

CURRICULUM VITAE

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Personal Information

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Education

1972 Agrégé de l'Enseignement Supérieur, University of Louvain, Belgium

1969 Ph.D., University of Louvain, Belgium

1966 Master's degree, University of Louvain, Belgium

University of Wisconsin–Madison Positions

2021–present Vilas Research Professor

2001–present Principal Investigator and co-Spokesperson for the IceCube project

1987–present Gregory Breit Distinguished Professor

1984–present Director of the Institute for Elementary Particle Physics Research

1991–2021 Hilldale Professor

2013–2014 Acting Director of the Wisconsin IceCube Particle Astrophysics Center

1977 Romnes Faculty Fellow

1977 Professor

1974 Associate Professor

1972 Assistant Professor

1971 Research Associate

Education, Experience, and Awards

Experience

1996	Science Associate at CERN, Geneva, Switzerland
1987	NSF – Japan U.S. exchange, Univ. Tokyo, Japan
1985	Scientific Associate at CERN, Geneva, Switzerland
1983	Fellow of the Japan Society for the Promotion of Science, U of Tokyo
1982	Visiting Professor at the University of Durham, UK
1982	Nordita Professor at the University of Helsinki
1977–1983	Lector at the University of Louvain, Belgium
1980	Visiting Professor at the University of Hawaii-Honolulu
1977	Consultant at the Rutherford High Energy Laboratory, Oxford, UK
1977	Visiting Scientist at CERN, Geneva, Switzerland
1971–1983	Chercheur Agrégé of the National Science Foundation, Belgium
1969–1971	Scientific Associate at CERN, Geneva, Switzerland
1968–1969	Research Associate of the National Science Foundation, Belgium

Summer and Short-Term Positions

2012–13	Aspen Institute for Physics
2007	Summer program, CERN, Geneva, Switzerland
2007	Scientific Associate at CERN, Geneva, Switzerland
1988	Visiting Professor at the University of Durham, UK
1987	Visiting Professor at the University of Durham, UK Visitor in Joint Particle Physics & Astrophysics Program at Johns Hopkins University, Baltimore, MD NSF Japan – US Exchange, University of Tokyo, Japan
1984	Visiting Professor at the University of Durham, UK
1981	Visiting Senior Scientist of the Science Research Council at the University of Durham, UK
1980	Visiting Scientist at LRL, University of California-Berkeley
1975	Associate Scientist at the Brookhaven National Laboratory, Upton, NY

Education, Experience, and Awards

1974–1975	Consultant at the Argonne National Laboratory, Chicago, IL
1974	Consultant at Fermilab, Batavia, IL
1971	Consultant at the Rutherford High Energy Laboratory, Oxford, UK

Awards

2021	Homi Bhabha Prize and Medal, IUPAP Bruno Rossi Prize, American Astronomical Society
2019	Yodh Prize, IUPAP Niels Bohr Lecture, NBI, Copenhagen George and Maureen Ewan Lecture, Queens University, Canada
2018	Bruno Pontecorvo Prize, Joint Institute for Nuclear Research Scientific Council Member Academia Europaea Gleb Wataghin Colloquium, Instituto de Fisica, Sao Paulo, Brazil 22 nd Kaczmarczik Lecture, Drexel University, Philadelphia Victor Hess Lecture, Innsbruck Physics Lecture, Universität Innsbruck, Austria.
2017	Doctor Honoris Causa, Southern Methodist University Julius Wess Award, Karlsruhe Institute of Technology
2016	Foreign member of the Belgian Royal National Academy of Science KVAB Bethe lectures, Cornell Brinson lectures, University of Chicago
2015	European Physical Society Cocconi Prize for Particle Astrophysics and Cosmology Balzan Prize for Astroparticle Physics, Switzerland
2014	Doctor Honoris Causa, Ghent University, Belgium Int'l Franqui Professor, VUB-ULB-UGent-UMons-UA-ULg-KULeuven, Belgium Smithsonian American Ingenuity Award
2013	<i>Physics World</i> Breakthrough of the Year Award, for making the first observation of cosmic neutrinos APS Highlights of the Year Franqui Int'l Chair, VUB – ULB – UGent – UMons – UA – ULg (Belgium) Hilldale Award, University of Wisconsin
2012	Affiliated Distinguished Professor, Technische Universität München, Germany

Education, Experience, and Awards

2010	Lecture for the Celebration of the 100 th Anniversary of the Birth of Gunnar Kallen
2008	Watkins Professor at Wichita State University, Kansas
2006	Helmholtz-Humboldt Research Award, Germany First John Bahcall Memorial Lecture, Weizman Institute, Israel Spitzer Lectures at Princeton University
2005	Doctor of Philosophy Honoris Causa, Uppsala University, Sweden Halzen Mesa, Antarctica, named (lat. -77.39, long. 161.44)
2000	“Best American Science Writing 2000” for the essay <i>Antarctic Dreams</i> , published in <i>The Sciences</i> , New York Academy of Sciences (1999) Cherwell-Symon Memorial Lecture 2000, Oxford University, UK
1999	University of Wisconsin Sesquicentennial Award: four faculty positions awarded for the AMANDA/IceCube projects
1998	Korean Research Foundation: Collaborative Research with Foreign Distinguished Scholars
1997	“The Science Coalition” award, <i>Great Advances of 1996</i> for the AMANDA experiment, Washington, DC
1995	Fellow of the American Physical Society

Refereed Publications & arXiv Papers

Evolution of the IceCube data acquisition (IceCube-Gen2 Collaboration, J. Kelley et al.), JINST **16** (2021) C09017; DOI: 10.1088/1748-0221/16/09/C09017.

The IceCube-Gen2 Neutrino Observatory ((IceCube-Gen2 Collaboration), JINST **16** (2021) C10007; DOI: 10.1088/1748-0221/16/10/C10007.

High-Energy Neutrinos from the Cosmos, submitted to Annalen der Physik; DOI: 10.1002/andp.202100309.

