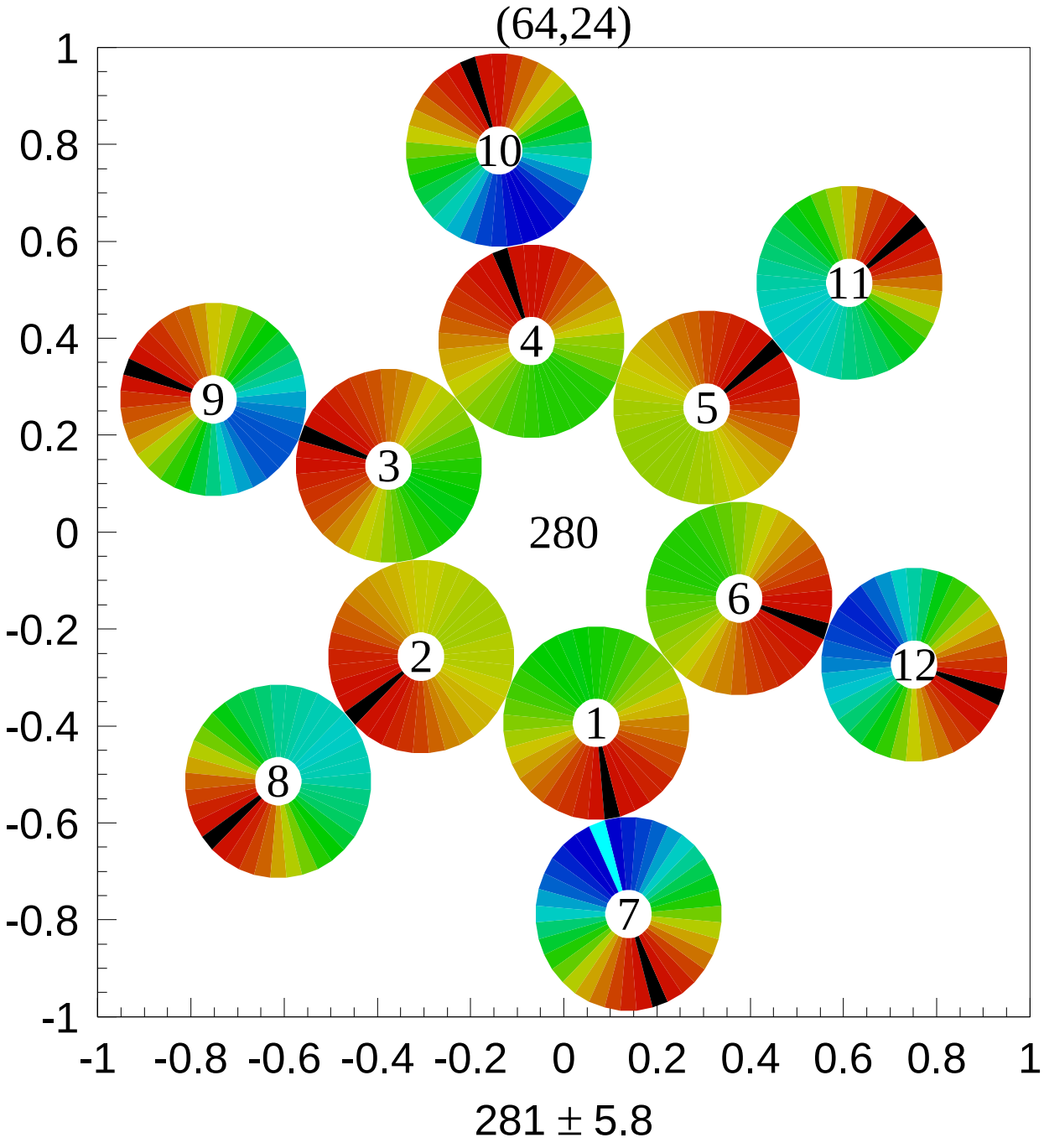

(64,22)
tilted LEDs
123 120 123 121 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 121 123 130 123 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

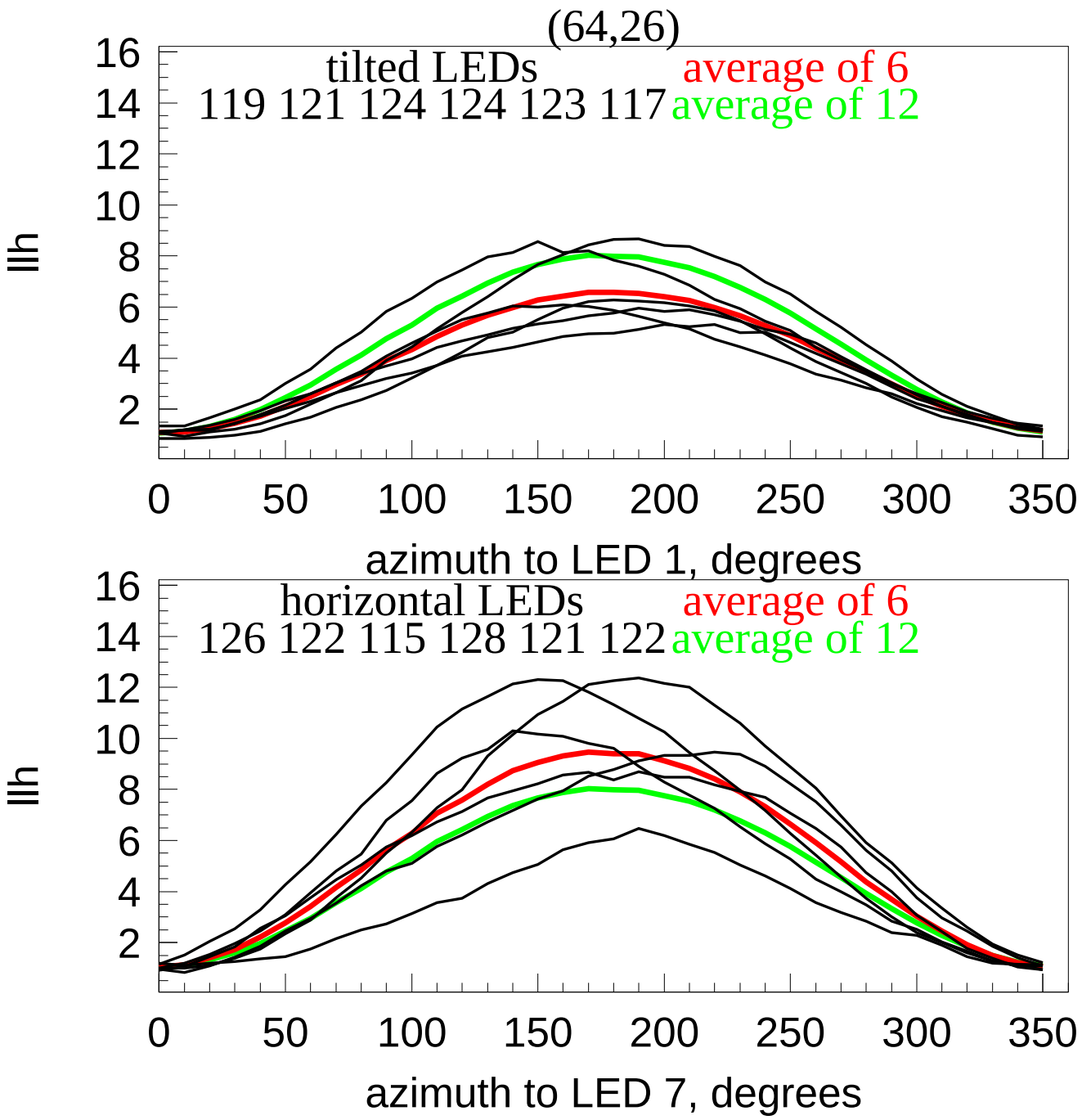

(64,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
140
137.6 ± 6.1
1
2
3
4
5
6
7
8
9
10
11
12

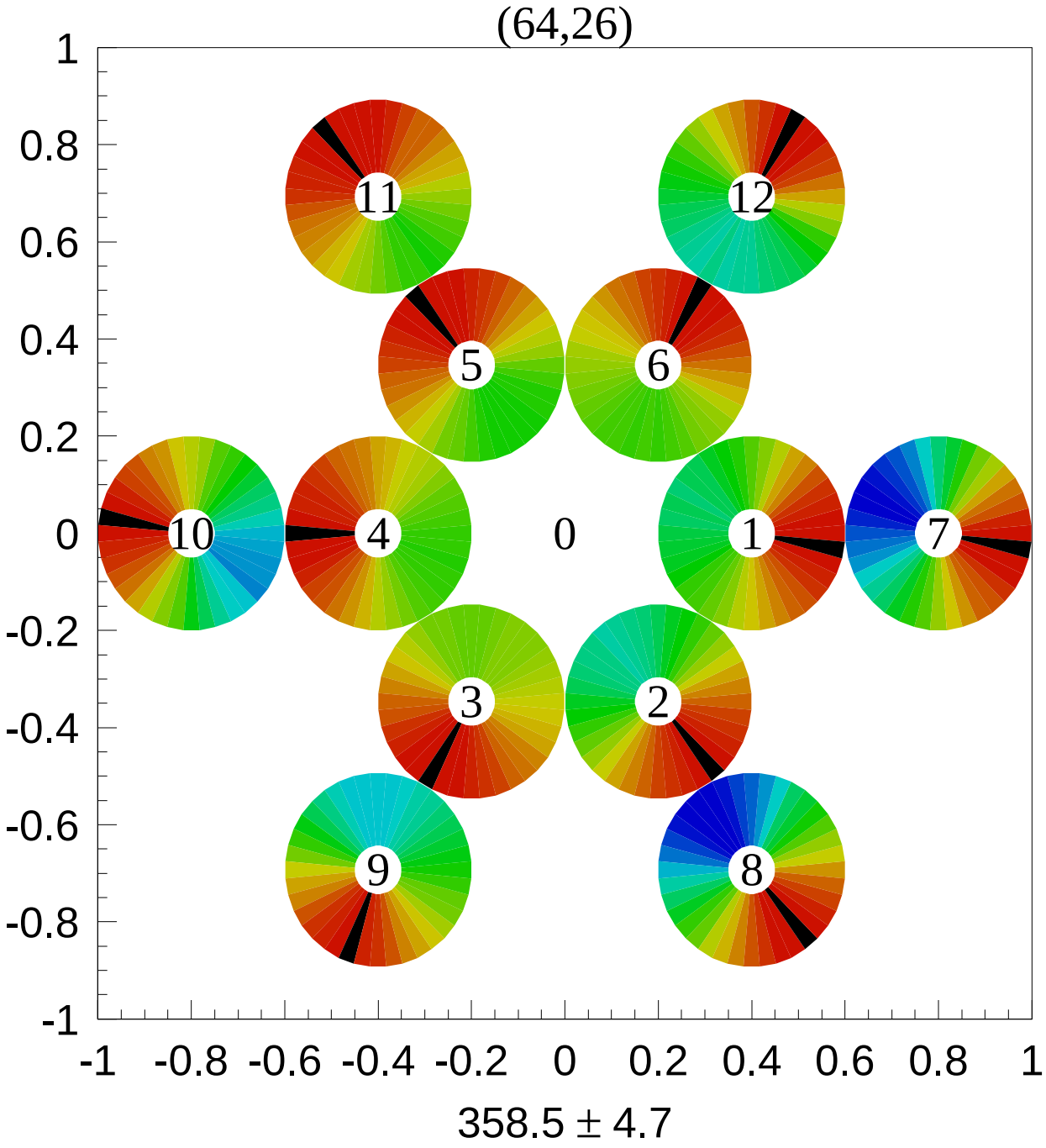

(64,23)
tilted LEDs
121 120 121 128 122 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 117 123 120 116 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

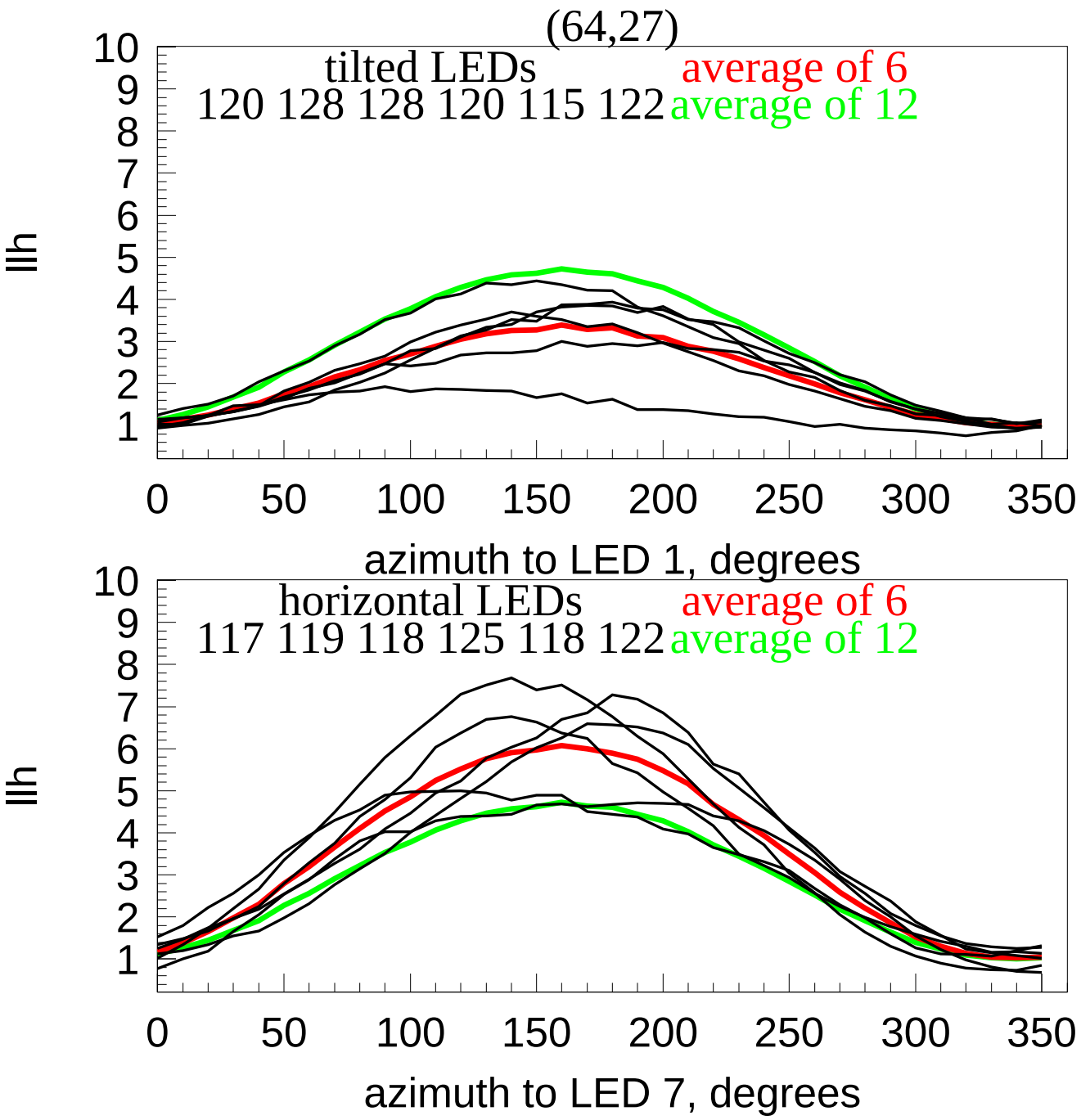

(64,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
350 ± 5.9

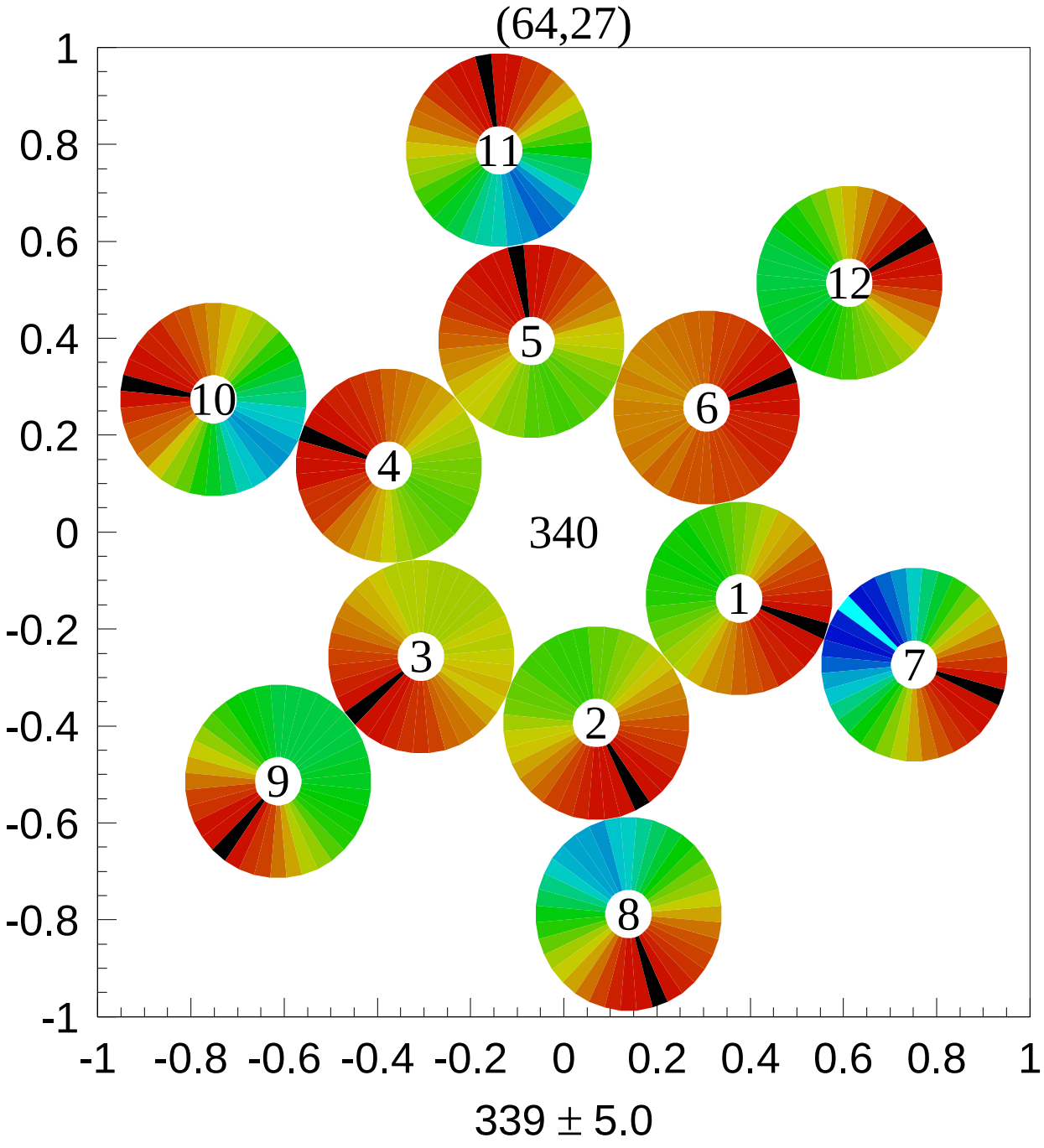

(64,24)
tilted LEDs
127 118 121 124 123 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 126 123 119 132 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

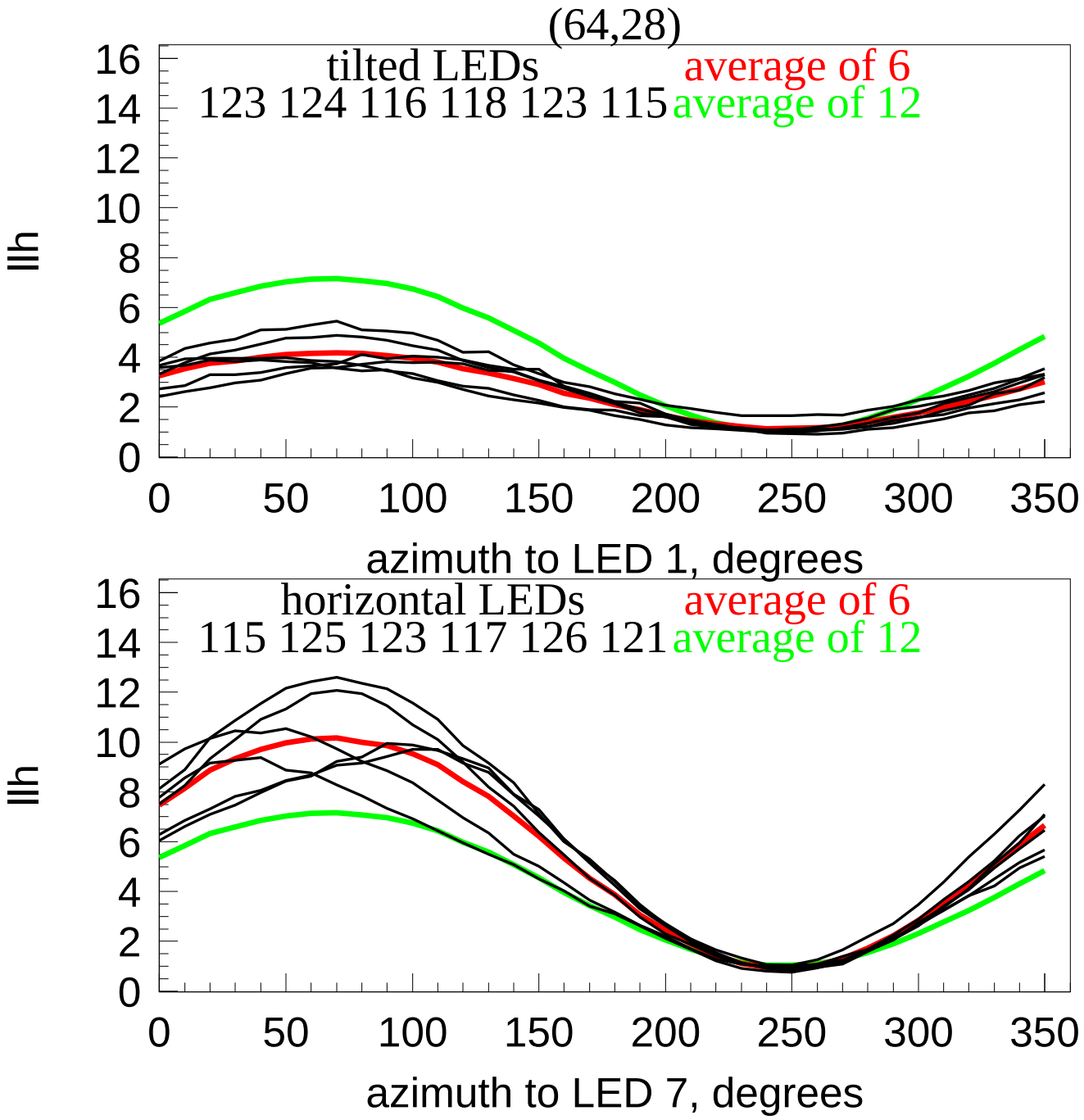

(64,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
281 ± 5.8

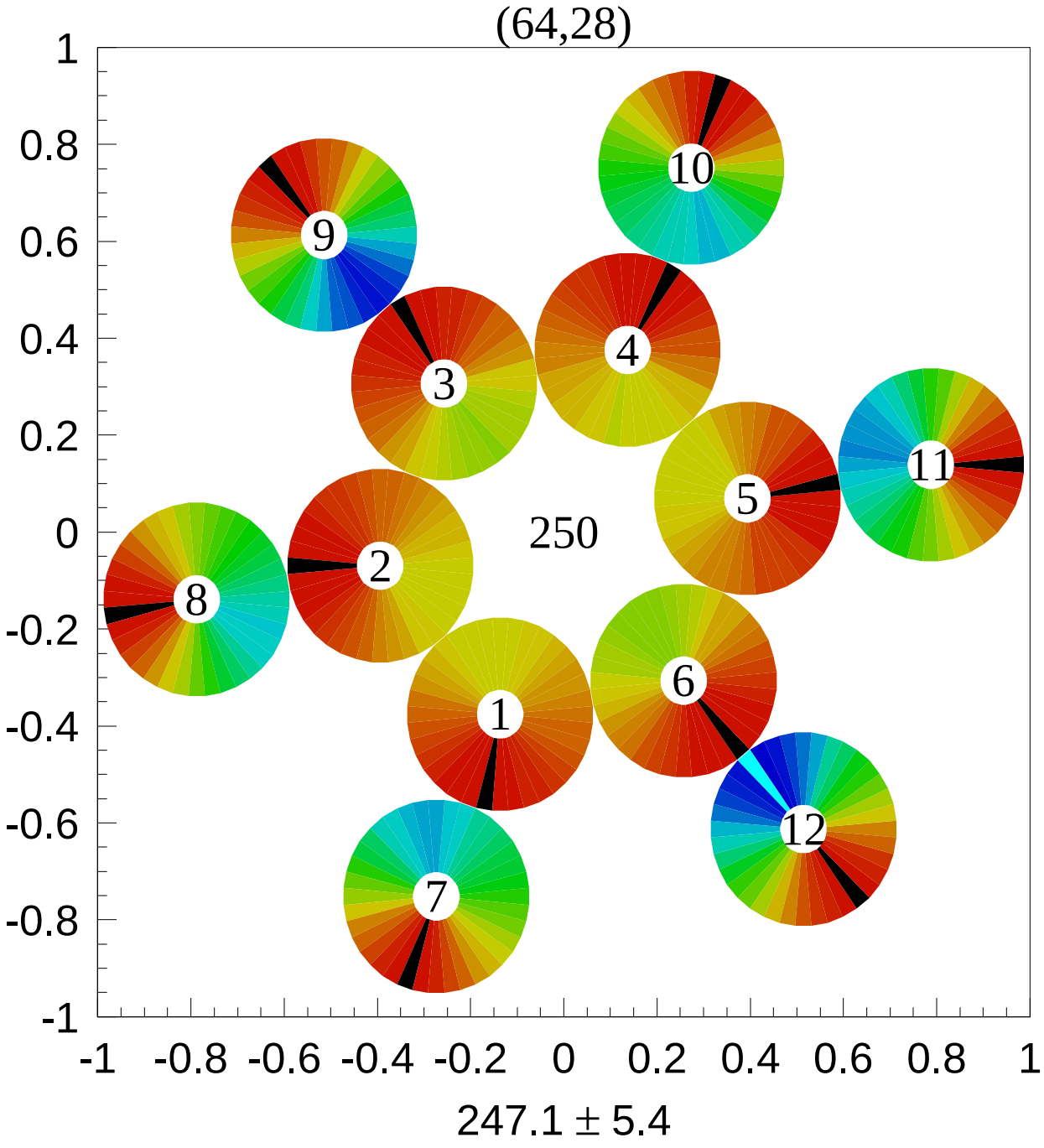

(64,26)
tilted LEDs
119 121 124 124 123 117
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 122 115 128 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

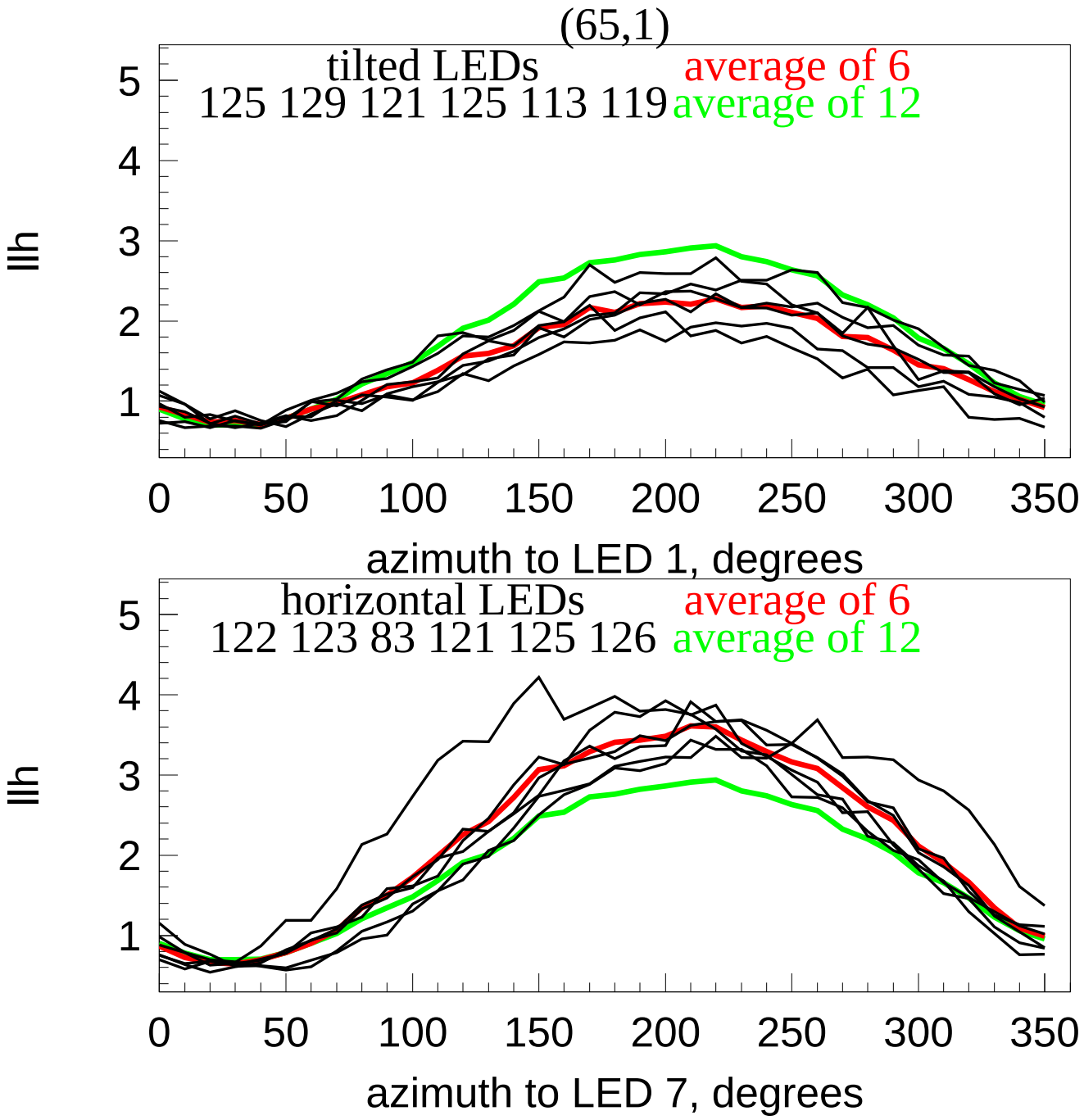

(64,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
358.5 ± 4.7

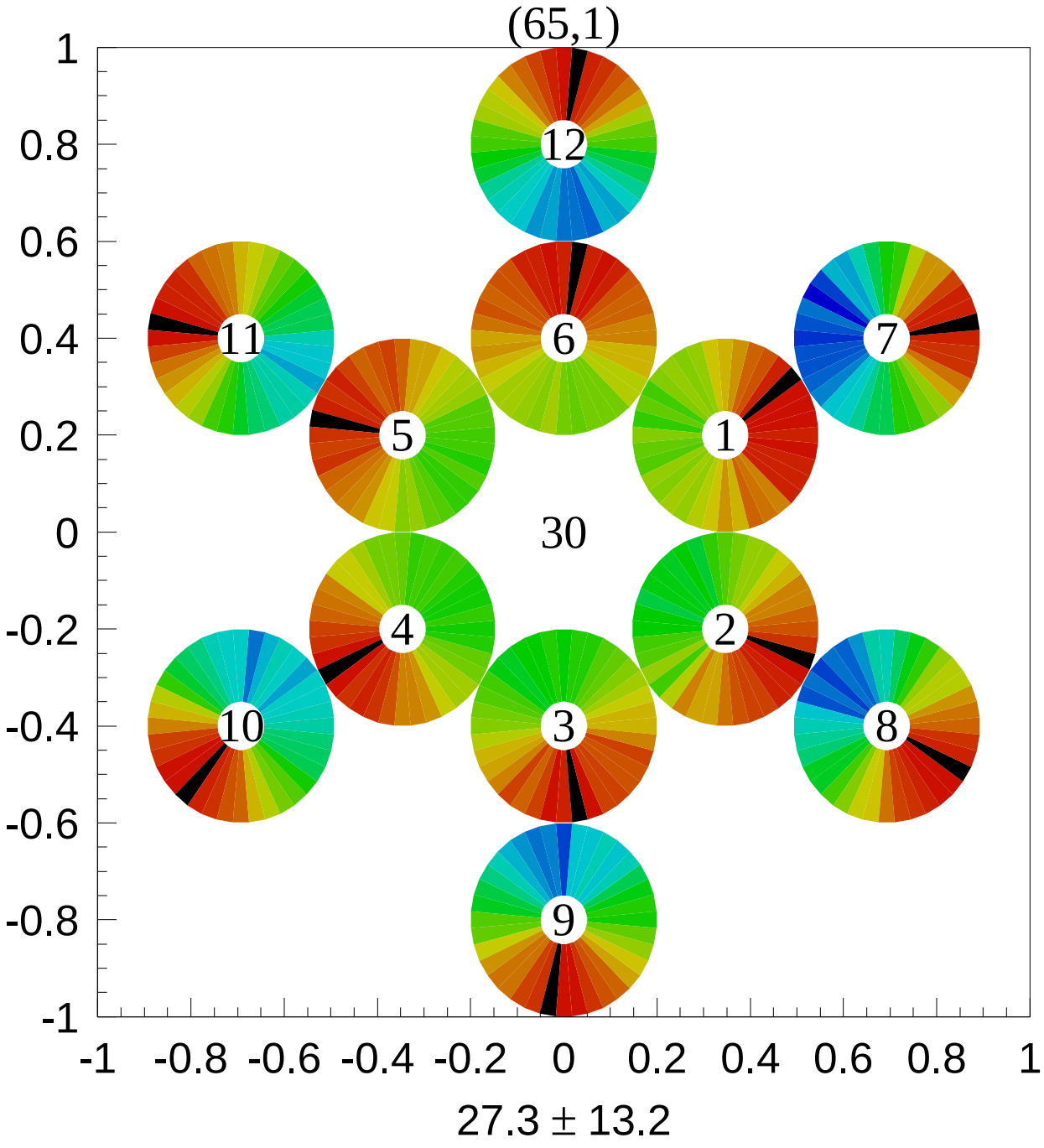

(64,27)
tilted LEDs
120 128 128 120 115 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 119 118 125 118 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

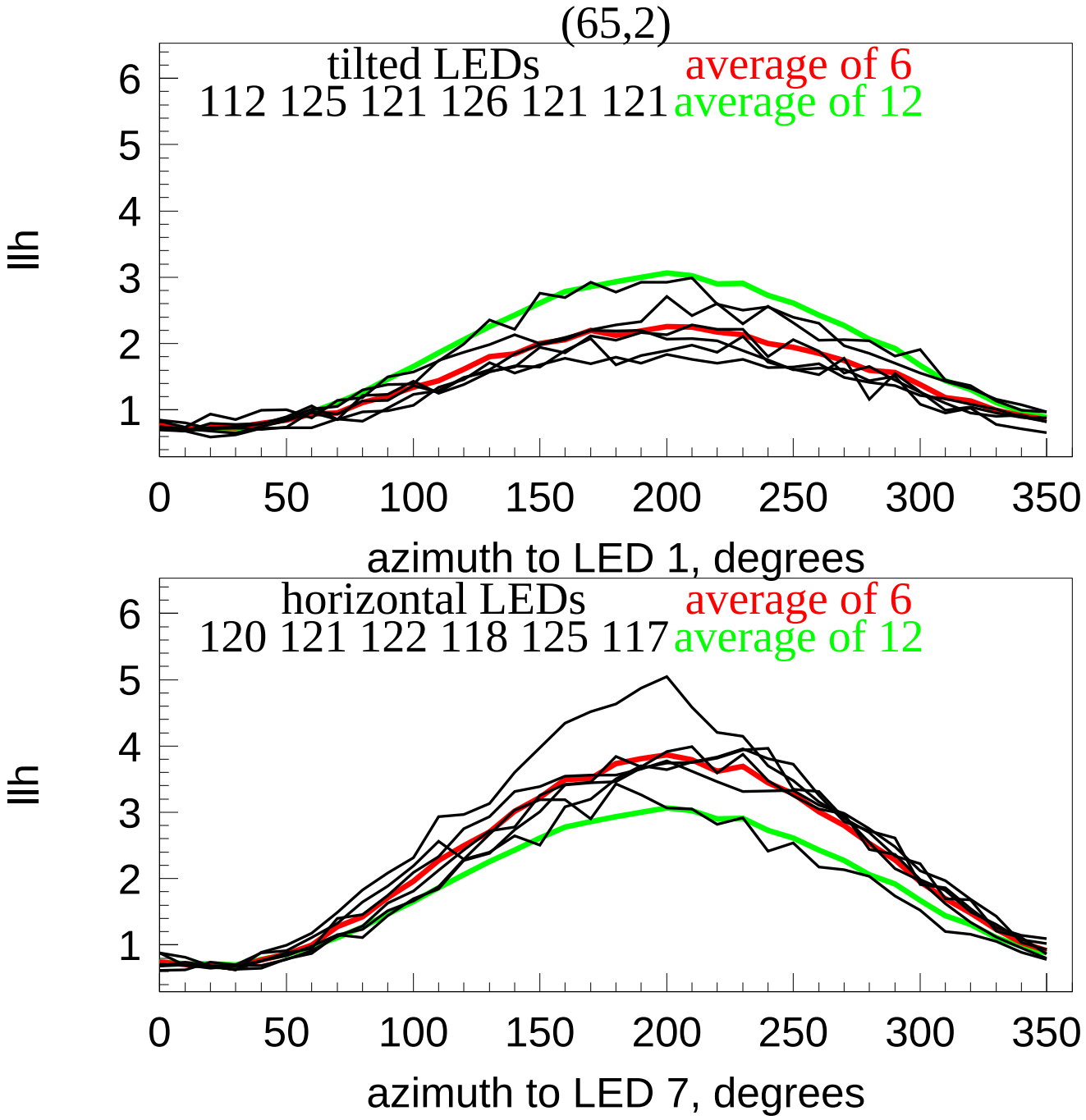

(64,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
339 ± 5.0

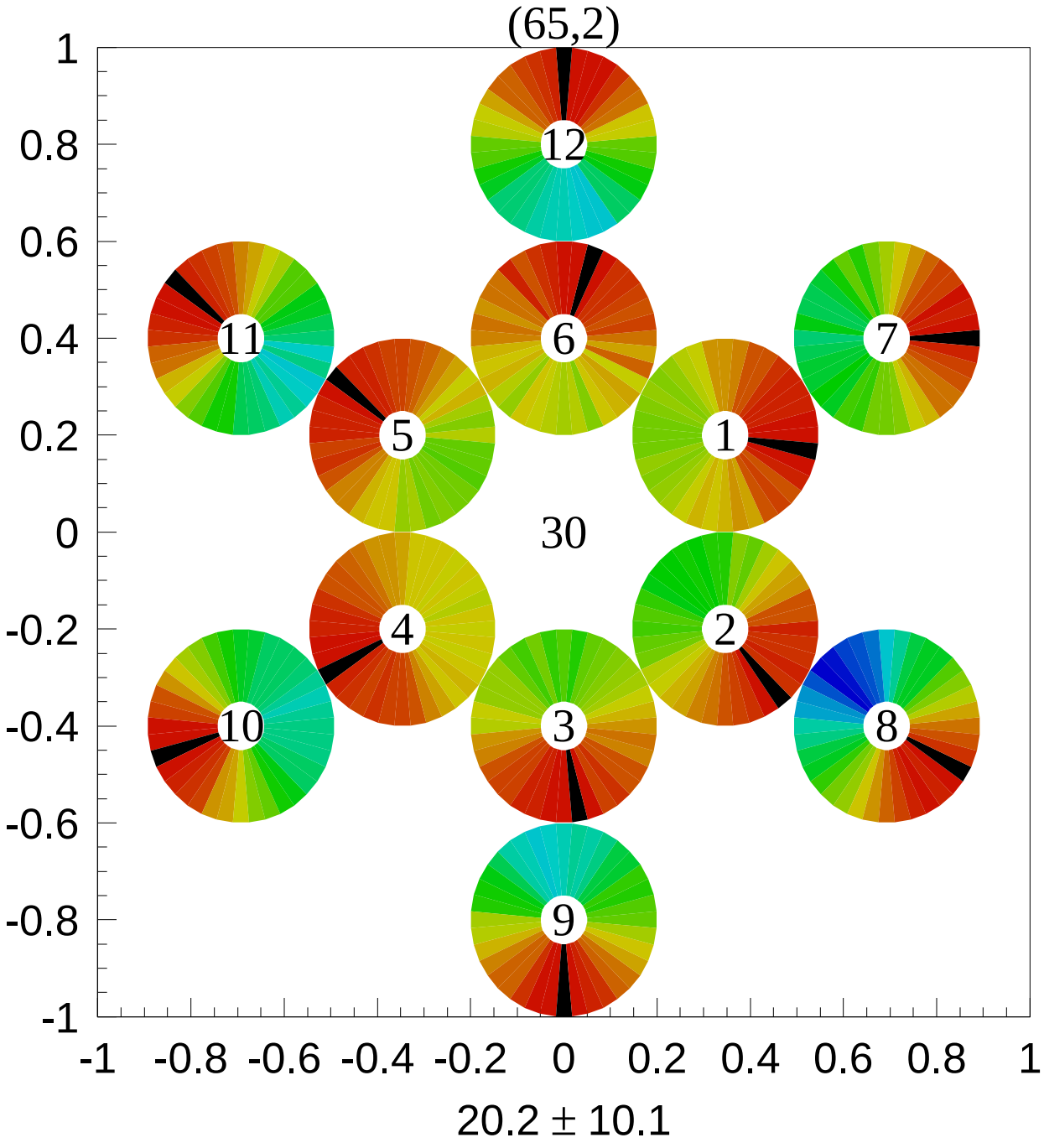

(64,28)
tilted LEDs
123 124 116 118 123 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 125 123 117 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

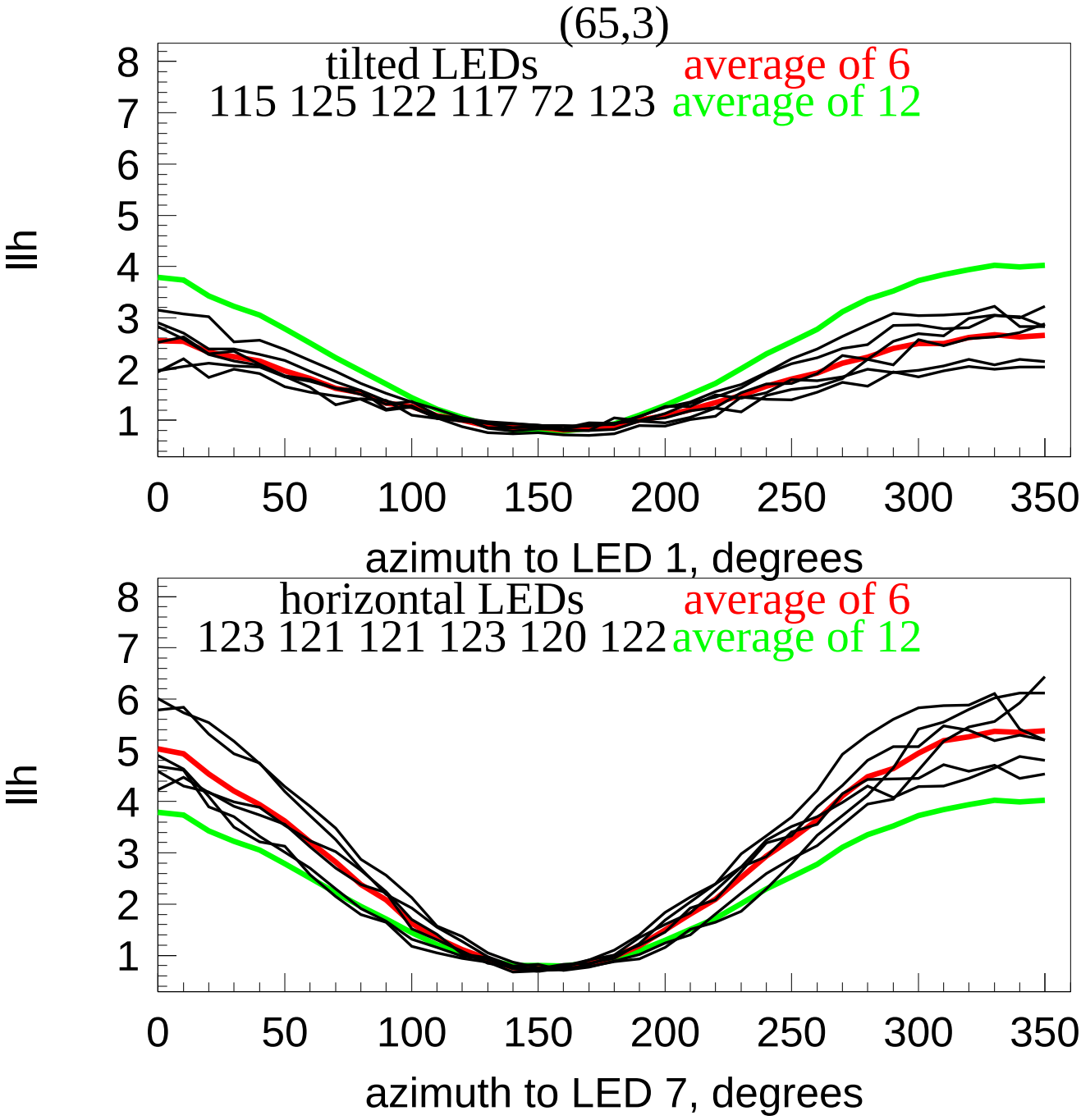

(64,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
247.1 ± 5.4

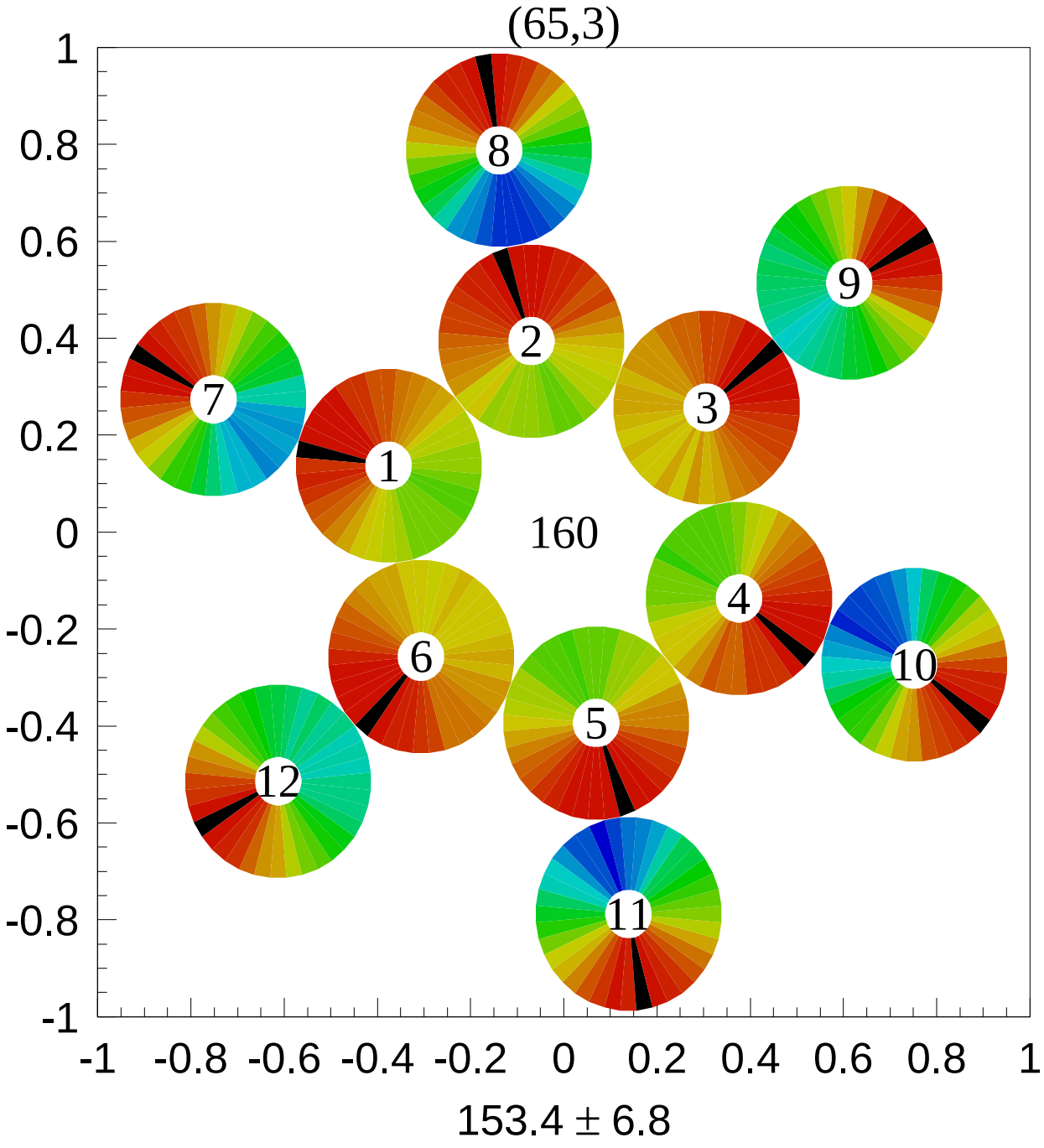

(65,1)
tilted LEDs
125 129 121 125 113 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 83 121 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

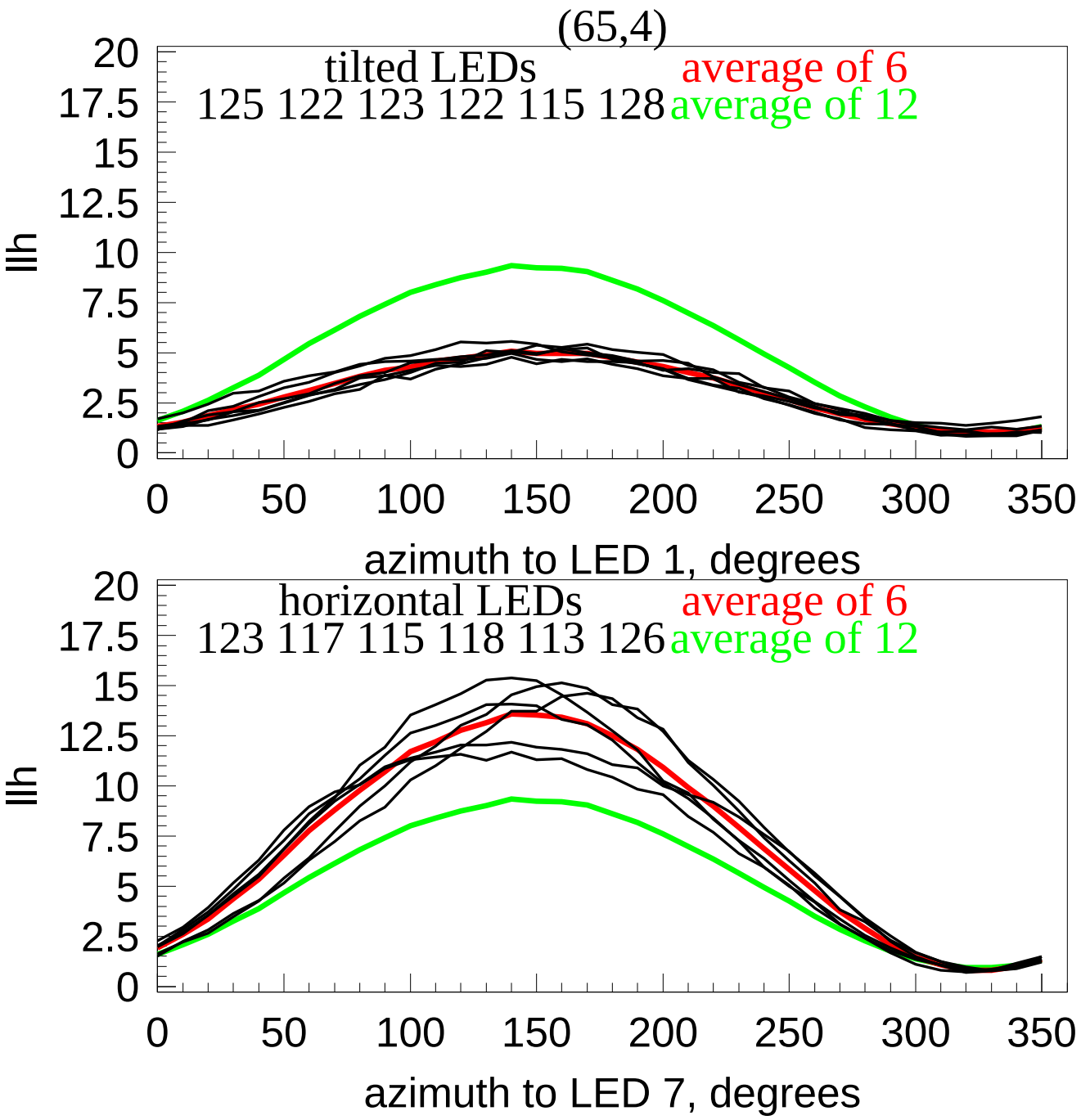

(65,1)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
27.3 ± 13.2

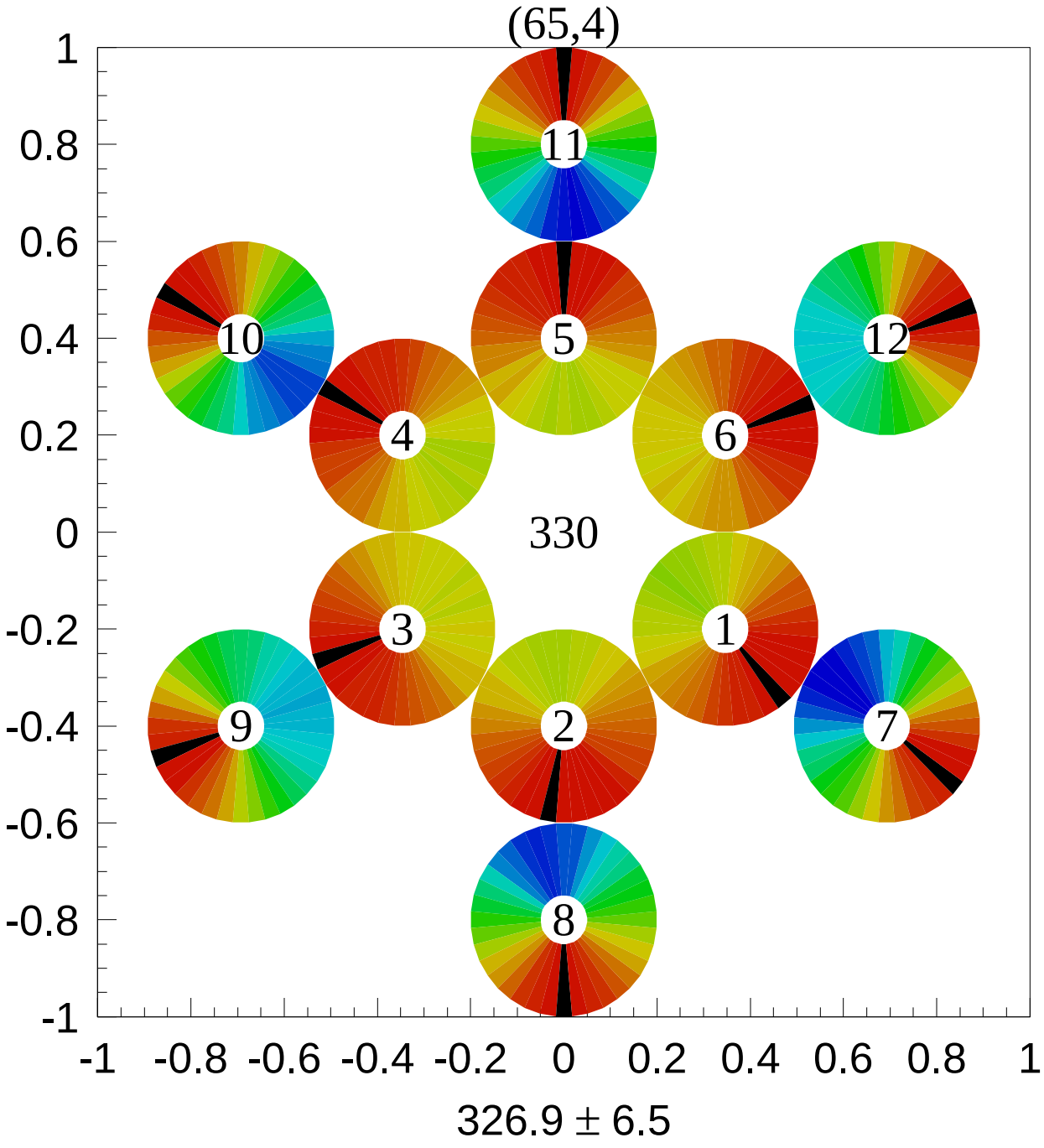

(65,2)
tilted LEDs
112 125 121 126 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 122 118 125 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

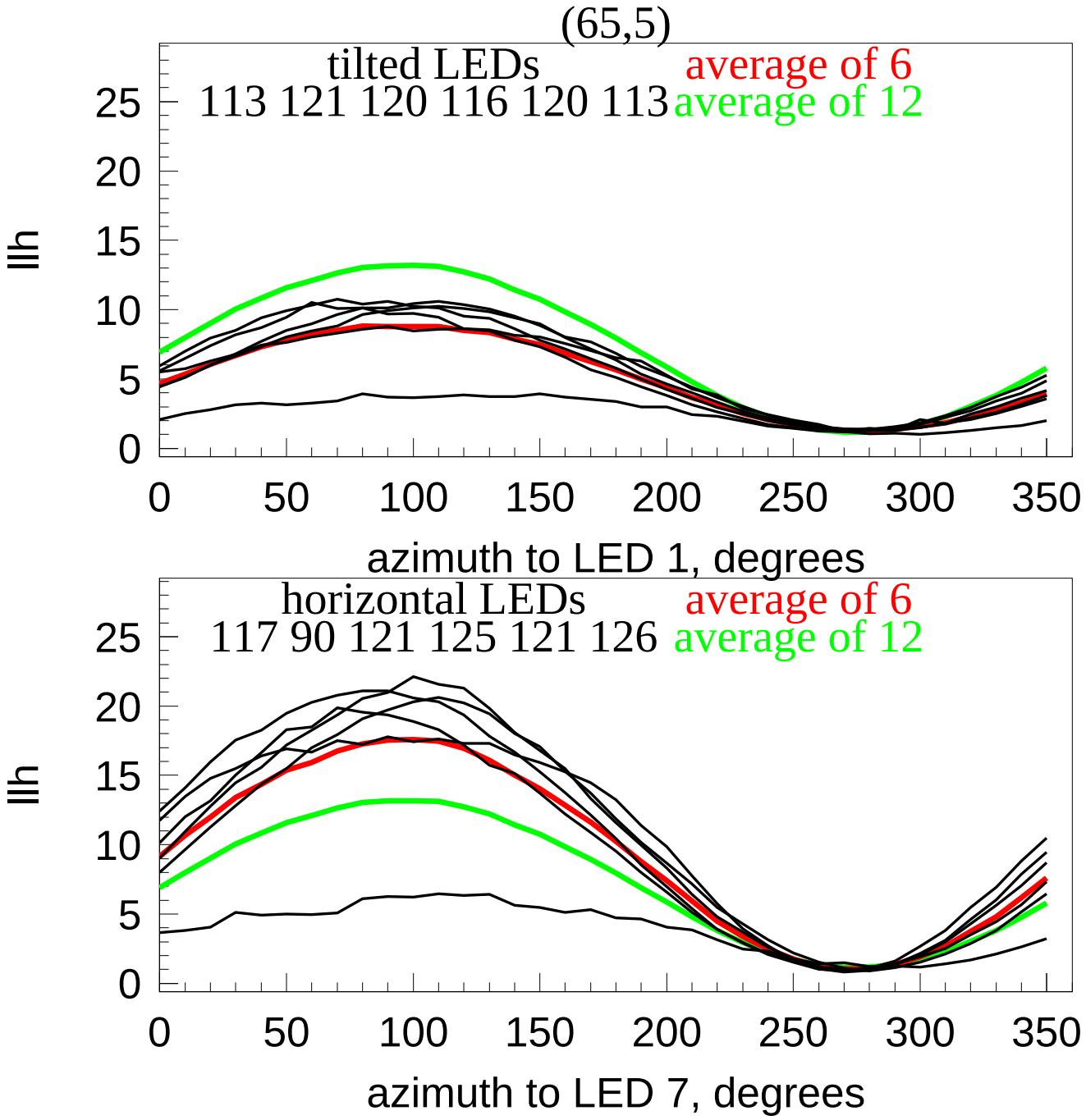

(65,2)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
20.2 ± 10.1

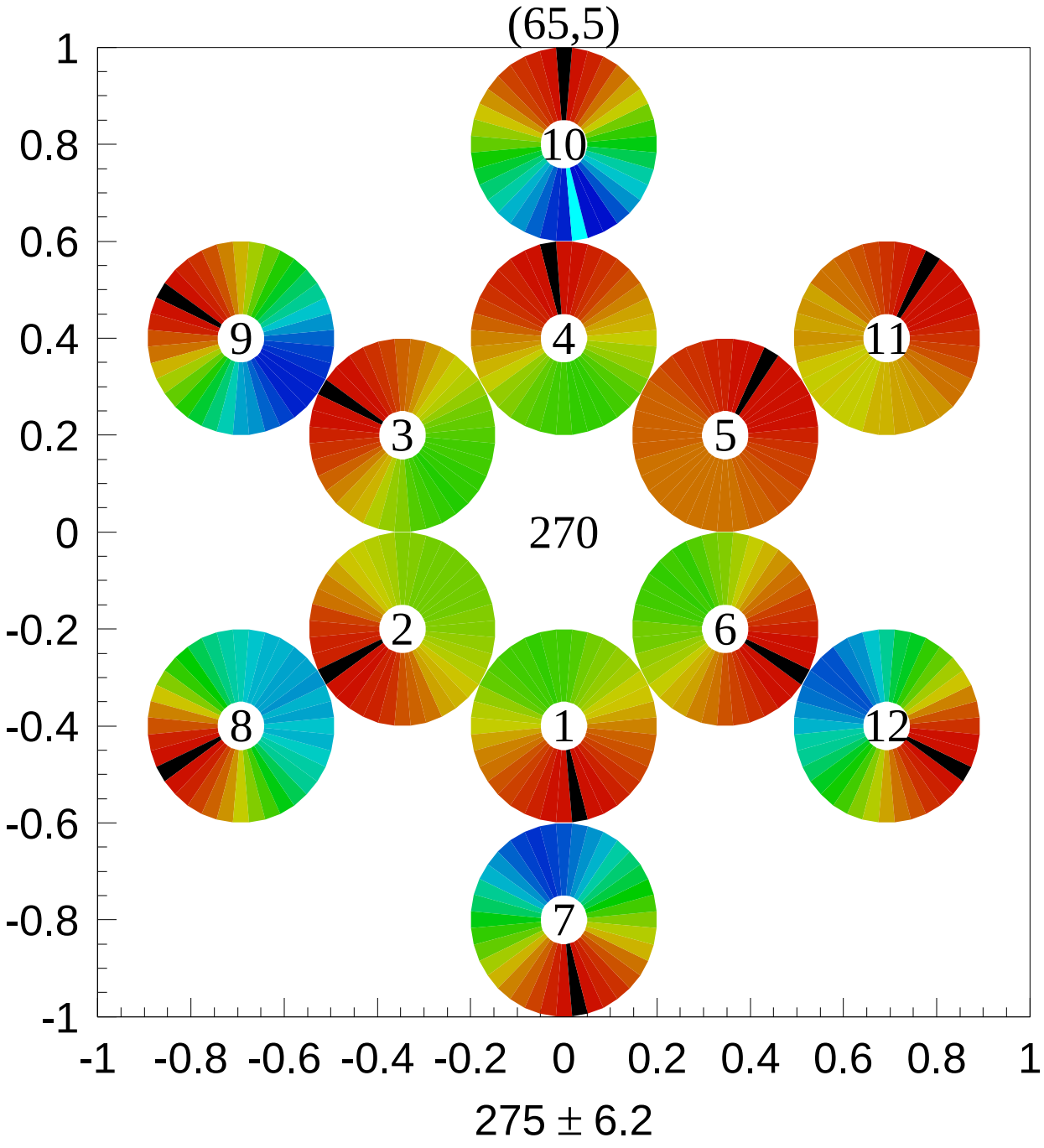

(65,3)
tilted LEDs
115 125 122 117 72 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 121 121 123 120 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

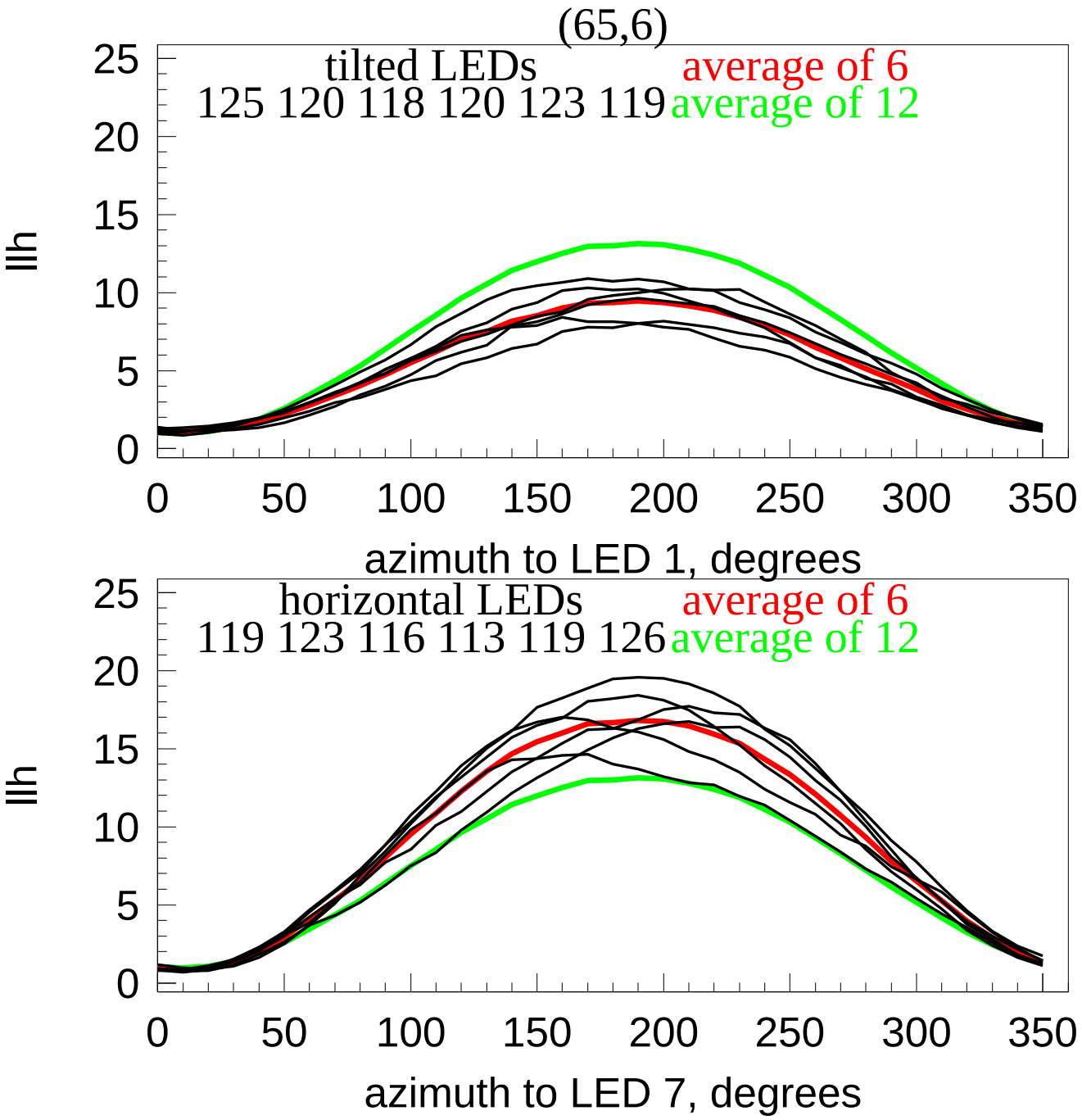

(65,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
153.4 ± 6.8

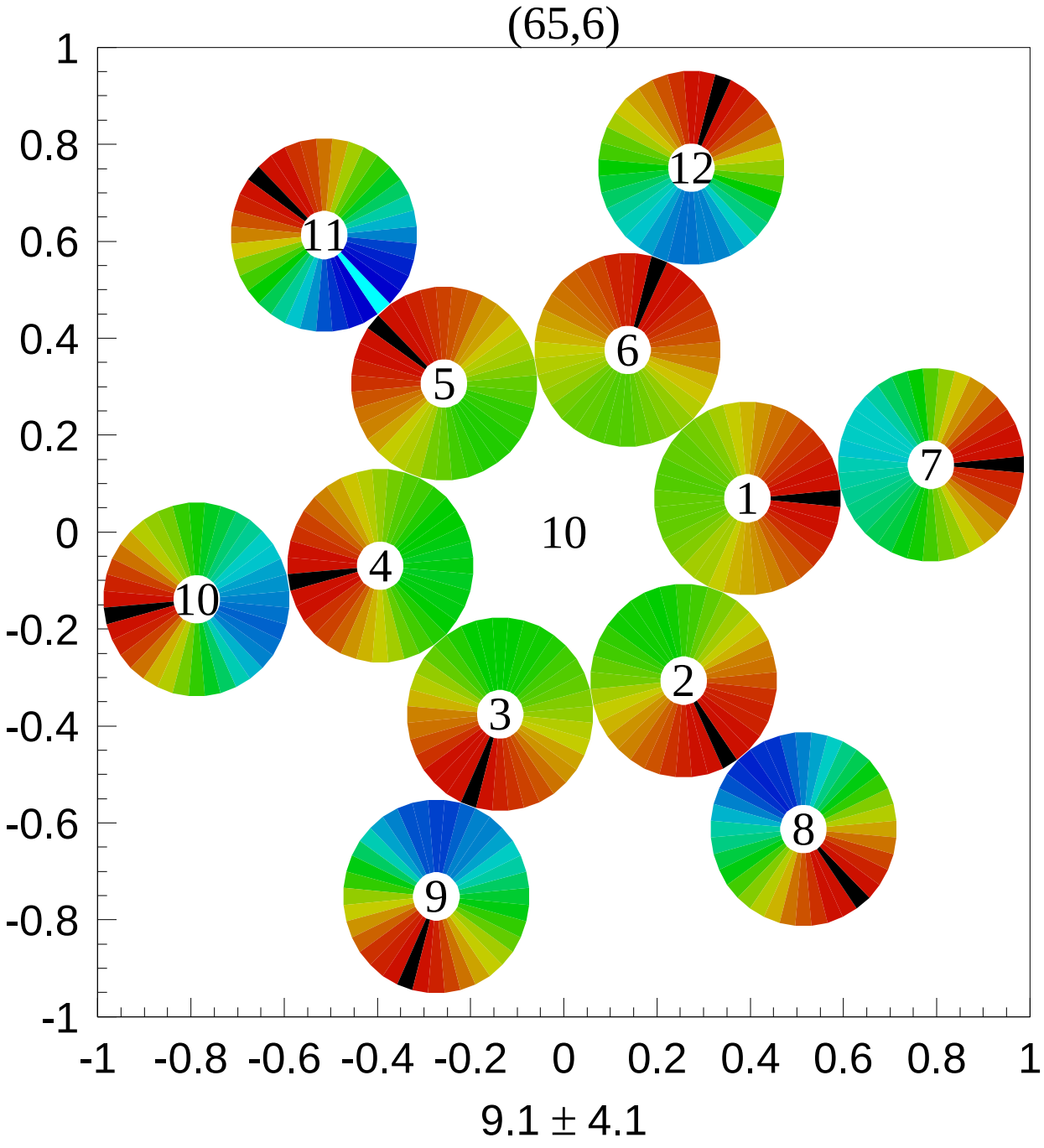

(65,4)
tilted LEDs
125 122 123 122 115 128
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
123 117 115 118 113 126
average of 6
average of 12
IIh
azimuth to LED 7, degrees

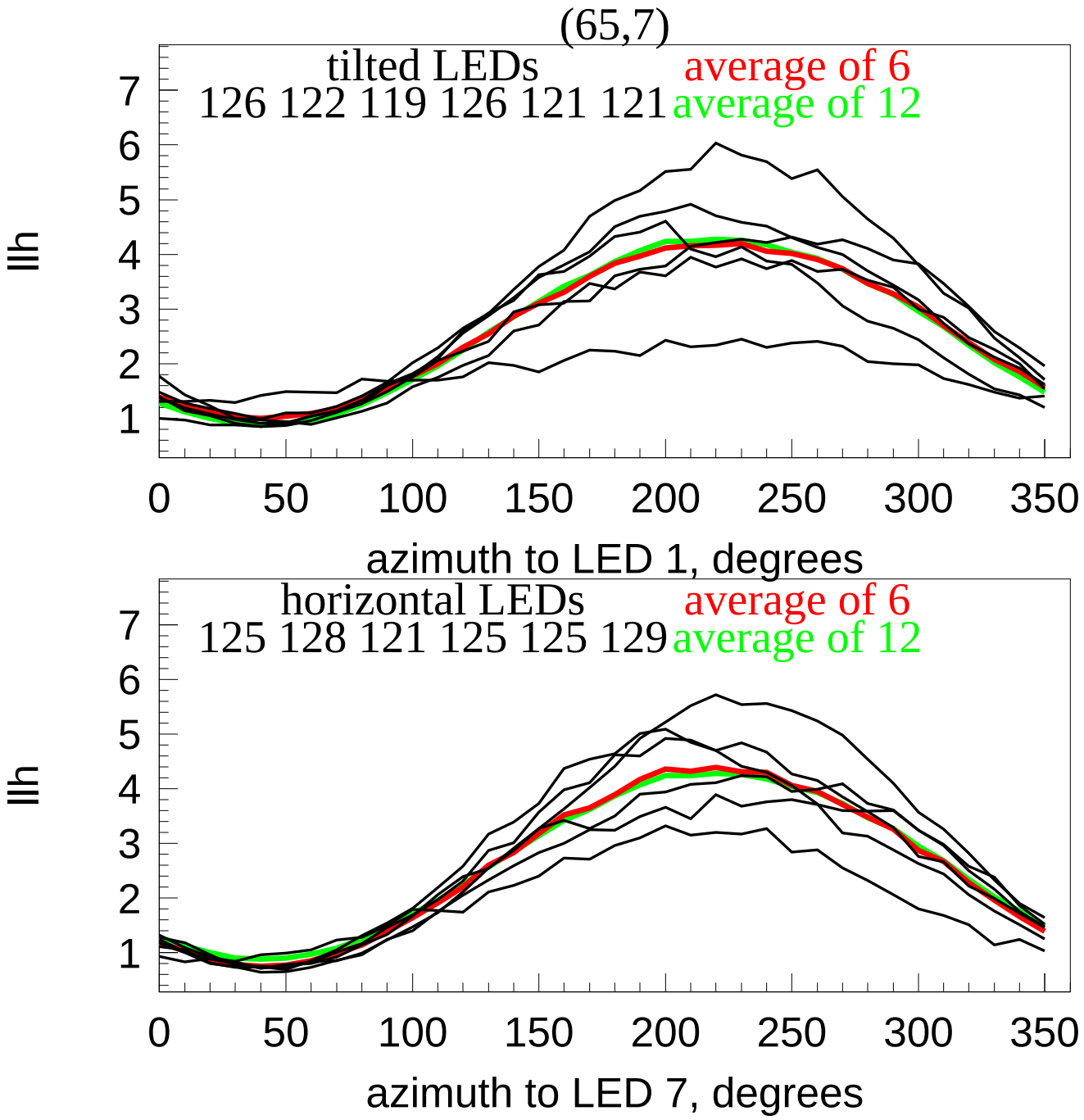

(65,4)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
326.9 ± 6.5

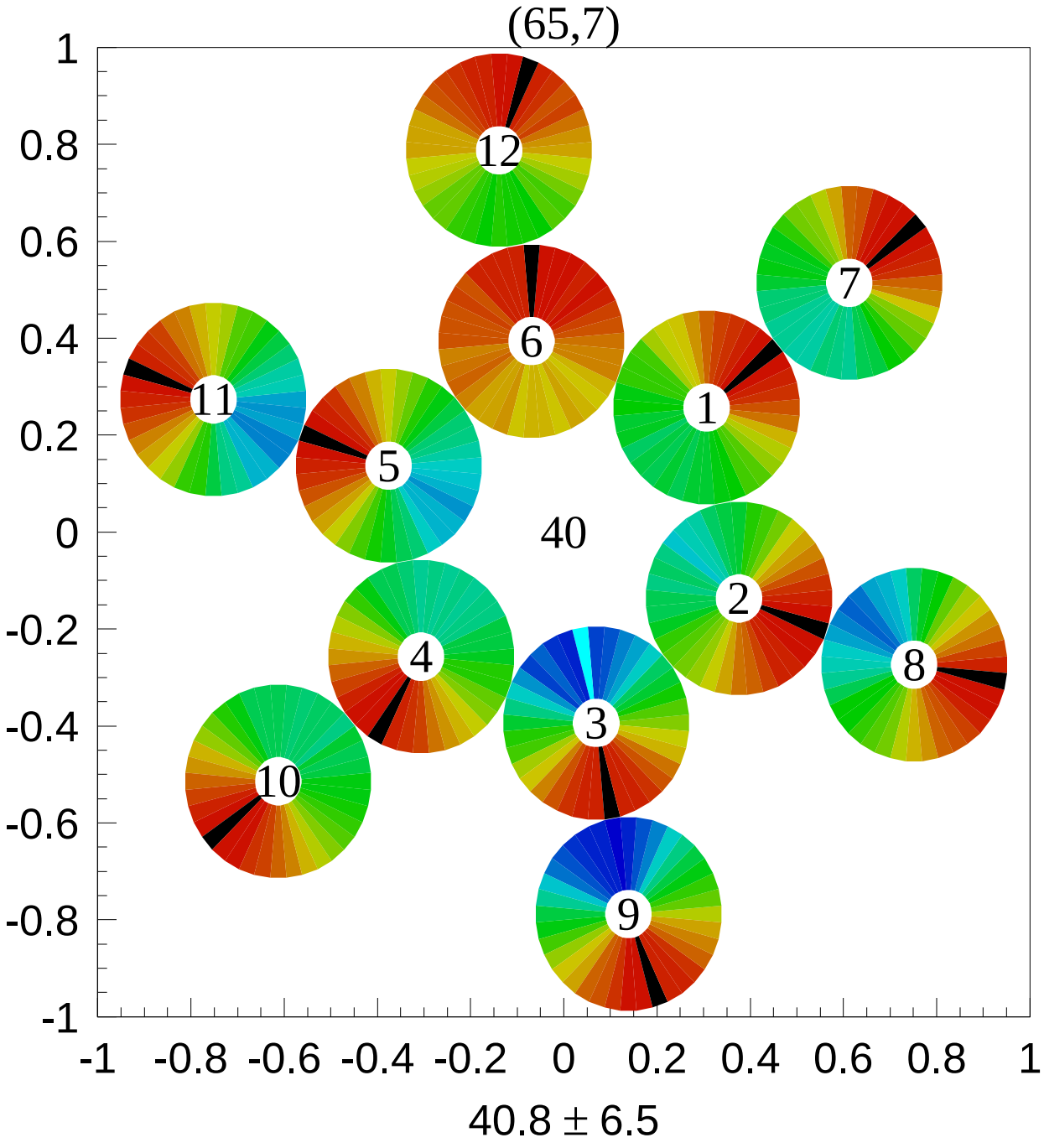

(65,5)
tilted LEDs
113 121 120 116 120 113
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 90 121 125 121 126
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

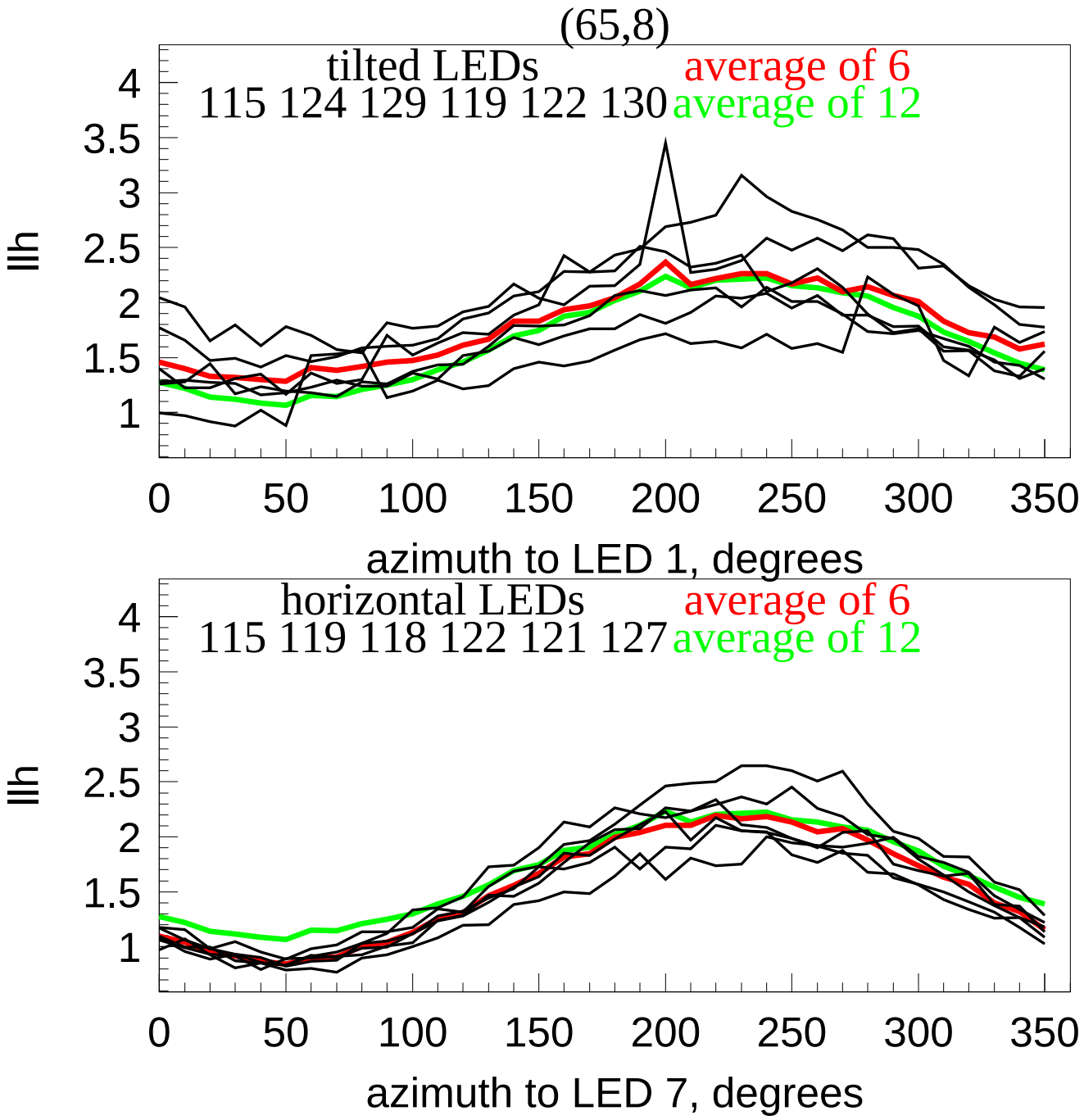

(65,5)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
275 ± 6.2

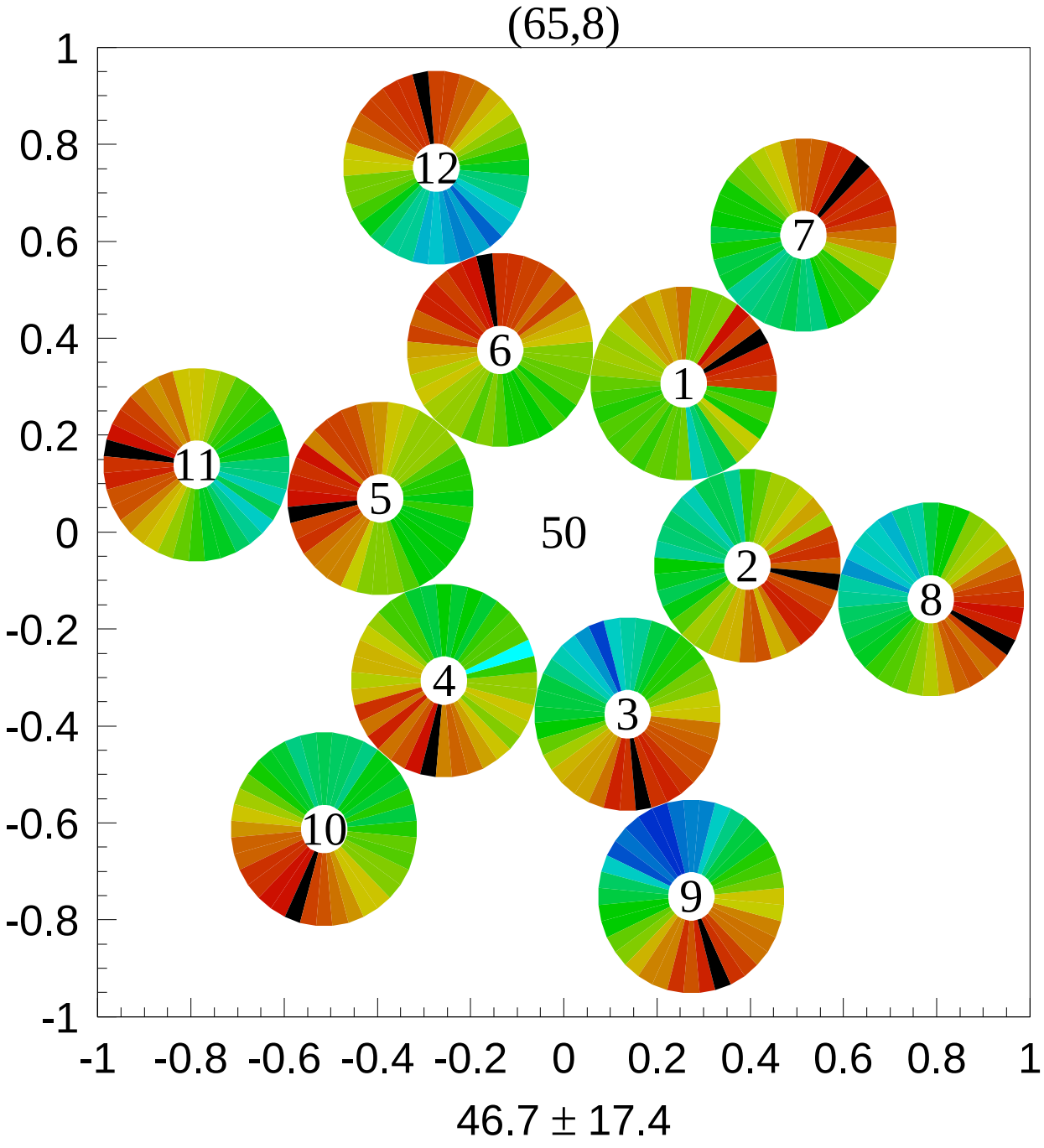

(65,6)
tilted LEDs
125 120 118 120 123 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 116 113 119 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

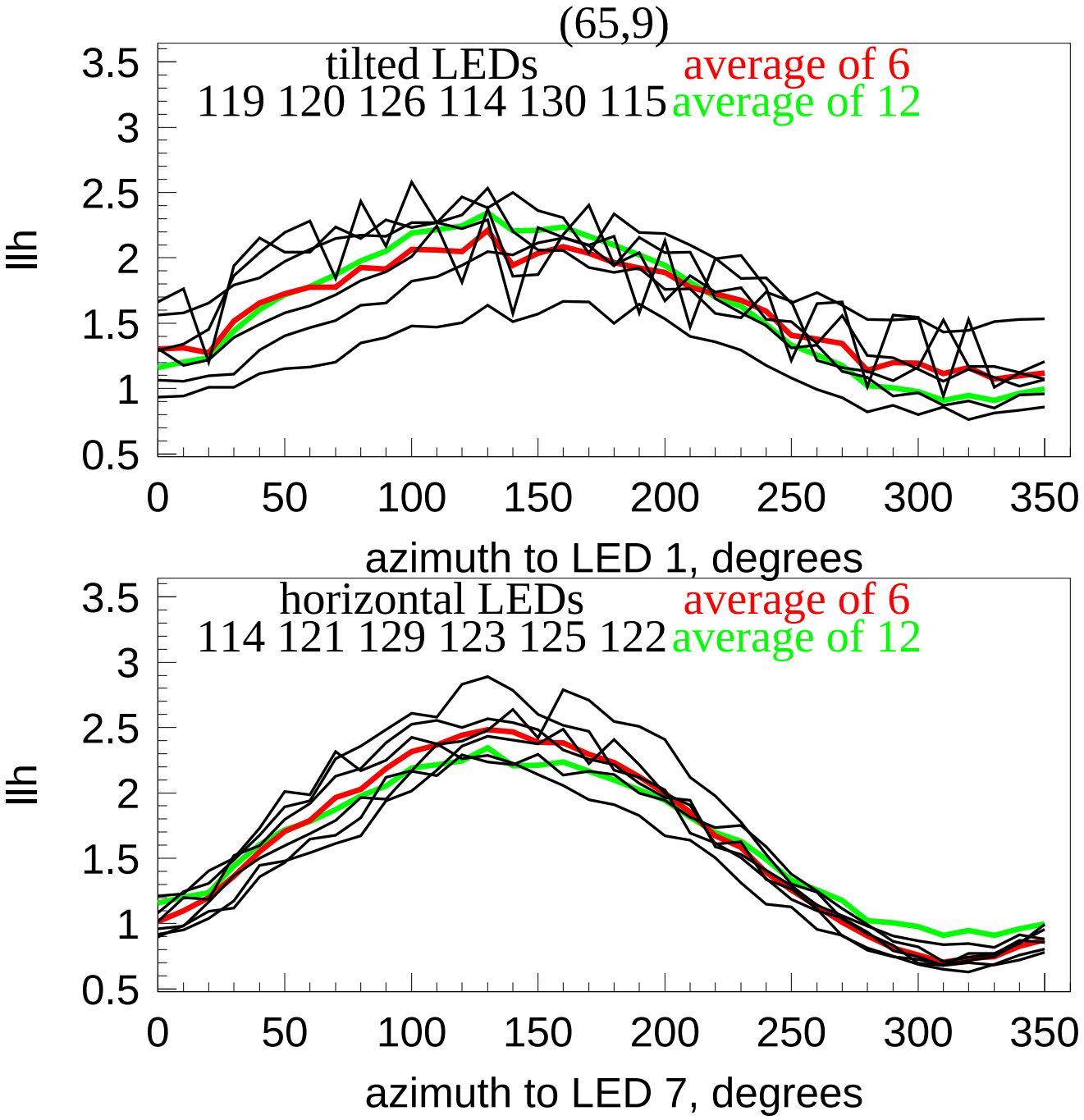

(65,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
9.1 ± 4.1

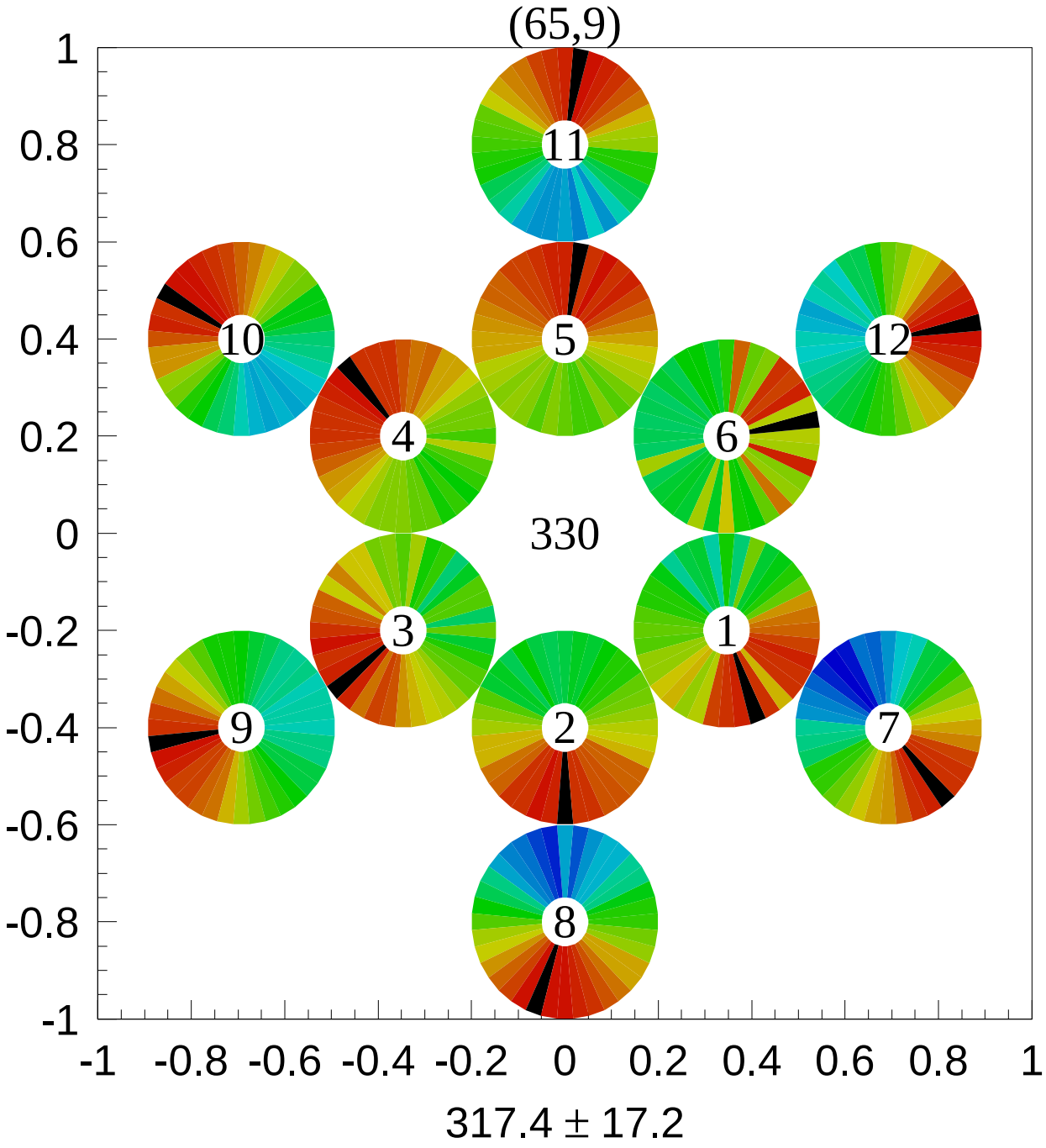

(65,7)
tilted LEDs
126 122 119 126 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 128 121 125 125 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

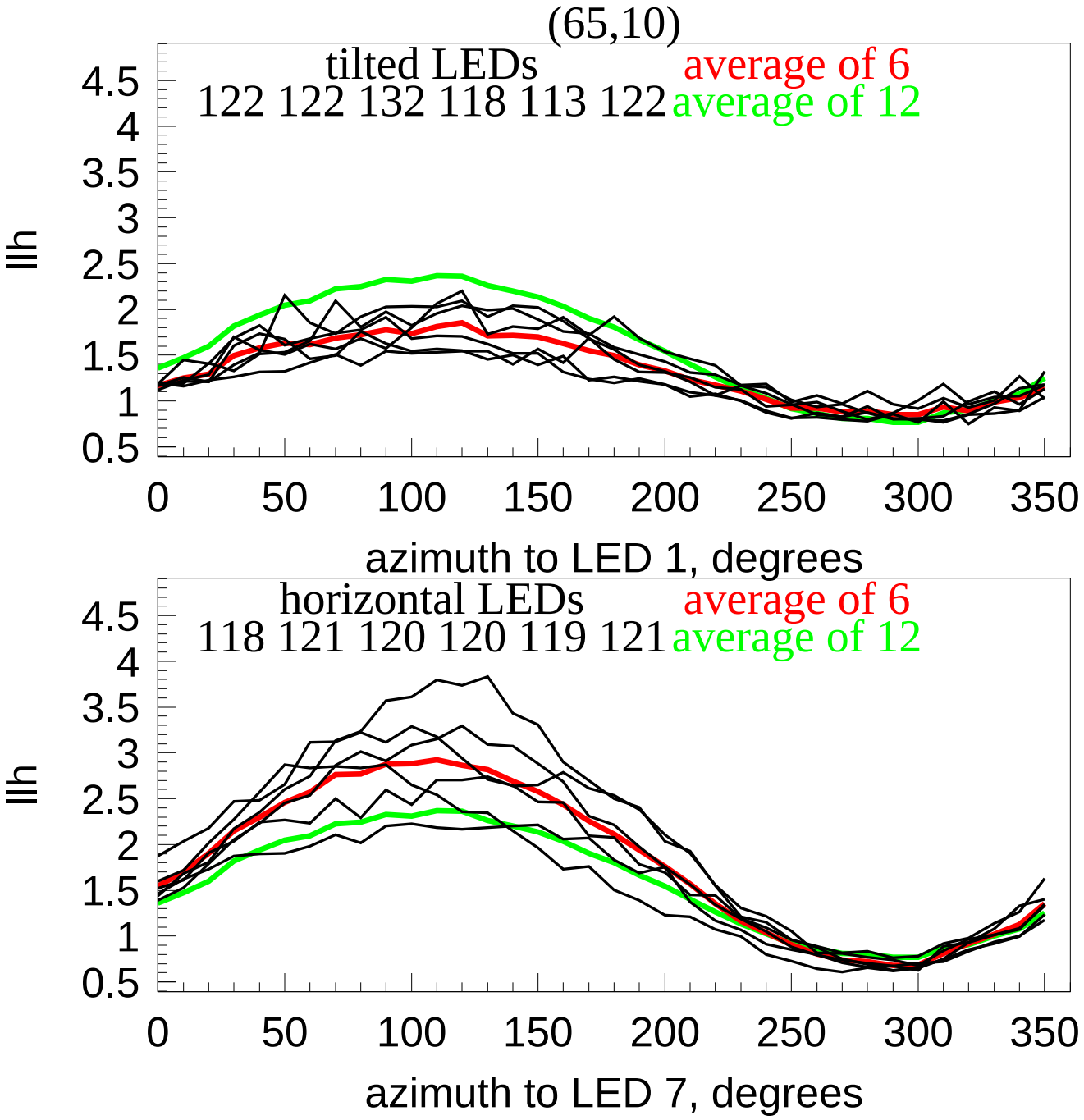

(65,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
40.8 ± 6.5

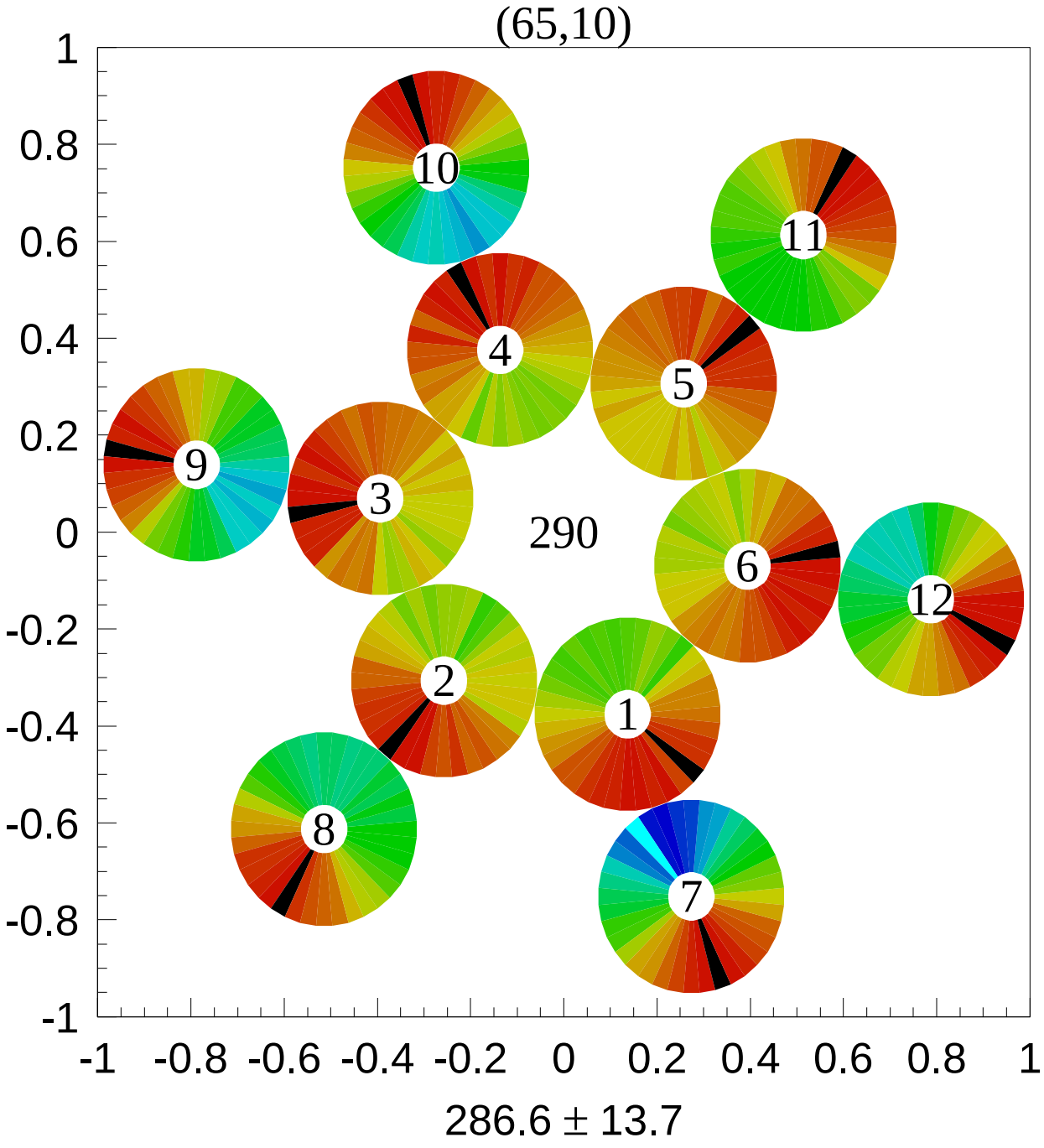

(65,8)
tilted LEDs
115 124 129 119 122 130
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 119 118 122 121 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

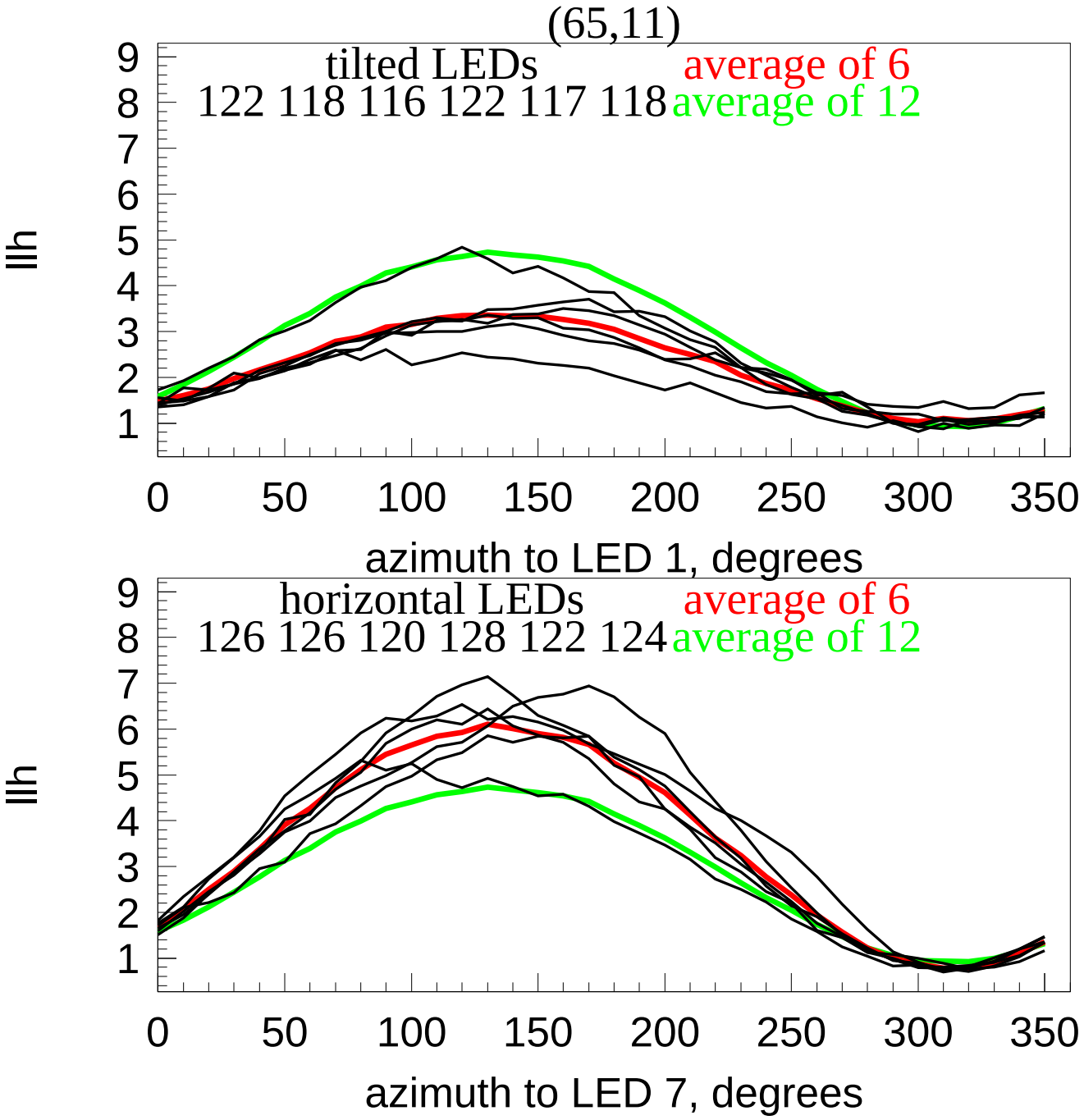

(65,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
46.7 ± 17.4

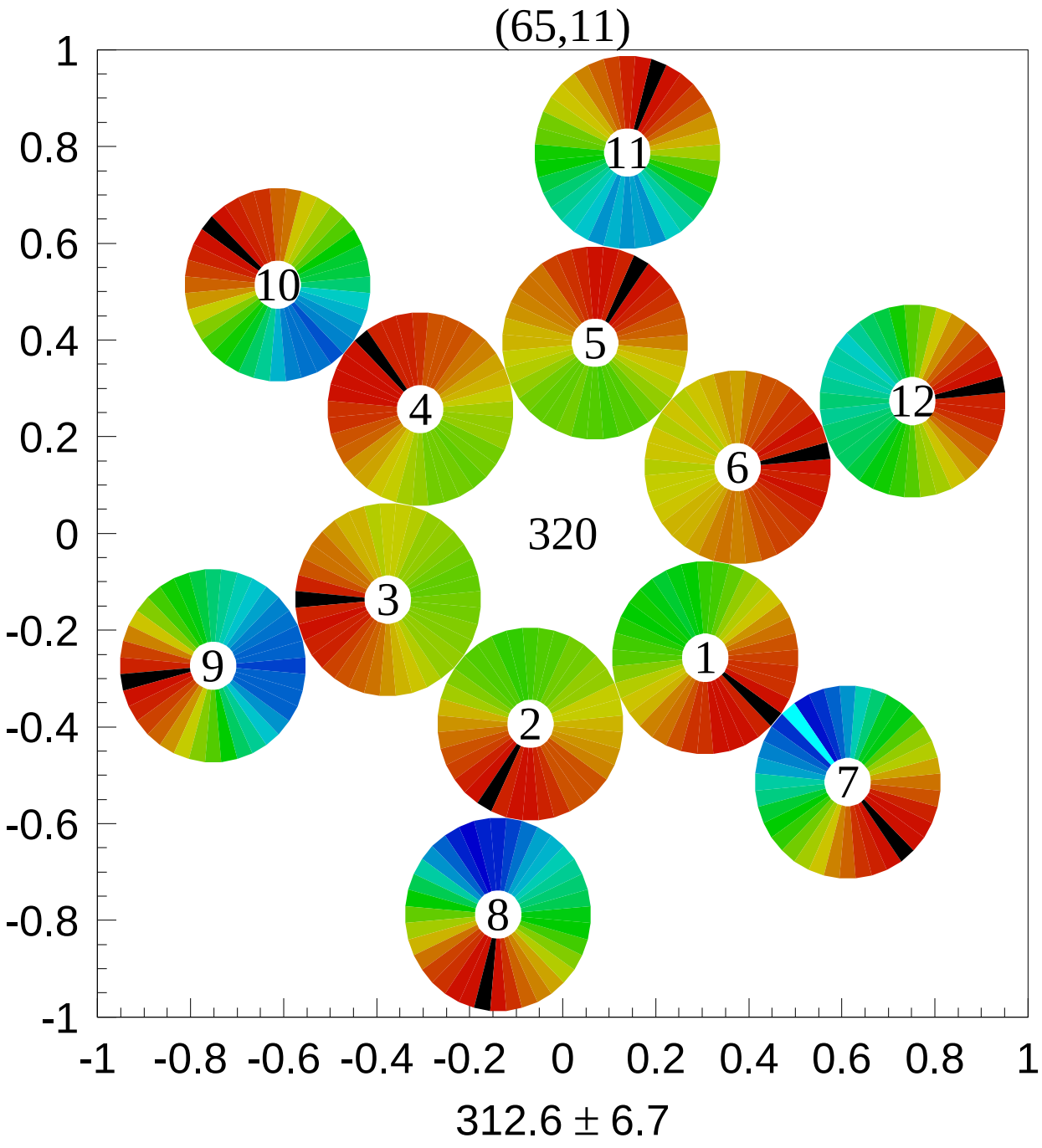

(65,9)
tilted LEDs
119 120 126 114 130 115
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
114 121 129 123 125 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

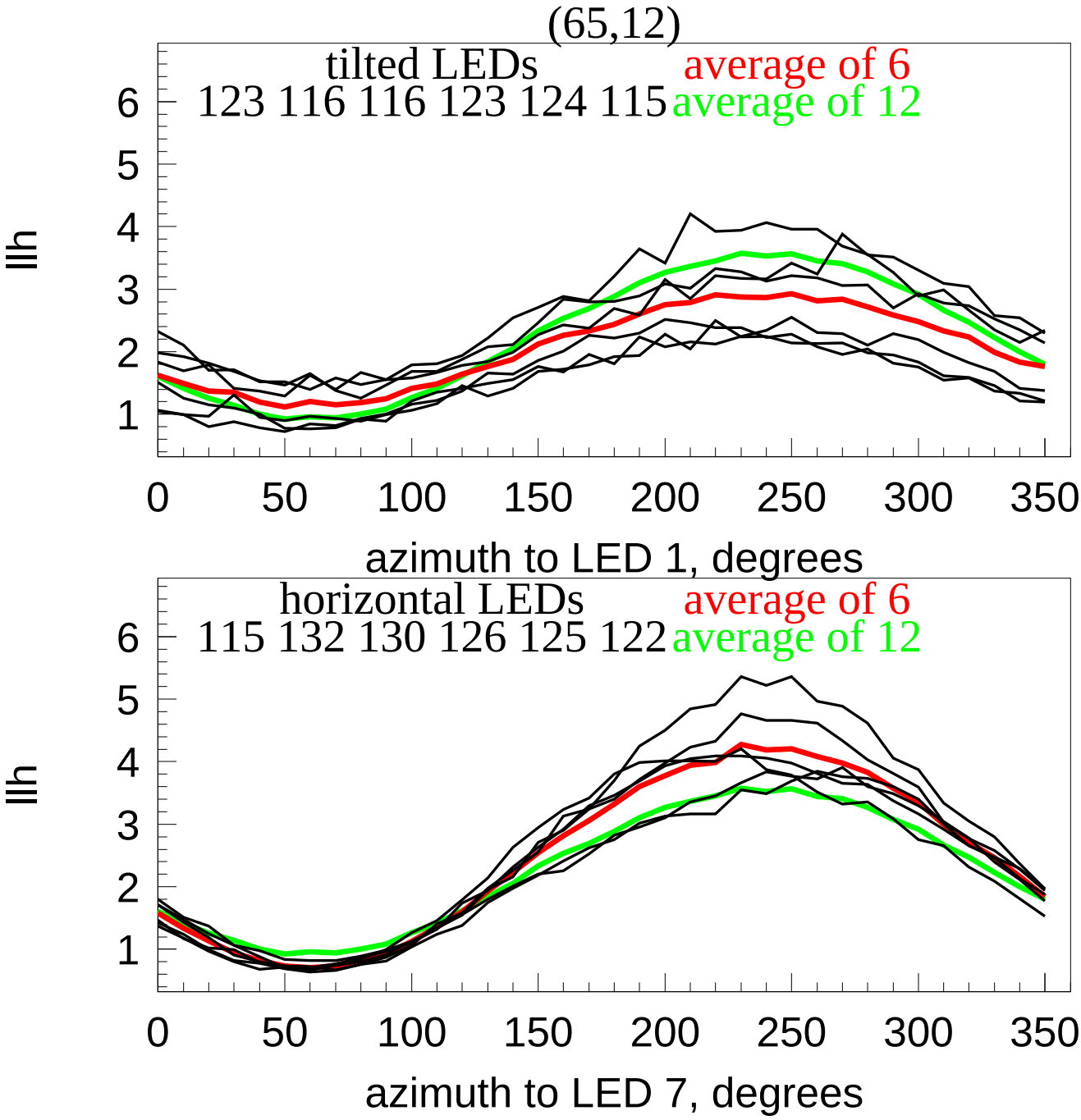

(65,9)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
317.4 ± 17.2

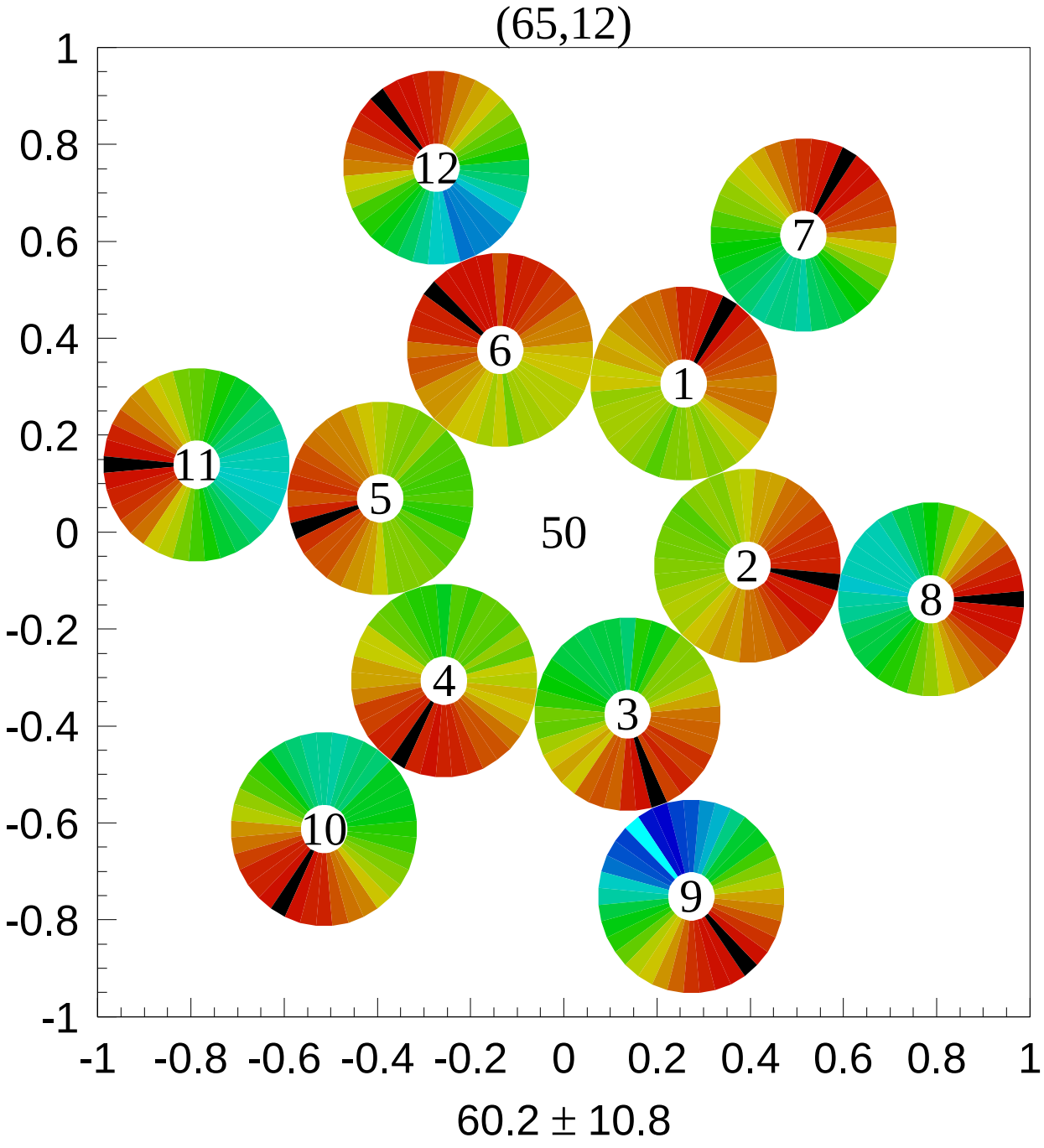

(65,10)
tilted LEDs
122 122 132 118 113 122
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 121 120 120 119 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

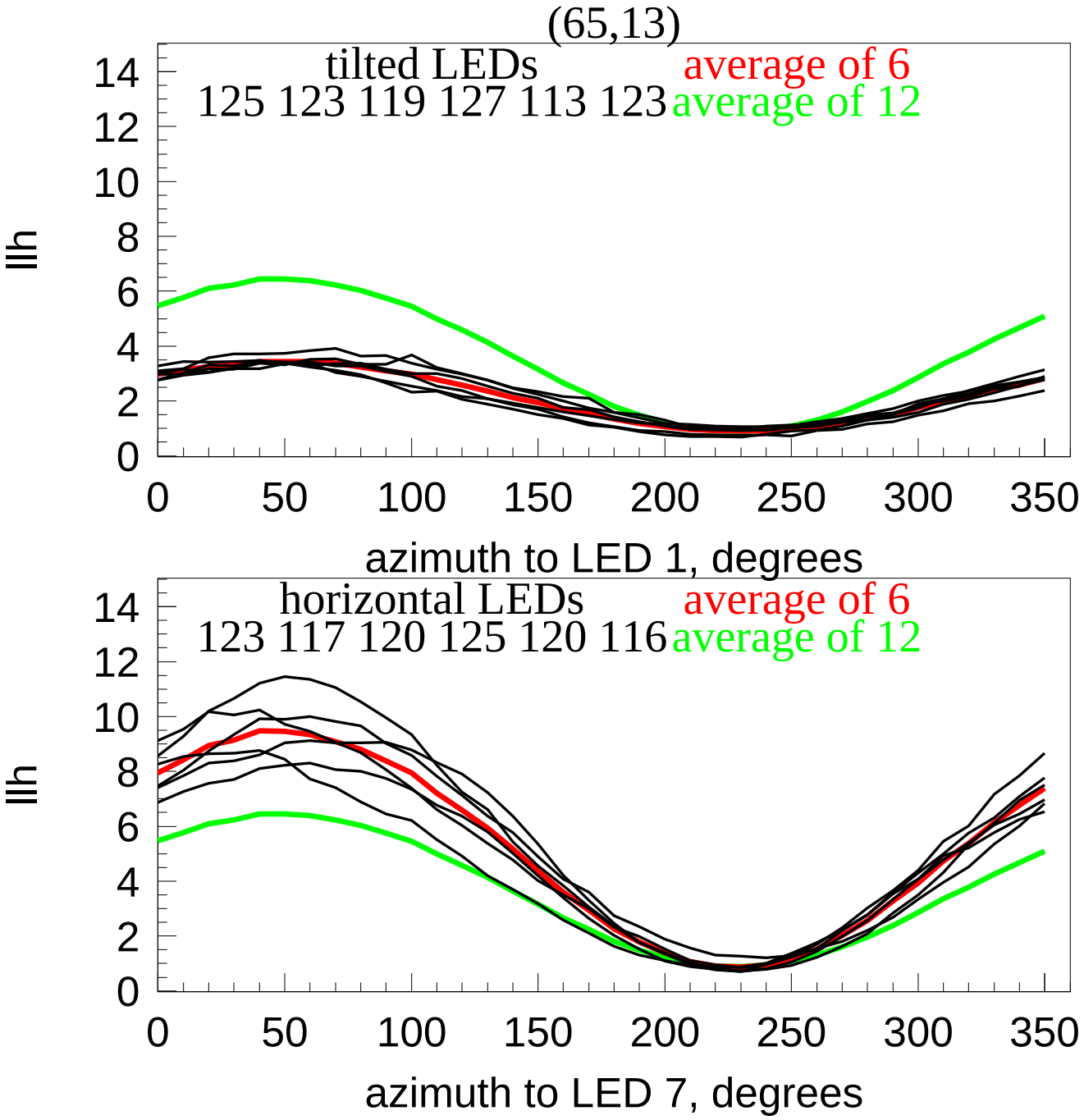

(65,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
286.6 ± 13.7

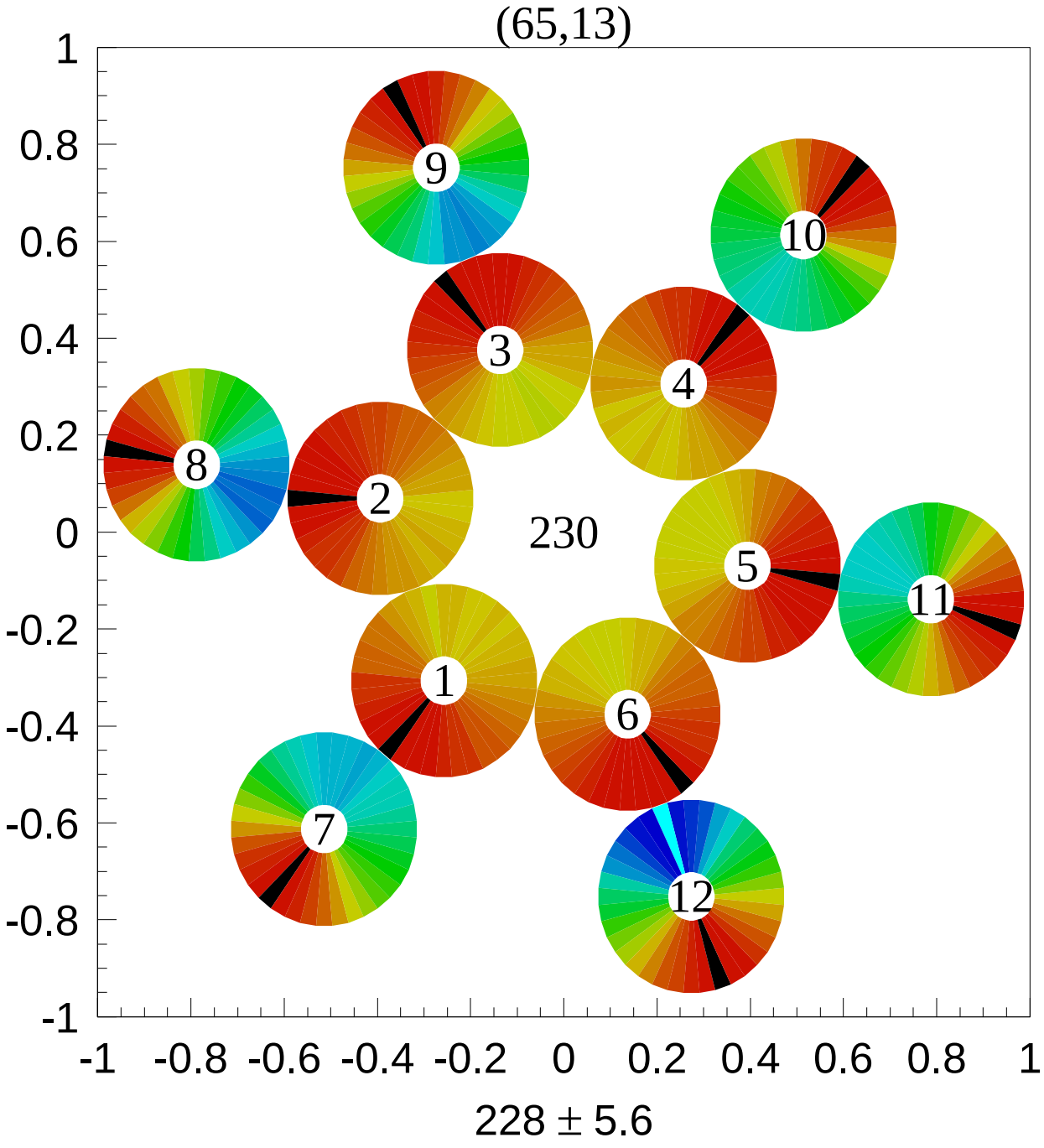

(65,11)
tilted LEDs
122 118 116 122 117 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 120 128 122 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

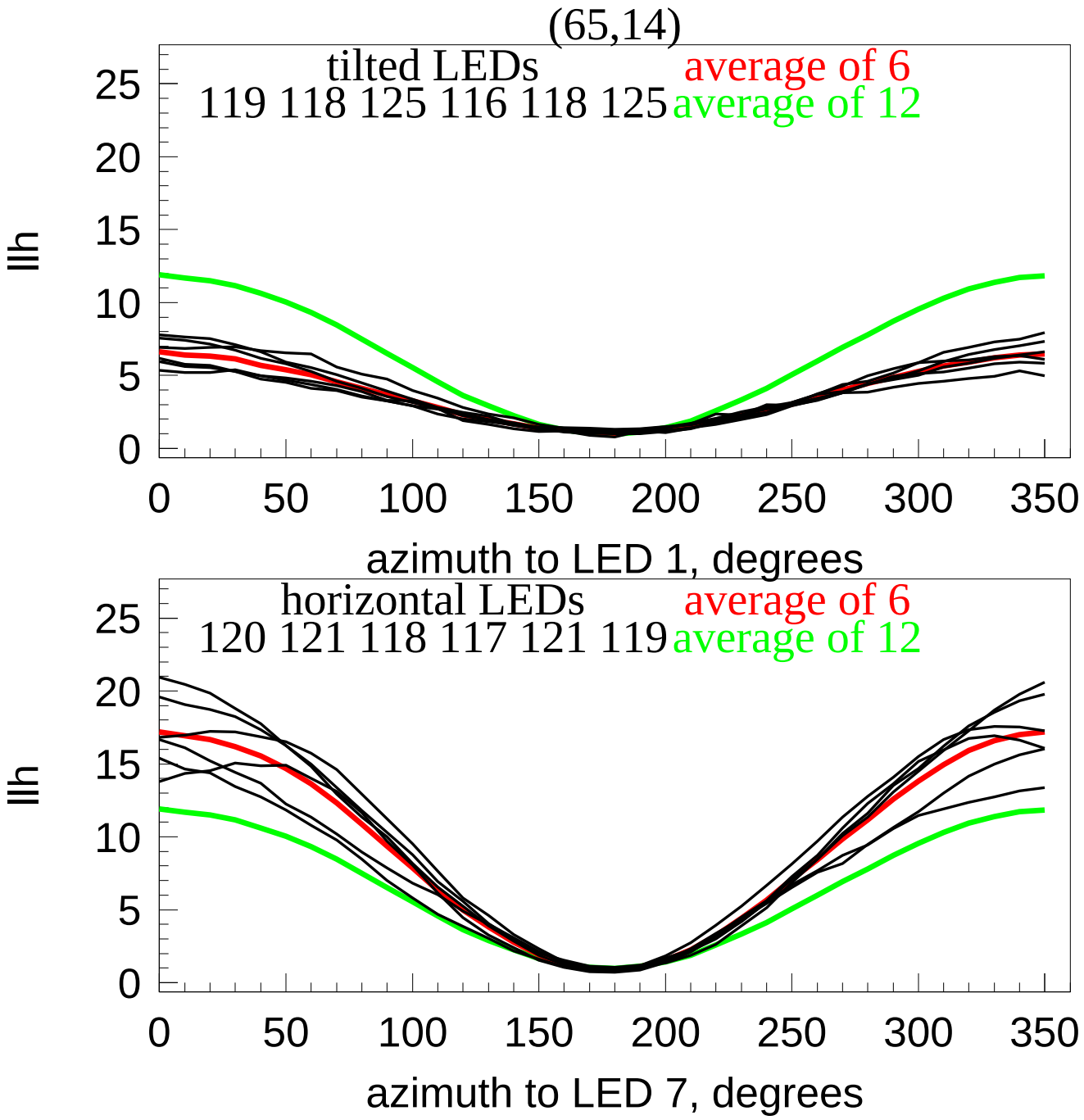

(65,11)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
312.6 ± 6.7

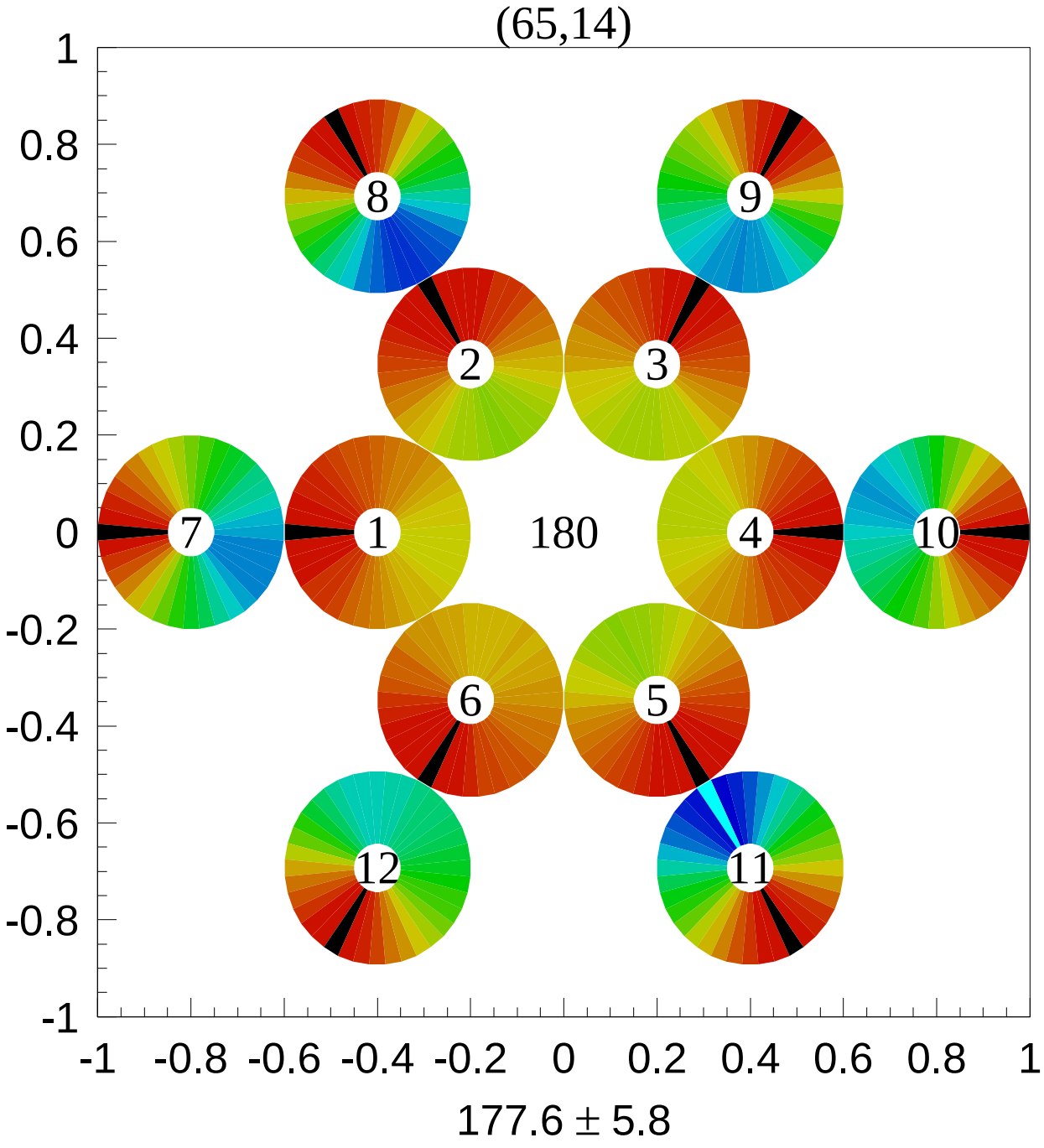

(65,12)
tilted LEDs
123 116 116 123 124 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 132 130 126 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

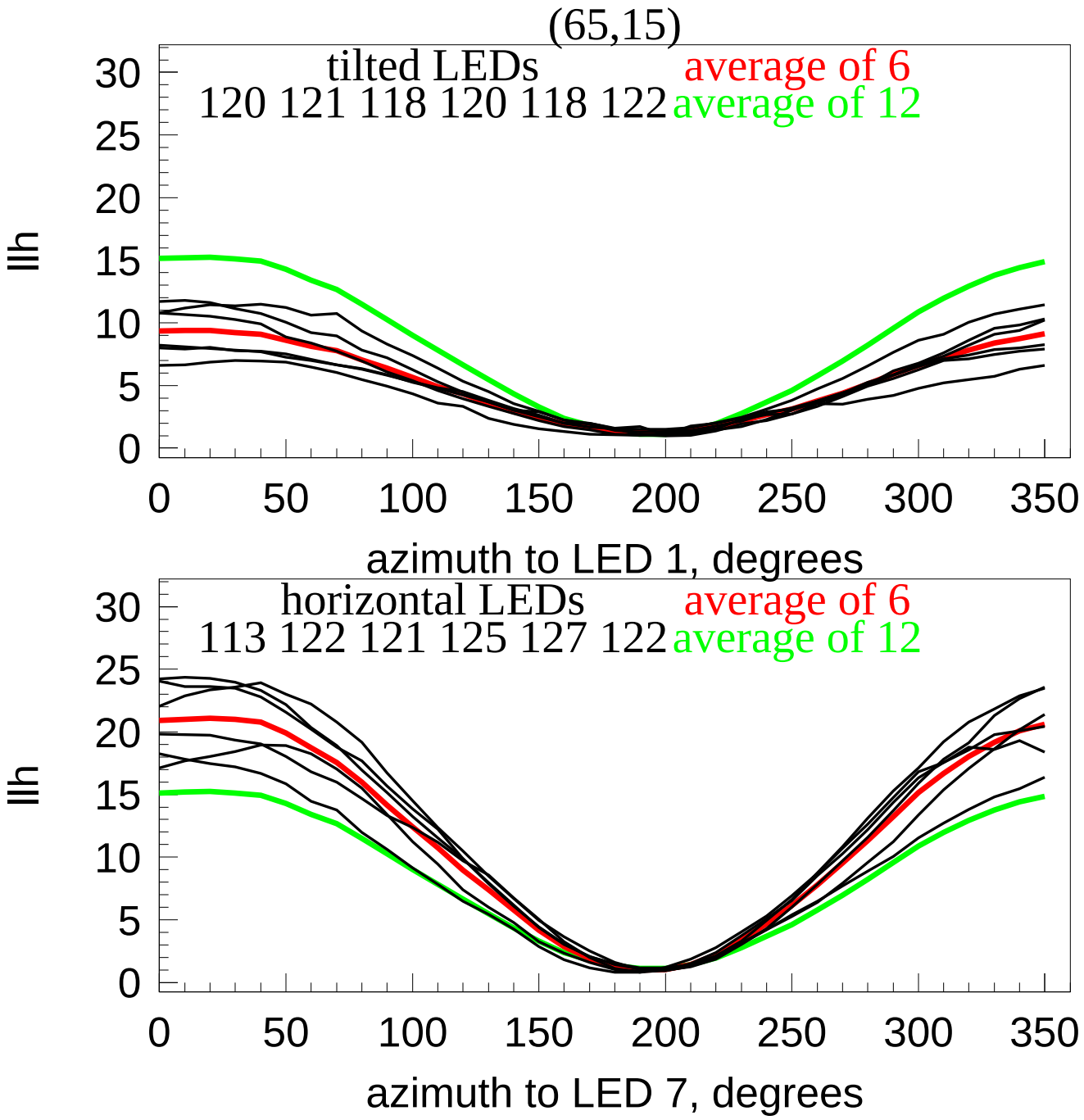

(65,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
60.2 ± 10.8

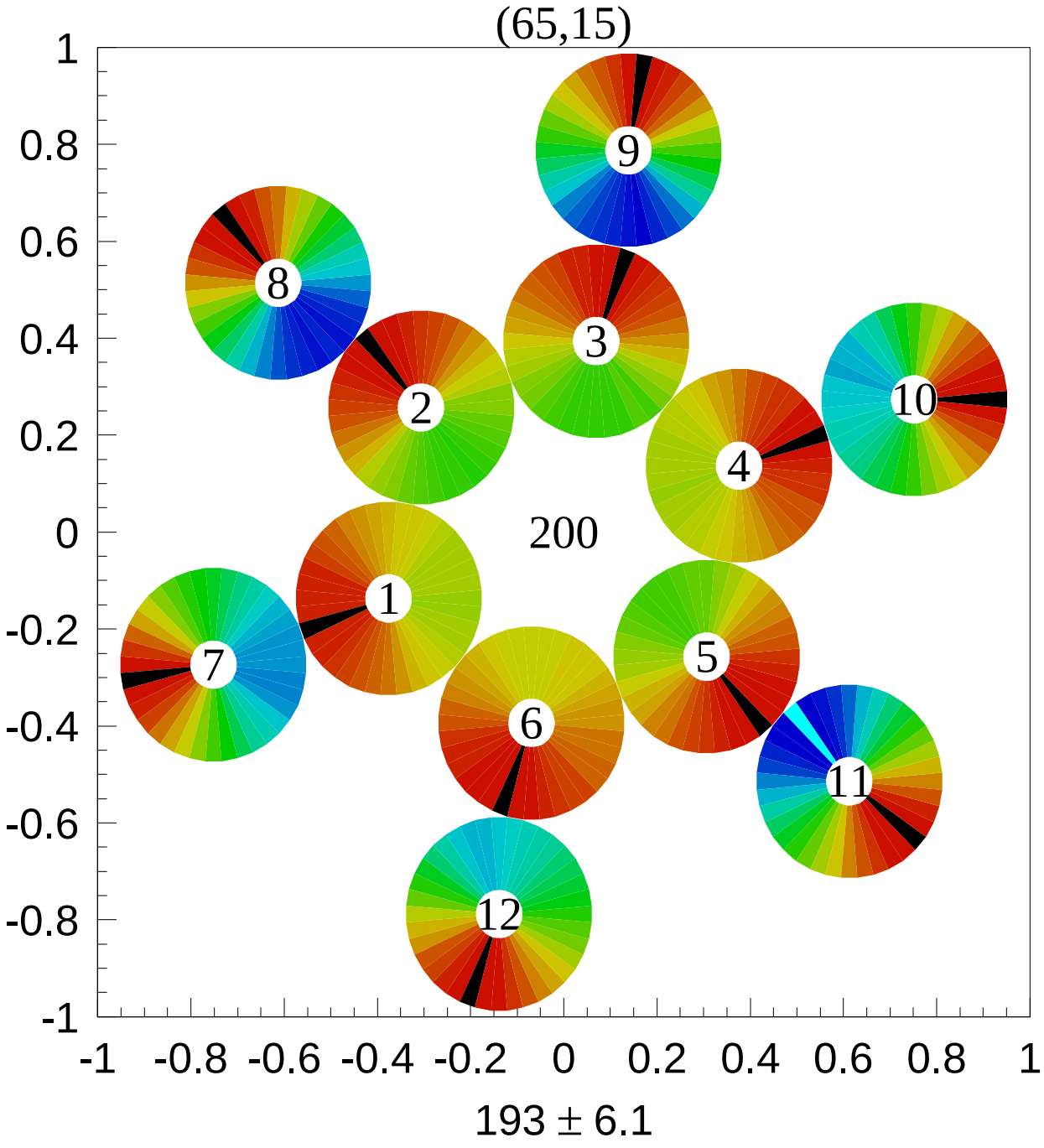

(65,13)
tilted LEDs
125 123 119 127 113 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 117 120 125 120 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

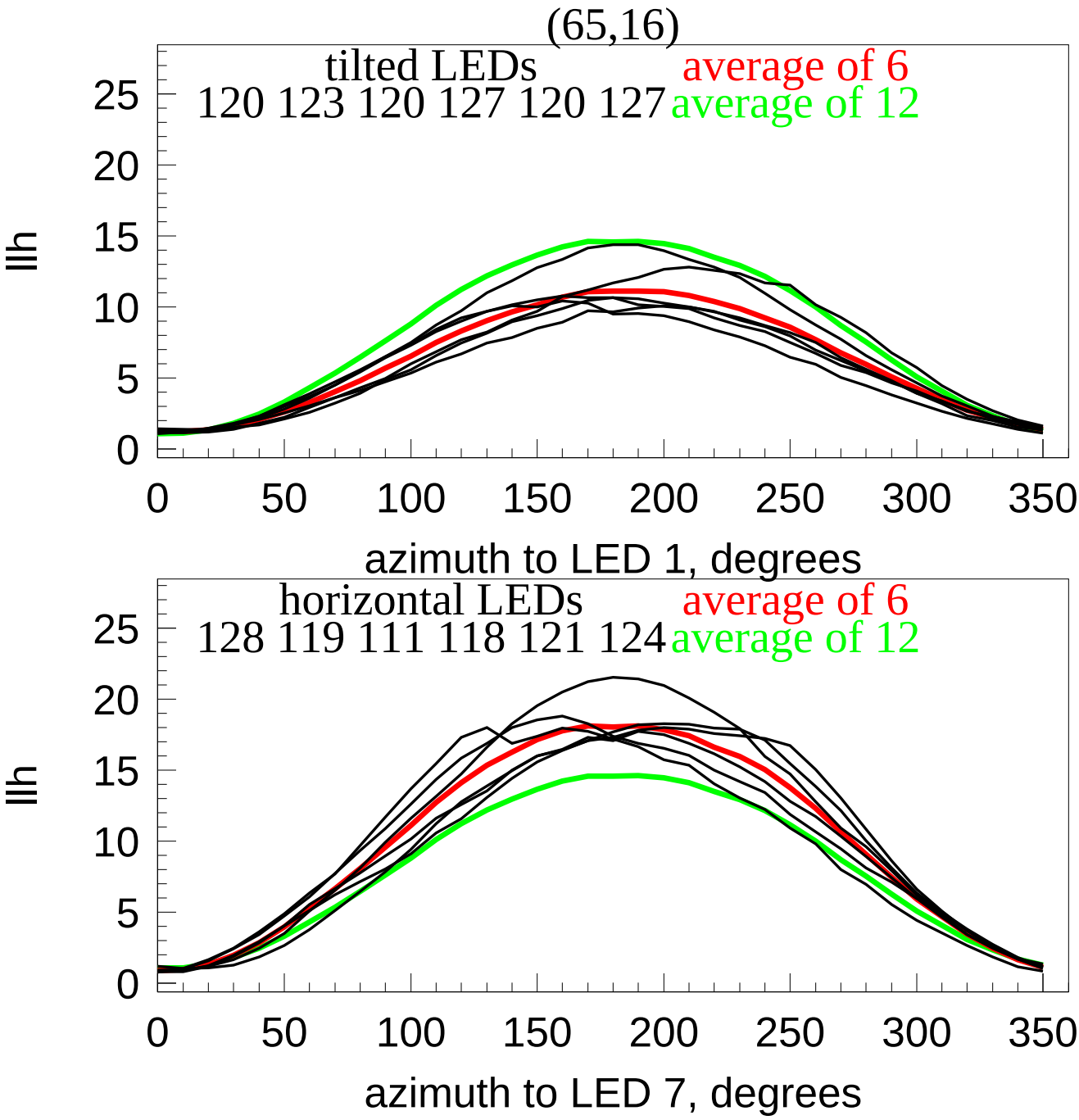

(65,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
228 ± 5.6

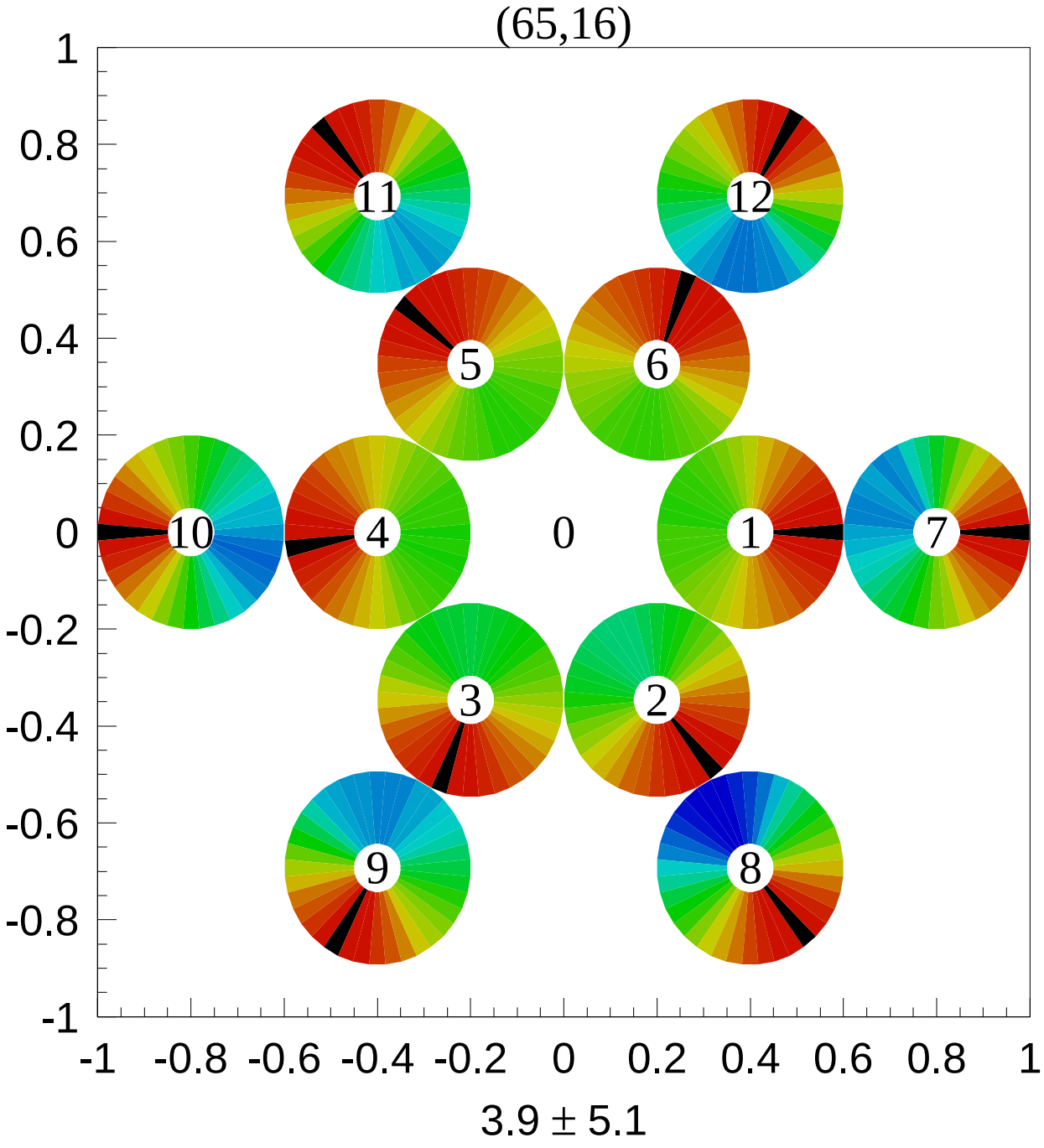

(65,14)
tilted LEDs
119 118 125 116 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 118 117 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

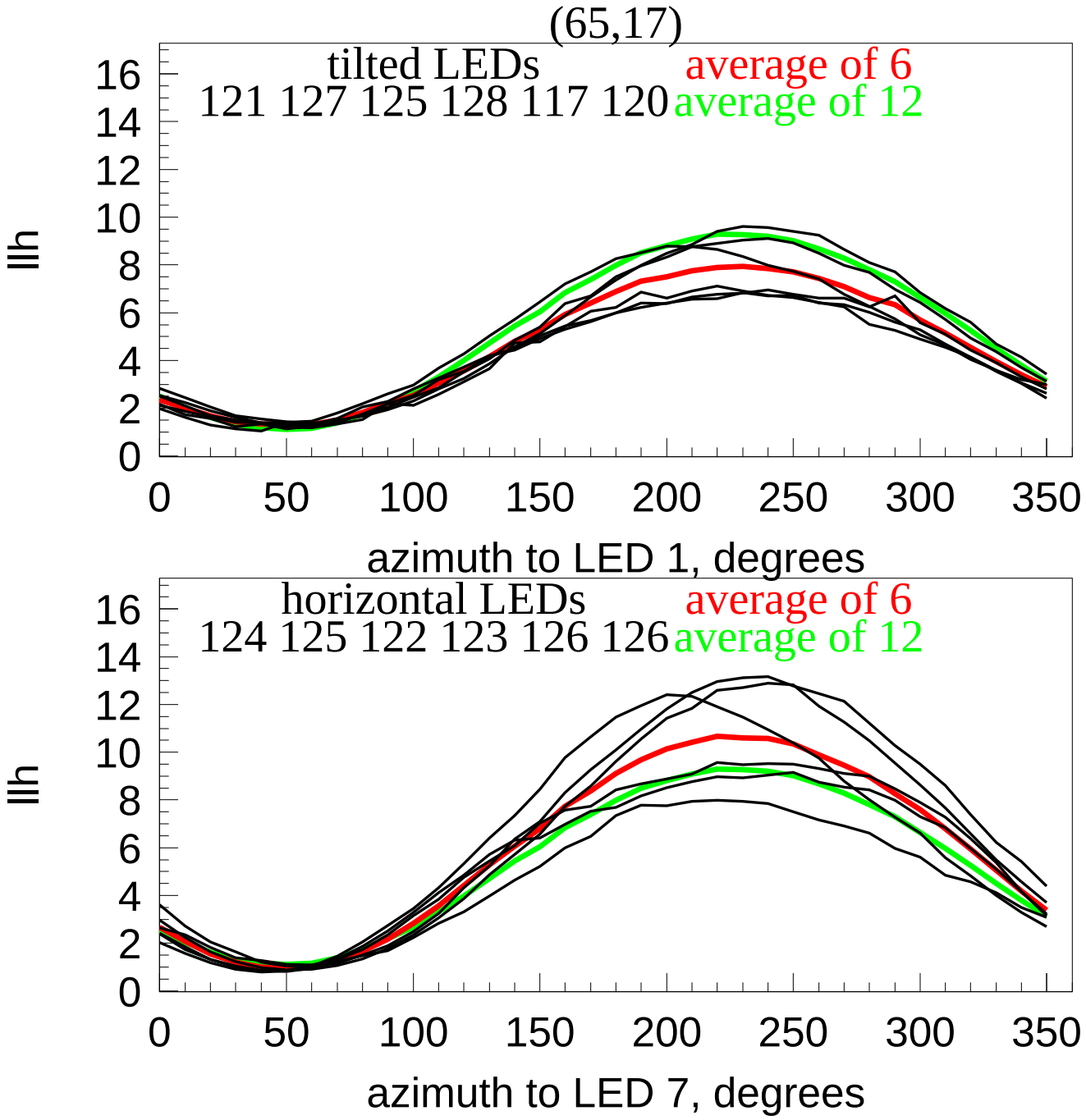

(65,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
177.6 ± 5.8
8
9
2
3
7
1
180
4
10
6
5
12
11

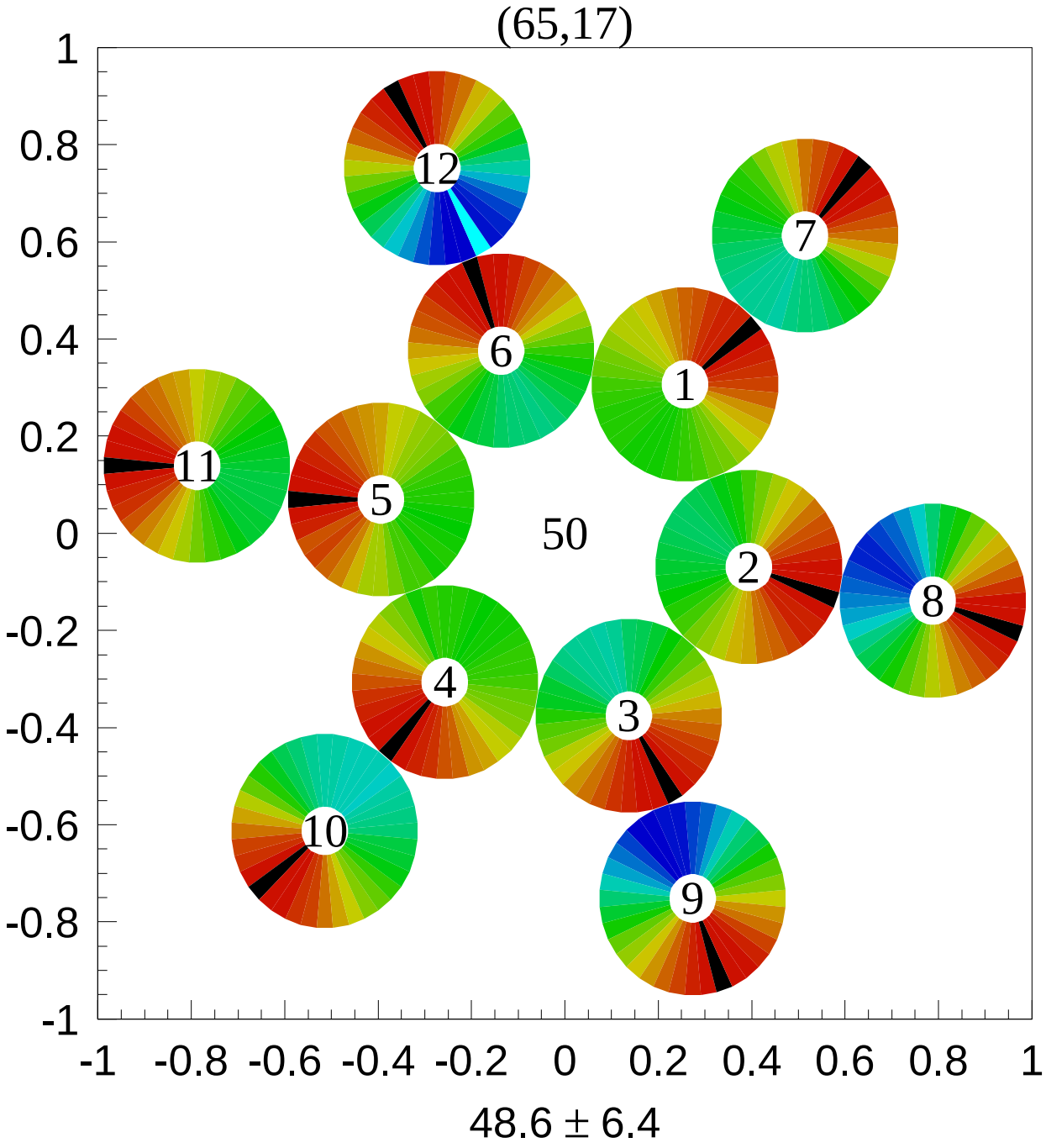

(65,15)
tilted LEDs
120 121 118 120 118 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 122 121 125 127 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

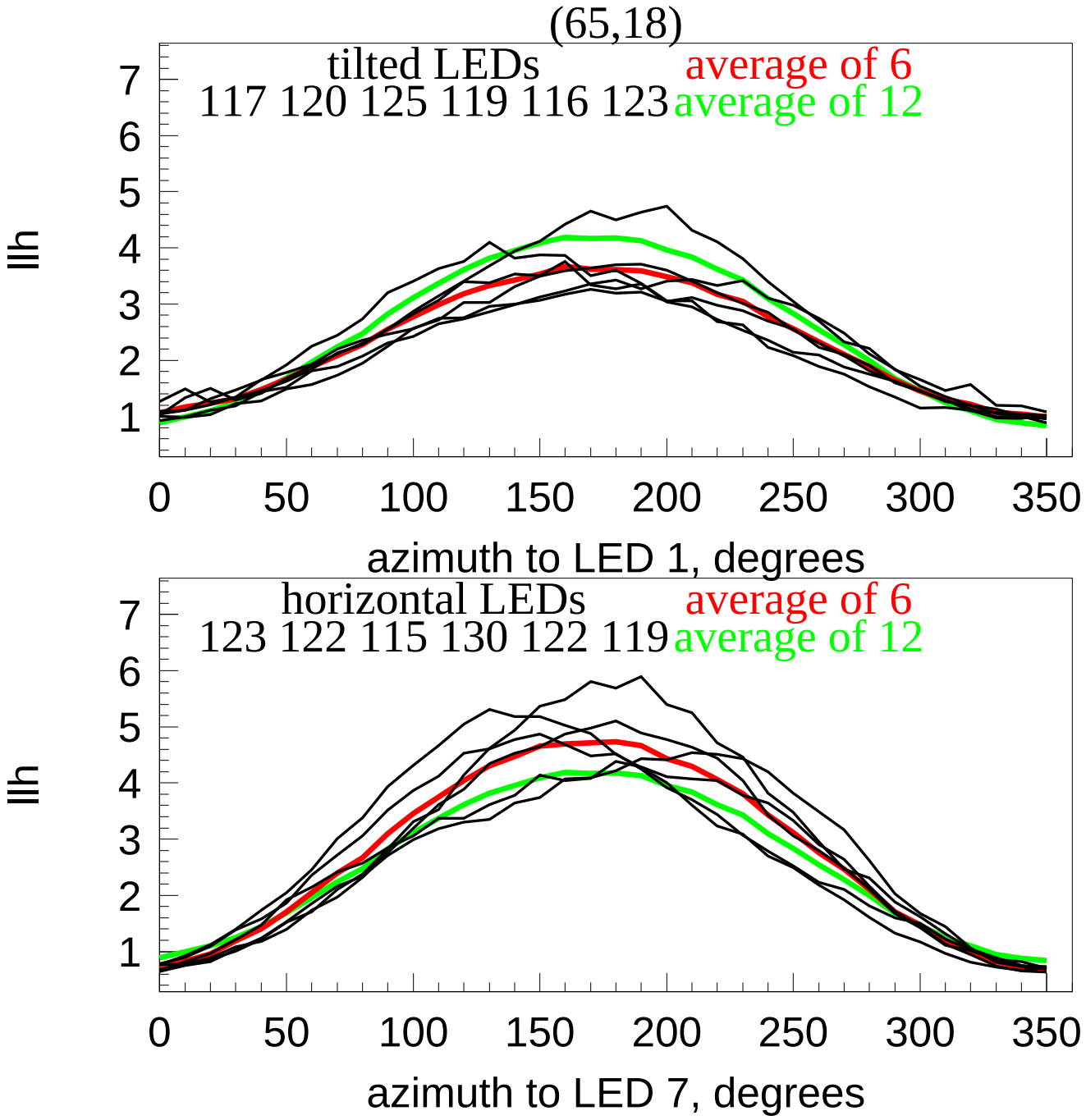

(65,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
193 ± 6.1

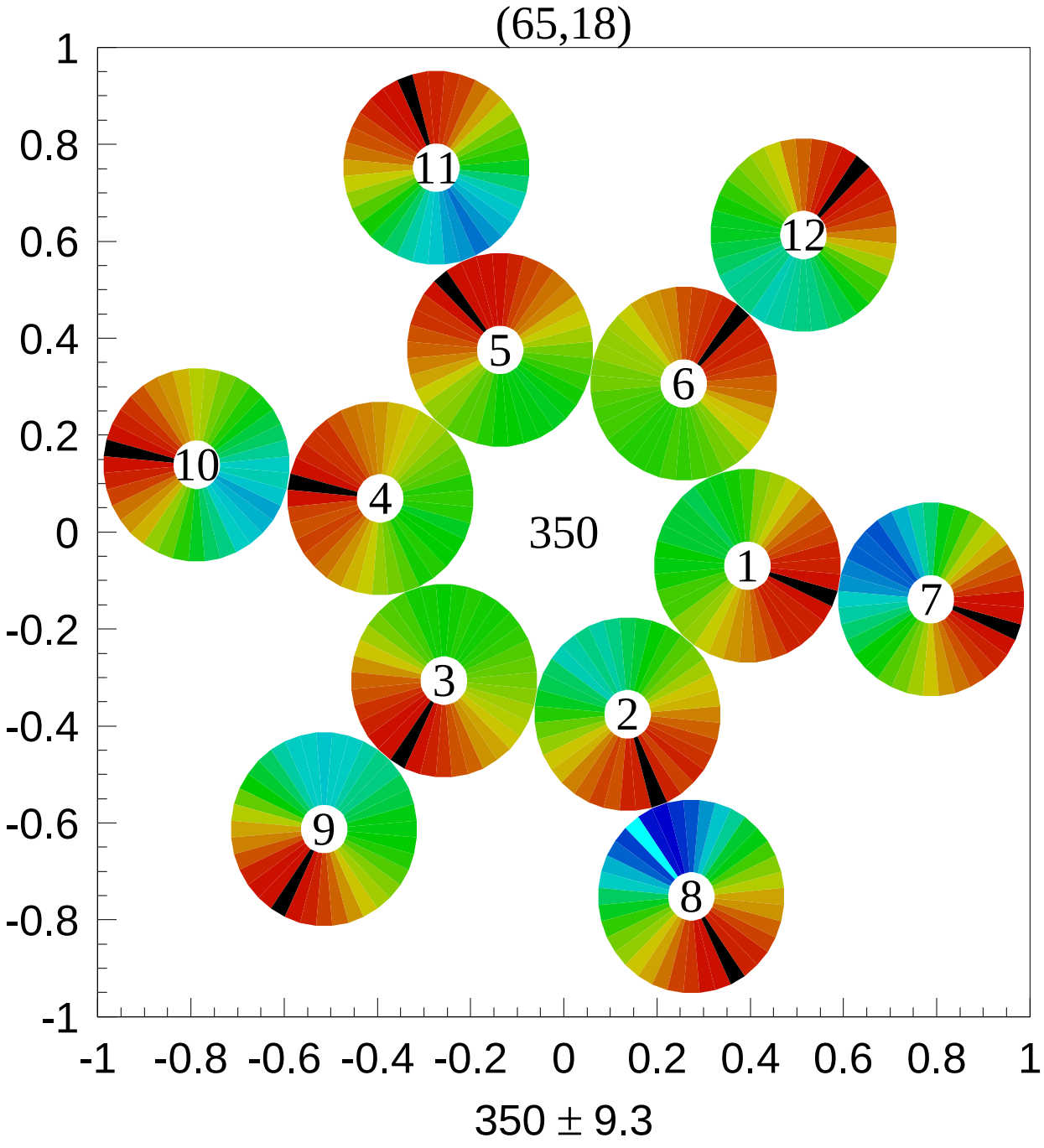

(65,16)
tilted LEDs
120 123 120 127 120 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 119 111 118 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

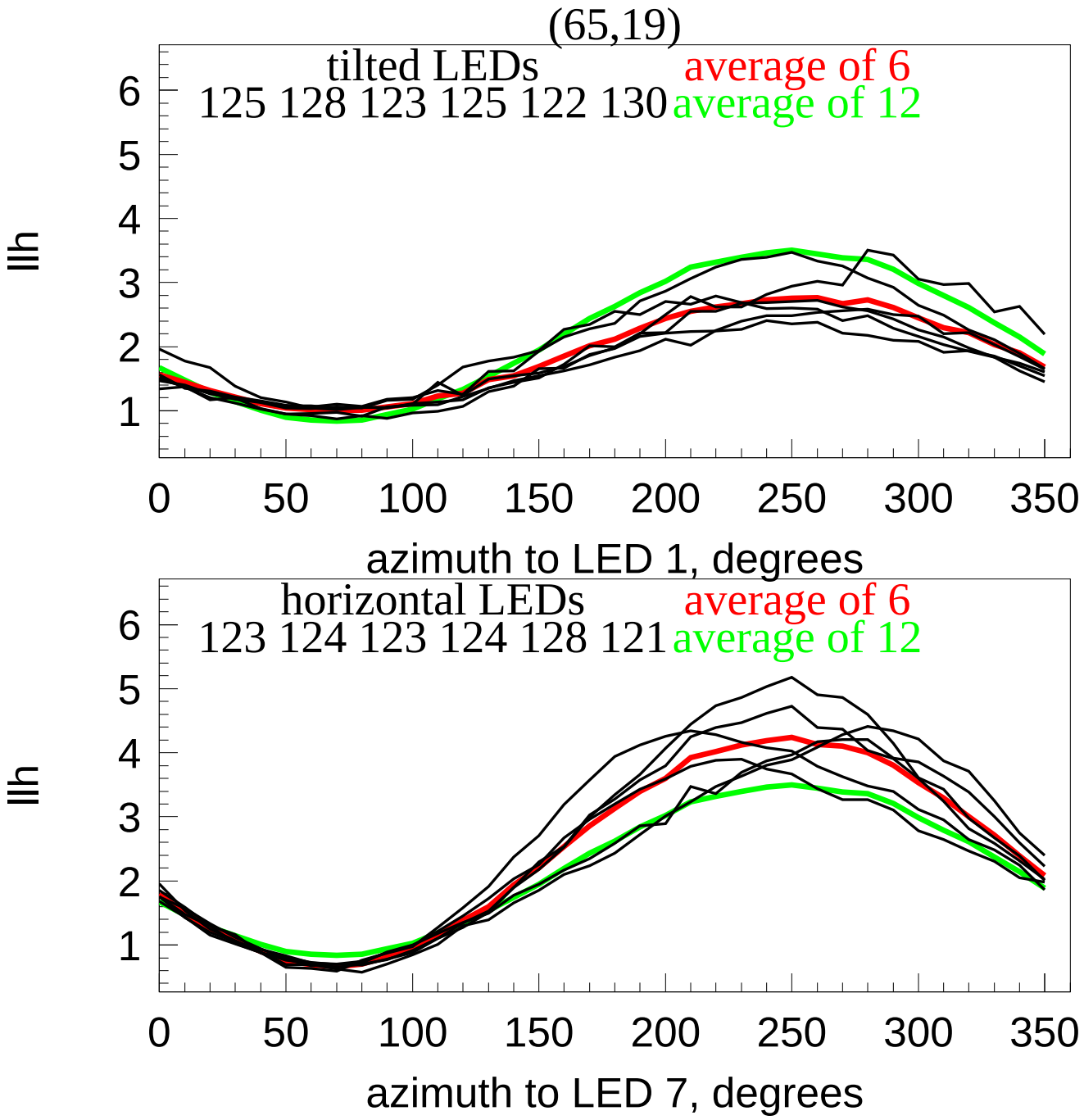

(65,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
3.9 ± 5.1

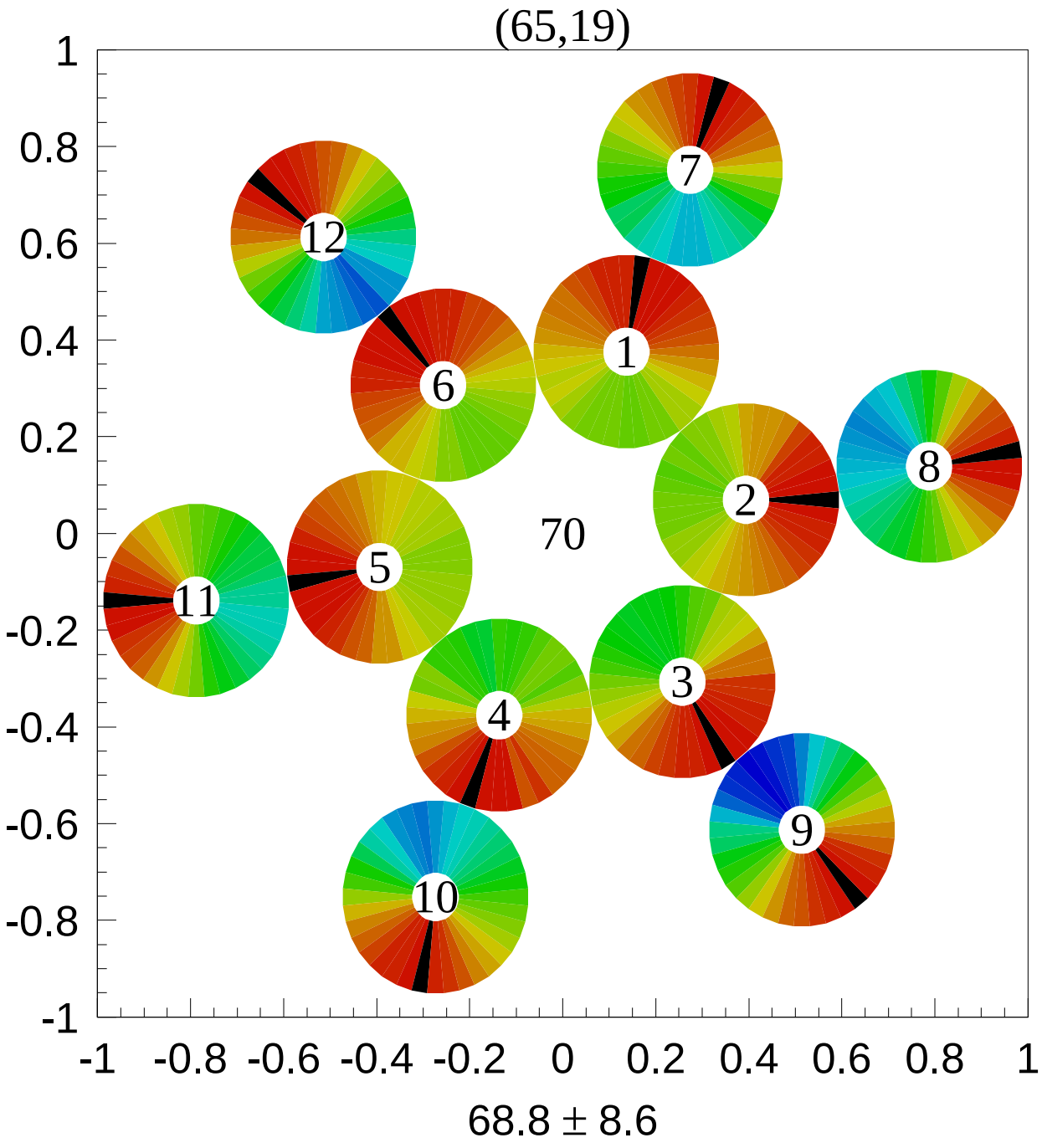

(65,17)
tilted LEDs
121 127 125 128 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 122 123 126 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

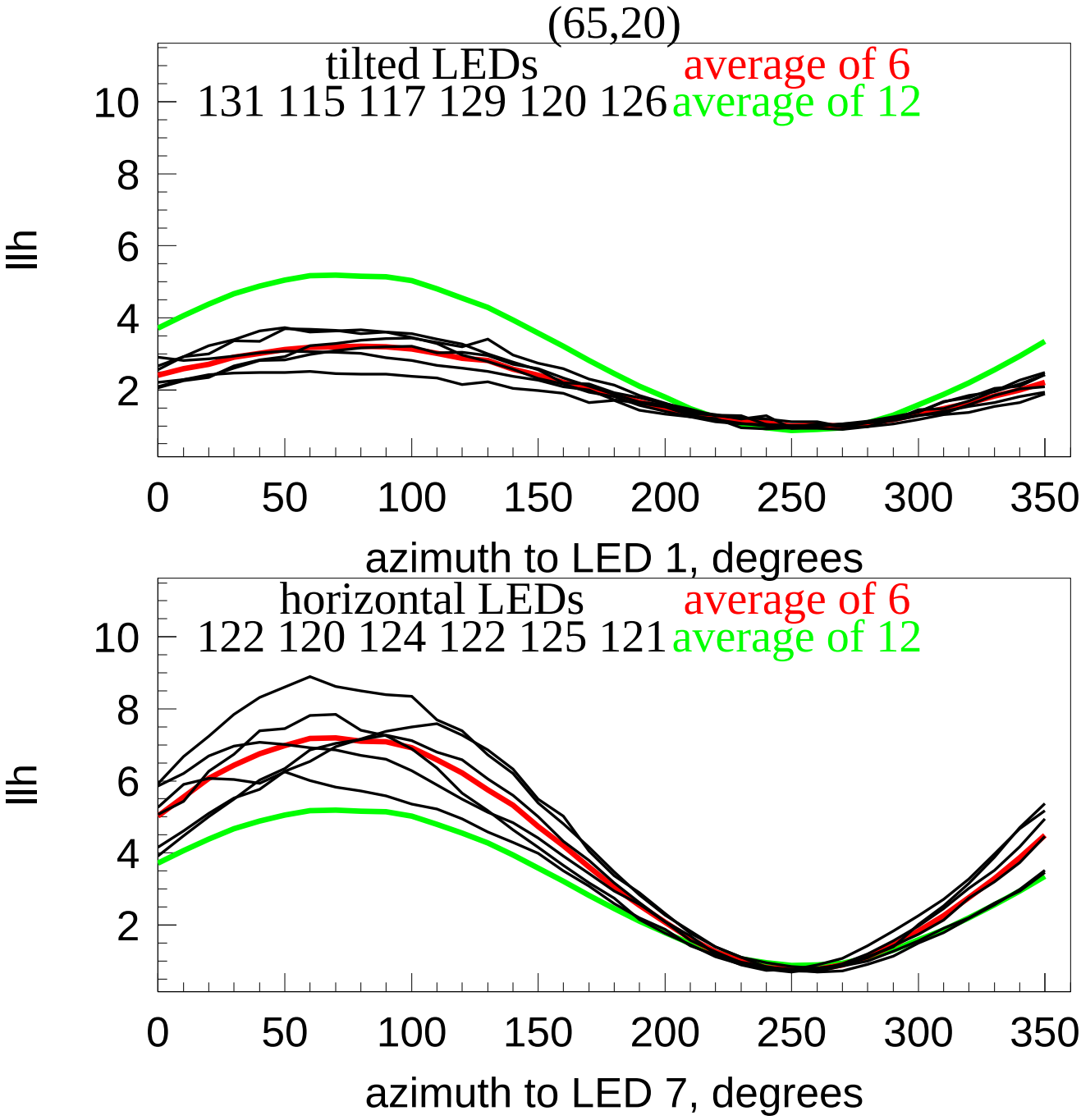

(65,17)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
48.6 ± 6.4

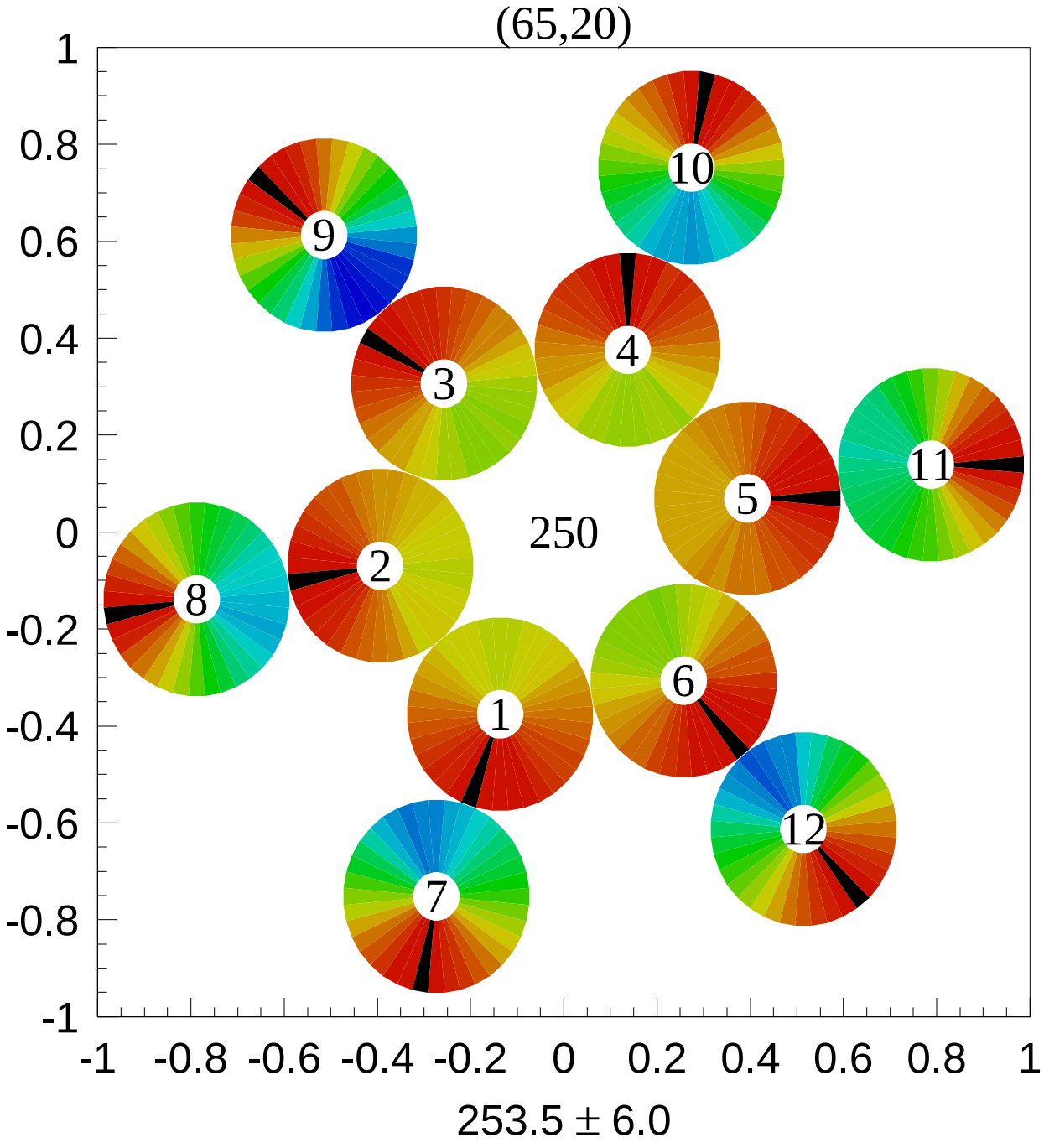

(65,18)
tilted LEDs
117 120 125 119 116 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 115 130 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

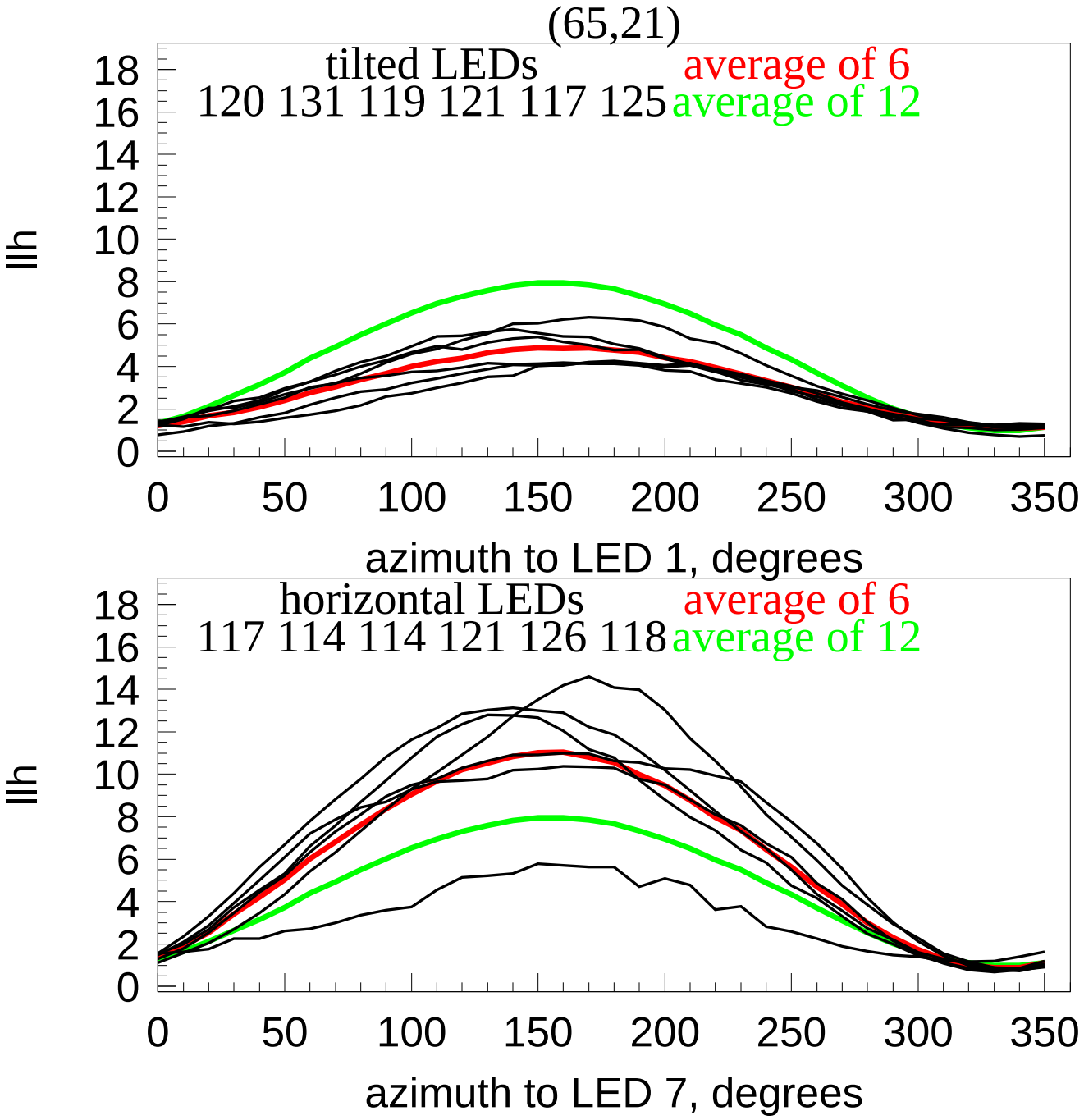

(65,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
350 ± 9.3

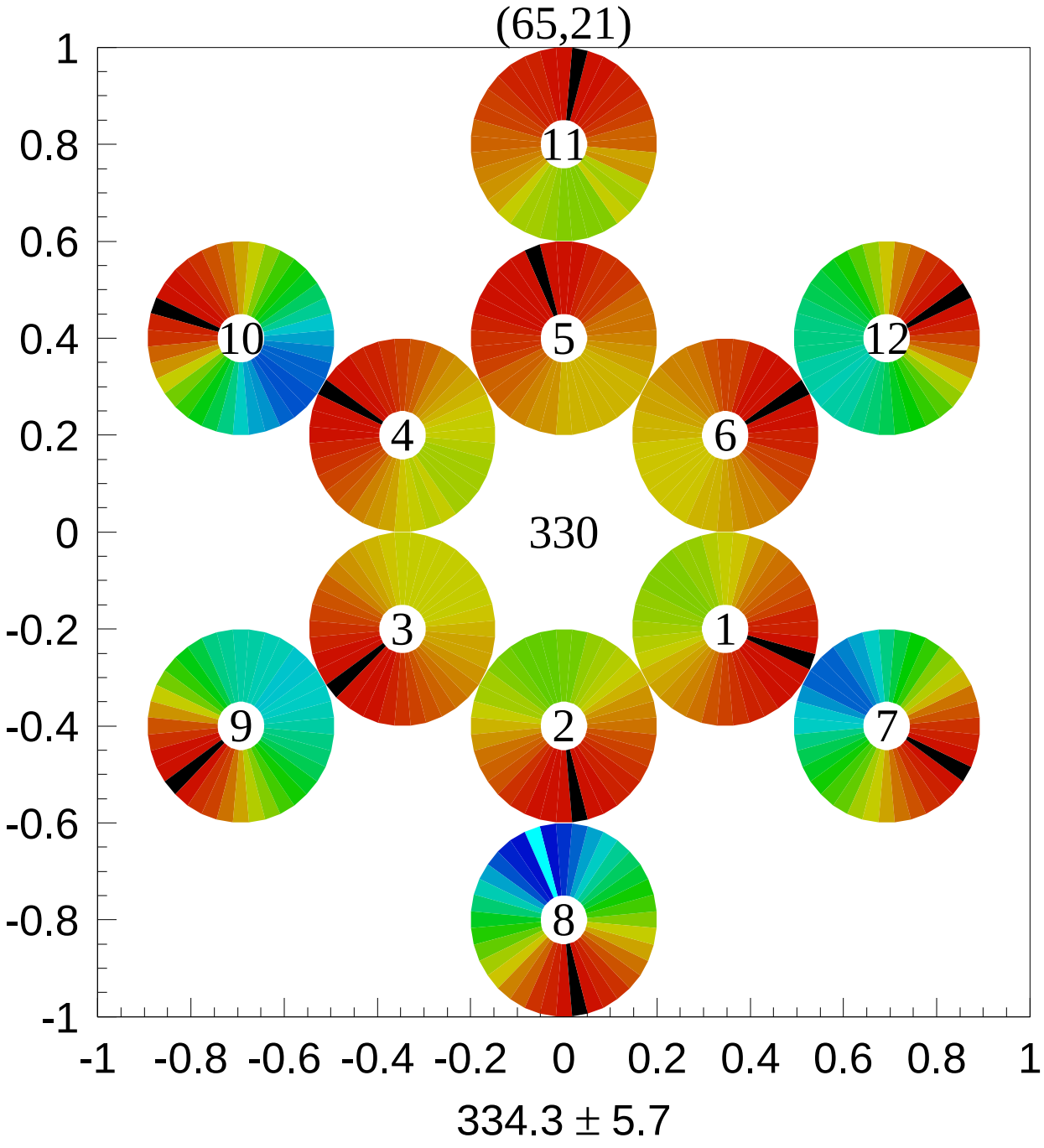

(65,19)
tilted LEDs
125 128 123 125 122 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 124 123 124 128 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

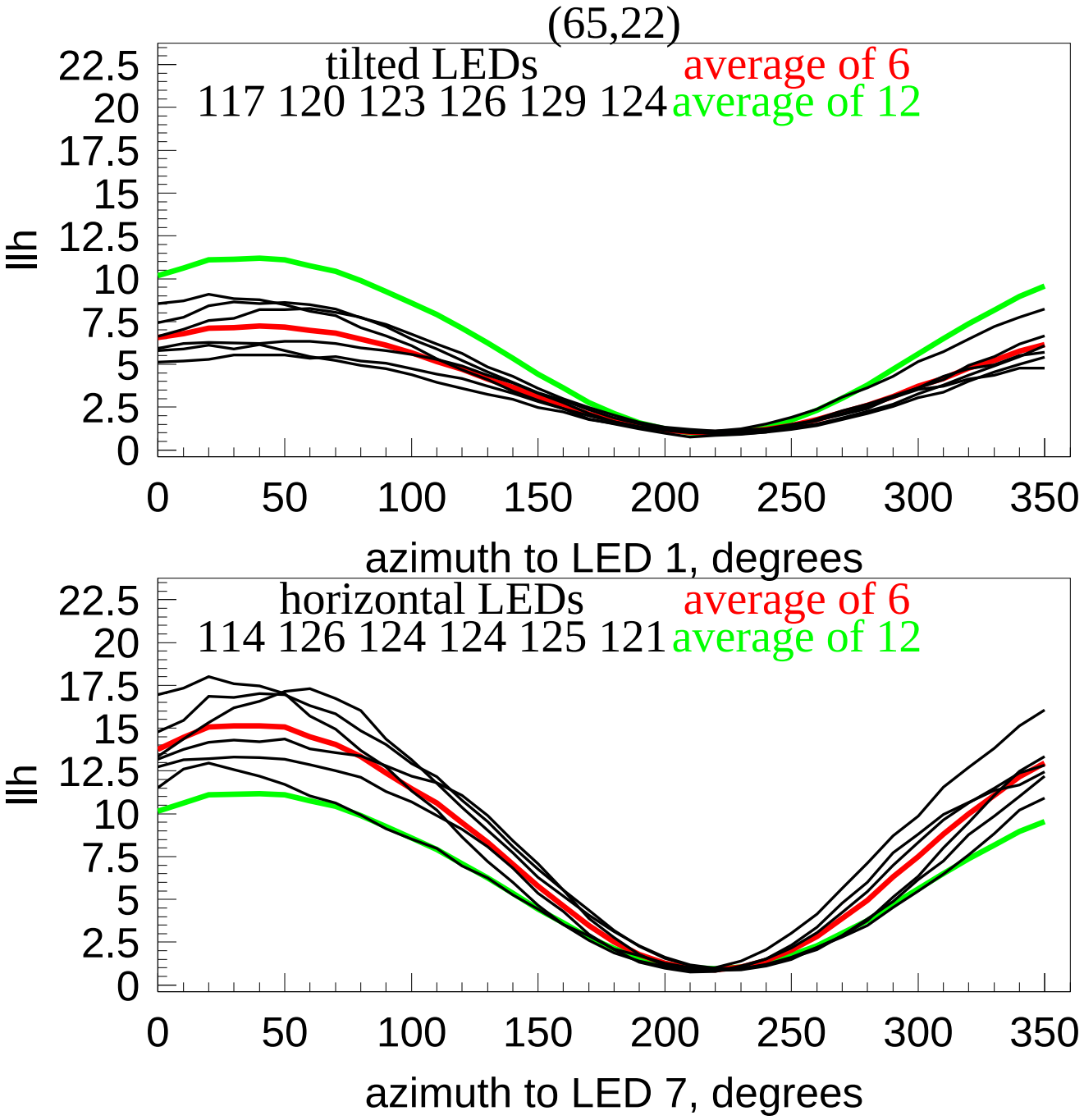

(65,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
68.8 ± 8.6
70
1
2
3
4
5
6
7
8
9
10
11
12

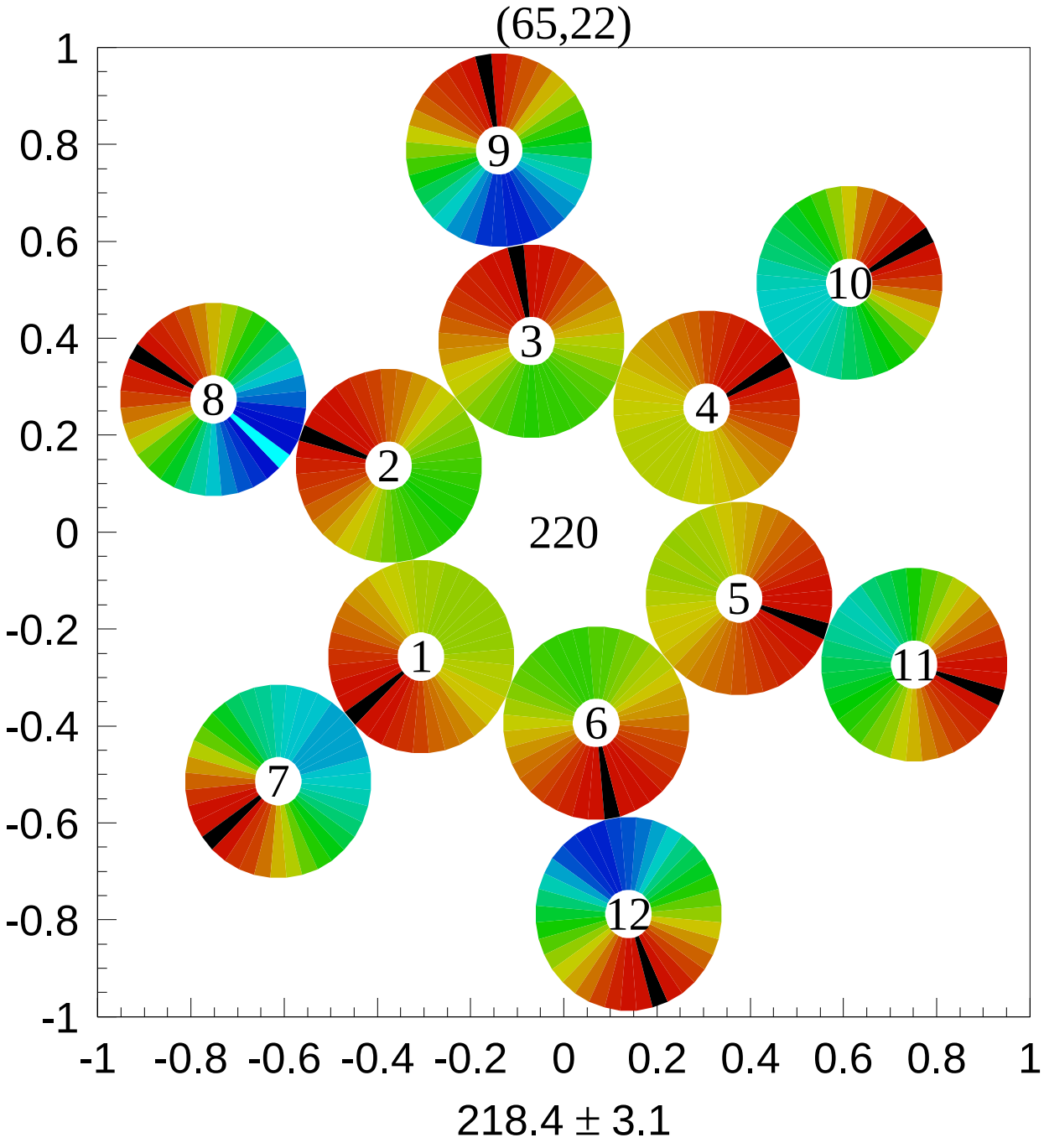

(65,20)
tilted LEDs
131 115 117 129 120 126
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 120 124 122 125 121
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

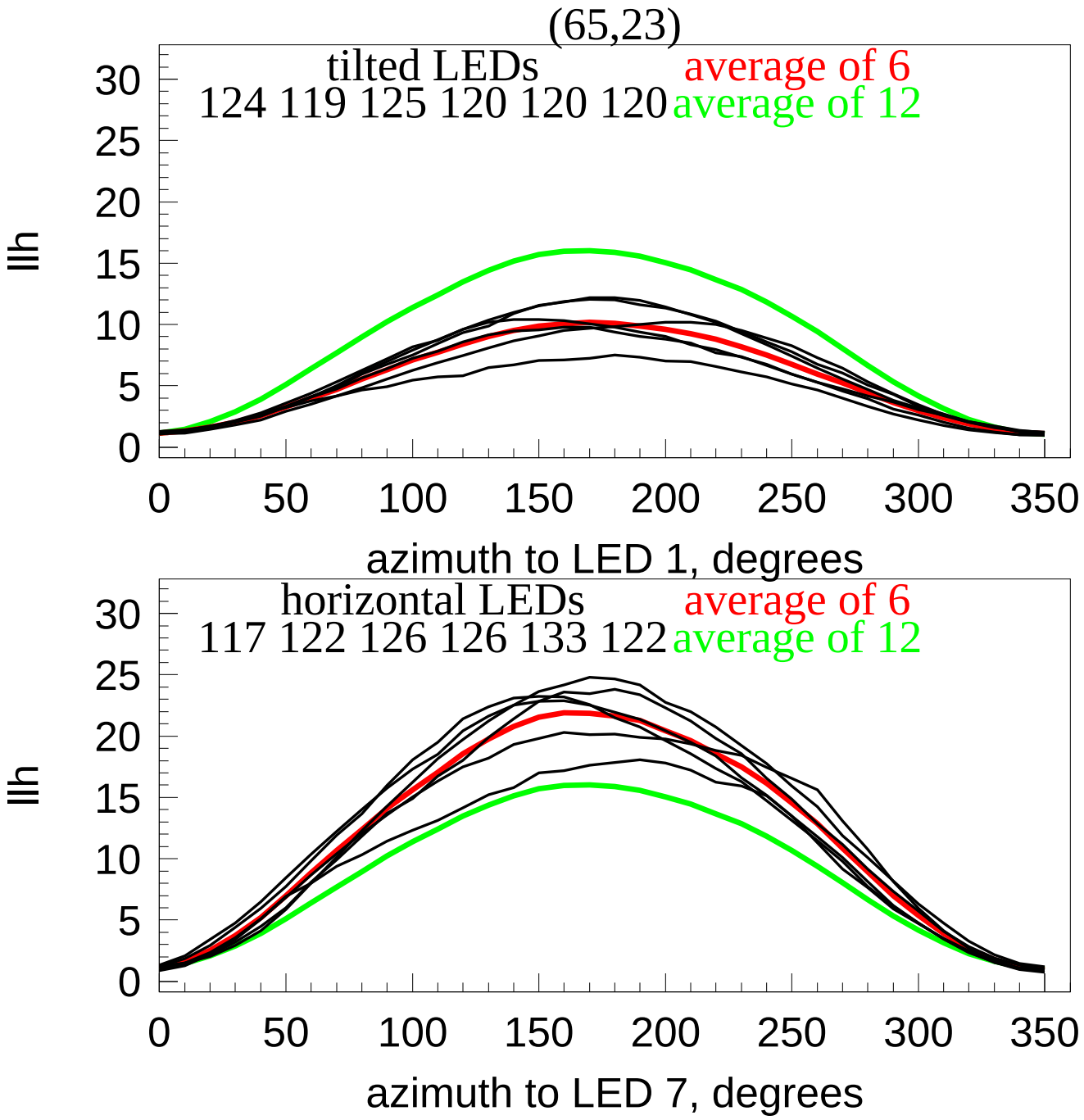

(65,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
8
250
1
6
12
7
253.5 ± 6.0

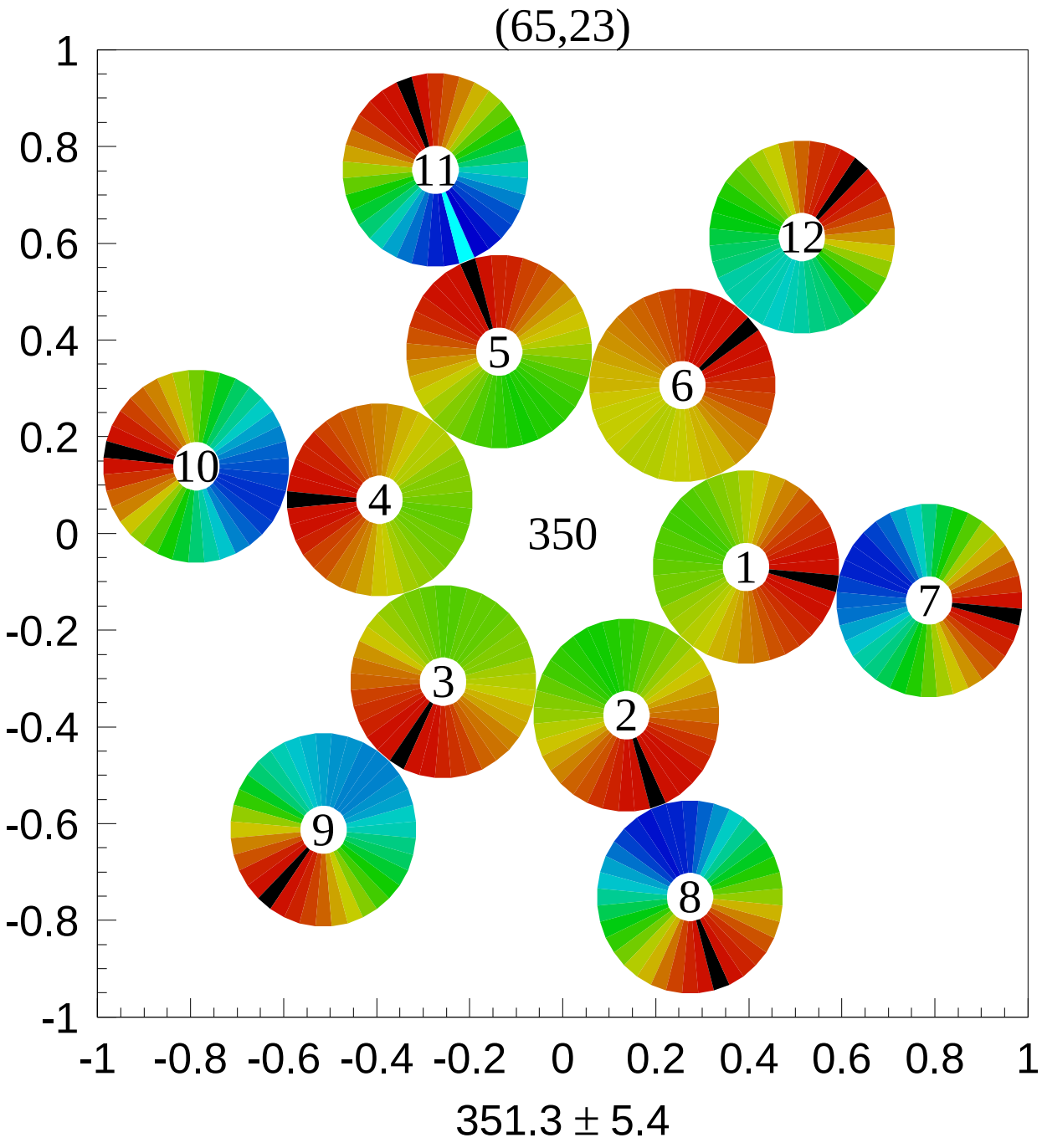

(65,21)
tilted LEDs
120 131 119 121 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 114 114 121 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

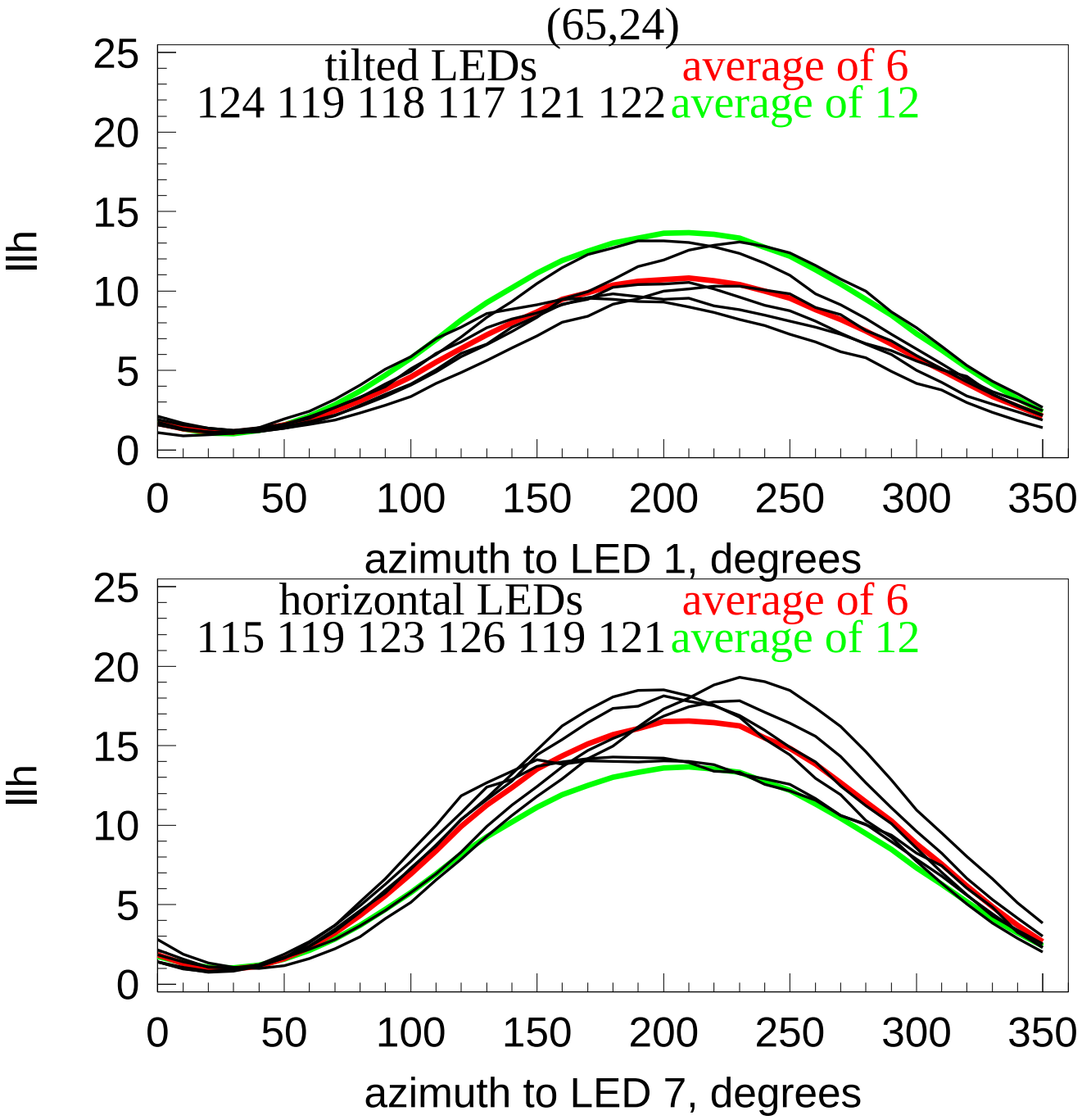

(65,21)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
334.3 ± 5.7

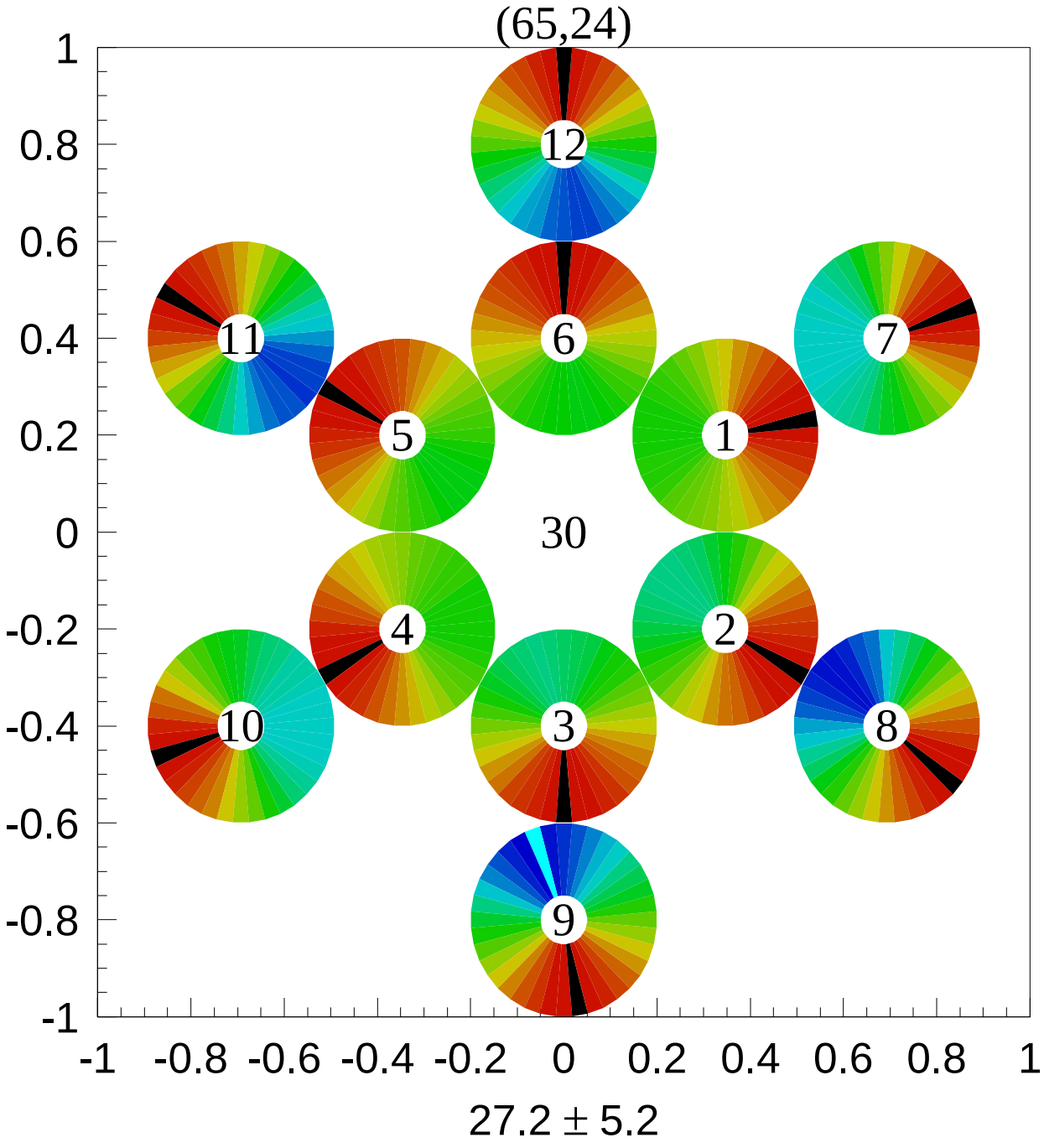

(65,22)
tilted LEDs
117 120 123 126 129 124
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
114 126 124 124 125 121
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

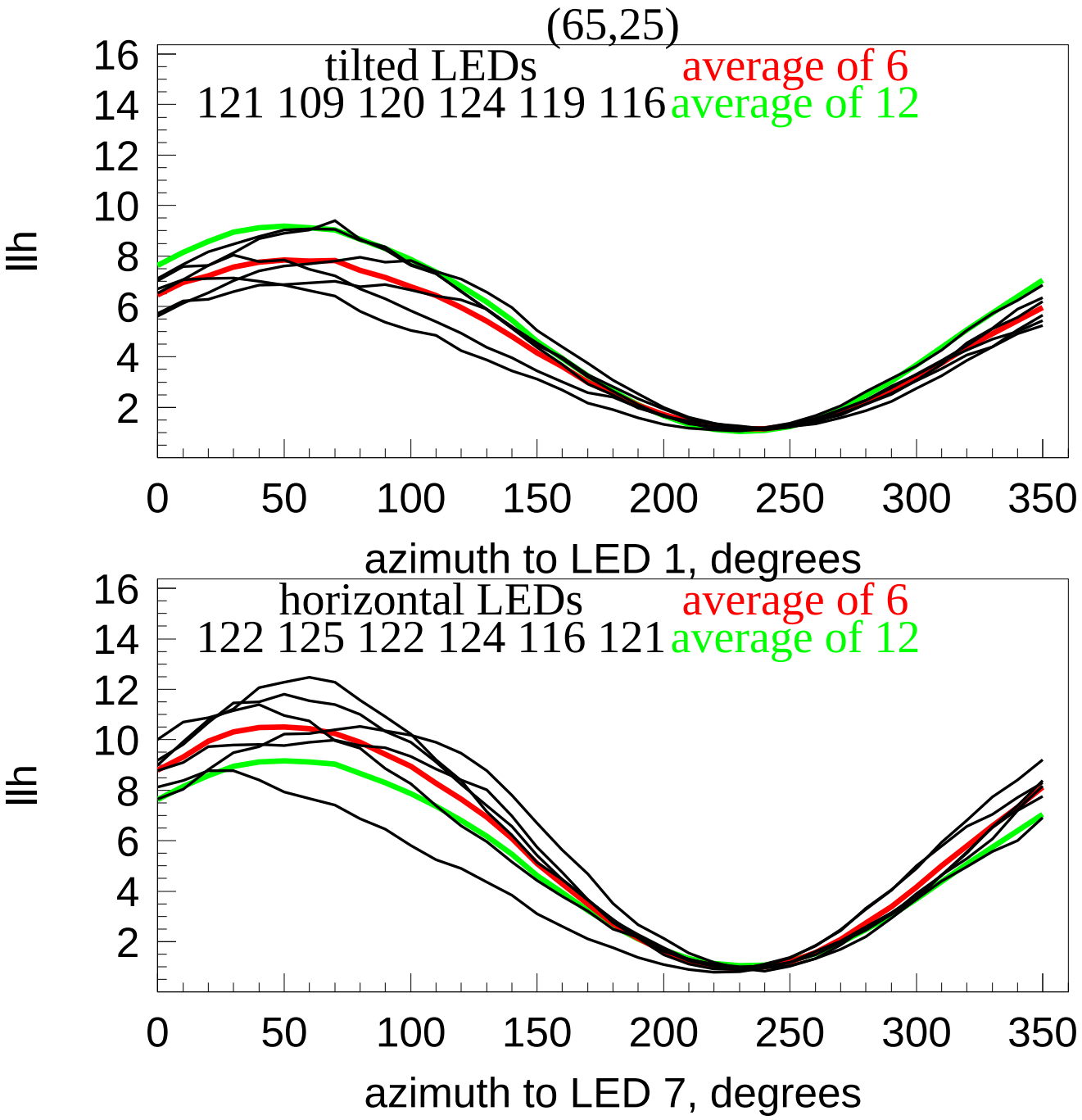

(65,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
218.4 ± 3.1

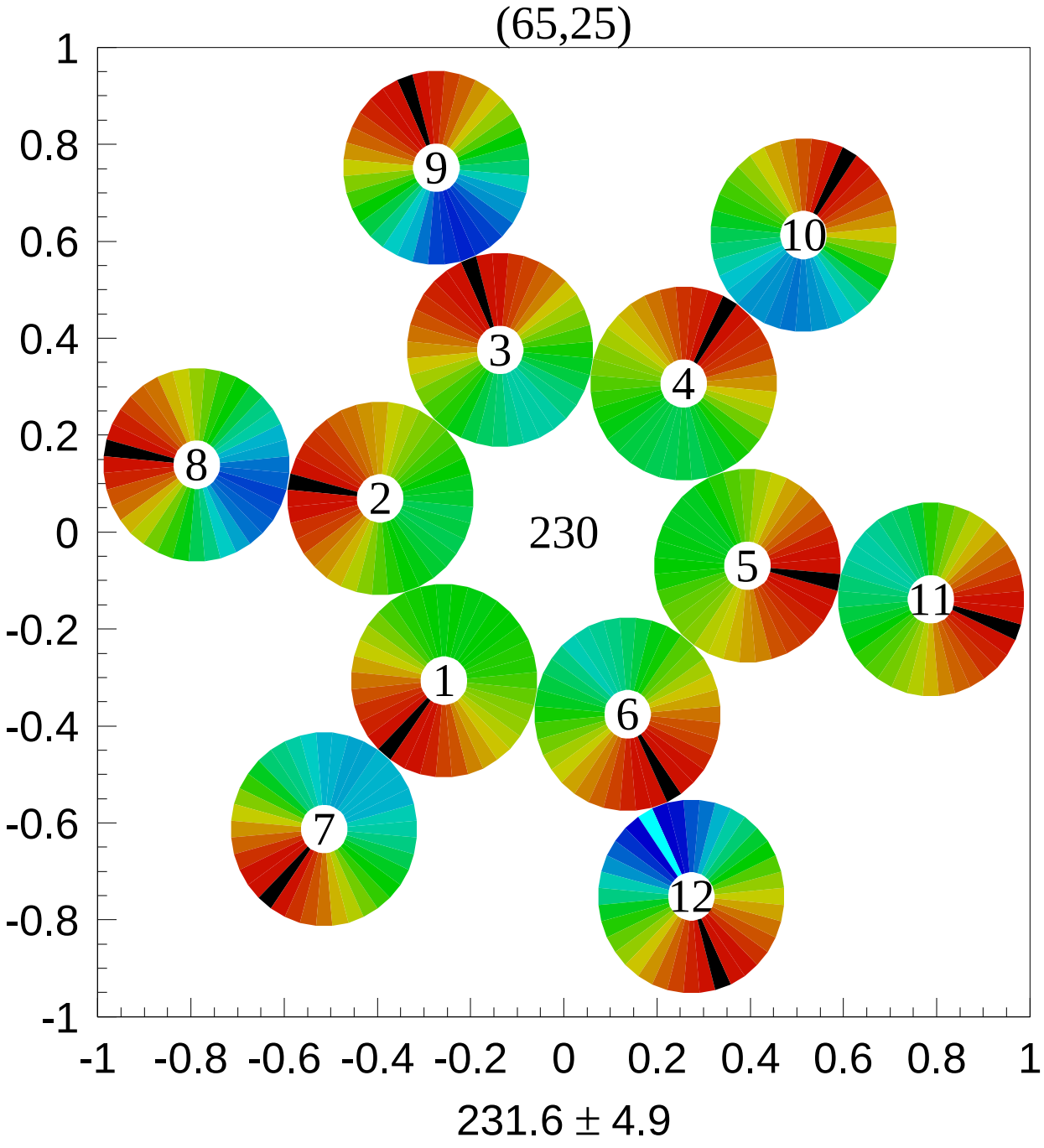

(65,23)
tilted LEDs
124 119 125 120 120 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 122 126 126 133 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

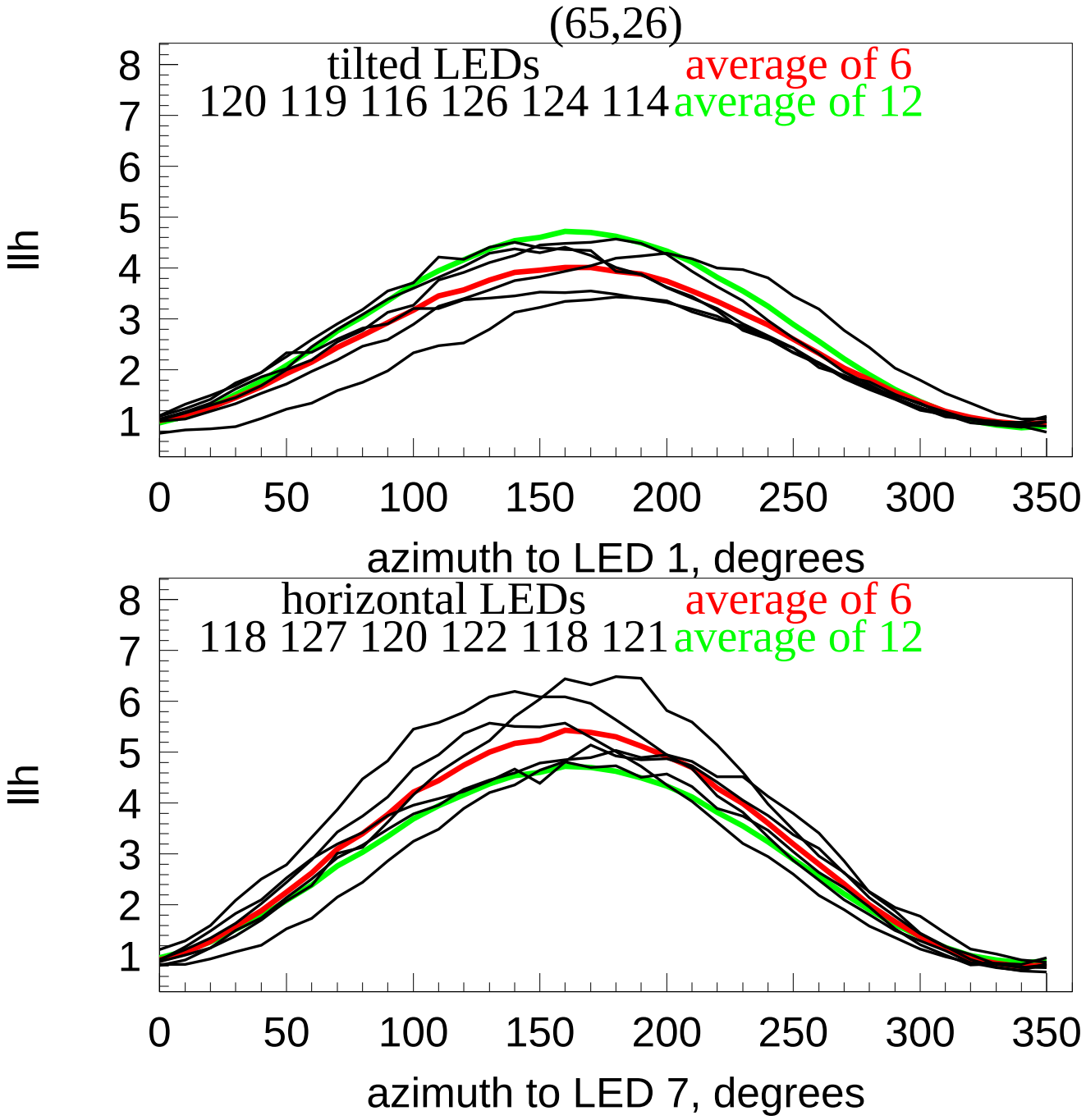

(65,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
351.3 ± 5.4

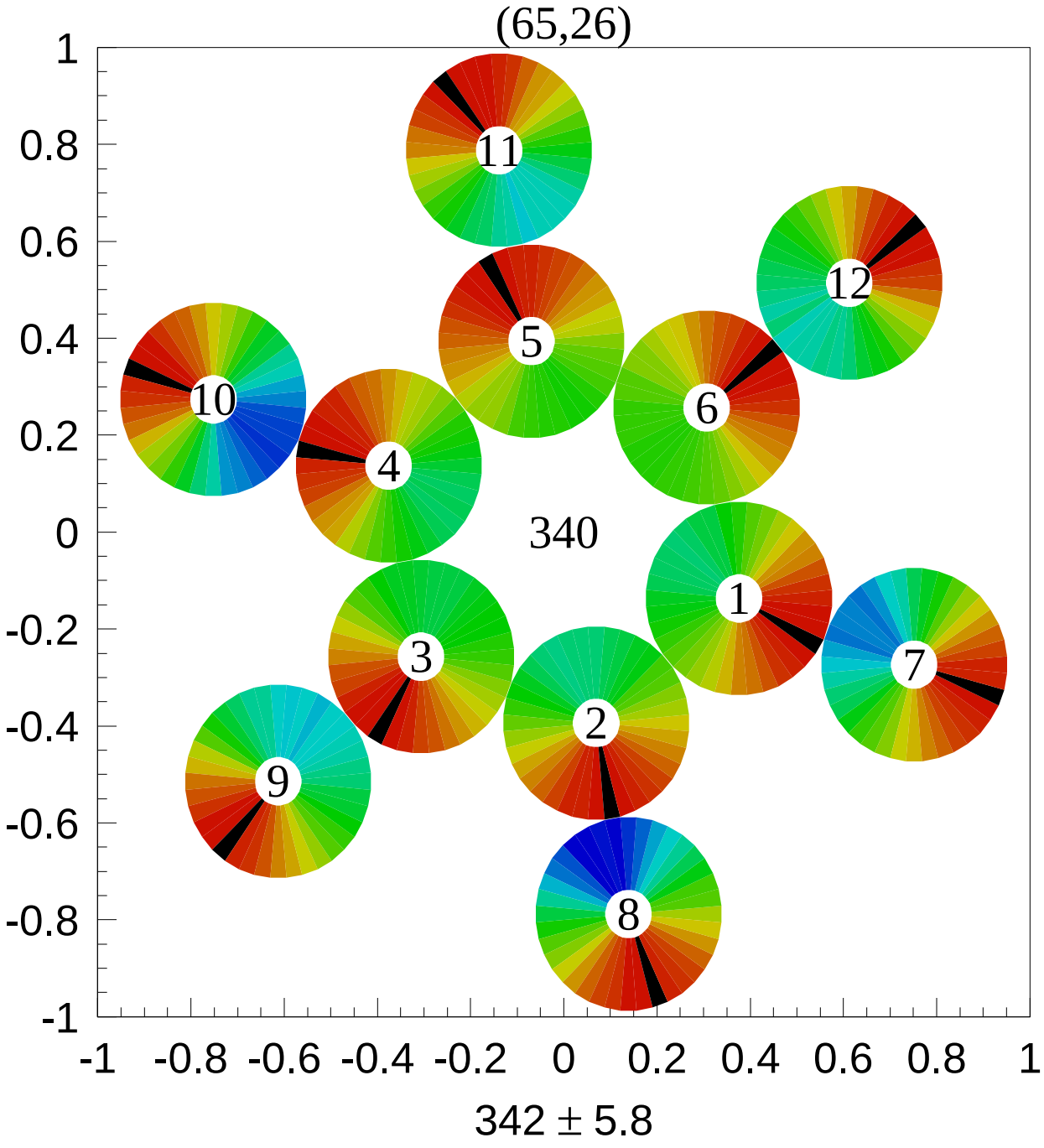

(65,24)
tilted LEDs
124 119 118 117 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 119 123 126 119 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

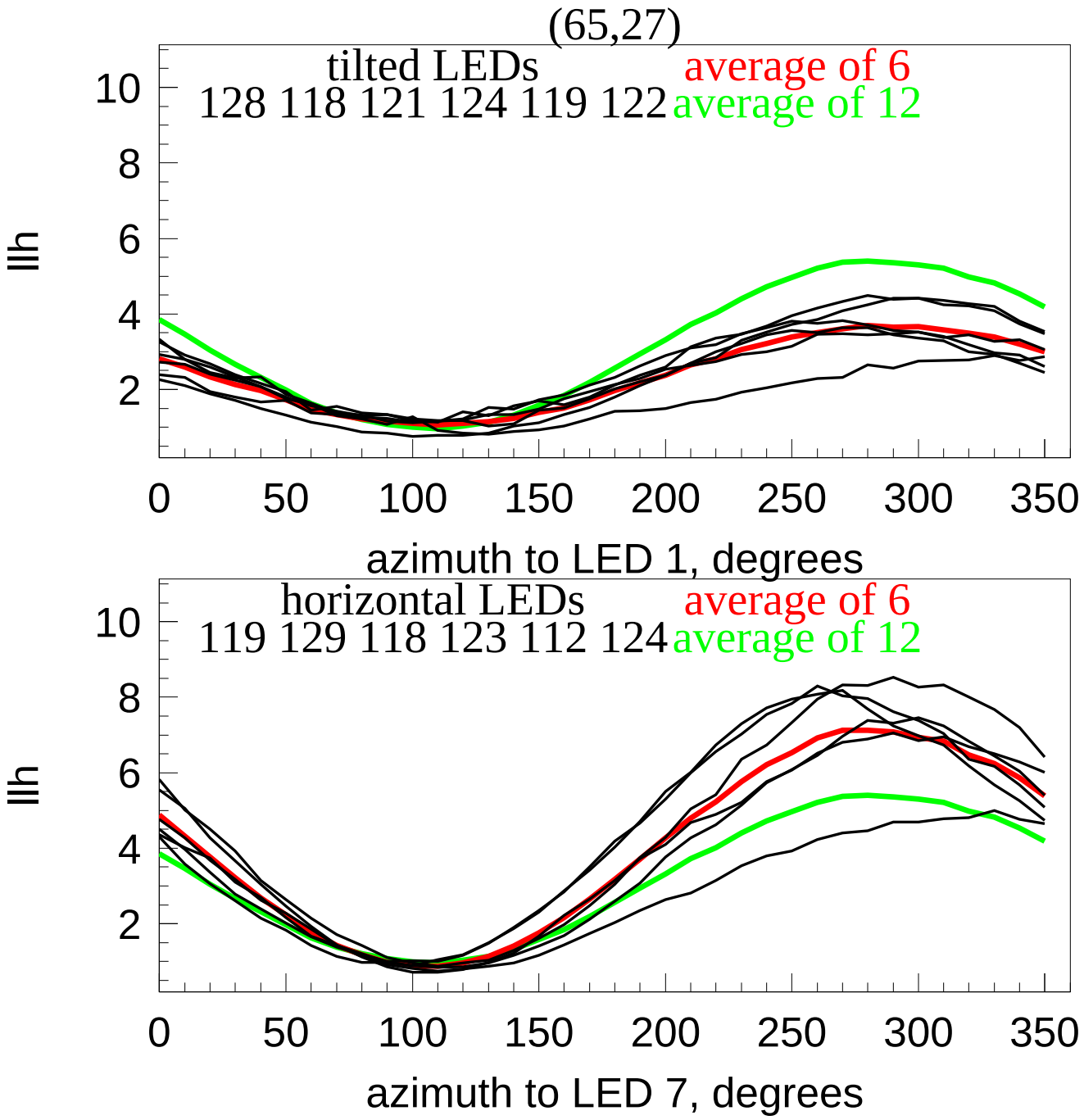

(65,24)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
27.2 ± 5.2

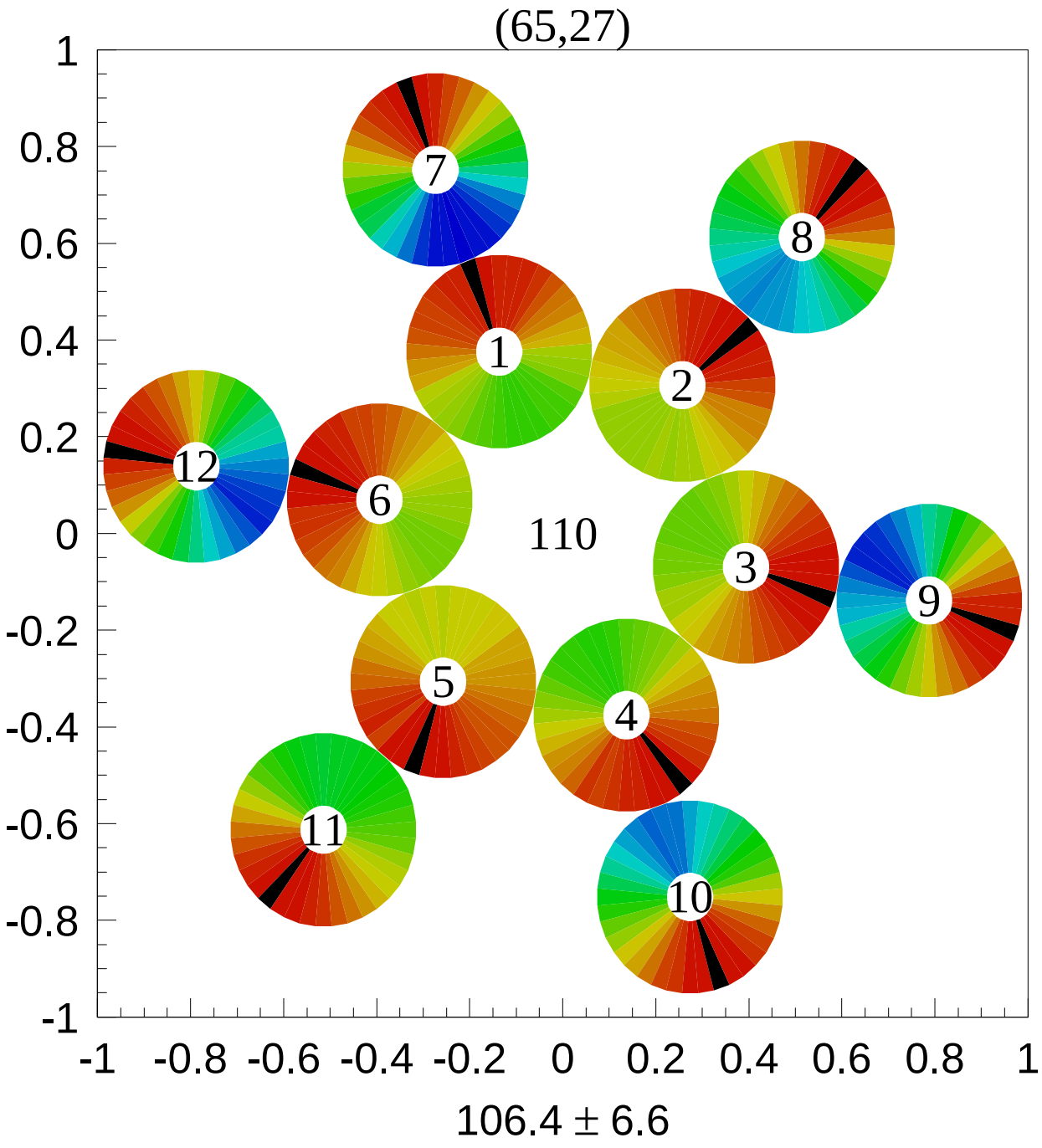

(65,25)
tilted LEDs
121 109 120 124 119 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 122 124 116 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

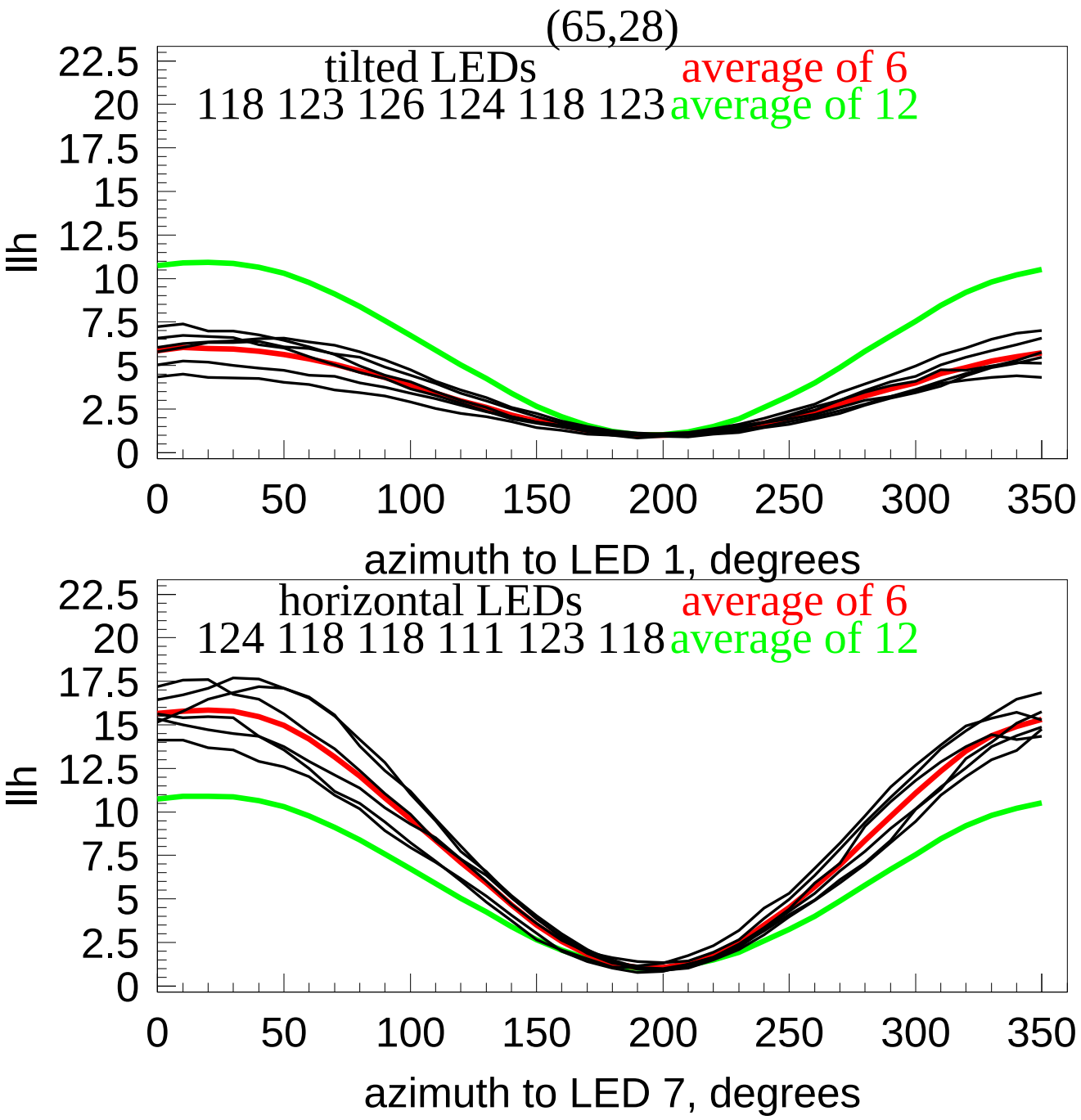

(65,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.6 ± 4.9

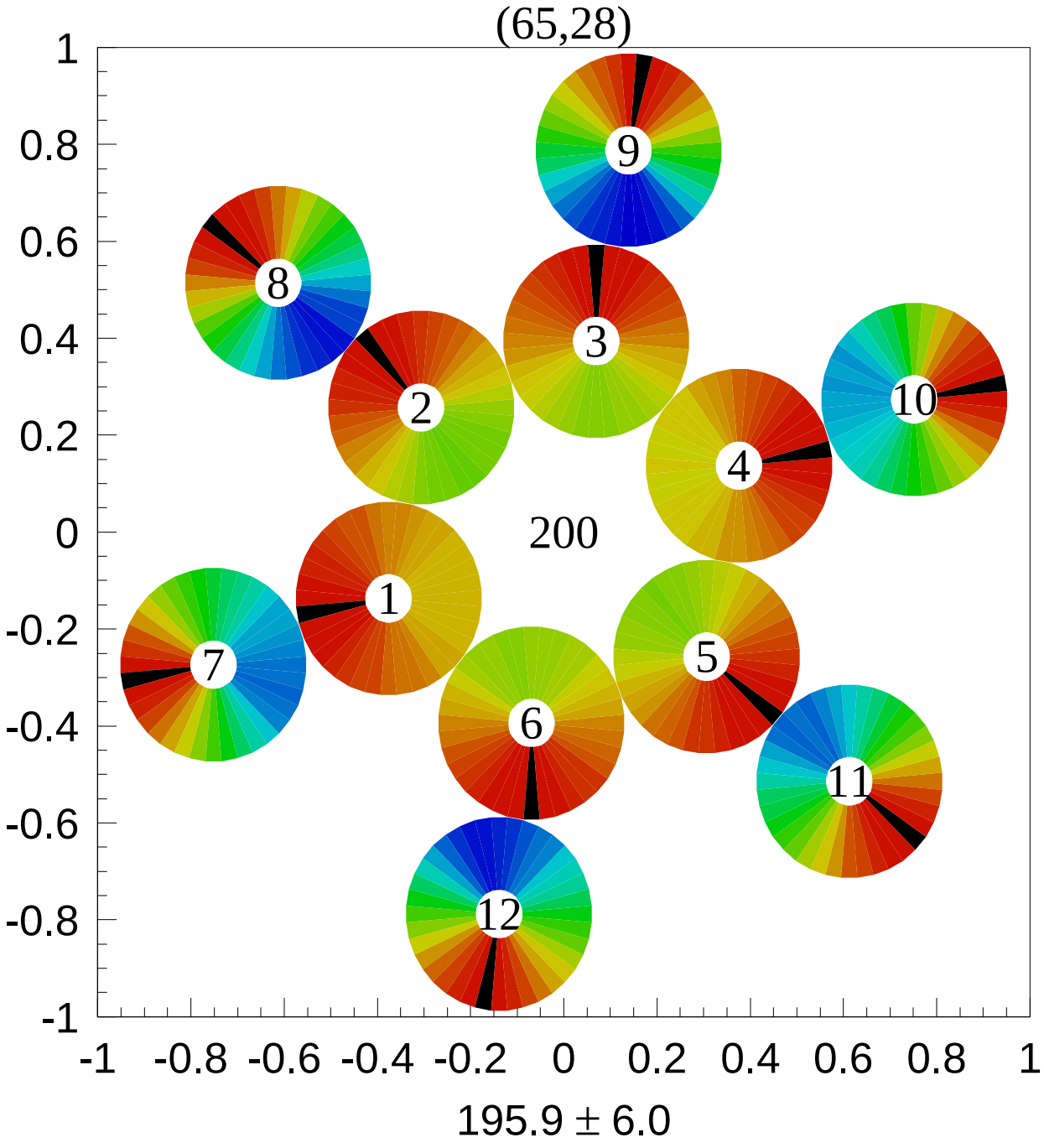

(65,26)
tilted LEDs
120 119 116 126 124 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 127 120 122 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

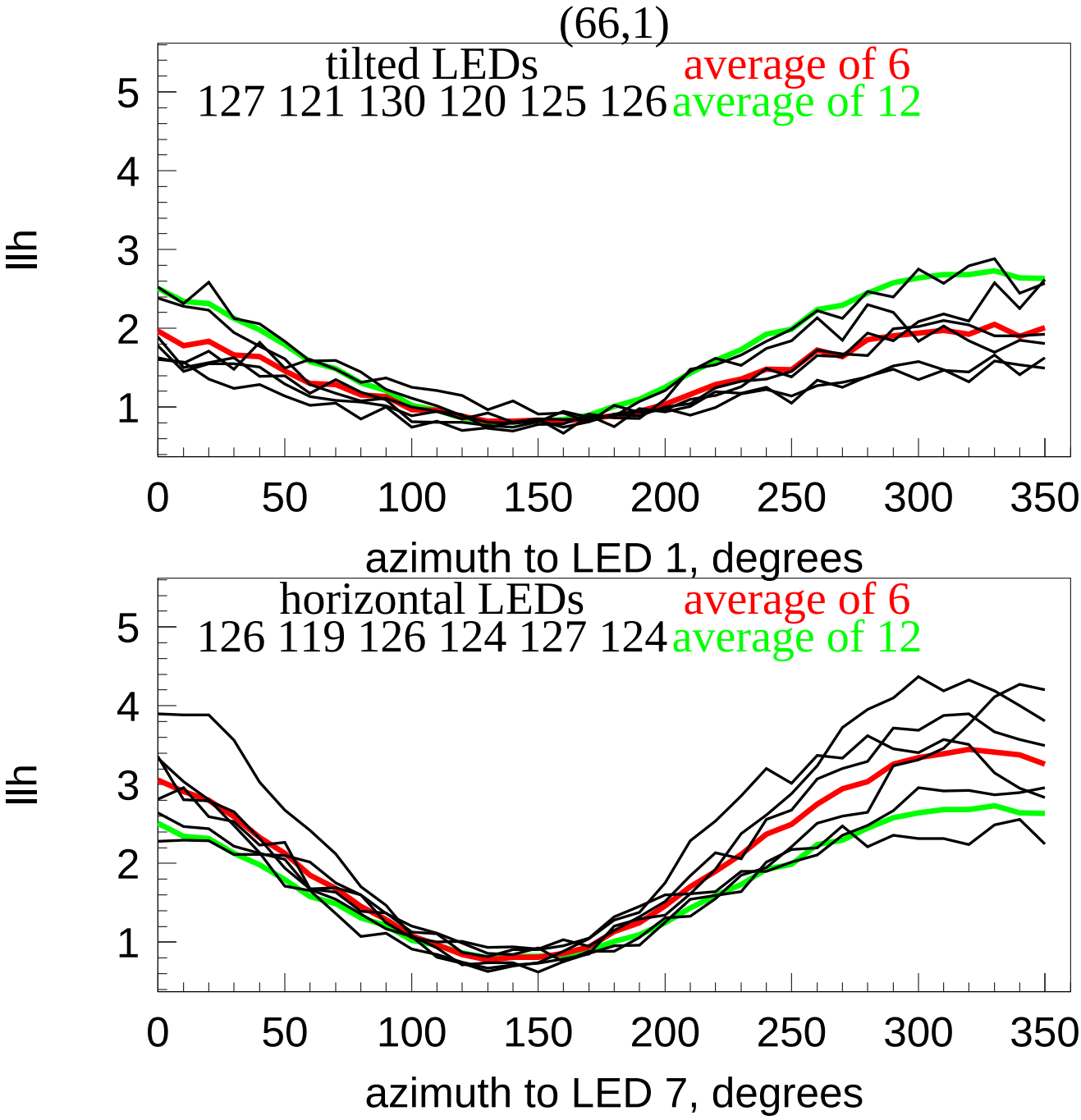

(65,26)
11
12
5
10
6
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
342 ± 5.8

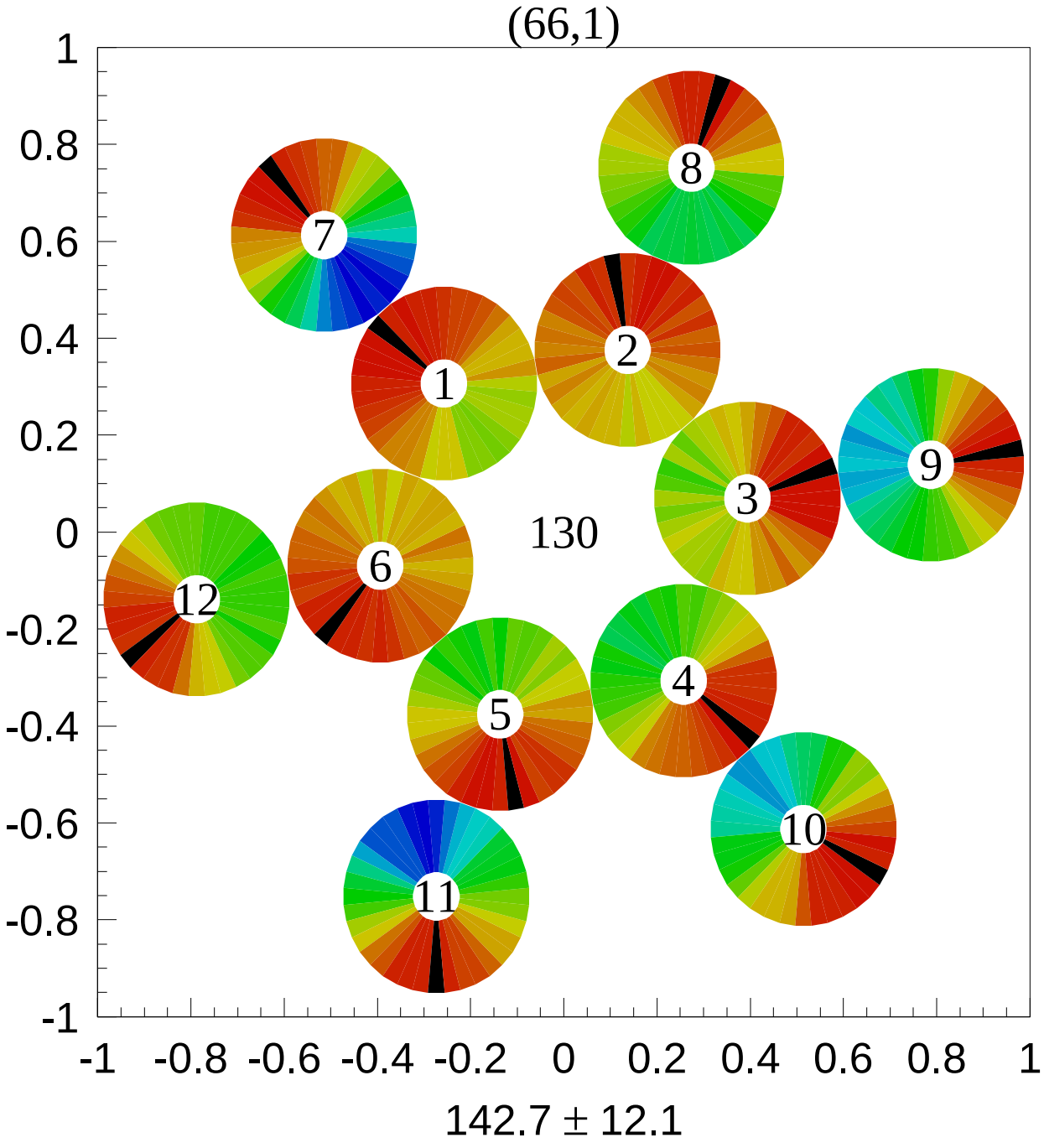

(65,27)
tilted LEDs
128 118 121 124 119 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 129 118 123 112 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

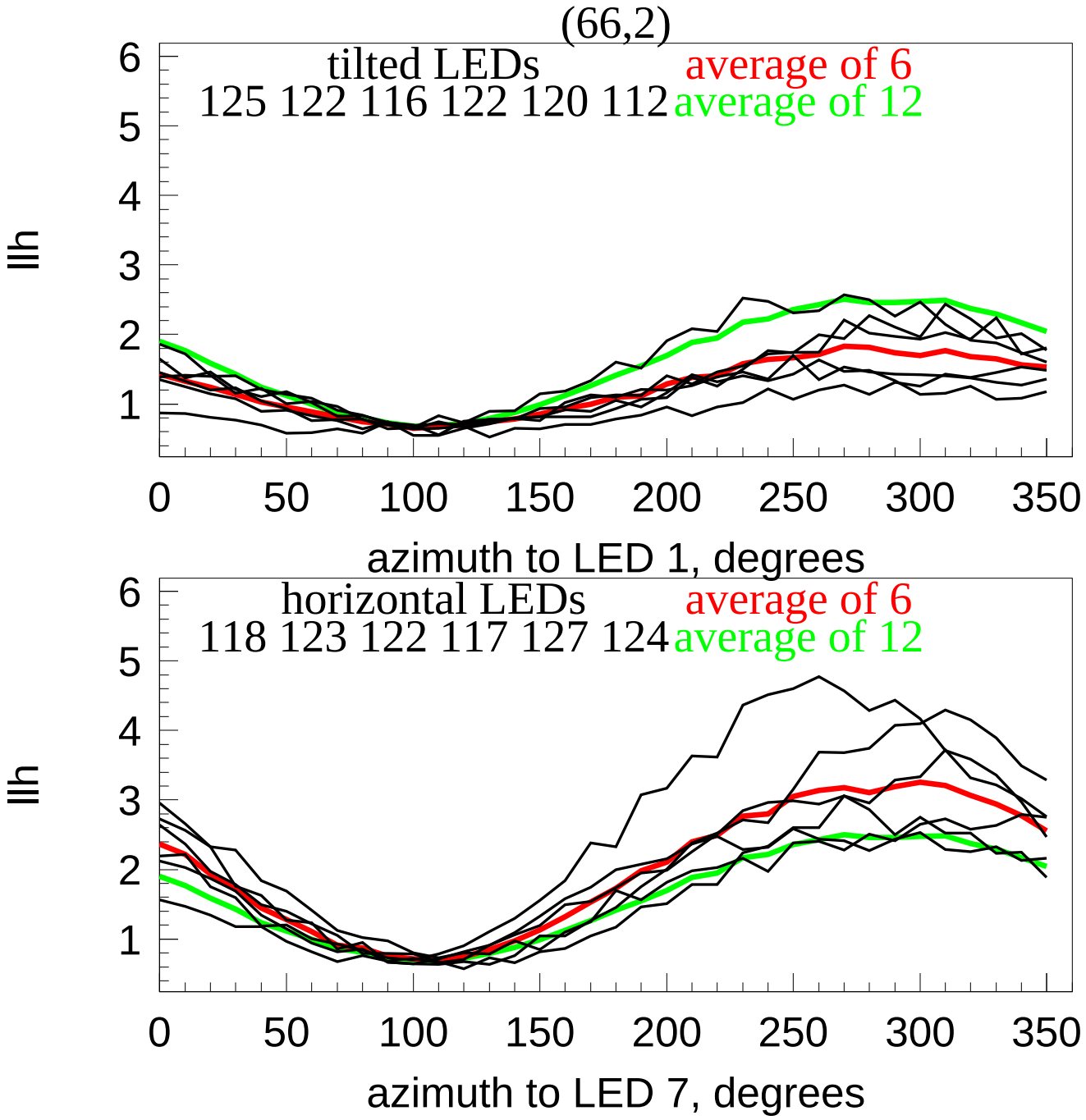

(65,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
106.4 ± 6.6

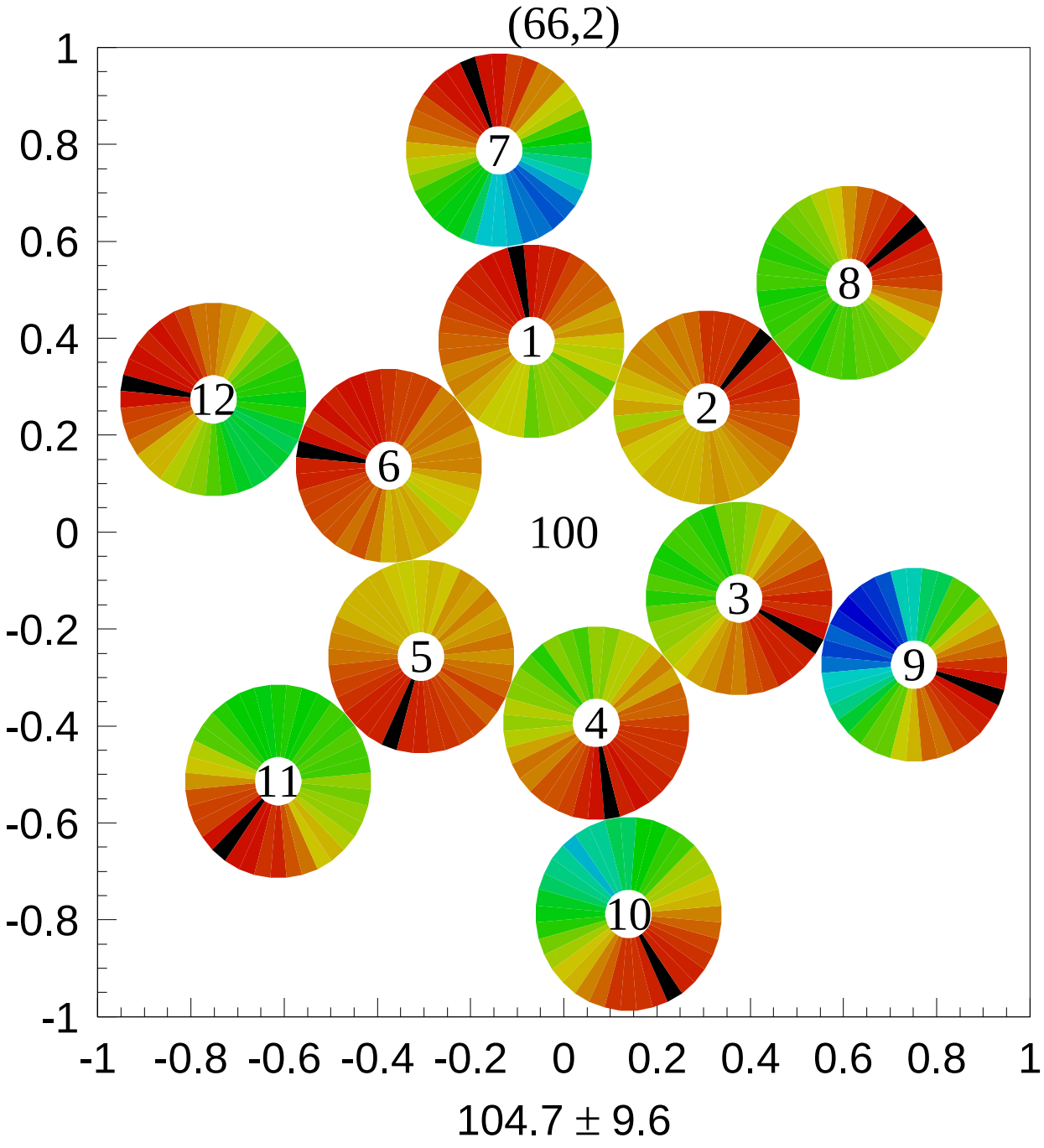

(65,28)
tilted LEDs
118 123 126 124 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 118 118 111 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

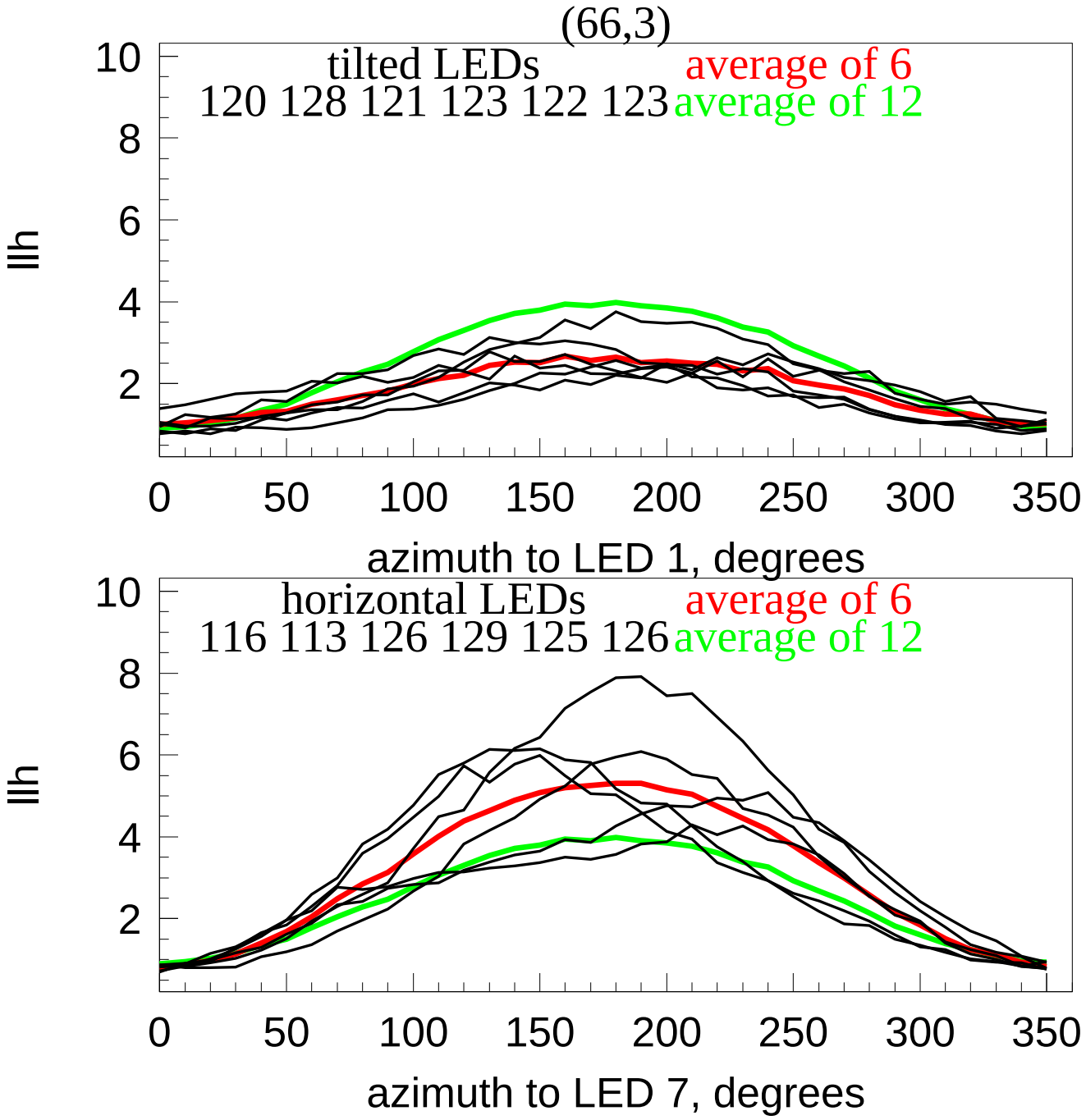

(65,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
195.9 ± 6.0

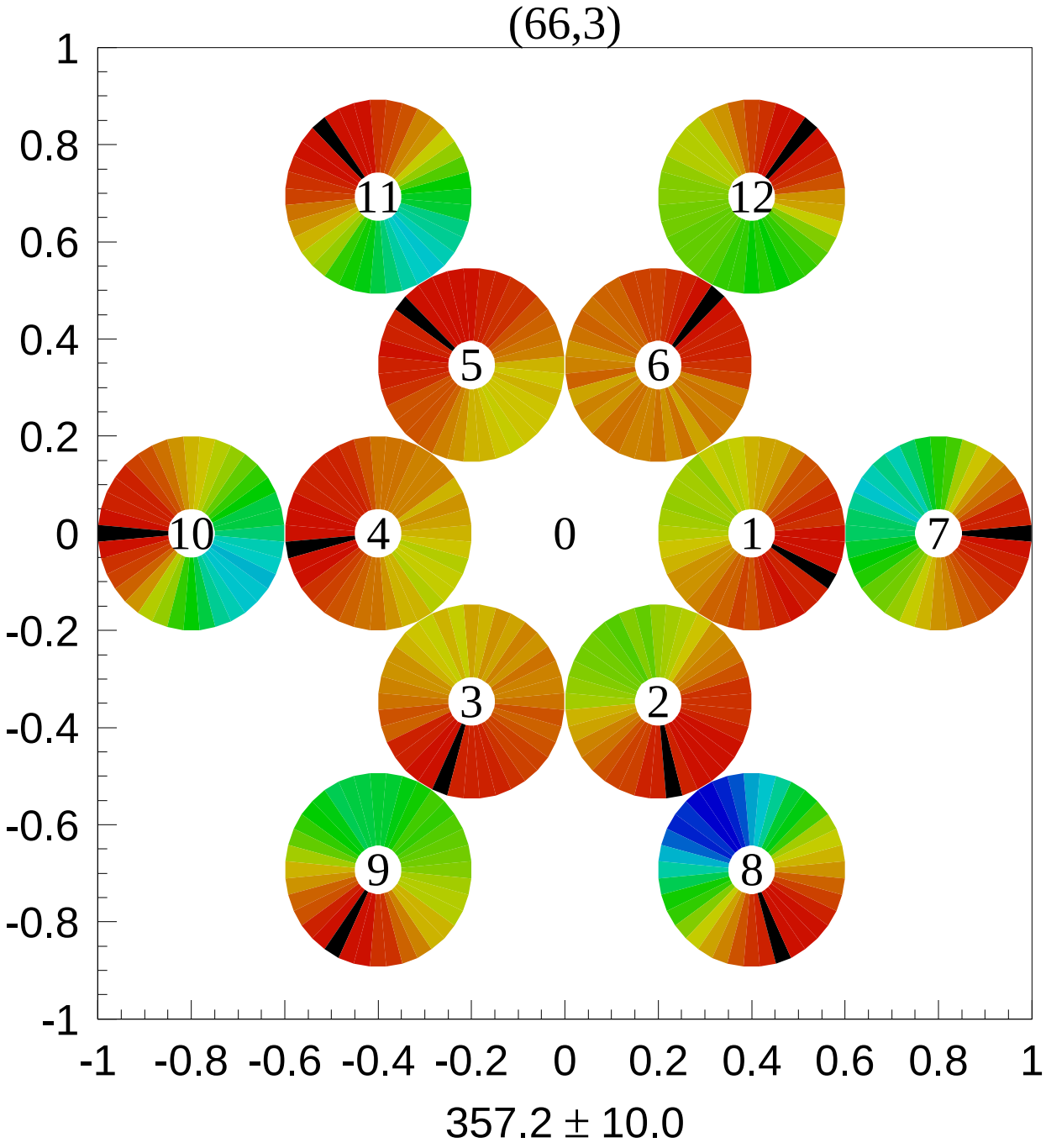

(66,1)
tilted LEDs
127 121 130 120 125 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 126 124 127 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

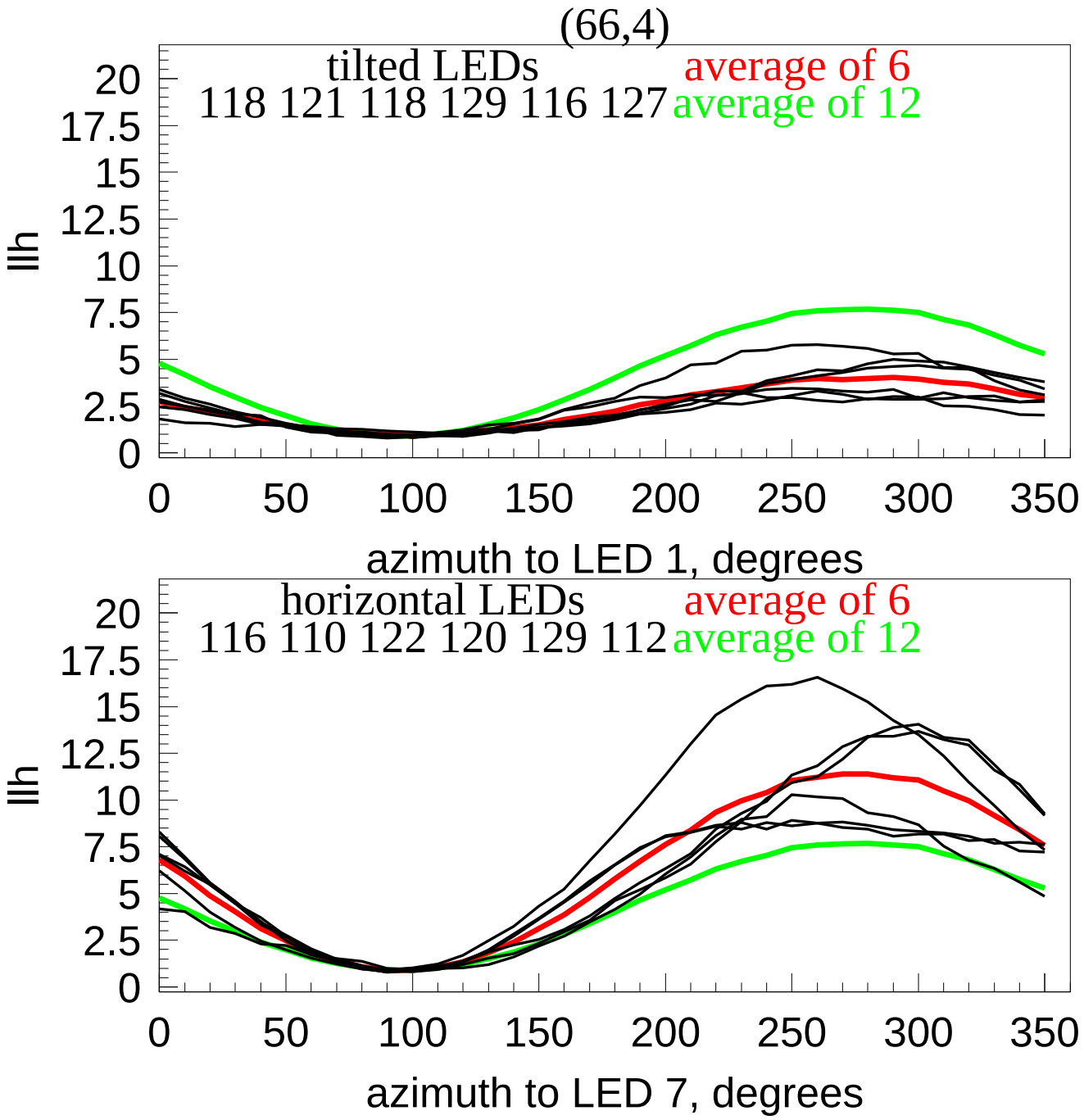

(66,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
142.7 ± 12.1
130
1
2
3
4
5
6
7
8
9
10
11
12

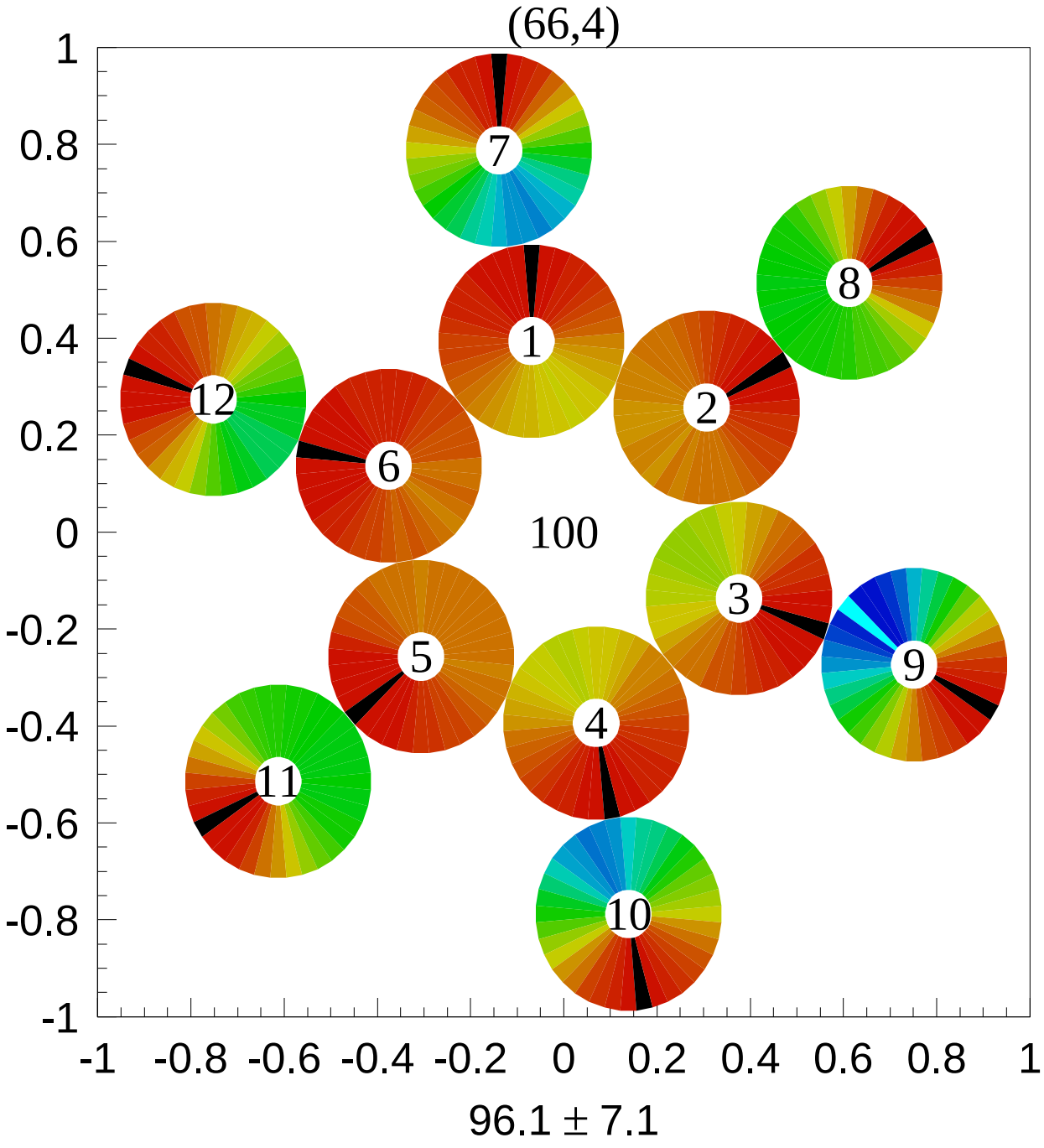

(66,2)
tilted LEDs
125 122 116 122 120 112
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 123 122 117 127 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

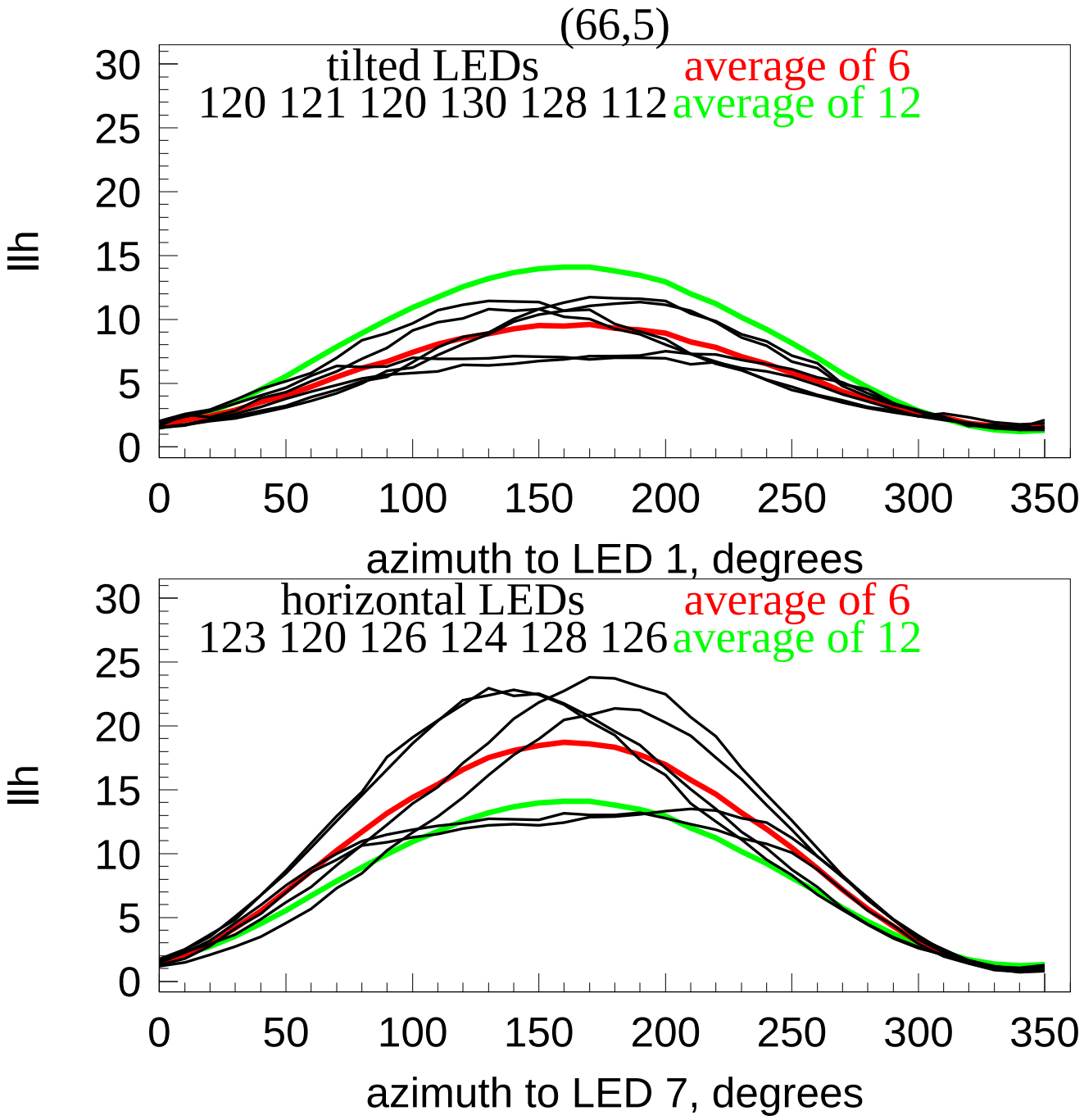

(66,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
104.7 ± 9.6
7
1
8
12
2
6
100
3
5
9
4
11
10

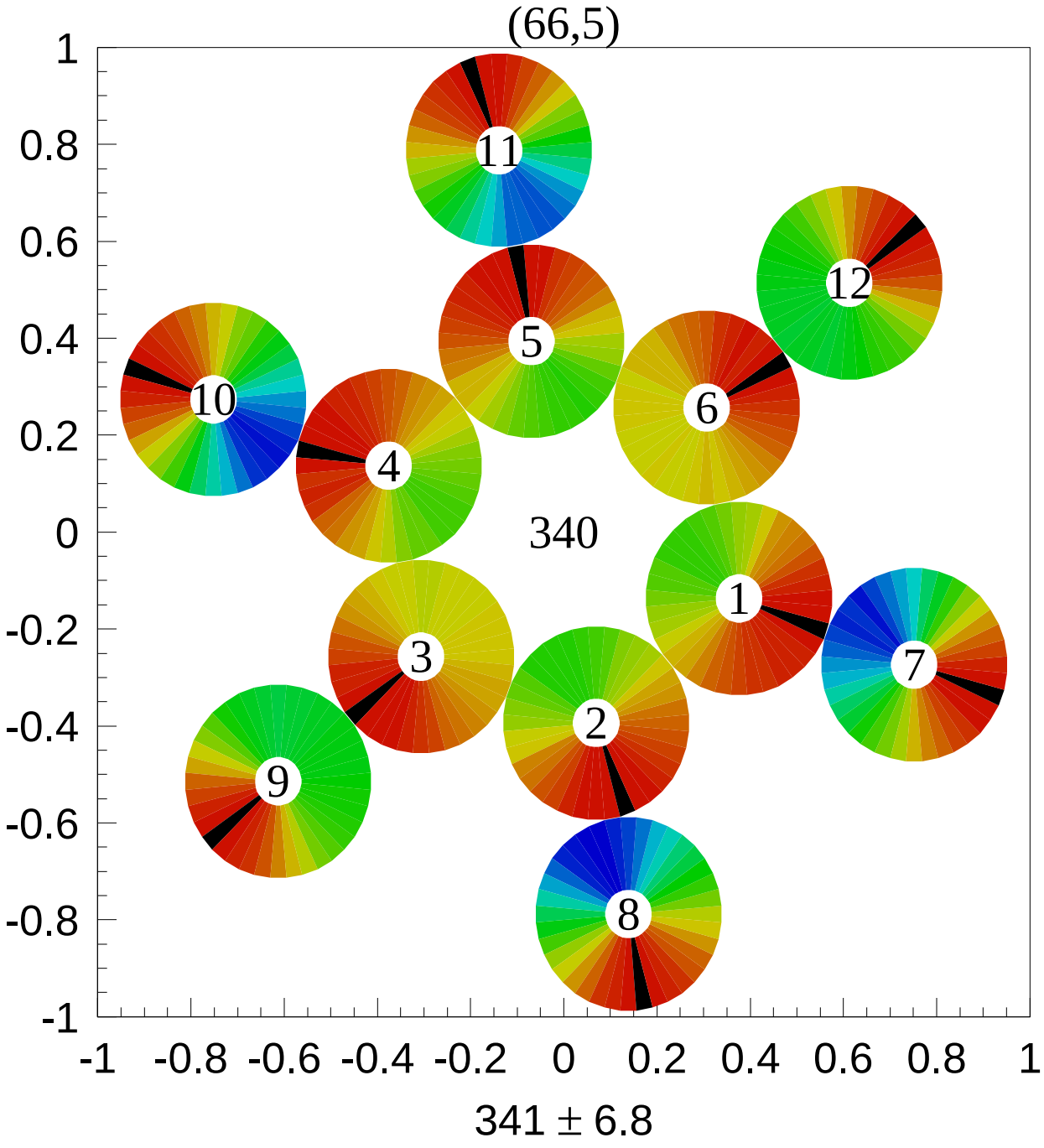

(66,3)
tilted LEDs
120 128 121 123 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 113 126 129 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

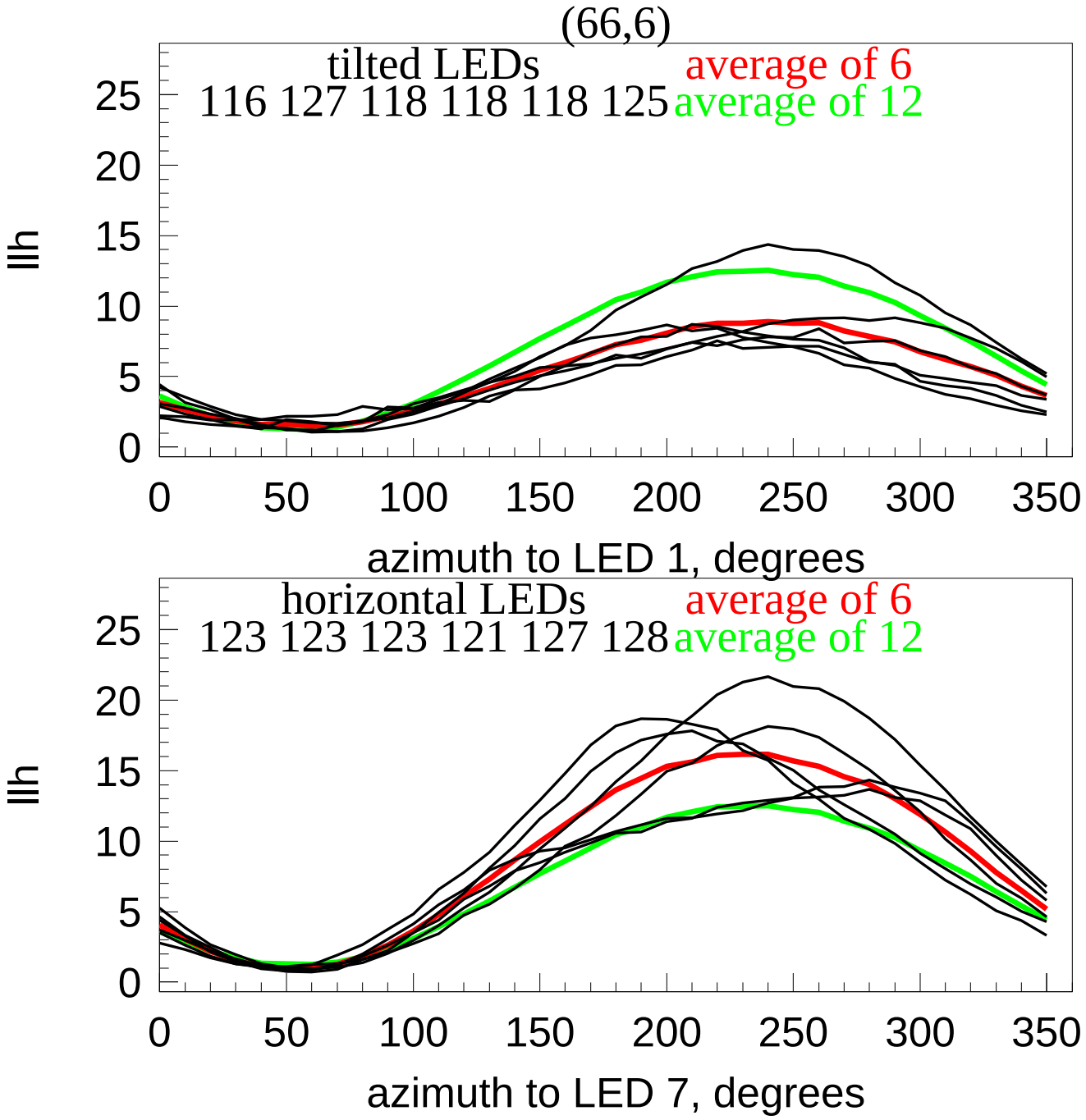

(66,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
357.2 ± 10.0

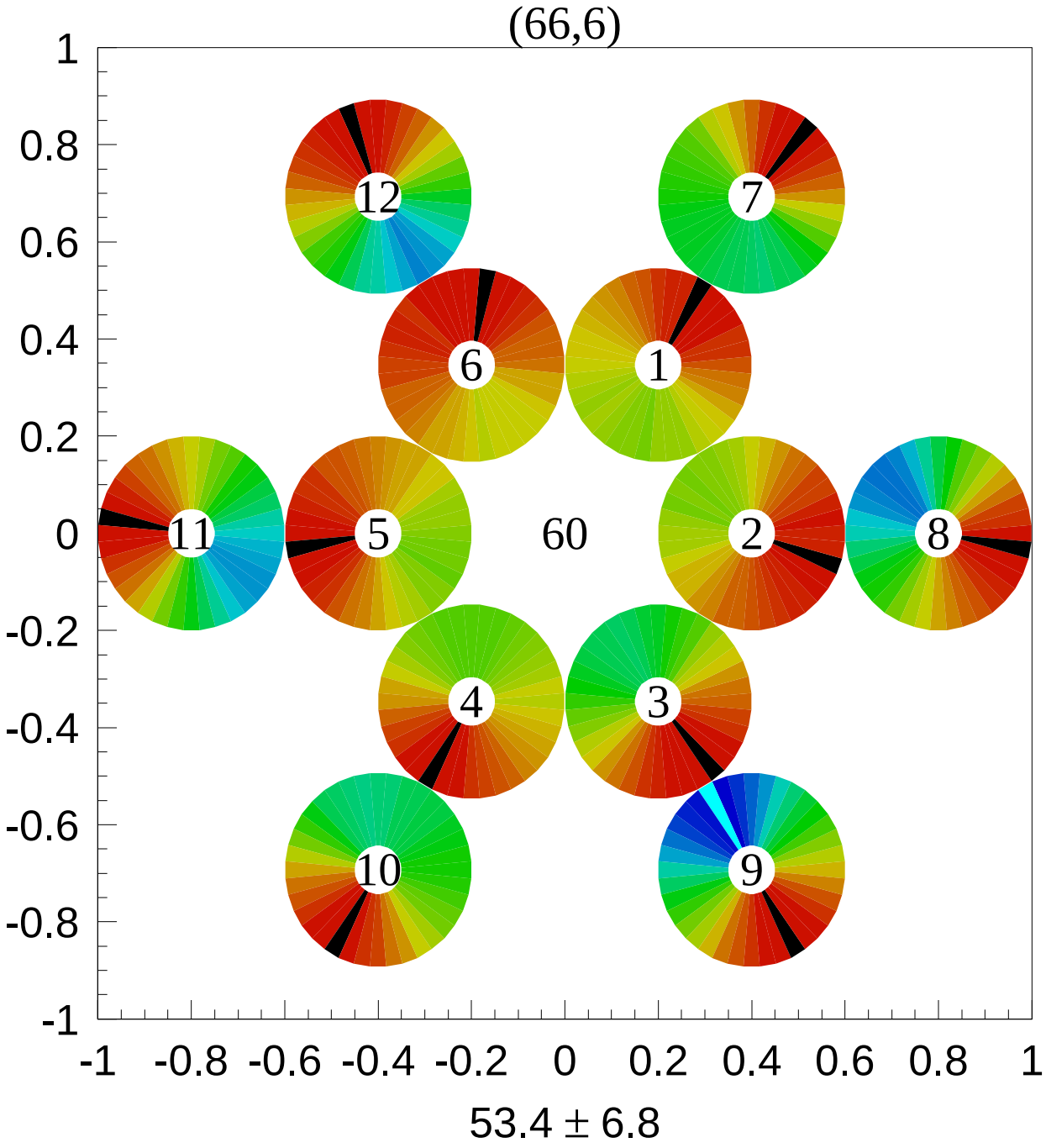

(66,4)
tilted LEDs
118 121 118 129 116 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 110 122 120 129 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

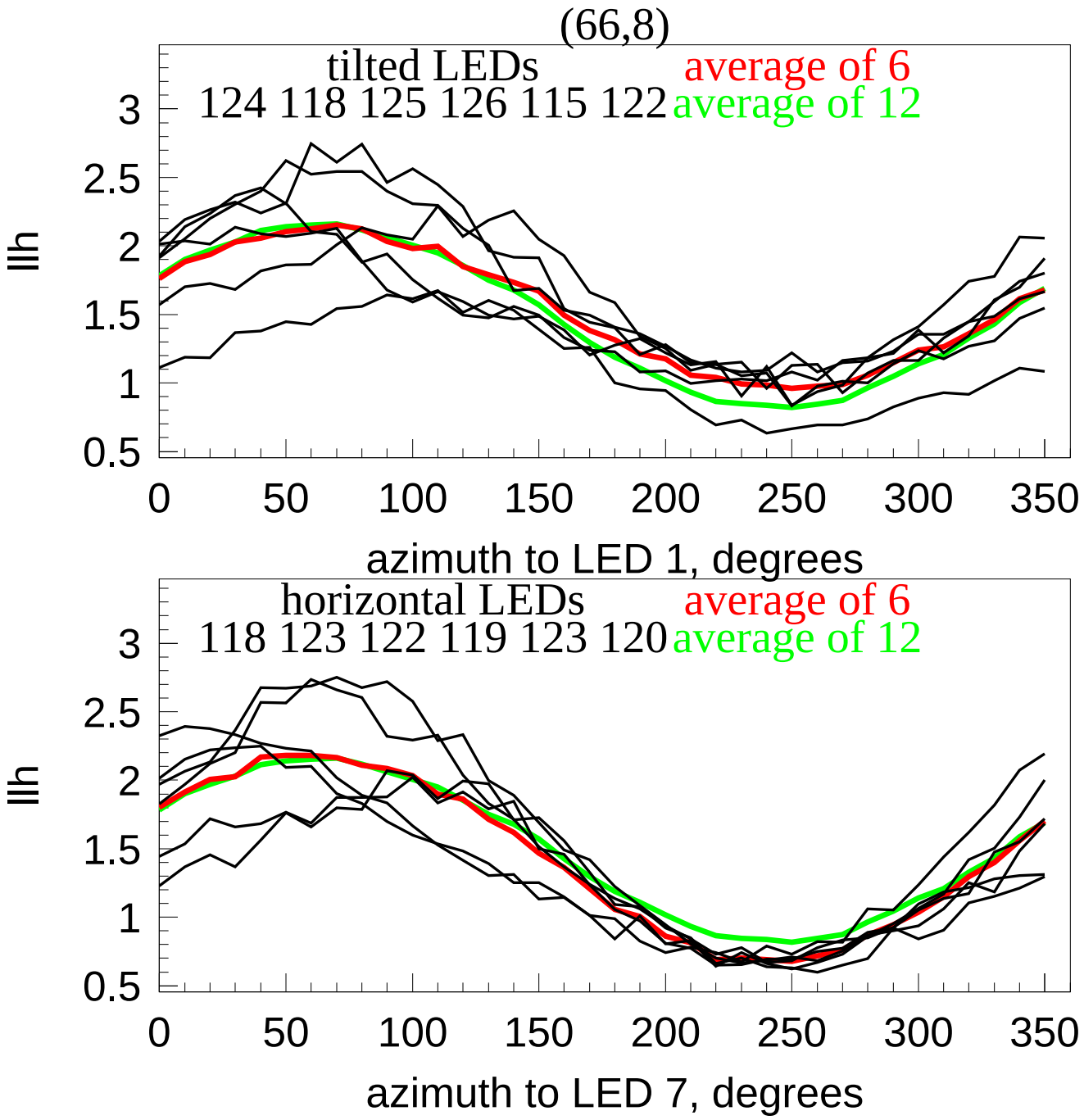

(66,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
96.1 ± 7.1

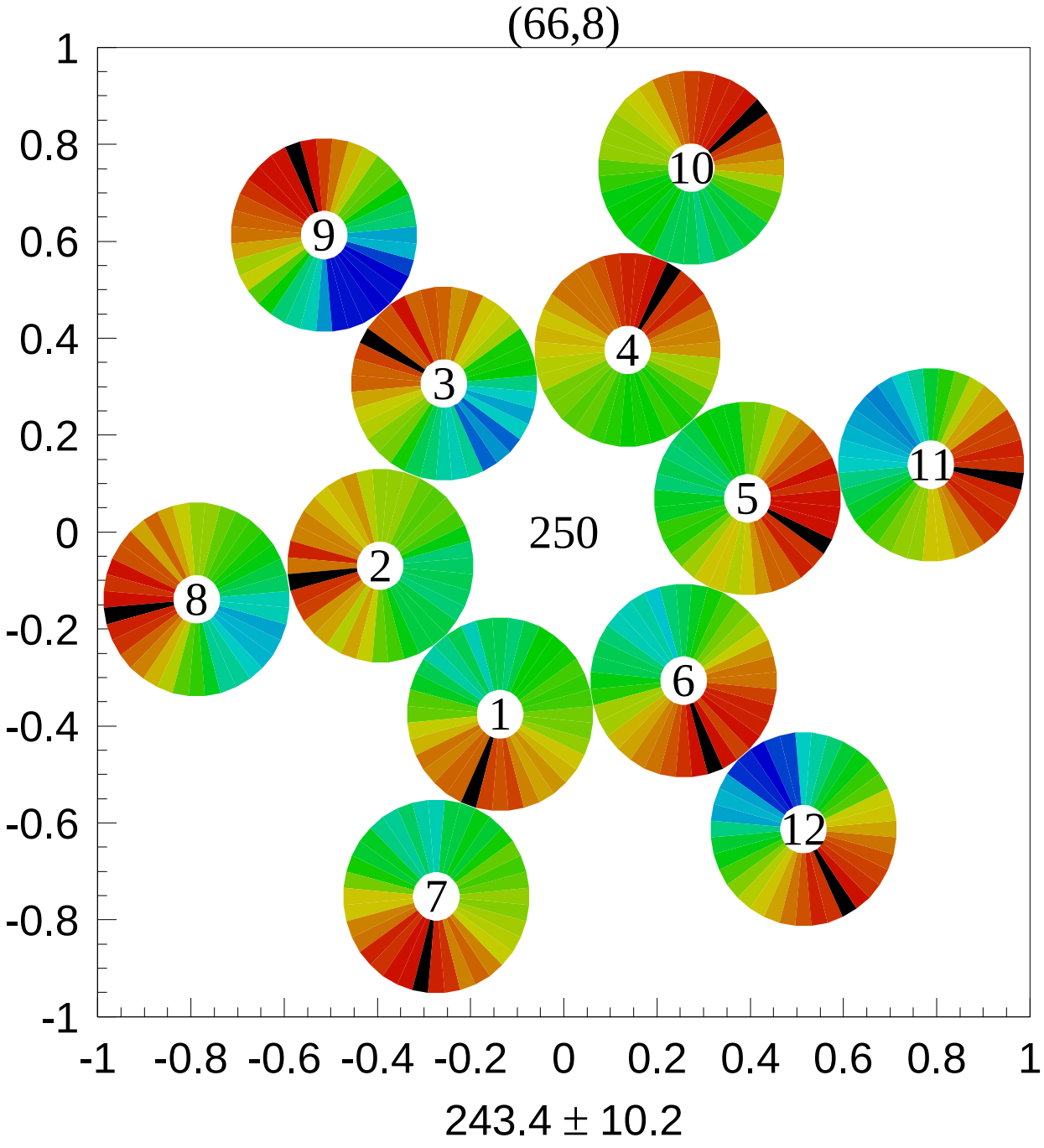

(66,5)
tilted LEDs
120 121 120 130 128 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 126 124 128 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

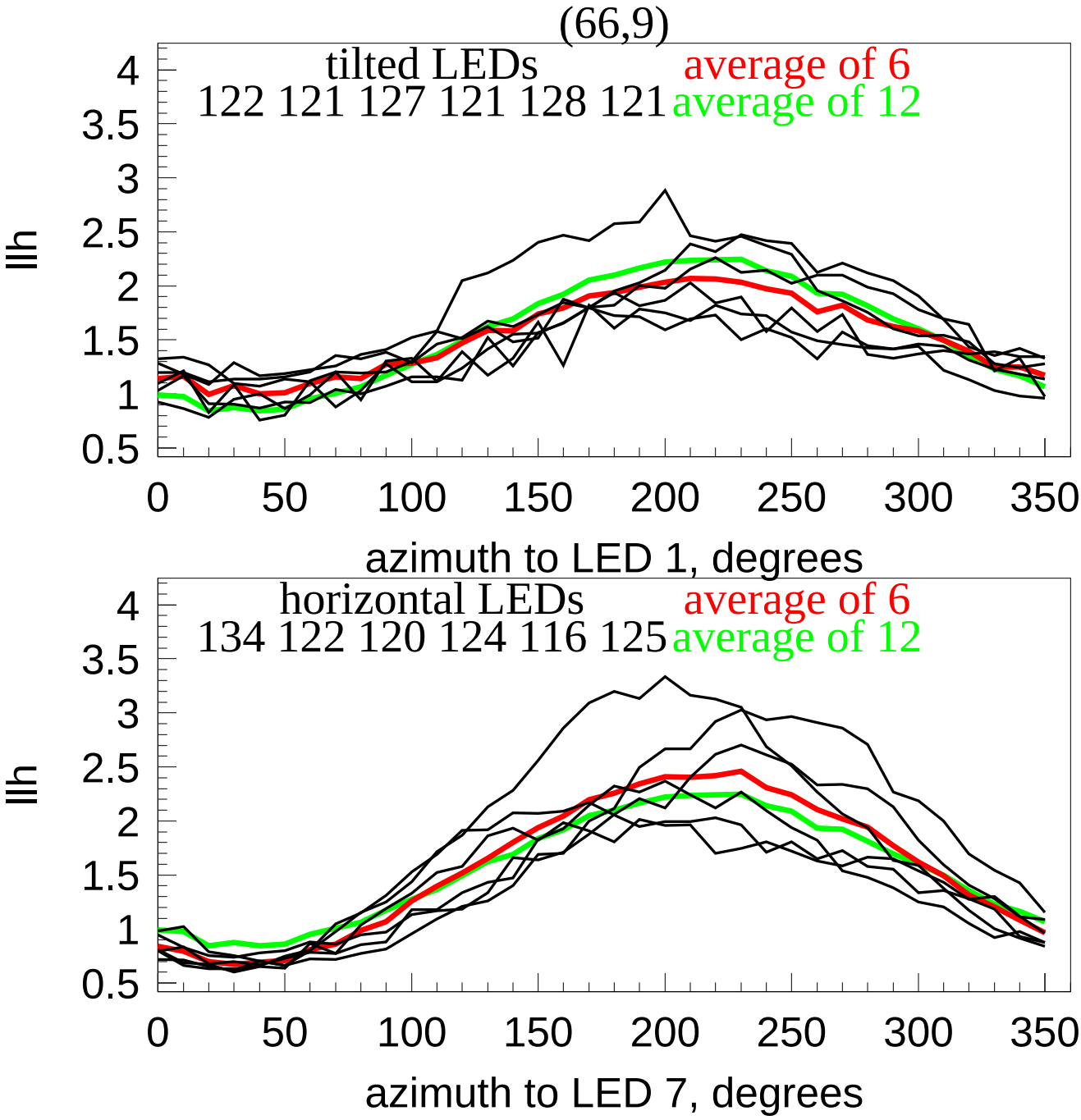

(66,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
341 ± 6.8

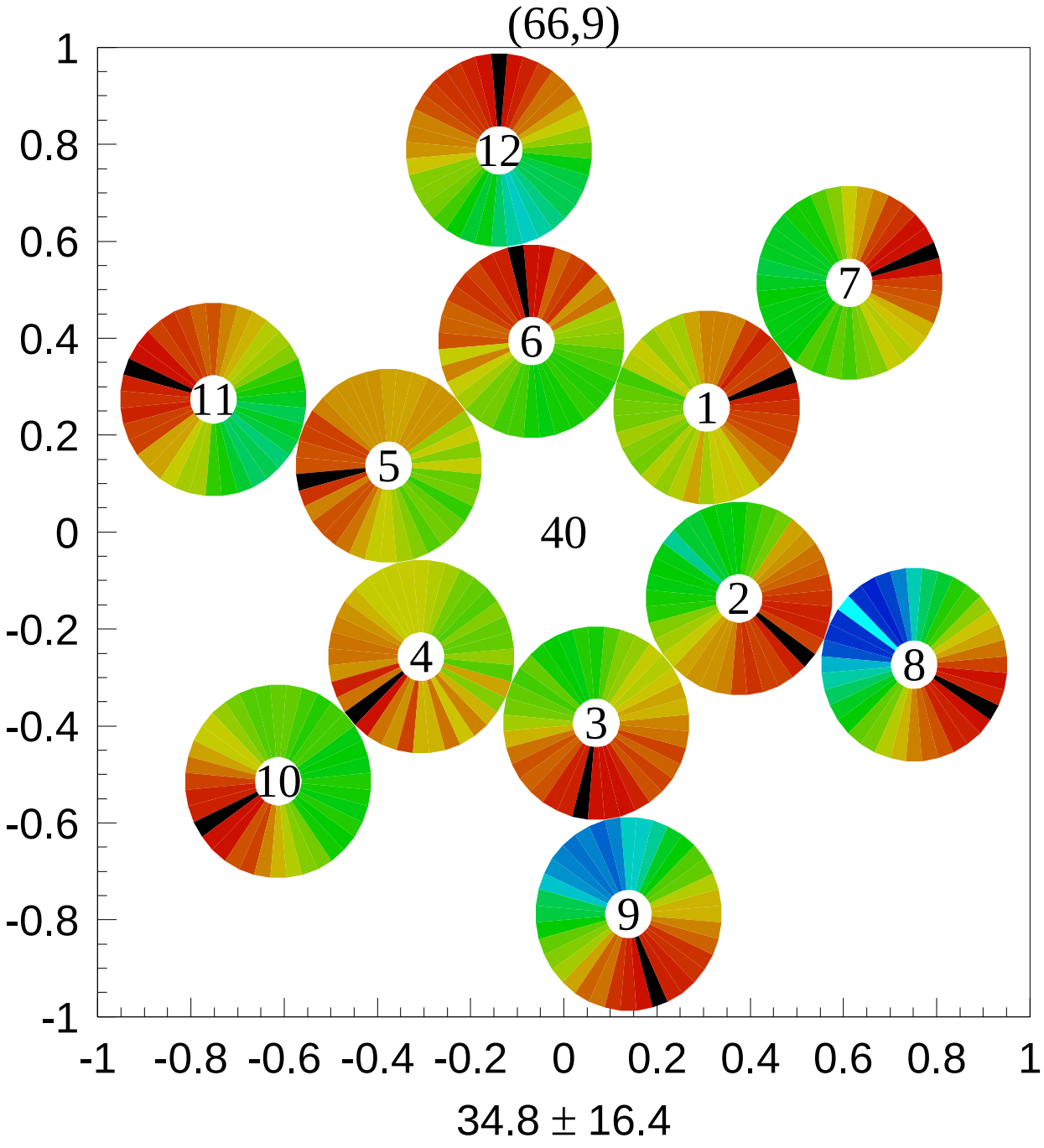

(66,6)
tilted LEDs
116 127 118 118 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 123 121 127 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

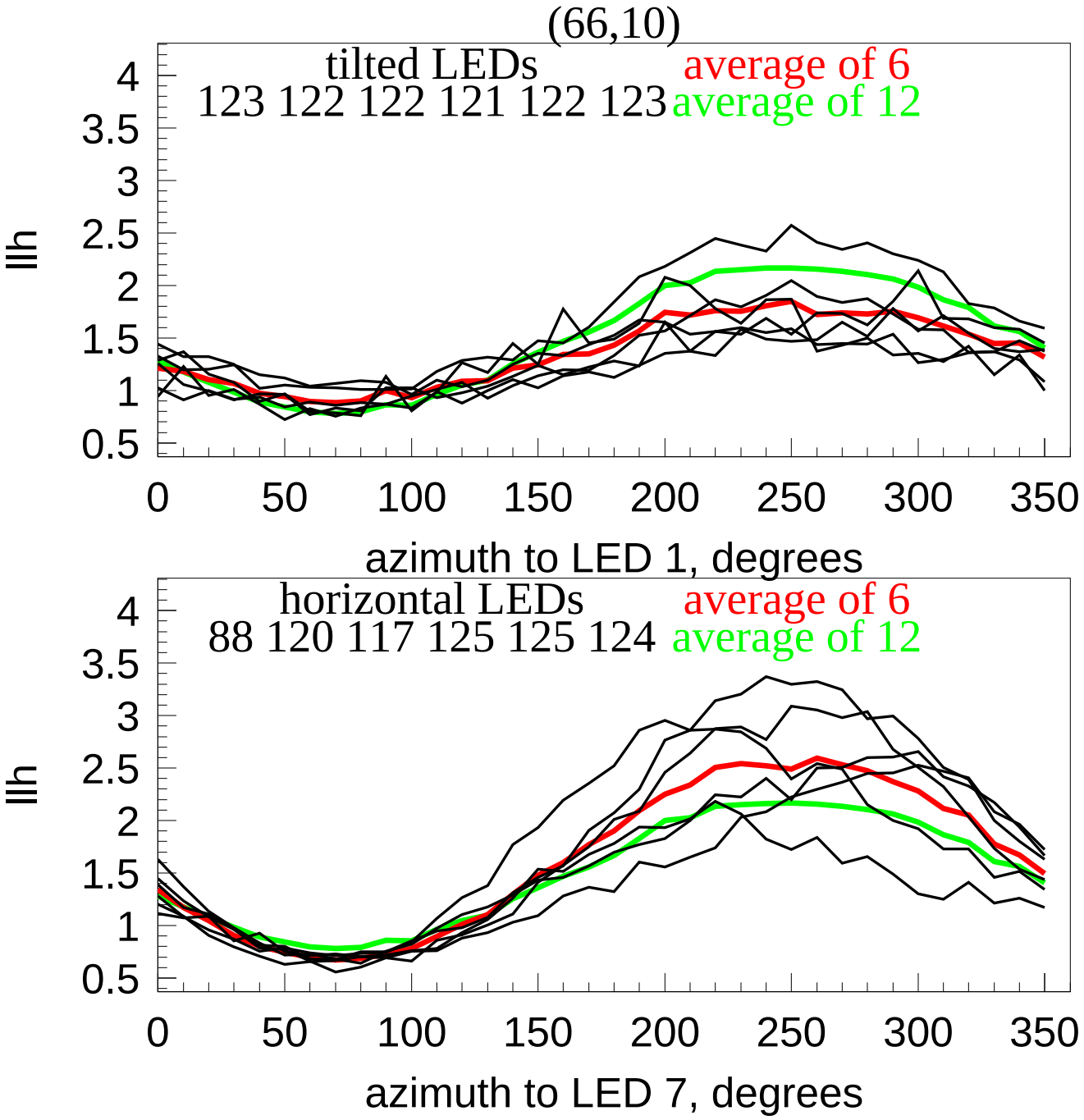

(66,6)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
53.4 ± 6.8

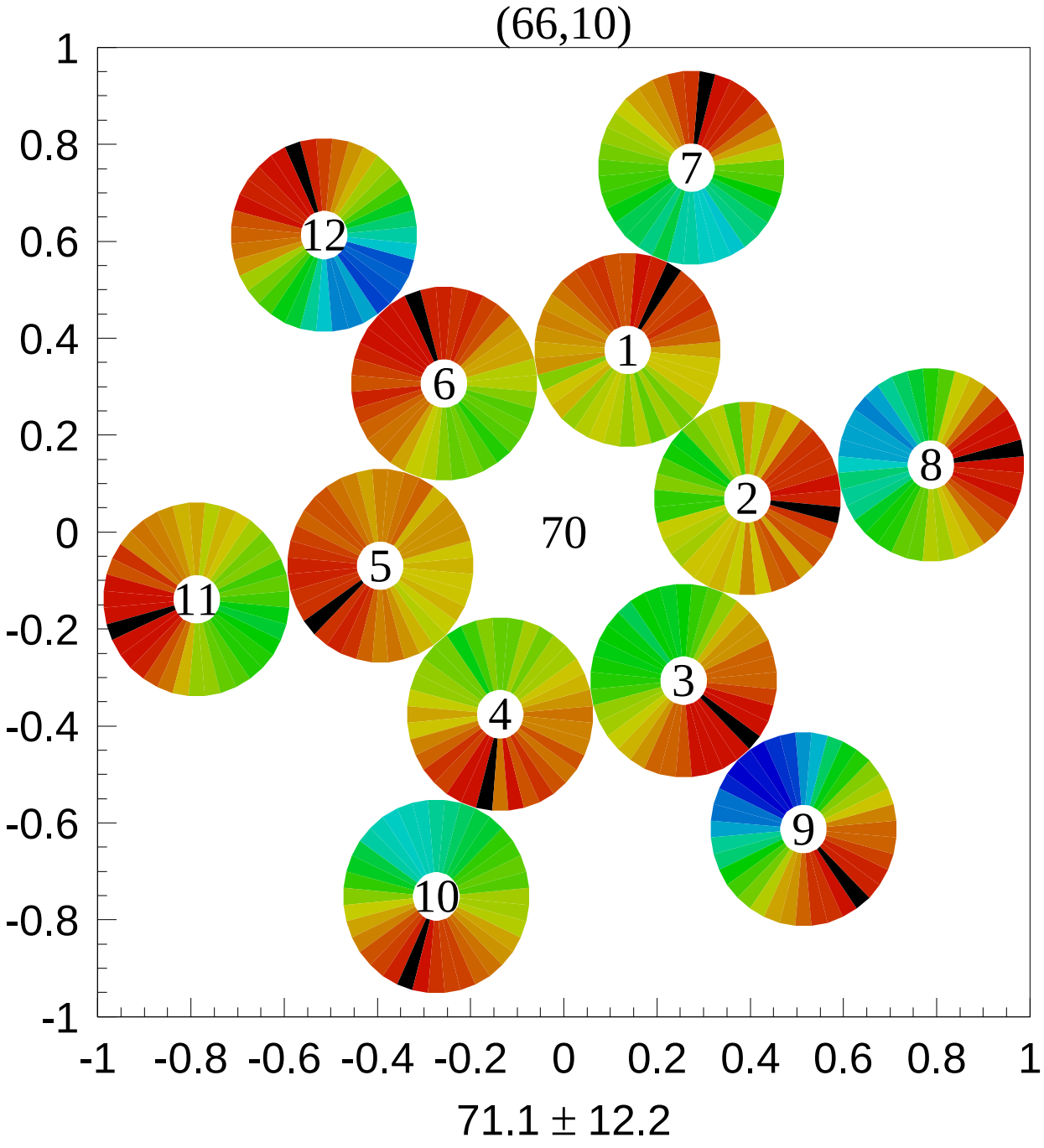

(66,8)
tilted LEDs
124 118 125 126 115 122
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
118 123 122 119 123 120
average of 6
average of 12
IIh
azimuth to LED 7, degrees

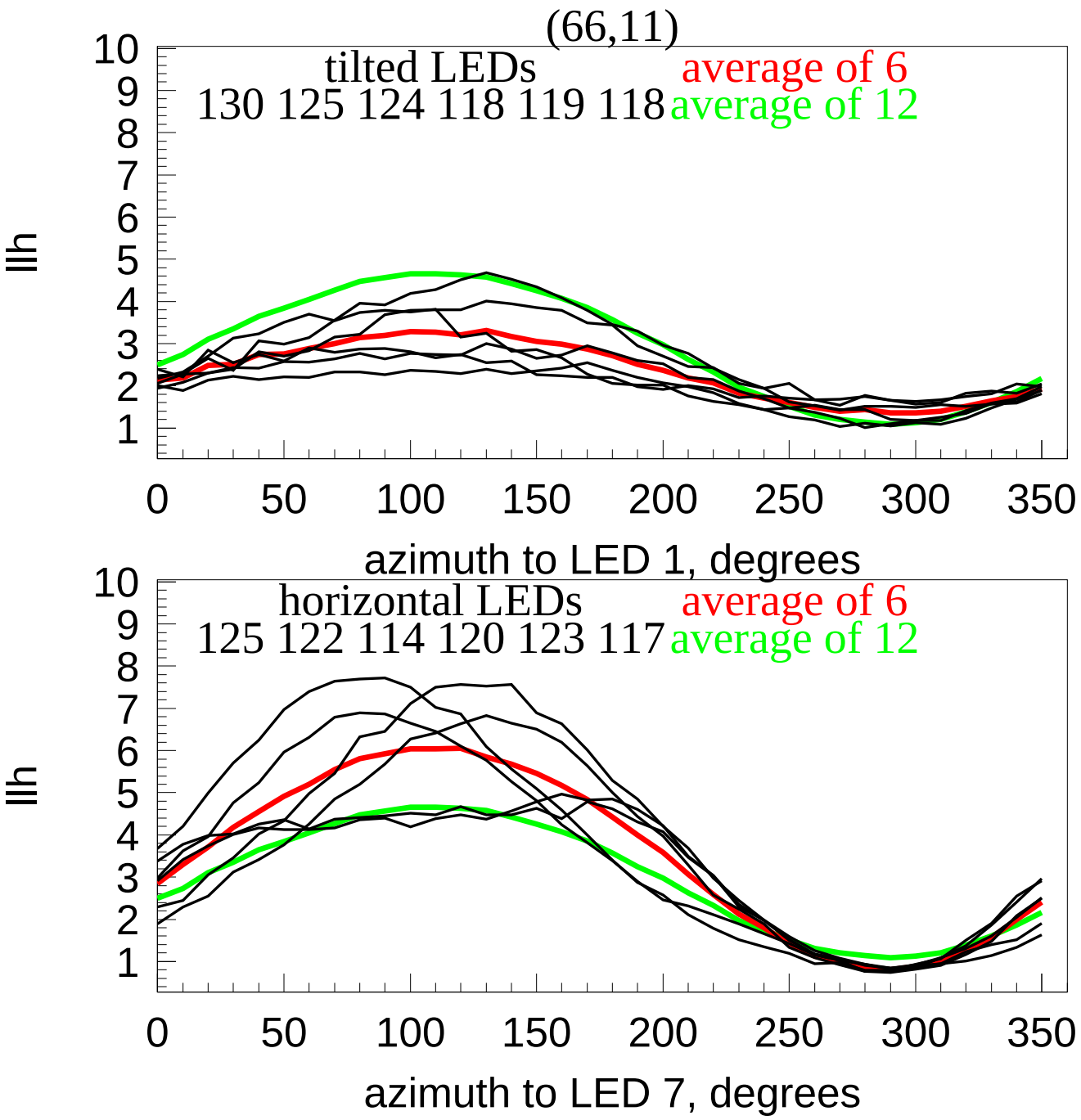

(66,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
243.4 ± 10.2
250
1
2
3
4
5
6
7
8
9
10
11
12

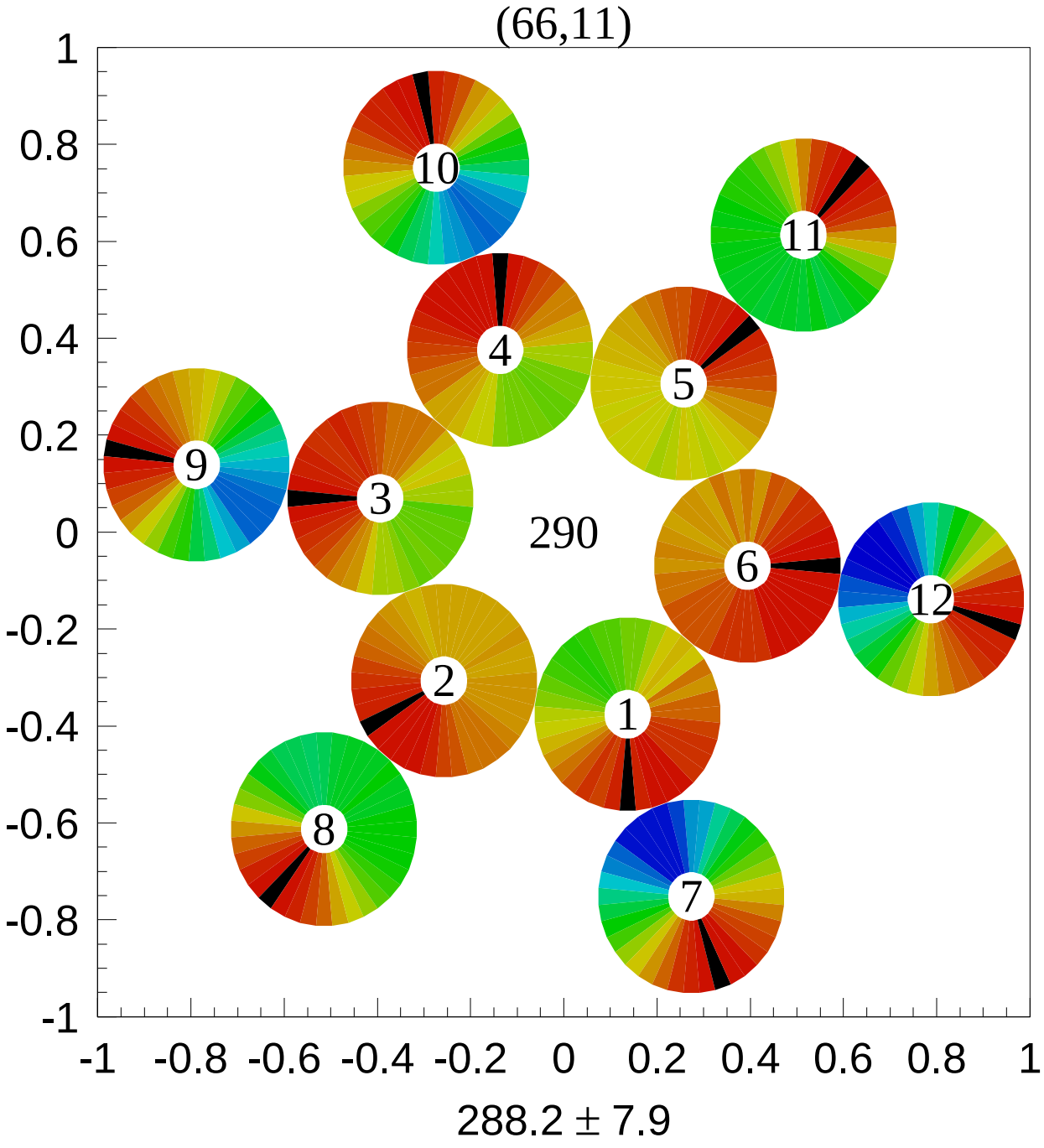

(66,9)
tilted LEDs
122 121 127 121 128 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
134 122 120 124 116 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

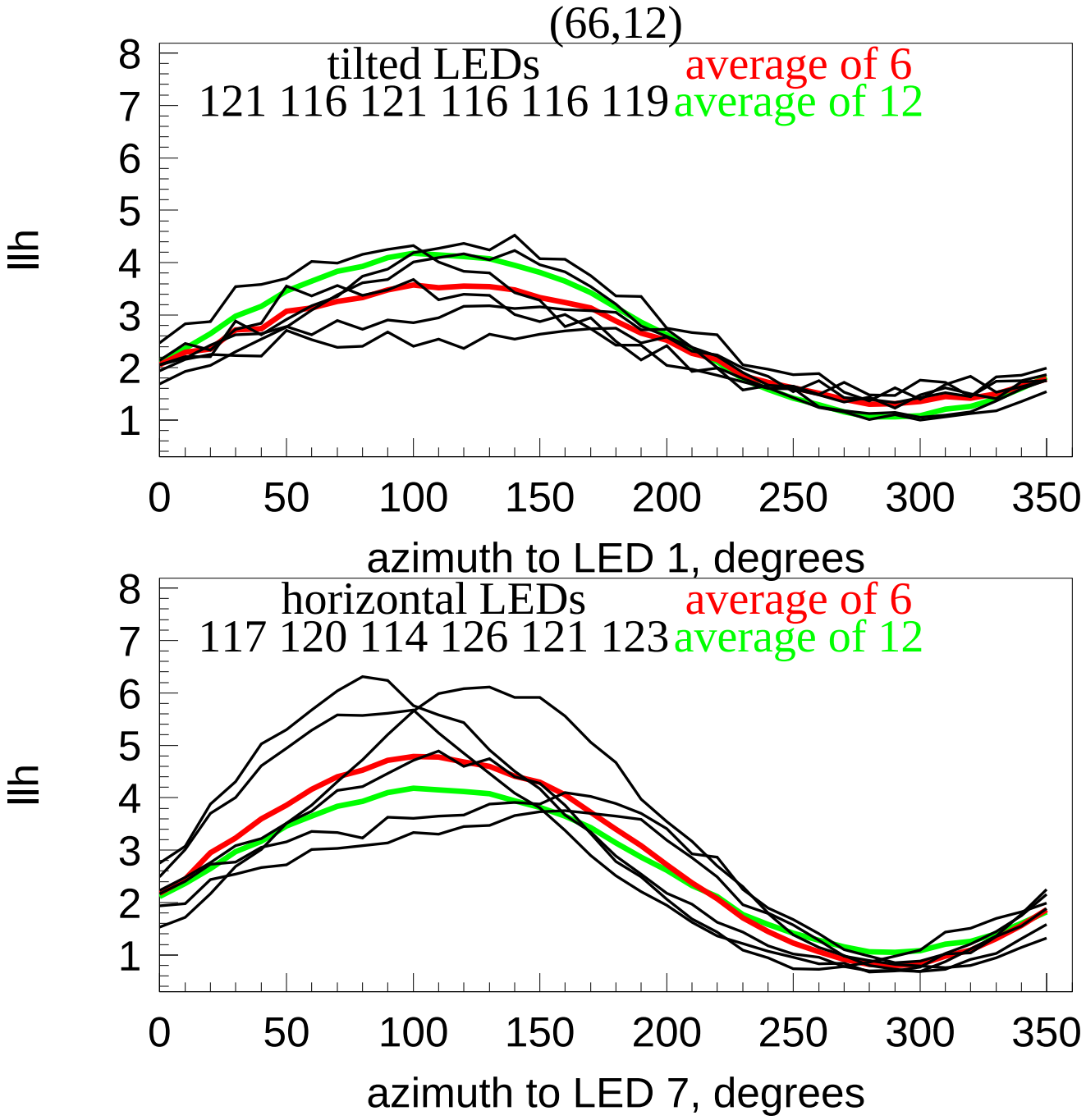

(66,9)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
34.8 ± 16.4

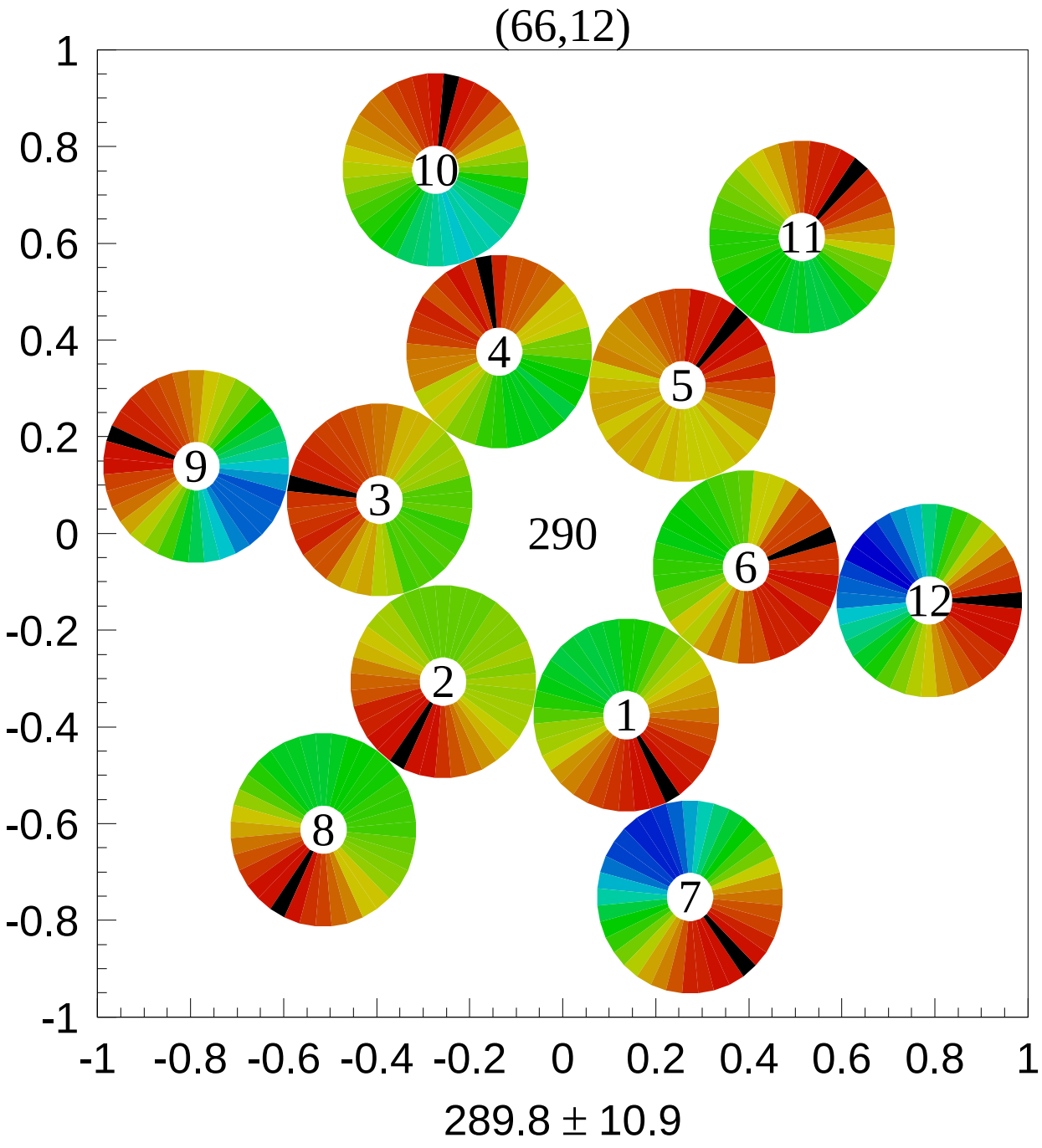

(66,10)
tilted LEDs
123 122 122 121 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
88 120 117 125 125 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

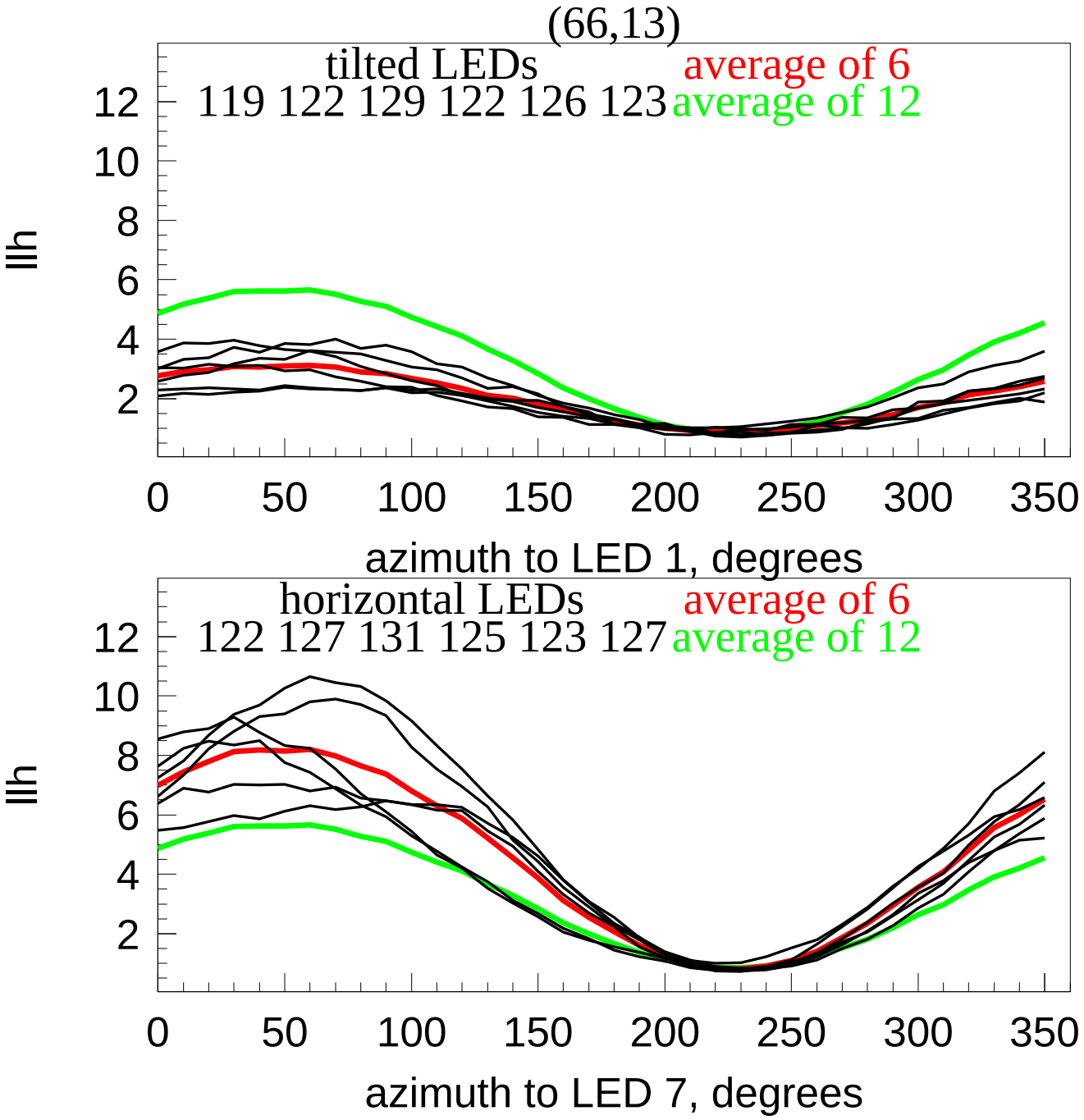

(66,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
70
5
11
3
4
9
10
71.1 ± 12.2

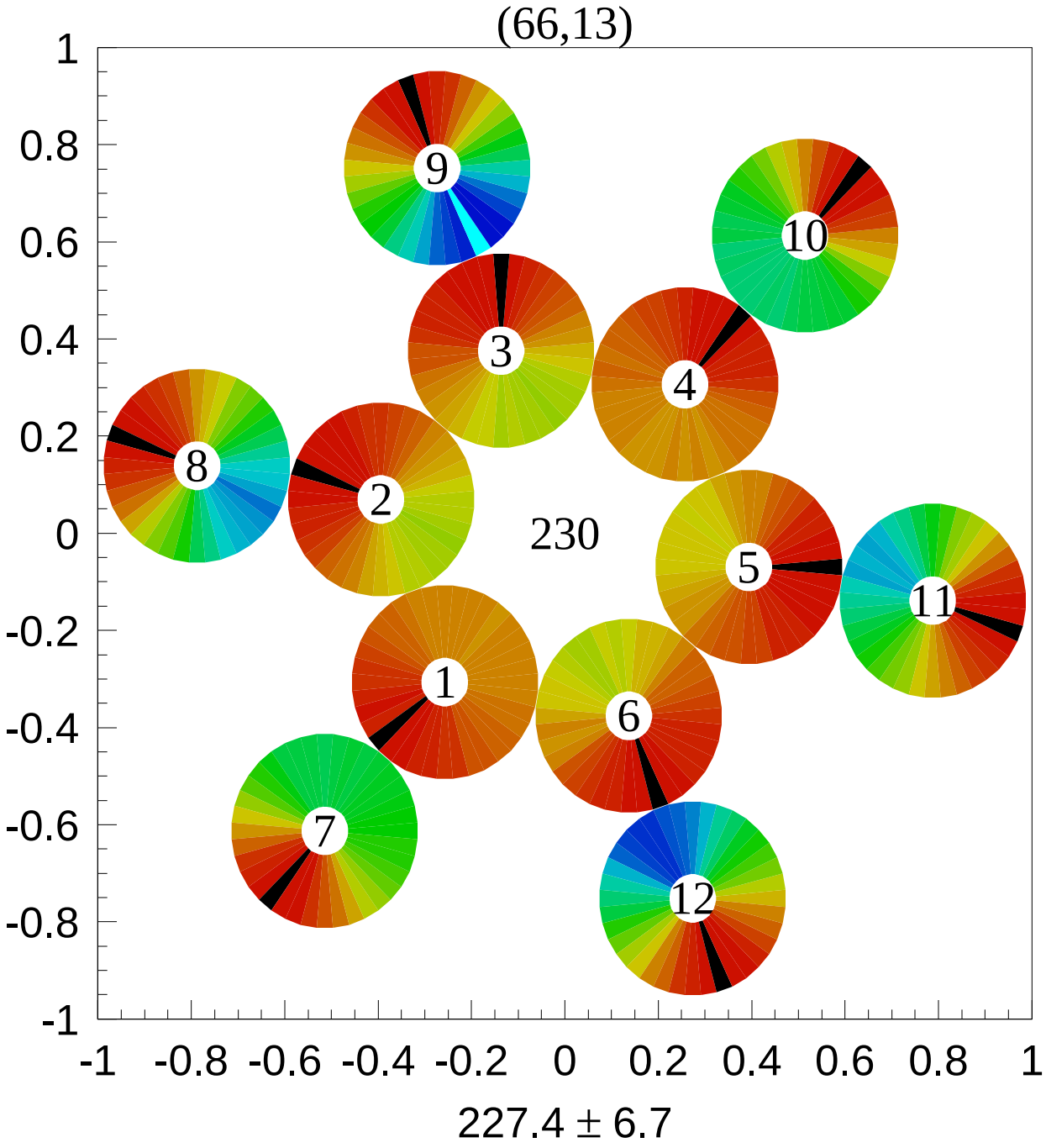

(66,11)
tilted LEDs
130 125 124 118 119 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 114 120 123 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

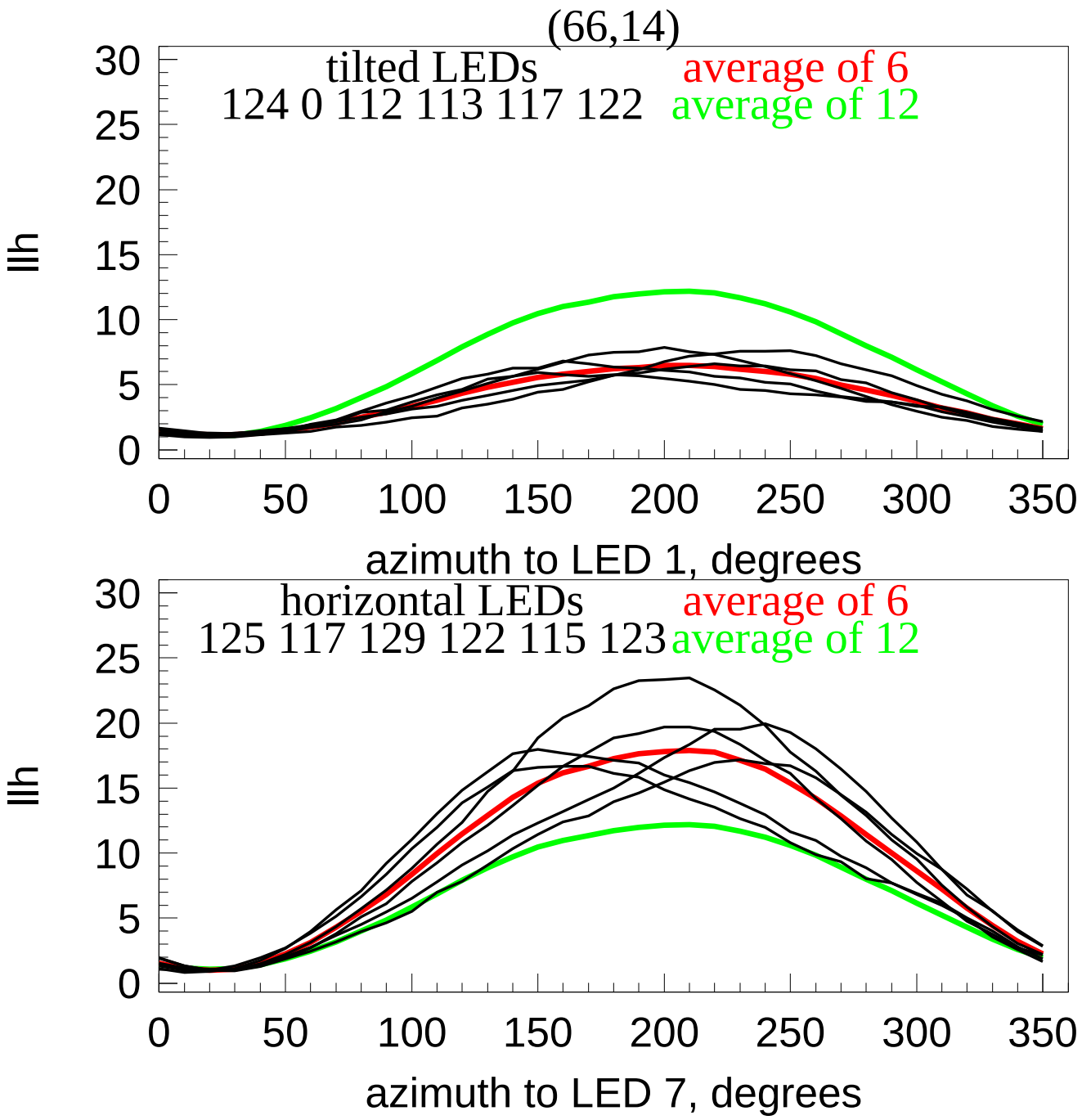

(66,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
288.2 ± 7.9

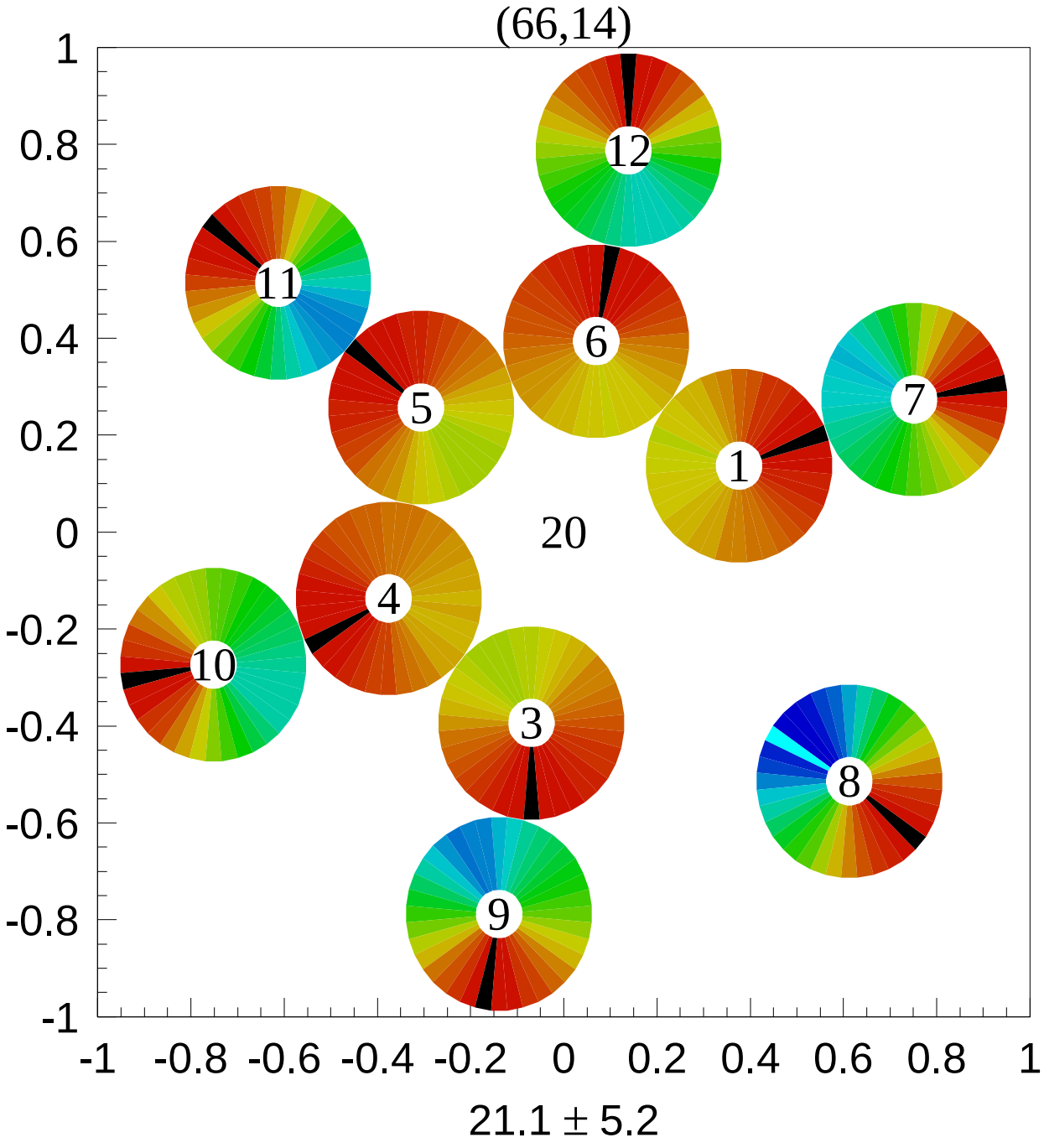

(66,12)
tilted LEDs
121 116 121 116 116 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 120 114 126 121 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

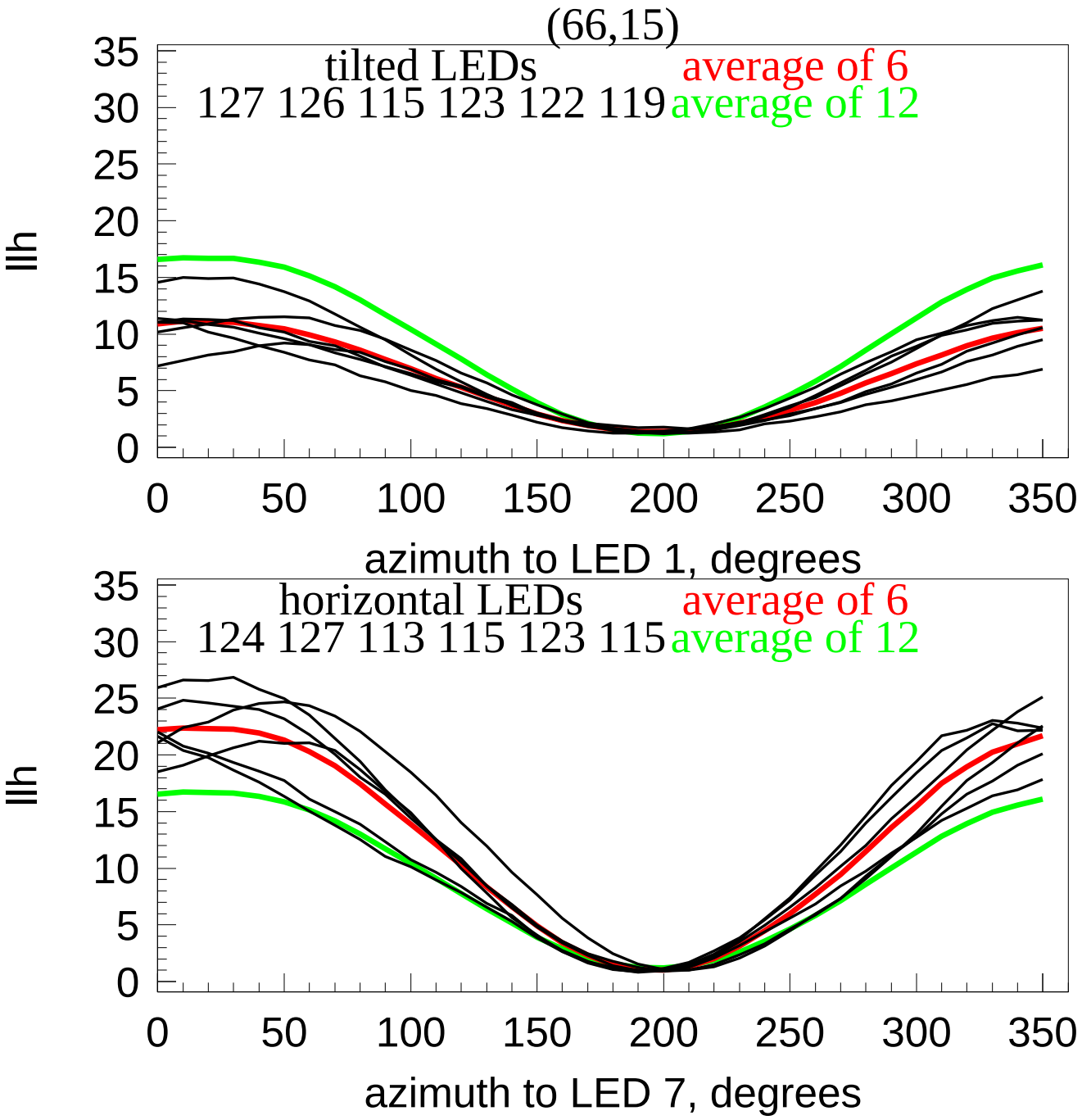

(66,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
289.8 ± 10.9

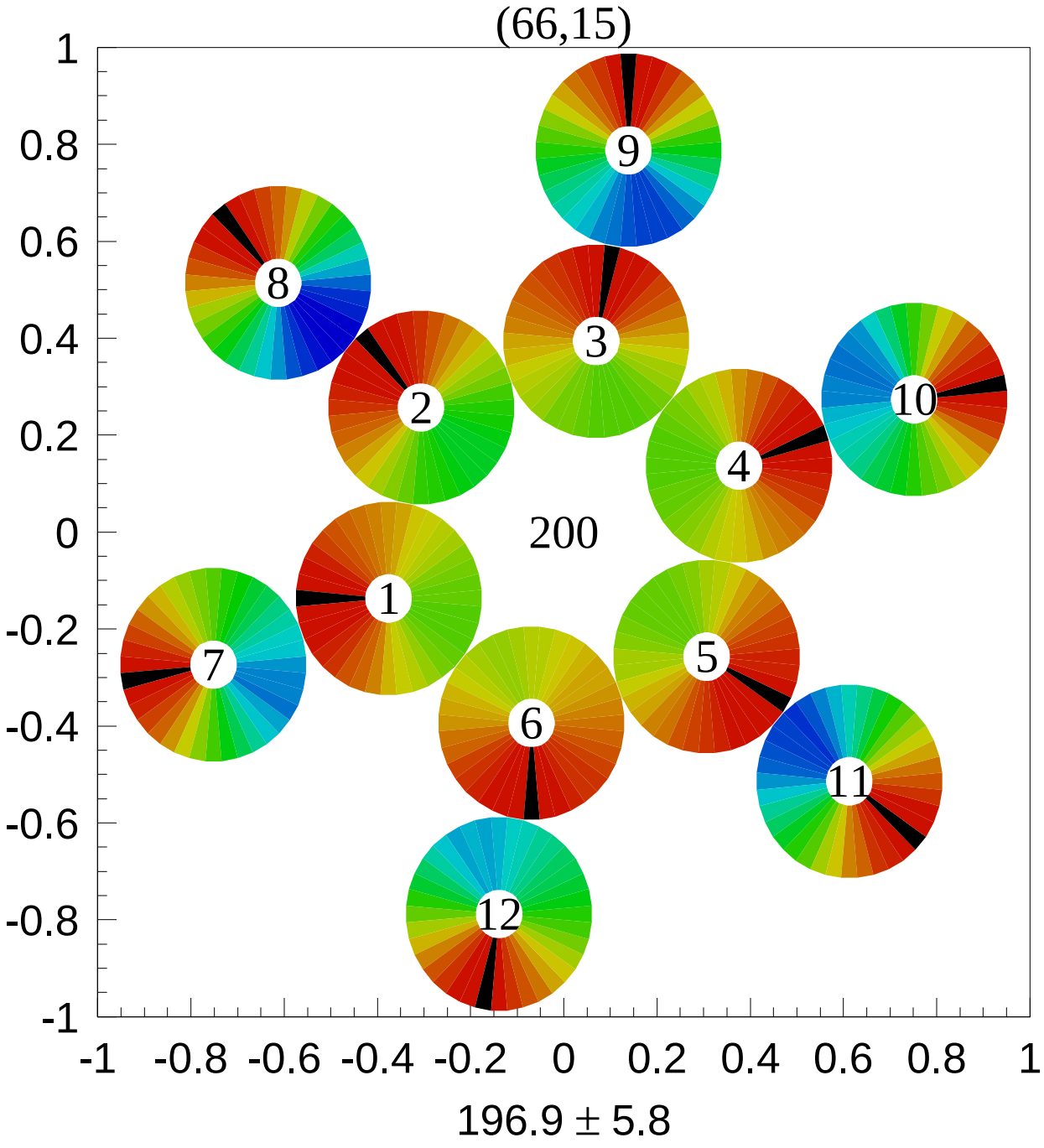

(66,13)
tilted LEDs
119 122 129 122 126 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 127 131 125 123 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

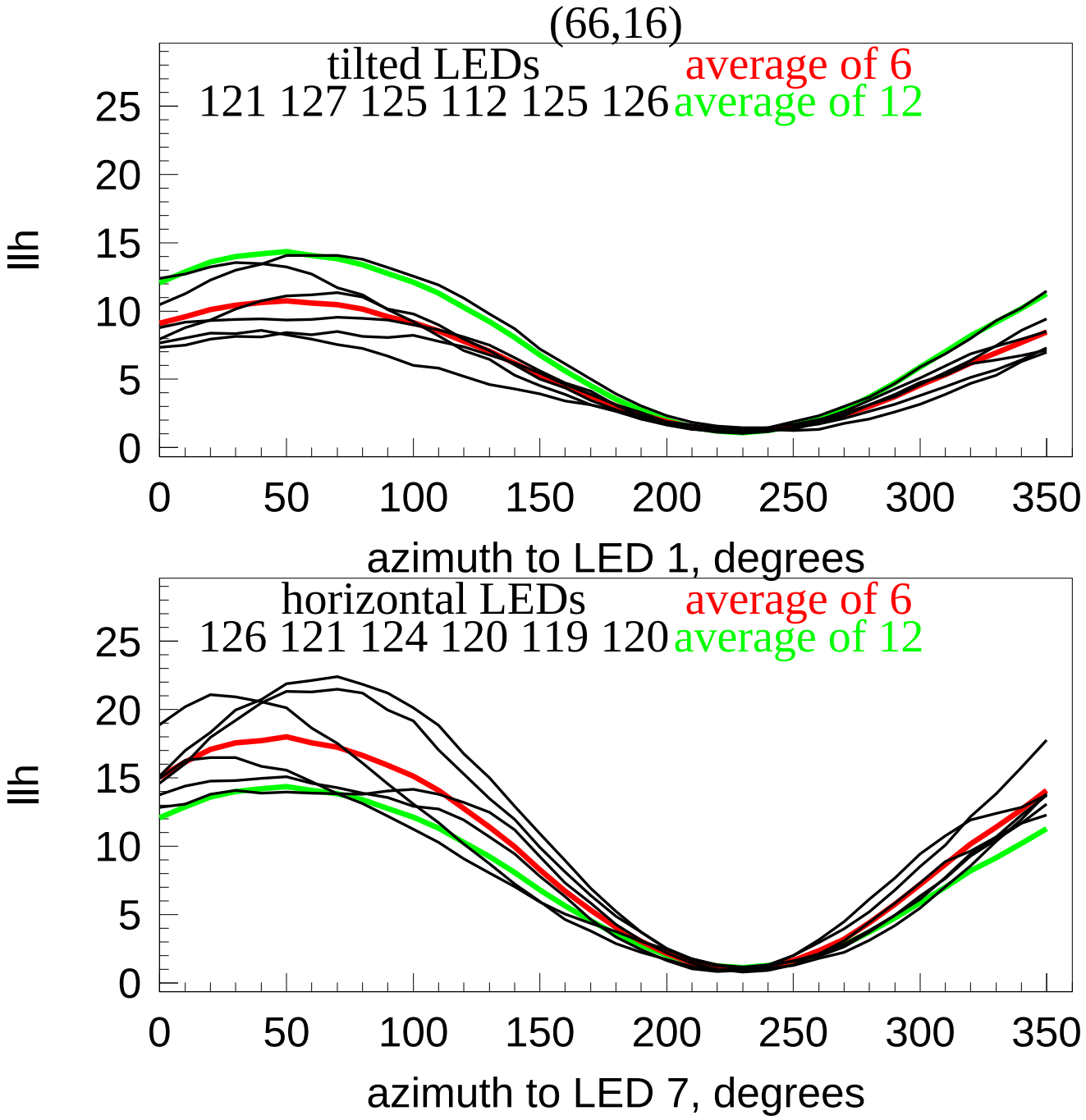

(66,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
227.4 ± 6.7

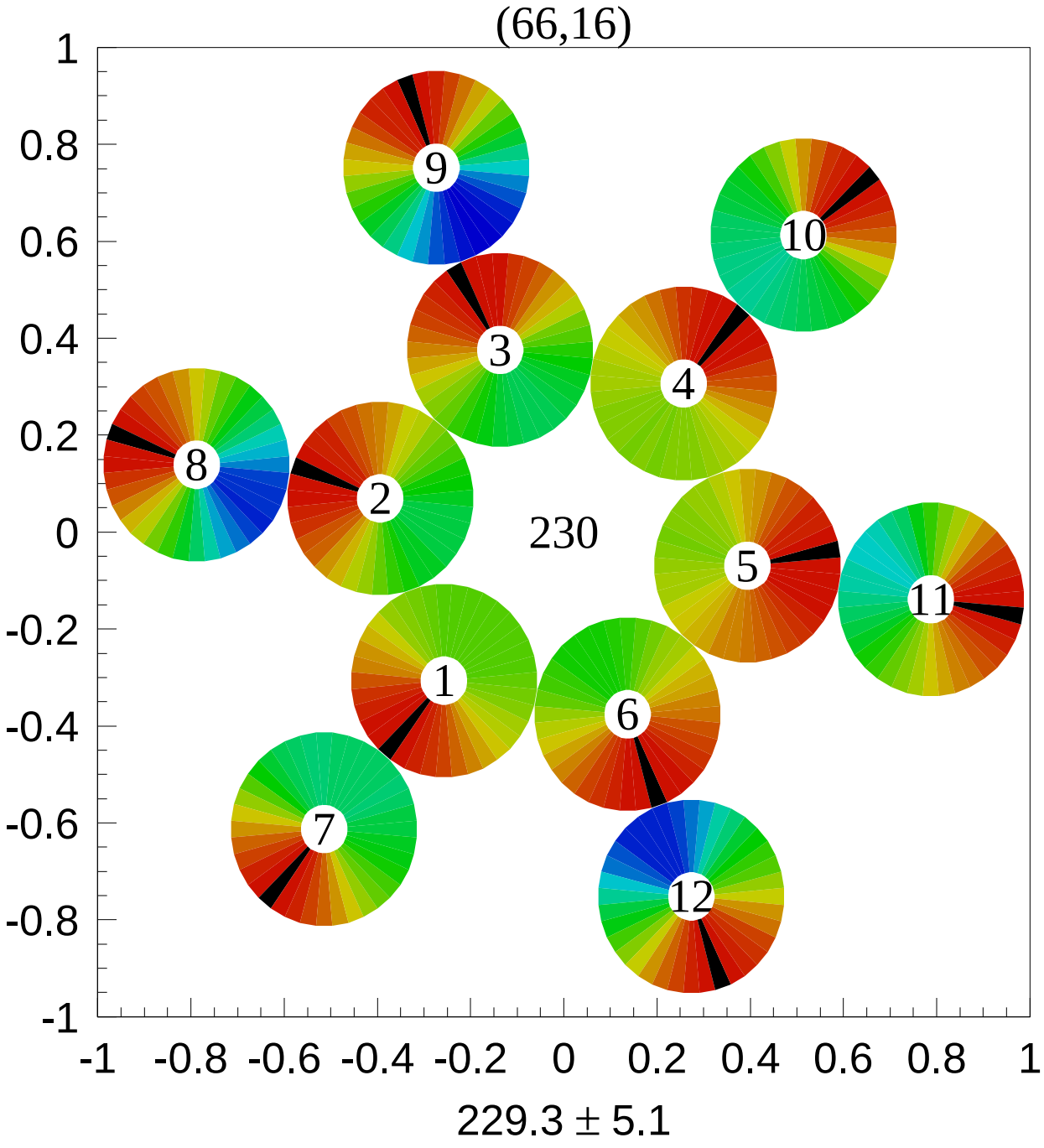

(66,14)
tilted LEDs
124 0 112 113 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 117 129 122 115 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

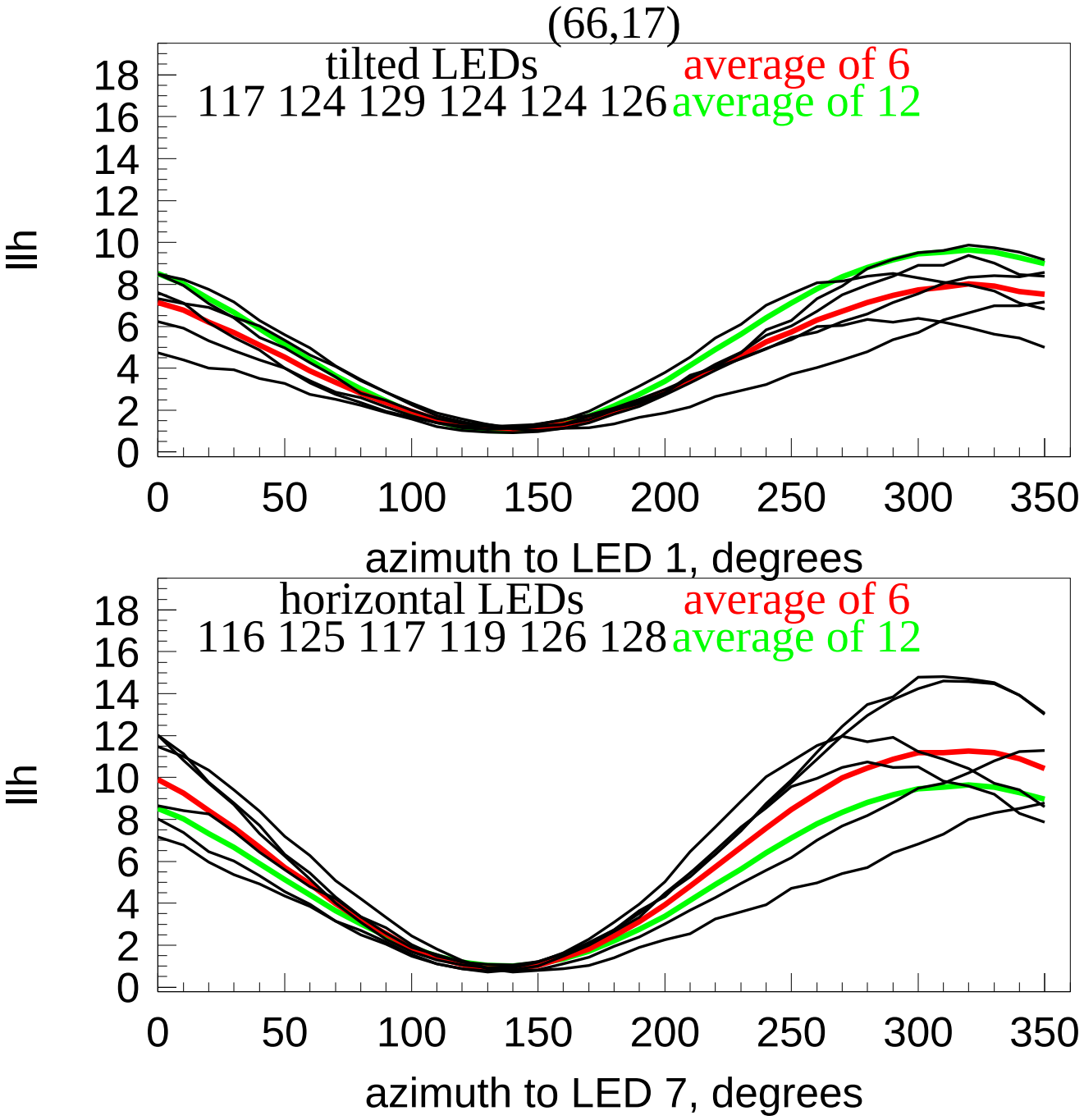

(66,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
3
8
9
21.1 ± 5.2

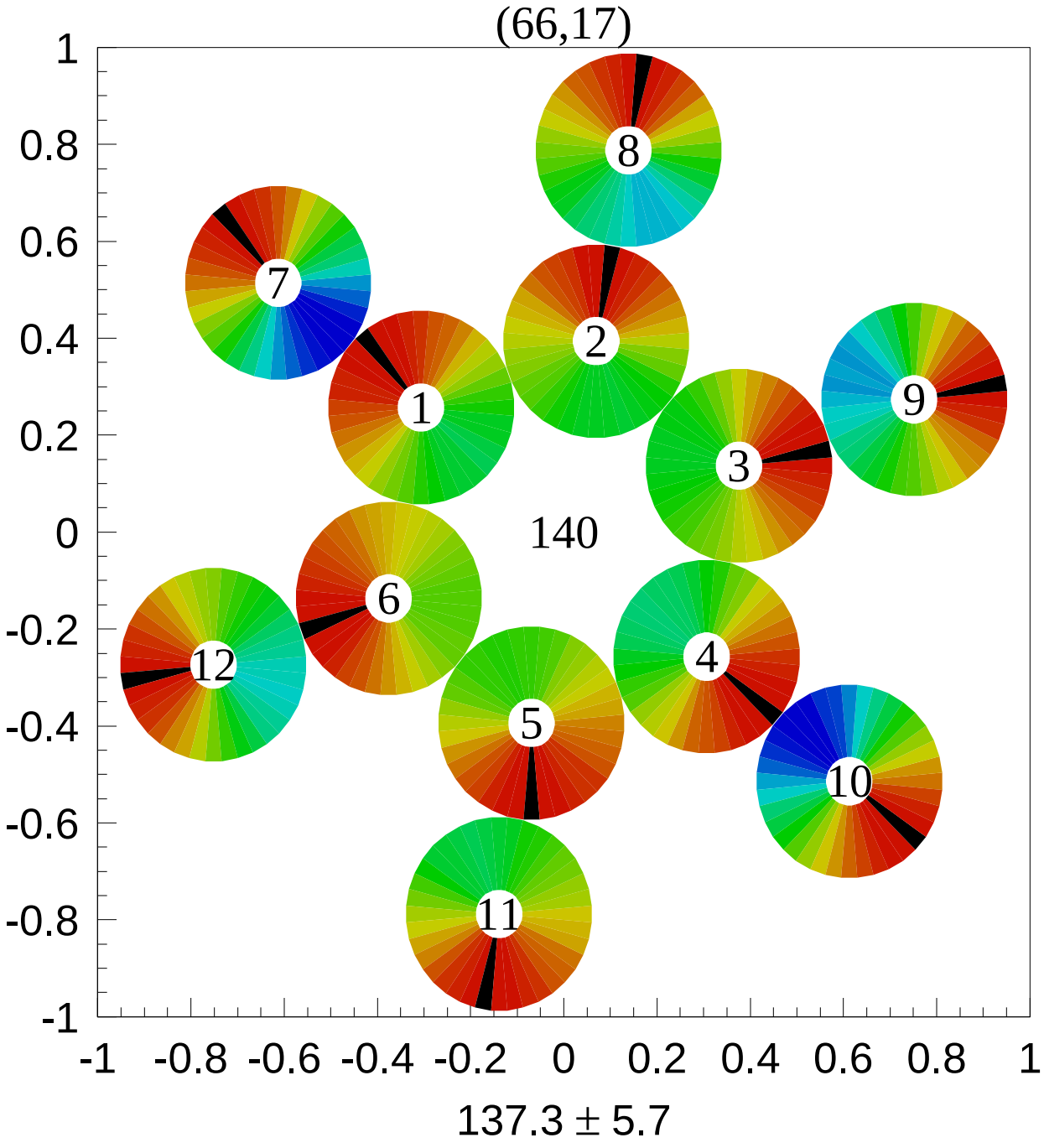

(66,15)
tilted LEDs
127 126 115 123 122 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 127 113 115 123 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

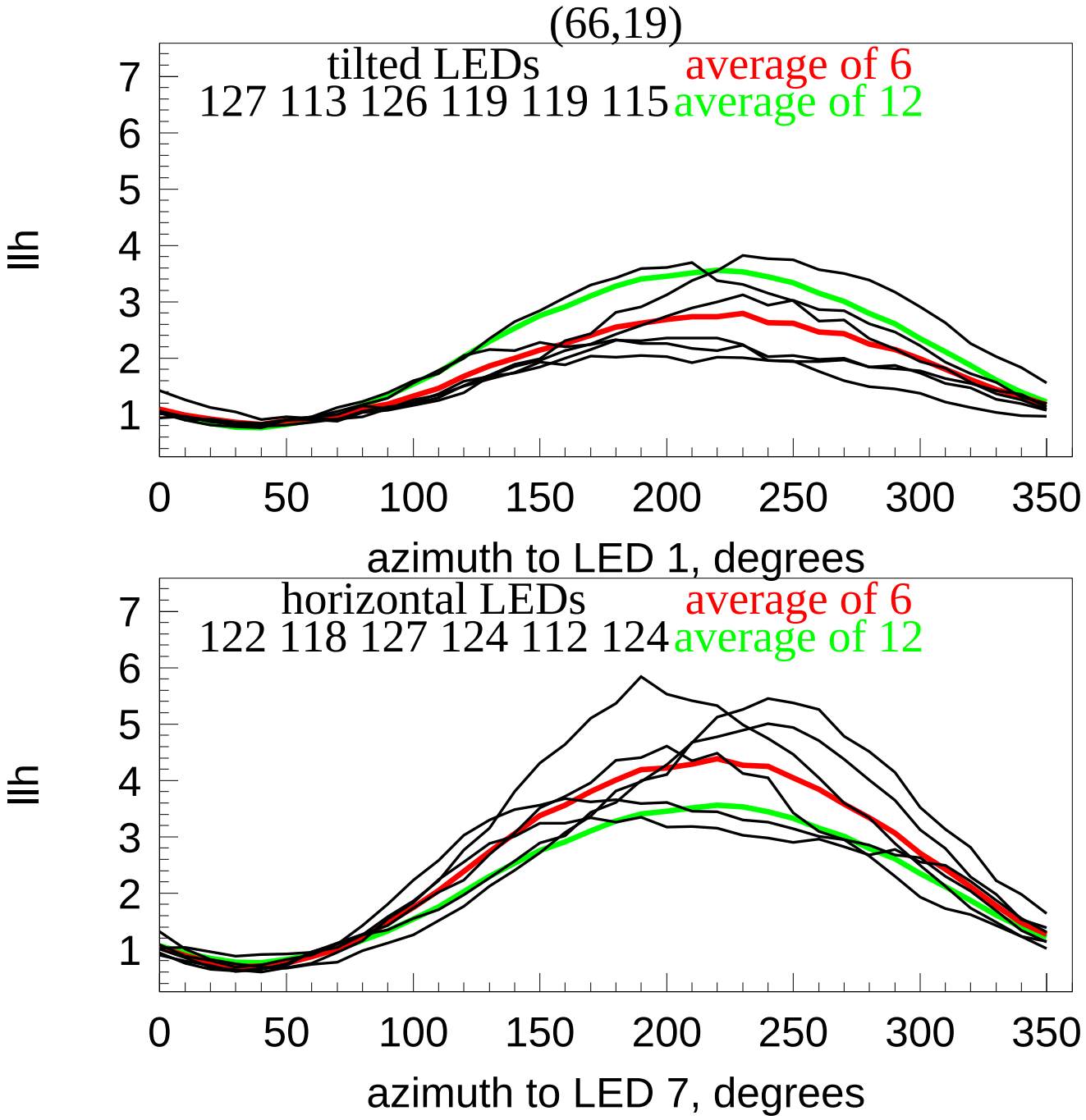

(66,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
196.9 ± 5.8
200
1
2
3
4
5
6
7
8
9
10
11
12

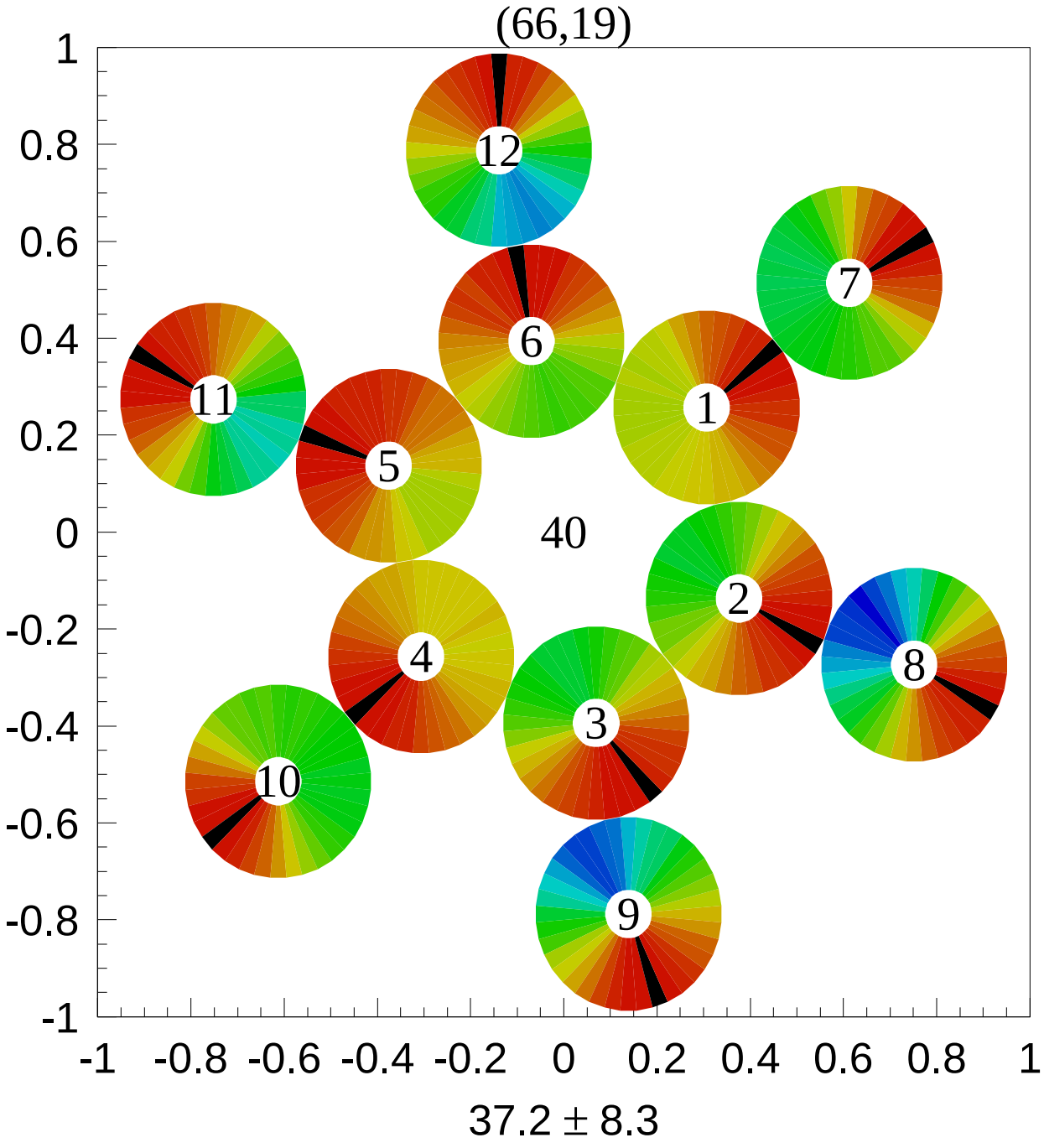

(66,16)
tilted LEDs
121 127 125 112 125 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 121 124 120 119 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

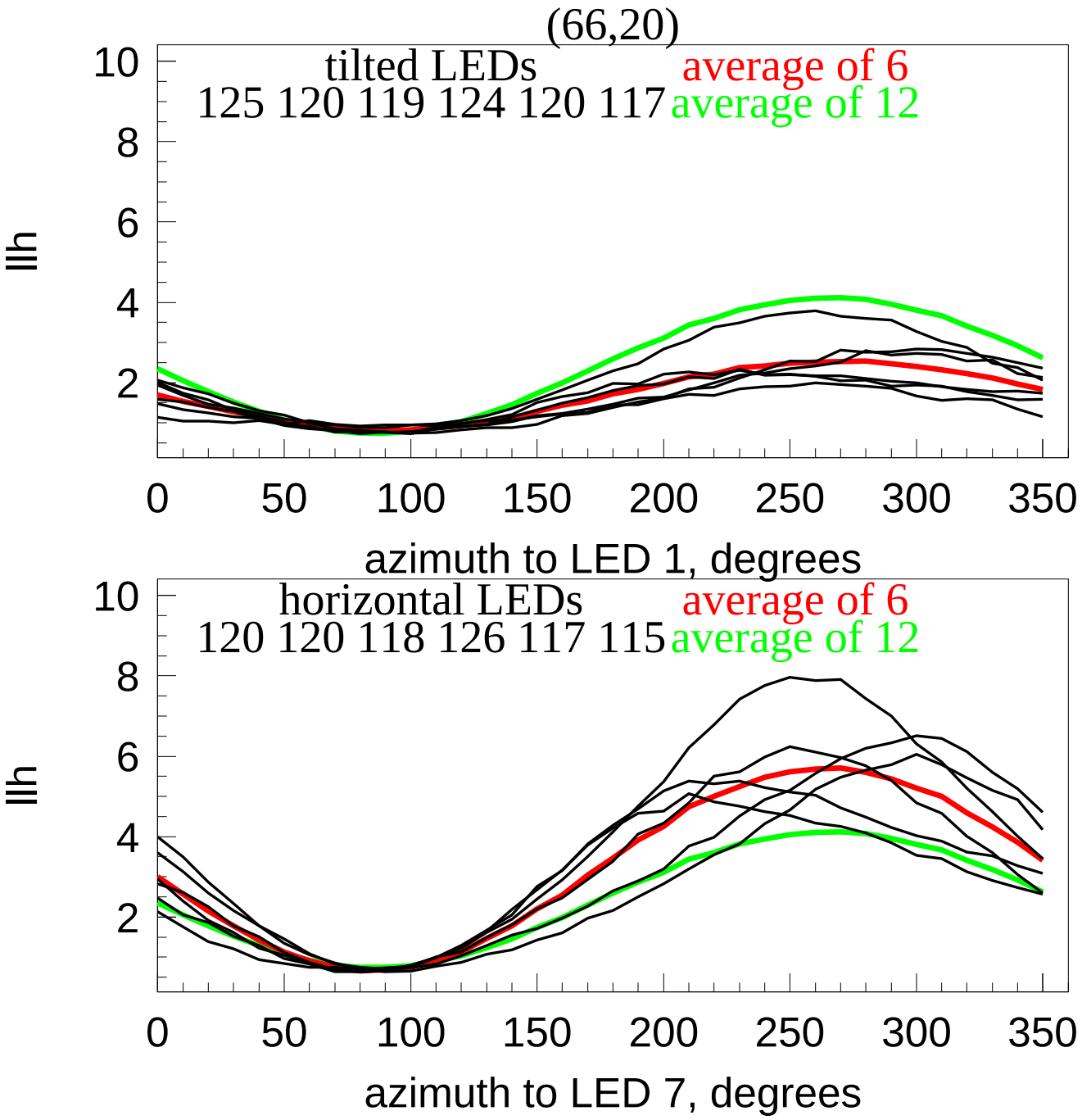

(66,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
229.3 ± 5.1

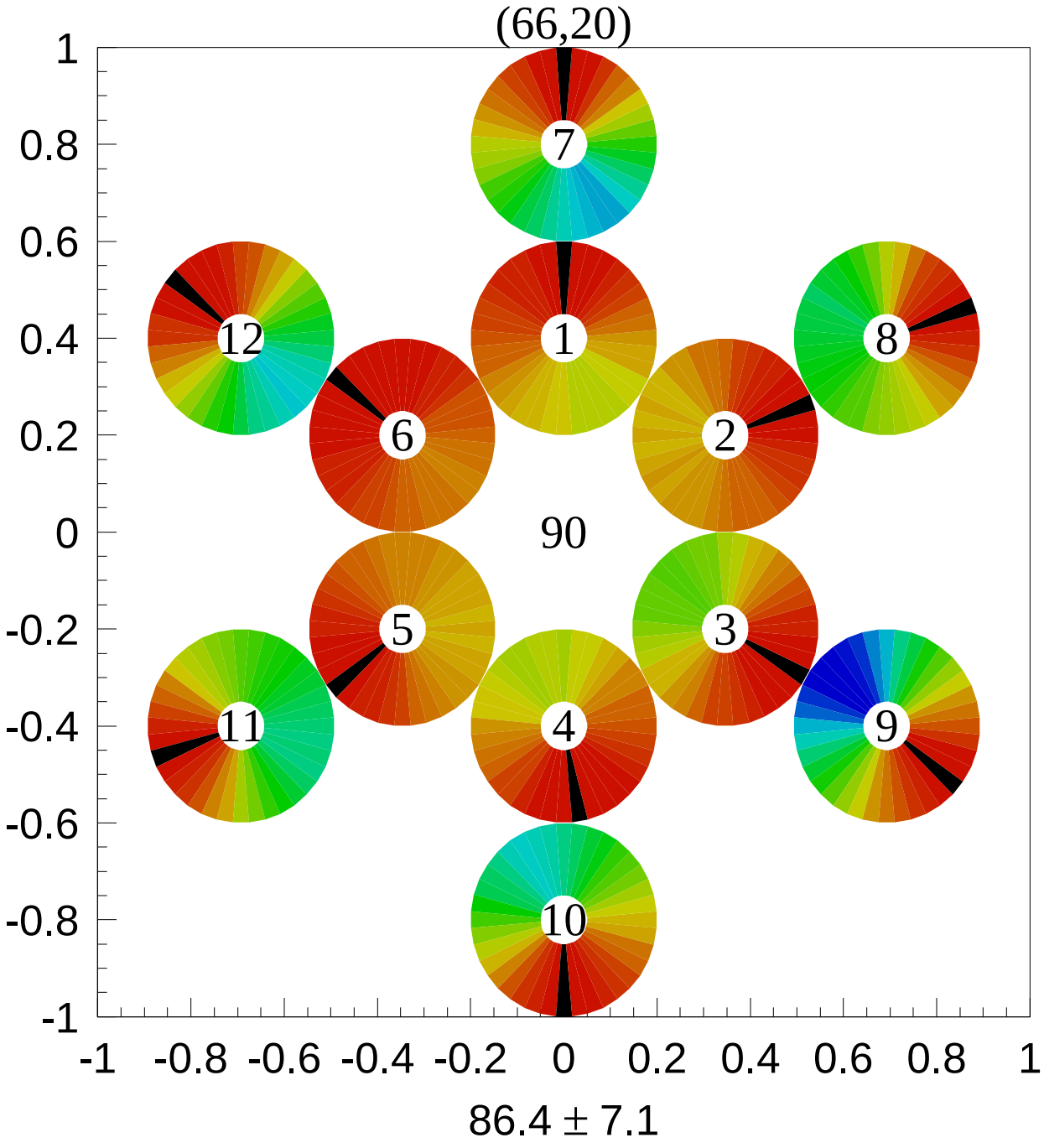

(66,17)
tilted LEDs
117 124 129 124 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 125 117 119 126 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

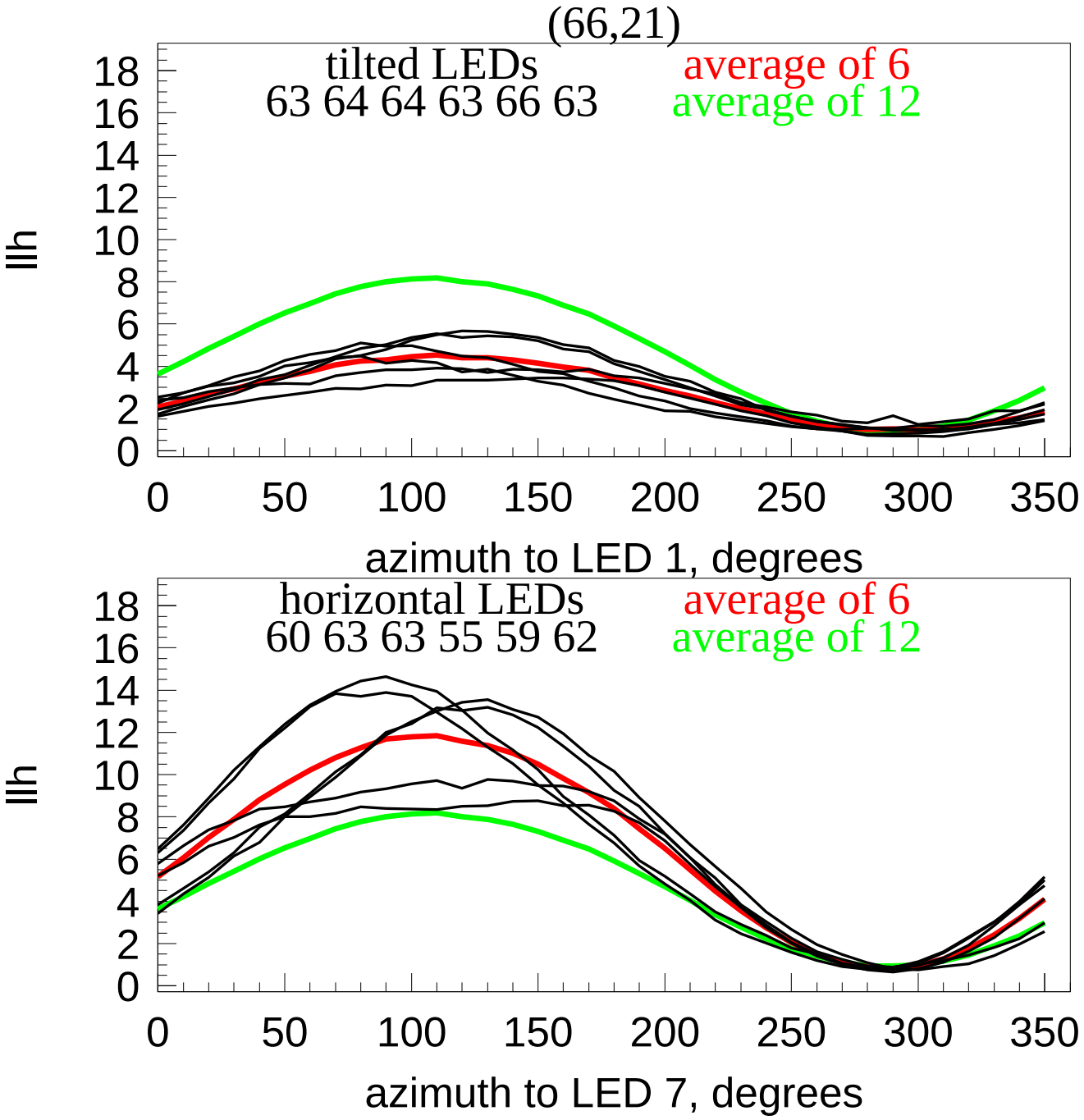

(66,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
137.3 ± 5.7
140
1
2
3
4
5
6
7
8
9
10
11
12

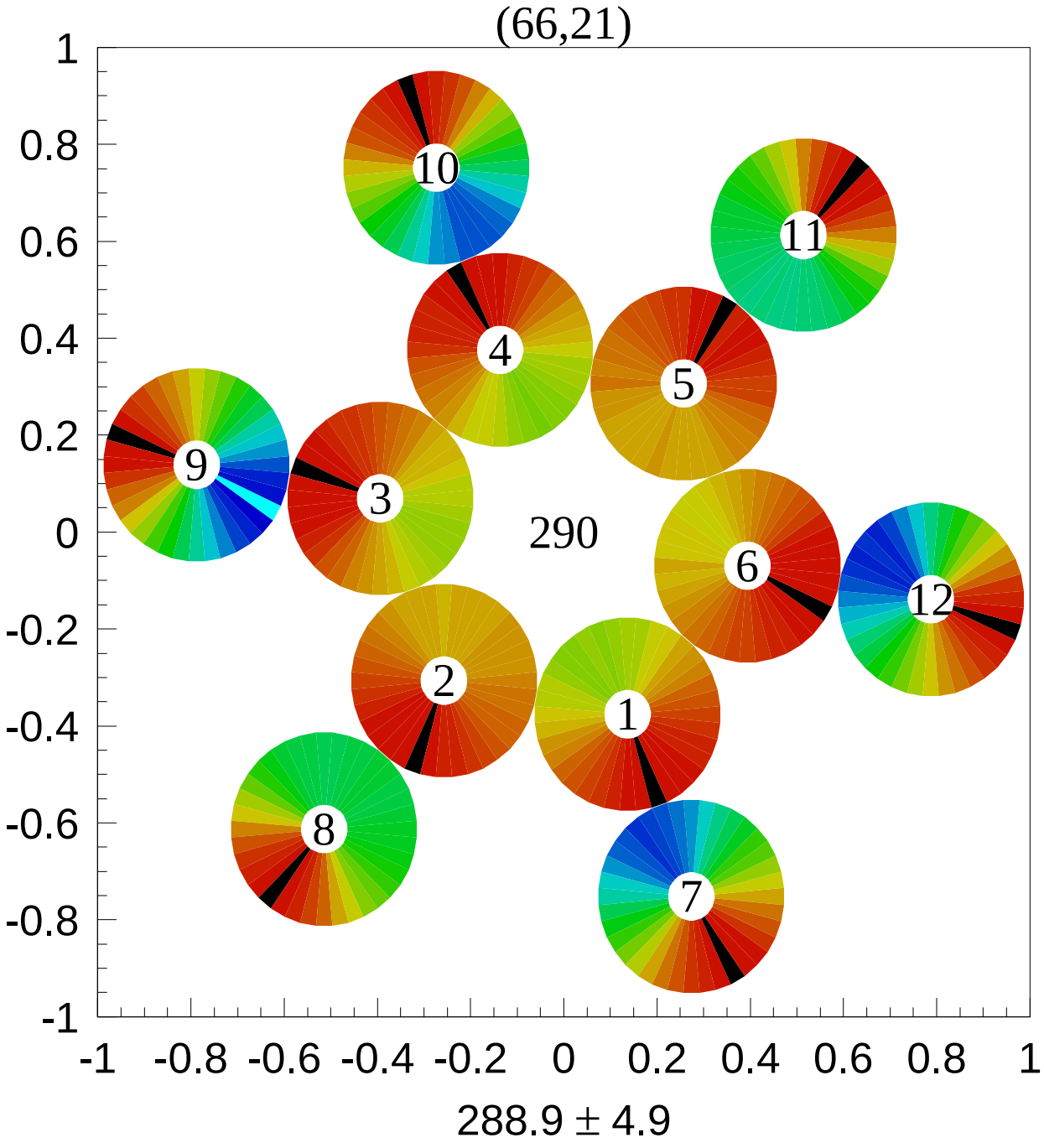

(66,19)
tilted LEDs
127 113 126 119 119 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 118 127 124 112 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

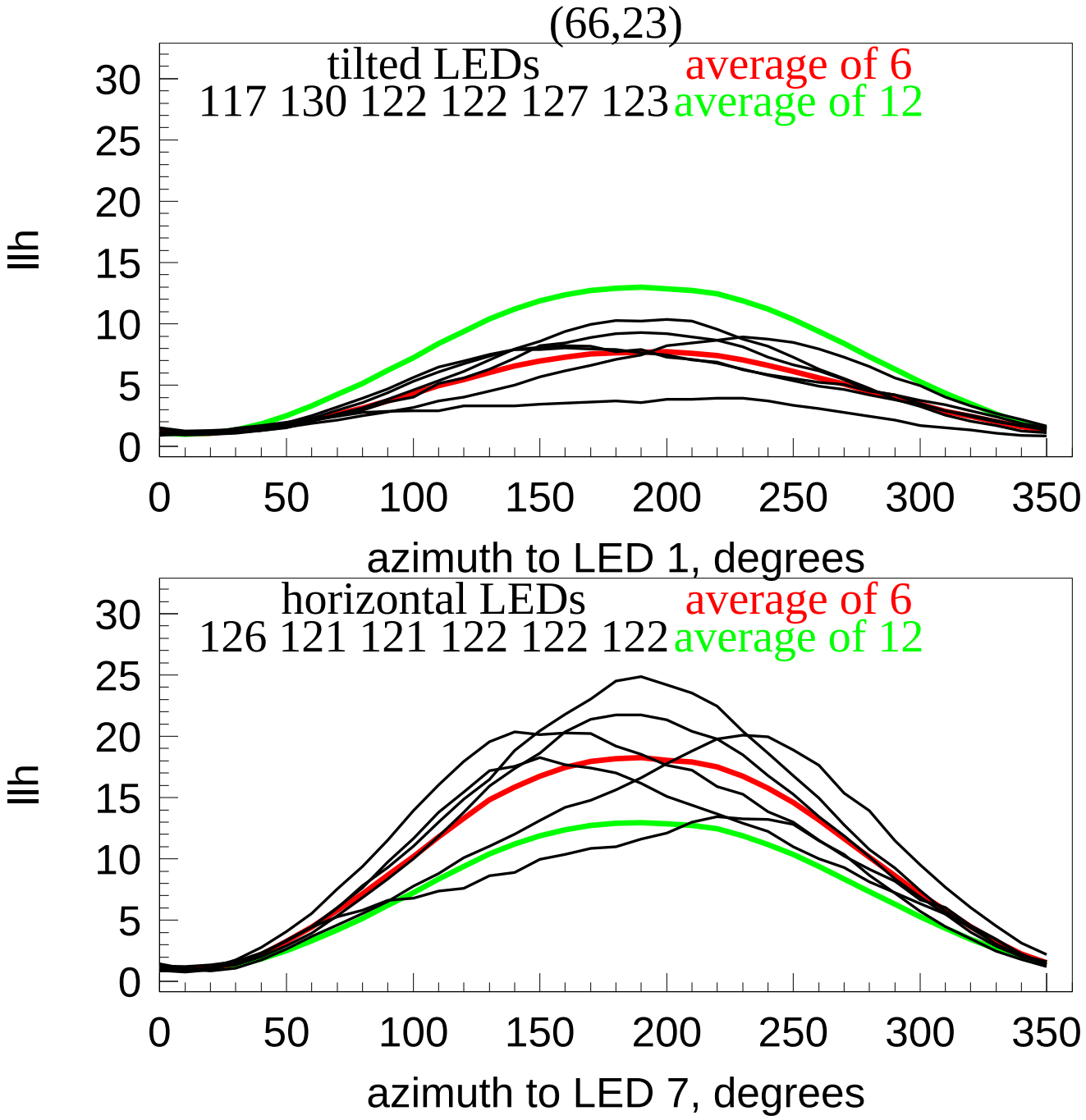

(66,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
37.2 ± 8.3

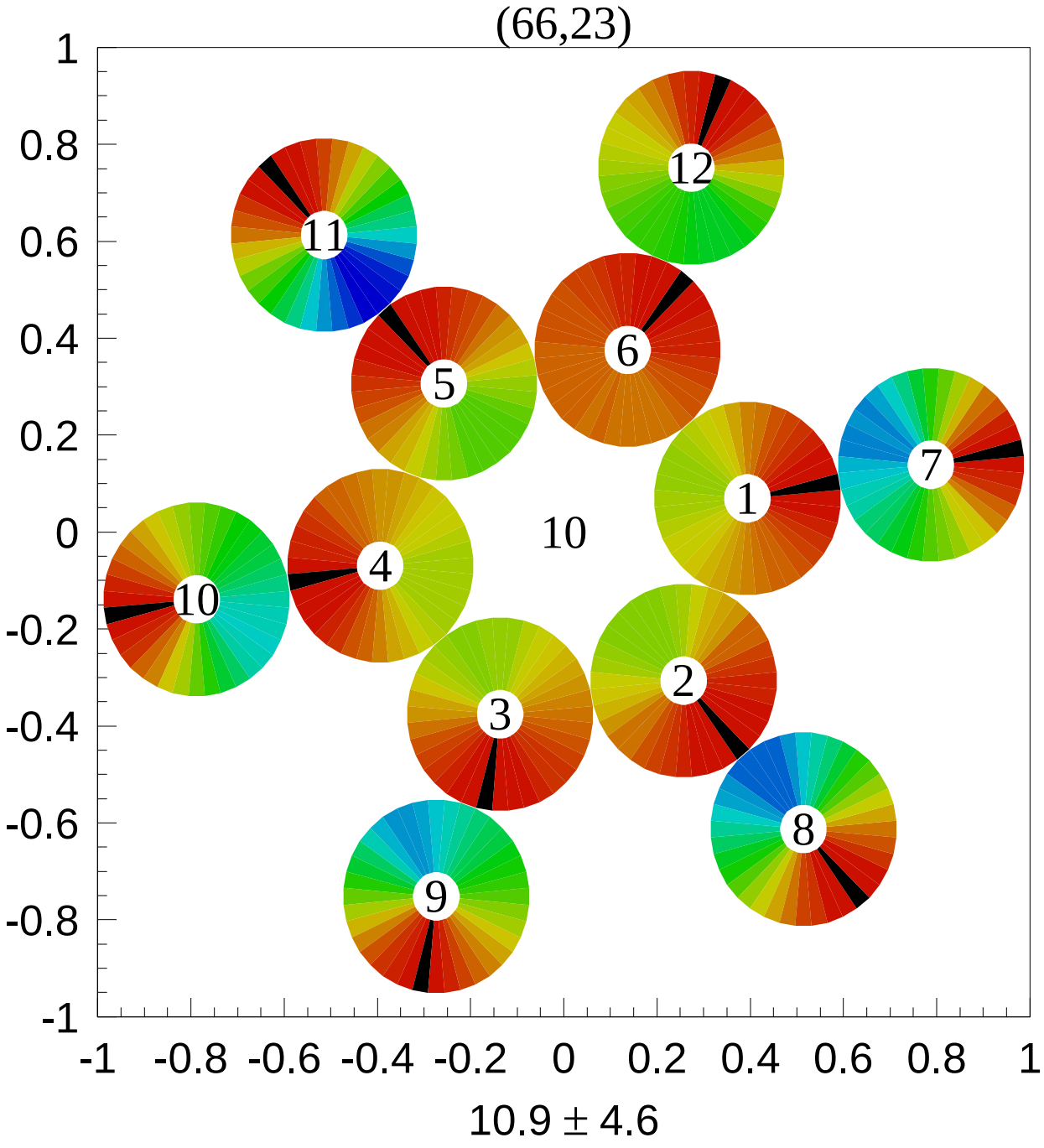

(66,20)
tilted LEDs
125 120 119 124 120 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 120 118 126 117 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

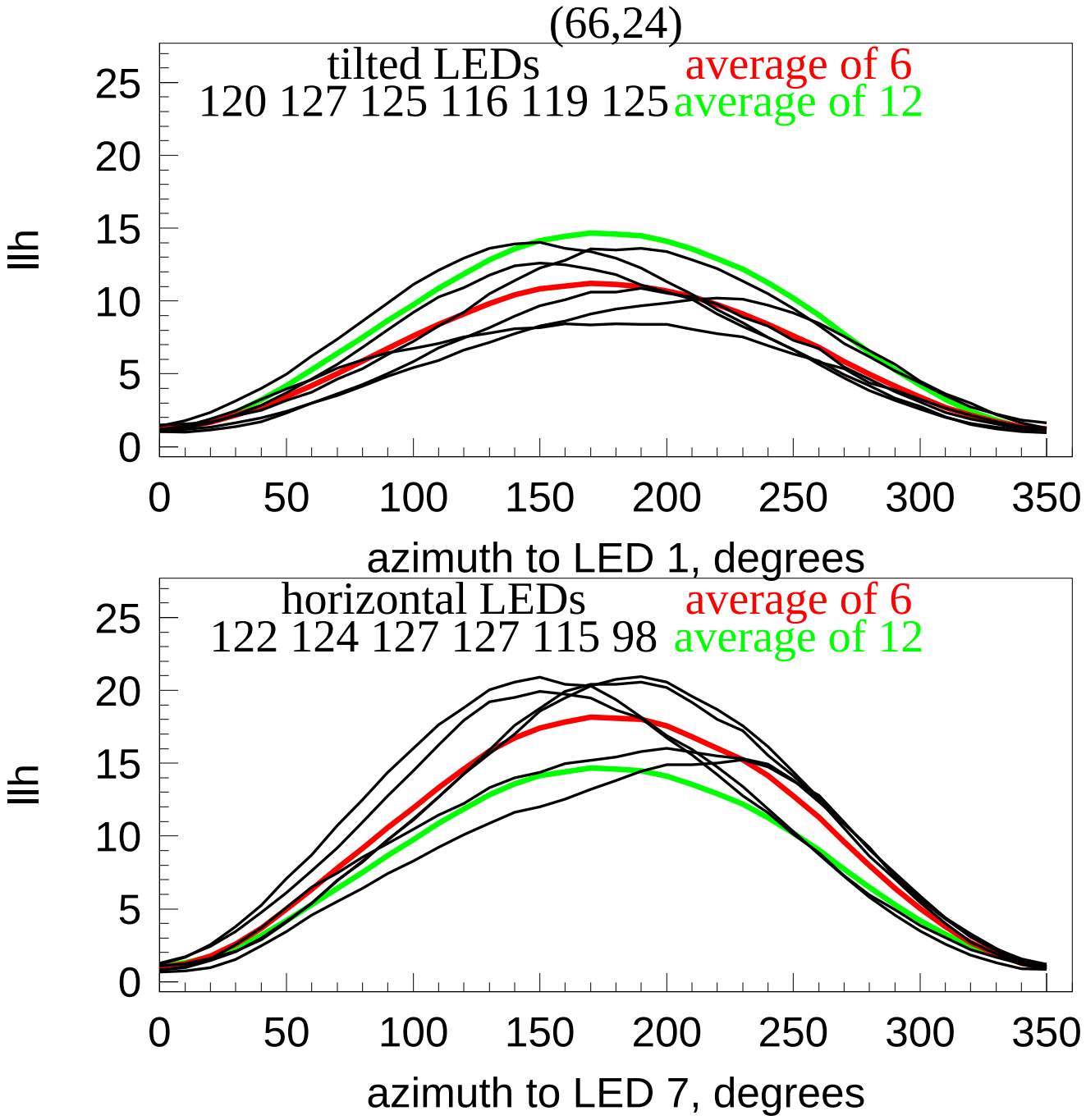

(66,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
86.4 ± 7.1

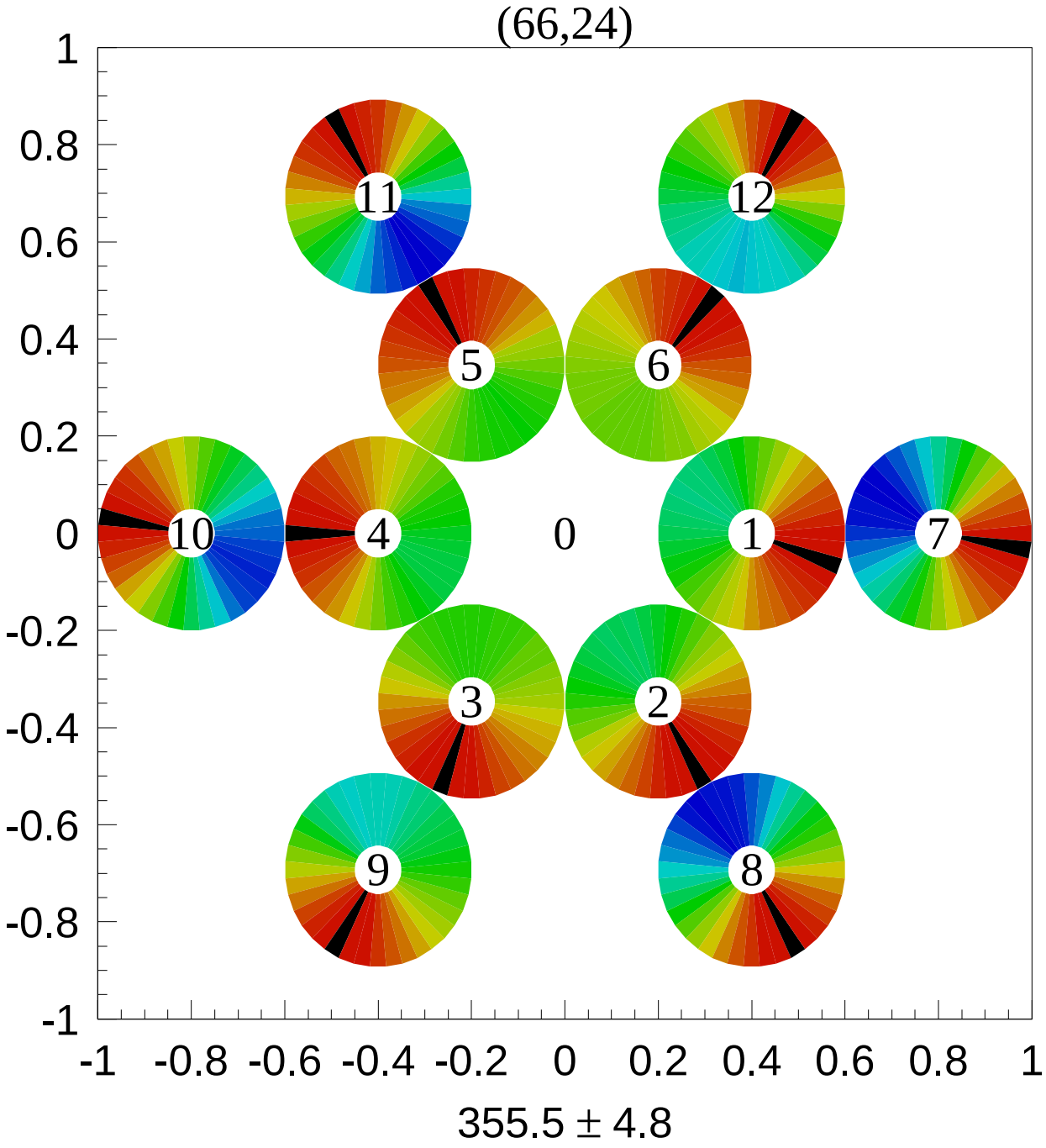

(66,21)
tilted LEDs
63 64 64 63 66 63
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
60 63 63 55 59 62
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

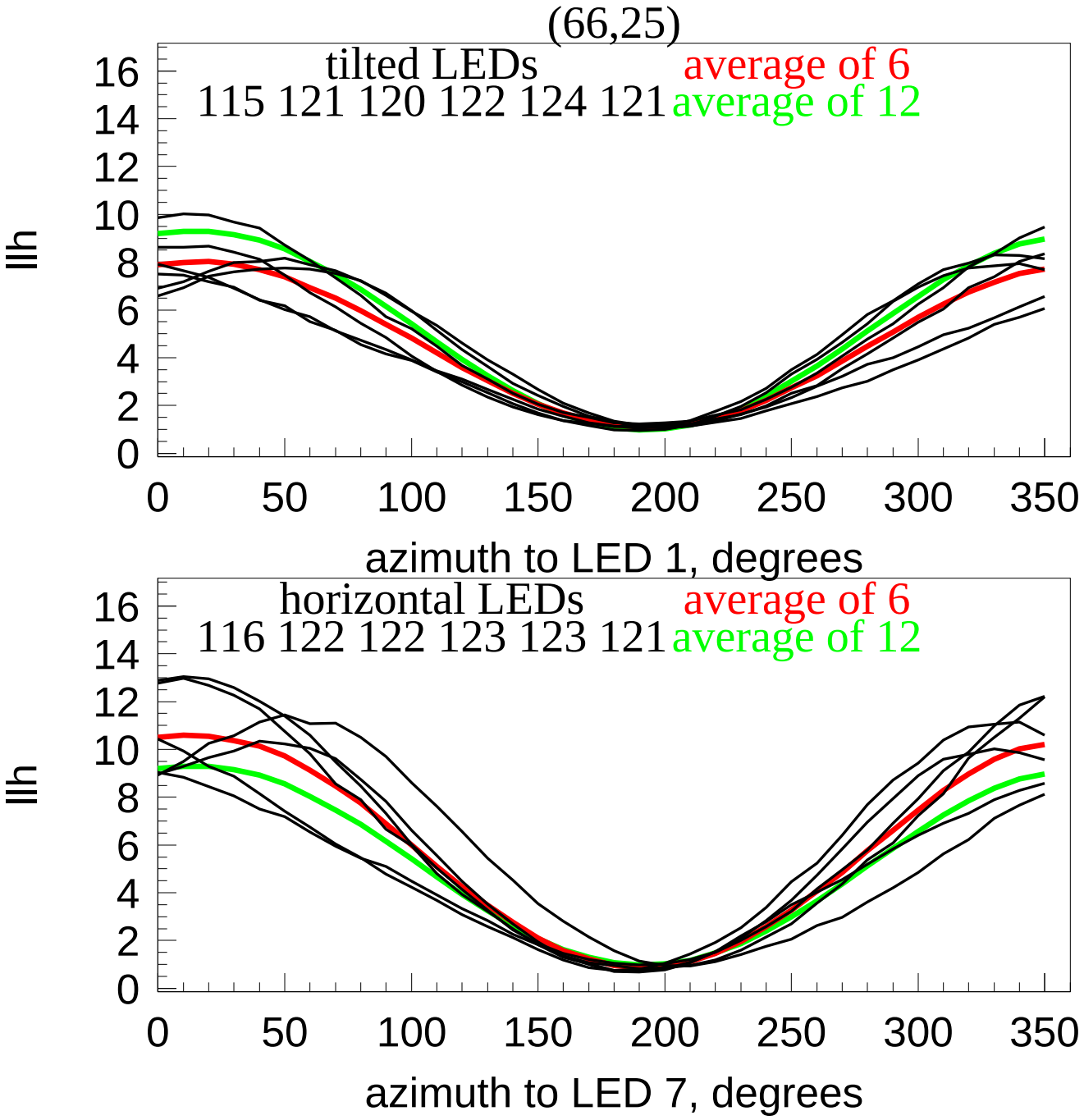

(66,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
288.9 ± 4.9

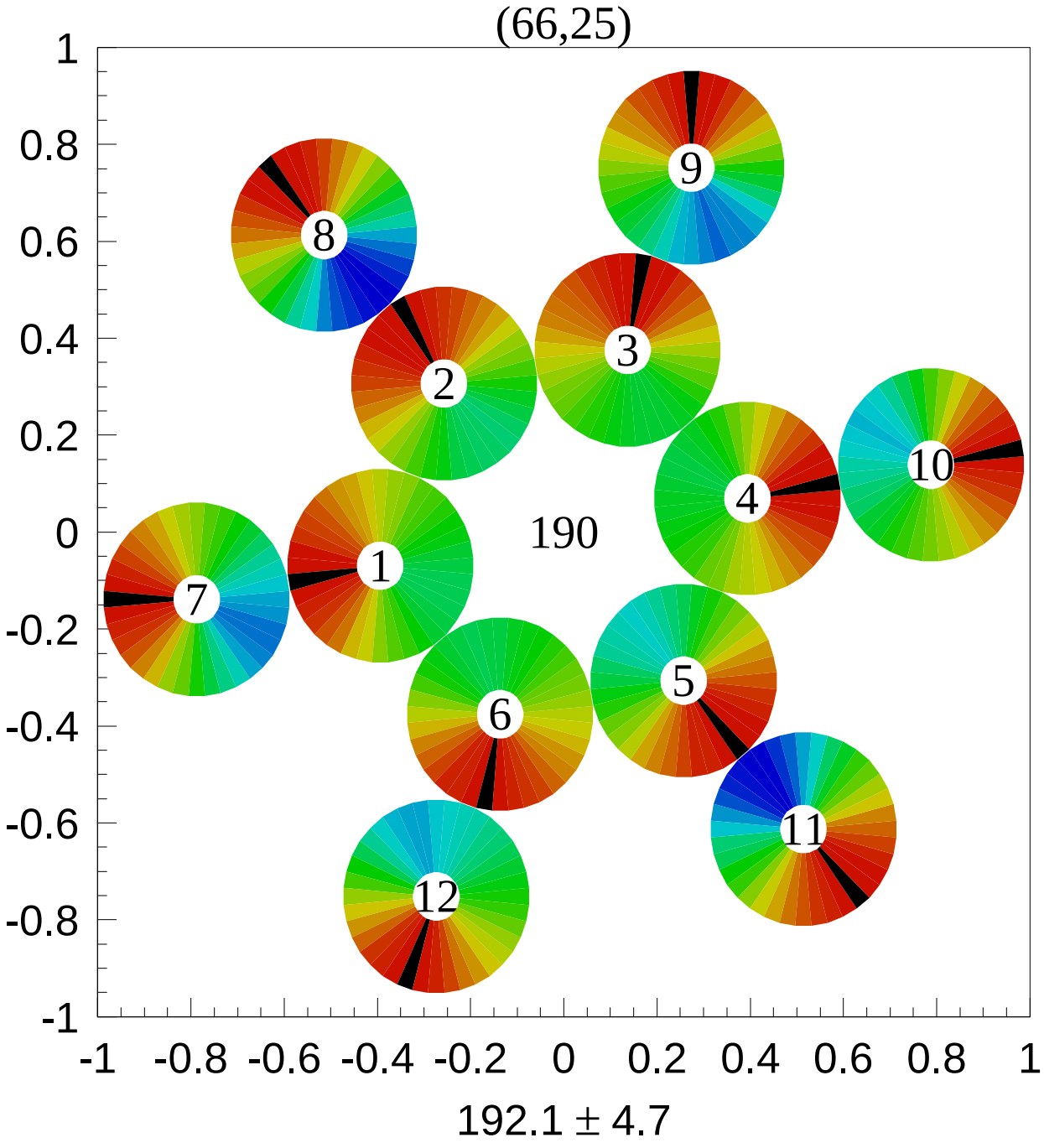

(66,23)
tilted LEDs
117 130 122 122 127 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 121 121 122 122 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

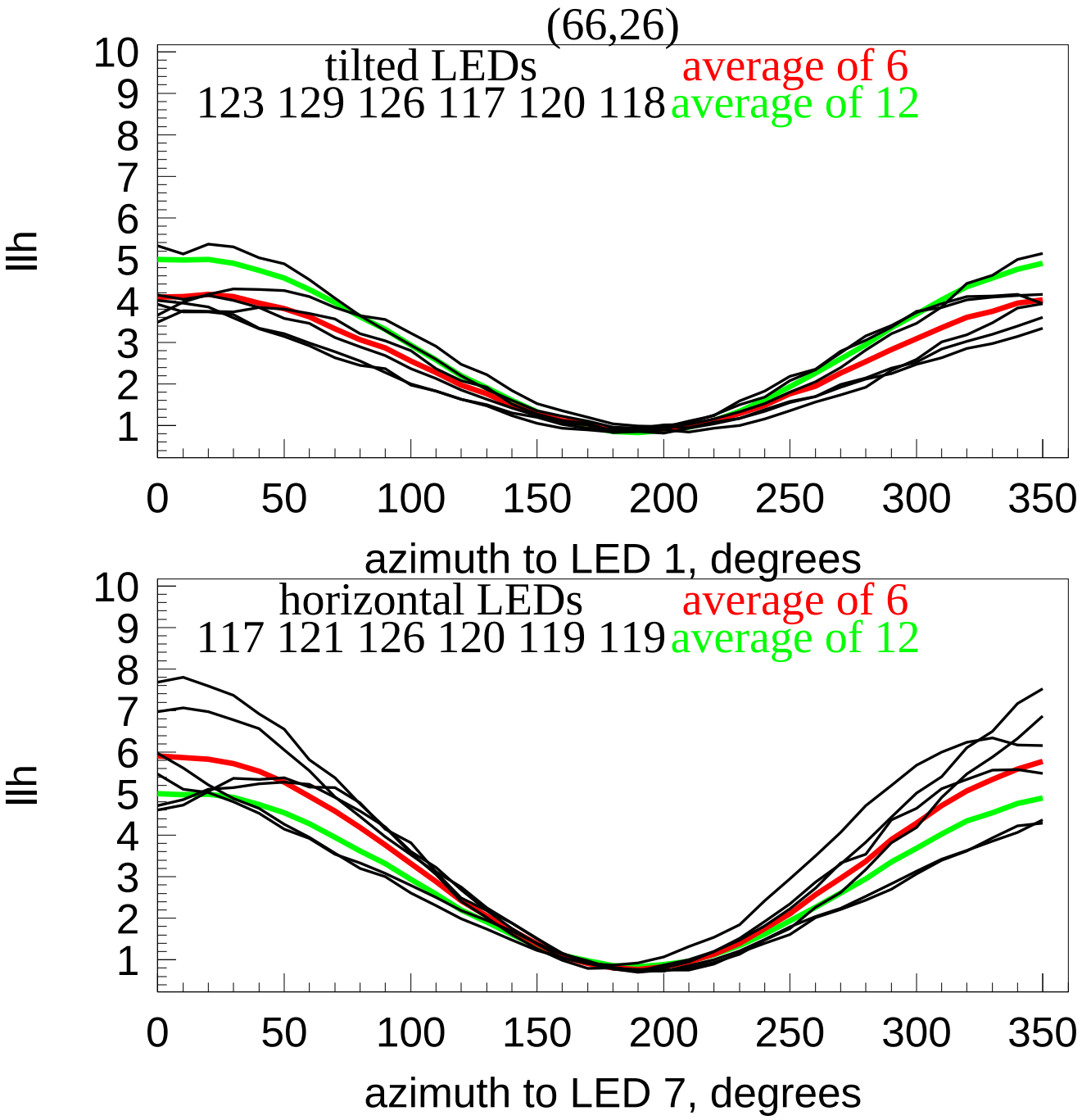

(66,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10.9 ± 4.6
12
11
6
5
7
1
10
4
10
2
3
8
9

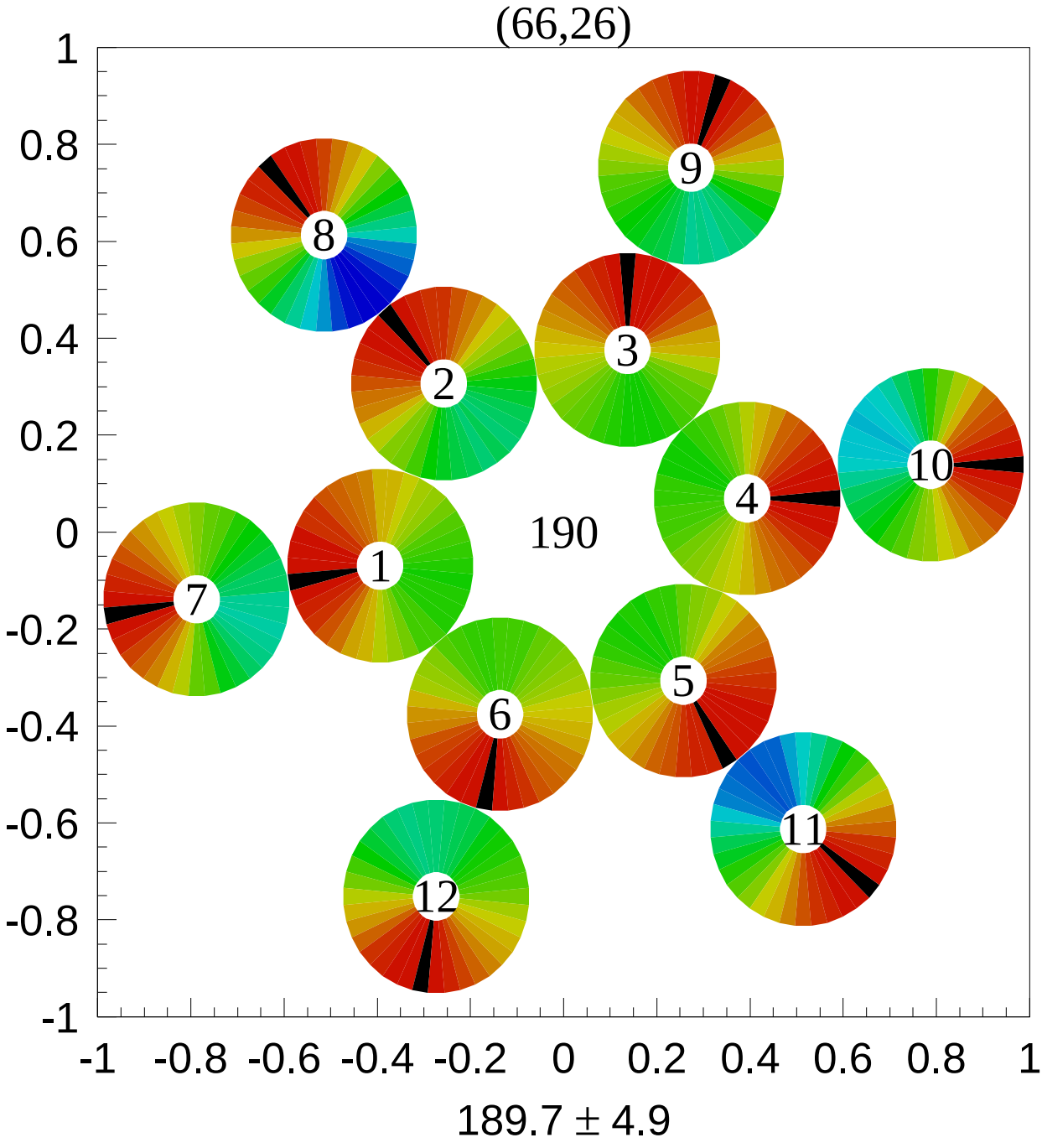

(66,24)
tilted LEDs
120 127 125 116 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 127 127 115 98
average of 6
average of 12
llh
azimuth to LED 7, degrees

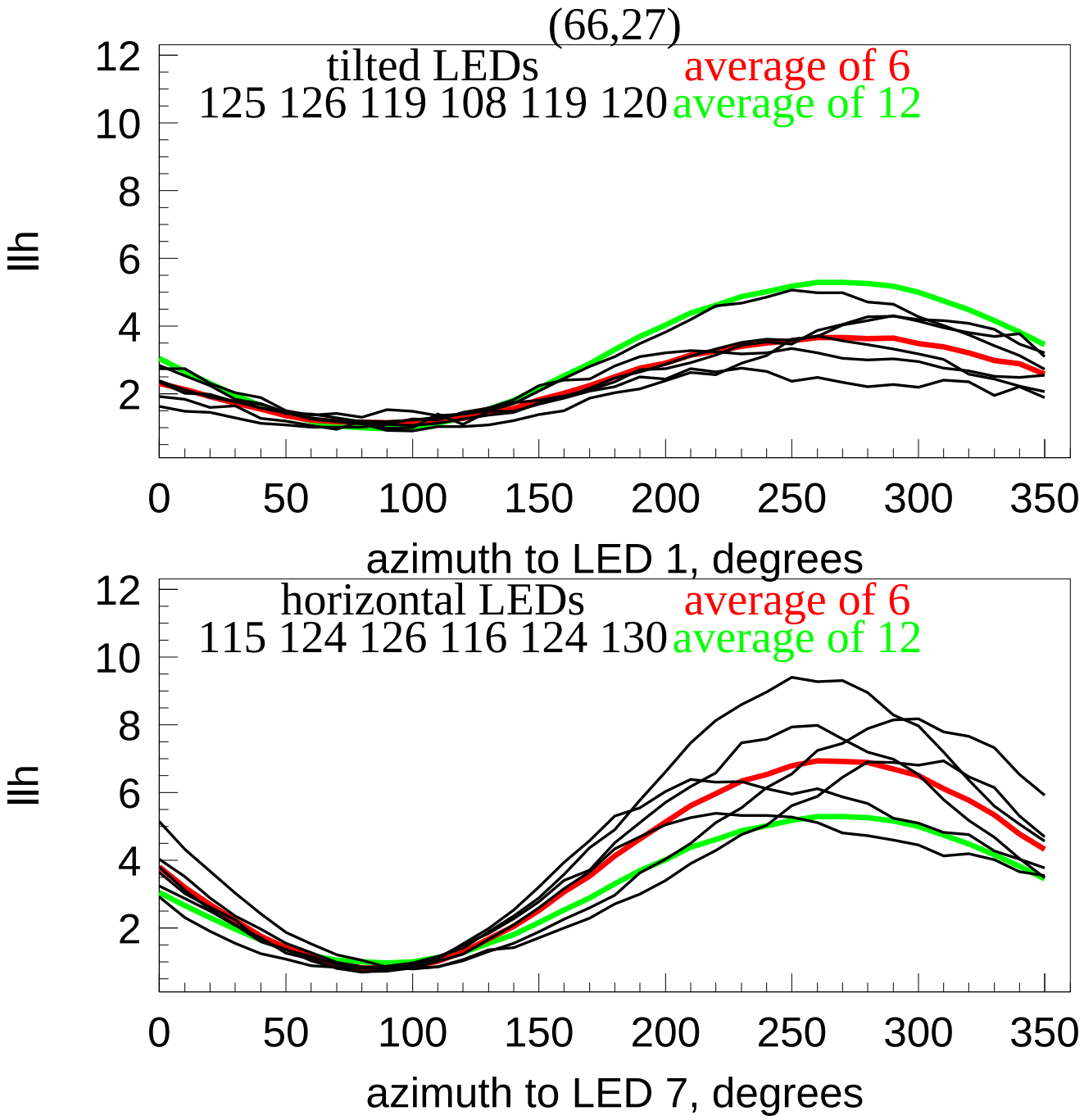

(66,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
355.5 ± 4.8
11
12
5
6
10
4
0
1
7
3
2
9
8

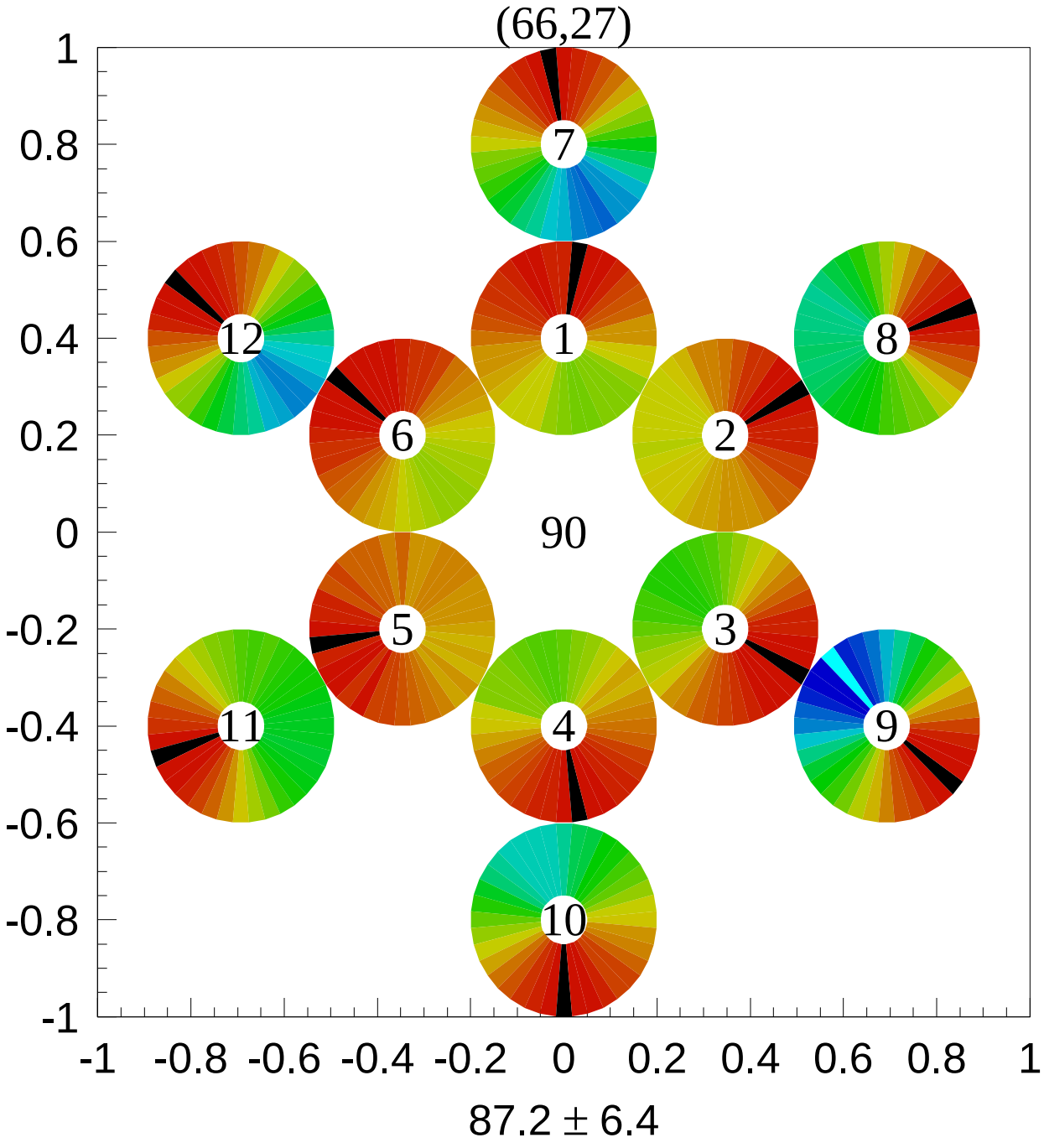

(66,25)
tilted LEDs
115 121 120 122 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 122 122 123 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

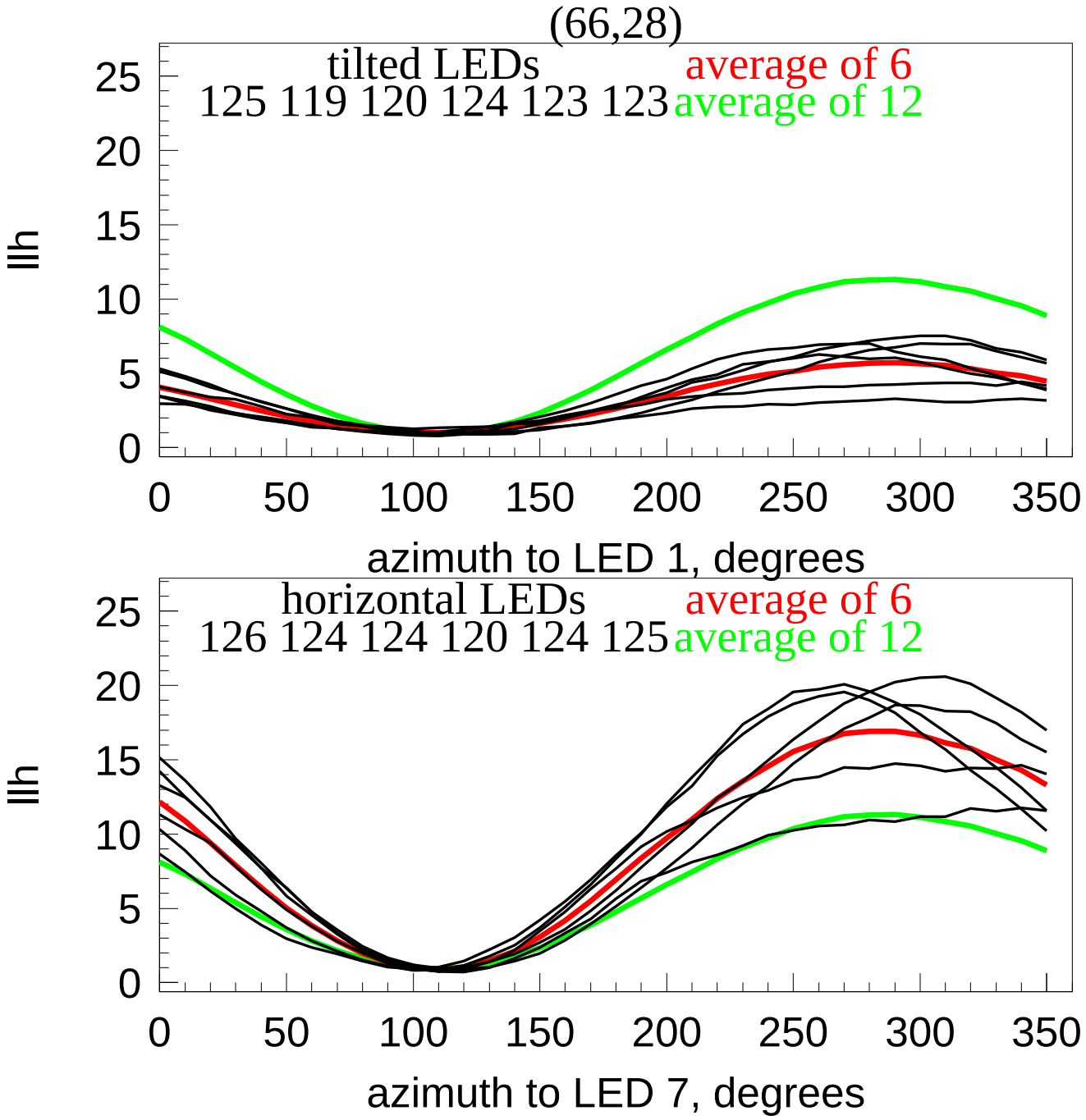

(66,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
192.1 ± 4.7
190
1
2
3
4
5
6
7
8
9
10
11
12

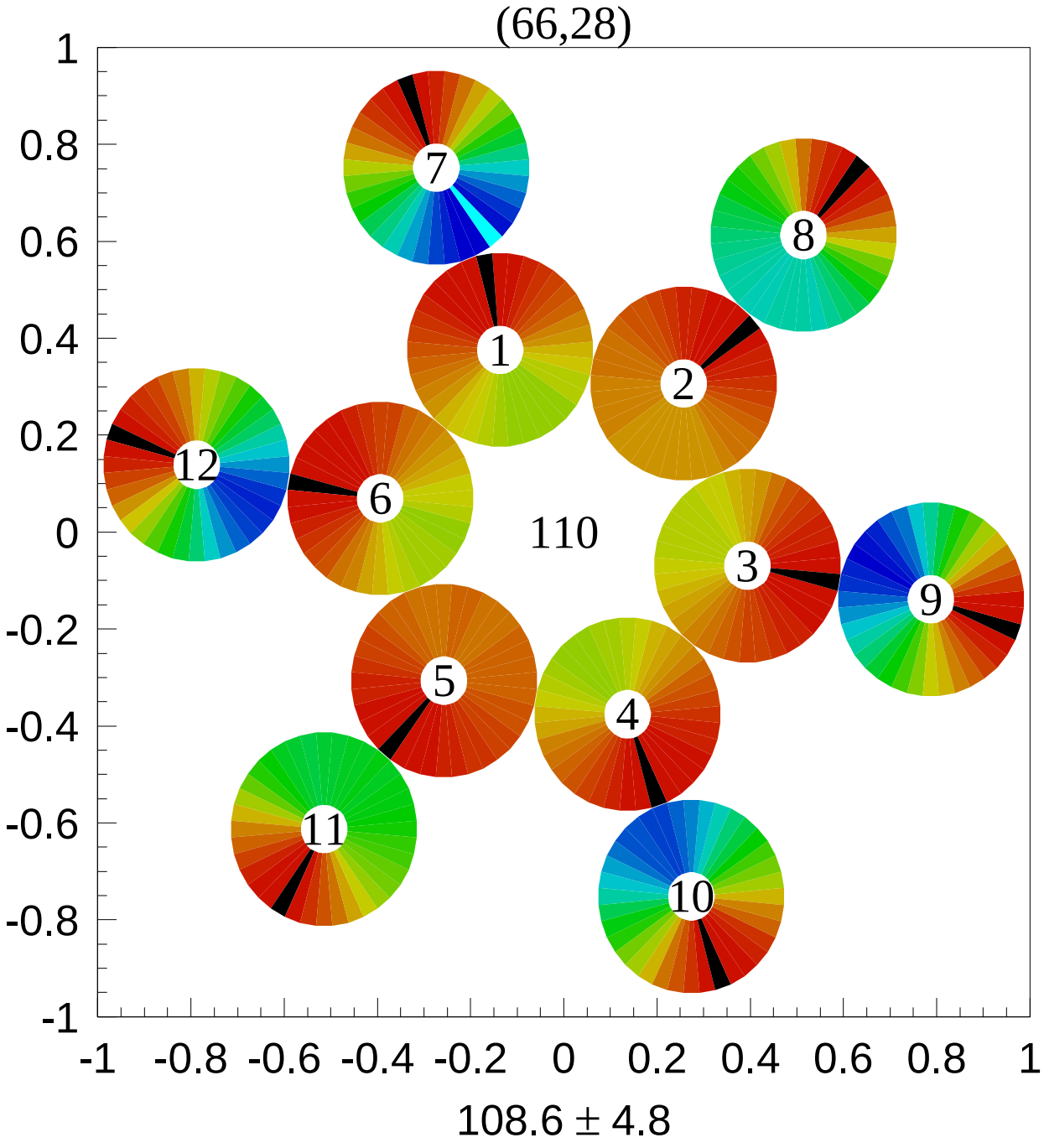

(66,26)
tilted LEDs
123 129 126 117 120 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 121 126 120 119 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

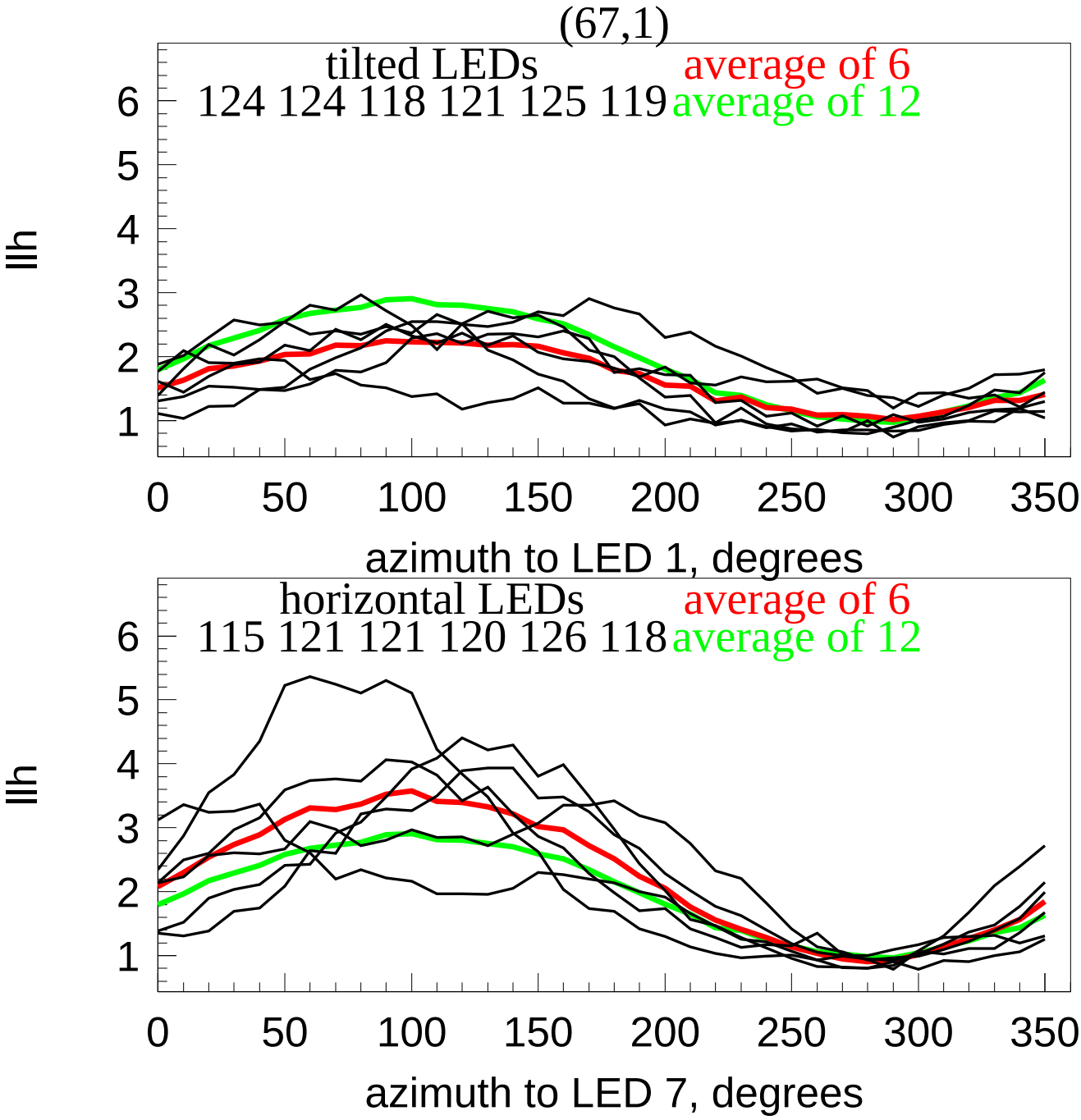

(66,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
189.7 ± 4.9

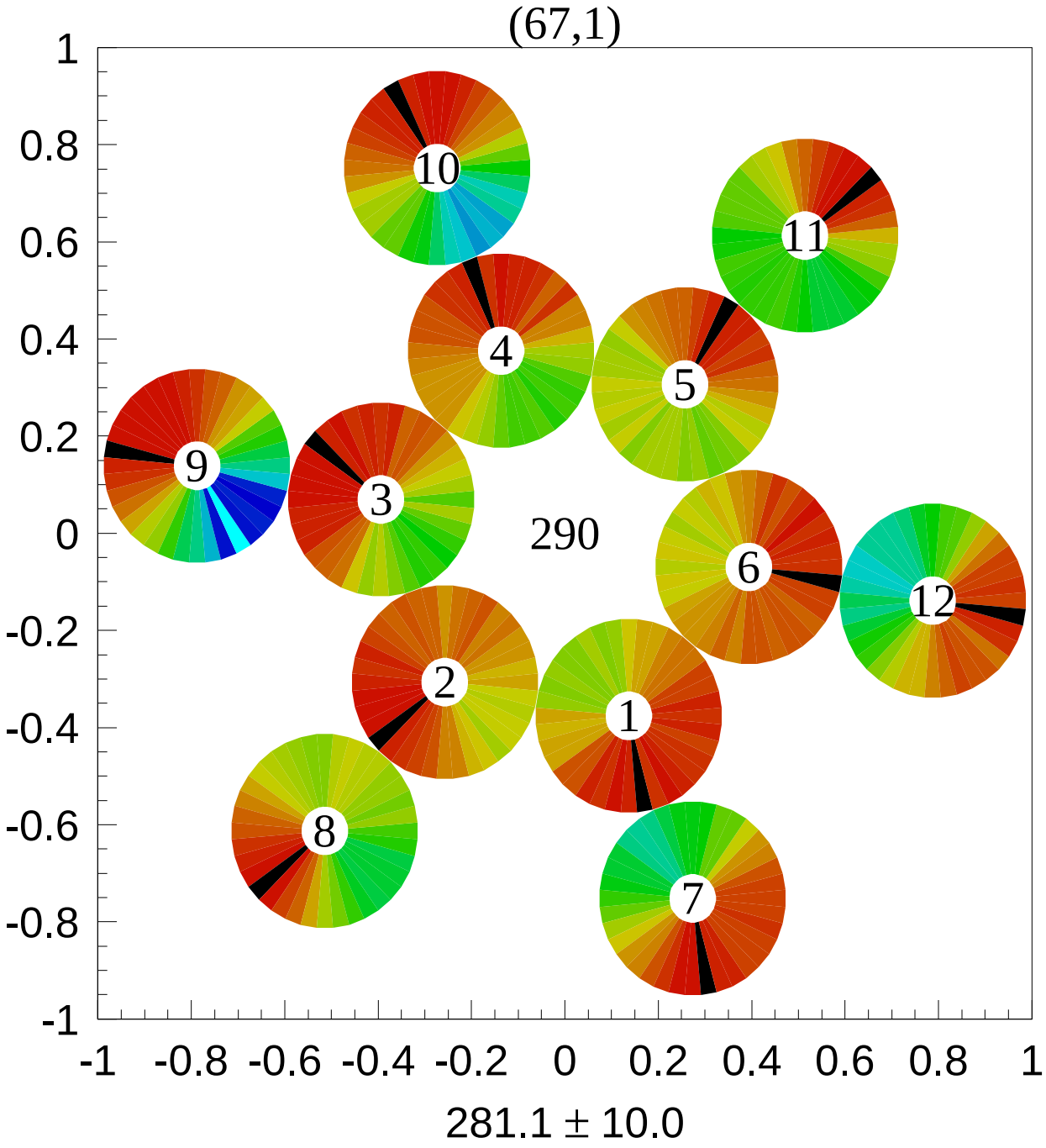

(66,27)
tilted LEDs
125 126 119 108 119 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 124 126 116 124 130
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

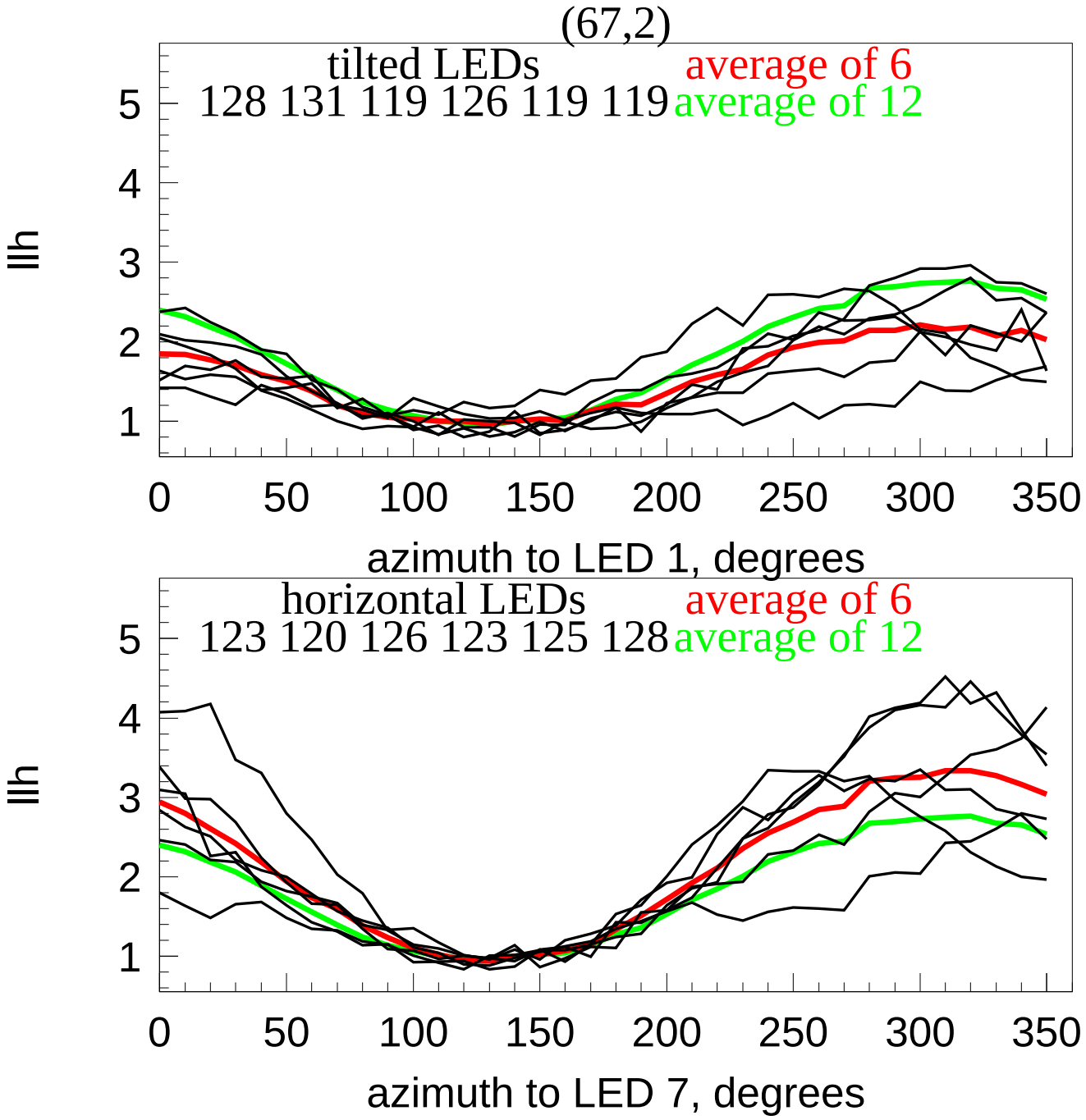

(66,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
87.2 ± 6.4

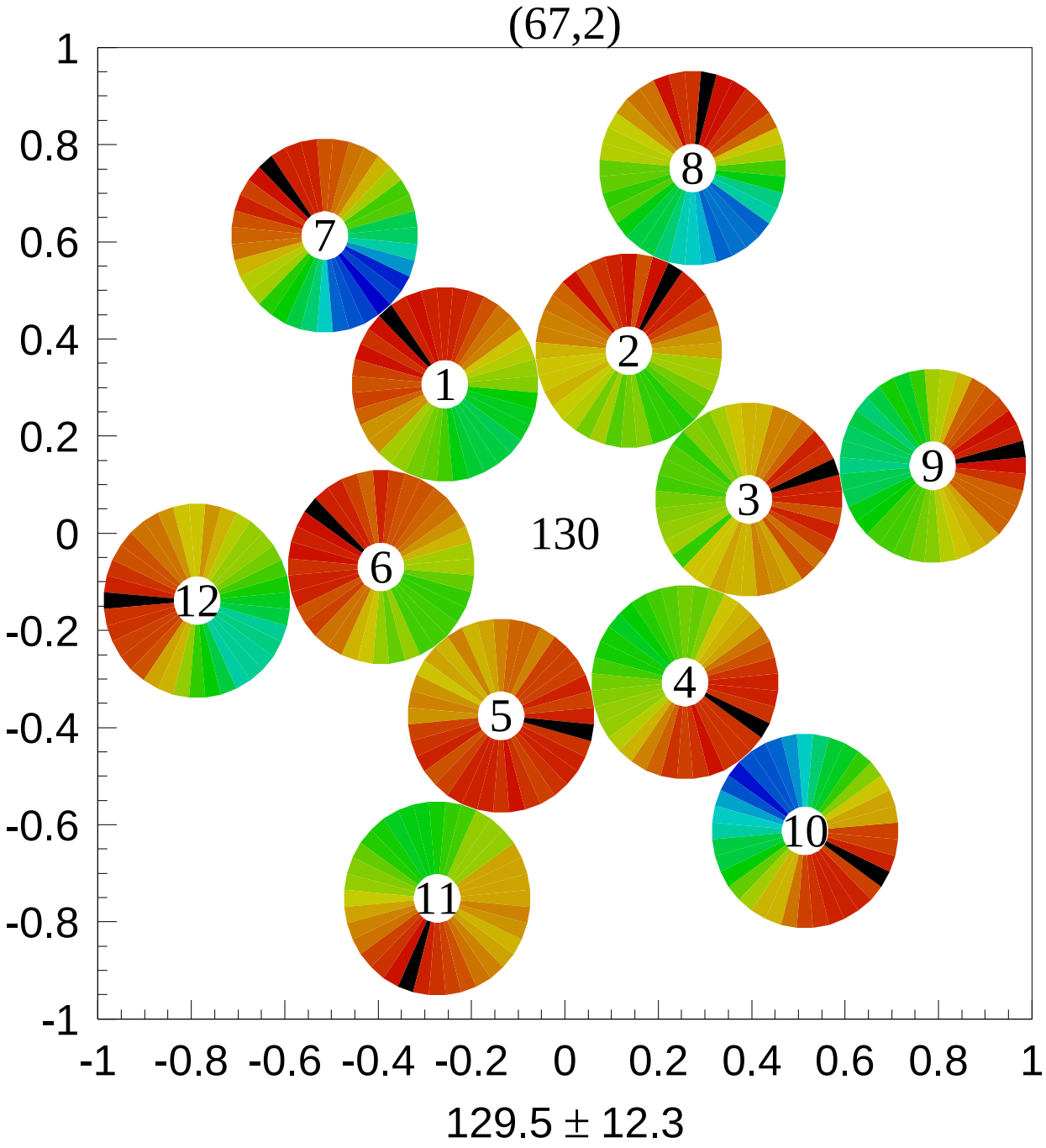

(66,28)
tilted LEDs
125 119 120 124 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 124 124 120 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

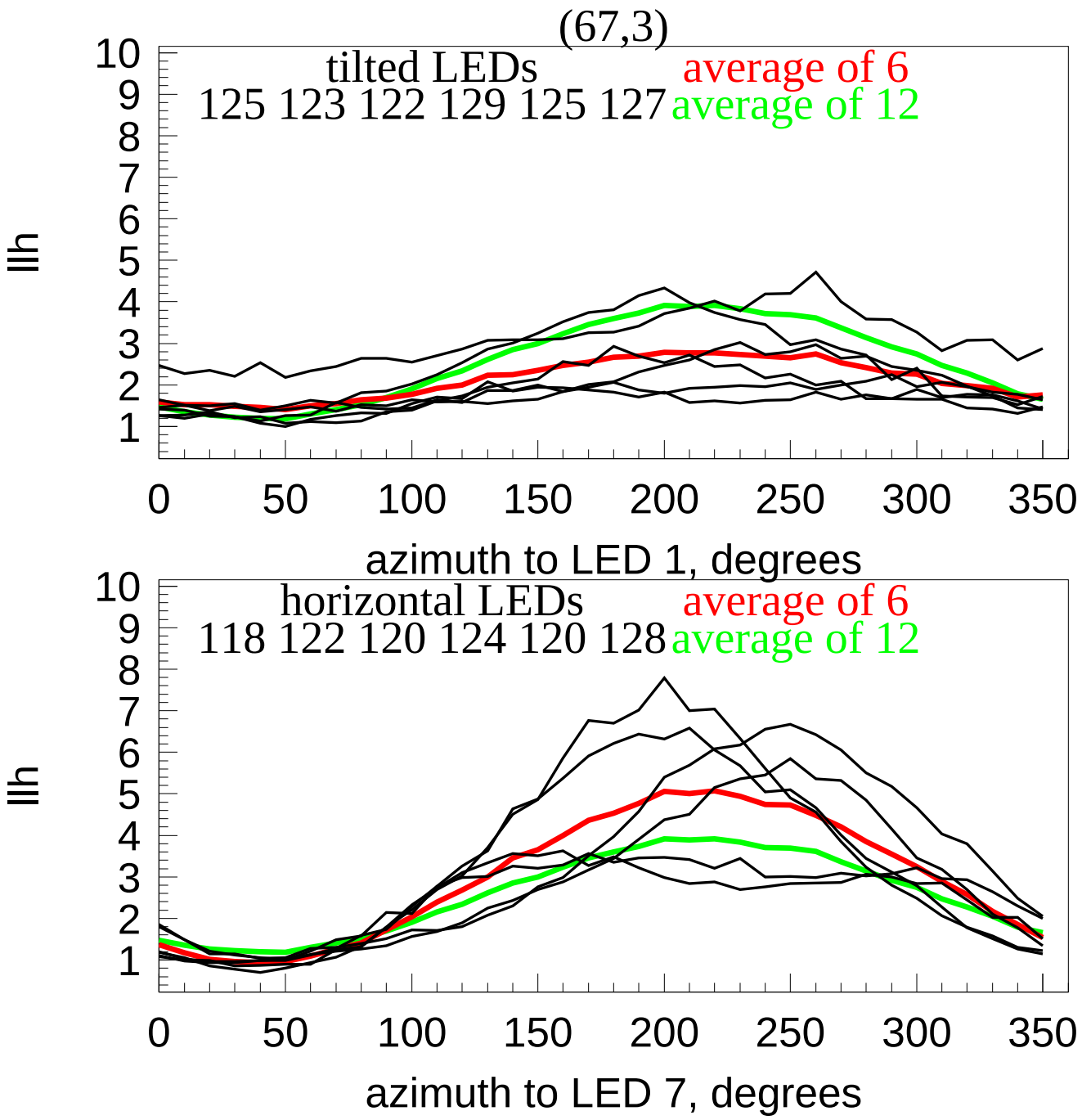

(66,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
108.6 ± 4.8

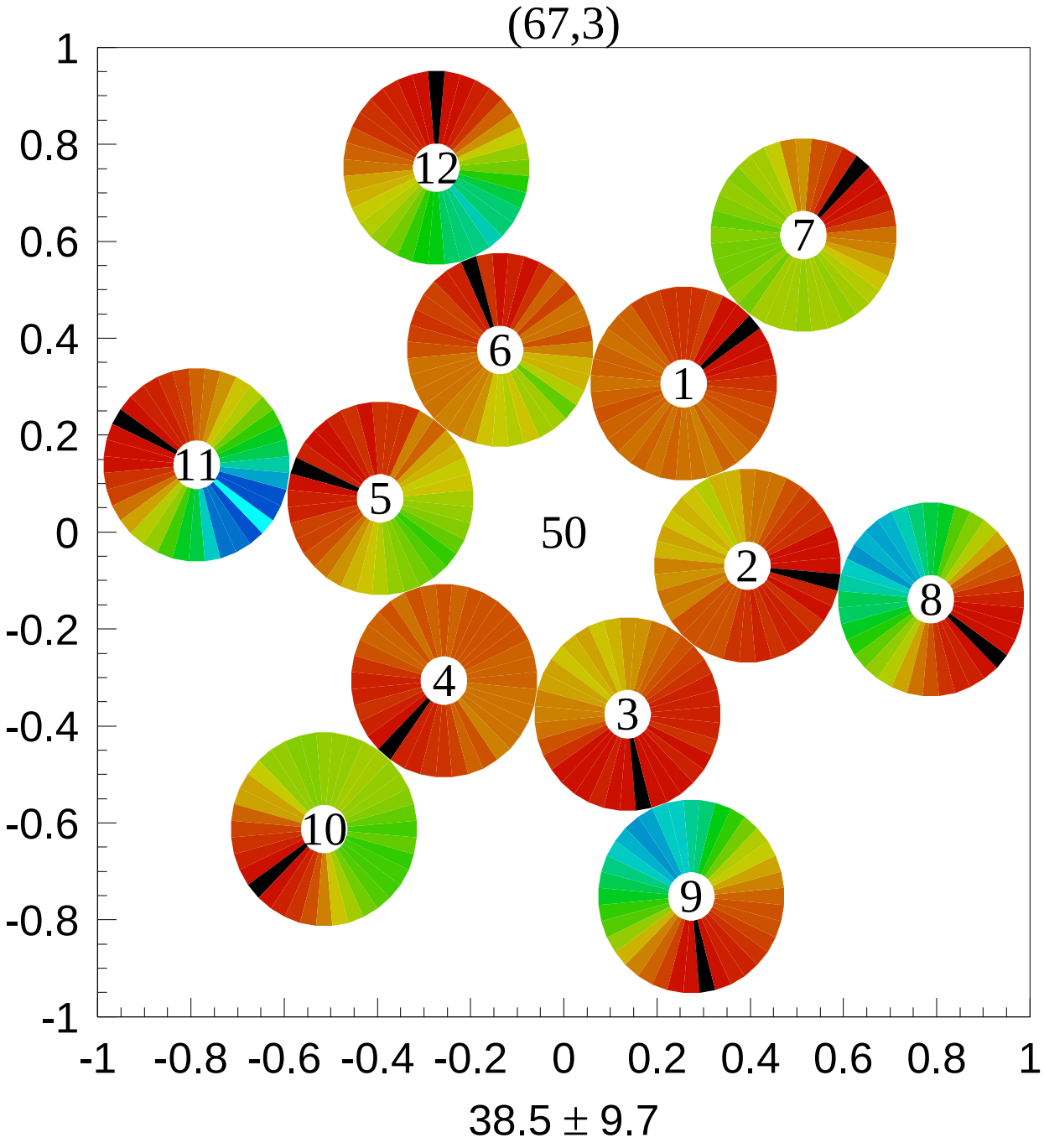

(67,1)
tilted LEDs
124 124 118 121 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 121 121 120 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

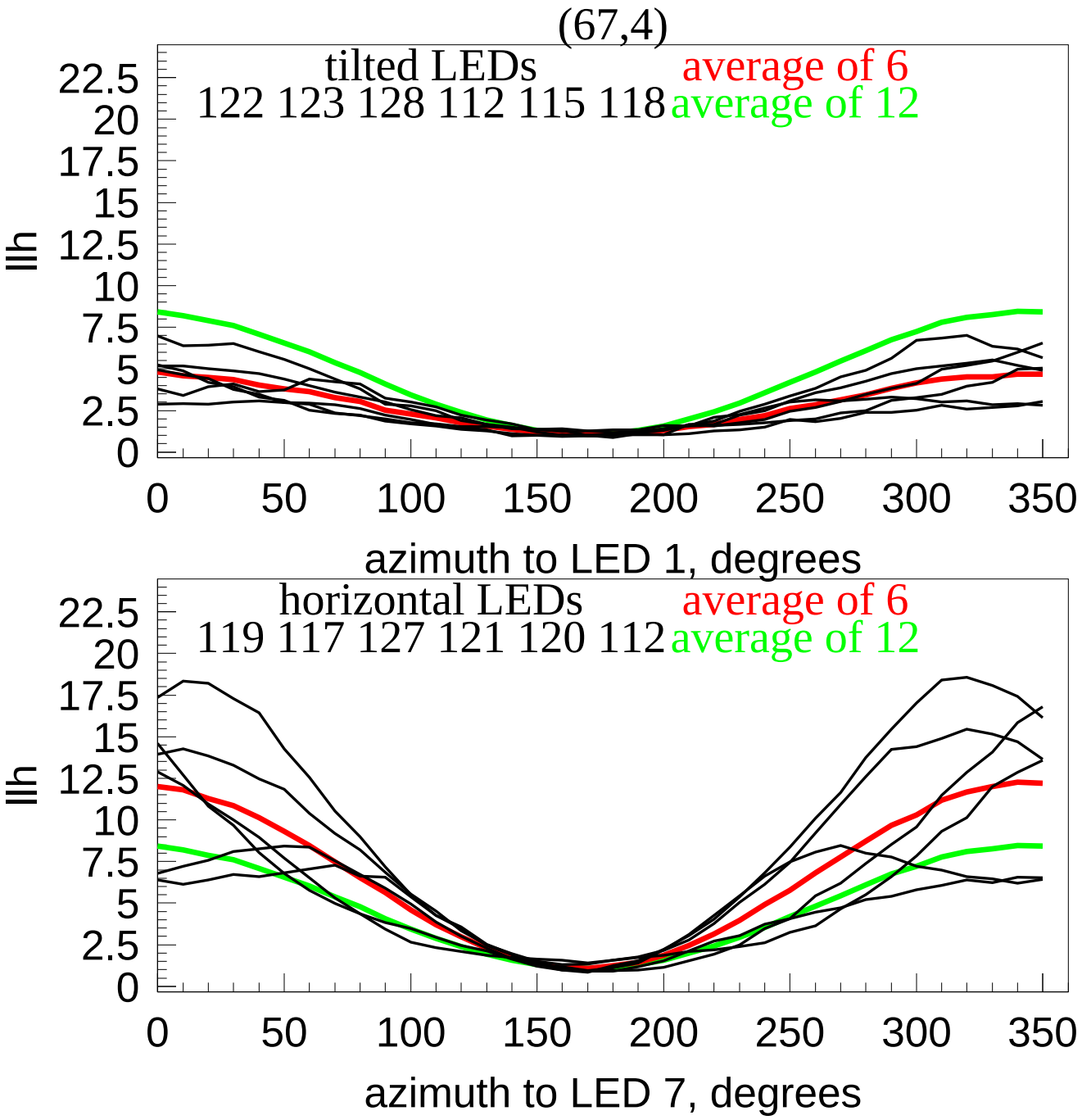

(67,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
281.1 ± 10.0

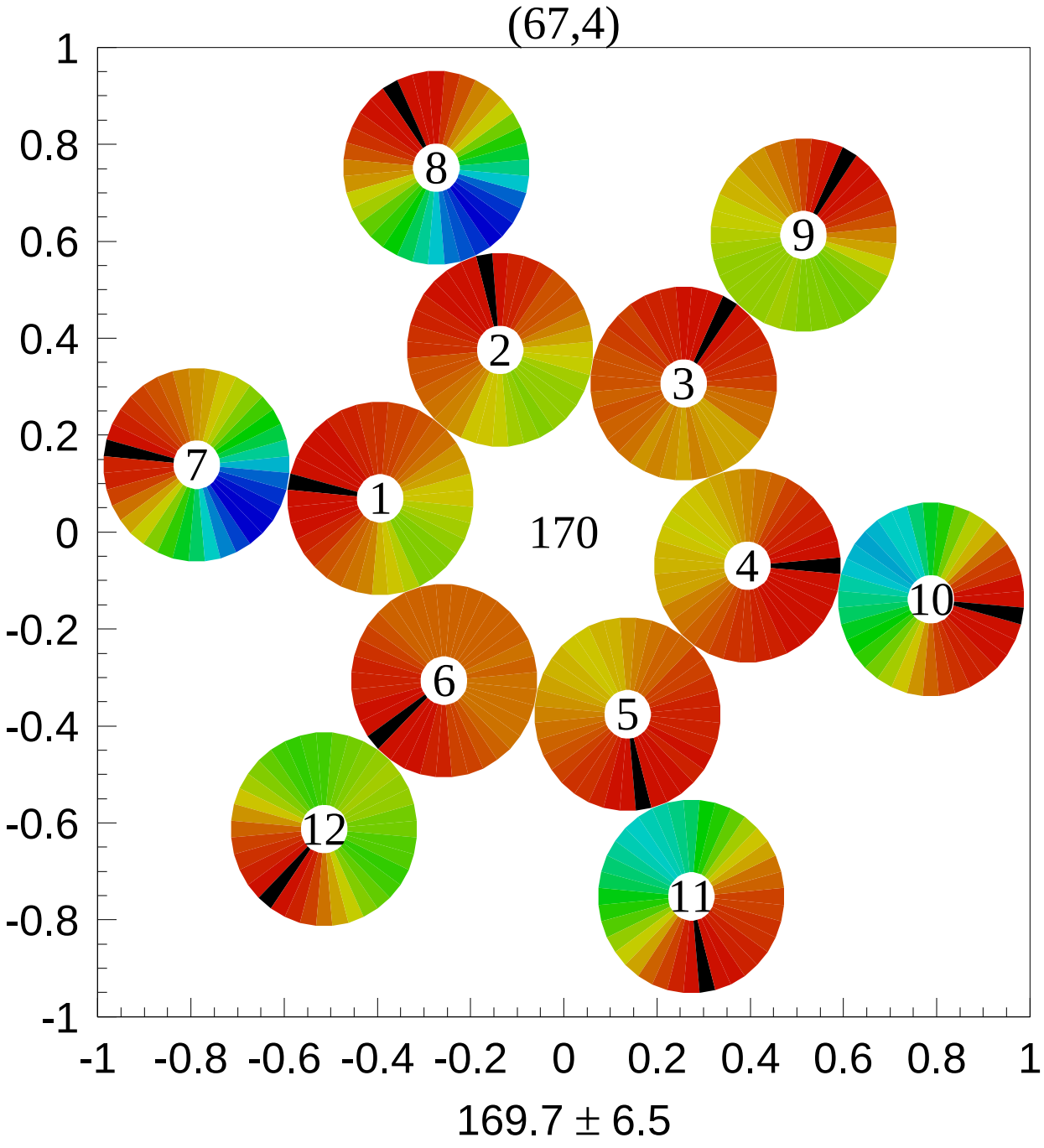

(67,2)
tilted LEDs
128 131 119 126 119 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 120 126 123 125 128
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

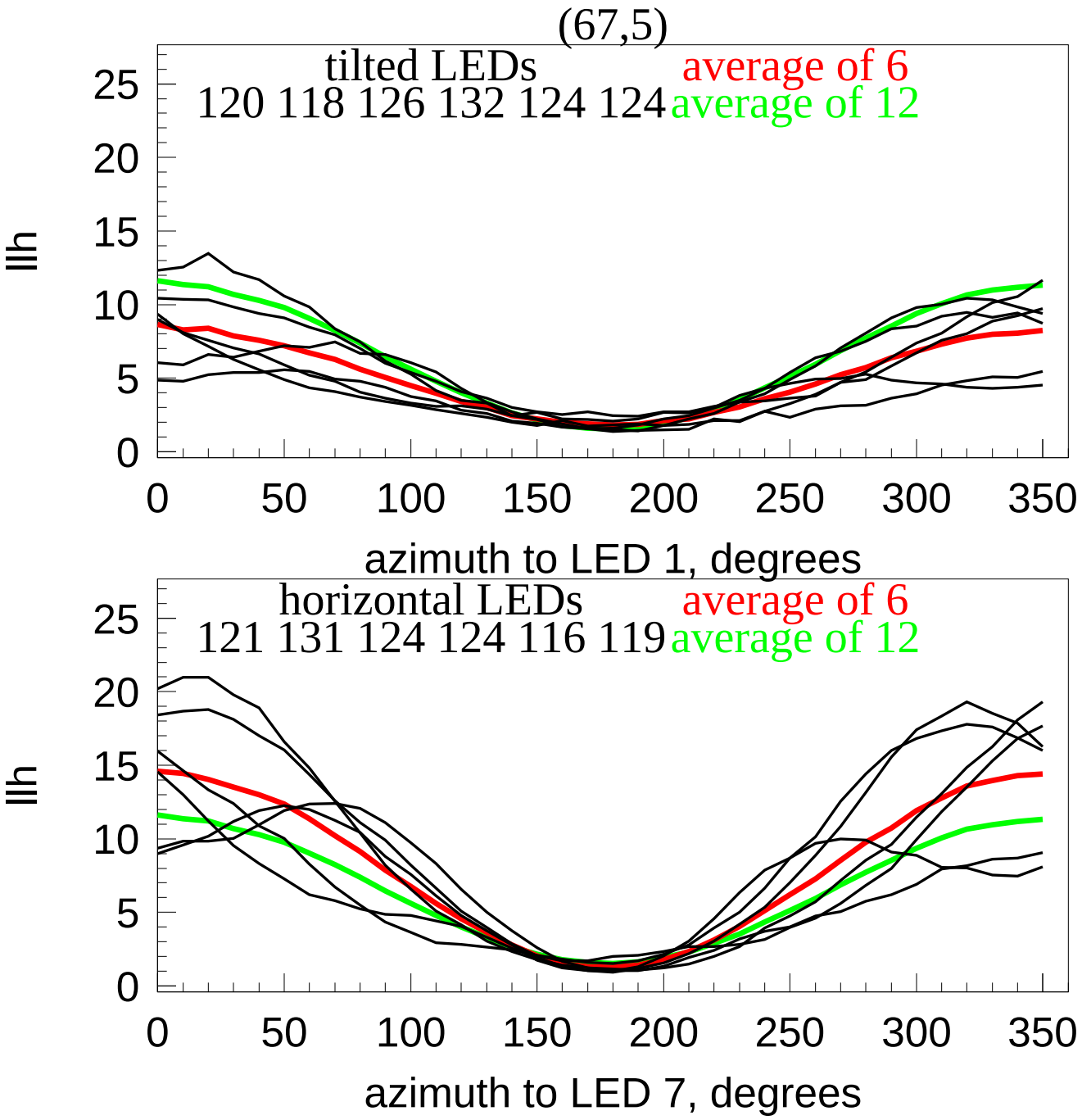

(67,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
129.5 ± 12.3
130
1
2
3
4
5
6
7
8
9
10
11
12

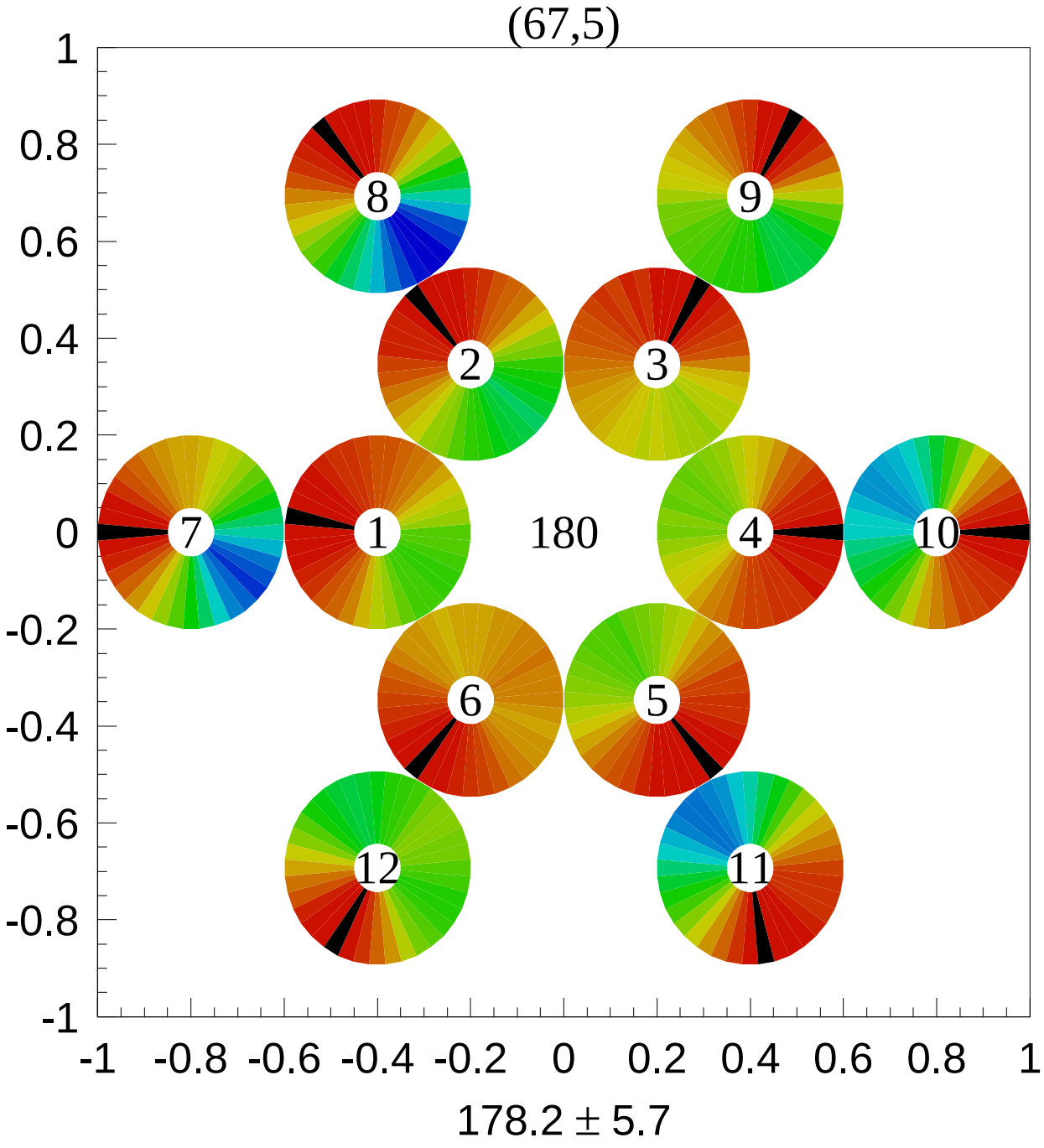

(67,3)
tilted LEDs
125 123 122 129 125 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 122 120 124 120 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

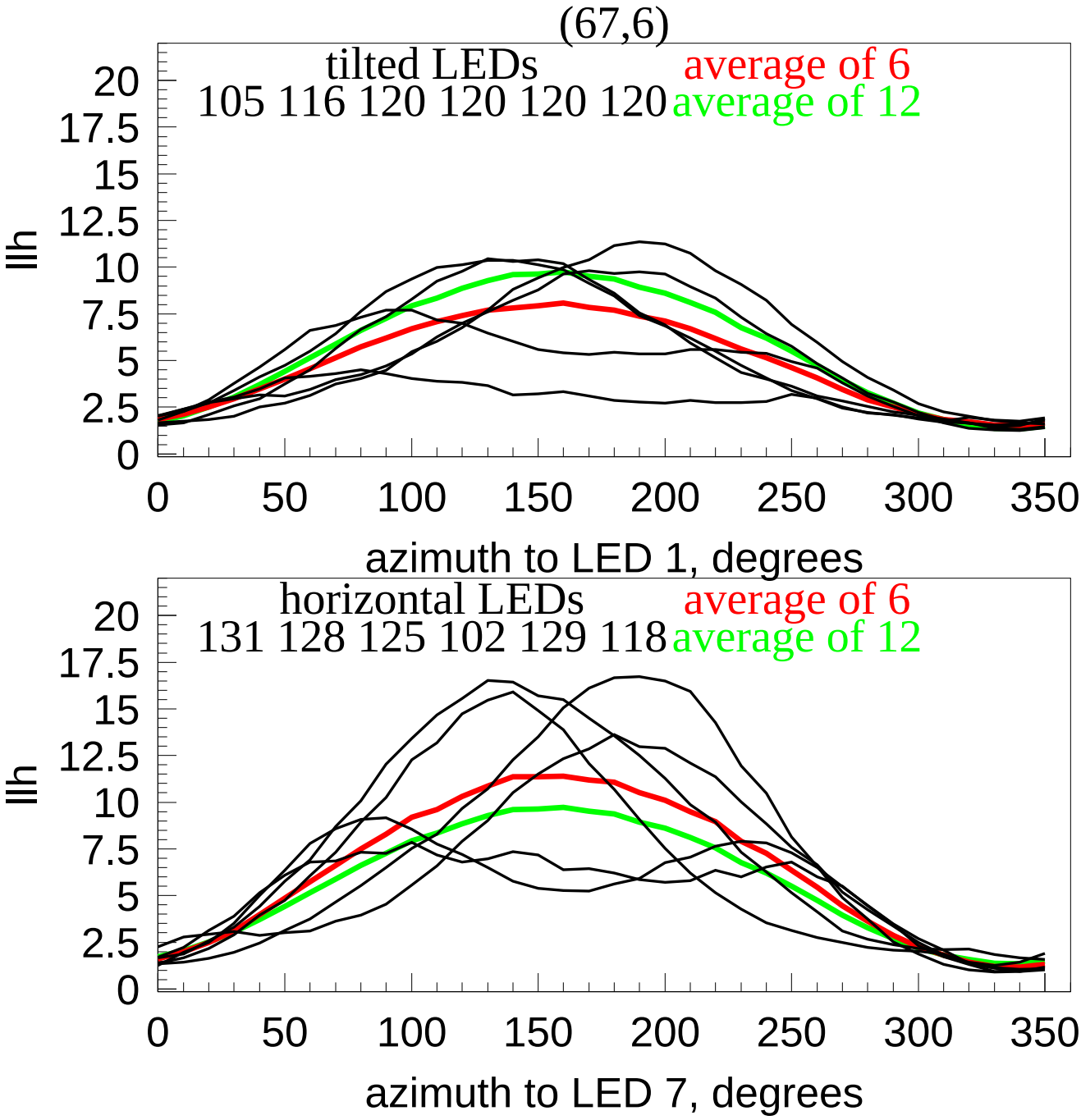

(67,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
38.5 ± 9.7

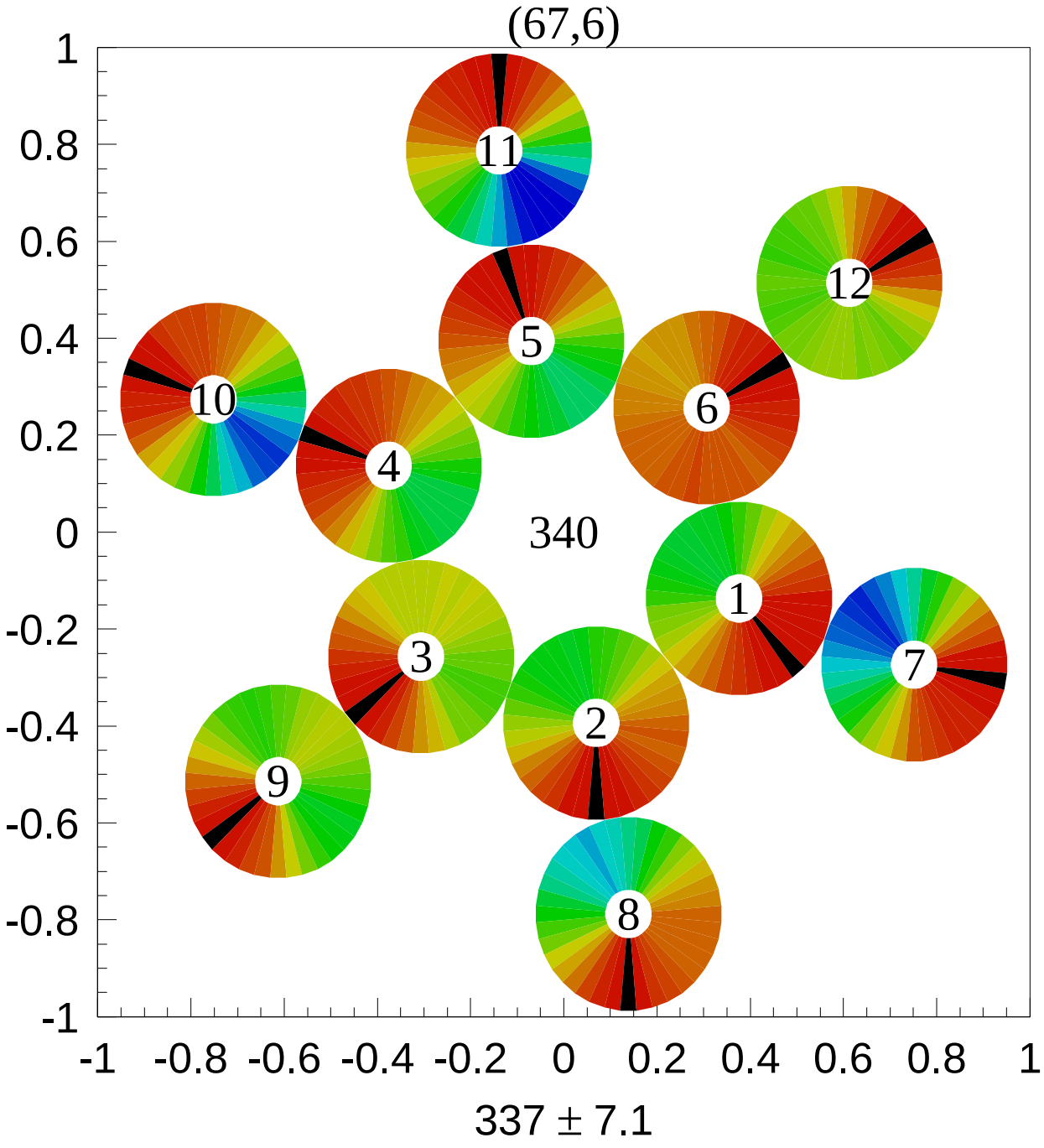

(67,4)
tilted LEDs
122 123 128 112 115 118
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 117 127 121 120 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

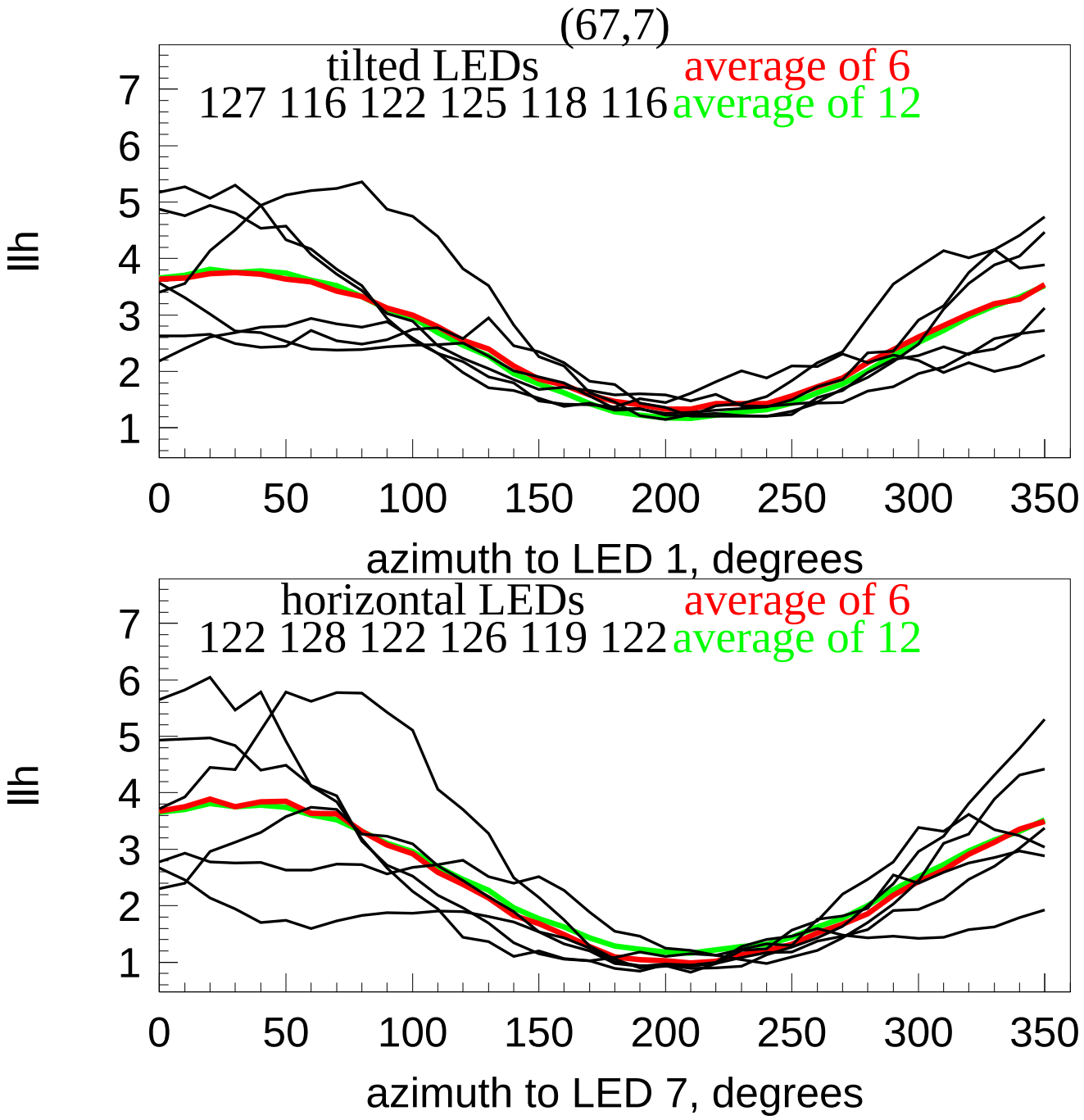

(67,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
169.7 ± 6.5

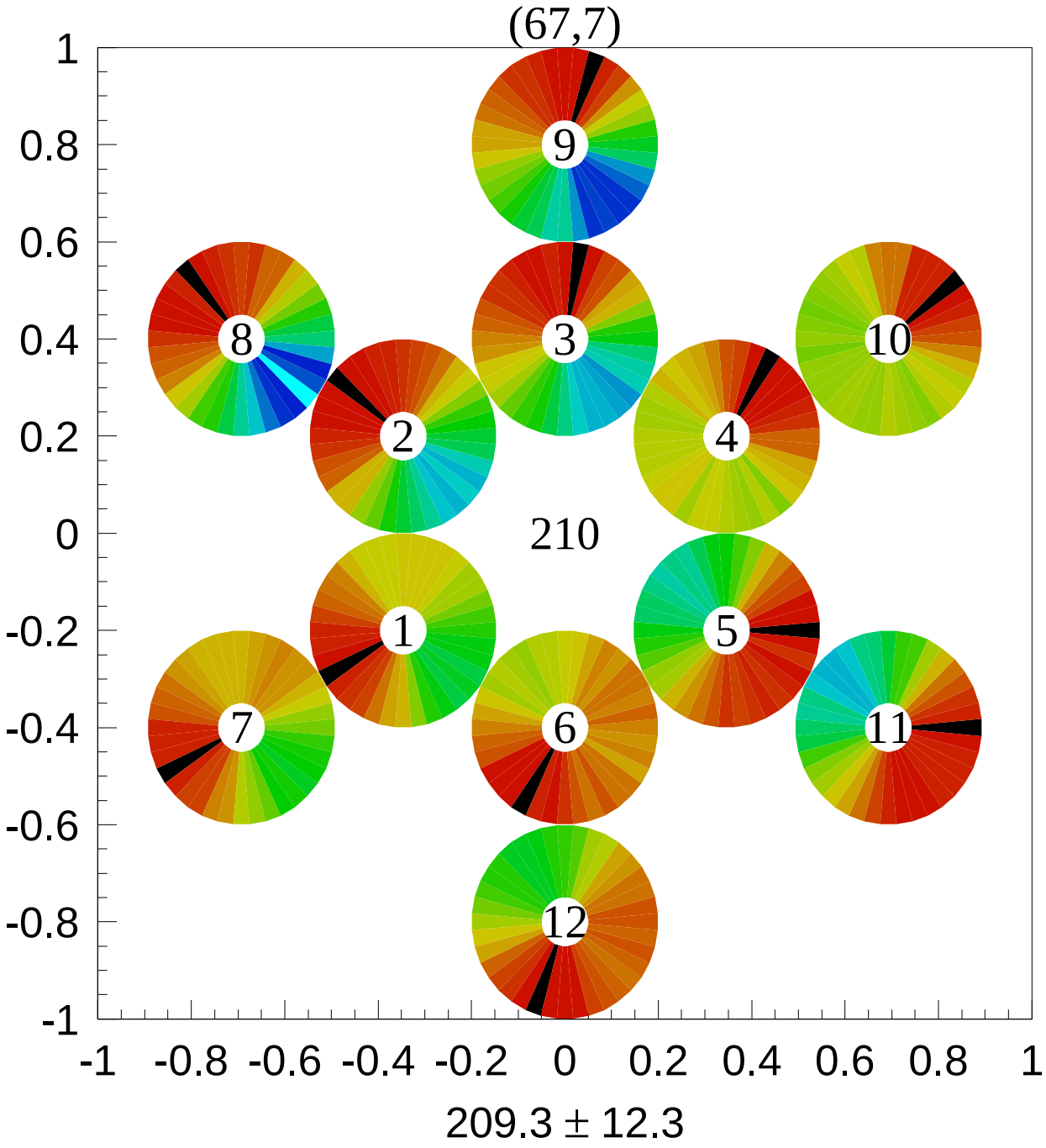

(67,5)
tilted LEDs
120 118 126 132 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 131 124 124 116 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

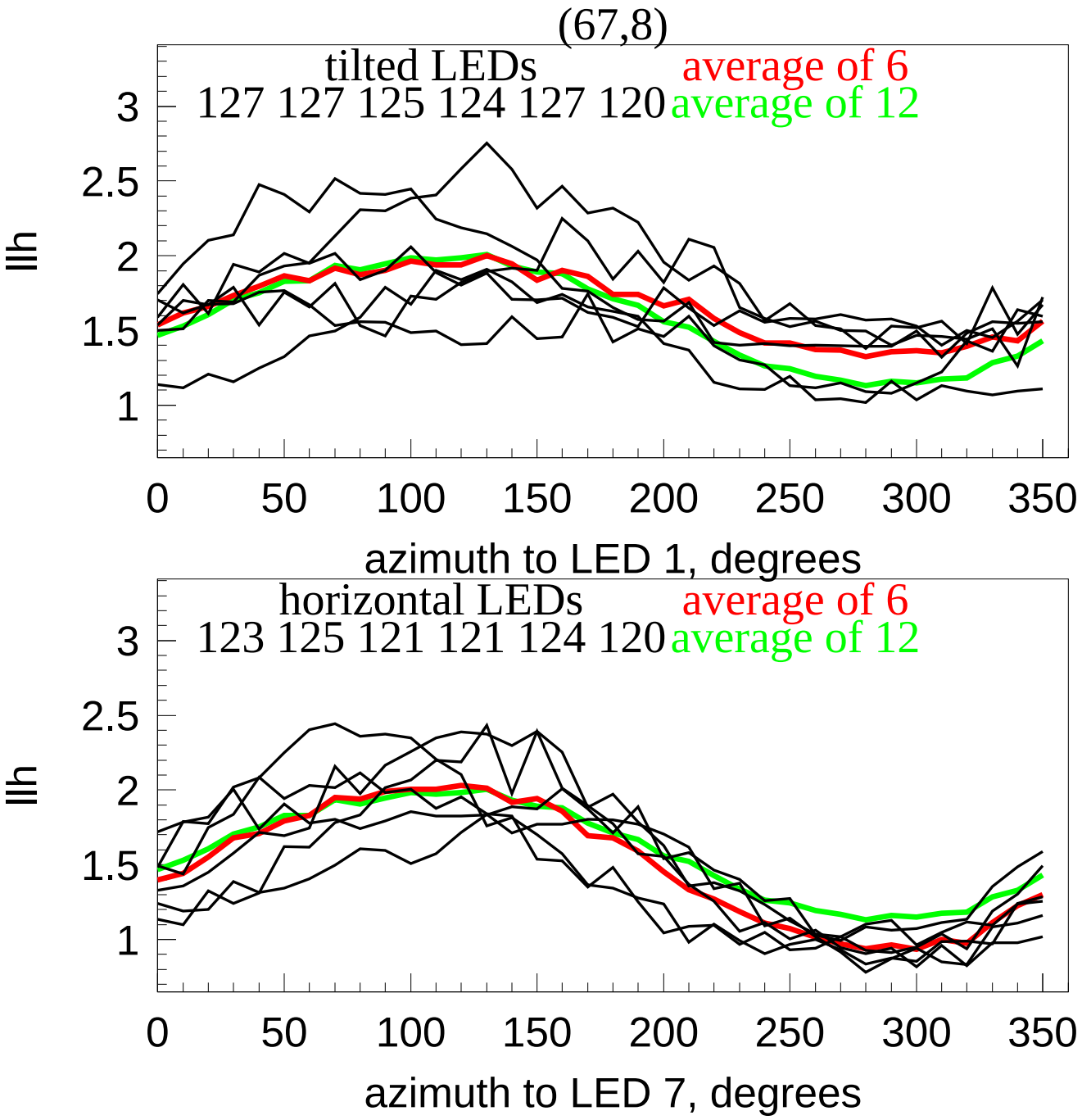

(67,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
178.2 ± 5.7
8
9
2
3
7
1
180
4
10
6
5
12
11

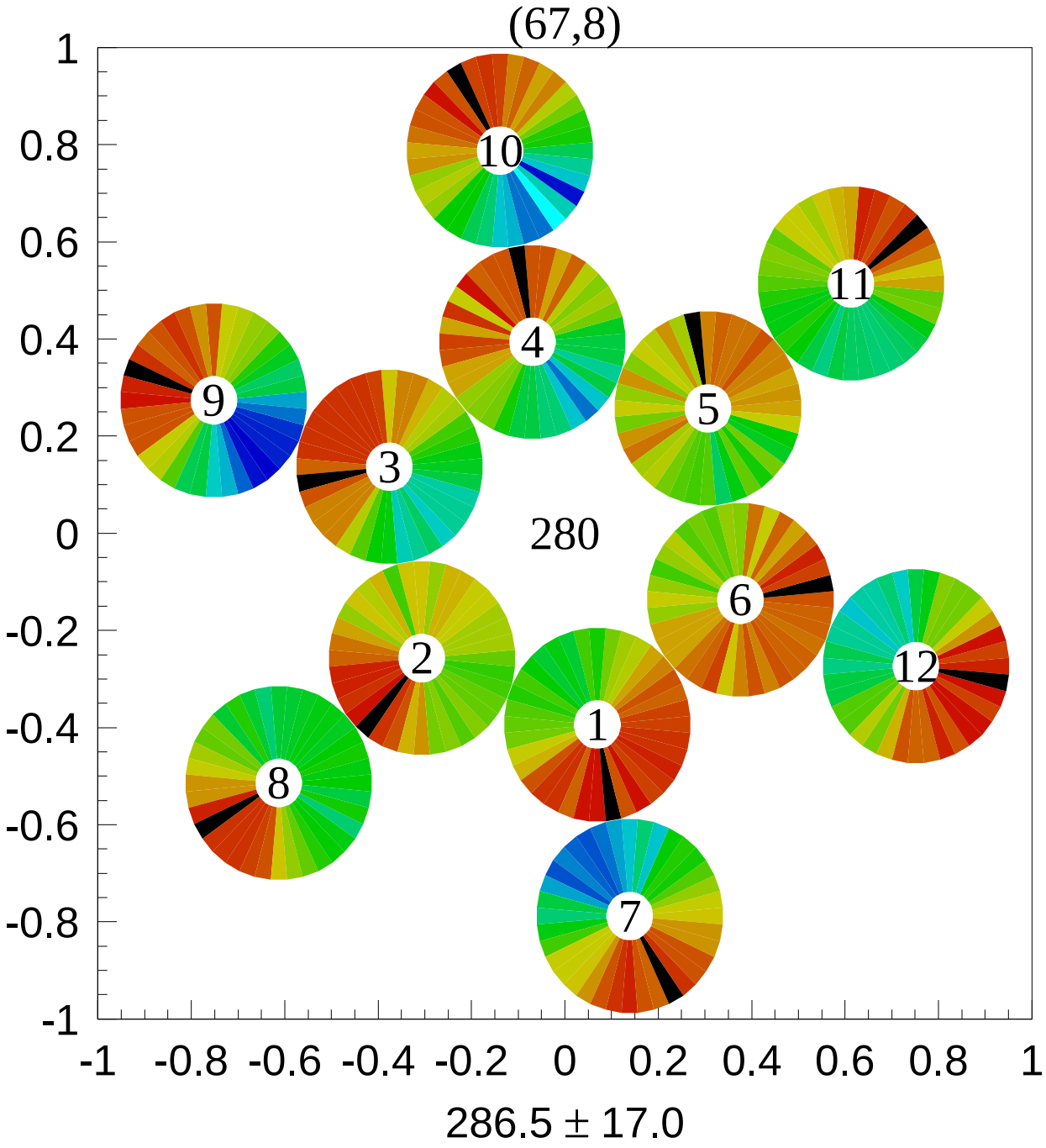

(67,6)
tilted LEDs
105 116 120 120 120 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
131 128 125 102 129 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

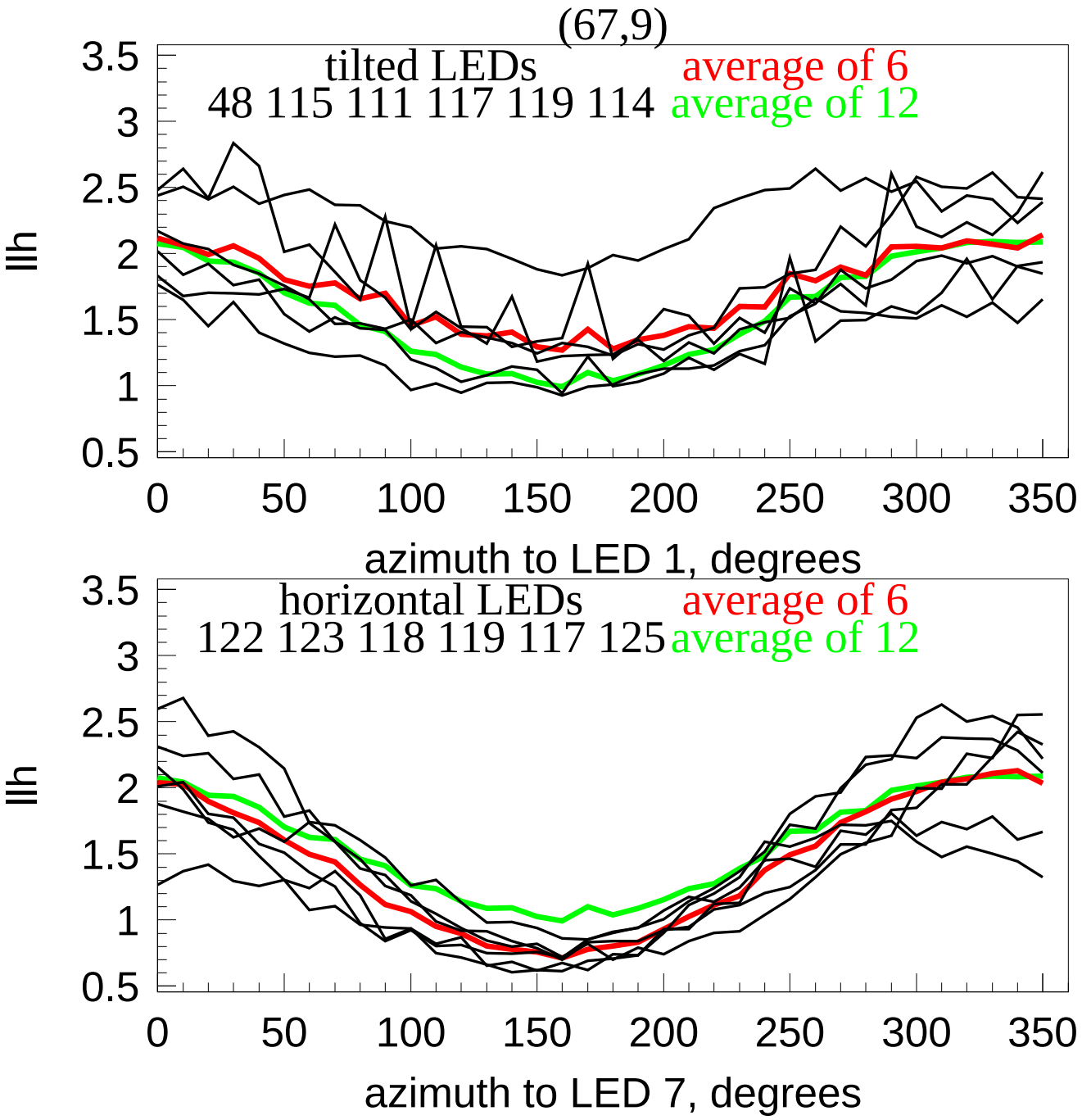

(67,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
337 ± 7.1

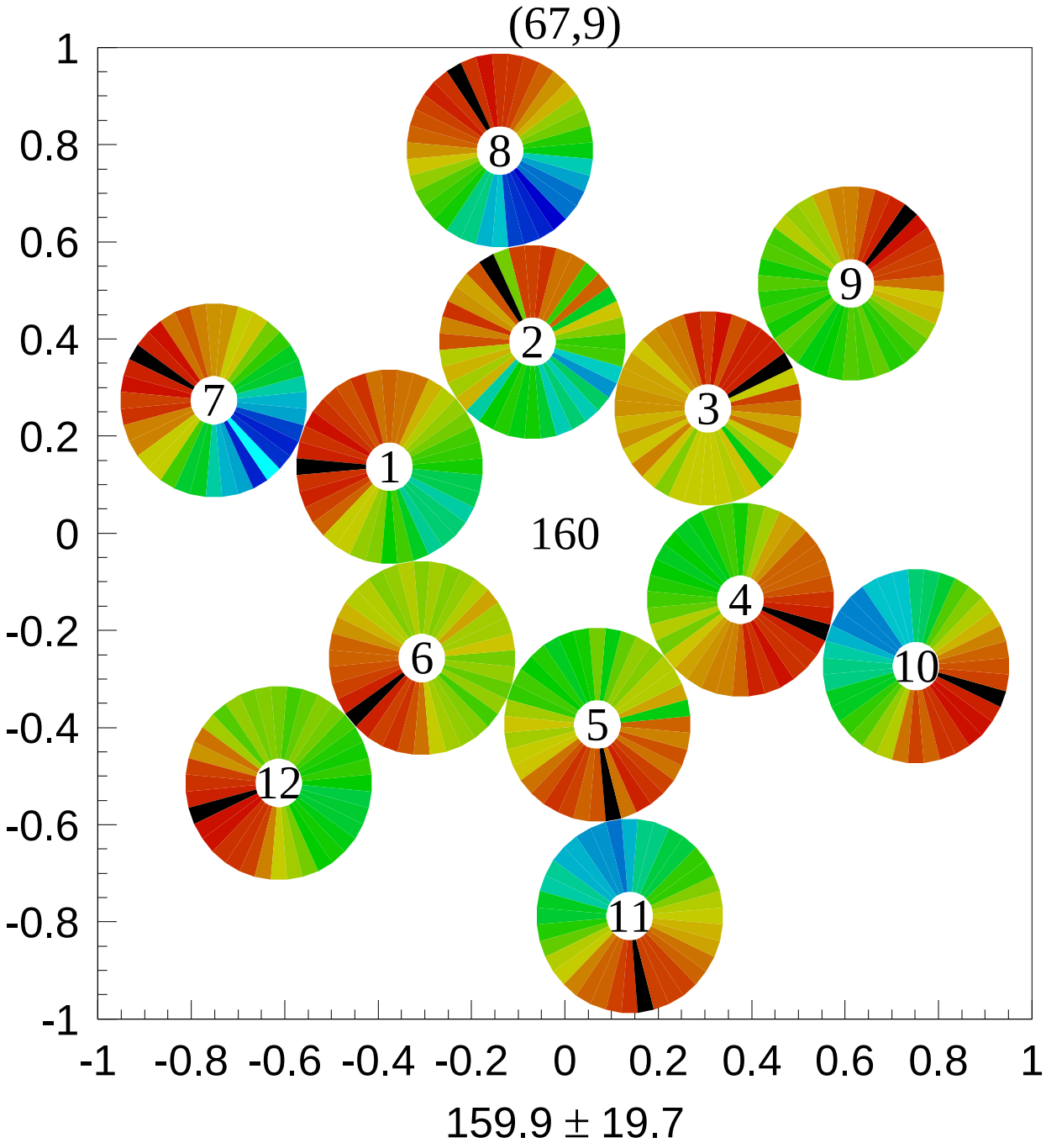

(67,7)
tilted LEDs
127 116 122 125 118 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 128 122 126 119 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

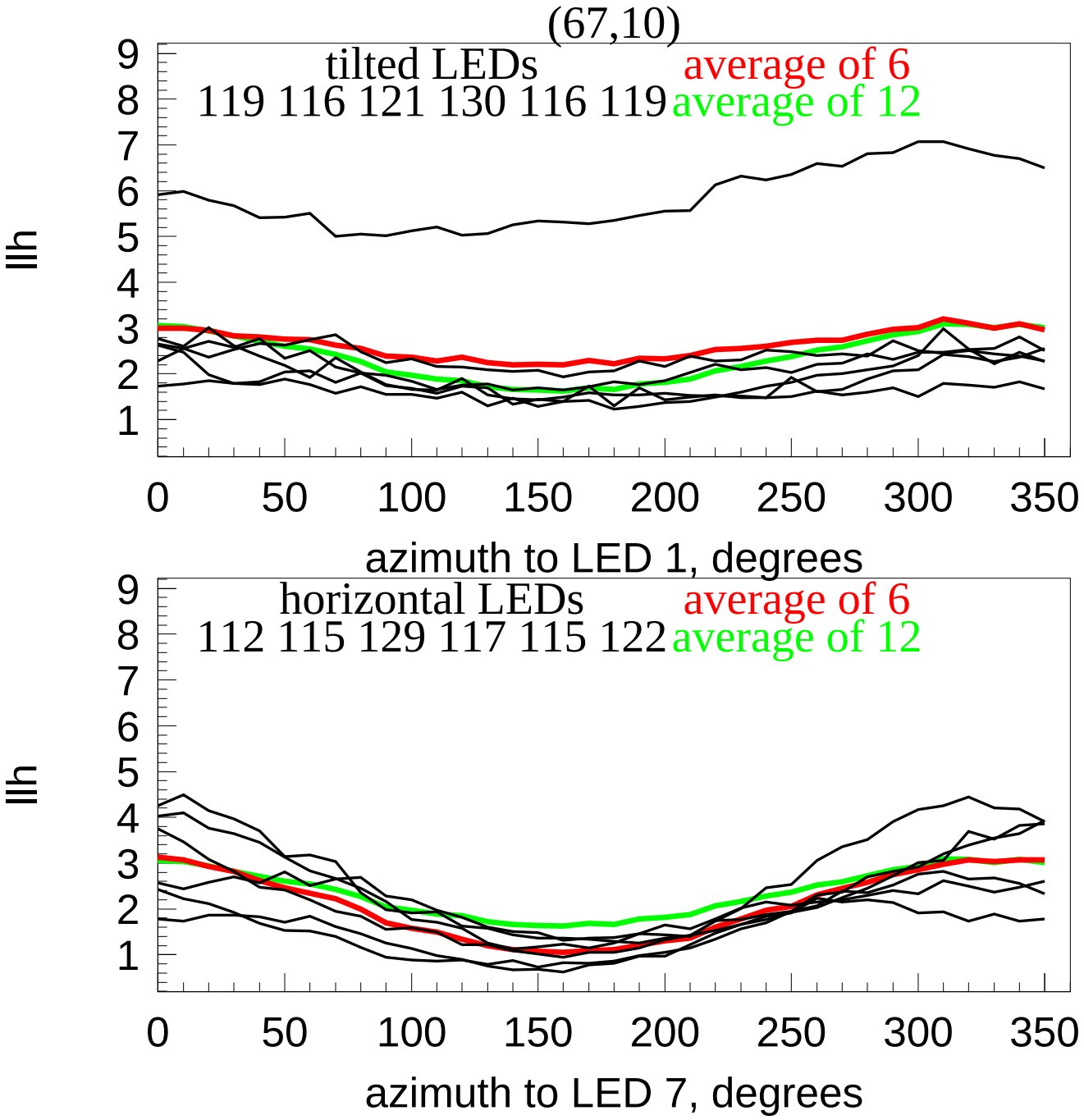

(67,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
10
2
4
210
1
5
7
6
11
12
209.3 ± 12.3

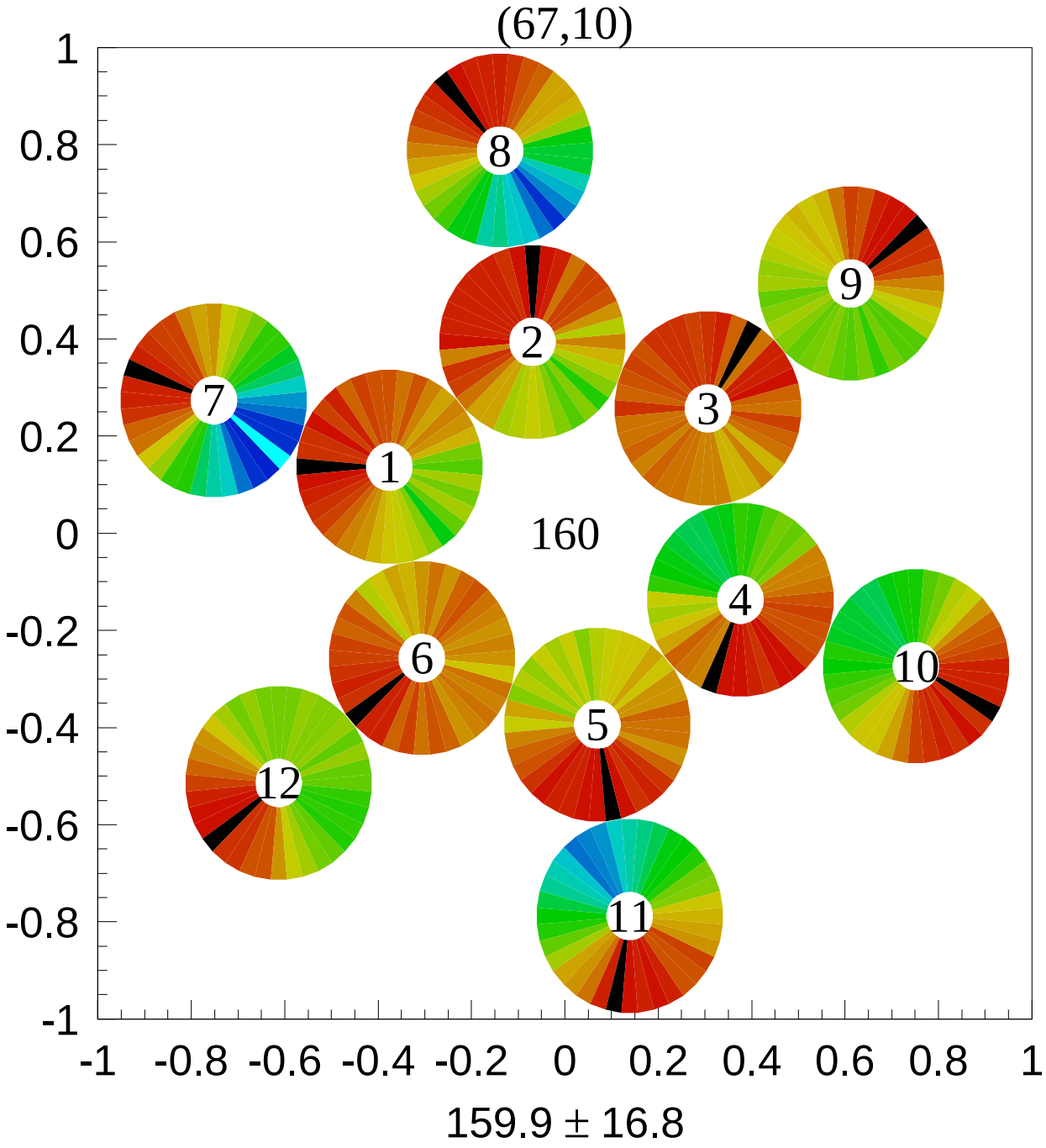

(67,8)
tilted LEDs
127 127 125 124 127 120
average of 6
average of 12
llh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 125 121 121 124 120
average of 6
average of 12
llh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

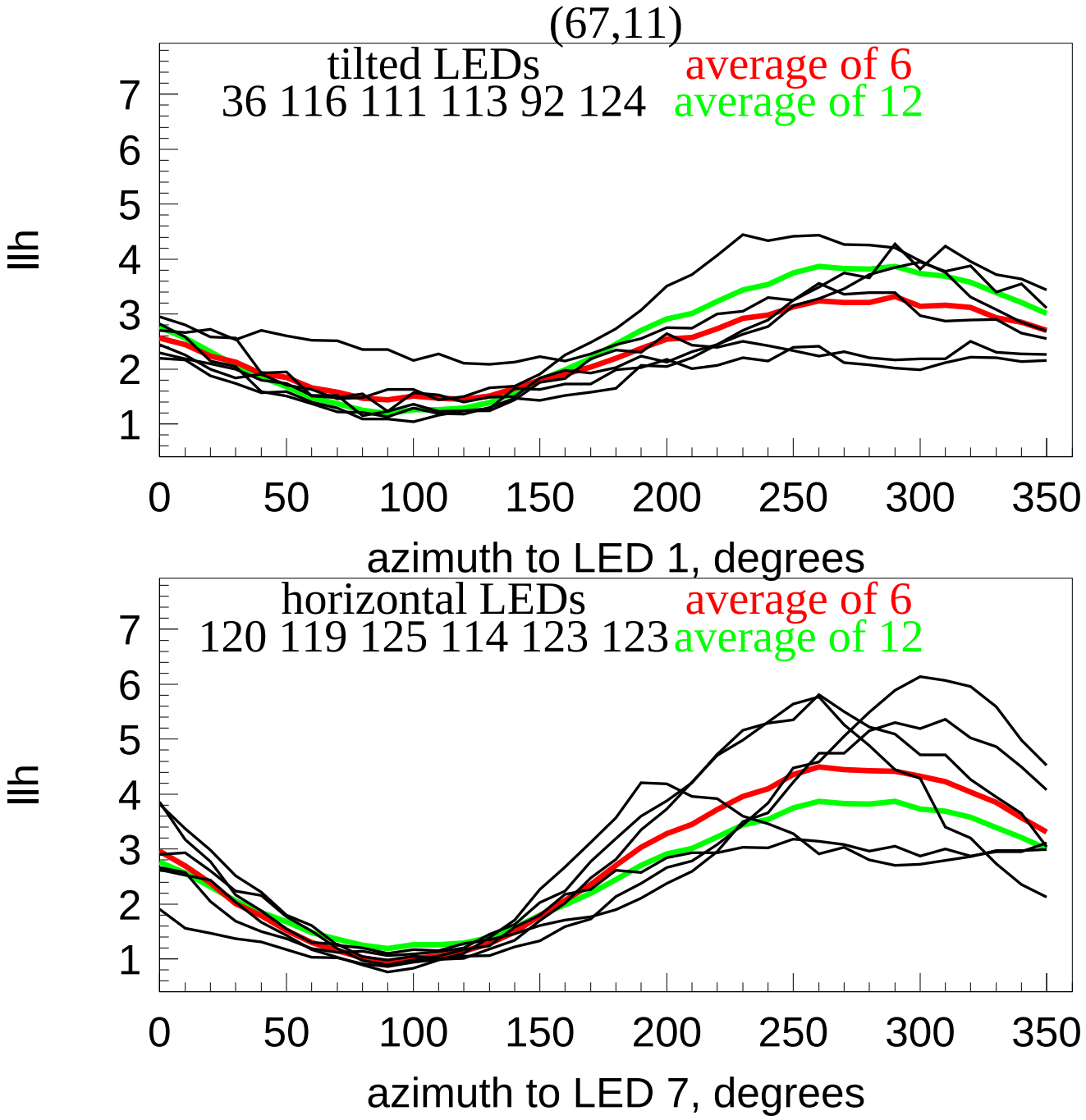

(67,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
286.5 ± 17.0

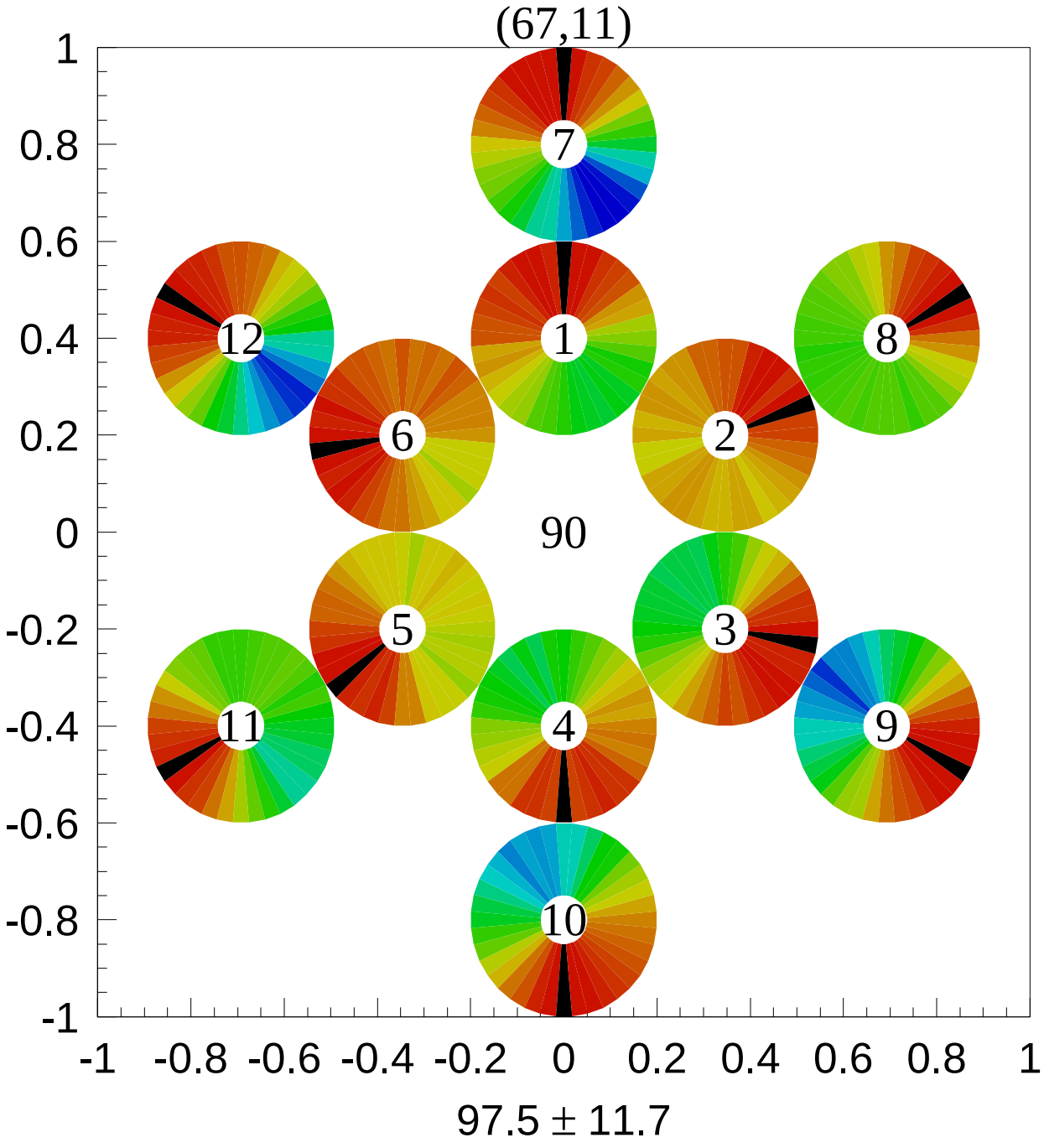

(67,9)
tilted LEDs
48 115 111 117 119 114
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 123 118 119 117 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

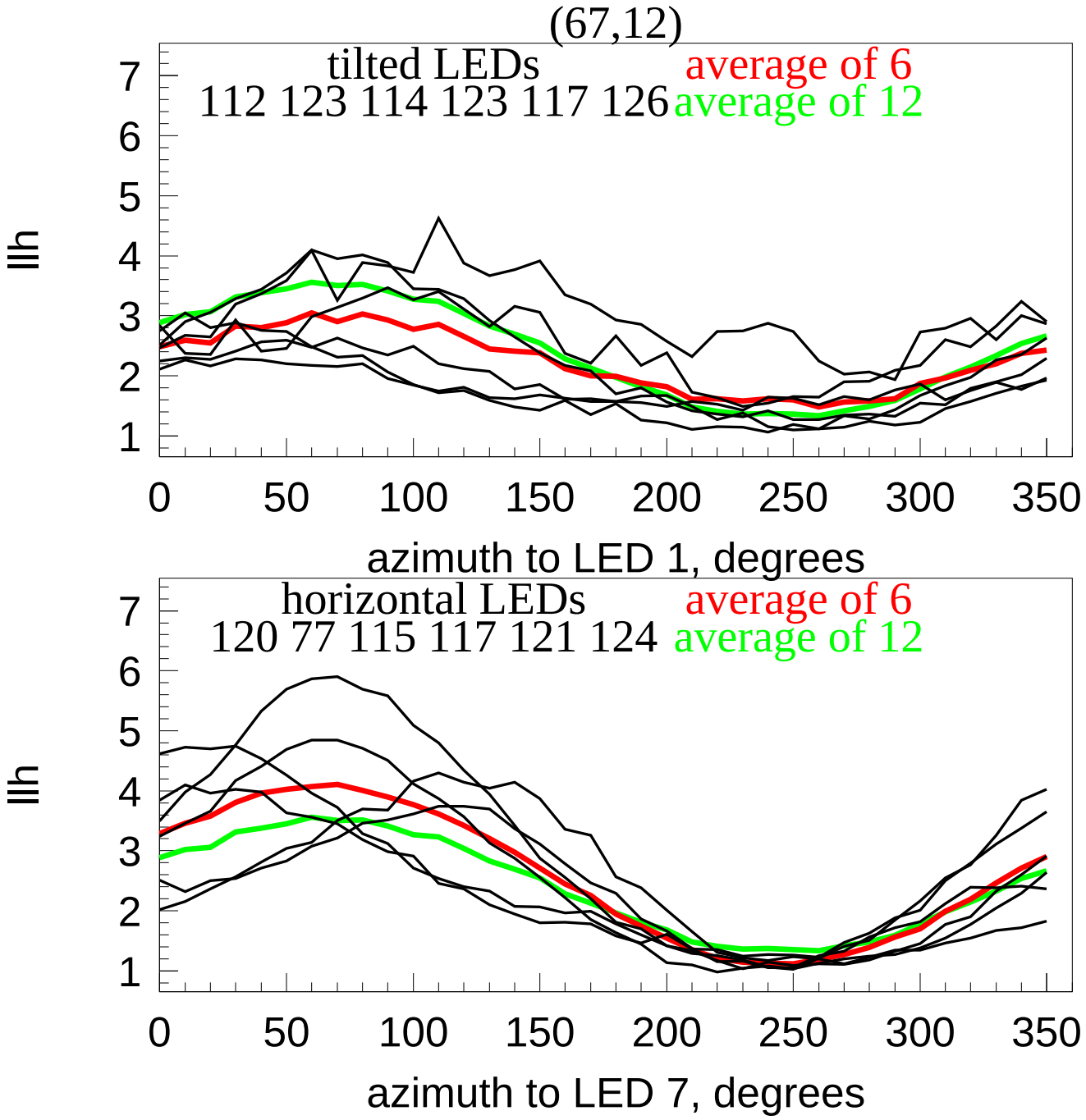

(67,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
9
2
7
3
1
160
4
10
6
5
12
11
159.9 ± 19.7

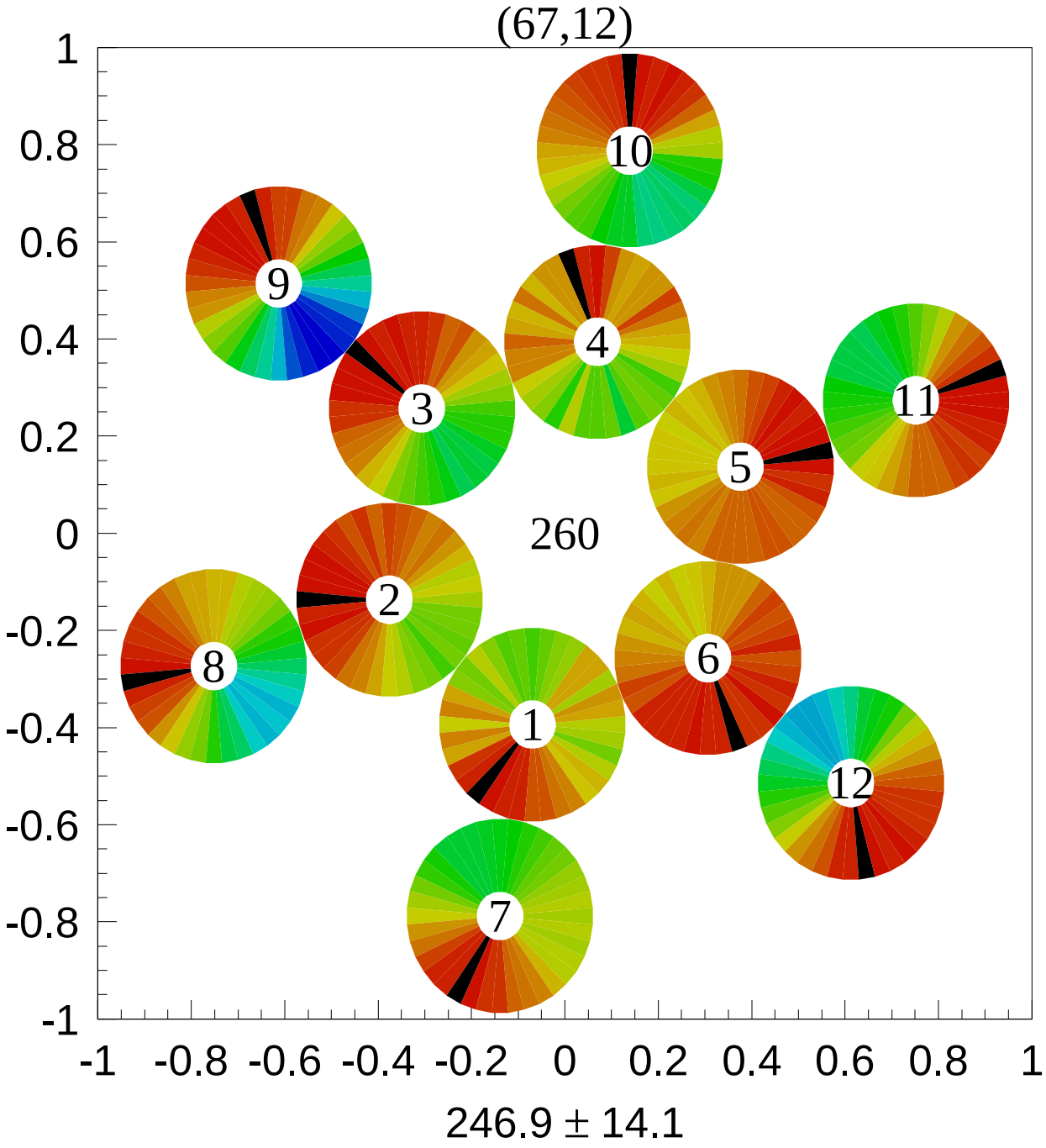

(67,10)
tilted LEDs
119 116 121 130 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 115 129 117 115 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

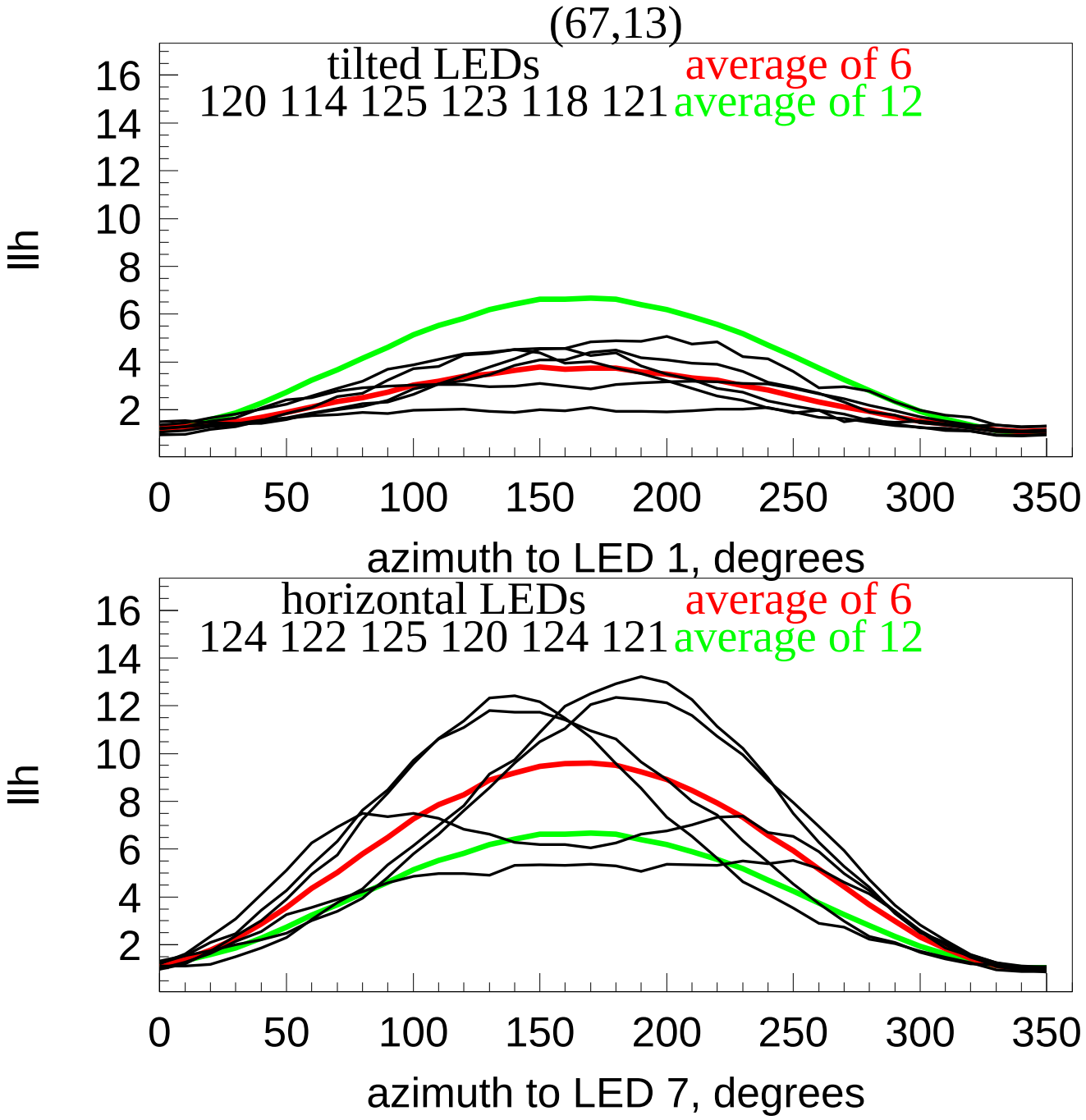

(67,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
159.9 ± 16.8

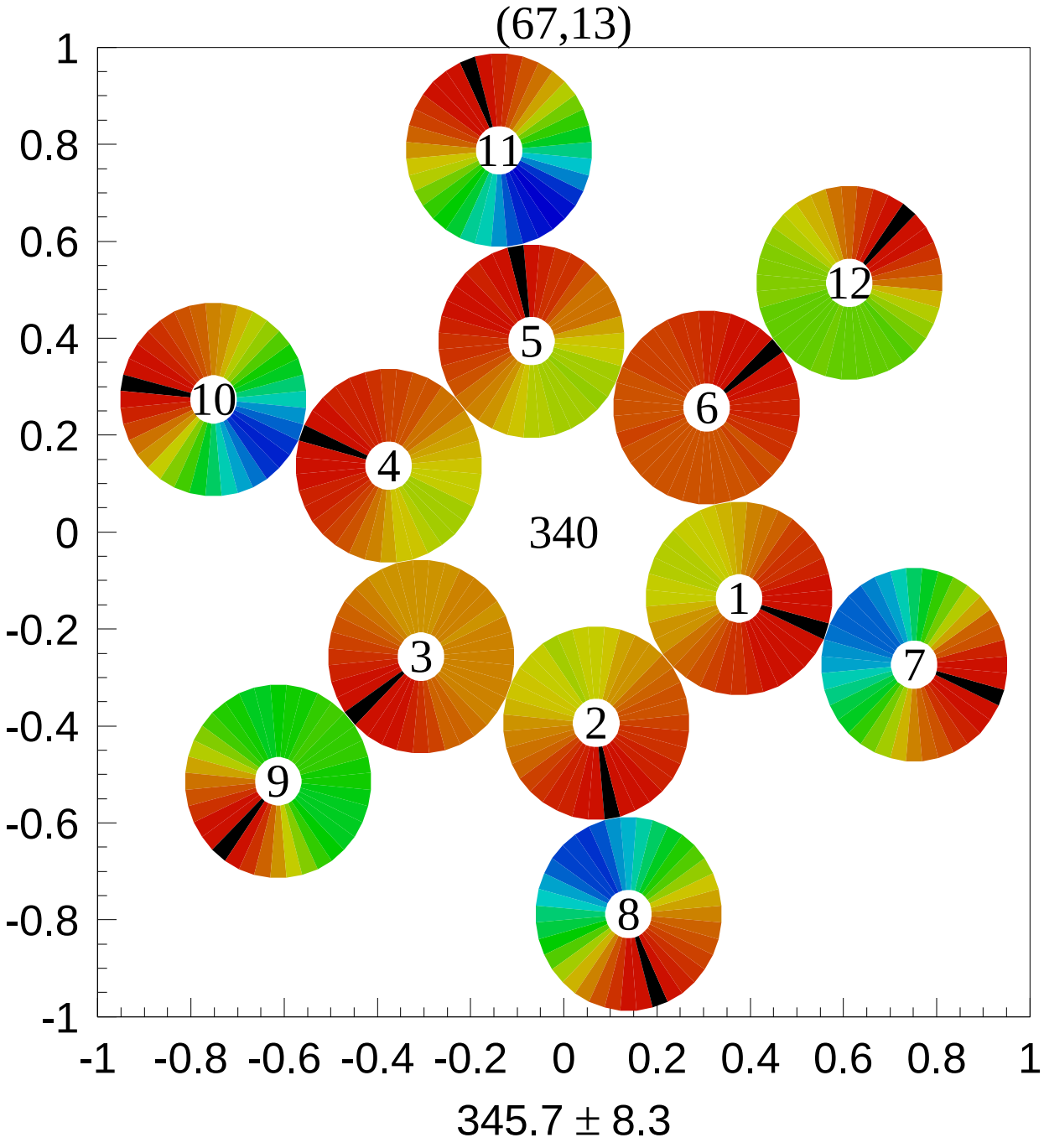

(67,11)
tilted LEDs
36 116 111 113 92 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 119 125 114 123 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

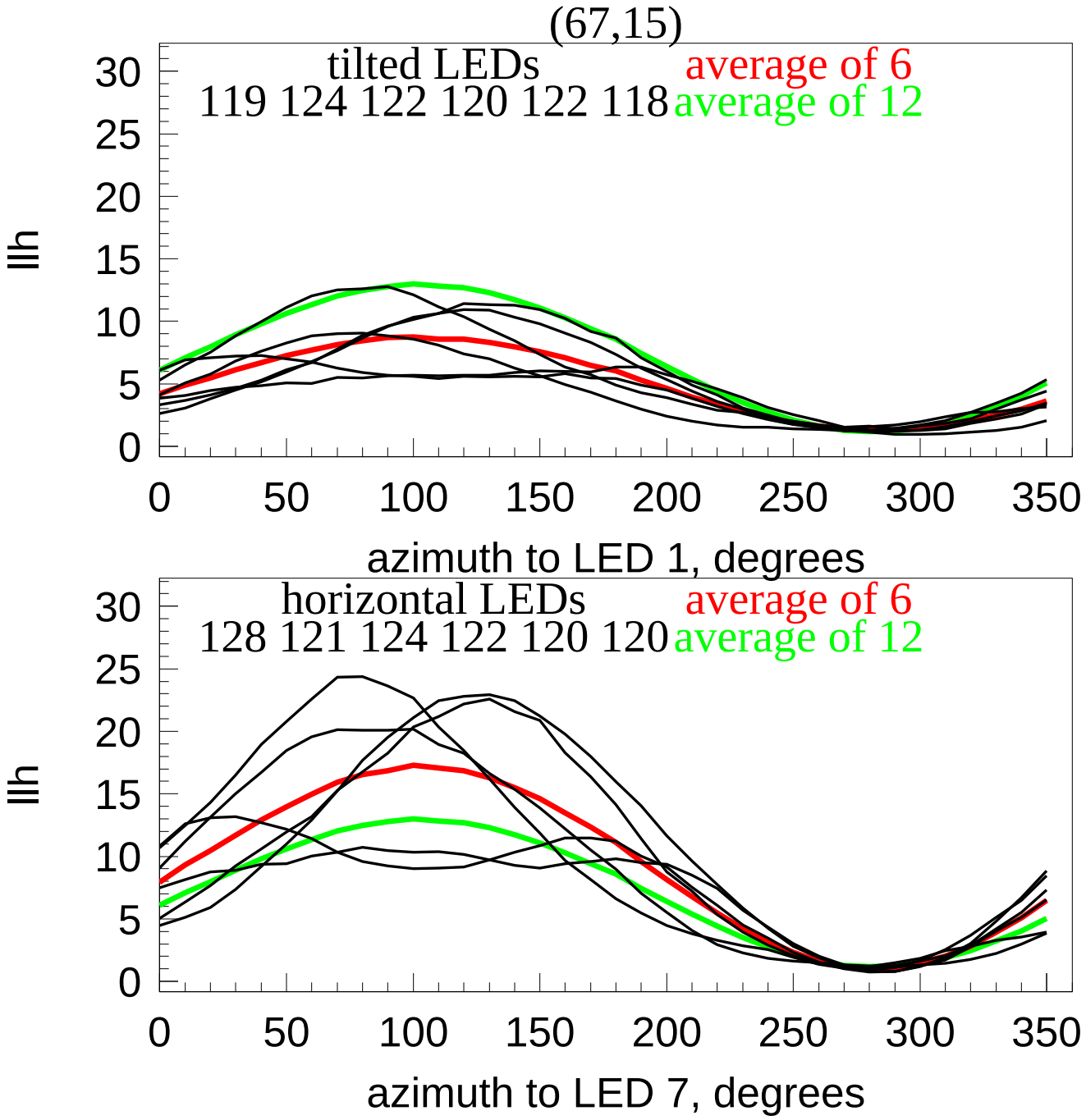

(67,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
97.5 ± 11.7

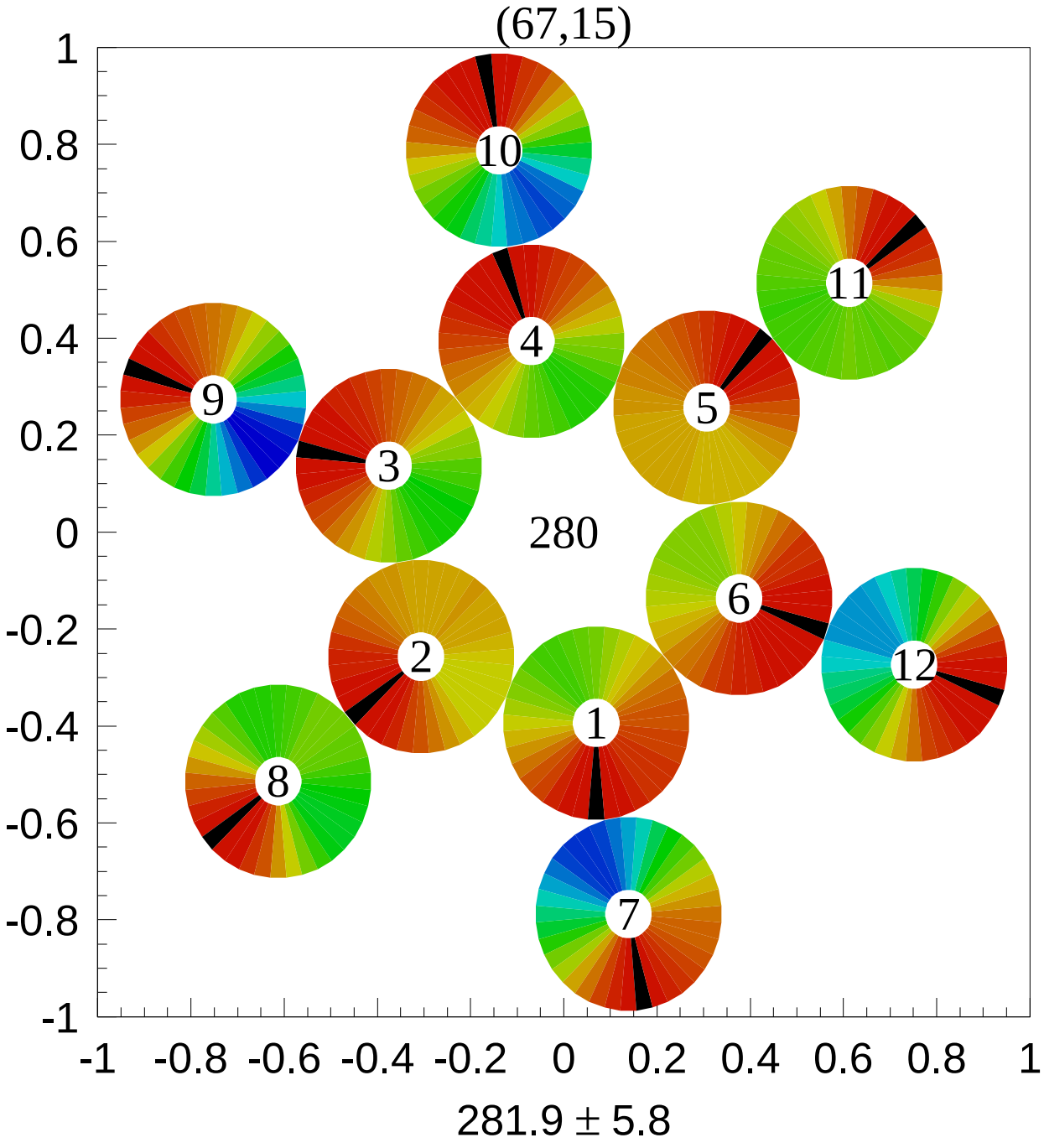

(67,12)
tilted LEDs
112 123 114 123 117 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 77 115 117 121 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

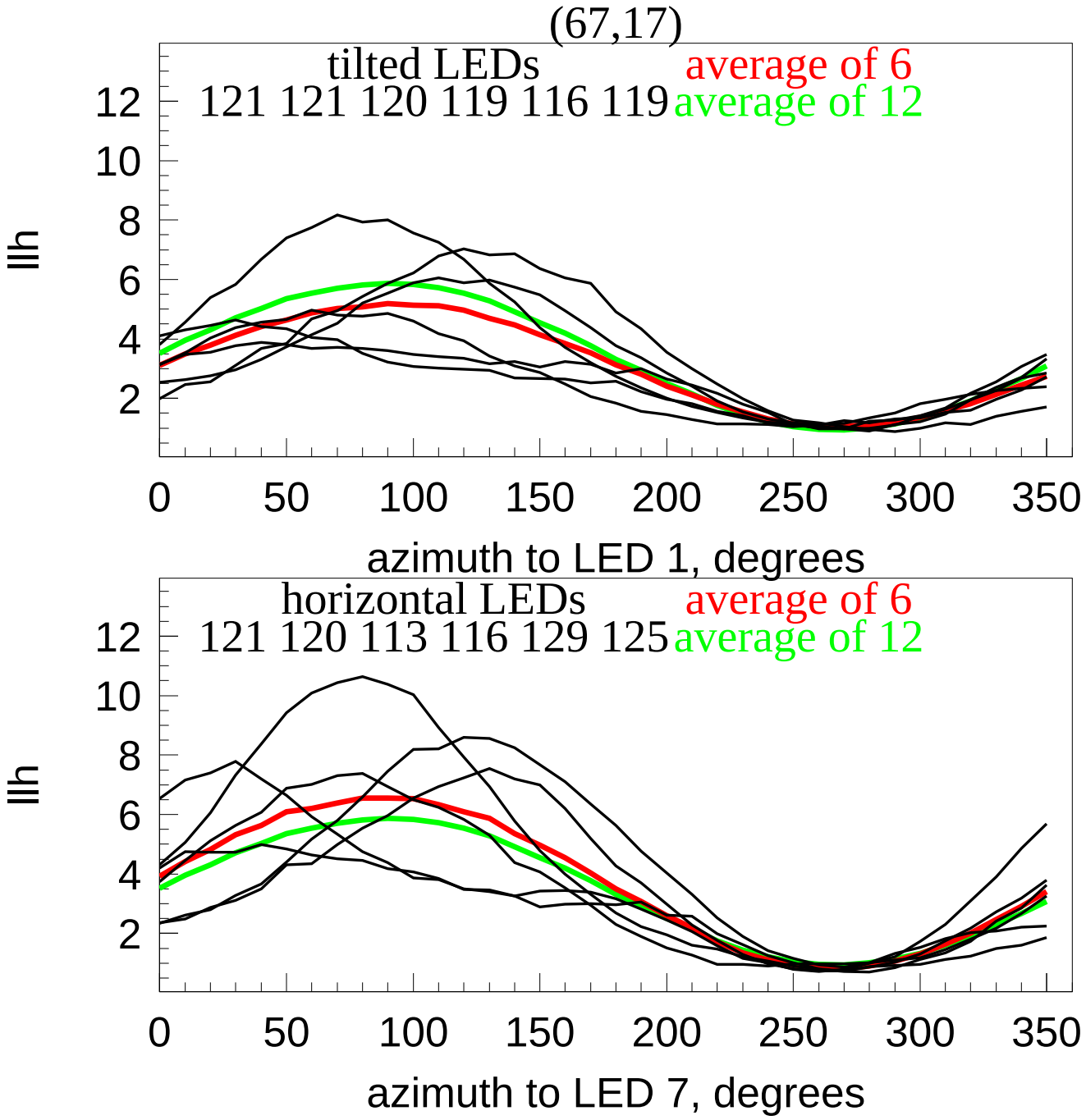

(67,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
246.9 ± 14.1

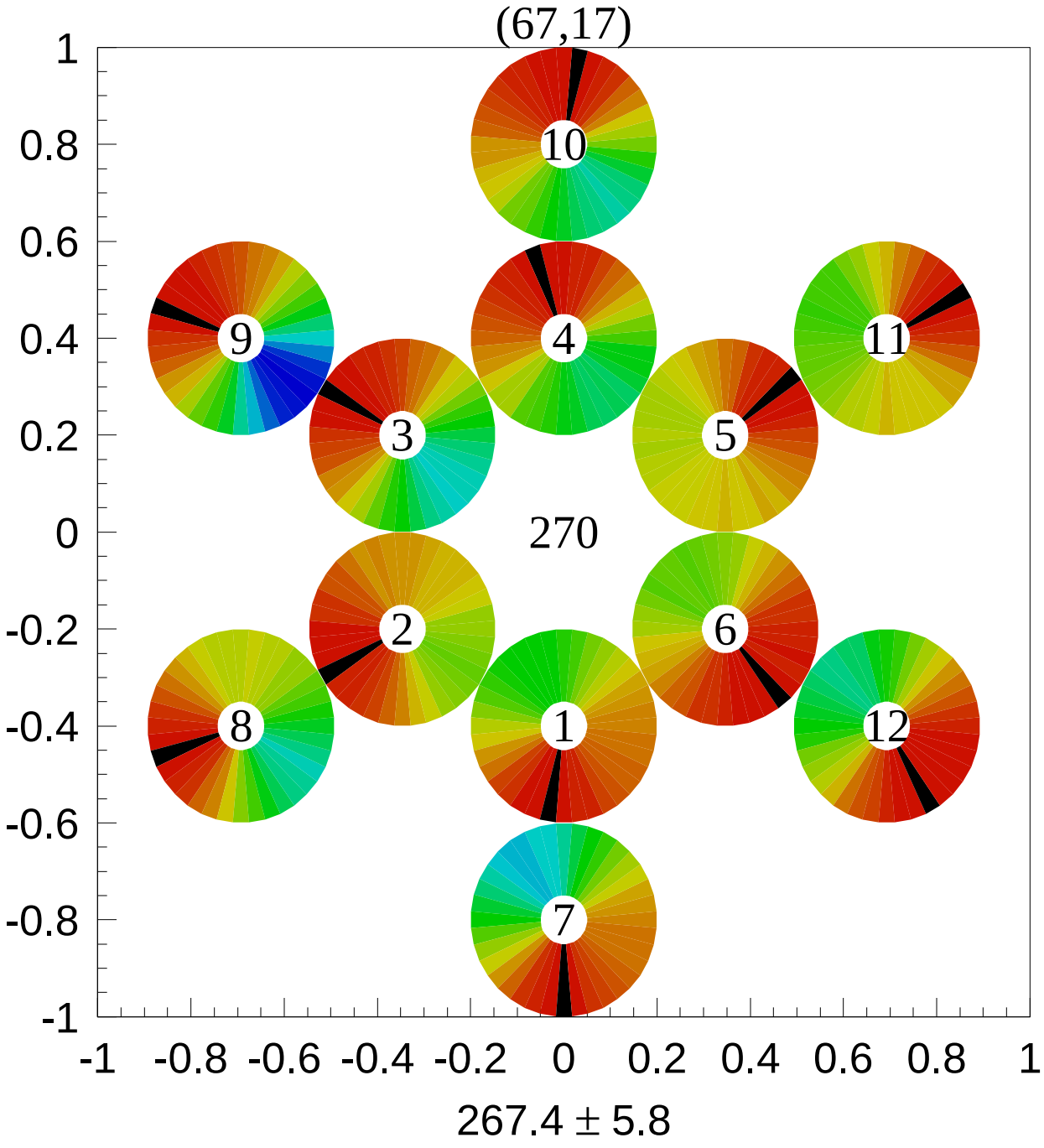

(67,13)
tilted LEDs
120 114 125 123 118 121
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 122 125 120 124 121
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

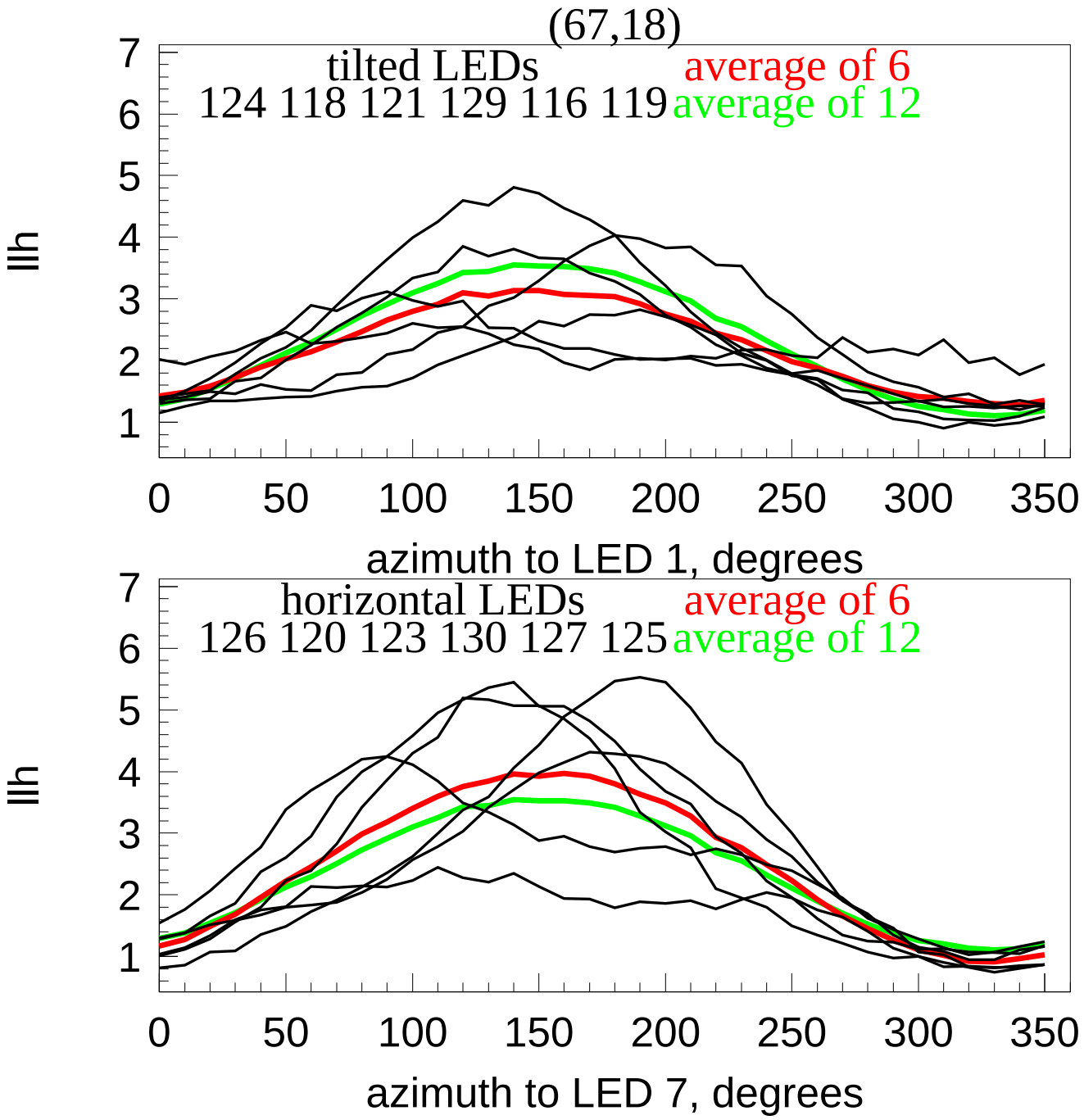

(67,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
345.7 ± 8.3

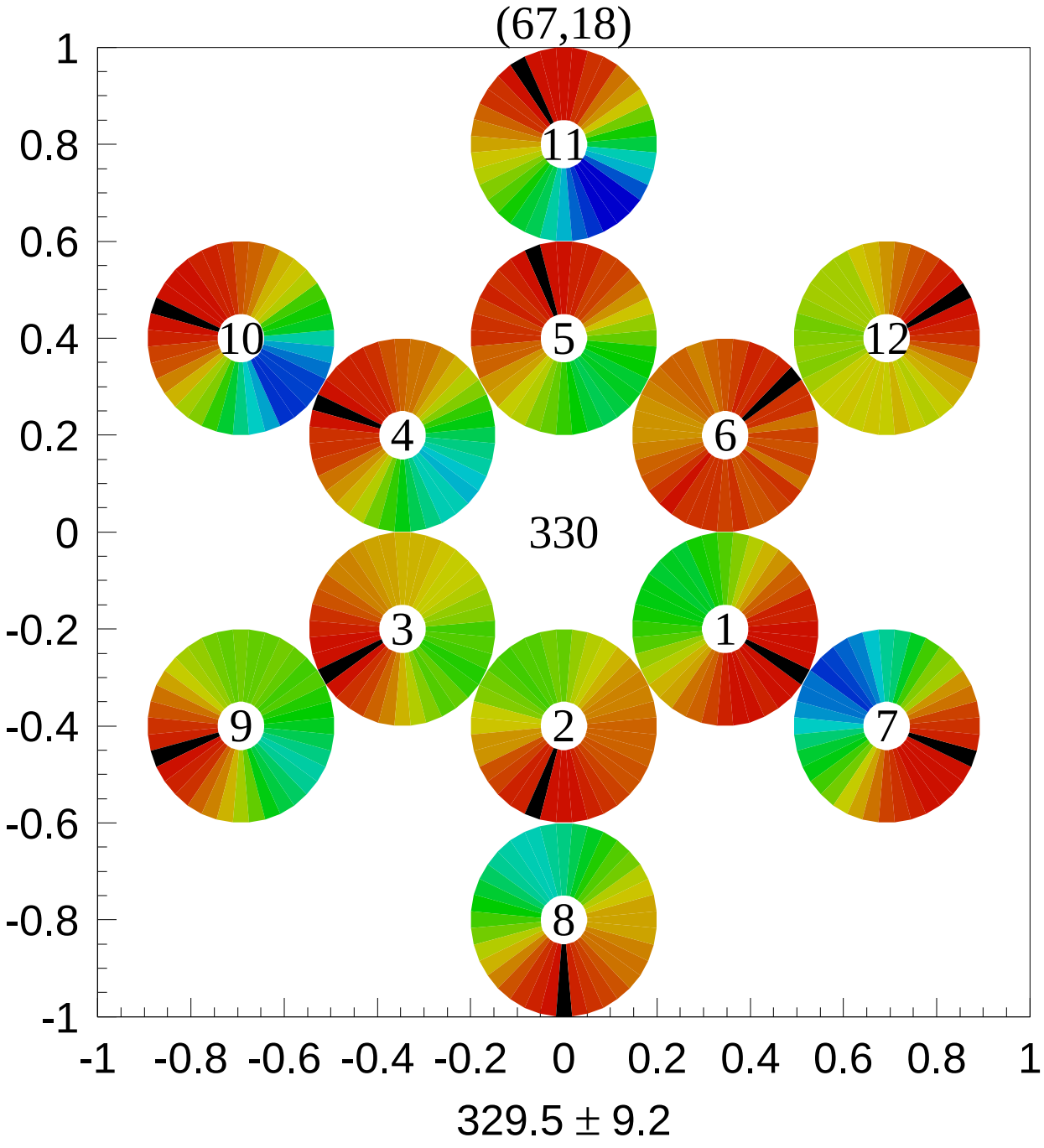

(67,15)
tilted LEDs
119 124 122 120 122 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 121 124 122 120 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

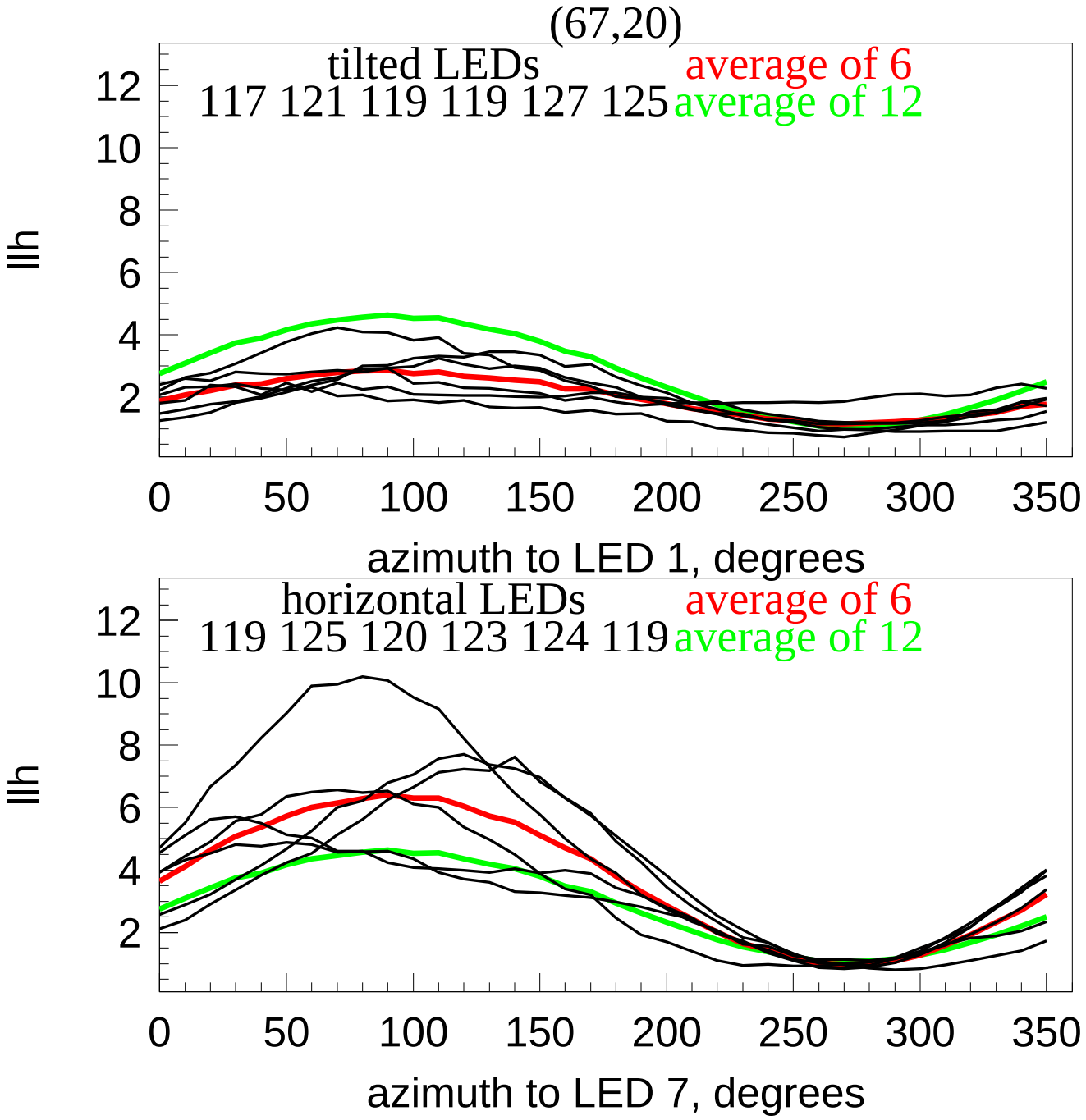

(67,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
281.9 ± 5.8

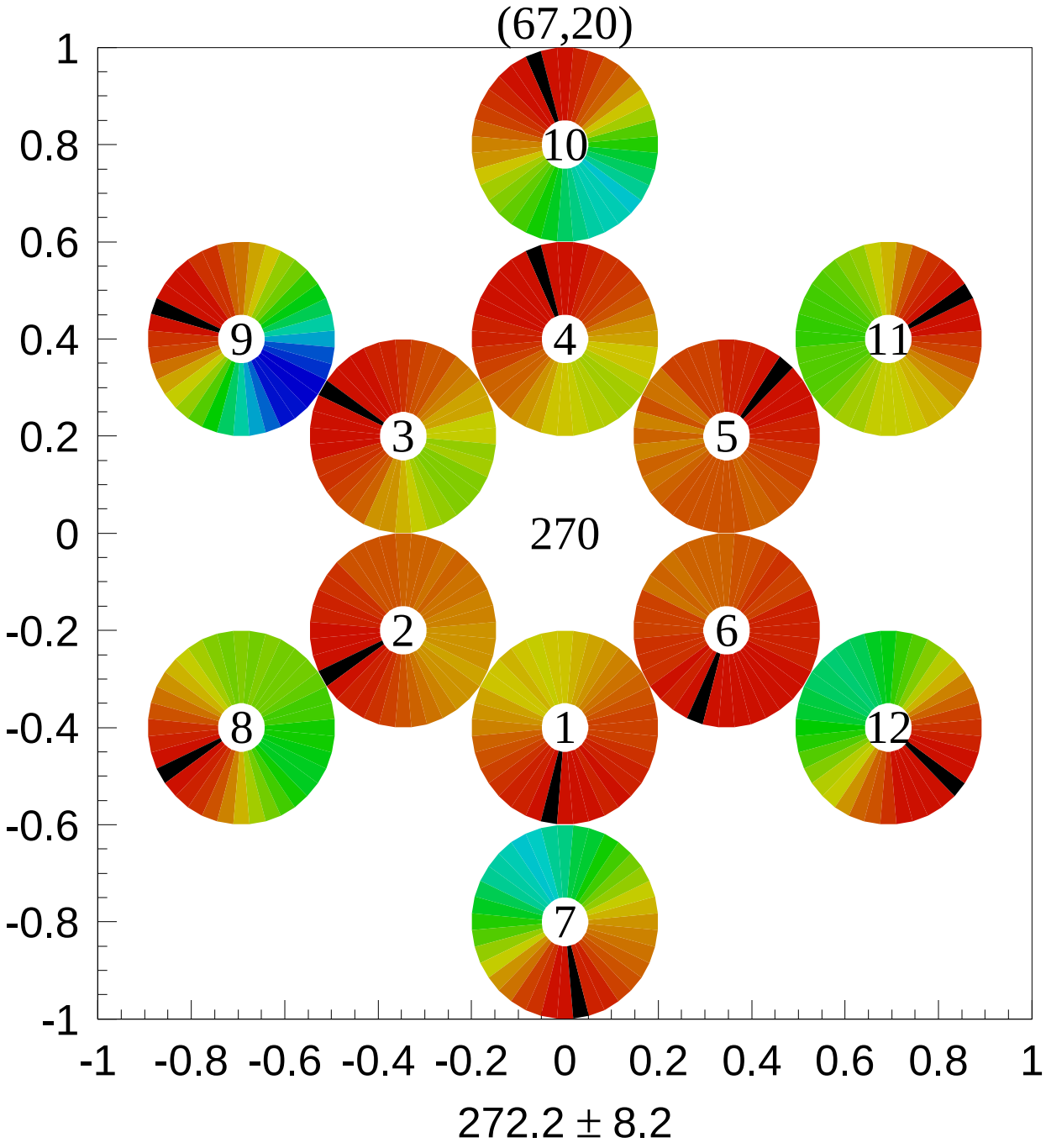

(67,17)
tilted LEDs
121 121 120 119 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 113 116 129 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

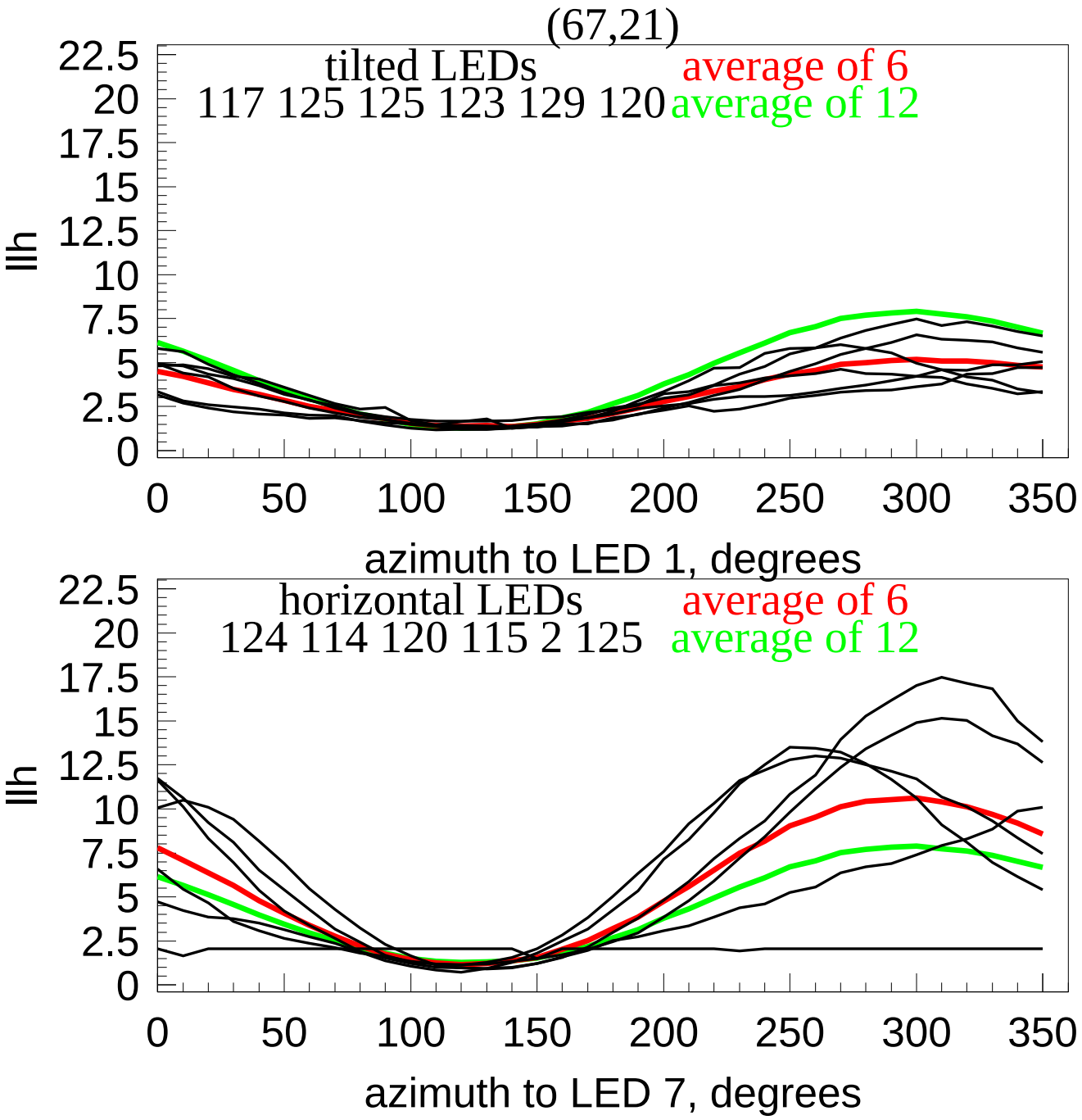

(67,17)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
267.4 ± 5.8

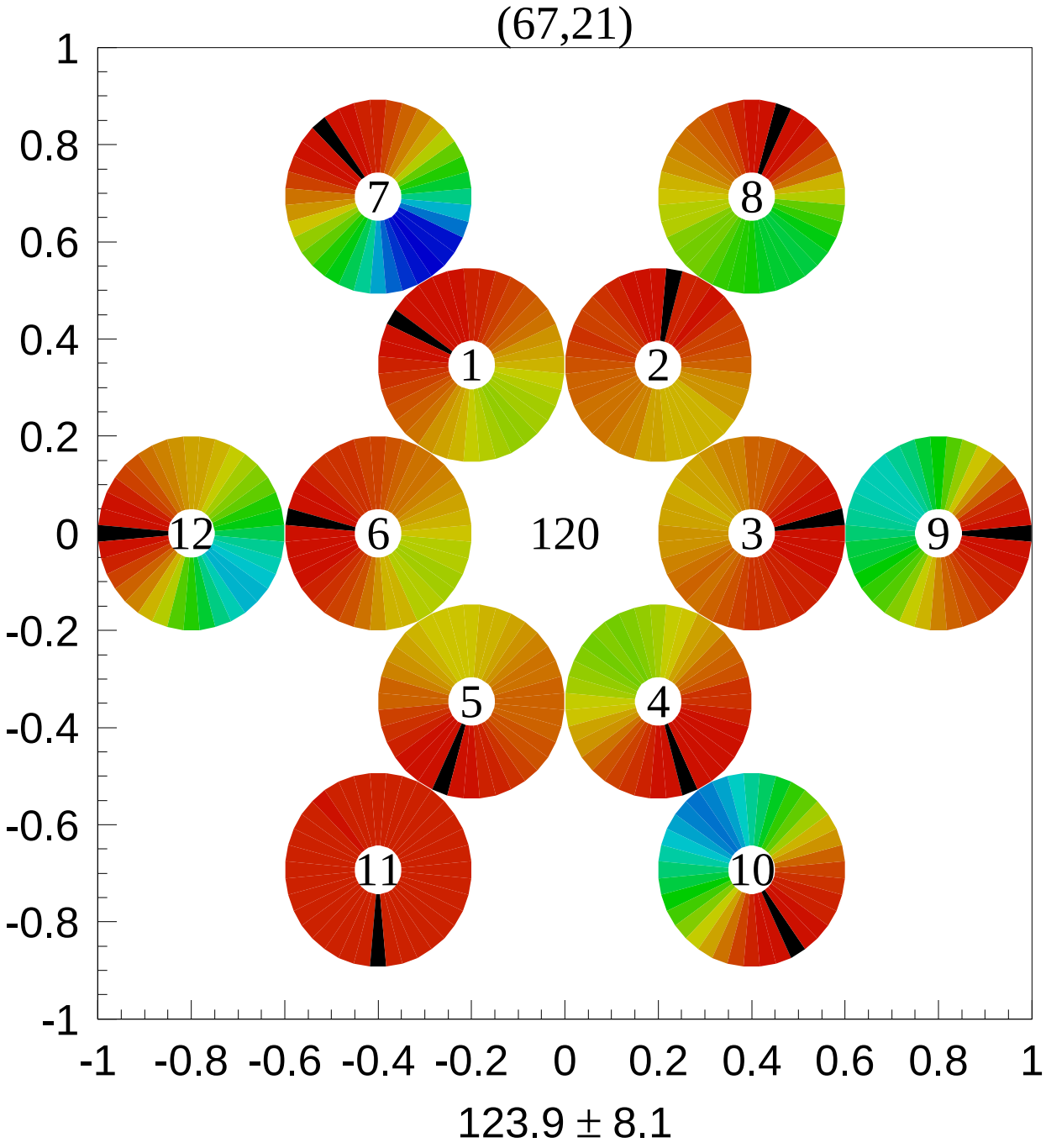

(67,18)
tilted LEDs
124 118 121 129 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 123 130 127 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

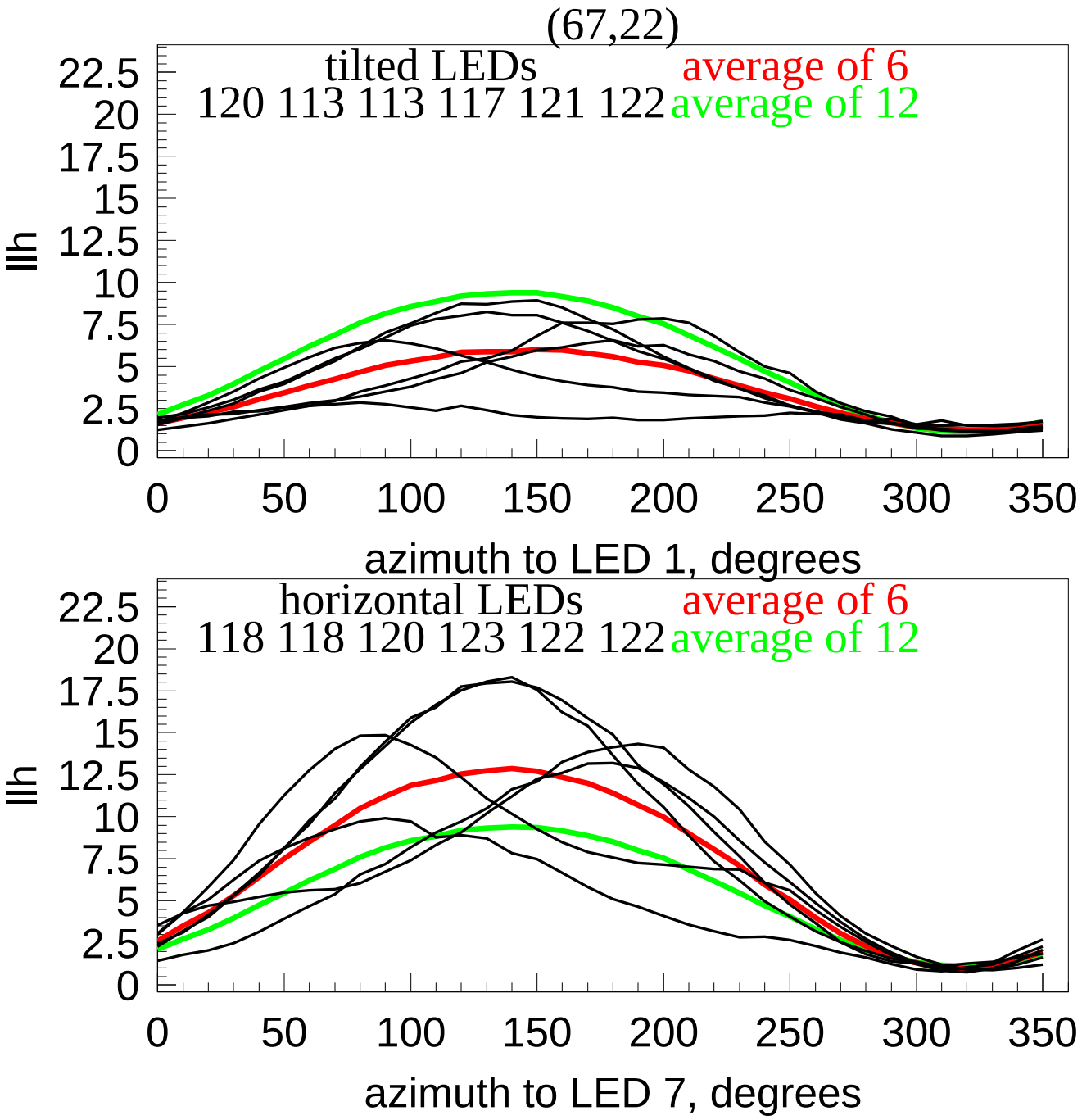

(67,18)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
329.5 ± 9.2

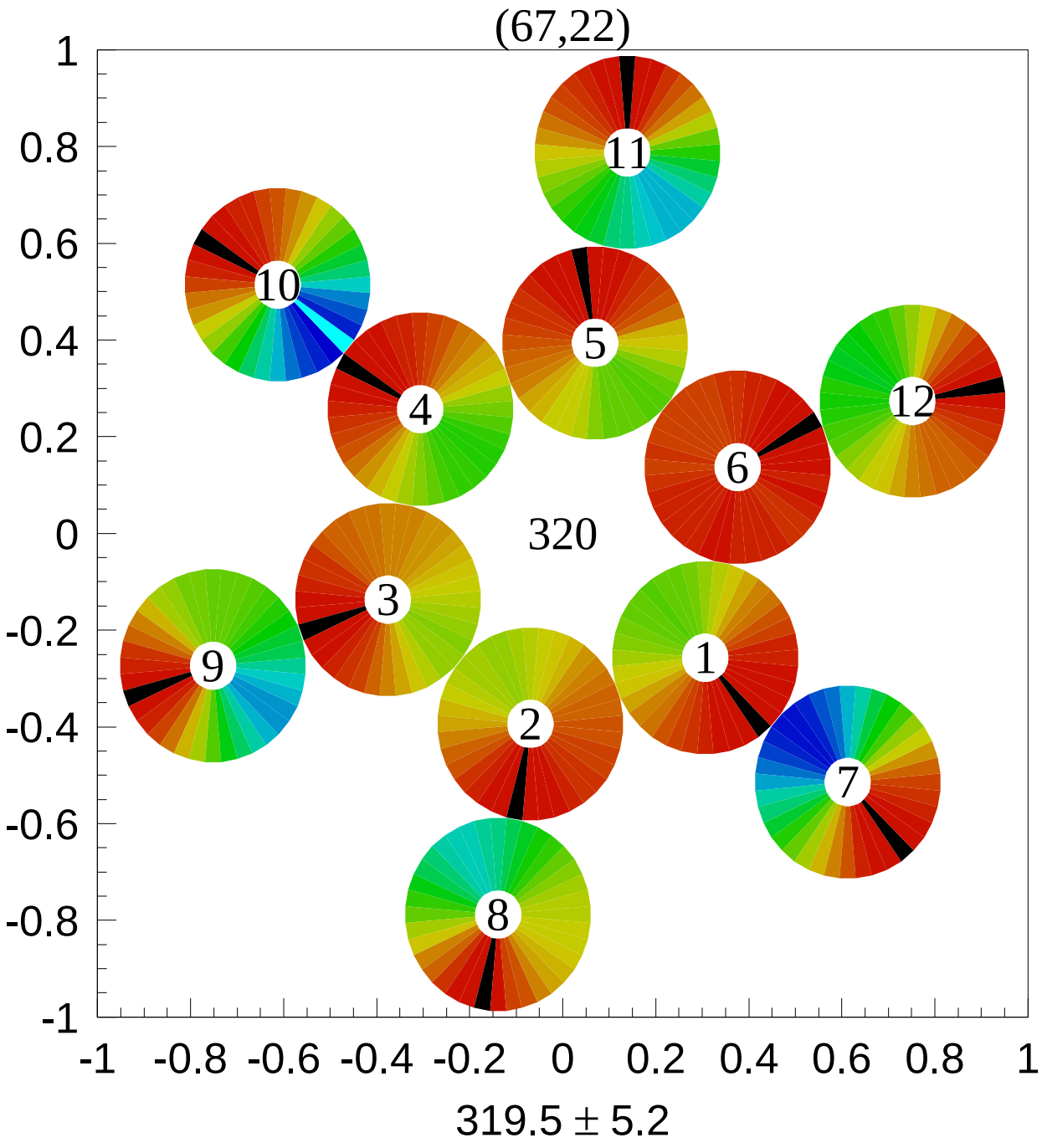

(67,20)
tilted LEDs
117 121 119 119 127 125
average of 6
average of 12
Ilh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 125 120 123 124 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

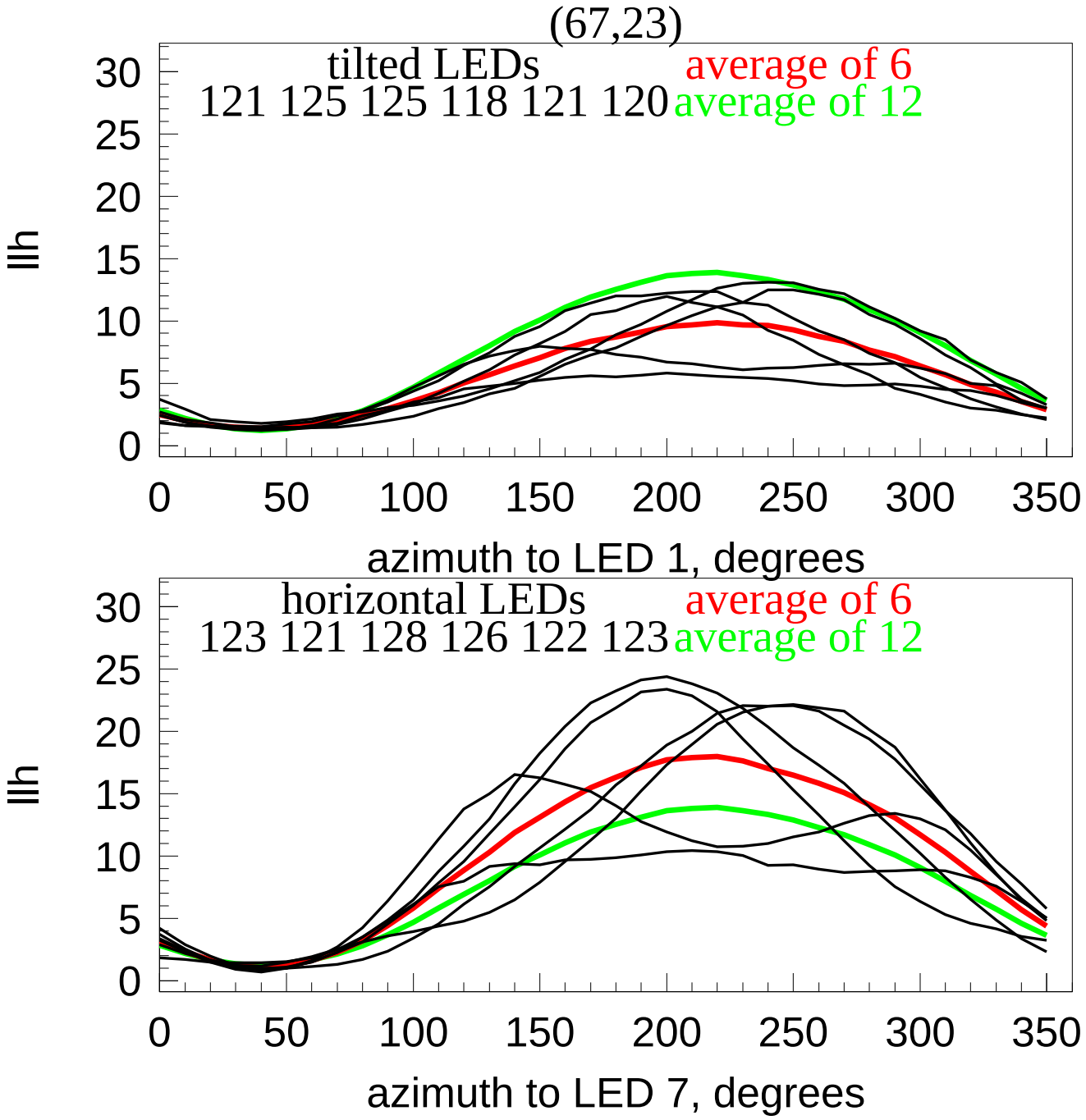

(67,20)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.2 ± 8.2

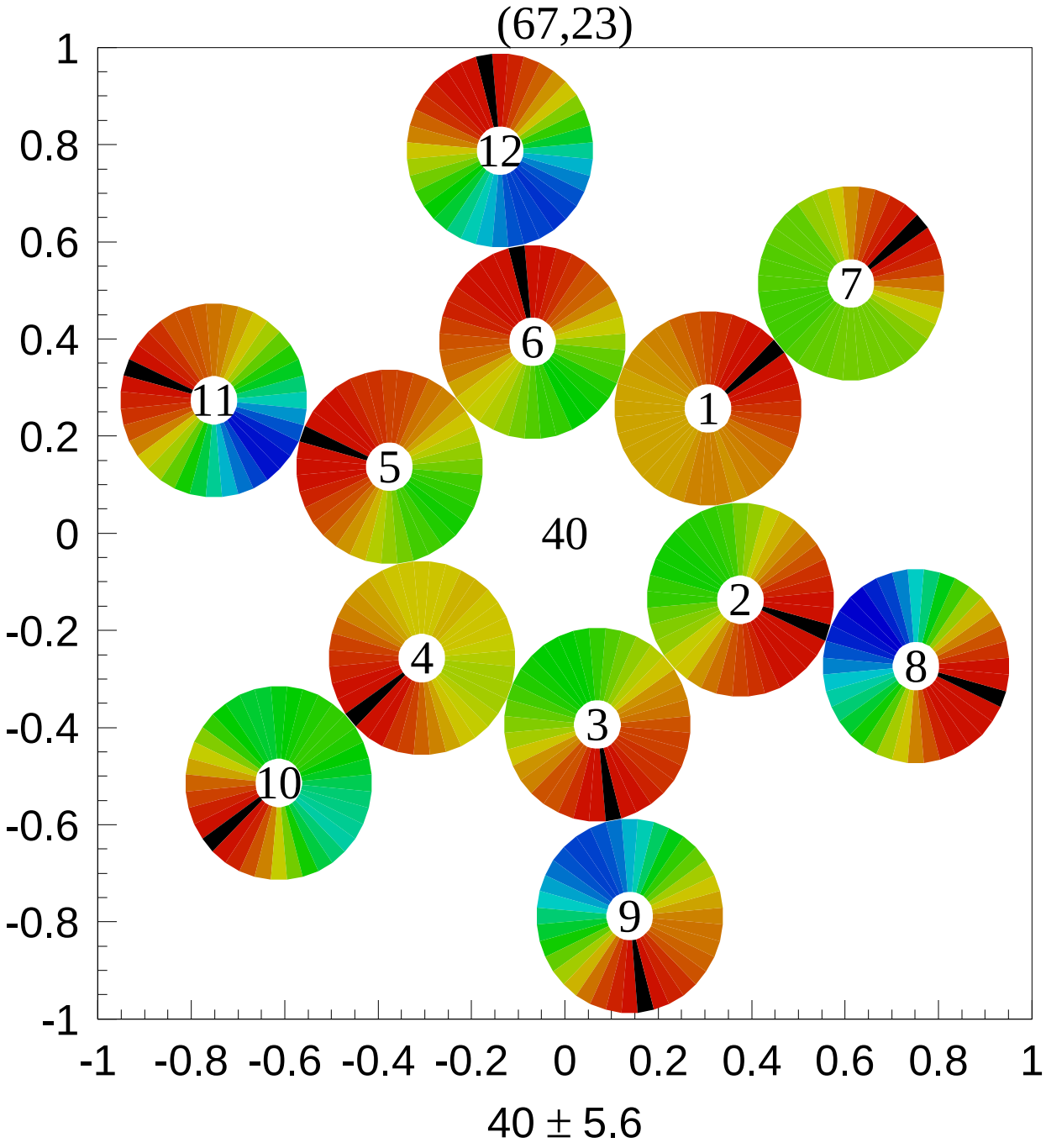

(67,21)
tilted LEDs
117 125 125 123 129 120
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 114 120 115 2 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

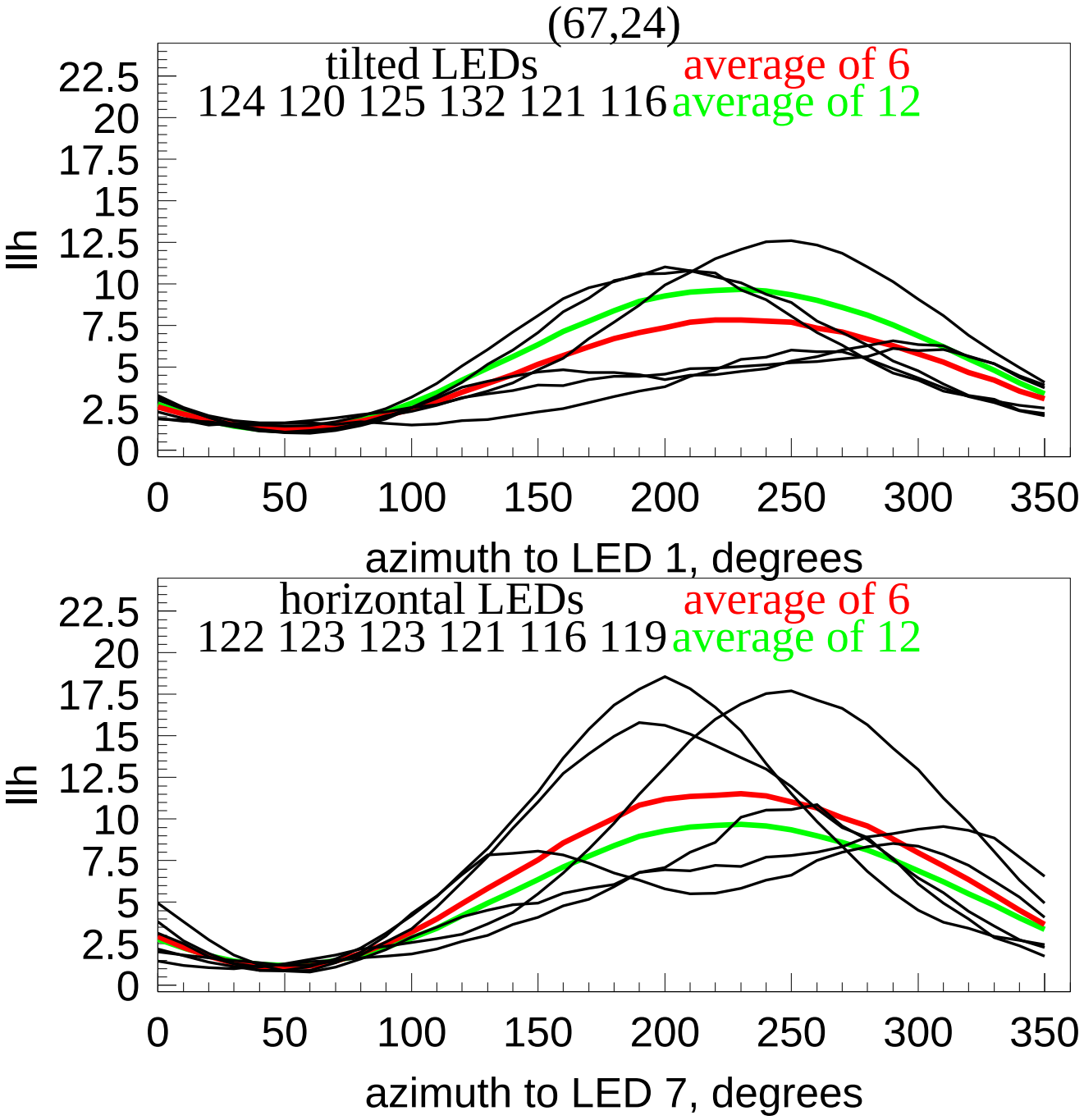

(67,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
123.9 ± 8.1

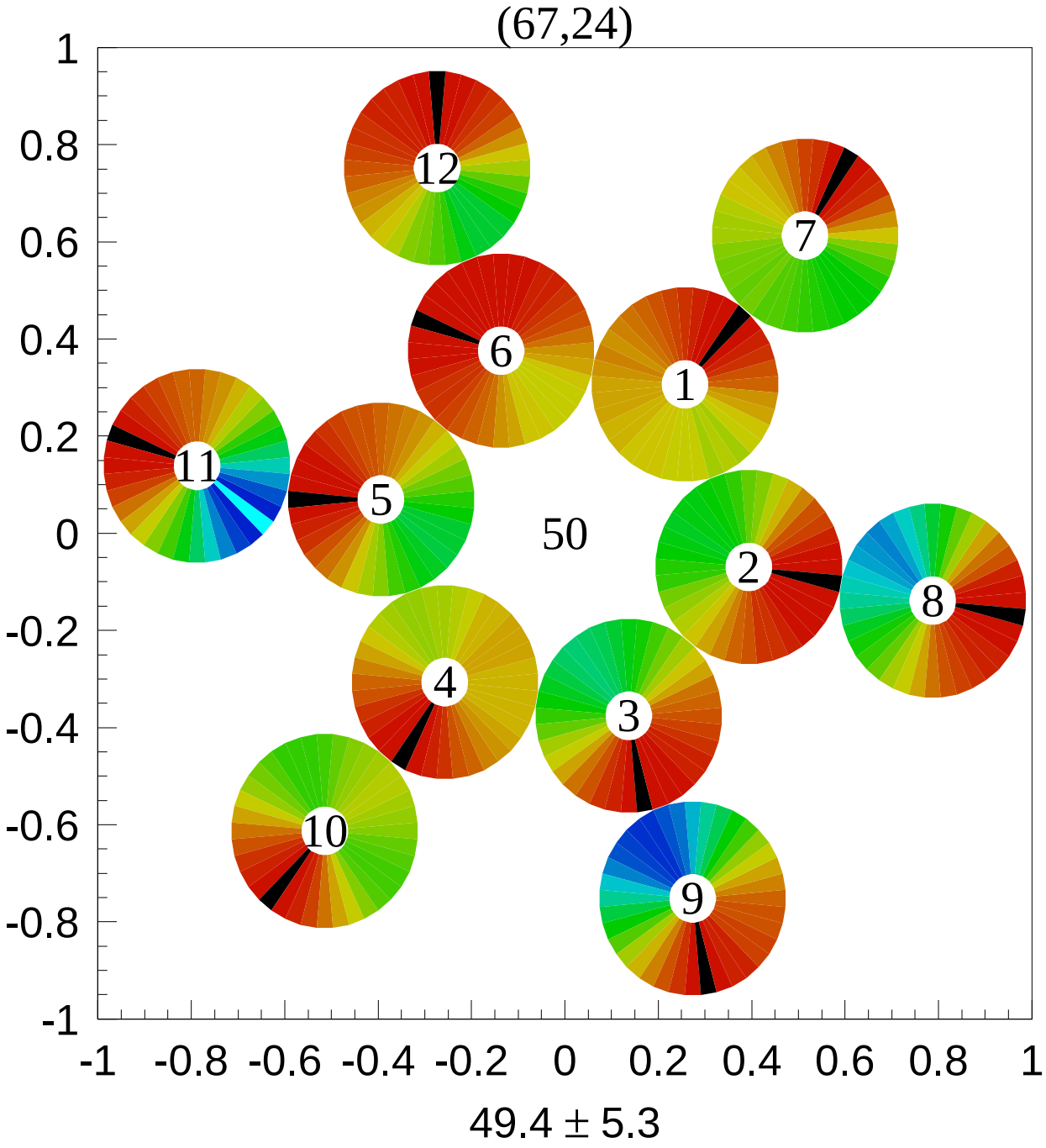

(67,22)
tilted LEDs
120 113 113 117 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 118 120 123 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

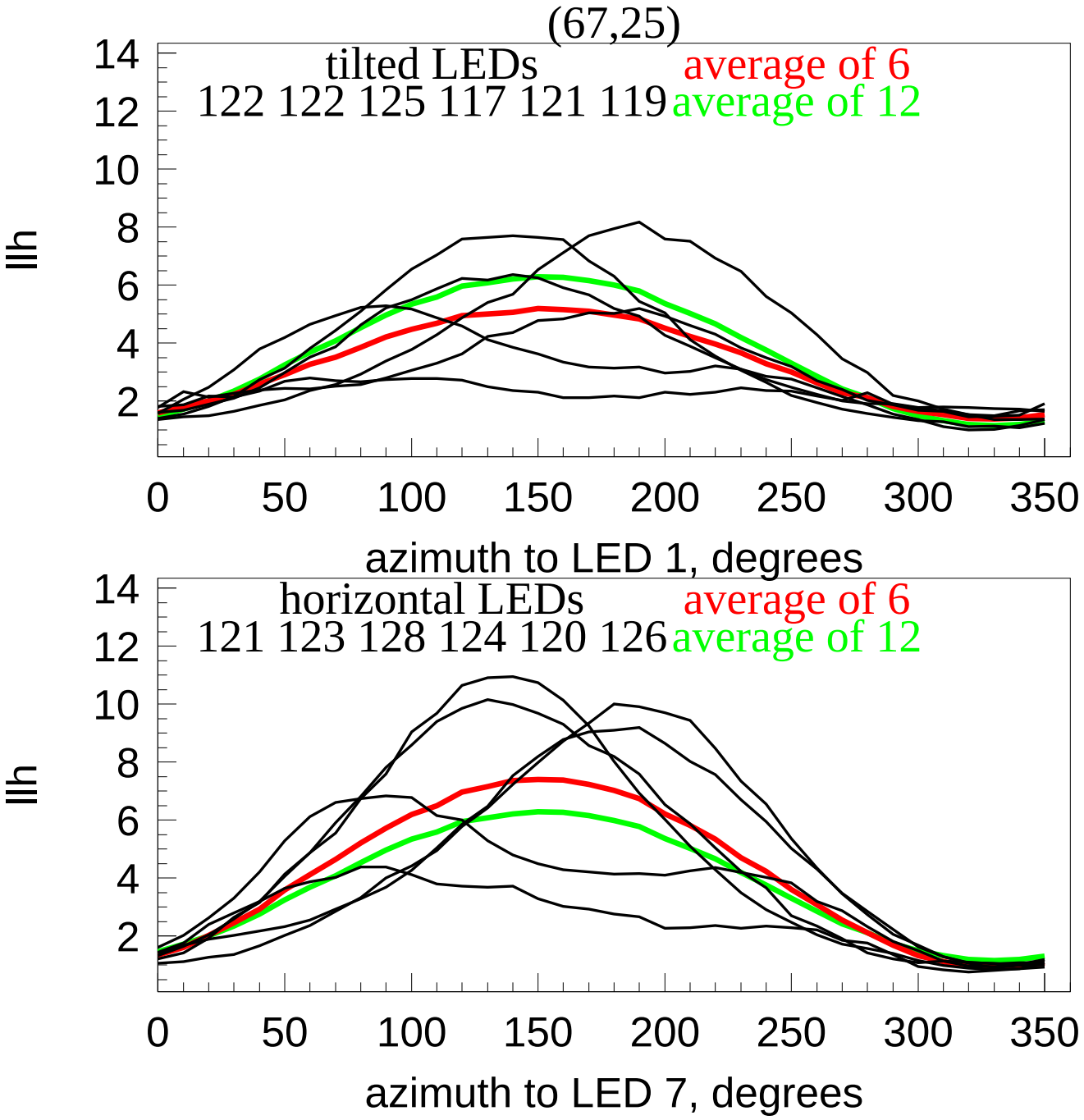

(67,22)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
319.5 ± 5.2

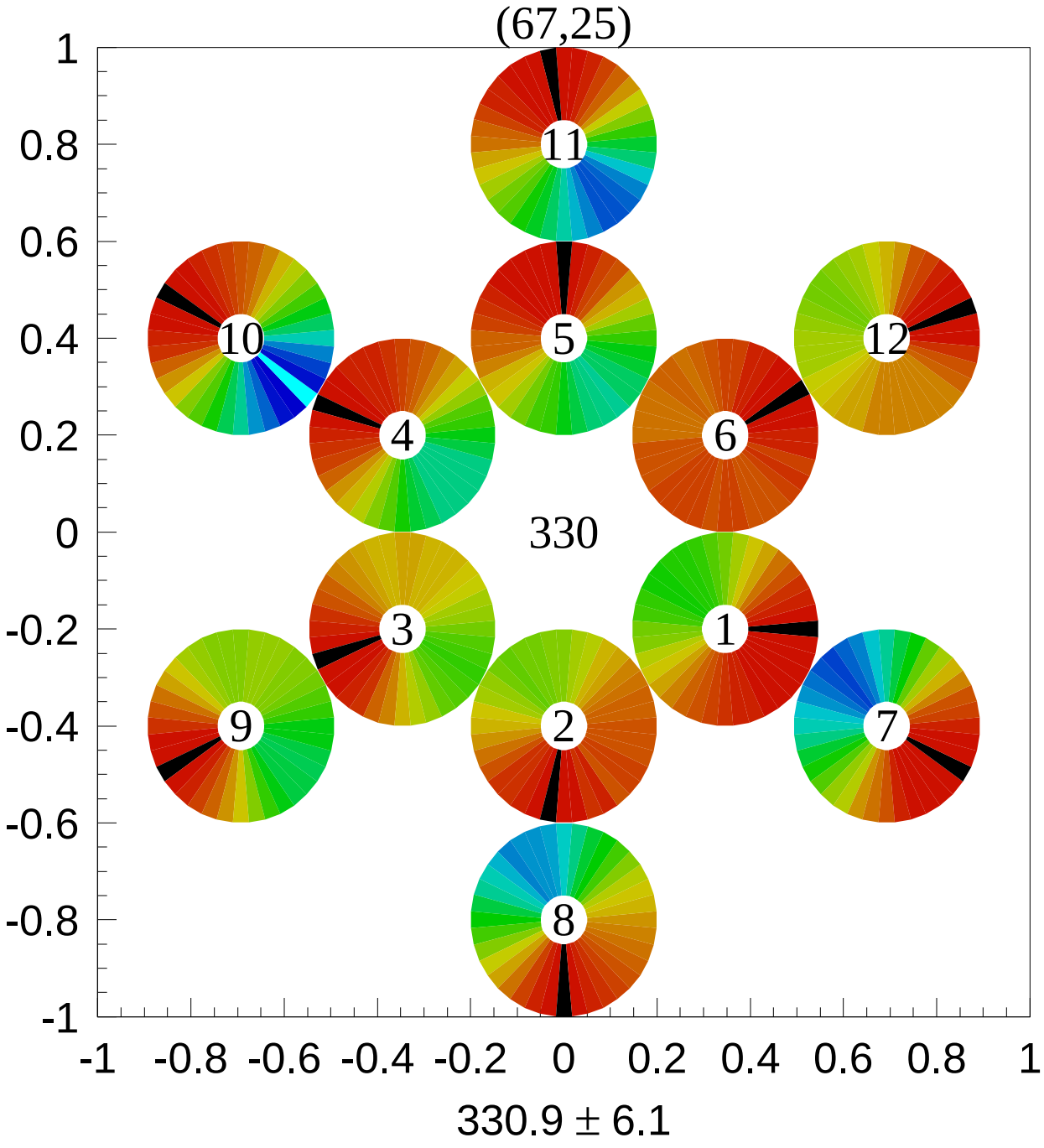

(67,23)
tilted LEDs
121 125 125 118 121 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 121 128 126 122 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

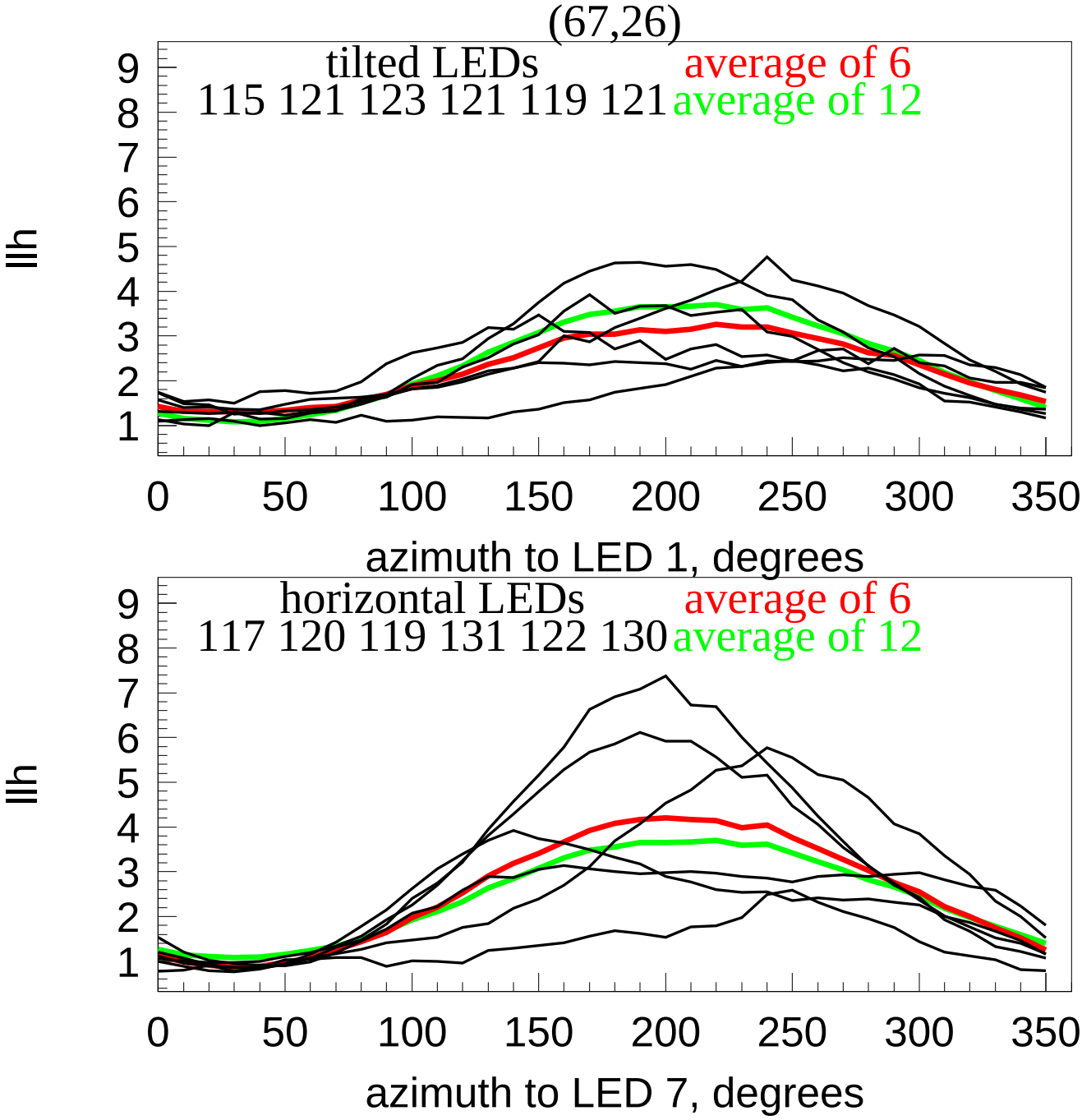

(67,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
7
6
11
1
5
40
2
8
4
3
10
9
40 ± 5.6

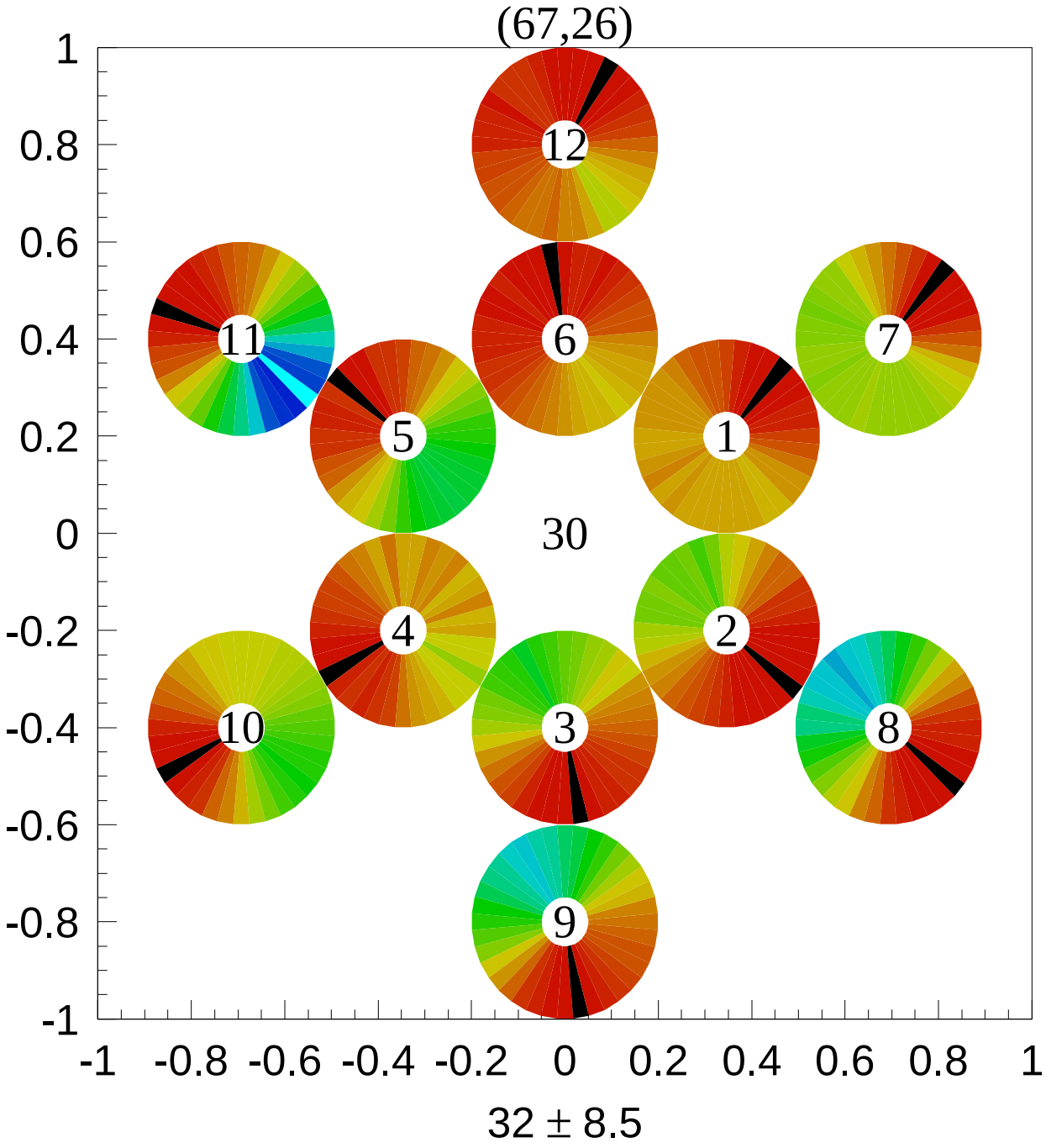

(67,24)
tilted LEDs
124 120 125 132 121 116
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 123 123 121 116 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

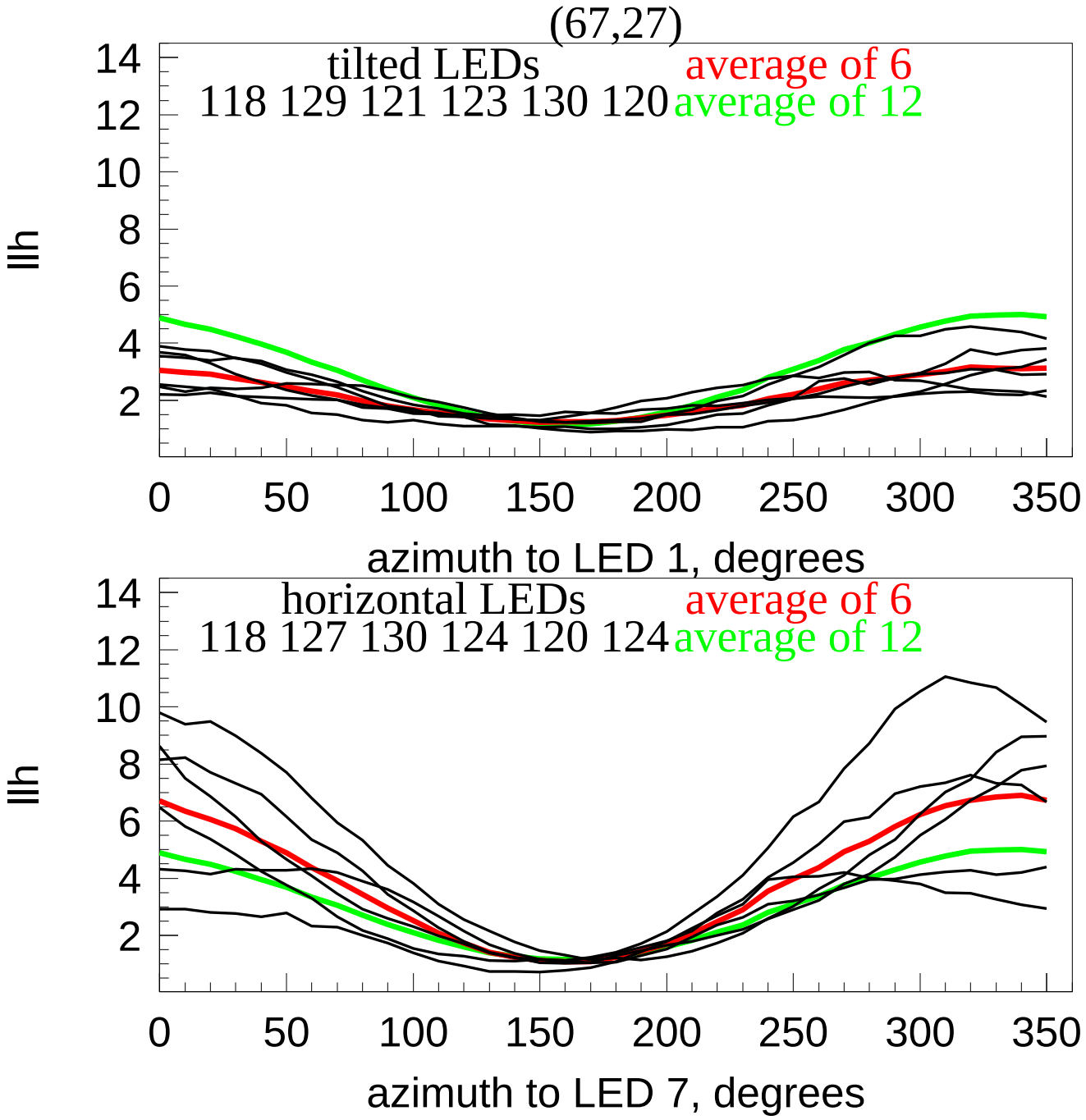

(67,24)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
49.4 ± 5.3

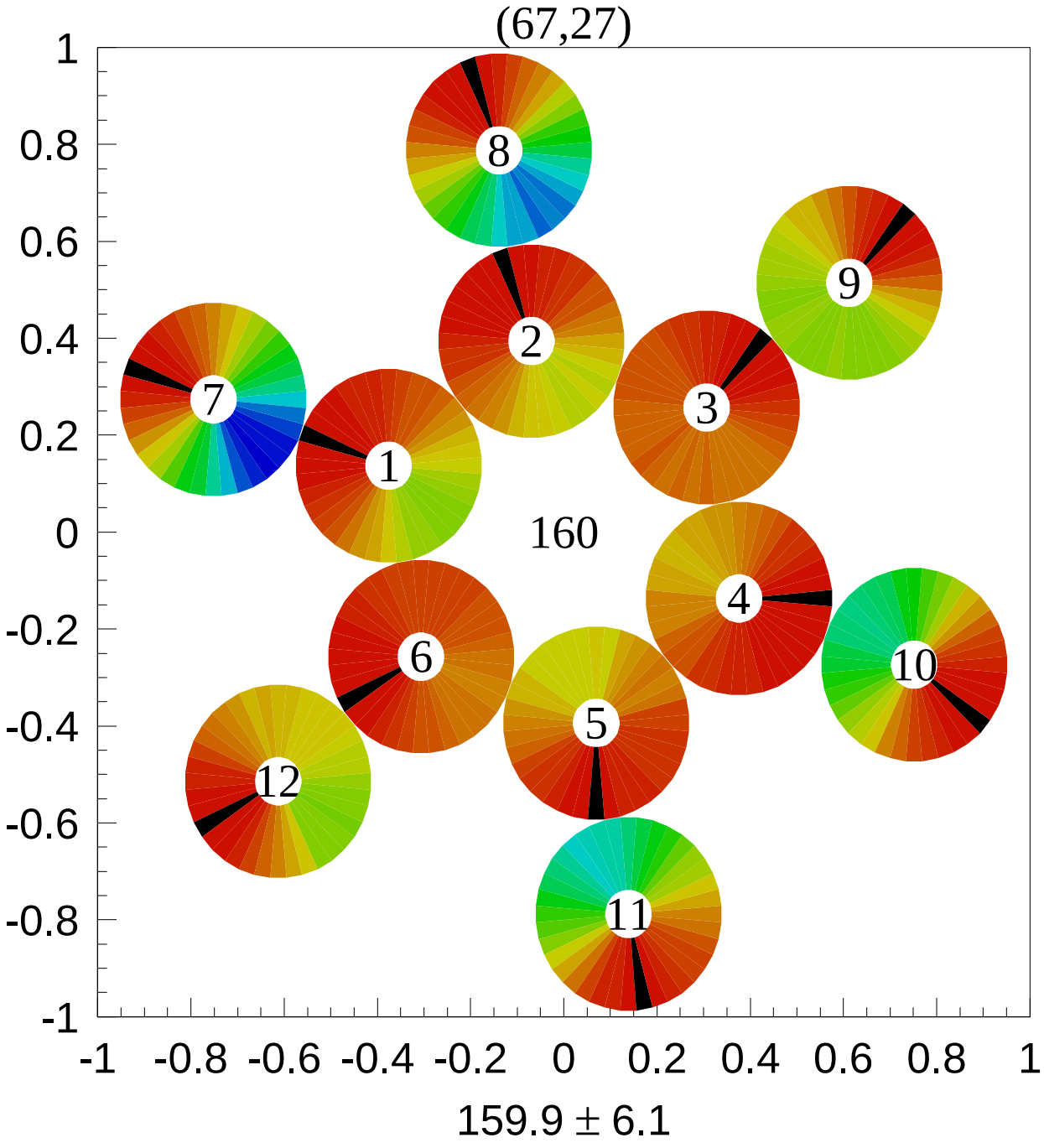

(67,25)
tilted LEDs
122 122 125 117 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 128 124 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

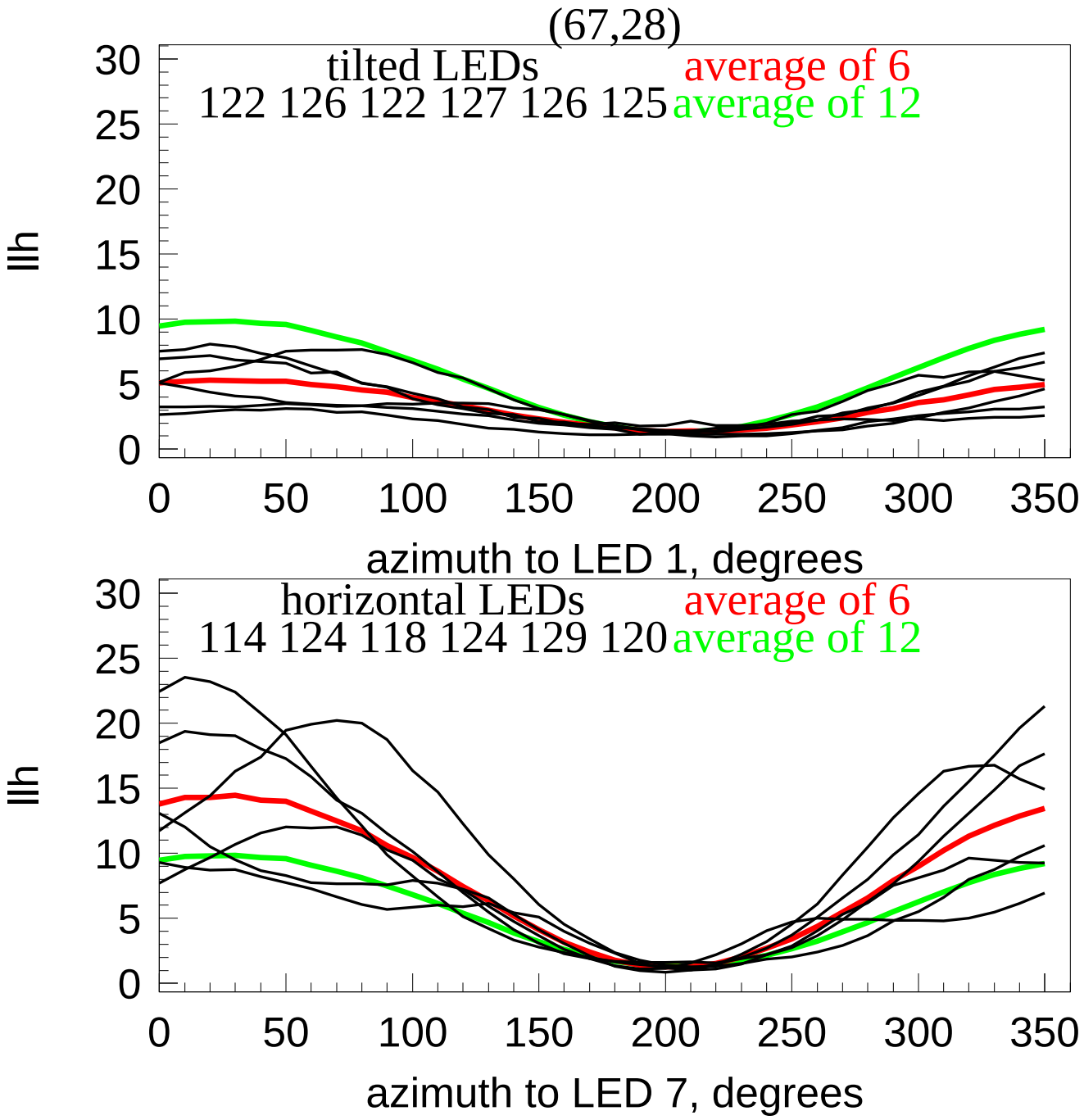

(67,25)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
330.9 ± 6.1

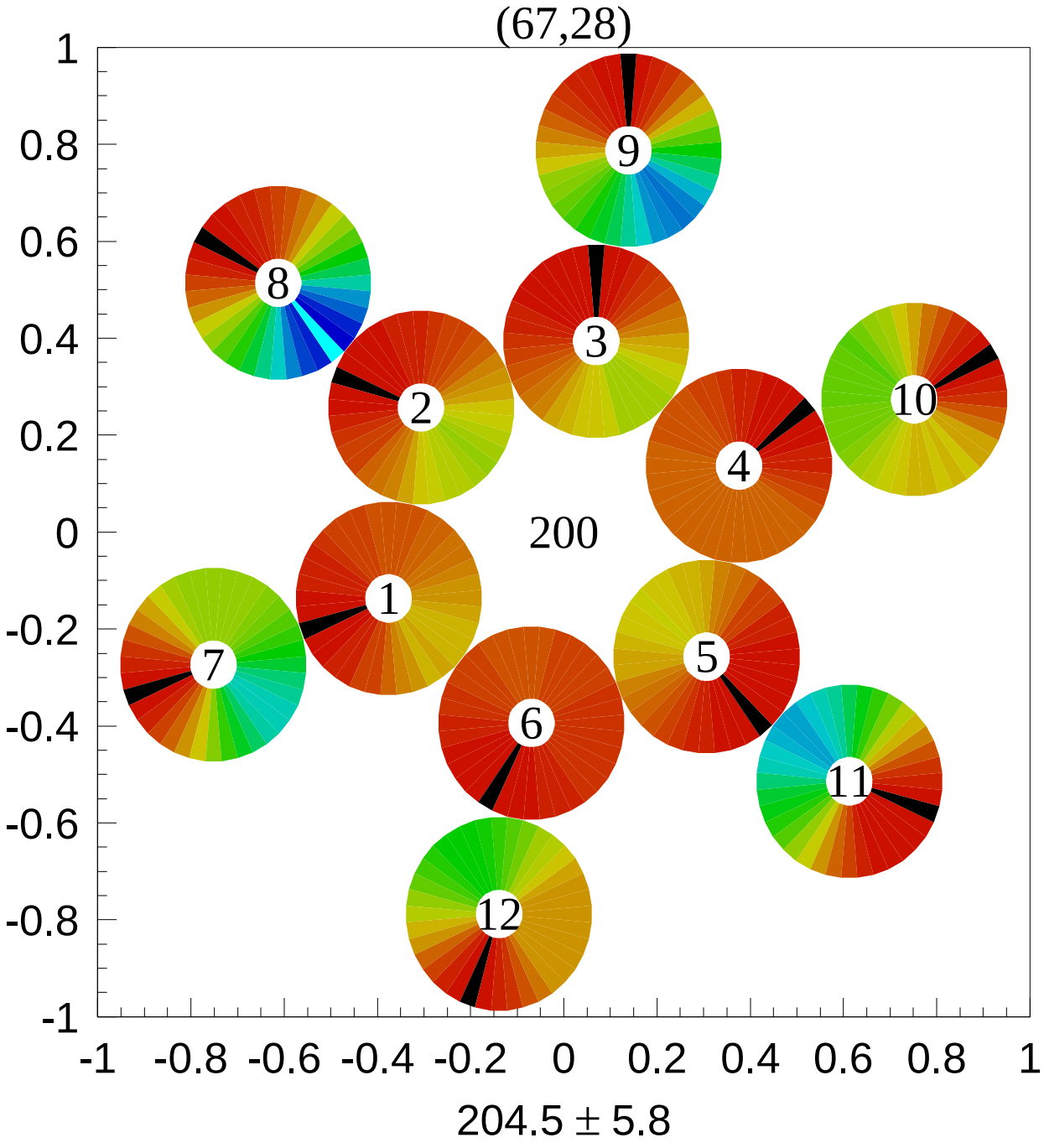

(67,26)
tilted LEDs
115 121 123 121 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 120 119 131 122 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

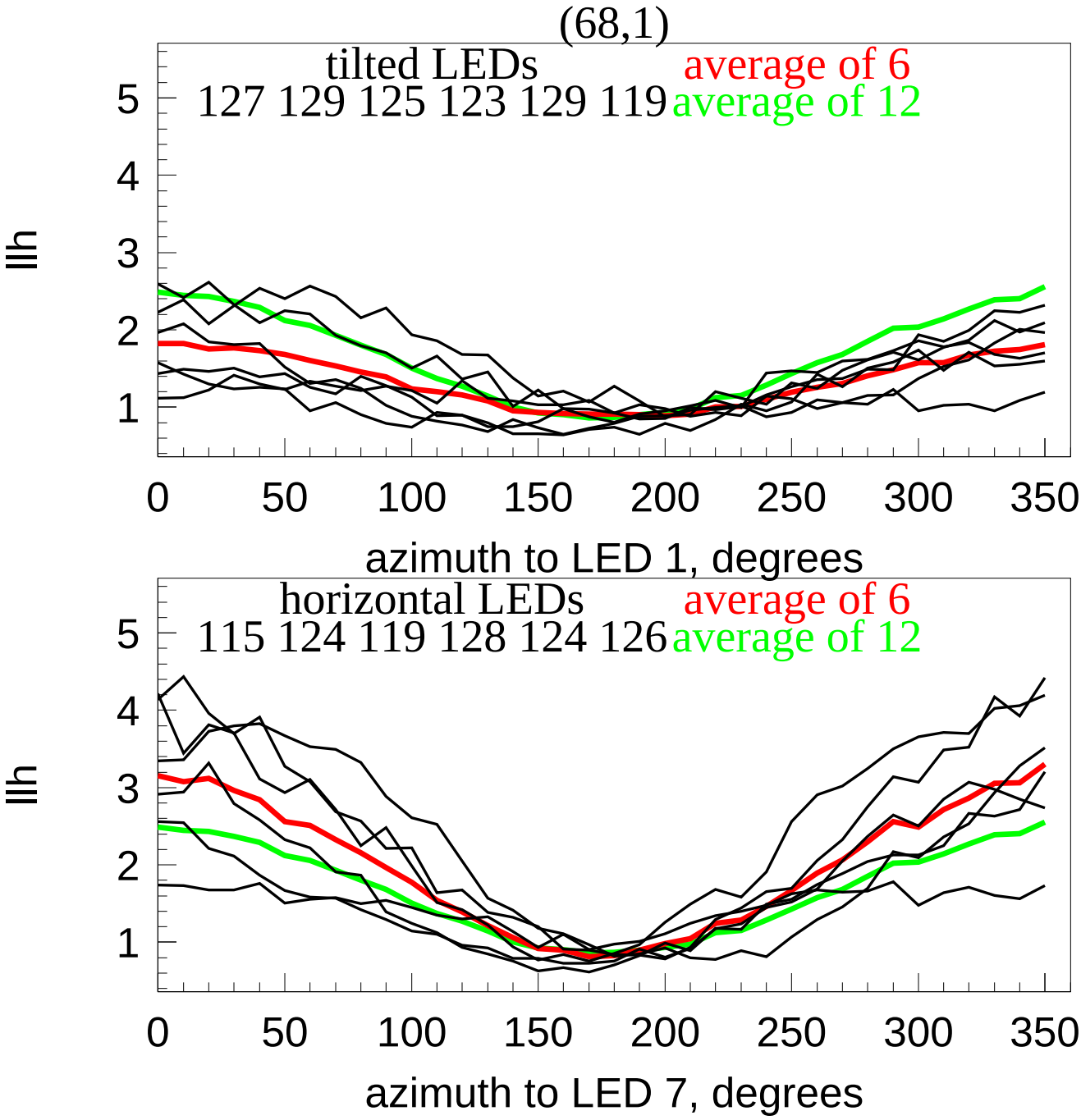

(67,26)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
32 ± 8.5

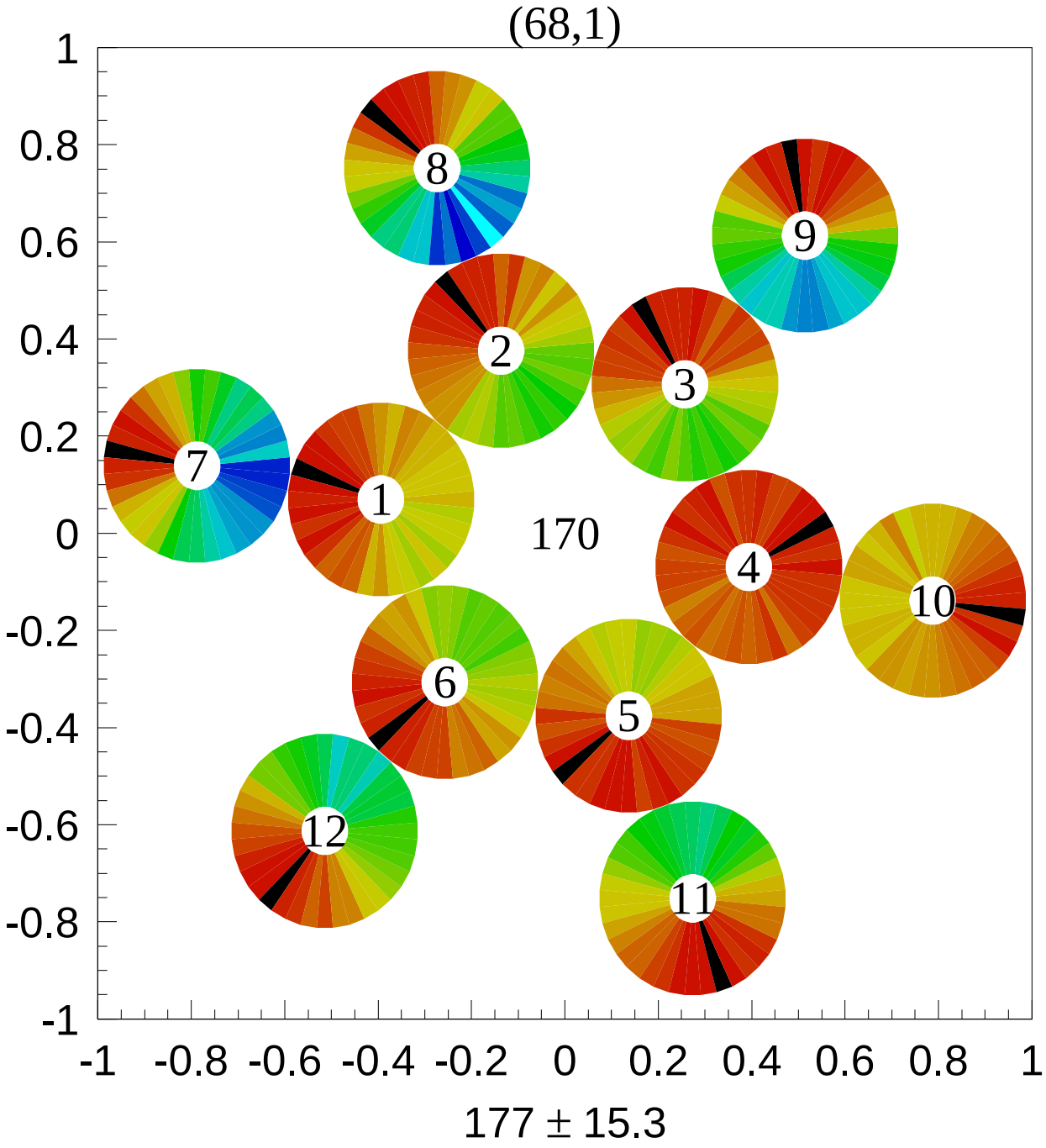

(67,27)
tilted LEDs
118 129 121 123 130 120
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 127 130 124 120 124
average of 6
average of 12
llh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

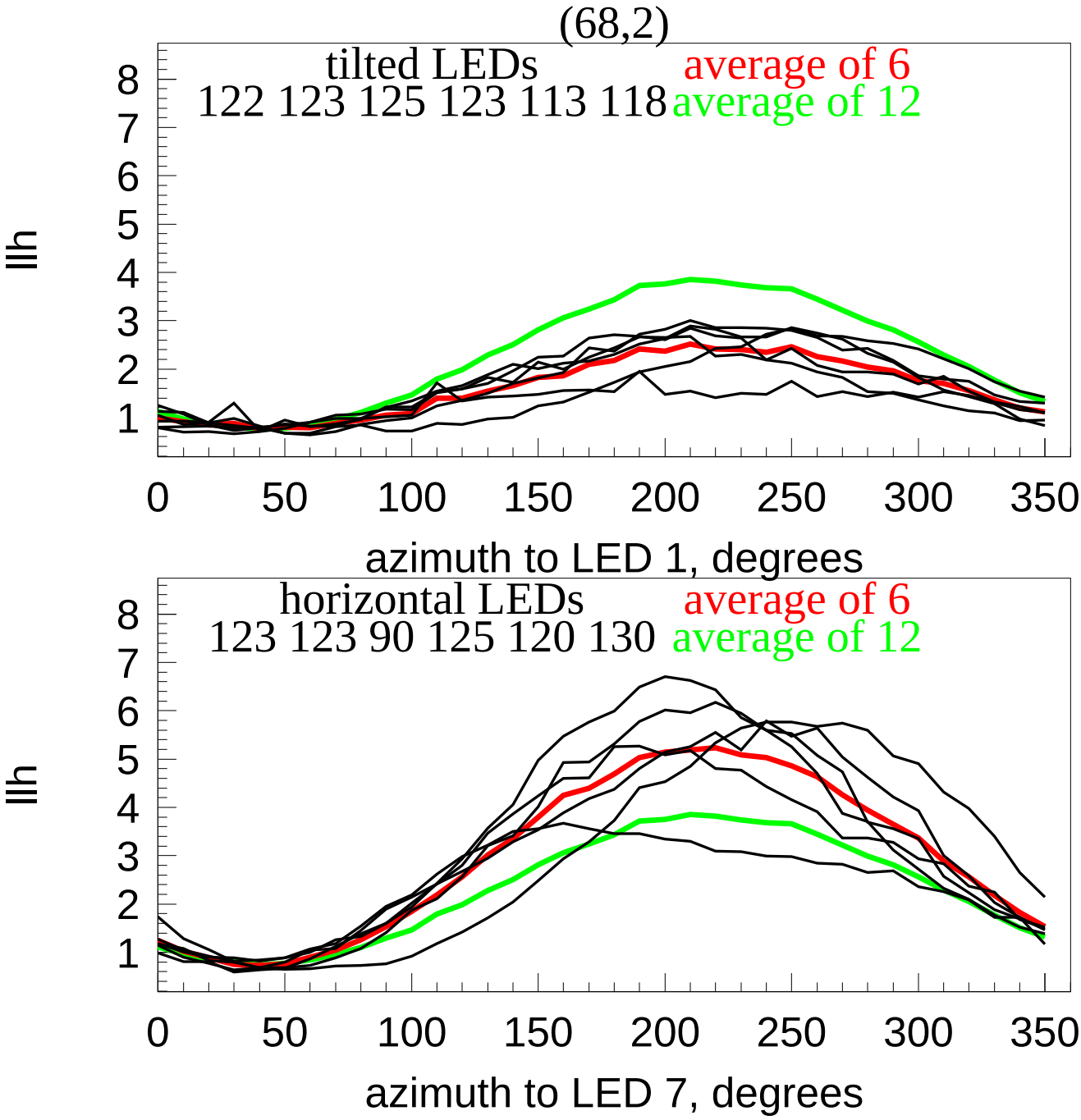

(67,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
8
2
9
7
3
1
160
4
10
6
5
12
11
159.9 ± 6.1

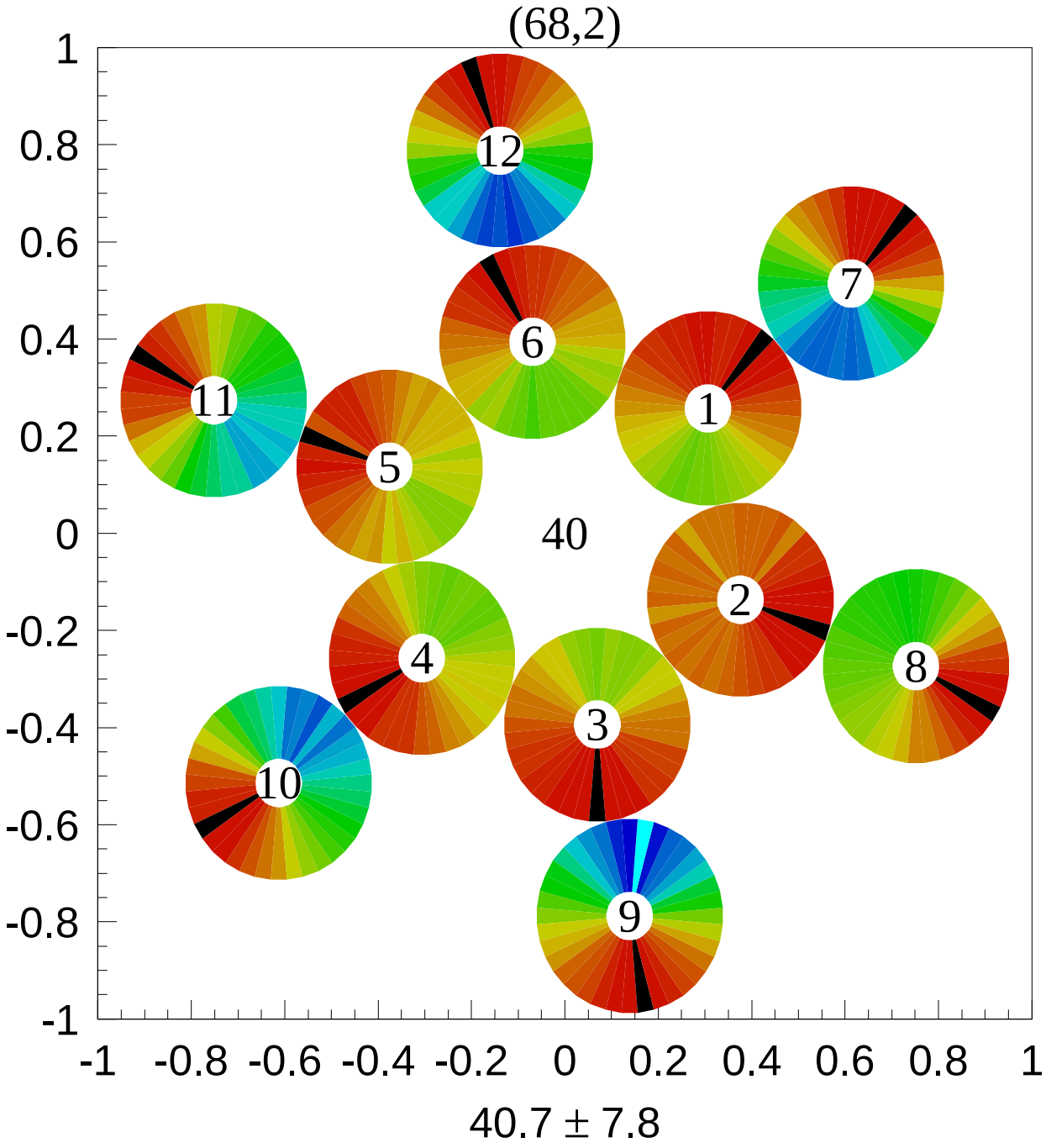

(67,28)
tilted LEDs
122 126 122 127 126 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 124 118 124 129 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

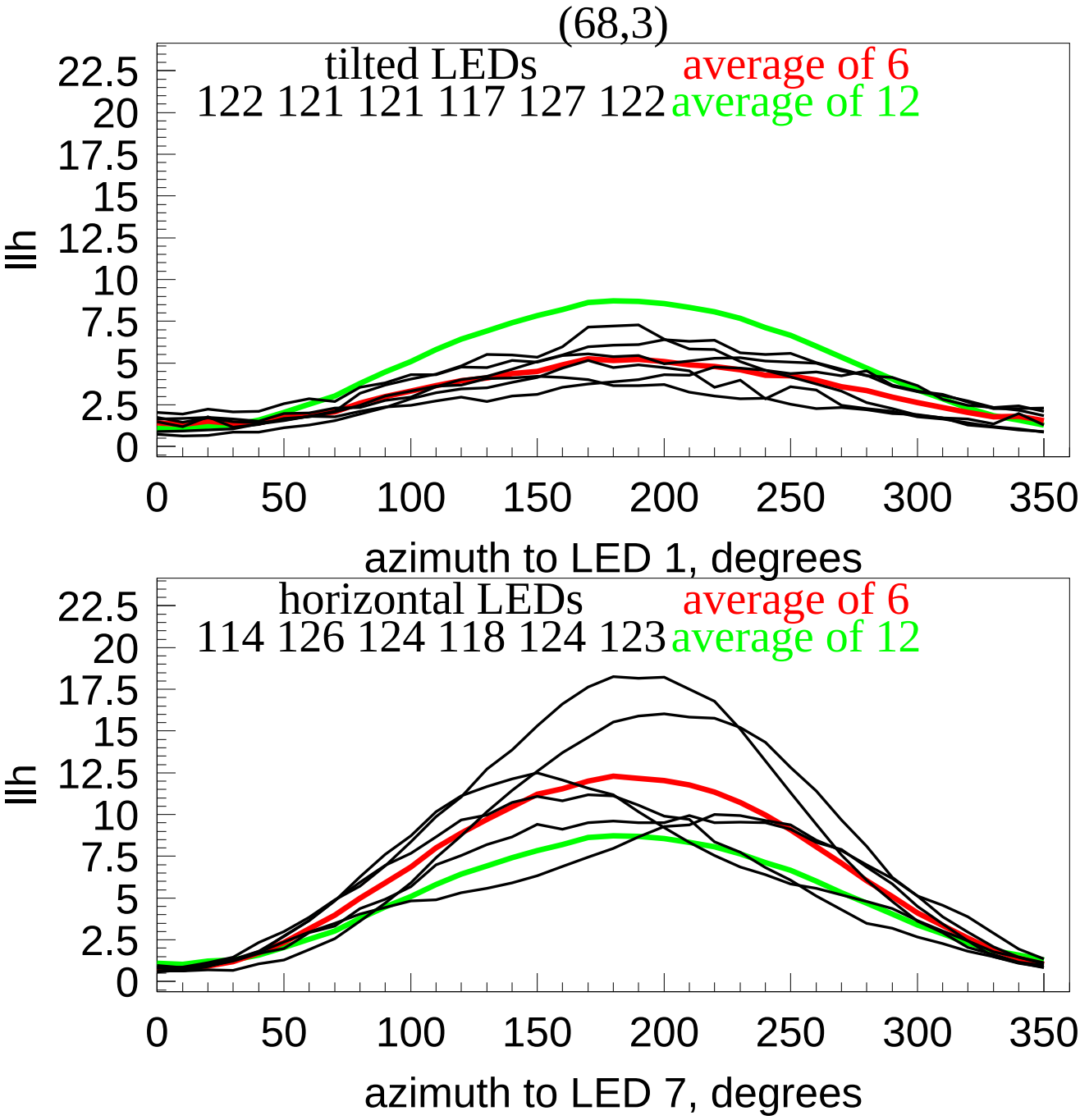

(67,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
204.5 ± 5.8

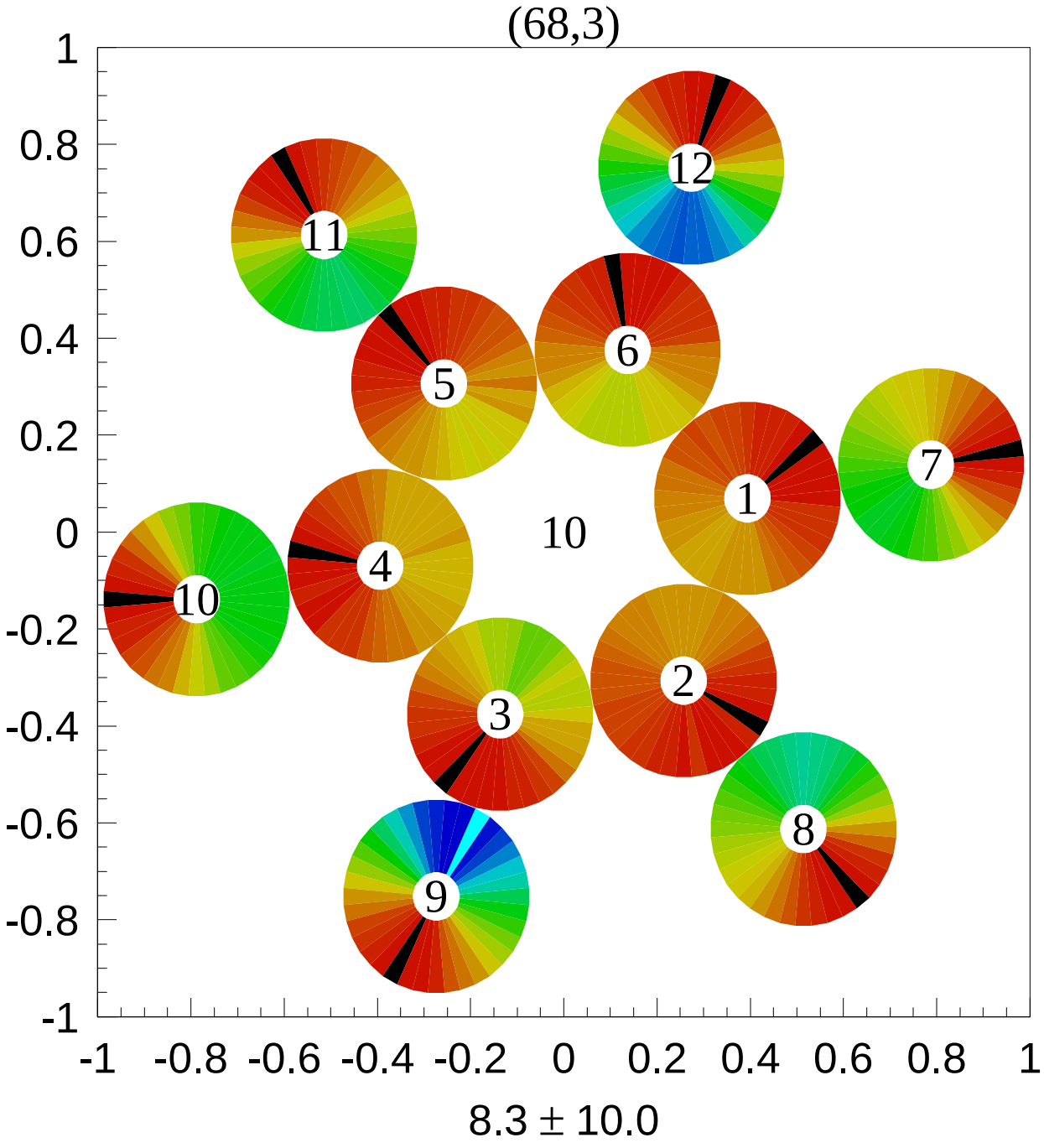

(68,1)
tilted LEDs
127 129 125 123 129 119
average of 6
average of 12
Ilh
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
115 124 119 128 124 126
average of 6
average of 12
Ilh
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

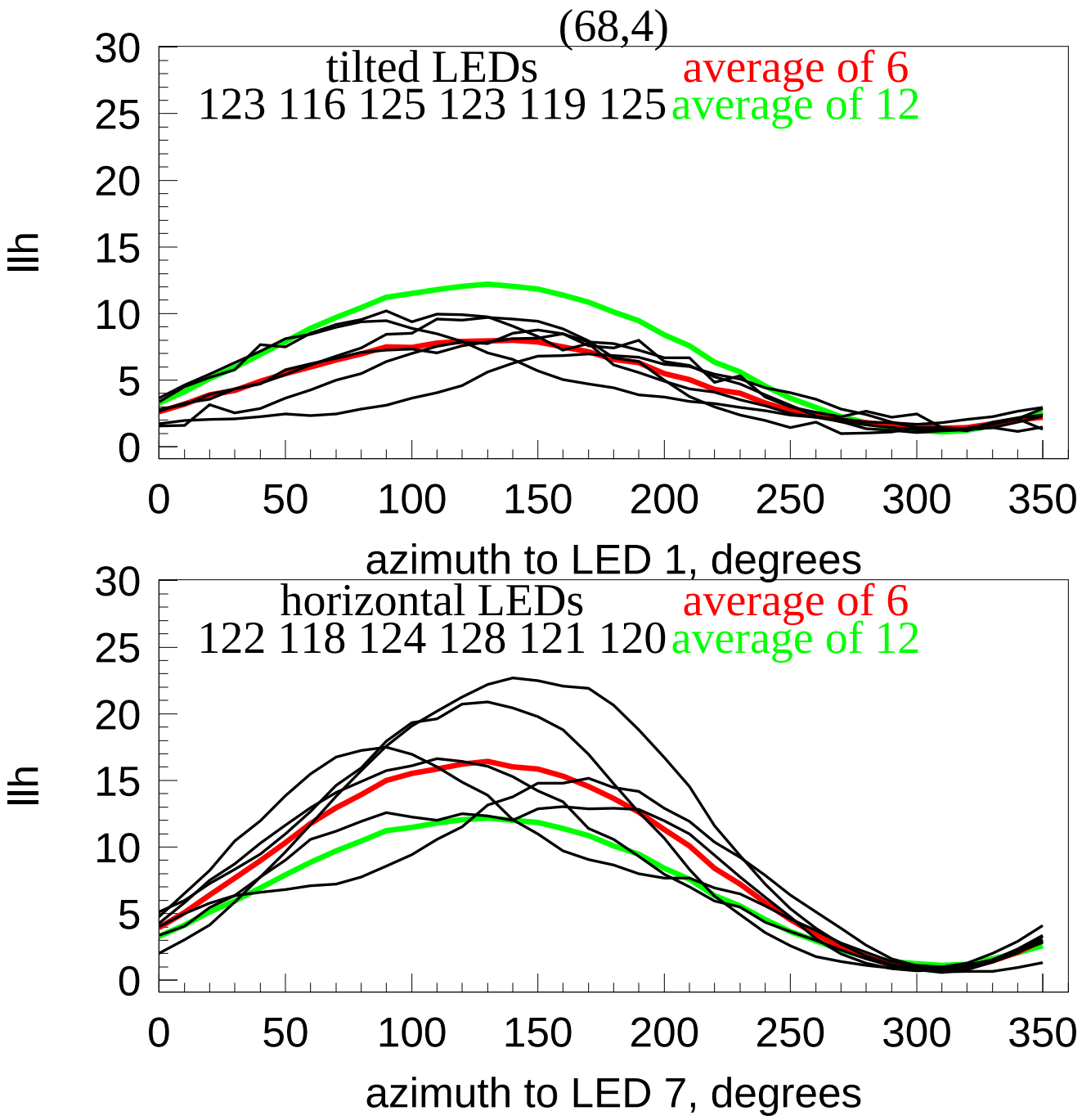

(68,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
177 ± 15.3

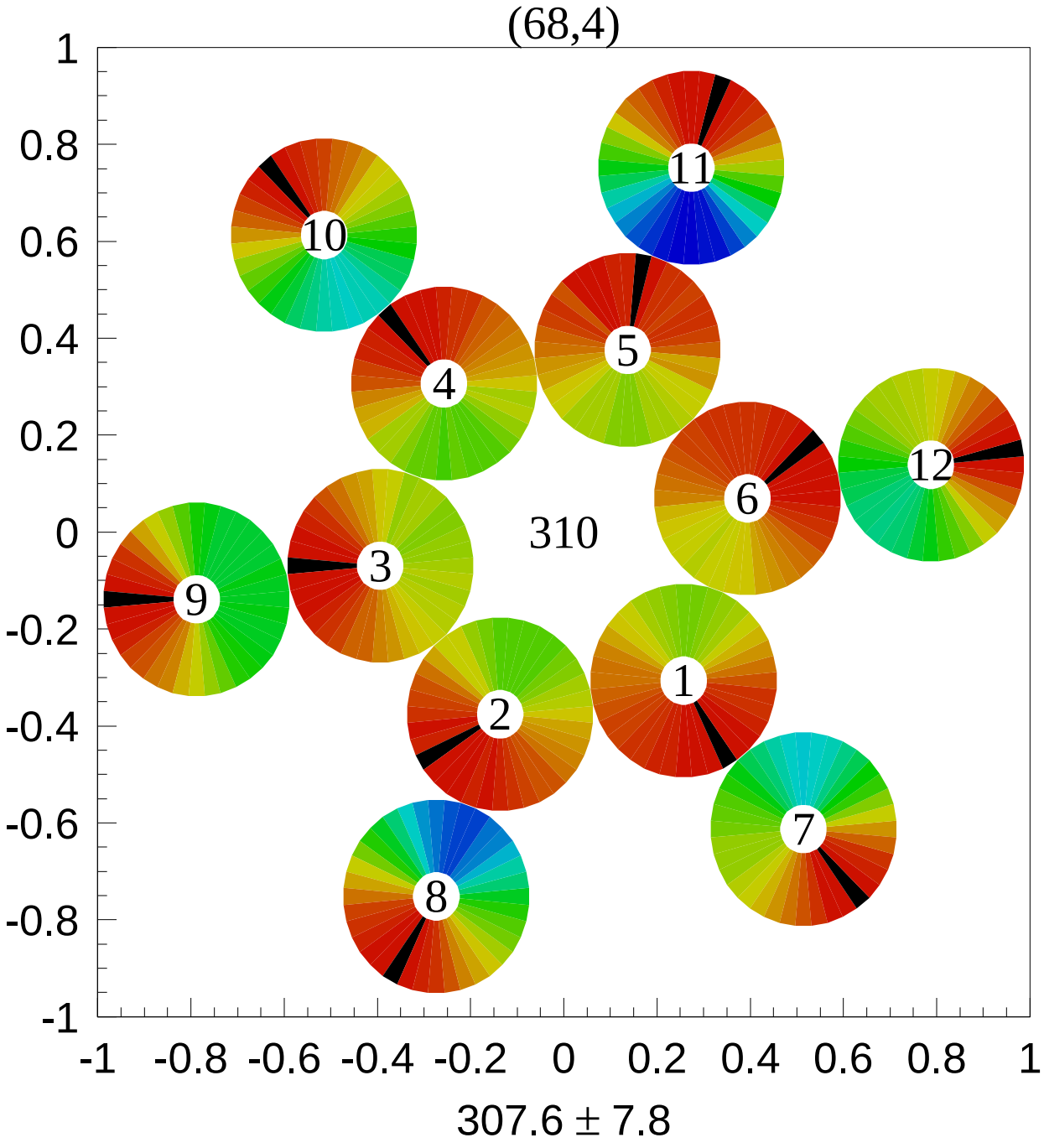

(68,2)
tilted LEDs
122 123 125 123 113 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 90 125 120 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

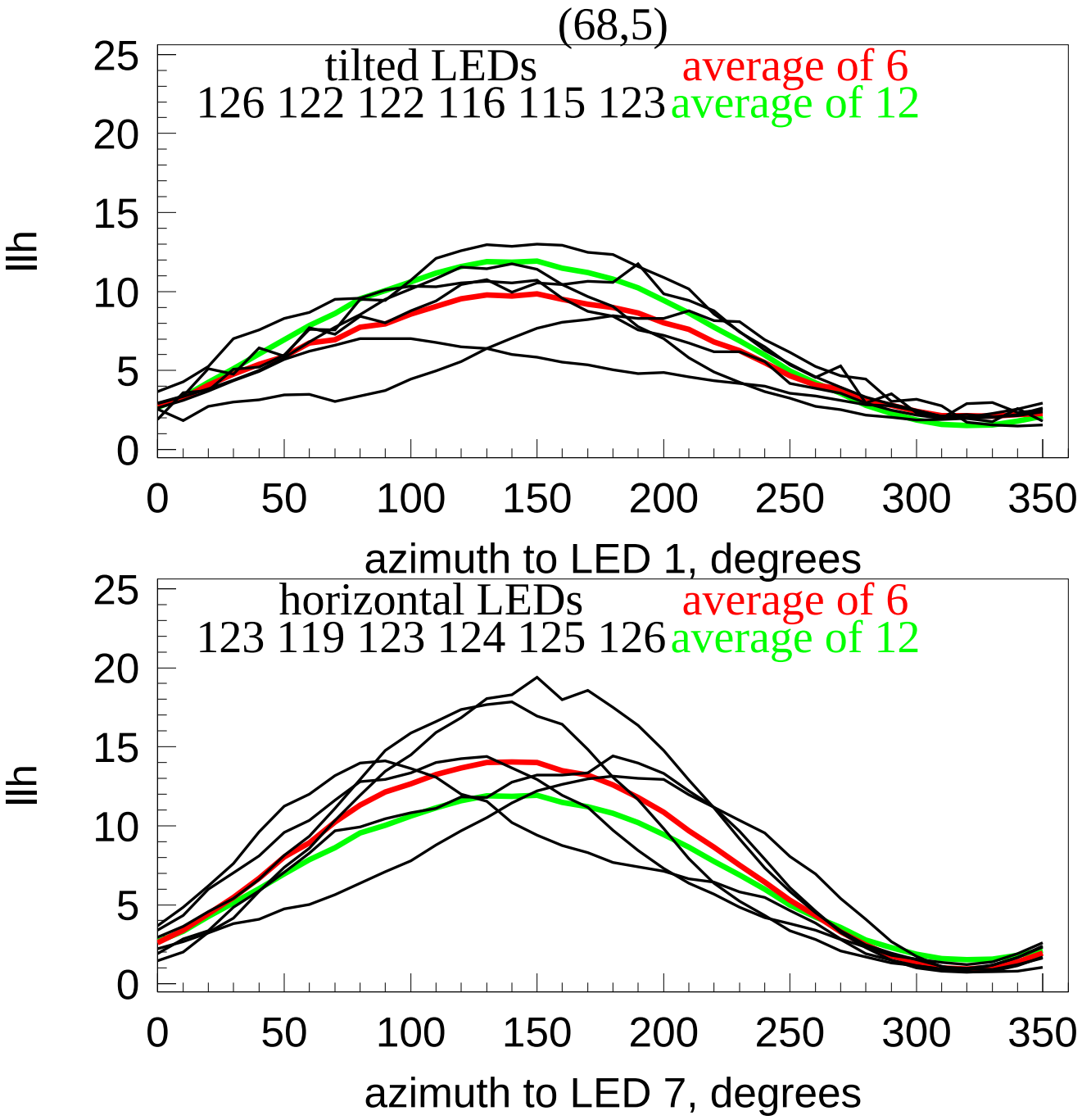

(68,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
40.7 ± 7.8

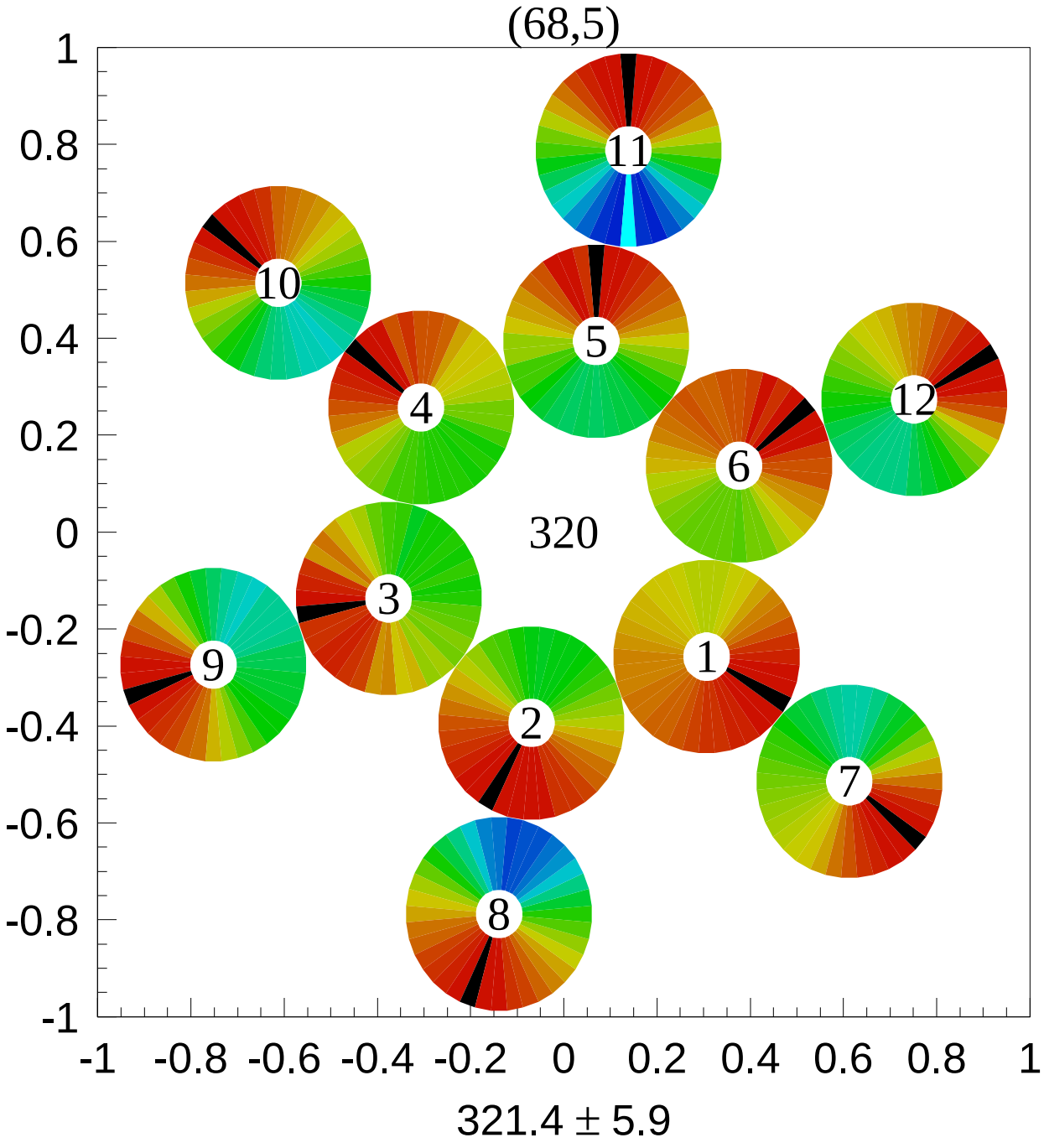

(68,3)
tilted LEDs
122 121 121 117 127 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 126 124 118 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

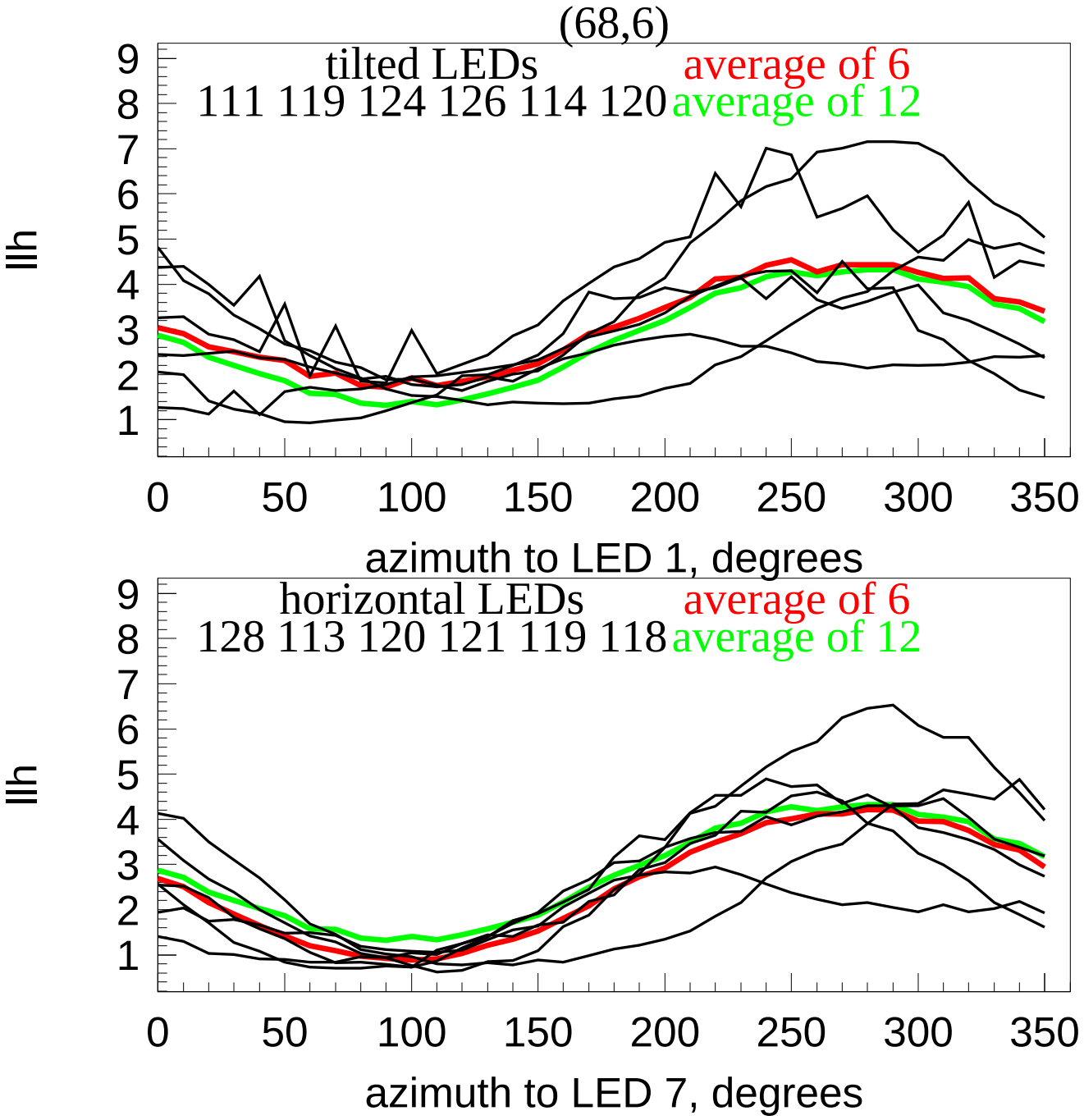

(68,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
8.3 ± 10.0

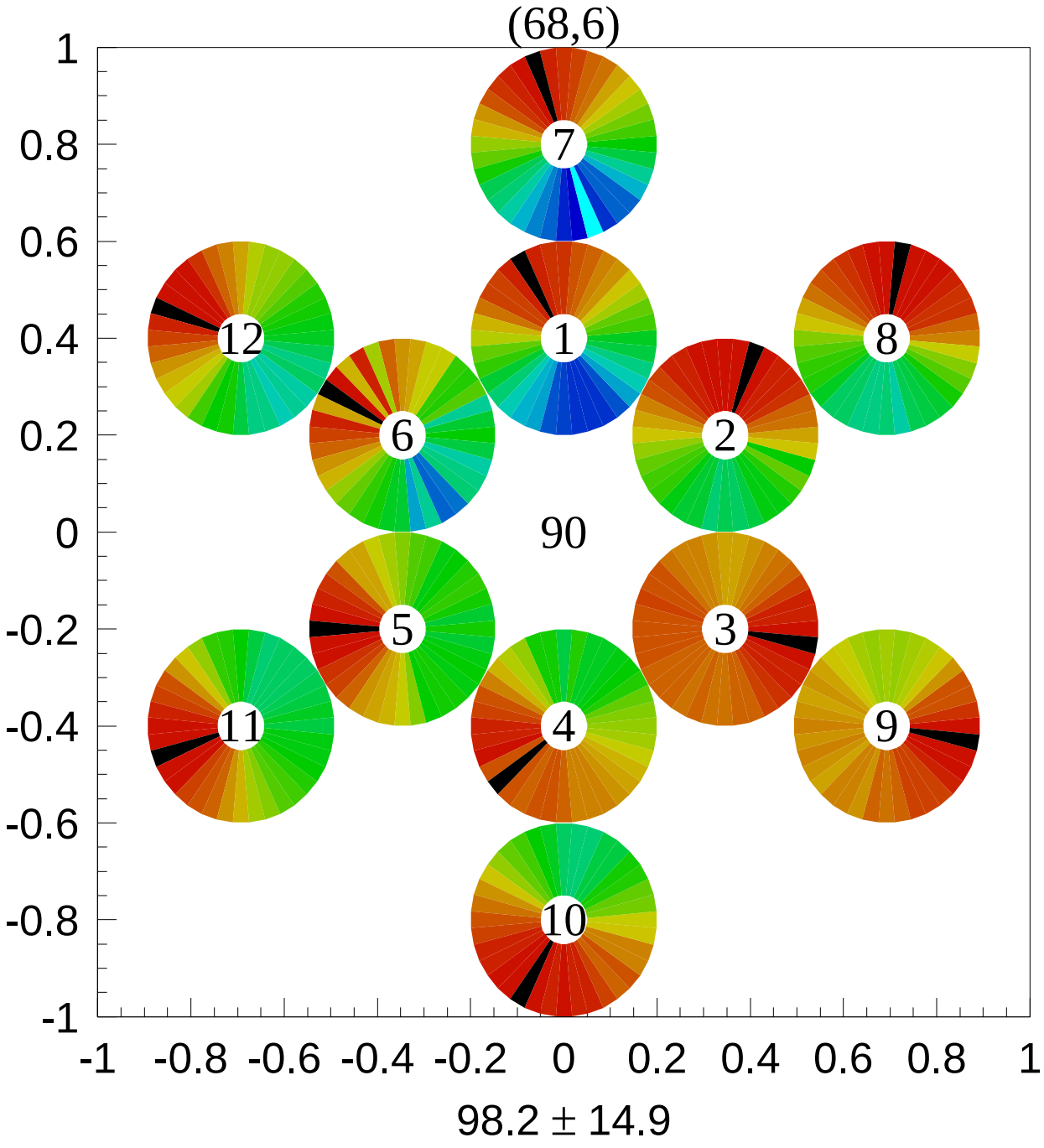

(68,4)
tilted LEDs
123 116 125 123 119 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 118 124 128 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

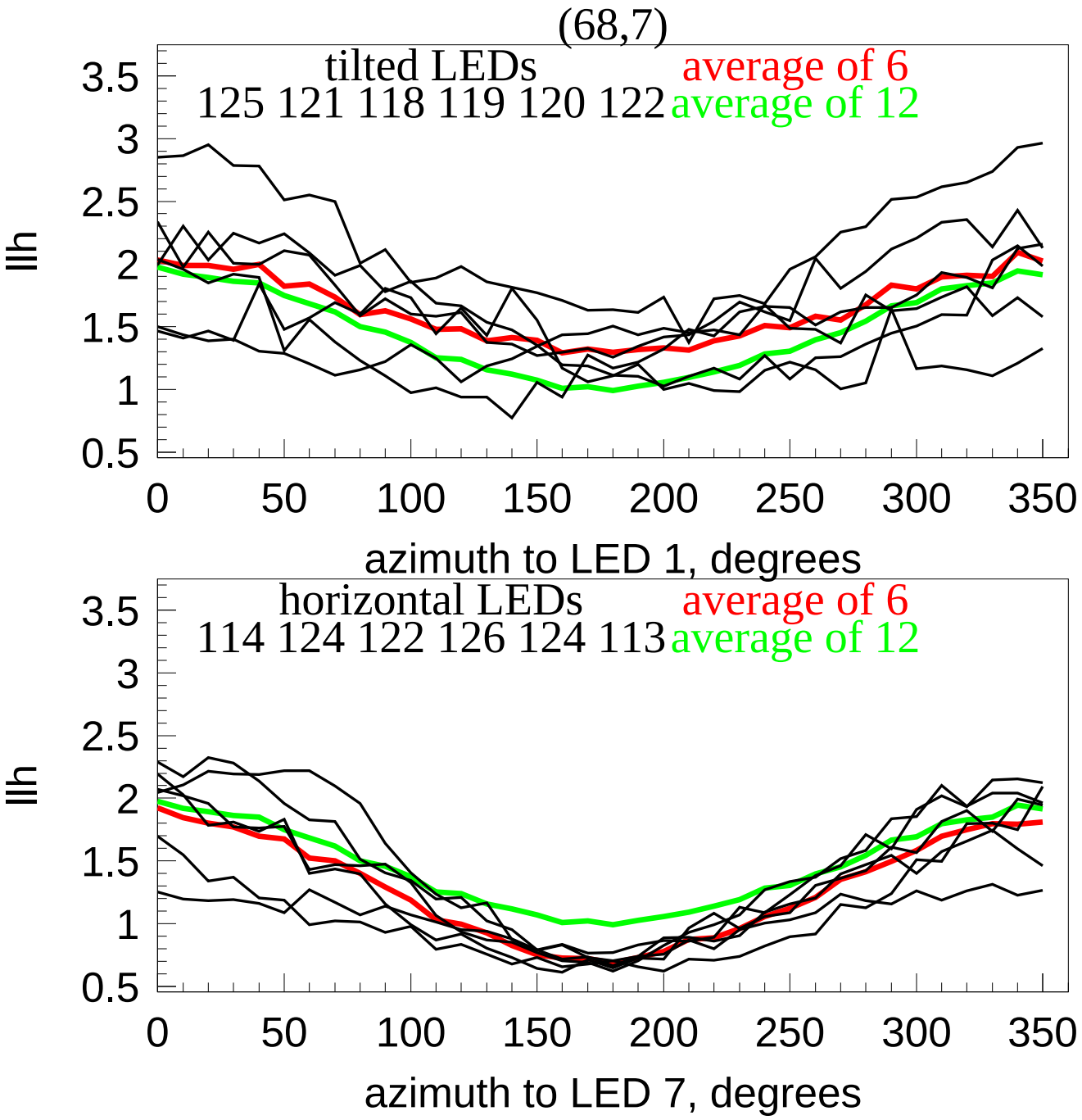

(68,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
307.6 ± 7.8

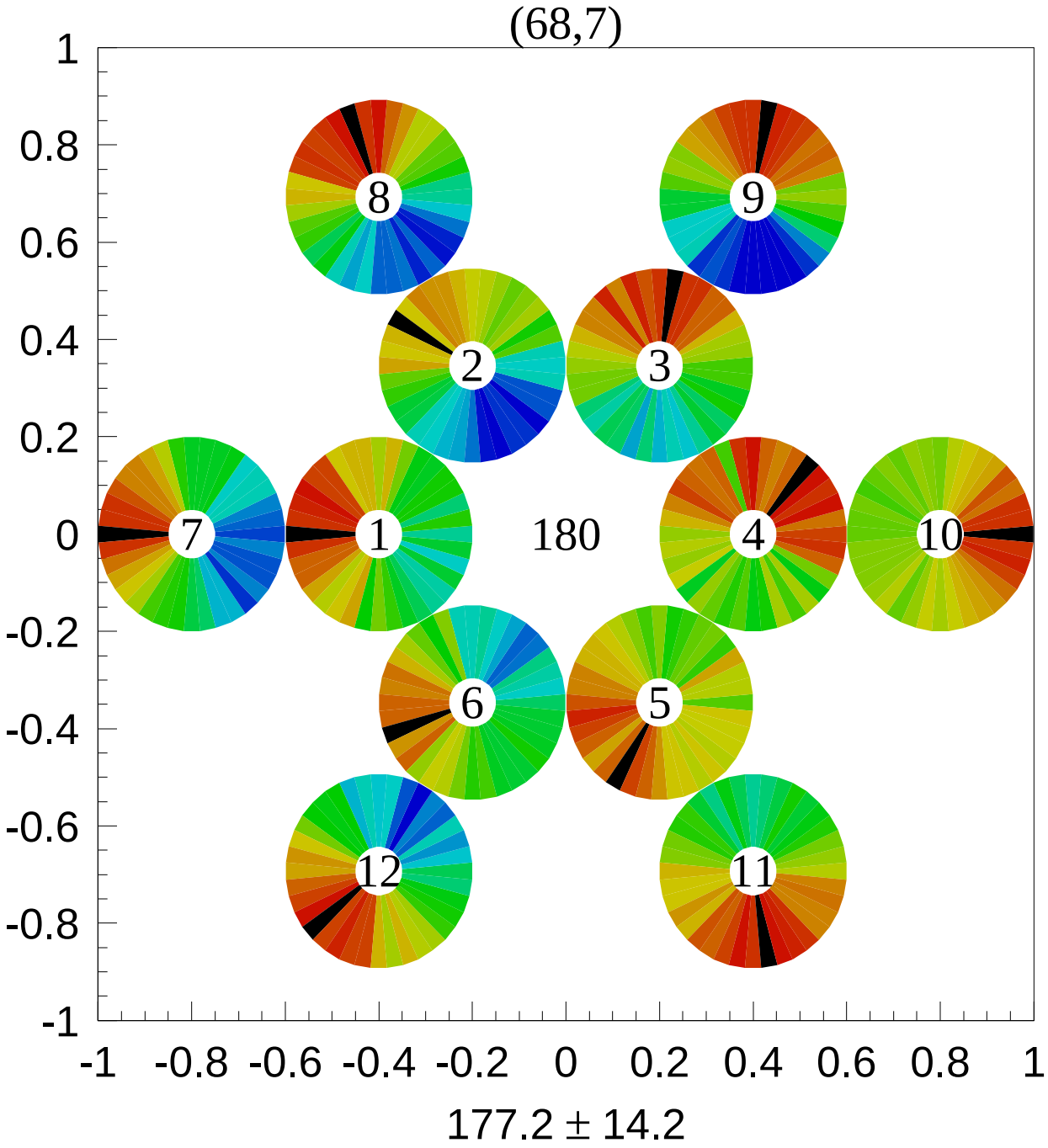

(68,5)
tilted LEDs
126 122 122 116 115 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 123 124 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

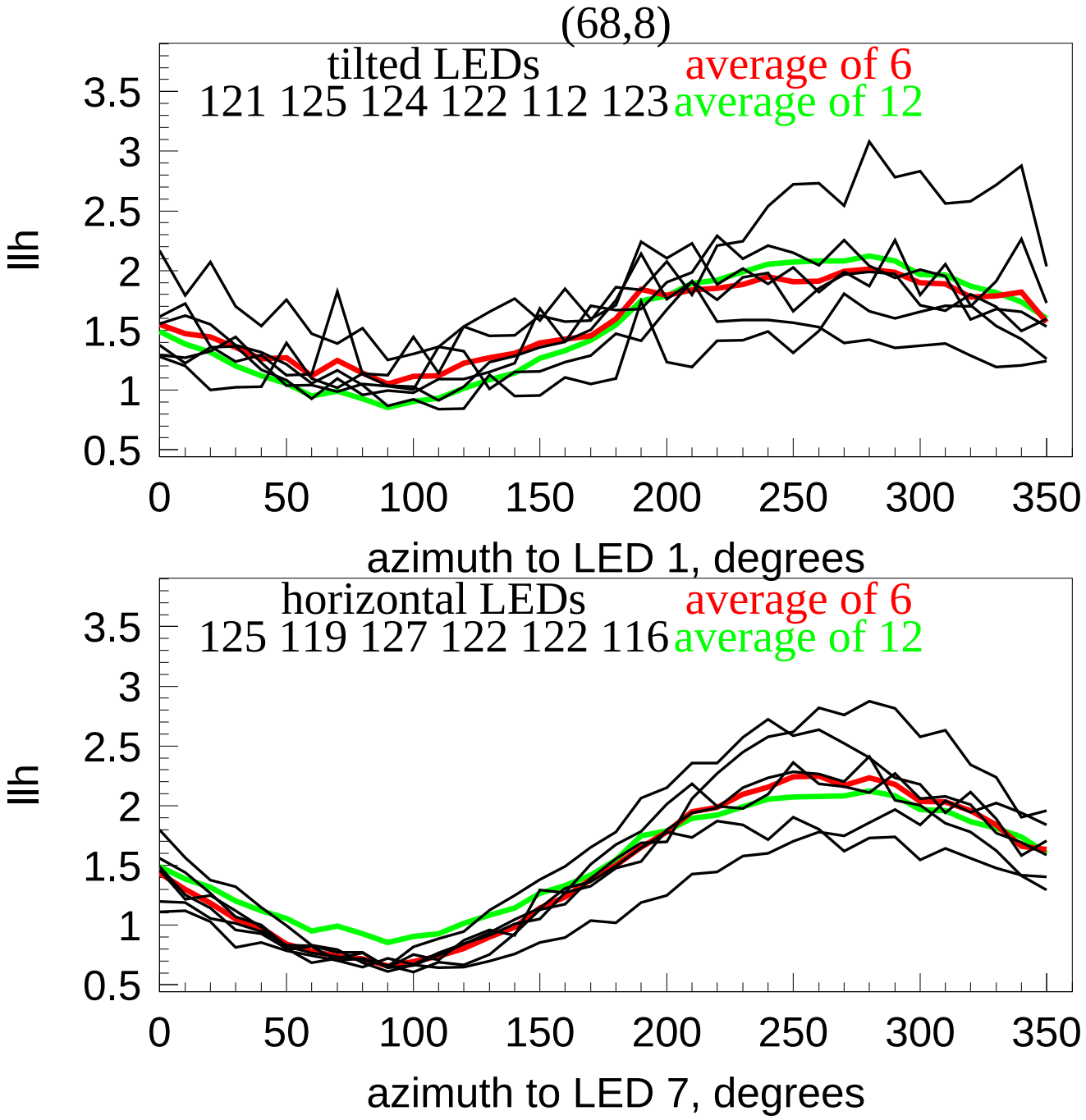

(68,5)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
321.4 ± 5.9

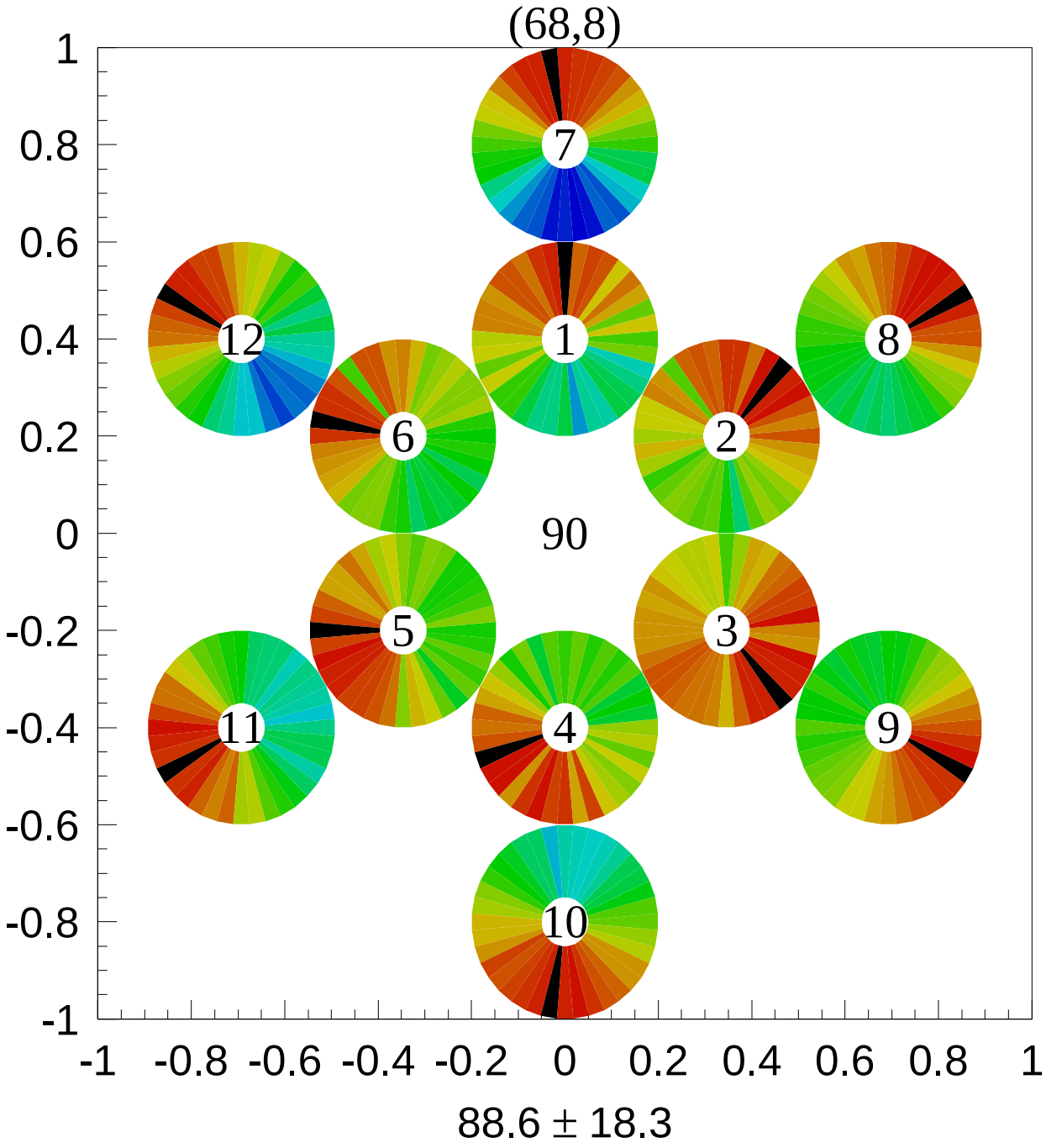

(68,6)
tilted LEDs
111 119 124 126 114 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 113 120 121 119 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

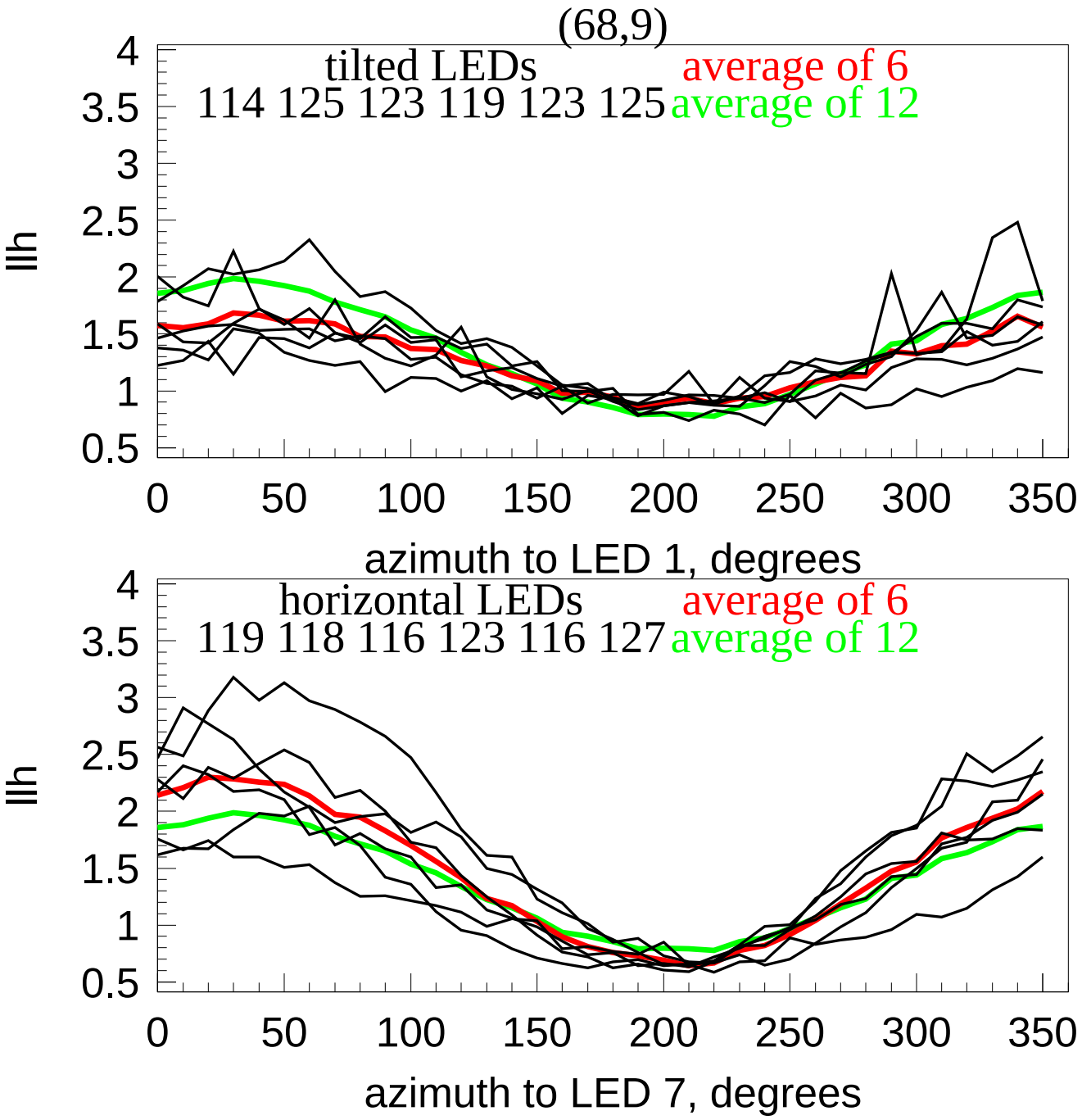

(68,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
98.2 ± 14.9

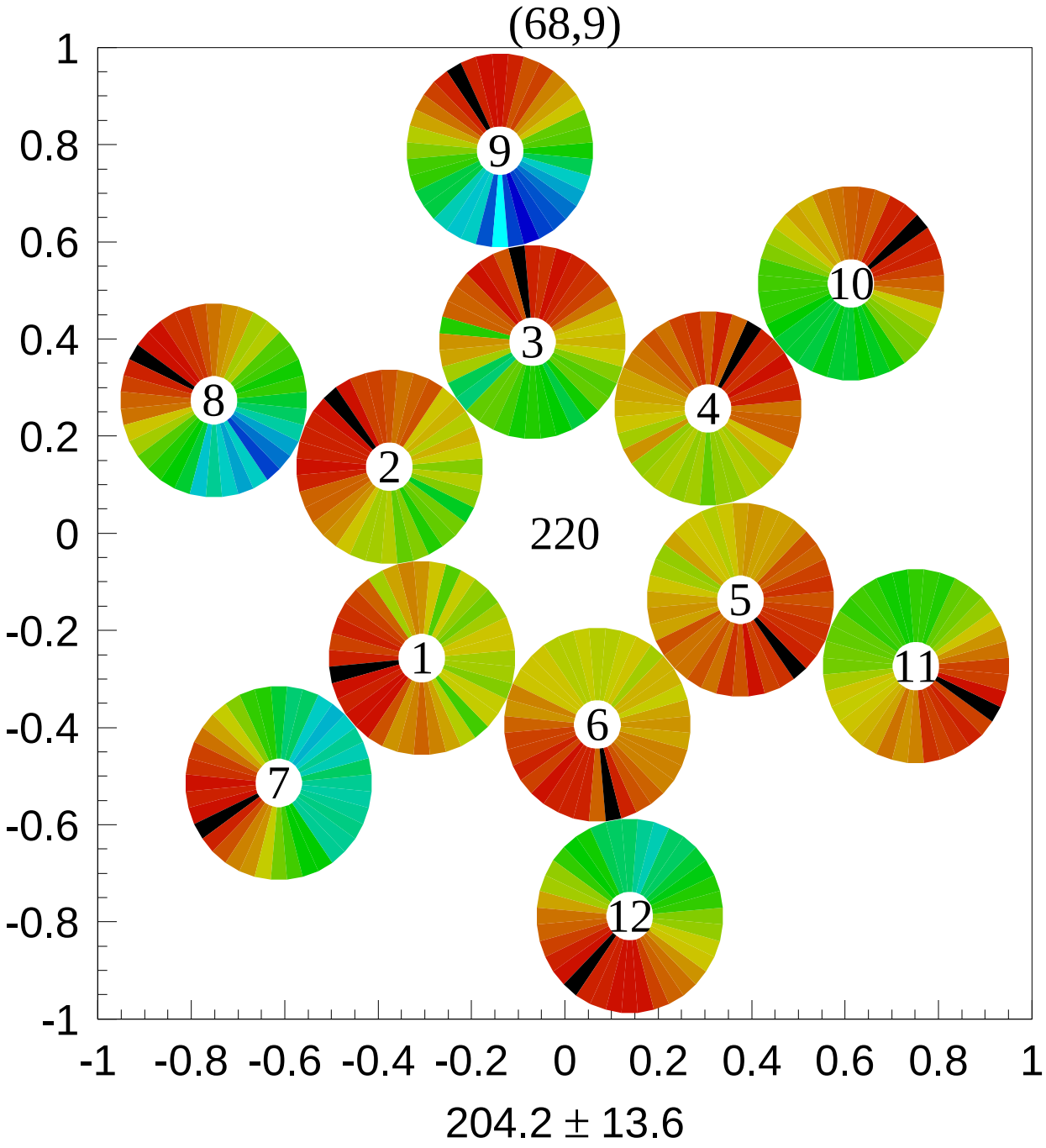

(68,7)
tilted LEDs
125 121 118 119 120 122
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
114 124 122 126 124 113
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

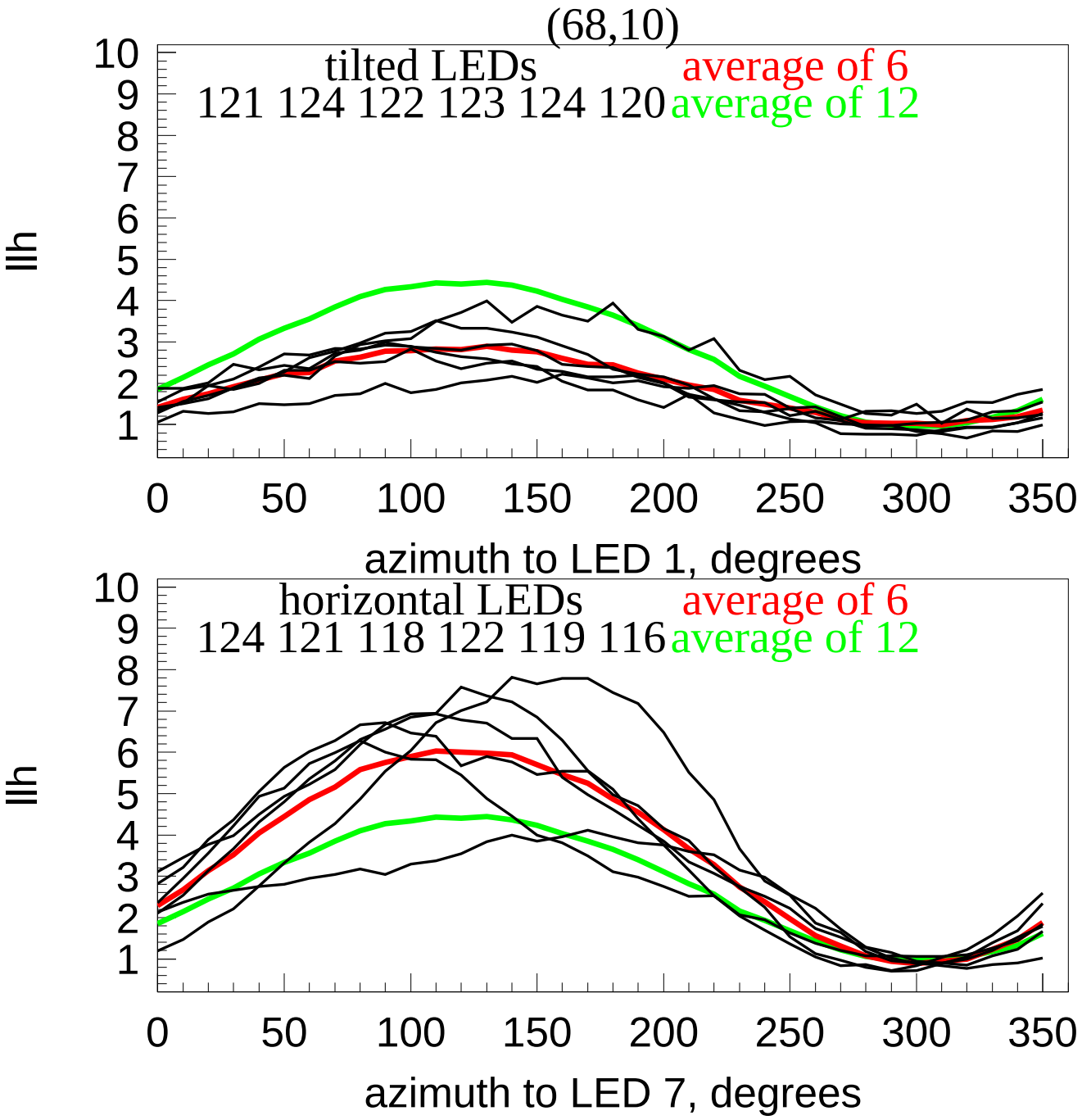

(68,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
177.2 ± 14.2
8
9
2
3
7
1
180
4
10
6
5
12
11

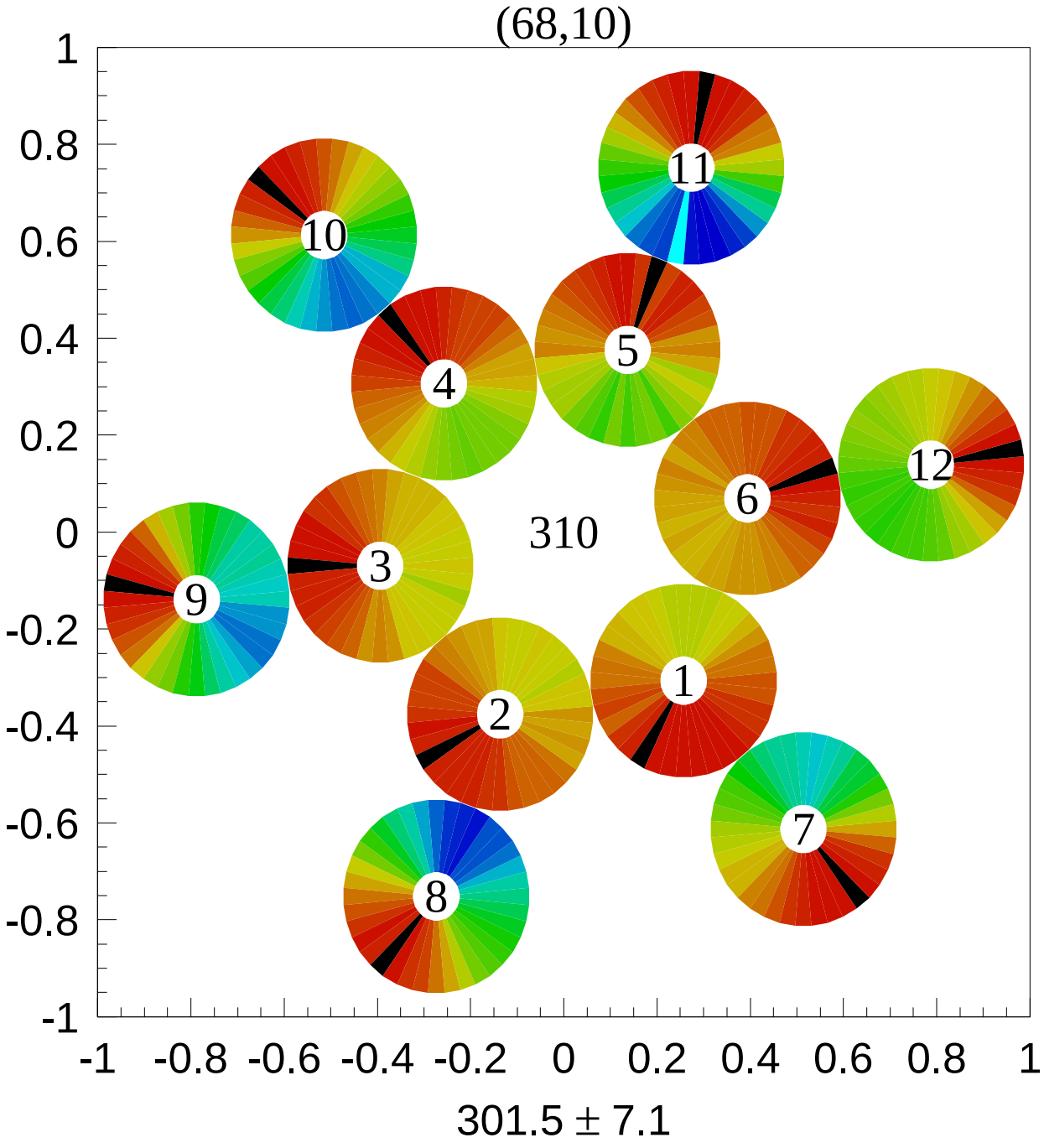

(68,8)
tilted LEDs
121 125 124 122 112 123
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 119 127 122 122 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

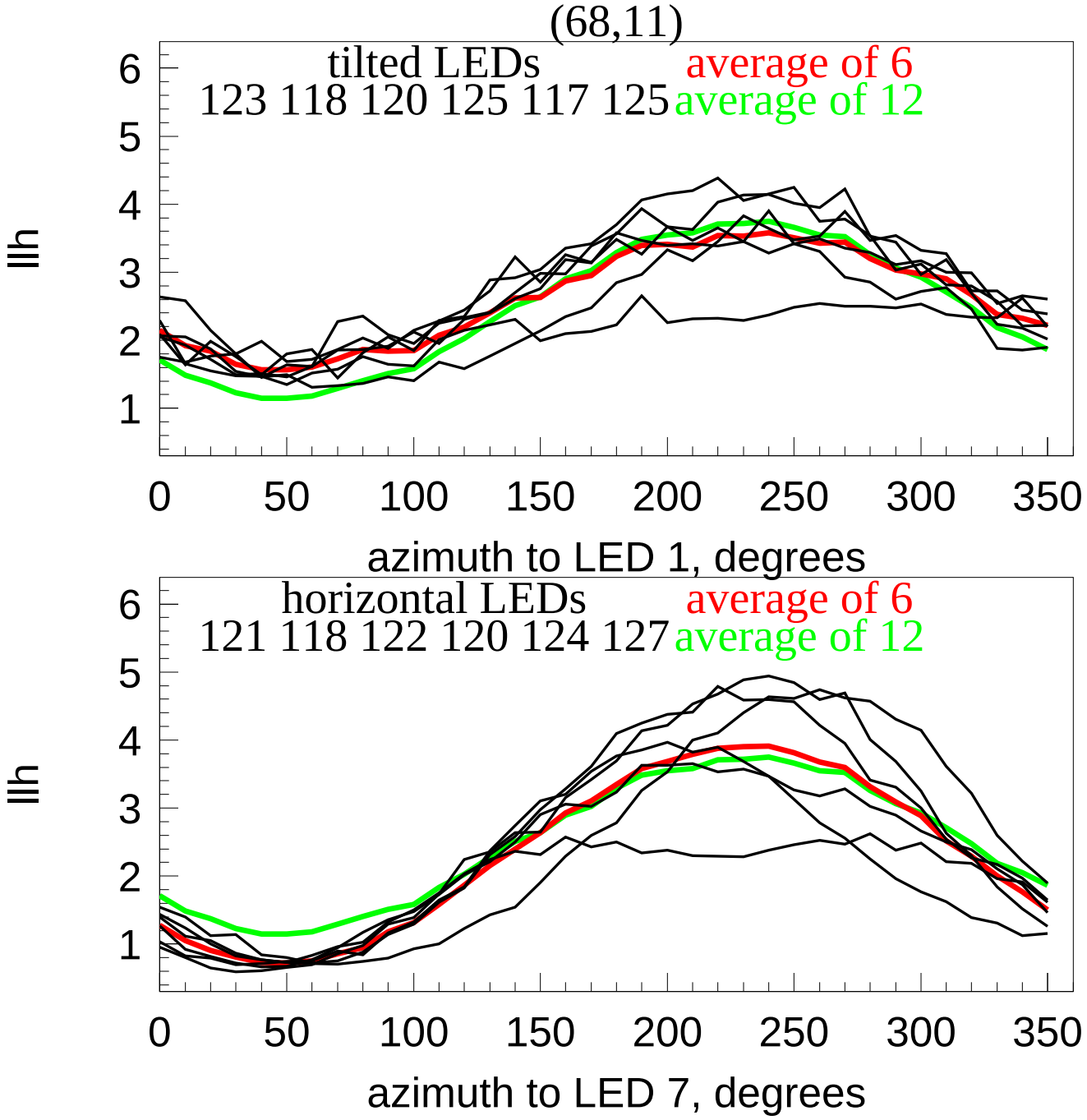

(68,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
88.6 ± 18.3

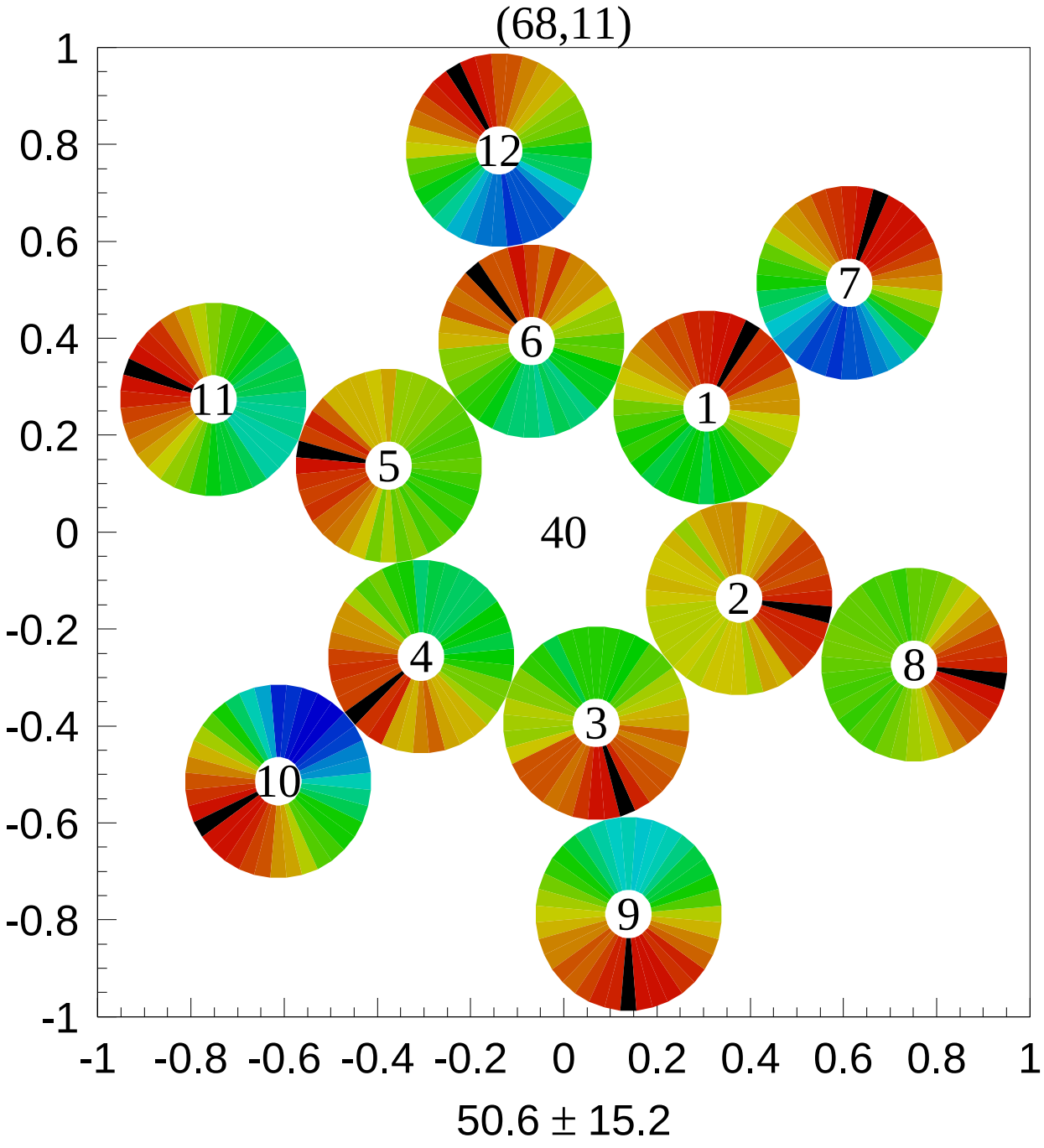

(68,9)
tilted LEDs
114 125 123 119 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 118 116 123 116 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

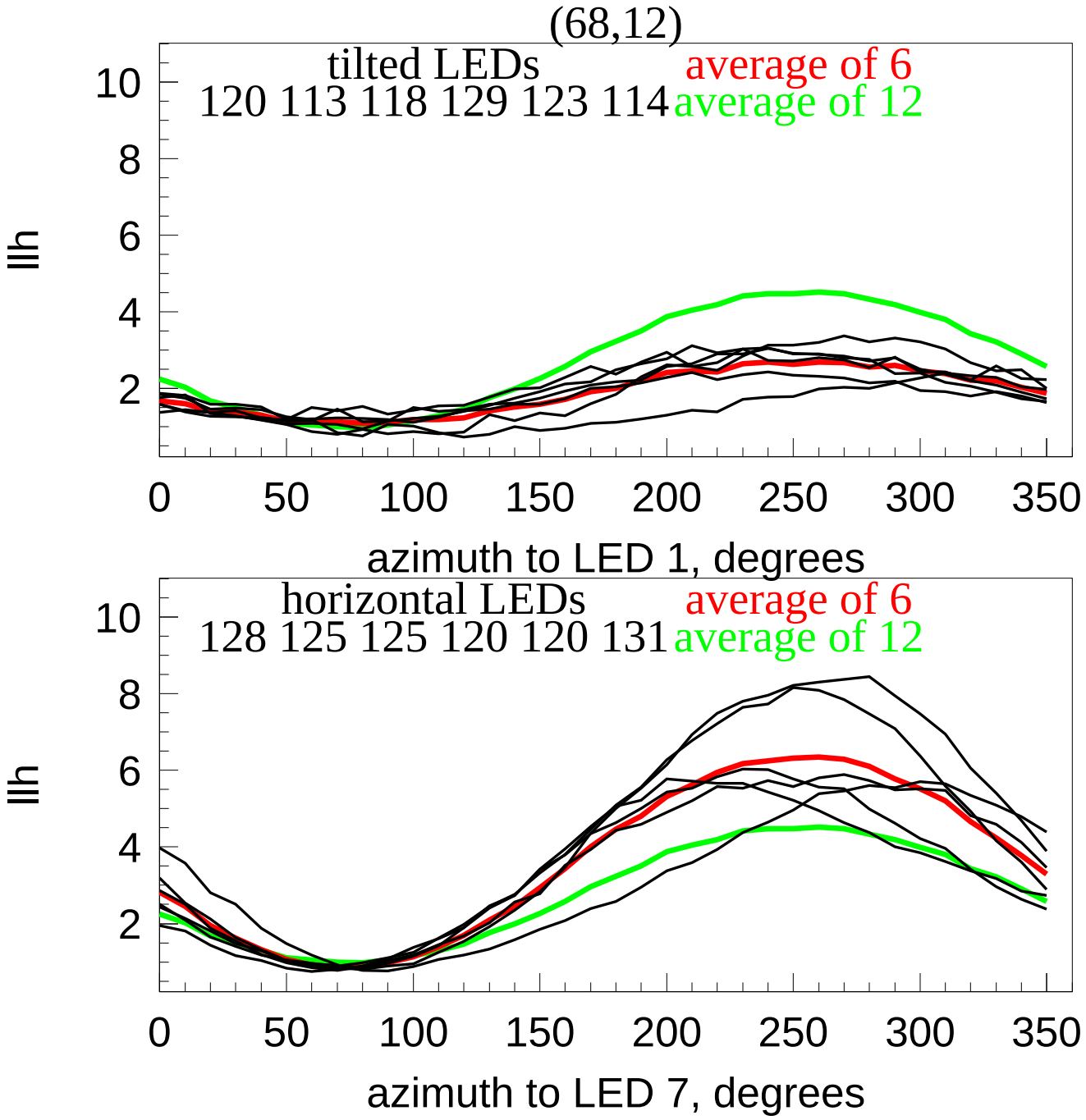

(68,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
204.2 ± 13.6

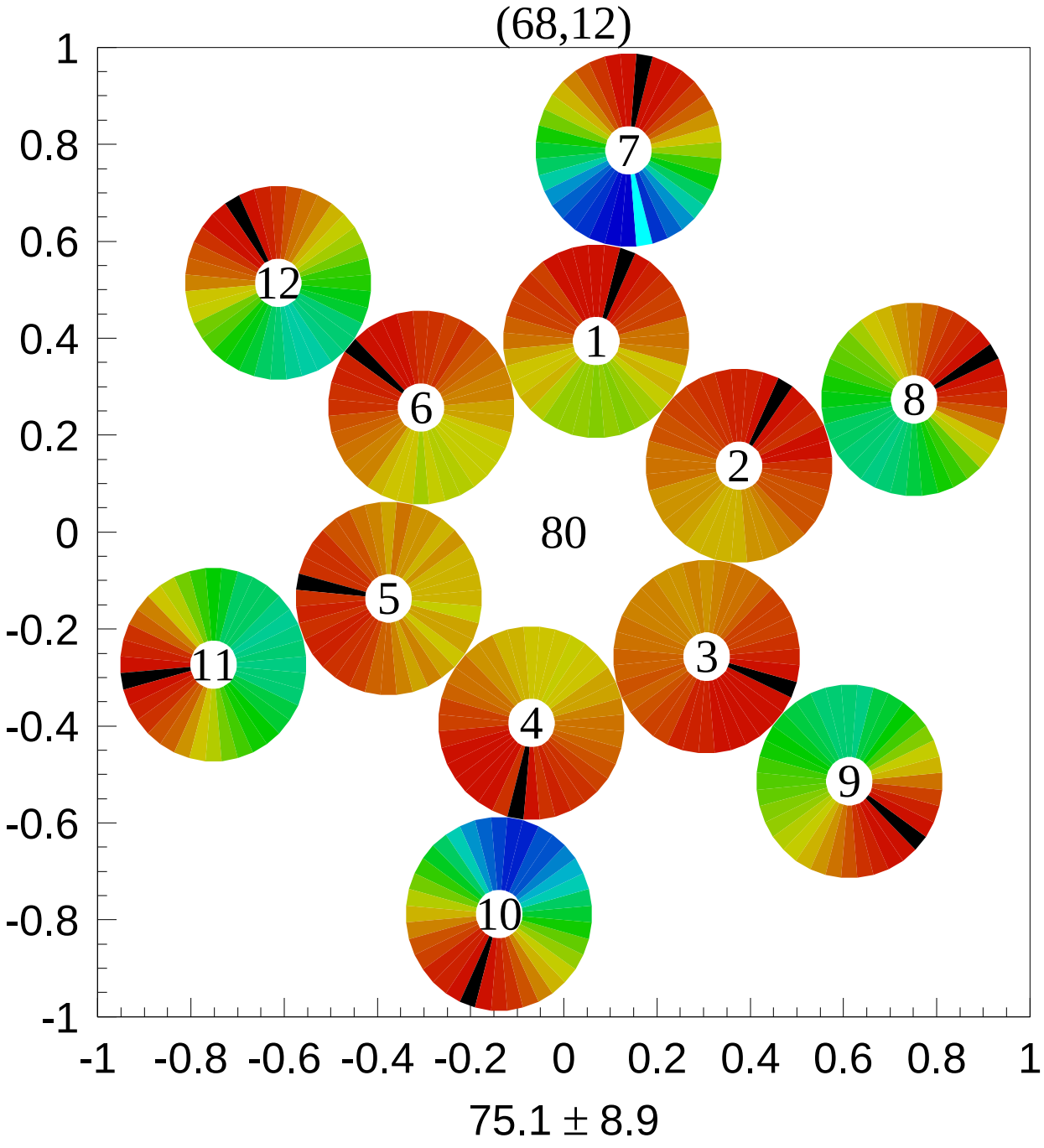

(68,10)
tilted LEDs
121 124 122 123 124 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 121 118 122 119 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

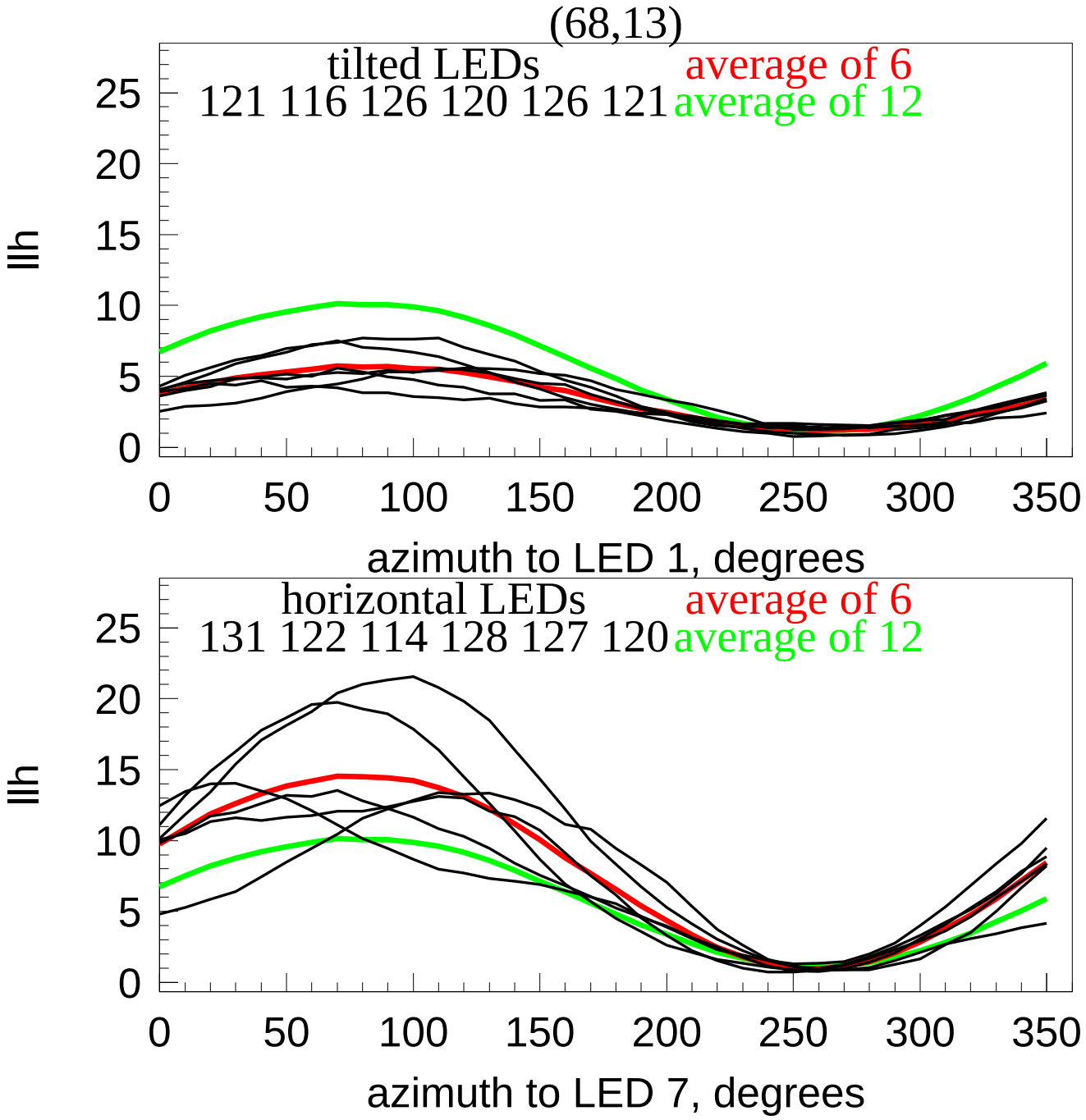

(68,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
301.5 ± 7.1

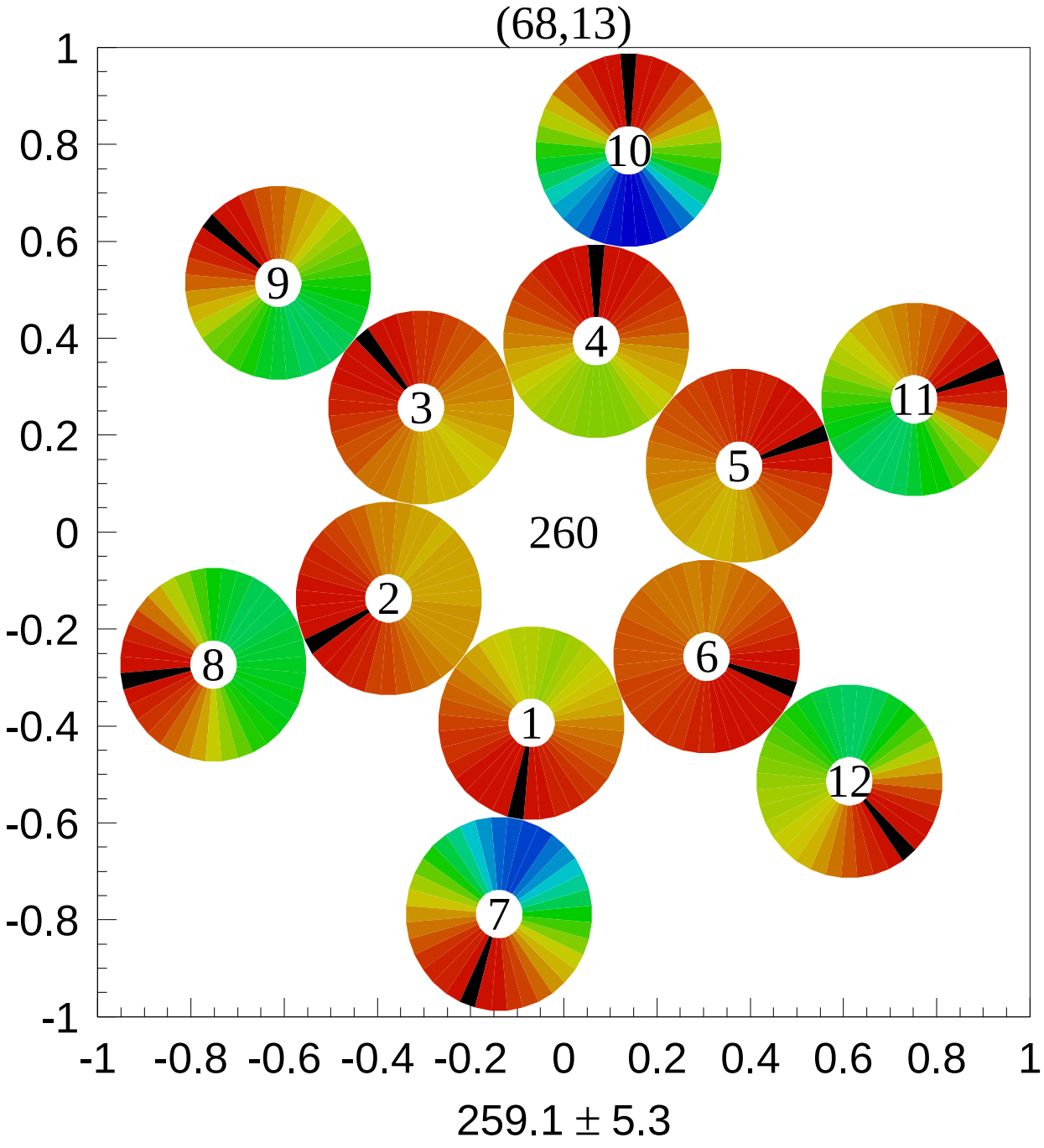

(68,11)
tilted LEDs
123 118 120 125 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 118 122 120 124 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

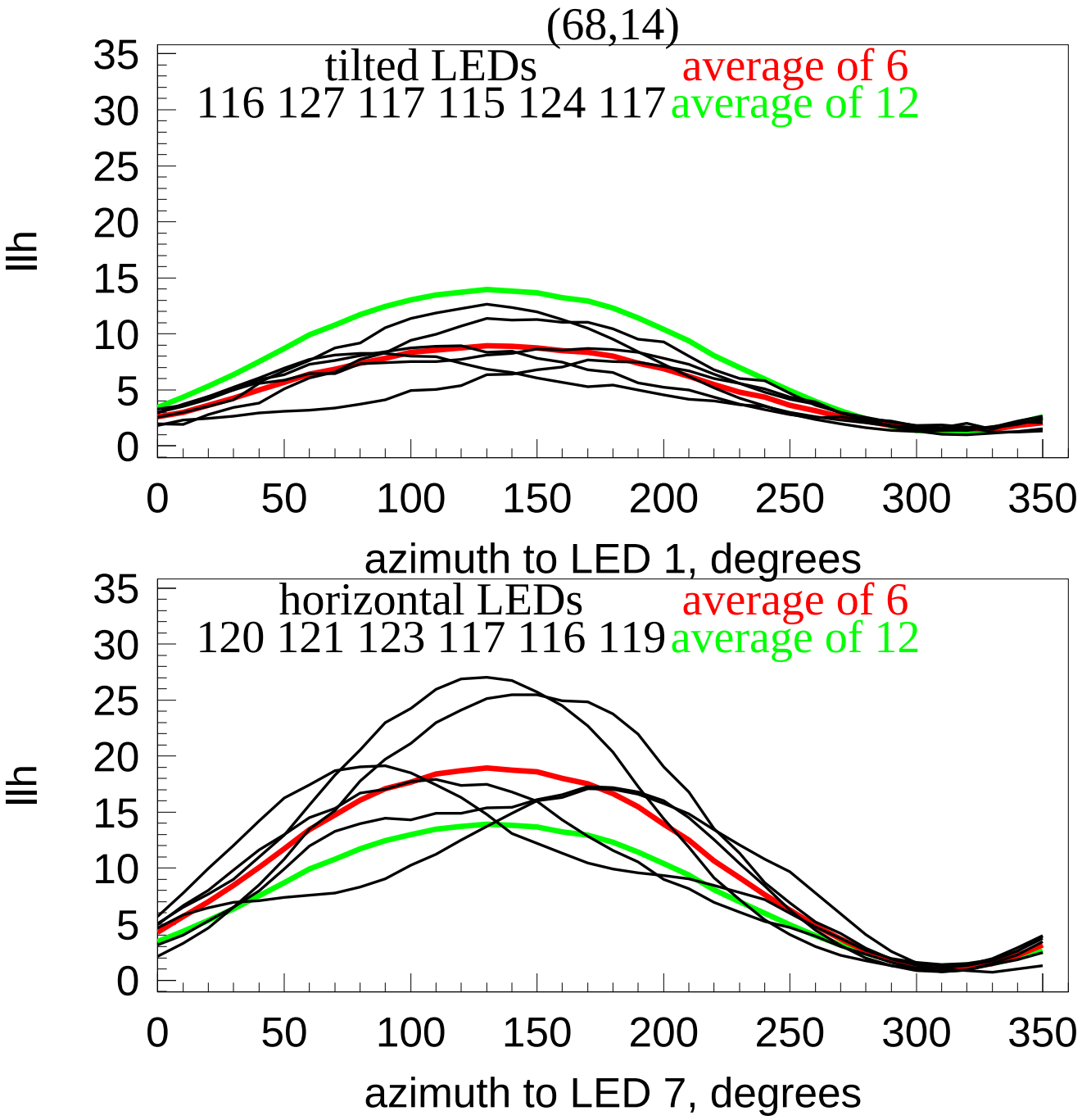

(68,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
50.6 ± 15.2

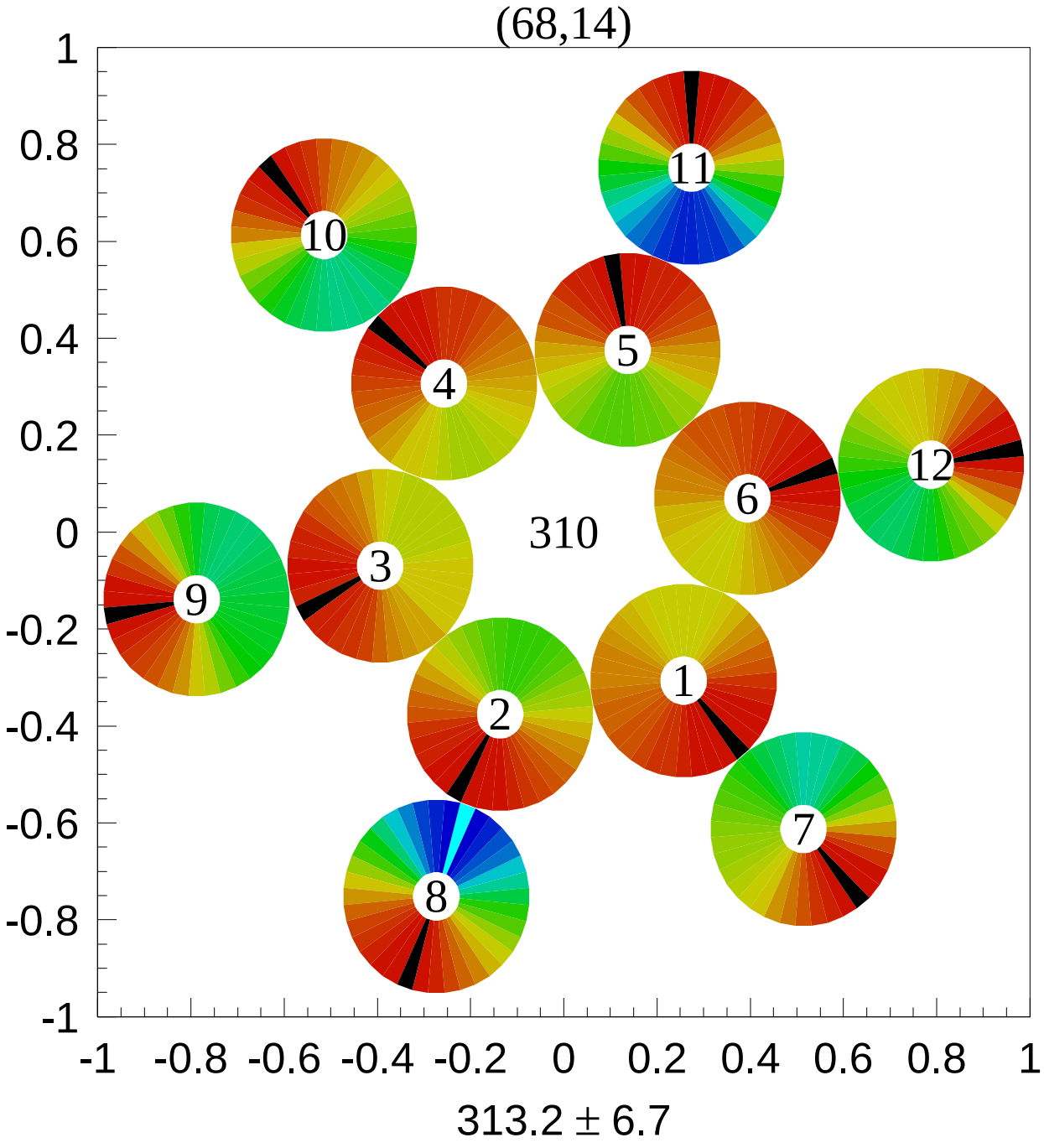

(68,12)
tilted LEDs
120 113 118 129 123 114
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
128 125 125 120 120 131
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

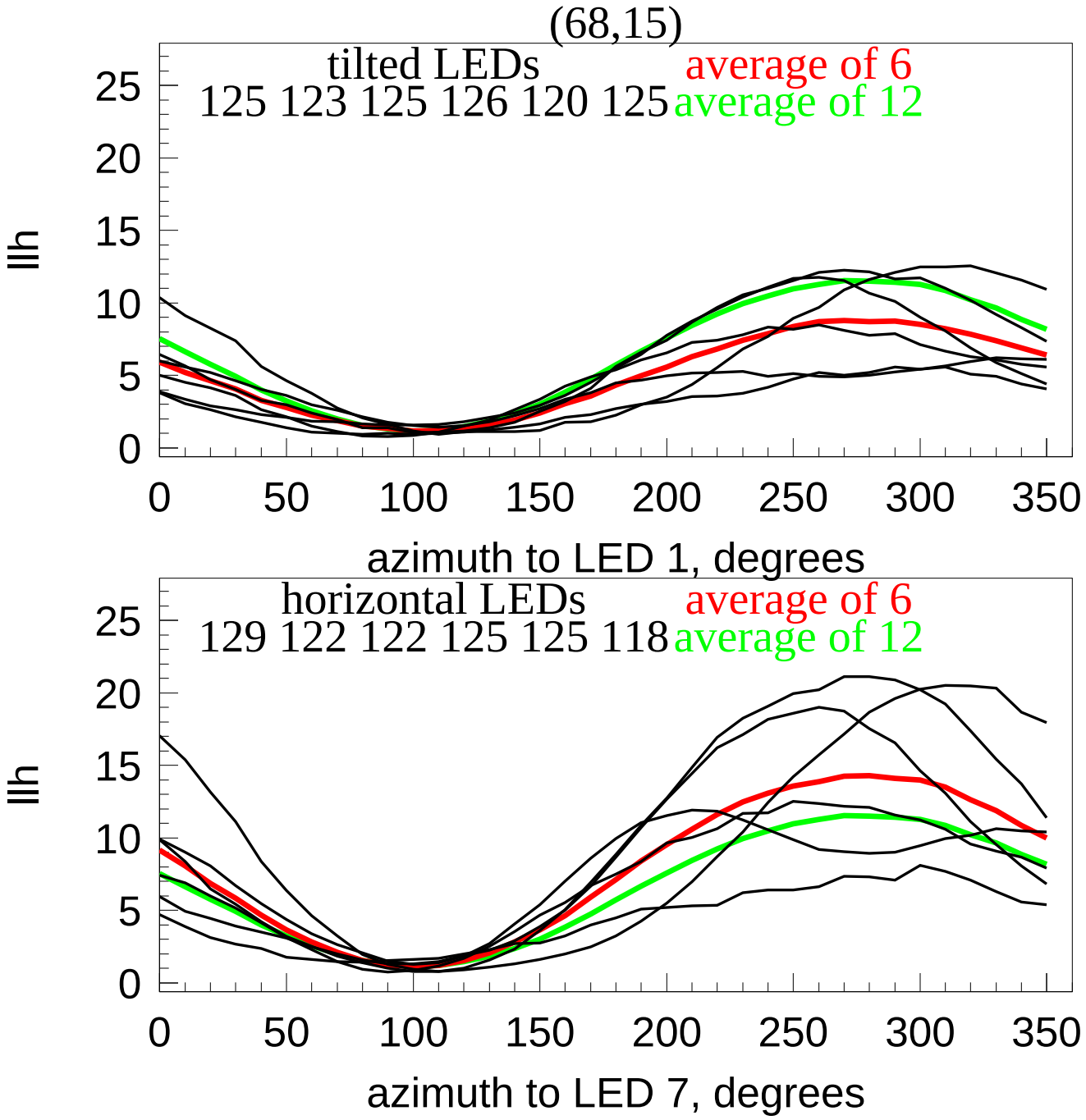

(68,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
75.1 ± 8.9

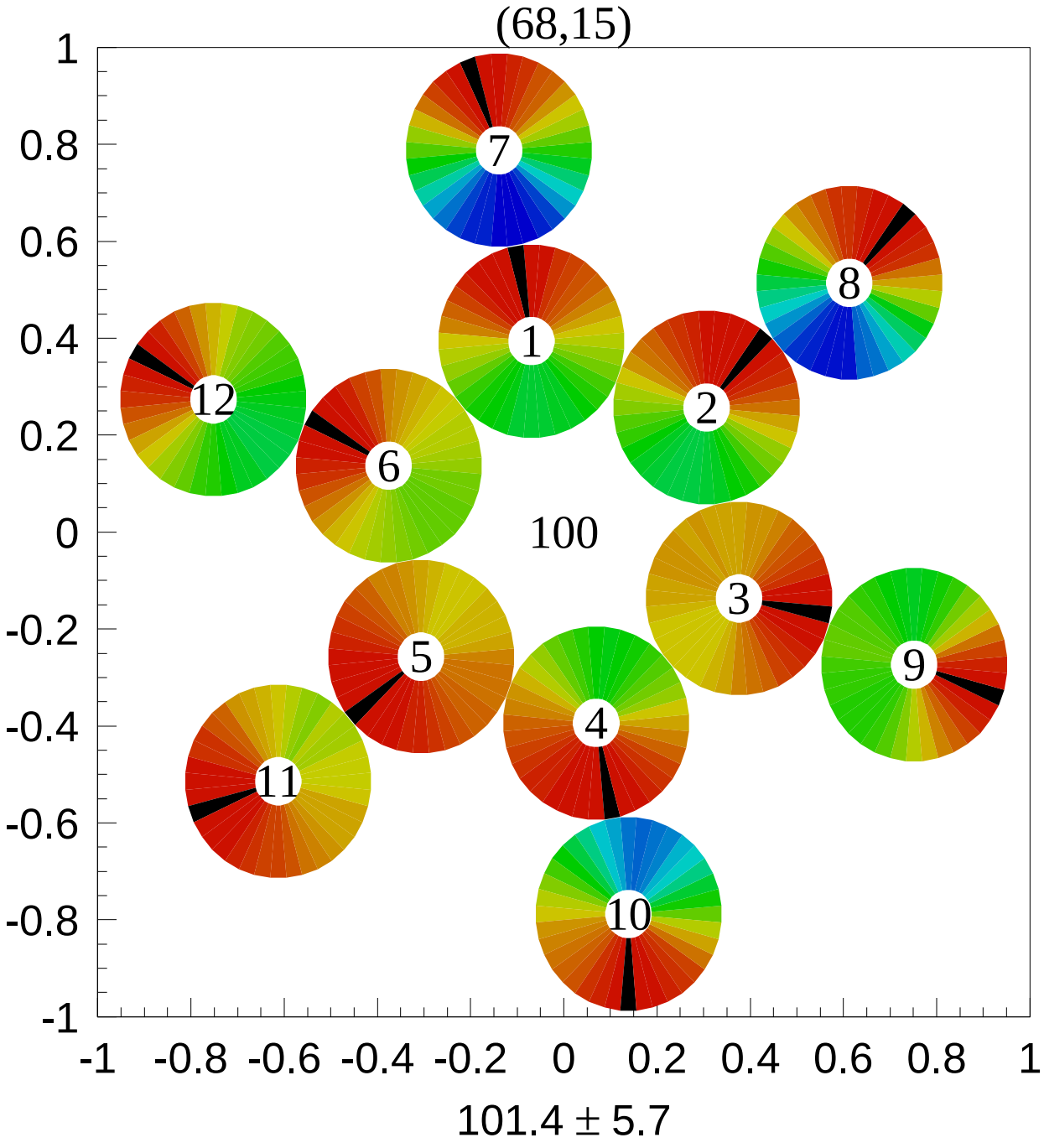

(68,13)
tilted LEDs
121 116 126 120 126 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
131 122 114 128 127 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

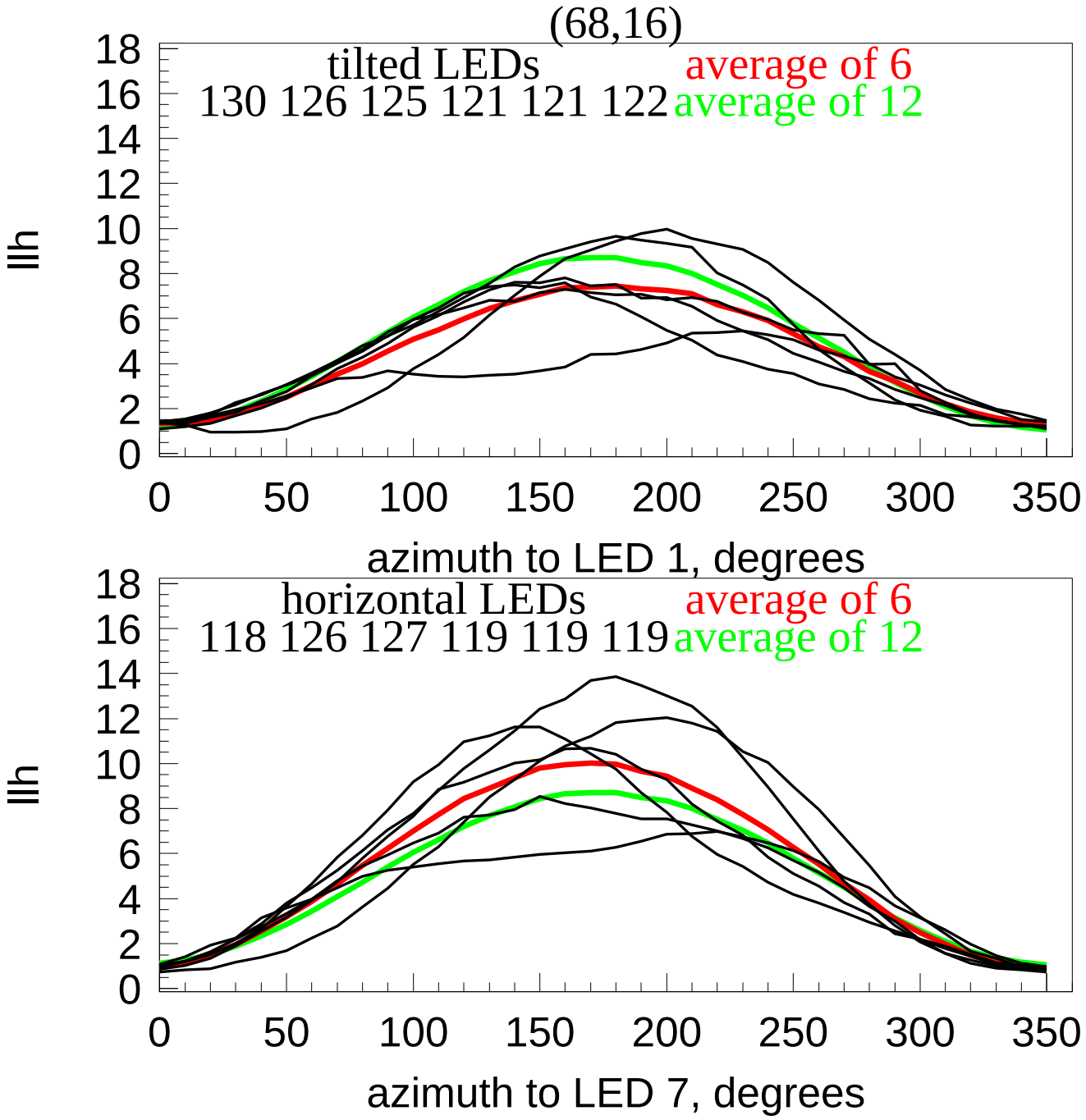

(68,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
259.1 ± 5.3

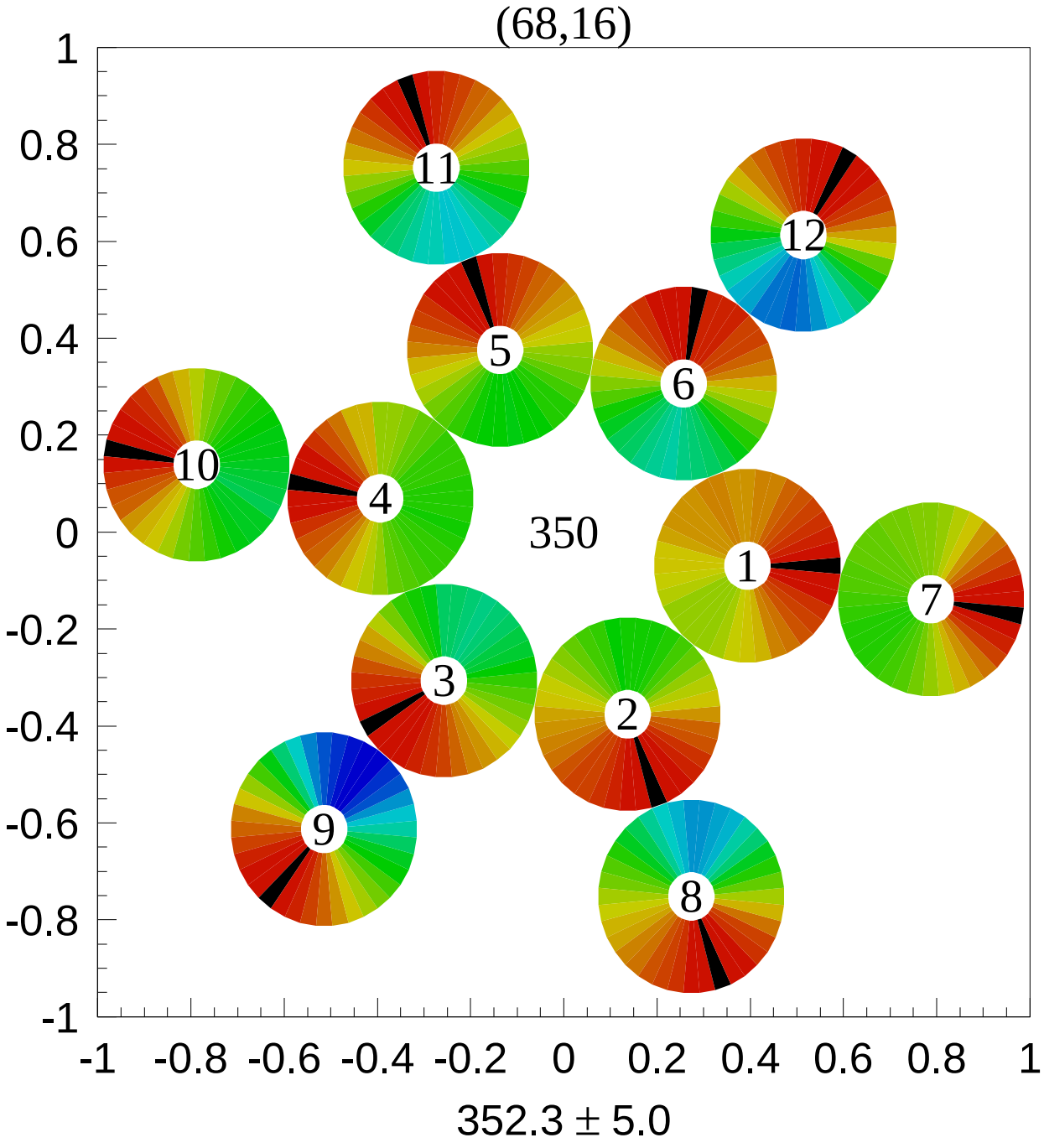

(68,14)
tilted LEDs
116 127 117 115 124 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 121 123 117 116 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

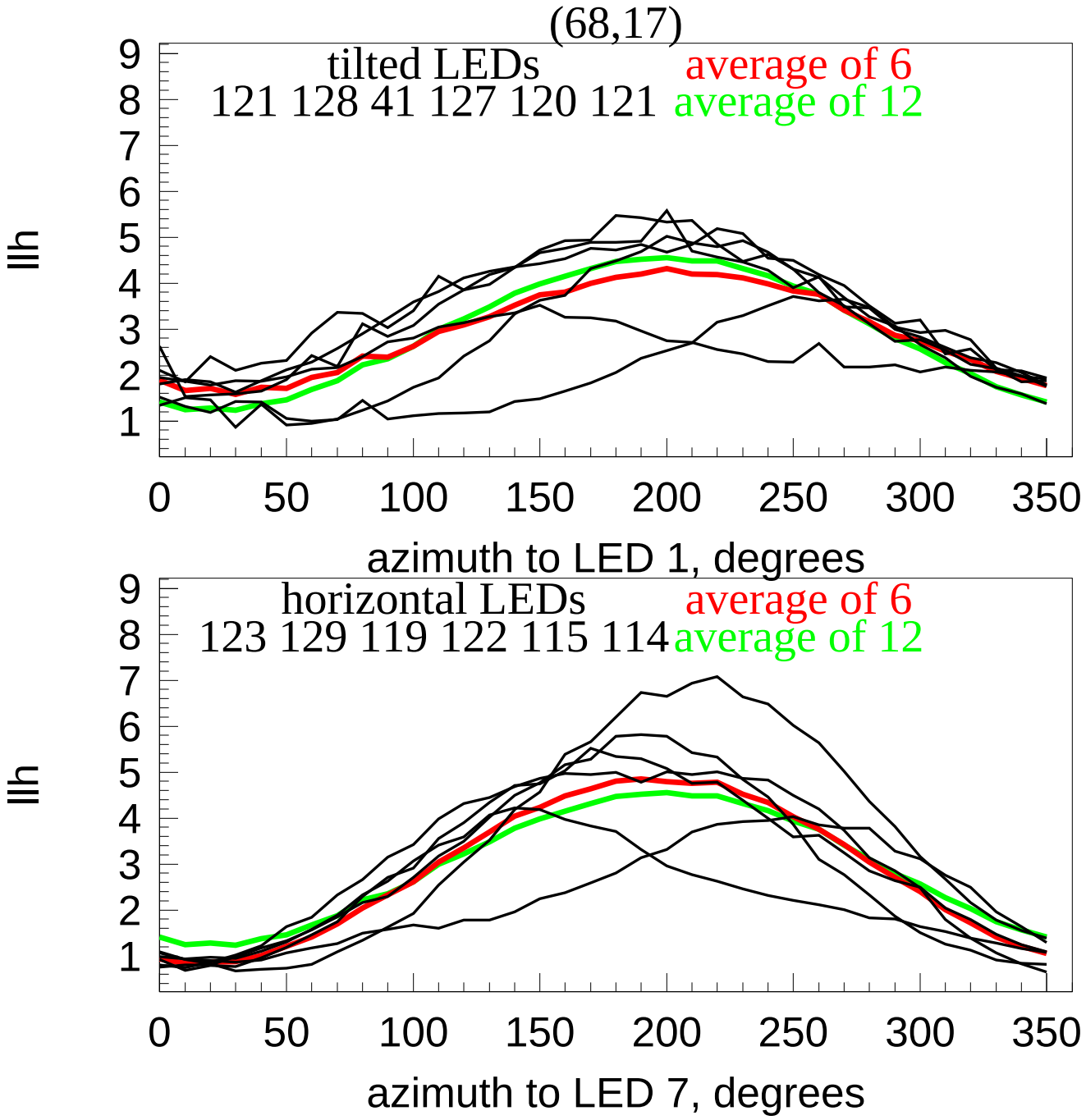

(68,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
313.2 ± 6.7

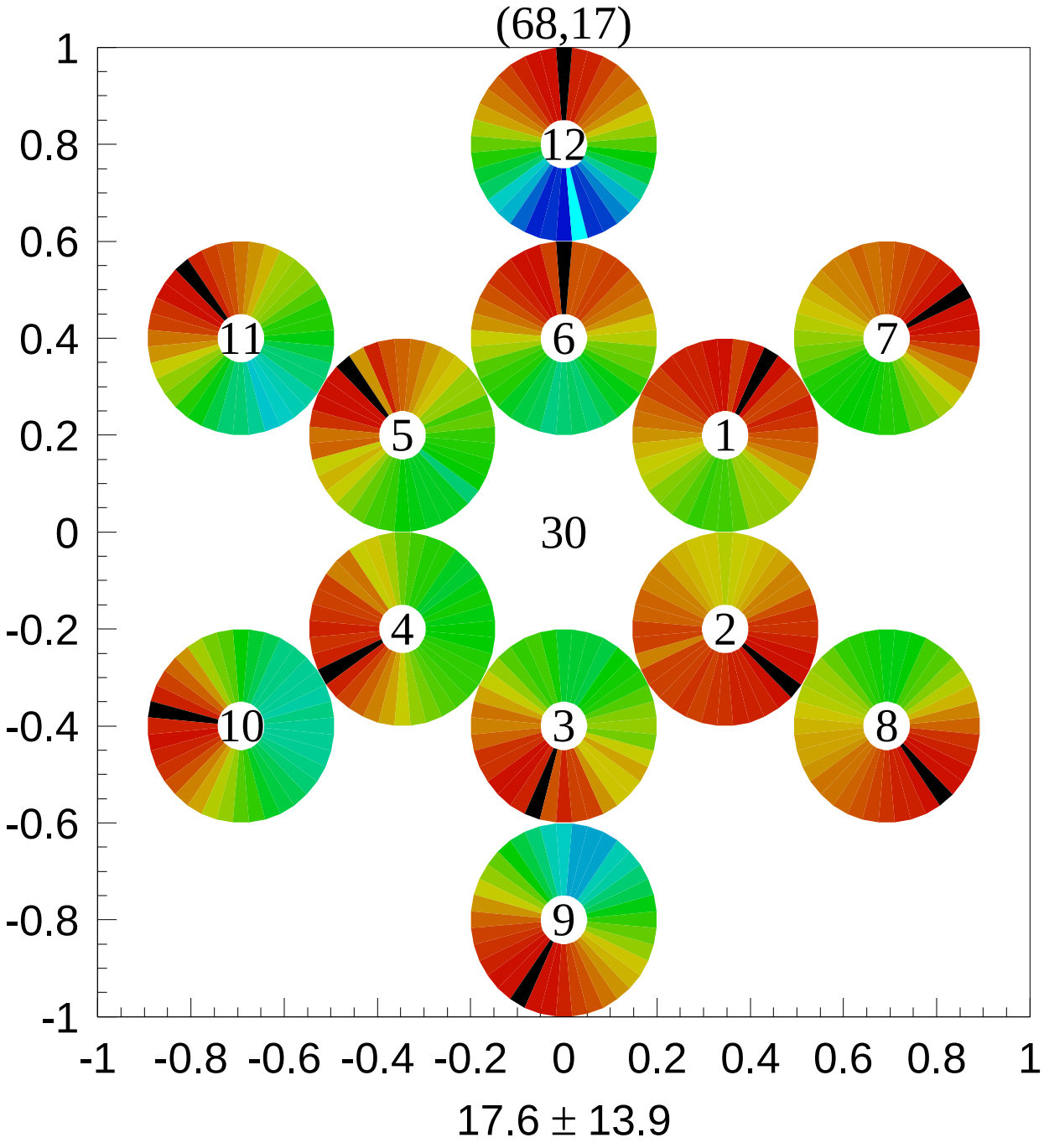

(68,15)
tilted LEDs
125 123 125 126 120 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 122 122 125 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

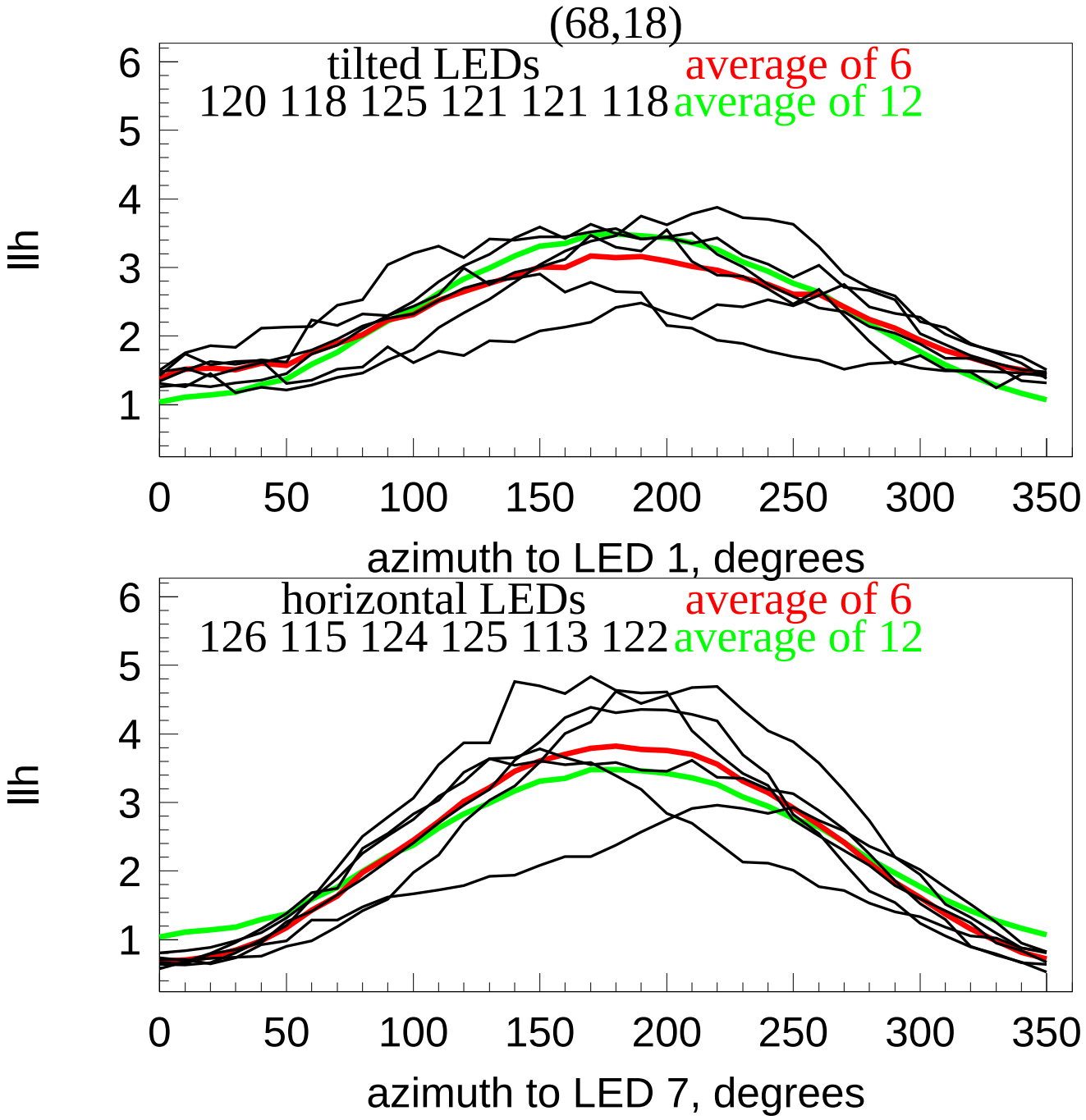

(68,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
101.4 ± 5.7

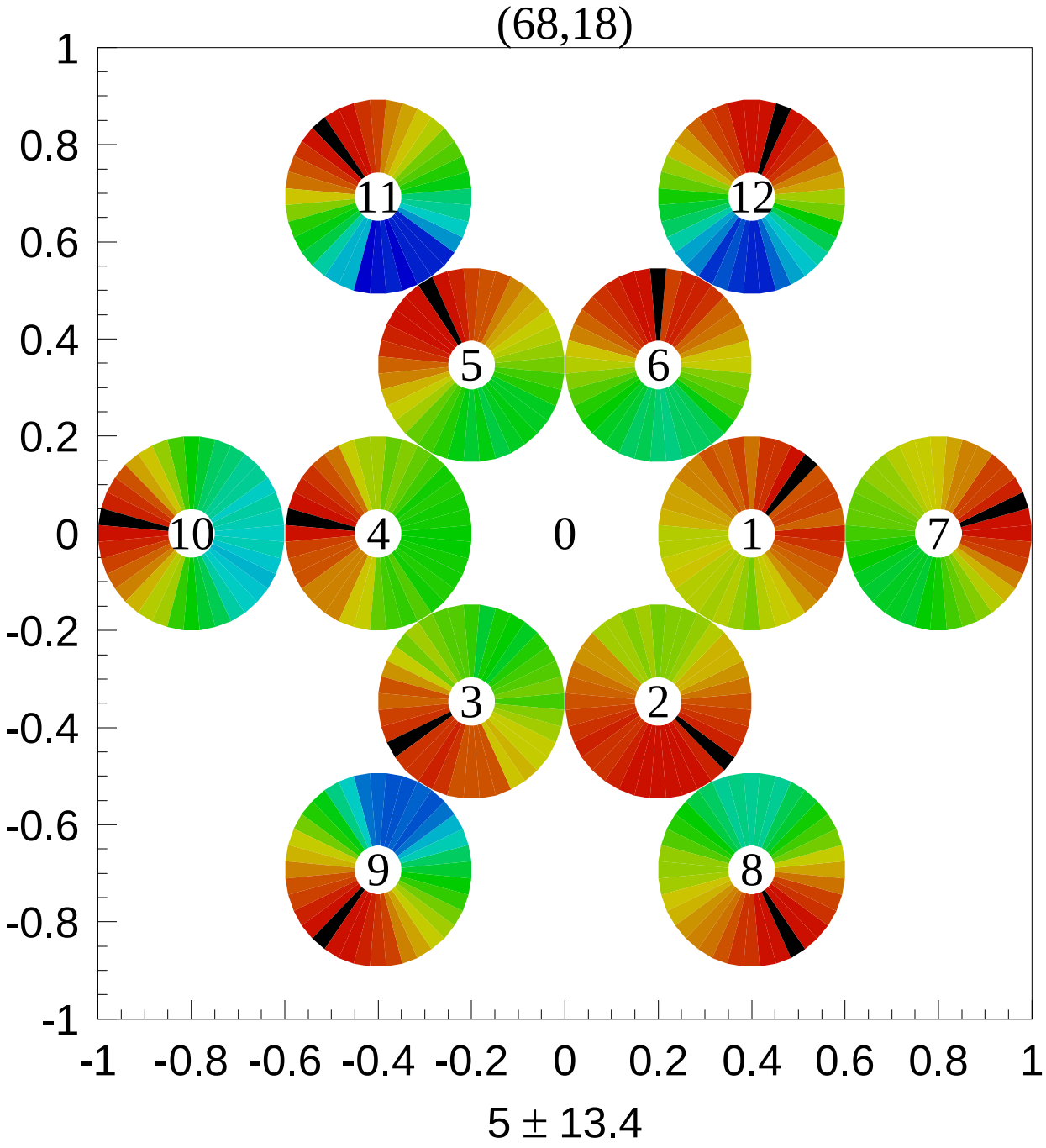

(68,16)
tilted LEDs
130 126 125 121 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 126 127 119 119 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

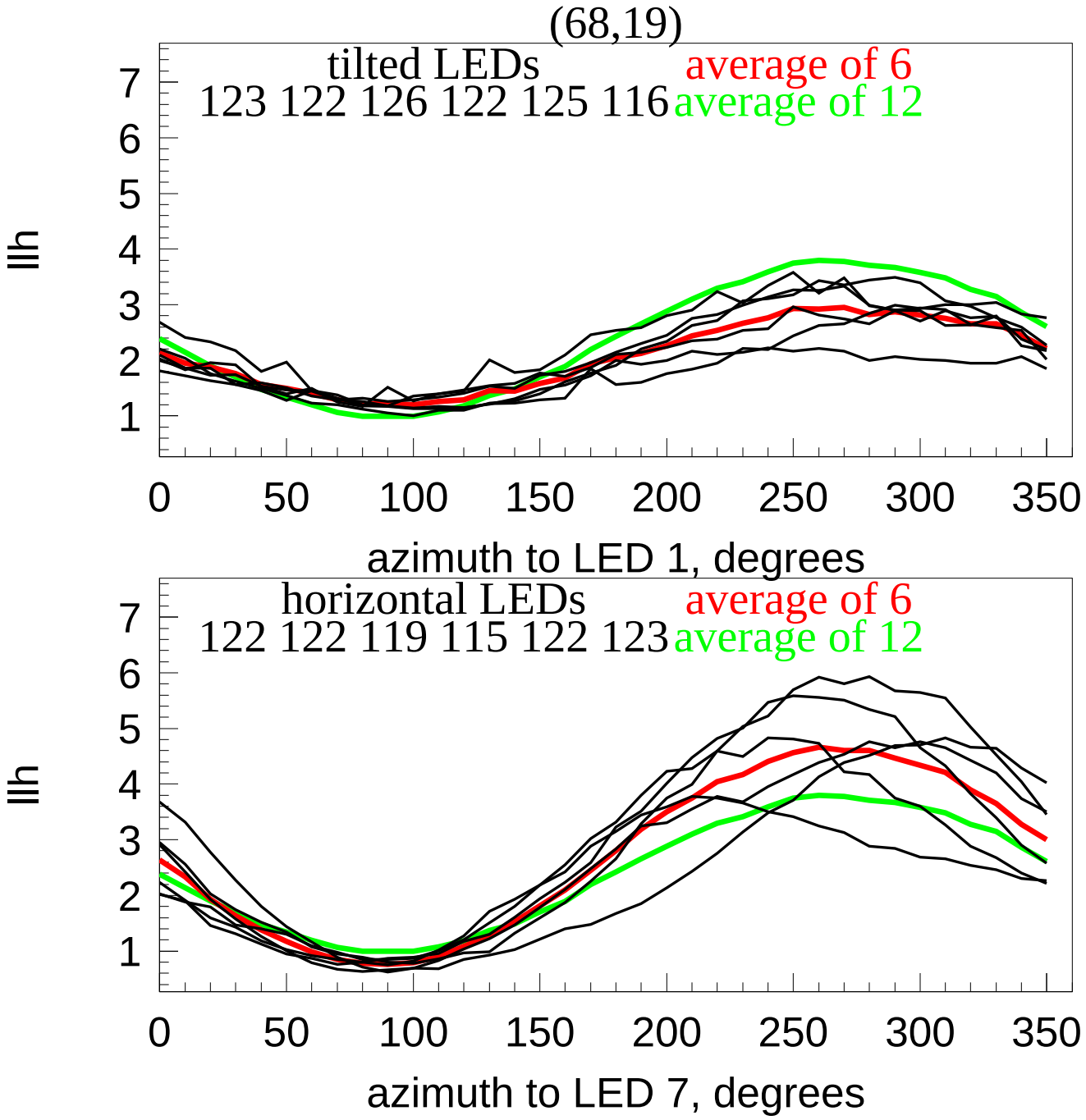

(68,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
352.3 ± 5.0

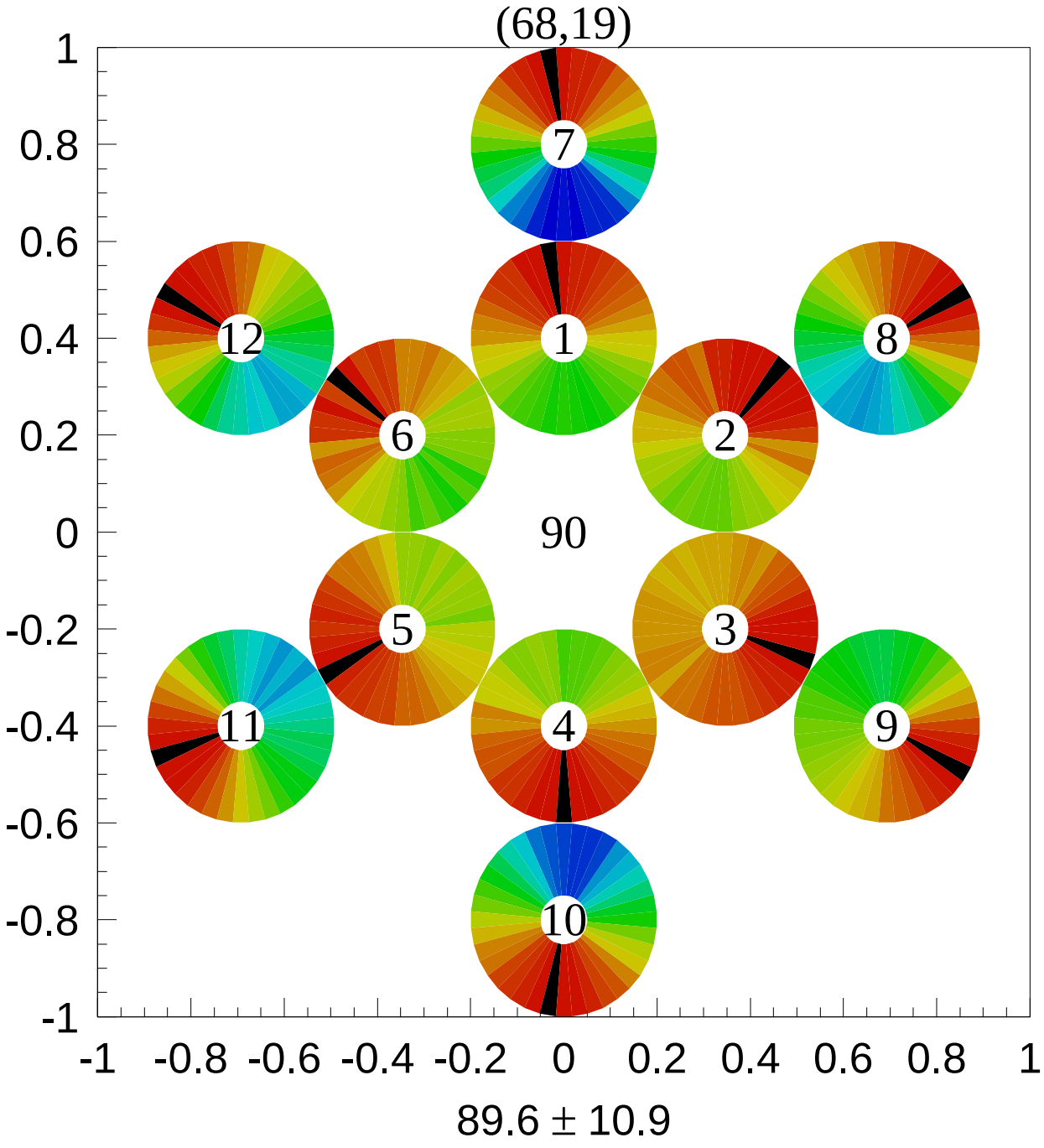

(68,17)
tilted LEDs
121 128 41 127 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 129 119 122 115 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

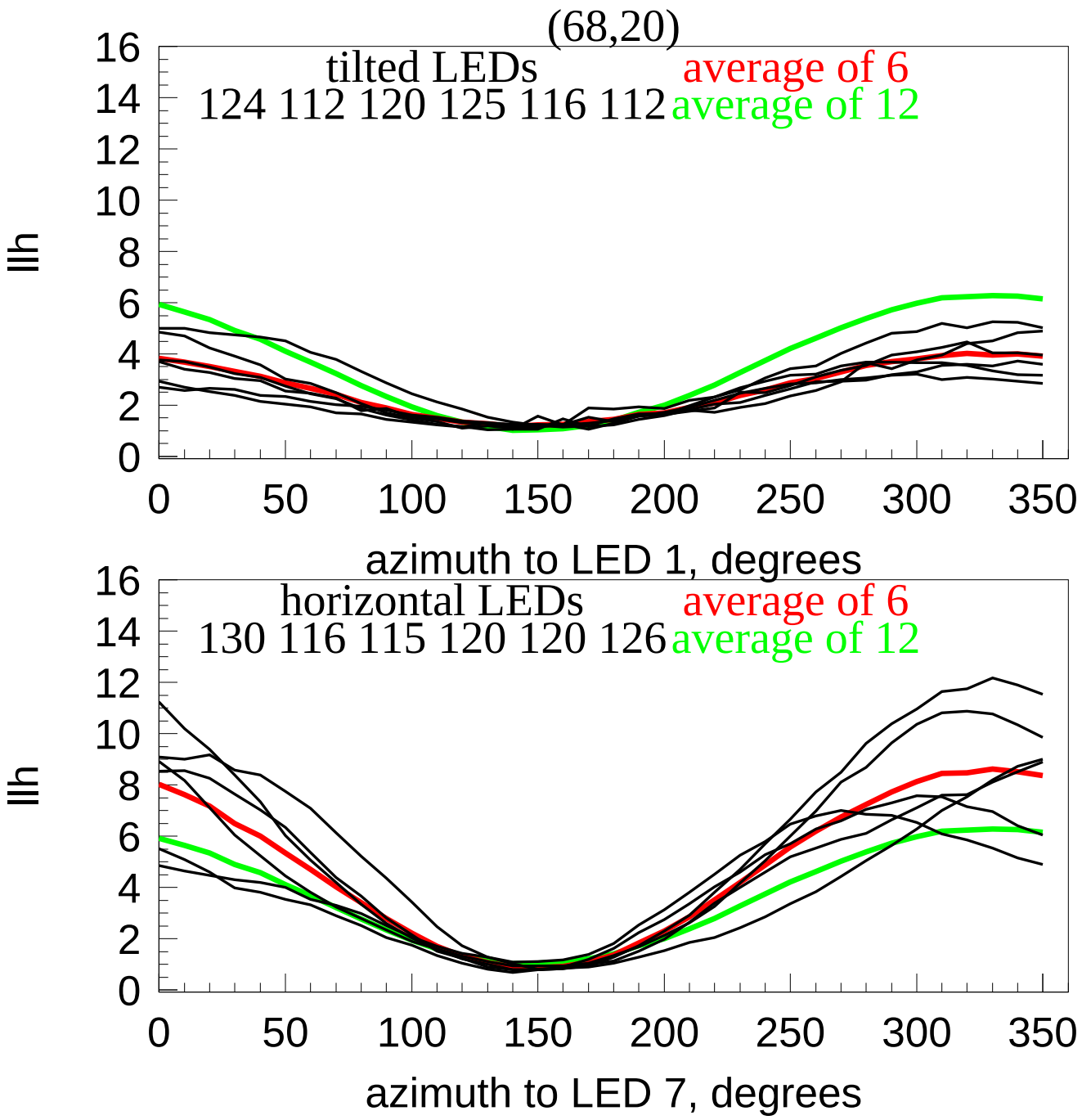

(68,17)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
17.6 ± 13.9

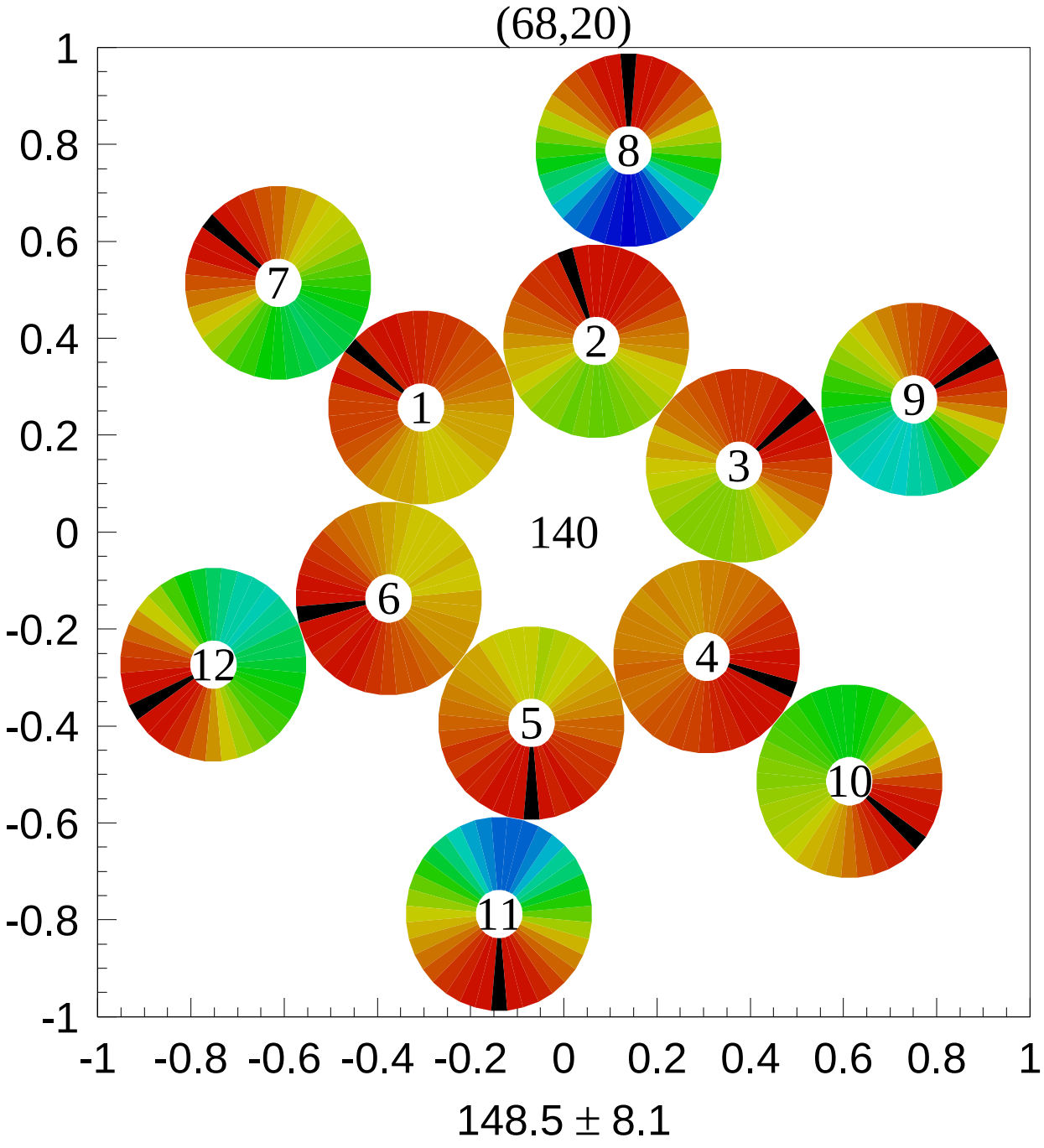

(68,18)
tilted LEDs
120 118 125 121 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 115 124 125 113 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

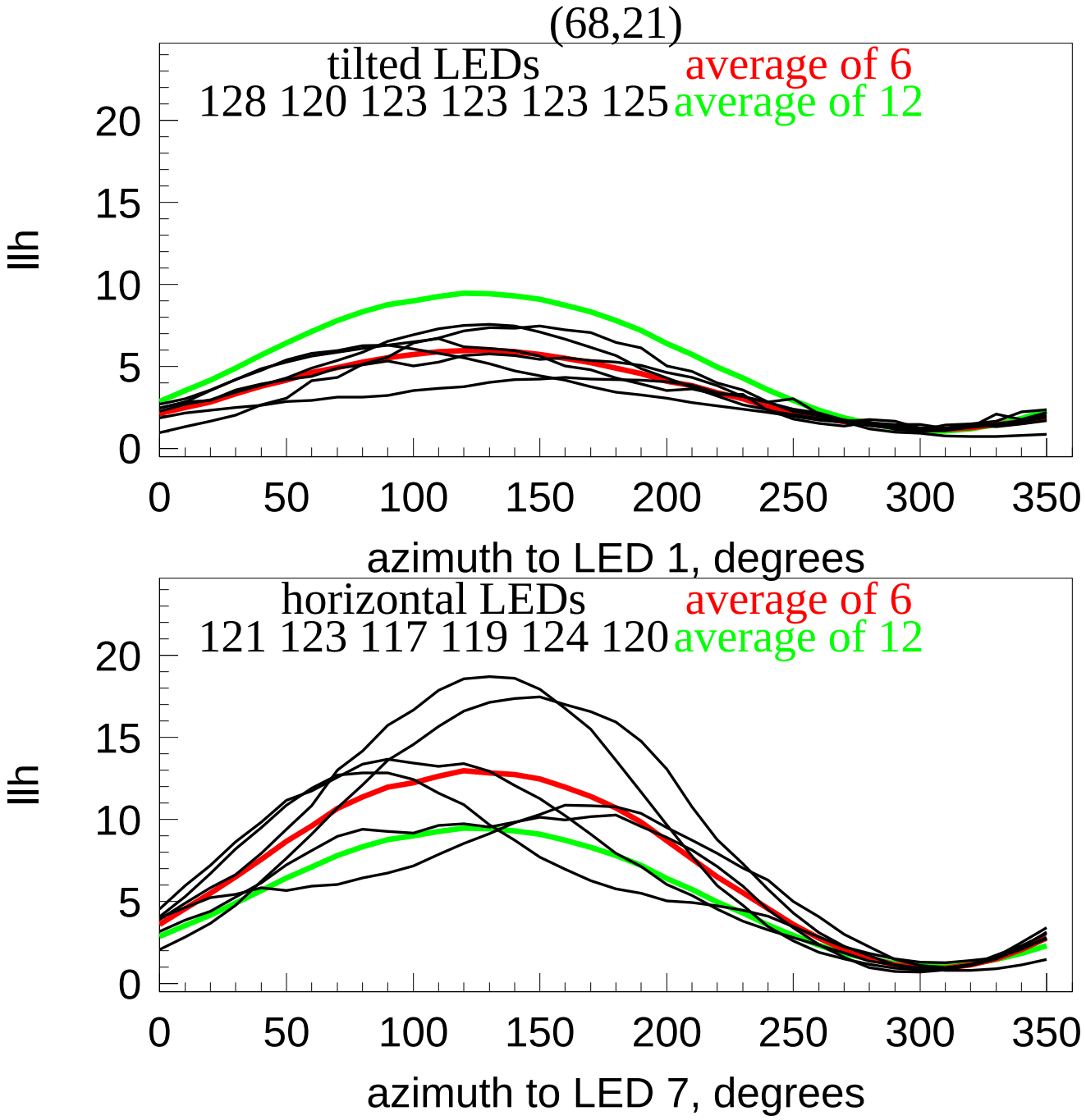

(68,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
5 ± 13.4

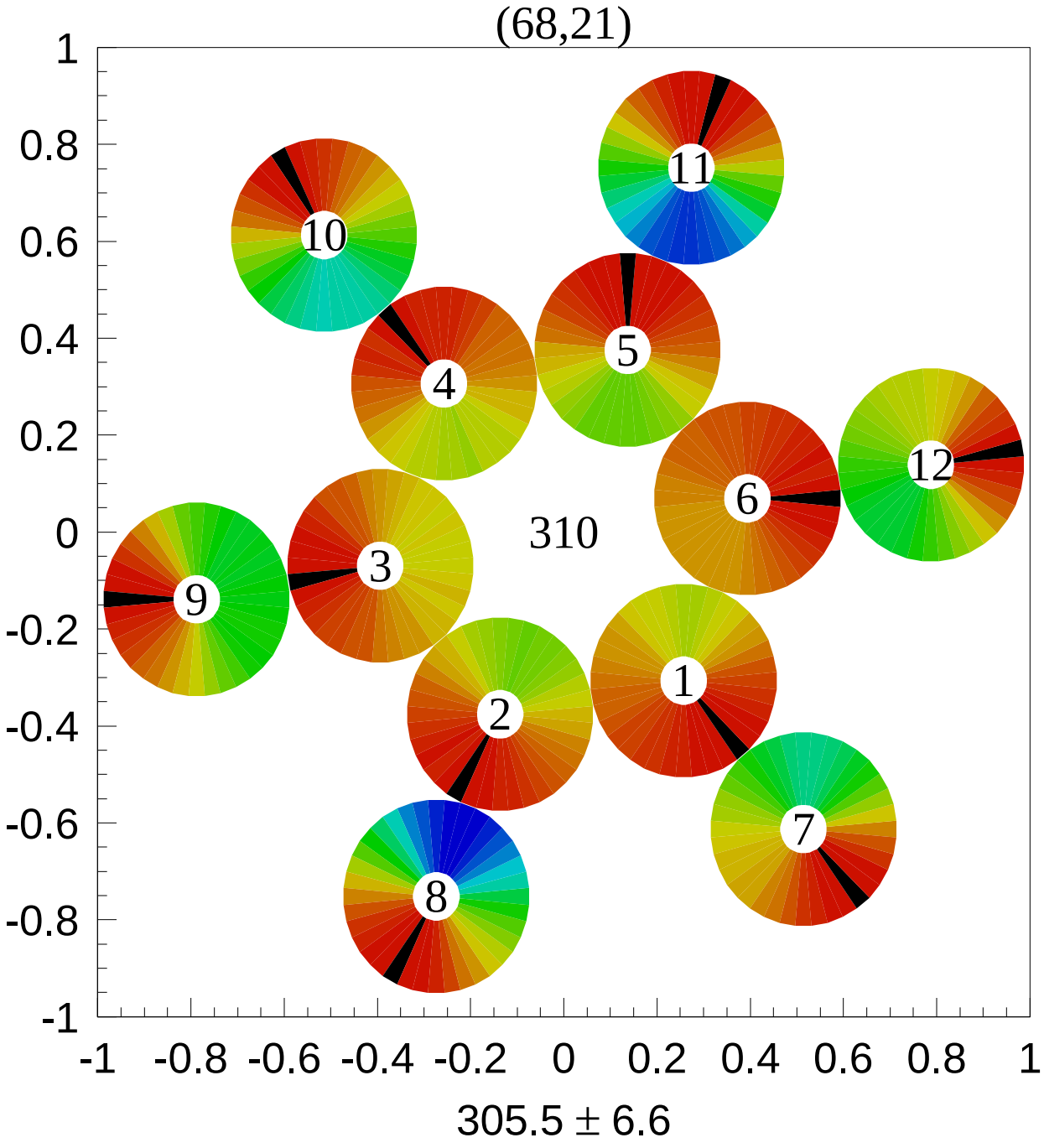

(68,19)
tilted LEDs
123 122 126 122 125 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 119 115 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

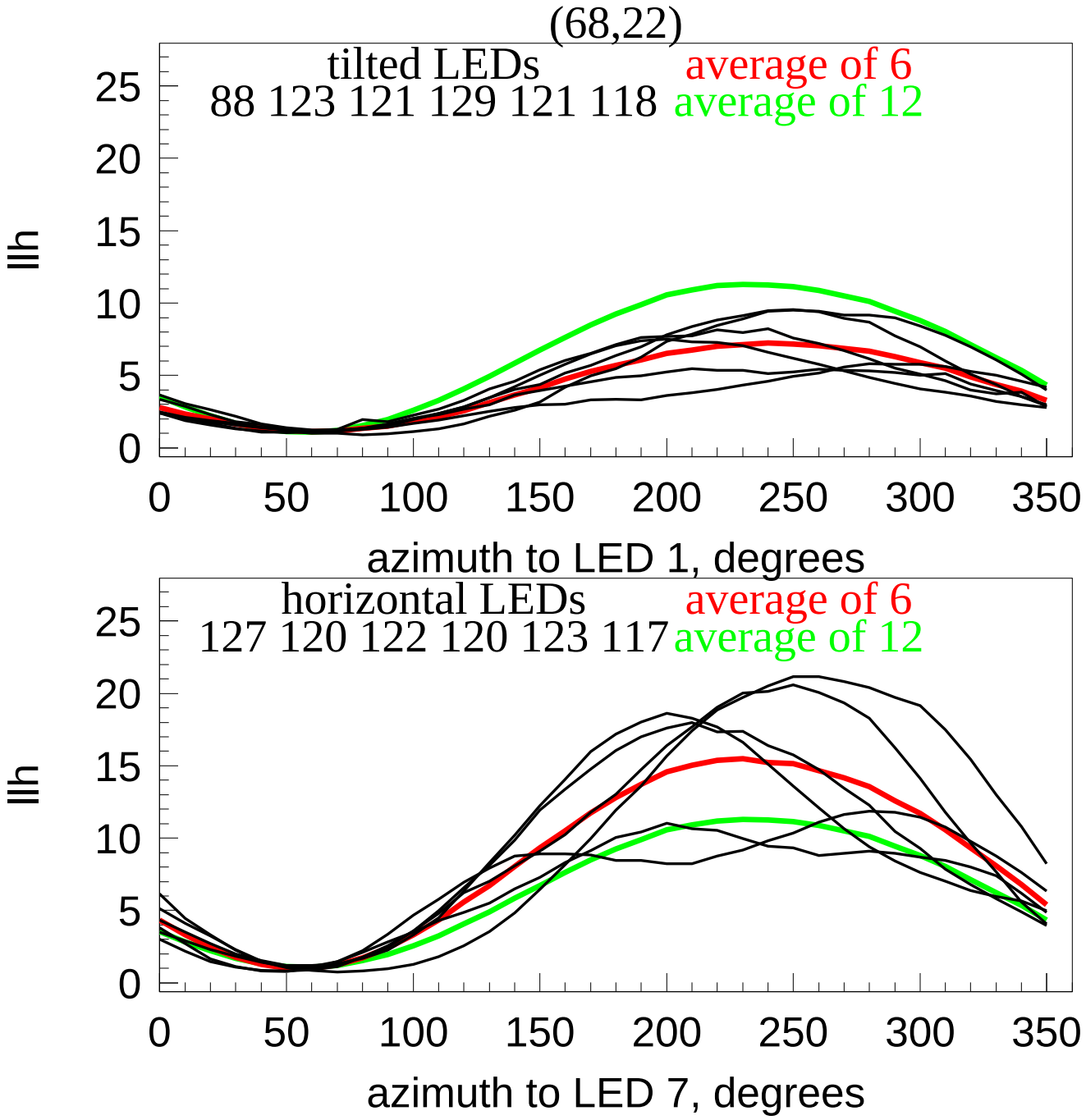

(68,19)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
89.6 ± 10.9

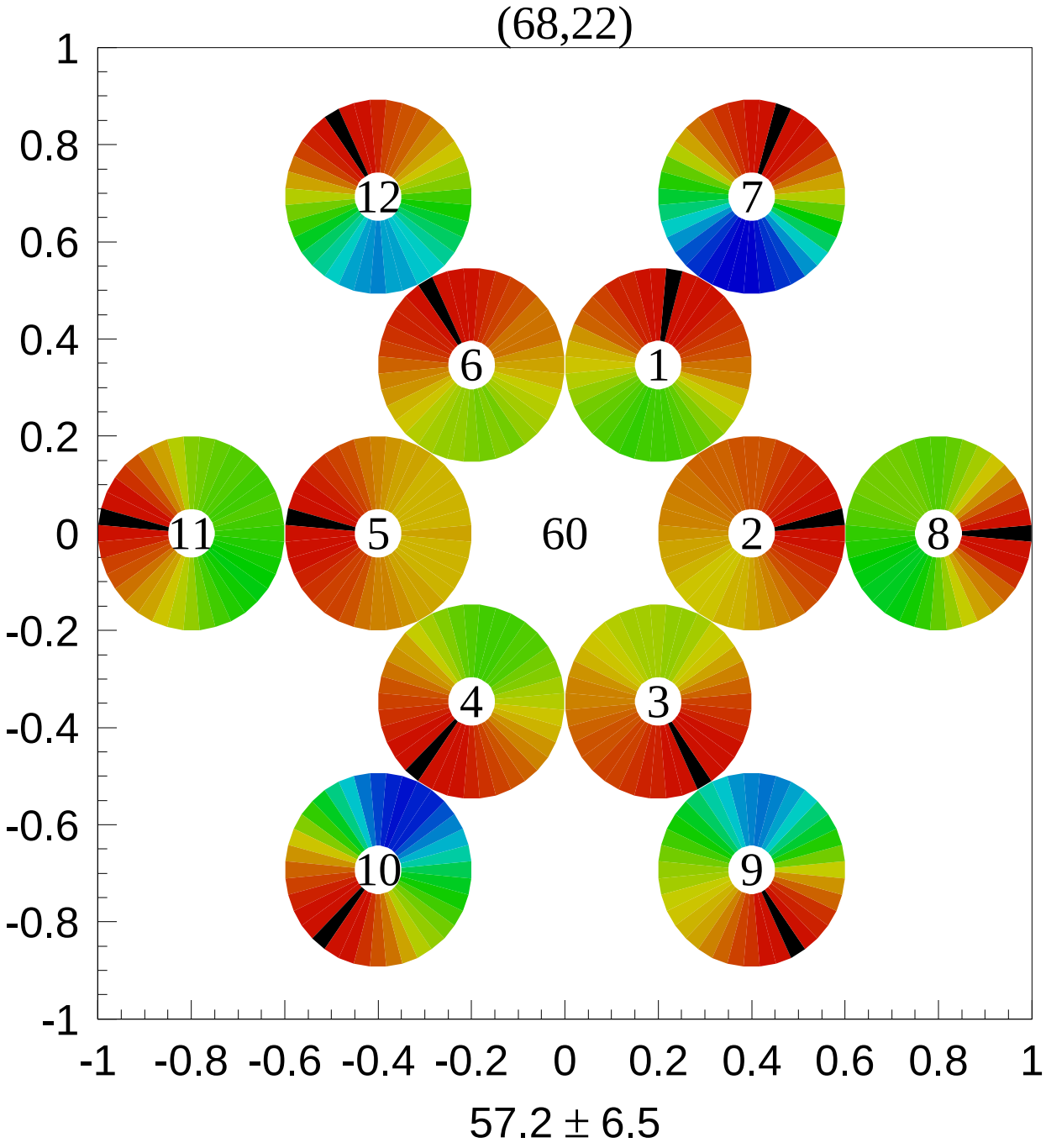

(68,20)
tilted LEDs
124 112 120 125 116 112
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
130 116 115 120 120 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

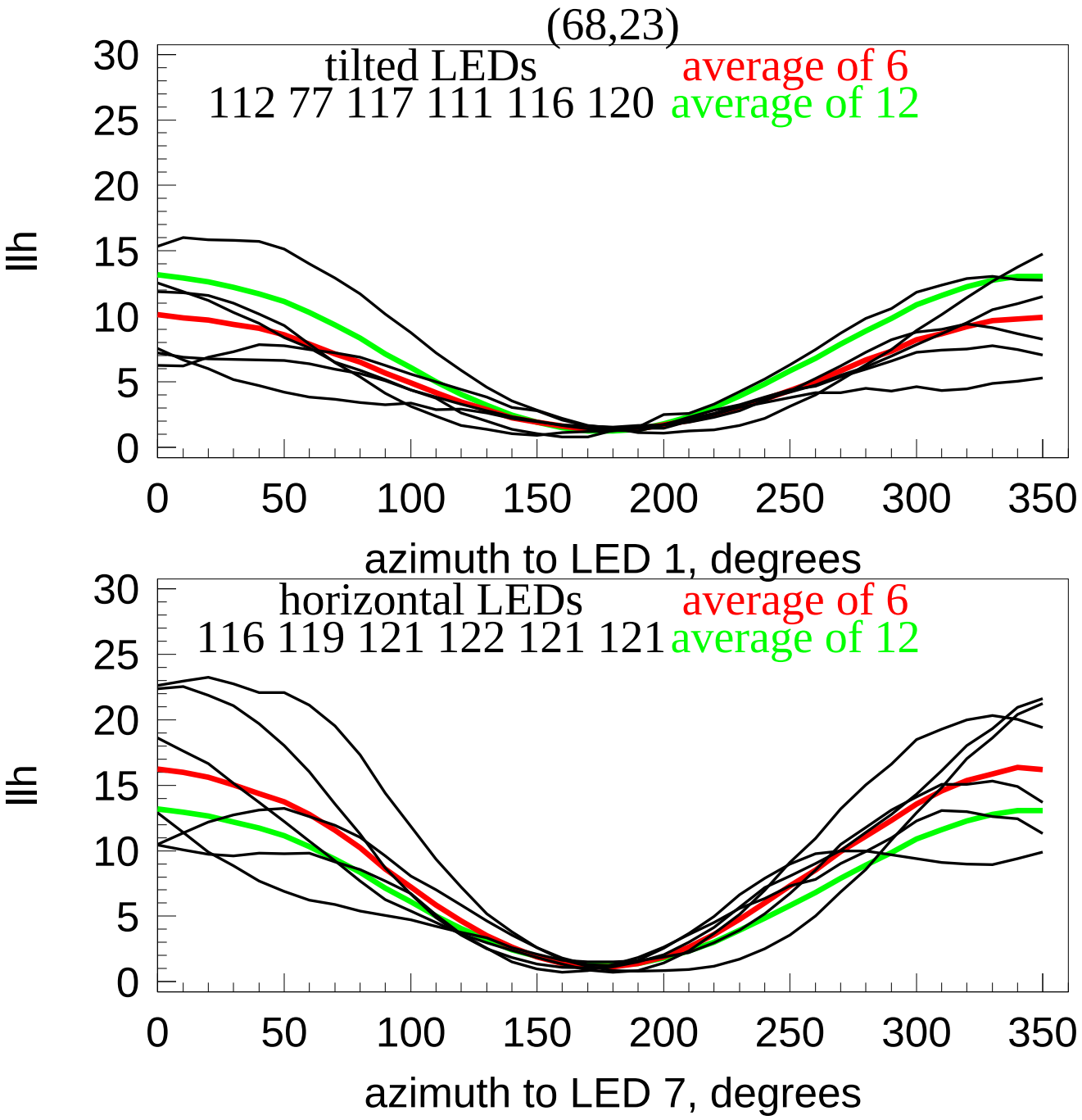

(68,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
148.5 ± 8.1

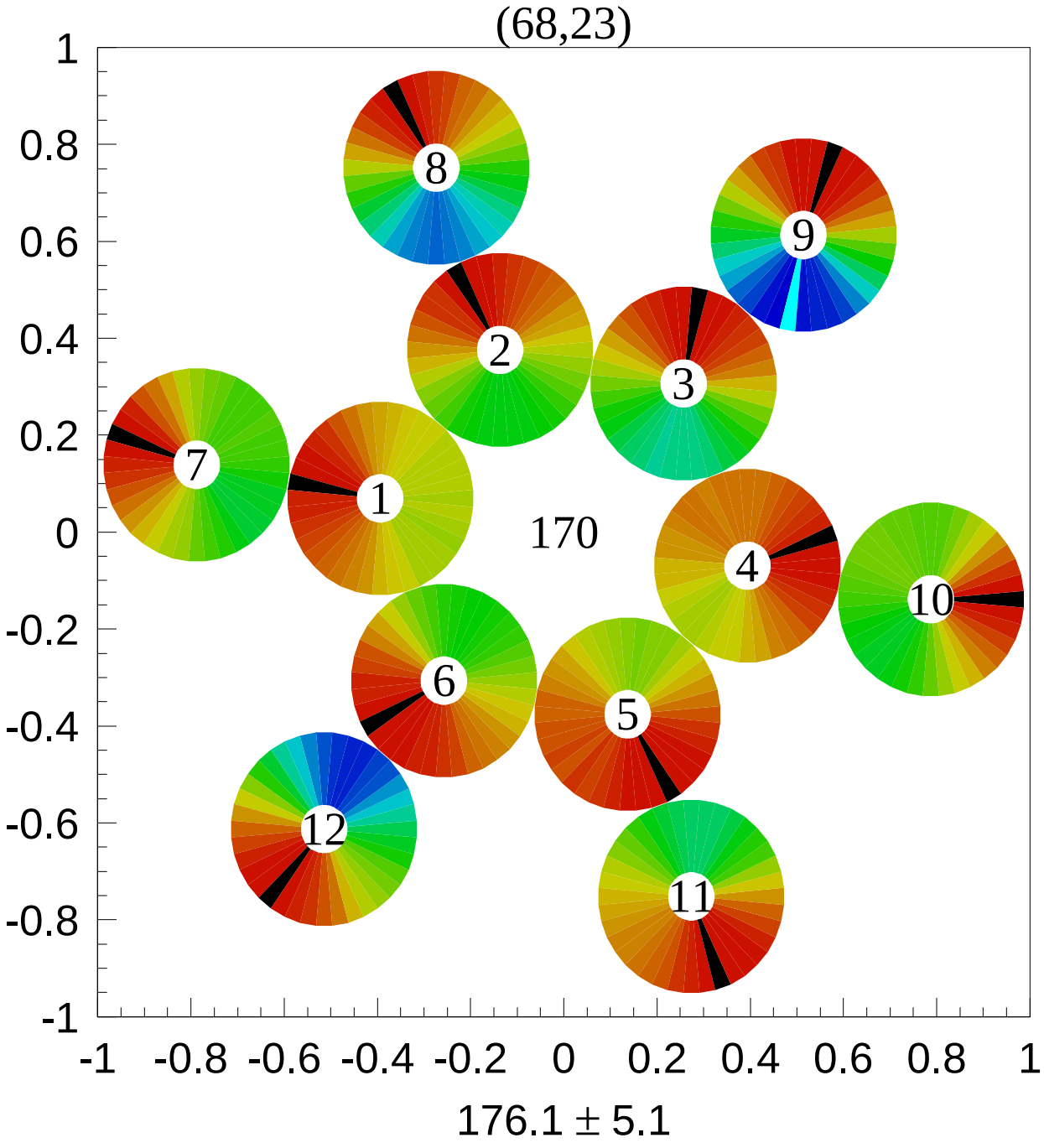

(68,21)
tilted LEDs
128 120 123 123 123 125
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 123 117 119 124 120
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

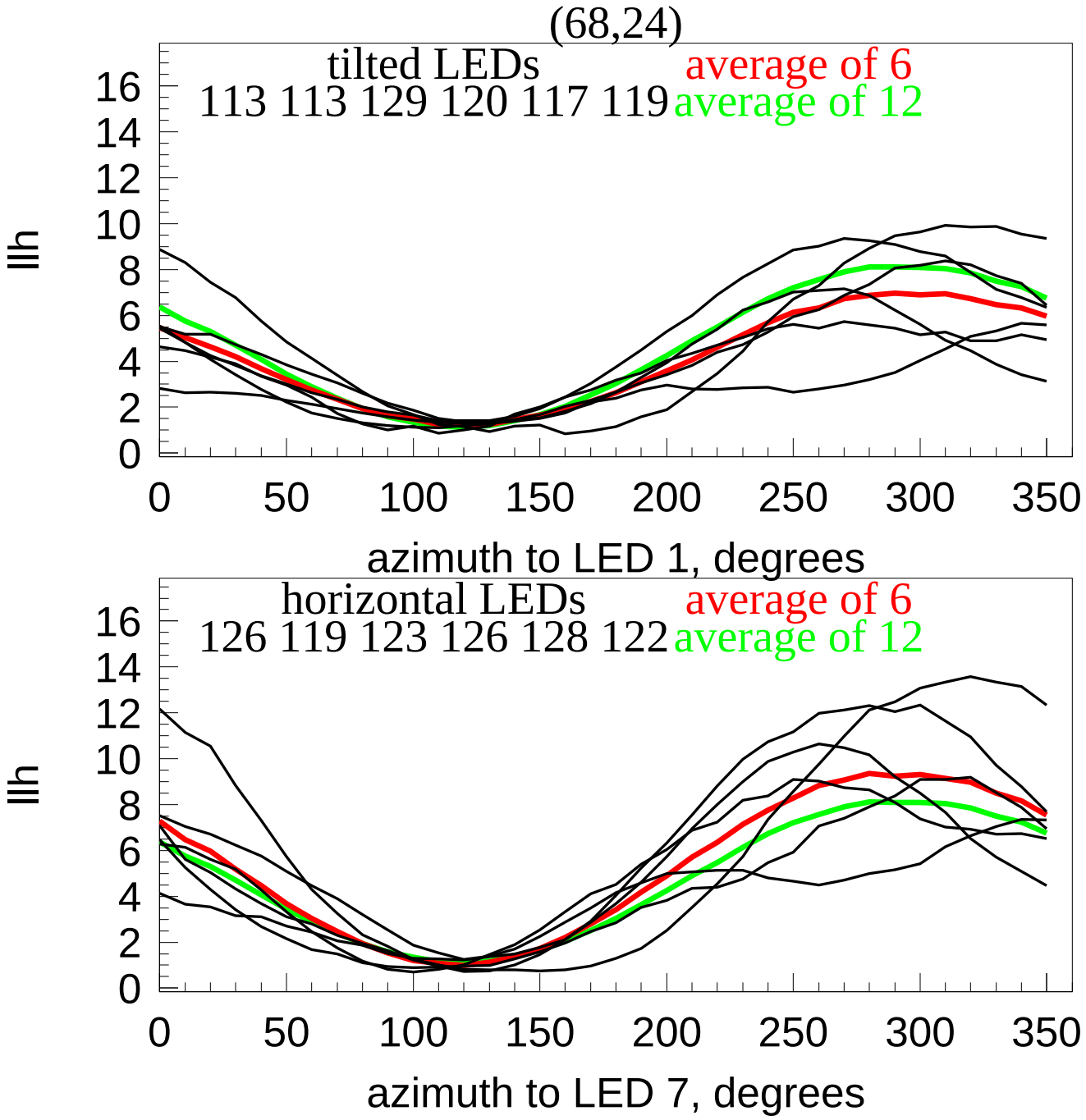

(68,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
305.5 ± 6.6

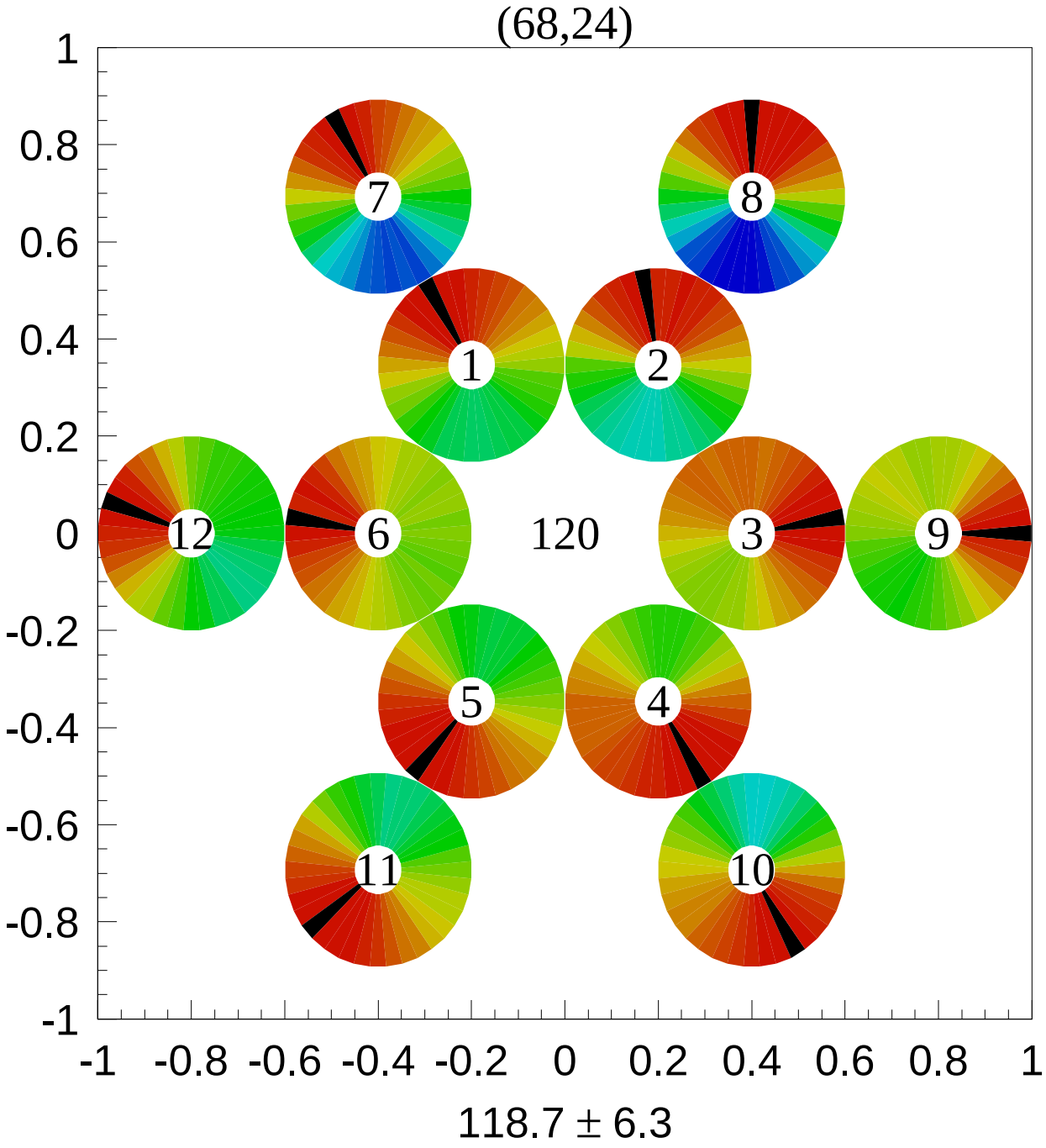

(68,22)
tilted LEDs
88 123 121 129 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 120 122 120 123 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

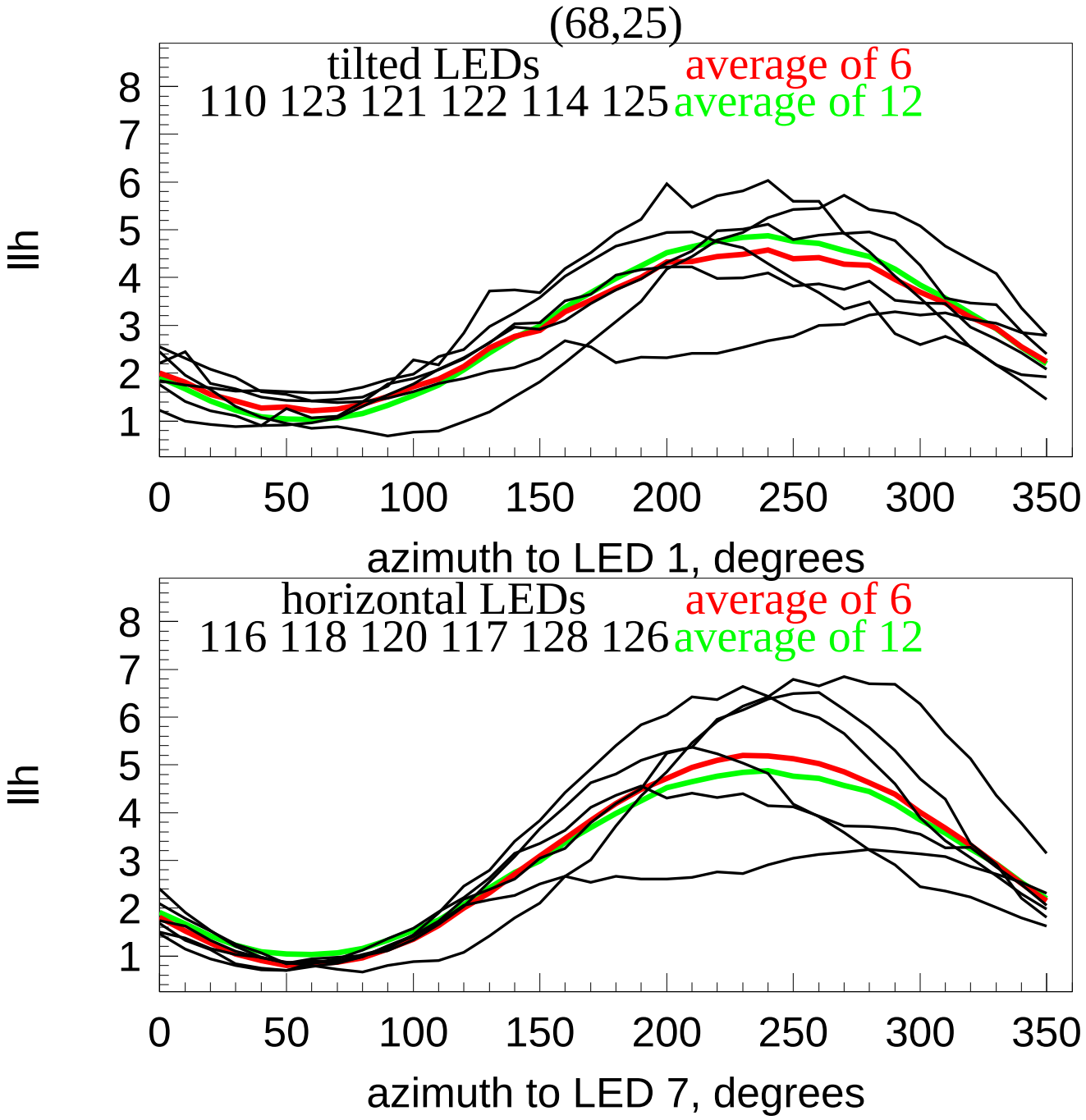

(68,22)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
57.2 ± 6.5

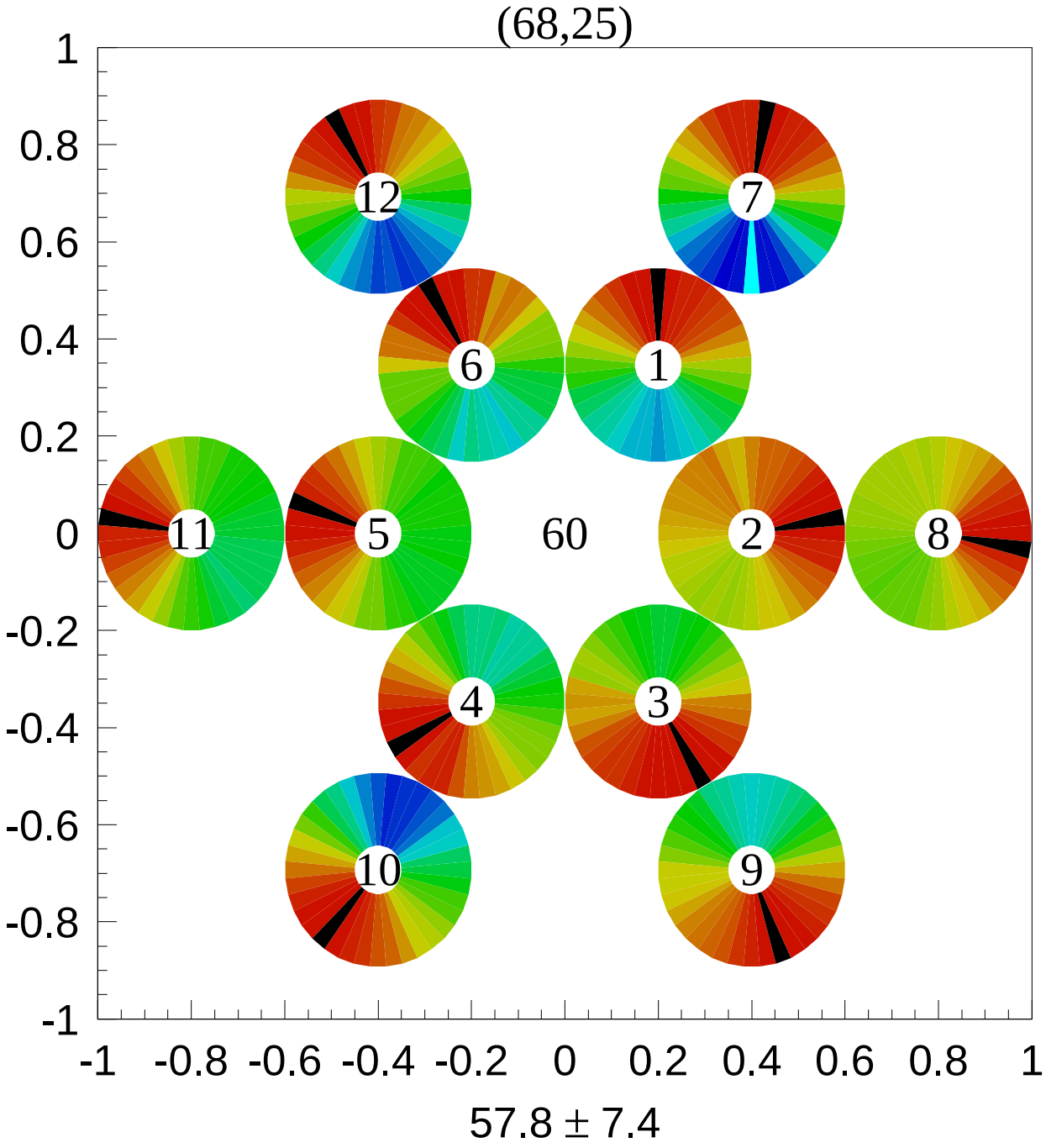

(68,23)
tilted LEDs
112 77 117 111 116 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 119 121 122 121 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

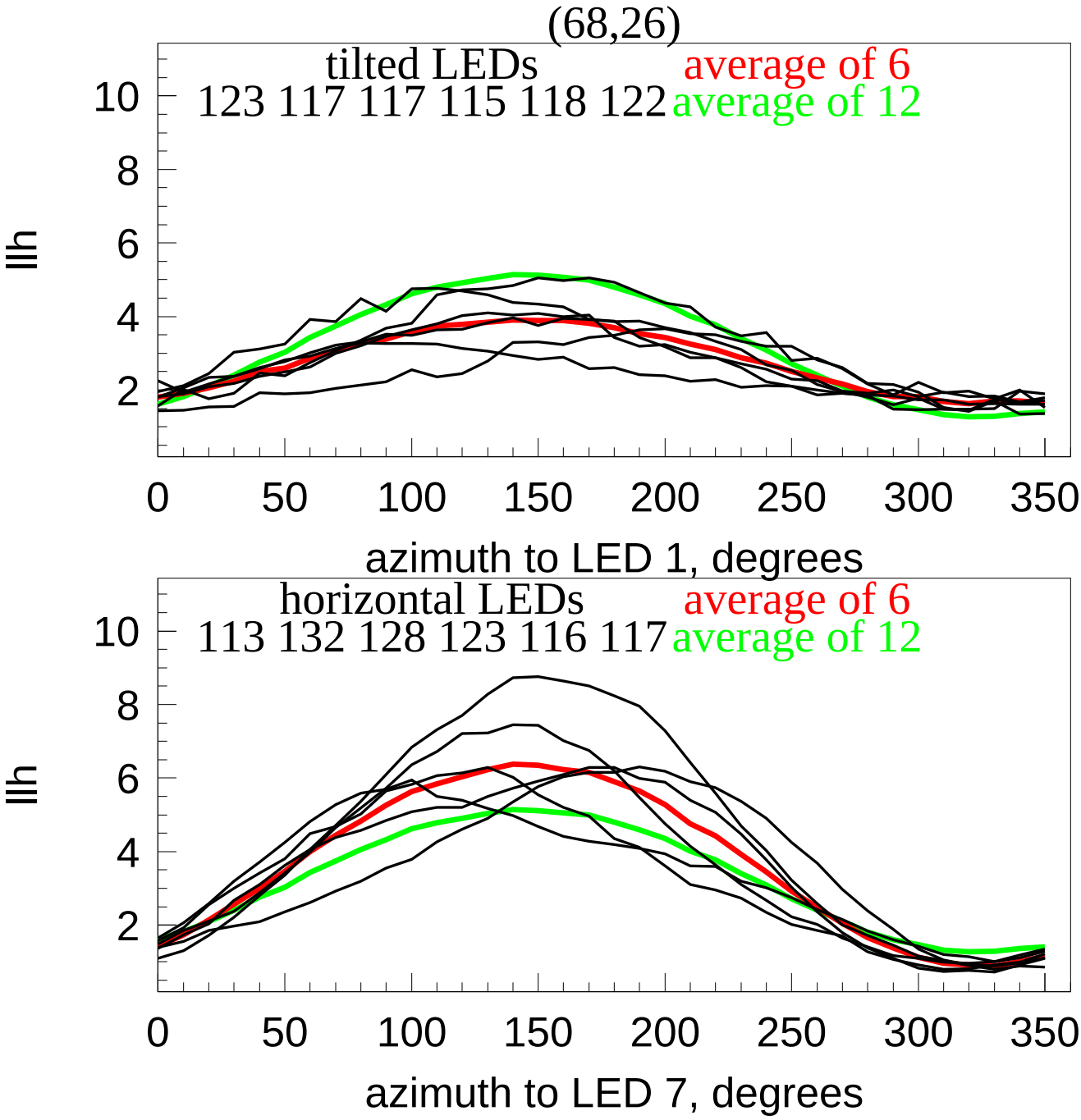

(68,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
176.1 ± 5.1

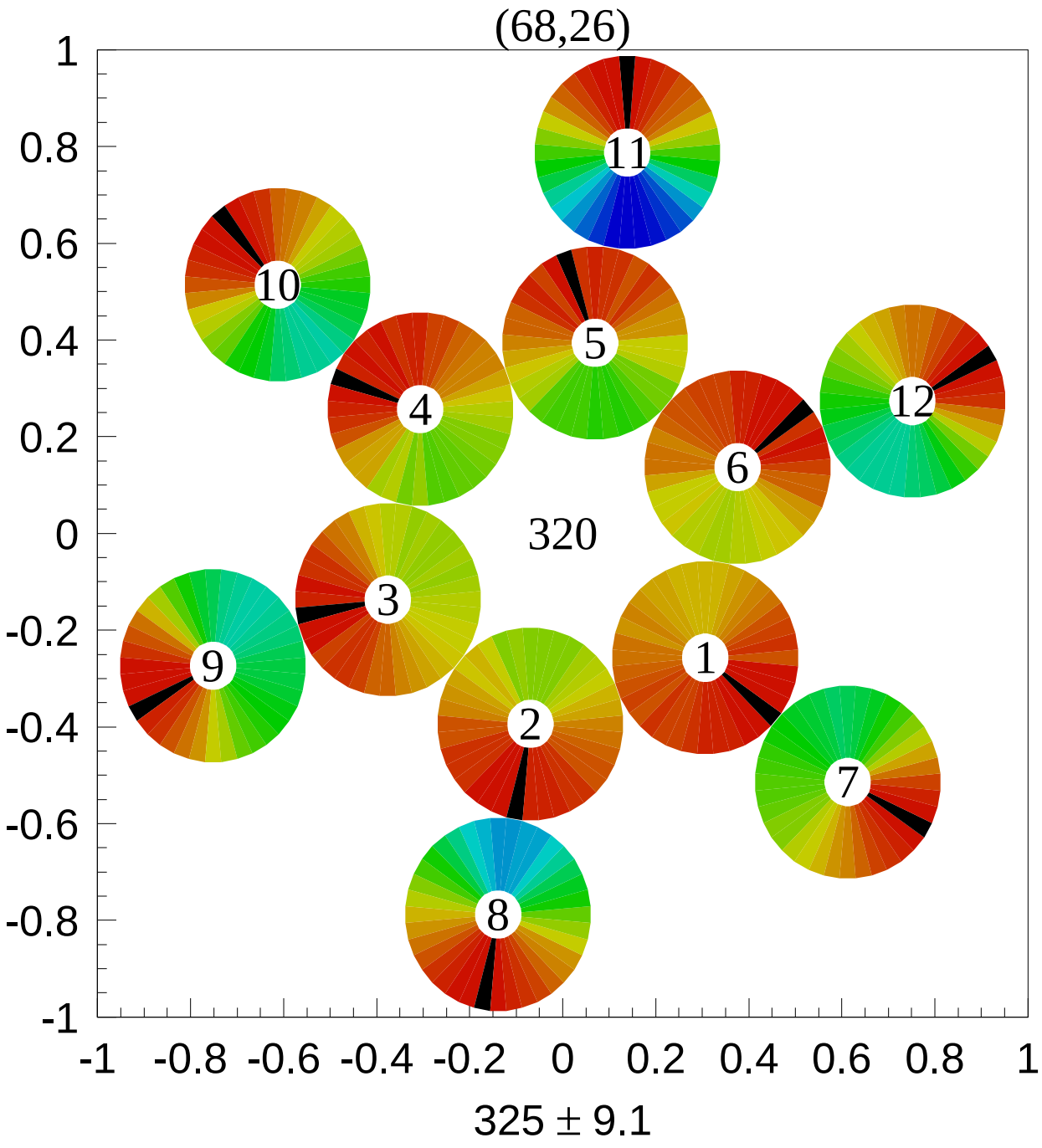

(68,24)
tilted LEDs
113 113 129 120 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 123 126 128 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

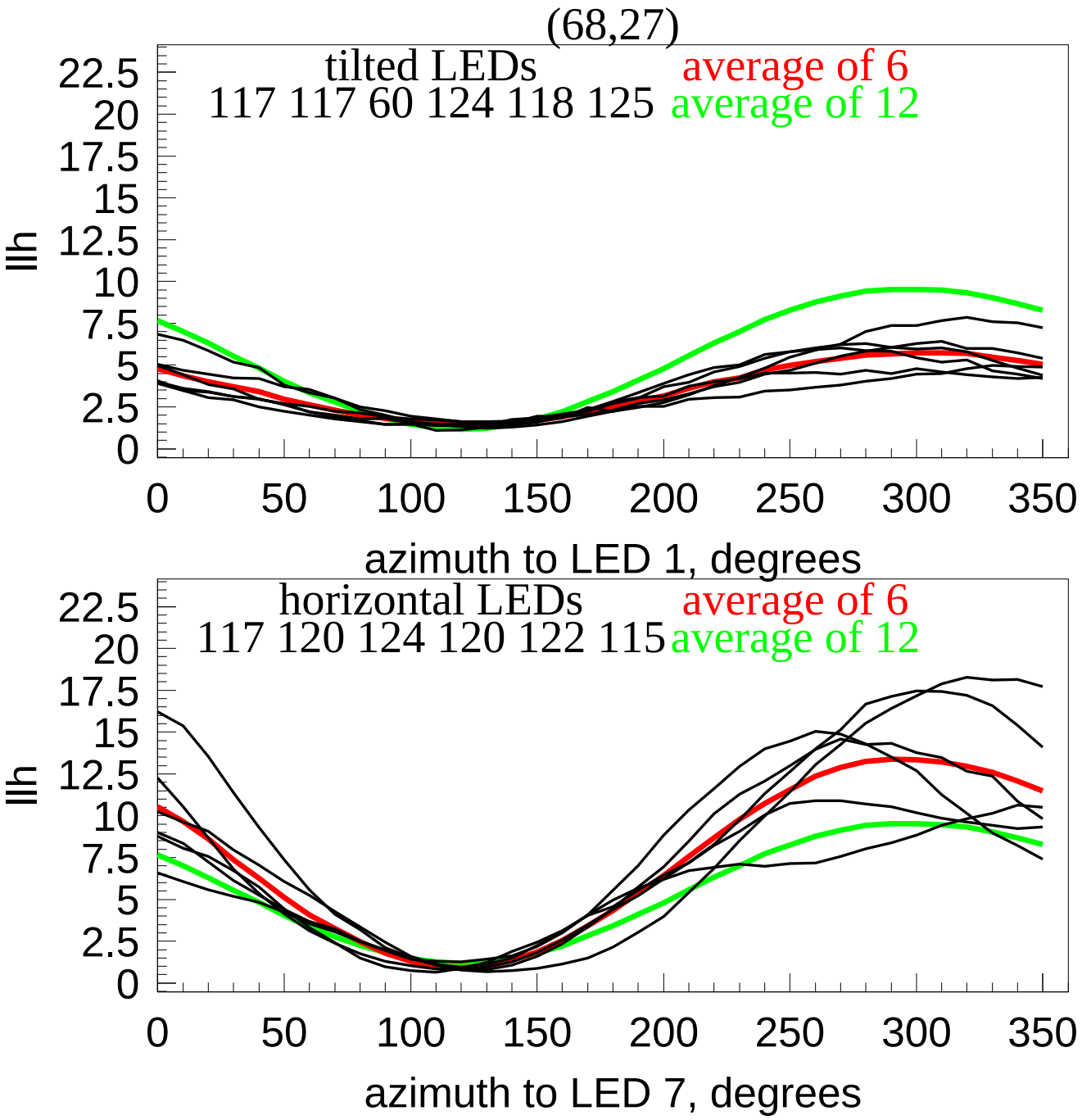

(68,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
118.7 ± 6.3

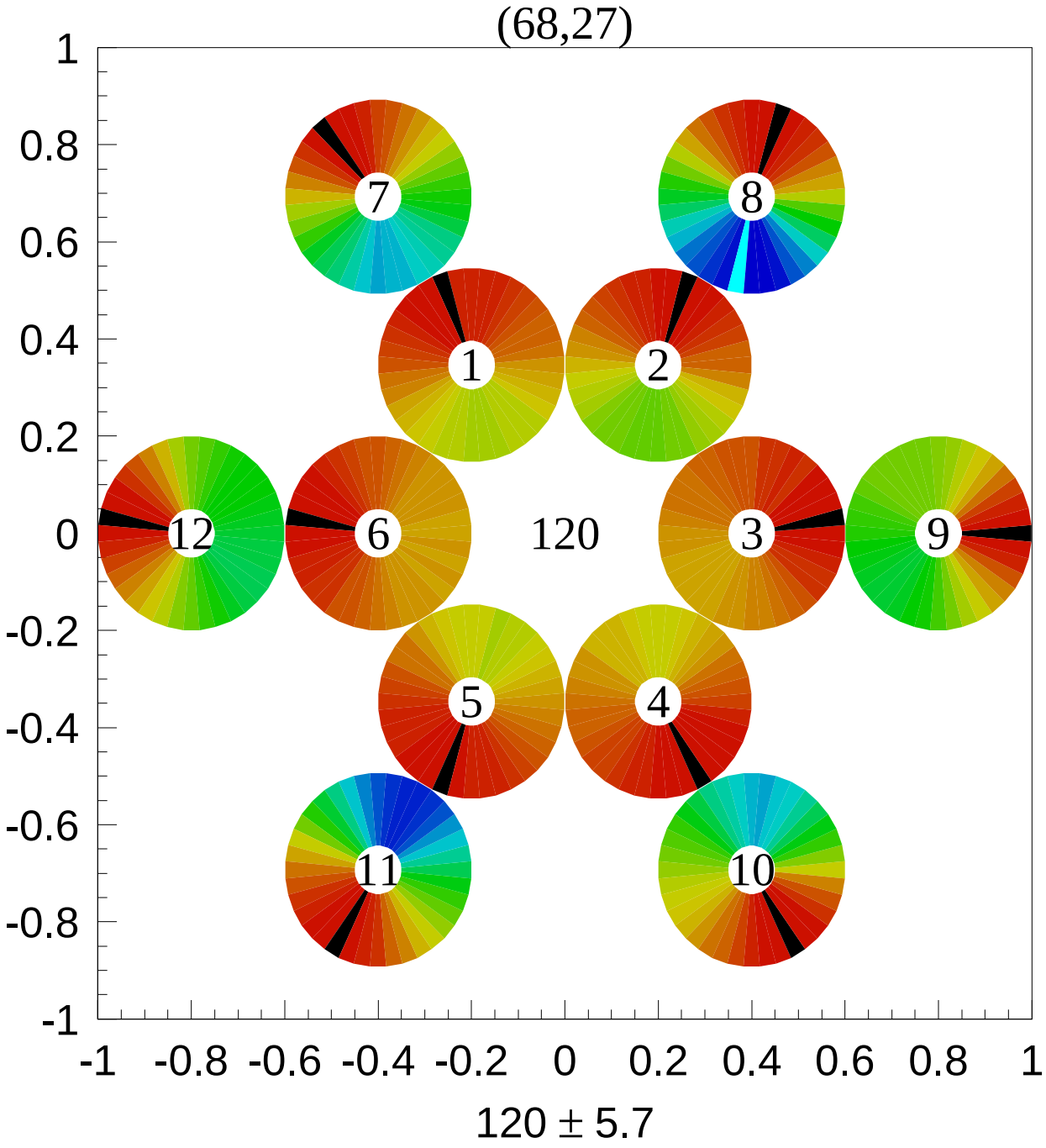

(68,25)
tilted LEDs
110 123 121 122 114 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 118 120 117 128 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

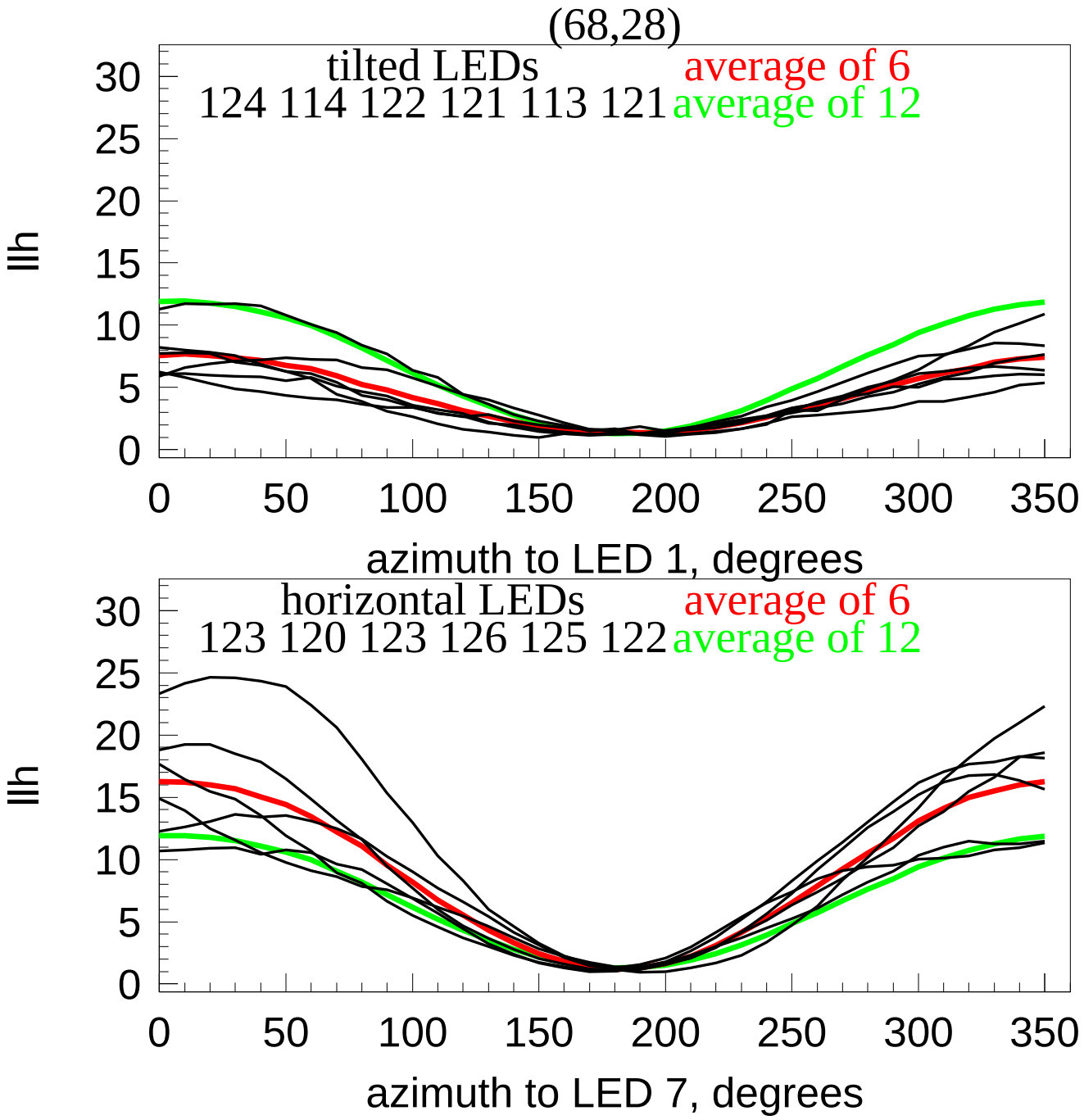

(68,25)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
57.8 ± 7.4

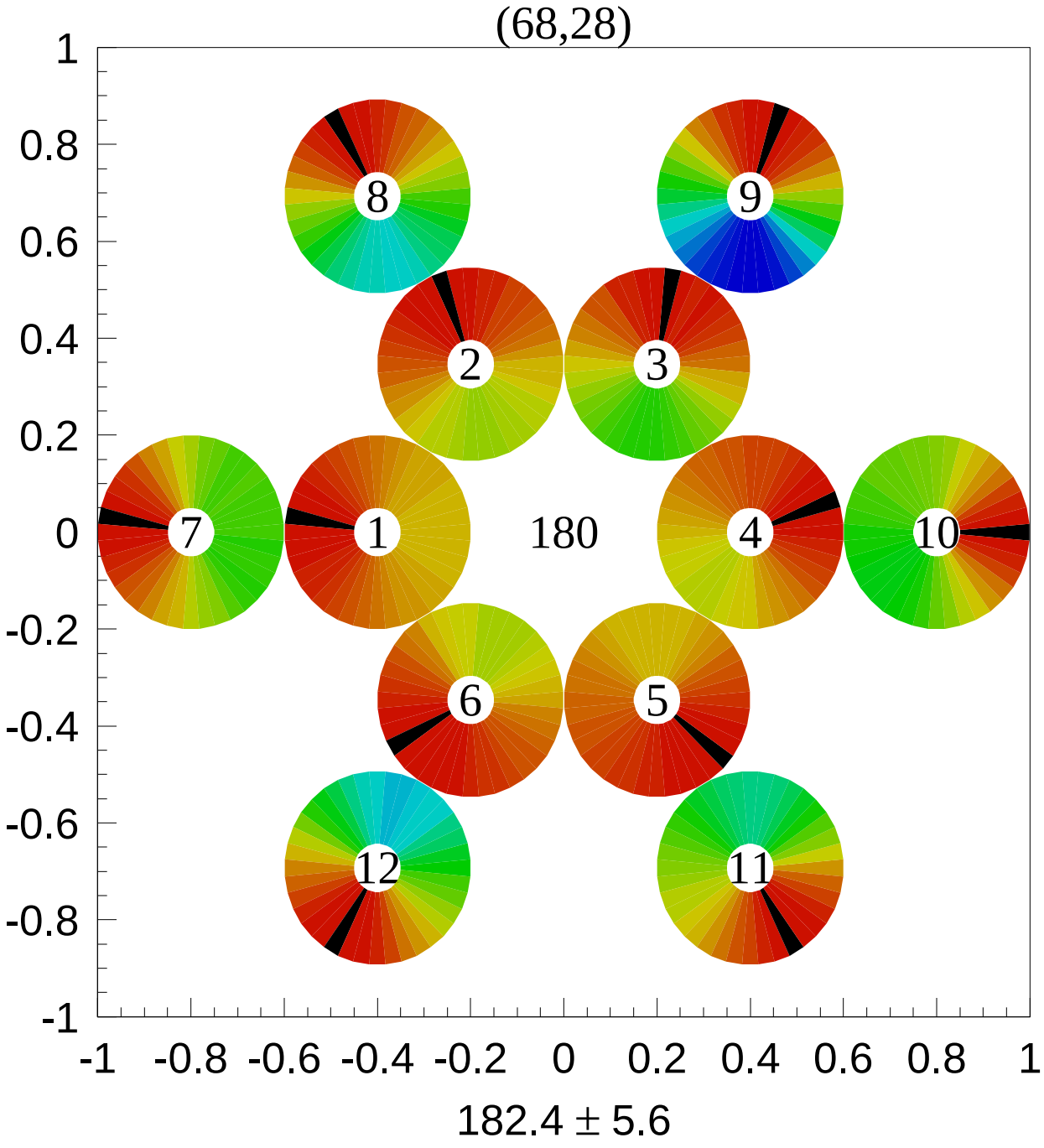

(68,26)
tilted LEDs
123 117 117 115 118 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
113 132 128 123 116 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

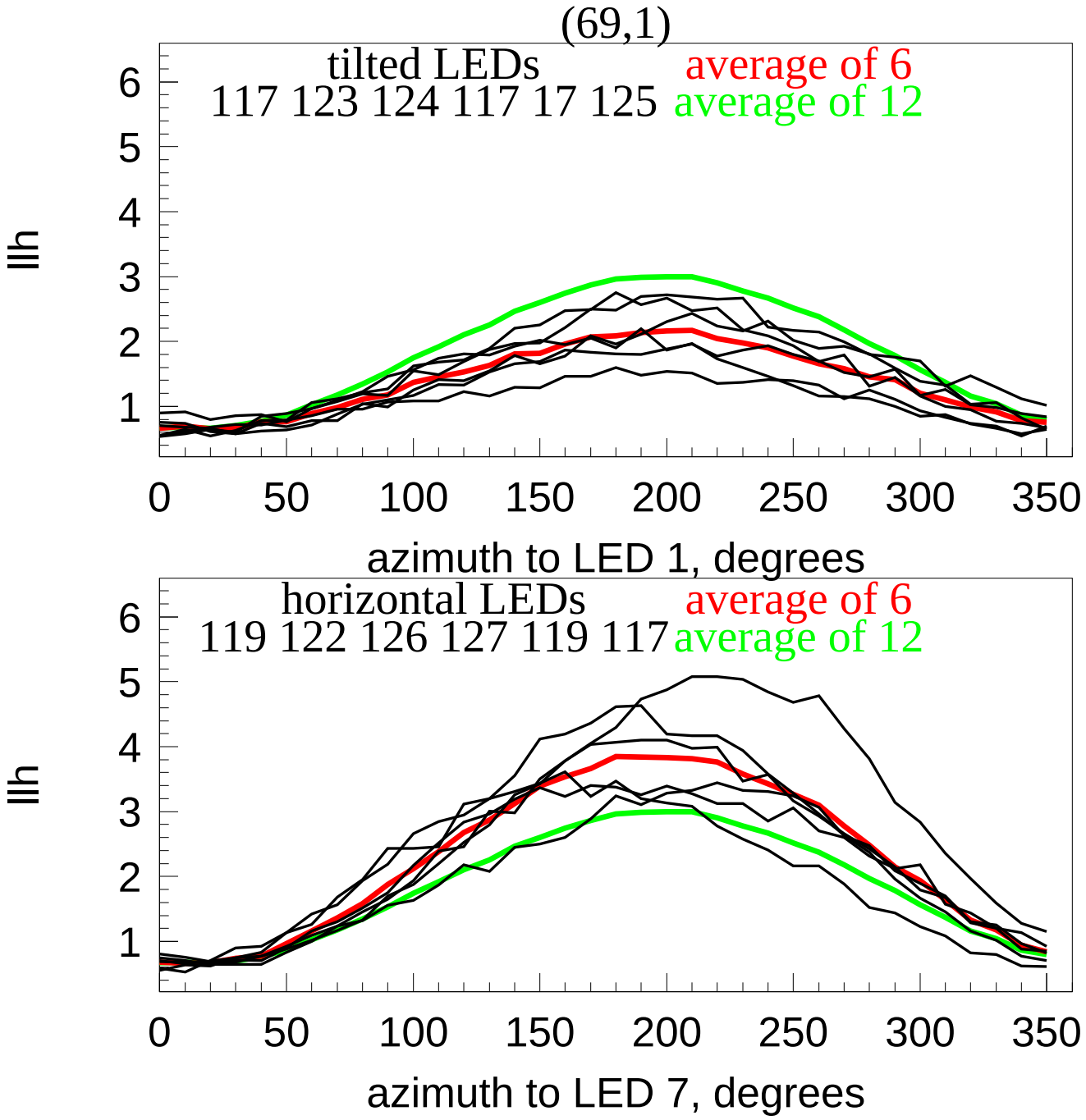

(68,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
325 ± 9.1

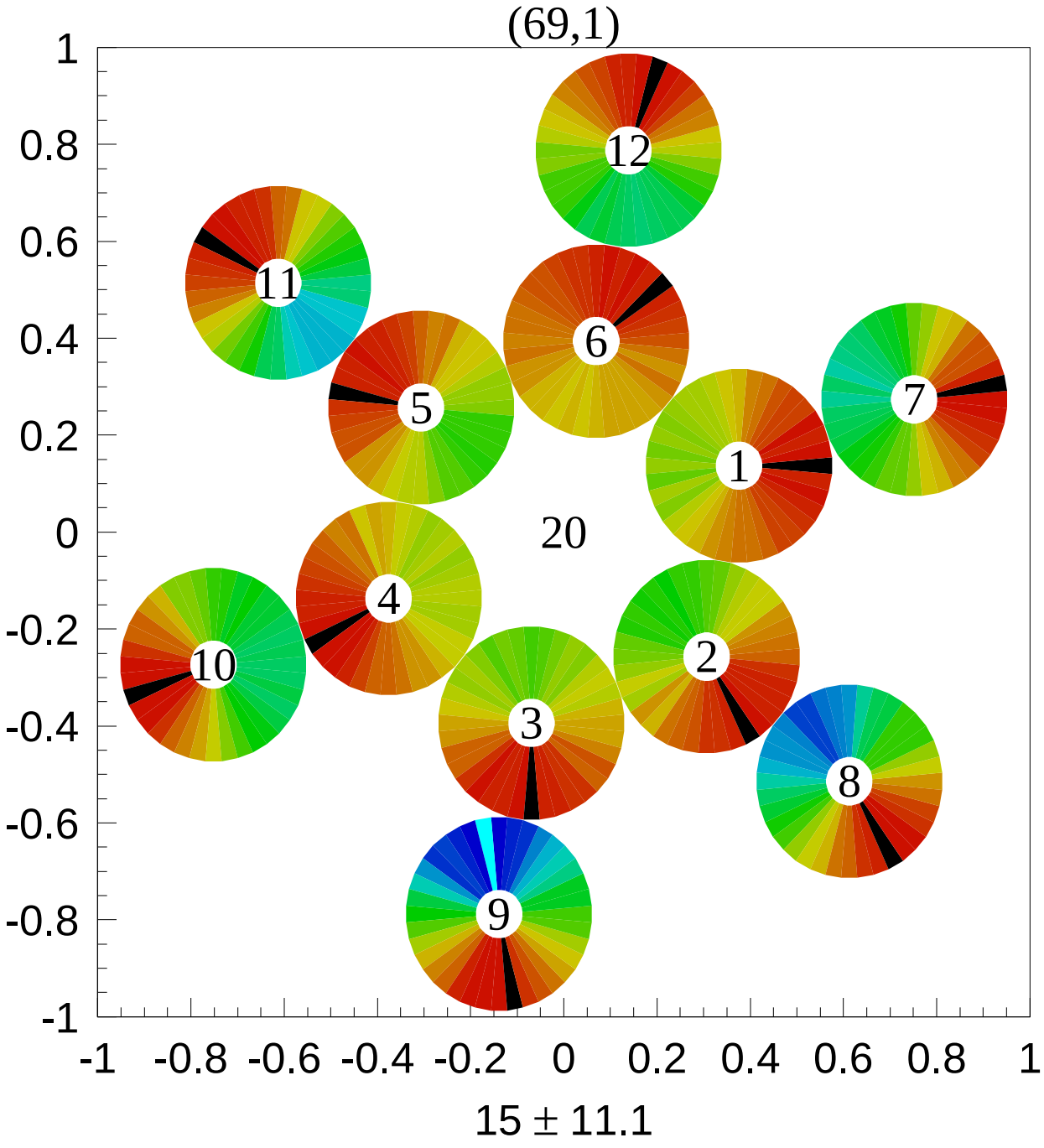

(68,27)
tilted LEDs
117 117 60 124 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 120 124 120 122 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

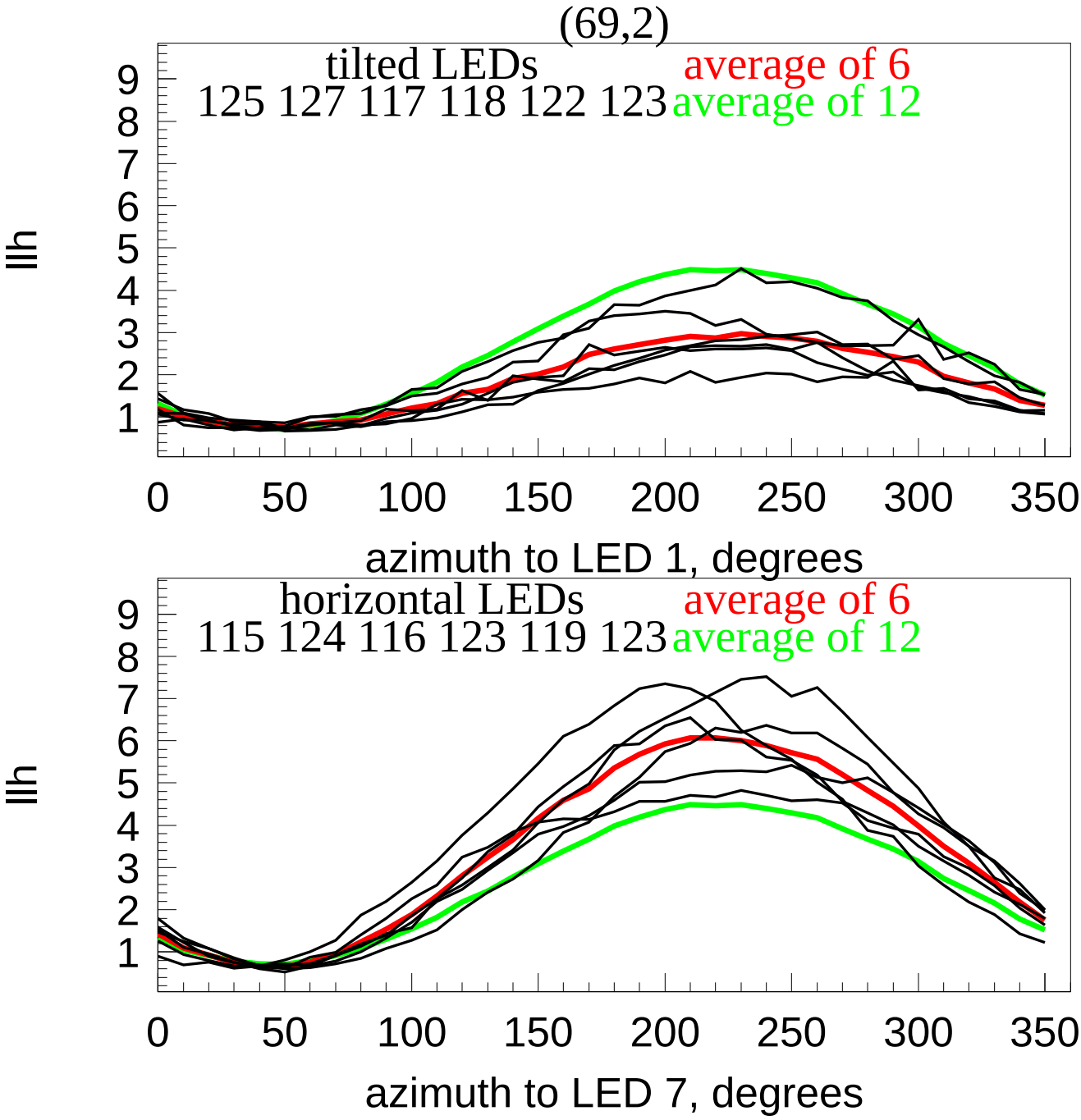

(68,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
120 ± 5.7
7
8
1
2
12
6
120
3
9
5
4
11
10

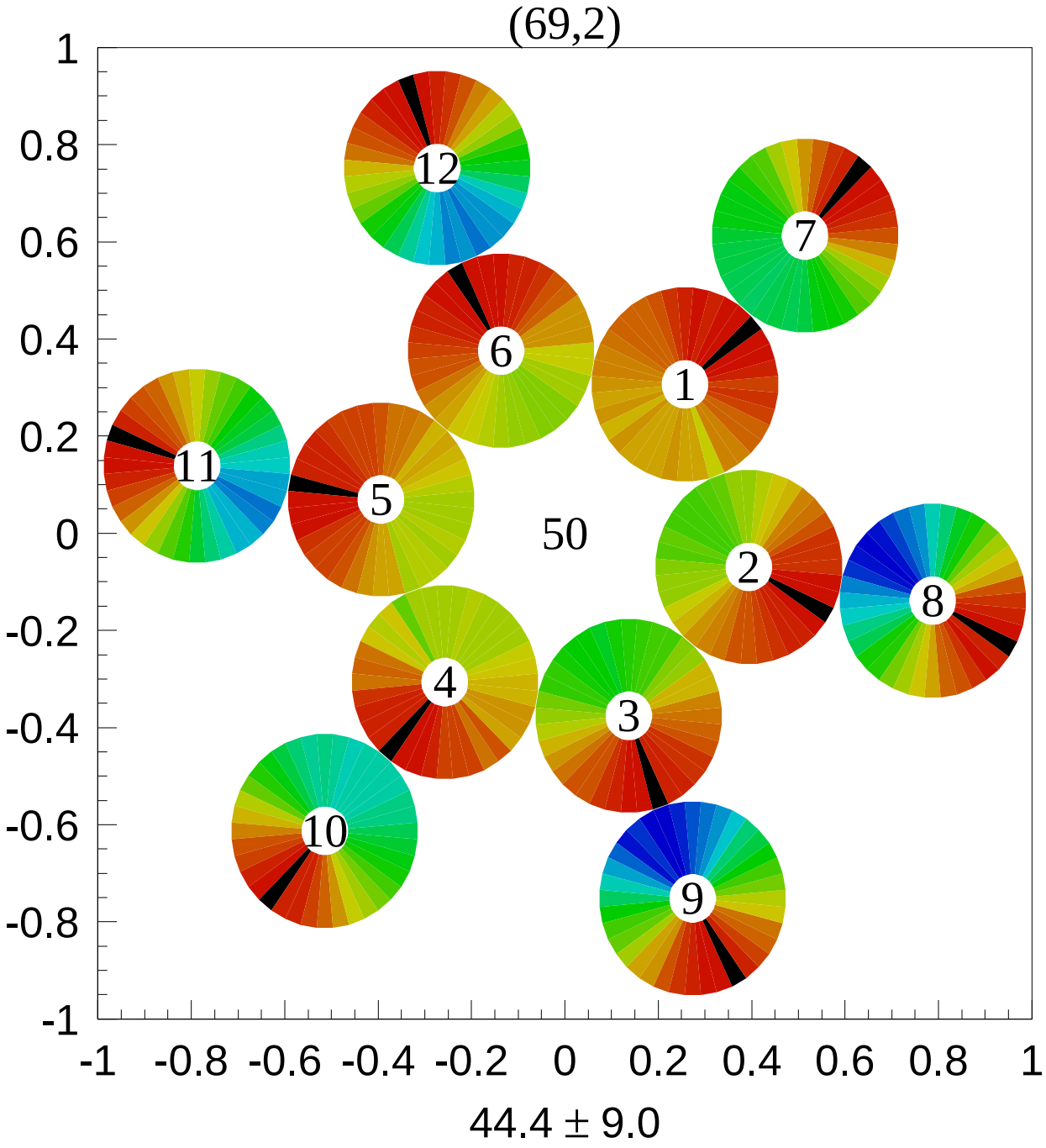

(68,28)
tilted LEDs
124 114 122 121 113 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 120 123 126 125 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

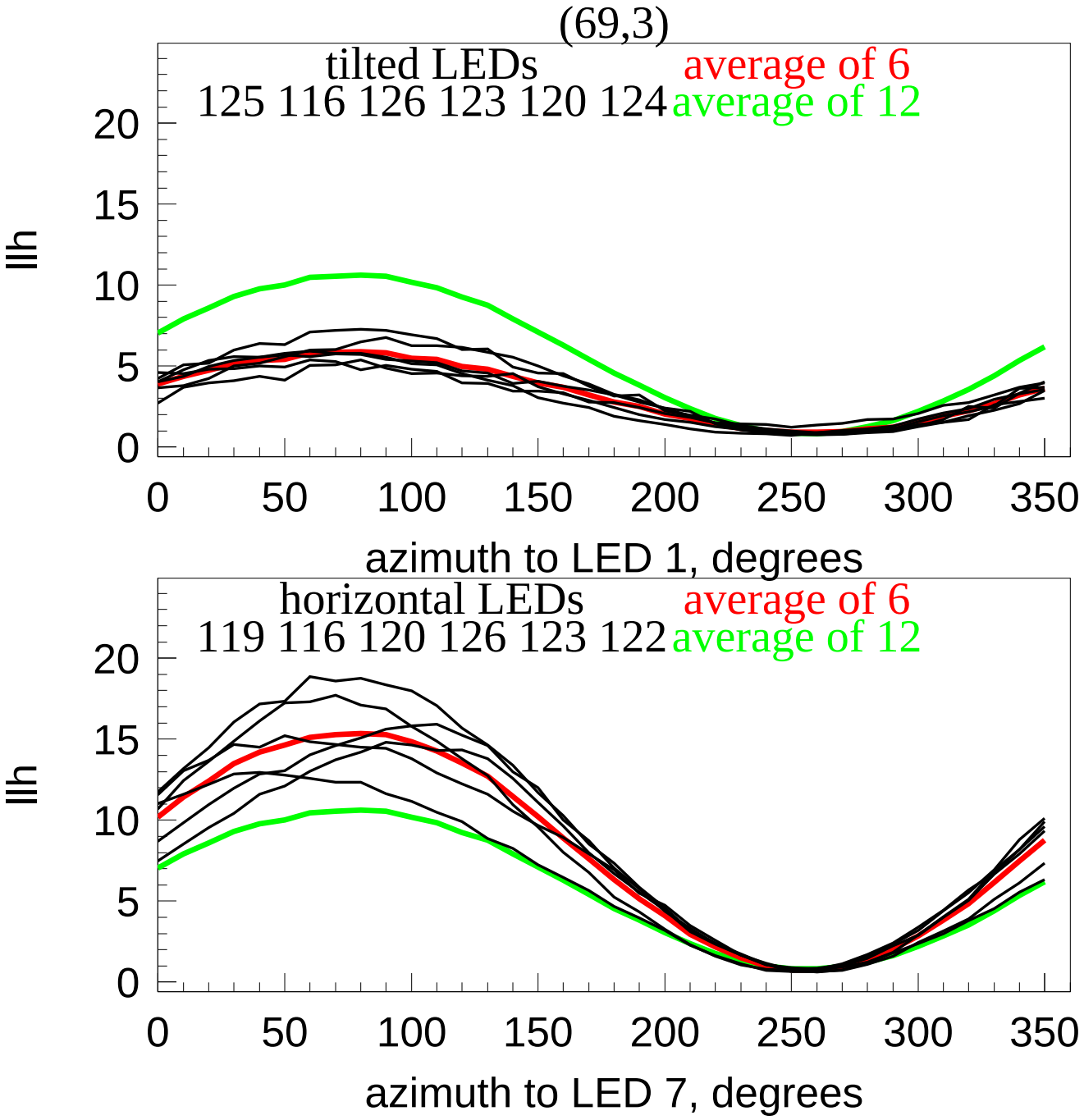

(68,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
182.4 ± 5.6
8
9
2
3
7
1
180
4
10
6
5
12
11

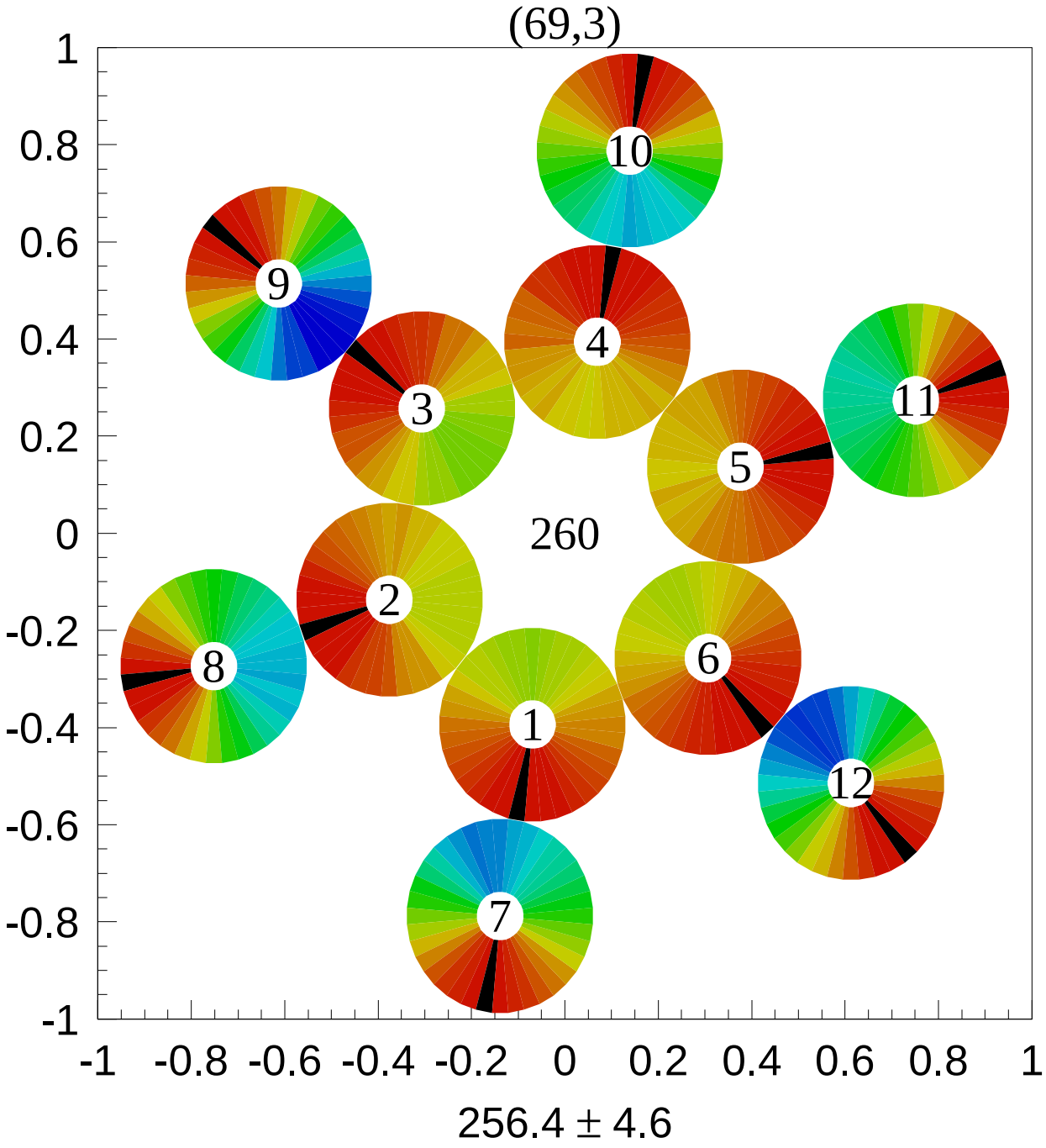

(69,1)
tilted LEDs
117 123 124 117 17 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 126 127 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

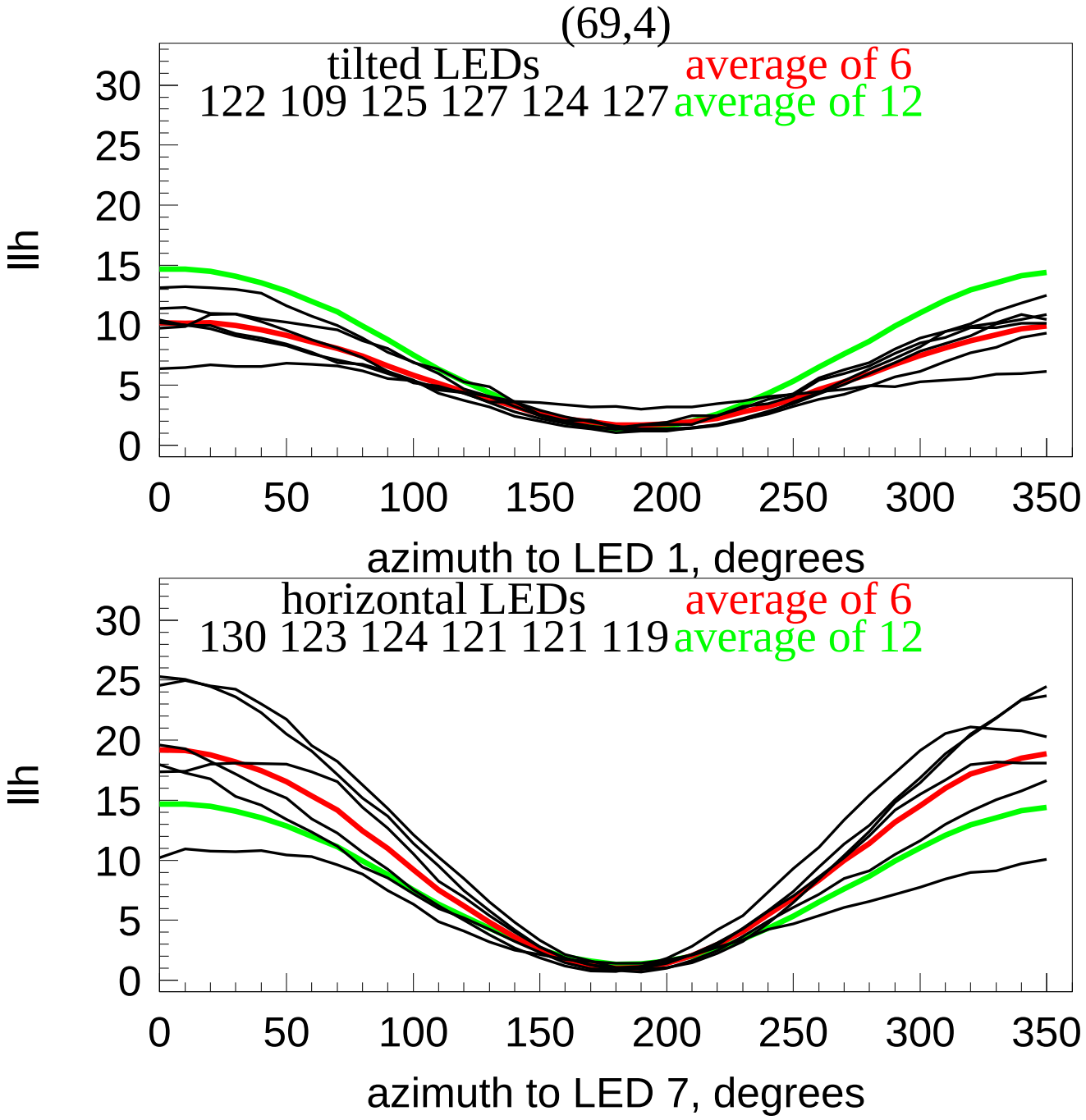

(69,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
15 ± 11.1

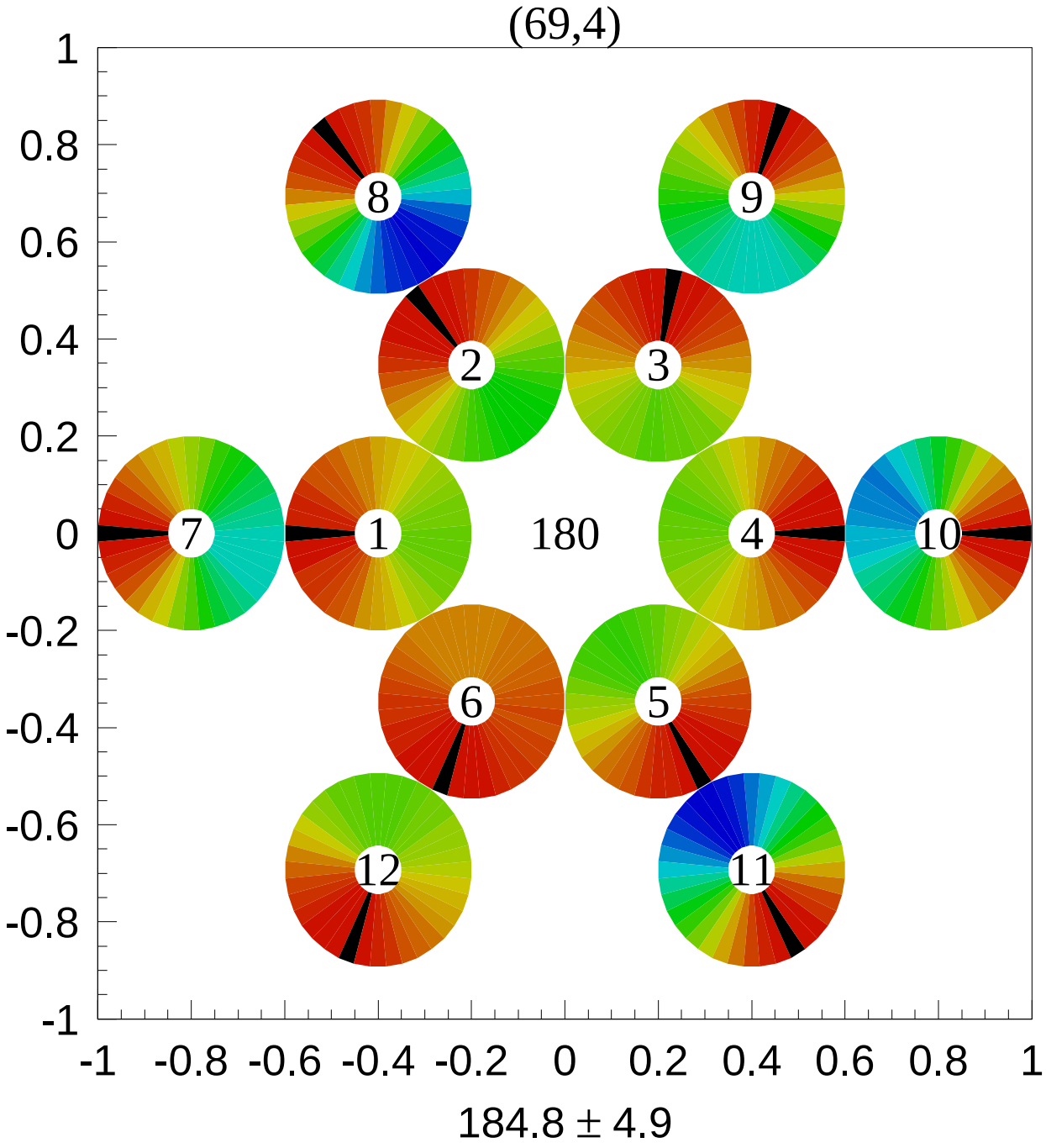

(69,2)
tilted LEDs
125 127 117 118 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 124 116 123 119 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