Cosmic Neutrinos from Temporarily Gamma-suppressed Blazars (with Emma Kun, Imre Bartos, Julia Becker Tjus, Peter L Biermann, and György Mező) ApJL **911** 2 (2021) L18; DOI: 10.3847/2041-8213/abf1ec.

Search for Relativistic Magnetic Monopoles with Eight Years of IceCube Data (IceCube Collaboration, Abbasi et al.), Submitted to Physical Review Letters; arXiv:2109.13719.

Search for Multi-Flare Neutrino Emissions in 10 Years of IceCube Data from a Catalog of Sources (IceCube Collaboration, Abbasi et al.), ApJL **920** L45 (2021); DOI: 10.3847/2041-8213/ac2c7b.

A Muon-Track Reconstruction Exploiting Stochastic Losses for Large-Scale Cherenkov Detectors (IceCube Collaboration, Abbasi et al.), JINST **16** (2021) P08034; DOI: 10.1088/1748-0221/16/08/P08034.

IceCube Data for Neutrino Point-Source Searches Years 2008-2018 (IceCube Collaboration, Abbasi et al.); DOI: 10.21234/CPKQ-K003.

All-flavor Constraints on Nonstandard Neutrino Interactions and Generalized Matter Potential with Three Years of IceCube DeepCore data (IceCube Collaboration, Abbasi et al), Phys. Rev. D **104** (2021) 072006; DOI: 10.1103/PhysRevD.104.072006.

Starting track events in IceCube (IceCube Collaboration with M. Silva), JINST **16** (2021) C09015; DOI: 10.1088/1748-0221/16/09/c09015.

Sensitivity of a search for eV-scale sterile neutrinos with 8 years of IceCube DeepCore data (IceCube Collaboration with A. Trettin), JINST **16** (2021) C09005; DOI: 10.1088/1748-0221/16/09/C09005.

Advances in IceCube ice modelling & what to expect from the Upgrade (IceCube Collaboration with M. Rongen and D. Chirkin), JINST **16** (2021) C09014; DOI: 10.1088/1748-0221/16/09/C09014.

A Convolutional Neural Network based Cascade Reconstruction for the IceCube Neutrino Observatory (IceCube Collaboration, Abbasi et al.), JINST **16** (2021) P07041; DOI: 10.1088/1748-0221/16/07/P07041.

Refereed Publications & arXiv Papers

Search for High-Energy Neutrinos from Ultra-Luminous Infrared Galaxies with IceCube (IceCube Collaboration, Abbasi et al.), Submitted to The Astrophysical Journal; arXiv:2107.03149.

Probing Neutrino Emission at GeV Energies from Compact Binary Mergers with the IceCube Neutrino Observatory (IceCube Collaboration, Abbasi et al.), Submitted to Physical Review D; arXiv:2105.13160.

Search for GeV Neutrino Emission During Intense Gamma-Ray Solar Flares with the IceCube Neutrino Observatory (IceCube Collaboration, Abbasi et al.), Phys. Rev. D **103** (2021) 102001; DOI: 10.1103/PhysRevD.103.102001.

Detection of a Particle Shower at the Glashow Resonance with IceCube (IceCube Collaboration, Aartsen et al.), Nature **591** (2021) 220-224; DOI: 10.1038/s41586-021-03256-1.

Measurements of the time-dependent cosmic-ray Sun shadow with seven years of IceCube data: Comparison with the Solar cycle and magnetic field models (IceCube Collaboration, Aartsen et al.), Phys. Rev. D **103** (2021) 04200; DOI: 10.1103/PhysRevD.103.042005.

Multimessenger Gamma-Ray and Neutrino Coincidence Alerts Using HAWC and IceCube Subthreshold Data (IceCube Collaboration, Solares et al.), Astrophys. J. **906** 1 63 (2021); astro-ph.HE/2008.10616.

LeptonInjector and LeptonWeighter: A neutrino event generator and weighter for neutrino observatories (IceCube Collaboration, Abbasi et al.), Comput. Phys. Commun. **266** 108018 (2021); DOI: 10.1016/j.cpc.2021.108018.

Search for periodic neutrino emission from X-ray binaries (IceCube Collaboration with C. F. Tung); JINST **16** (2021) C09025; DOI: 10.1088/1748-0221/16/09/C09025.

Using convolutional neural networks to reconstruct energy of GeV scale IceCube neutrinos (IceCube Collaboration with J. Micallef), JINST **16** (2021) C09019; DOI: 10.1088/1748-0221/16/09/C09019.

Dark matter neutrino scattering in the galactic centre with IceCube (IceCube Collaboration, A. McMullen, A. Vincent, C. Argüelles, A. Schneider et al.), JINST **16** (2021) C08001; DOI: 10.1088/1748-0221/16/08/C08001.

Follow-up of astrophysical transients in real time with the IceCube Neutrino Observatory (IceCube Collaboration, Abbasi et al.), Astrophys. J. **910** 4 (2021); DOI: 10.3847/1538-4357/abe123 .

A search for time-dependent astrophysical neutrino emission with IceCube data from 2012 to 2017 (IceCube Collaboration, Abbasi et al.), Astrophys. J. **911** 1 67 (2021); DOI: 10.3847/1538-4357/abe7e6.

Search for sub-TeV neutrino emission from transient sources with three years of IceCube data (IceCube Collaboration, Abbasi et al.), submitted to JCAP; arXiv:2011.05096.

Refereed Publications & arXiv Papers

Measurement of the high-energy all-flavor neutrino-nucleon cross section with IceCube (IceCube Collaboration, Abbasi et al.), Phys. Rev. D **104** 022001 (2021); DOI: 10.1103/PhysRevD.104.022001.

Measurement of Astrophysical Tau Neutrinos in IceCube's High-Energy Starting Events (IceCube Collaboration), submitted to Physical Review Letters; arXiv:2011.03561.

The IceCube high-energy starting event sample: Description and flux characterization with 7.5 years of data (IceCube Collaboration), Phys. Rev. D **104** 022002 (2021); DOI: 10.1103/PhysRevD.104.022002.