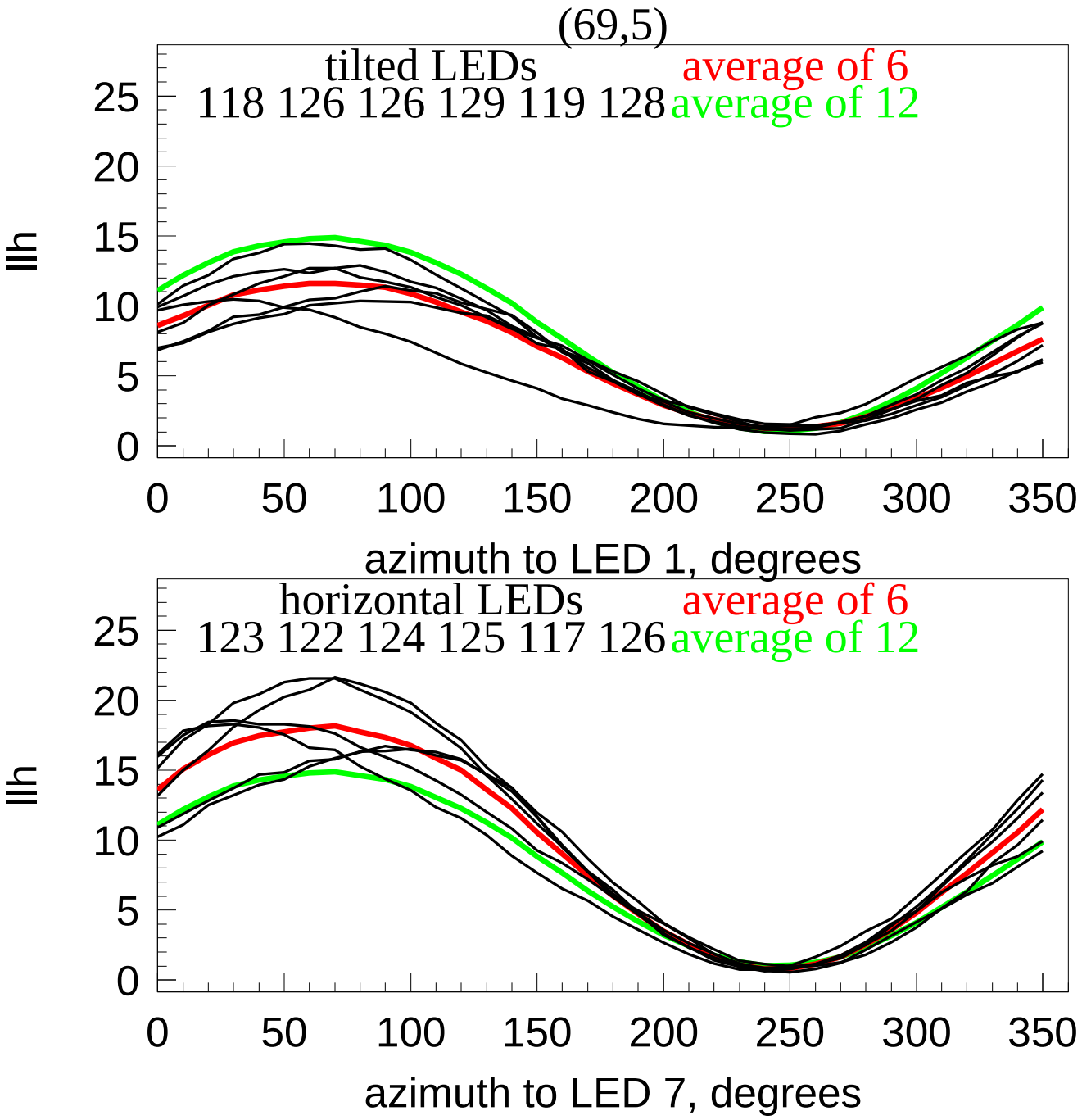

(69,2)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
44.4 ± 9.0

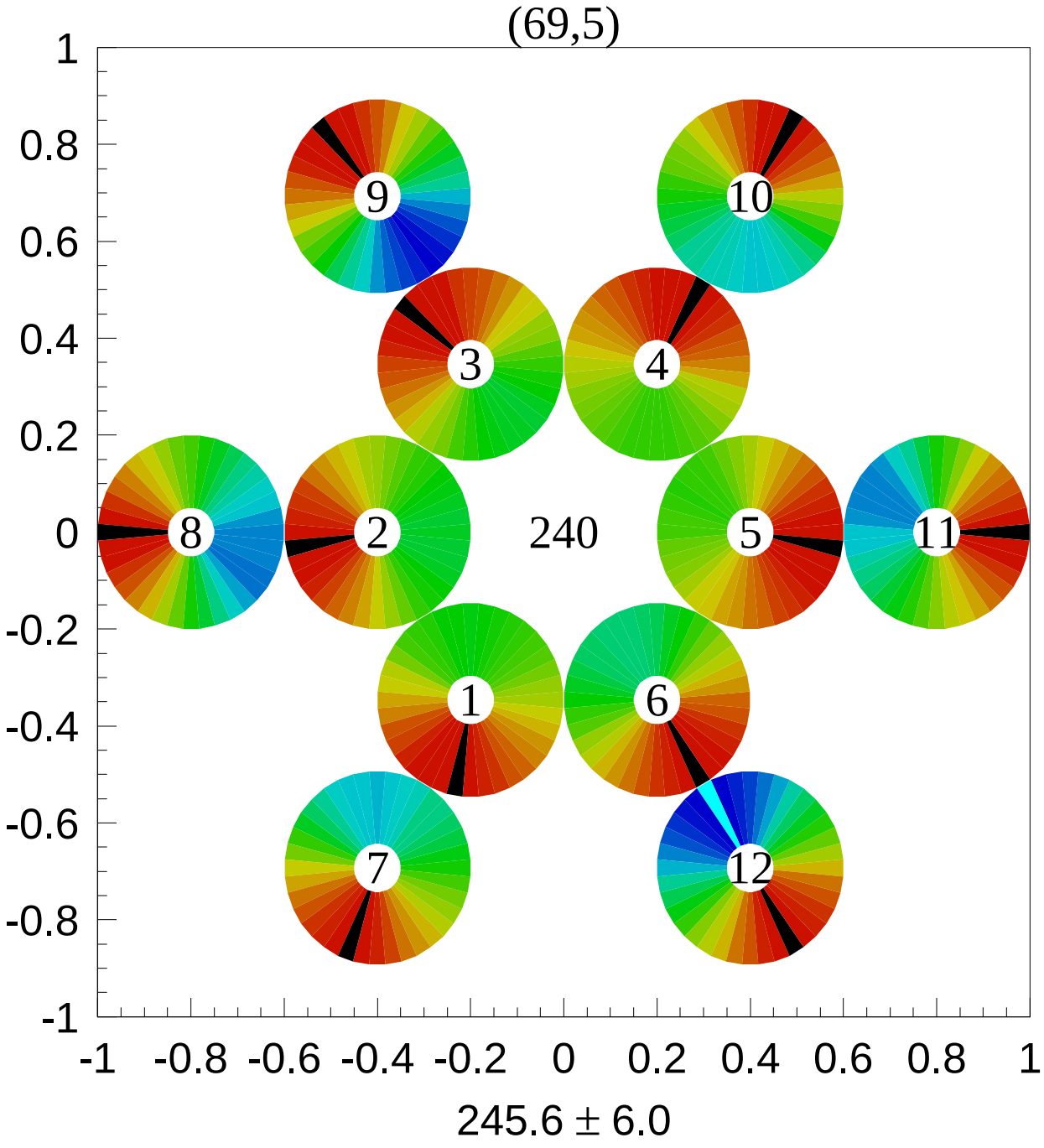

(69,3)
tilted LEDs
125 116 126 123 120 124
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 116 120 126 123 122
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

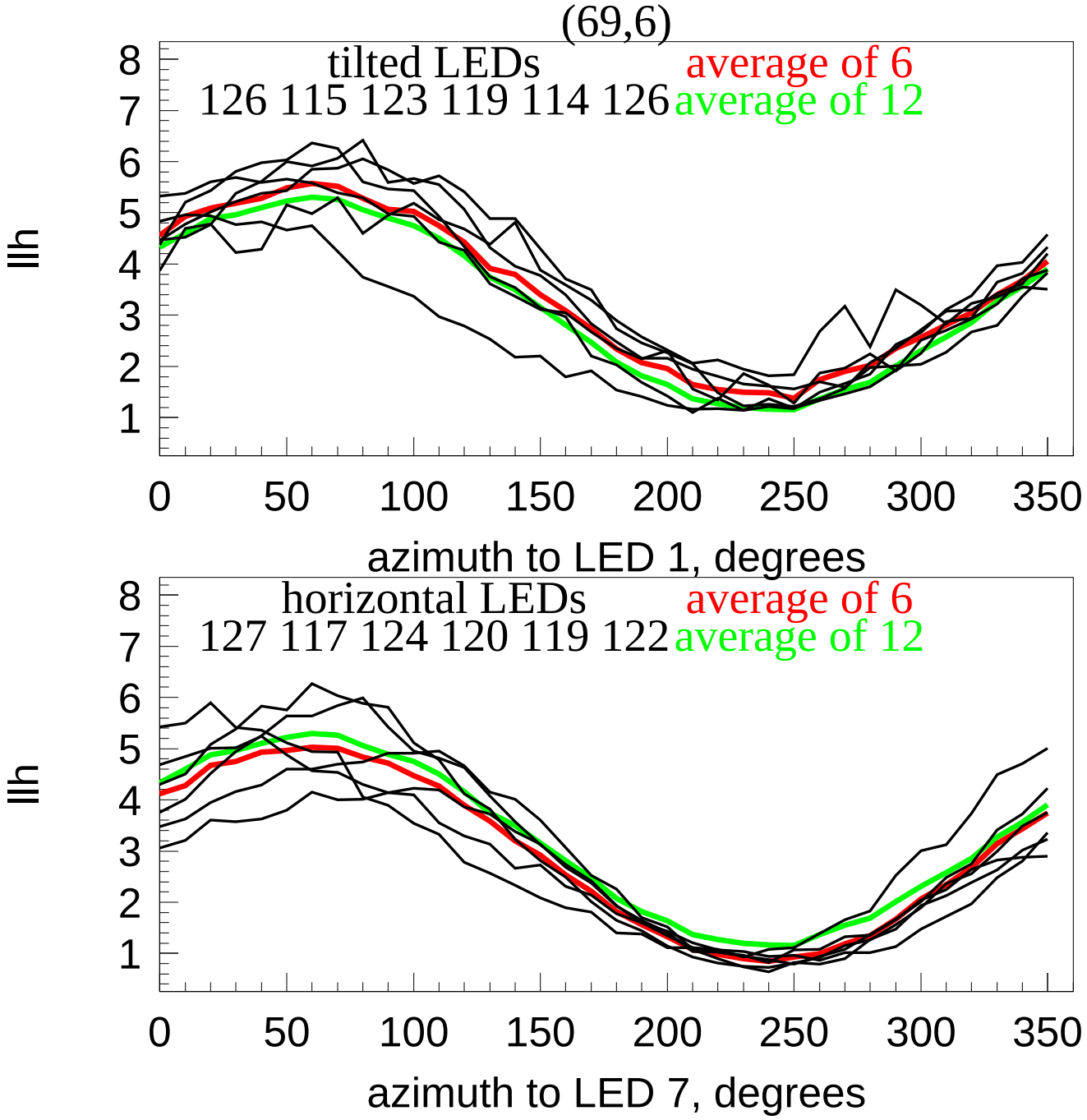

(69,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
256.4 ± 4.6

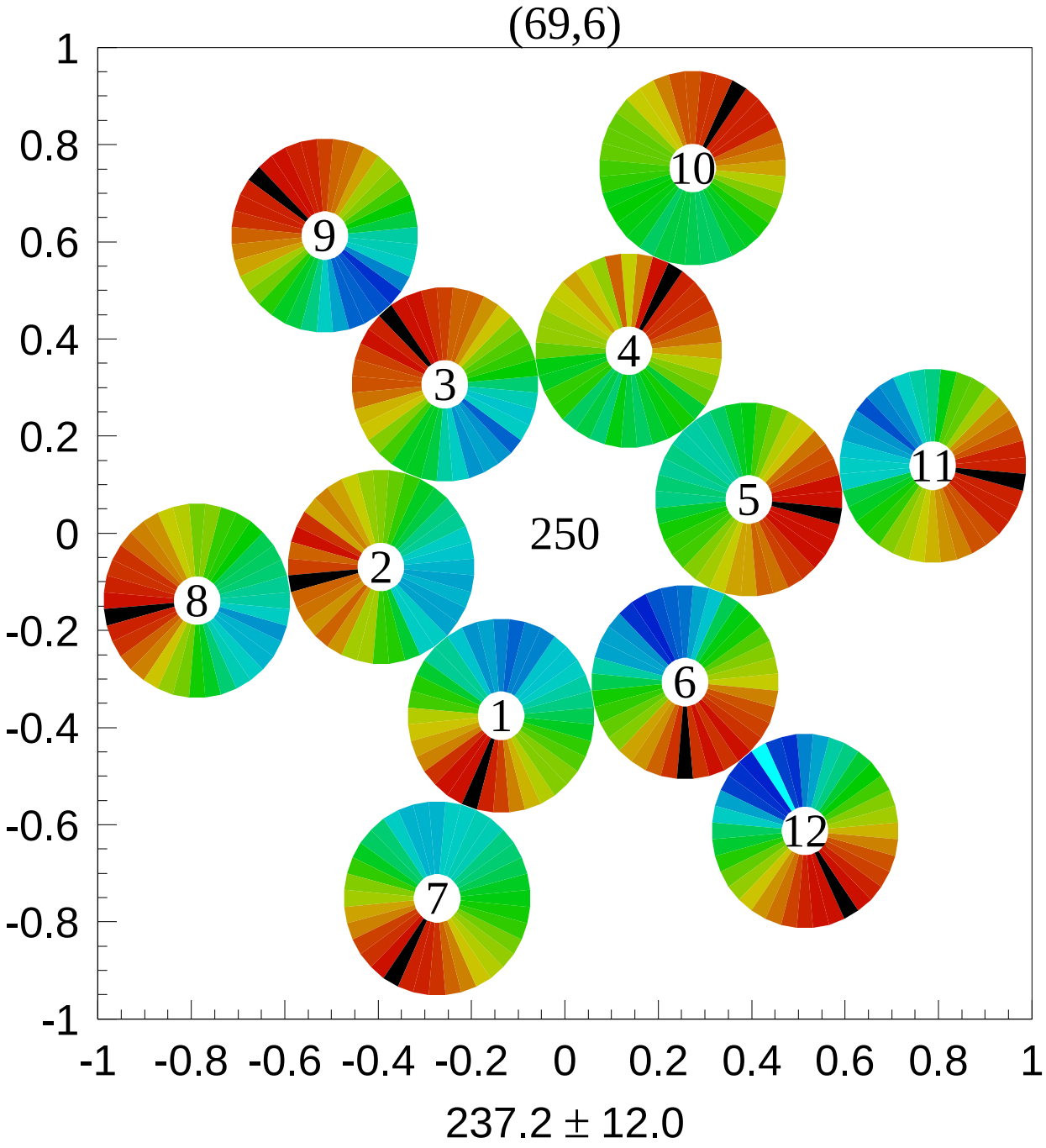

(69,4)
tilted LEDs
122 109 125 127 124 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 123 124 121 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

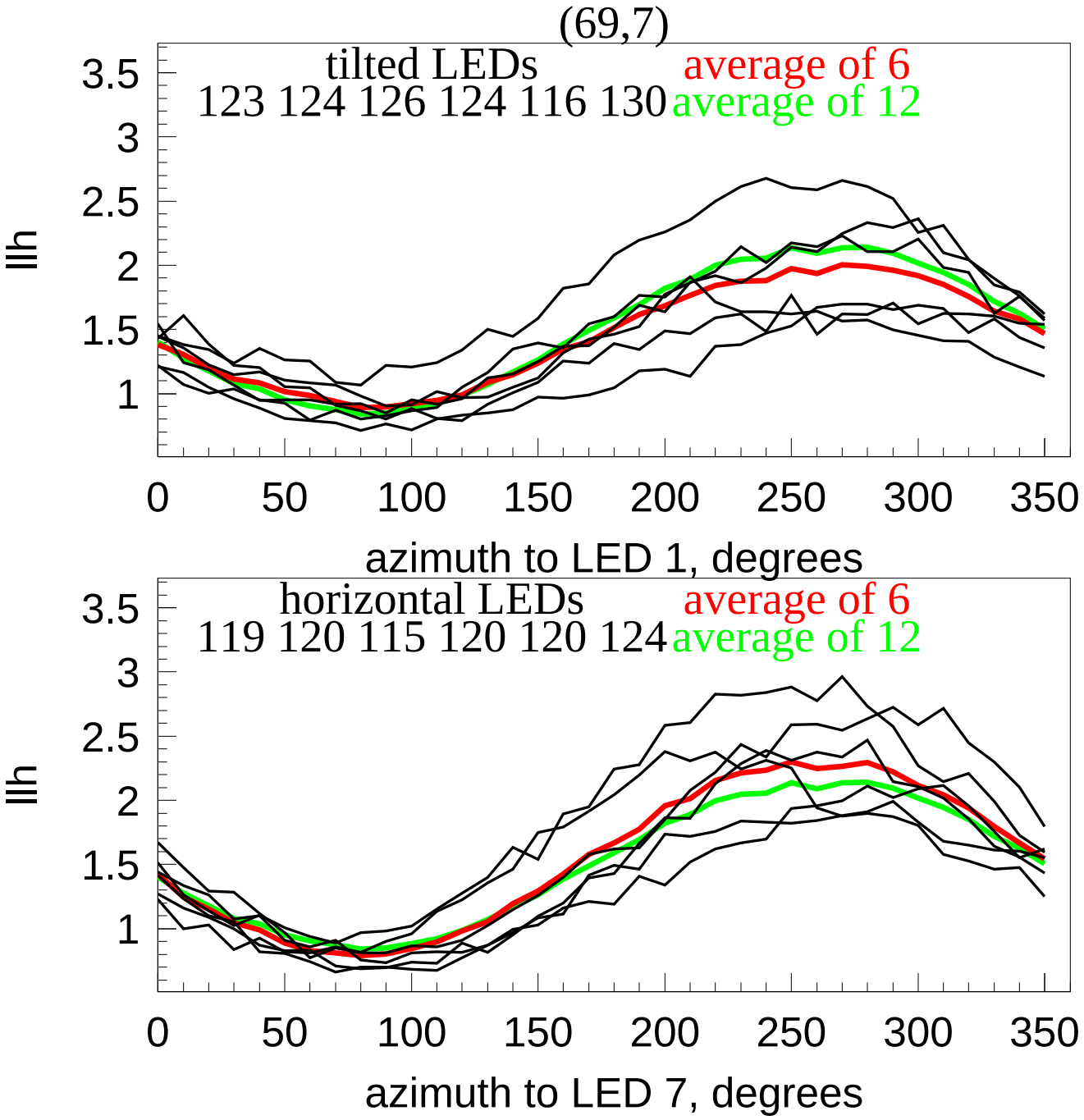

(69,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
184.8 ± 4.9
8
9
2
3
7
1
180
4
10
6
5
12
11

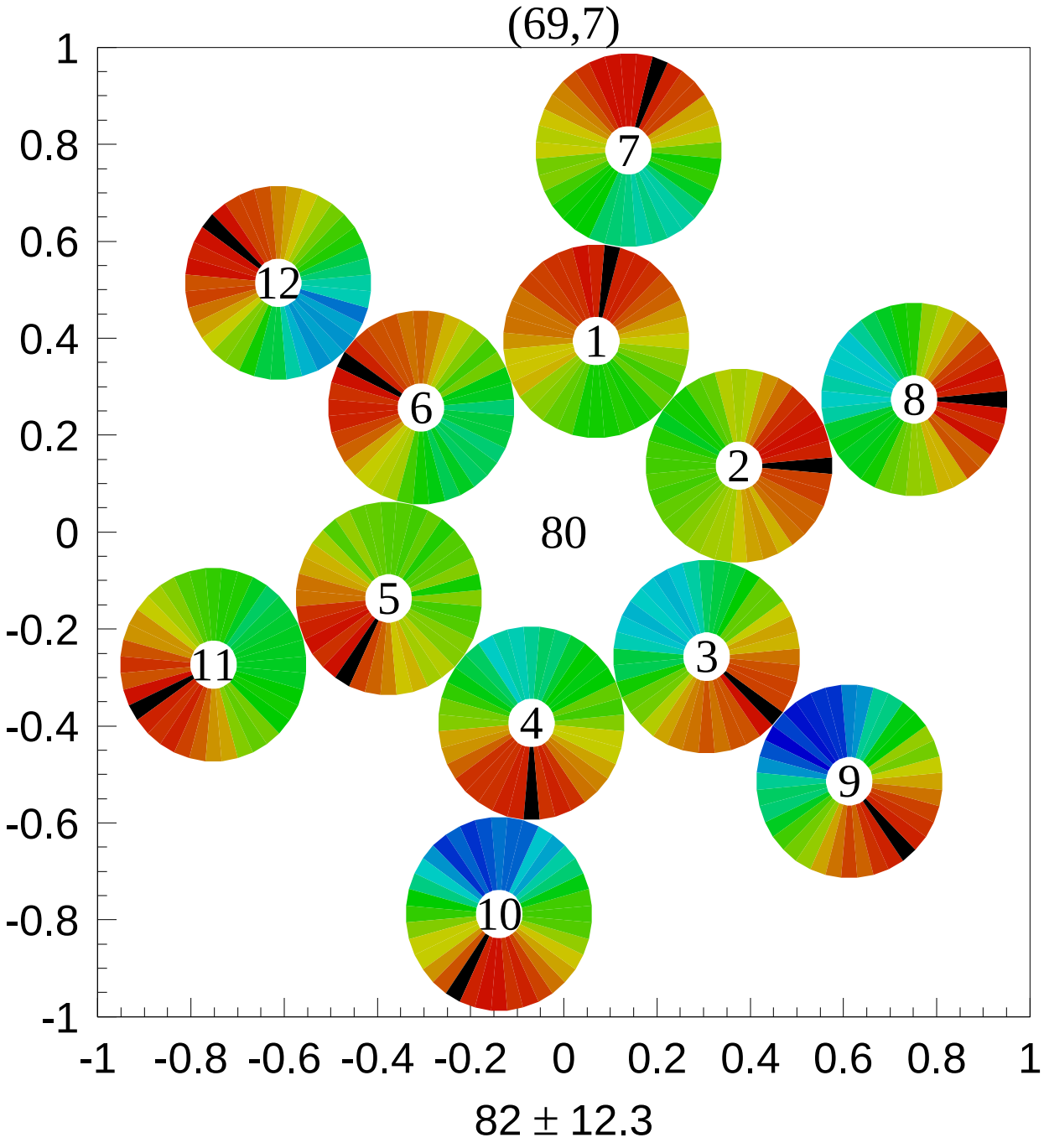

(69,5)
tilted LEDs
118 126 126 129 119 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 124 125 117 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

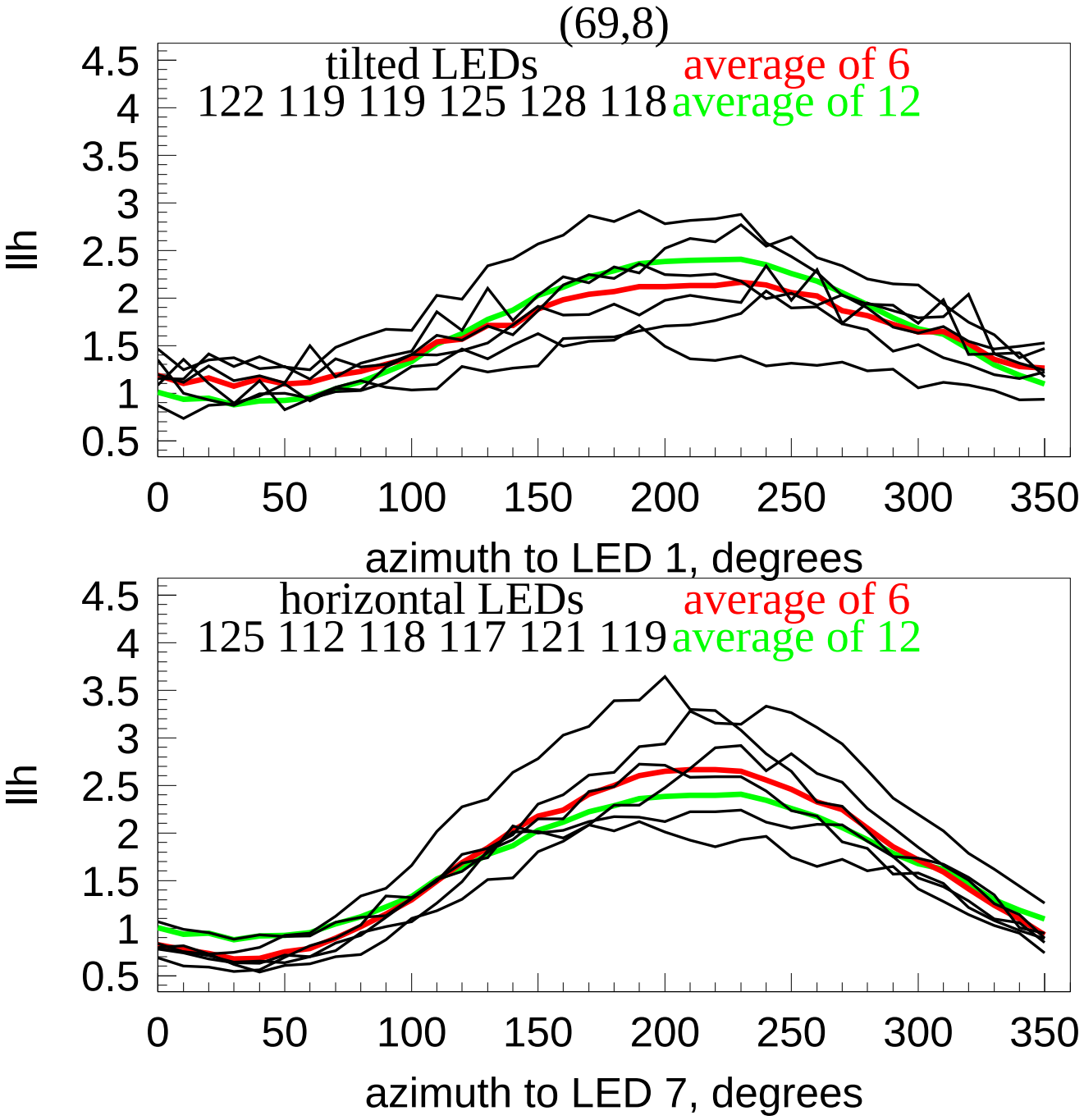

(69,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
245.6 ± 6.0

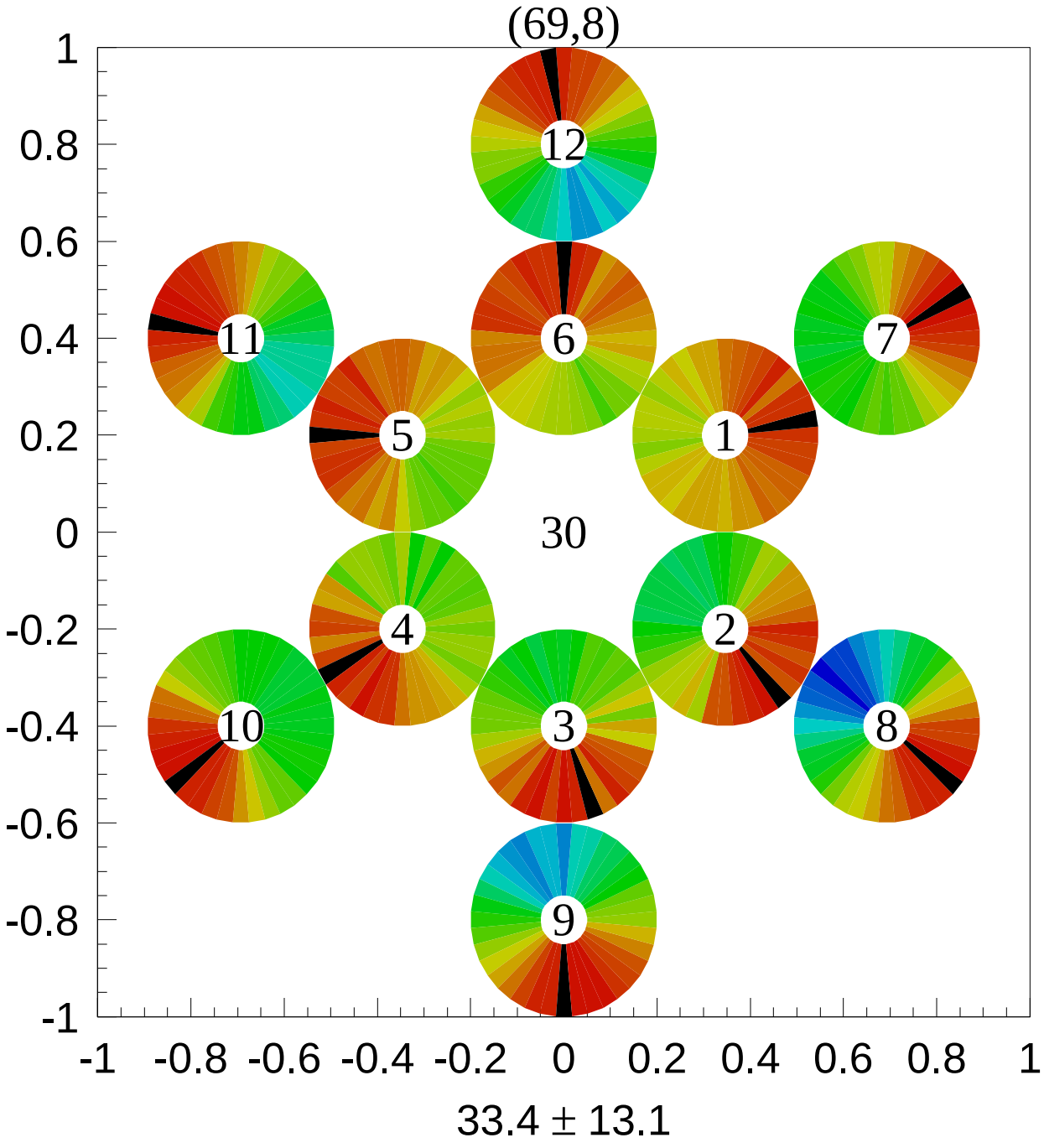

(69,6)
tilted LEDs
126 115 123 119 114 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
127 117 124 120 119 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

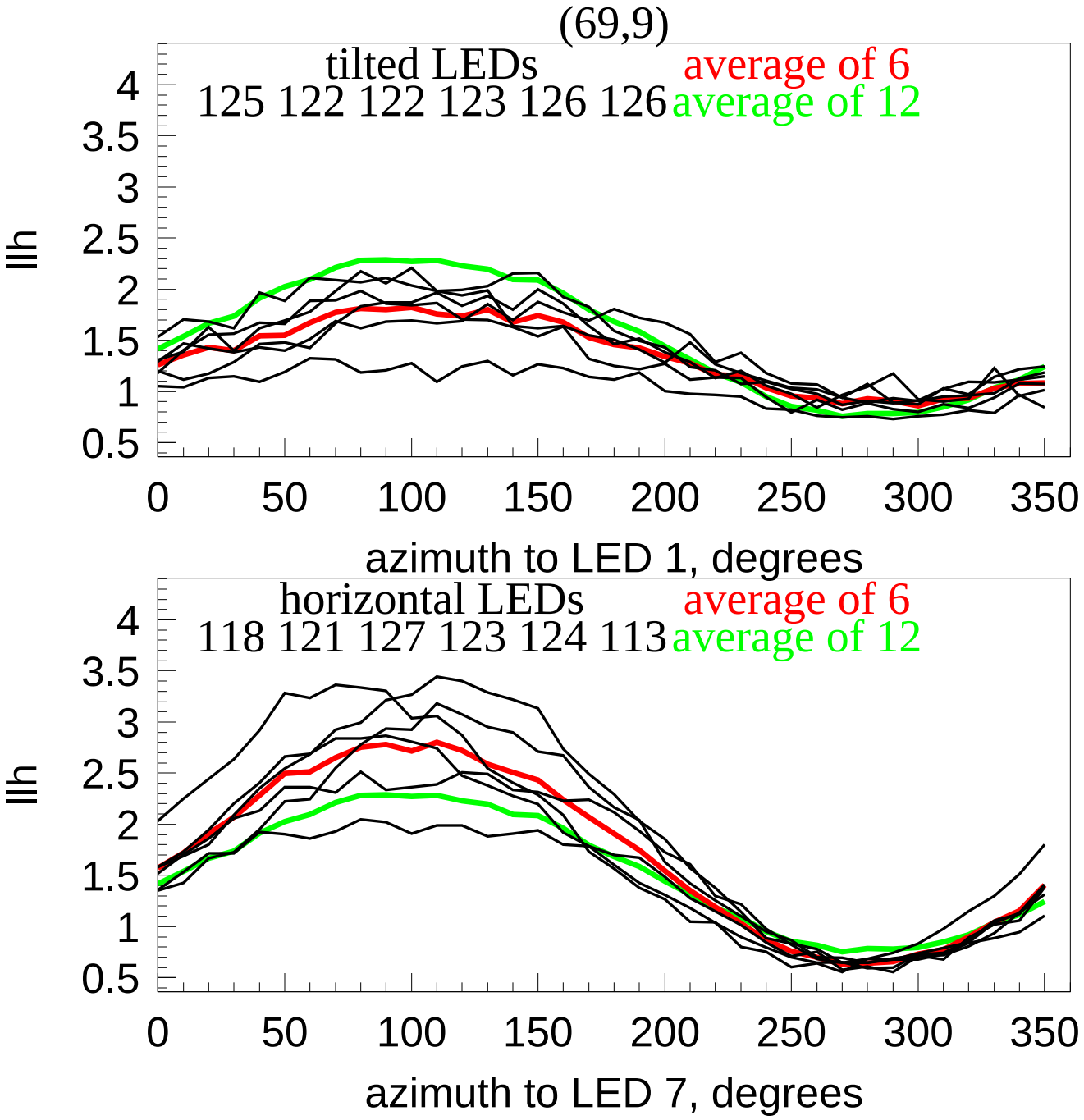

(69,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
237.2 ± 12.0
250
1
2
3
4
5
6
7
8
9
10
11
12

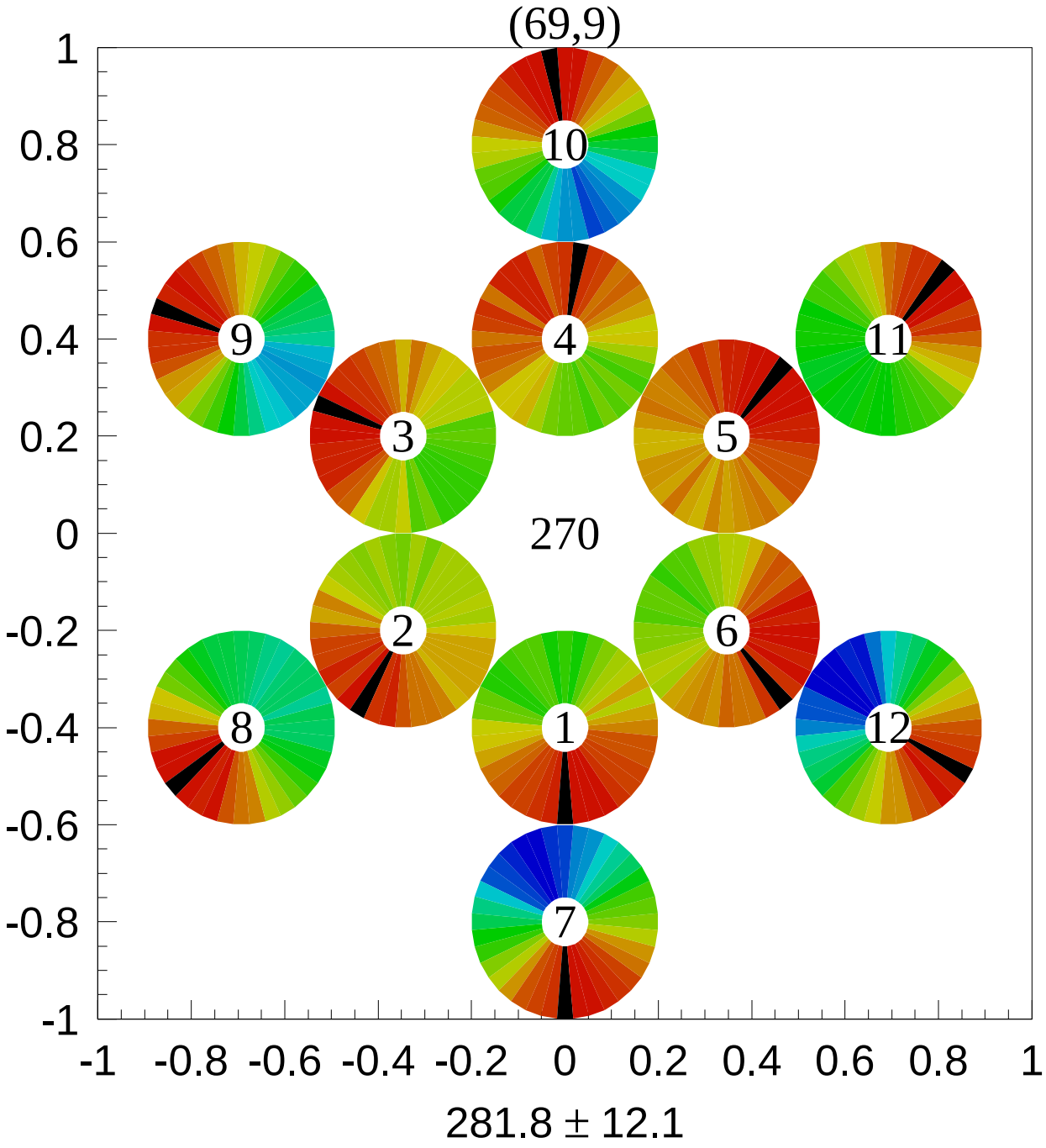

(69,7)
tilted LEDs
123 124 126 124 116 130
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 120 115 120 120 124
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

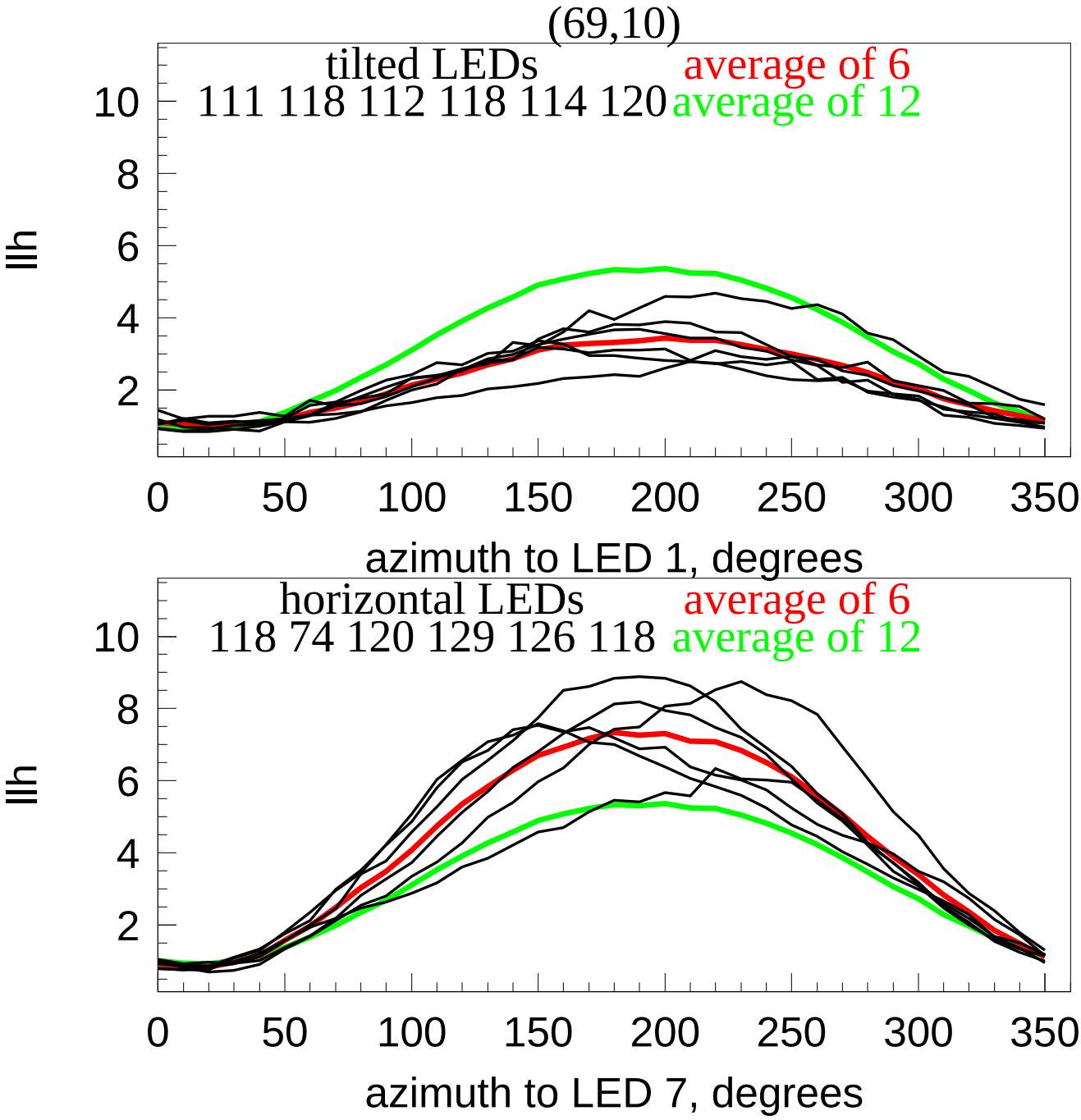

(69,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
82 ± 12.3

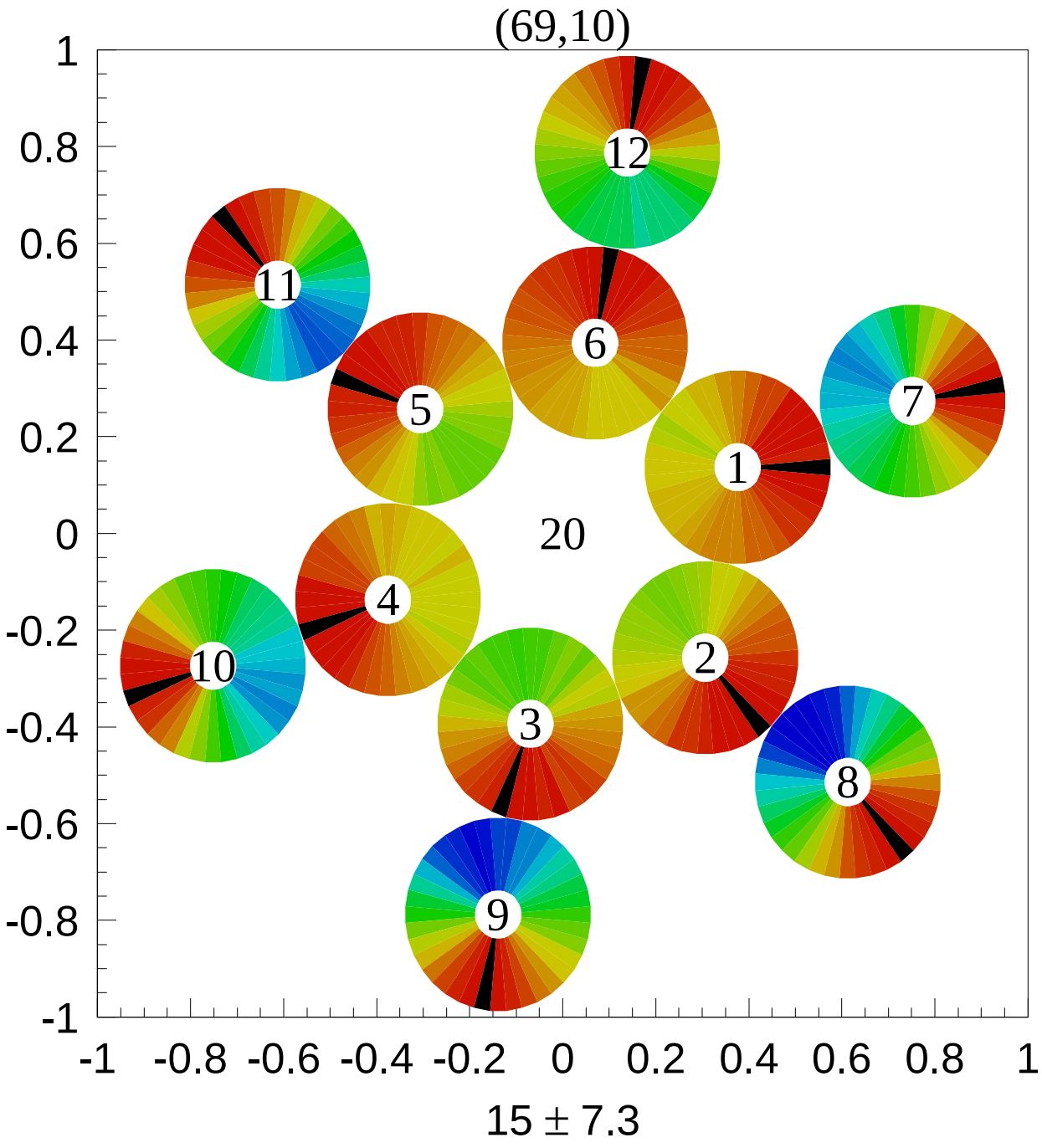

(69,8)
tilted LEDs
122 119 119 125 128 118
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 112 118 117 121 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

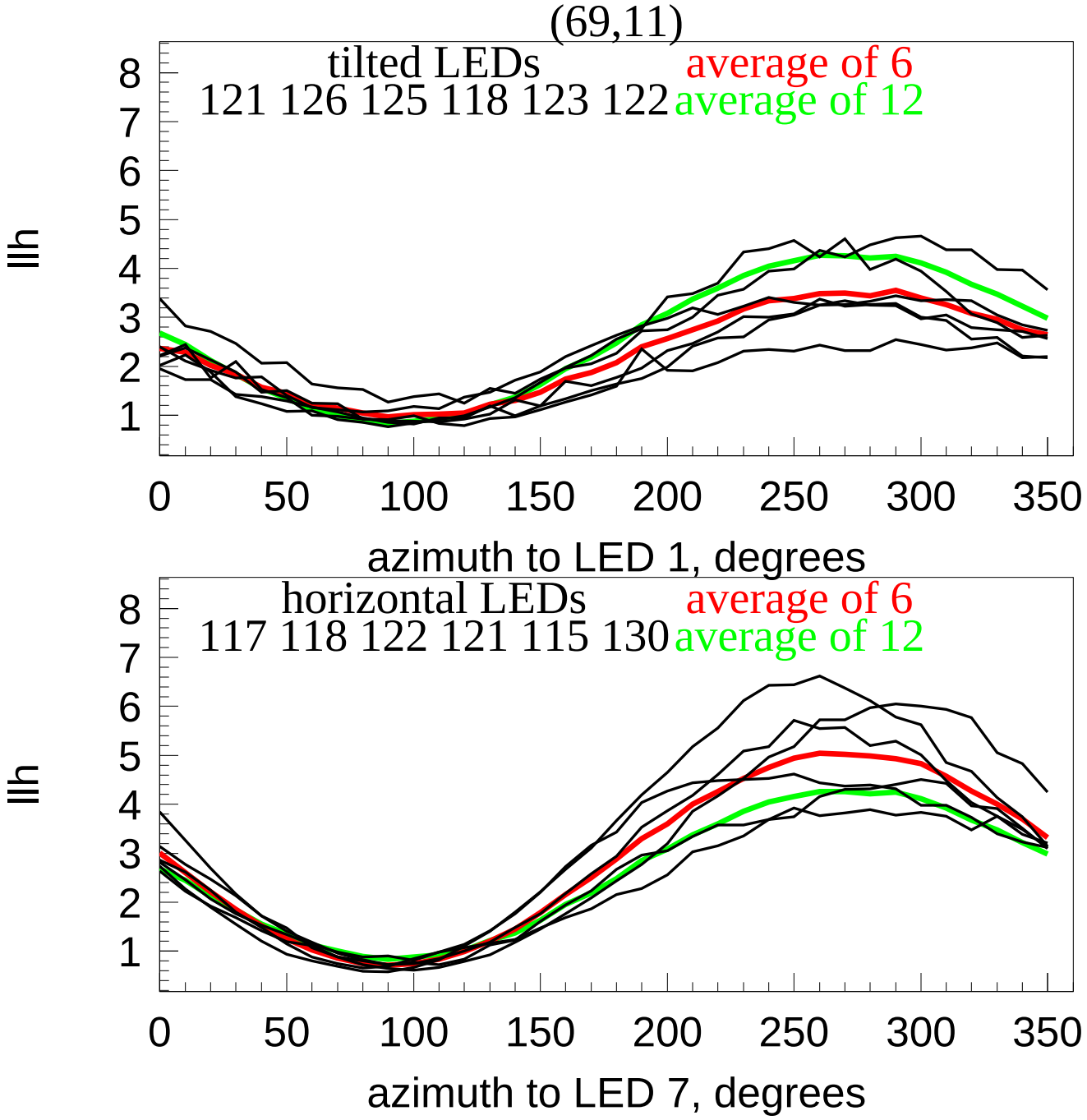

(69,8)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
33.4 ± 13.1

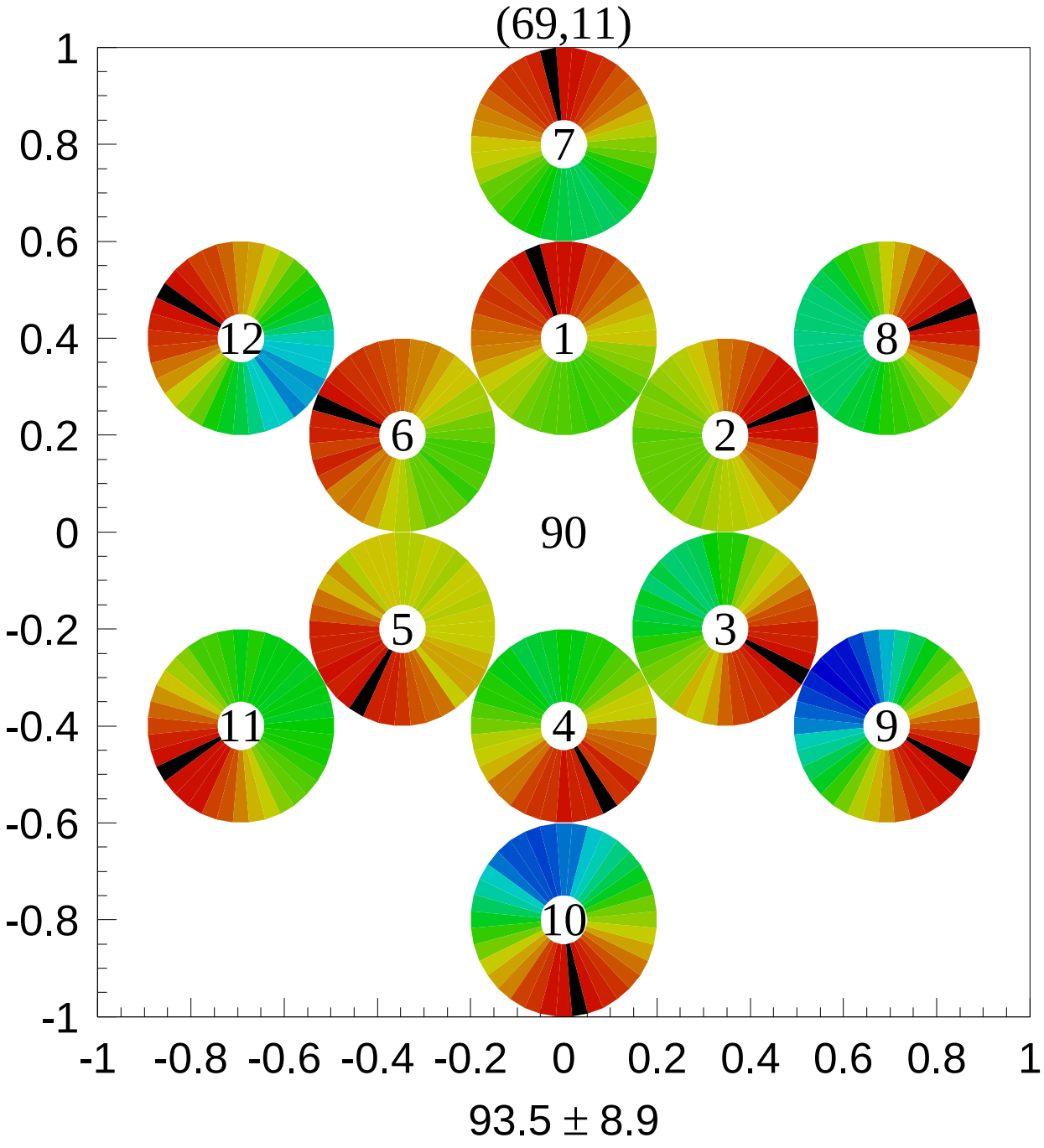

(69,9)
tilted LEDs
125 122 122 123 126 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 127 123 124 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

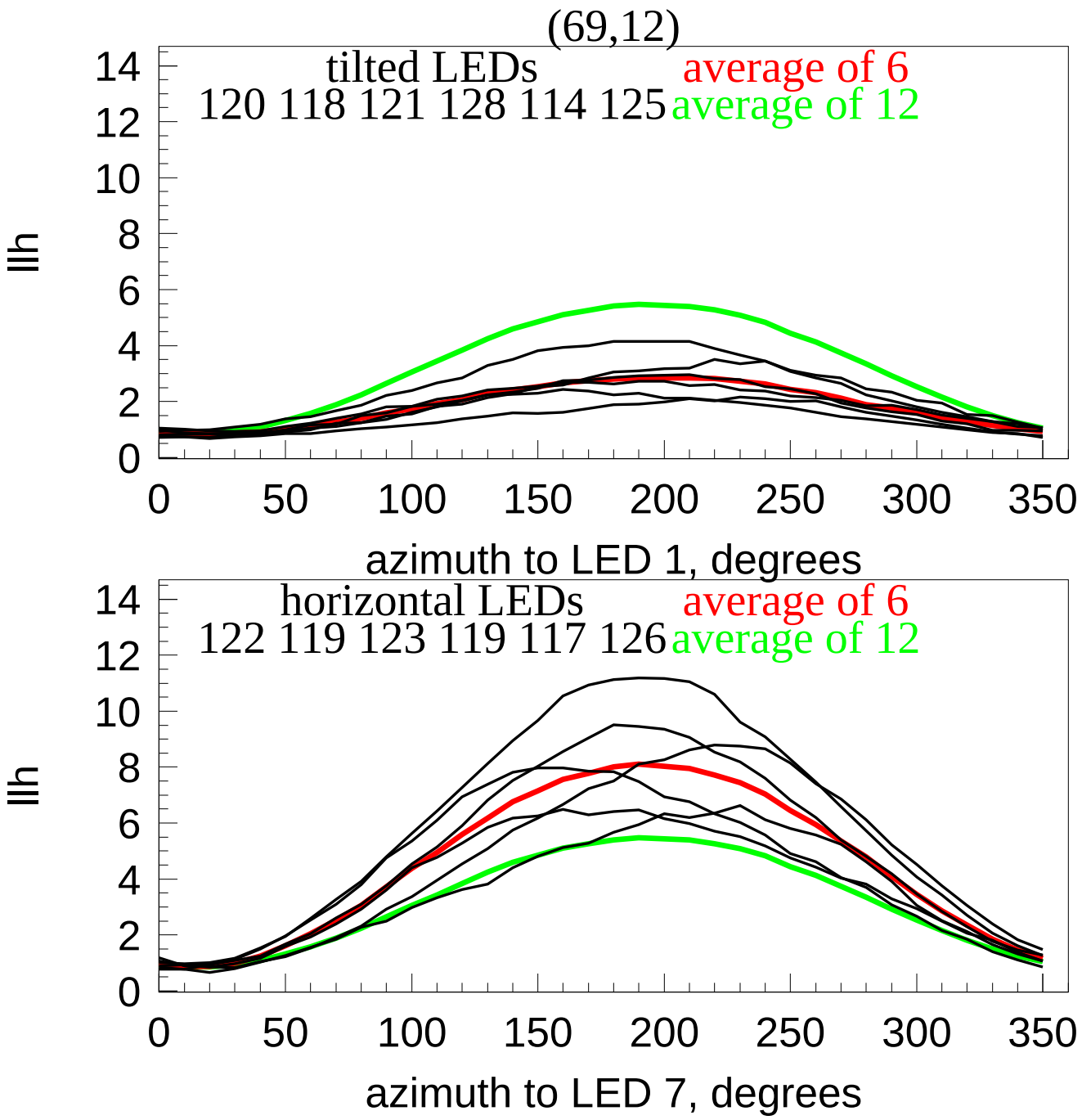

(69,9)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
281.8 ± 12.1

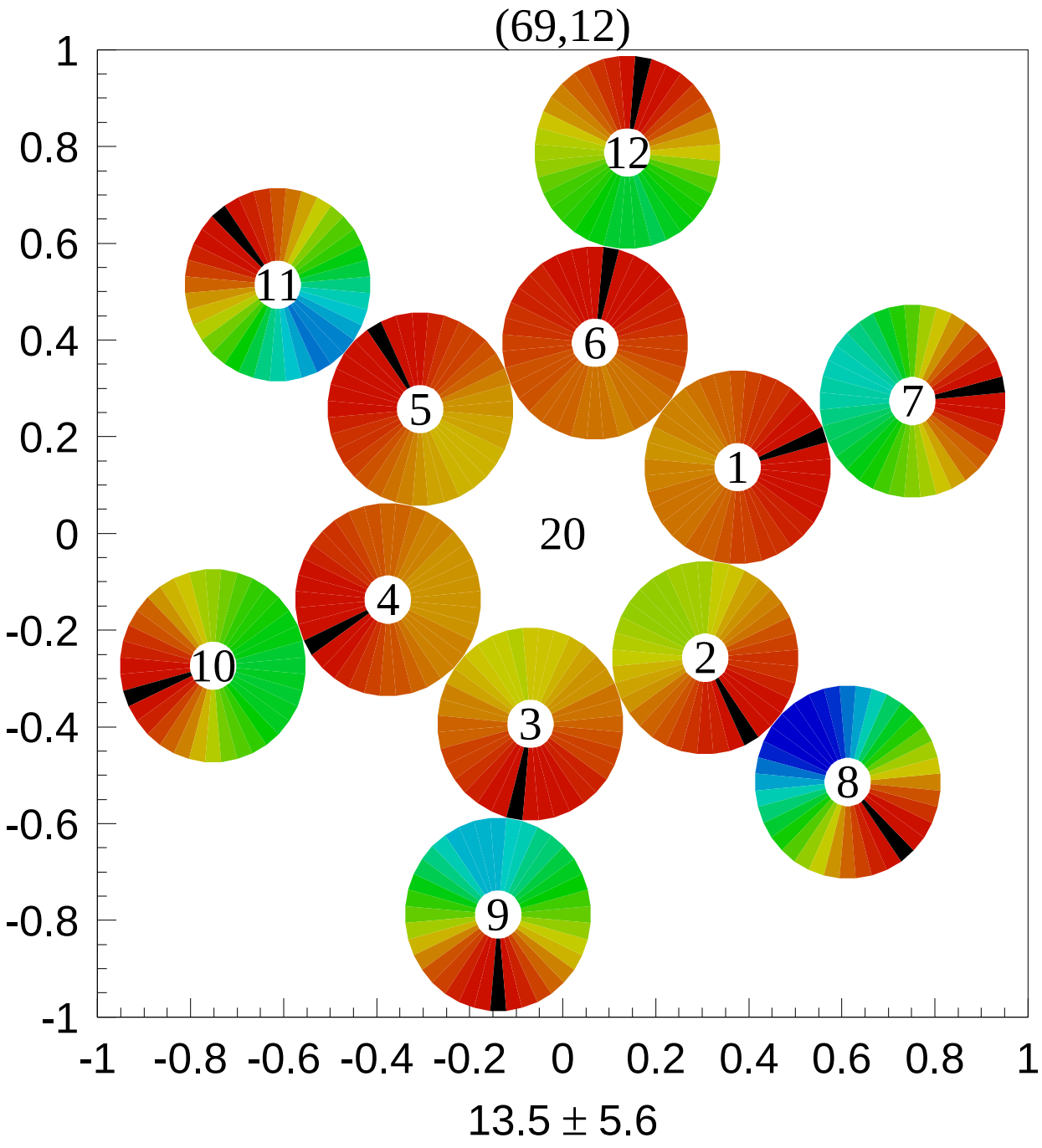

(69,10)
tilted LEDs
111 118 112 118 114 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 74 120 129 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

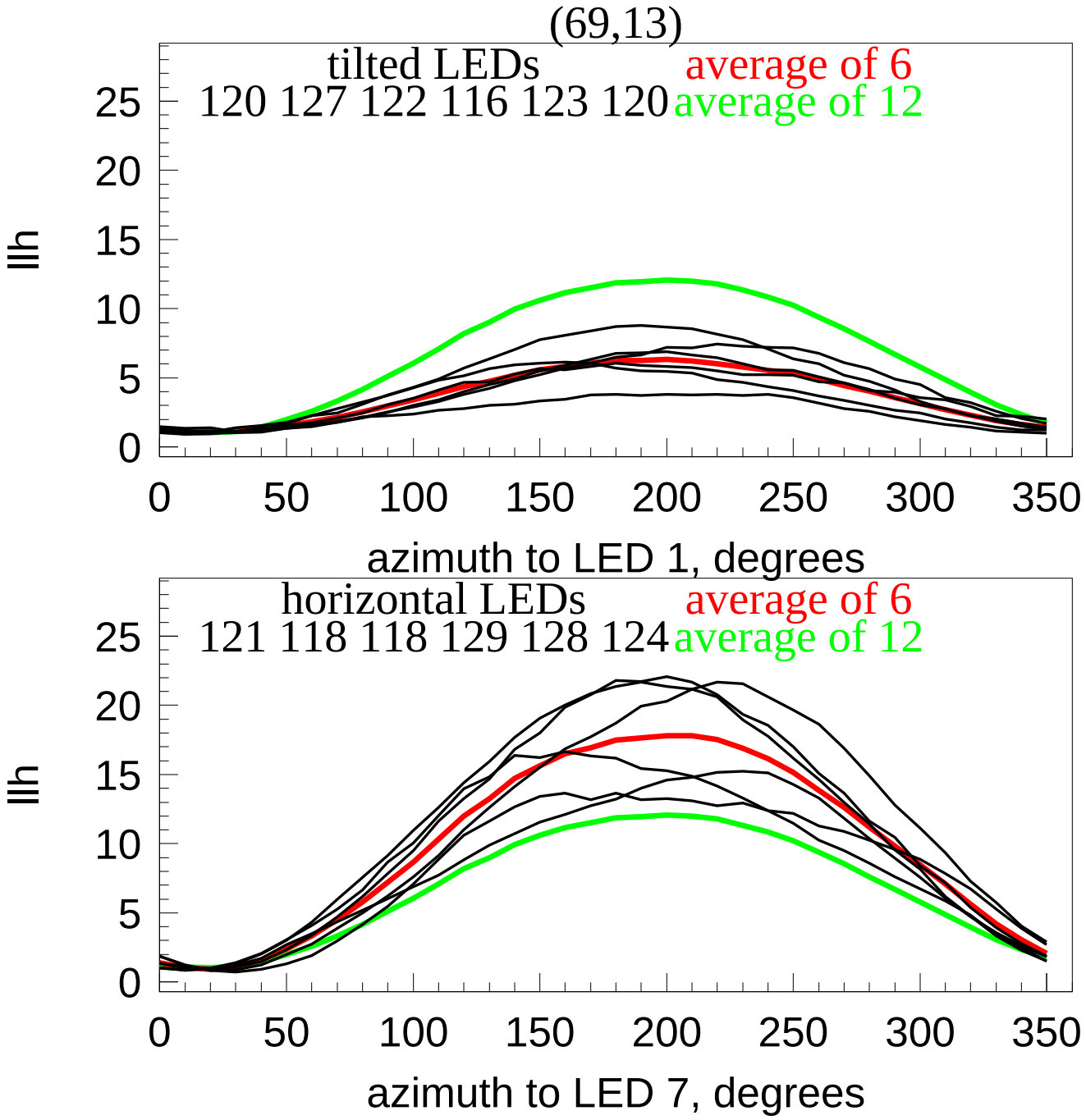

(69,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
15 ± 7.3

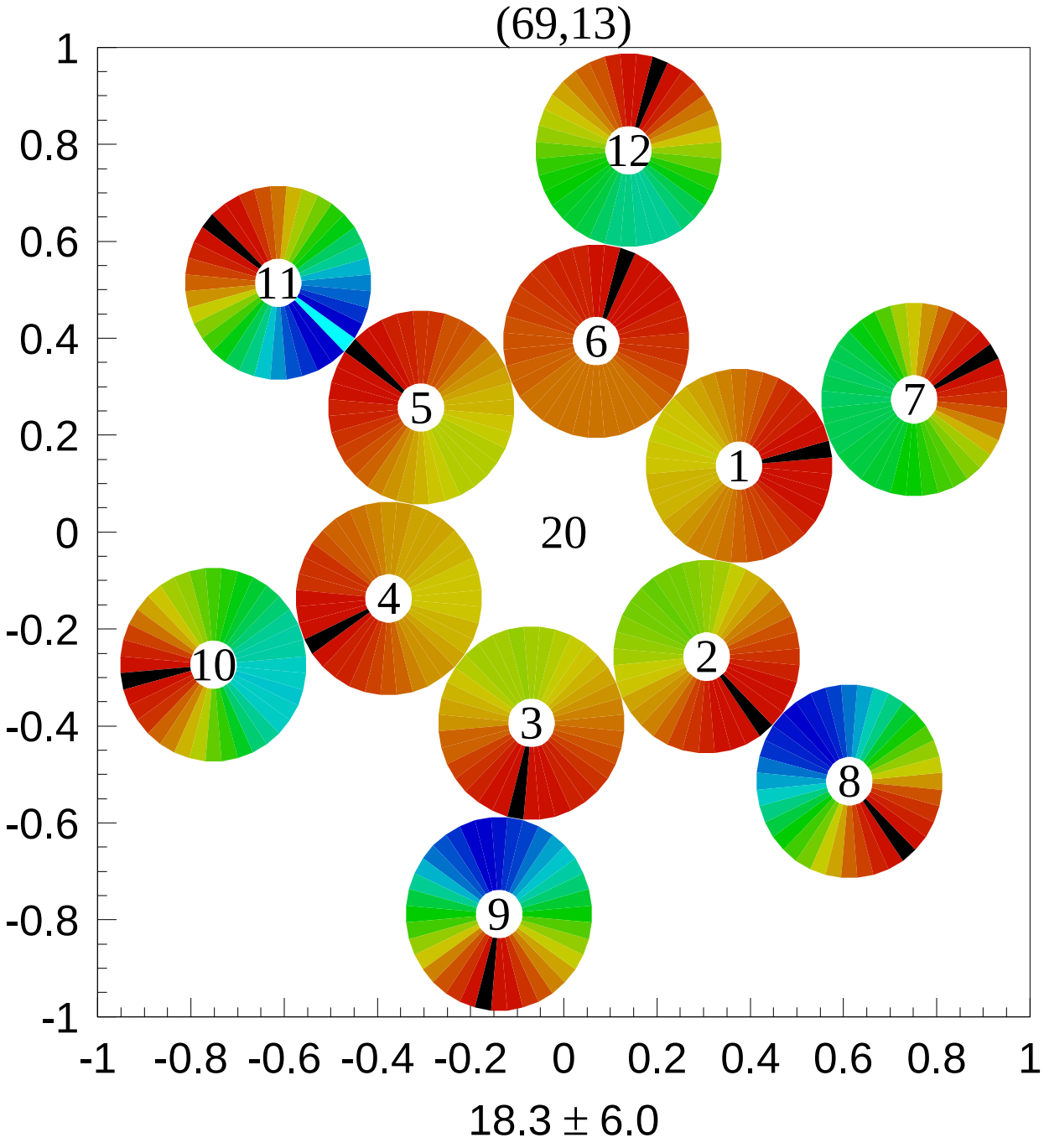

(69,11)
tilted LEDs
121 126 125 118 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 122 121 115 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

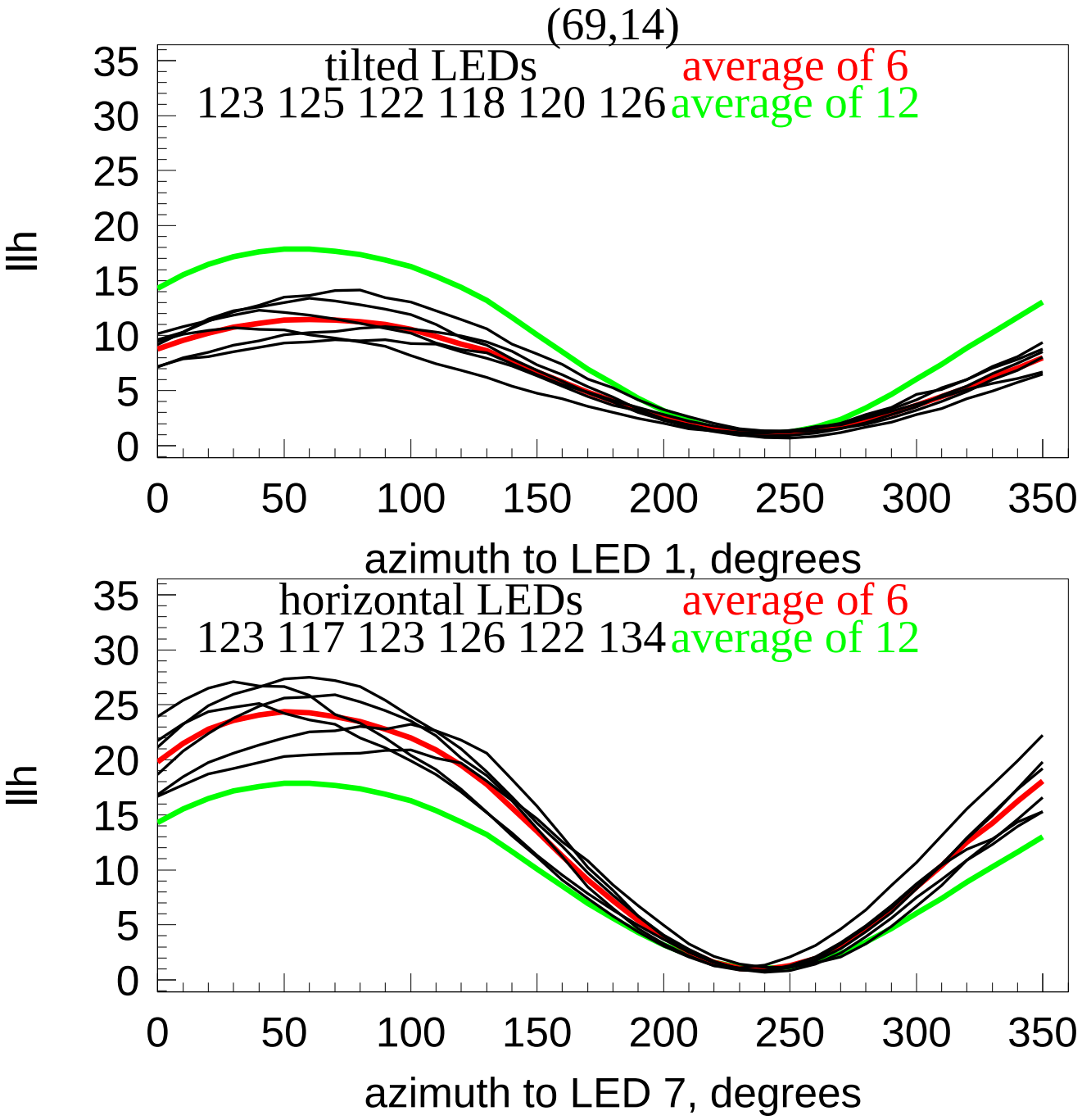

(69,11)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
93.5 ± 8.9

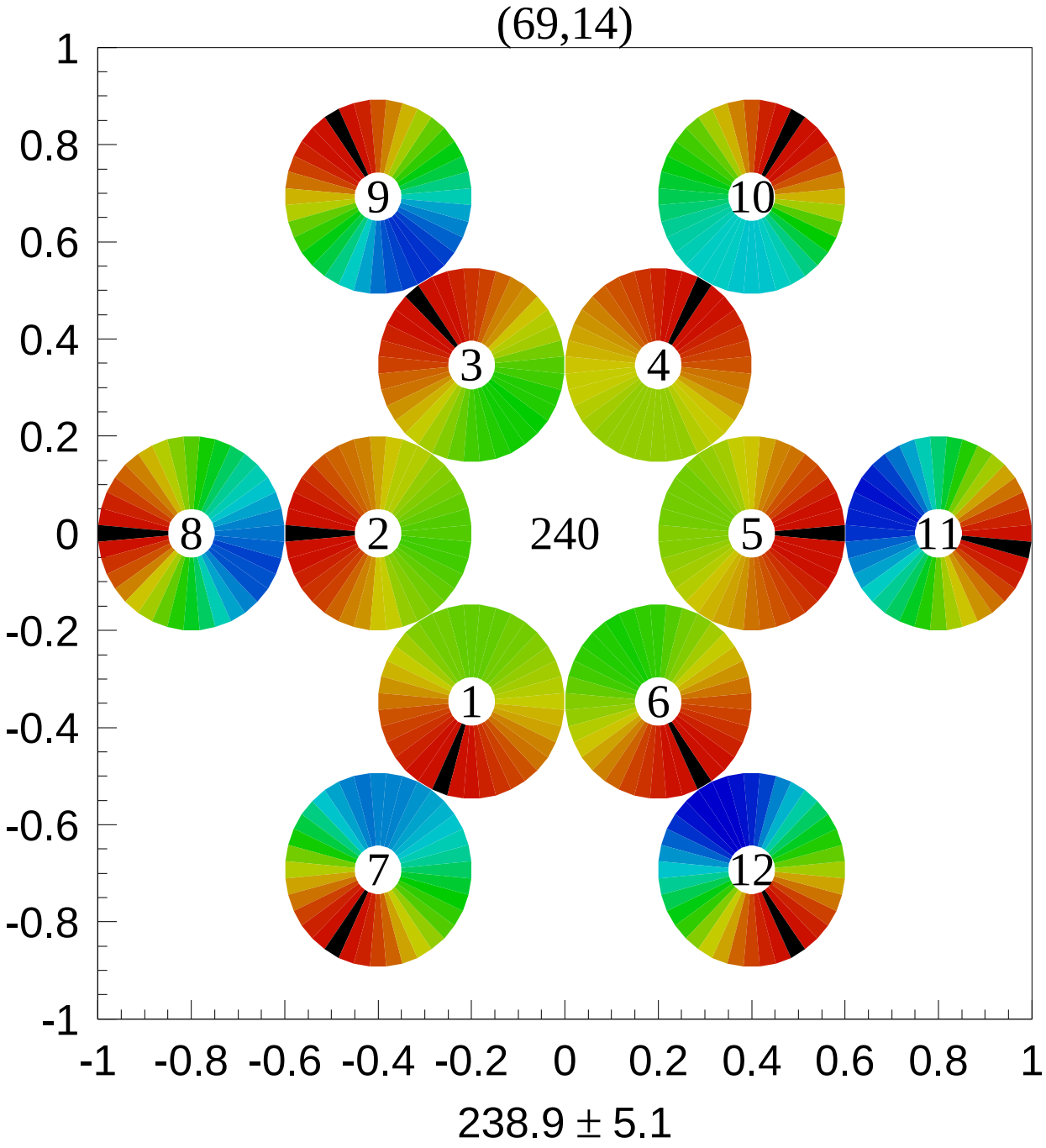

(69,12)
tilted LEDs
120 118 121 128 114 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 123 119 117 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

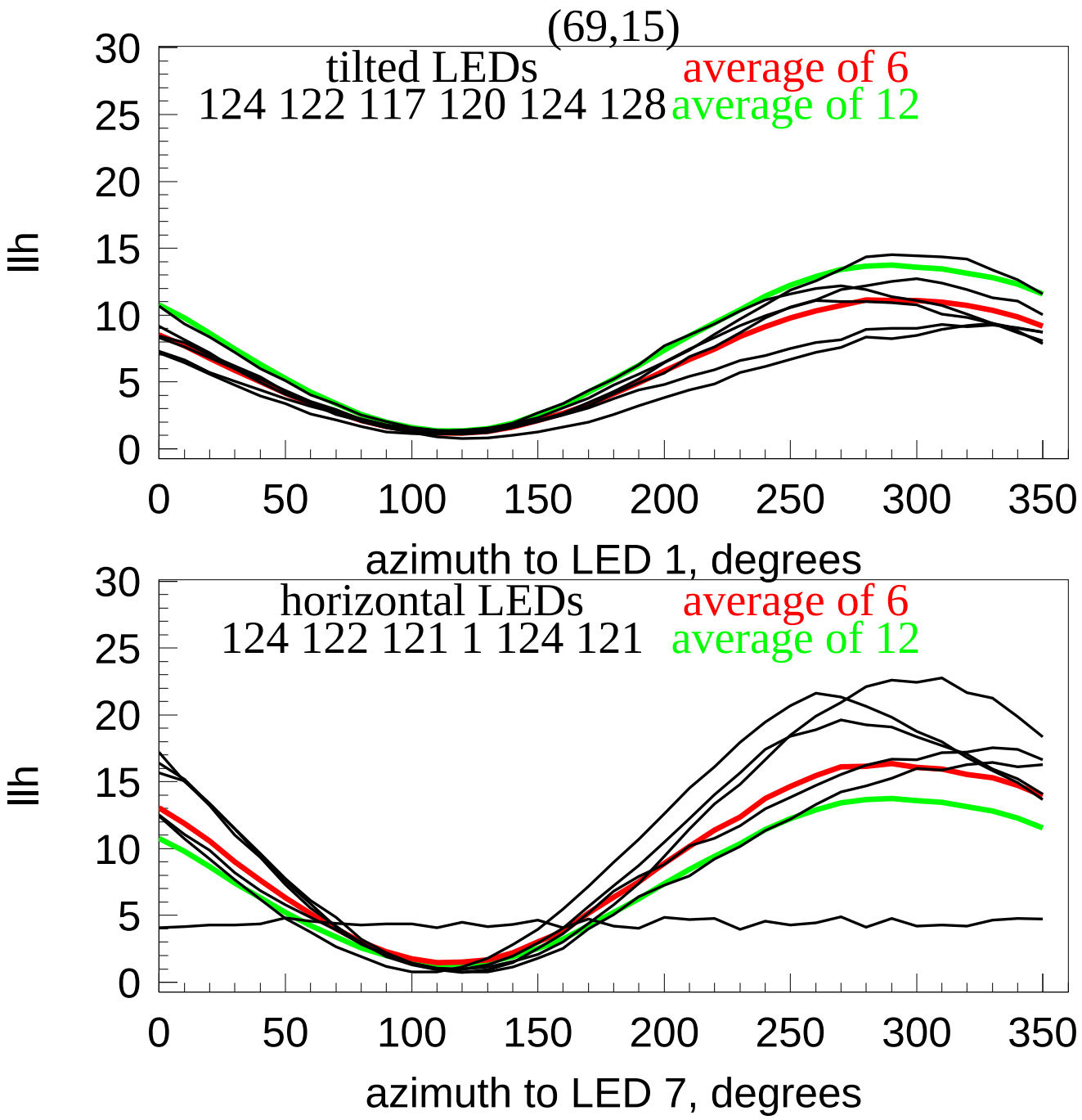

(69,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
13.5 ± 5.6

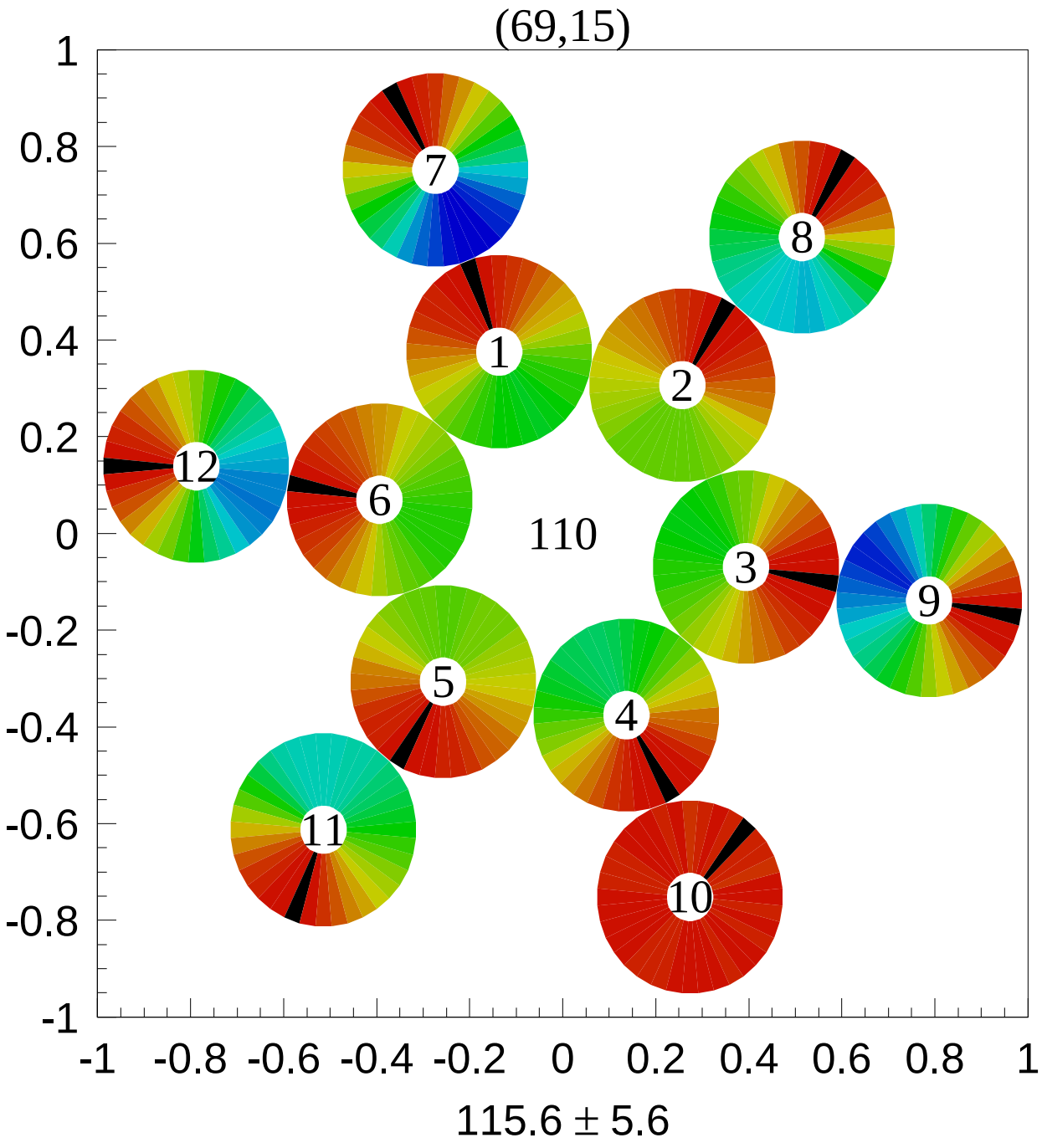

(69,13)
tilted LEDs
120 127 122 116 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 118 118 129 128 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

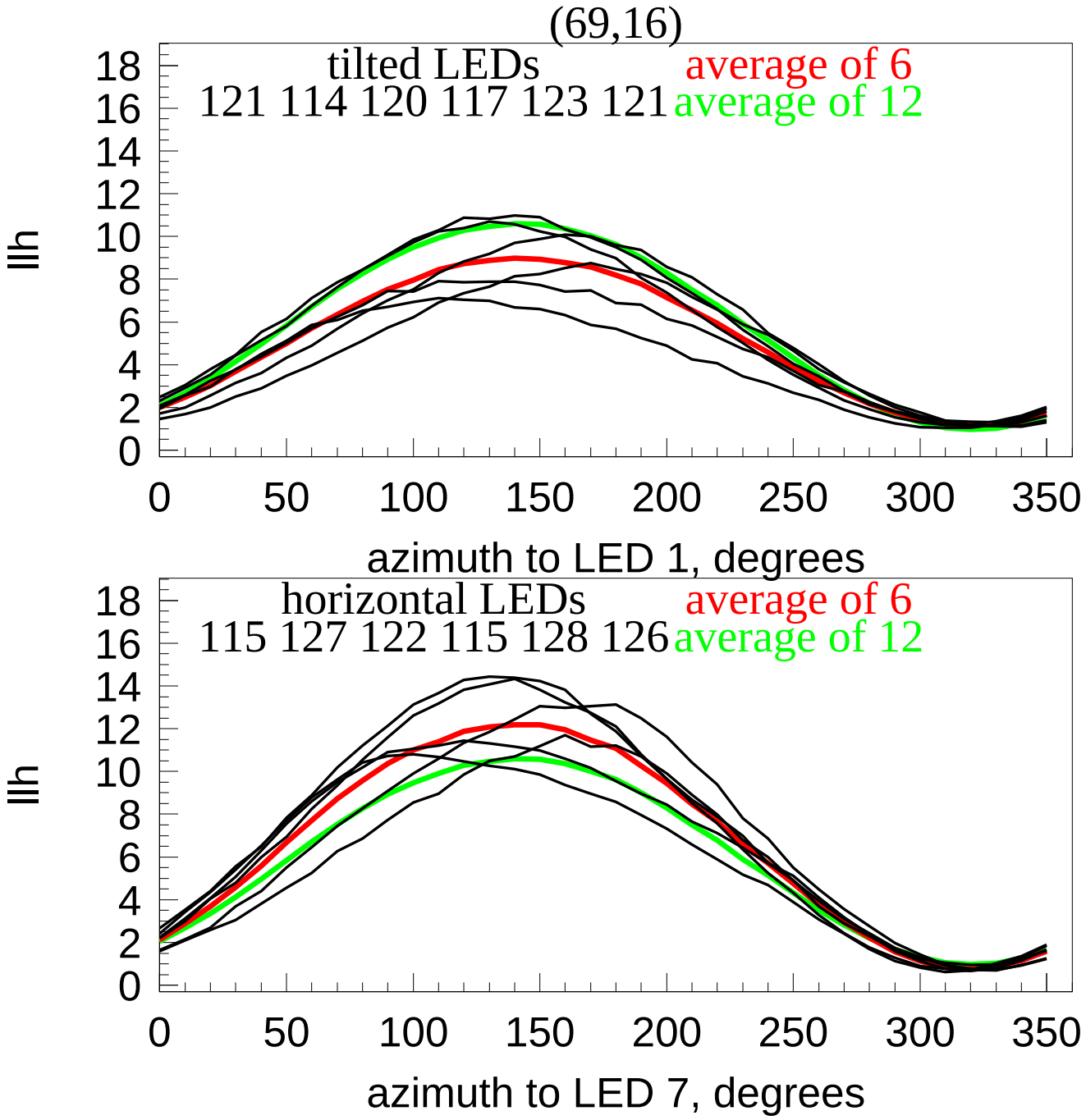

(69,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
18.3 ± 6.0

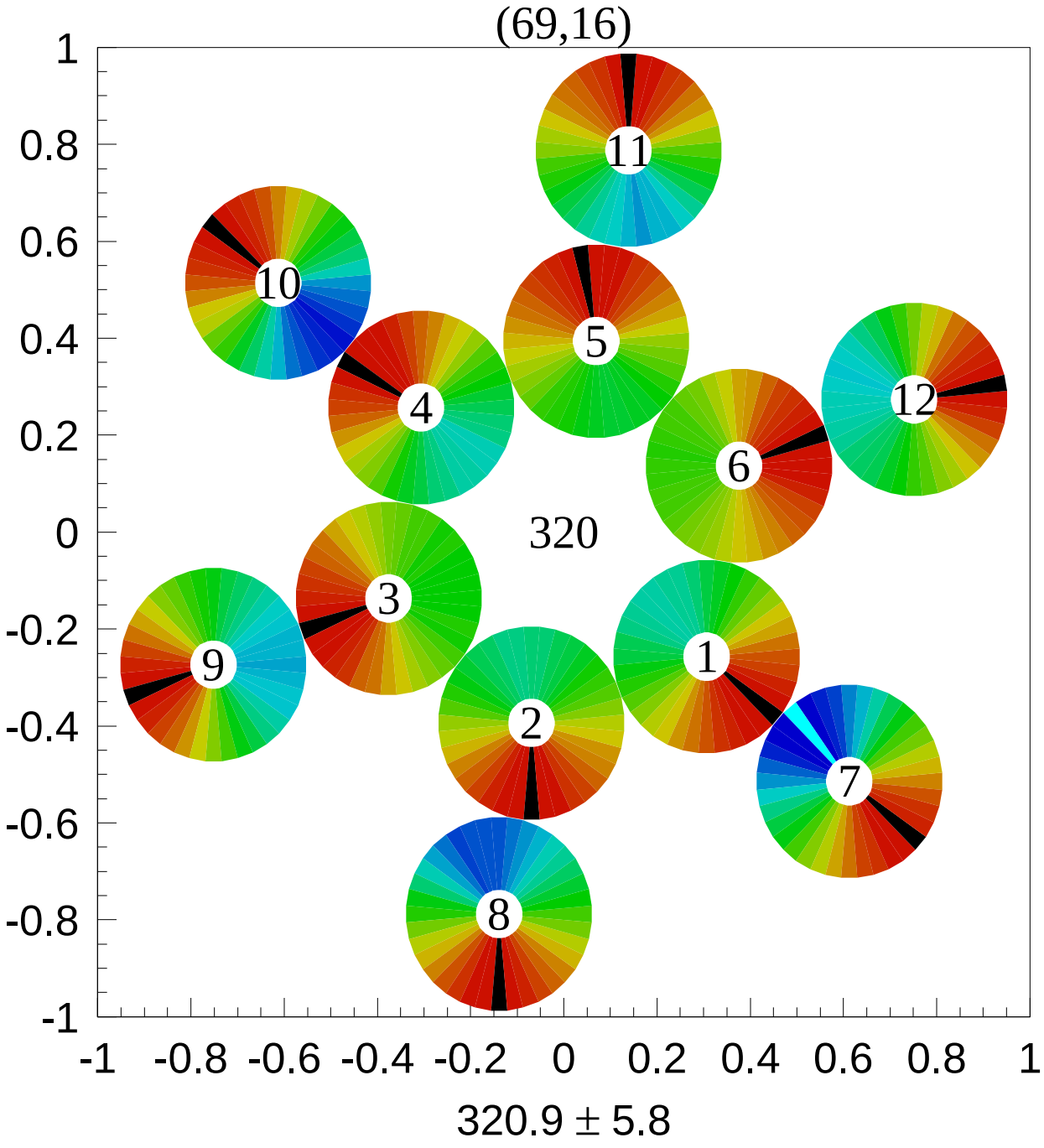

(69,14)
tilted LEDs
123 125 122 118 120 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 117 123 126 122 134
average of 6
average of 12
llh
azimuth to LED 7, degrees

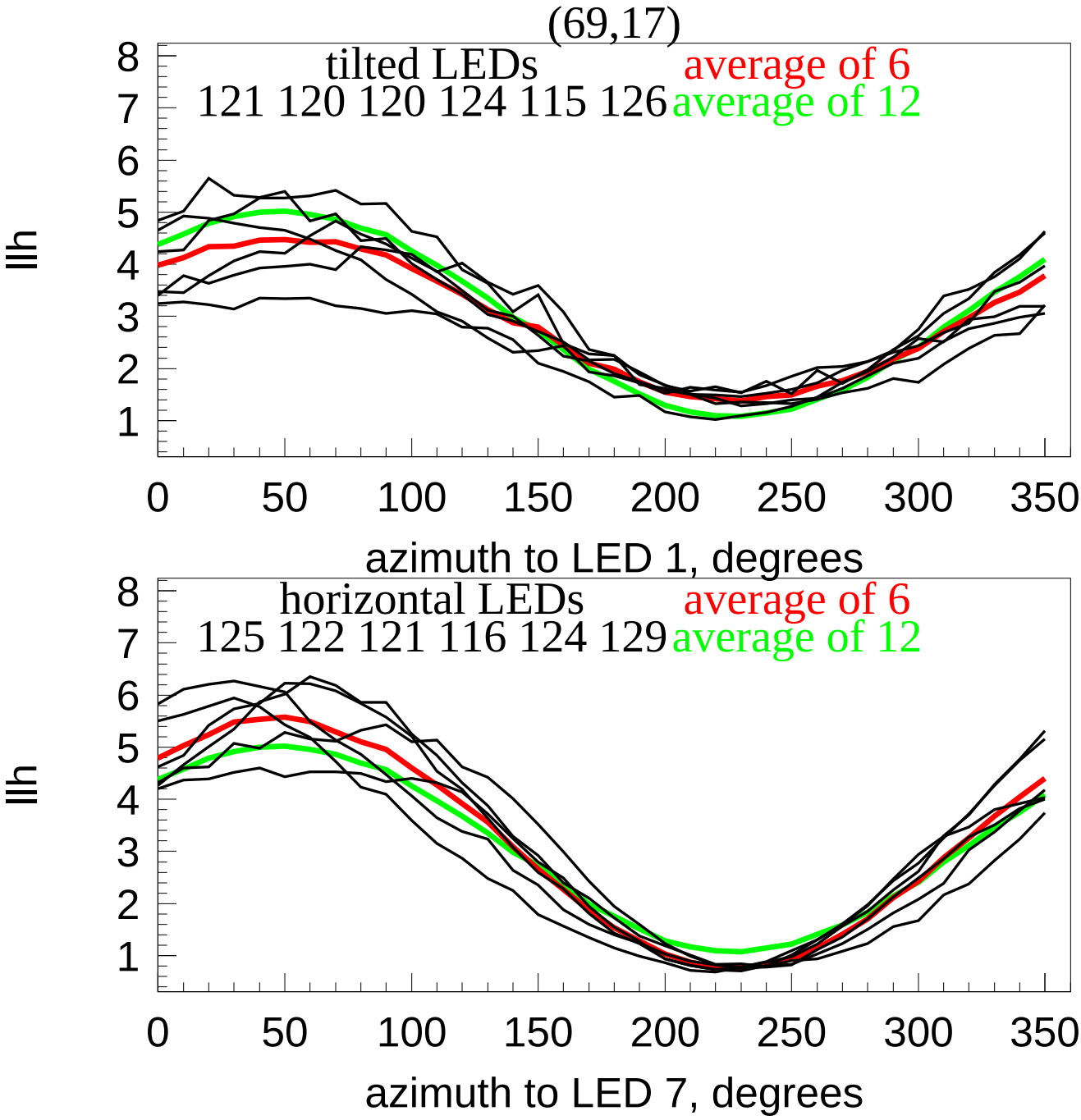

(69,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
238.9 ± 5.1

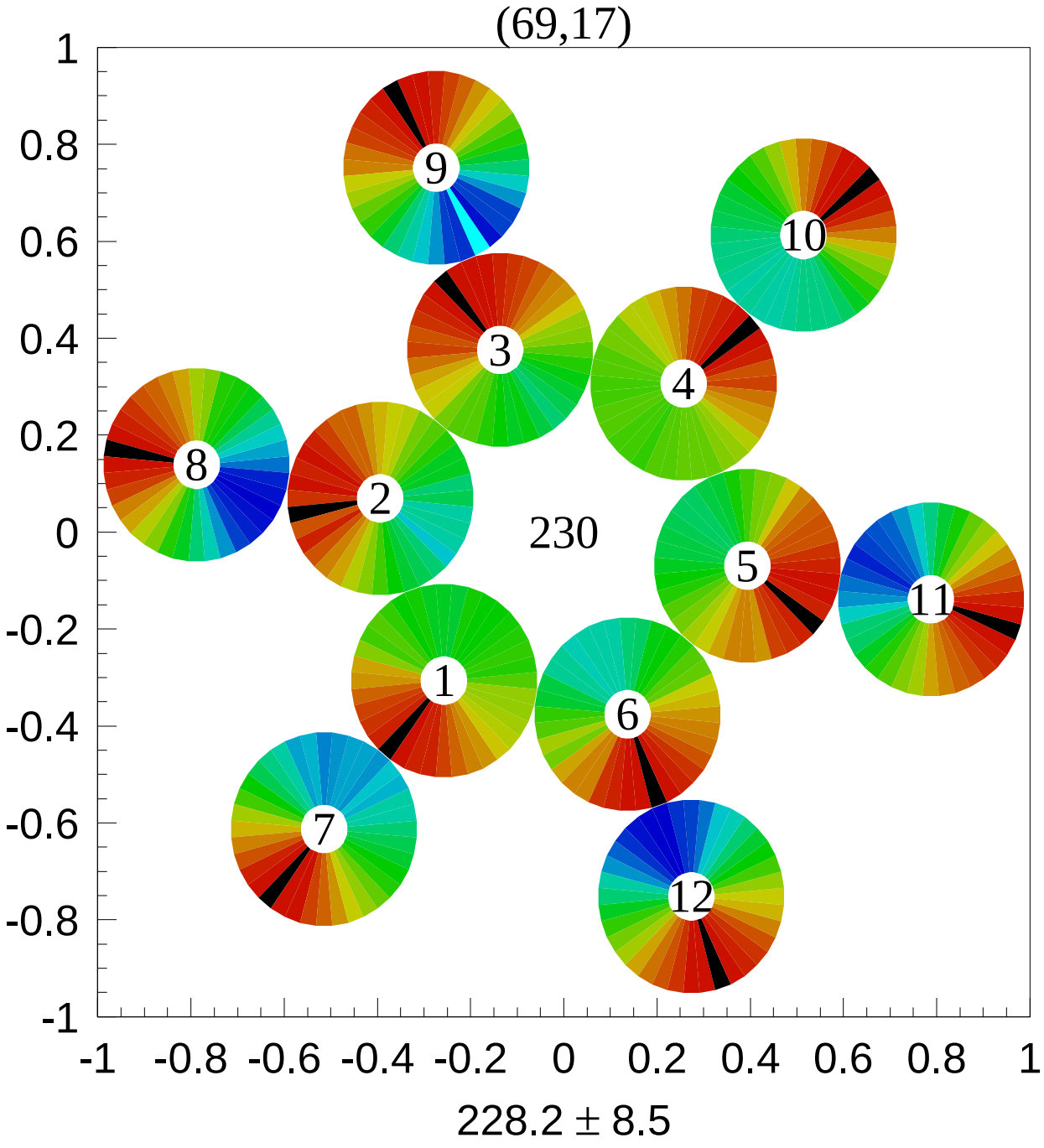

(69,15)
tilted LEDs
124 122 117 120 124 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 122 121 1 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

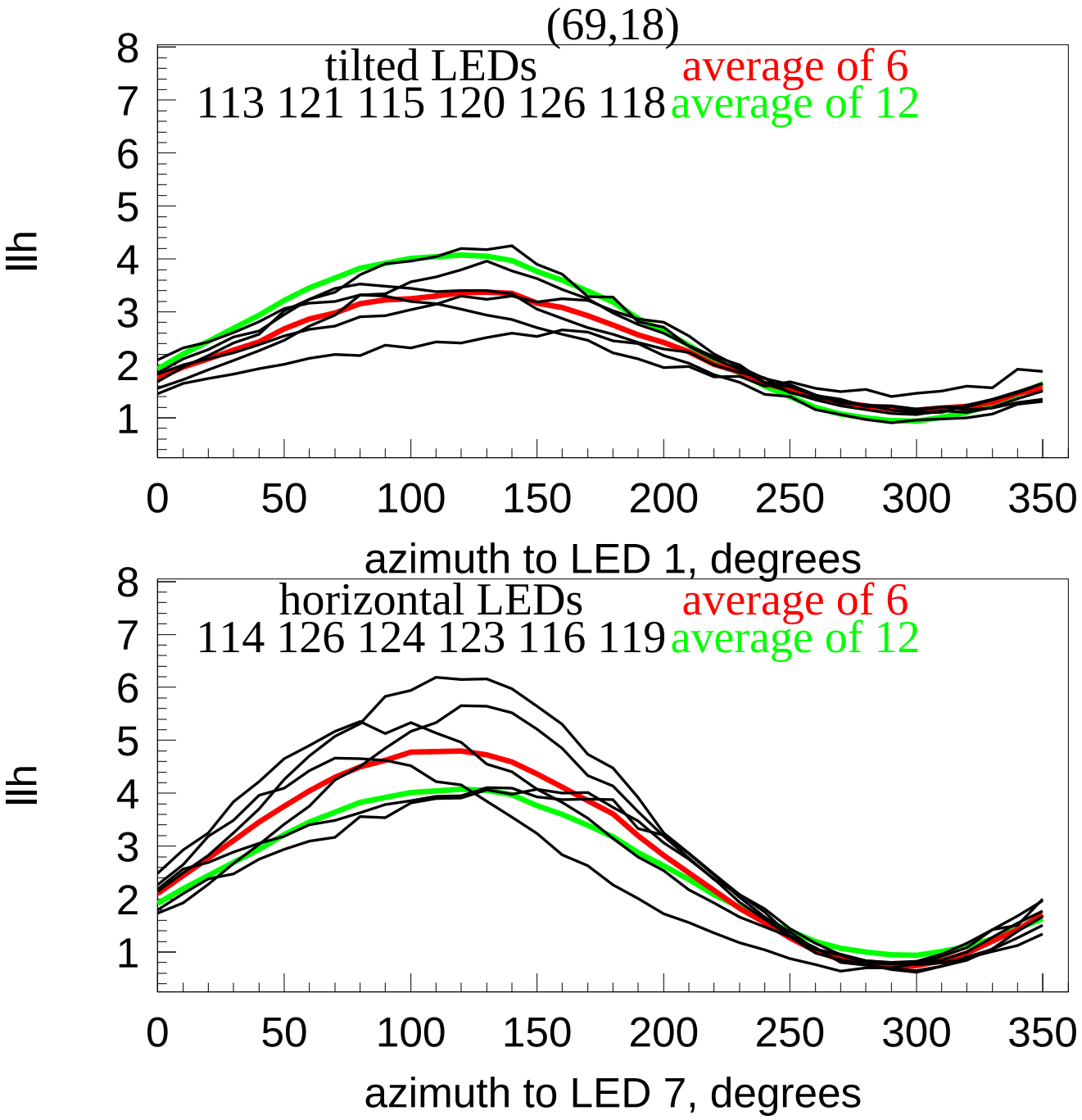

(69,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
115.6 ± 5.6

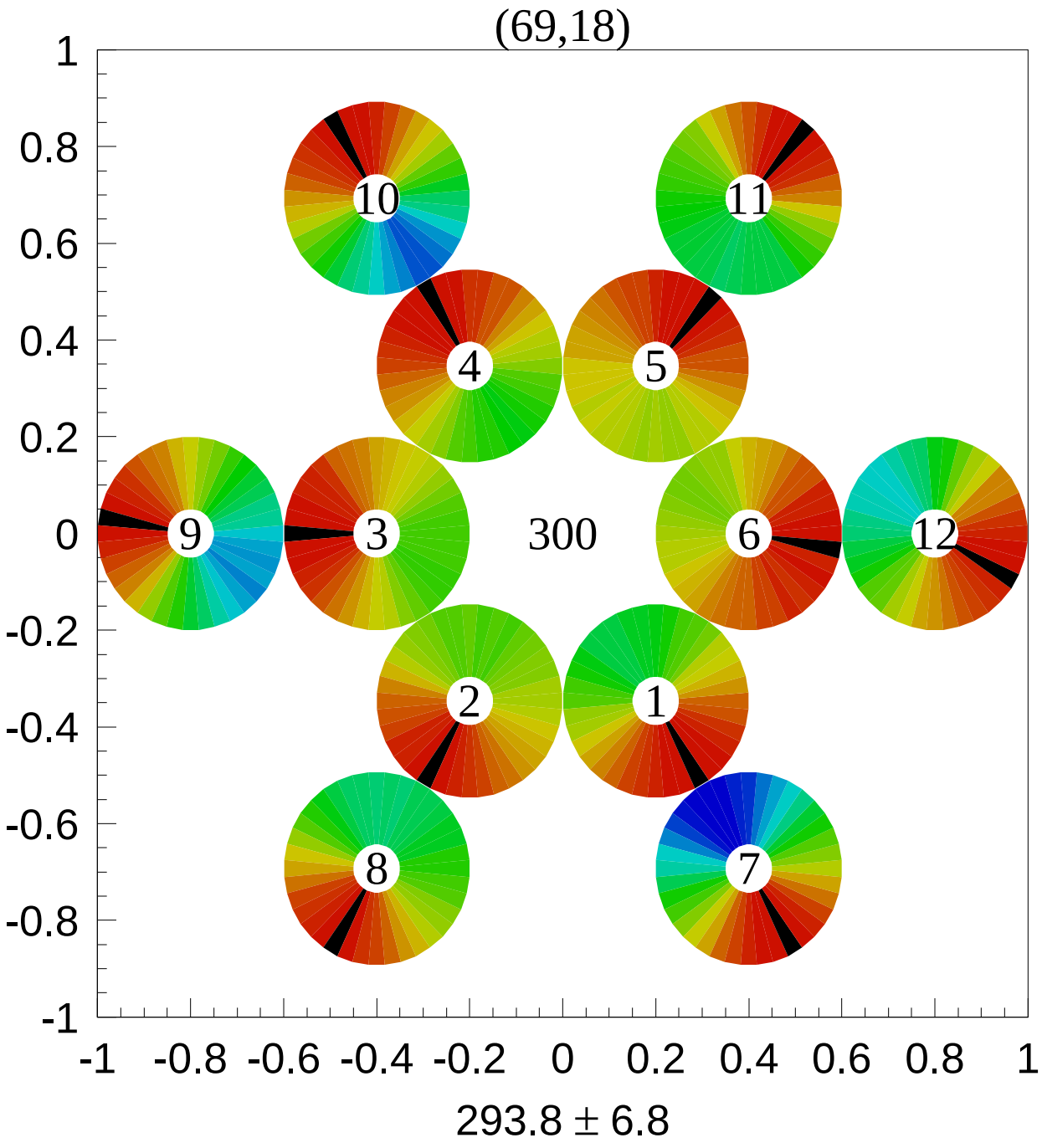

(69,16)
tilted LEDs
121 114 120 117 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 127 122 115 128 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

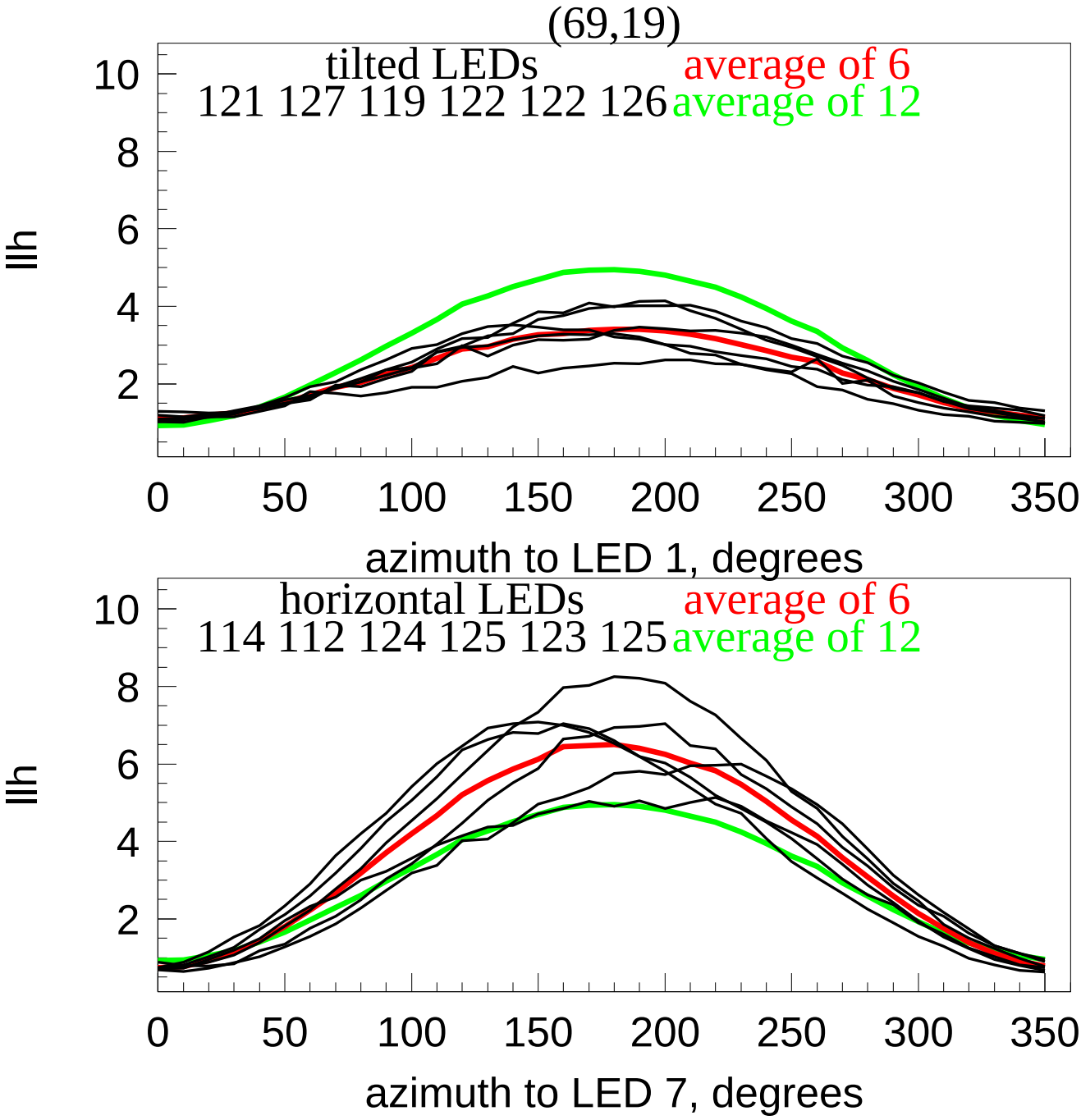

(69,16)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
320.9 ± 5.8

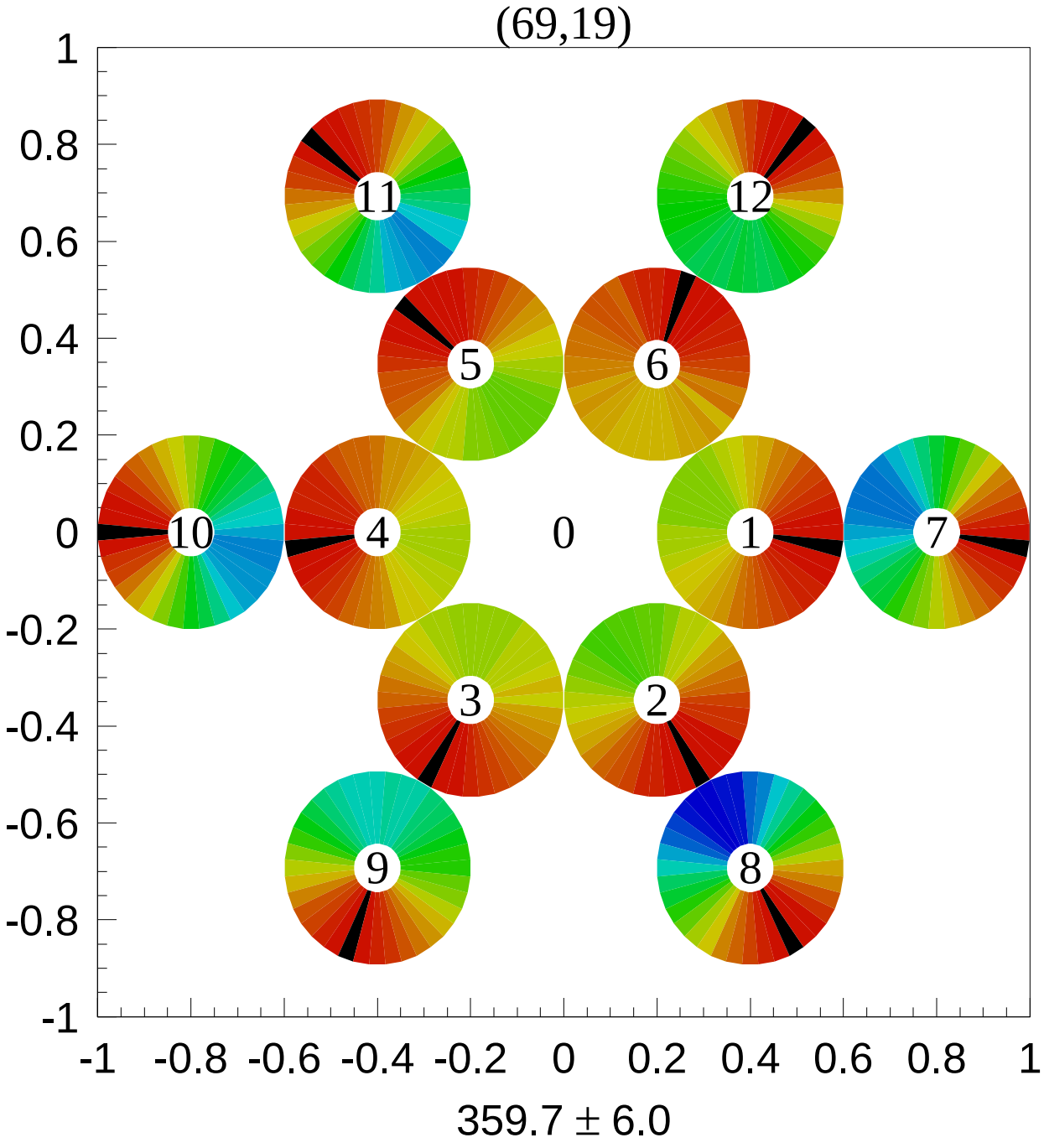

(69,17)
tilted LEDs
121 120 120 124 115 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 121 116 124 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

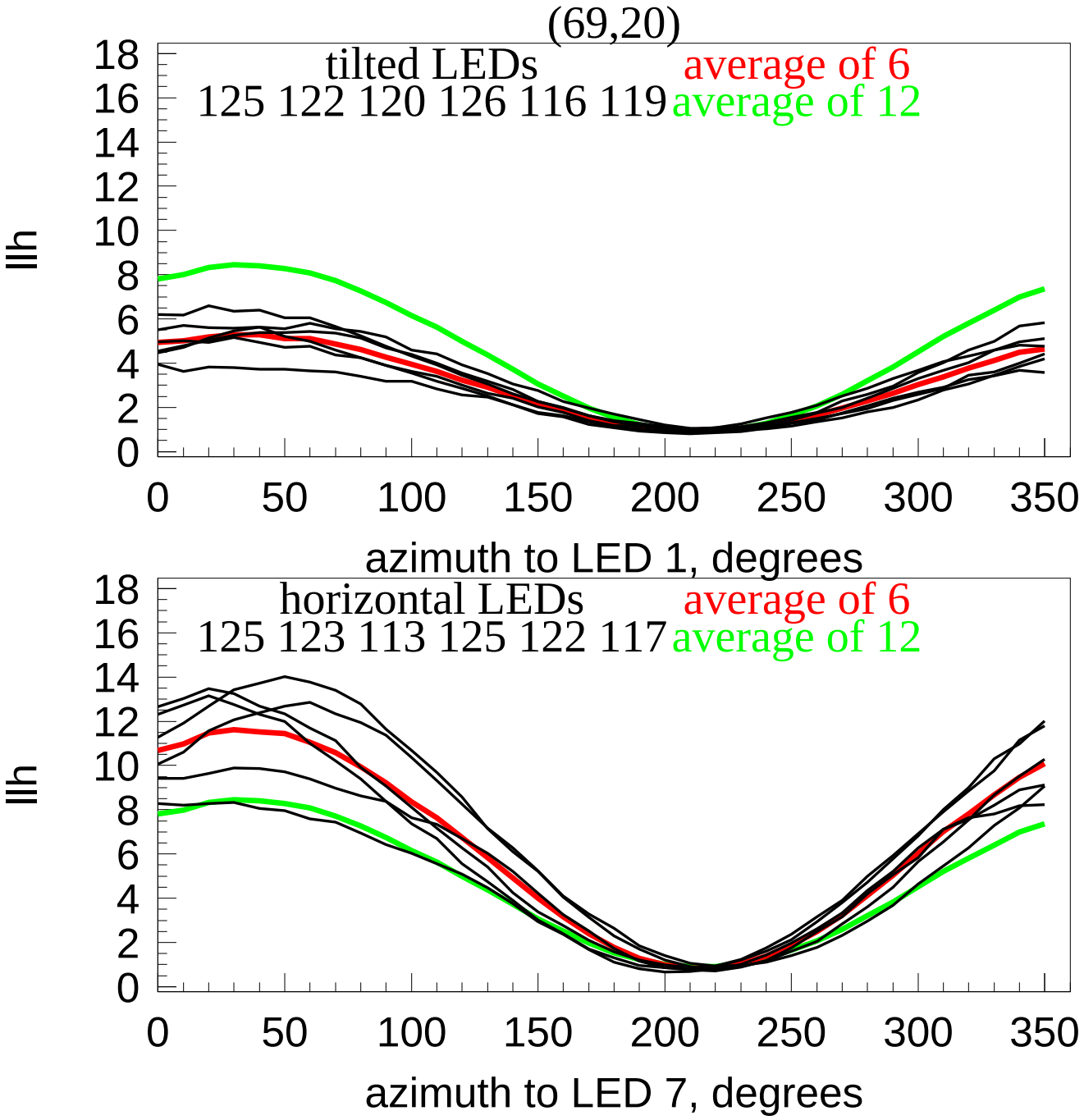

(69,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
228.2 ± 8.5

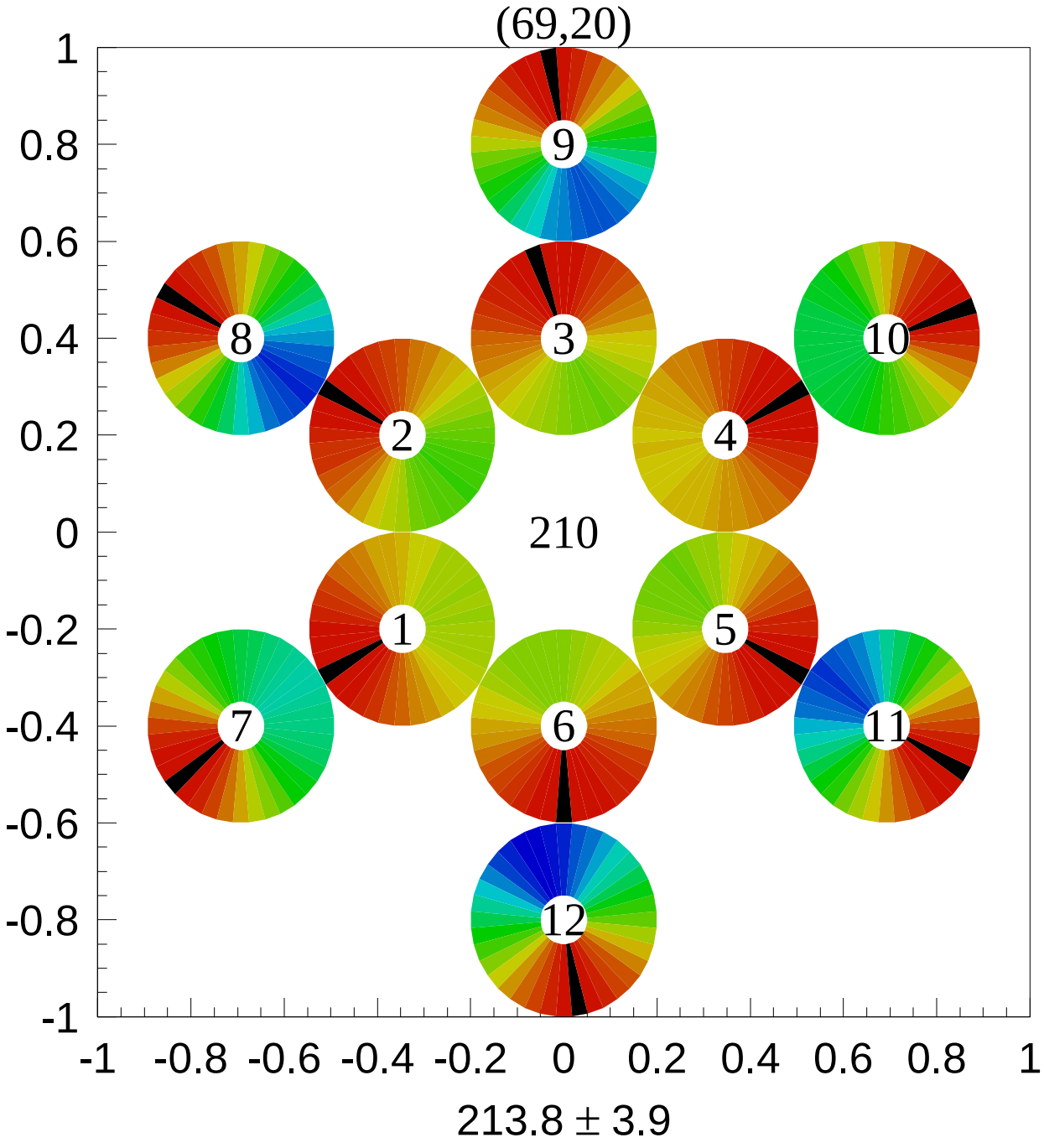

(69,18)
tilted LEDs
113 121 115 120 126 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
114 126 124 123 116 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

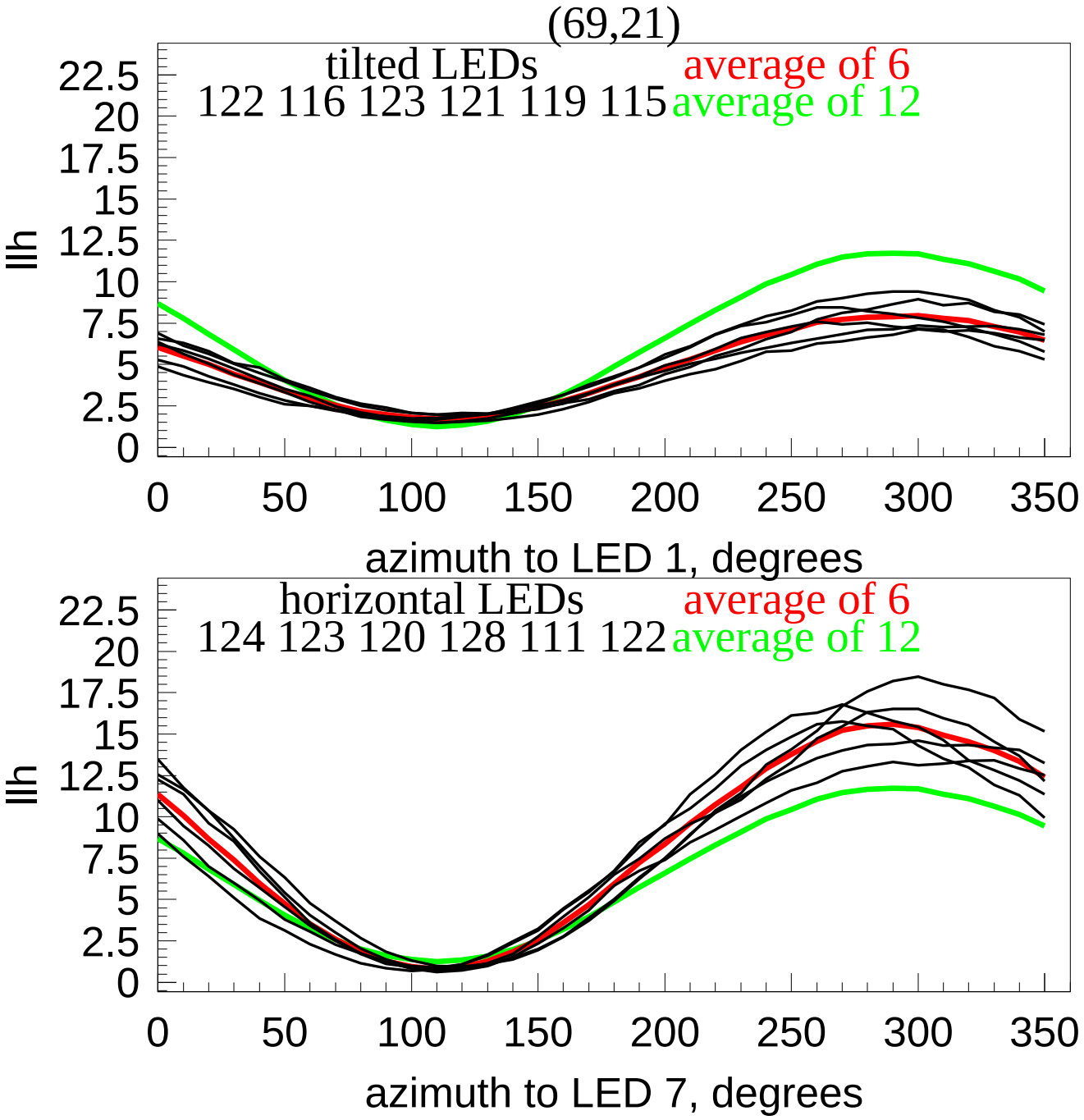

(69,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
293.8 ± 6.8

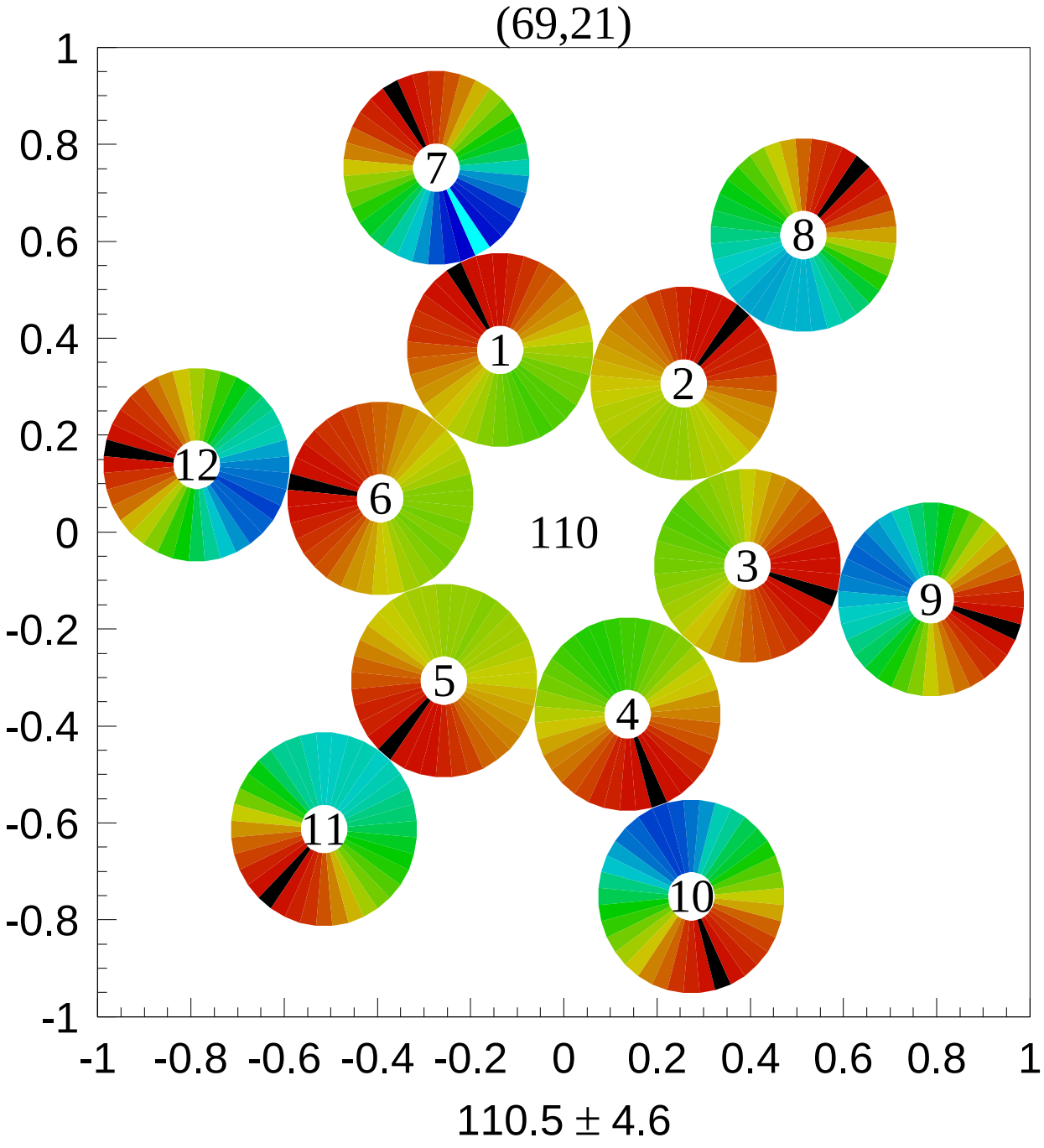

(69,19)
tilted LEDs
121 127 119 122 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 112 124 125 123 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

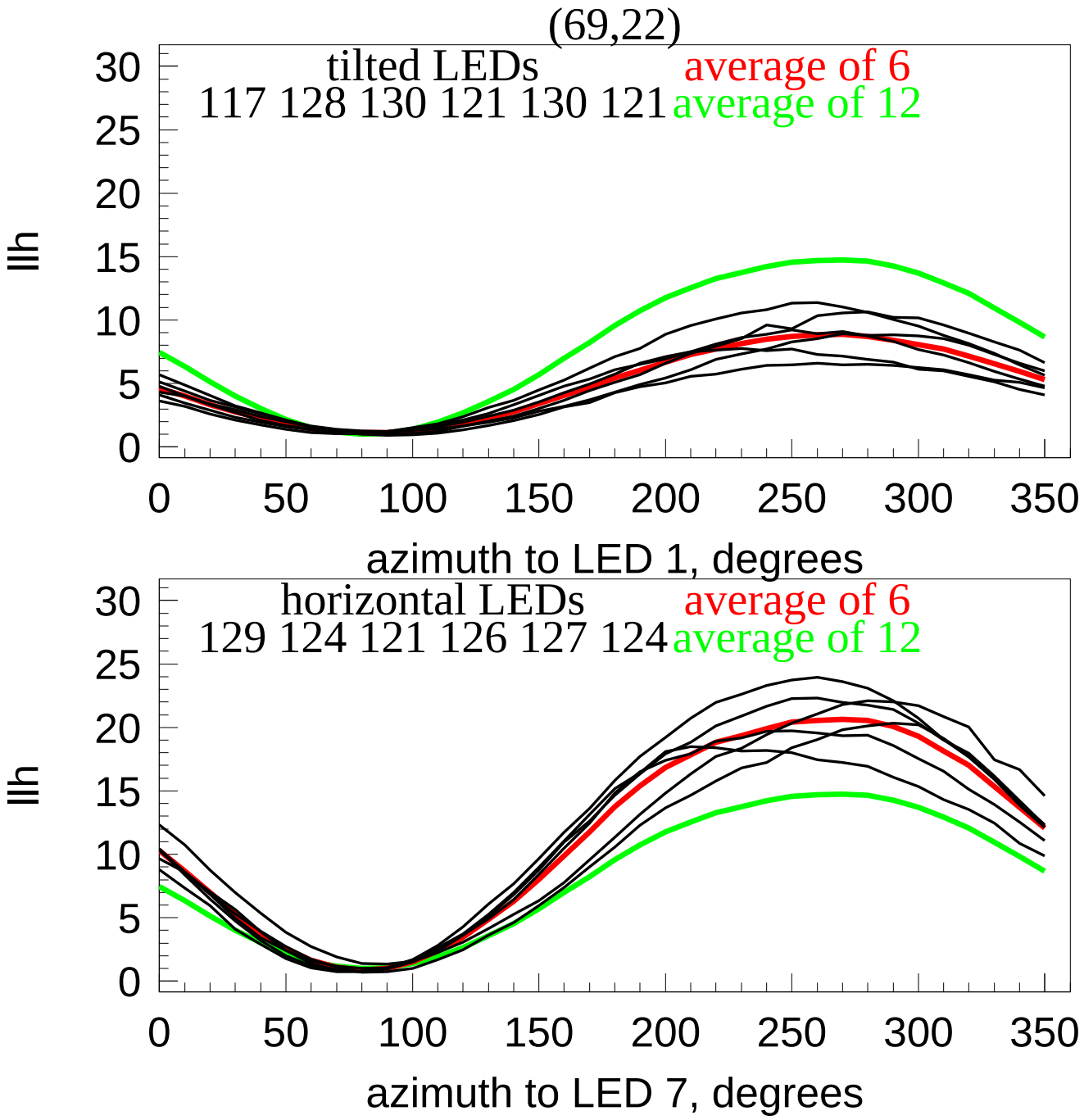

(69,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.7 ± 6.0

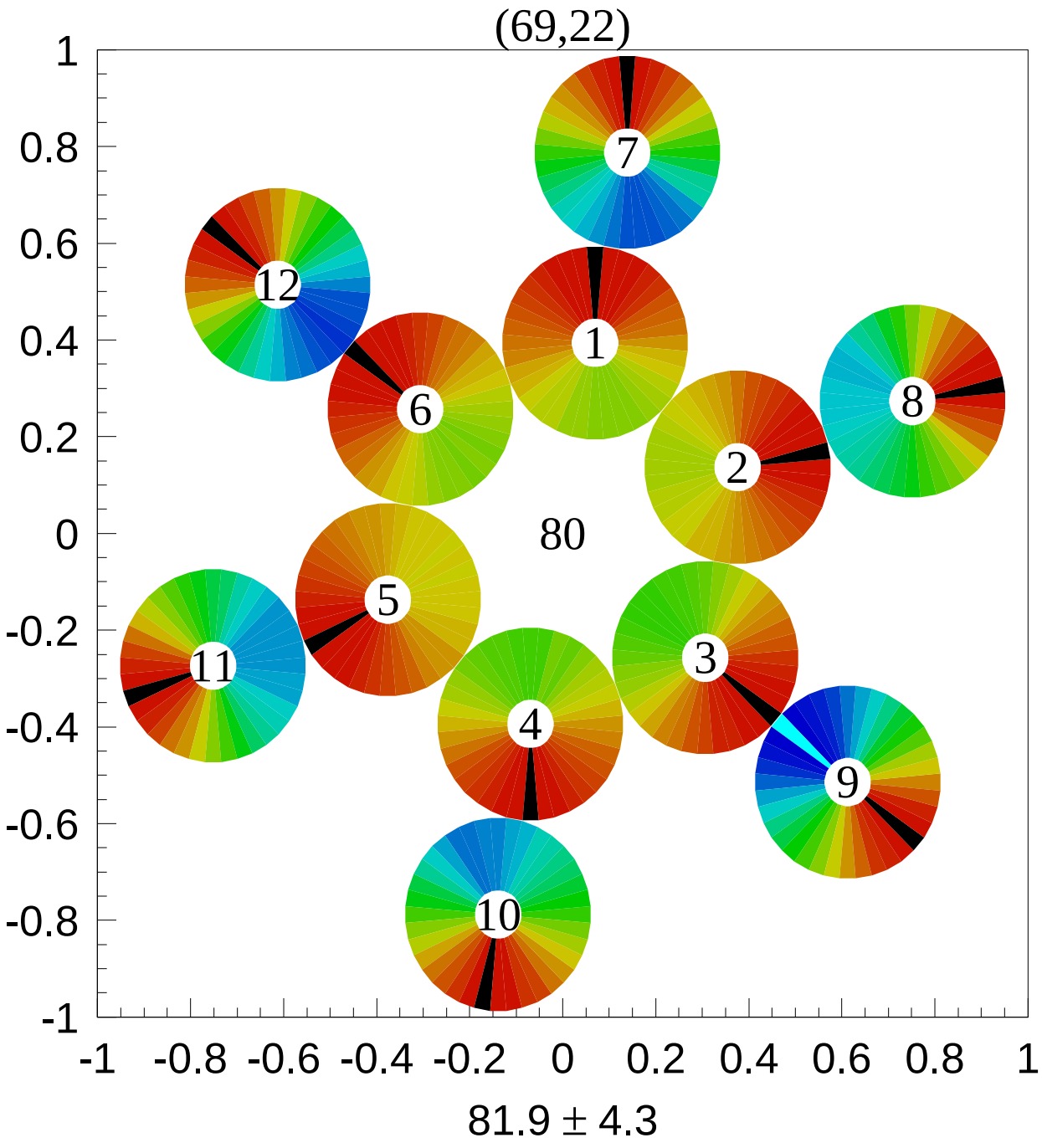

(69,20)
tilted LEDs
125 122 120 126 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 113 125 122 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

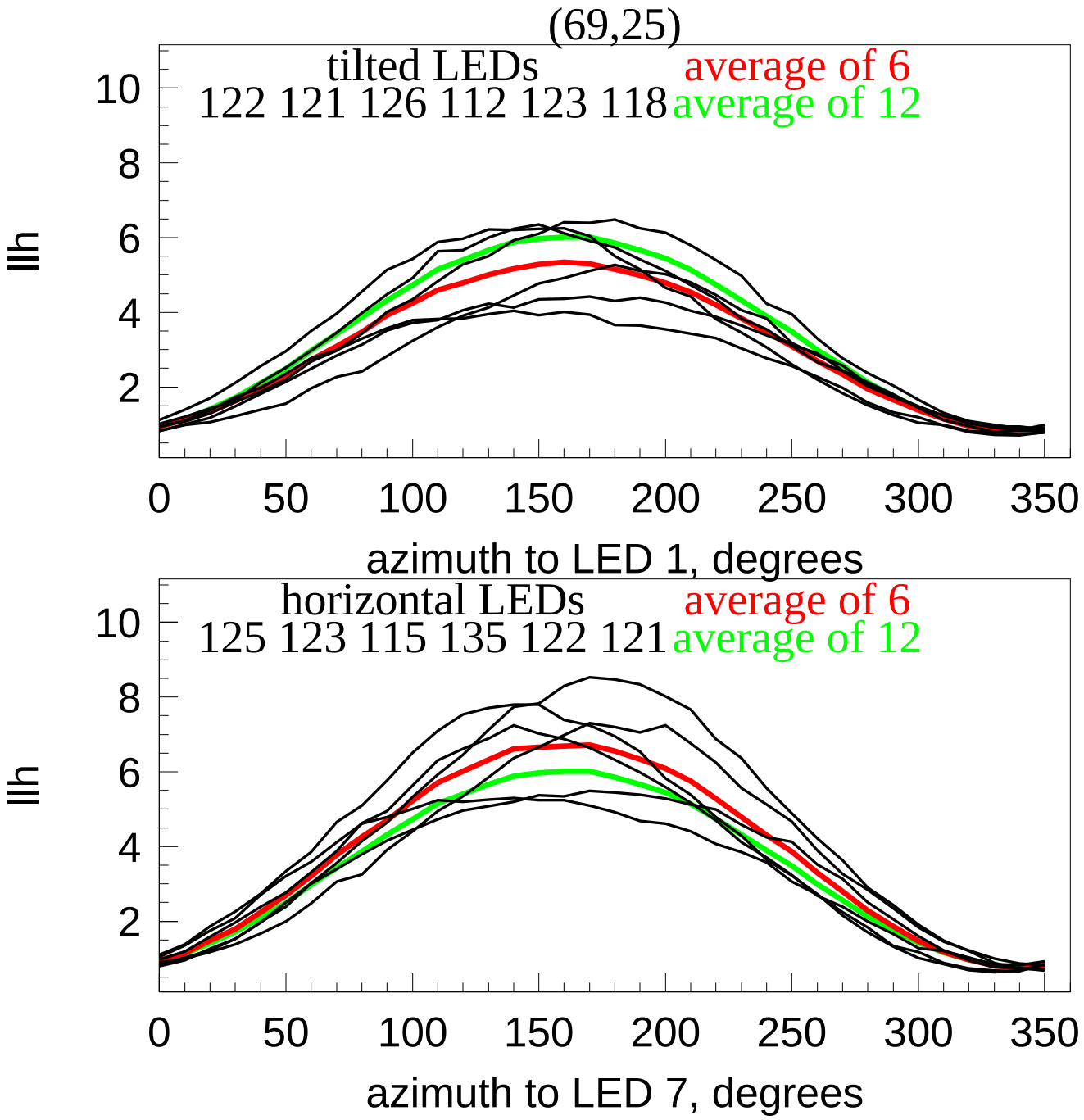

(69,20)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
213.8 ± 3.9

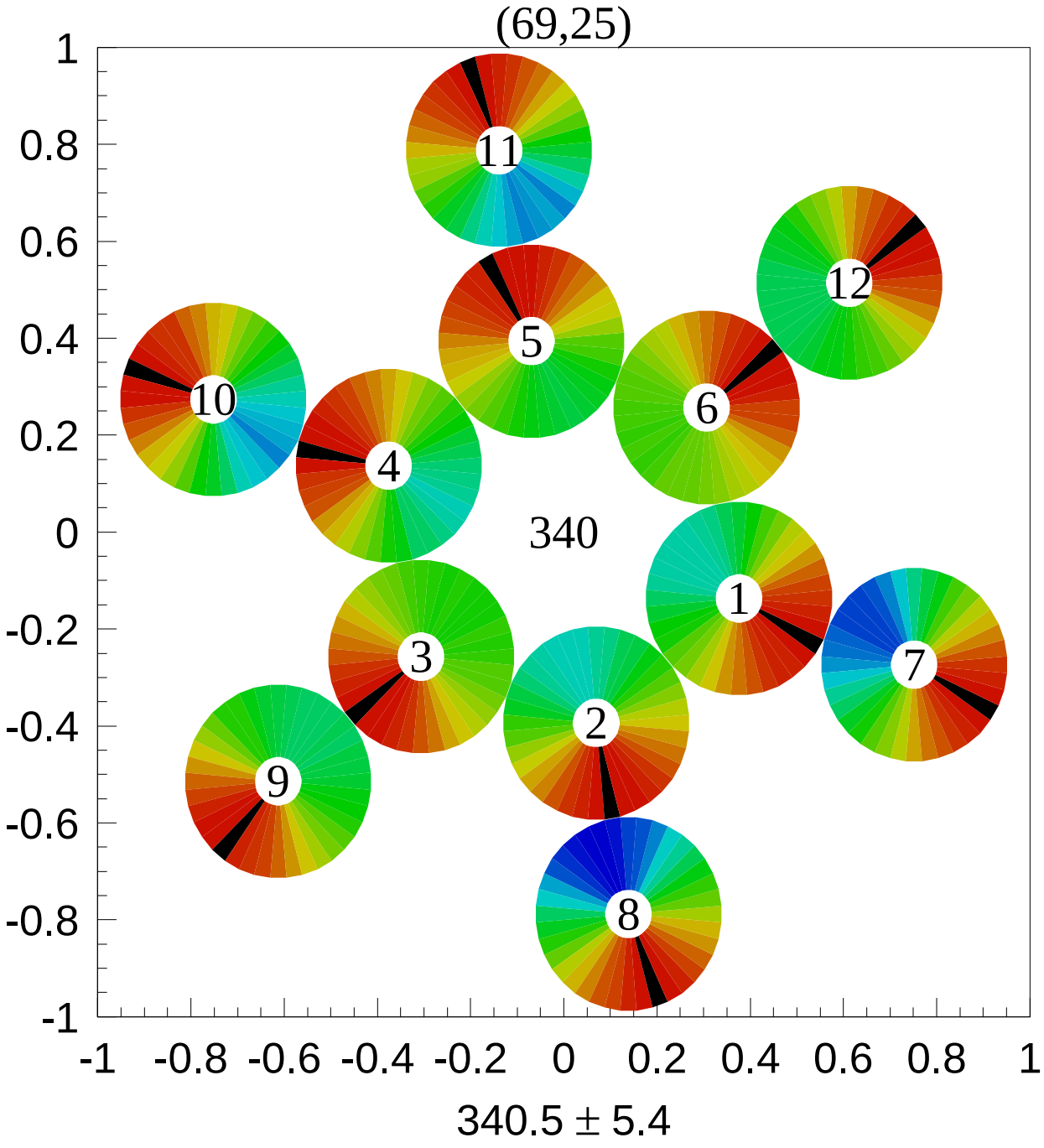

(69,21)
tilted LEDs
122 116 123 121 119 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 123 120 128 111 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

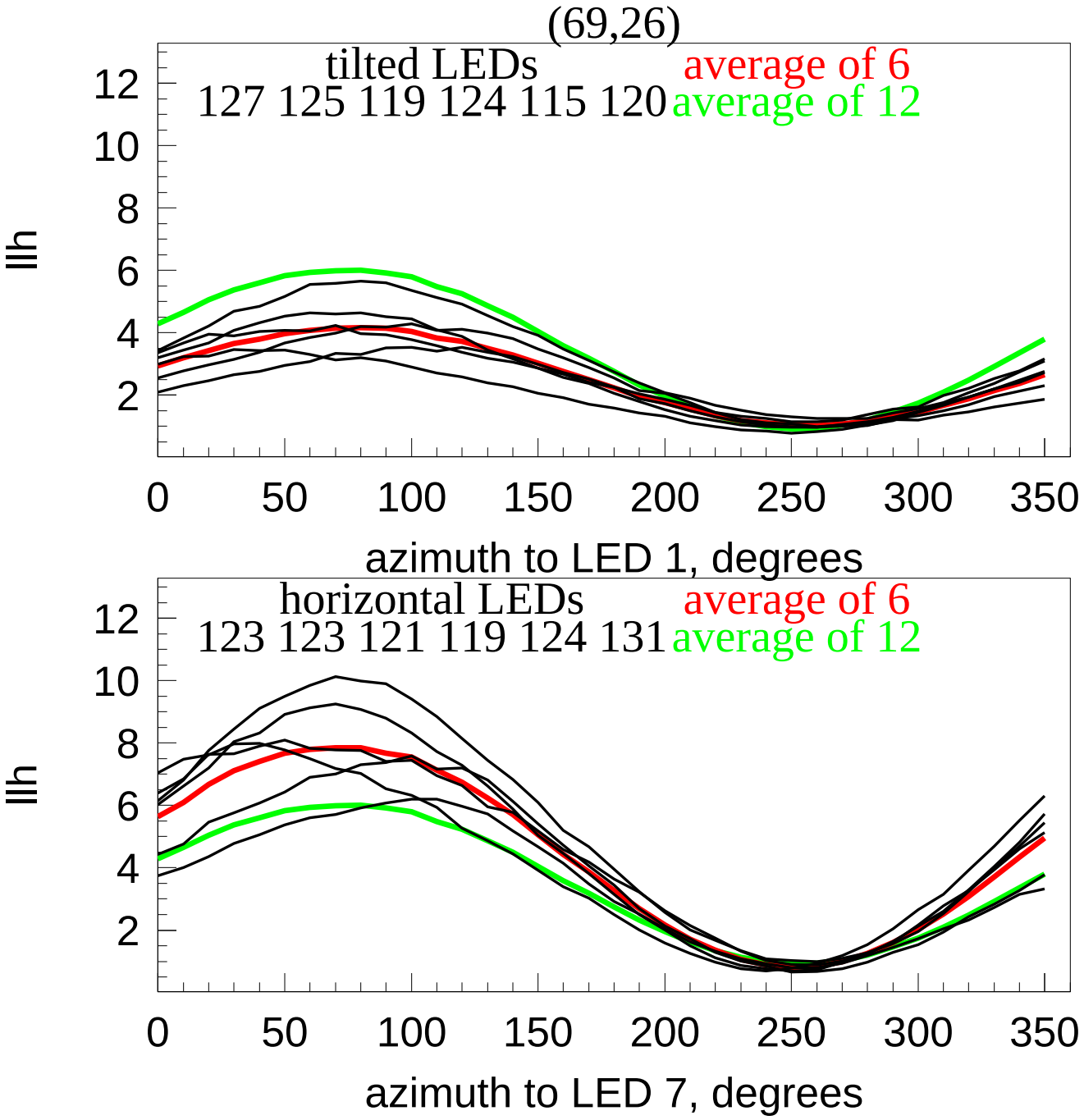

(69,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
110.5 ± 4.6

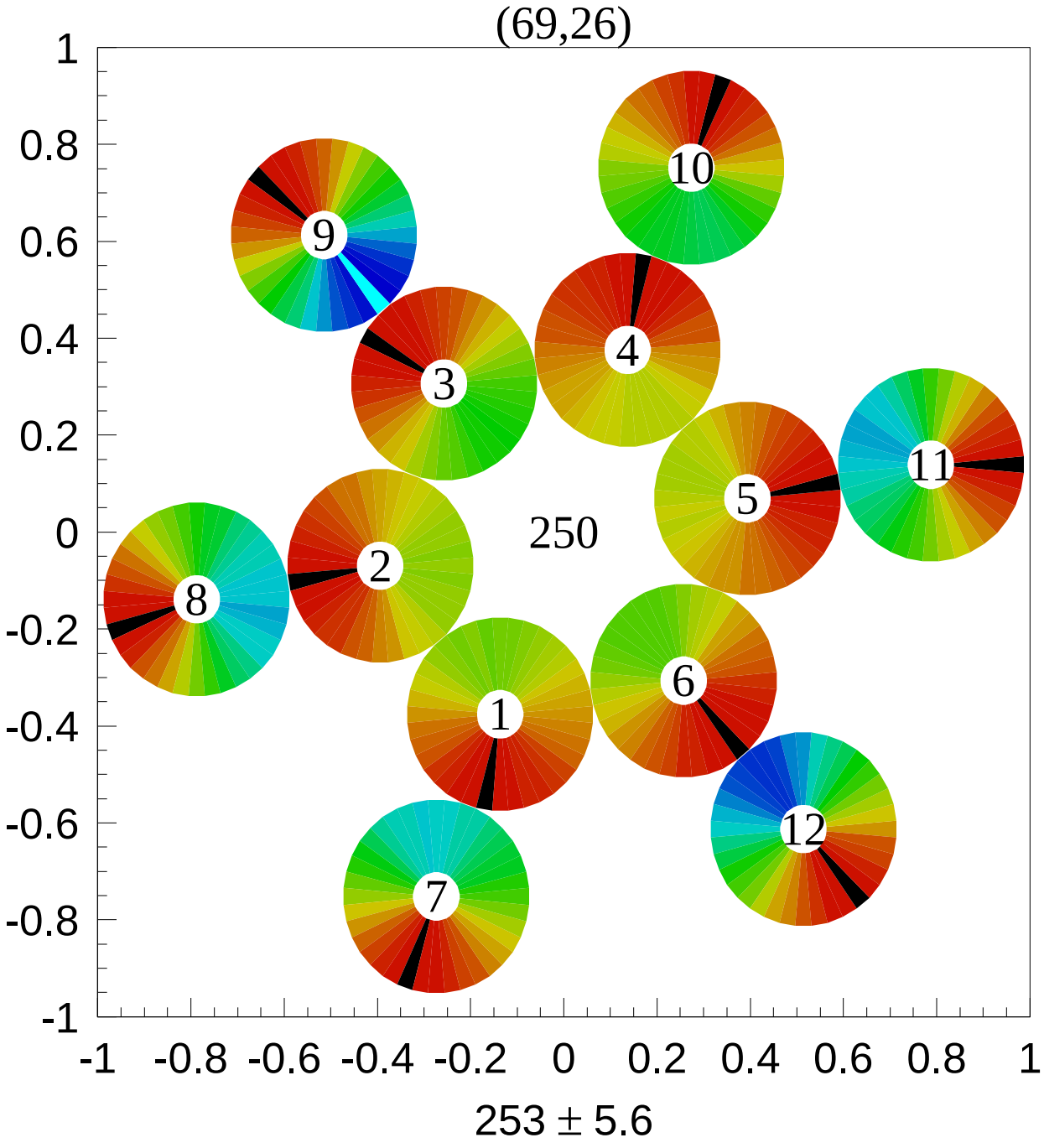

(69,22)
tilted LEDs
117 128 130 121 130 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
129 124 121 126 127 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

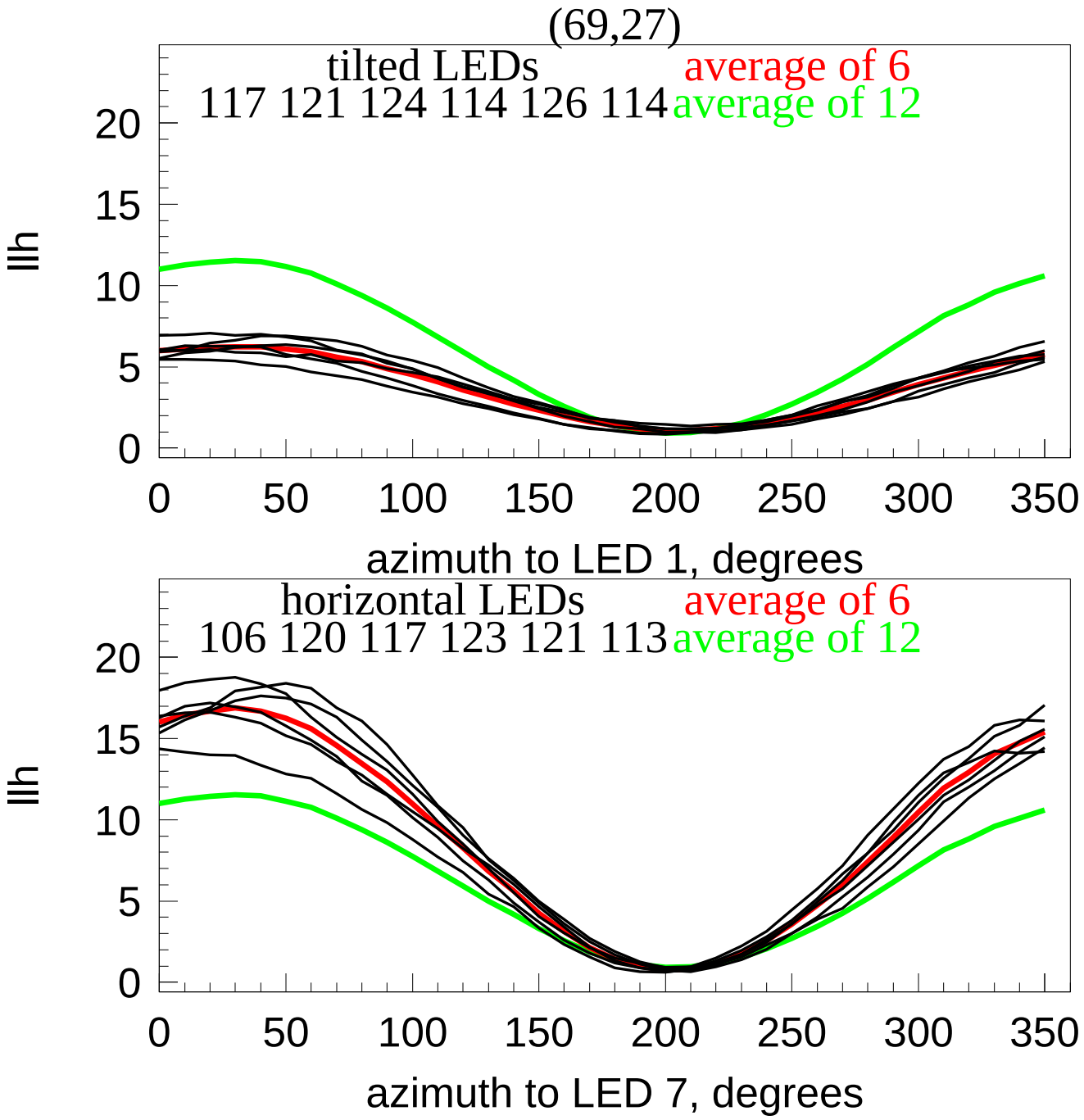

(69,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
81.9 ± 4.3

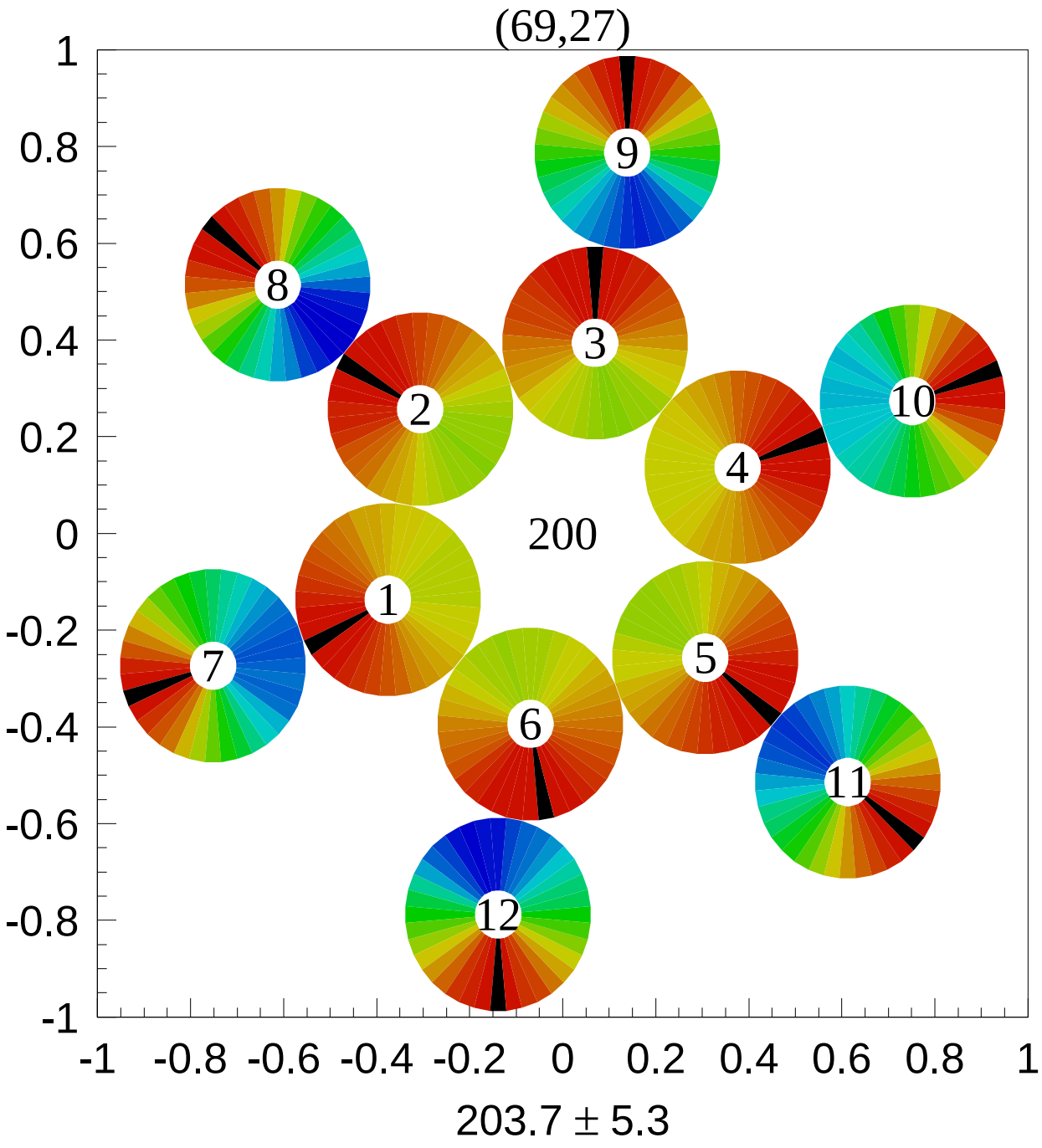

(69,25)
tilted LEDs
122 121 126 112 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 115 135 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

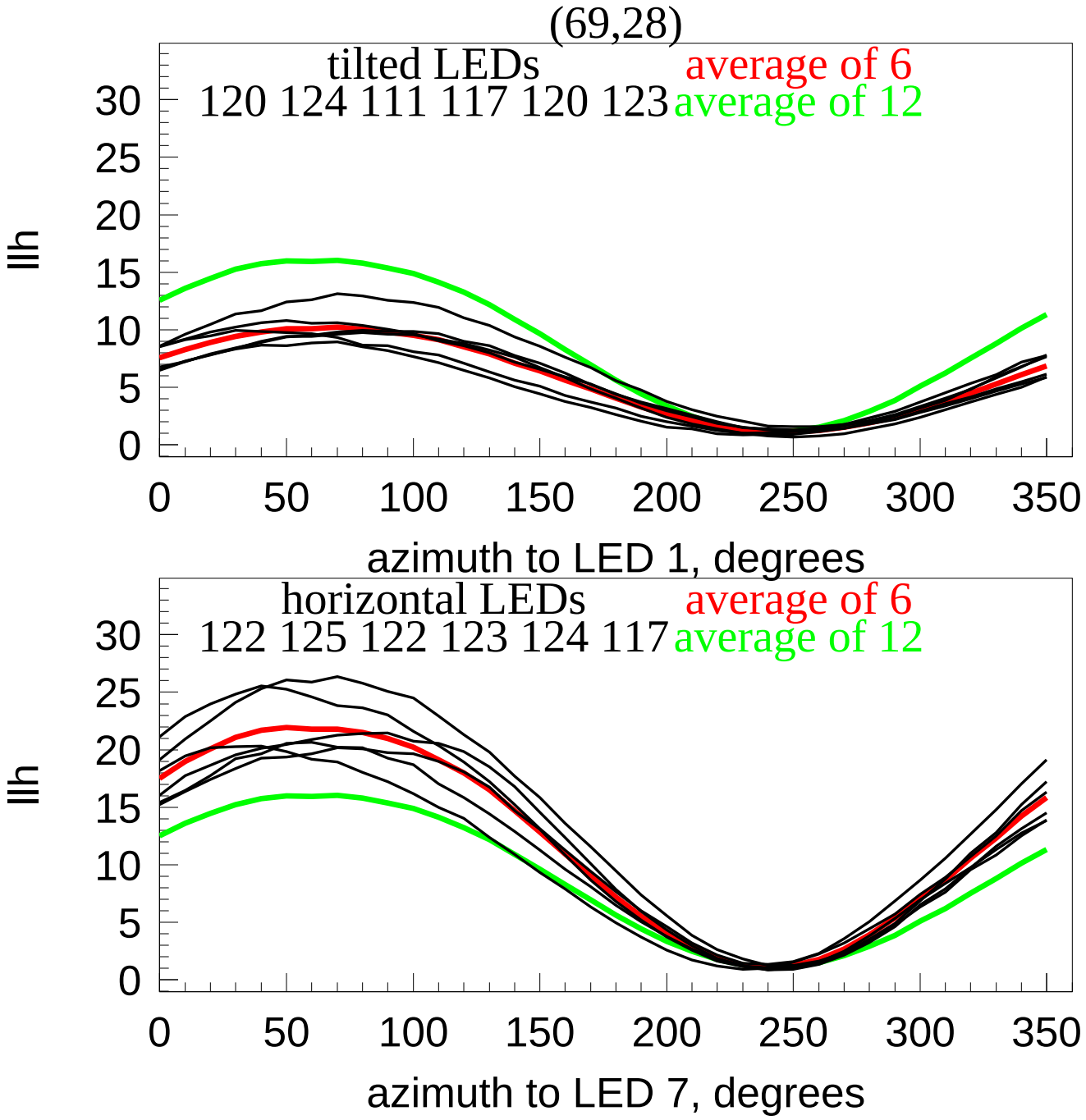

(69,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
340.5 ± 5.4

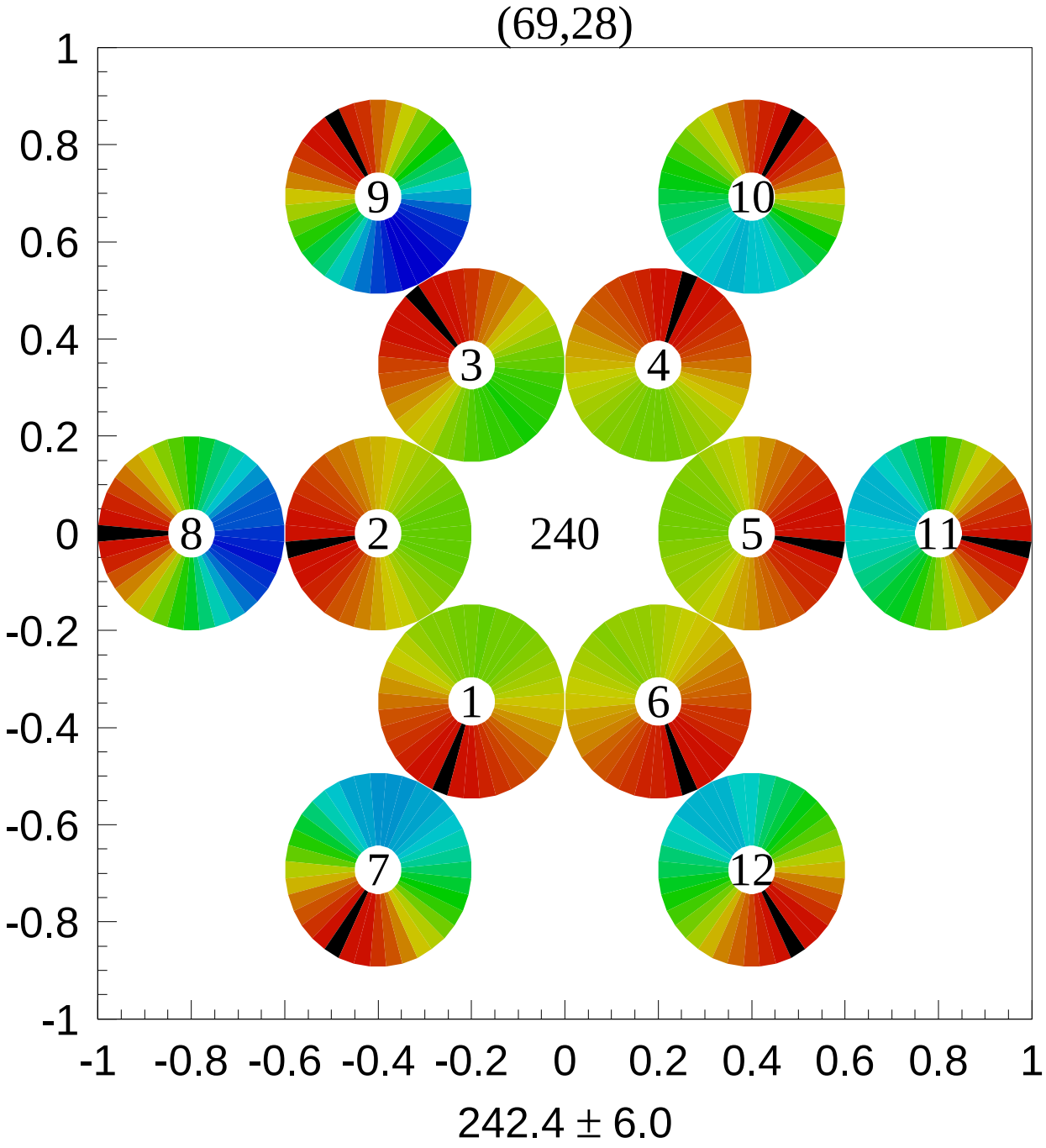

(69,26)
tilted LEDs
127 125 119 124 115 120
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 123 121 119 124 131
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

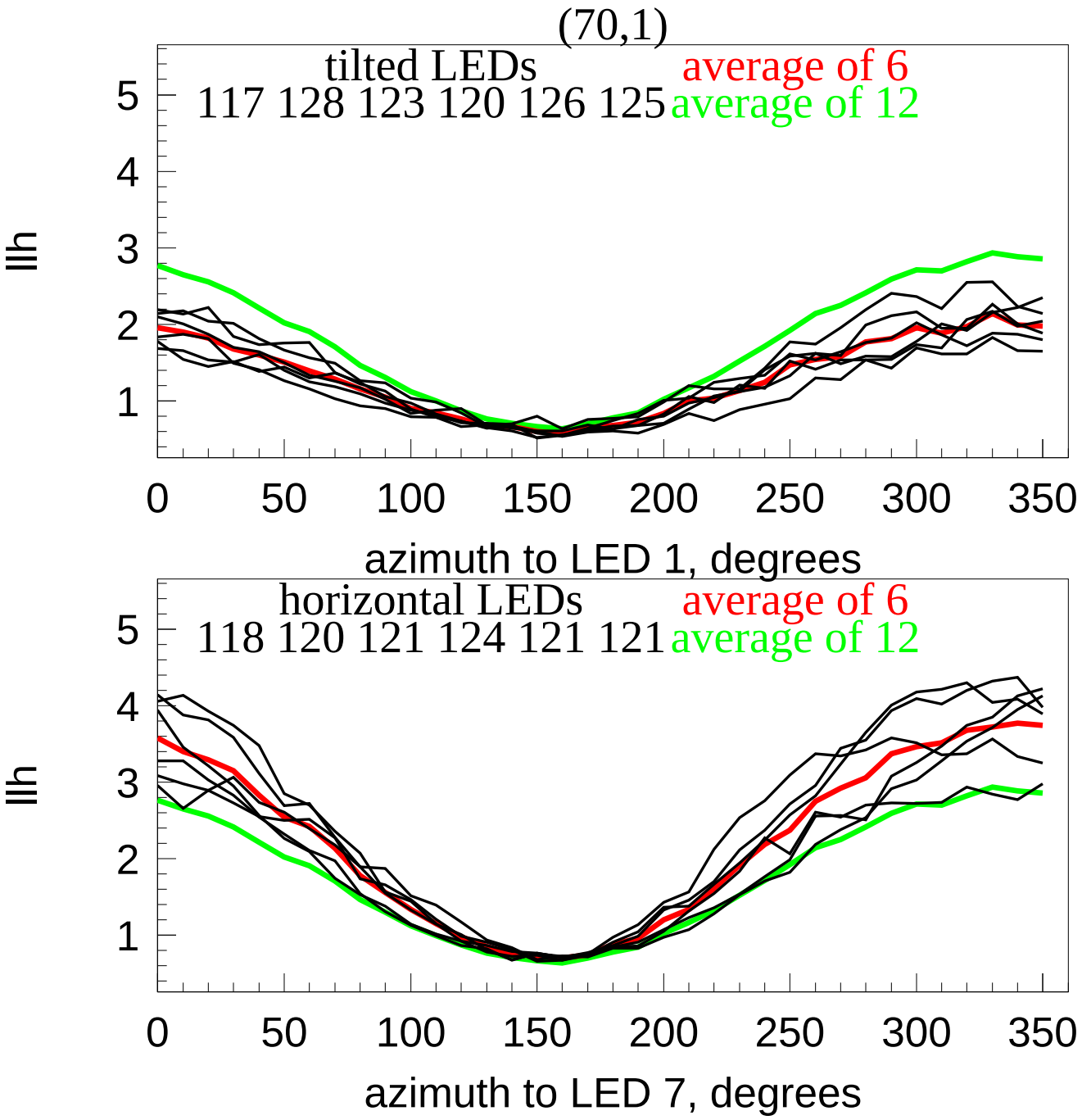

(69,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
253 ± 5.6
1
2
3
4
5
6
7
8
9
10
11
12

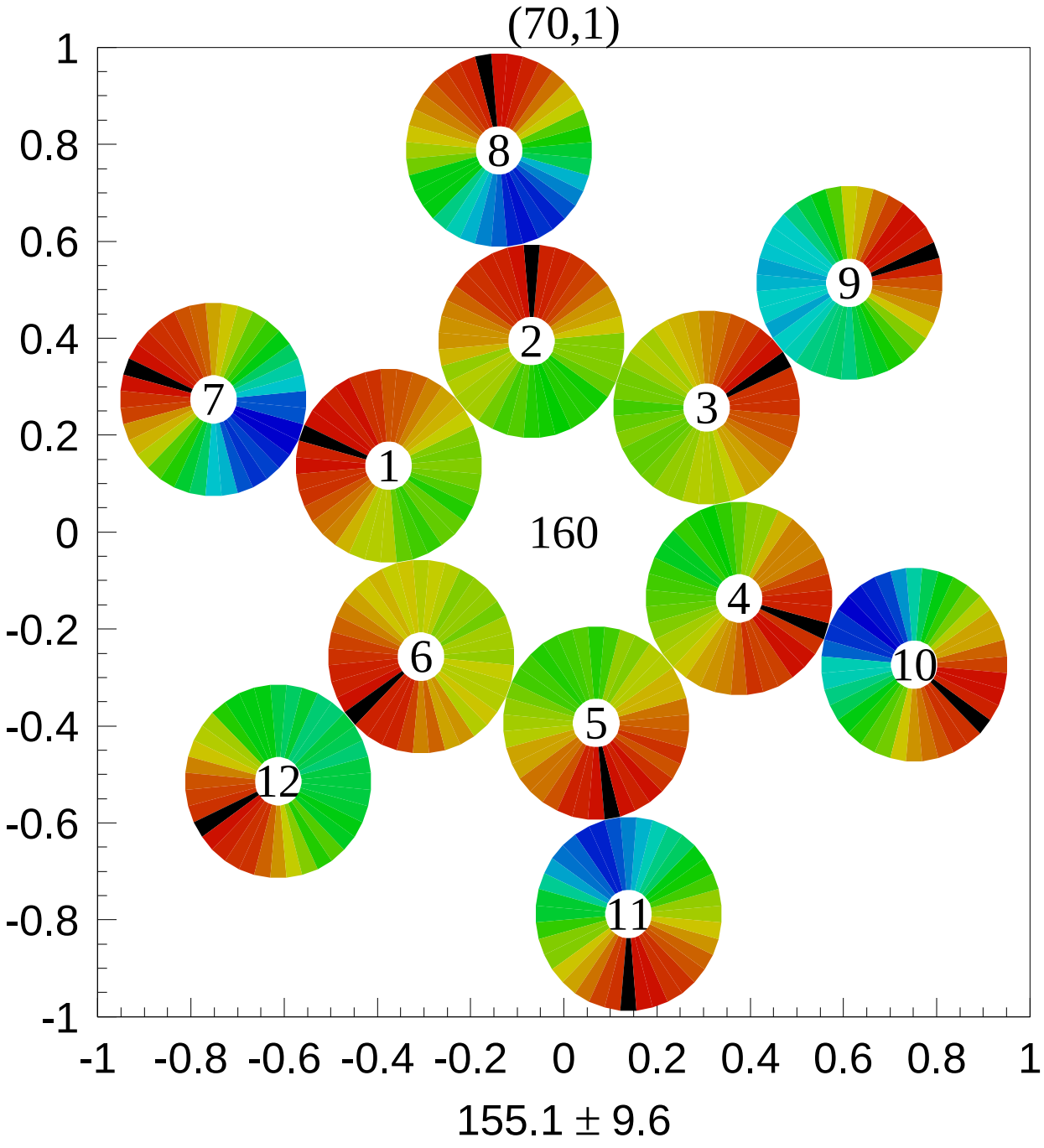

(69,27)
tilted LEDs
117 121 124 114 126 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
106 120 117 123 121 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

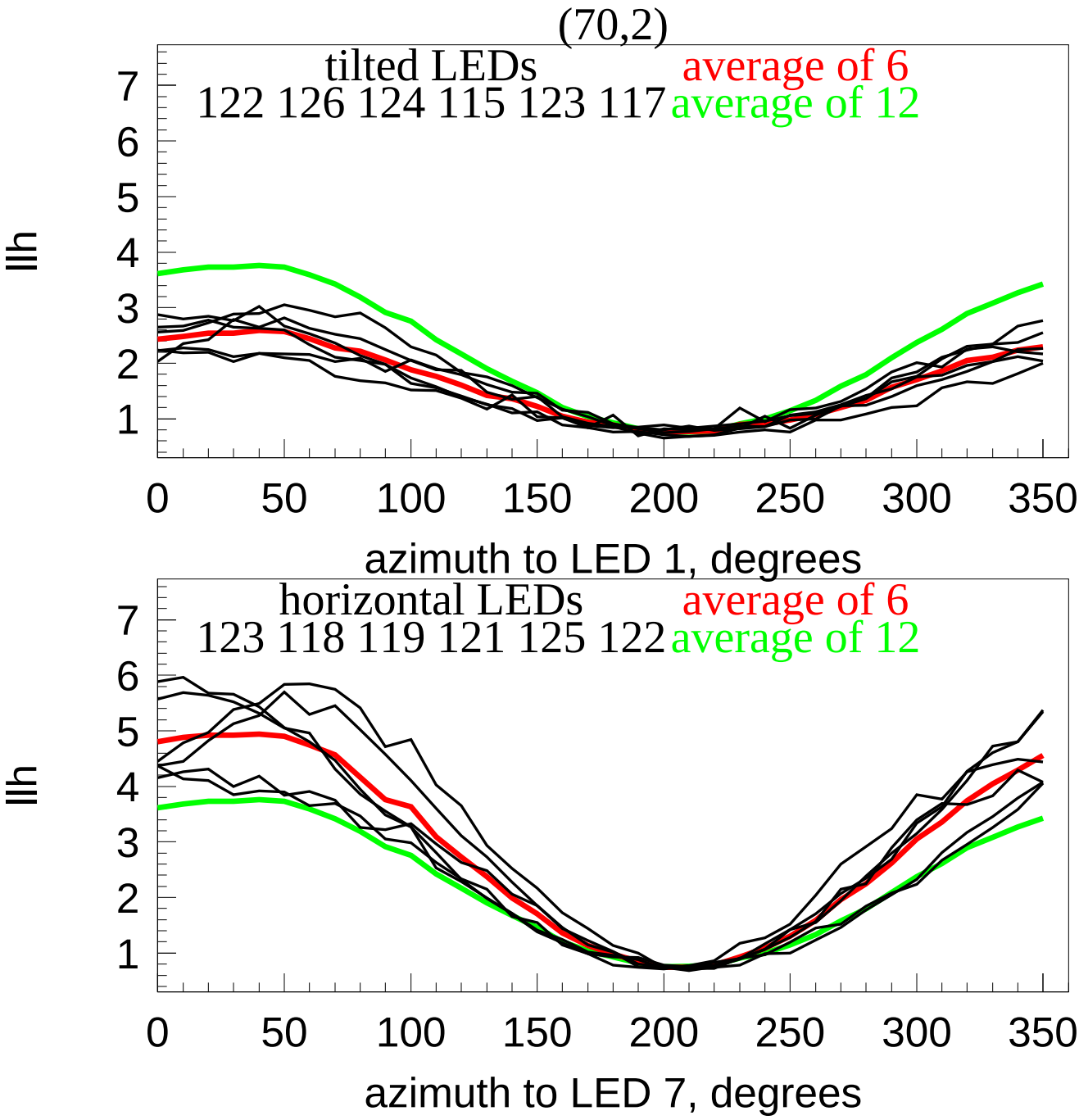

(69,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
200
1
2
3
4
5
6
7
8
9
10
11
12
203.7 ± 5.3

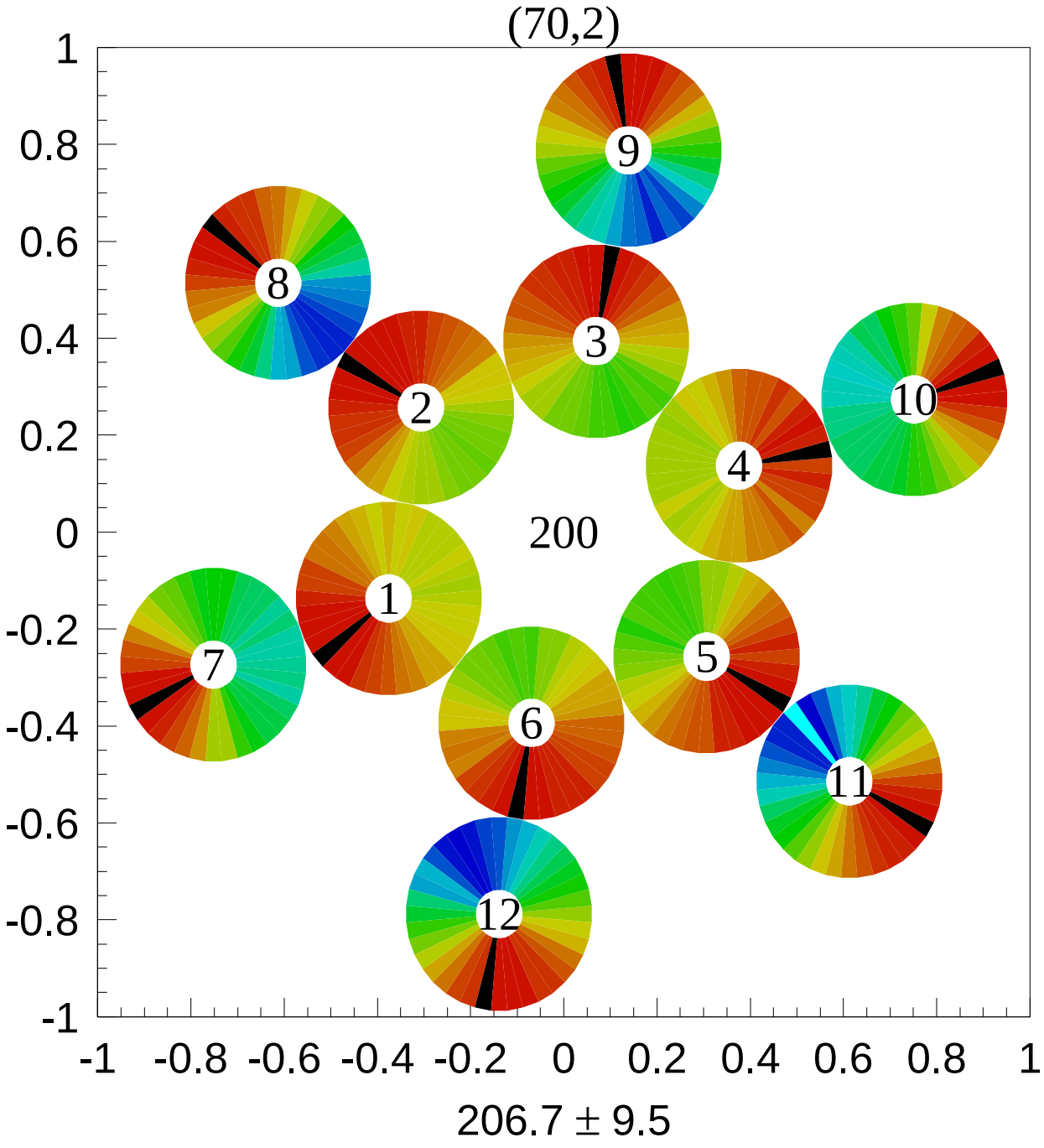

(69,28)
tilted LEDs
120 124 111 117 120 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 122 123 124 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

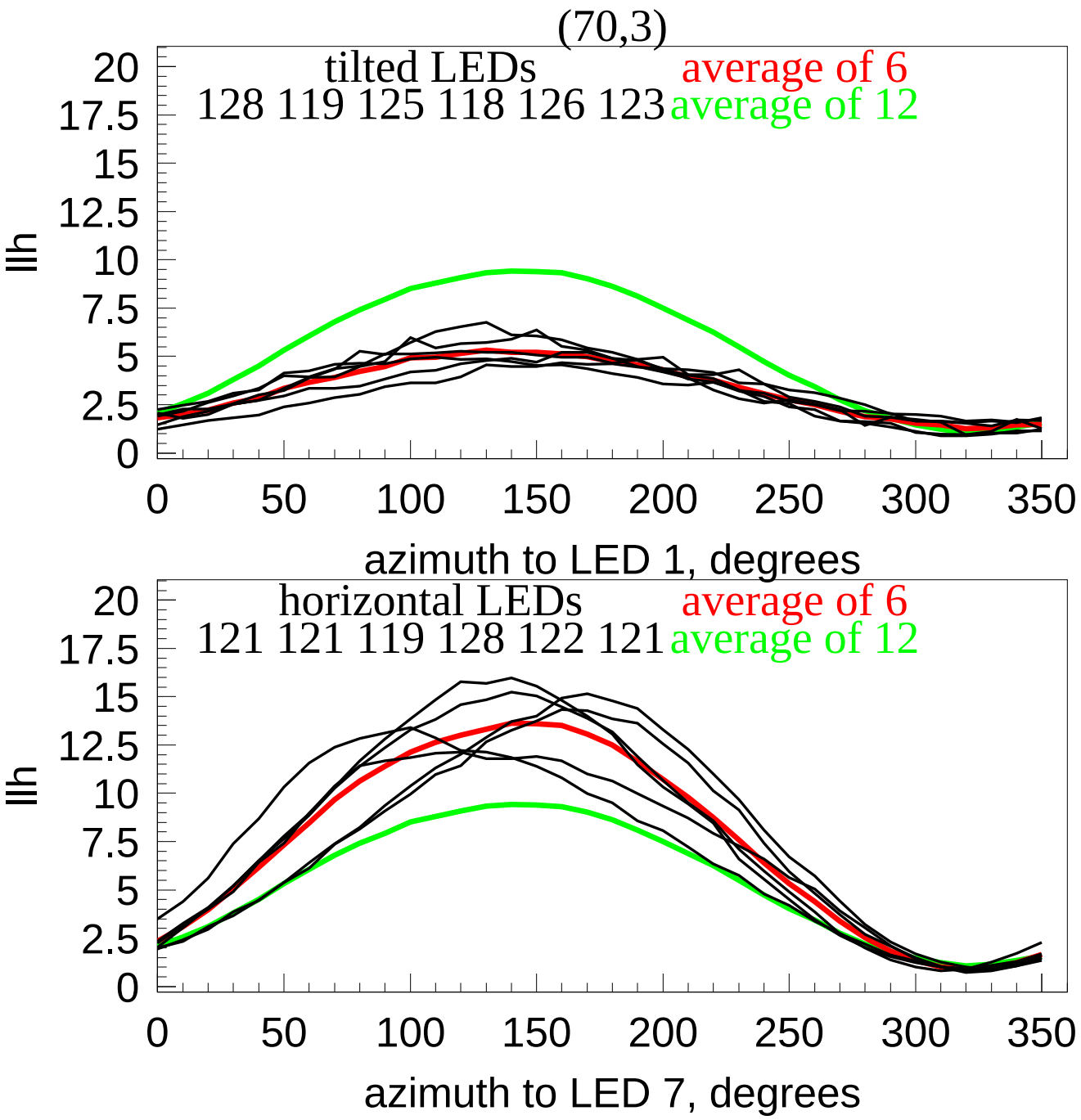

(69,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
242.4 ± 6.0

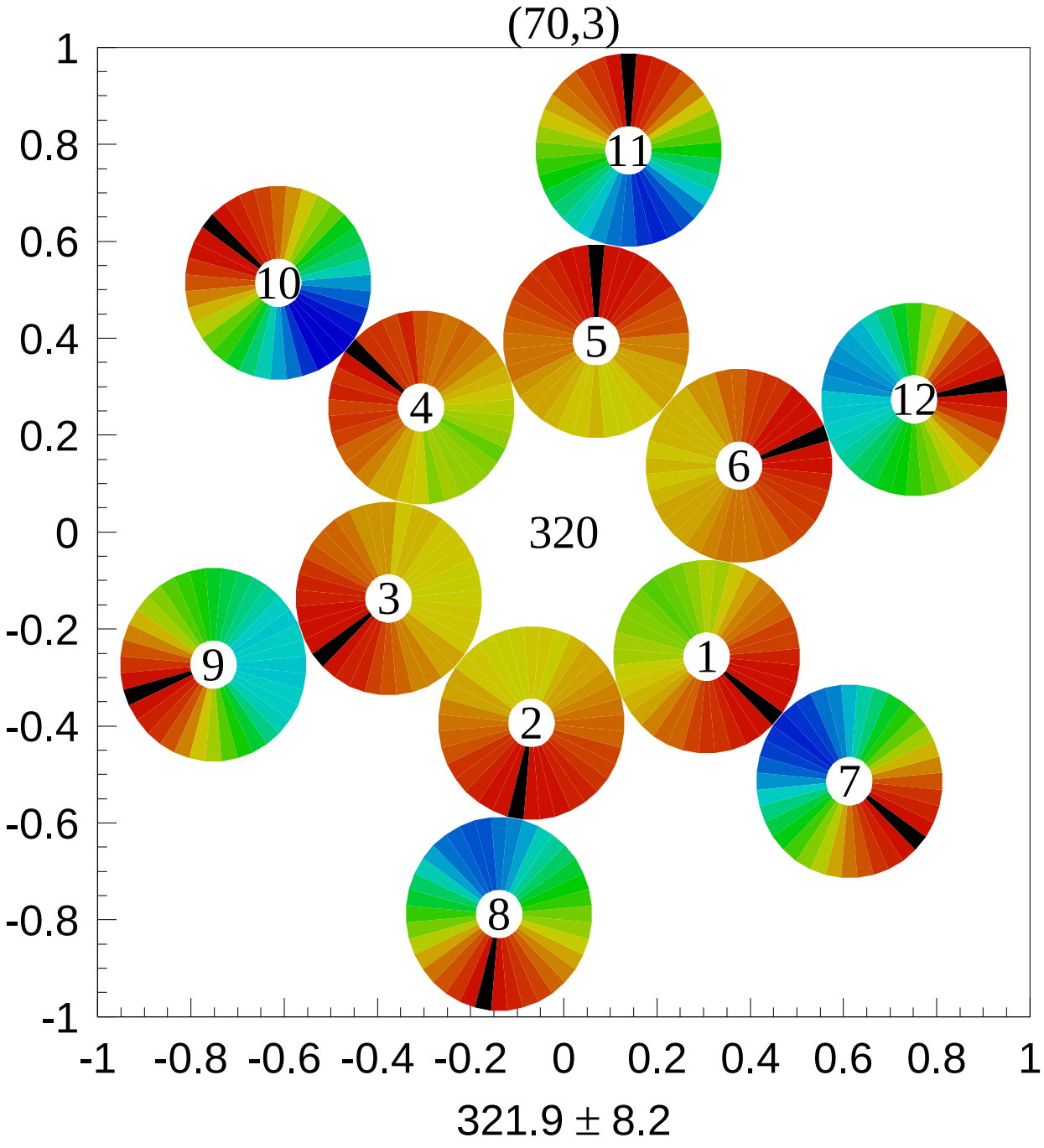

(70,1)
tilted LEDs
117 128 123 120 126 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 120 121 124 121 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

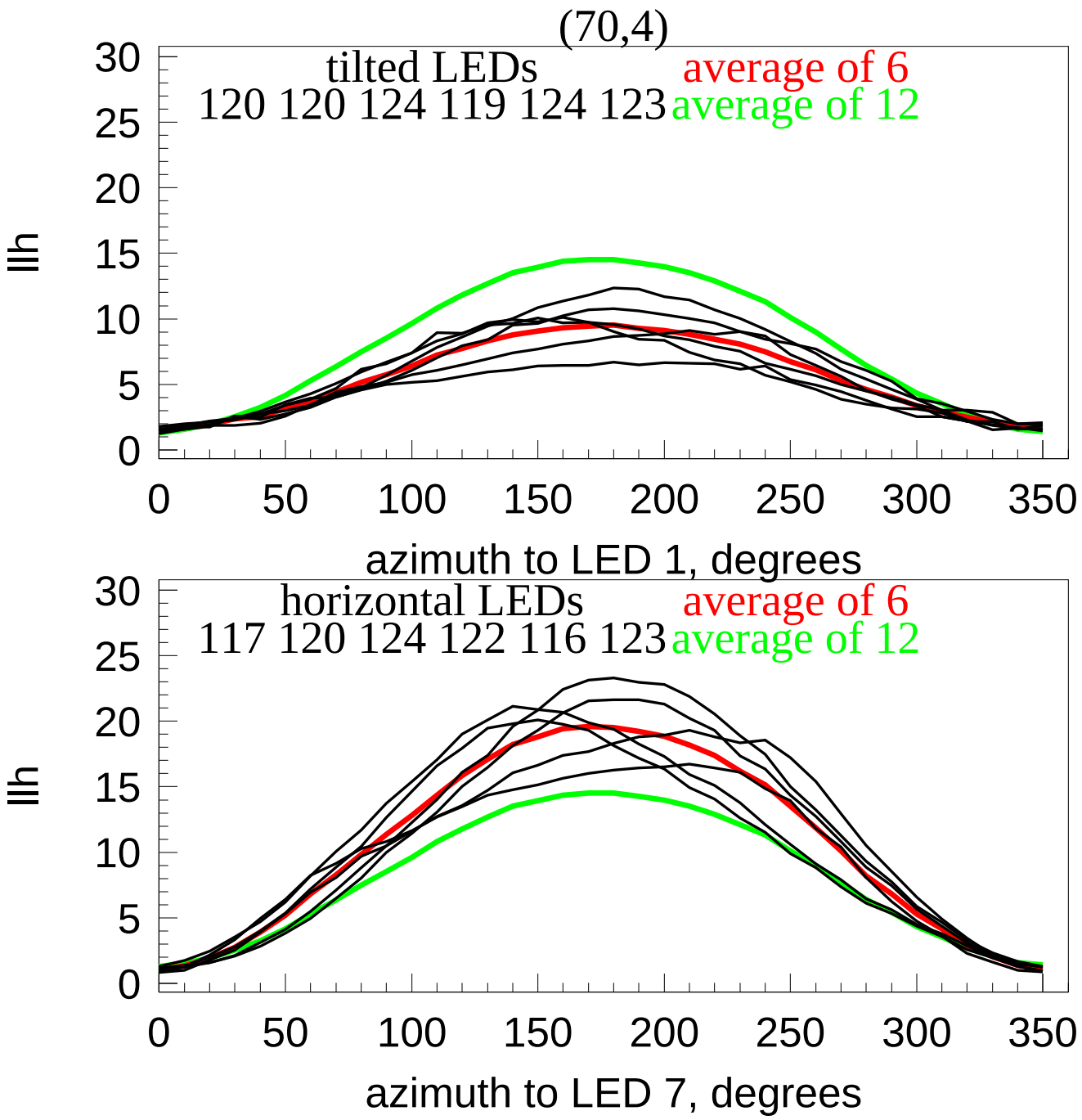

(70,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
155.1 ± 9.6
160
1
2
3
4
5
6
7
8
9
10
11
12

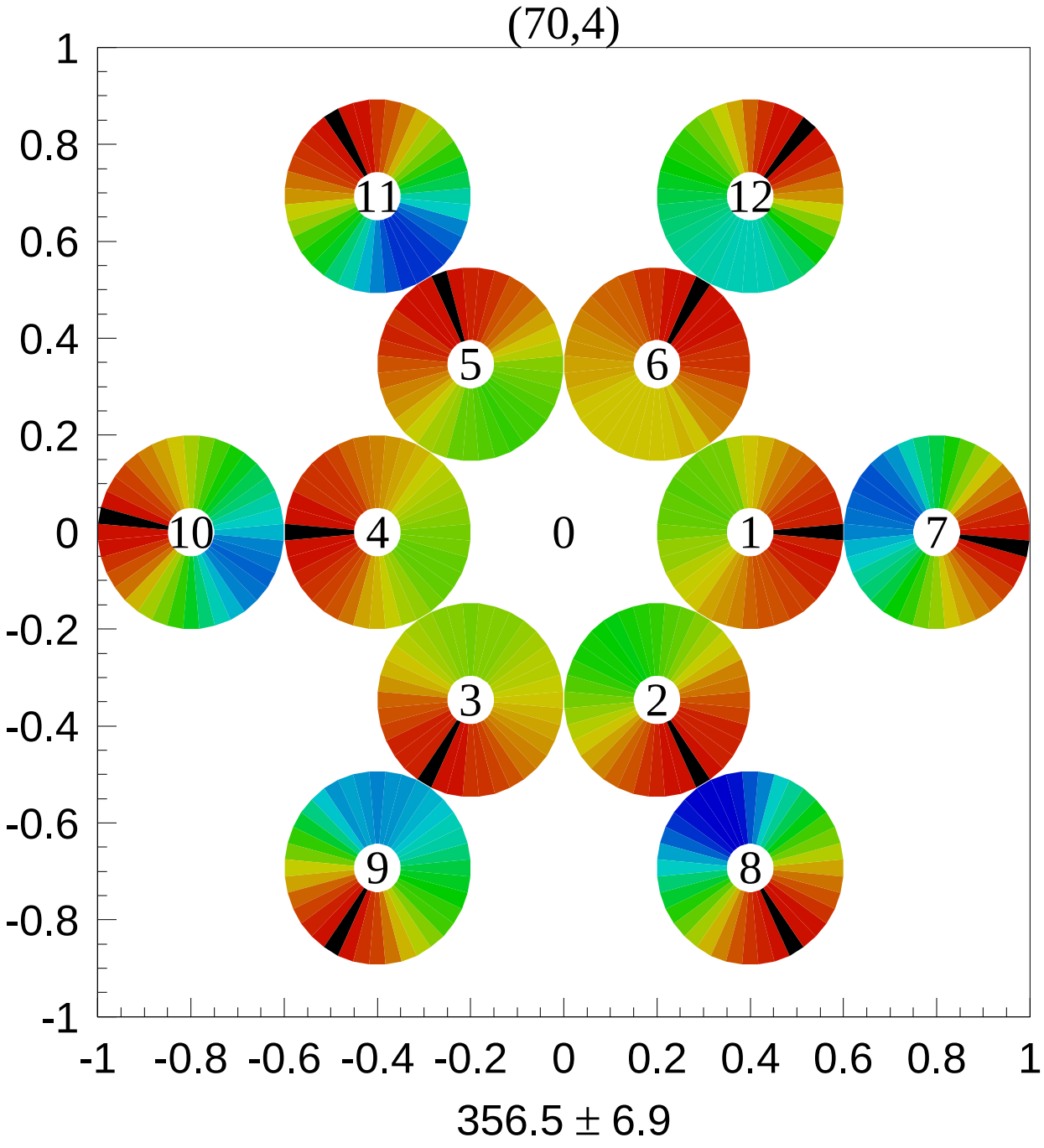

(70,2)
tilted LEDs
122 126 124 115 123 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 119 121 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

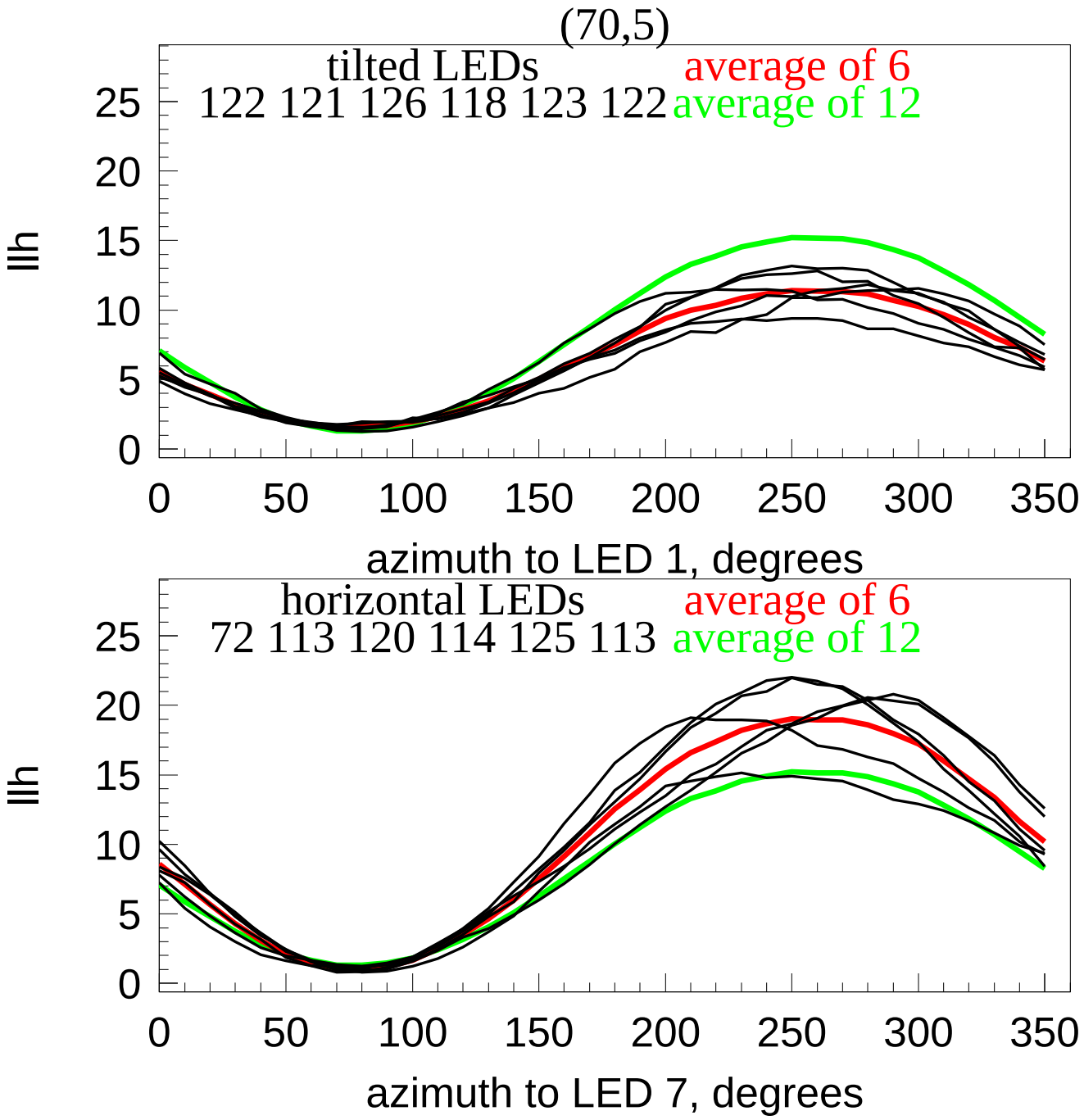

(70,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
206.7 ± 9.5
200
1
2
3
4
5
6
7
8
9
10
11
12

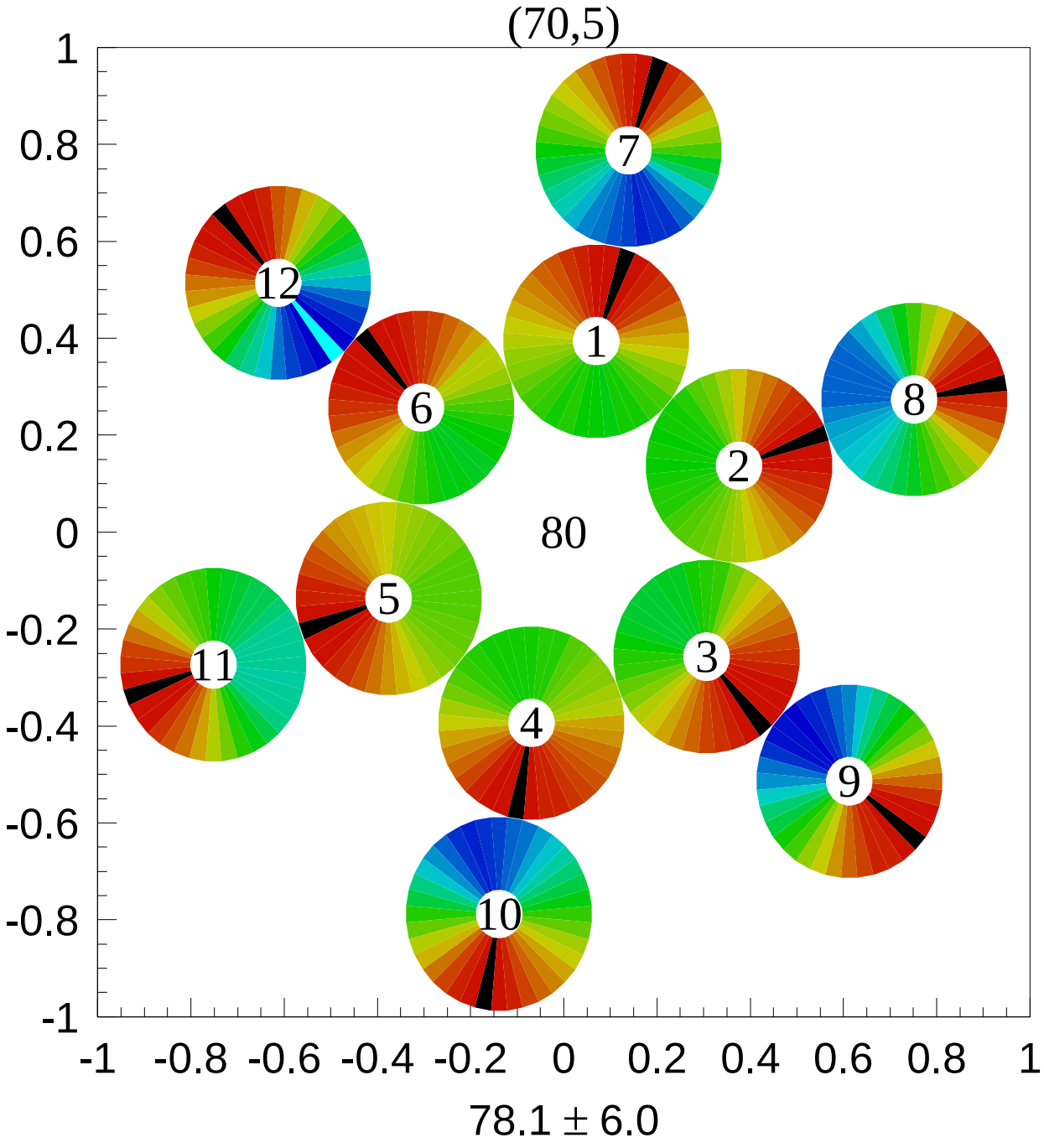

(70,3)
tilted LEDs
128 119 125 118 126 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 121 119 128 122 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

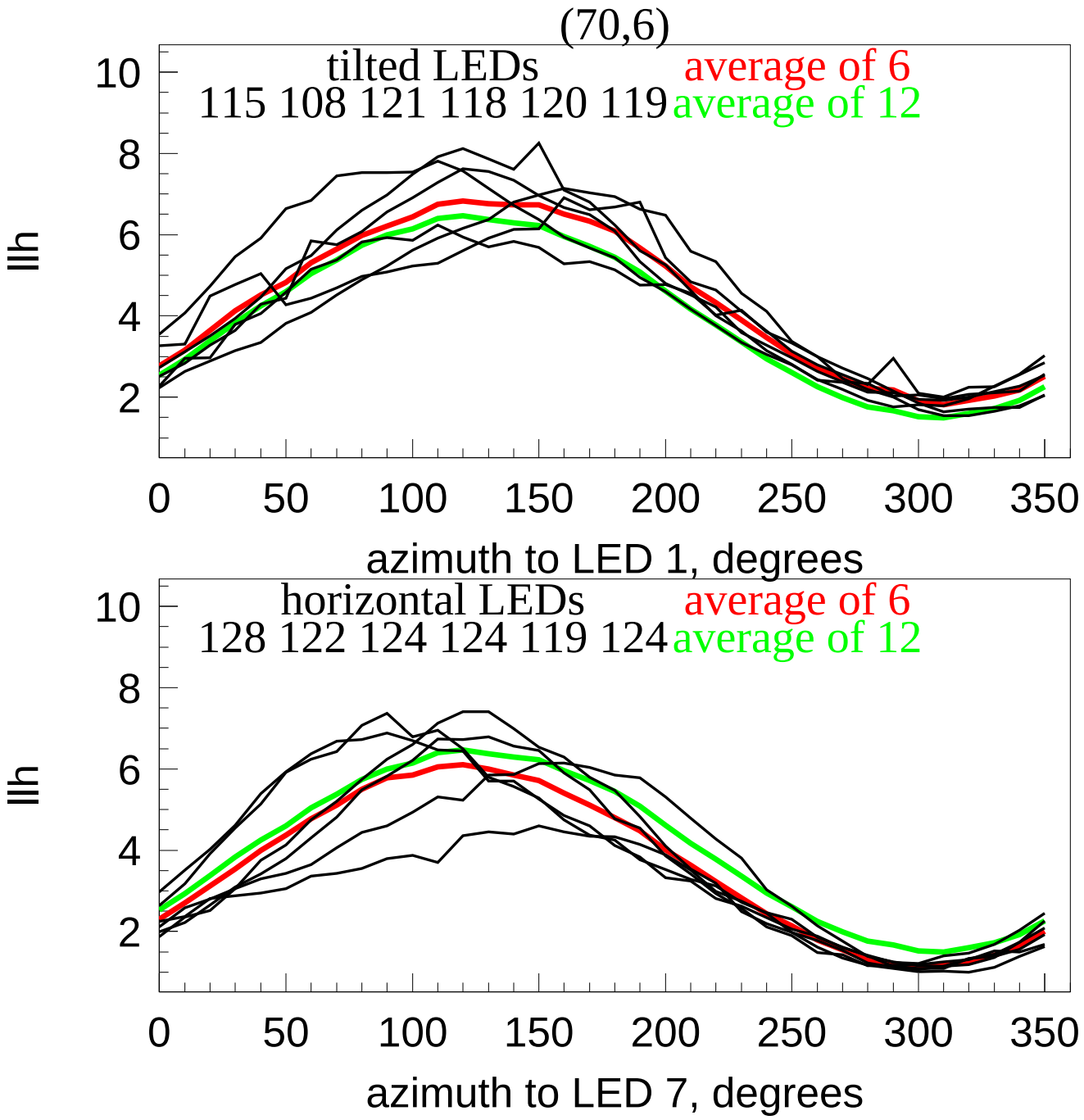

(70,3)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
321.9 ± 8.2

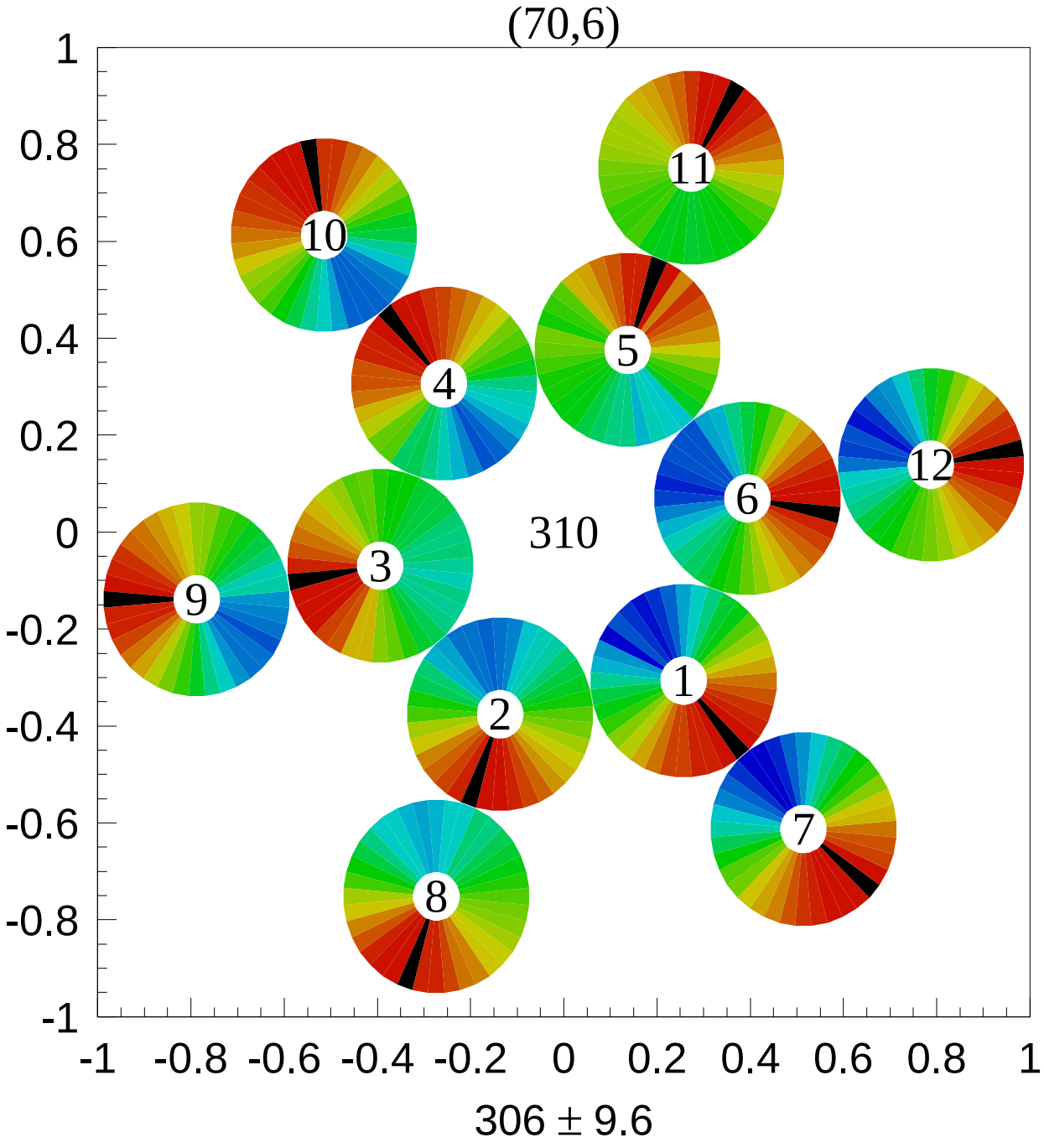

(70,4)
tilted LEDs
120 120 124 119 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 120 124 122 116 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

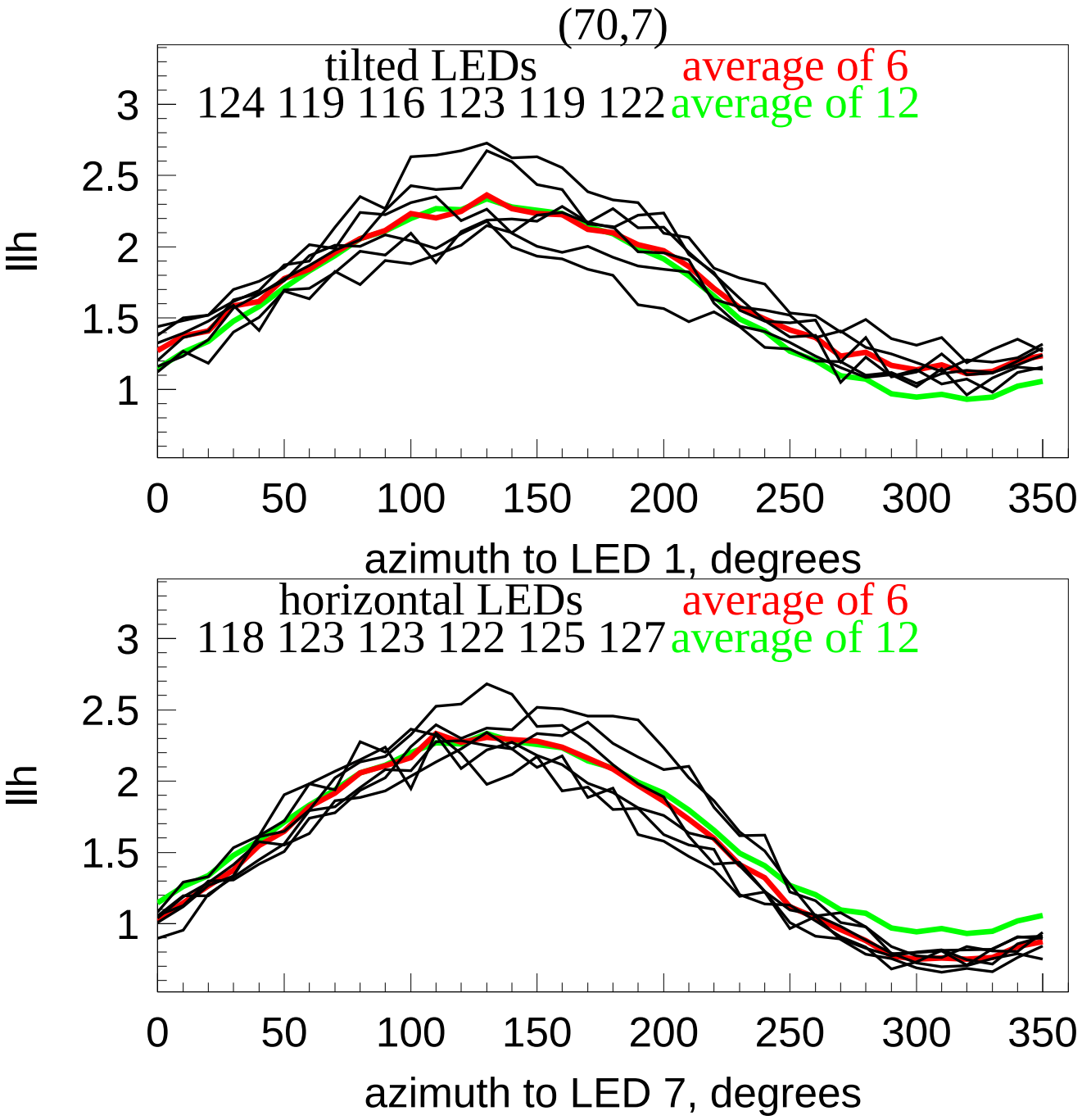

(70,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
356.5 ± 6.9

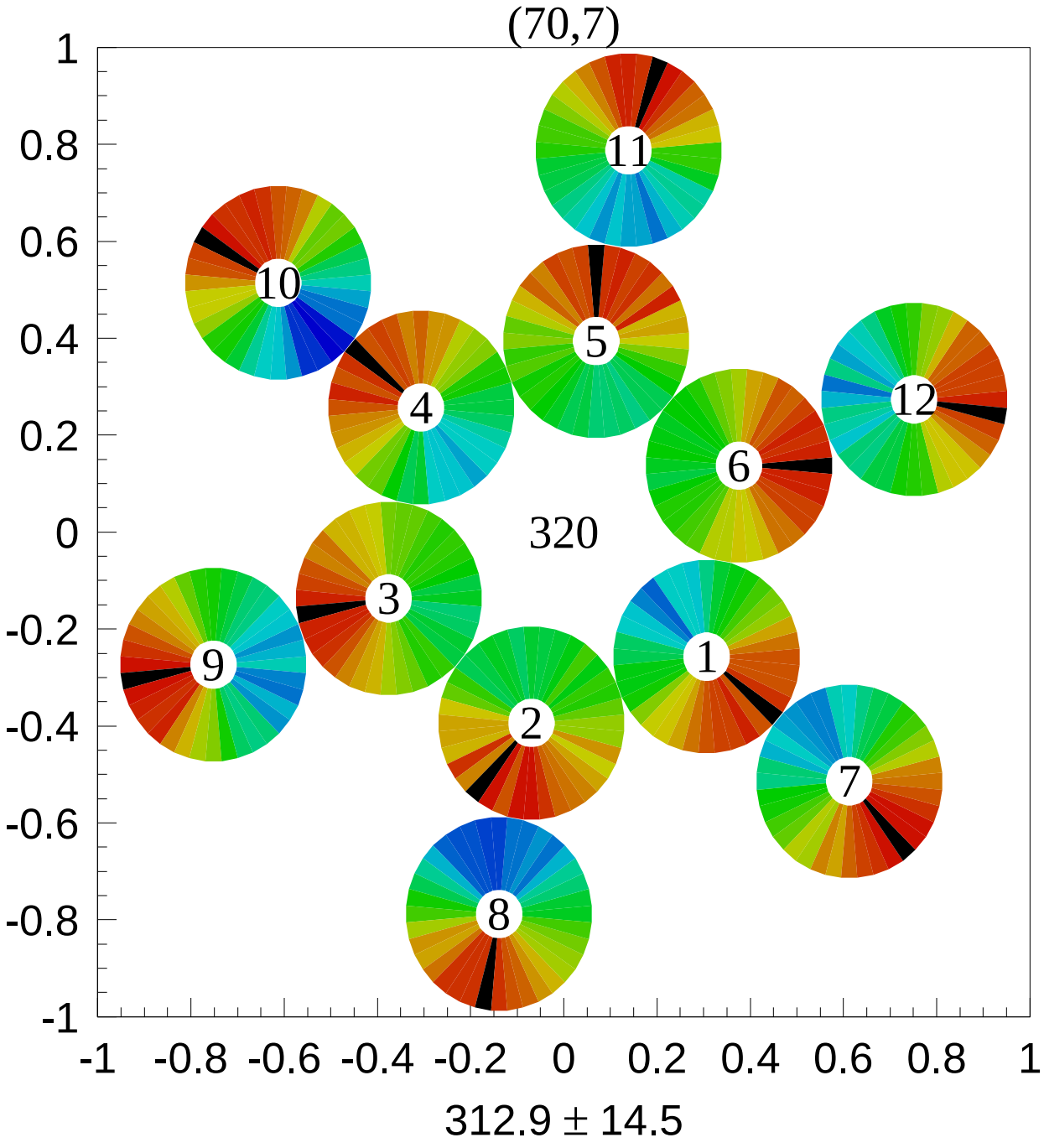

(70,5)
tilted LEDs
122 121 126 118 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
72 113 120 114 125 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

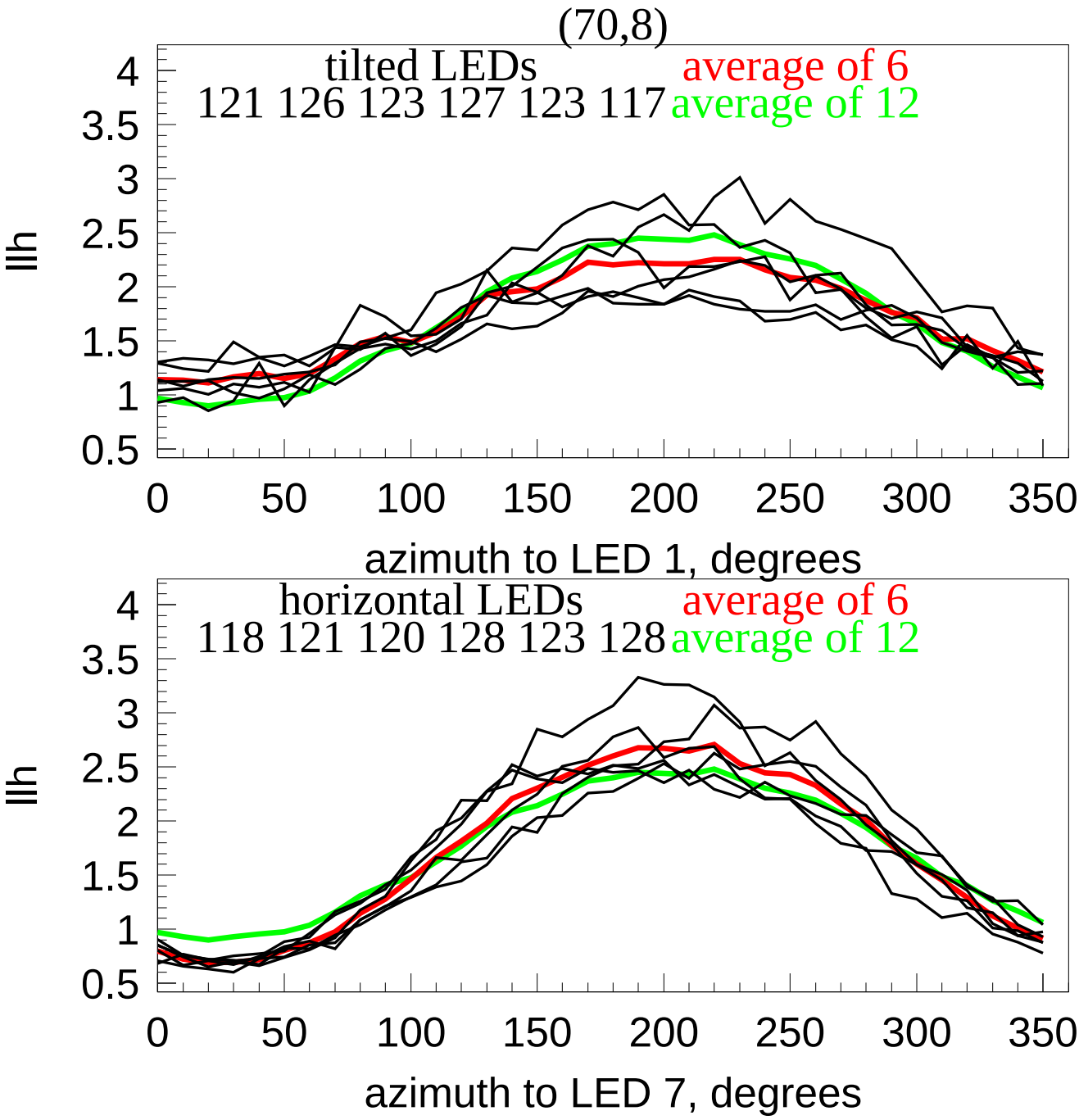

(70,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
78.1 ± 6.0

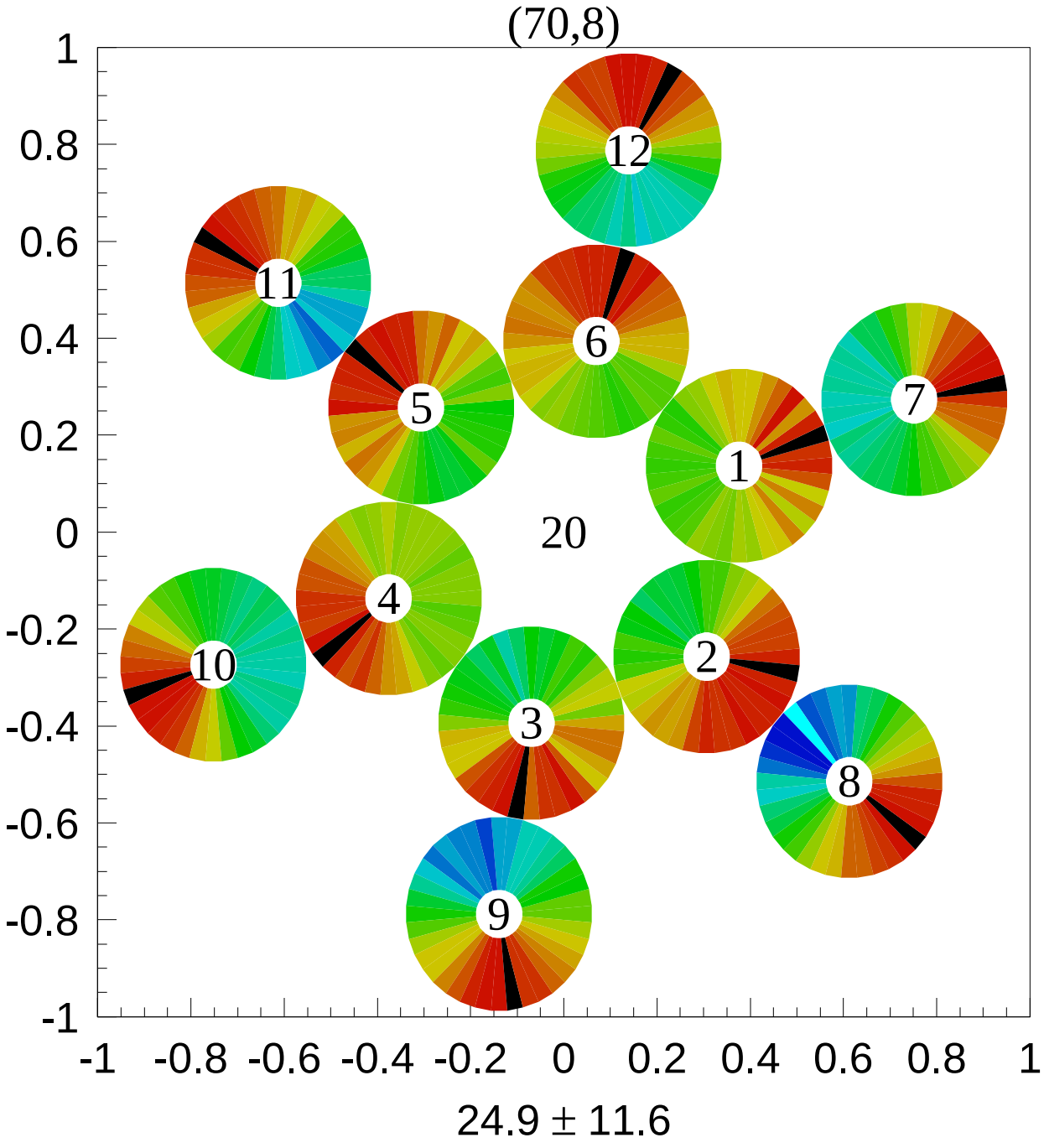

(70,6)
tilted LEDs
115 108 121 118 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 122 124 124 119 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

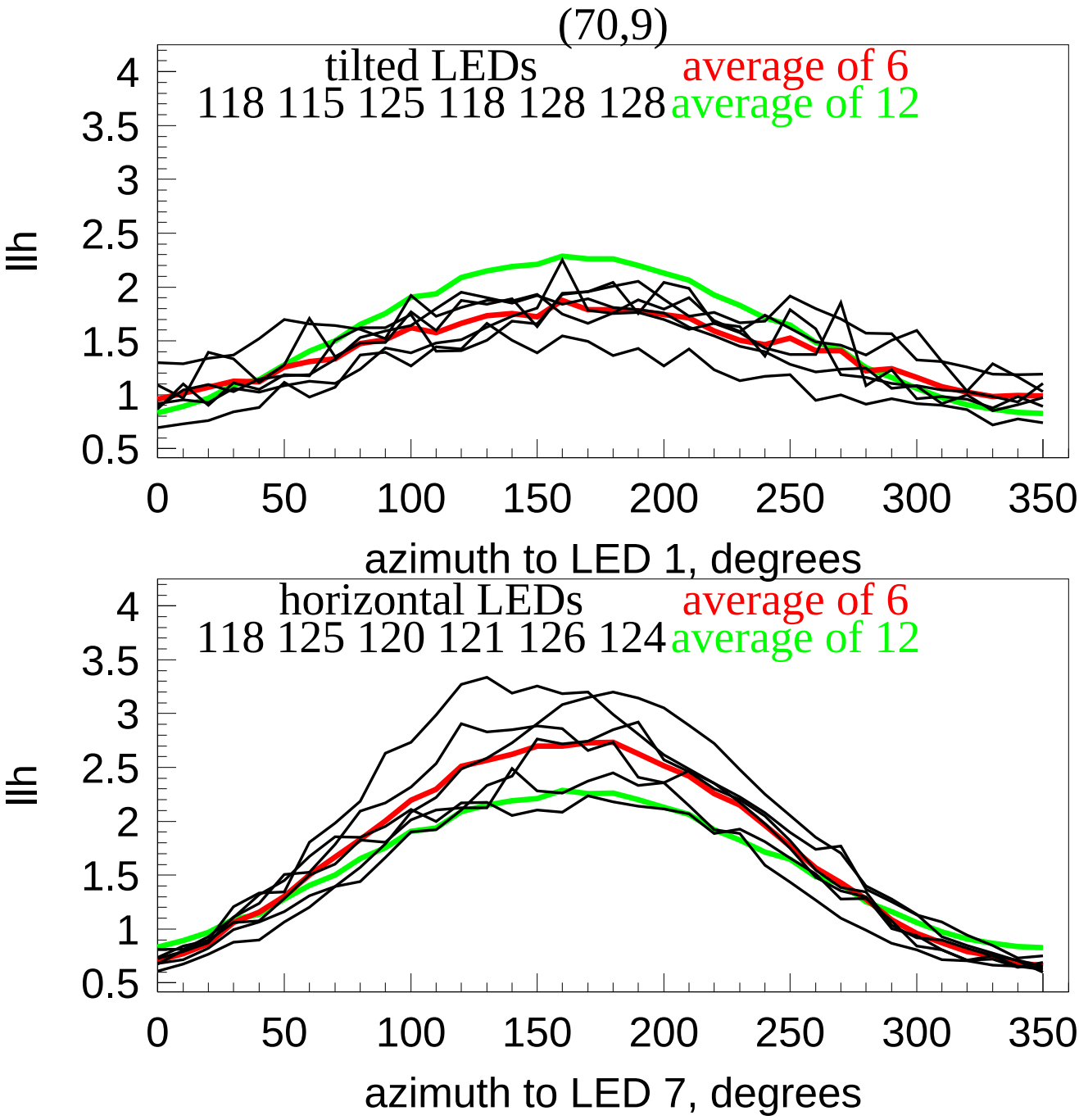

(70,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
306 ± 9.6
310
1
2
3
4
5
6
7
8
9
10
11
12

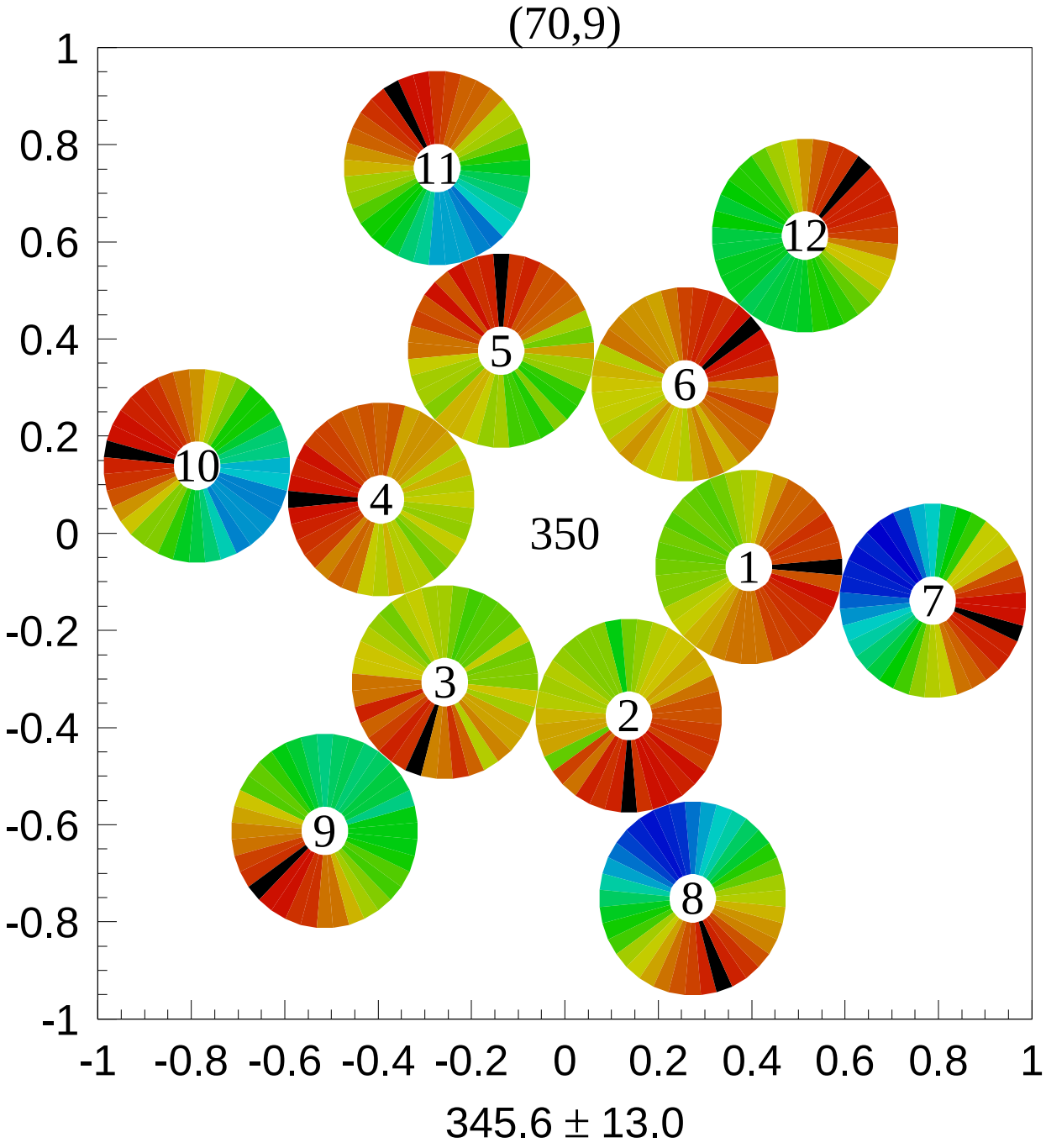

(70,7)
tilted LEDs
124 119 116 123 119 122
average of 6
average of 12
IIh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 123 123 122 125 127
average of 6
average of 12
IIh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

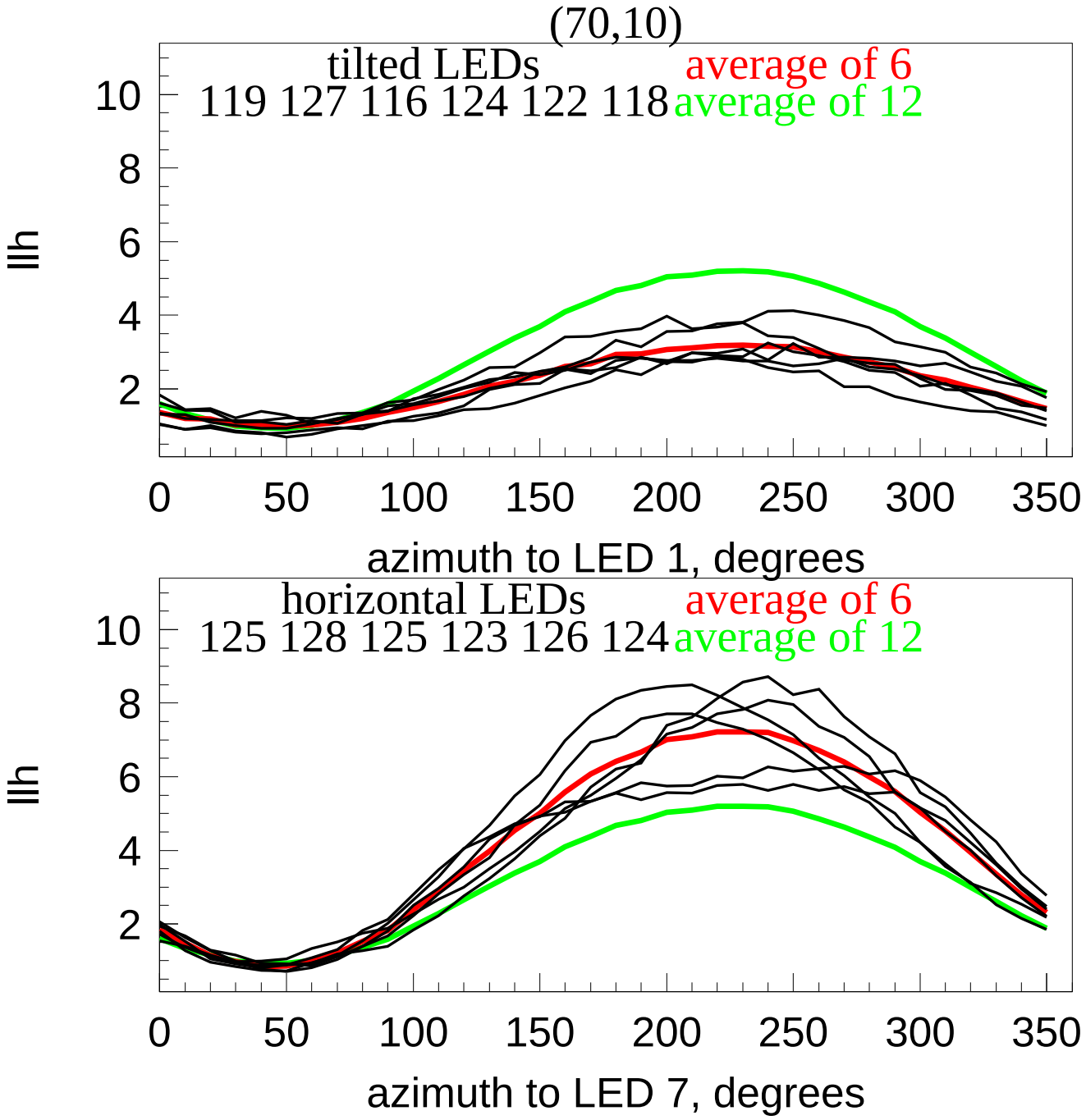

(70,7)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
312.9 ± 14.5

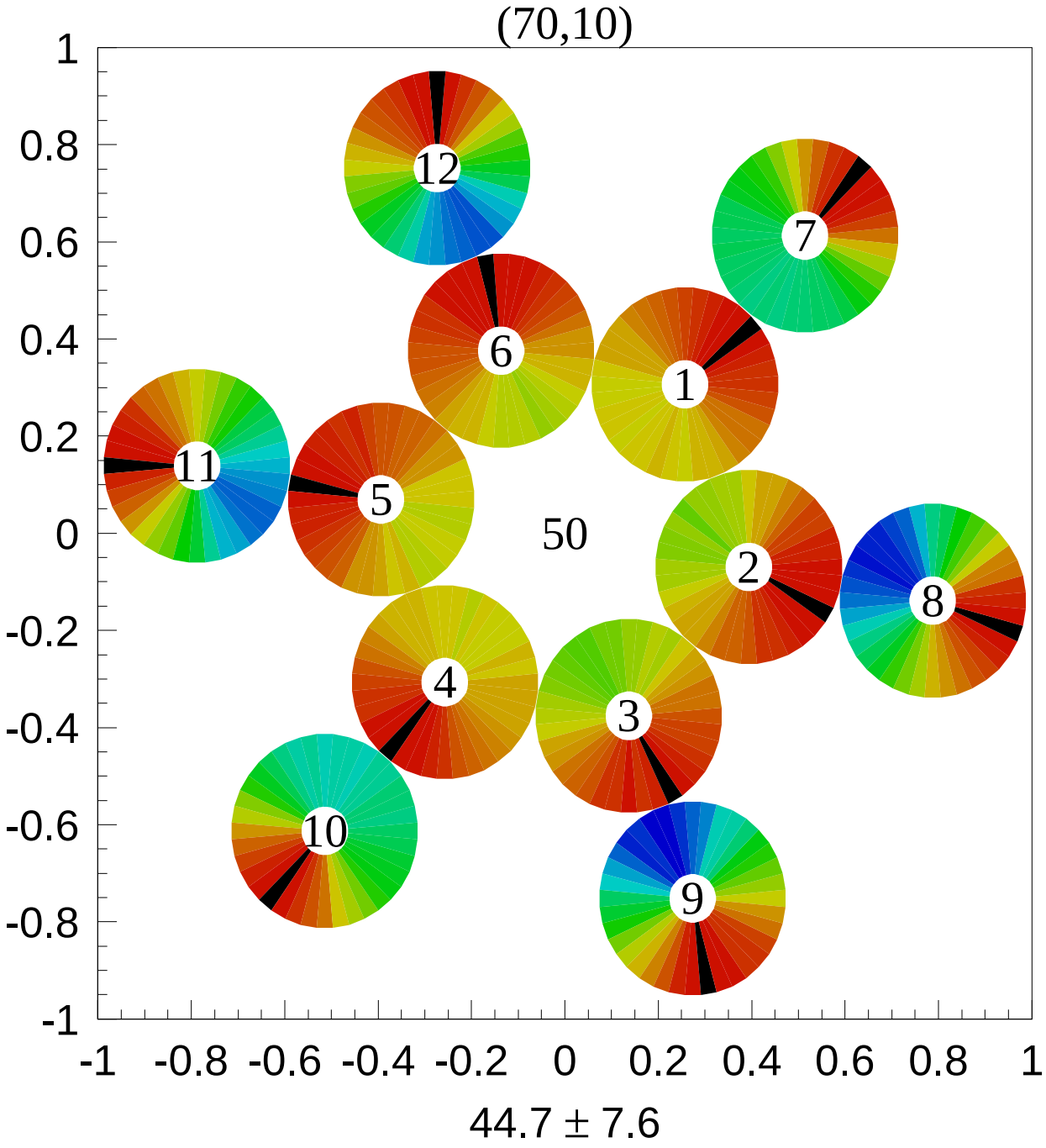

(70,8)
tilted LEDs
121 126 123 127 123 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 120 128 123 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

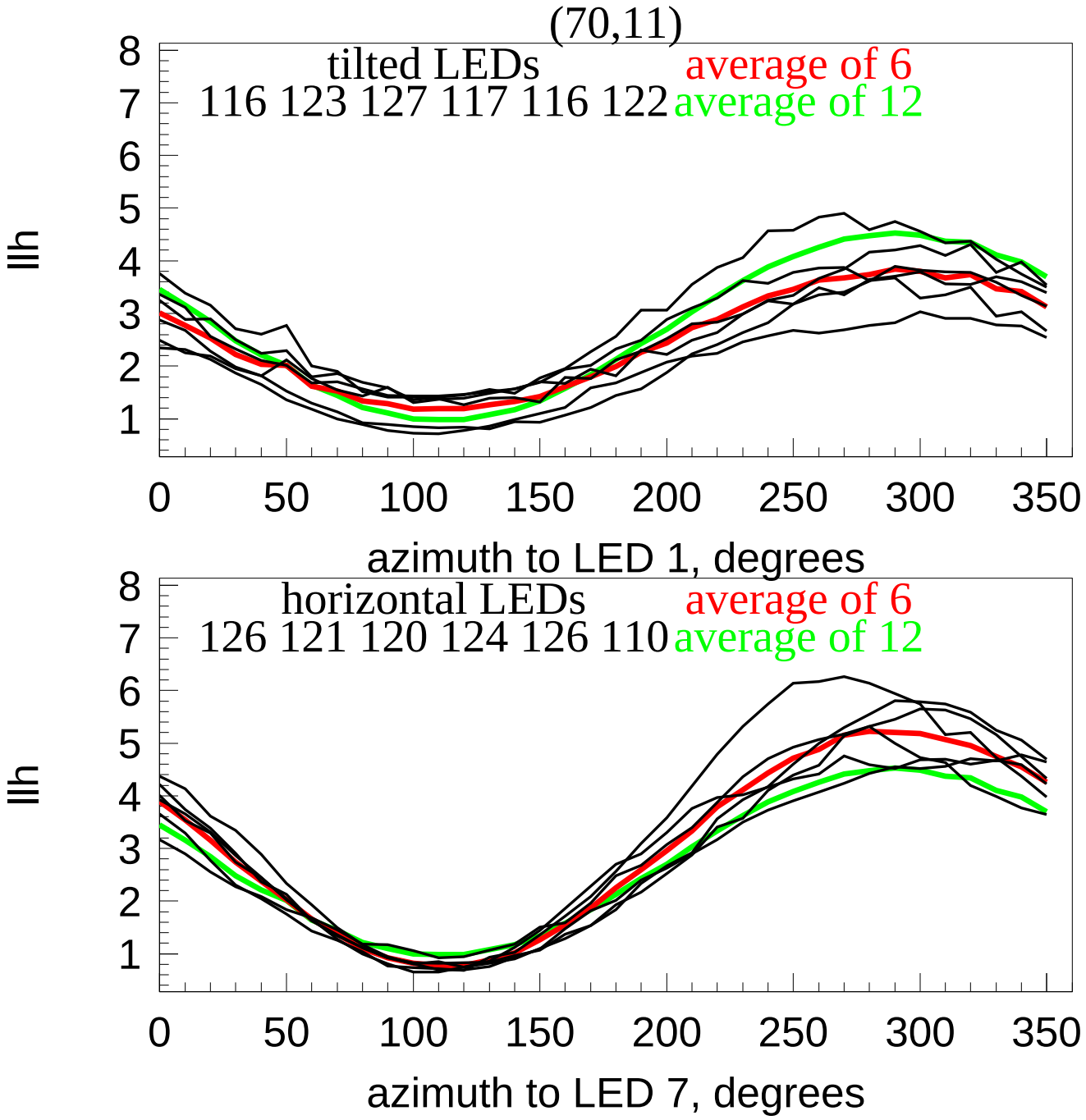

(70,8)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
24.9 ± 11.6

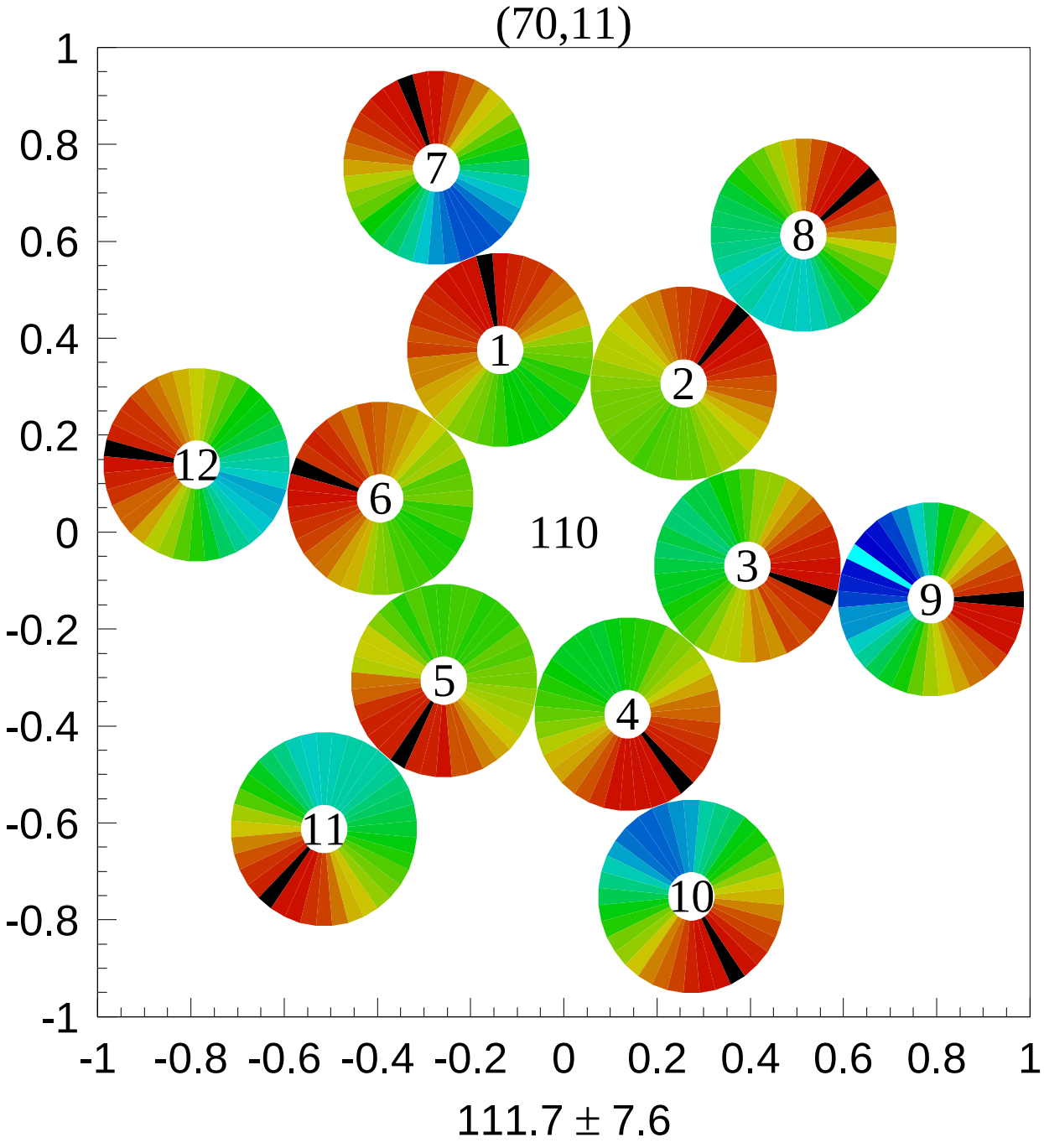

(70,9)
tilted LEDs
118 115 125 118 128 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 125 120 121 126 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

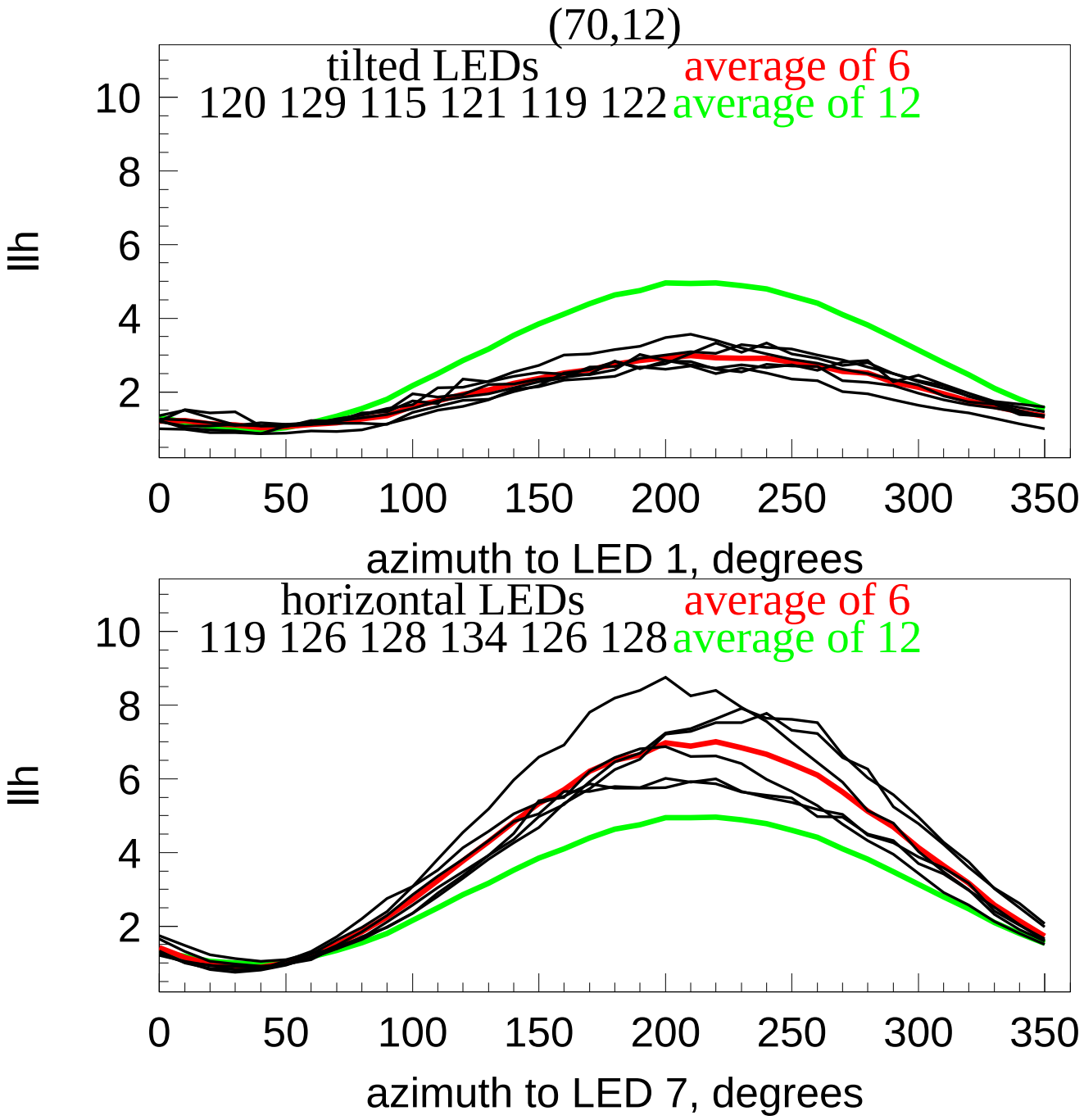

(70,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
345.6 ± 13.0

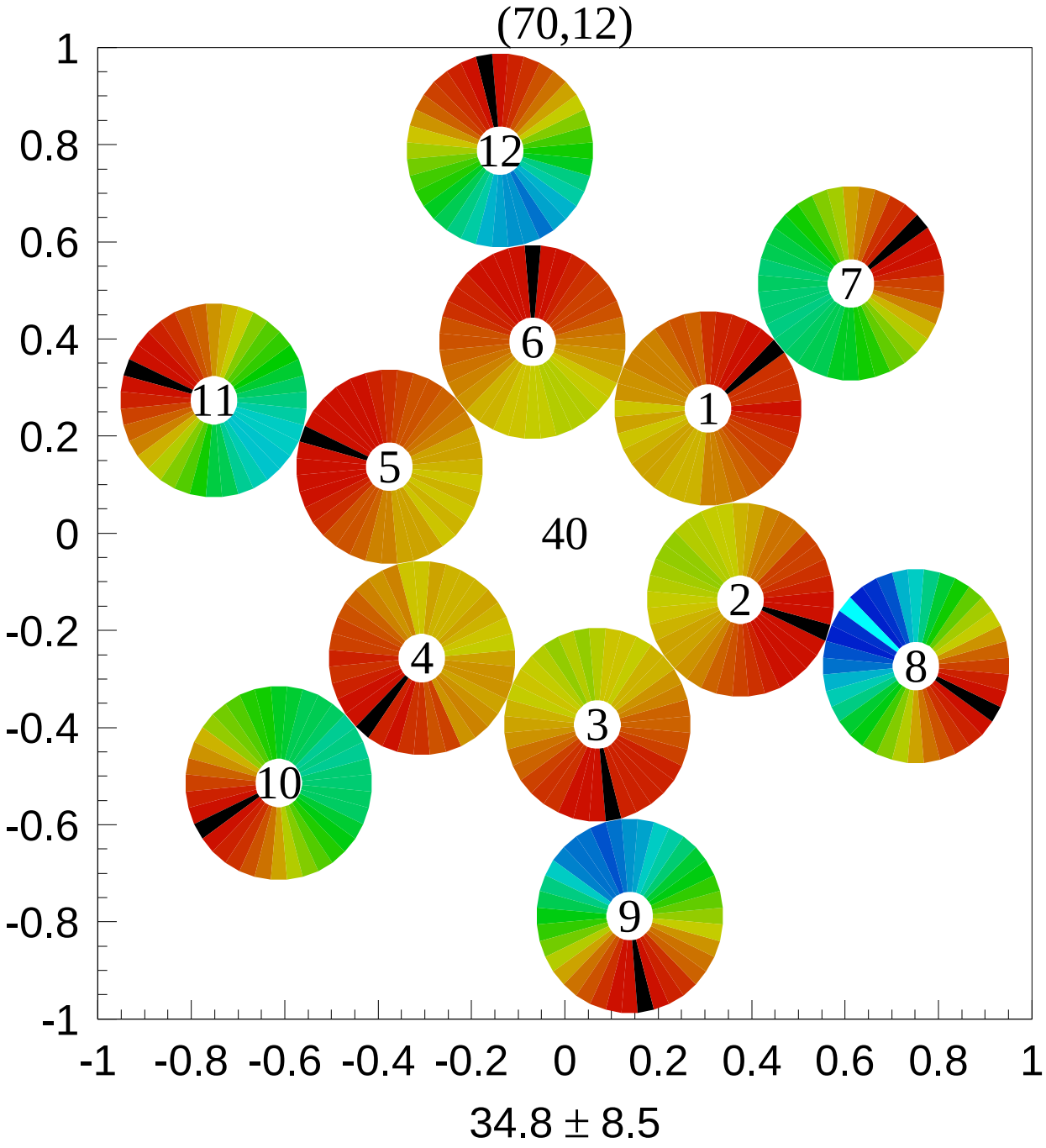

(70,10)
tilted LEDs
119 127 116 124 122 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 128 125 123 126 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

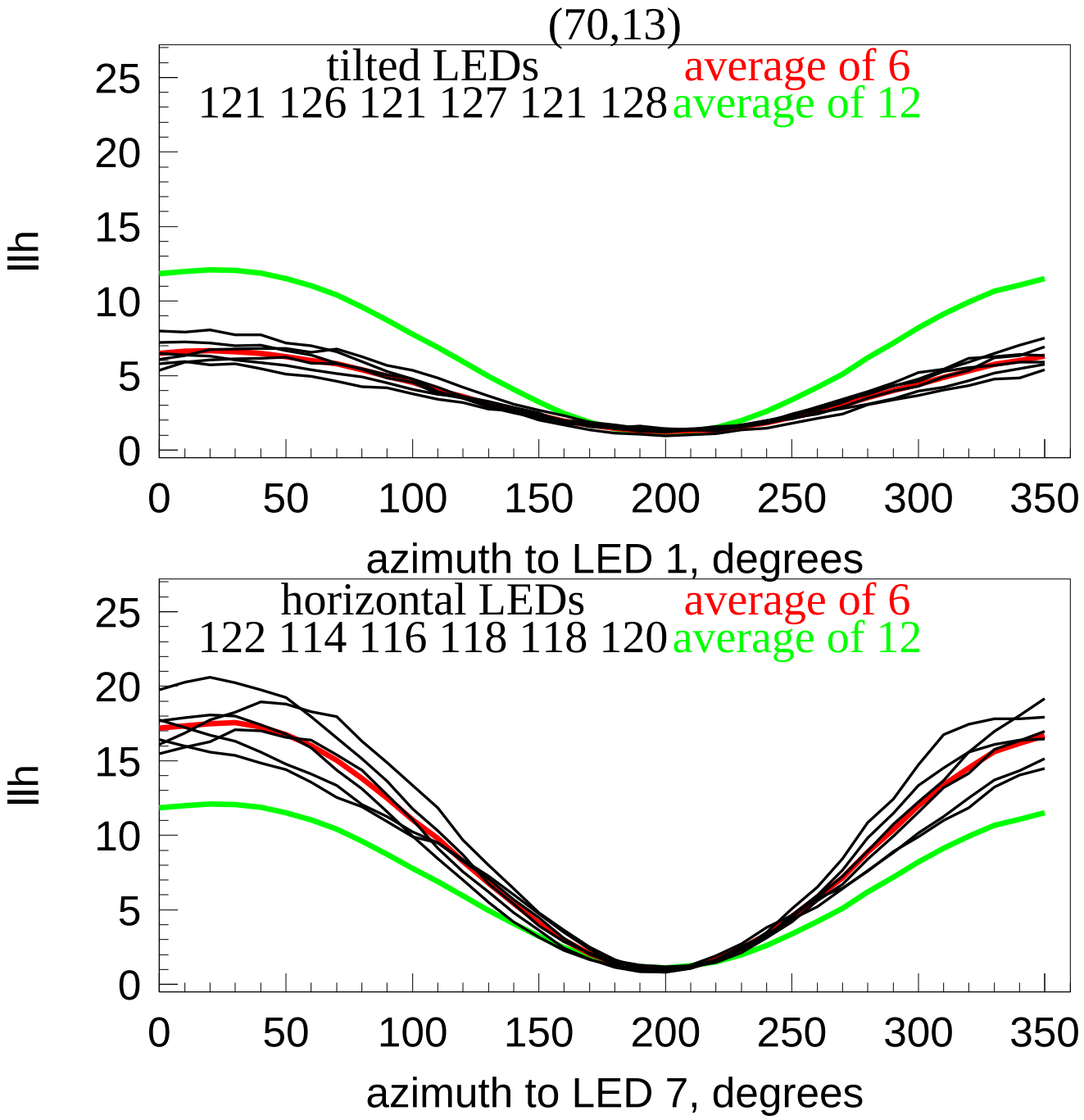

(70,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
44.7 ± 7.6

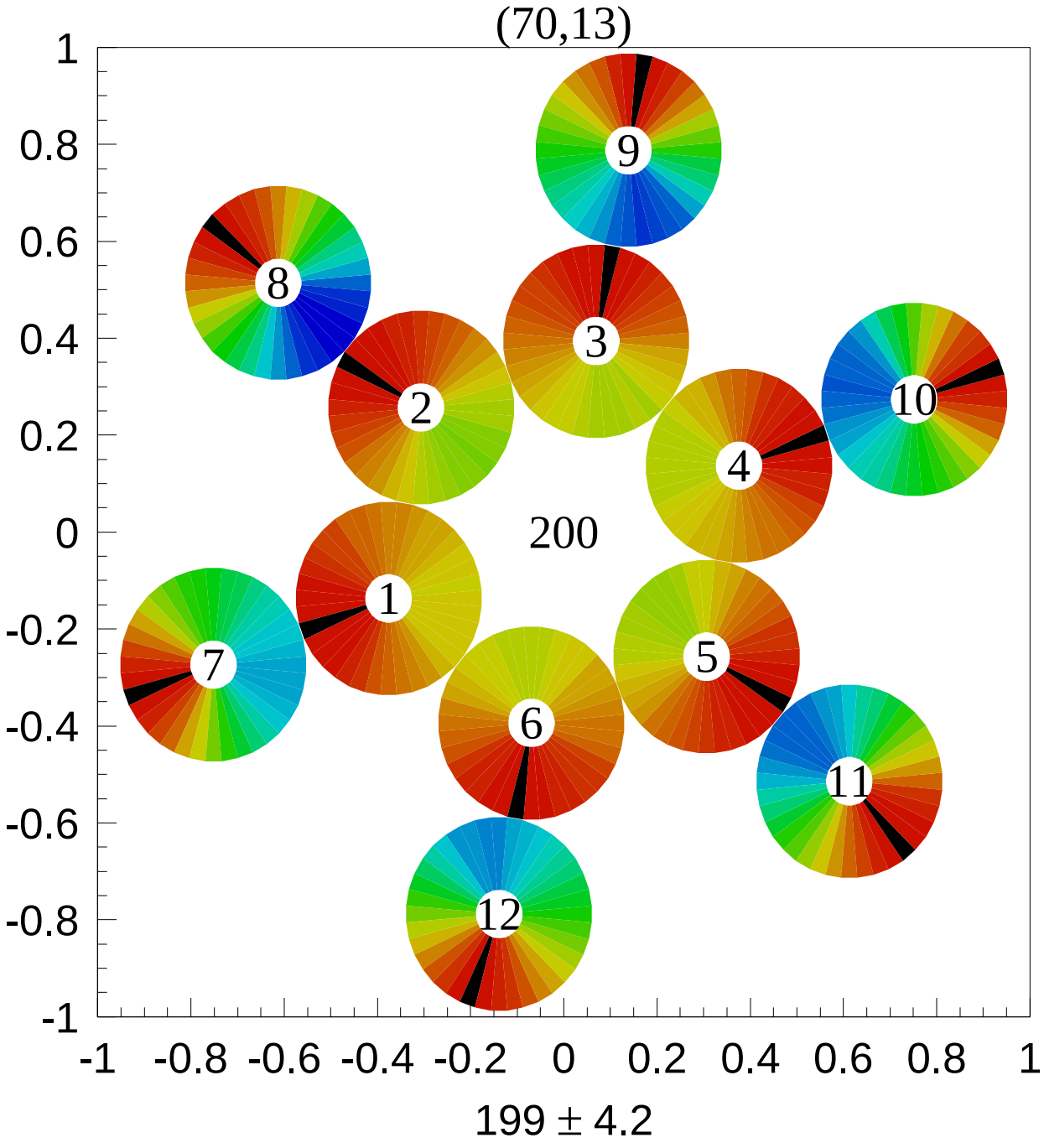

(70,11)
tilted LEDs
116 123 127 117 116 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 121 120 124 126 110
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

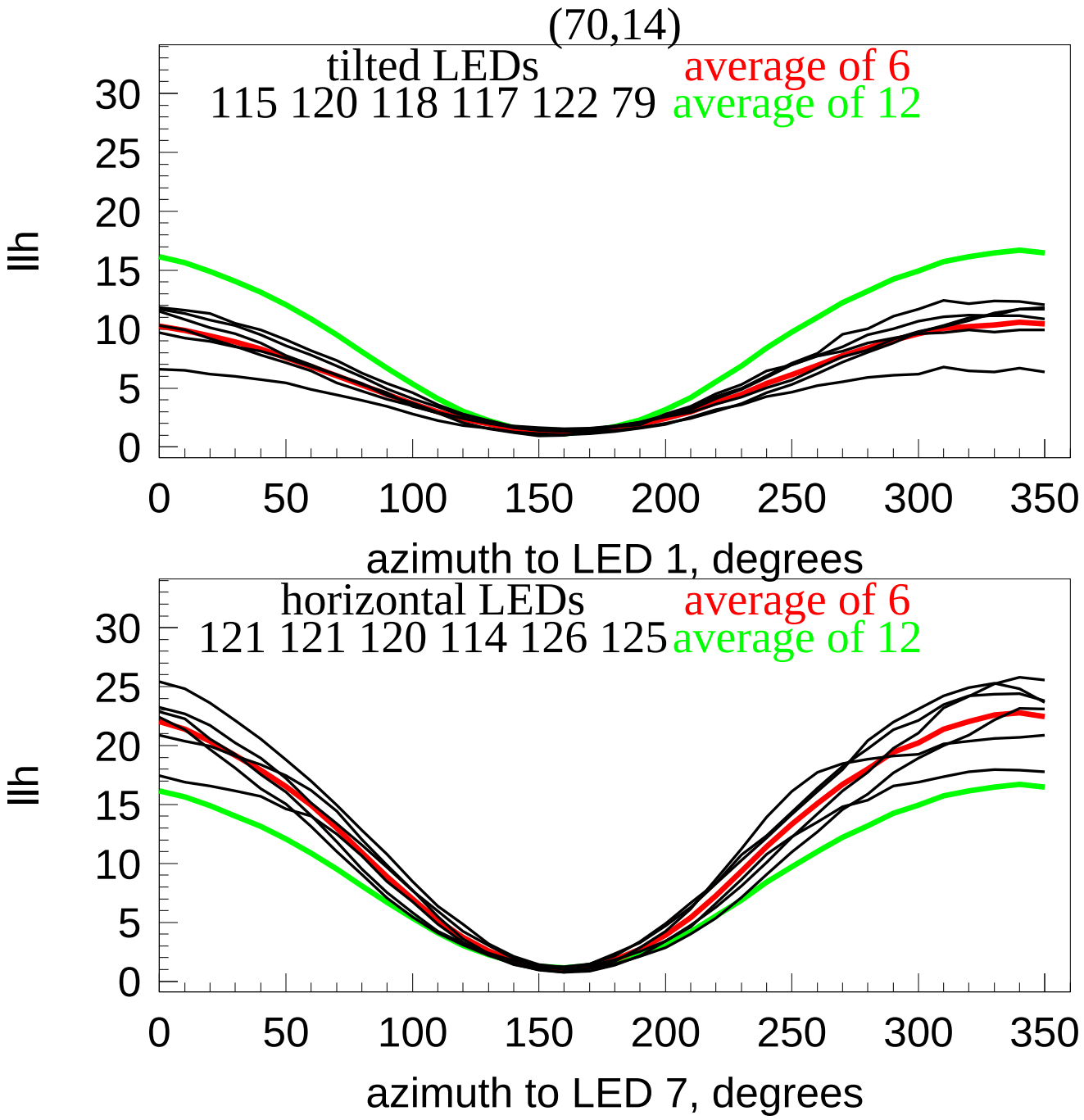

(70,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
111.7 ± 7.6

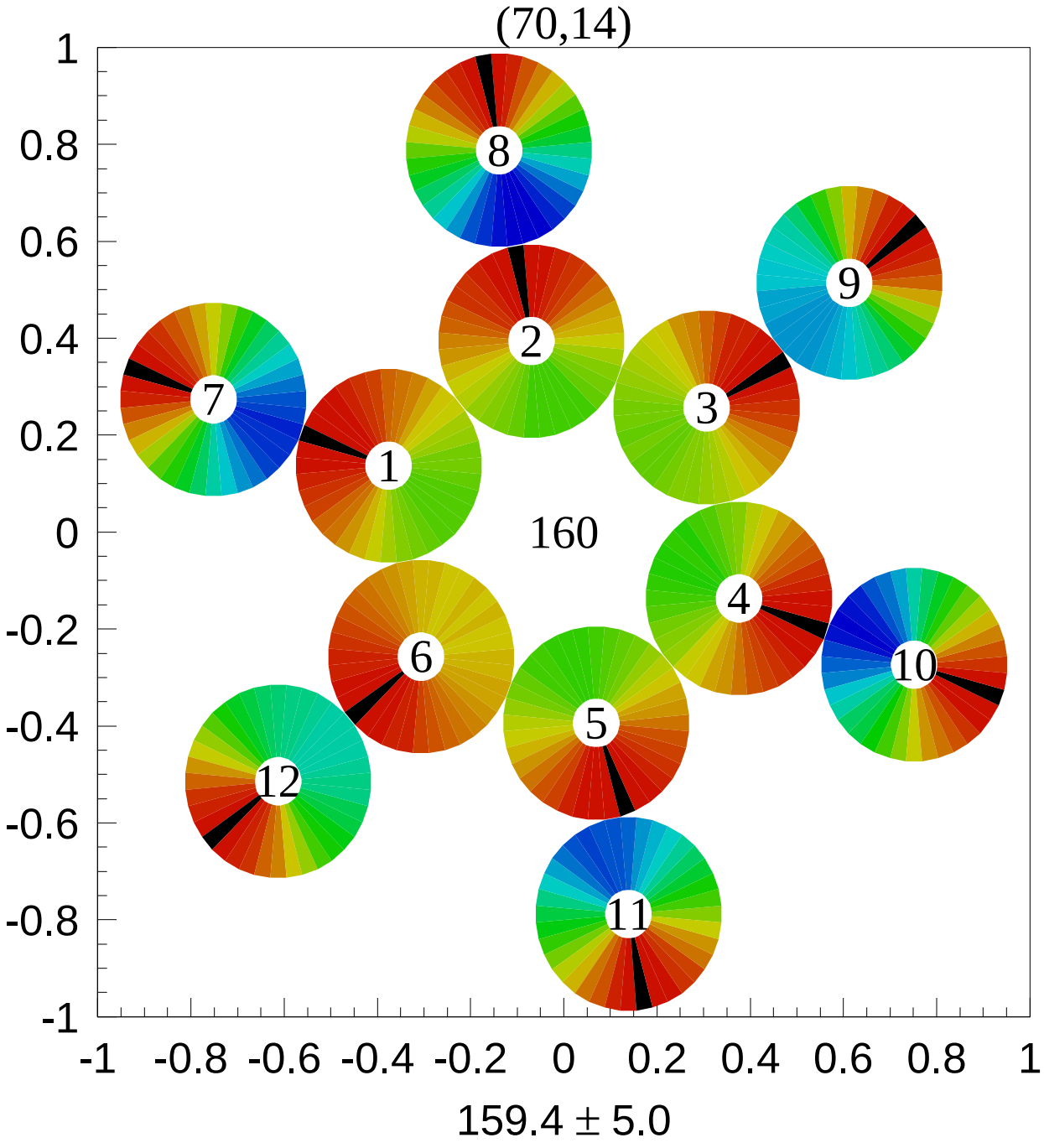

(70,12)
tilted LEDs
120 129 115 121 119 122
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 126 128 134 126 128
average of 6
average of 12
10
8
6
4
2
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

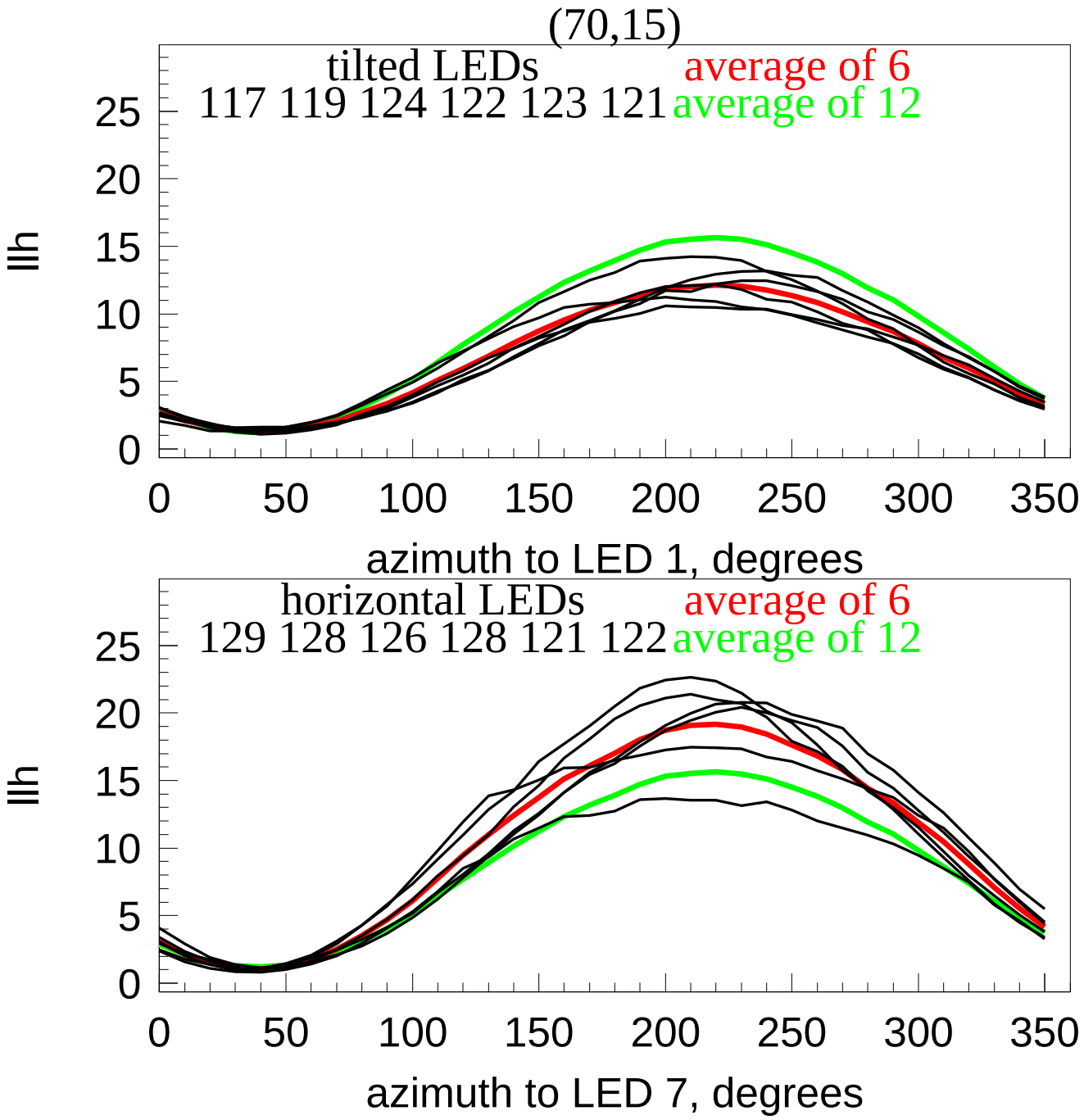

(70,12)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
34.8 ± 8.5

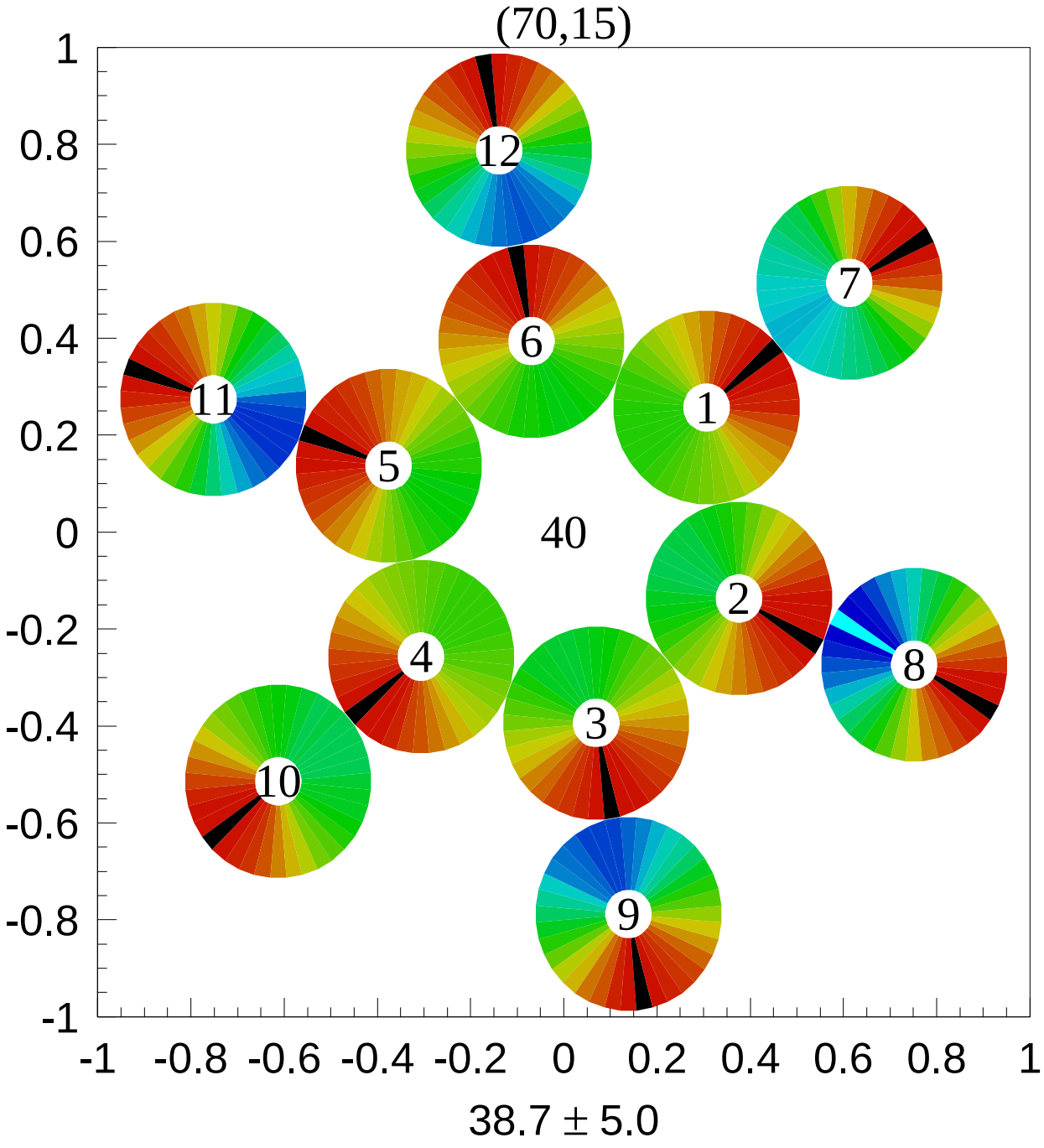

(70,13)
tilted LEDs
121 126 121 127 121 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 114 116 118 118 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

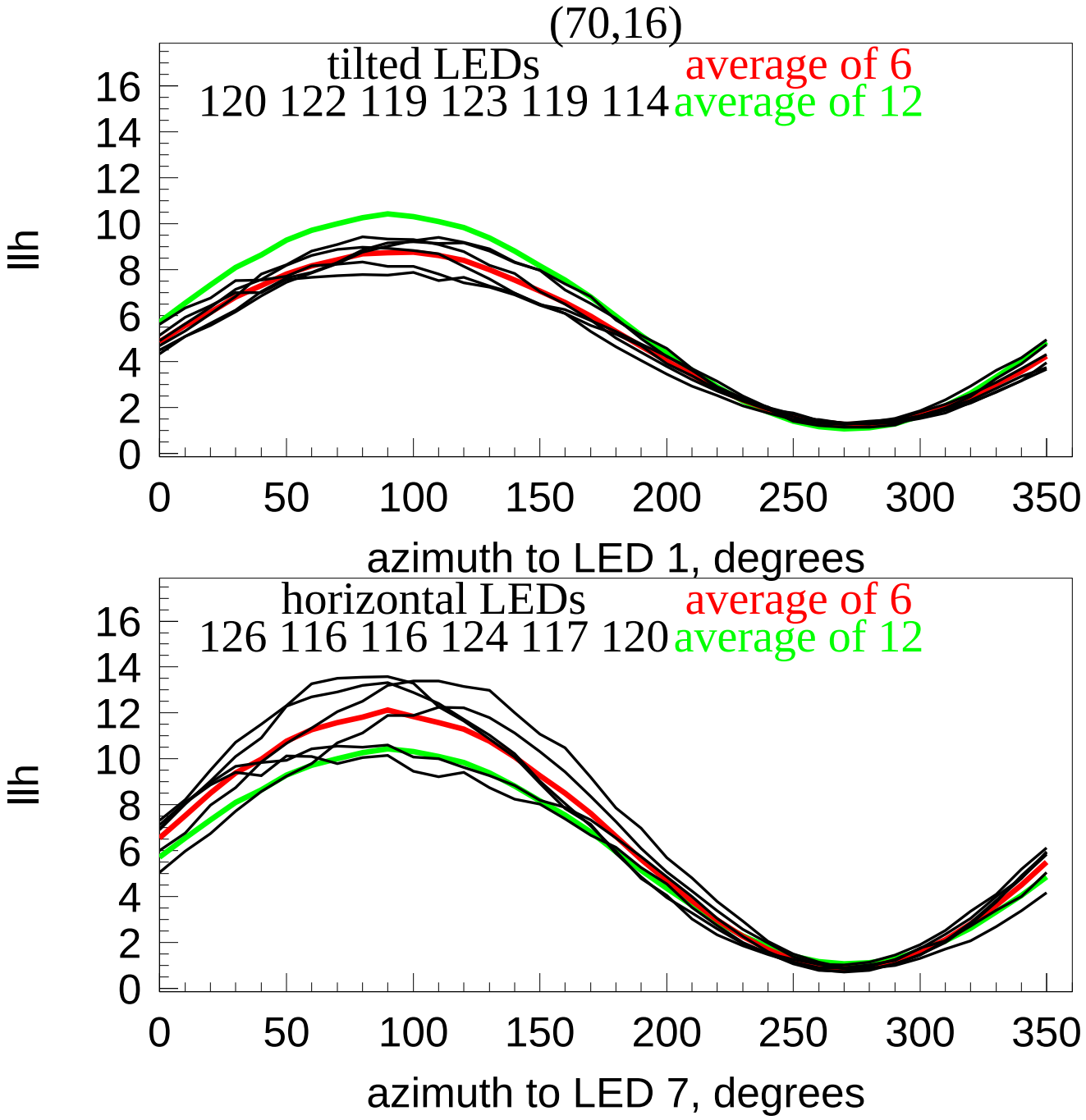

(70,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
199 ± 4.2

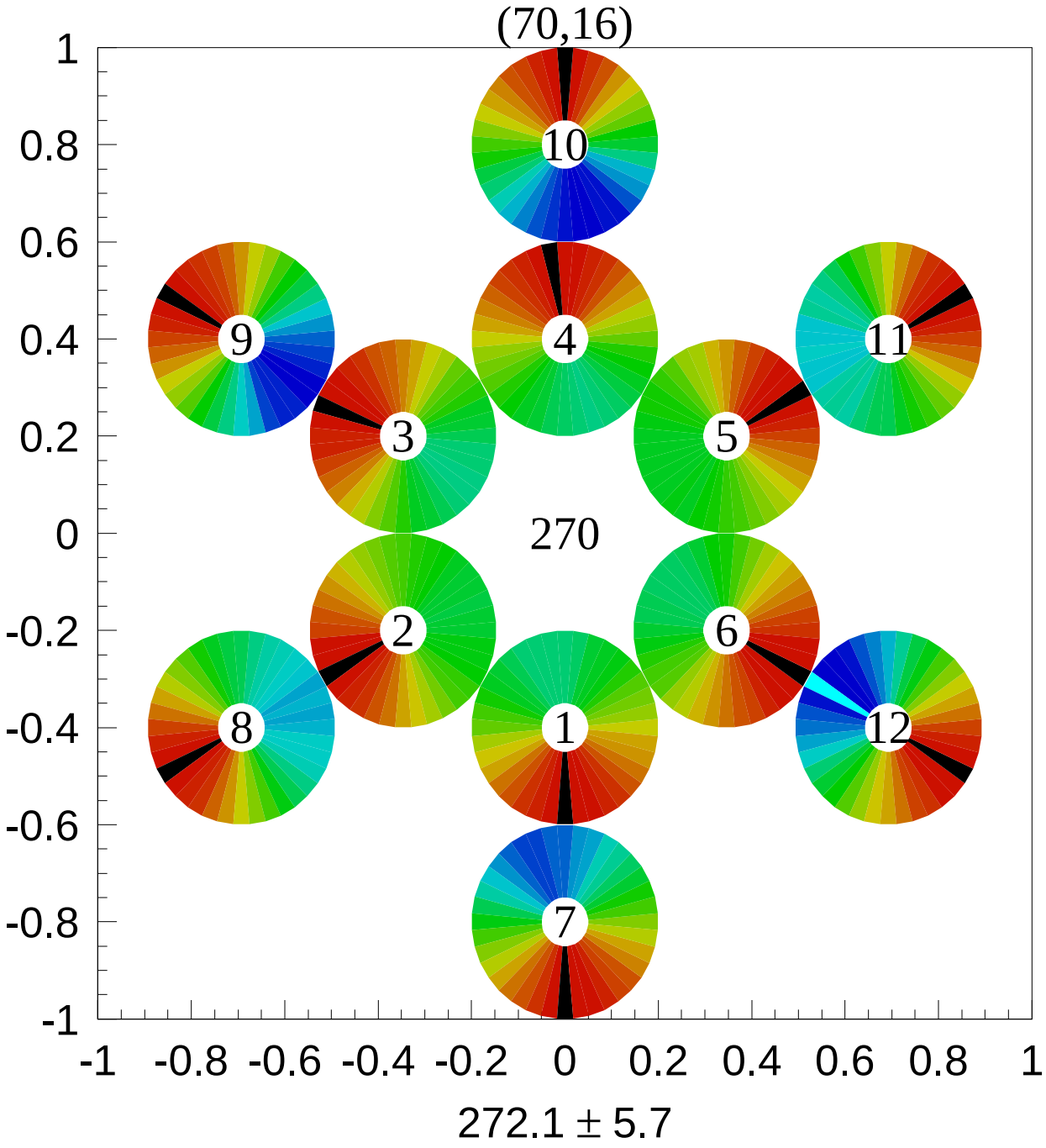

(70,14)
tilted LEDs
115 120 118 117 122 79
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 121 120 114 126 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

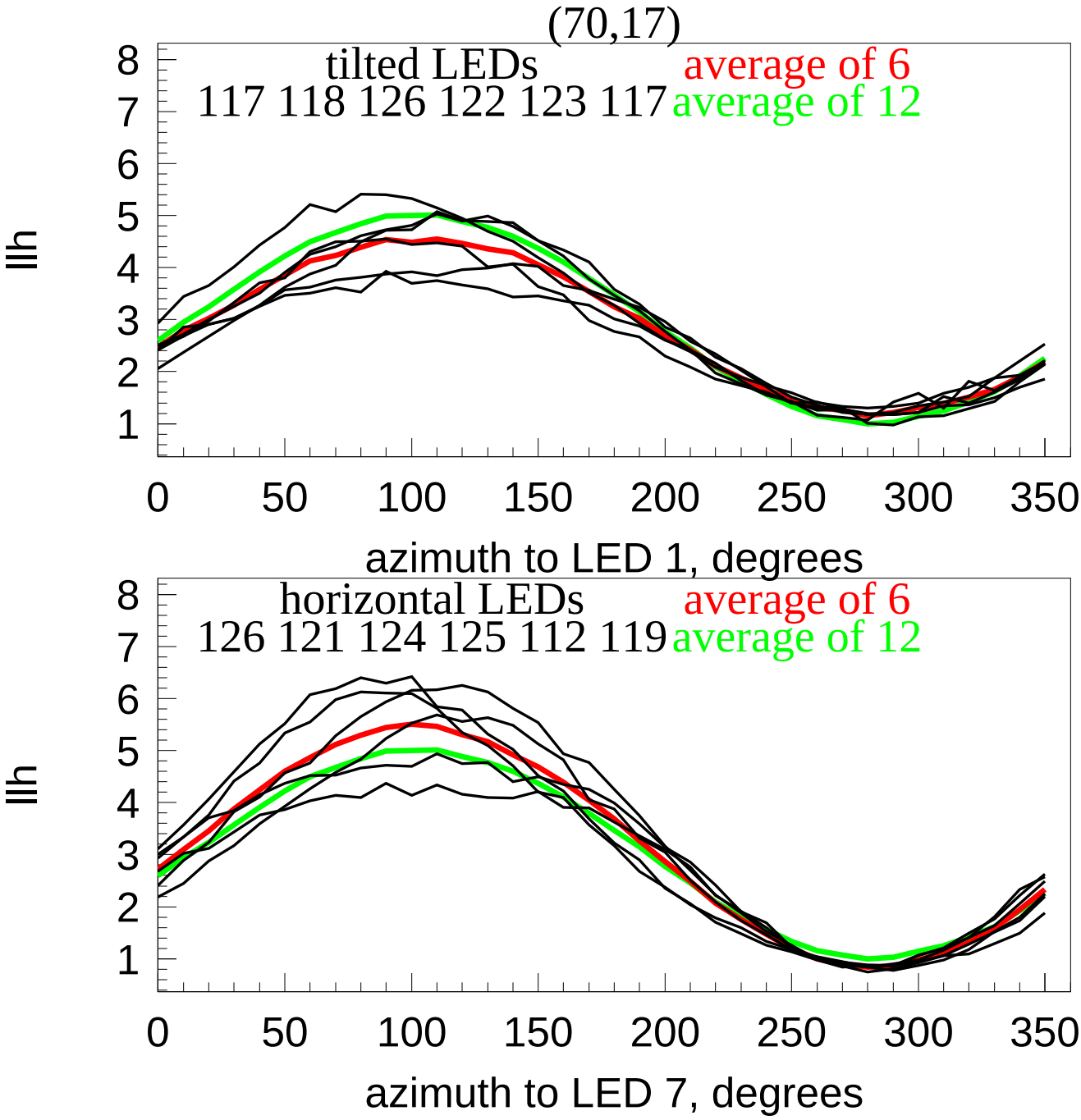

(70,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
10
6
5
12
11
159.4 ± 5.0

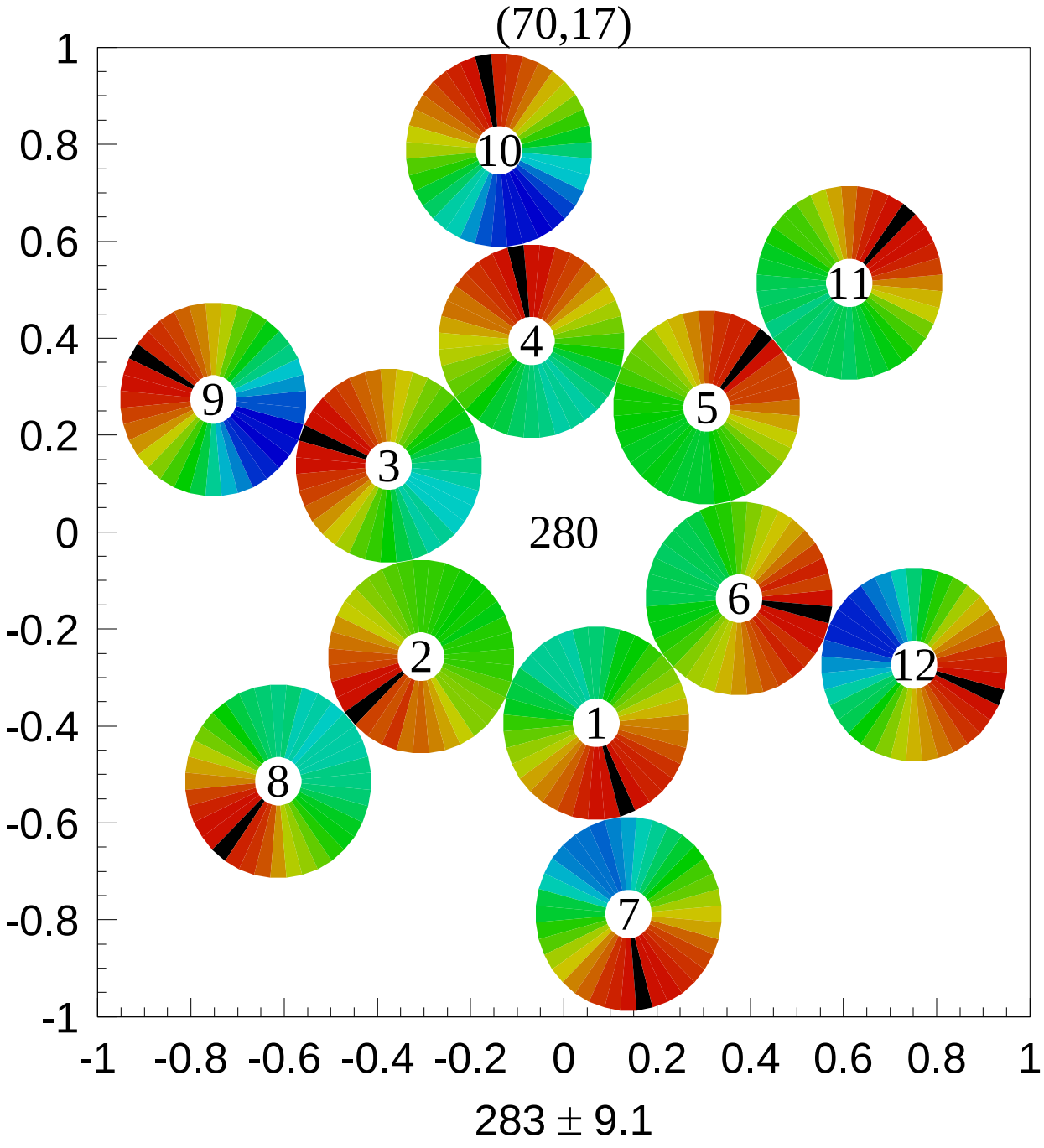

(70,15)
tilted LEDs
117 119 124 122 123 121
average of 6
average of 12
Ilh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
129 128 126 128 121 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

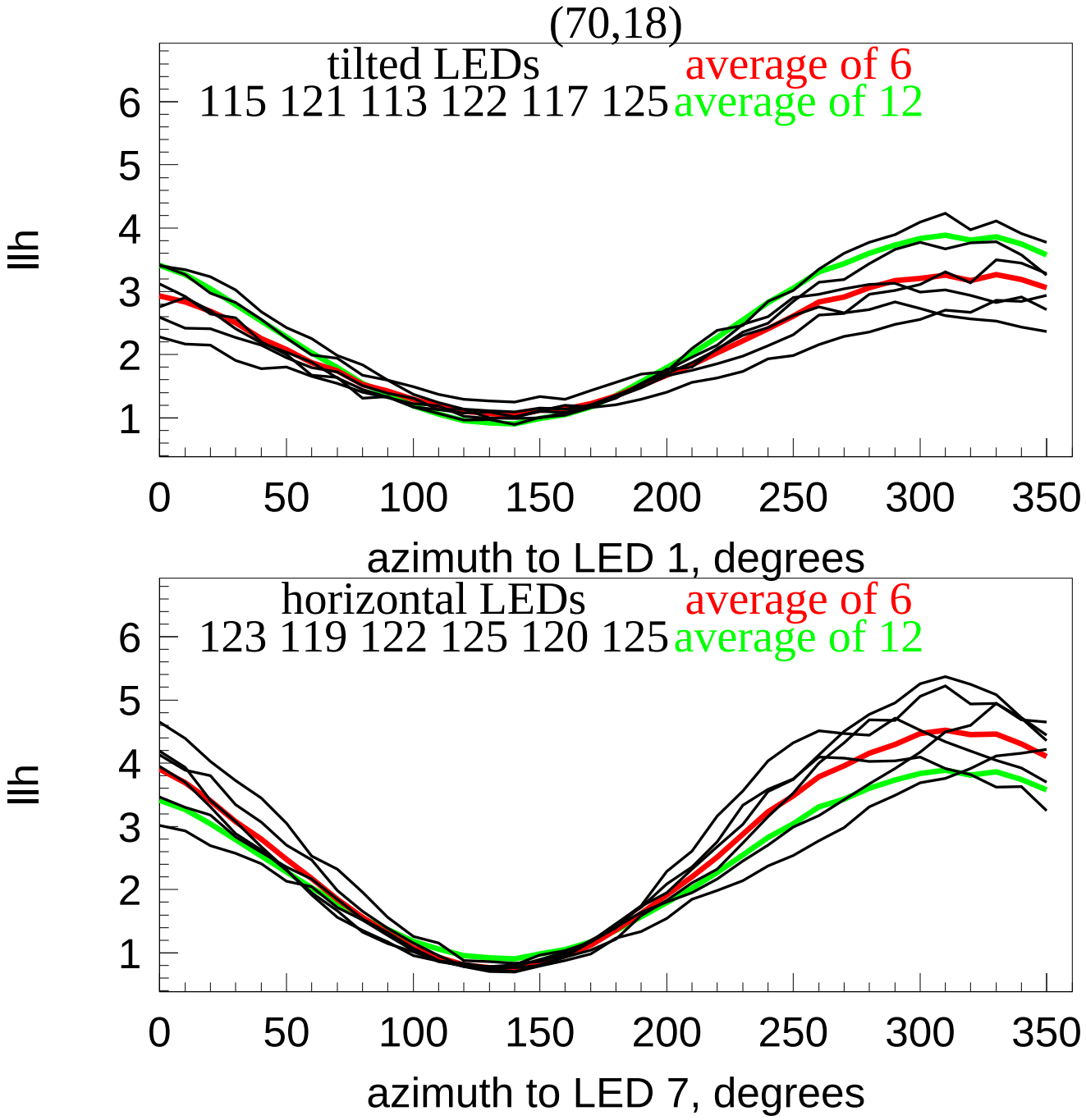

(70,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
38.7 ± 5.0

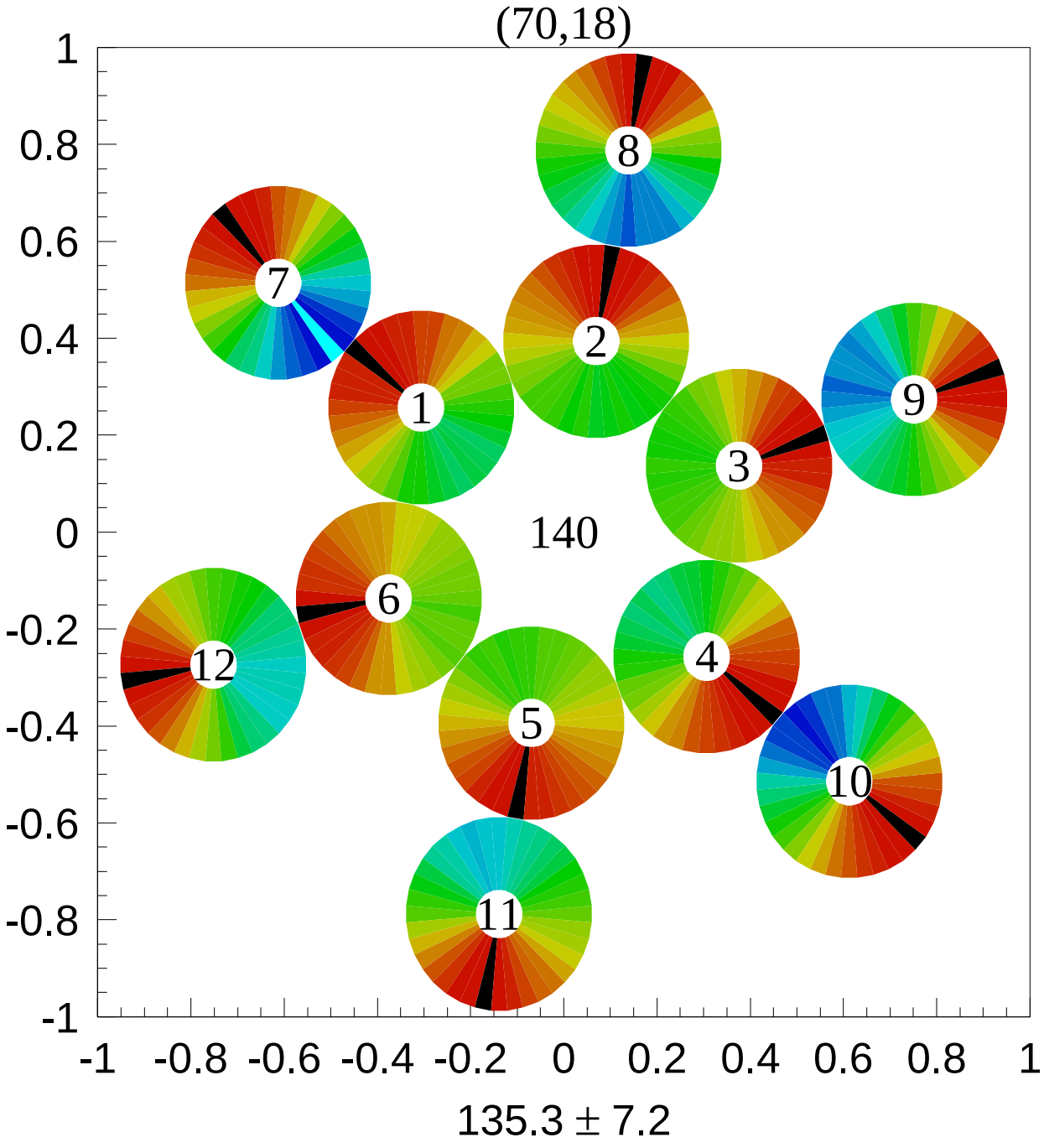

(70,16)
tilted LEDs
120 122 119 123 119 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 116 116 124 117 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

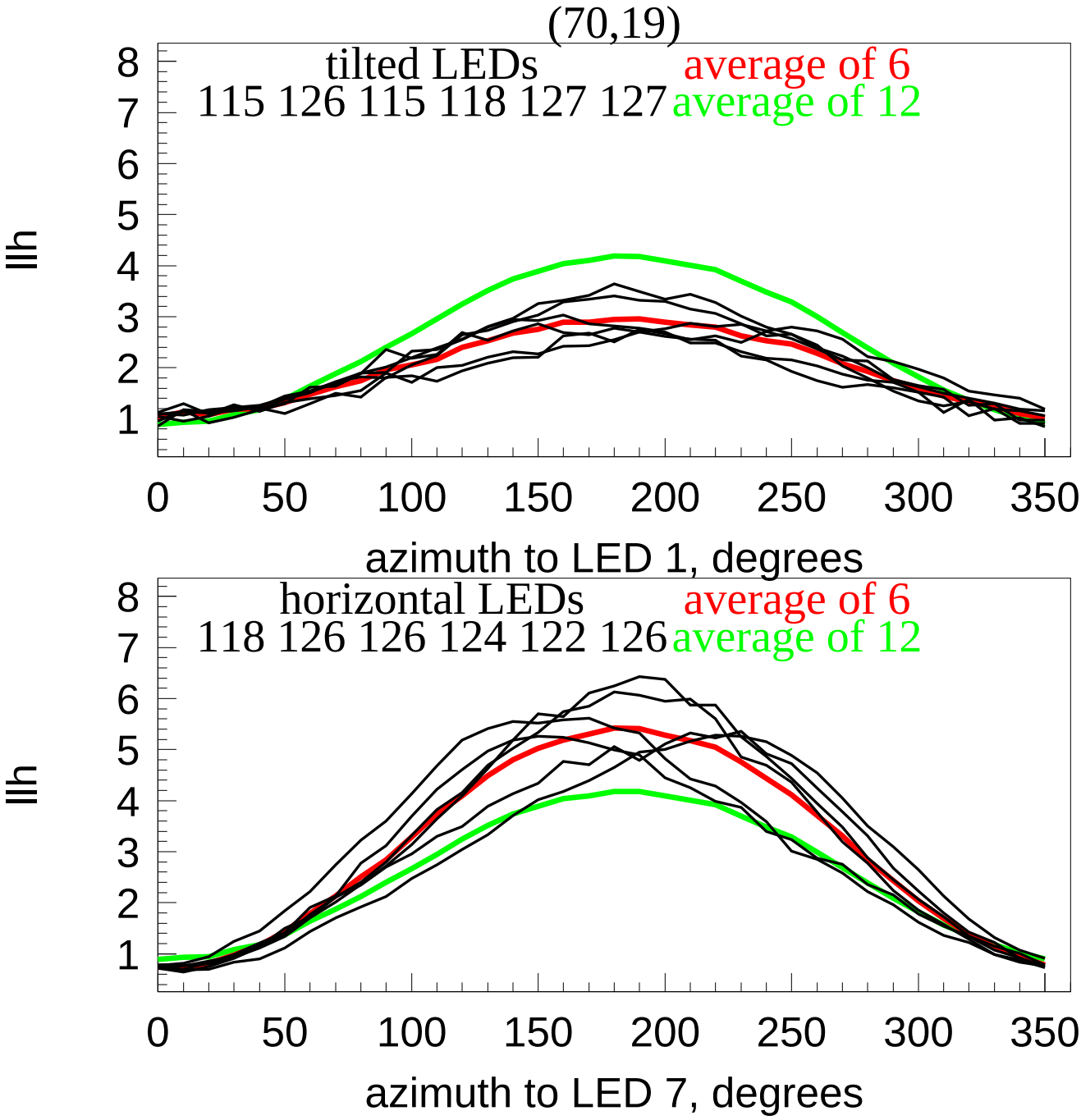

(70,16)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.1 ± 5.7

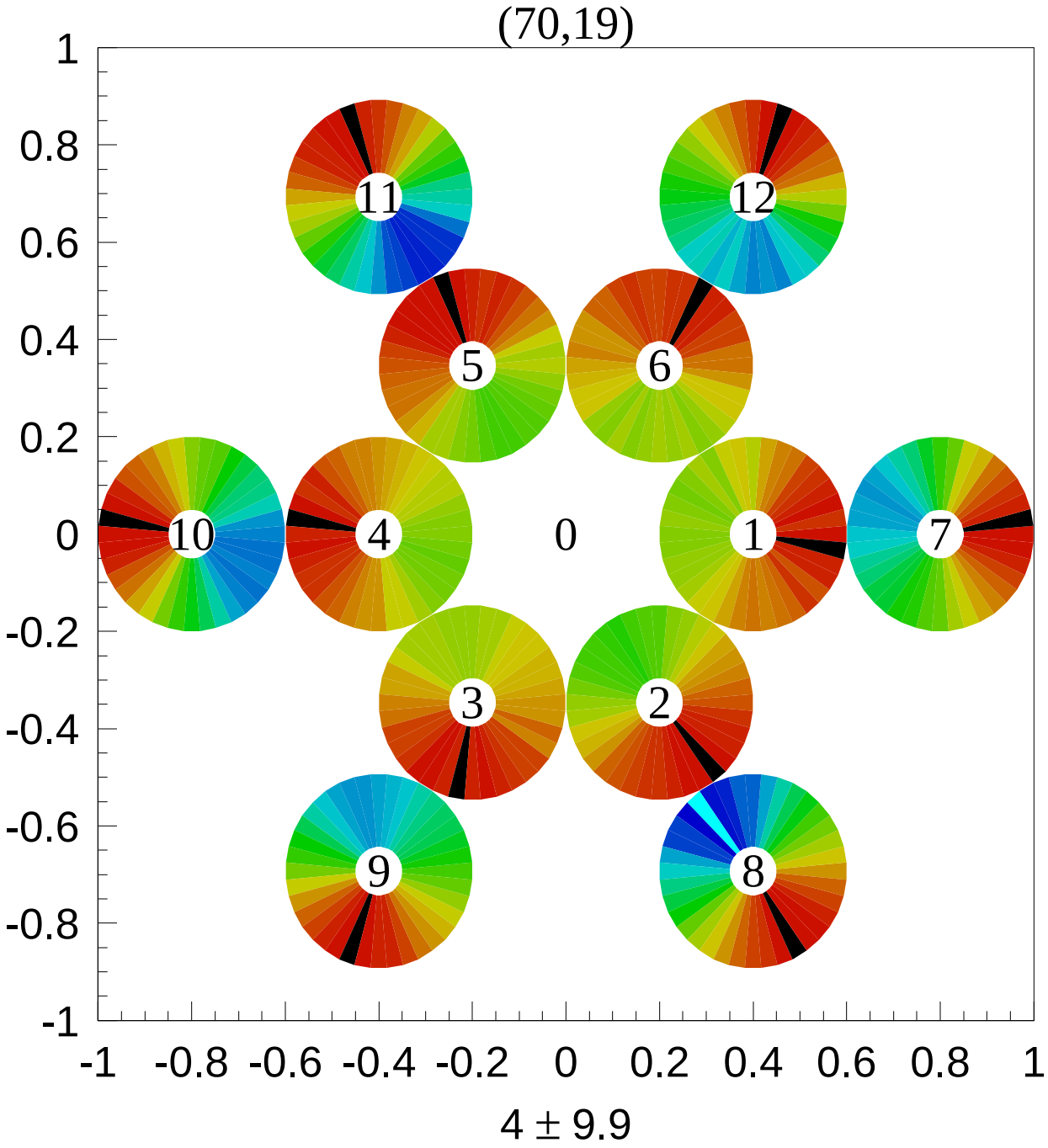

(70,17)
tilted LEDs
117 118 126 122 123 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 121 124 125 112 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

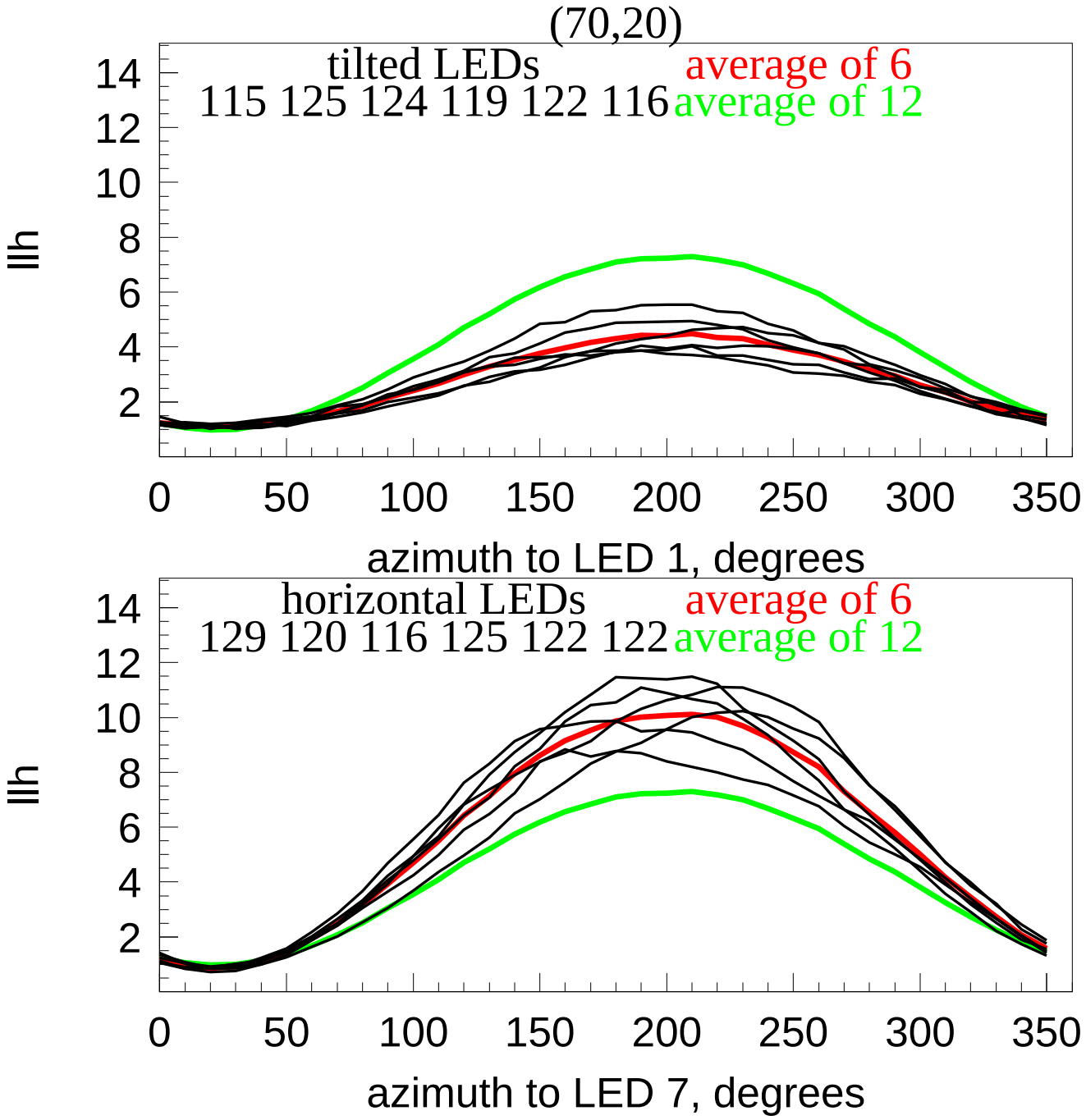

(70,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
283 ± 9.1

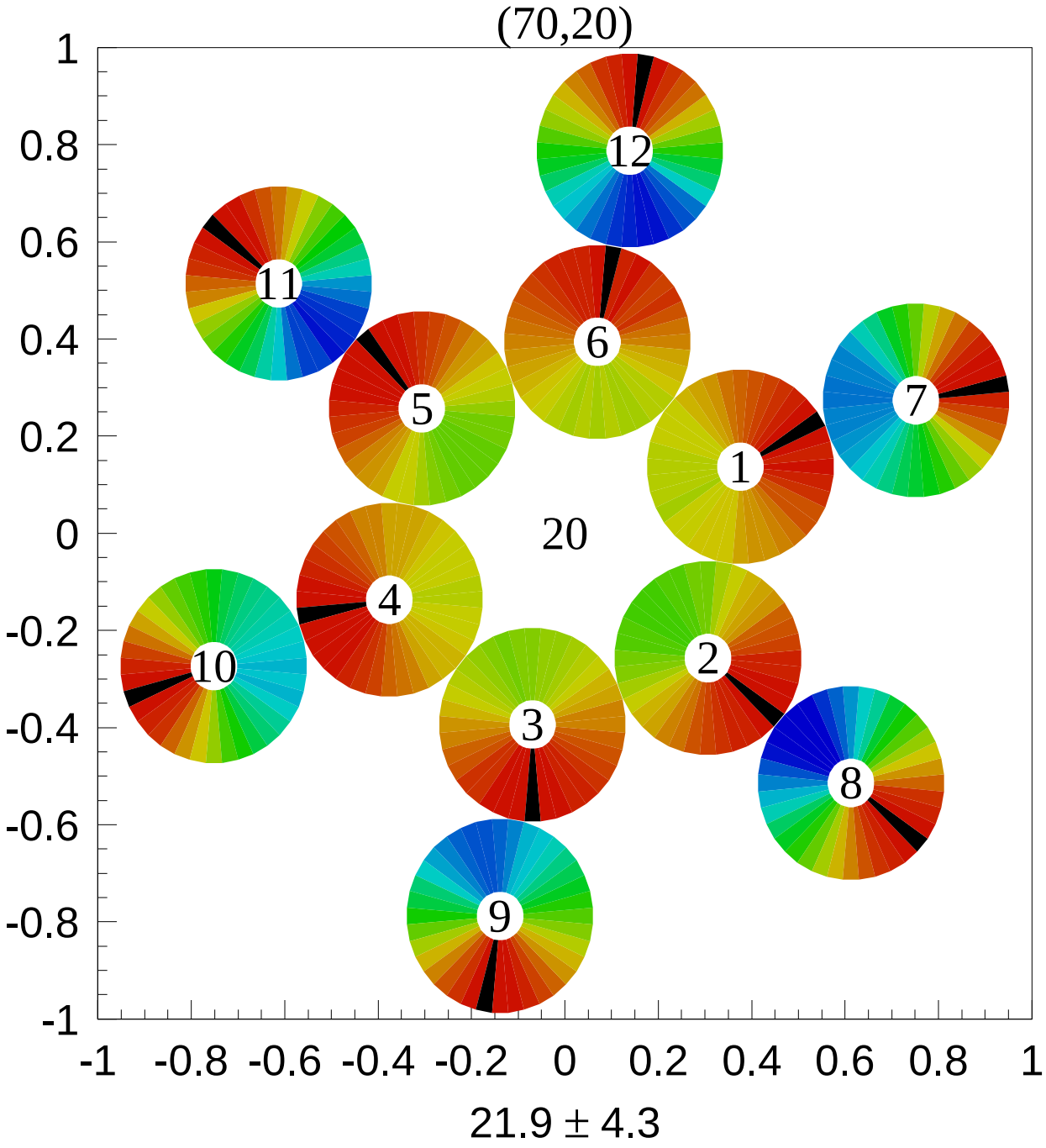

(70,18)
tilted LEDs
115 121 113 122 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 122 125 120 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

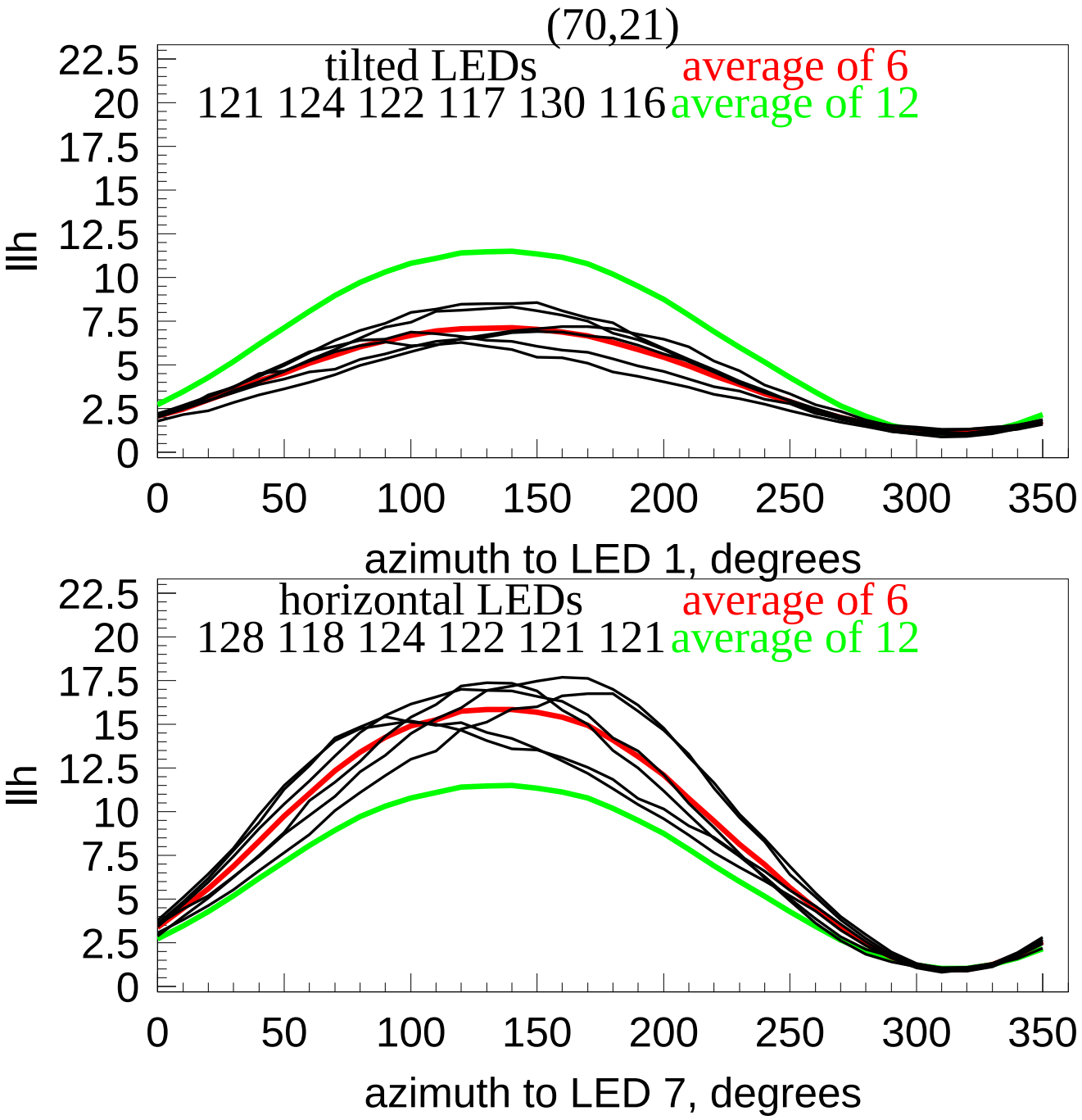

(70,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
135.3 ± 7.2
140
1
2
3
4
5
6
7
8
9
10
11
12

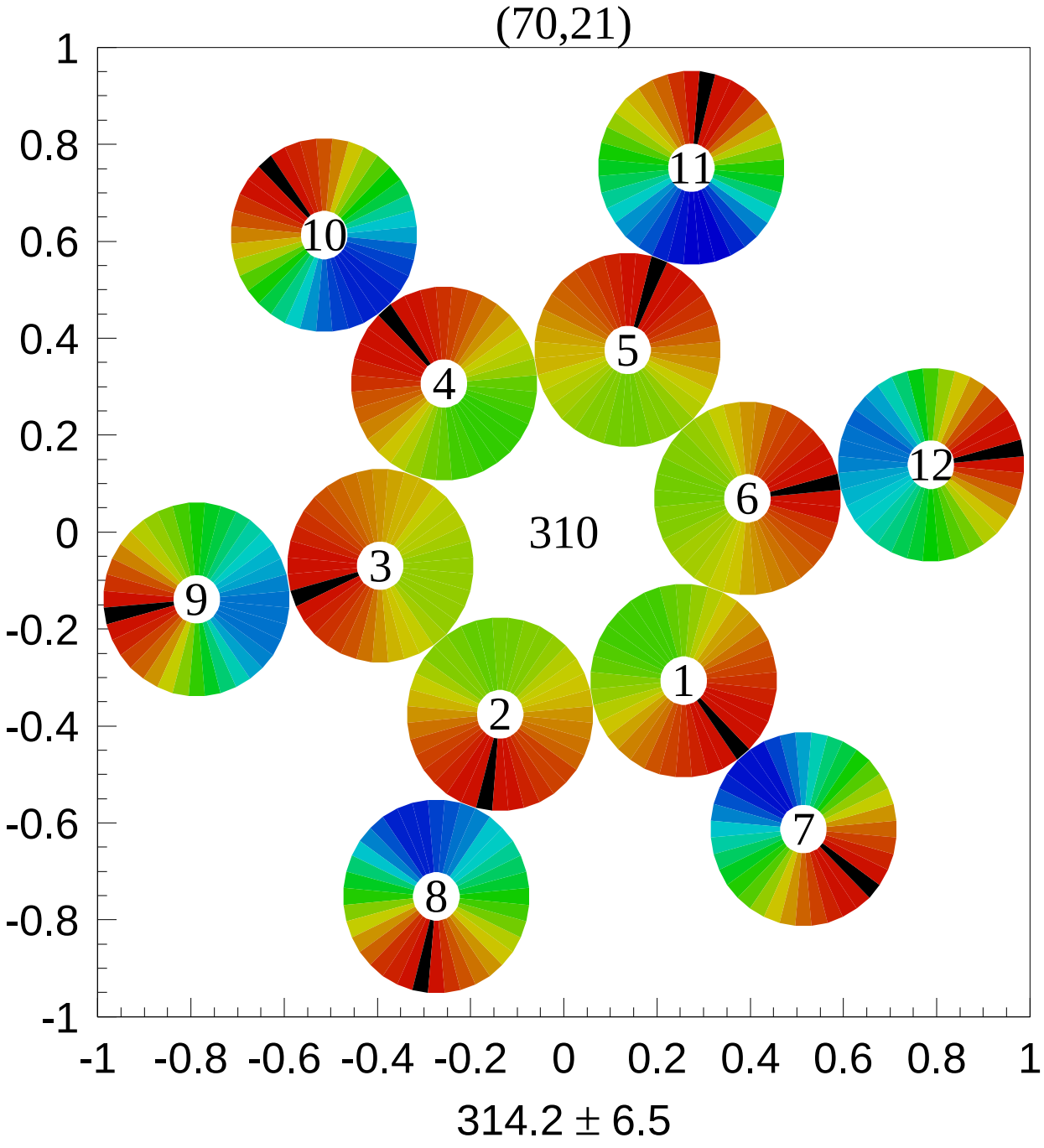

(70,19)
tilted LEDs
115 126 115 118 127 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 126 126 124 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

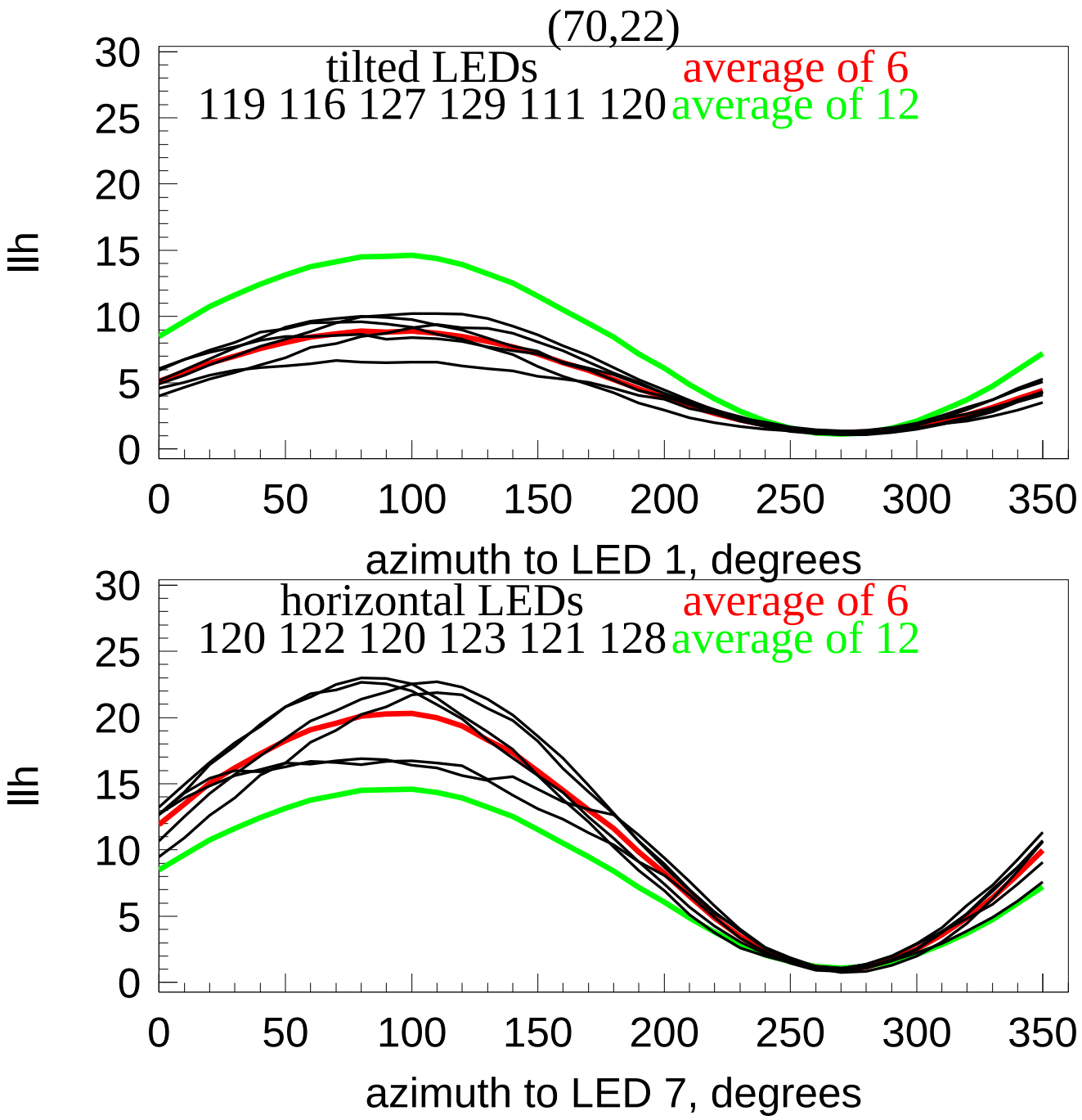

(70,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
4 ± 9.9
11
12
5
6
10
4
0
1
7
3
2
9
8

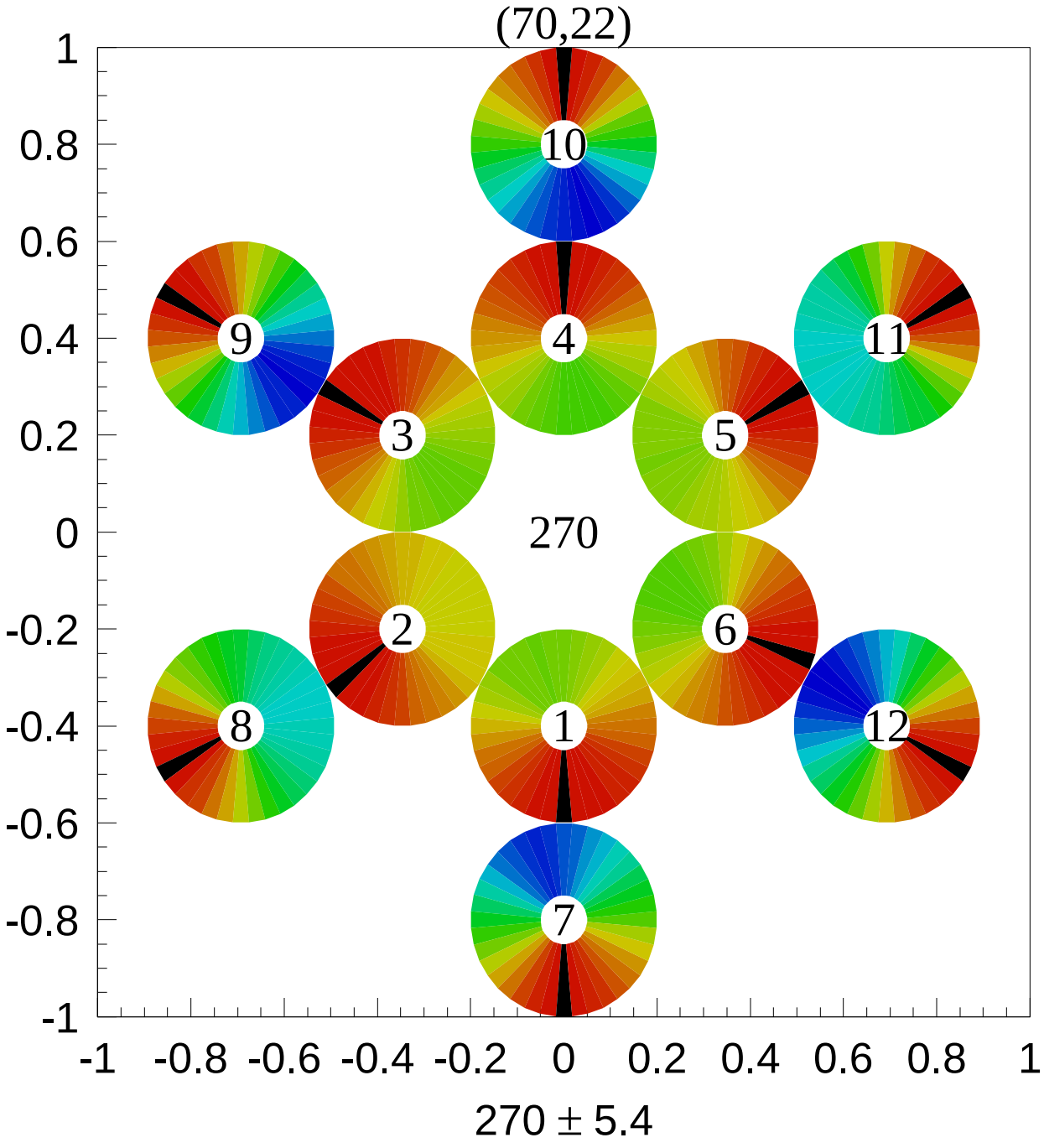

(70,20)
tilted LEDs
115 125 124 119 122 116
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
129 120 116 125 122 122
average of 6
average of 12
Ilh
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

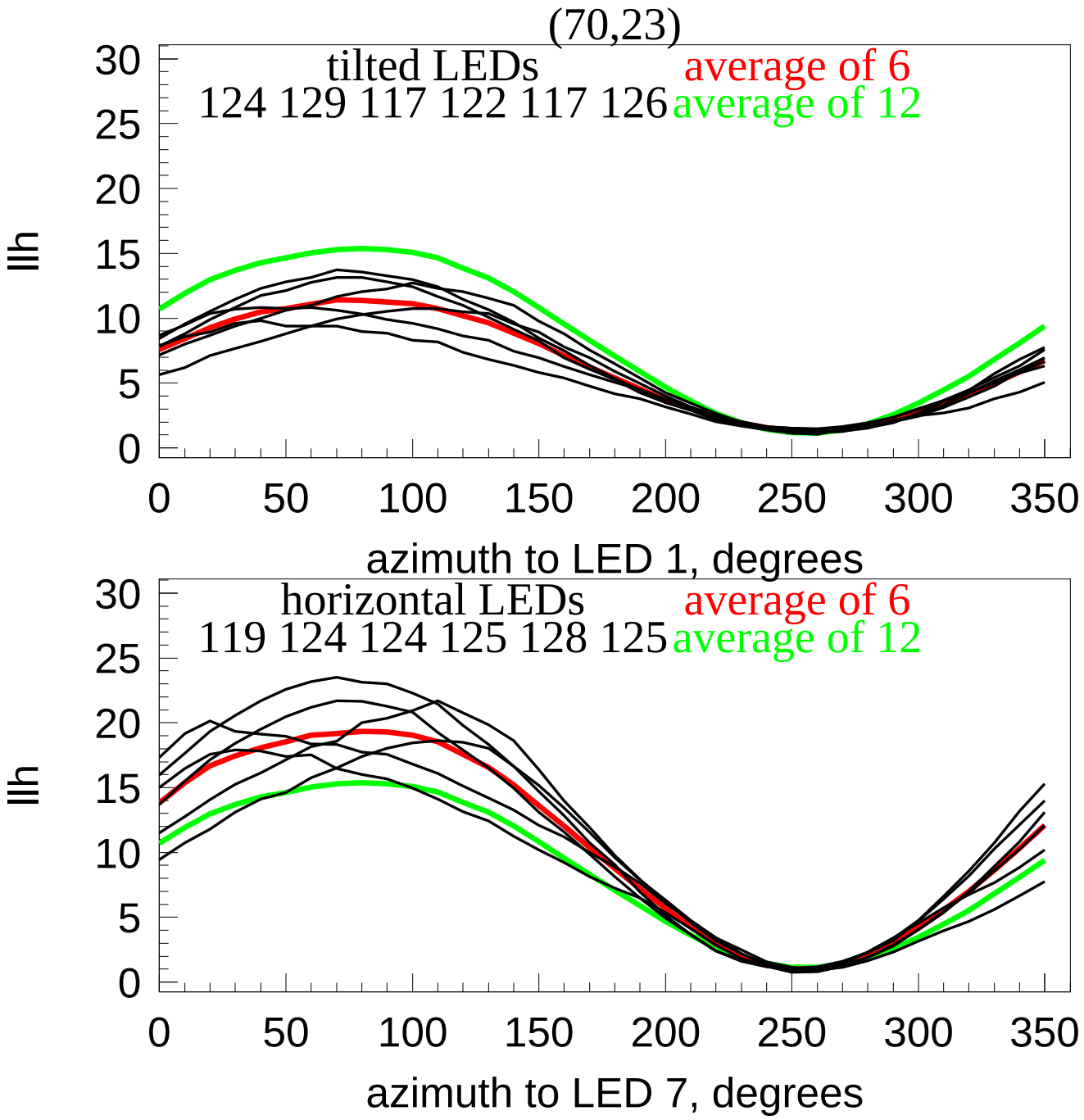

(70,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
12
11
6
5
7
1
20
4
10
2
3
8
9
21.9 ± 4.3

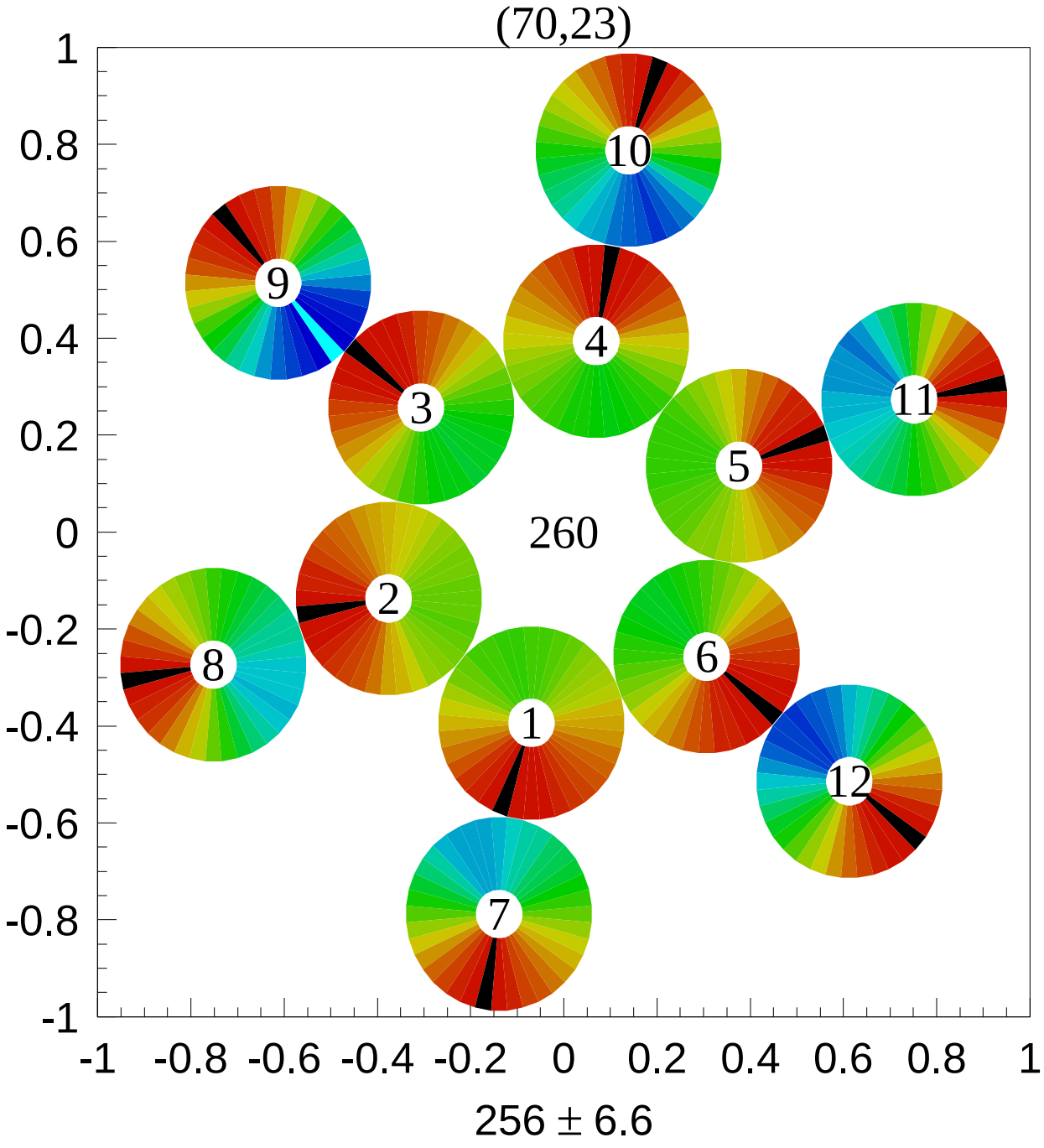

(70,21)
tilted LEDs
121 124 122 117 130 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 118 124 122 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

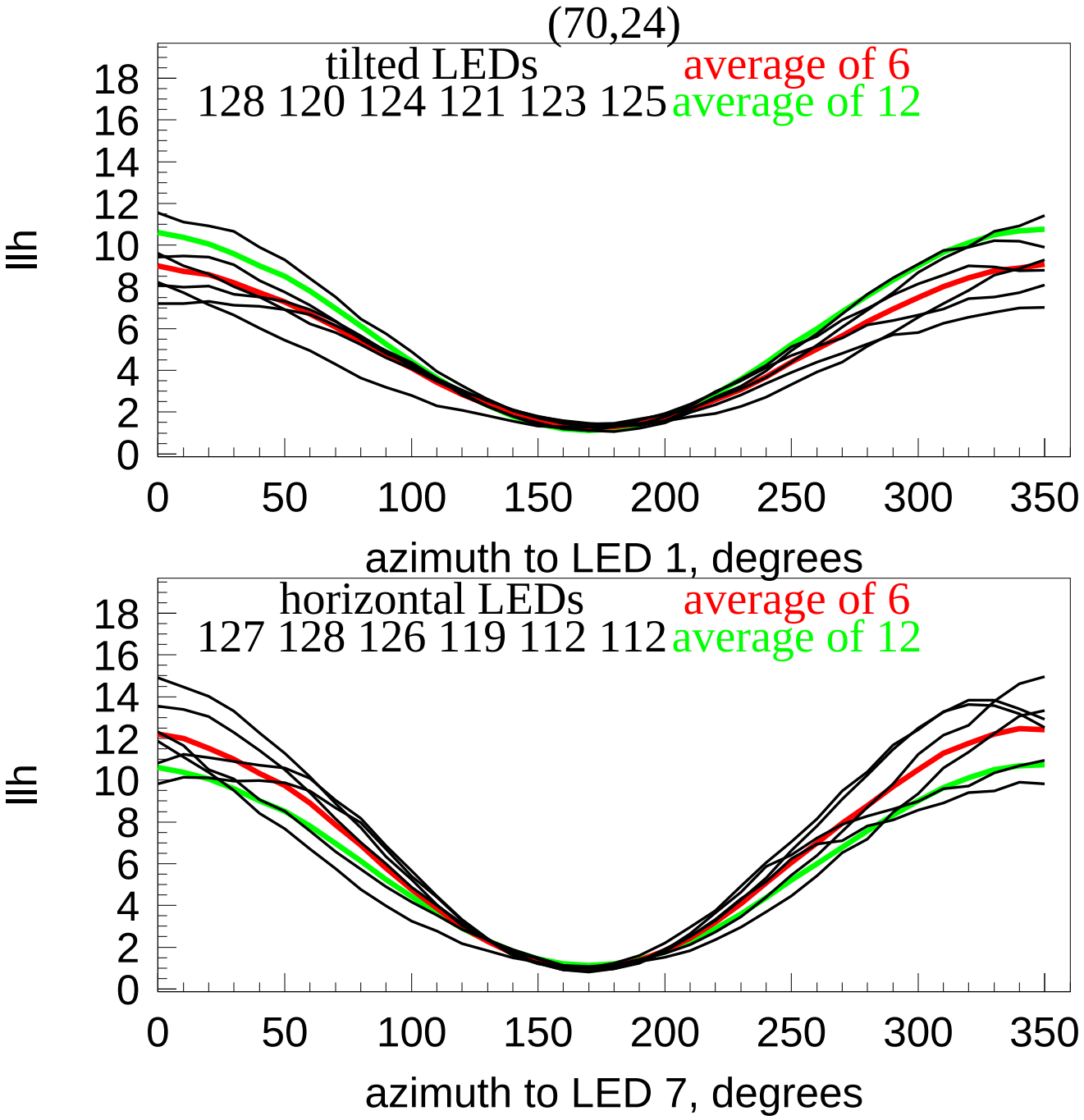

(70,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
314.2 ± 6.5

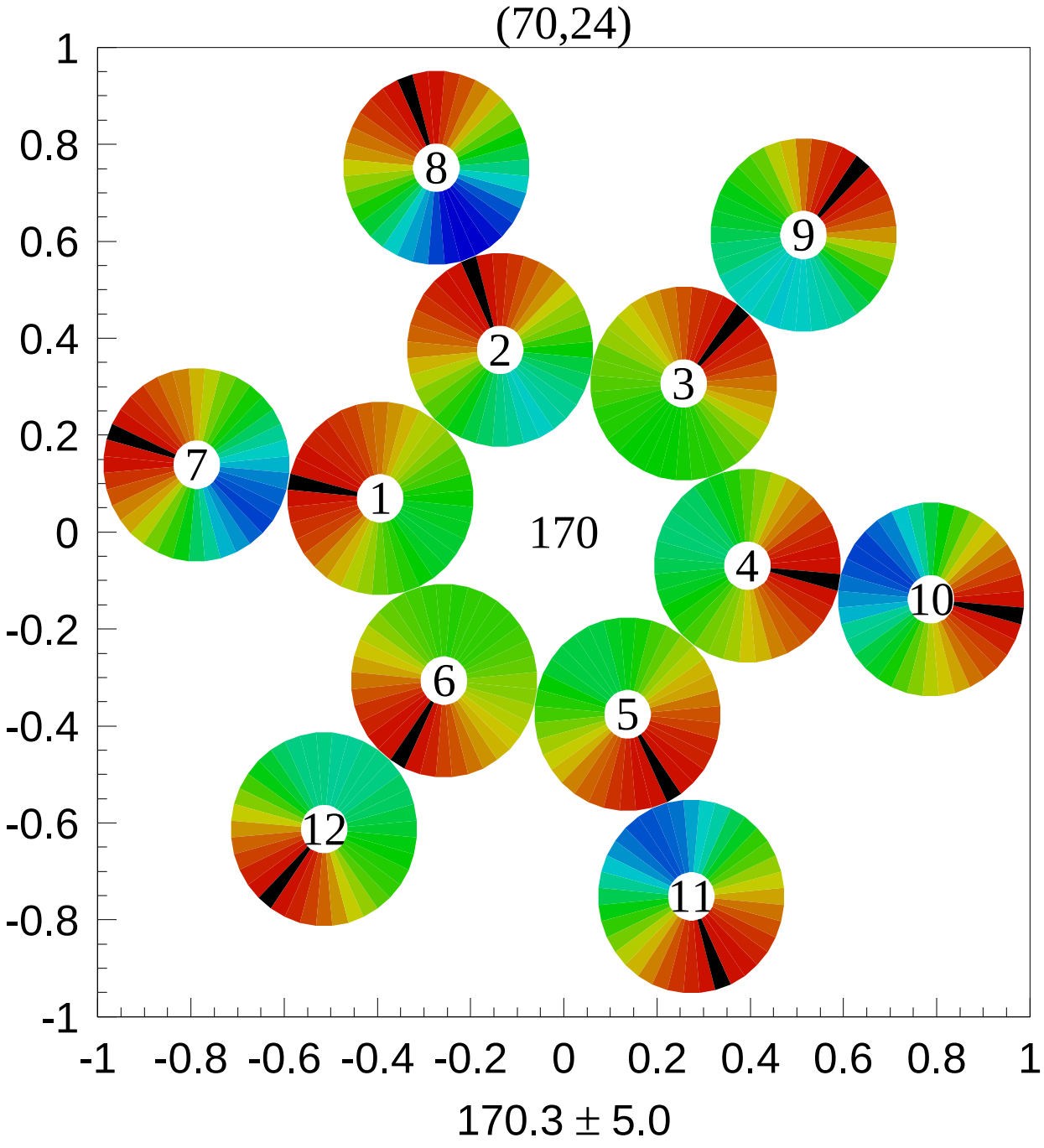

(70,22)
tilted LEDs
119 116 127 129 111 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 120 123 121 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

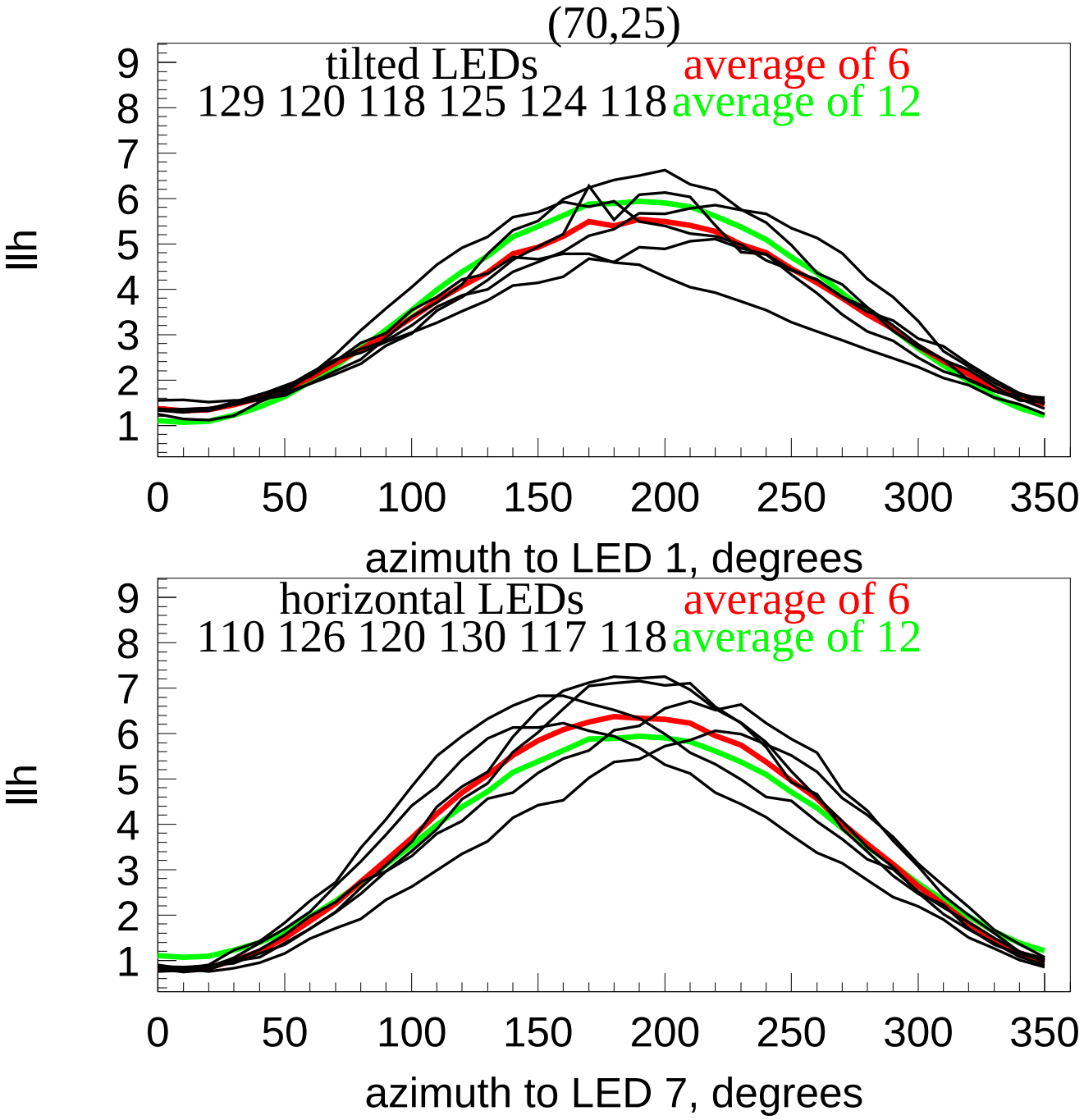

(70,22)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
270 ± 5.4

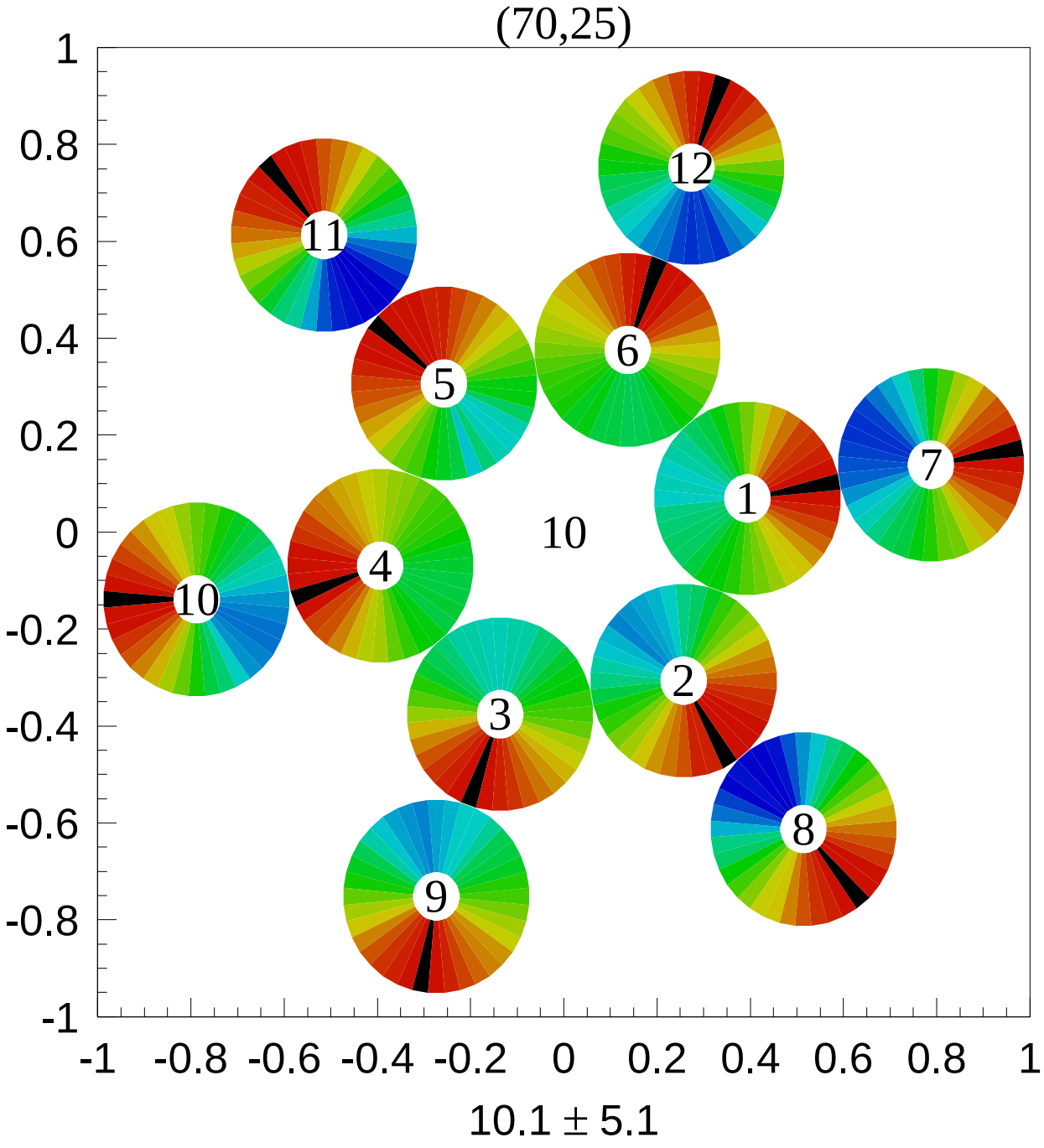

(70,23)
tilted LEDs
124 129 117 122 117 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 124 124 125 128 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

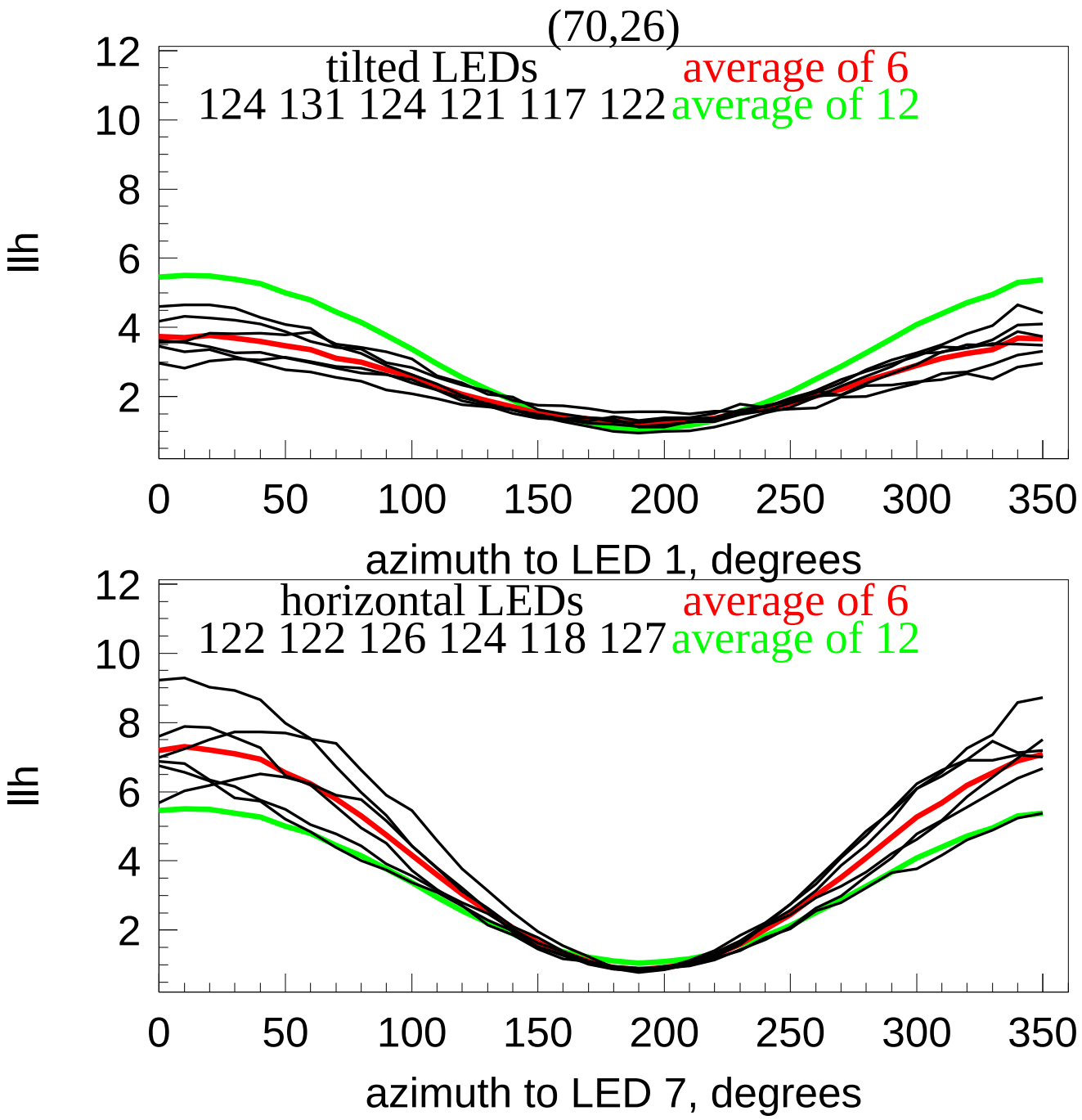

(70,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
256 ± 6.6
260
1
2
3
4
5
6
7
8
9
10
11
12

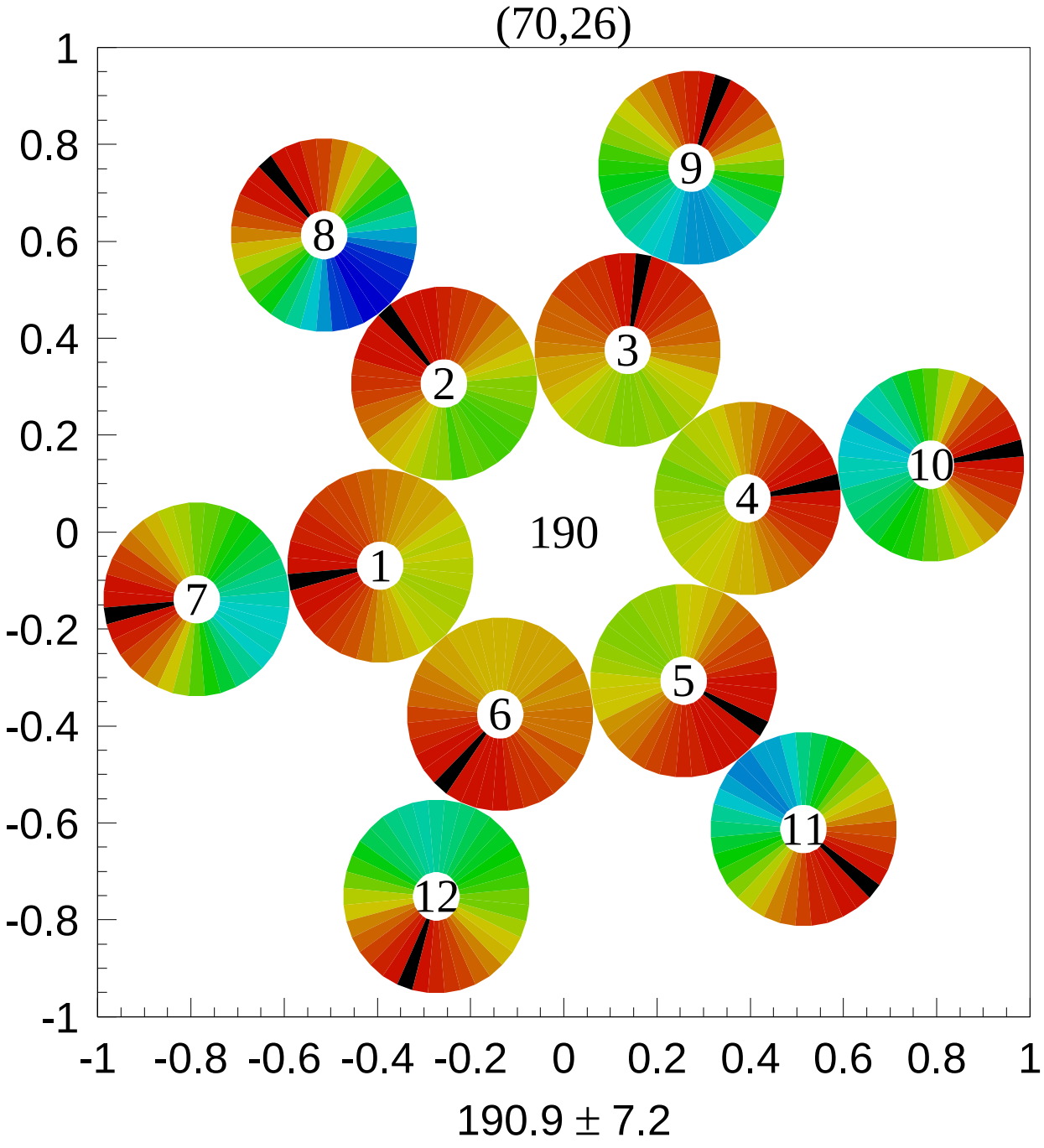

(70,24)
tilted LEDs
128 120 124 121 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 128 126 119 112 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

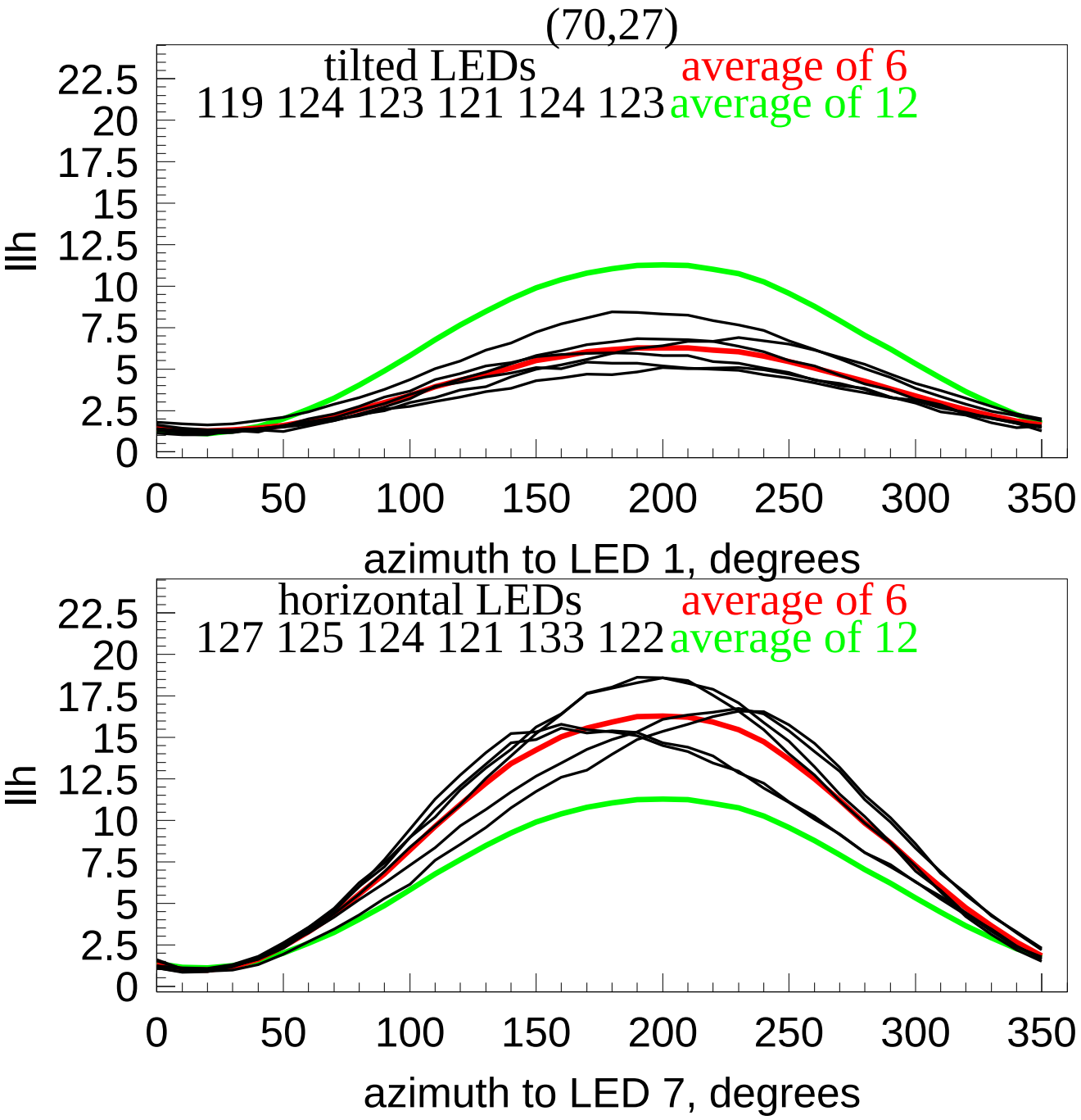

(70,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
170.3 ± 5.0

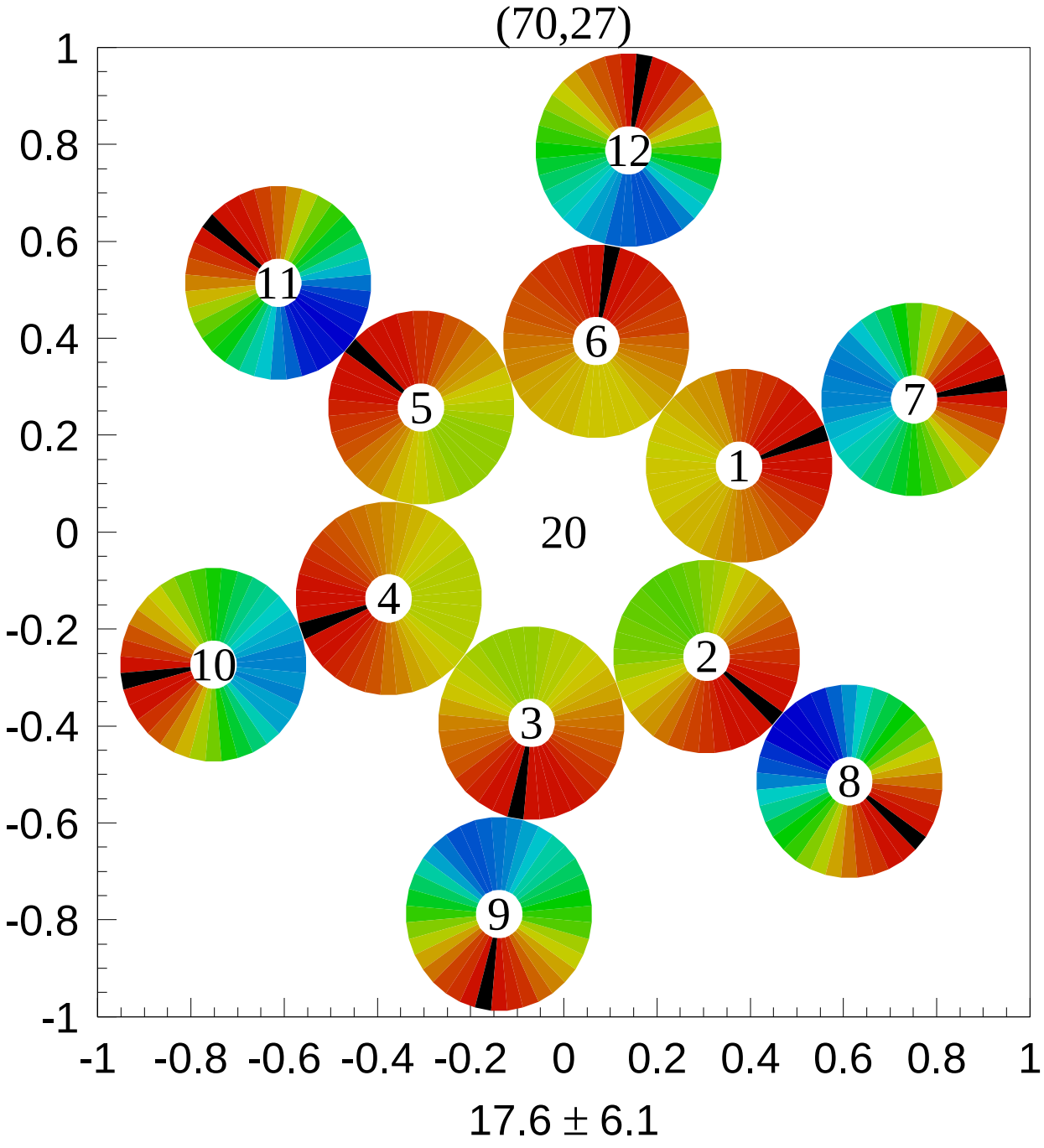

(70,25)
tilted LEDs
129 120 118 125 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
110 126 120 130 117 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

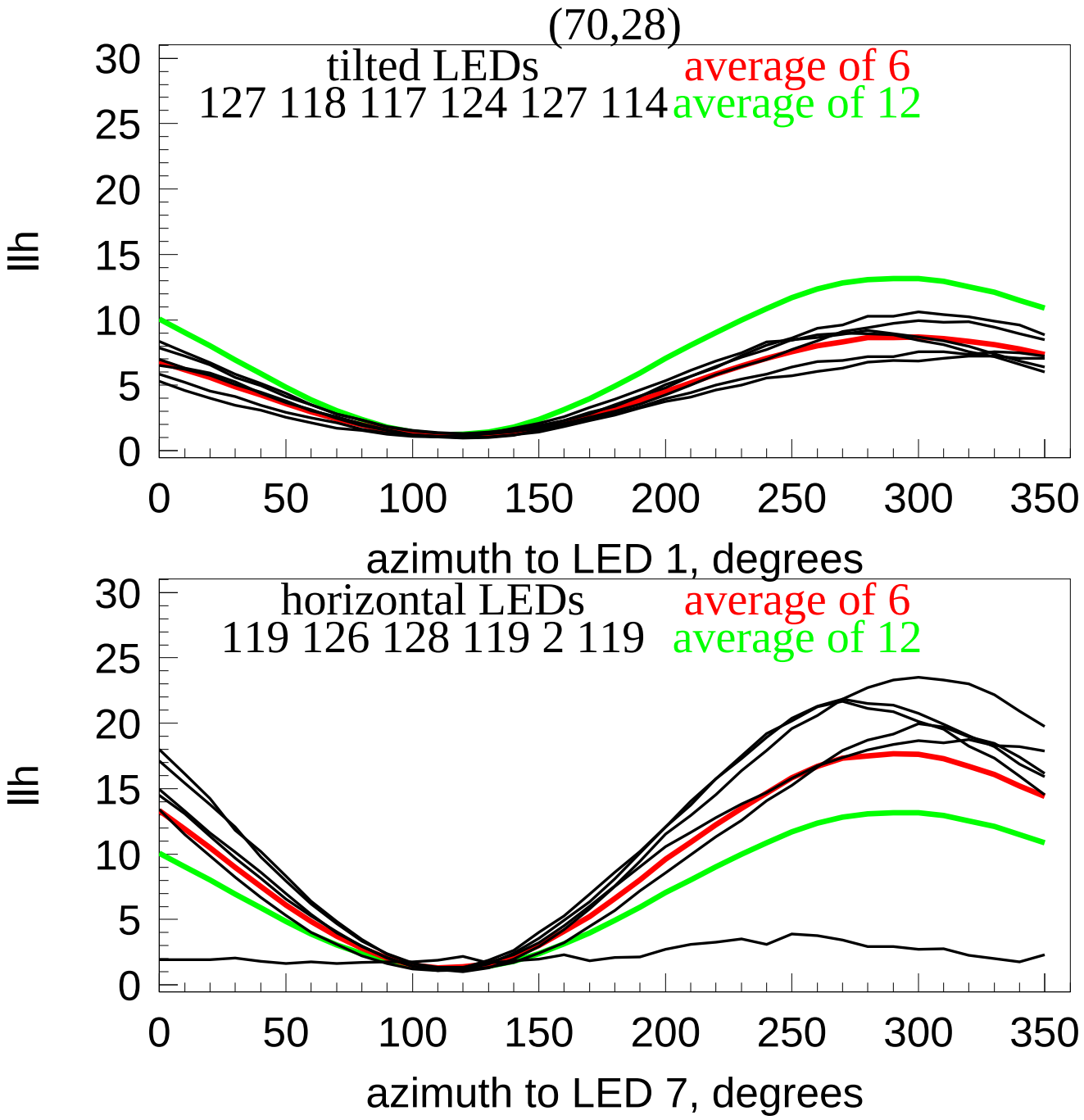

(70,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10.1 ± 5.1
12
11
6
5
7
1
10
4
10
2
3
8
9

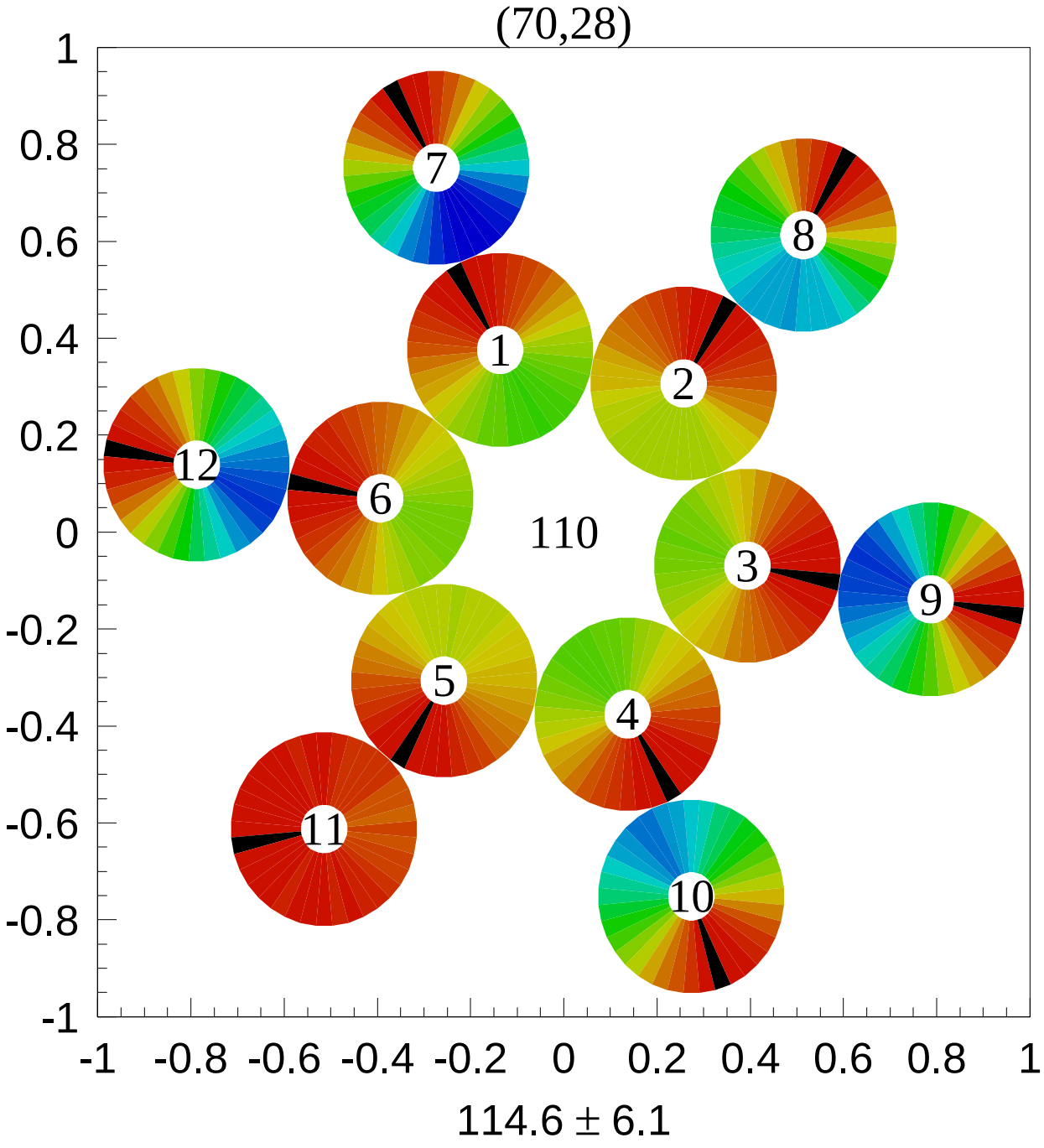

(70,26)
tilted LEDs
124 131 124 121 117 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 122 126 124 118 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

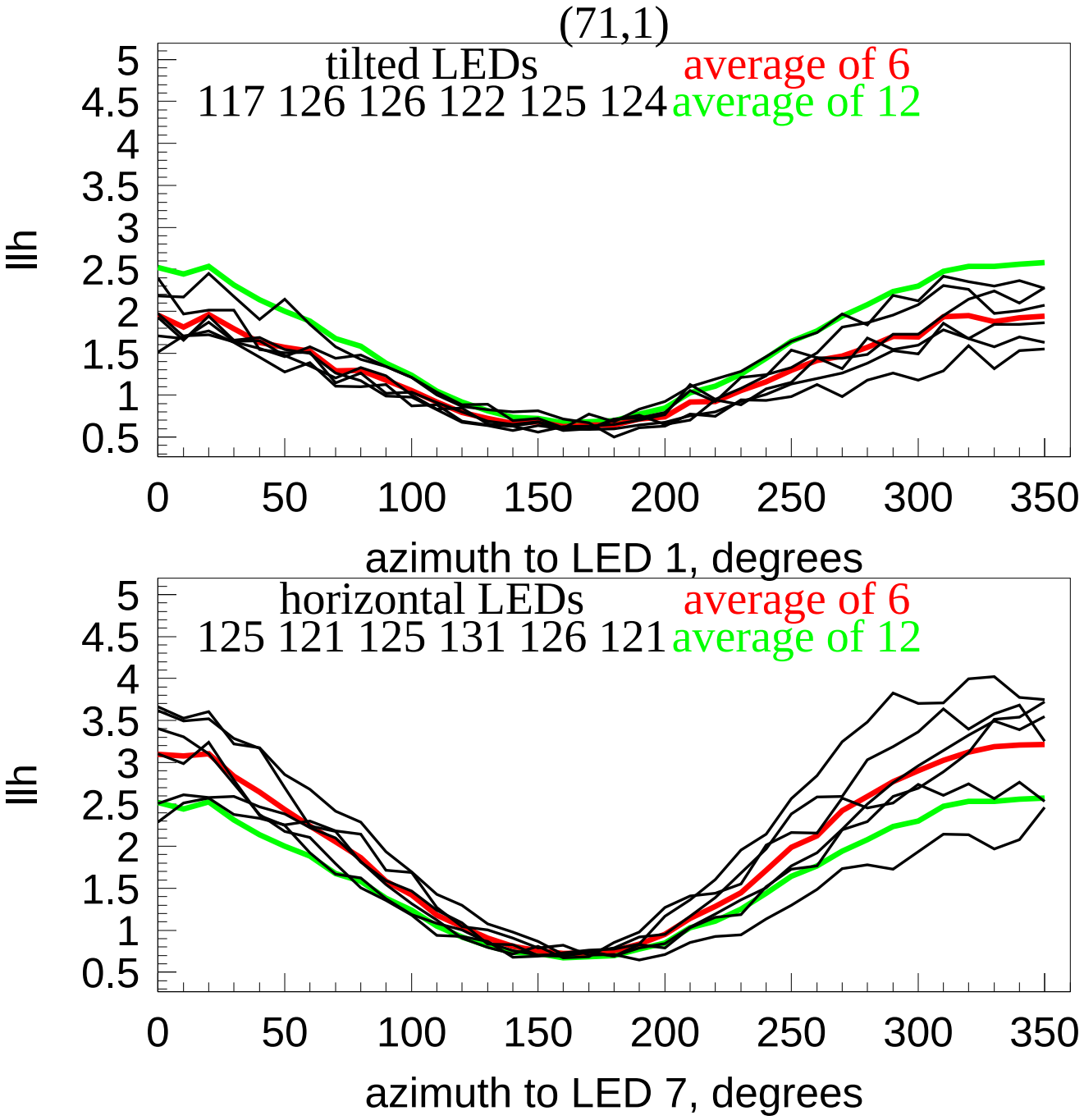

(70,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
190.9 ± 7.2
1
2
3
4
5
6
7
8
9
10
11
12

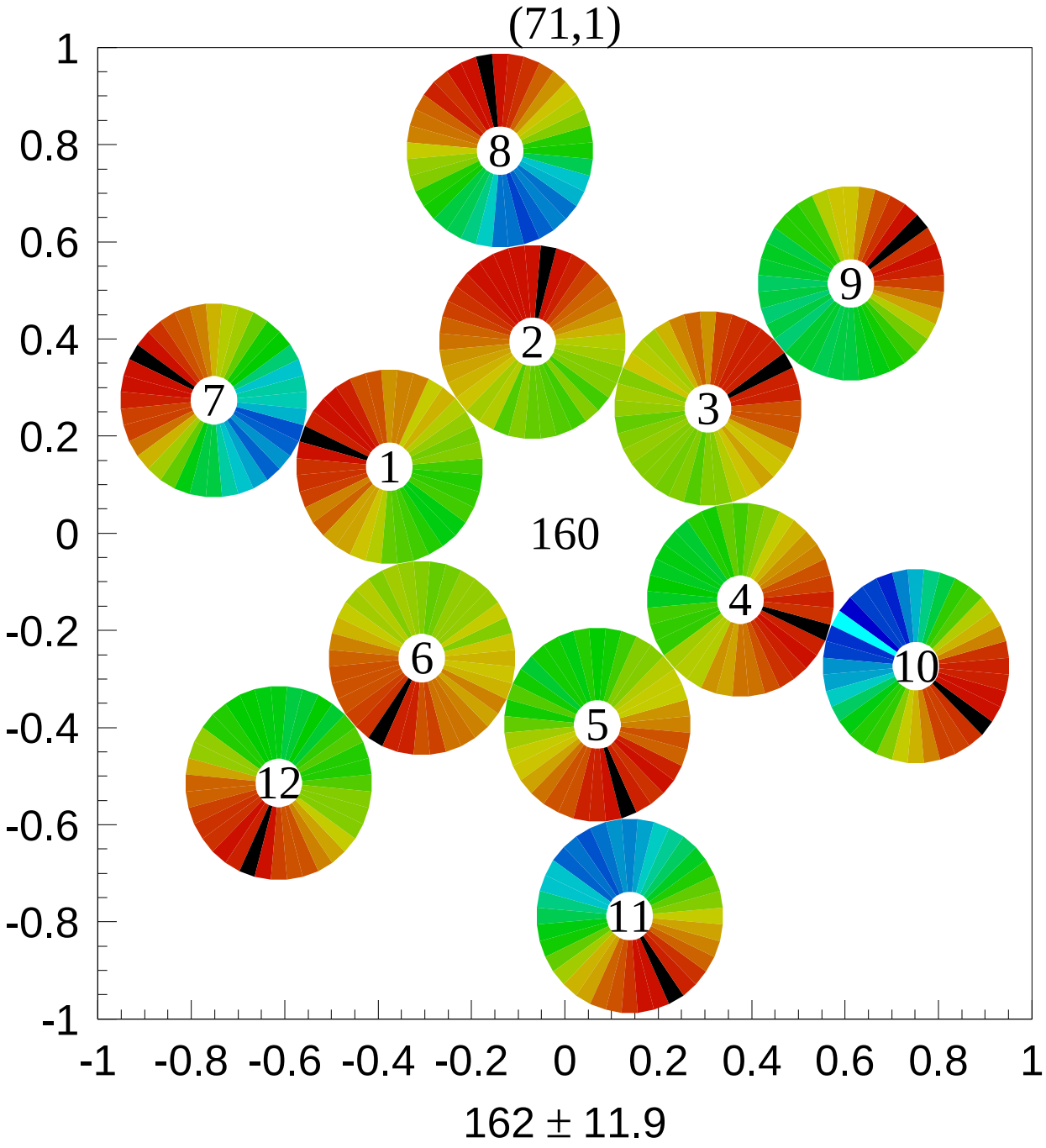

(70,27)
tilted LEDs
119 124 123 121 124 123
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 125 124 121 133 122
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

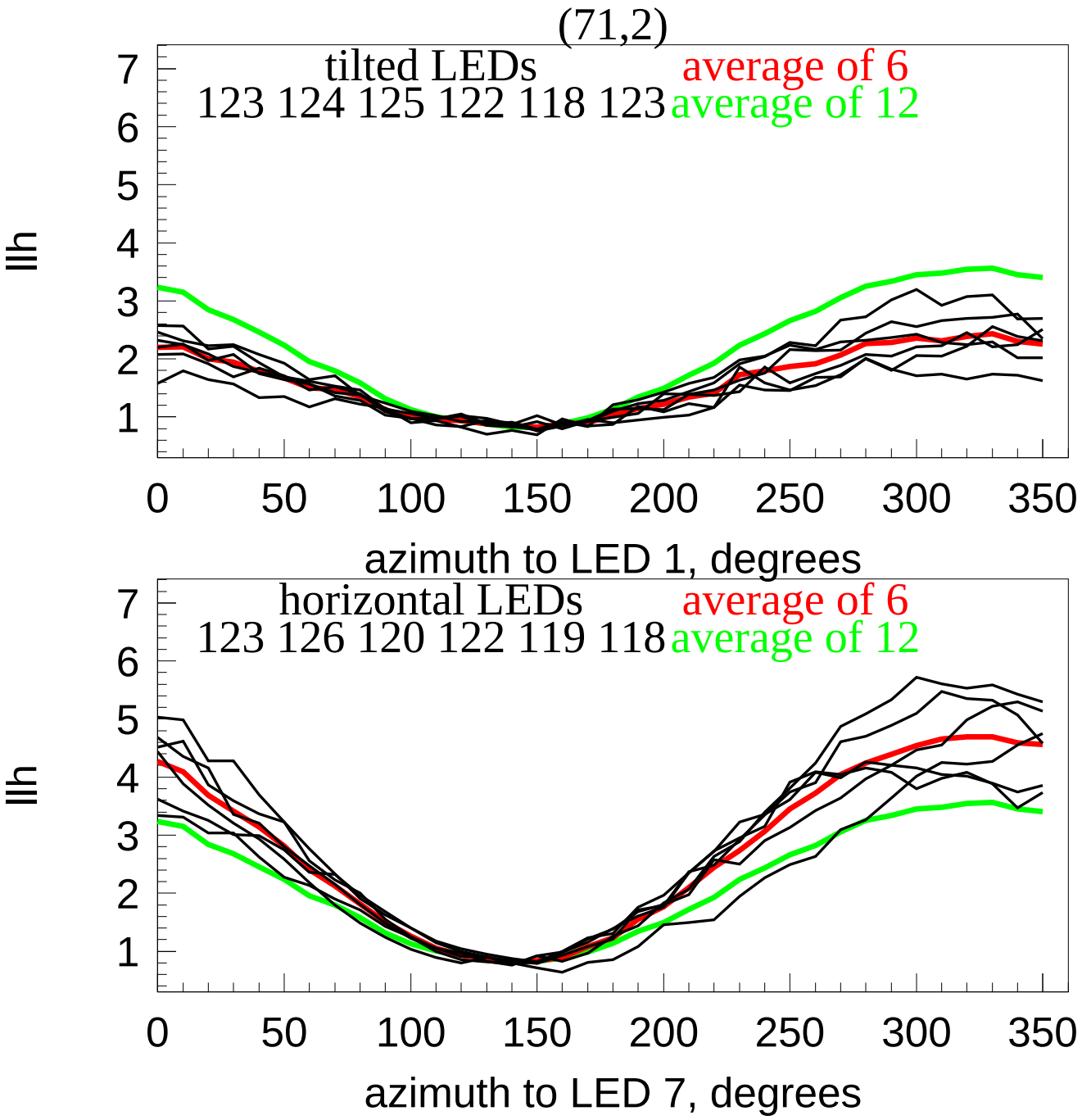

(70,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
17.6 ± 6.1

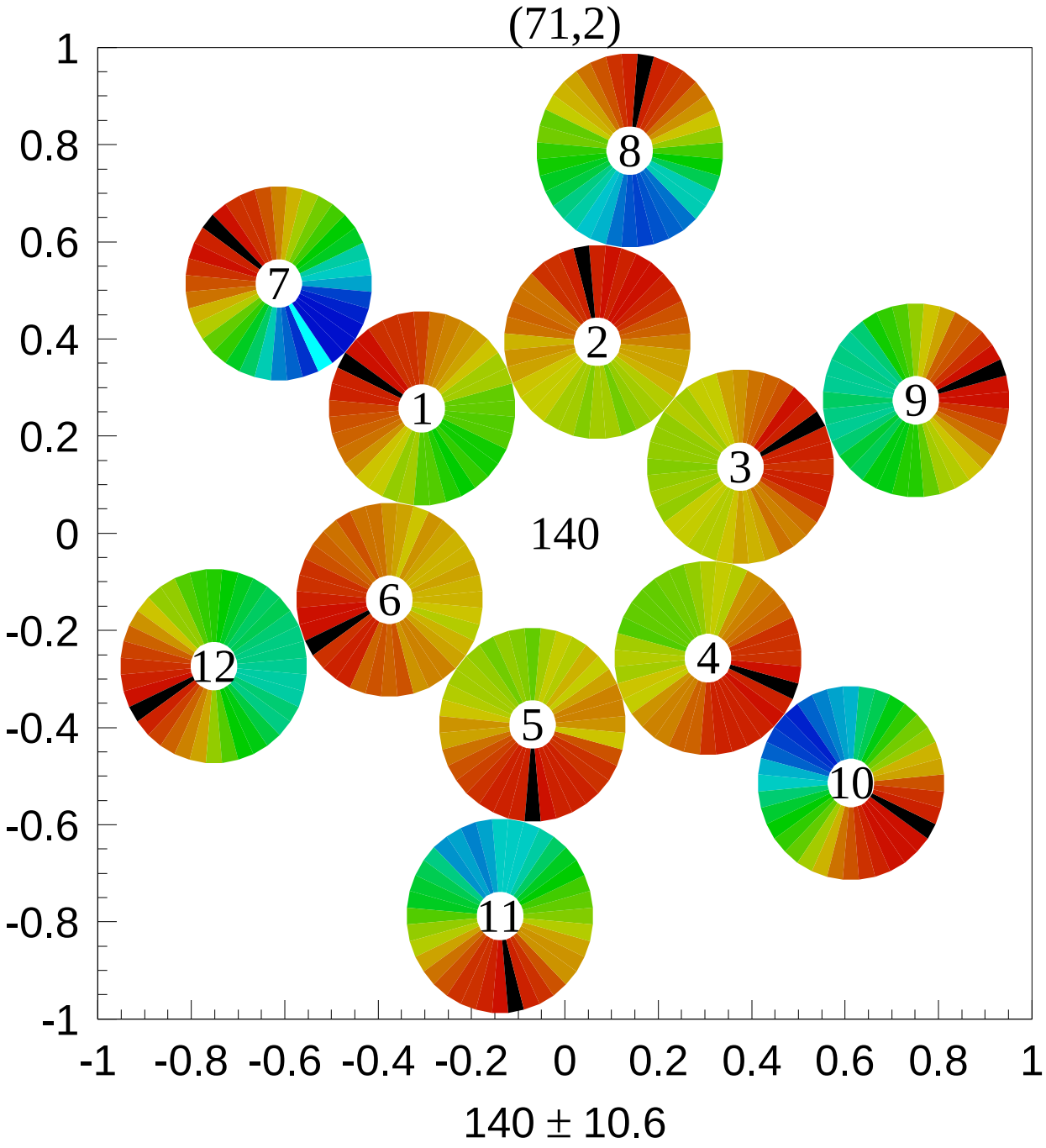

(70,28)
tilted LEDs
127 118 117 124 127 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 128 119 2 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

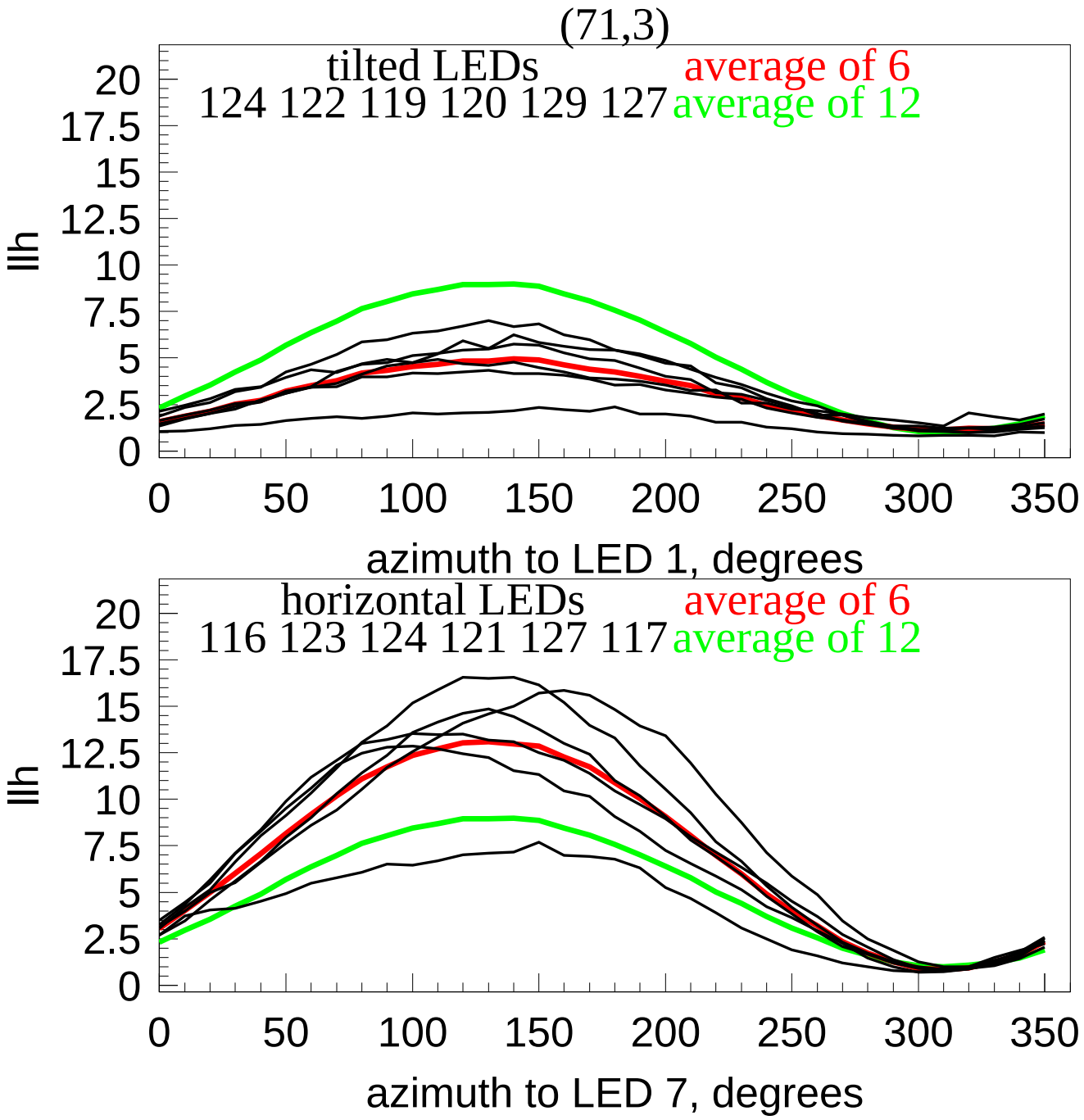

(70,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
114.6 ± 6.1

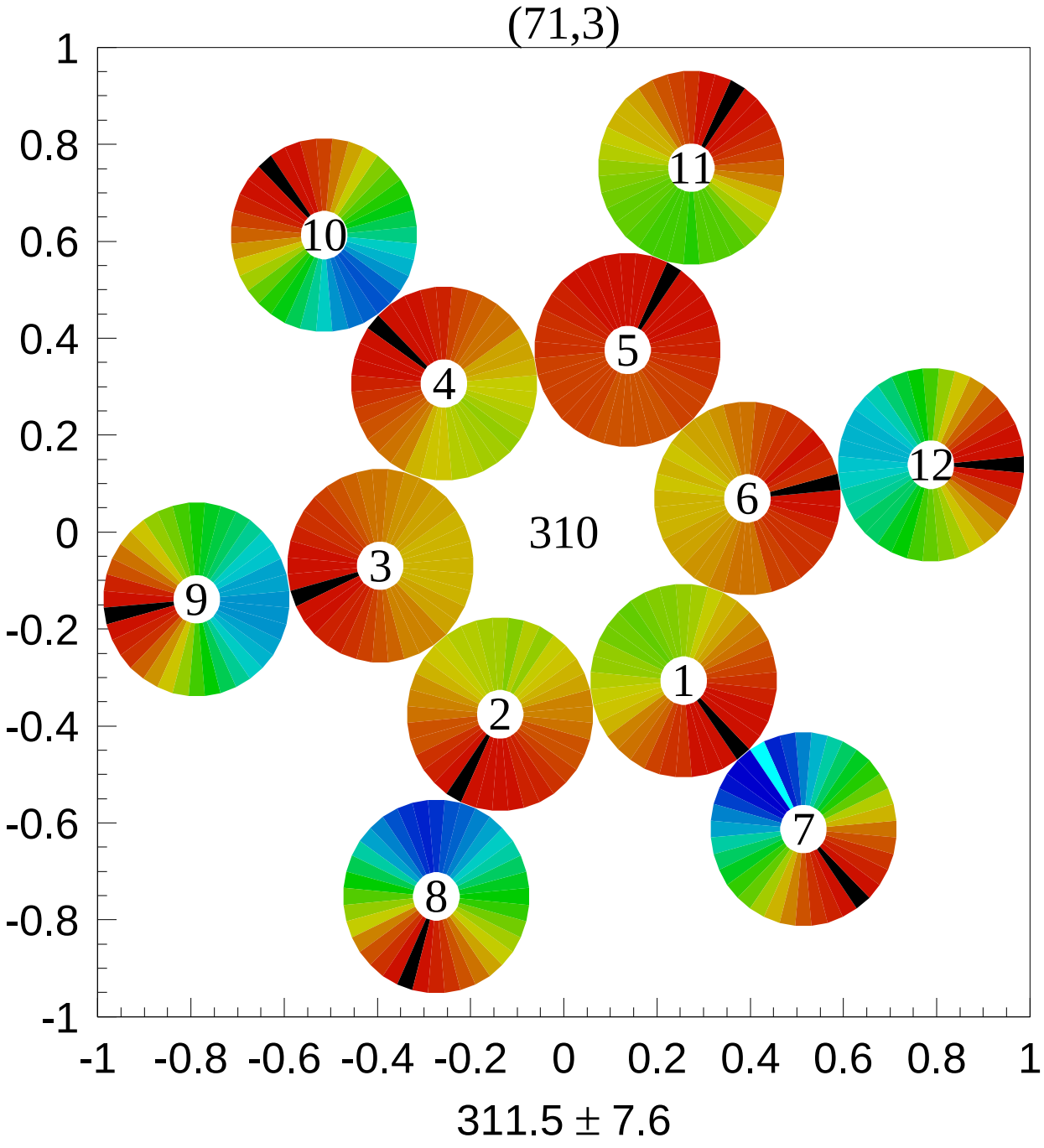

(71,1)
tilted LEDs
117 126 126 122 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 125 131 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

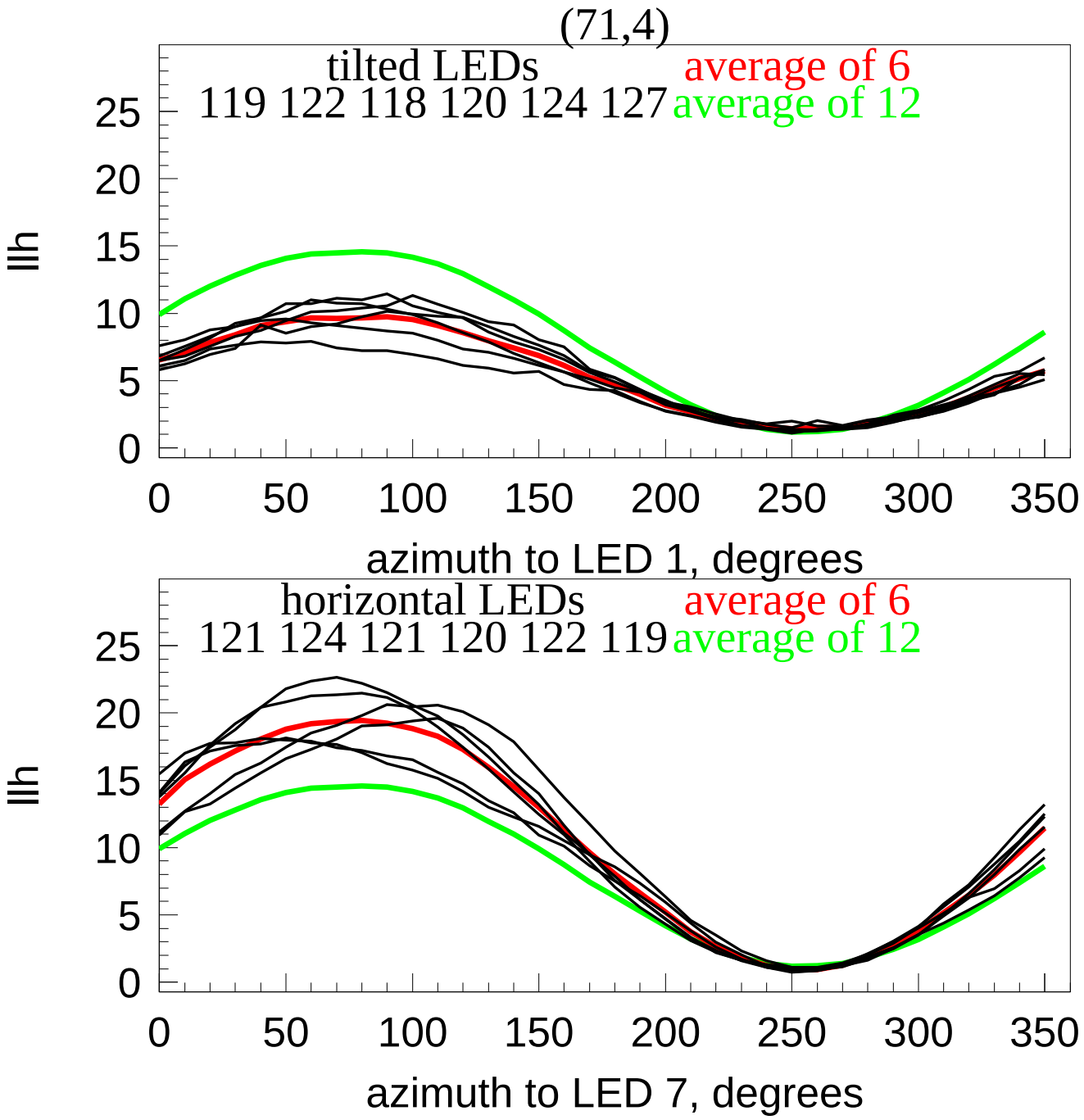

(71,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
162 ± 11.9

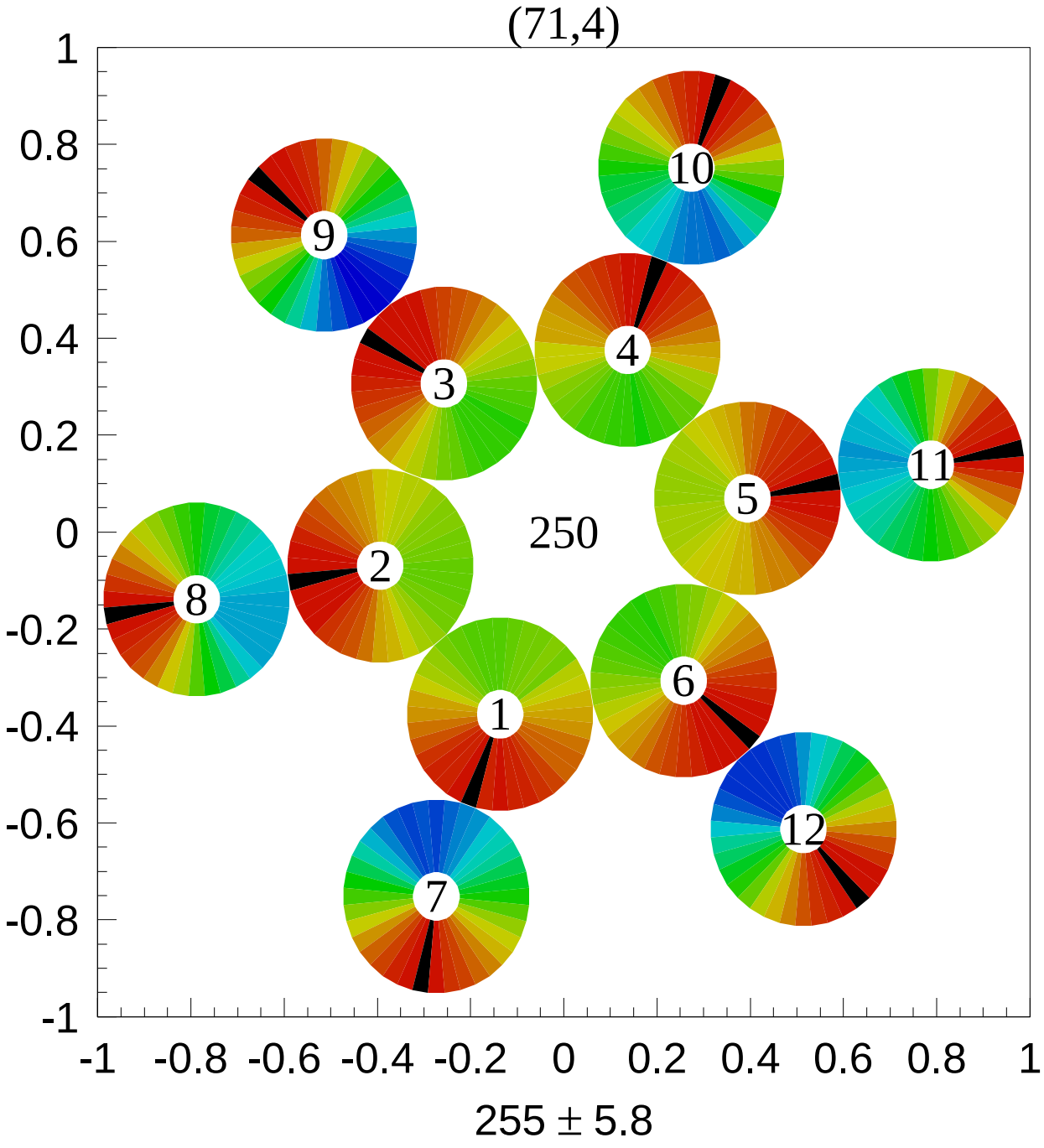

(71,2)
tilted LEDs
123 124 125 122 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 126 120 122 119 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

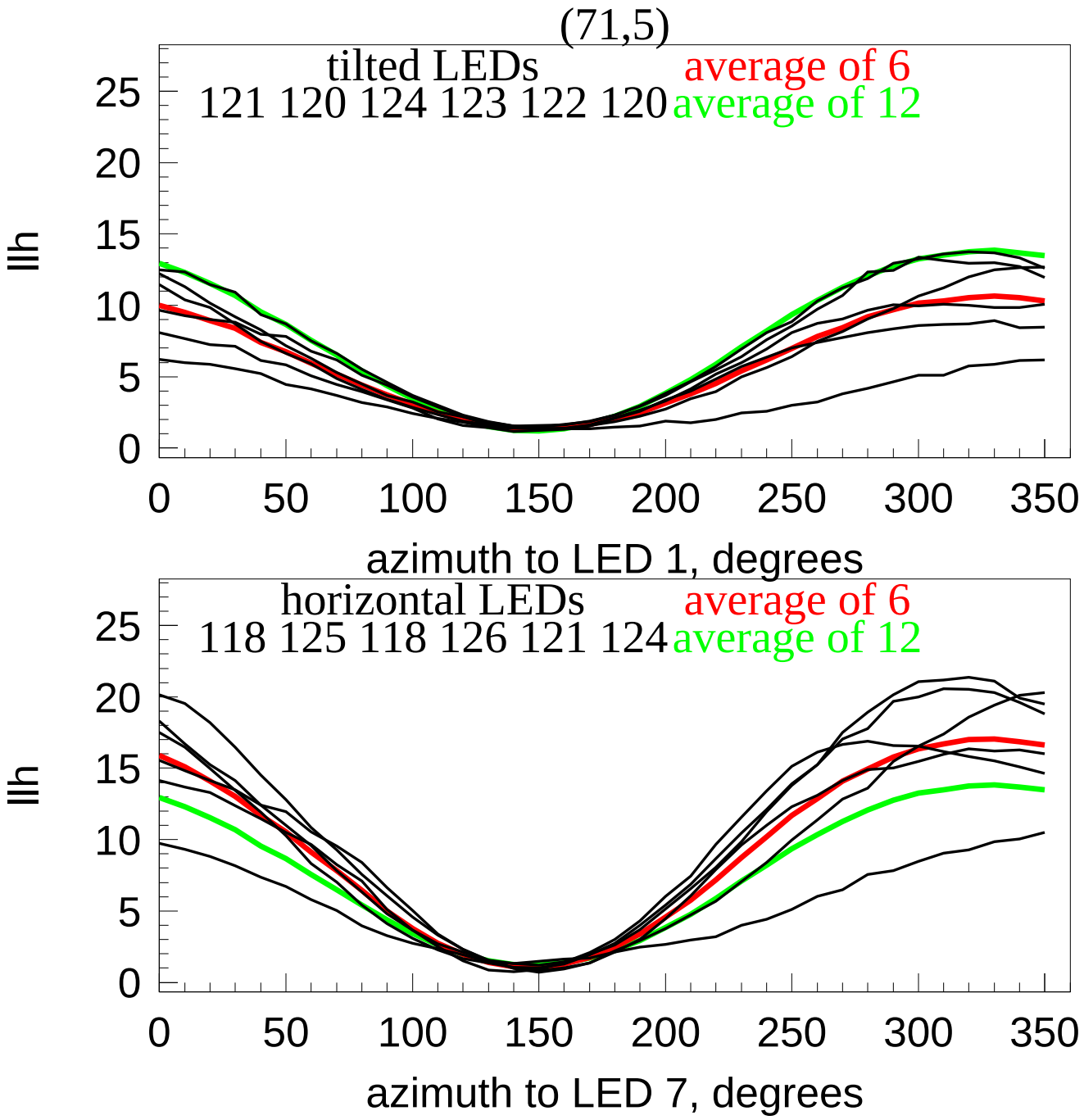

(71,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
140 ± 10.6
140
1
2
3
4
5
6
7
8
9
10
11
12

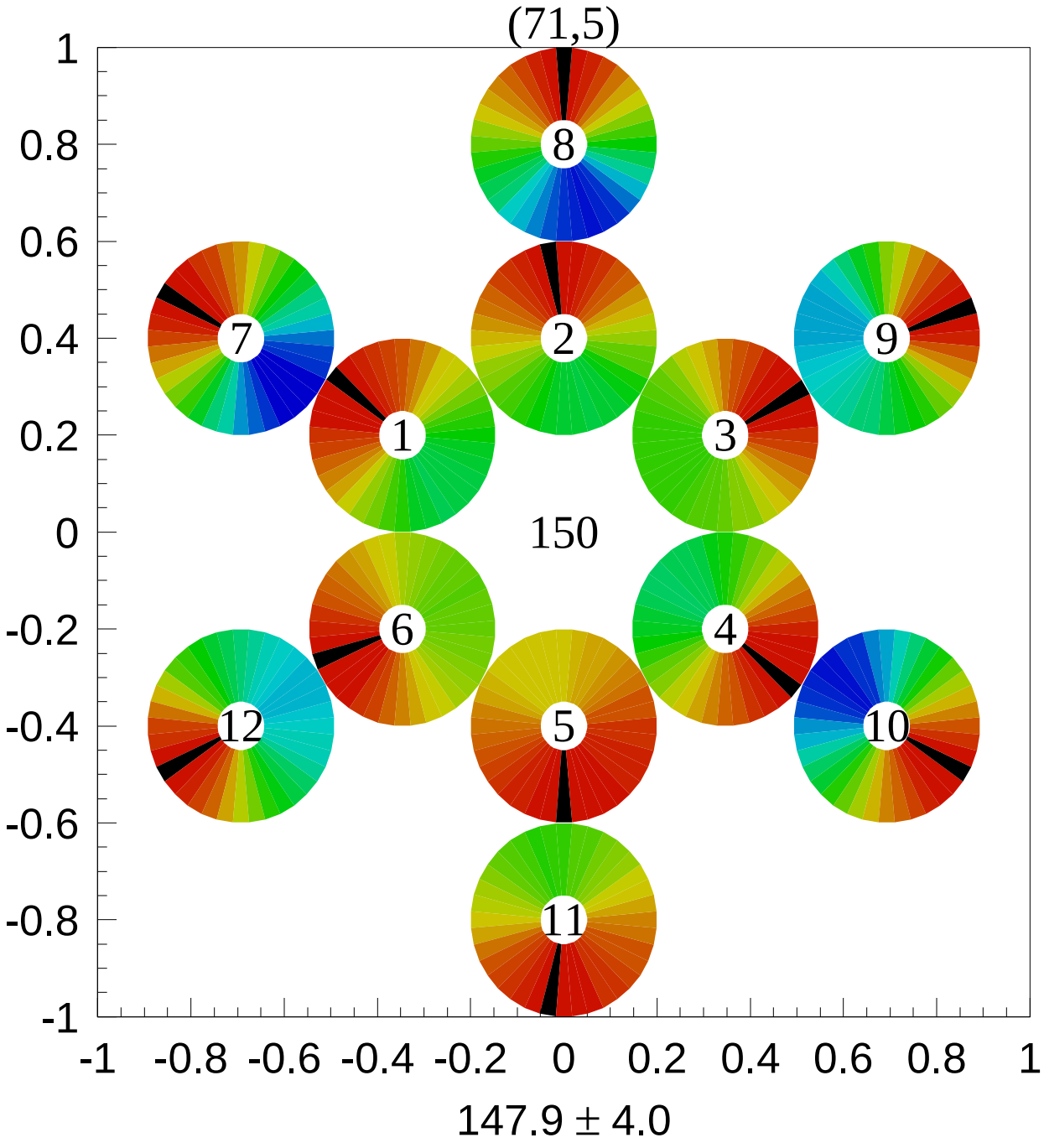

(71,3)
tilted LEDs
124 122 119 120 129 127
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 123 124 121 127 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

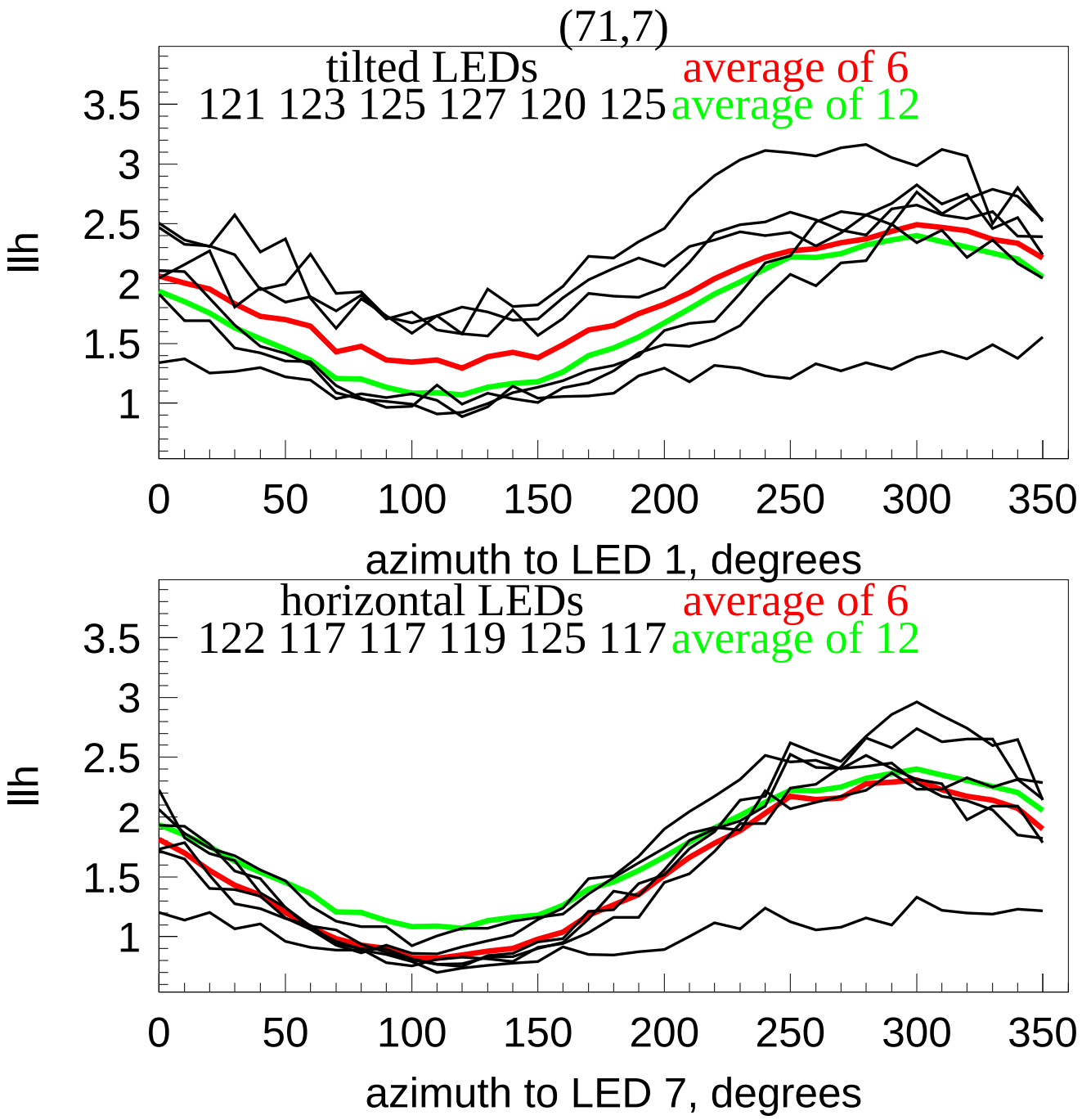

(71,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
310
1
2
3
4
5
6
7
8
9
10
11
12
311.5 ± 7.6

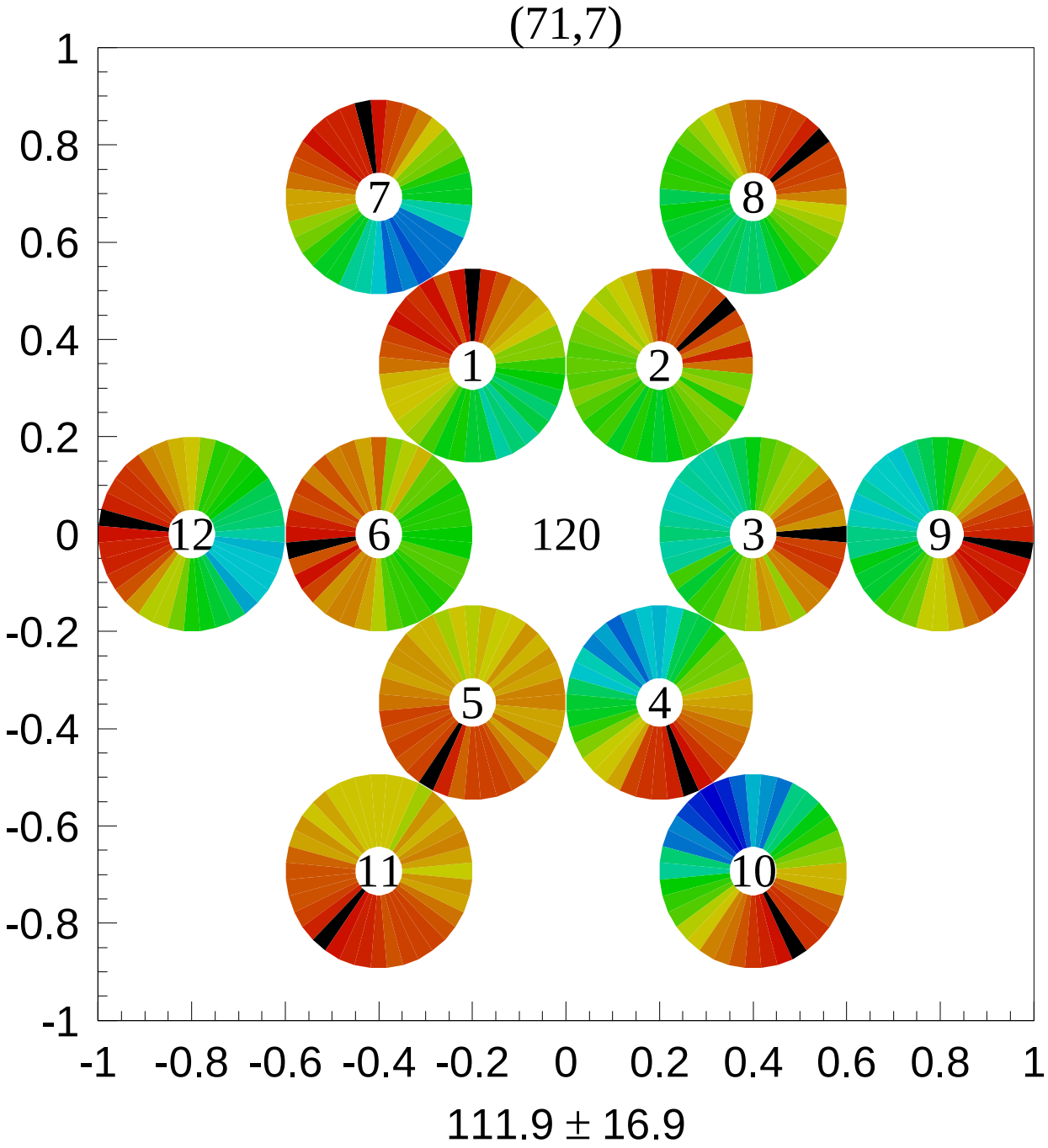

(71,4)
tilted LEDs
119 122 118 120 124 127
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 124 121 120 122 119
average of 6
average of 12
llh
0
5
10
15
20
25
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

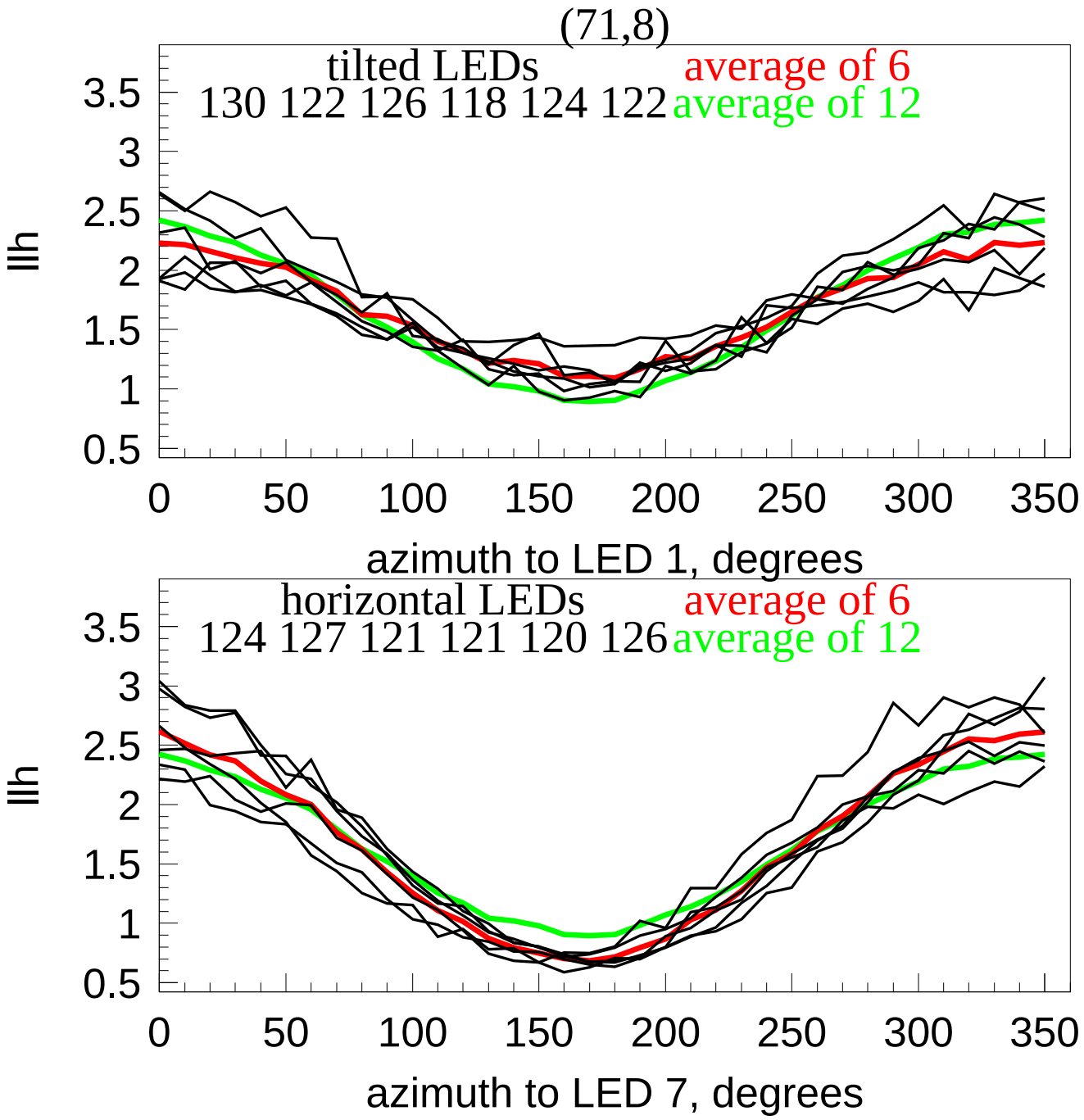

(71,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
255 ± 5.8
250
1
2
3
4
5
6
7
8
9
10
11
12

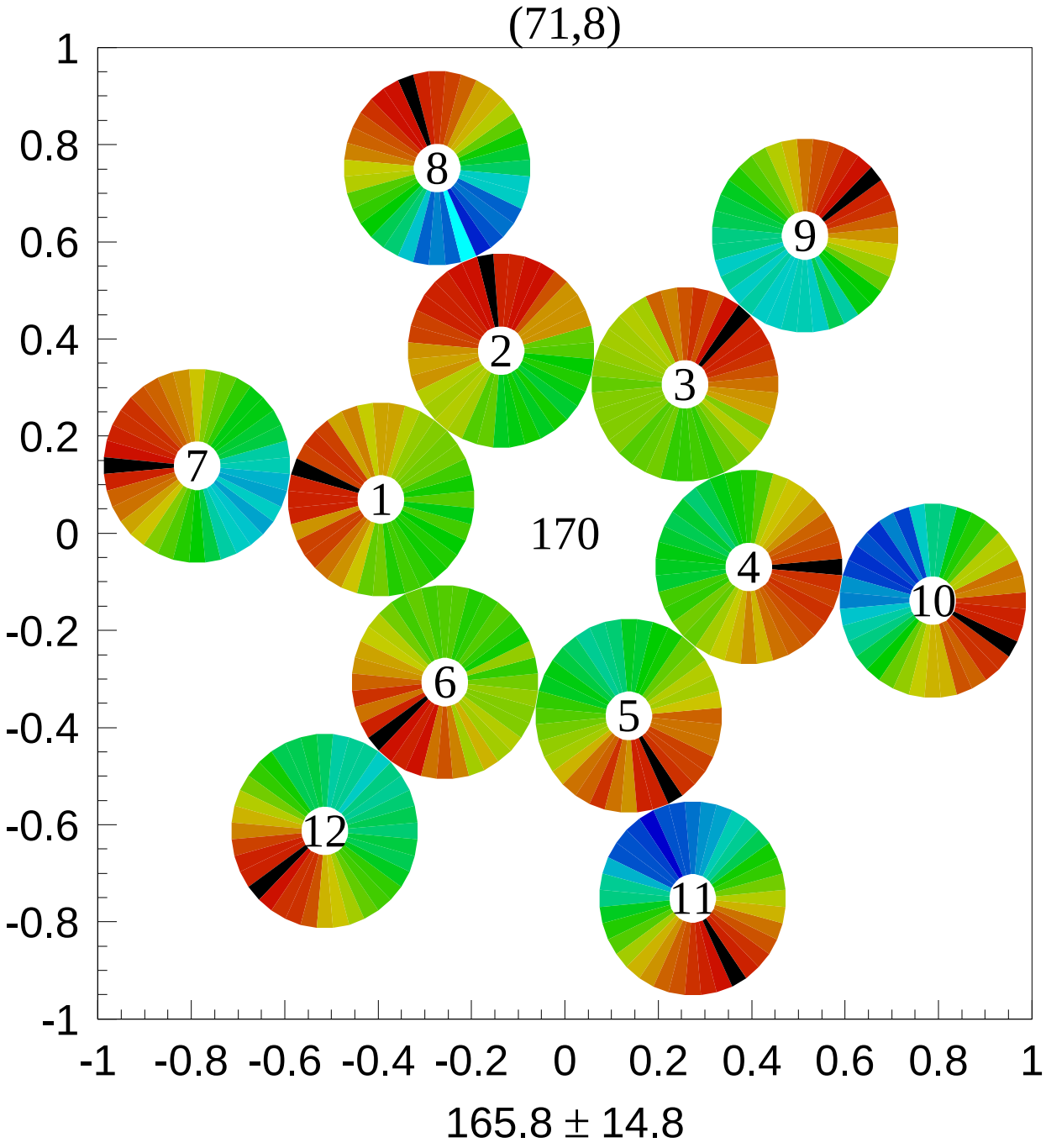

(71,5)
tilted LEDs
121 120 124 123 122 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 125 118 126 121 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

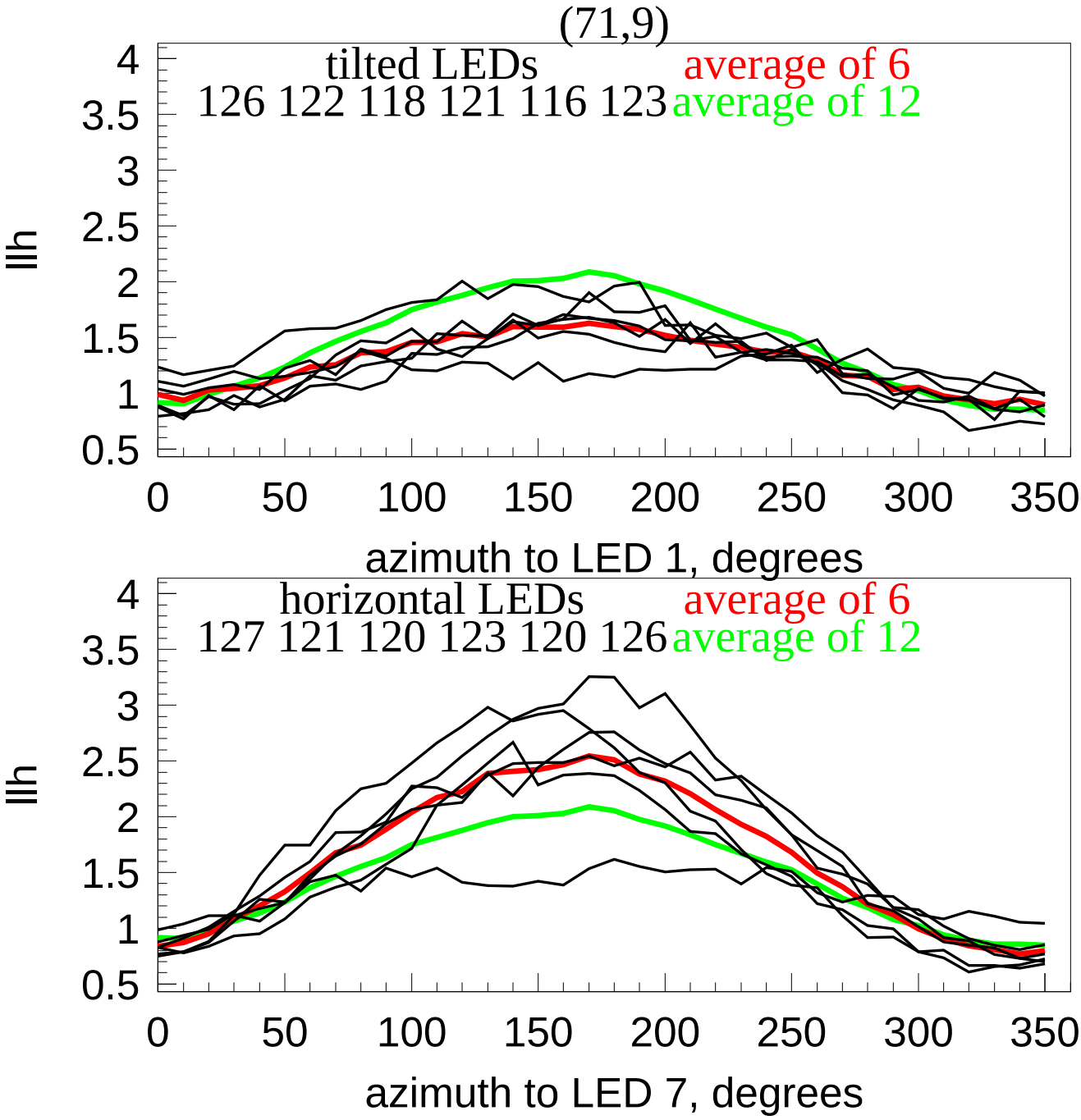

(71,5)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
147.9 ± 4.0

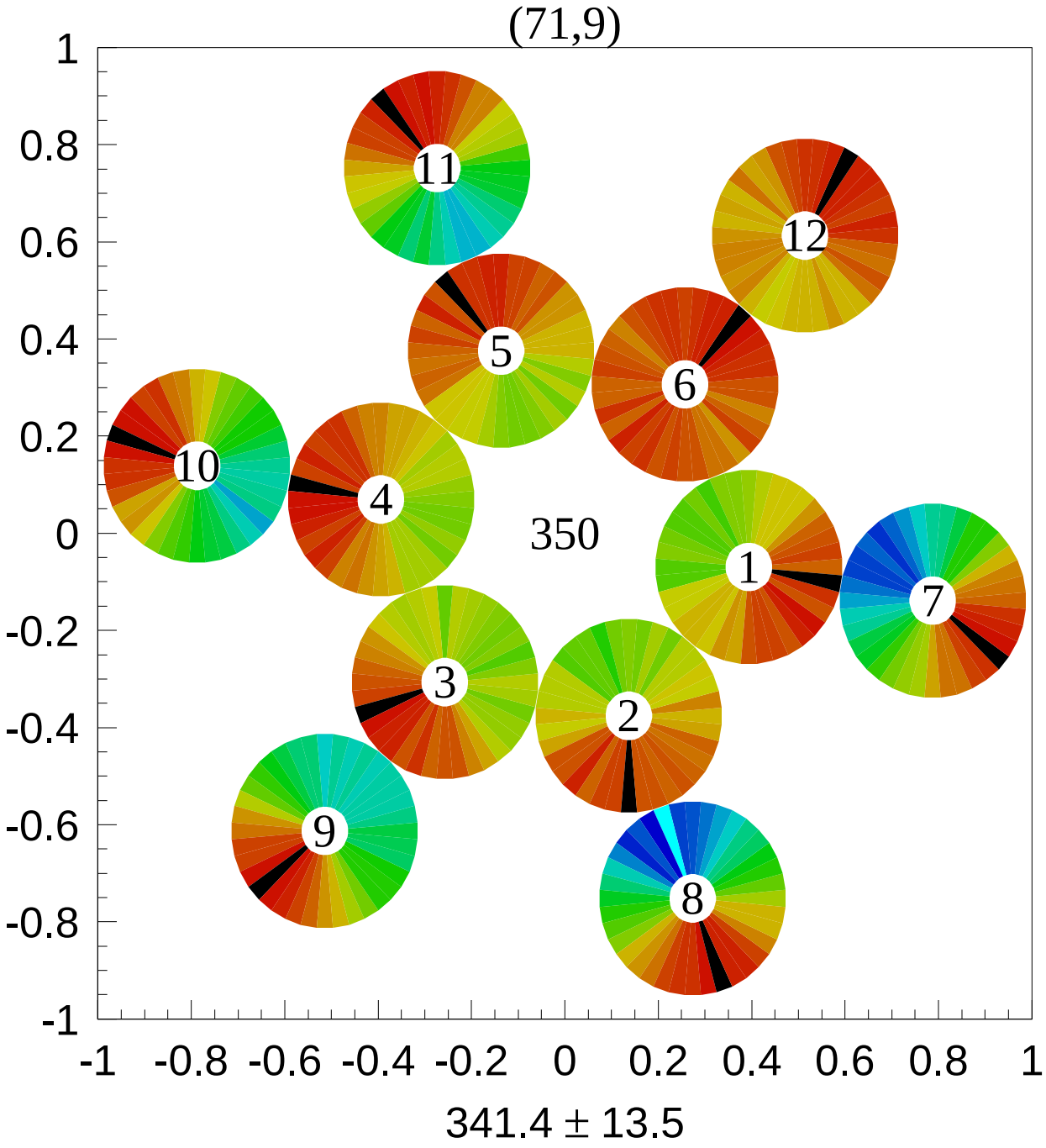

(71,7)
tilted LEDs
121 123 125 127 120 125
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 117 117 119 125 117
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

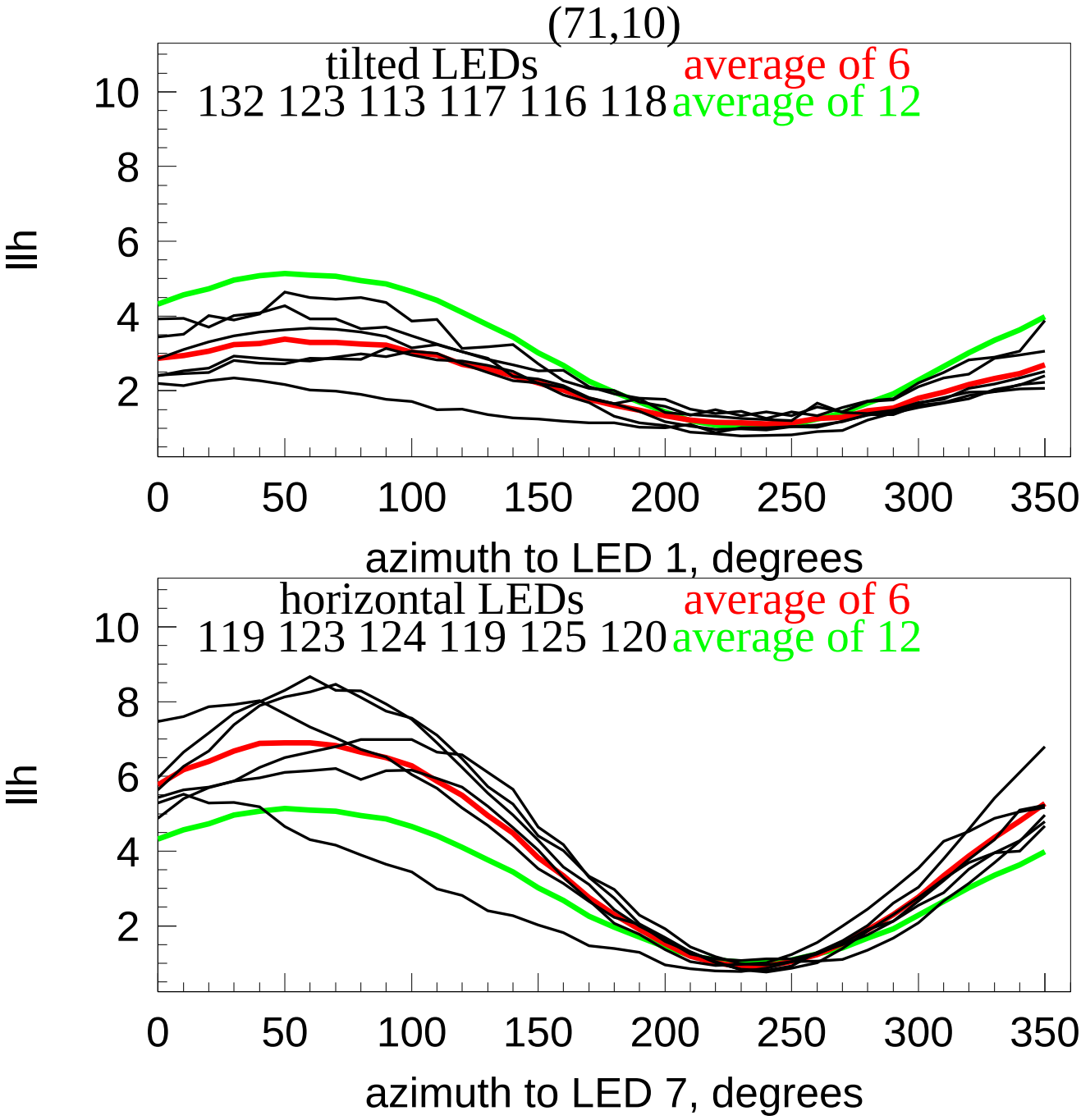

(71,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
111.9 ± 16.9

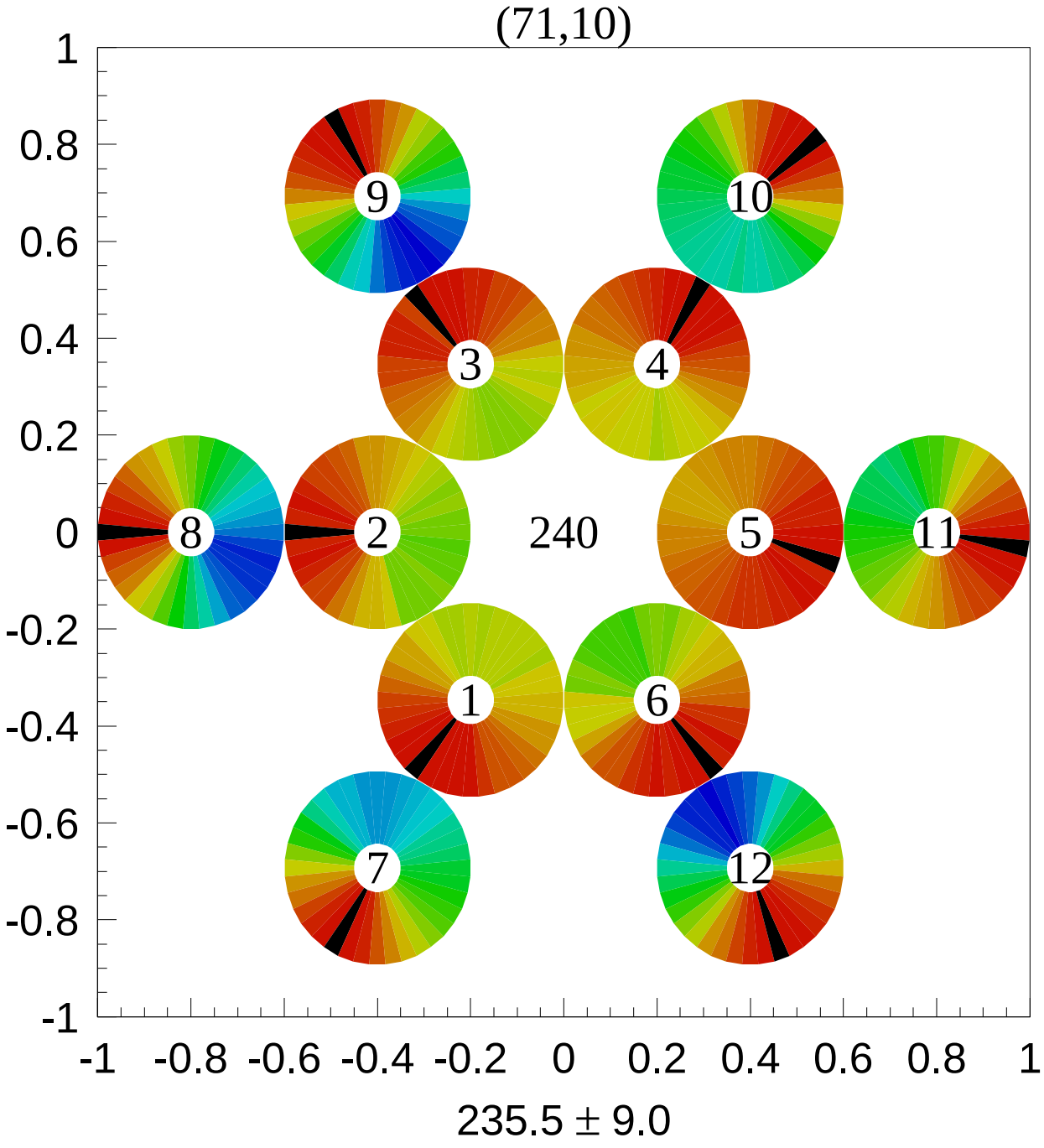

(71,8)
tilted LEDs
130 122 126 118 124 122
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 127 121 121 120 126
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

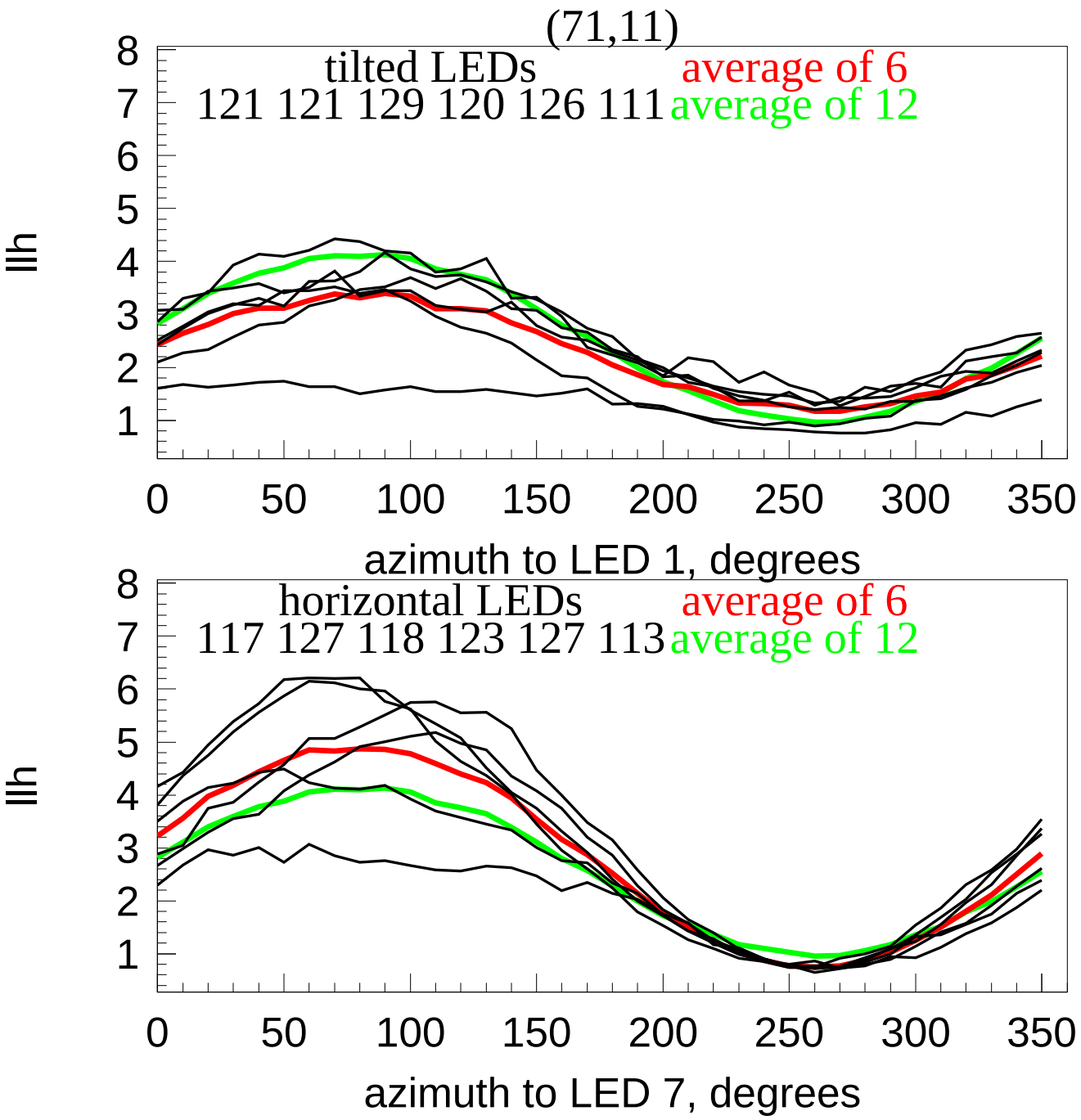

(71,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
165.8 ± 14.8

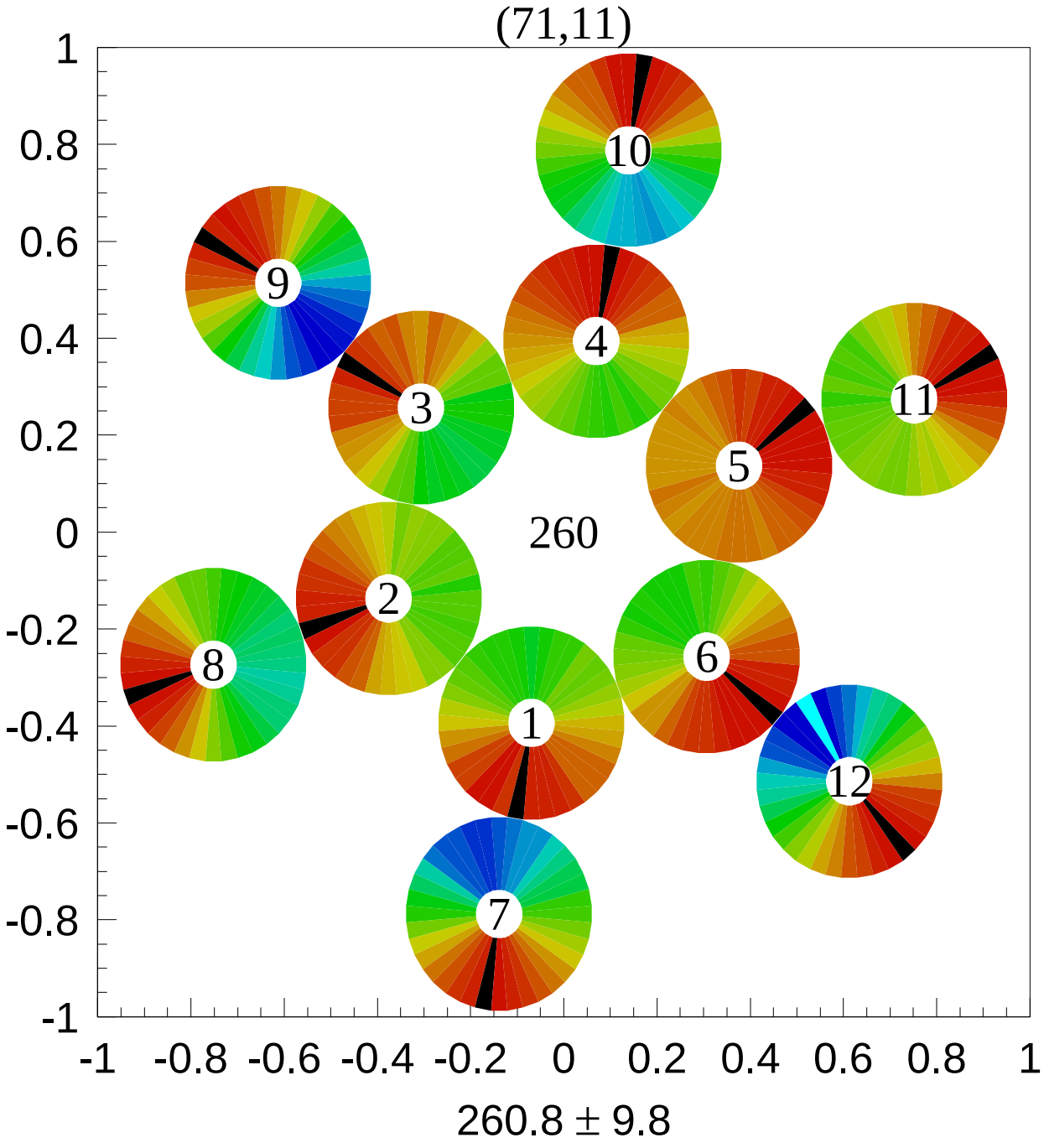

(71,9)
tilted LEDs
126 122 118 121 116 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 121 120 123 120 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

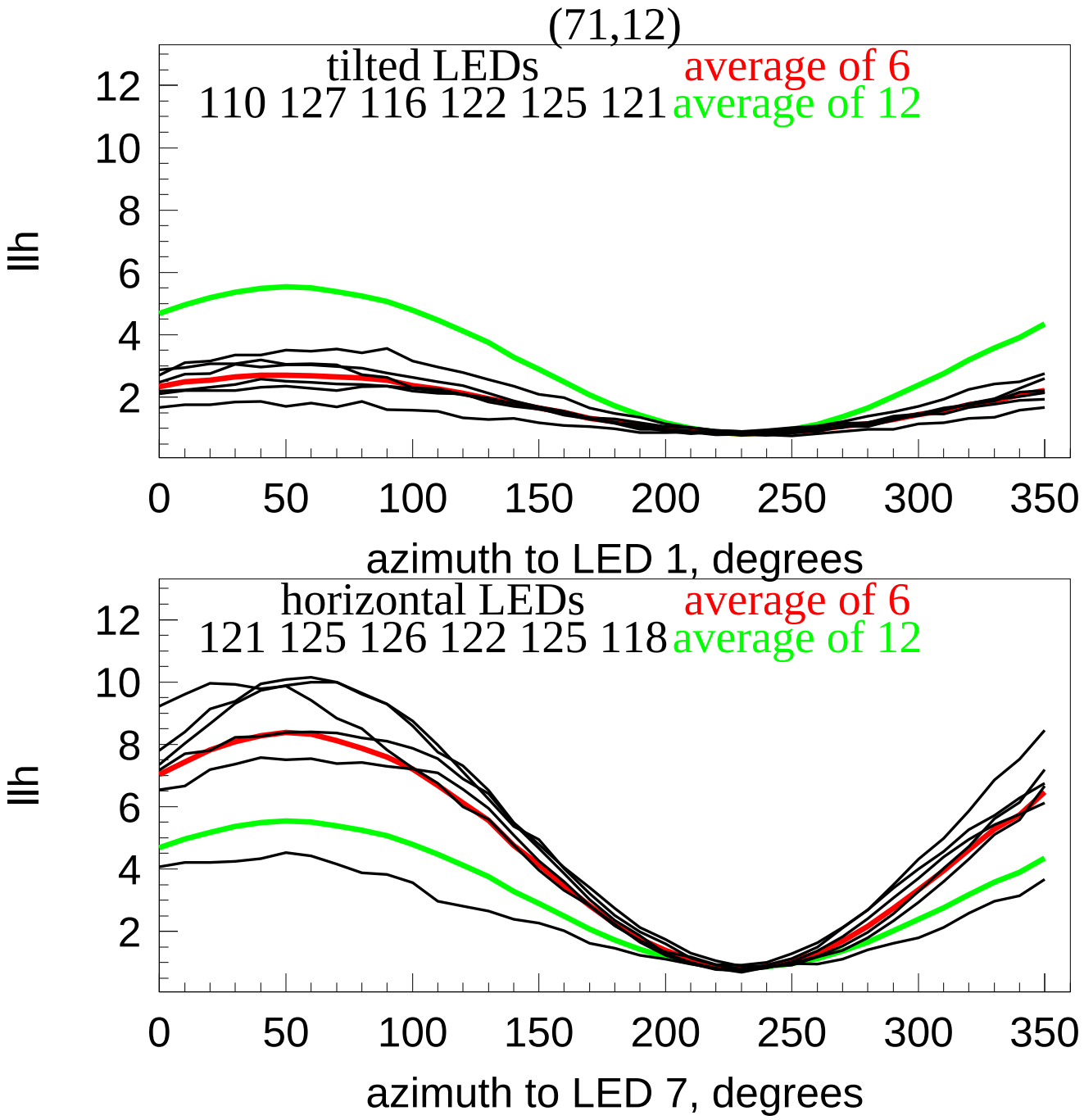

(71,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
341.4 ± 13.5

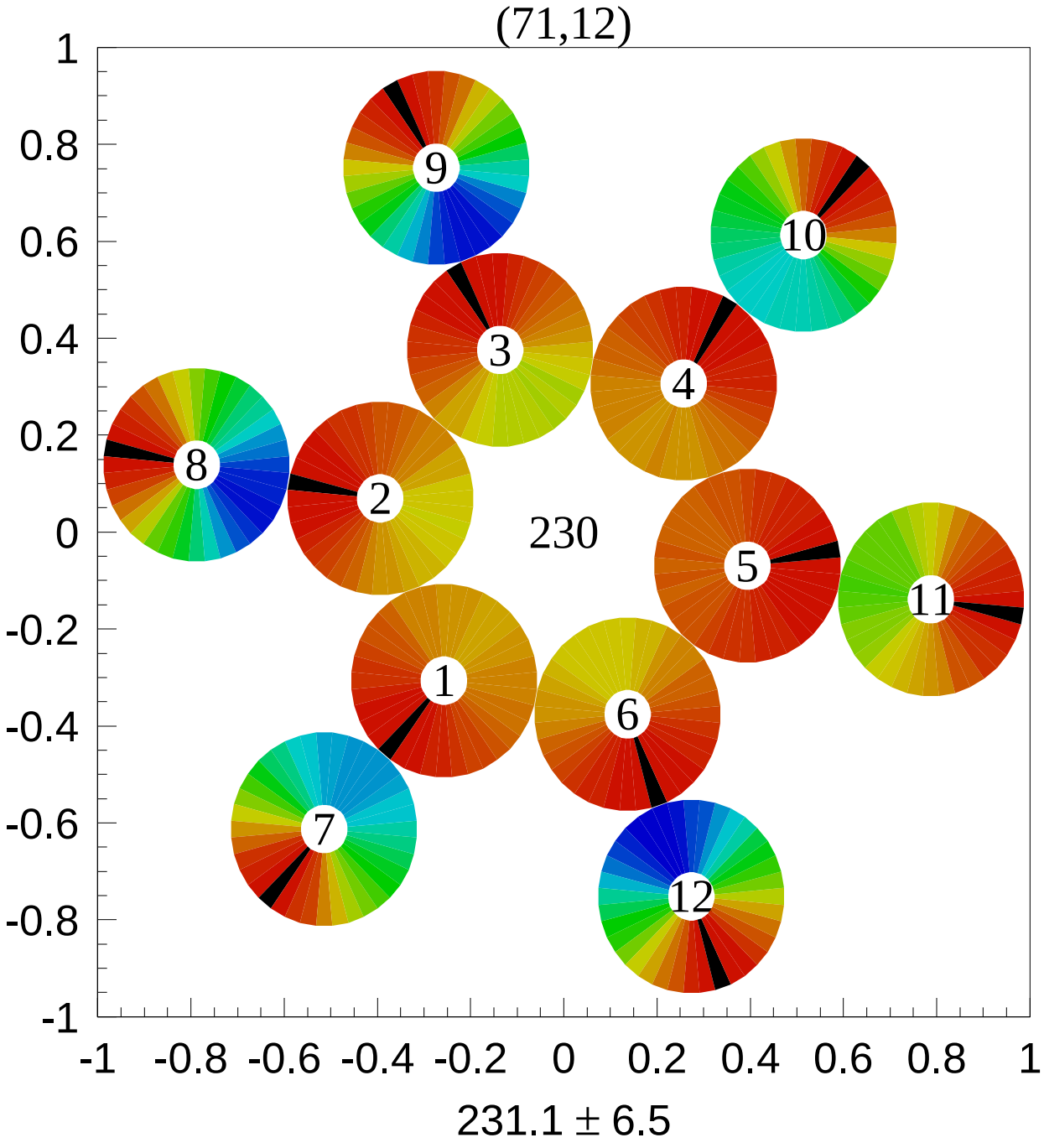

(71,10)
tilted LEDs
132 123 113 117 116 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 124 119 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

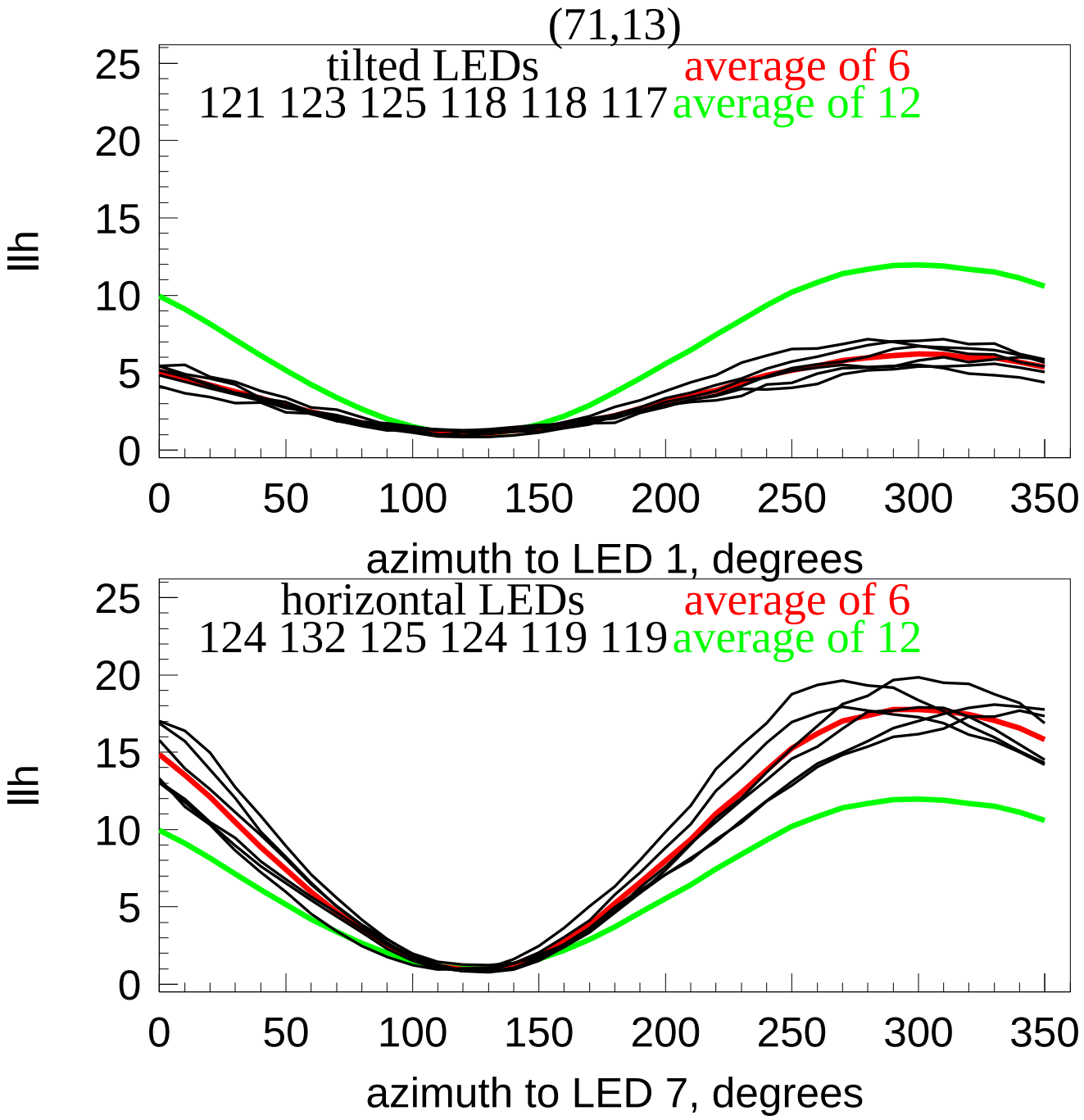

(71,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
235.5 ± 9.0

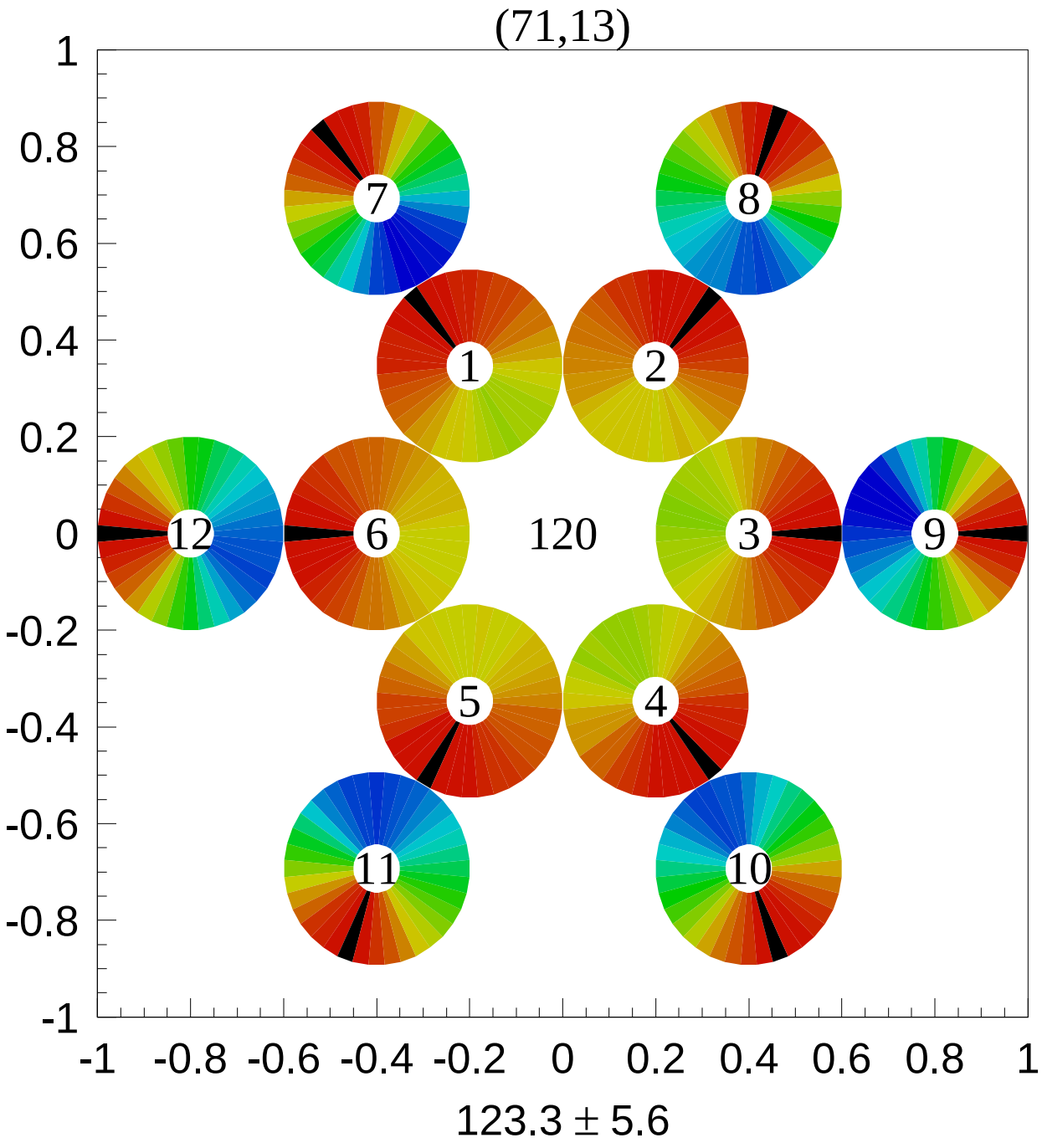

(71,11)
tilted LEDs
121 121 129 120 126 111
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 127 118 123 127 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

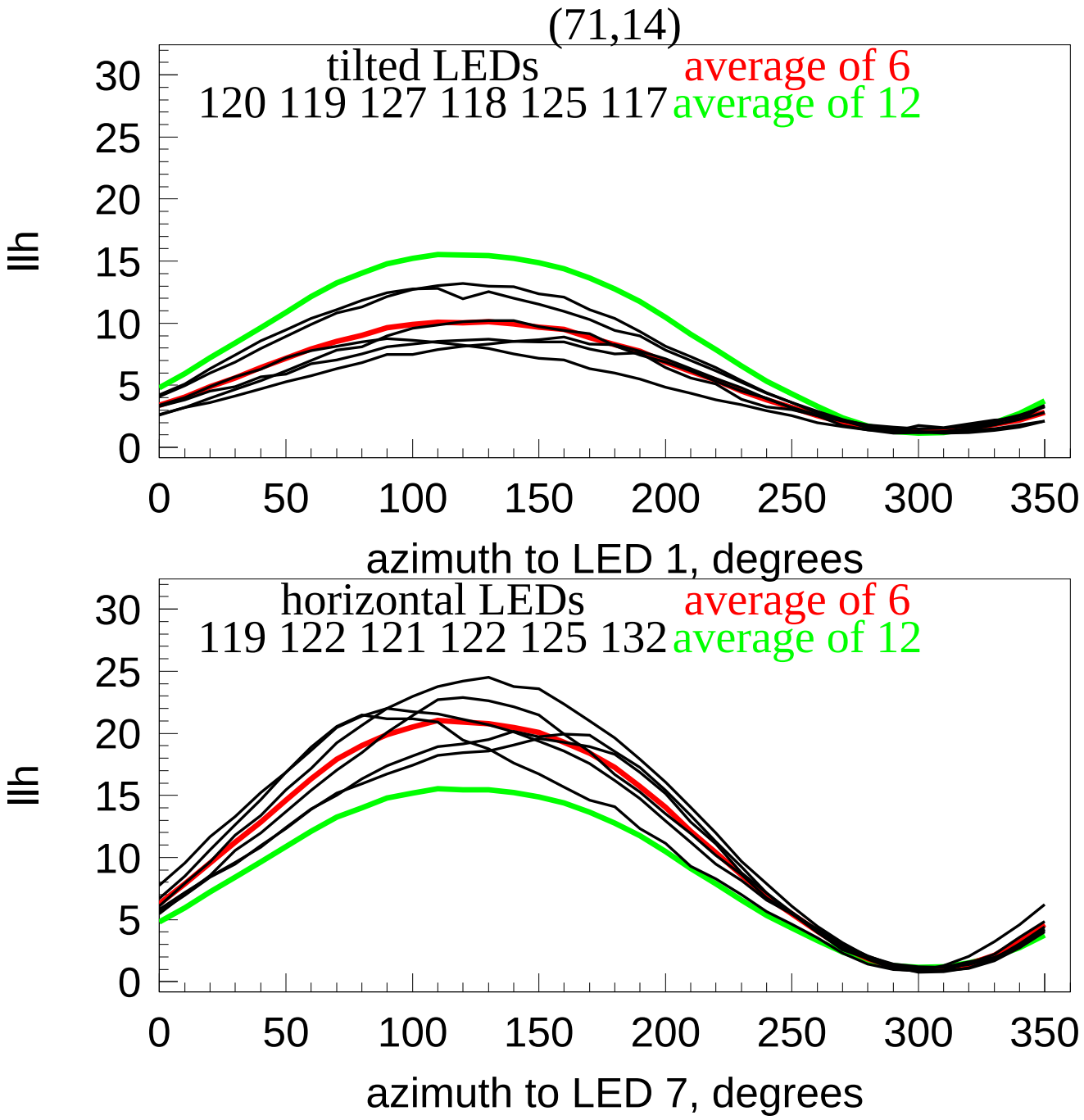

(71,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
260
260.8 ± 9.8
10
9
4
3
11
5
2
8
6
1
12
7

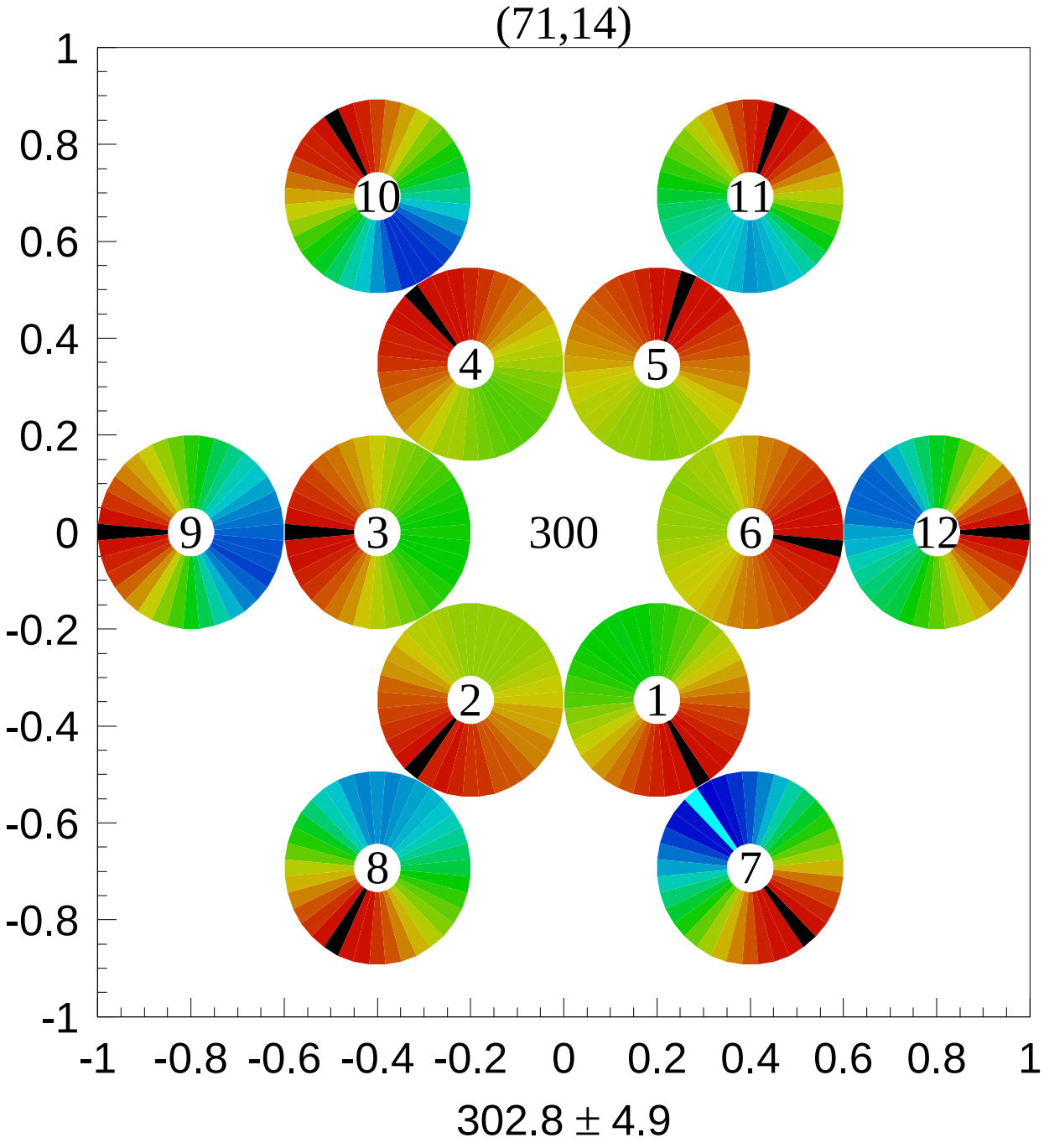

(71,12)
tilted LEDs
110 127 116 122 125 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 126 122 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

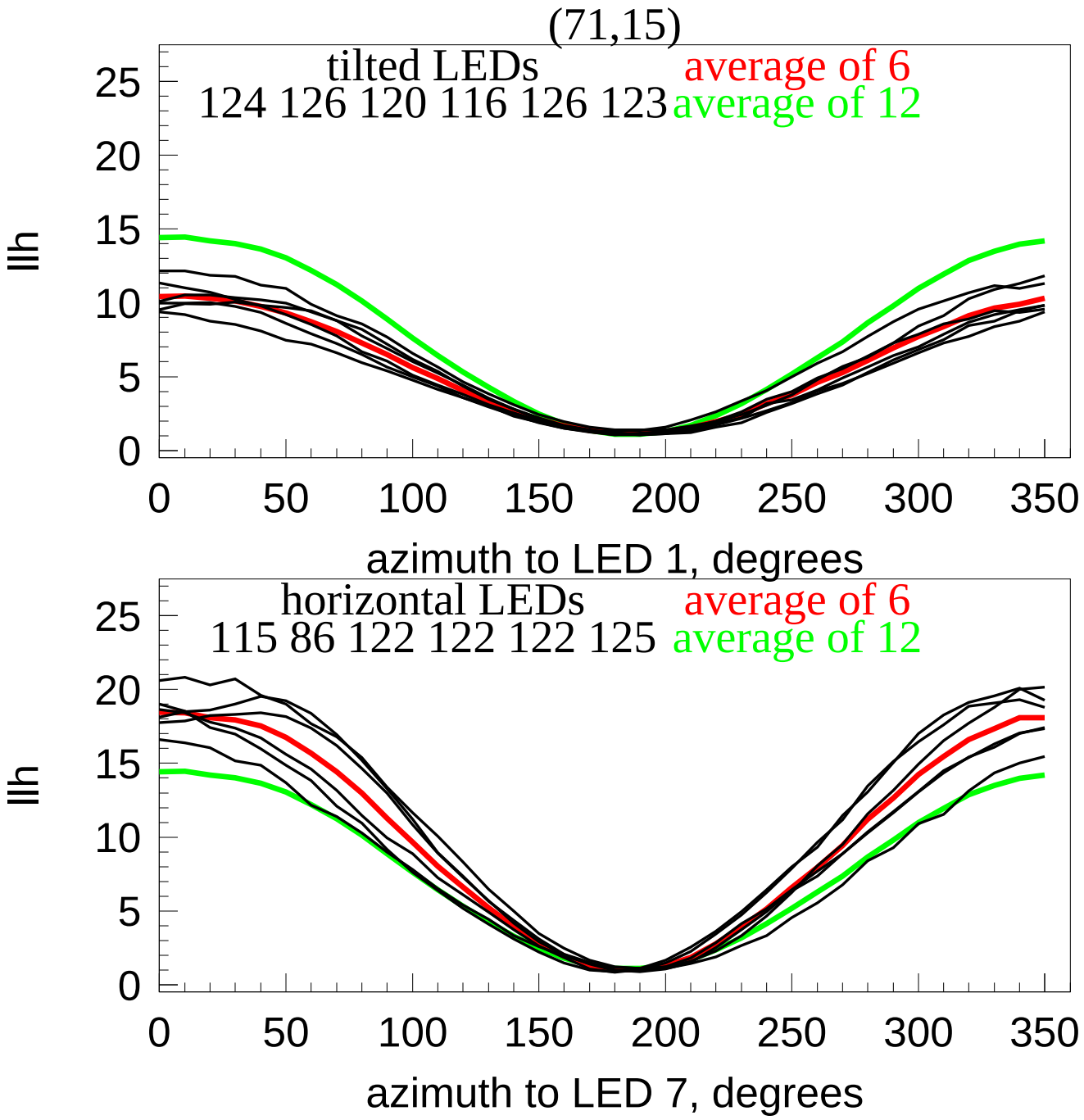

(71,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.1 ± 6.5

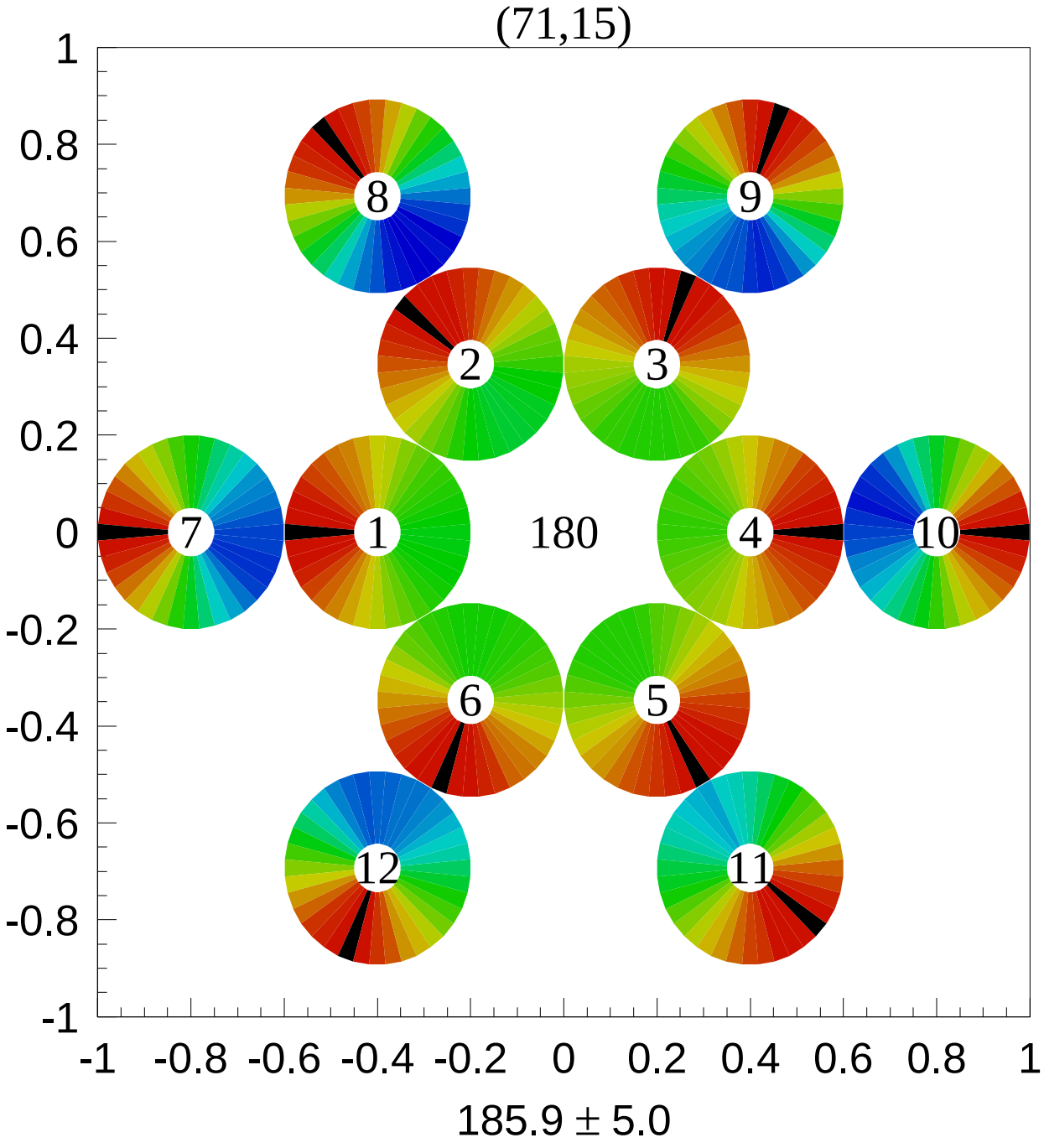

(71,13)
tilted LEDs
121 123 125 118 118 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 132 125 124 119 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

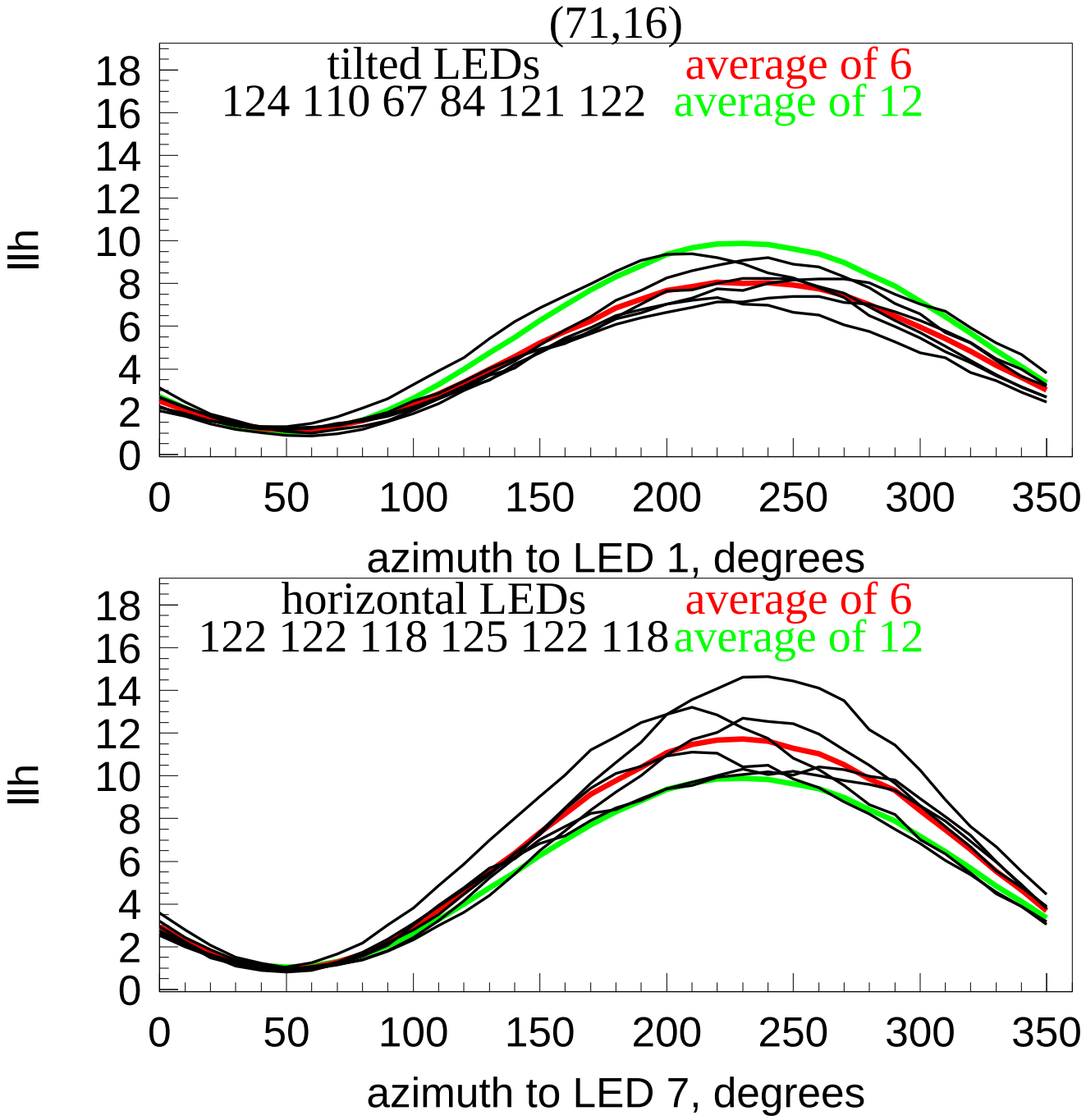

(71,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
123.3 ± 5.6

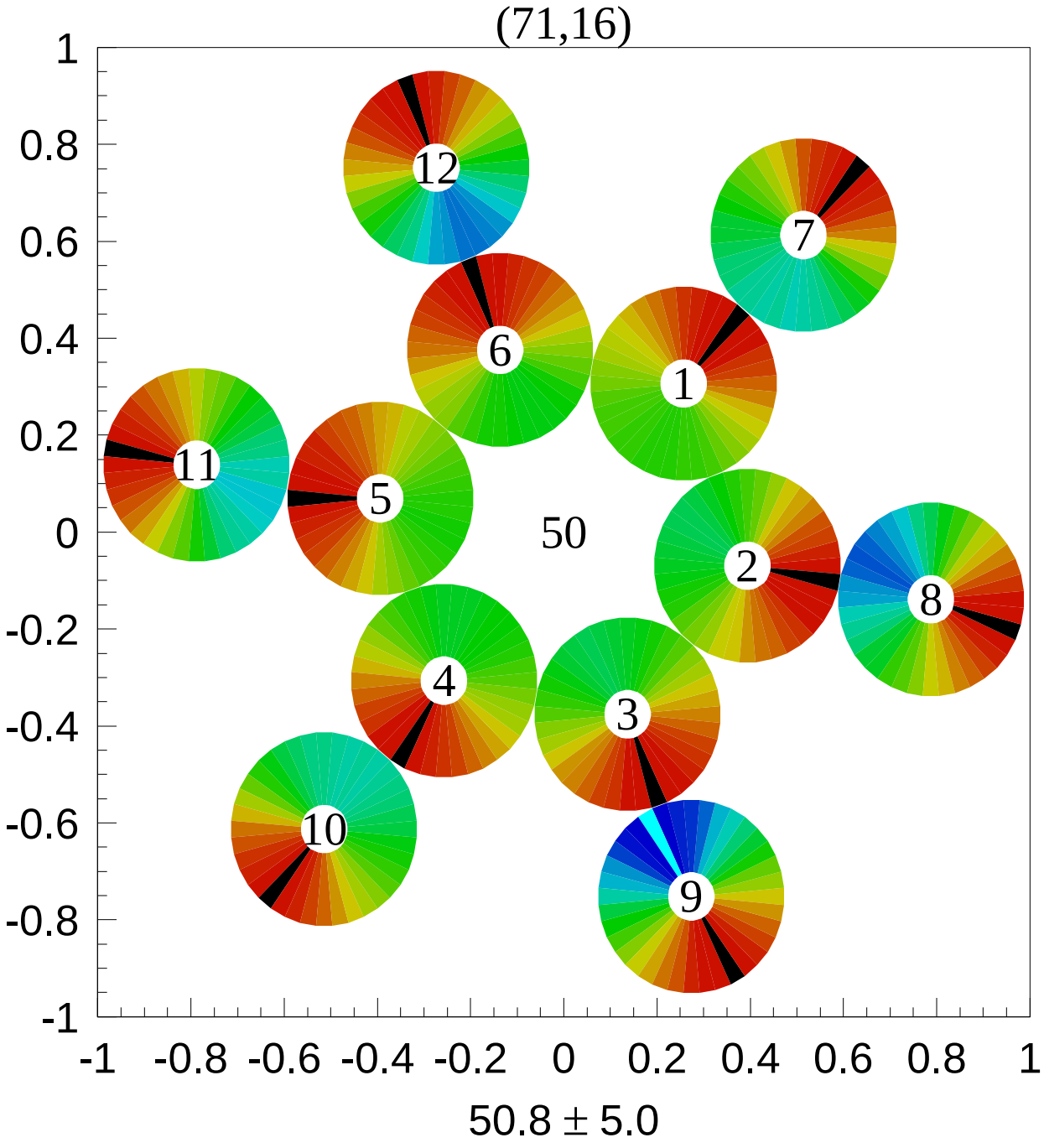

(71,14)
tilted LEDs
120 119 127 118 125 117
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 122 121 122 125 132
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

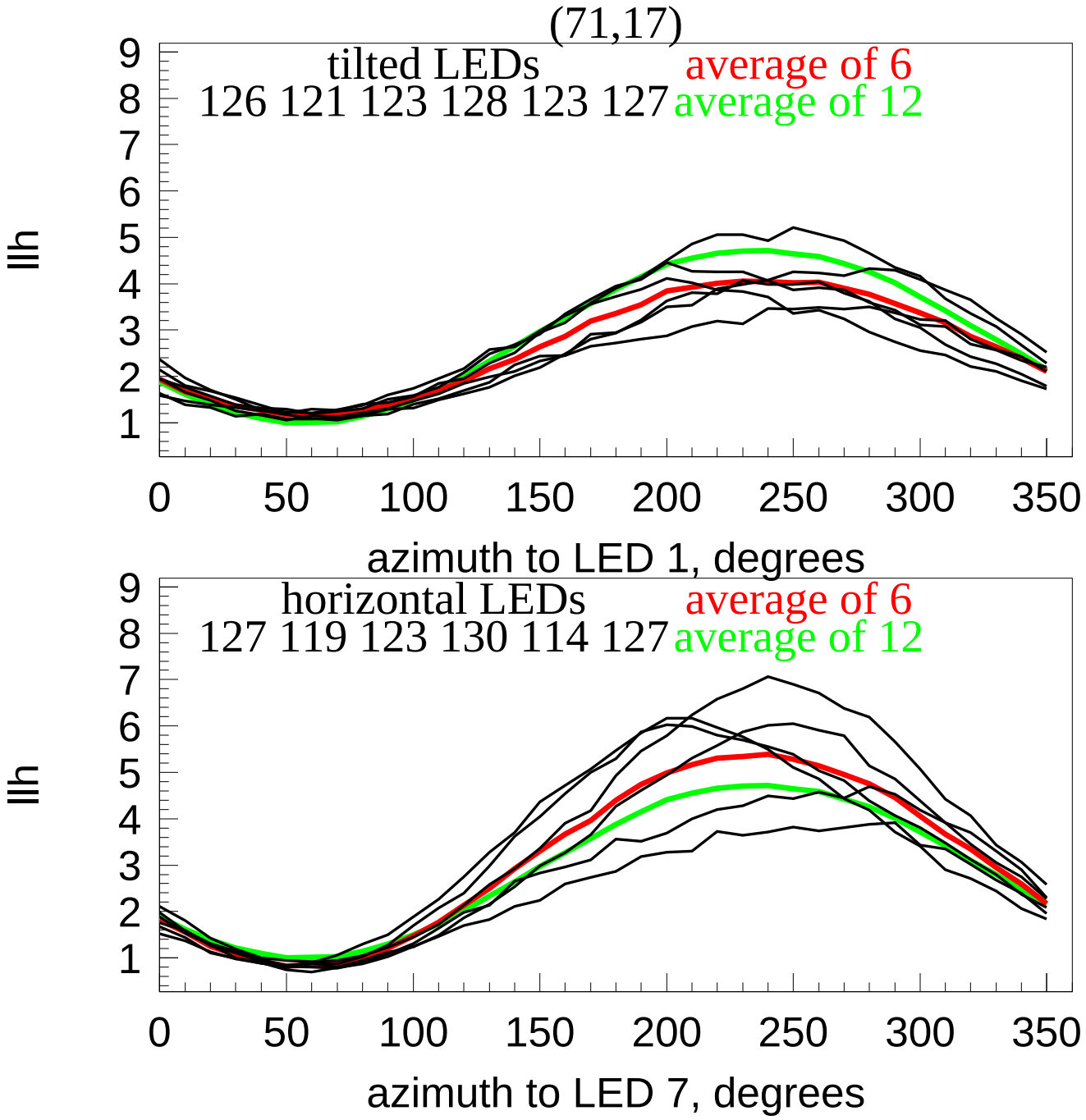

(71,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
302.8 ± 4.9

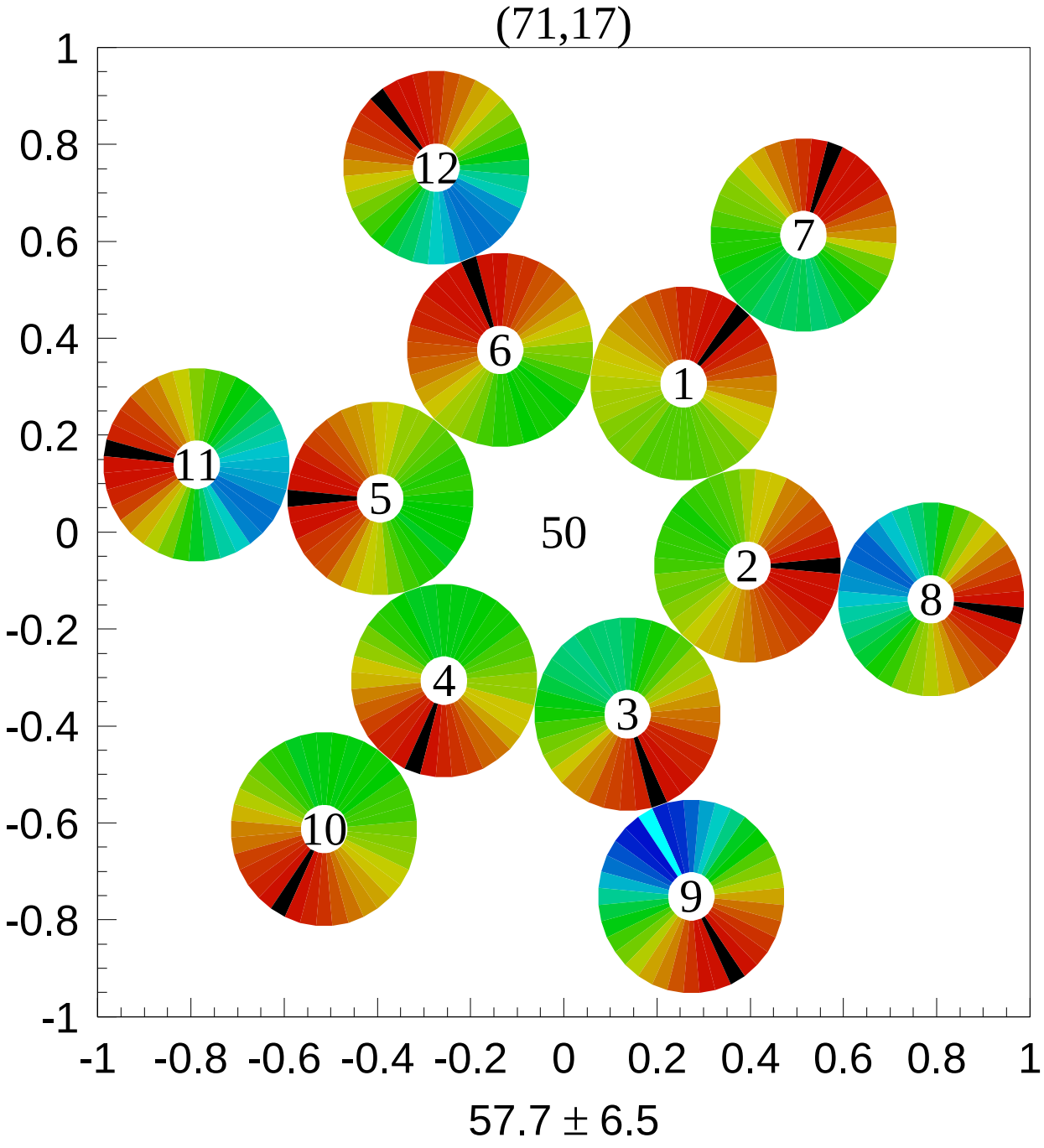

(71,15)
tilted LEDs
124 126 120 116 126 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 86 122 122 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

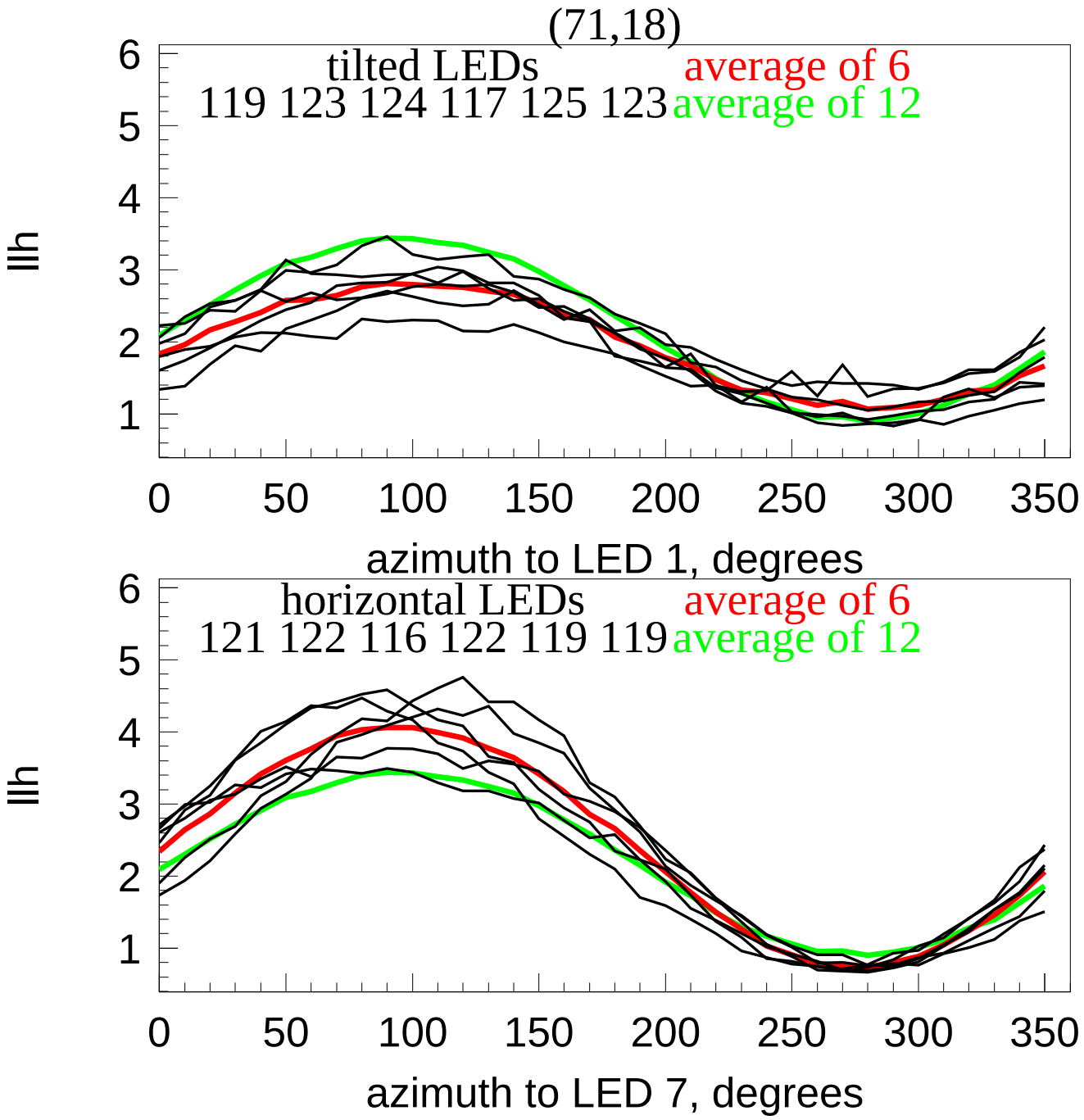

(71,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
185.9 ± 5.0

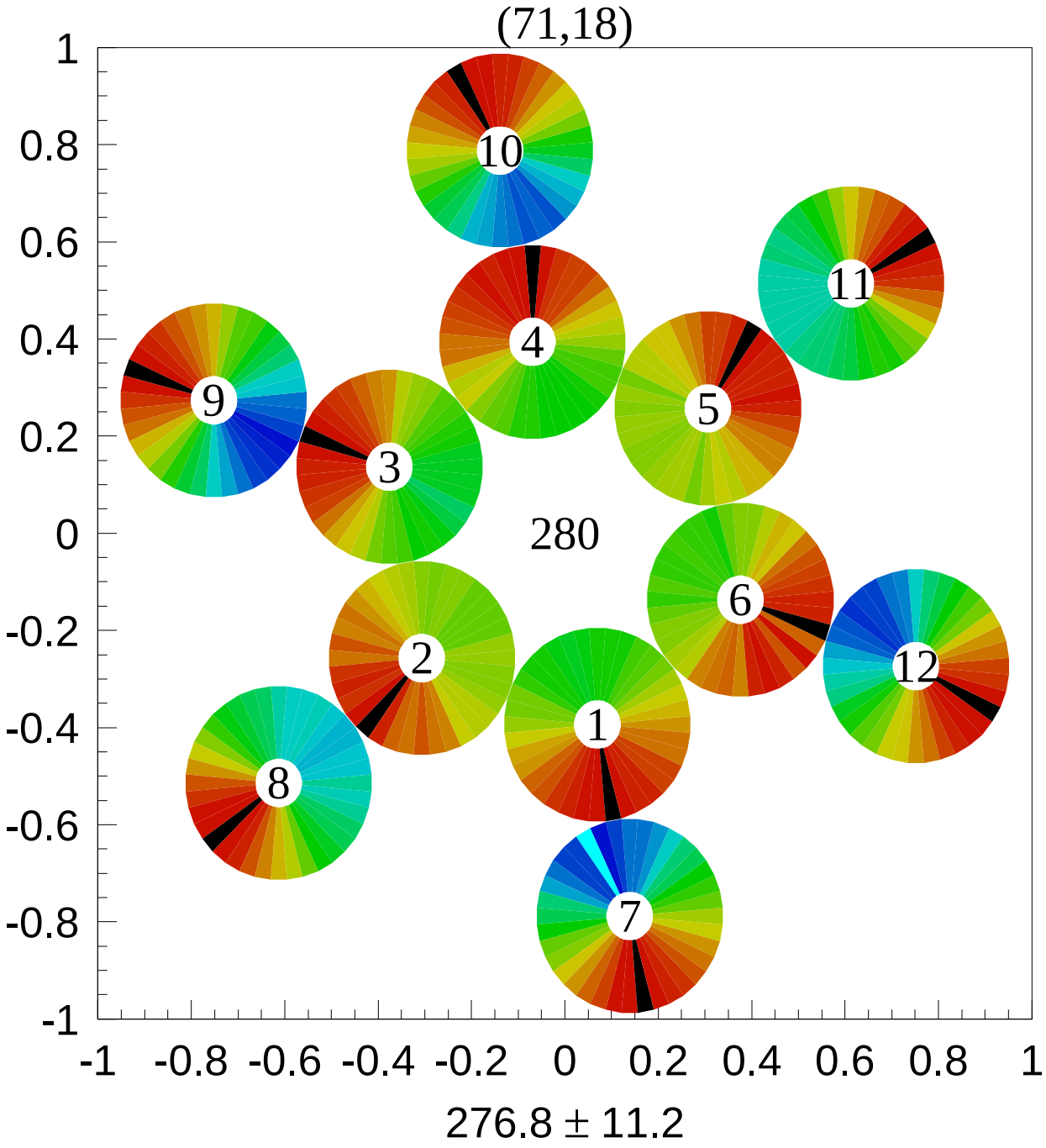

(71,16)
tilted LEDs
124 110 67 84 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 118 125 122 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

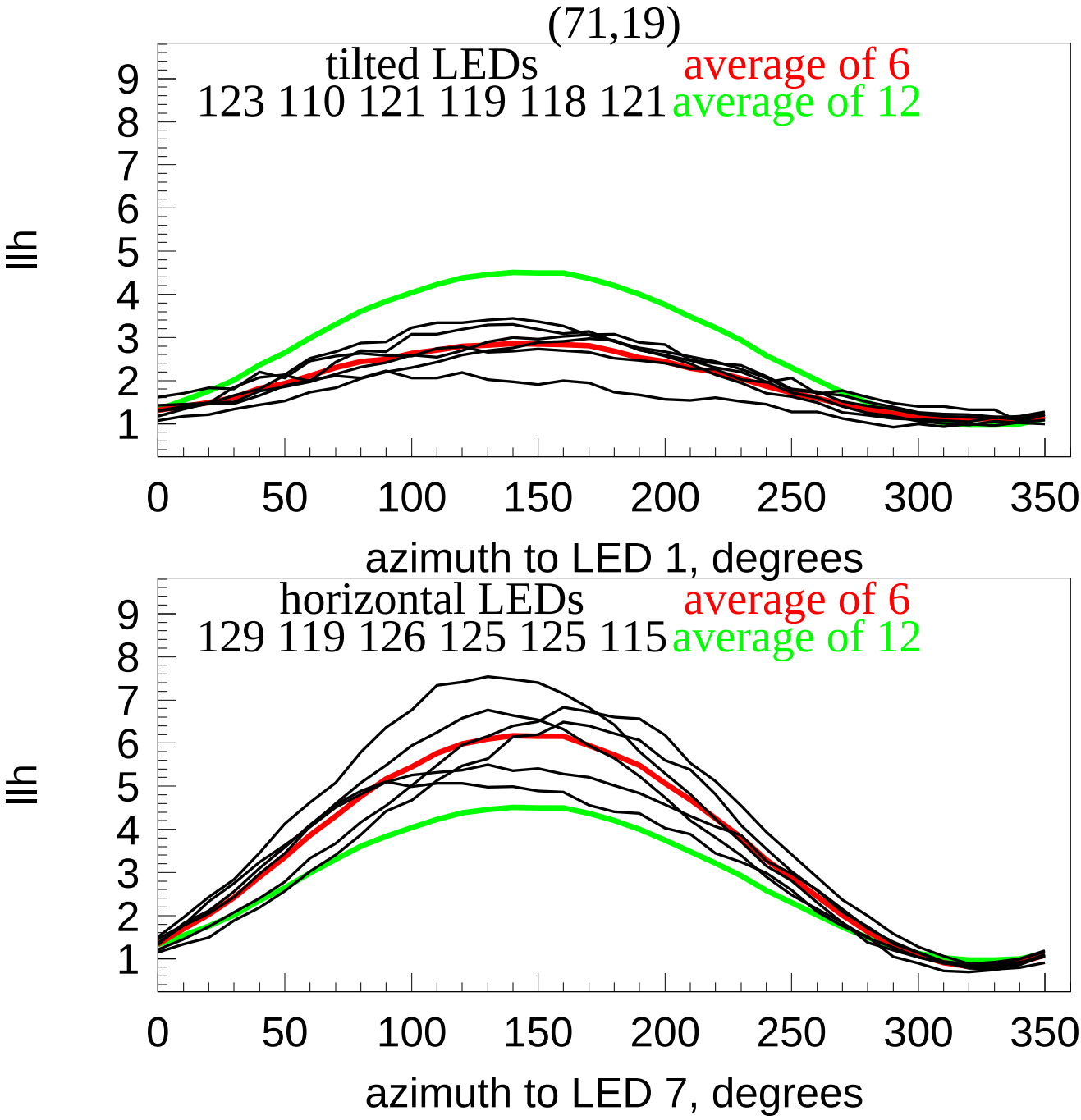

(71,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
50.8 ± 5.0
12
7
6
1
11
5
50
2
8
4
3
10
9

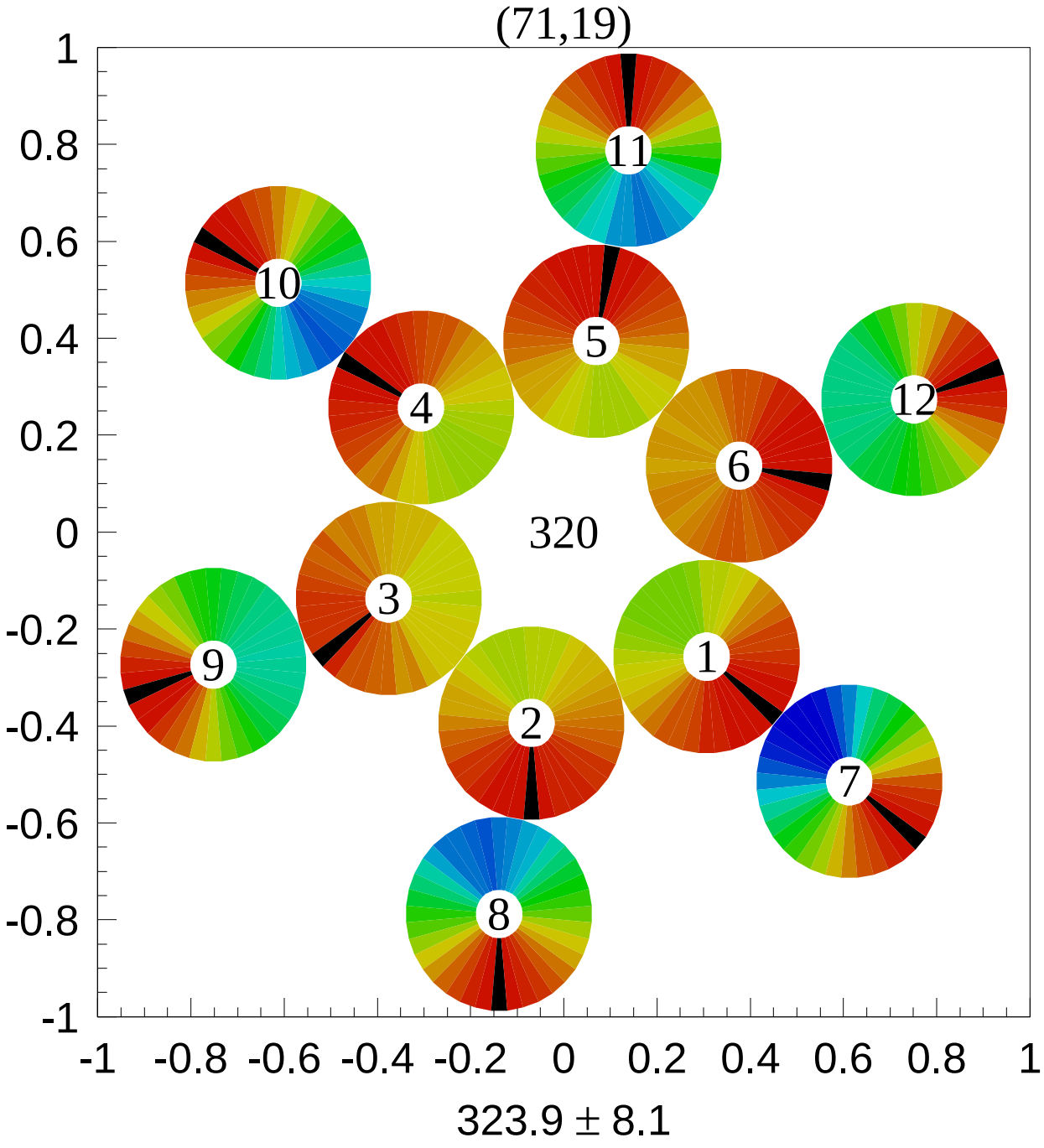

(71,17)
tilted LEDs
126 121 123 128 123 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 119 123 130 114 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

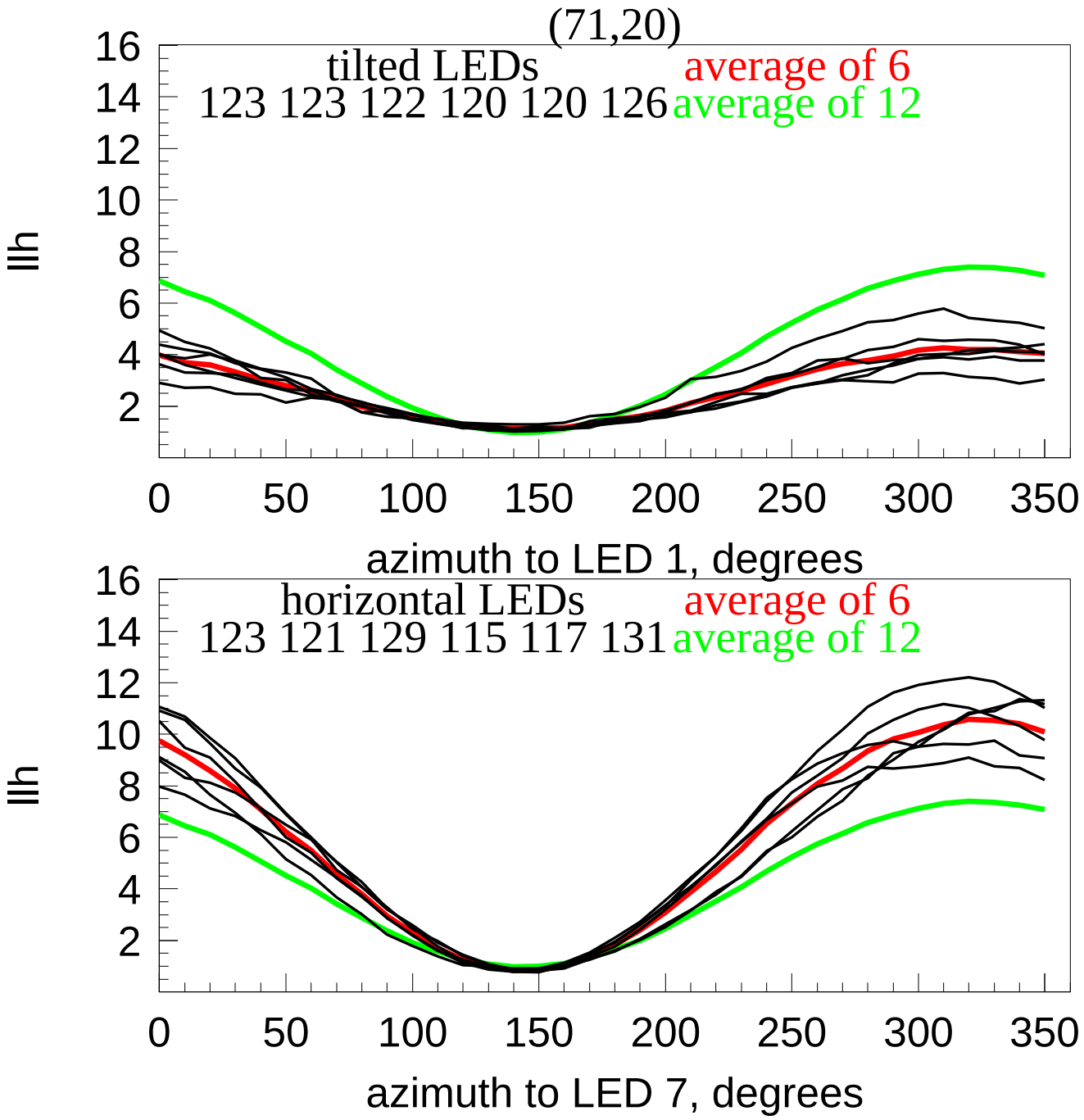

(71,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
57.7 ± 6.5

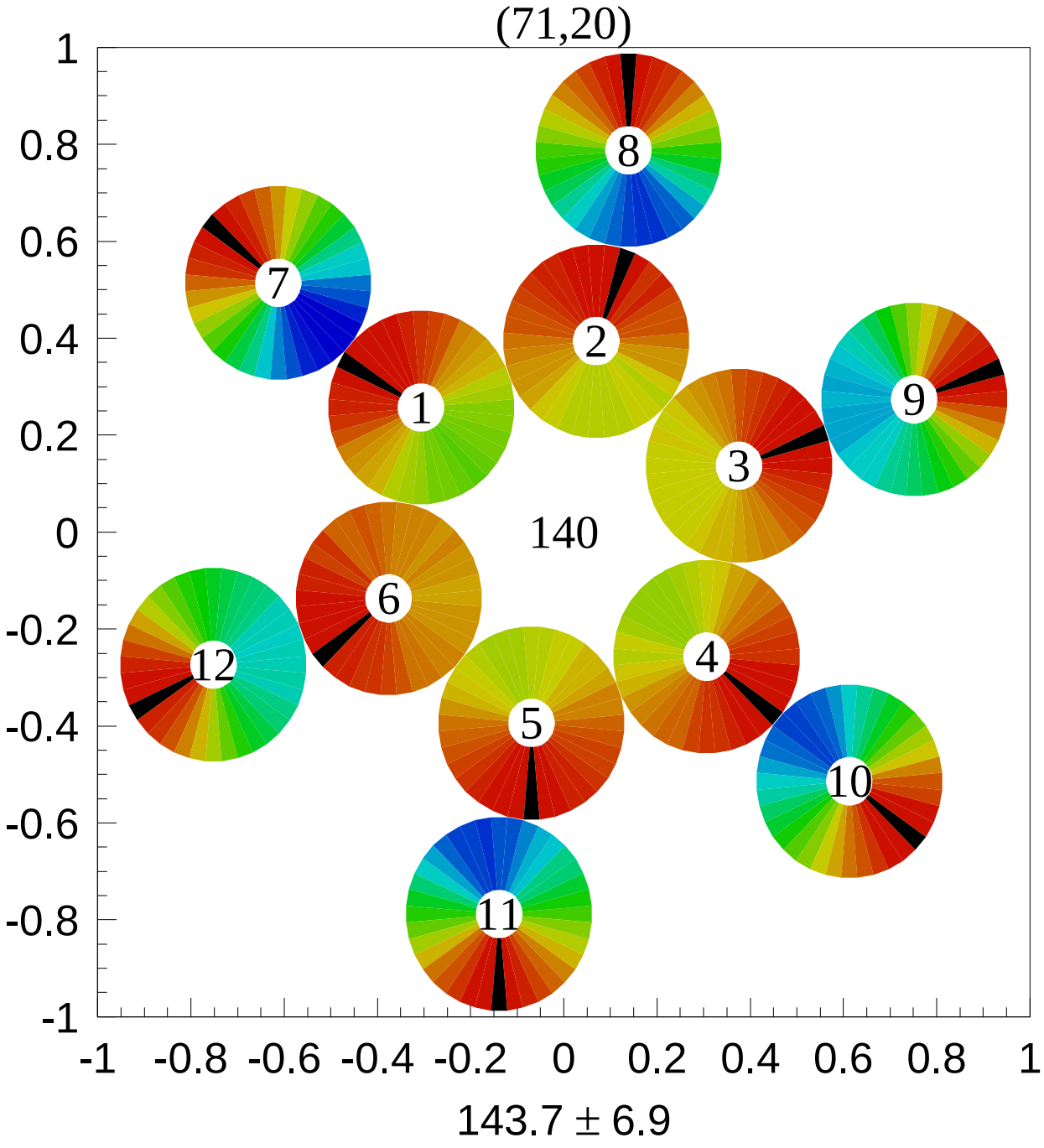

(71,18)
tilted LEDs
119 123 124 117 125 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 122 116 122 119 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

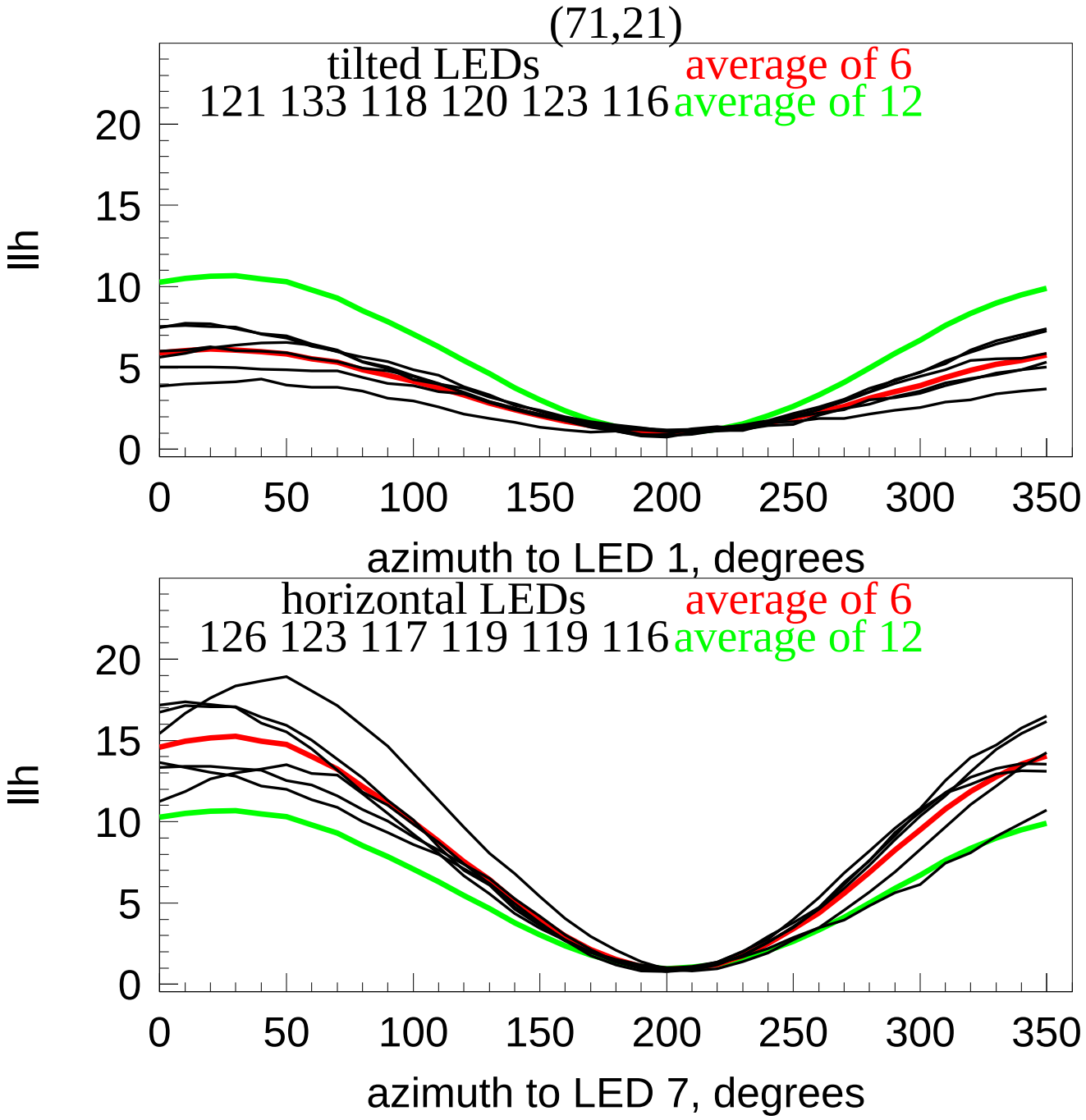

(71,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
276.8 ± 11.2

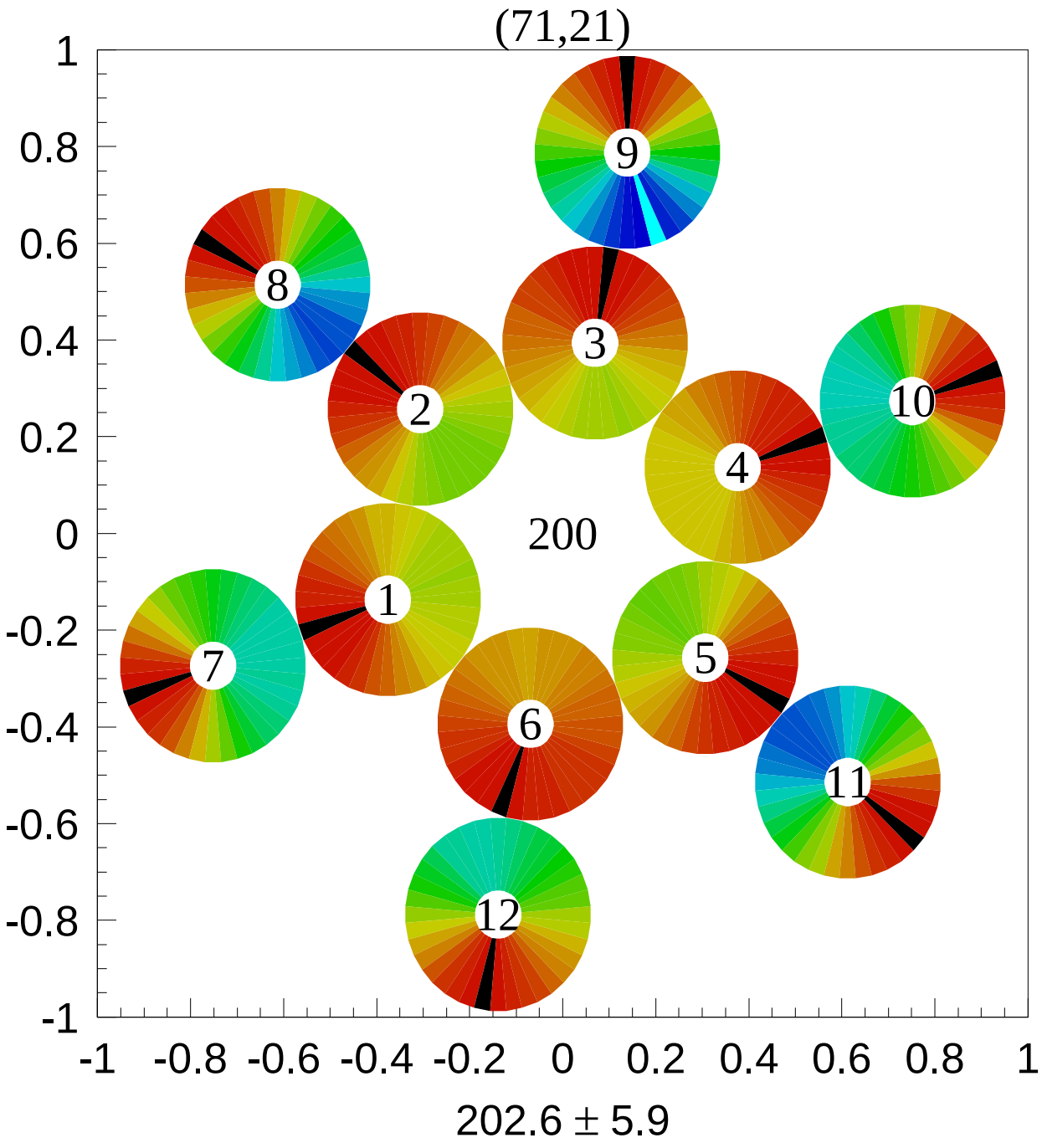

(71,19)
tilted LEDs
123 110 121 119 118 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 119 126 125 125 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

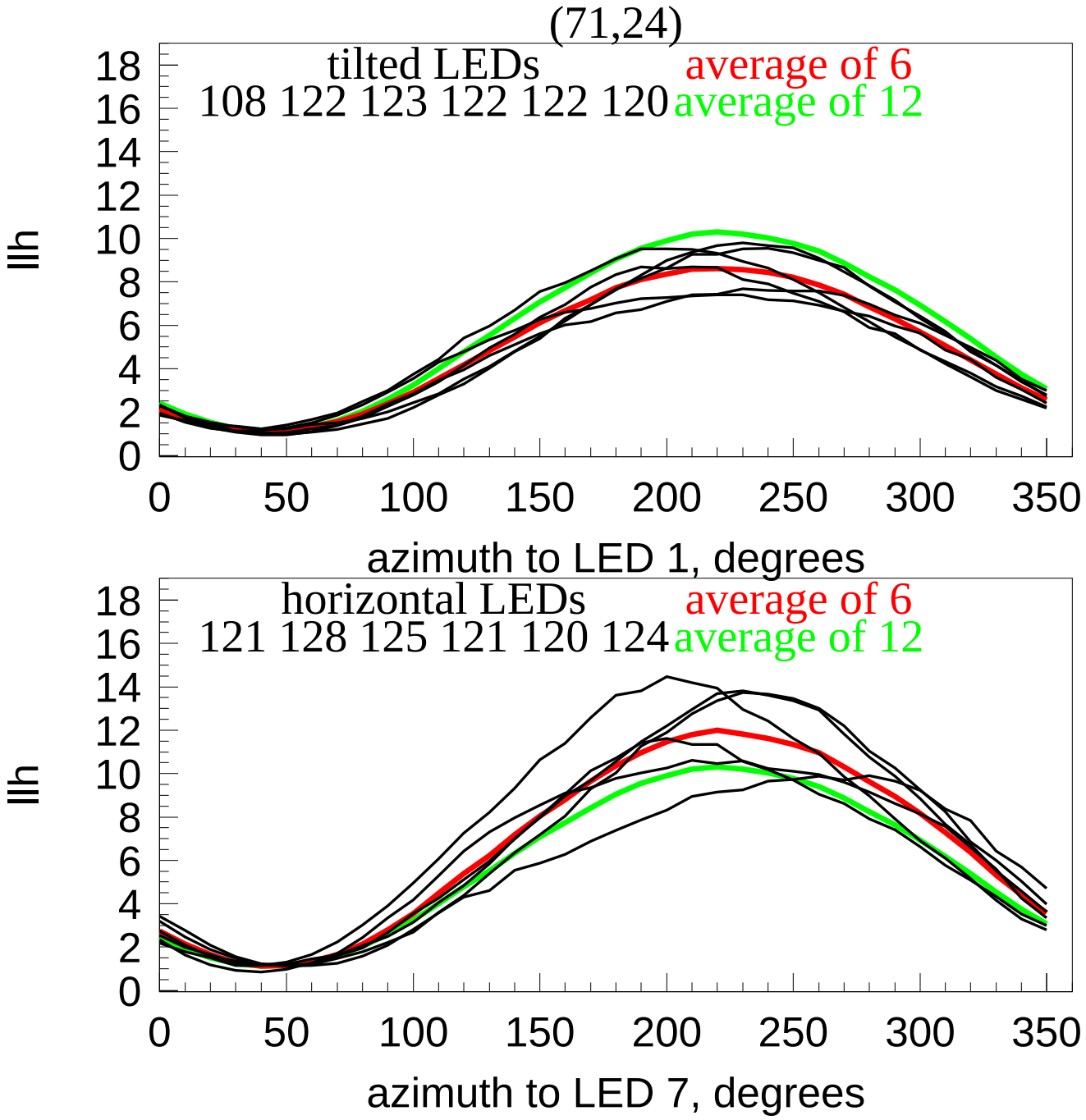

(71,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
323.9 ± 8.1

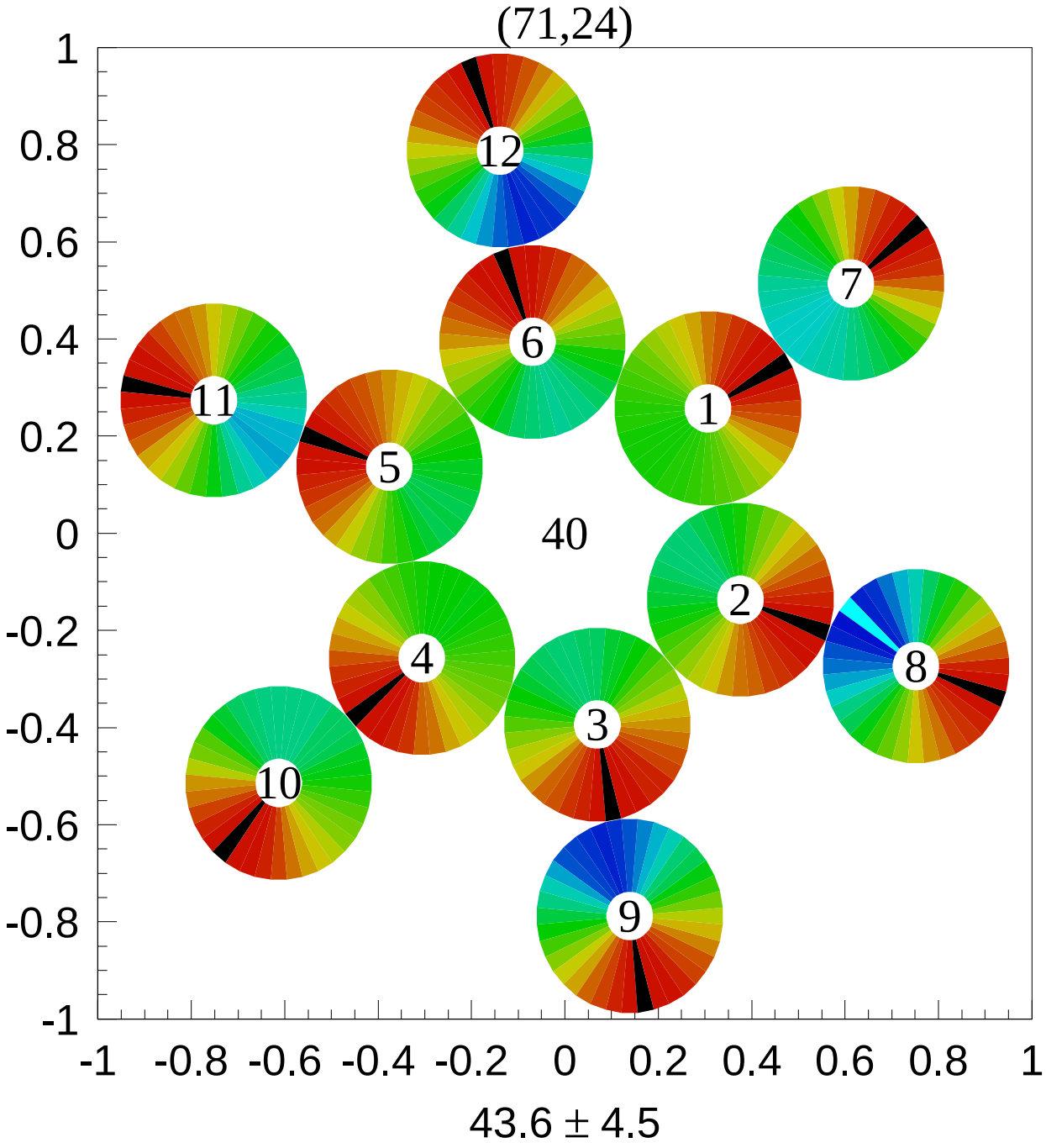

(71,20)
tilted LEDs
123 123 122 120 120 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 129 115 117 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

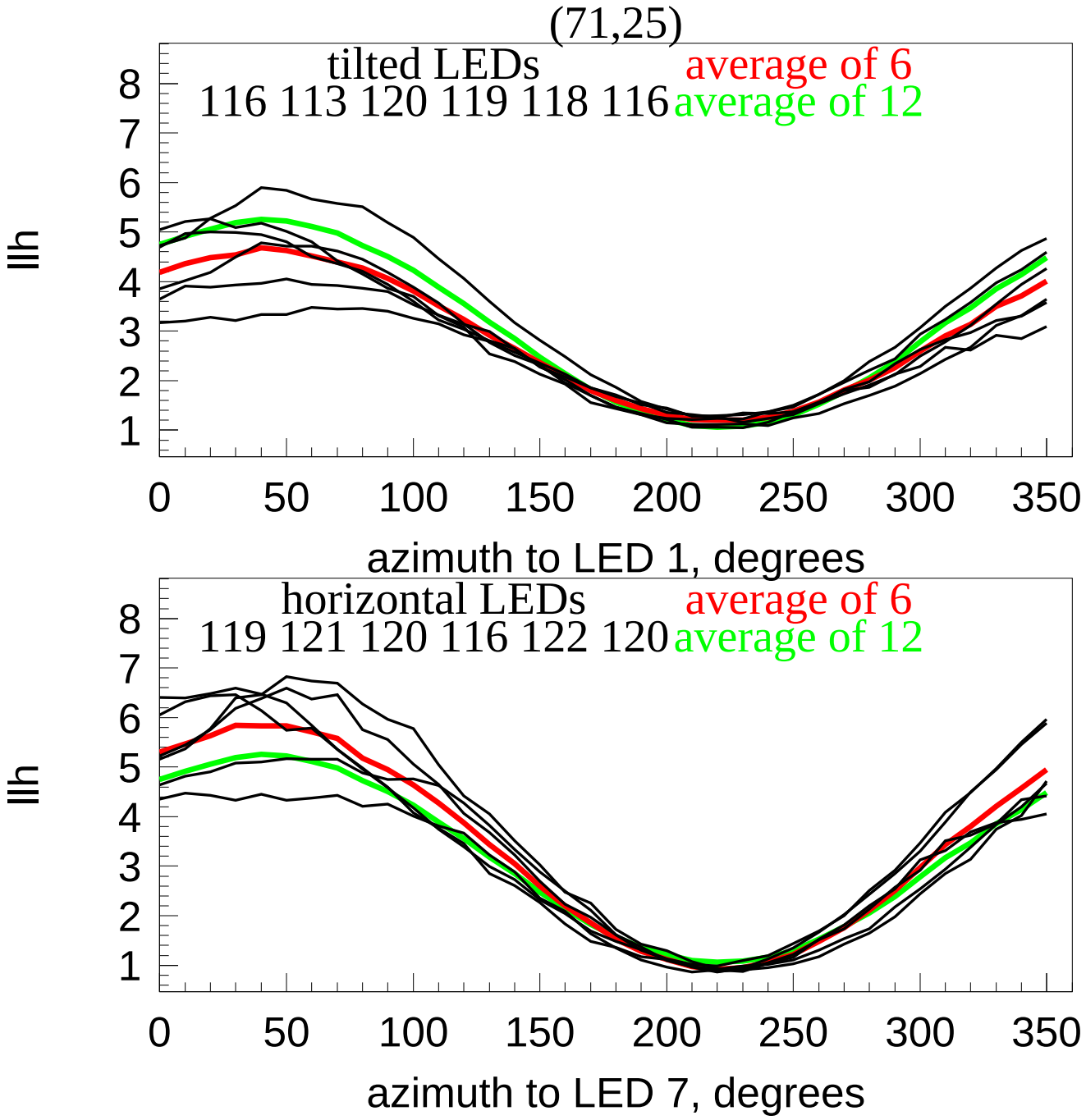

(71,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
143.7 ± 6.9

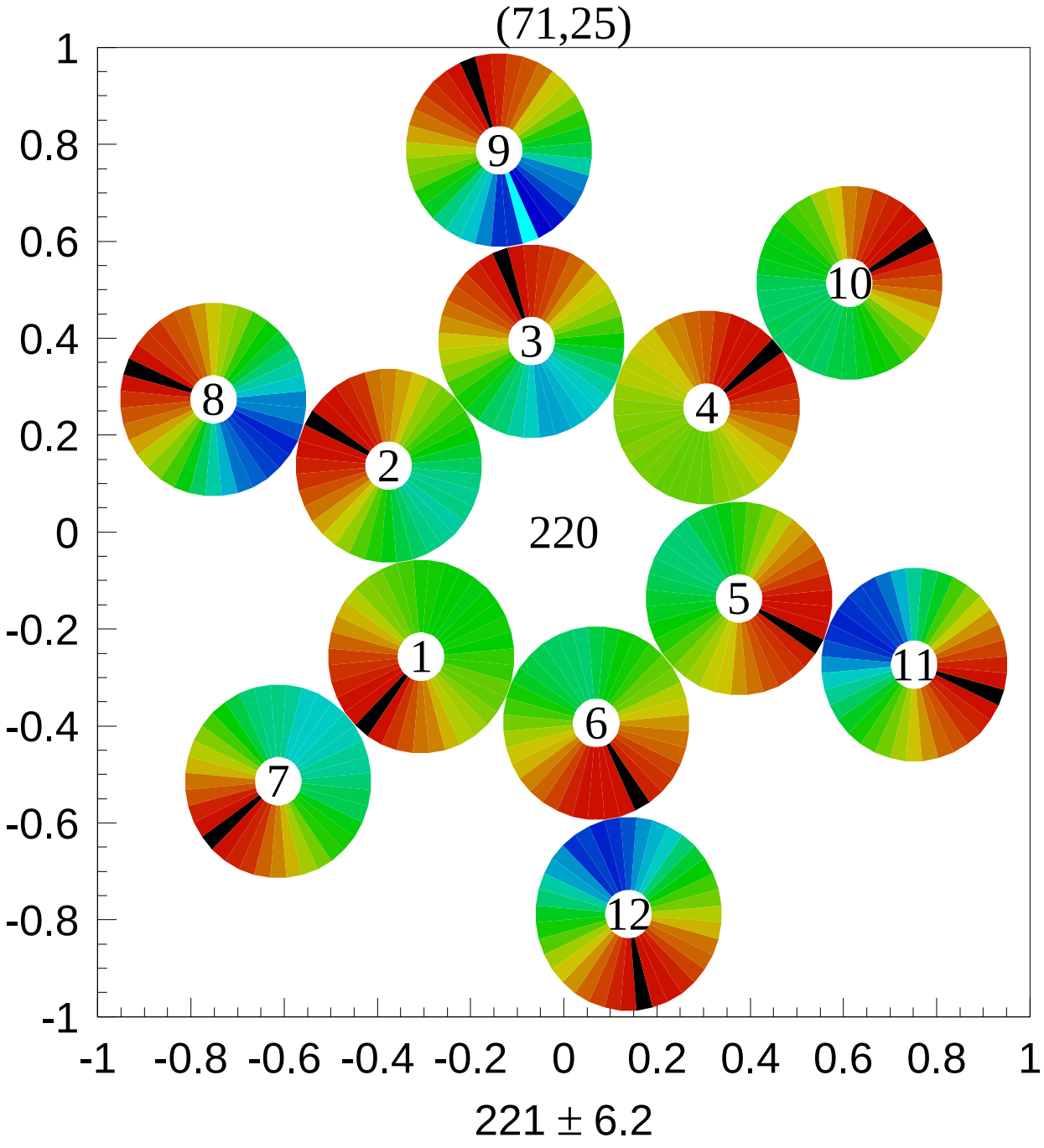

(71,21)
tilted LEDs
121 133 118 120 123 116
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 123 117 119 119 116
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

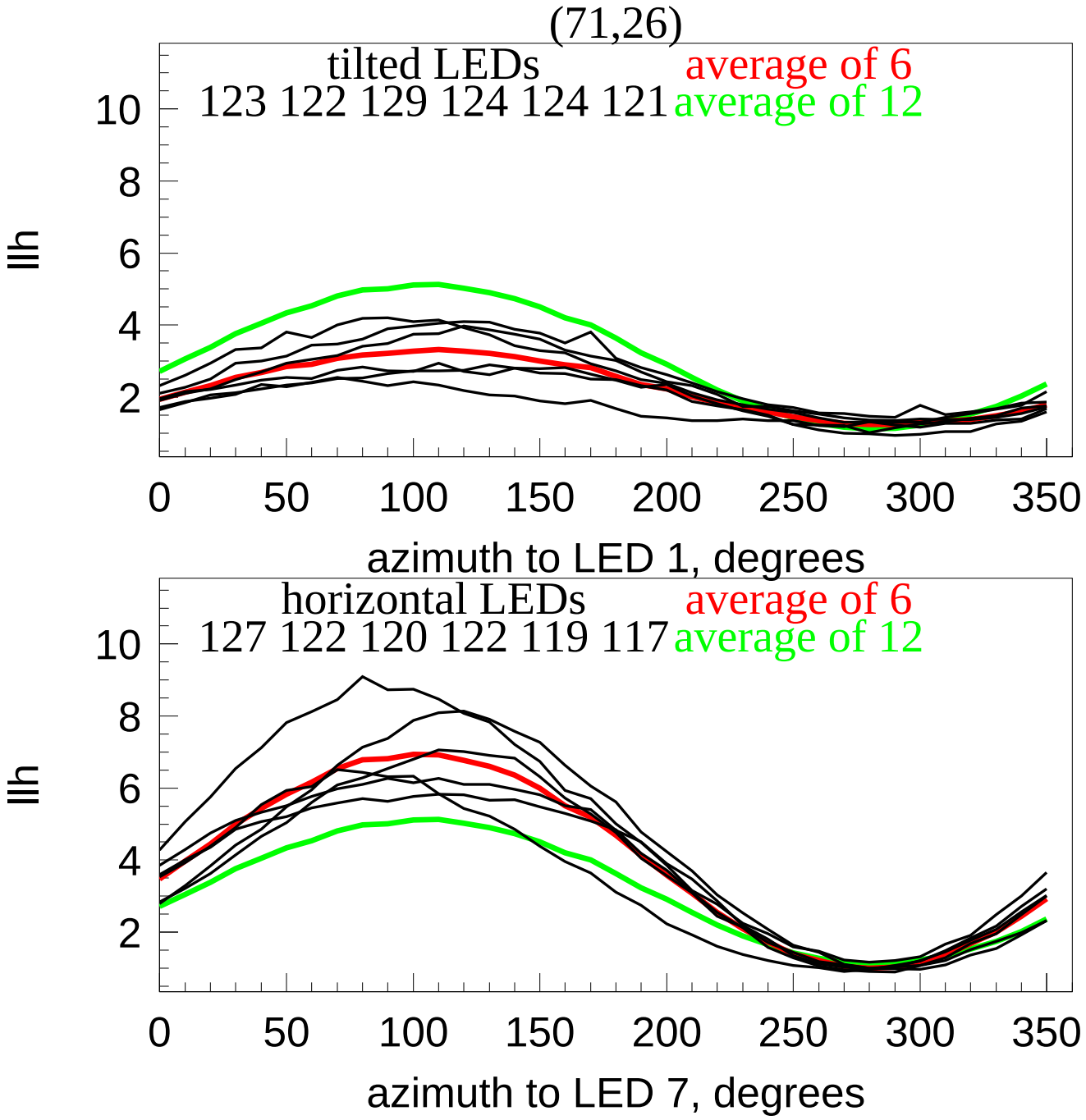

(71,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
202.6 ± 5.9

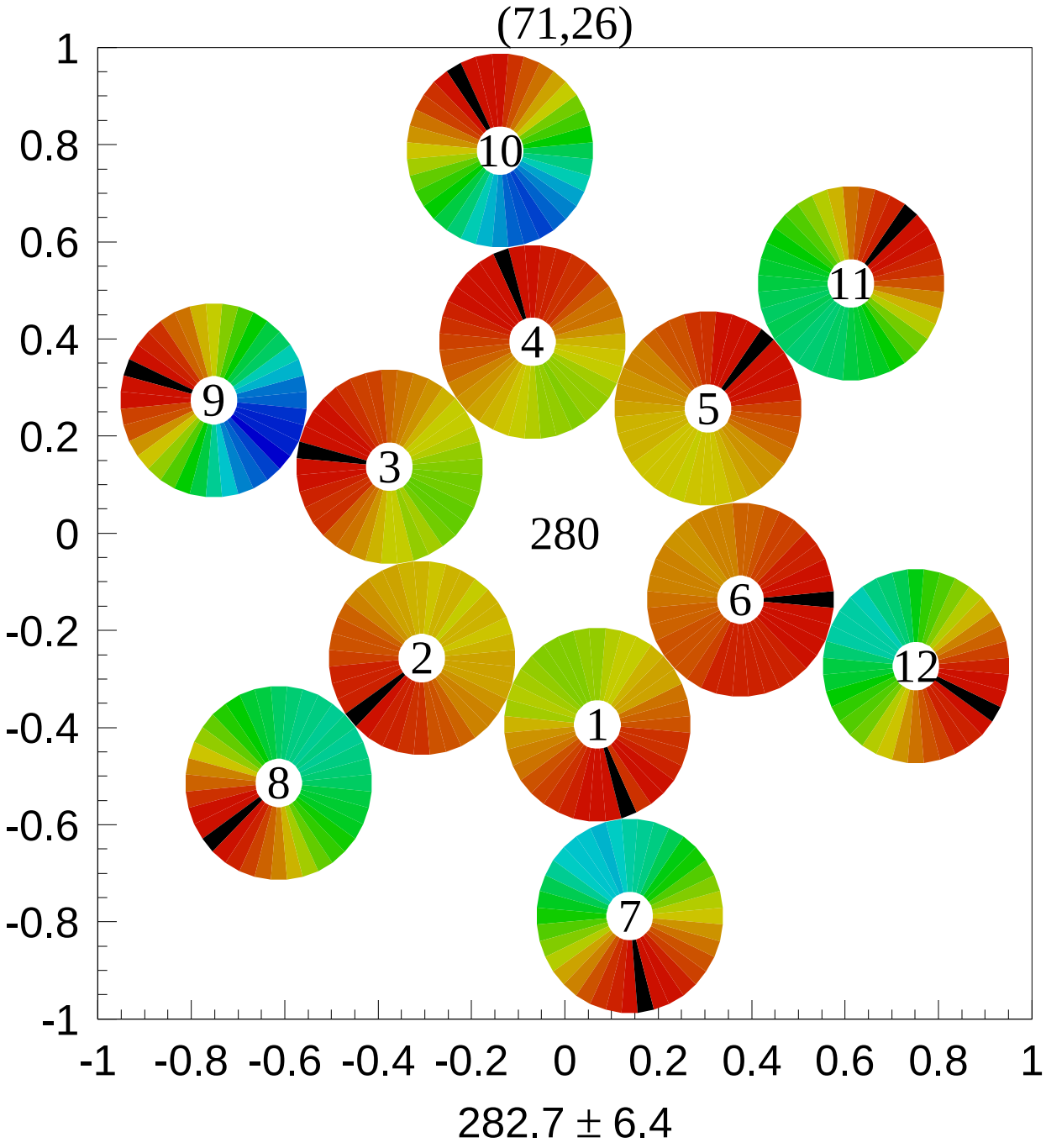

(71,24)
tilted LEDs
108 122 123 122 122 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 128 125 121 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

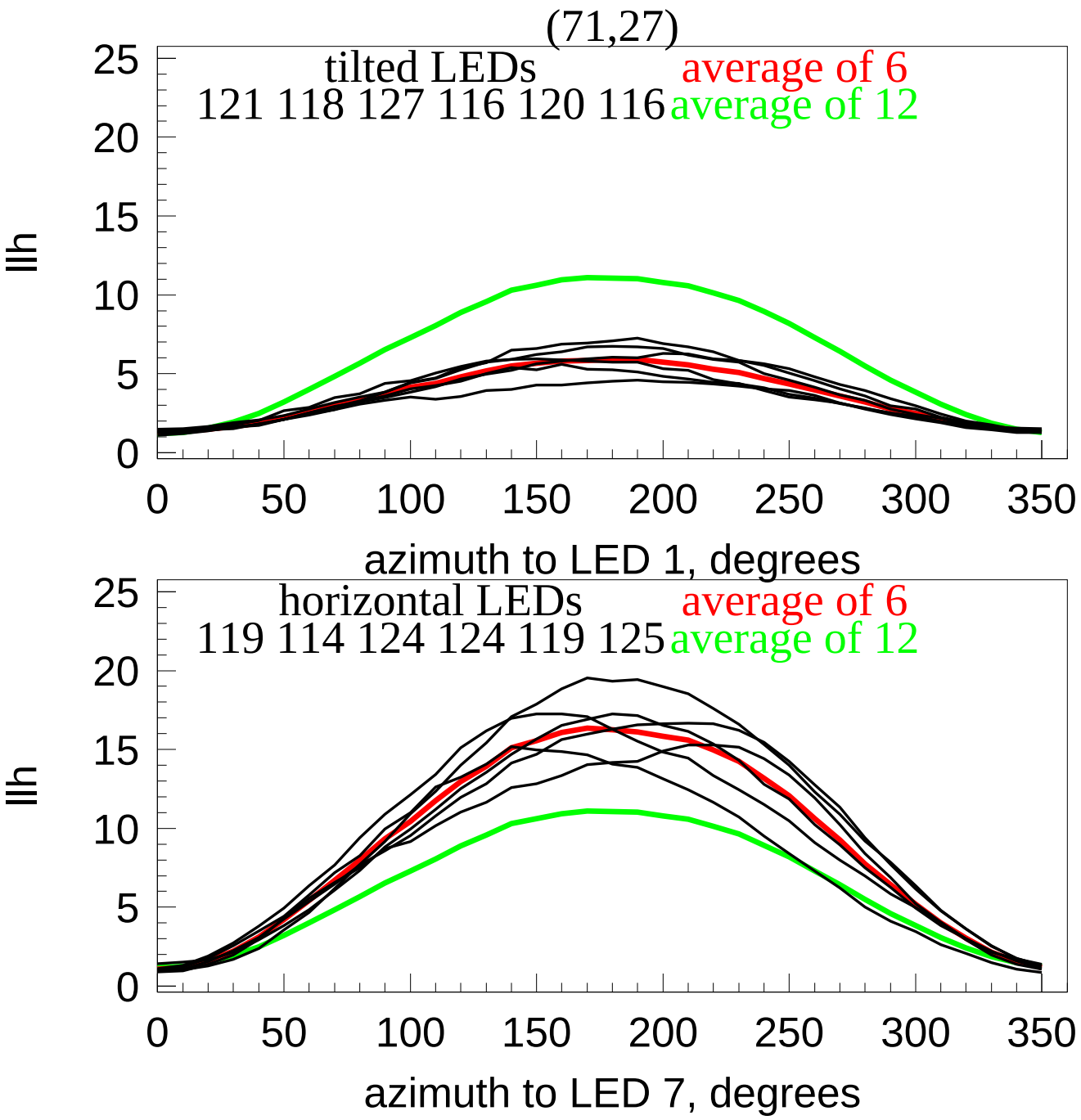

(71,24)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
43.6 ± 4.5

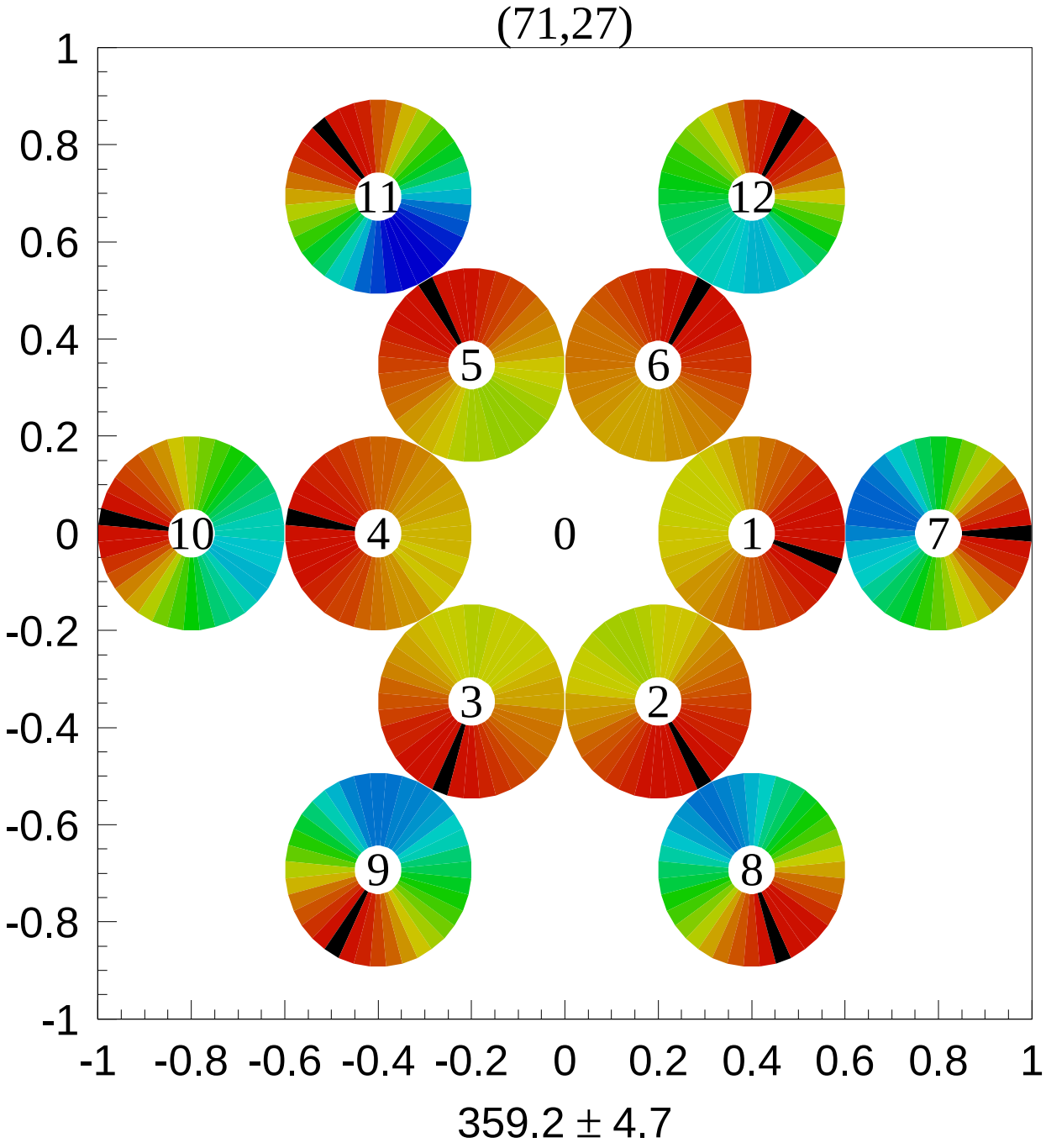

(71,25)
tilted LEDs
116 113 120 119 118 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 120 116 122 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

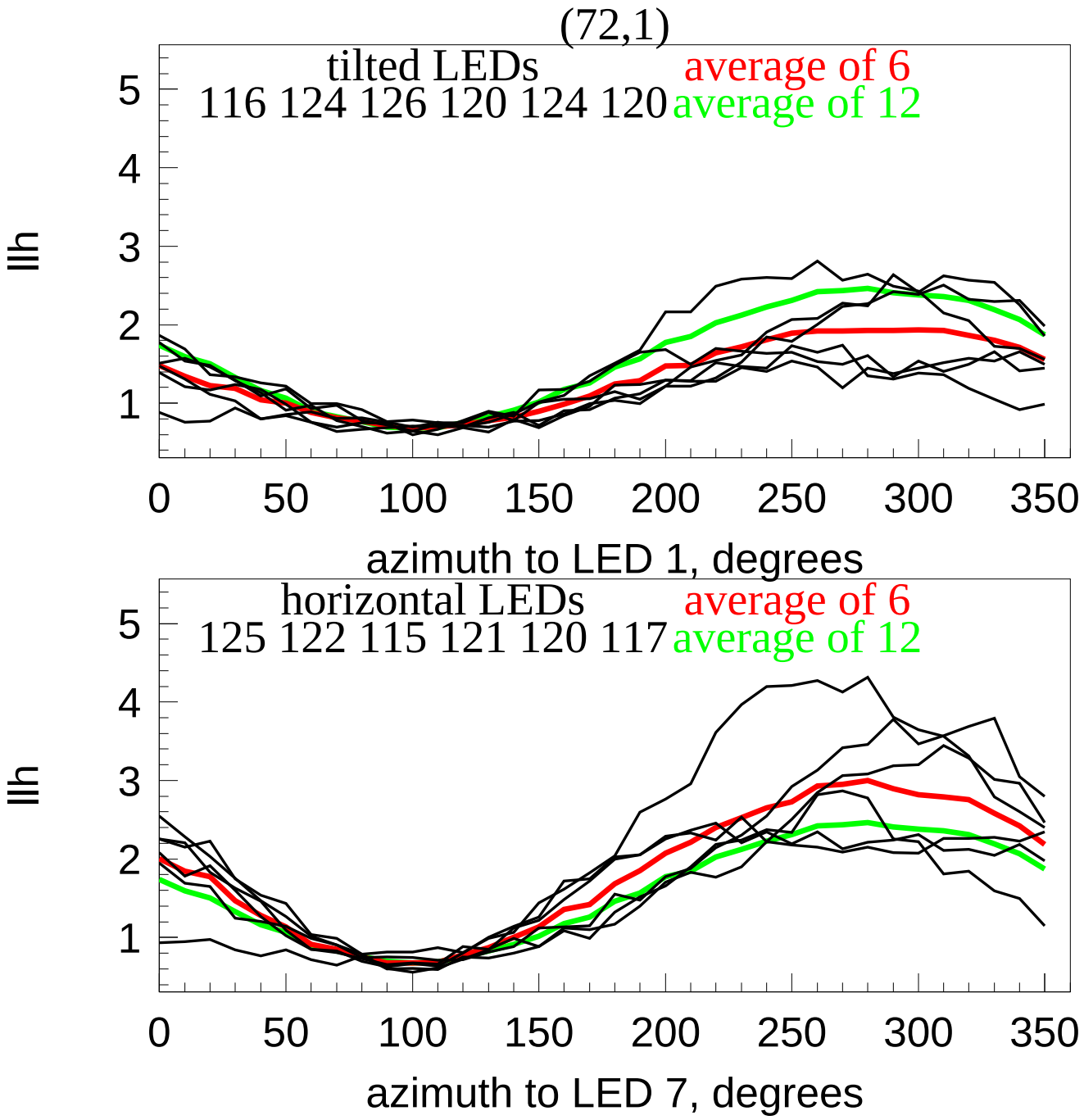

(71,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
221 ± 6.2

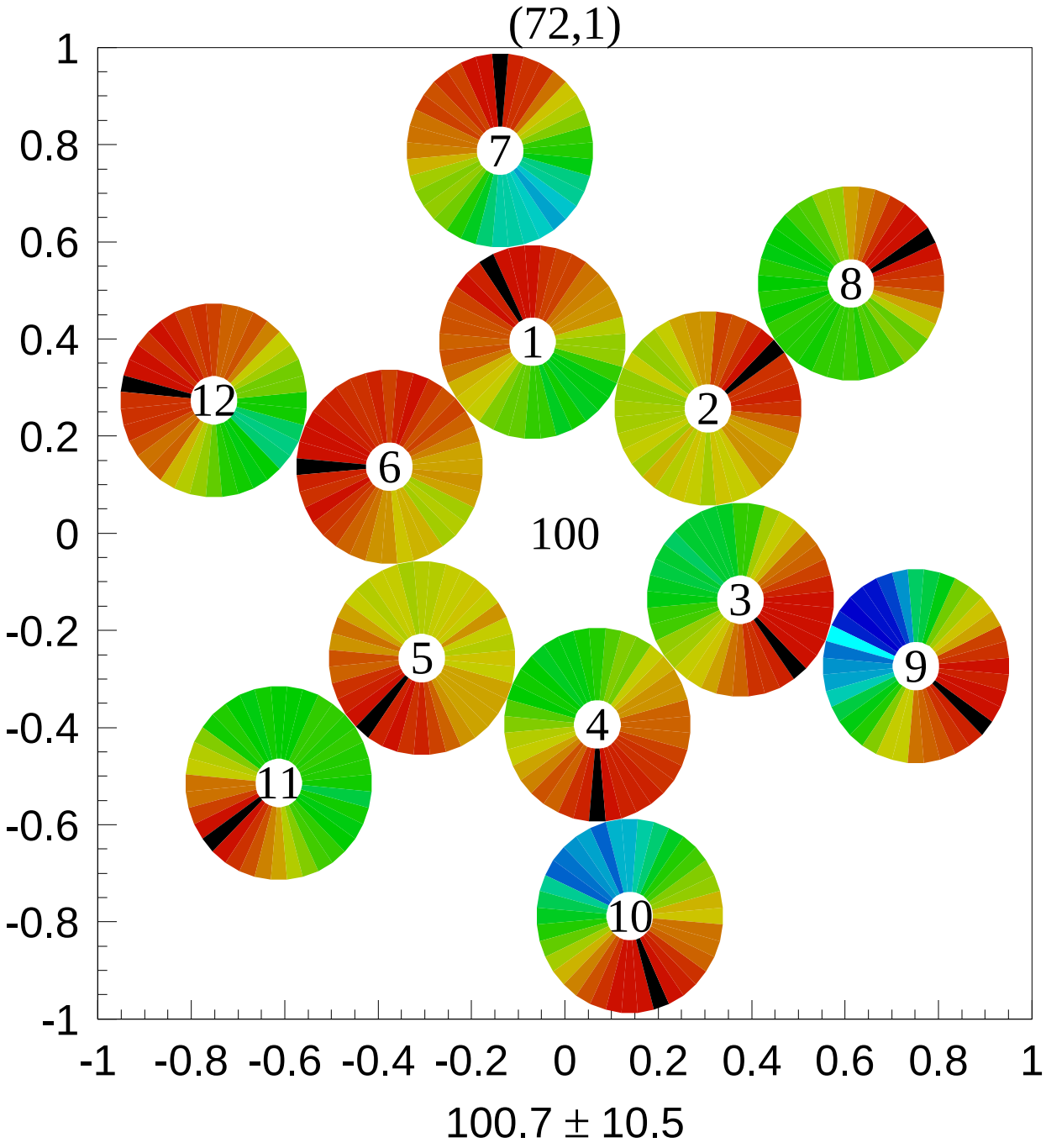

(71,26)
tilted LEDs
123 122 129 124 124 121
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 122 120 122 119 117
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

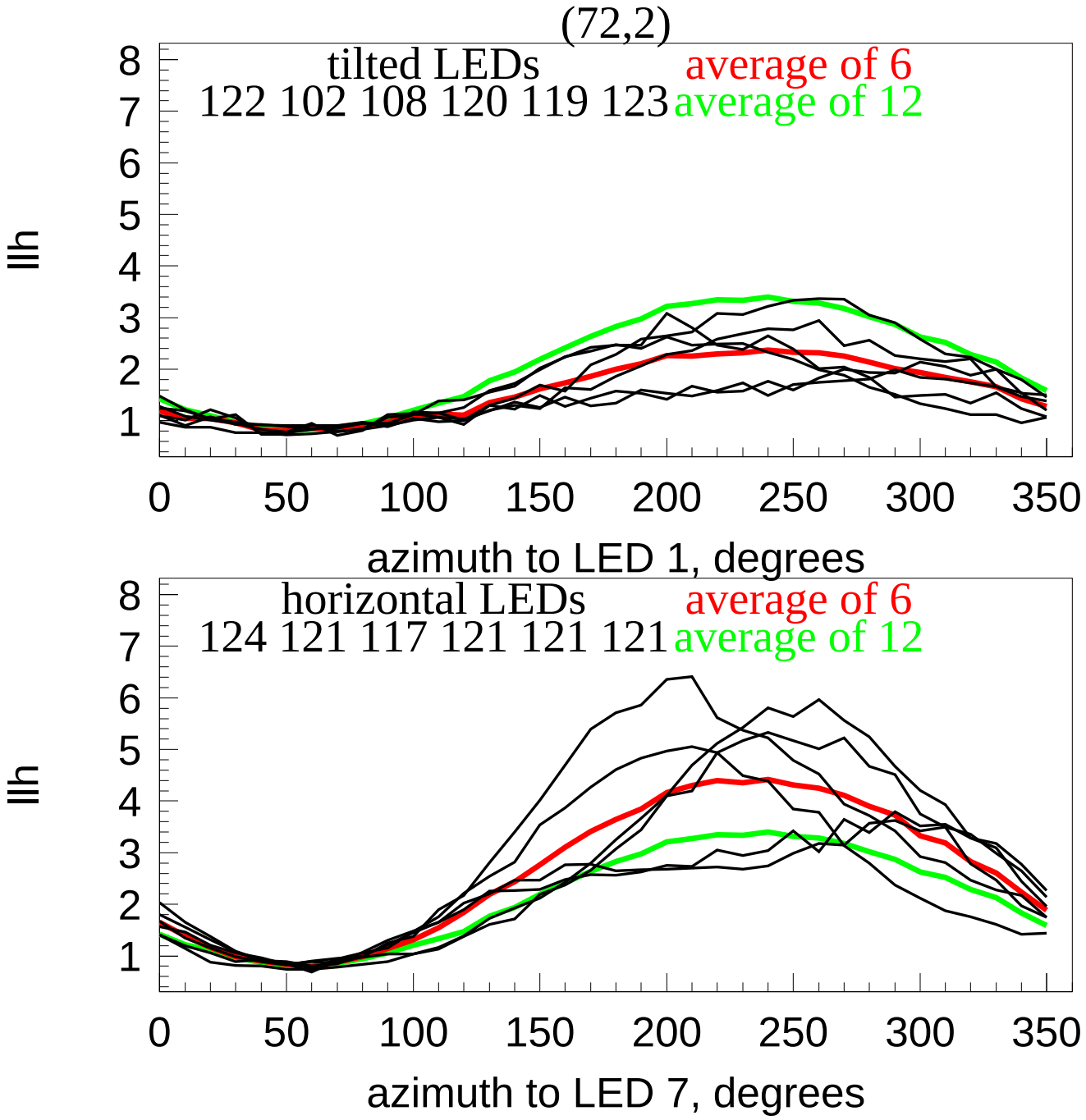

(71,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
282.7 ± 6.4

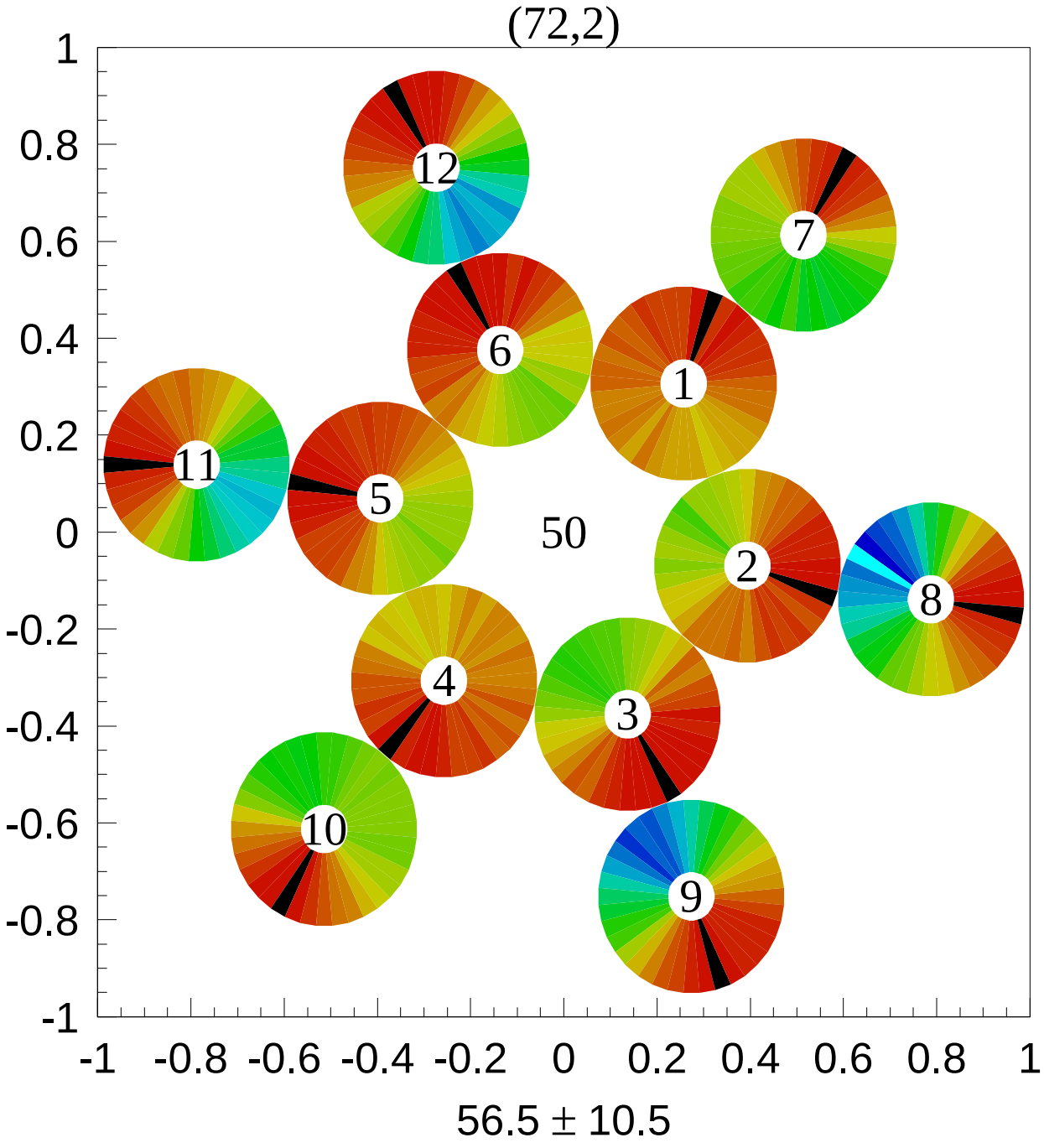

(71,27)
tilted LEDs
121 118 127 116 120 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 114 124 124 119 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

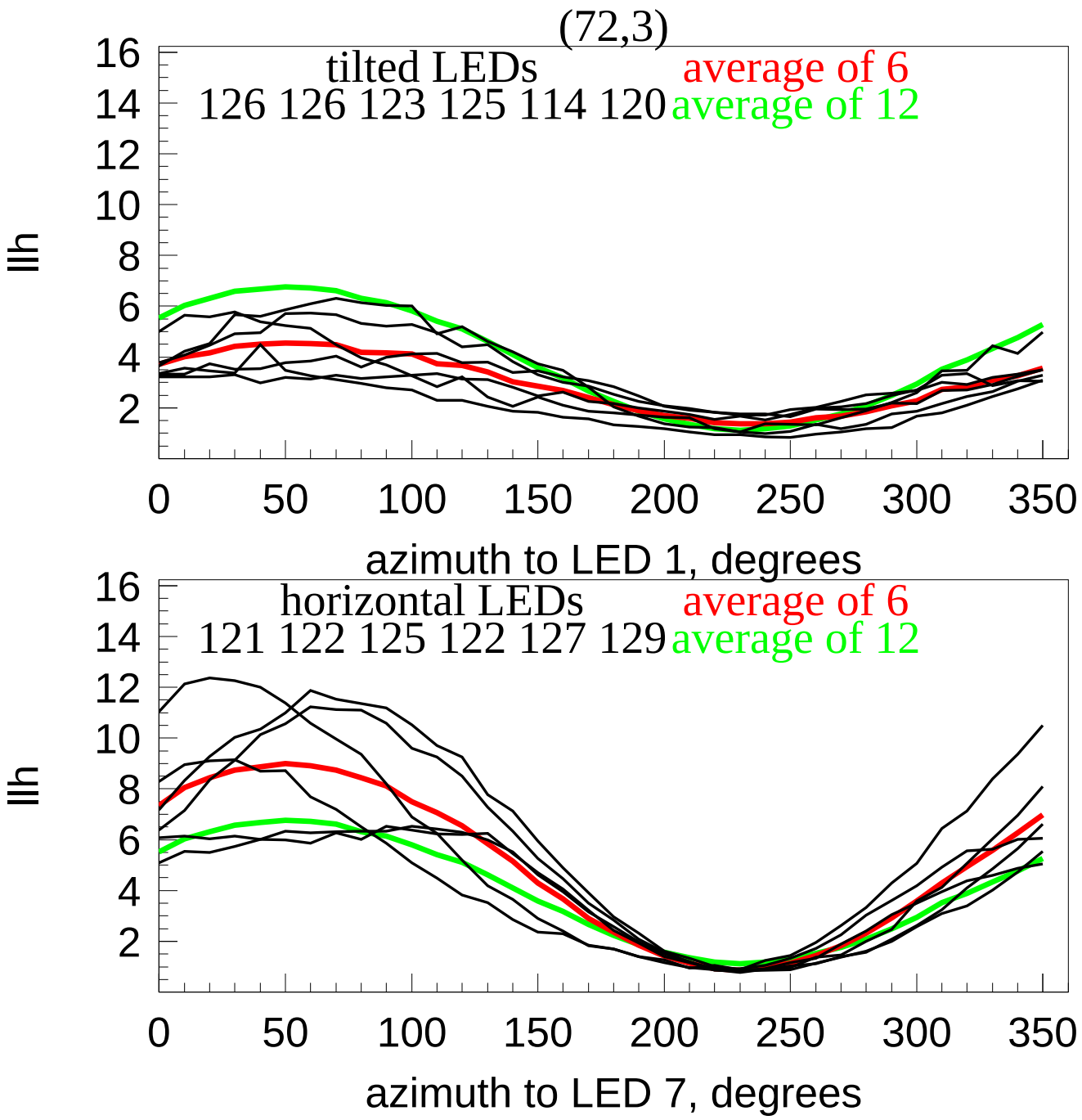

(71,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.2 ± 4.7

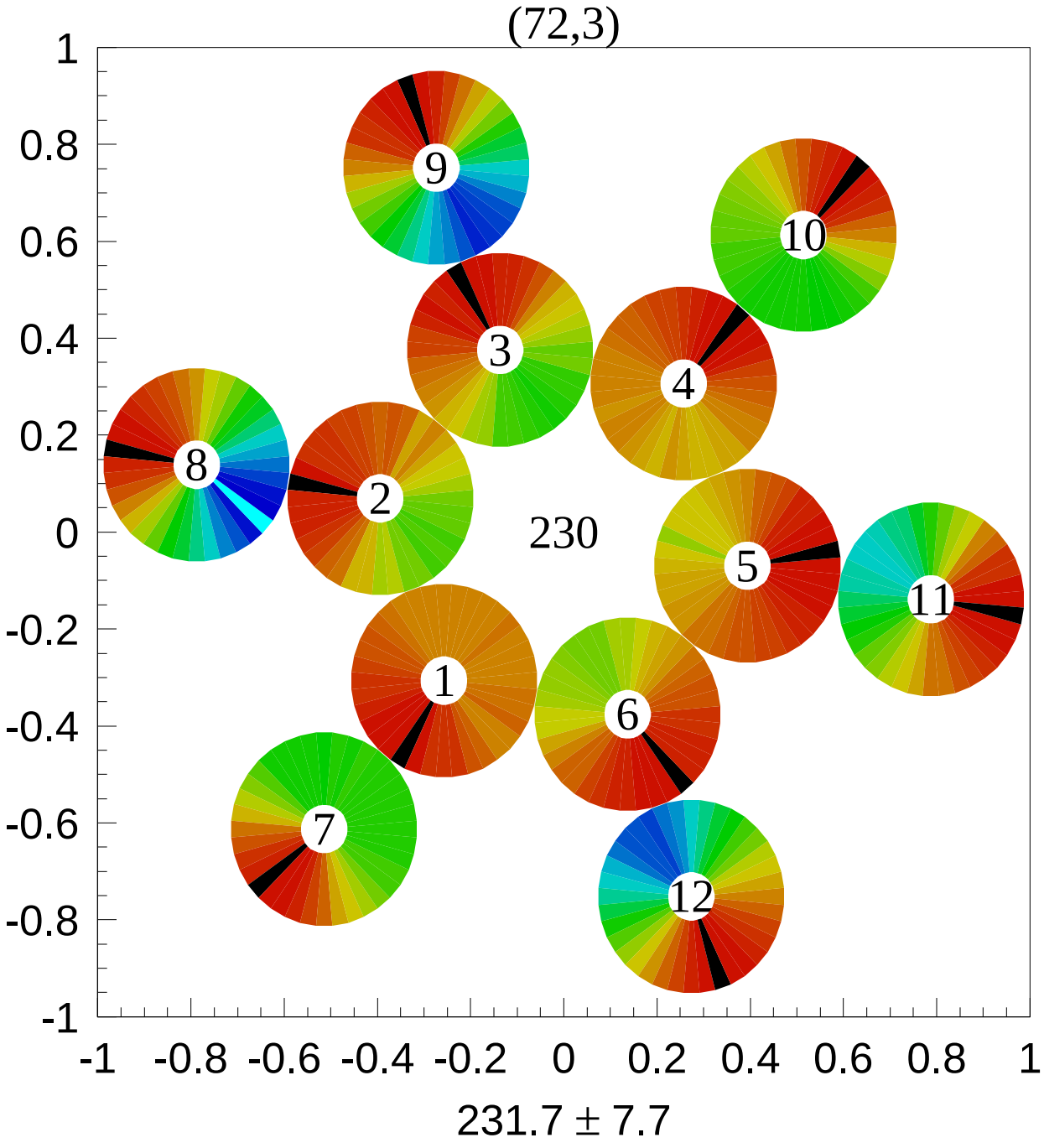

(72,1)
tilted LEDs
116 124 126 120 124 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 115 121 120 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

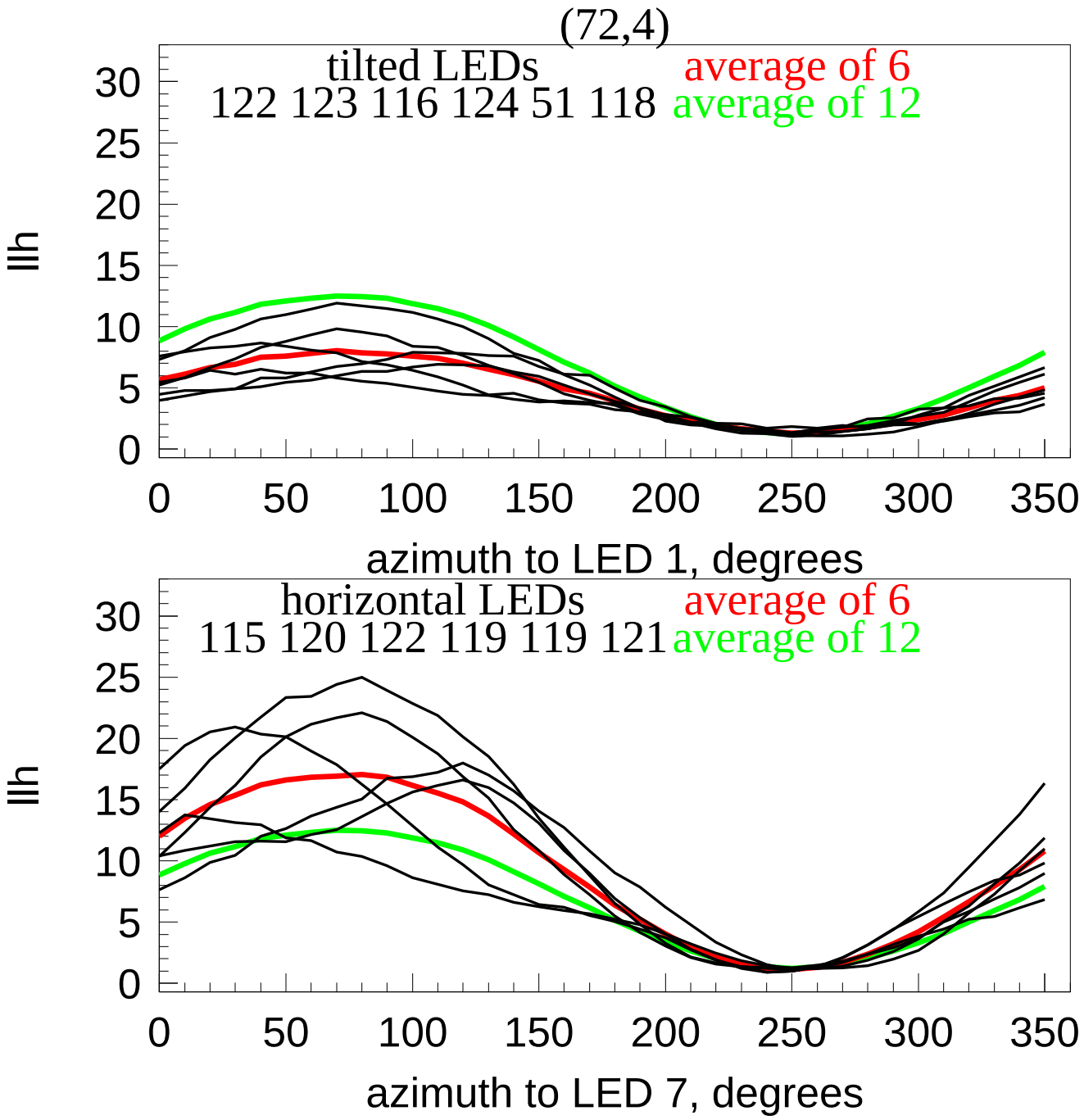

(72,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
100.7 ± 10.5
7
1
8
12
2
6
100
3
5
9
4
11
10

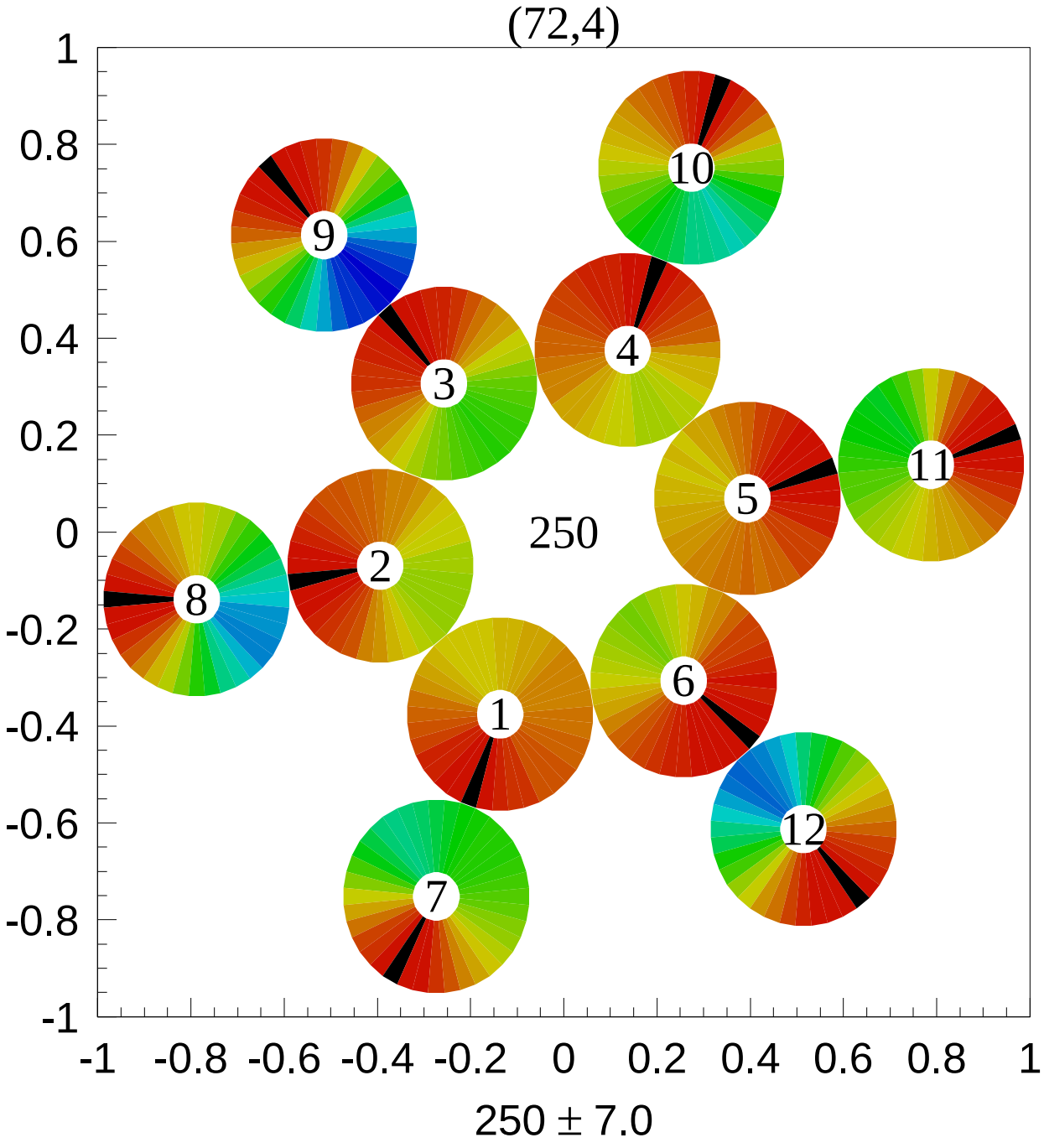

(72,2)
tilted LEDs
122 102 108 120 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 121 117 121 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

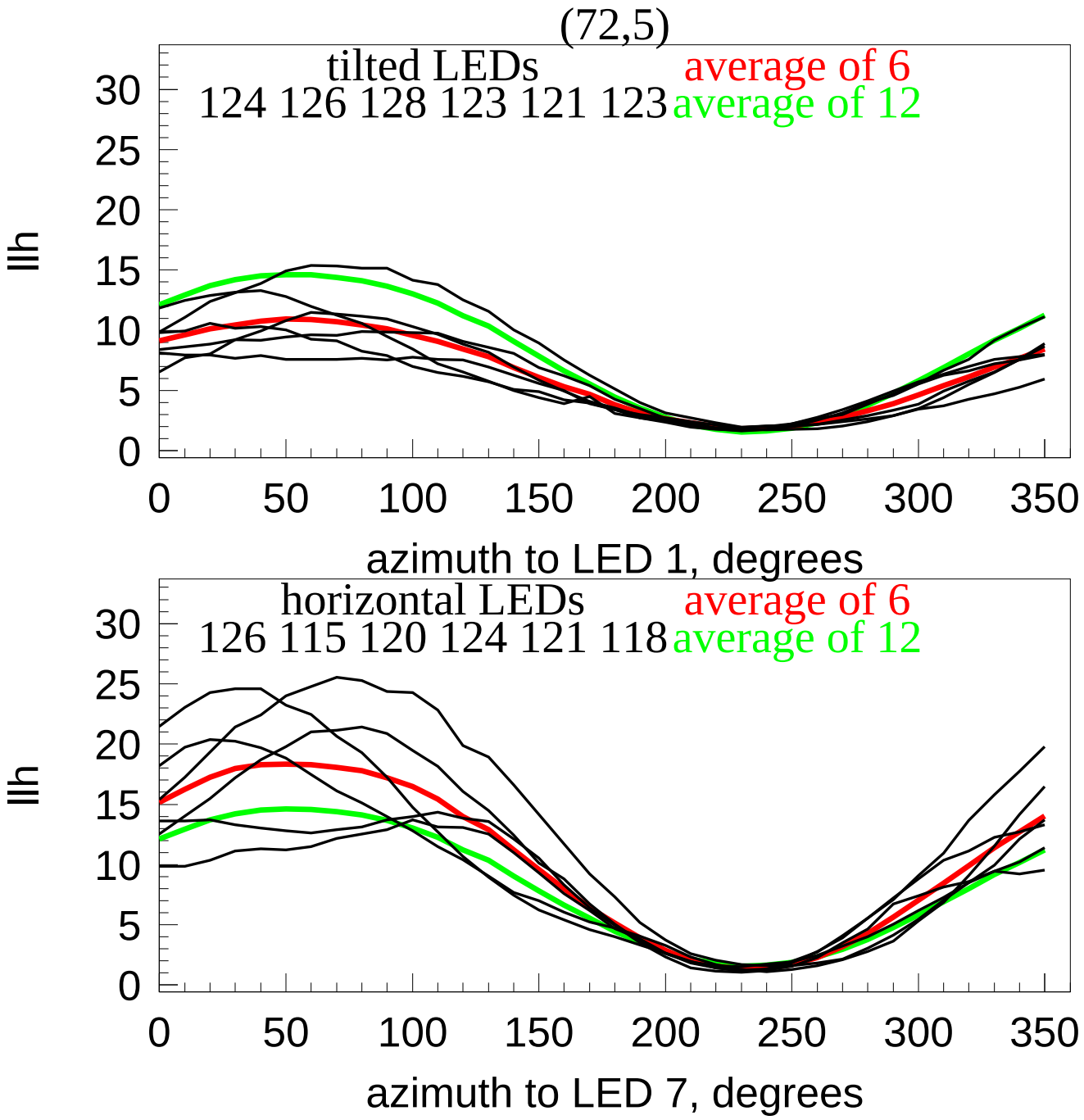

(72,2)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
56.5 ± 10.5

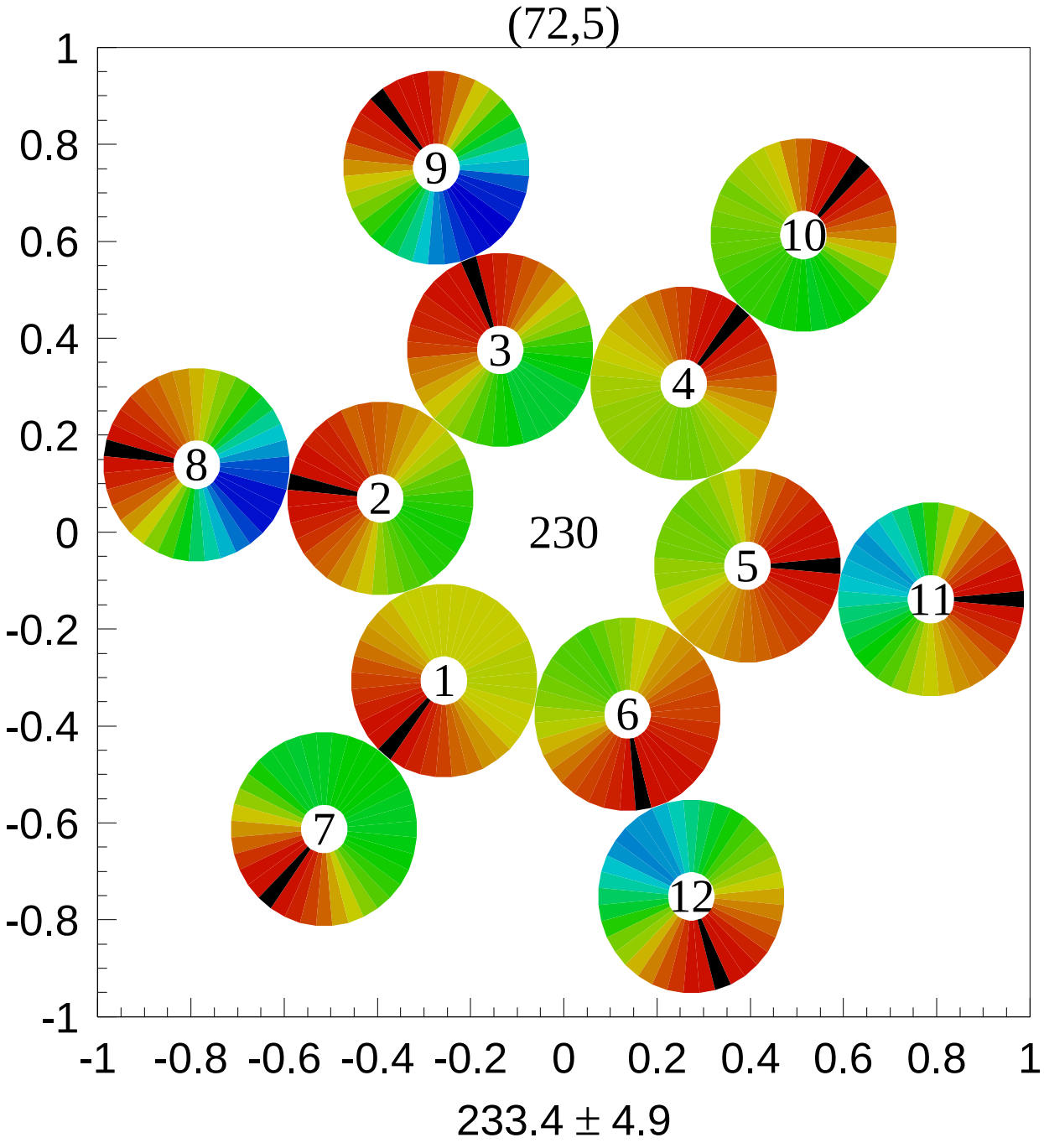

(72,3)
tilted LEDs
126 126 123 125 114 120
average of 6
average of 12
llh
16
14
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 122 125 122 127 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

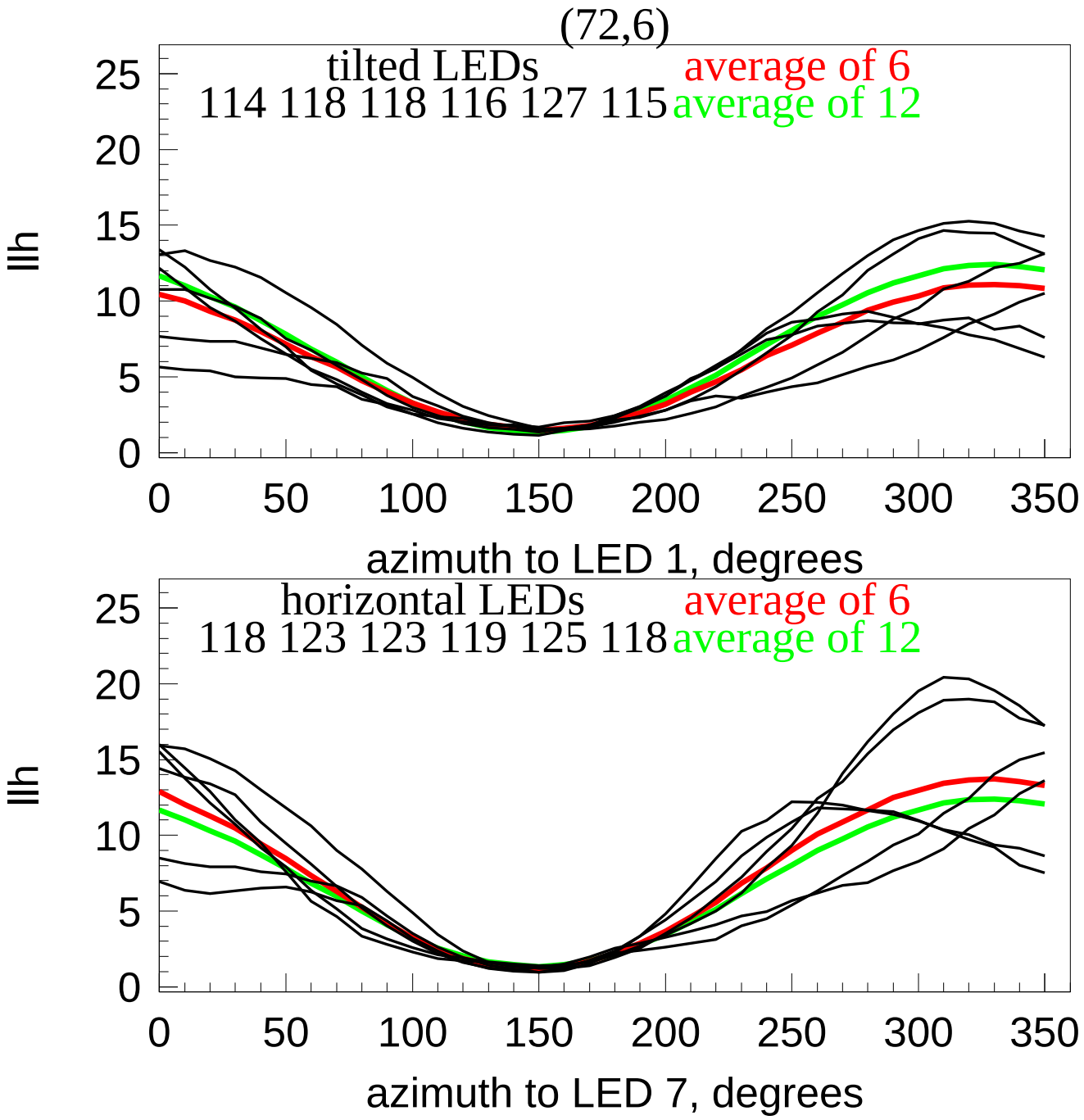

(72,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
231.7 ± 7.7

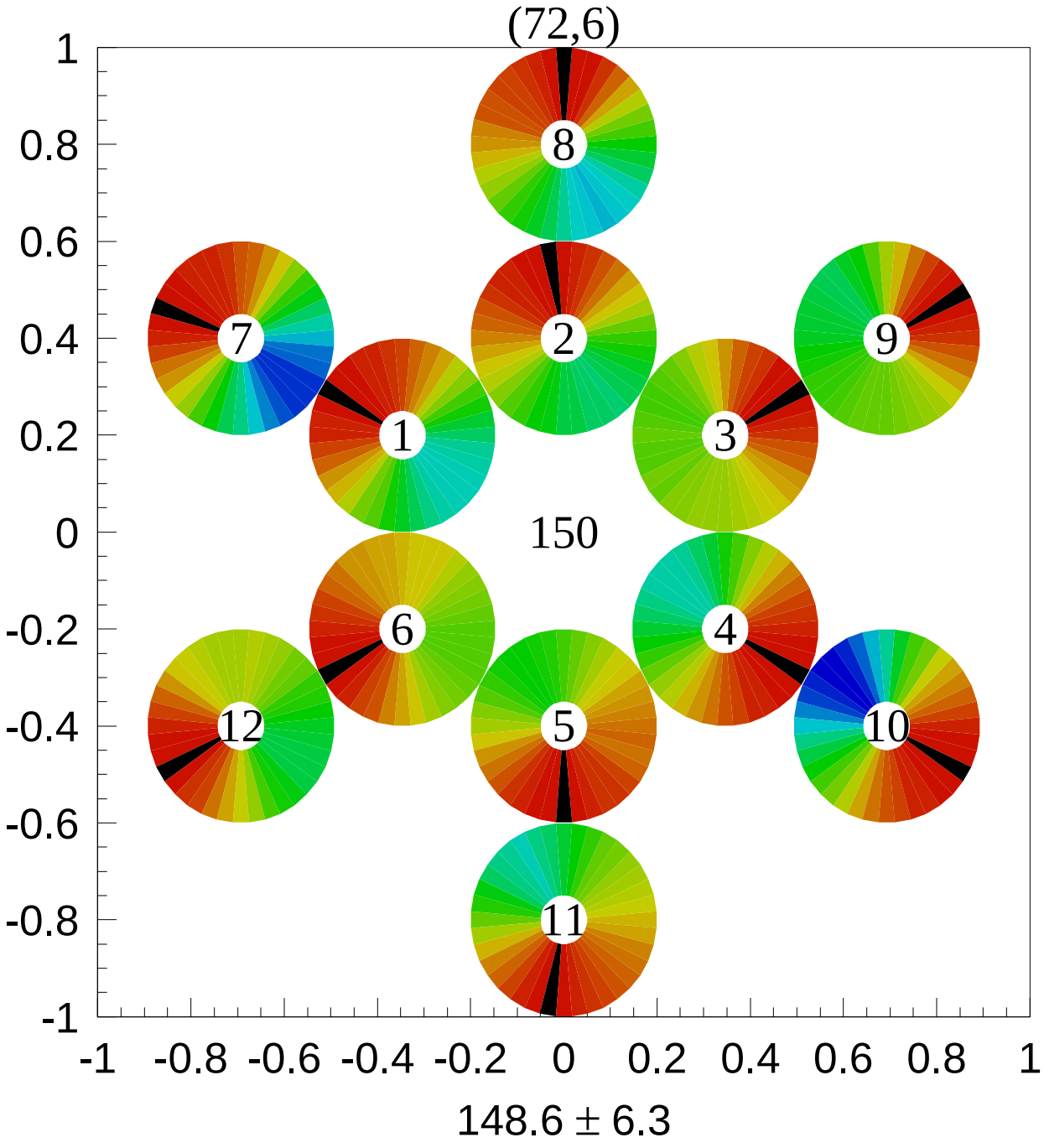

(72,4)
tilted LEDs
122 123 116 124 51 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 120 122 119 119 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

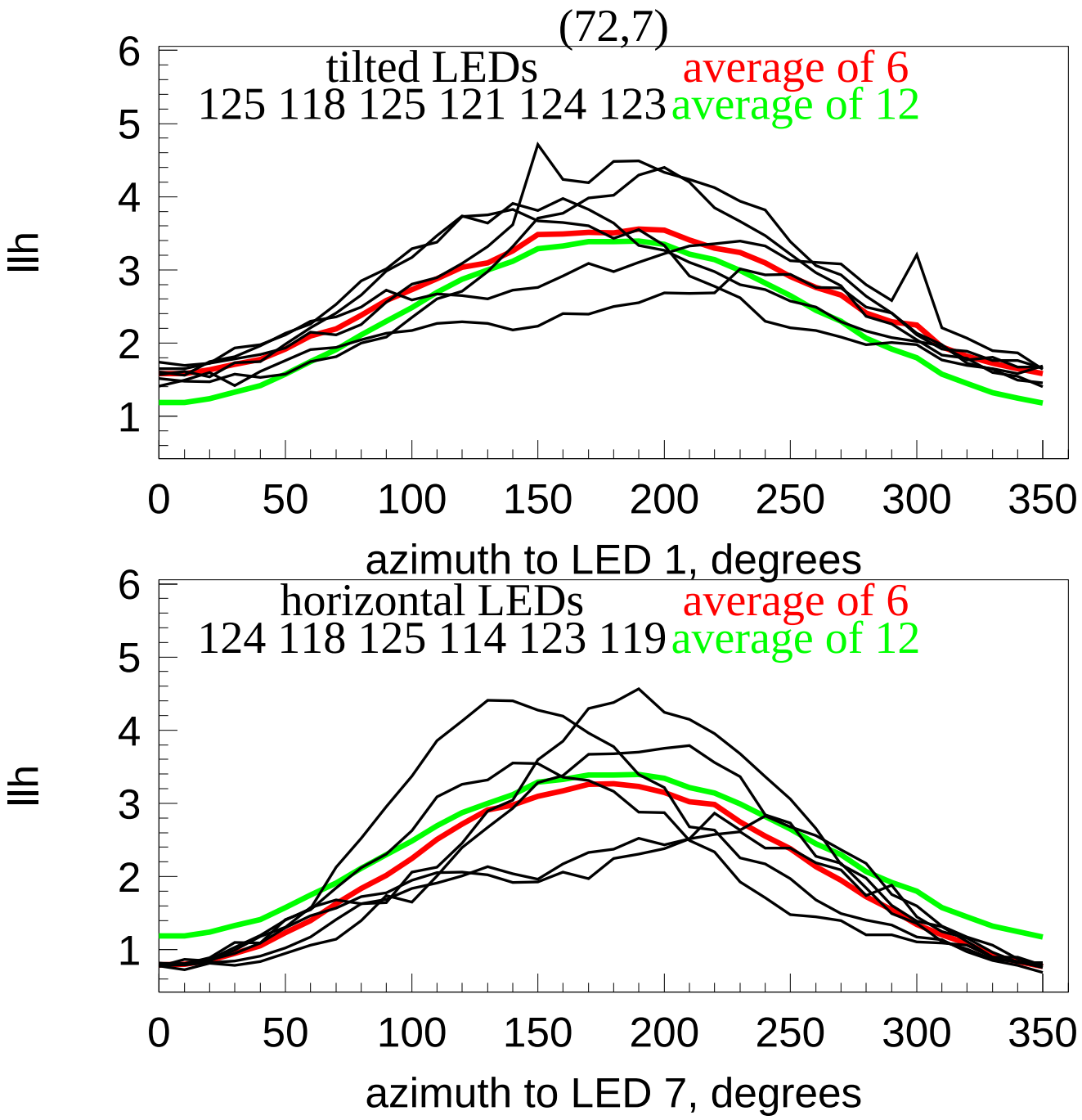

(72,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250 ± 7.0
250
1
2
3
4
5
6
7
8
9
10
11
12

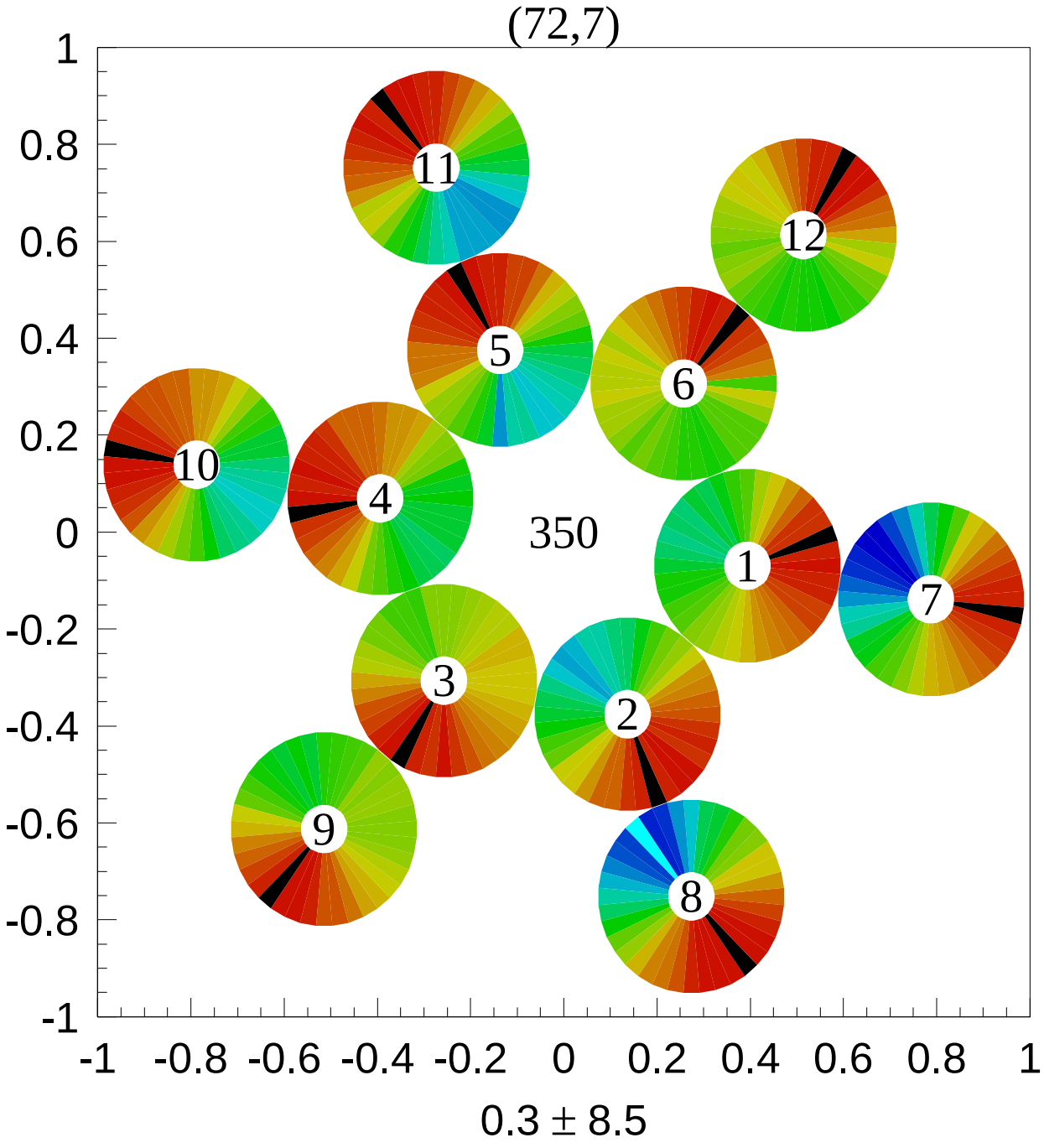

(72,5)
tilted LEDs
124 126 128 123 121 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 115 120 124 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

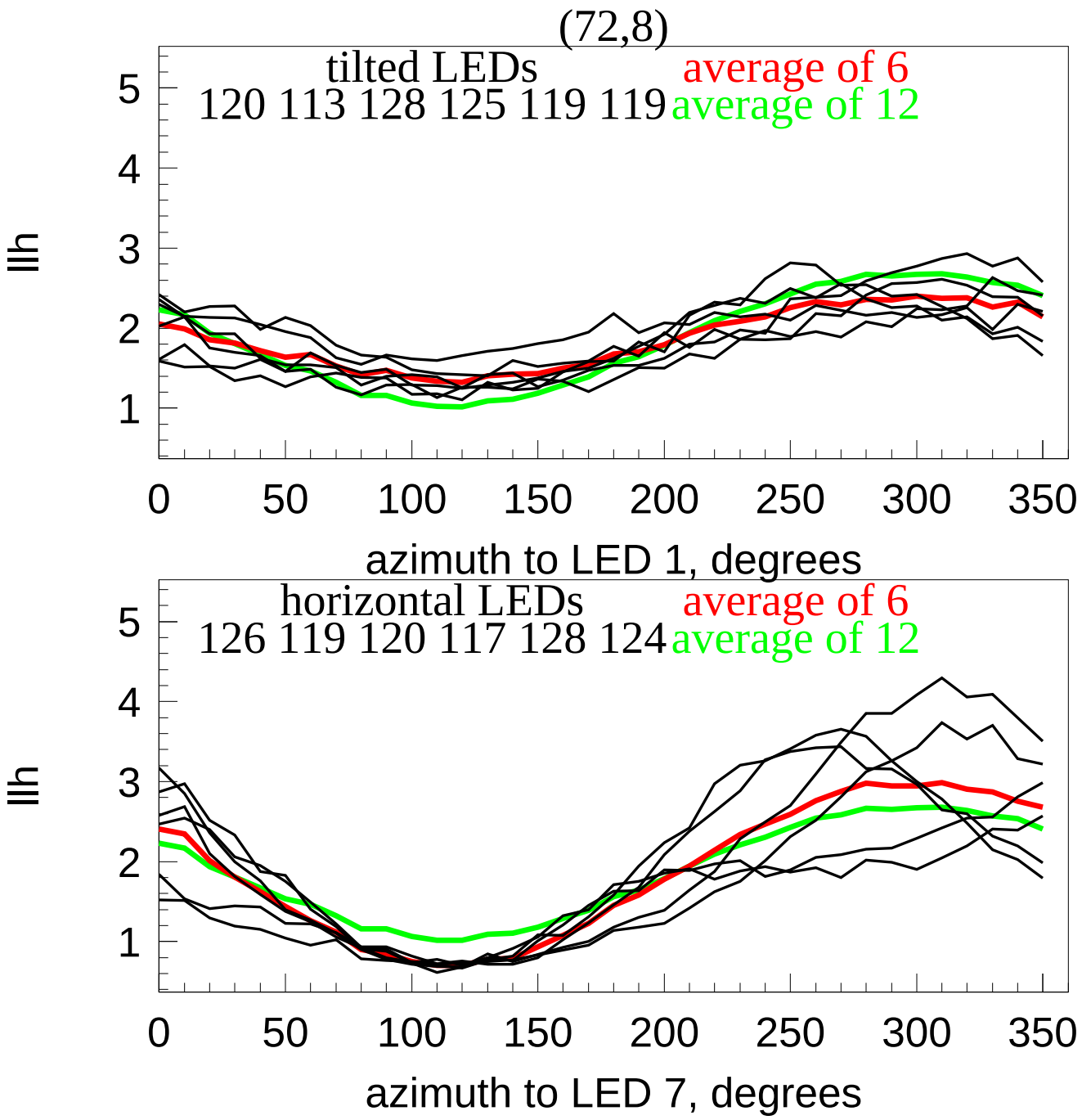

(72,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
233.4 ± 4.9

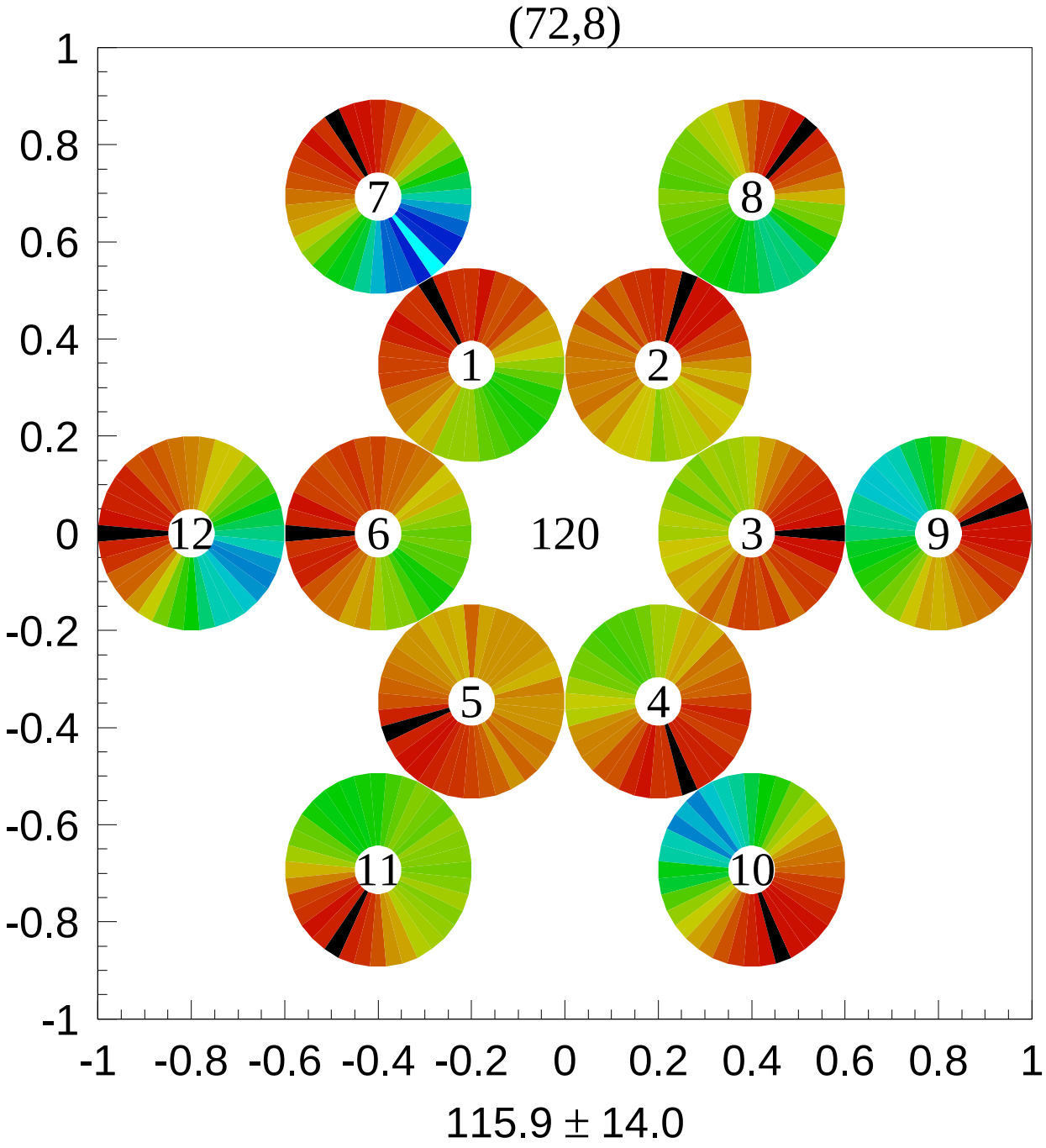

(72,6)
tilted LEDs
114 118 118 116 127 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 123 123 119 125 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

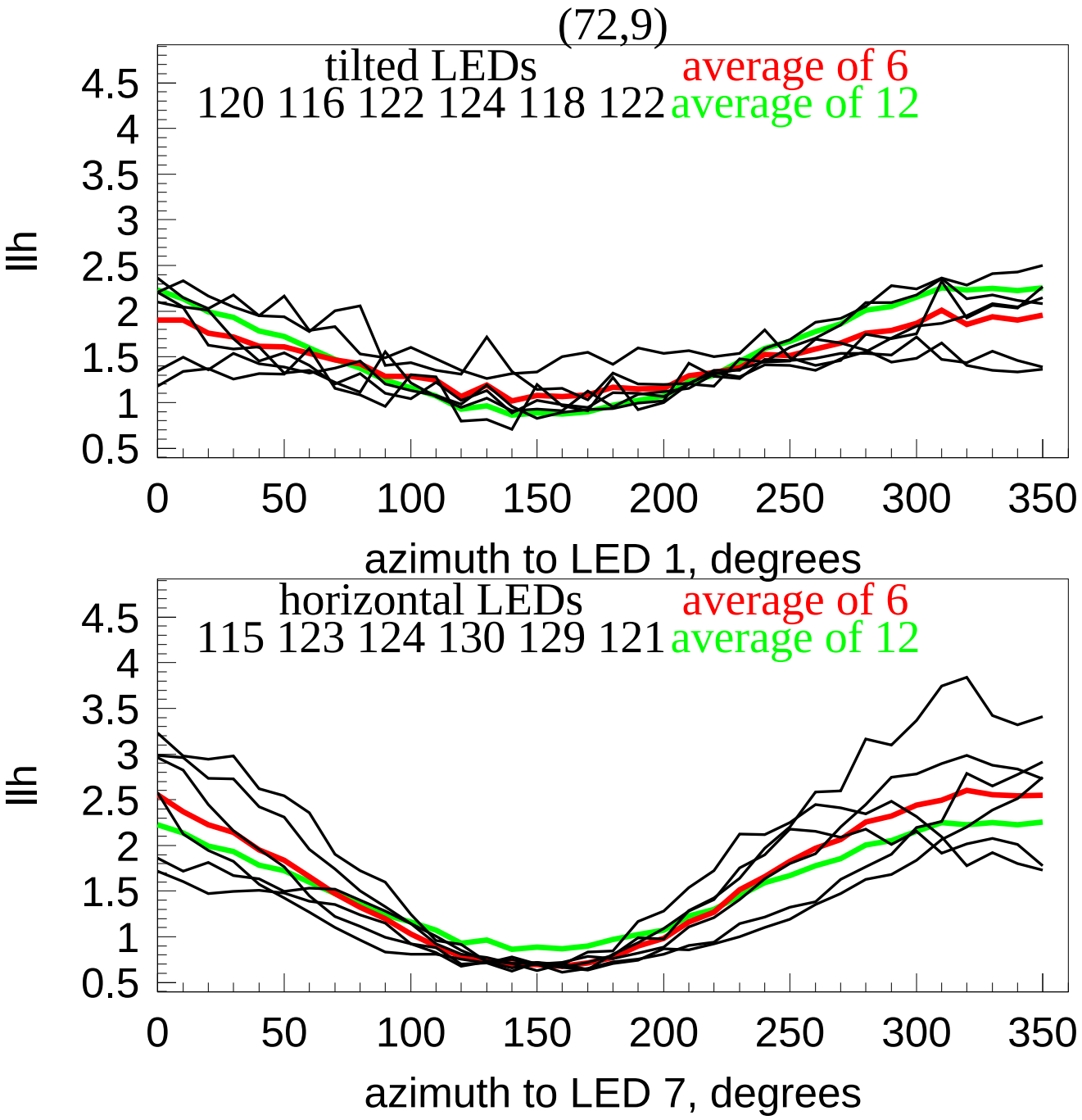

(72,6)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
148.6 ± 6.3

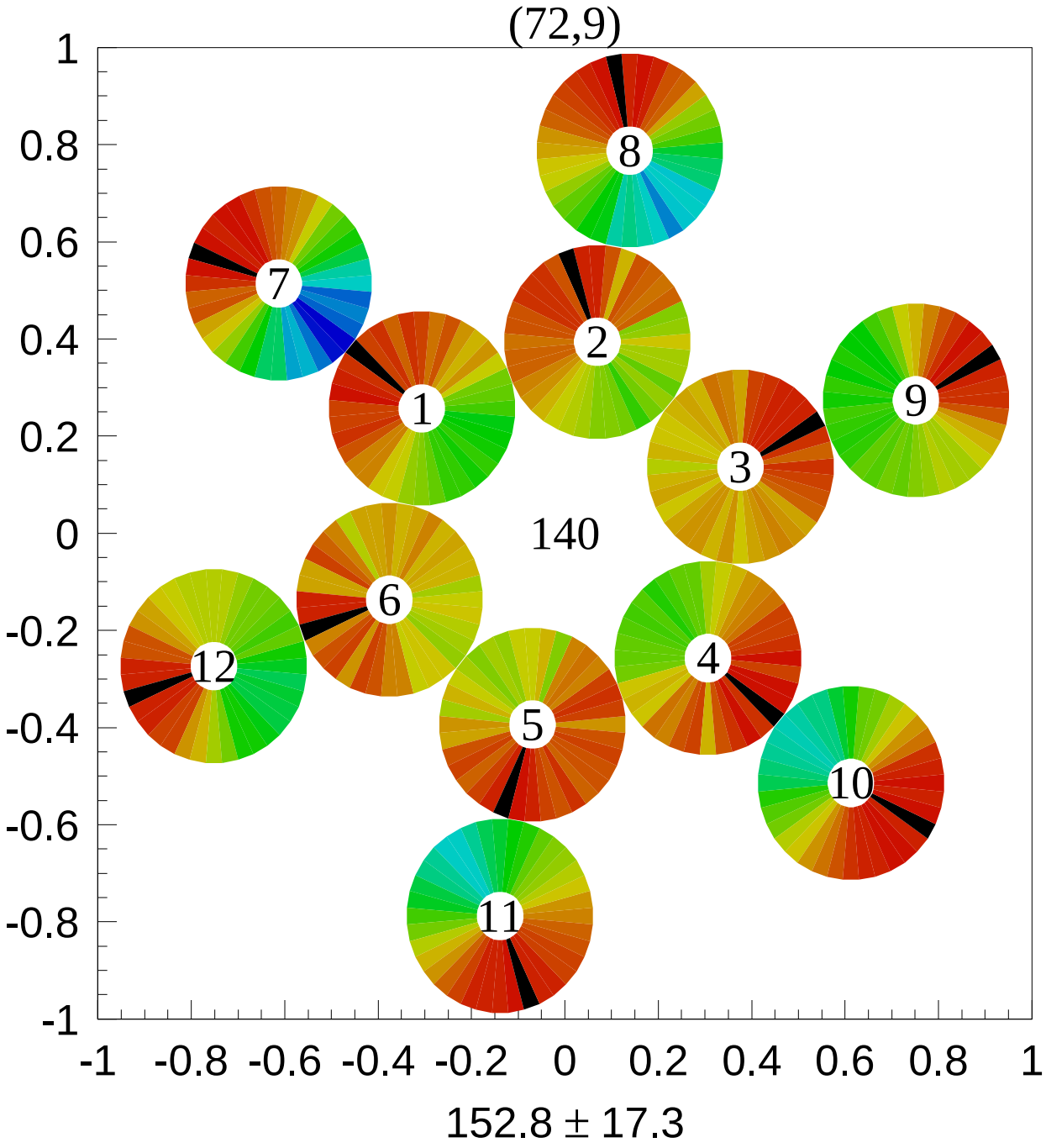

(72,7)
tilted LEDs
125 118 125 121 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 118 125 114 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

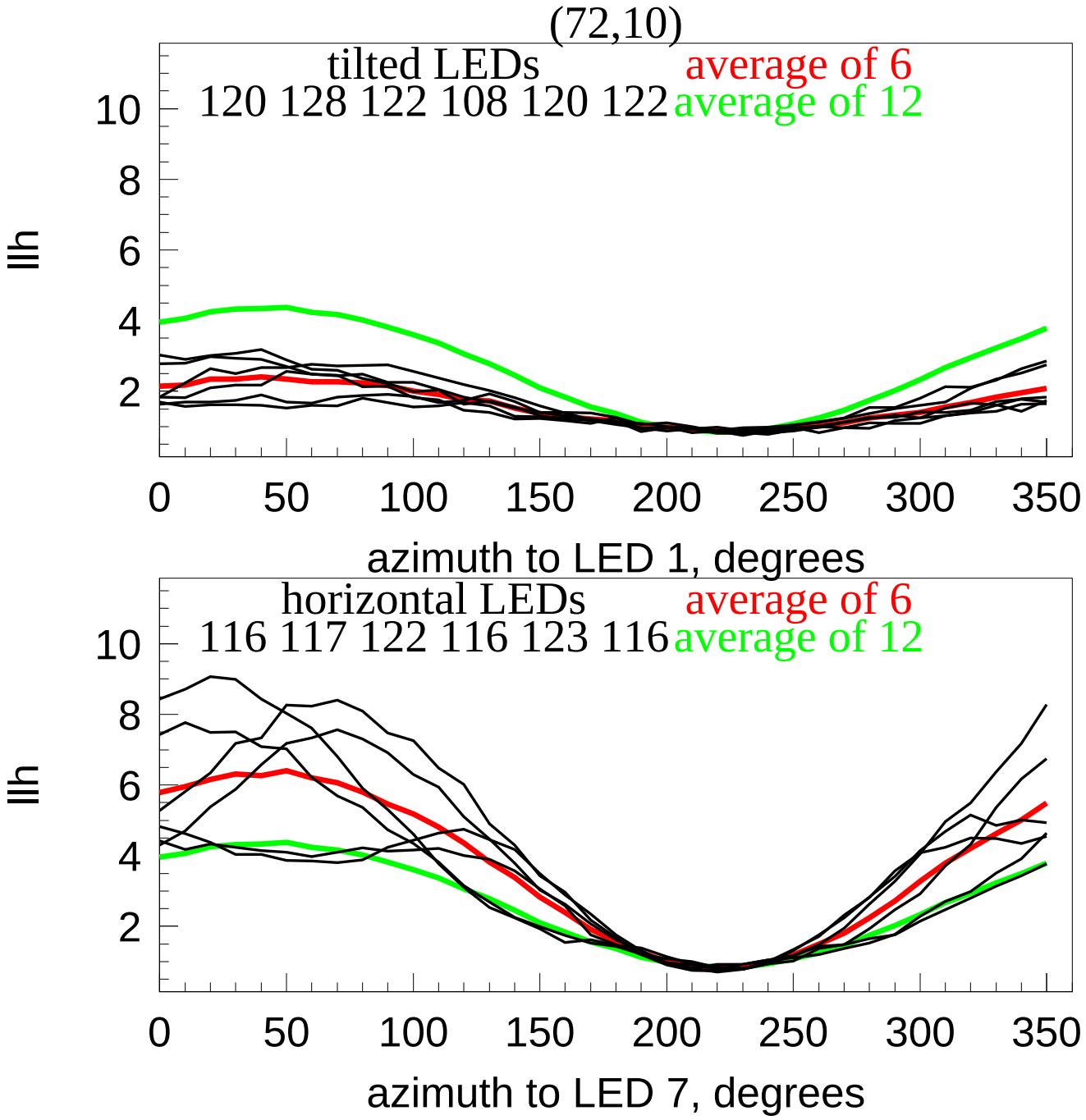

(72,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
0.3 ± 8.5

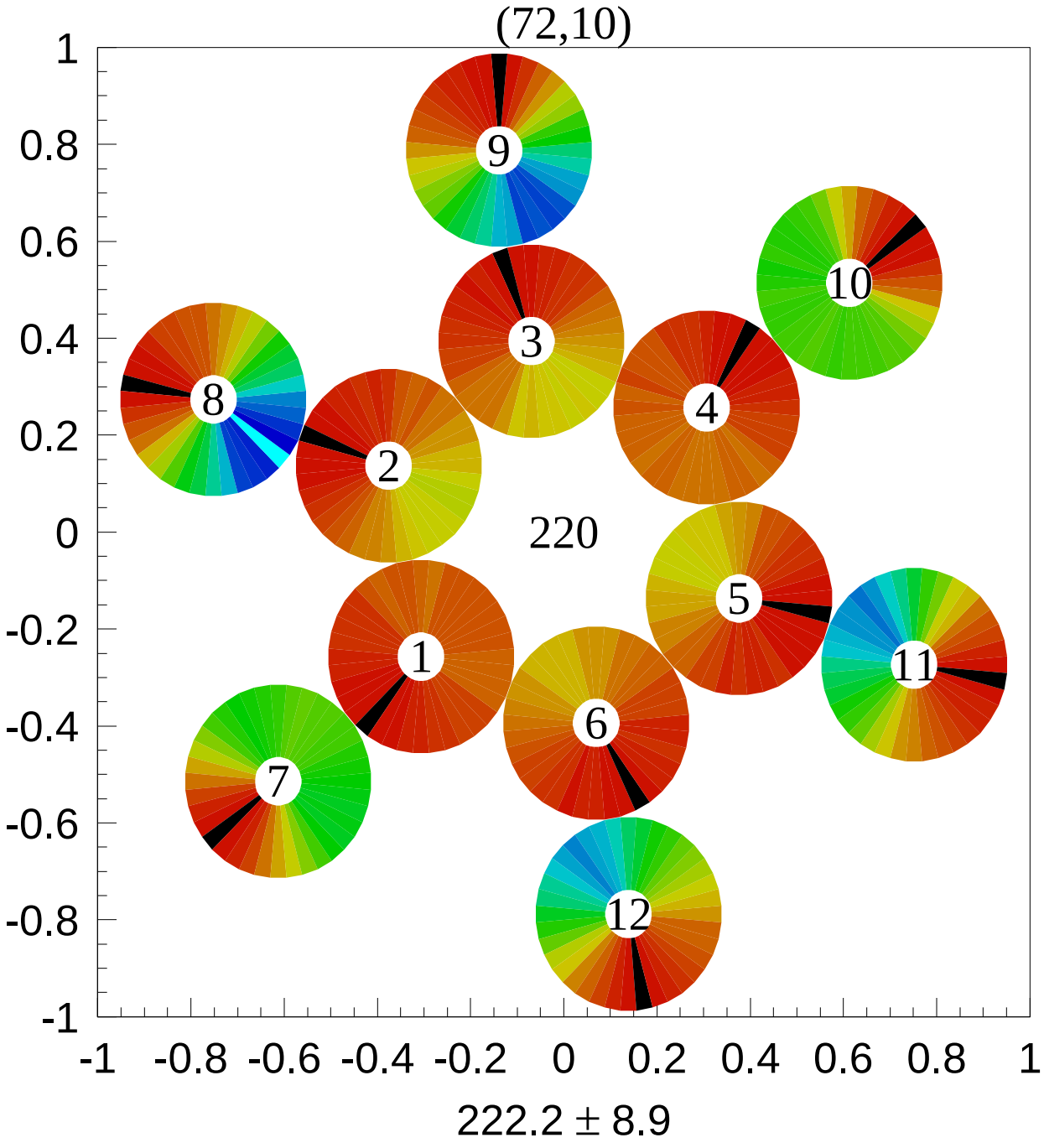

(72,8)
tilted LEDs
120 113 128 125 119 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 119 120 117 128 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

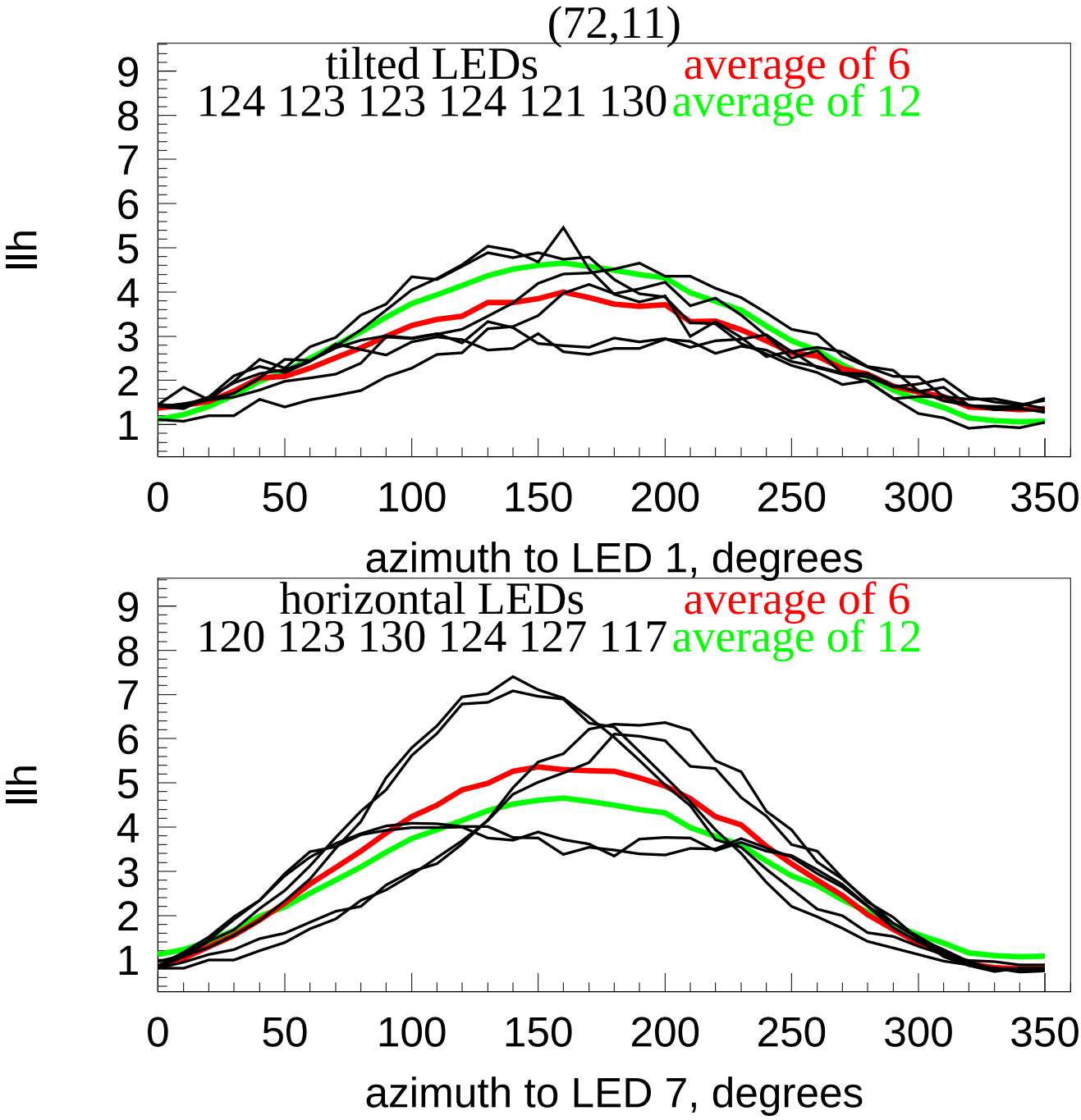

(72,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
115.9 ± 14.0

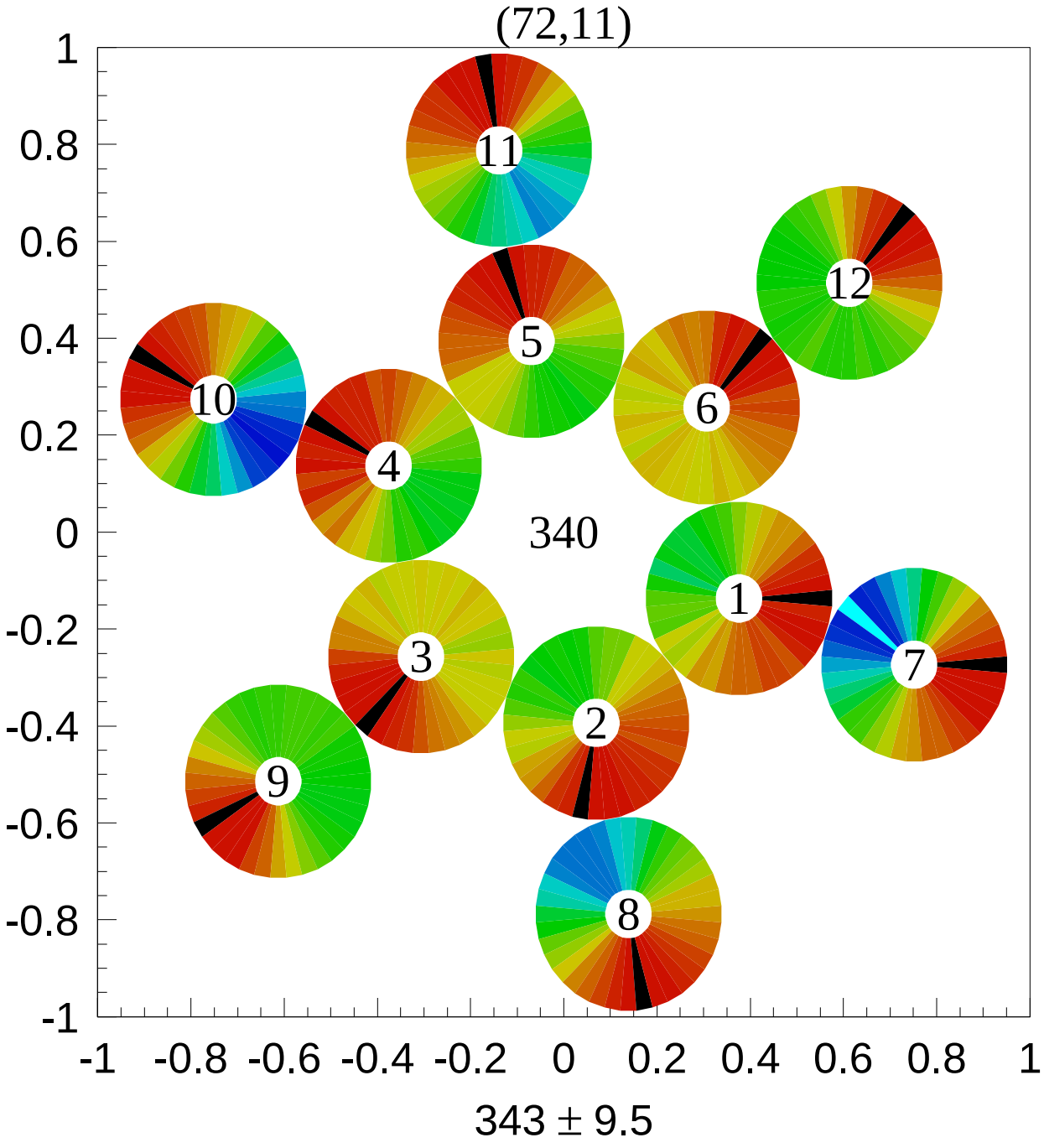

(72,9)
tilted LEDs
120 116 122 124 118 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 123 124 130 129 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

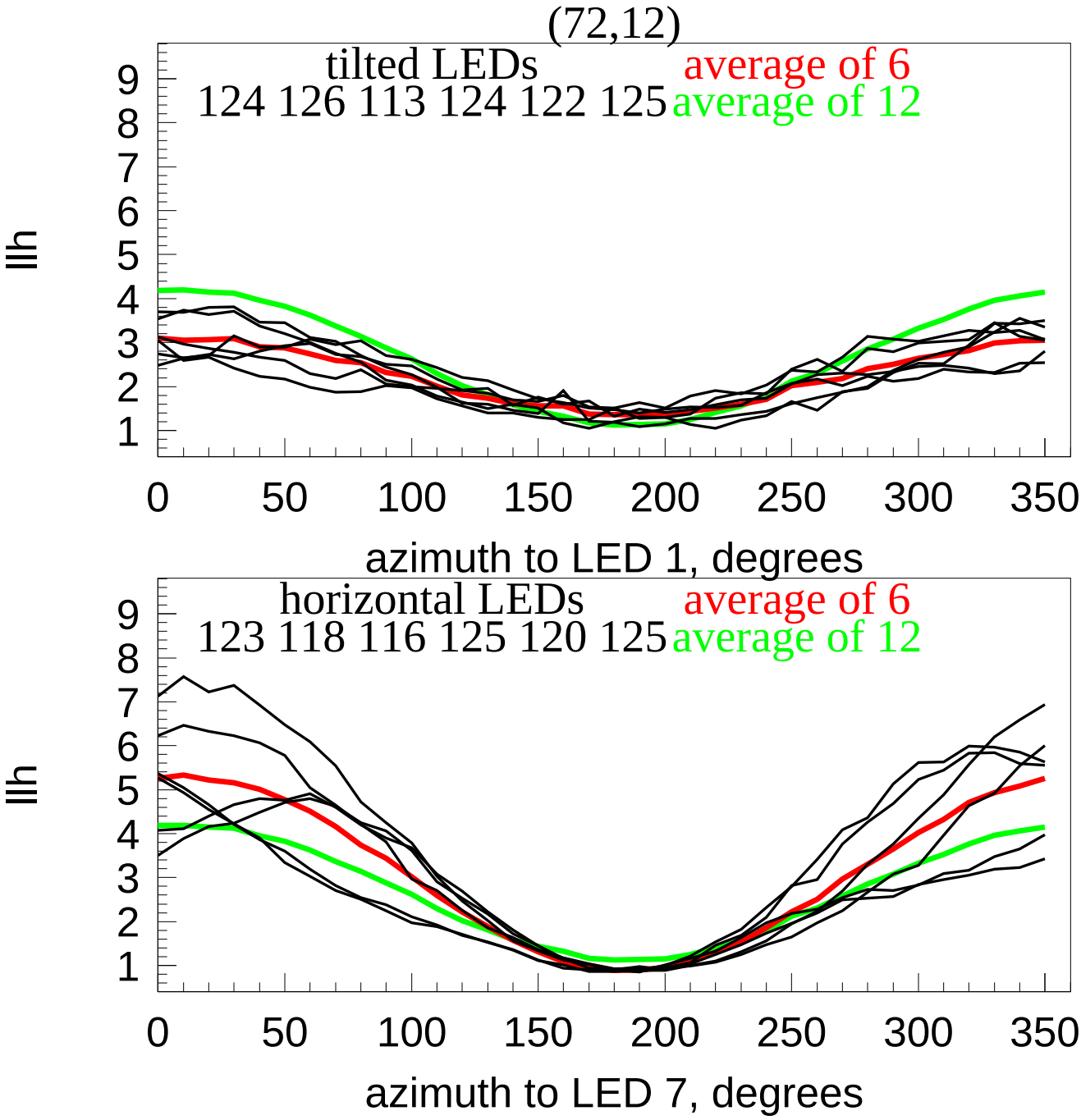

(72,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
152.8 ± 17.3
140
1
2
3
4
5
6
7
8
9
10
11
12

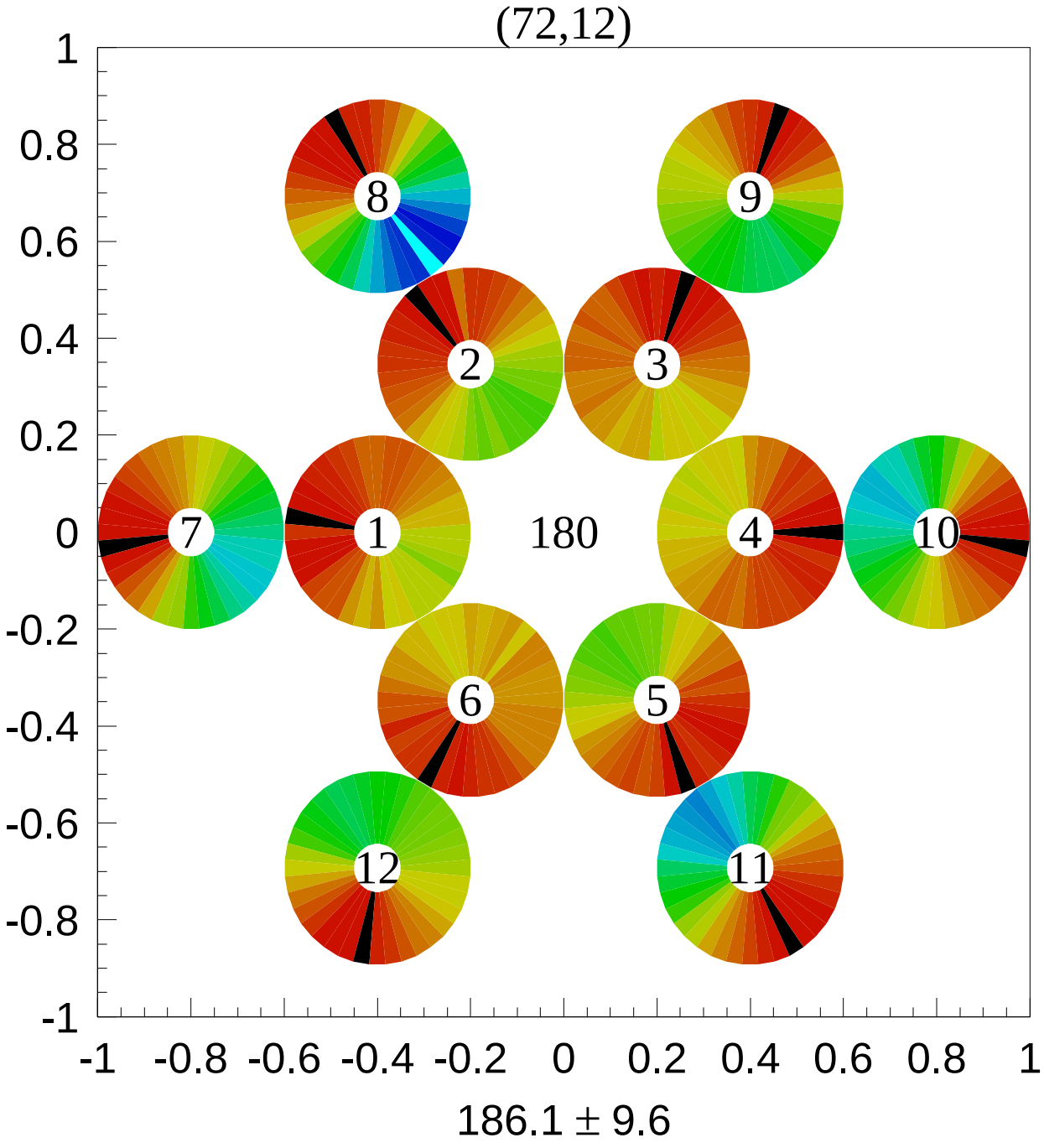

(72,10)
tilted LEDs
120 128 122 108 120 122
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 117 122 116 123 116
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

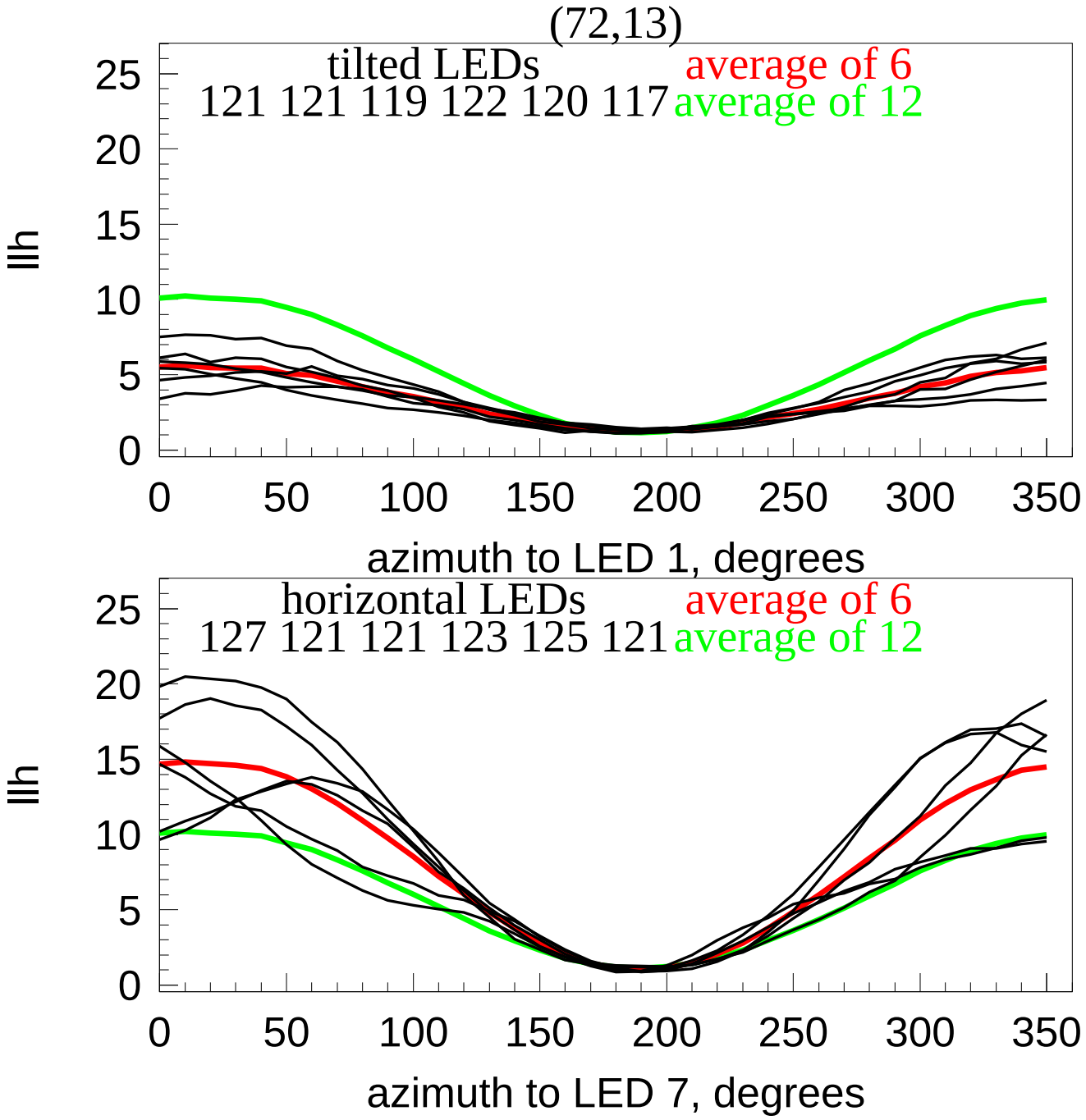

(72,10)
9
10
3
4
8
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
222.2 ± 8.9

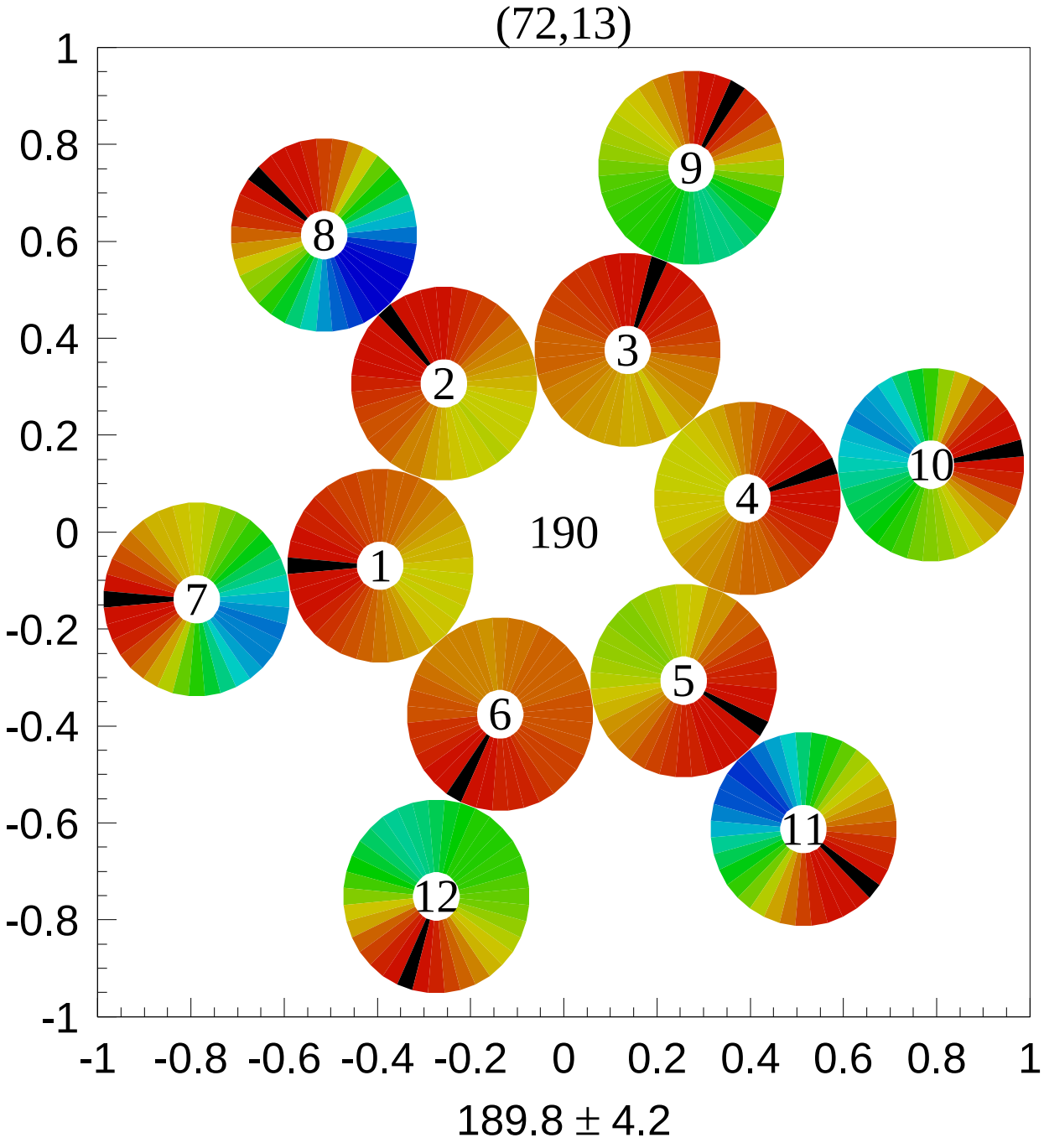

(72,11)
tilted LEDs
124 123 123 124 121 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 123 130 124 127 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

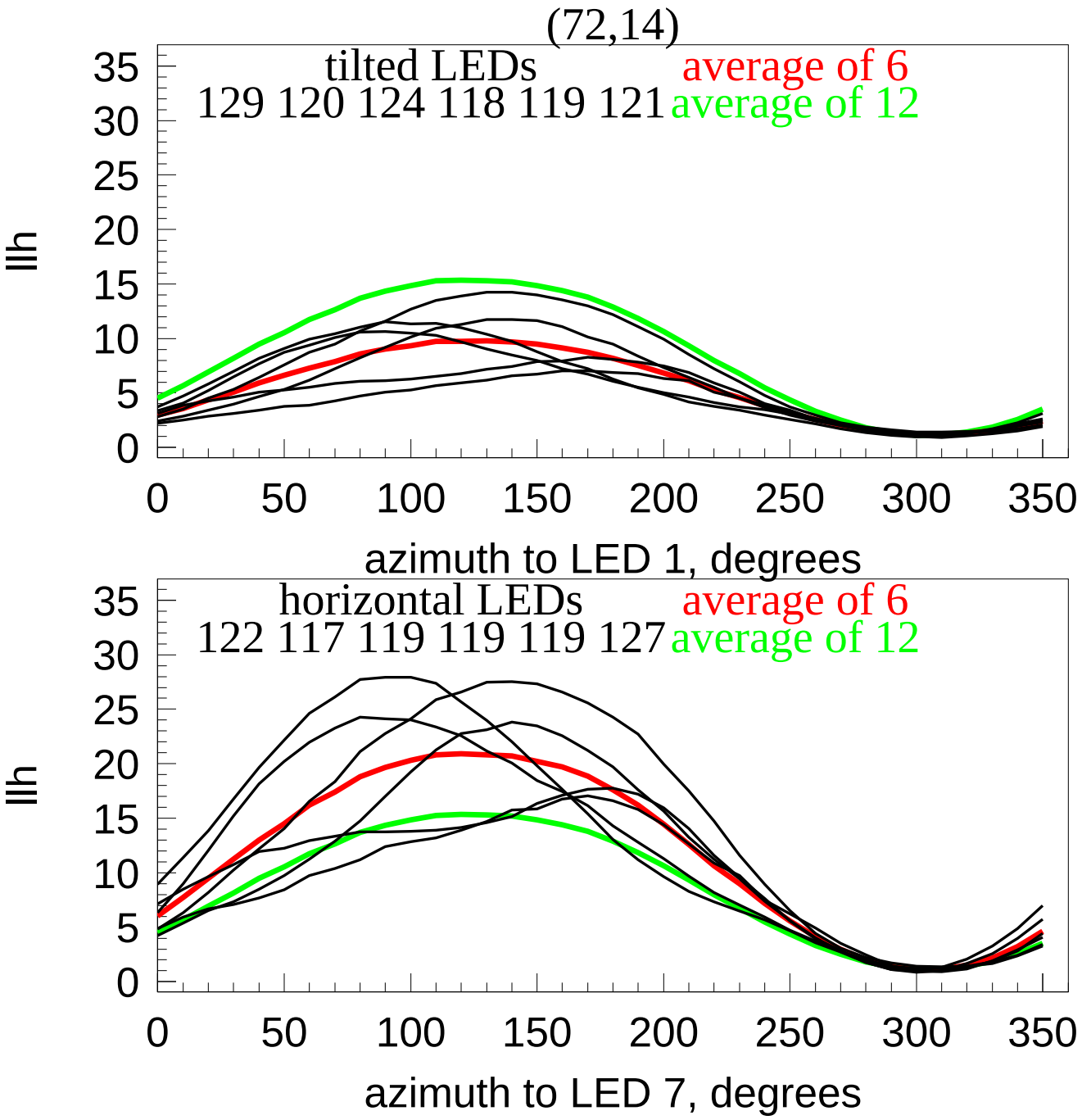

(72,11)
11
12
5
6
10
4
340
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
343 ± 9.5

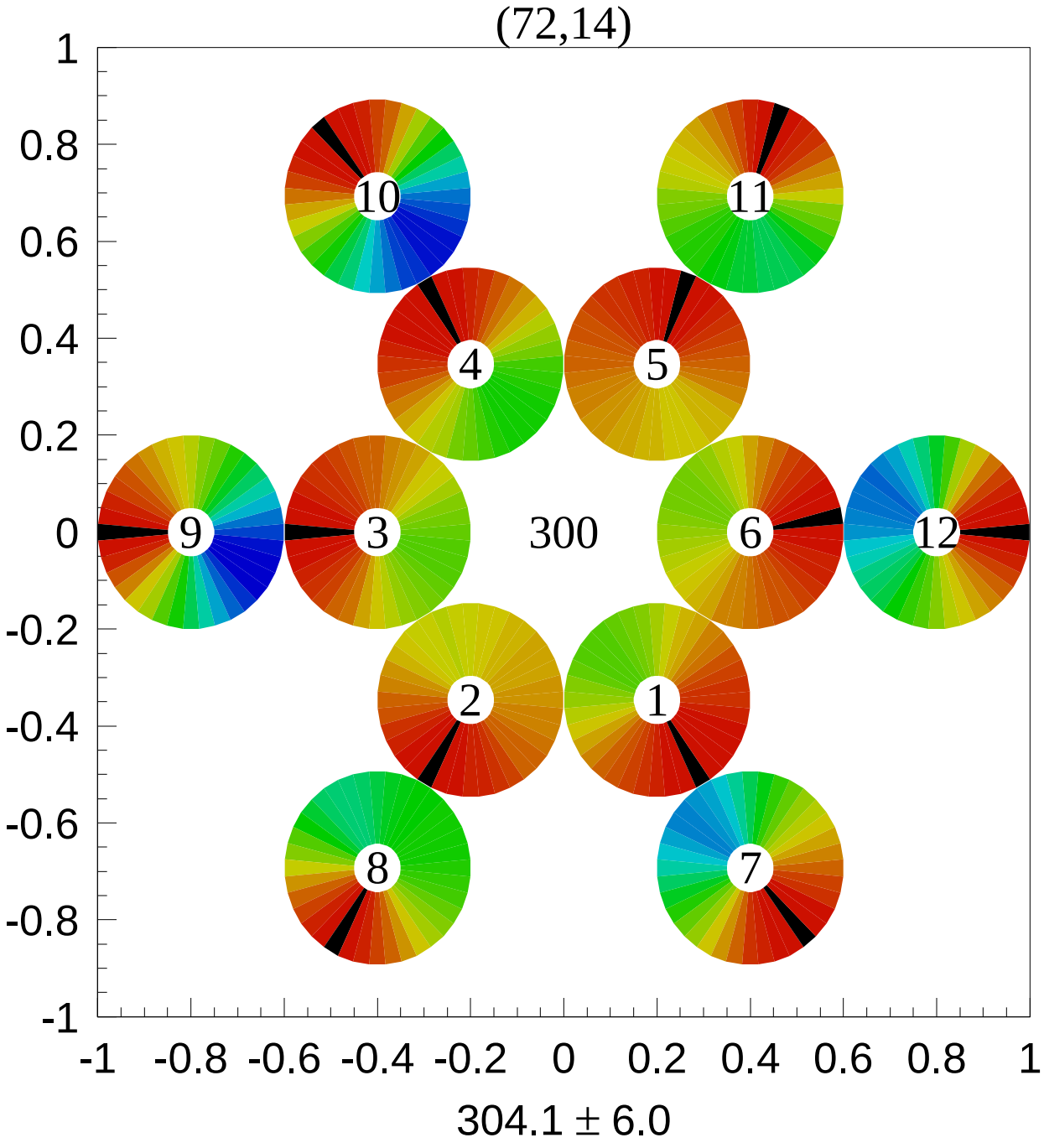

(72,12)
tilted LEDs
124 126 113 124 122 125
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 118 116 125 120 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

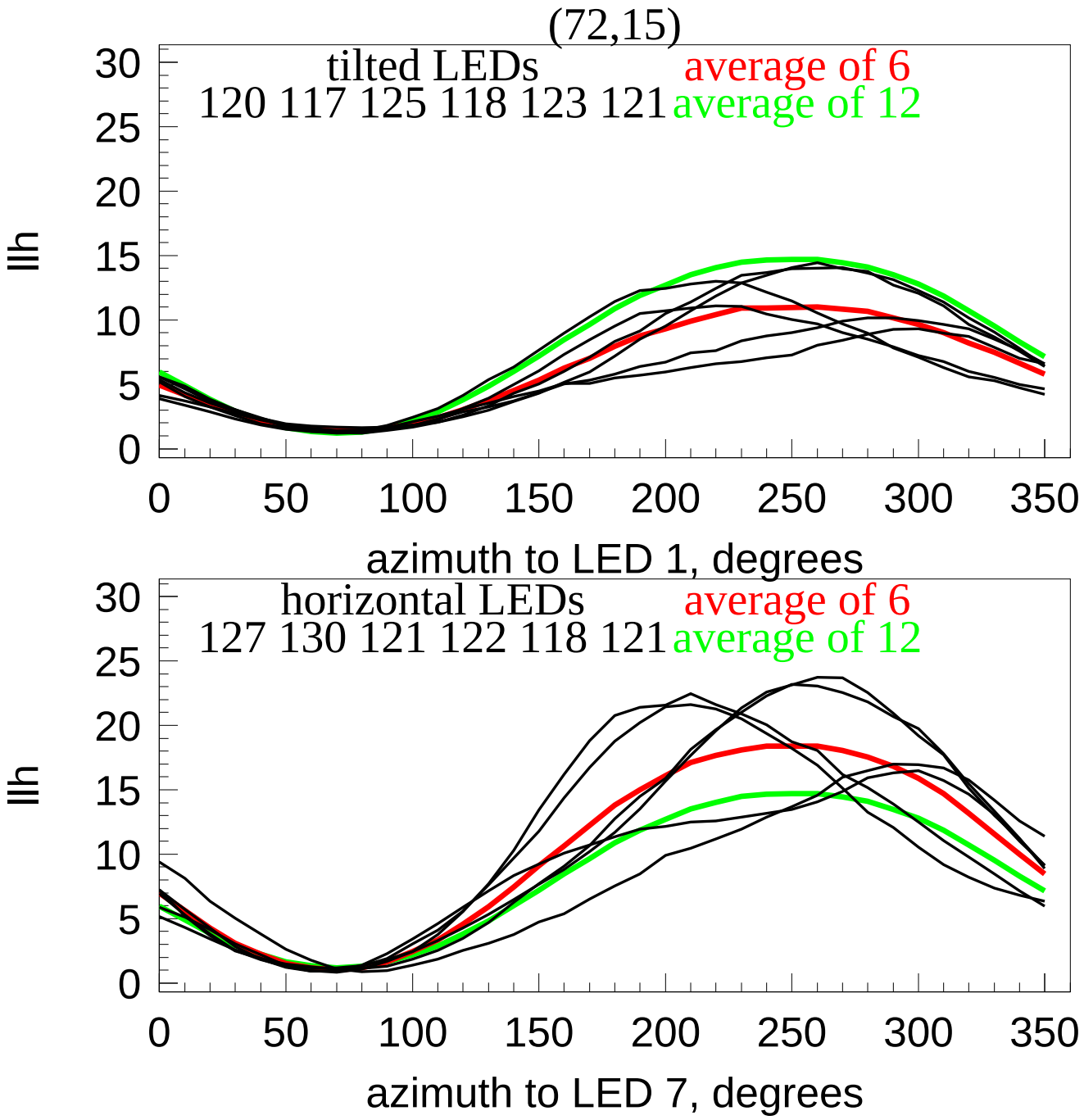

(72,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
186.1 ± 9.6

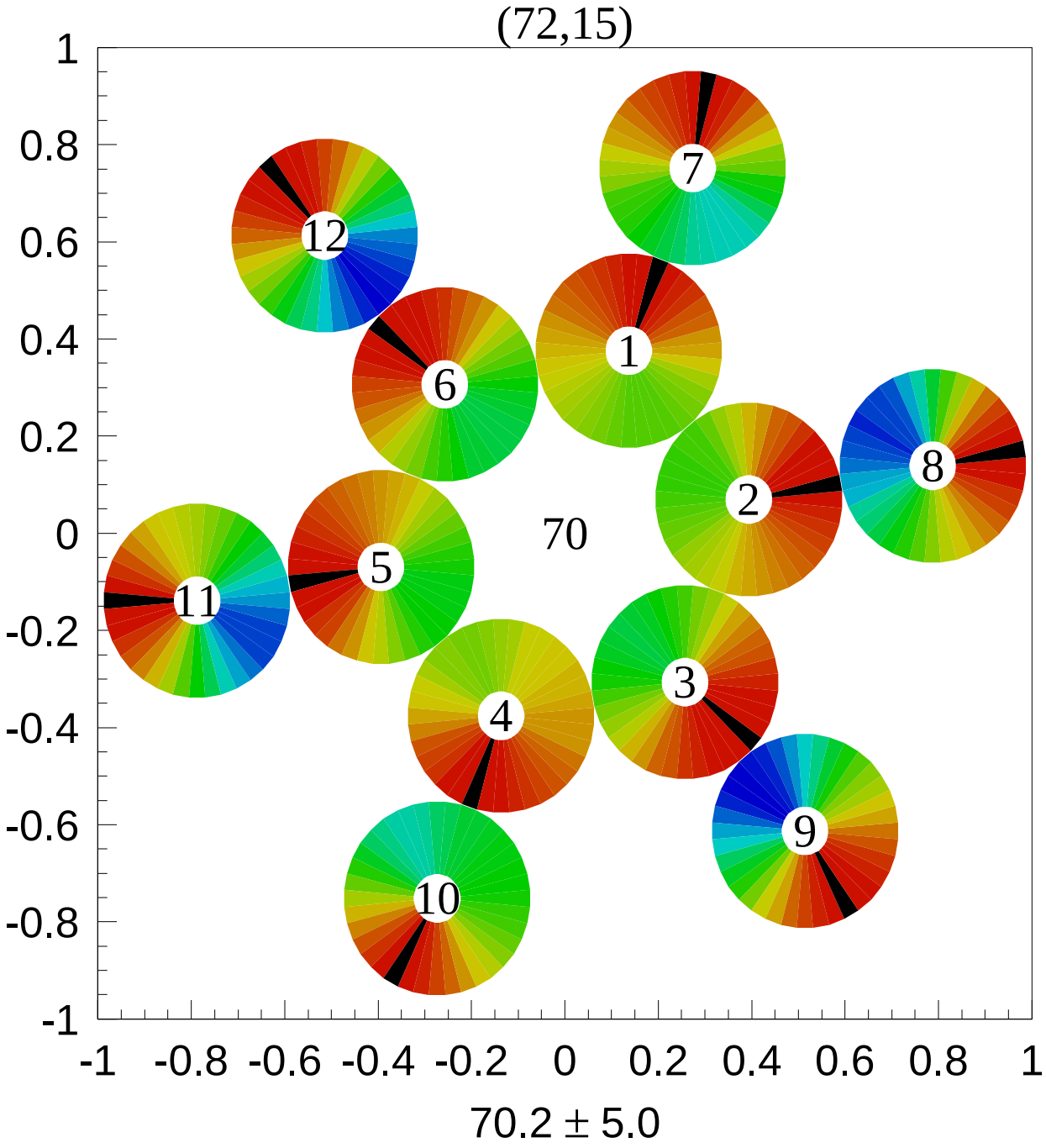

(72,13)
tilted LEDs
121 121 119 122 120 117
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 121 121 123 125 121
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

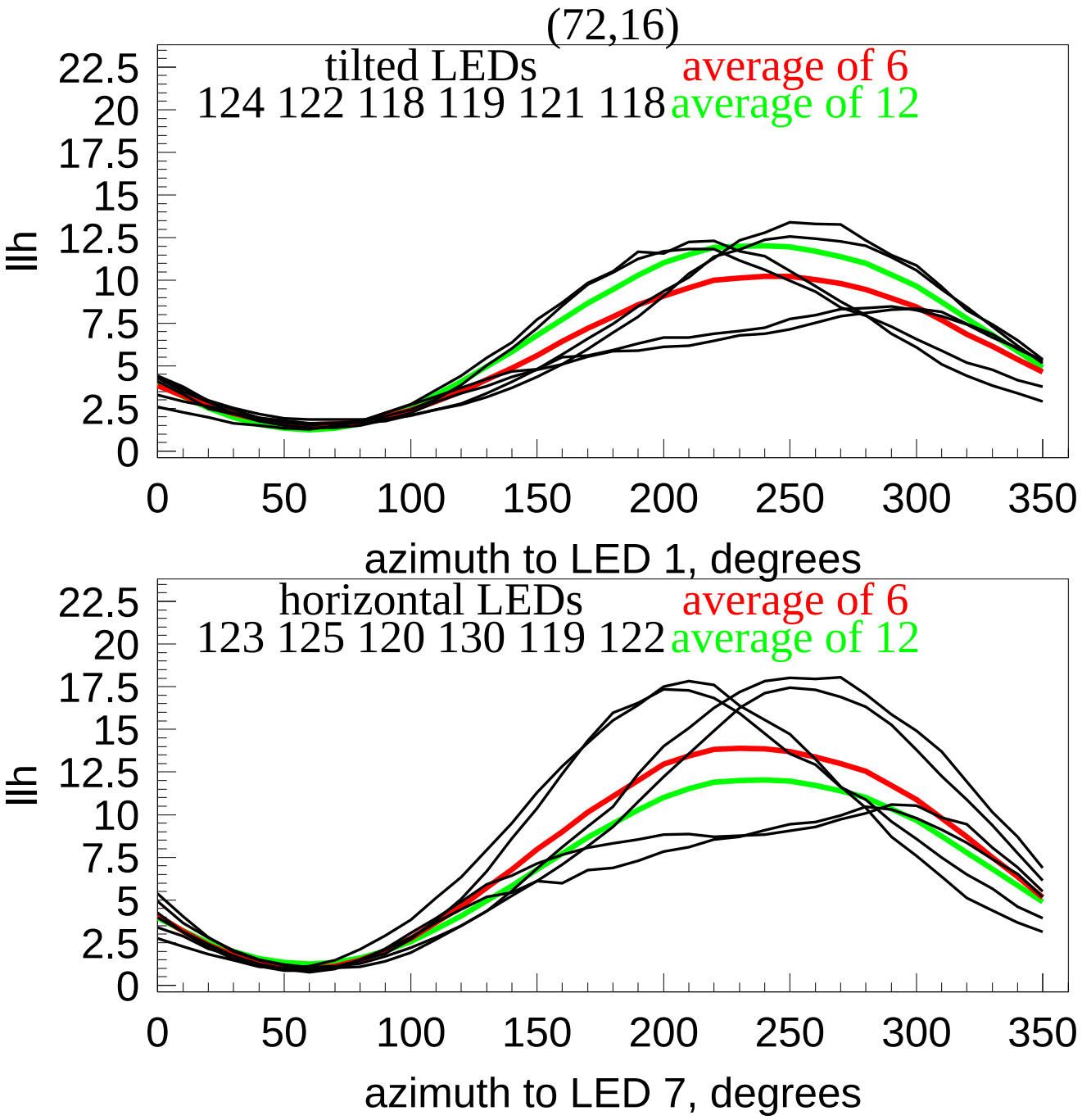

(72,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
190
189.8 ± 4.2

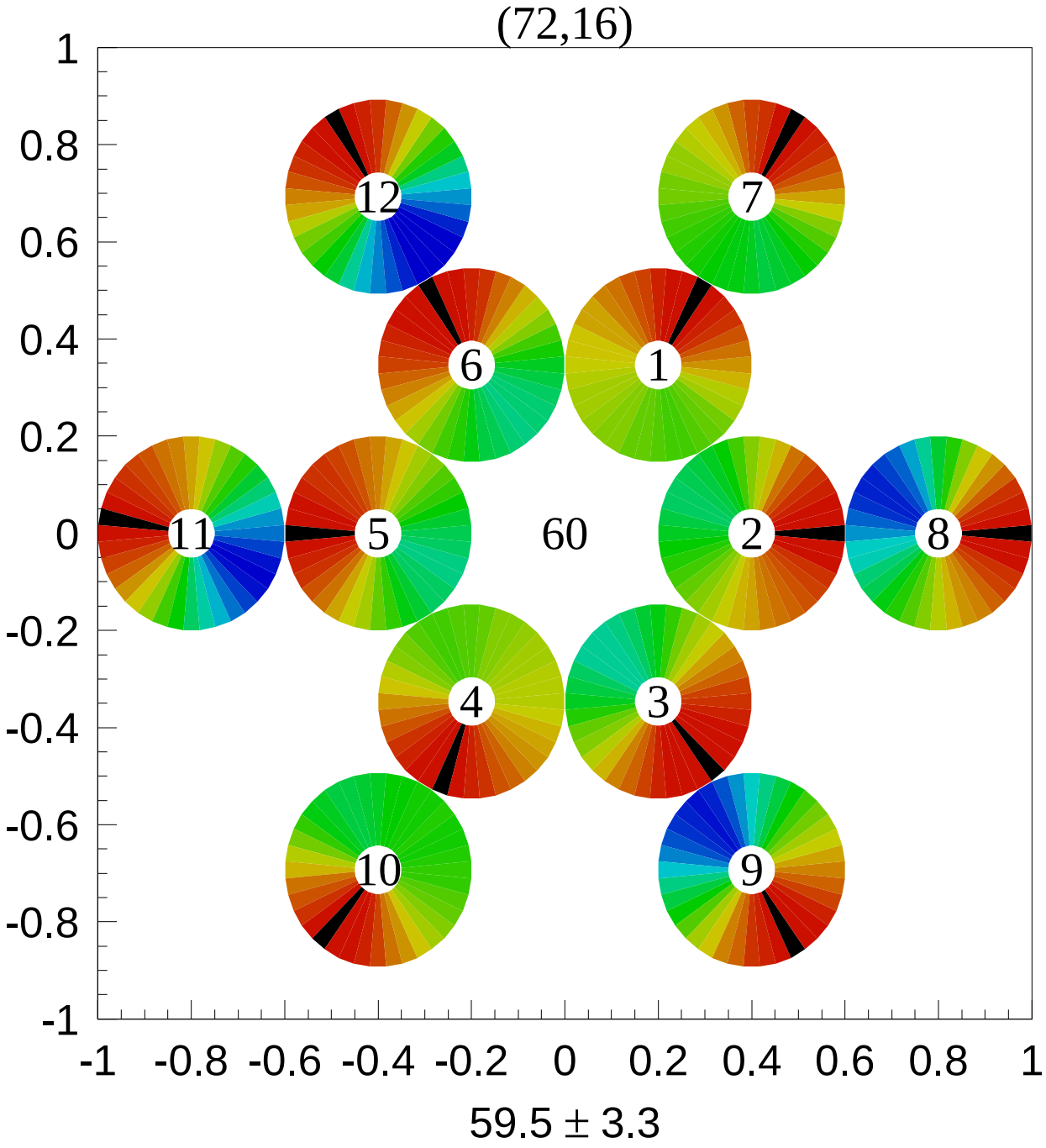

(72,14)
tilted LEDs
129 120 124 118 119 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 117 119 119 119 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

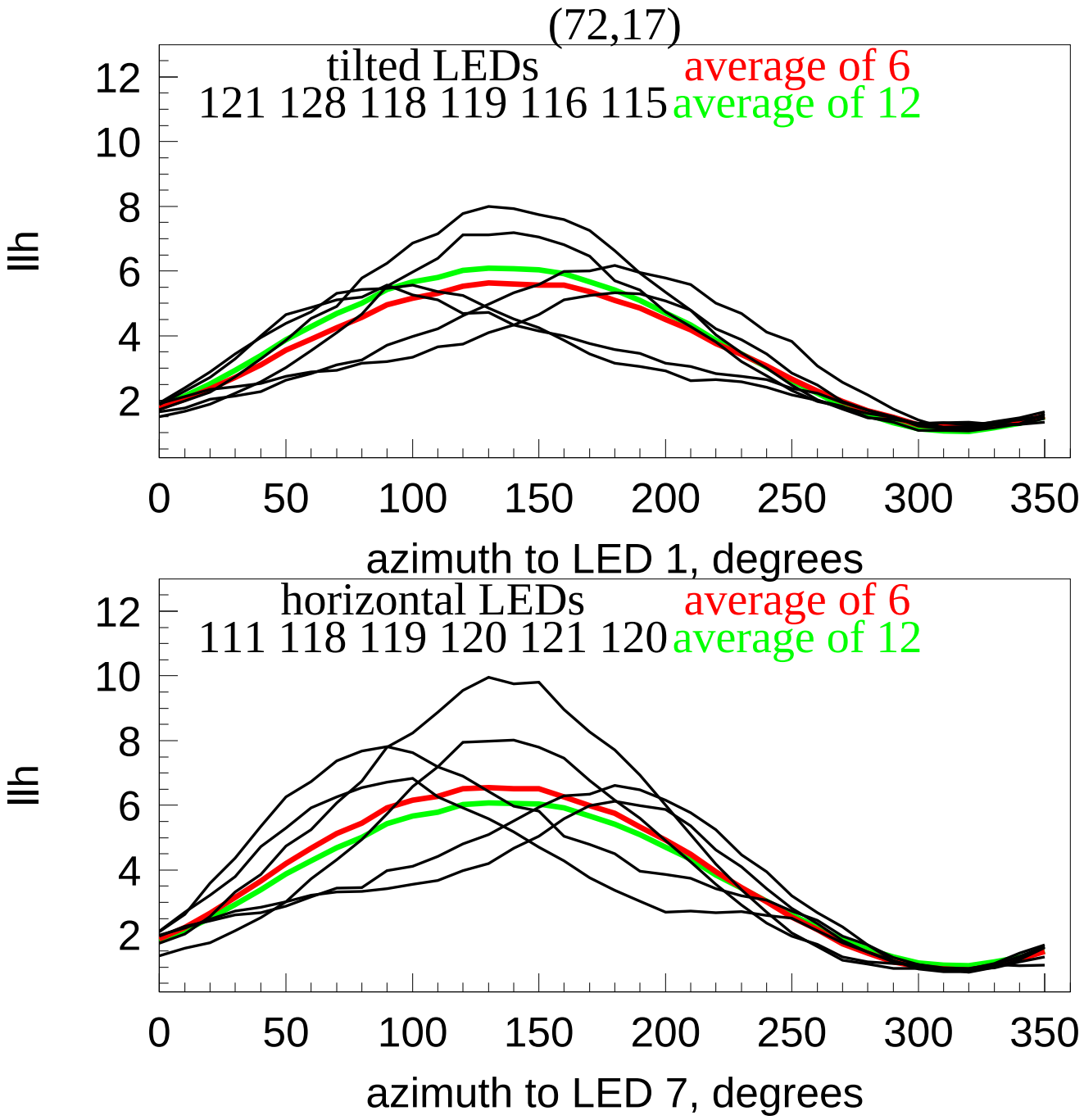

(72,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
304.1 ± 6.0

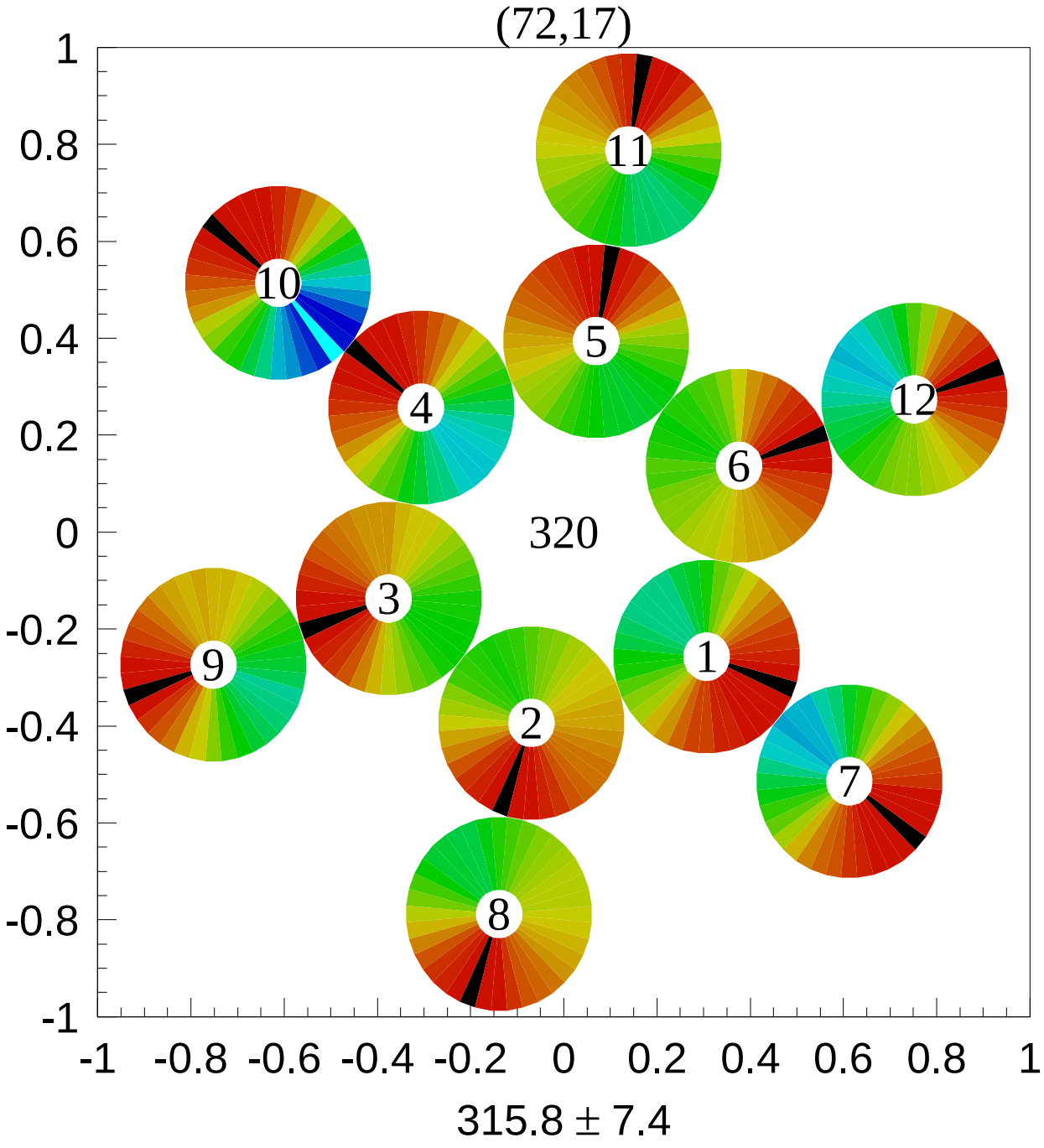

(72,15)
tilted LEDs
120 117 125 118 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 130 121 122 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

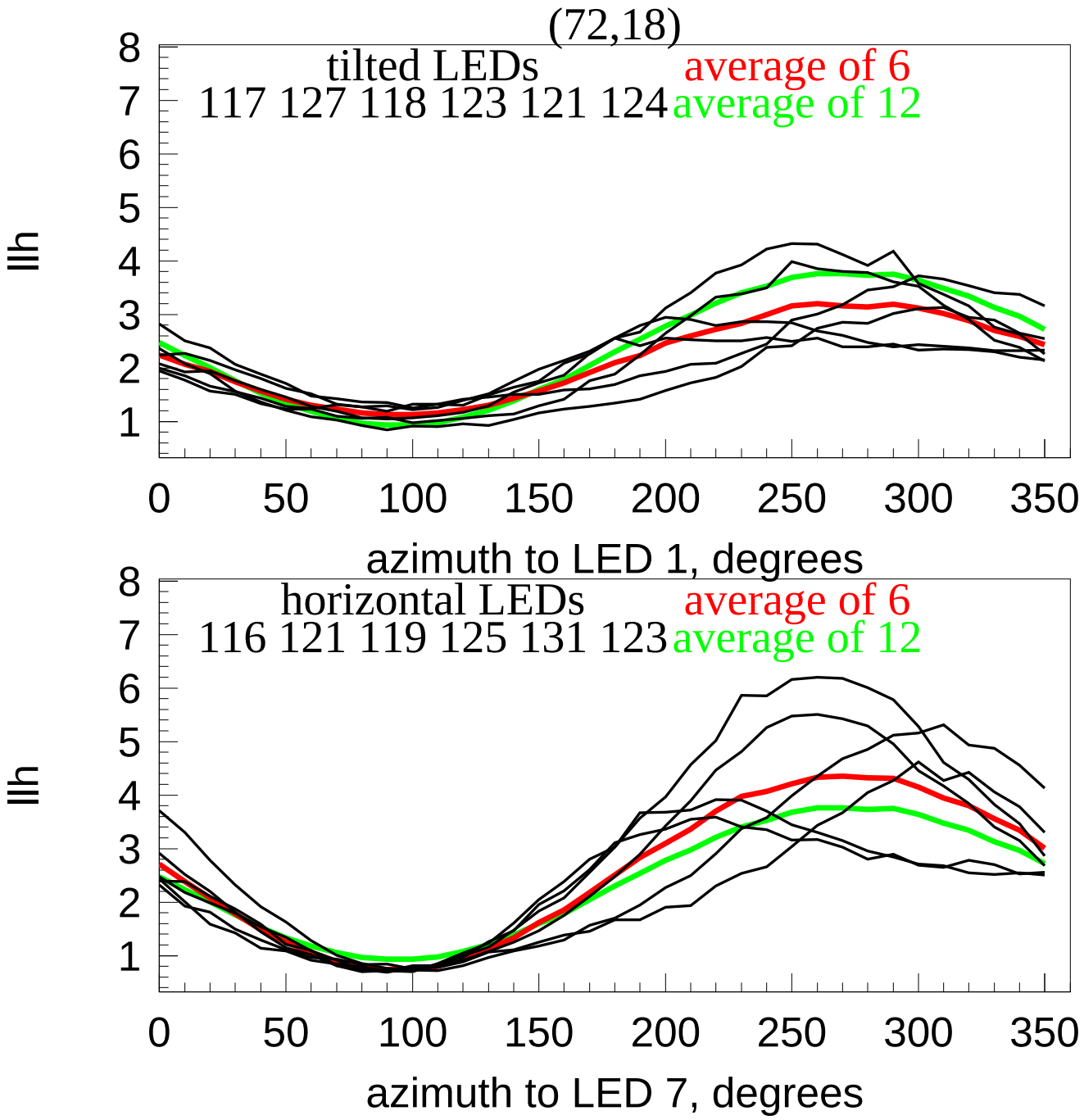

(72,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
70
12
7
1
6
2
8
5
11
3
4
9
10
70.2 ± 5.0

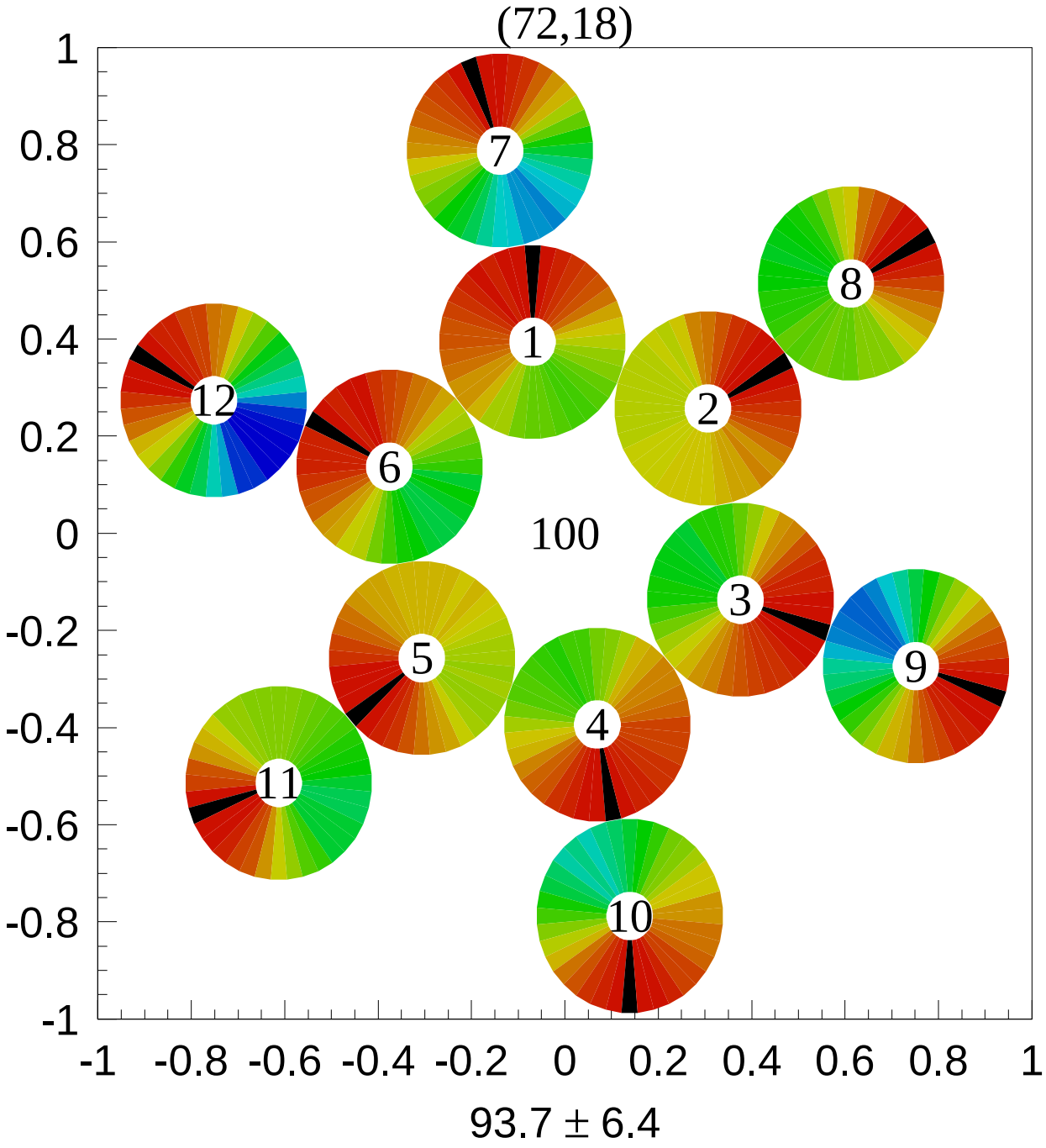

(72,16)
tilted LEDs
124 122 118 119 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 120 130 119 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

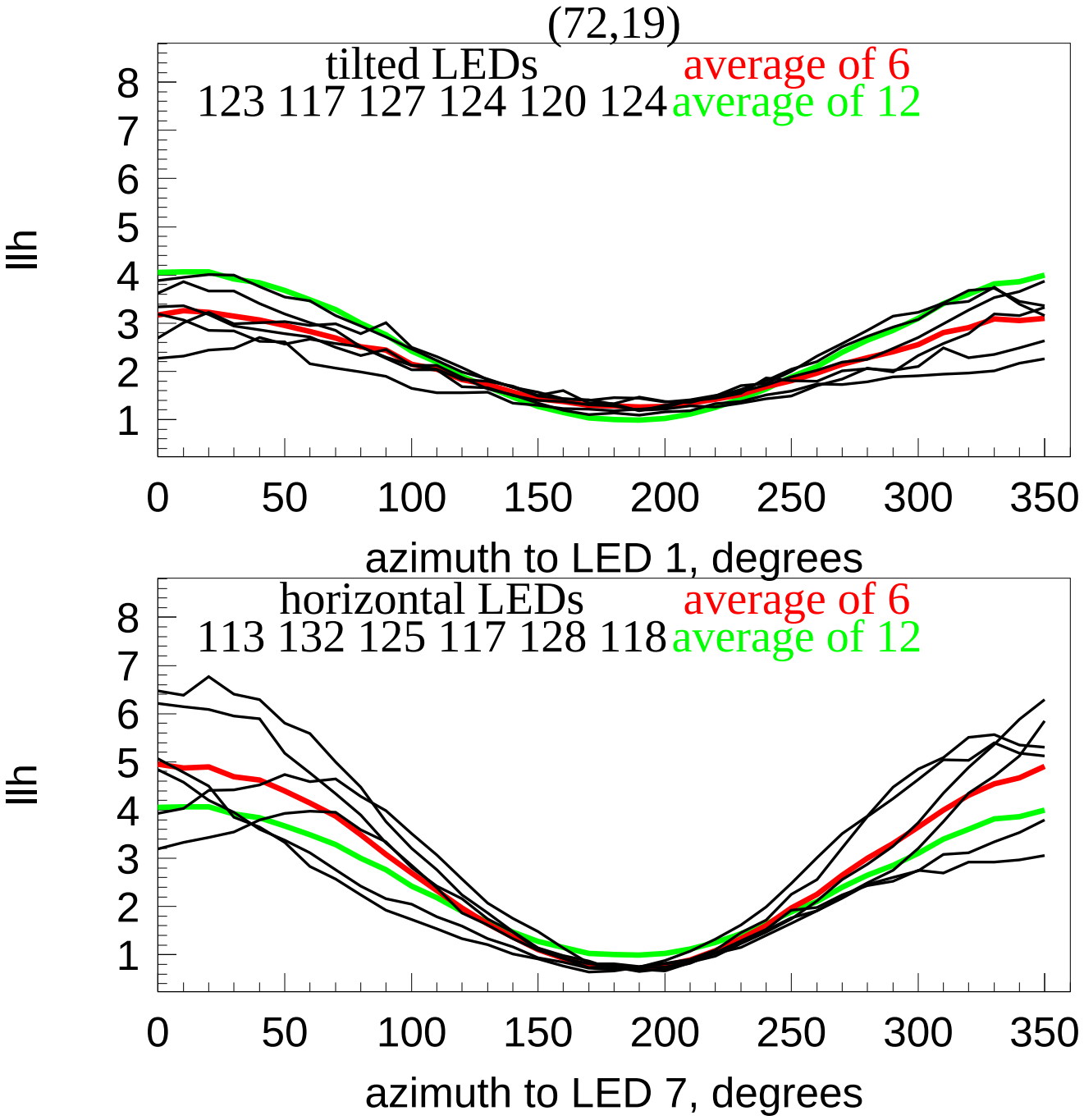

(72,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
59.5 ± 3.3

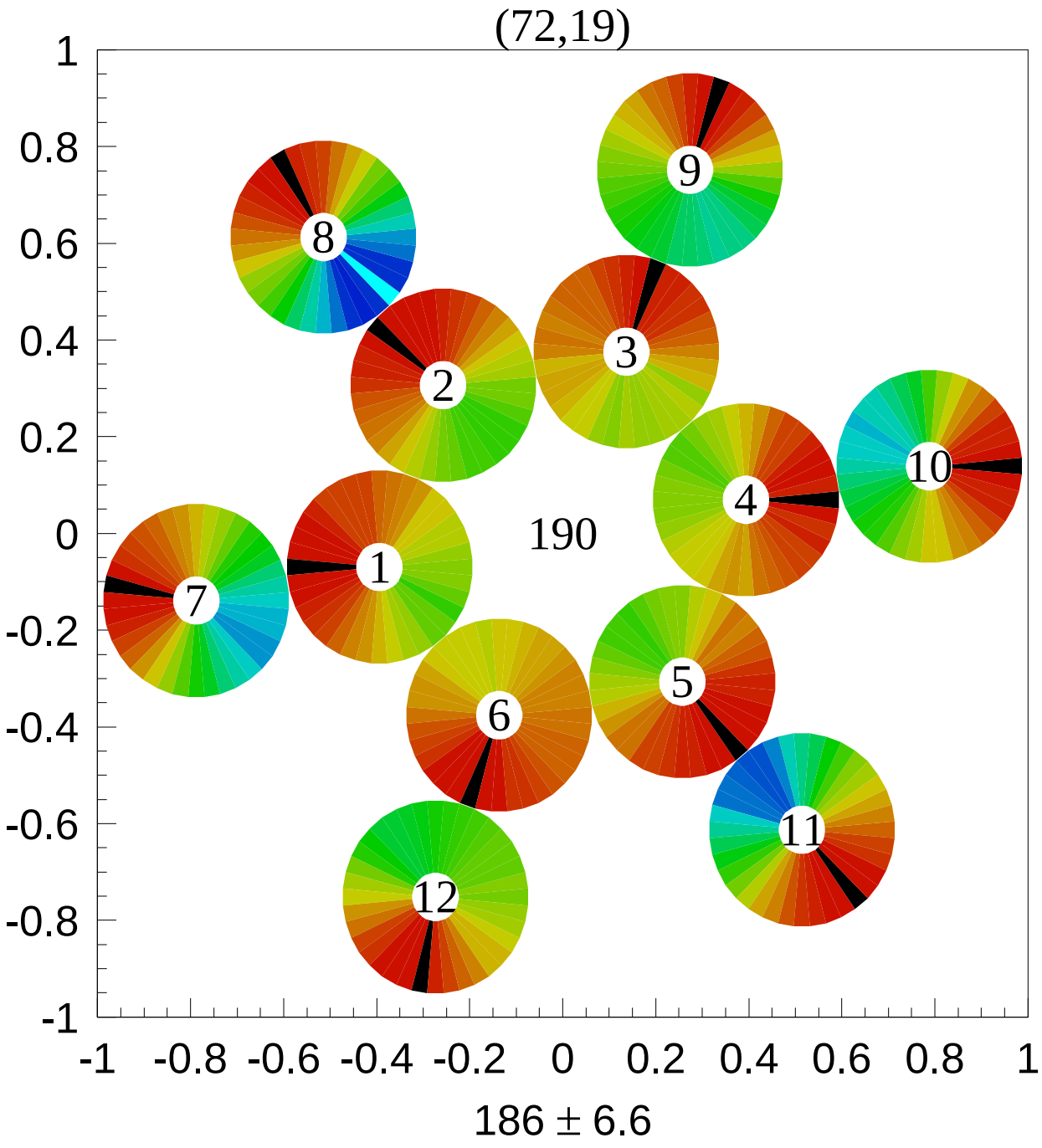

(72,17)
tilted LEDs
121 128 118 119 116 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 118 119 120 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

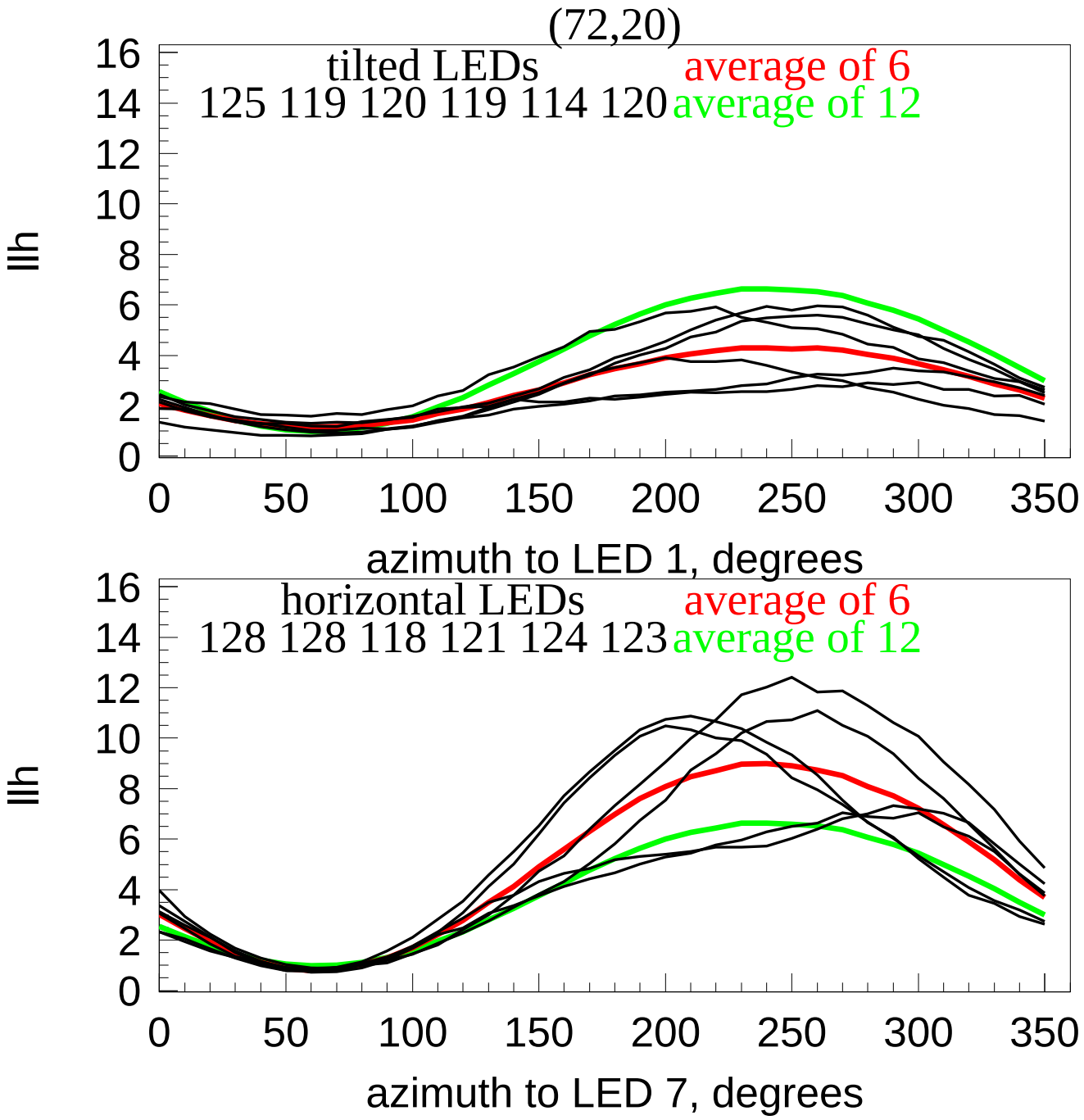

(72,17)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
315.8 ± 7.4

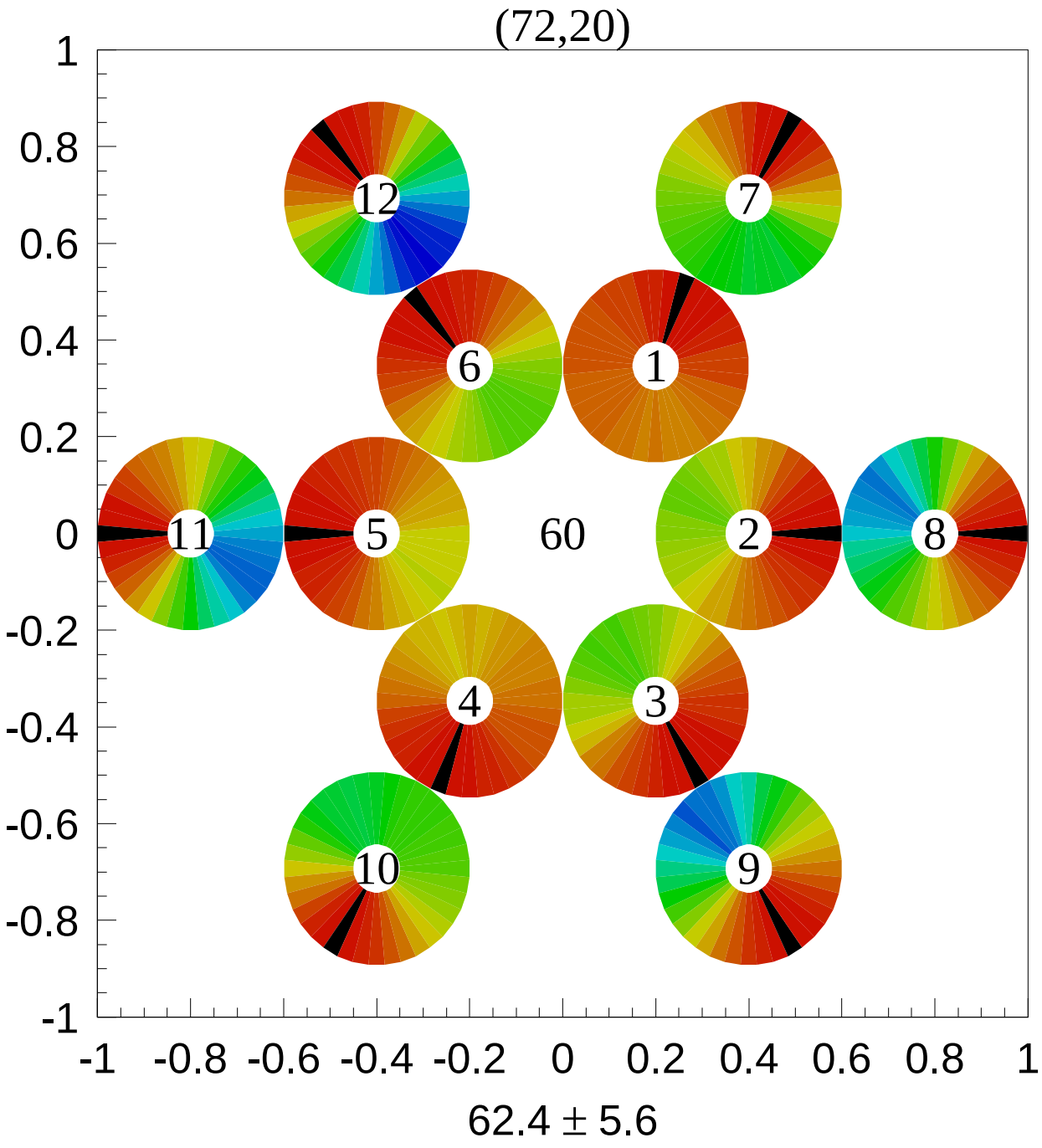

(72,18)
tilted LEDs
117 127 118 123 121 124
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
116 121 119 125 131 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

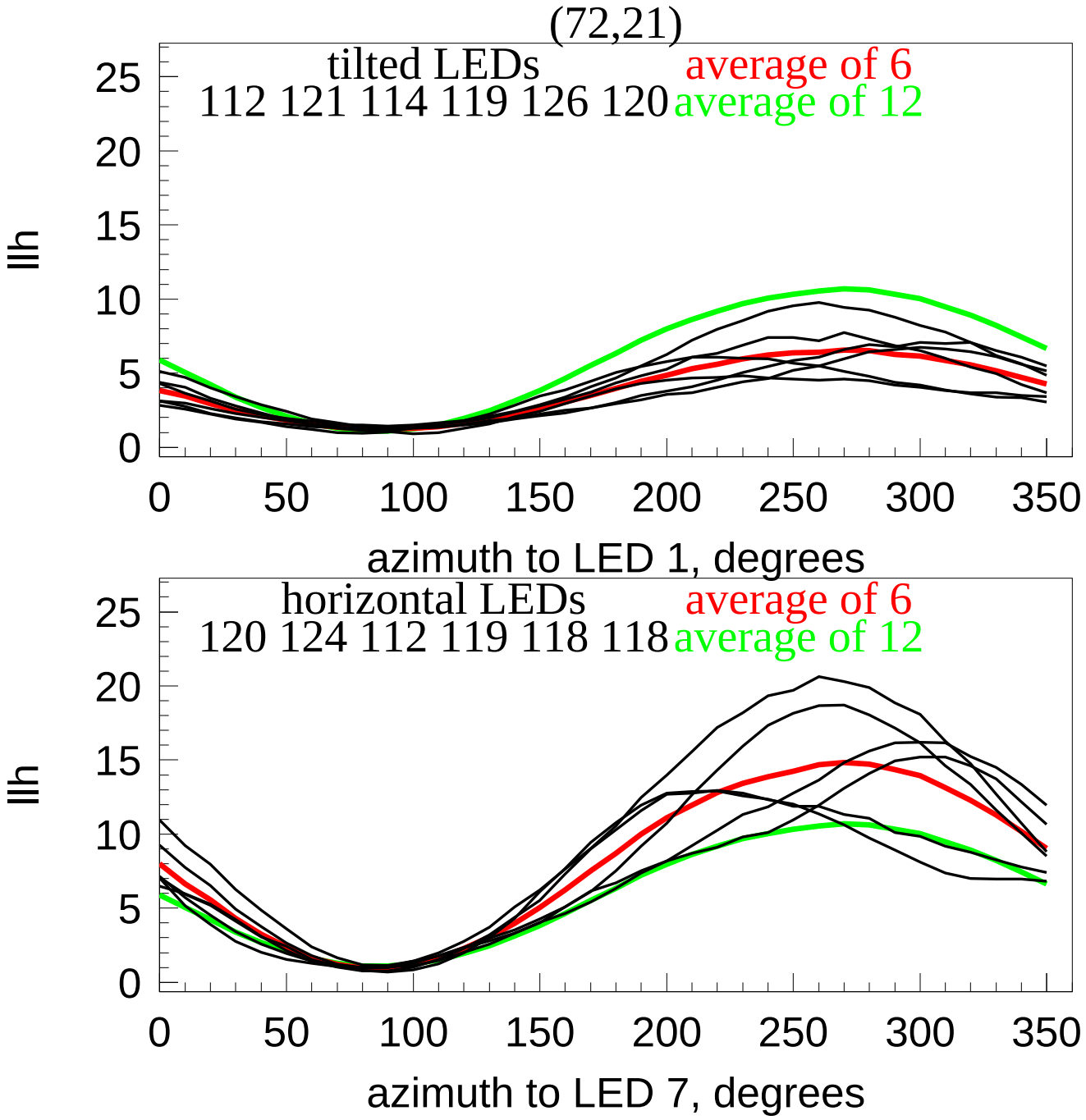

(72,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
93.7 ± 6.4

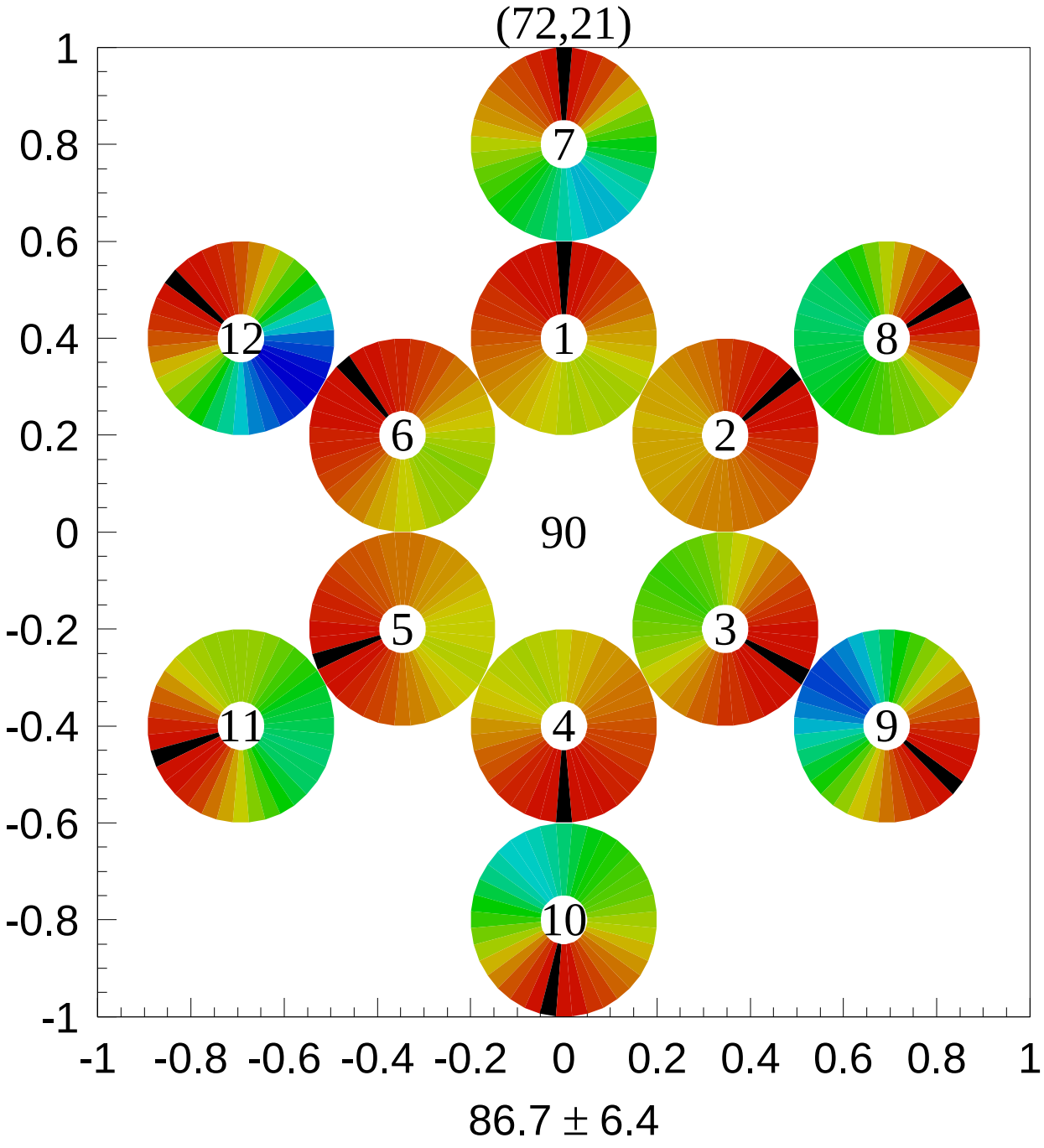

(72,19)
tilted LEDs
123 117 127 124 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 132 125 117 128 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

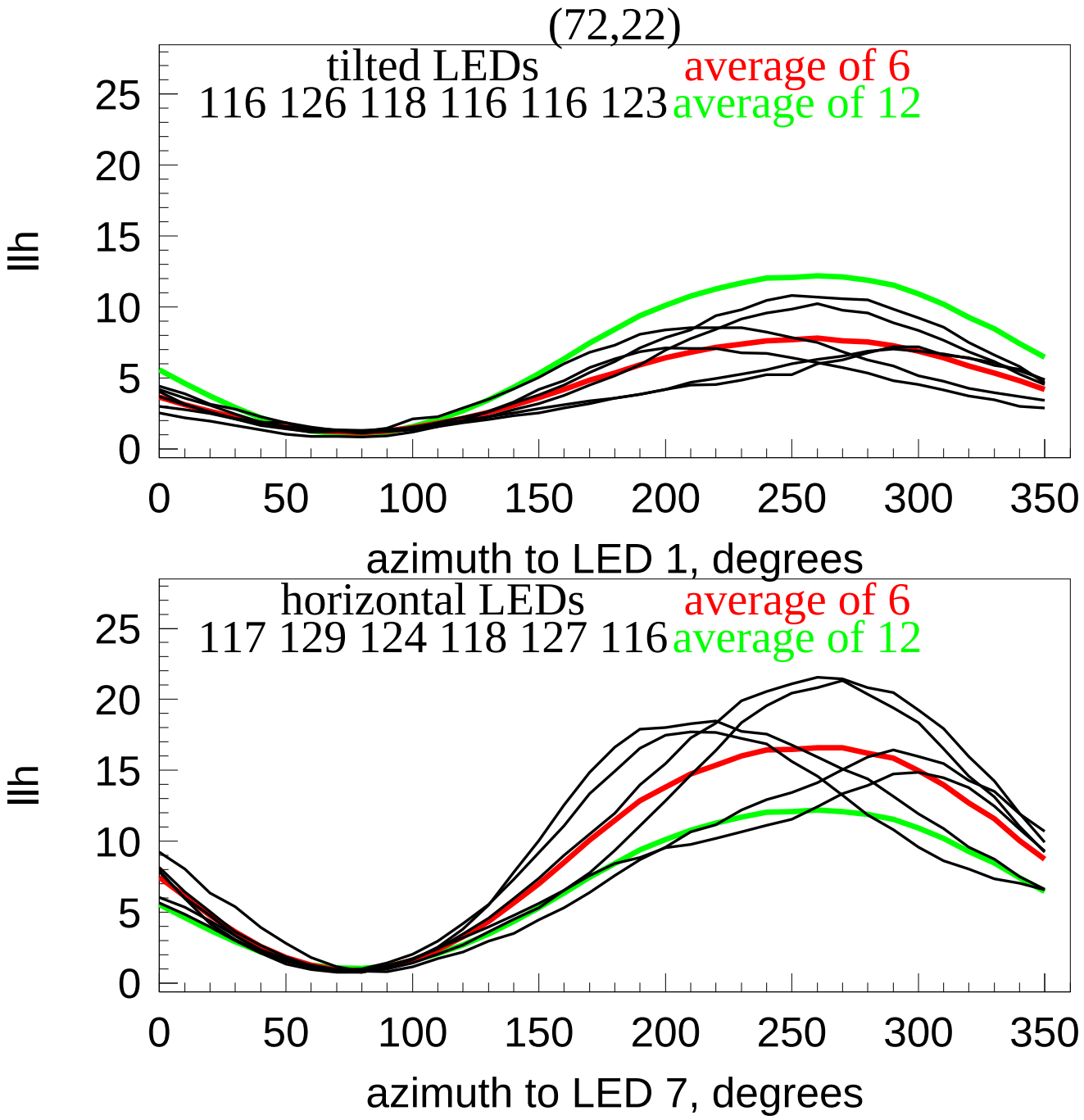

(72,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186 ± 6.6
190
1
2
3
4
5
6
7
8
9
10
11
12

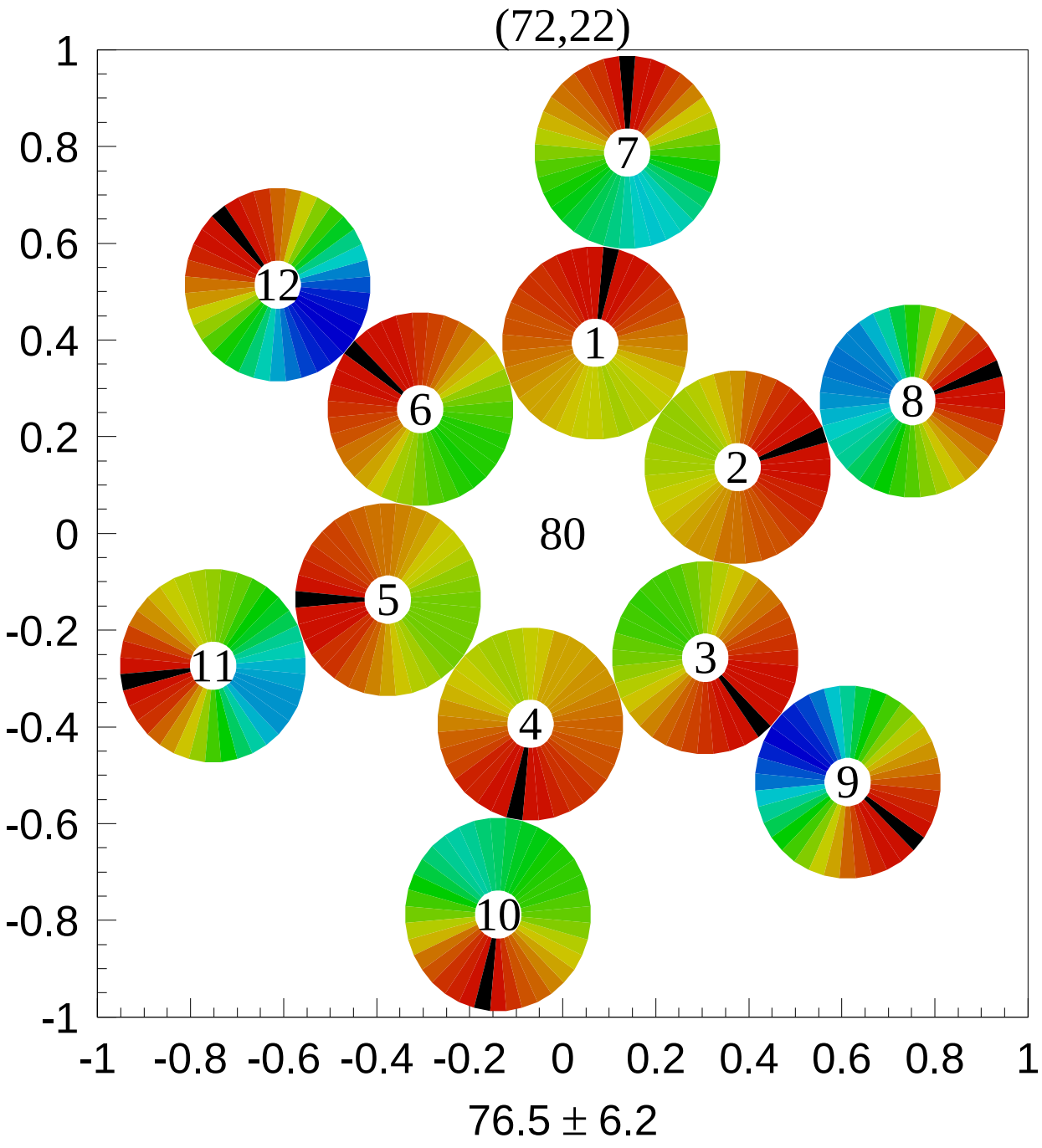

(72,20)
tilted LEDs
125 119 120 119 114 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 128 118 121 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

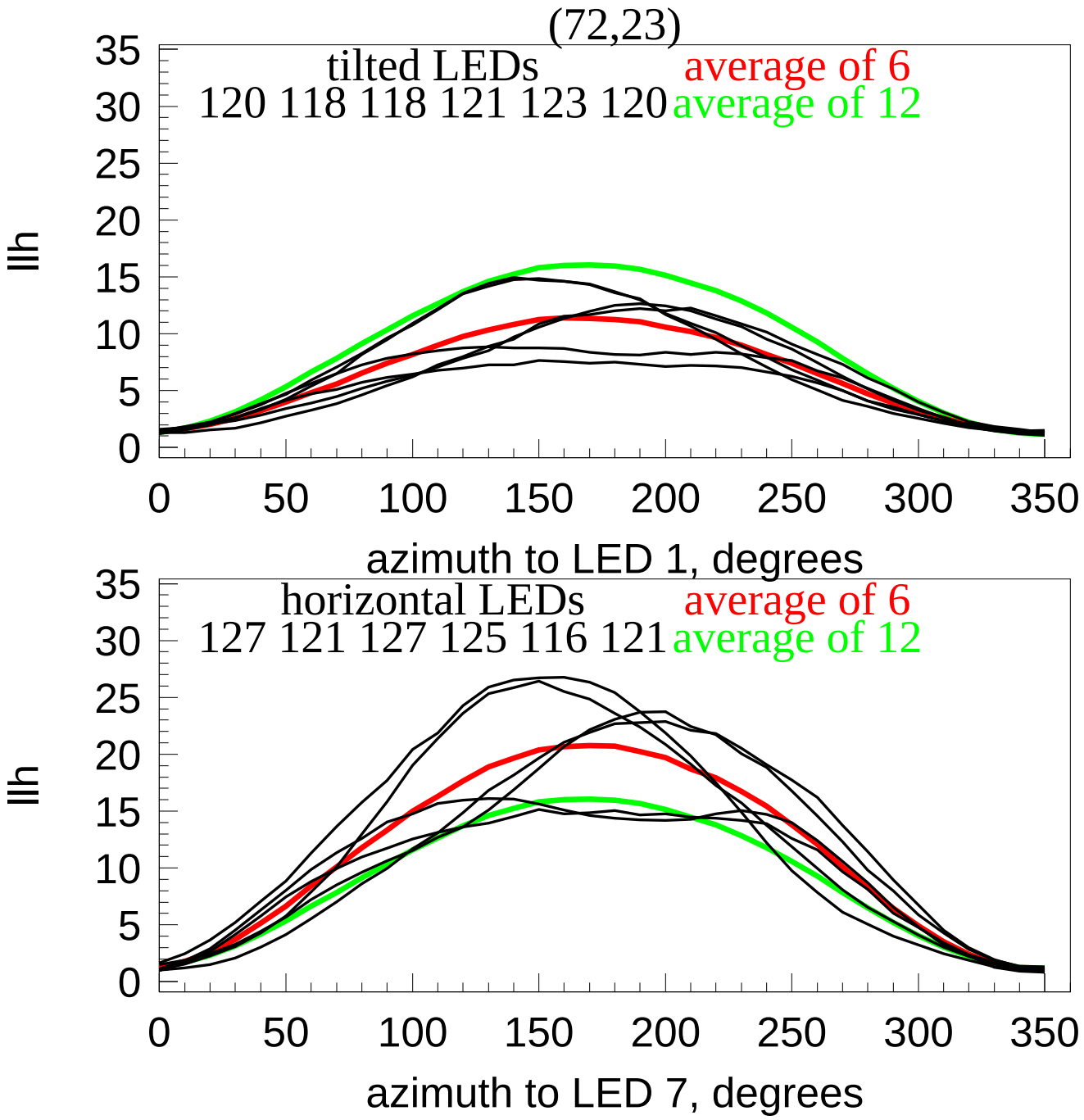

(72,20)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
62.4 ± 5.6

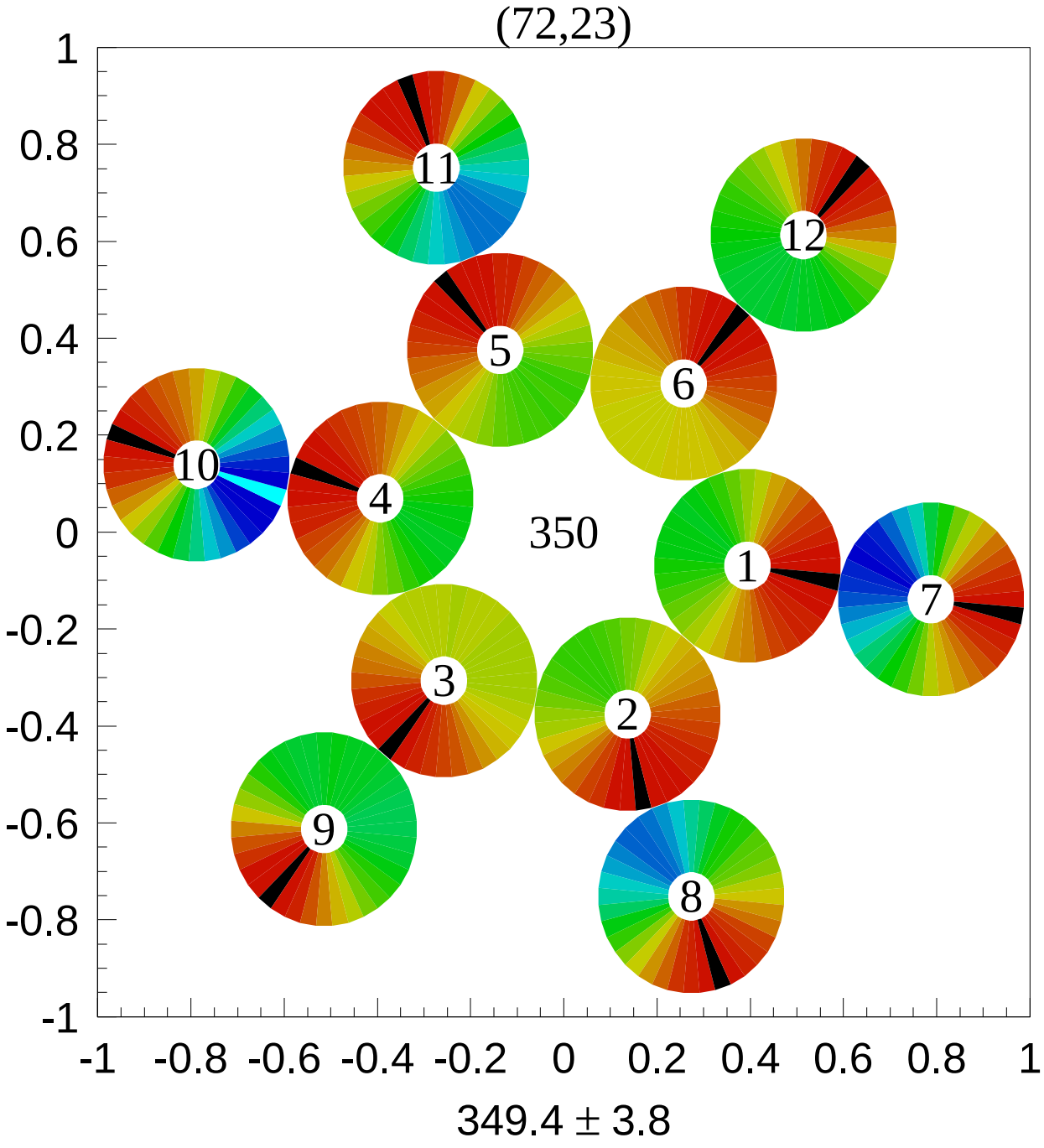

(72,21)
tilted LEDs
112 121 114 119 126 120
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 124 112 119 118 118
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

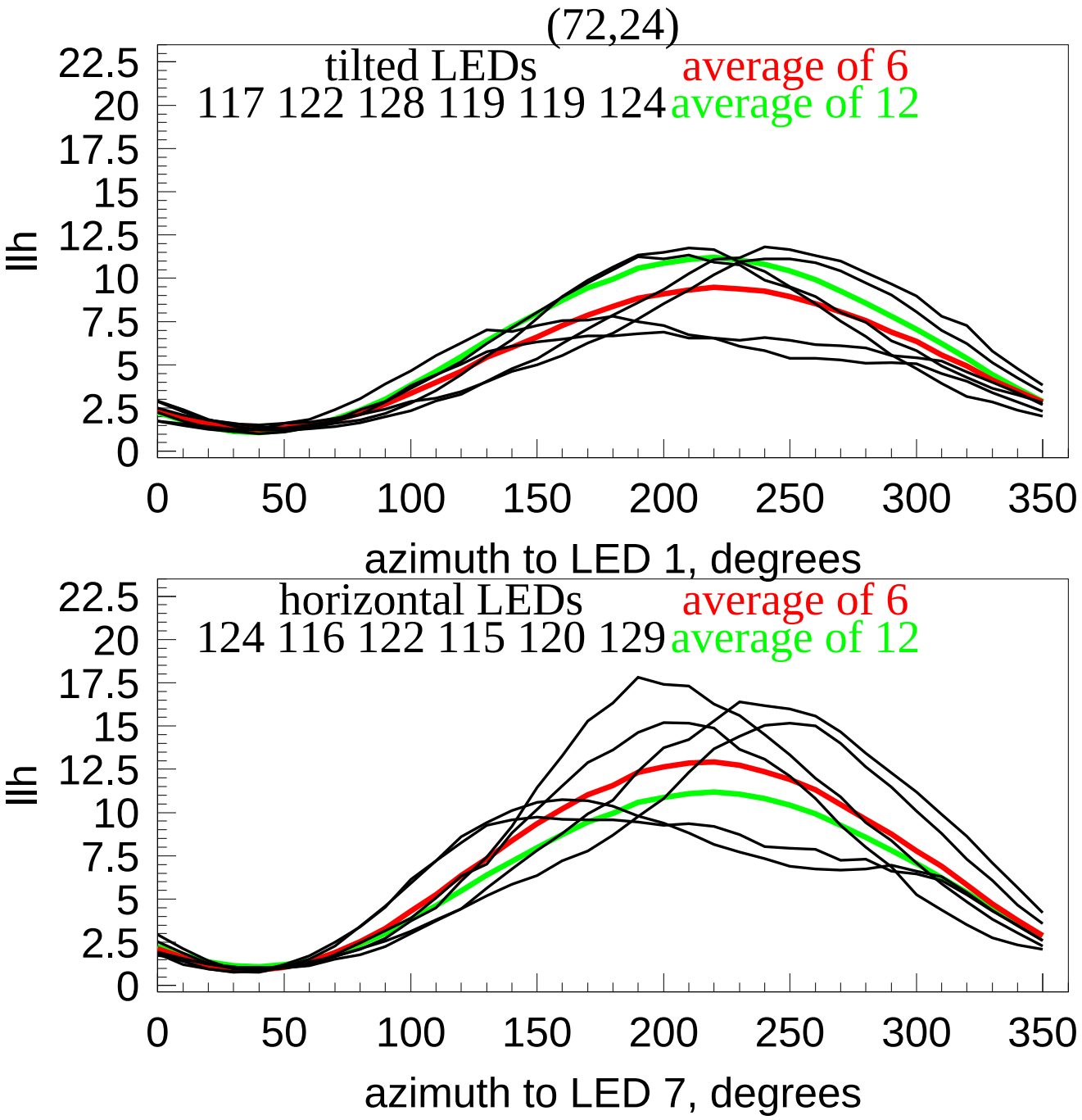

(72,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
86.7 ± 6.4

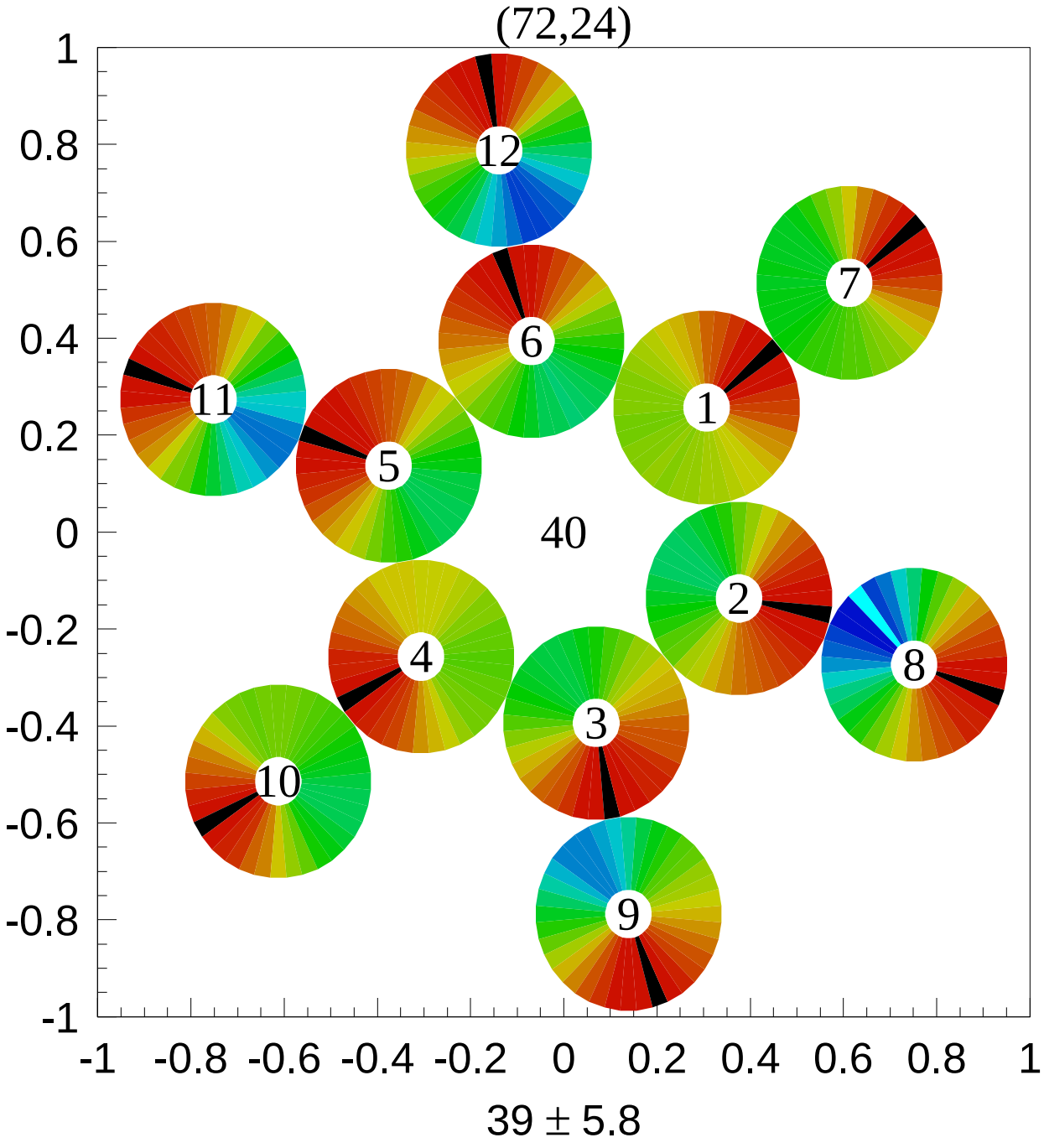

(72,22)
tilted LEDs
116 126 118 116 116 123
average of 6
average of 12
Ilh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
117 129 124 118 127 116
average of 6
average of 12
Ilh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

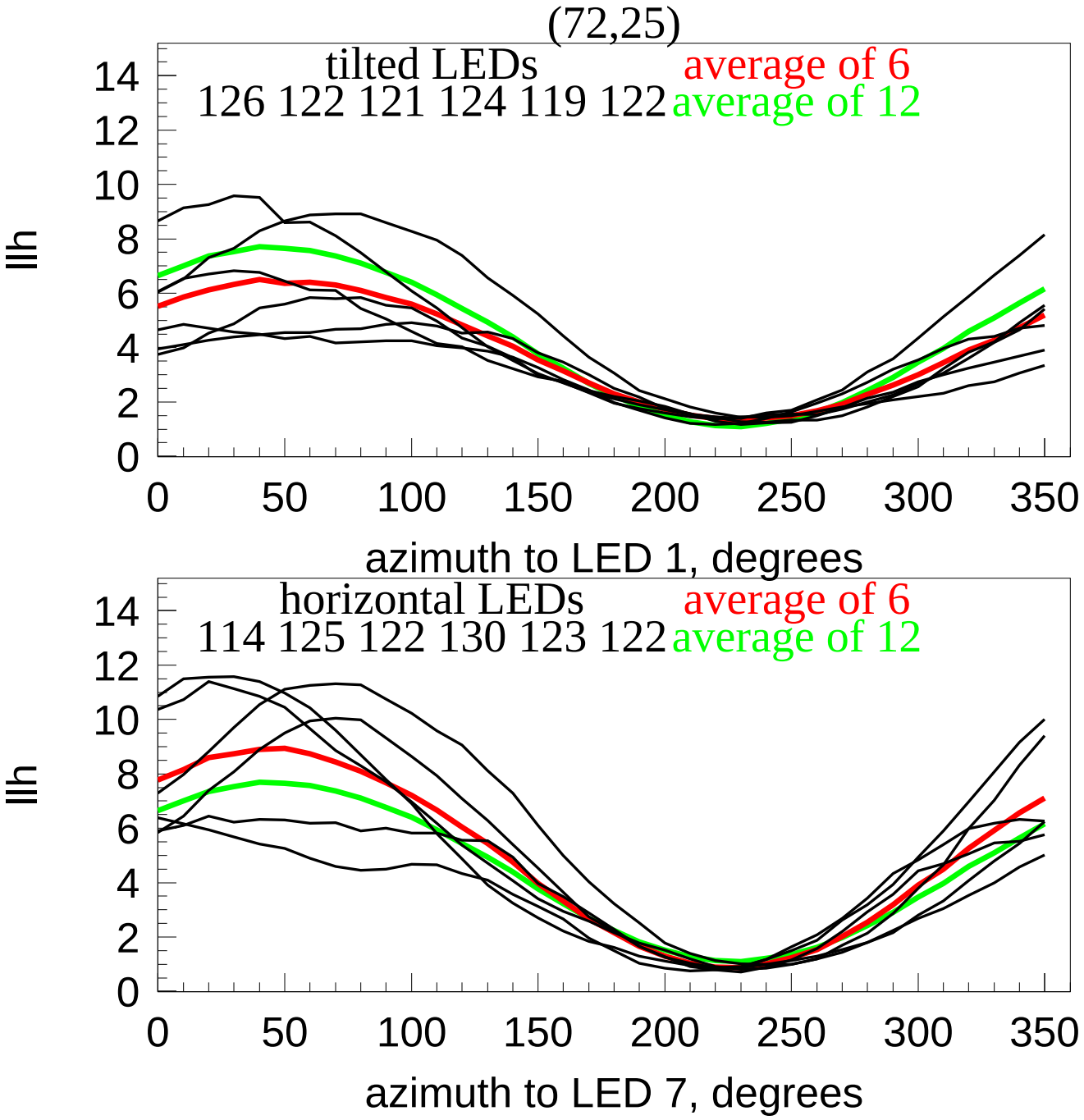

(72,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
76.5 ± 6.2

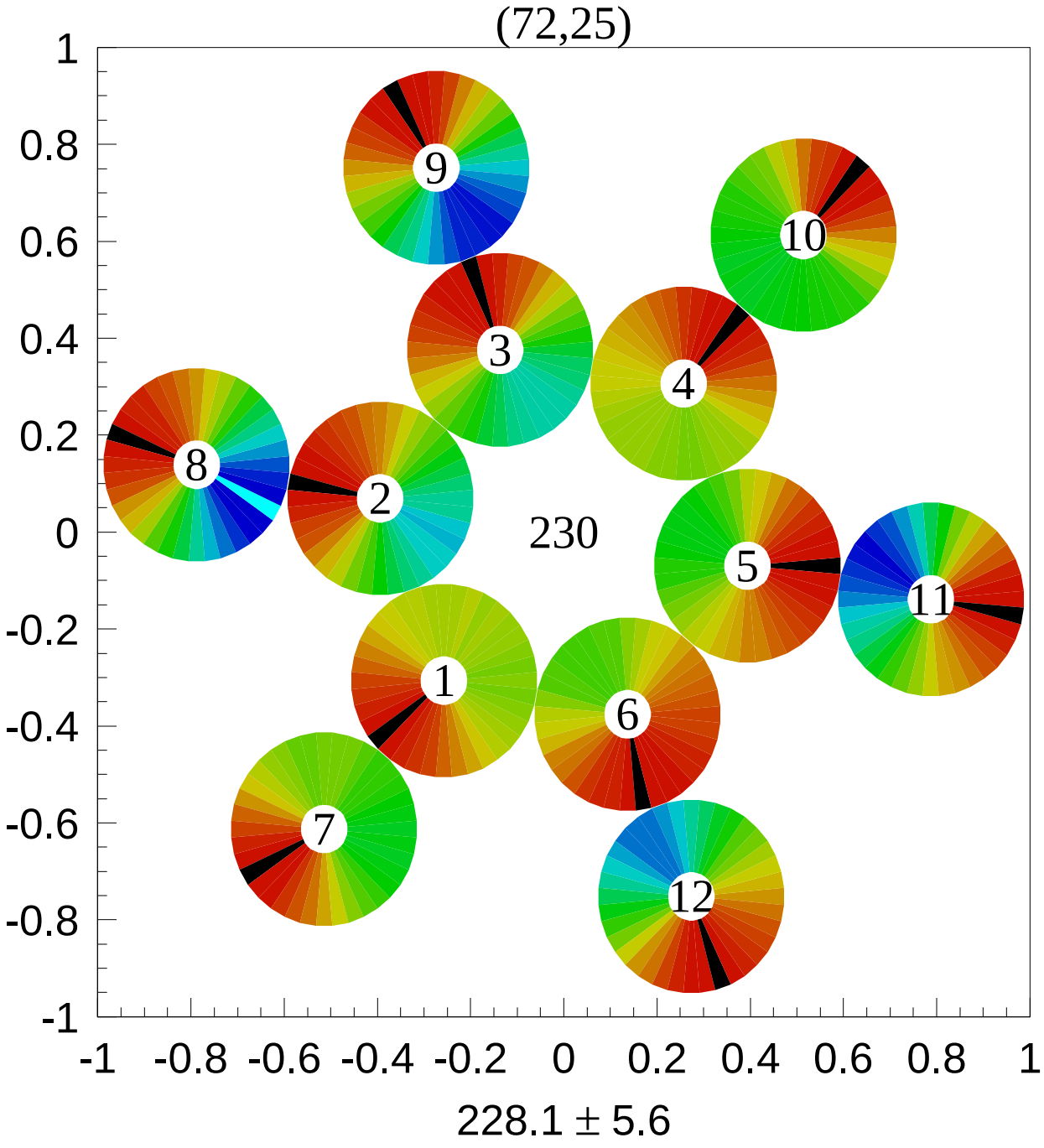

(72,23)
tilted LEDs
120 118 118 121 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 121 127 125 116 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

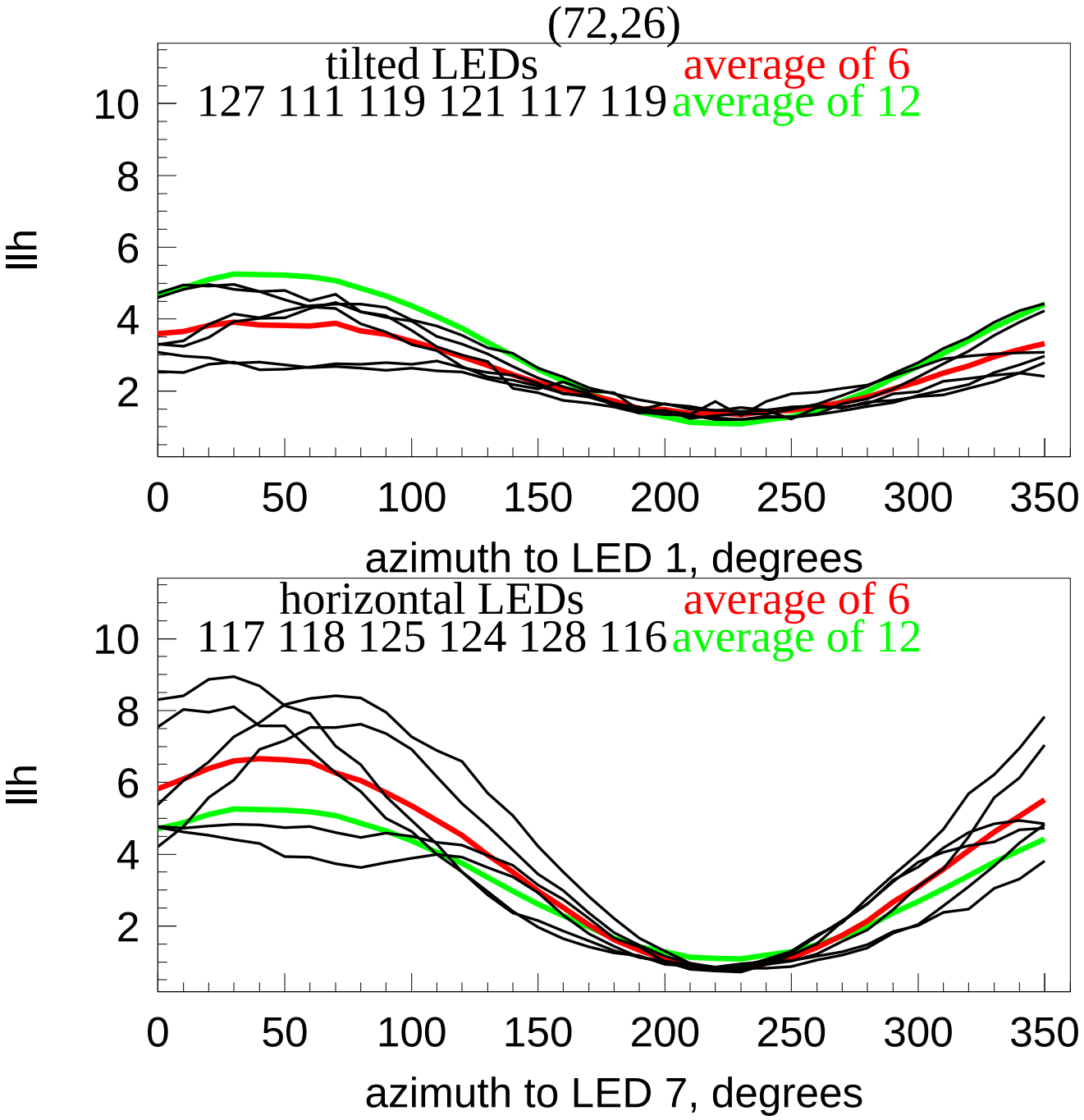

(72,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
349.4 ± 3.8

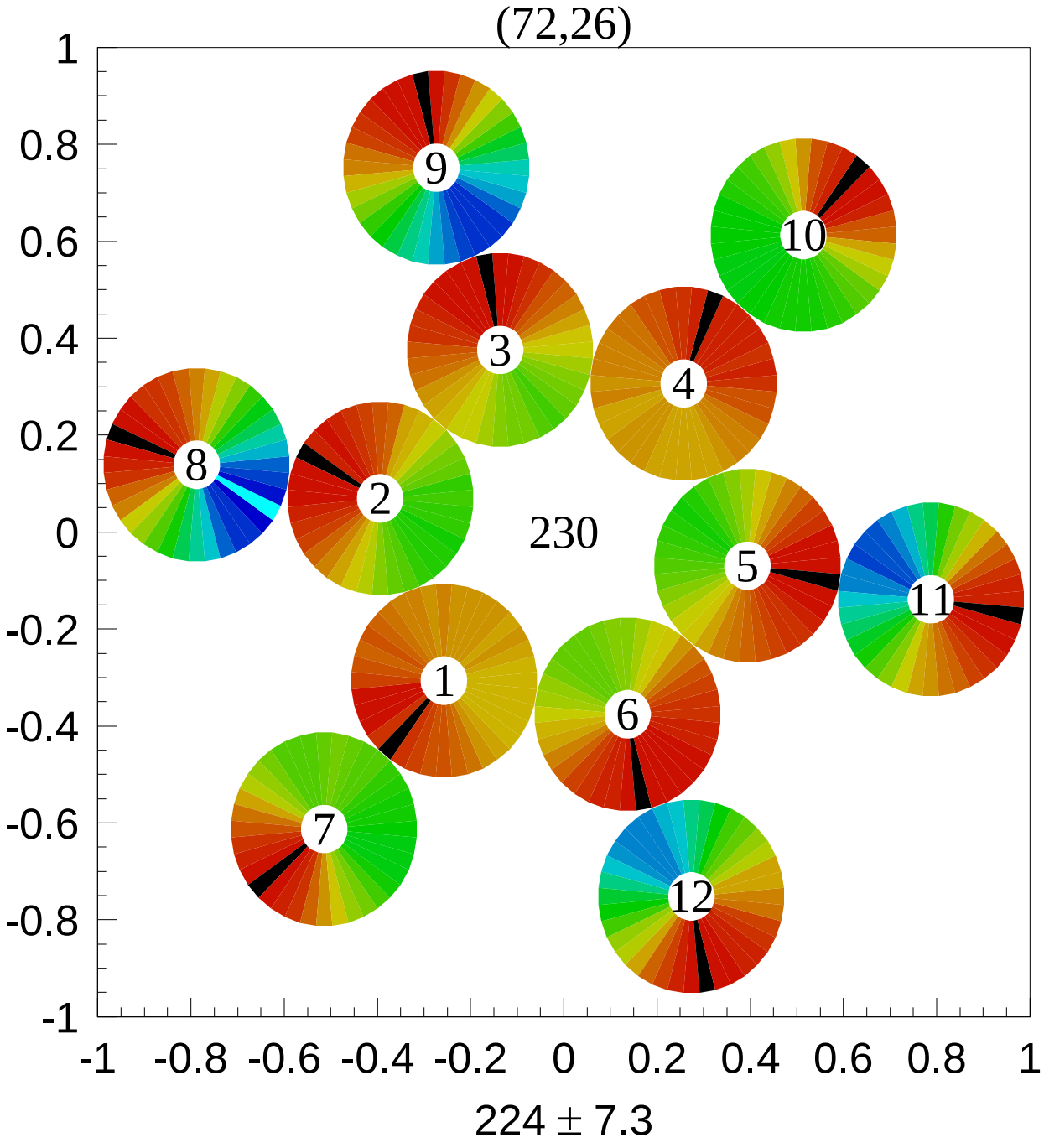

(72,24)
tilted LEDs
117 122 128 119 119 124
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 116 122 115 120 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

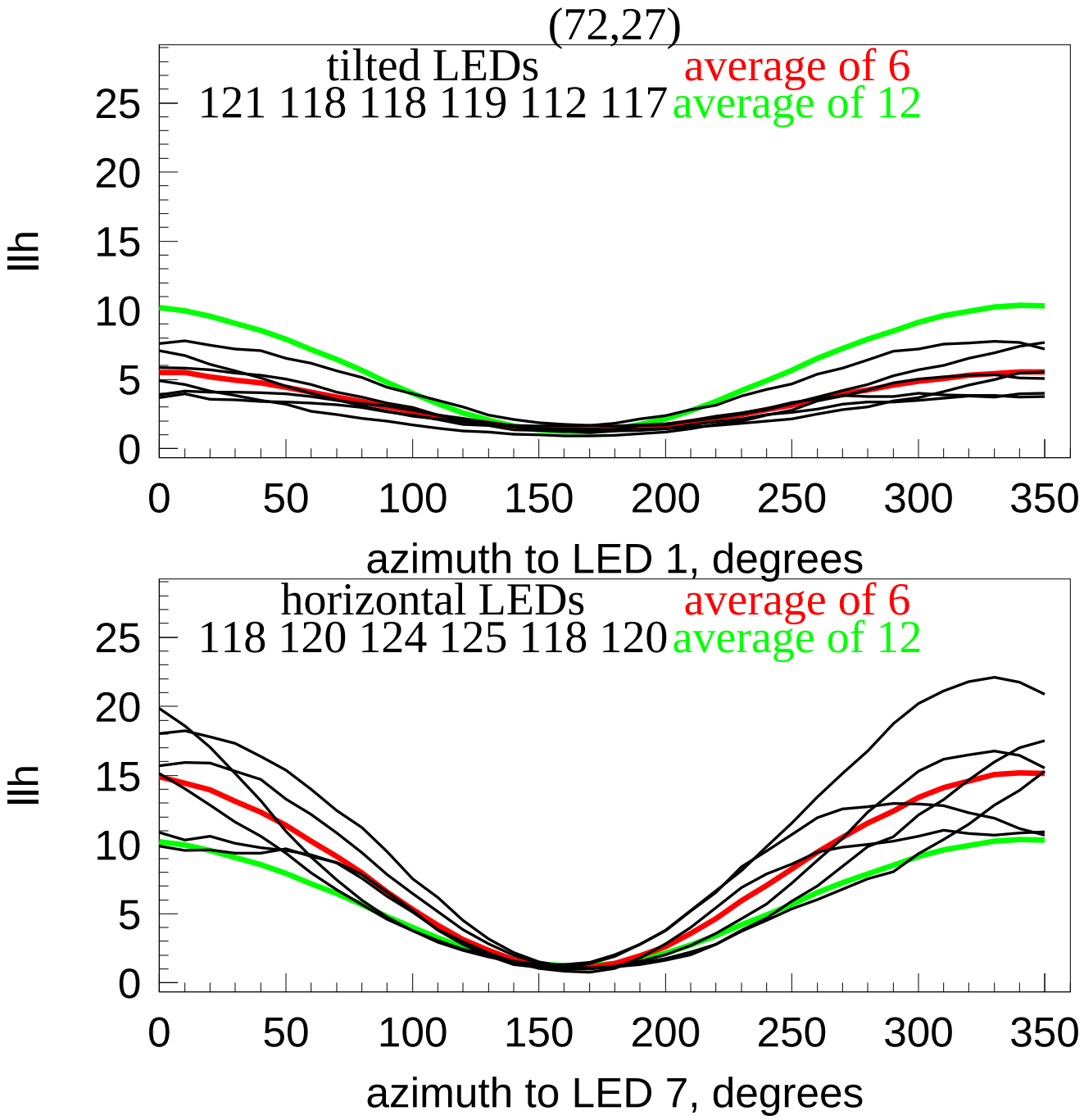

(72,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
39 ± 5.8

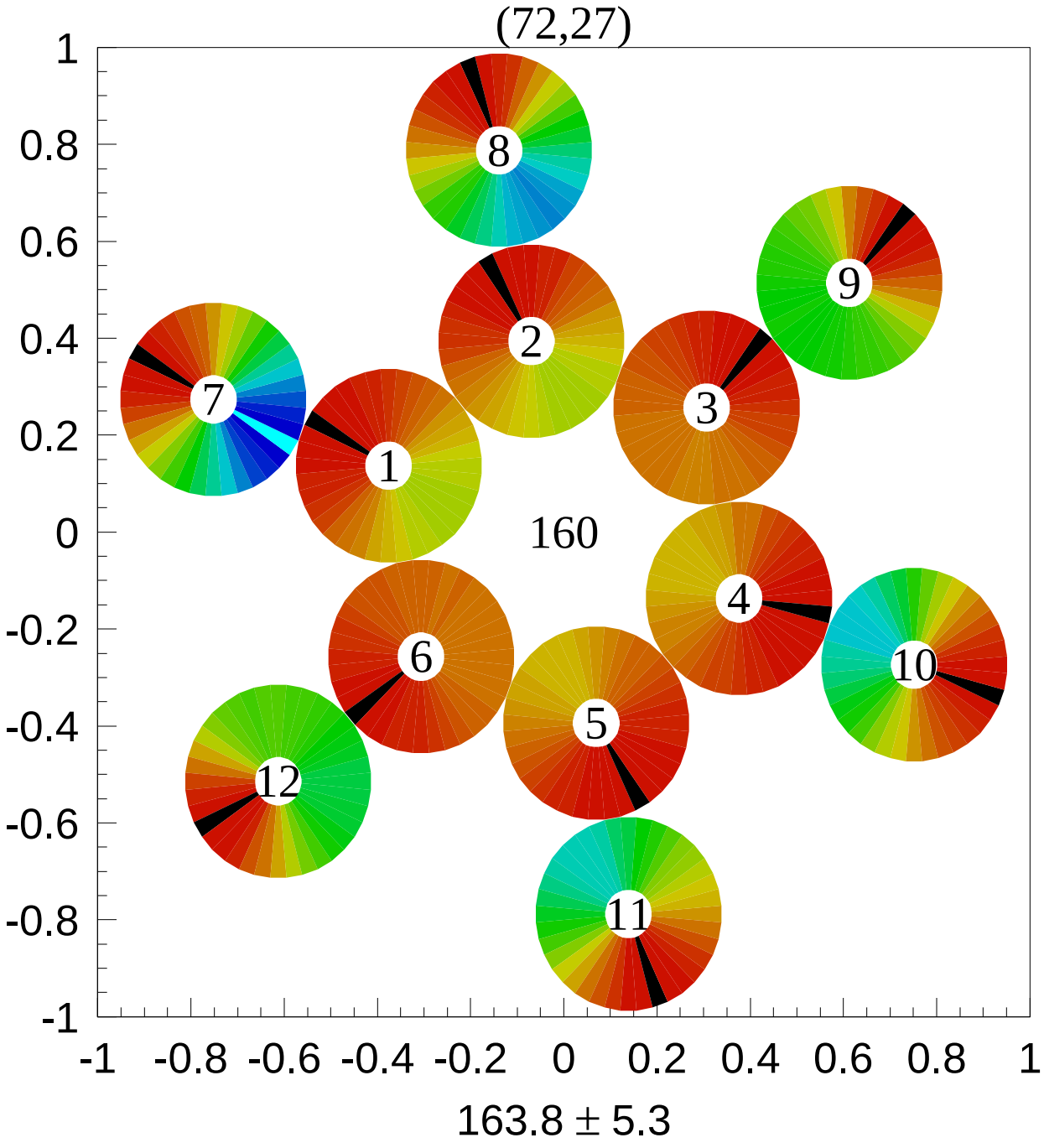

(72,25)
tilted LEDs
126 122 121 124 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
114 125 122 130 123 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

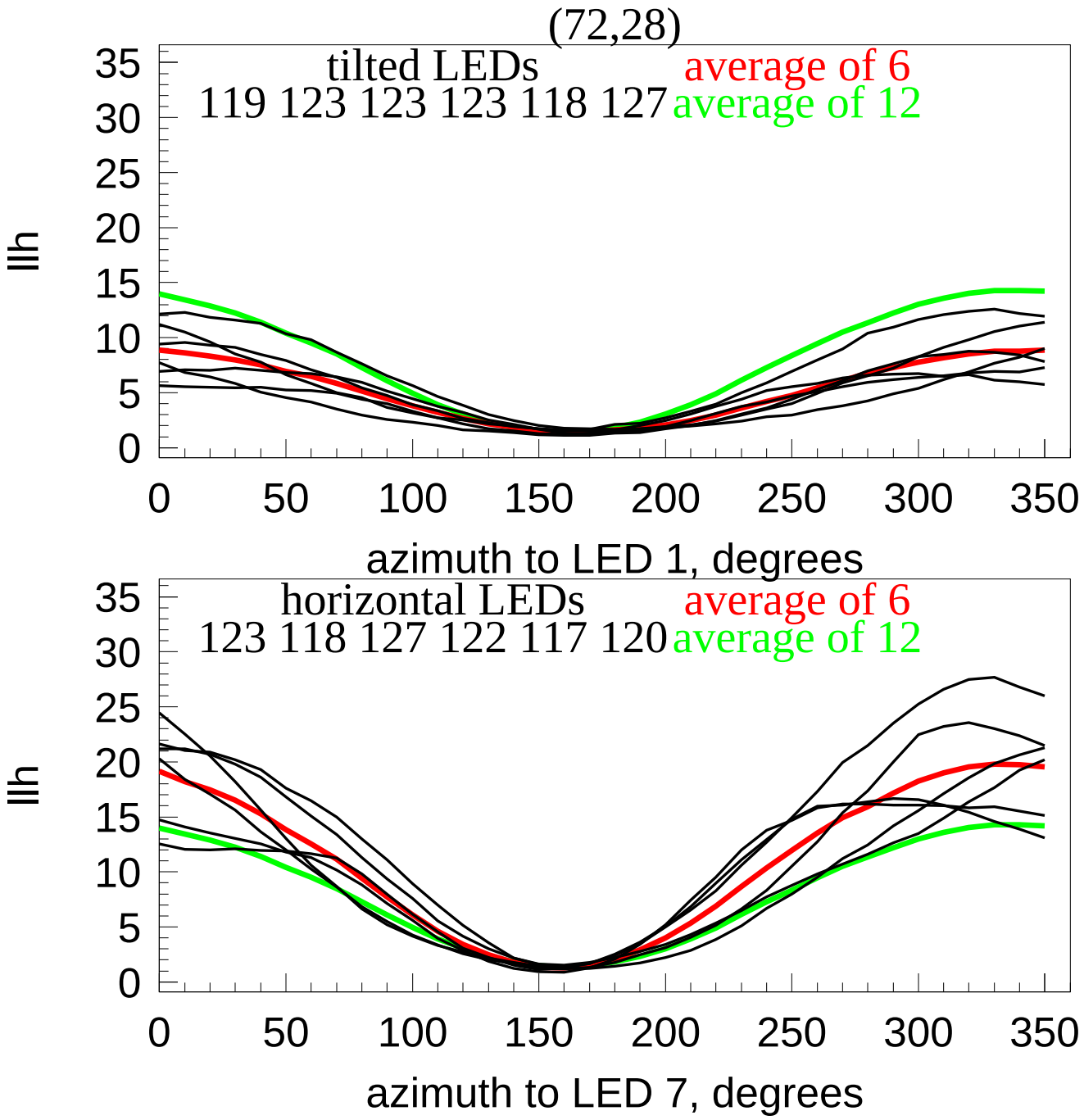

(72,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
228.1 ± 5.6

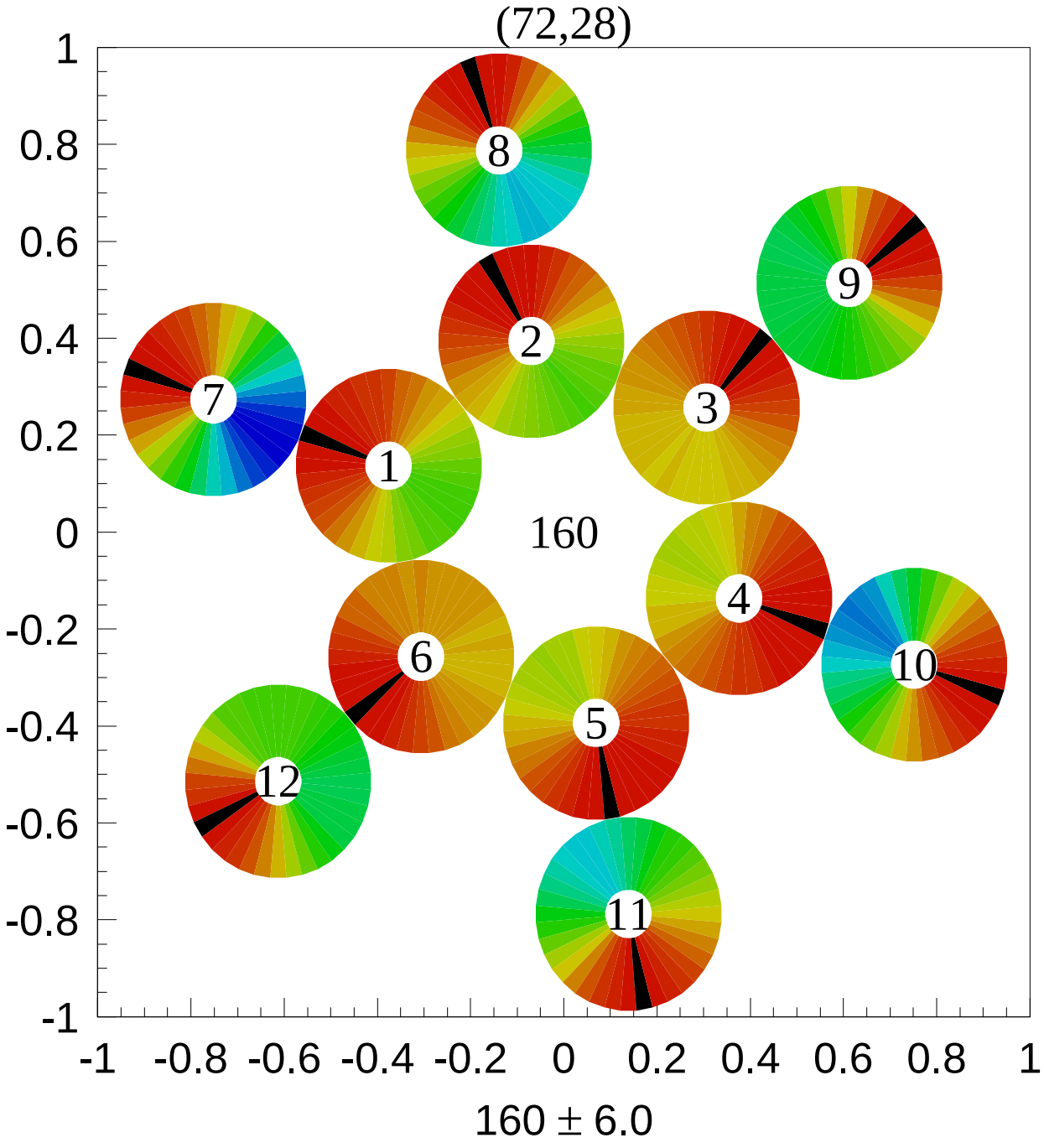

(72,26)
tilted LEDs
127 111 119 121 117 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 118 125 124 128 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

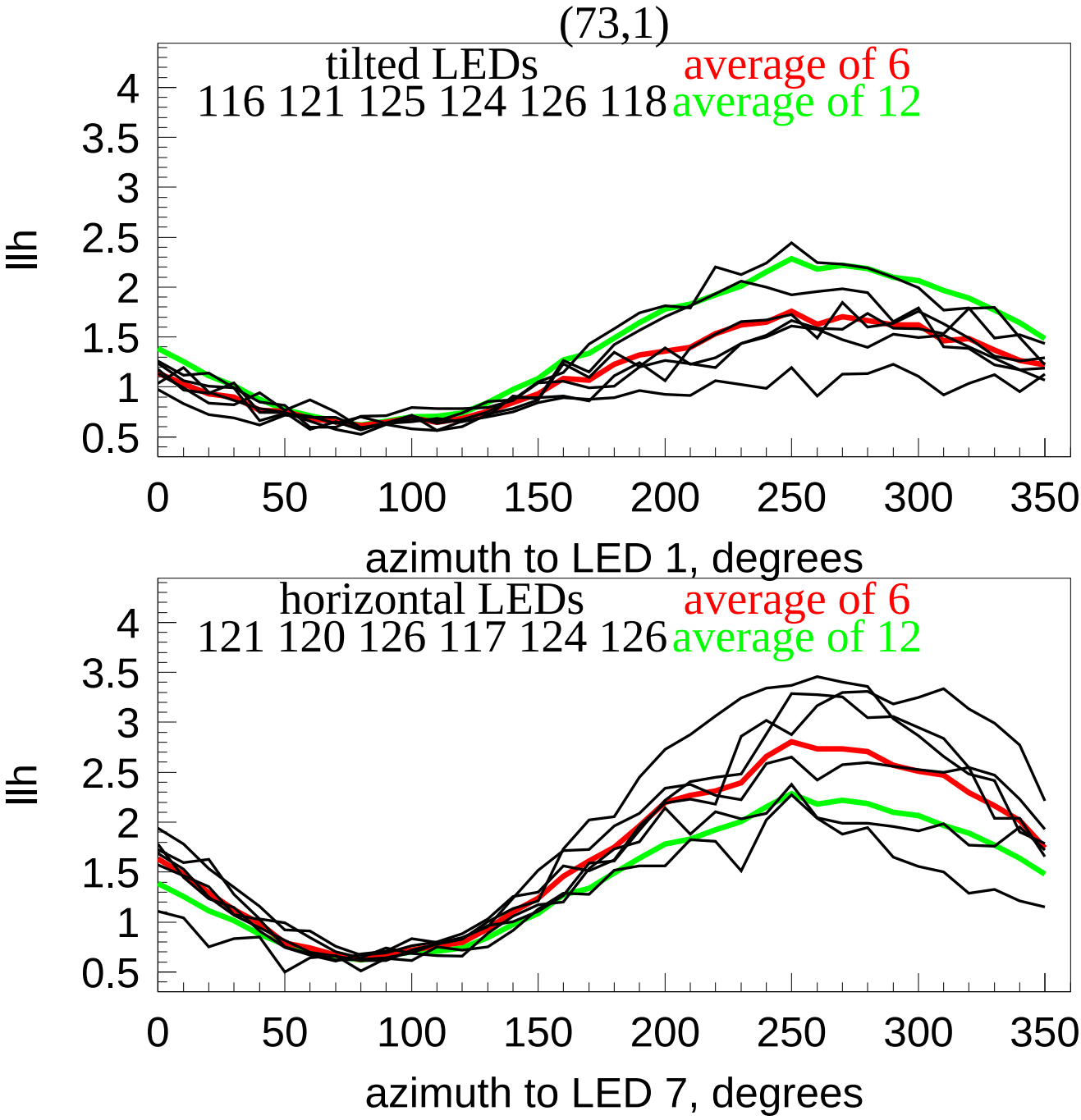

(72,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
224 ± 7.3

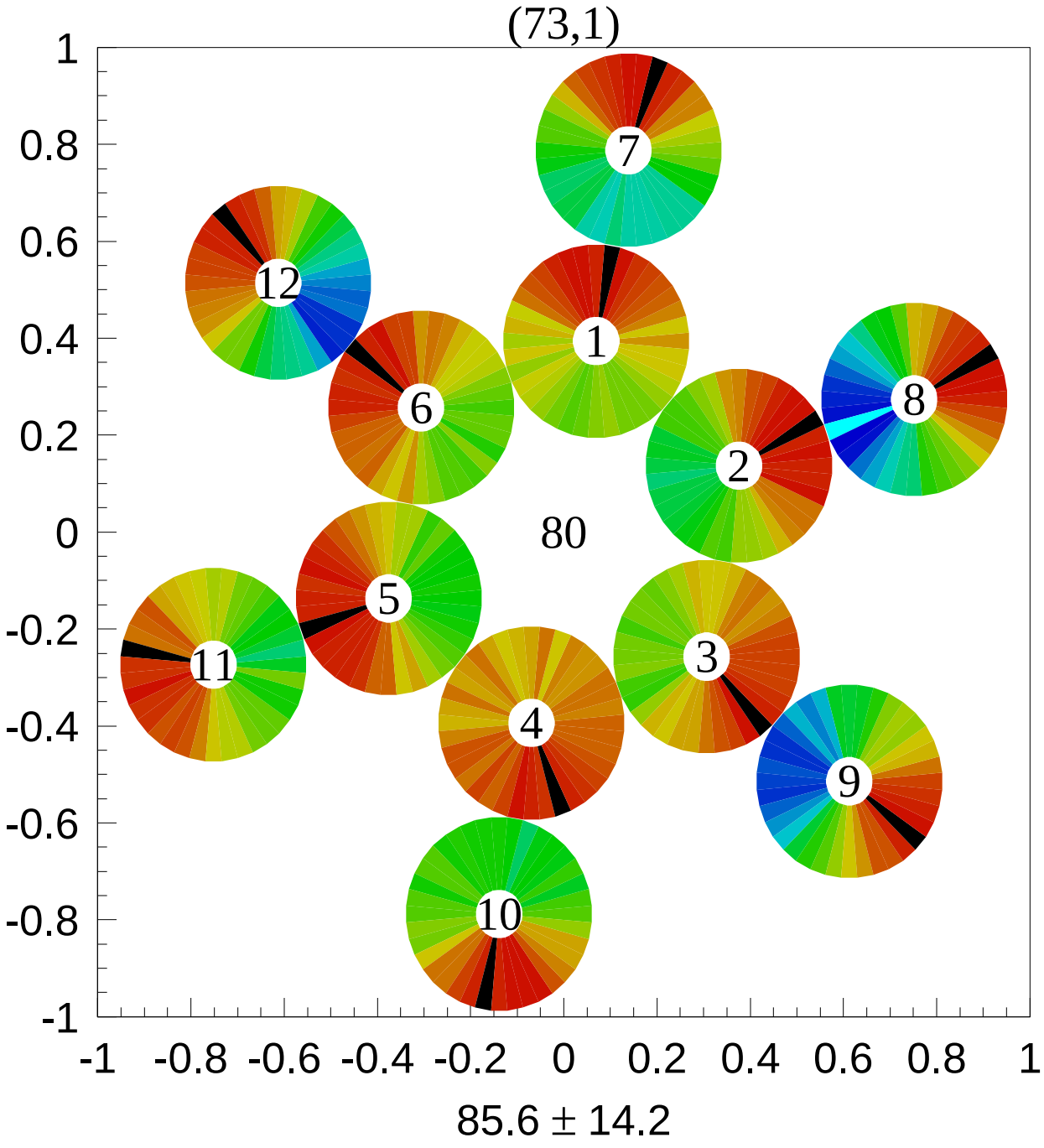

(72,27)
tilted LEDs
121 118 118 119 112 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 124 125 118 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

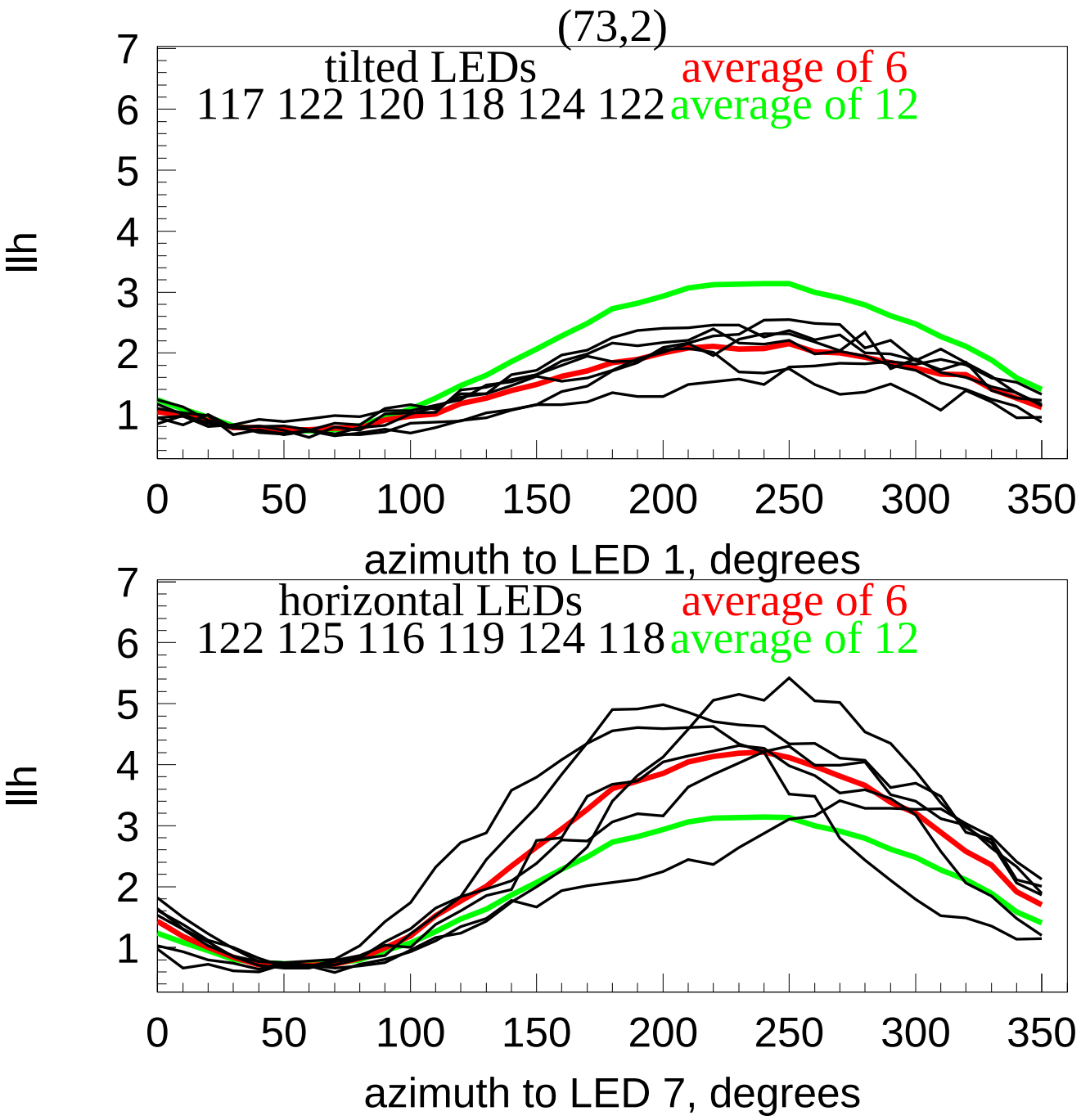

(72,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
163.8 ± 5.3

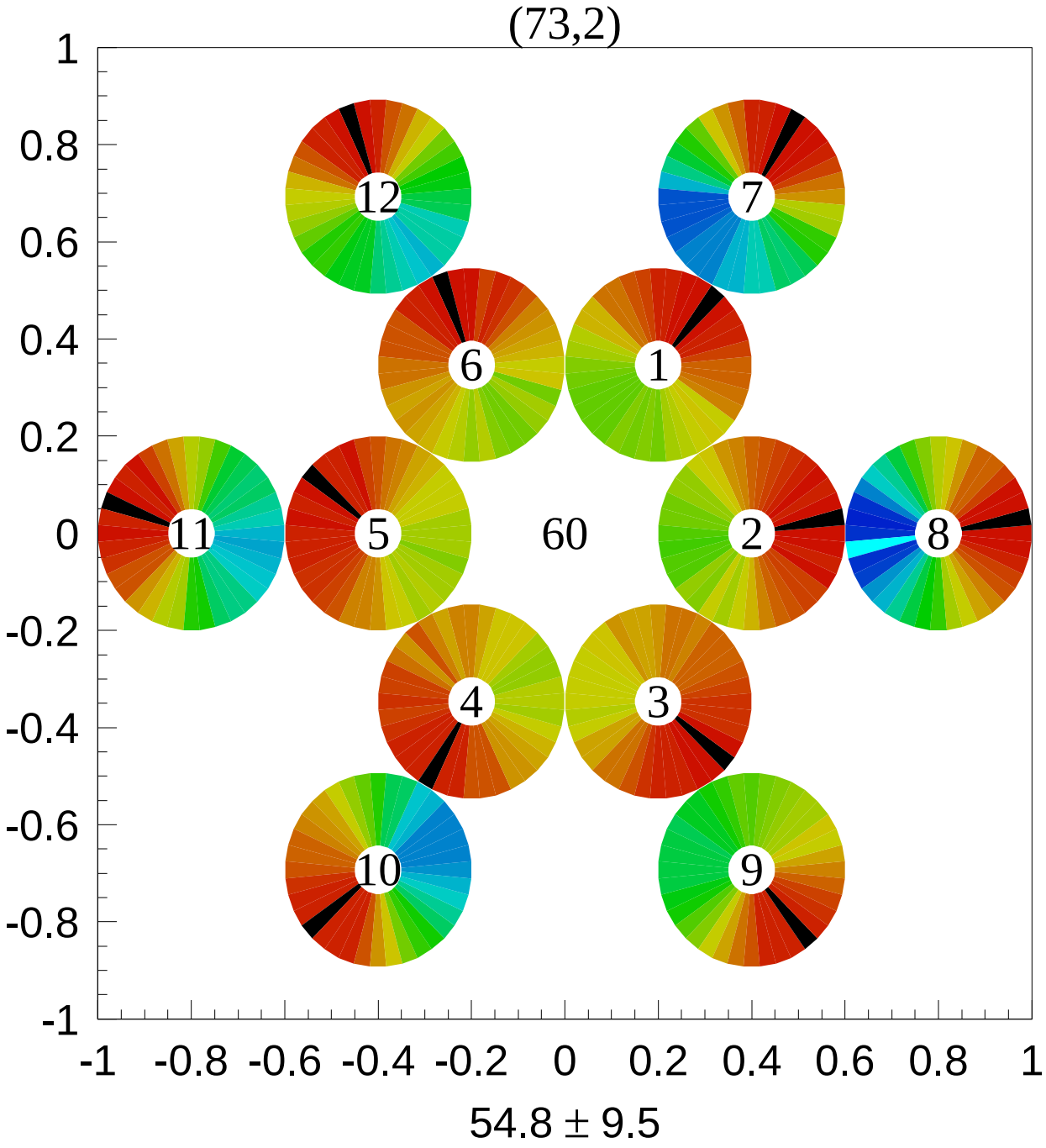

(72,28)
tilted LEDs
119 123 123 123 118 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 127 122 117 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

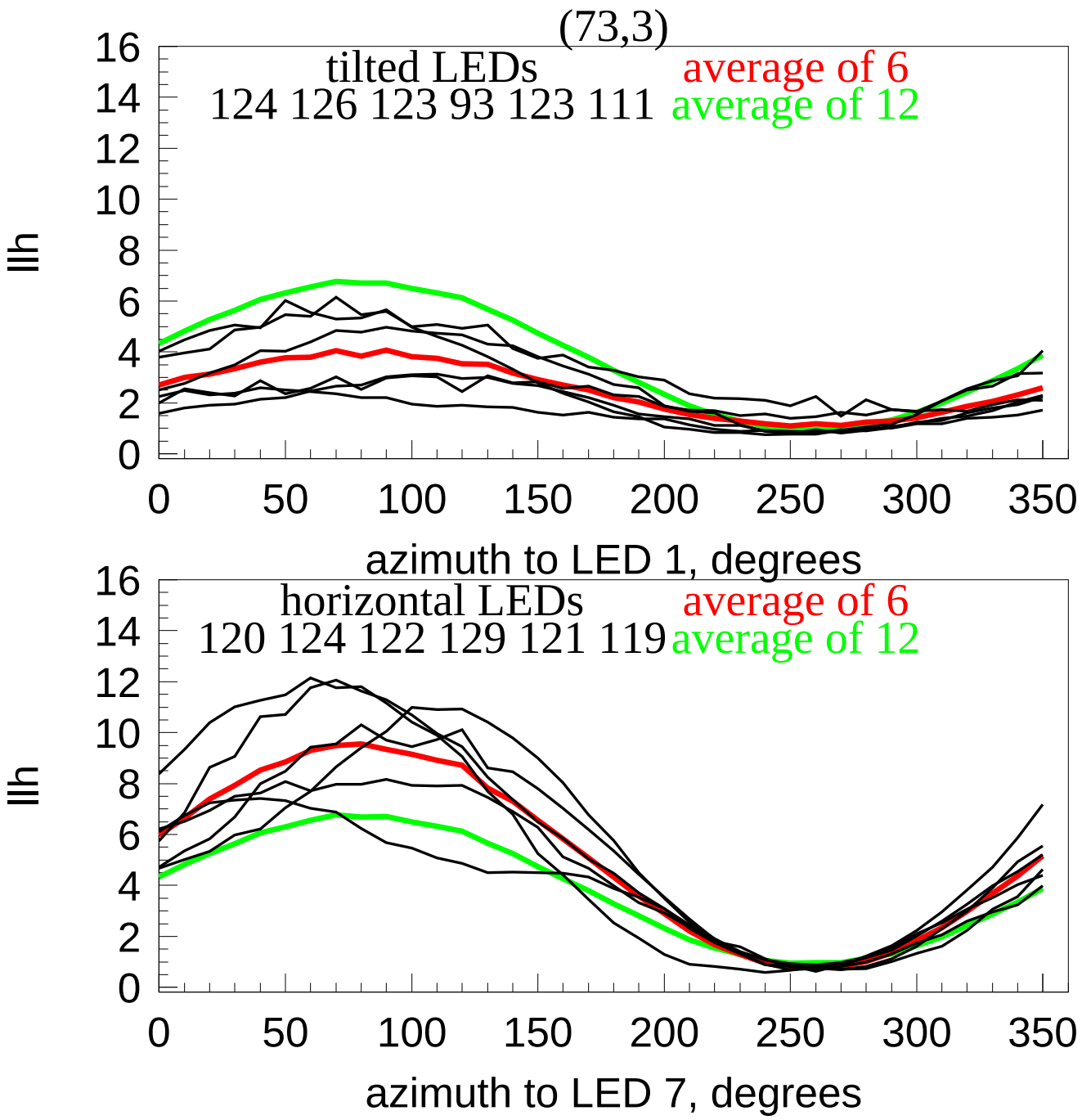

(72,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
160 ± 6.0
160
1
2
3
4
5
6
7
8
9
10
11
12

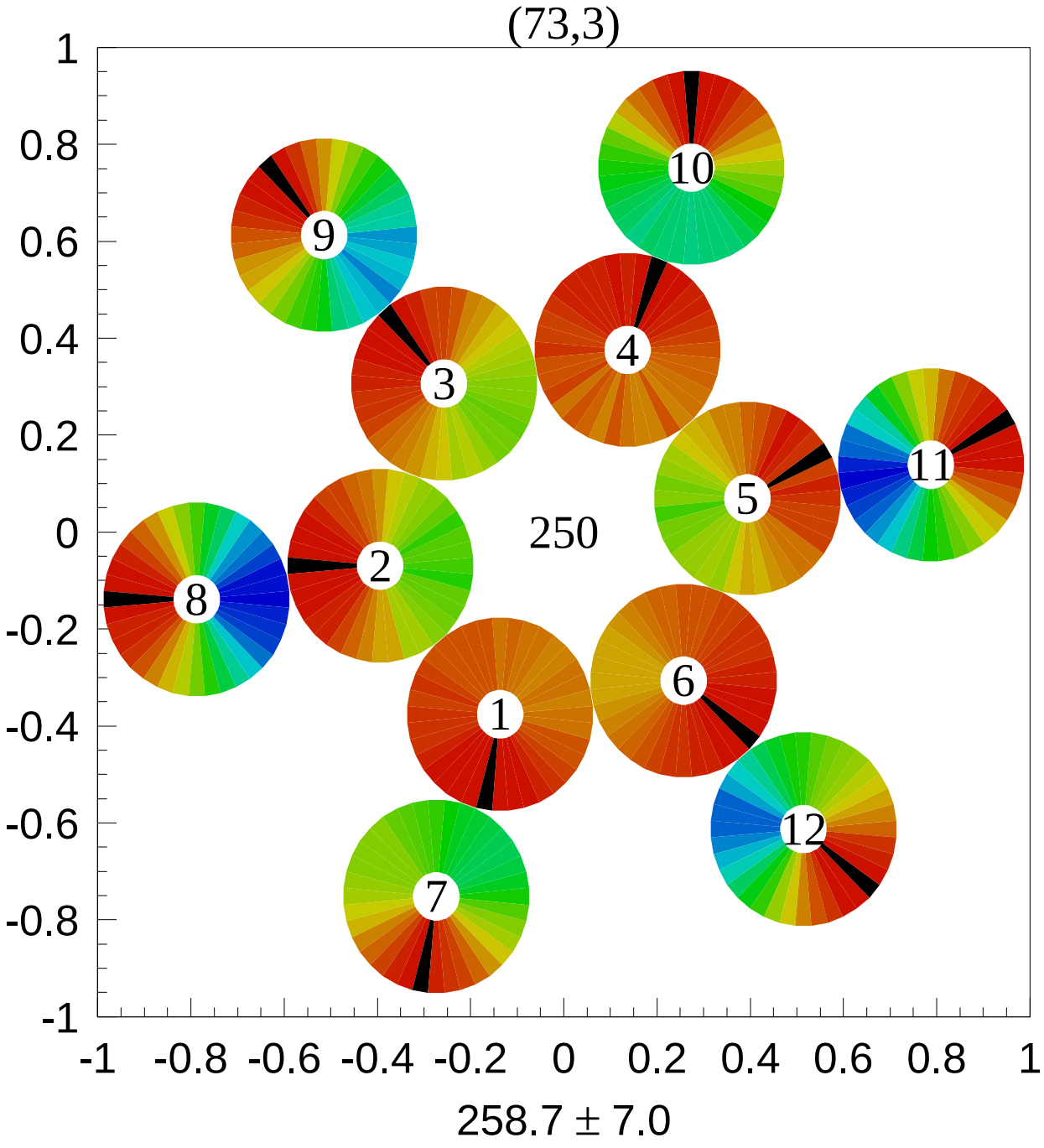

(73,1)
tilted LEDs
116 121 125 124 126 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 126 117 124 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

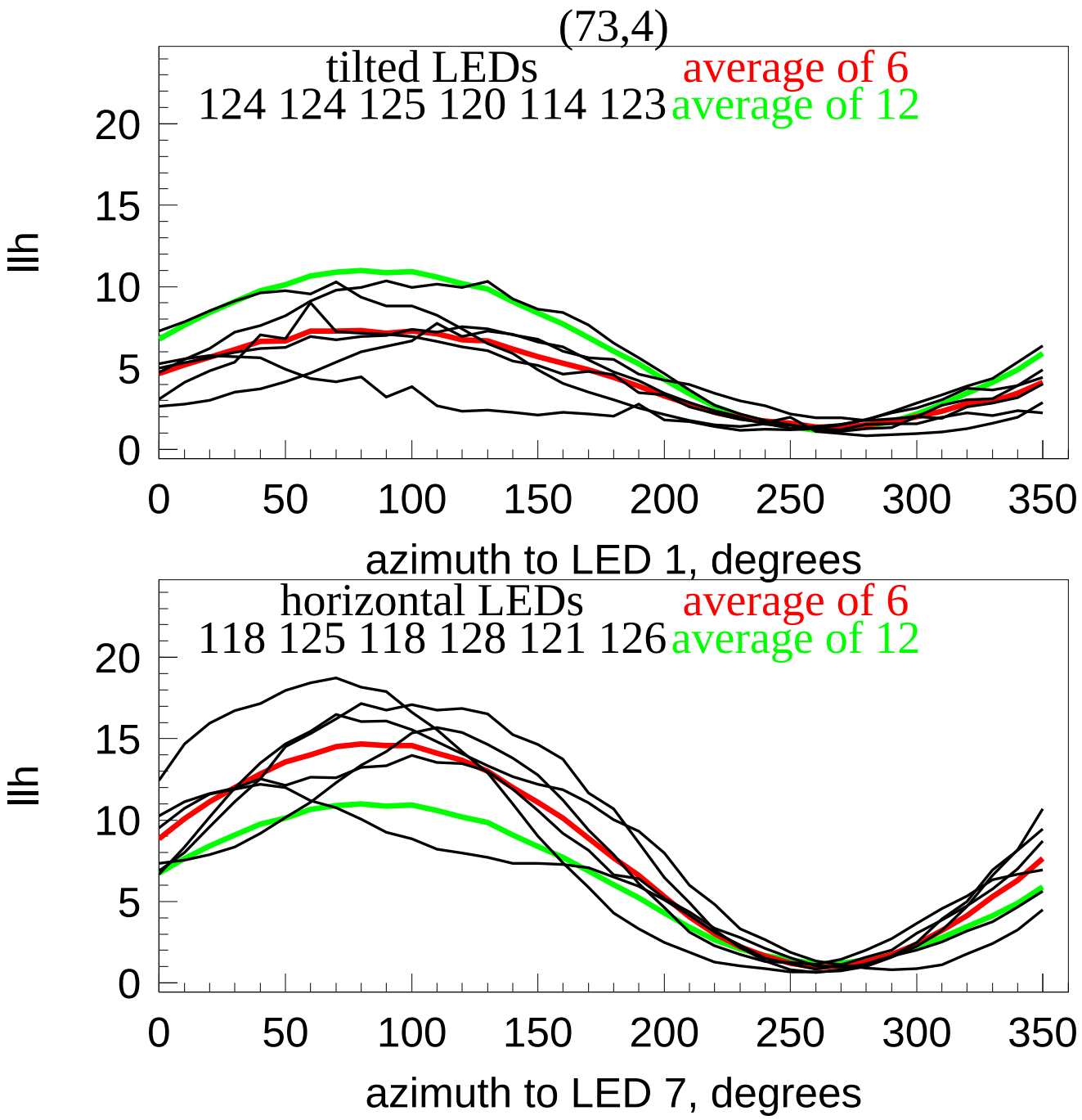

(73,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
85.6 ± 14.2

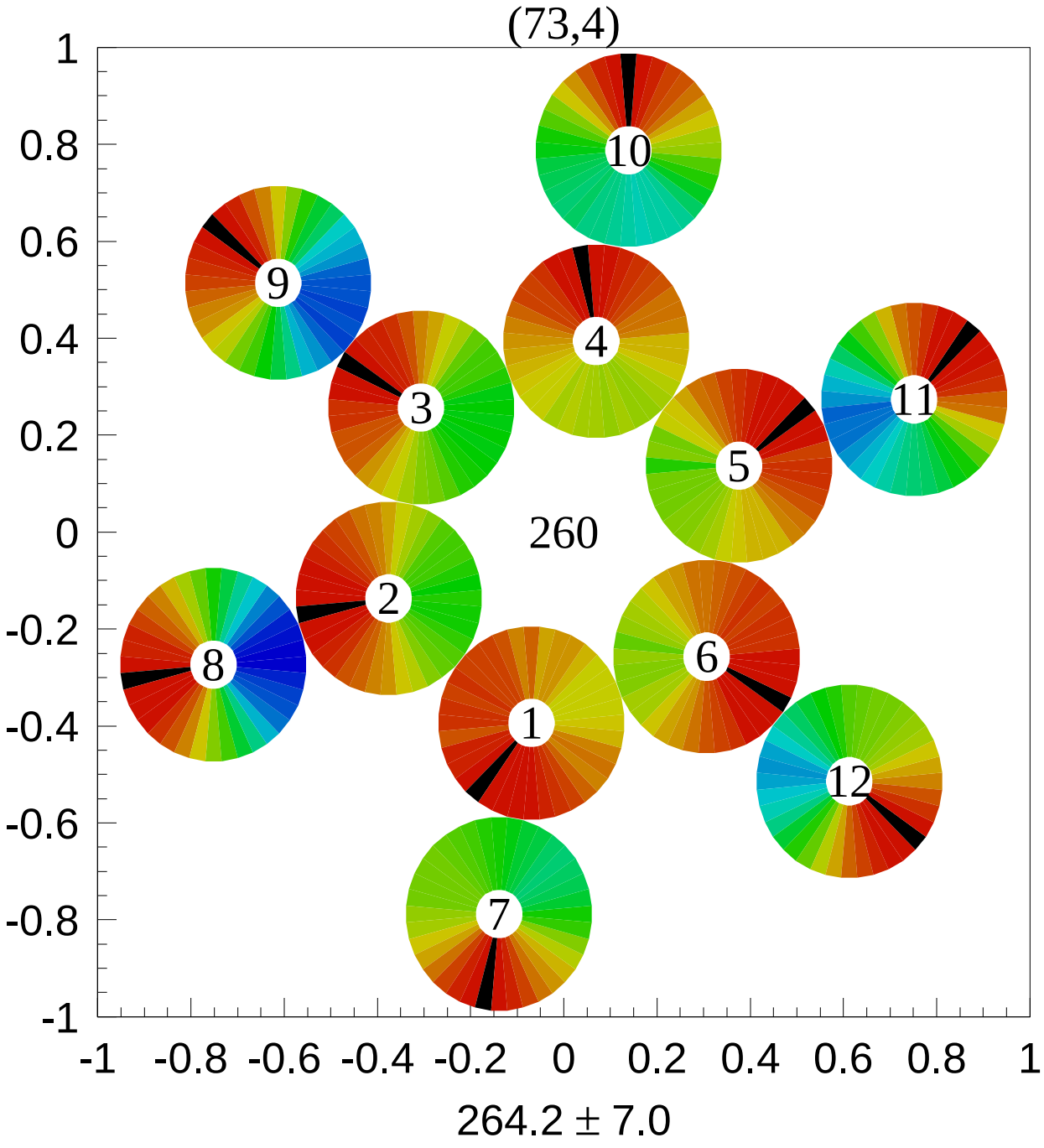

(73,2)
tilted LEDs
117 122 120 118 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 116 119 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

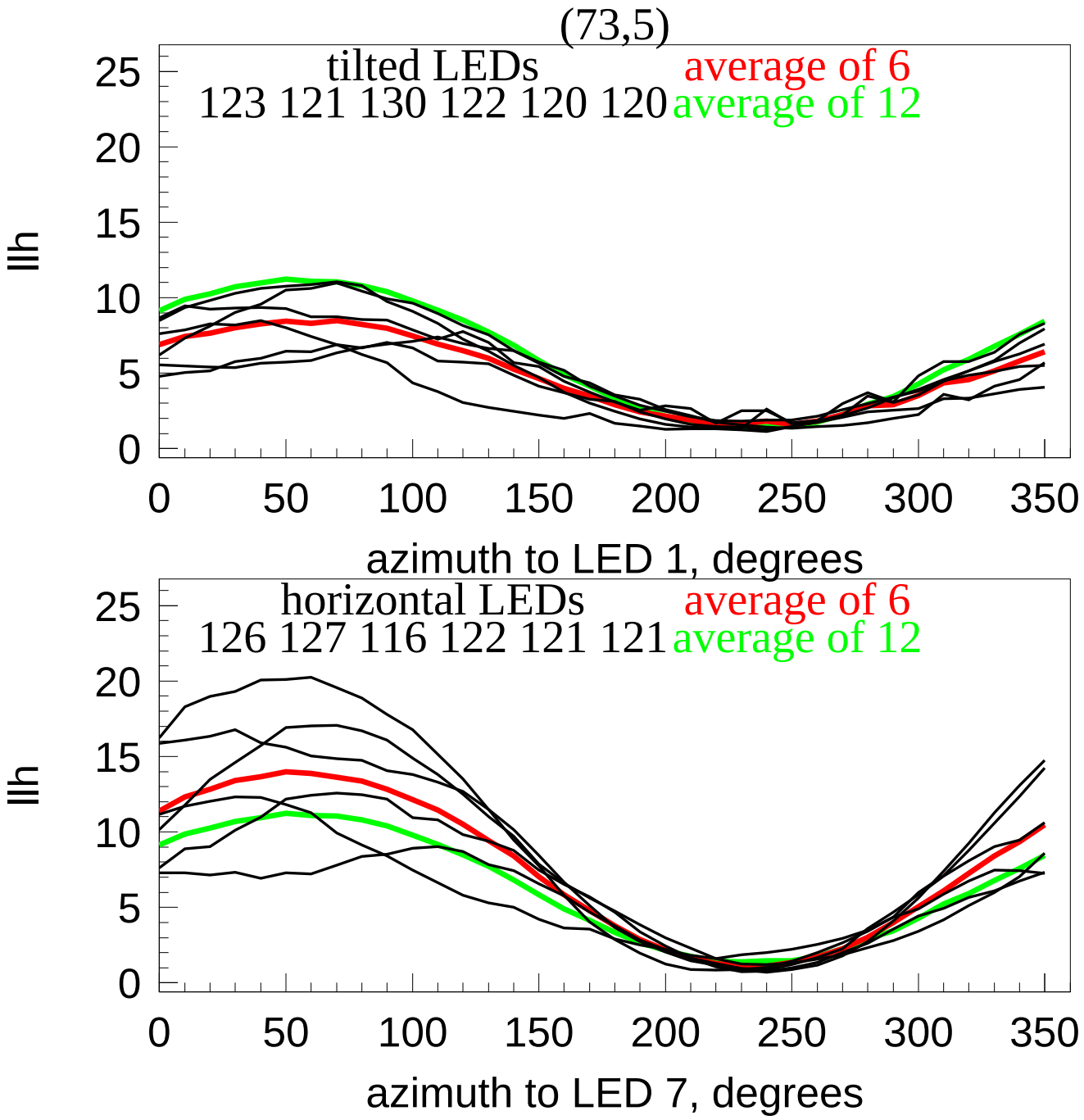

(73,2)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
54.8 ± 9.5

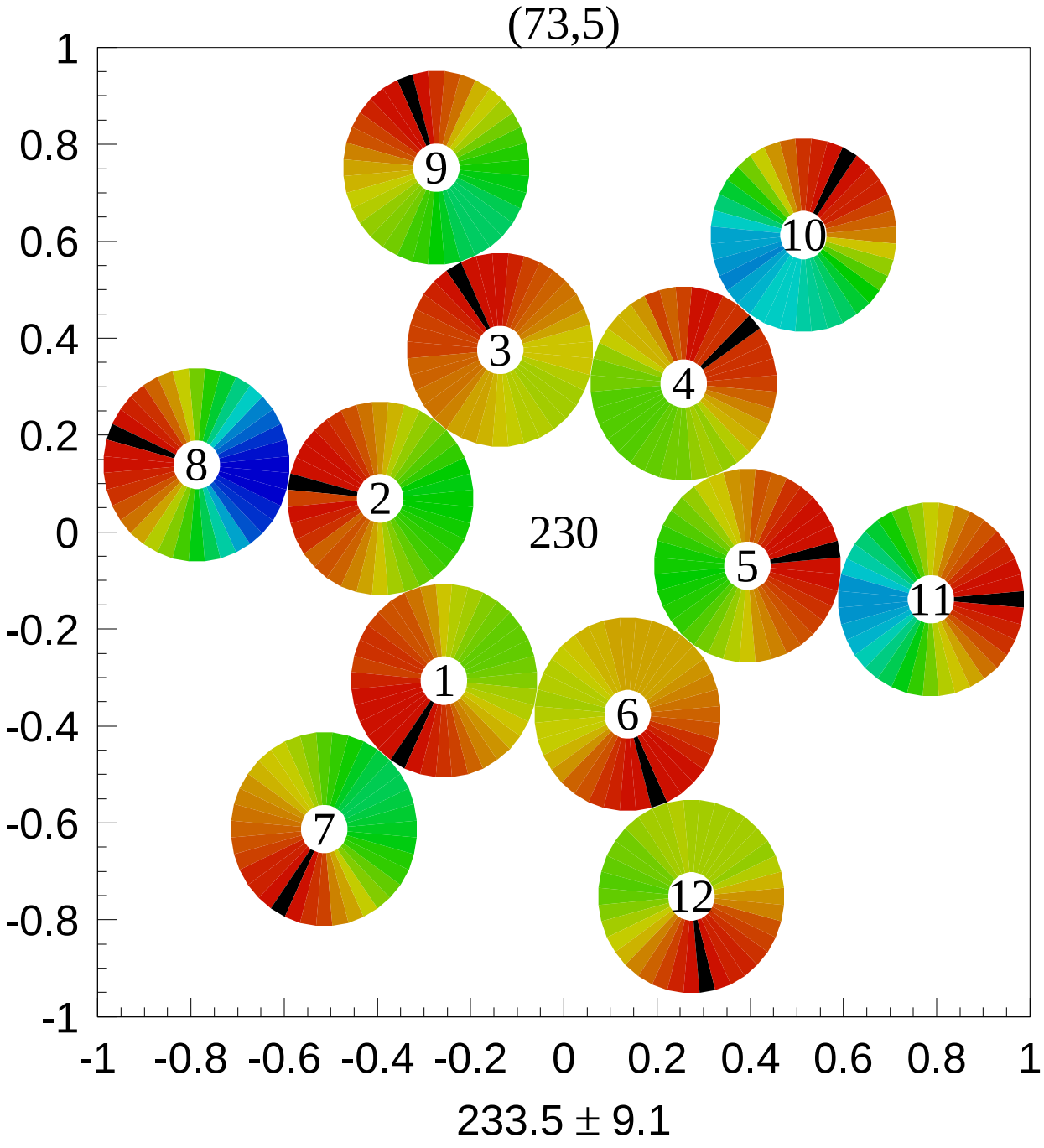

(73,3)
tilted LEDs
124 126 123 93 123 111
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 124 122 129 121 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

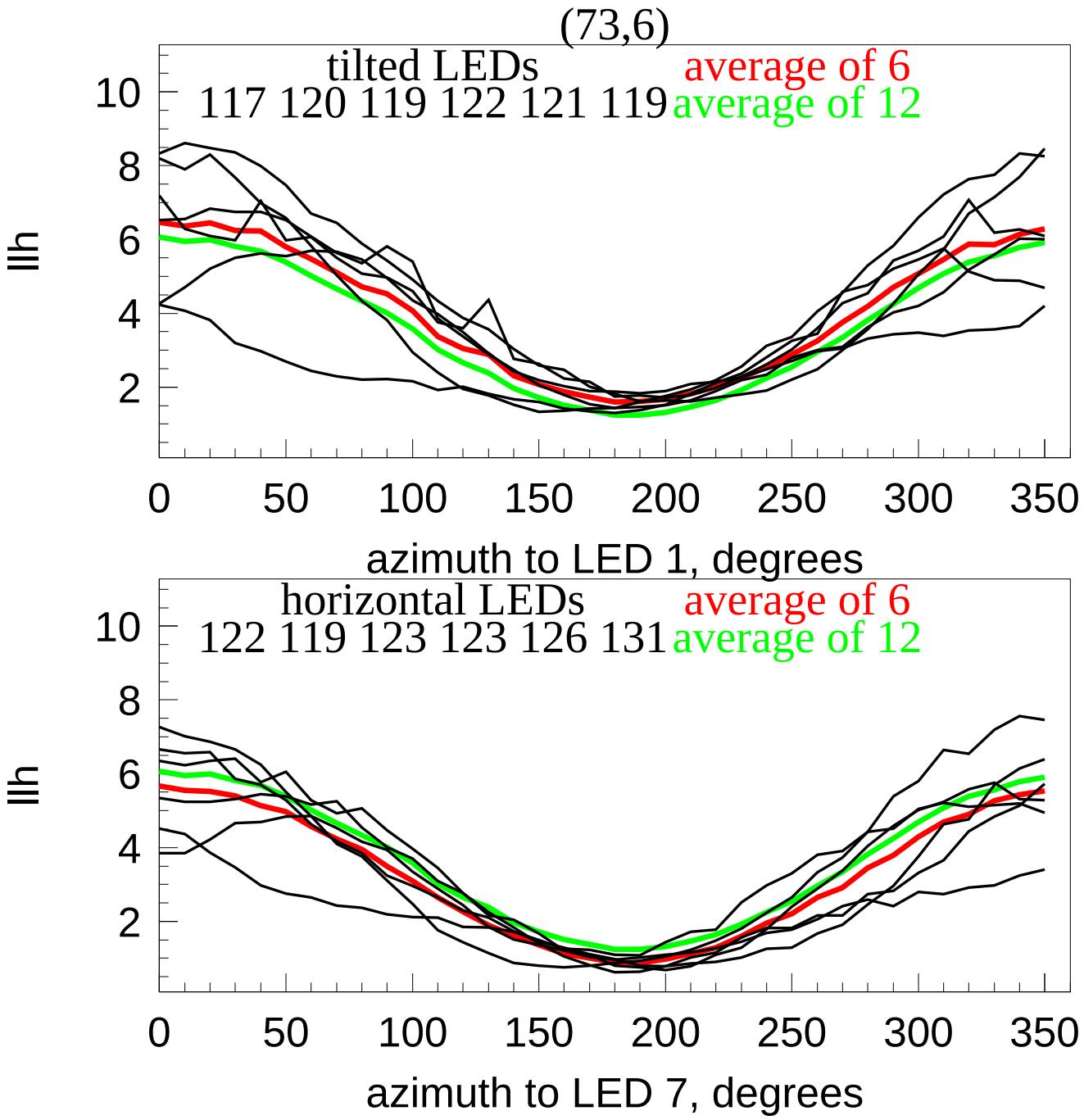

(73,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
258.7 ± 7.0

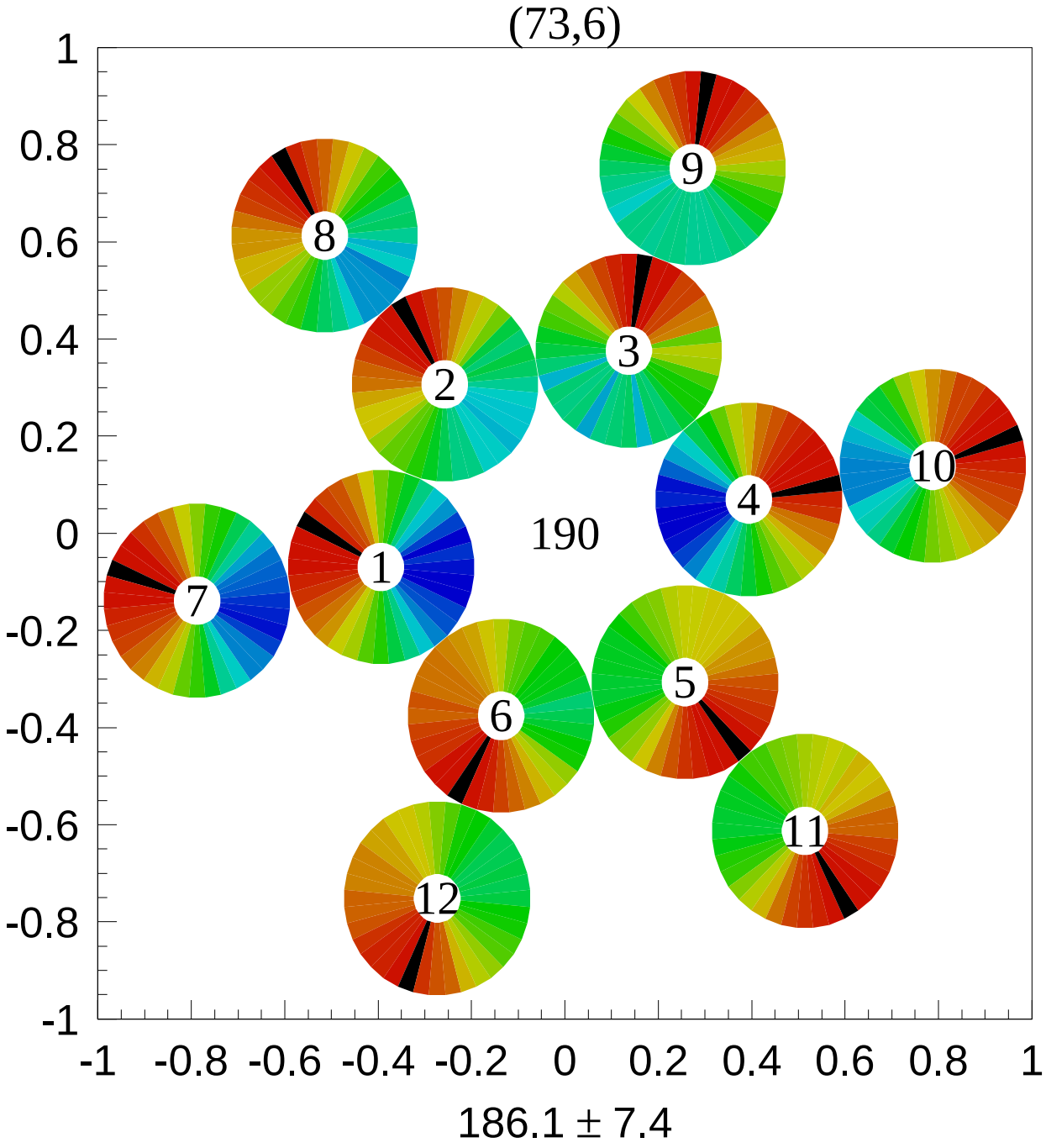

(73,4)
tilted LEDs
124 124 125 120 114 123
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 125 118 128 121 126
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

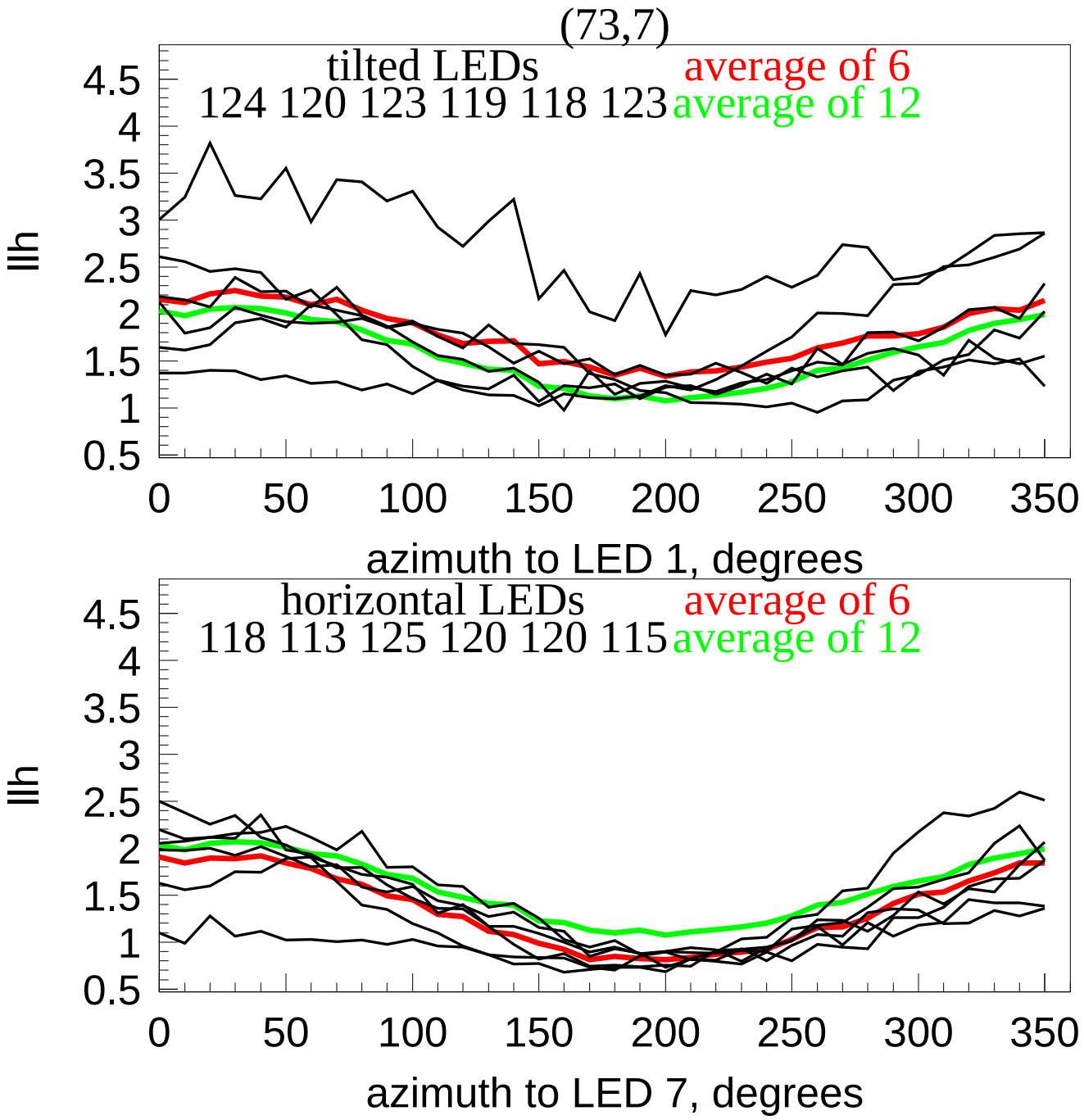

(73,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
264.2 ± 7.0

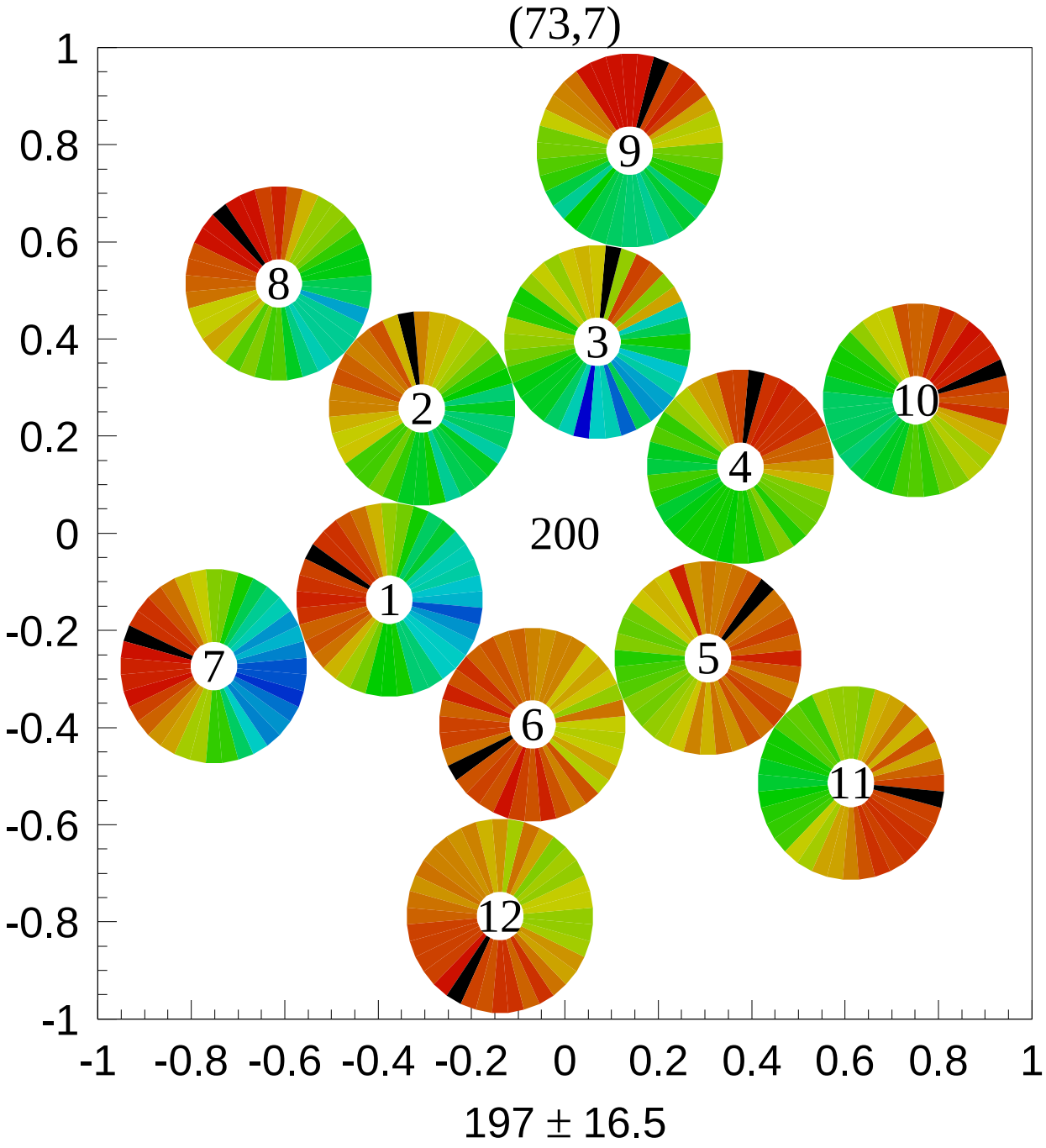

(73,5)
tilted LEDs
123 121 130 122 120 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 127 116 122 121 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

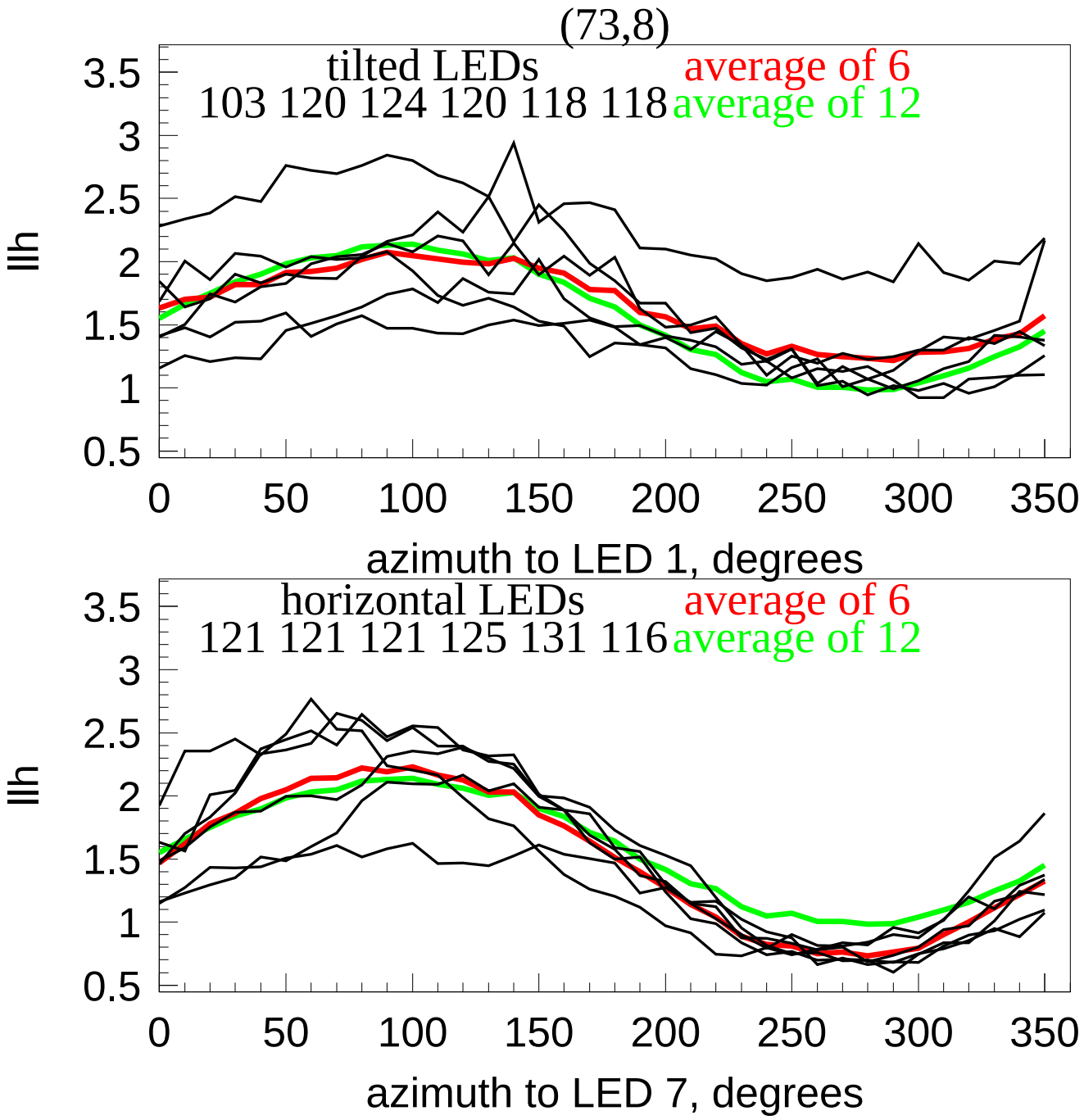

(73,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
233.5 ± 9.1

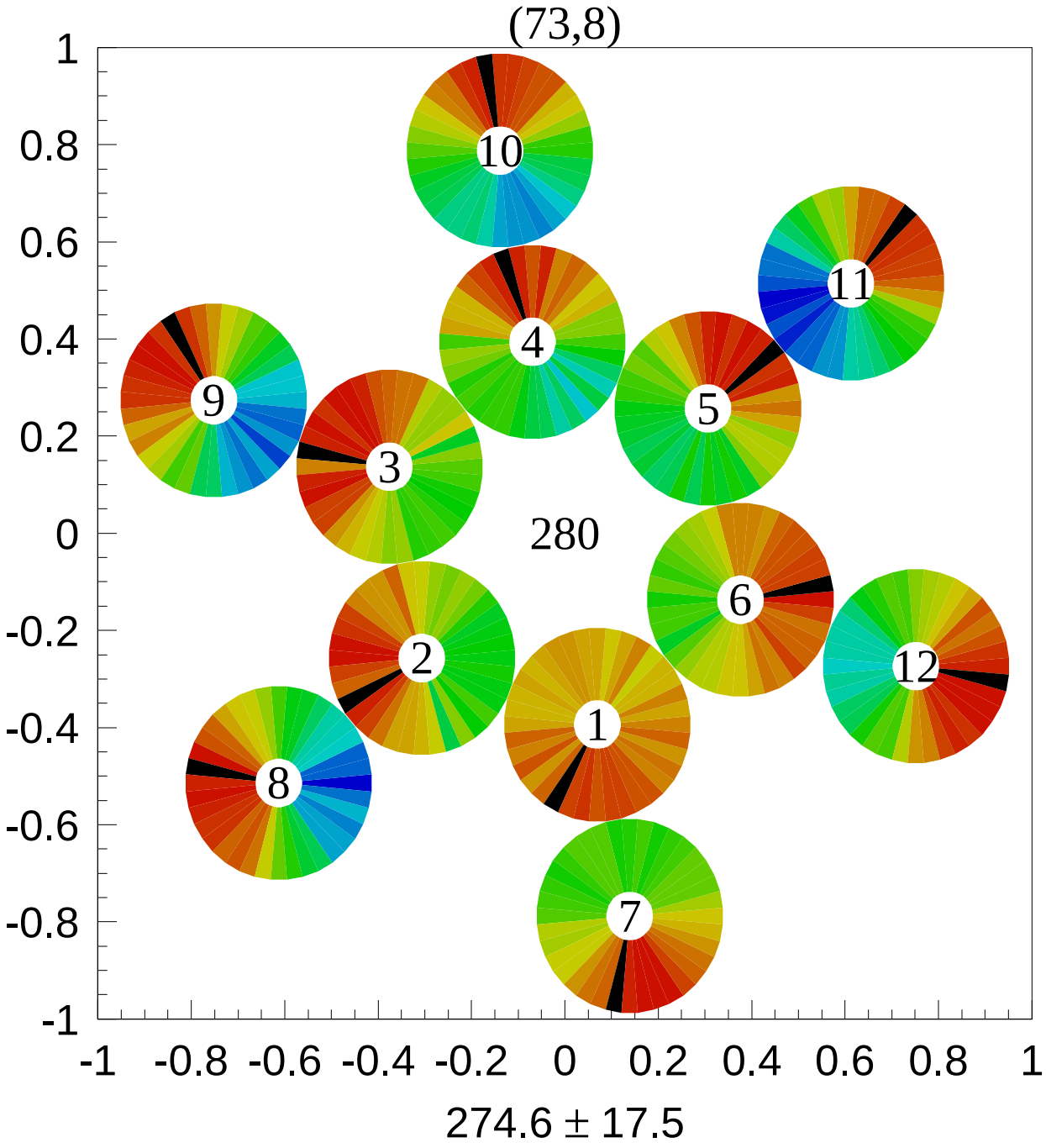

(73,6)
tilted LEDs
117 120 119 122 121 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 123 123 126 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

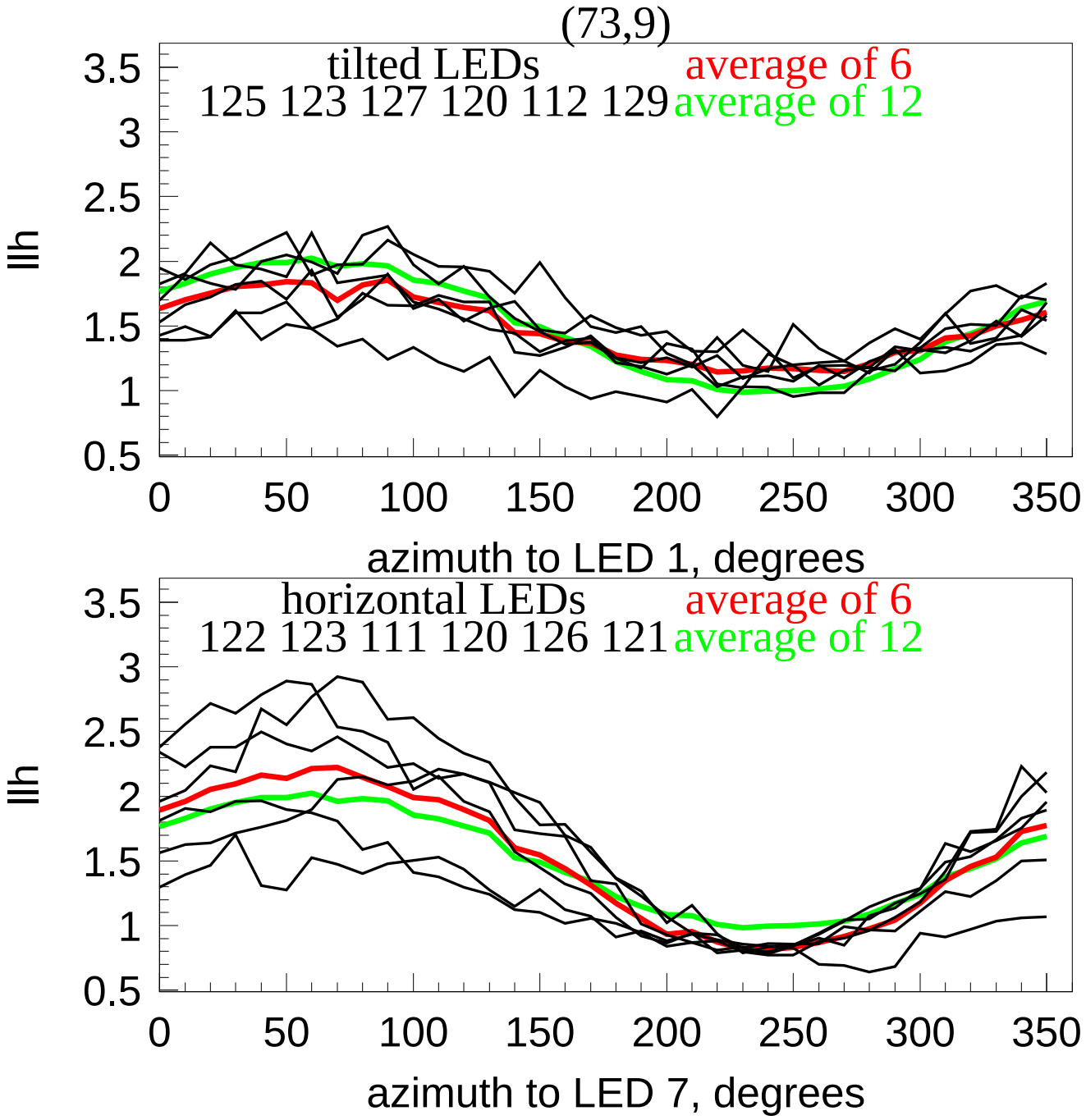

(73,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.1 ± 7.4
190
1
2
3
4
5
6
7
8
9
10
11
12

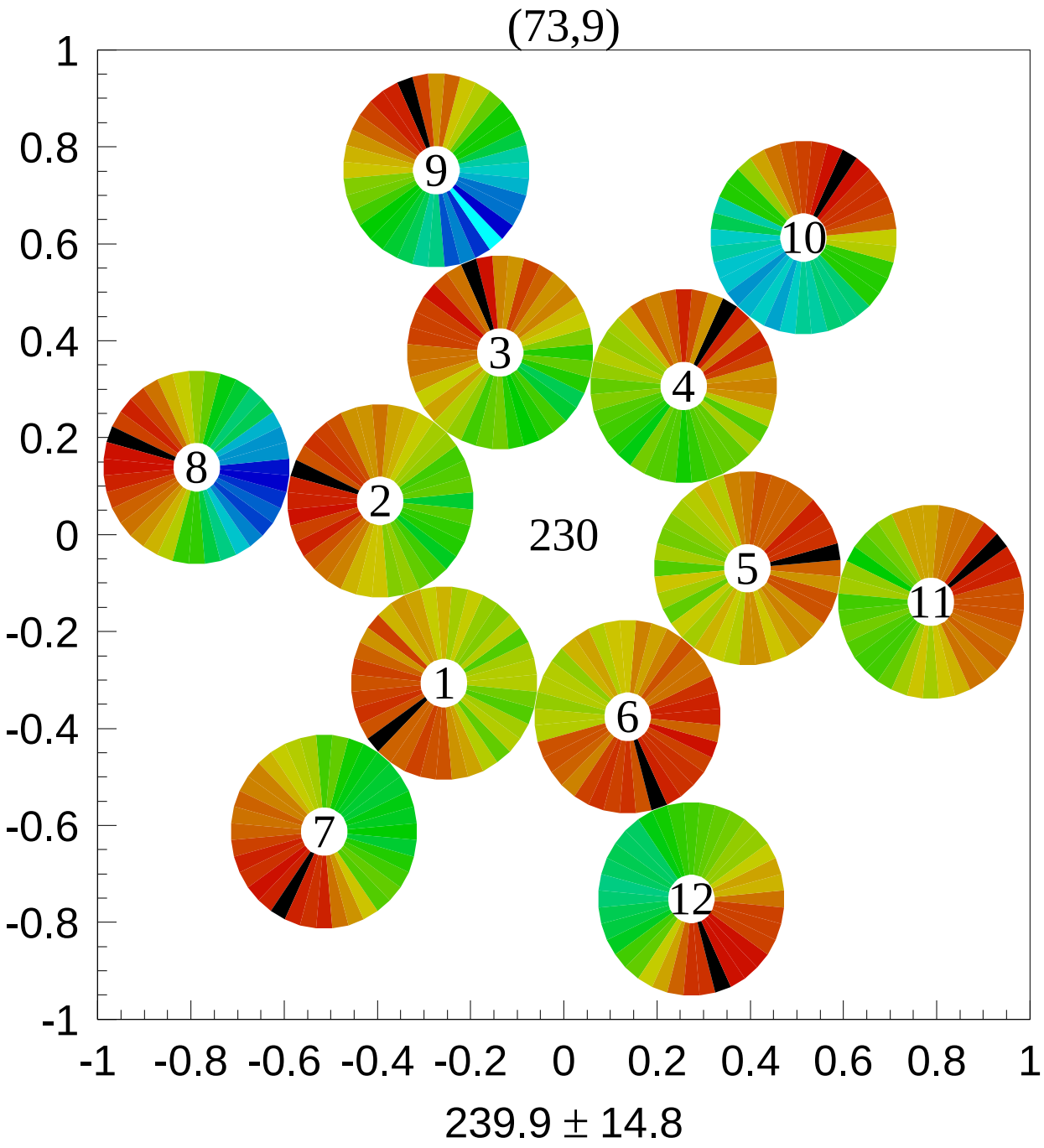

(73,7)
tilted LEDs
124 120 123 119 118 123
average of 6
average of 12
llh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 113 125 120 120 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

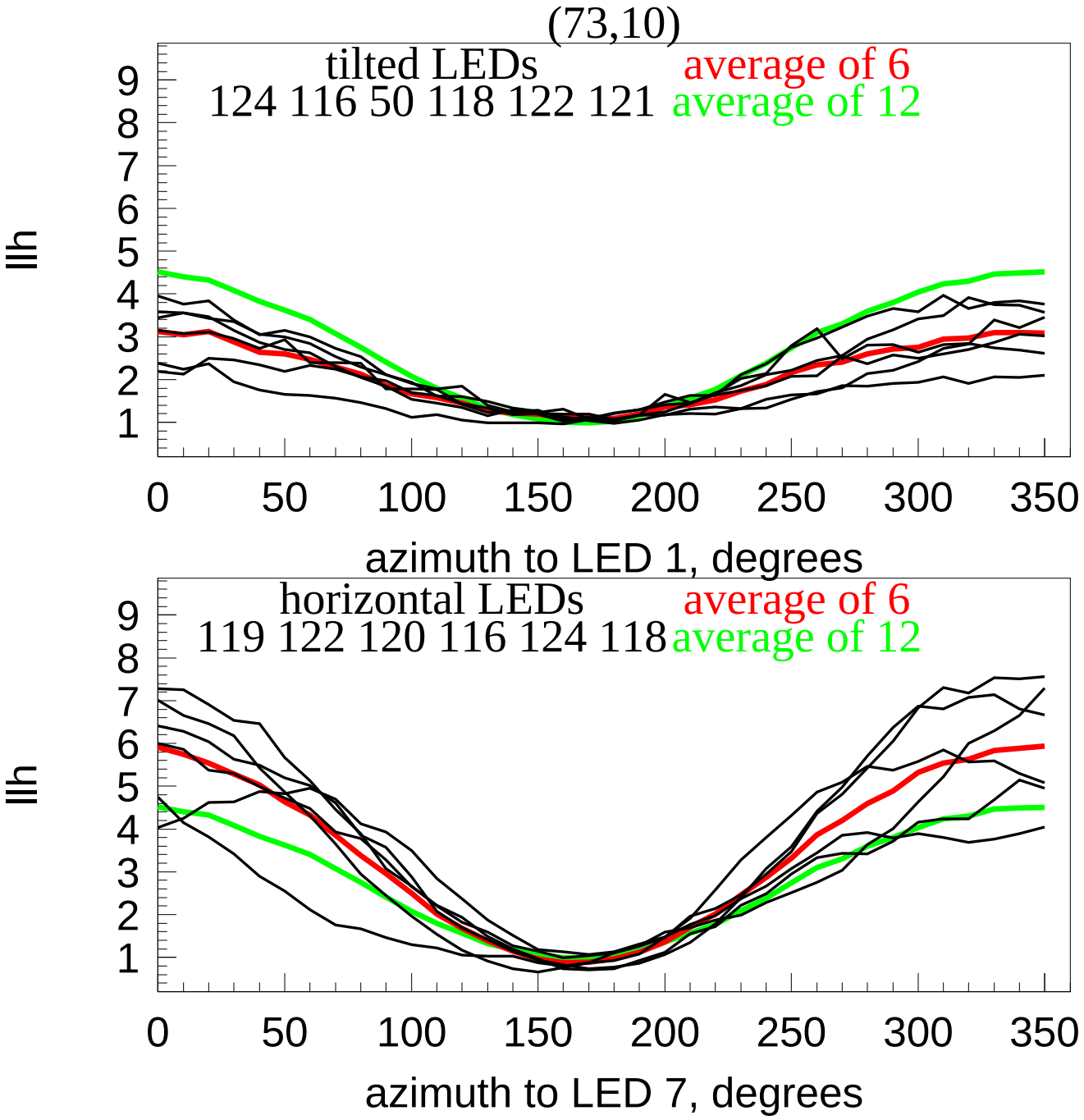

(73,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
197 ± 16.5

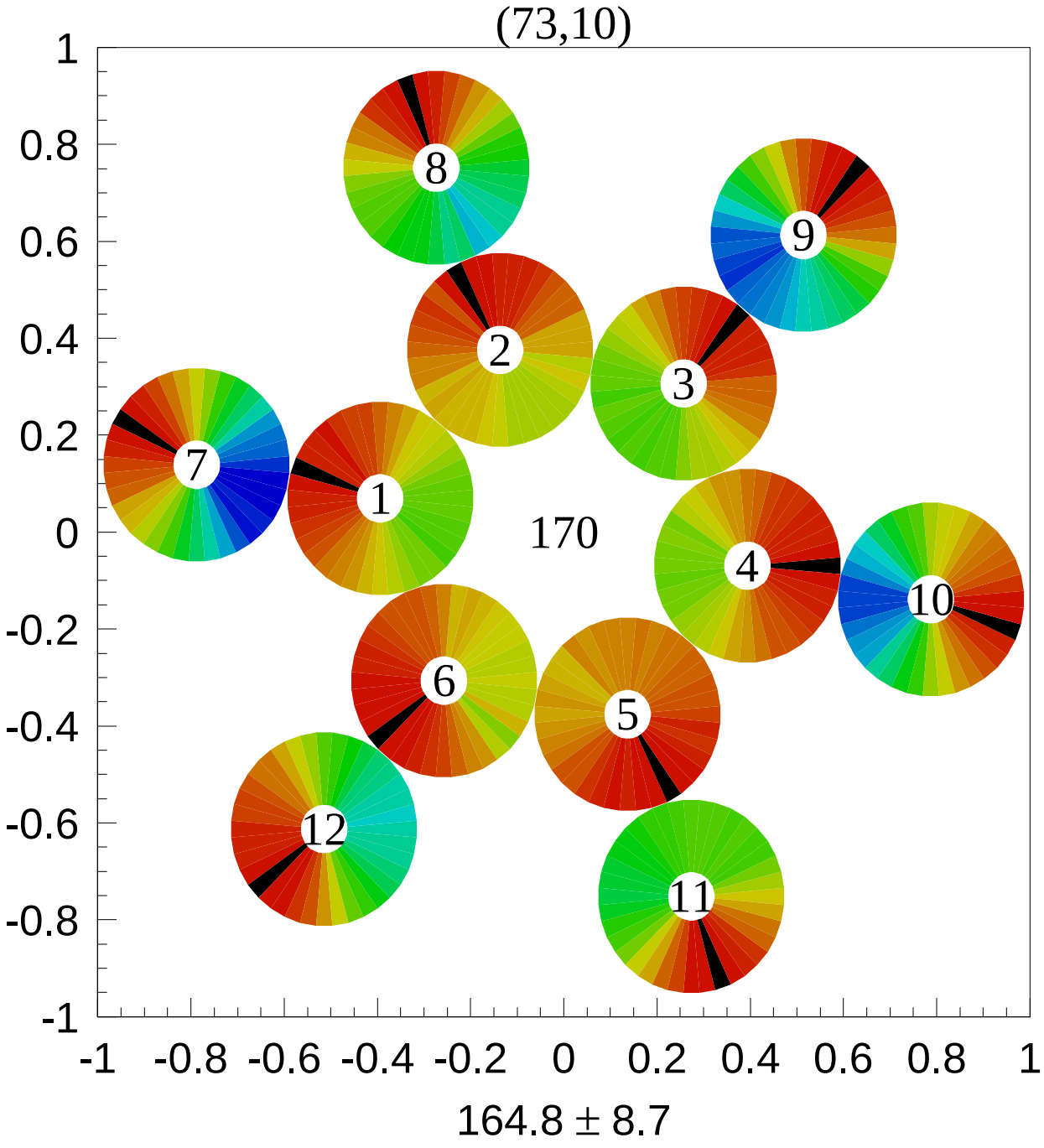

(73,8)
tilted LEDs
103 120 124 120 118 118
average of 6
average of 12
llh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 121 121 125 131 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

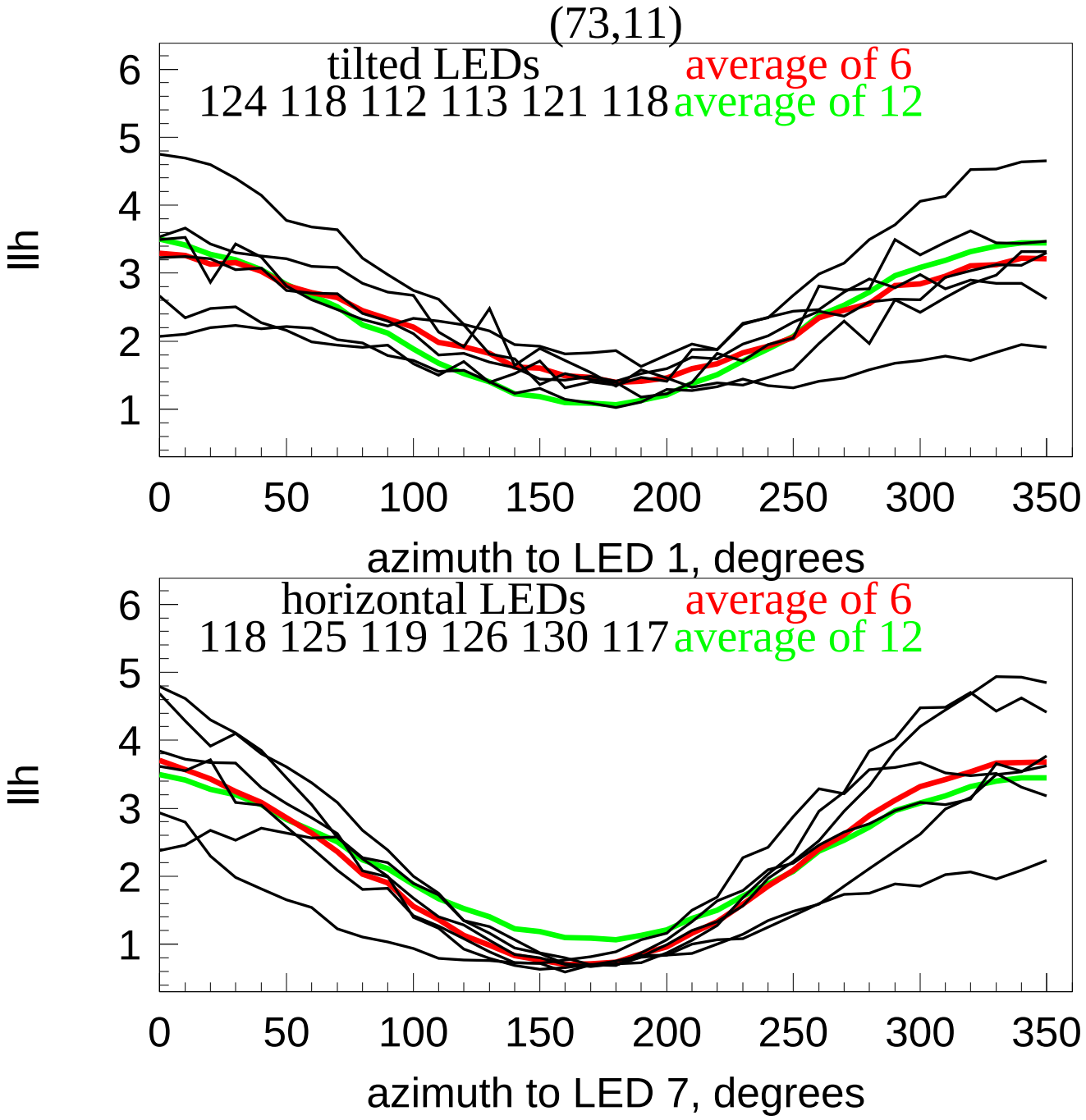

(73,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
274.6 ± 17.5

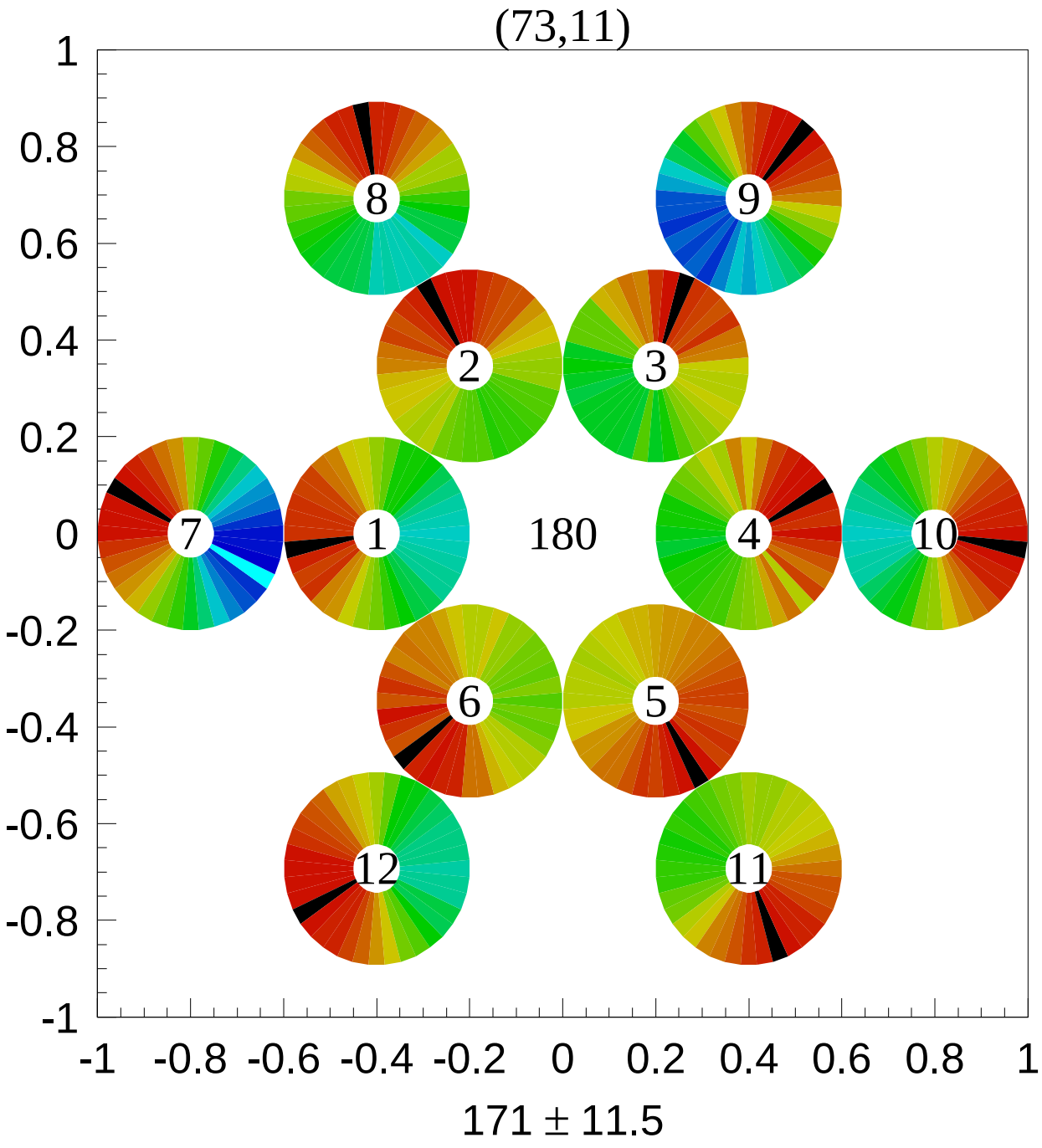

(73,9)
tilted LEDs
125 123 127 120 112 129
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 123 111 120 126 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

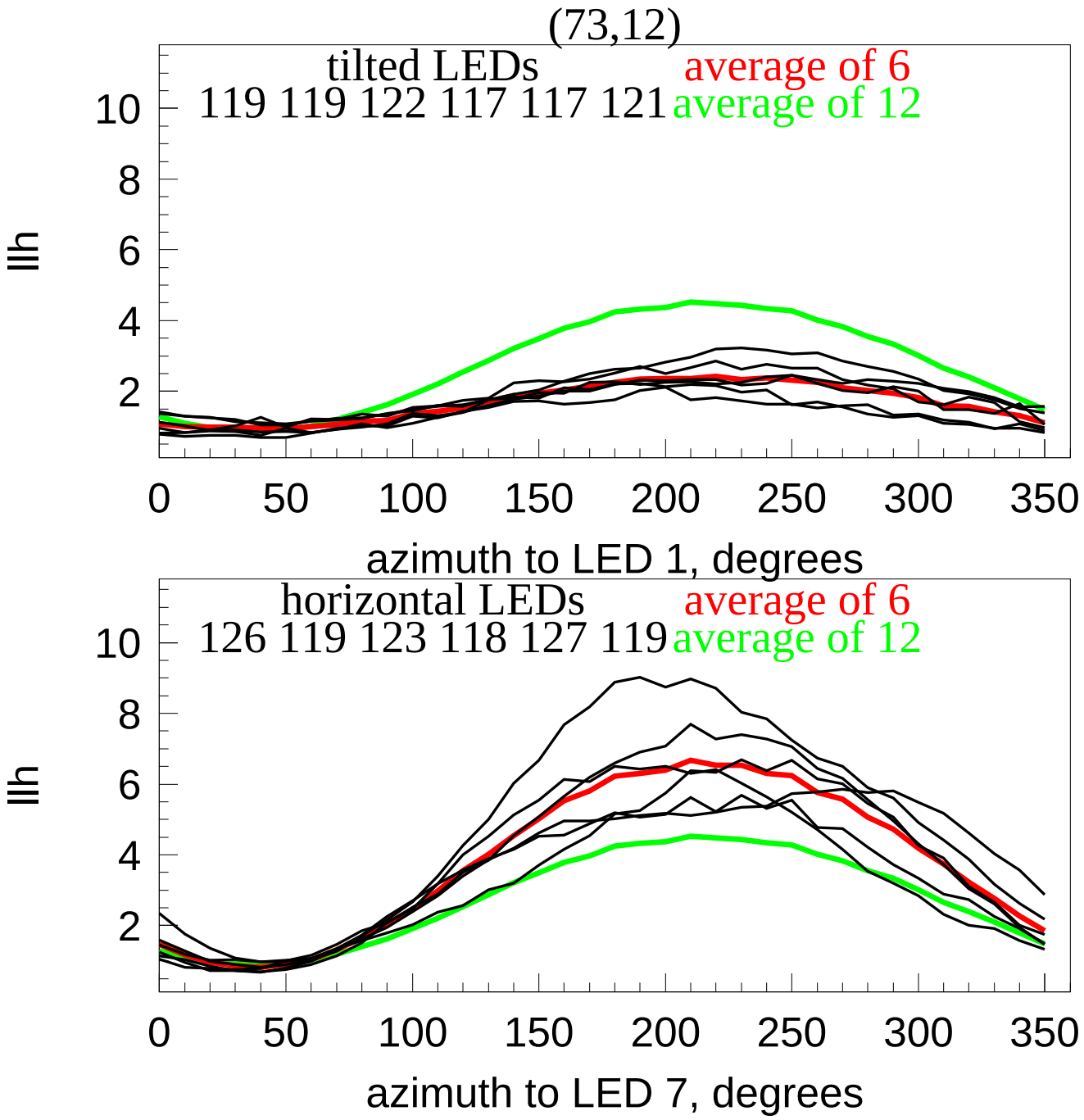

(73,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
239.9 ± 14.8

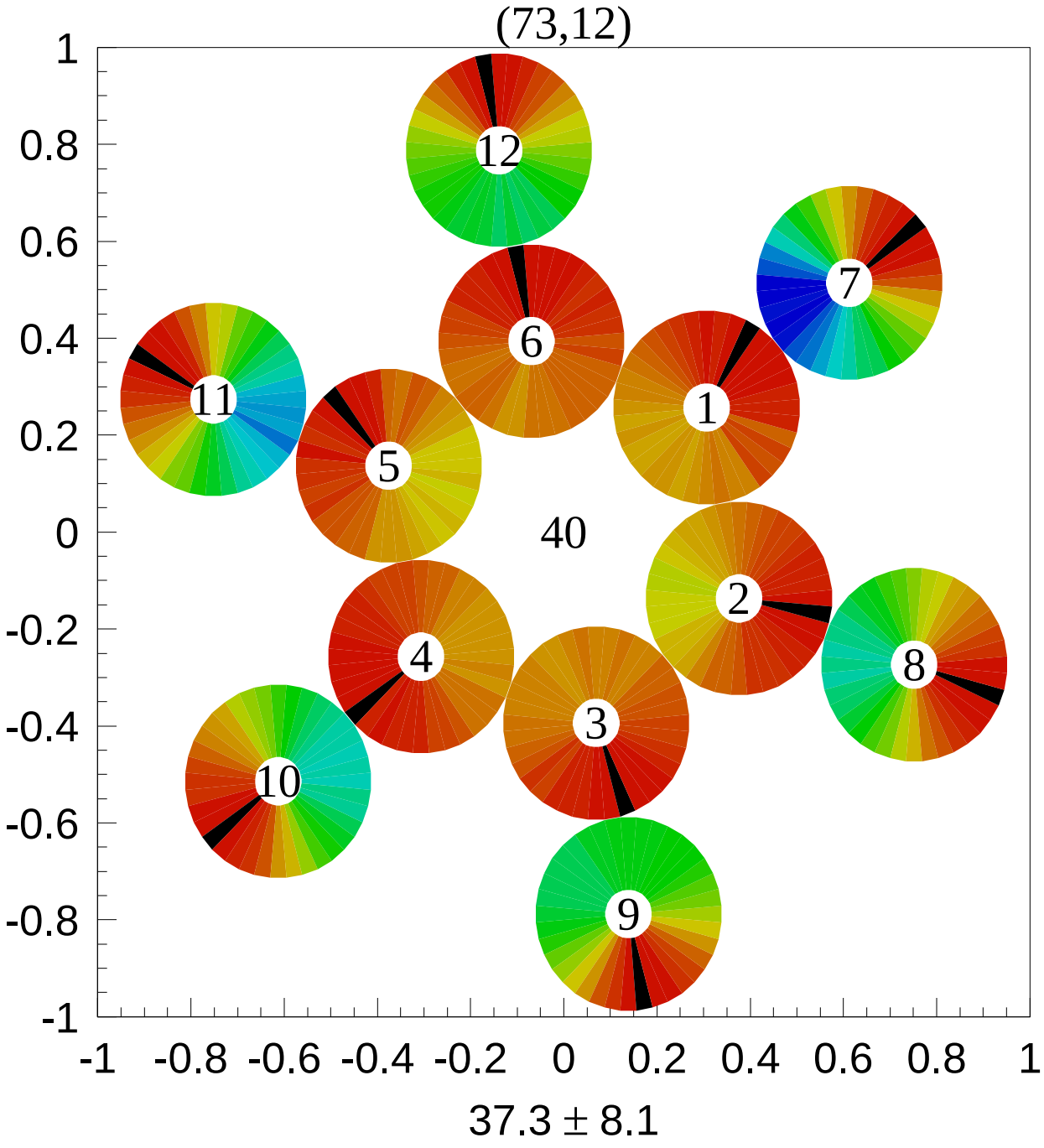

(73,10)
tilted LEDs
124 116 50 118 122 121
average of 6
average of 12
llh
9
8
7
6
5
4
3
2
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 122 120 116 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