Computational techniques for the analysis of small signals in high-statistics neutrino oscillation experiments (IceCube Collaboration), Nucl. Instrum. Meth. A **977** (2020), 164332; physics.data-an/1803.05390.

IceCube-Gen2: The Window to the Extreme Universe (IceCube Gen2 Collaboration, Aartsen et al.), J. Phys. G **48** 6 060501 (2021); DOI: 10.1088/1361-6471/abbd48.

Combined Search for Neutrinos from Dark Matter Self-Annihilation in the Galactic Centre with ANTARES and IceCube (ANTARES and IceCube Collaborations, Albert et al.), Phys. Rev. D **102** (2020) 082002; DOI: 10.1103/PhysRevD.102.082002.

Characteristics of the Diffuse Astrophysical Electron and Tau Neutrino Flux with Six Years of IceCube High Energy Cascade Data (IceCube Collaboration, Aartsen et al.), Phys. Rev. Lett. **125** (2020) 12110; DOI: 10.1103/PhysRevLett.125.121104.

Velocity Independent Constraints on Spin-Dependent DM-Nucleon Interactions from IceCube and PICO (IceCube Collaboration, Aartsen et al.), Eur. Phys. J. C **80** (2020) 819; DOI: 10.1140/epjc/s10052-020-8069-5.

Cosmic Ray Spectrum and Composition from Three Years of IceTop and IceCube (IceCube Collaboration, K. Rawlins et al.), Phys. Atom. Nucl. **83** 2 280-284 (2020); DOI: 10.1134/S1063778820020234.

Measurements of Cosmic Ray Muon Distributions with IceTop and IceCube (IceCube Collaboration with K. Rawlins), Phys. Atom. Nucl. **83** 2 285-289 (2020) 2; DOI: 10.1134/S1063778820020246.

Cosmic Ray Spectrum from 250 TeV to 10 PeV using IceTop (IceCube Collaboration, Aartsen et al.), Phys. Rev. D **102** 122001 (2020); DOI: 10.1103/PhysRevD.102.122001.

Searching for eV-scale sterile neutrinos with eight years of atmospheric neutrinos at the IceCube Neutrino Telescope (IceCube Collaboration, Aartsen et al.), Phys. Rev. D **102** 5 052009 (2020); DOI: 10.1103/PhysRevD.102.052009.

Refereed Publications & arXiv Papers

eV-Scale Sterile Neutrino Search Using Eight Years of Atmospheric Muon Neutrino Data from the IceCube Neutrino Observatory (IceCube Collaboration, Aartsen et al.), Phys. Rev. Lett. **125** 14 141801 (2020); DOI: 10.1103/PhysRevLett.125.141801.

IceCube Search for Neutrinos Coincident with Compact Binary Mergers from LIGO-Virgo's First Gravitational-wave Transient Catalog (IceCube Collaboration, Aartsen et al.), Astrophys. J. Lett. **898** 1 L10 (2020); DOI: 10.3847/2041-8213/ab9d24.

IceCube Search for High-Energy Neutrino Emission from TeV Pulsar Wind Nebulae (IceCube Collaboration, Aartsen et al.), Astrophys. J. **898** 2 117 (2020); DOI: 10.3847/1538-4357/ab9fa0.

Combined search for neutrinos from dark matter self-annihilation in the Galactic Center with ANTARES and IceCube (ANTARES and IceCube Collaborations, A. Albert et al.), Phys. Rev. D **102** 8 082002 (2020); astro-ph.HE/2003.06614.

In-situ calibration of the single-photoelectron charge response of the IceCube photomultiplier tubes (IceCube Collaboration, Aartsen et al.), JINST **15** 06 06 (2020); DOI: 10.1088/1748-0221/15/06/P06032.

Characteristics of the diffuse astrophysical electron and tau neutrino flux with six years of IceCube high energy cascade data (IceCube Collaboration, M.G. Aartsen et al.), Phys. Rev. Lett. **125** 12 121104 (2020); astro-ph.HE/2001.09520.

Neutrino emission during the γ -suppressed state of blazars (with Emma Kun et al.); astro-ph.HE/2009.09792.

Black holes associated with cosmic neutrino flares (with Ali Kheirandish), Nature Phys. **16** 5 498-500 (2020); DOI: 10.1038/s41567-020-0864-2.

ANTARES and IceCube Combined Search for Neutrino Point-like and Extended Sources in the Southern Sky (IceCube Collaboration), Astrophys. J. **892** 92 (2020); DOI: 10.3847/1538-4357/ab7afb.

A search for IceCube events in the direction of ANITA neutrino candidates (IceCube Collaboration), Astrophys. J. **892** 53 (2020); DOI: 10.3847/1538-4357/ab791d.

Observing EeV neutrinos through Earth: GZK and the anomalous ANITA events (with Ibrahim Safa, Alex Pizzuto, Carlos A. Argüelles, Raamis Hussain, Ali Kheirandish, and Justin Vandenbroucke,) JCAP **01** 012 (2020); hep-ph/1909.10487.

Neutrinos below 100 TeV from the Southern sky employing refined veto techniques to IceCube data (IceCube Collaboration), Astrop. Phys. **116** 102392 (2020); astro-ph.HE/1902.05792.

Development of an analysis to probe the neutrino mass ordering with atmospheric neutrinos using three years of IceCube DeepCore data (IceCube Collaboration), European Physical Journal C **80** (2020) 0091; hep-ex/1902.07771.

Refereed Publications & arXiv Papers

Searches for neutrinos from cosmic-ray interactions in the Sun using seven years of IceCube data (IceCube Collaboration), JCAP **02** 025 (2021); DOI: 10.1088/1475-7516/2021/02/025.