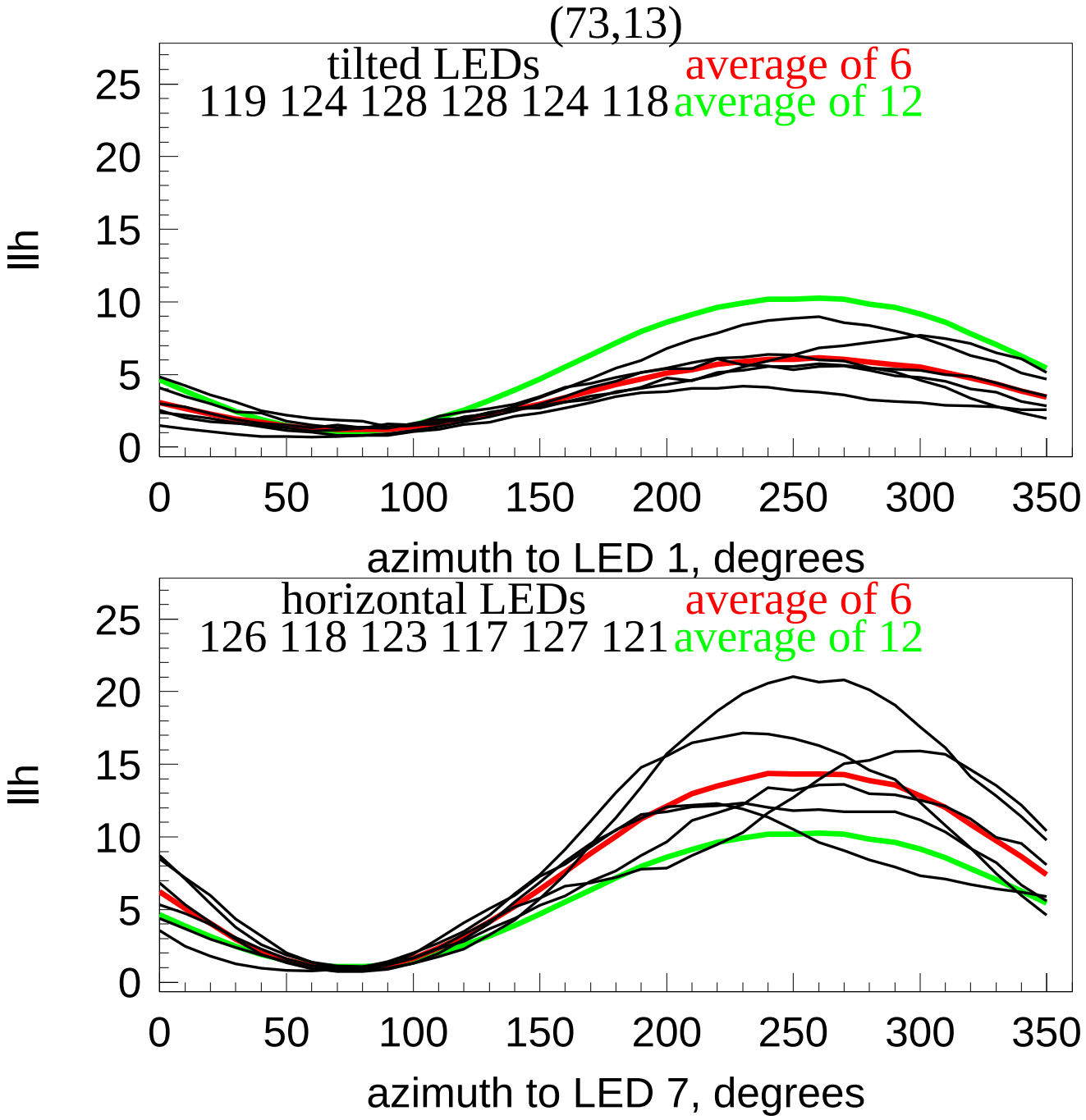

(73,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
164.8 ± 8.7

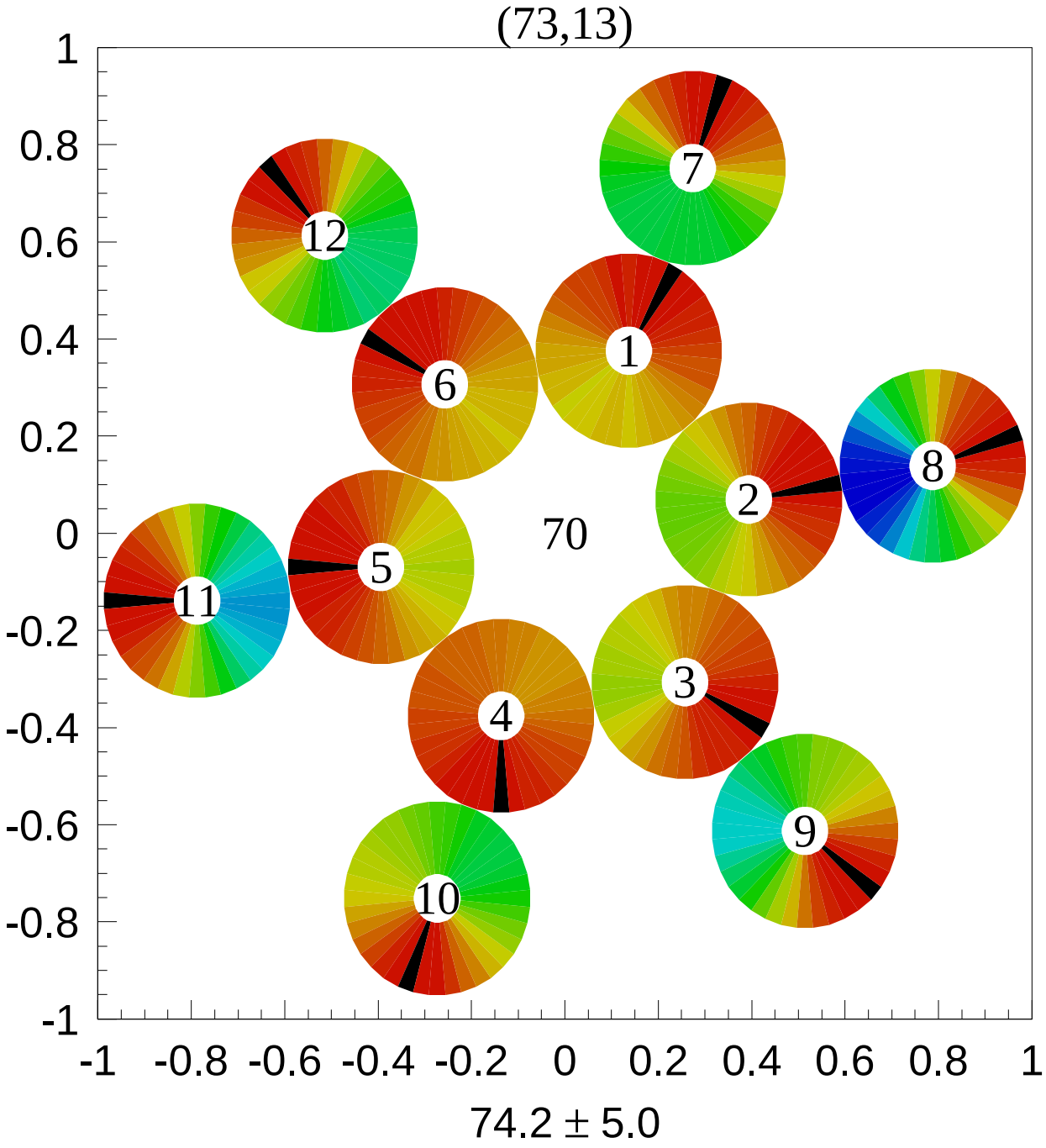

(73,11)
tilted LEDs
124 118 112 113 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 125 119 126 130 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

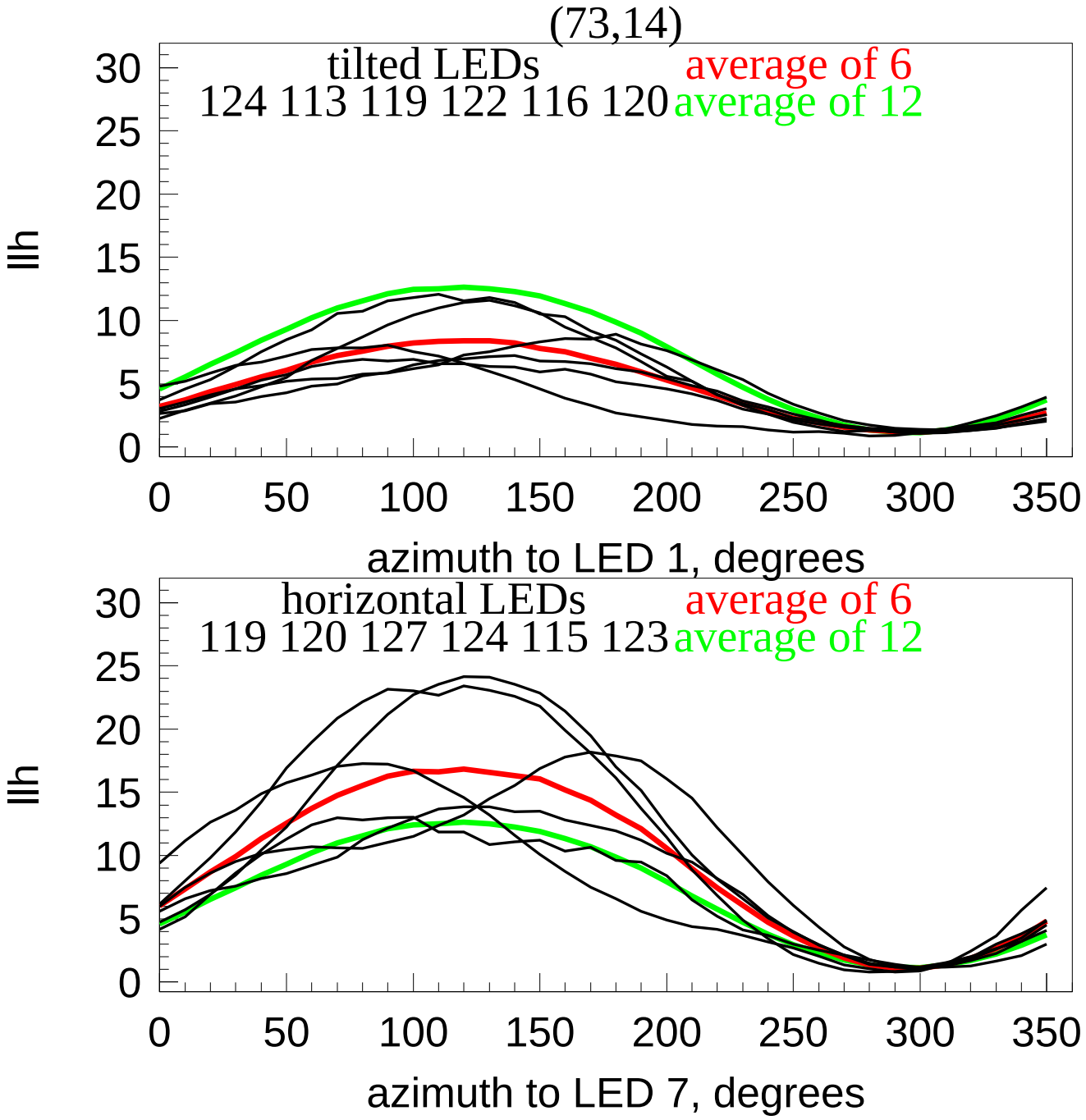

(73,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
171 ± 11.5

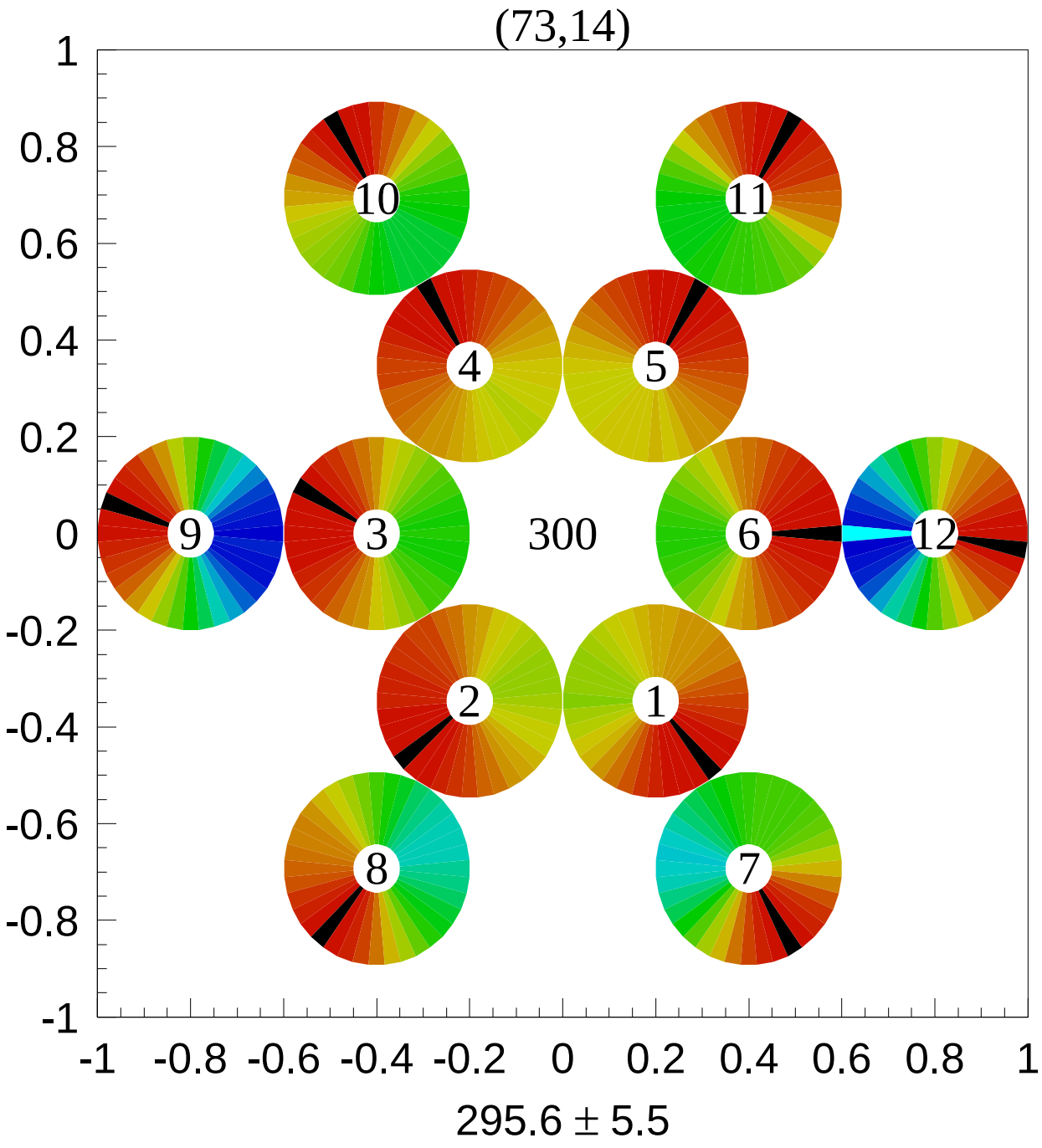

(73,12)
tilted LEDs
119 119 122 117 117 121
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 119 123 118 127 119
average of 6
average of 12
Ilh
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

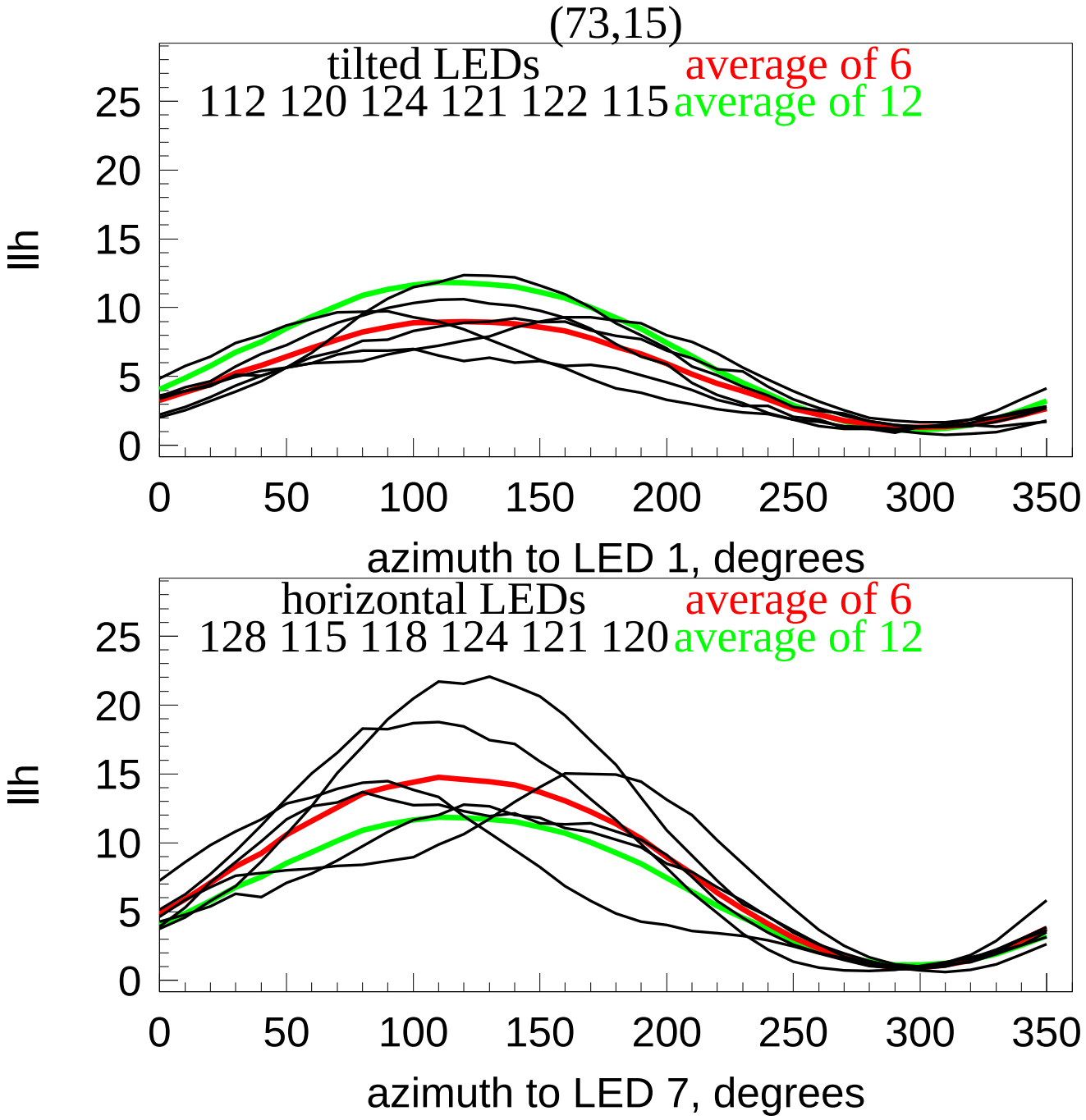

(73,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
37.3 ± 8.1

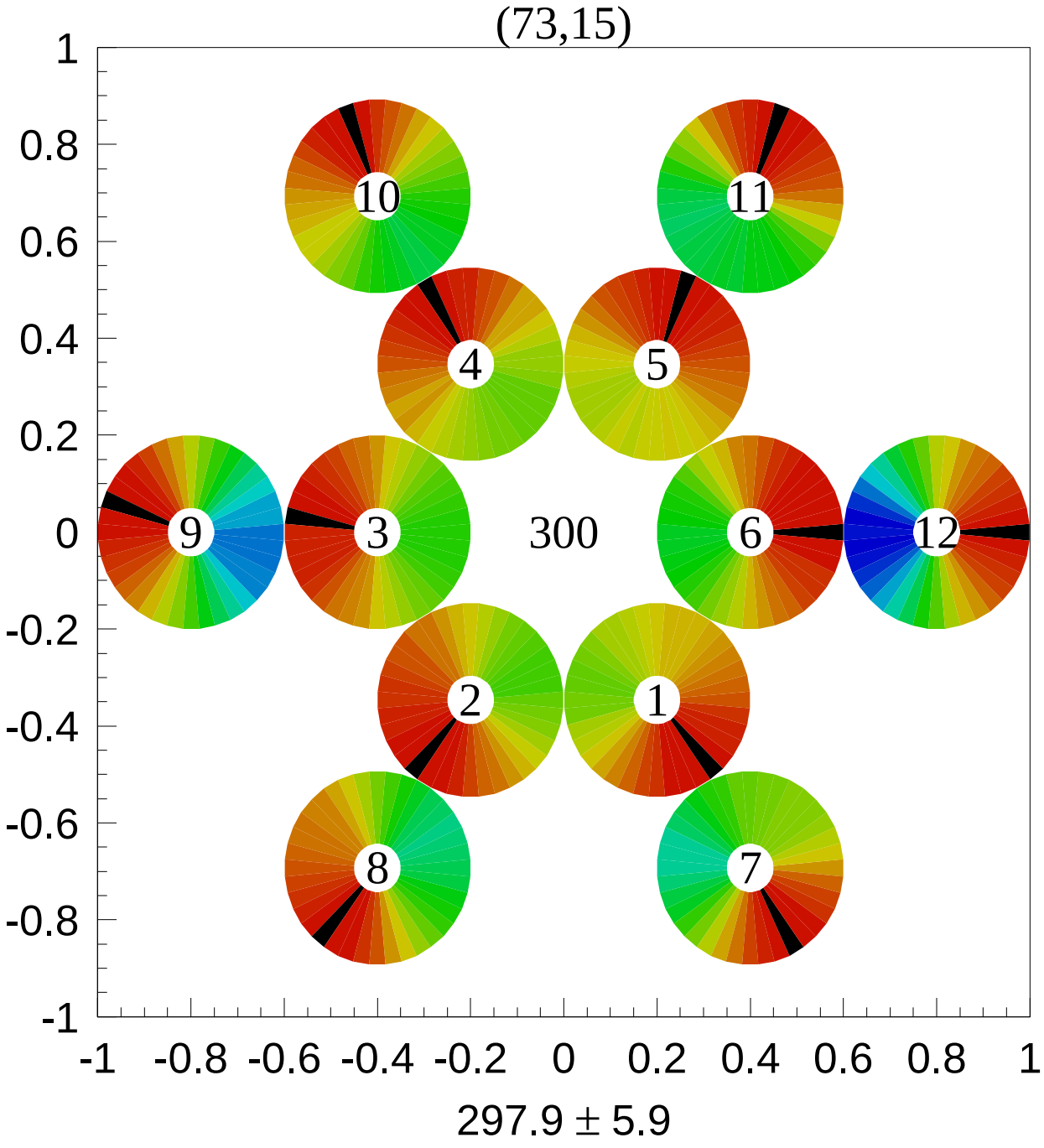

(73,13)
tilted LEDs
119 124 128 128 124 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 118 123 117 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

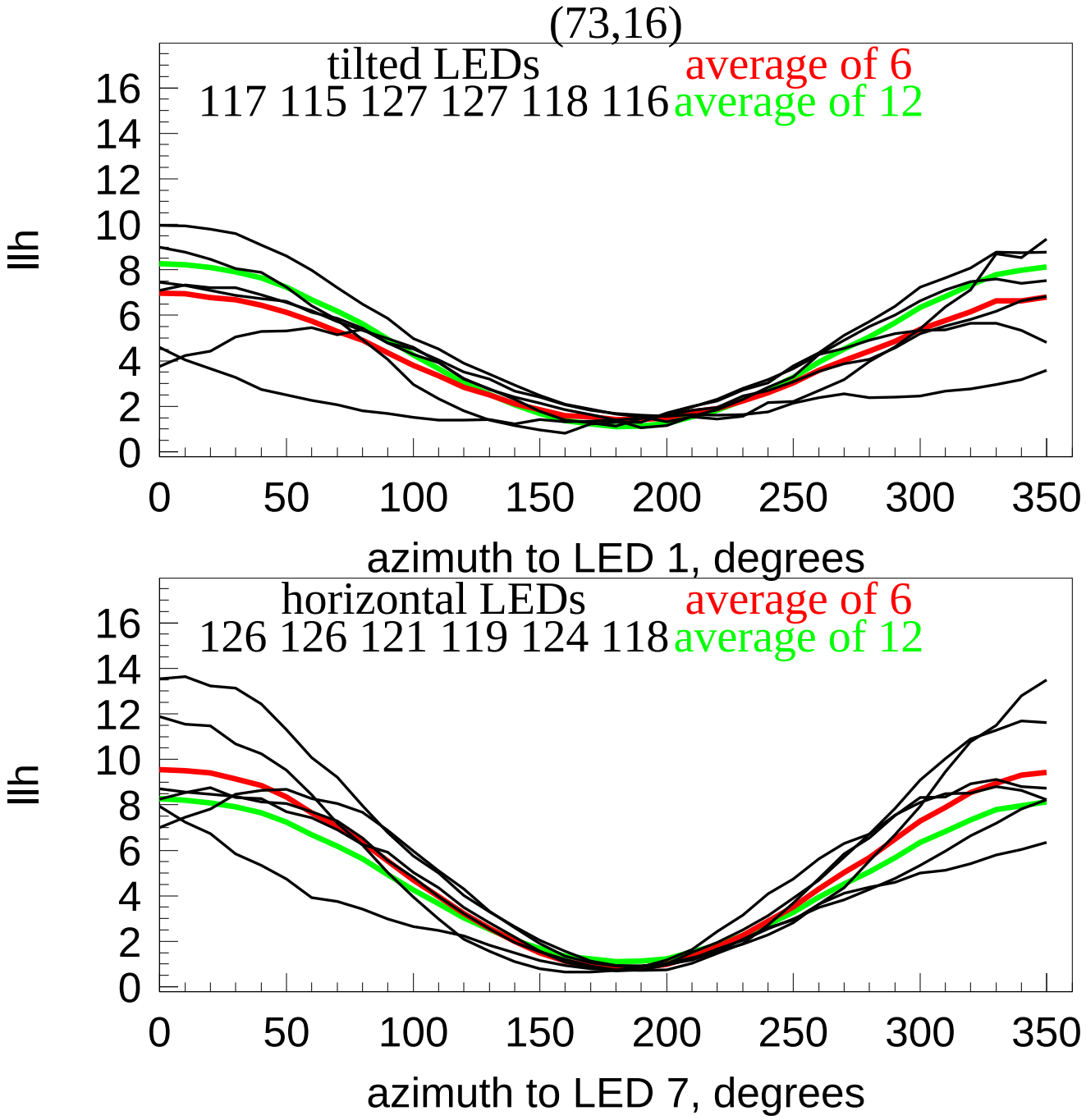

(73,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
74.2 ± 5.0

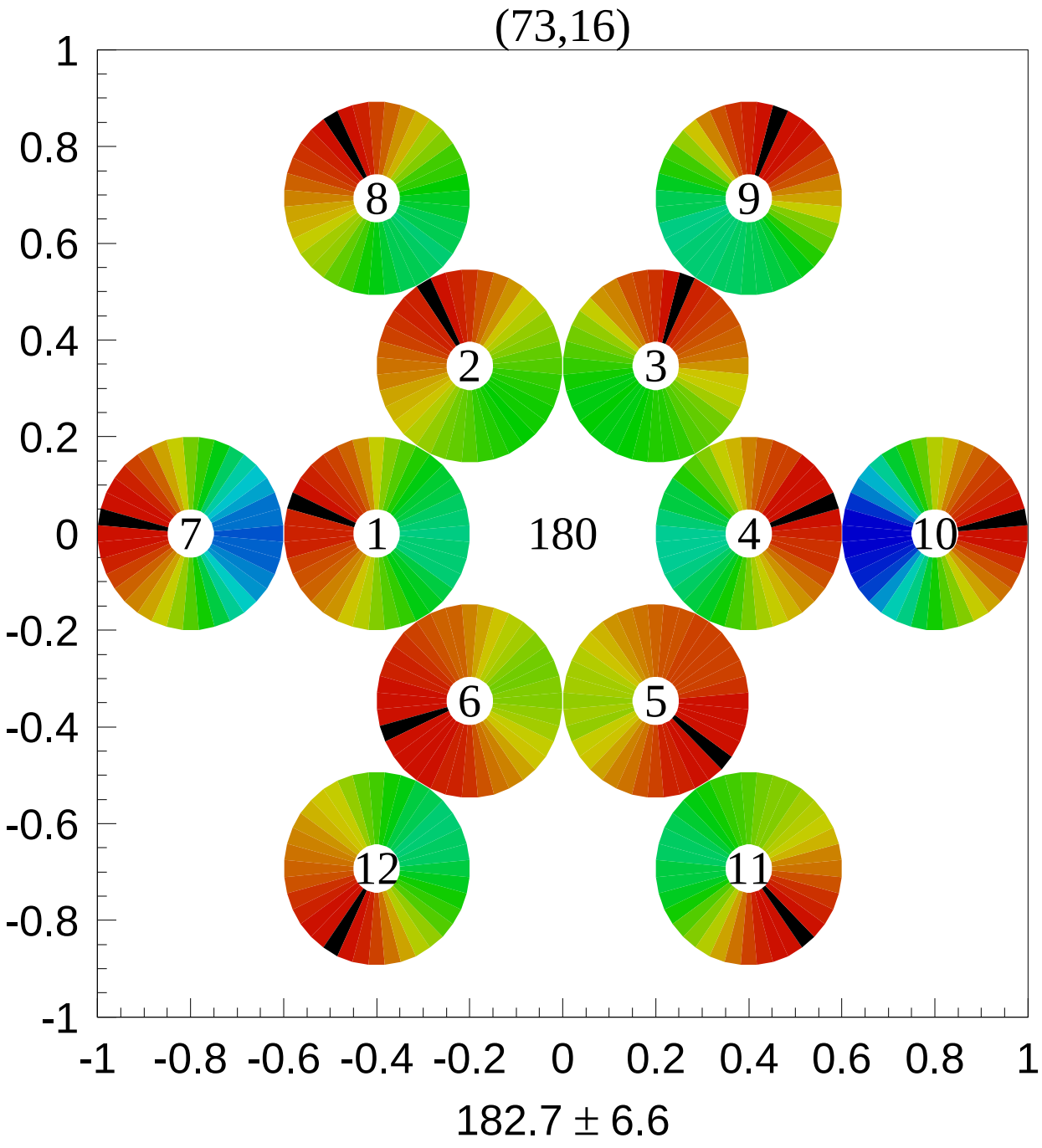

(73,14)
tilted LEDs
124 113 119 122 116 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 127 124 115 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

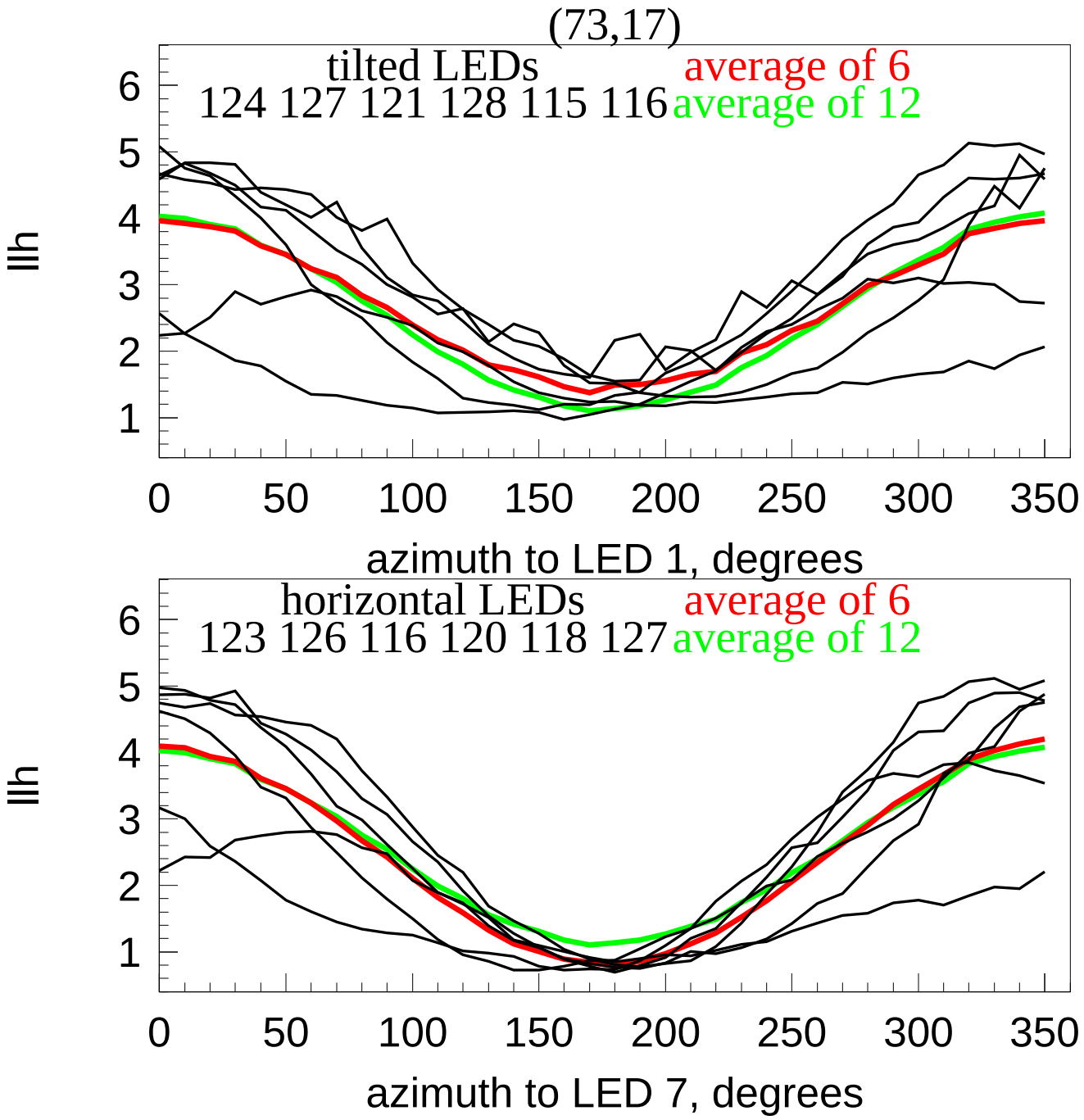

(73,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
295.6 ± 5.5

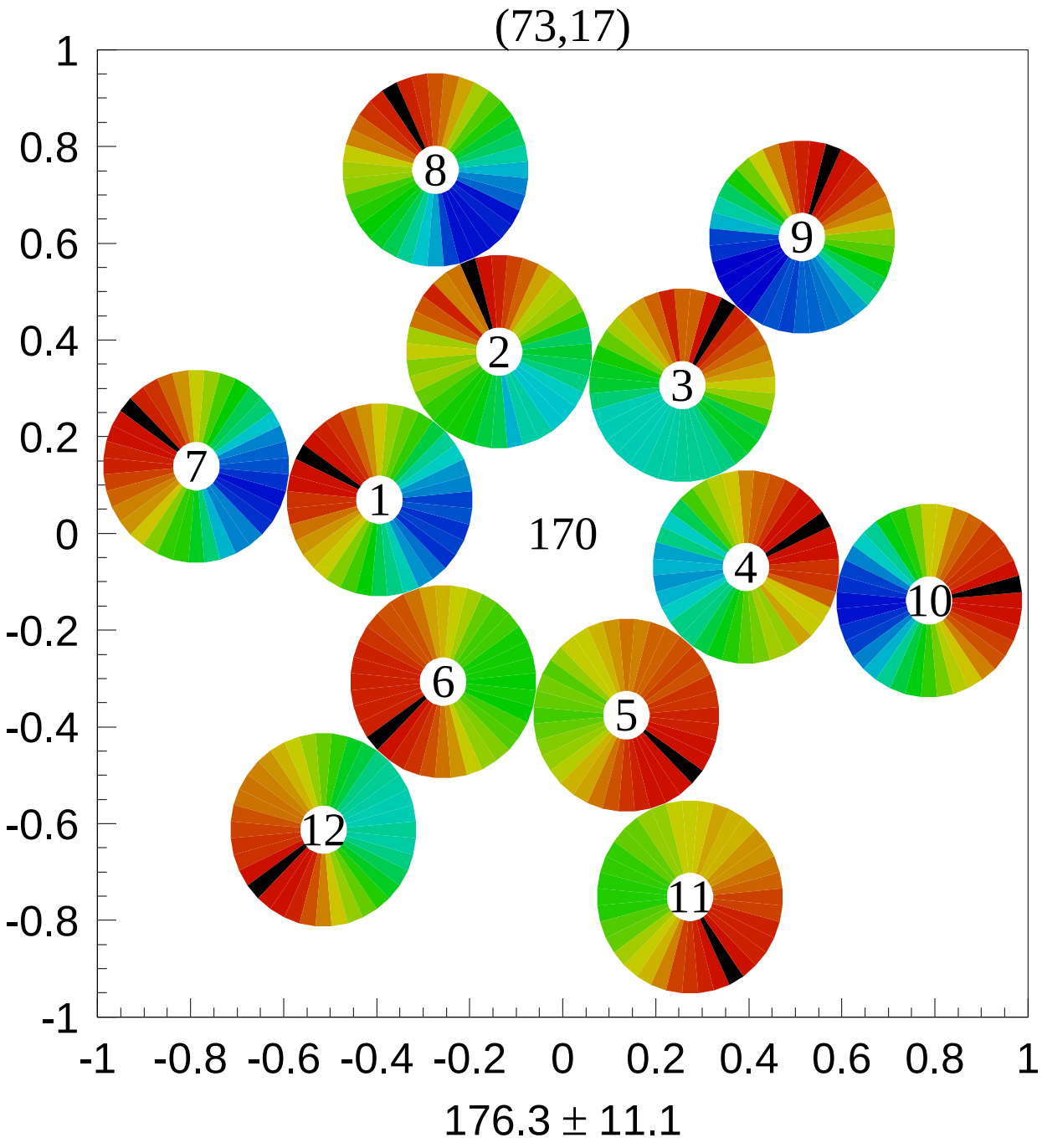

(73,15)
tilted LEDs
112 120 124 121 122 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 115 118 124 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

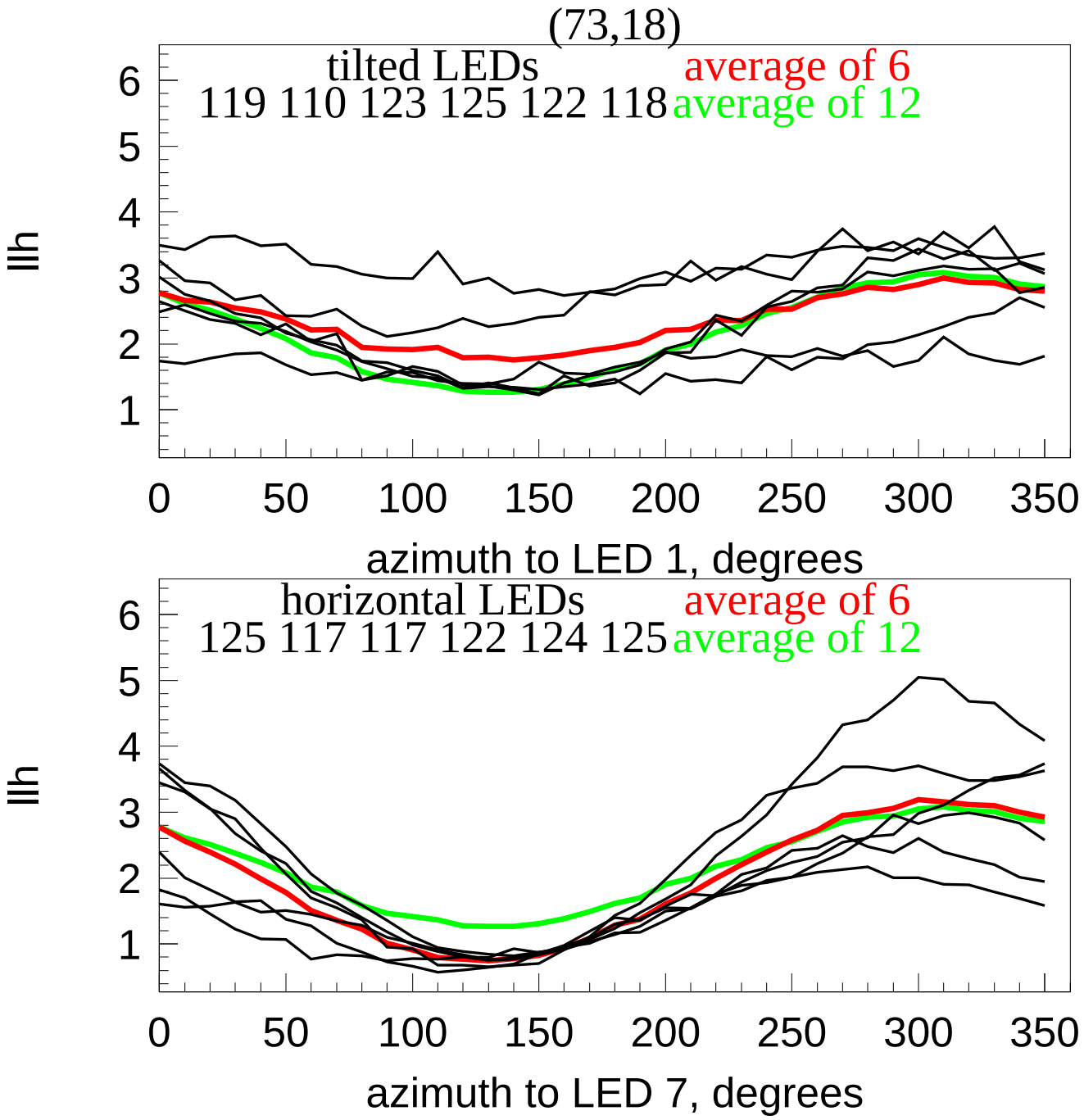

(73,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
297.9 ± 5.9

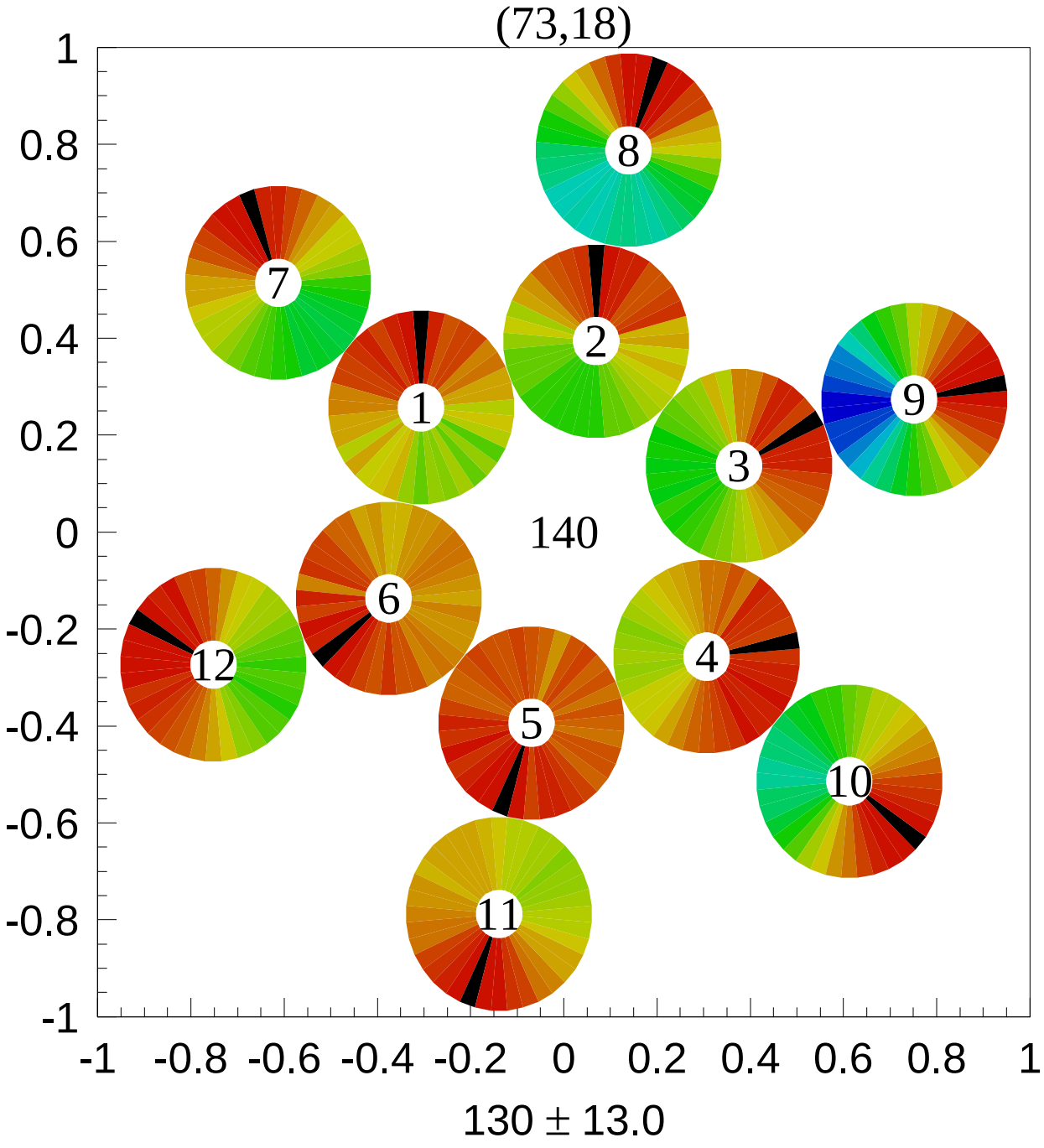

(73,16)
tilted LEDs
117 115 127 127 118 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 126 121 119 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

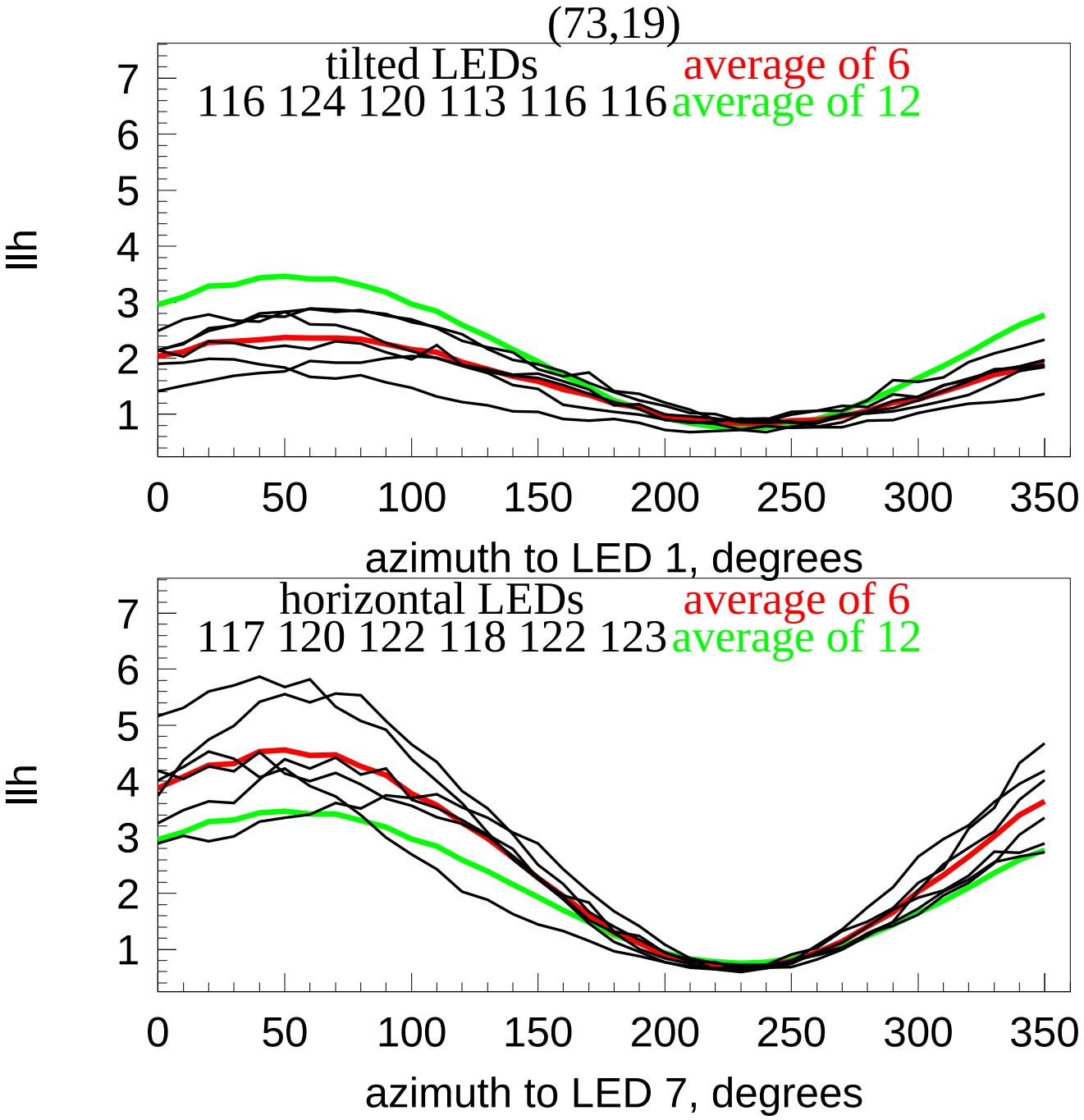

(73,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
180
4
10
6
5
12
11
182.7 ± 6.6

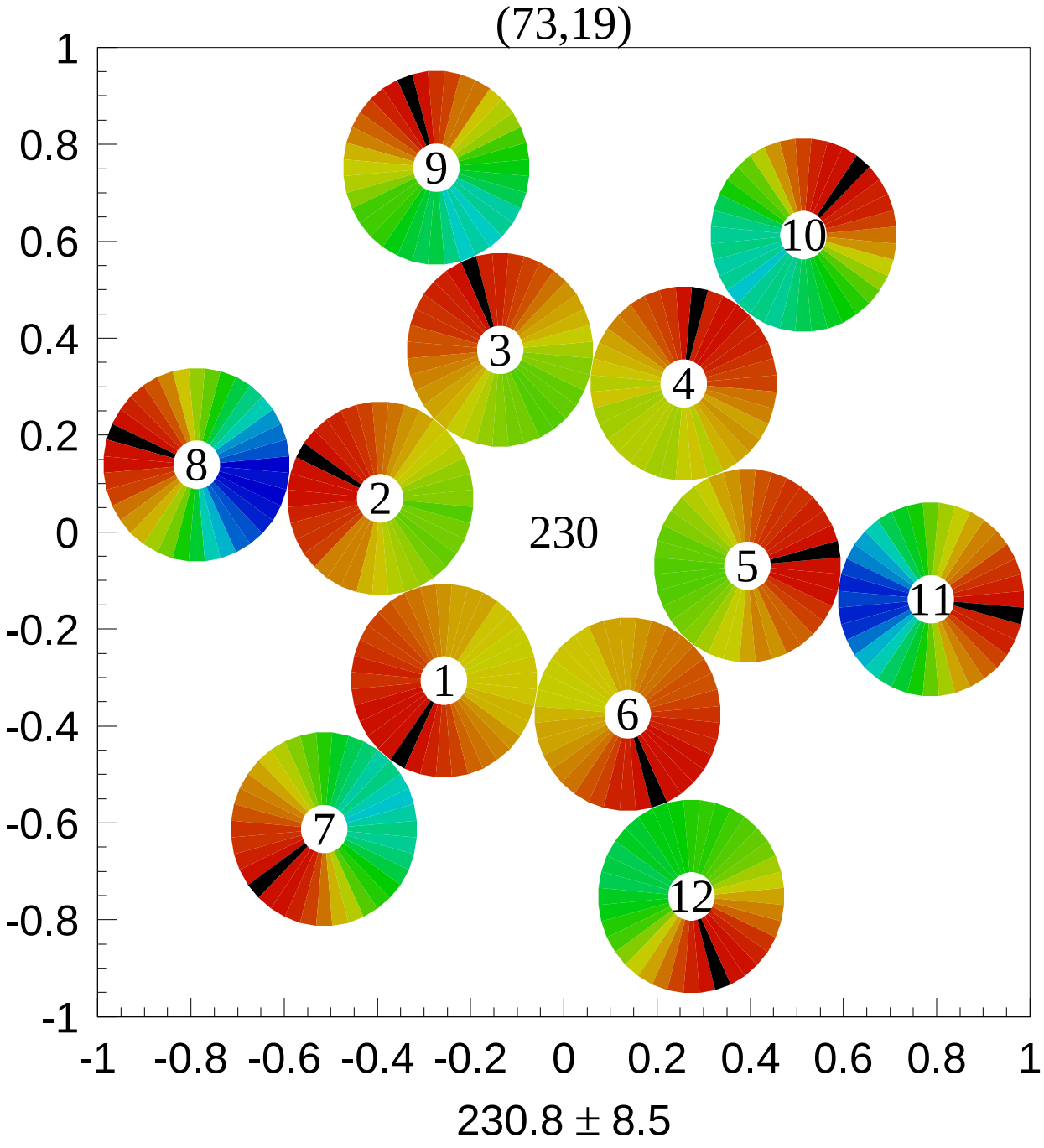

(73,17)
tilted LEDs
124 127 121 128 115 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 126 116 120 118 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

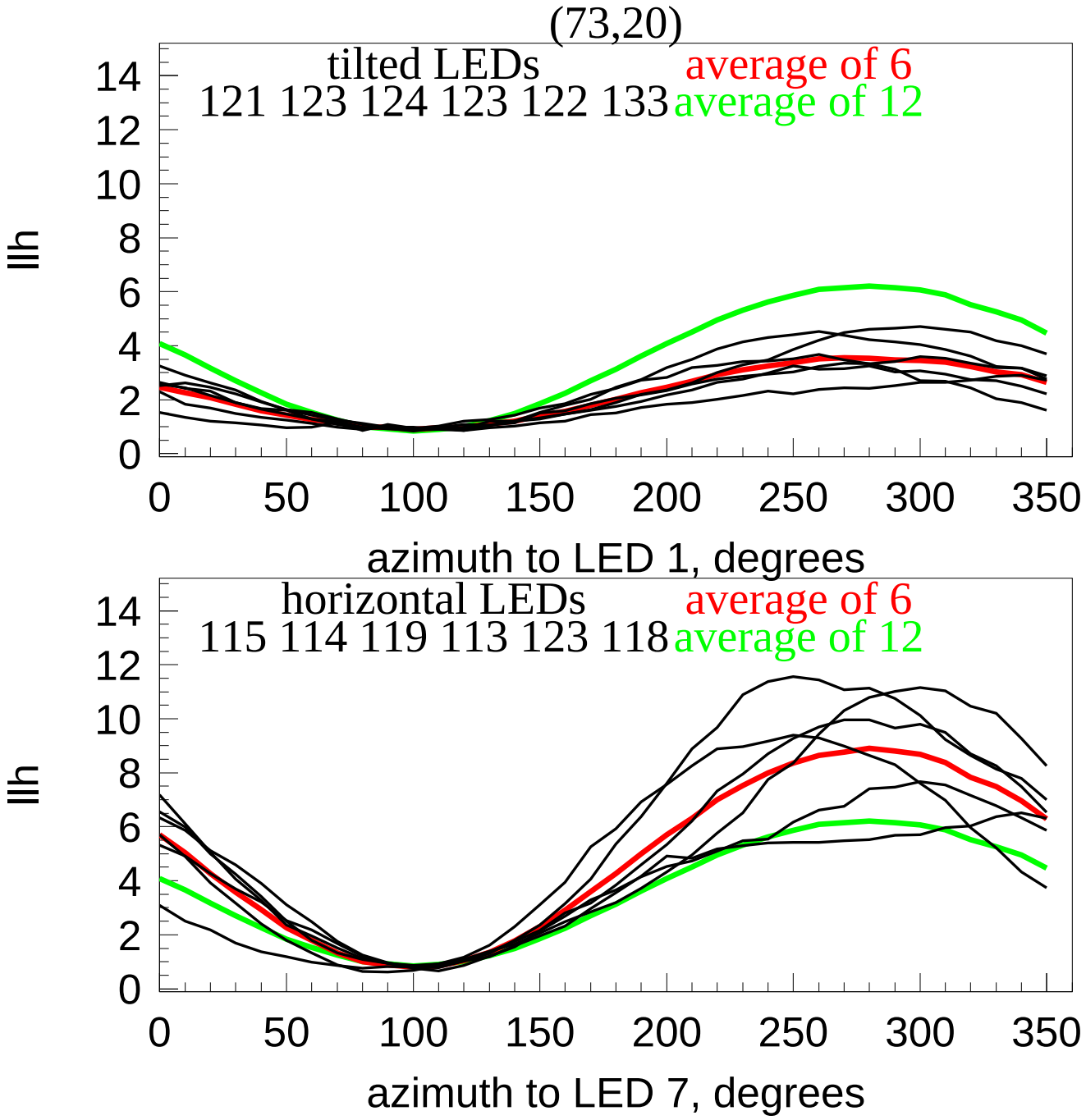

(73,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
176.3 ± 11.1

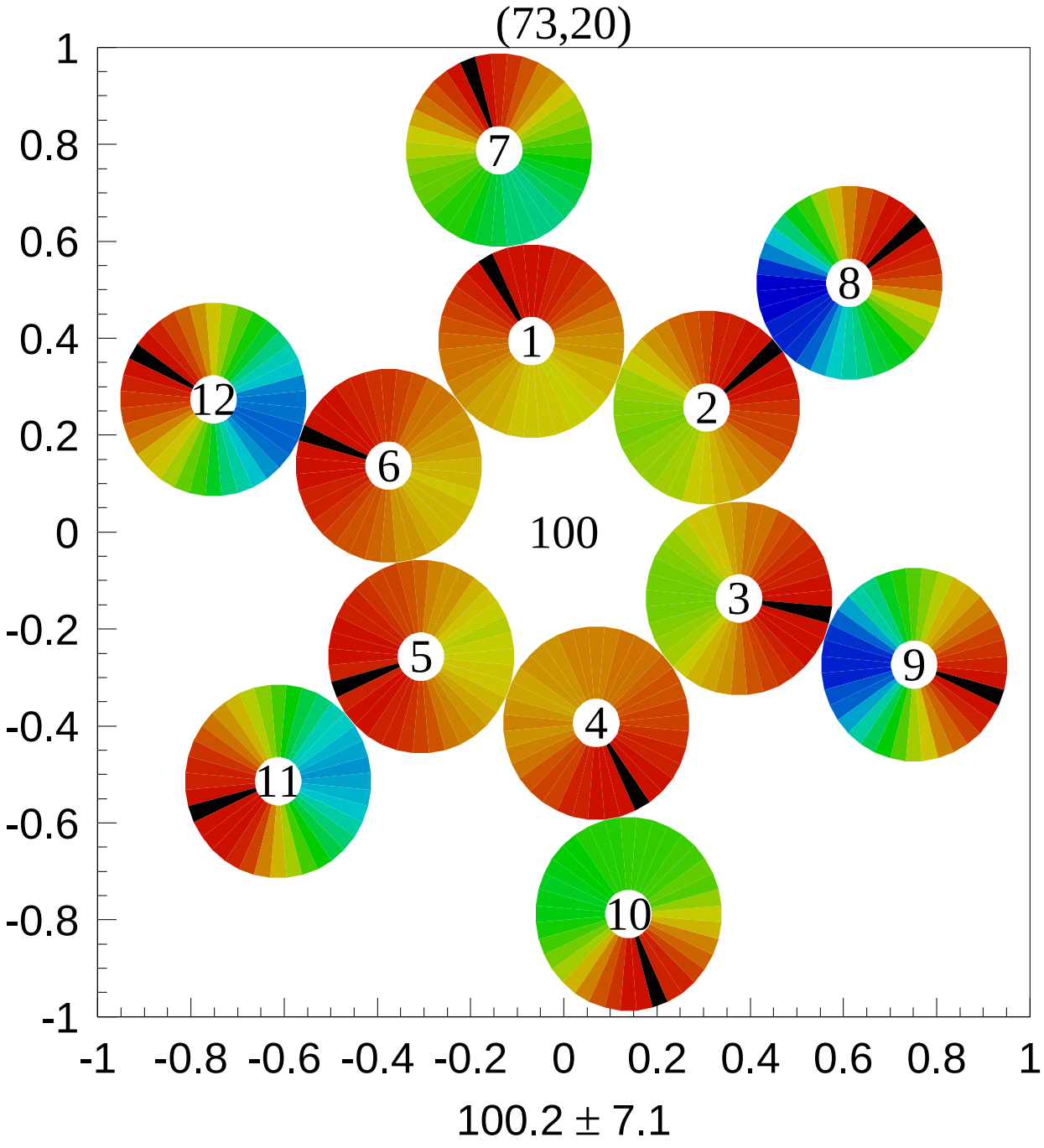

(73,18)
tilted LEDs
119 110 123 125 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 117 117 122 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

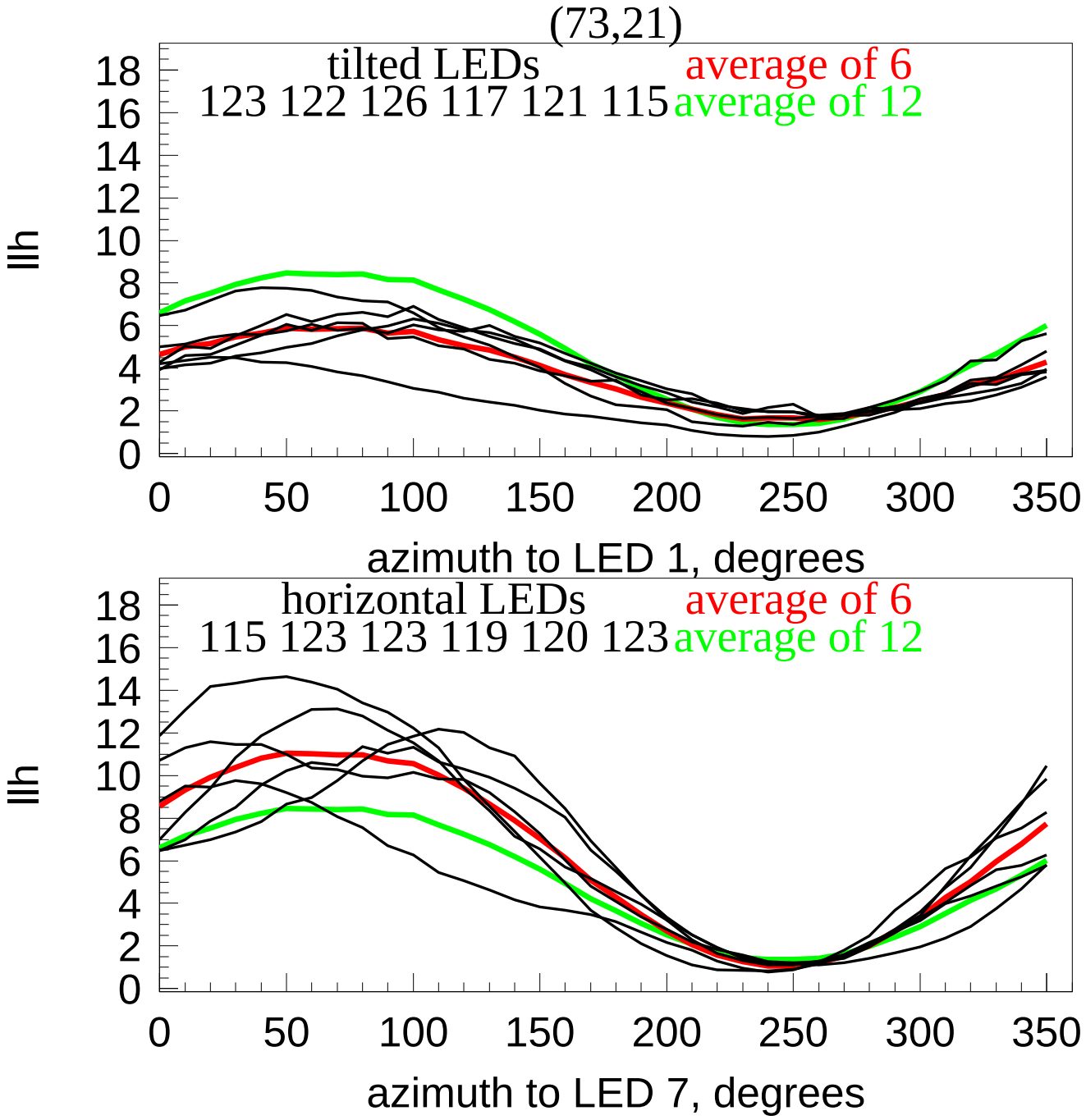

(73,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
130 ± 13.0
140
1
2
3
4
5
6
7
8
9
10
11
12

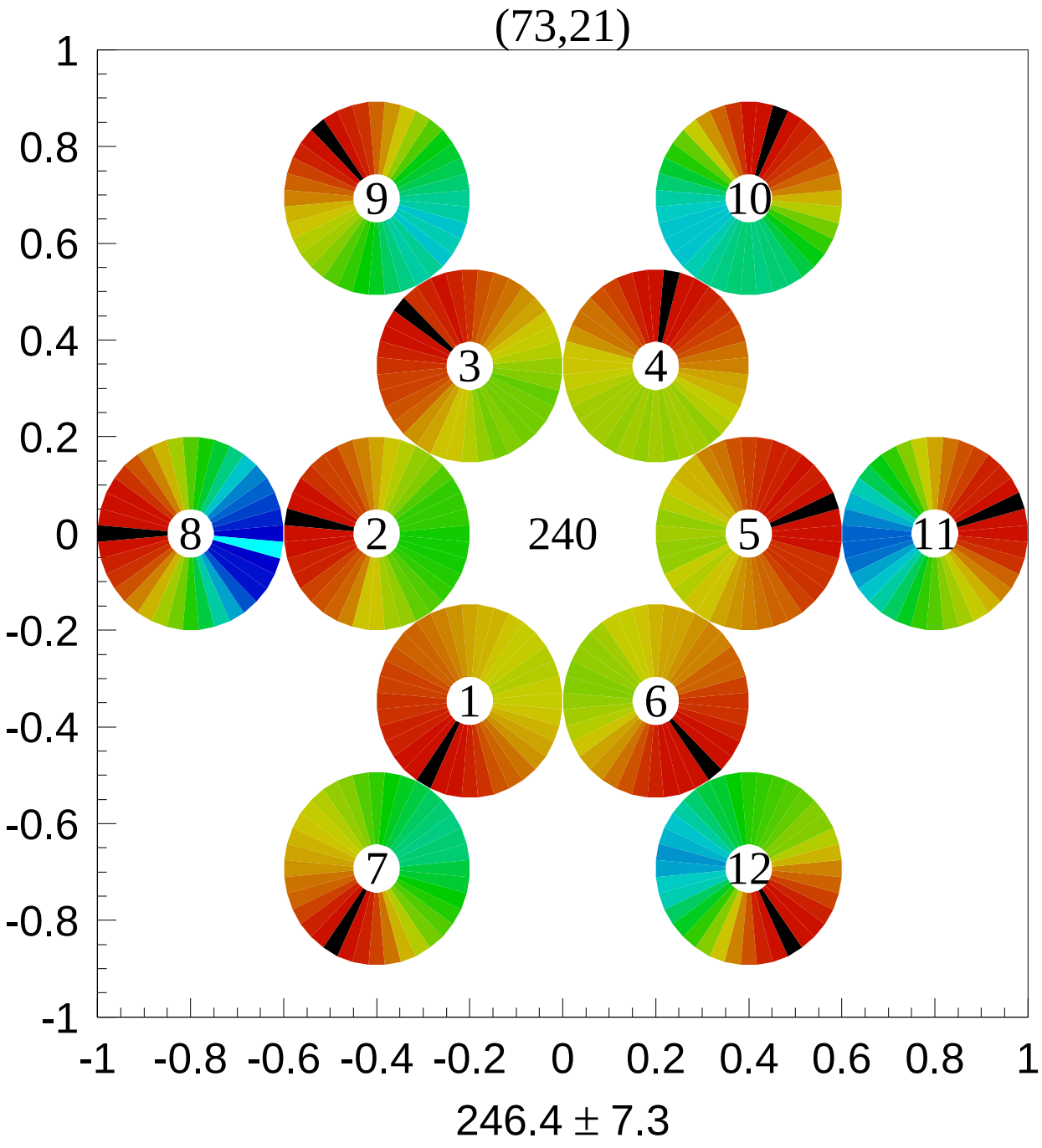

(73,19)
tilted LEDs
116 124 120 113 116 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 120 122 118 122 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

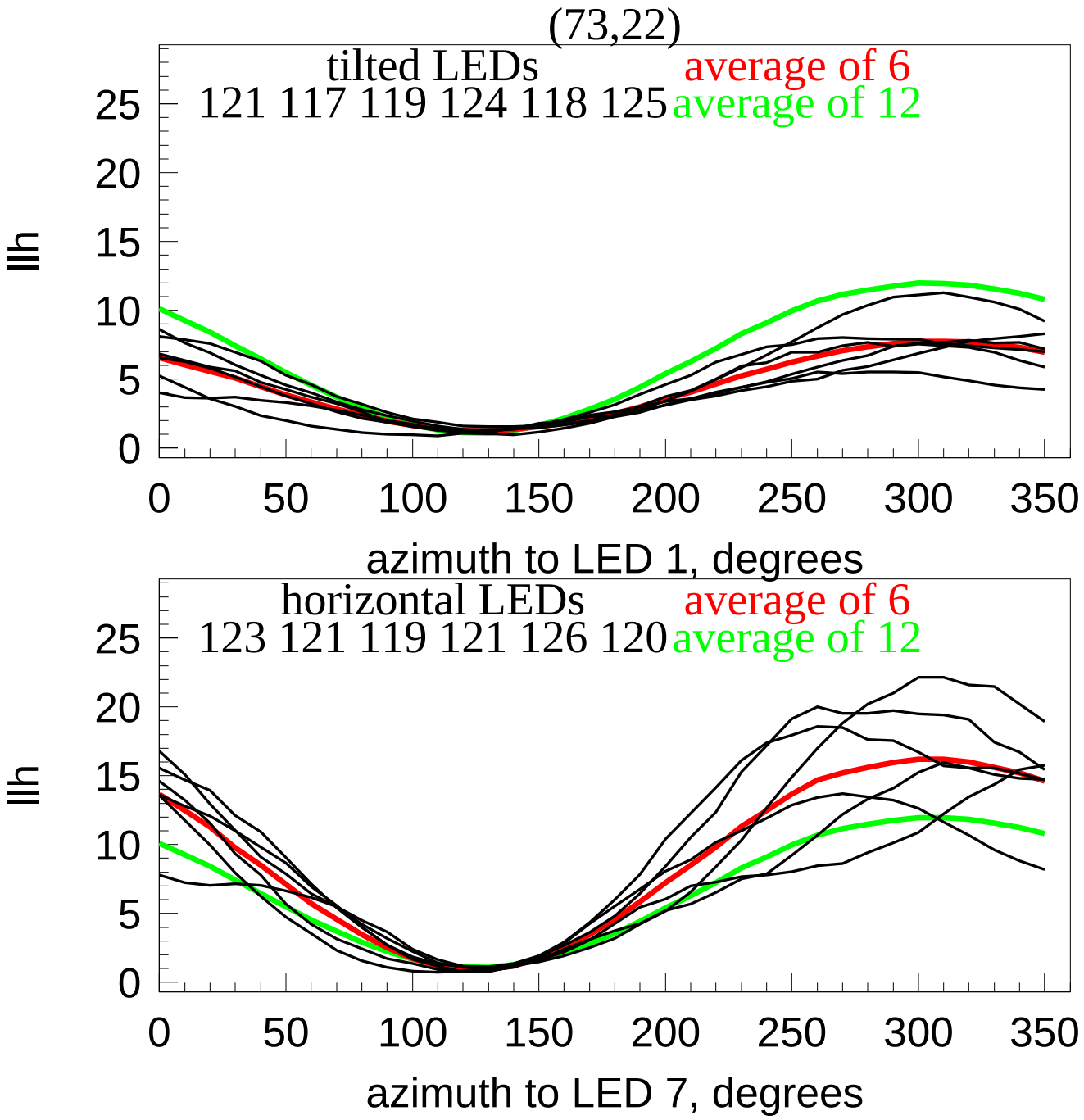

(73,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
230
230.8 ± 8.5
1
2
3
4
5
6
7
8
9
10
11
12

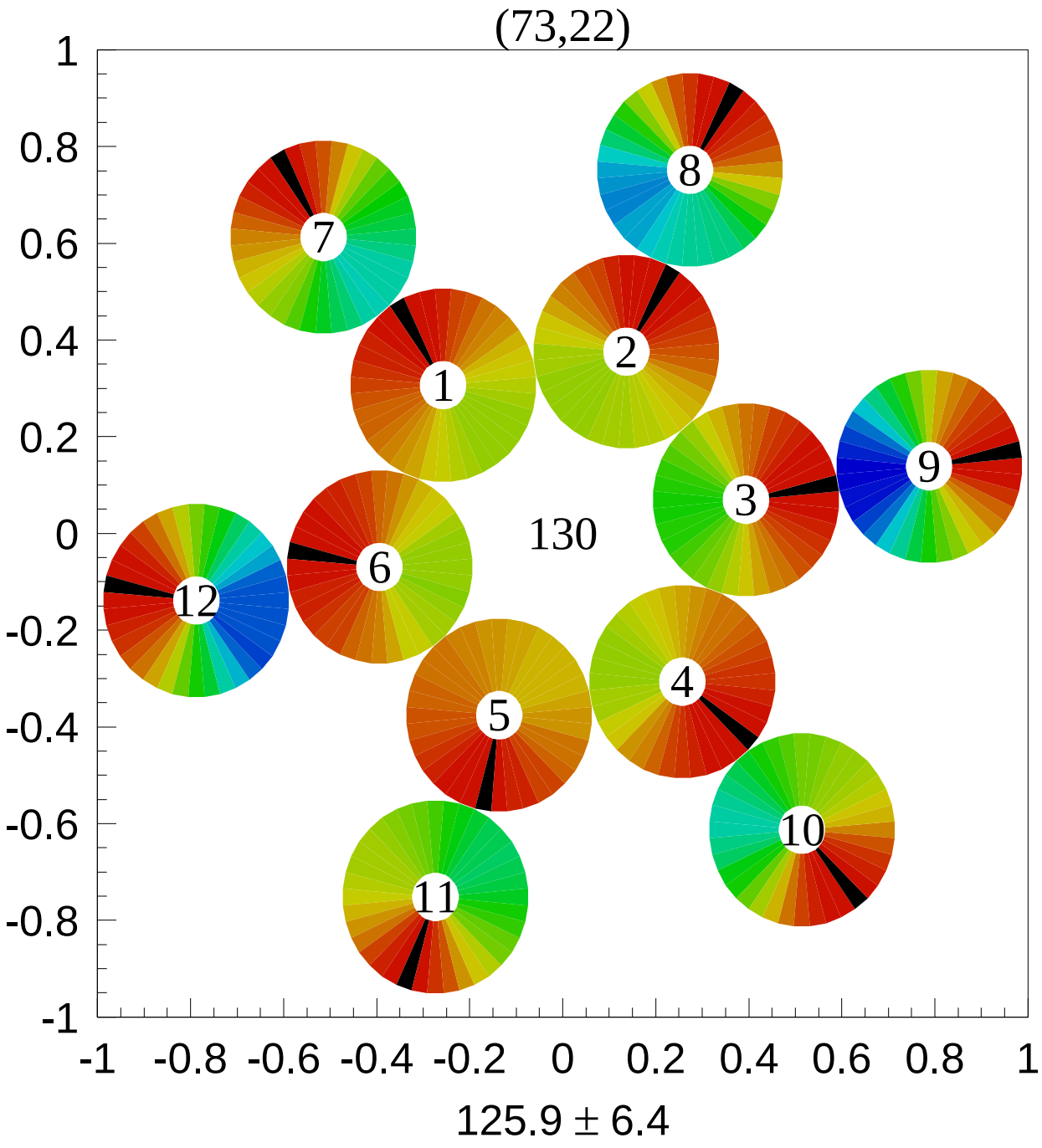

(73,20)
tilted LEDs
121 123 124 123 122 133
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 114 119 113 123 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

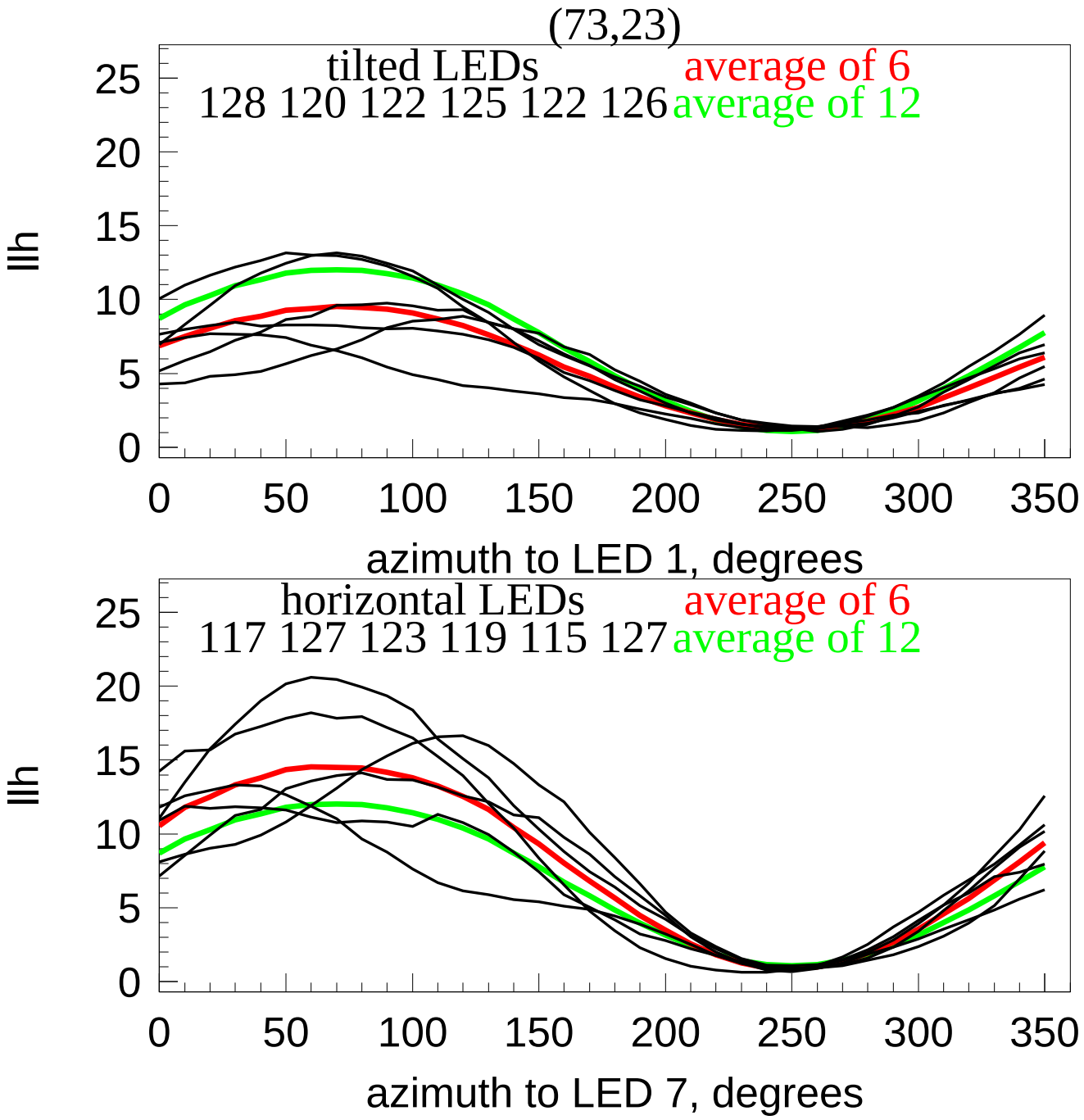

(73,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
100.2 ± 7.1

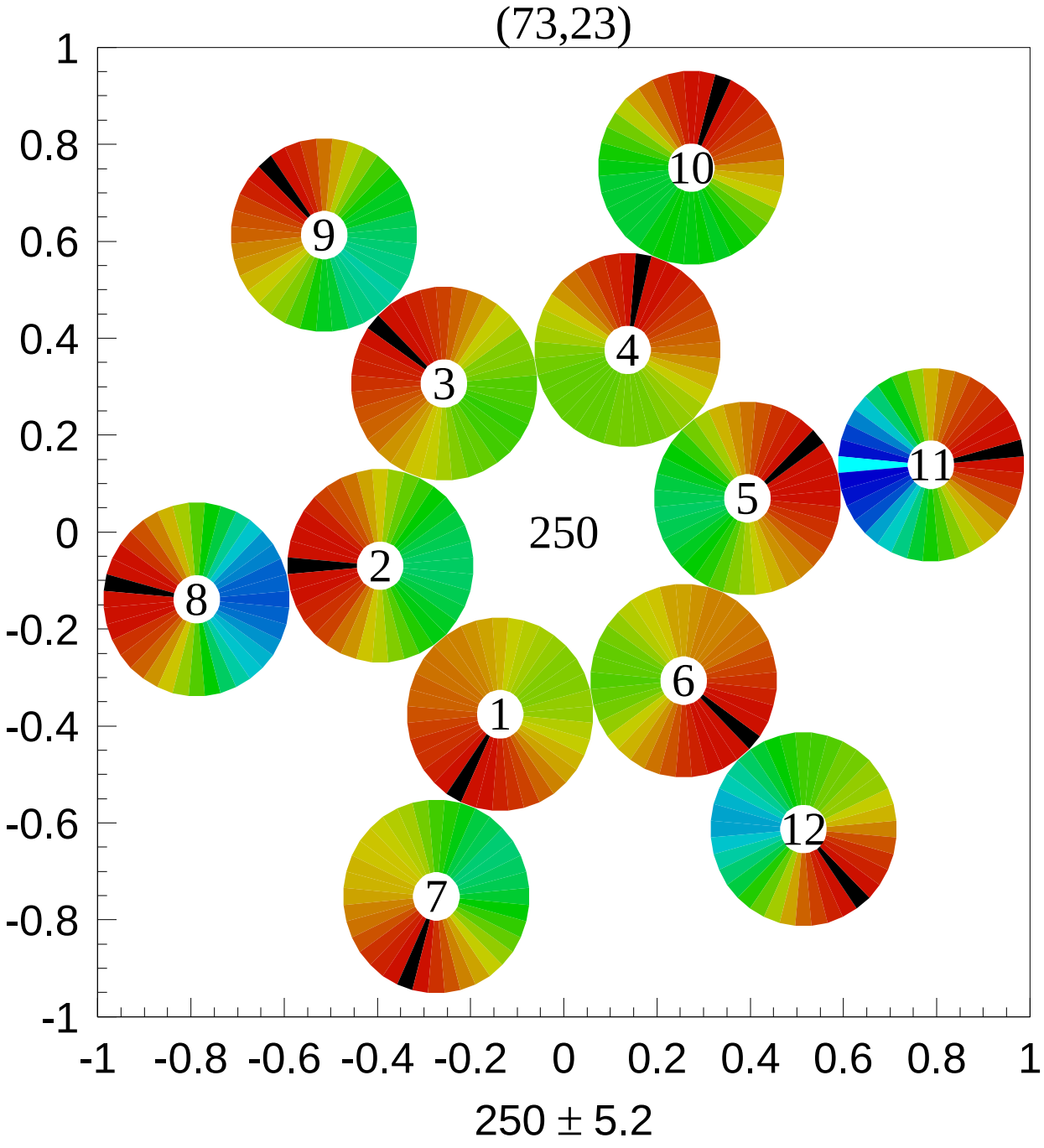

(73,21)
tilted LEDs
123 122 126 117 121 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 123 123 119 120 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

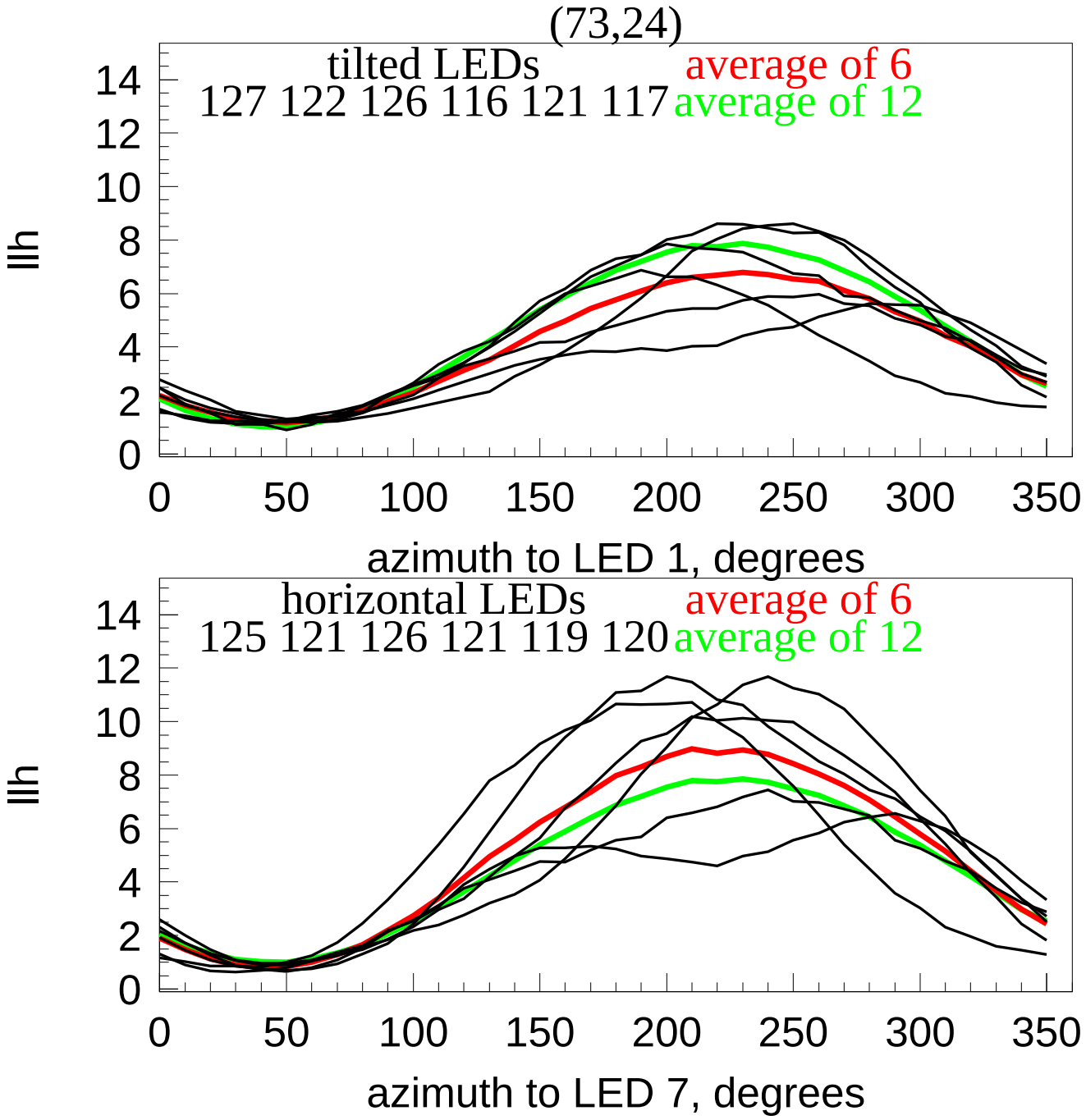

(73,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
246.4 ± 7.3

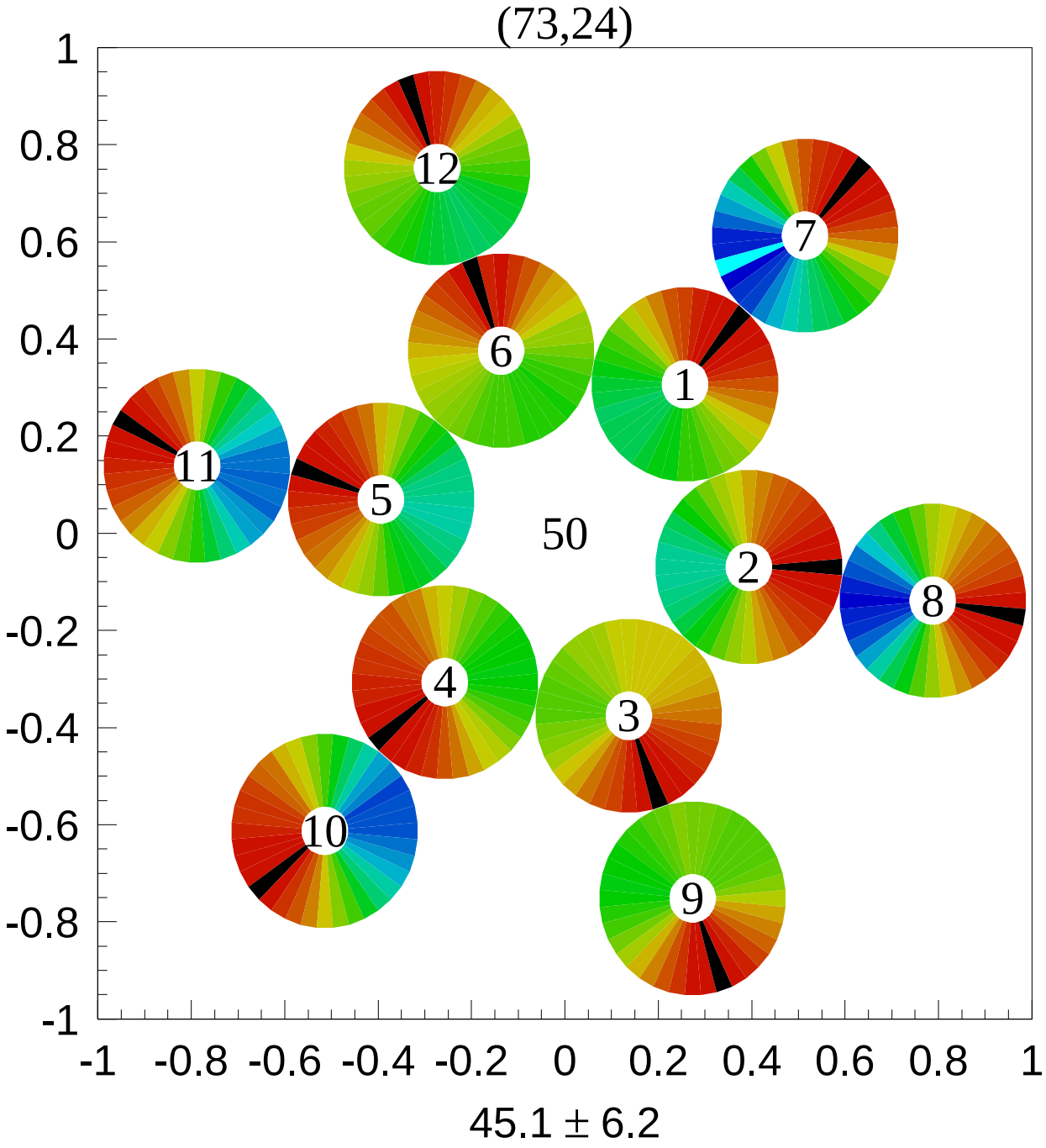

(73,22)
tilted LEDs
121 117 119 124 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 119 121 126 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

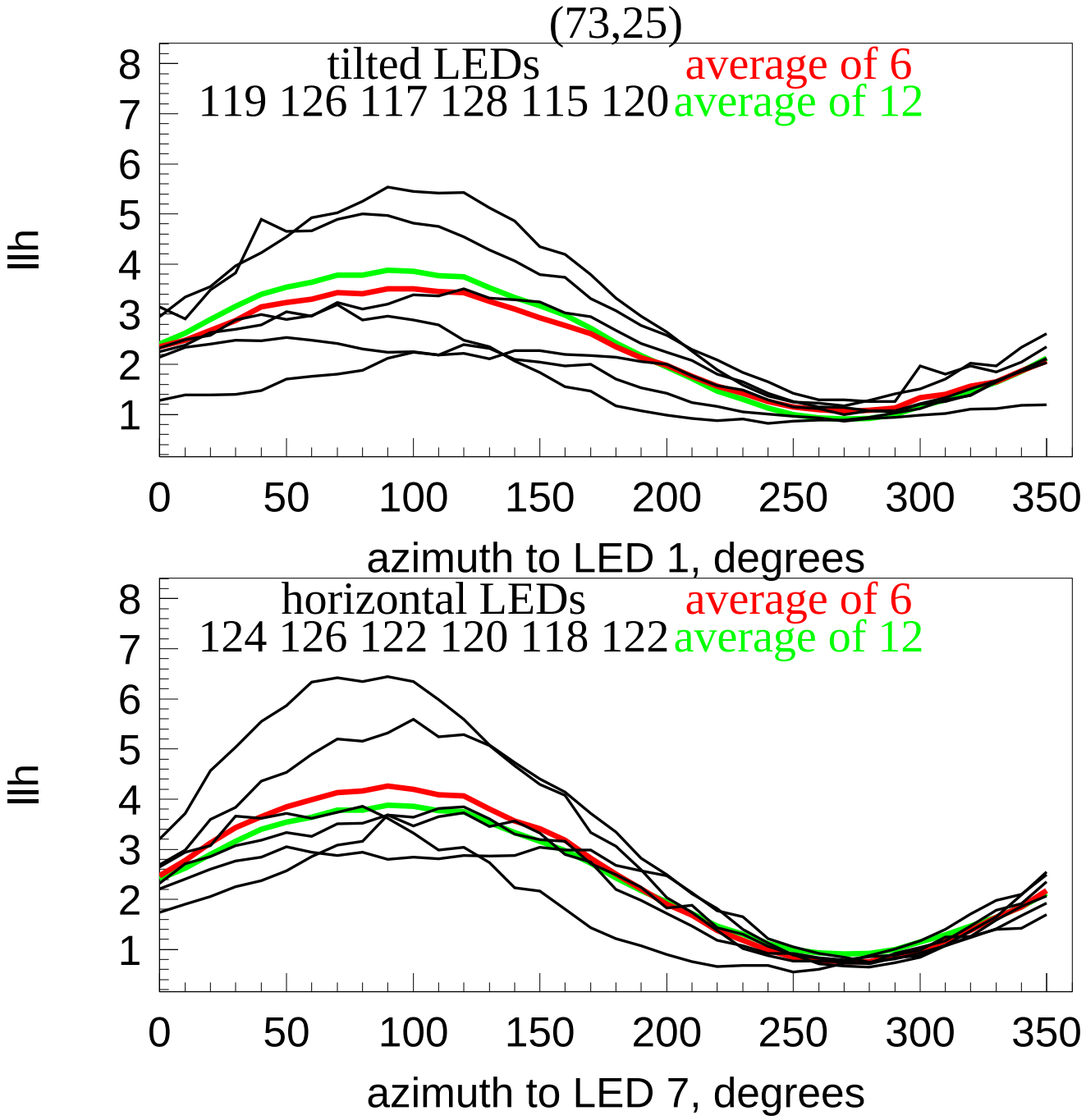

(73,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
125.9 ± 6.4

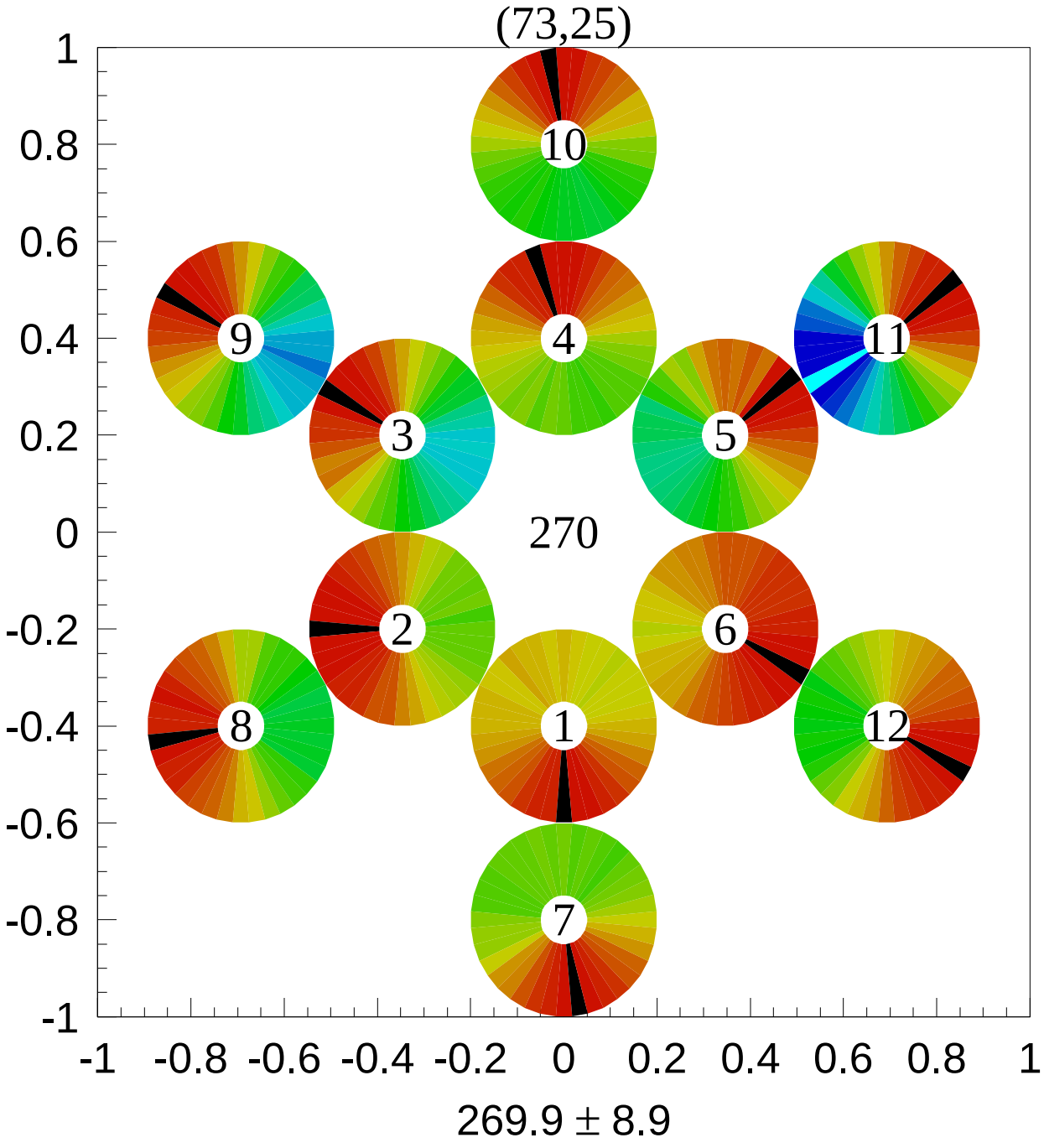

(73,23)
tilted LEDs
128 120 122 125 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 127 123 119 115 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

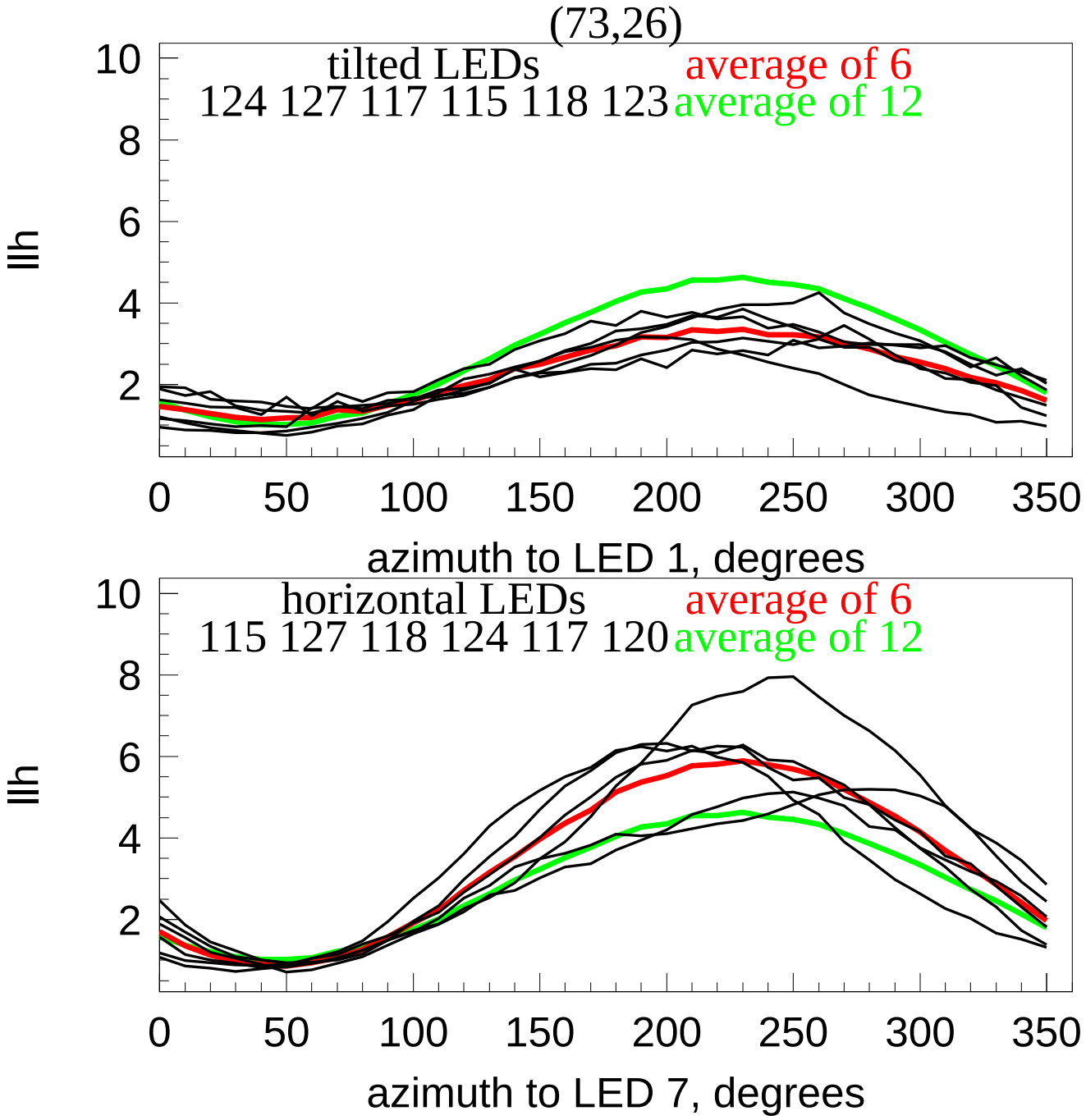

(73,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250 ± 5.2
250
1
2
3
4
5
6
7
8
9
10
11
12

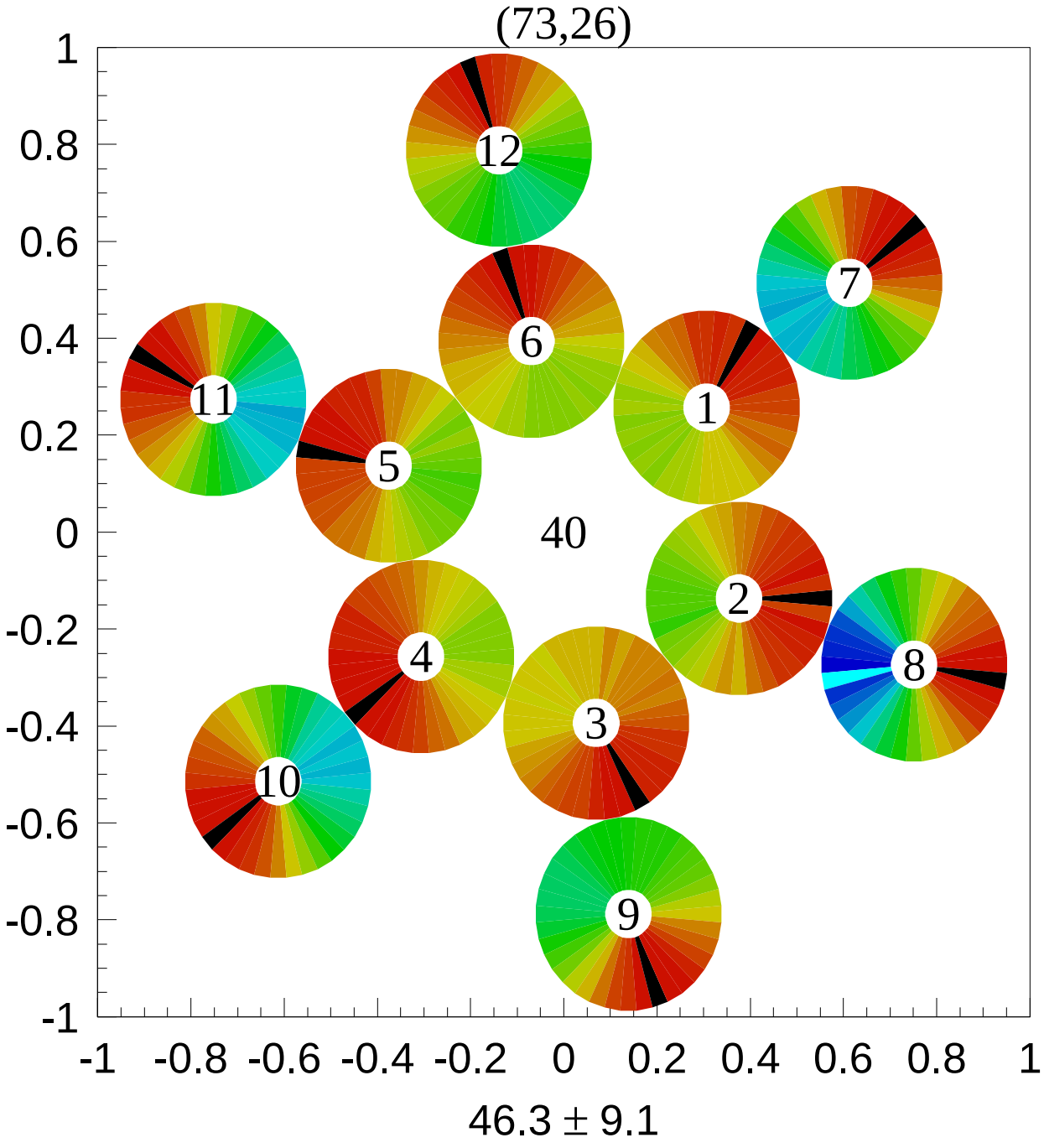

(73,24)
tilted LEDs
127 122 126 116 121 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 121 126 121 119 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

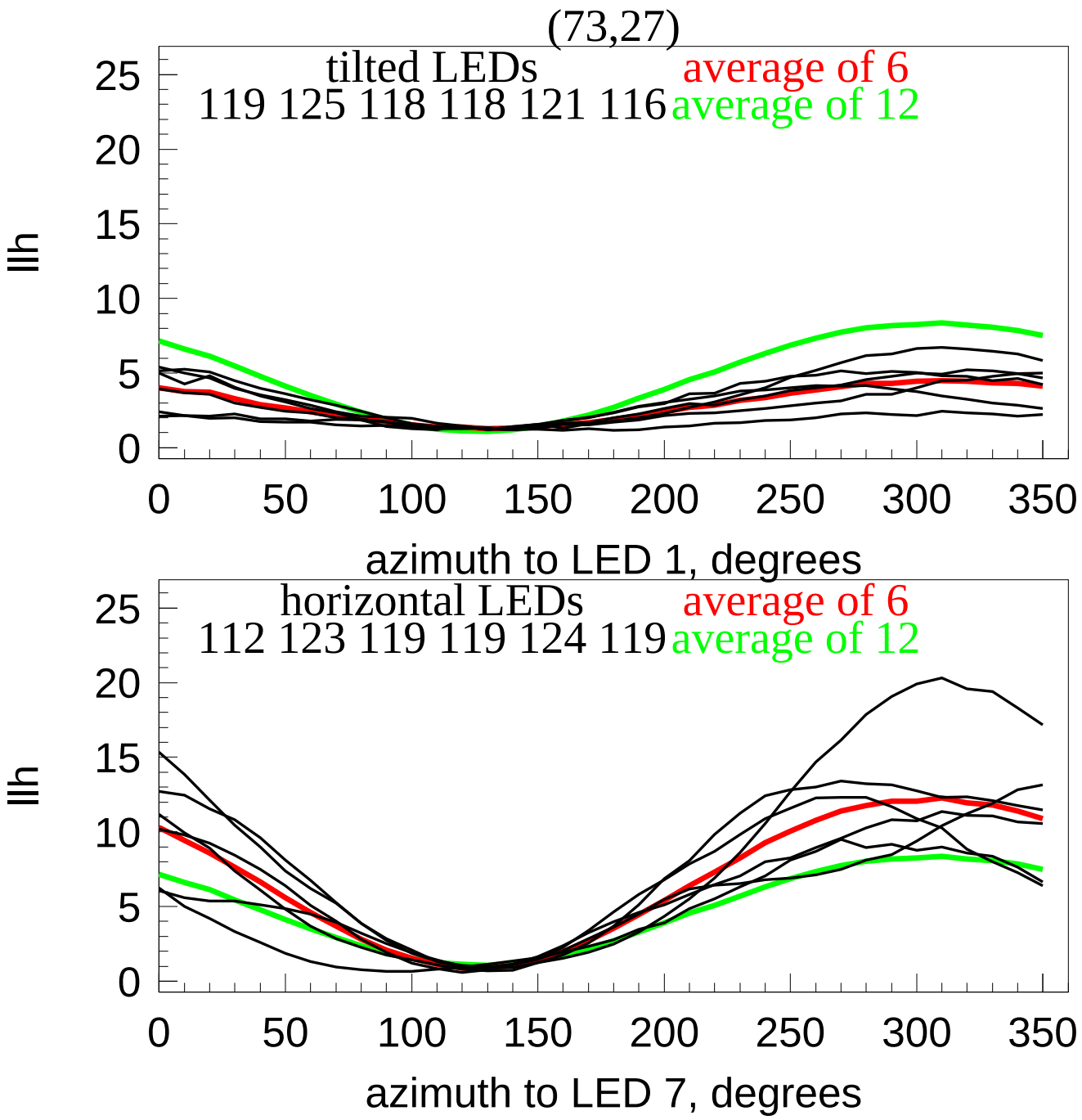

(73,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
45.1 ± 6.2

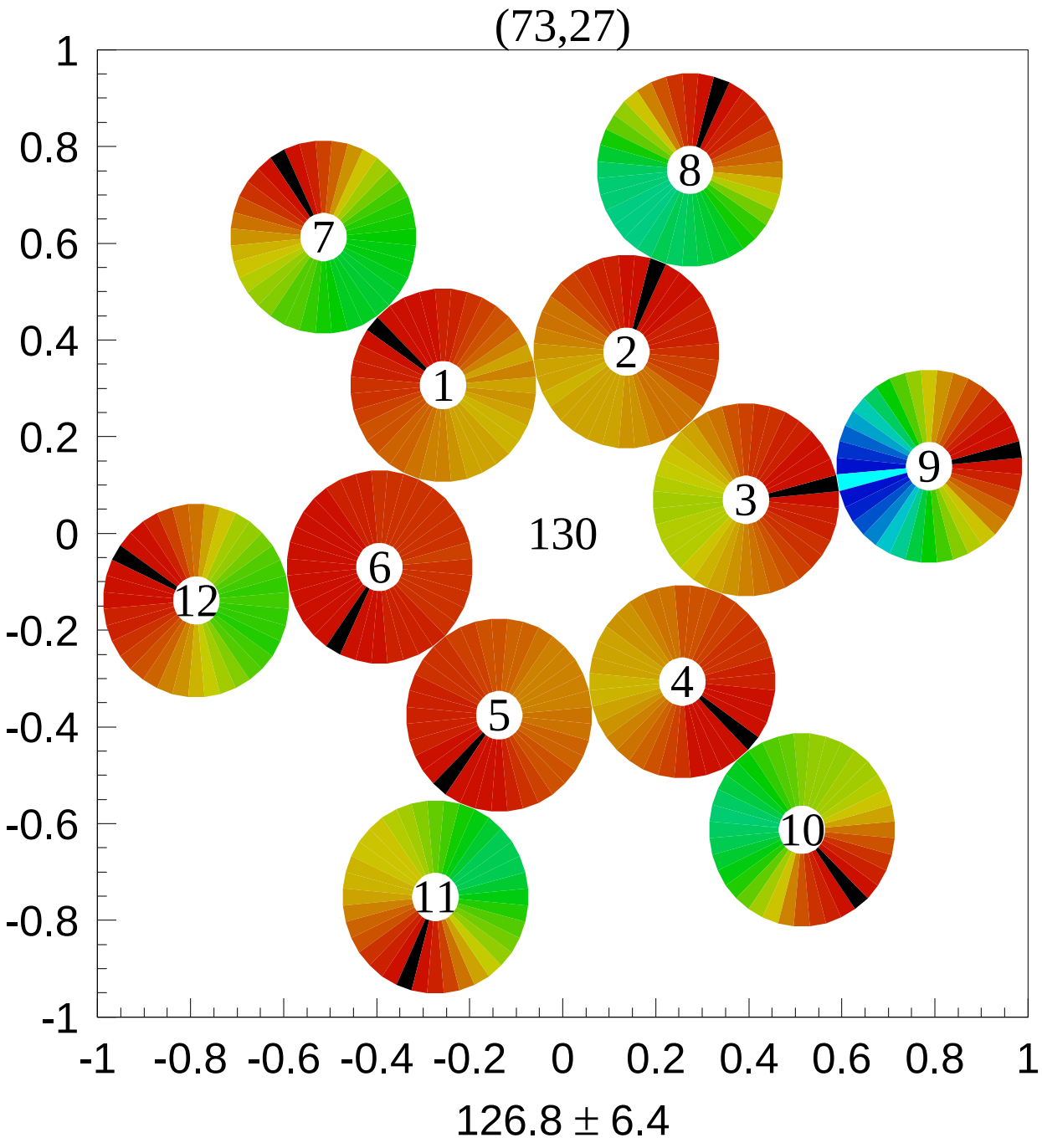

(73,25)
tilted LEDs
119 126 117 128 115 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 126 122 120 118 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

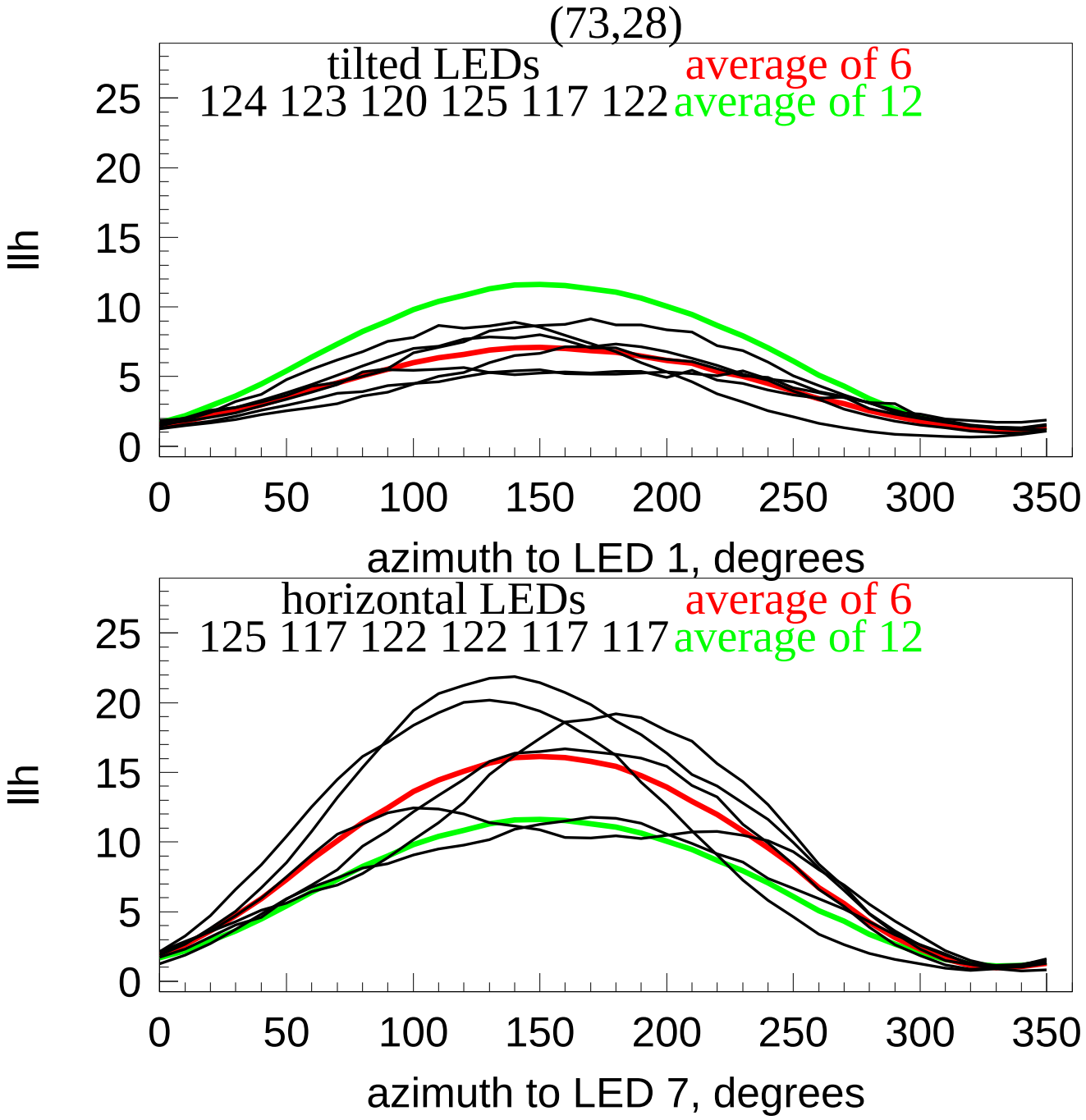

(73,25)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
269.9 ± 8.9

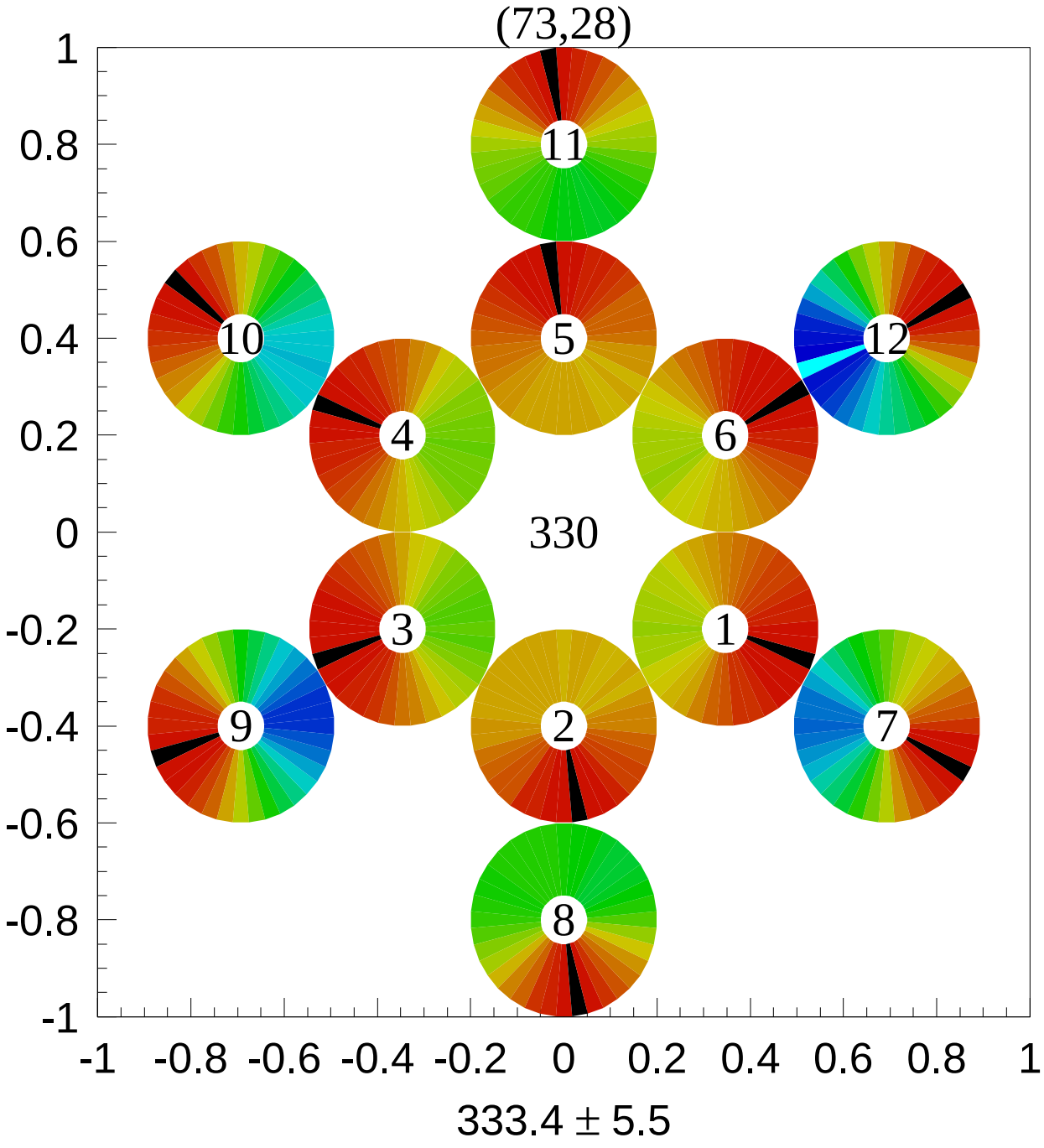

(73,26)
tilted LEDs
124 127 117 115 118 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 127 118 124 117 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

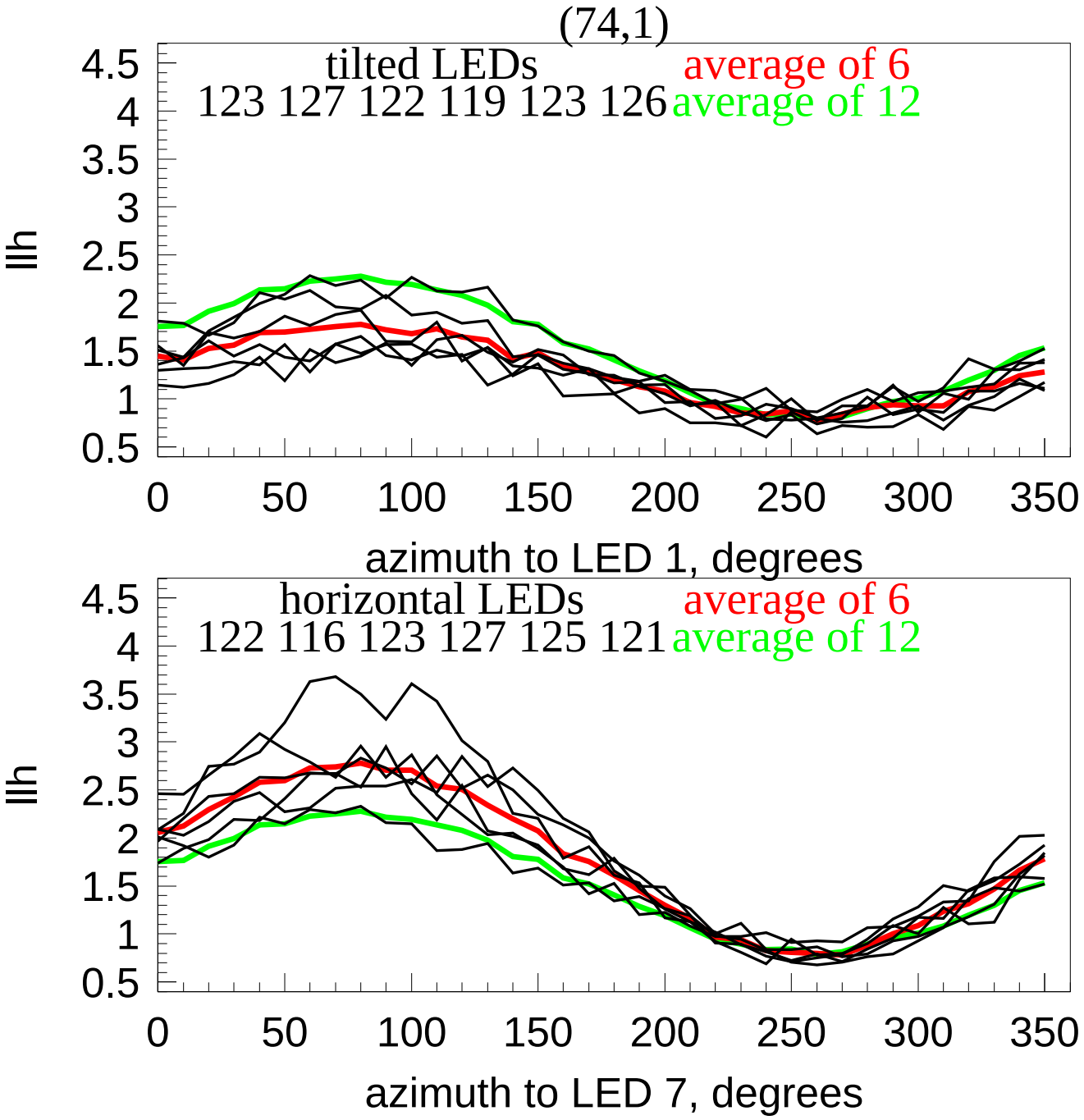

(73,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
46.3 ± 9.1

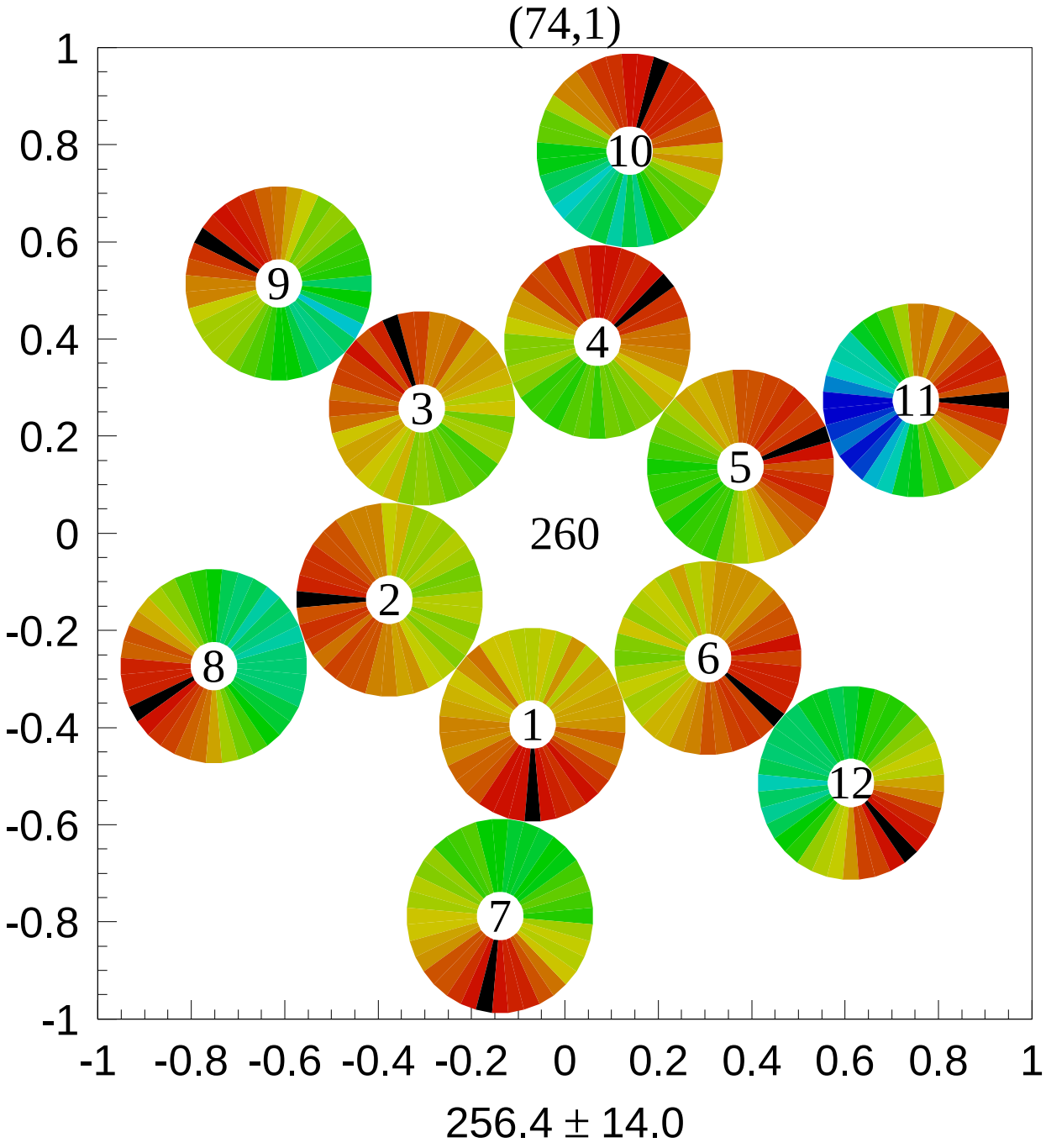

(73,27)
tilted LEDs
119 125 118 118 121 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
112 123 119 119 124 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

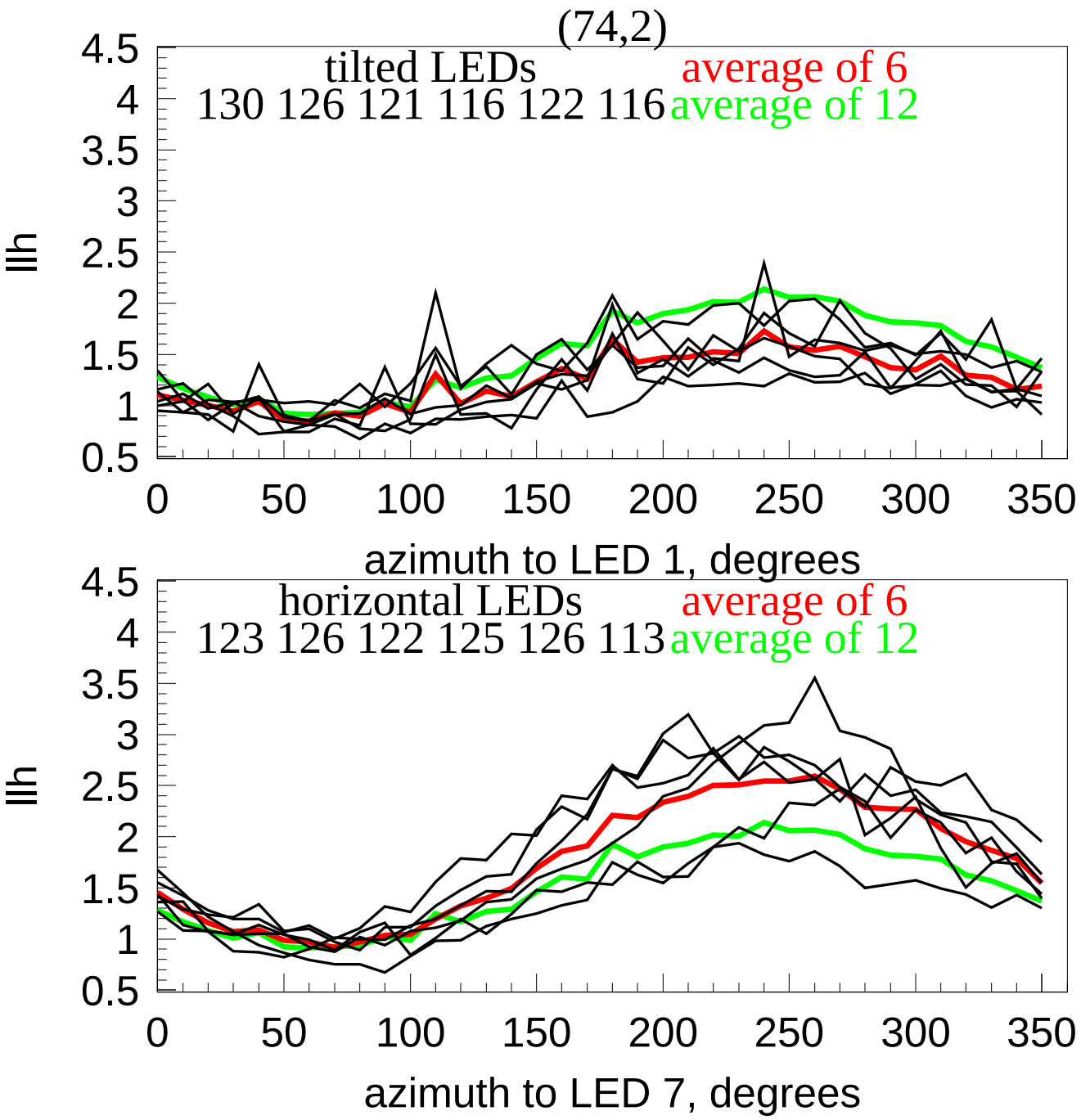

(73,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
126.8 ± 6.4
130
1
2
3
4
5
6
7
8
9
10
11
12

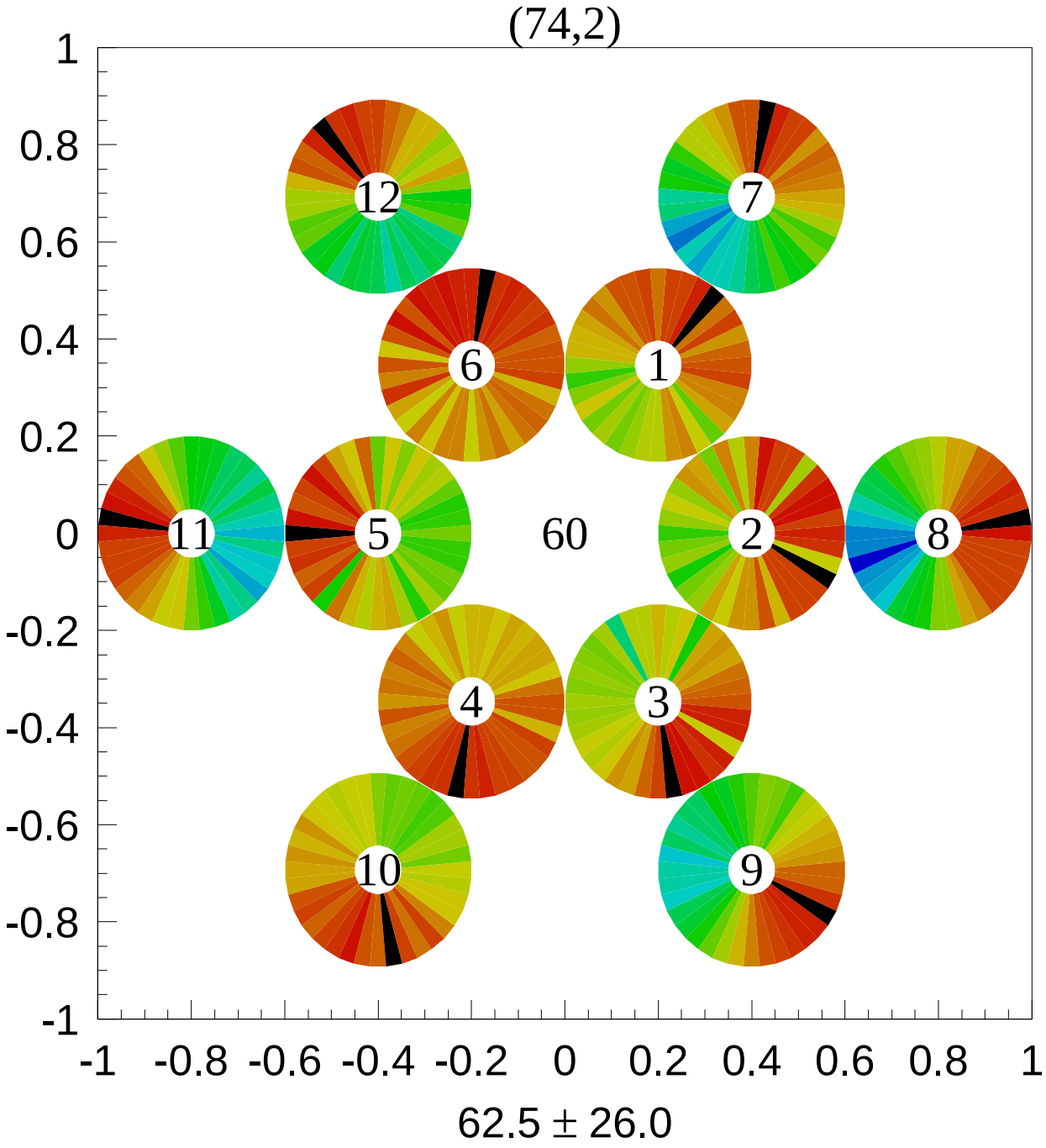

(73,28)
tilted LEDs
124 123 120 125 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 117 122 122 117 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

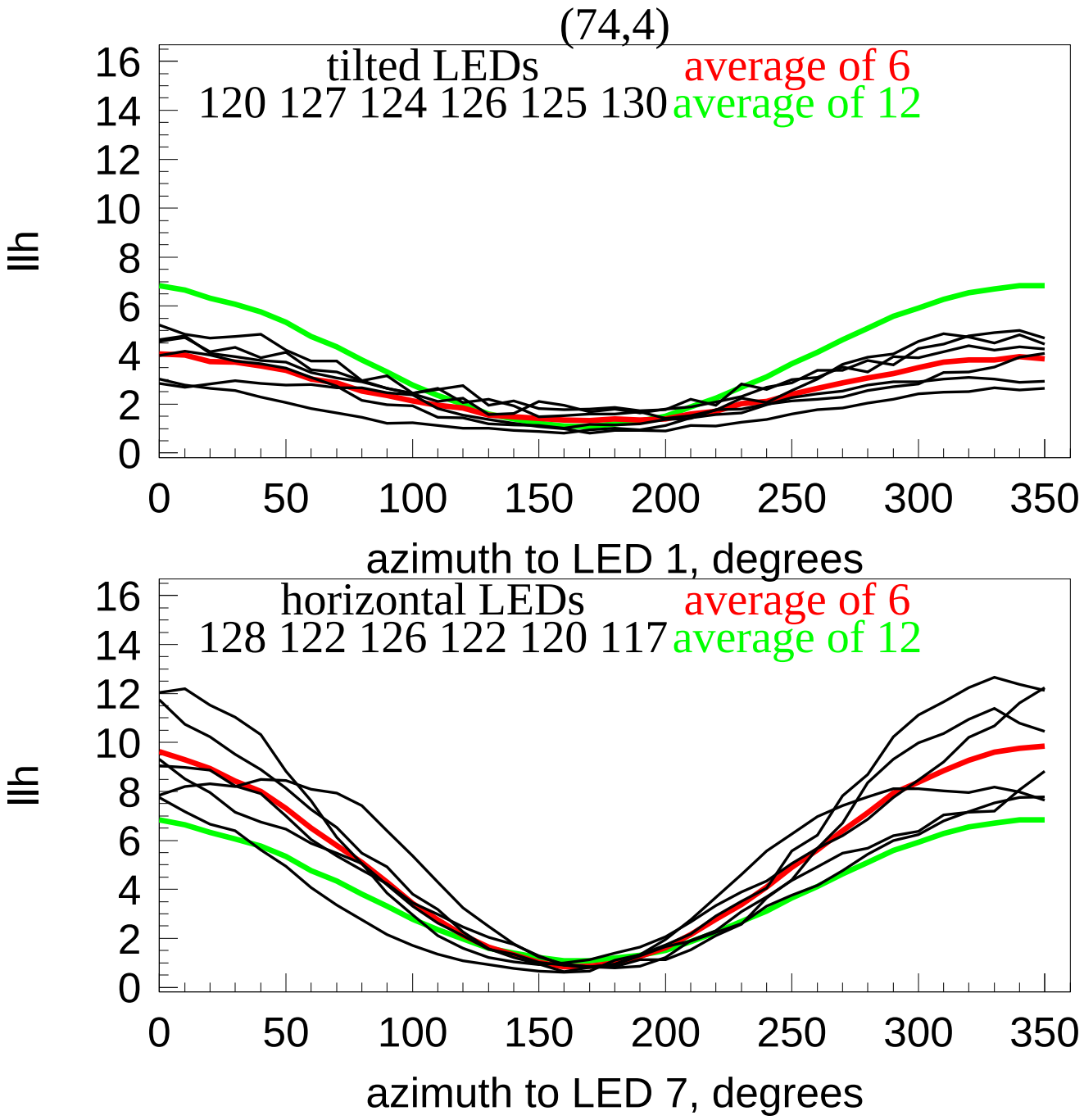

(73,28)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
333.4 ± 5.5

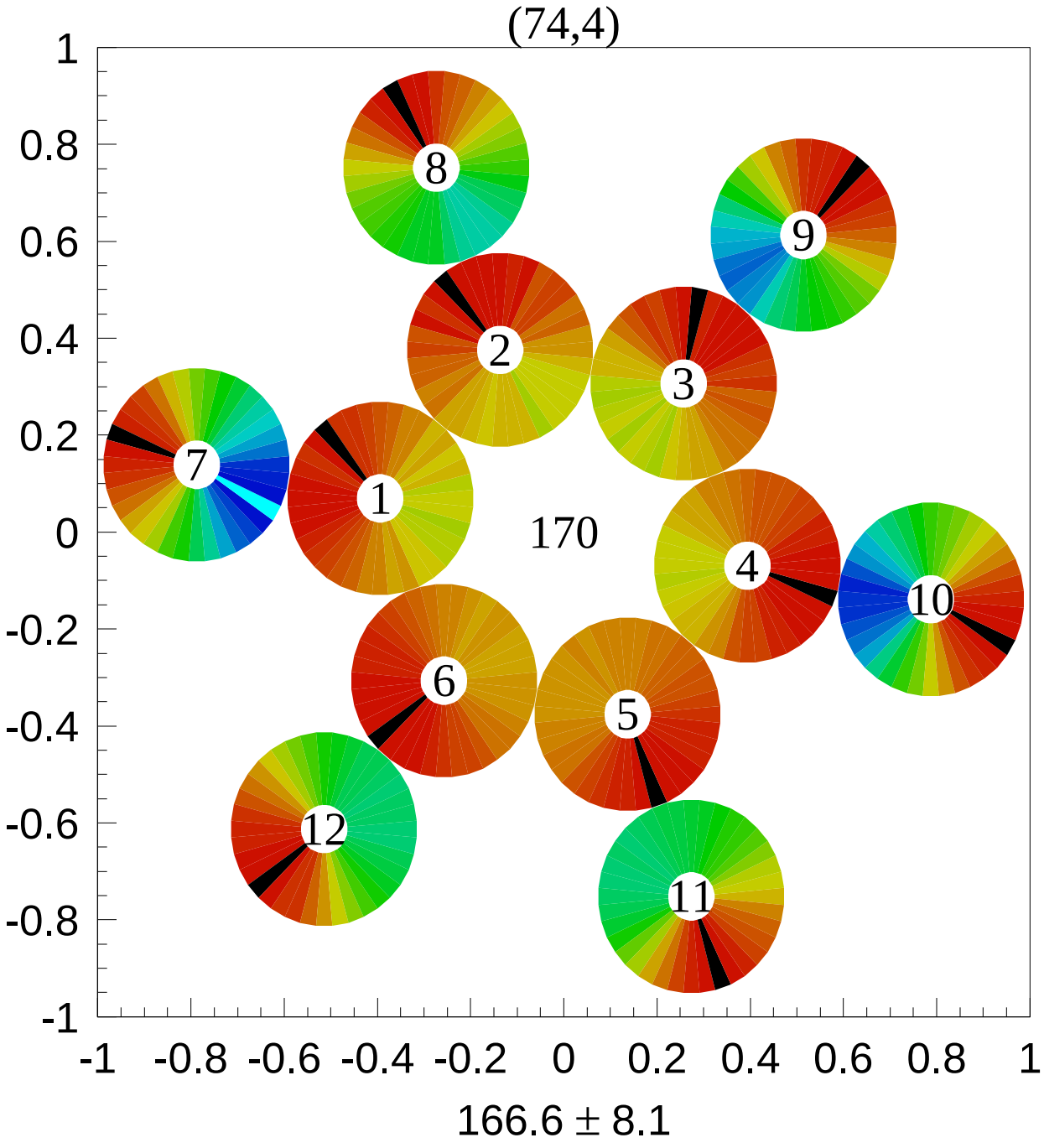

(74,1)
tilted LEDs
123 127 122 119 123 126
average of 6
average of 12
Ilh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 116 123 127 125 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

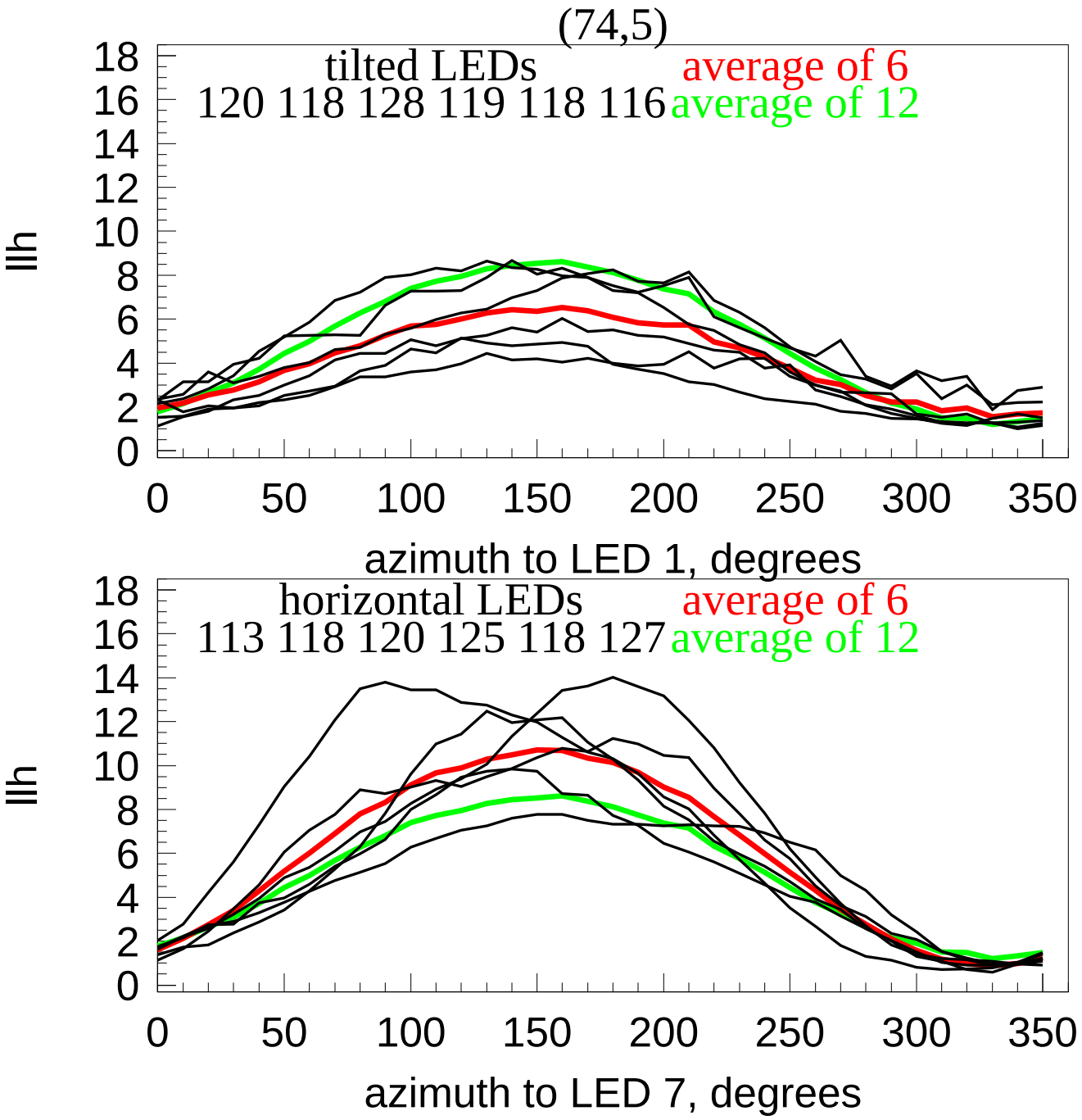

(74,1)
10
9
4
3
11
5
260
2
8
6
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
256.4 ± 14.0

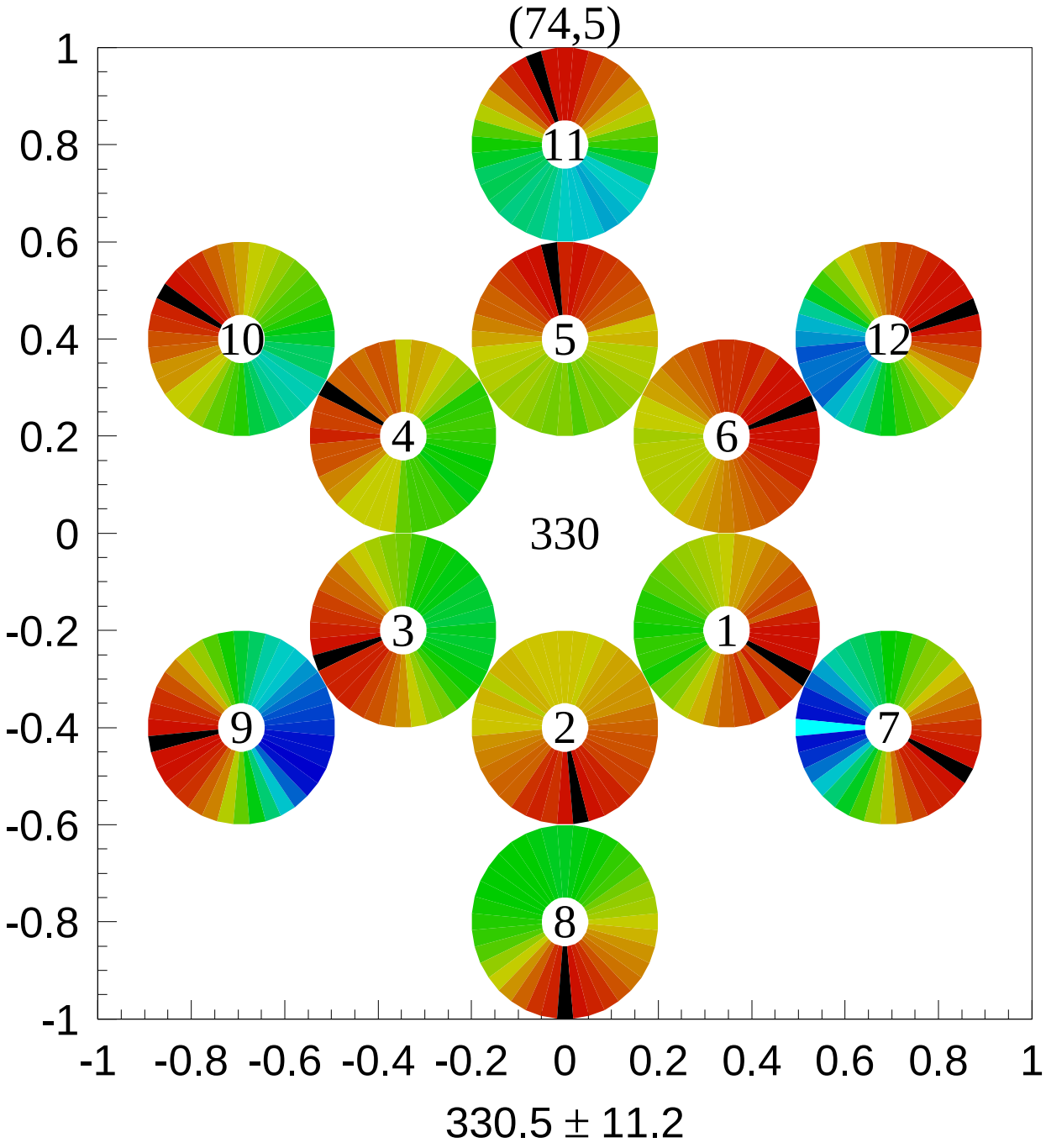

(74,2)
tilted LEDs
130 126 121 116 122 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 126 122 125 126 113
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

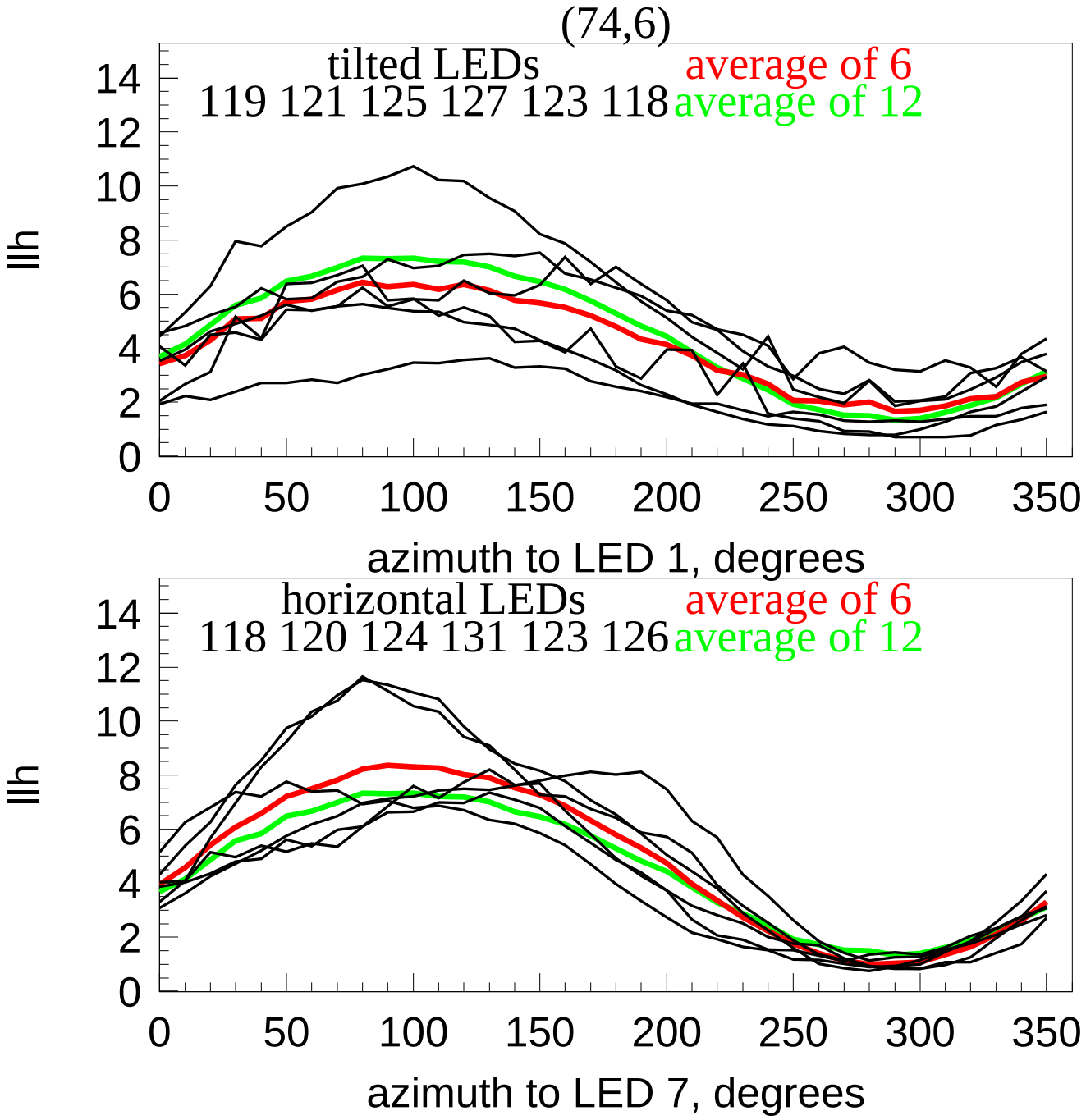

(74,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
62.5 ± 26.0

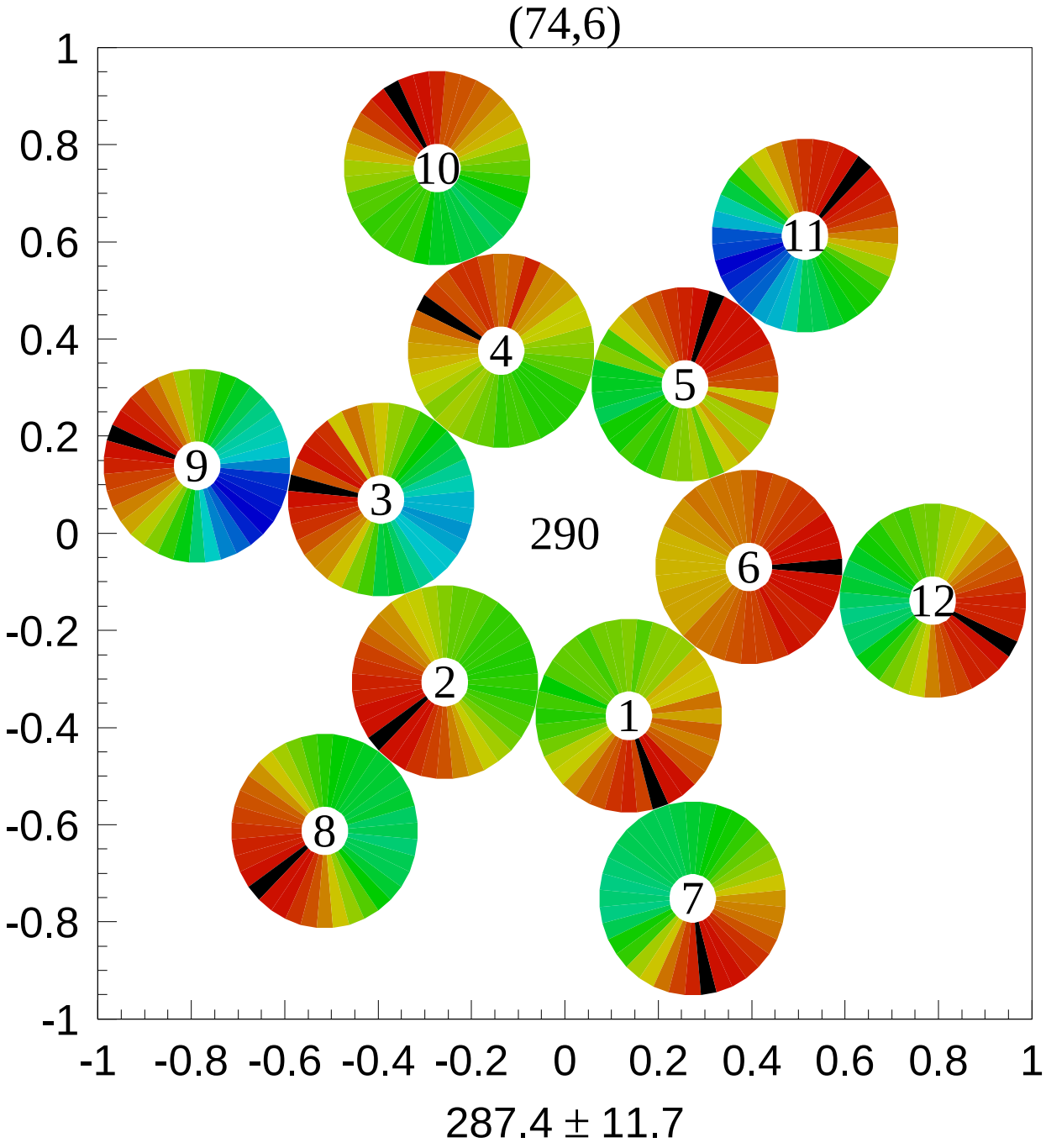

(74,4)
tilted LEDs
120 127 124 126 125 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 122 126 122 120 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

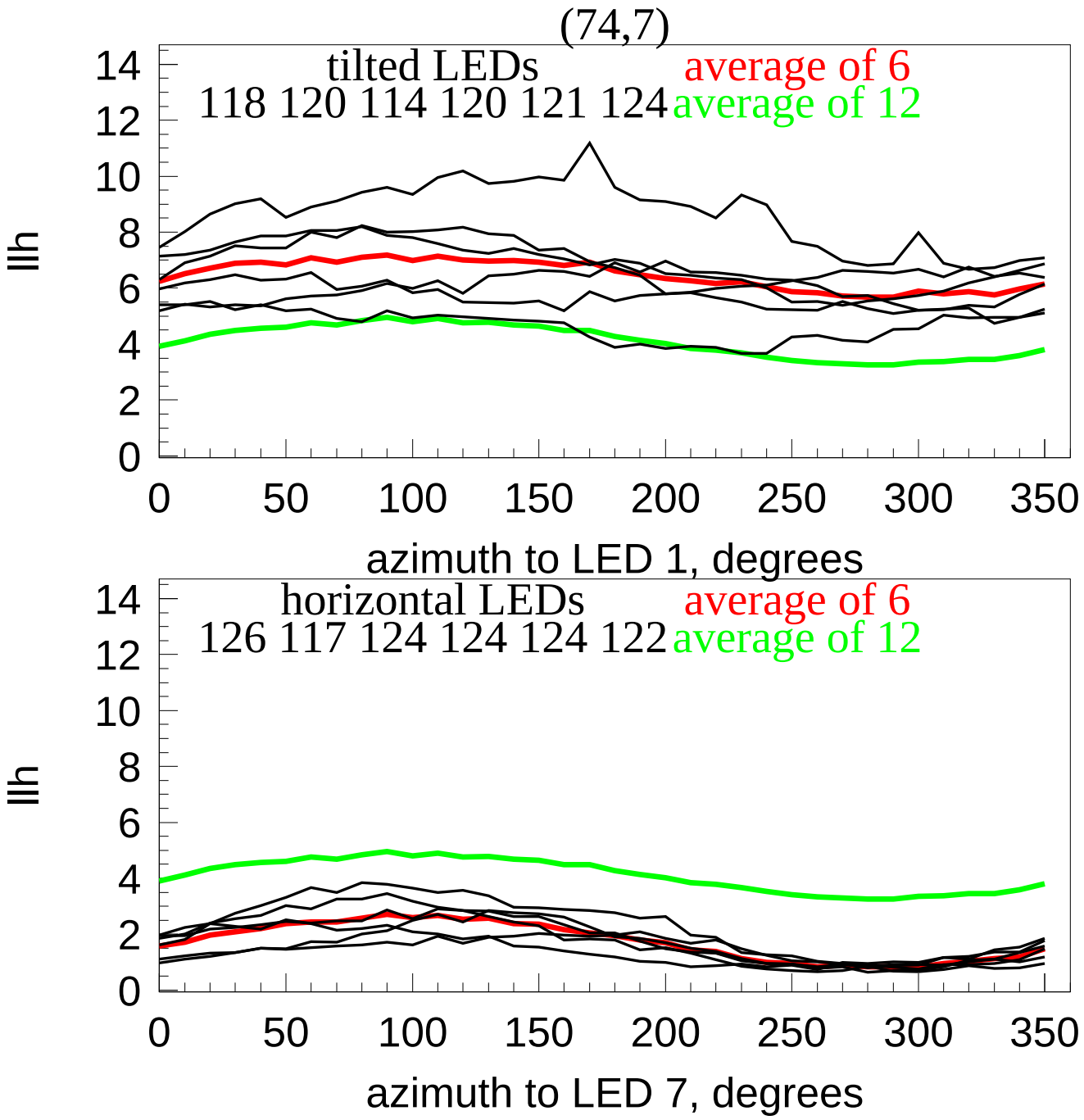

(74,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
166.6 ± 8.1

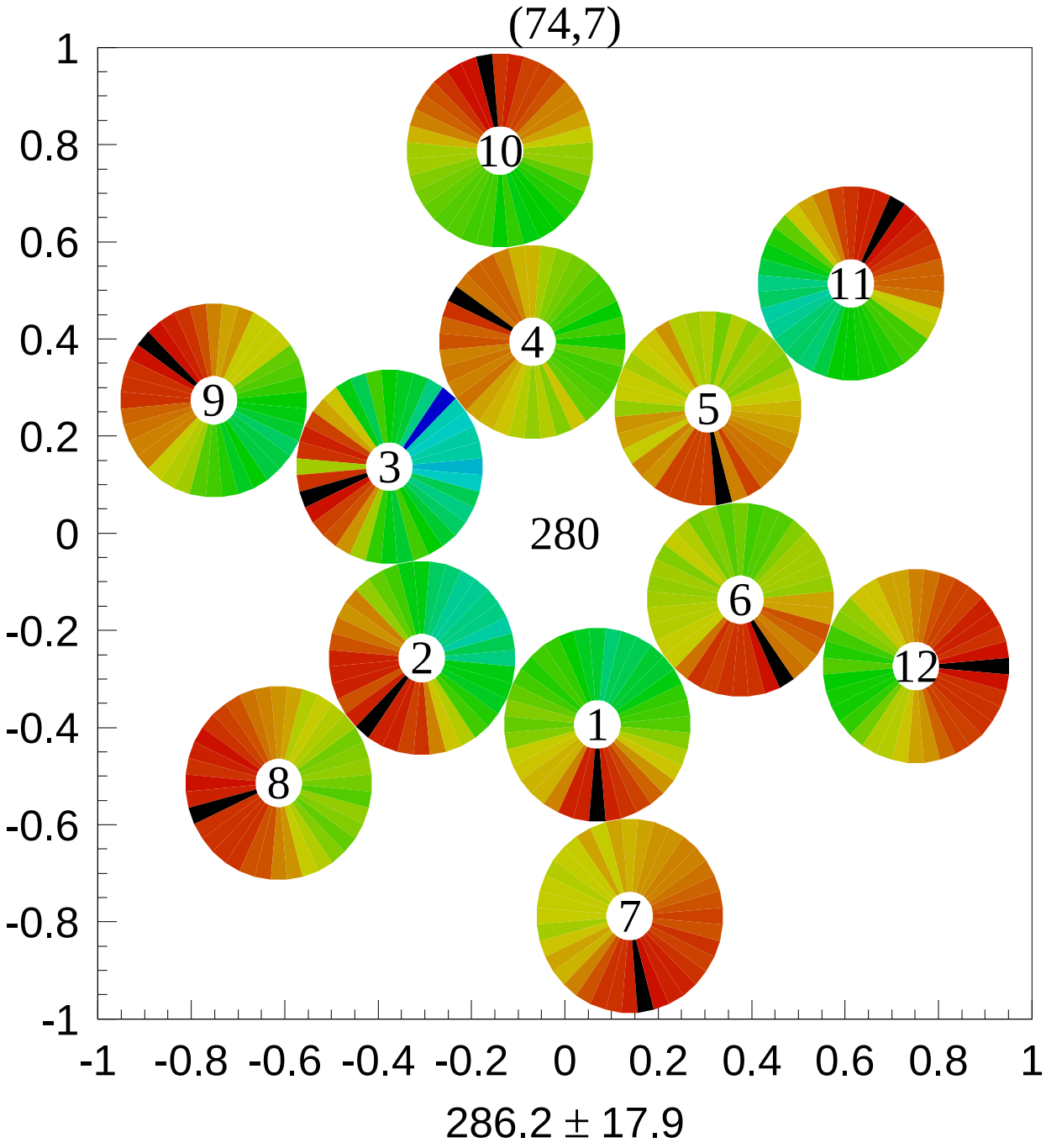

(74,5)
tilted LEDs
120 118 128 119 118 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 118 120 125 118 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

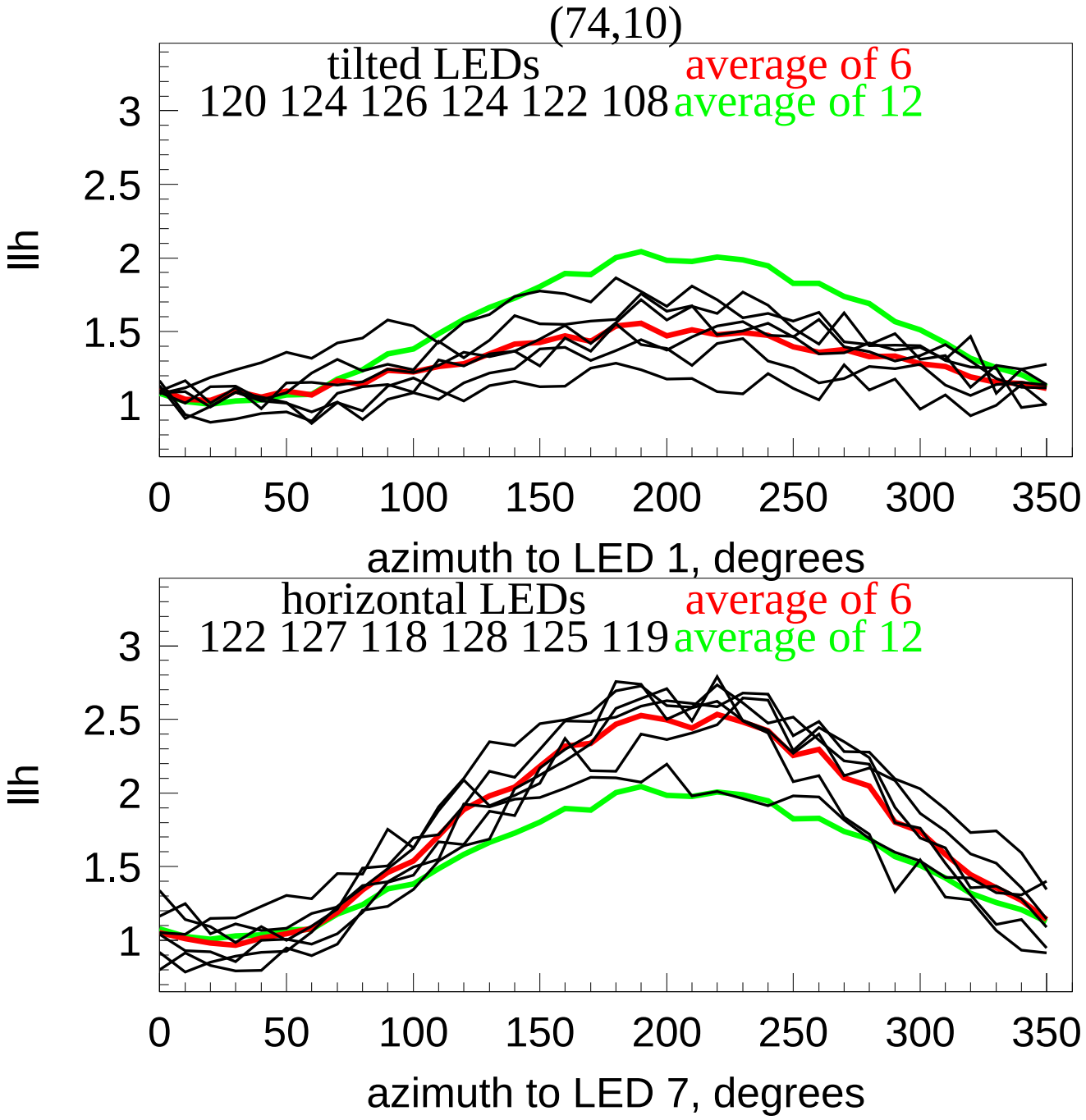

(74,5)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
330.5 ± 11.2

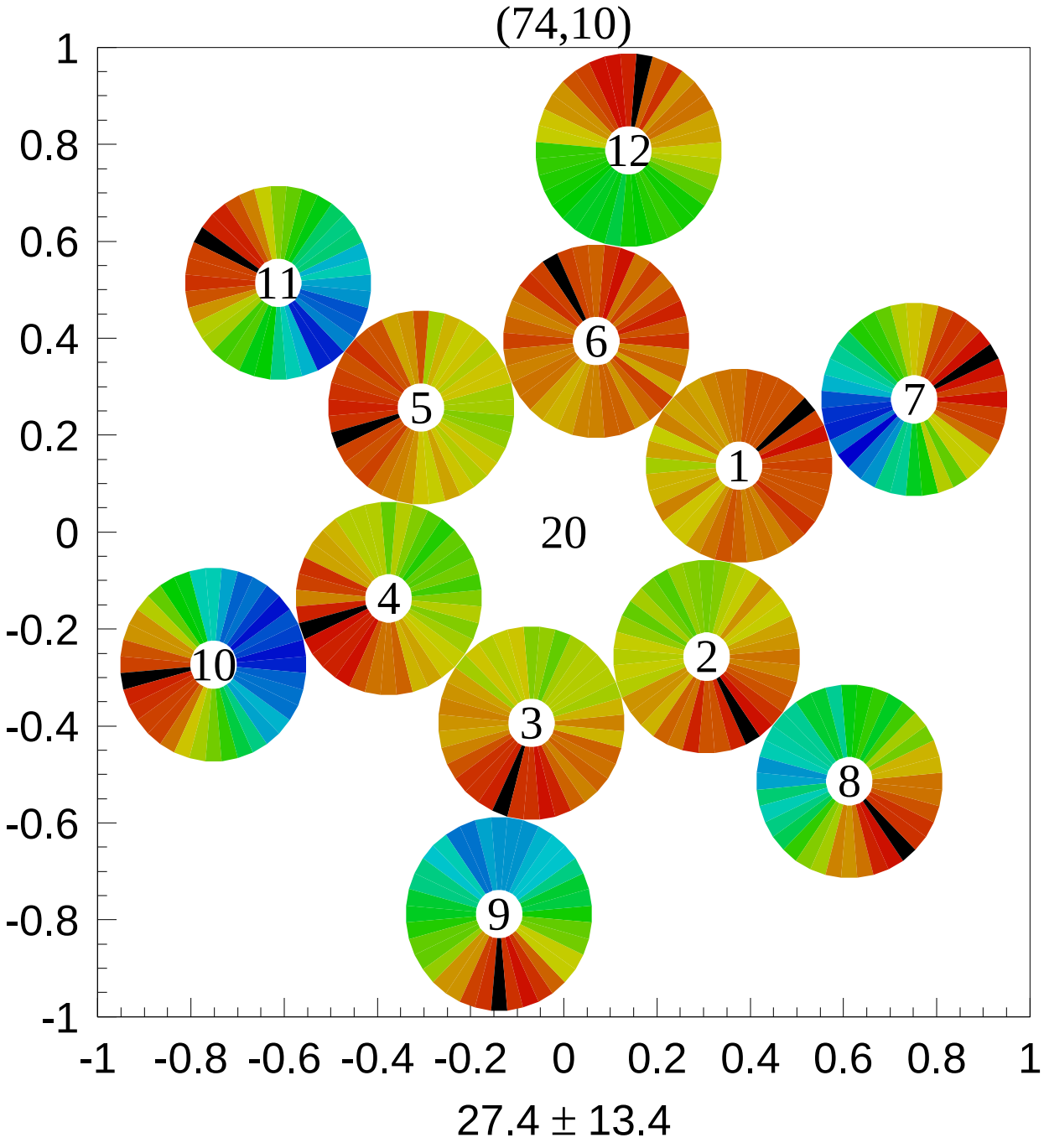

(74,6)
tilted LEDs
119 121 125 127 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 120 124 131 123 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

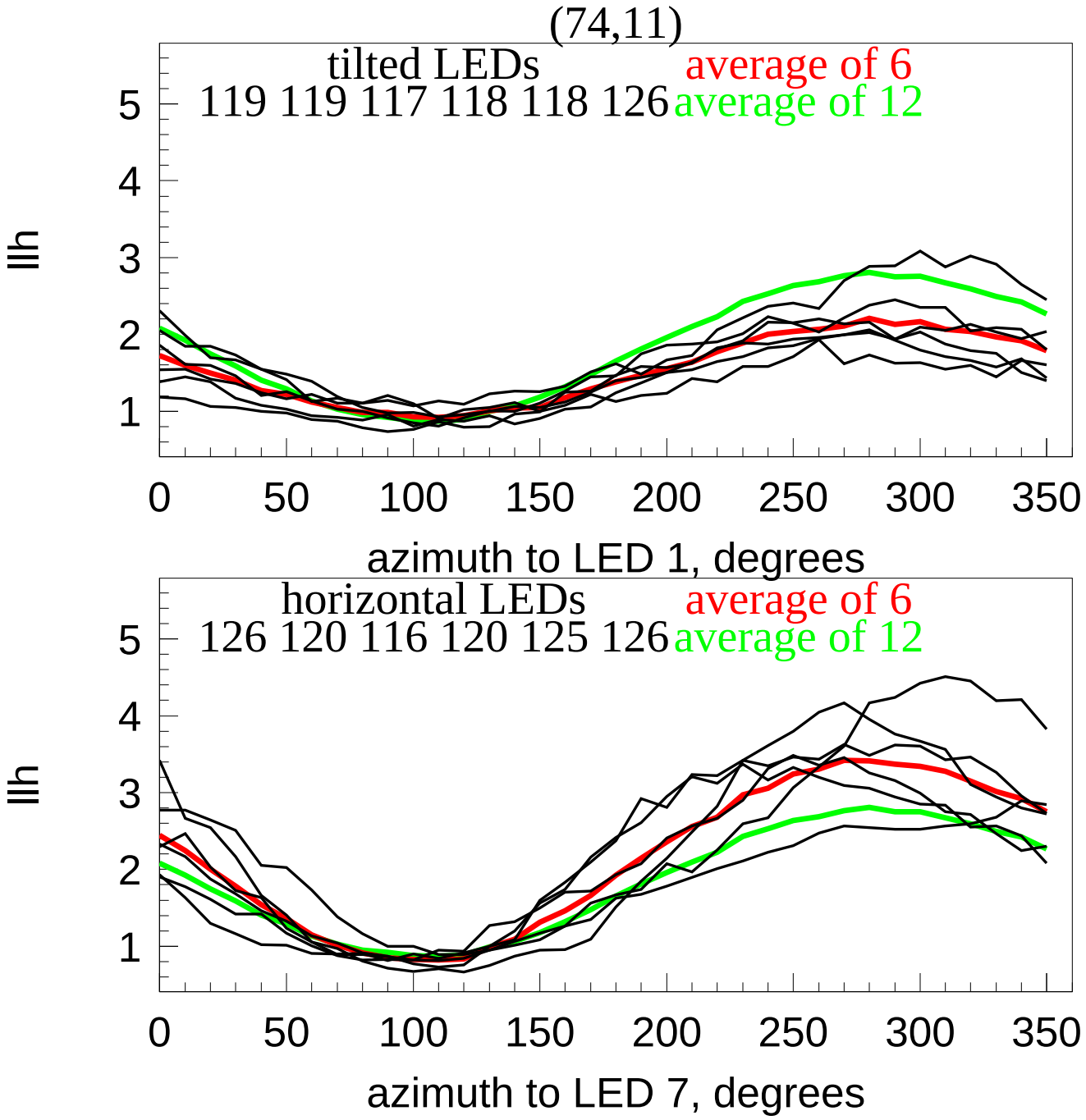

(74,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
287.4 ± 11.7

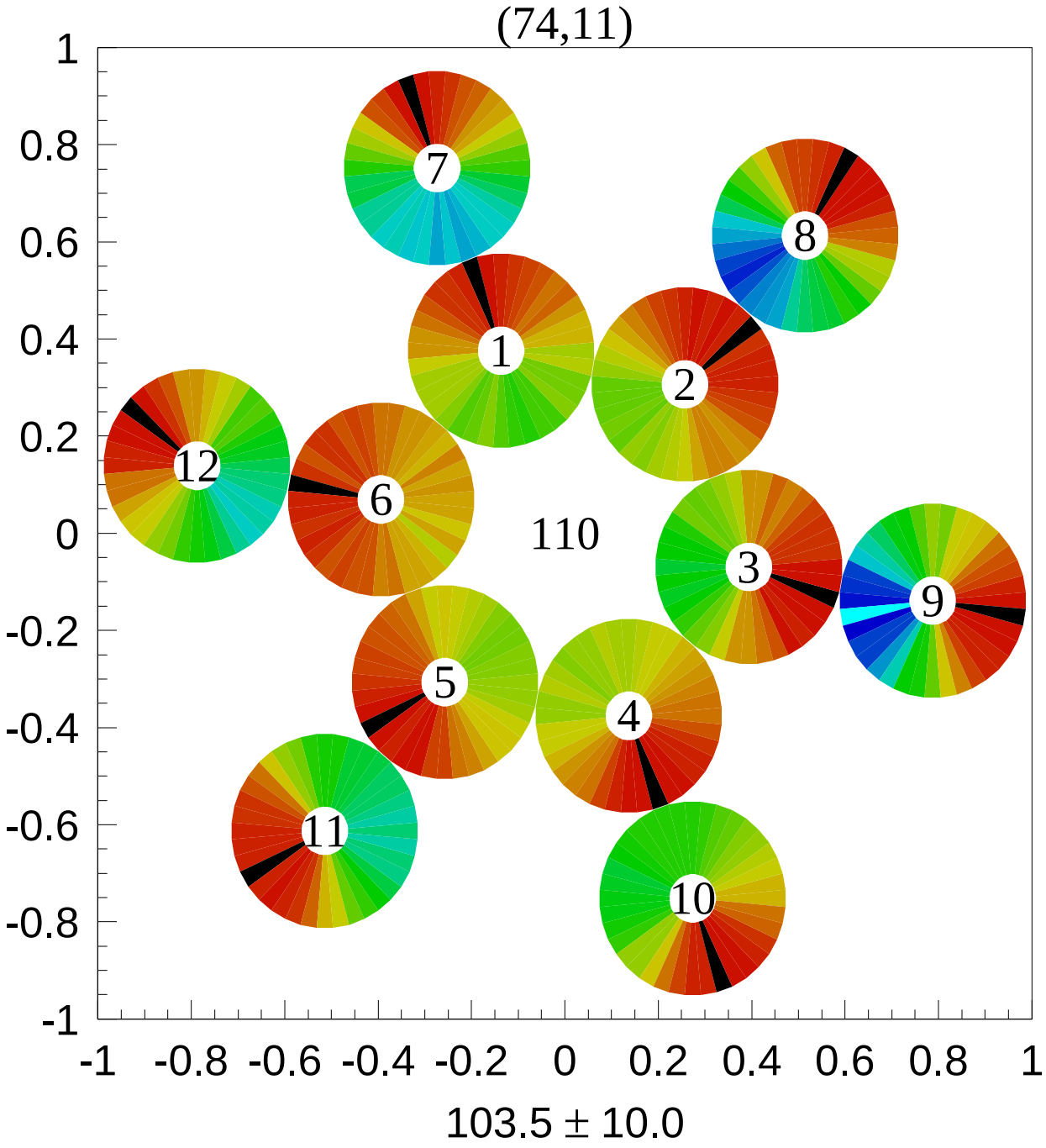

(74,7)
tilted LEDs
118 120 114 120 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 117 124 124 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

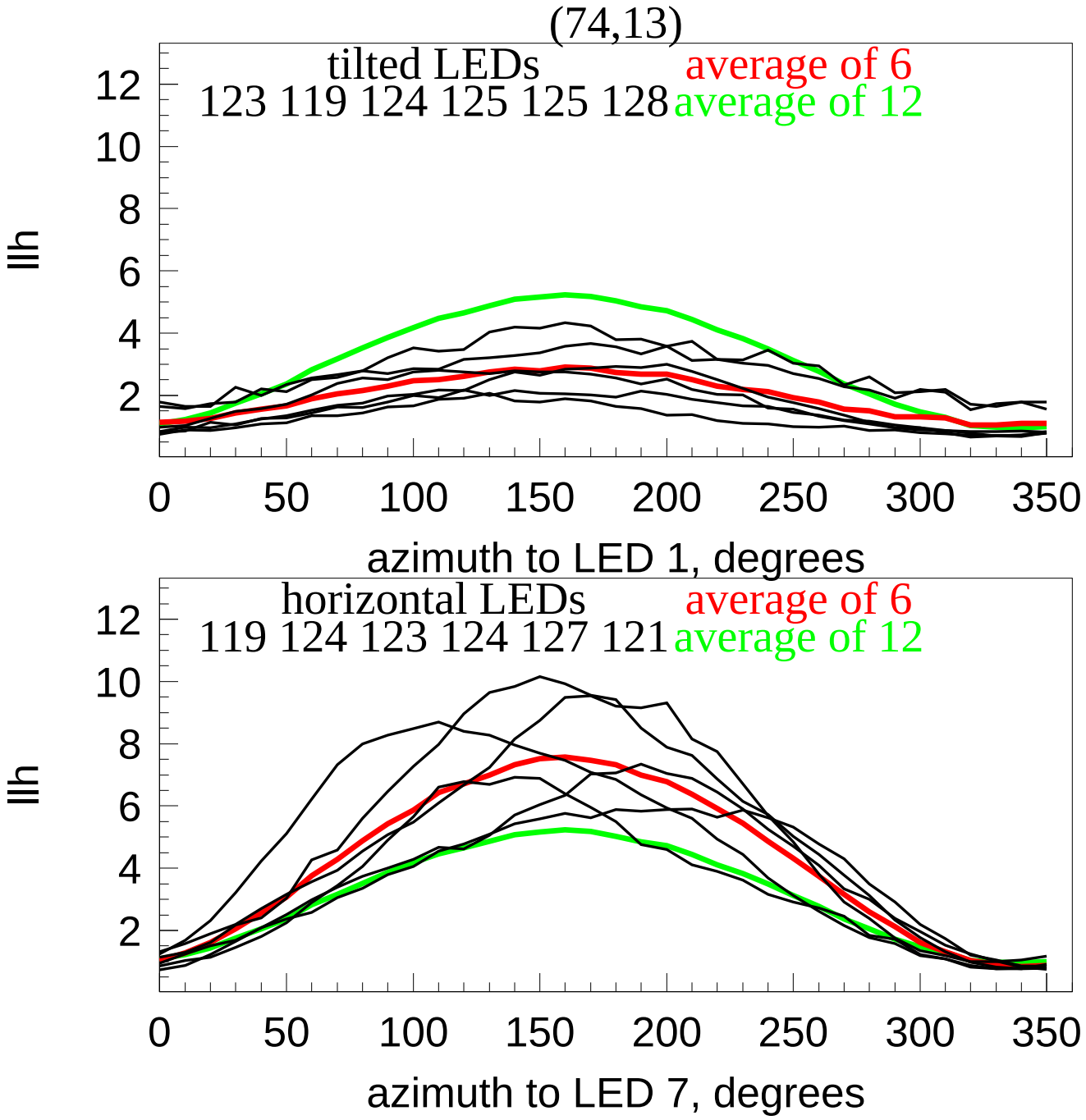

(74,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
286.2 ± 17.9

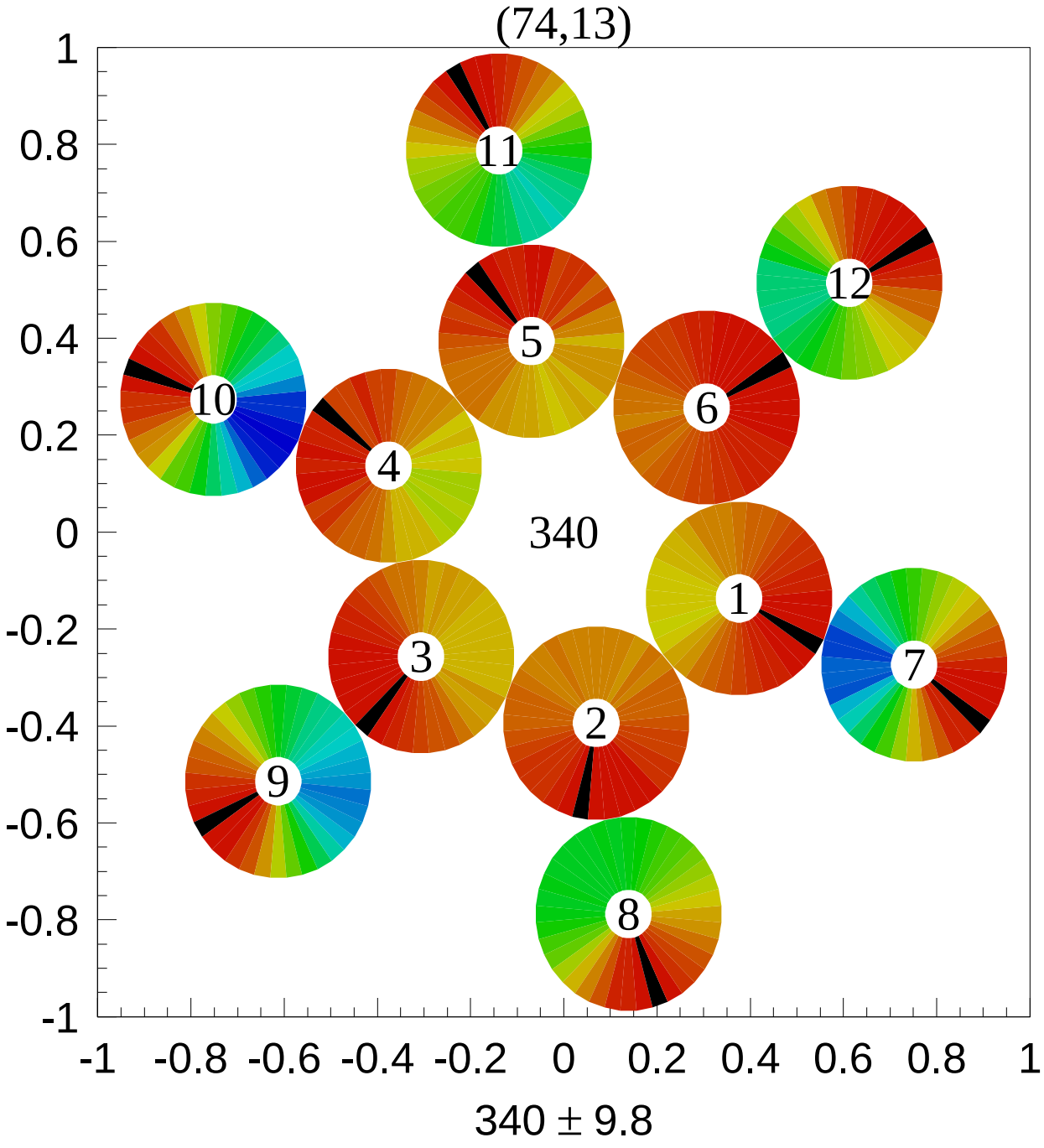

(74,10)
tilted LEDs
120 124 126 124 122 108
average of 6
average of 12
Ilh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 127 118 128 125 119
average of 6
average of 12
Ilh
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

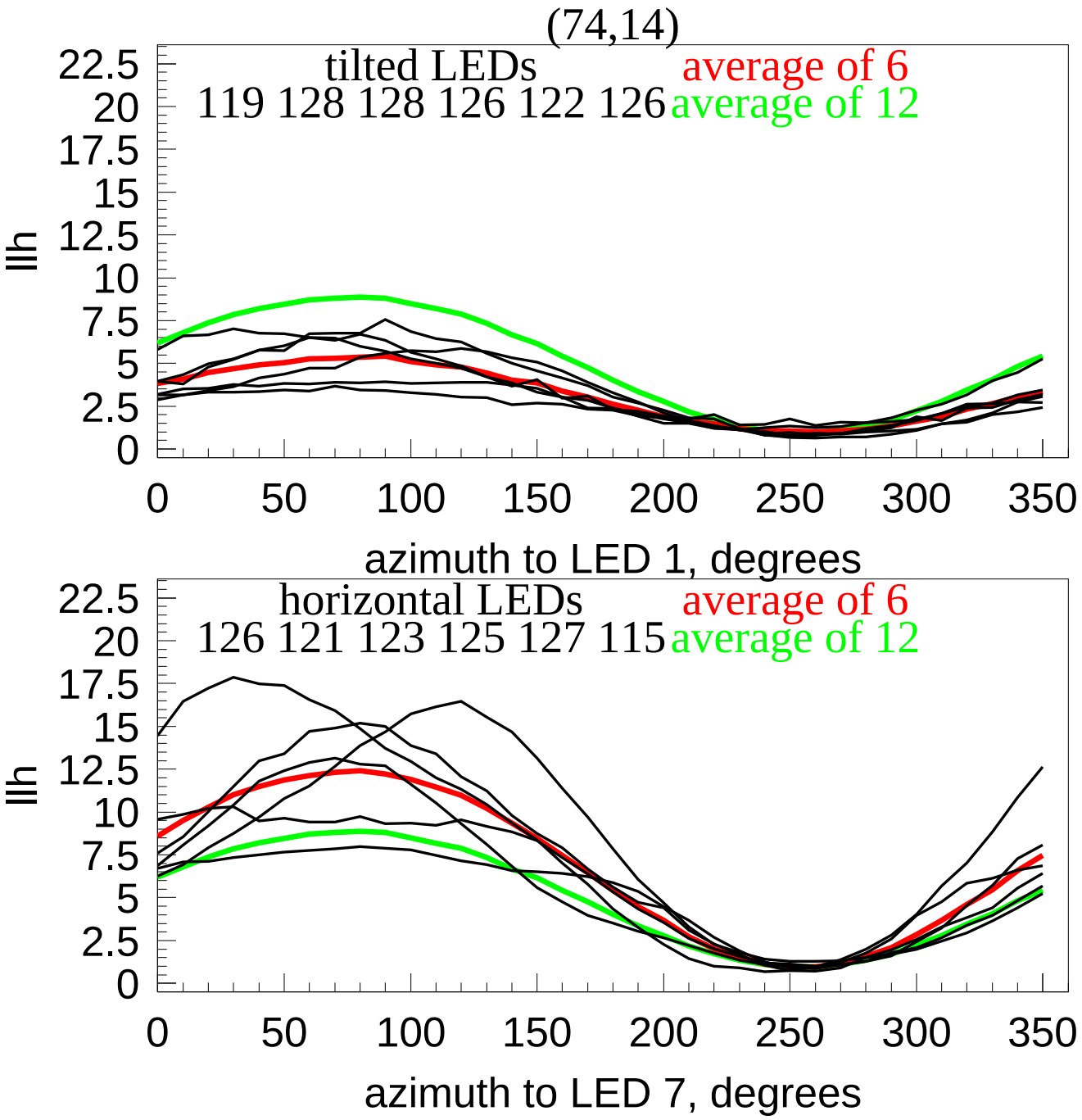

(74,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
27.4 ± 13.4

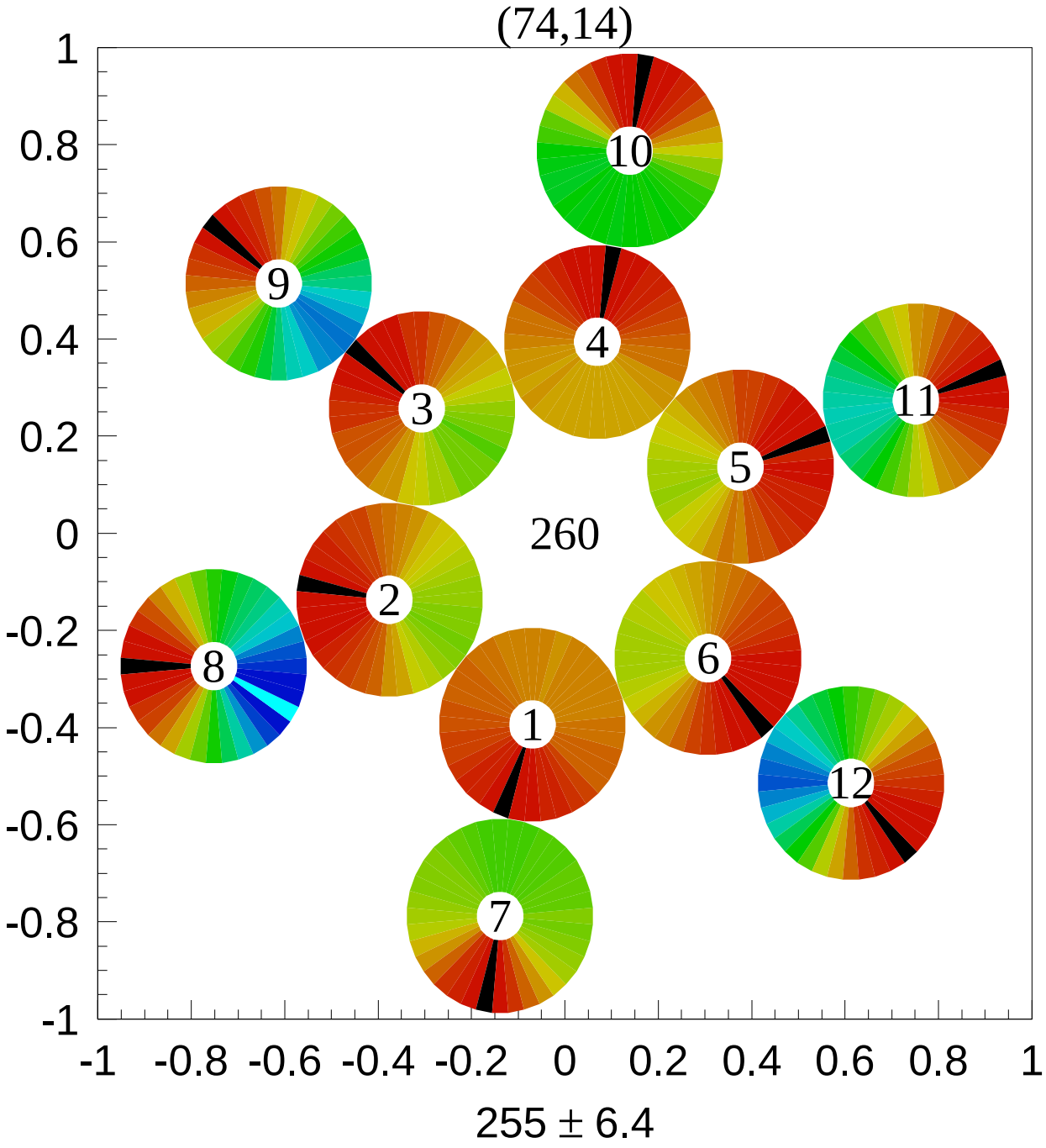

(74,11)
tilted LEDs
119 119 117 118 118 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 120 116 120 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

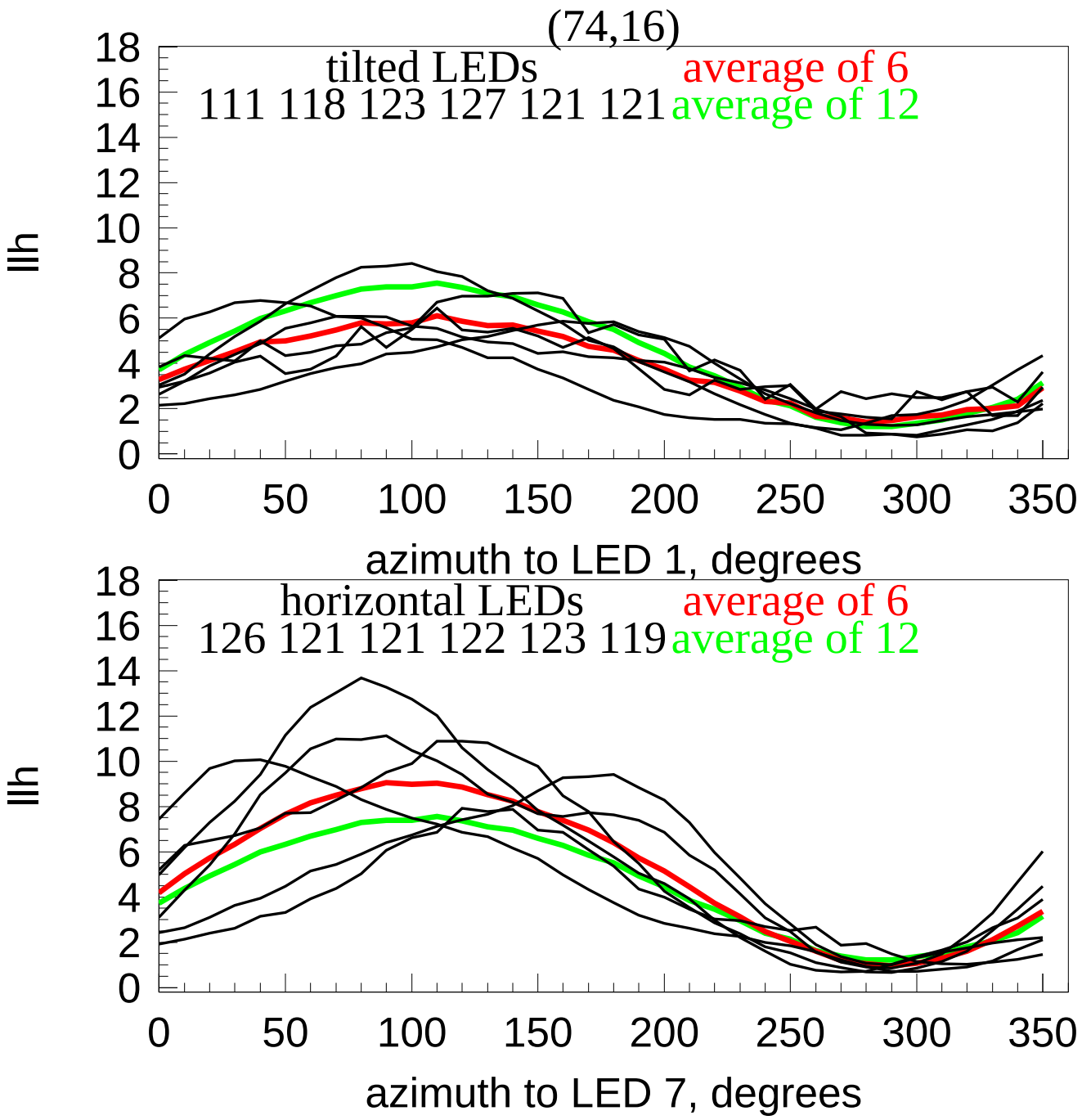

(74,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
103.5 ± 10.0
7
8
1
2
12
6
110
3
9
5
4
11
10

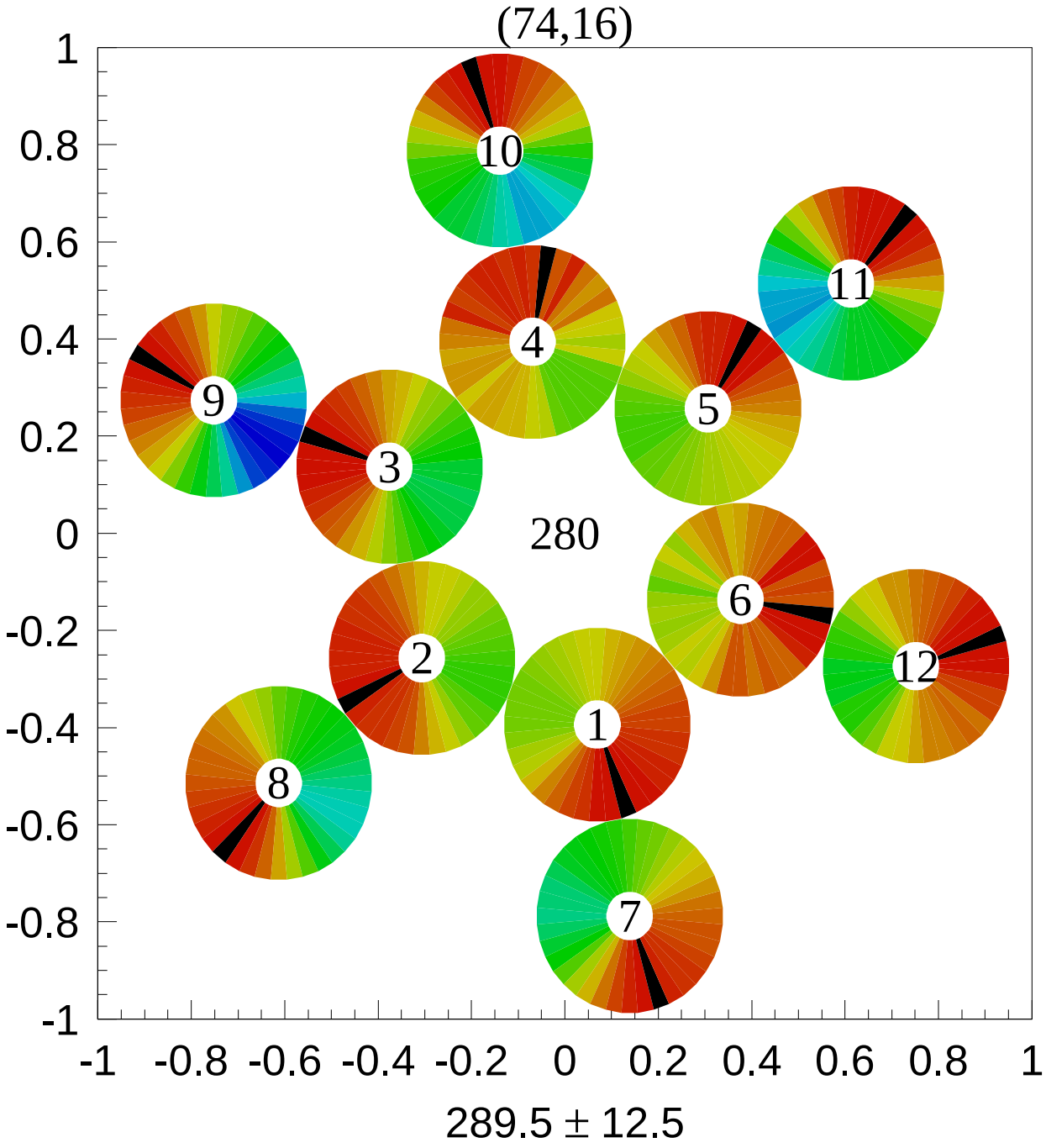

(74,13)
tilted LEDs
123 119 124 125 125 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 124 123 124 127 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

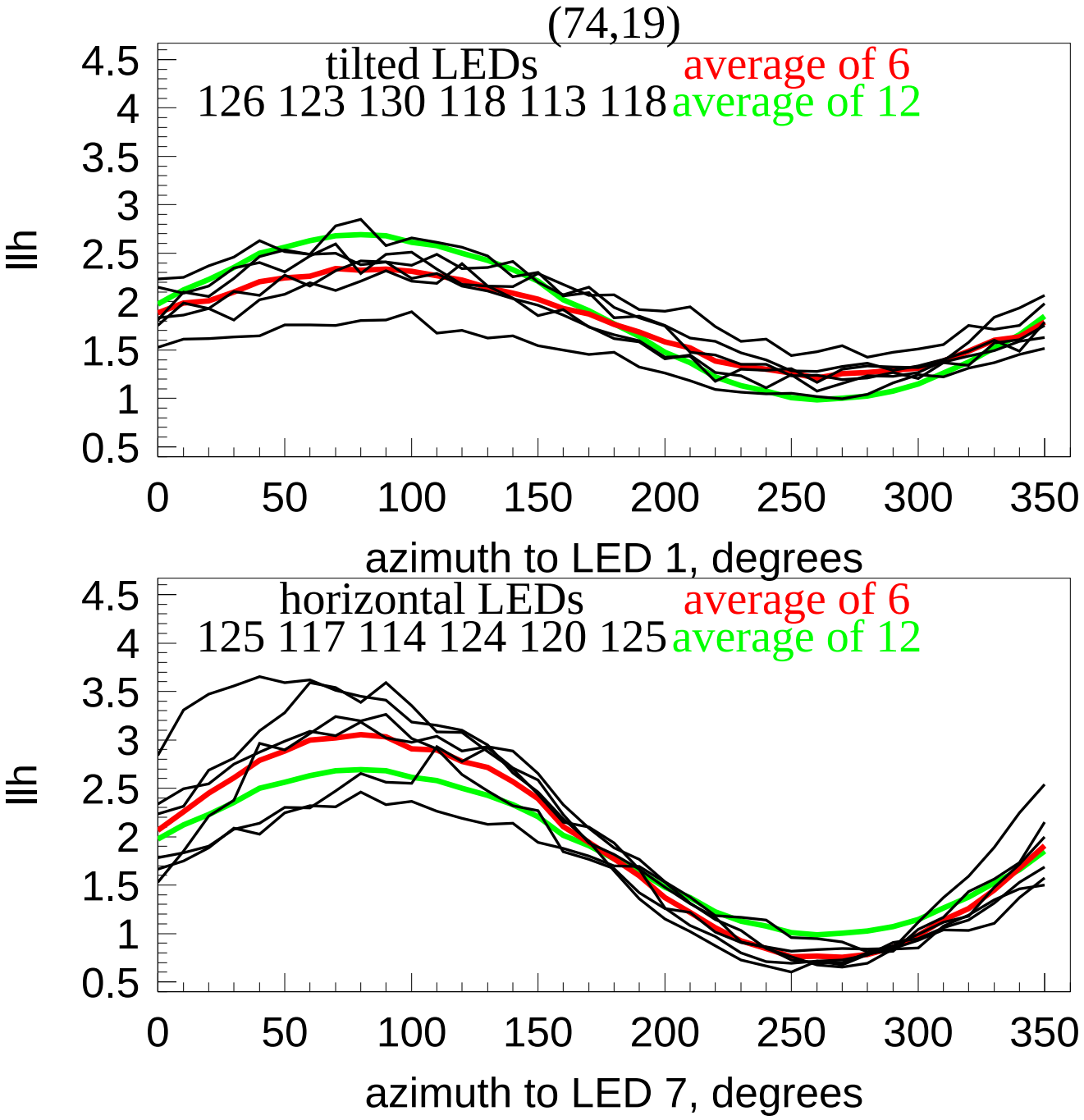

(74,13)
11
12
5
6
10
4
340
1
7
3
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
340 ± 9.8

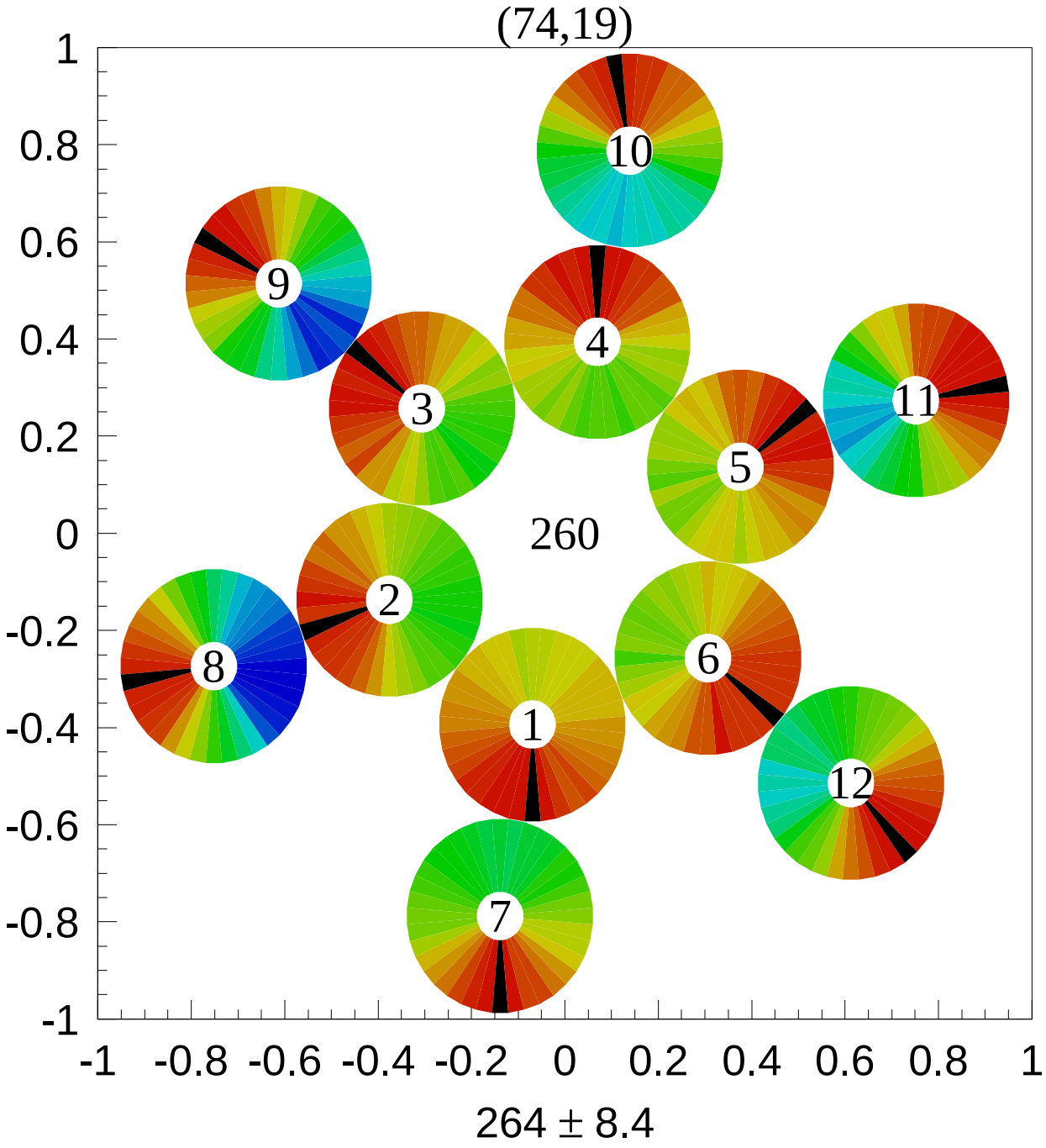

(74,14)
tilted LEDs
119 128 128 126 122 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 121 123 125 127 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

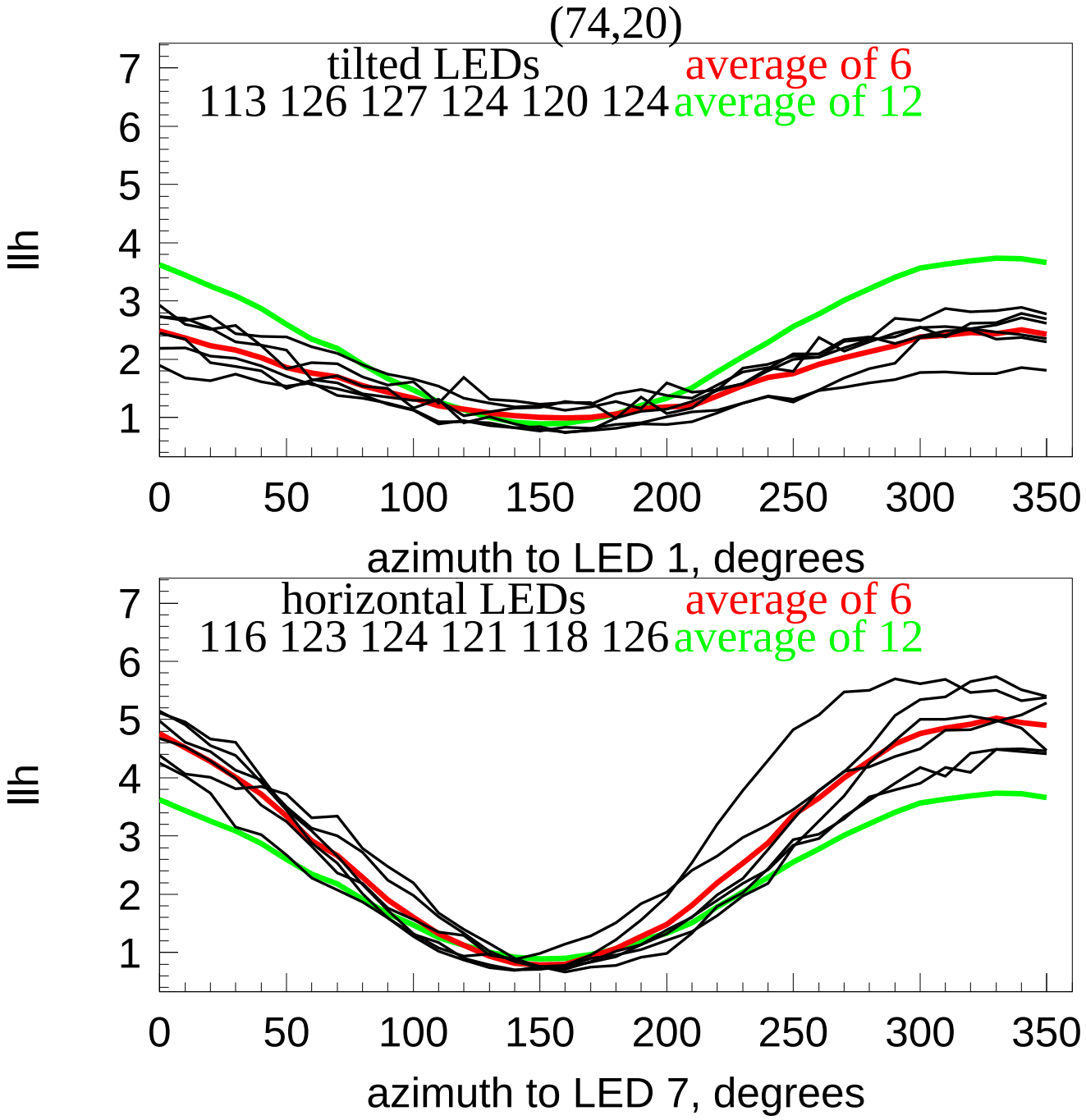

(74,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
255 ± 6.4
260
1
2
3
4
5
6
7
8
9
10
11
12

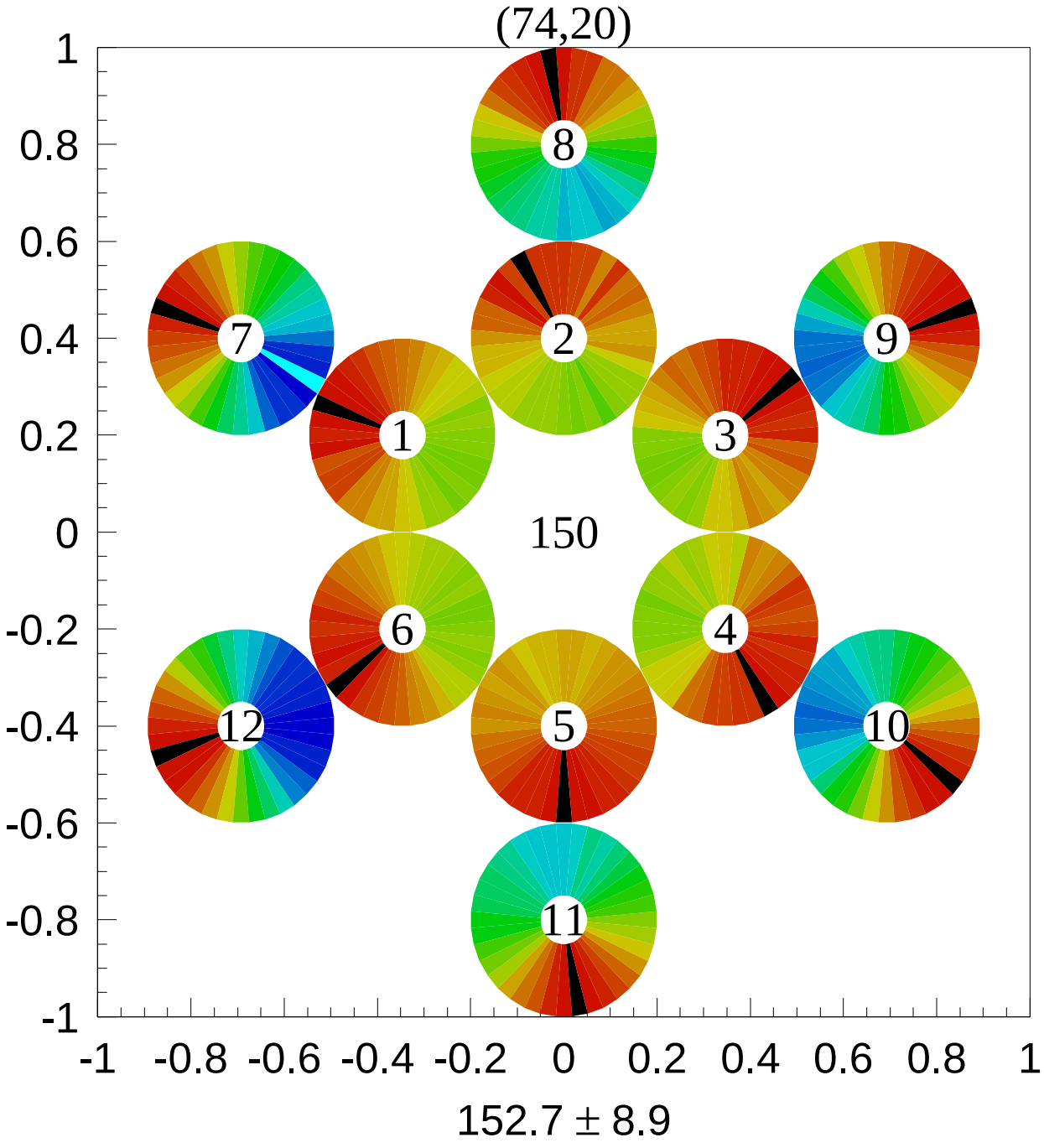

(74,16)
tilted LEDs
111 118 123 127 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 121 121 122 123 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

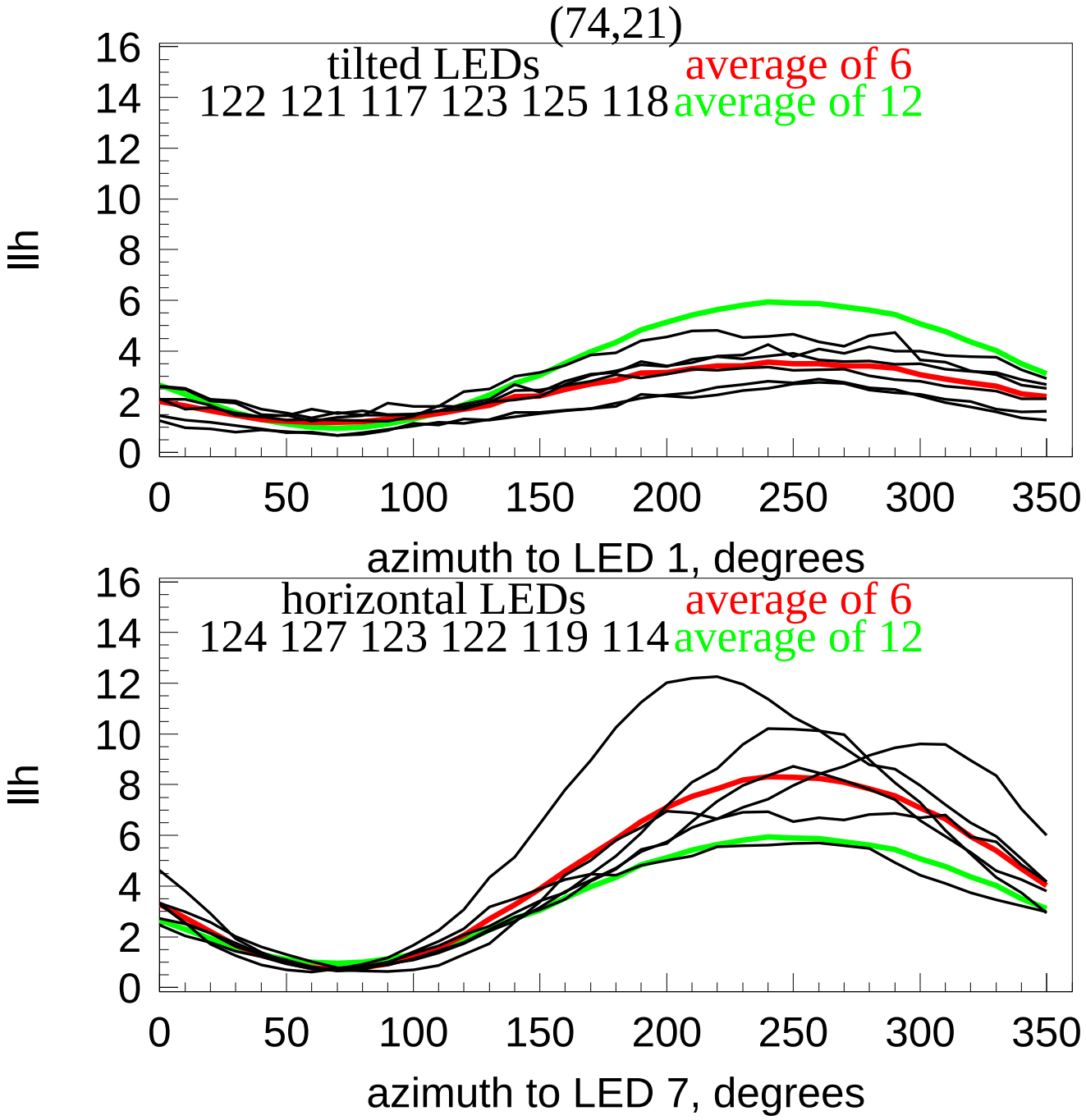

(74,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
289.5 ± 12.5
10
11
4
9
5
3
280
6
12
2
1
8
7

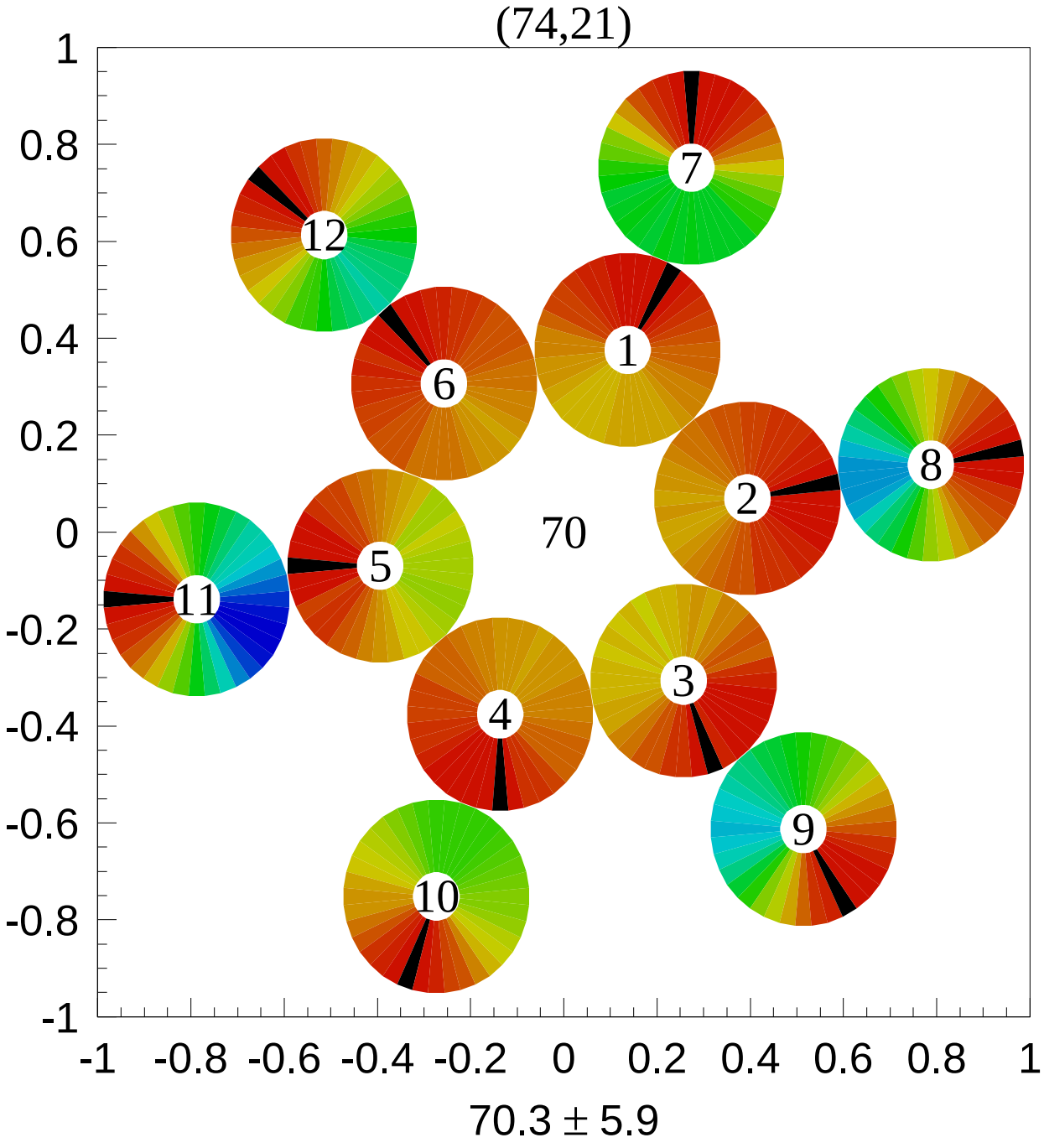

(74,19)
tilted LEDs
126 123 130 118 113 118
average of 6
average of 12
IIh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 117 114 124 120 125
average of 6
average of 12
IIh
azimuth to LED 7, degrees

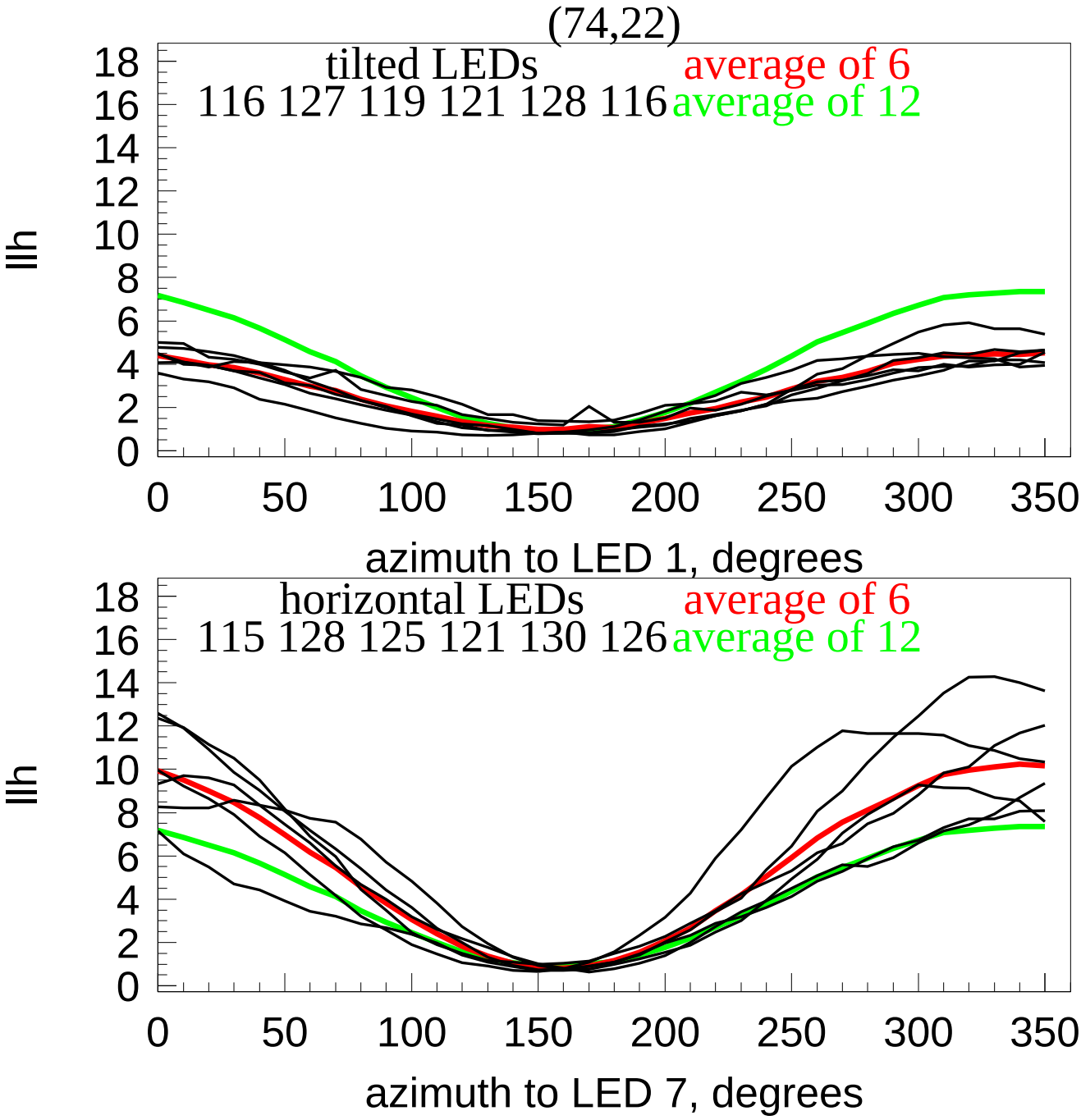

(74,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
264 ± 8.4

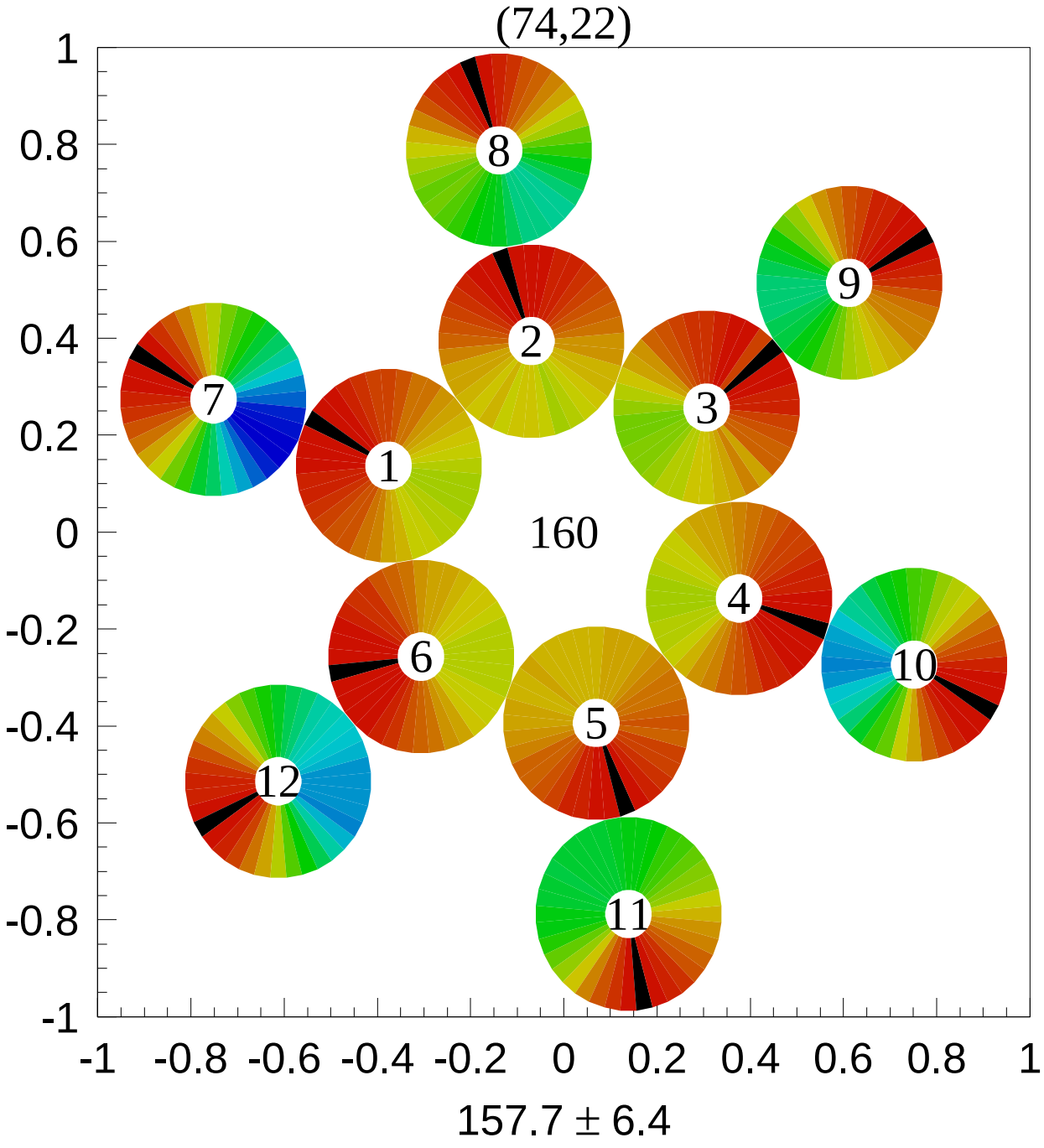

(74,20)
tilted LEDs
113 126 127 124 120 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 123 124 121 118 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

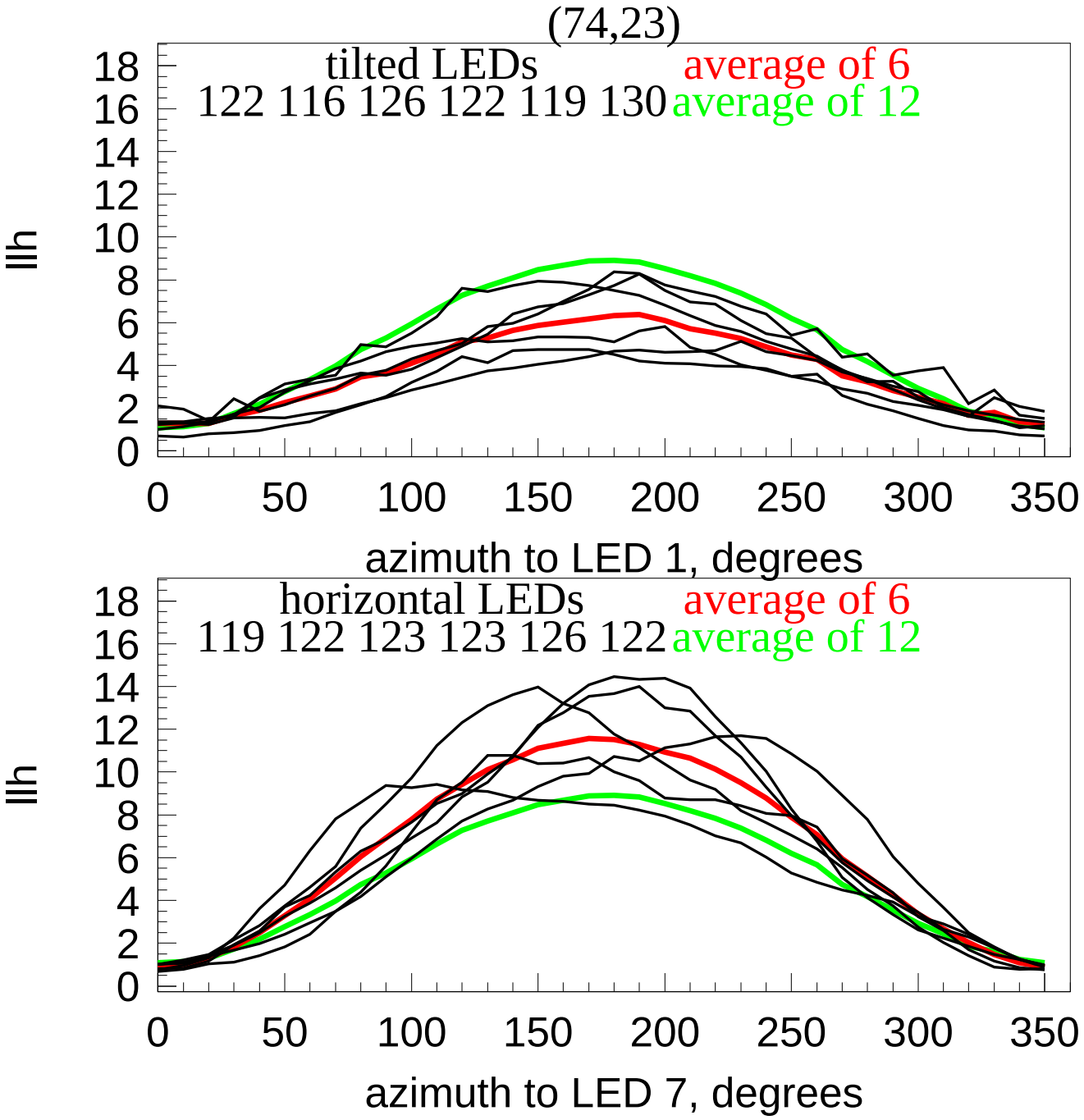

(74,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
152.7 ± 8.9

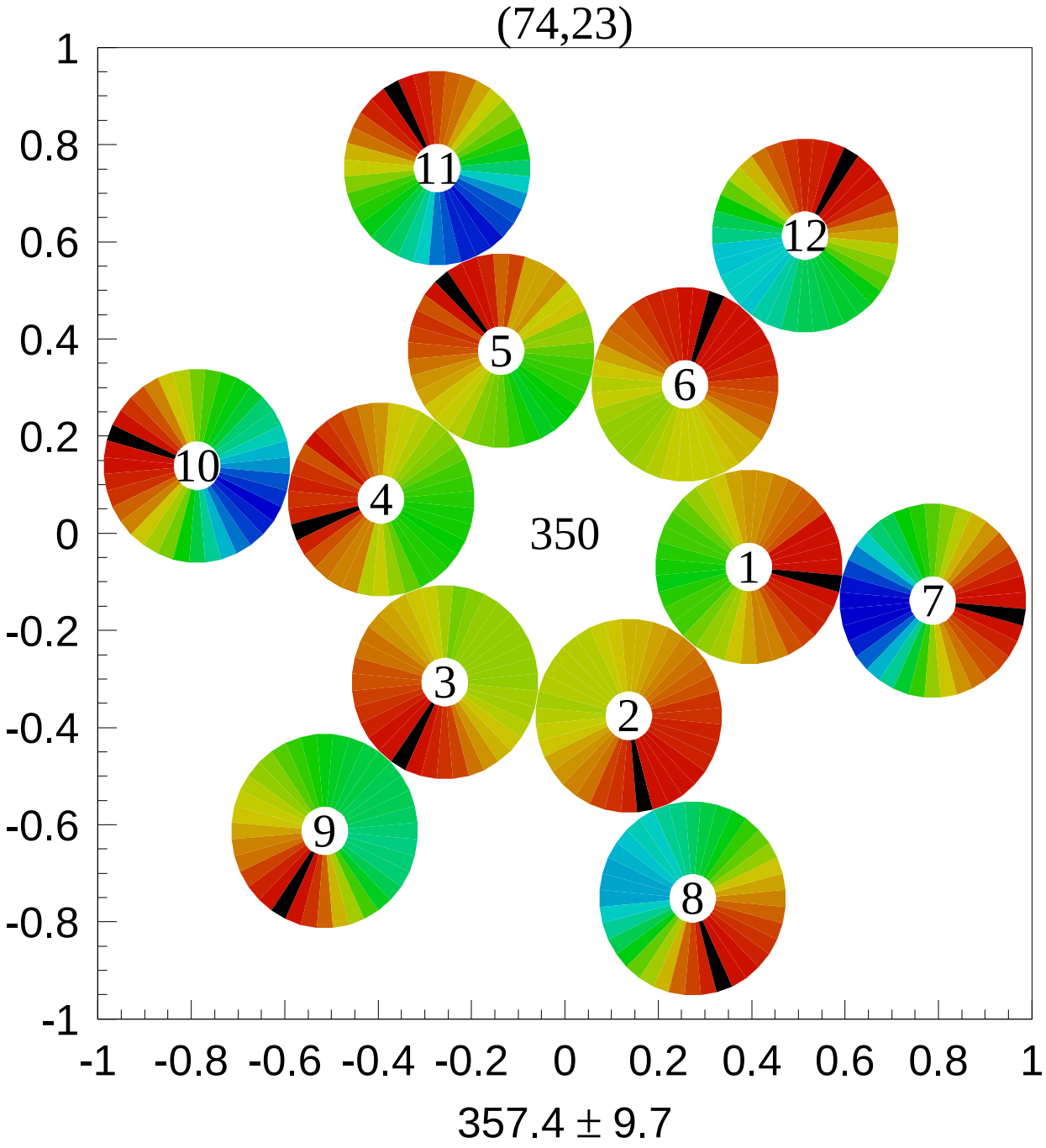

(74,21)
tilted LEDs
122 121 117 123 125 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 127 123 122 119 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

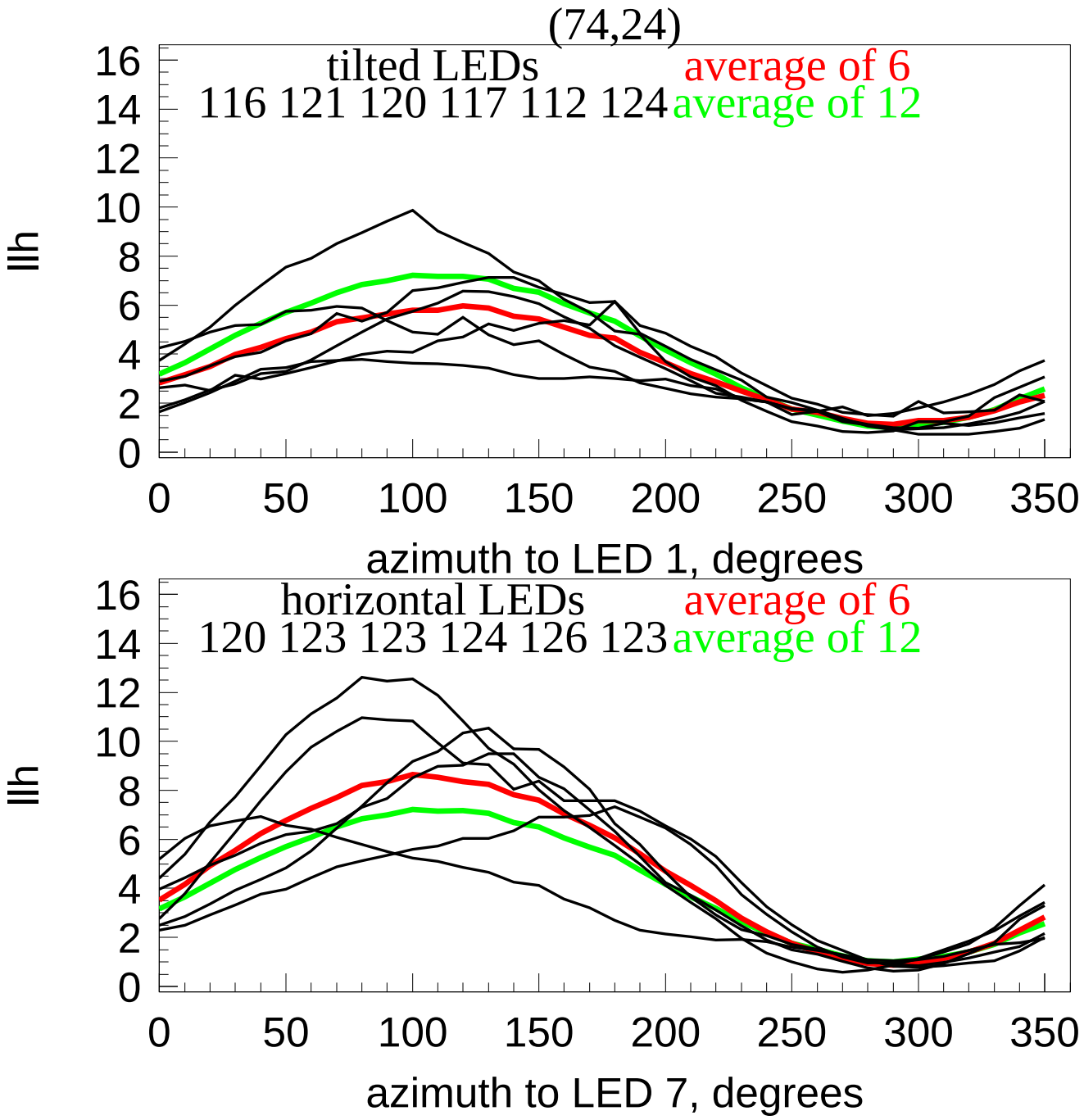

(74,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
70
1
2
3
4
5
6
7
8
9
10
11
12
70.3 ± 5.9

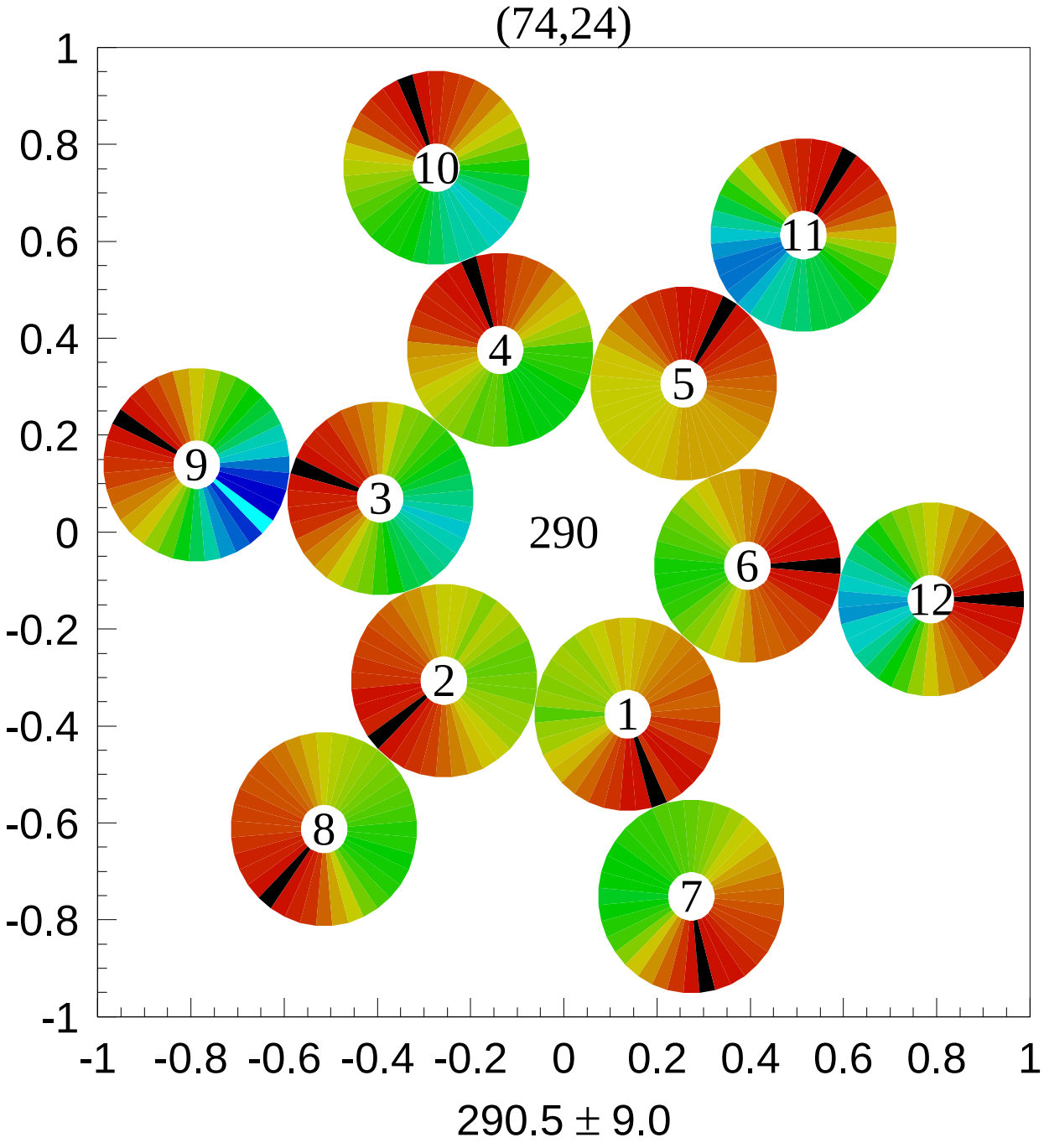

(74,22)
tilted LEDs
116 127 119 121 128 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 128 125 121 130 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

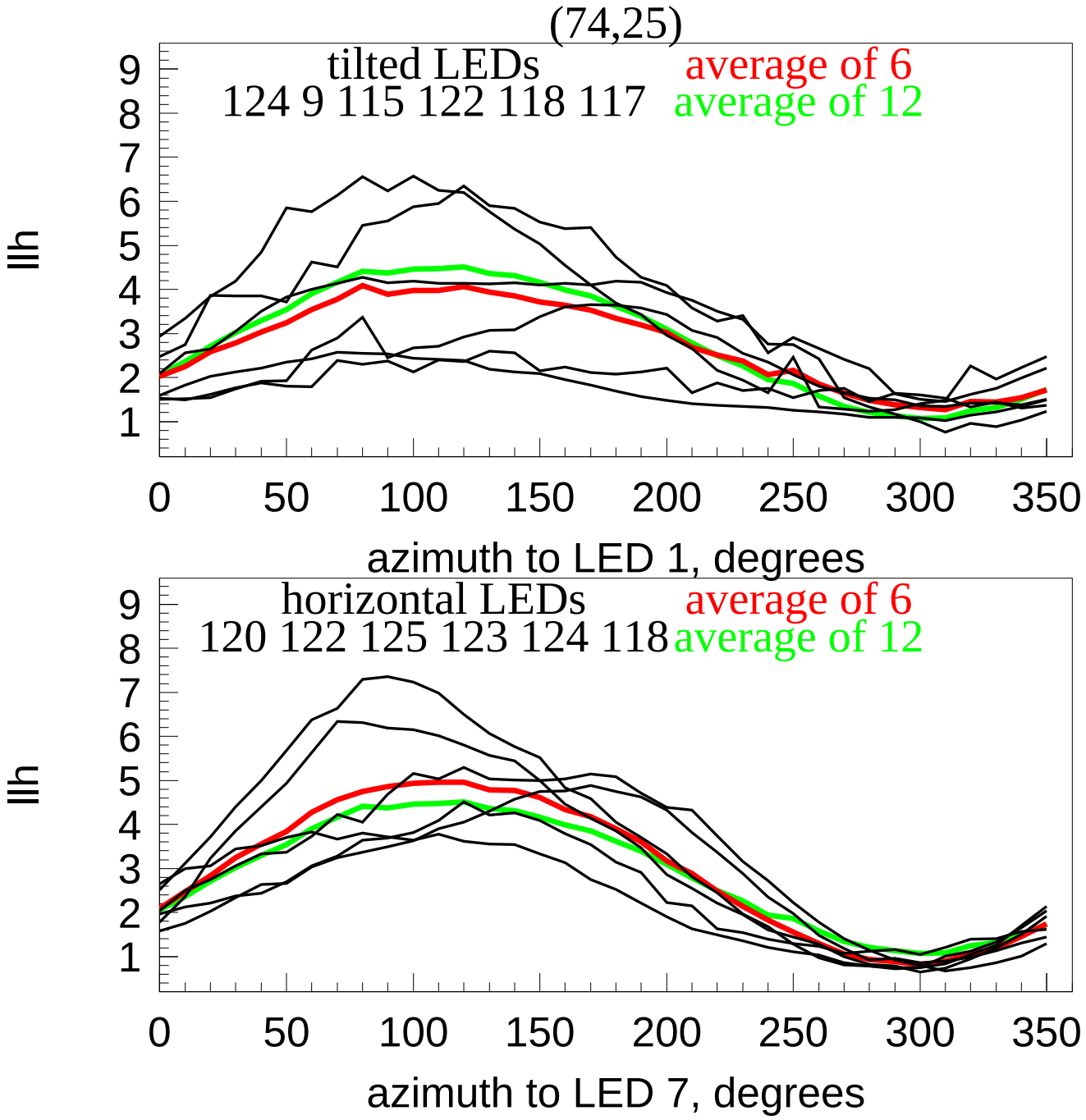

(74,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
10
6
5
12
11
157.7 ± 6.4

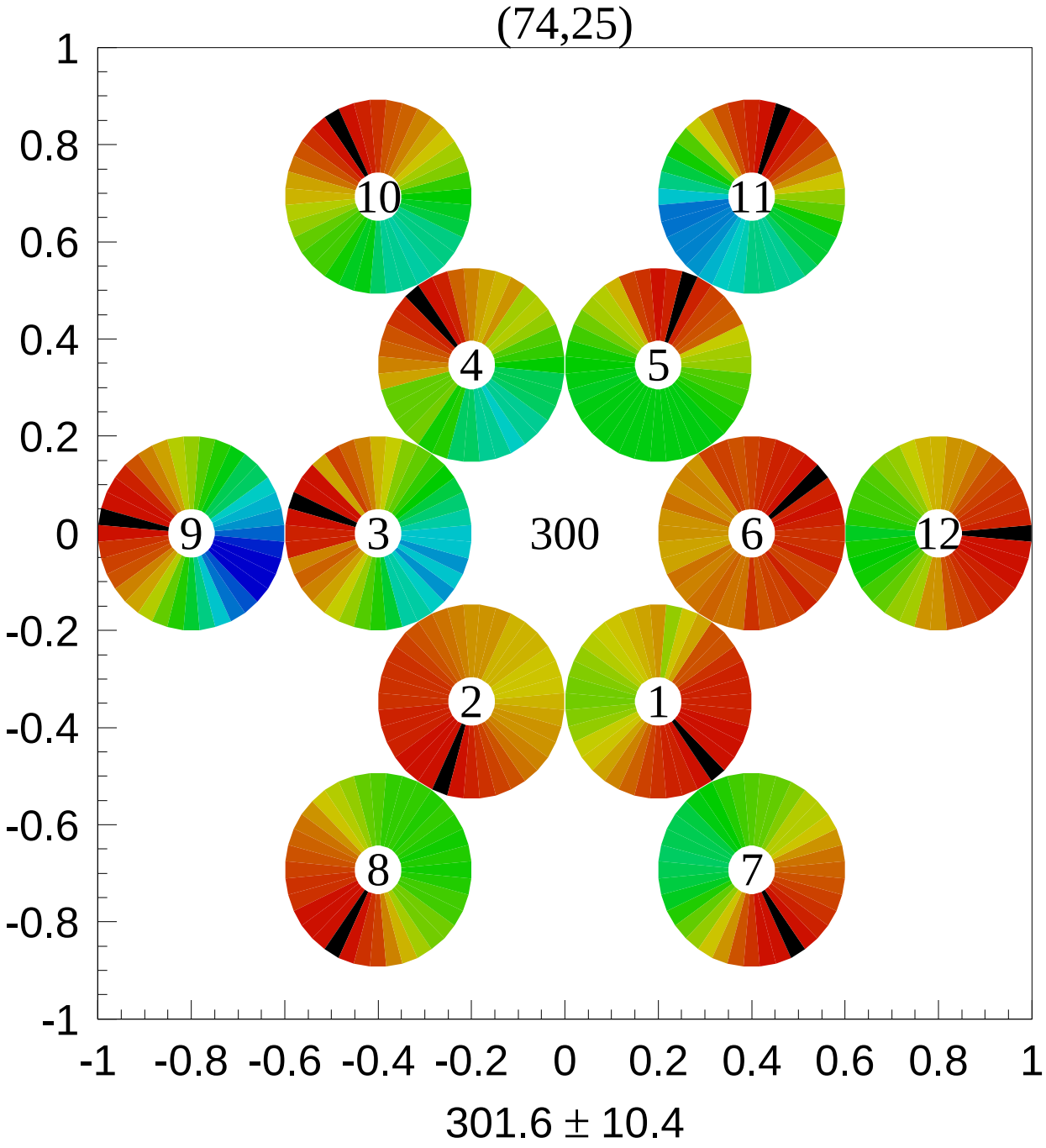

(74,23)
tilted LEDs
122 116 126 122 119 130
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 123 123 126 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

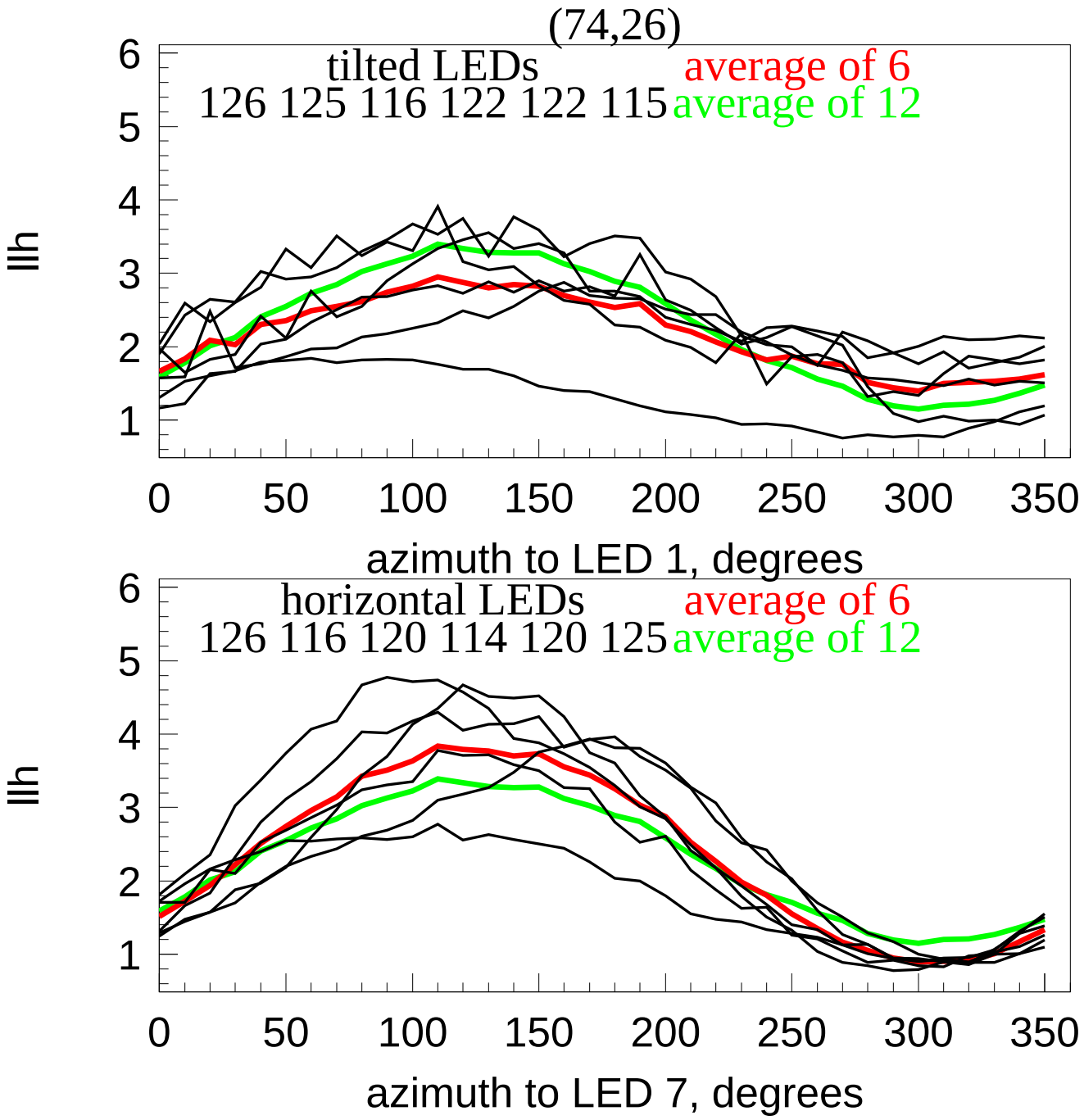

(74,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
357.4 ± 9.7

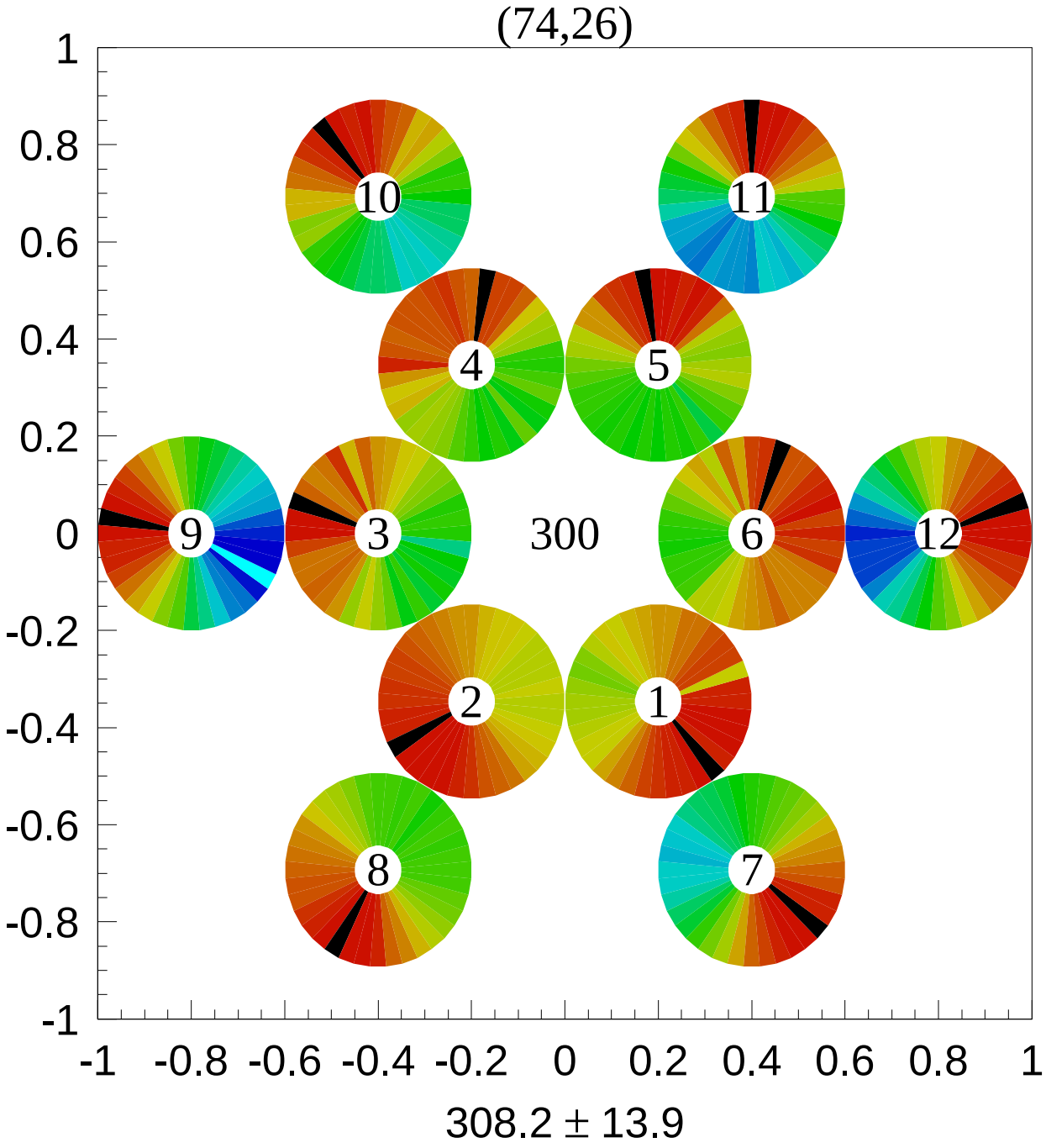

(74,24)
tilted LEDs
116 121 120 117 112 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 123 123 124 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

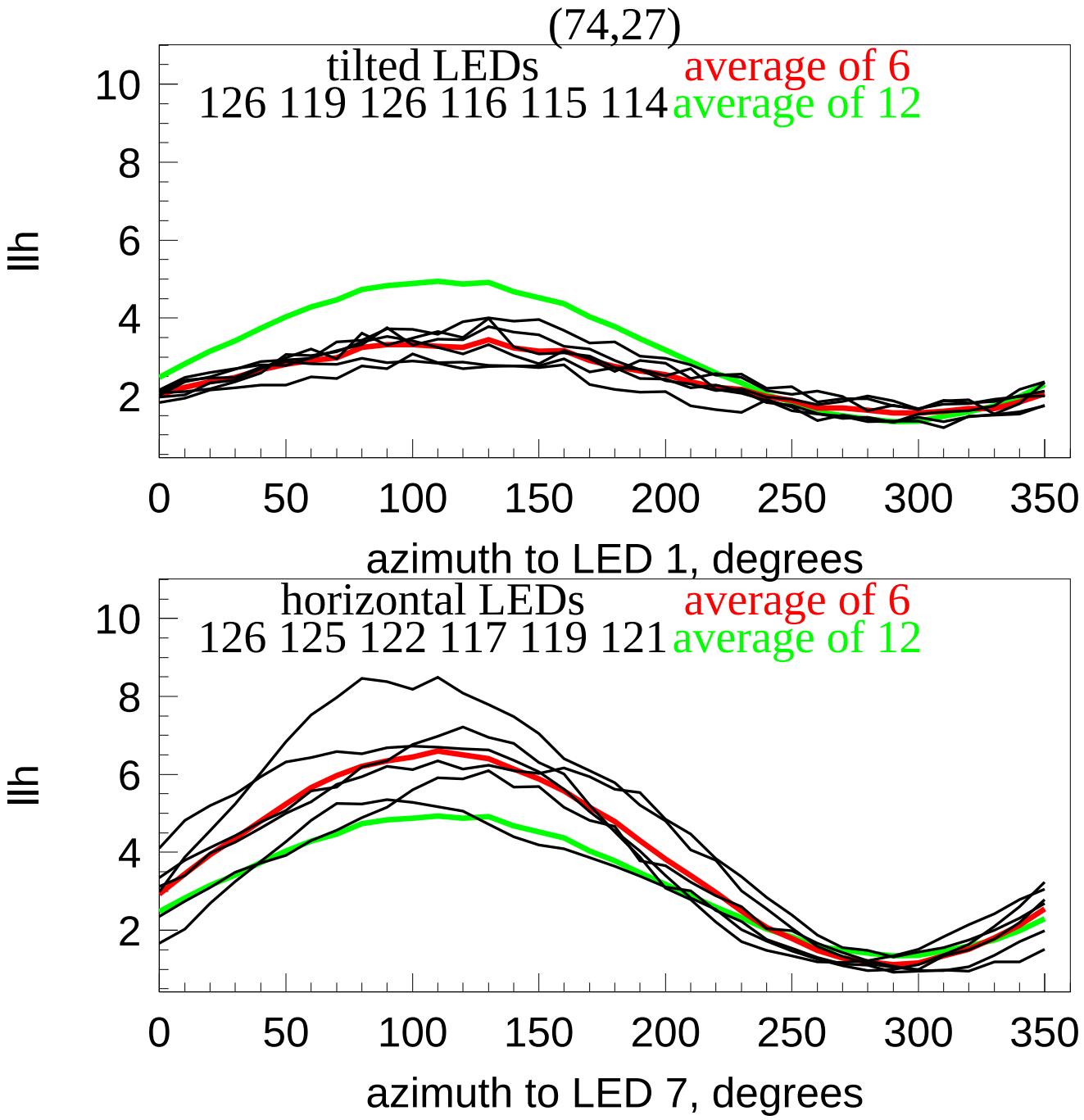

(74,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
290
290.5 ± 9.0
1
2
3
4
5
6
7
8
9
10
11
12

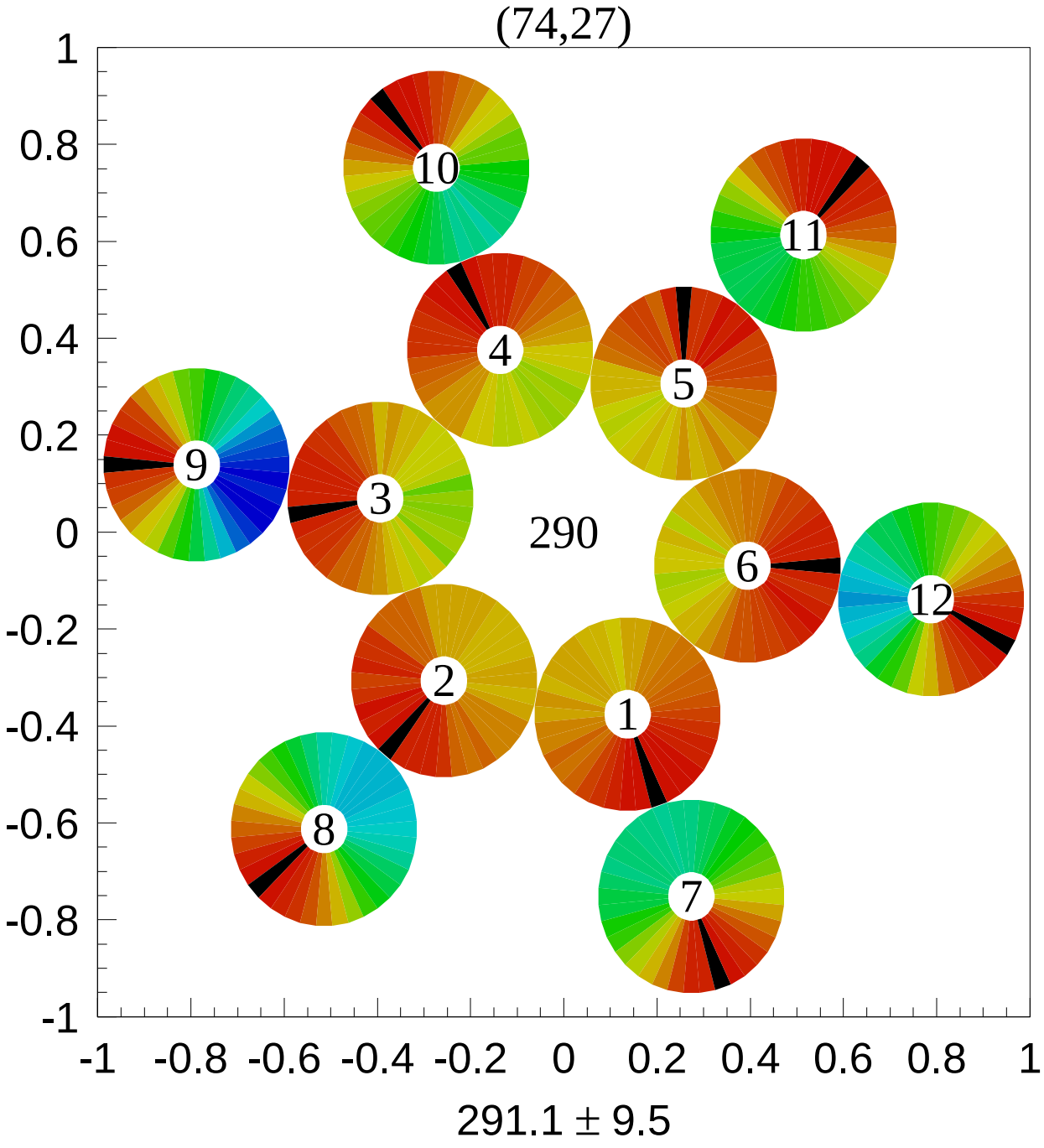

(74,25)
tilted LEDs
124 9 115 122 118 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 125 123 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

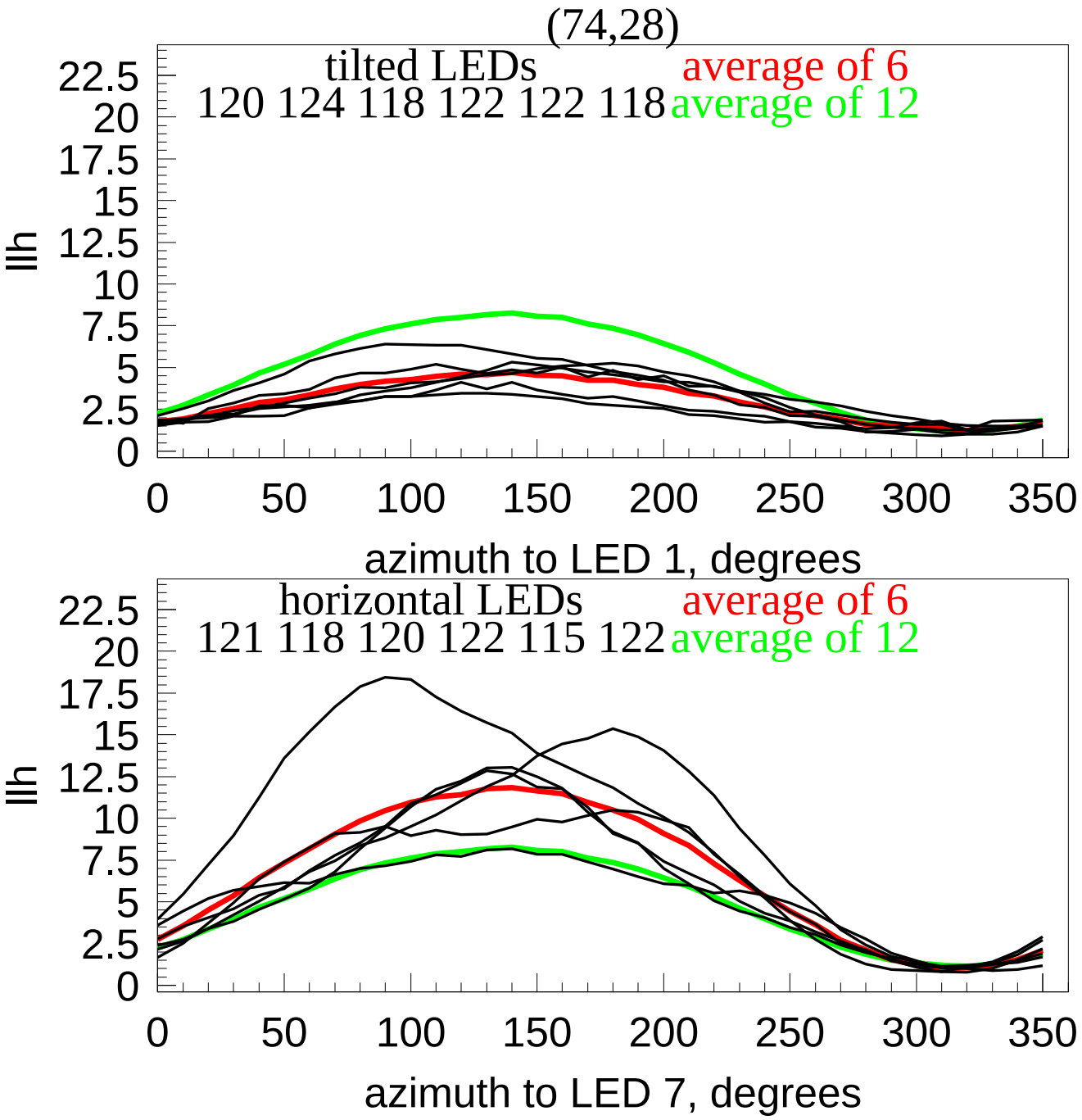

(74,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
301.6 ± 10.4

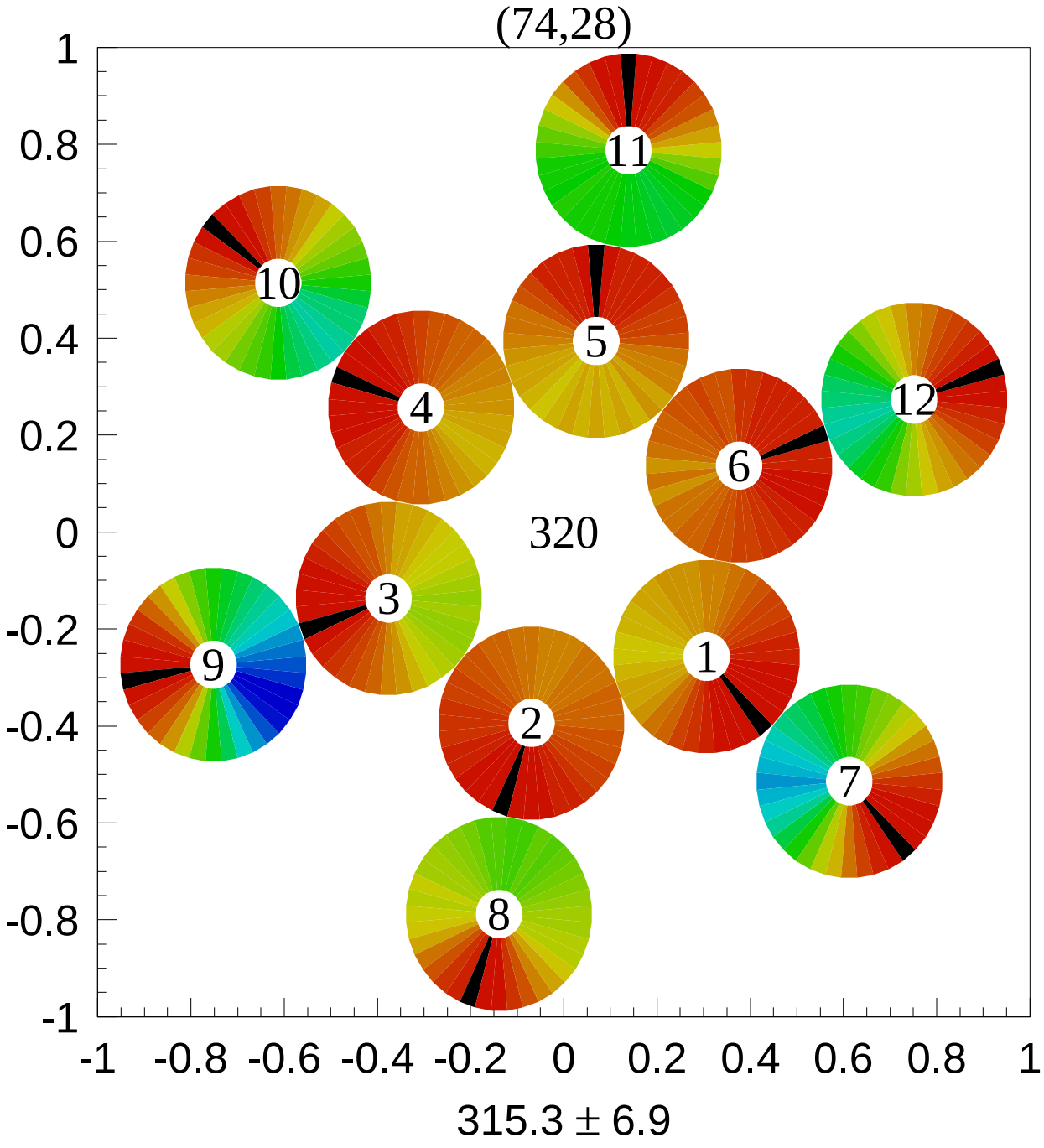

(74,26)
tilted LEDs
126 125 116 122 122 115
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 116 120 114 120 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

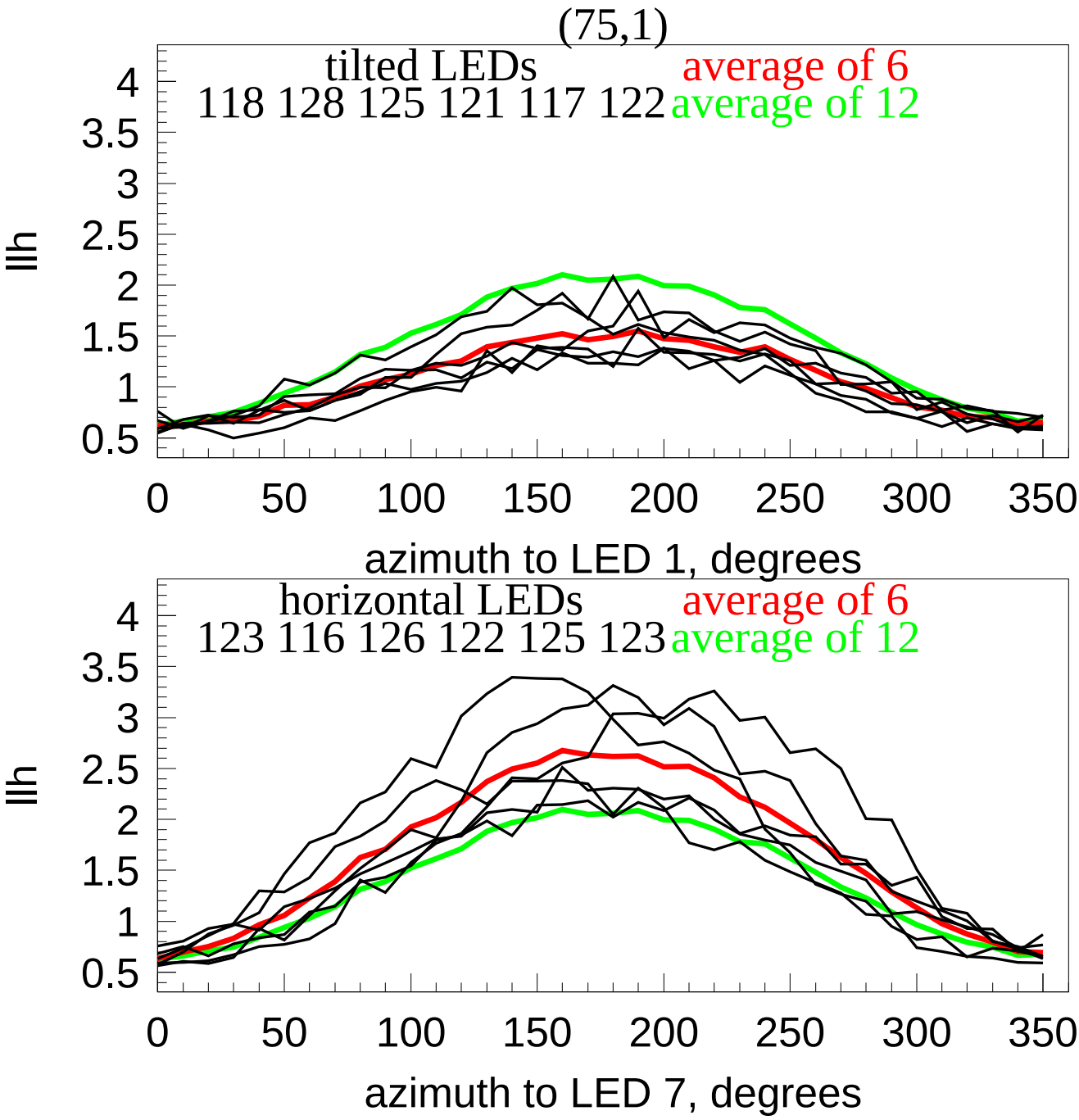

(74,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
308.2 ± 13.9

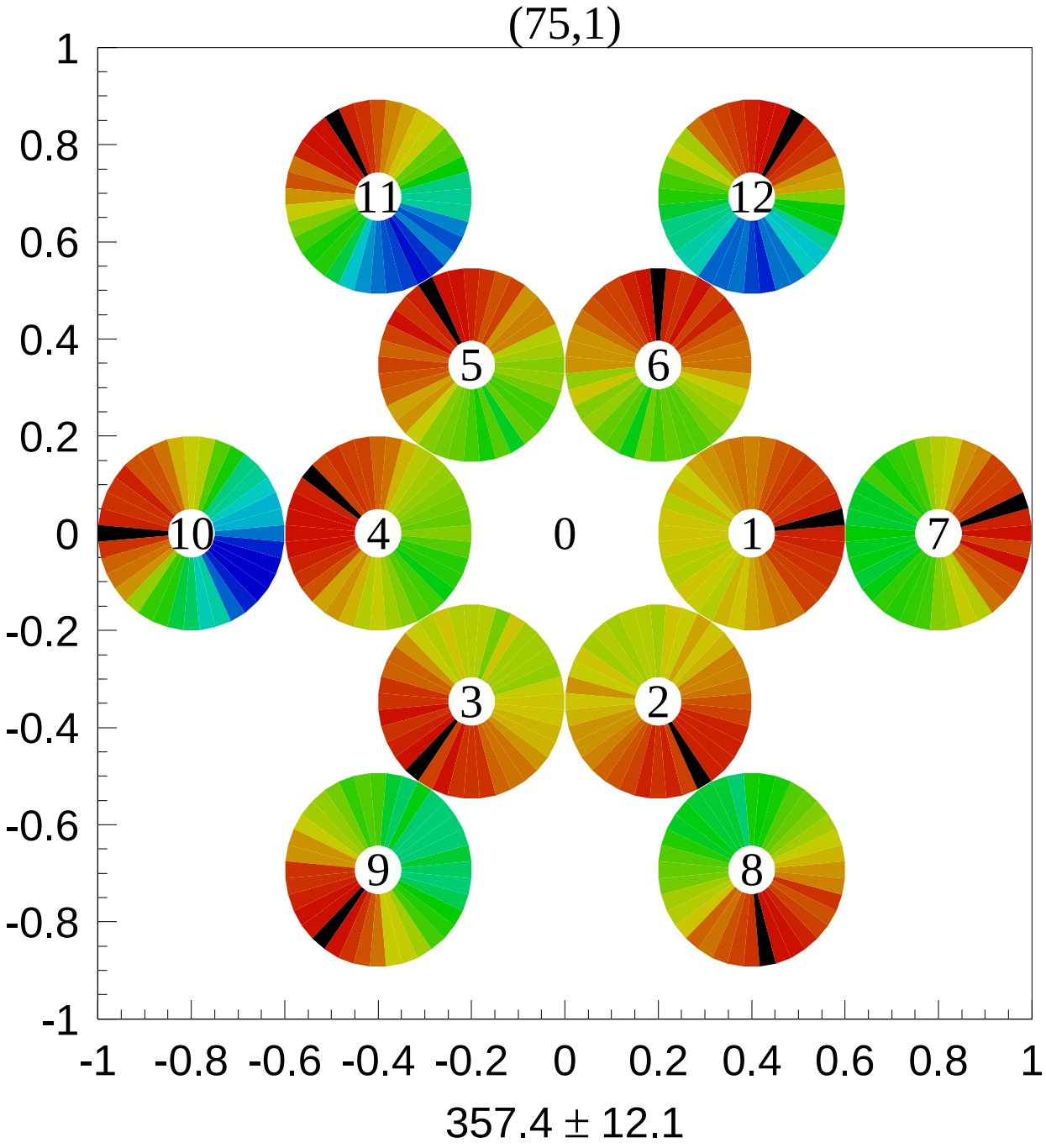

(74,27)
tilted LEDs
126 119 126 116 115 114
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 125 122 117 119 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

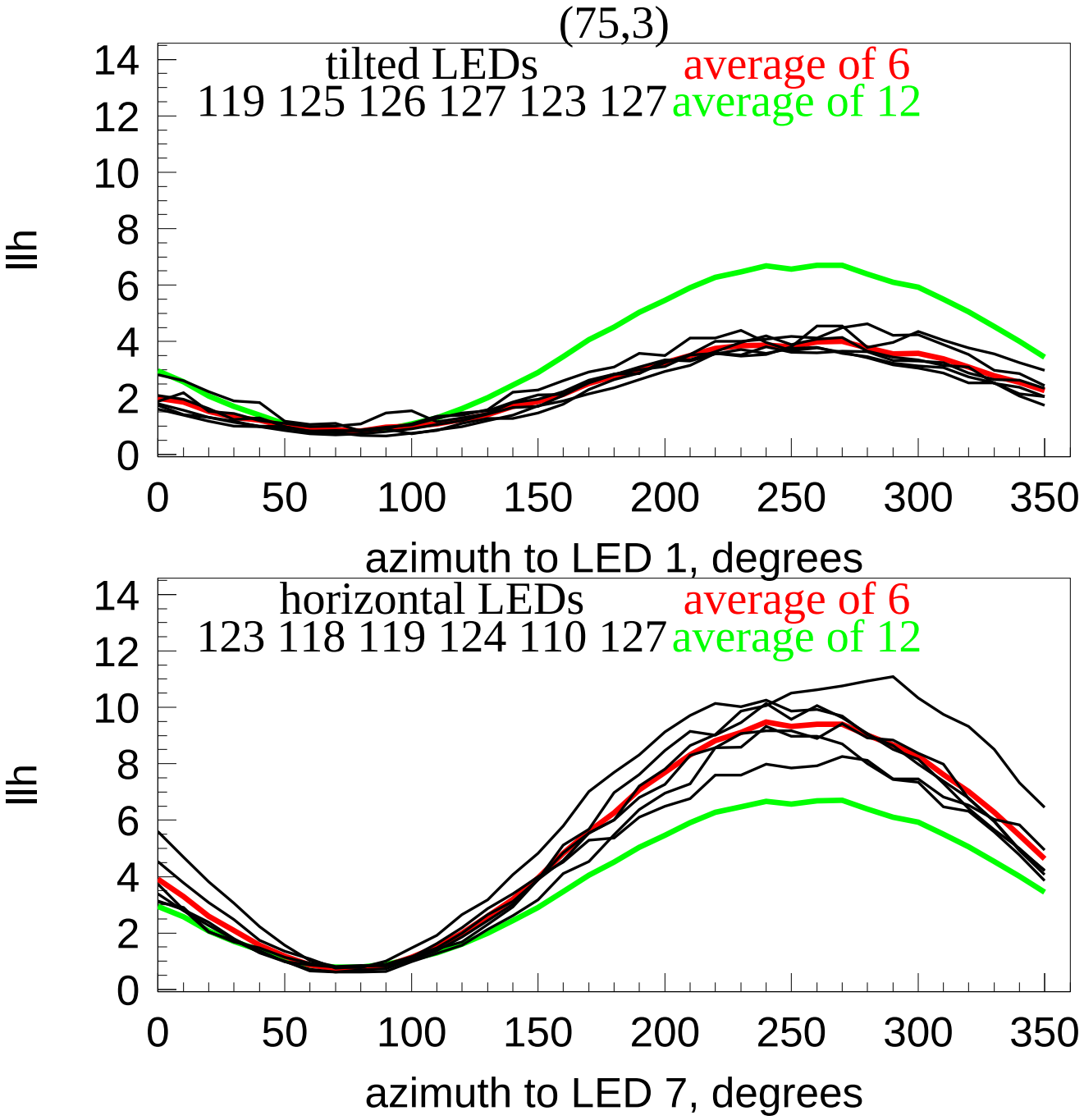

(74,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
291.1 ± 9.5

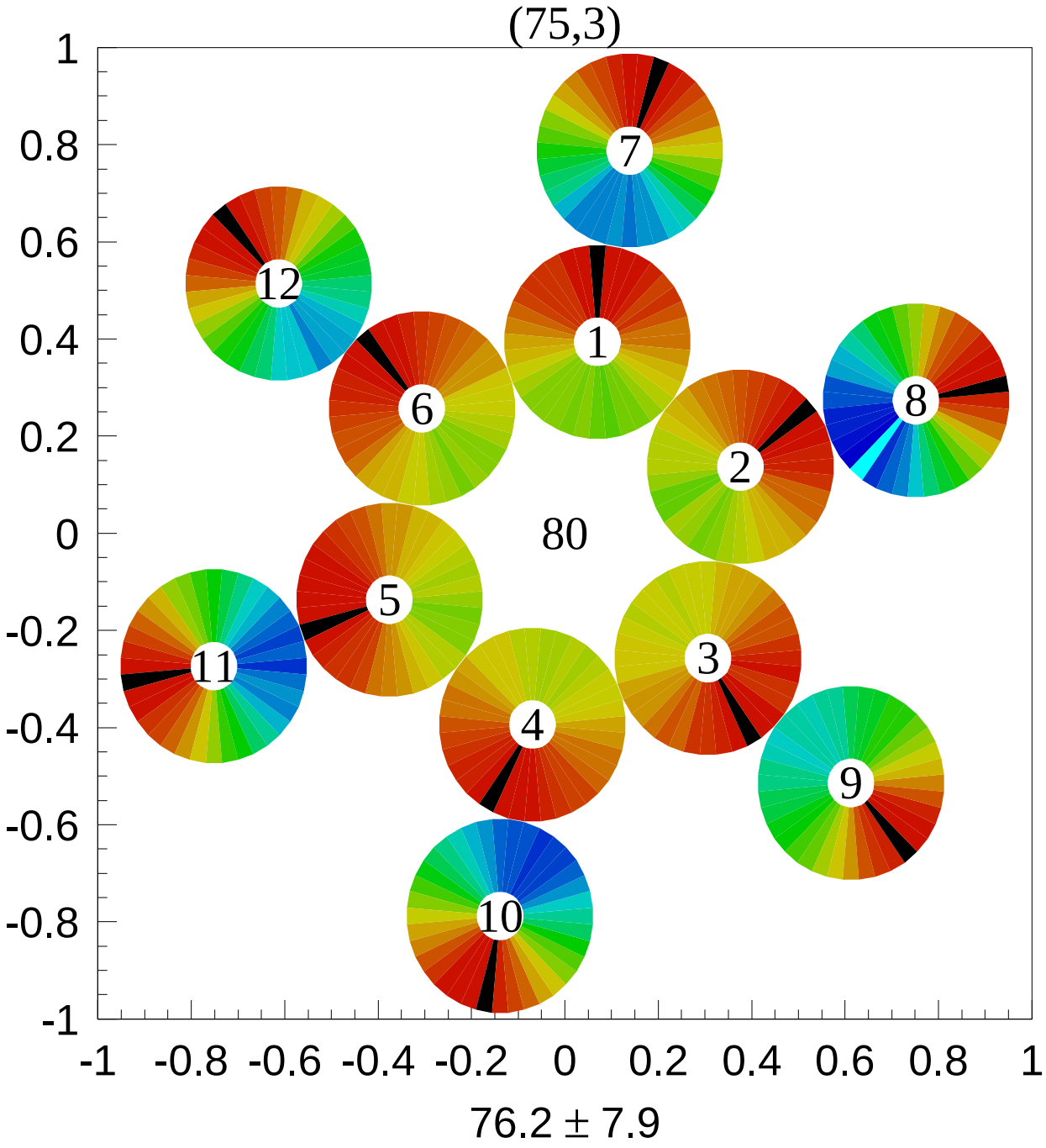

(74,28)
tilted LEDs
120 124 118 122 122 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 118 120 122 115 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

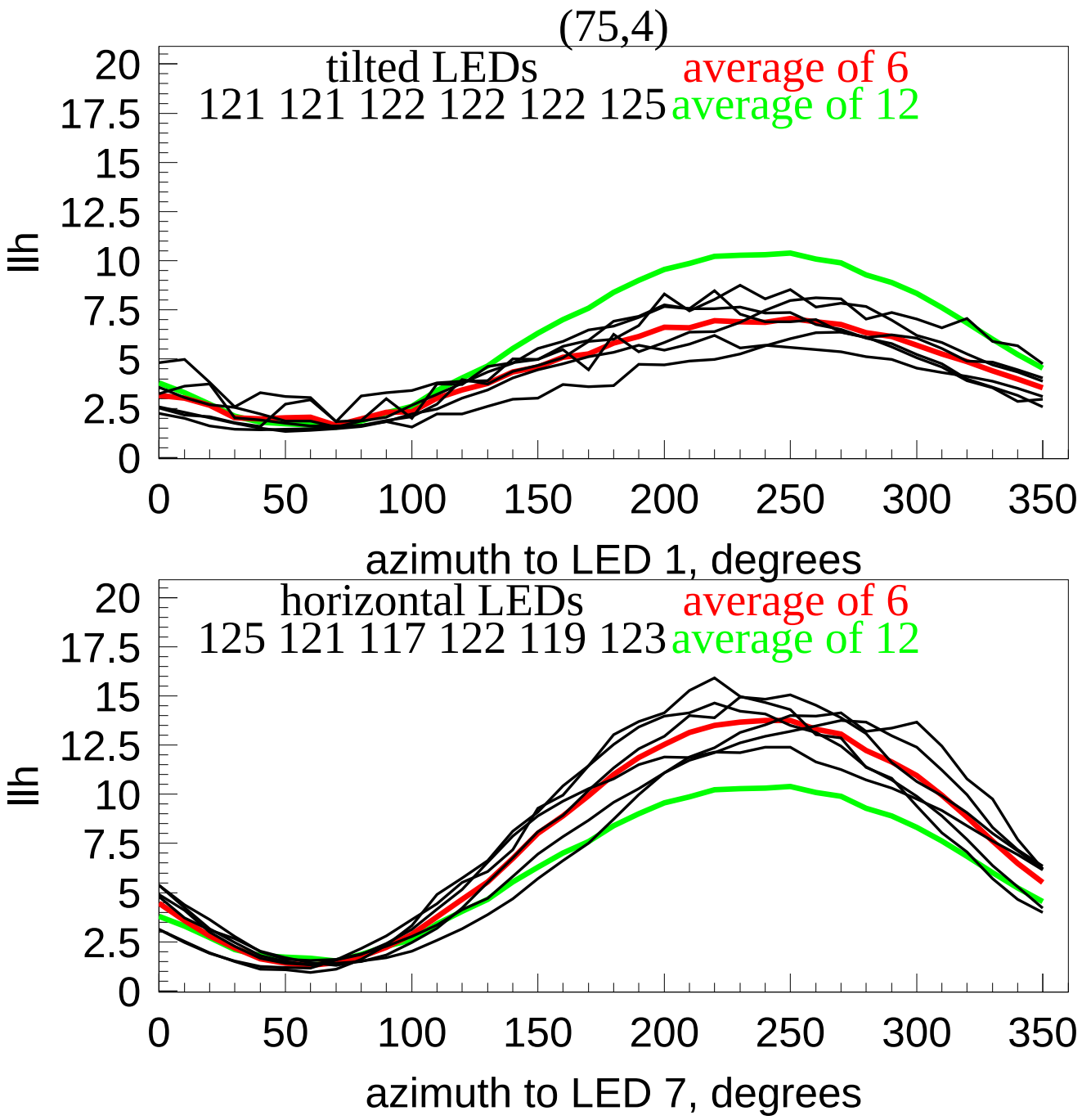

(74,28)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
315.3 ± 6.9

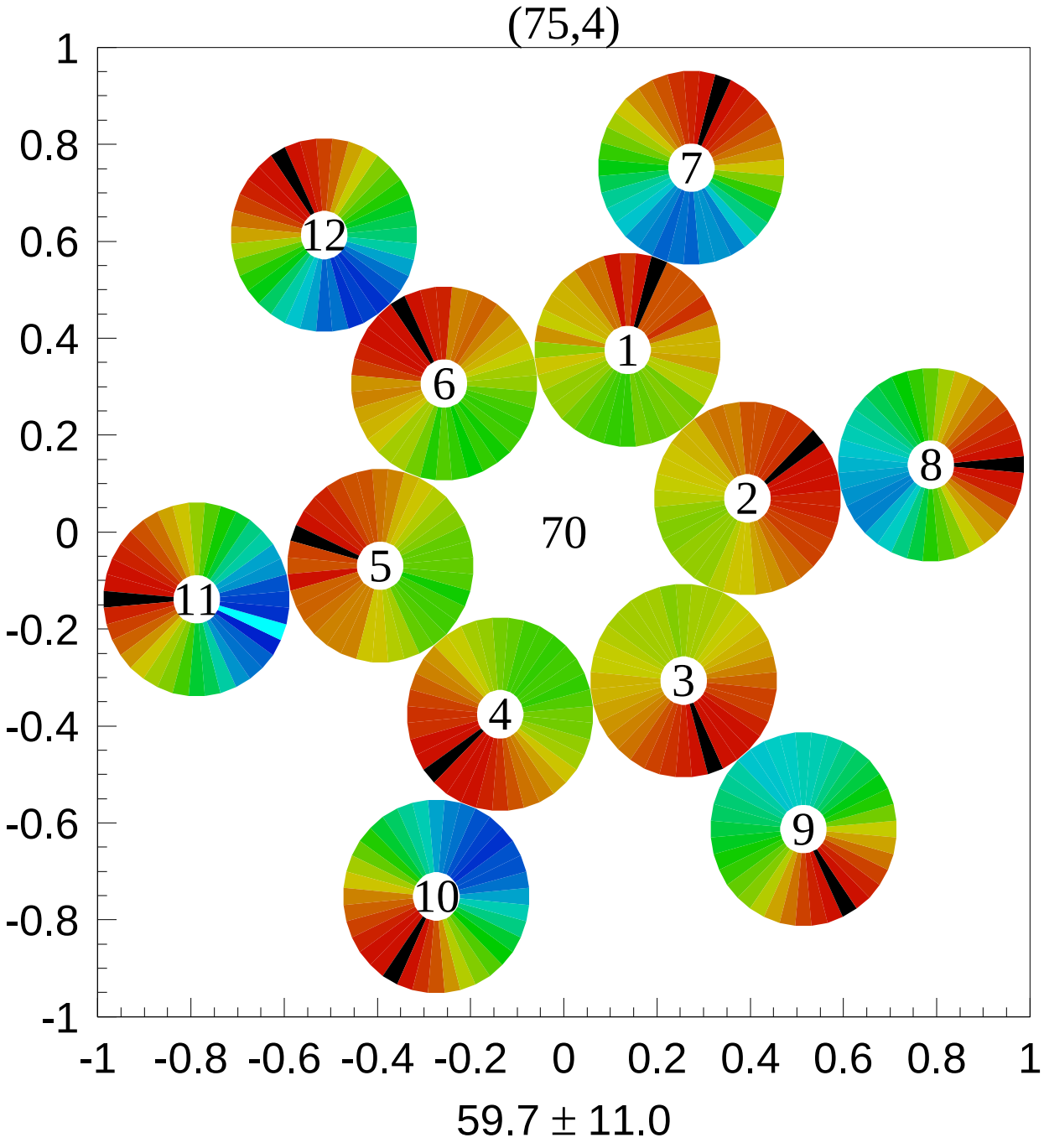

(75,1)
tilted LEDs
118 128 125 121 117 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 116 126 122 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

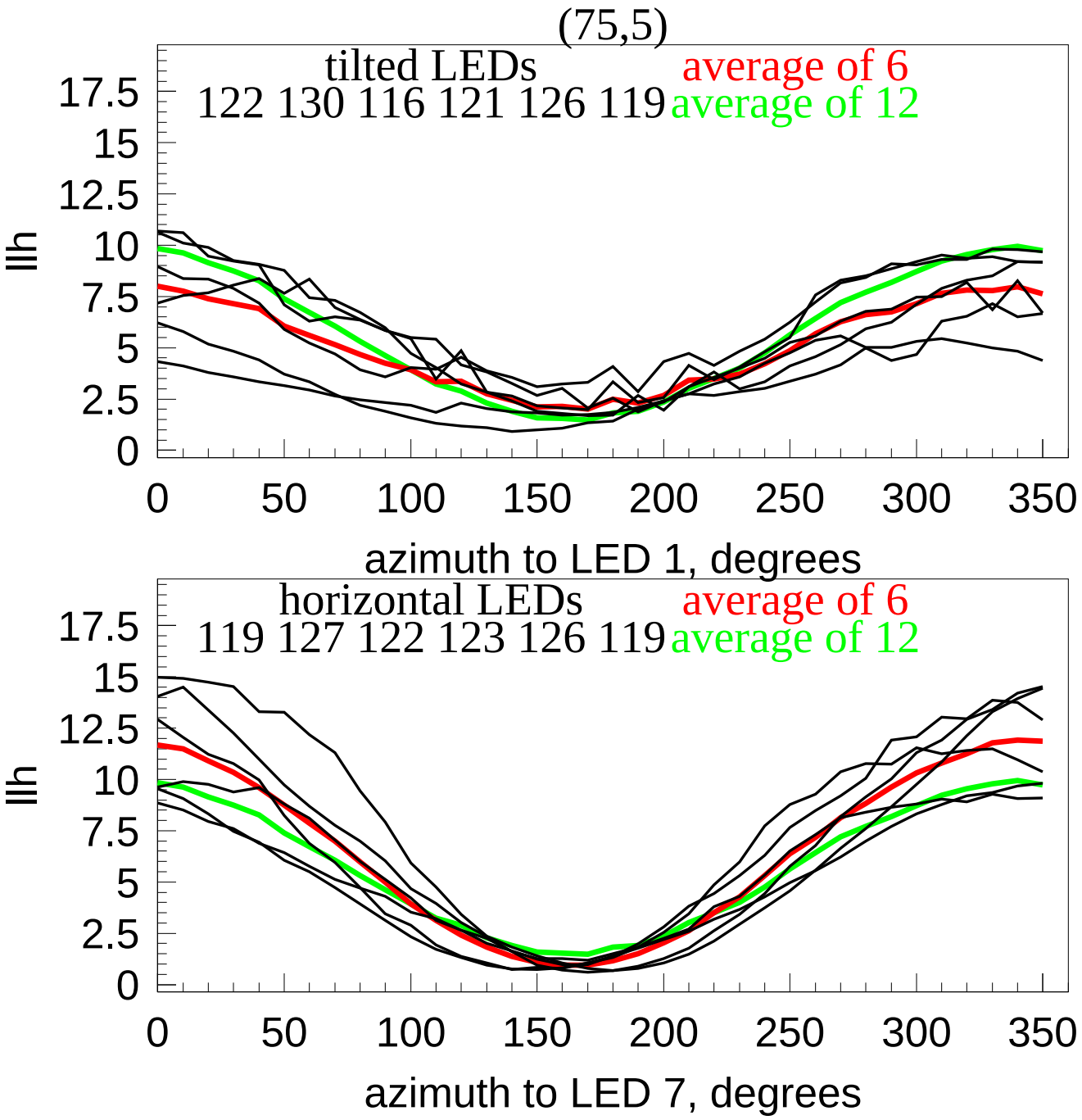

(75,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
357.4 ± 12.1

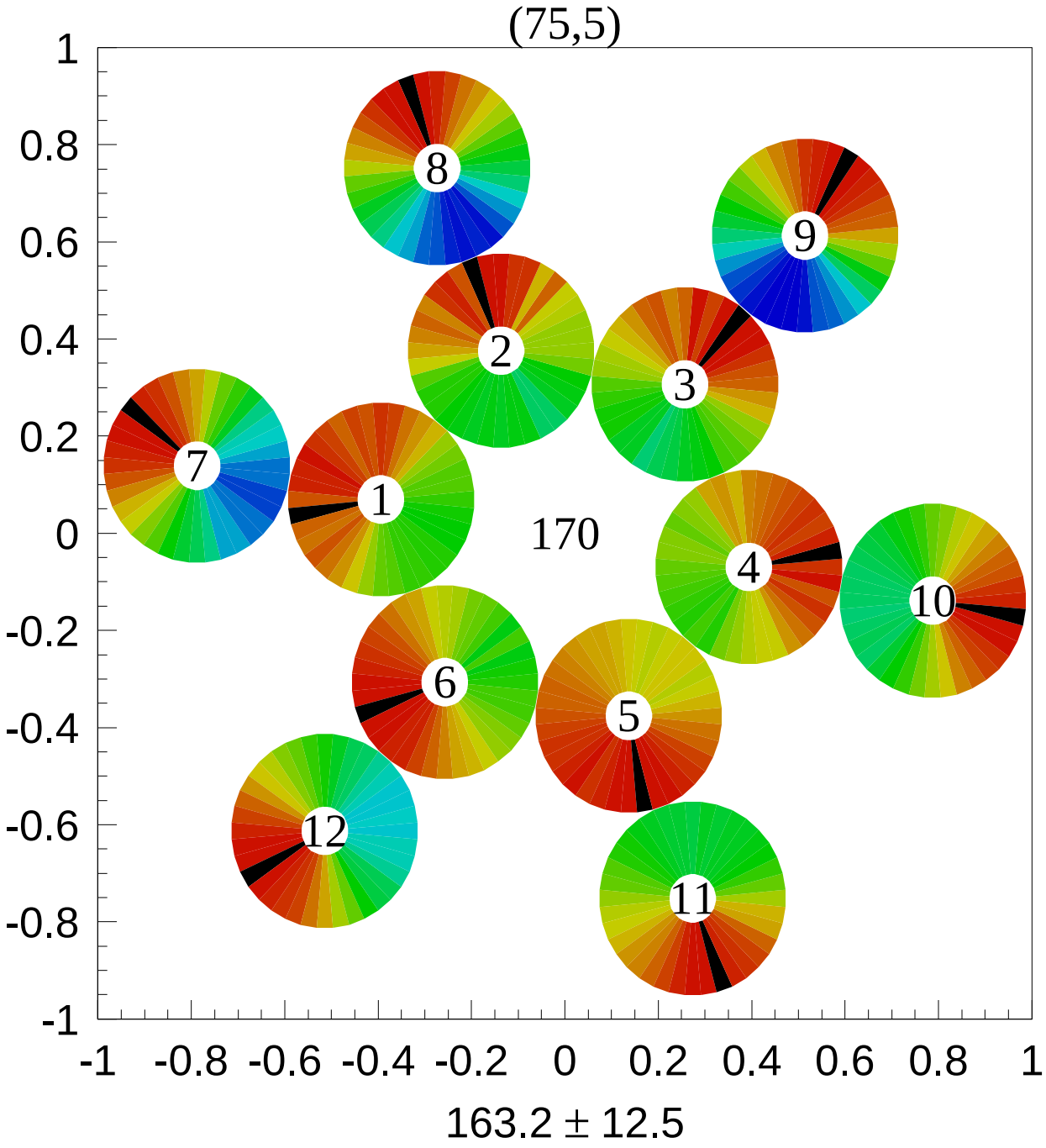

(75,3)
tilted LEDs
119 125 126 127 123 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 119 124 110 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

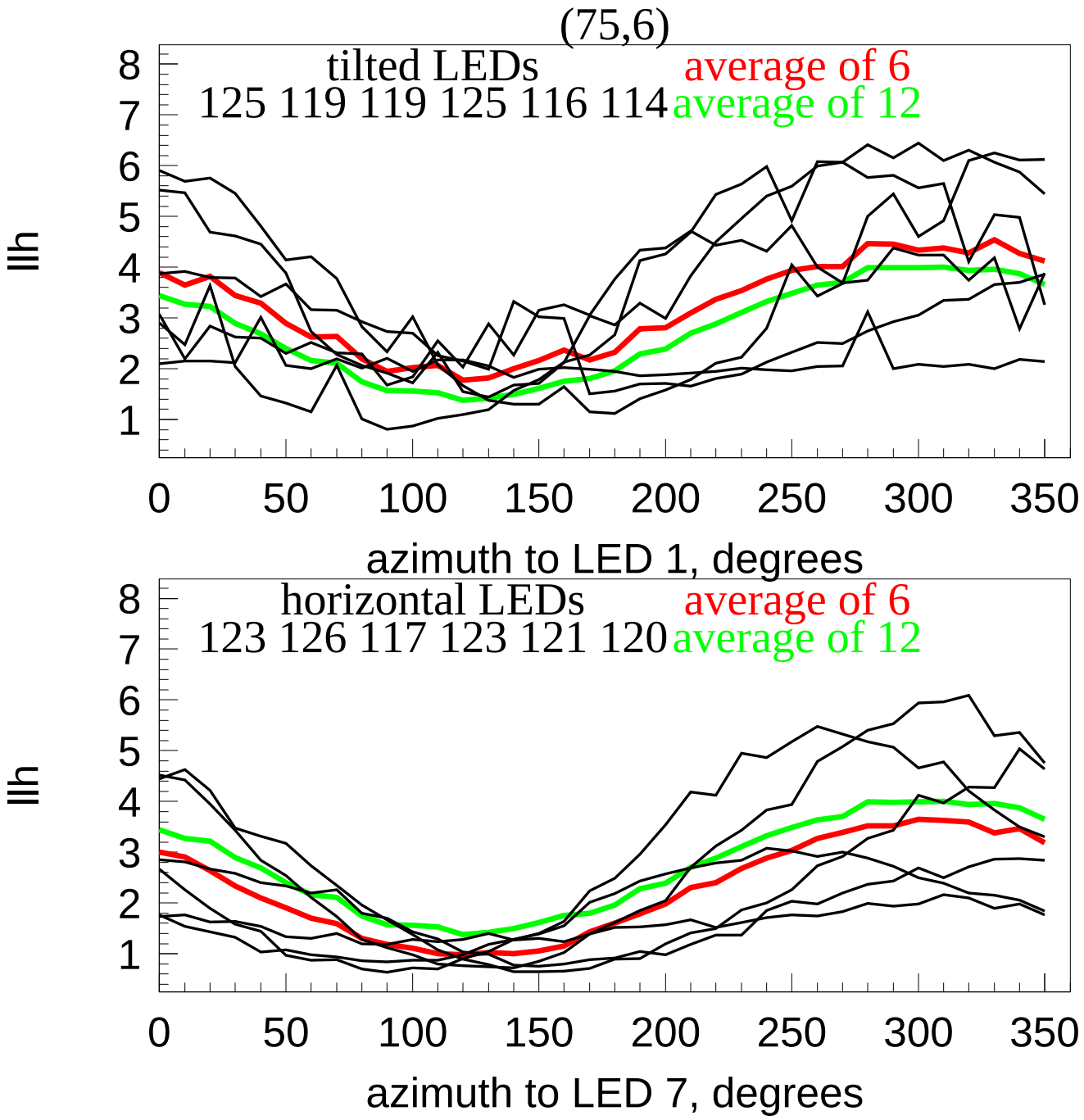

(75,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
76.2 ± 7.9

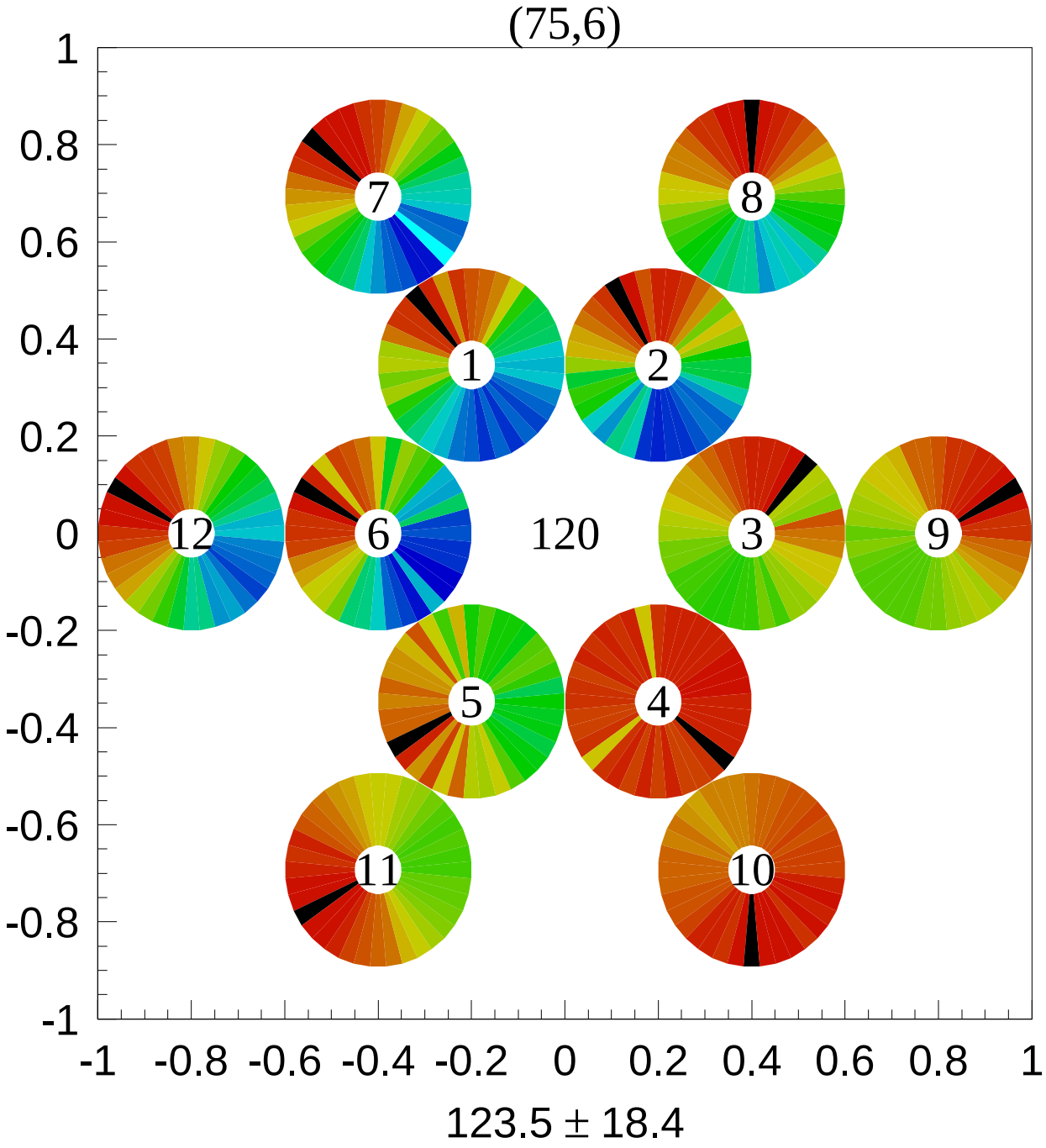

(75,4)
tilted LEDs
121 121 122 122 122 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 121 117 122 119 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

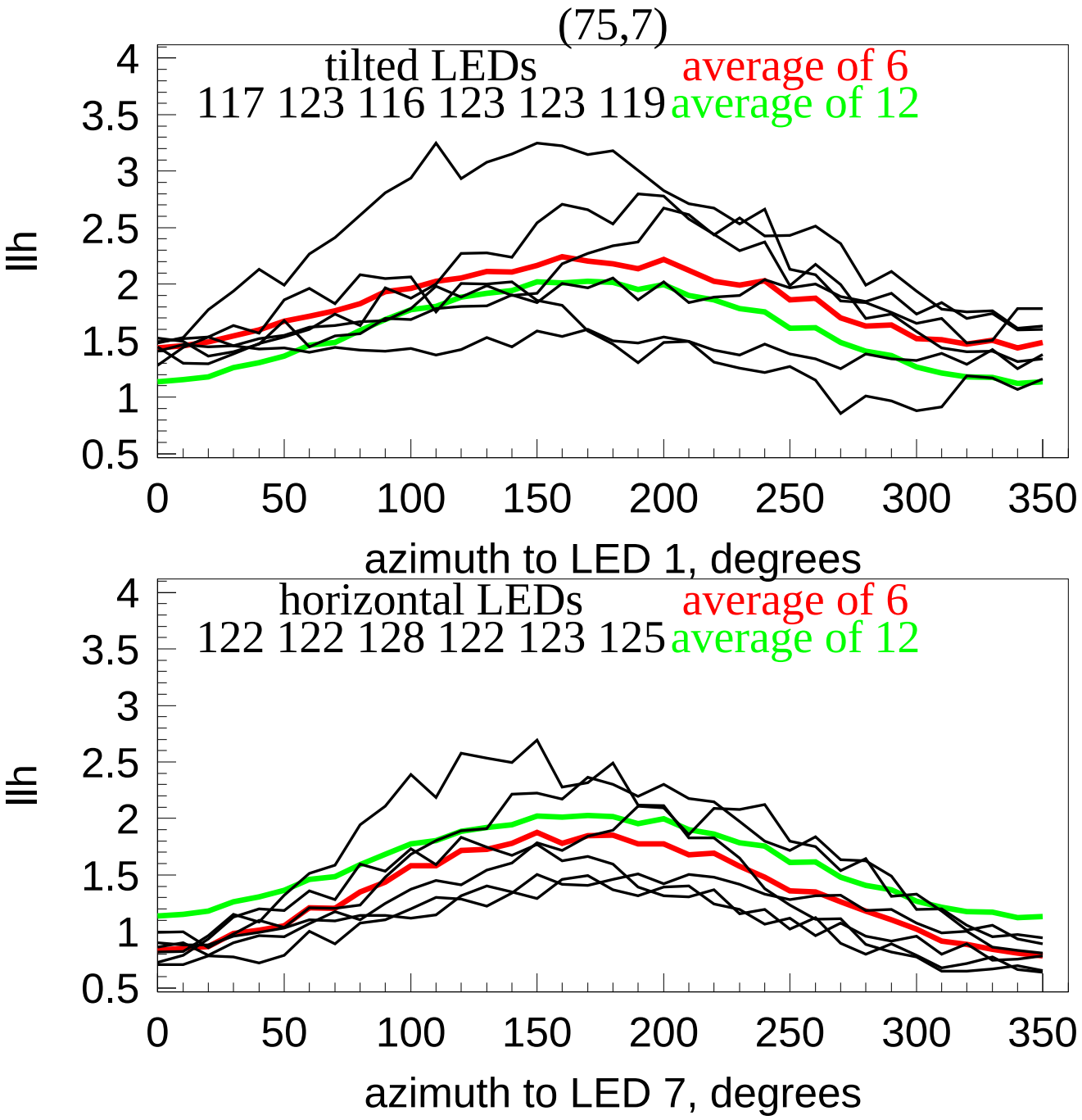

(75,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
59.7 ± 11.0

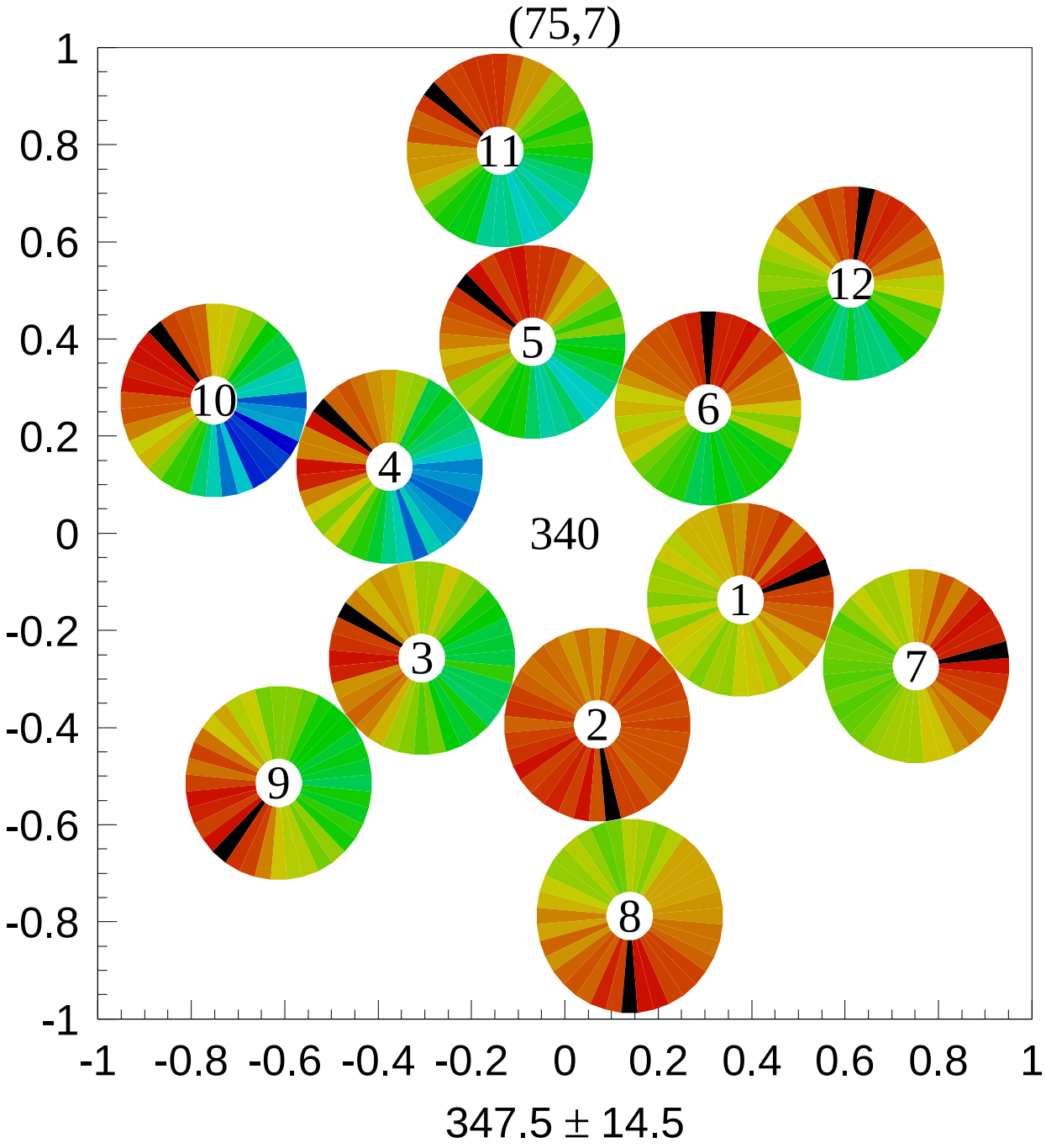

(75,5)
tilted LEDs
122 130 116 121 126 119
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 127 122 123 126 119
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

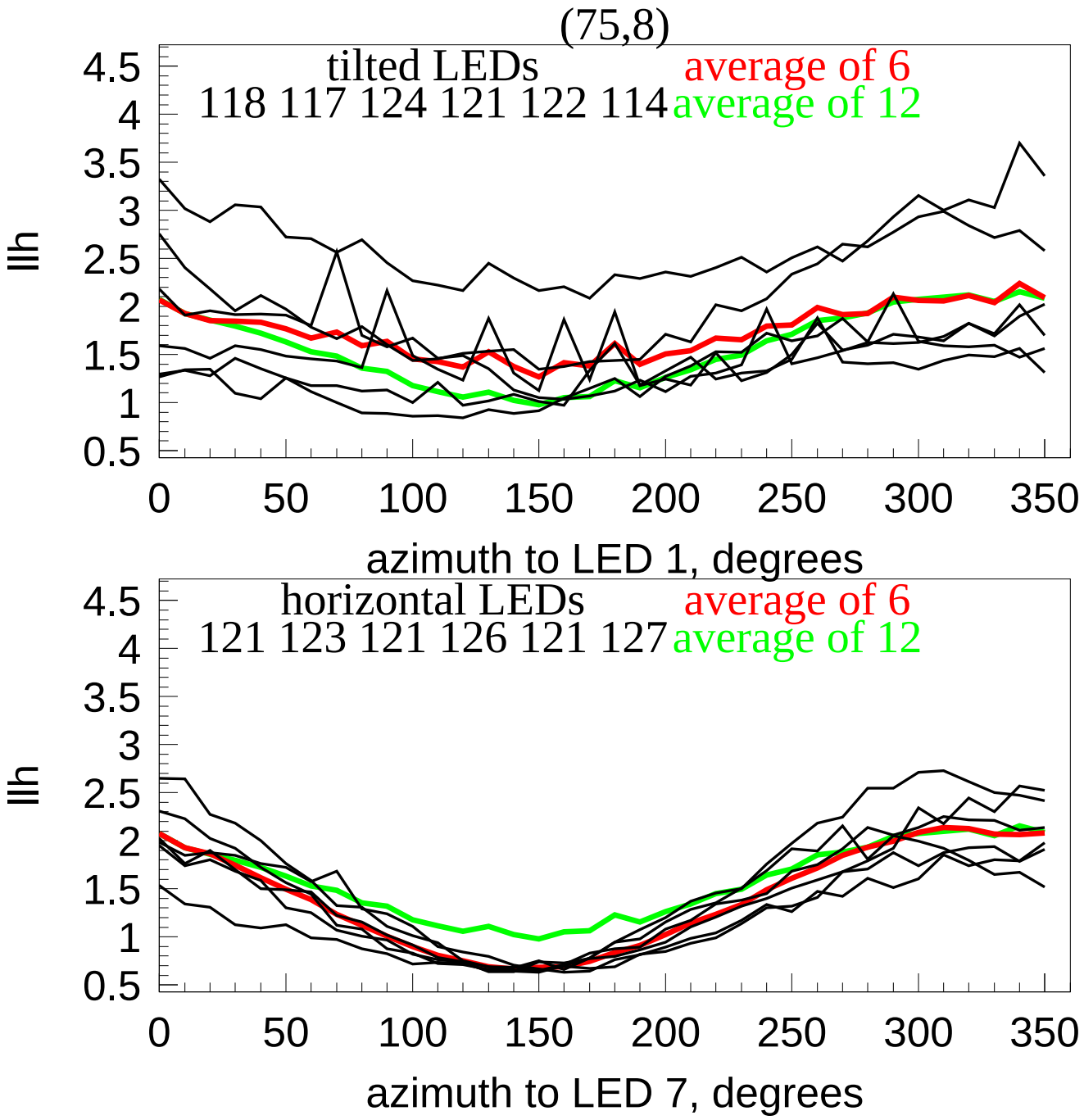

(75,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
3
7
1
170
4
10
6
5
12
11
163.2 ± 12.5

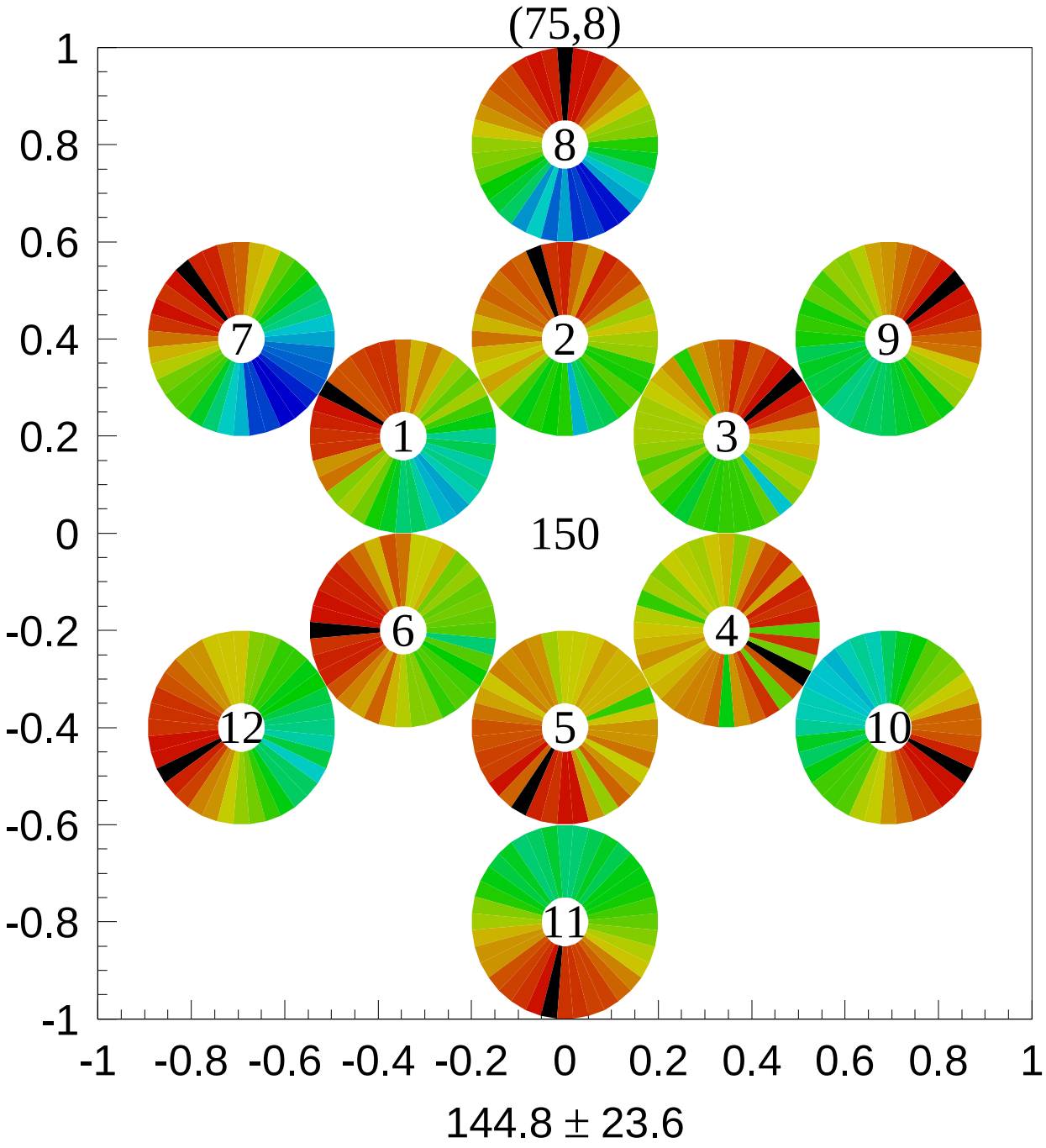

(75,6)
tilted LEDs
125 119 119 125 116 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 126 117 123 121 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

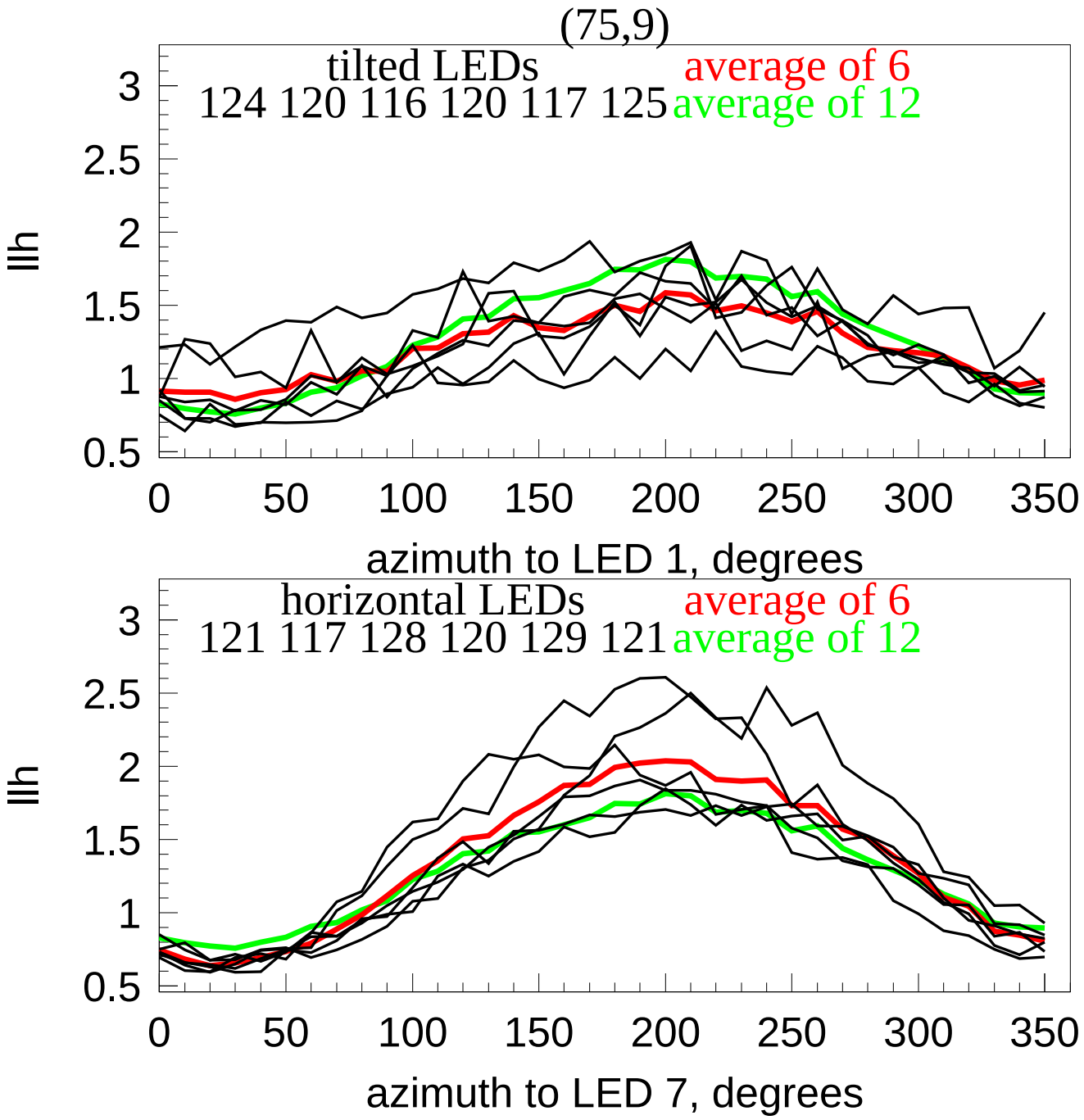

(75,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
123.5 ± 18.4

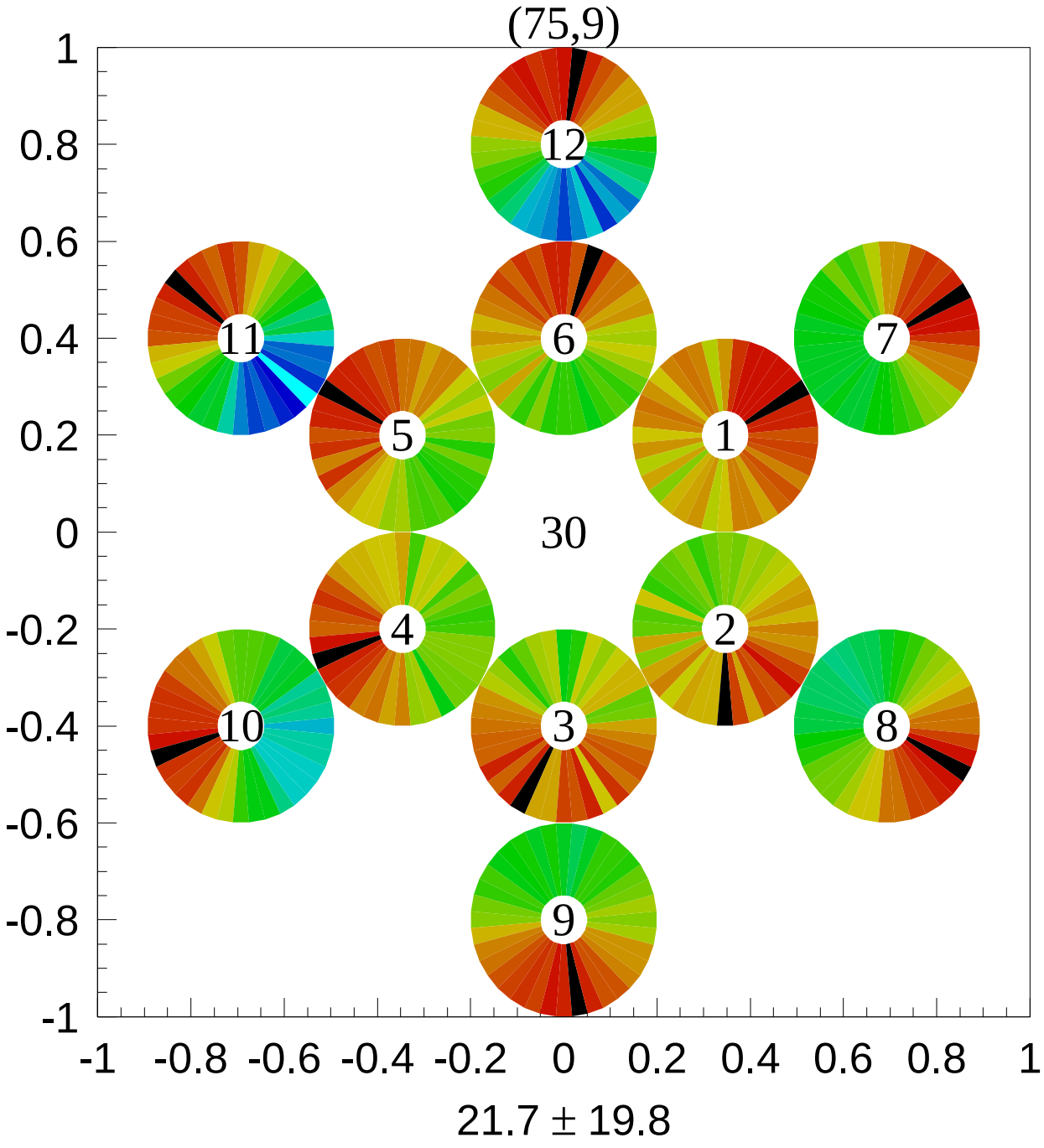

(75,7)
tilted LEDs
117 123 116 123 123 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 128 122 123 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

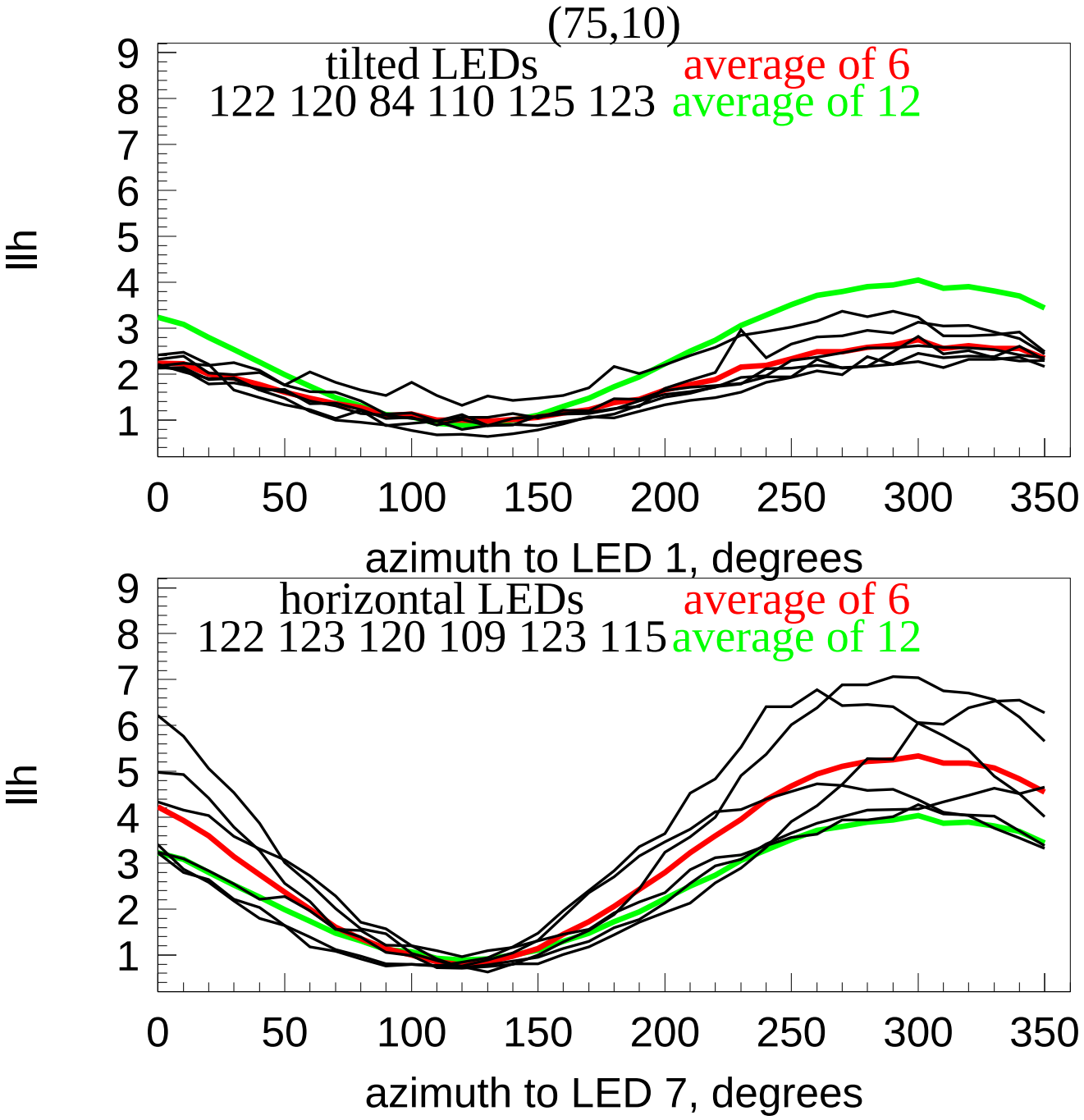

(75,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
7
3
2
9
8
347.5 ± 14.5

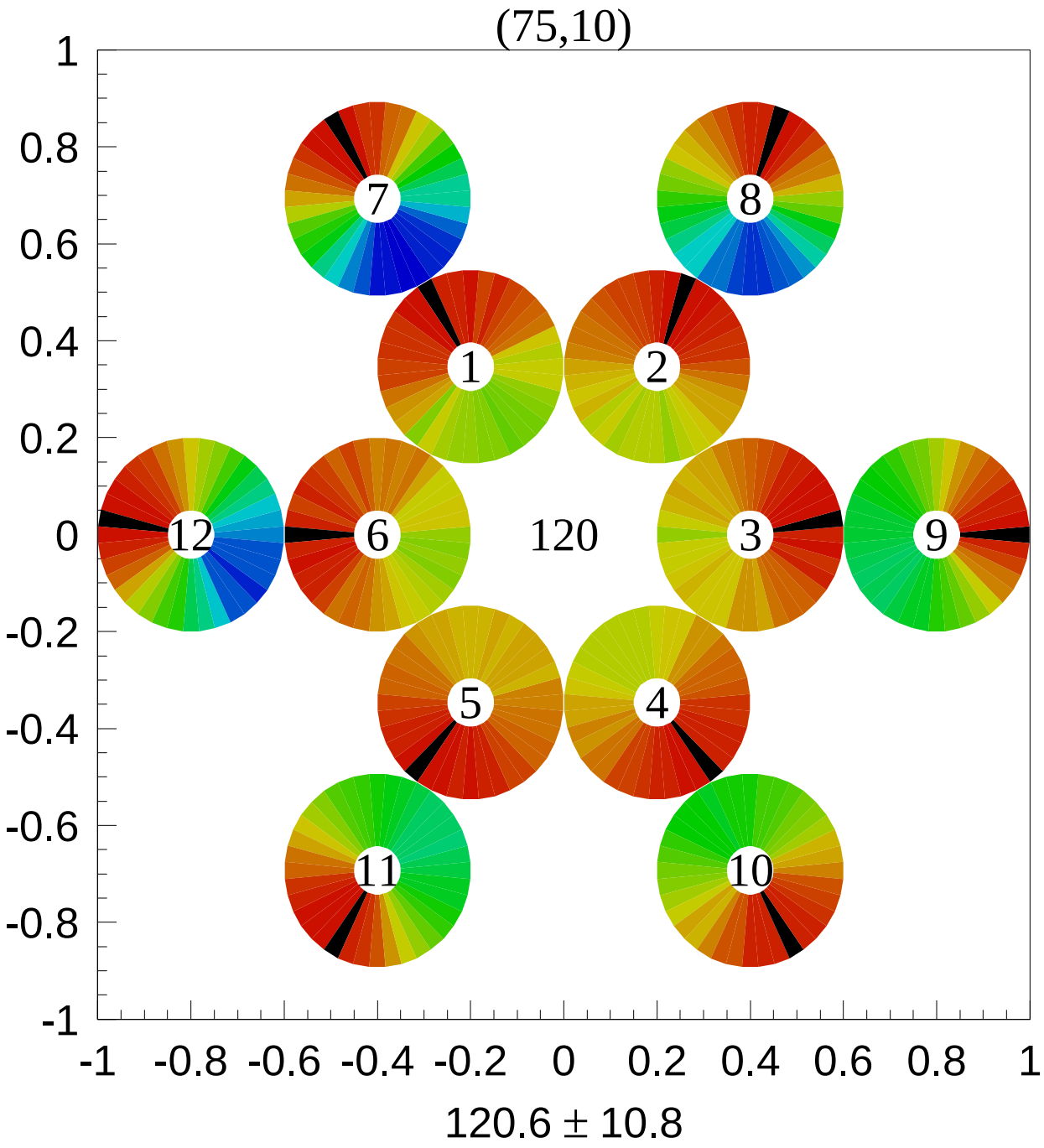

(75,8)
tilted LEDs
118 117 124 121 122 114
average of 6
average of 12
IIh
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
121 123 121 126 121 127
average of 6
average of 12
IIh
azimuth to LED 7, degrees

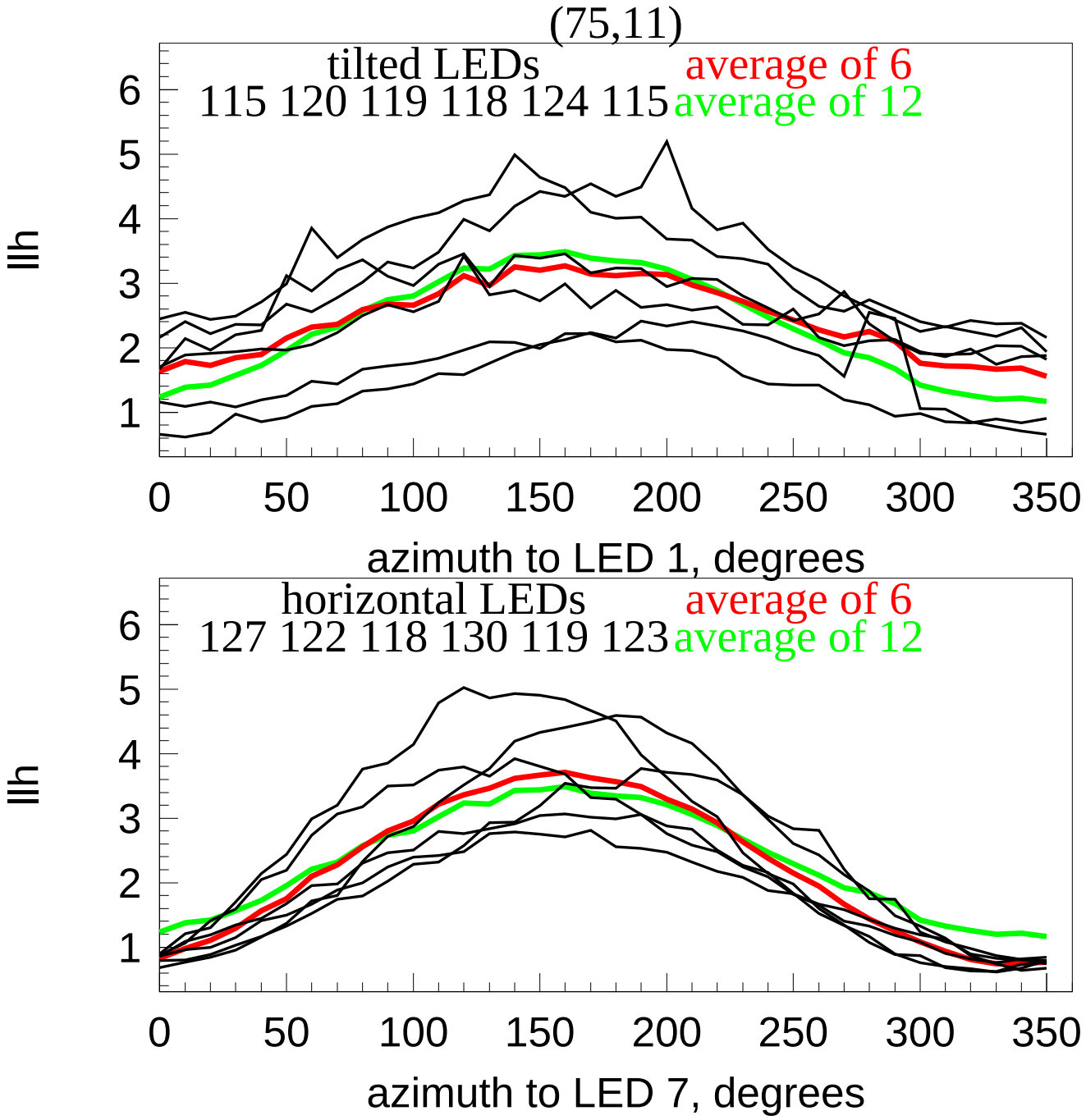

(75,8)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
144.8 ± 23.6

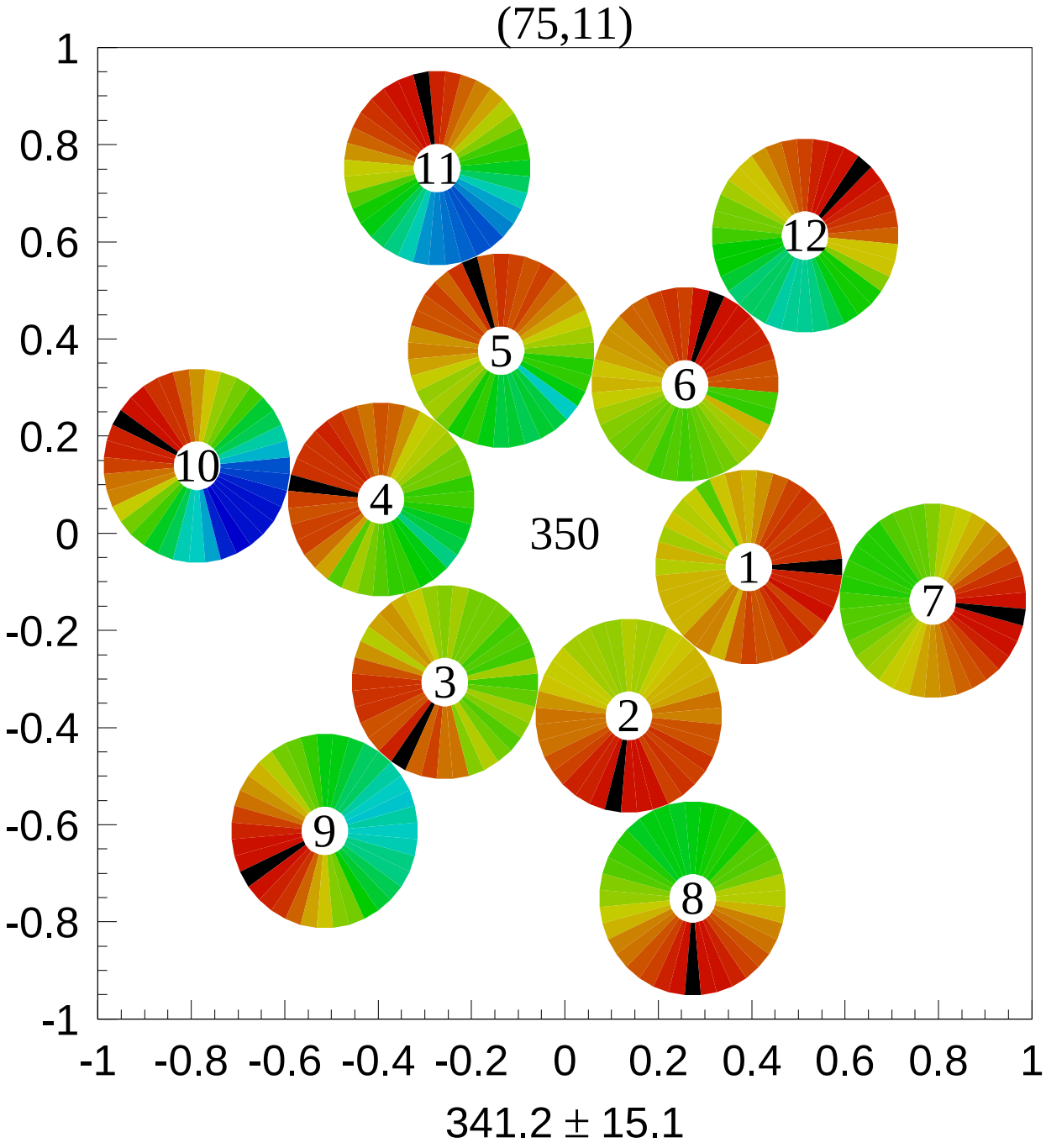

(75,9)
tilted LEDs
124 120 116 120 117 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 117 128 120 129 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

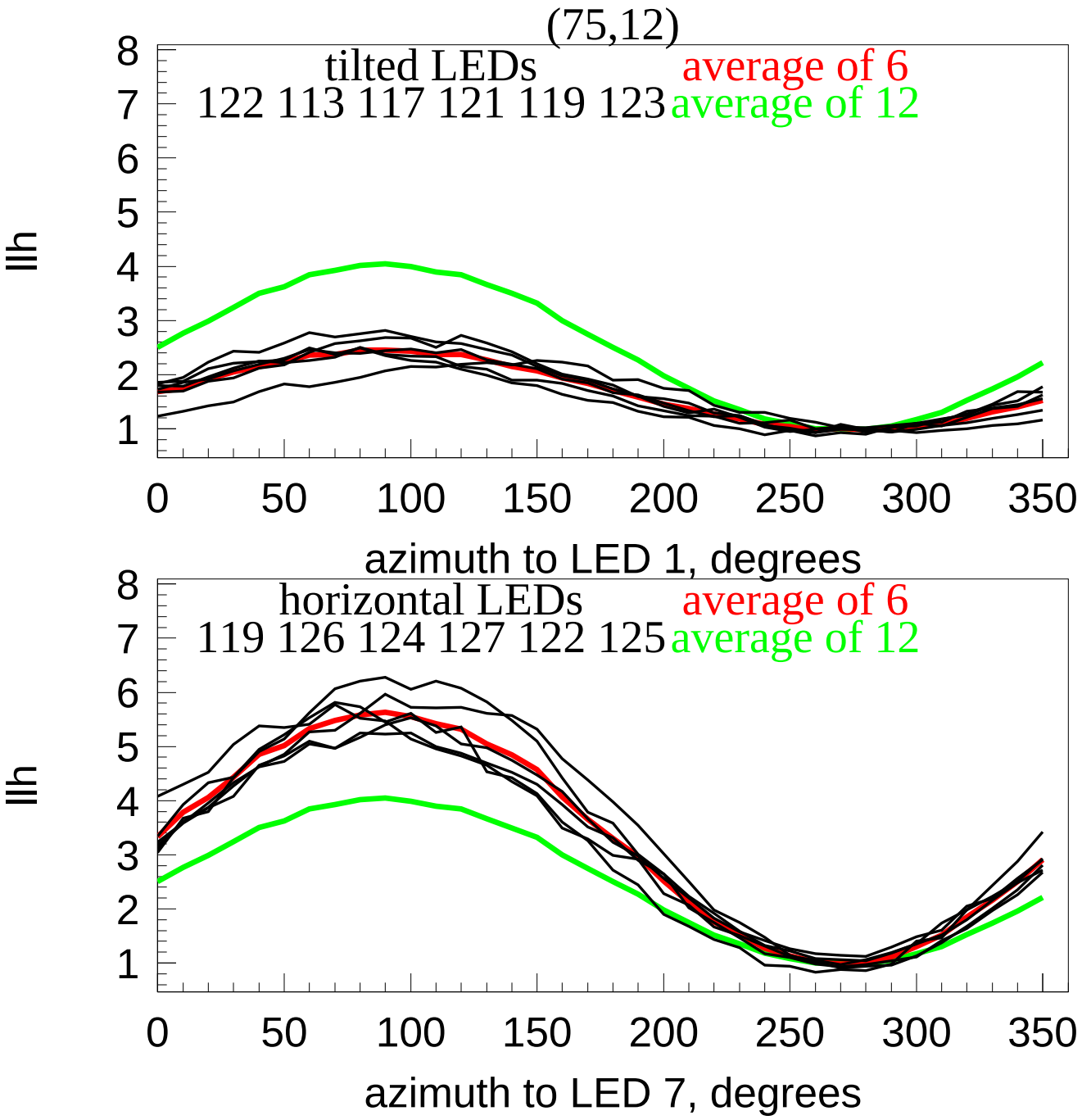

(75,9)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
21.7 ± 19.8

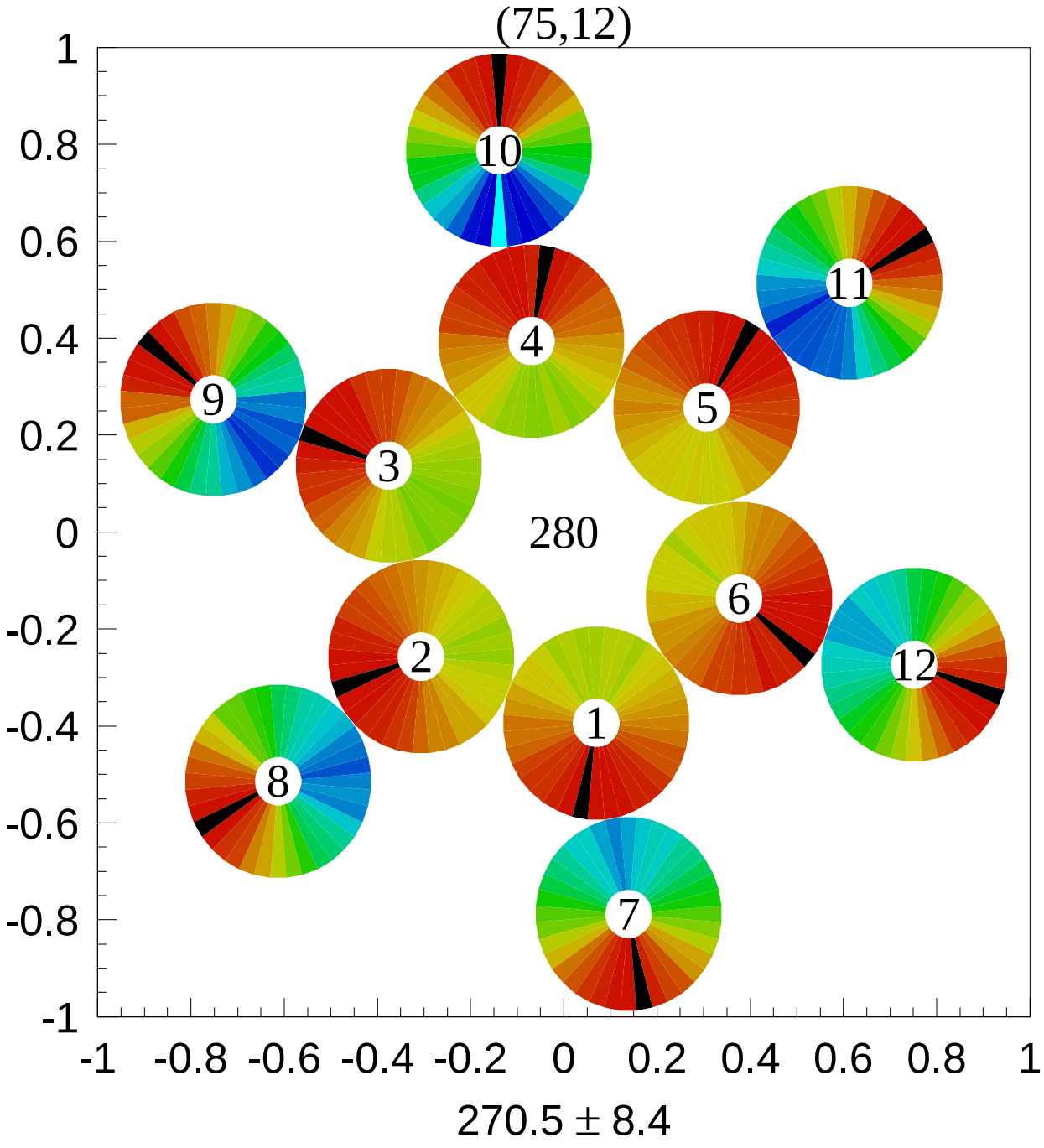

(75,10)
tilted LEDs
122 120 84 110 125 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 120 109 123 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

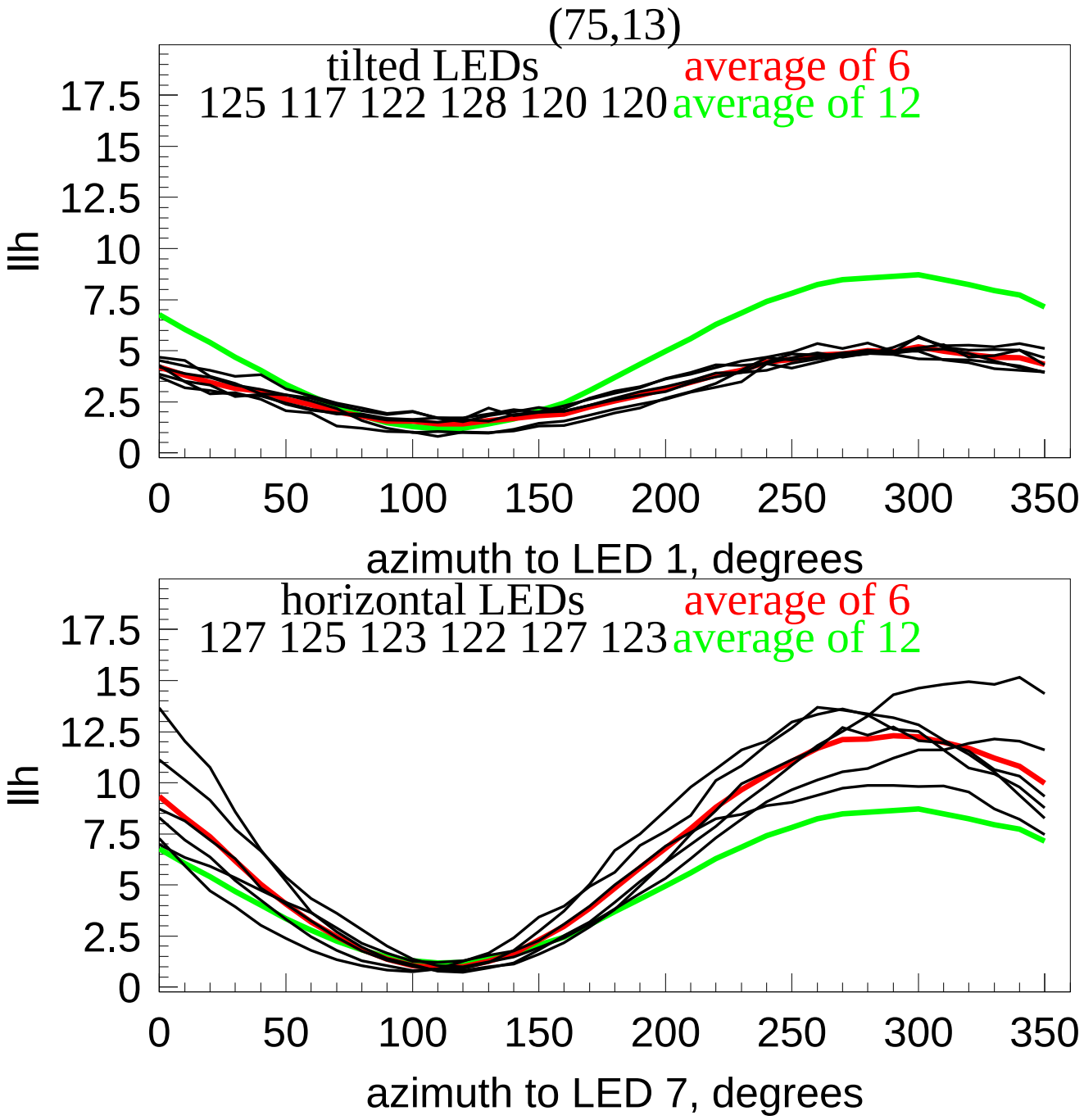

(75,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
120.6 ± 10.8
7
8
1
2
12
6
120
3
9
5
4
11
10

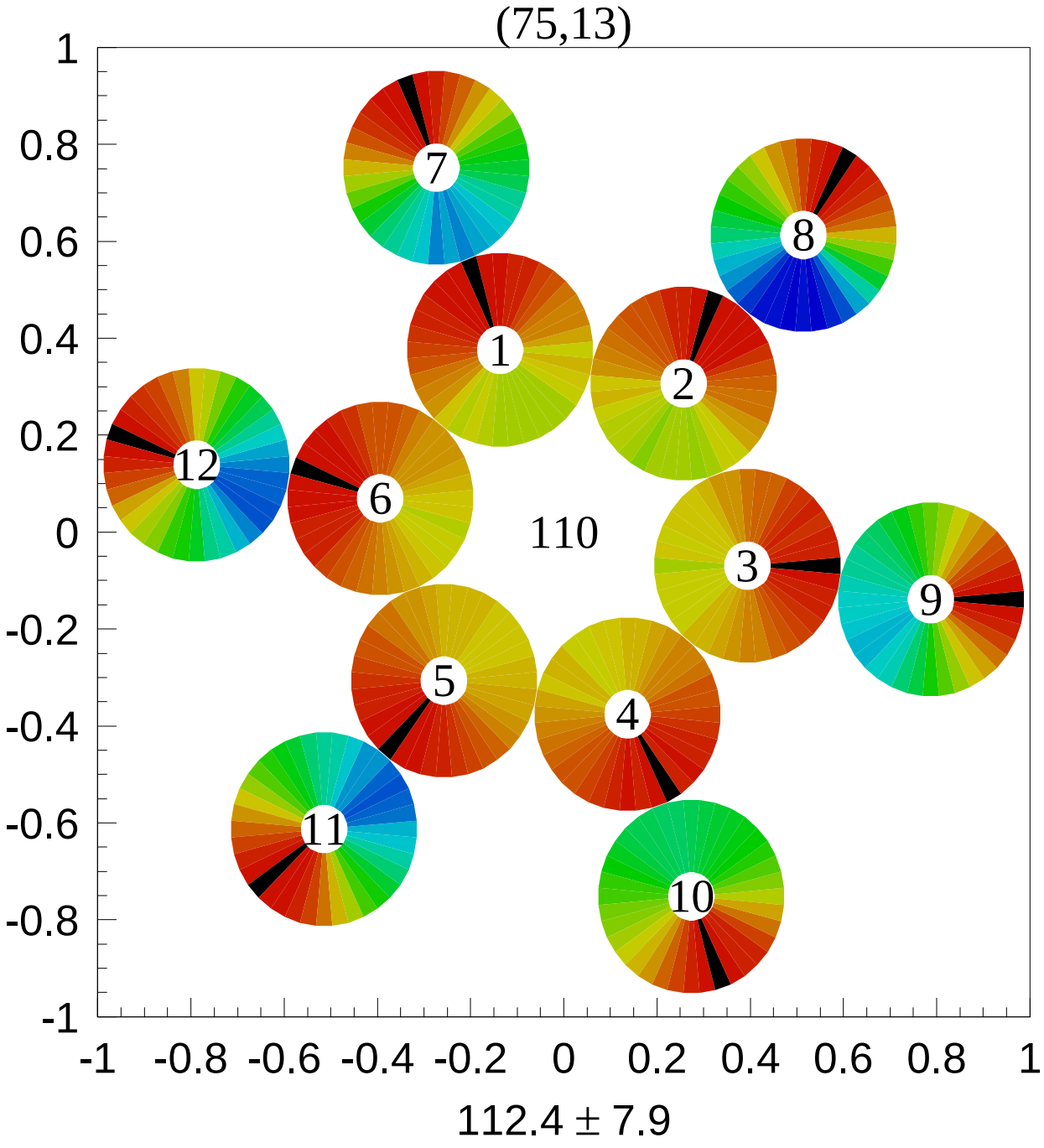

(75,11)
tilted LEDs
115 120 119 118 124 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 122 118 130 119 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

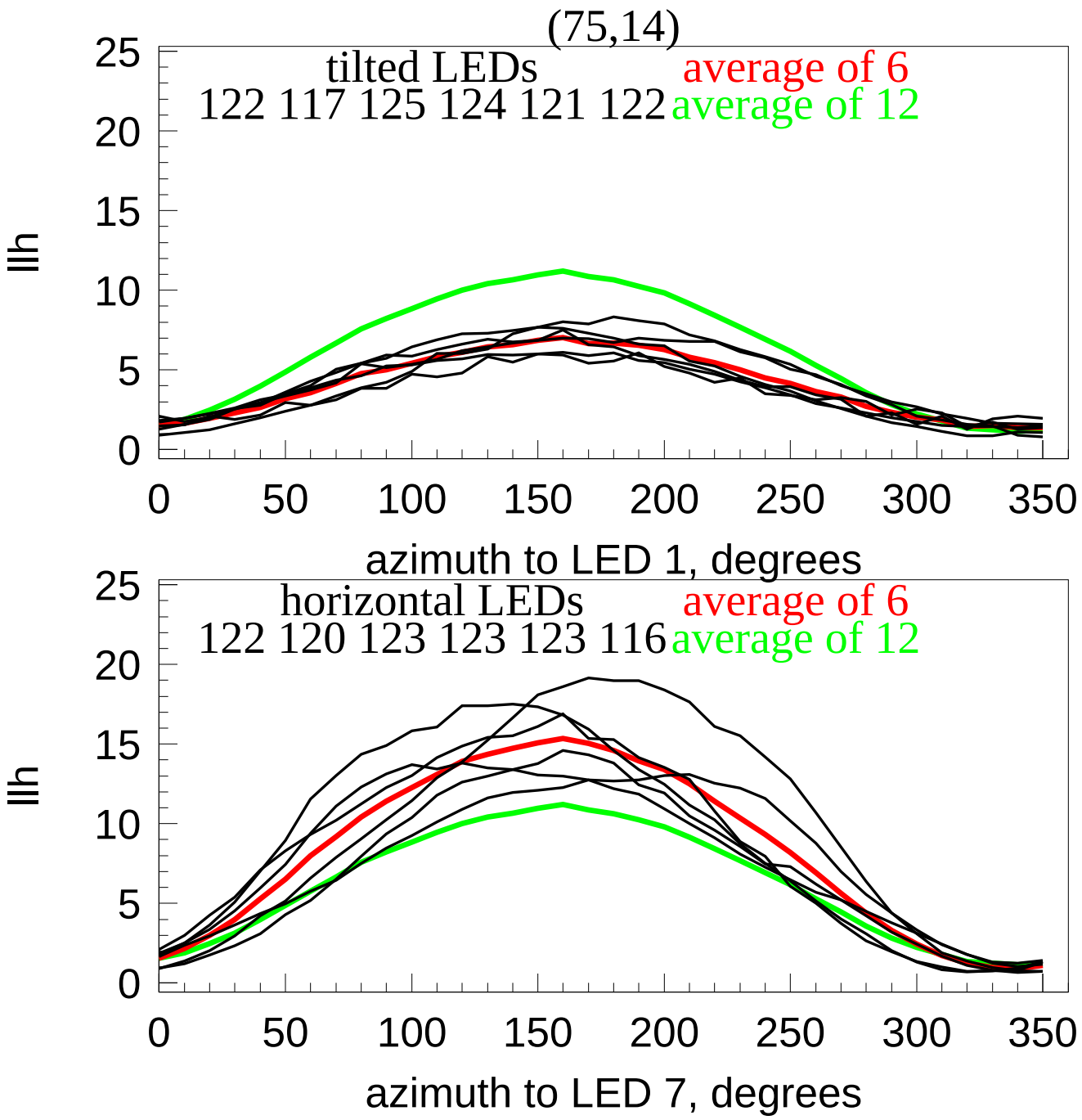

(75,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
341.2 ± 15.1

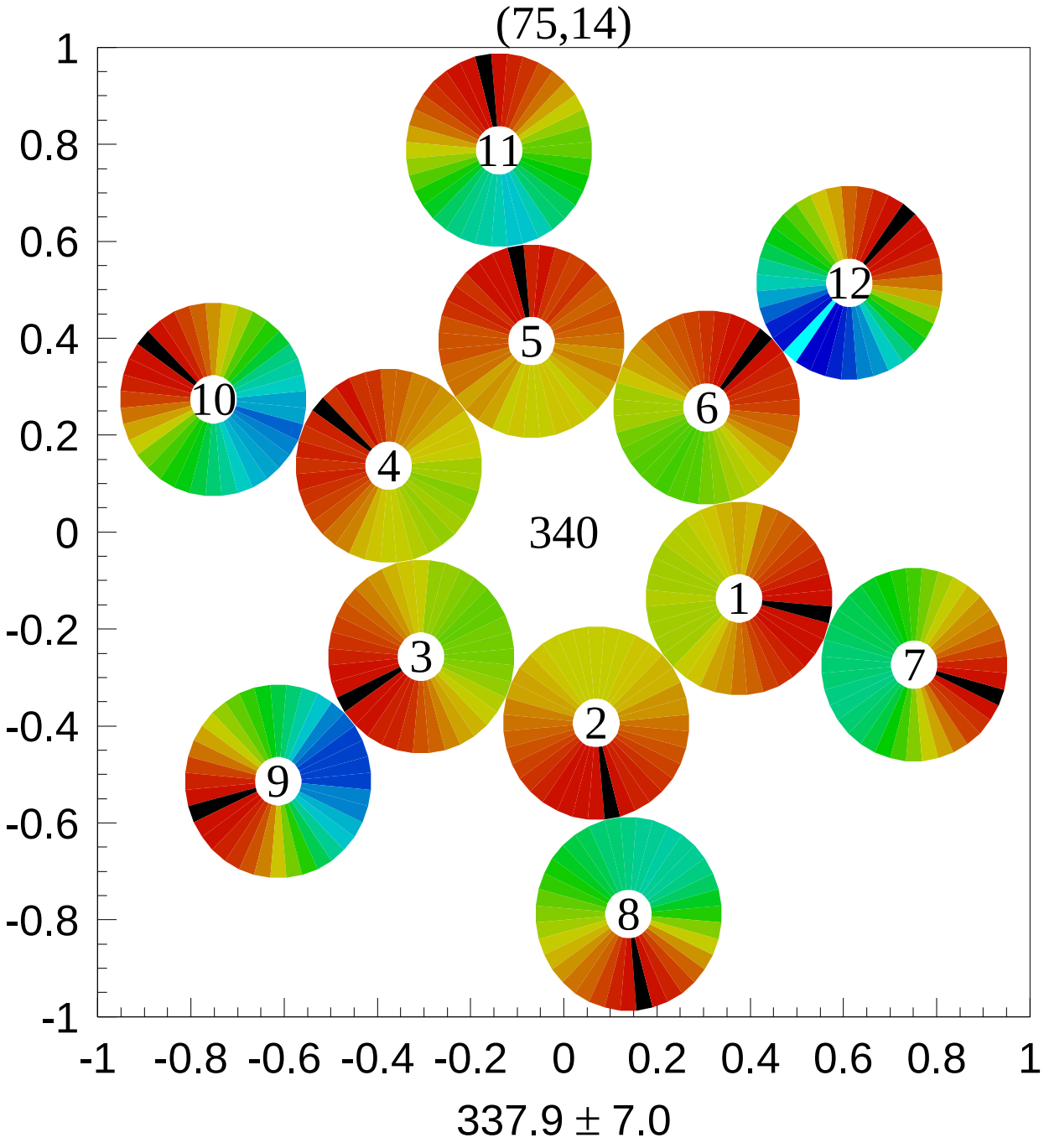

(75,12)
tilted LEDs
122 113 117 121 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 126 124 127 122 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

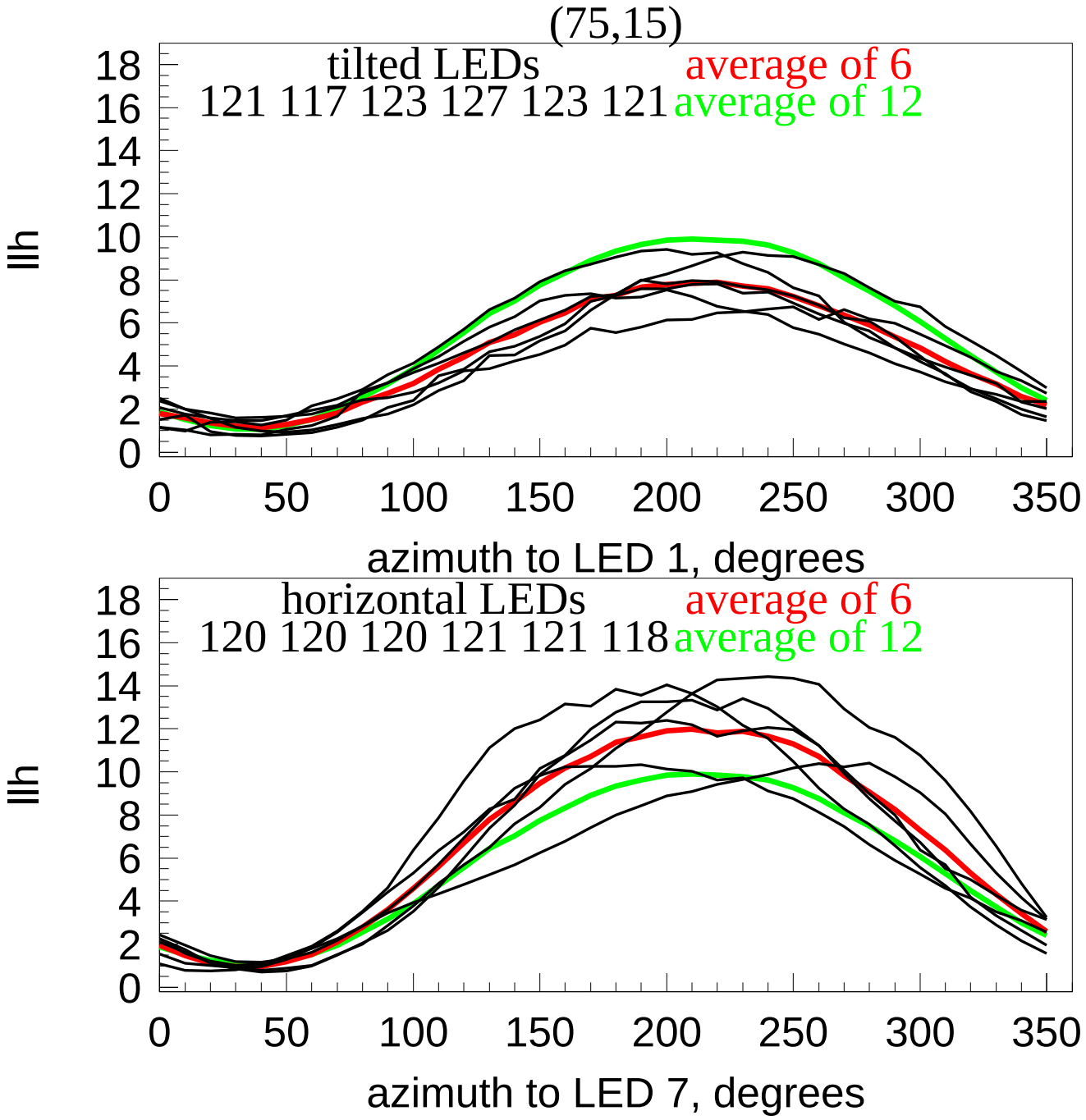

(75,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
270.5 ± 8.4

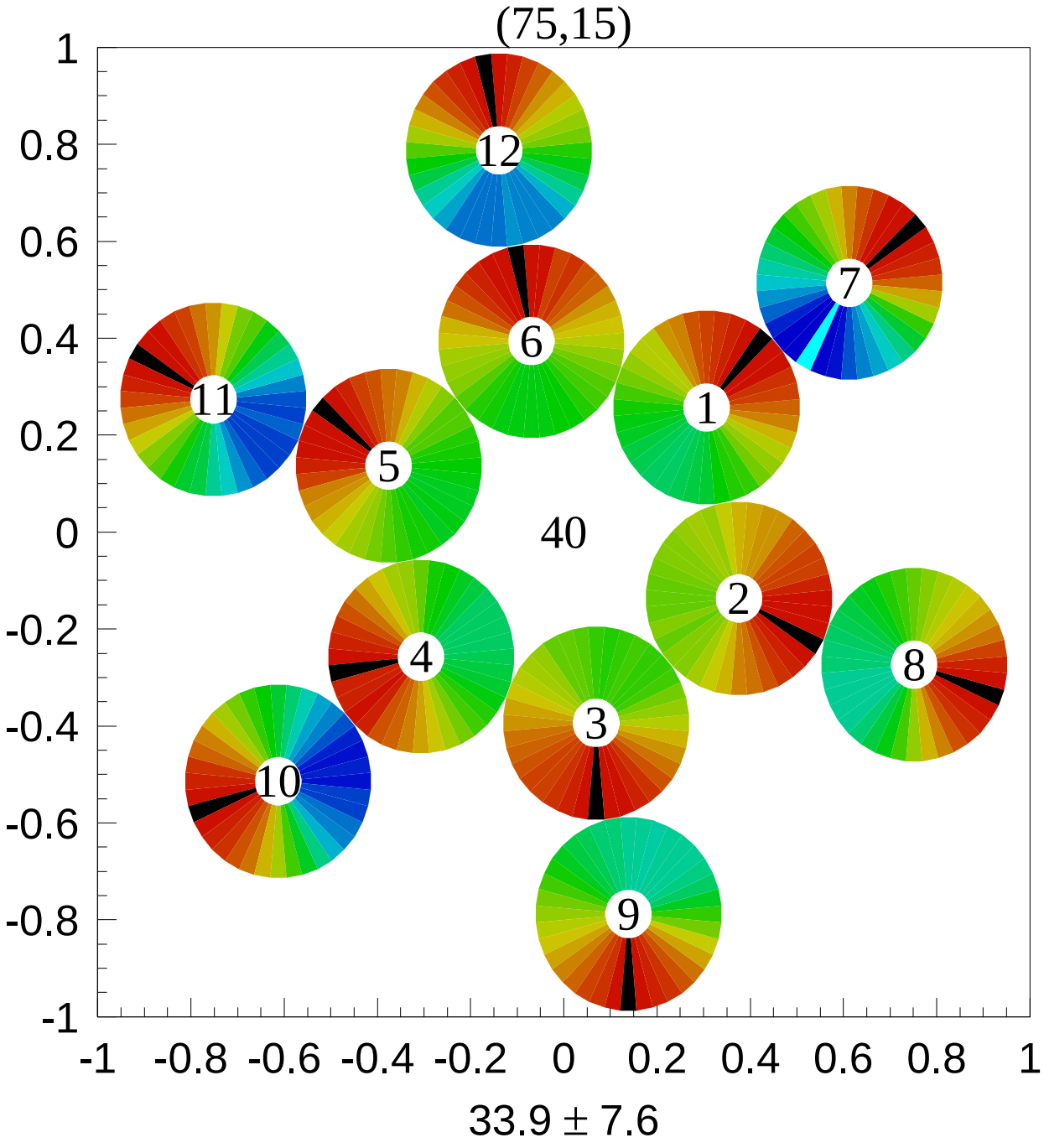

(75,13)
tilted LEDs
125 117 122 128 120 120
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
127 125 123 122 127 123
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

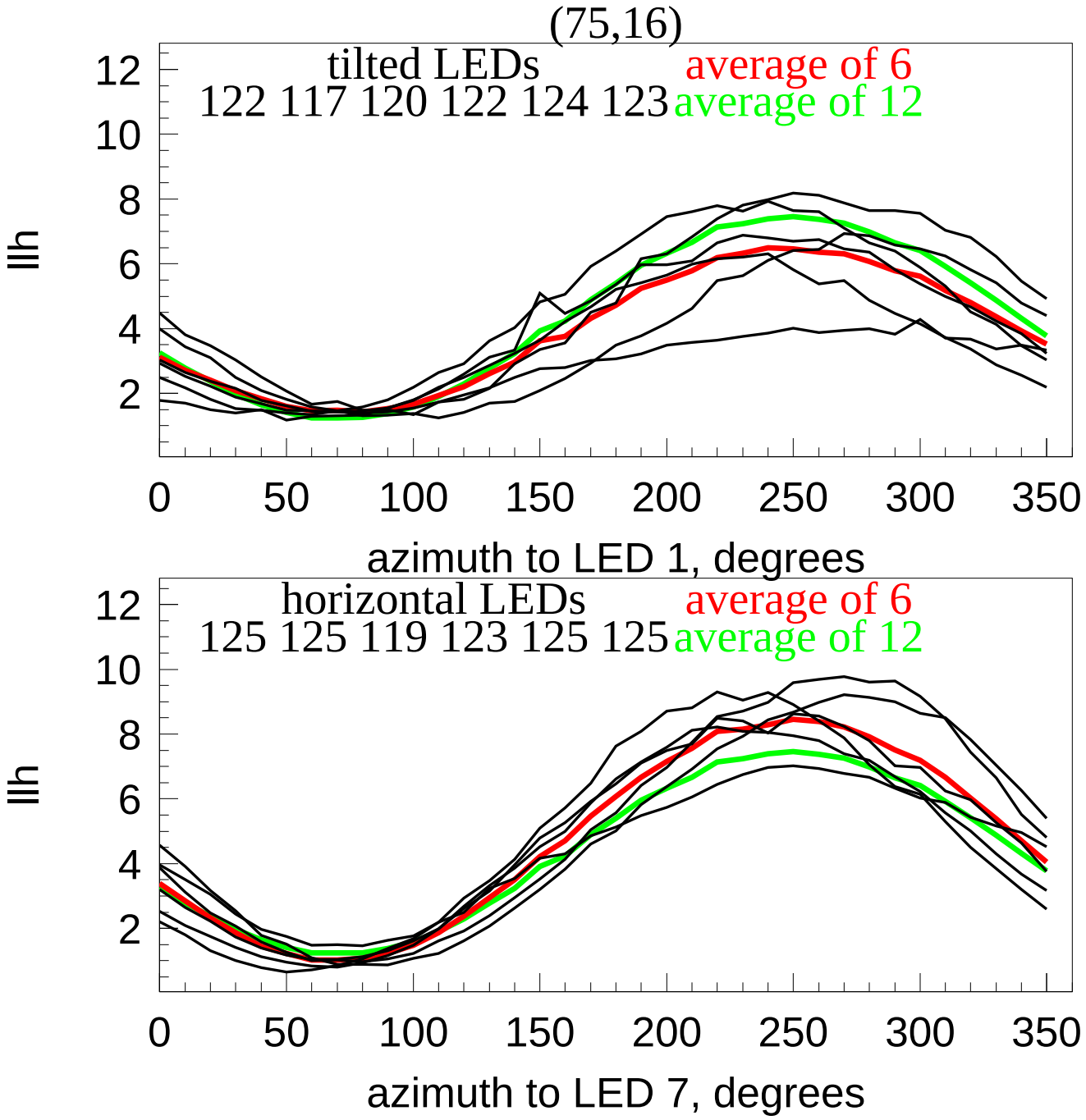

(75,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112.4 ± 7.9

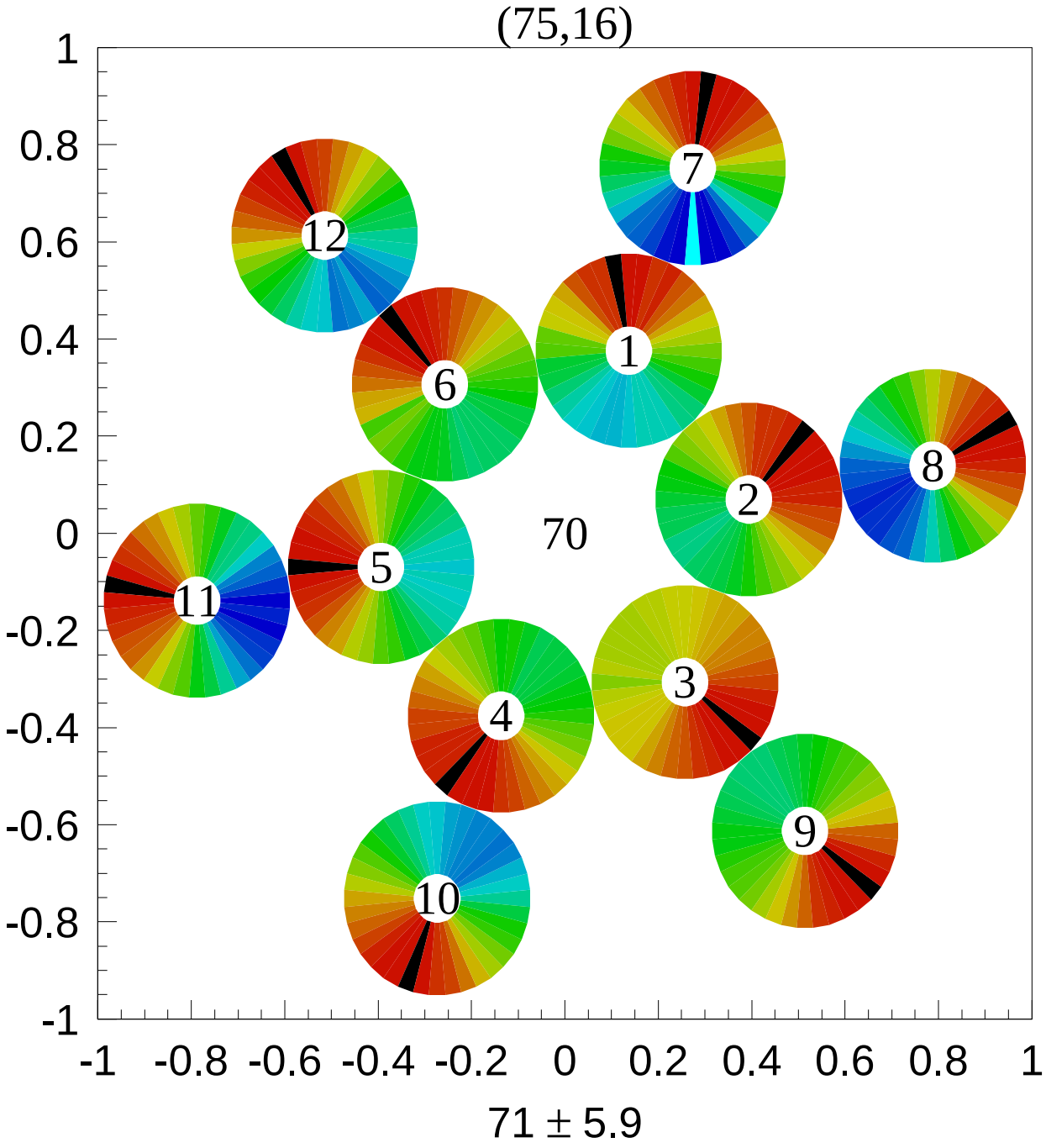

(75,14)
tilted LEDs
122 117 125 124 121 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 120 123 123 123 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

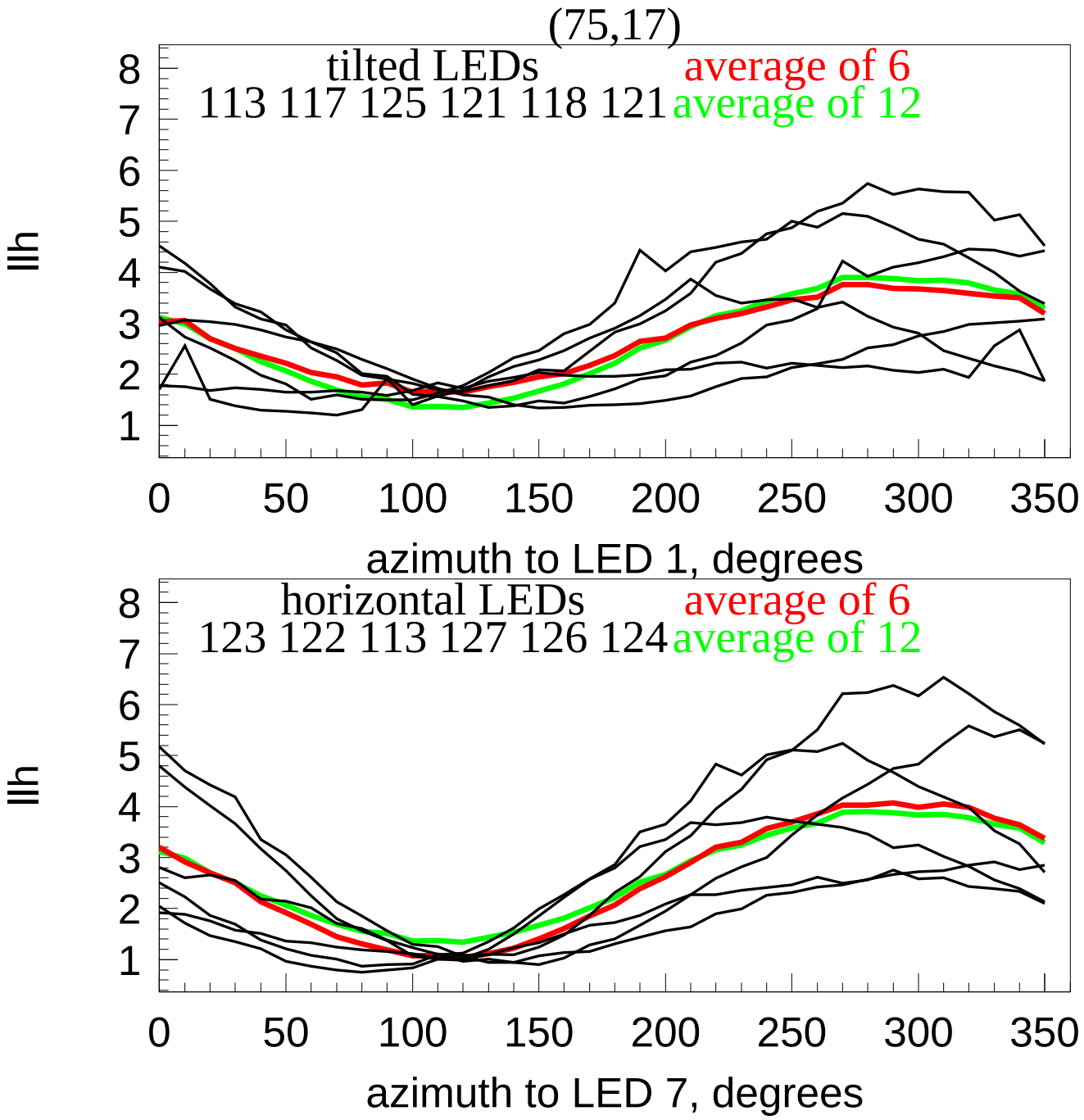

(75,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
10
6
4
340
1
3
7
2
9
8
337.9 ± 7.0

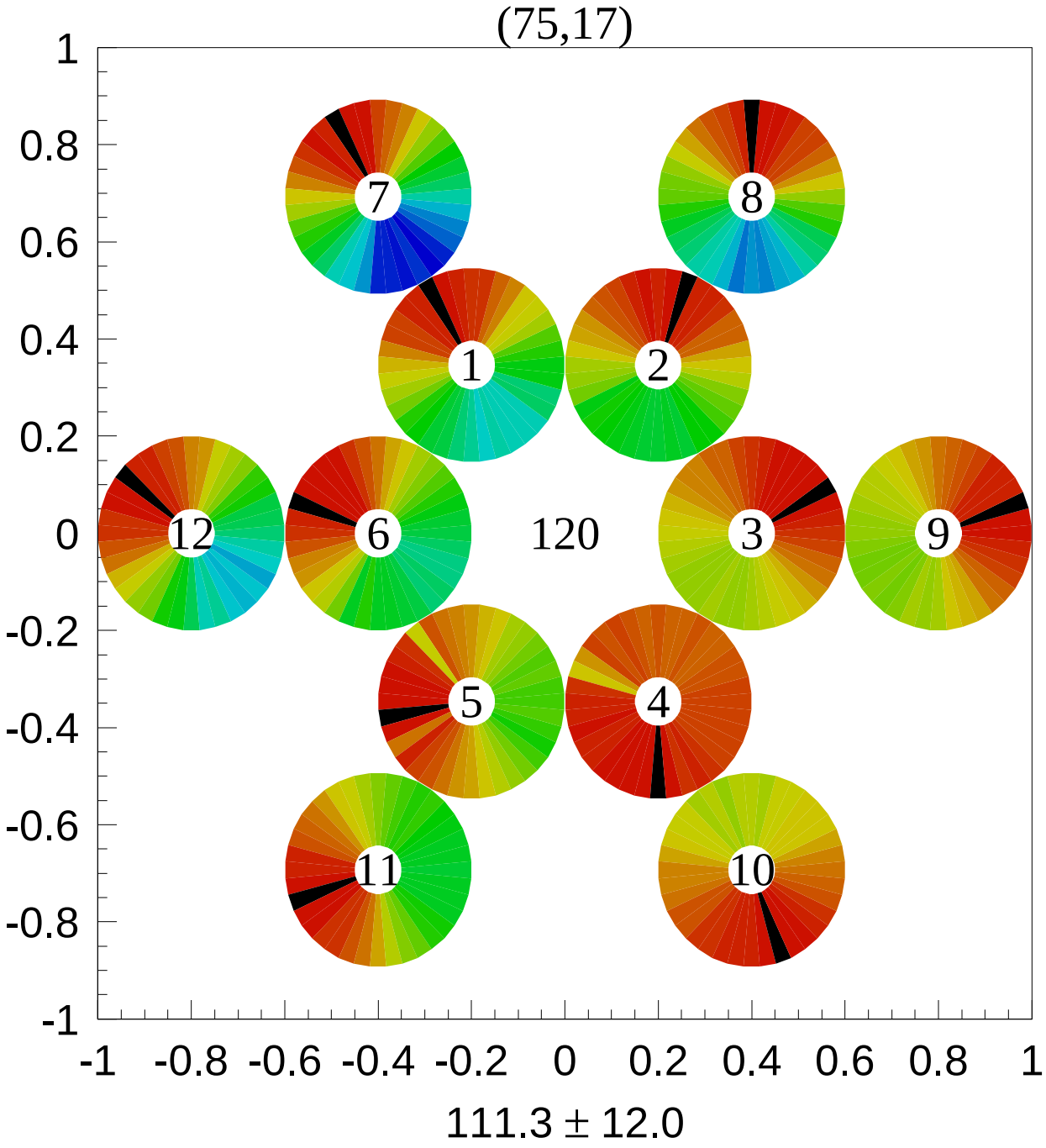

(75,15)
tilted LEDs
121 117 123 127 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 120 121 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

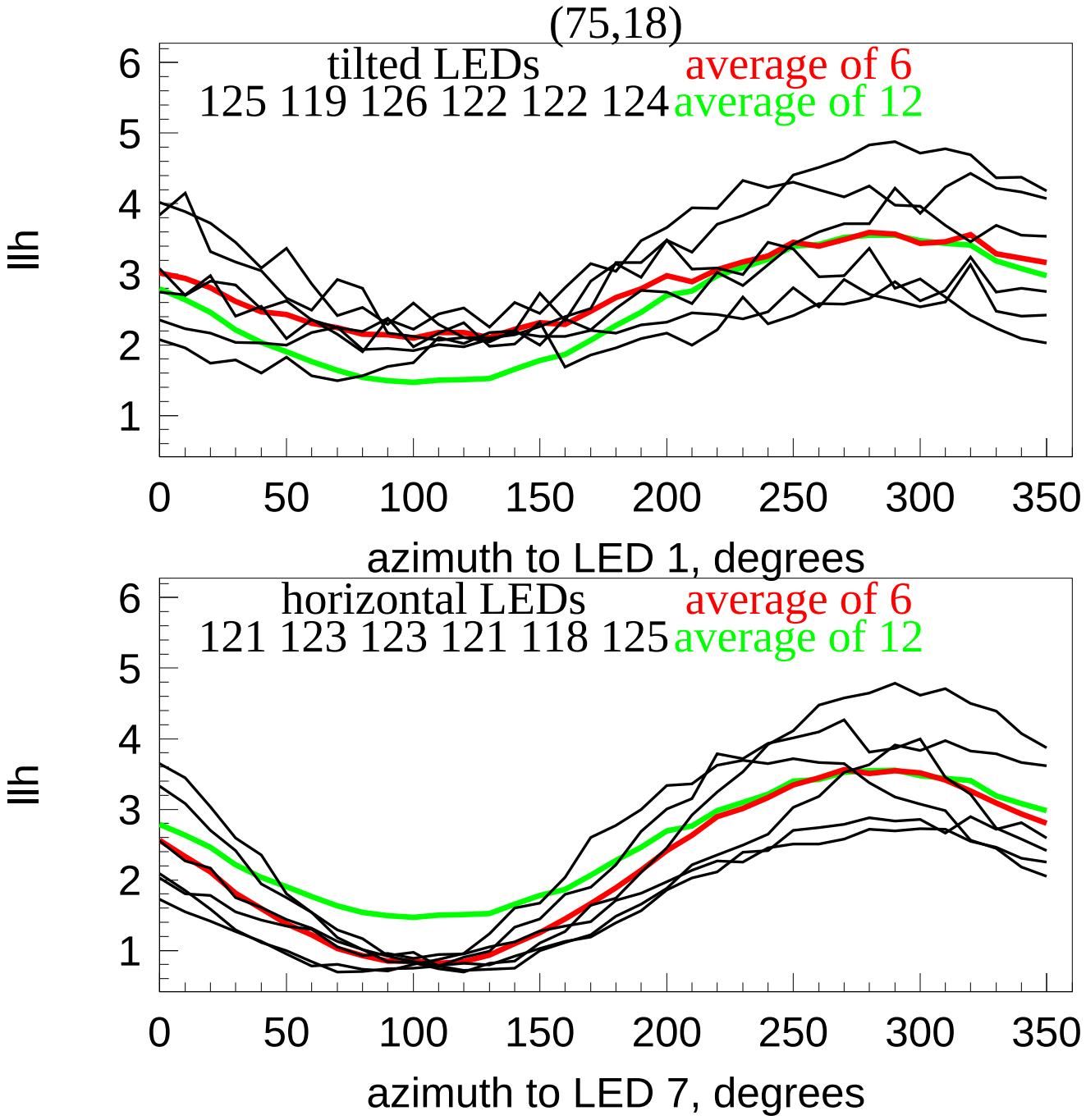

(75,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
4
8
3
10
9
33.9 ± 7.6

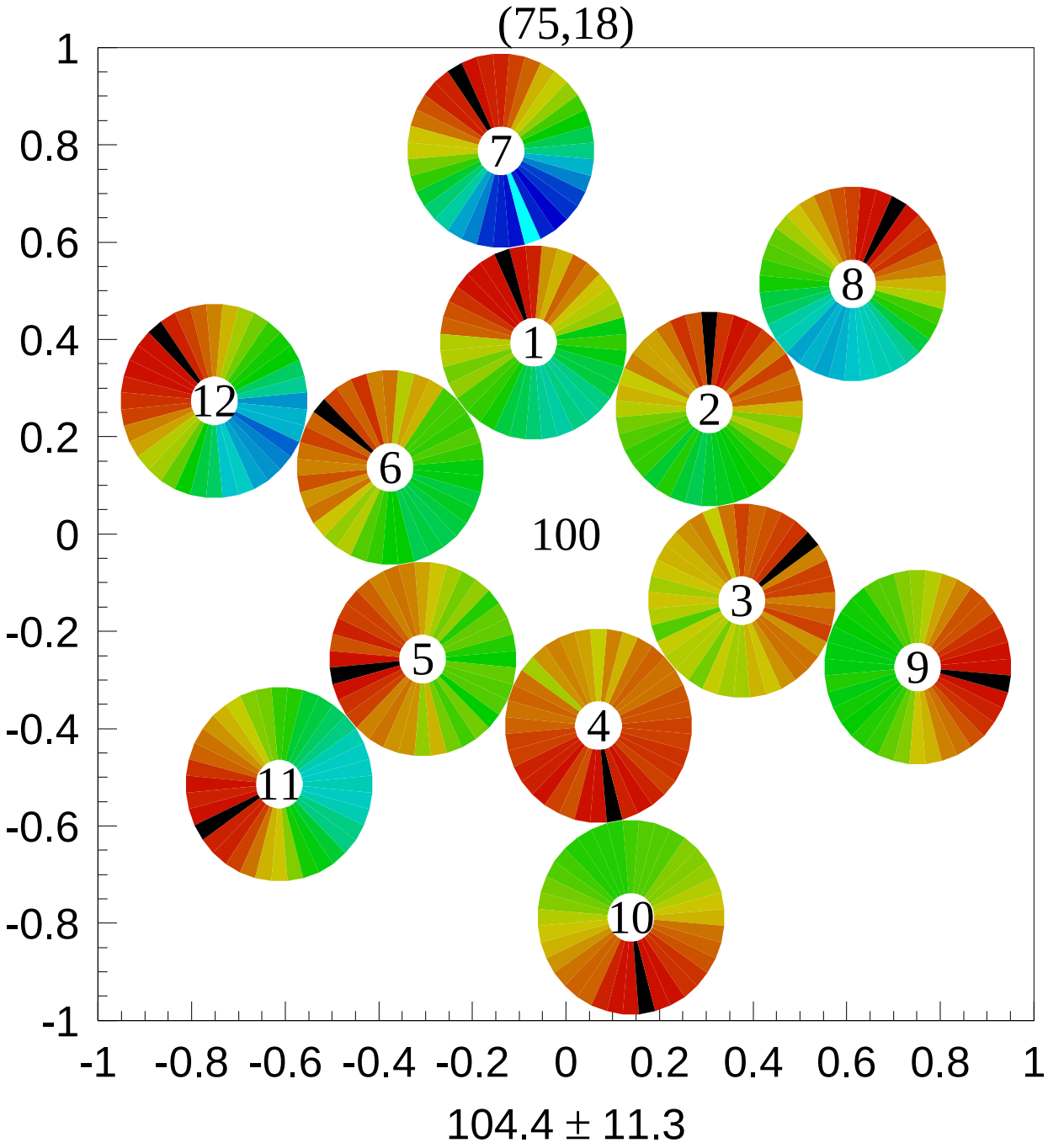

(75,16)
tilted LEDs
122 117 120 122 124 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 119 123 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

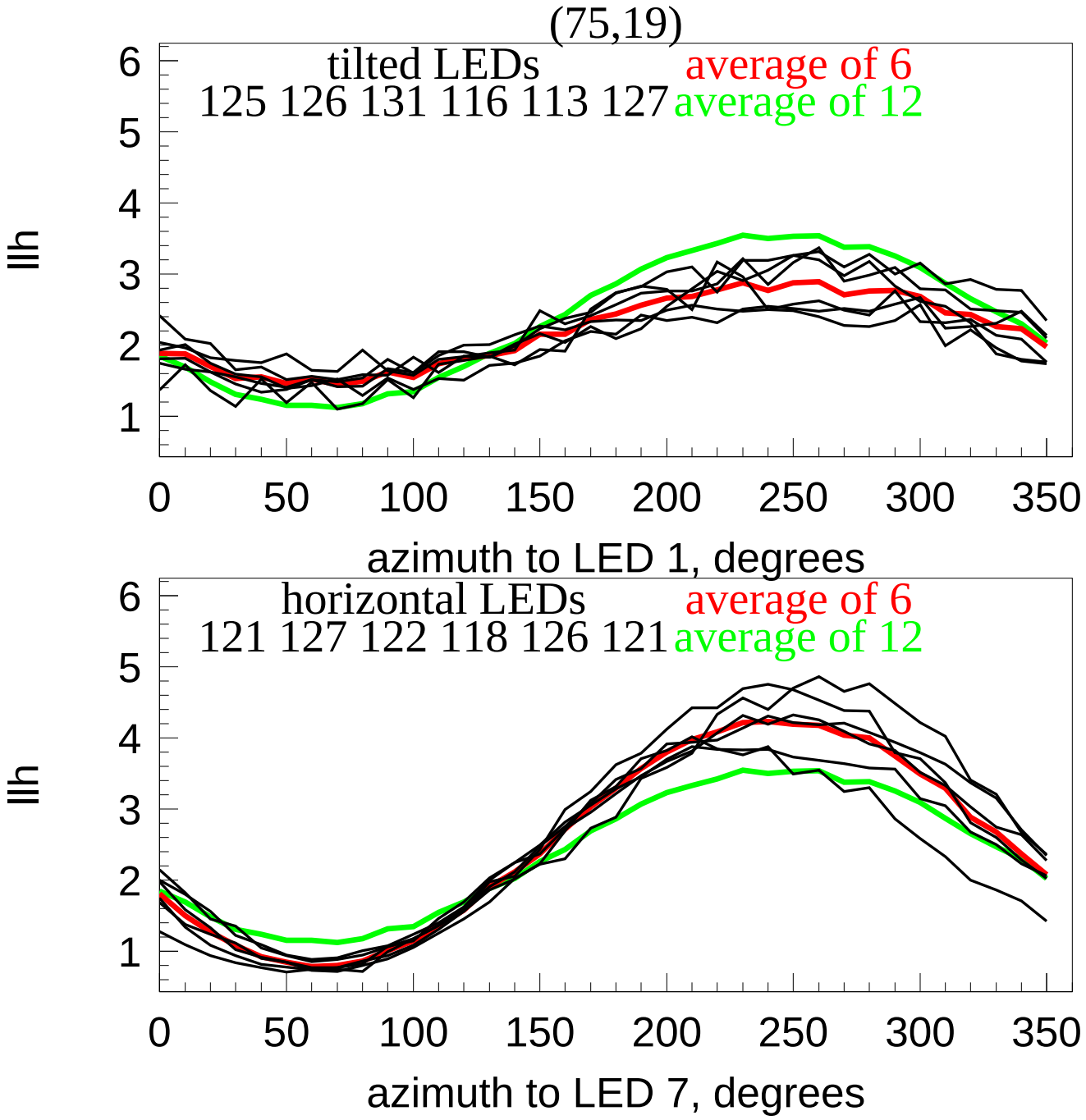

(75,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
2
8
70
5
11
3
4
9
10
71 ± 5.9

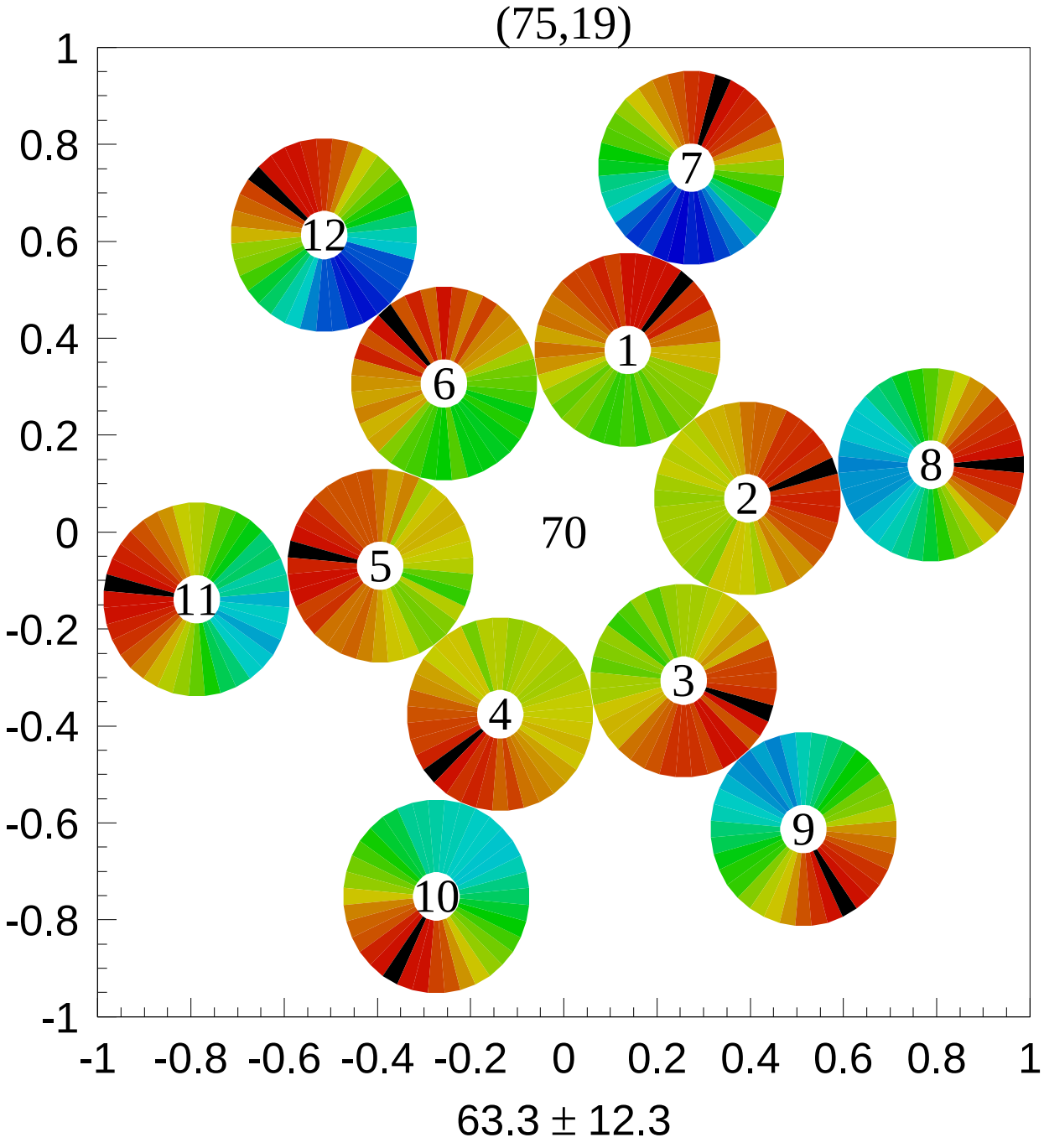

(75,17)
tilted LEDs
113 117 125 121 118 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 122 113 127 126 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

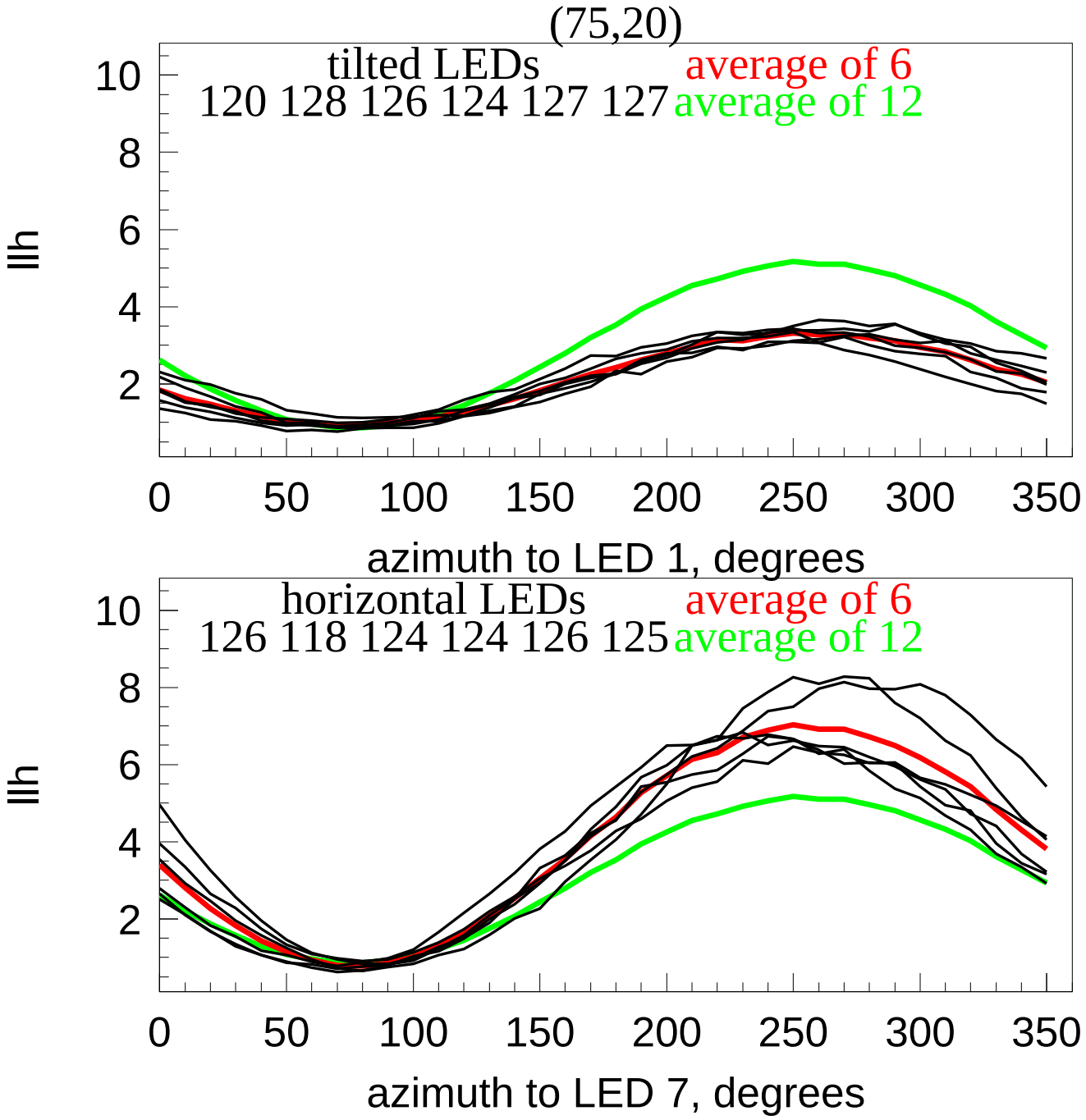

(75,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
111.3 ± 12.0

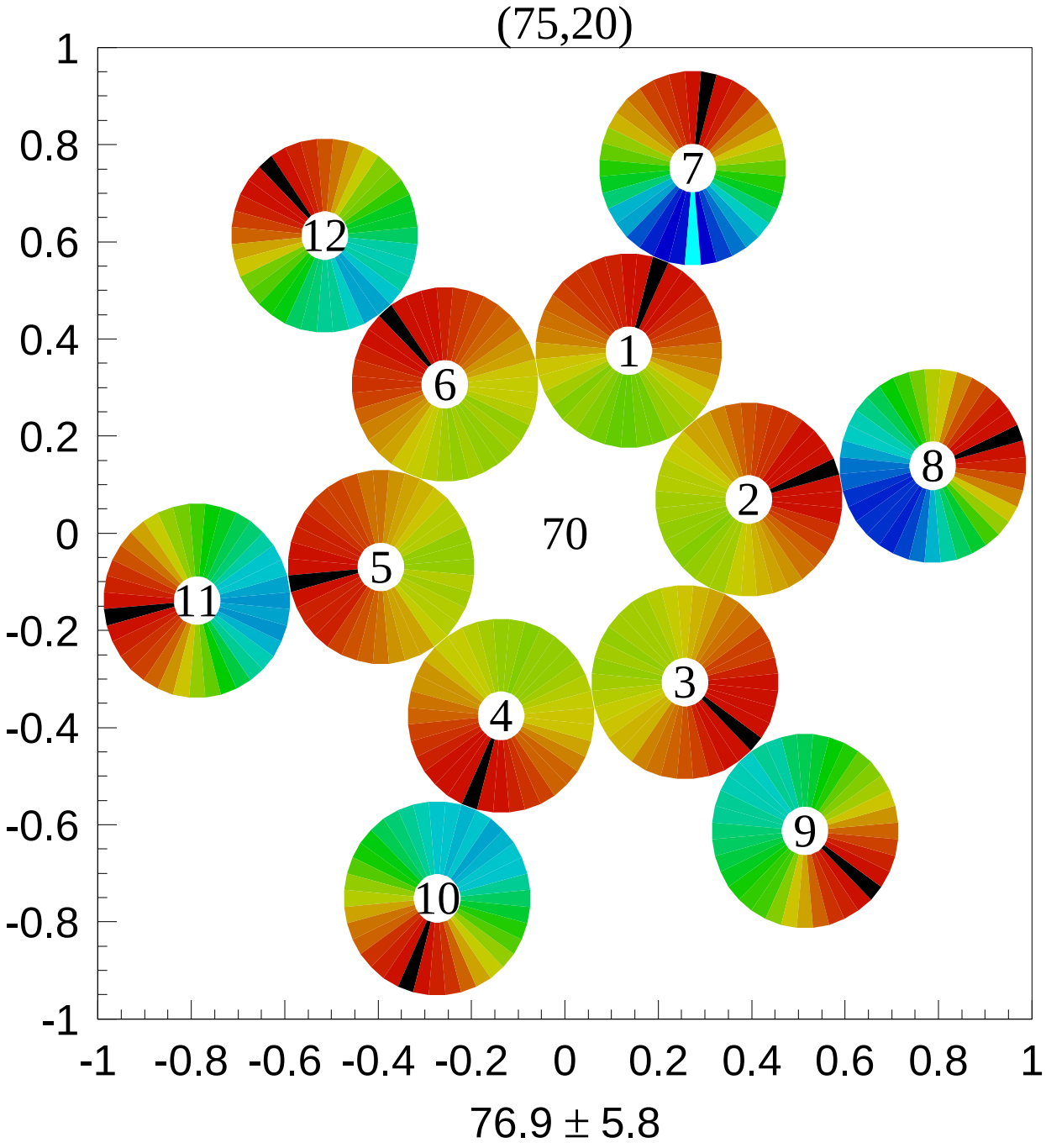

(75,18)
tilted LEDs
125 119 126 122 122 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 123 123 121 118 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

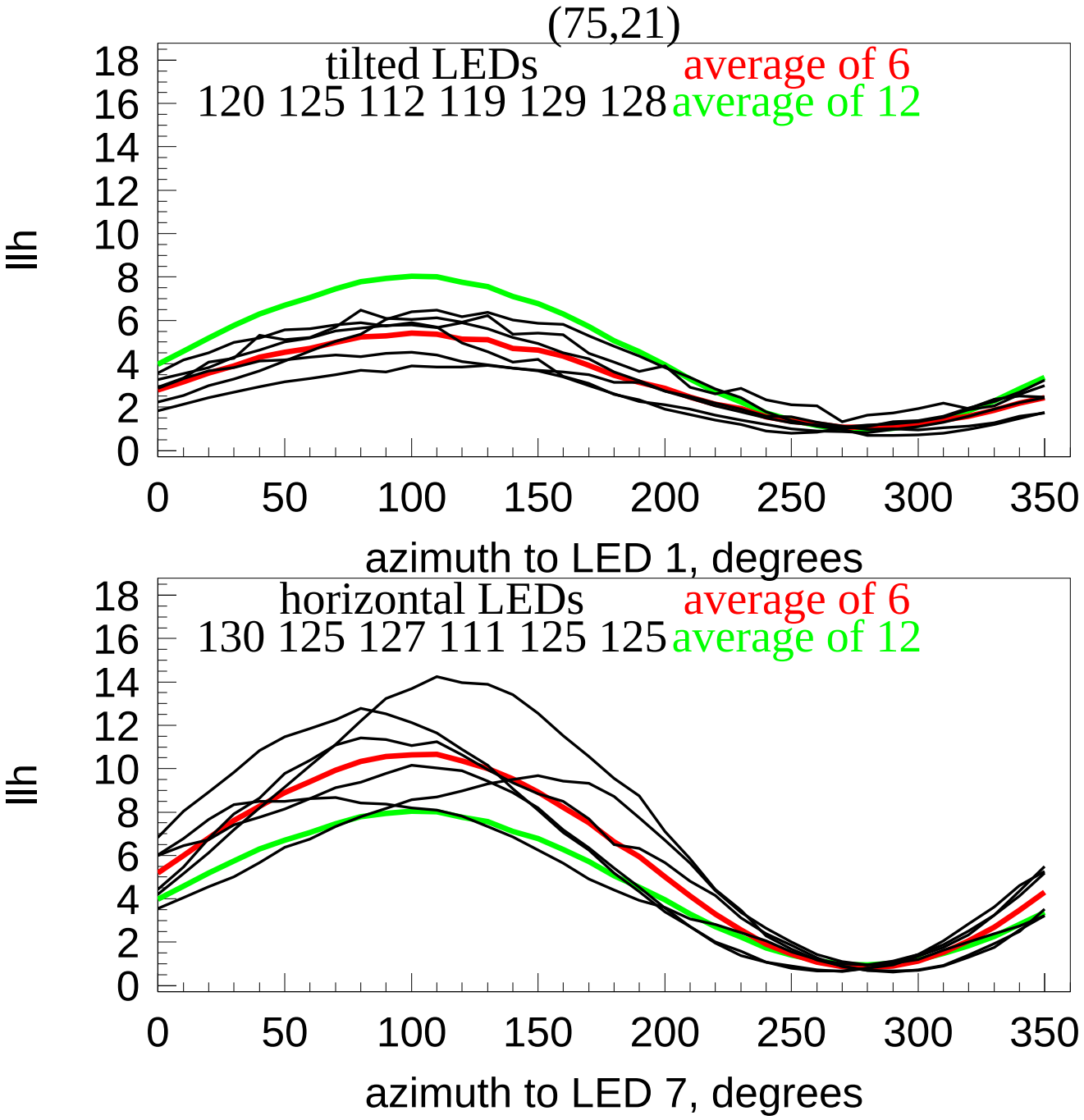

(75,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
104.4 ± 11.3
7
1
8
12
2
6
100
3
5
9
4
11
10

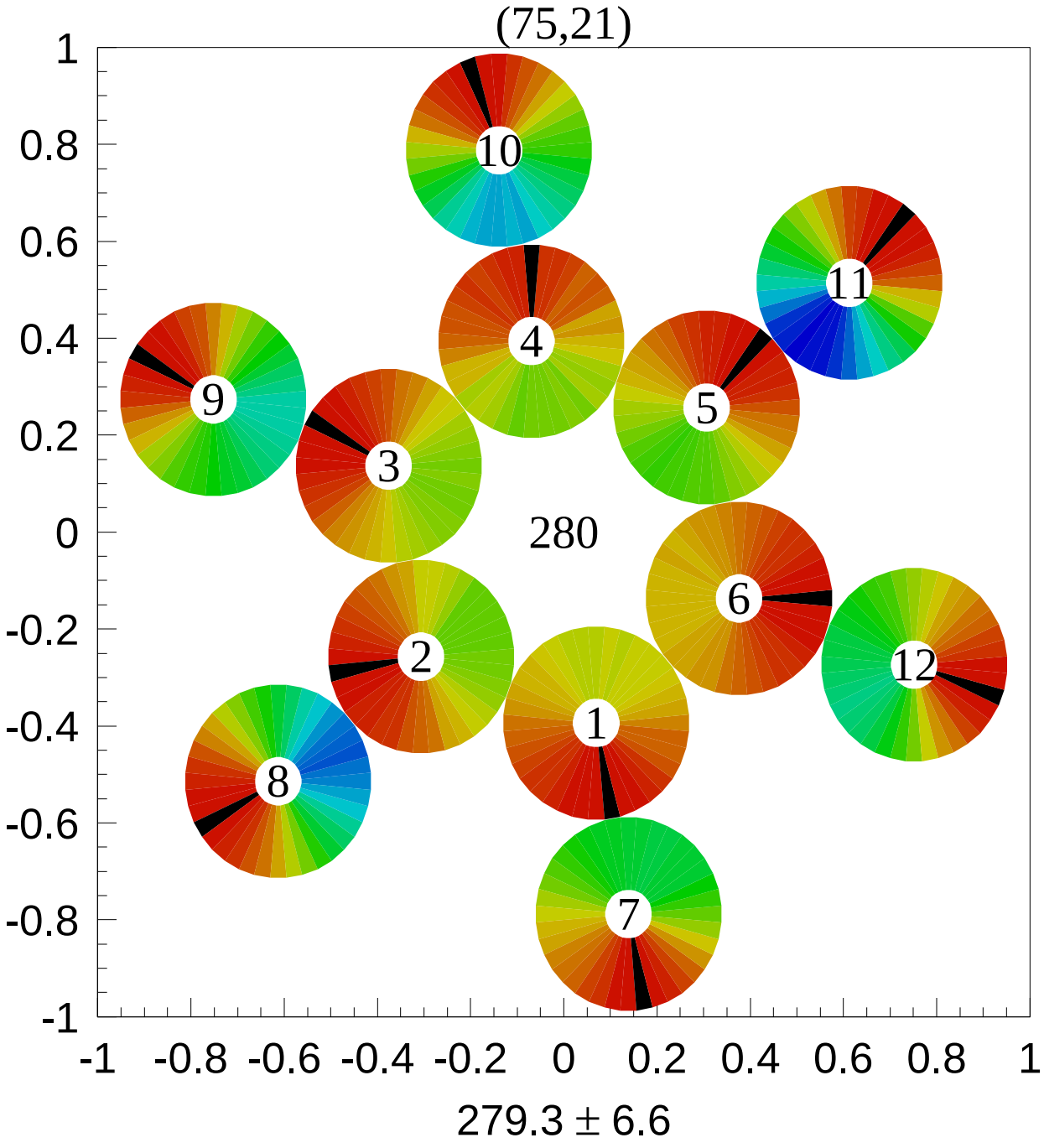

(75,19)
tilted LEDs
125 126 131 116 113 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 127 122 118 126 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

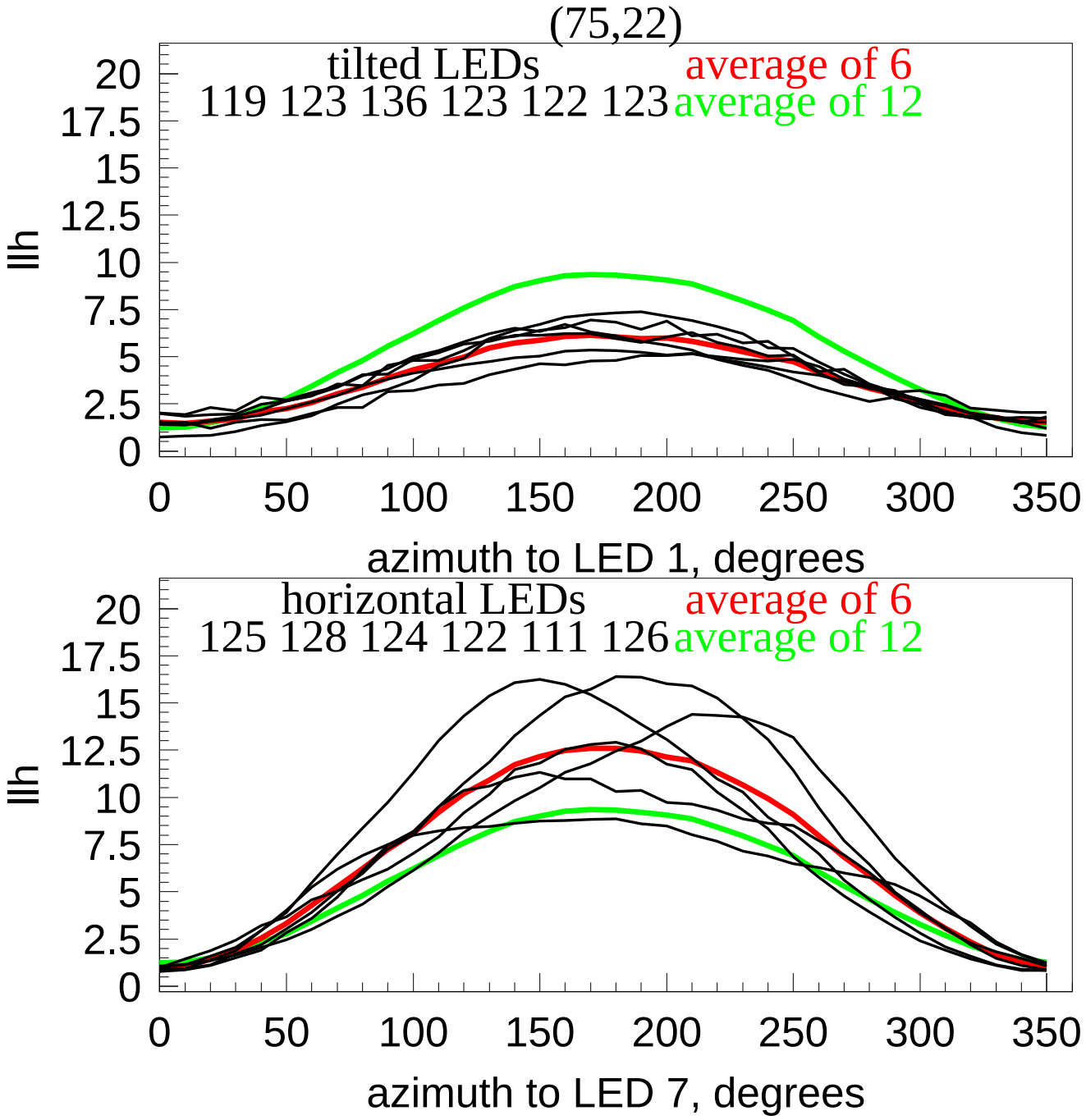

(75,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
63.3 ± 12.3
70
1
2
3
4
5
6
7
8
9
10
11
12

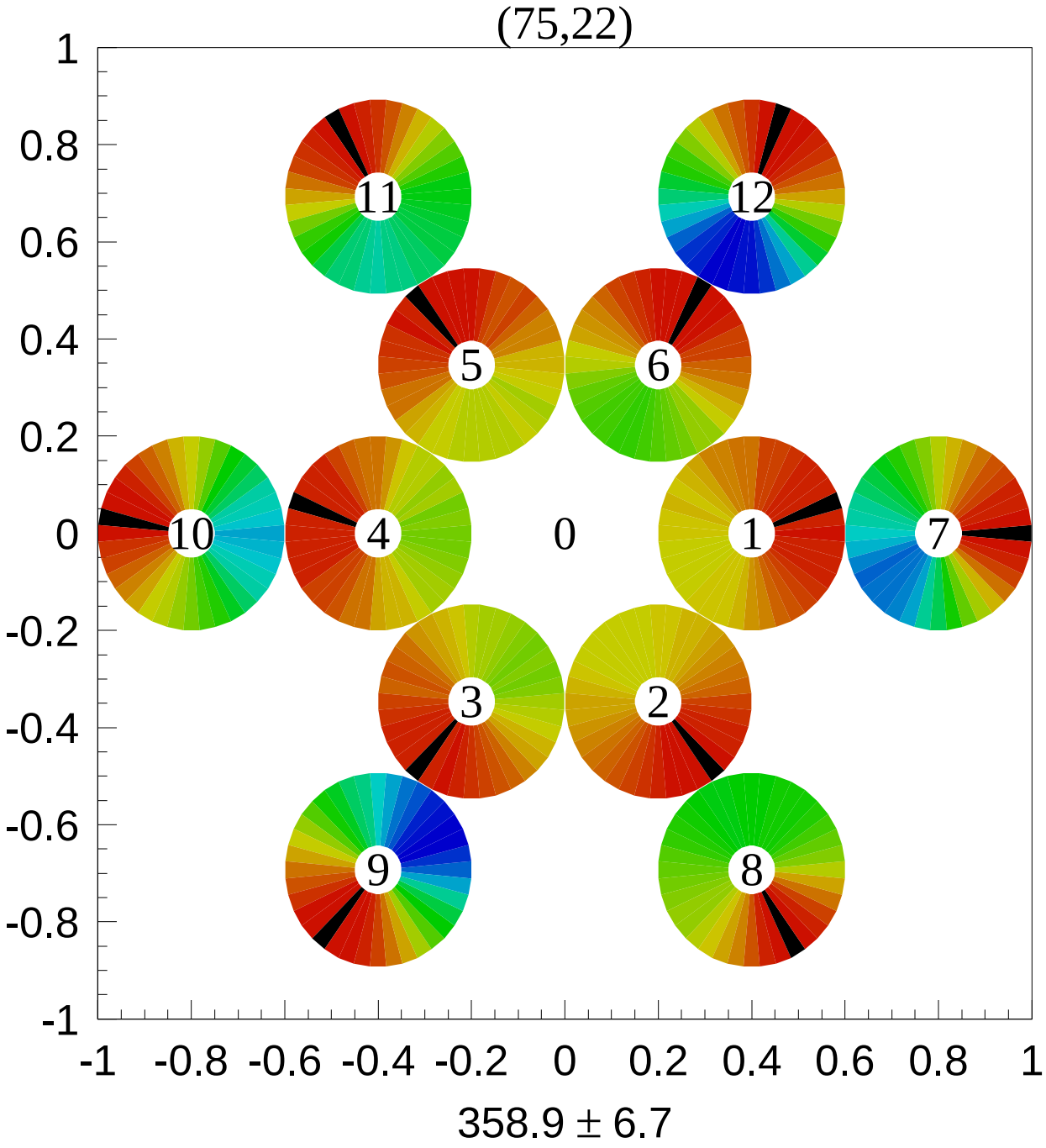

(75,20)
tilted LEDs
120 128 126 124 127 127
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 118 124 124 126 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

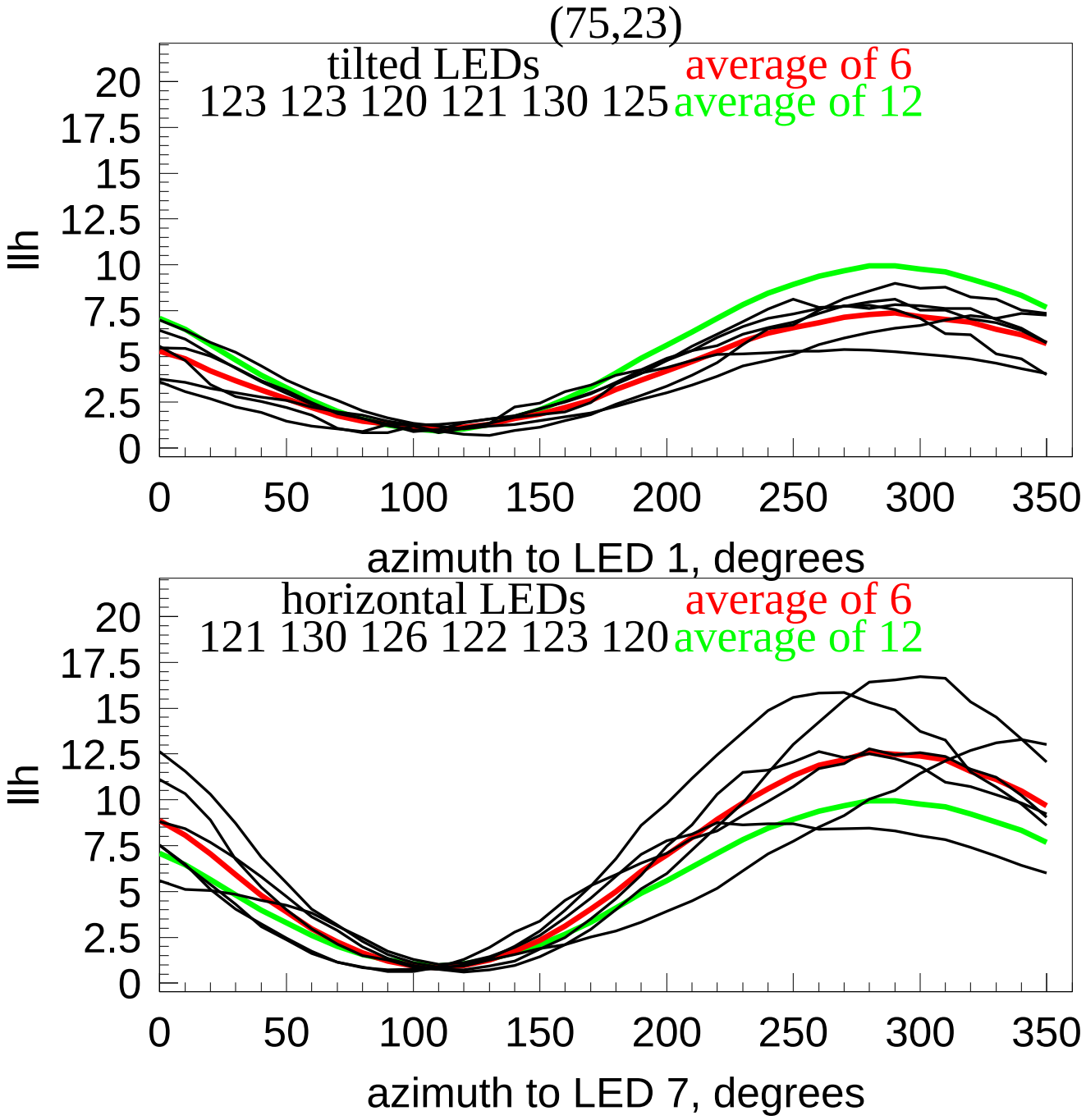

(75,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
70
1
2
3
4
5
6
7
8
9
10
11
12
76.9 ± 5.8

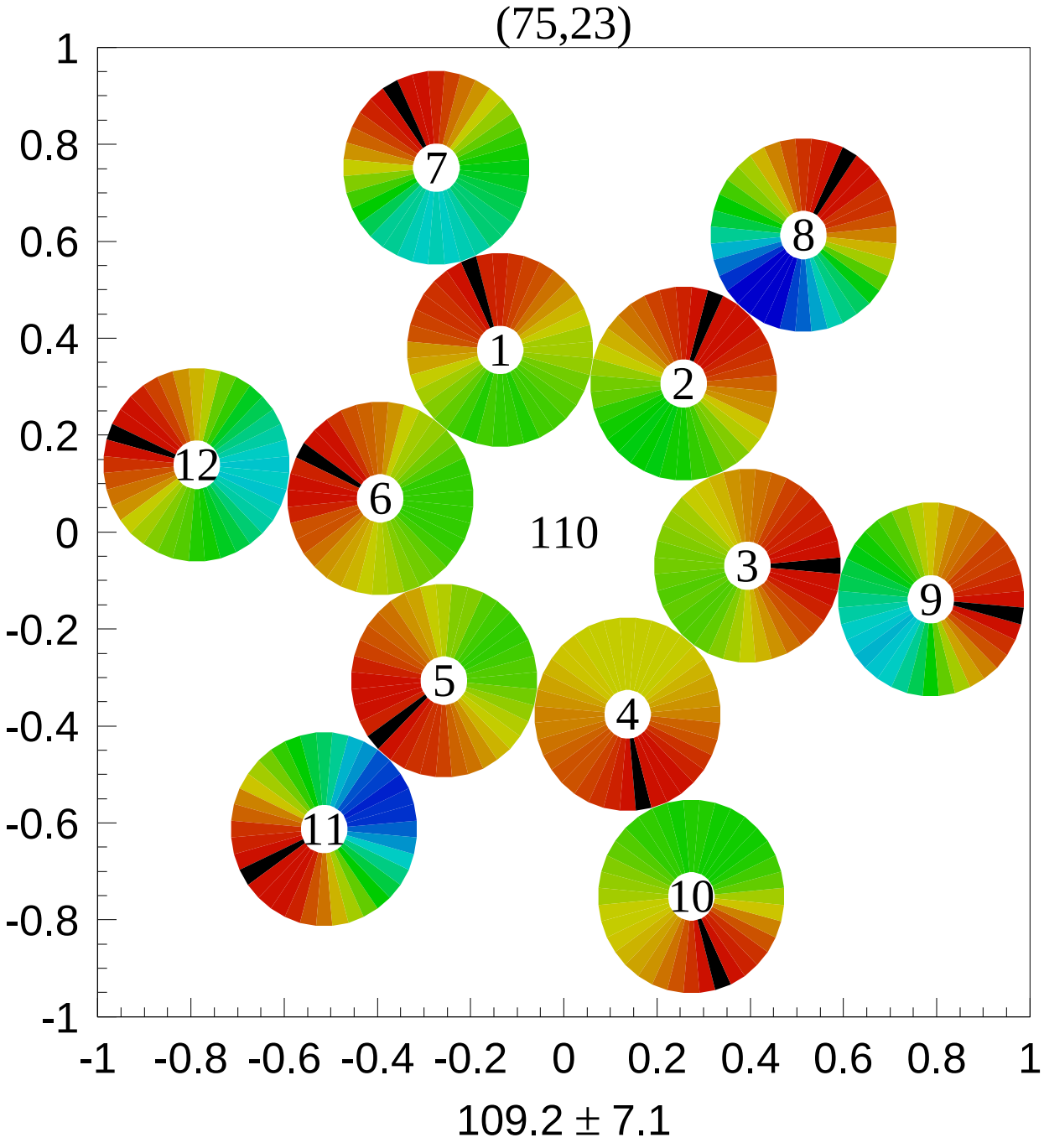

(75,21)
tilted LEDs
120 125 112 119 129 128
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
130 125 127 111 125 125
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

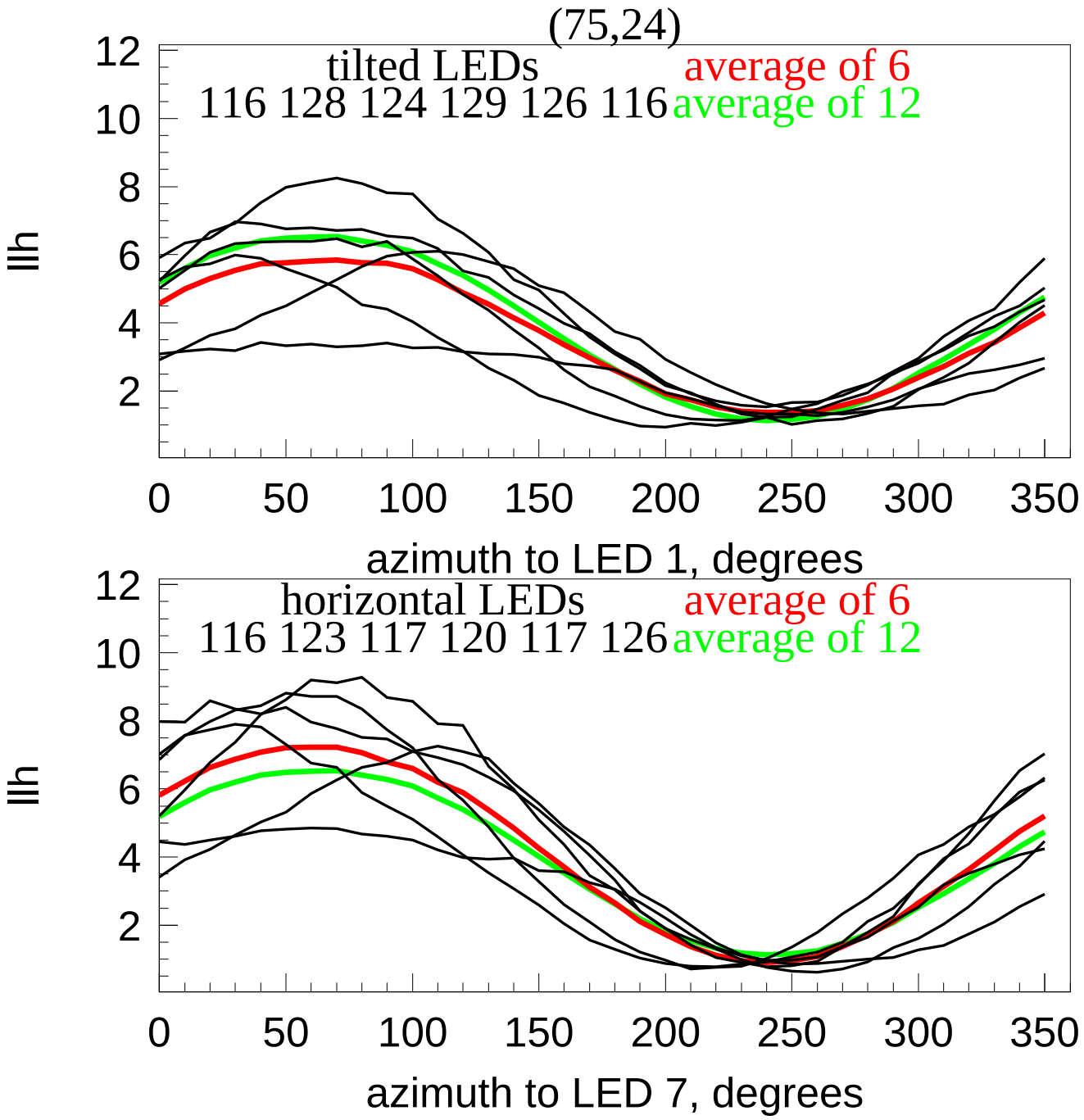

(75,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
279.3 ± 6.6

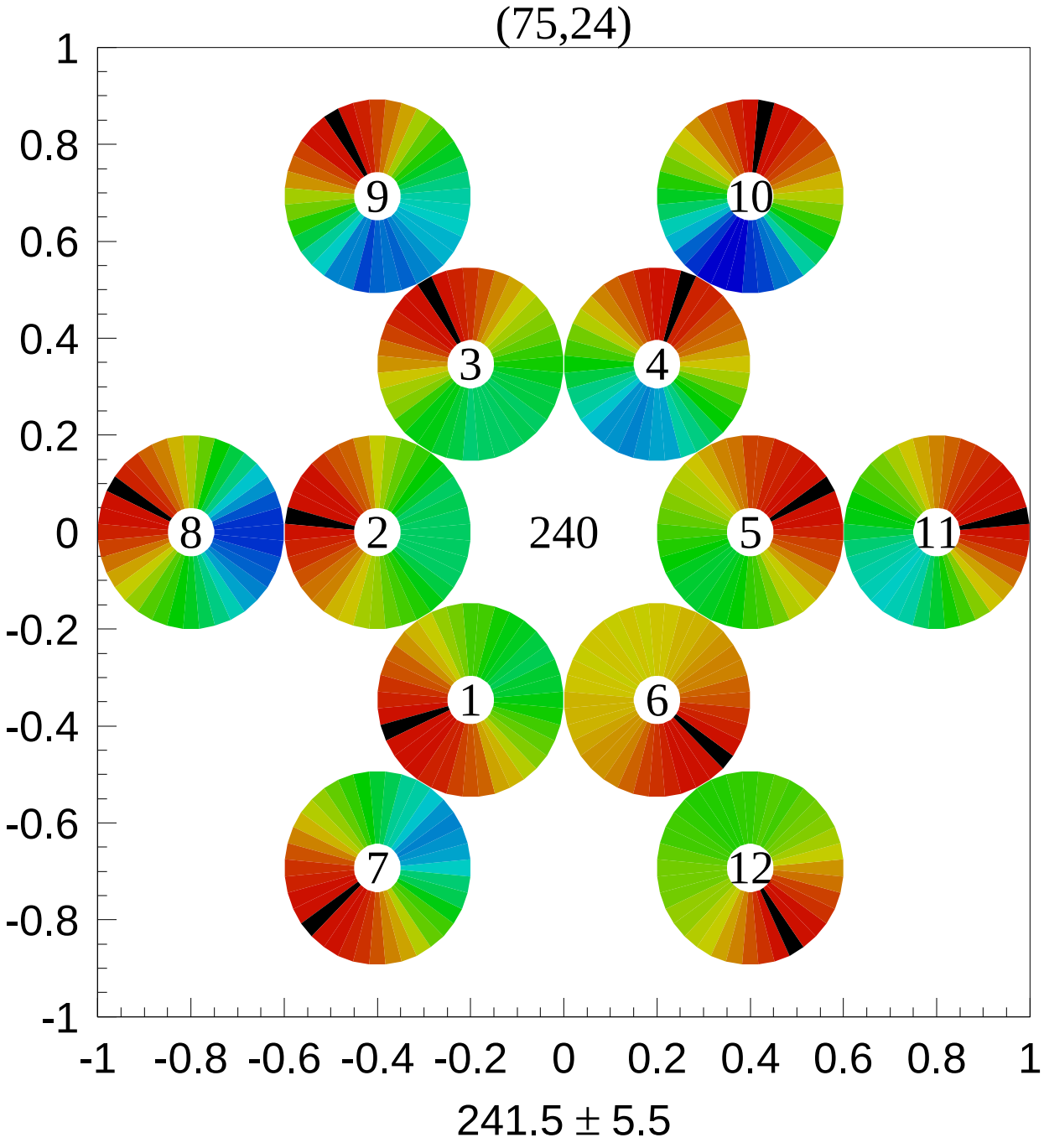

(75,22)
tilted LEDs
119 123 136 123 122 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 128 124 122 111 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

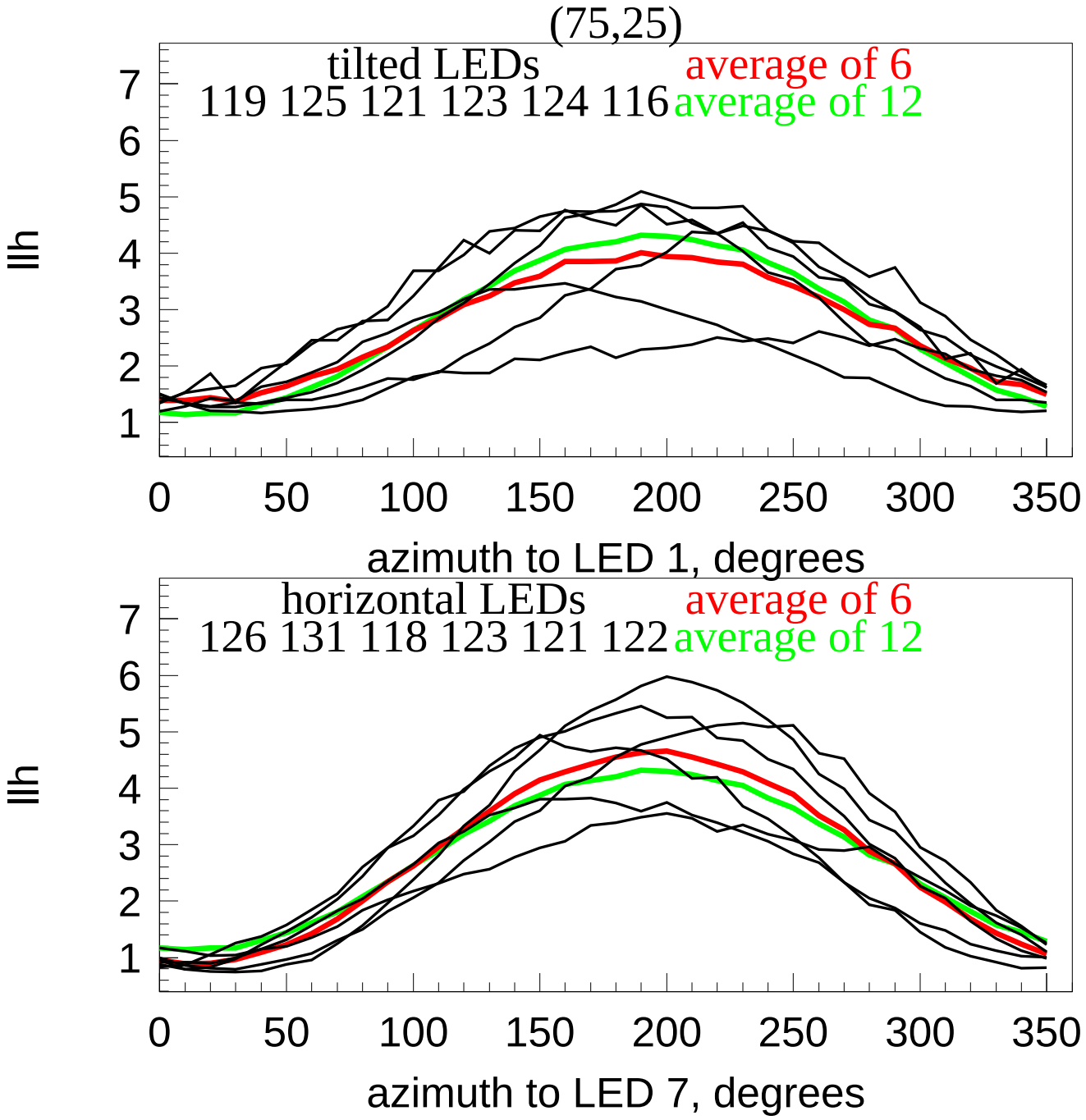

(75,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
358.9 ± 6.7

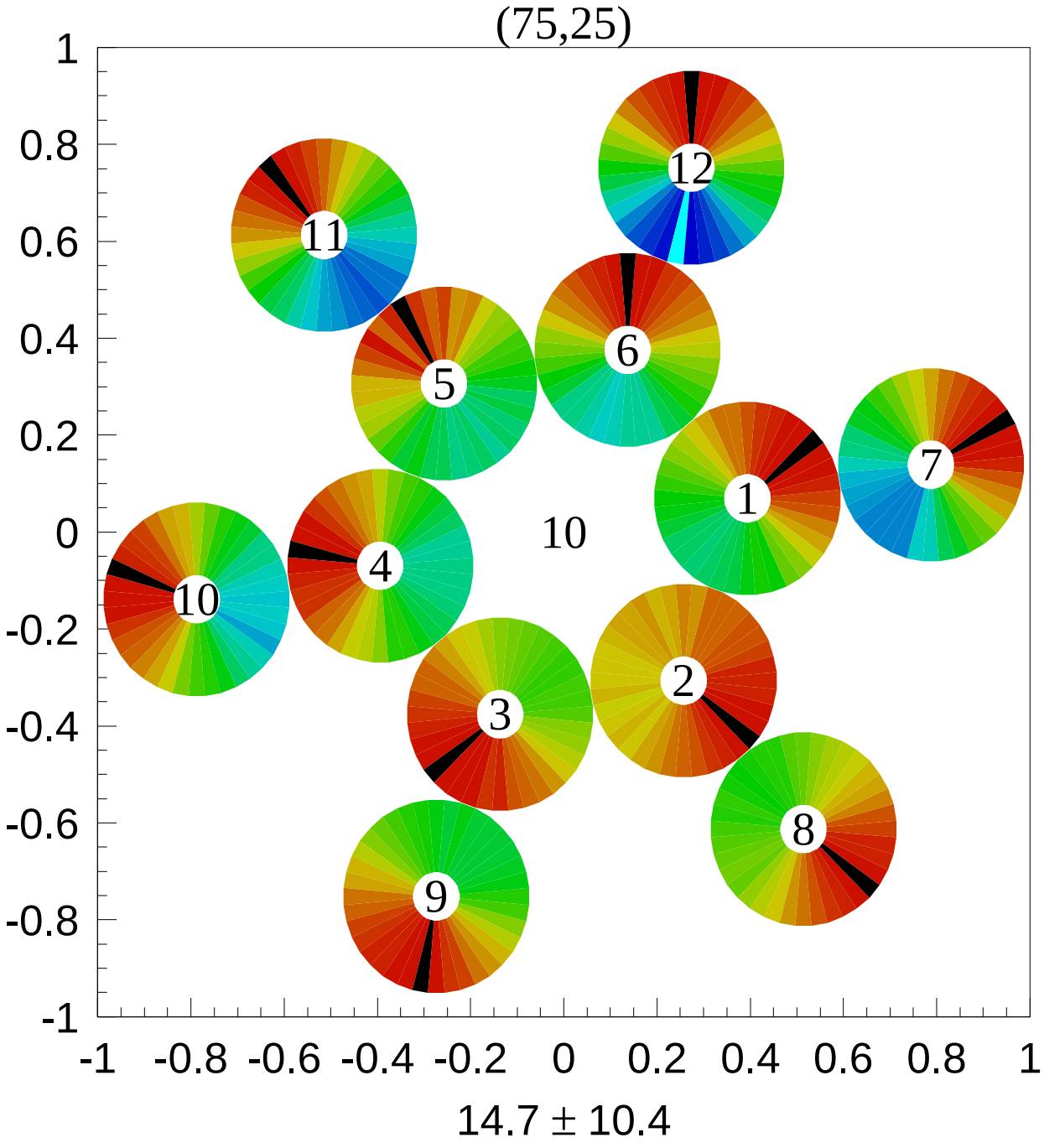

(75,23)
tilted LEDs
123 123 120 121 130 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 130 126 122 123 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

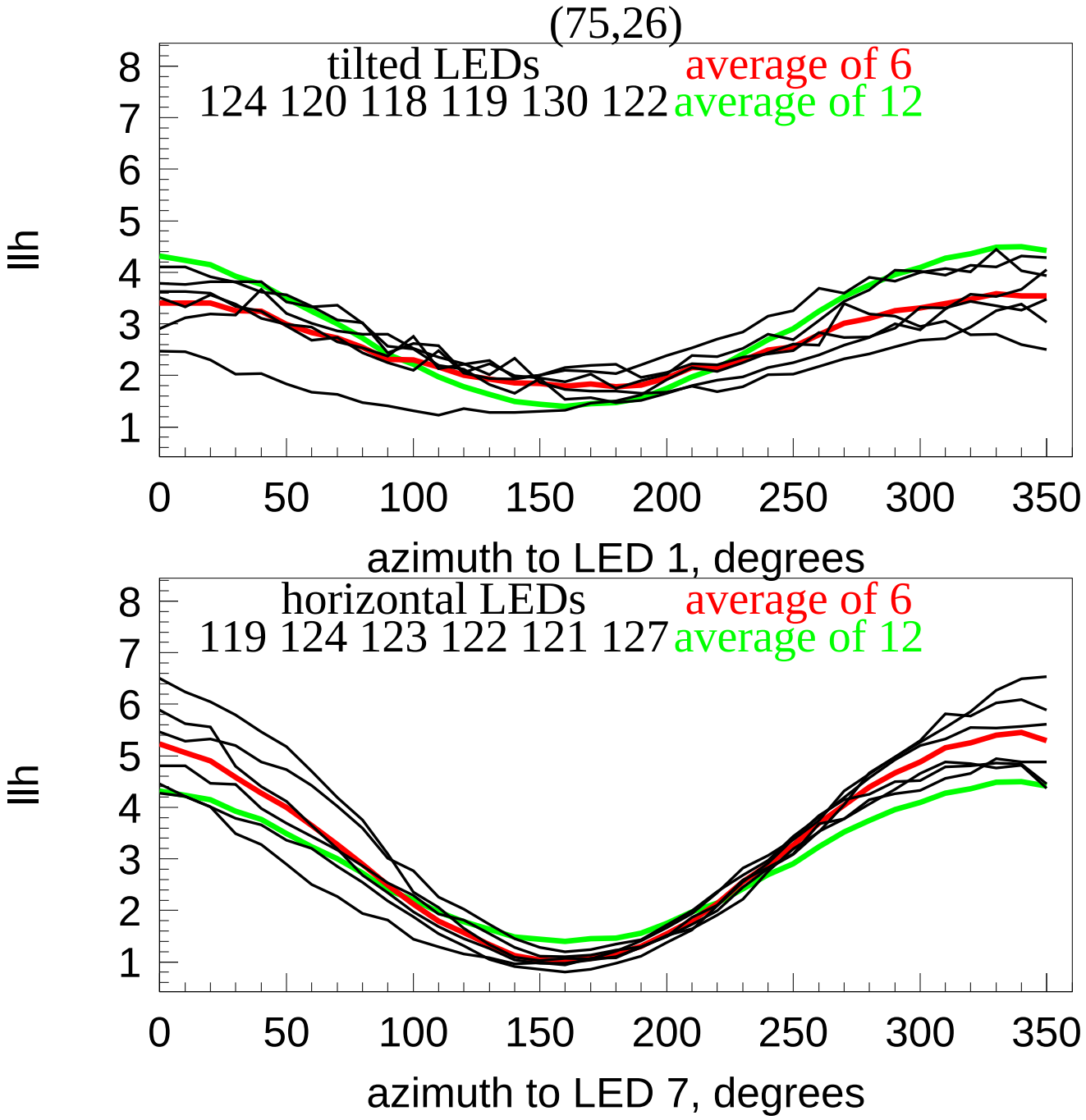

(75,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
109.2 ± 7.1

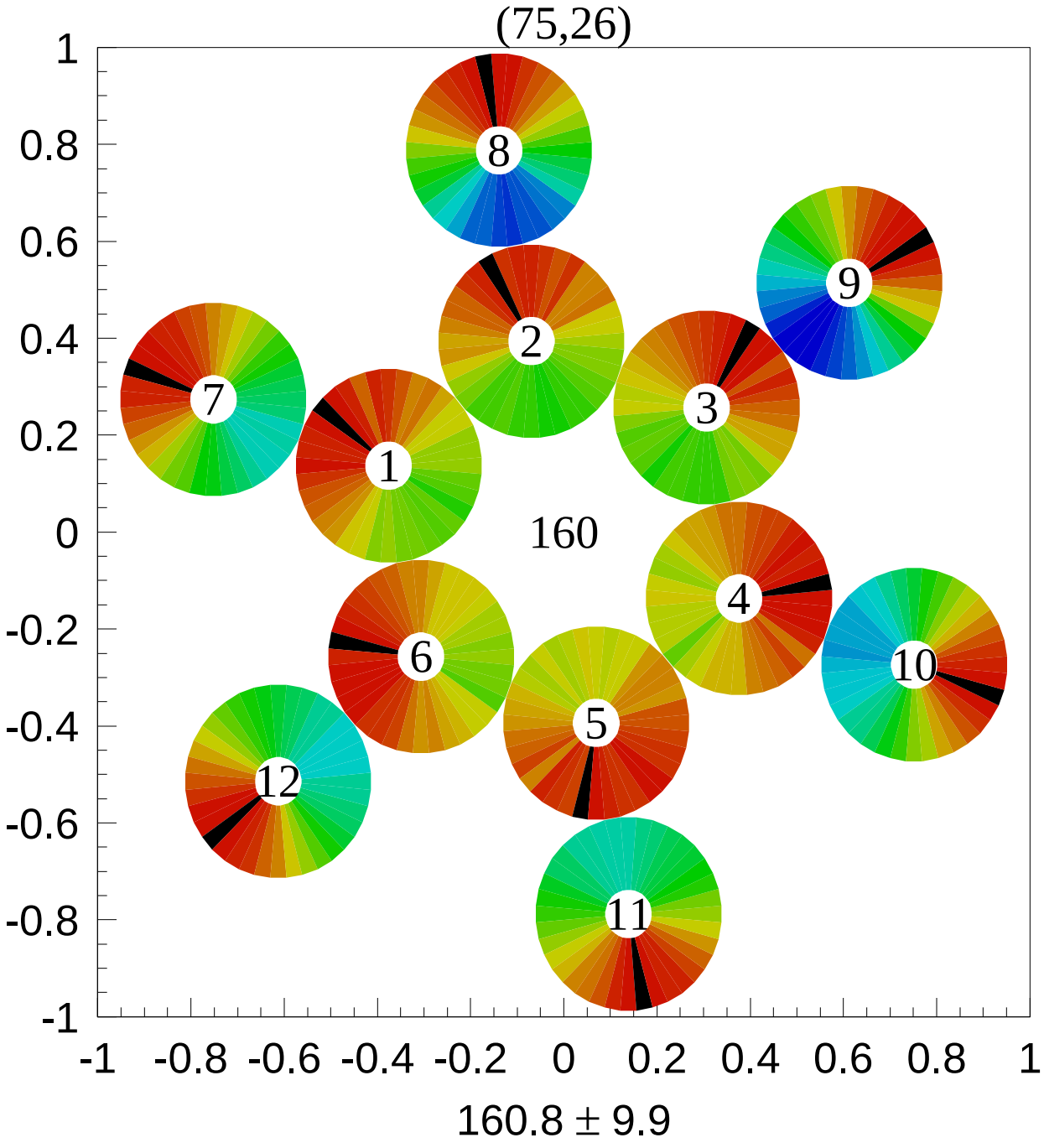

(75,24)
tilted LEDs
116 128 124 129 126 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 123 117 120 117 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

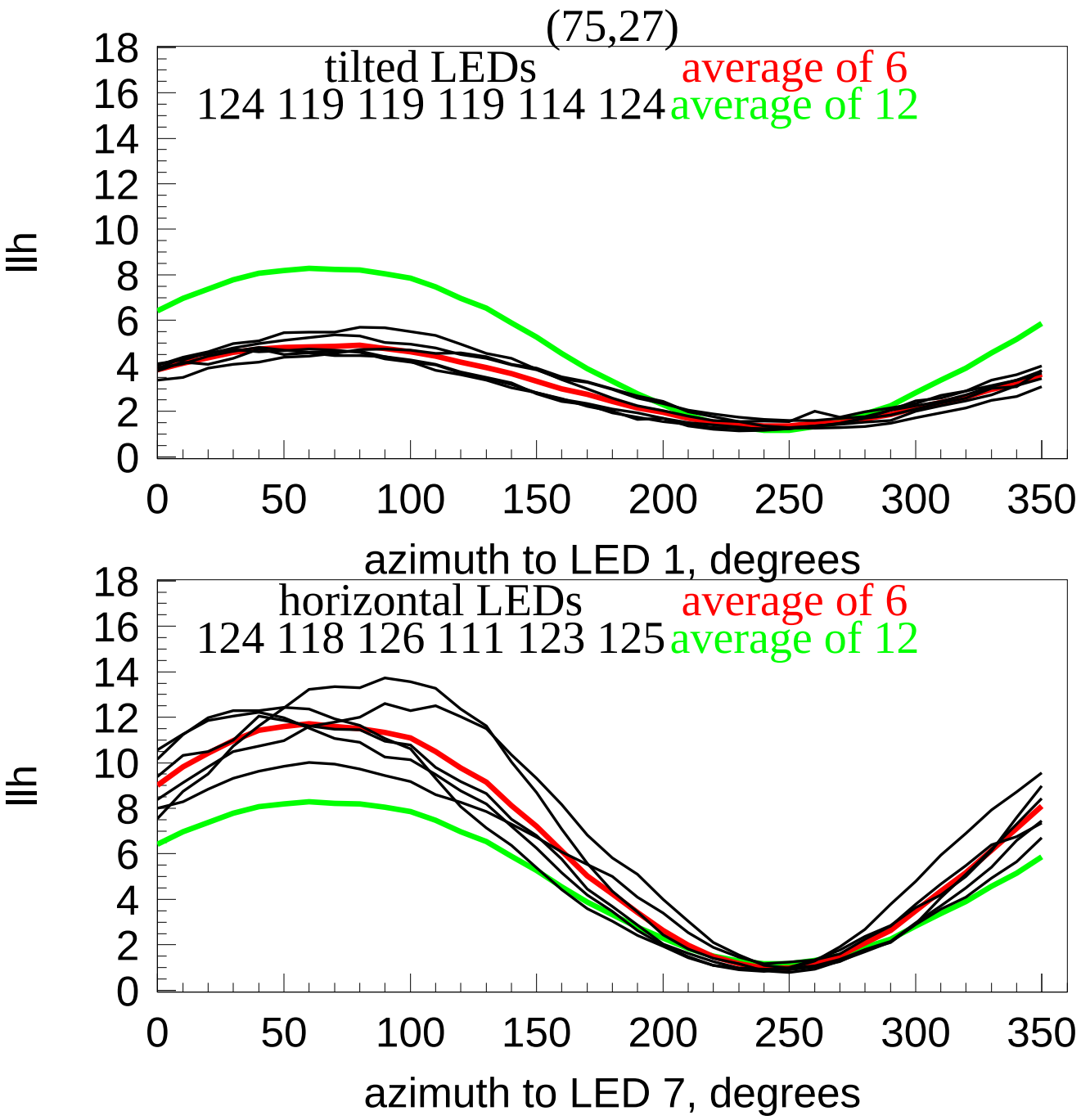

(75,24)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
241.5 ± 5.5
9
10
3
4
8
2
240
5
11
1
6
7
12

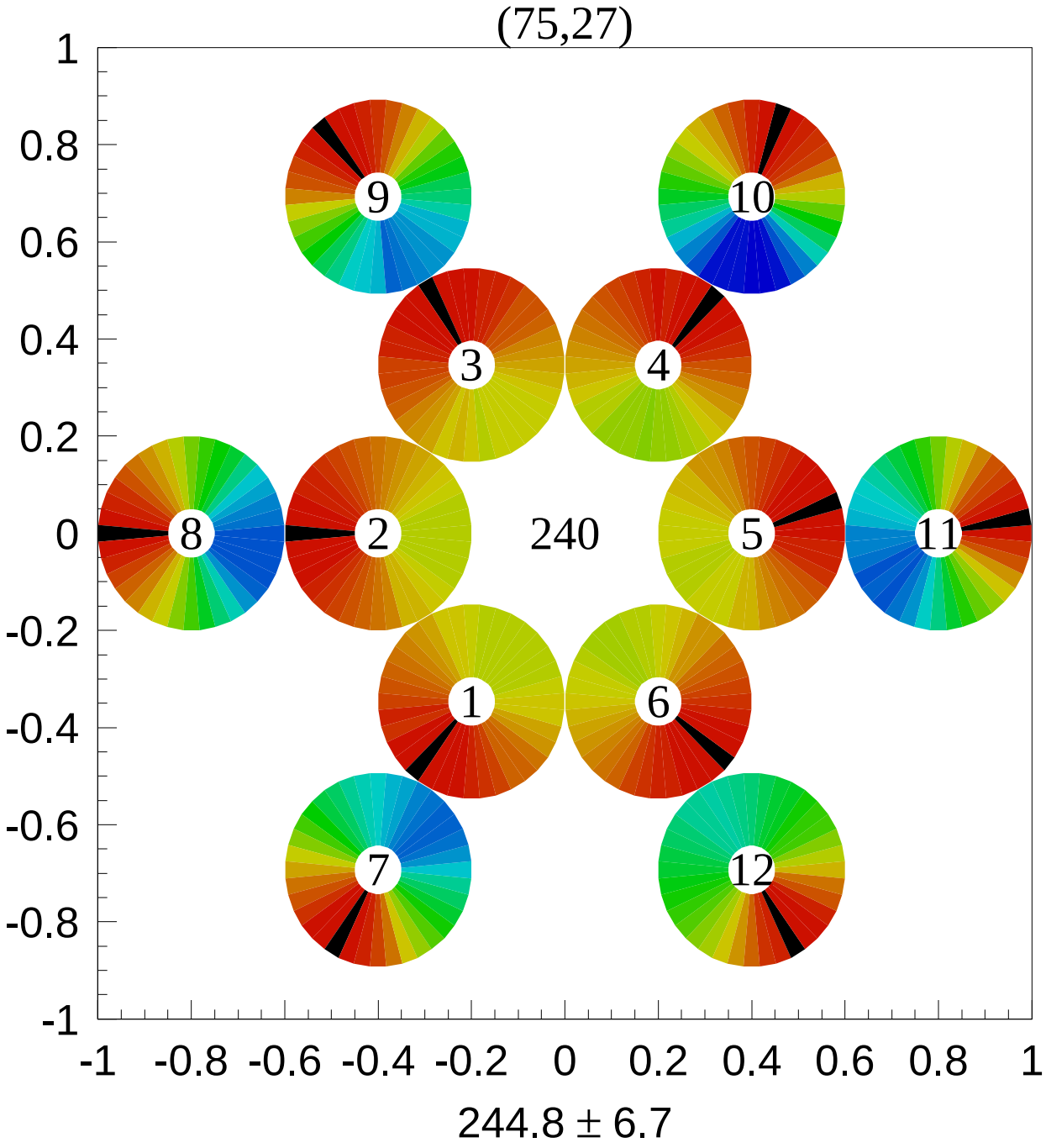

(75,25)
tilted LEDs
119 125 121 123 124 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 131 118 123 121 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

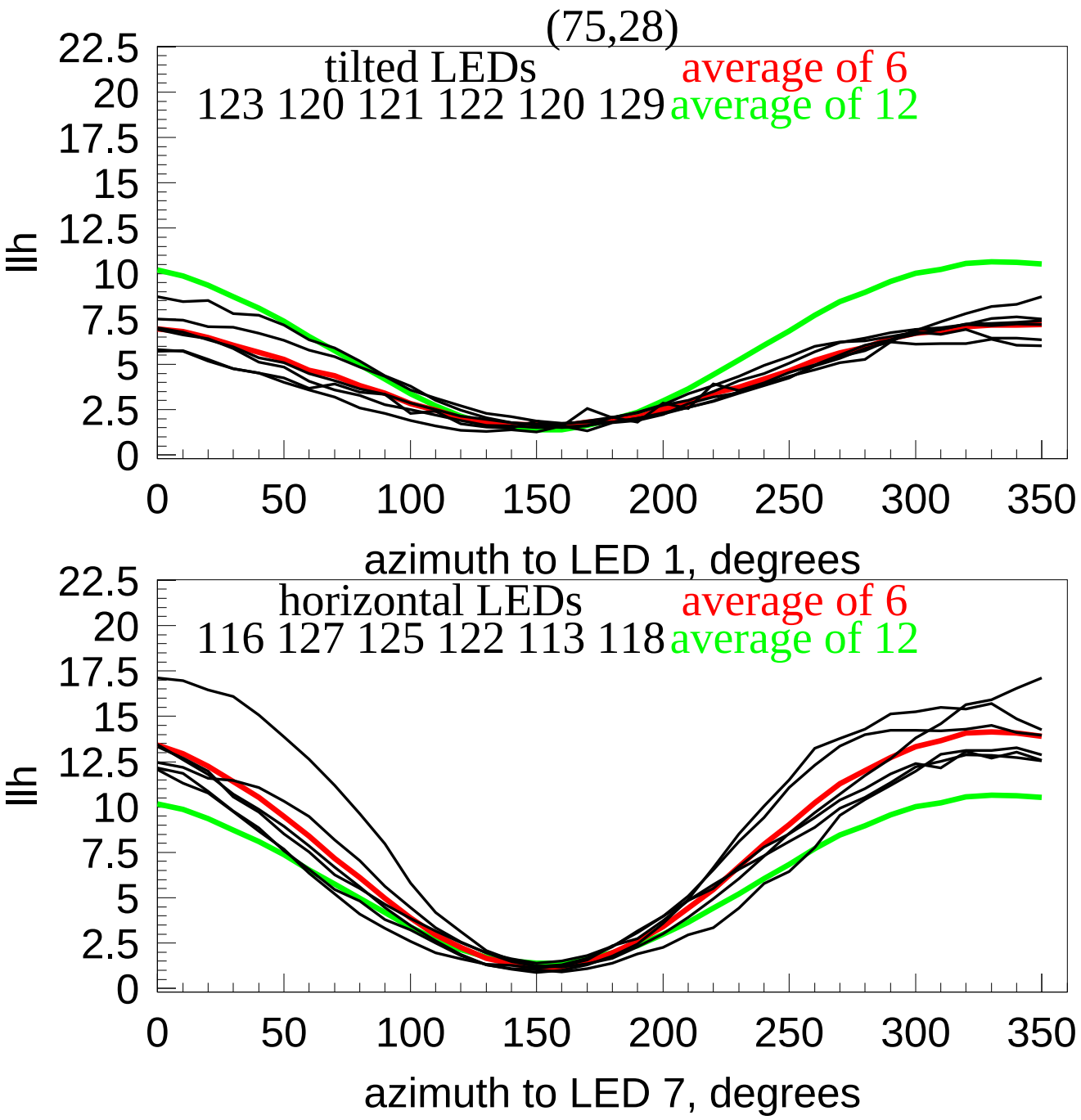

(75,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
14.7 ± 10.4
12
11
6
5
7
1
10
4
10
2
3
8
9

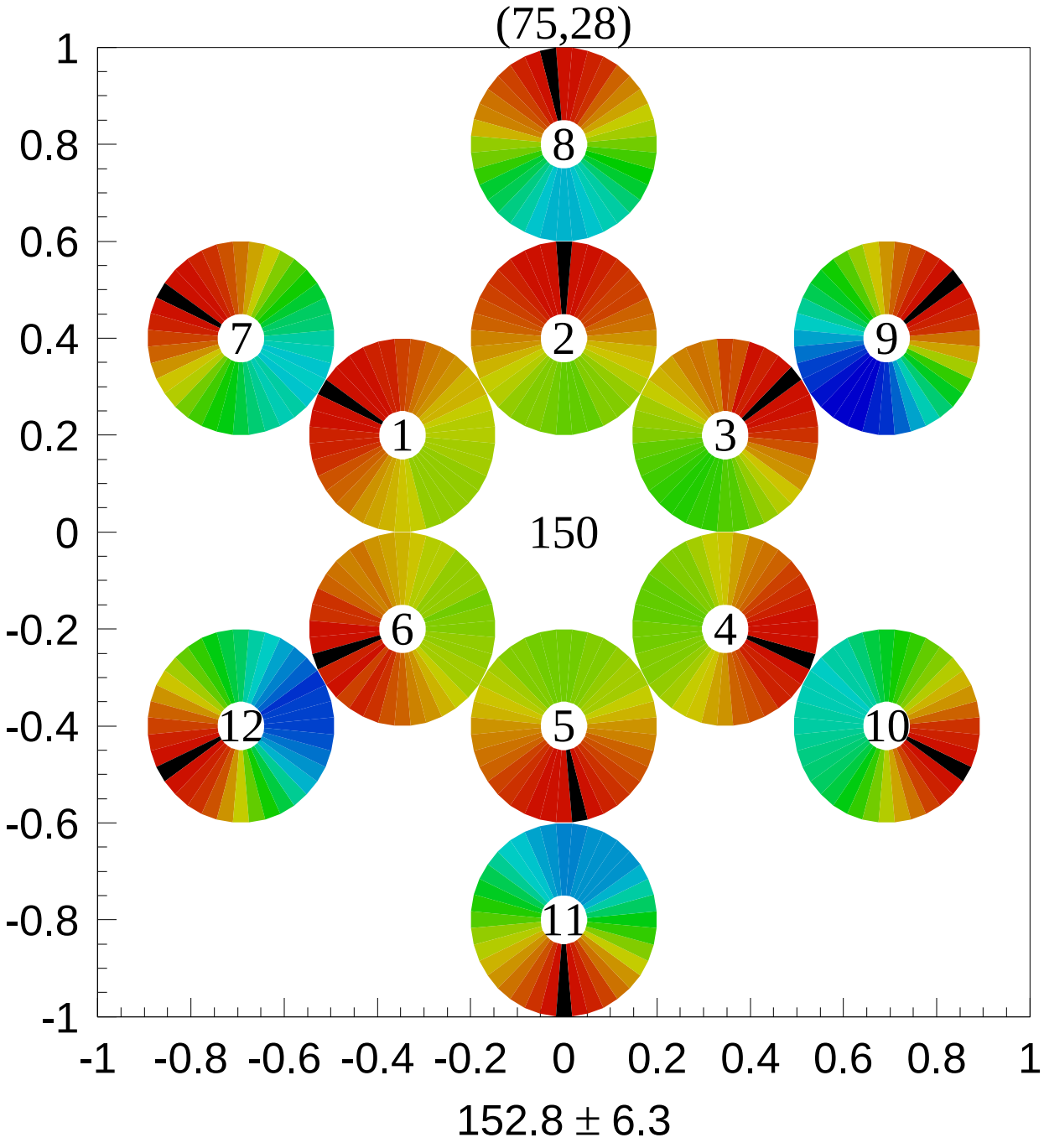

(75,26)
tilted LEDs
124 120 118 119 130 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 124 123 122 121 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

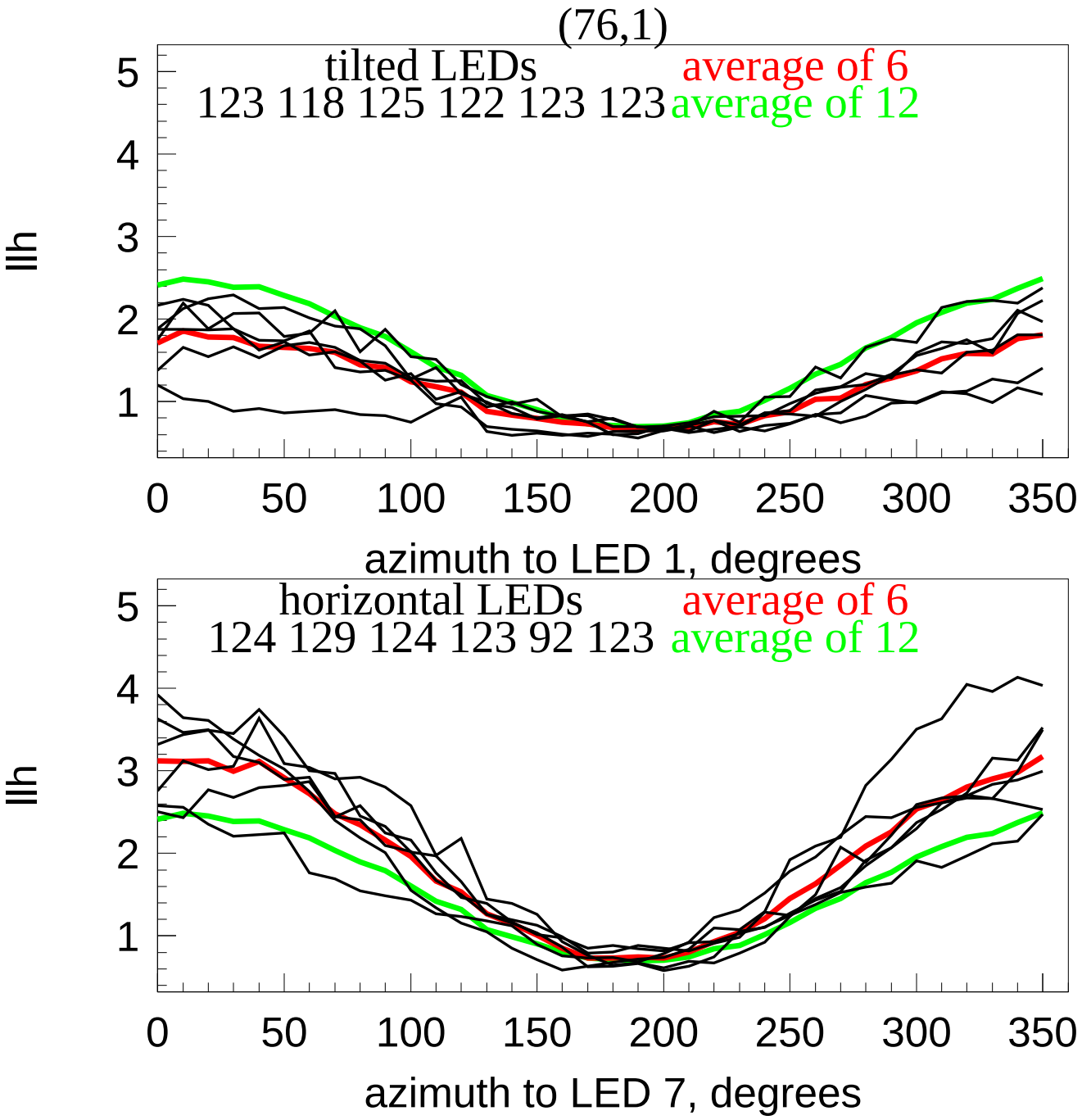

(75,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
160
160.8 ± 9.9
1
2
3
4
5
6
7
8
9
10
11
12

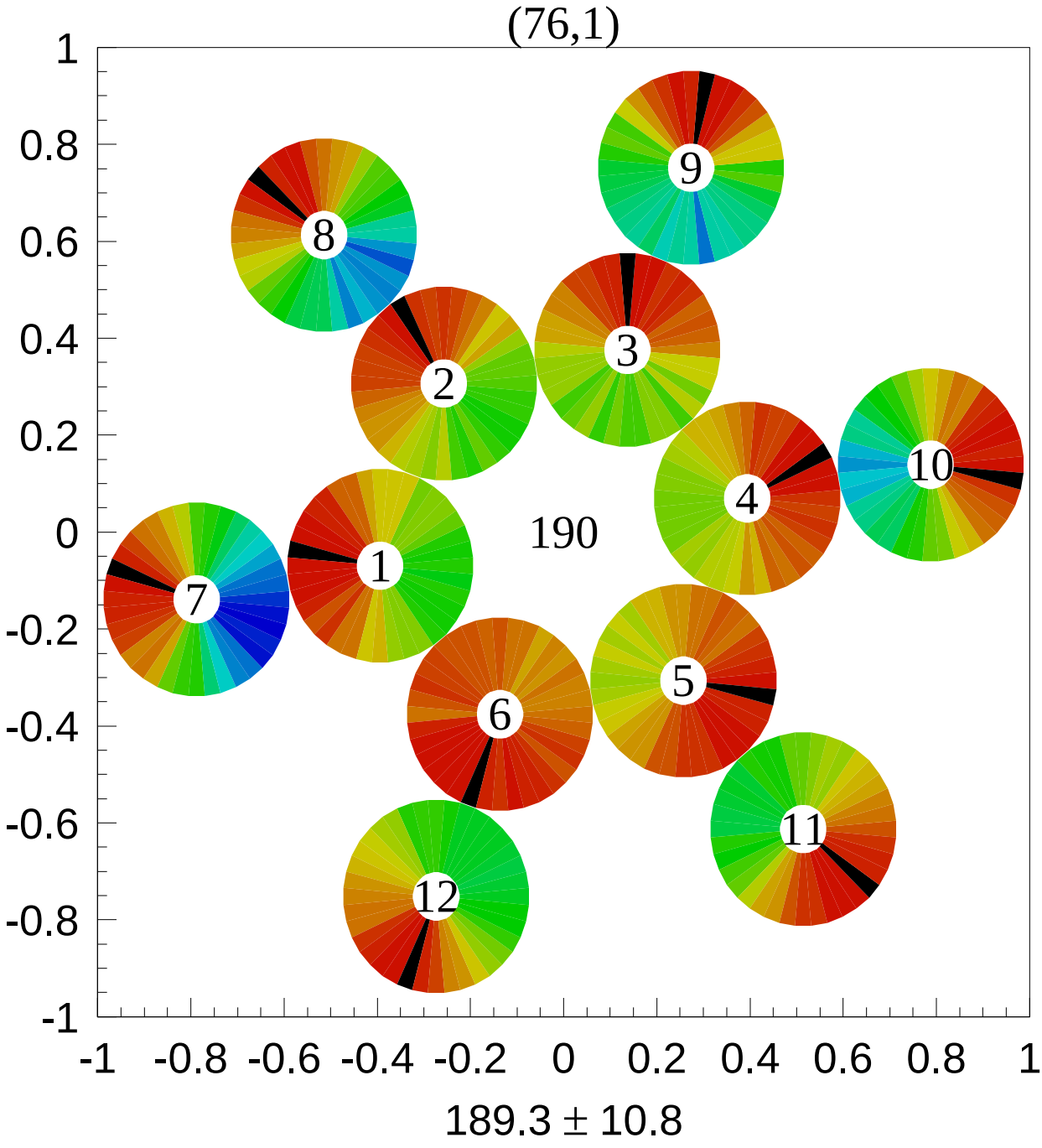

(75,27)
tilted LEDs
124 119 119 119 114 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 118 126 111 123 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

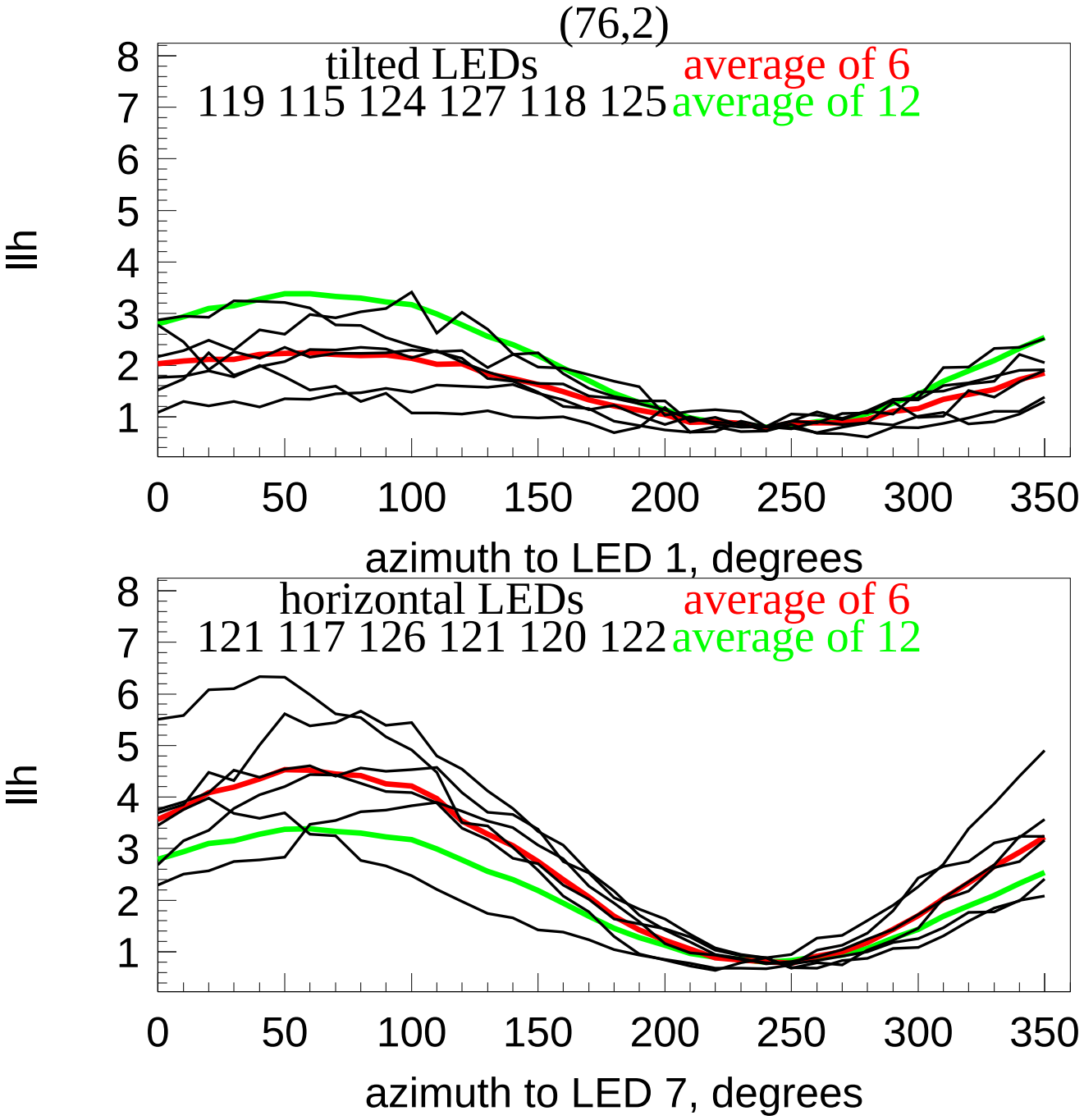

(75,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
244.8 ± 6.7

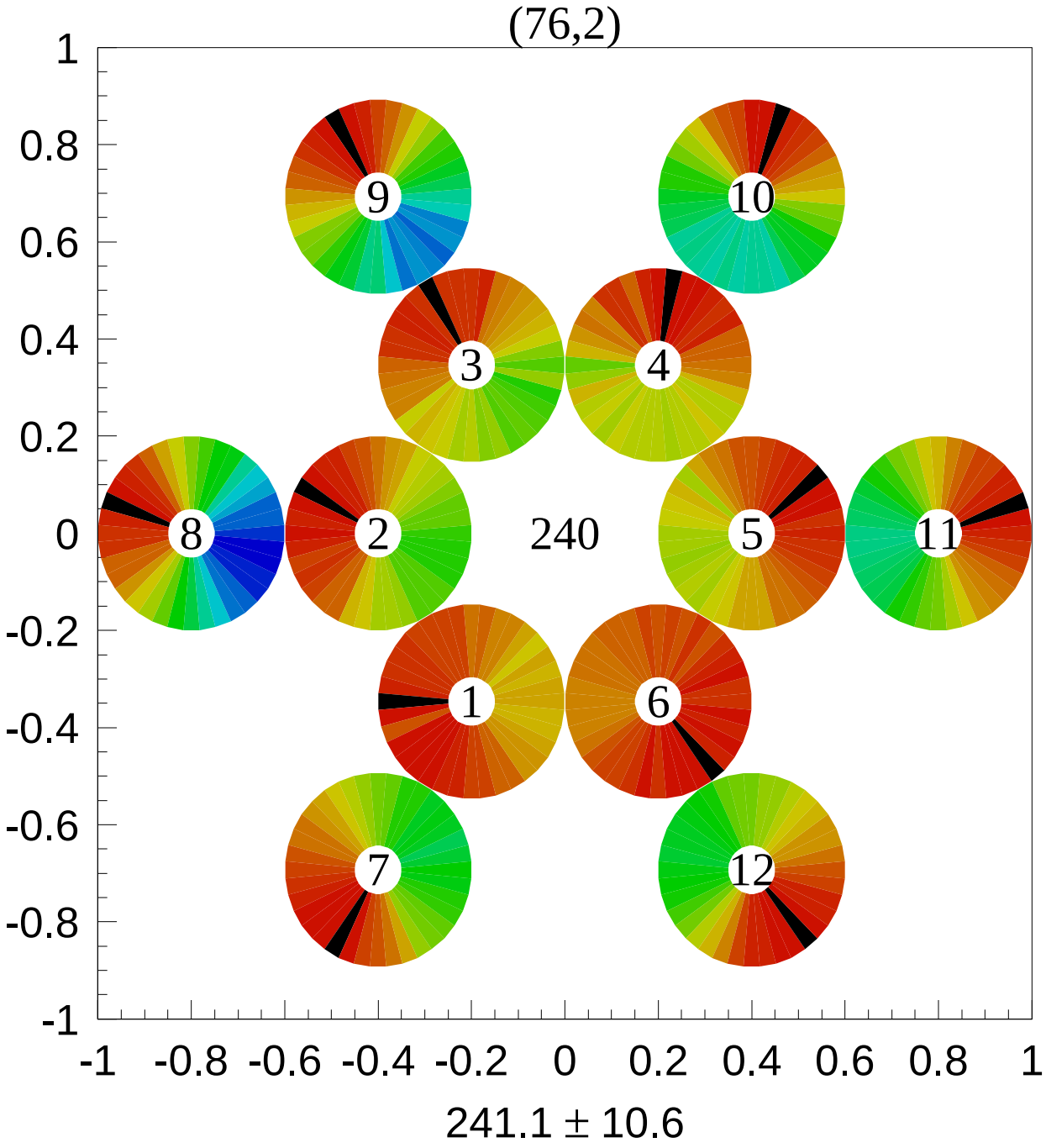

(75,28)
tilted LEDs
123 120 121 122 120 129
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 127 125 122 113 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

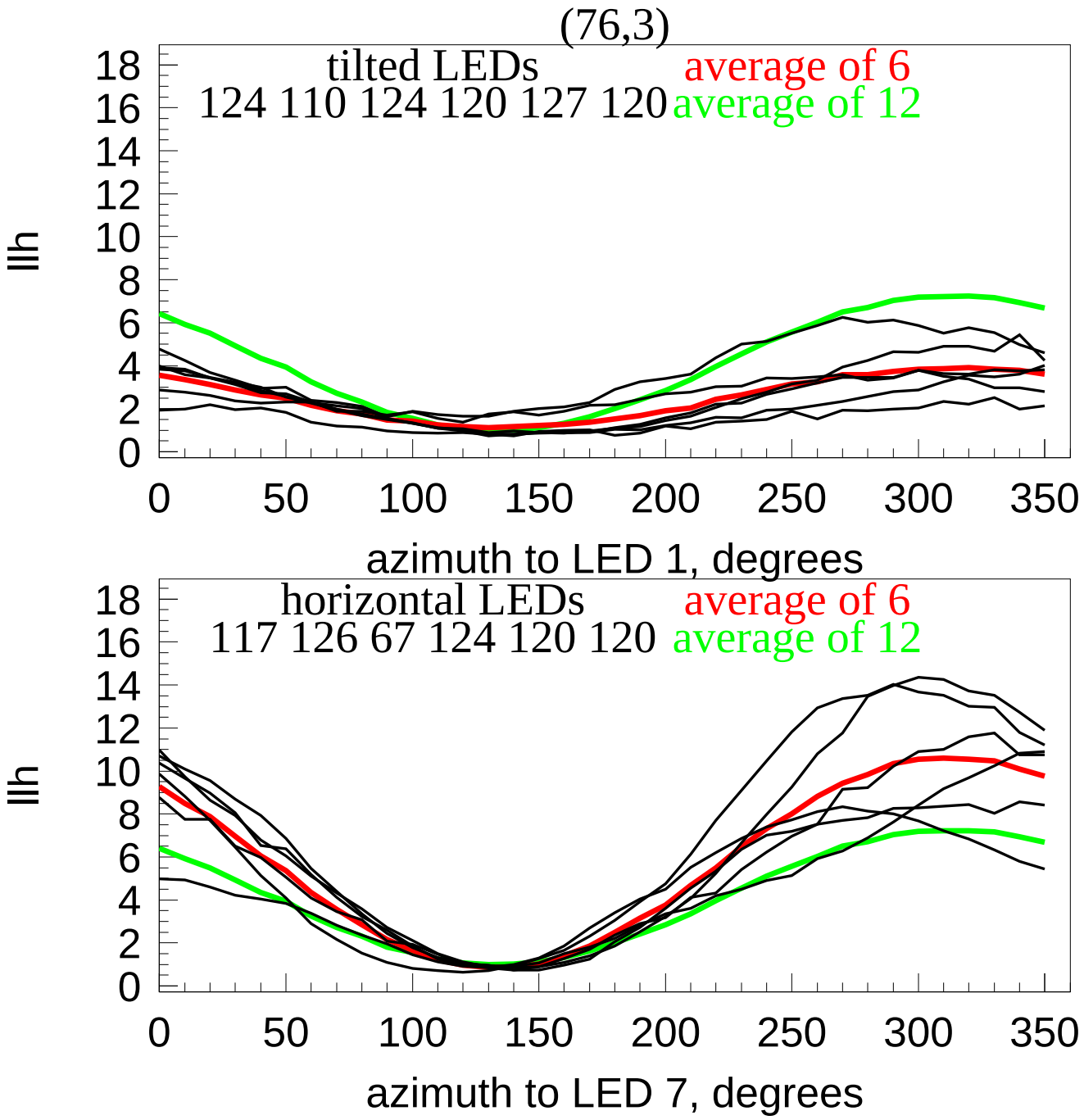

(75,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
9
1
3
150
6
4
12
5
10
11
152.8 ± 6.3

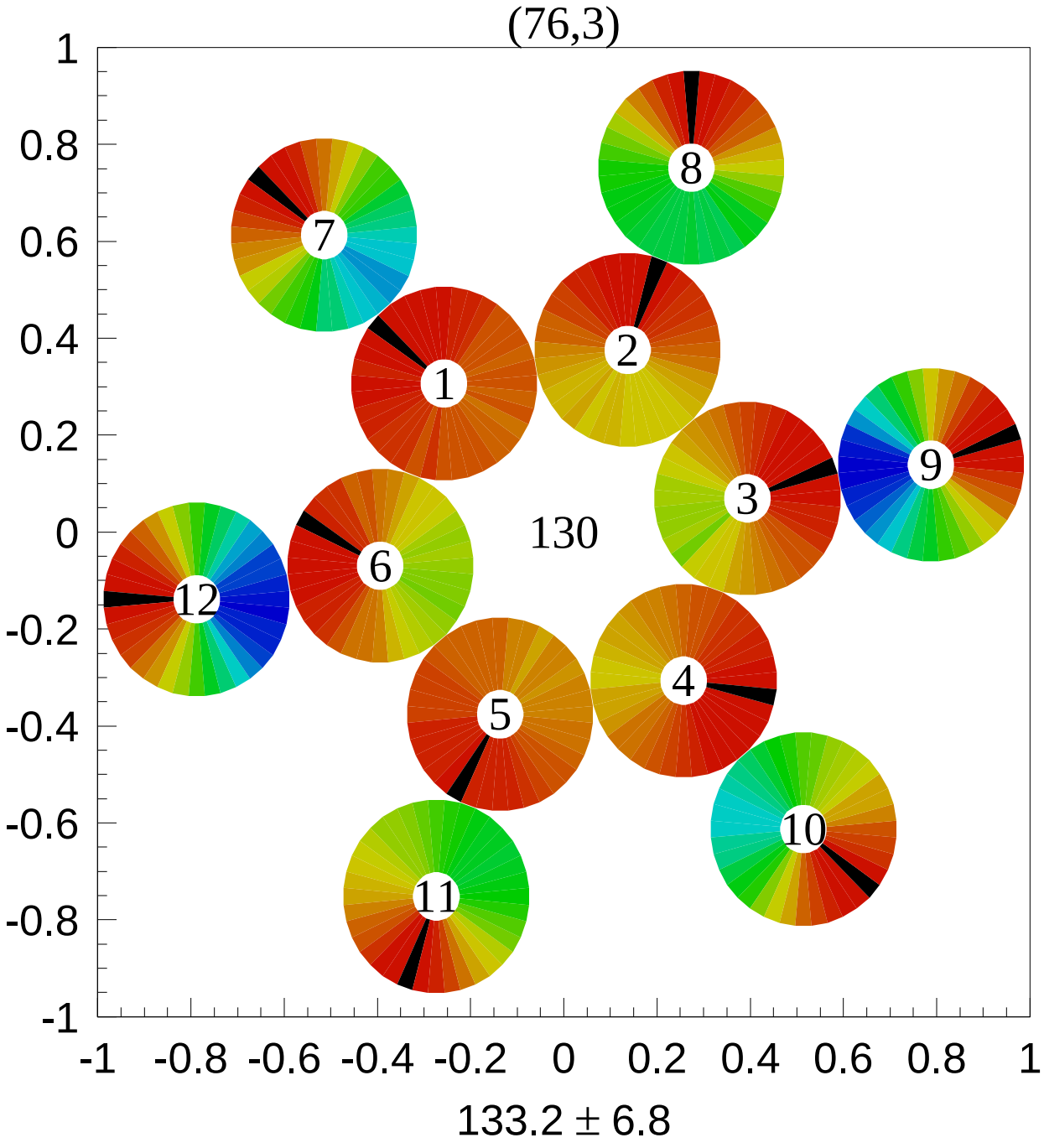

(76,1)
tilted LEDs
123 118 125 122 123 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 129 124 123 92 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

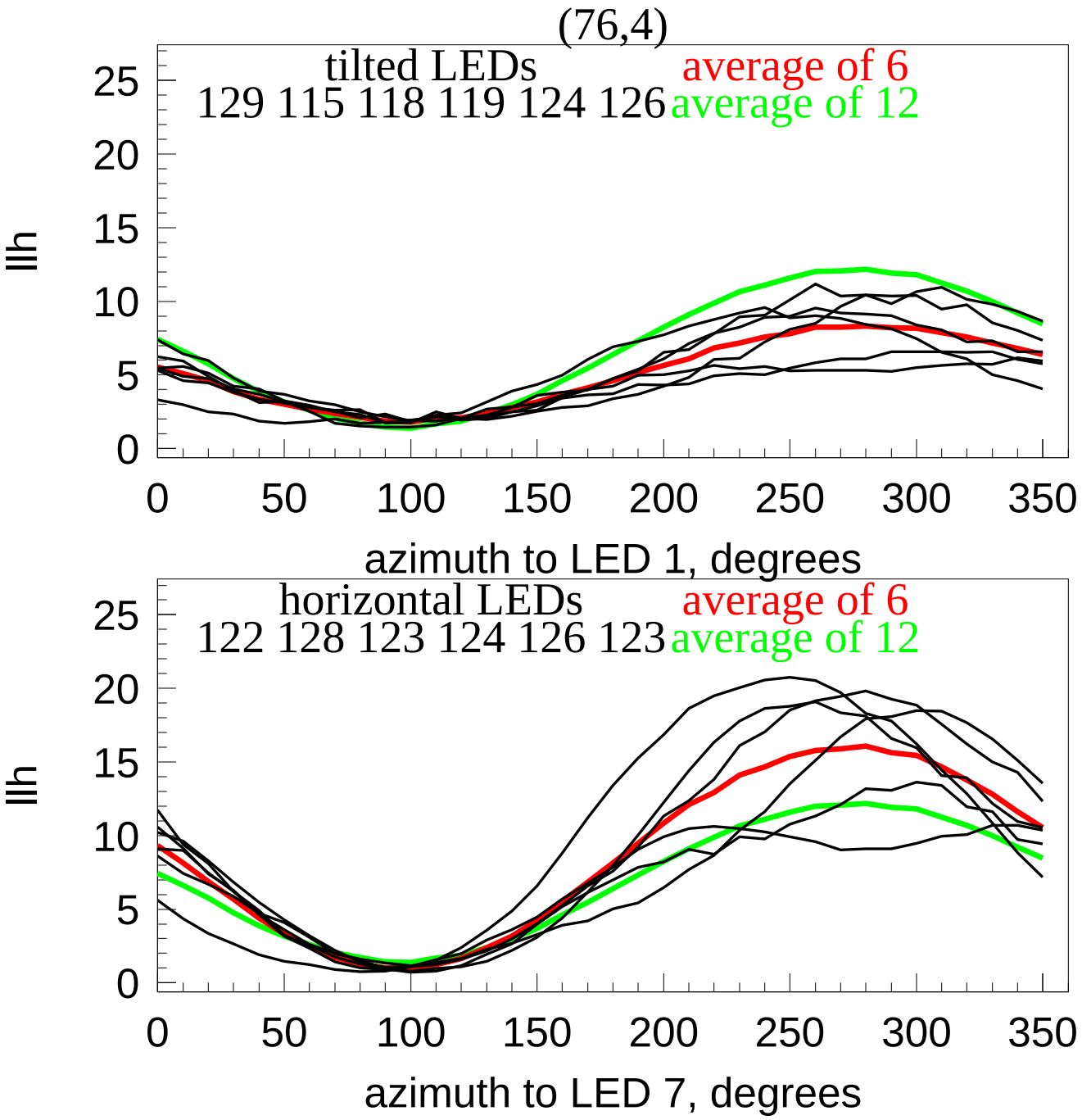

(76,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
189.3 ± 10.8
190
1
2
3
4
5
6
7
8
9
10
11
12

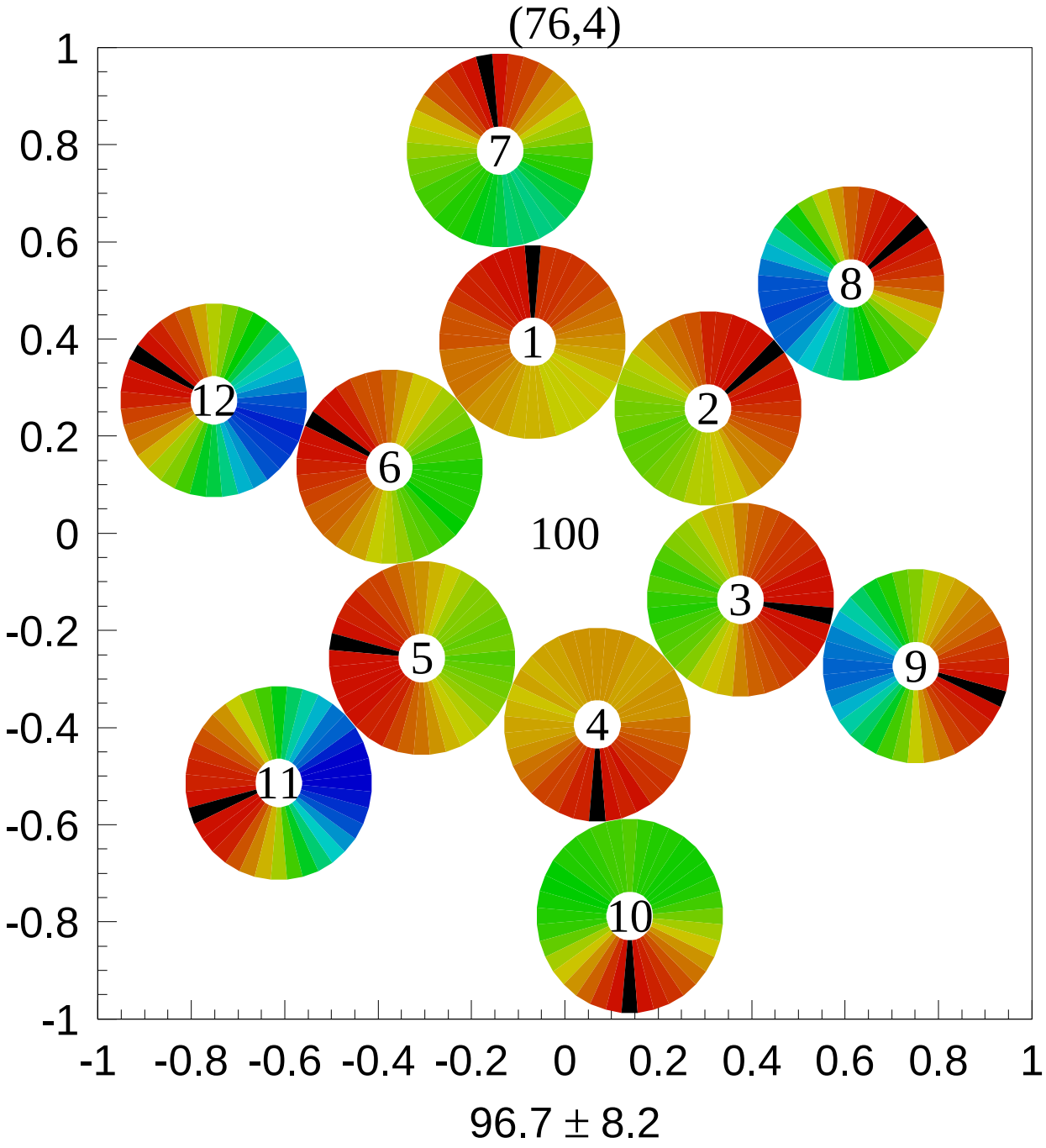

(76,2)
tilted LEDs
119 115 124 127 118 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 117 126 121 120 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

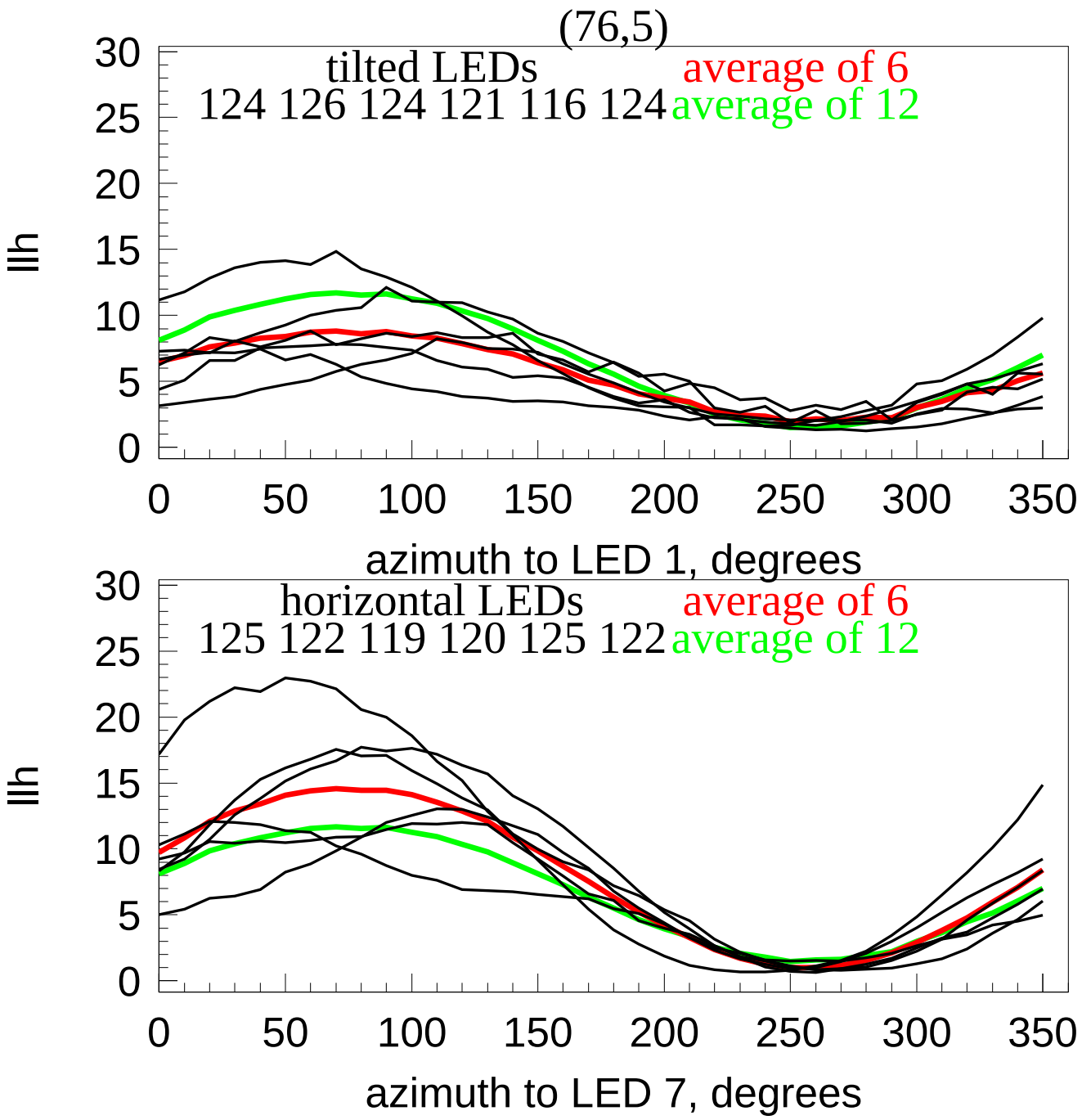

(76,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
241.1 ± 10.6

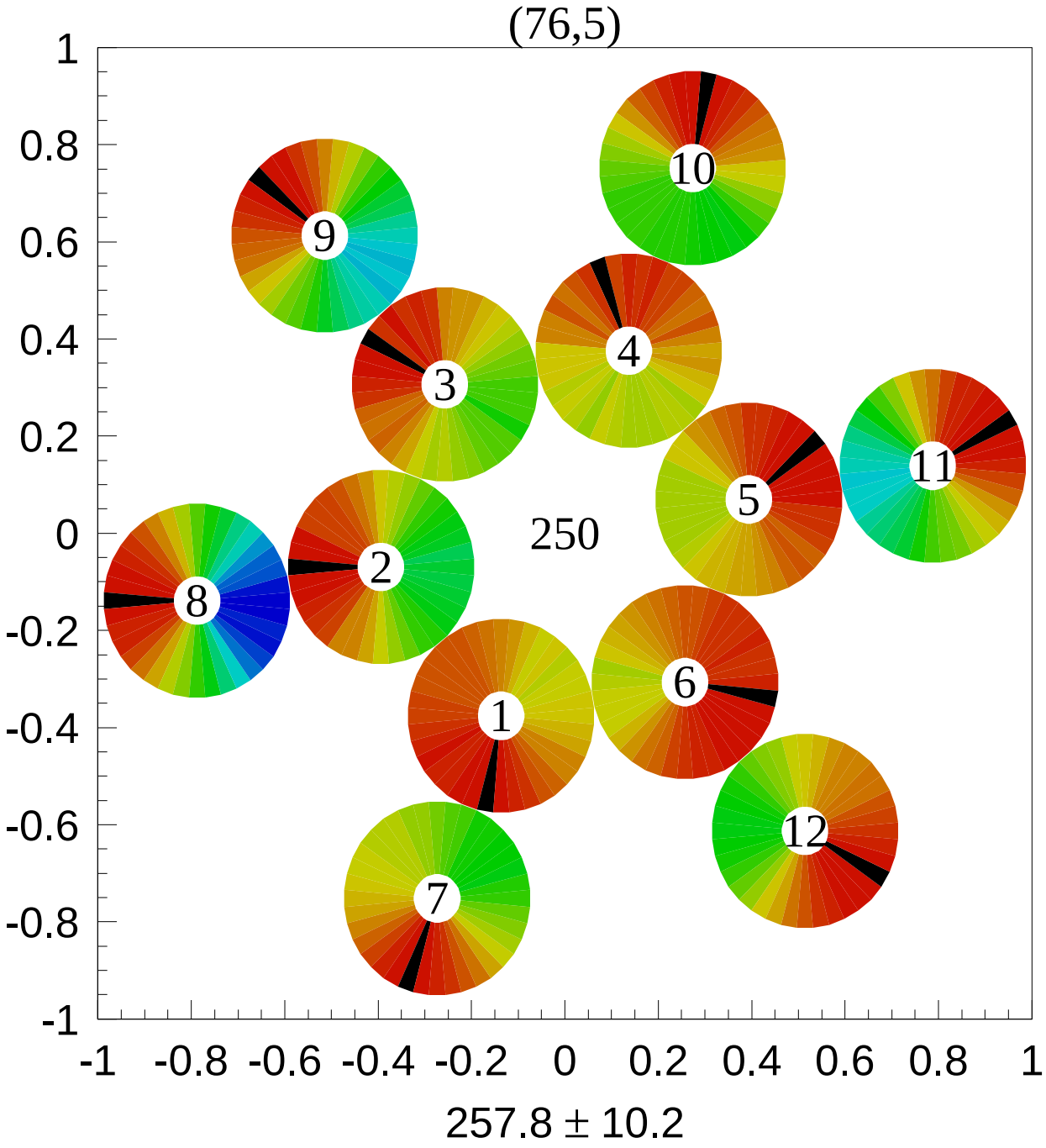

(76,3)
tilted LEDs
124 110 124 120 127 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 126 67 124 120 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

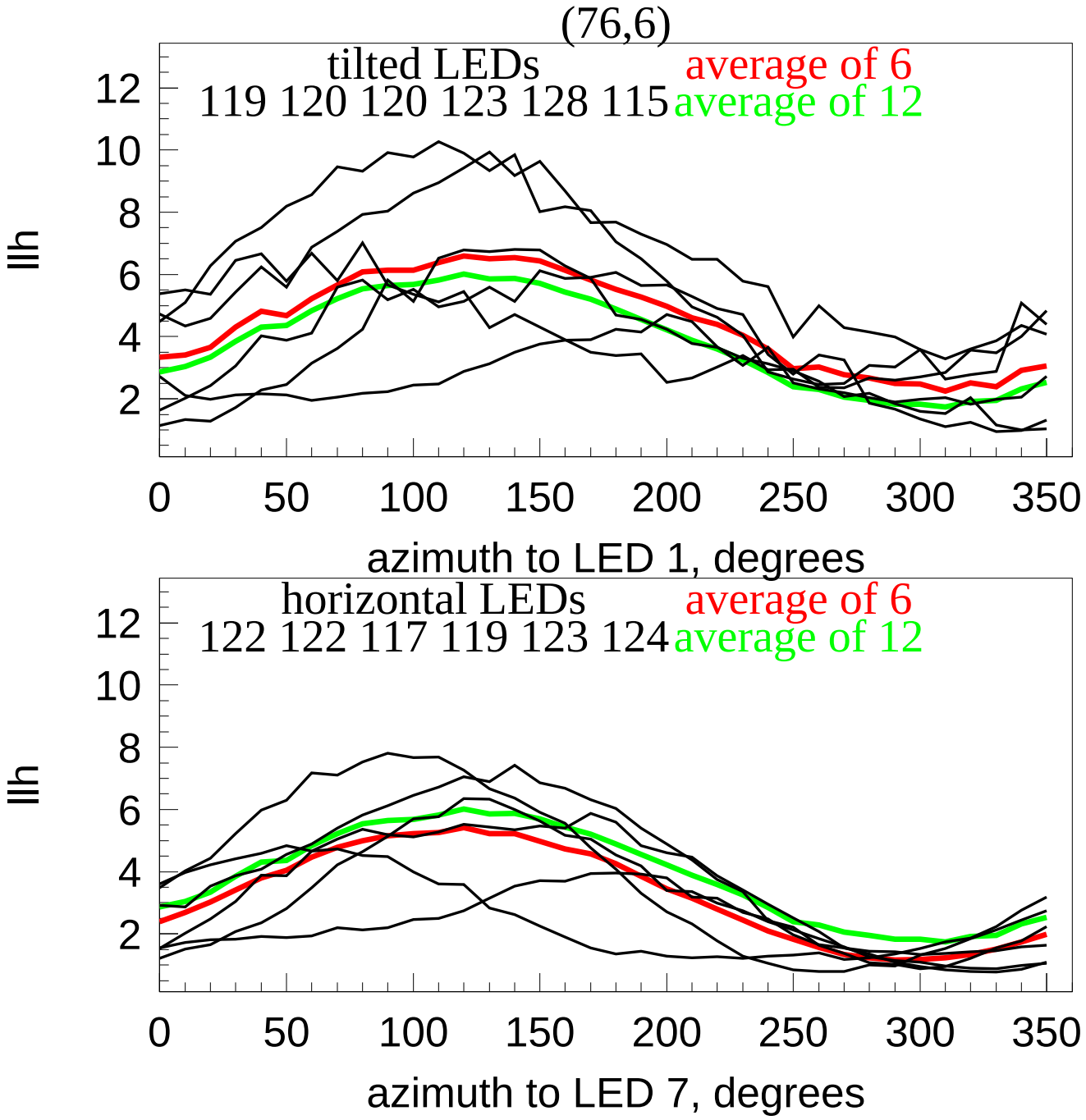

(76,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
133.2 ± 6.8

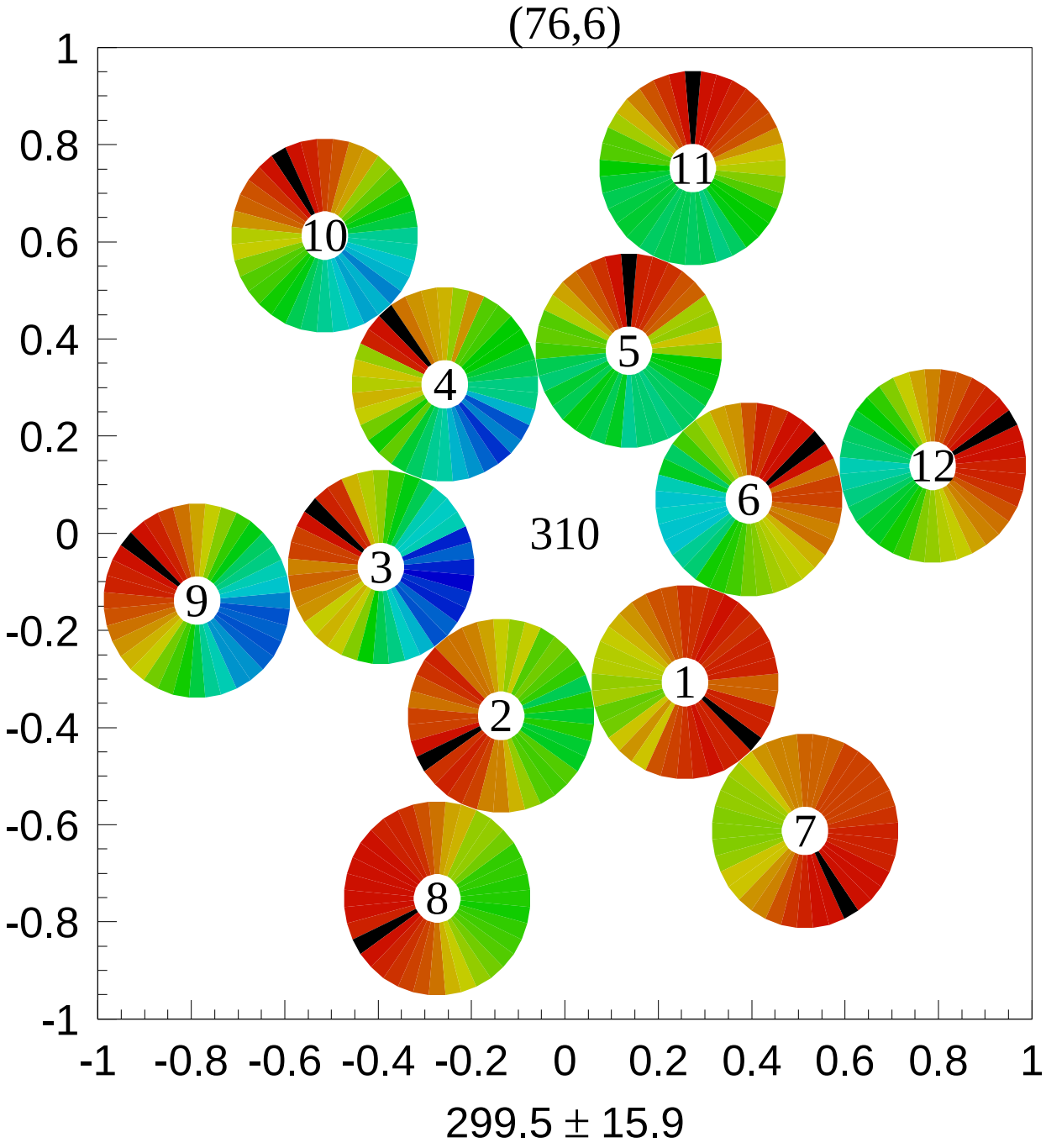

(76,4)
tilted LEDs
129 115 118 119 124 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 128 123 124 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

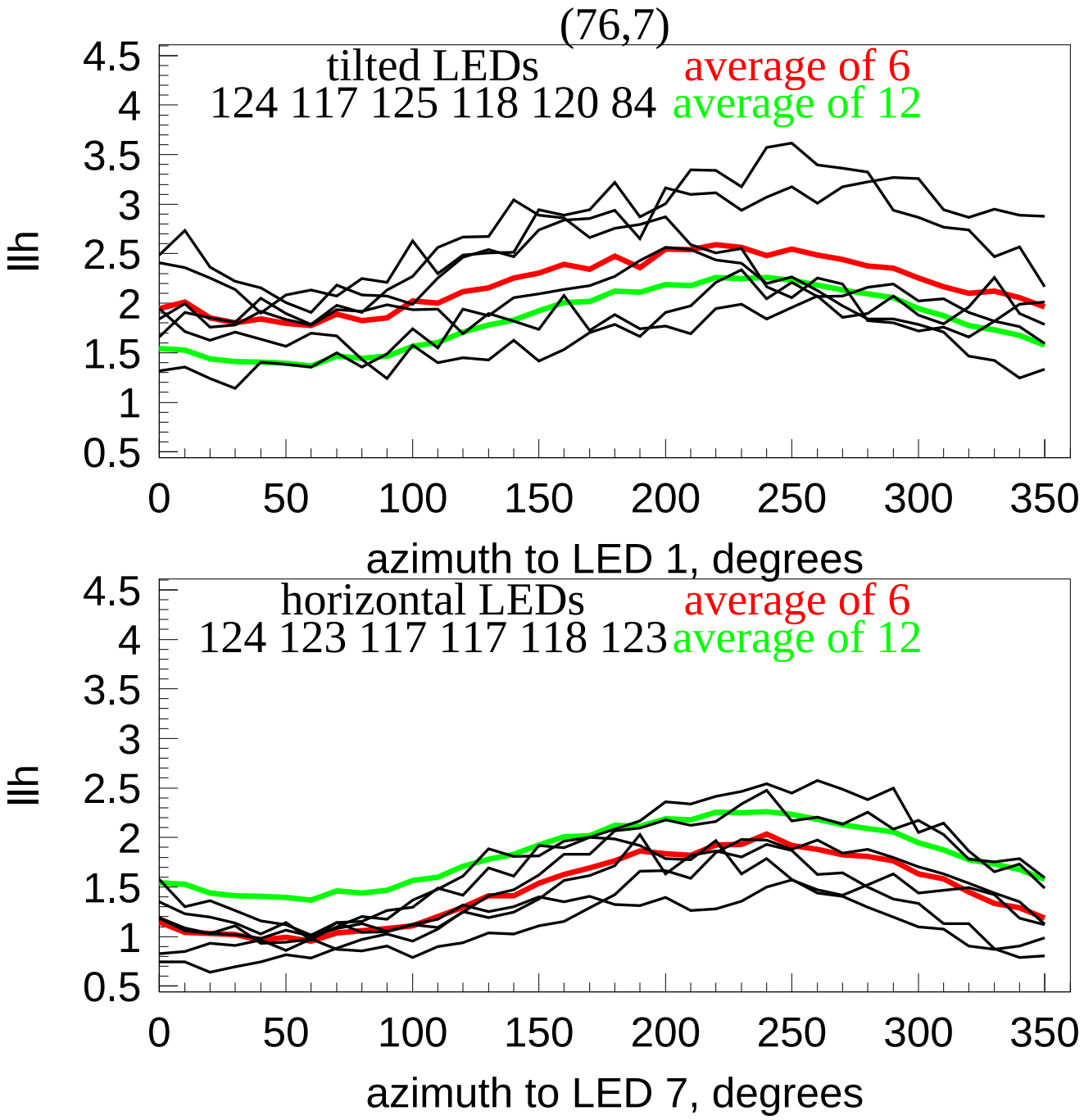

(76,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
96.7 ± 8.2

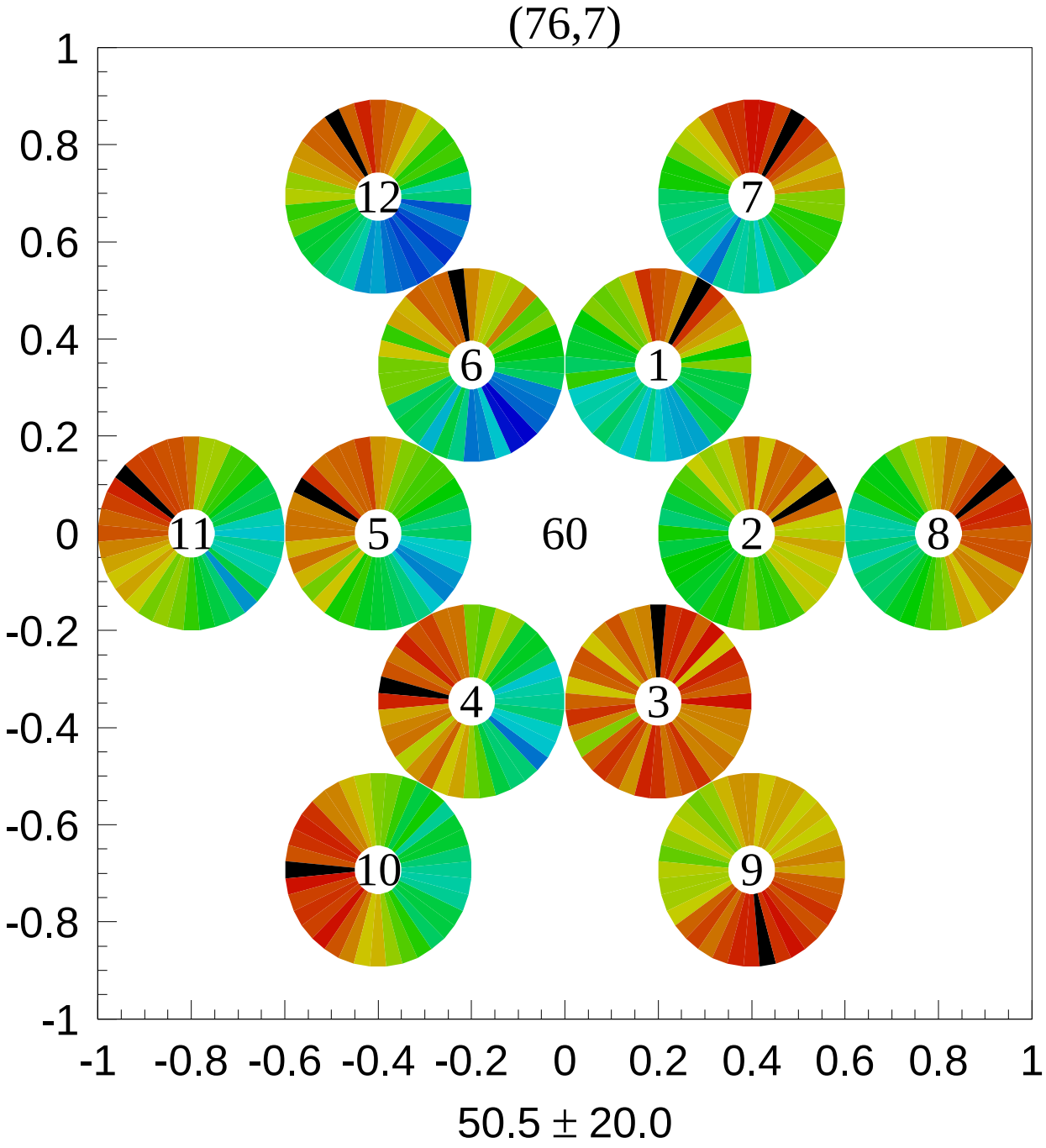

(76,5)
tilted LEDs
124 126 124 121 116 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 122 119 120 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

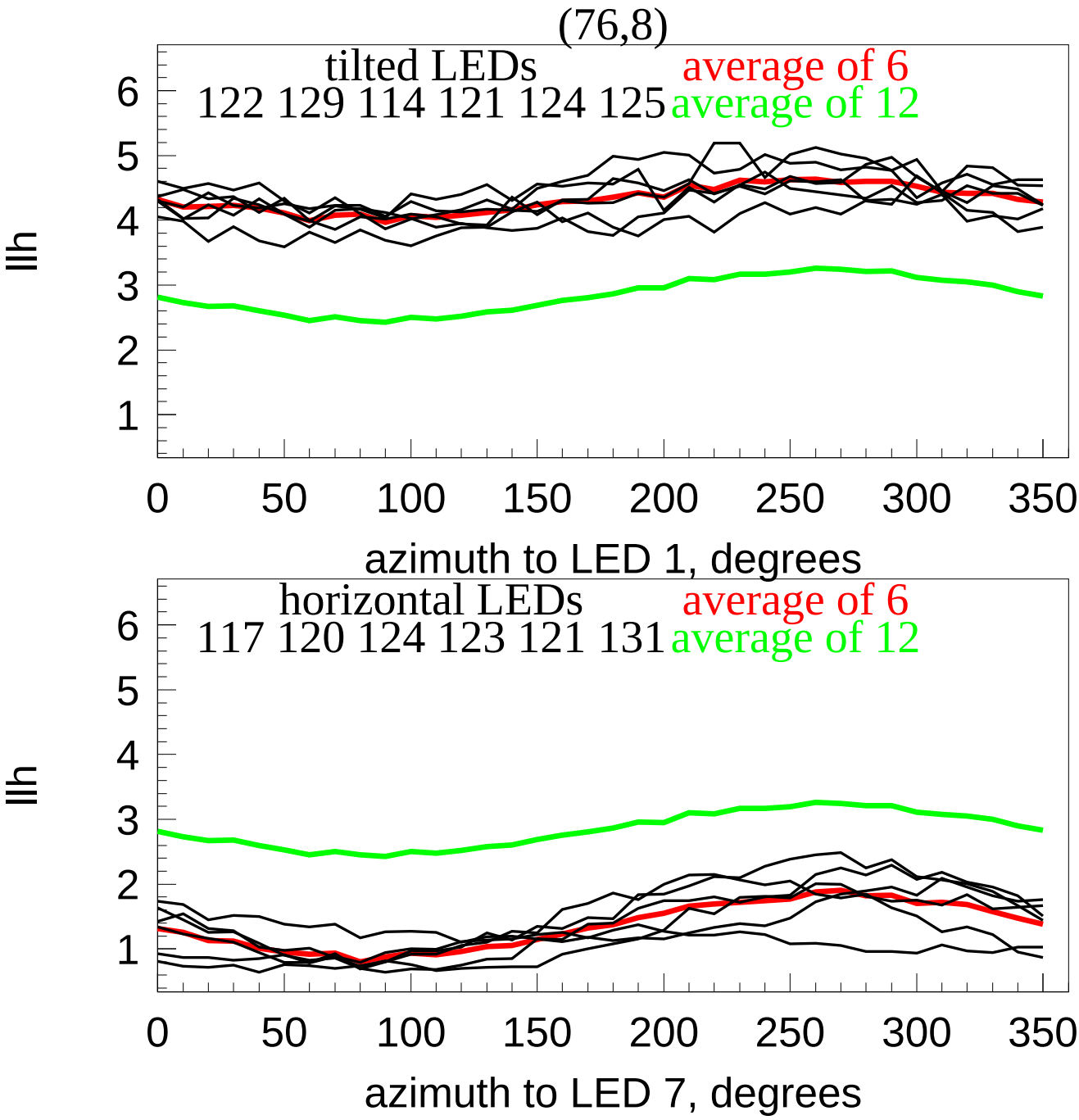

(76,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
257.8 ± 10.2
250
1
2
3
4
5
6
7
8
9
10
11
12

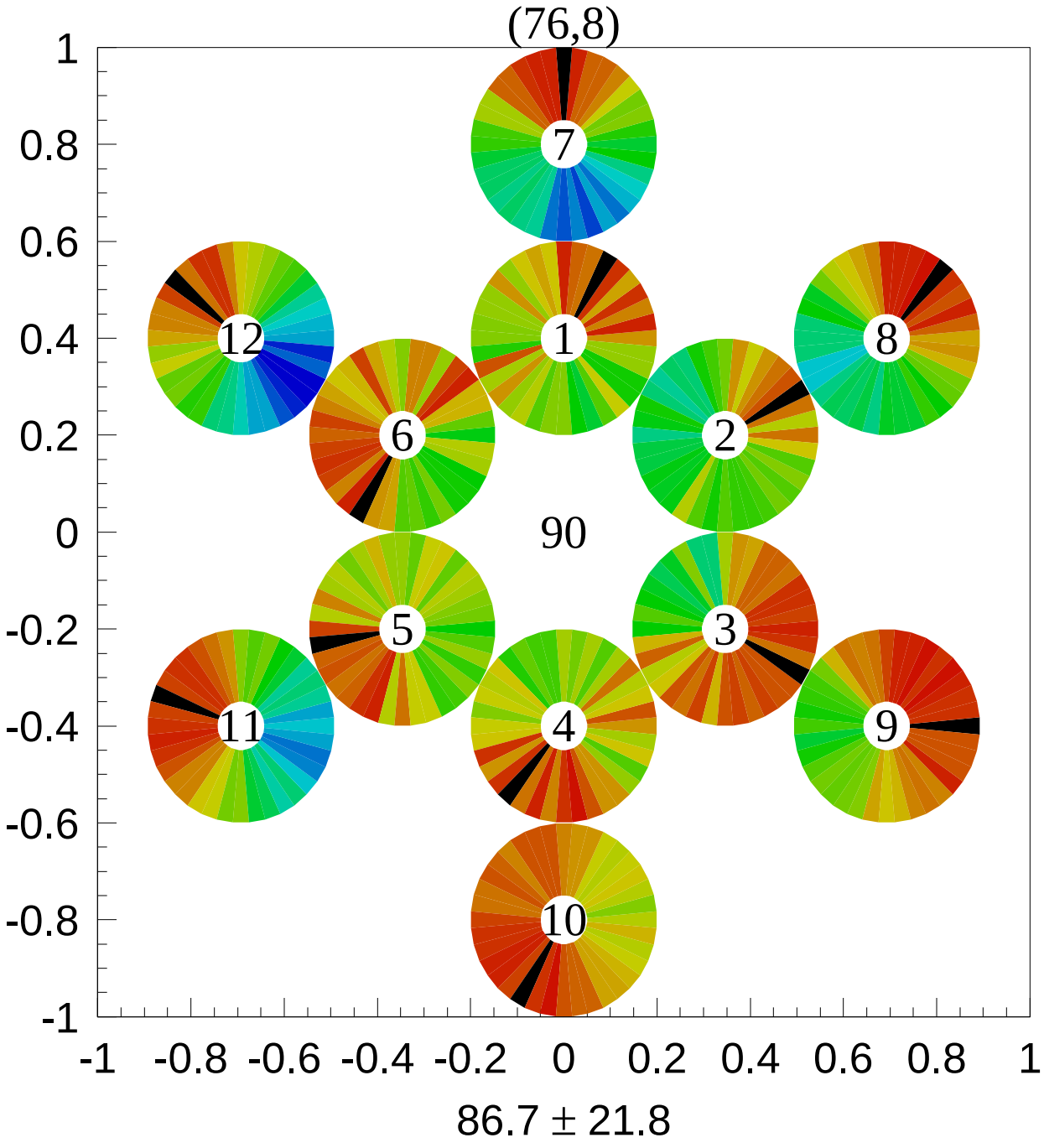

(76,6)
tilted LEDs
119 120 120 123 128 115
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 122 117 119 123 124
average of 6
average of 12
llh
12
10
8
6
4
2
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

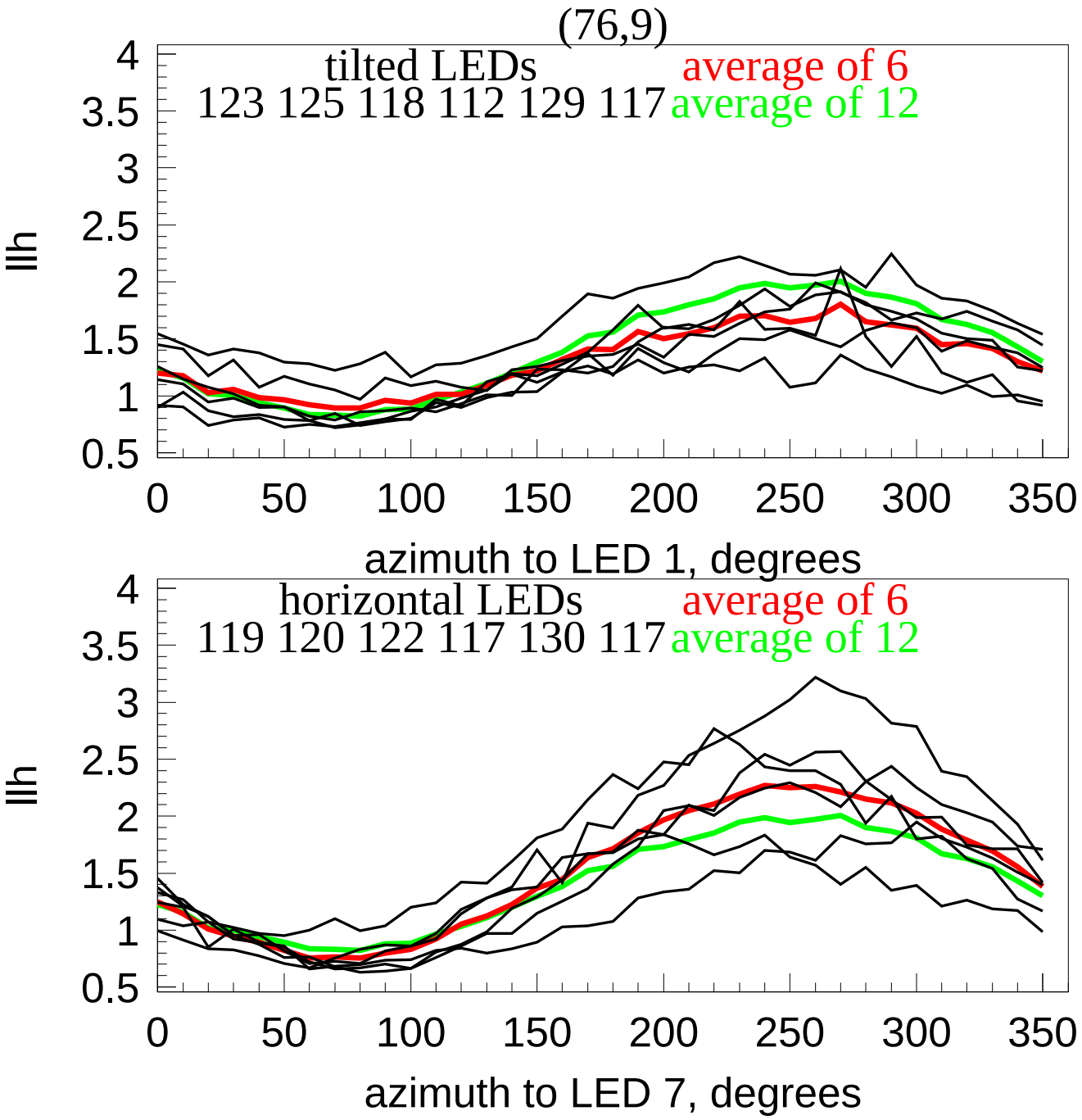

(76,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
299.5 ± 15.9
310
1
2
3
4
5
6
7
8
9
10
11
12

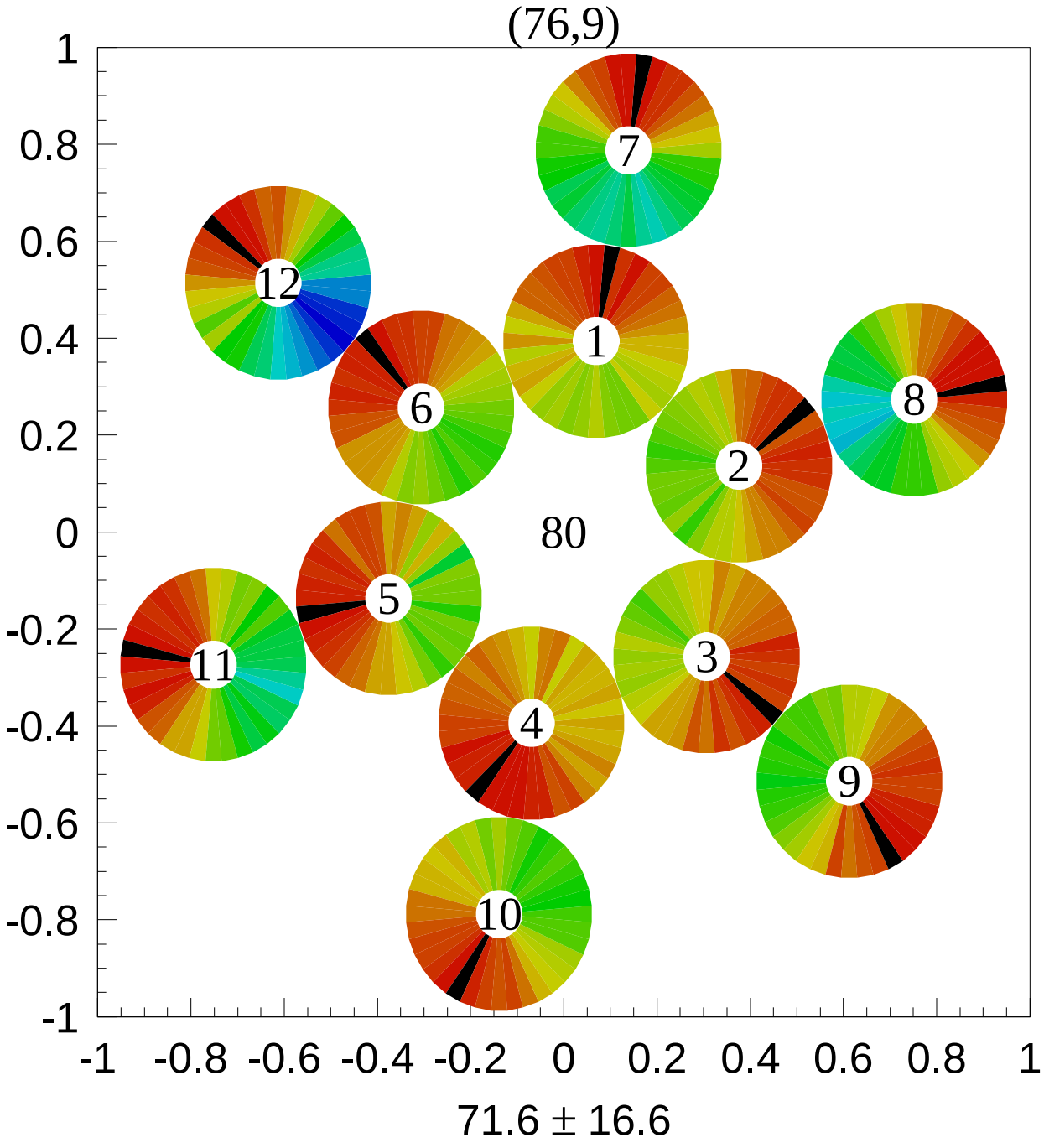

(76,7)
tilted LEDs
124 117 125 118 120 84
average of 6
average of 12
IIh
azimuth to LED 1, degrees
horizontal LEDs
124 123 117 117 118 123
average of 6
average of 12
IIh
azimuth to LED 7, degrees

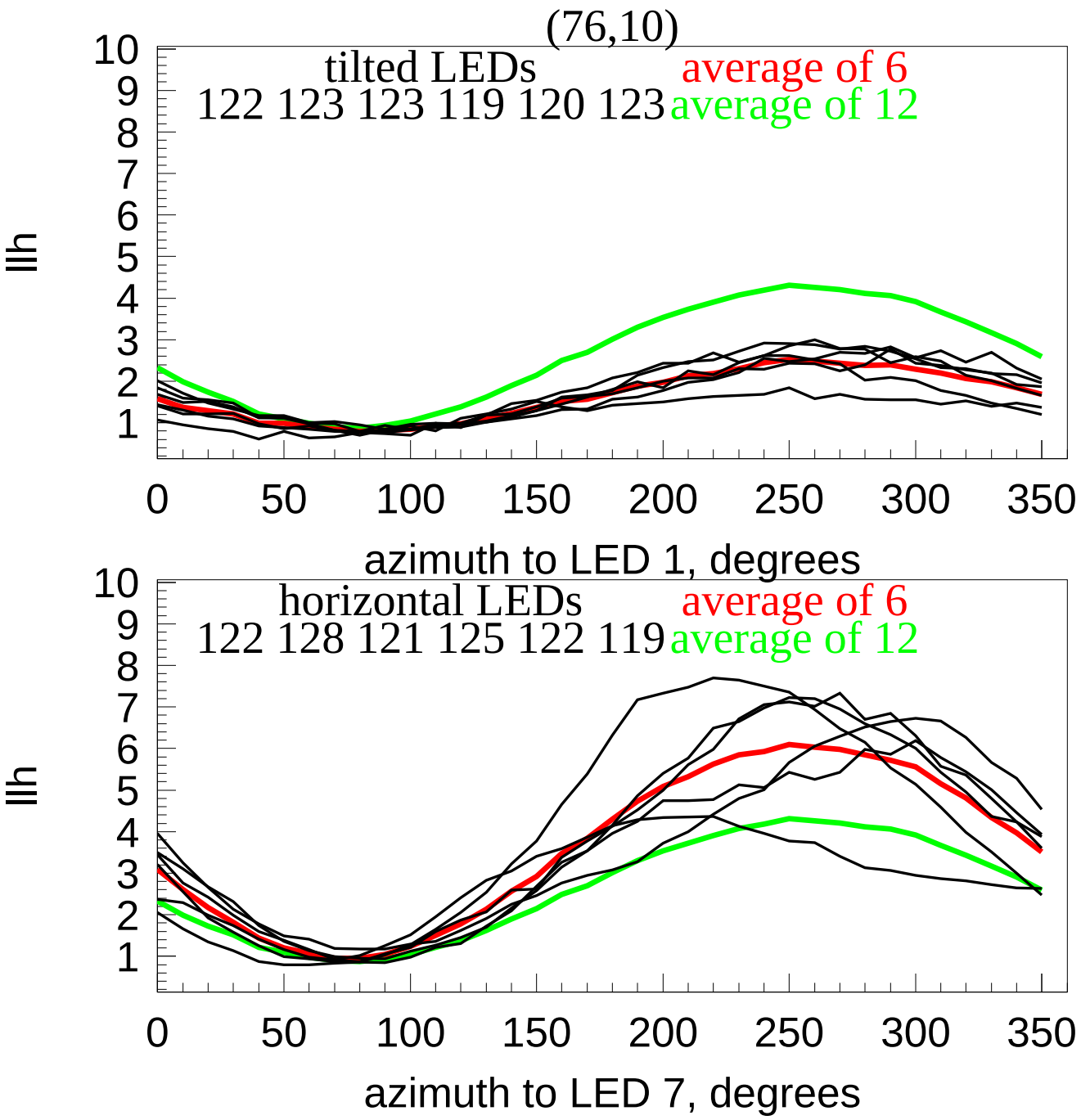

(76,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
50.5 ± 20.0

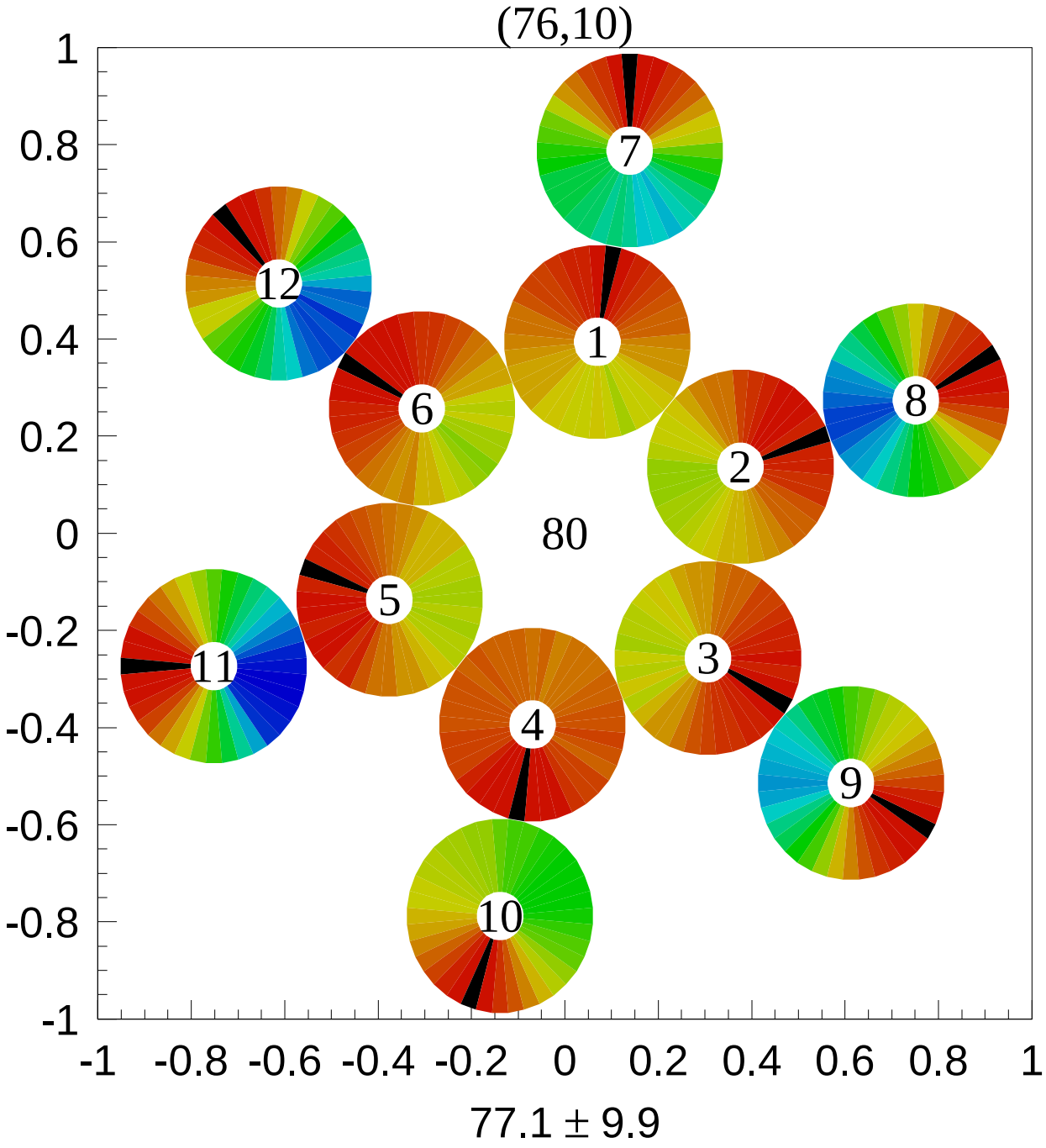

(76,8)
tilted LEDs
122 129 114 121 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 120 124 123 121 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

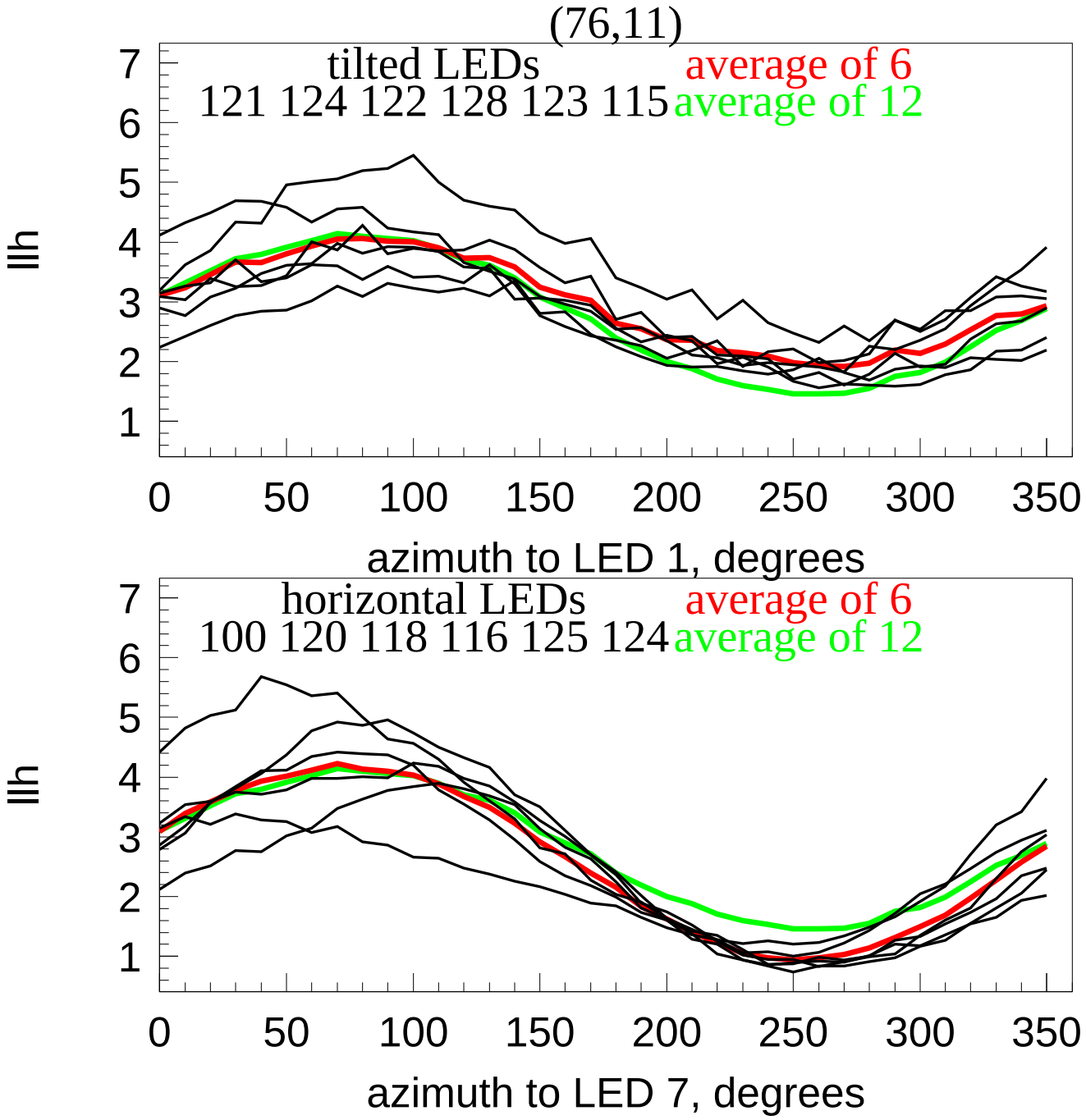

(76,8)
7
12
1
8
6
2
90
5
3
11
4
9
10
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
86.7 ± 21.8

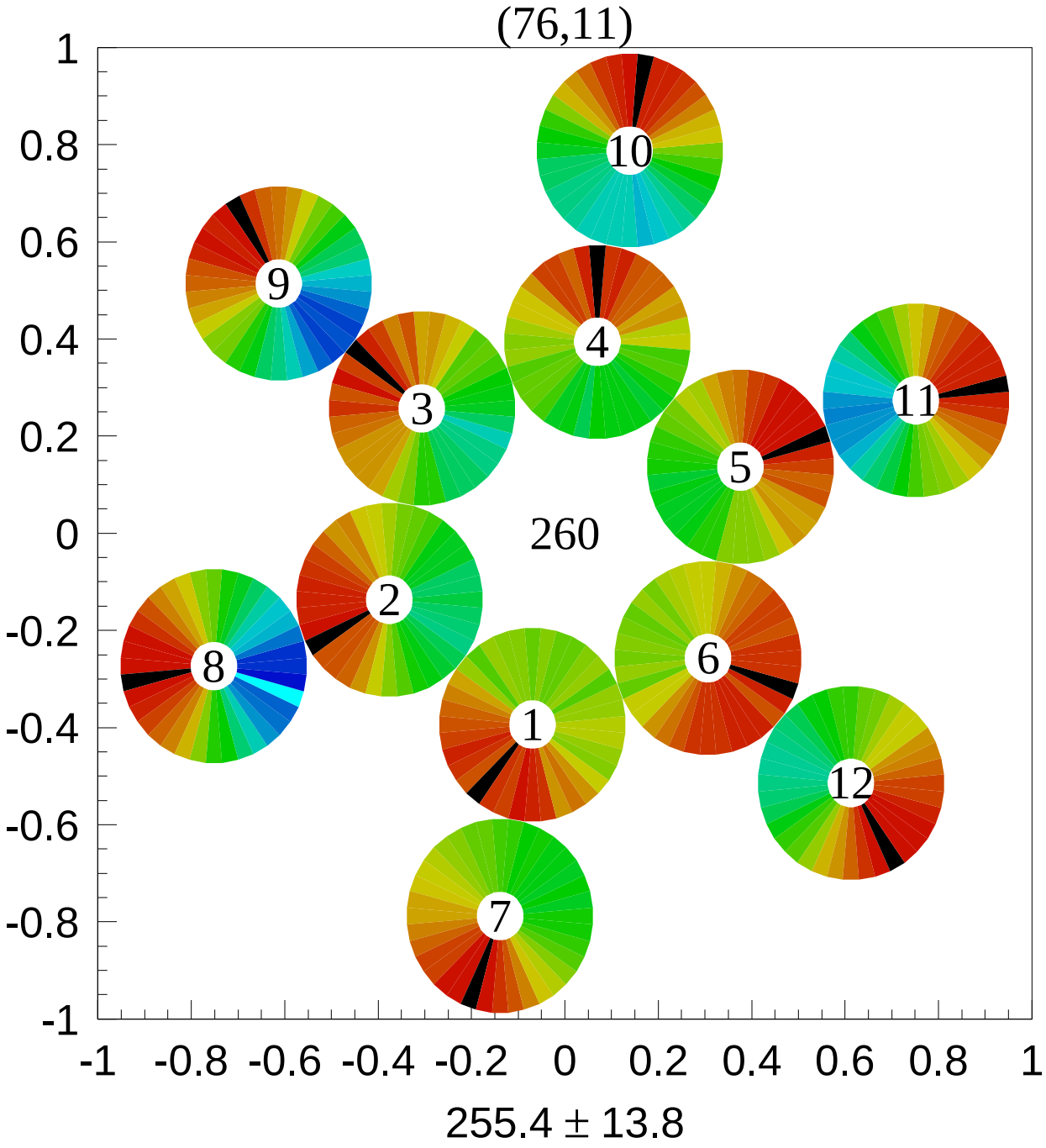

(76,9)
tilted LEDs
123 125 118 112 129 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 120 122 117 130 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

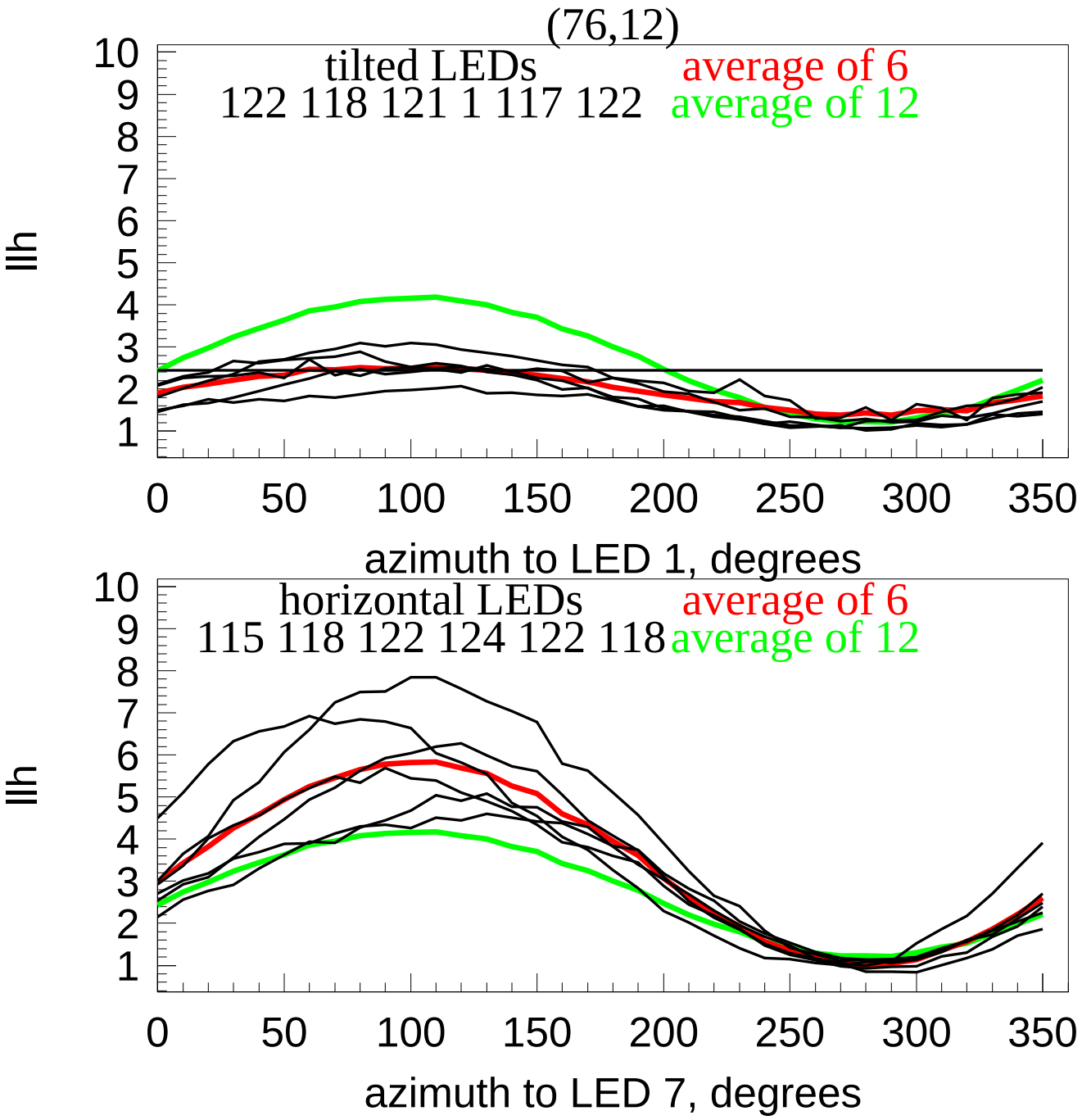

(76,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
71.6 ± 16.6

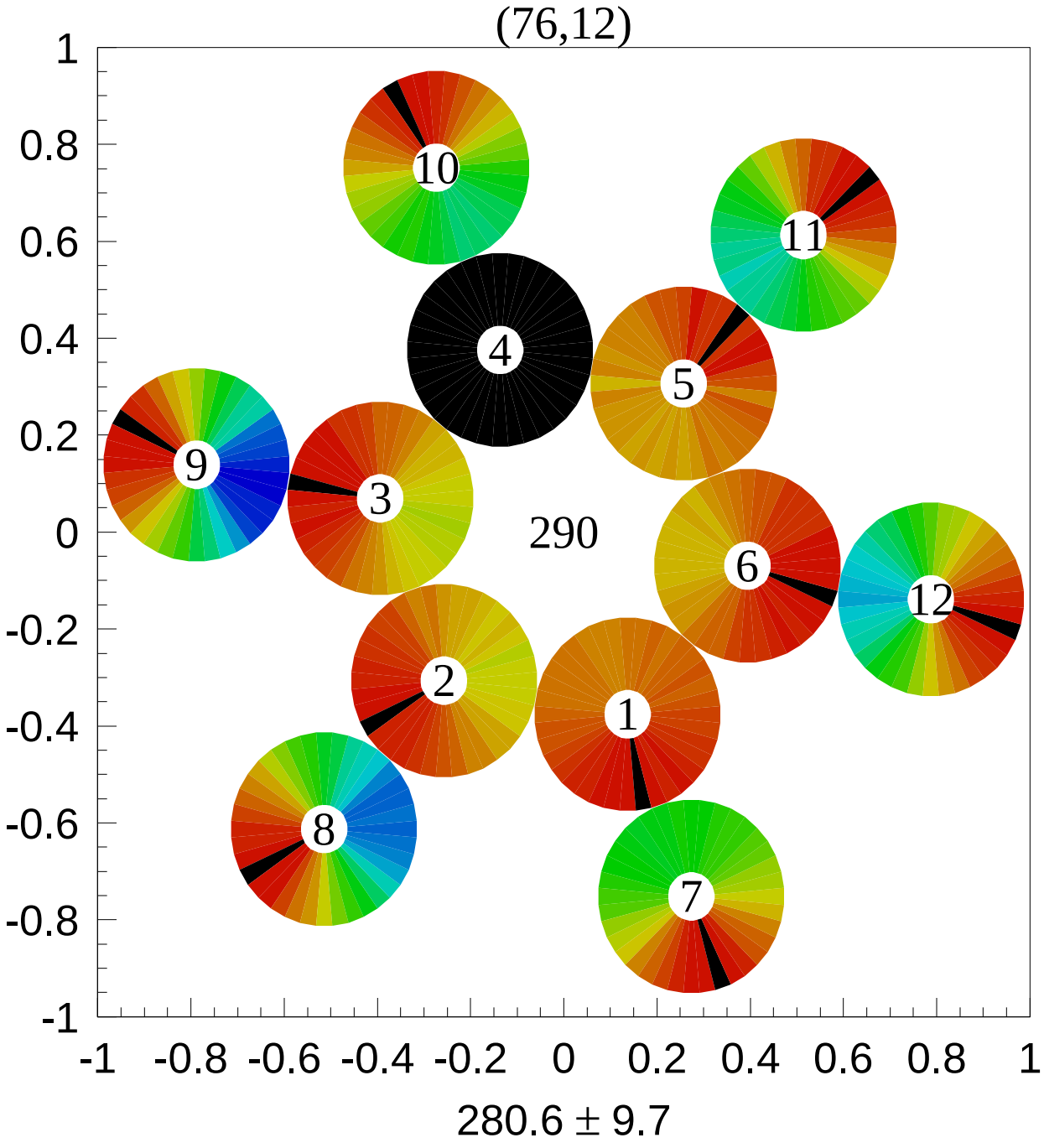

(76,10)
tilted LEDs
122 123 123 119 120 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 128 121 125 122 119
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

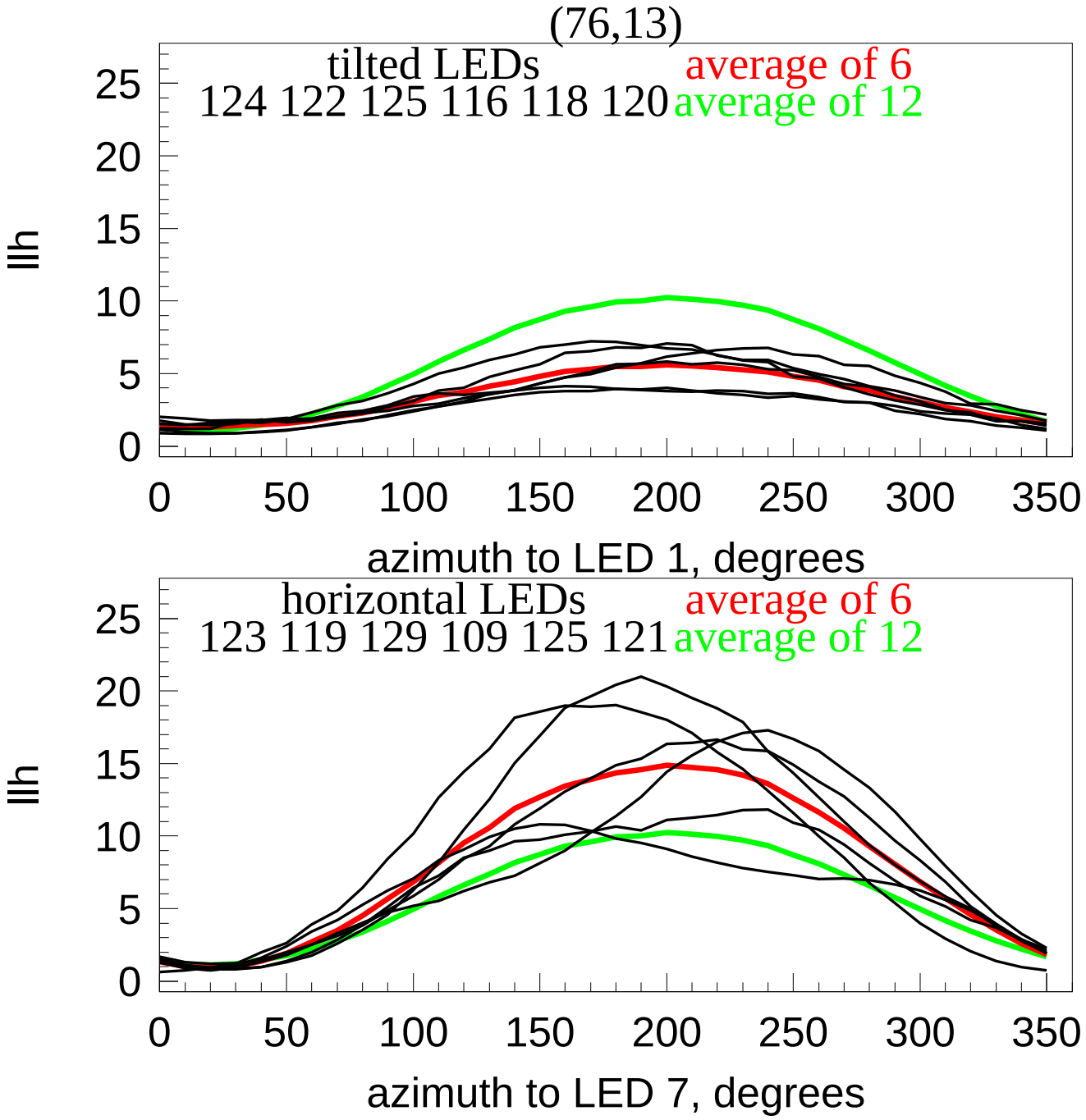

(76,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
77.1 ± 9.9
7
12
1
6
8
2
80
5
11
3
4
9
10

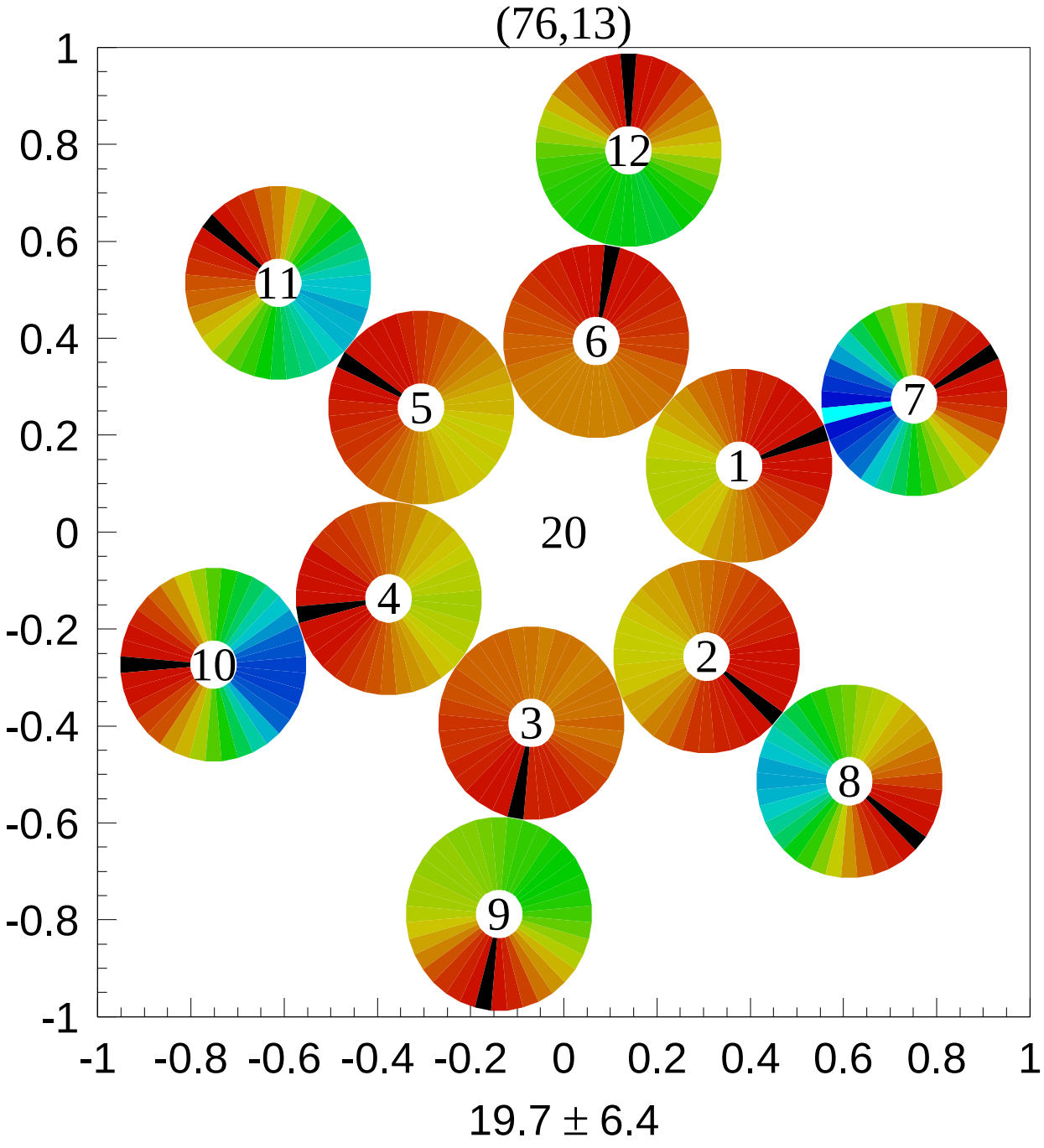

(76,11)
tilted LEDs
121 124 122 128 123 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
100 120 118 116 125 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

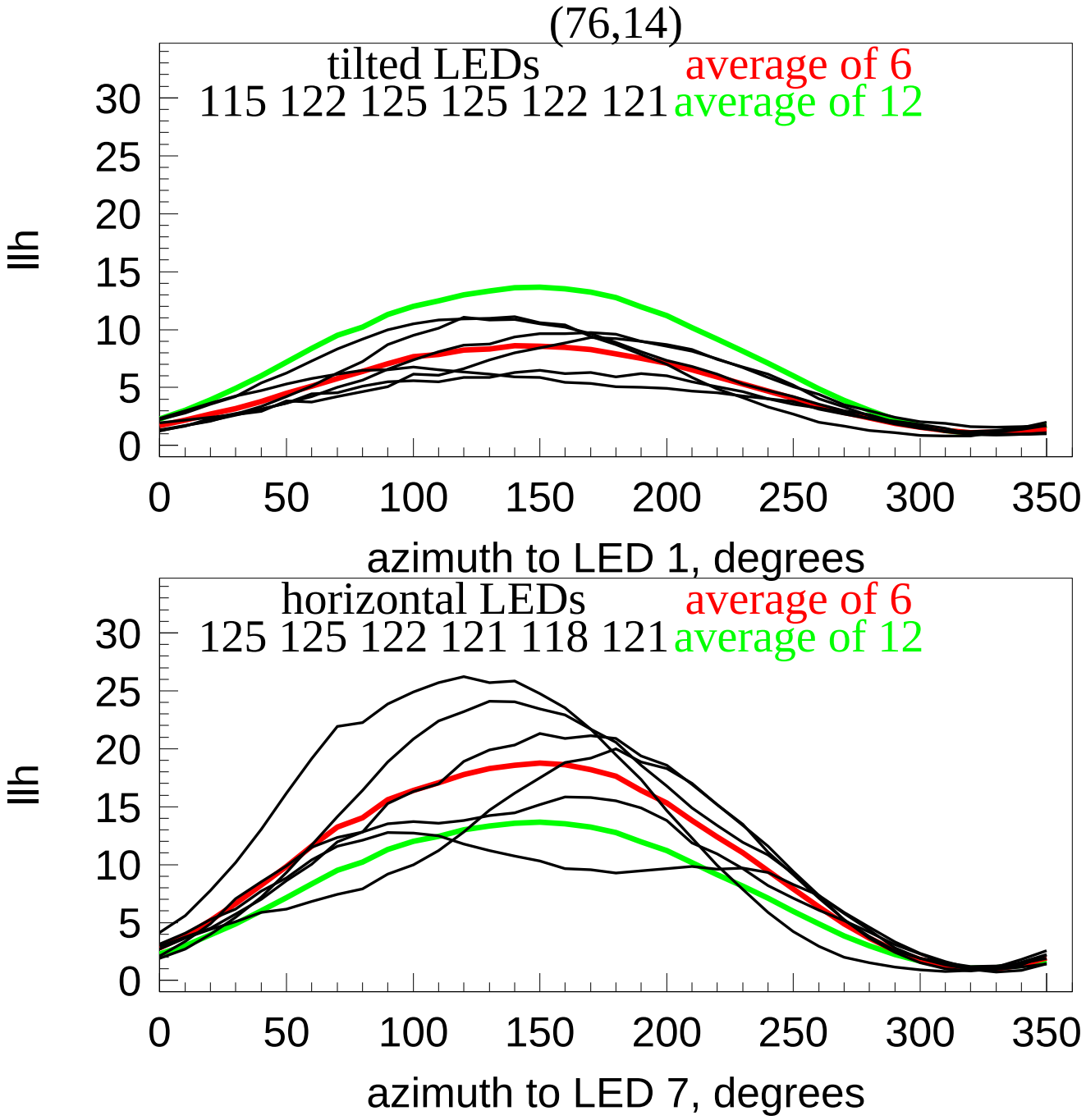

(76,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
255.4 ± 13.8

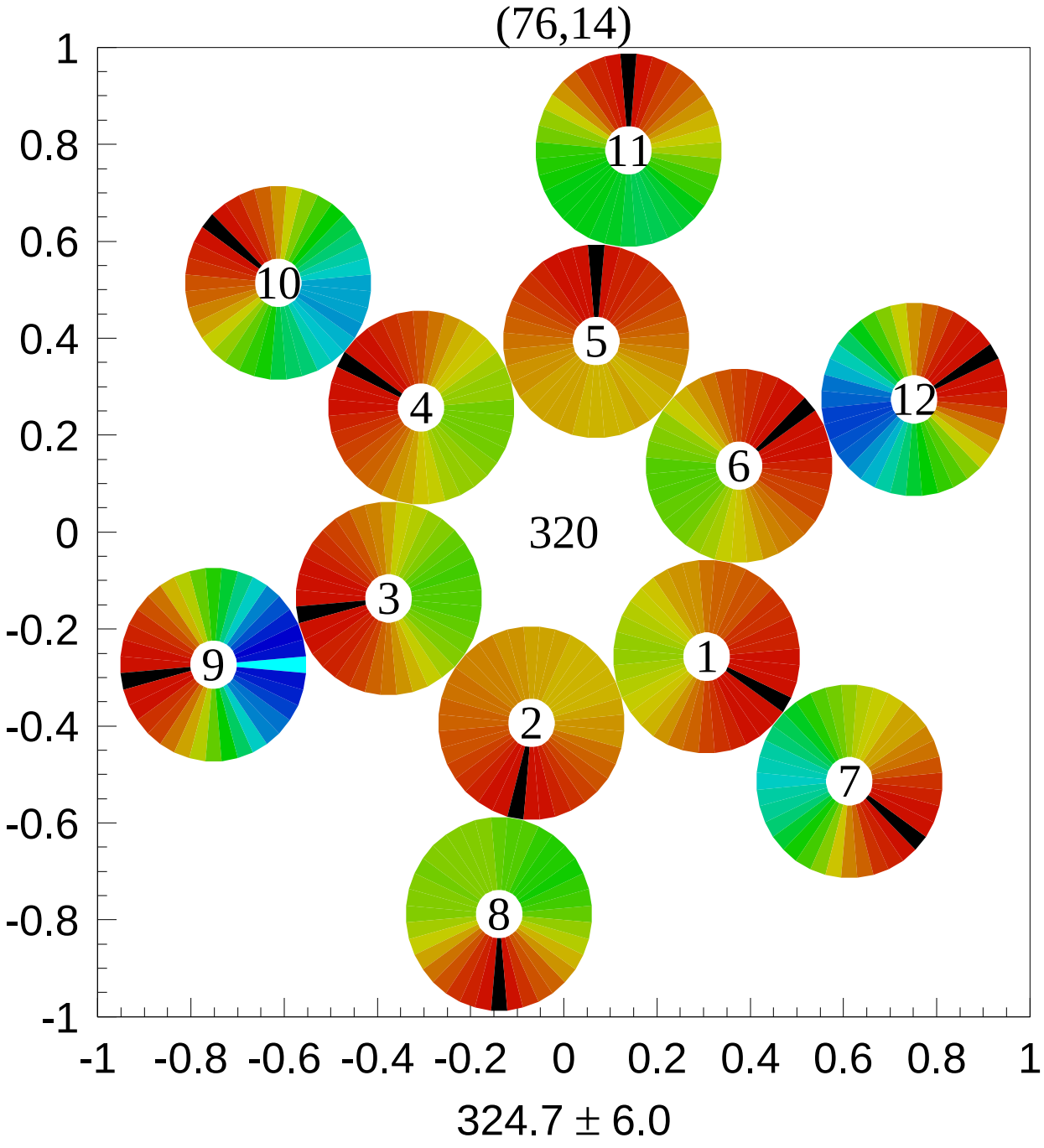

(76,12)
tilted LEDs
122 118 121 1 117 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 118 122 124 122 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

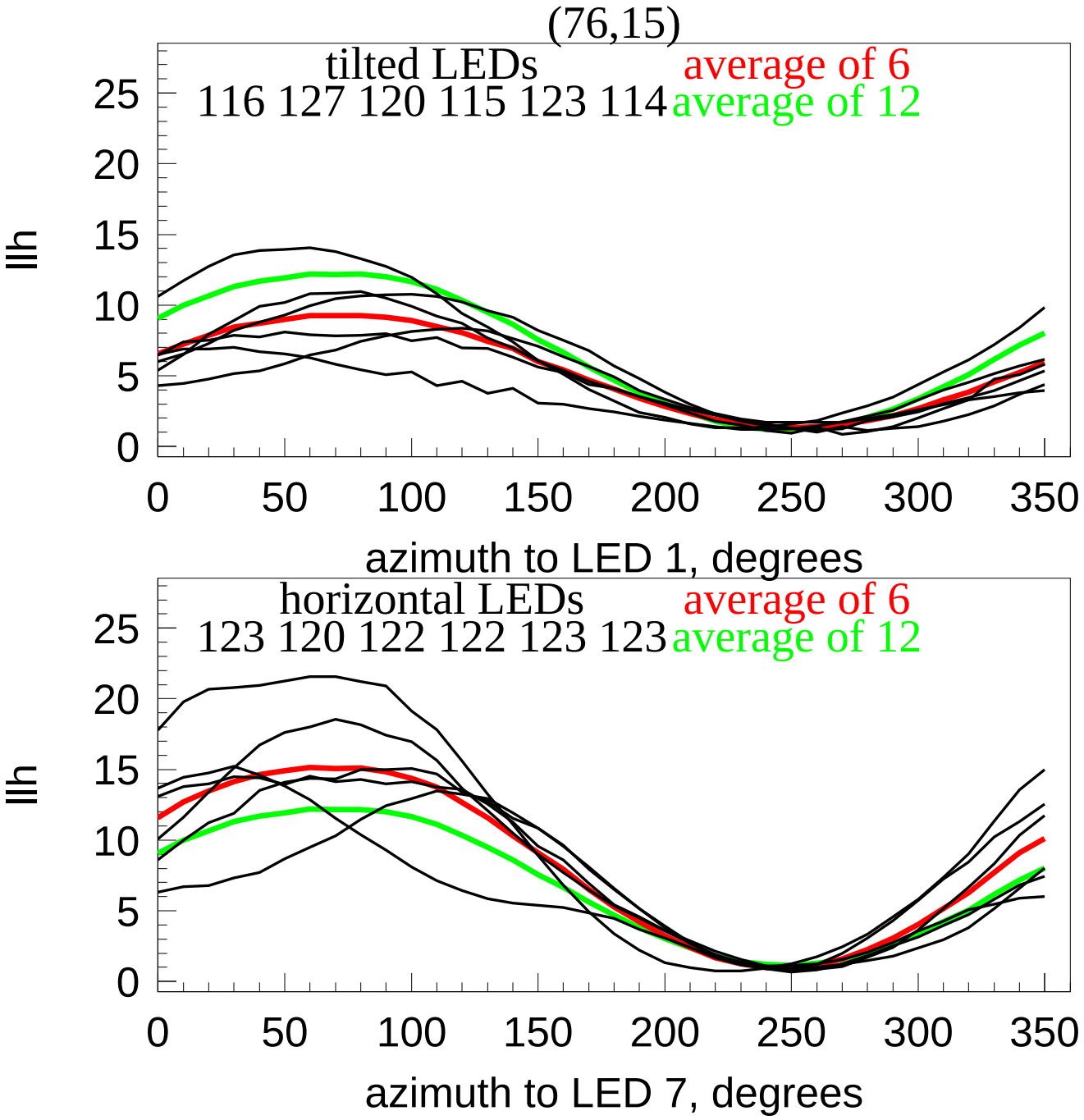

(76,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
280.6 ± 9.7

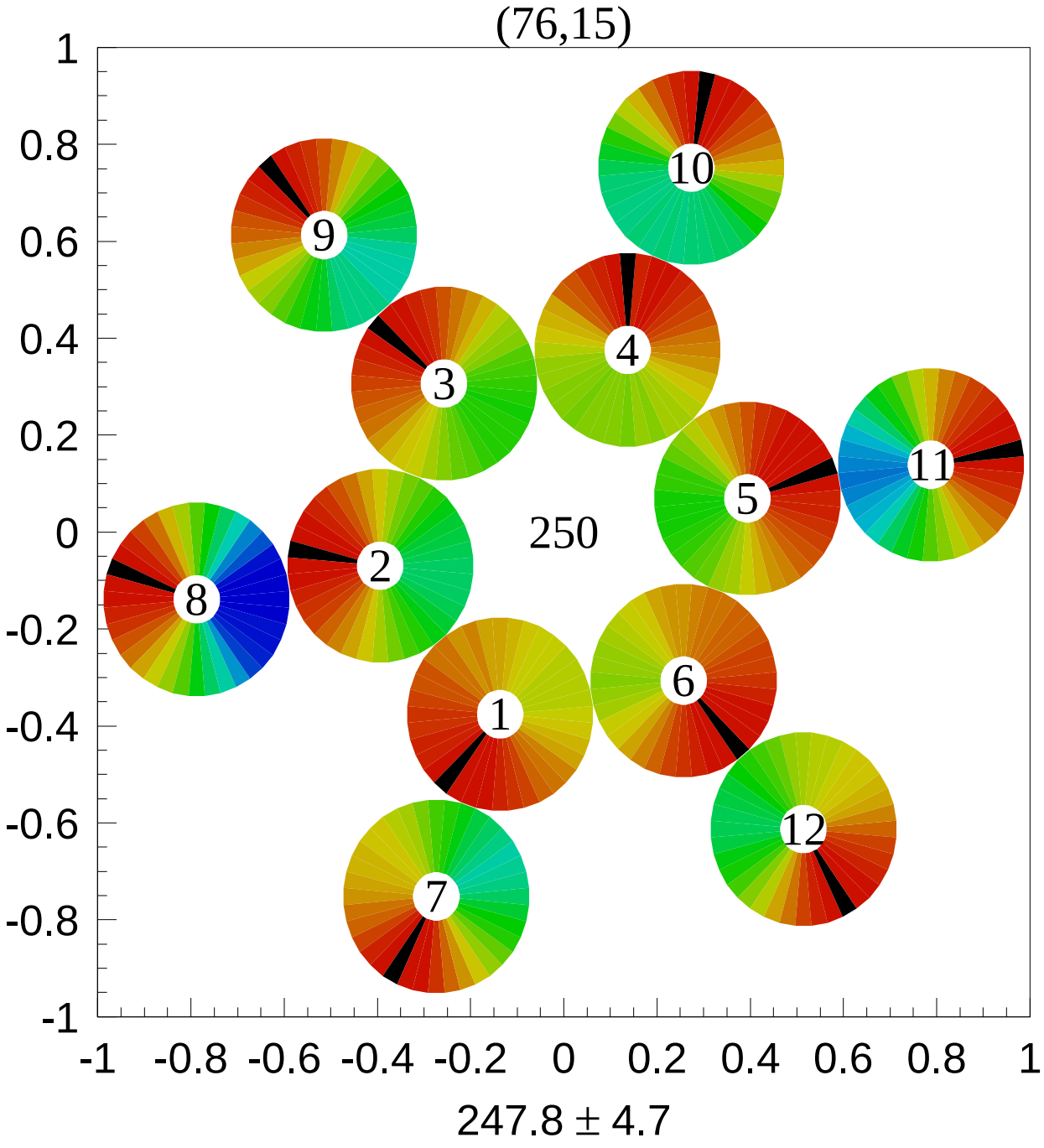

(76,13)
tilted LEDs
124 122 125 116 118 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 119 129 109 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

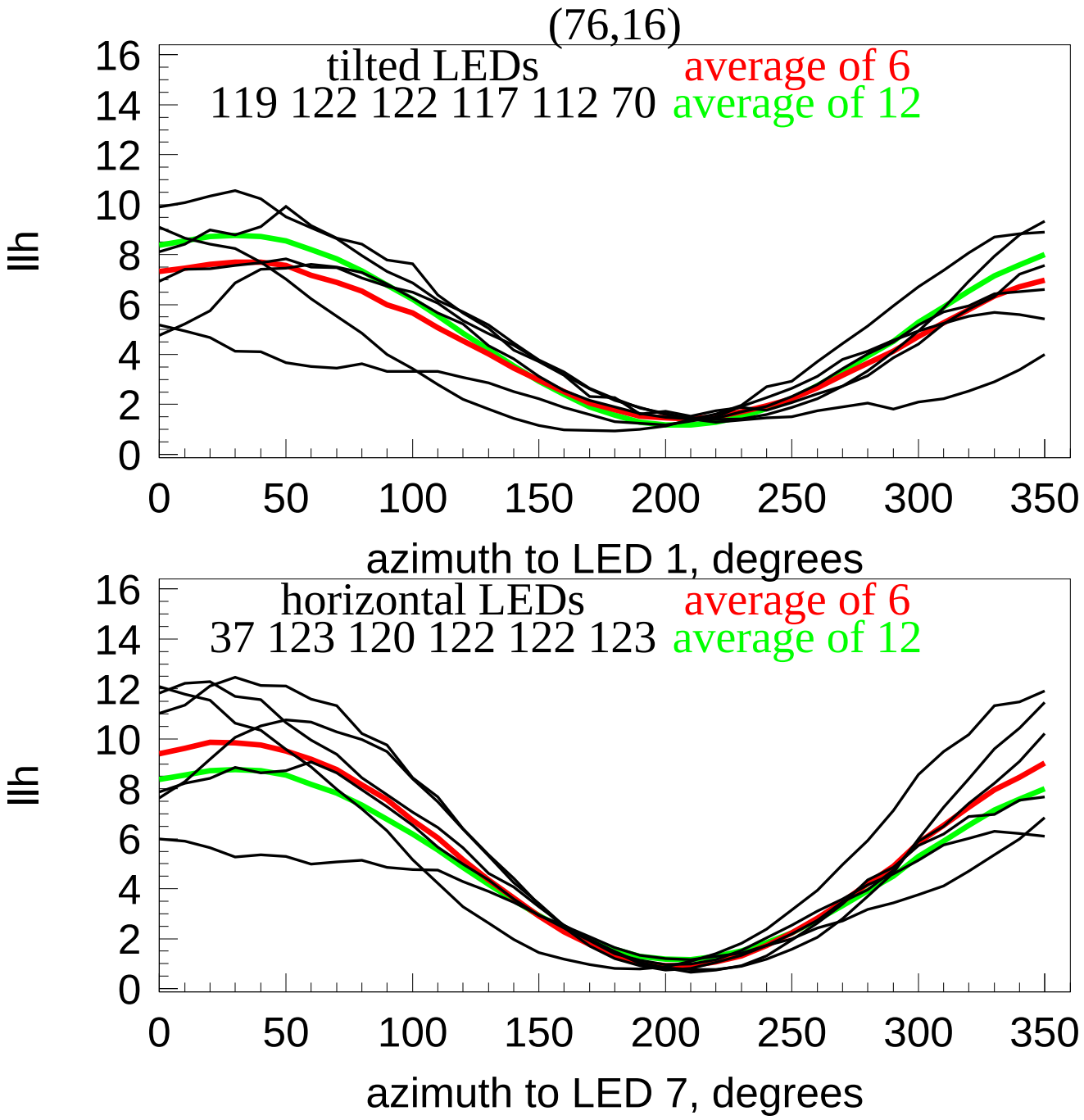

(76,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
19.7 ± 6.4

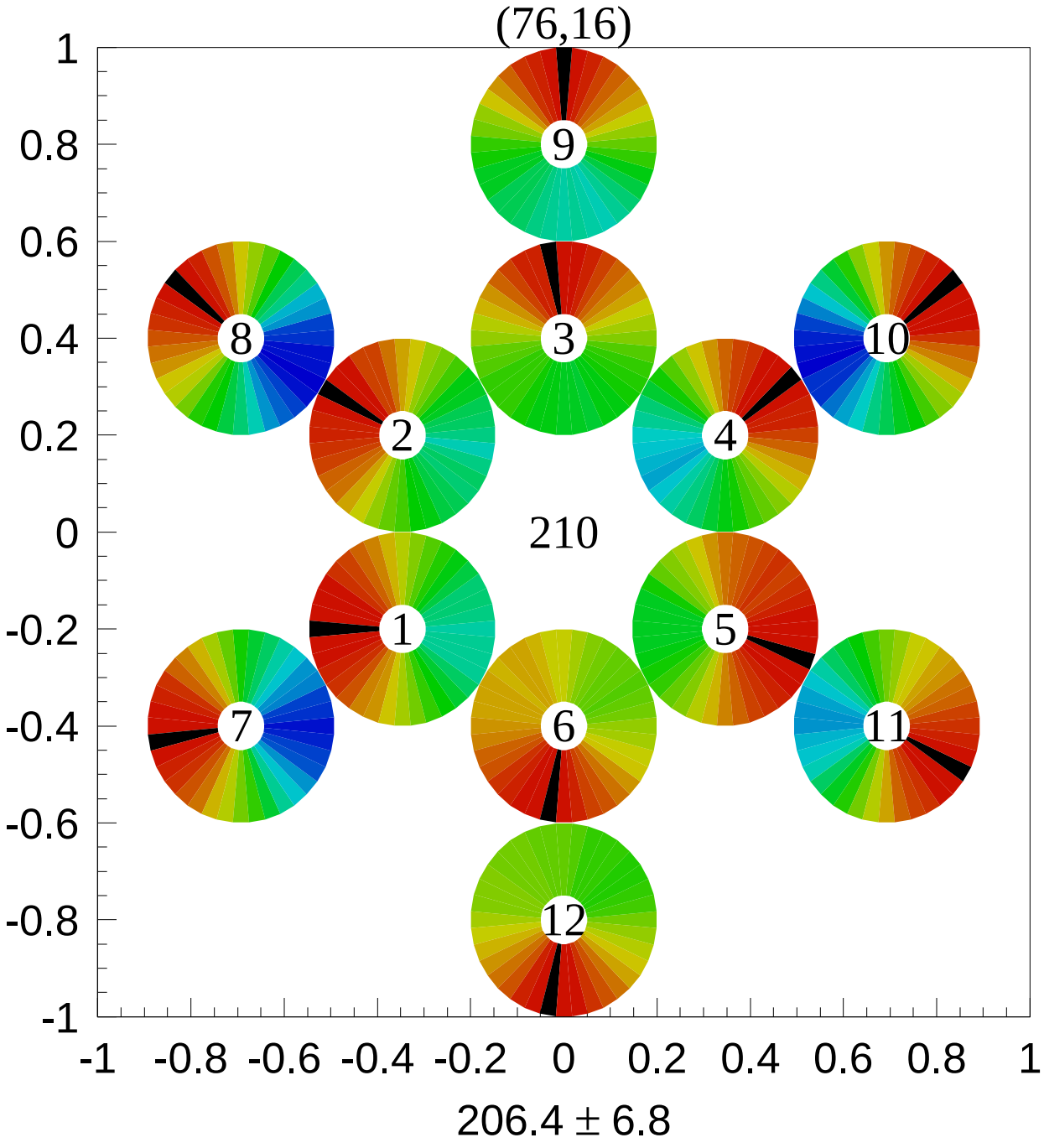

(76,14)
tilted LEDs
115 122 125 125 122 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 125 122 121 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

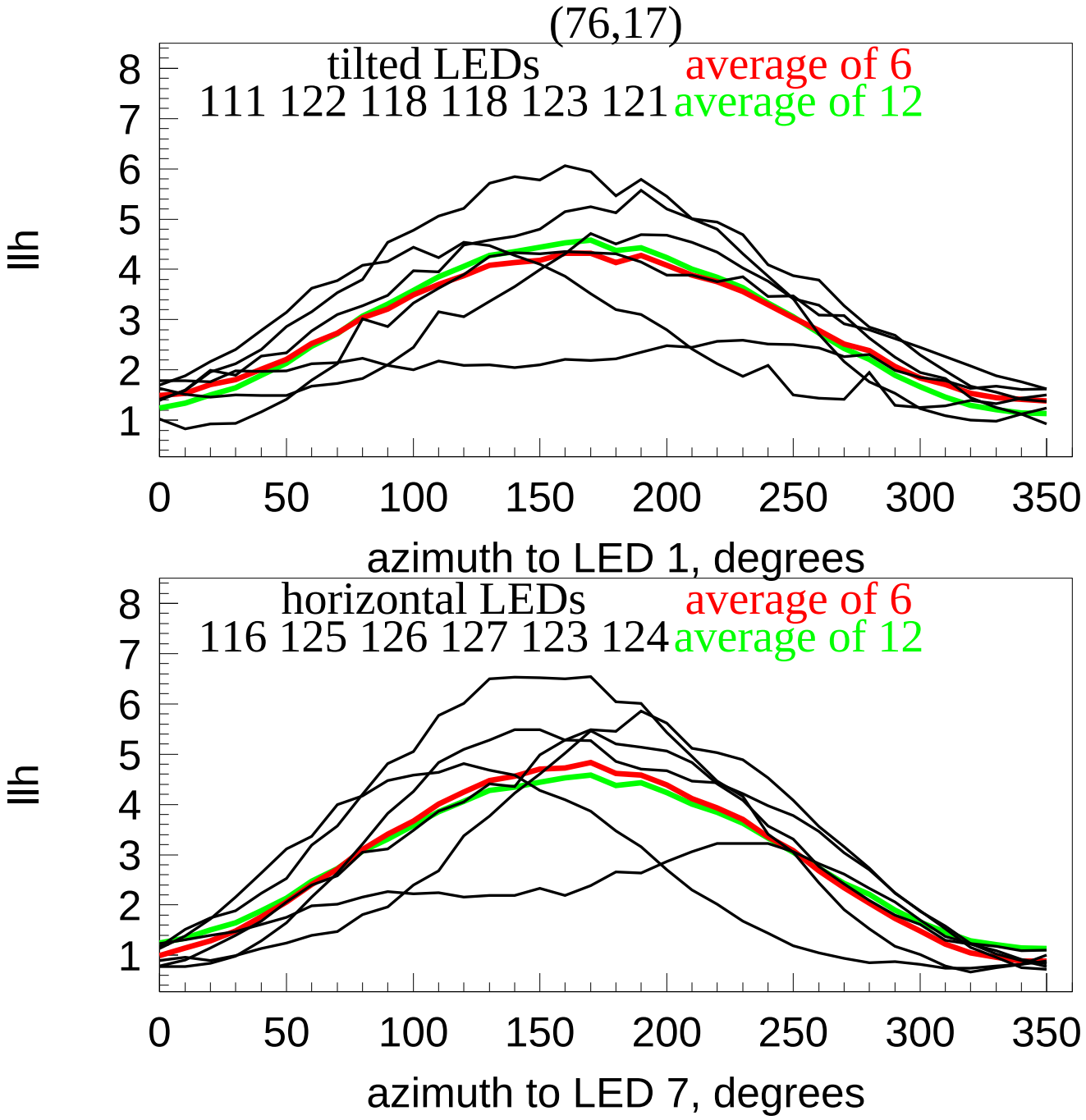

(76,14)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
324.7 ± 6.0

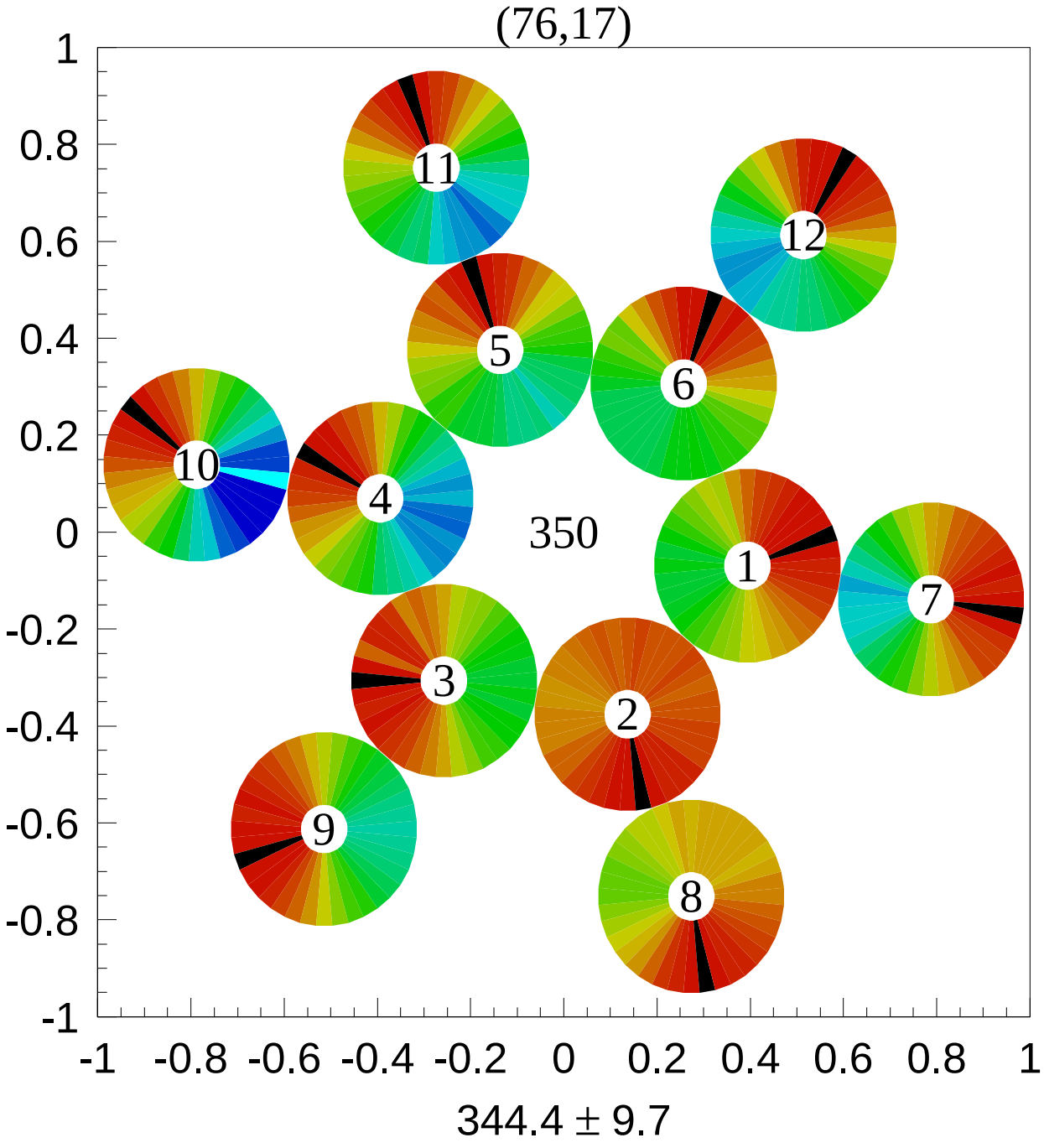

(76,15)
tilted LEDs
116 127 120 115 123 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 122 122 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

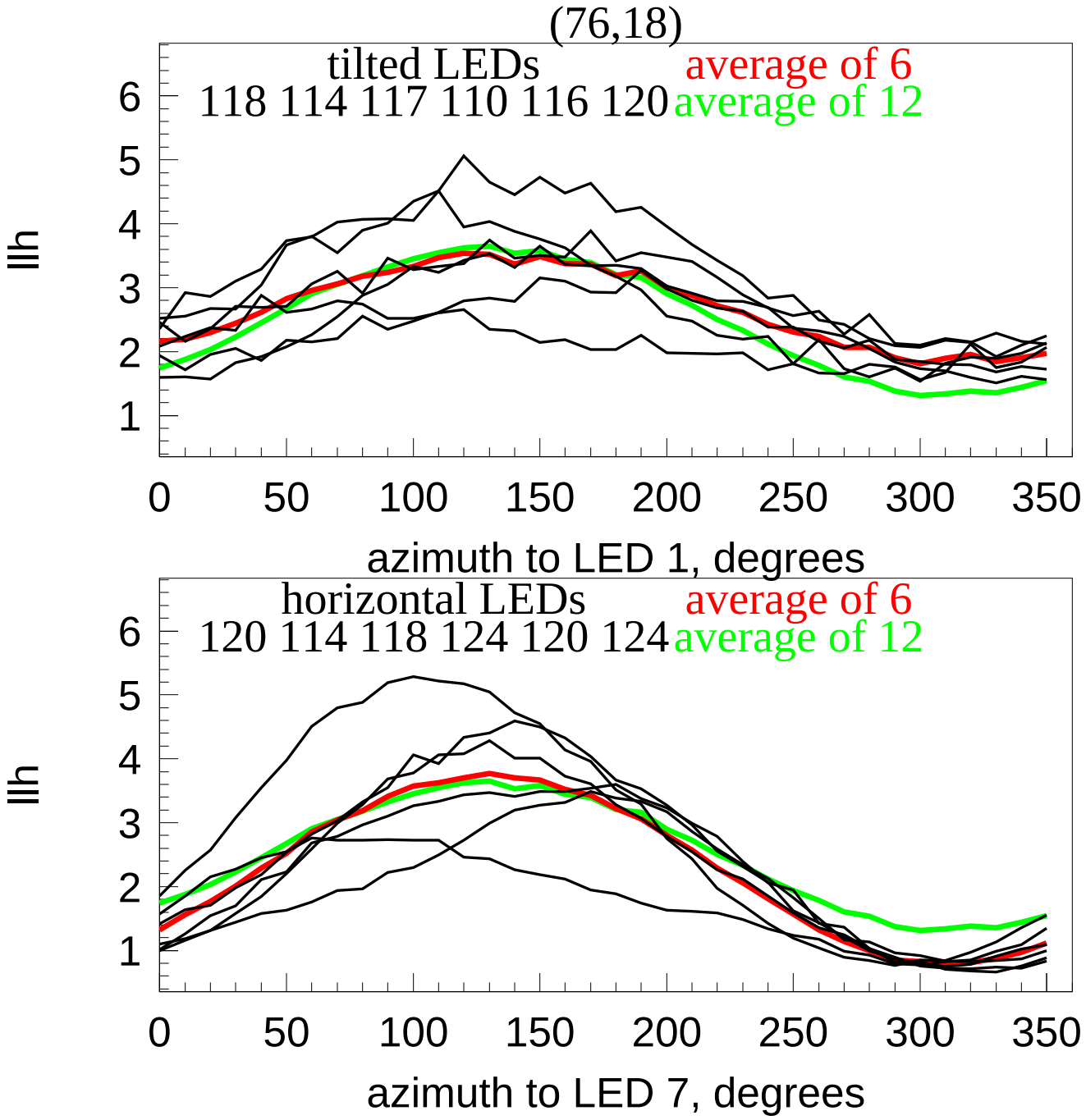

(76,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
247.8 ± 4.7
250
1
2
3
4
5
6
7
8
9
10
11
12

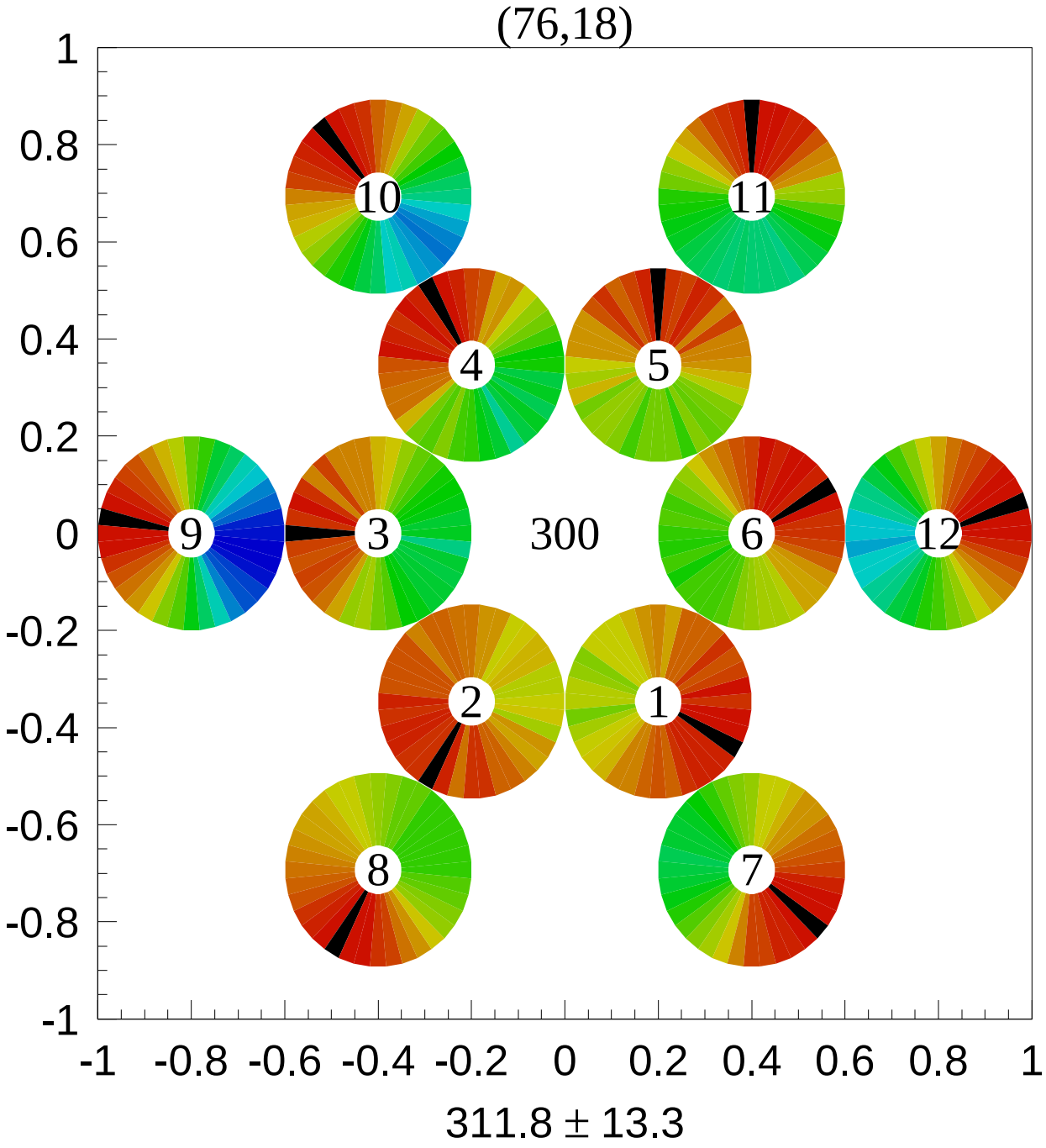

(76,16)
tilted LEDs
119 122 122 117 112 70
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
37 123 120 122 122 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

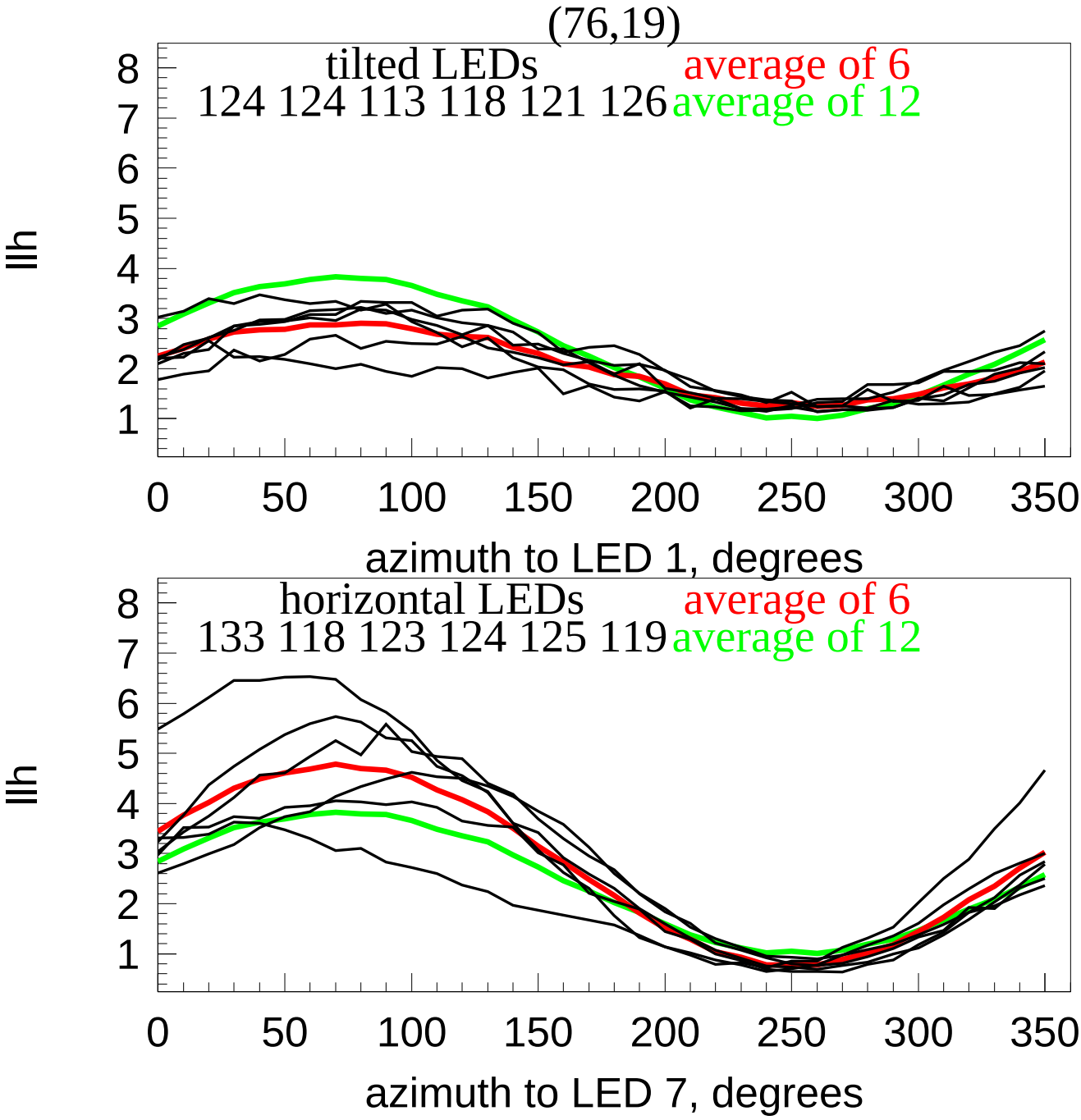

(76,16)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
206.4 ± 6.8

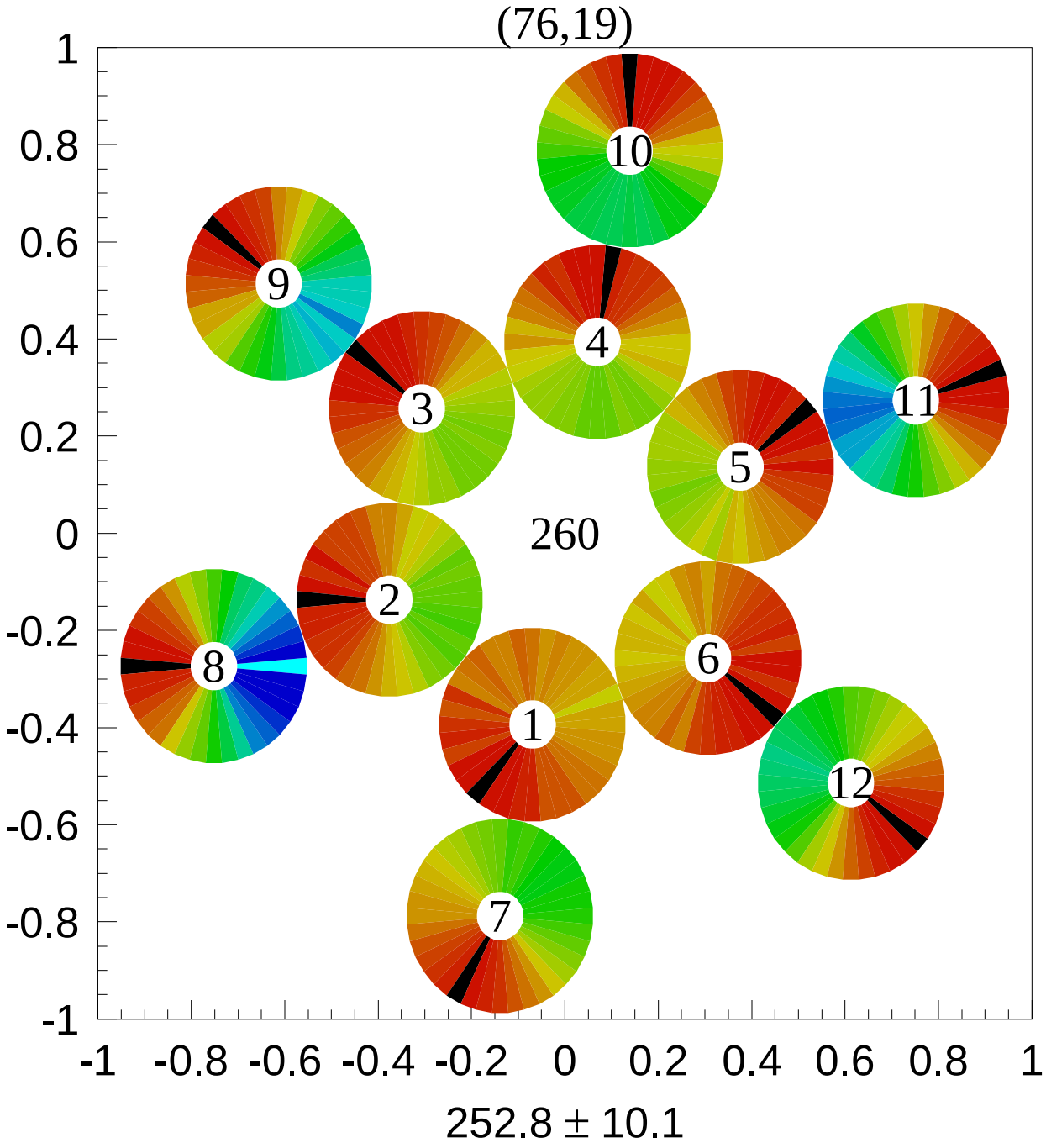

(76,17)
tilted LEDs
111 122 118 118 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 125 126 127 123 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

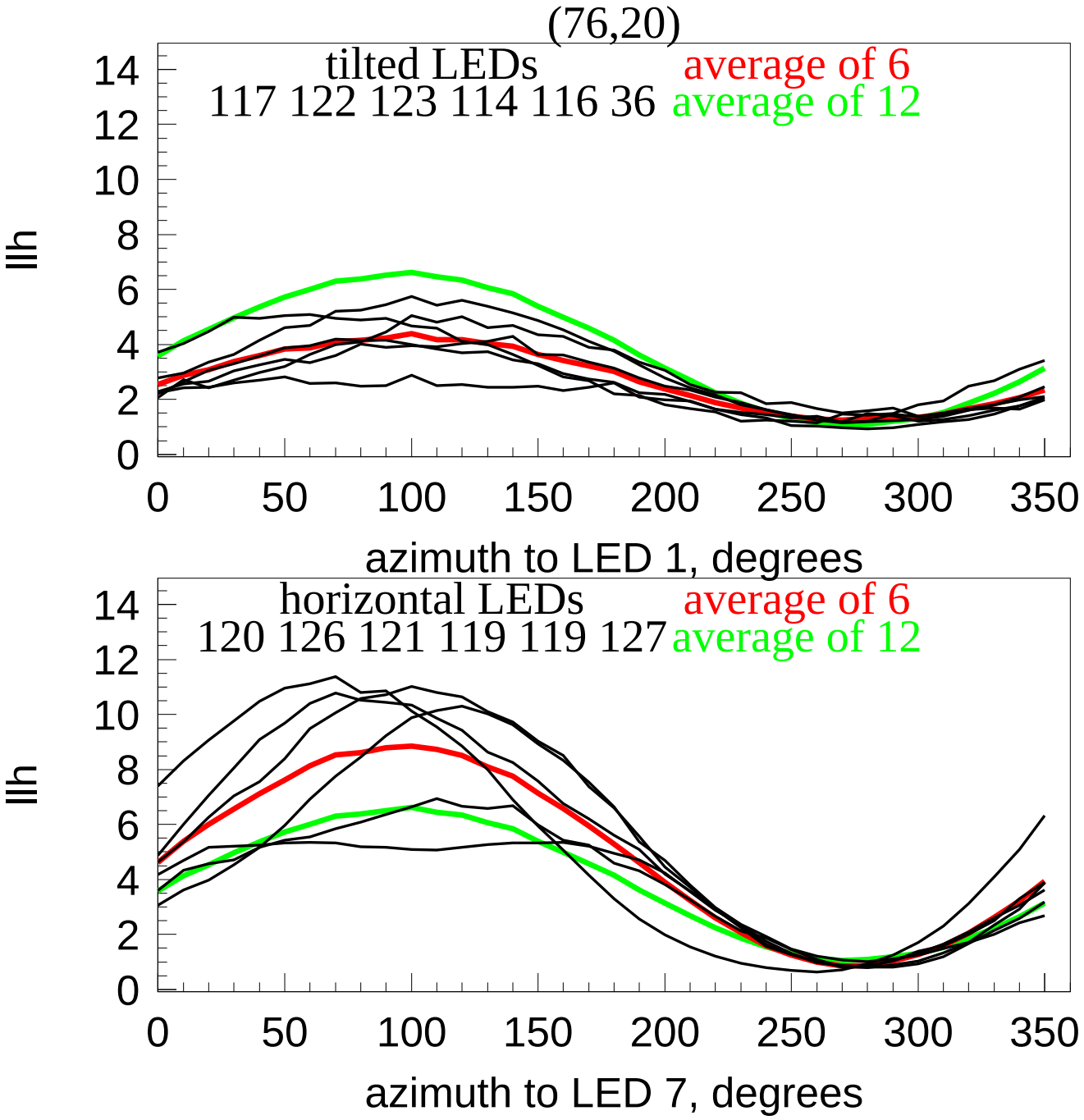

(76,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
344.4 ± 9.7

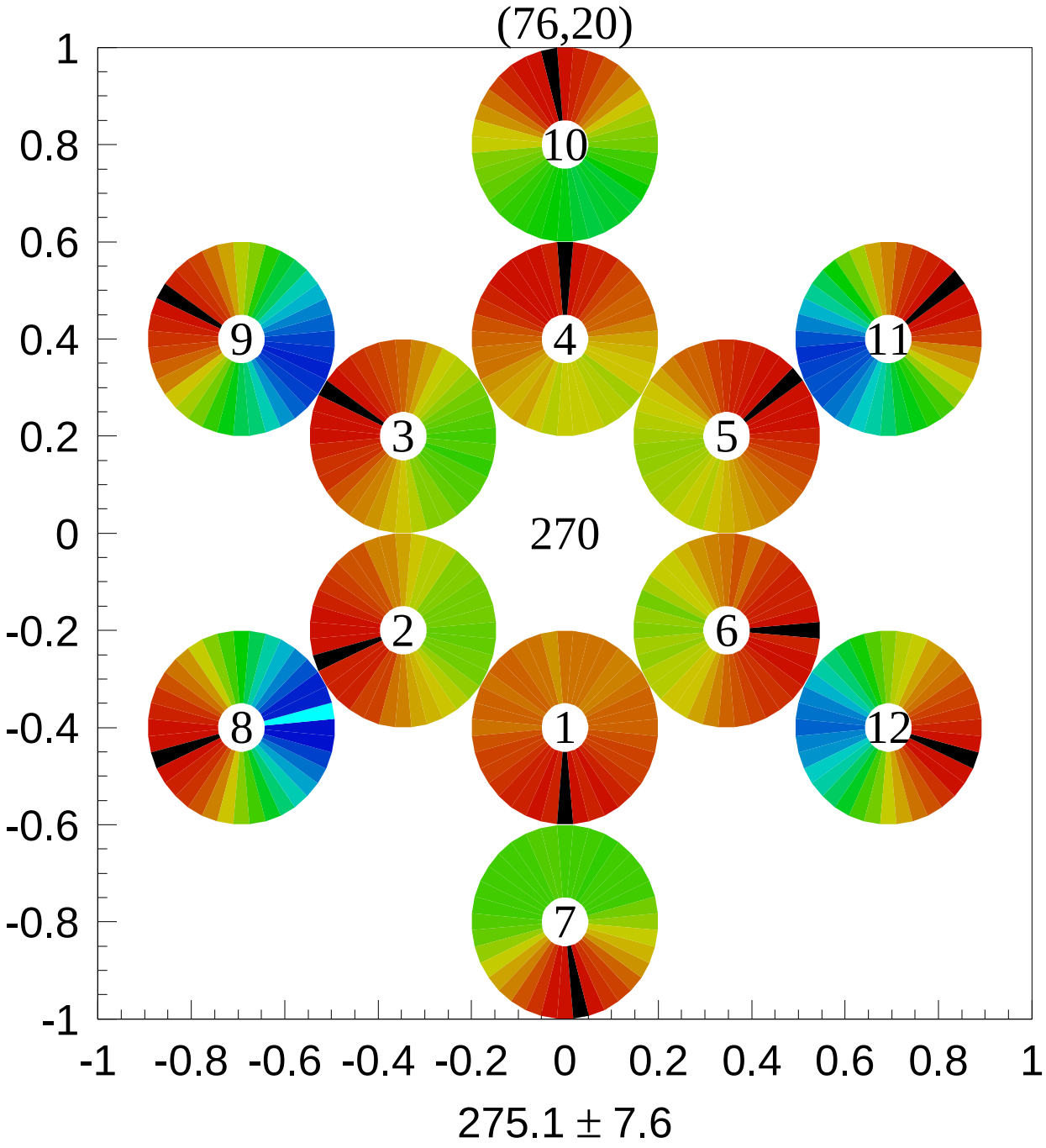

(76,18)
tilted LEDs
118 114 117 110 116 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 114 118 124 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

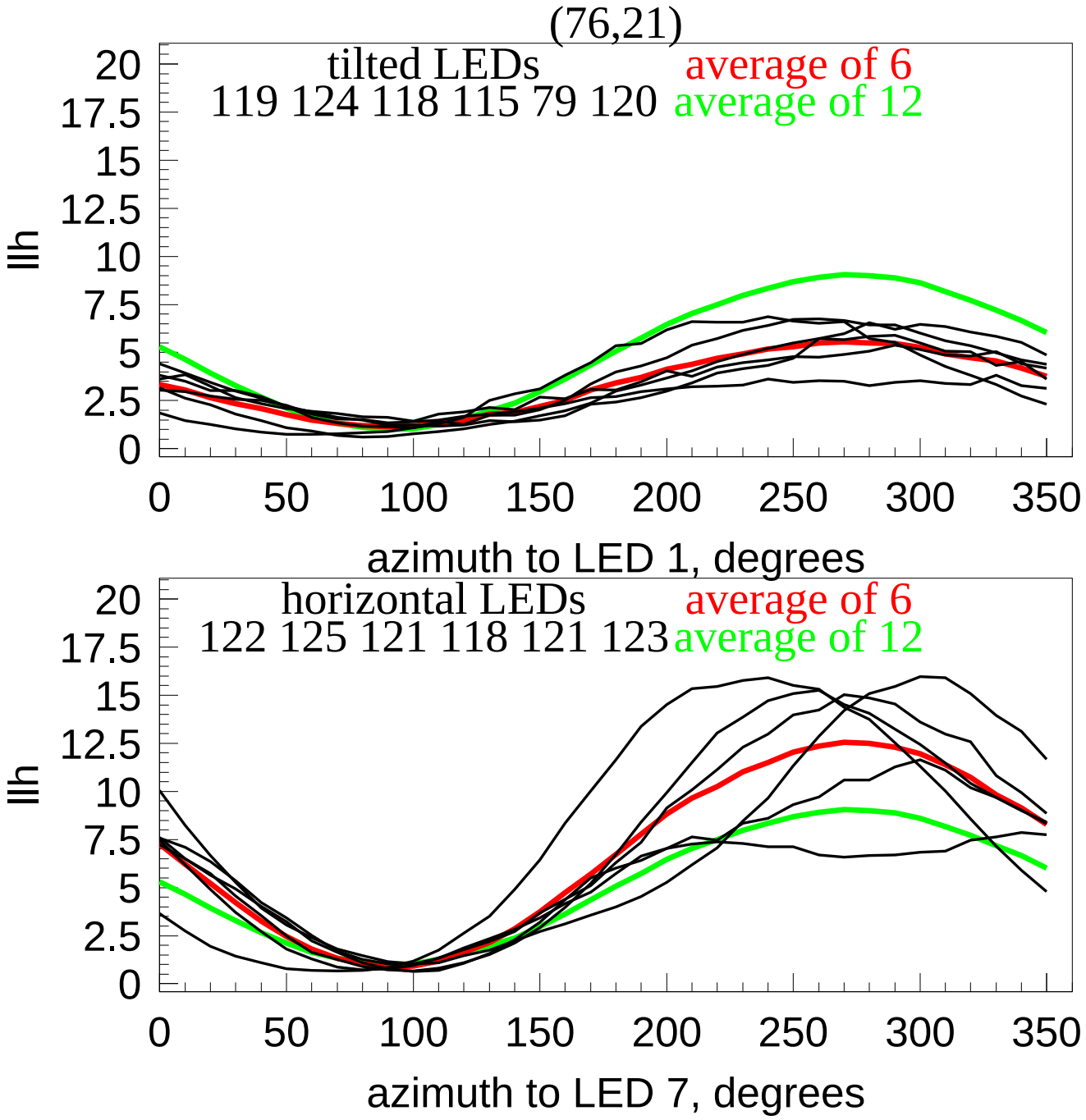

(76,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
311.8 ± 13.3

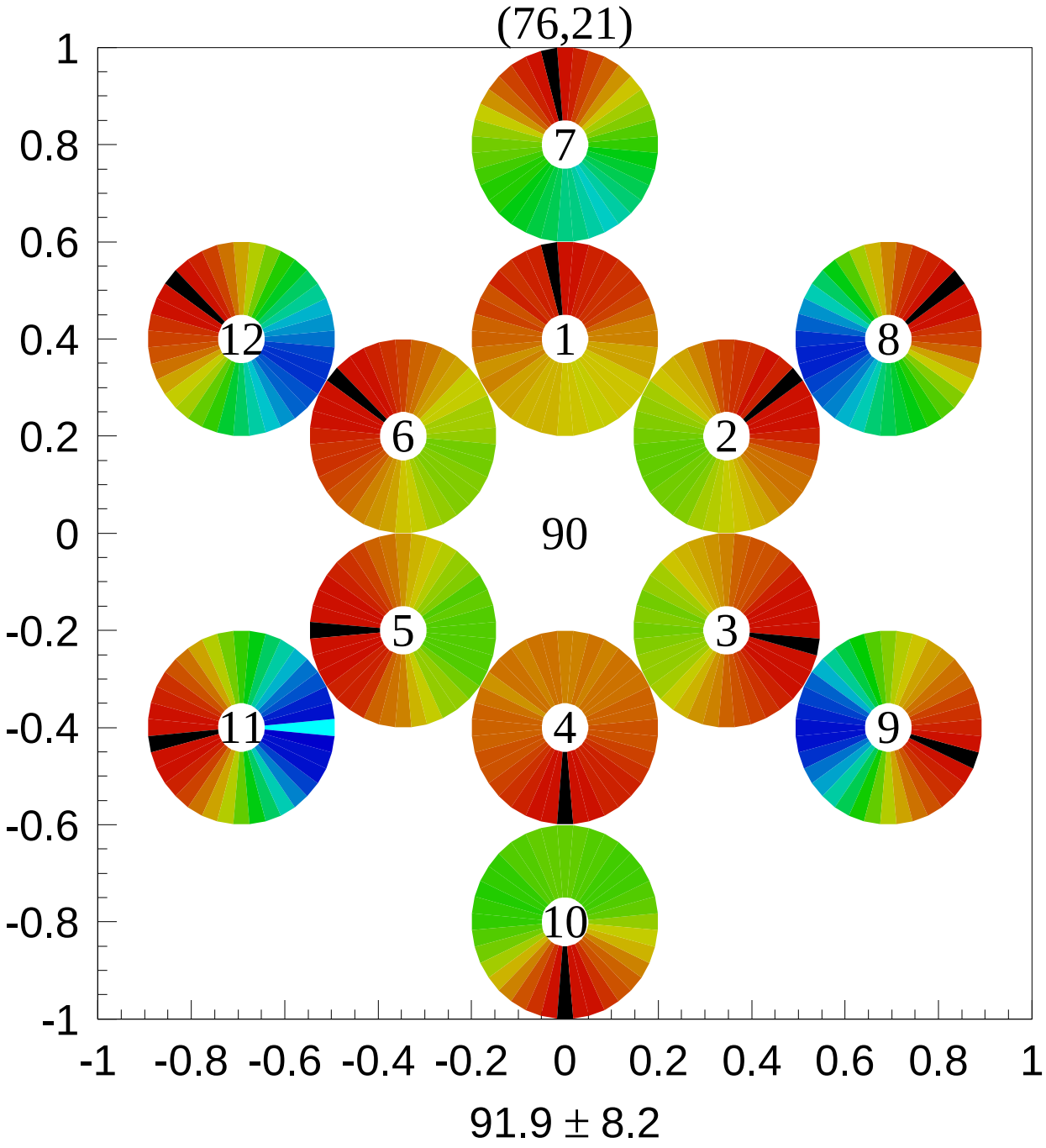

(76,19)
tilted LEDs
124 124 113 118 121 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
133 118 123 124 125 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

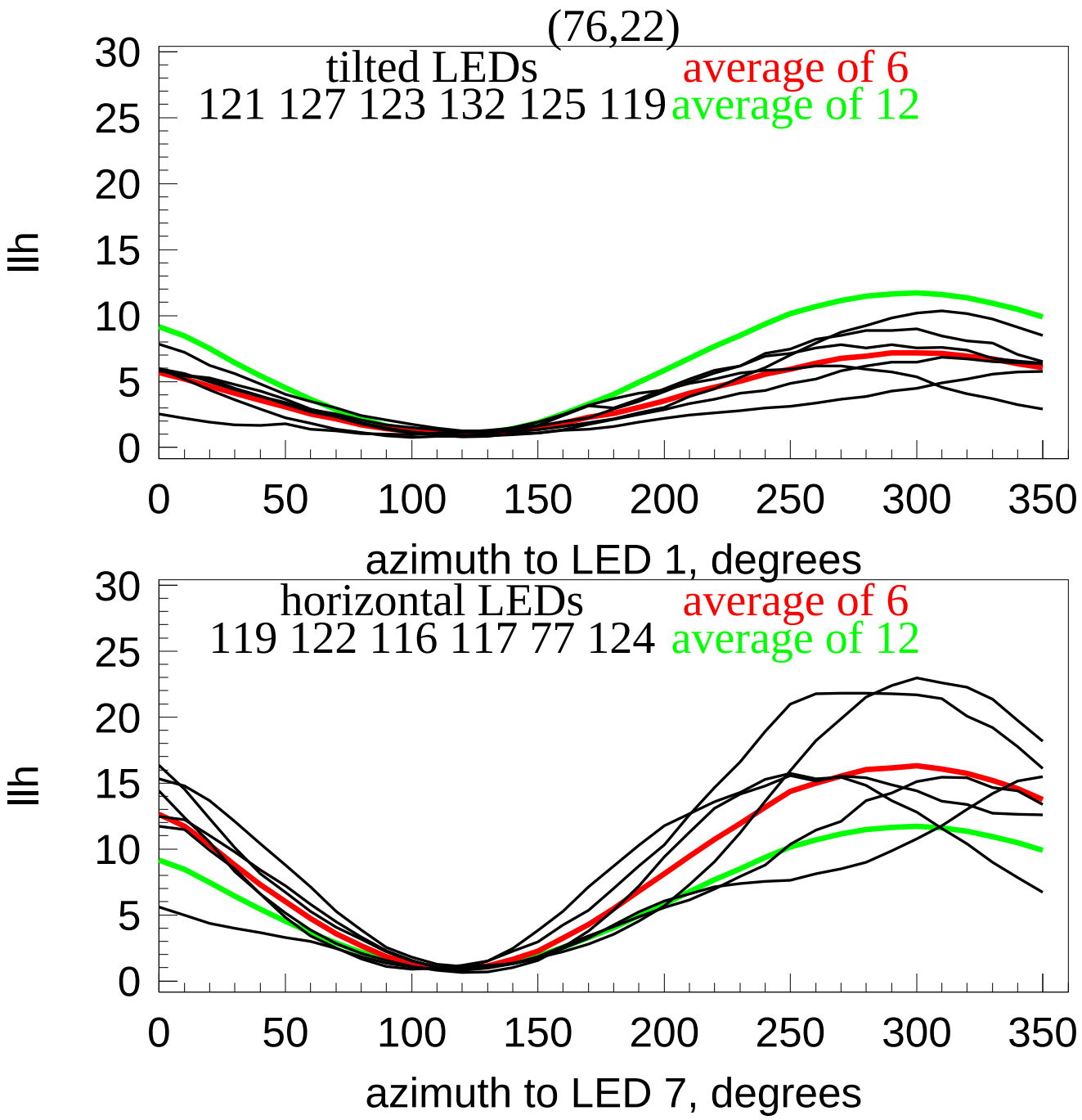

(76,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
252.8 ± 10.1

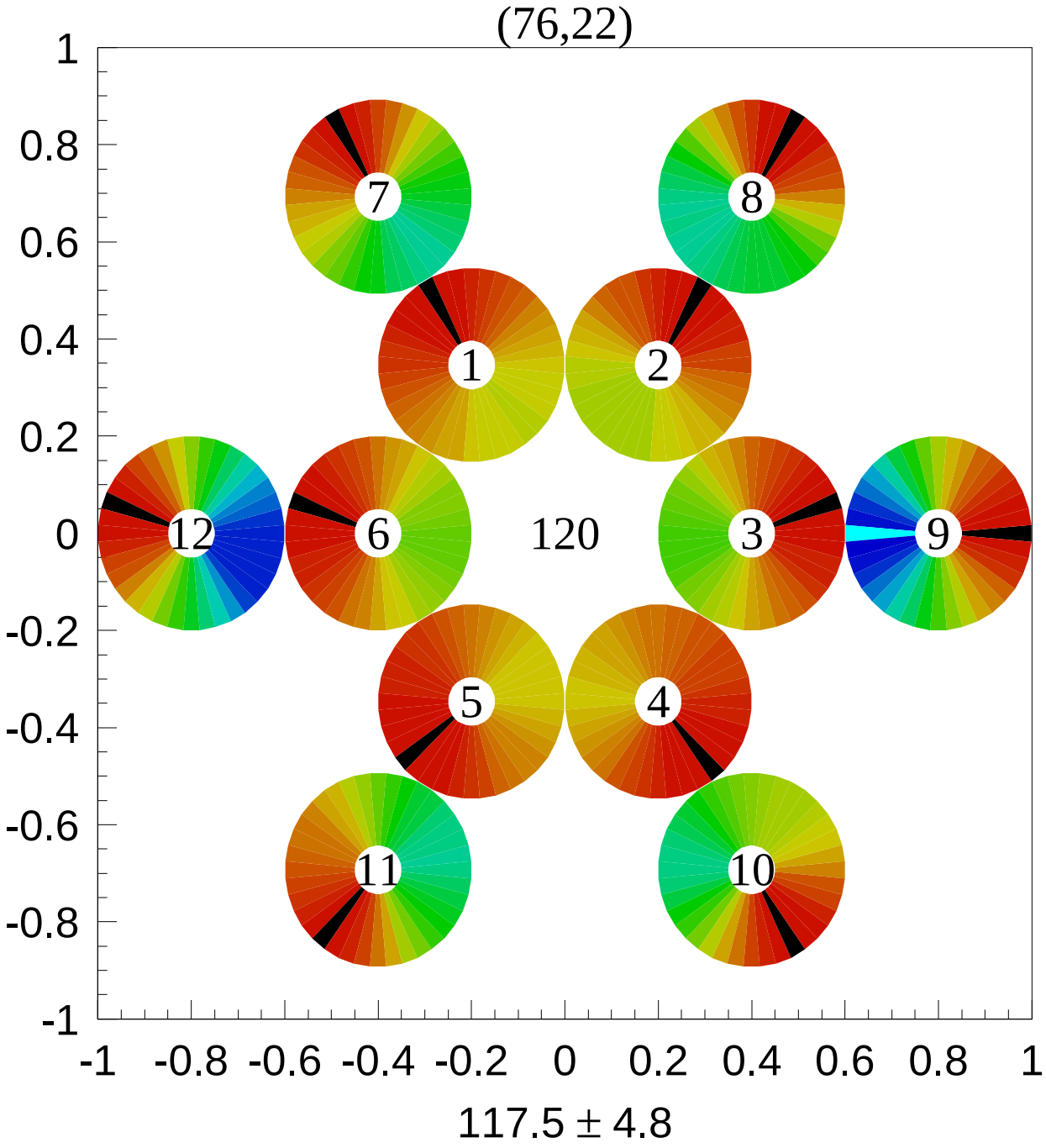

(76,20)
tilted LEDs
117 122 123 114 116 36
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 126 121 119 119 127
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

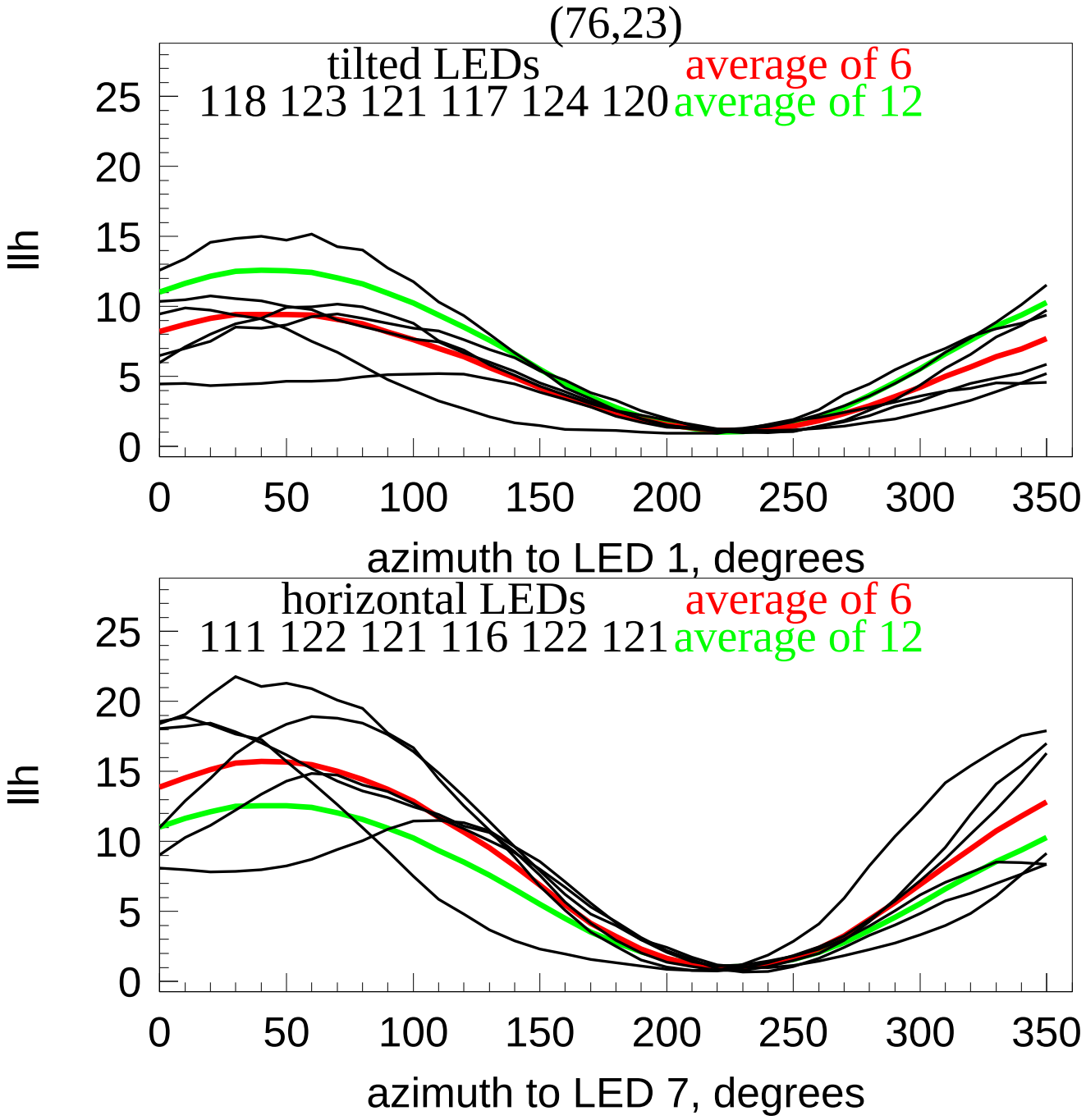

(76,20)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
275.1 ± 7.6

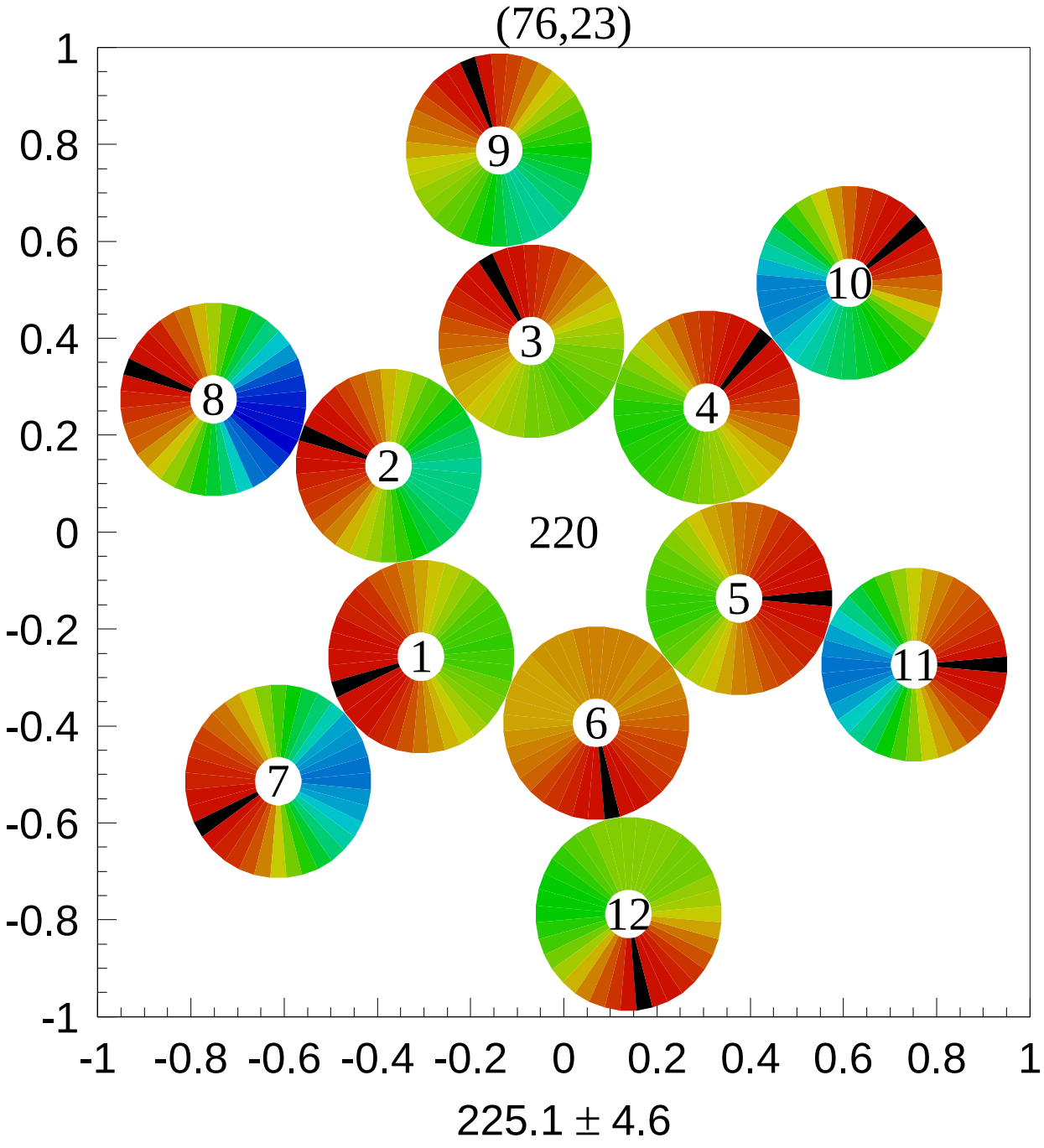

(76,21)
tilted LEDs
119 124 118 115 79 120
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 125 121 118 121 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

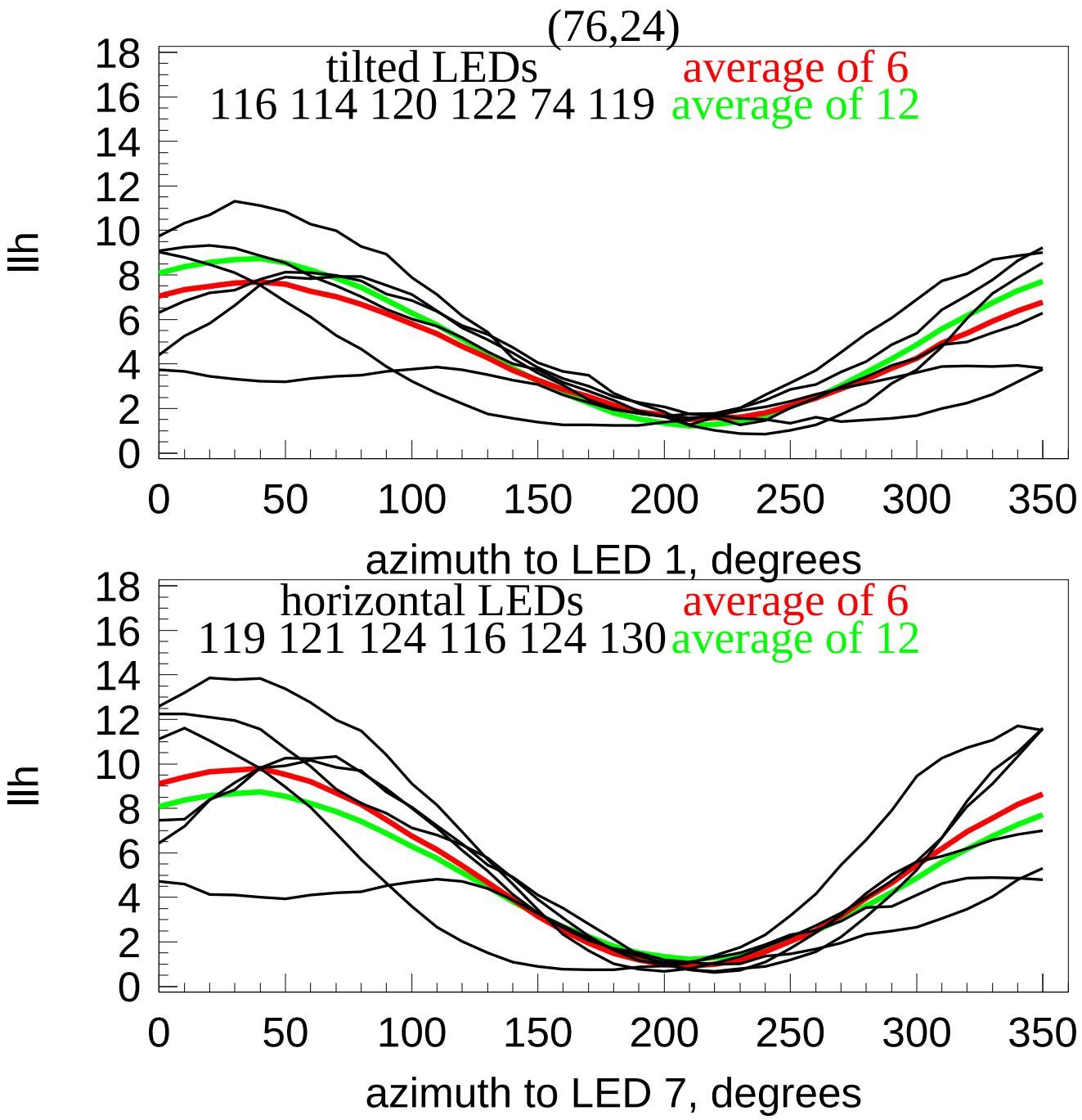

(76,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
91.9 ± 8.2

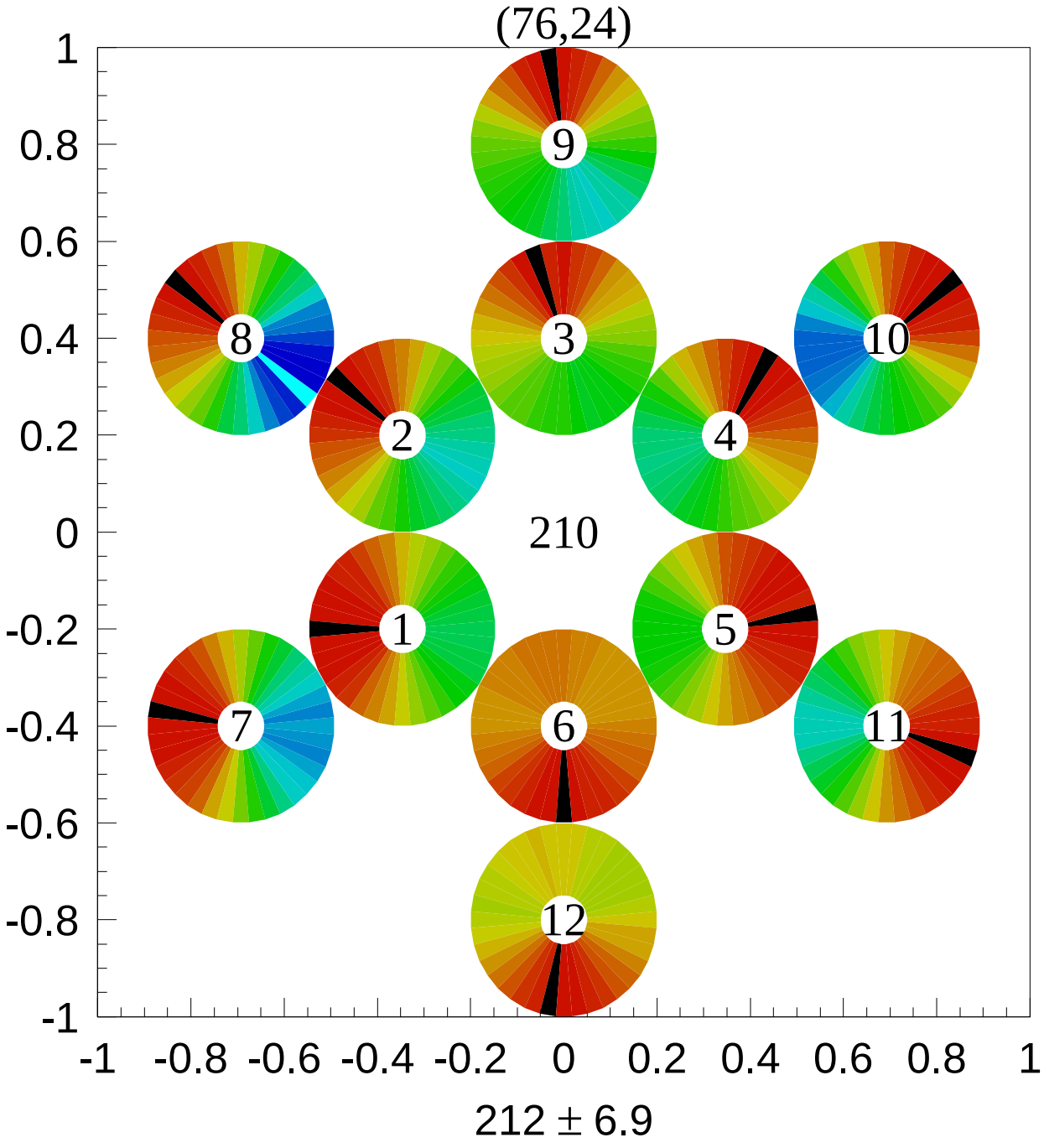

(76,22)
tilted LEDs
121 127 123 132 125 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 122 116 117 77 124
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

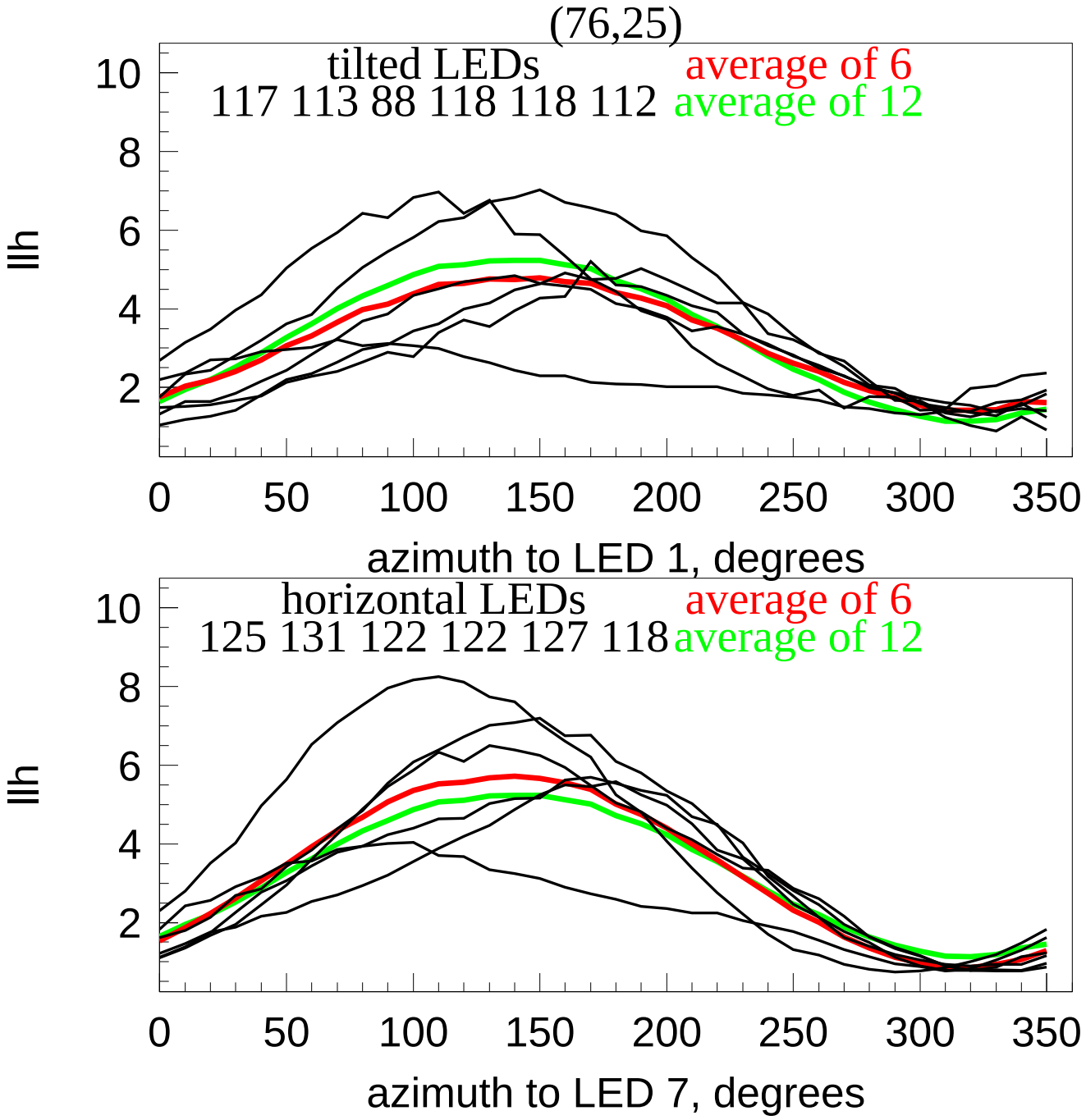

(76,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
117.5 ± 4.8

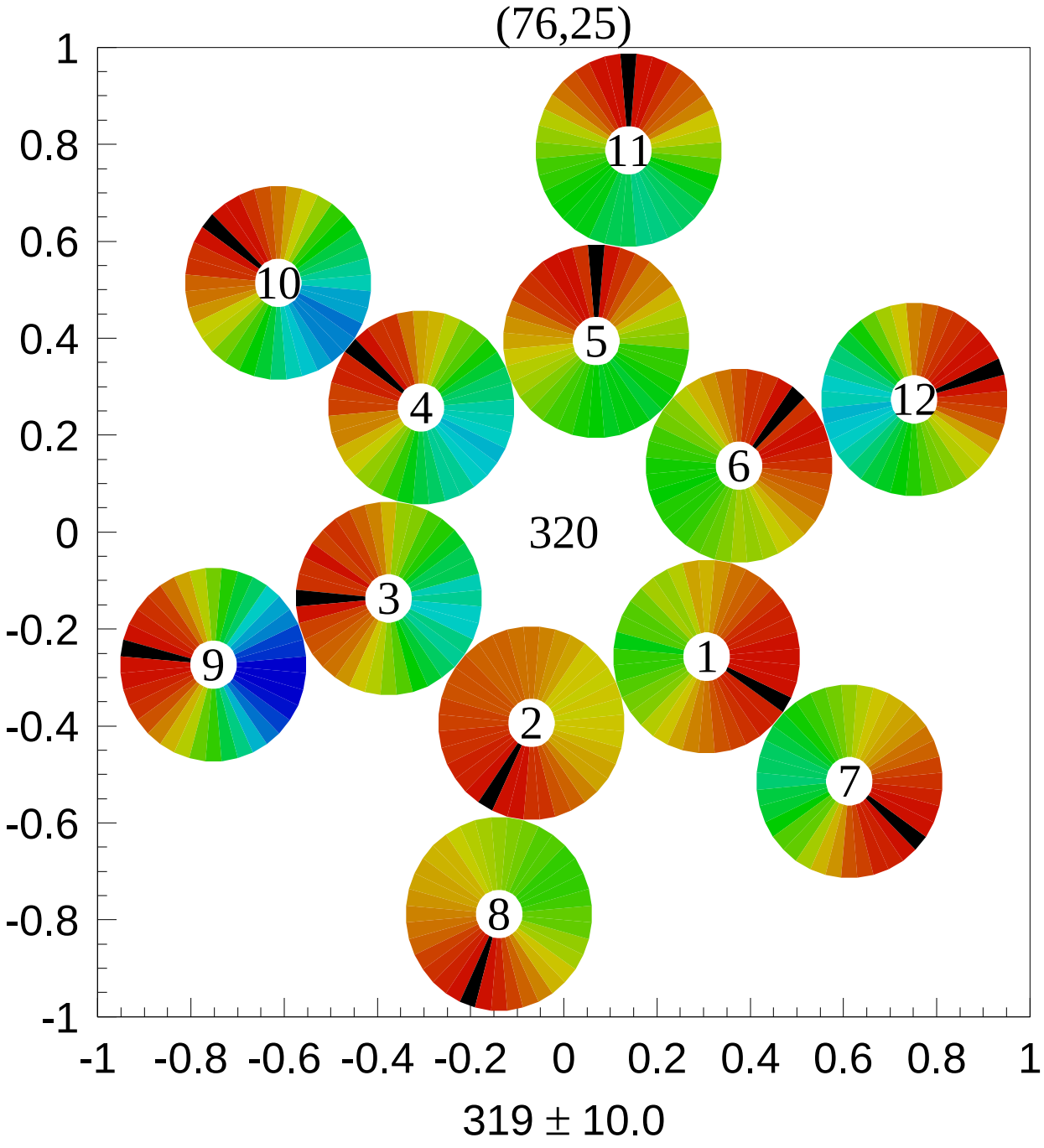

(76,23)
tilted LEDs
118 123 121 117 124 120
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
111 122 121 116 122 121
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

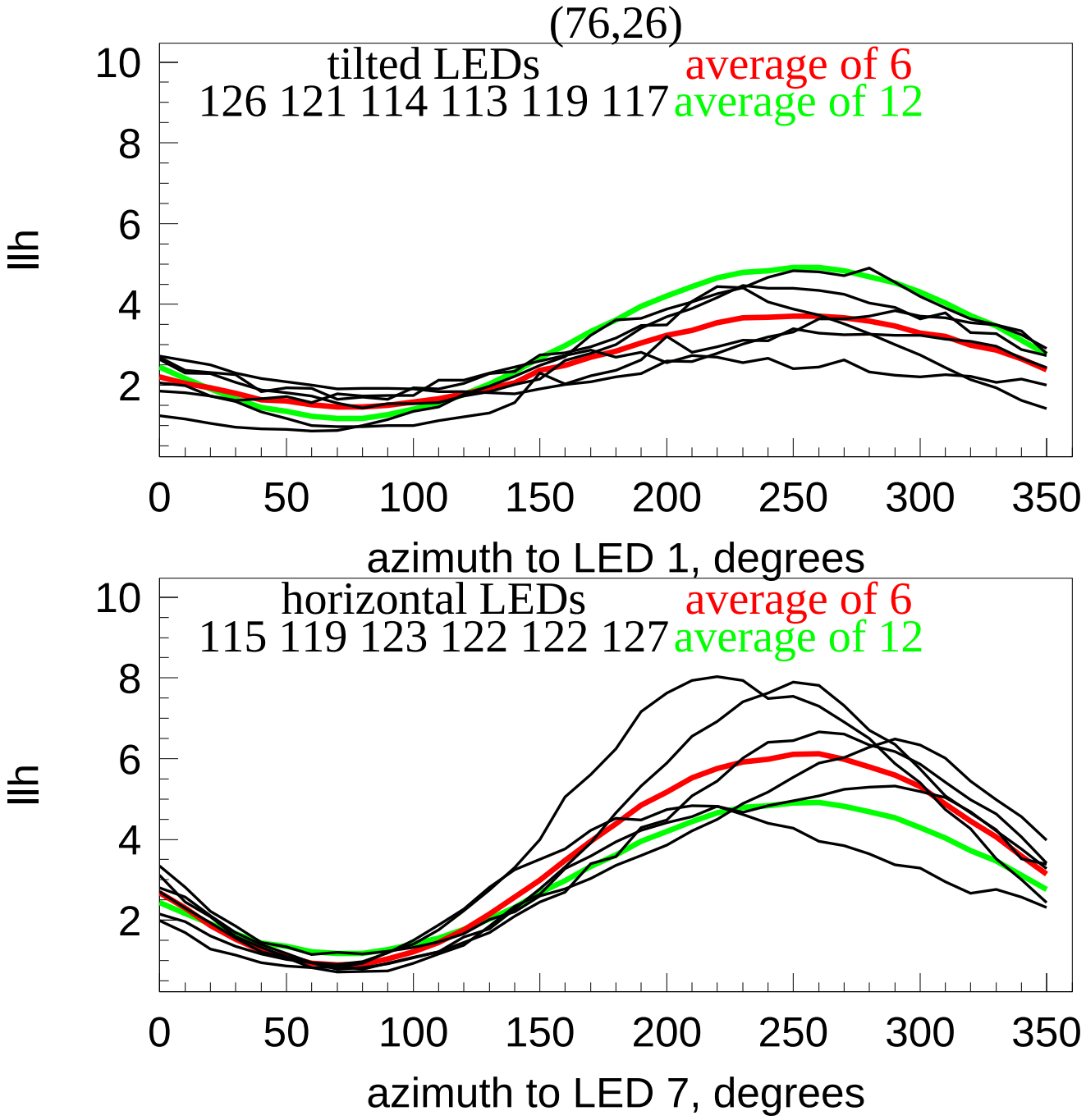

(76,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
225.1 ± 4.6

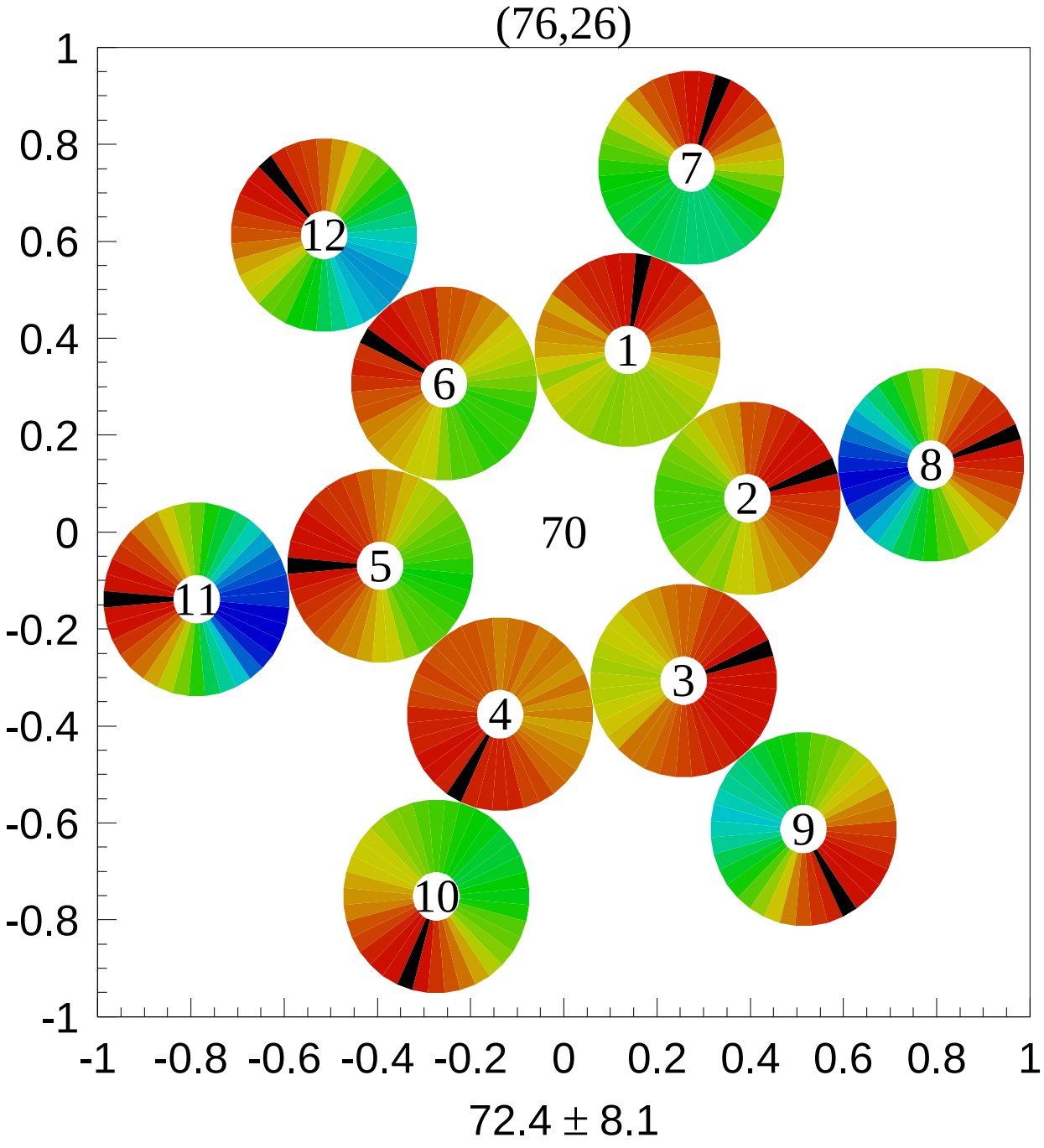

(76,24)
tilted LEDs
116 114 120 122 74 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 121 124 116 124 130
average of 6
average of 12
llh
azimuth to LED 7, degrees

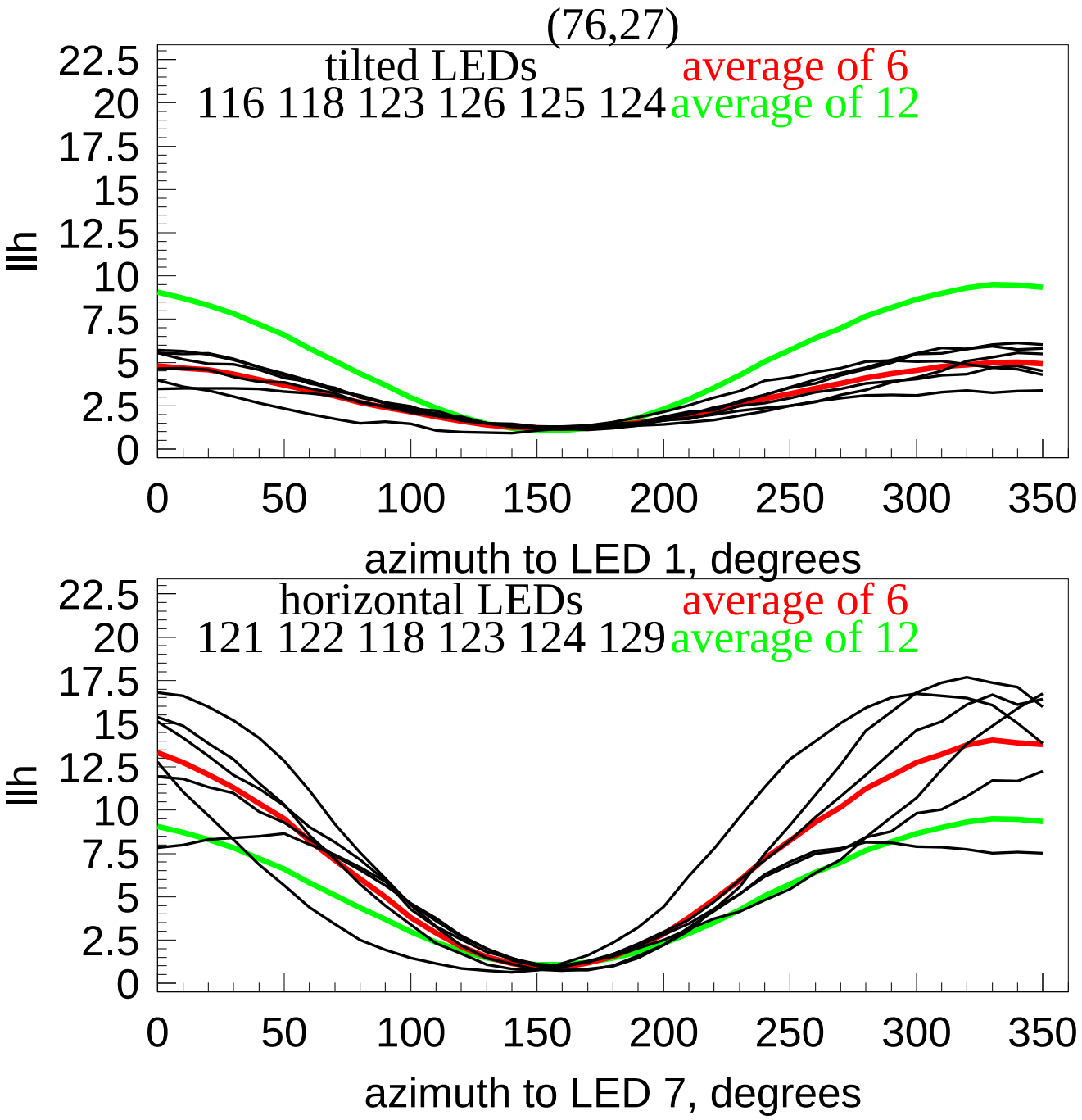

(76,24)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
212 ± 6.9

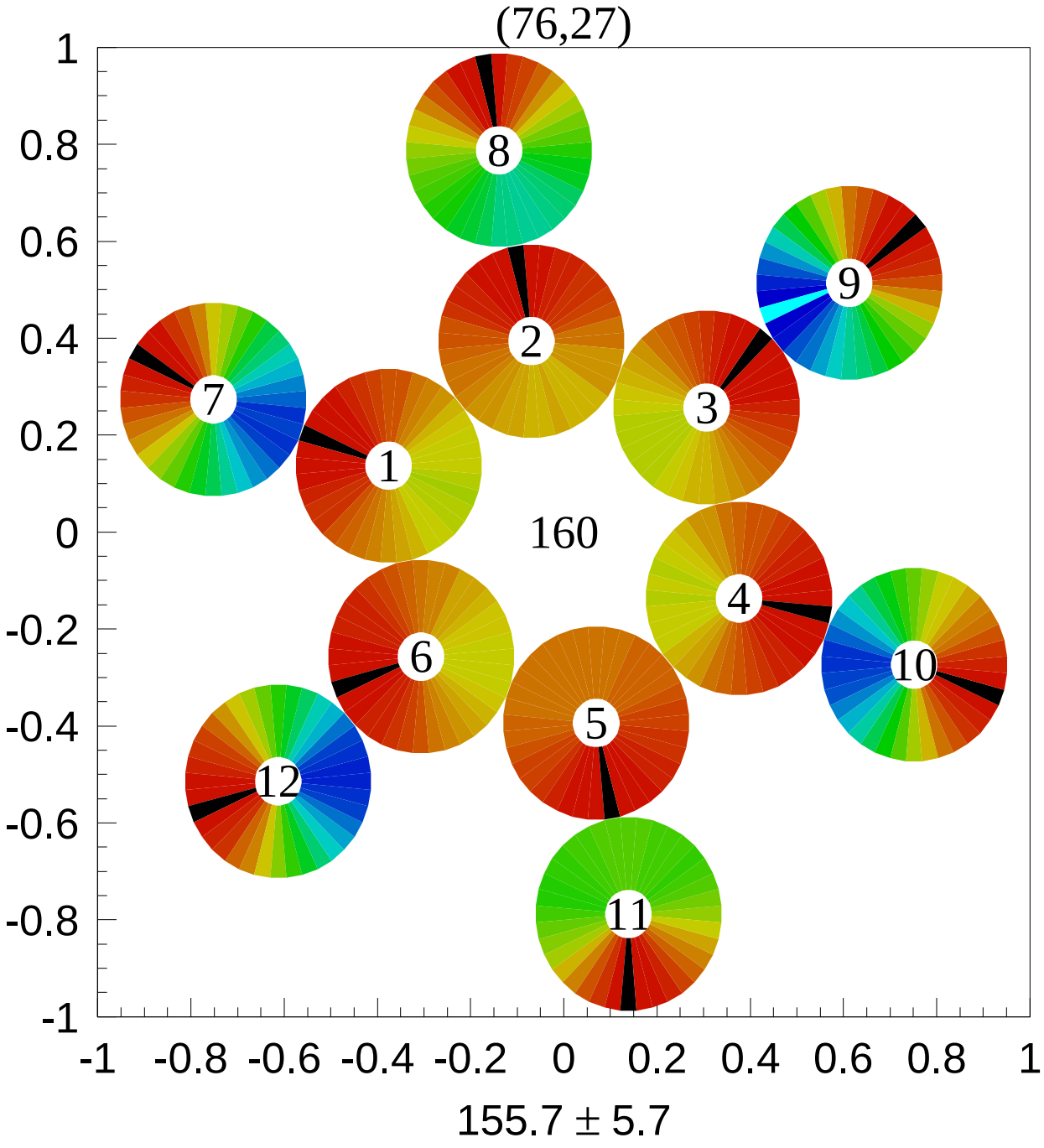

(76,25)
tilted LEDs
117 113 88 118 118 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 131 122 122 127 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

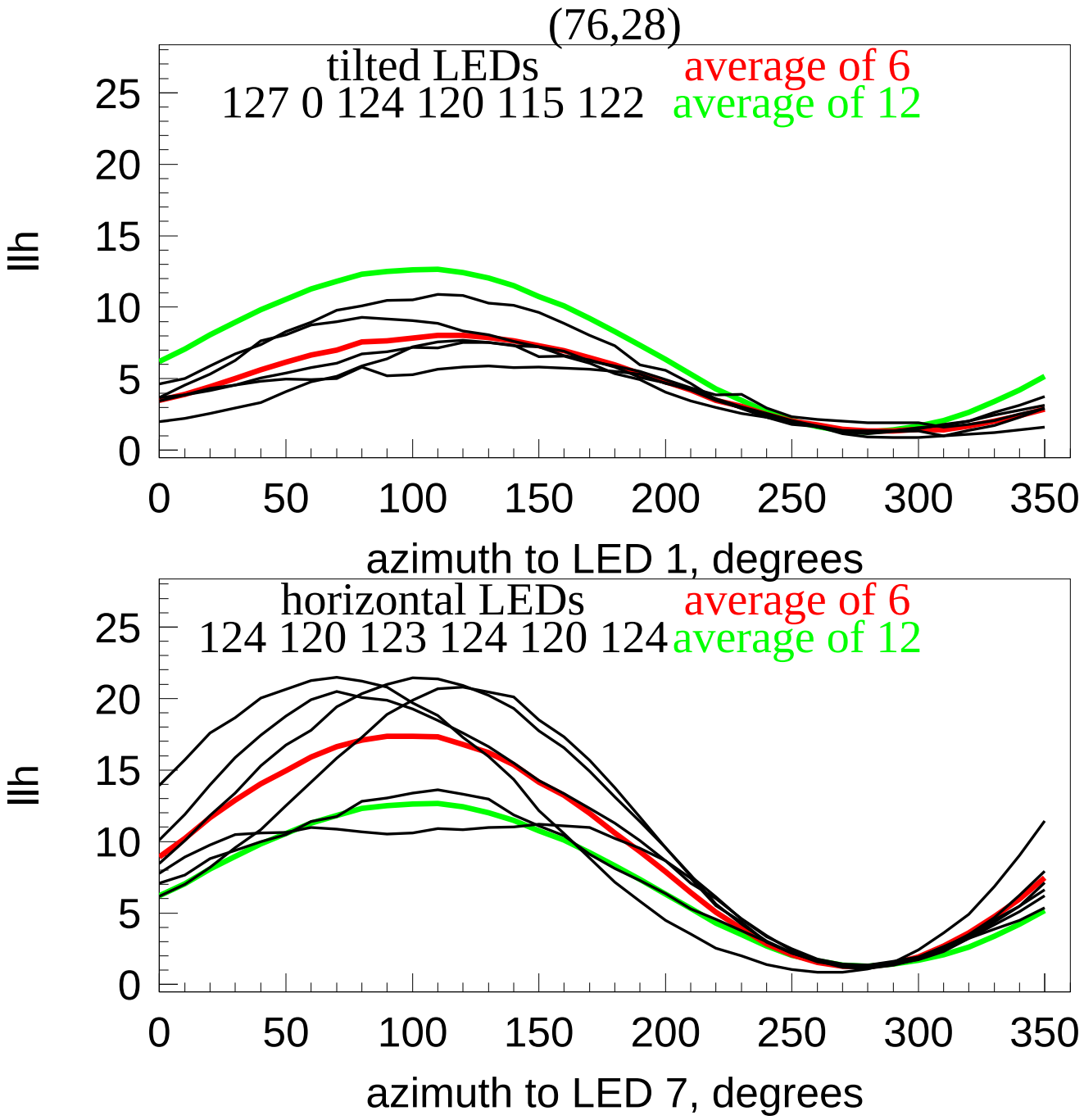

(76,25)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
319 ± 10.0

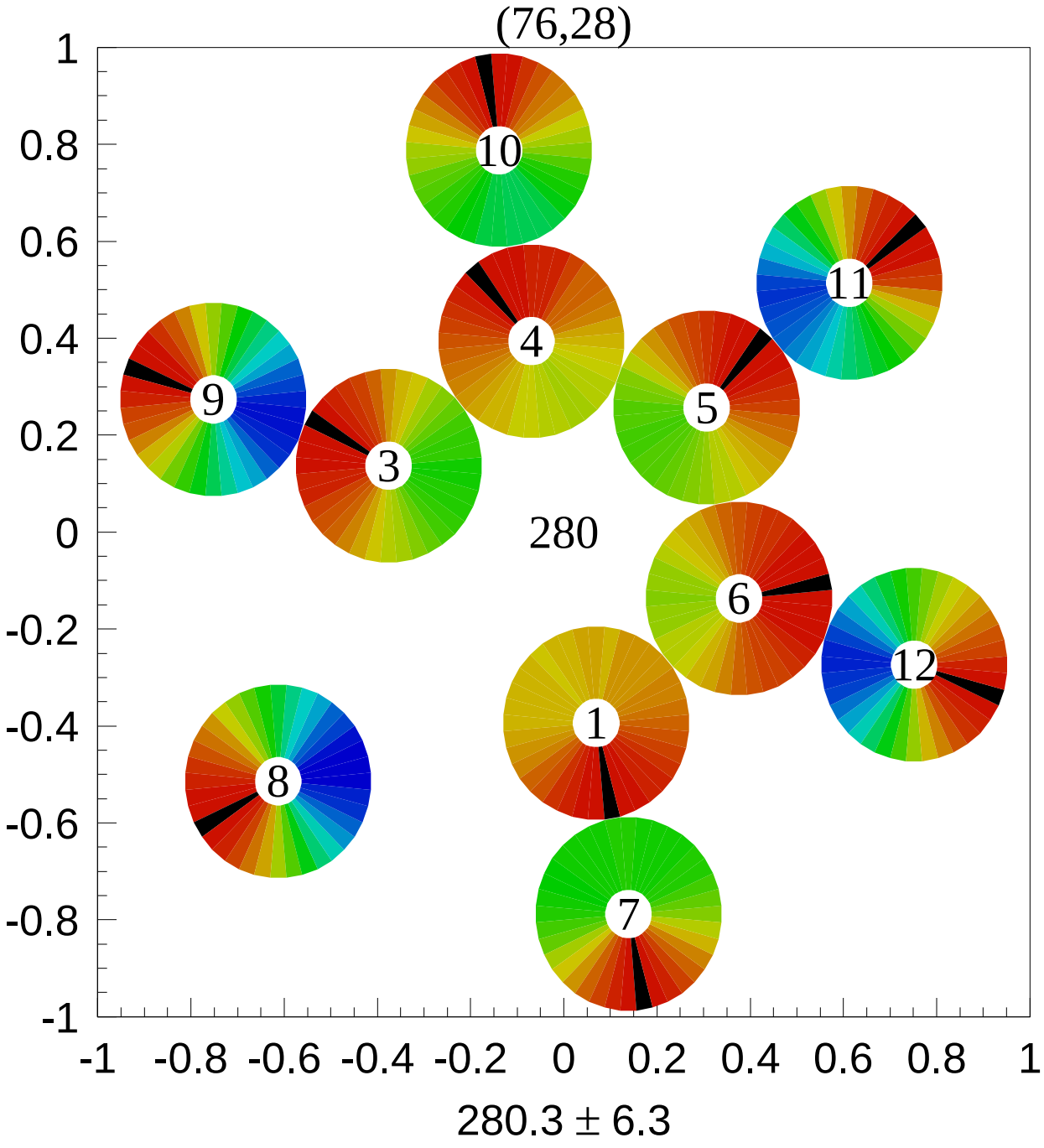

(76,26)
tilted LEDs
126 121 114 113 119 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 119 123 122 122 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

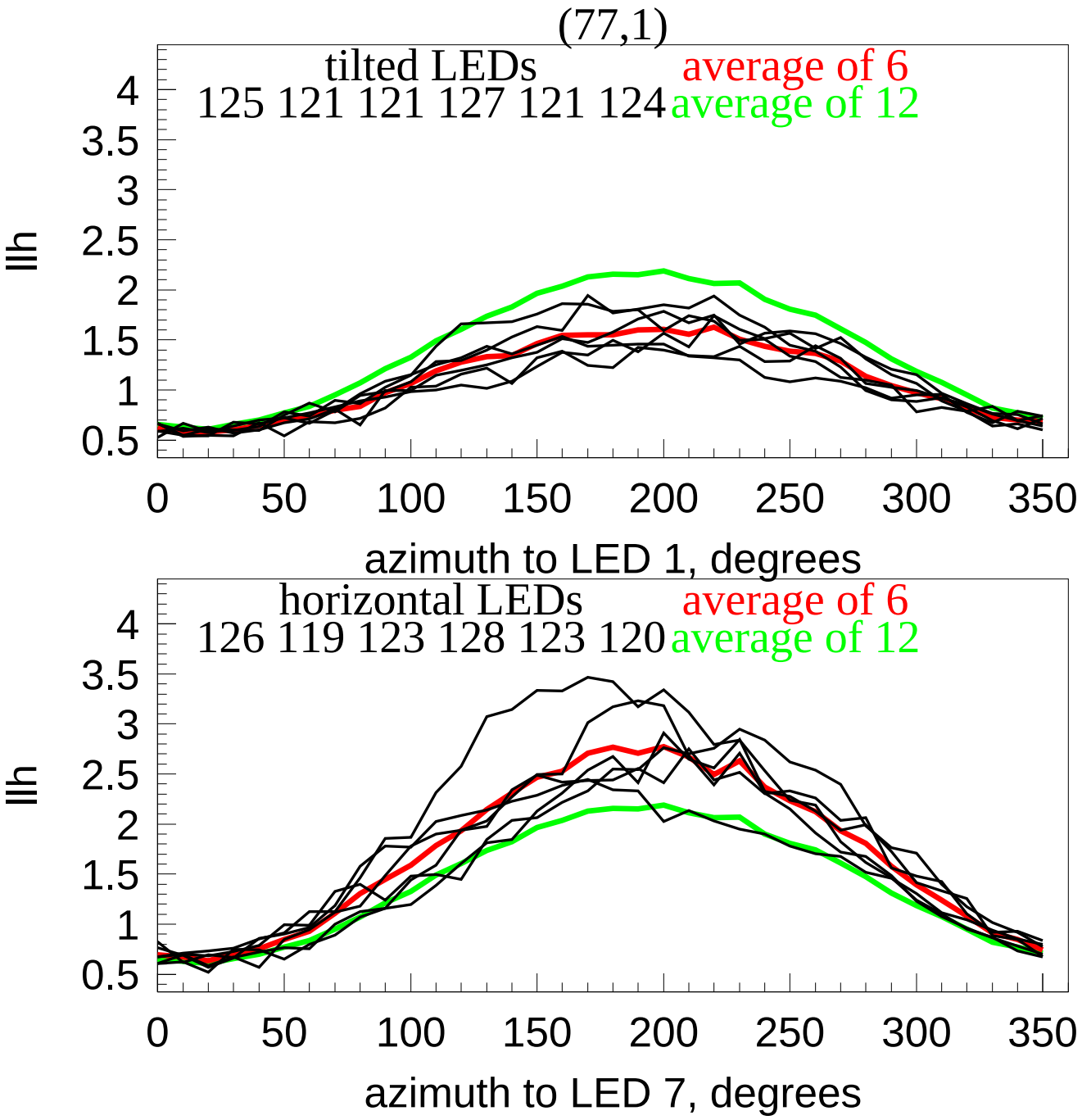

(76,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
72.4 ± 8.1

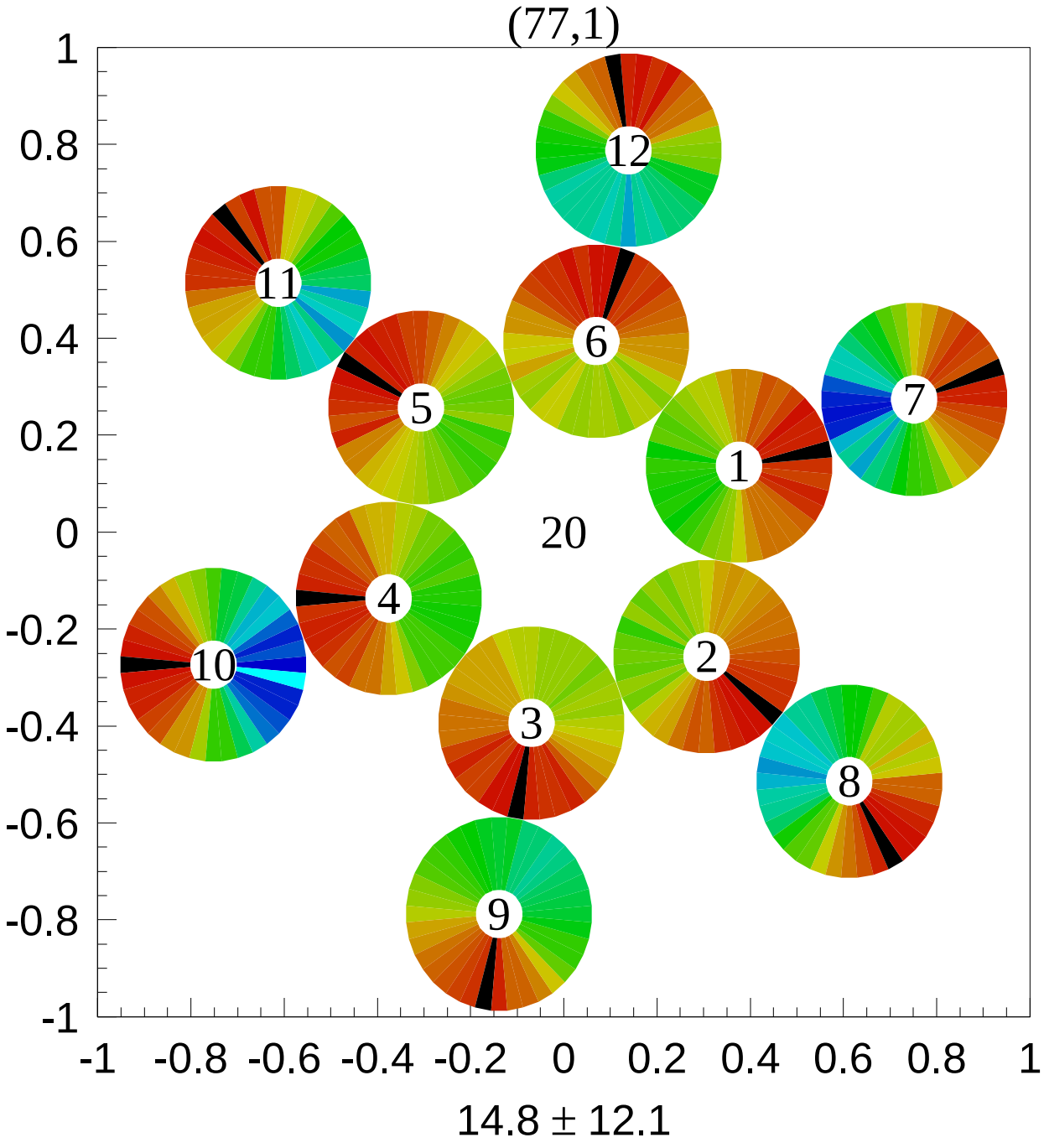

(76,27)
tilted LEDs
116 118 123 126 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 122 118 123 124 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

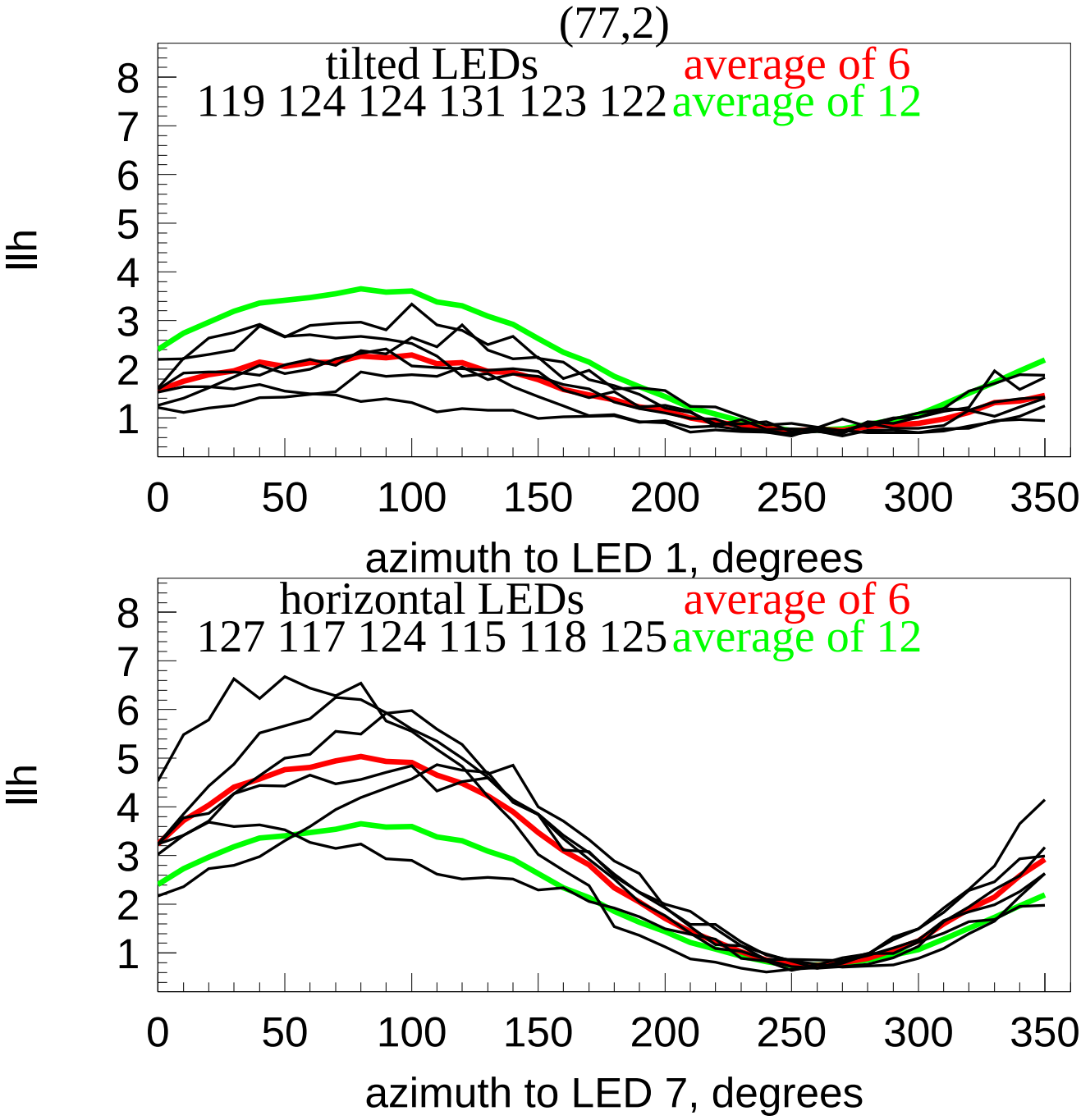

(76,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
9
2
7
3
1
160
4
10
6
5
12
11
155.7 ± 5.7

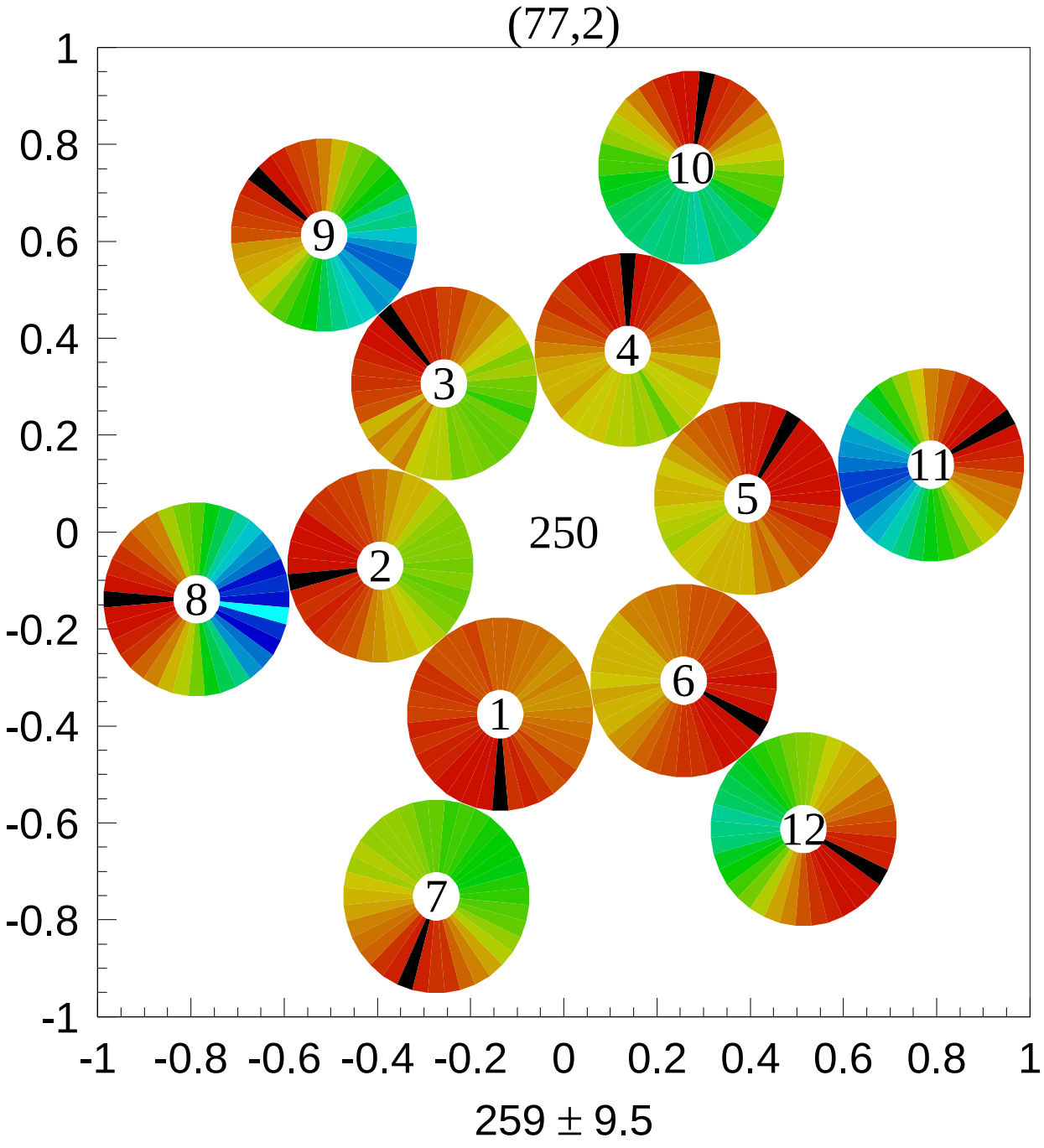

(76,28)
tilted LEDs
127 0 124 120 115 122
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 120 123 124 120 124
average of 6
average of 12
llh
25
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

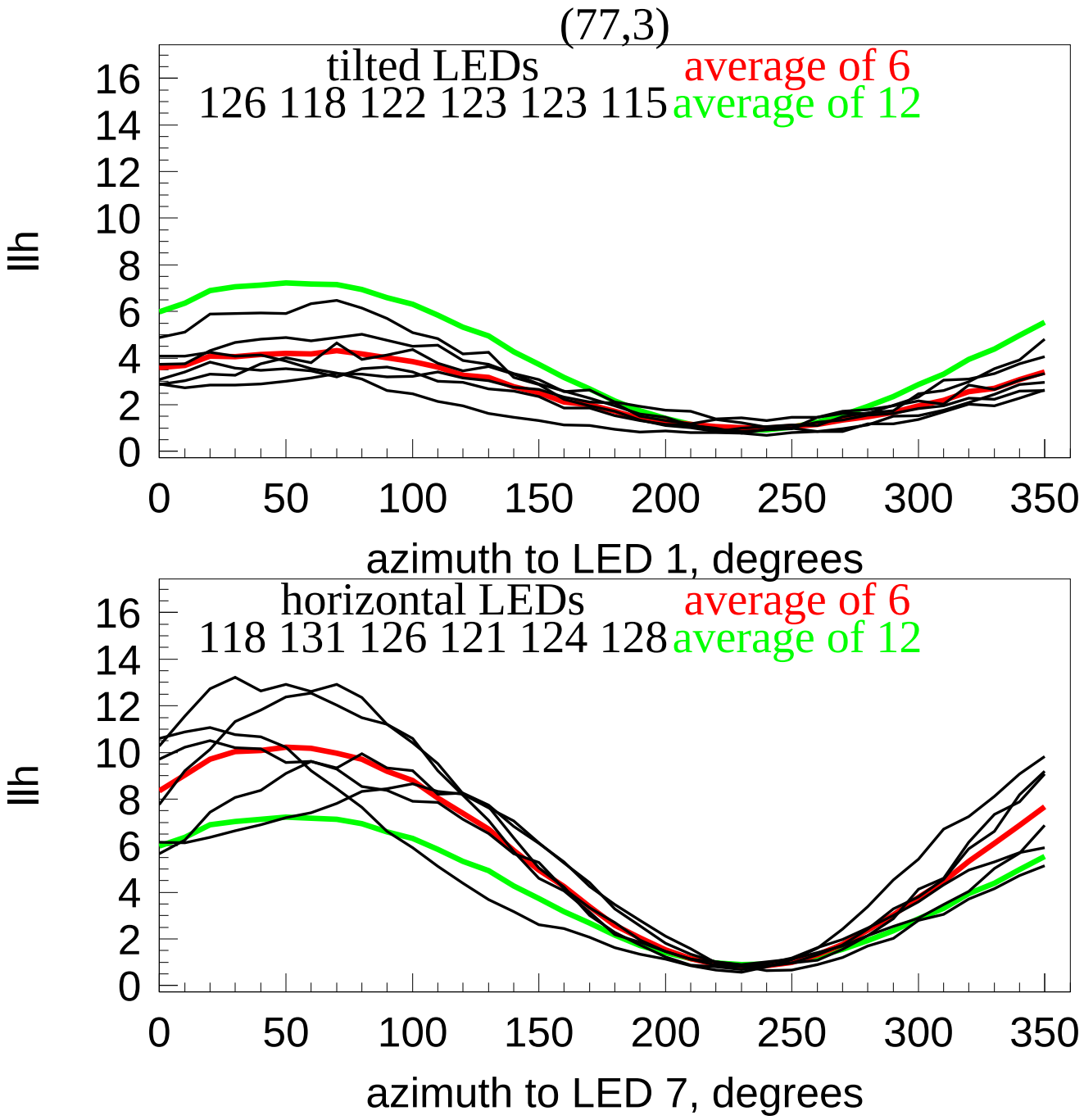

(76,28)
10
11
4
9
5
3
280
6
12
1
8
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
280.3 ± 6.3

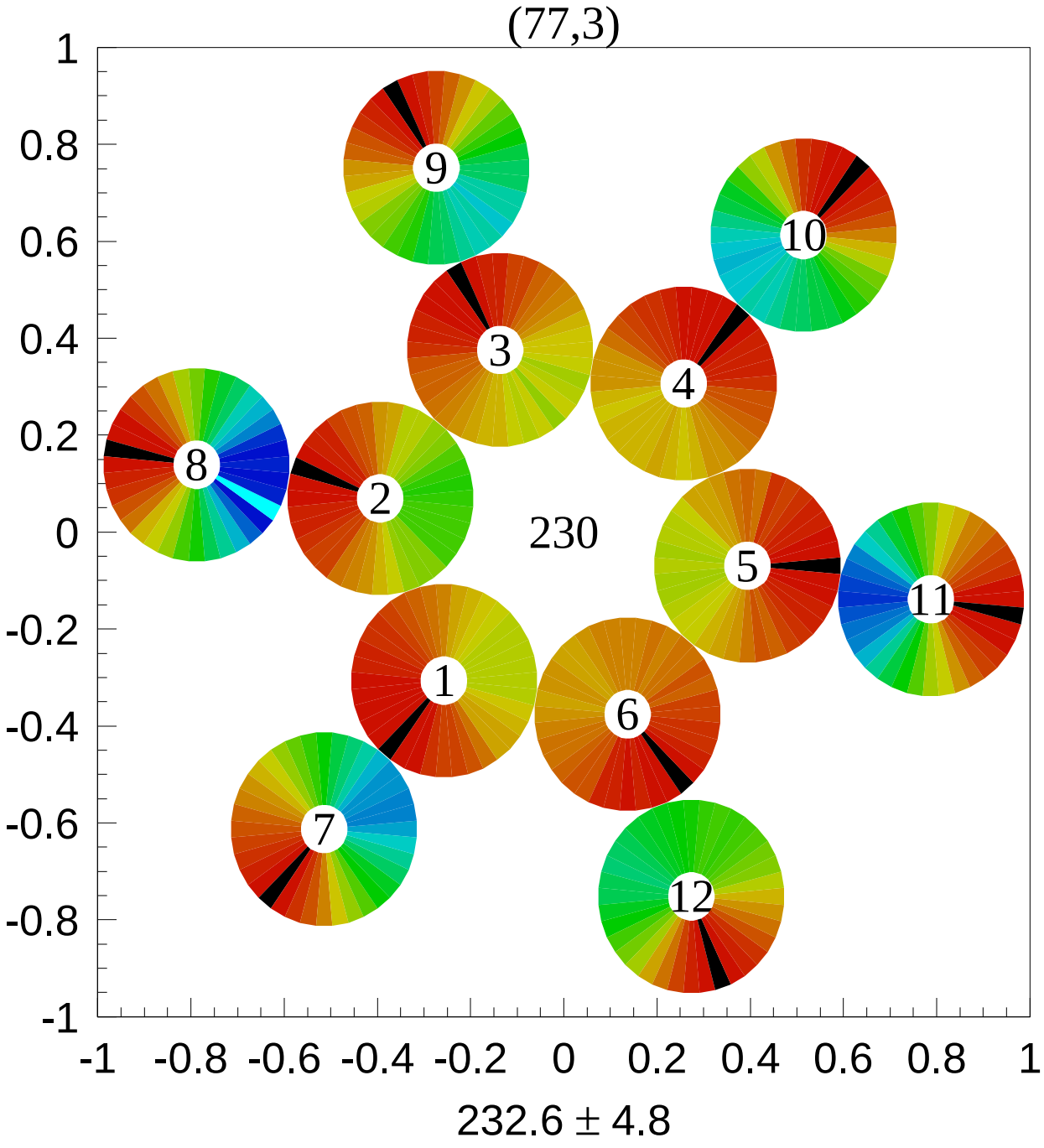

(77,1)
tilted LEDs
125 121 121 127 121 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 119 123 128 123 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

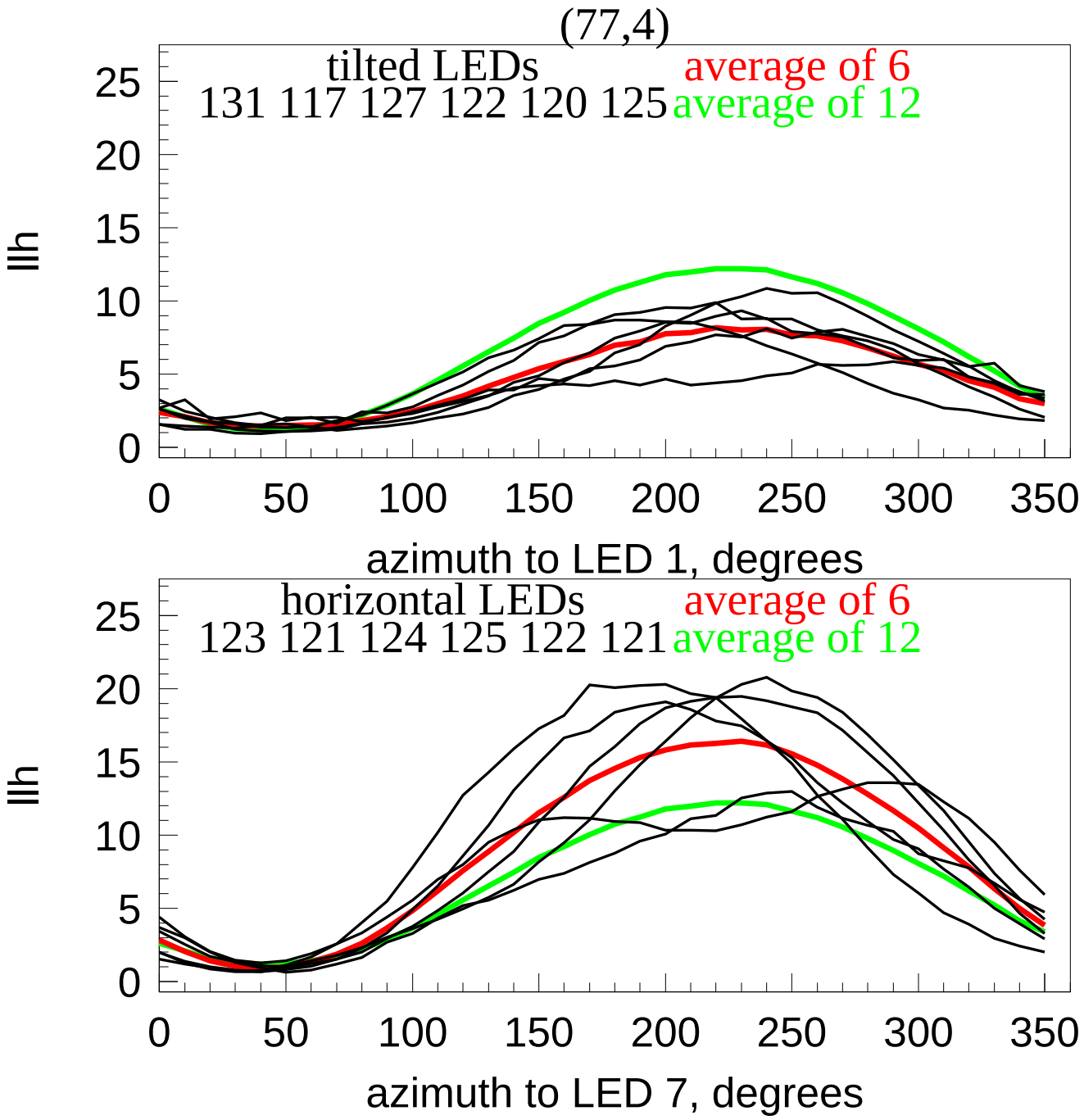

(77,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
14.8 ± 12.1
12
11
6
5
7
1
20
4
10
2
3
8
9

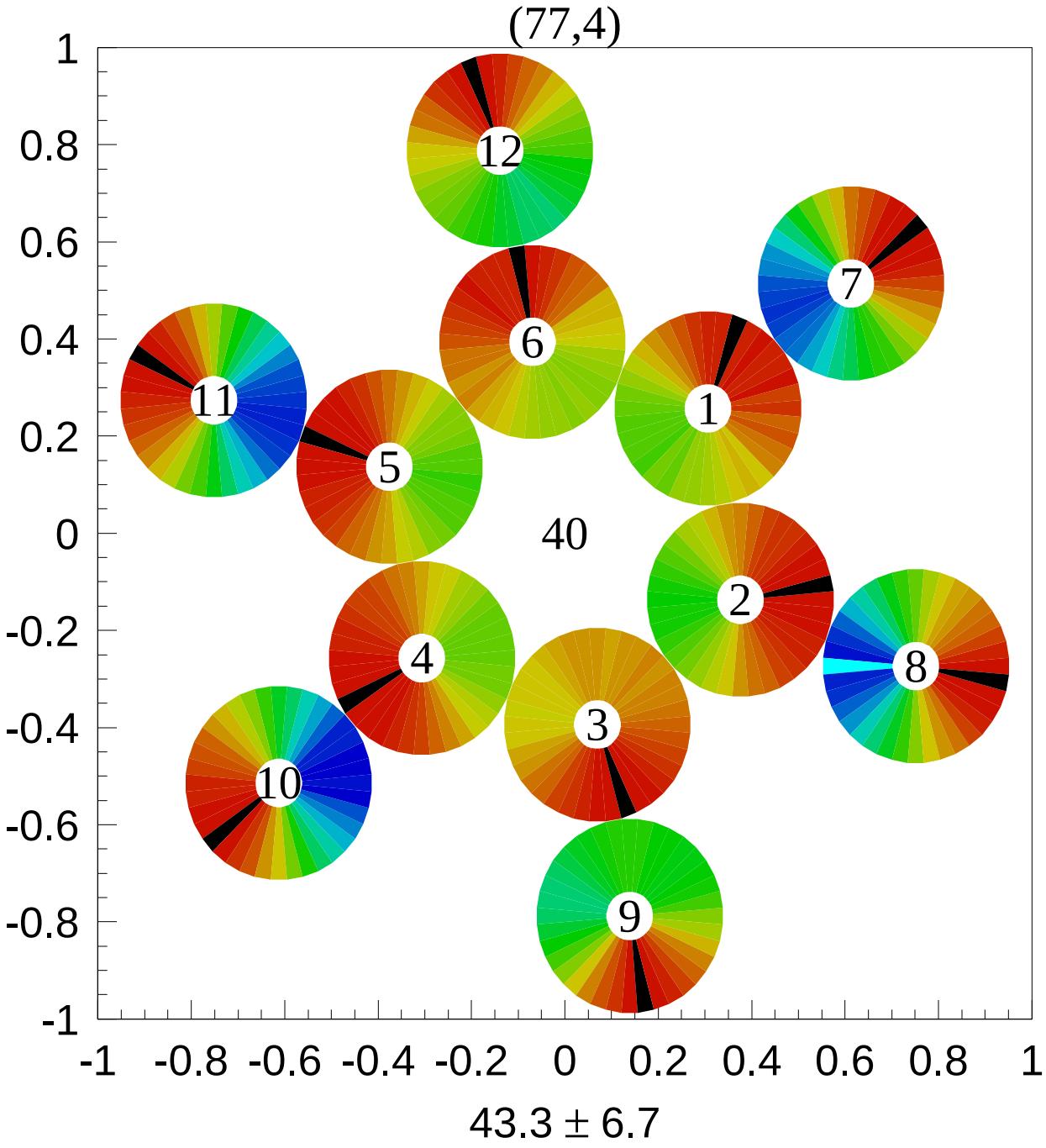

(77,2)
tilted LEDs
119 124 124 131 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
127 117 124 115 118 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

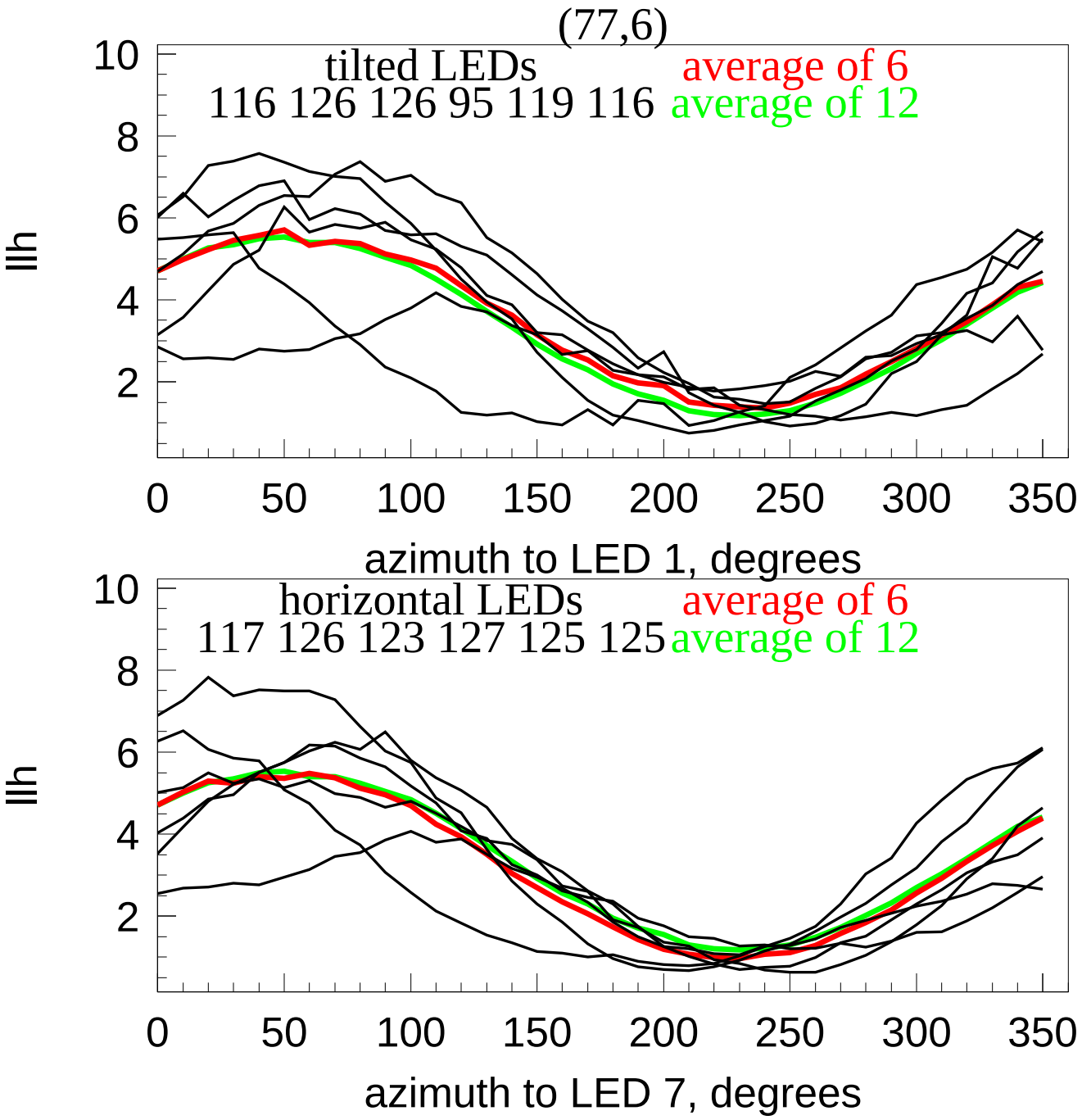

(77,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
259 ± 9.5
250
1
2
3
4
5
6
7
8
9
10
11
12

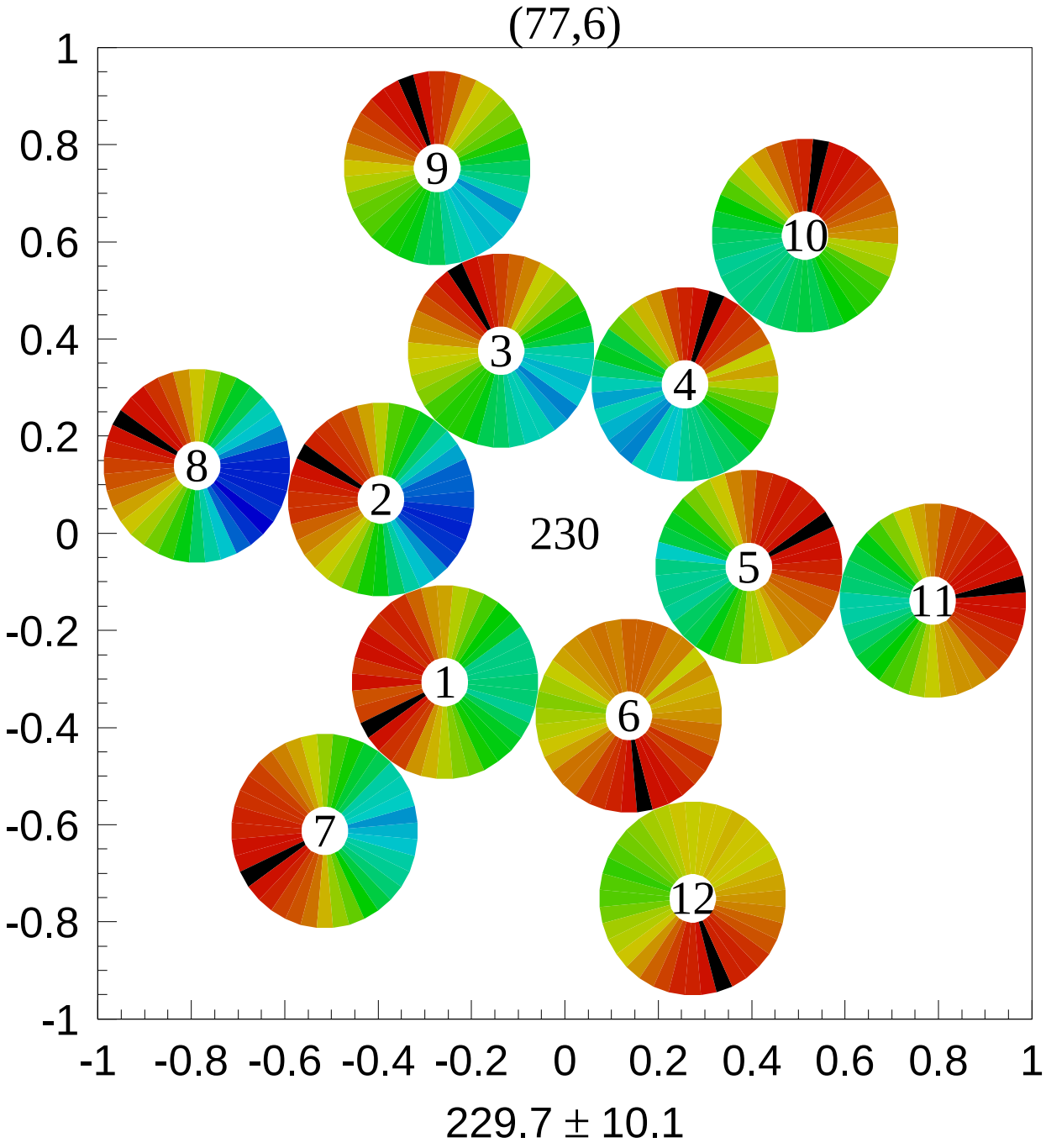

(77,3)
tilted LEDs
126 118 122 123 123 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 131 126 121 124 128
average of 6
average of 12
llh
azimuth to LED 7, degrees

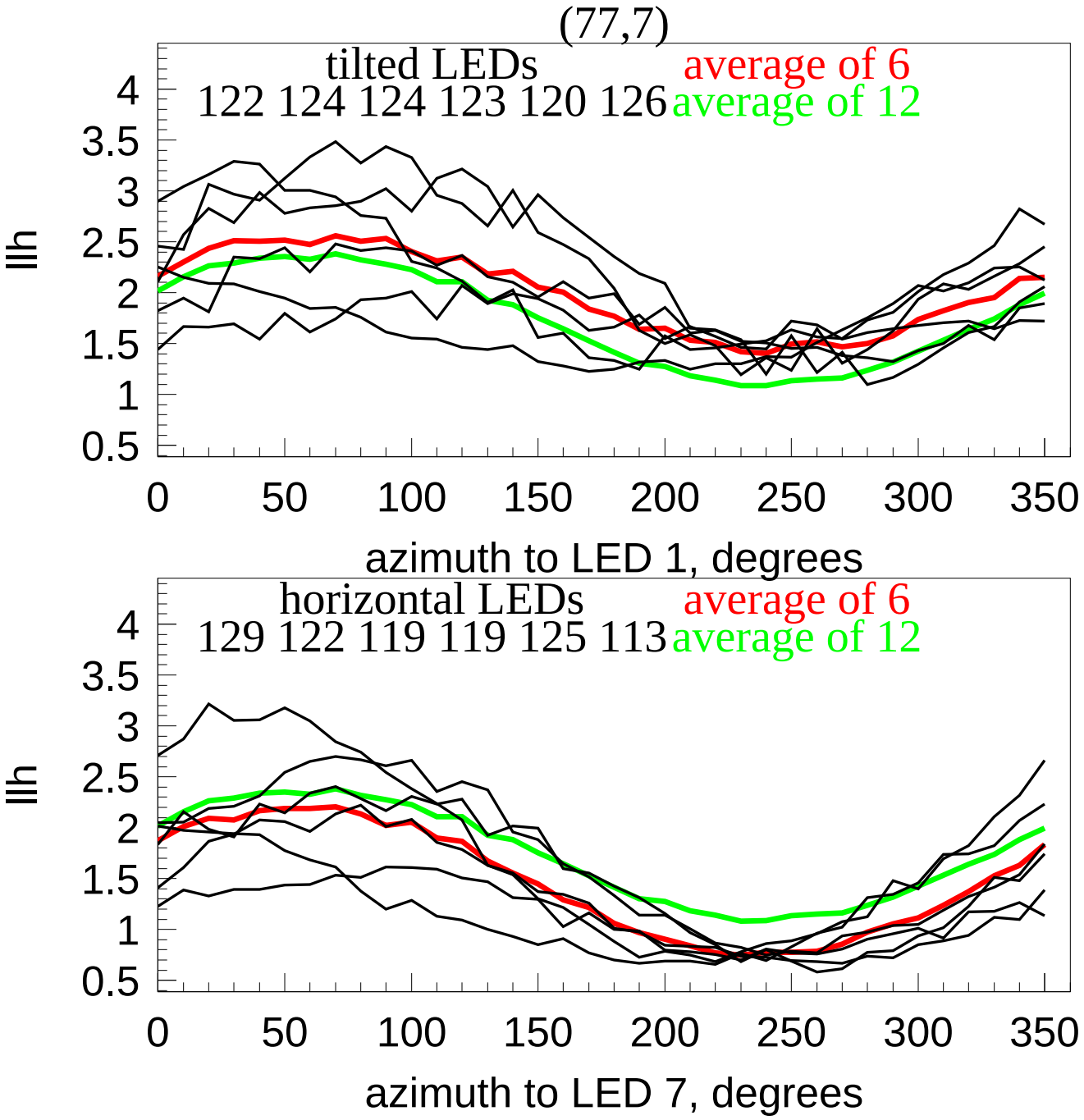

(77,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
232.6 ± 4.8

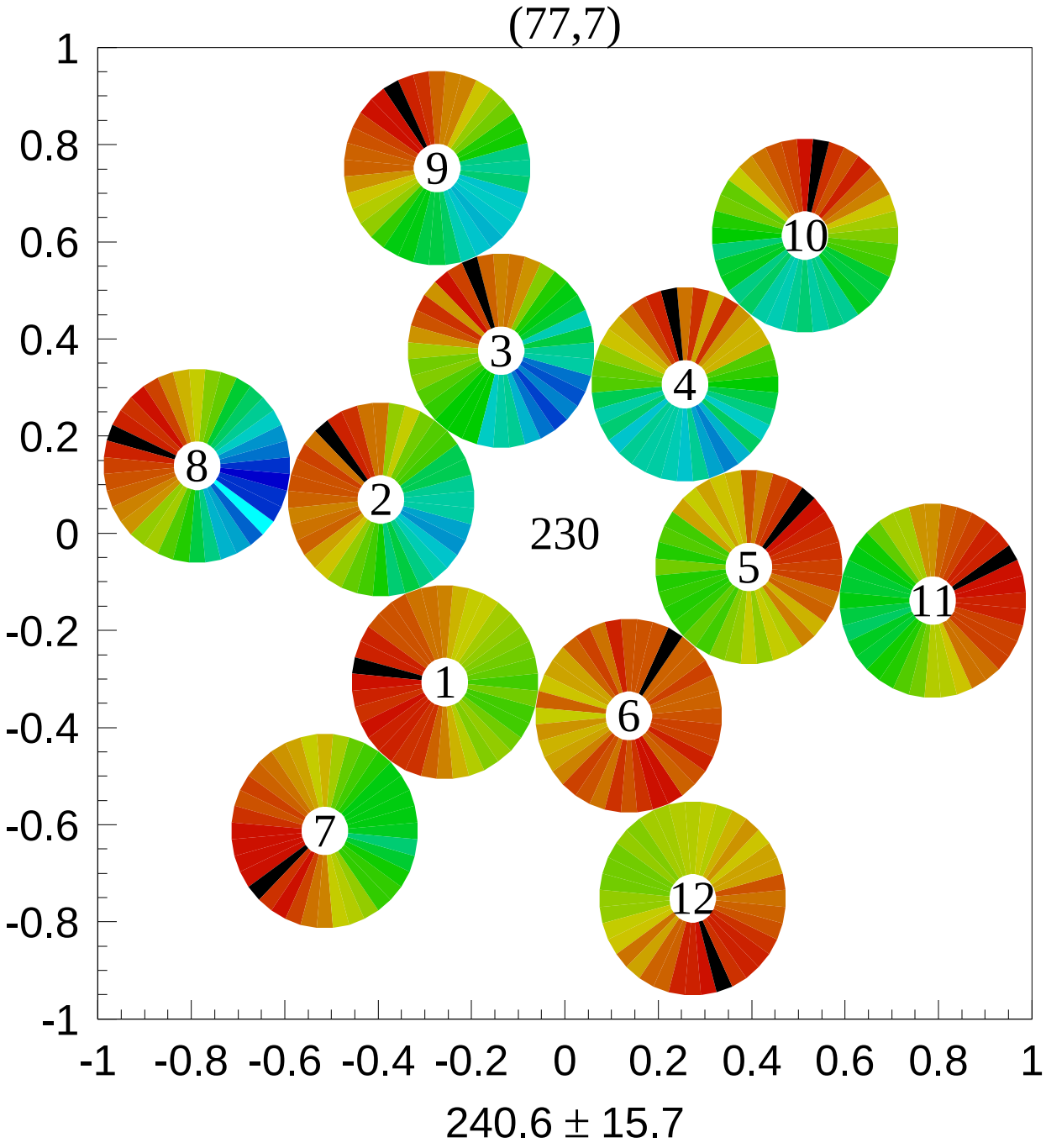

(77,4)
tilted LEDs
131 117 127 122 120 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 124 125 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

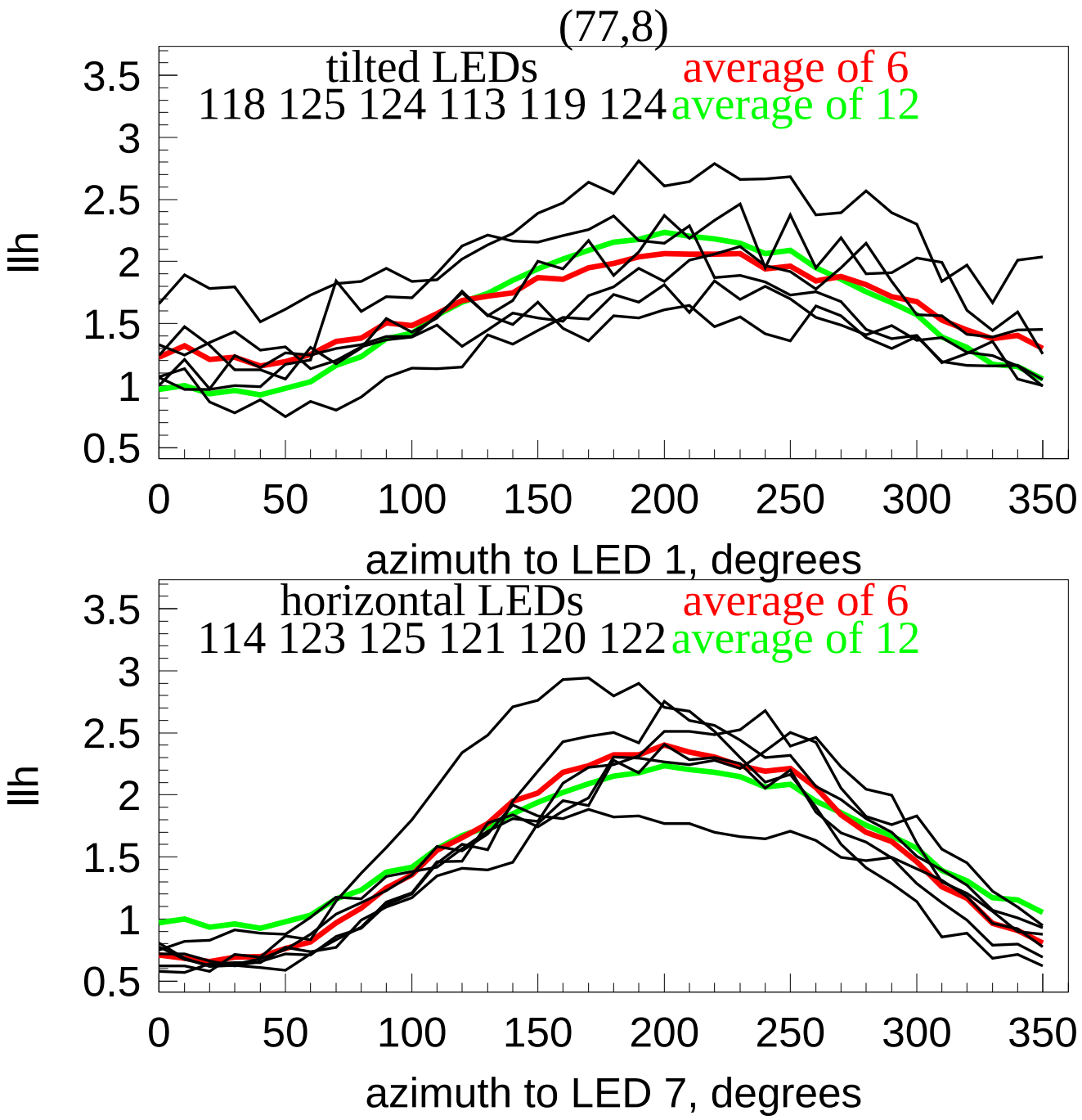

(77,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
43.3 ± 6.7

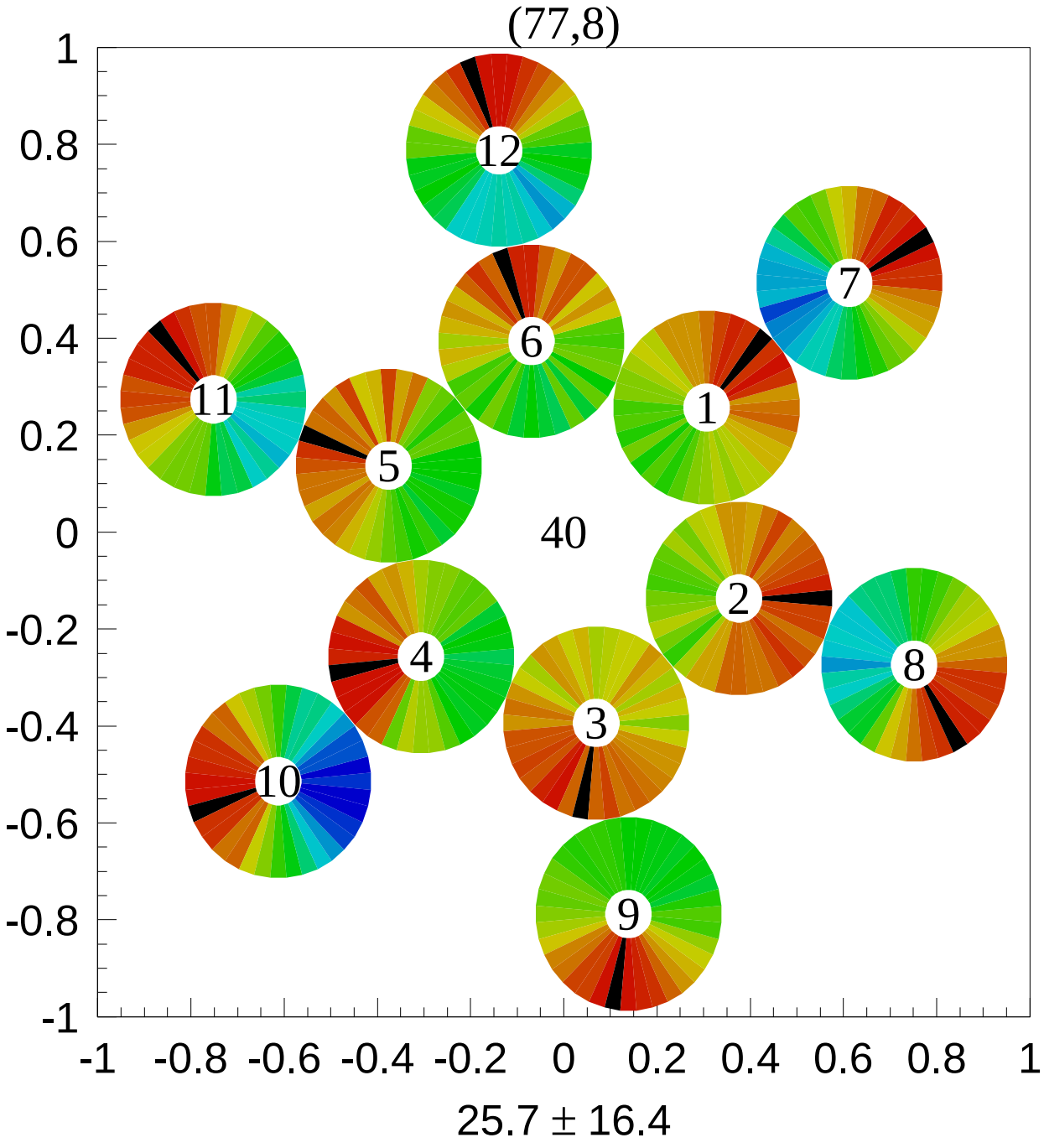

(77,6)
tilted LEDs
116 126 126 95 119 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 126 123 127 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

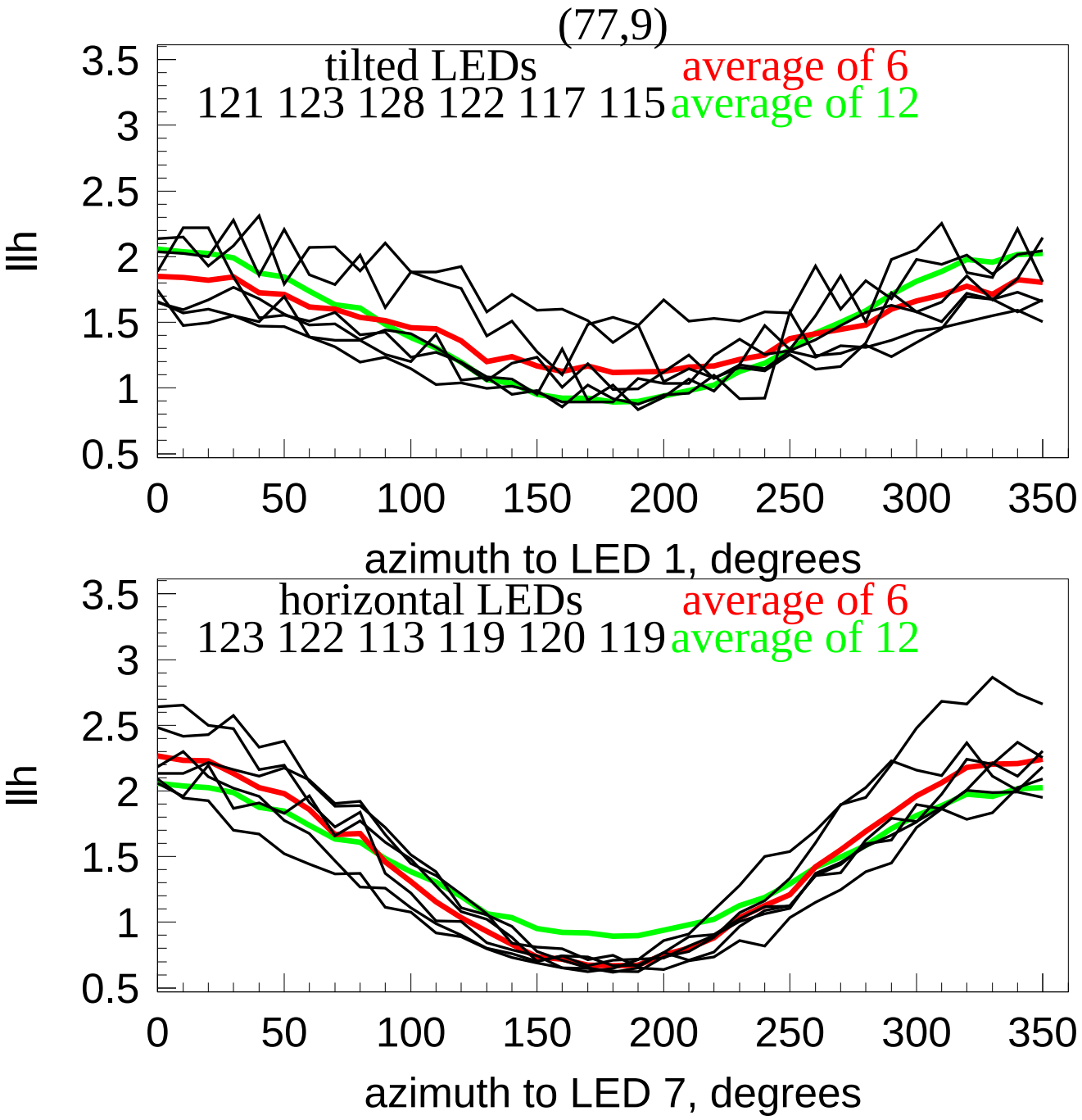

(77,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
229.7 ± 10.1

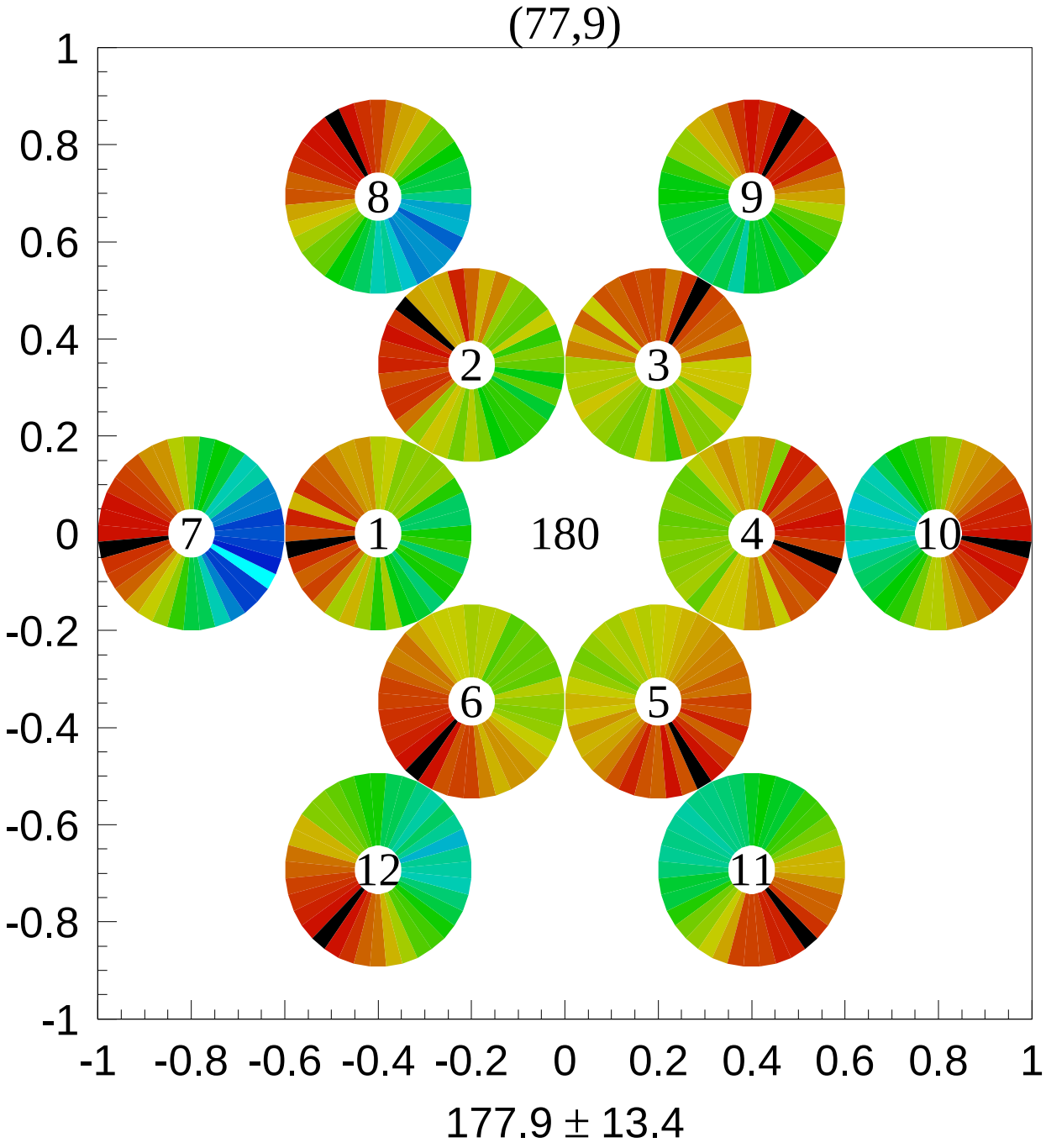

(77,7)
tilted LEDs
122 124 124 123 120 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 122 119 119 125 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

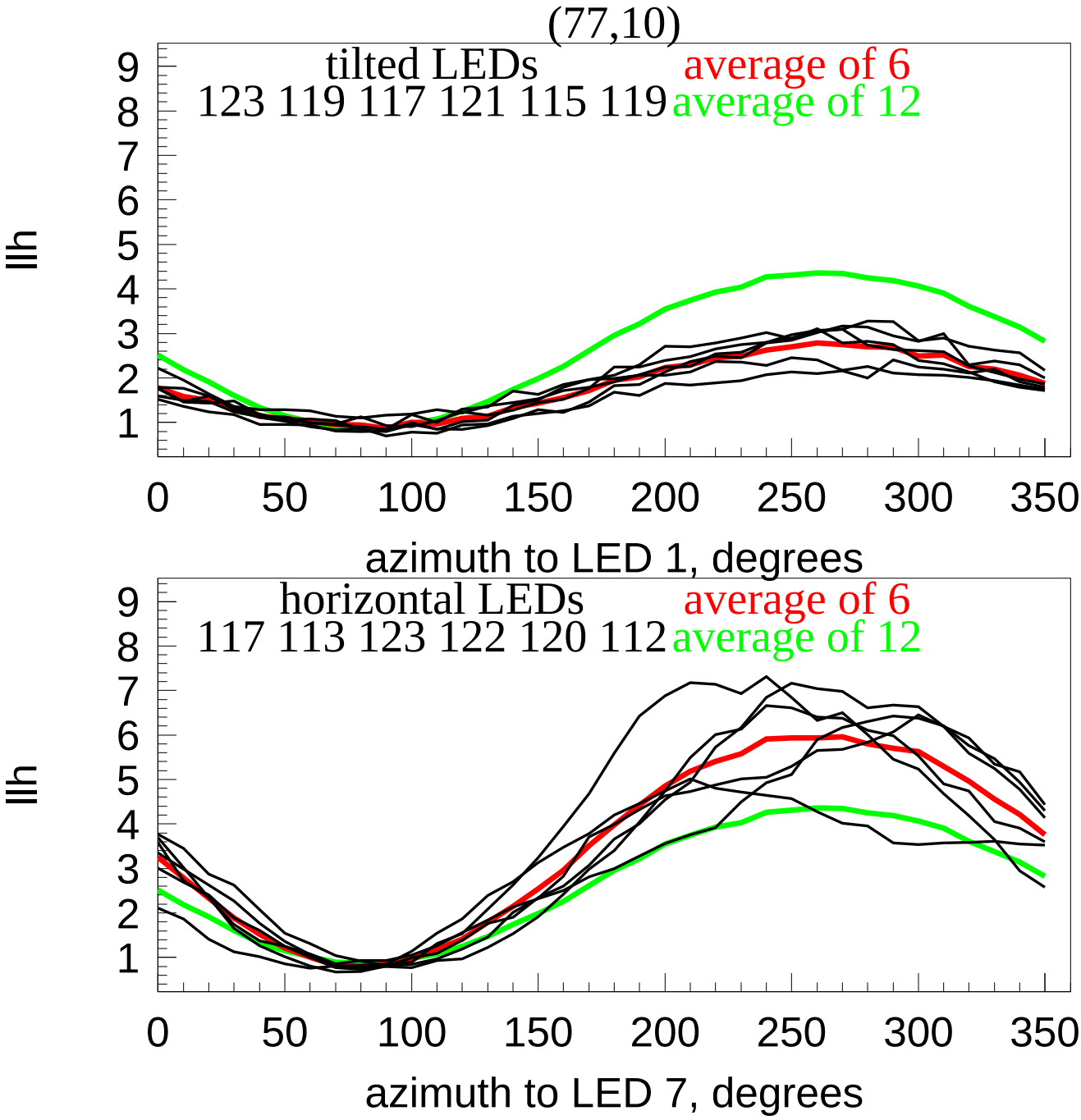

(77,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
240.6 ± 15.7

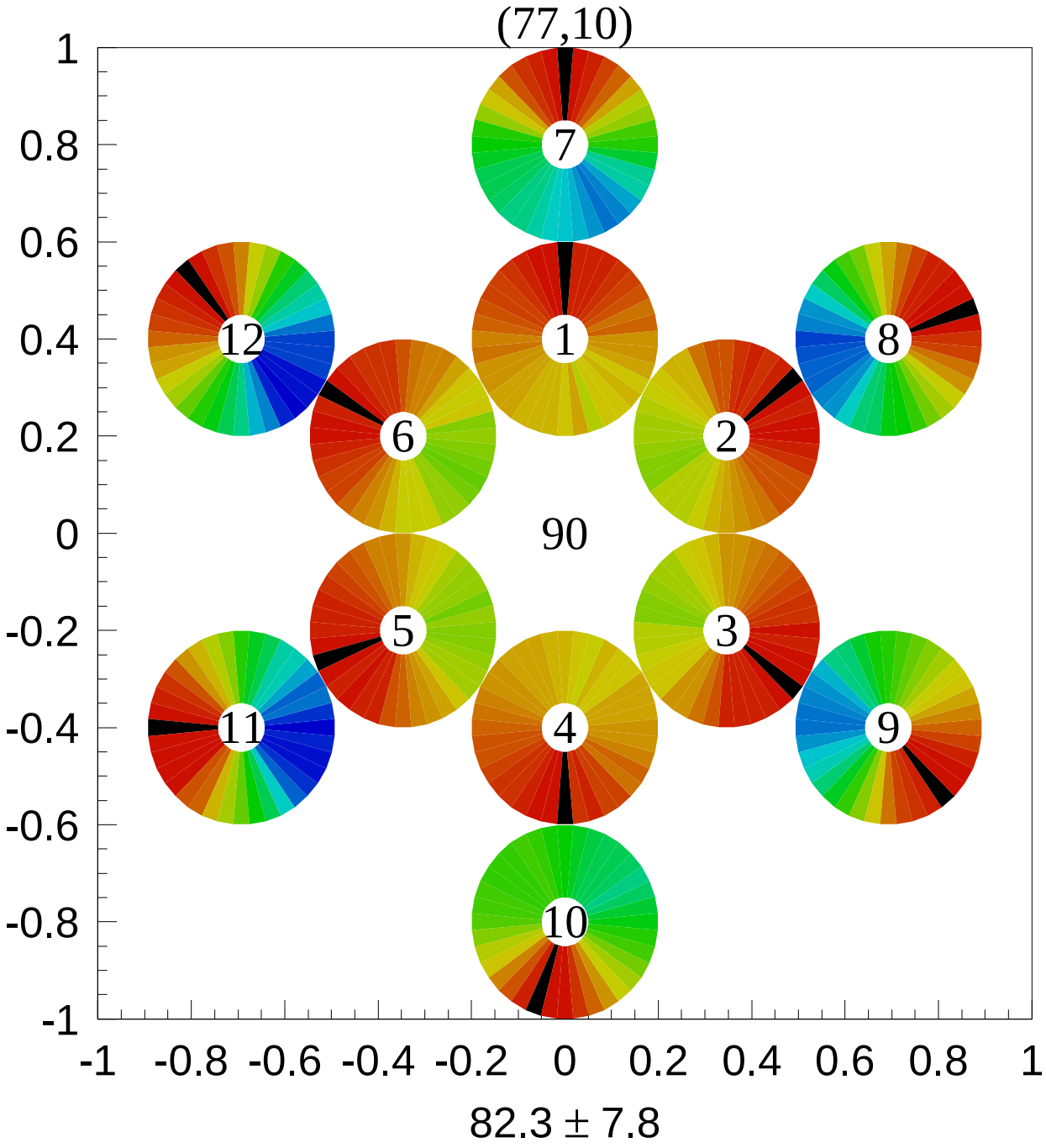

(77,8)
tilted LEDs
118 125 124 113 119 124
average of 6
average of 12
IIh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
114 123 125 121 120 122
average of 6
average of 12
IIh
azimuth to LED 7, degrees

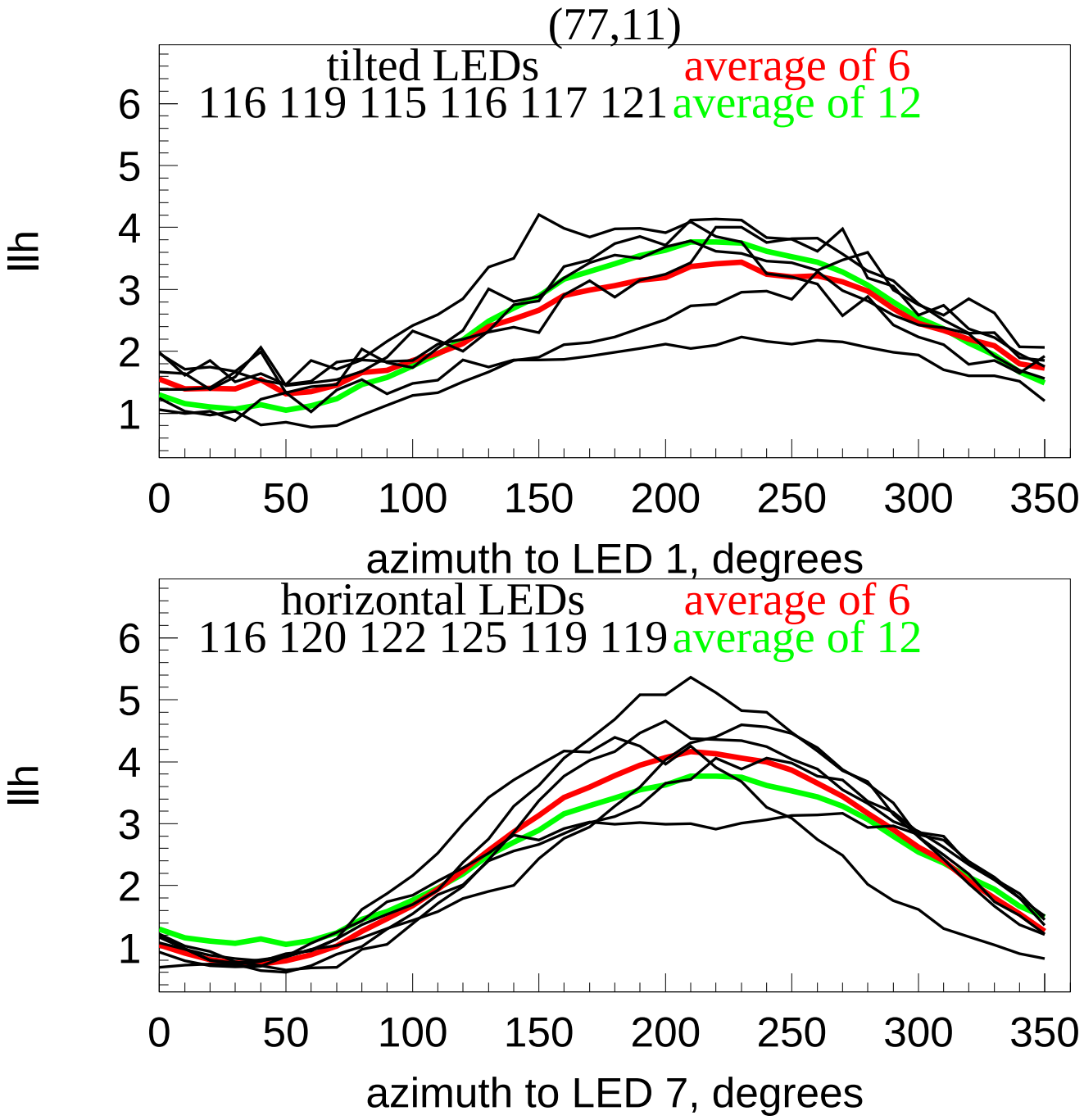

(77,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
4
8
3
10
9
25.7 ± 16.4

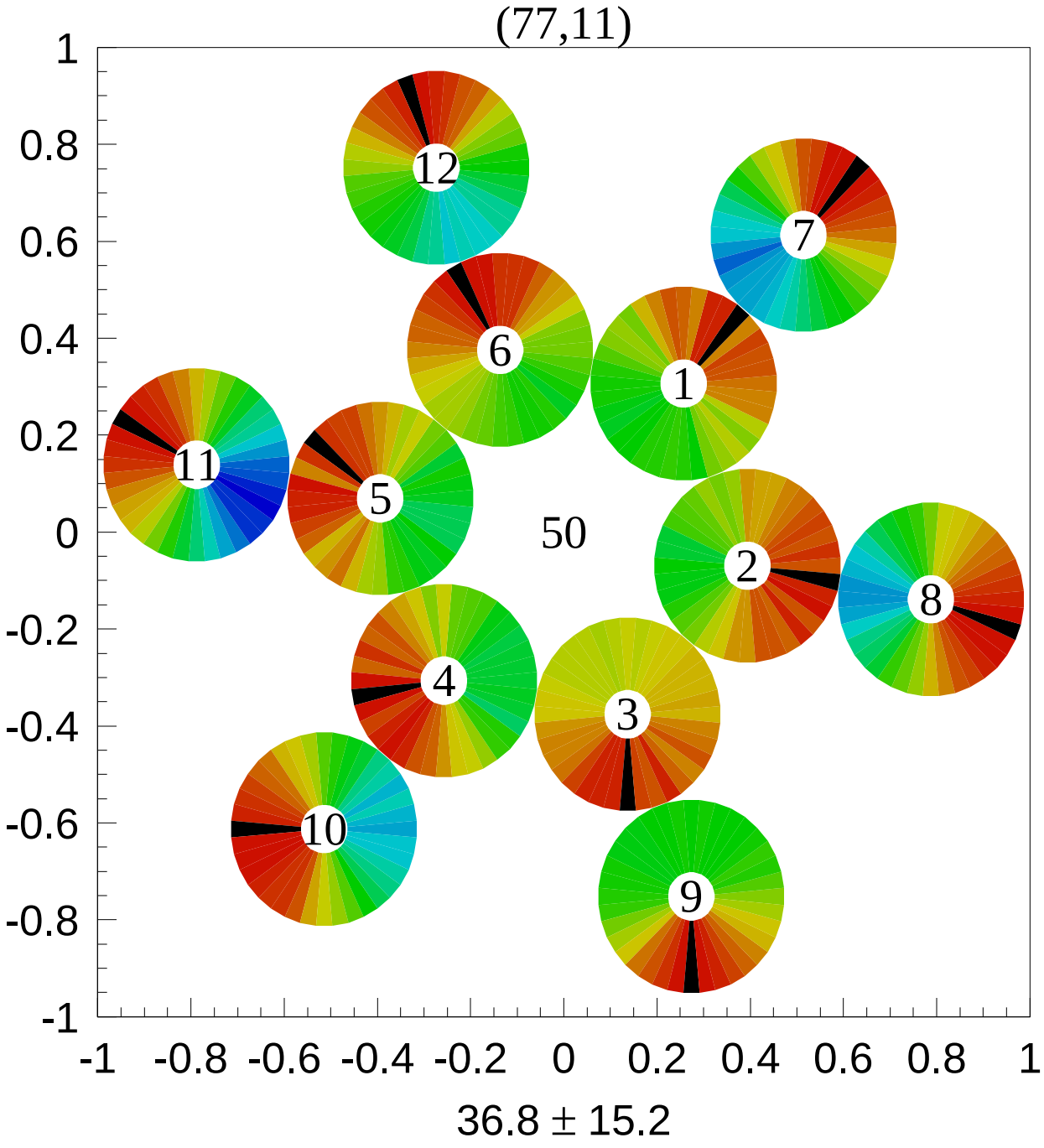

(77,9)
tilted LEDs
121 123 128 122 117 115
average of 6
average of 12
IIh
3.5
3
2.5
2
1.5
1
0.5
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
123 122 113 119 120 119
average of 6
average of 12
IIh
azimuth to LED 7, degrees

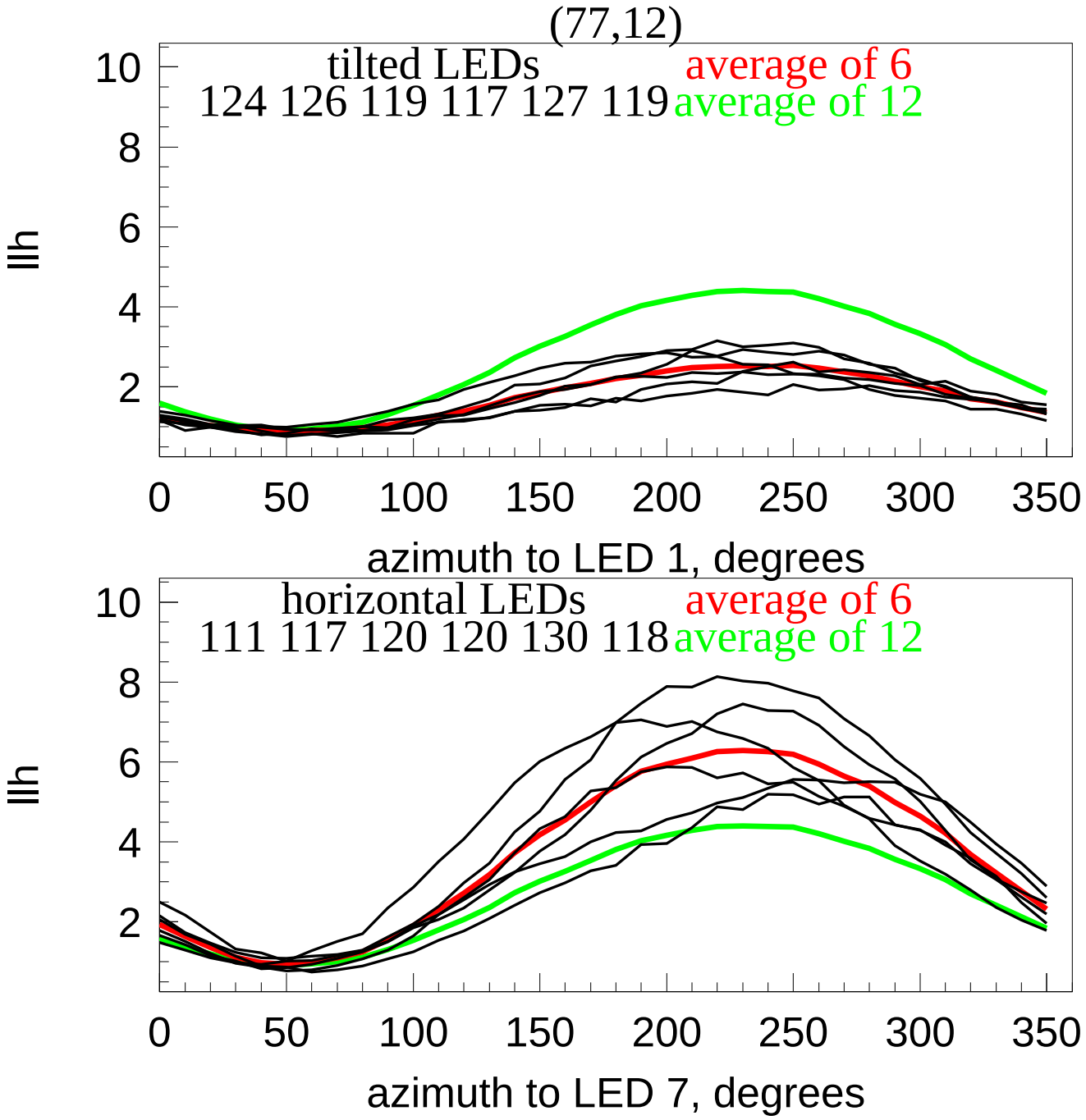

(77,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
177.9 ± 13.4
8
9
2
3
7
1
180
4
10
6
5
12
11

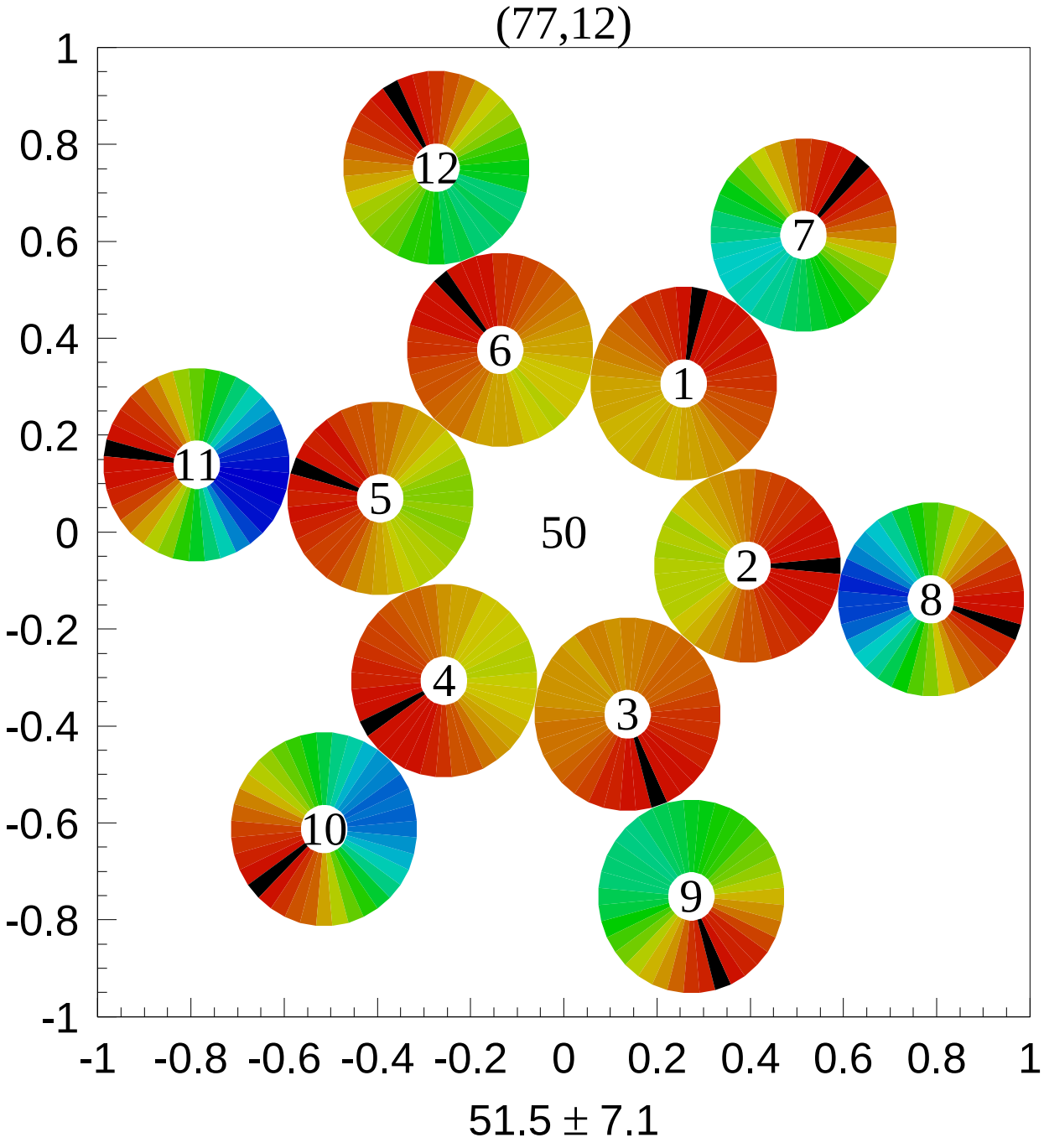

(77,10)
tilted LEDs
123 119 117 121 115 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 113 123 122 120 112
average of 6
average of 12
llh
azimuth to LED 7, degrees

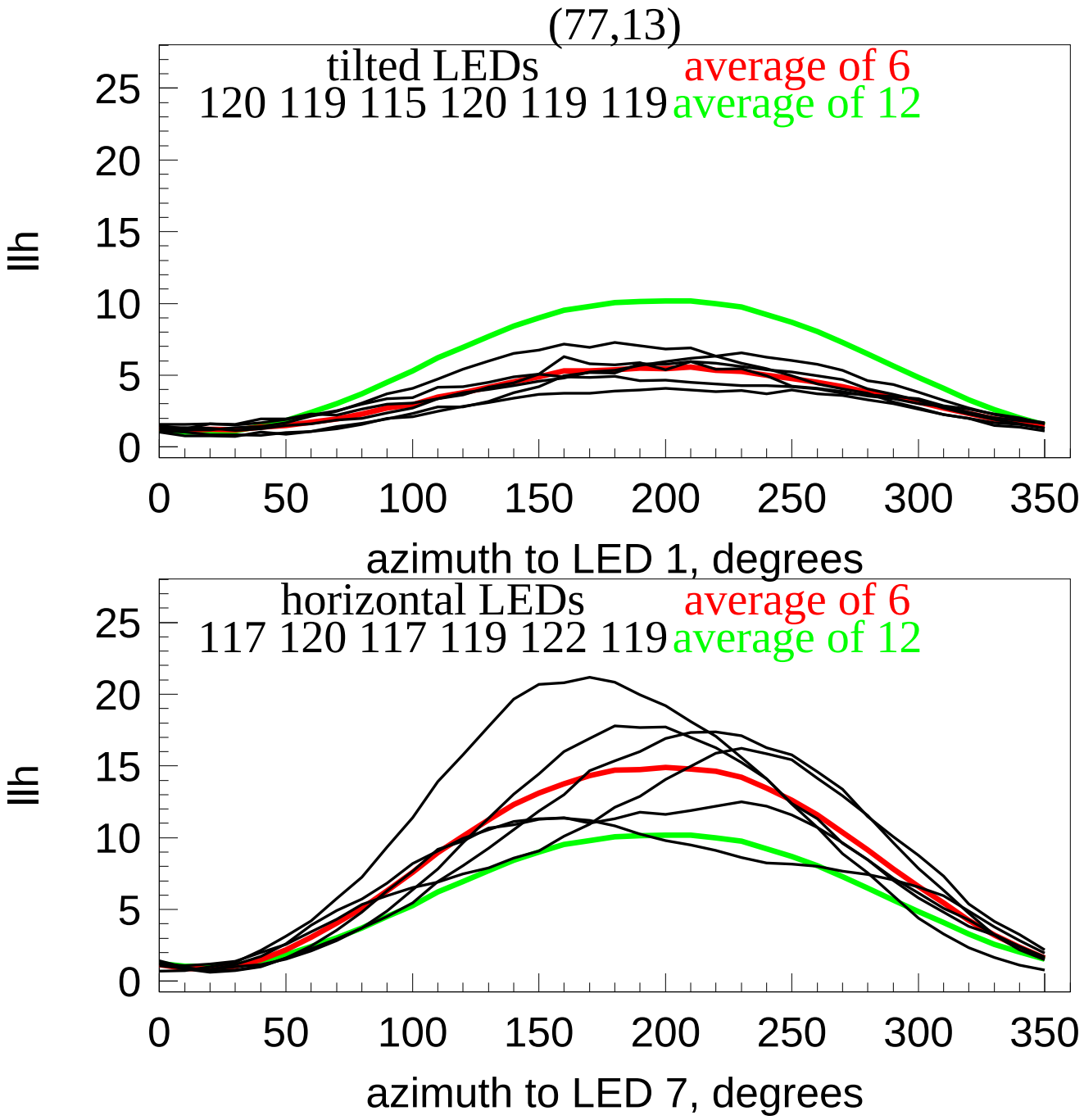

(77,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
82.3 ± 7.8

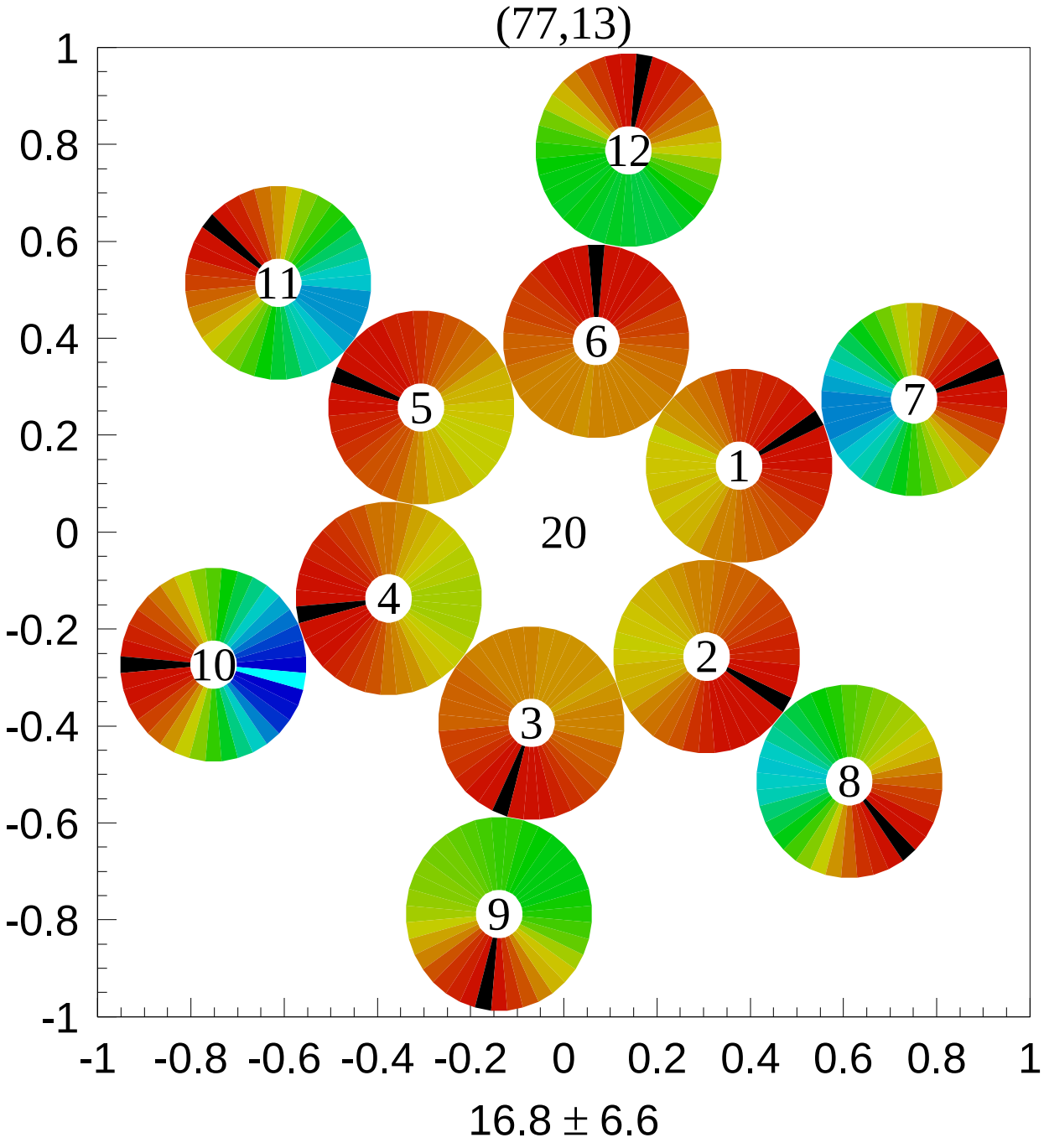

(77,11)
tilted LEDs
116 119 115 116 117 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 120 122 125 119 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

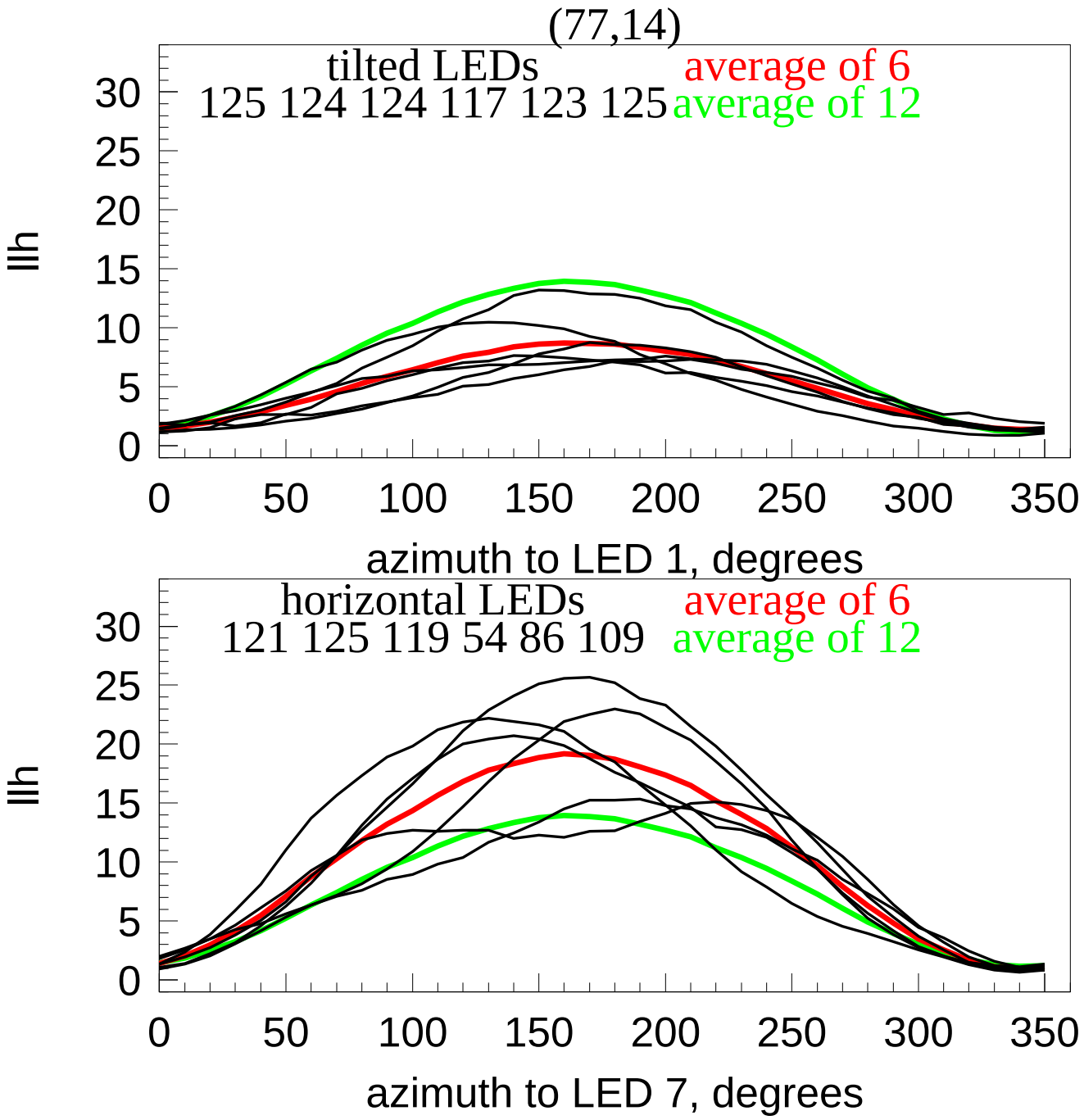

(77,11)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
36.8 ± 15.2

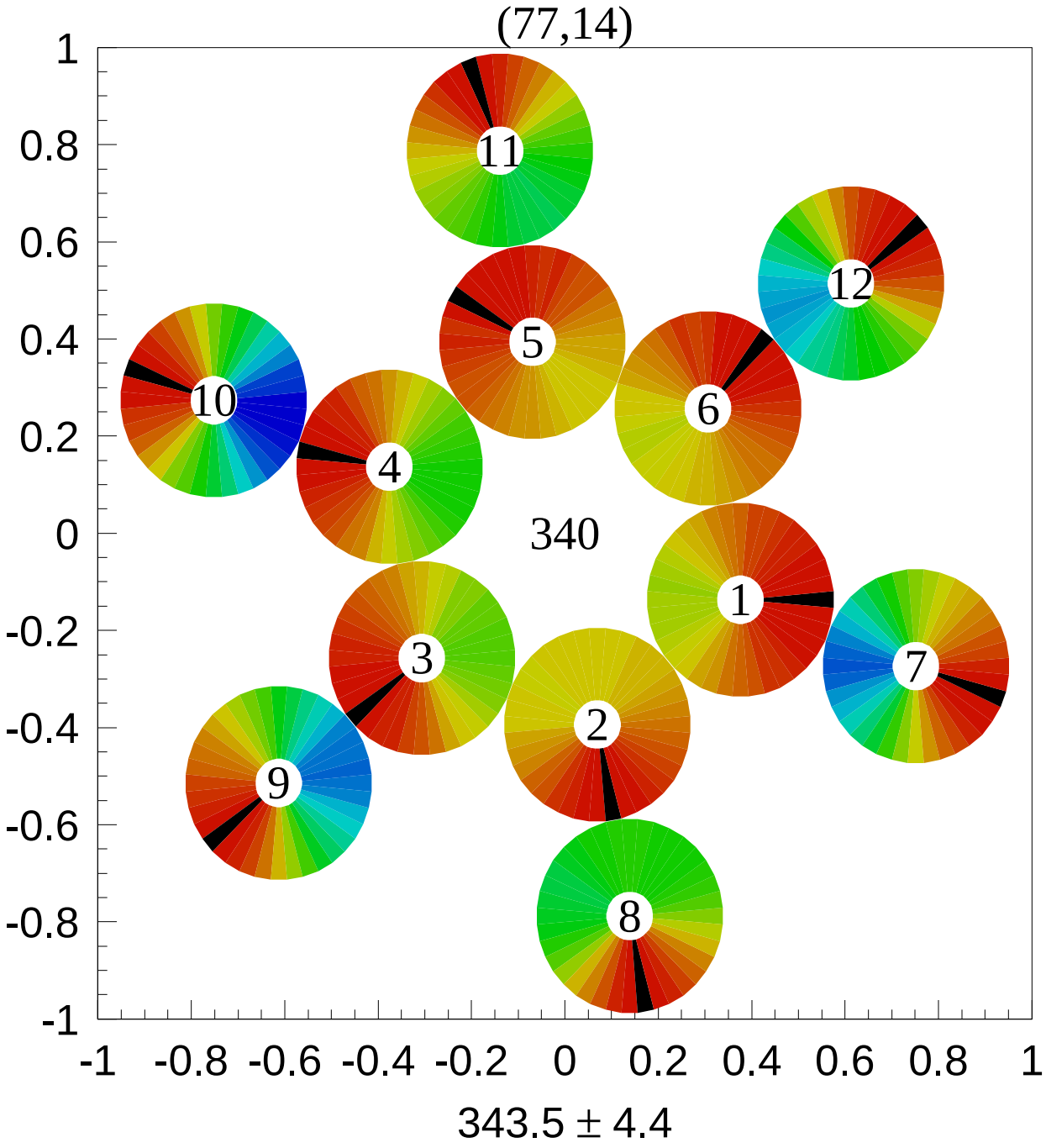

(77,12)
tilted LEDs
124 126 119 117 127 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 117 120 120 130 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

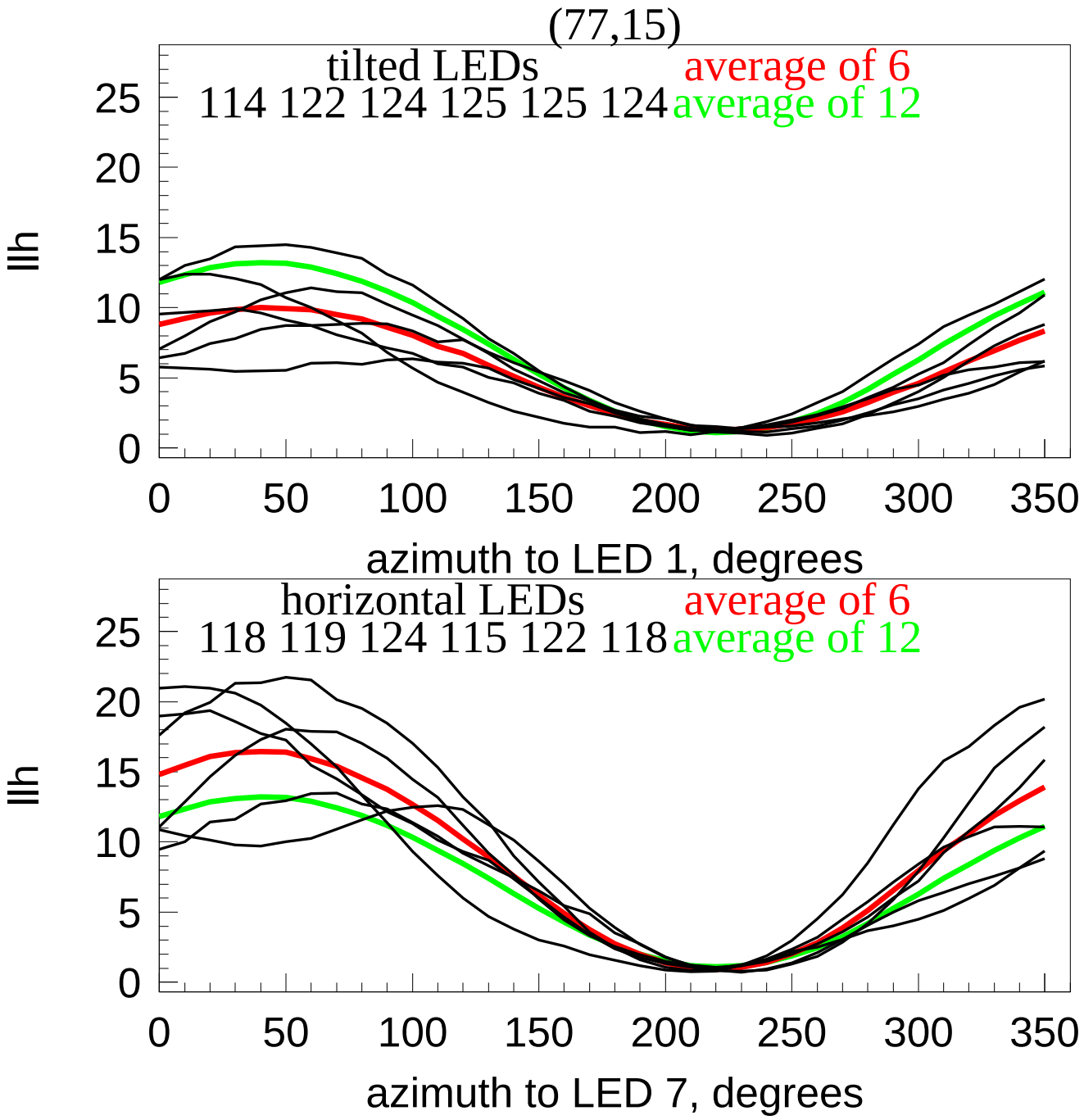

(77,12)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
51.5 ± 7.1

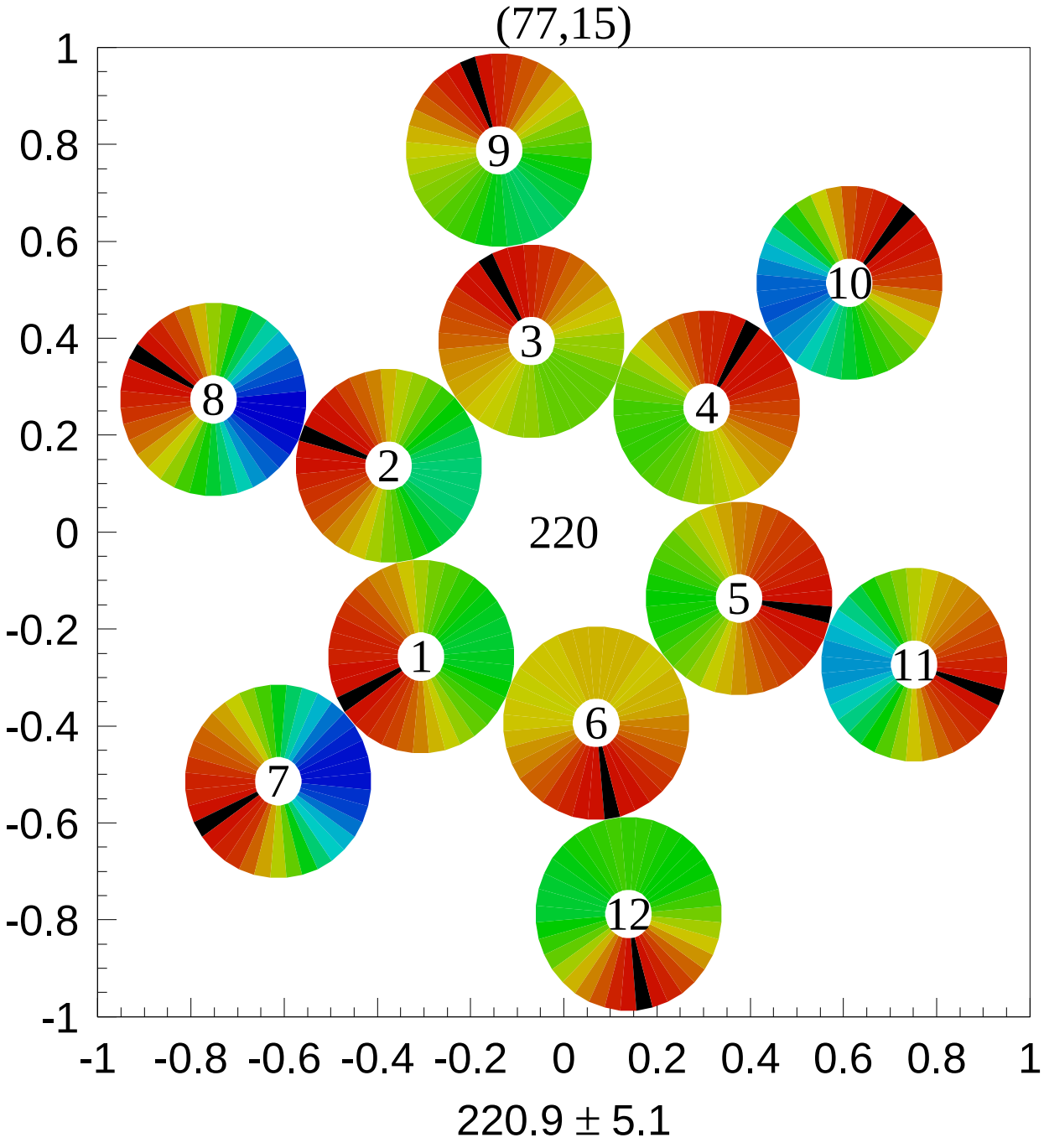

(77,13)
tilted LEDs
120 119 115 120 119 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 120 117 119 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

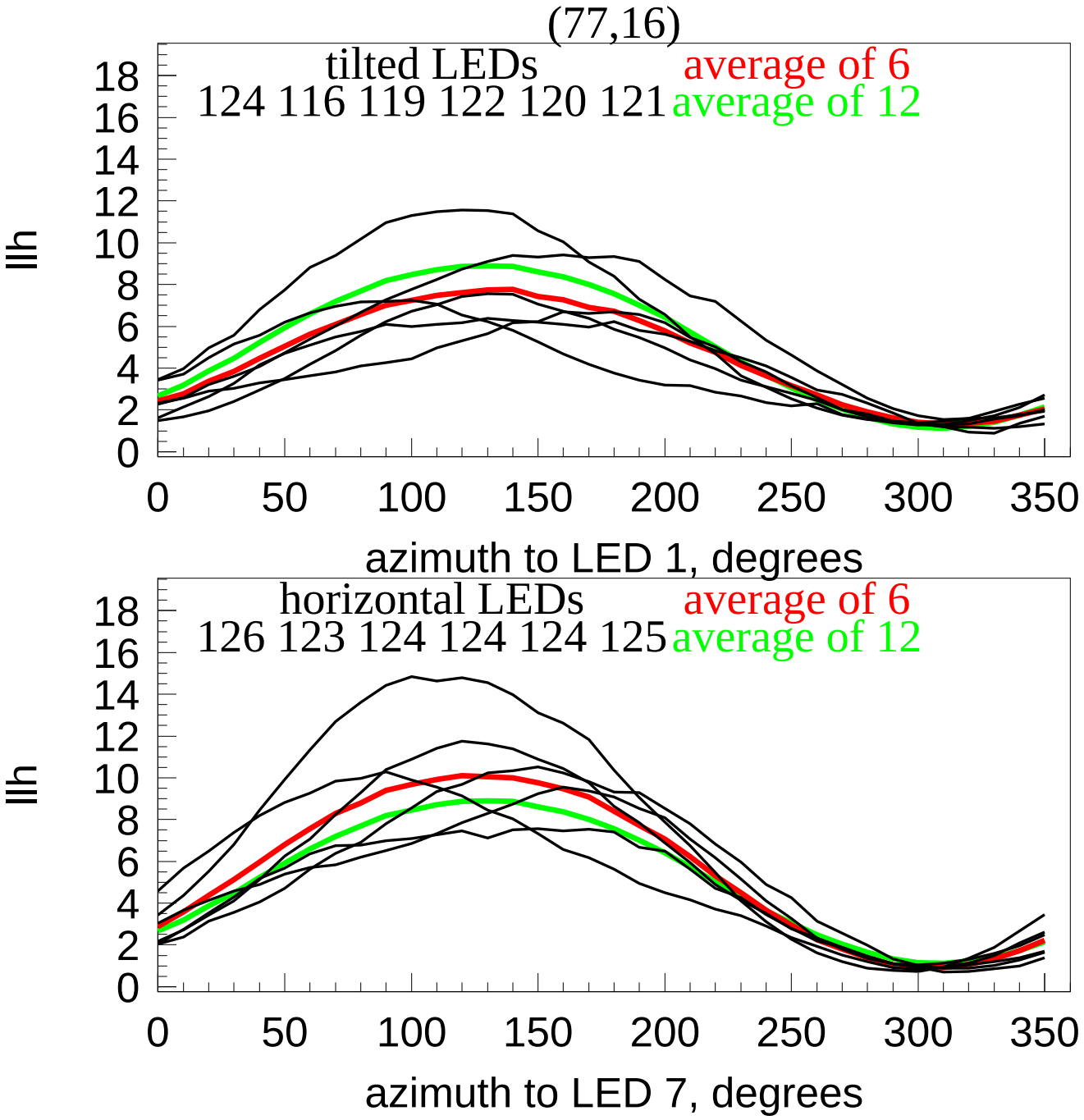

(77,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
16.8 ± 6.6
12
11
6
5
7
1
20
4
10
2
3
8
9

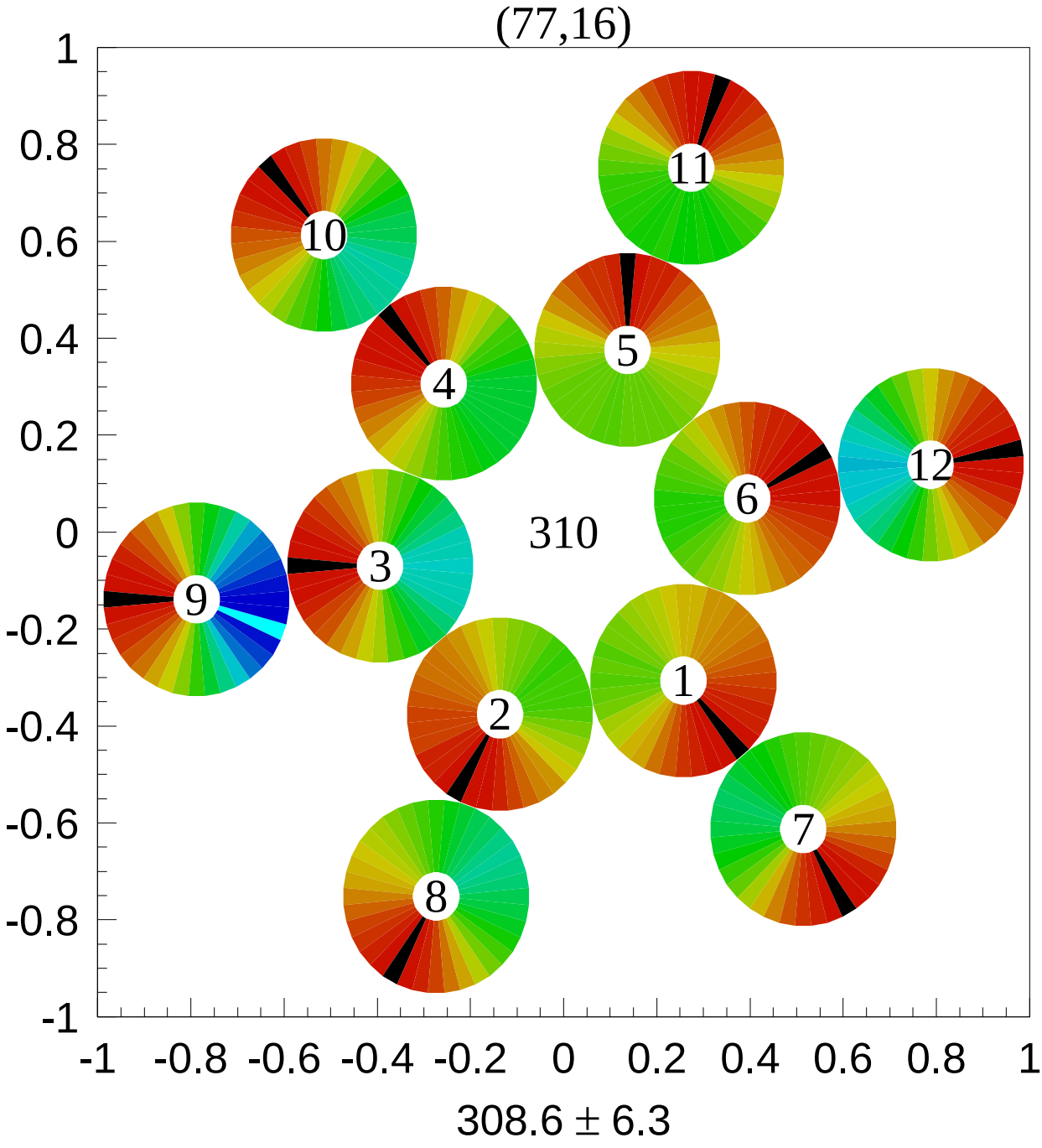

(77,14)
tilted LEDs
125 124 124 117 123 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 119 54 86 109
average of 6
average of 12
llh
azimuth to LED 7, degrees

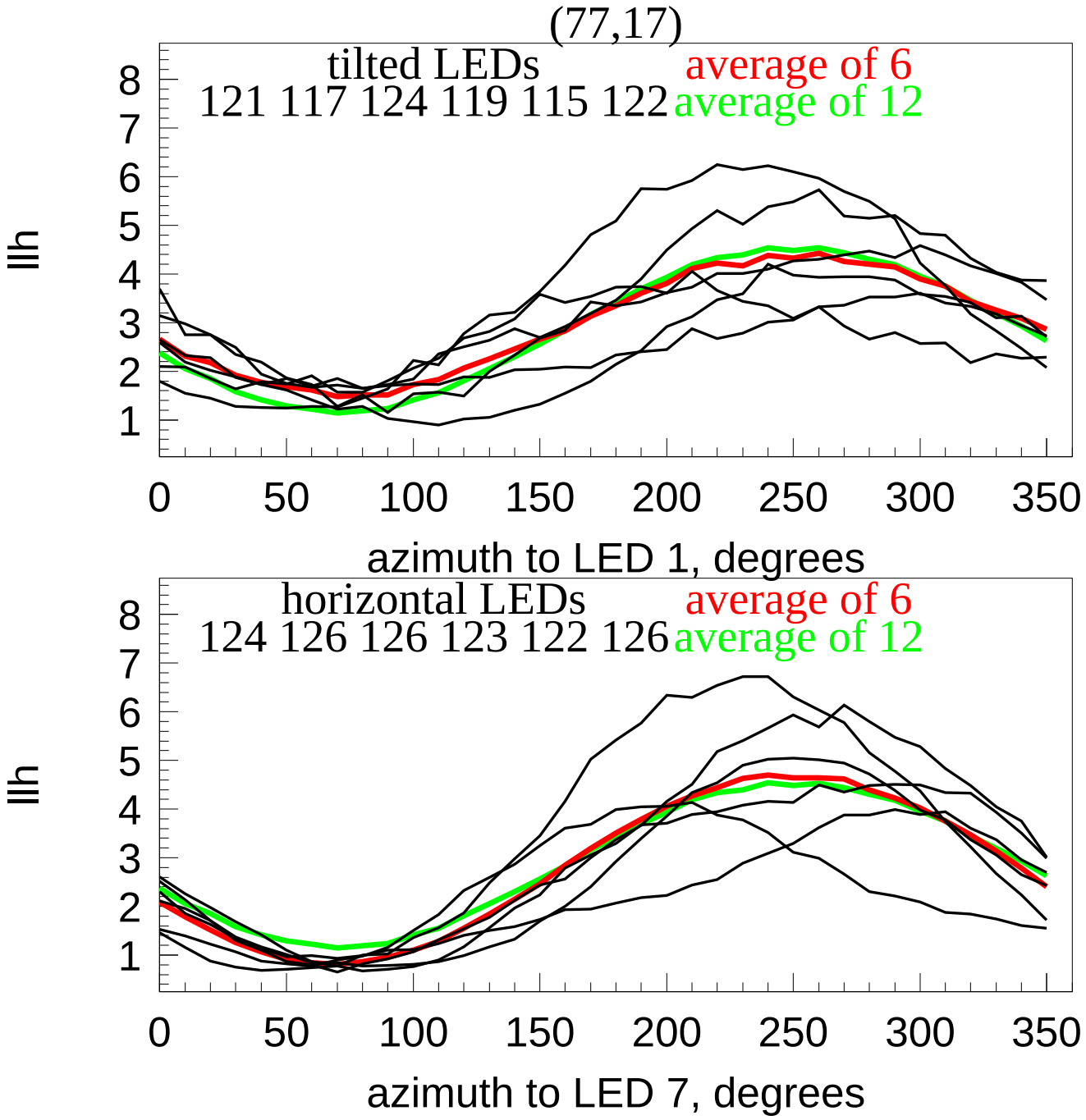

(77,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
340
1
3
7
2
9
8
343.5 ± 4.4

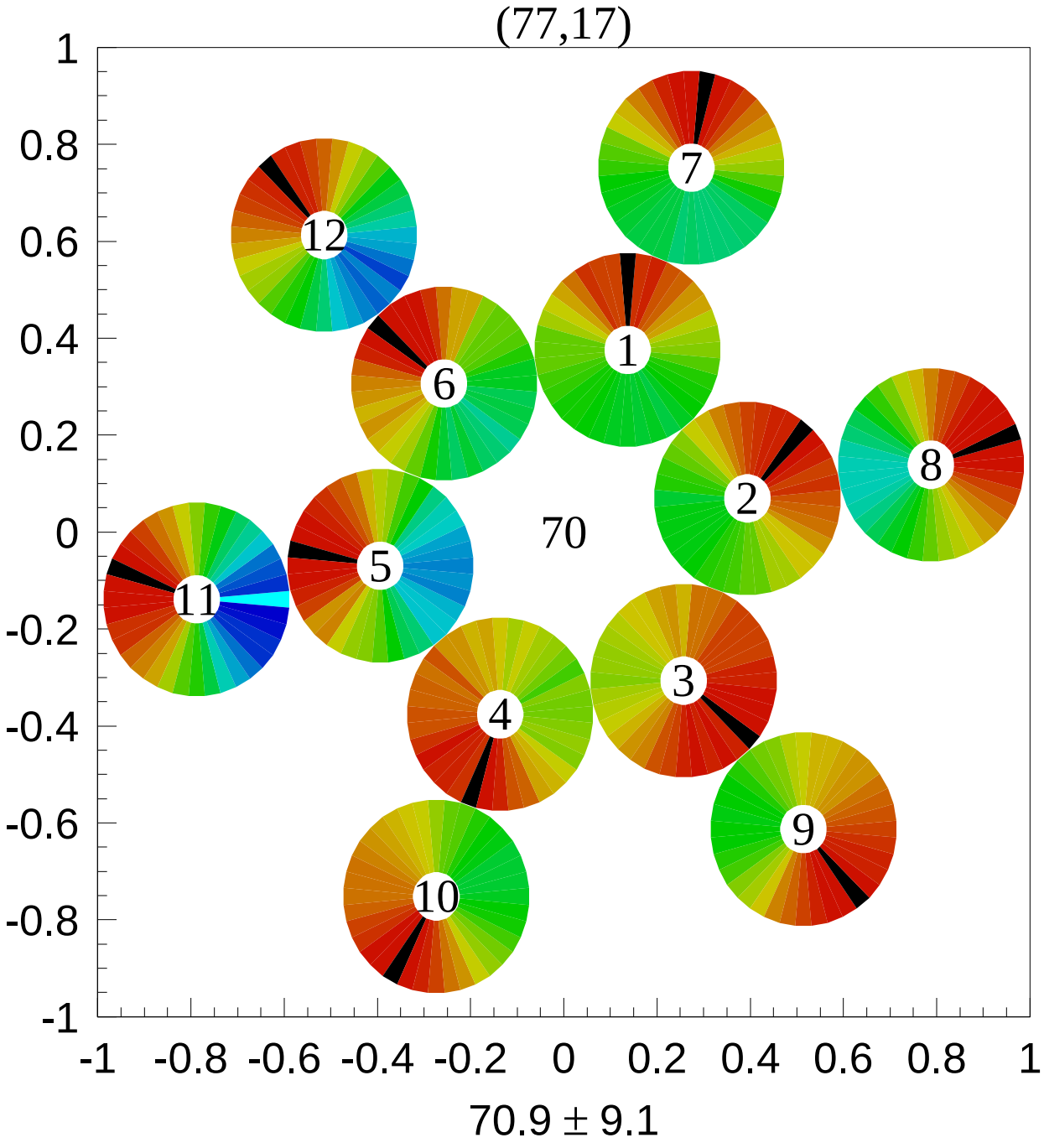

(77,15)
tilted LEDs
114 122 124 125 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 119 124 115 122 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

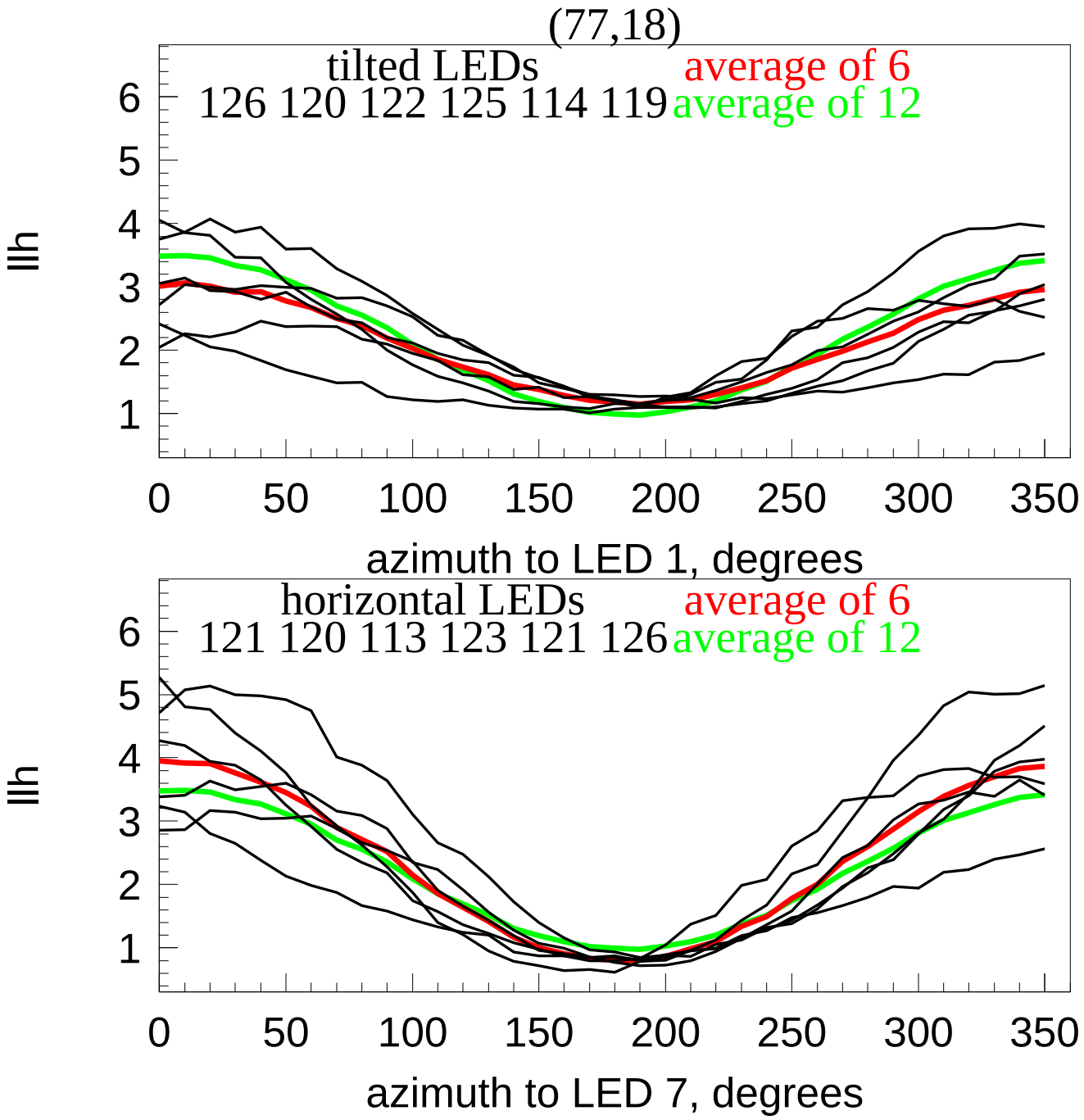

(77,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
220.9 ± 5.1

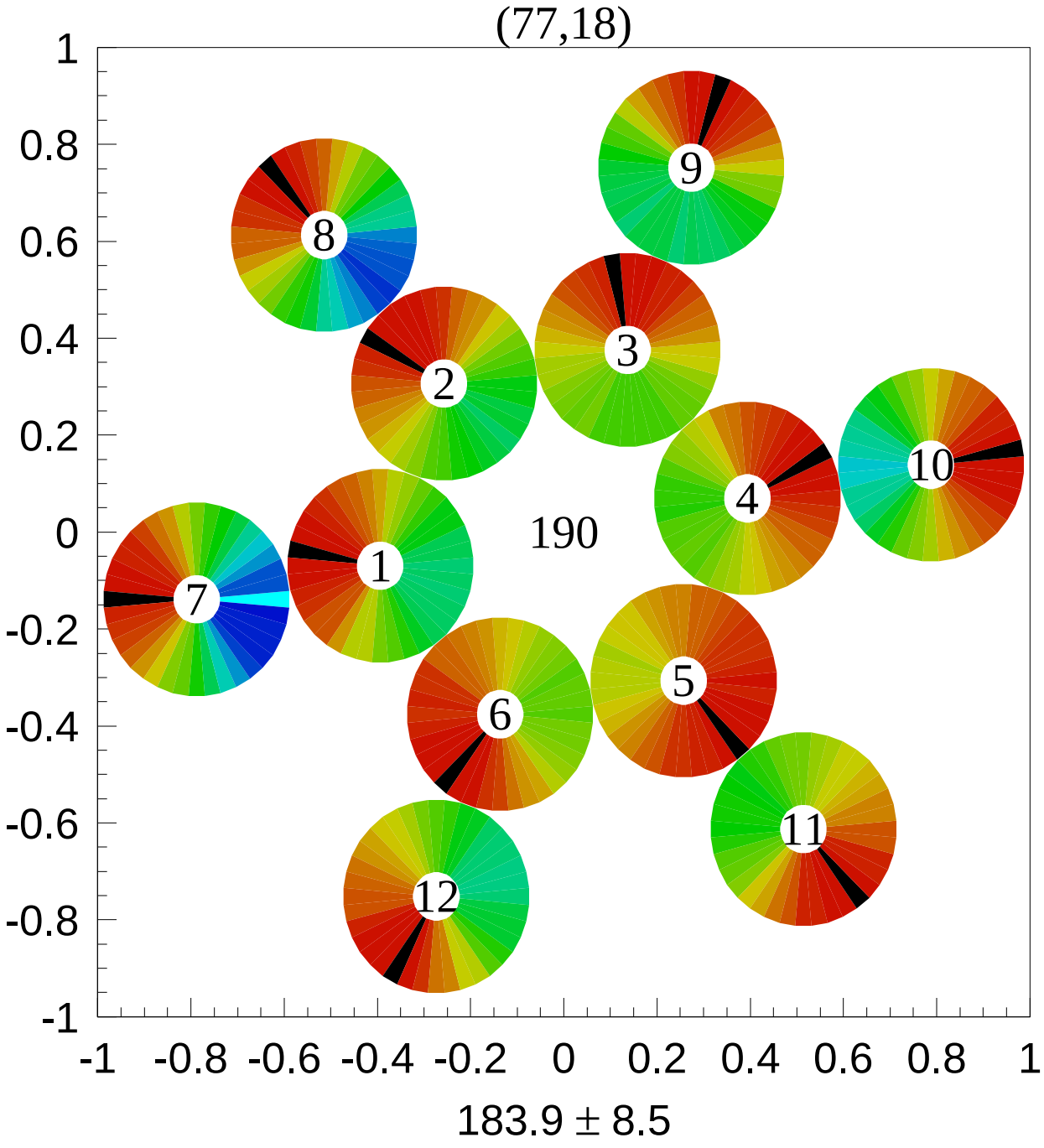

(77,16)
tilted LEDs
124 116 119 122 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 123 124 124 124 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

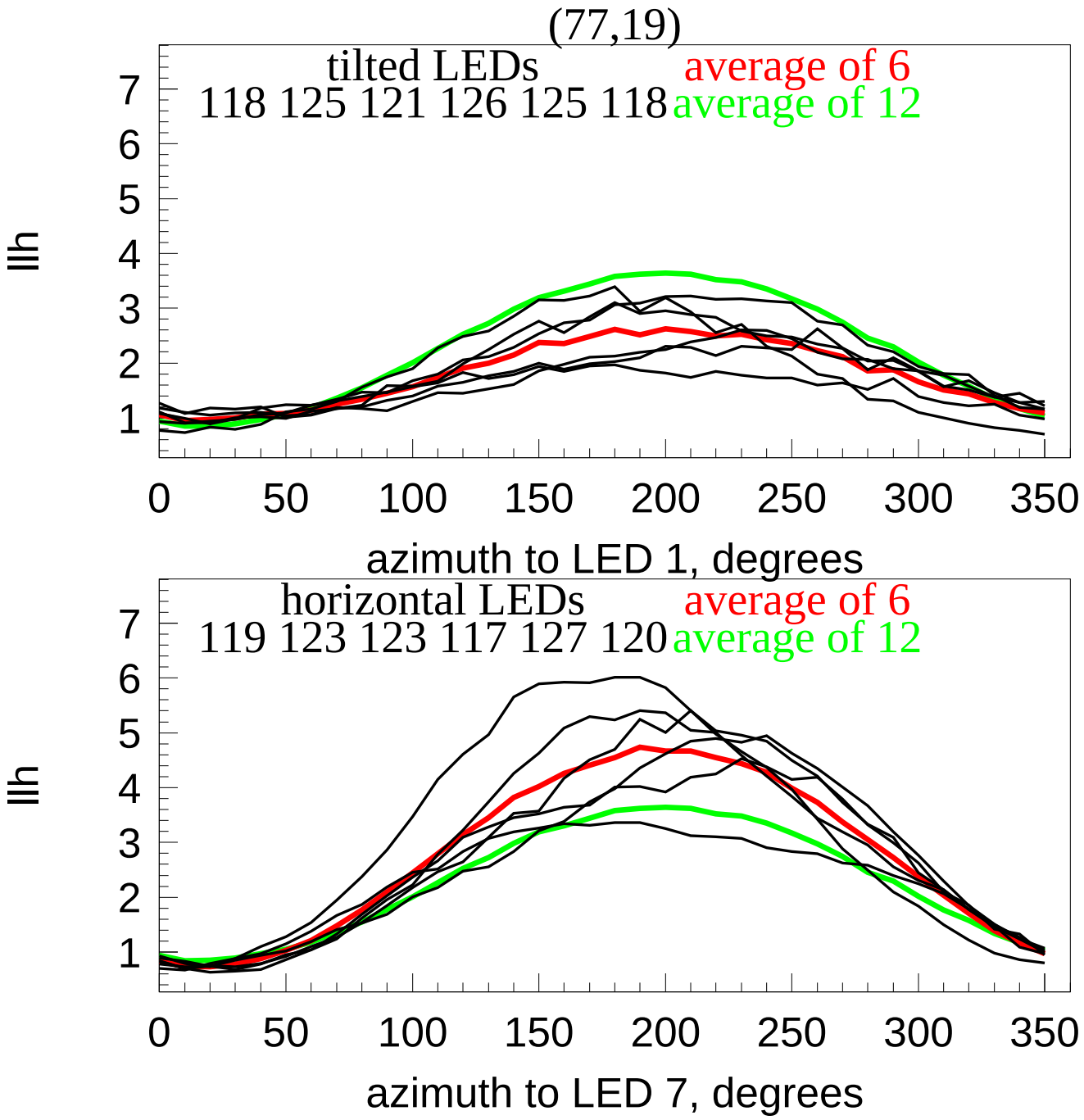

(77,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
308.6 ± 6.3

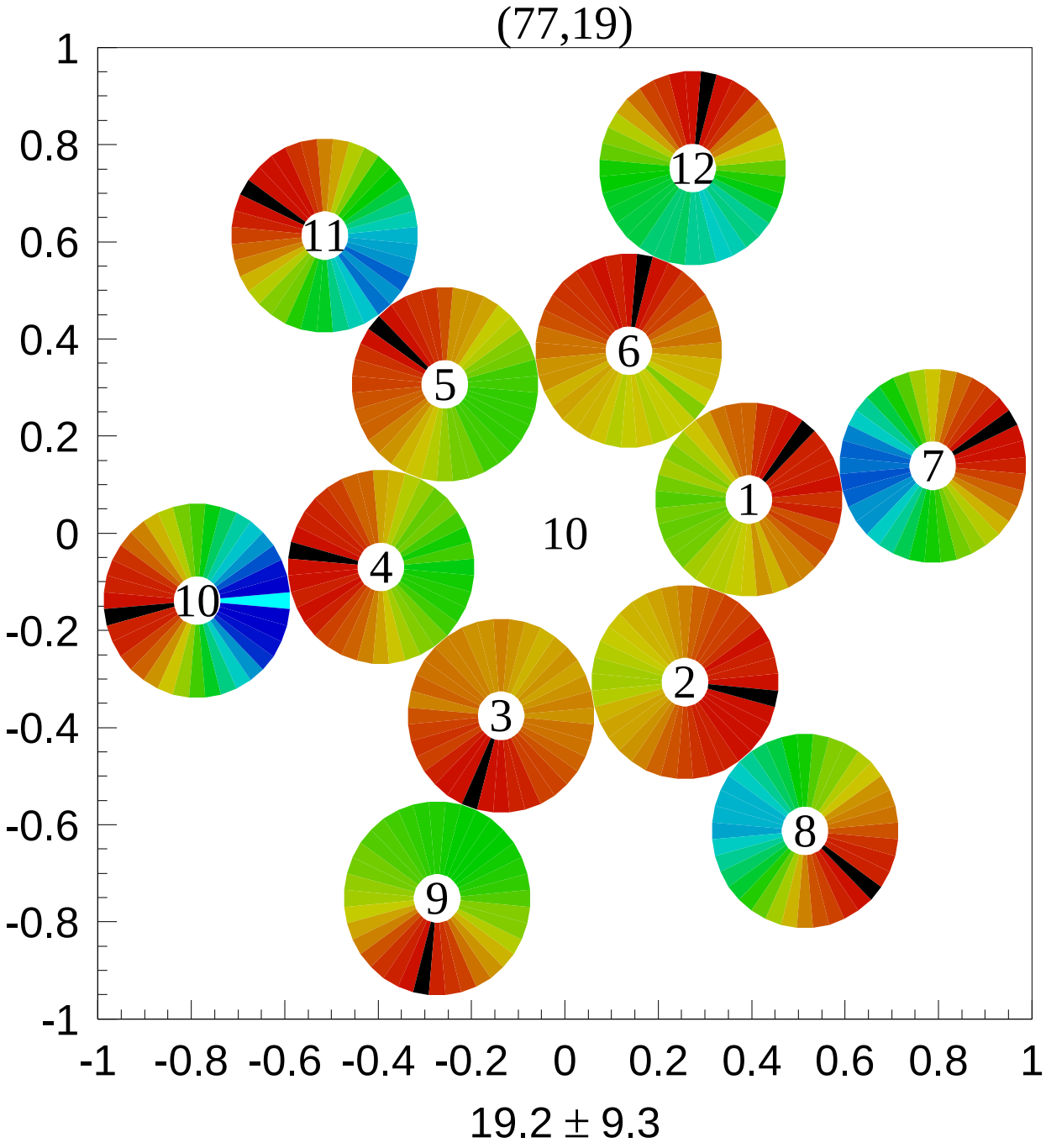

(77,17)
tilted LEDs
121 117 124 119 115 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 126 126 123 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

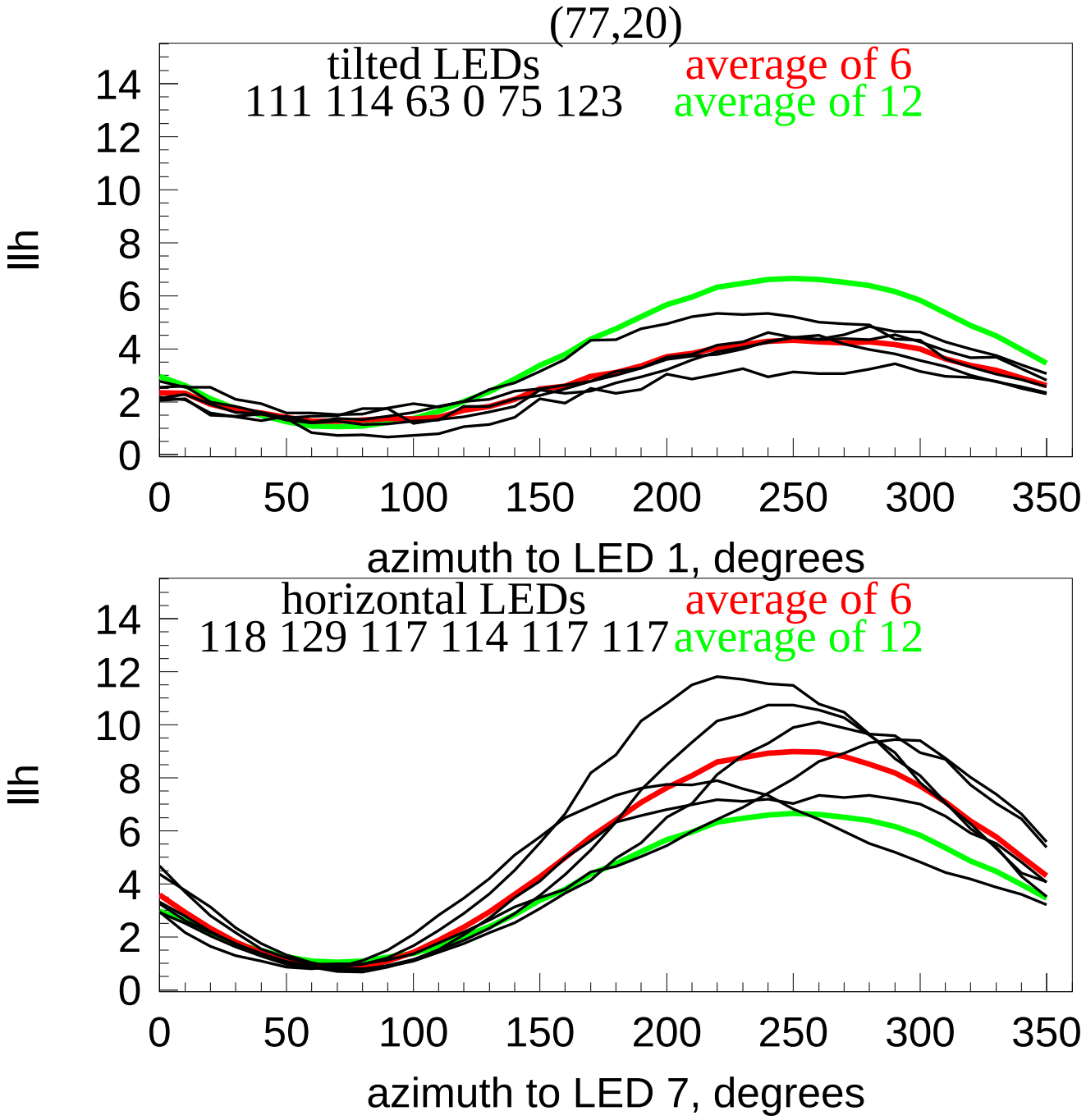

(77,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
70
12
7
1
6
2
8
5
11
3
4
9
10
70.9 ± 9.1

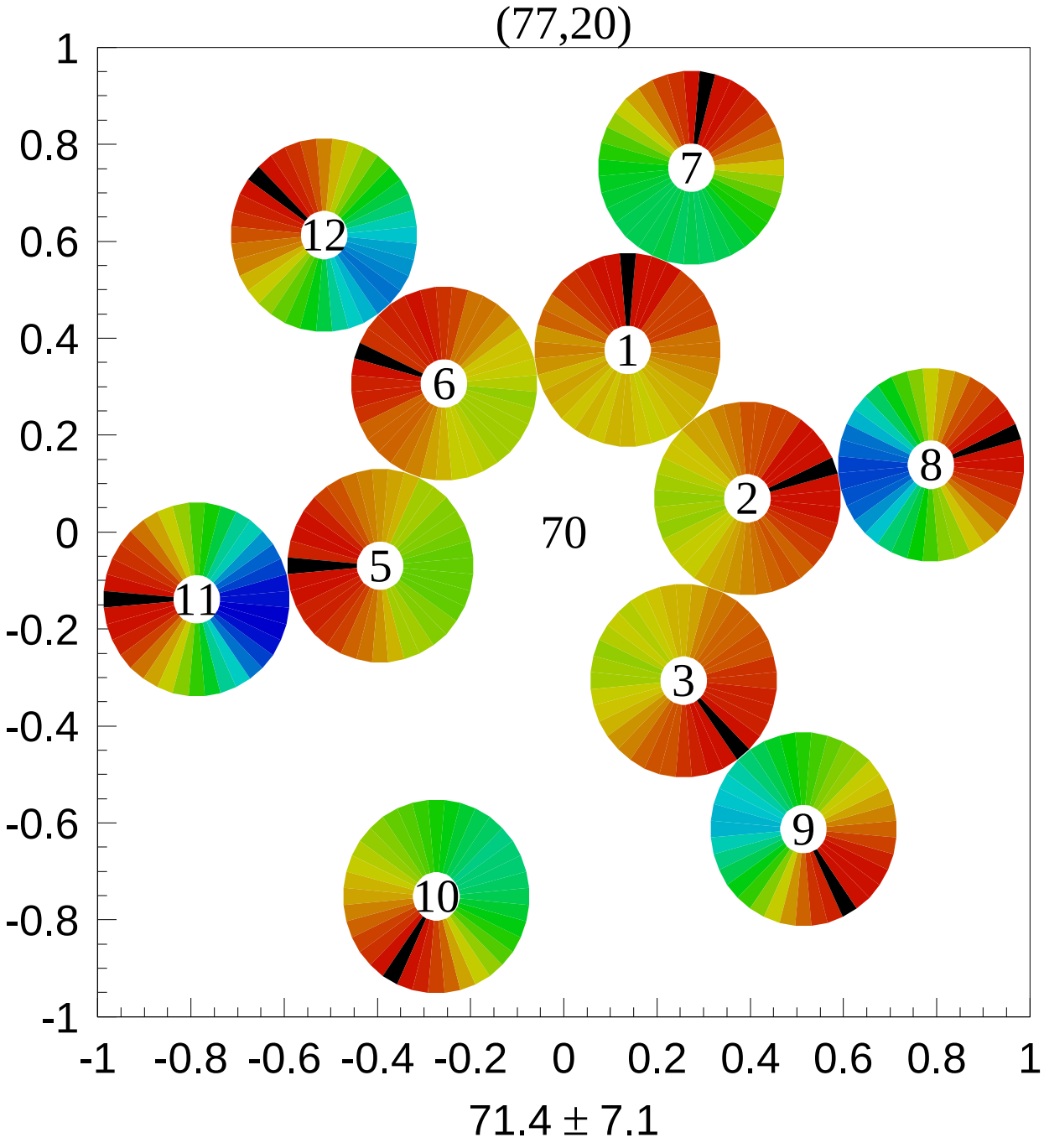

(77,18)
tilted LEDs
126 120 122 125 114 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 120 113 123 121 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

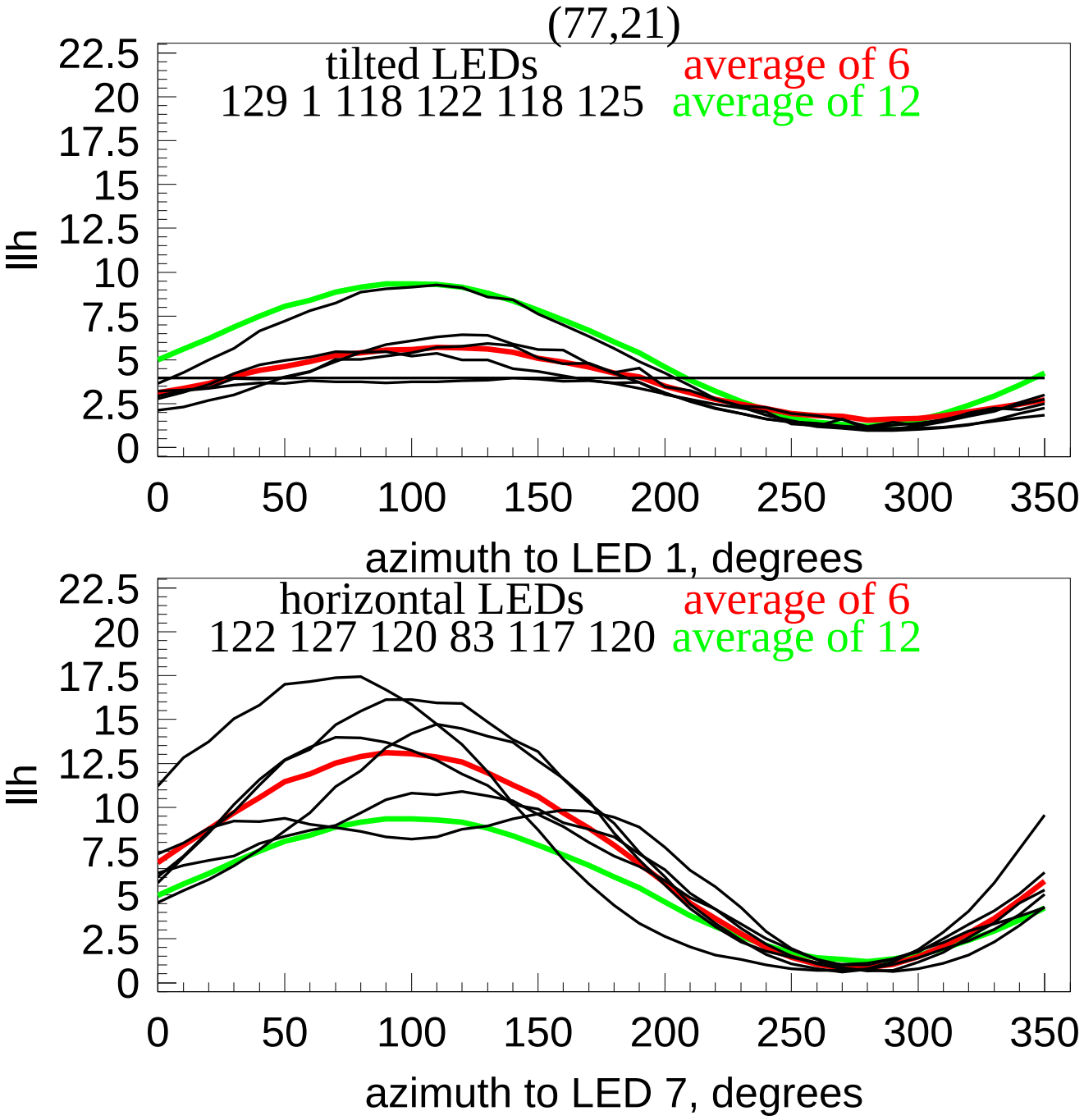

(77,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
183.9 ± 8.5
190
1
2
3
4
5
6
7
8
9
10
11
12

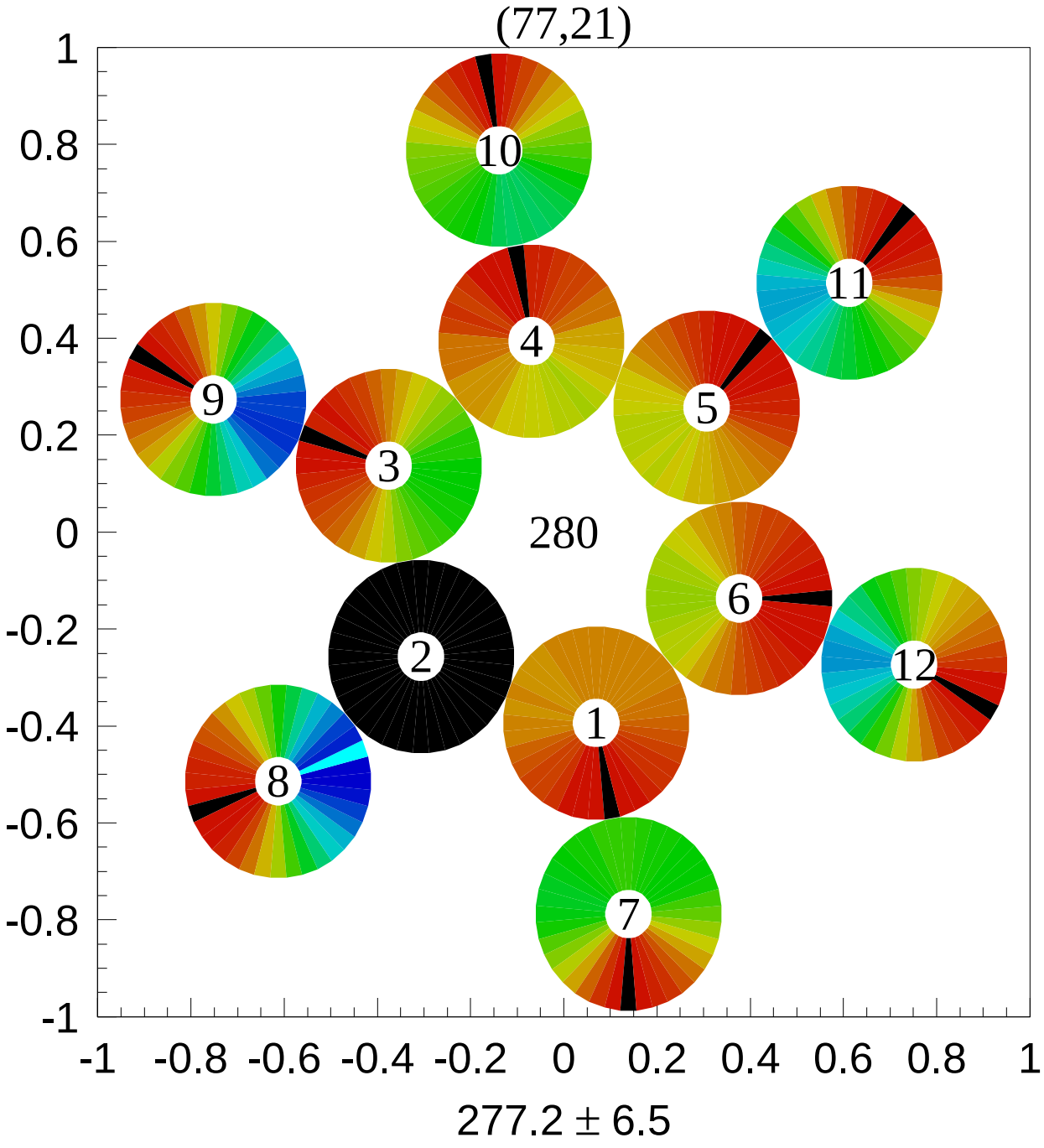

(77,19)
tilted LEDs
118 125 121 126 125 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 123 117 127 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

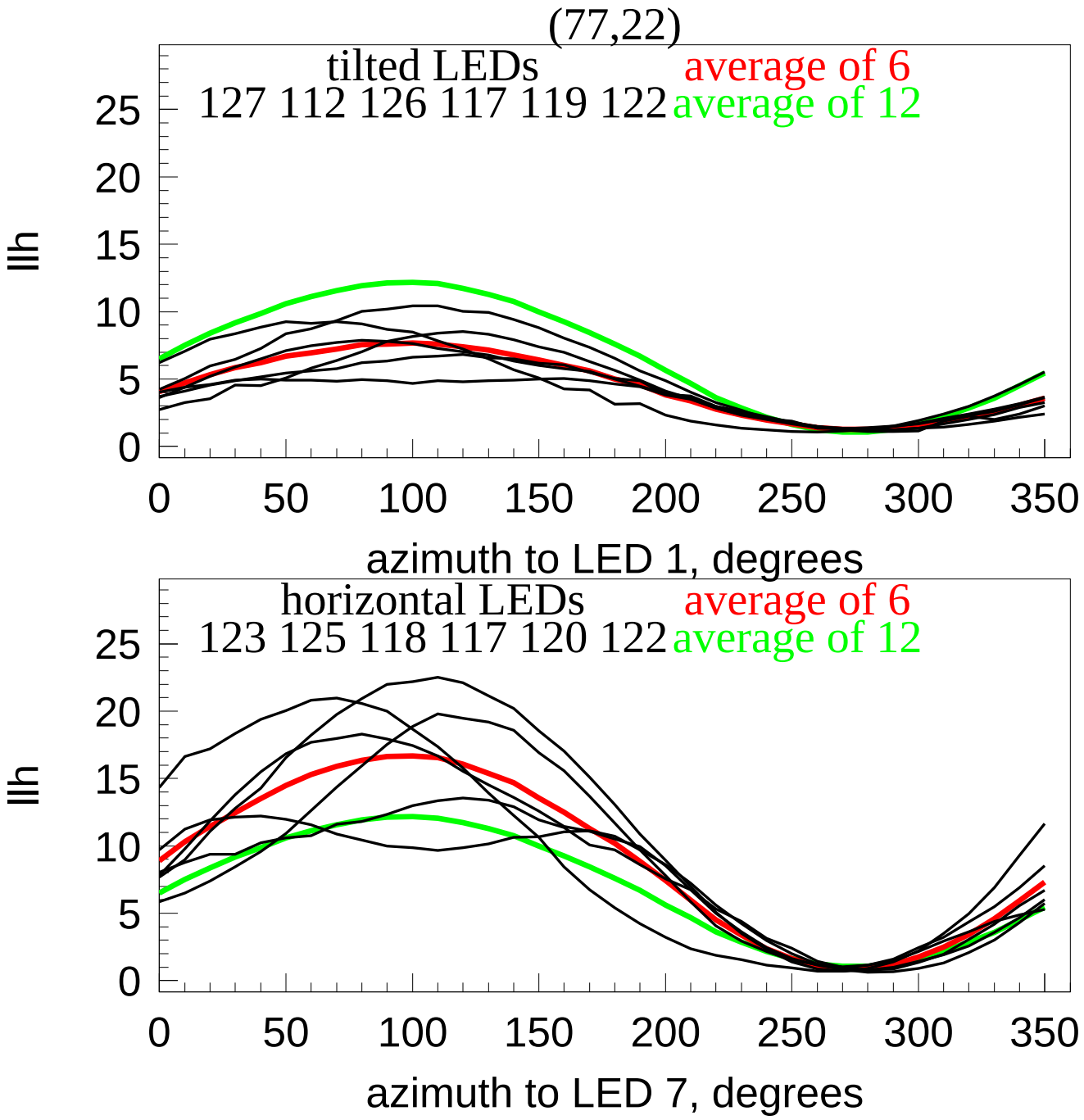

(77,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
19.2 ± 9.3
12
11
6
5
7
1
10
4
10
2
3
8
9

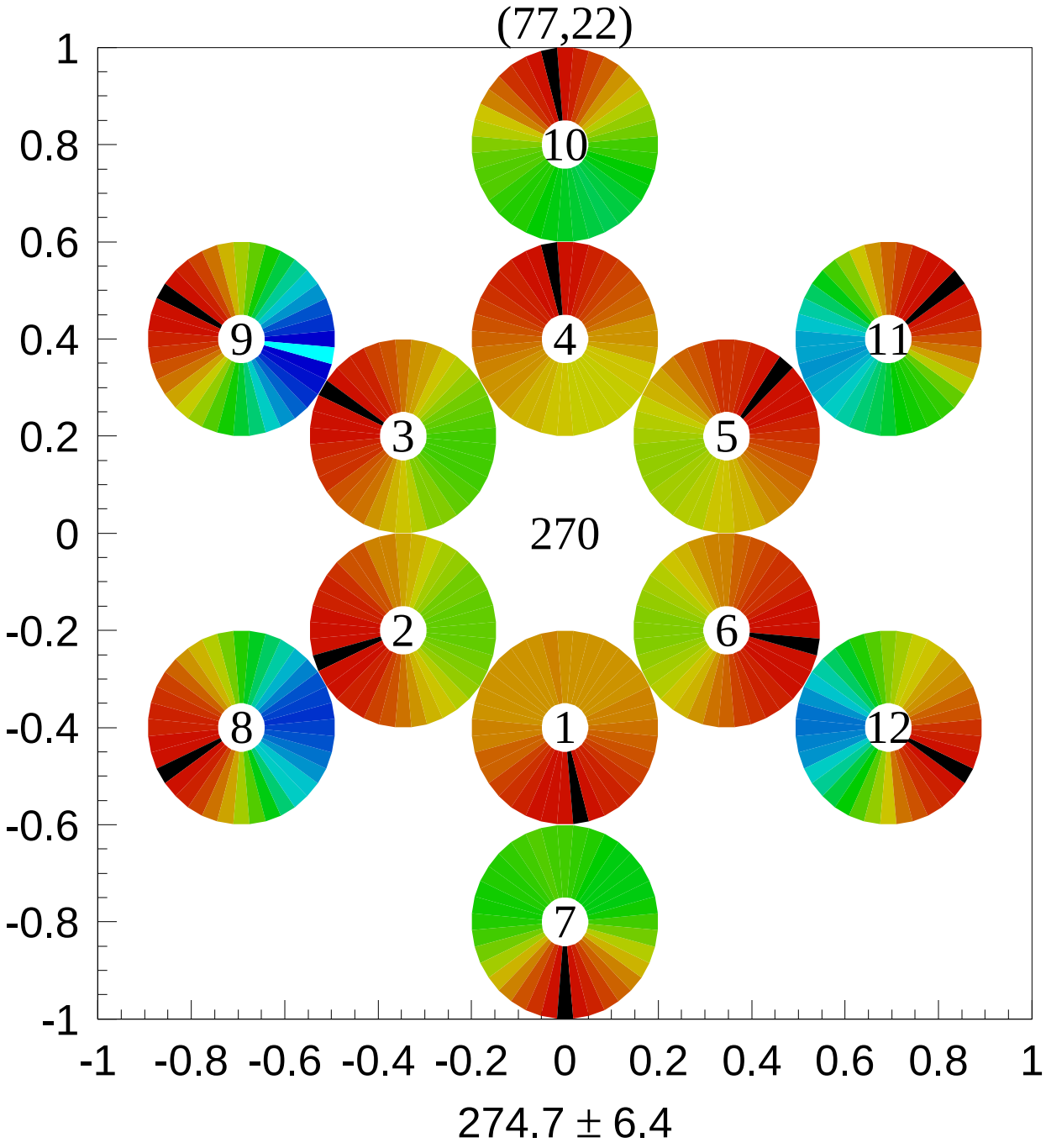

(77,20)
tilted LEDs
111 114 63 0 75 123
average of 6
average of 12
Ilh
0
2
4
6
8
10
12
14
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 129 117 114 117 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

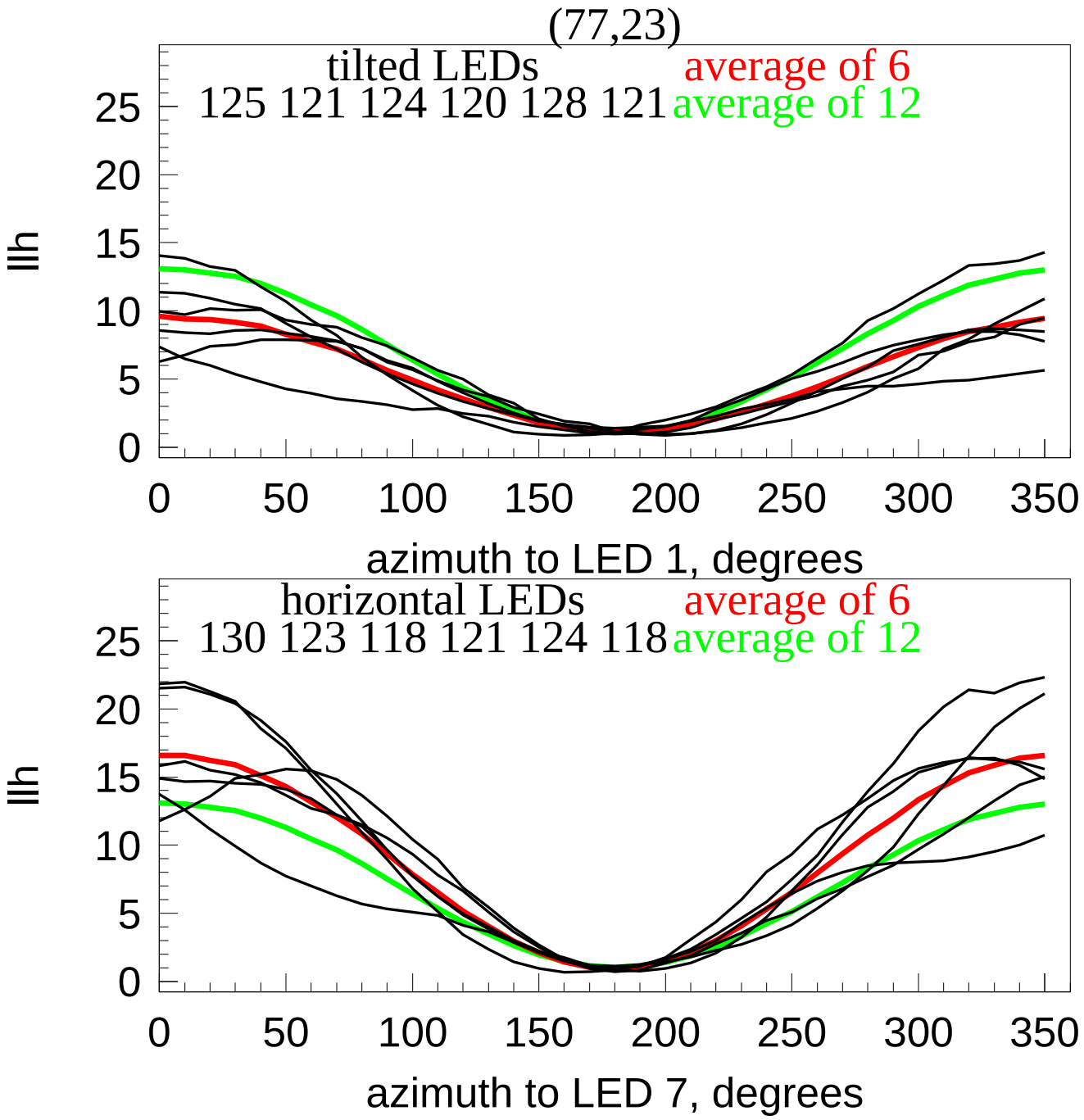

(77,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
11
70
3
9
10
71.4 ± 7.1

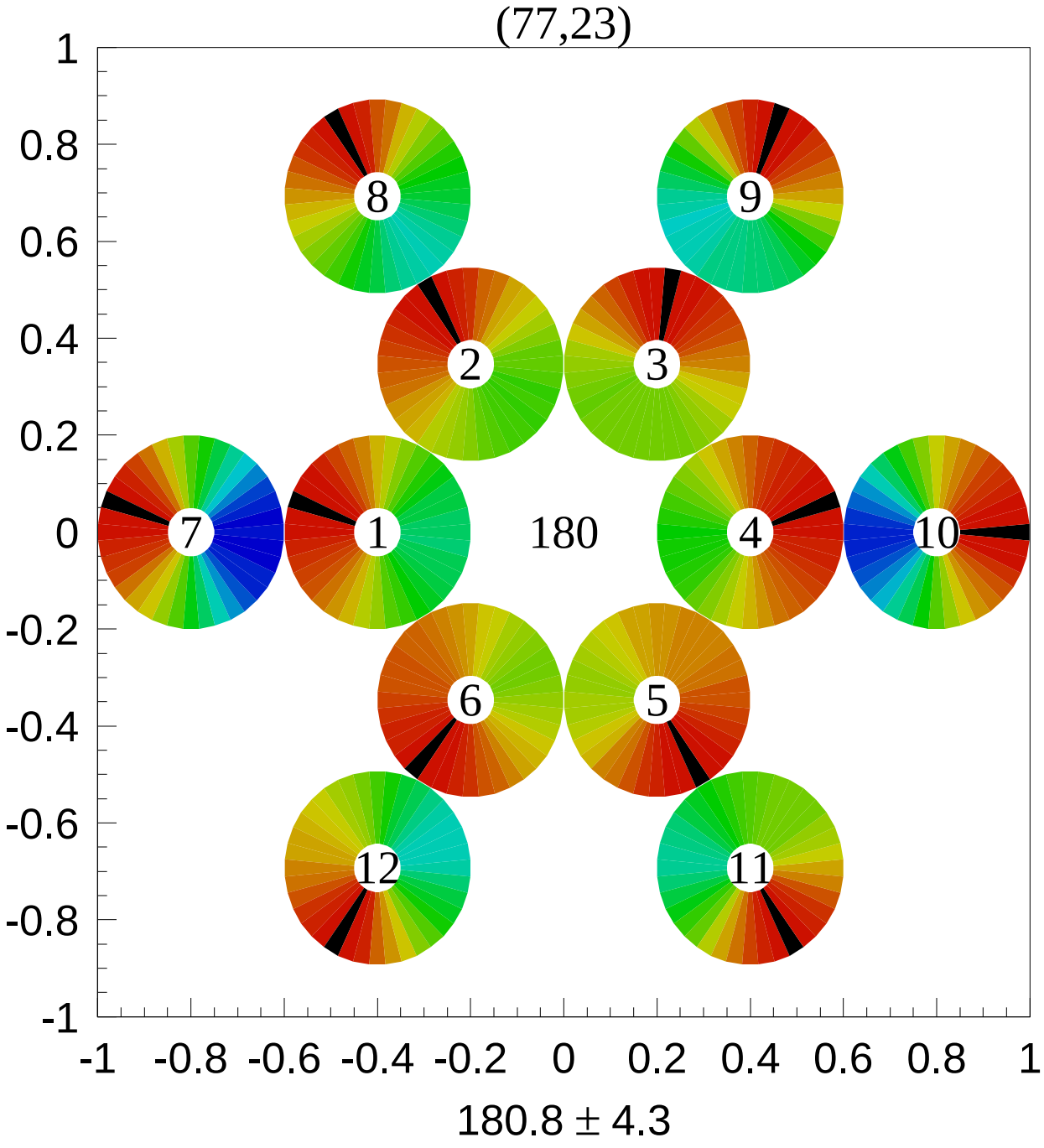

(77,21)
tilted LEDs
129 1 118 122 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 127 120 83 117 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