Constraints on Neutrino Emission from Nearby Galaxies Using the 2MASS Redshift Survey and IceCube (IceCube Collaboration), JCAP **7** 042 (2020); astro-ph.HE/1911.11809

Combined sensitivity to the neutrino mass ordering with JUNO, the IceCube Upgrade, and PINGU (IceCube-Gen2 and JUNO Collaborations), Phys. Rev. D **101** 032006 (2020); hep-ex/1911.06745

Neutrino astronomy with the next generation IceCube Neutrino Observatory (IceCube-Gen2 Collaboration), submitted to Astro2020; astro-ph.HE/1911.02561.

Time-integrated Neutrino Source Searches with 10 years of IceCube Data (IceCube Collaboration), Phys. Rev. Lett. **124** 051103 (2020); astro-ph.HE/1910.08488.

Design and Performance of the first IceAct Demonstrator at the South Pole (IceCube-Gen2 Collaboration), JINST **15** T02002 (2020); astro-ph.IM/1910.06945.

A Search for Neutrino Point-Source Populations in 7 Years of IceCube Data with Neutrino-count Statistics (IceCube Collaboration), Astrophys. J. **893** 102 (2020); astro-ph.HE/1909.08623.

Cosmic Ray Spectrum and Composition from PeV to EeV Using 3 Years of Data From IceTop and IceCube (IceCube Collaboration, Aartsen et al.), Phys. Rev. D **100** (2019) 082002; DOI: 10.1103/PhysRevD.100.082002.

Search for Multimessenger Sources of Gravitational Waves and High-energy Neutrinos with Advanced LIGO during its first Observing Run, ANTARES and IceCube (ANTARES, IceCube, LIGO, Virgo Collaborations, Albert et al.), Astrophys. J. **870** (2019) 134; DOI: 10.3847/1538-4357/aaf21d.

Efficient propagation of systematic uncertainties from calibration to analysis with the SnowStorm method in IceCube (IceCube Collaboration), JCAP **10** 048 (2019); hep-ex/1909.01530.

Search for PeV Gamma-Ray Emission from the Southern Hemisphere with 5 Years of Data from the IceCube Observatory (IceCube Collaboration), Astrophys. J. **891** 9 (2020); astro-ph.HE/1908.09918.

A Search for MeV to TeV Neutrinos from Fast Radio Bursts with IceCube (IceCube Collaboration), Astrophys.J. **890** 111 (2020); astro-ph.HE/1908.09997.

Velocity-independent constraints on spin-dependent DM-nucleon interactions from IceCube and PICO (PICO and IceCube collaborations), Eur. Phys. J. C **80** 819 (2020); DOI: 10.1140/epjc/s10052-020-8069-5.

Search for sources of astrophysical neutrinos using 7 years of IceCube cascade events (IceCube Collaboration), Astrophys. J. **886** 12 (2019); hep-ex/1907.06714.

Refereed Publications & arXiv Papers

Multimessenger search for the sources of cosmic rays using cosmic neutrinos (with Ali Kheirandish), *Front. Astron. Space Sci.* **6** 32 (2019).

Cosmic-Ray Spectrum and Composition from PeV to EeV Using 3 years of Data from IceTop and IceCube (IceCube Collaboration), *Phys. Rev. D* **100** 082002 (2019); hep-ex/1906.04317.

Monitoring and Multi-Messenger Astronomy with IceCube (IceCube Collaboration), *Galaxies* **7** 40 (2019).

High-energy Galactic cosmic rays (Astro2020 Science White Paper) (with Frank Schröder, et al.), *Bull. Am. Astron. Soc.* **51** 3 131 (2019); astro-ph.HE/1903.07713.

Astrophysics uniquely enabled by observations of high-energy cosmic neutrinos (Astro2020 Science White Paper) (with Markus Ackermann et al.), *Bull. Am. Astron. Soc.* **51** 185 (2019); astro-ph.HE/1903.04334.

Fundamental physics with high-energy cosmic neutrinos (Astro2020 Science White Paper) (with Markus Ackermann et al.), *Bull. Am. Astron. Soc.* **51** 215 (2019); astro-ph.HE/1903.04333.

Search for transient optical counterparts to high-energy IceCube neutrinos with Pan-STARRS1 (Pan-STARRS and IceCube collaborations), *Astron. Astrophys.* **626** A117 (2019); hep-ex/1901.11080.

Investigation of two Fermi-LAT gamma-ray blazars coincident with high-energy nus detected by IceCube (Fermi-LAT, ASAS-SN and IceCube collaborations), *Astrophys. J.* **880** 103 (2019); hep-ex/1901.10806.

Measurement of atmospheric tau neutrino appearance with IceCube DeepCore (IceCube Collaboration), *Phys. Rev. D* **99** 032007 (2019); hep-ex/1901.05366v1.

All-sky measurement of the anisotropy of cosmic rays at 10 TeV and mapping of the local interstellar magnetic field (HAWC and IceCube collaborations), *Astrophys. J.* **871** 96 (2019); astro-ph.HE/1812.05682.

Search for steady point-like sources in the astrophysical muon neutrino flux with 8 years of IceCube data (IceCube Collaboration), *Eur. Phys. J. C* **79** 234 (2019); astro-ph.HE/1811.07979.

On the neutrino flares from the direction of TXS 0506+056 (with Ali Kheirandish, et al.), *Astrophys. J.* **874** 1 L9 (2019); astro-ph.HE/1811.07439.

Detection of the temporal variation of the Sun's cosmic ray shadow with the IceCube detector (IceCube Collaboration), *Astrophys. J.* **872** 133 (2019); hep-ex/1811.02015.

Search for multi-messenger sources of gravitational waves and high-energy neutrinos with advanced LIGO during its first observing run (ANTARES, IceCube, LIGO, and Virgo collaborations), *Astrophys. J.* **870** 134 (2019); astro-ph.HE/1810.10693.

Refereed Publications & arXiv Papers

IceCube: Opening a new window on the Universe from the South Pole, *Int. J. Mod. Phys. D* **28** 03 1930007 (2018).

Measurements using the inelasticity distribution of multi-TeV neutrino interactions in IceCube (IceCube Collaboration), *Phys. Rev. D* **99** 032004 (2019); hep-ex/1808.07629.