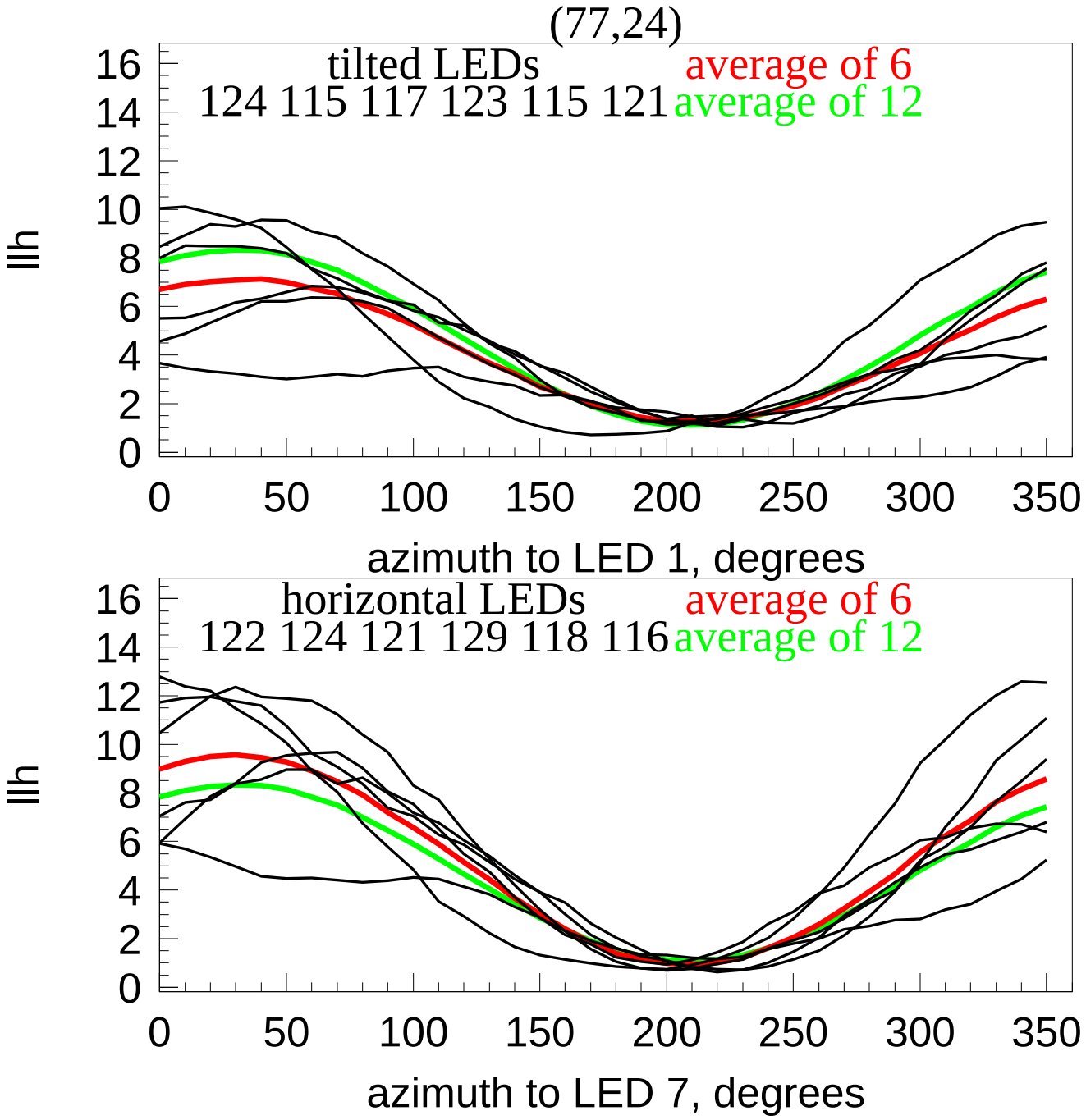

(77,21)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
9
5
3
280
6
12
2
1
8
7
277.2 ± 6.5

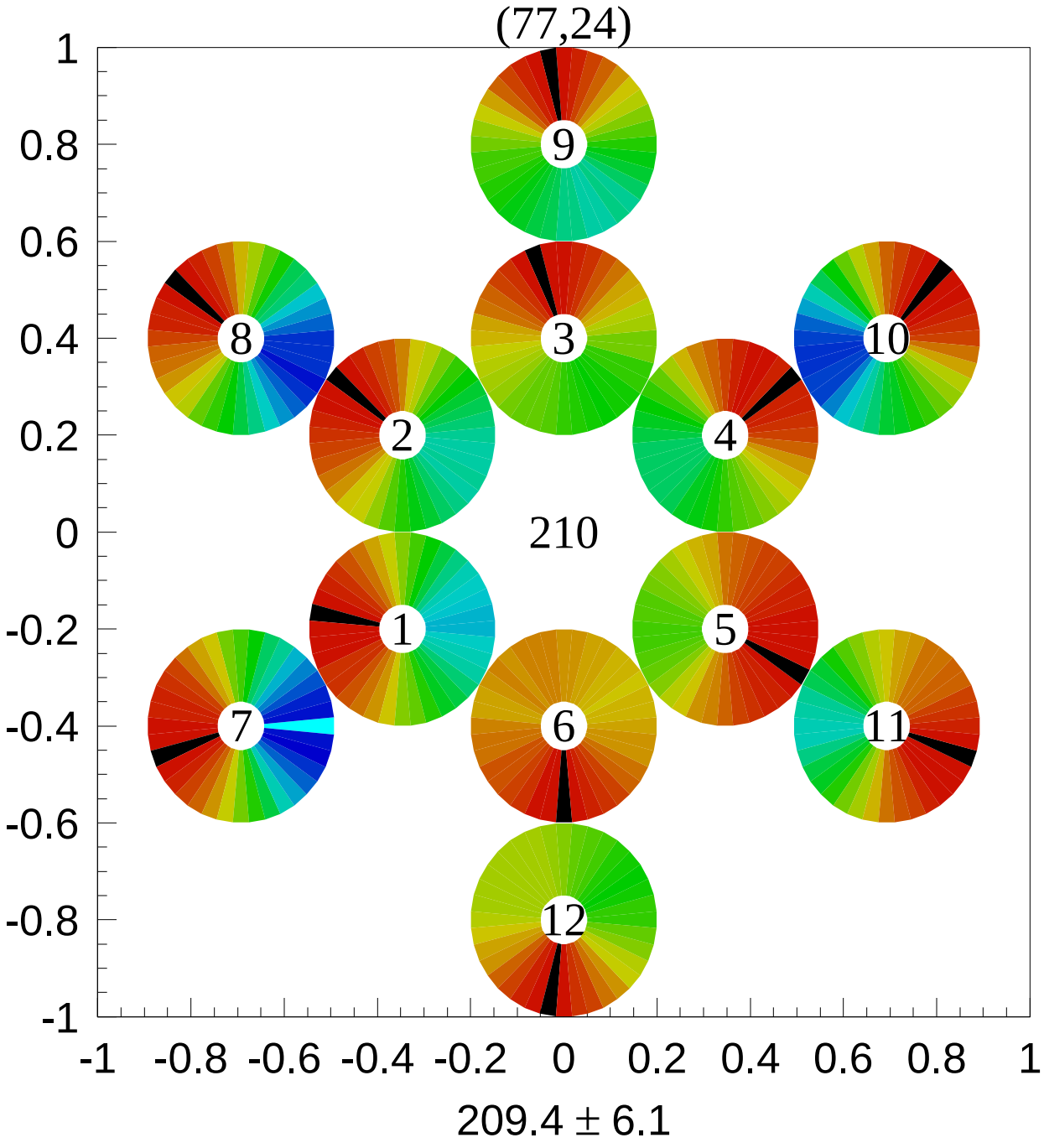

(77,22)
tilted LEDs
127 112 126 117 119 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 125 118 117 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

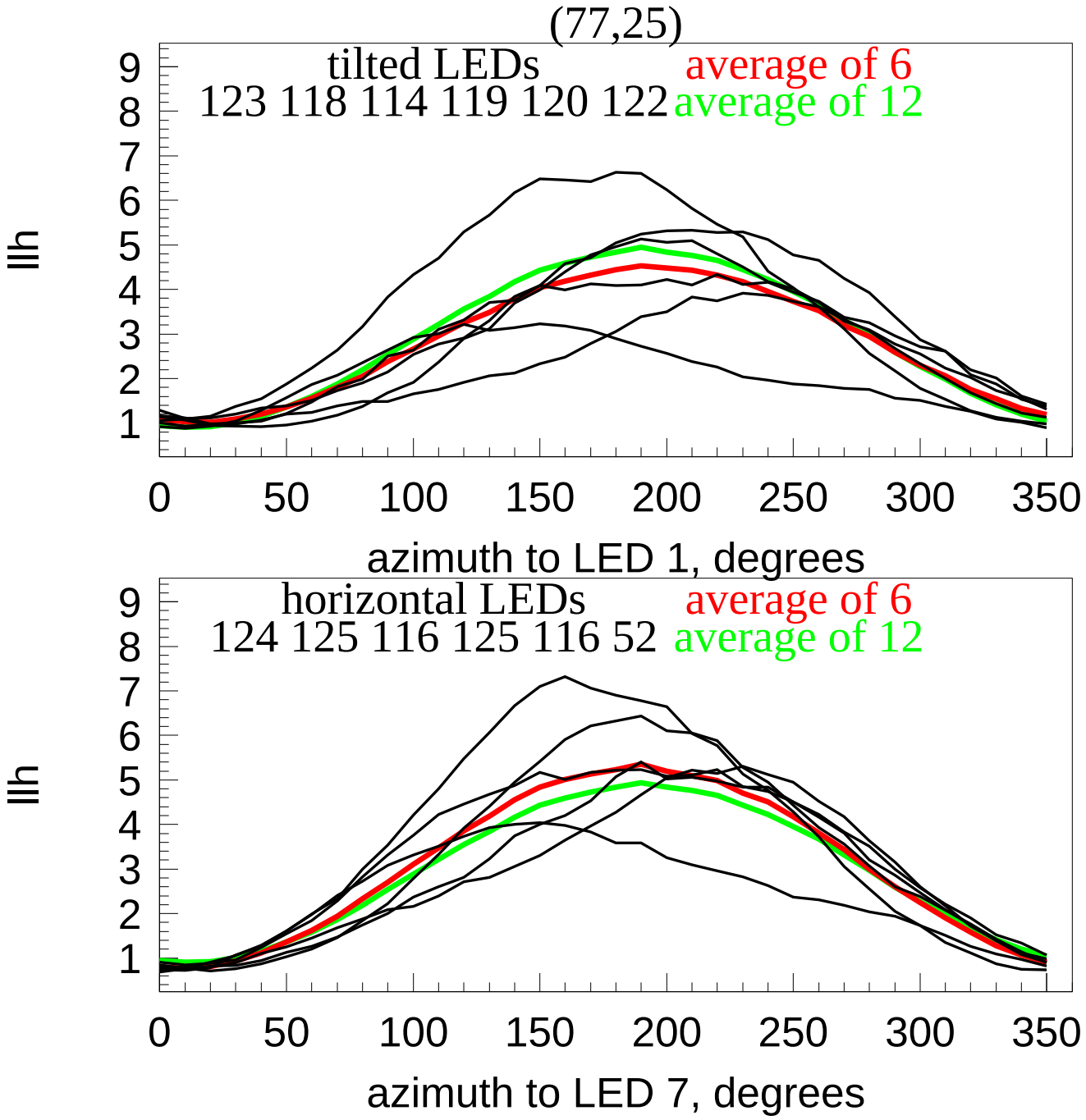

(77,22)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
274.7 ± 6.4

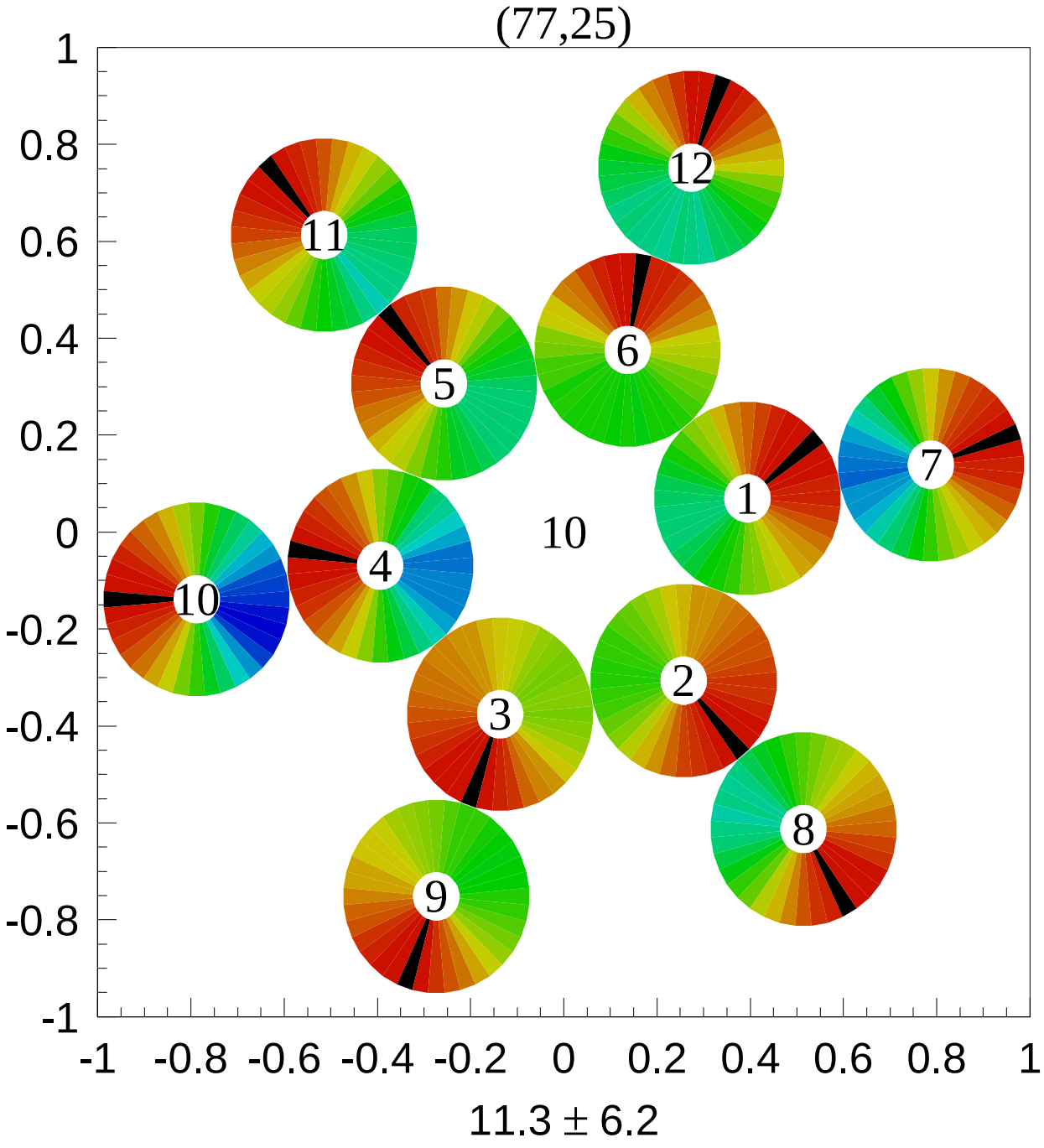

(77,23)
tilted LEDs
125 121 124 120 128 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 123 118 121 124 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

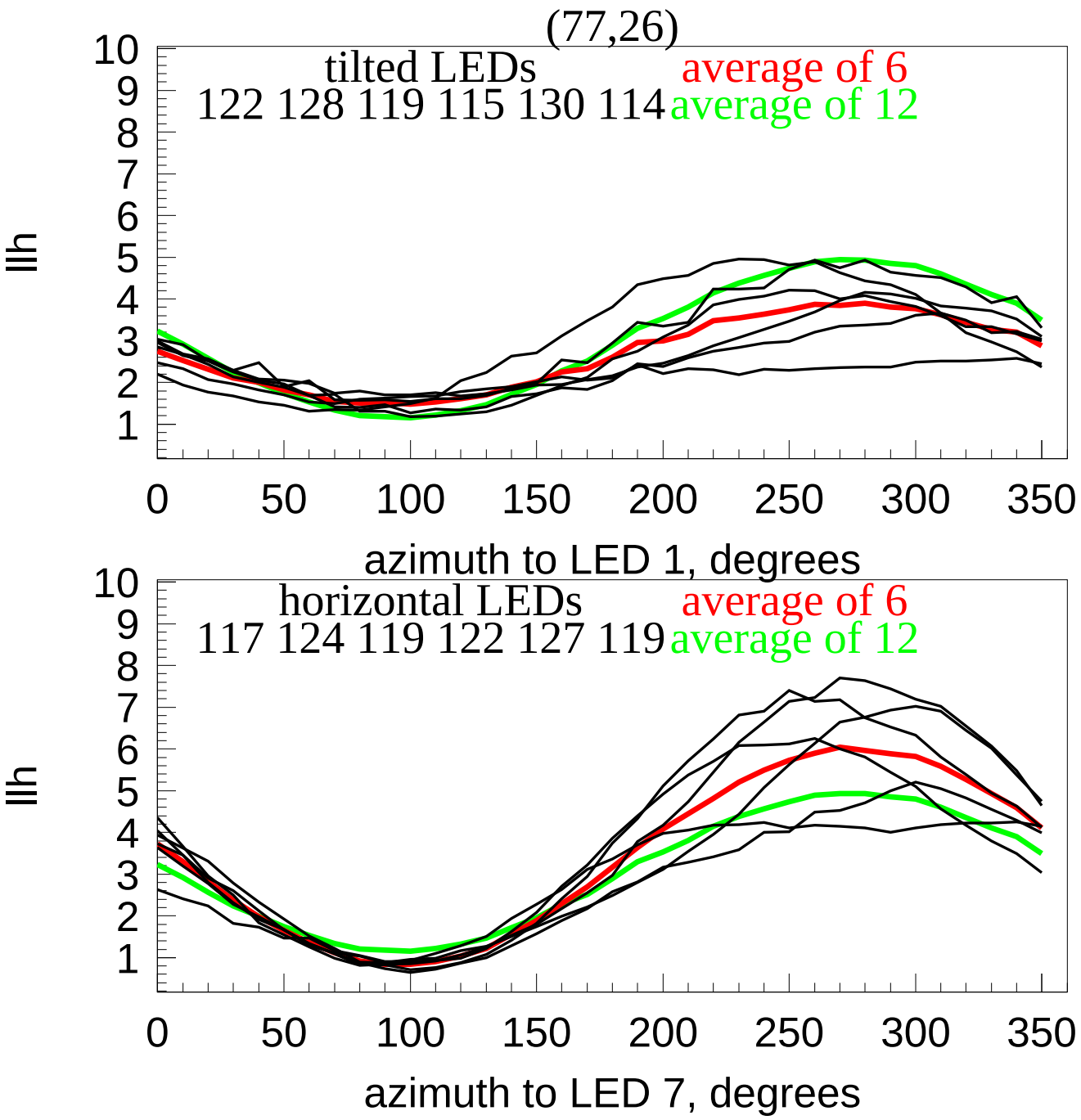

(77,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
180.8 ± 4.3
8
9
2
3
7
1
180
4
10
6
5
12
11

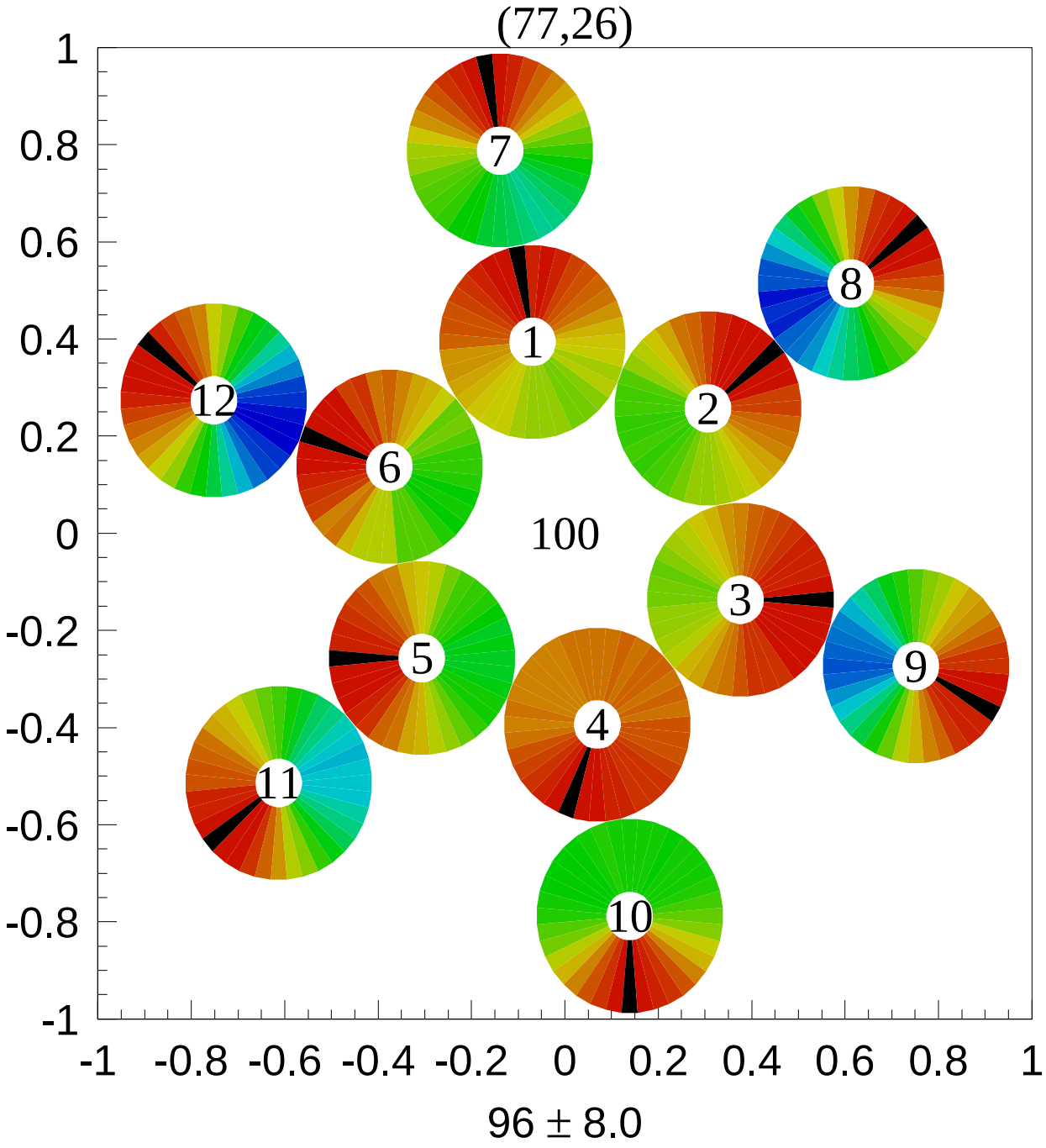

(77,24)
tilted LEDs
124 115 117 123 115 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 121 129 118 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

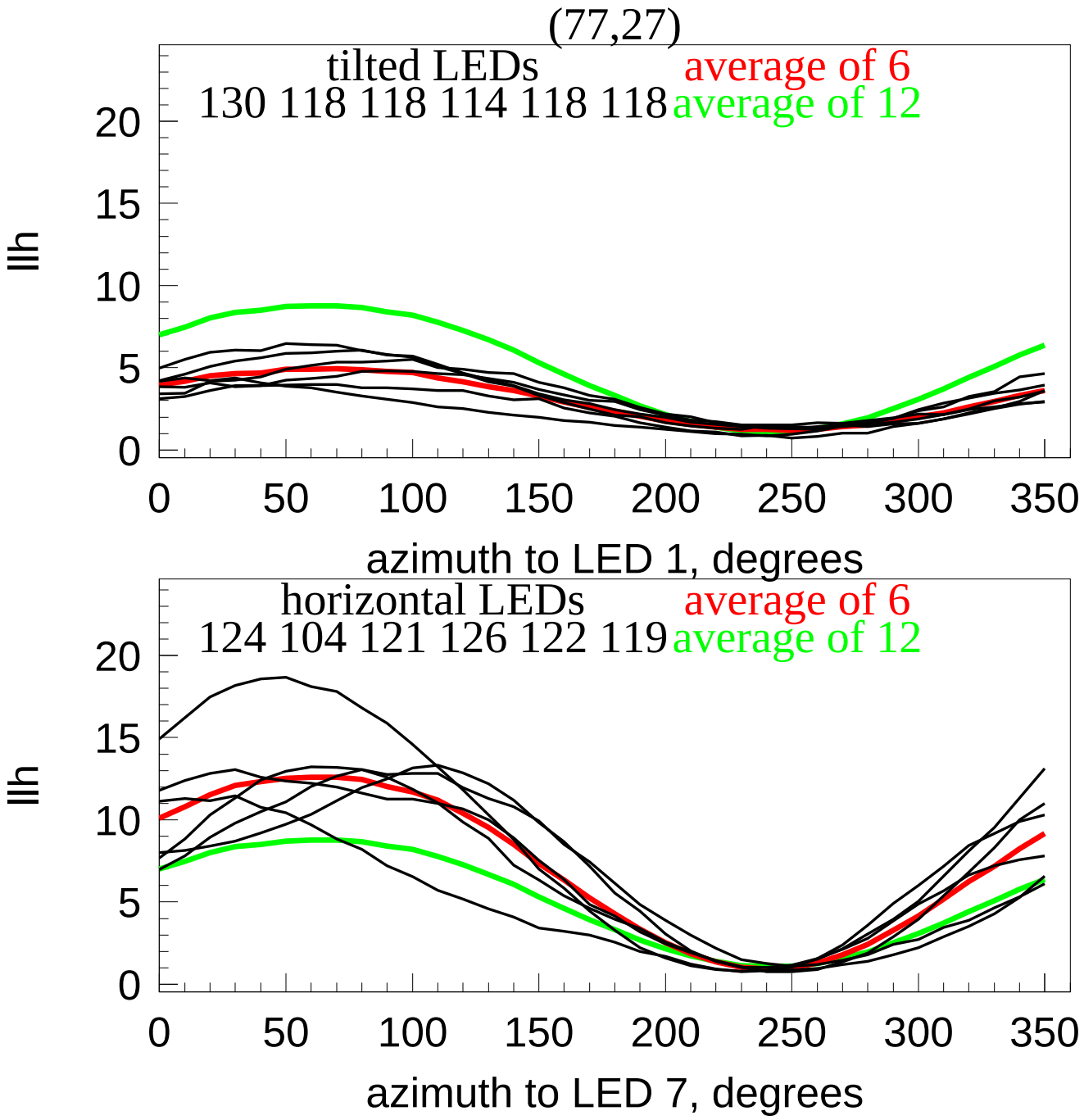

(77,24)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
209.4 ± 6.1

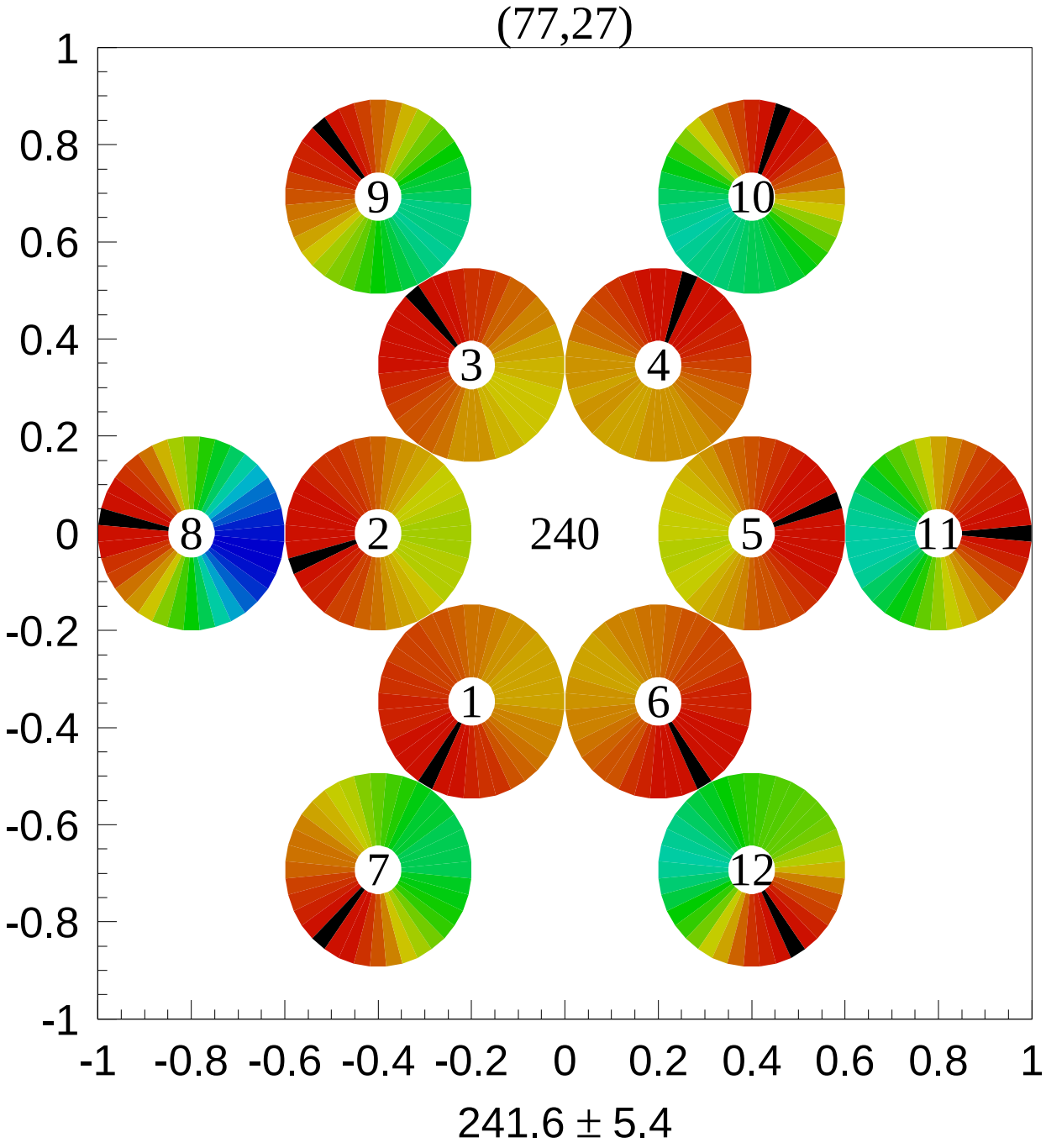

(77,25)
tilted LEDs
123 118 114 119 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 116 125 116 52
average of 6
average of 12
llh
azimuth to LED 7, degrees

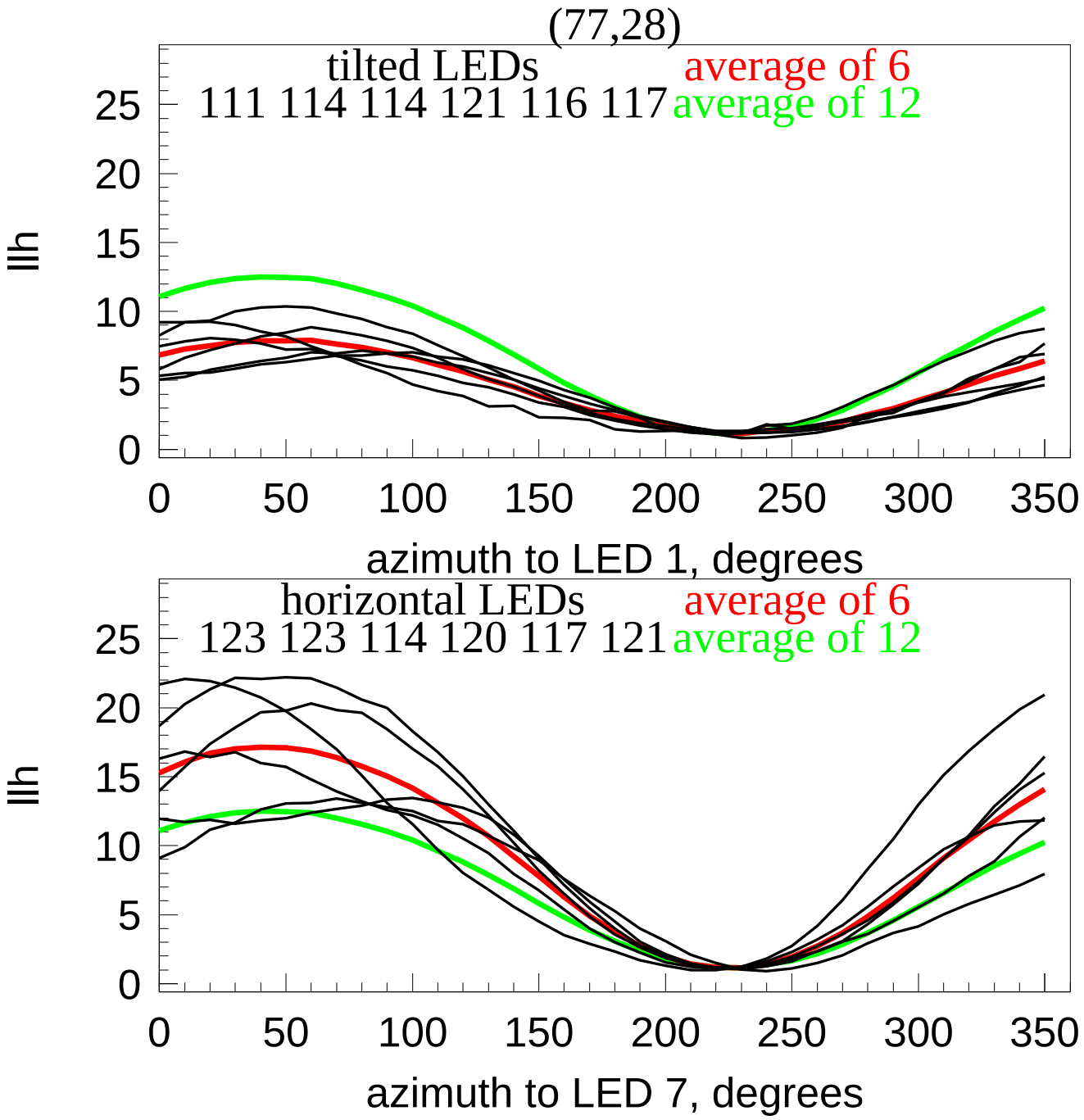

(77,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11.3 ± 6.2
12
11
6
5
7
1
10
4
10
2
3
8
9

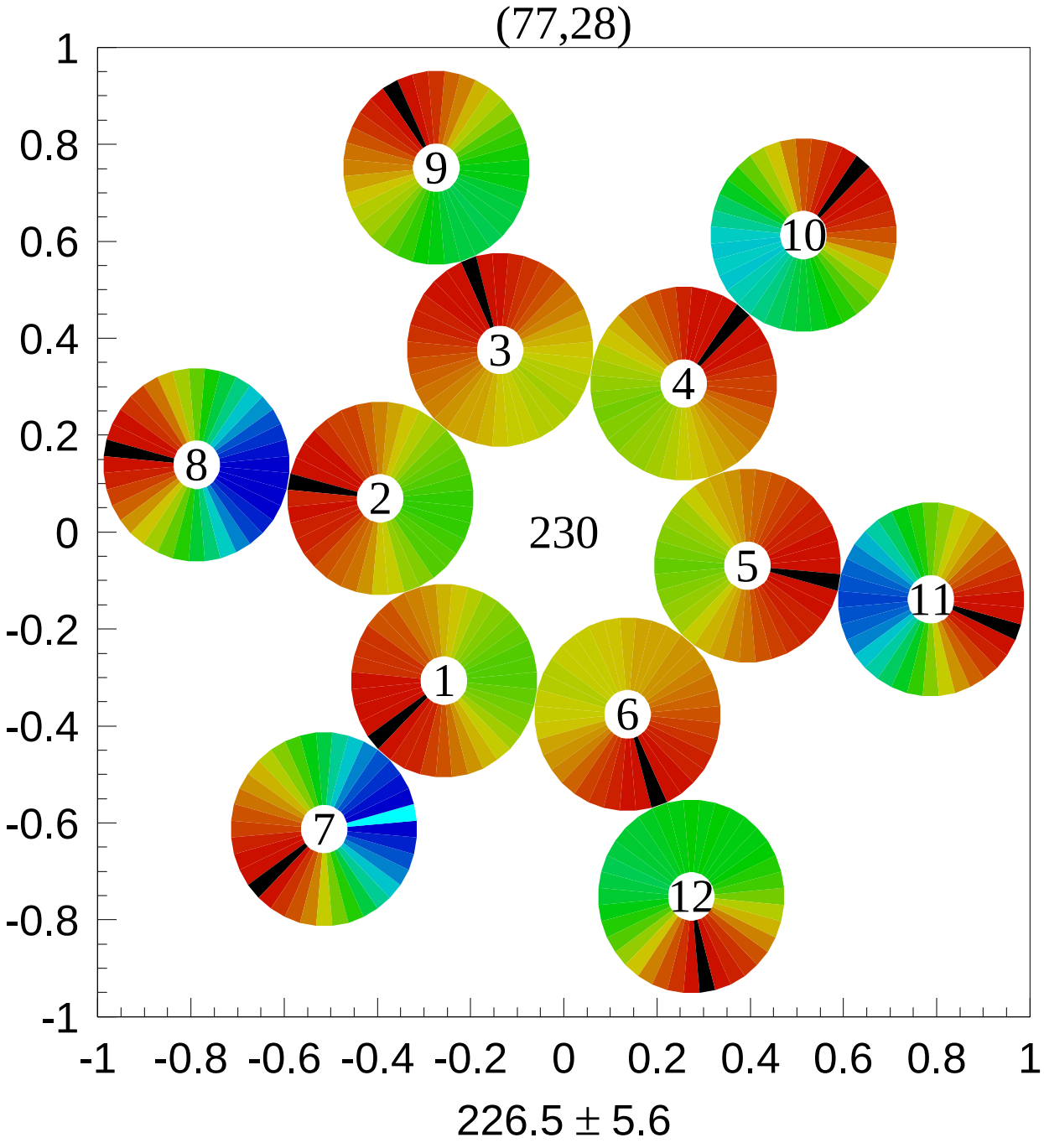

(77,26)
tilted LEDs
122 128 119 115 130 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 124 119 122 127 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

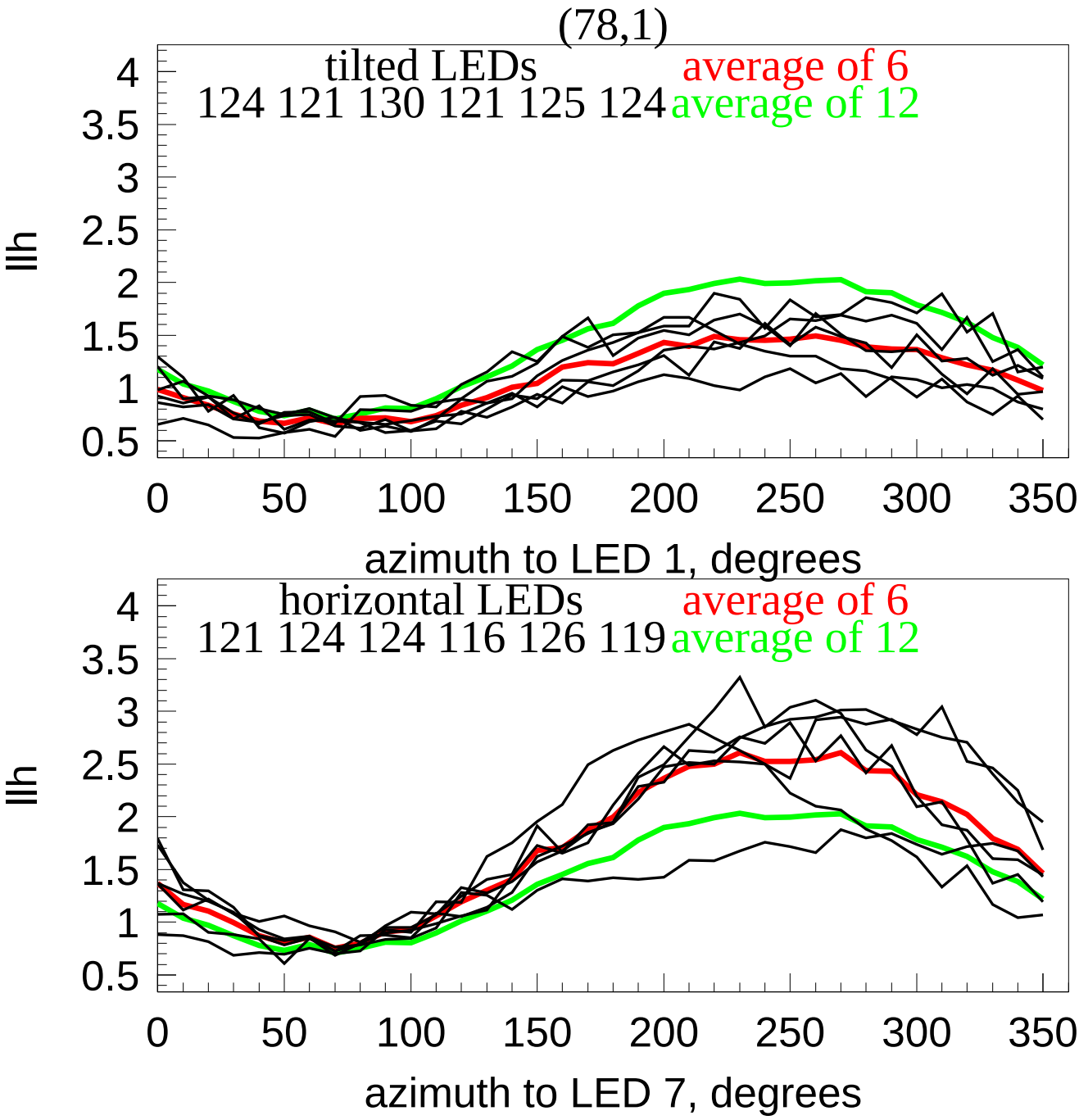

(77,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
96 ± 8.0

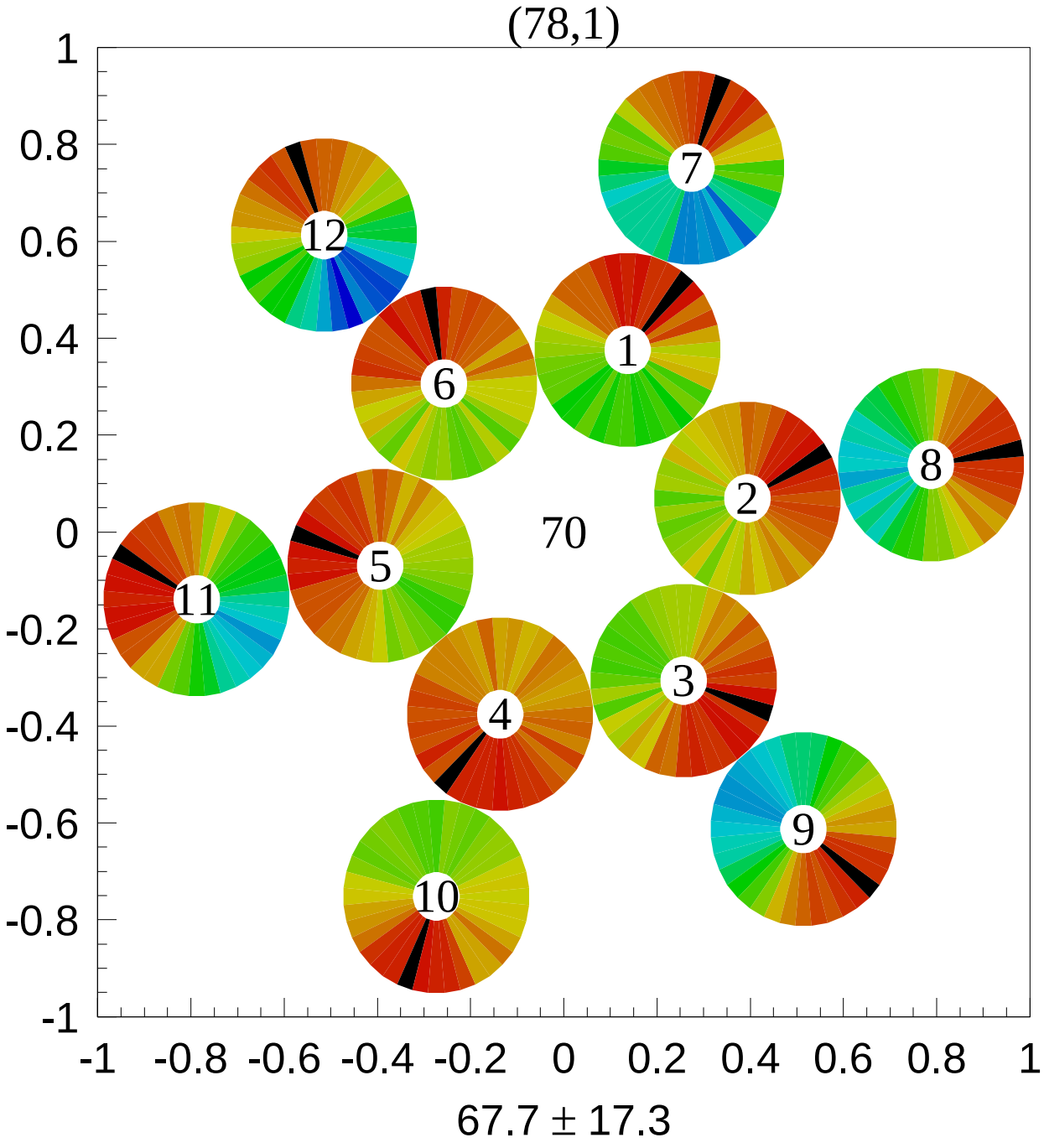

(77,27)
tilted LEDs
130 118 118 114 118 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 104 121 126 122 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

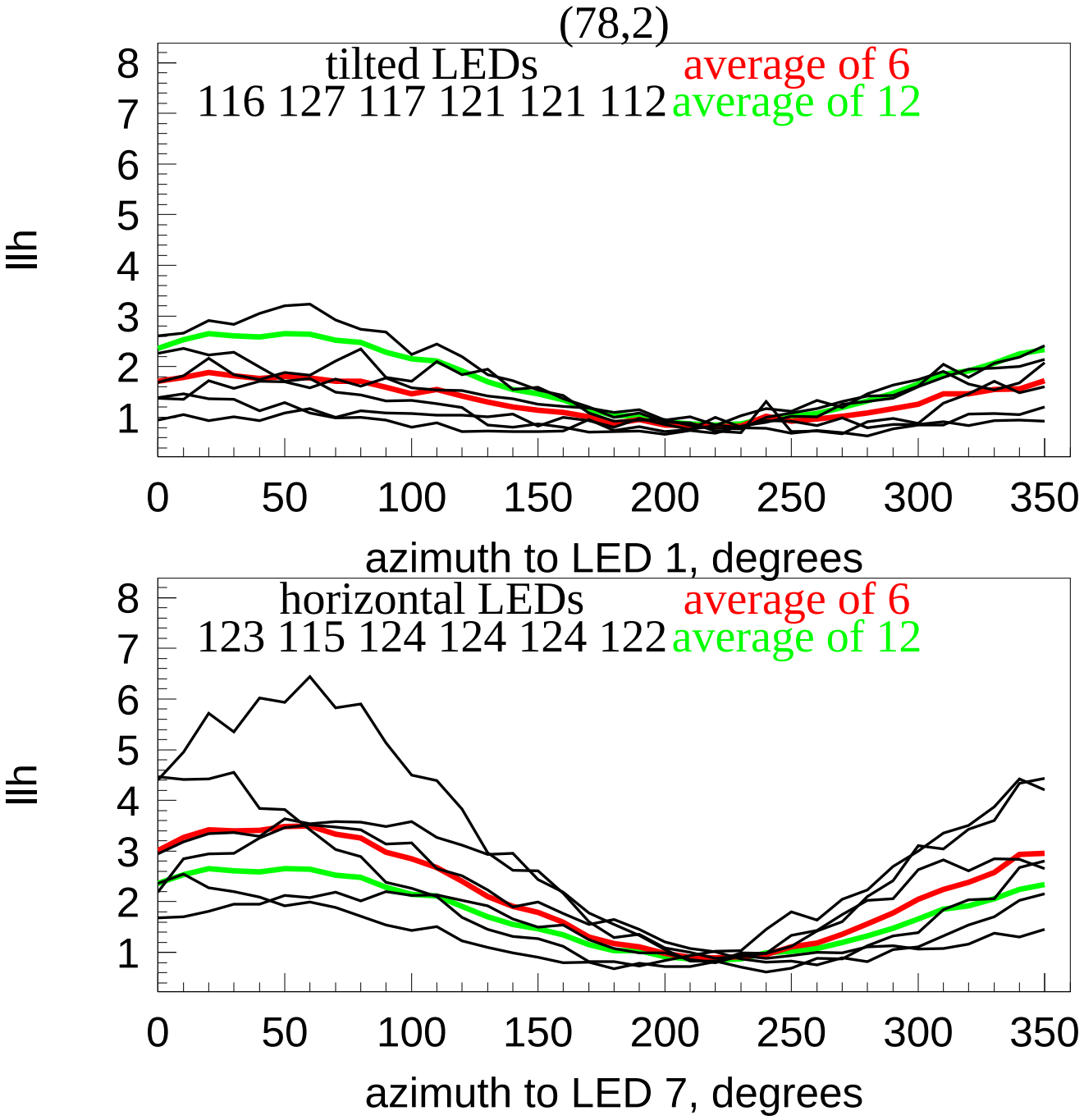

(77,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
241.6 ± 5.4

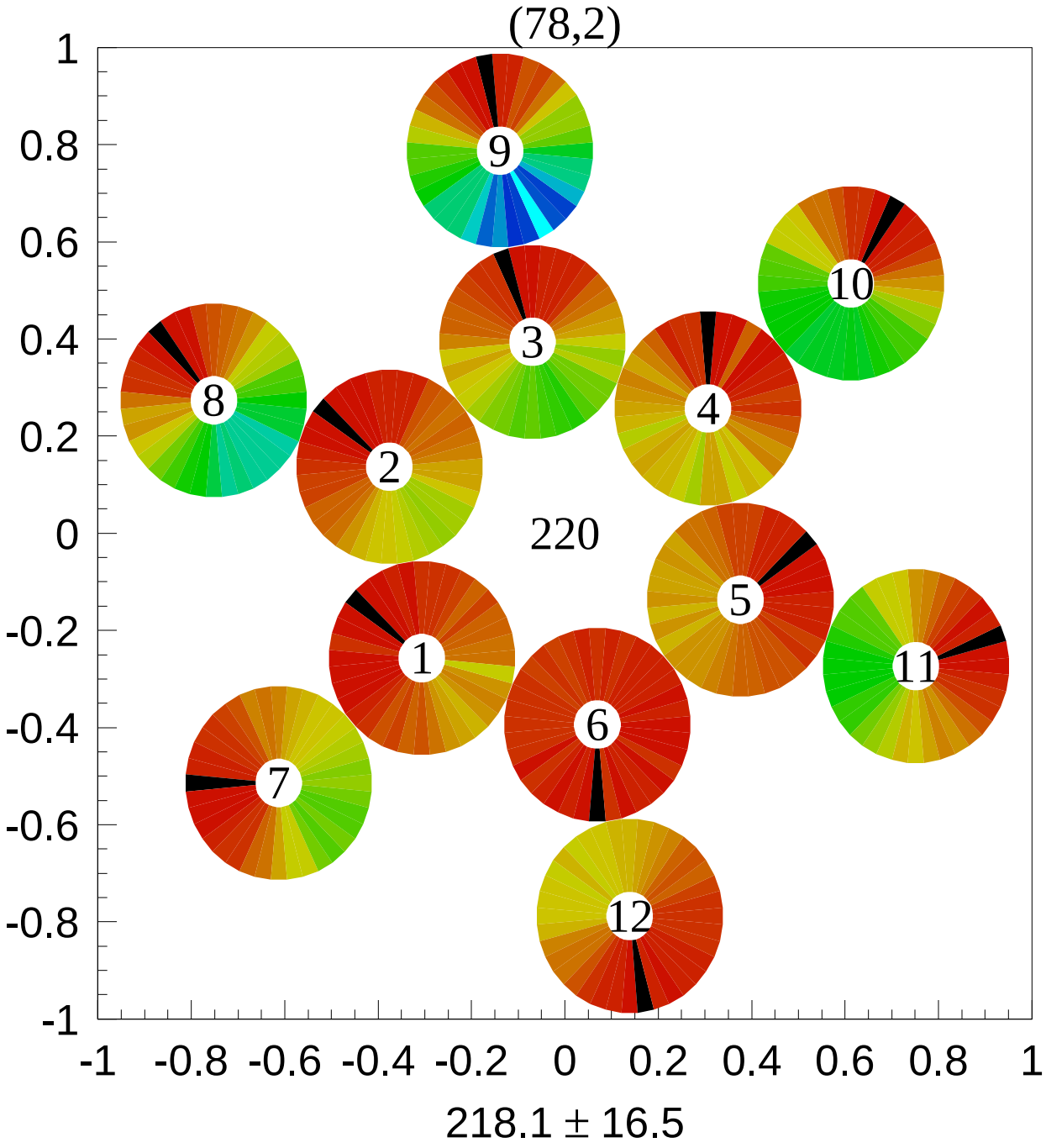

(77,28)
tilted LEDs
111 114 114 121 116 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 123 114 120 117 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

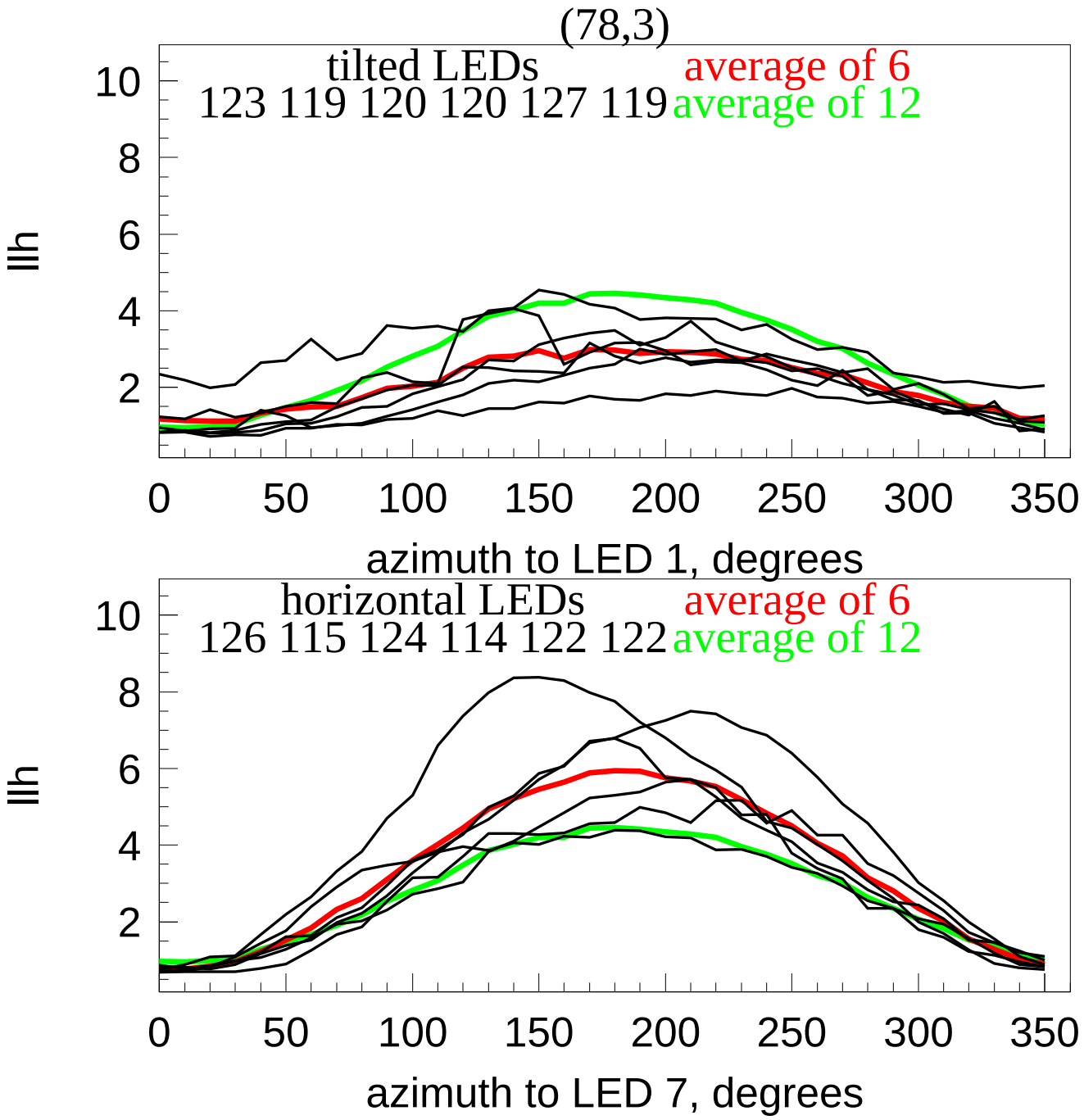

(77,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
226.5 ± 5.6

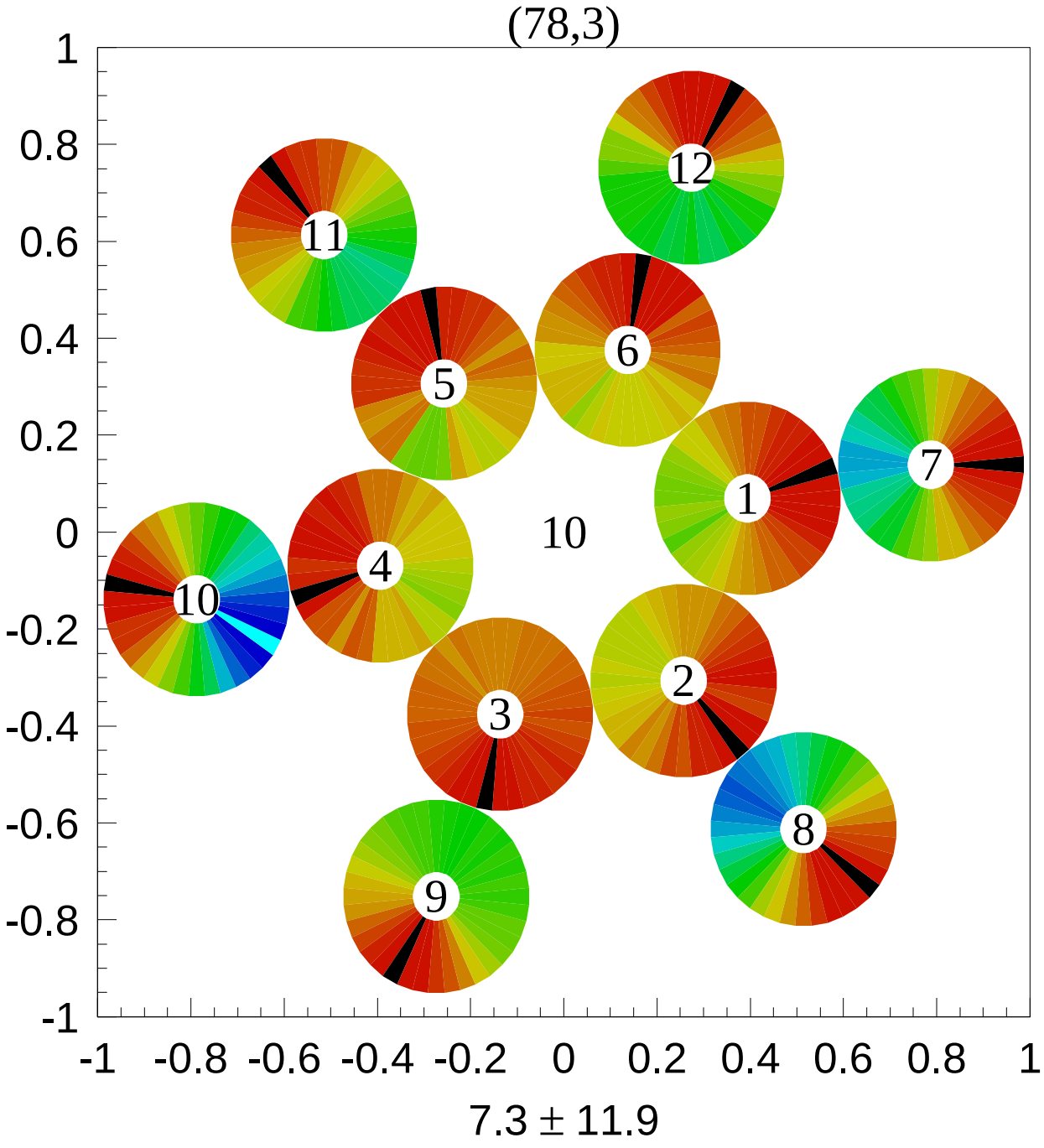

(78,1)
tilted LEDs
124 121 130 121 125 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 124 124 116 126 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

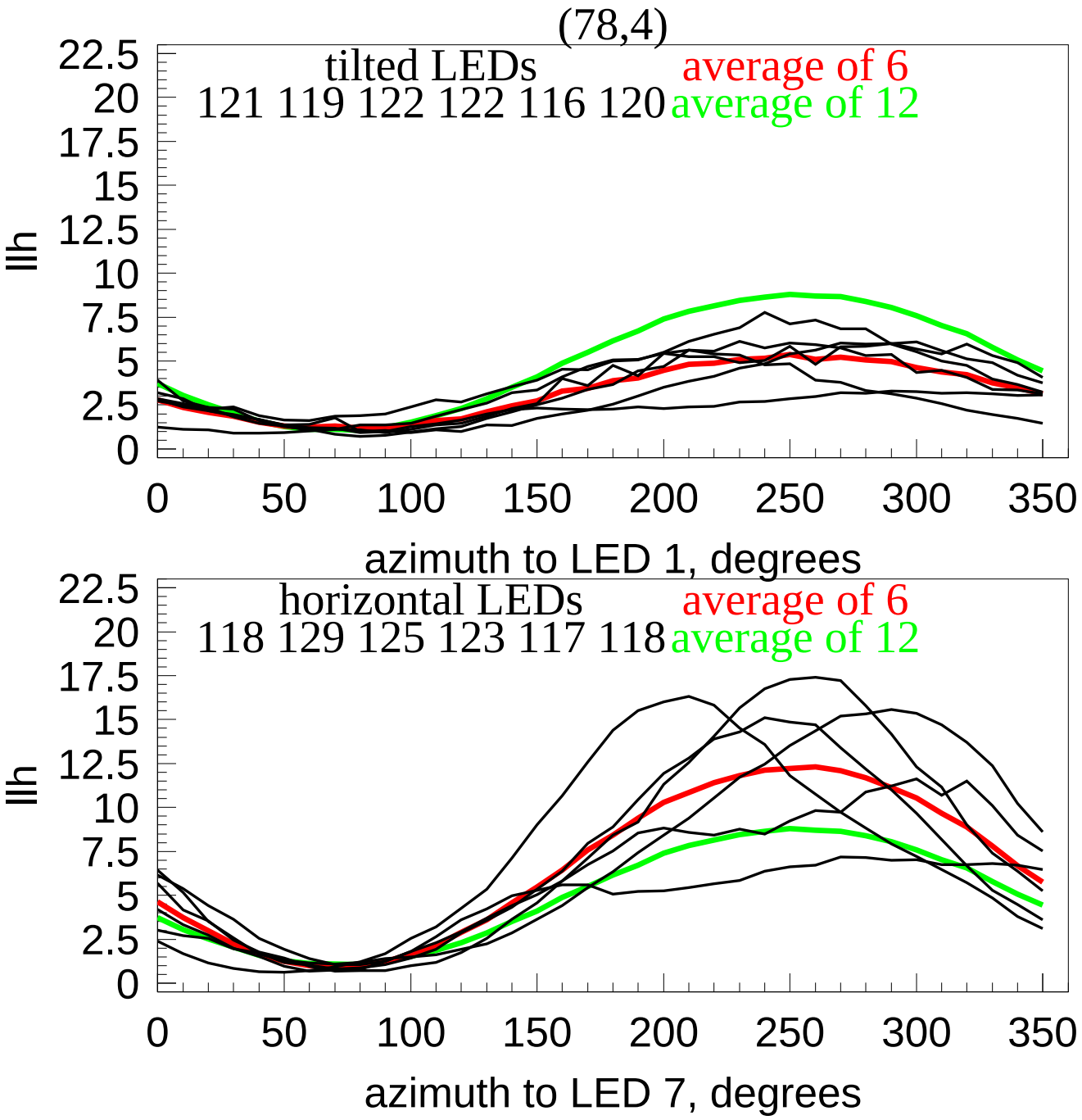

(78,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
67.7 ± 17.3

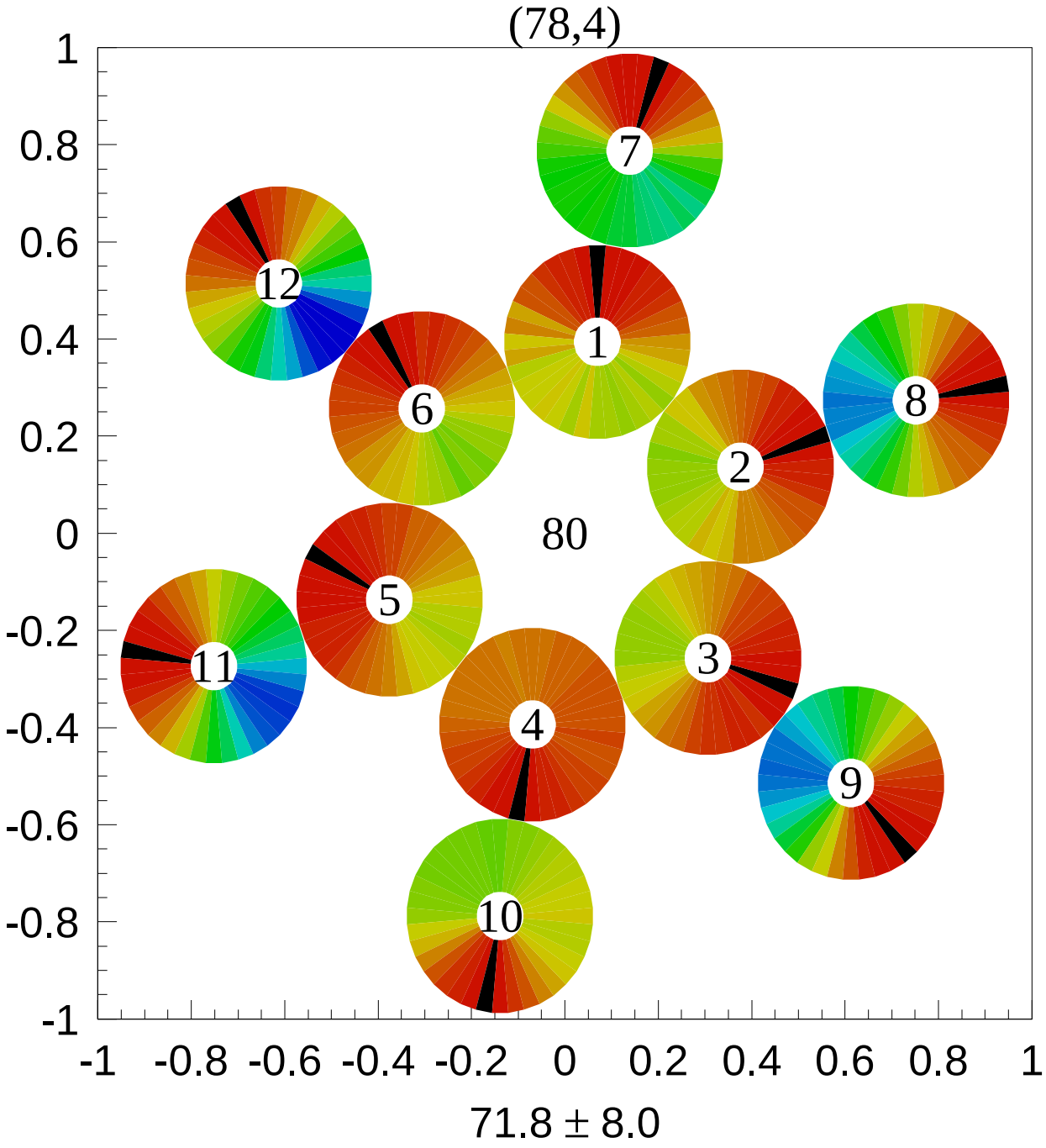

(78,2)
tilted LEDs
116 127 117 121 121 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 115 124 124 124 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

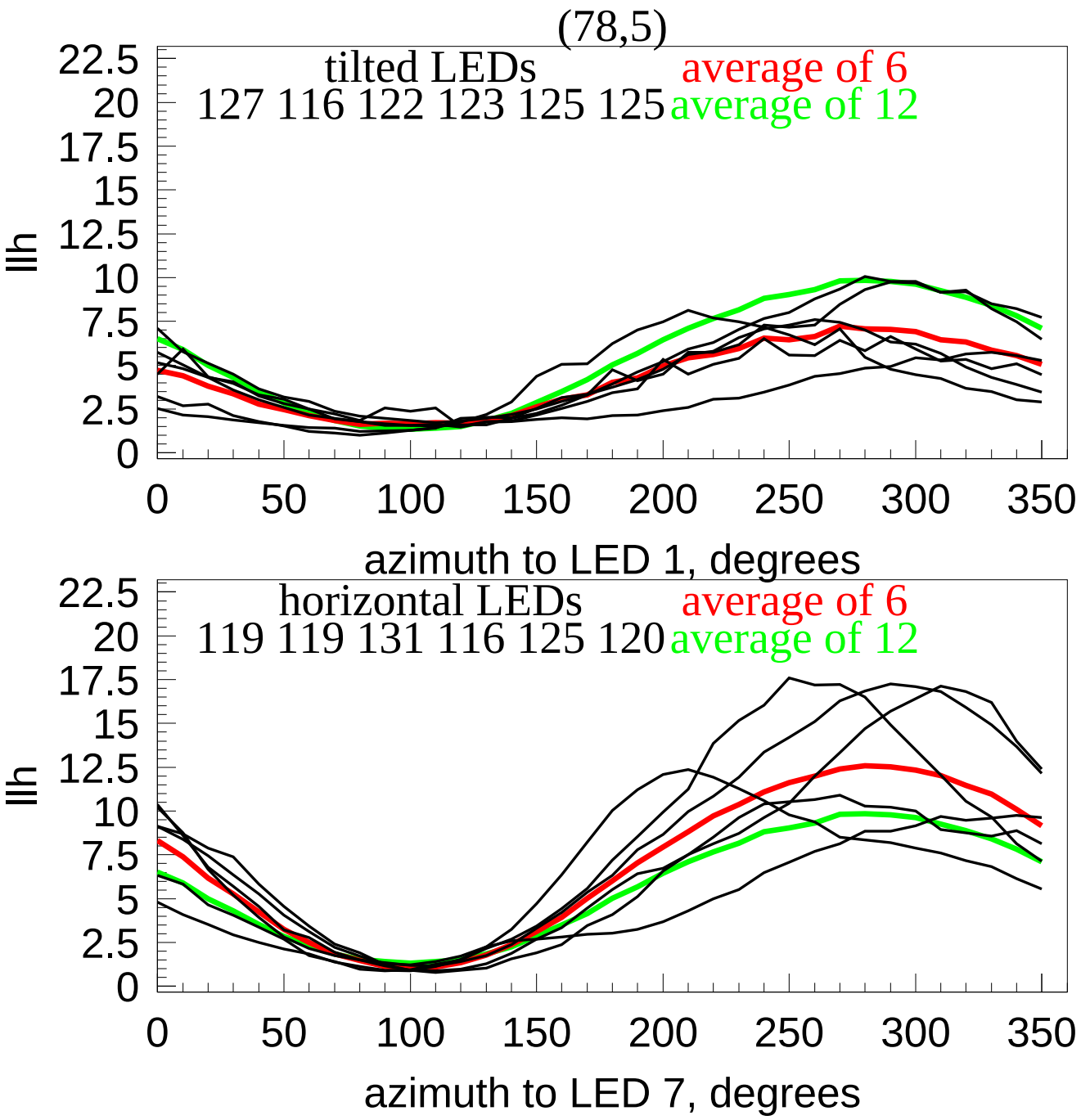

(78,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
11
1
6
7
12
218.1 ± 16.5

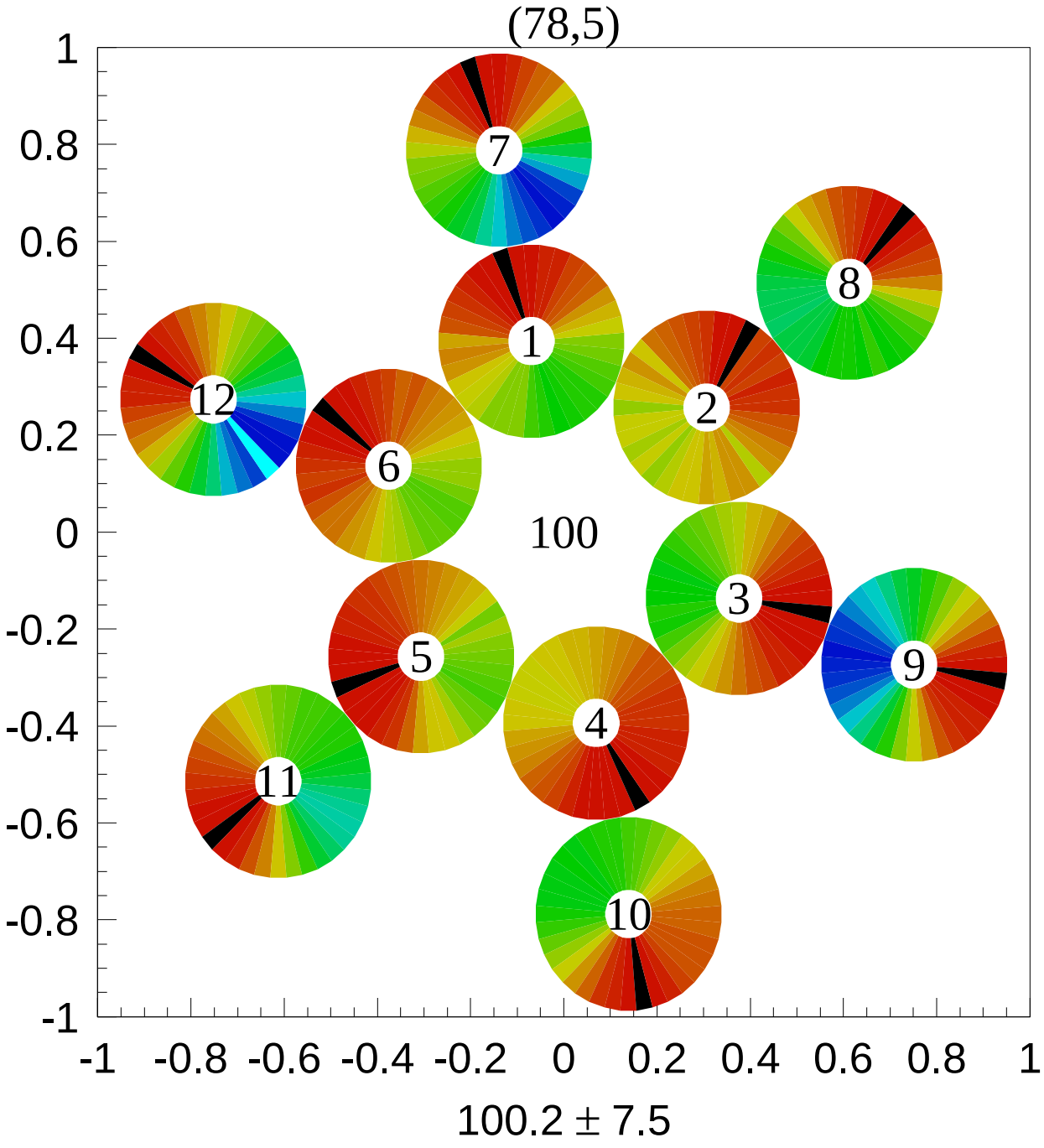

(78,3)
tilted LEDs
123 119 120 120 127 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 115 124 114 122 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

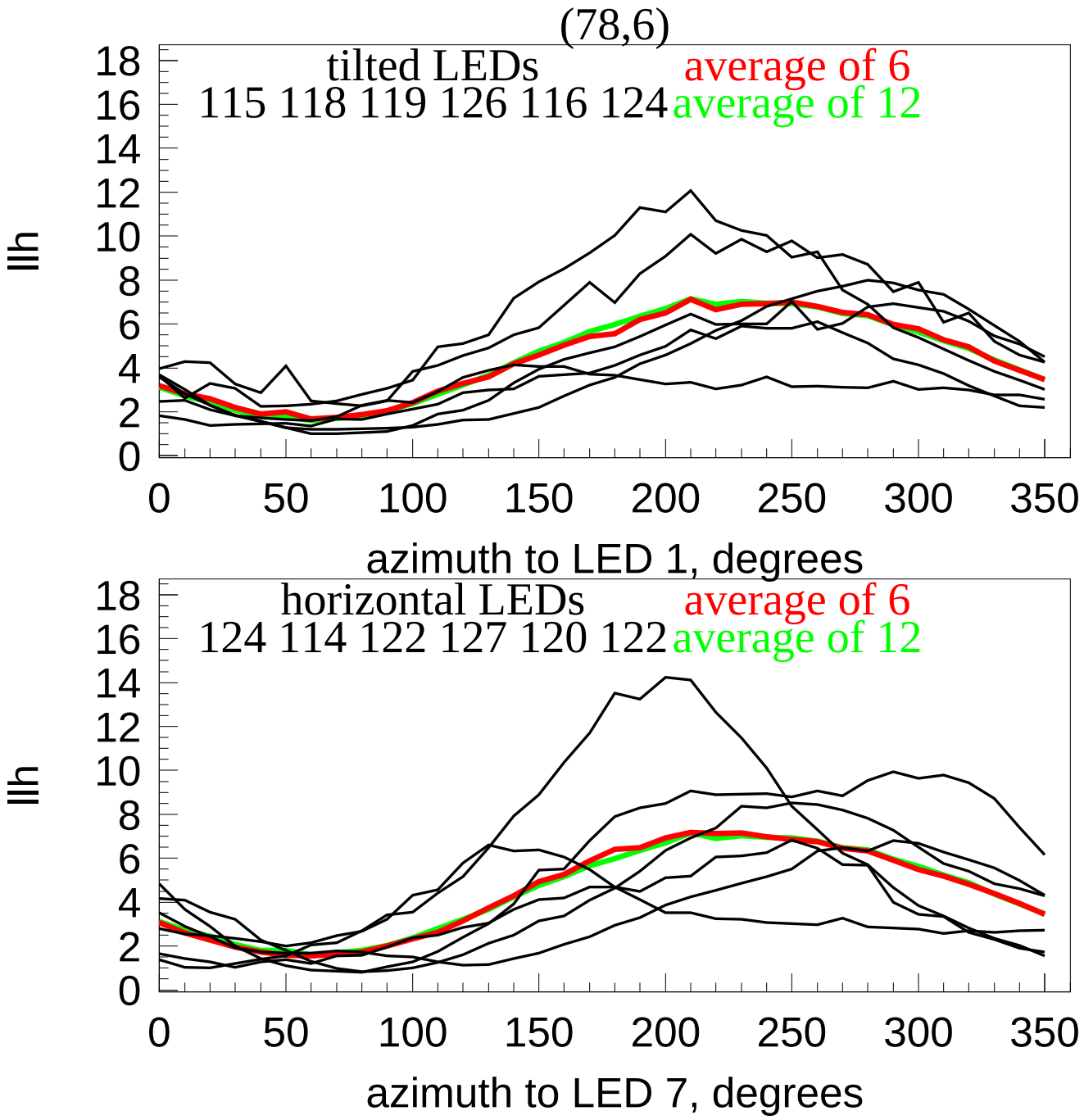

(78,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
7.3 ± 11.9

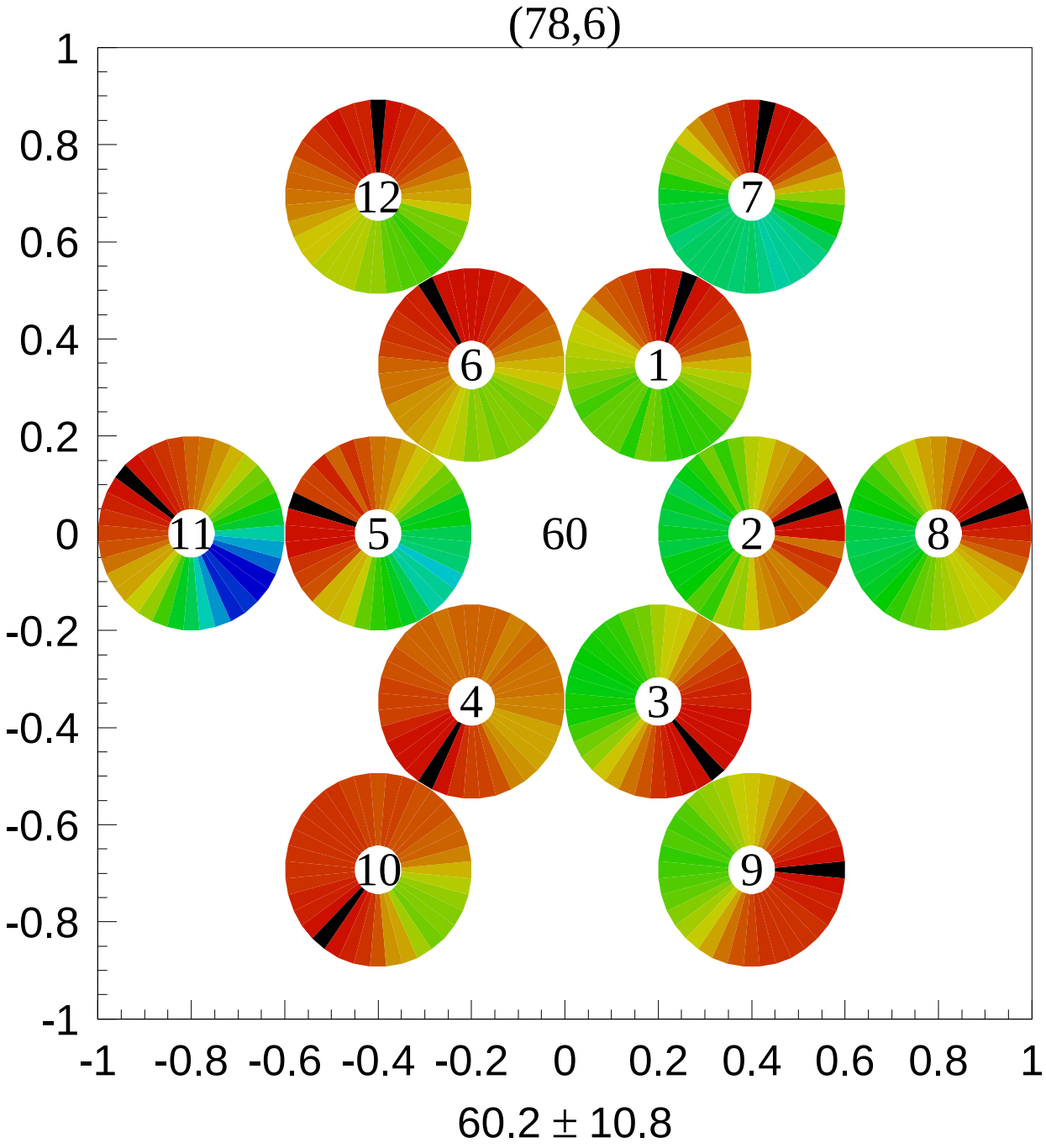

(78,4)
tilted LEDs
121 119 122 122 116 120
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 129 125 123 117 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

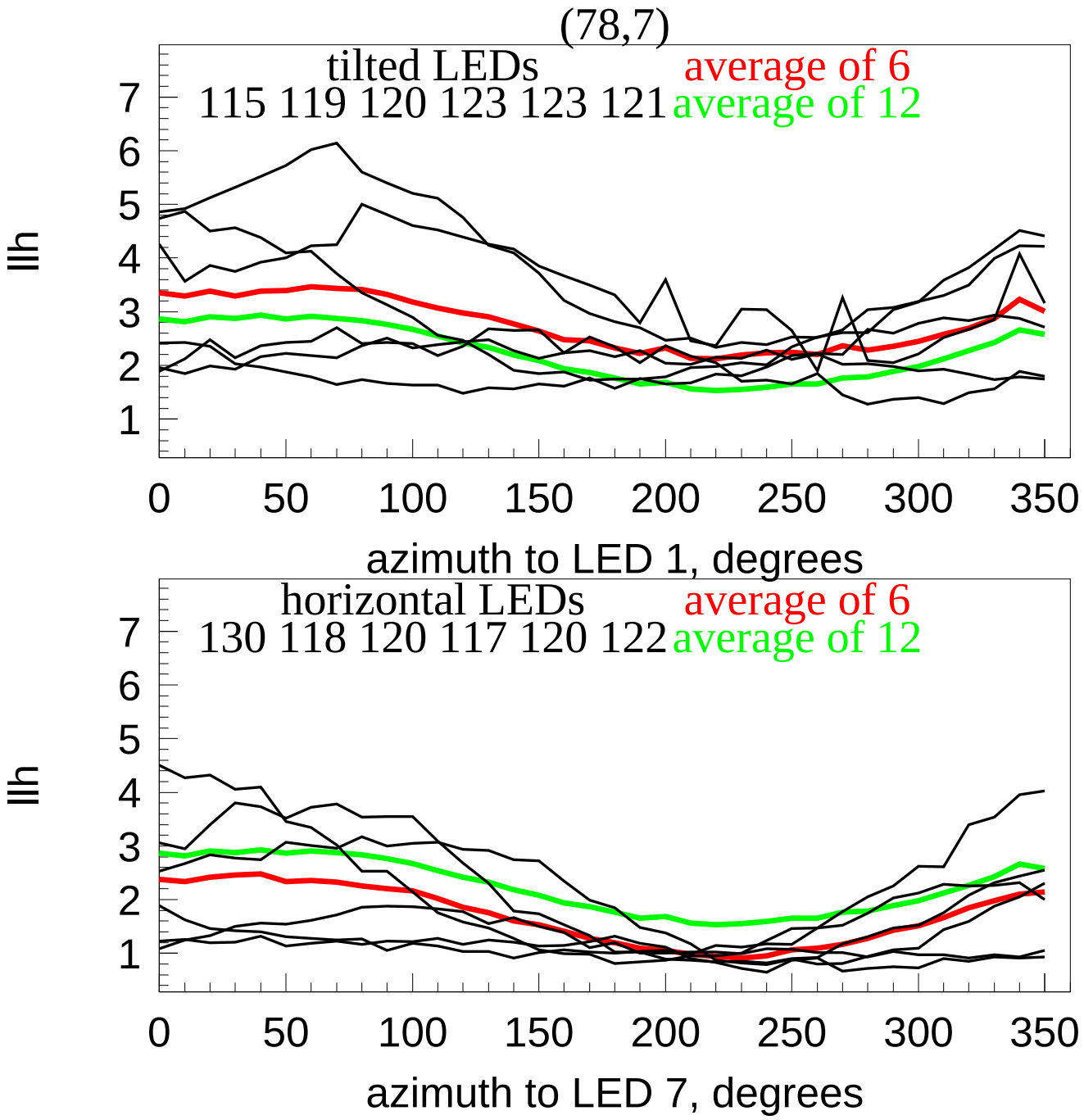

(78,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
71.8 ± 8.0
80
1
2
3
4
5
6
7
8
9
10
11
12

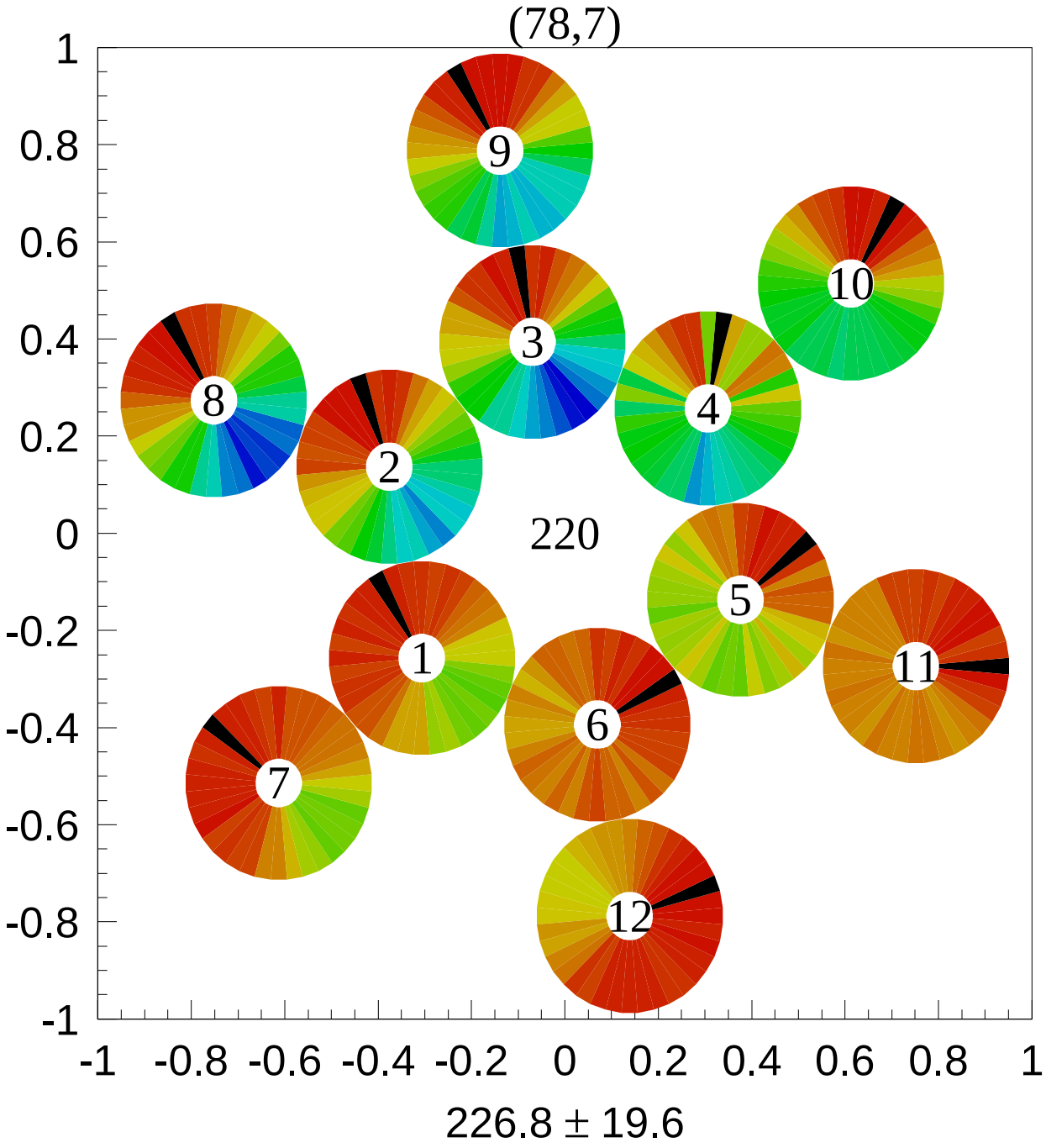

(78,5)
tilted LEDs
127 116 122 123 125 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 119 131 116 125 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

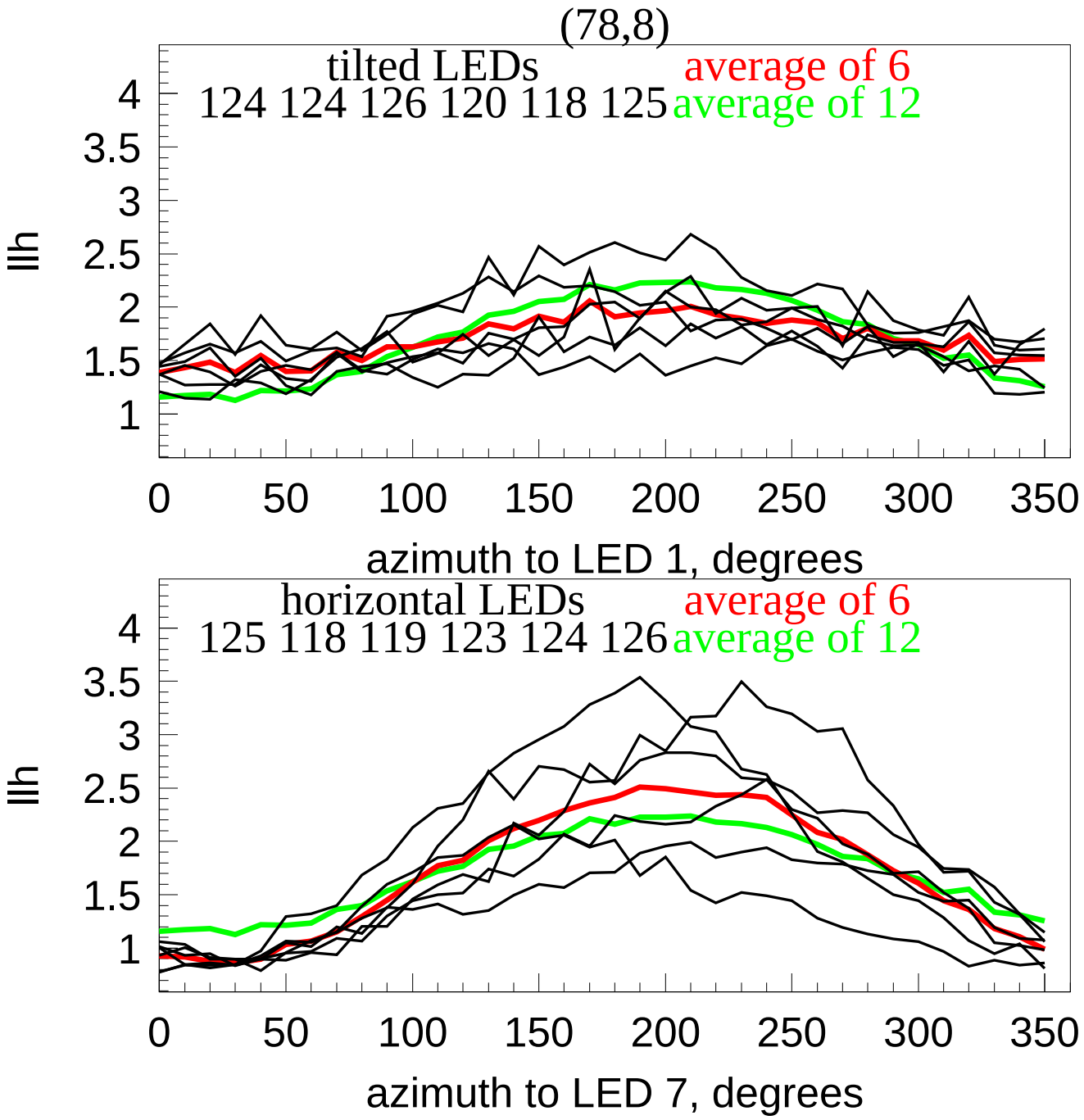

(78,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
100.2 ± 7.5
7
1
8
12
2
6
100
3
5
9
4
11
10

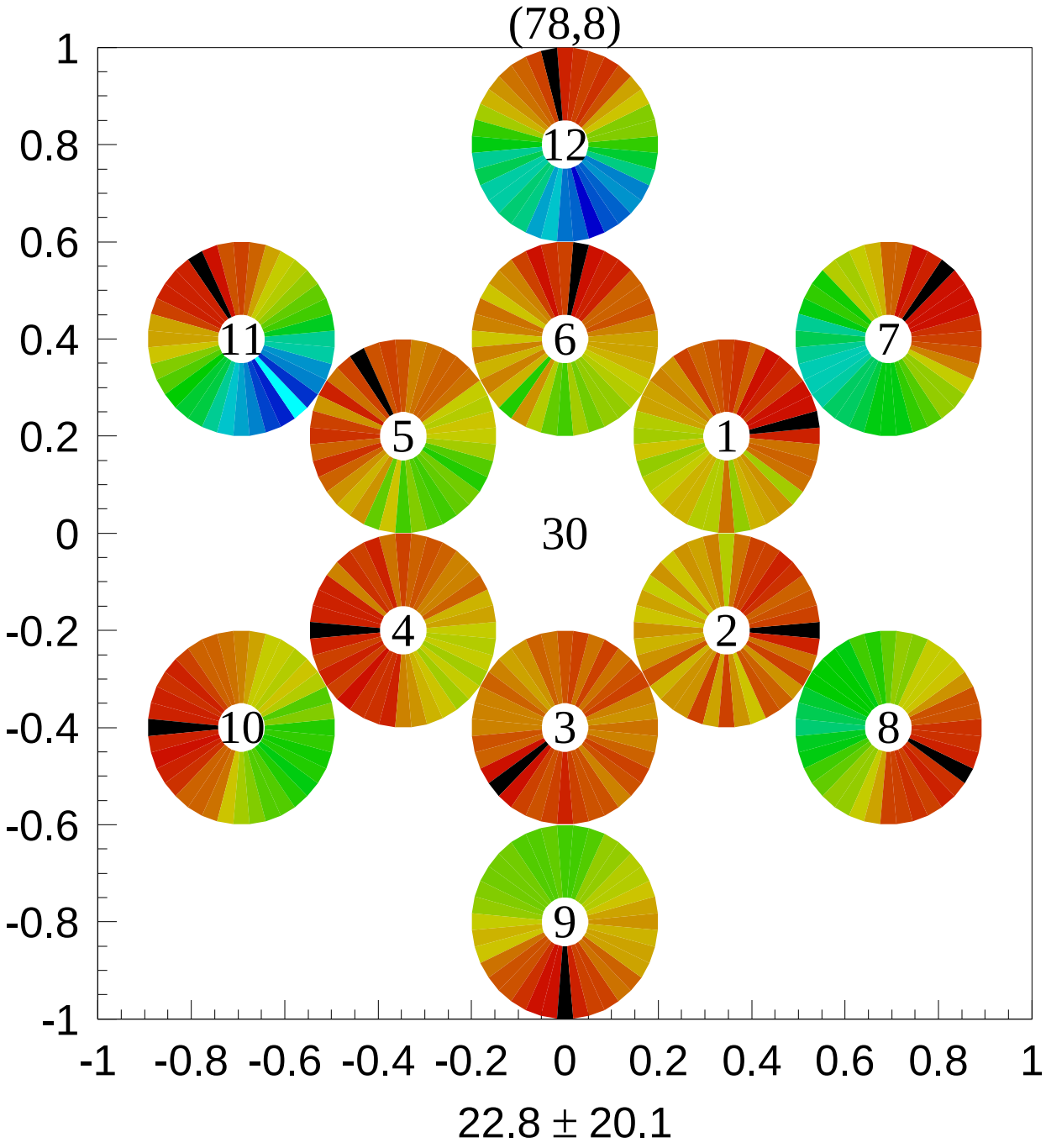

(78,6)
tilted LEDs
115 118 119 126 116 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 114 122 127 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

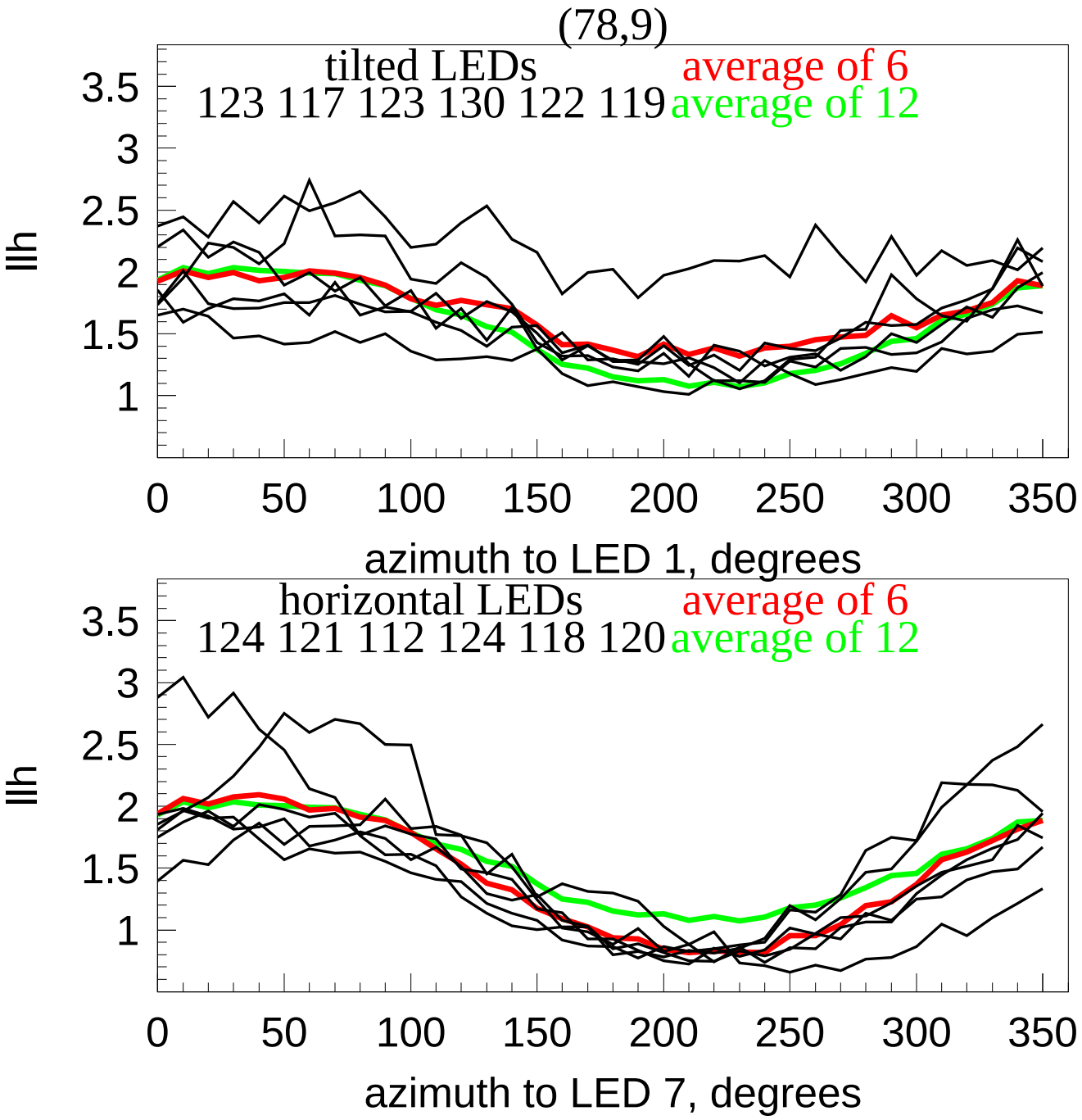

(78,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
60.2 ± 10.8

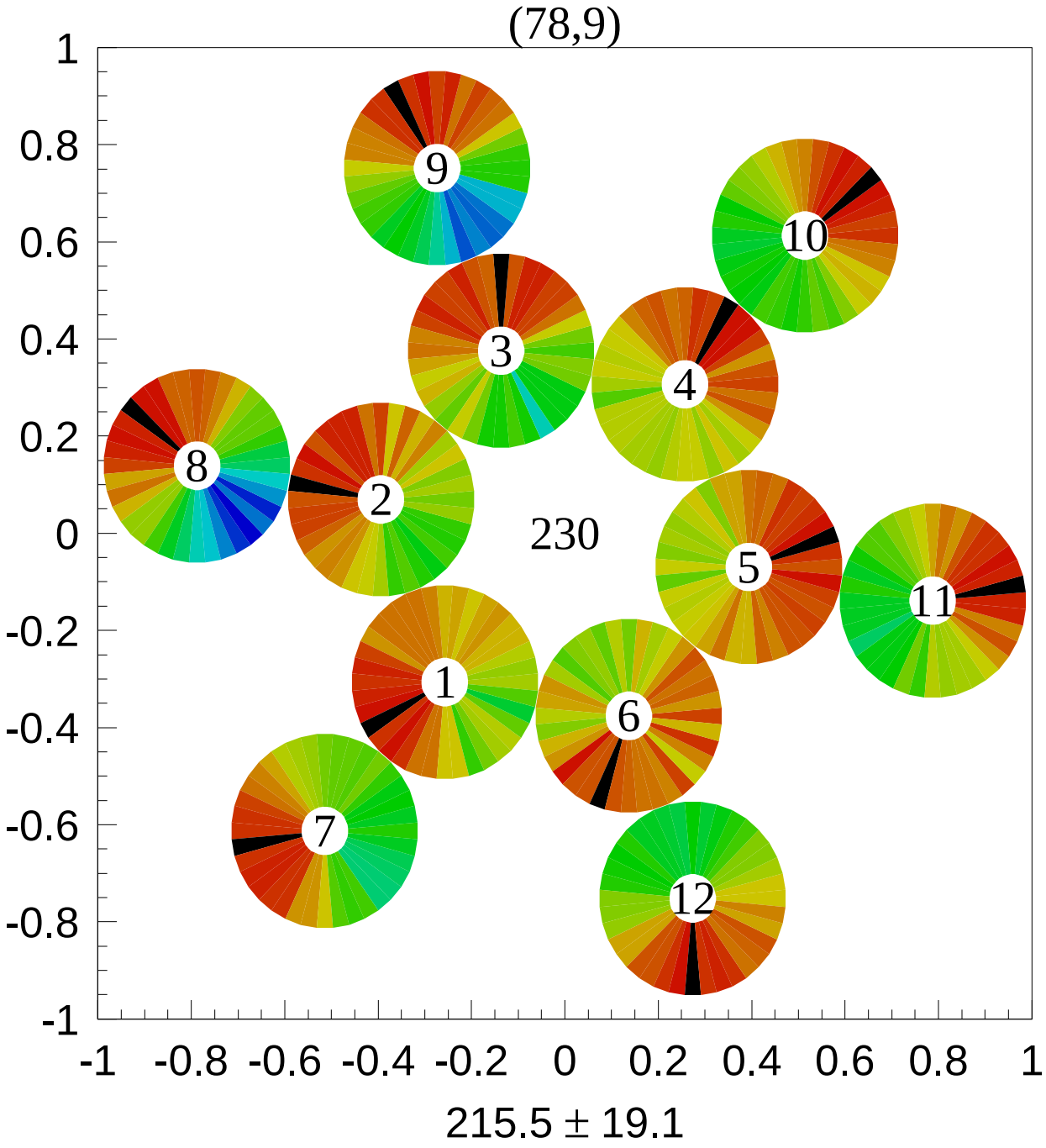

(78,7)
tilted LEDs
115 119 120 123 123 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 118 120 117 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

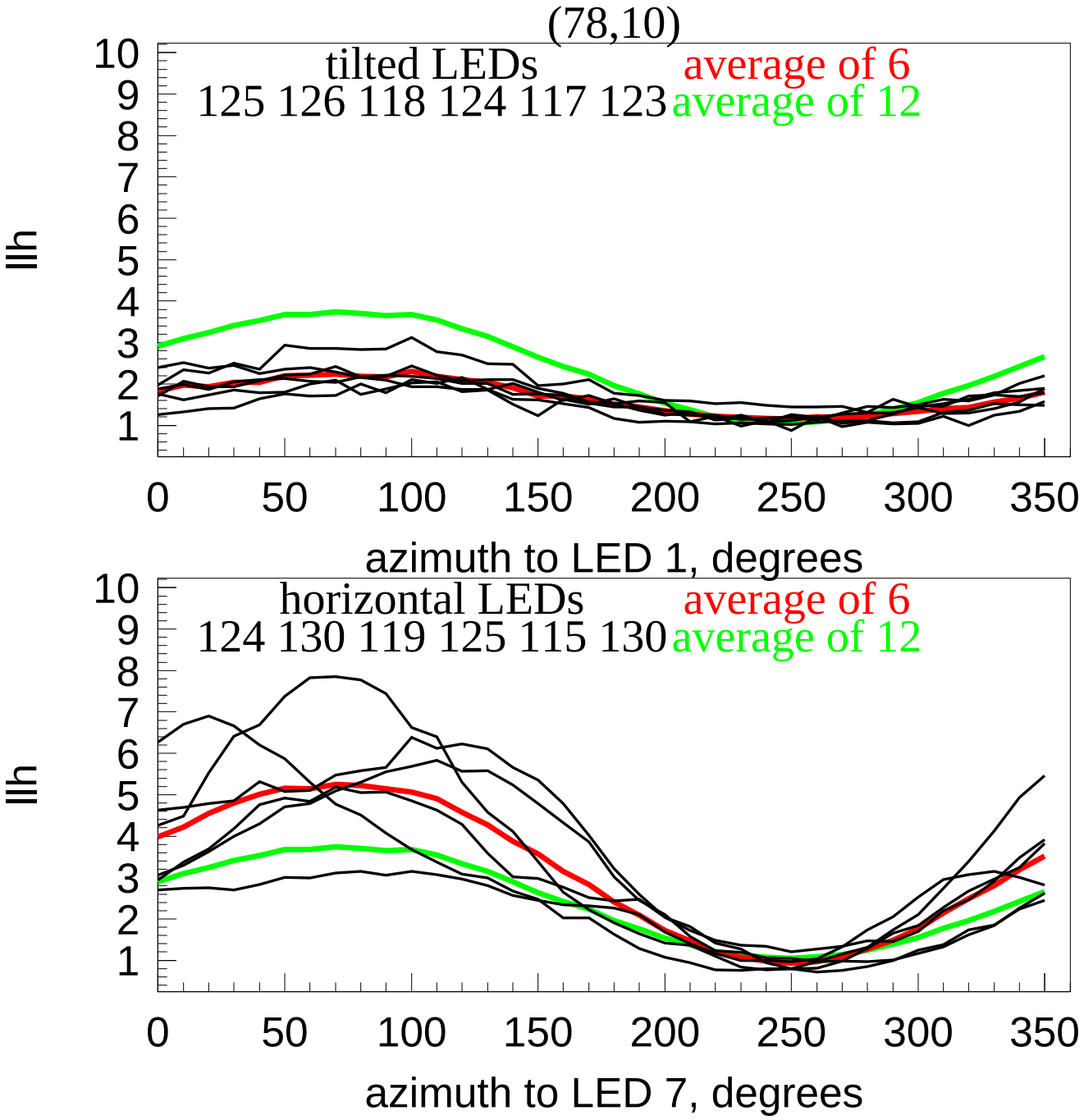

(78,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
8
4
2
220
5
1
11
6
7
12
226.8 ± 19.6

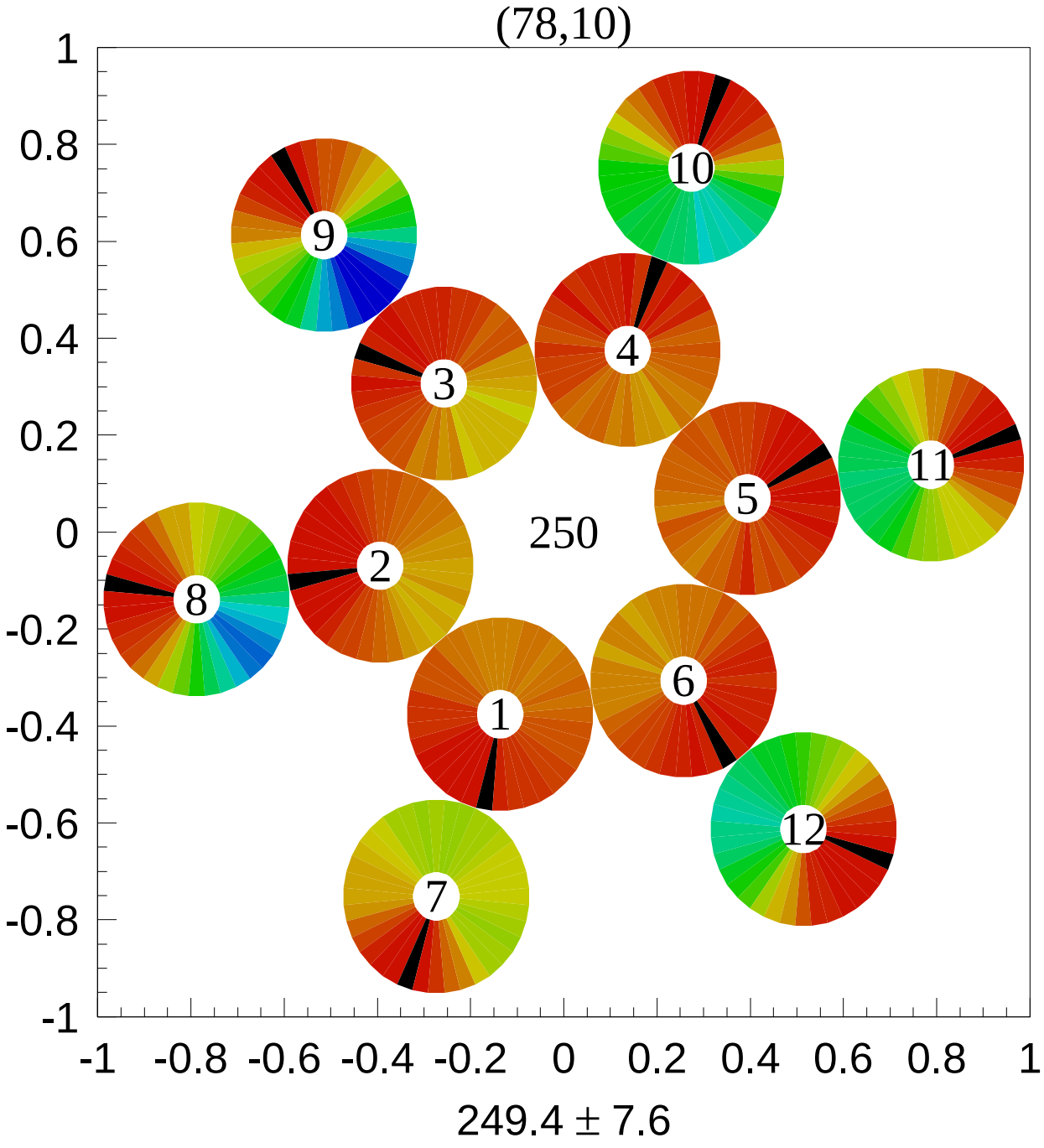

(78,8)
tilted LEDs
124 124 126 120 118 125
average of 6
average of 12
Ilh
4
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
125 118 119 123 124 126
average of 6
average of 12
Ilh
4
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

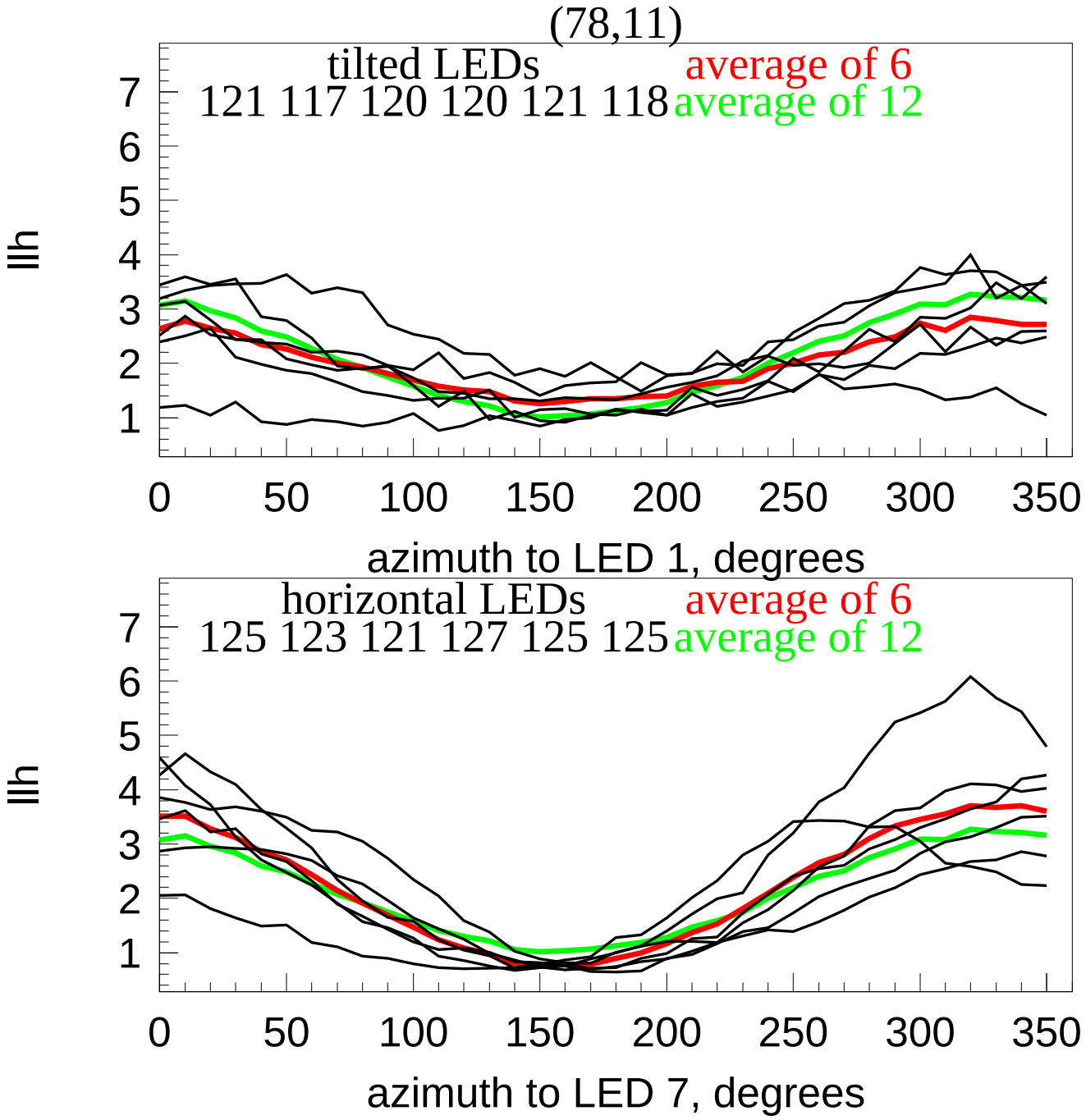

(78,8)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
22.8 ± 20.1

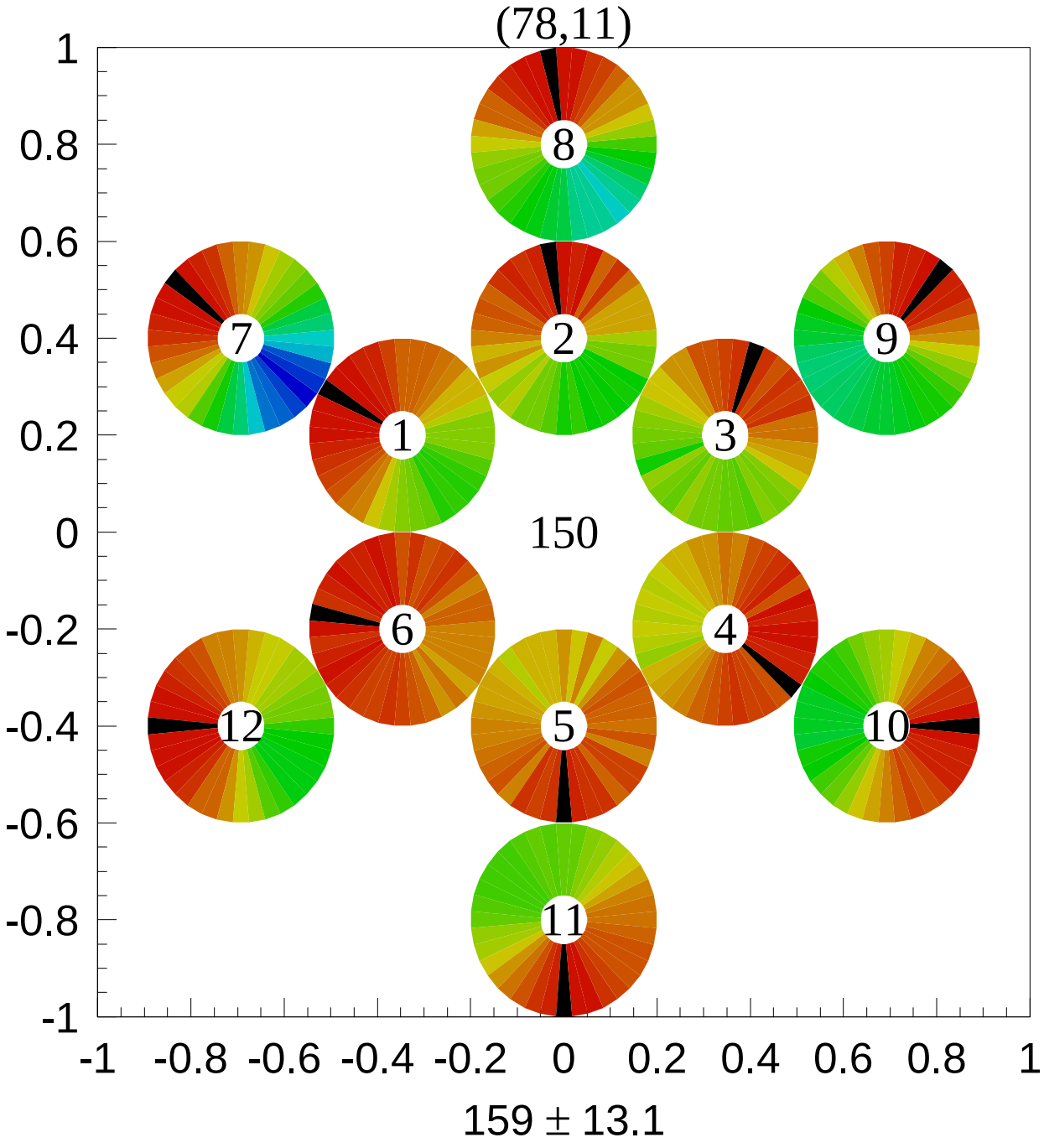

(78,9)
tilted LEDs
123 117 123 130 122 119
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 121 112 124 118 120
average of 6
average of 12
Ilh
3.5
3
2.5
2
1.5
1
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

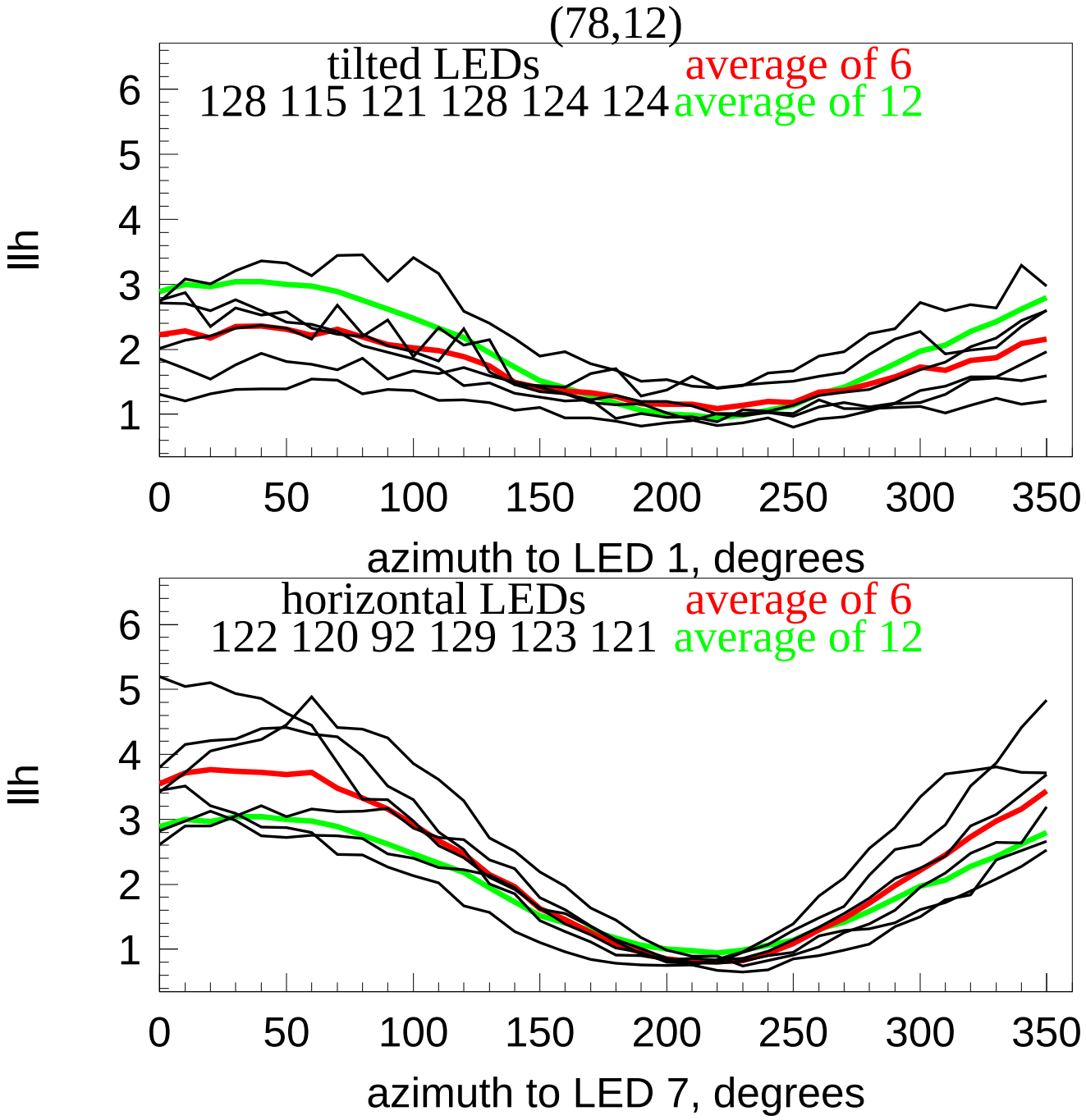

(78,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
215.5 ± 19.1

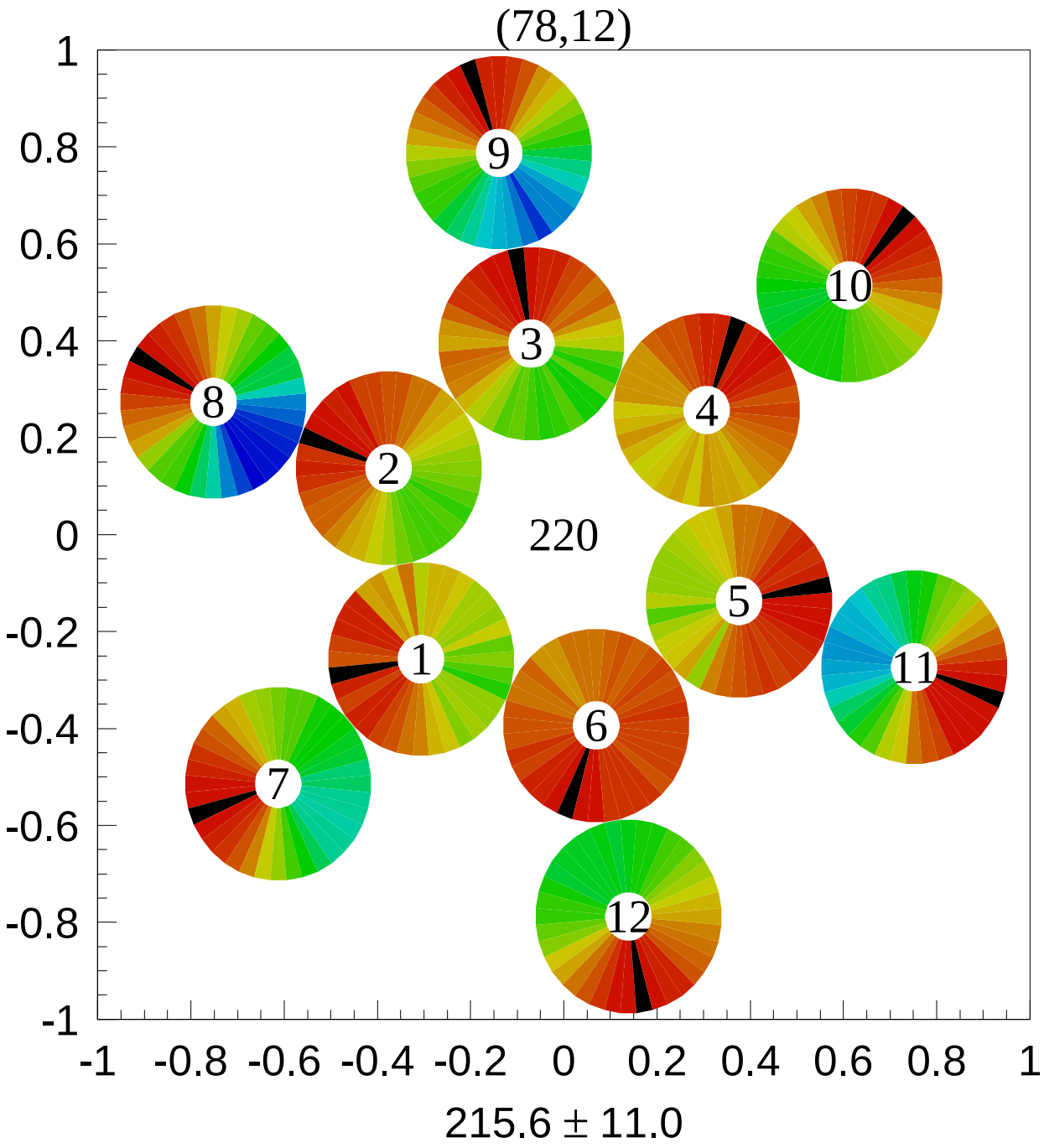

(78,10)
tilted LEDs
125 126 118 124 117 123
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 130 119 125 115 130
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

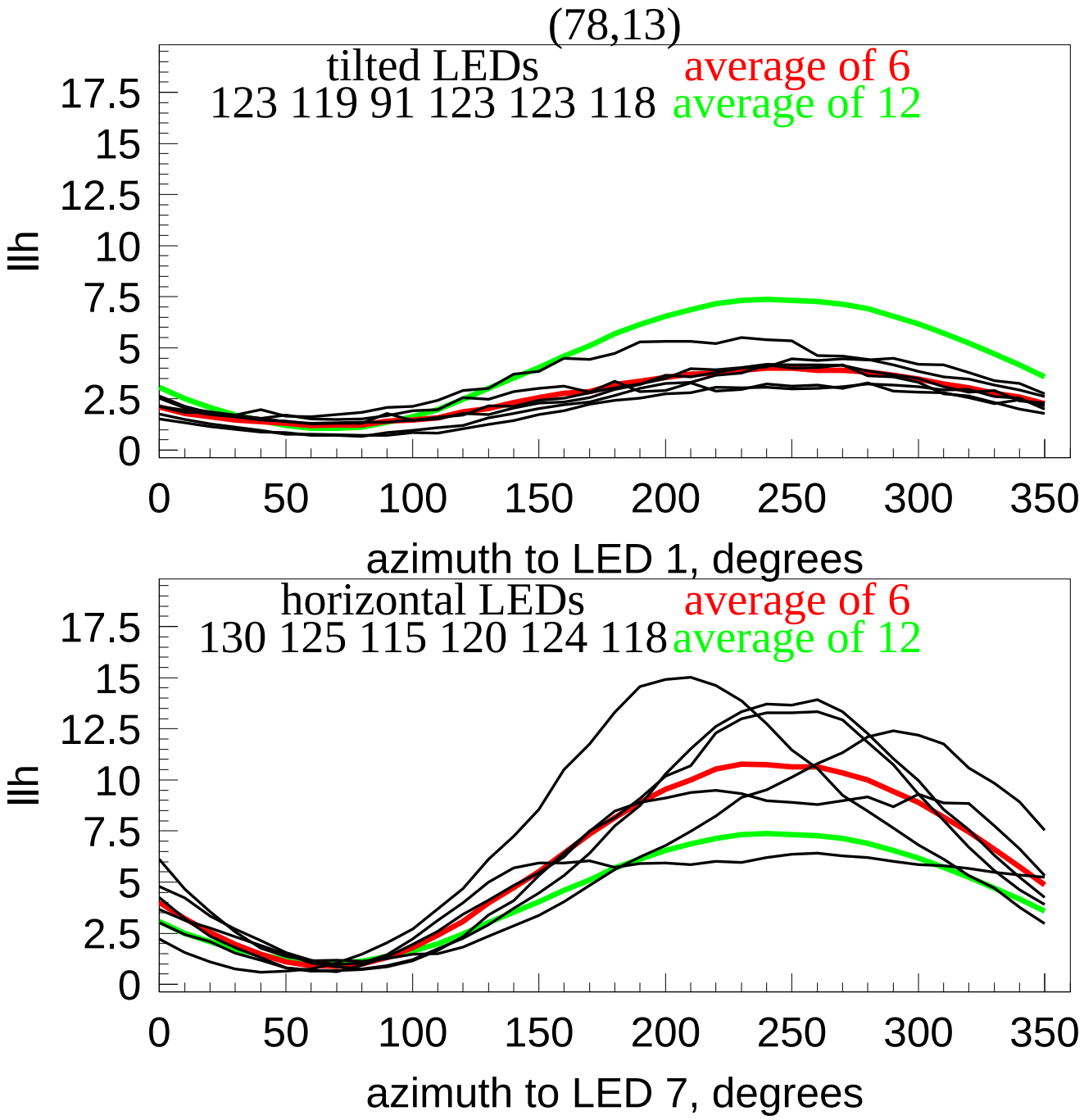

(78,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
249.4 ± 7.6

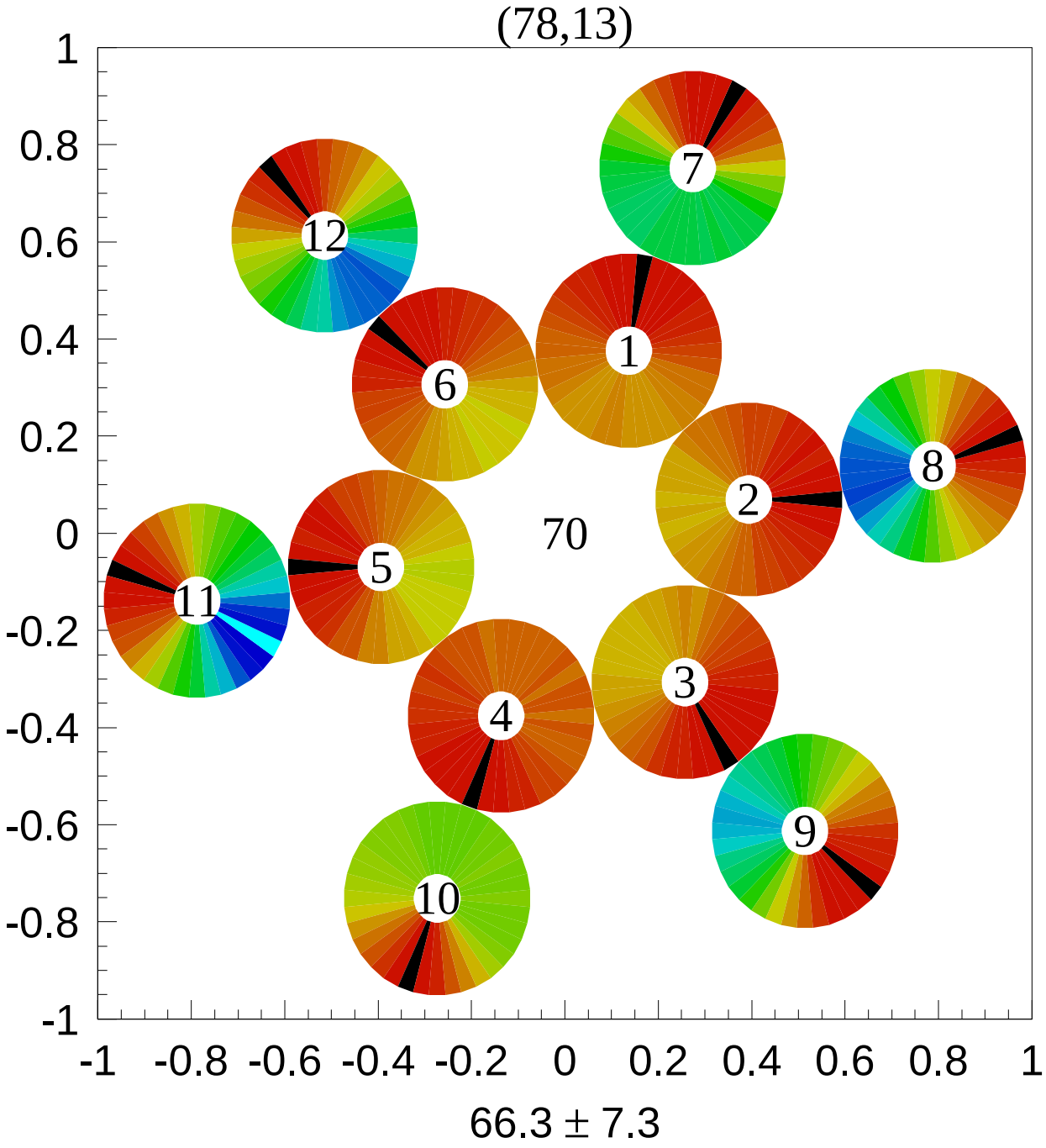

(78,11)
tilted LEDs
121 117 120 120 121 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 121 127 125 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

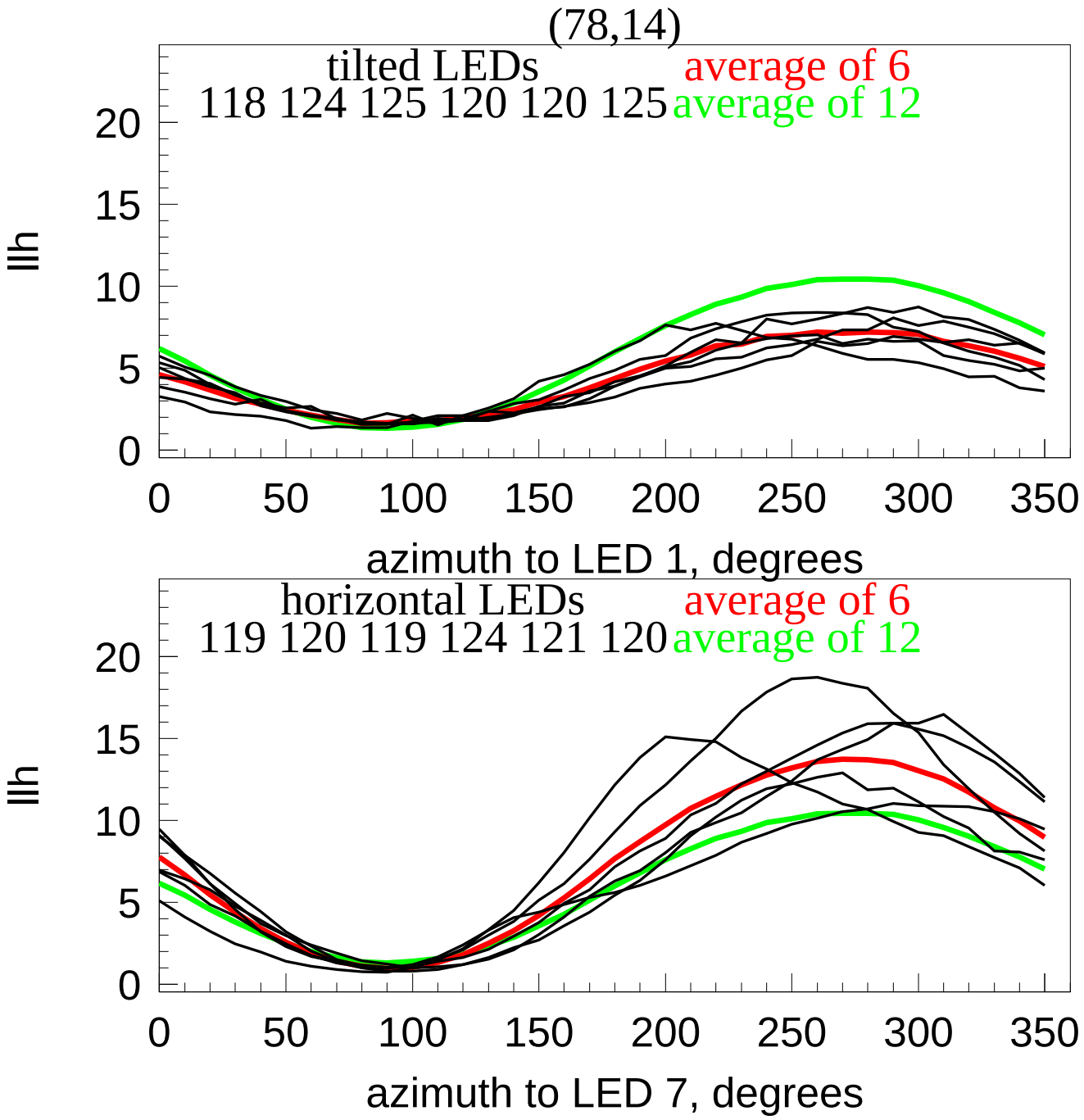

(78,11)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
159 ± 13.1

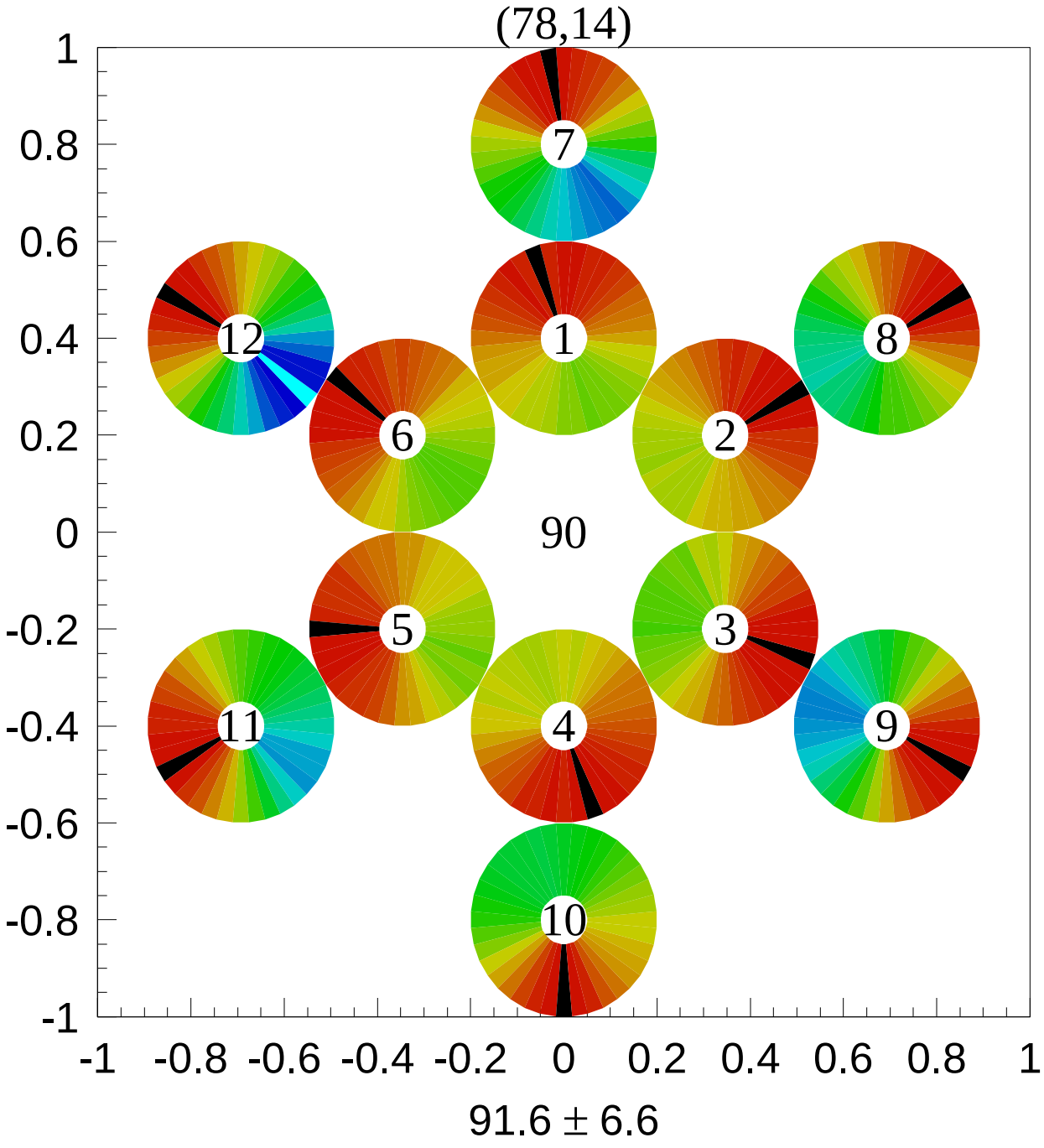

(78,12)
tilted LEDs
128 115 121 128 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 120 92 129 123 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

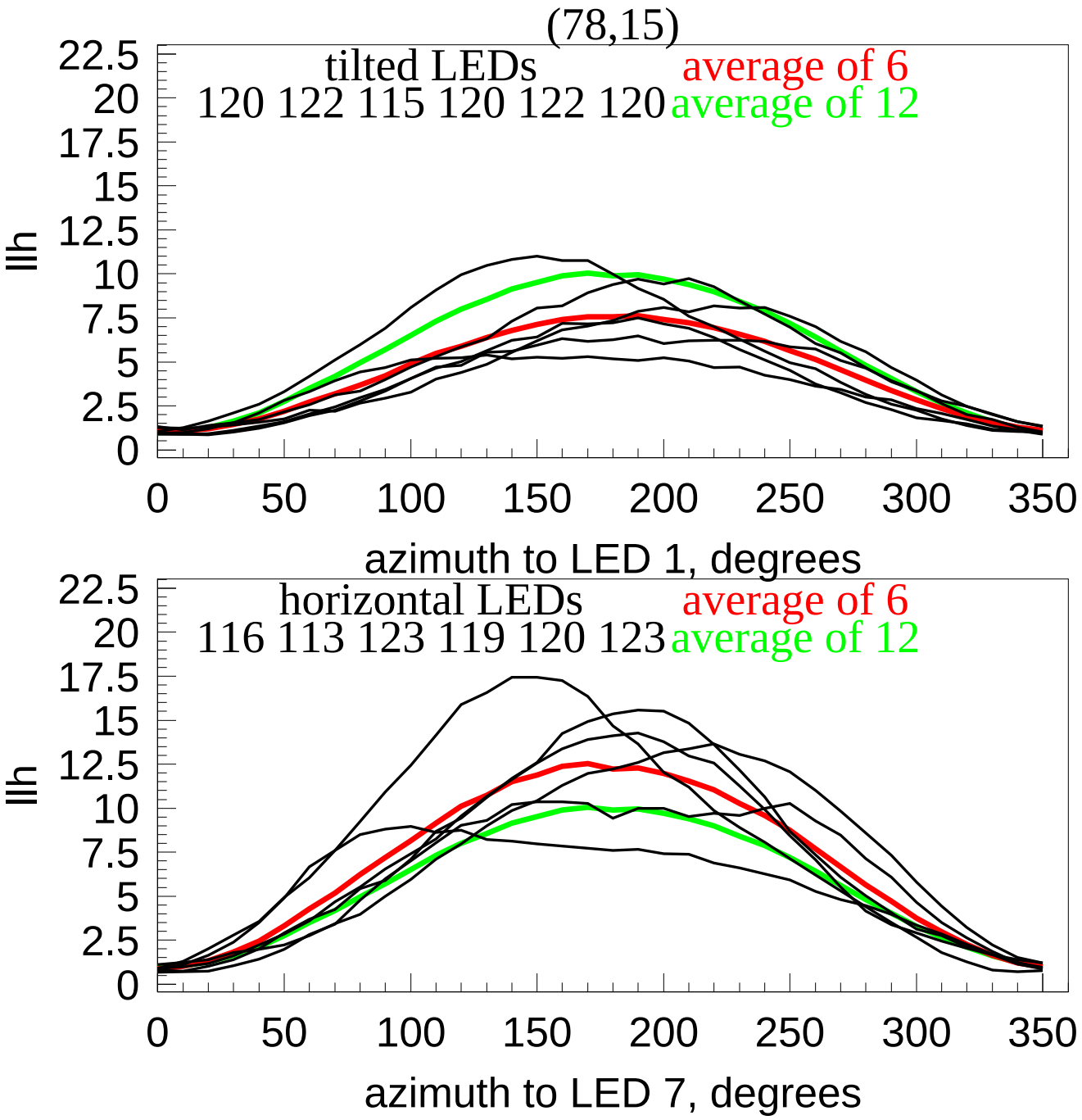

(78,12)
9
10
3
8
4
2
220
5
1
11
6
7
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
215.6 ± 11.0

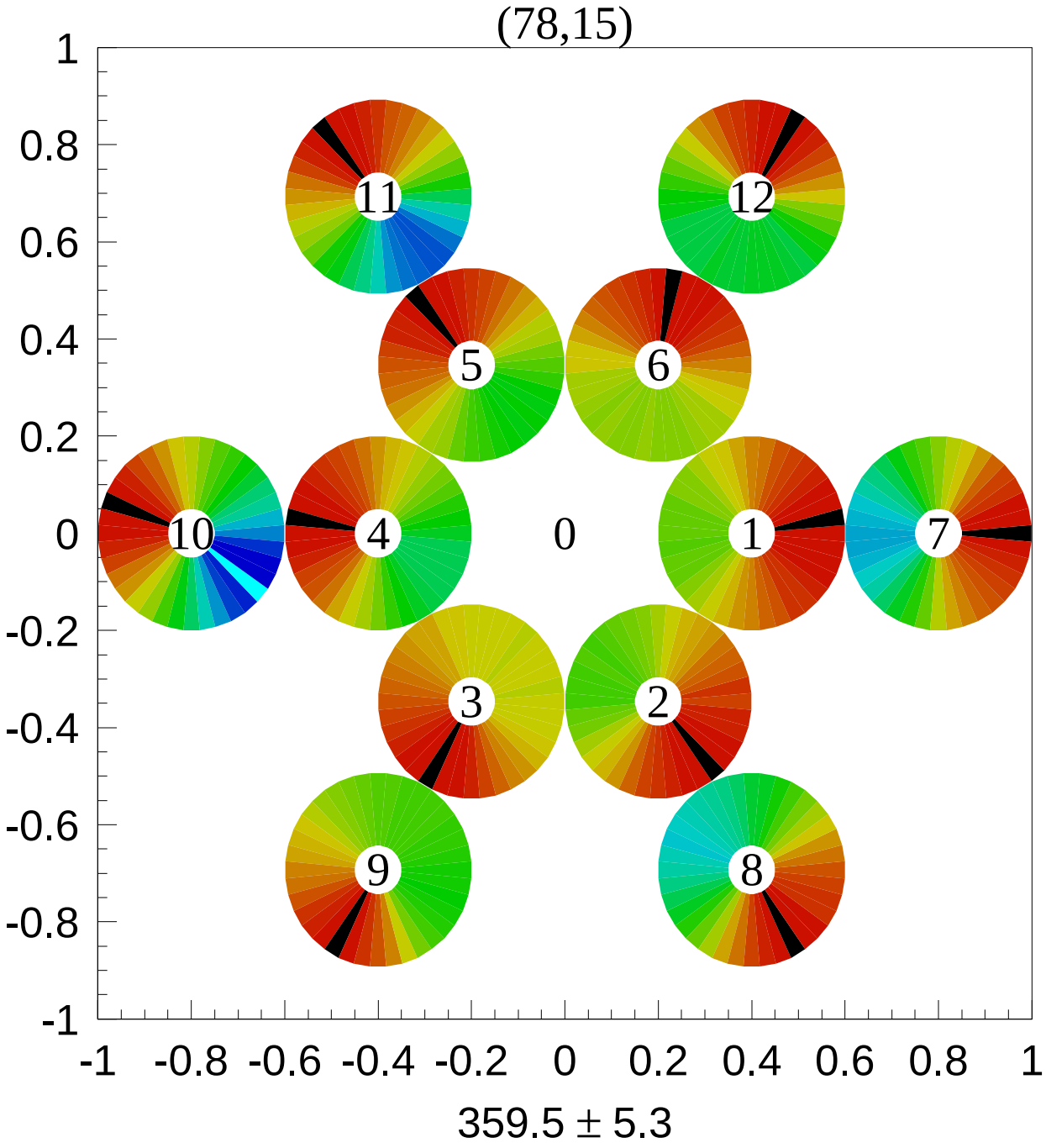

(78,13)
tilted LEDs
123 119 91 123 123 118
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
130 125 115 120 124 118
average of 6
average of 12
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

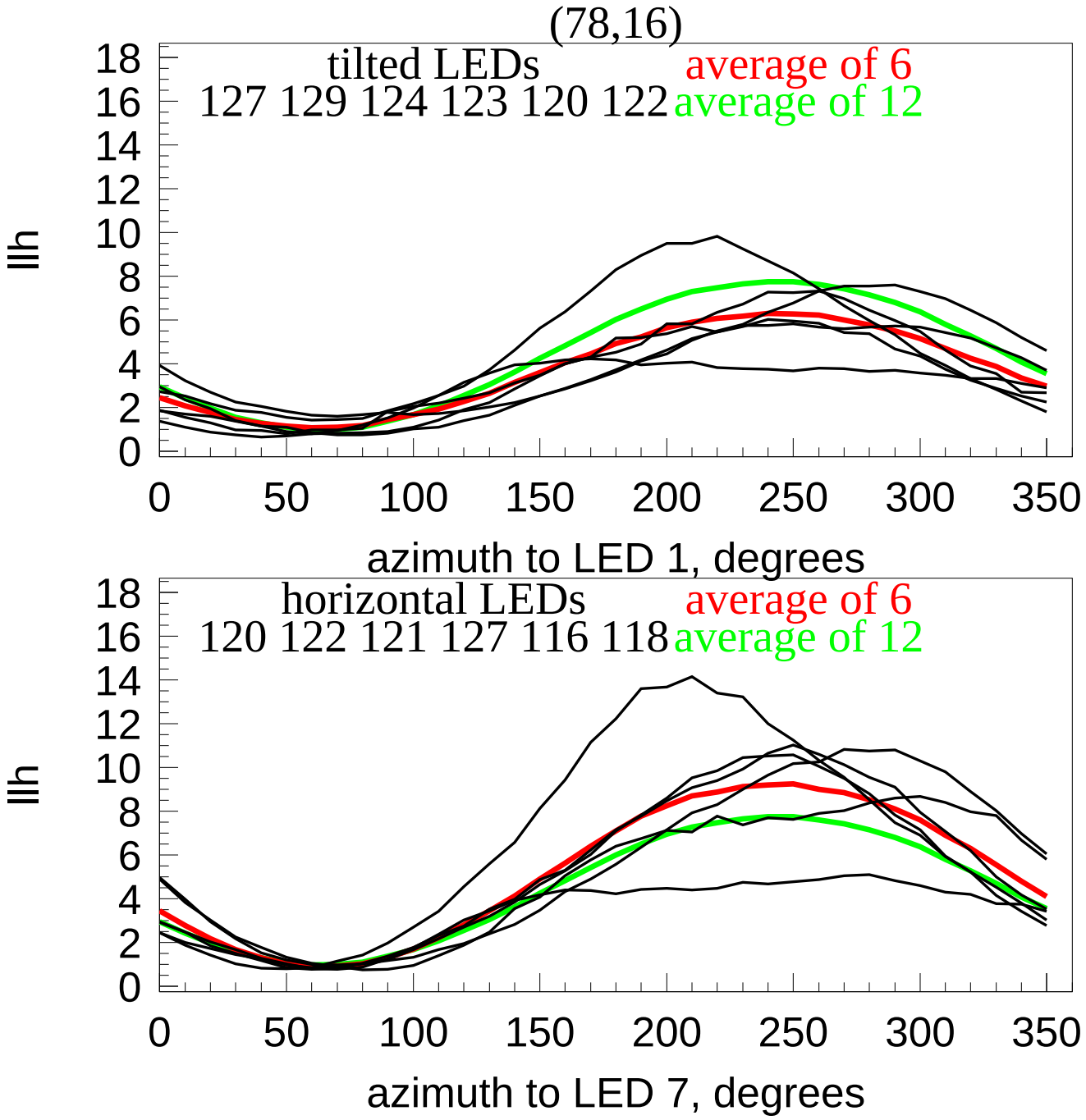

(78,13)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
3
4
9
10
66.3 ± 7.3

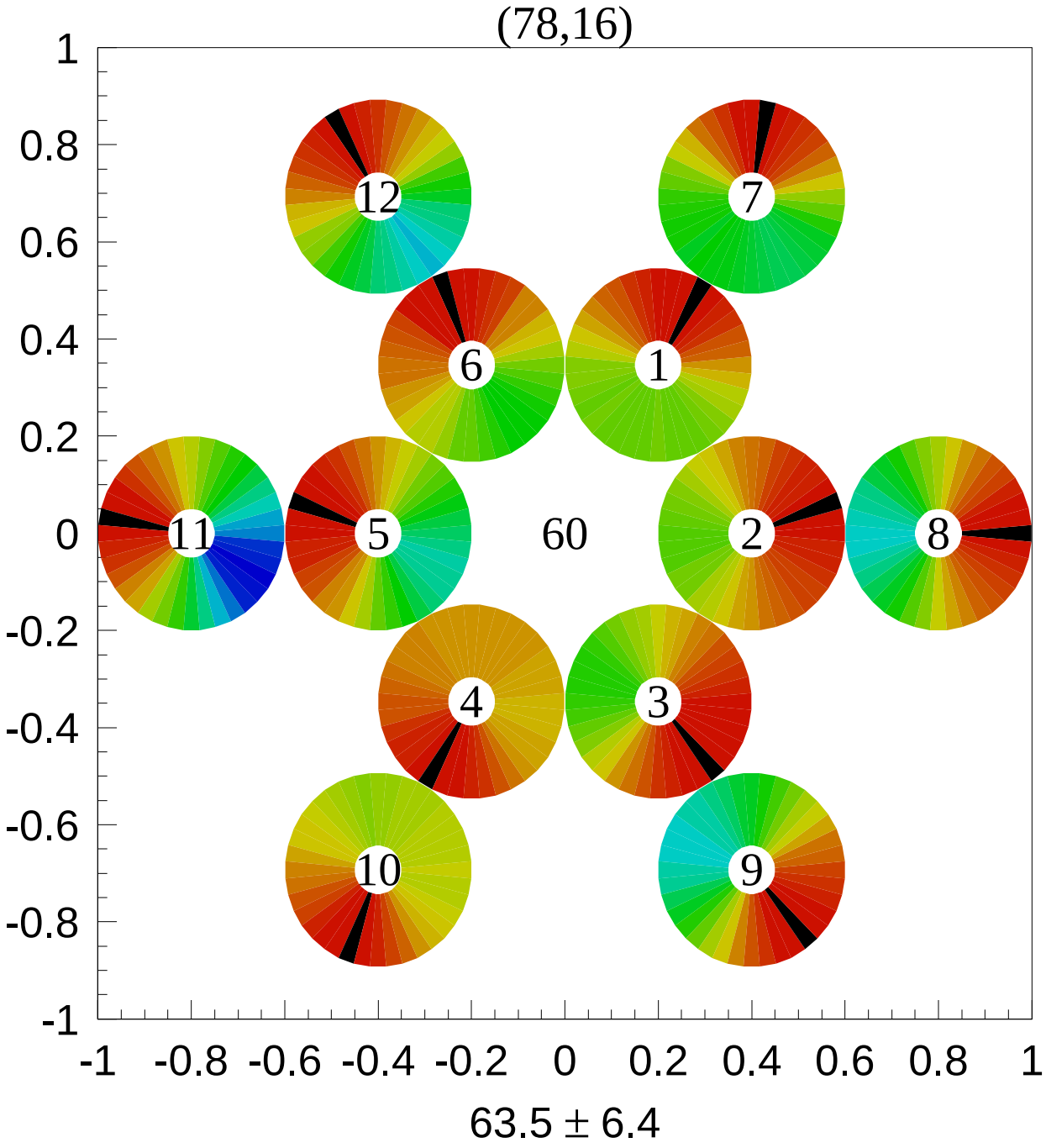

(78,14)
tilted LEDs
118 124 125 120 120 125
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
119 120 119 124 121 120
average of 6
average of 12
llh
0
5
10
15
20
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

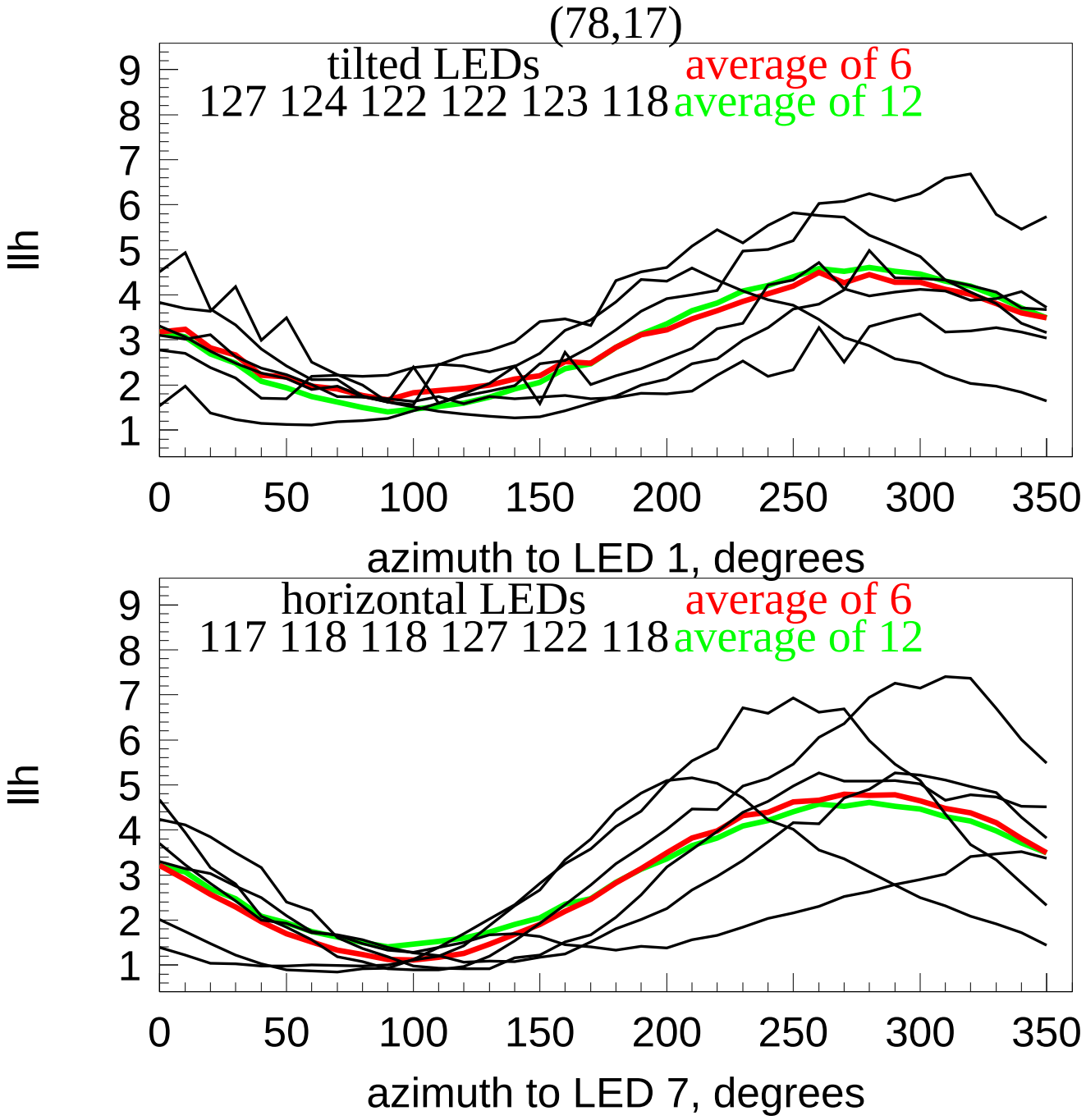

(78,14)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
8
6
2
90
5
3
11
4
9
10
91.6 ± 6.6

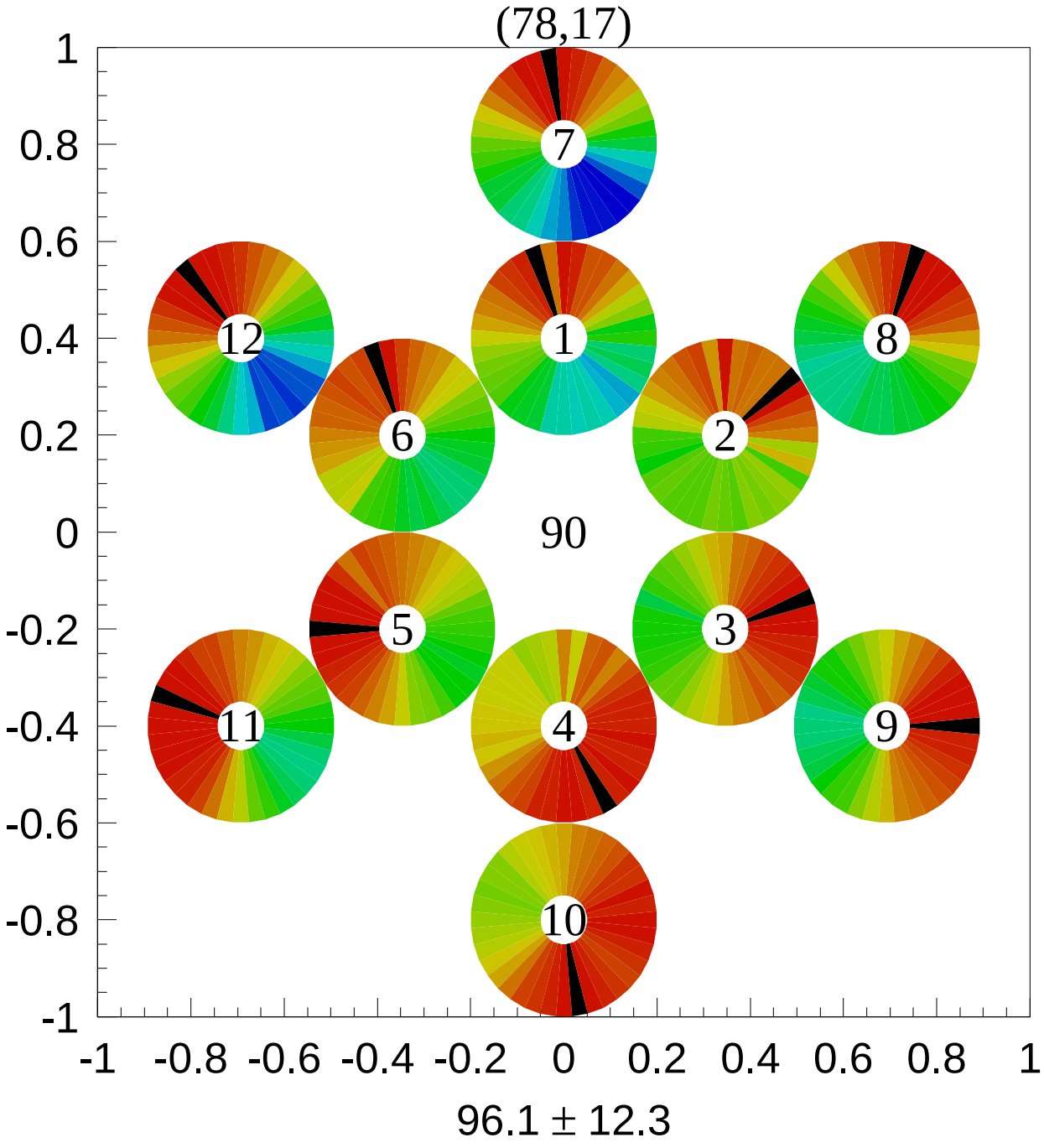

(78,15)
tilted LEDs
120 122 115 120 122 120
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 113 123 119 120 123
average of 6
average of 12
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
llh
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

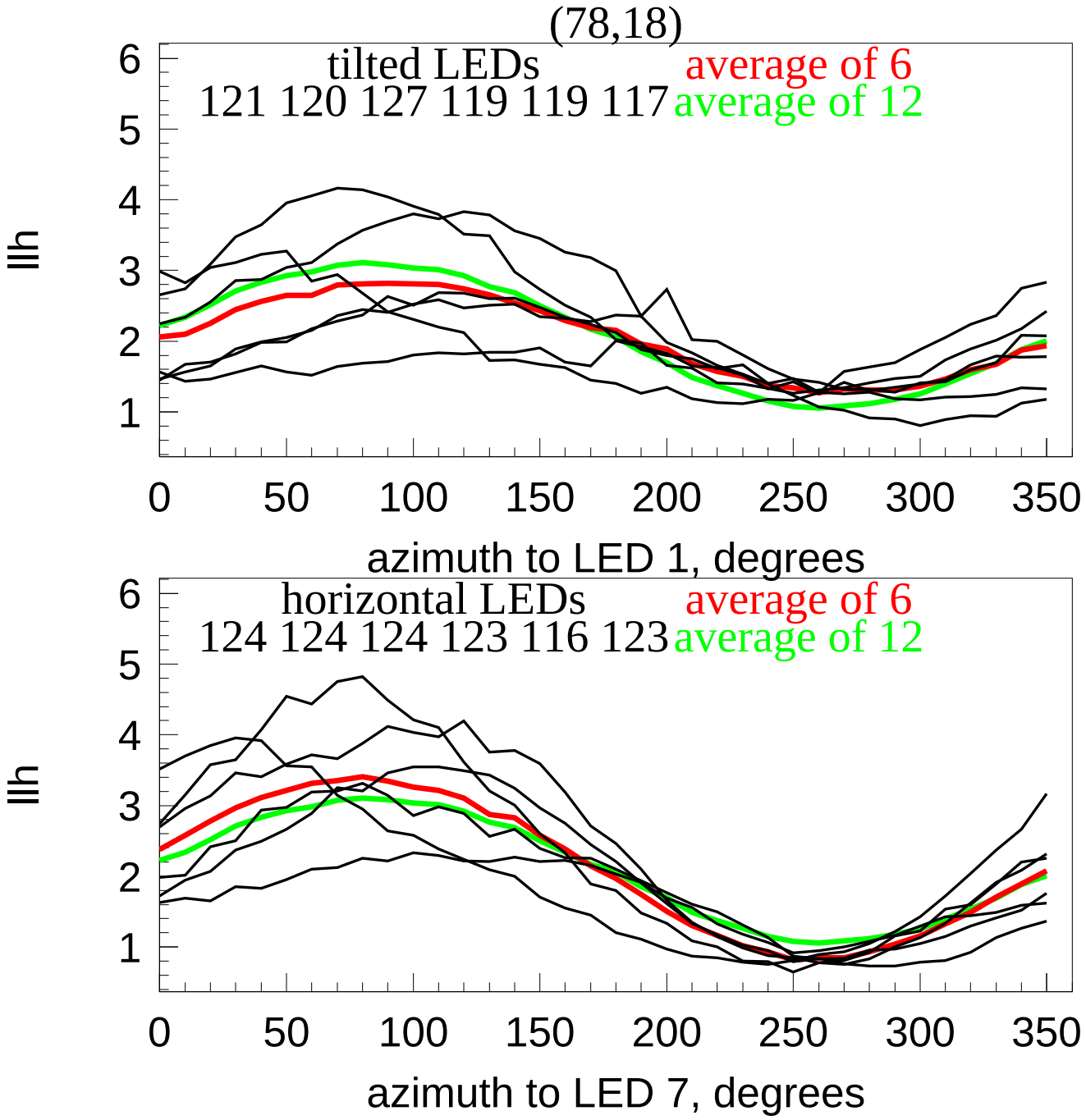

(78,15)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
0
1
7
3
2
9
8
359.5 ± 5.3

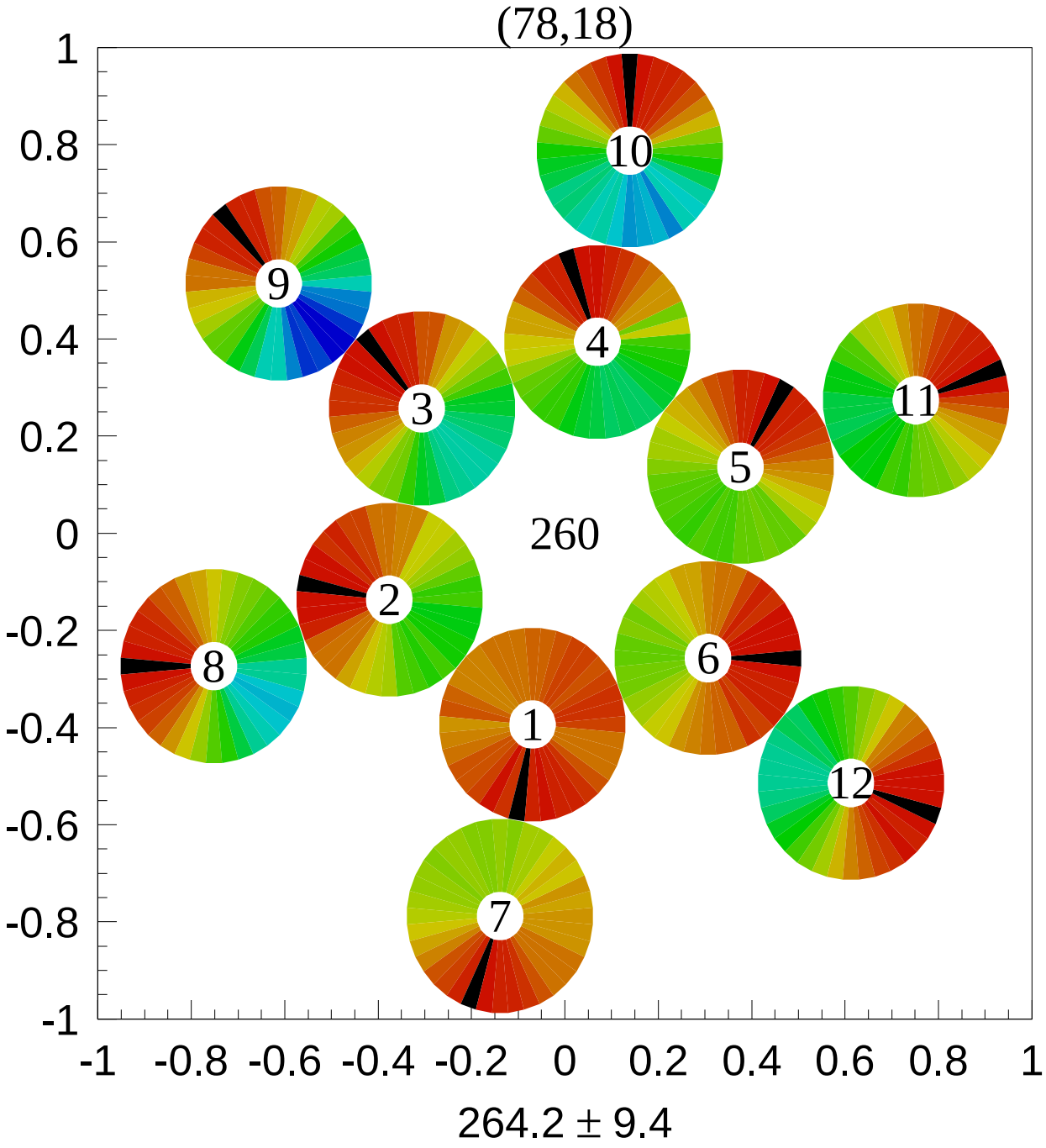

(78,16)
tilted LEDs
127 129 124 123 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 121 127 116 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

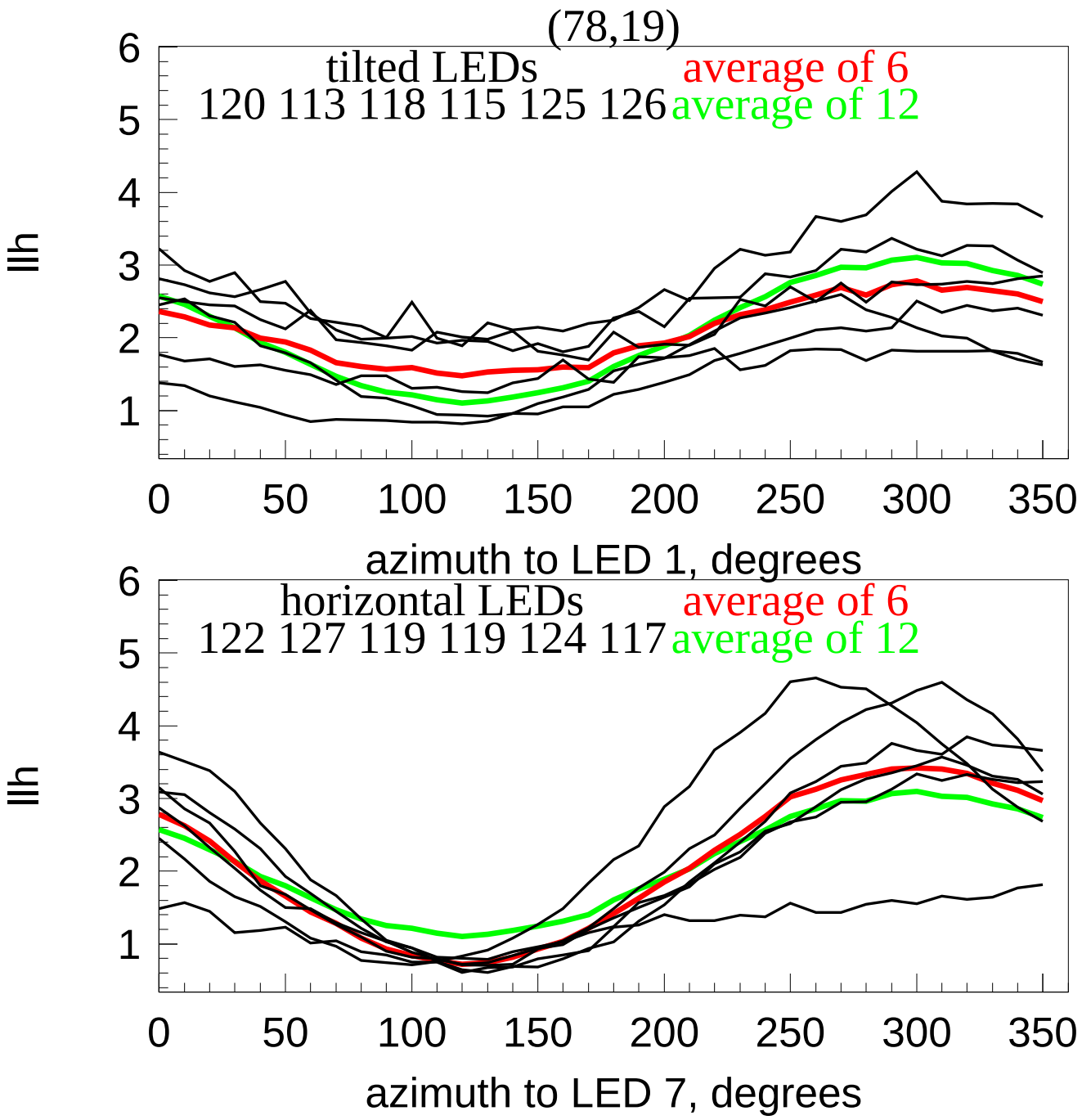

(78,16)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
63.5 ± 6.4

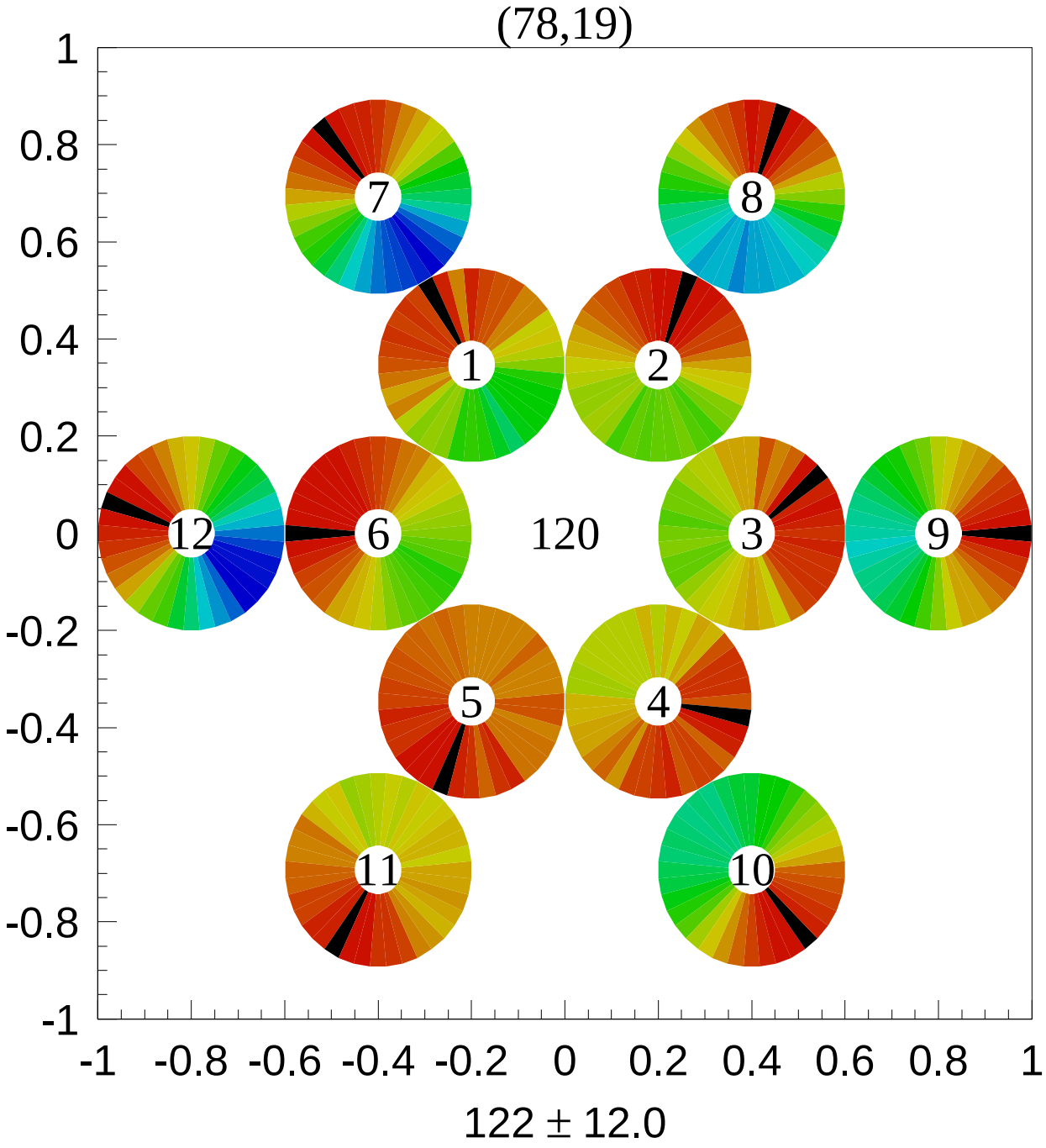

(78,17)
tilted LEDs
127 124 122 122 123 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 118 127 122 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

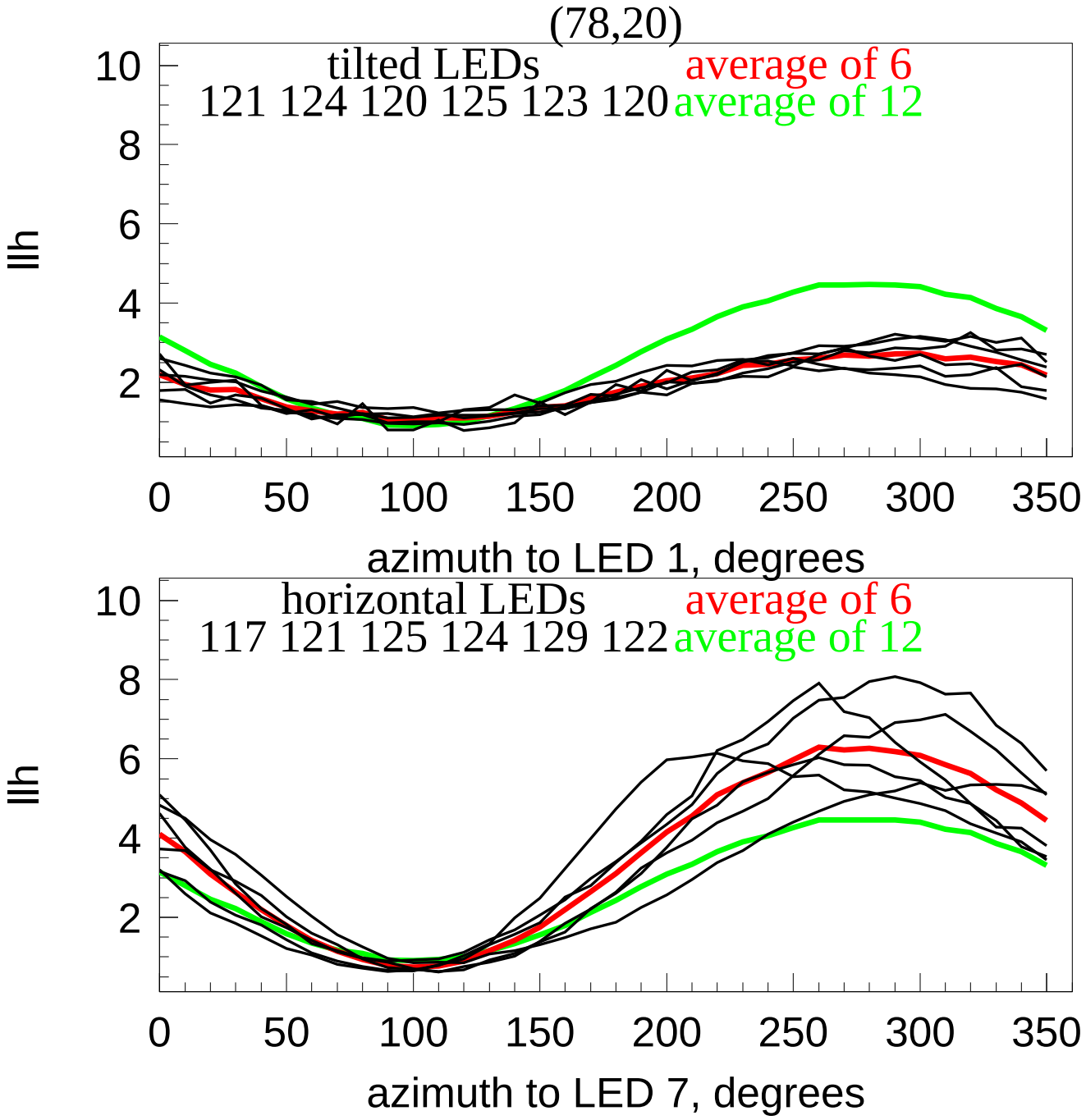

(78,17)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
8
6
2
90
5
3
11
4
9
10
96.1 ± 12.3

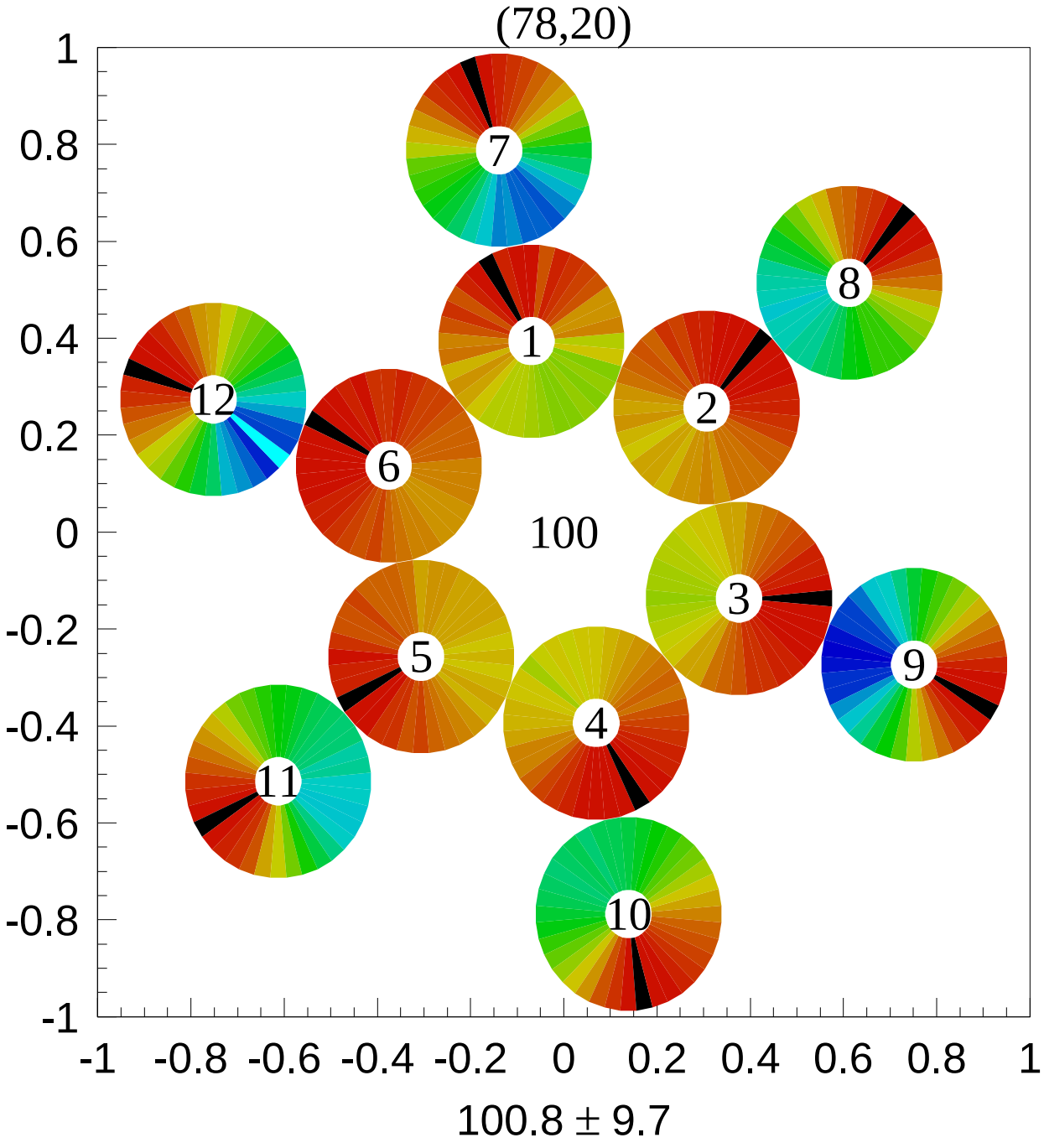

(78,18)
tilted LEDs
121 120 127 119 119 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 124 124 123 116 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

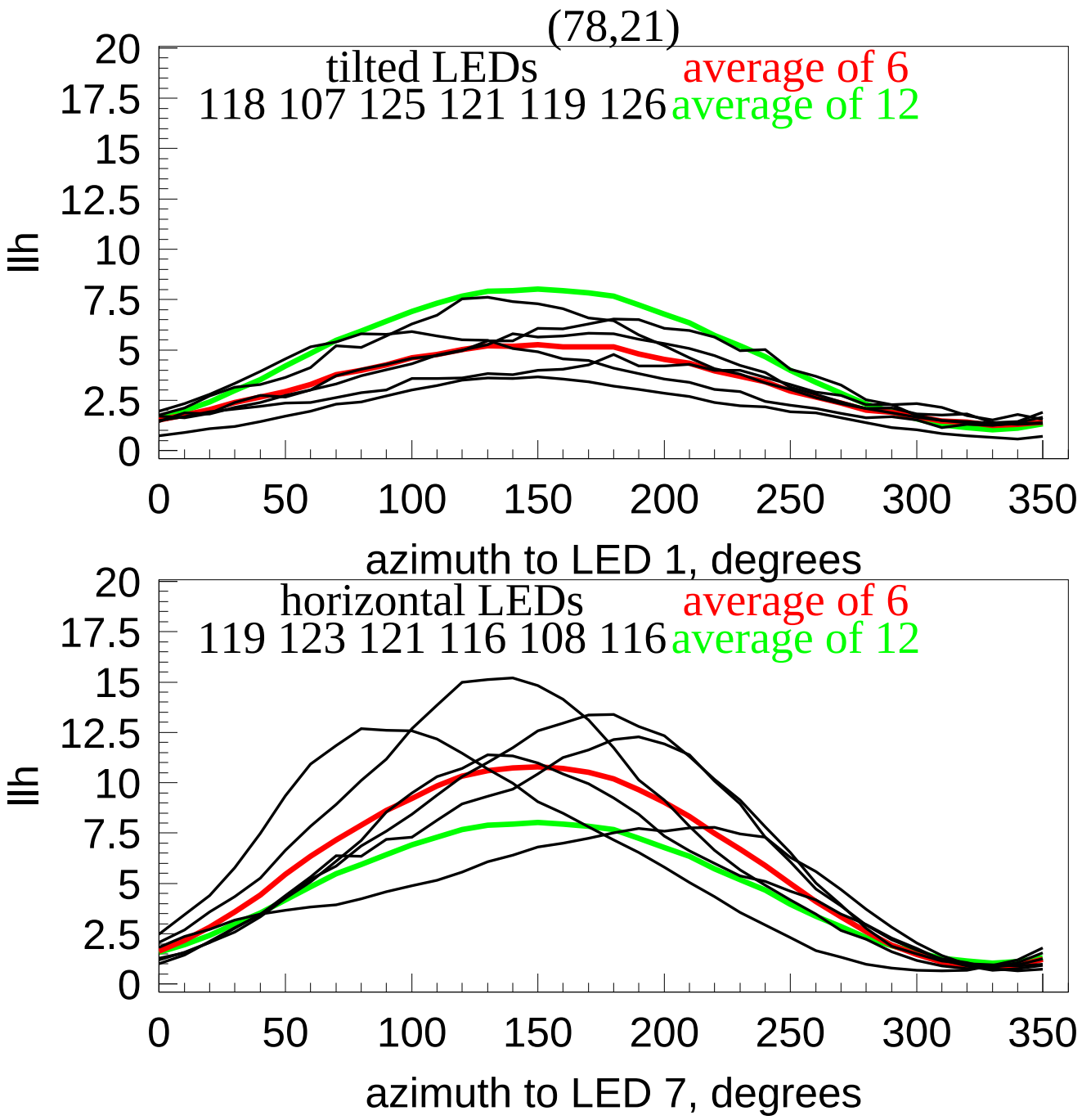

(78,18)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
260
2
8
6
1
12
7
264.2 ± 9.4

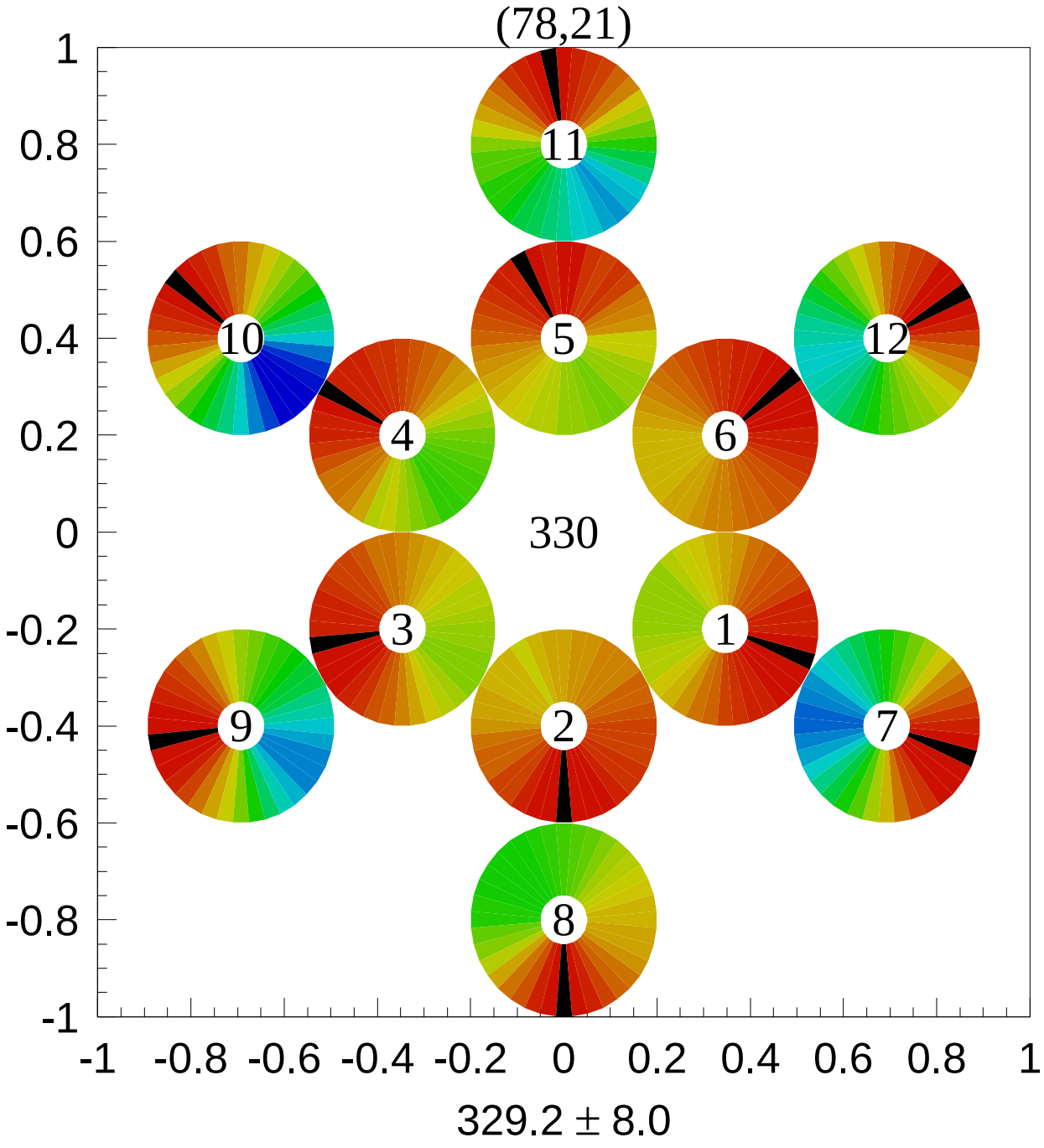

(78,19)
tilted LEDs
120 113 118 115 125 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 127 119 119 124 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

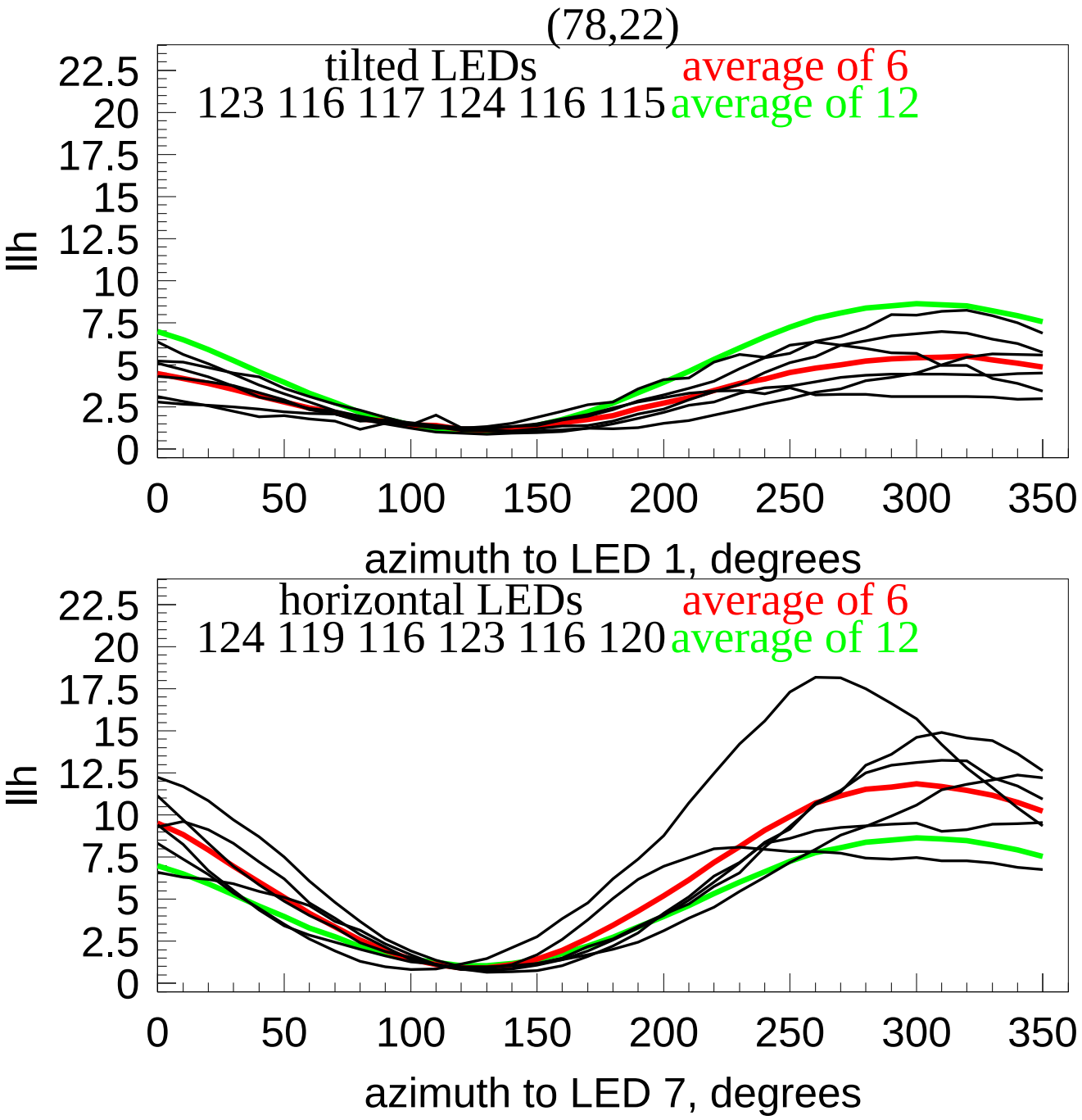

(78,19)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
122 ± 12.0

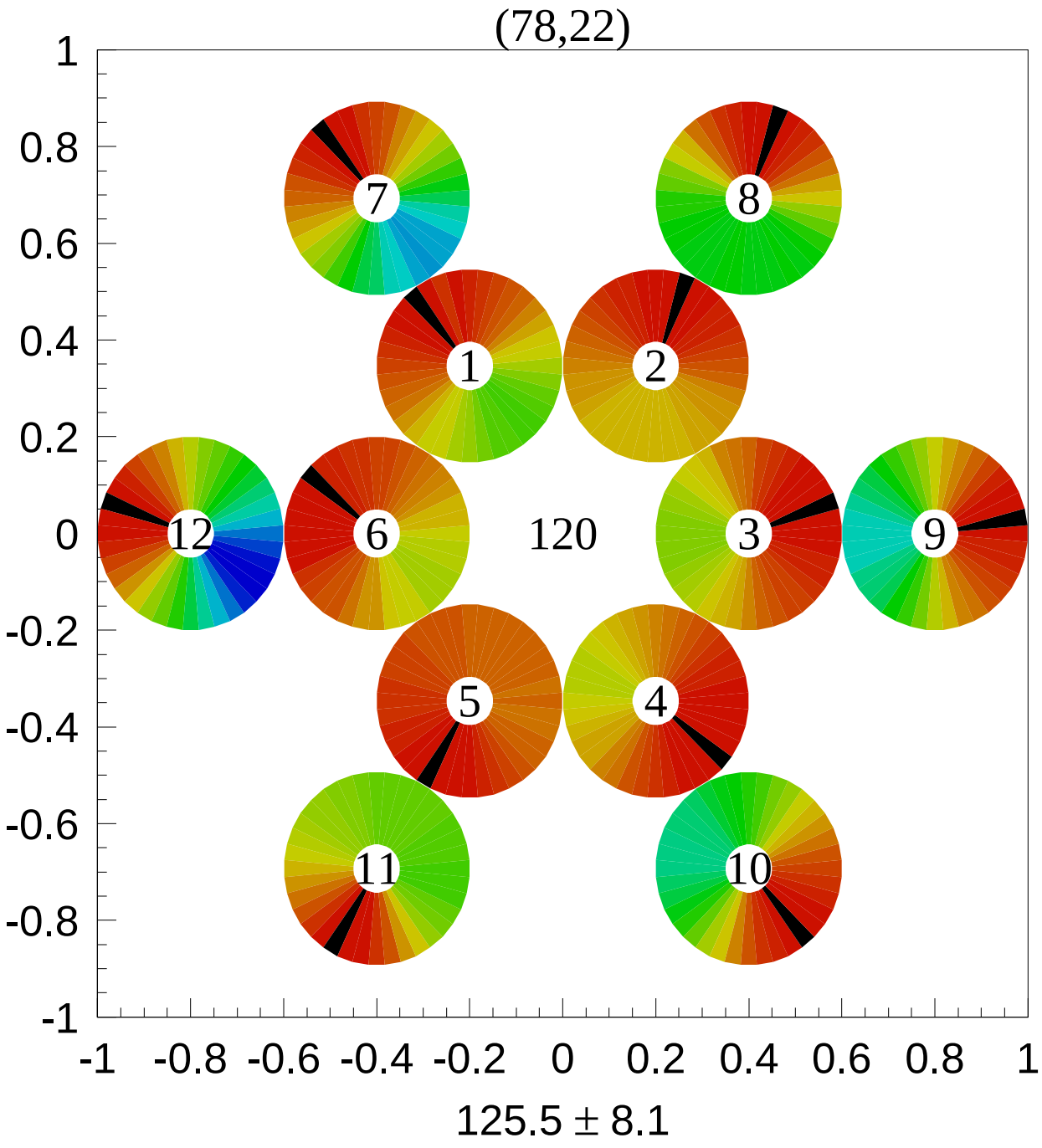

(78,20)
tilted LEDs
121 124 120 125 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 121 125 124 129 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

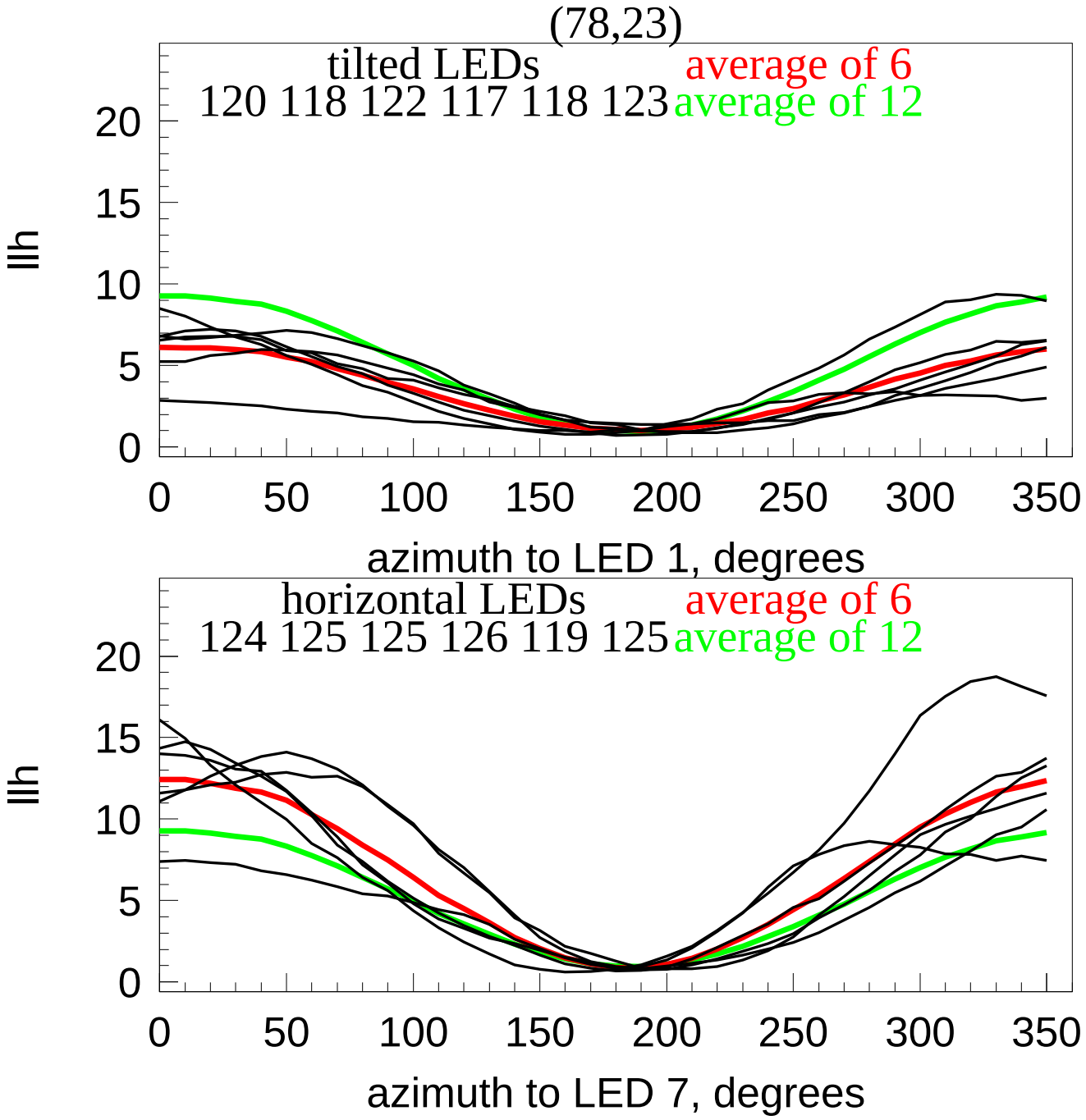

(78,20)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
100.8 ± 9.7
7
1
8
12
2
6
100
3
5
9
4
11
10

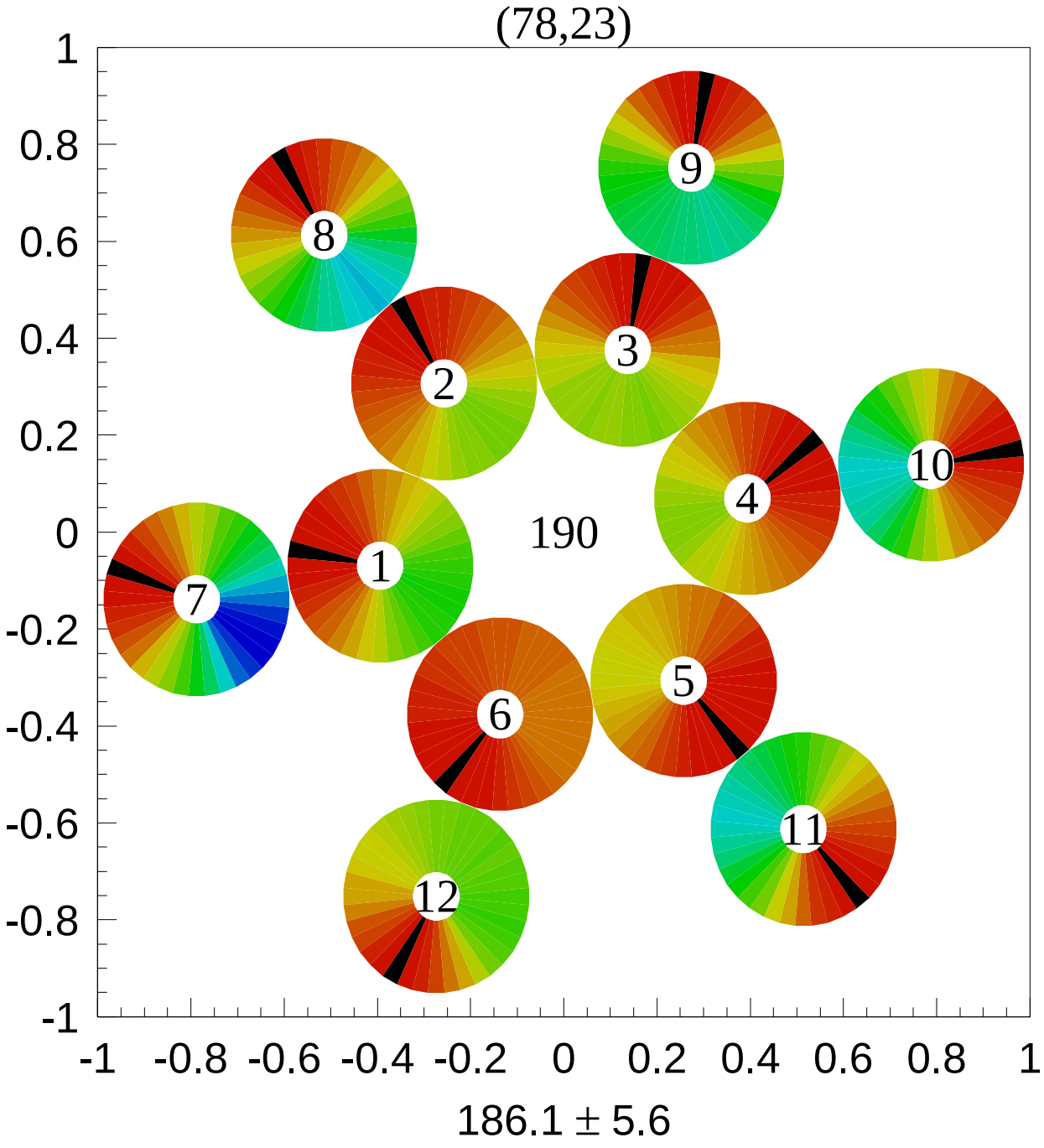

(78,21)
tilted LEDs
118 107 125 121 119 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 121 116 108 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

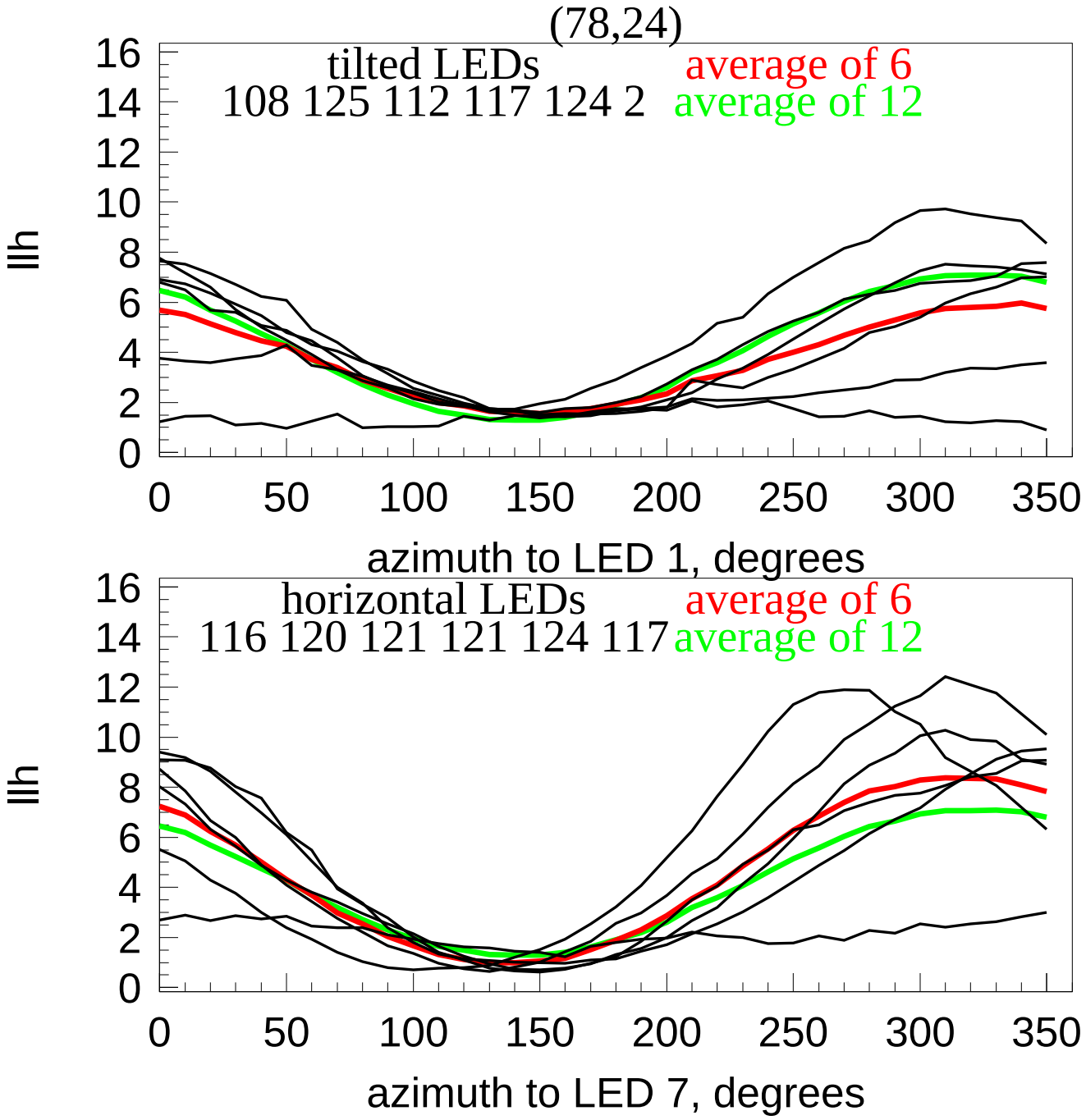

(78,21)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
329.2 ± 8.0

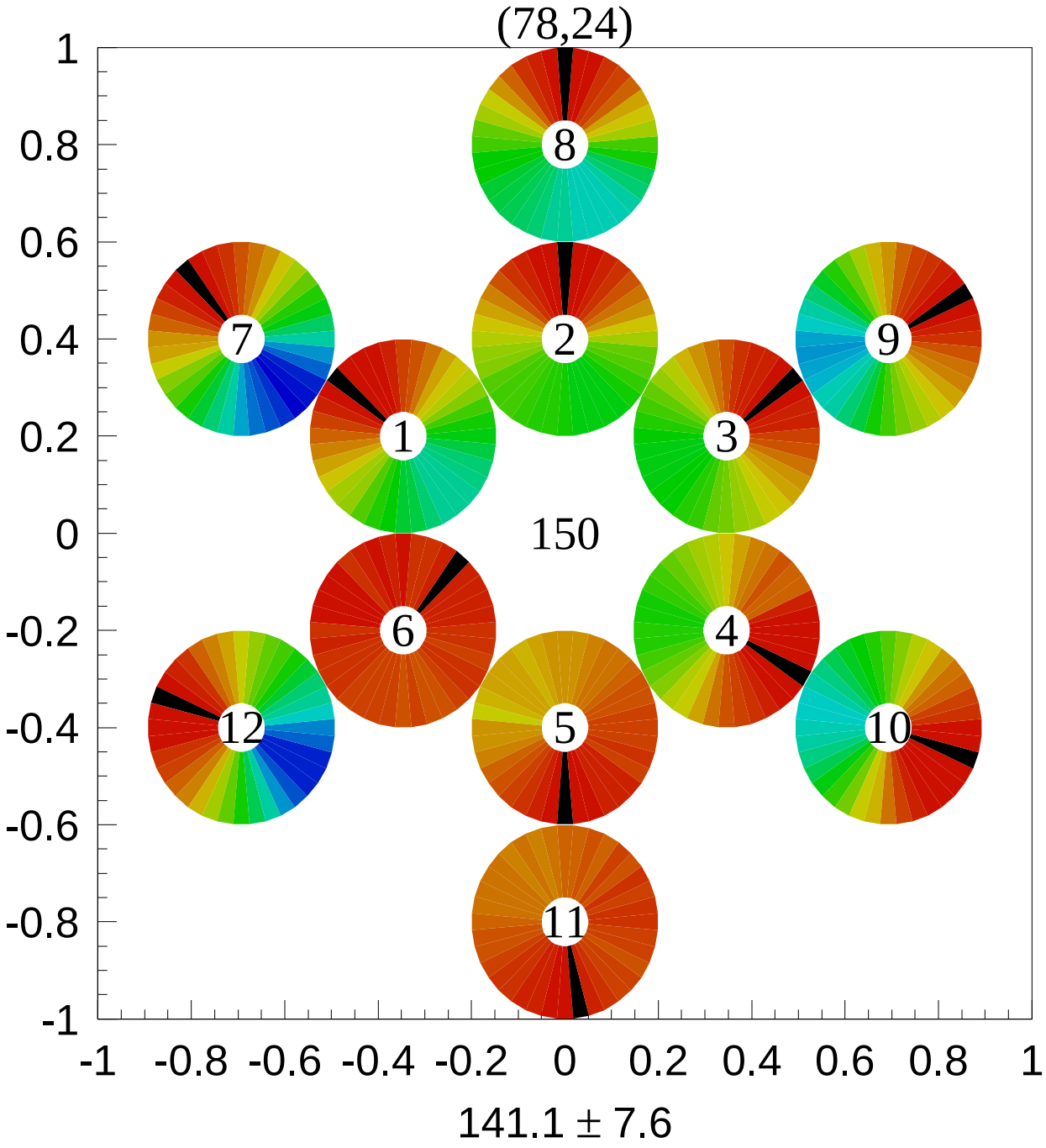

(78,22)
tilted LEDs
123 116 117 124 116 115
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 119 116 123 116 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

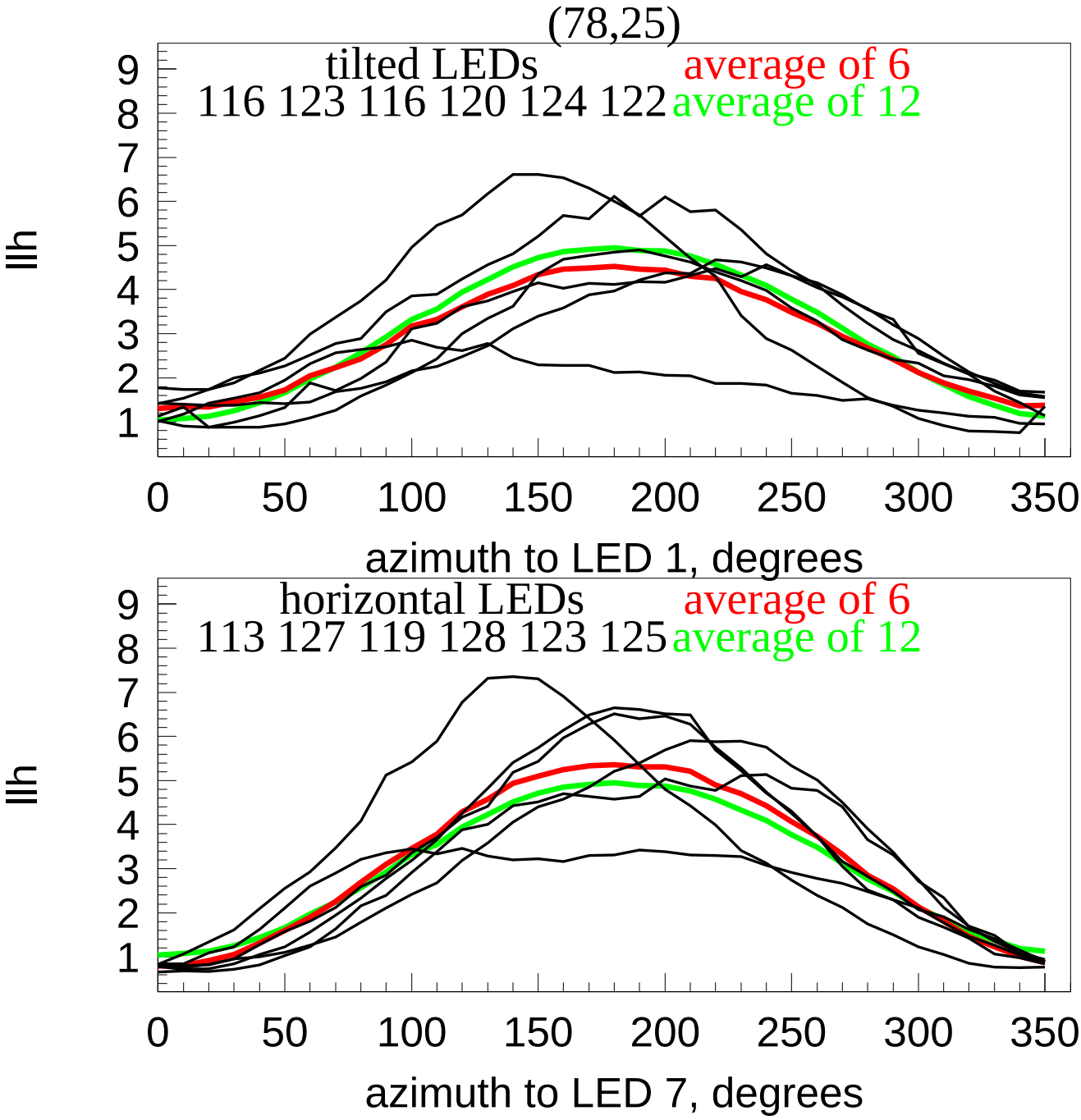

(78,22)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
125.5 ± 8.1

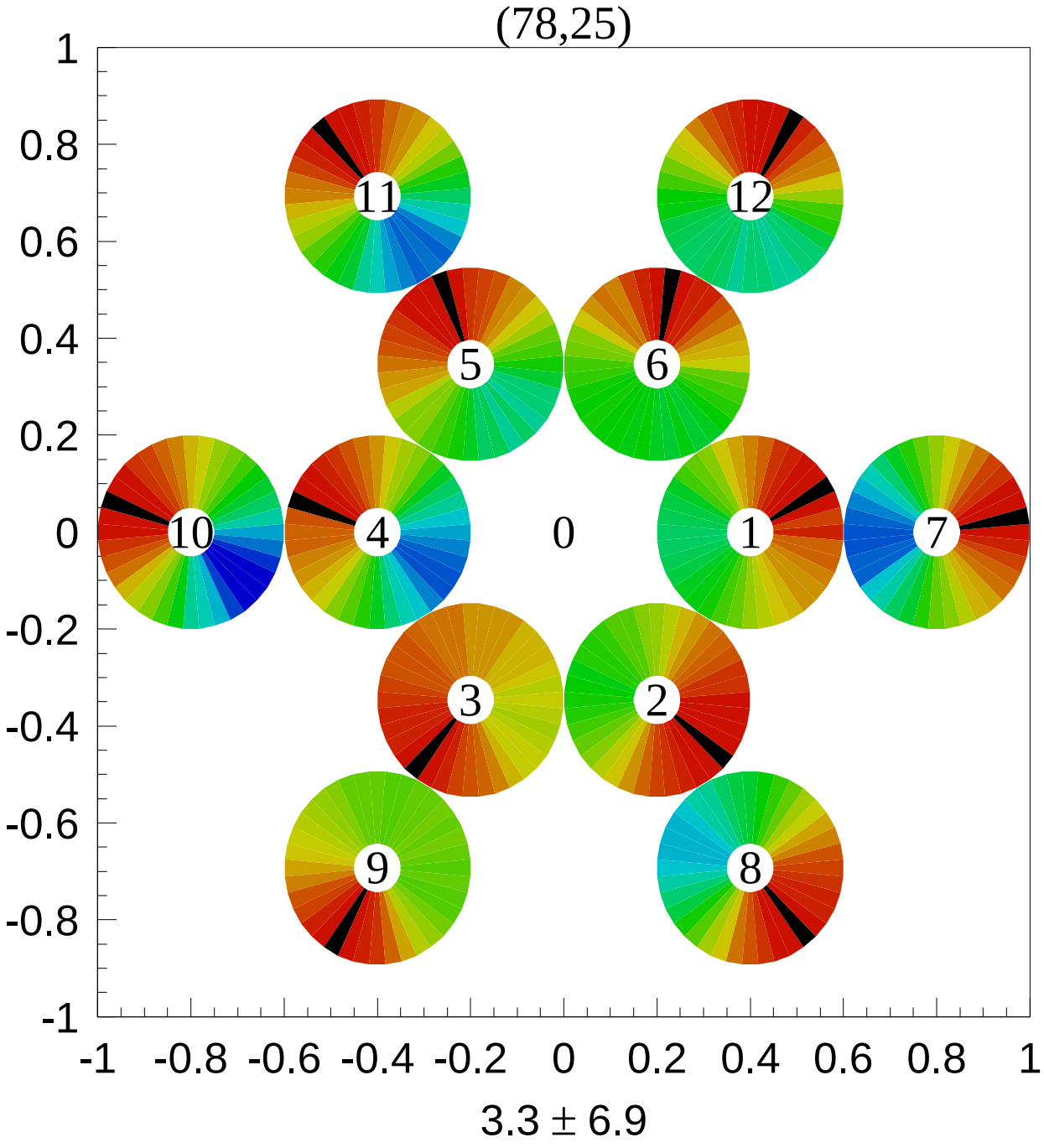

(78,23)
tilted LEDs
120 118 122 117 118 123
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
124 125 125 126 119 125
average of 6
average of 12
llh
20
15
10
5
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

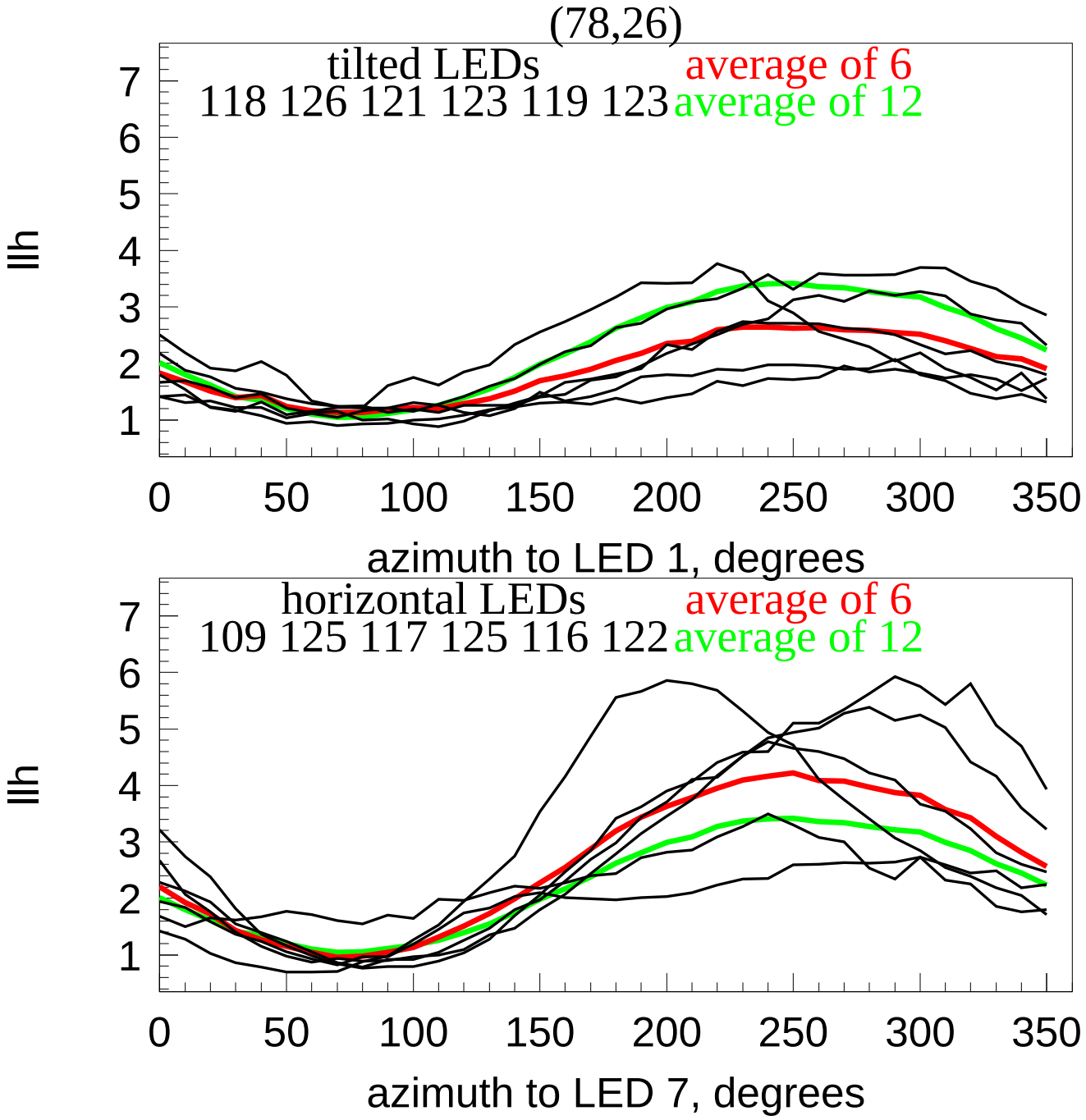

(78,23)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.1 ± 5.6
190
1
2
3
4
5
6
7
8
9
10
11
12

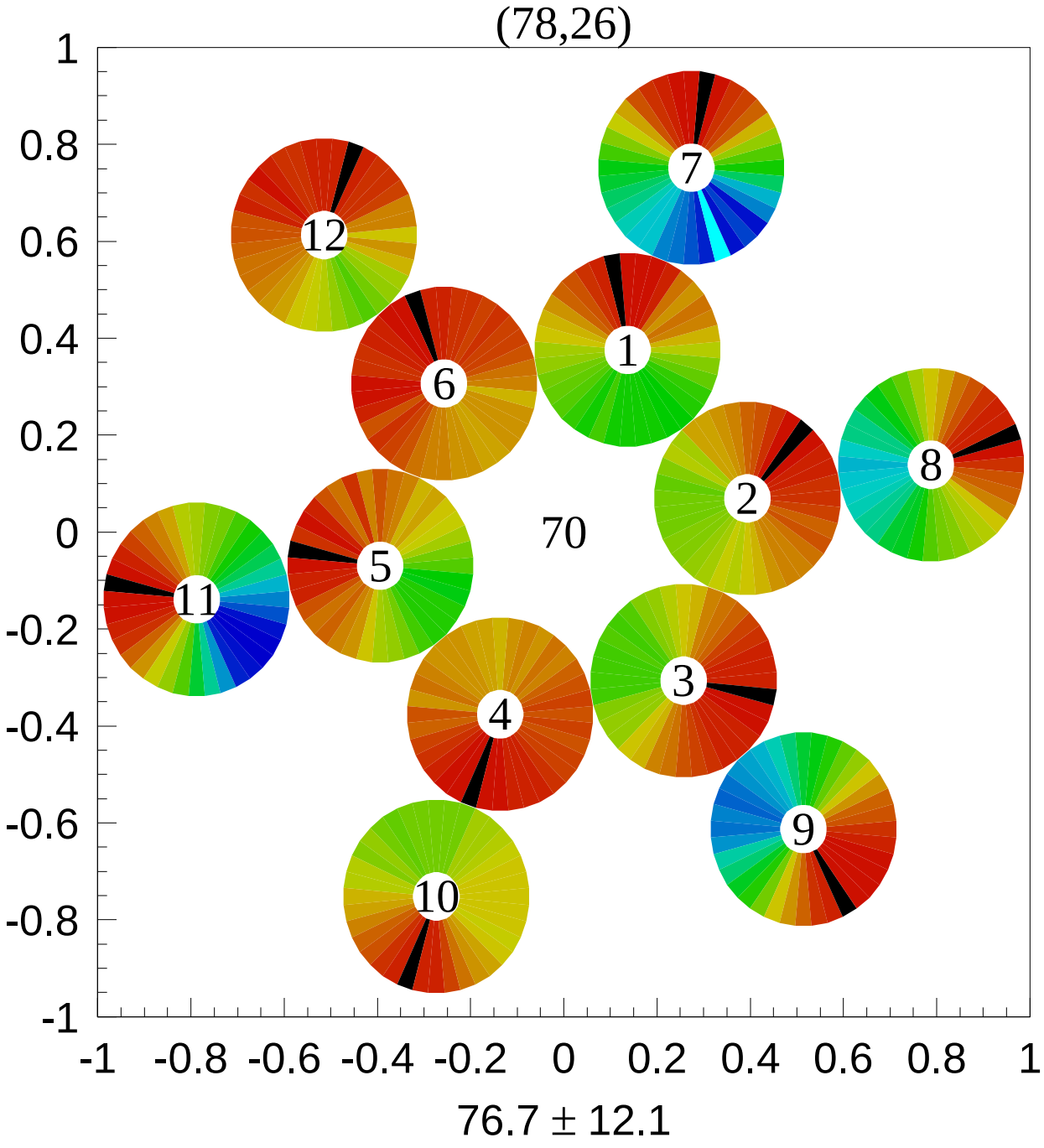

(78,24)
tilted LEDs
108 125 112 117 124 2
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 120 121 121 124 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

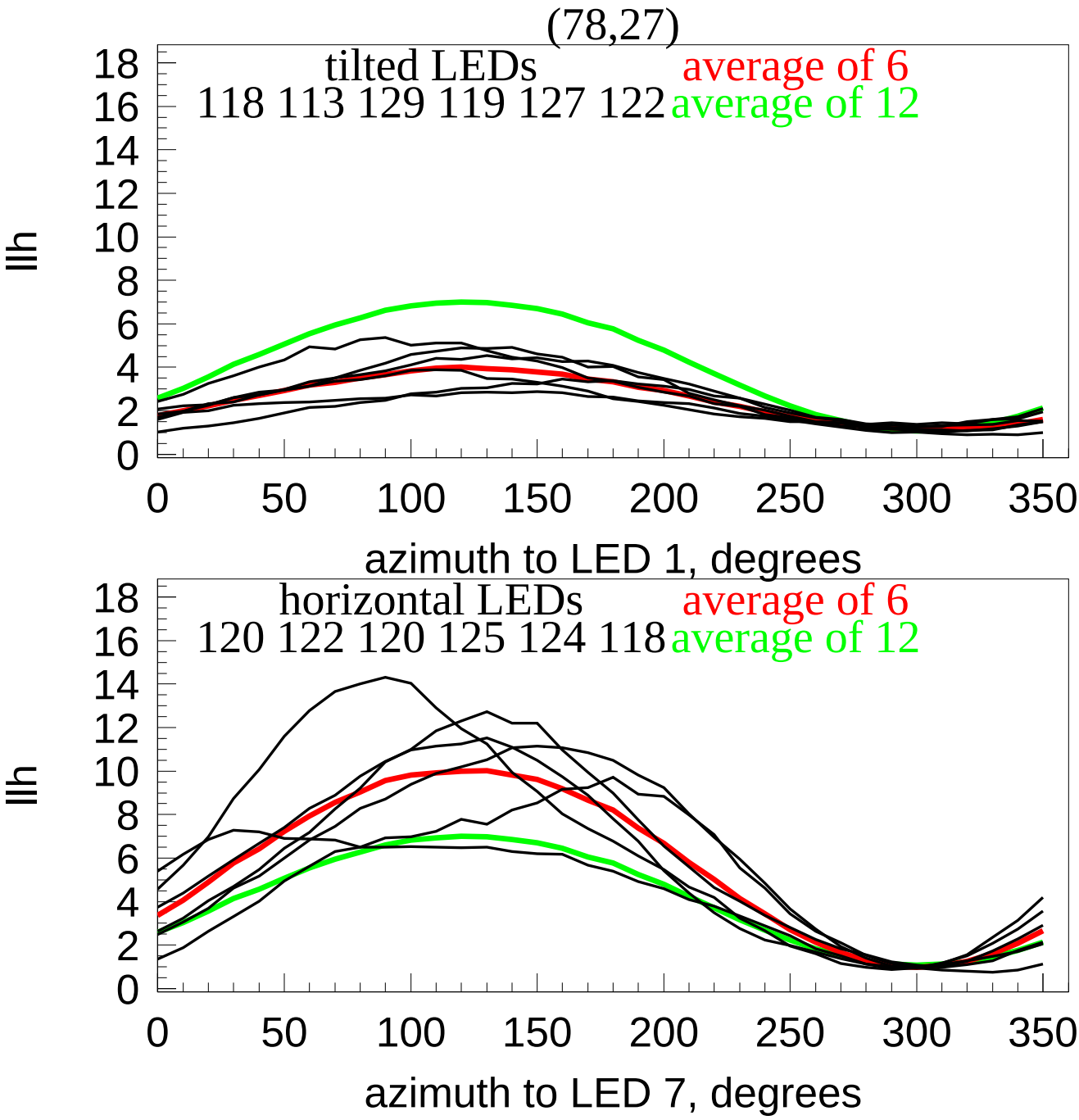

(78,24)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
141.1 ± 7.6

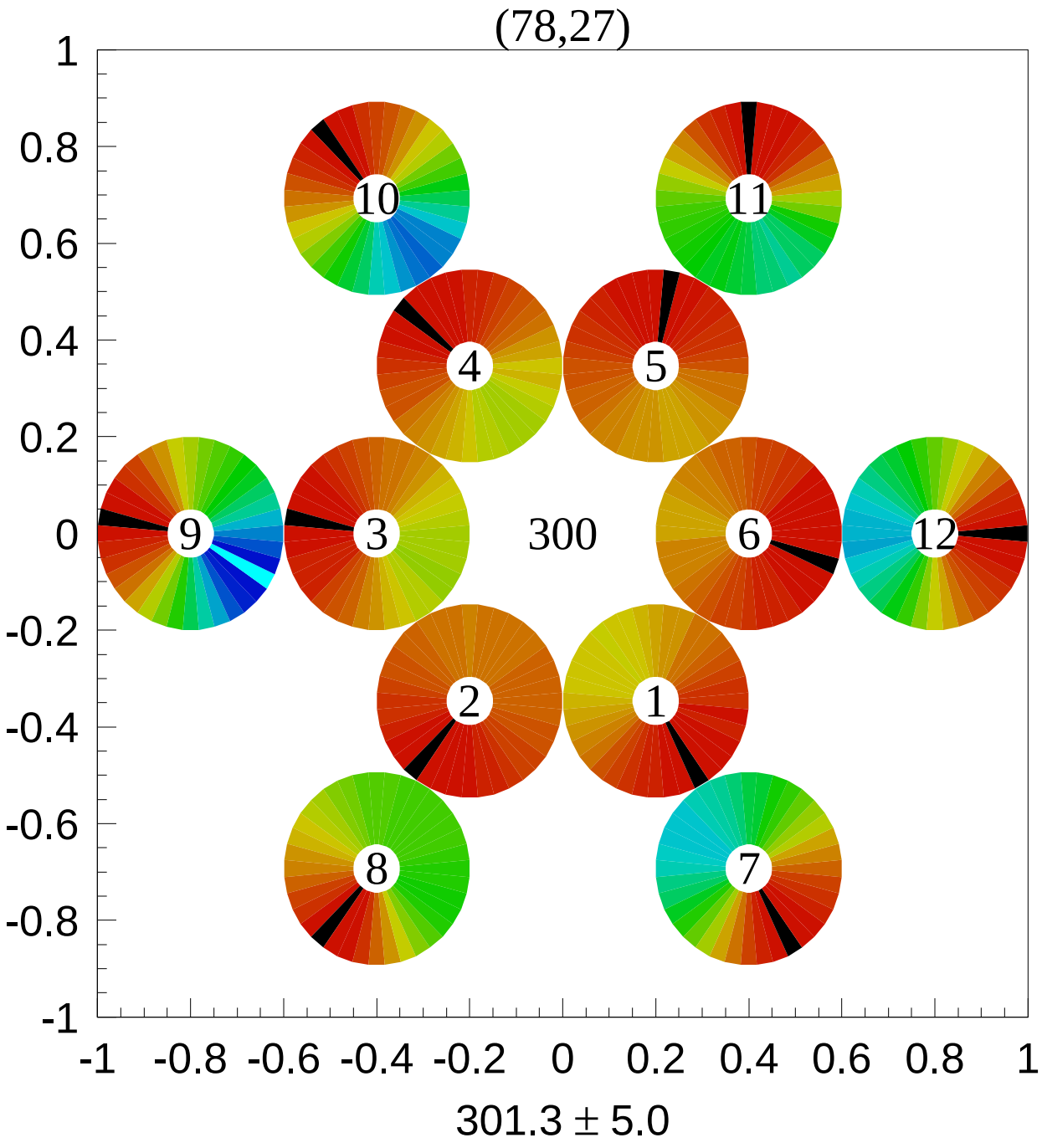

(78,25)
tilted LEDs
116 123 116 120 124 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
113 127 119 128 123 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

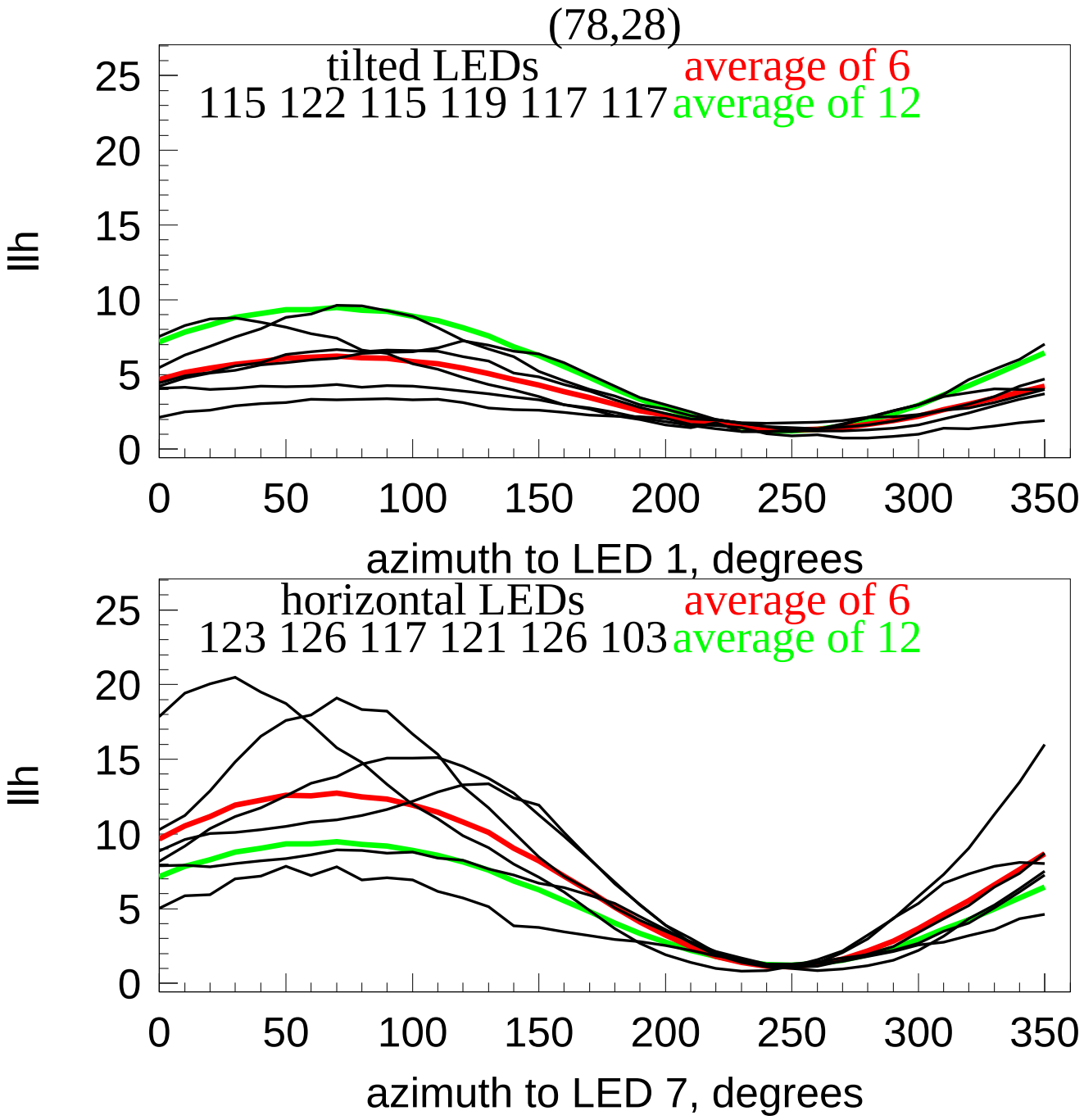

(78,25)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
3.3 ± 6.9
11
12
5
6
10
4
0
1
7
3
2
9
8

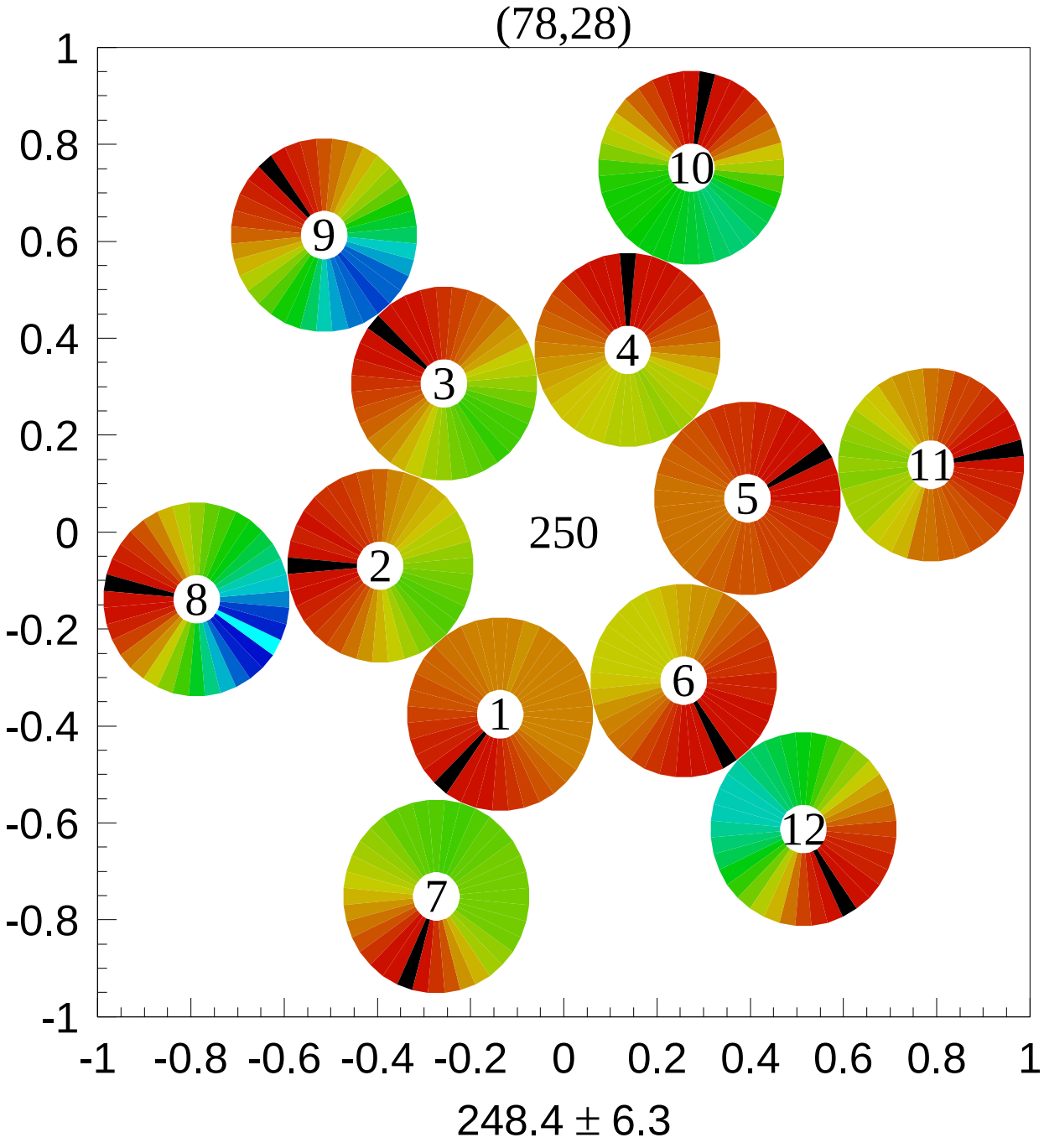

(78,26)
tilted LEDs
118 126 121 123 119 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
109 125 117 125 116 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

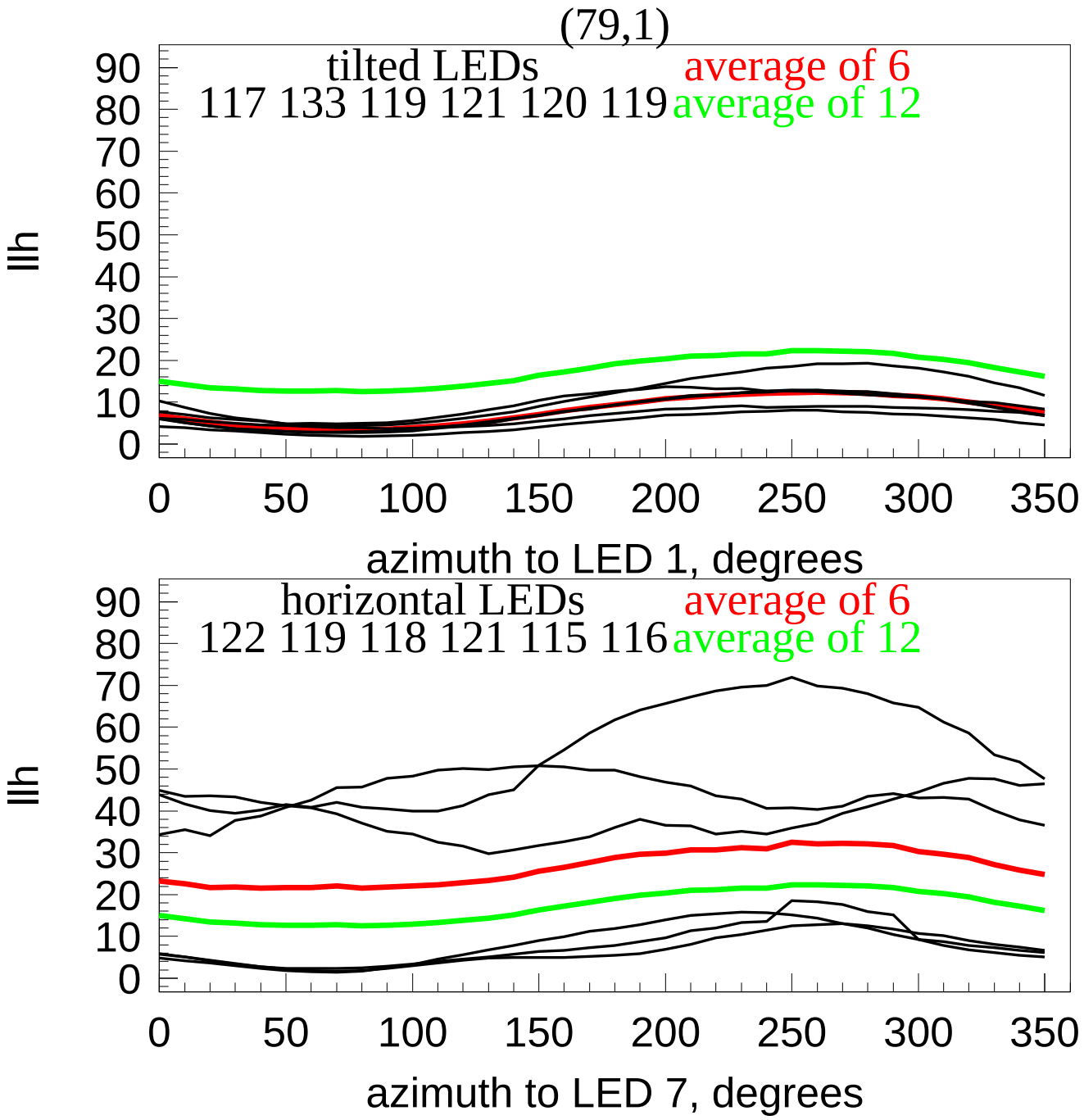

(78,26)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
3
4
9
10
76.7 ± 12.1

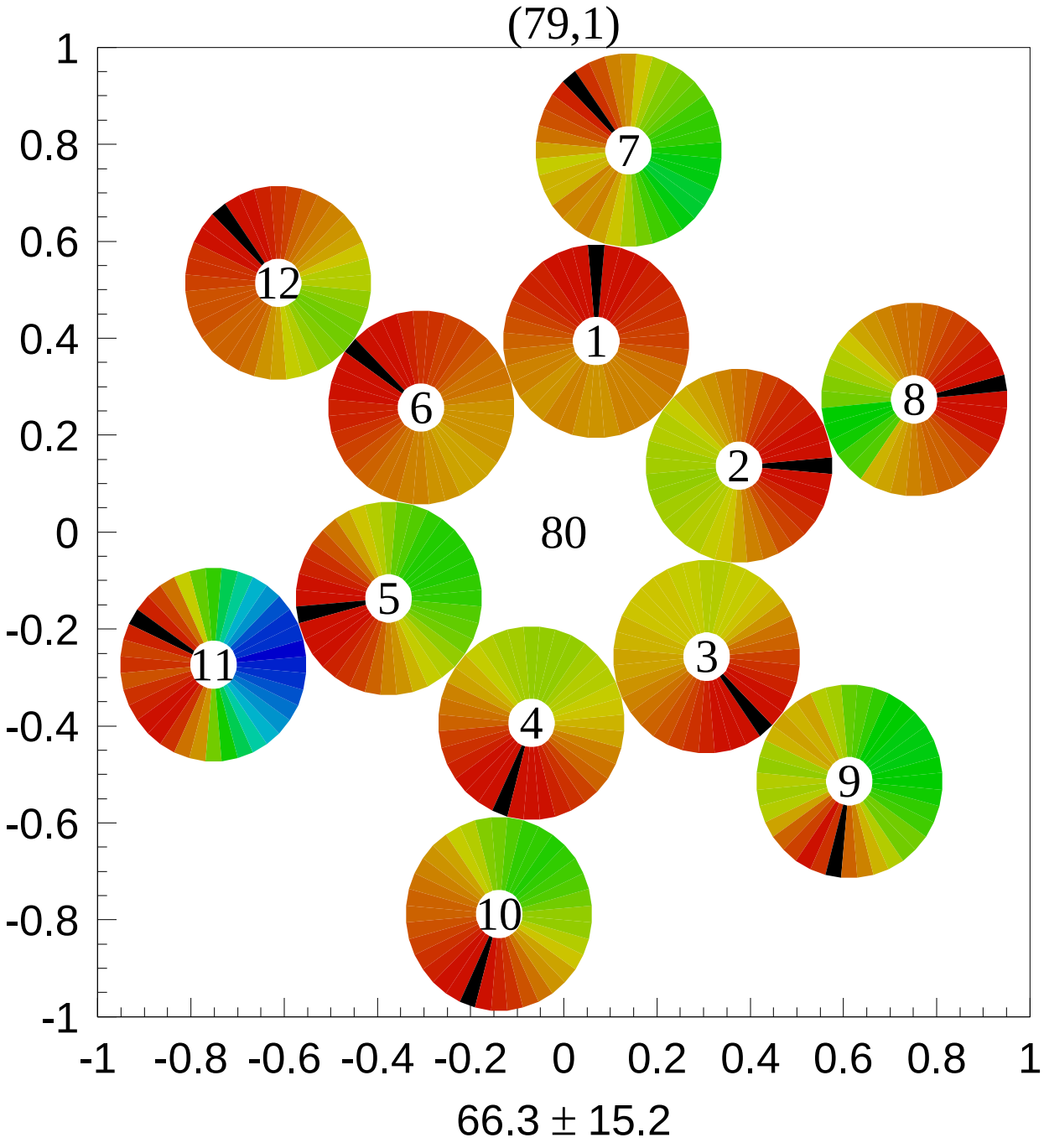

(78,27)
tilted LEDs
118 113 129 119 127 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 122 120 125 124 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

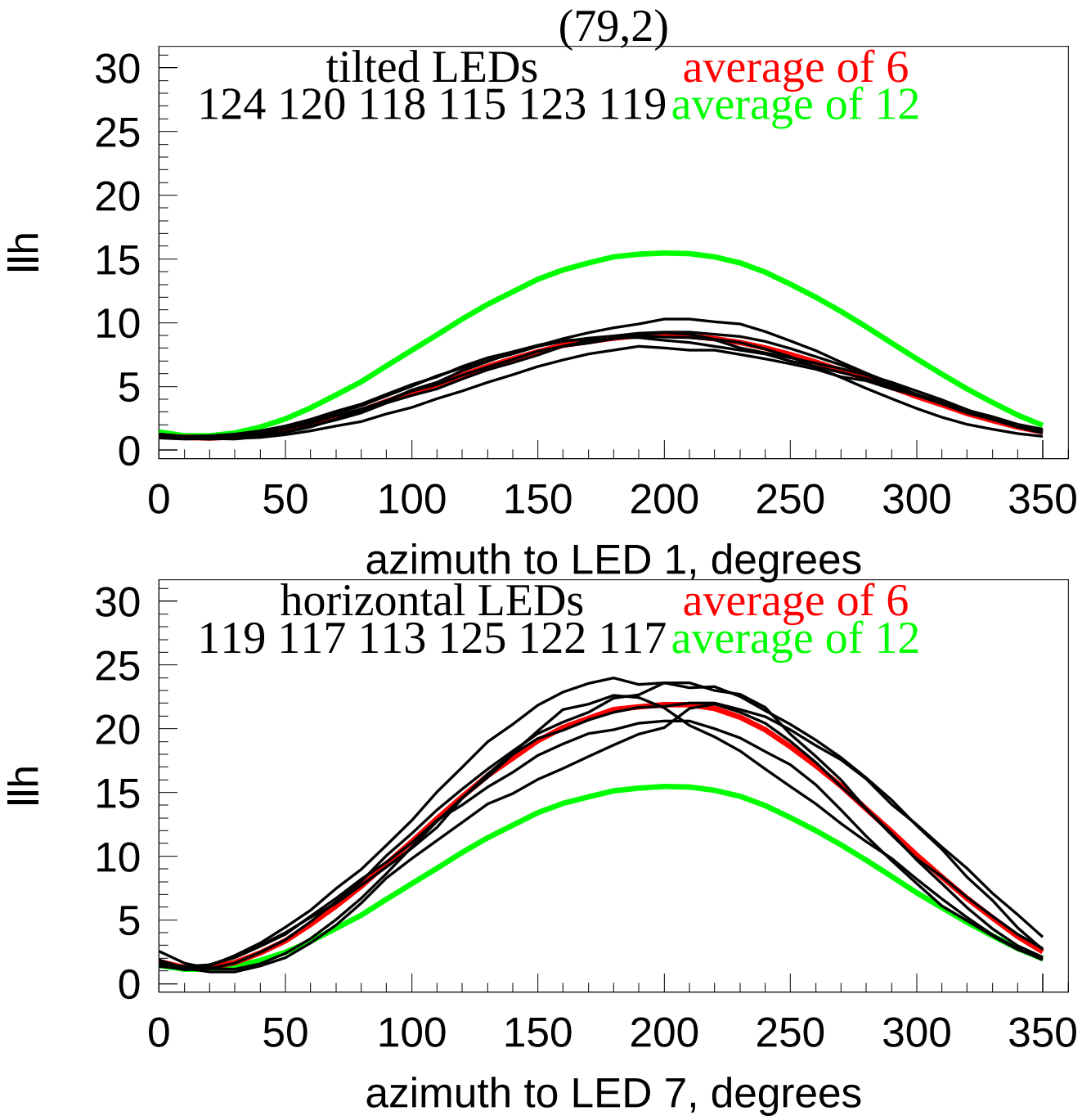

(78,27)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
301.3 ± 5.0

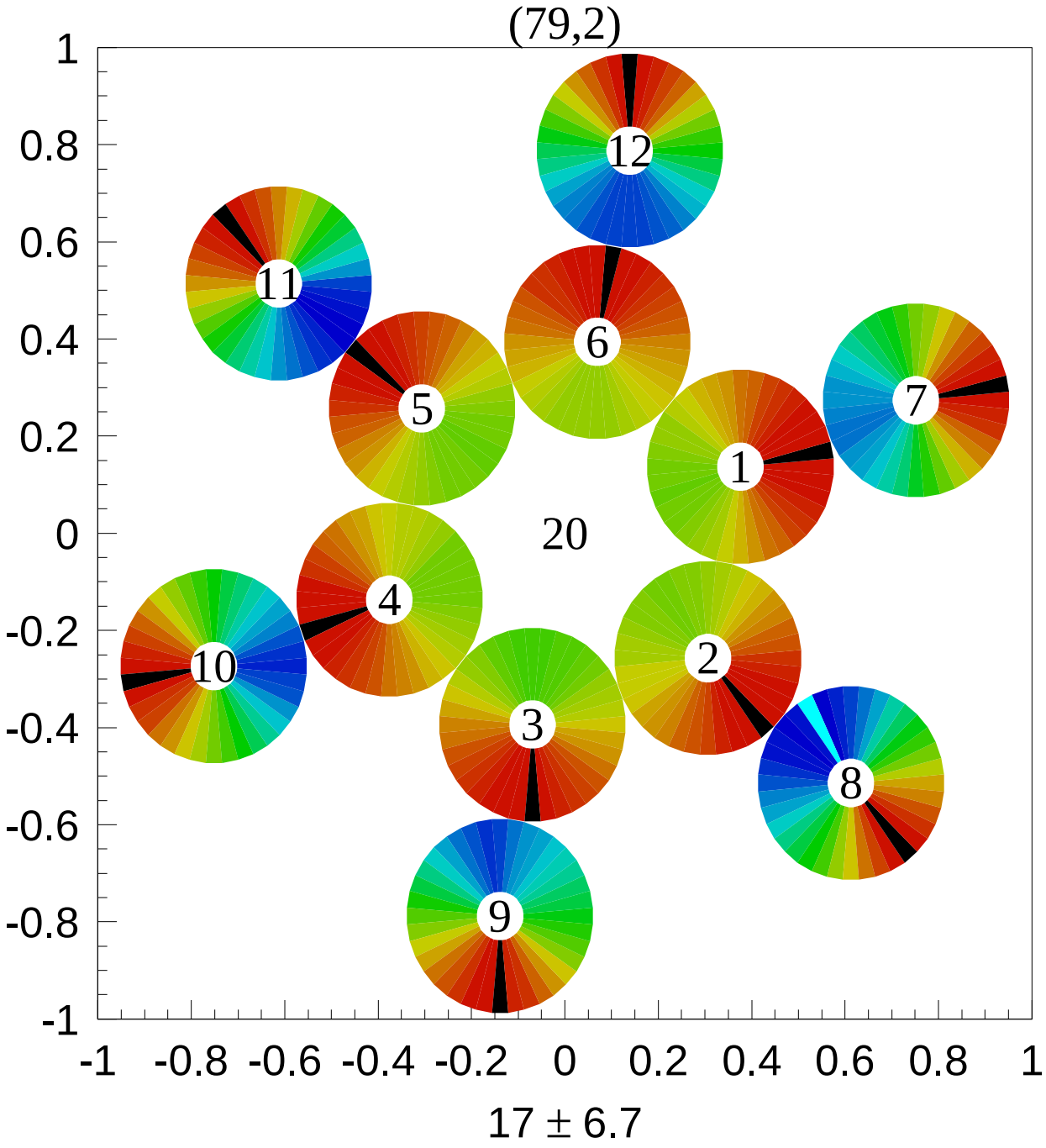

(78,28)
tilted LEDs
115 122 115 119 117 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 126 117 121 126 103
average of 6
average of 12
llh
azimuth to LED 7, degrees

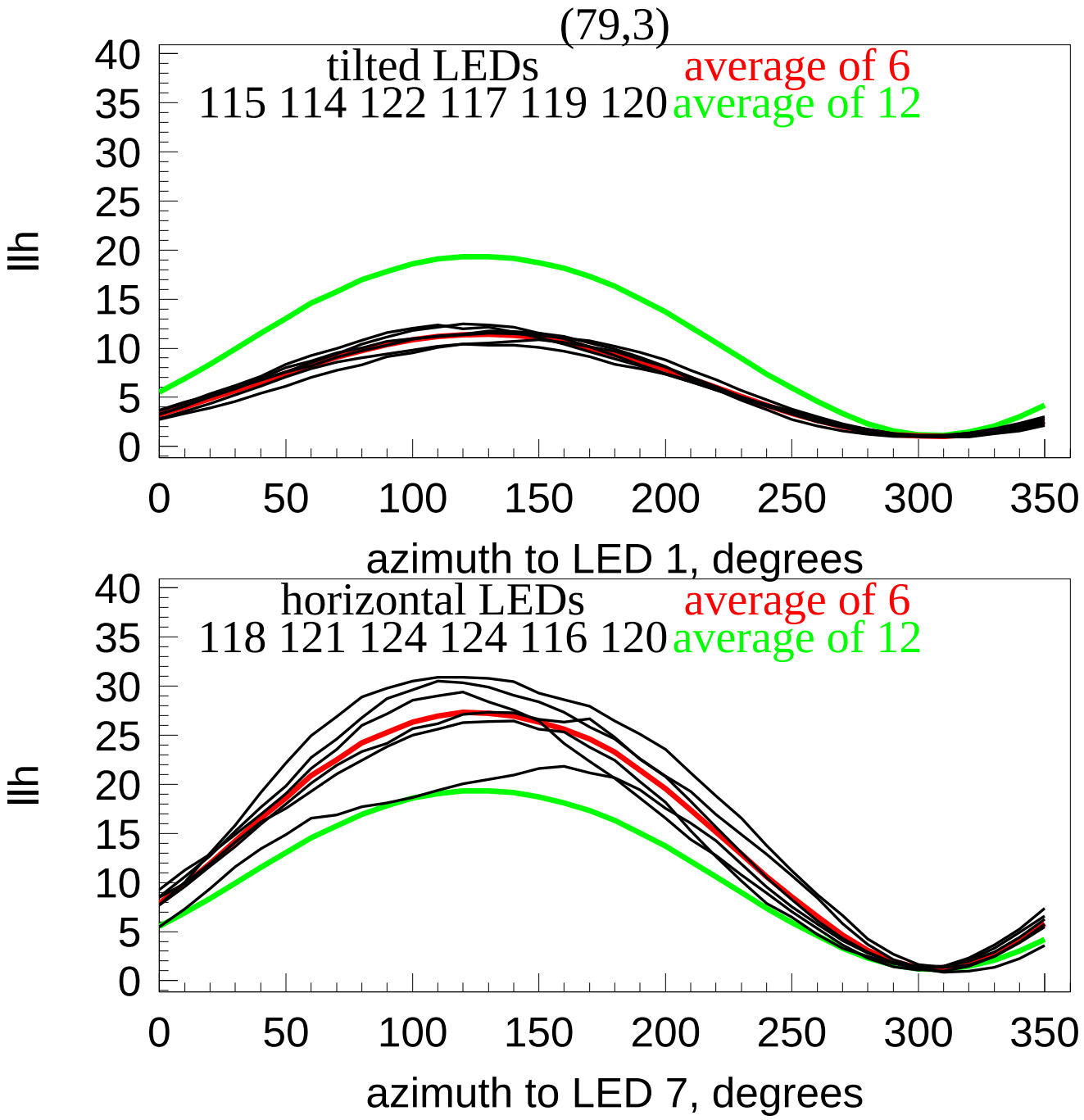

(78,28)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
11
5
2
250
8
1
6
12
7
248.4 ± 6.3

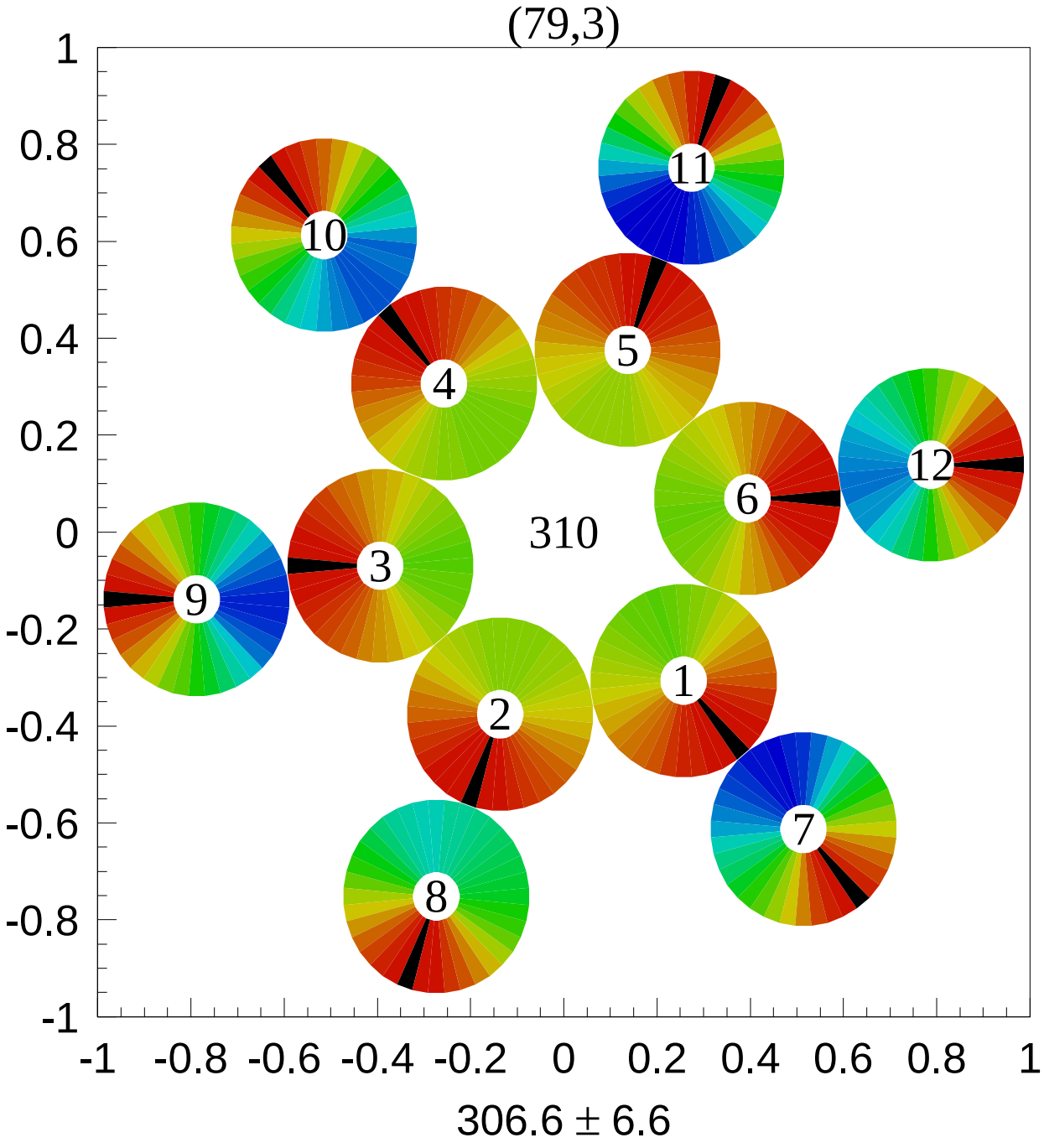

(79,1)
tilted LEDs
117 133 119 121 120 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 118 121 115 116
average of 6
average of 12
llh
azimuth to LED 7, degrees

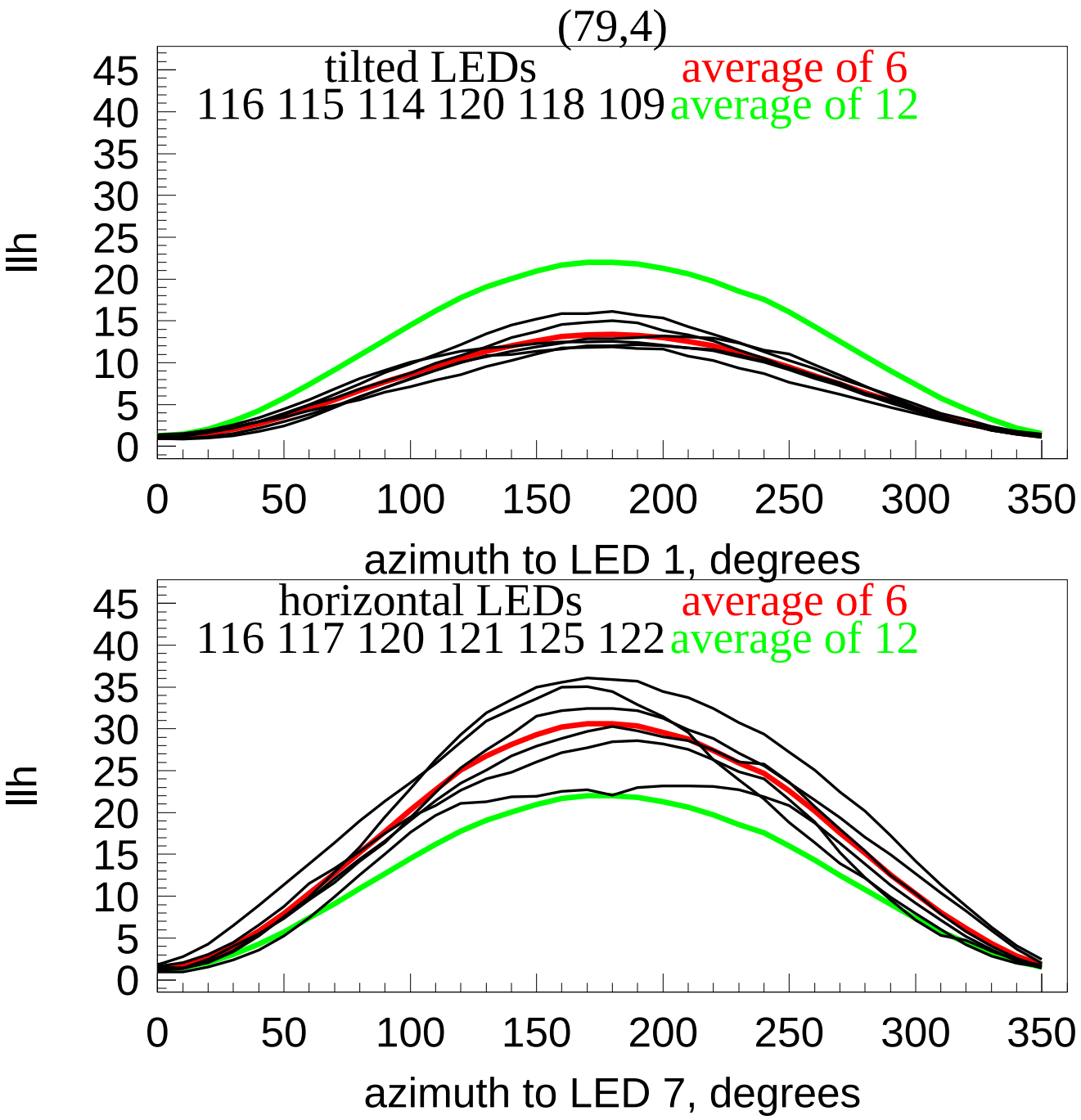

(79,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
66.3 ± 15.2

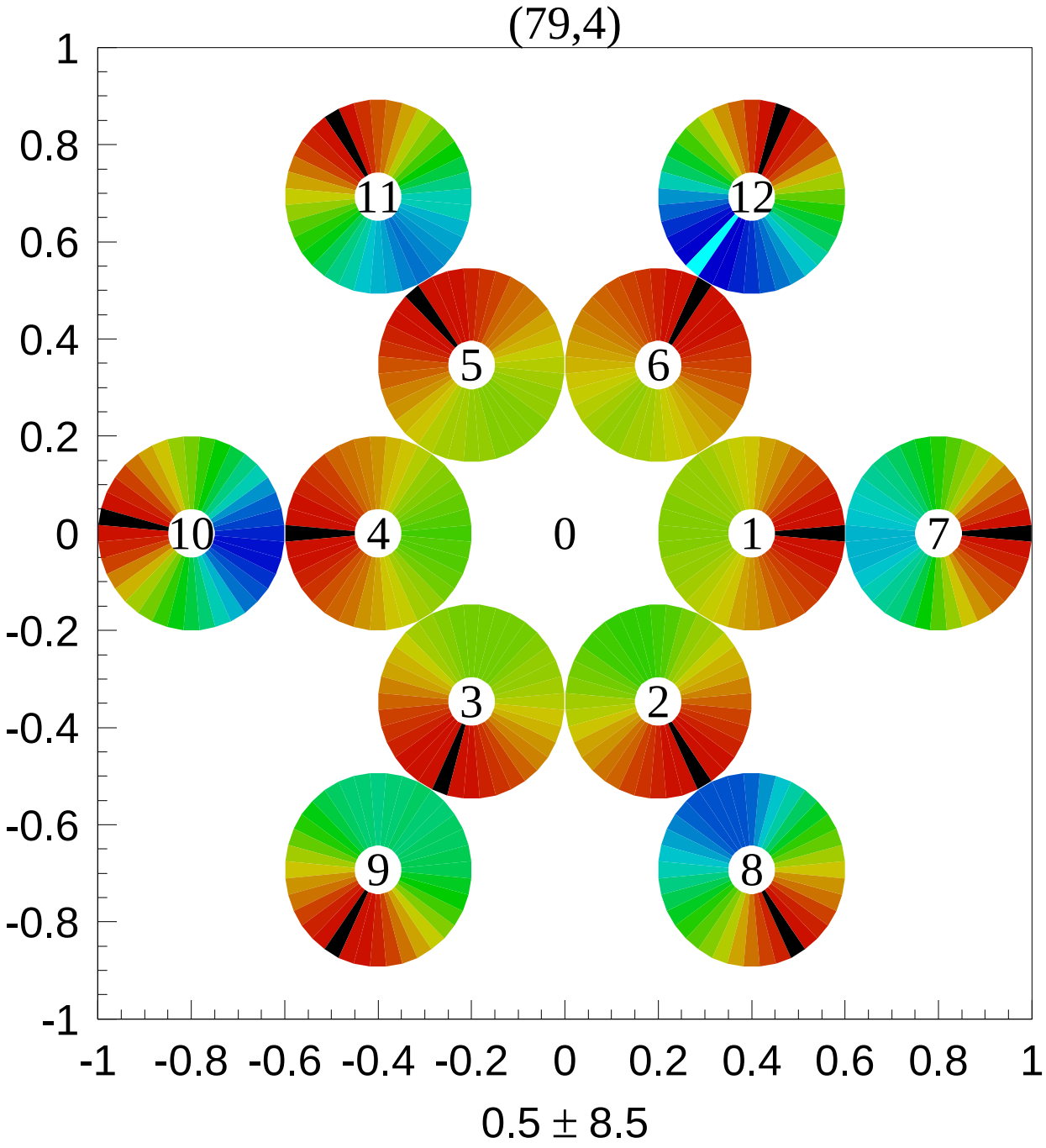

(79,2)
tilted LEDs
124 120 118 115 123 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
119 117 113 125 122 117
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

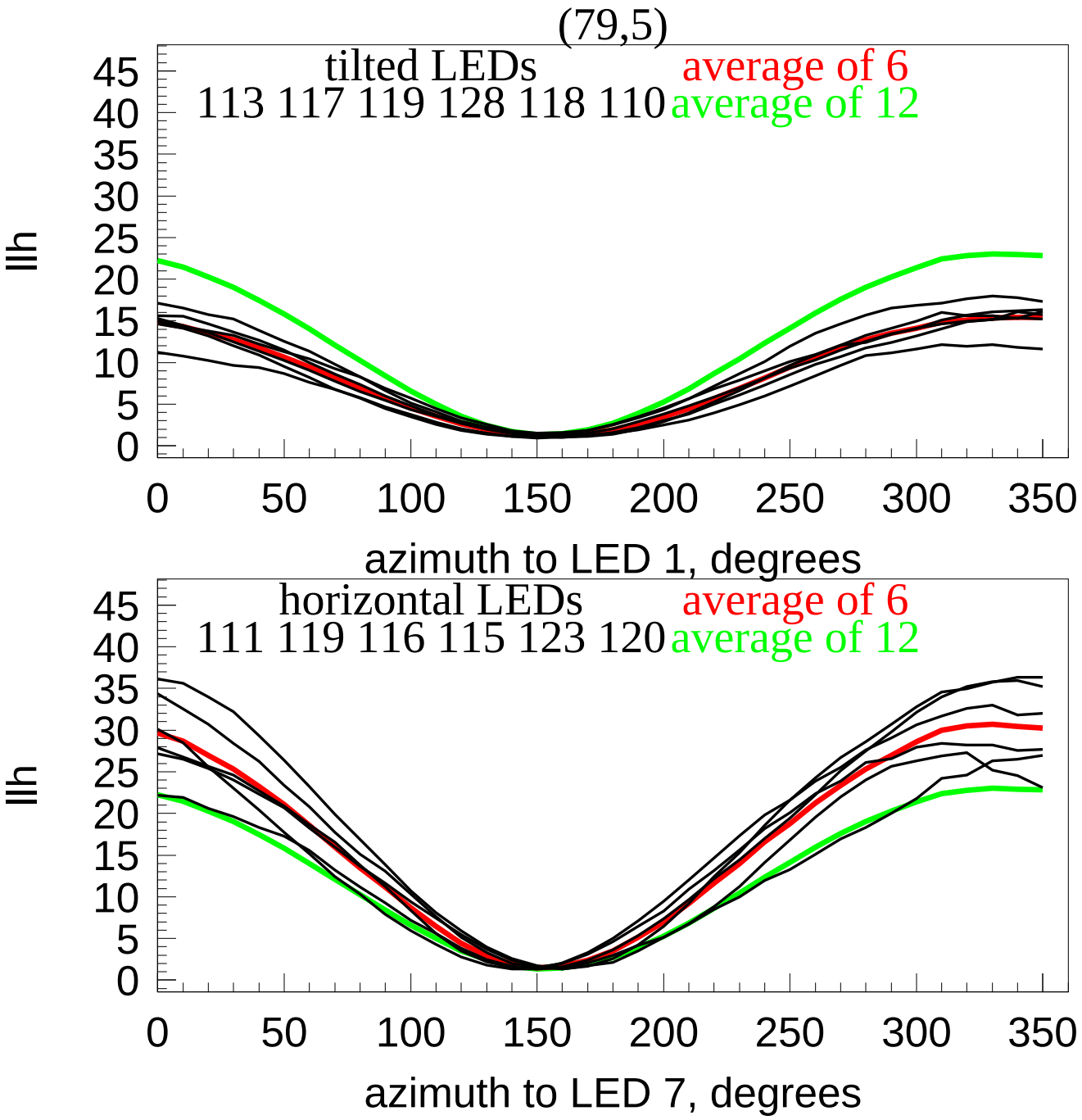

(79,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
17 ± 6.7

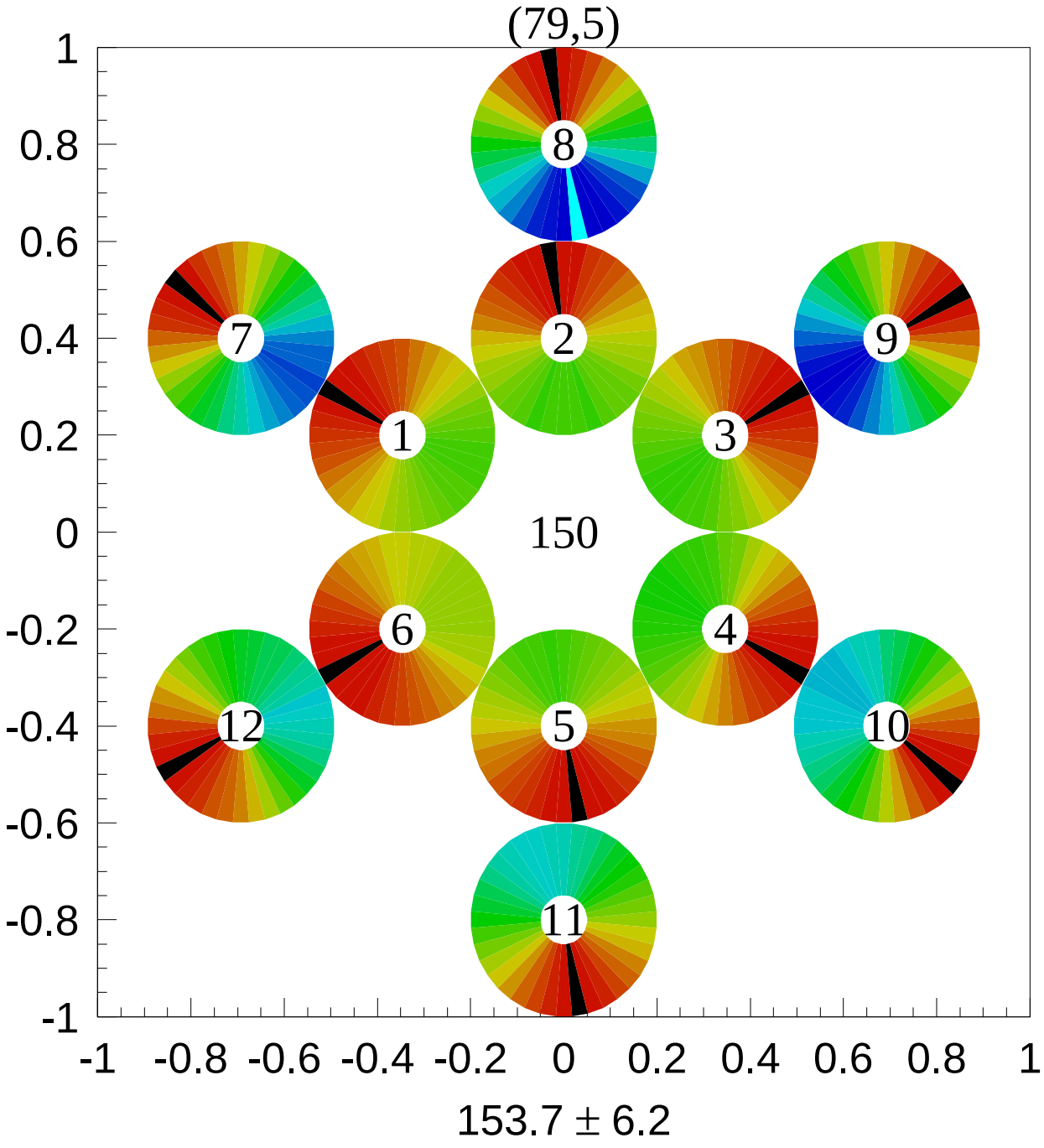

(79,3)
tilted LEDs
115 114 122 117 119 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 121 124 124 116 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

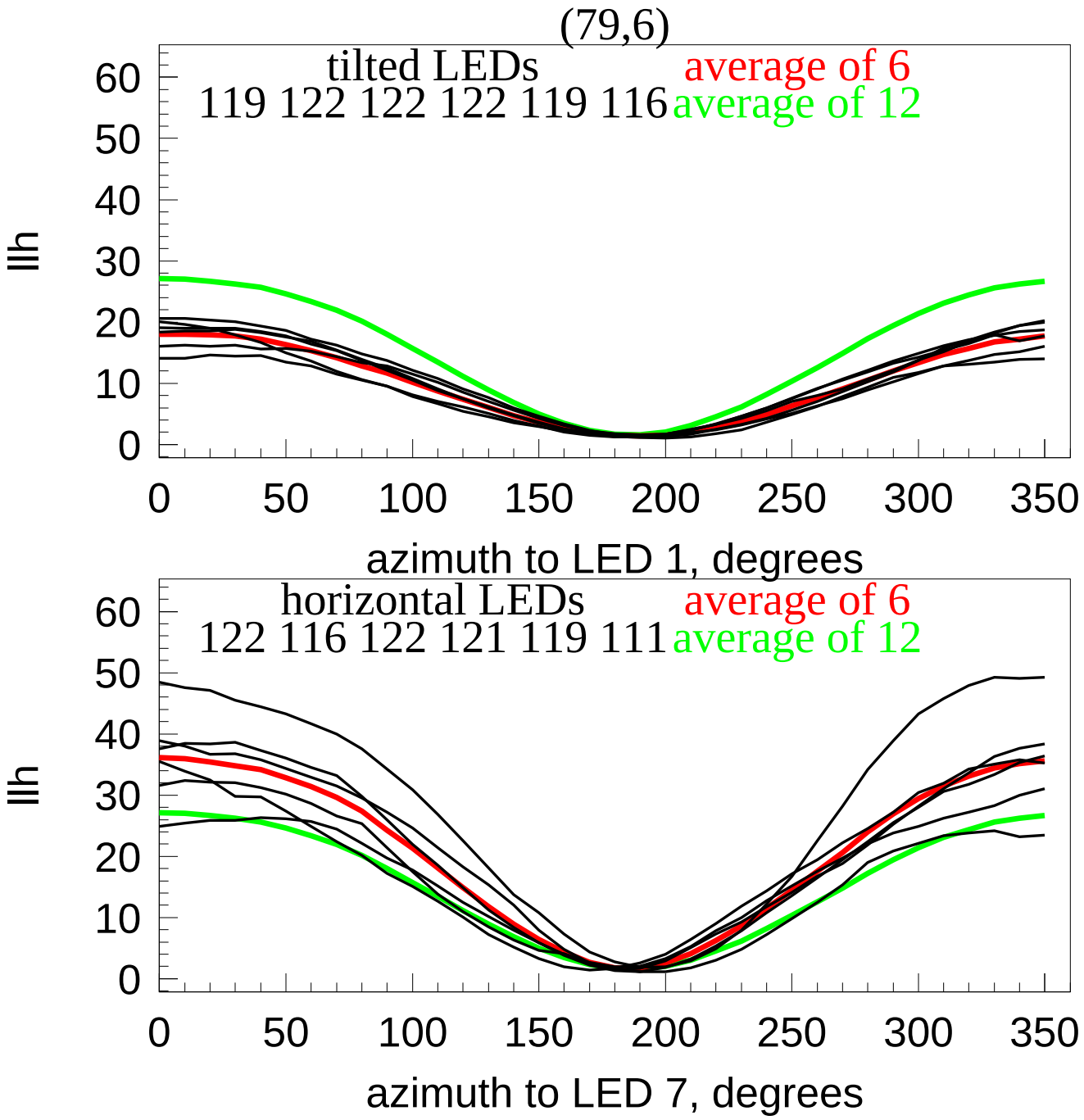

(79,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
306.6 ± 6.6
310
1
2
3
4
5
6
7
8
9
10
11
12

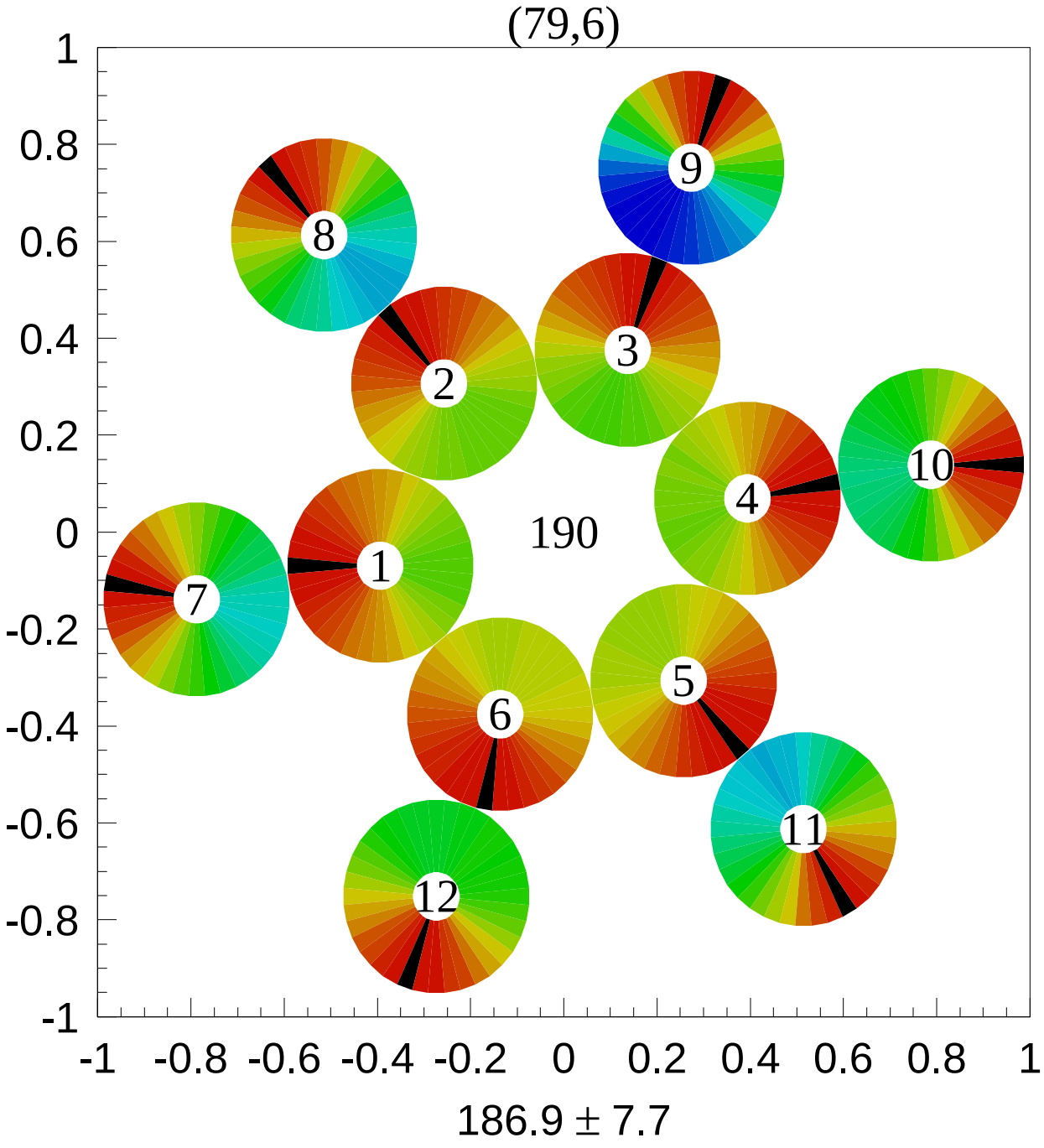

(79,4)
tilted LEDs
116 115 114 120 118 109
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 117 120 121 125 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

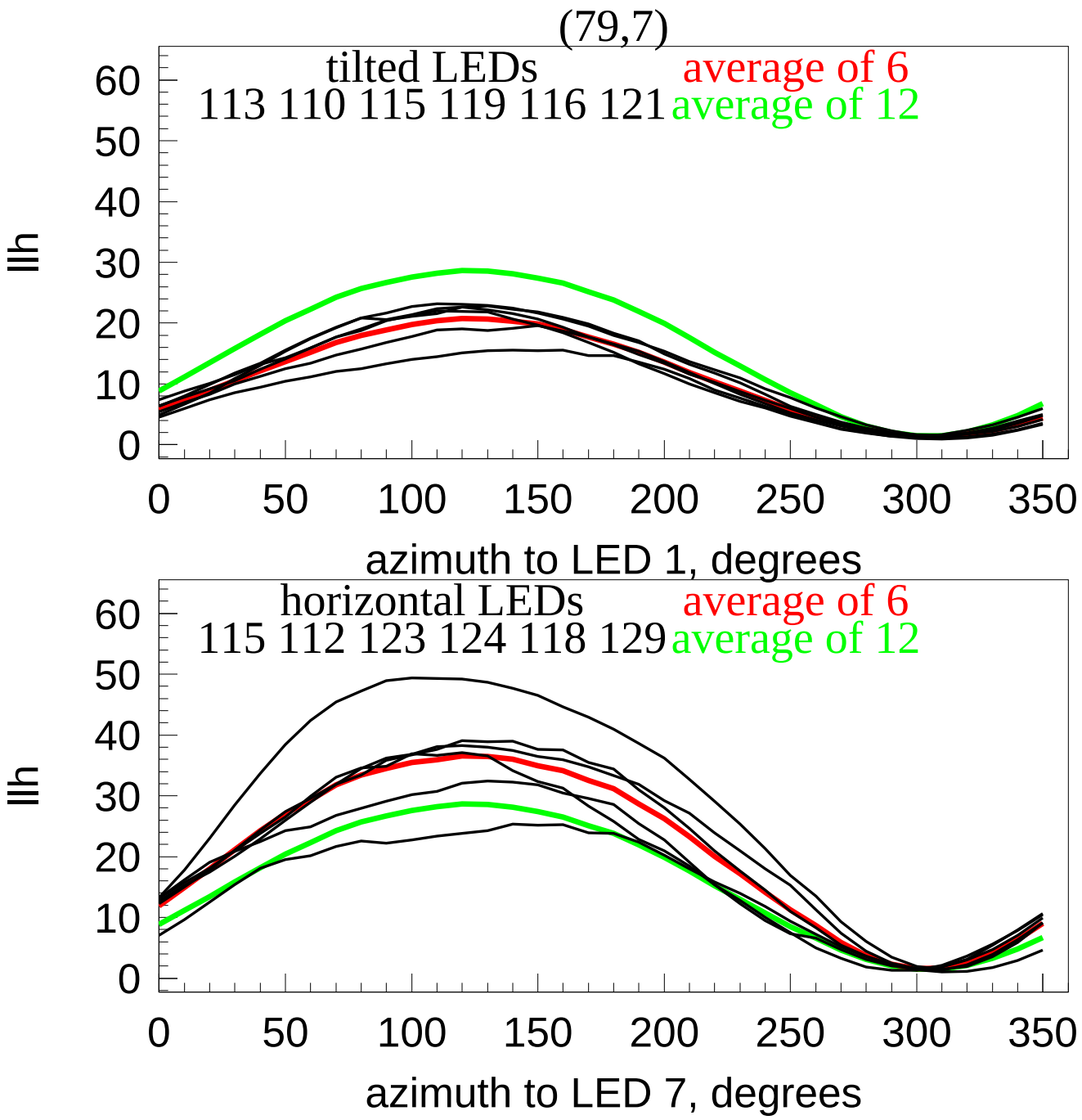

(79,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
0.5 ± 8.5
11
12
5
6
10
4
0
1
7
3
2
9
8

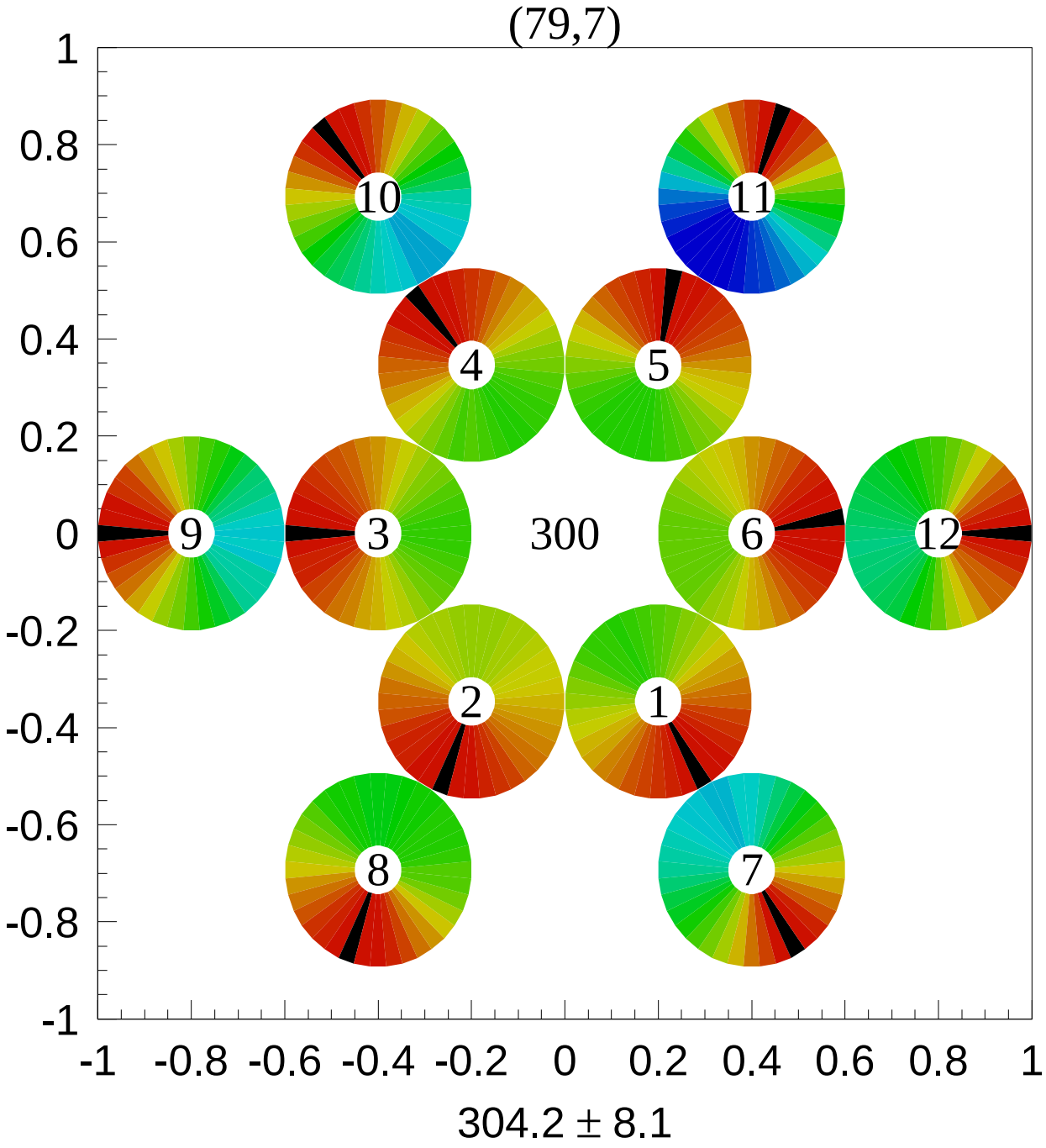

(79,5)
tilted LEDs
113 117 119 128 118 110
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
111 119 116 115 123 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

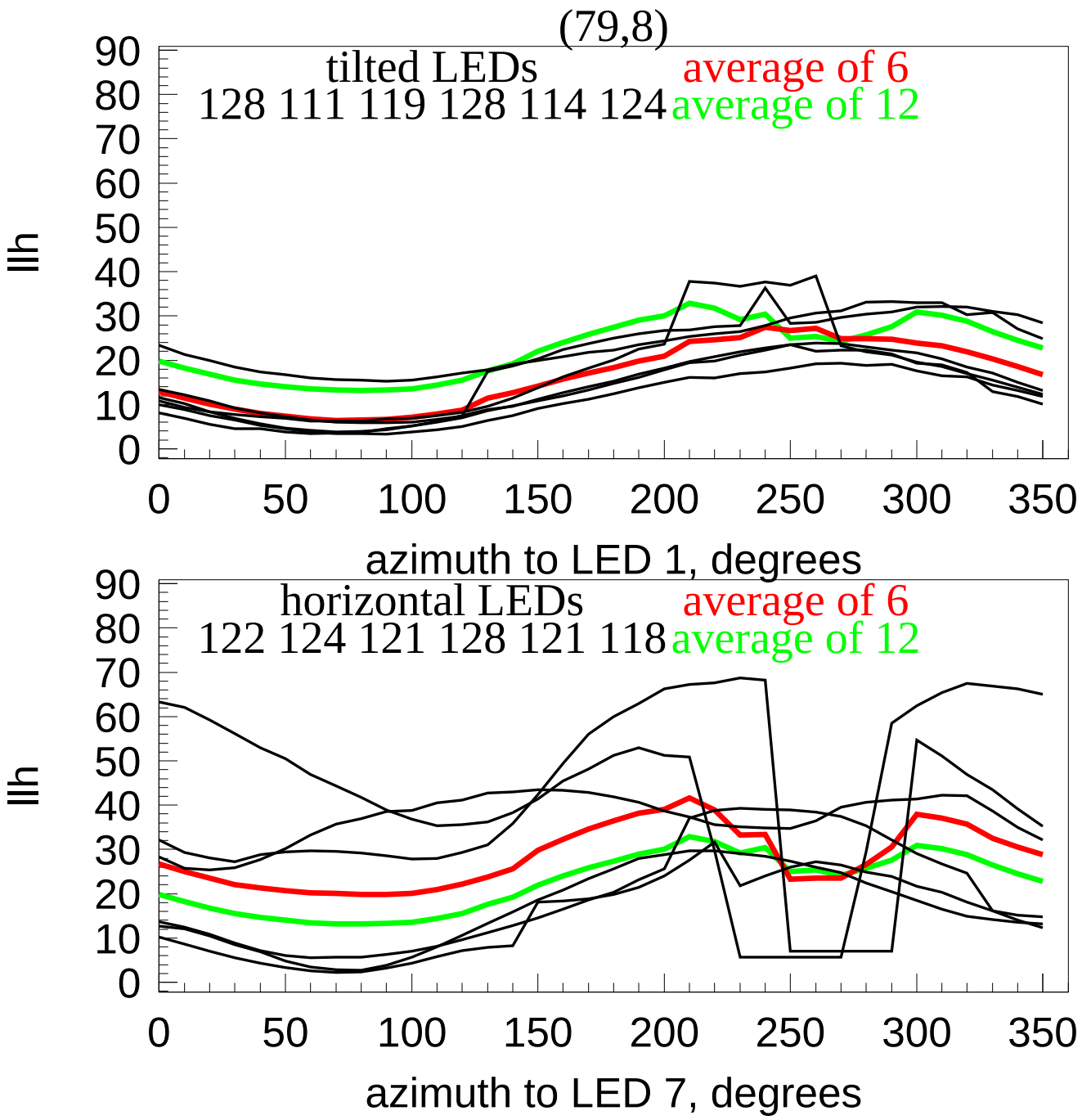

(79,5)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
153.7 ± 6.2

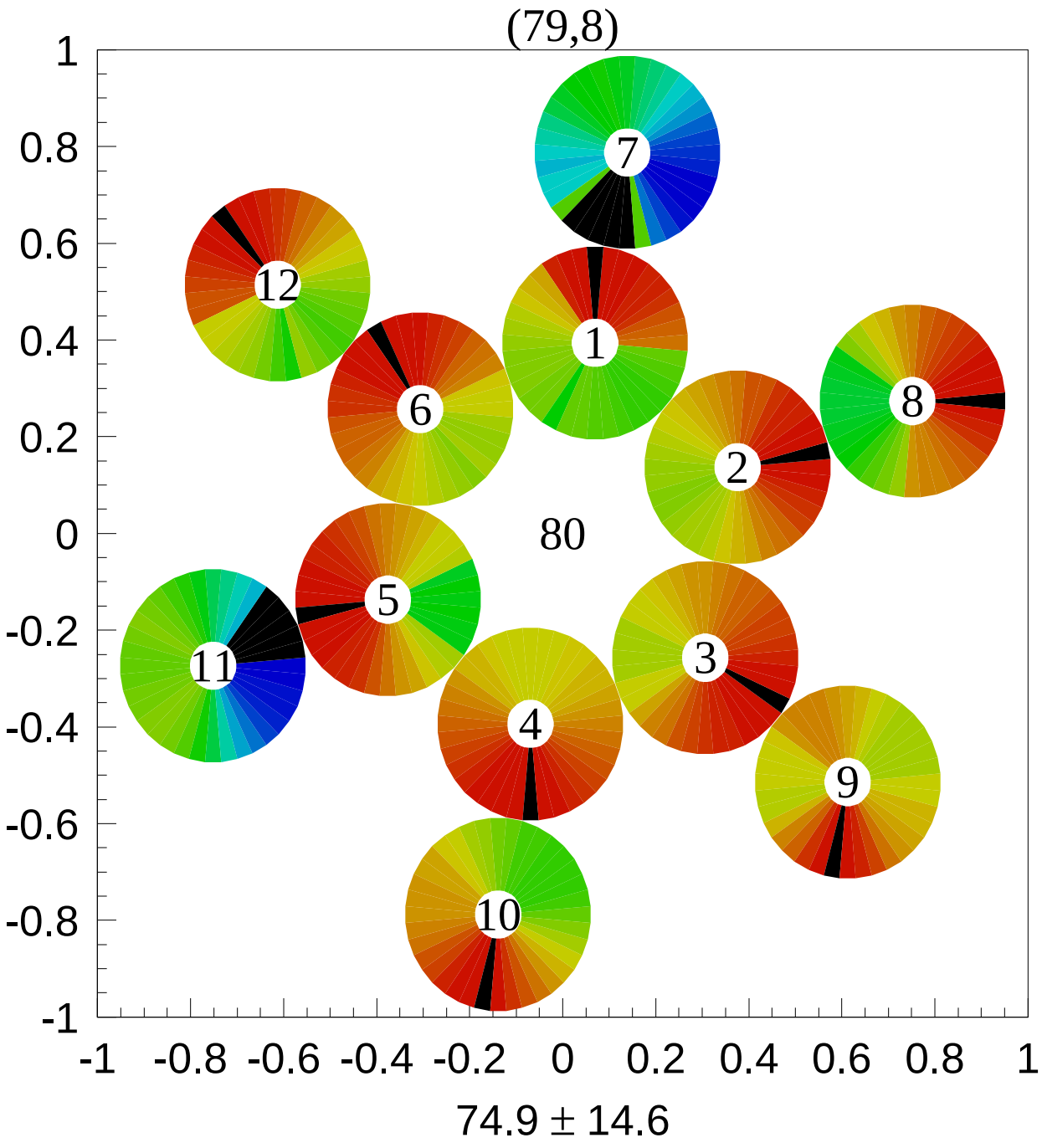

(79,6)
tilted LEDs
119 122 122 122 119 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
122 116 122 121 119 111
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

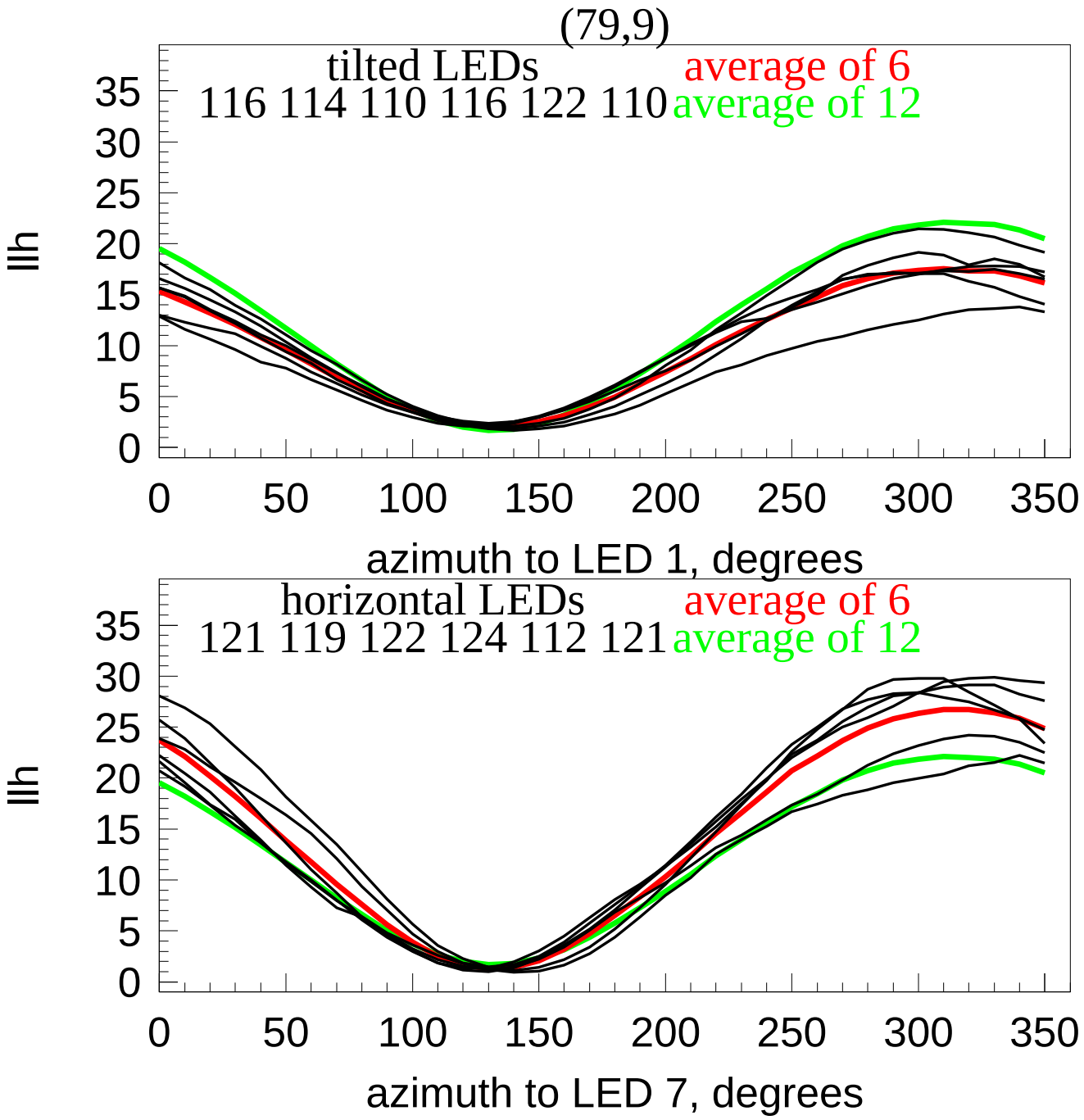

(79,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
186.9 ± 7.7
190
1
2
3
4
5
6
7
8
9
10
11
12

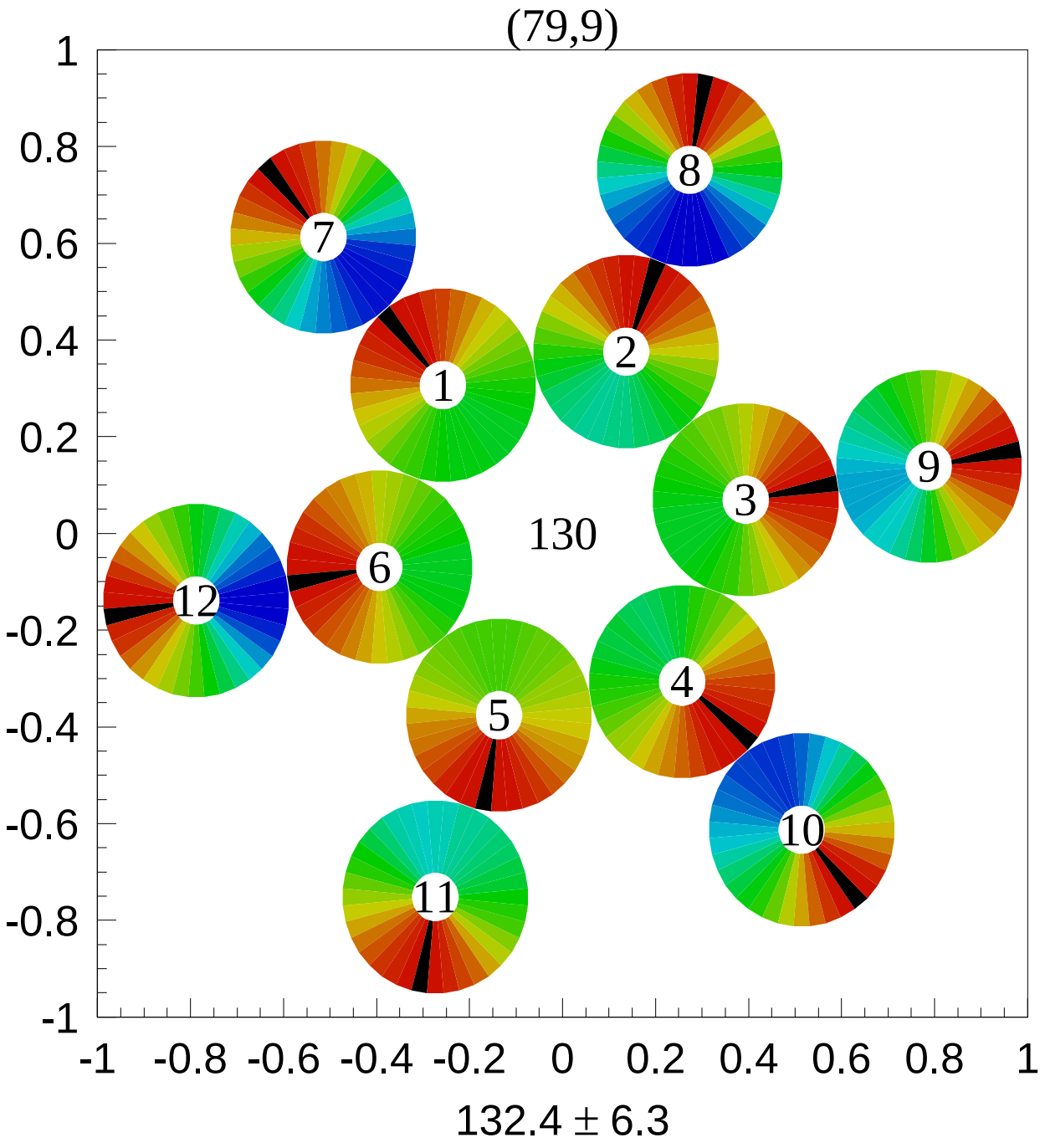

(79,7)
tilted LEDs
113 110 115 119 116 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 112 123 124 118 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

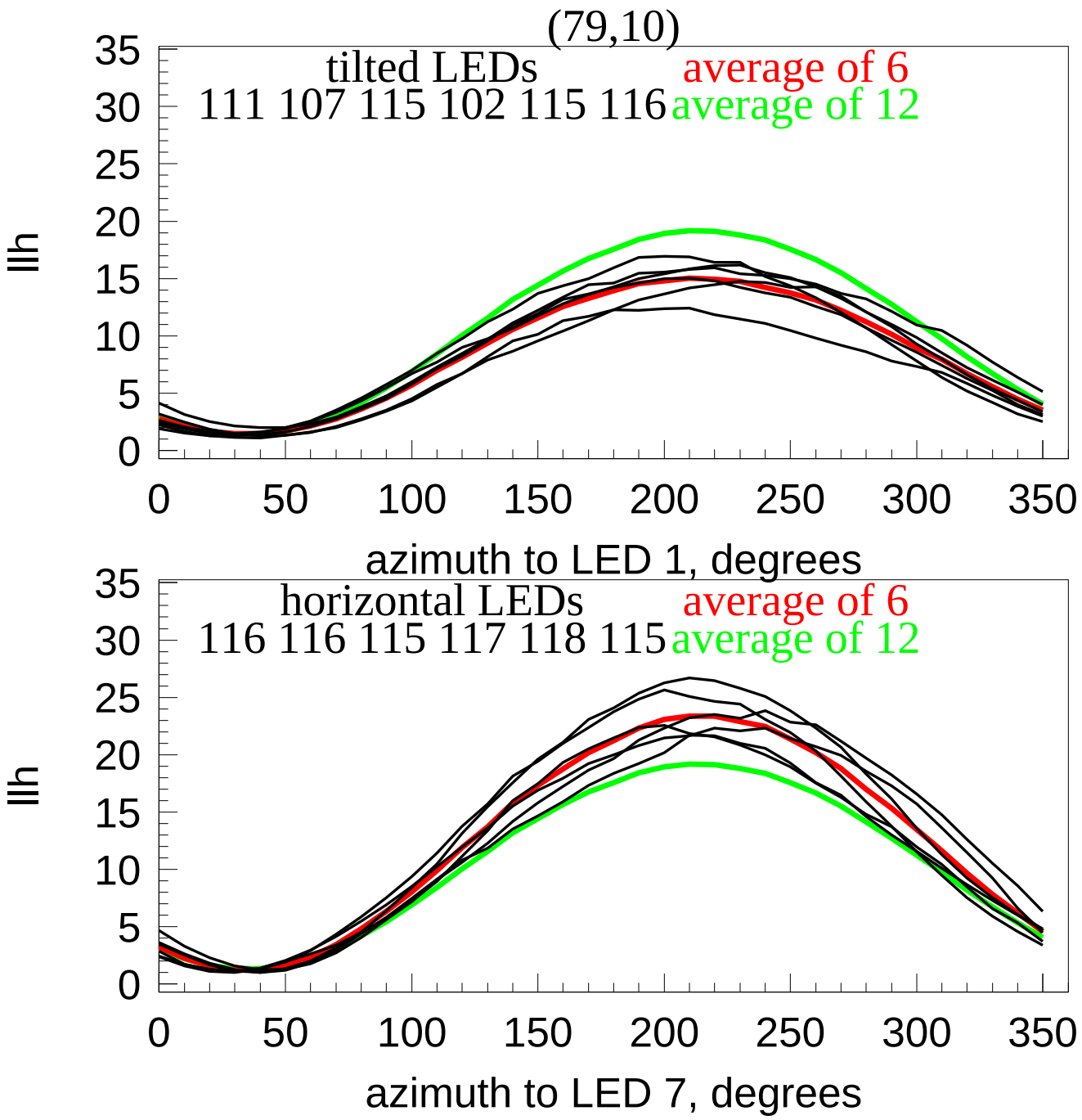

(79,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
304.2 ± 8.1

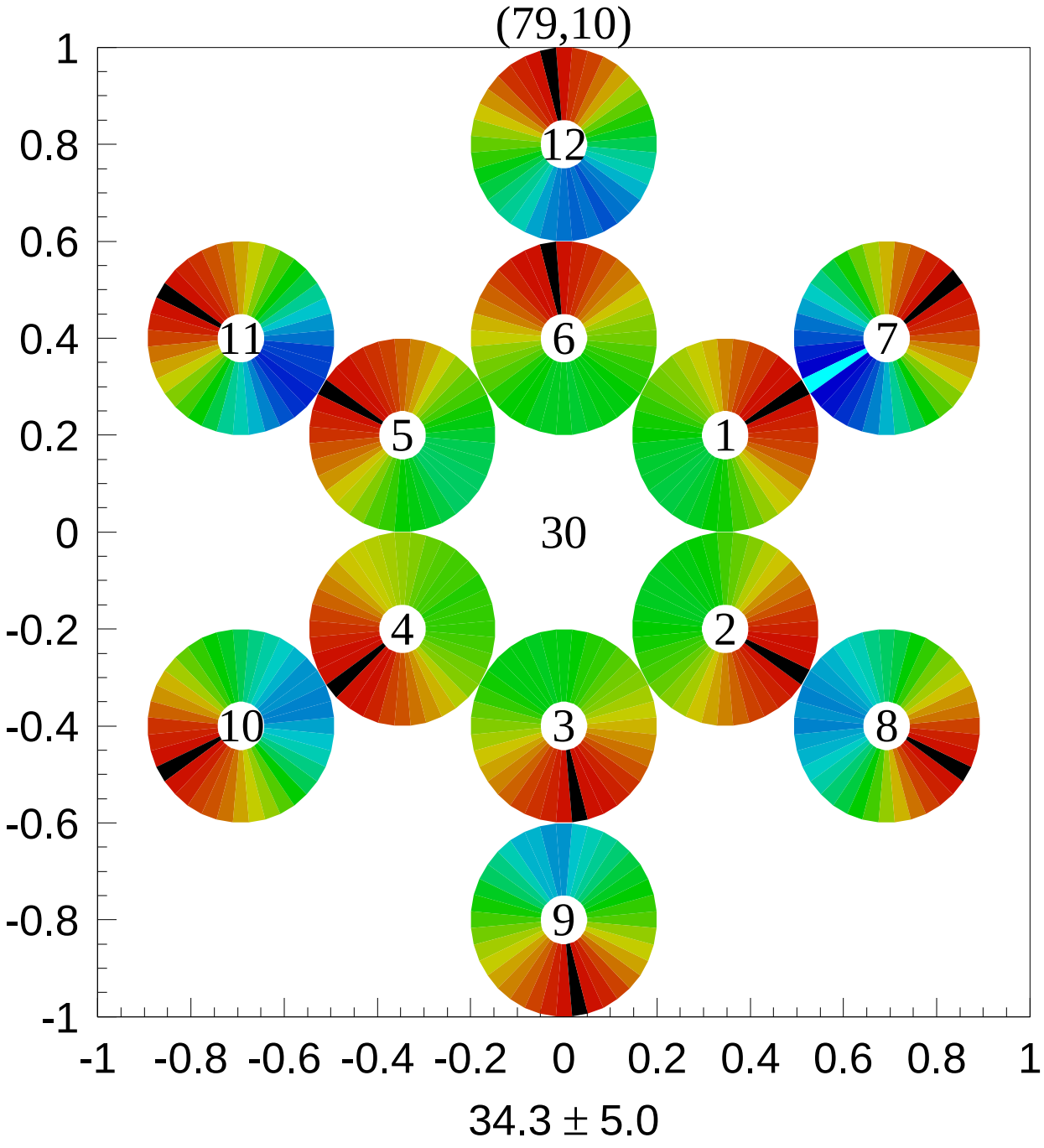

(79,8)
tilted LEDs
128 111 119 128 114 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 124 121 128 121 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

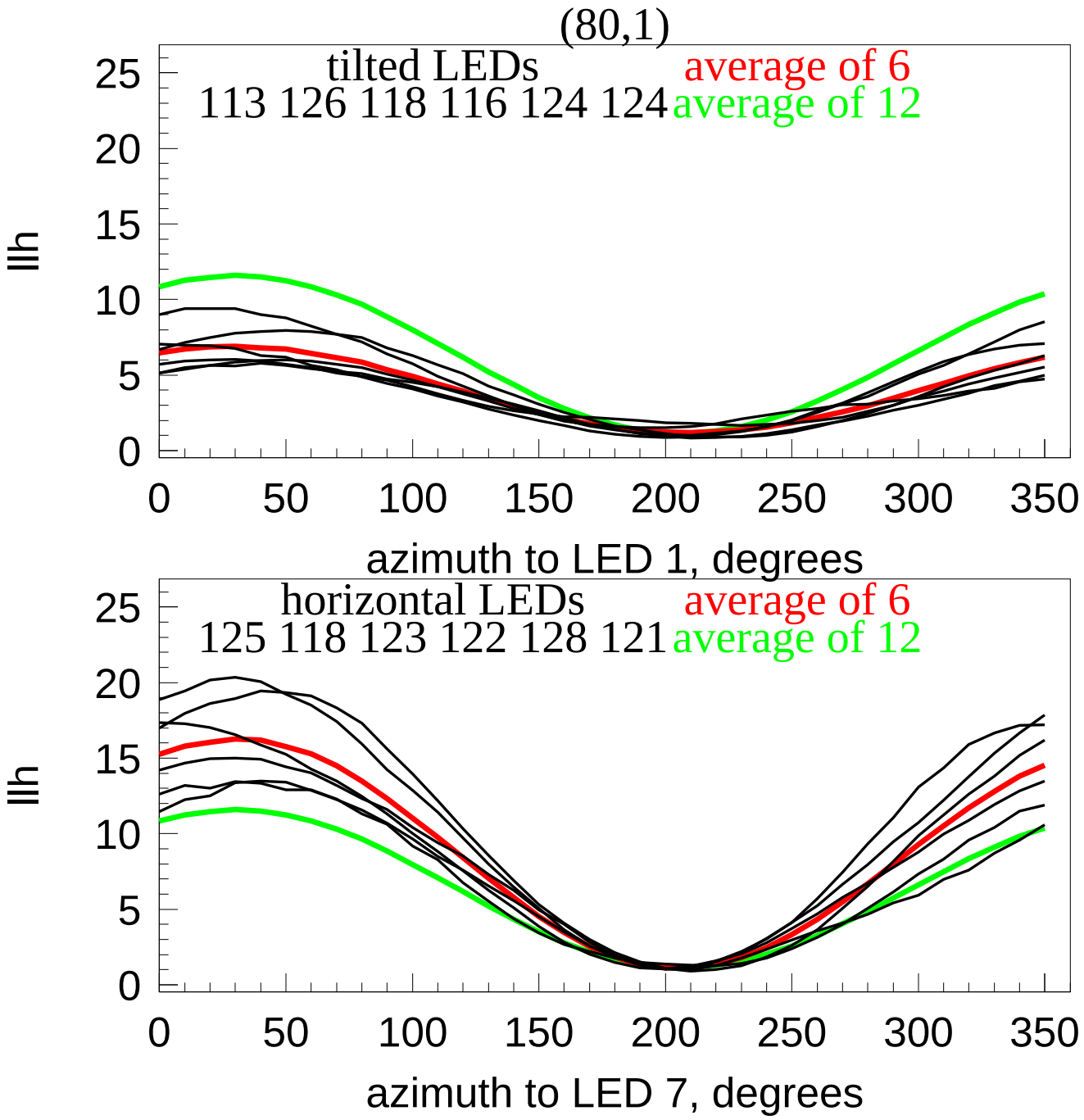

(79,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
74.9 ± 14.6

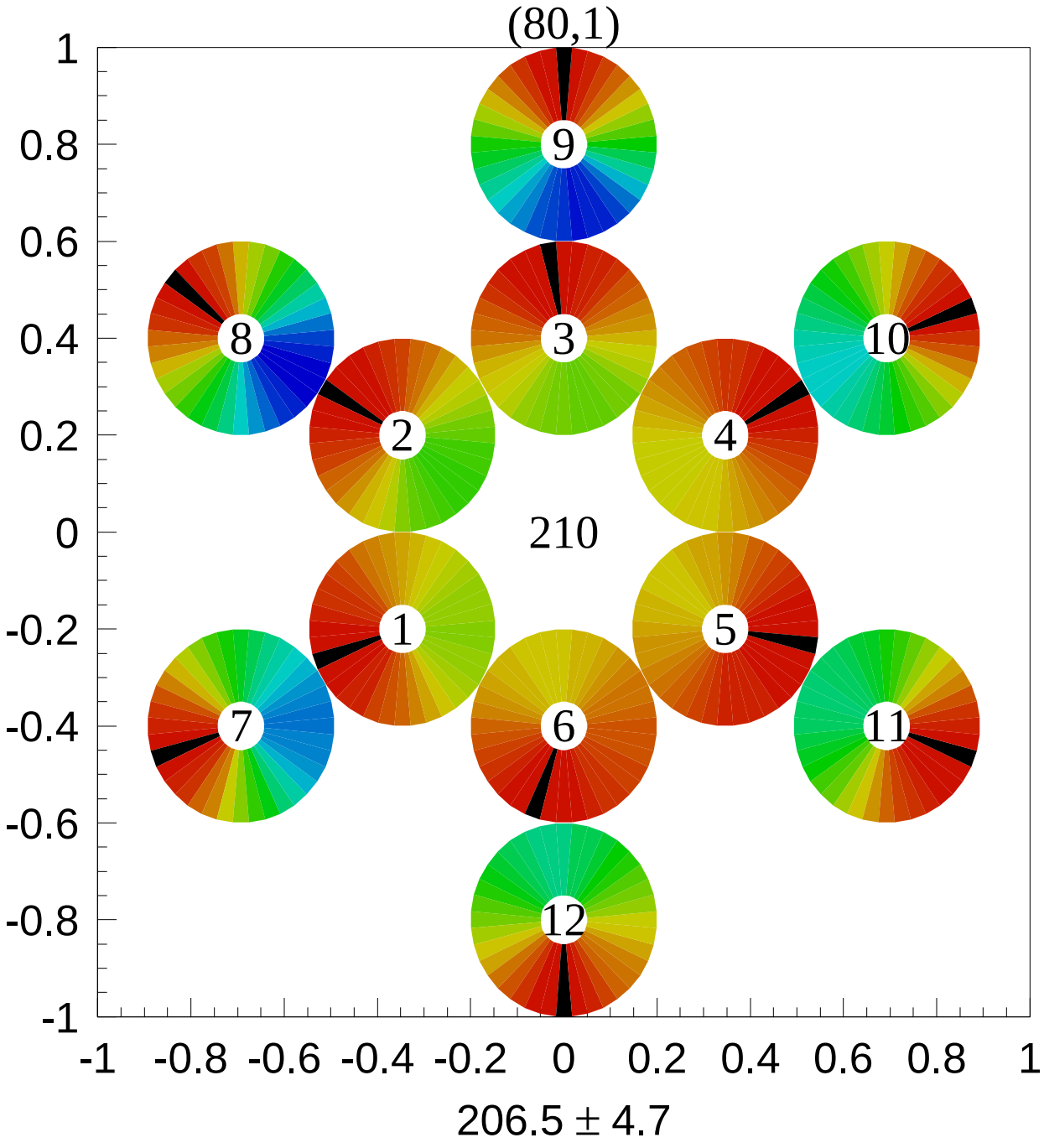

(79,9)
tilted LEDs
116 114 110 116 122 110
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 119 122 124 112 121
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

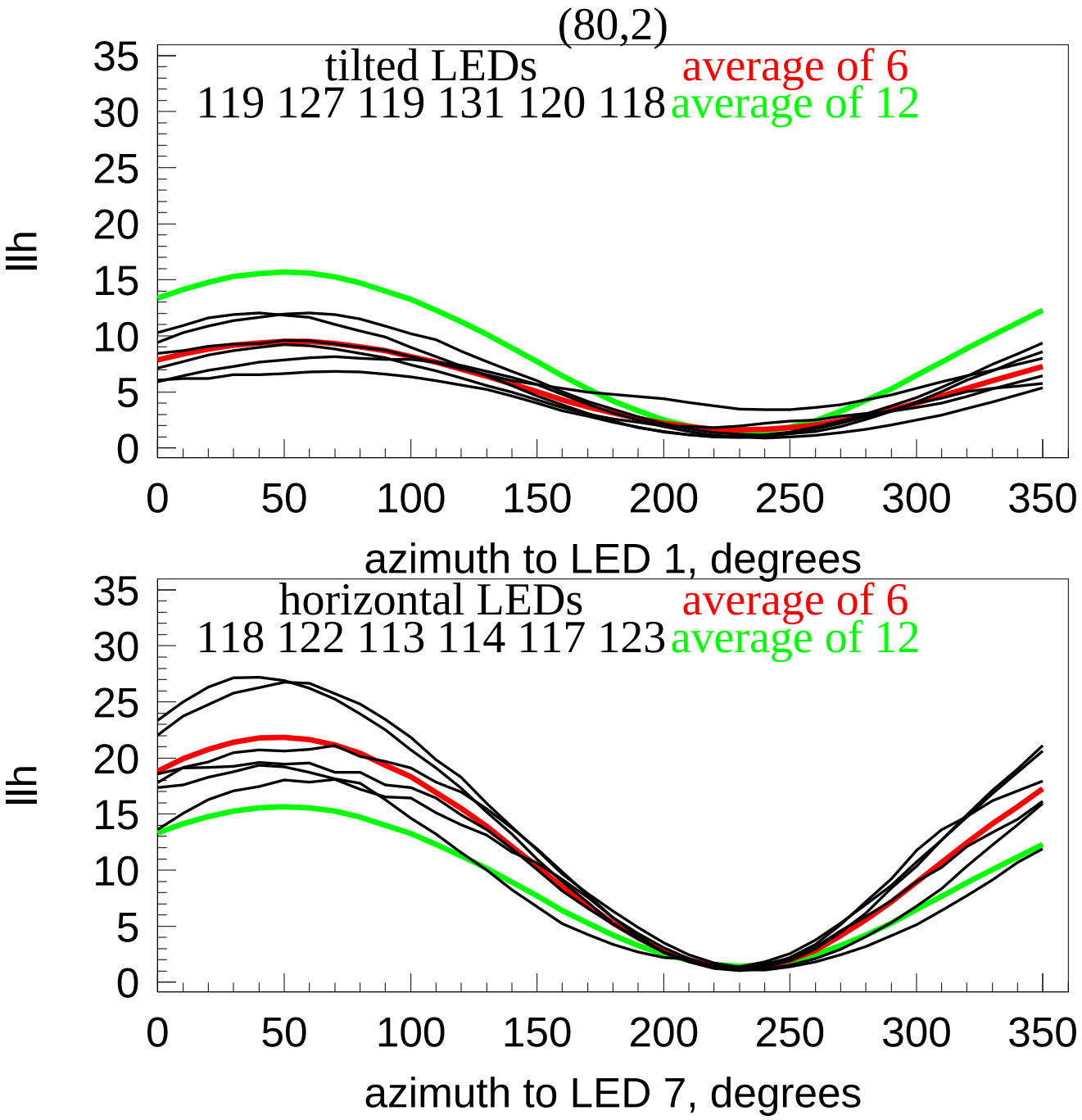

(79,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
1
2
3
4
5
6
7
8
9
10
11
12
130
132.4 ± 6.3

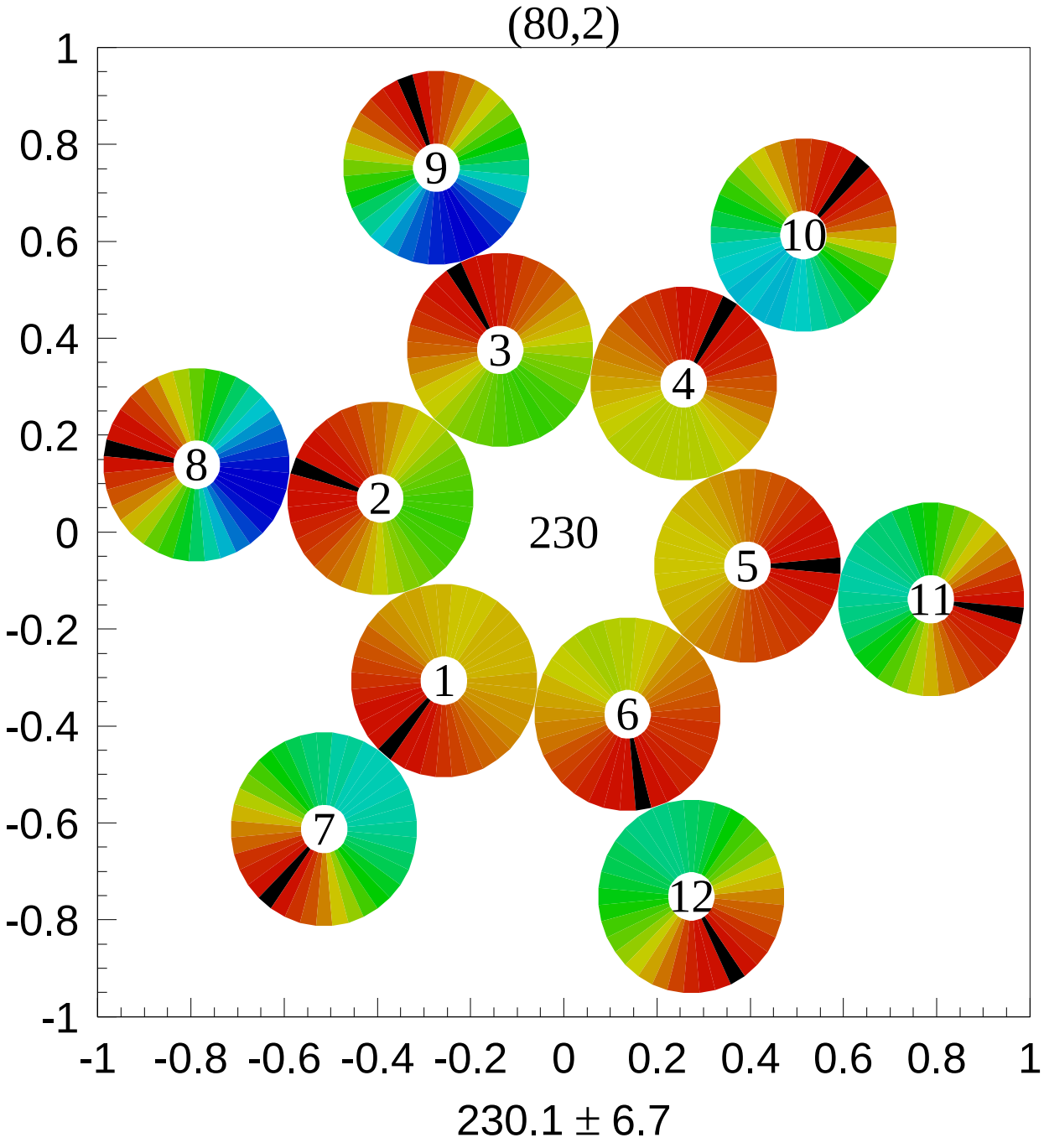

(79,10)
tilted LEDs
111 107 115 102 115 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 116 115 117 118 115
average of 6
average of 12
llh
azimuth to LED 7, degrees

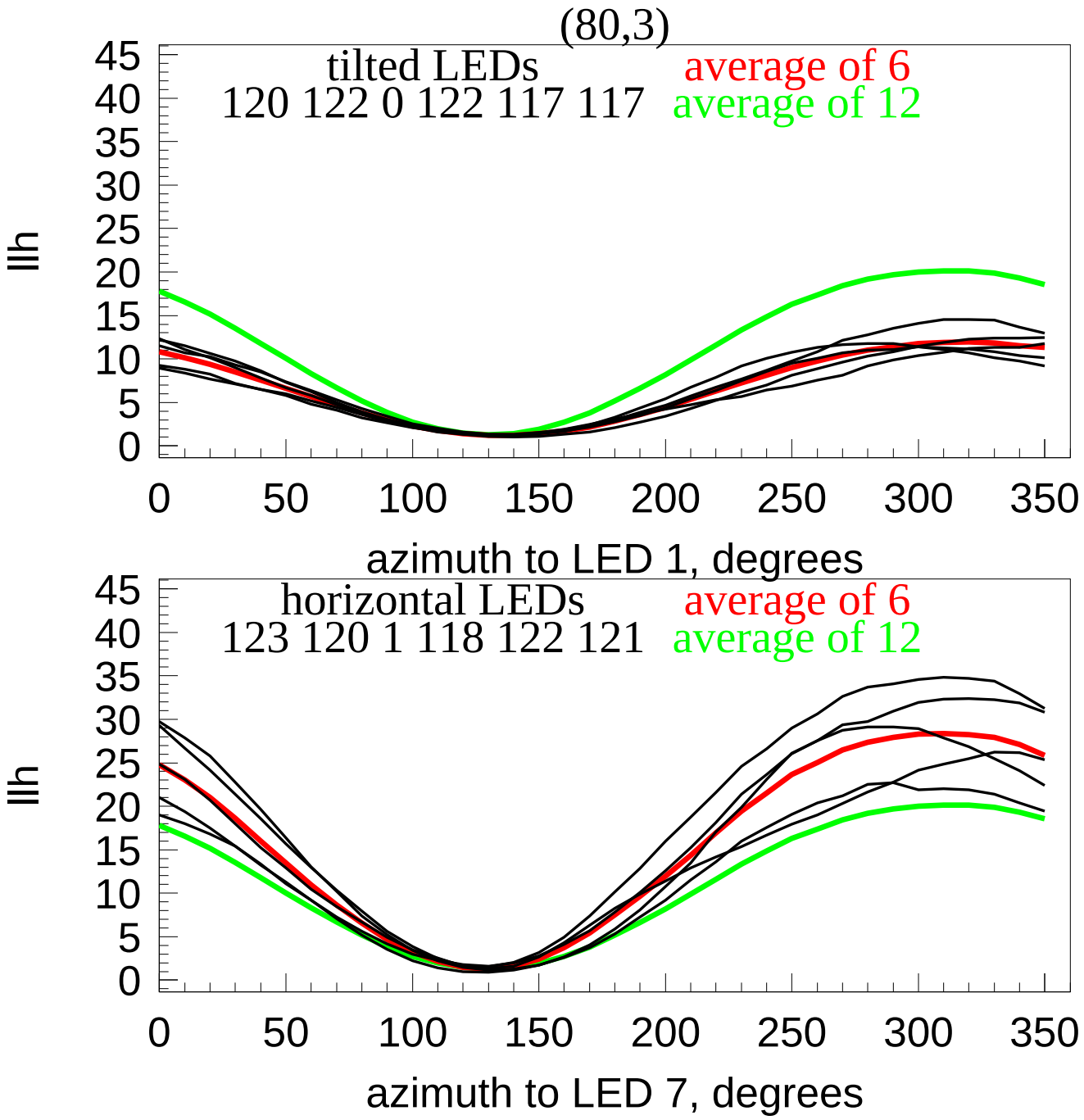

(79,10)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
34.3 ± 5.0

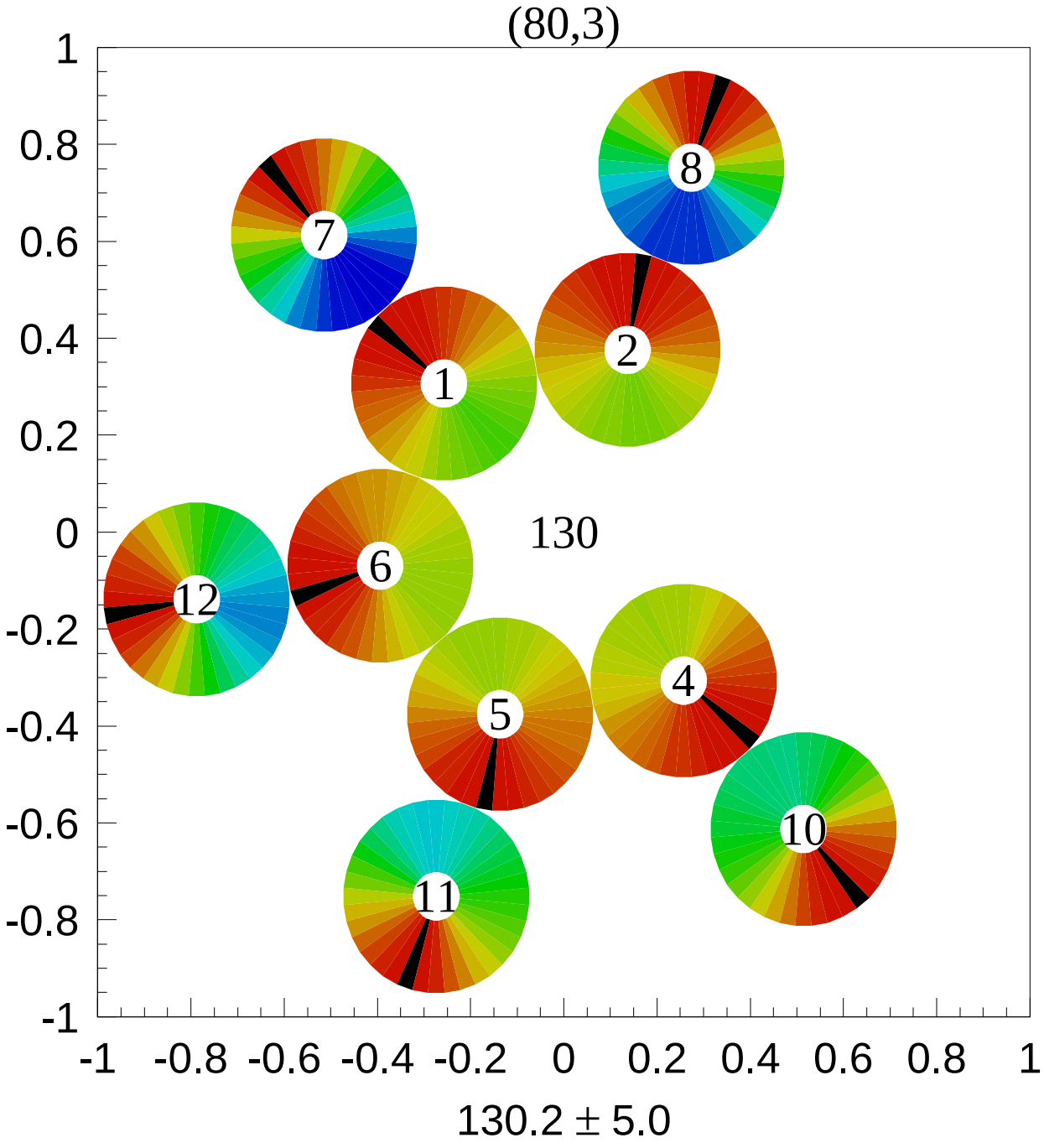

(80,1)
tilted LEDs
113 126 118 116 124 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 118 123 122 128 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

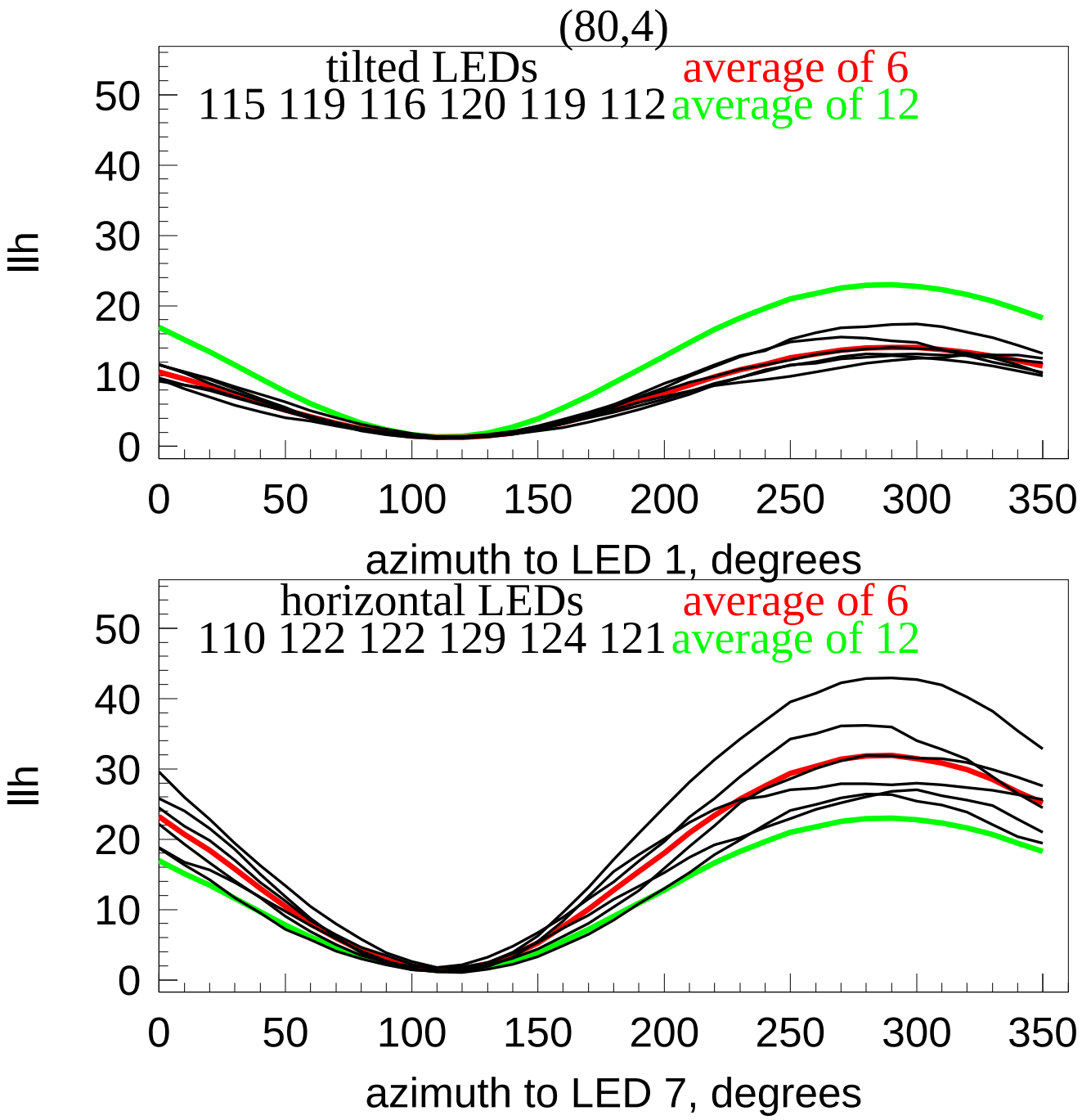

(80,1)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
206.5 ± 4.7

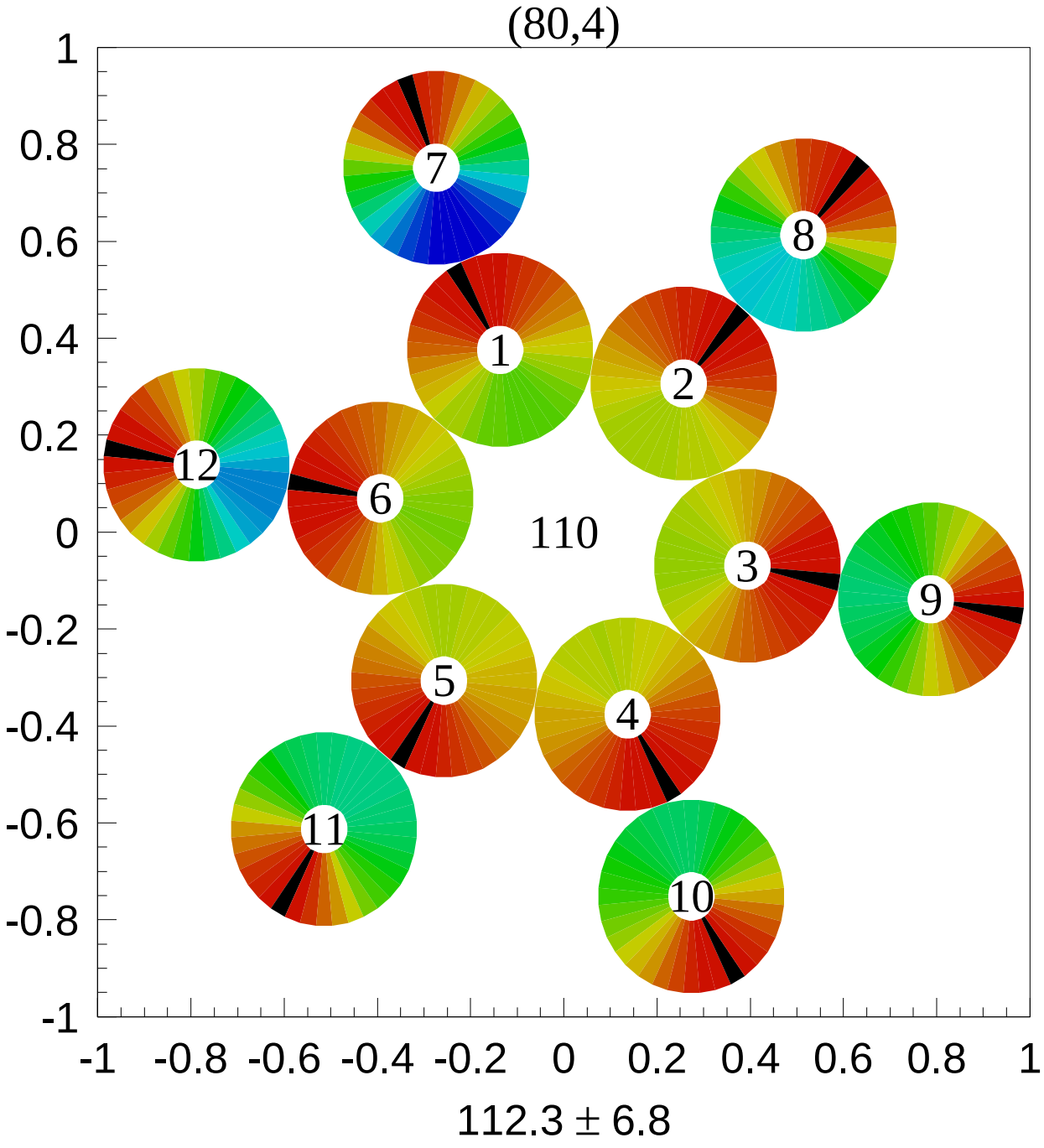

(80,2)
tilted LEDs
119 127 119 131 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 122 113 114 117 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

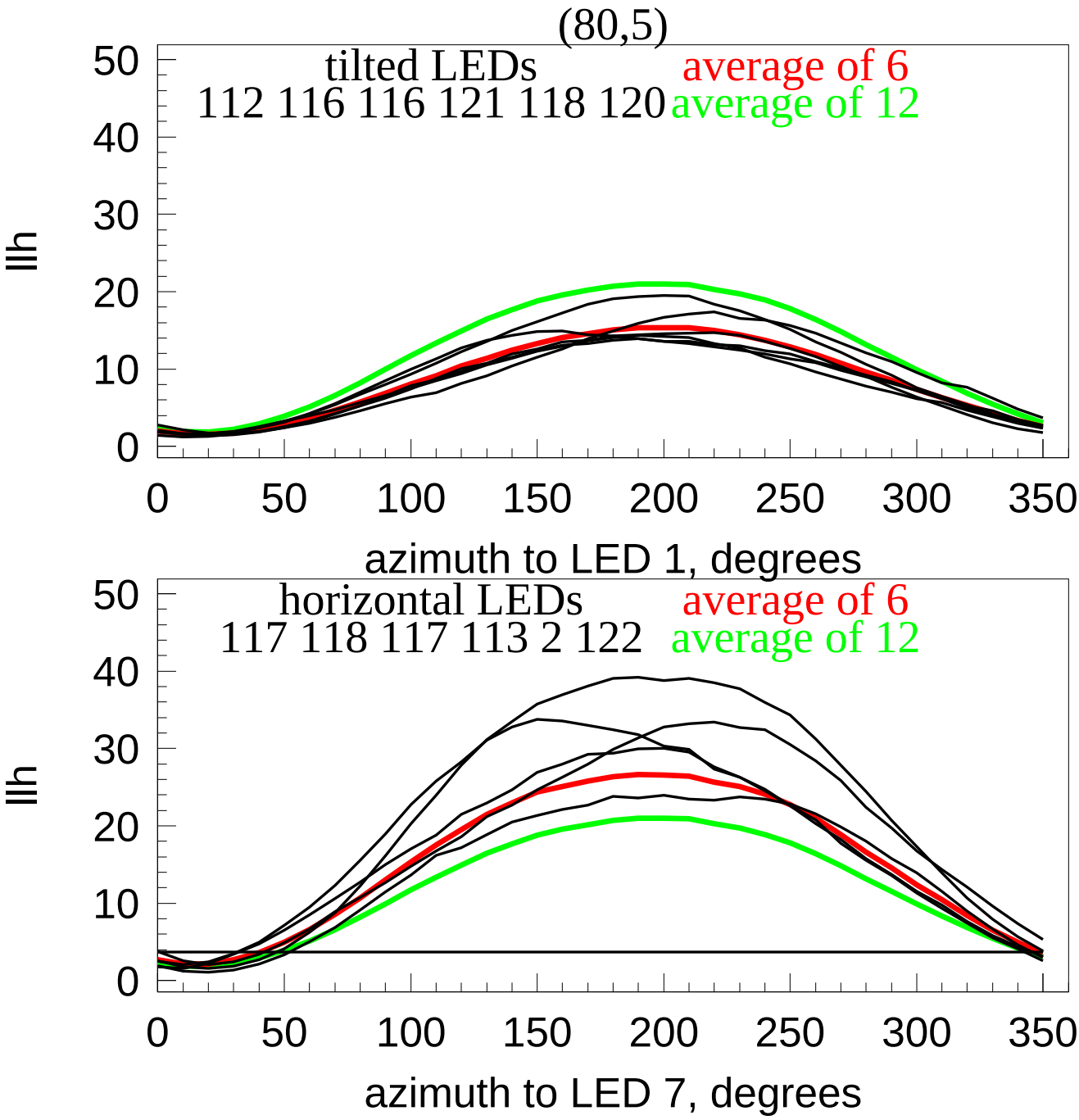

(80,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
230
5
11
1
6
7
12
230.1 ± 6.7

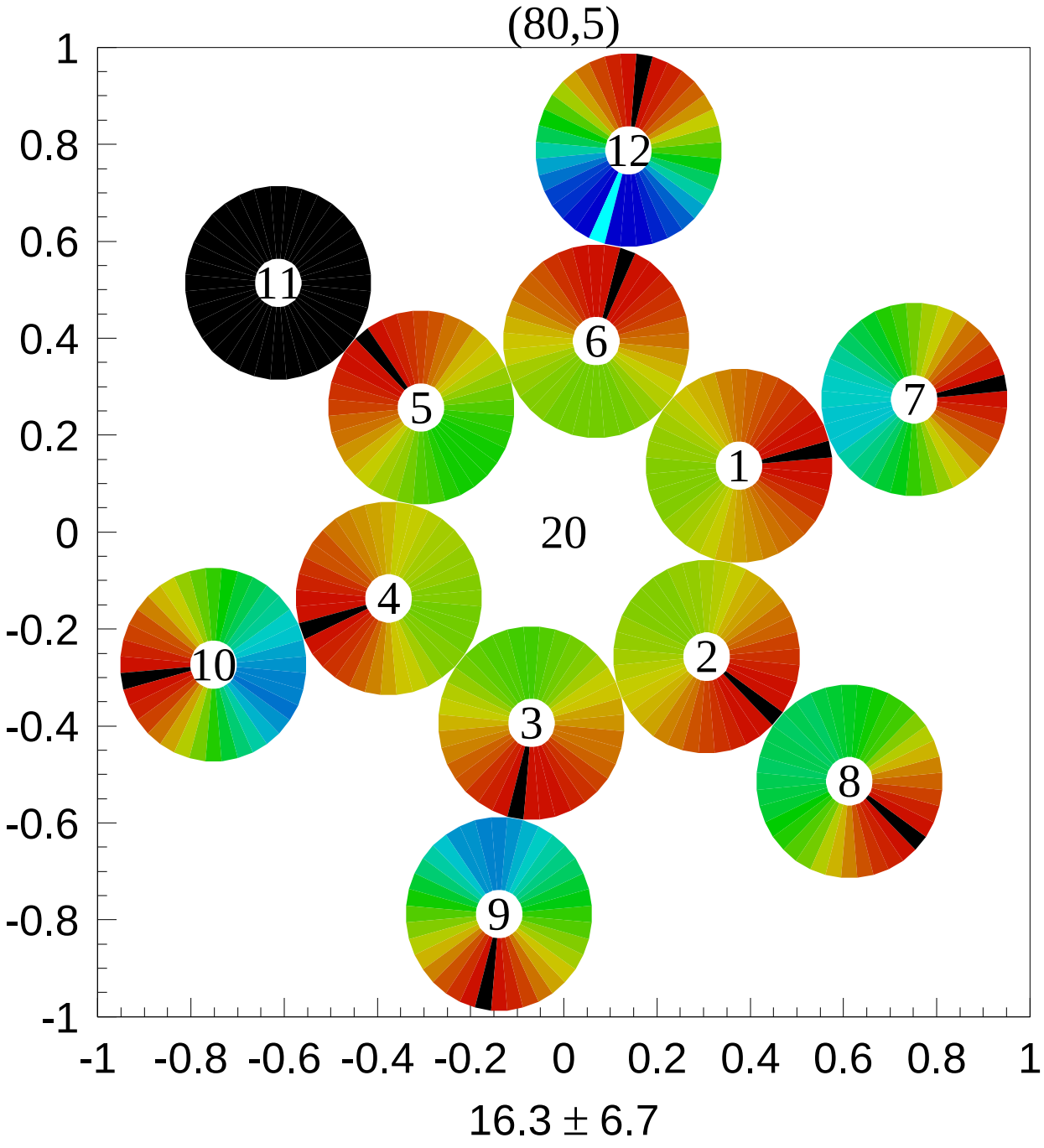

(80,3)
tilted LEDs
120 122 0 122 117 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 120 1 118 122 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

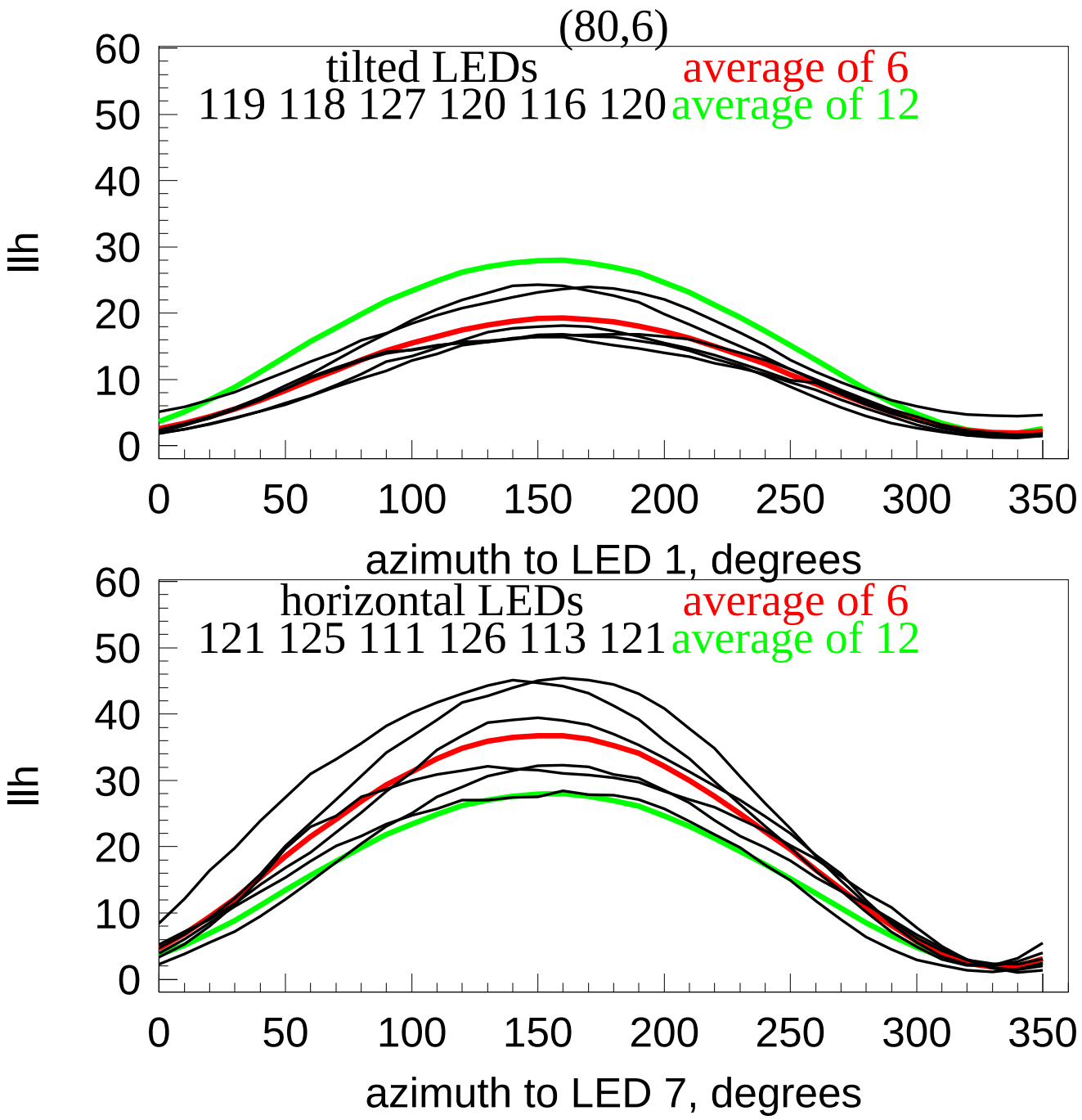

(80,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
130
130.2 ± 5.0
1
2
4
5
6
7
8
10
11
12

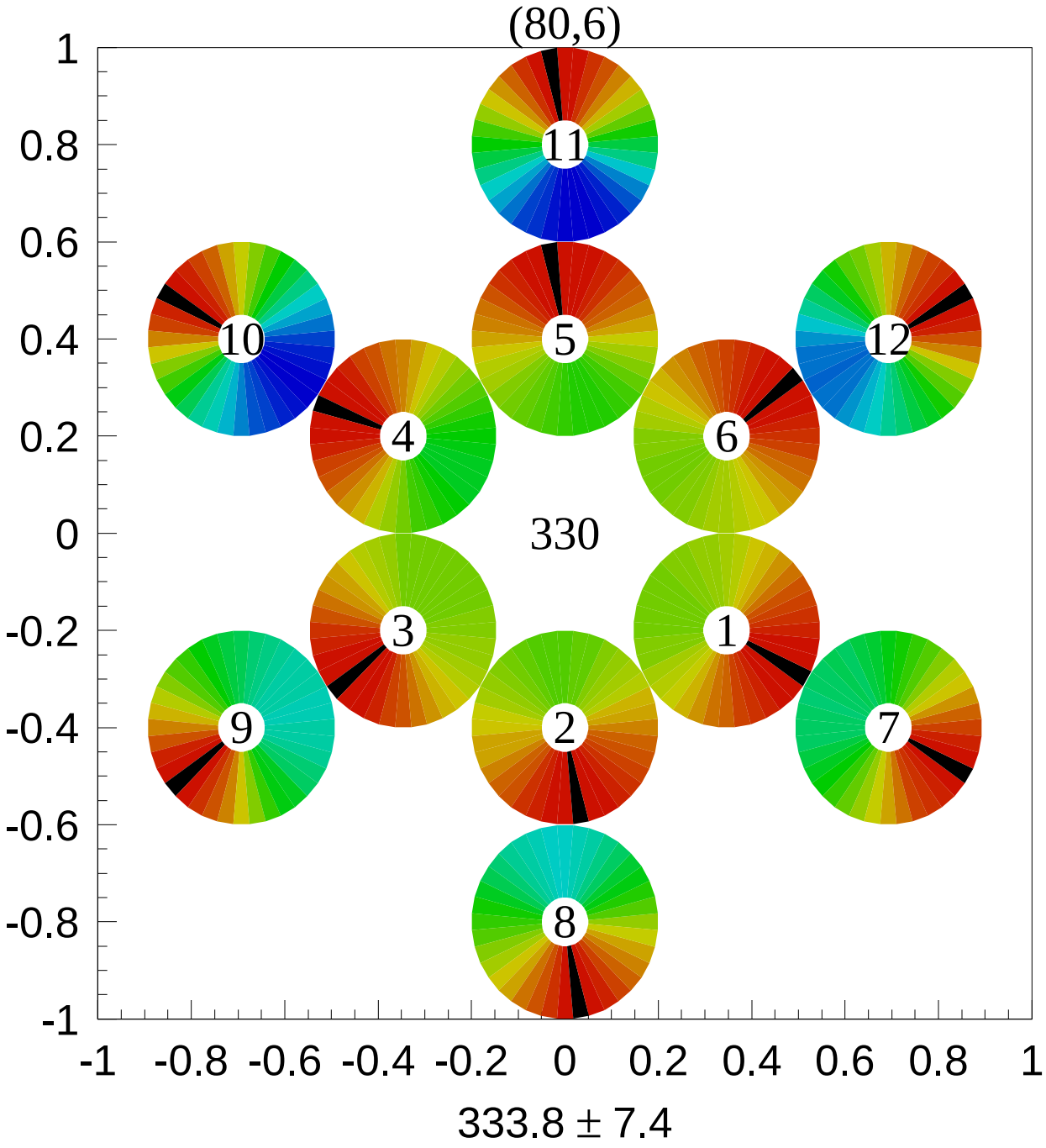

(80,4)
tilted LEDs
115 119 116 120 119 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
110 122 122 129 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

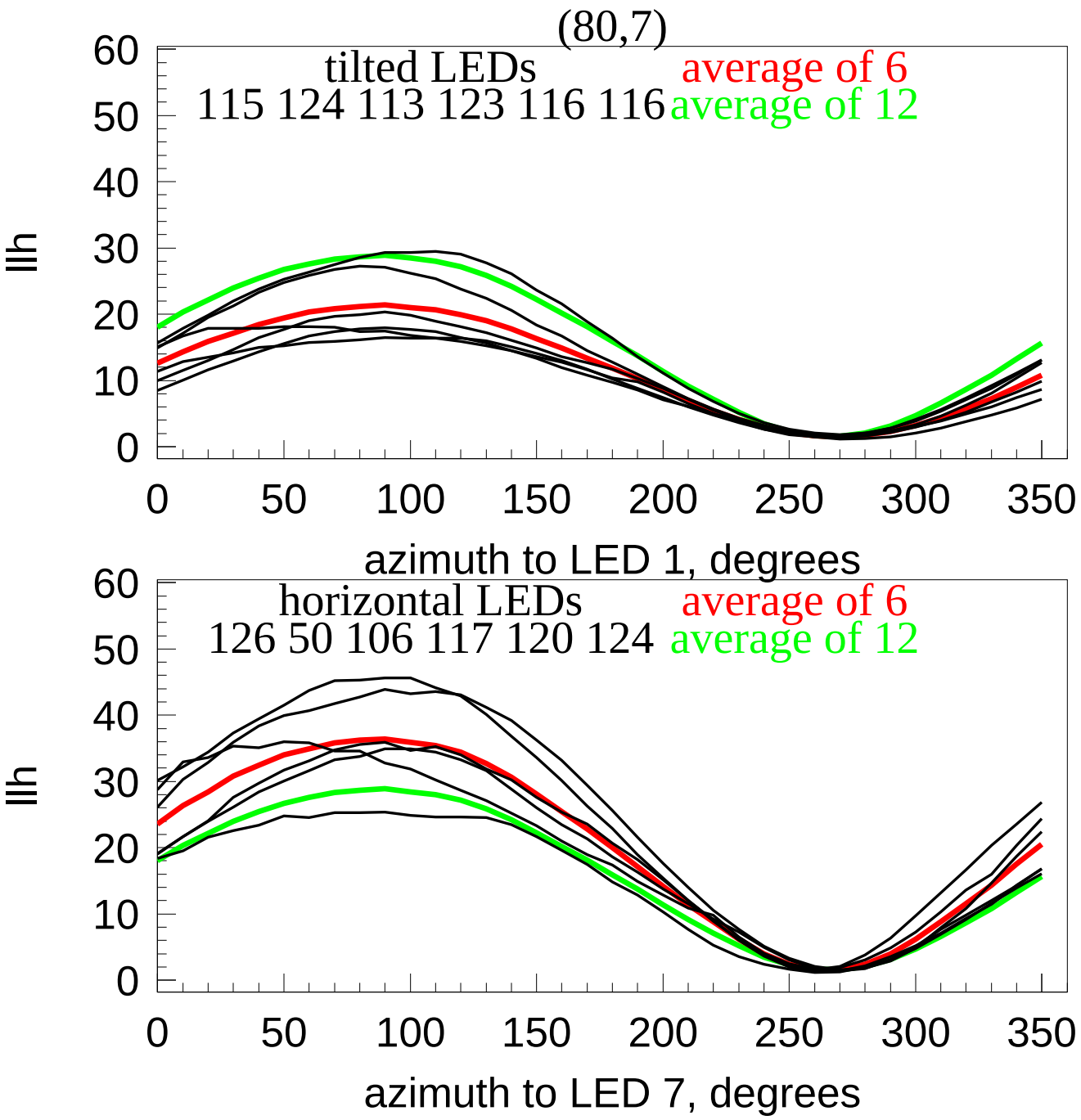

(80,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
112.3 ± 6.8

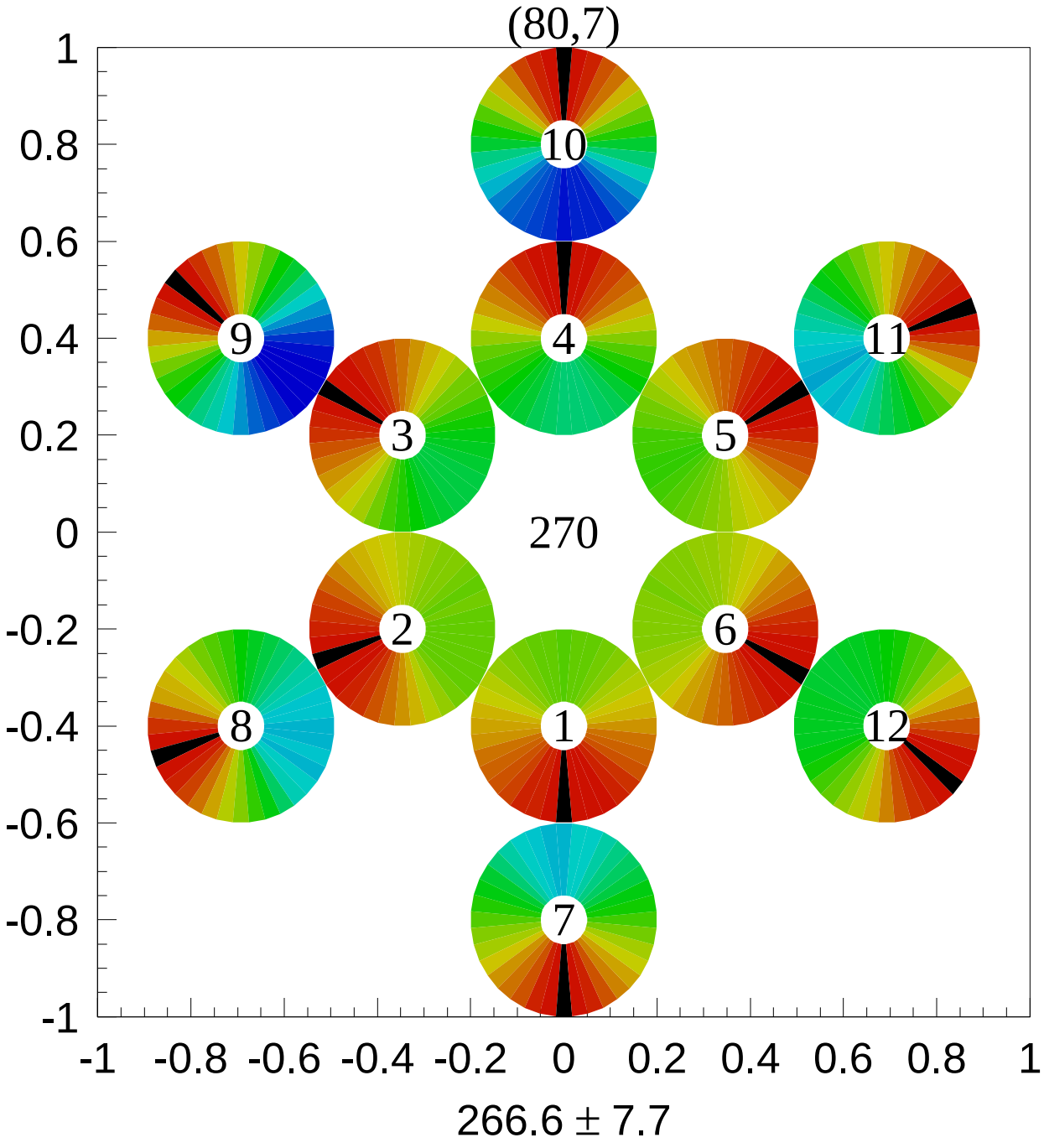

(80,5)
tilted LEDs
112 116 116 121 118 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 117 113 2 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

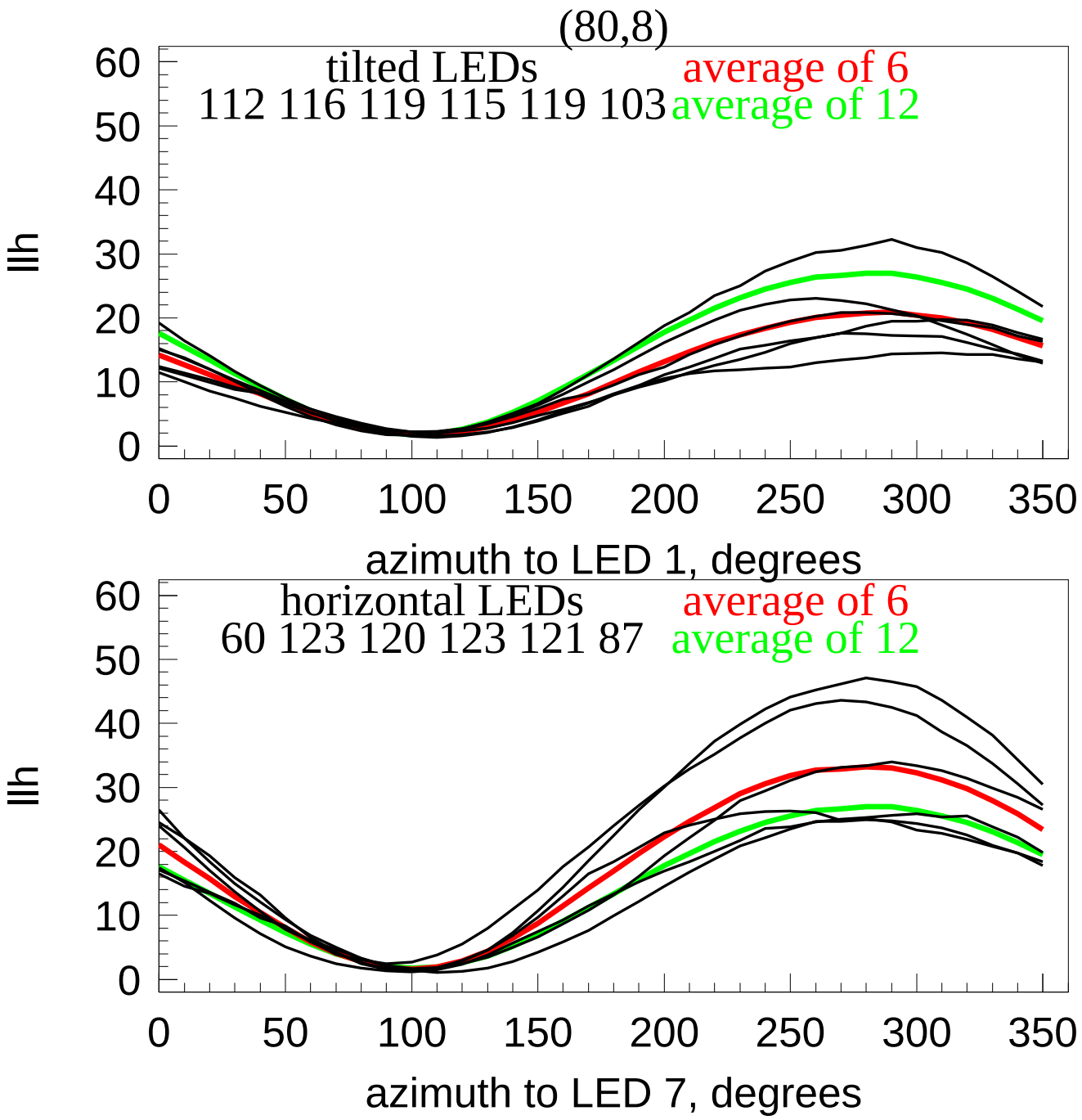

(80,5)
12
11
6
5
7
1
20
4
10
2
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
16.3 ± 6.7

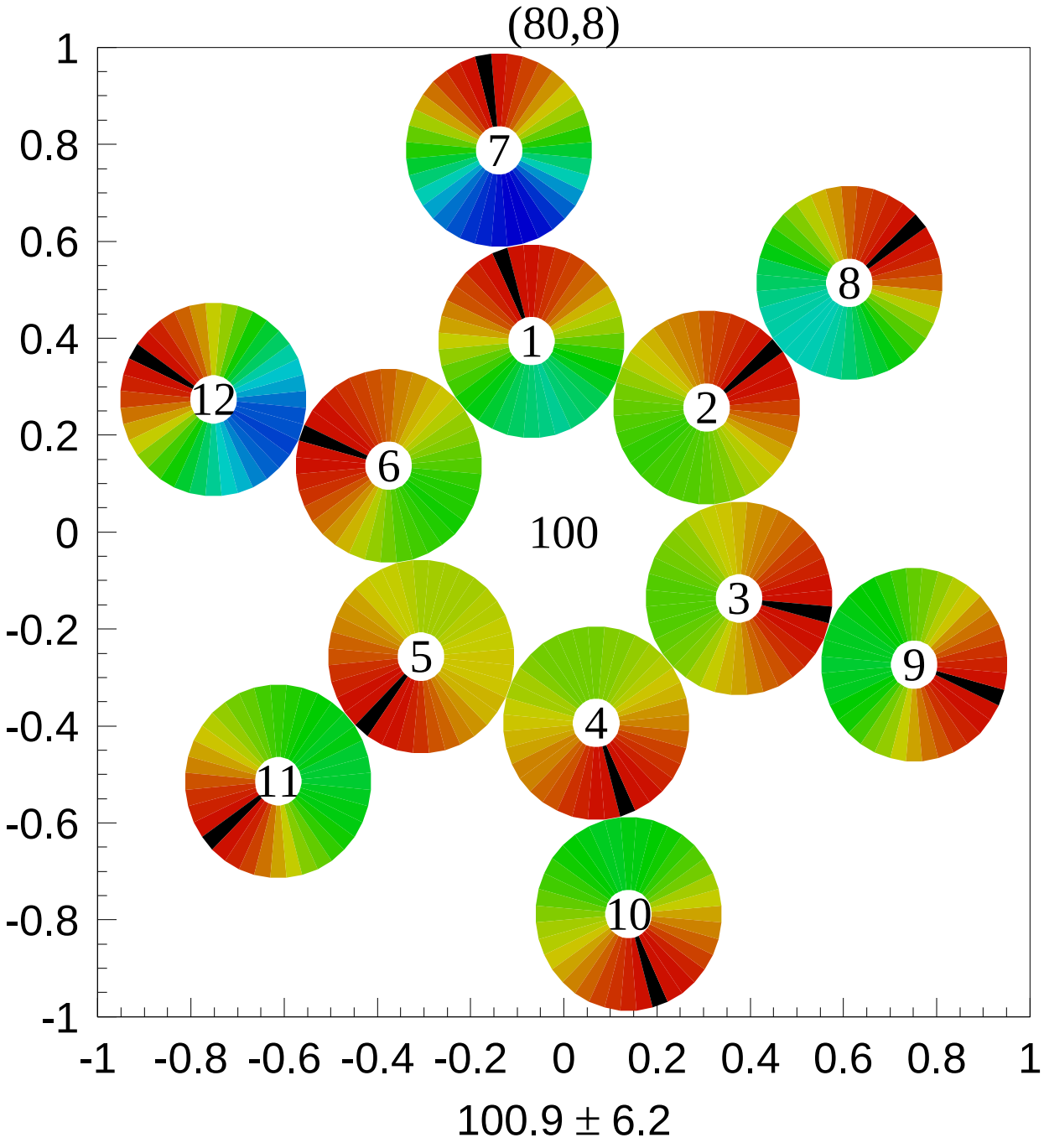

(80,6)
tilted LEDs
119 118 127 120 116 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 125 111 126 113 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

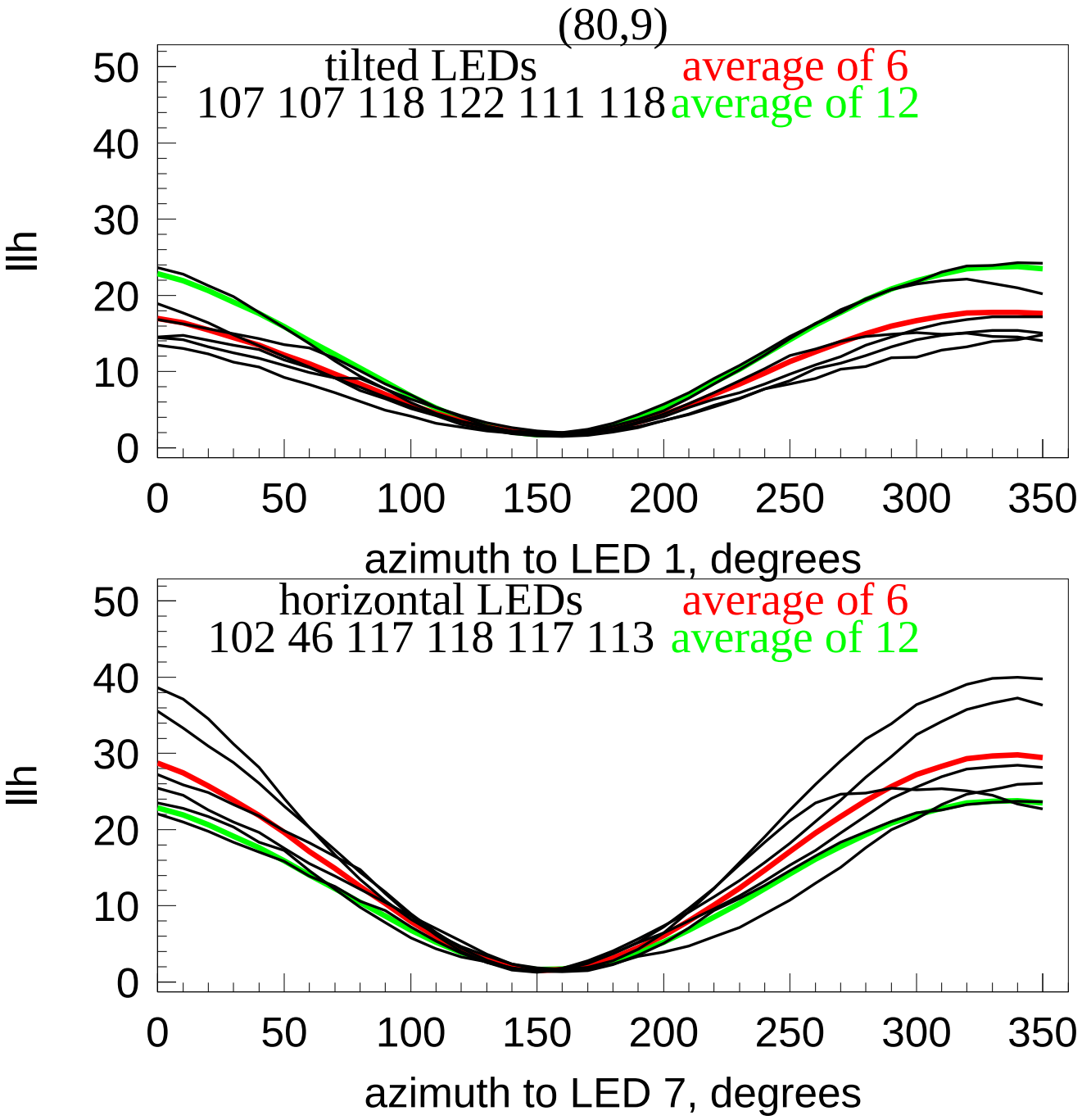

(80,6)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
333.8 ± 7.4

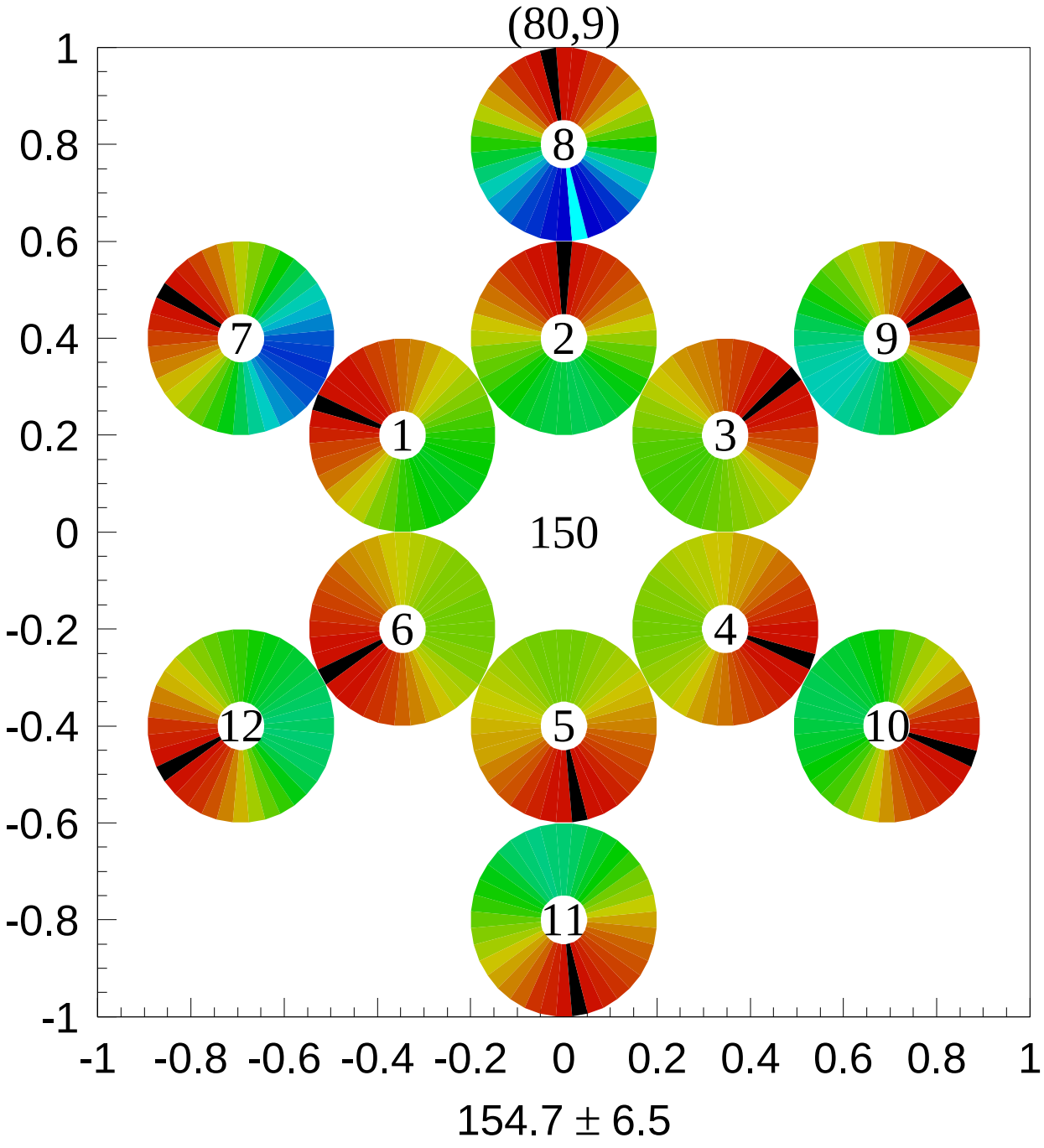

(80,7)
tilted LEDs
115 124 113 123 116 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
126 50 106 117 120 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

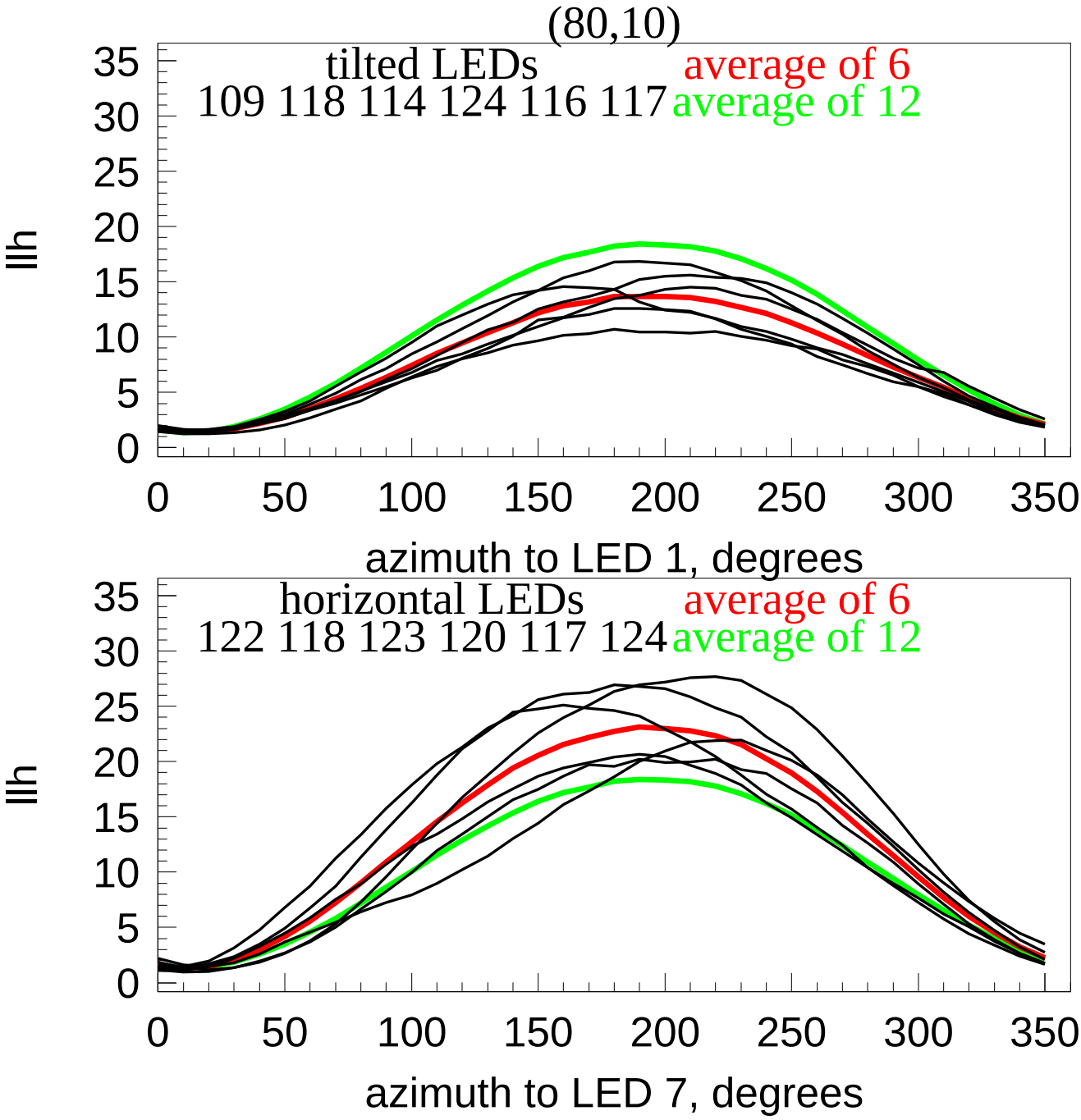

(80,7)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
266.6 ± 7.7

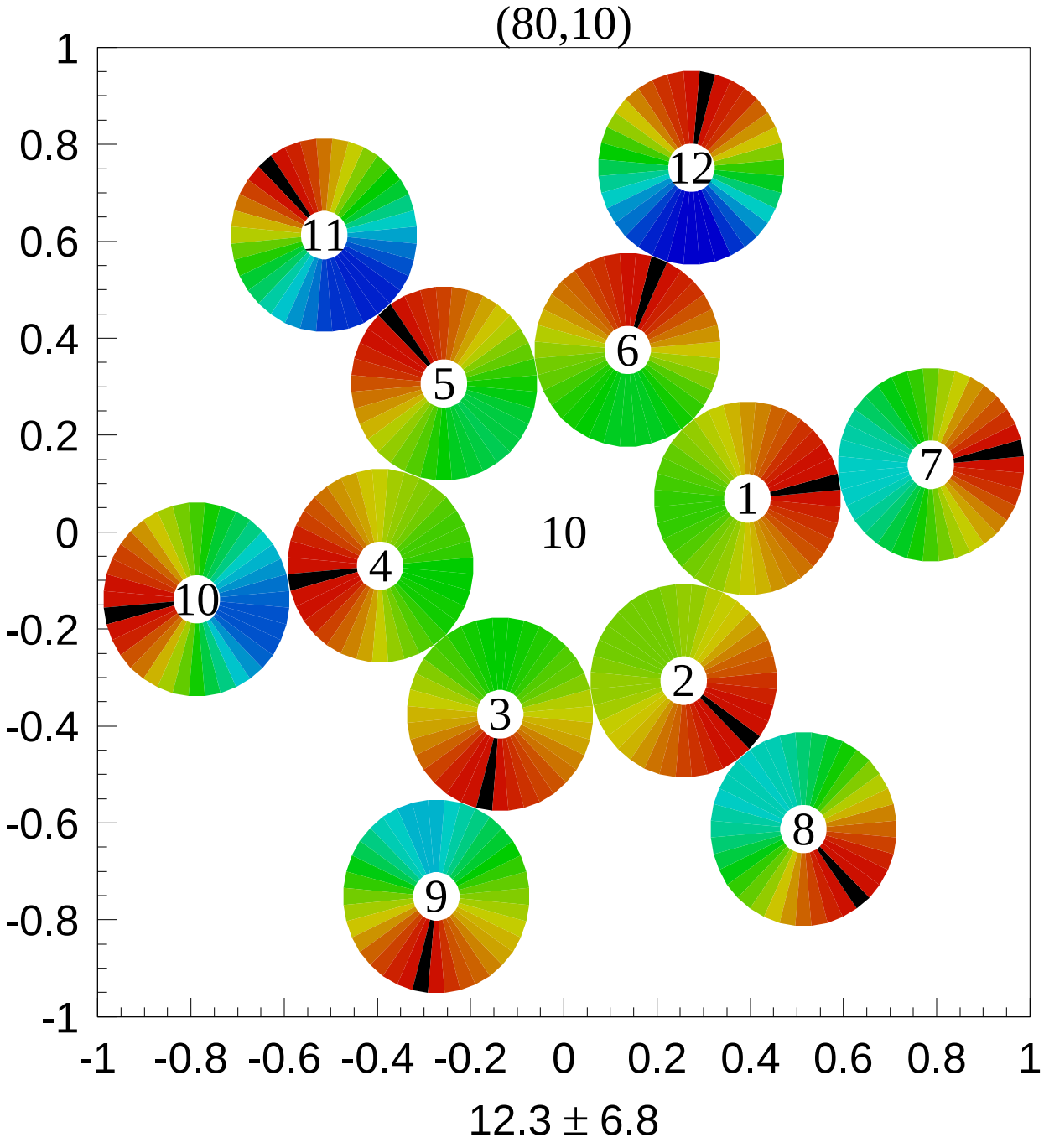

(80,8)
tilted LEDs
112 116 119 115 119 103
average of 6
average of 12
Ilh
60
50
40
30
20
10
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
60 123 120 123 121 87
average of 6
average of 12
Ilh
60
50
40
30
20
10
0
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

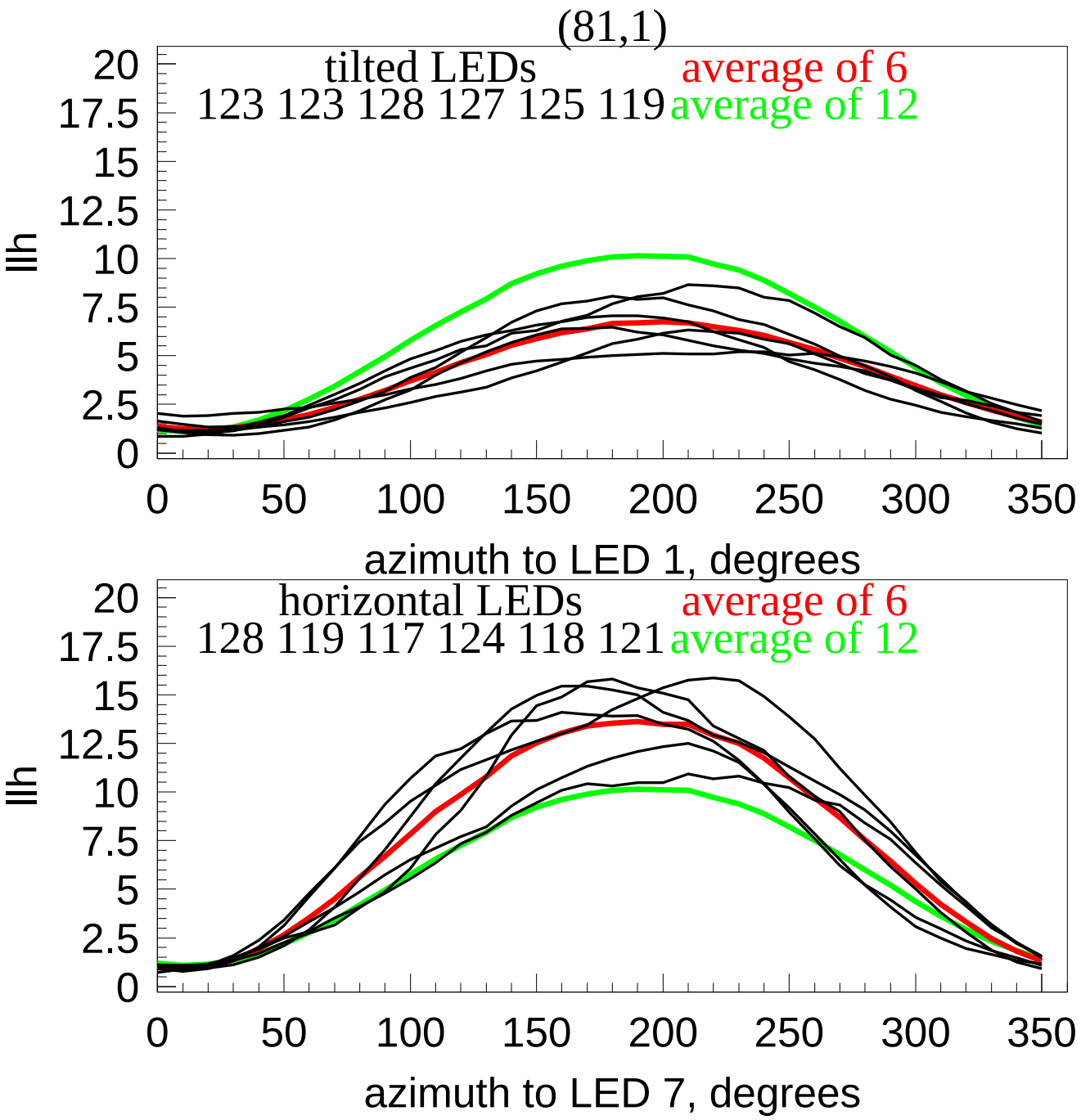

(80,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
100.9 ± 6.2

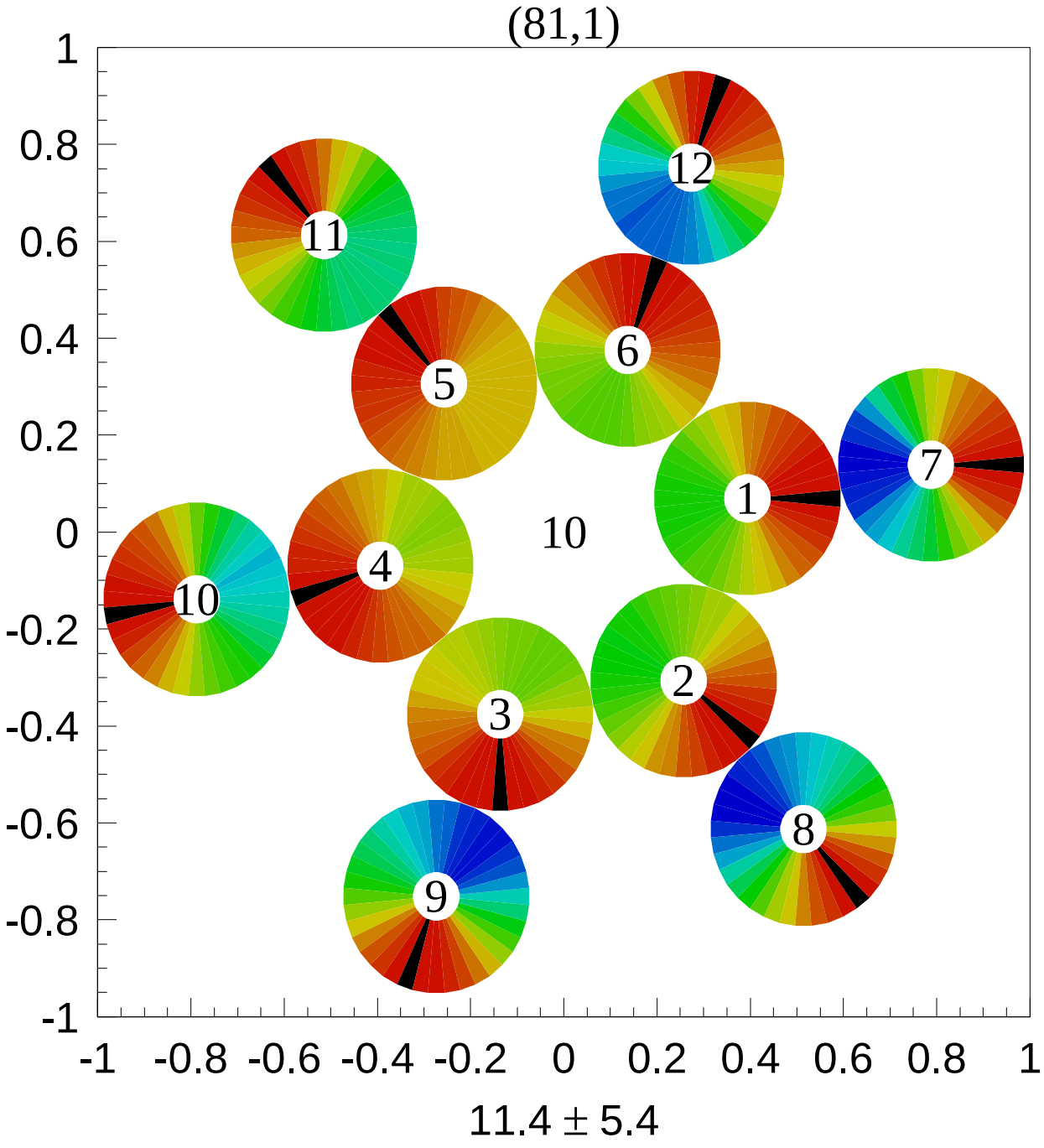

(80,9)
tilted LEDs
107 107 118 122 111 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
102 46 117 118 117 113
average of 6
average of 12
llh
azimuth to LED 7, degrees

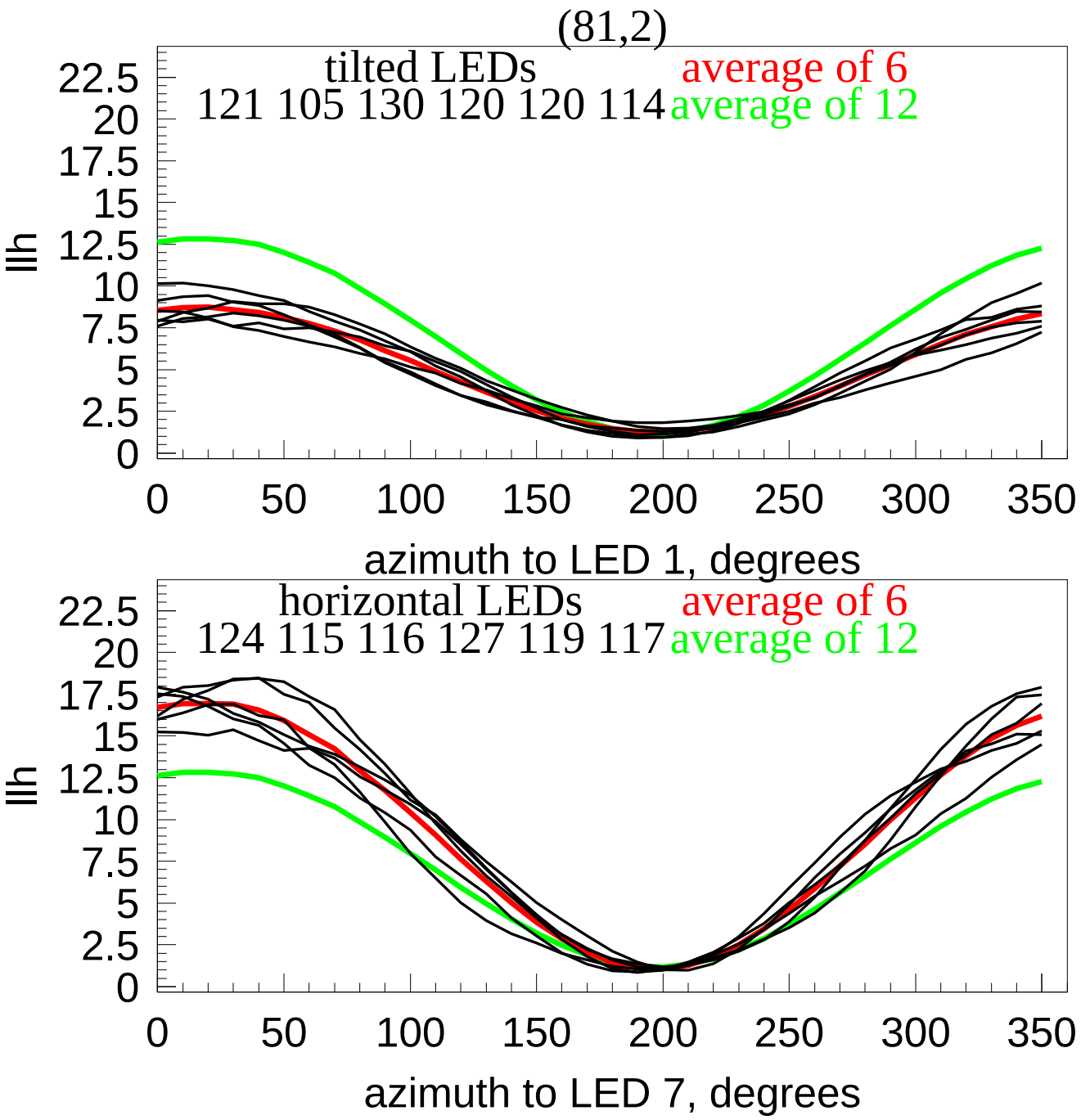

(80,9)
8
7
2
9
1
3
150
6
4
12
5
10
11
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
154.7 ± 6.5

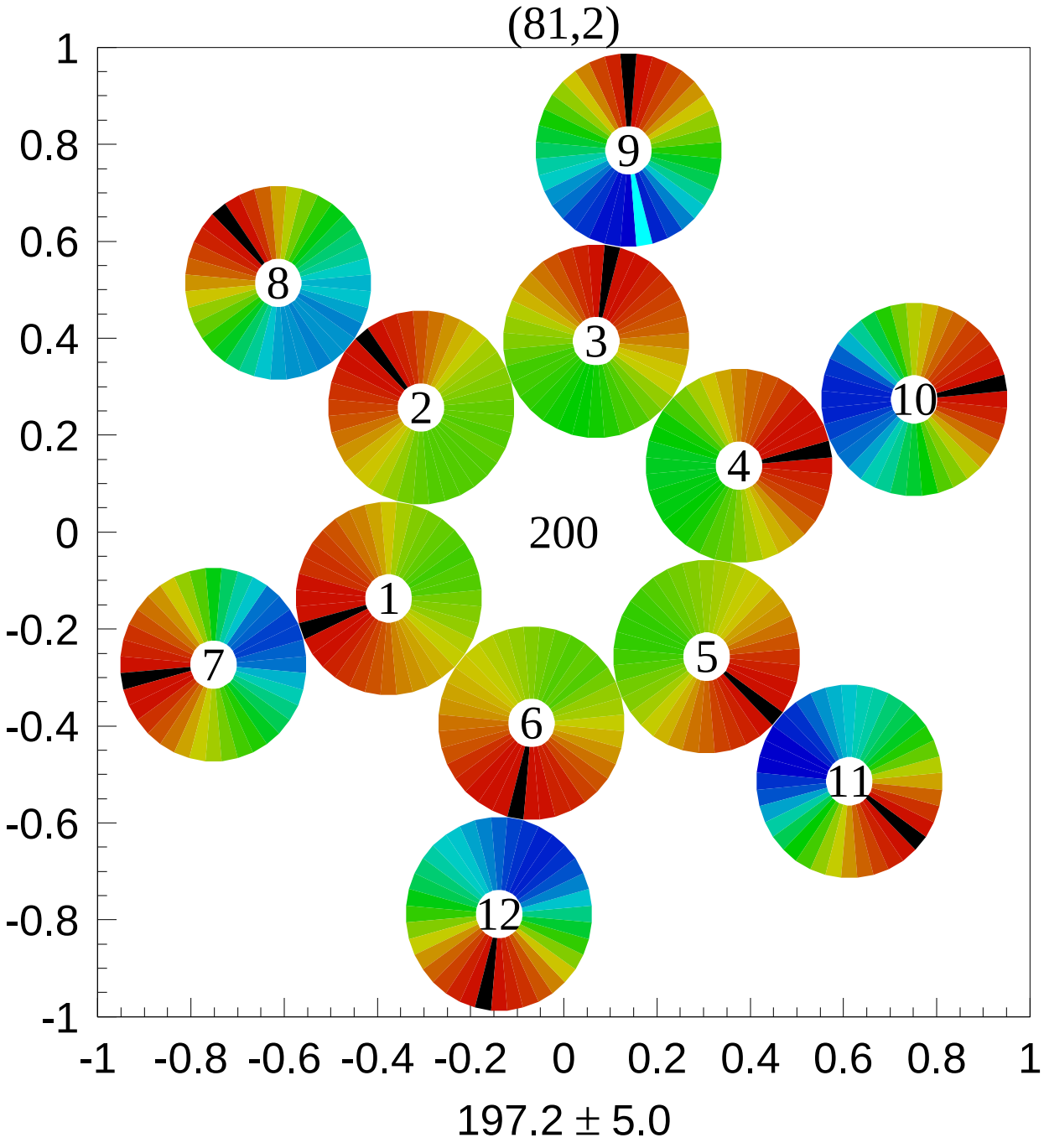

(80,10)
tilted LEDs
109 118 114 124 116 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 118 123 120 117 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

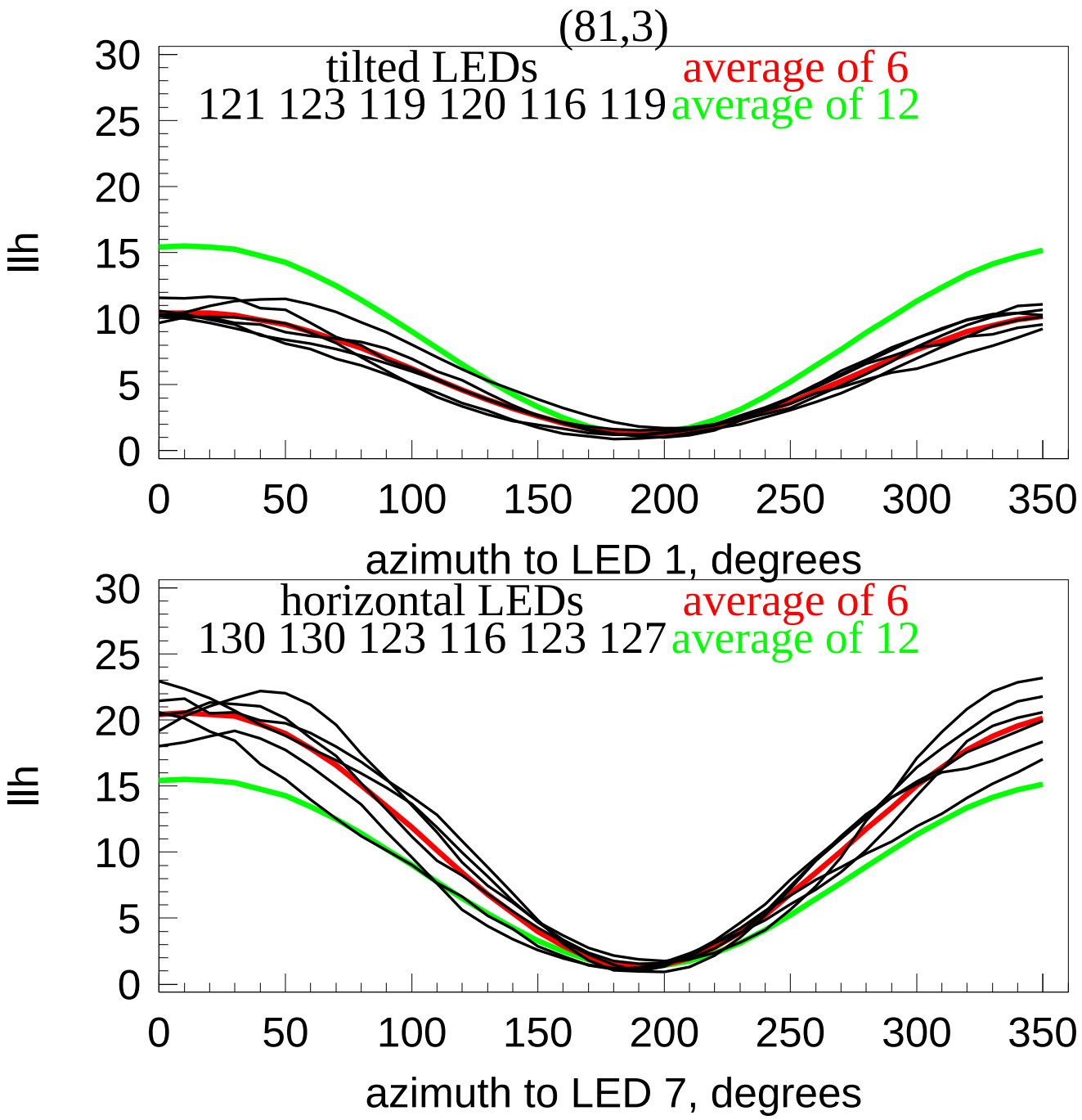

(80,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12.3 ± 6.8
12
11
6
5
7
1
10
4
10
2
3
8
9

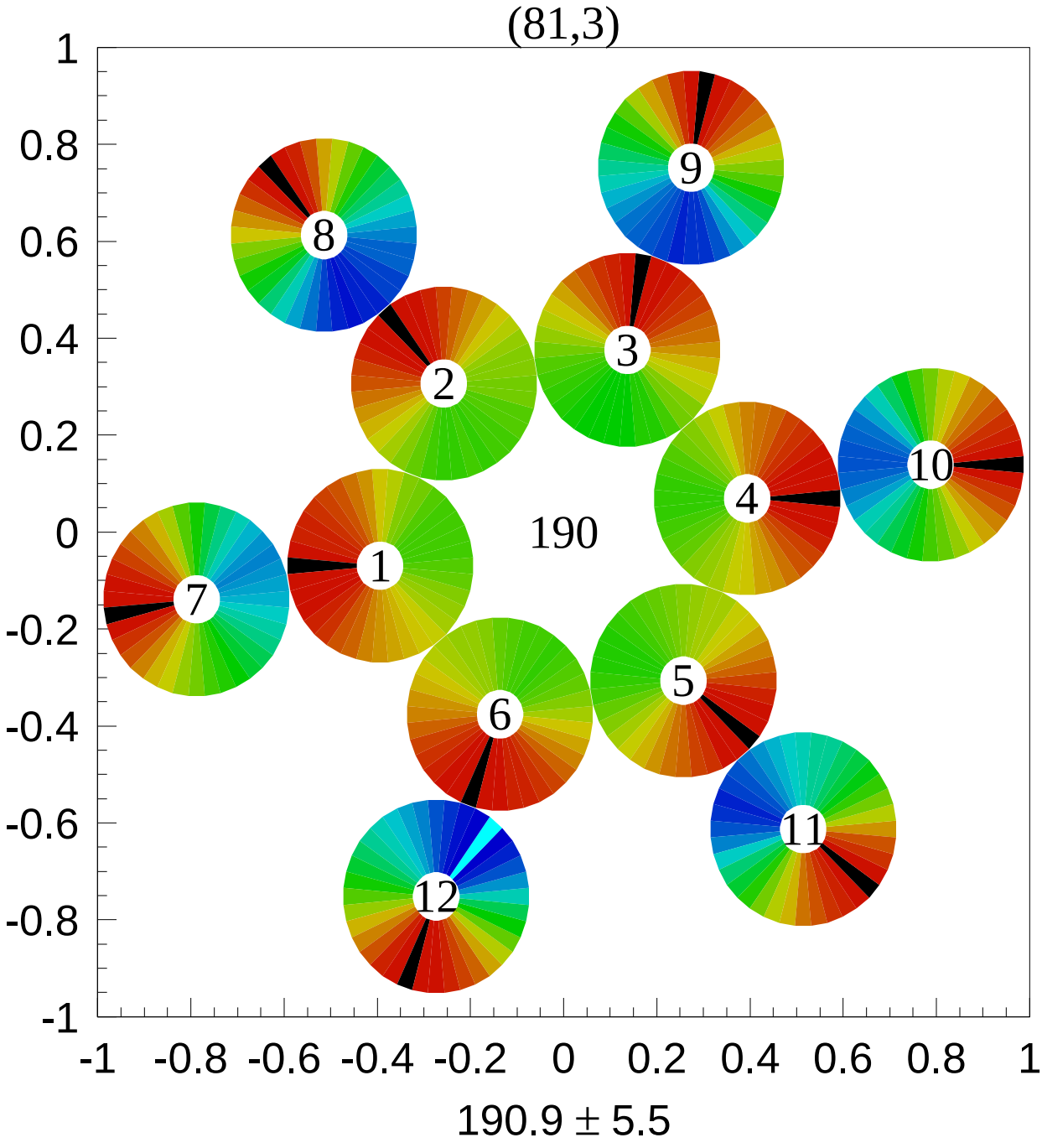

(81,1)
tilted LEDs
123 123 128 127 125 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 119 117 124 118 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

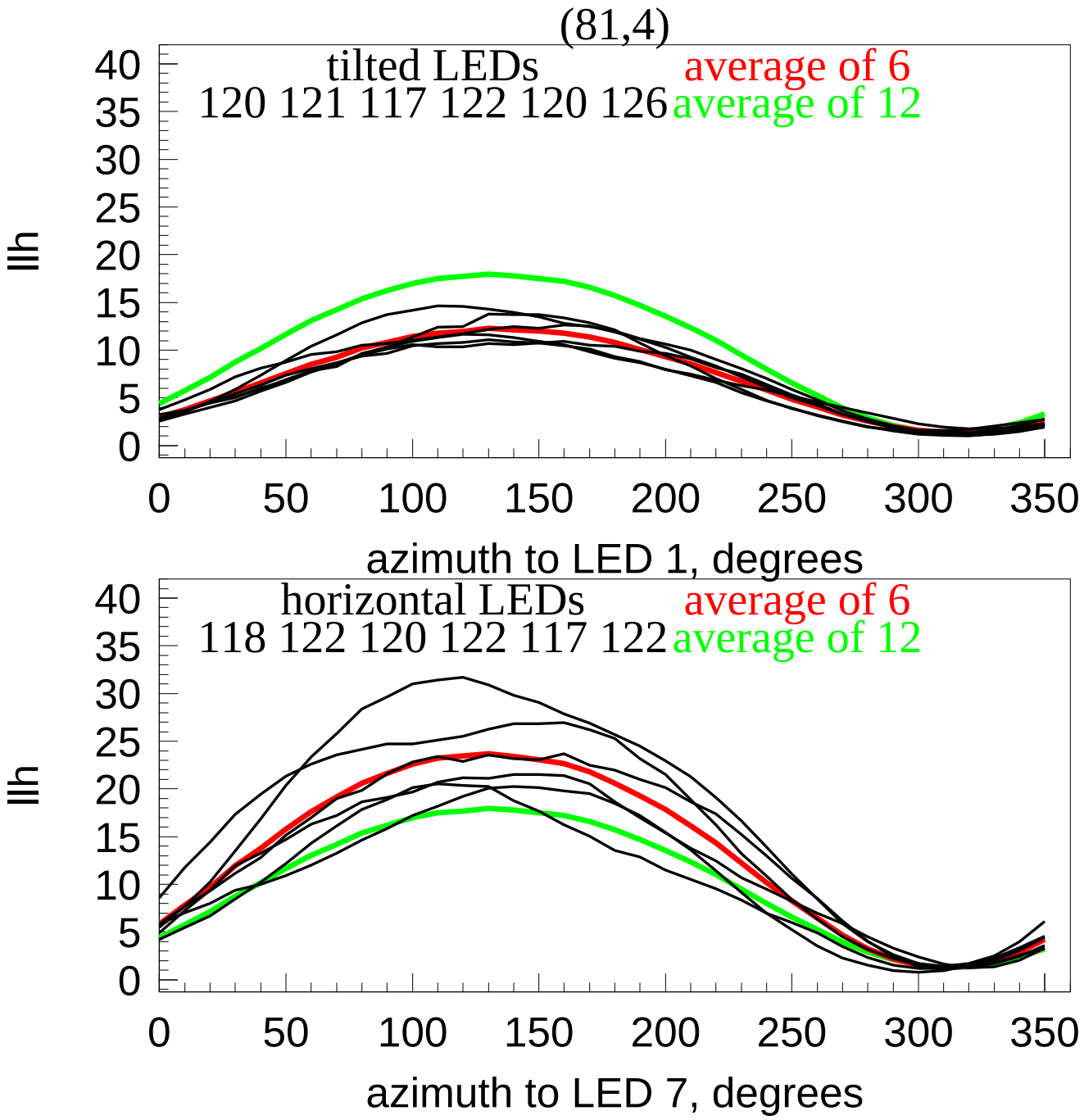

(81,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11.4 ± 5.4
12
11
6
5
7
1
10
4
10
2
3
8
9