Joint constraints on Galactic diffuse neutrino emission from the ANTARES and IceCube neutrino telescopes (ANTARES and IceCube collaborations), *Astrophys. J. Lett.* **868** L20 (2018); astro-ph.HE/1808.03531.

Neutrino emission from the direction of the blazar TXS0506+056 prior to the IceCube-170922A alert (IceCube Collaboration), *Science* **361** 147 (2018); astro-ph.HE/1807.08794.

Multimessenger observations of a flaring blazar coincident with high-energy neutrino IceCube-170922A (IceCube, Fermi-LAT, MAGIC, AGILE, ASAS-HN, HAWC, H.E.S.S., INTEGRAL, Kanata, Kiso, Liverpool Telescope, Subaru, Swift/NuSTAR, VERITAS and VLA/178-403 collaborations and teams), *Science* **361** eaat1378 (2018); astro-ph.HE/1807.08816.

Constraints on minute-scale transient astrophysical neutrino sources (IceCube Collaboration), *Phys. Rev. Lett.* **122** 051102; astro-ph.HE/1807.11492.

Differential limit on the extremely high-energy cosmic neutrino flux in the presence of astrophysical background from 9 years of IceCube data (IceCube Collaboration), *Phys. Rev. D* **98** 062003 (2018); astro-ph.HE/1807.01820.

Opening a new window onto the Universe with IceCube (with Markus Ahlers), *Progress in Particle and Nuclear Physics* **102** 73 (2018); astro-ph.HE/1805.11112.

Search for neutrinos from decaying dark matter with IceCube (IceCube Collaboration), *Euro. Phys. J. C* **78** 831 (2018); astro-ph.HE/1804.03848.

High-energy astrophysical neutrinos, *Adv. Ser. Direct. High Energy Phys.* **28** 325 (2018).

A search for neutrino emission from fast radio bursts with 6 years of IceCube data (IceCube Collaboration), *Astrophys. J.* **857** 117 (2018); hep-ex/1712.06277.

Measurement of the multi-TeV neutrino cross section with IceCube using Earth absorption (IceCube Collaboration), *Nature* **551** 596 (2017); hep-ex/1711.08119.

Search for high-energy neutrinos from binary neutron star merger GW170817 with ANTARES, IceCube and the Pierre Auger Observatory (ANTARES, IceCube, Auger, LIGO Scientific and Virgo collaborations), *Astrophys. J. Lett.* **850** L35 (2017); astro-ph.HE/1710.05839.

Multi-messenger observations of a binary neutron star merger (IceCube Collaboration with LIGO Scientific and Virgo collaborations, et al), *Astrophys. J. Lett.* **848** L12 (2017); astro-ph.HE/1710.05833.

Refereed Publications & arXiv Papers

Search for non-standard neutrino interactions with IceCube DeepCore (IceCube Collaboration), Phys. Rev. D **97** 072009 (2018); hep-ex/1709.07079.

Neutrino interferometry for high-precision tests of Lorentz symmetry with IceCube (IceCube Collaboration), Nature Physics **14** 961(2018); hep-ex/1709.03434.

Measurement of atmospheric neutrino oscillations at 6-56 GeV with IceCube DeepCore (IceCube Collaboration), Phys. Rev. Lett. **120** 071801 (2018); astro-ph.HE/1707.07081.

Constraints on Galactic neutrino emission with 7 years of IceCube data (IceCube Collaboration), Astrophys. J. **849** 67 (2017); astro-ph.HE/1707.03416.

Identification of gamma-rays and neutrinos from the Cygnus-X complex considering radio gamma correlation (with Mehmet Gündüz et al.); astro-ph.HE/1705.08337.

Search for neutrinos from dark matter self-annihilations in the center of the Milky Way with 3 years of IceCube/DeepCore (IceCube Collaboration), Eur. Phys. Jour. C **77** 9 627 (2017); hep-ex/1705.08103.

Measurement of the ν_μ energy spectrum with IceCube-79 (IceCube Collaboration), Eur. Phys. J. C **77** 10 692 (2017); astro-ph.HE/1705.07780.

Search for astrophysical sources of neutrinos using cascade events in IceCube (IceCube Collaboration), Astrophys. J. **846** 2 136 (2017); astro-ph.HE/1705.02383.

Search for high-energy neutrinos from Gravitational Wave Event GW151226 and Candidate LVT151012 with ANTARES and IceCube (ANTARES, IceCube, LIGO Scientific and Virgo collaborations), Phys. Rev. D **96** 022005 (2017); astro-ph.HE/1703.06298.

IceCube: Neutrinos and multimessenger astronomy (with M. Ahlers), Progress of Theoretical and Experimental Physics **12** 12A105 (2017).

Gamma-ray puzzle in Cygnus X: Implications for high-energy neutrinos (with T. Yoast-Hull et al.), Phys. Rev. D **96** 4 043011 (2017); astro-ph.HE/1703.02590.

Extending the search for muon neutrinos coincident with gamma-ray bursts in IceCube data (IceCube Collaboration), Astrophys. J. **843** 112 (2017); astro-ph.HE/1702.06868.

Multiwavelength follow-up of a rare IceCube neutrino multiplet (IceCube Collaboration, ASAS-SN, The Astrophysical Multimessenger Observatory Network, Fermi, HAWC, LCO, MASTER, Swift and VERITAS collaborations), Astronomy and Astrophysics **850** L35 (2017); astro-ph.HE/1702.06131.

Search for sterile-neutrino mixing using 3 years of IceCube / DeepCore data (IceCube Collaboration), Phys. Rev. D **95** 112002 (2017); hep-ex/1702.05160.

IceCube in the era of multimessenger astrophysics, Mod. Phys. Lett. A **32** 2 1730010 (2017).

Refereed Publications & arXiv Papers

Astrophysical neutrinos and cosmic rays observed by IceCube (IceCube Collaboration), *Advances in Space Research* **62** 2902 (2018); astro-ph.HE/1701.03731.