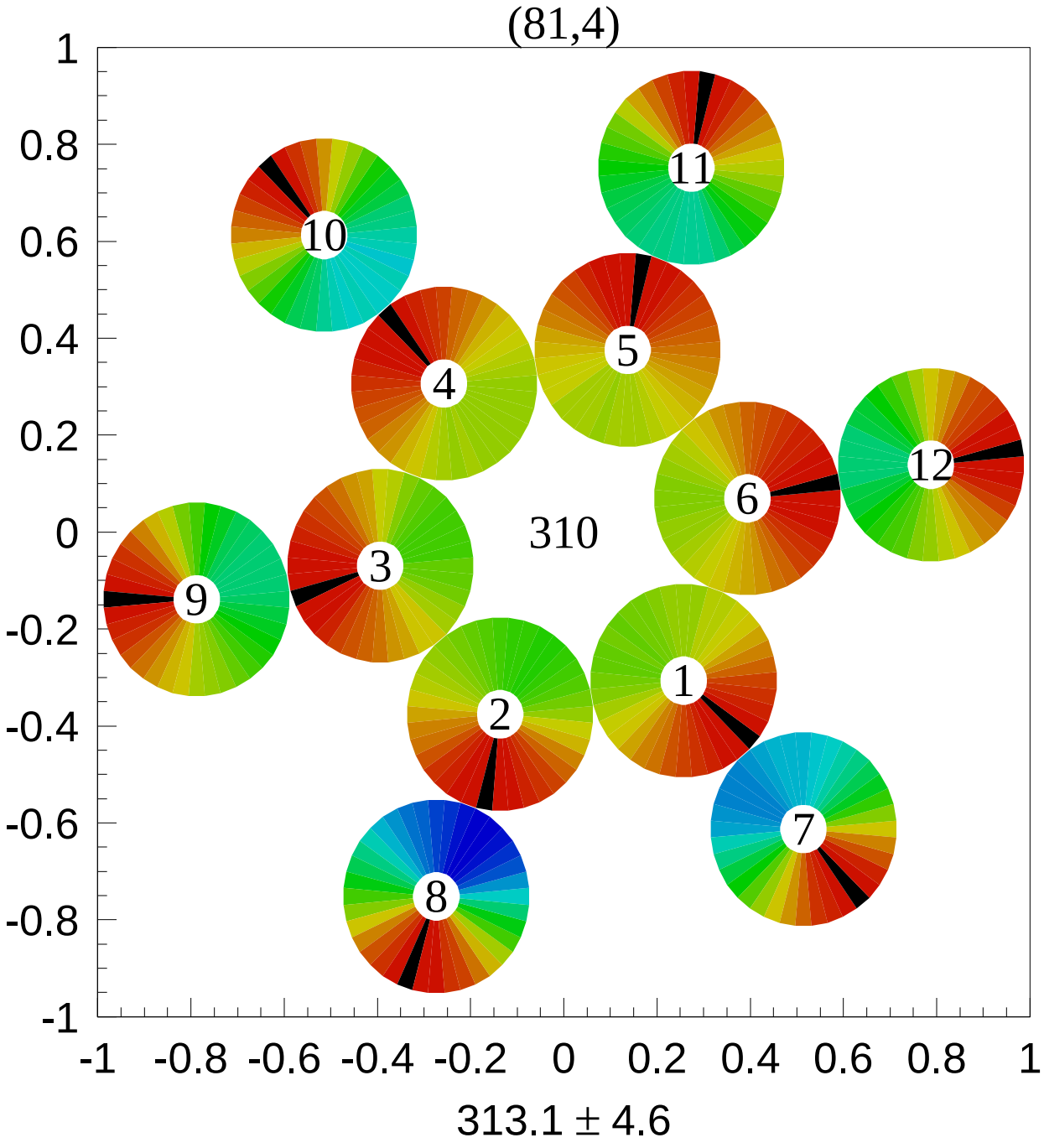

(81,2)
tilted LEDs
121 105 130 120 120 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 115 116 127 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

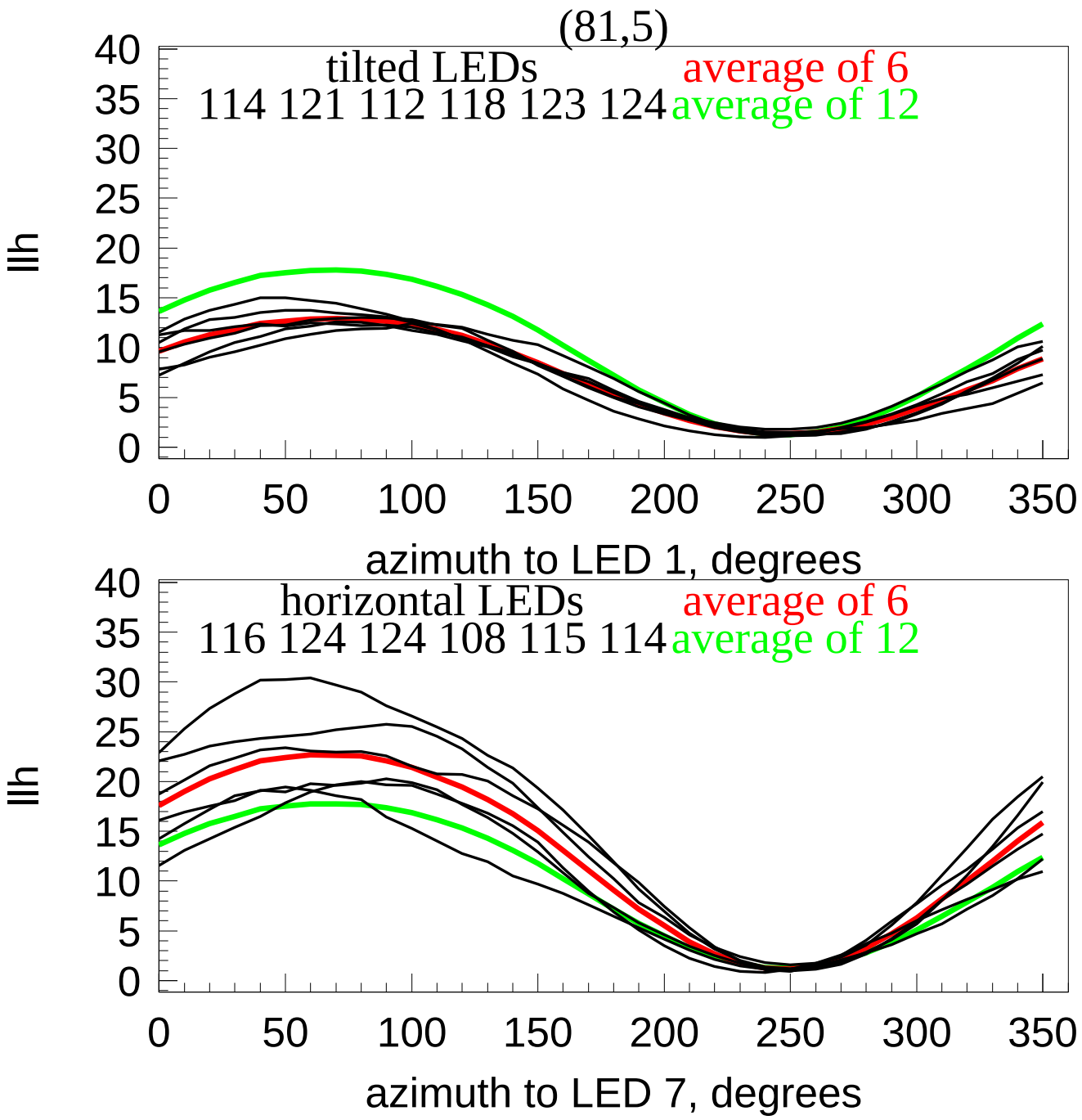

(81,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
8
3
2
10
4
200
1
7
5
6
11
12
197.2 ± 5.0

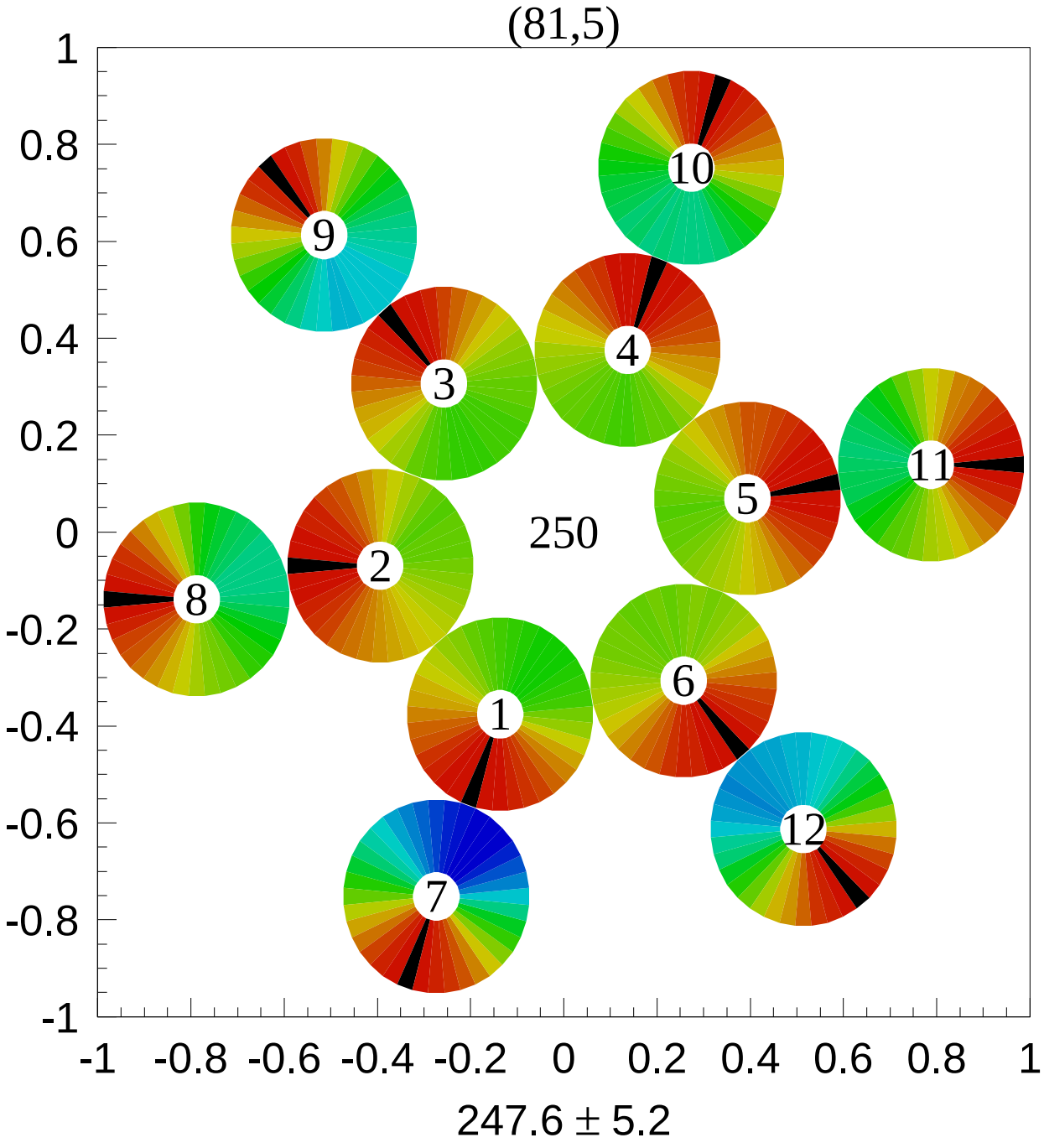

(81,3)
tilted LEDs
121 123 119 120 116 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 130 123 116 123 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

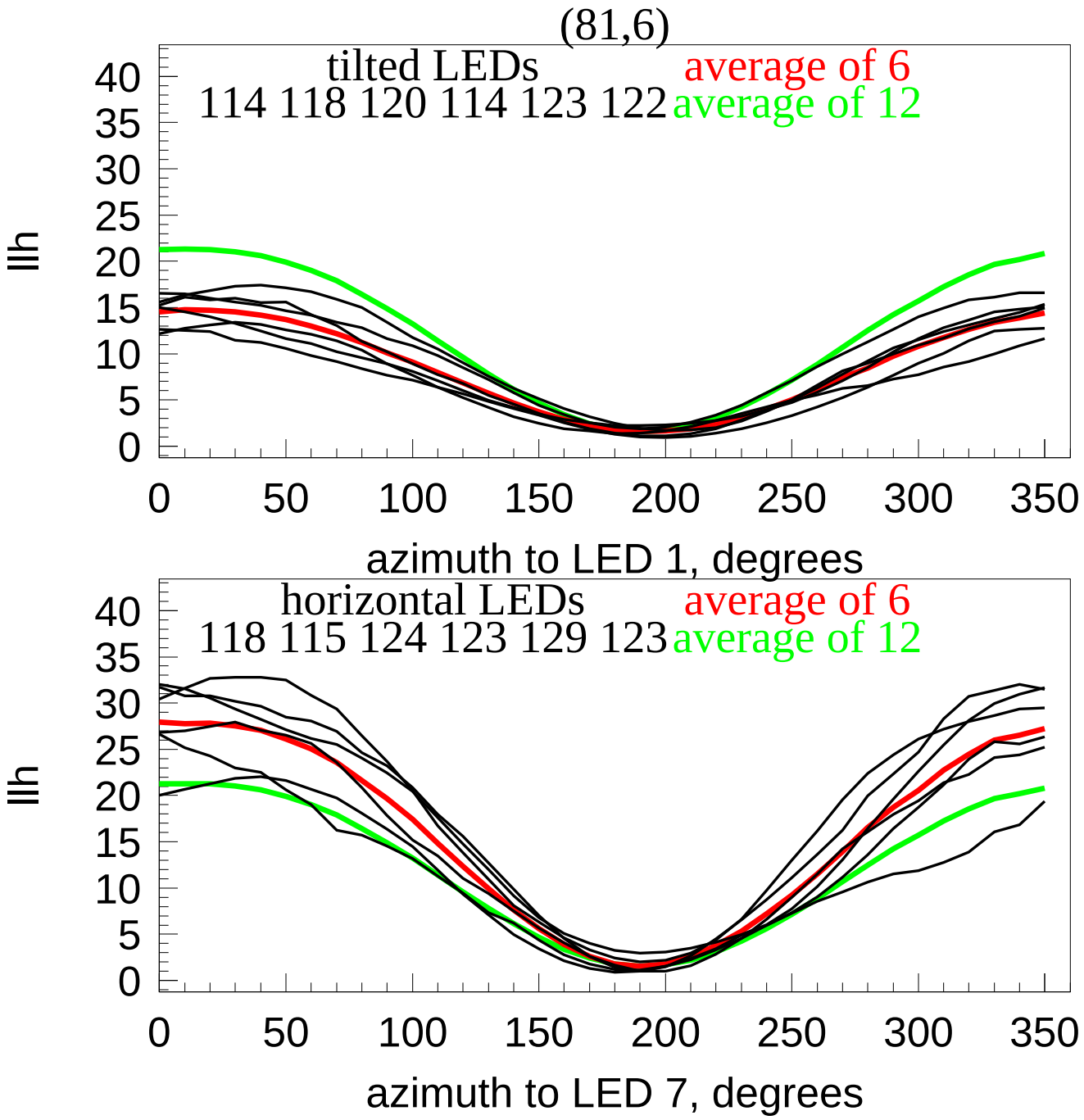

(81,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
190.9 ± 5.5

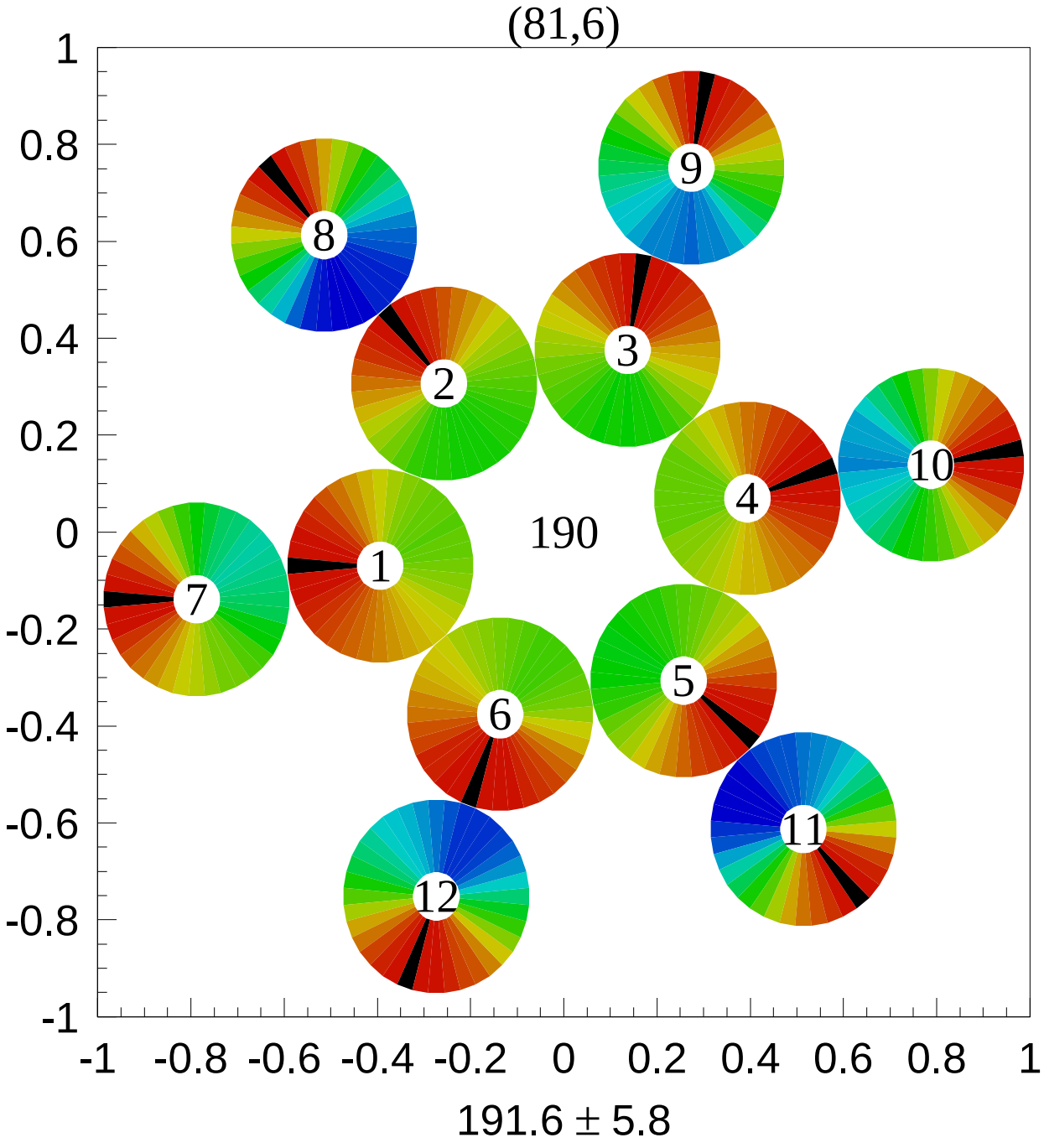

(81,4)
tilted LEDs
120 121 117 122 120 126
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
118 122 120 122 117 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

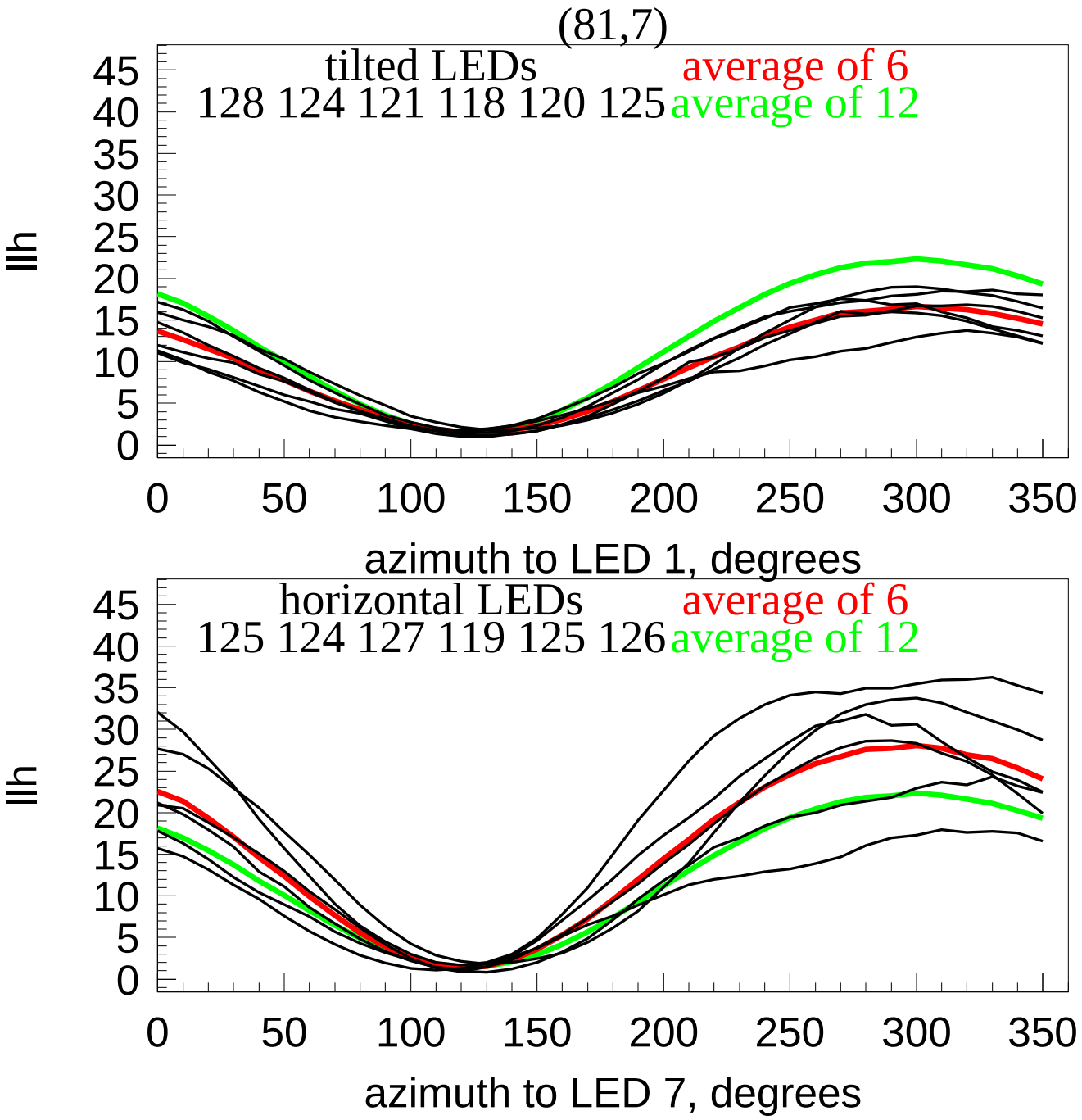

(81,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
313.1 ± 4.6

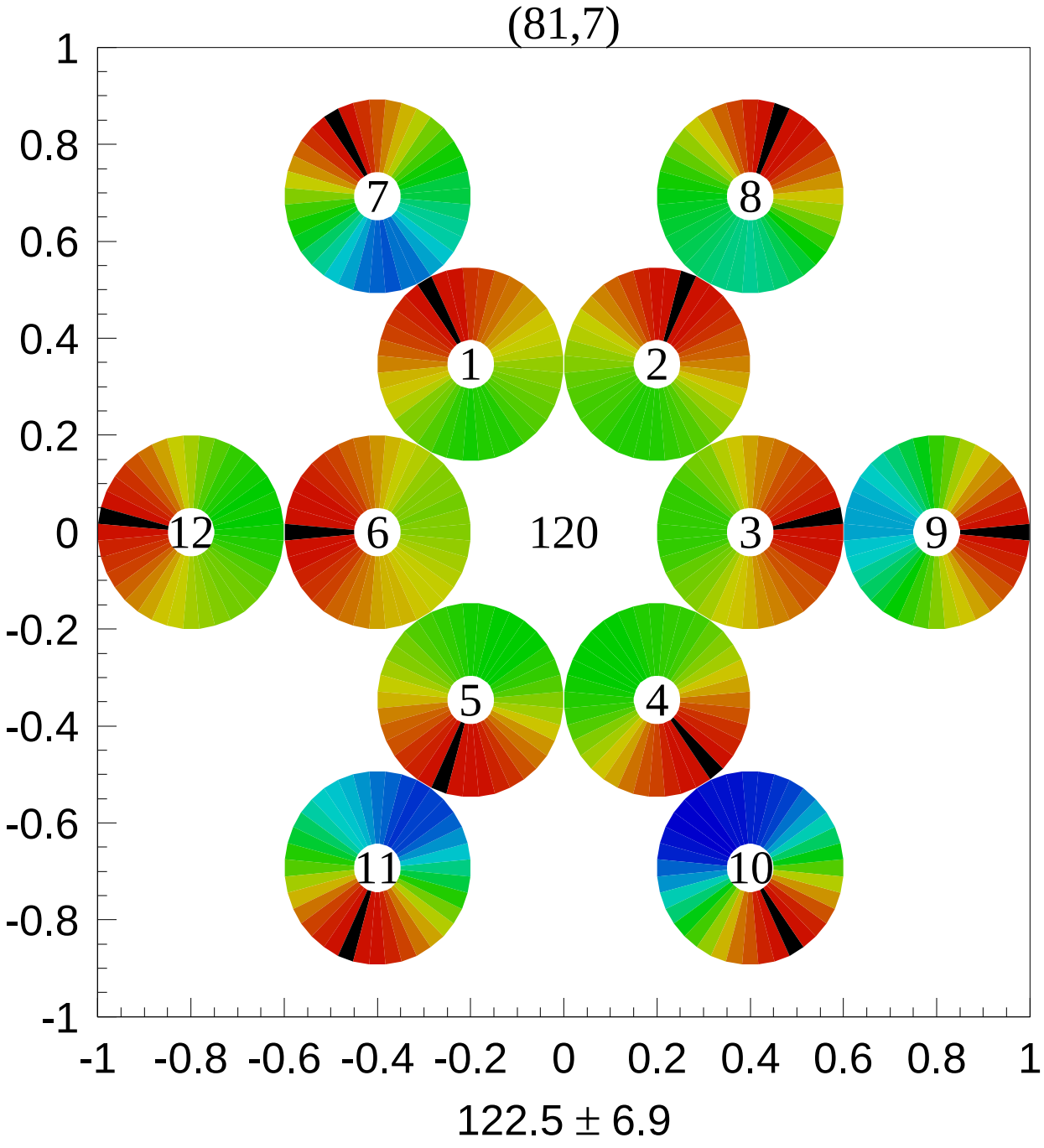

(81,5)
tilted LEDs
114 121 112 118 123 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 124 124 108 115 114
average of 6
average of 12
llh
azimuth to LED 7, degrees

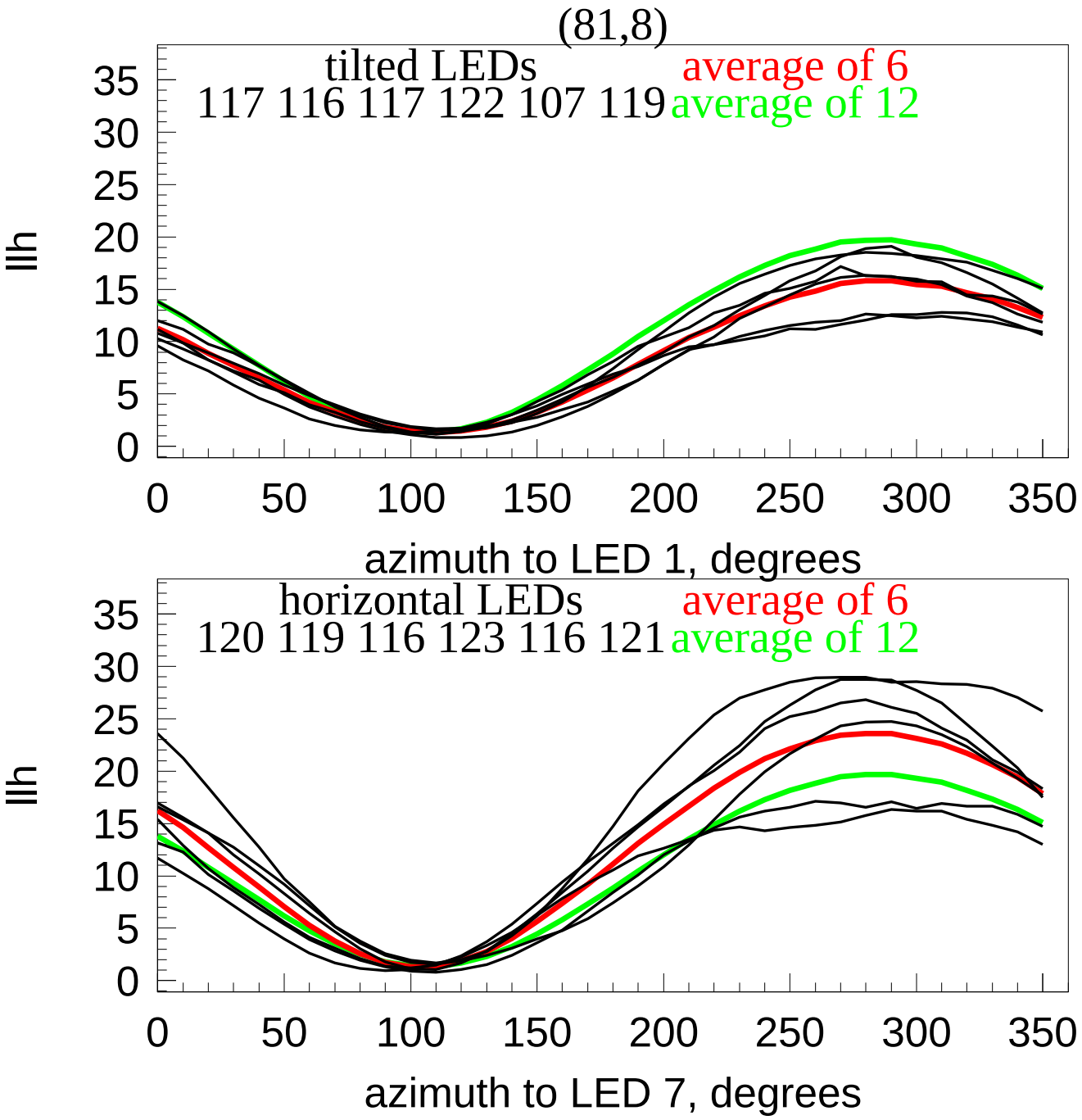

(81,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
250
1
2
3
4
5
6
7
8
9
10
11
12
247.6 ± 5.2

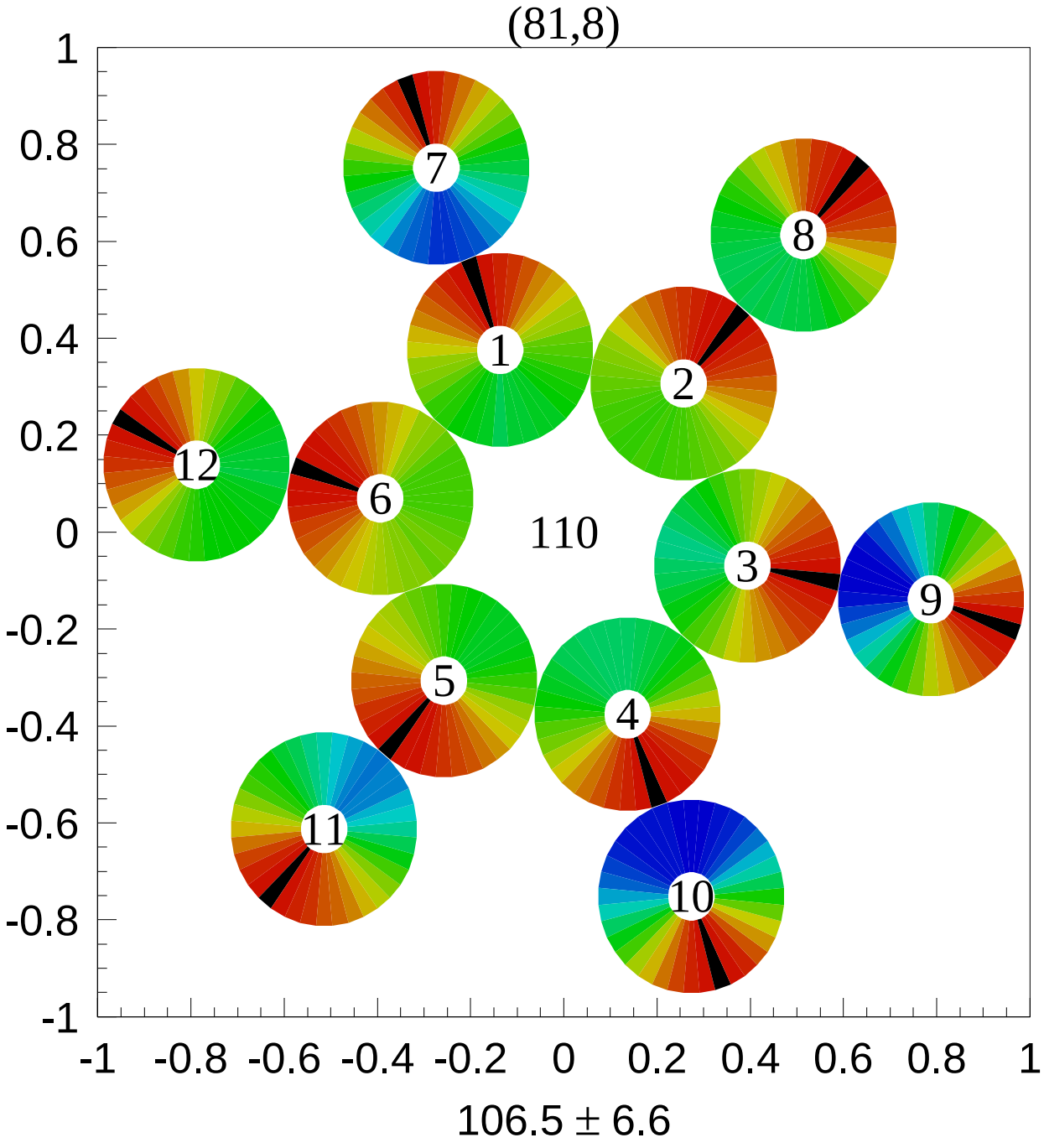

(81,6)
tilted LEDs
114 118 120 114 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 115 124 123 129 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

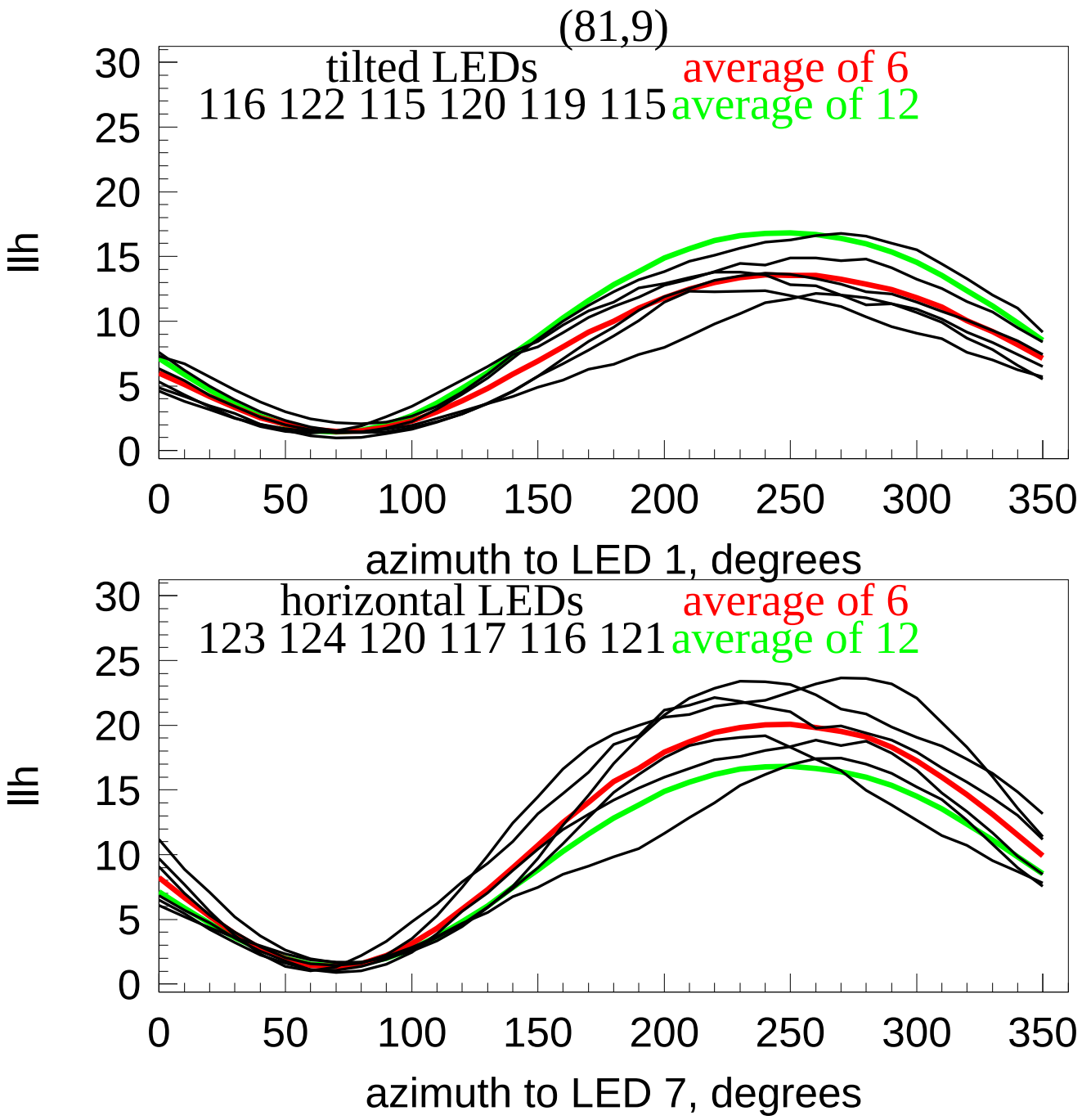

(81,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
190
1
2
3
4
5
6
7
8
9
10
11
12
191.6 ± 5.8

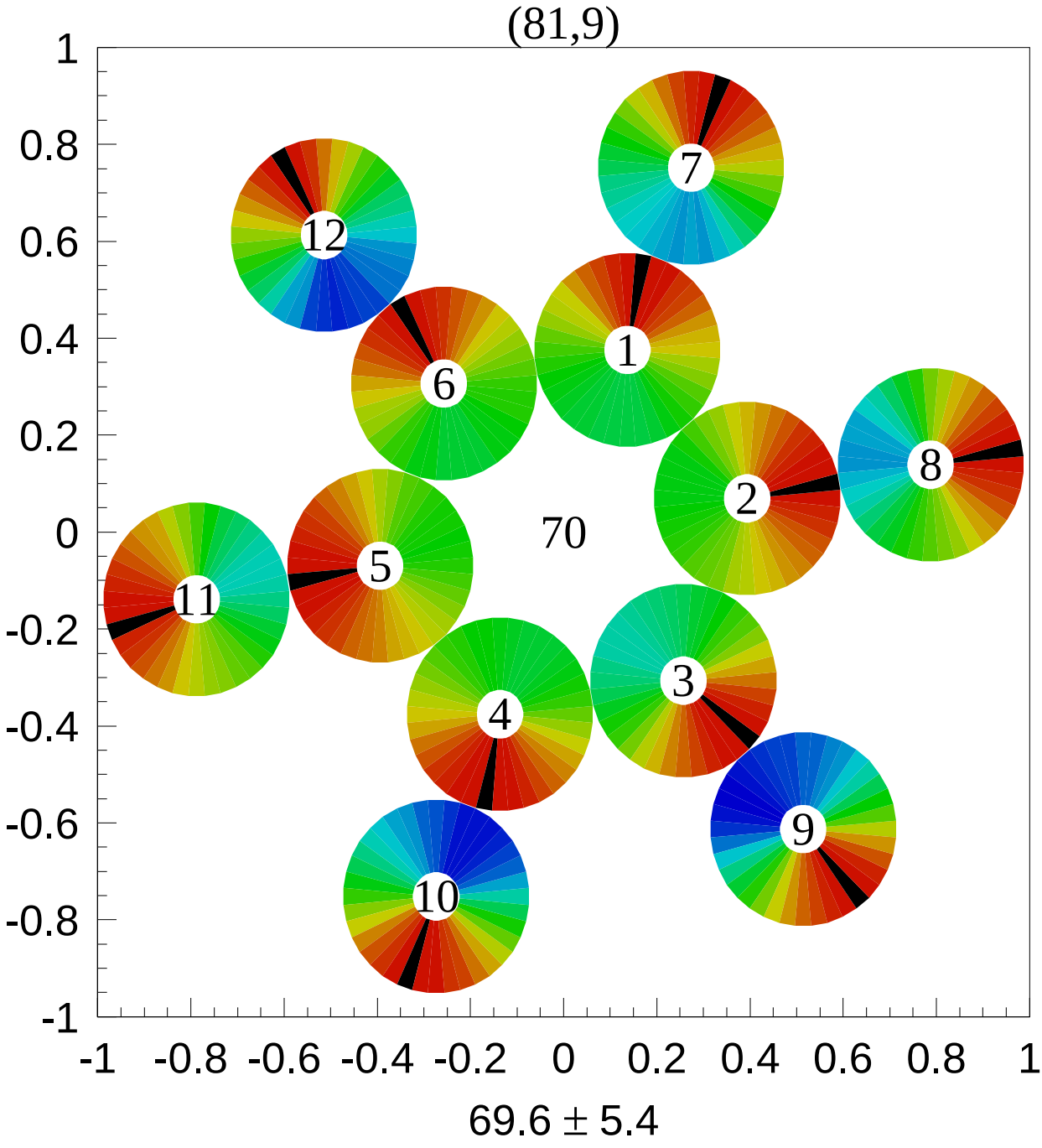

(81,7)
tilted LEDs
128 124 121 118 120 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 124 127 119 125 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

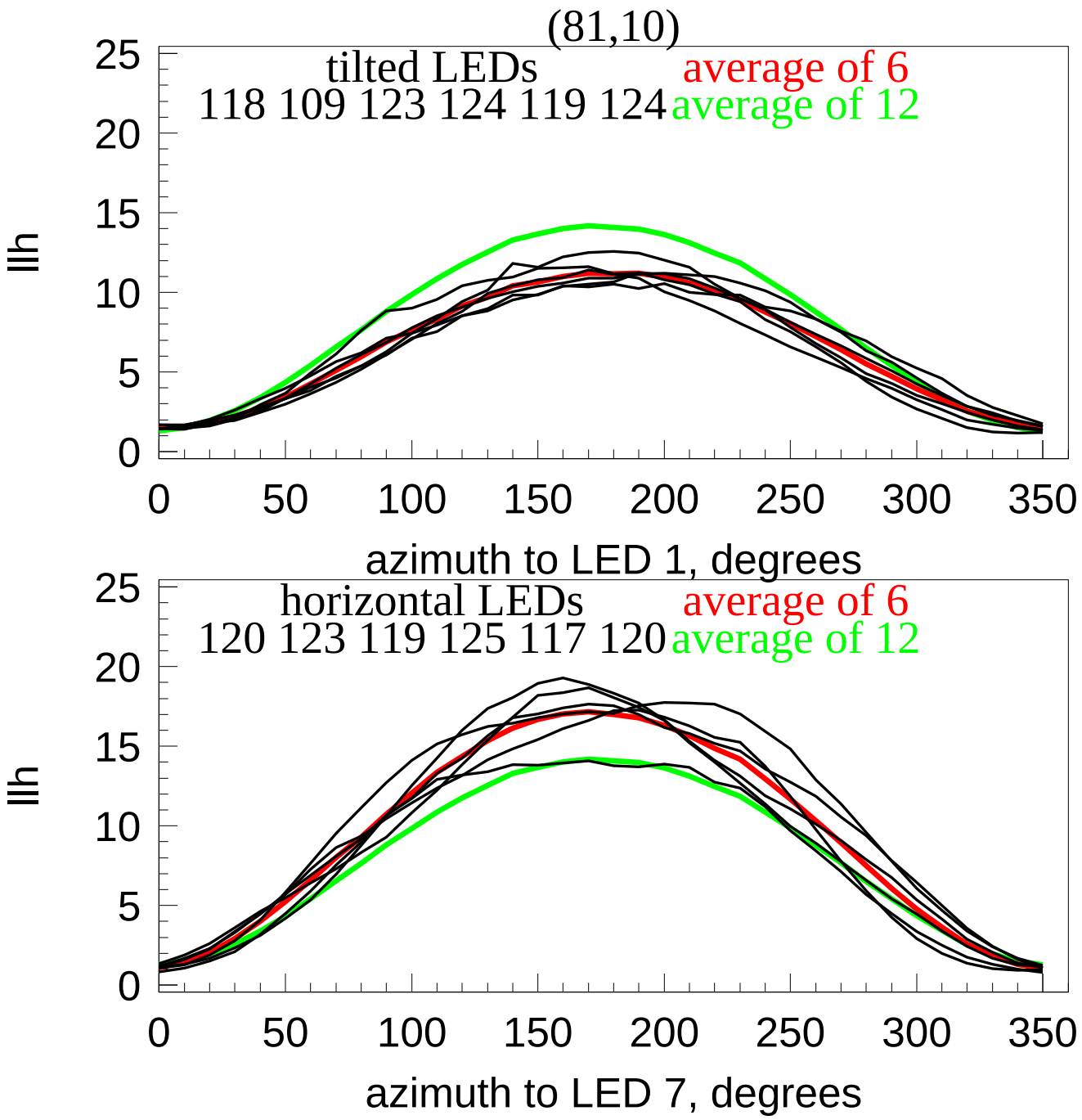

(81,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
120
3
9
5
4
11
10
122.5 ± 6.9

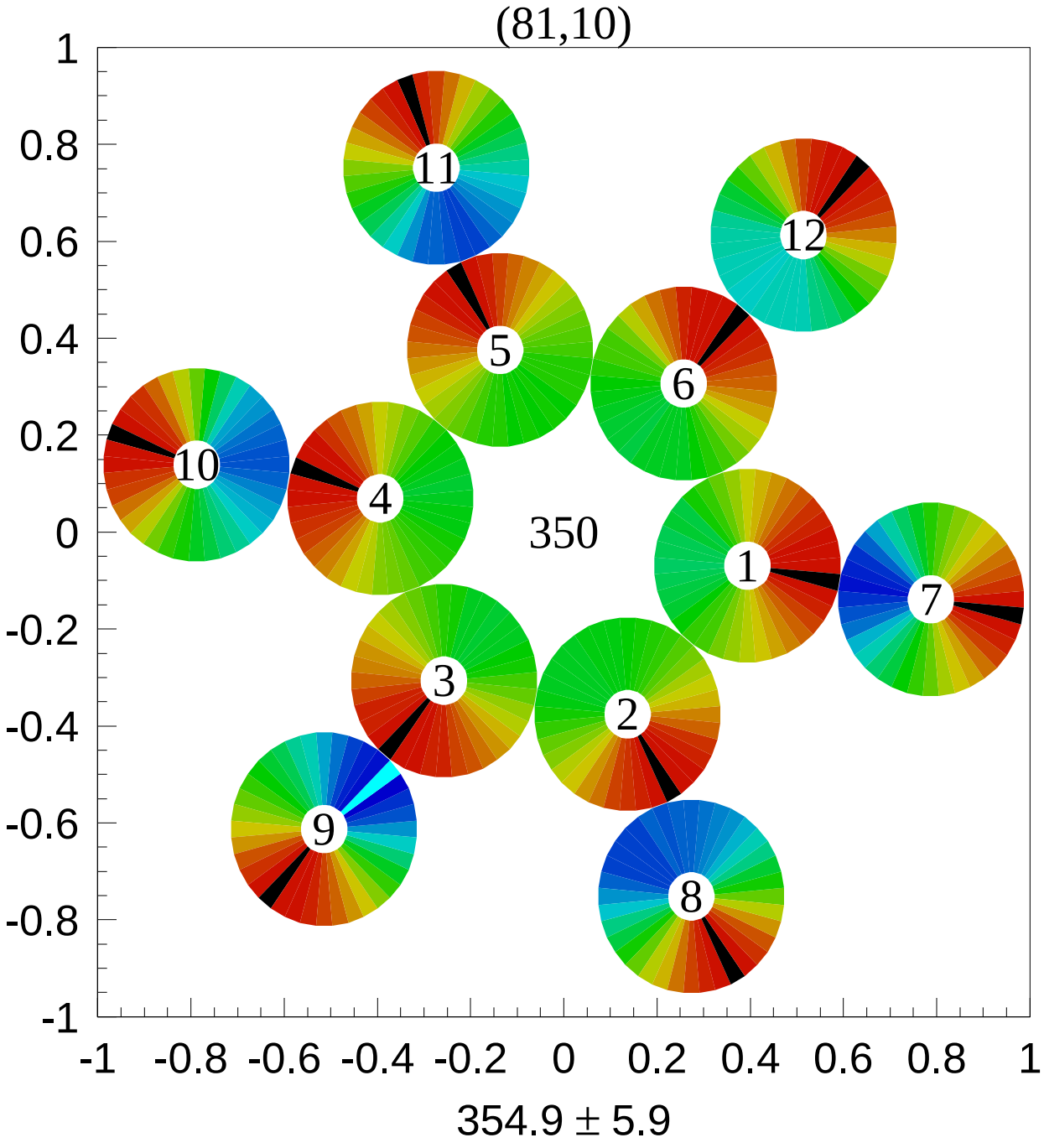

(81,8)
tilted LEDs
117 116 117 122 107 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 119 116 123 116 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

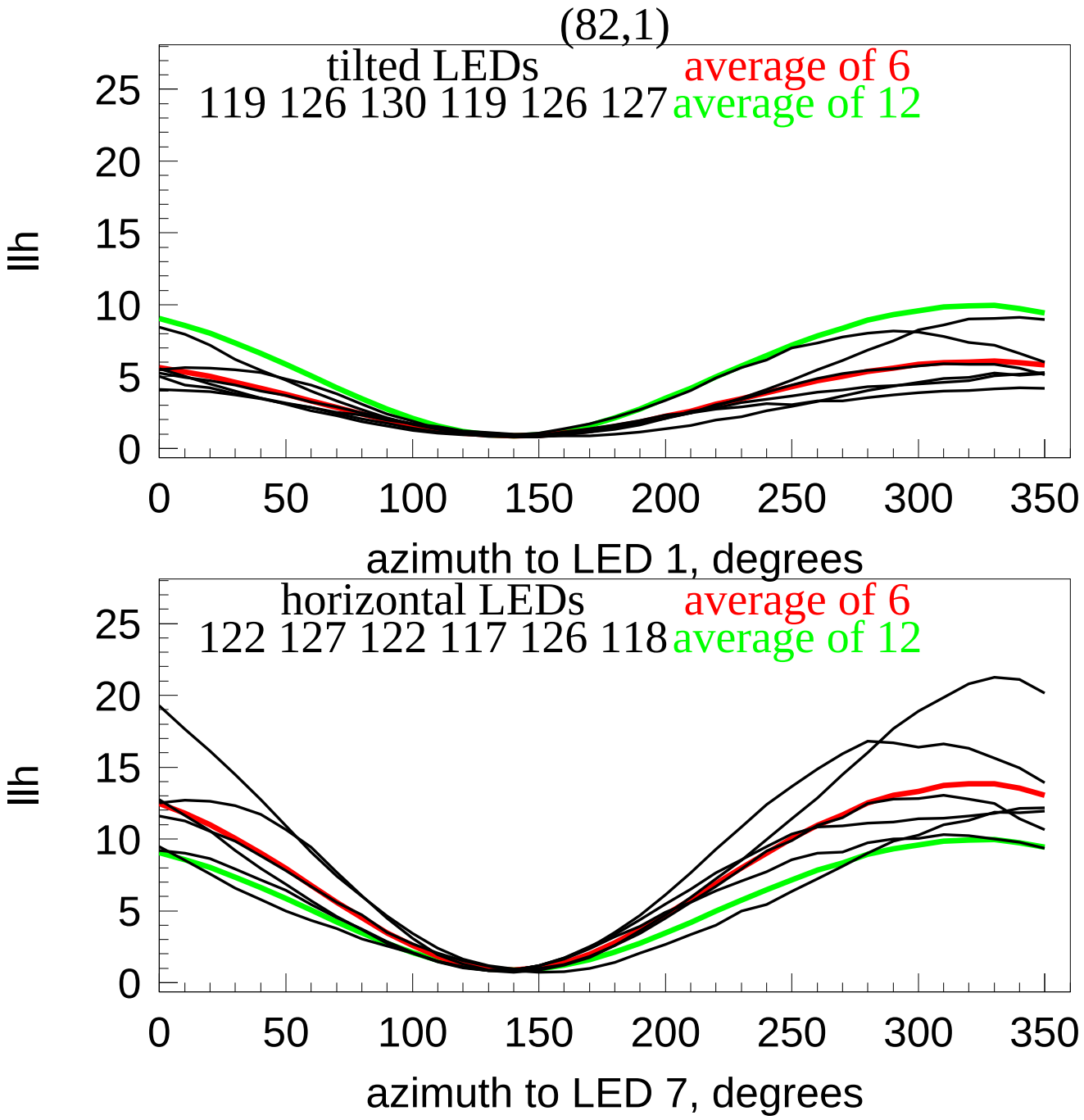

(81,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
106.5 ± 6.6

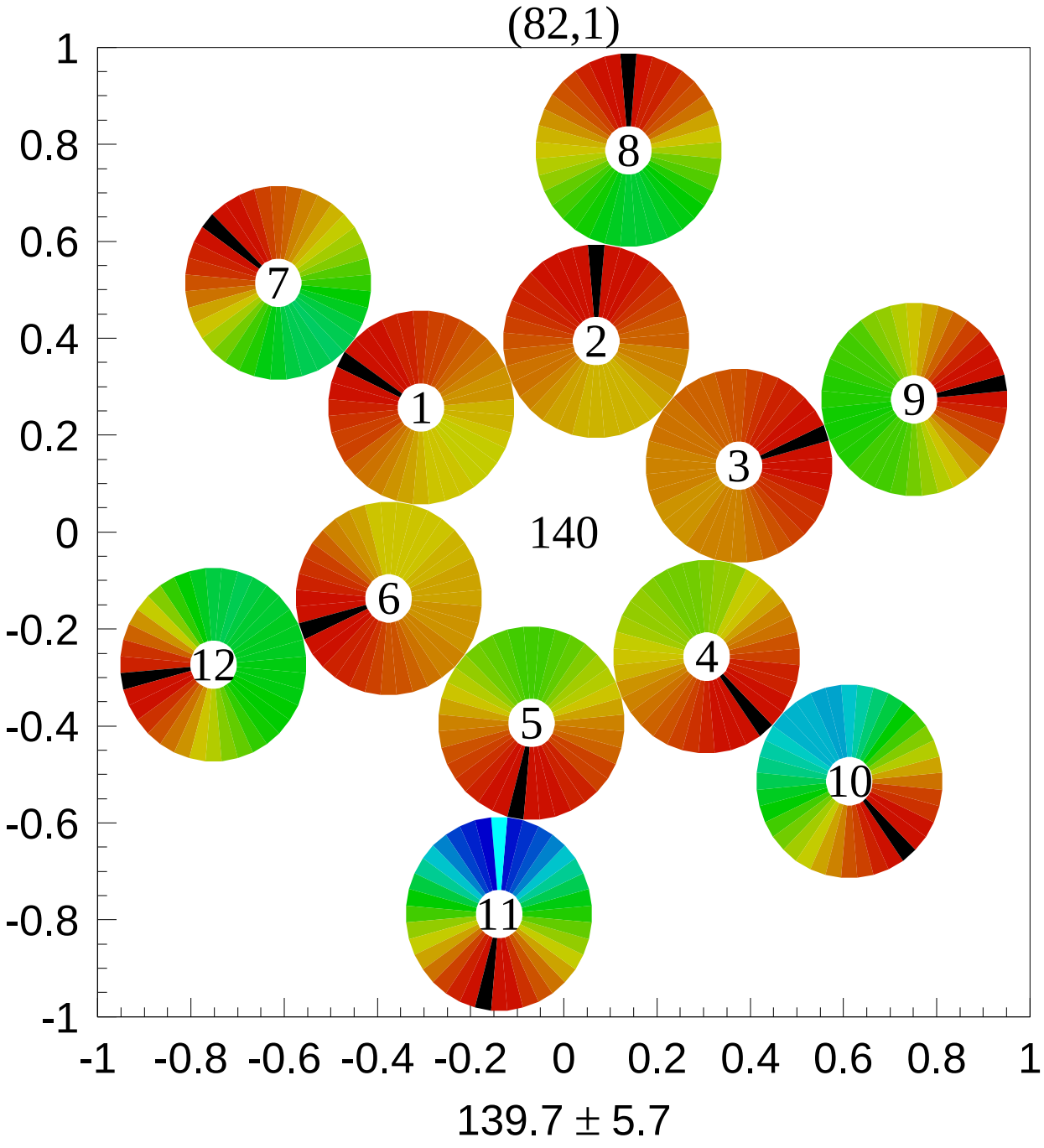

(81,9)
tilted LEDs
116 122 115 120 119 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 124 120 117 116 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

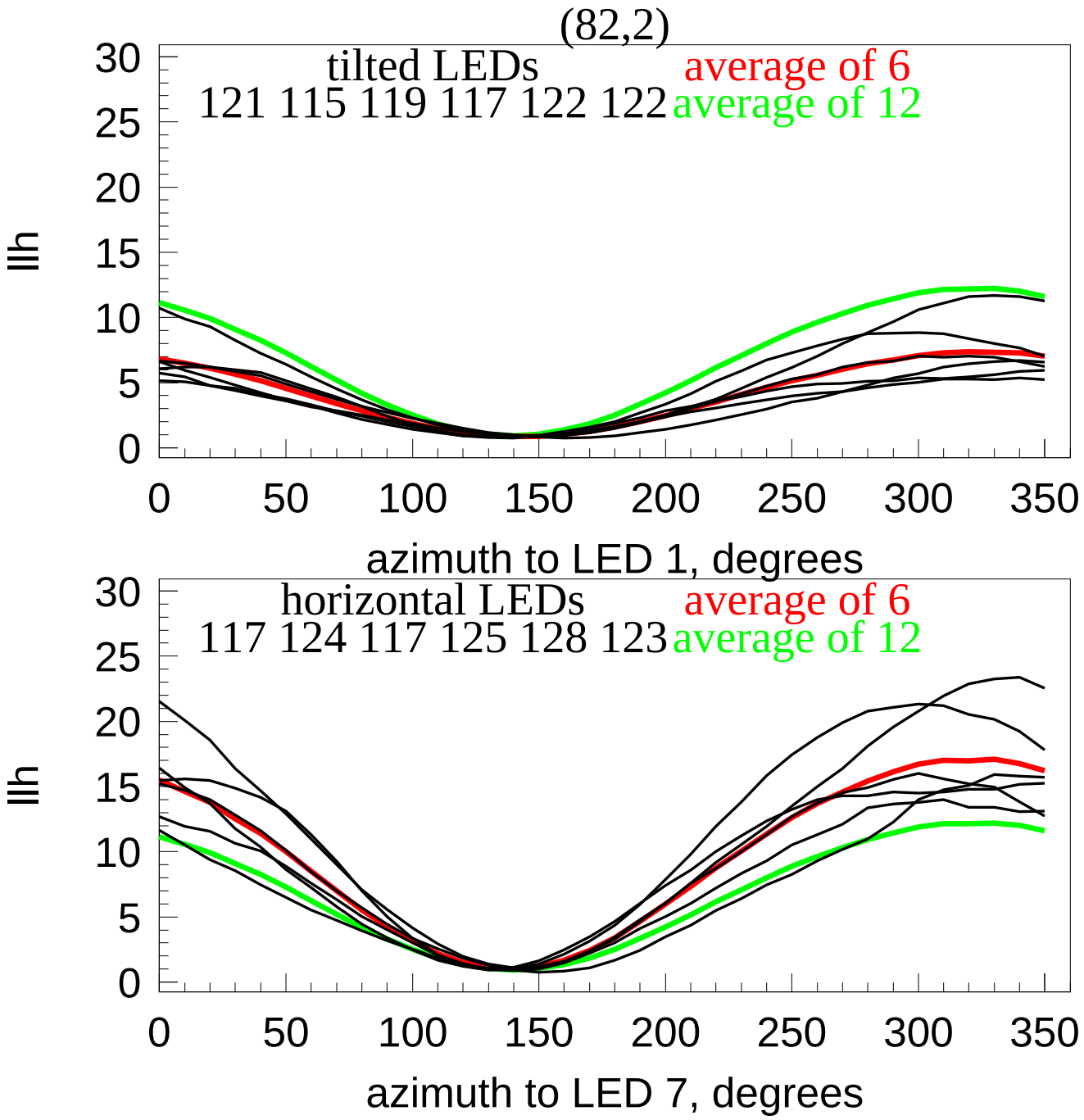

(81,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
8
2
5
70
11
4
3
9
10
69.6 ± 5.4

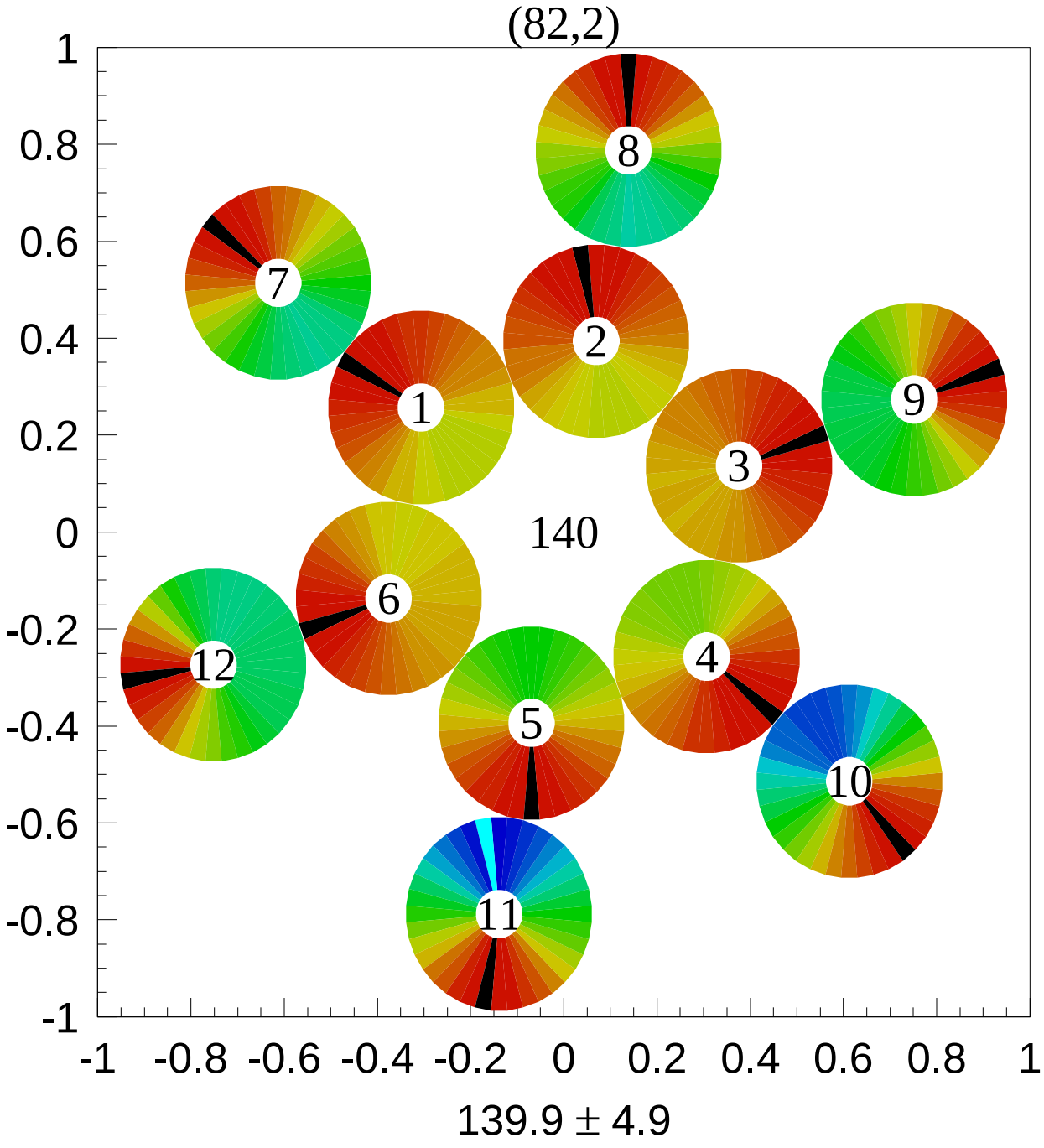

(81,10)
tilted LEDs
118 109 123 124 119 124
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 123 119 125 117 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

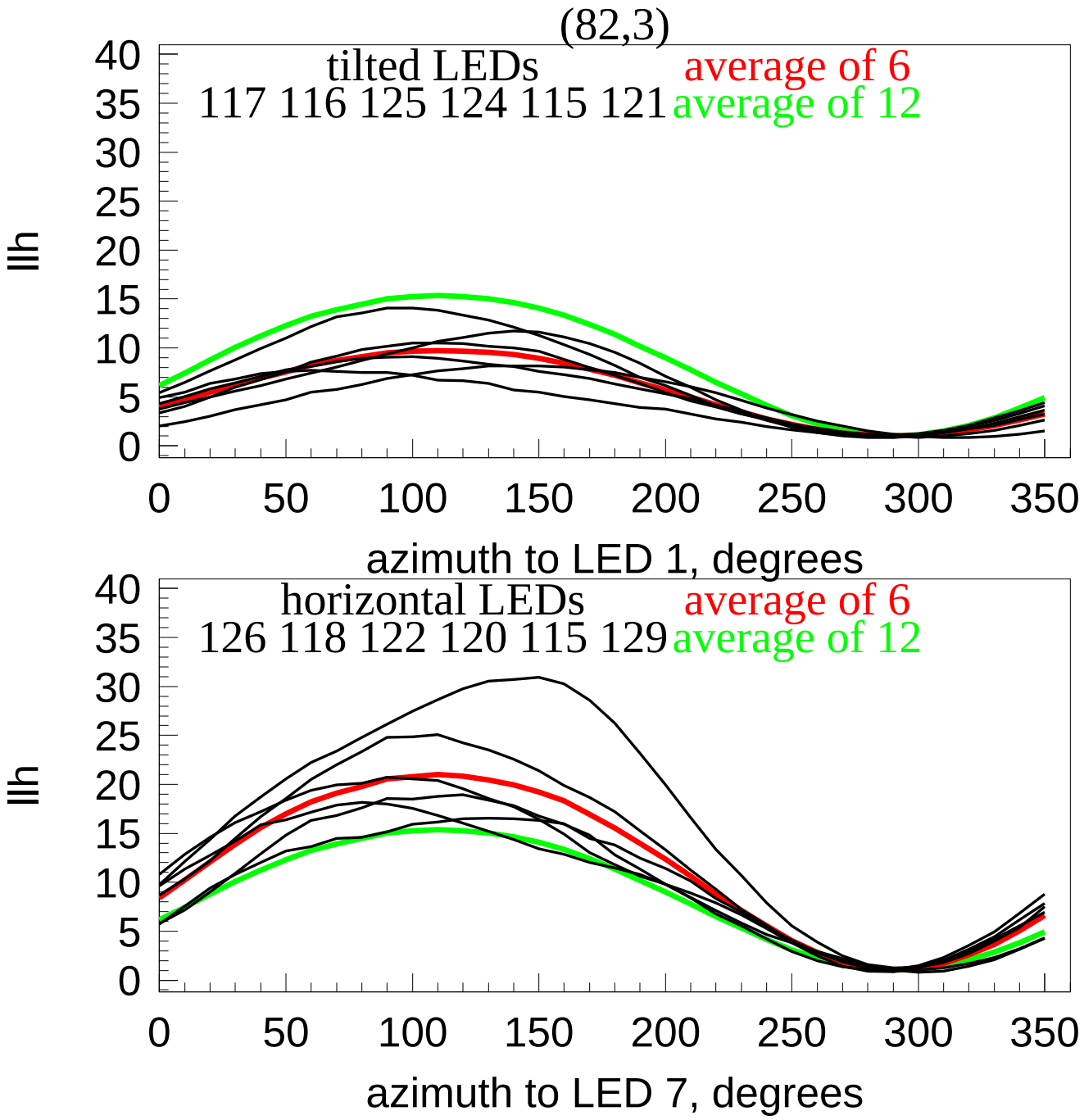

(81,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
354.9 ± 5.9

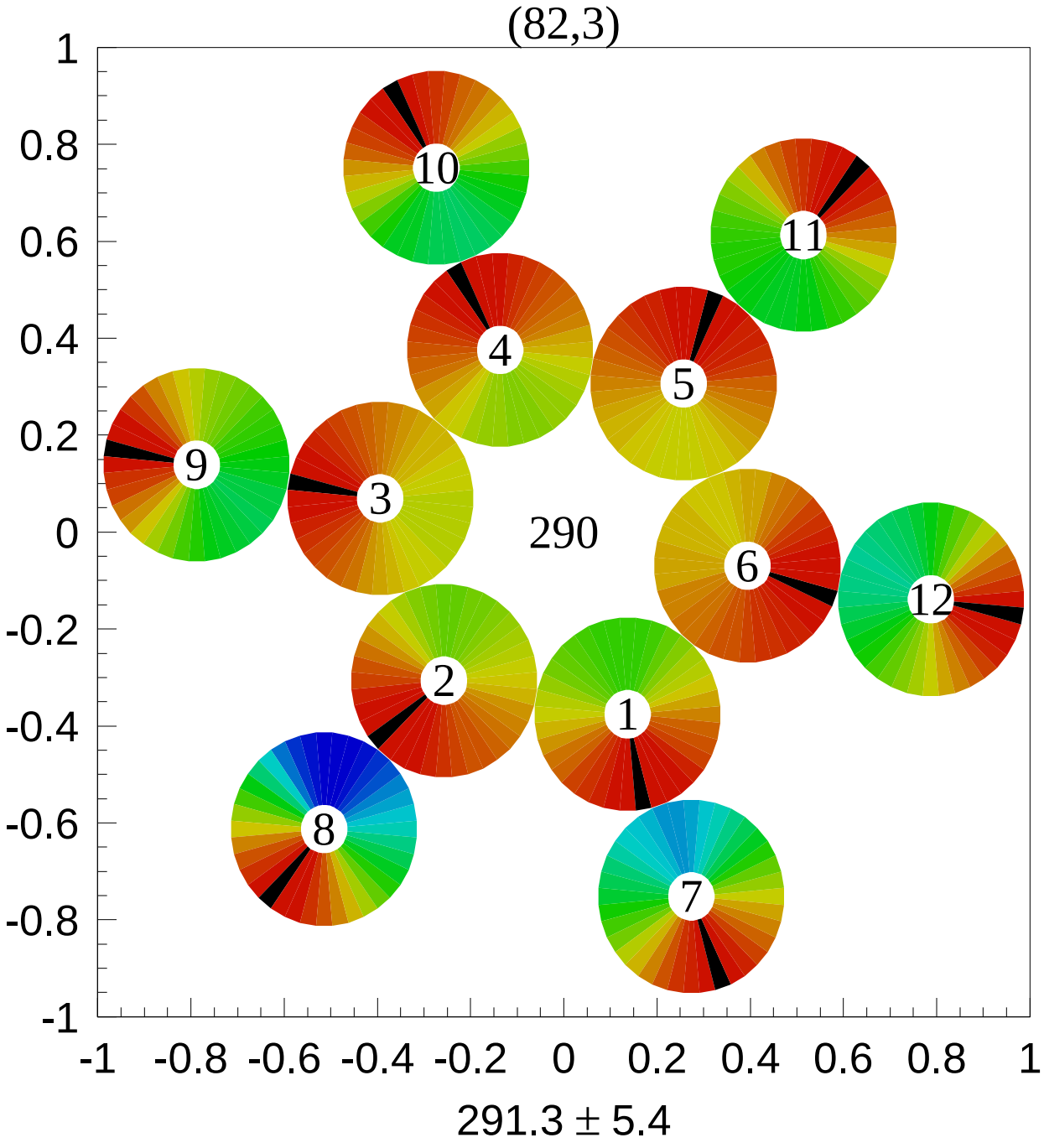

(82,1)
tilted LEDs
119 126 130 119 126 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 127 122 117 126 118
average of 6
average of 12
llh
azimuth to LED 7, degrees

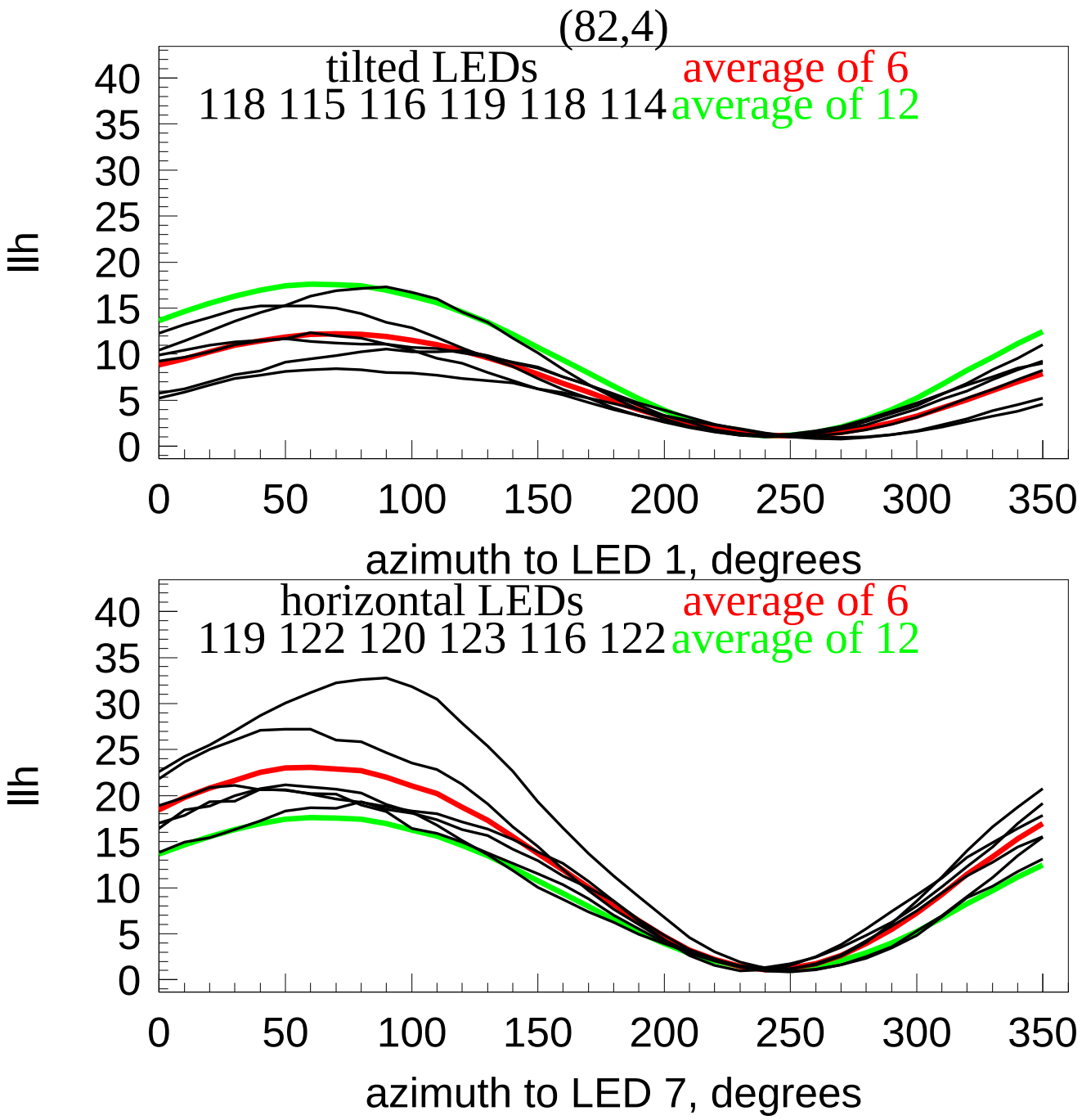

(82,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
139.7 ± 5.7

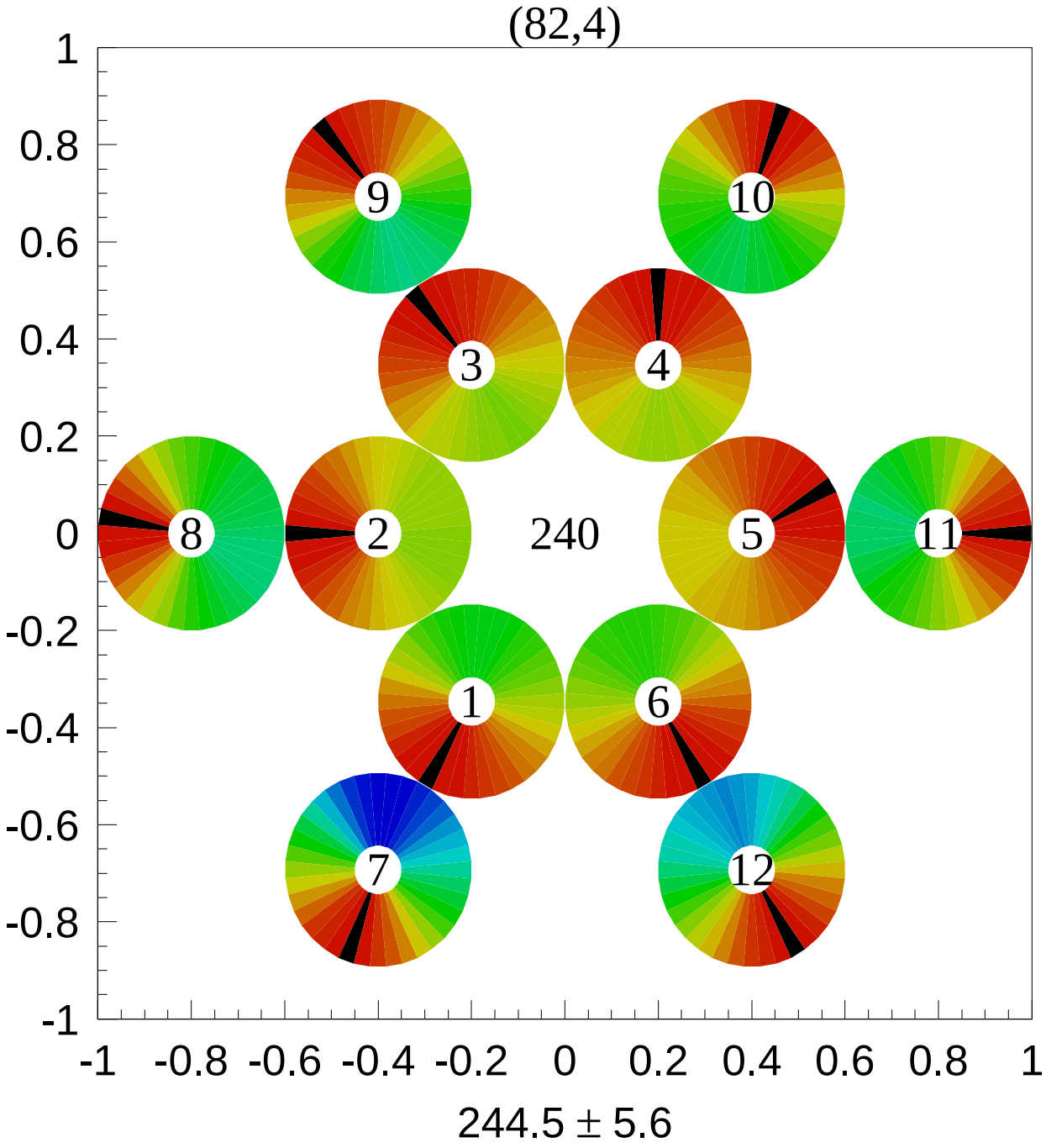

(82,2)
tilted LEDs
121 115 119 117 122 122
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
117 124 117 125 128 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

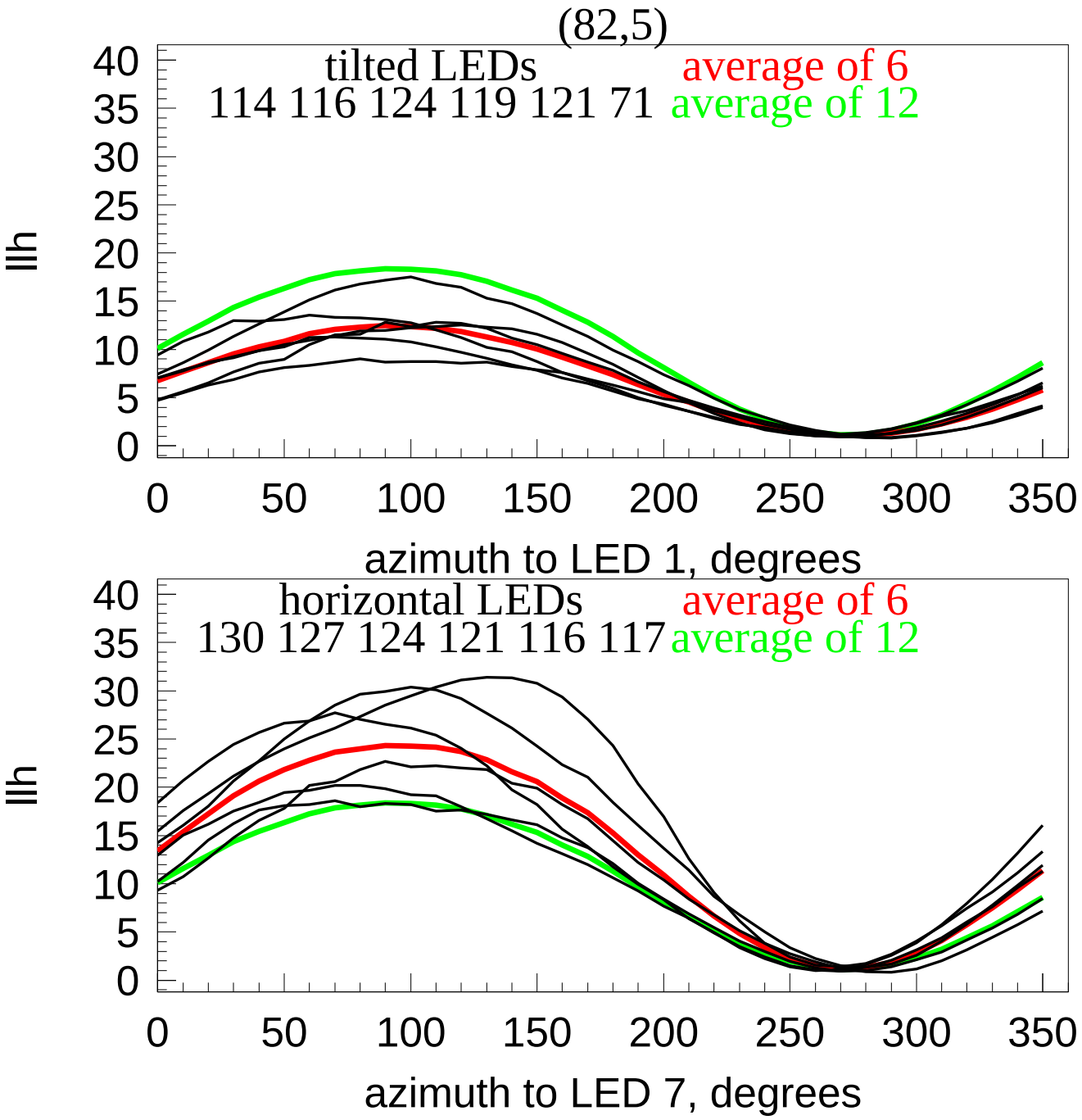

(82,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
7
2
1
9
3
140
6
12
4
5
10
11
139.9 ± 4.9

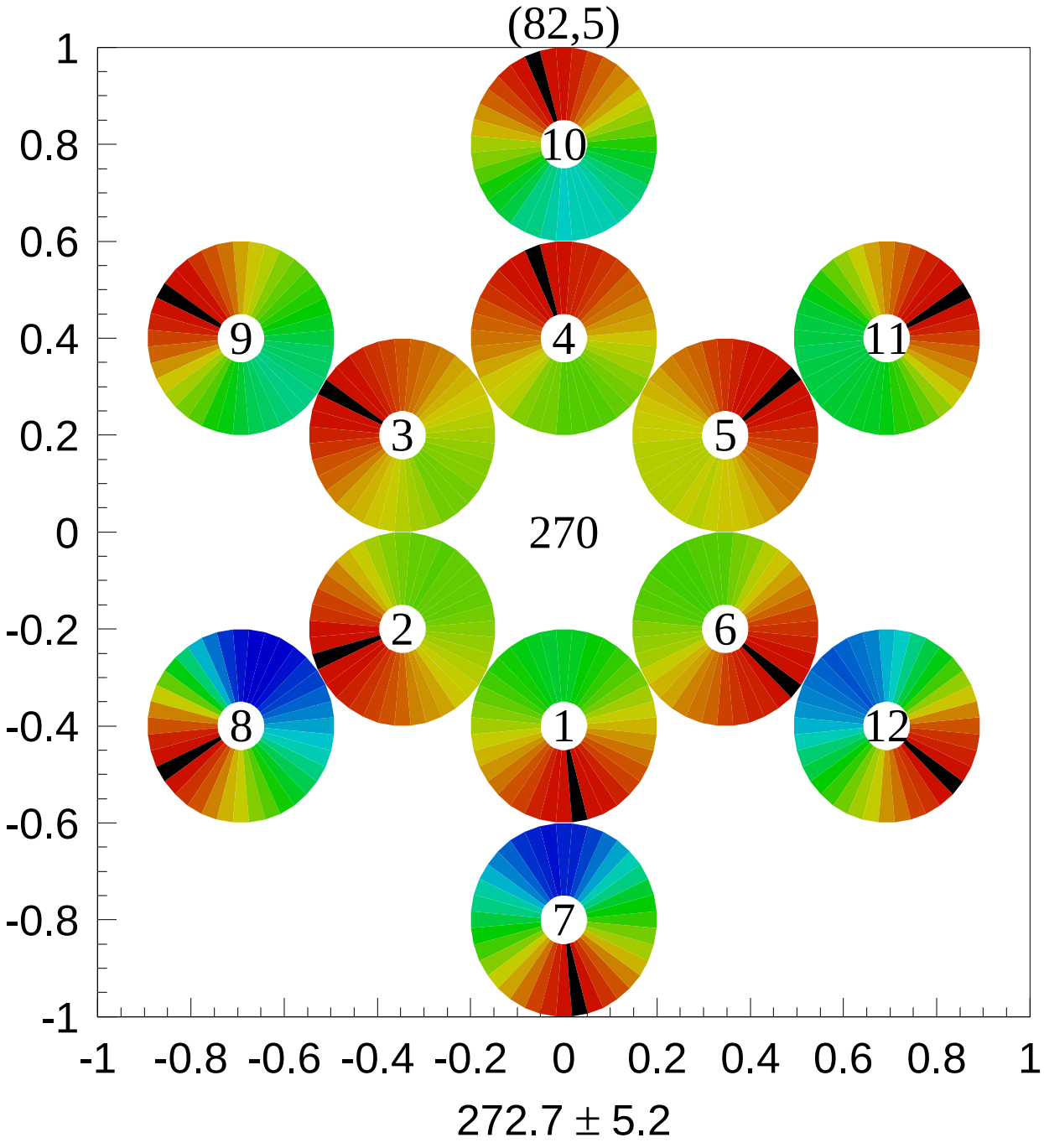

(82,3)
tilted LEDs
117 116 125 124 115 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
126 118 122 120 115 129
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

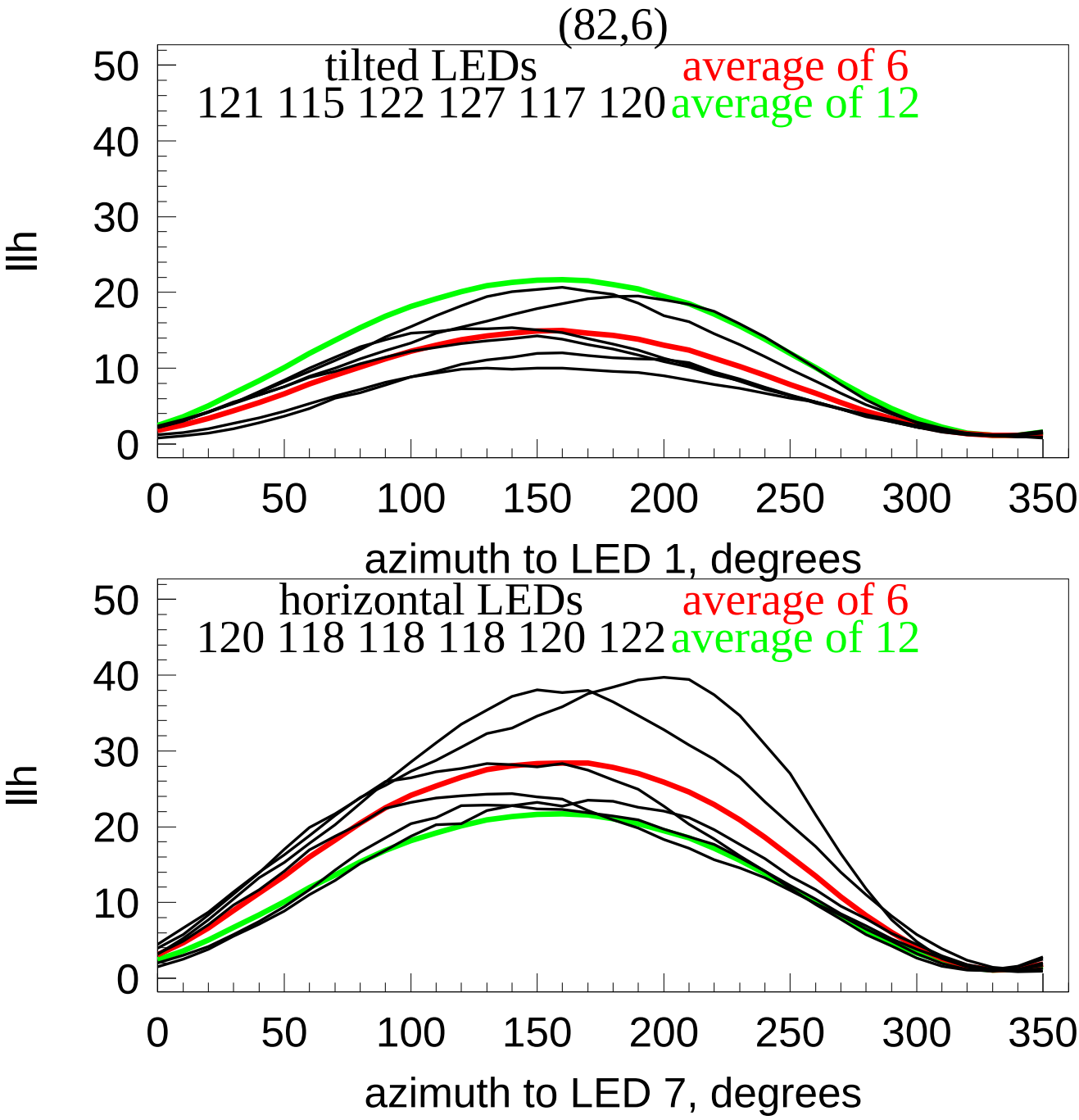

(82,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
291.3 ± 5.4

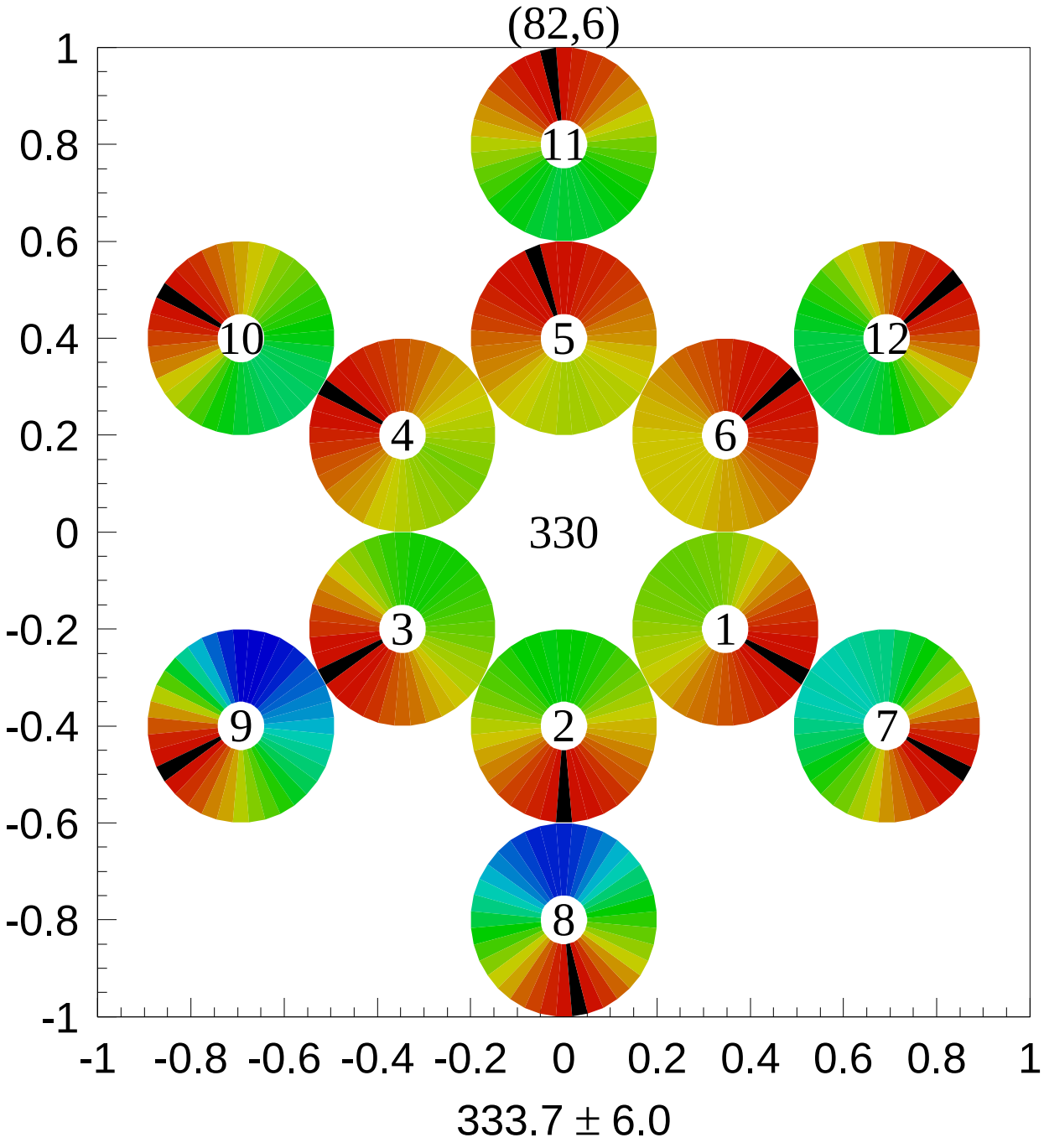

(82,4)
tilted LEDs
118 115 116 119 118 114
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 122 120 123 116 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

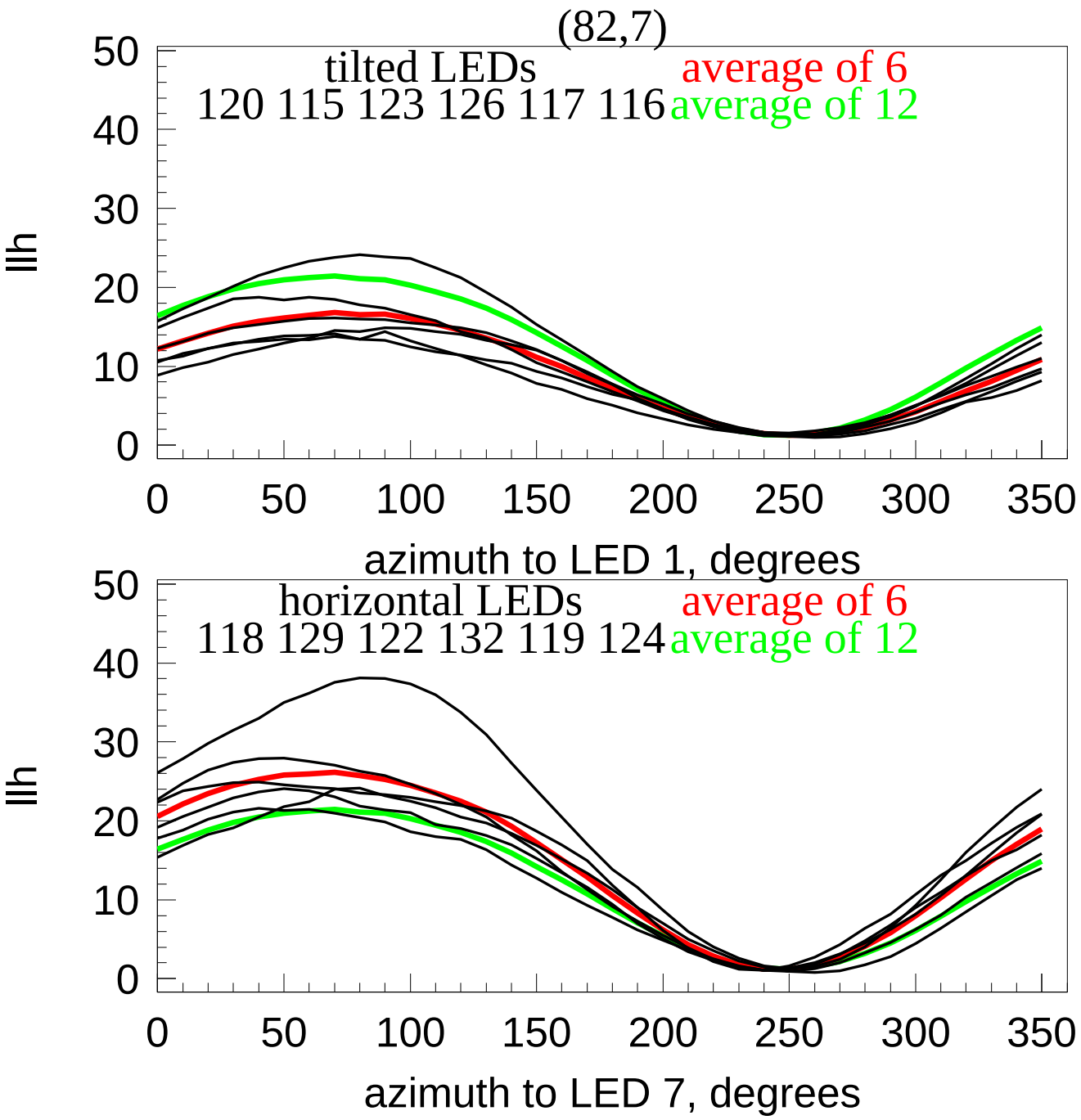

(82,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
244.5 ± 5.6

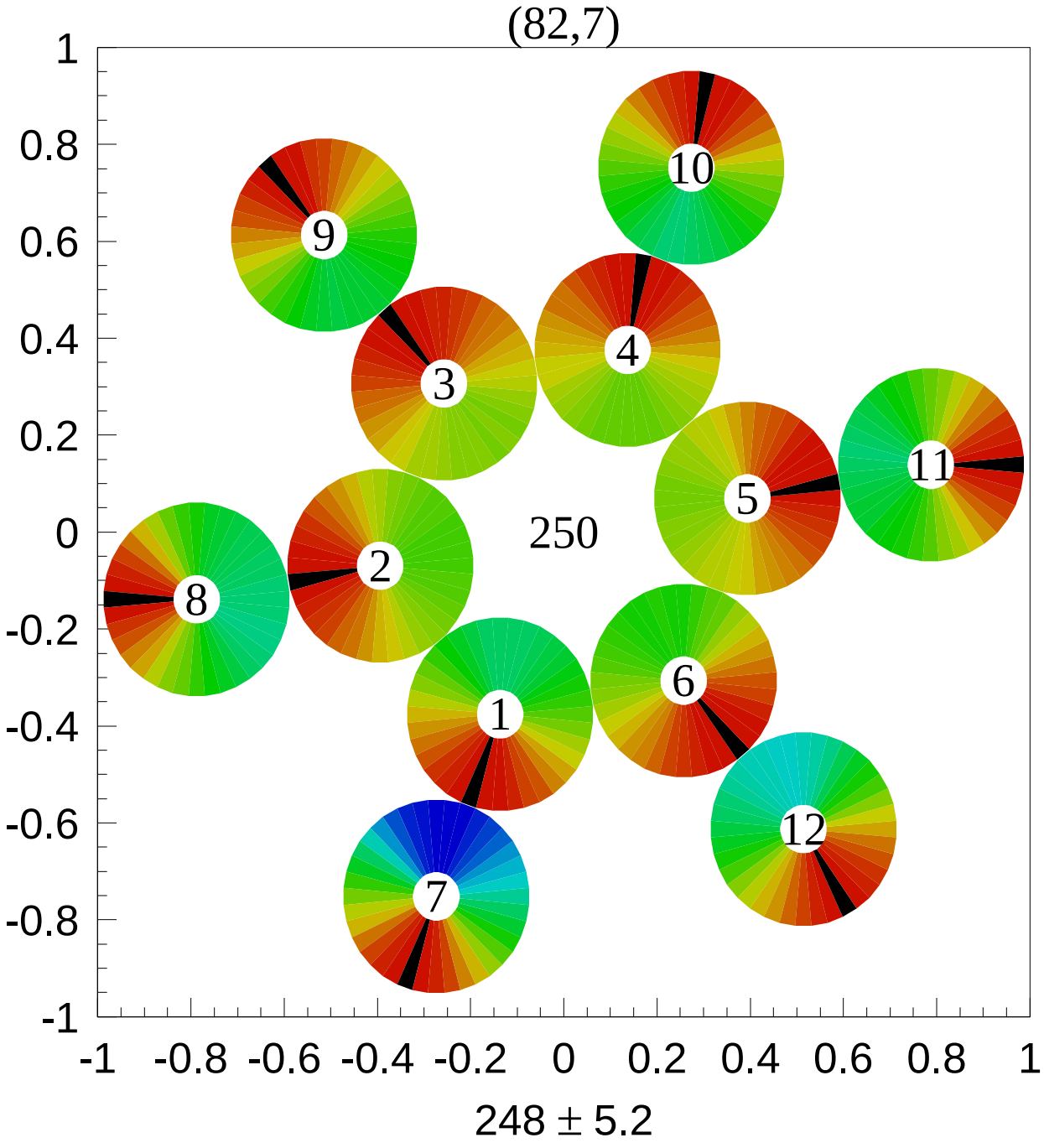

(82,5)
tilted LEDs
114 116 124 119 121 71
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
130 127 124 121 116 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

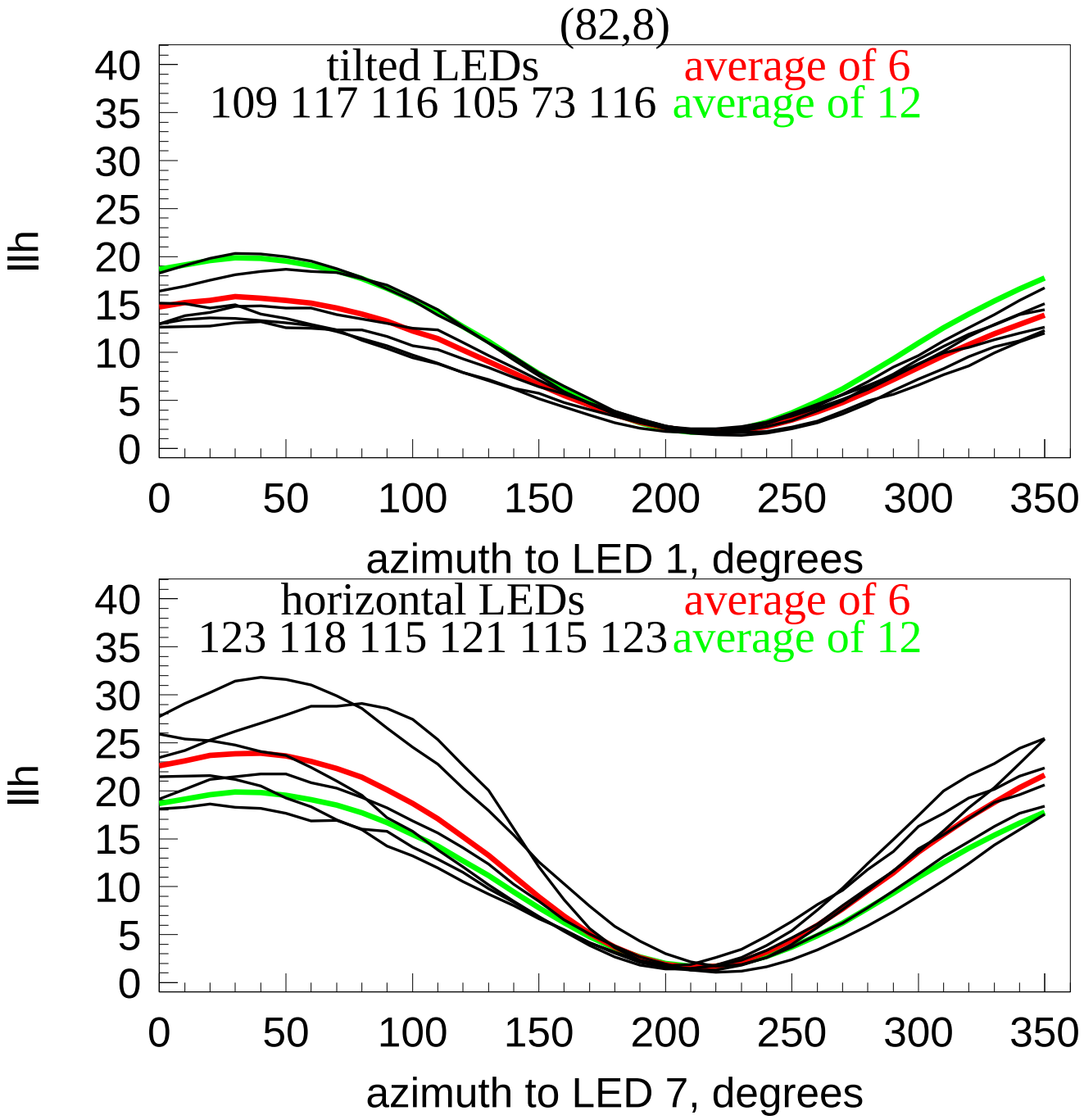

(82,5)
10
9
4
11
3
5
270
2
6
8
1
12
7
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
272.7 ± 5.2

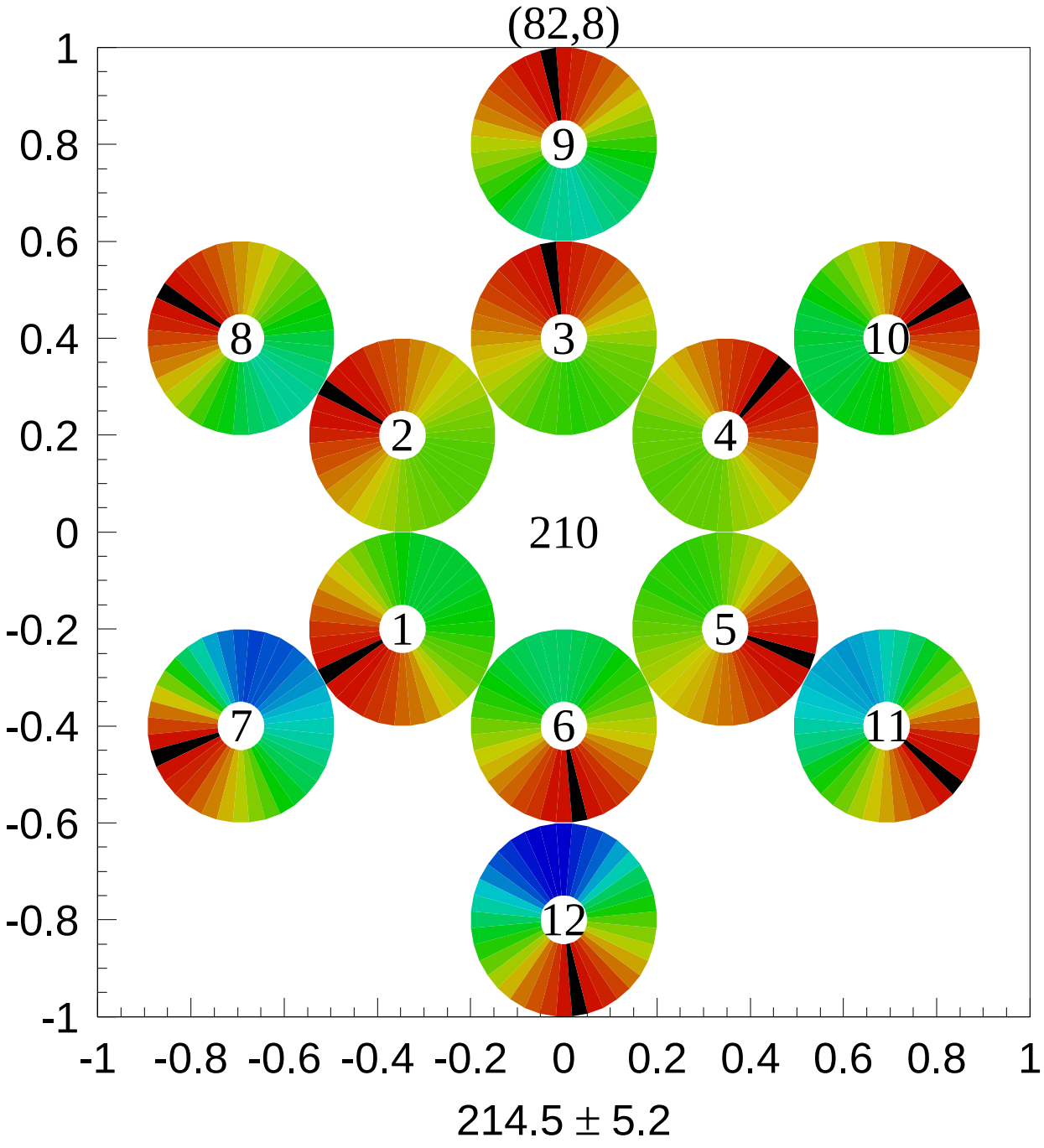

(82,6)
tilted LEDs
121 115 122 127 117 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 118 118 118 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

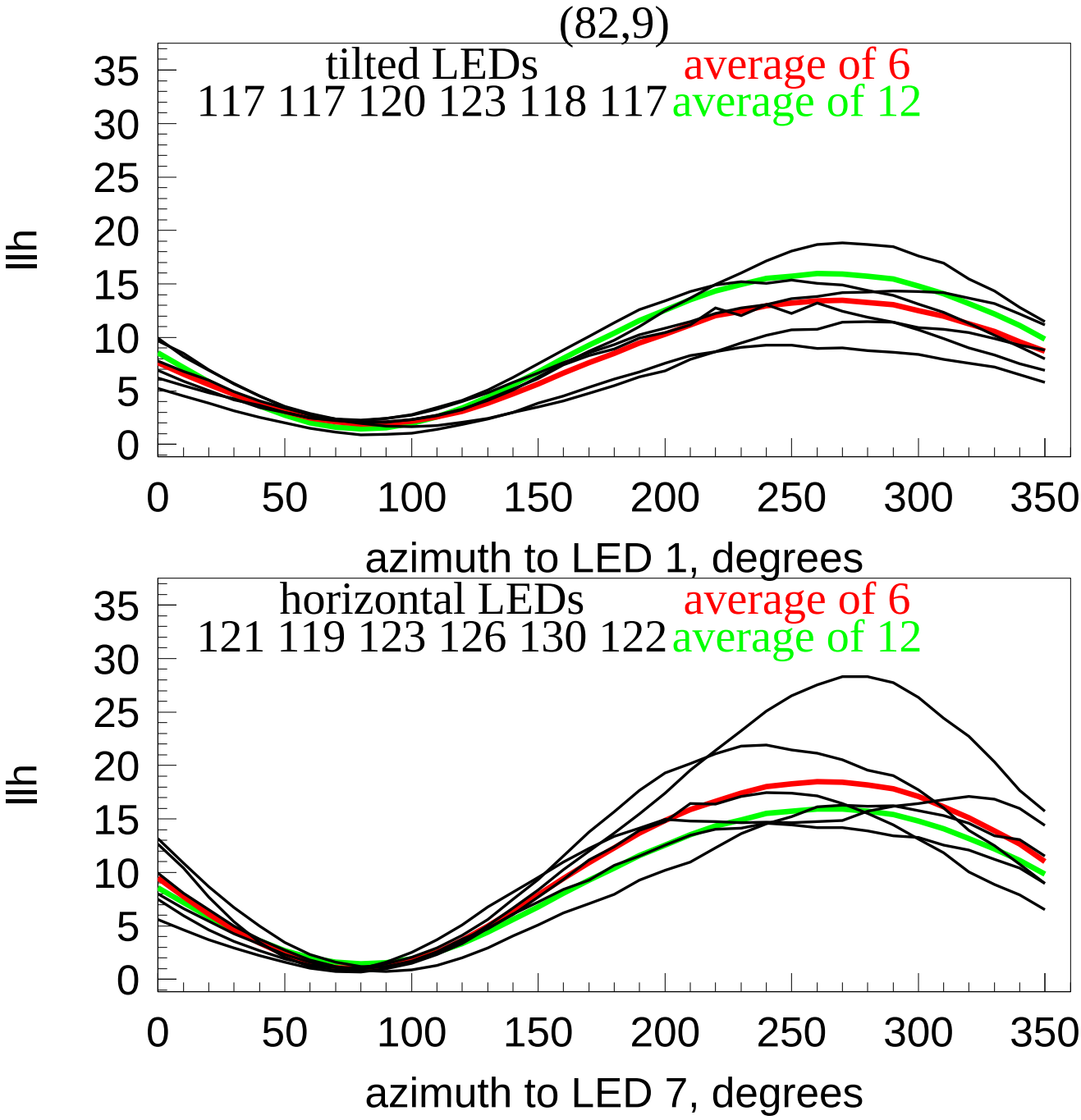

(82,6)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
333.7 ± 6.0

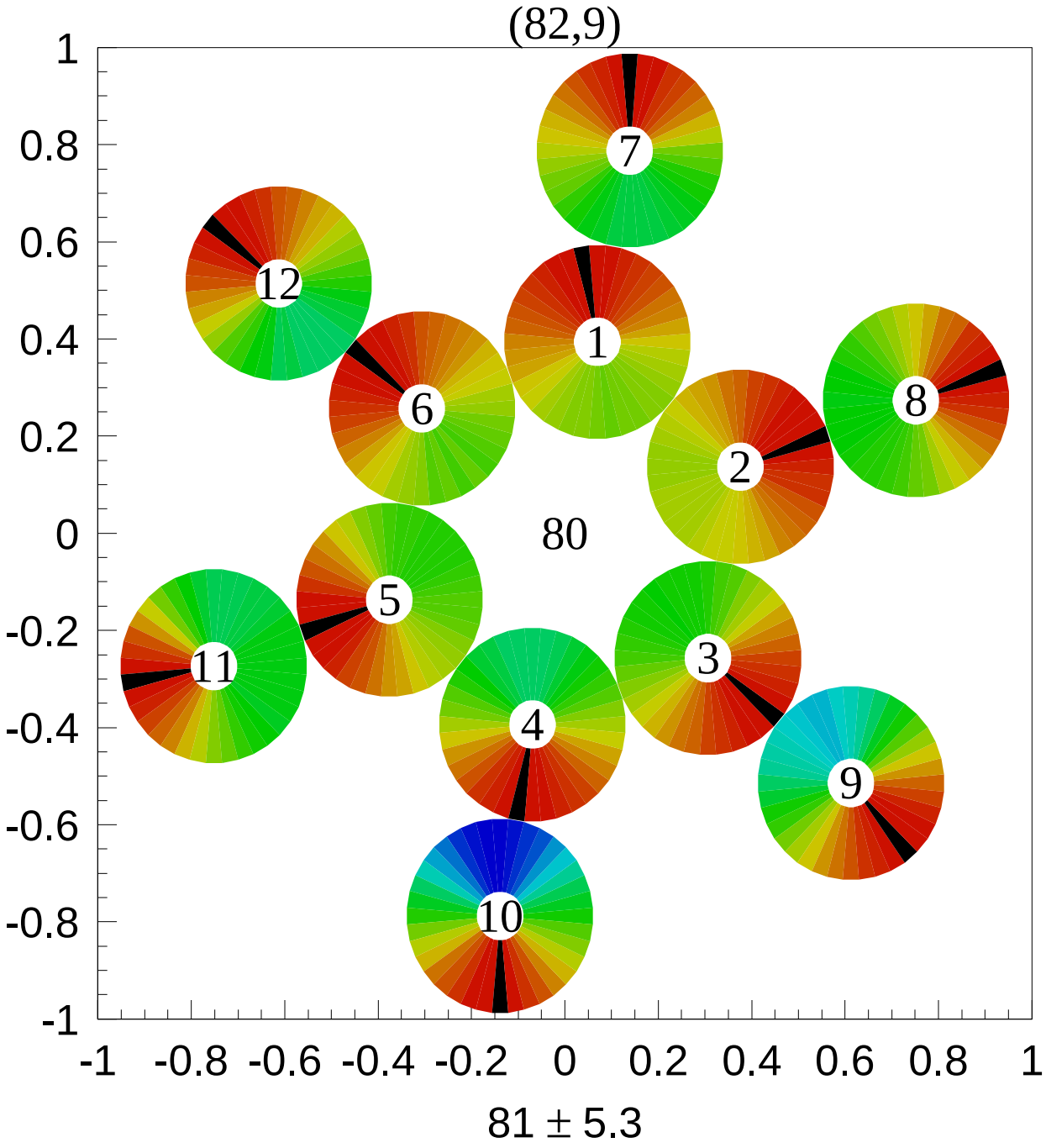

(82,7)
tilted LEDs
120 115 123 126 117 116
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 129 122 132 119 124
average of 6
average of 12
llh
azimuth to LED 7, degrees

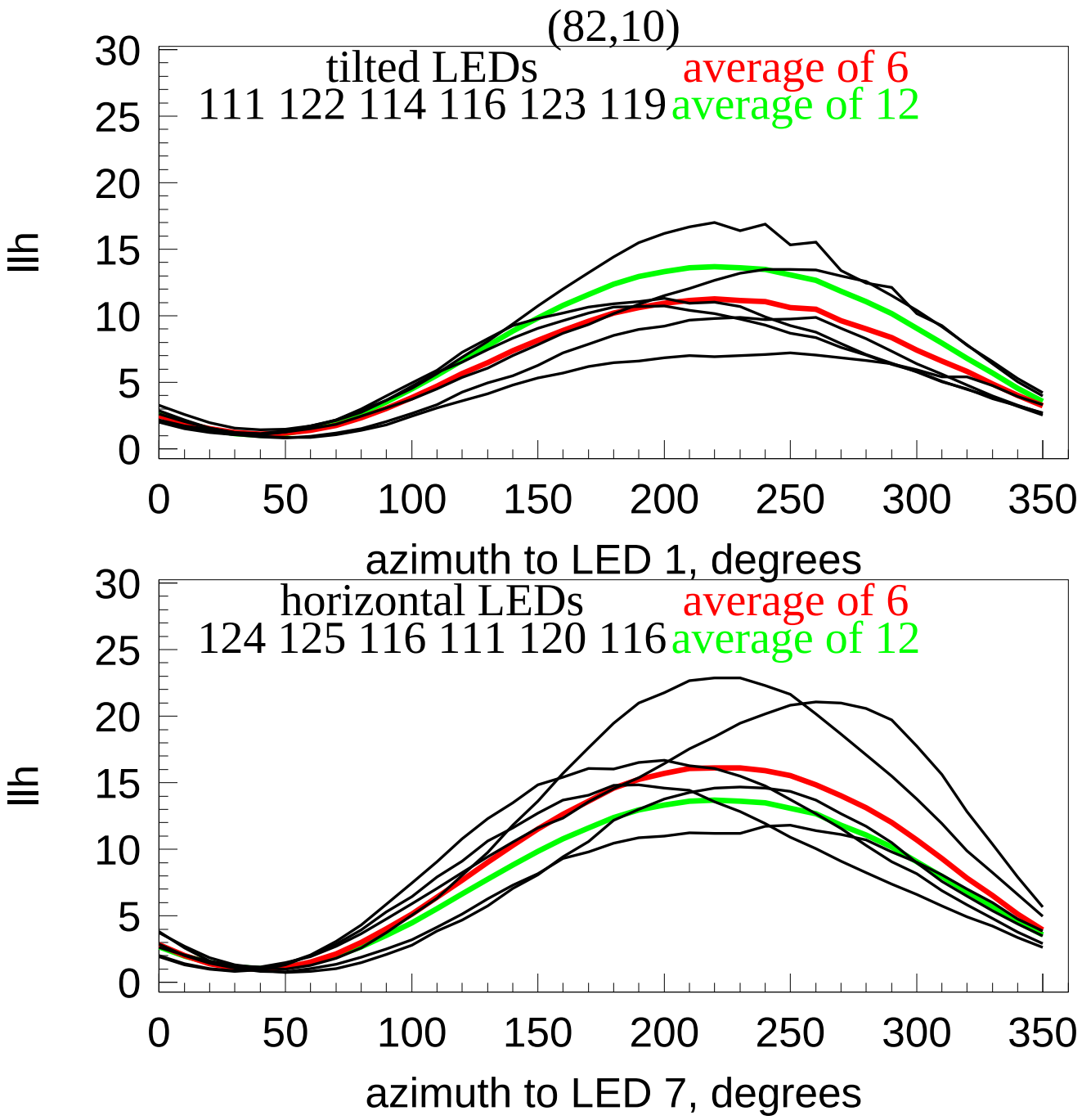

(82,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
9
4
3
11
5
250
2
8
6
1
12
7
248 ± 5.2

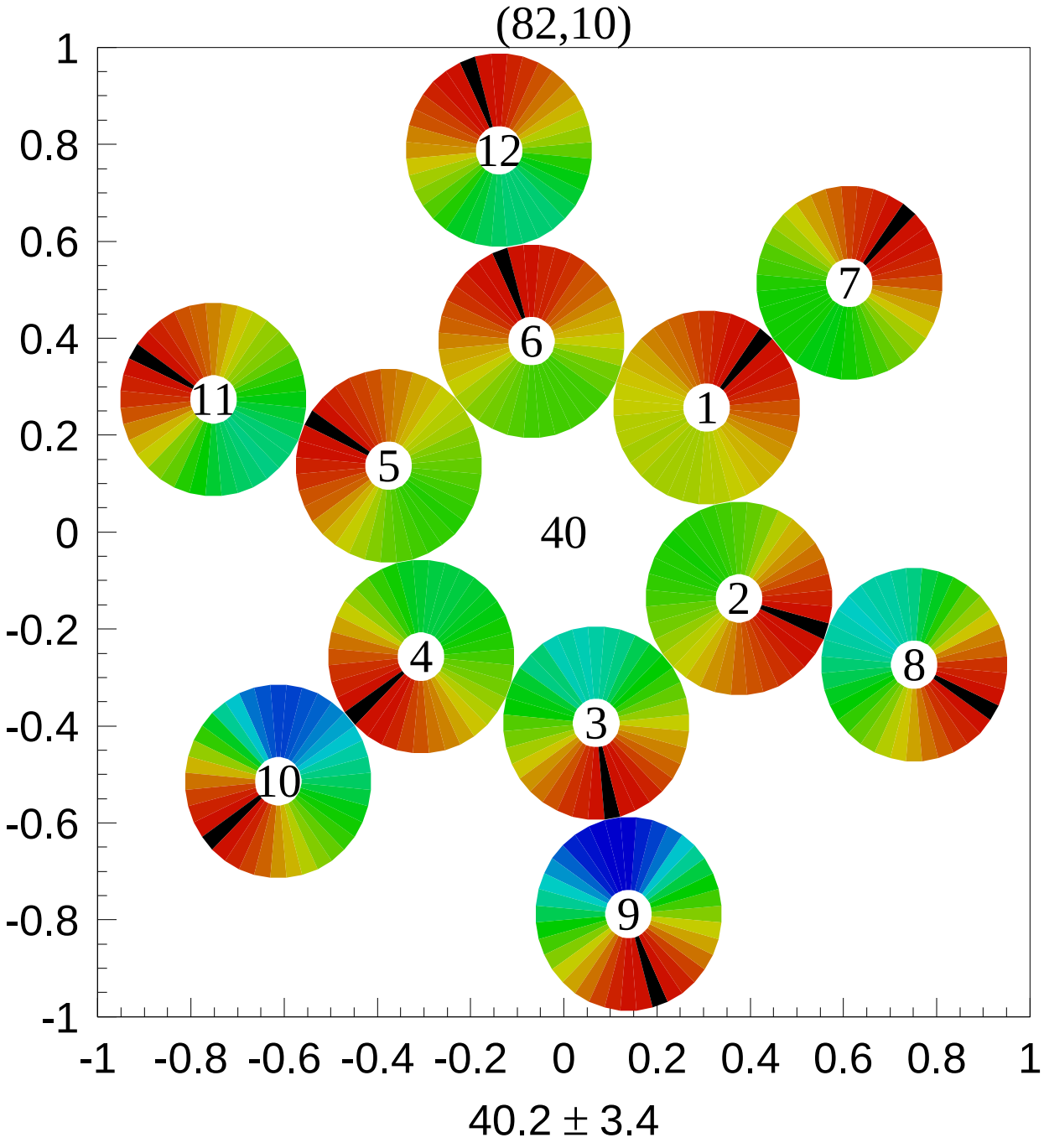

(82,8)
tilted LEDs
109 117 116 105 73 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 118 115 121 115 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

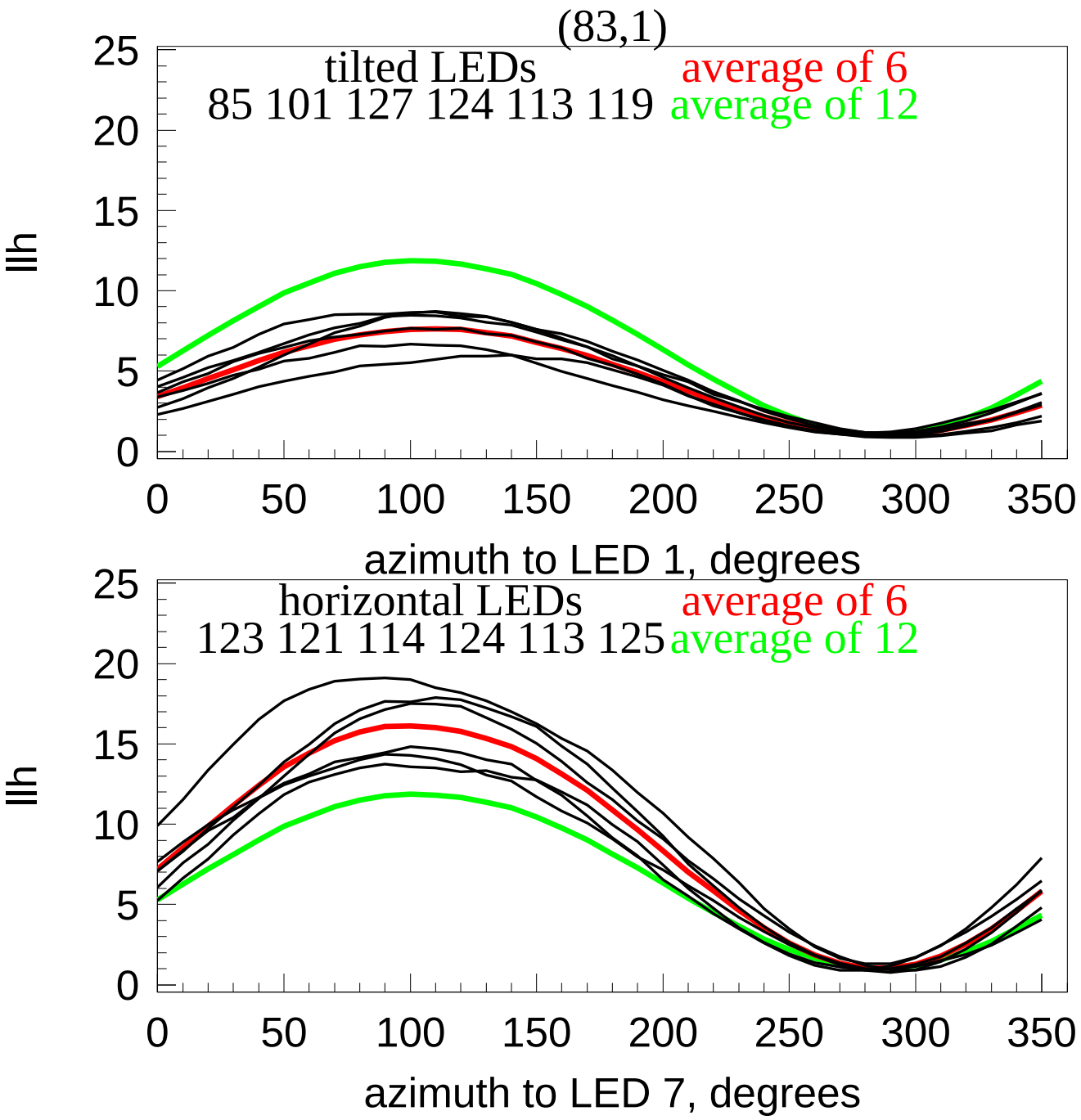

(82,8)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
214.5 ± 5.2

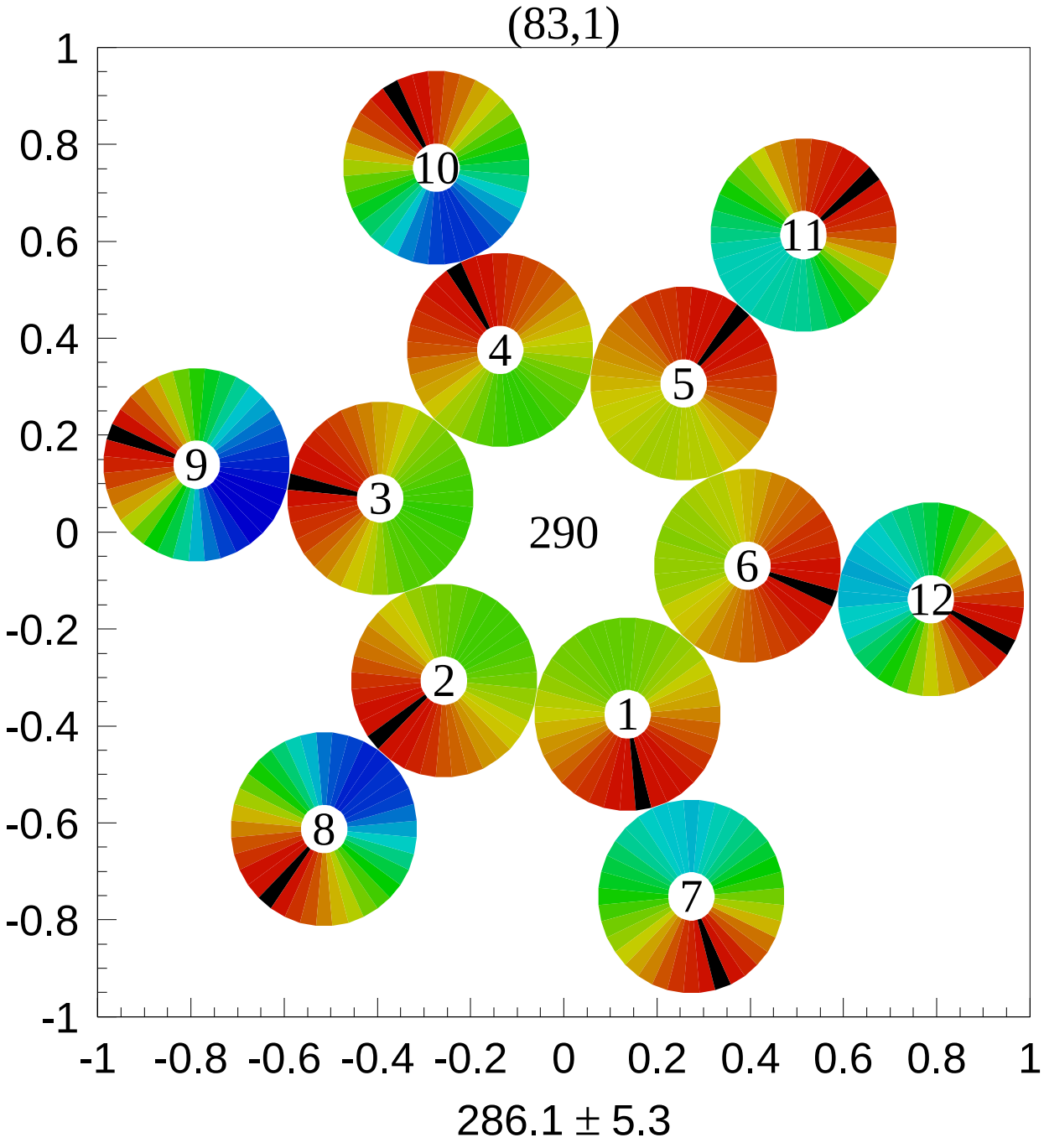

(82,9)
tilted LEDs
117 117 120 123 118 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 119 123 126 130 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

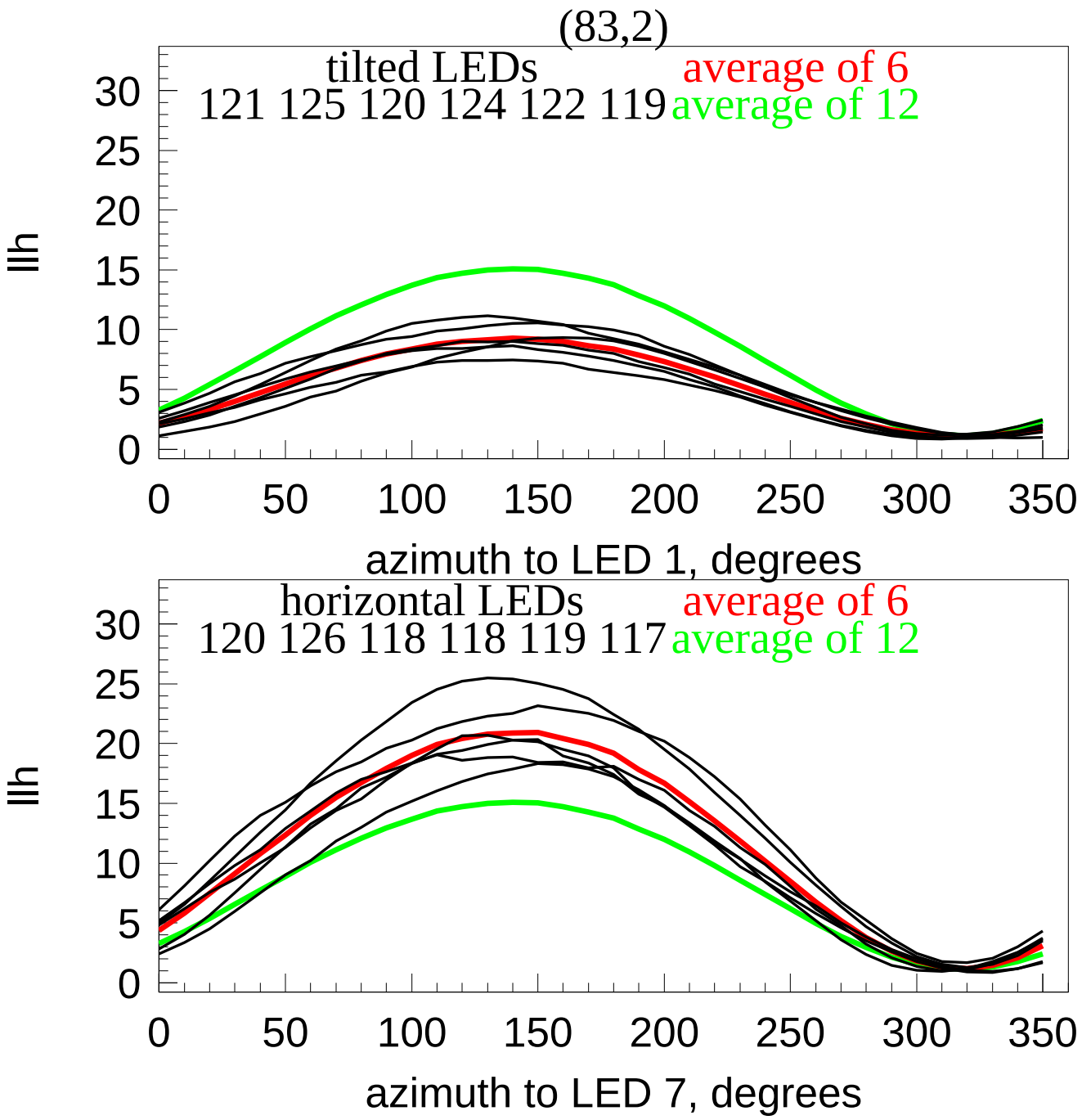

(82,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
7
12
1
6
8
2
80
5
11
3
4
9
10
81 ± 5.3

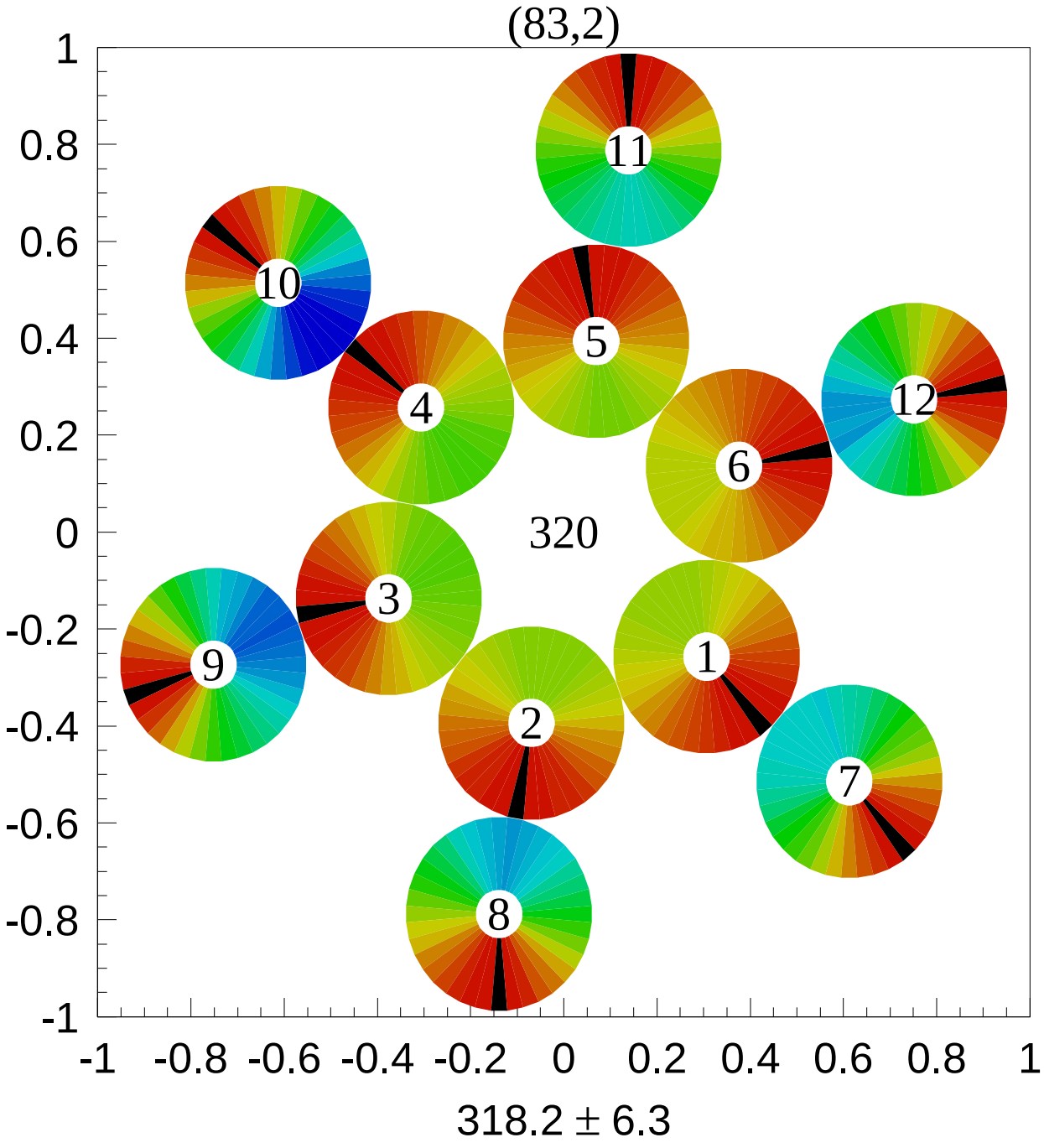

(82,10)
tilted LEDs
111 122 114 116 123 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
124 125 116 111 120 116
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

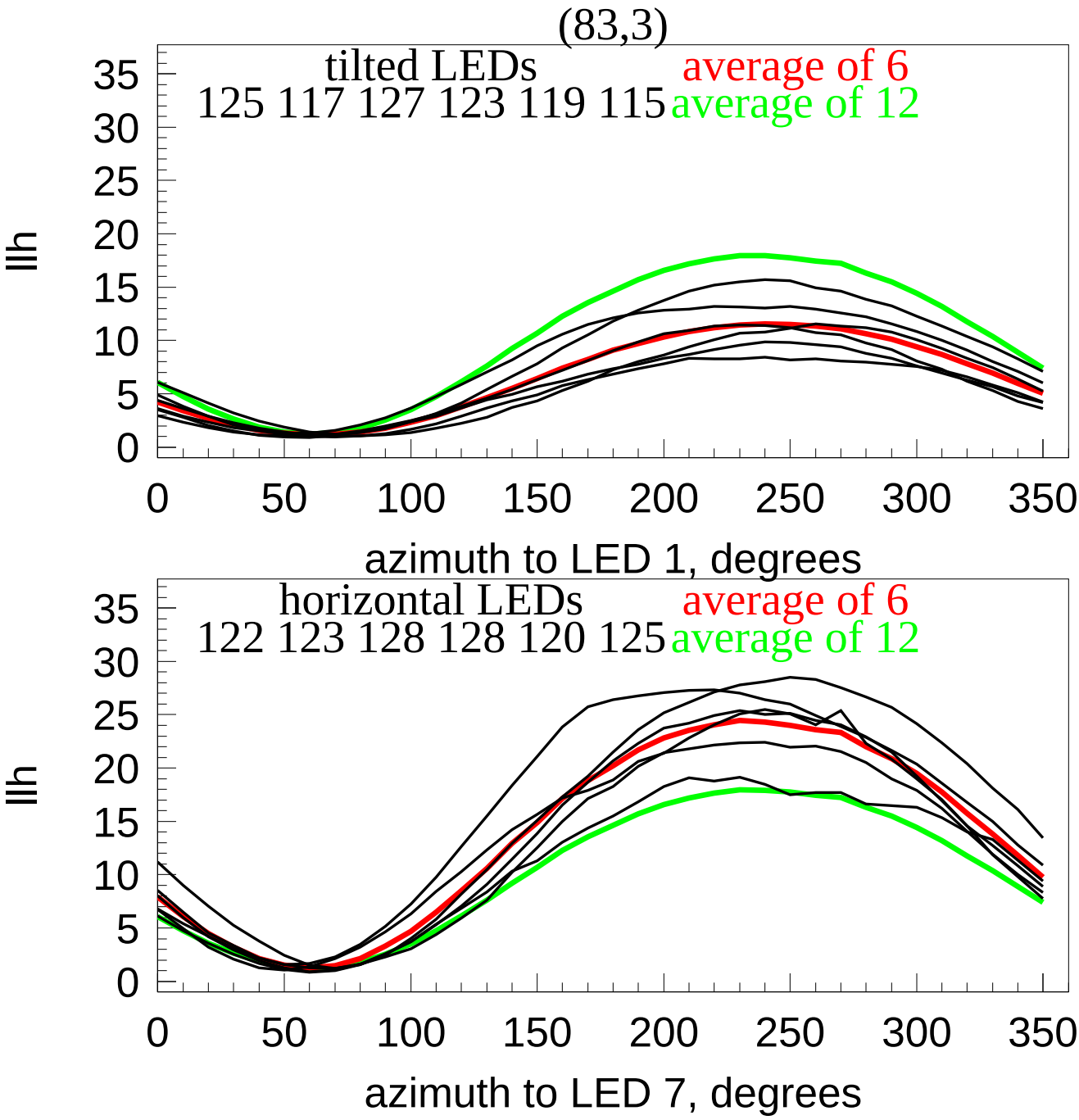

(82,10)
12
7
6
11
1
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
40.2 ± 3.4

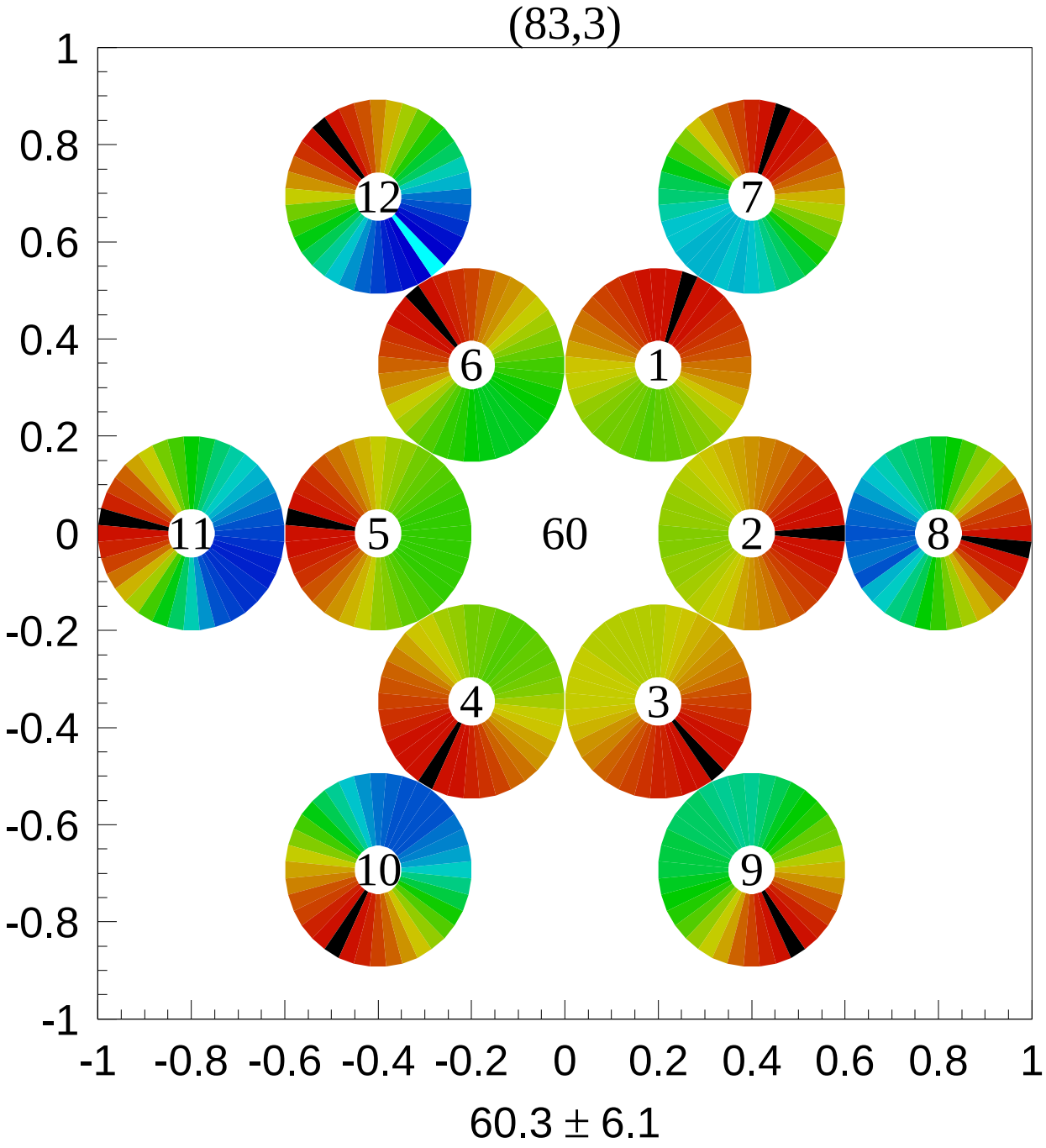

(83,1)
tilted LEDs
85 101 127 124 113 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 121 114 124 113 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

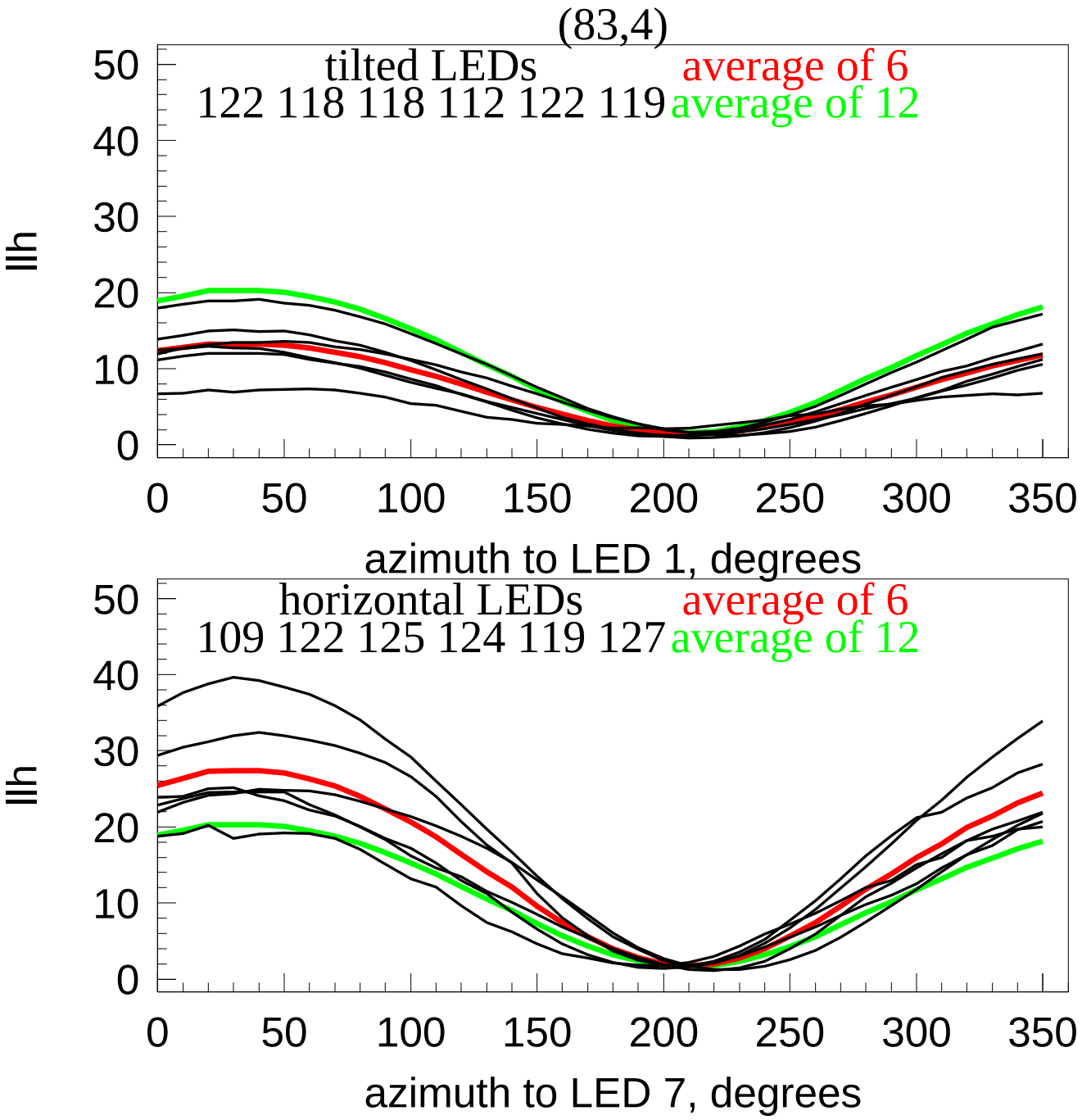

(83,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
286.1 ± 5.3

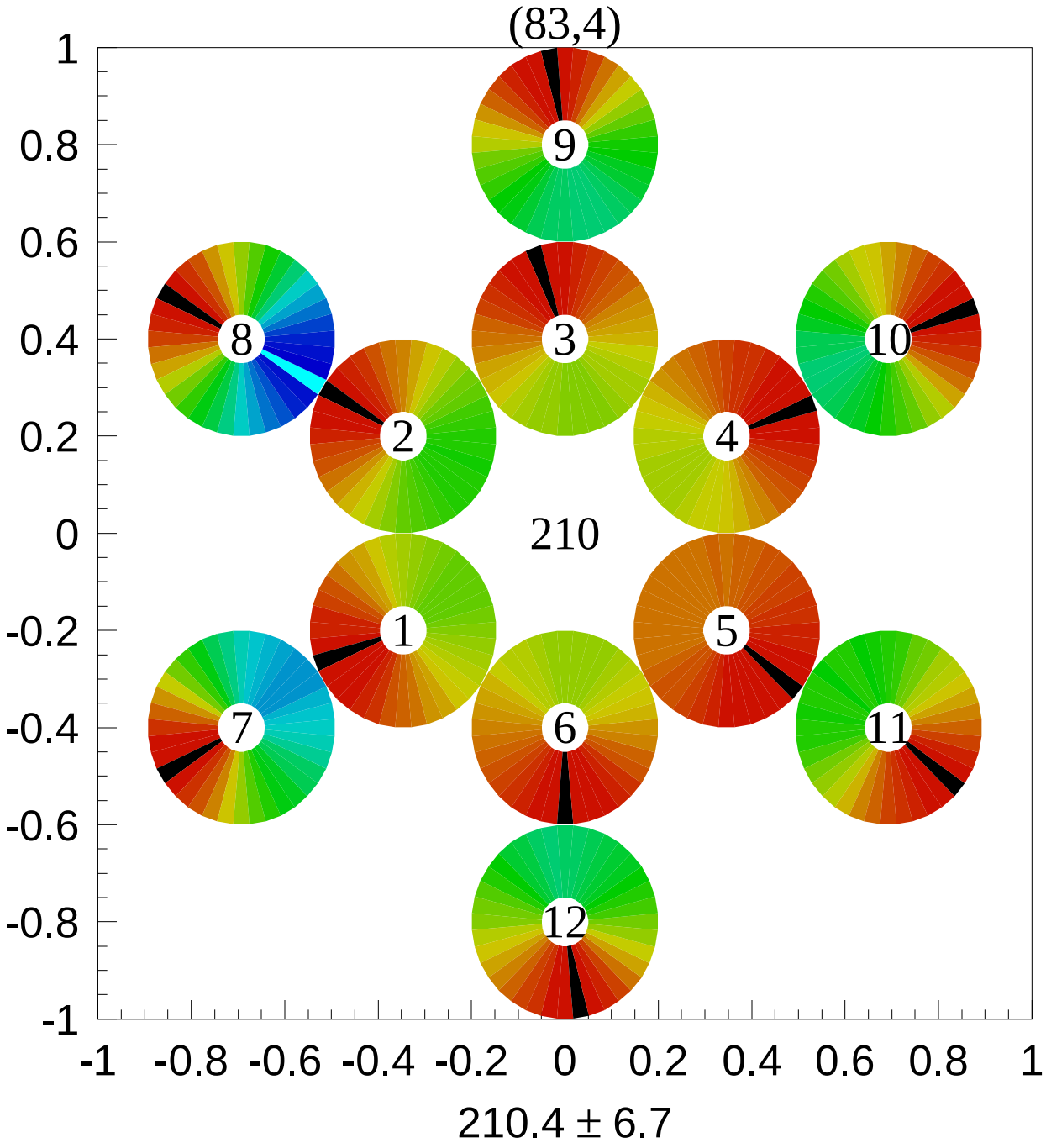

(83,2)
tilted LEDs
121 125 120 124 122 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 126 118 118 119 117
average of 6
average of 12
llh
azimuth to LED 7, degrees

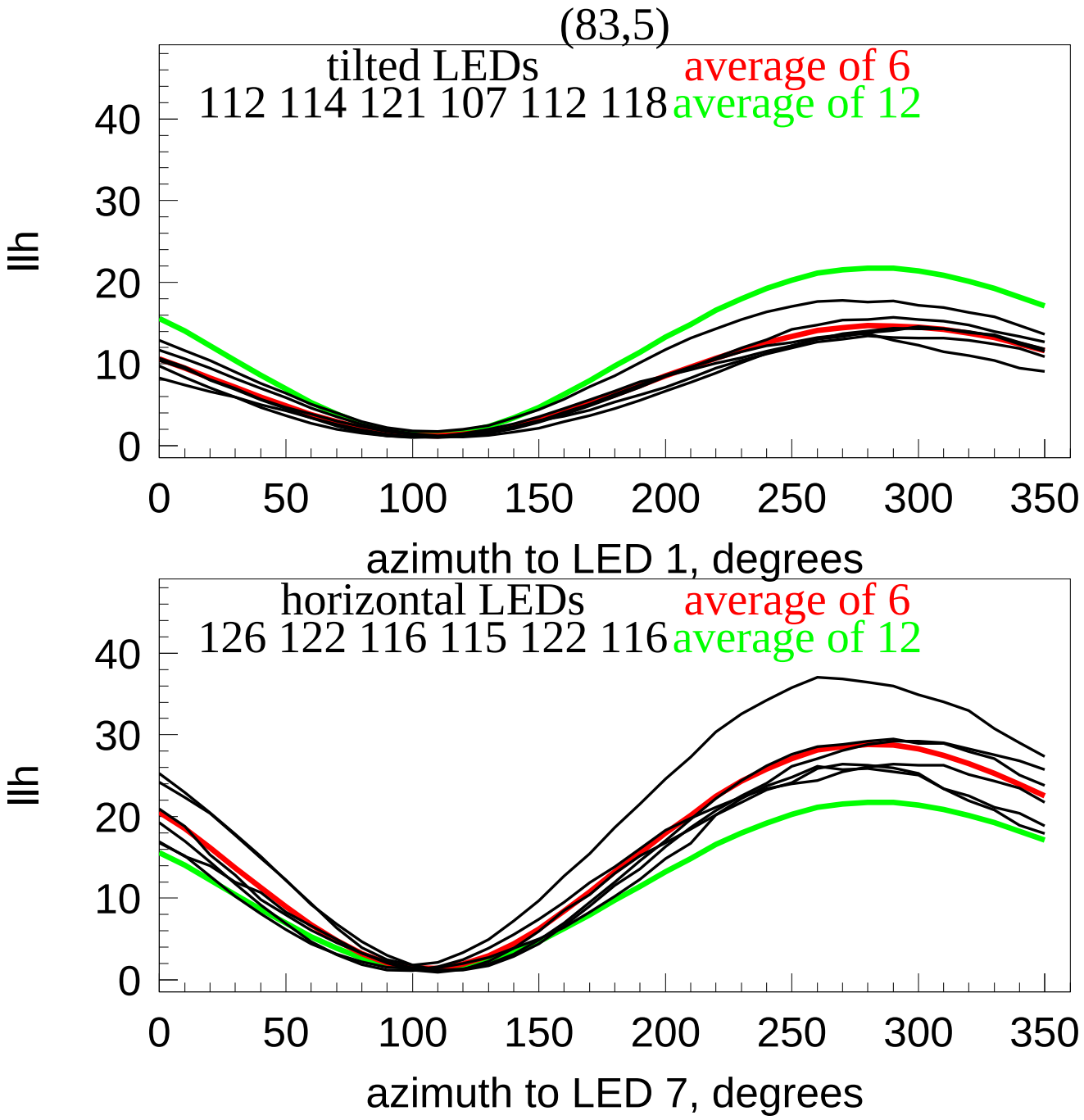

(83,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
10
5
4
12
6
320
3
9
1
2
7
8
318.2 ± 6.3

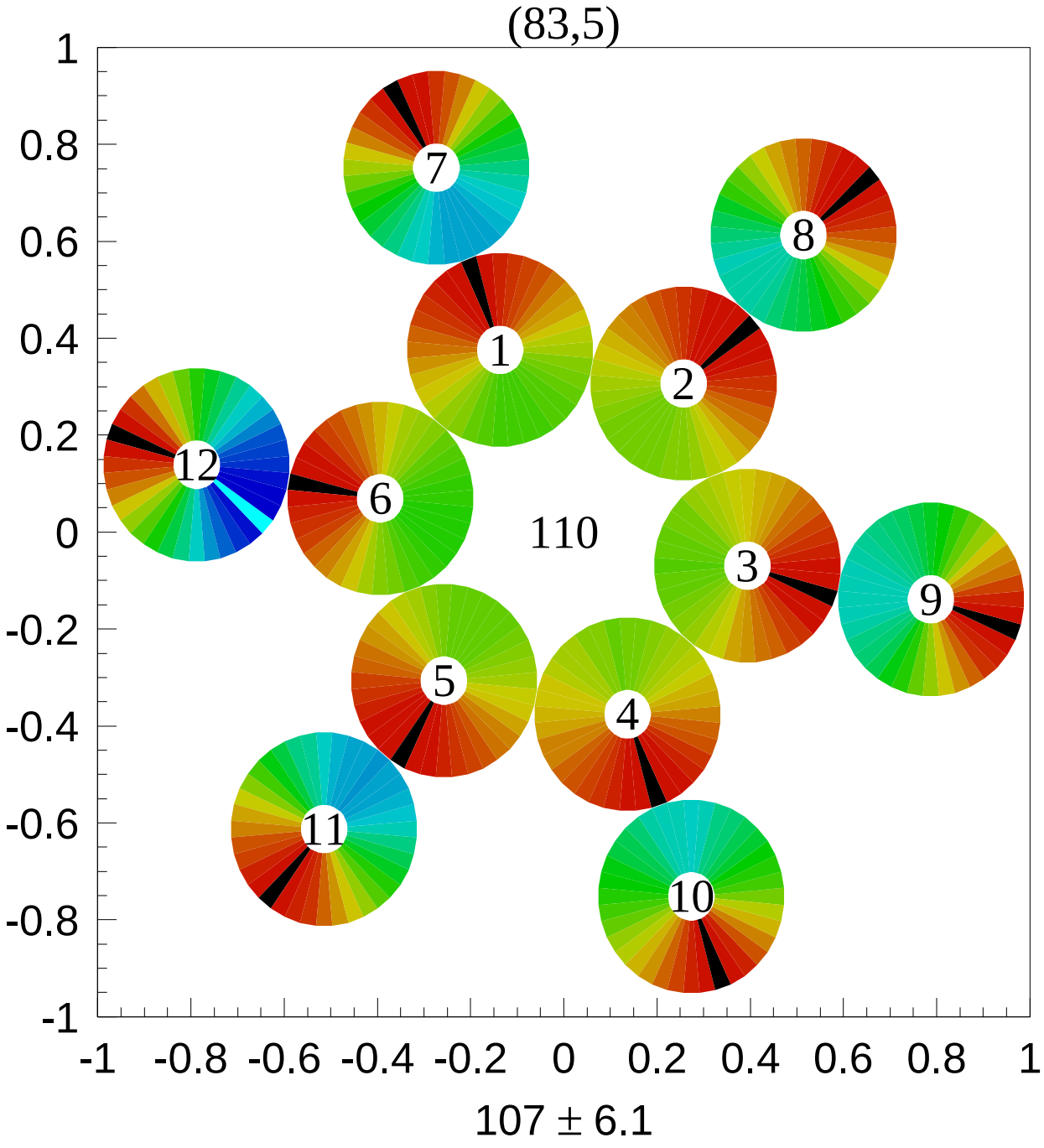

(83,3)
tilted LEDs
125 117 127 123 119 115
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 123 128 128 120 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

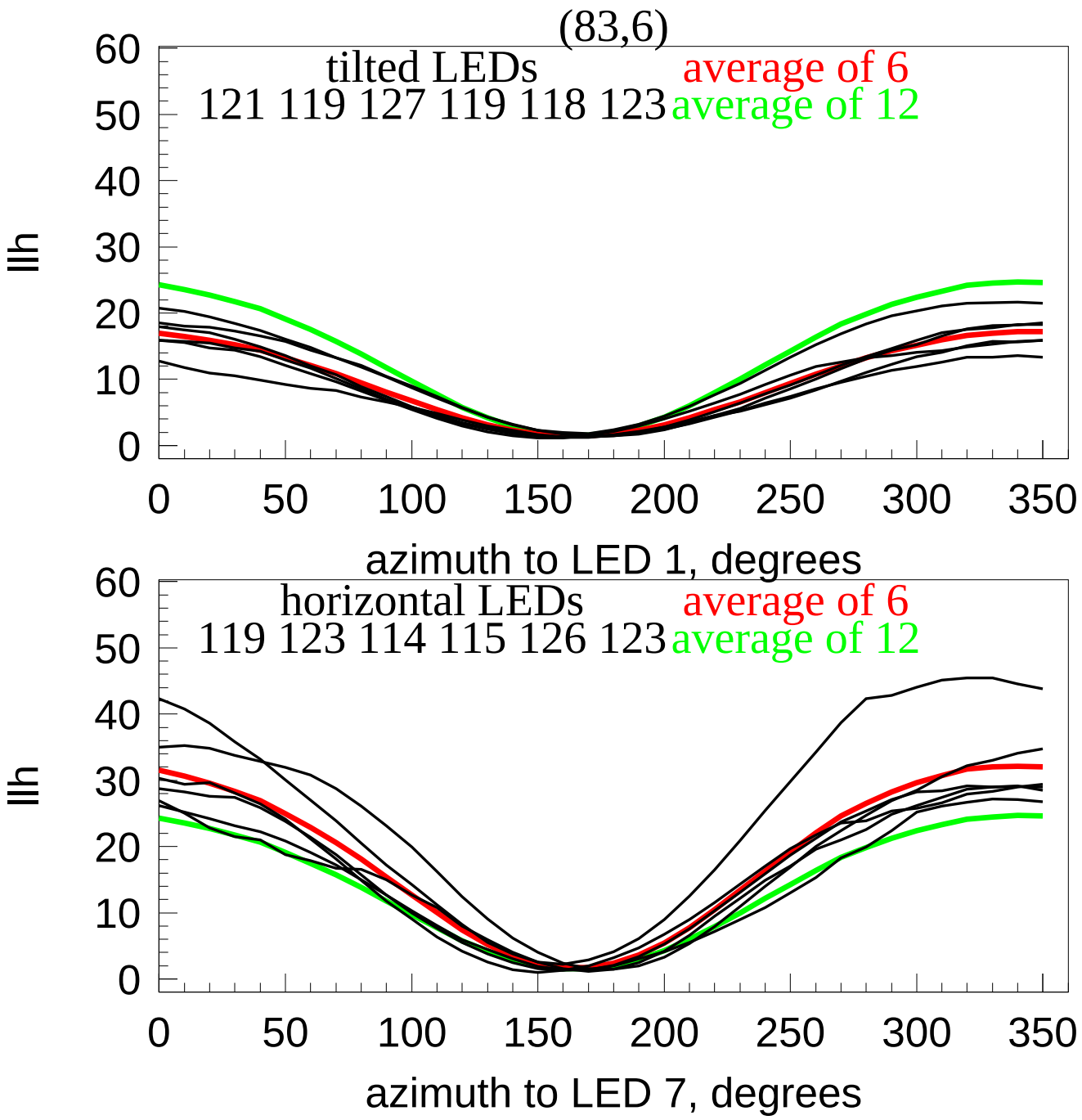

(83,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
60.3 ± 6.1

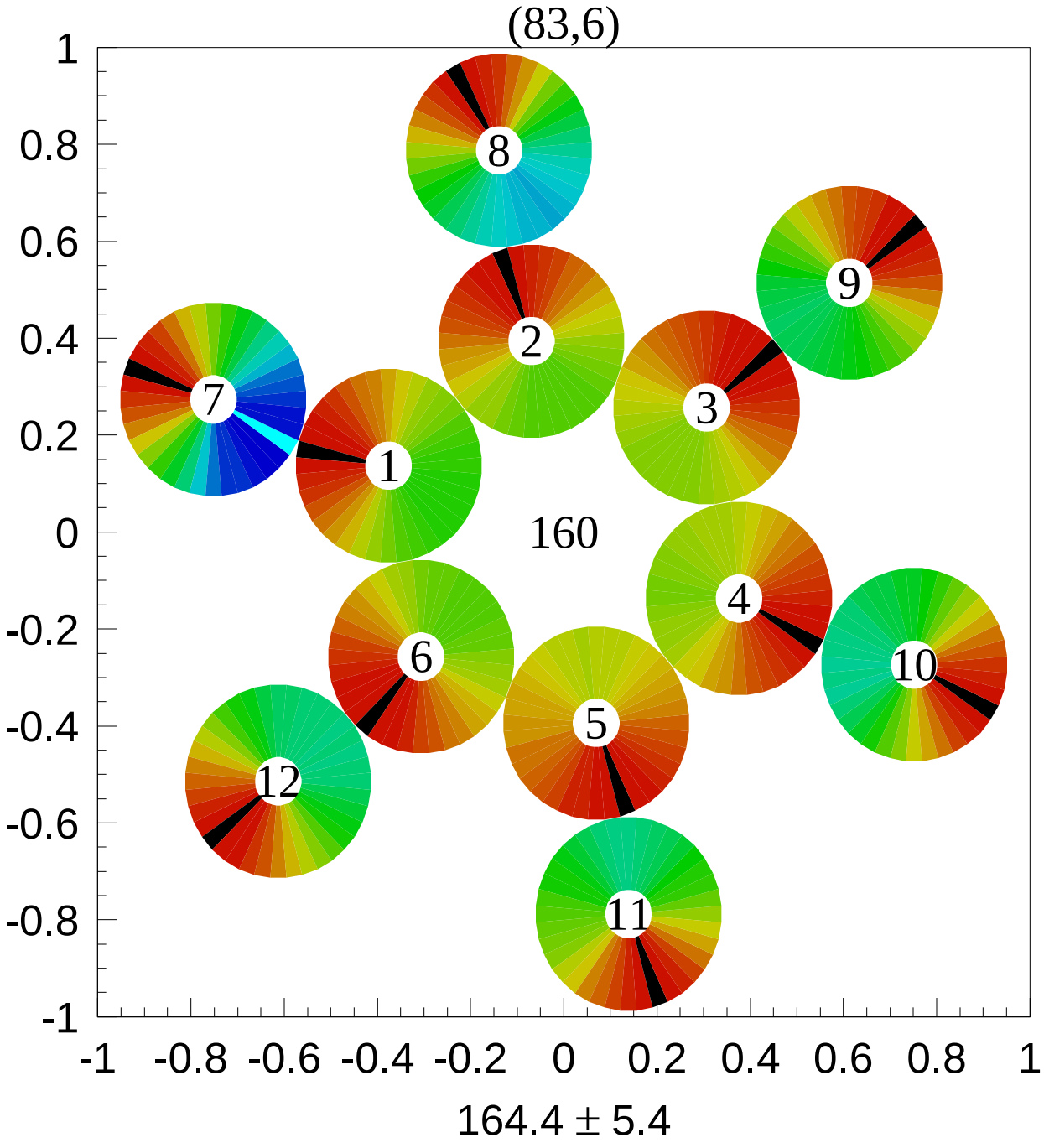

(83,4)
tilted LEDs
122 118 118 112 122 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
109 122 125 124 119 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

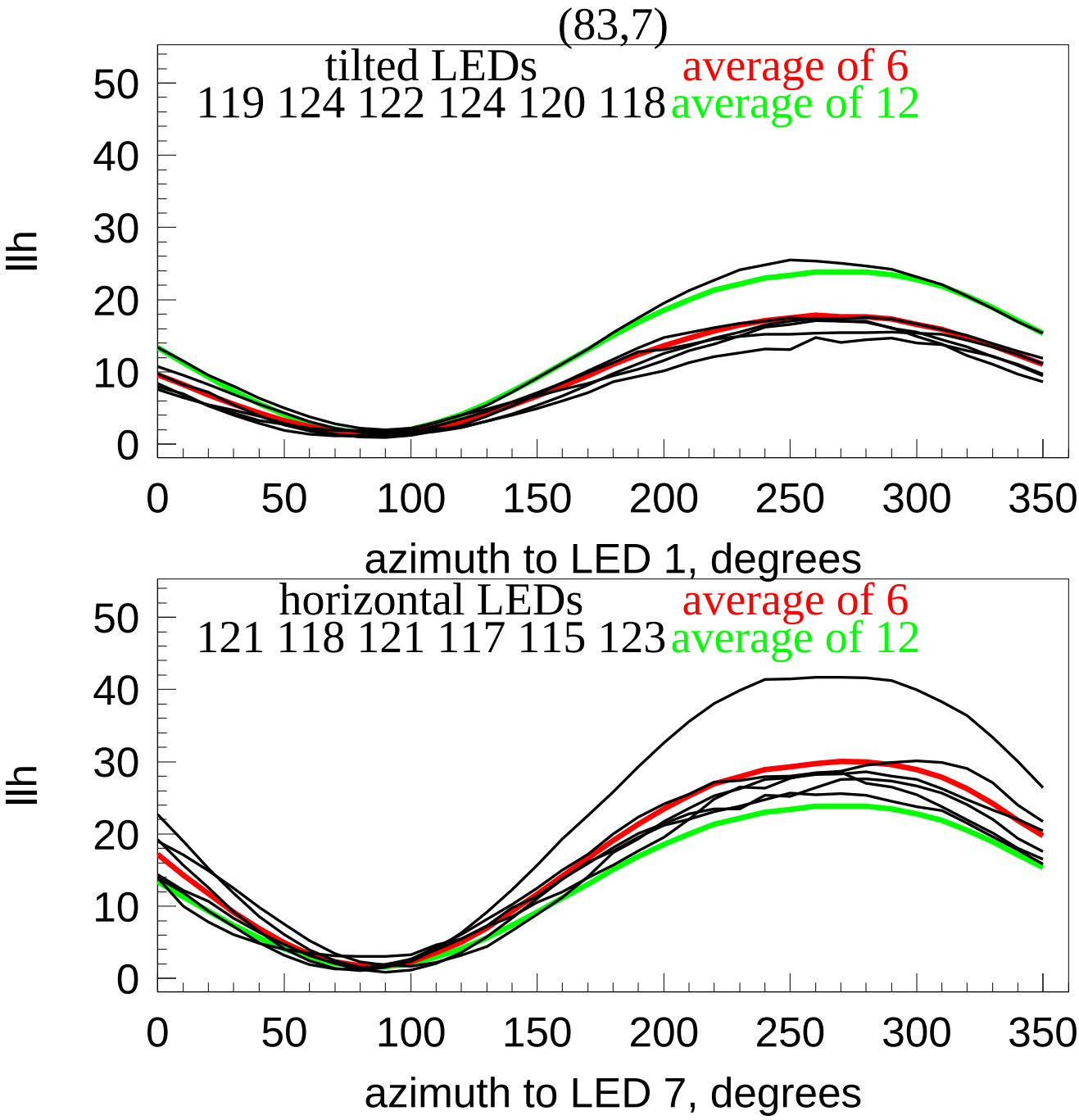

(83,4)
9
8
3
10
2
4
210
1
5
7
6
11
12
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
210.4 ± 6.7

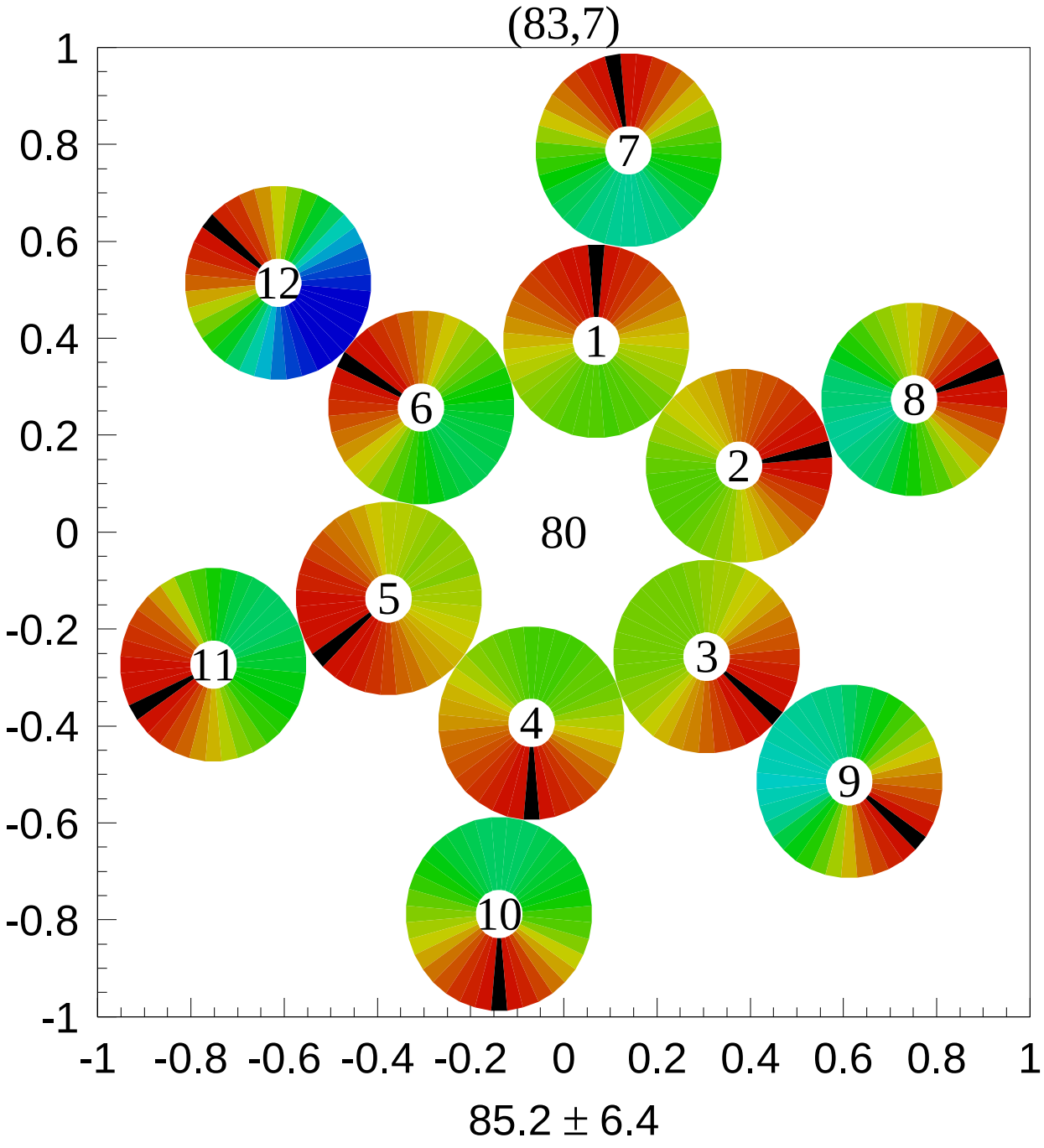

(83,5)
tilted LEDs
112 114 121 107 112 118
average of 6
average of 12
Ilh
0
10
20
30
40
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 122 116 115 122 116
average of 6
average of 12
Ilh
0
10
20
30
40
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

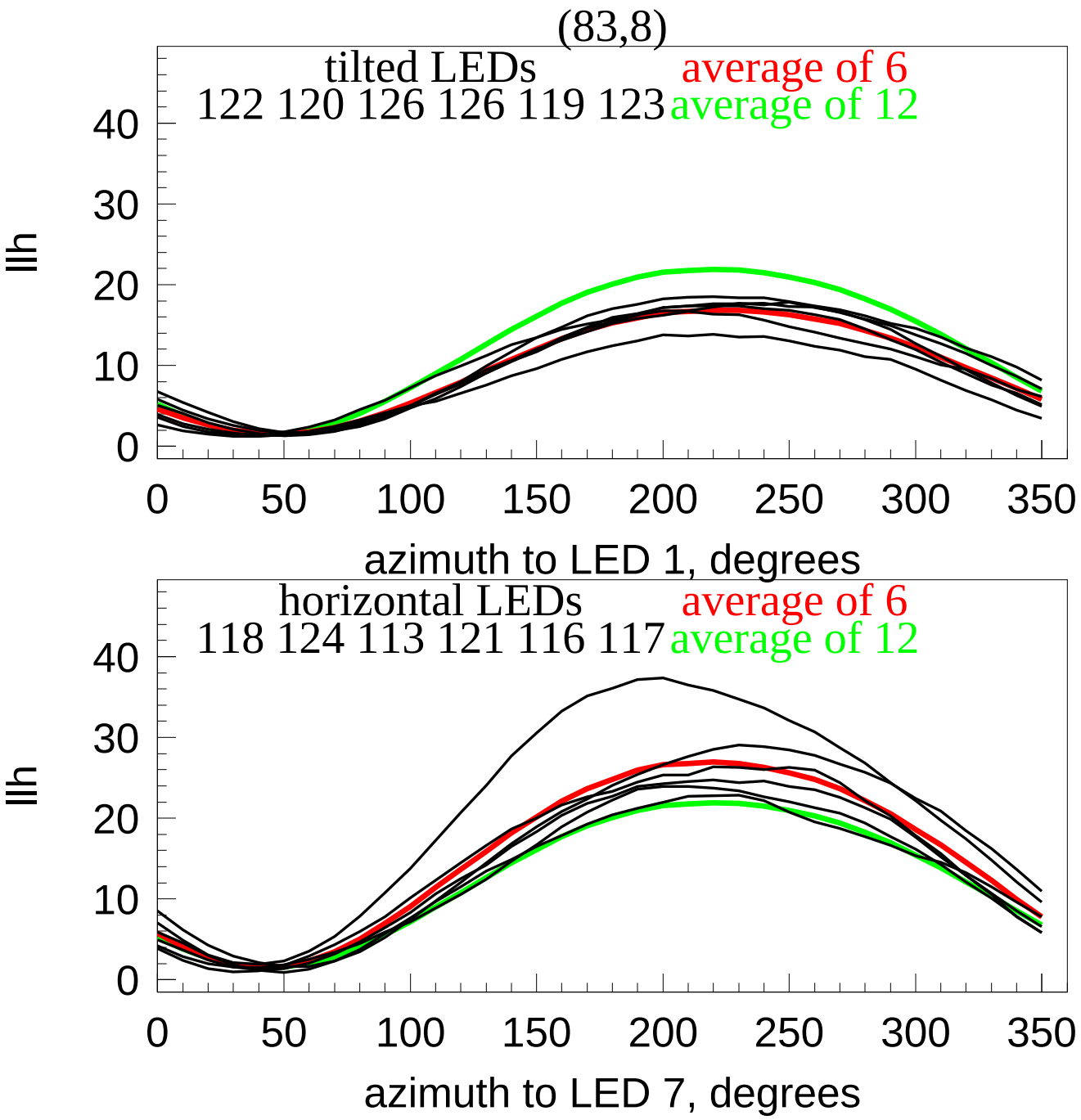

(83,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
12
6
110
3
9
5
4
11
10
107 ± 6.1

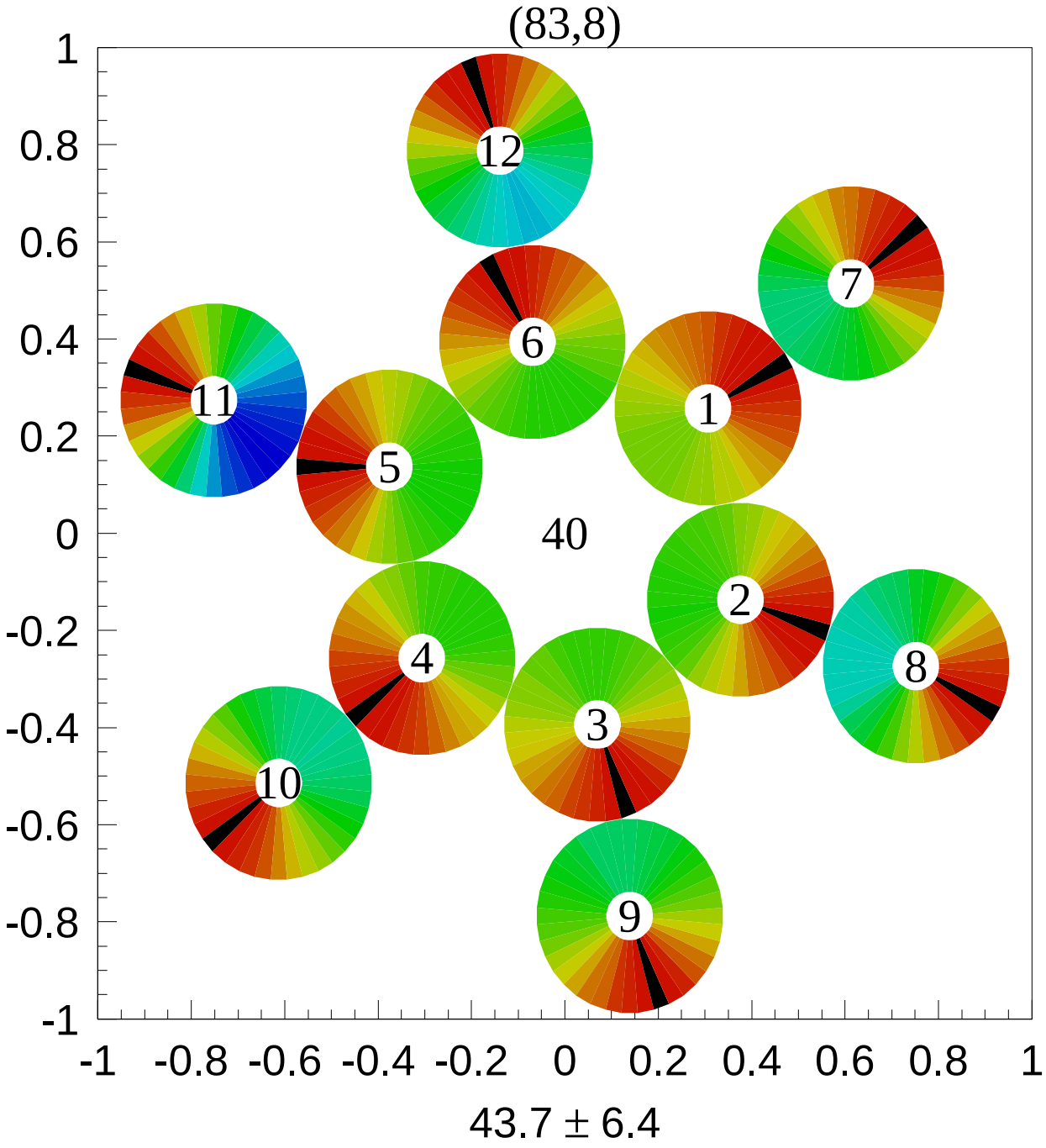

(83,6)
tilted LEDs
121 119 127 119 118 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
119 123 114 115 126 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

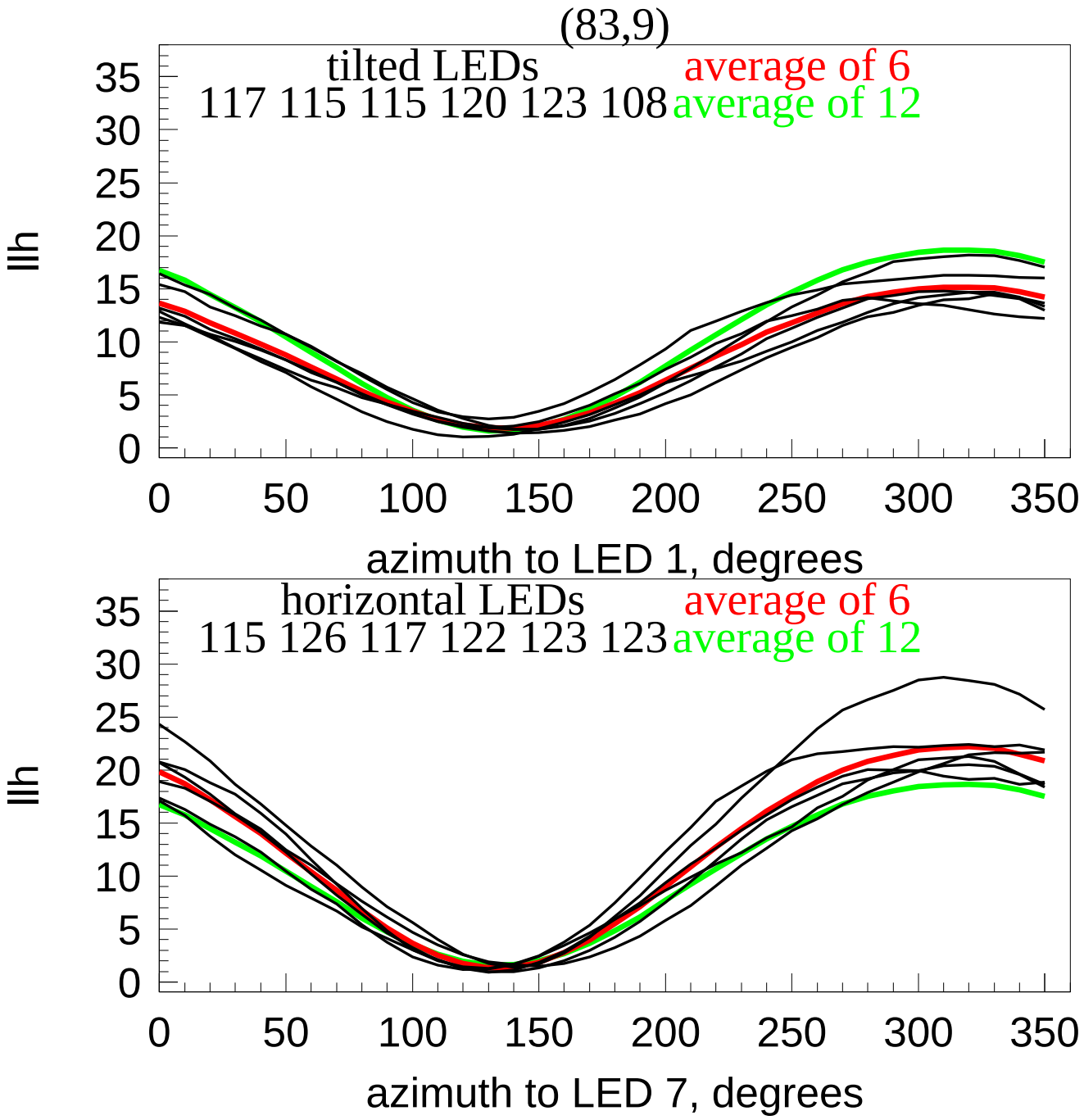

(83,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
8
2
9
7
3
1
160
4
6
10
5
12
11
164.4 ± 5.4

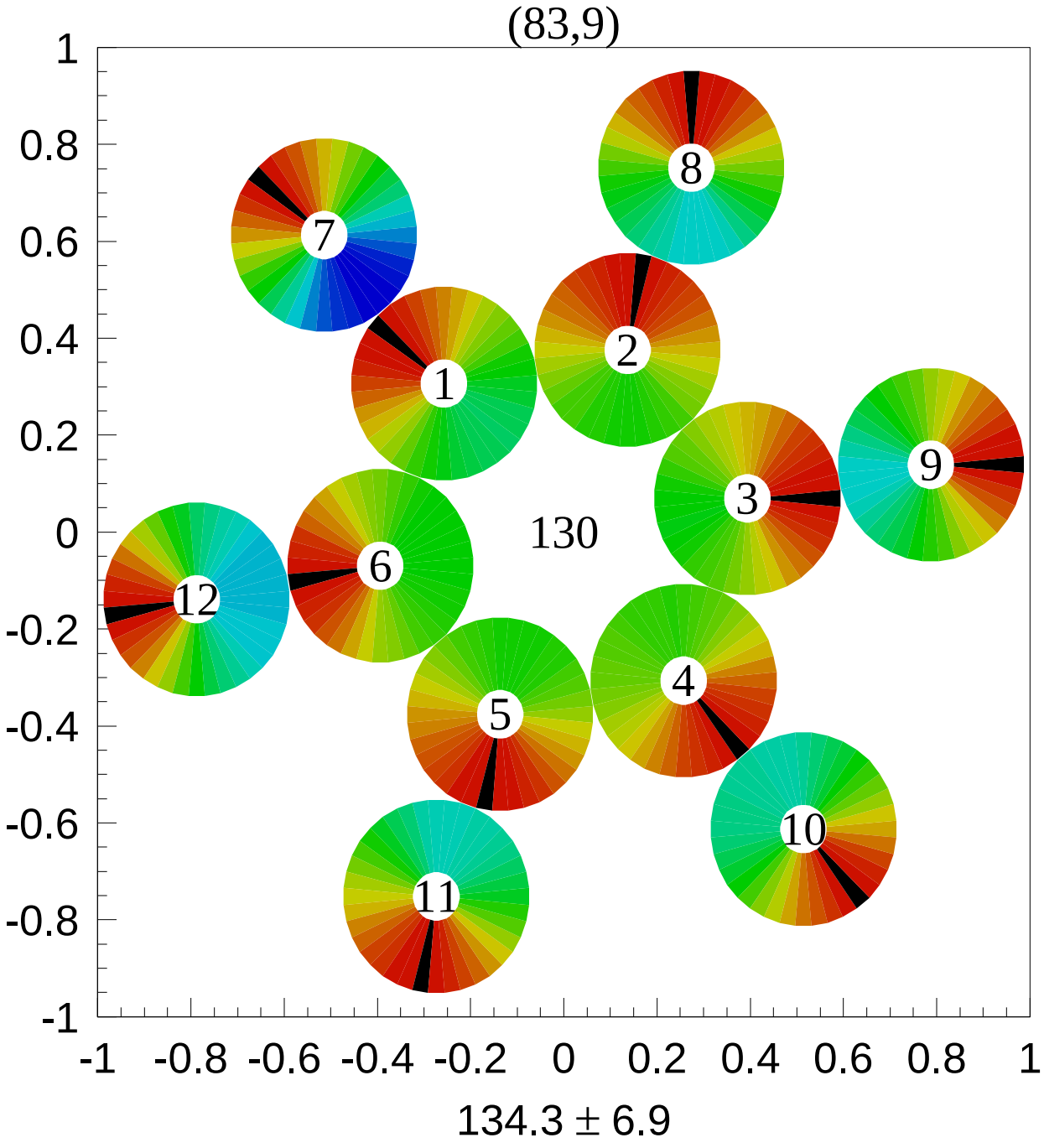

(83,7)
tilted LEDs
119 124 122 124 120 118
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
121 118 121 117 115 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

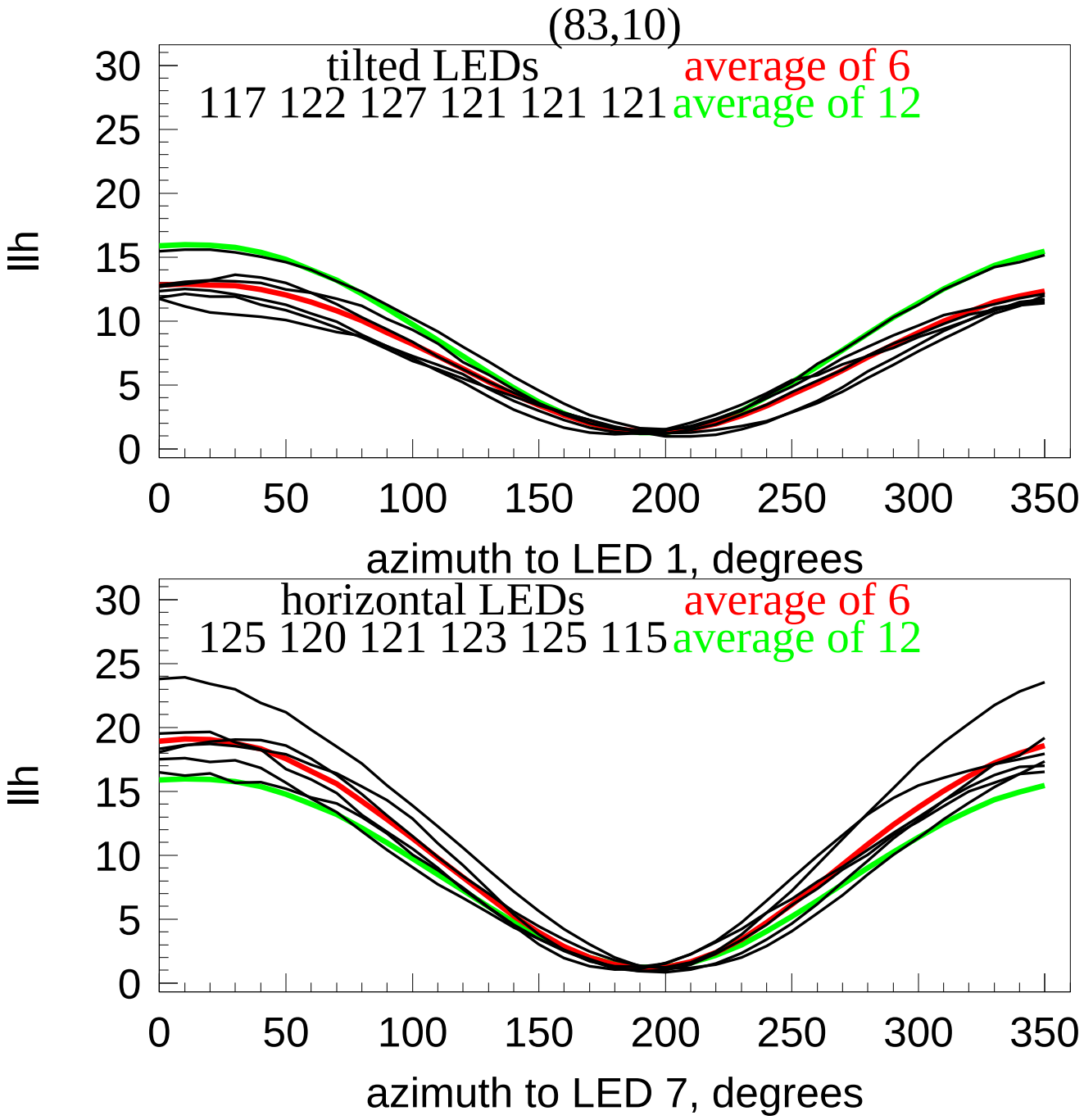

(83,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
12
1
6
8
2
80
5
11
3
4
9
10
85.2 ± 6.4

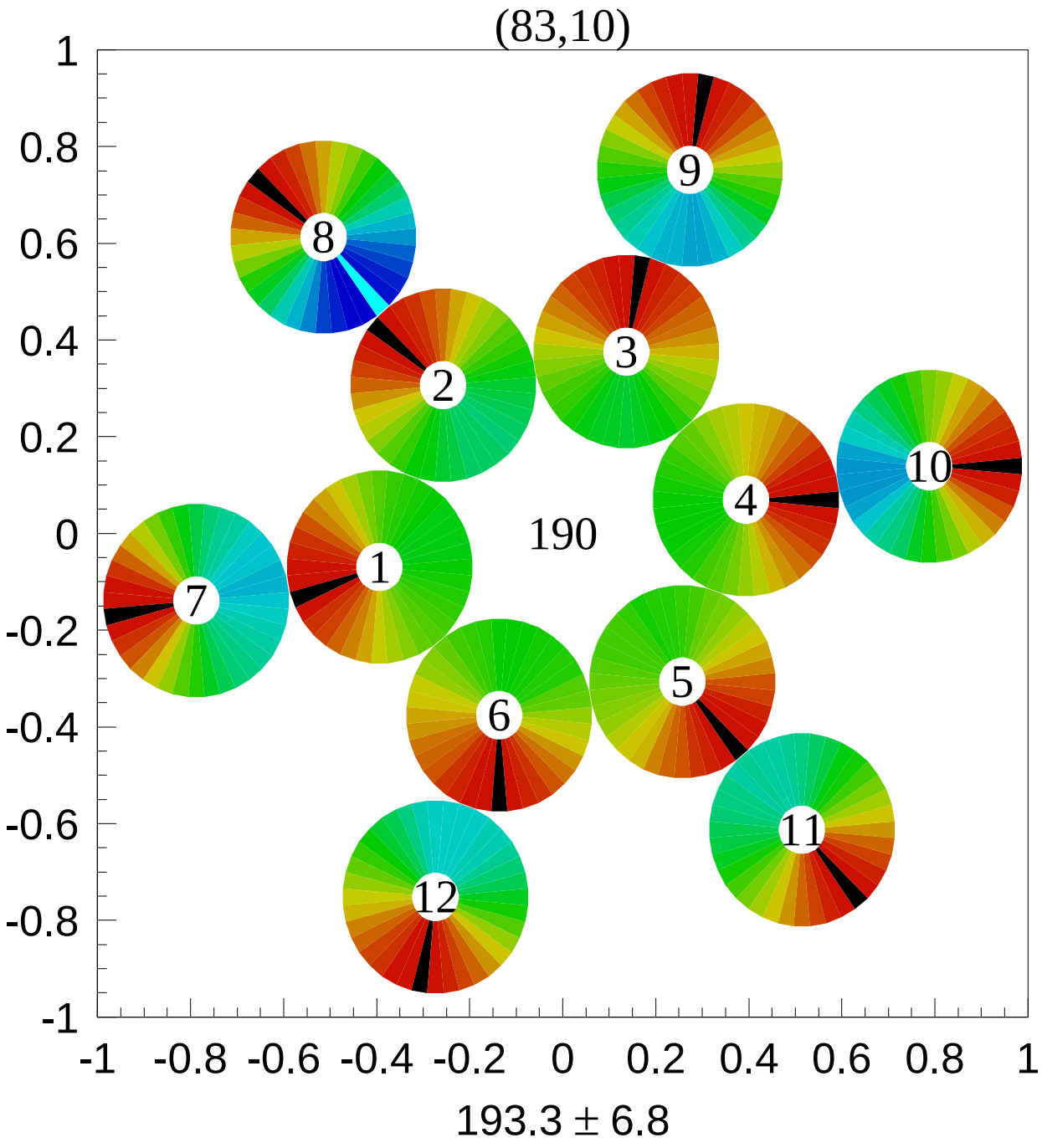

(83,8)
tilted LEDs
122 120 126 126 119 123
average of 6
average of 12
llh
0
10
20
30
40
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
118 124 113 121 116 117
average of 6
average of 12
llh
0
10
20
30
40
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

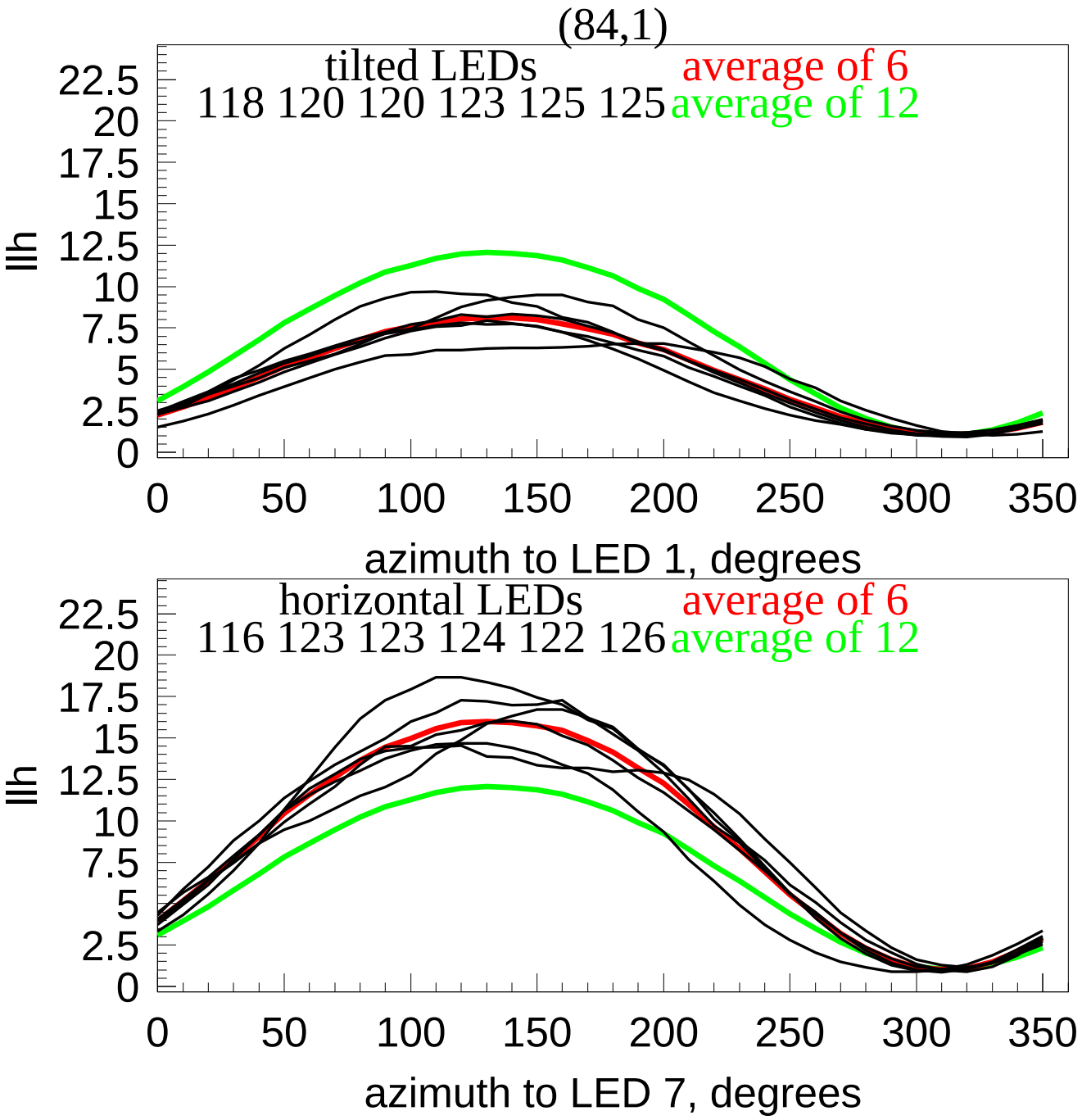

(83,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
11
1
5
40
2
8
4
3
10
9
43.7 ± 6.4

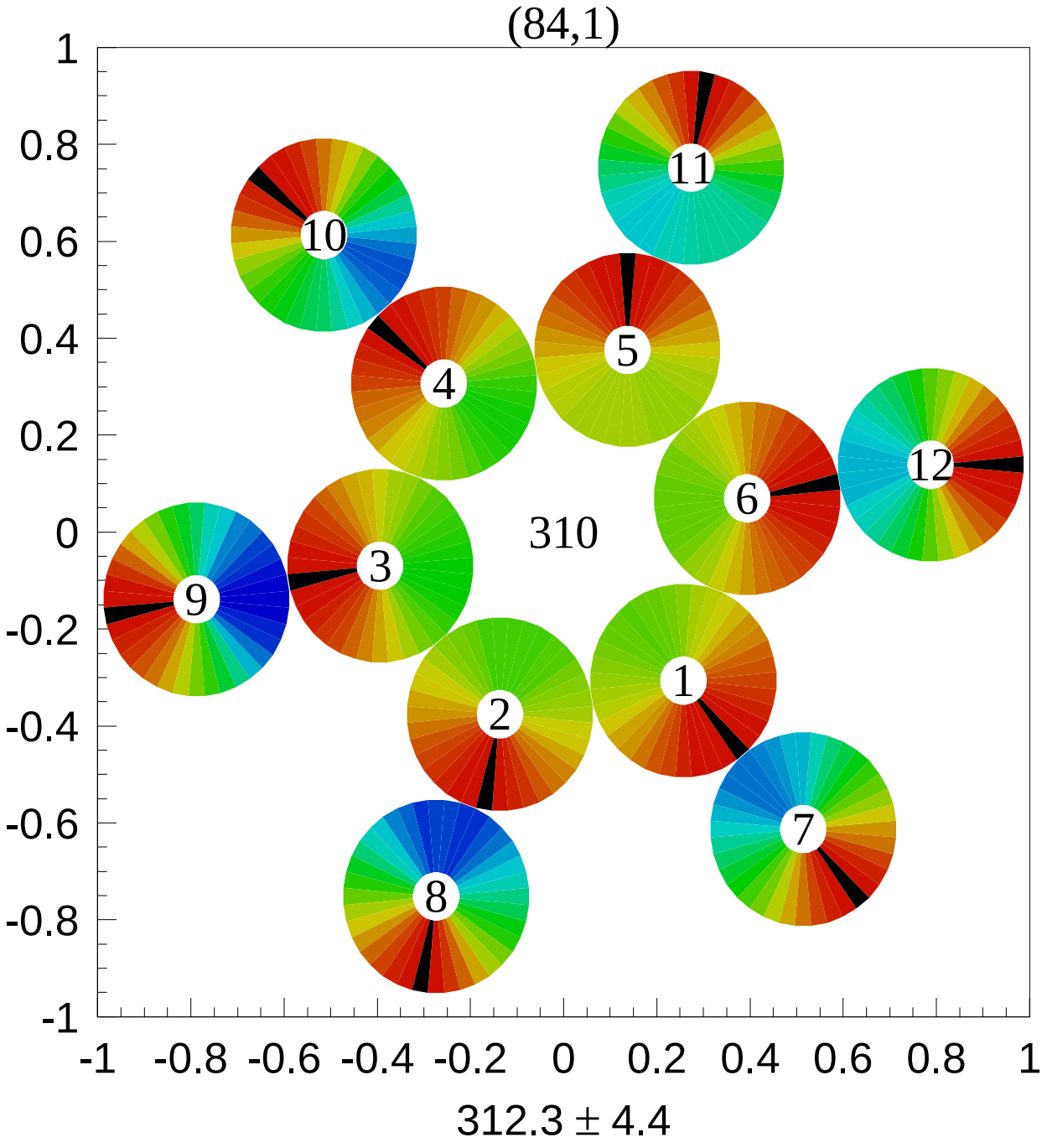

(83,9)
tilted LEDs
117 115 115 120 123 108
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
115 126 117 122 123 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

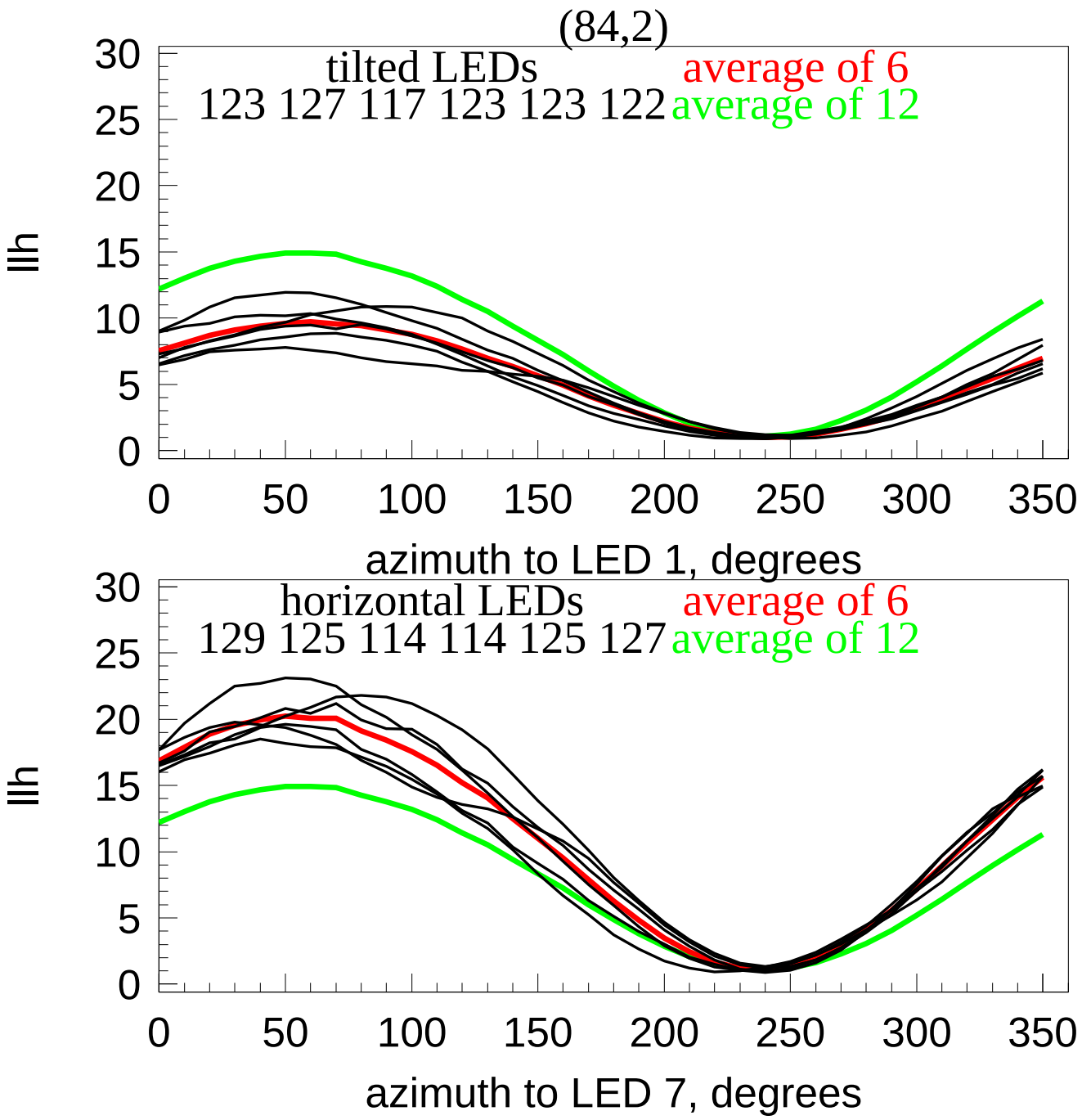

(83,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
8
1
2
9
3
6
12
130
5
4
10
11
134.3 ± 6.9

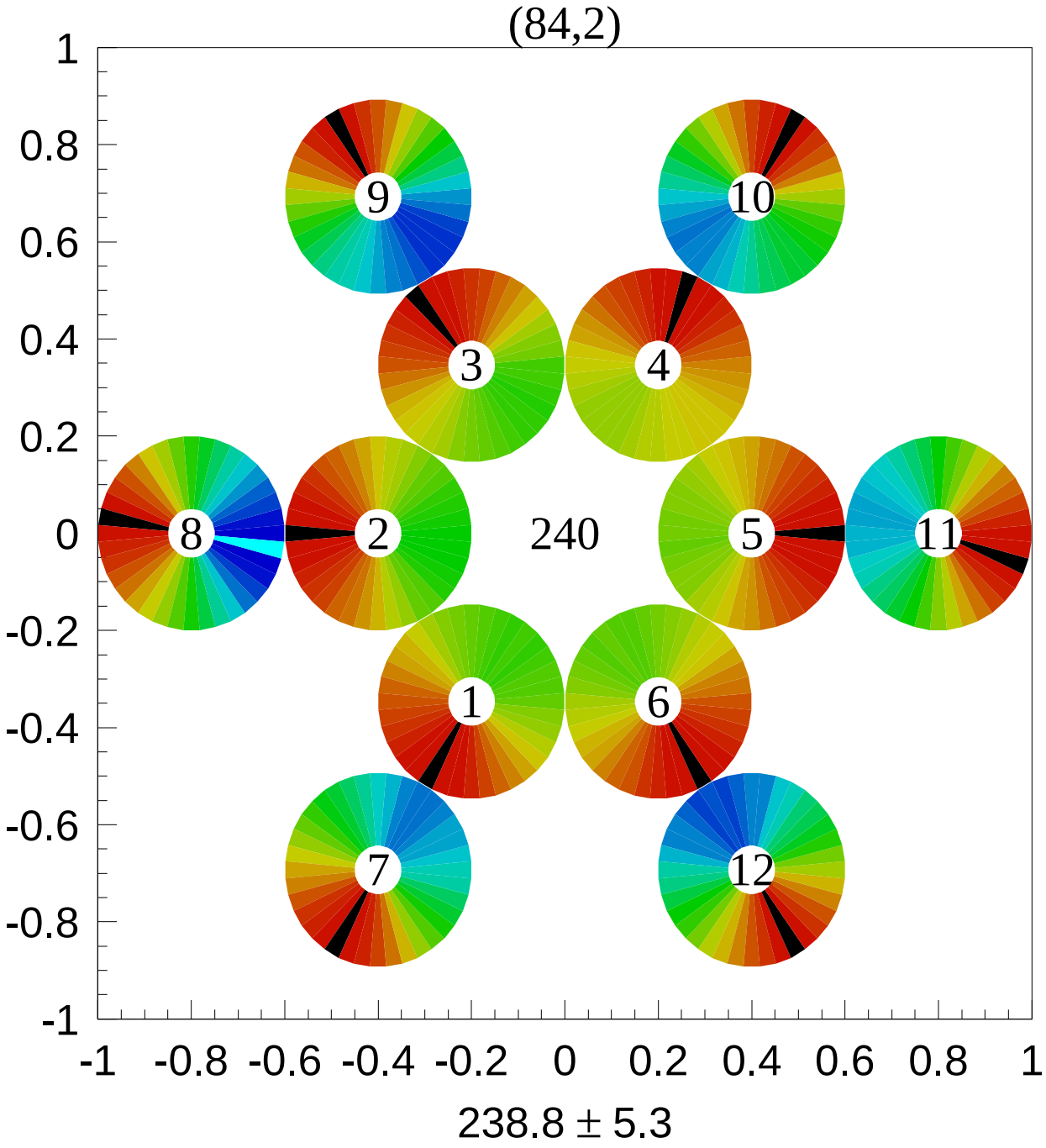

(83,10)
tilted LEDs
117 122 127 121 121 121
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
125 120 121 123 125 115
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

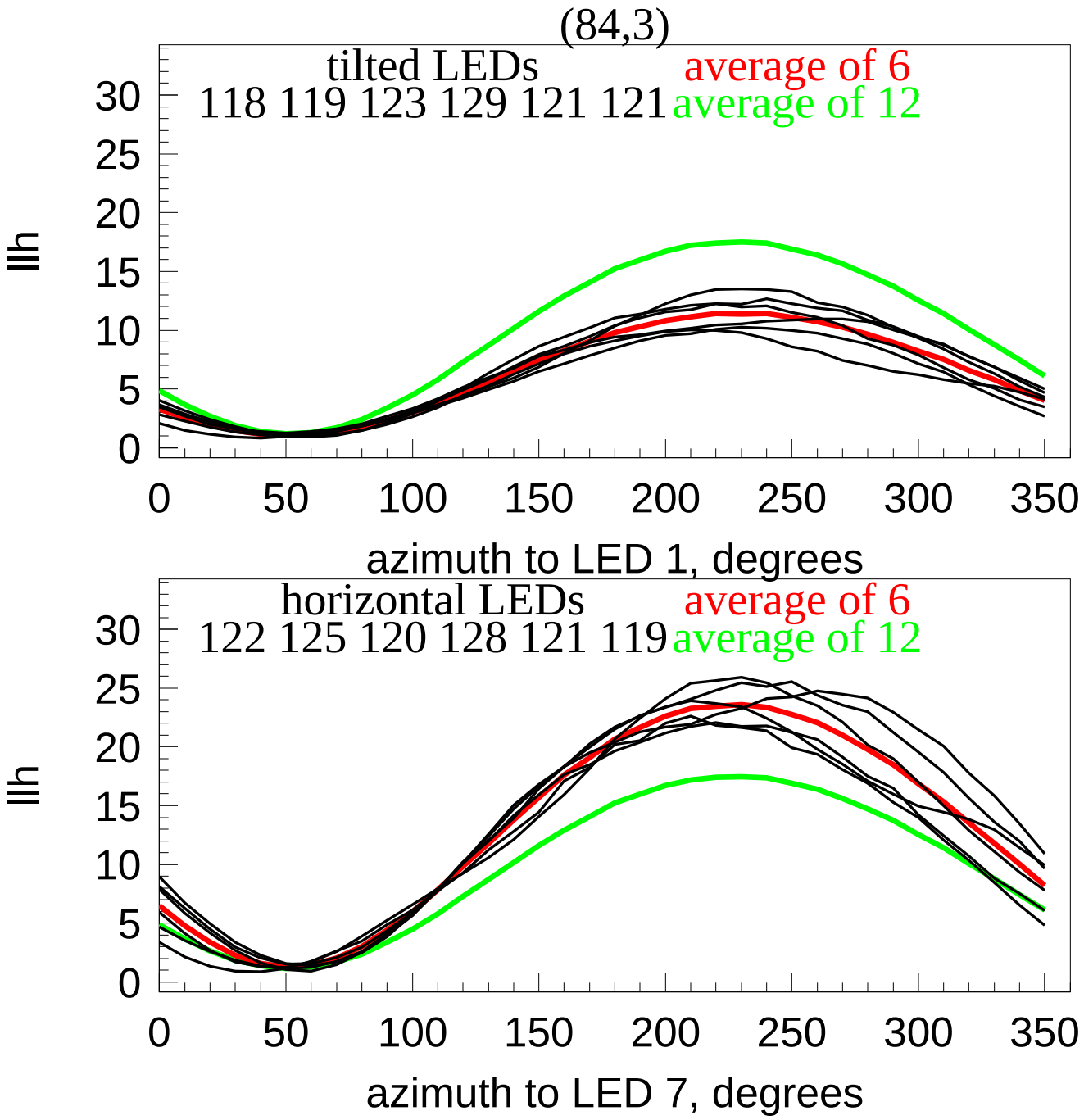

(83,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
193.3 ± 6.8
190
1
2
3
4
5
6
7
8
9
10
11
12

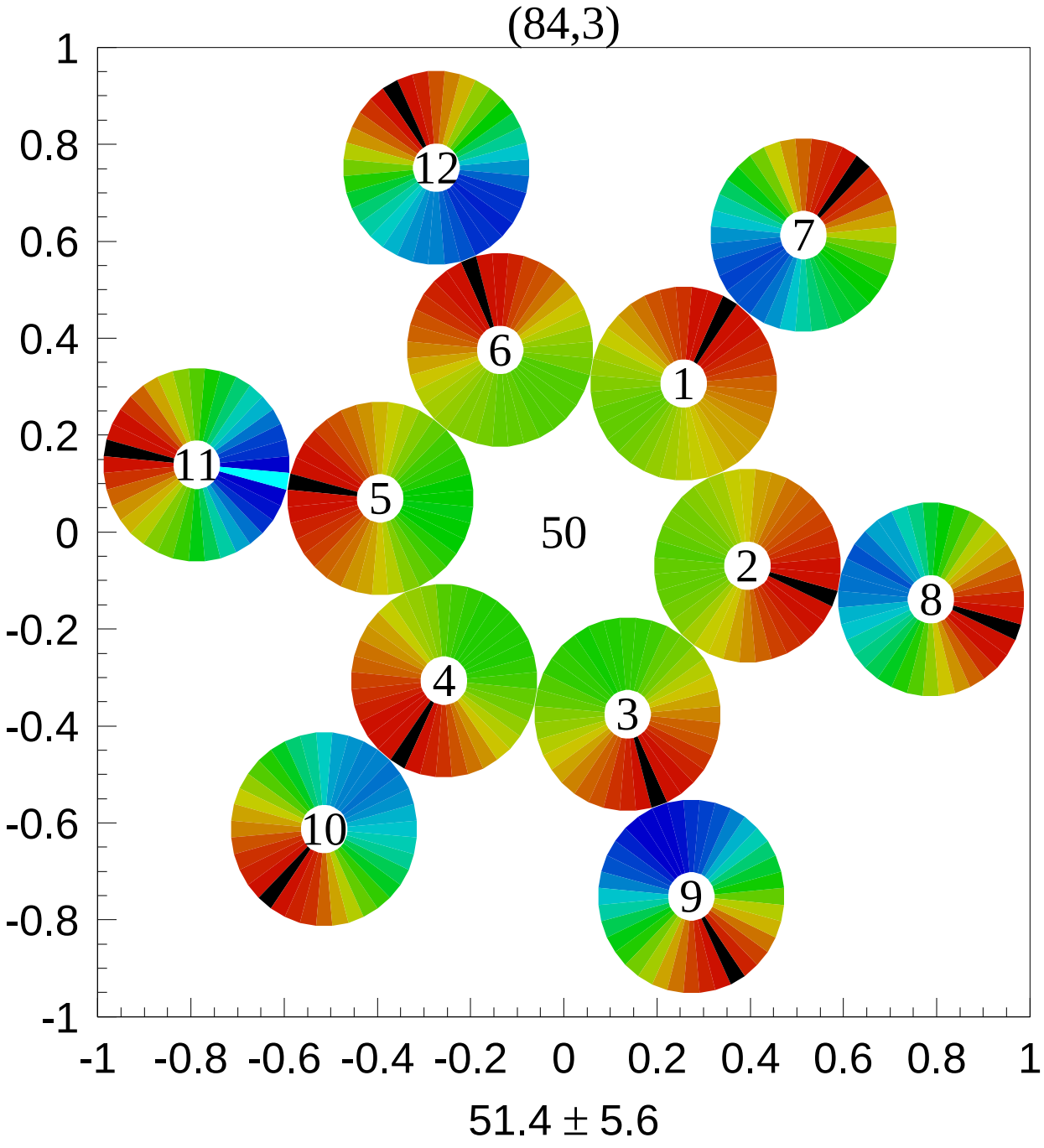

(84,1)
tilted LEDs
118 120 120 123 125 125
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
116 123 123 124 122 126
average of 6
average of 12
llh
azimuth to LED 7, degrees

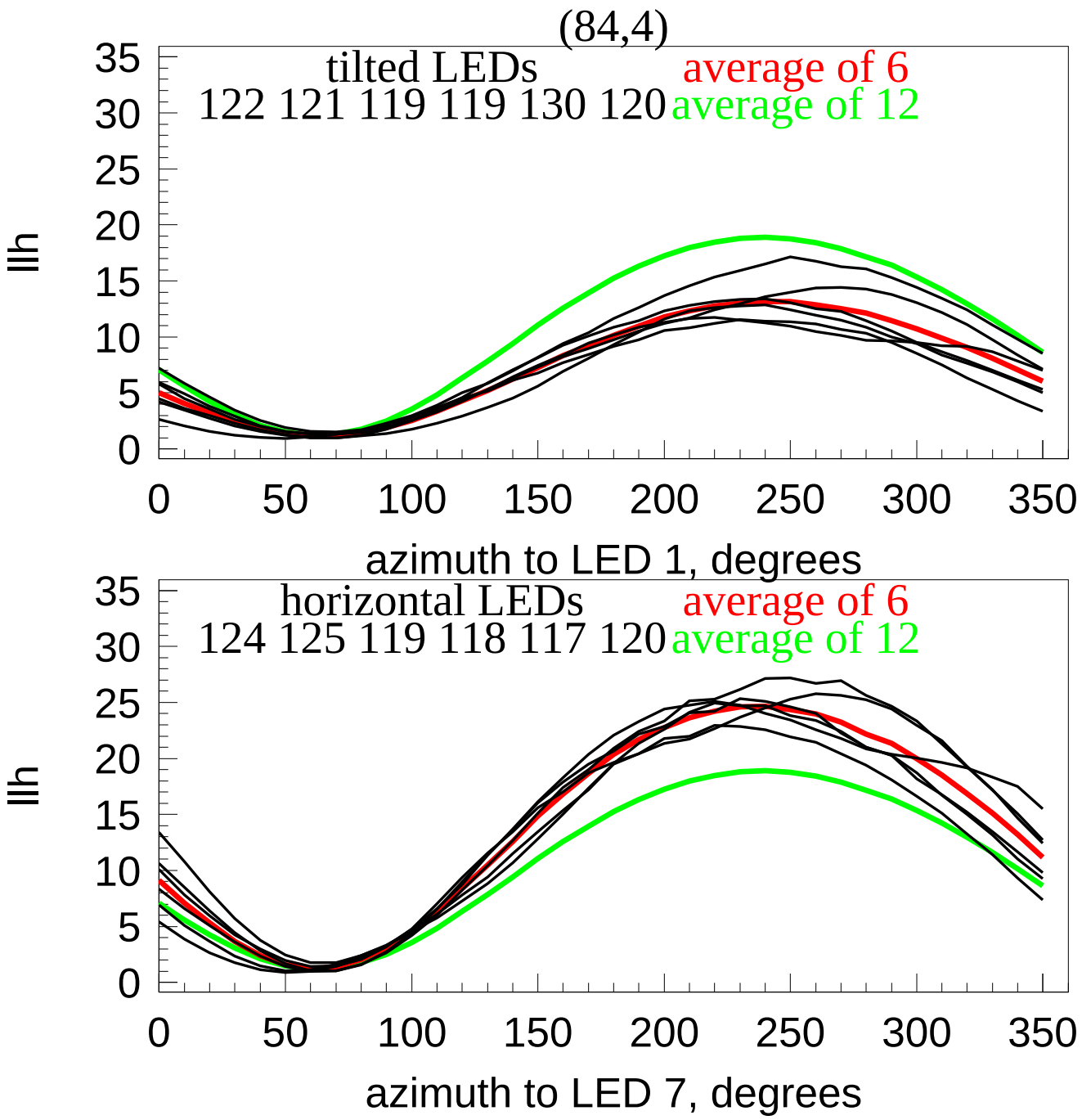

(84,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
312.3 ± 4.4

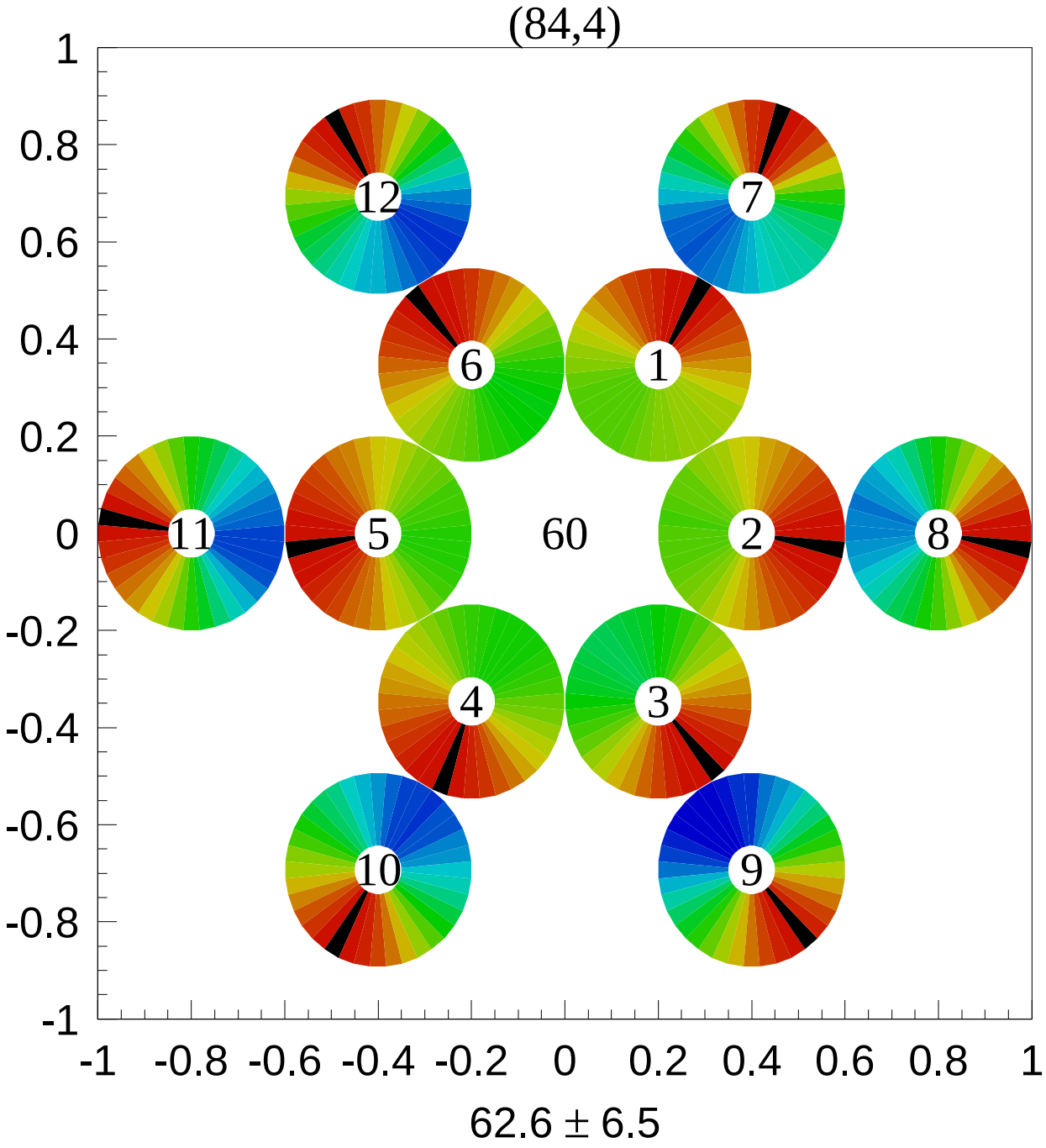

(84,2)
tilted LEDs
123 127 117 123 123 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
129 125 114 114 125 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

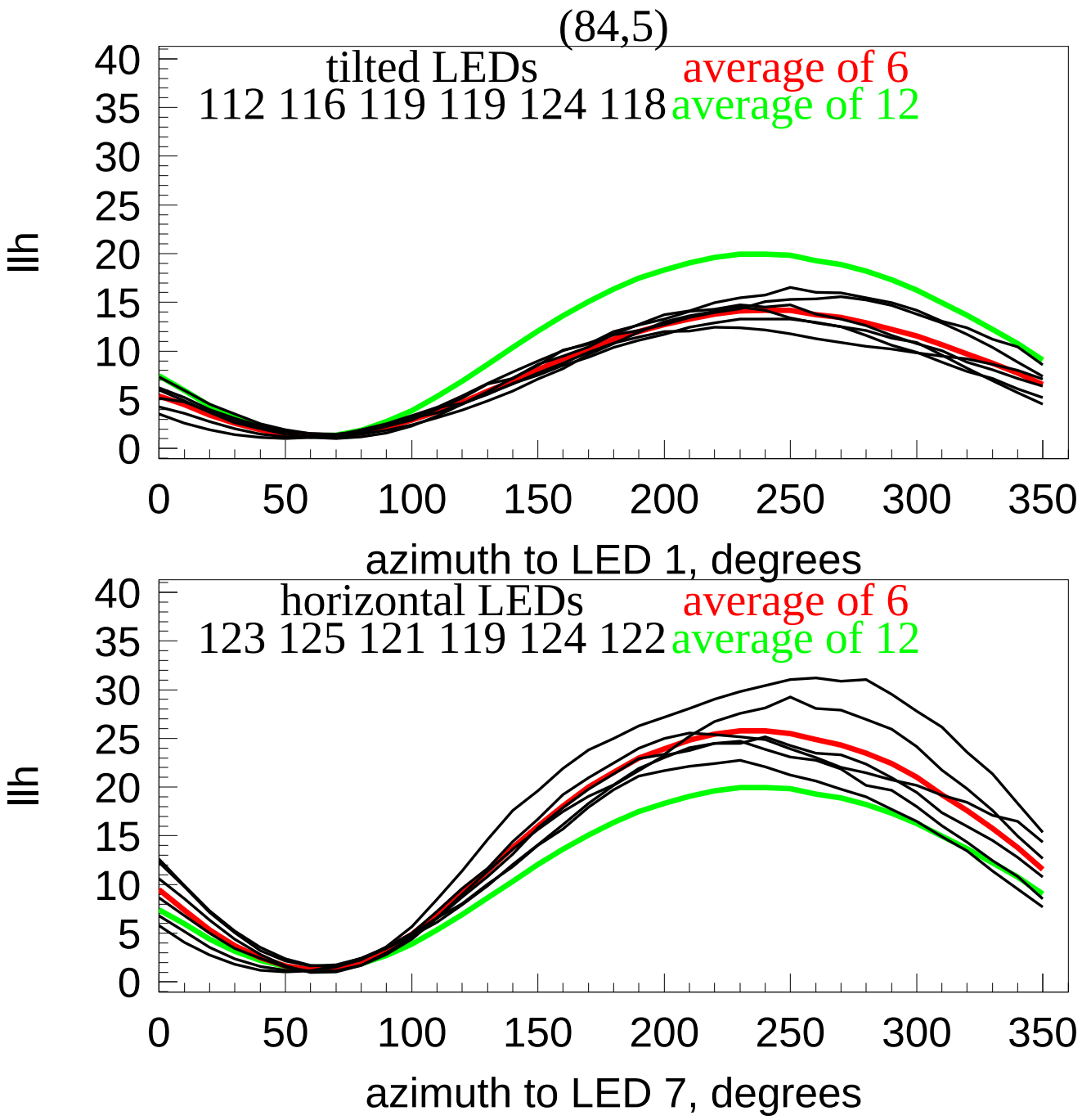

(84,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
238.8 ± 5.3

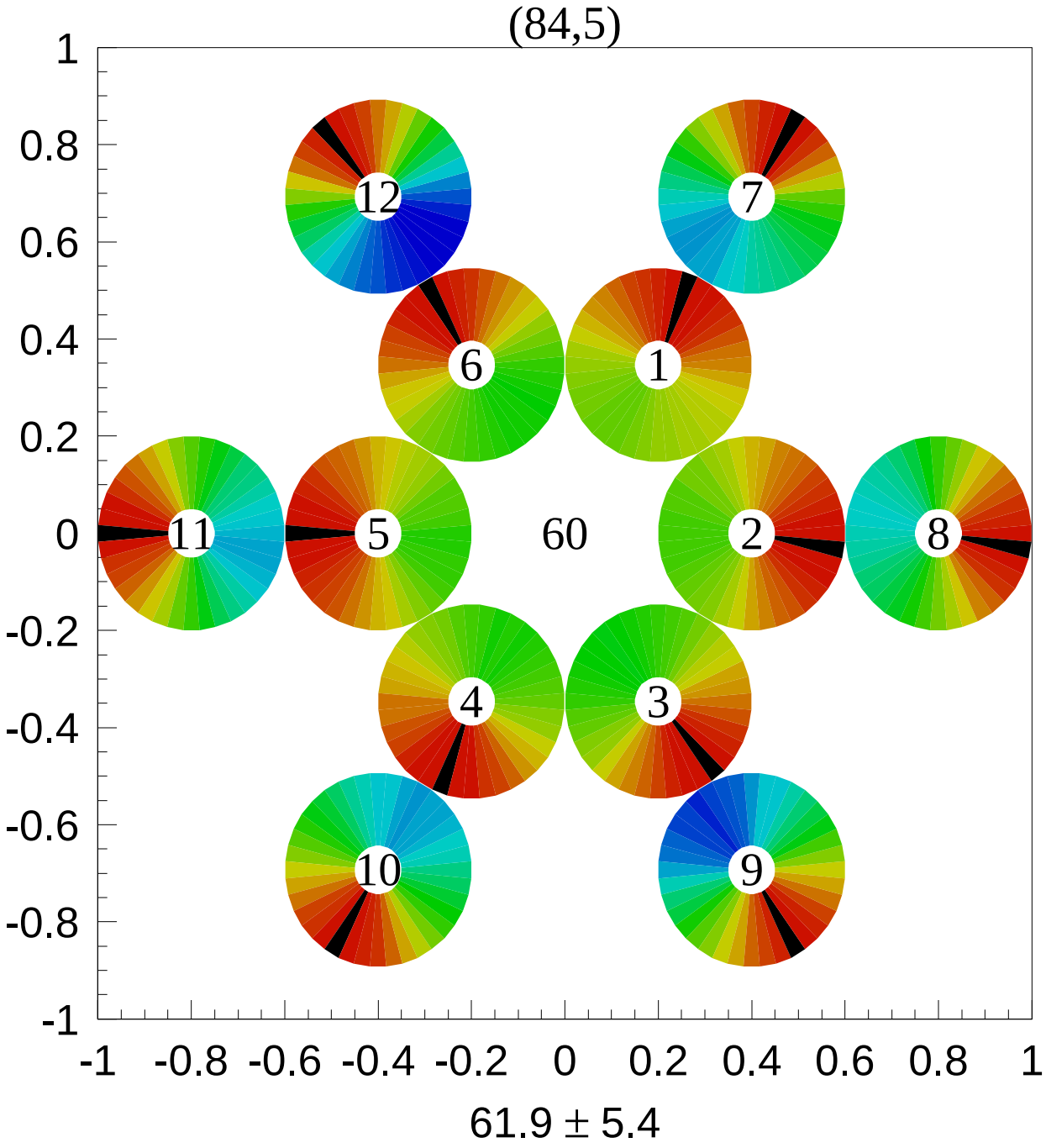

(84,3)
tilted LEDs
118 119 123 129 121 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 125 120 128 121 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

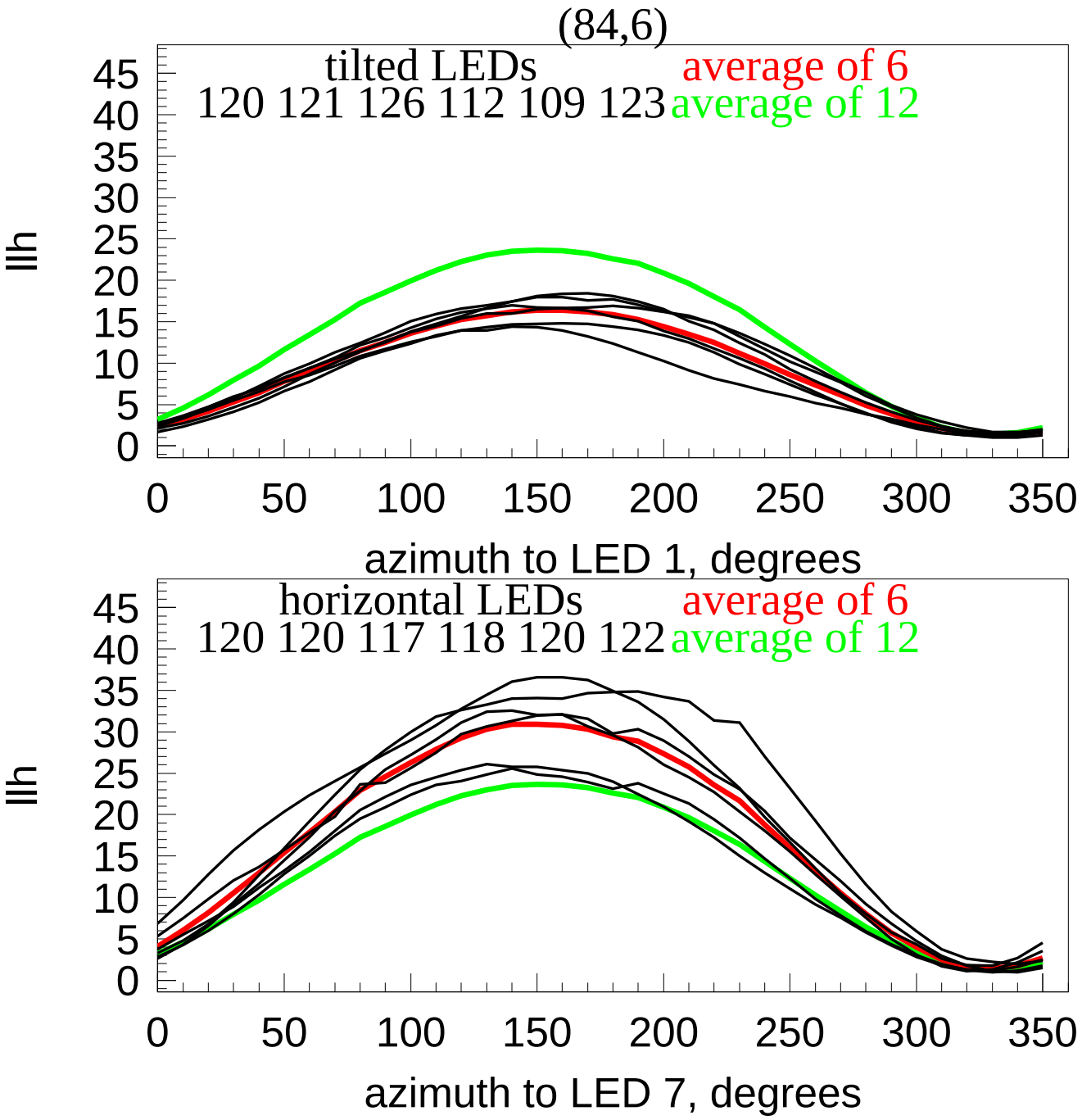

(84,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
50
2
8
4
3
10
9
51.4 ± 5.6

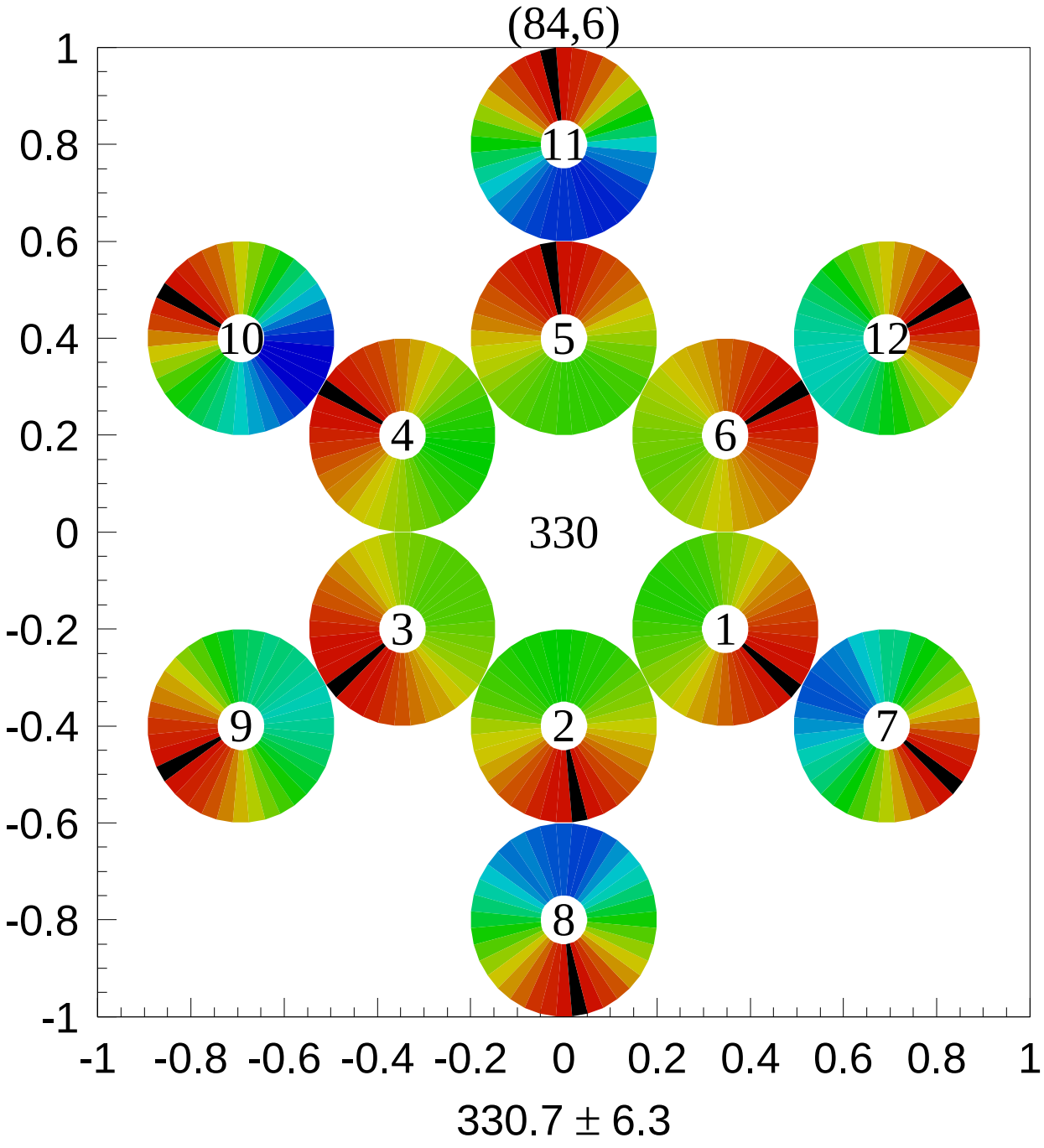

(84,4)
tilted LEDs
122 121 119 119 130 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
124 125 119 118 117 120
average of 6
average of 12
llh
azimuth to LED 7, degrees

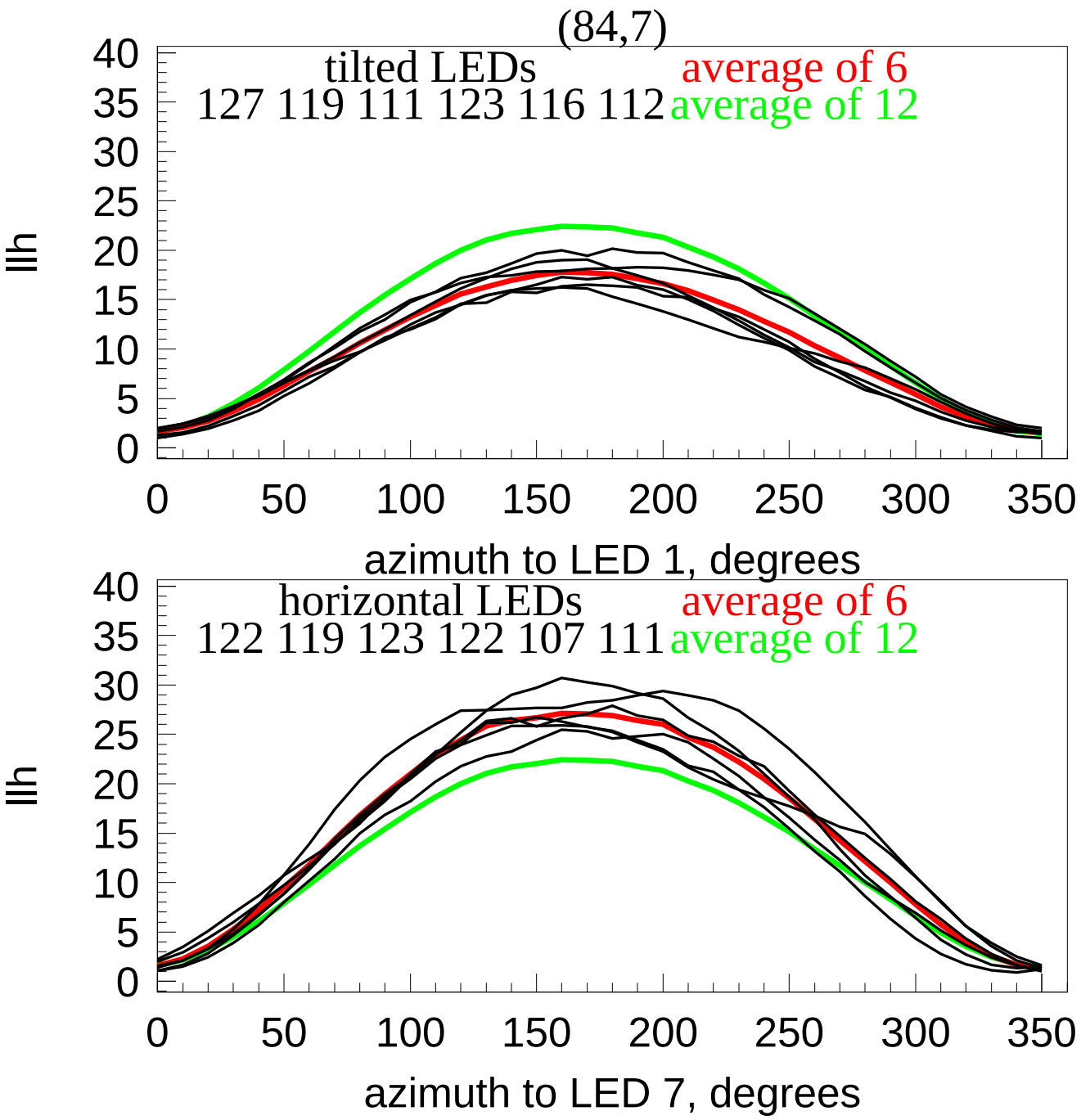

(84,4)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
62.6 ± 6.5

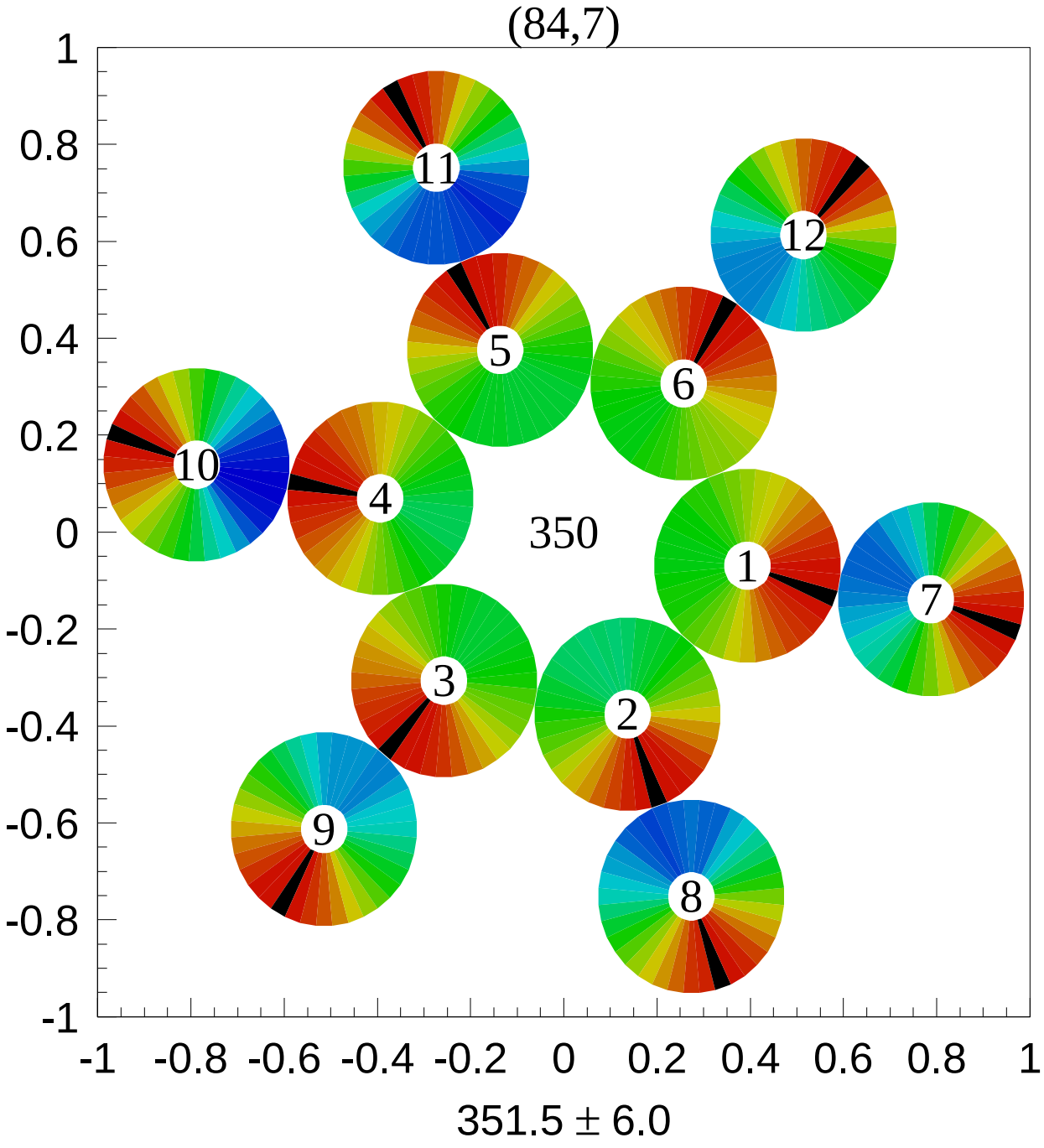

(84,5)
tilted LEDs
112 116 119 119 124 118
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
123 125 121 119 124 122
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

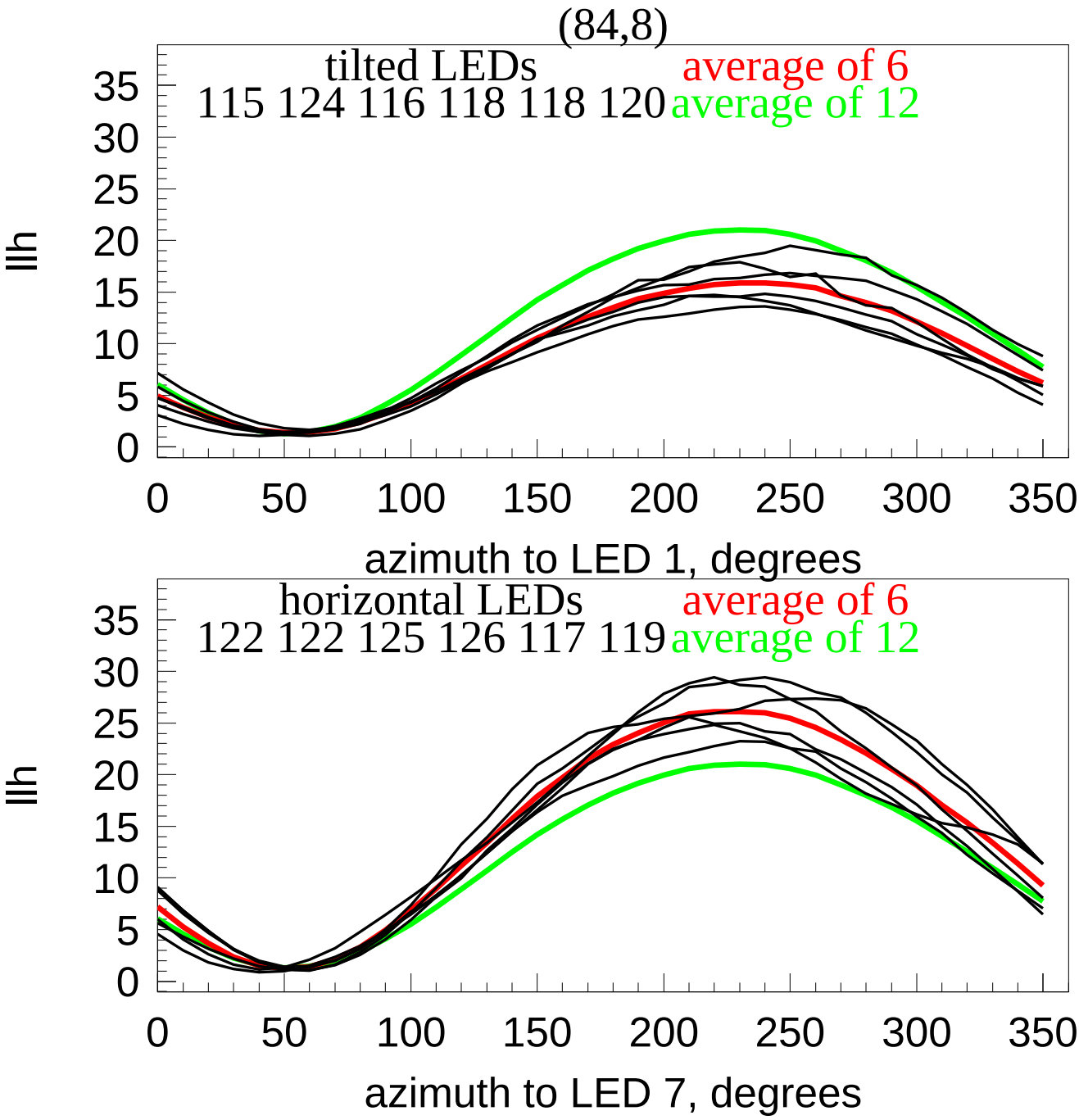

(84,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
7
6
1
11
5
60
2
8
4
3
10
9
61.9 ± 5.4

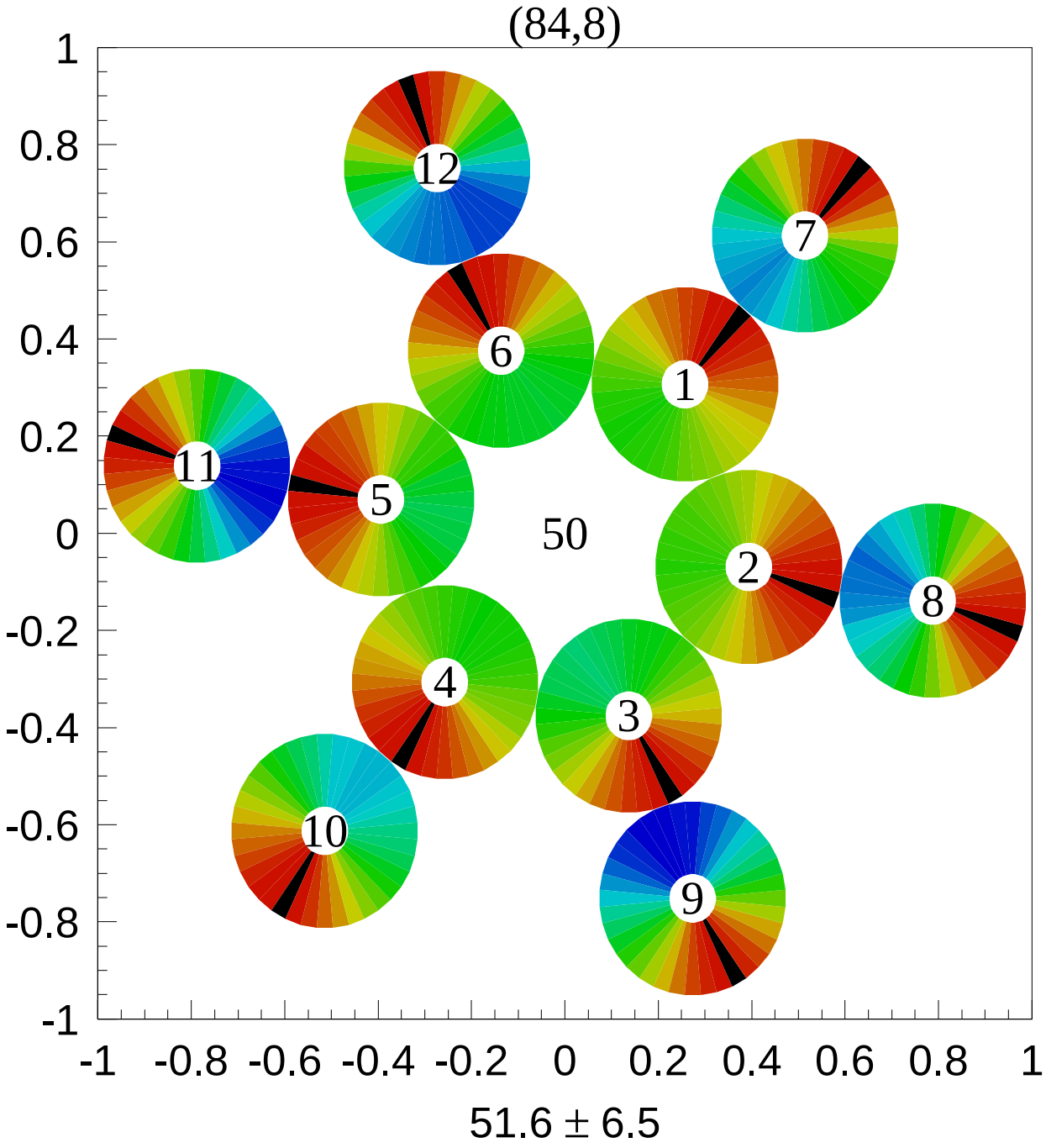

(84,6)
tilted LEDs
120 121 126 112 109 123
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 120 117 118 120 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

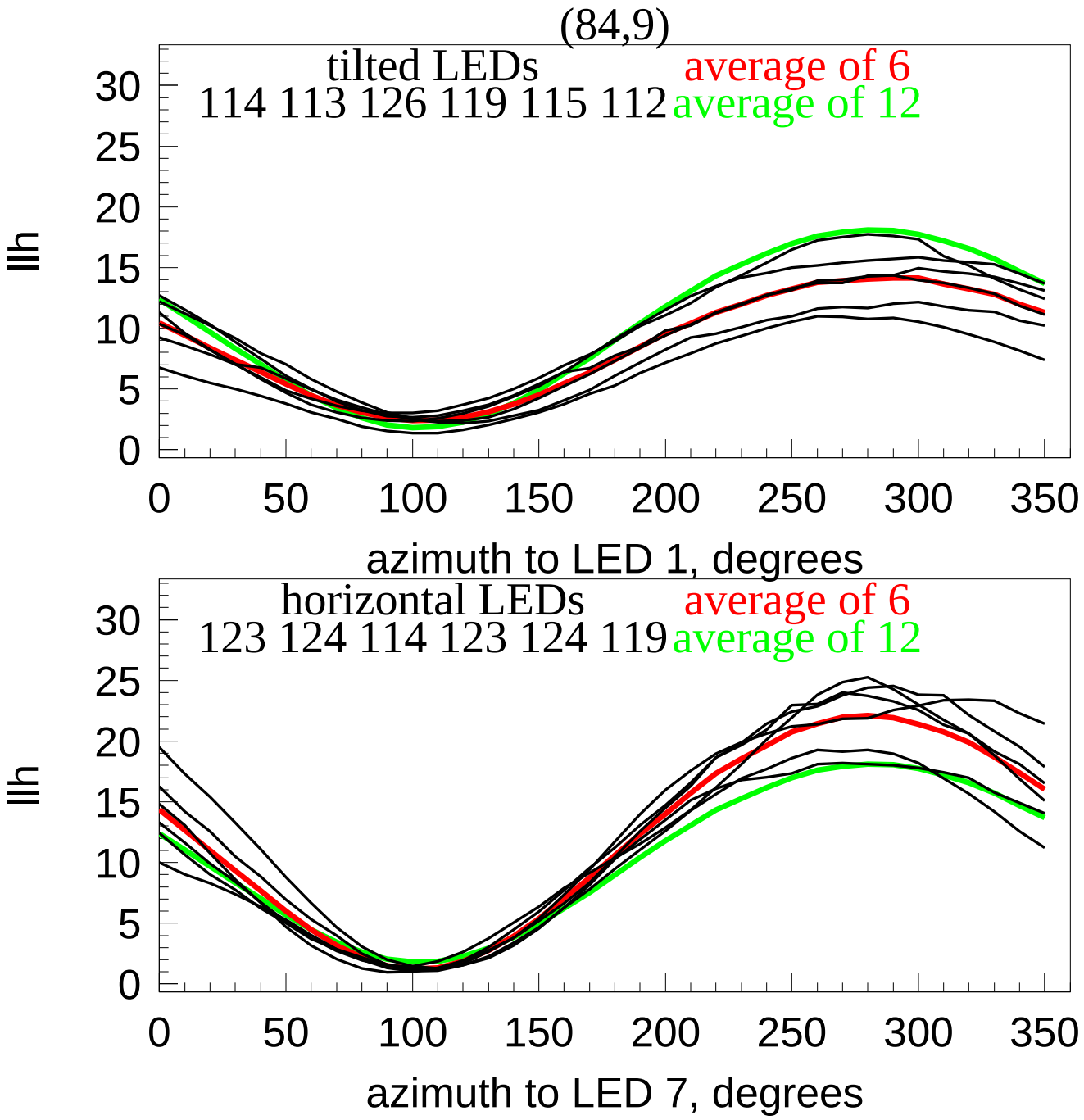

(84,6)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
330.7 ± 6.3

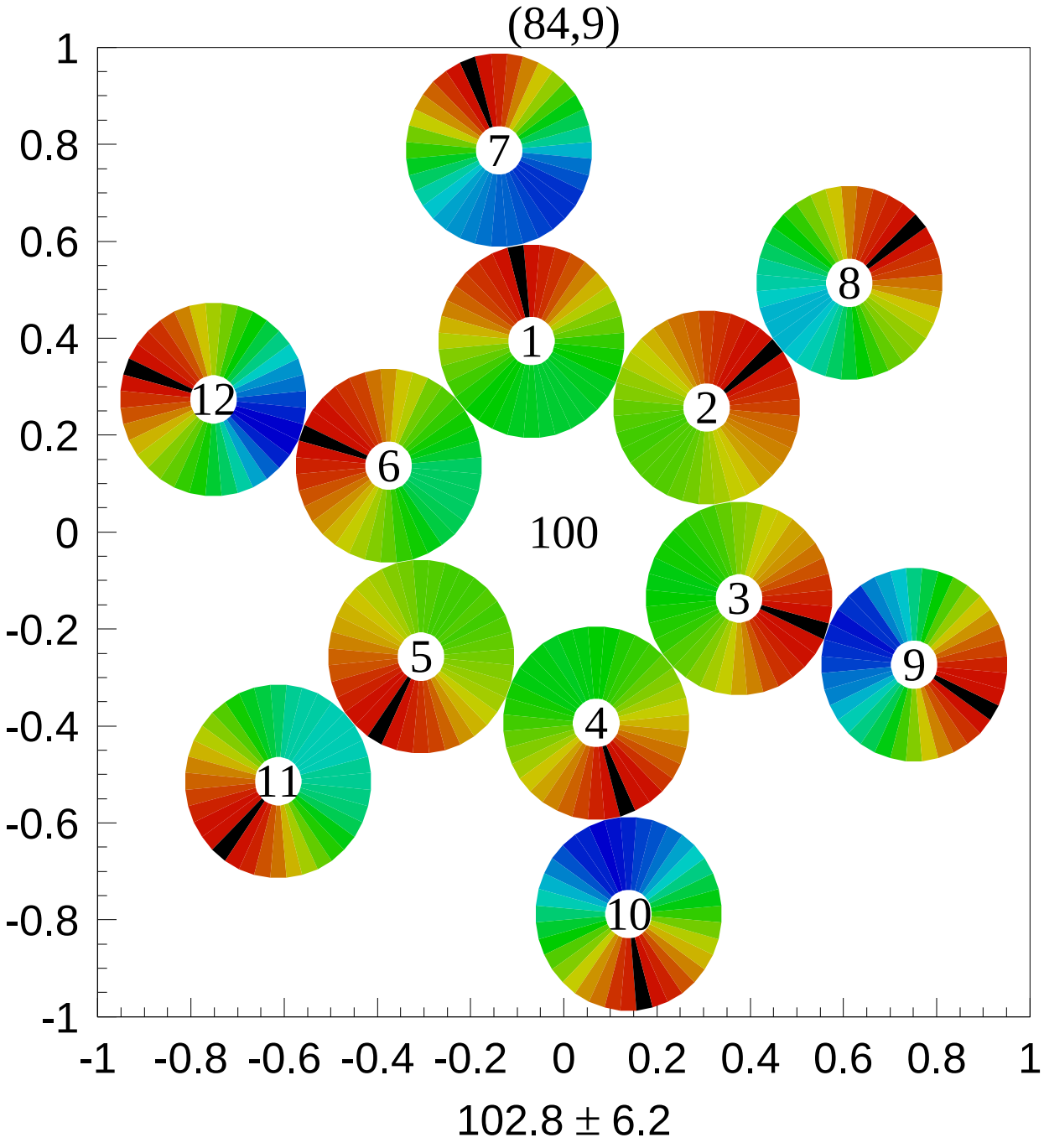

(84,7)
tilted LEDs
127 119 111 123 116 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 119 123 122 107 111
average of 6
average of 12
llh
azimuth to LED 7, degrees

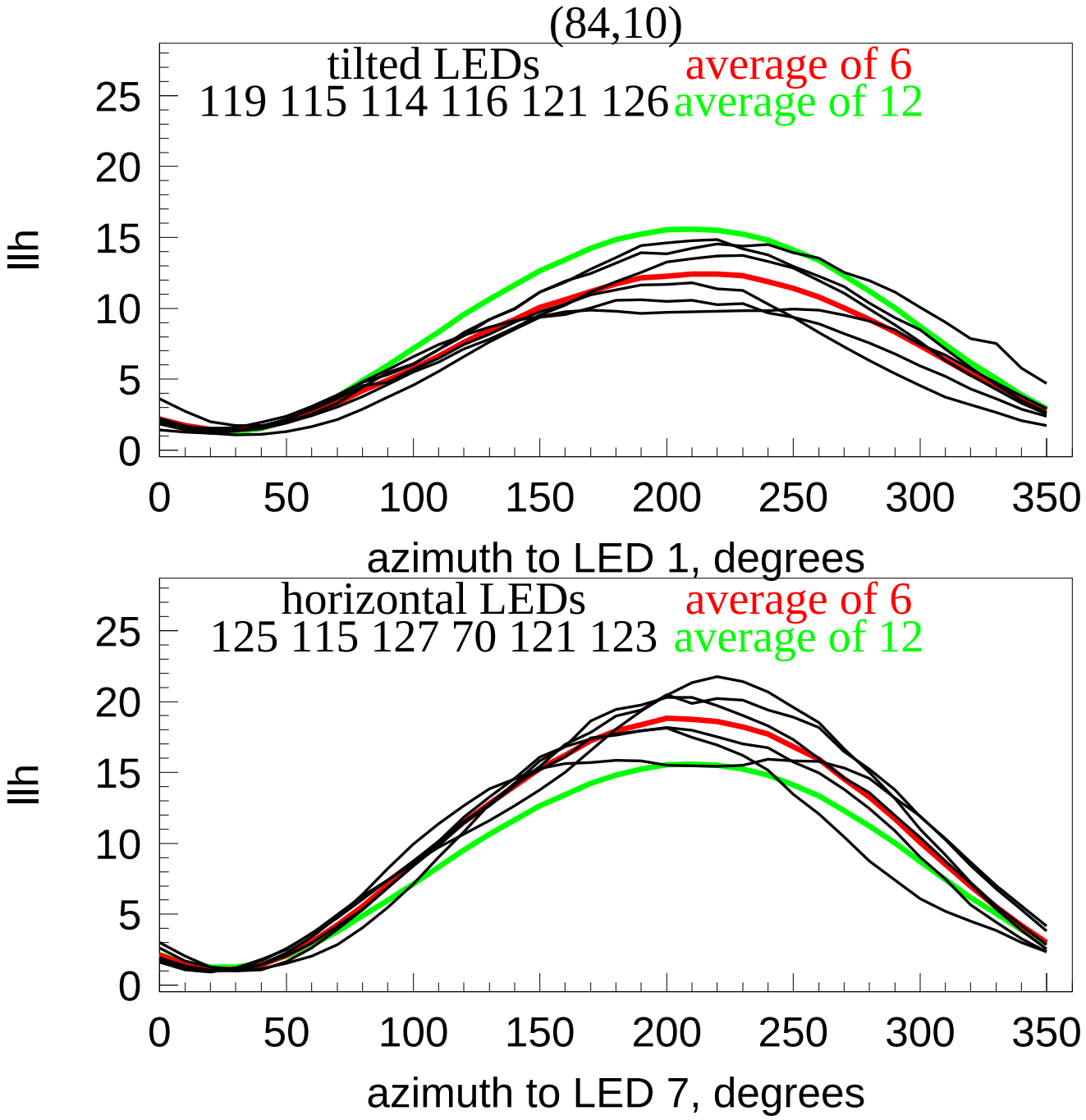

(84,7)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
351.5 ± 6.0

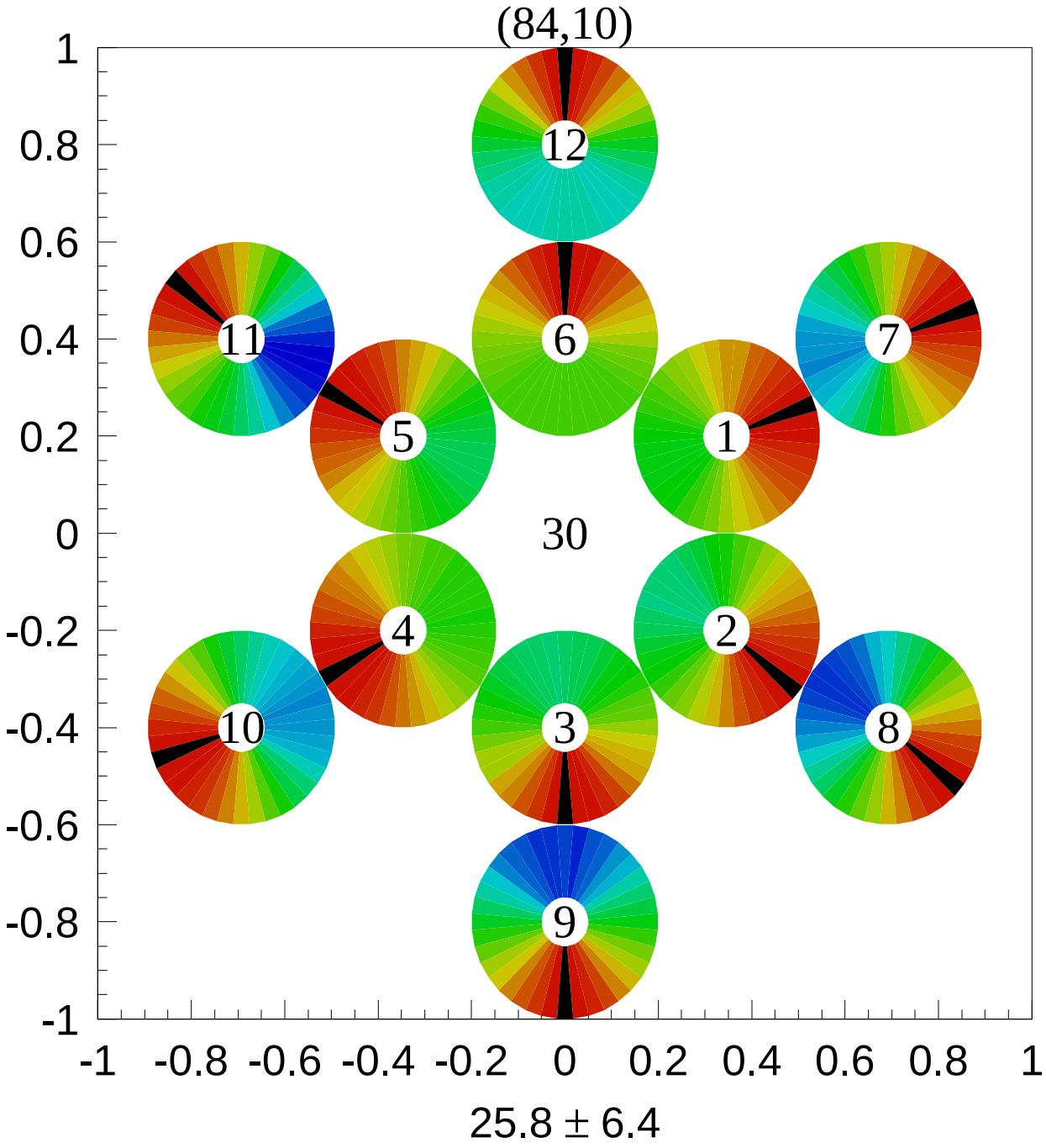

(84,8)
tilted LEDs
115 124 116 118 118 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
122 122 125 126 117 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

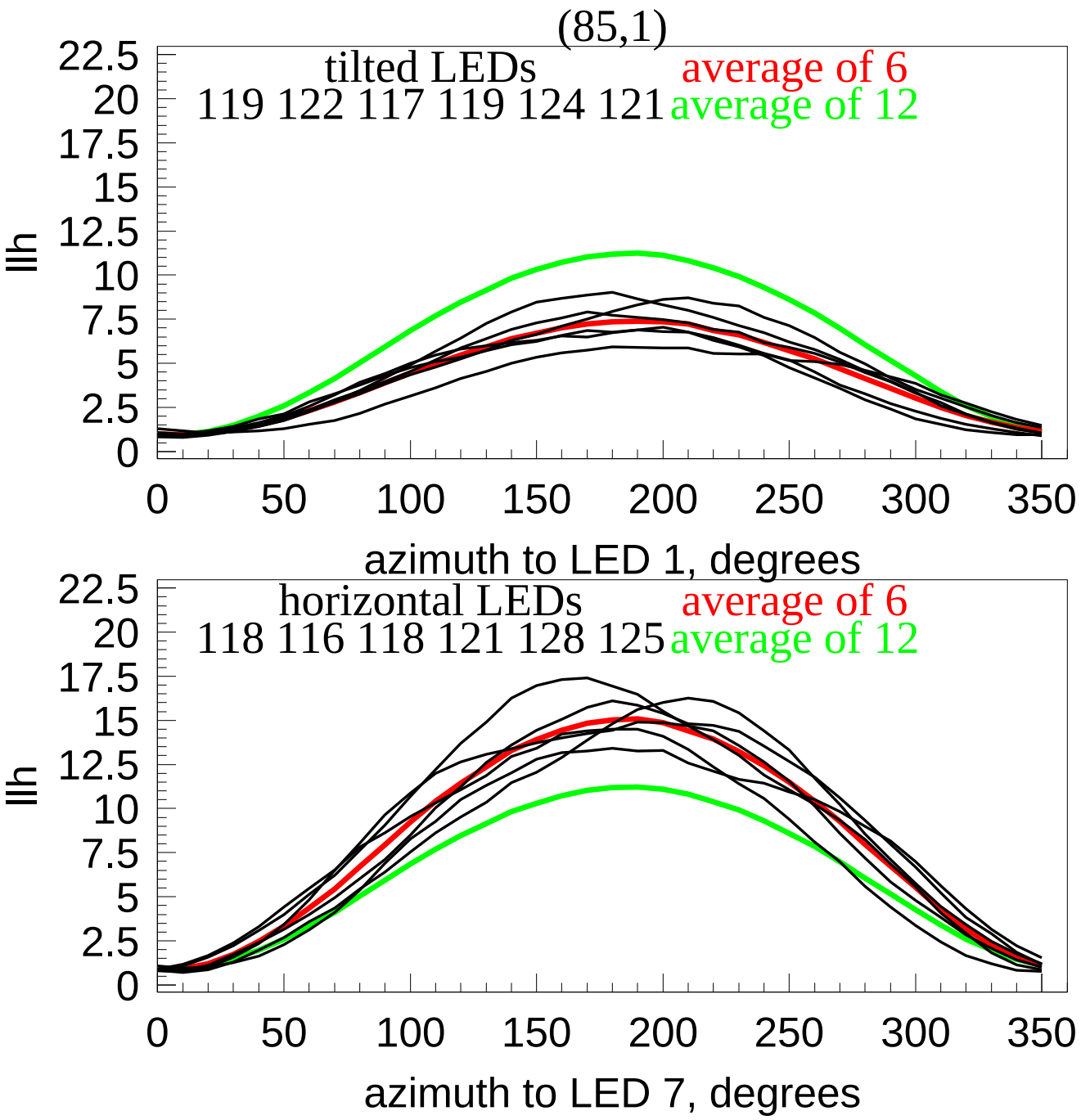

(84,8)
12
7
6
1
11
5
50
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
51.6 ± 6.5

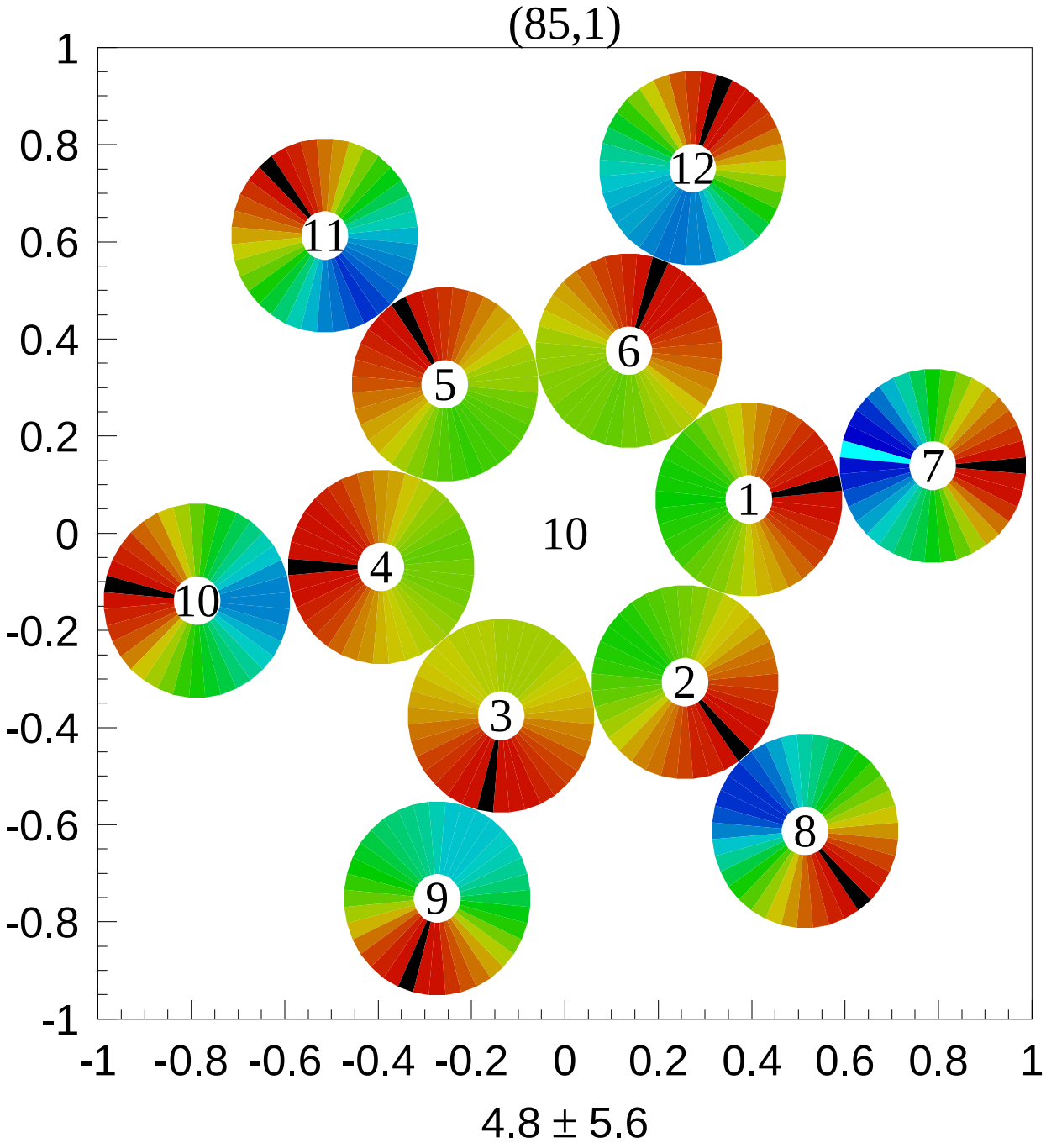

(84,9)
tilted LEDs
114 113 126 119 115 112
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 124 114 123 124 119
average of 6
average of 12
llh
azimuth to LED 7, degrees

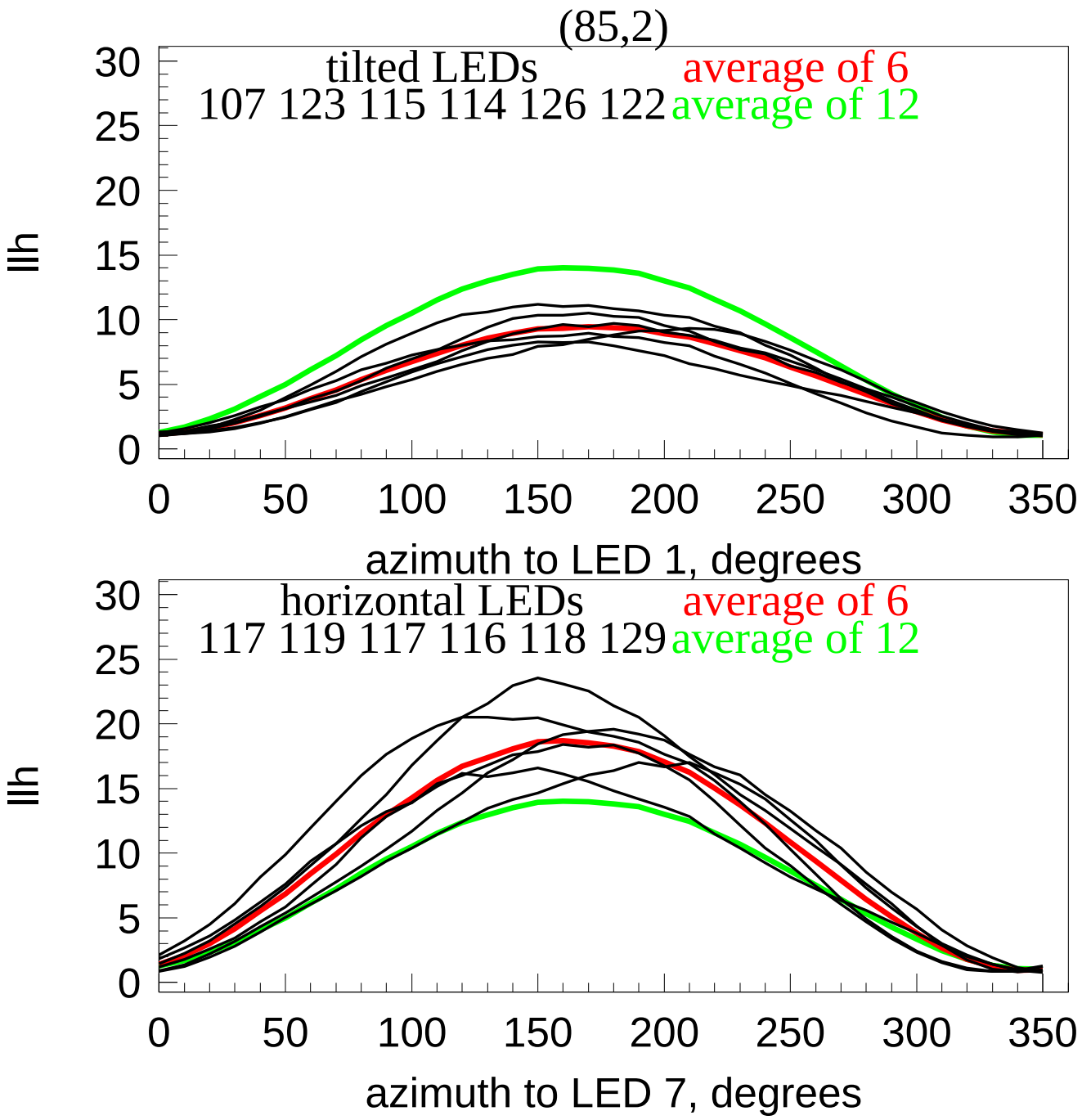

(84,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
7
1
8
12
2
6
100
3
5
9
4
11
10
102.8 ± 6.2

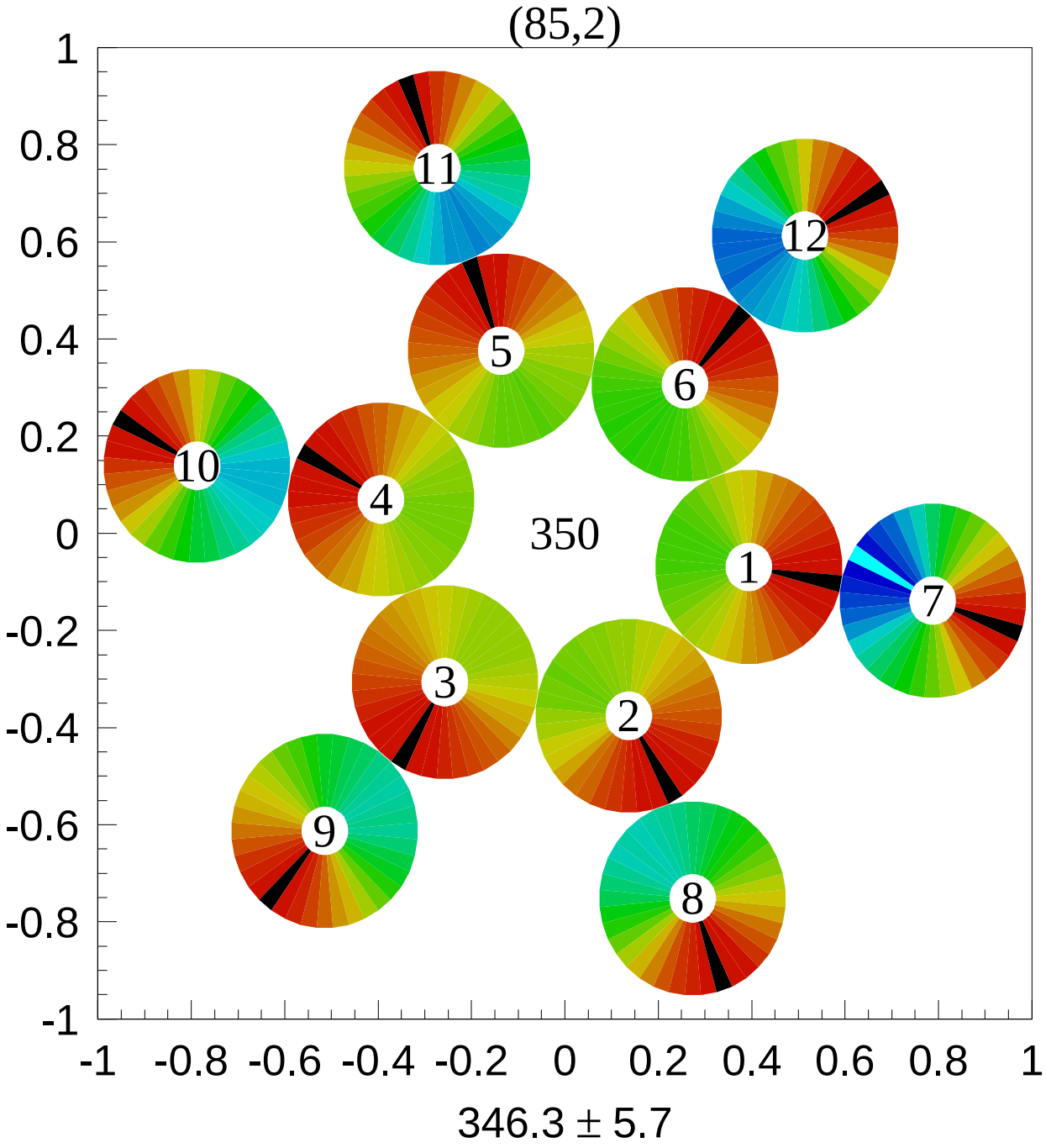

(84,10)
tilted LEDs
119 115 114 116 121 126
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 115 127 70 121 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

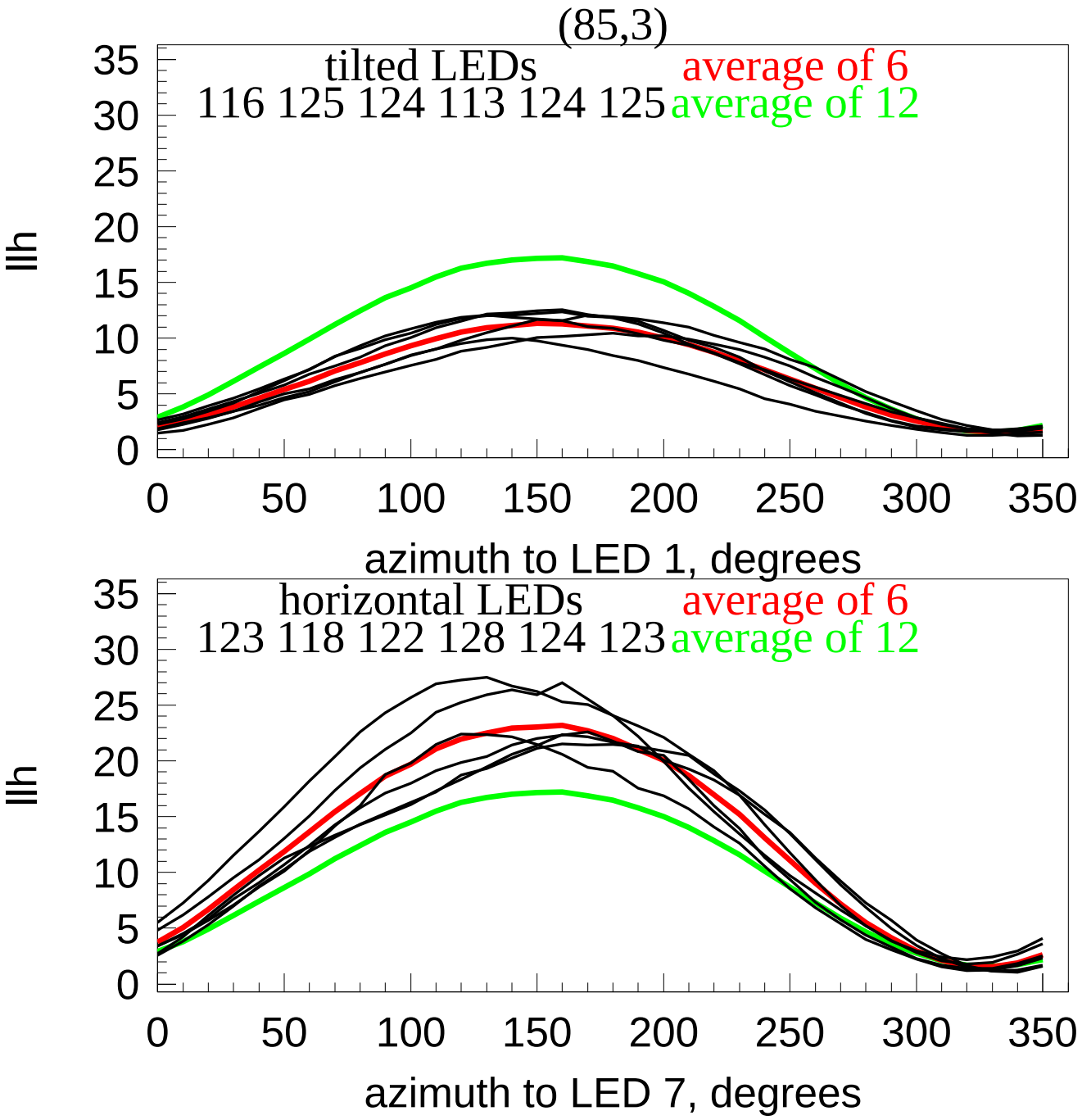

(84,10)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
25.8 ± 6.4

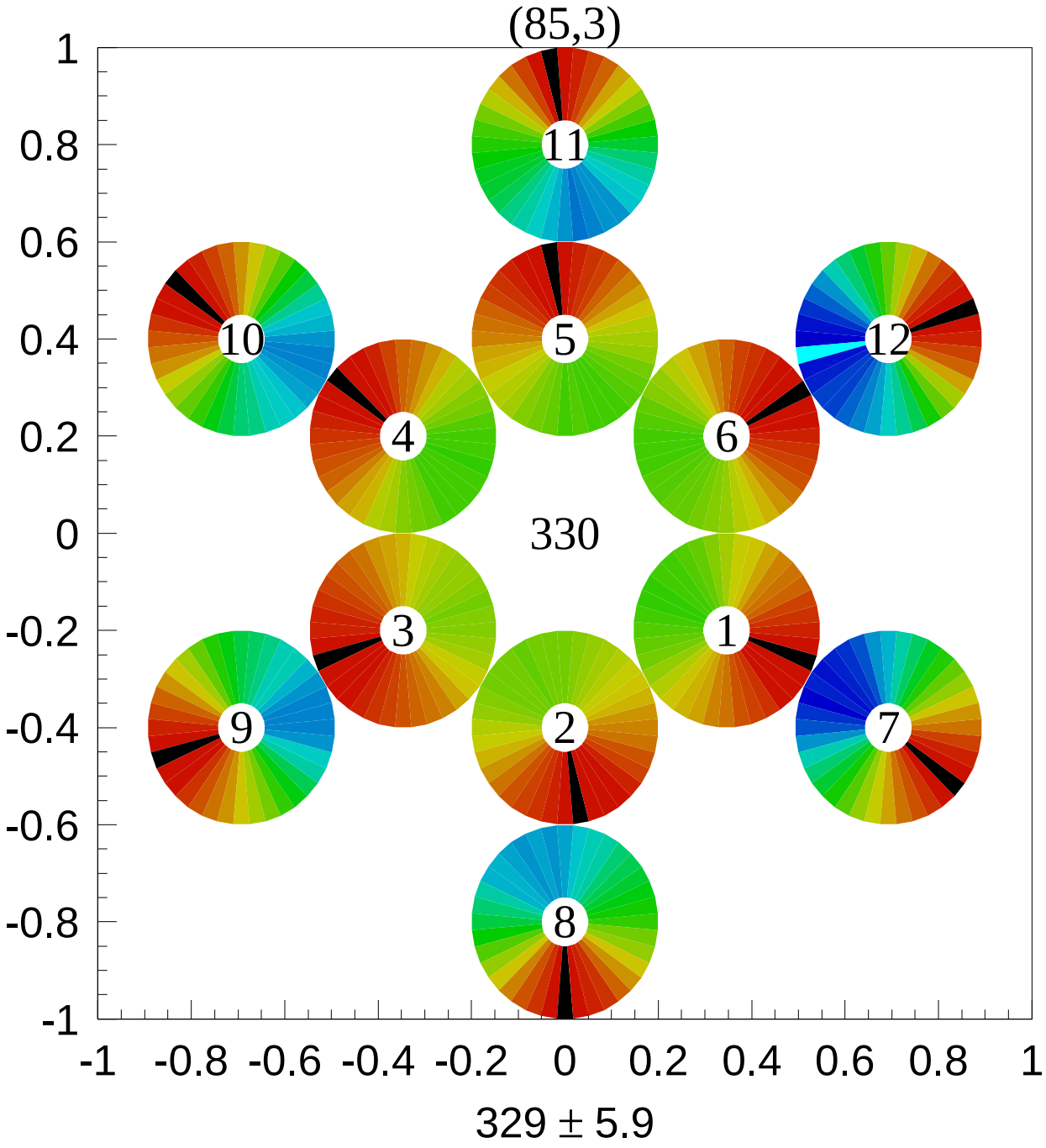

(85,1)
tilted LEDs
119 122 117 119 124 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 116 118 121 128 125
average of 6
average of 12
llh
azimuth to LED 7, degrees

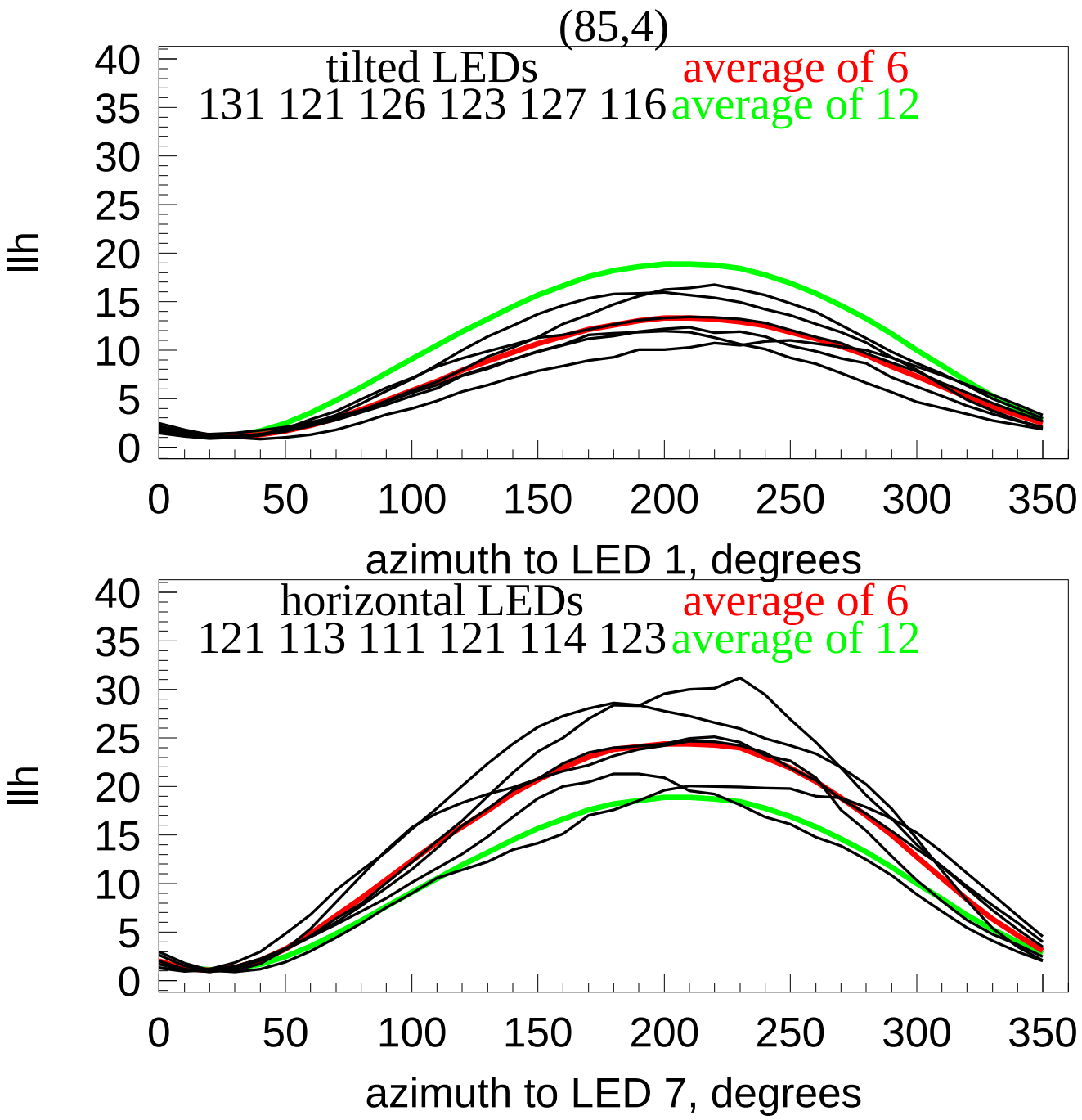

(85,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
4.8 ± 5.6

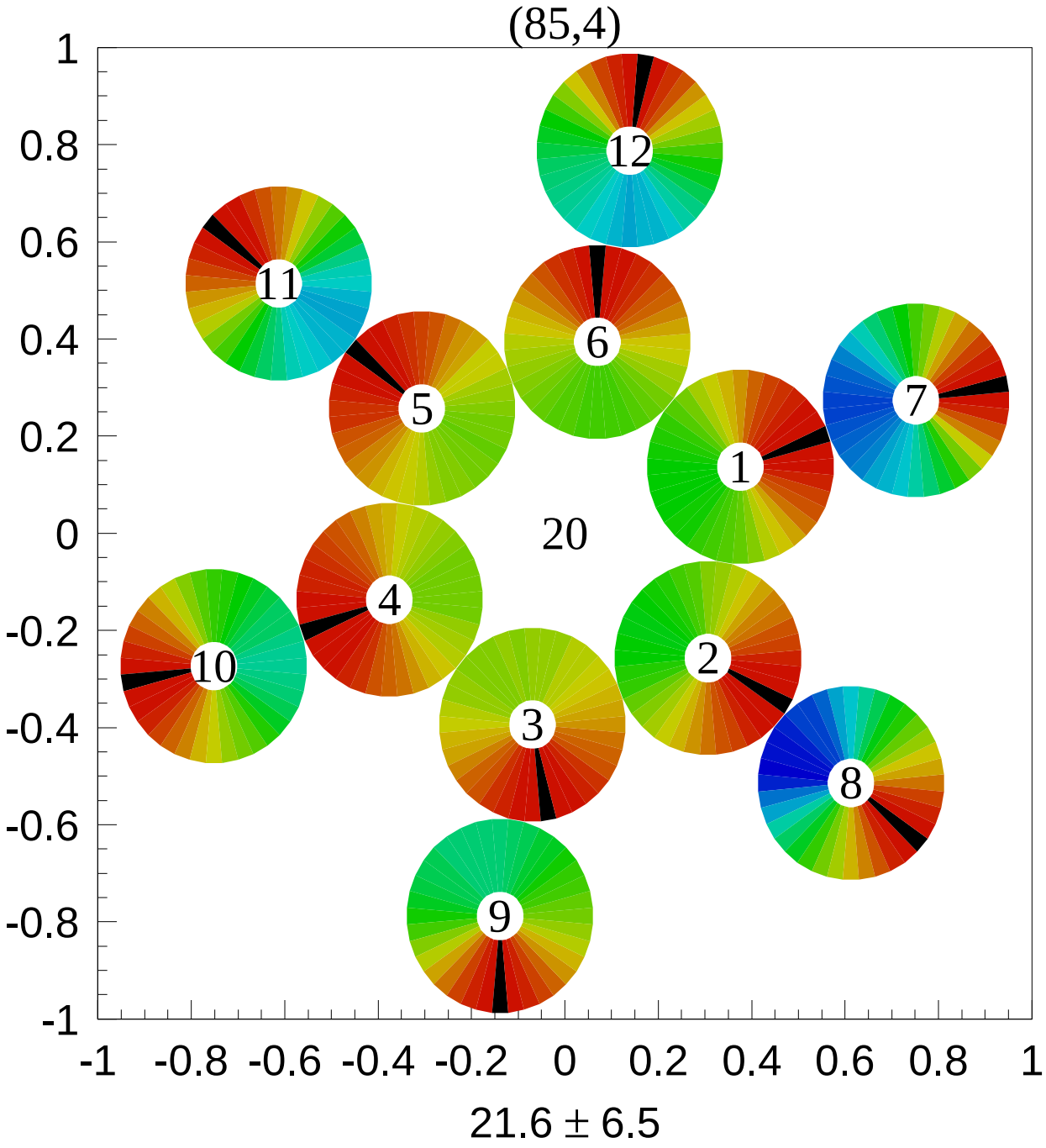

(85,2)
tilted LEDs
107 123 115 114 126 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 119 117 116 118 129
average of 6
average of 12
llh
azimuth to LED 7, degrees

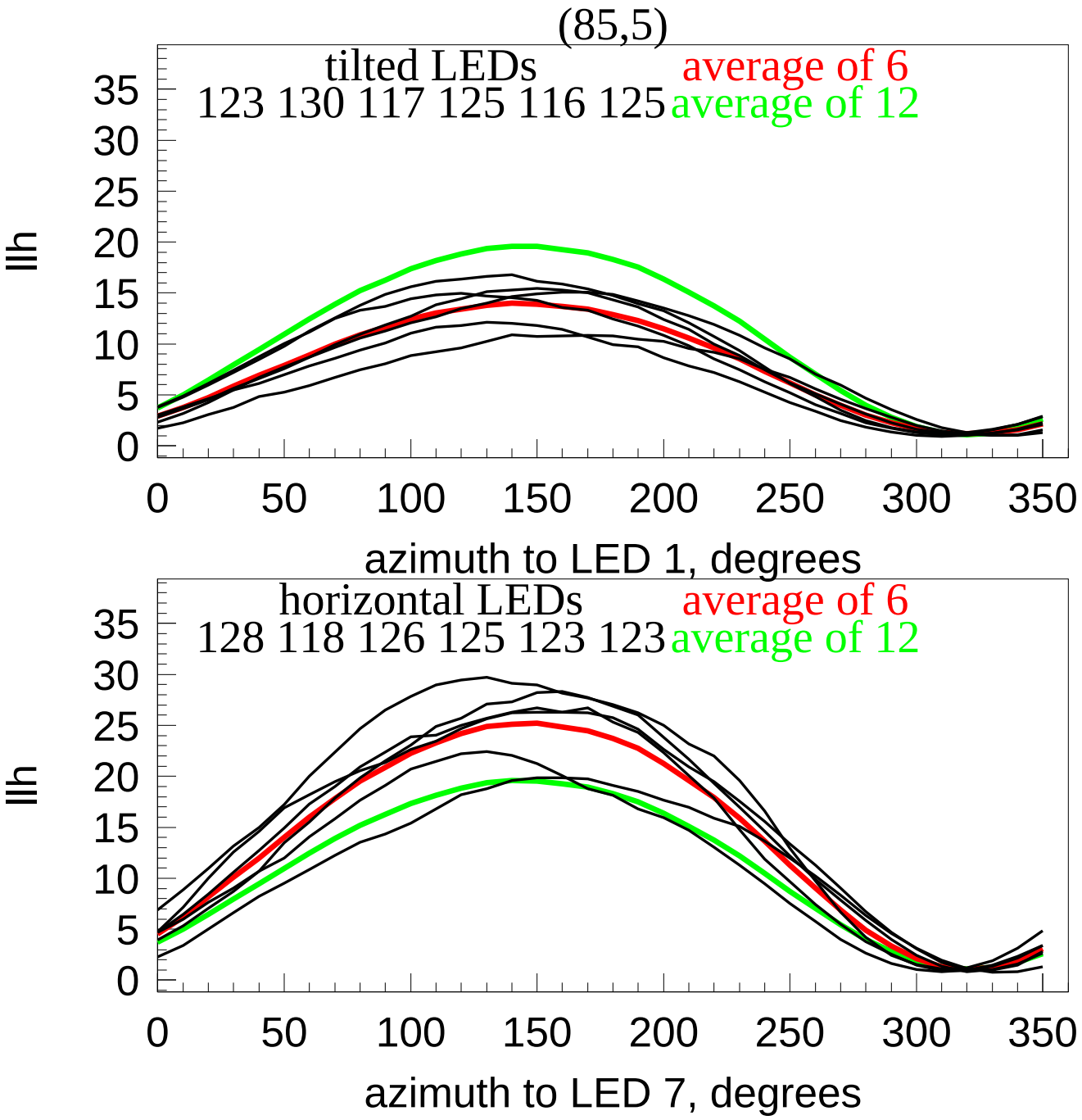

(85,2)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
346.3 ± 5.7

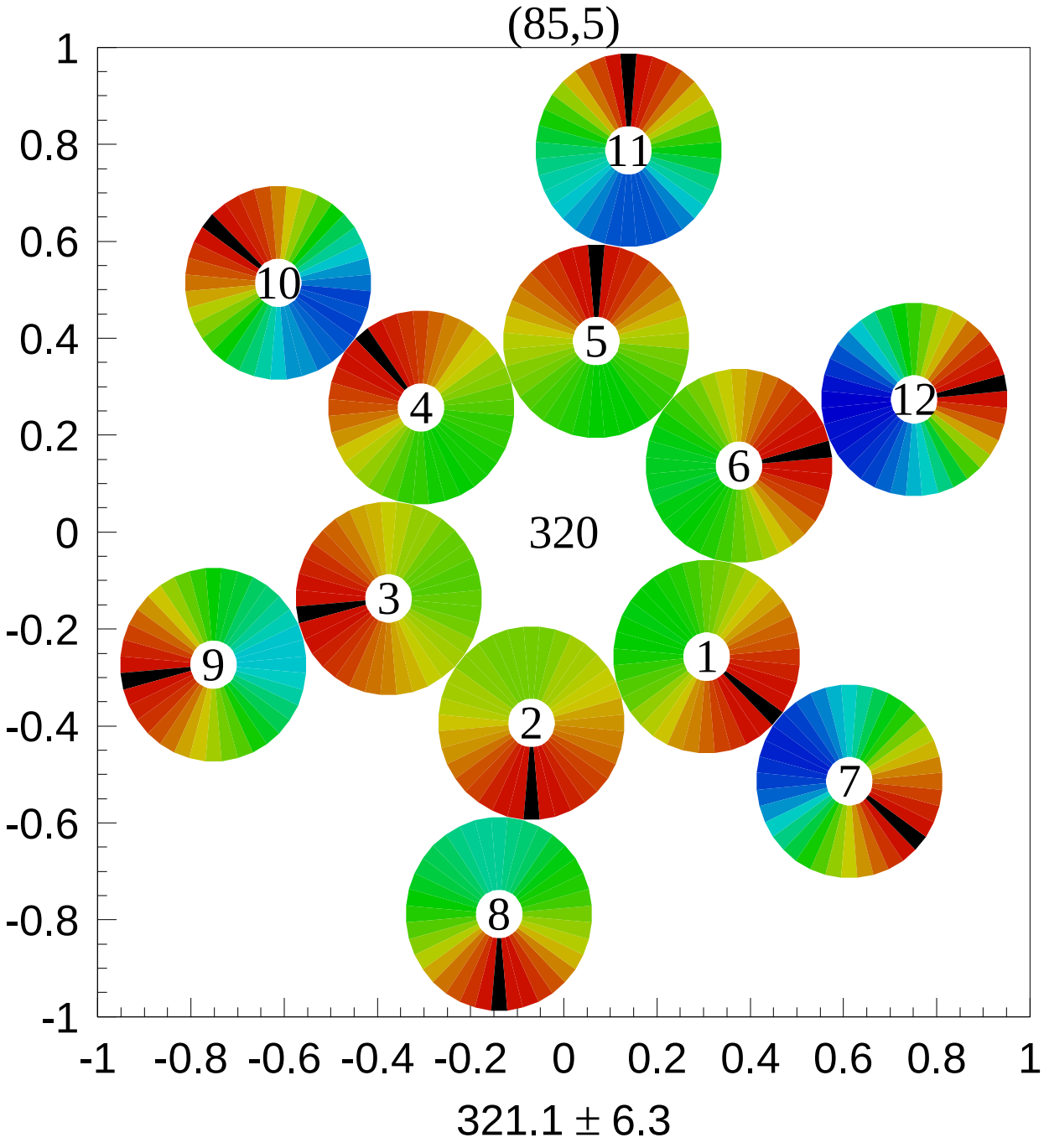

(85,3)
tilted LEDs
116 125 124 113 124 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
123 118 122 128 124 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

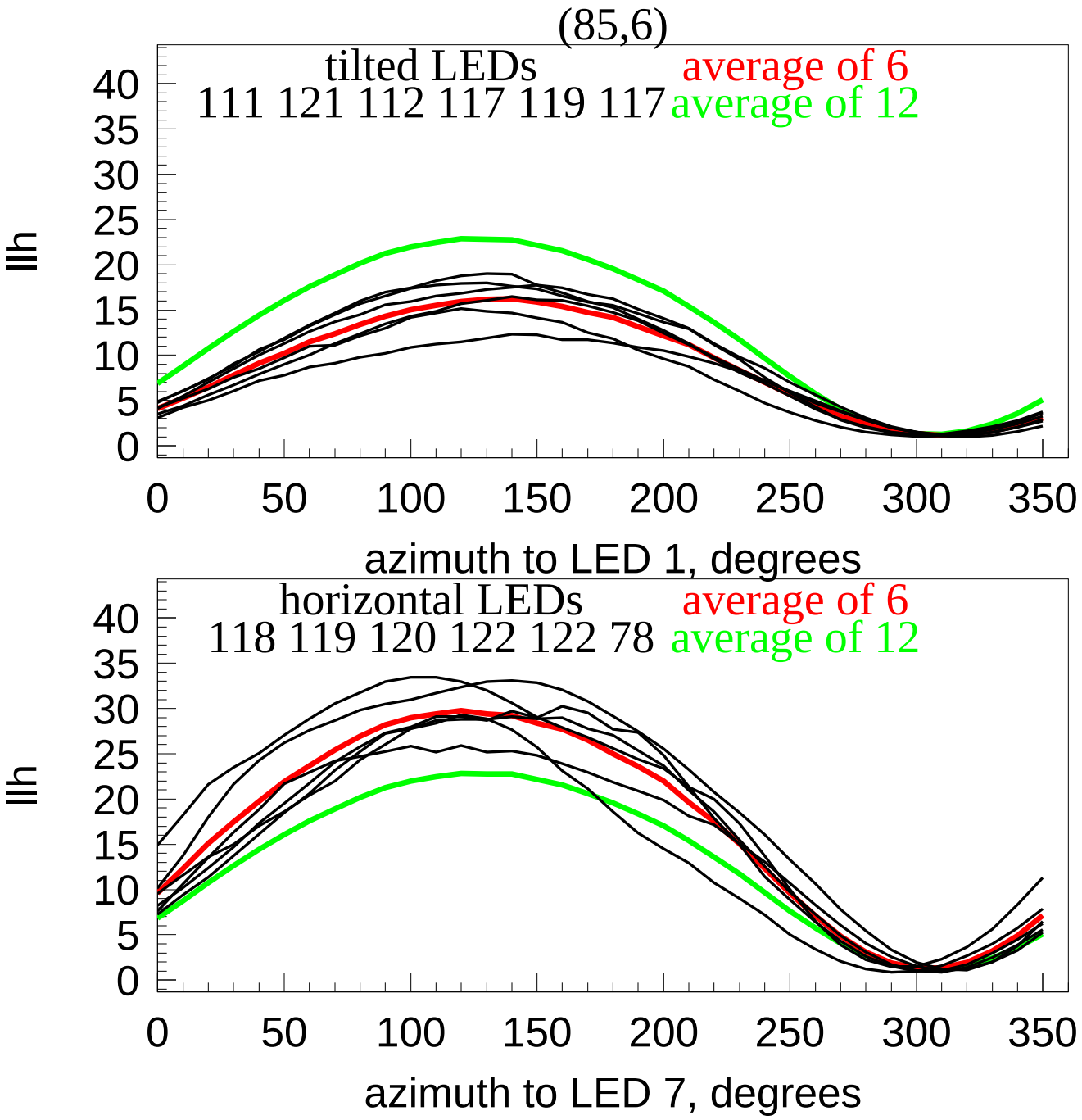

(85,3)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
329 ± 5.9

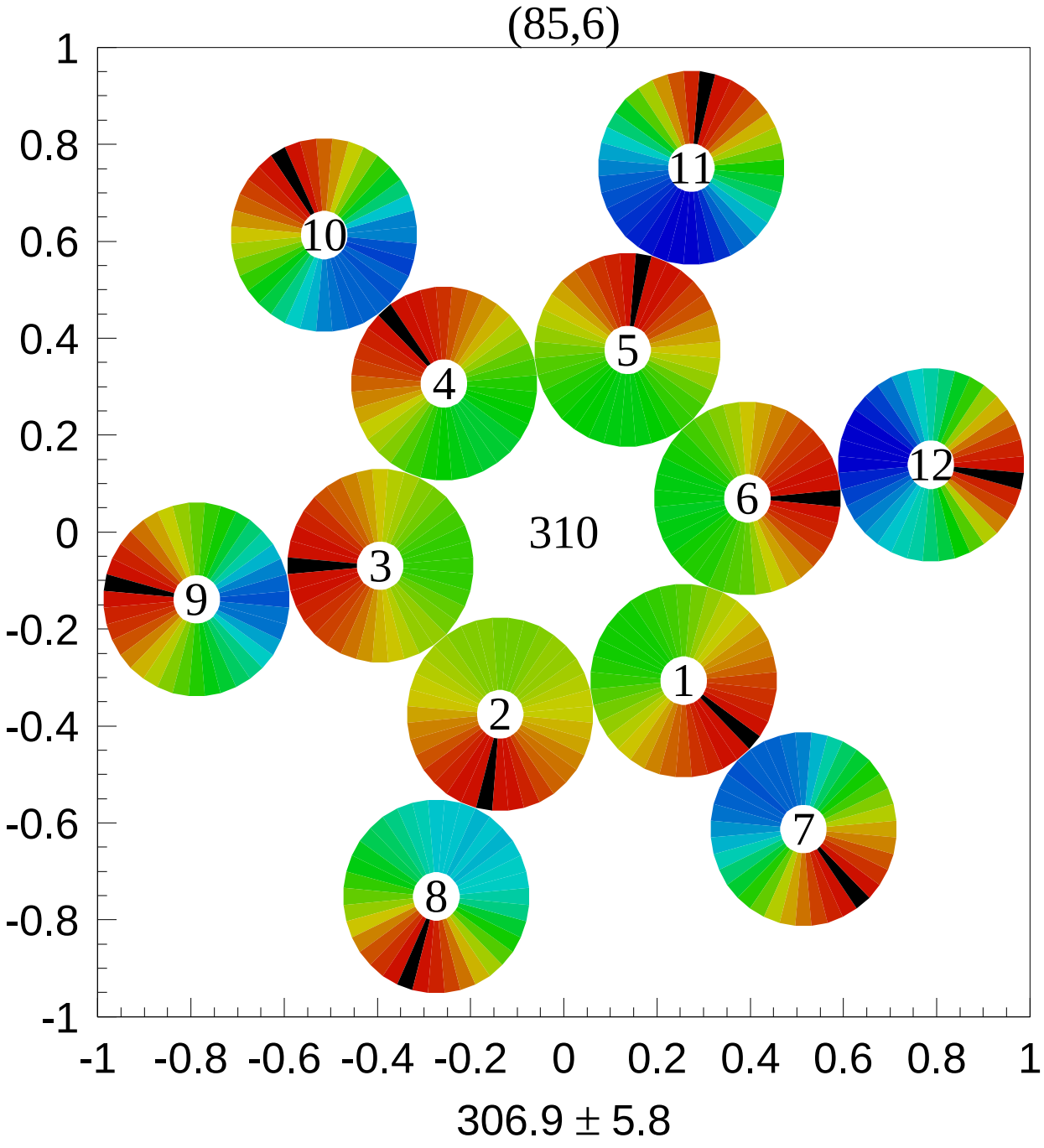

(85,4)
tilted LEDs
131 121 126 123 127 116
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
121 113 111 121 114 123
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

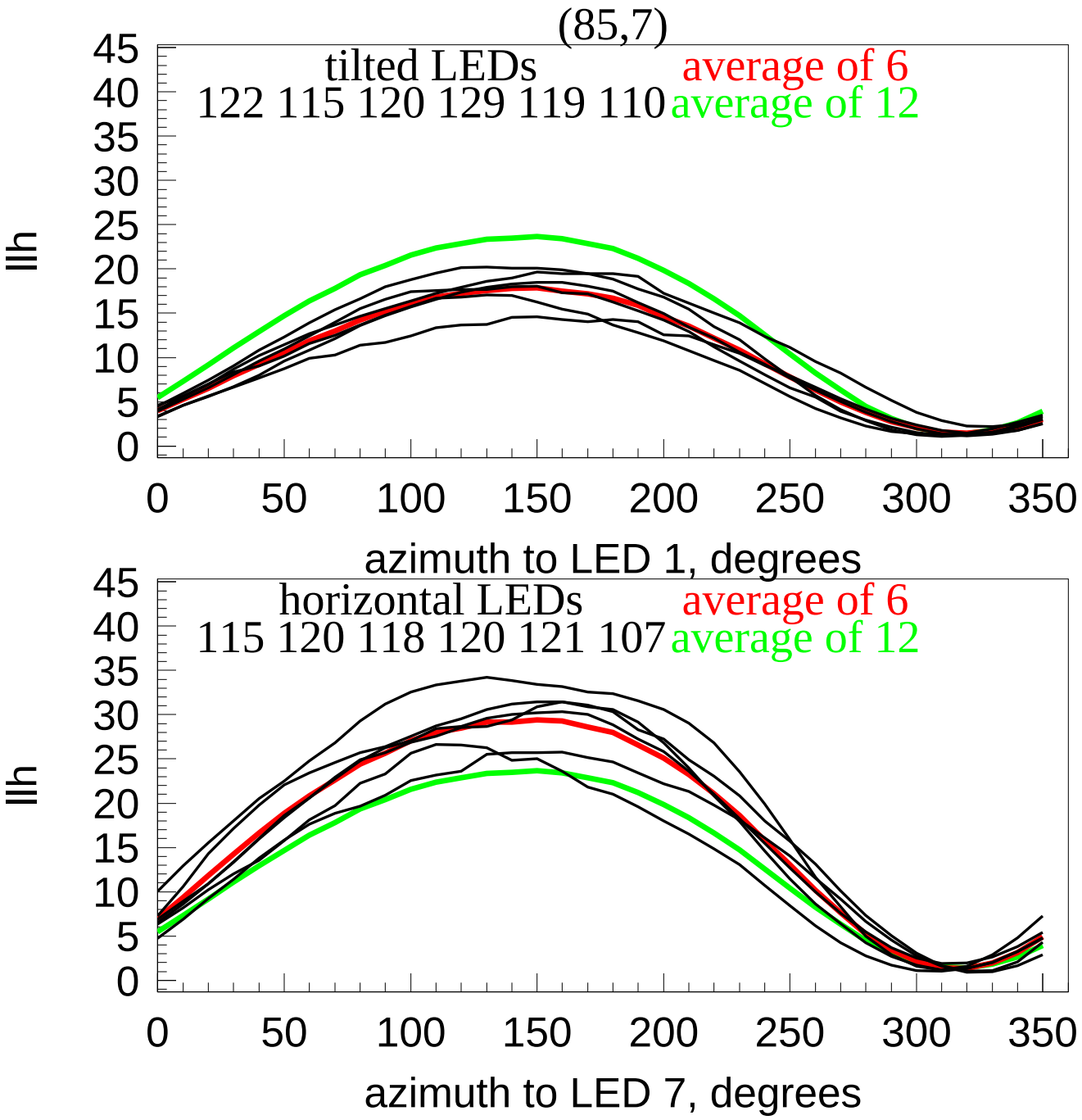

(85,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
21.6 ± 6.5

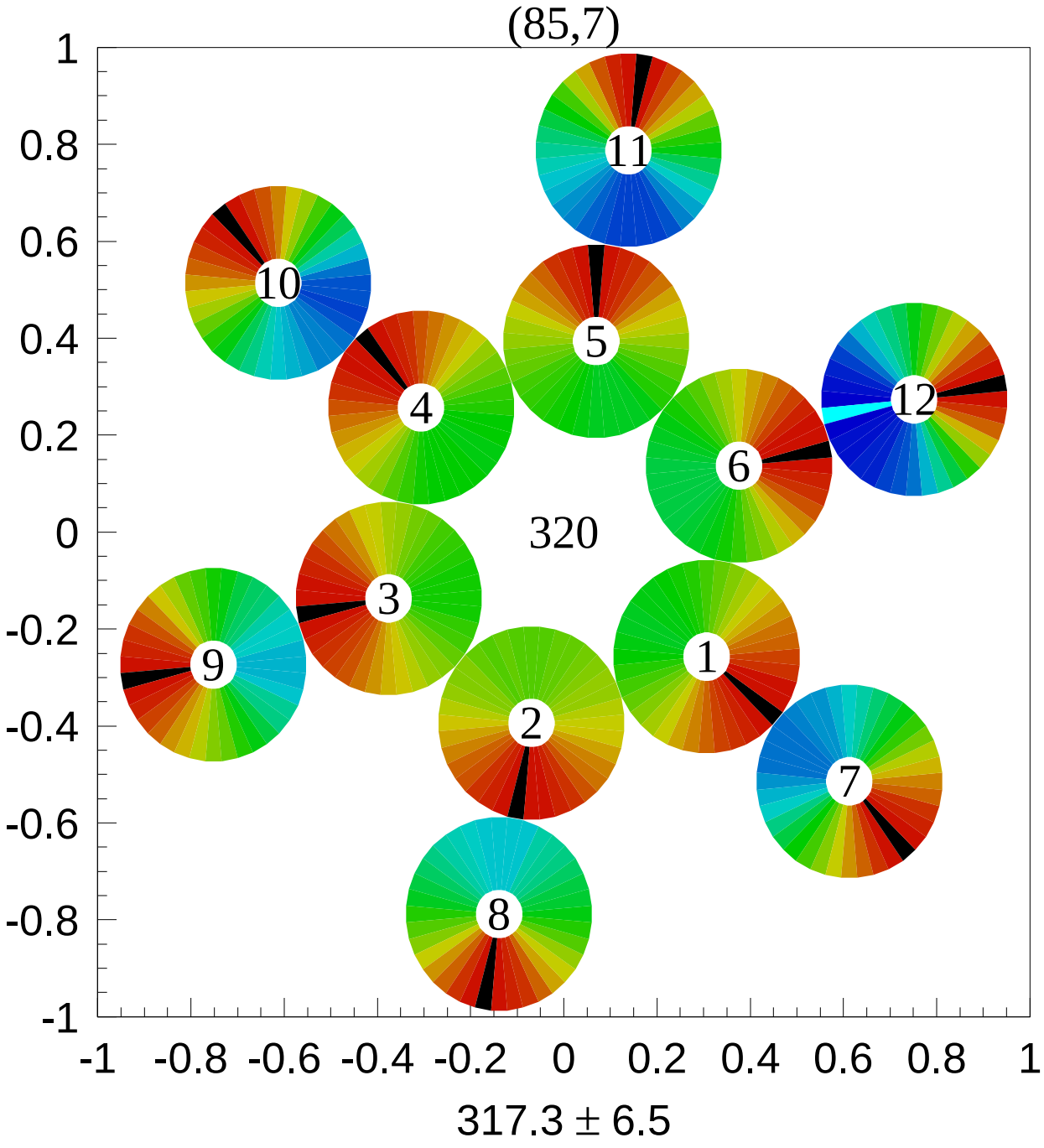

(85,5)
tilted LEDs
123 130 117 125 116 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
128 118 126 125 123 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

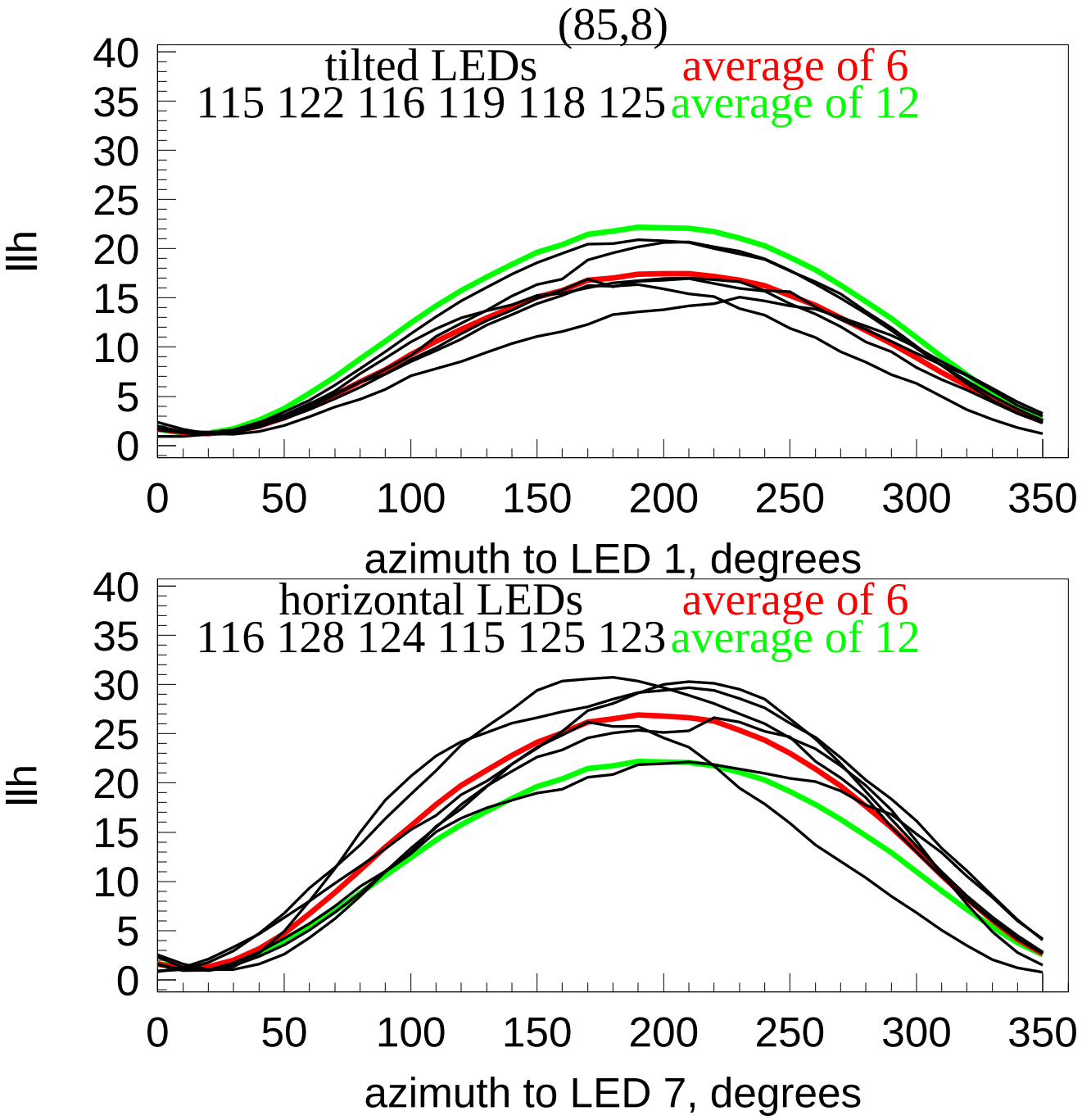

(85,5)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
321.1 ± 6.3

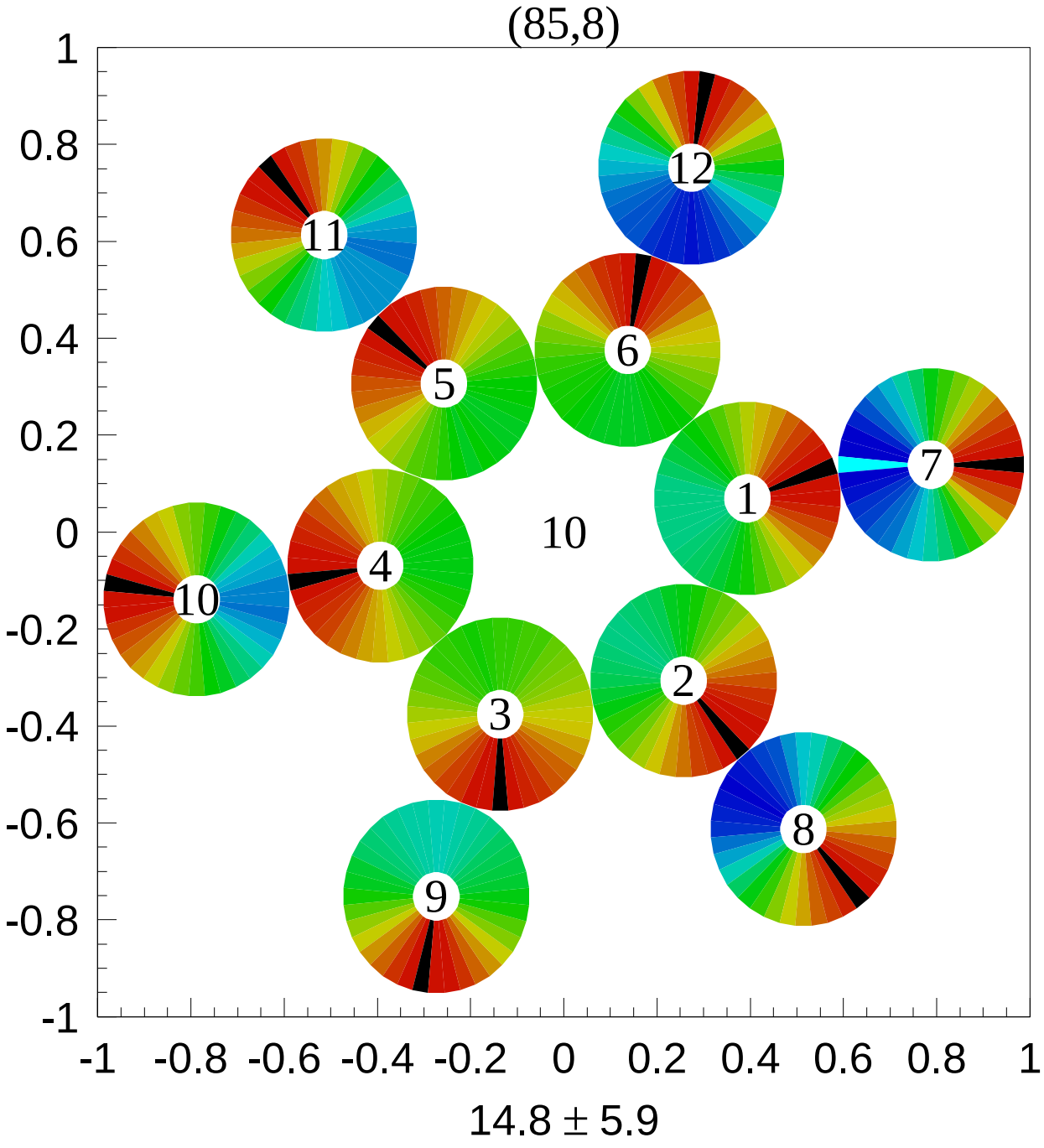

(85,6)
tilted LEDs
111 121 112 117 119 117
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 119 120 122 122 78
average of 6
average of 12
llh
azimuth to LED 7, degrees

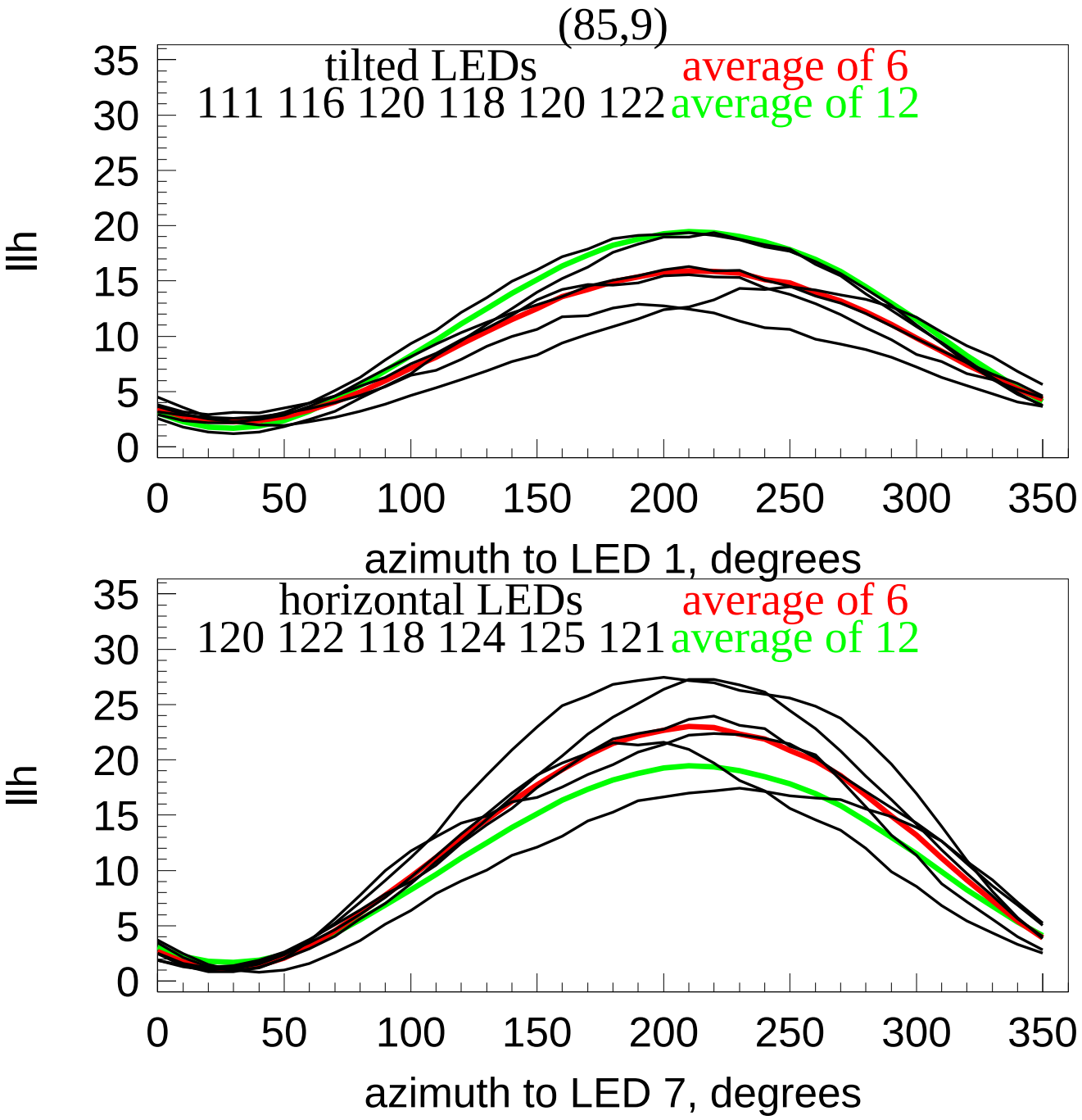

(85,6)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
12
6
3
9
310
2
1
7
8
306.9 ± 5.8

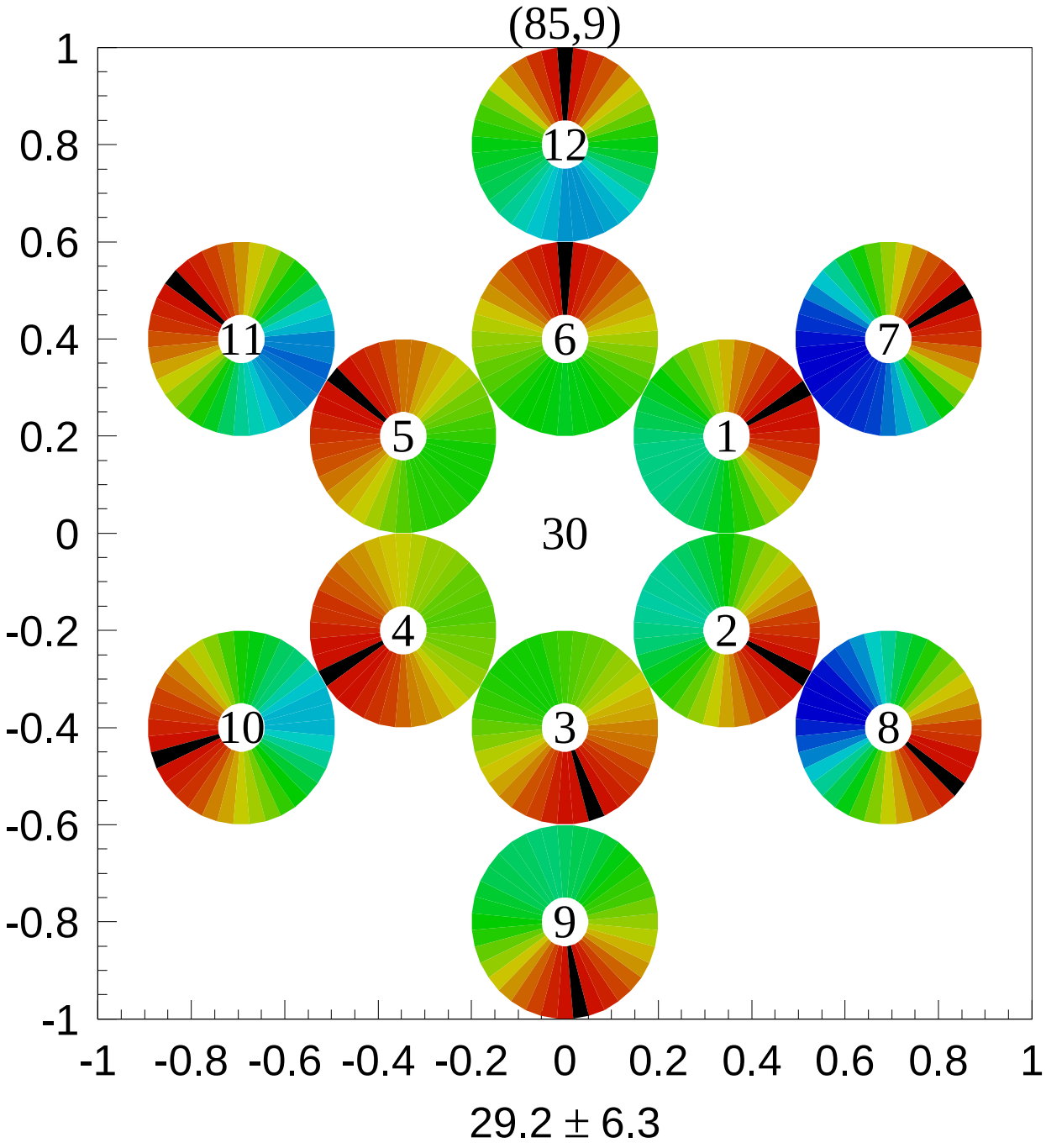

(85,7)
tilted LEDs
122 115 120 129 119 110
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 120 118 120 121 107
average of 6
average of 12
llh
azimuth to LED 7, degrees

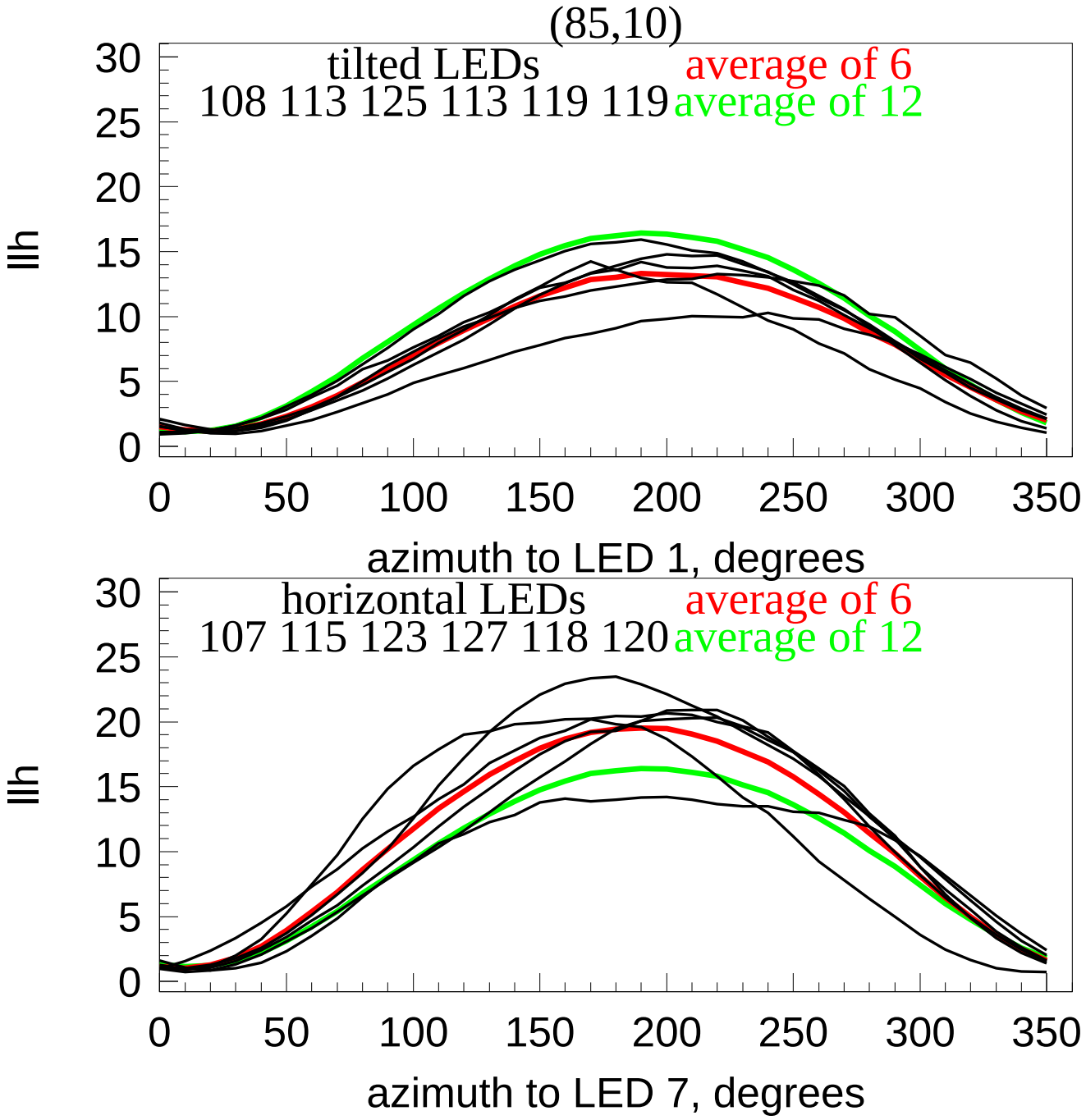

(85,7)
11
10
5
4
12
6
320
3
9
1
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
317.3 ± 6.5

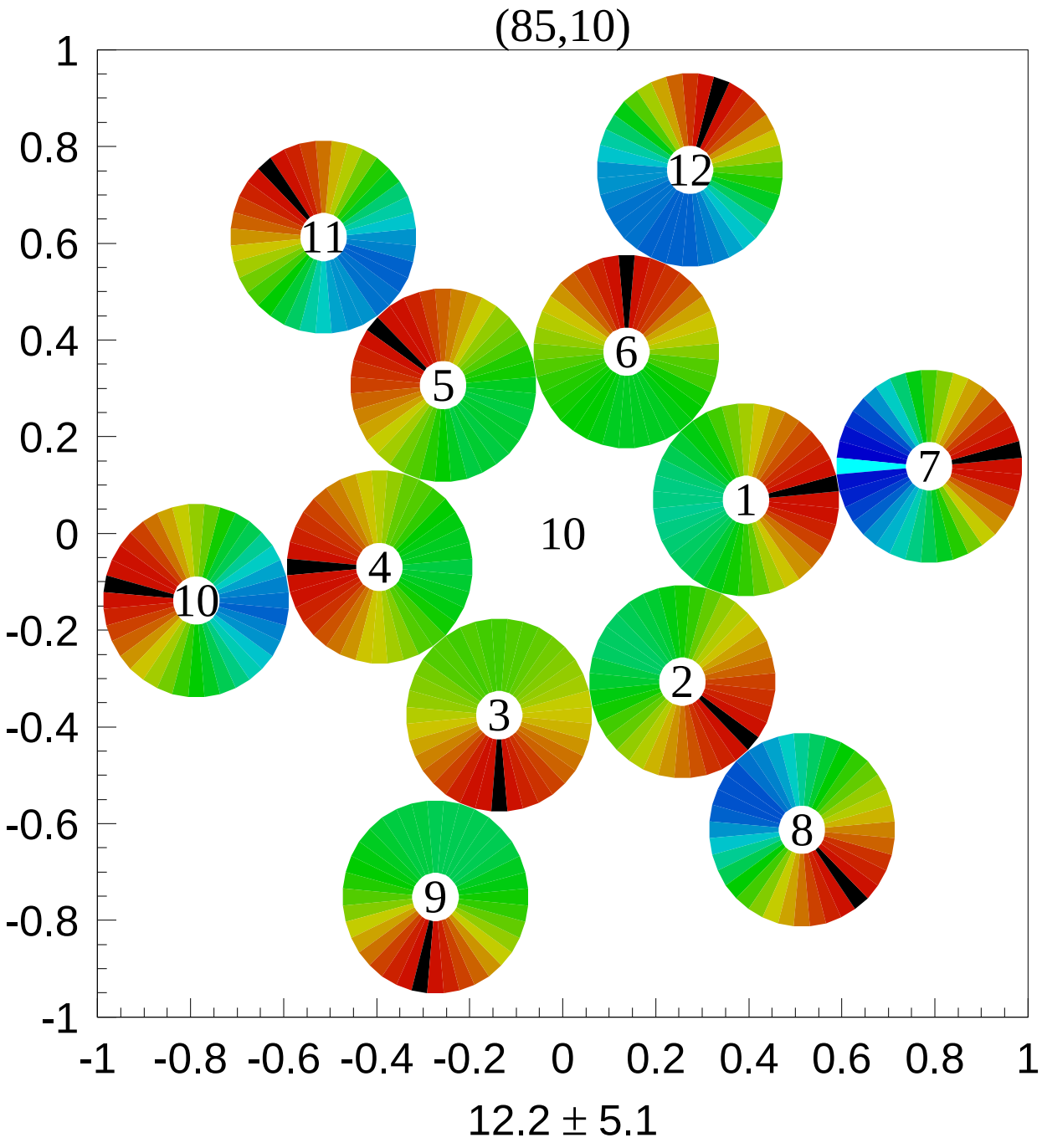

(85,8)
tilted LEDs
115 122 116 119 118 125
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
116 128 124 115 125 123
average of 6
average of 12
llh
azimuth to LED 7, degrees

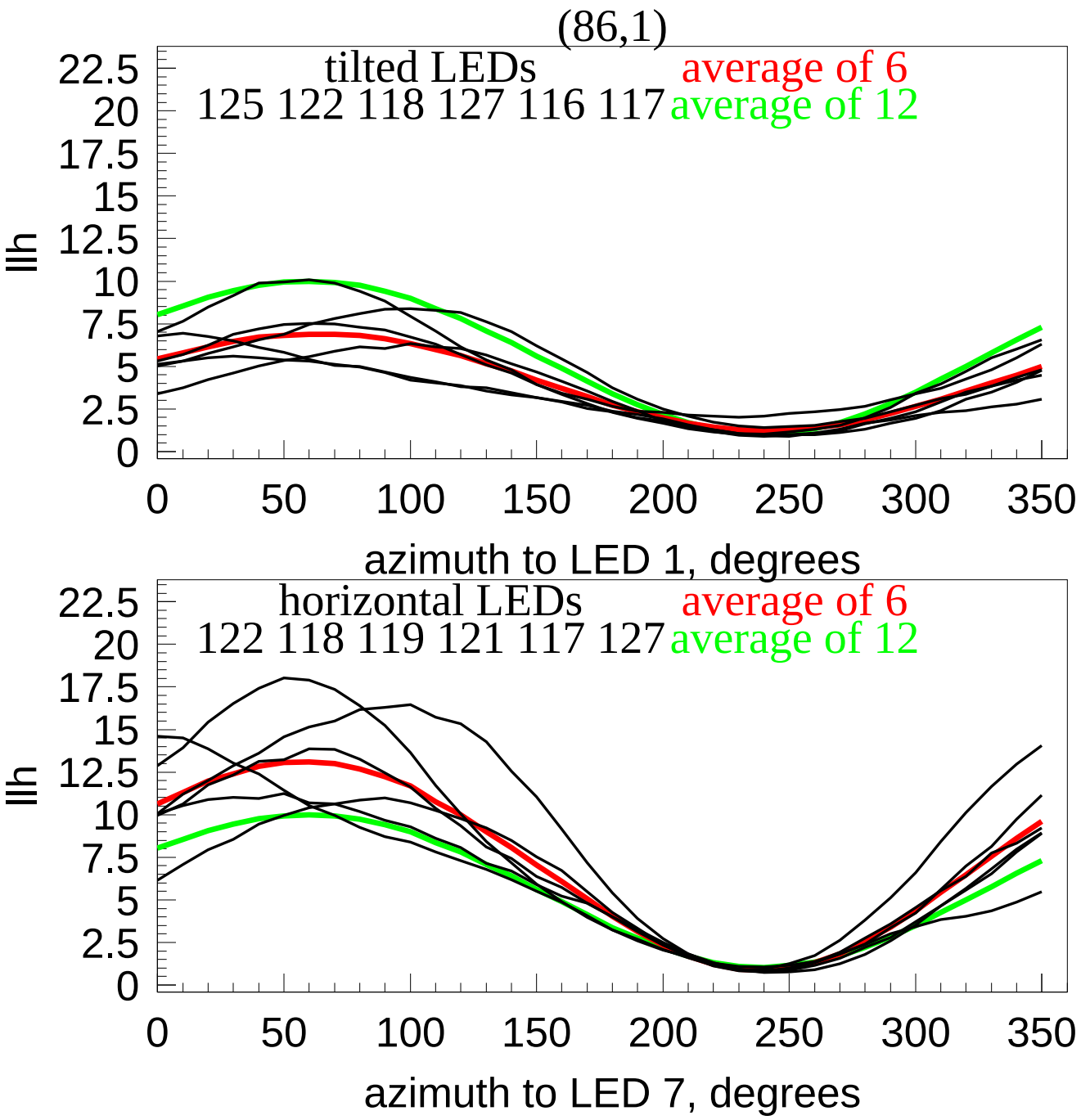

(85,8)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
10
4
10
2
3
8
9
14.8 ± 5.9

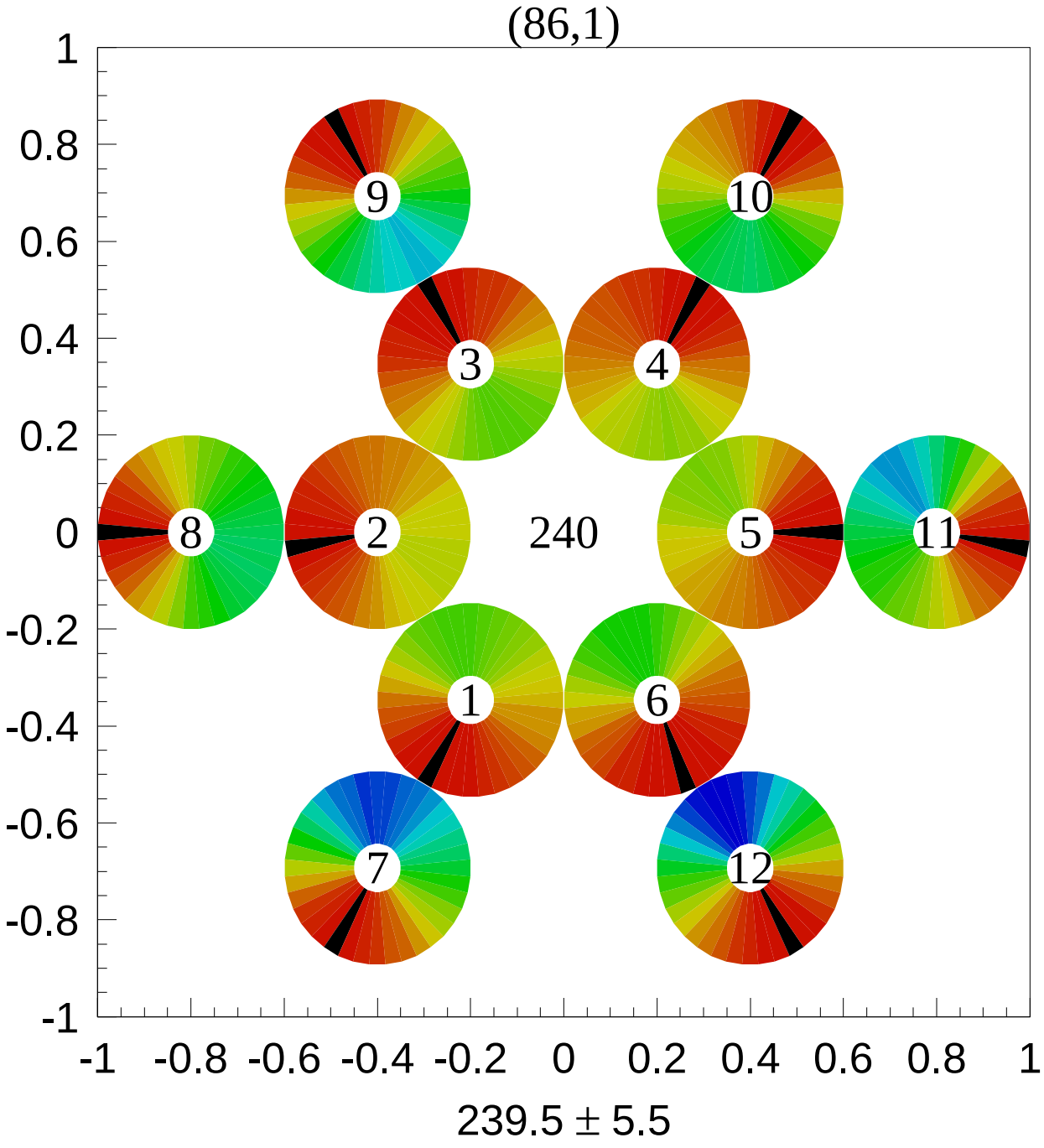

(85,9)
tilted LEDs
111 116 120 118 120 122
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
120 122 118 124 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

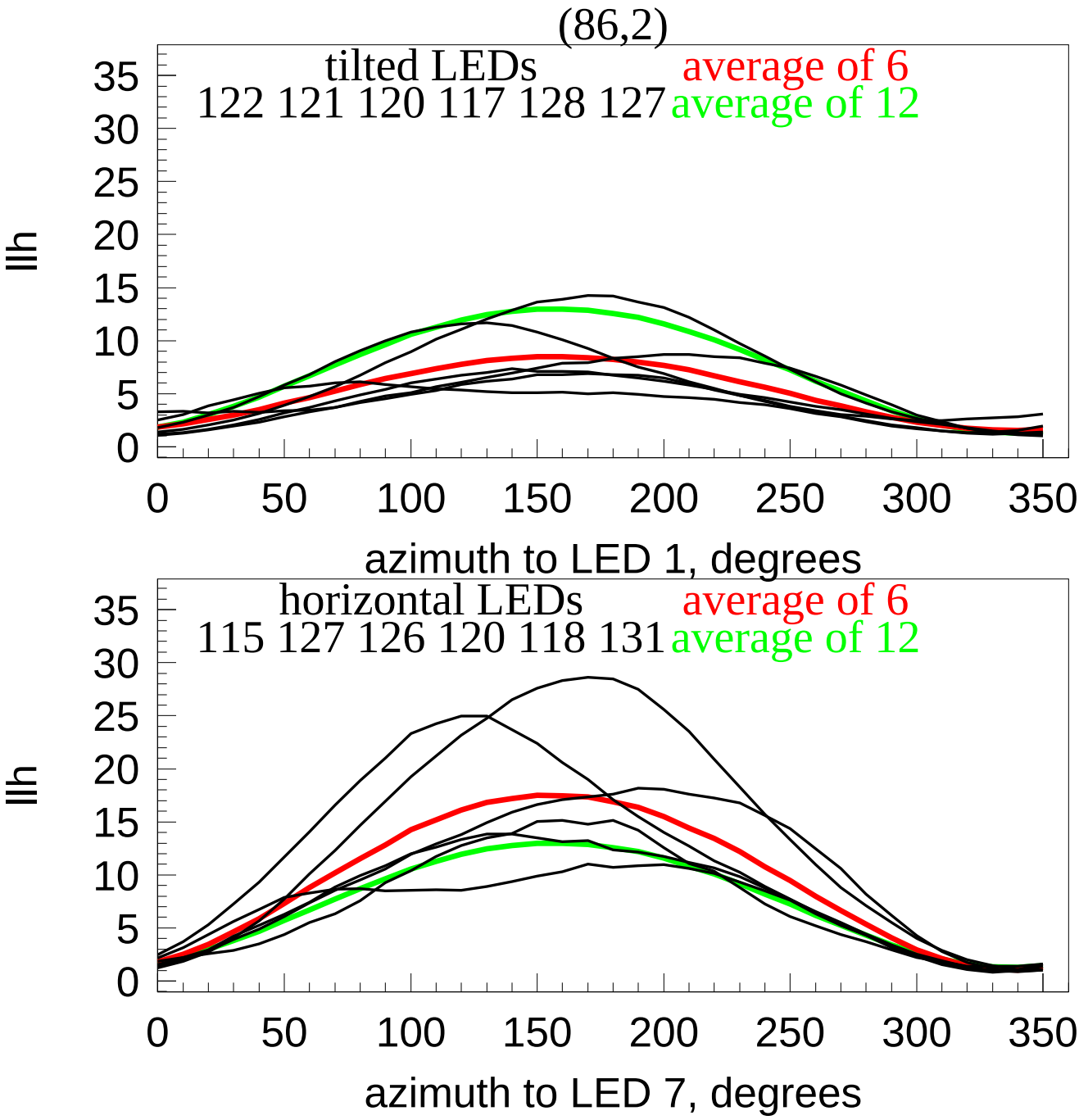

(85,9)
12
11
6
7
5
1
30
4
2
10
3
8
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
29.2 ± 6.3

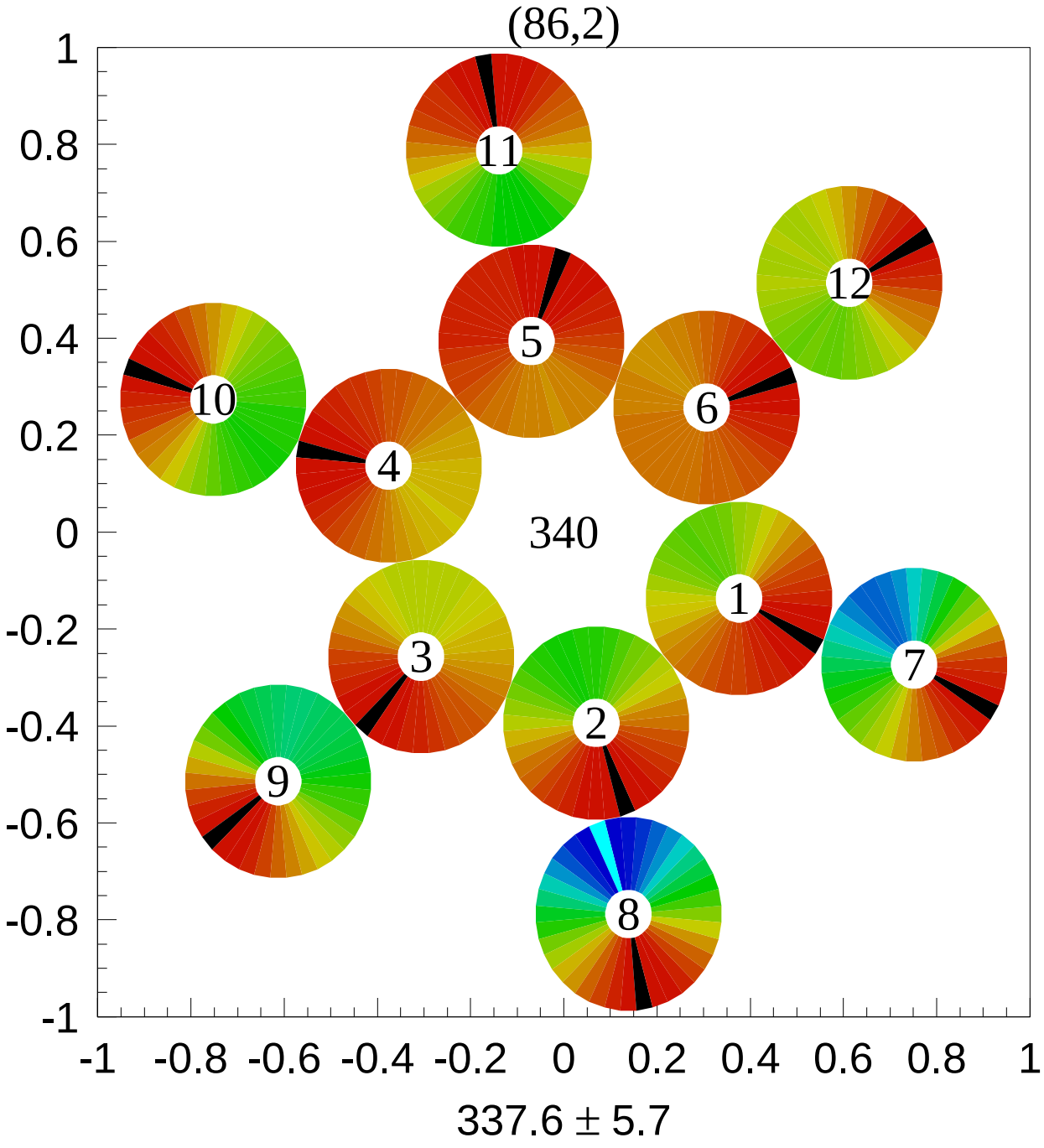

(85,10)
tilted LEDs
108 113 125 113 119 119
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
107 115 123 127 118 120
average of 6
average of 12
Ilh
azimuth to LED 7, degrees

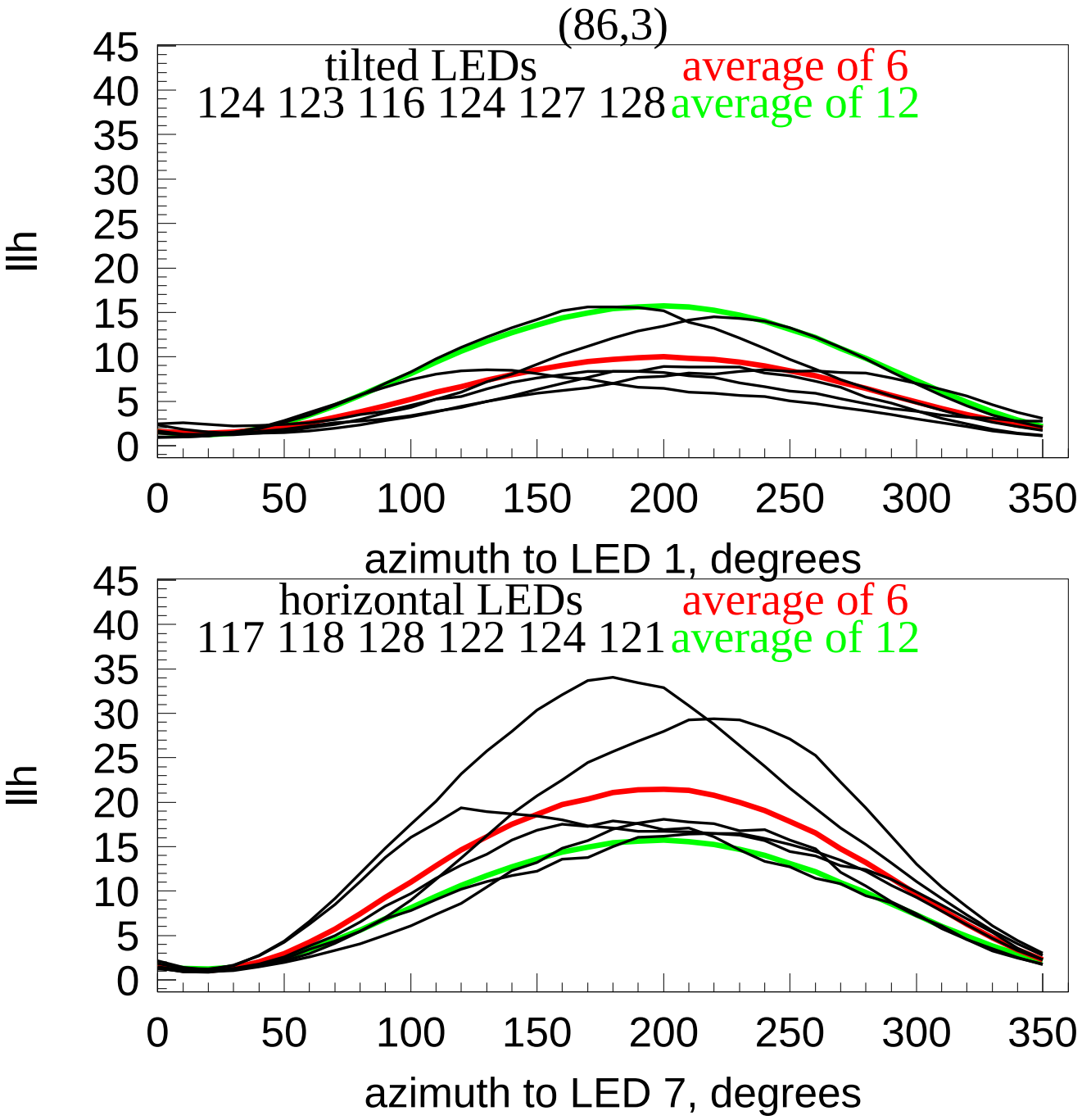

(85,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12.2 ± 5.1
12
11
6
5
7
1
10
4
10
2
3
8
9

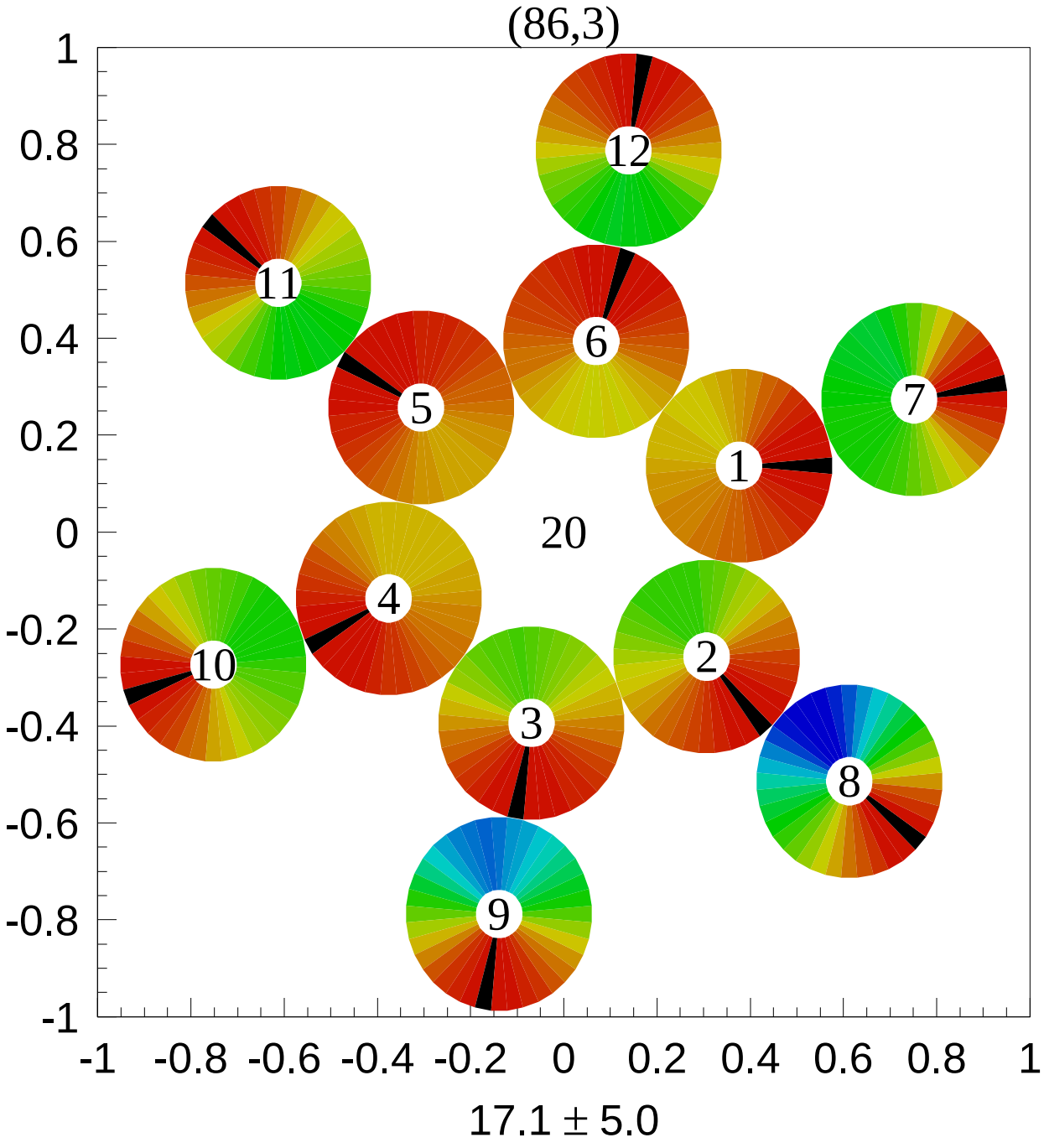

(86,1)
tilted LEDs
125 122 118 127 116 117
average of 6
average of 12
llh
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
122 118 119 121 117 127
average of 6
average of 12
llh
azimuth to LED 7, degrees

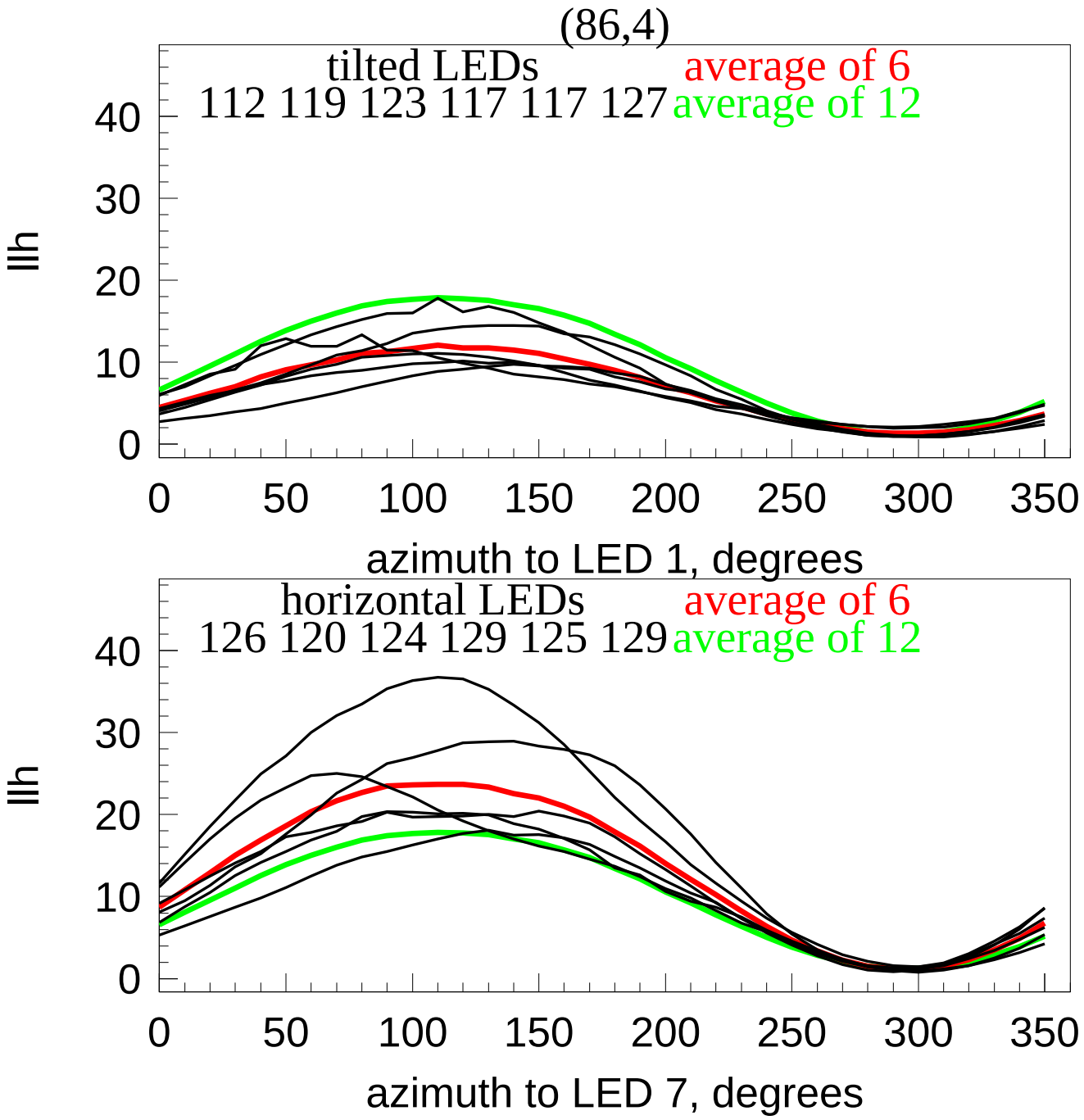

(86,1)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
9
10
3
4
8
2
240
5
11
1
6
7
12
239.5 ± 5.5

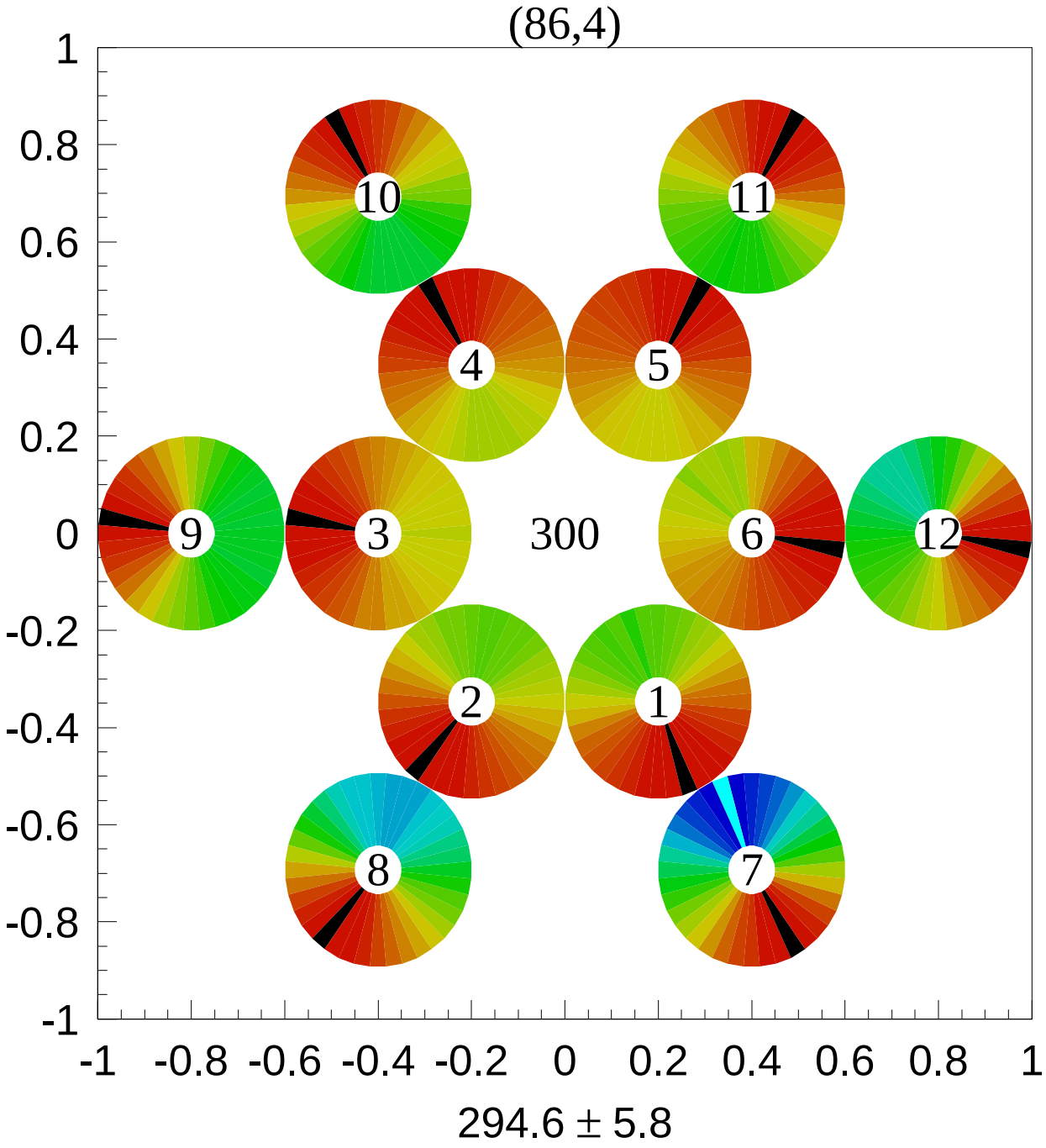

(86,2)
tilted LEDs
122 121 120 117 128 127
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
115 127 126 120 118 131
average of 6
average of 12
llh
azimuth to LED 7, degrees

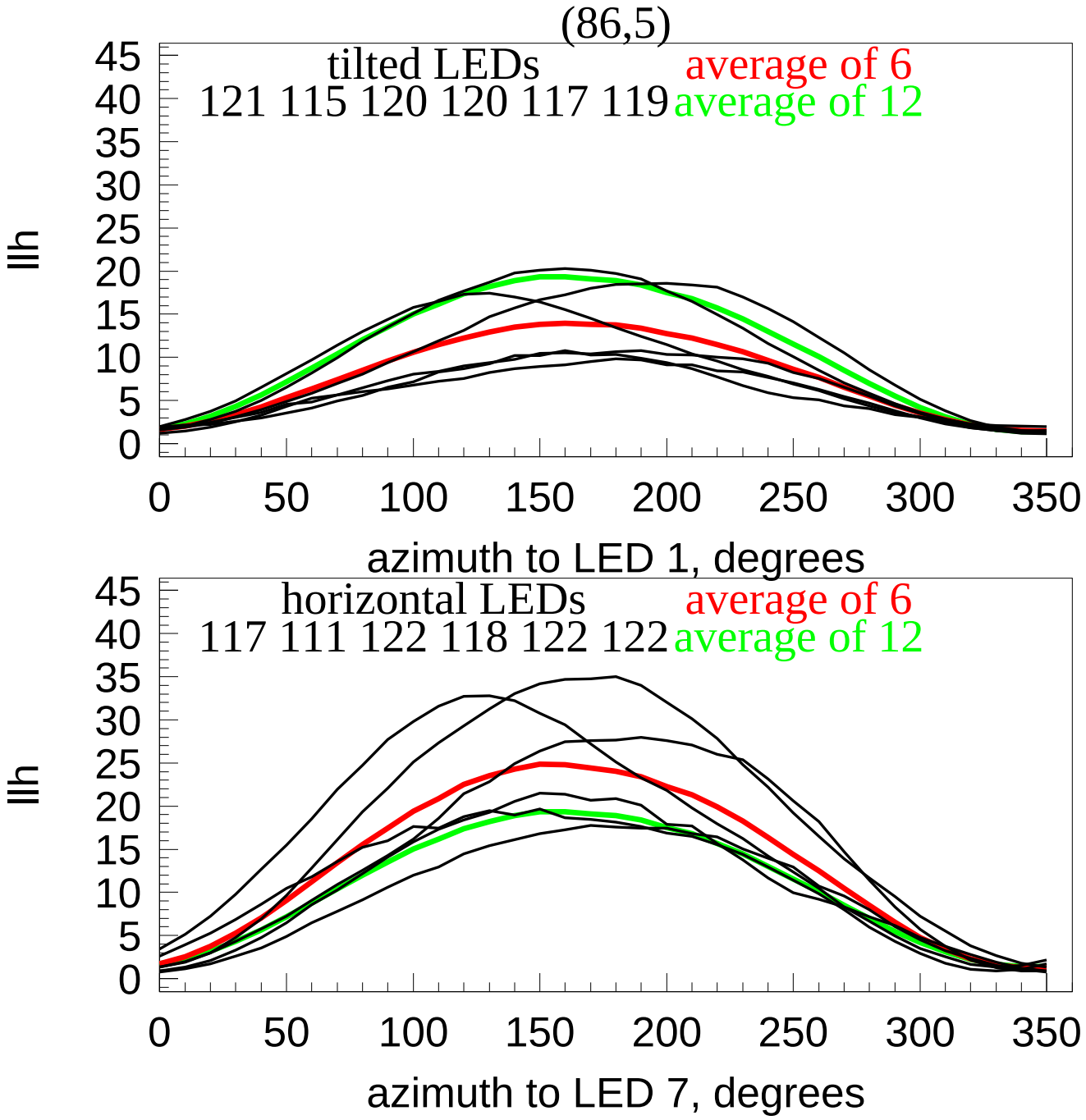

(86,2)
11
12
5
6
10
4
340
1
3
7
2
9
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
337.6 ± 5.7

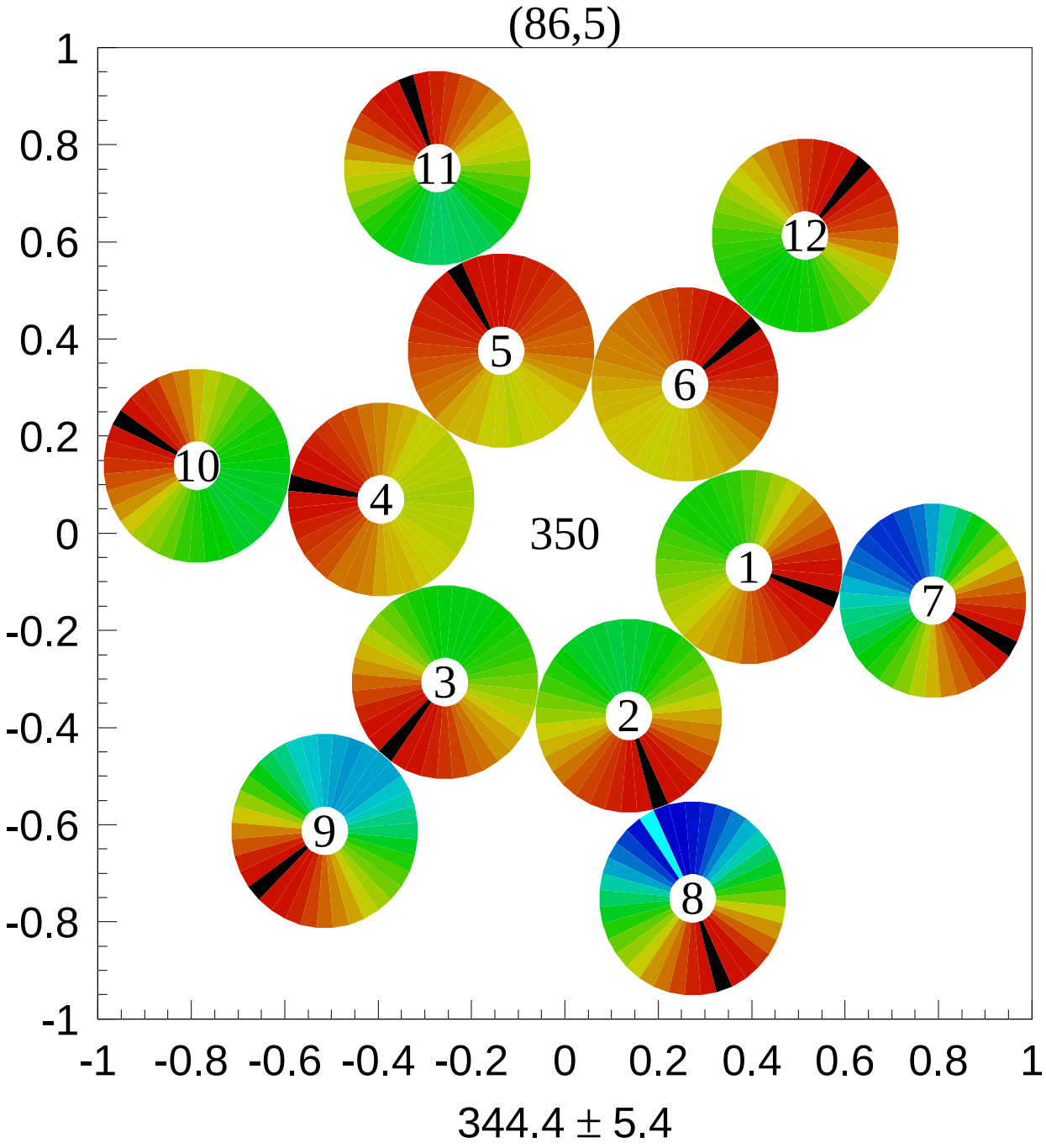

(86,3)
tilted LEDs
124 123 116 124 127 128
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 118 128 122 124 121
average of 6
average of 12
llh
azimuth to LED 7, degrees

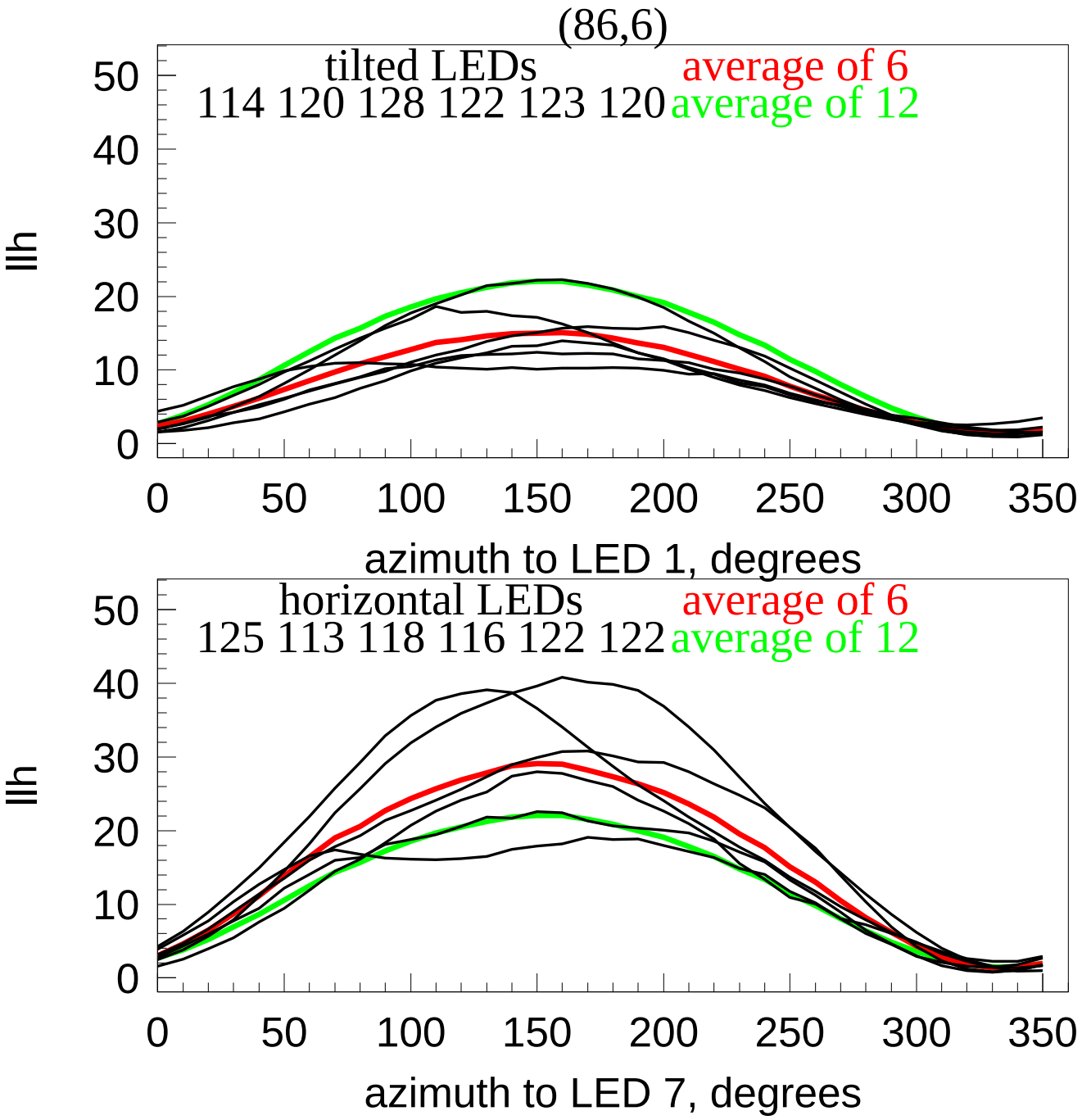

(86,3)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
12
11
6
5
7
1
20
4
10
2
3
8
9
17.1 ± 5.0

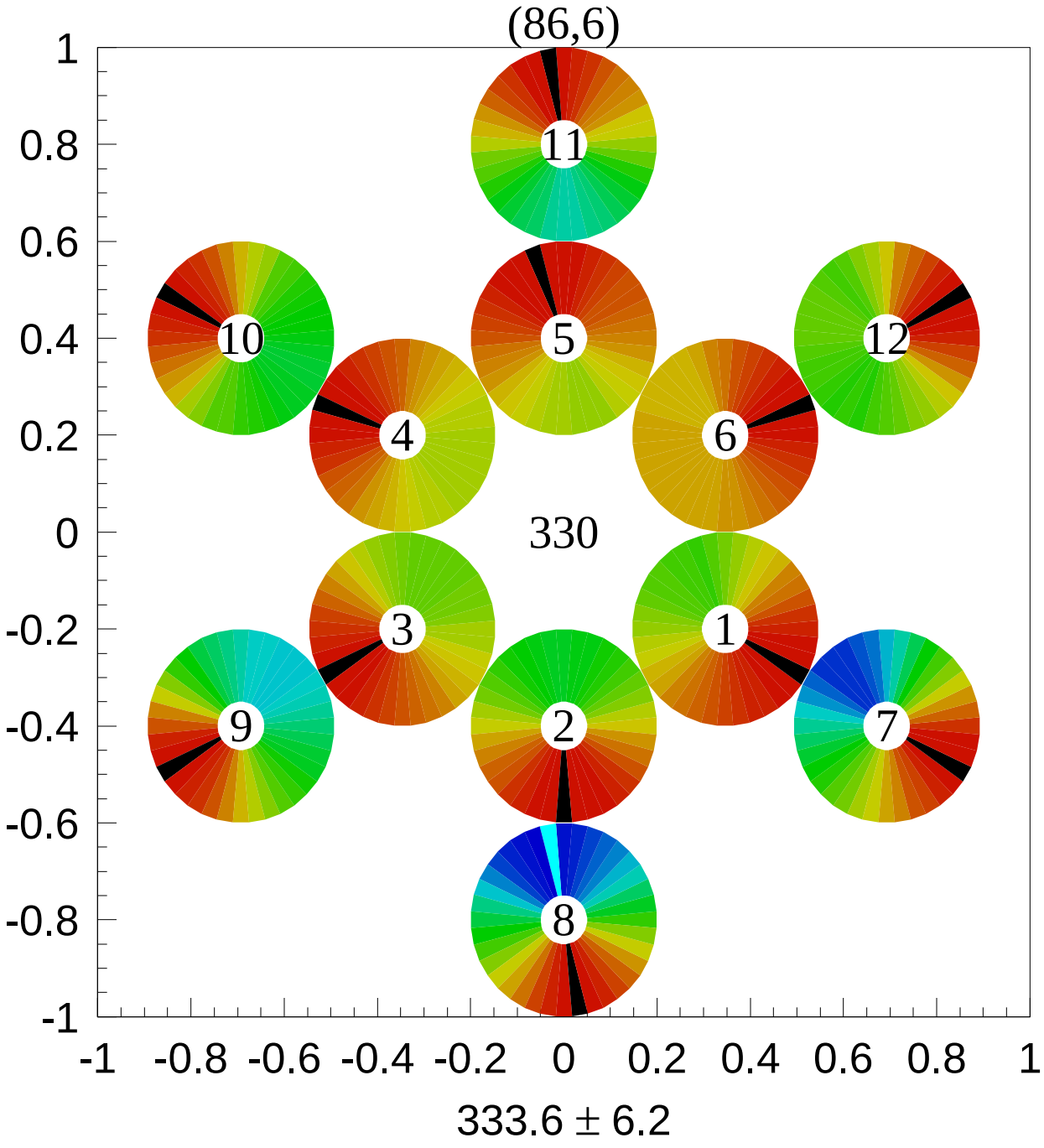

(86,4)
tilted LEDs
112 119 123 117 117 127
average of 6
average of 12
llh
0
10
20
30
40
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
126 120 124 129 125 129
average of 6
average of 12
llh
0
10
20
30
40
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

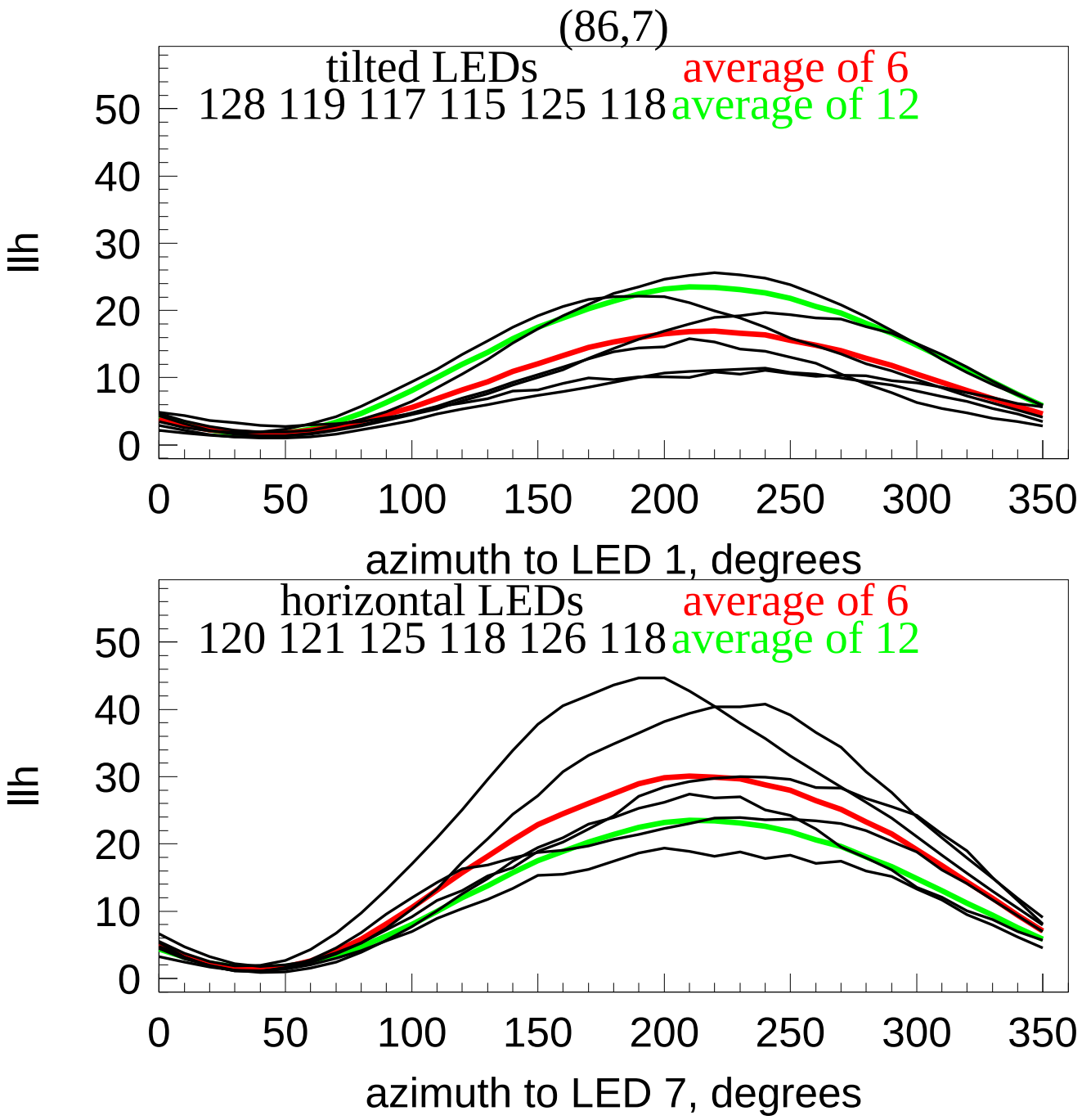

(86,4)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
294.6 ± 5.8

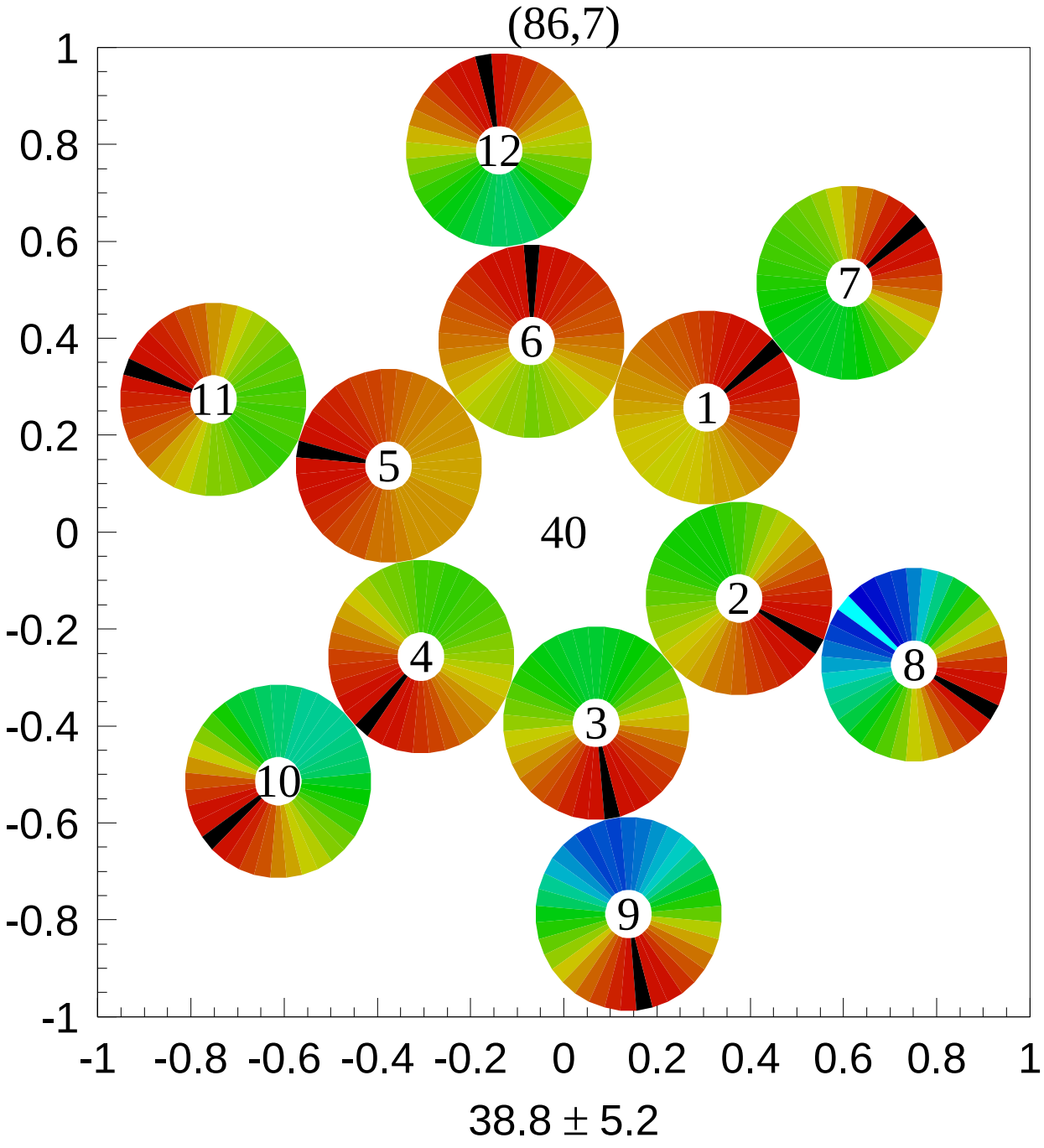

(86,5)
tilted LEDs
121 115 120 120 117 119
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
117 111 122 118 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

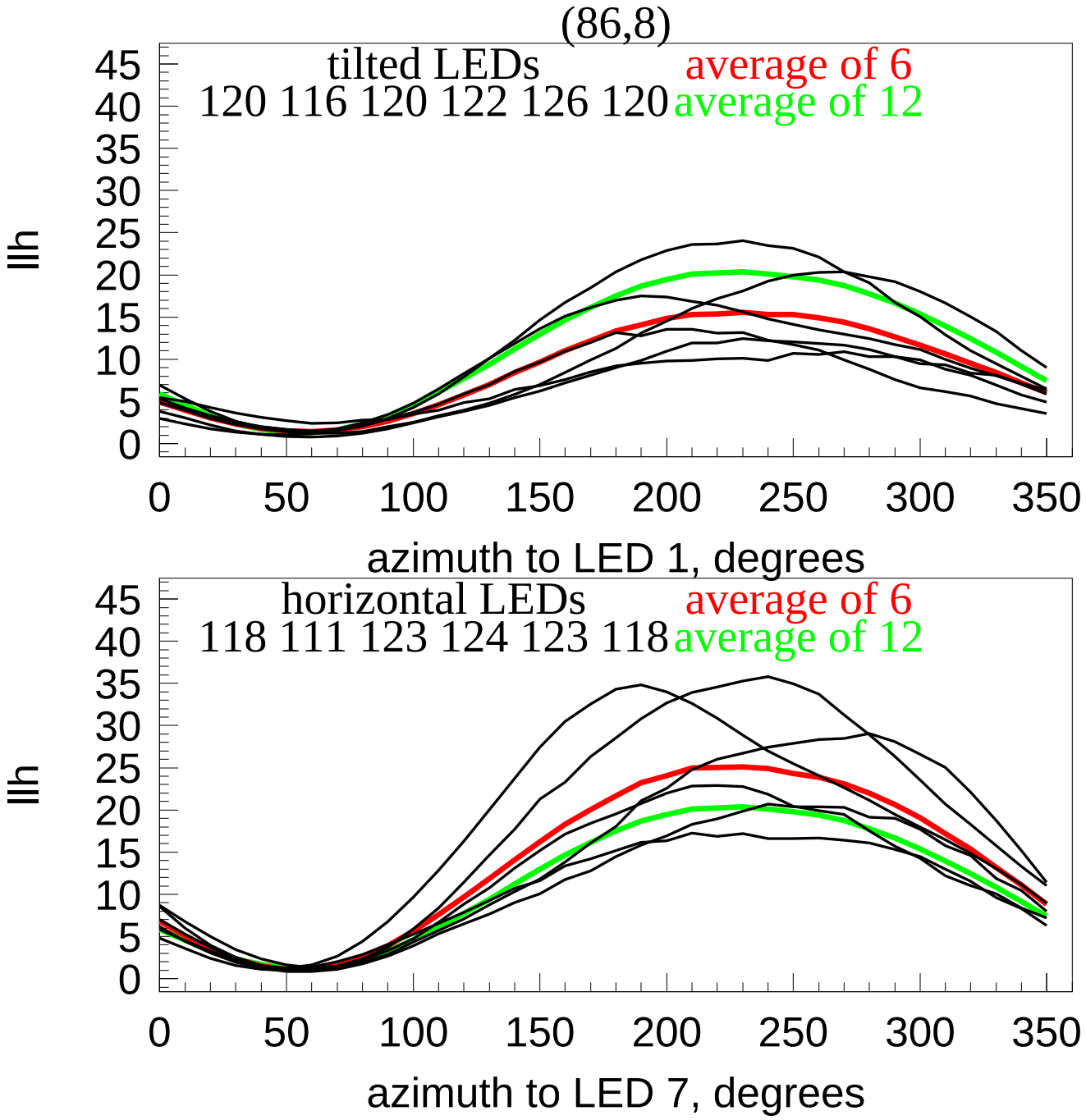

(86,5)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
11
12
5
6
10
4
350
1
7
3
2
9
8
344.4 ± 5.4

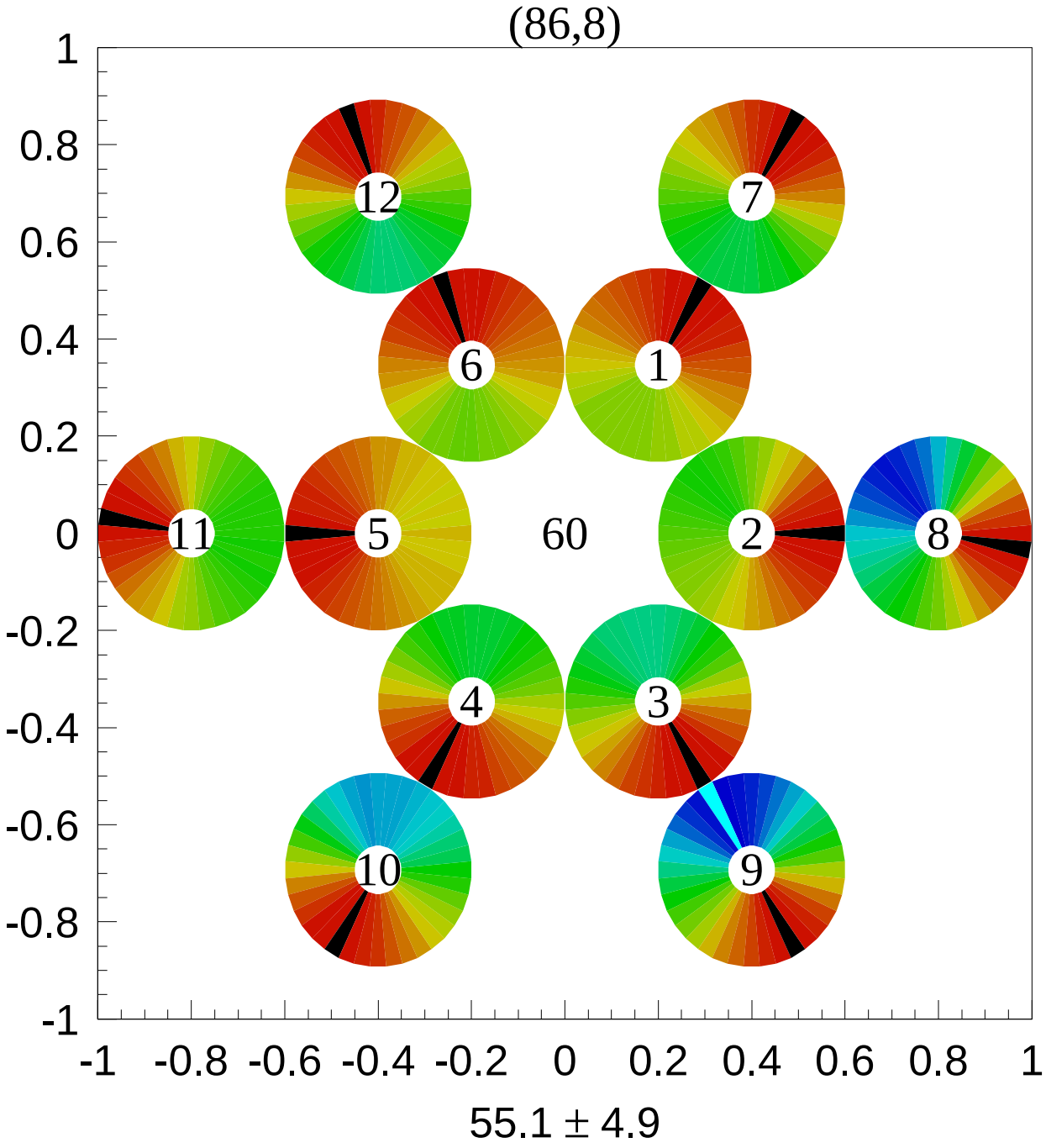

(86,6)
tilted LEDs
114 120 128 122 123 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 113 118 116 122 122
average of 6
average of 12
llh
azimuth to LED 7, degrees

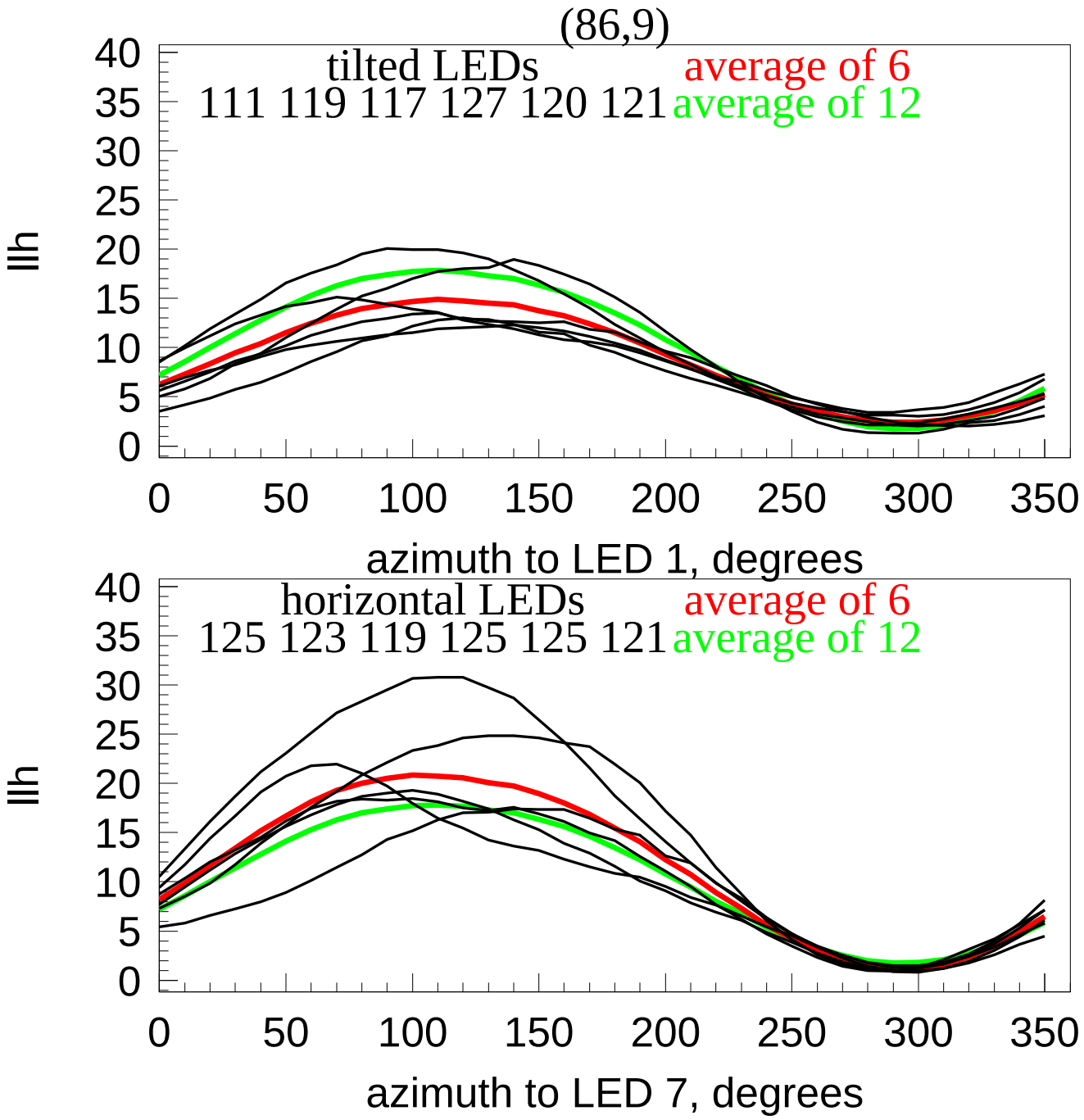

(86,6)
11
10
5
12
4
6
330
3
1
9
2
7
8
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
333.6 ± 6.2

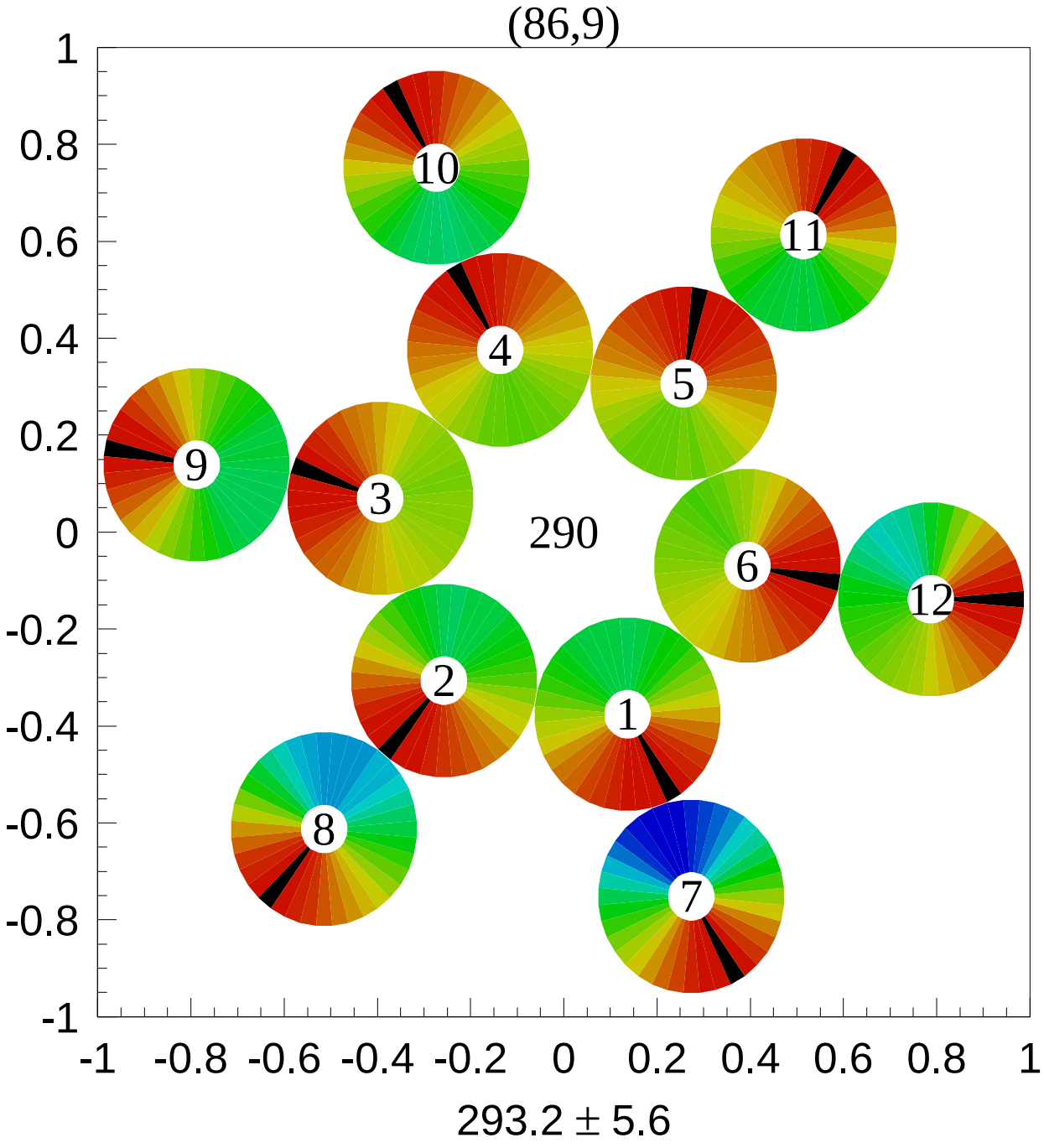

(86,7)
tilted LEDs
128 119 117 115 125 118
average of 6
average of 12
llh
0
10
20
30
40
50
0
50
100
150
200
250
300
350
azimuth to LED 1, degrees
horizontal LEDs
120 121 125 118 126 118
average of 6
average of 12
llh
0
10
20
30
40
50
0
50
100
150
200
250
300
350
azimuth to LED 7, degrees

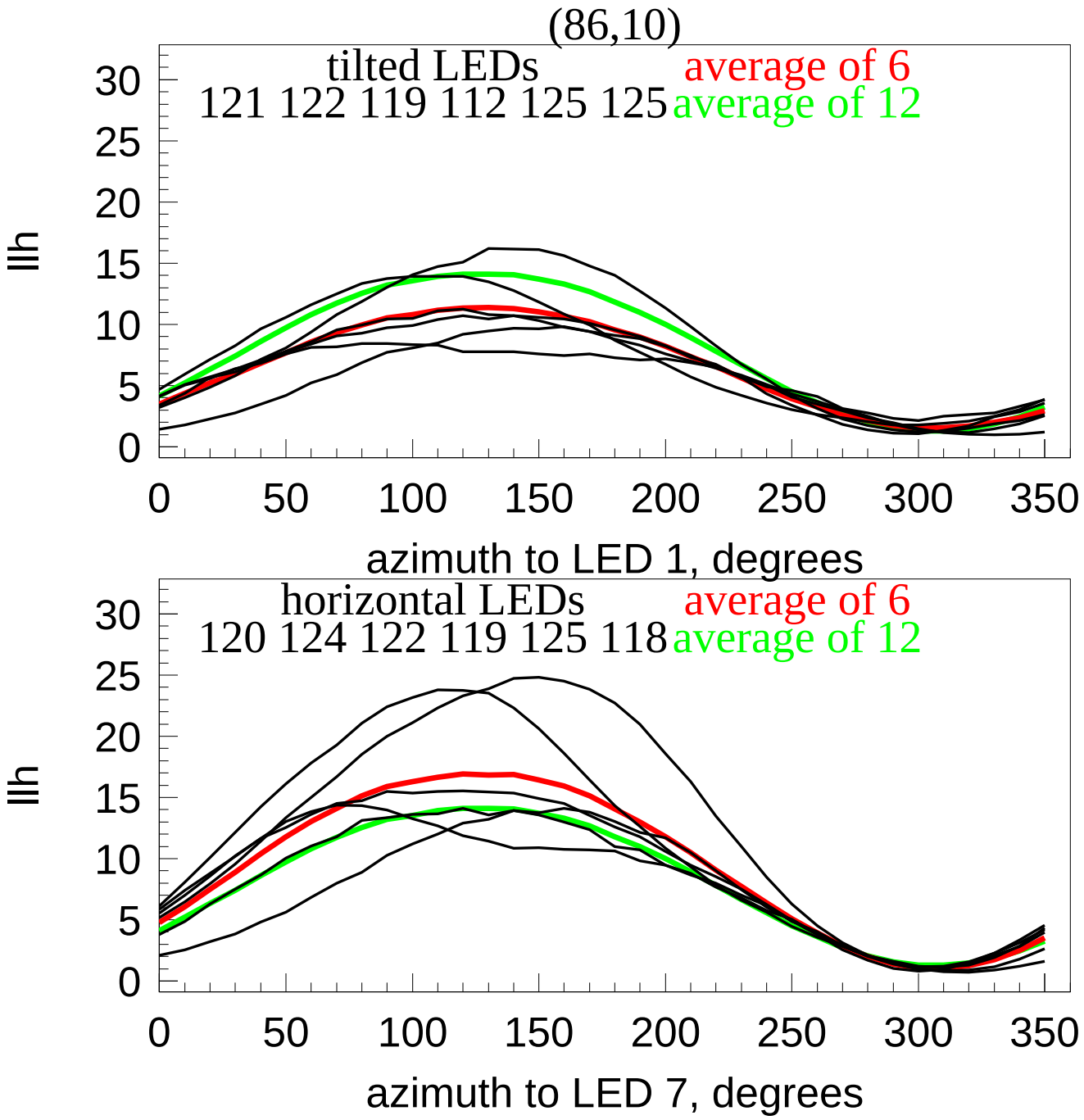

(86,7)
12
7
6
1
11
5
40
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
38.8 ± 5.2

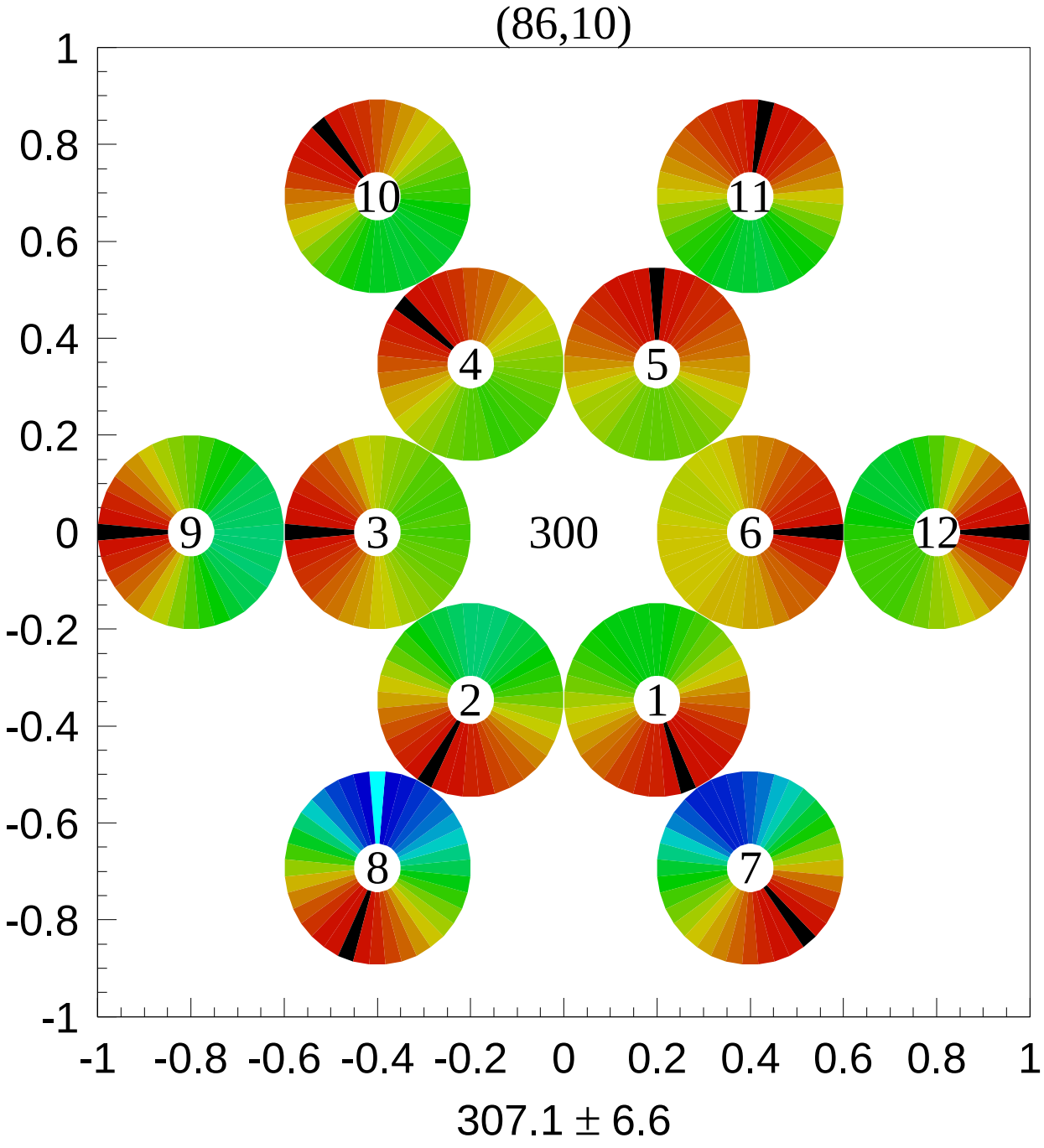

(86,8)
tilted LEDs
120 116 120 122 126 120
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
118 111 123 124 123 118
average of 6
average of 12
llh
azimuth to LED 7, degrees


(86,8)
12
7
6
1
11
5
60
2
8
4
3
10
9
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
55.1 ± 4.9


(86,9)
tilted LEDs
111 119 117 127 120 121
average of 6
average of 12
llh
azimuth to LED 1, degrees
horizontal LEDs
125 123 119 125 125 121
average of 6
average of 12
llh
azimuth to LED 7, degrees


(86,9)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
290
6
12
2
1
8
7
293.2 ± 5.6


(86,10)
tilted LEDs
121 122 119 112 125 125
average of 6
average of 12
Ilh
azimuth to LED 1, degrees
horizontal LEDs
120 124 122 119 125 118
average of 6
average of 12
Ilh
azimuth to LED 7, degrees


(86,10)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
10
11
4
5
9
3
300
6
12
2
1
8
7
307.1 ± 6.6