The IceCube Realtime Alert System (IceCube Collaboration), *Astropart. Phys.* **92** 30 (2017); astro-ph.HE/1612.06028.

Search for annihilating dark matter in the Sun with 3 years of IceCube data (IceCube Collaboration), *Eur. Phys. J. C* **77** 3 146 (2017); astro-ph.HE/1612.05949/ erratum 2019.

The IceCube Neutrino Observatory: Instrumentation and Online Systems (IceCube Collaboration), *J. Inst.* **12** P03012 (2017); astro-ph.IM/1612.05093.

The contribution of Fermi-2LAC blazars to the diffuse TeV-PeV neutrino flux (IceCube Collaboration), *Astrophys. J.* **835** 1 45 (2017); astro-ph.HE/1611.03874.

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Every Flare, Everywhere: An All-Sky Untriggered Search for Astrophysical Neutrino Transients Using IceCube Data (IceCube Collaboration, F. Lucarelli, W. Luszczak et al.), PoS 1128 (ICRC 2021)

Combining Maximum-Likelihood with Deep Learning for Event Reconstruction in IceCube (IceCube Collaboration, M. Huennefeld et al.), PoS 1065 (ICRC 2021)

Searching for time-dependent high-energy neutrino emission from X-ray binaries with IceCube (IceCube Collaboration, Q. Liu, A. Kheirandish et al.), PoS 1136 (ICRC 2021)

Completing Aganta Kairos: Capturing Metaphysical Time on the Seventh Continent (IceCube Collaboration, J. Madsen et al.), PoS 1381 (ICRC 2021)

Design, performance, and analysis of a measurement of optical properties of antarctic ice below 400 nm (IceCube Collaboration, J. Brostean-Kaiser et al.), PoS 1057 (ICRC 2021)

A Search for Neutrinos from Decaying Dark Matter in Galaxy Clusters and Galaxies with IceCube (IceCube Collaboration, M. Jeong et al.), PoS 506 (ICRC 2021)

Towards Equitable, Diverse, and Inclusive science collaborations: The Multimessenger Diversity Network (IceCube Collaboration, E. Bechtol et al.), PoS 1383 (ICRC 2021)

Reconstruction of Neutrino Events in IceCube using Graph Neural Networks IceCube (IceCube Collaboration, M. Minh et al.), PoS 1044 (ICRC 2021)

Gravitational Wave Follow-Up Using Low Energy Neutrinos in IceCube DeepCore (IceCube Collaboration, A. Balagopal V., R. Hussain, A. Pizzuto et al.), PoS 939 (ICRC 2021)

Reconstructing Neutrino Energy using CNNs for GeV Scale IceCube Events (IceCube Collaboration, J. Brostean-Kaiser et al.), PoS 1053 (ICRC 2021)

Design and performance of the multi-PMT optical module for IceCube Upgrade (IceCube Collaboration, T. Anderson et al.), PoS 1070 (ICRC 2021)

Indirect search for dark matter in the Galactic Centre with IceCube (IceCube Collaboration, N. Iovine, J. Aguilar et al.), PoS 524 (ICRC 2021)

Discrimination of Muons for Mass Composition Studies of Inclined Air Showers Detected with IceTop (IceCube Collaboration, A. Balagopal V. et al.), PoS 212 (ICRC 2021)

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Design of a Robust Fiber Optic Communications System for Future IceCube Detectors (IceCube Collaboration, R. Halliday et al.), PoS 2017 (ICRC 2021)

Camera Calibration for the IceCube Upgrade and Gen2 (IceCube Collaboration, W. Kang et al.), PoS 1064 (ICRC 2021)

Neutrino Education, Outreach, and Communications Activities: Captivating Examples from IceCube (IceCube Collaboration, J. Argueta, E. Bechtol, J. Madsen, M. O'Keefe, K. Shirey et al.), PoS 1382 (ICRC 2021)

Deployment of the IceCube Upgrade Camera System in the SPICEcore hole (IceCube Collaboration, C. Toennis et al.), PoS 1047 (ICRC 2021)

Constraining non-standard Dark Matter-Nucleon Interactions with IceCube (IceCube Collaboration, L. Peters, K. Choi, M. Nisa et al.), PoS 522 (ICRC 2021)

Search for secluded dark matter with 6 years of IceCube data (IceCube Collaboration, C. Toennis et al.), PoS 521 (ICRC 2021)

New Flux Limits in the Low Relativistic Regime for Magnetic Monopoles at IceCube (IceCube Collaboration, F. Lauber et al.), PoS 534 (ICRC 2021)

Design of an Efficient, High-Throughput Photomultiplier Tube Testing Facility for the IceCube Upgrade (IceCube Collaboration, L. Halve et al.), PoS 1056 (ICRC 2021)

A calibration study of local ice and optical sensor properties in IceCube (IceCube Collaboration, D. Chirkin et al.), PoS 1023 (ICRC 2021)

A time-independent search for neutrinos from galaxy clusters with IceCube (IceCube Collaboration, M. Nisa, A. Ludwig et al.), PoS 1133 (ICRC 2021)

The Wavelength-shifting Optical Module (WOM) for the IceCube Upgrade (IceCube Collaboration, J. Rack-Helleis), PoS 1038 (ICRC 2021)

A Combined Fit of the Diffuse Neutrino Spectrum using IceCube Muon Tracks and Cascades (IceCube Collaboration E. Ganster, R. Naab, Z. Zhang et al.), PoS 1129 (ICRC 2021)

Development of a scintillation and radio hybrid detector array at the South Pole (IceCube Collaboration, M. Oehler, R. Turcotte-Tardif et al.), PoS 225 (ICRC 2021)

The Surface Array Planned for IceCube-Gen2 (IceCube-Gen2 Collaboration, F. Schroeder et al.), PoS 407 (ICRC 2021)

Simulation Study for the Future IceCube-Gen2 Surface Array (IceCube-Gen2 Collaboration, A. Leszczyńska, M. Weyrauch, A. Coleman et al.), PoS 411 (ICRC 2021)

Performance Studies for a Next-Generation Optical Sensor for IceCube-Gen2 (IceCube-Gen2

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- Collaboration, N. Shimizu, A. Ishihara, A. Kappes et al.), PoS 1041 (ICRC 2021)
- A Next-Generation Optical Sensor for IceCube-Gen2 (IceCube-Gen2 Collaboration, V. Basu, A. Ishihara, M. Dittmer, N. Shimizu et al.), PoS 1062 (ICRC 2021)
- Observation of Cosmic Ray Anisotropy with Nine years of IceCube Data (IceCube Collaboration, F. McNally, R. Abbasi, P. Desiati, J. Diaz-Velez, T. Aguado, K. Gruchot, A. Moy, A. Simmons, A. Thorpe, H. Woodward), PoS 320 (ICRC 2021)
- Multi-messenger searches via IceCube's high-energy neutrinos and gravitational-wave detections of LIGO/Virgo (IceCube Collaboration, D. Veske, R. Hussain, Z. Márka, S. Countryman, A. Pizzuto, Y. Asali, A. Oliveira, J. Vandenbroucke, et al.), PoS 950 (ICRC 2021)
- Density of GeV Muons Measured with IceTop (IceCube Collaboration, D. Soldin et al.), PoS 342 (ICRC 2021)
- Testing Hadronic Interaction Models with Cosmic Ray Measurements at the IceCube Neutrino Observatory (IceCube Collaboration, S. Verpoest et al.), PoS 357 (ICRC 2021)
- Search for Astrophysical Neutrino Transients with IceCube DeepCore (IceCube Collaboration, C. Chen, Chujie, P. Dave, Pranav, I. Taboada et al.), PoS 1143 (ICRC 2021)
- Searching for High-Energy Neutrinos from Core-Collapse Supernovae with IceCube (IceCube Collaboration, J. Necker et al.), PoS 1116 (ICRC 2021)
- Seasonal Variations of the Unfolded Atmospheric Neutrino Spectrum with IceCube (IceCube Collaboration, K. Hymon et al.), PoS 1159 (ICRC 2021)
- Realtime follow-up of astrophysical transients with the IceCube Neutrino Observatory (IceCube Collaboration, A. Pizzuto, A. Desai, R. Hussain et al.), PoS 952 (ICRC 2021)
- Measuring total neutrino cross section with IceCube at intermediate energies (~ 100 GeV to a few TeV) (IceCube Collaboration, S. Nowicki et al.), PoS 1132 (ICRC 2021)
- Study of mass composition of cosmic rays with IceTop and IceCube (IceCube Collaboration, P. Koundal, M. Plum, J. Saffer et al.), PoS 323 (ICRC 2021)
- Searches for and Characterization of Astrophysical Neutrinos using Starting Track Events in IceCube (IceCube Collaboration, S. Mancina, M. Silva et al.), PoS 1130 (ICRC 2021)
- The SkyLLH framework for IceCube point-source search (IceCube Collaboration, T. Kontrimas, M. Wolf et al.), PoS 1073 (ICRC 2021)
- A Search for Neutrino Sources with Cascade Events in IceCube (IceCube Collaboration, S. Sclafani, M. Hünnefeld et al.), PoS 1150 (ICRC 2021)
- A New Search for Neutrino Point Sources with IceCube (IceCube Collaboration, C. Bellenghi, T.

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Glauch, C. Haack, T. Kontrimas, H. Niederhausen, R. Riemann, M. Wolf et al.), PoS 1138 (ICRC 2021)

A novel microstructure-based model to explain the IceCube ice anisotropy (IceCube Collaboration, M. Rongen, D. Chirkin et al.), PoS 1119 (ICRC 2021)

Simulation Study of the Observed Radio Emission of Air Showers by the IceTop Surface Extension (IceCube Collaboration, A. Coleman et al.), PoS 317 (ICRC 2021)

Studies of systematic uncertainty effects on IceCube's real-time angular uncertainty (IceCube Collaboration, C. Gualda, Y. Ashida, A. Sharma, H. Thomas et al.), PoS 1045 (ICRC 2021)

Search for high-energy neutrino sources from the direction of IceCube alert events (IceCube Collaboration, M. Karl, P. Eller, A. Schubert et al.), PoS 940 (ICRC 2021)

Searches for Neutrinos from Precursors and Afterglows of Gamma-Ray Bursts using the IceCube Neutrino Observatory (IceCube Collaboration, K. Deoskar, P. Coppin, E. Friedman et al.), PoS 1118 (ICRC 2021)

First air-shower measurements with the prototype station of the IceCube surface enhancement (IceCube Collaboration, H. Dujmovic, A. Coleman, M. Oehler et al.), PoS 314 (ICRC 2021)

Search for high-energy neutrino emission from hard X-ray AGN with IceCube (IceCube Collaboration, S. Goswami et al.), PoS 1142 (ICRC 2021)

IceCube Search for High-Energy Neutrinos from Ultra-Luminous Infrared Galaxies (IceCube Collaboration, P. Correa, K. de Vries, N. van Eijndhoven et al.), PoS 1115 (ICRC 2021)

Searching for High Energy Neutrinos from Magnetars with IceCube (IceCube Collaboration, A. Ghadimi, M. Santander et al.), PoS 1135 (ICRC 2021)

Analysis framework for multi-messenger astronomy with IceCube (IceCube Collaboration, J. Evans, K. Fan, M. Larson et al.), PoS 1098 (ICRC 2021)

End-to-End Test of the Sensitivity of IceCube to the Neutrino Burst from a Core-Collapse Supernova (IceCube Collaboration, S. Griswold et al.), PoS 1085 (ICRC 2021)

A model-independent analysis of neutrino flares detected in IceCube from X-ray selected blazars (IceCube Collaboration, A. Sharma, E. O'Sullivan et al.), PoS 971 (ICRC 2021)

Testing the AGN Radio and Neutrino correlation using the MOJAVE catalog and 10 years of IceCube Data (IceCube Collaboration, A. Desai, J. Vandenbroucke, A. Pizzuto et al.), PoS 949 (ICRC 2021)

Direction Reconstruction using a CNN for GeV-Scale Neutrinos in IceCube (IceCube Collaboration, S. Yu et al.), PoS 1054 (ICRC 2021)

Results from IceCube (IceCube Collaboration, D. Williams et al.), PoS 016 (ICRC 2021)

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Search for dark matter from the center of the Earth with 8 years of IceCube data (IceCube Collaboration, G. Renzi et al.), PoS 526 (ICRC 2021)

IceCube Search for Earth-traversing ultra-high energy Neutrinos (IceCube Collaboration, I. Safa, C. Argüelles et al.), PoS 1170 (ICRC 2021)

Stau Search in IceCube (IceCube Collaboration, J. Schmidt-Dencker et al.), PoS 1117 (ICRC 2021)

A Posterior Analysis on IceCube Double Pulse Tau Neutrino Candidates (IceCube Collaboration, W. Tian et al.), PoS 1146 (ICRC 2021)

Sensitivity Studies for the IceCube-Gen2 Radio Array (IceCube-Gen2 Collaboration, S. Hallmann, B. Clark, C. Glaser, D. Smith et al.), Pos 1183 (ICRC 2021)

Optimization of the Optical Array Geometry for IceCube-Gen2 (IceCube-Gen2 Collaboration, A. Omeliukh et al.), Pos 1184 (ICRC 2021)

Simulation and Sensitivities for a Phased IceCube-Gen2 Deployment (IceCube-Gen2 Collaboration, B. Clark, R. Halliday et al.), Pos 1186 (ICRC 2021)

Concept Study of a Radio Array Embedded in a Deep Gen2-like Optical Array (IceCube-Gen2 Collaboration, A. Bishop, L. Lu, A. Karle, B. Hokanson-Fasig et al.), Pos 1182 (ICRC 2021)

Searching for Dark Matter Neutrino Scattering in the Galactic Centre with IceCube (IceCube Collaboration, A. McMullen et al.), PoS 569 (ICRC 2021)

Search for correlations of high-energy neutrinos and ultra-high energy cosmic rays (IceCube, Pierre Auger, Telescope Array, ANTARES collaborations, A. Barbano et al.), PoS 842 (ICRC 2021)

Working Group Report on the Combined Analysis of Muon Density Measurements from Eight Air Shower Experiments (EAS-MSU, IceCube, KASCADE Grande, NEVOD-DECOR, Pierre Auger, SUGAR, Telescope Array, Yakutsk EAS Array collaborations, L. Cazon et al.), PoS 214 (ICRC 2021)

A novel method of rejecting muon backgrounds for the detection of the highest energy neutrinos (IceCube Collaboration, L. Lu, C. Haack, T. Yuan et al.), PoS 945 (ICRC 2021)

Search for dark matter annihilation in the center of the Earth with 8 years of IceCube data (IceCube Collaboration, R. Abbasi et al.), PoS 541 (ICRC 2021)

2019 – Madison, Wisconsin

Individuals posted their talks to: arxiv.org/abs/1907.11699

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Recent Results of Cosmic-Ray Measurements from IceCube and IceTop (IceCube Collaboration, Soldin *et al.*), PoS 014 (ICRC2019)

Results from IceCube (IceCube Collaboration, Williams *et al.*), PoS 016 (ICRC2019)

Search for Neutrinos in IceCube from the Local Anisotropic Universe using 2MRS (IceCube Collaboration, Sclafani *et al.*), PoS 1006 (ICRC2019)

Recent Results for All-Sky Time-Integrated Point Source Searches Using 10 yrs of IceCube Data (IceCube Collaboration, Carver *et al.*), PoS 851 (ICRC2019)

The Next Generation of IceCube Realtime Neutrino Alerts (IceCube Collaboration, Tung *et al.*), PoS 1021 (ICRC2019)

IceCube Search for Galactic Neutrino Sources Based on HAWC Observations of the Galactic Plane (IceCube Collaboration, Kheirandish *et al.*), PoS 932 (ICRC2019)

Neutrino Source Searches and a Realtime Neutrino Alert Stream in the Southern Sky with IceCube Starting Tracks (IceCube Collaboration, Mancina *et al.*), PoS 954 (ICRC2019)

Searching for High-Energy Neutrino Emission from TeV Pulsar-Wind Nebulae (IceCube Collaboration, Liu *et al.*), PoS 944 (ICRC2019)

ANTARES-IceCube Combined Search for Neutrino Point Sources in the Southern Hemisphere (IceCube Collaboration, Illuminati *et al.*), PoS 919 (ICRC2019)

A Search for Counterparts to ANITA Neutrino Candidates with IceCube (IceCube Collaboration, Pizzuto *et al.*), PoS 981 (ICRC2019)

Search for Neutrino Emission in IceCube's Archival Data from the Direction of IceCube Alert Events (IceCube Collaboration, Karl *et al.*), PoS 929 (ICRC2019)

IceCube as a Multi-Messenger Follow-Up Observatory for Astrophysical Transients (IceCube Collaboration, Vandenbroucke *et al.*), PoS 1026 (ICRC2019)

Searching for Multi-Messenger Gravitational-Wave + High-Energy Neutrino Sources with Advanced LIGO, Virgo and IceCube (IceCube Collaboration, Keivani *et al.*), PoS 930 (ICRC2019)

Constraining anomalous EeV ANITA detections with PeV neutrinos (IceCube Collaboration, Safa *et al.*), PoS 995 (ICRC2019)

Searching for Common Sources of Gravitational Waves and Neutrinos (IceCube Collaboration, Hussain *et al.*), PoS 918 (ICRC2019)

Searching for Time-Dependent Neutrino Emission from Blazars (IceCube Collaboration, O'Sullivan *et al.*), PoS 973 (ICRC2019)

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Search for High-Energy Neutrinos from Populations of Optical Transients (IceCube Collaboration, Stein et al.), PoS 1016 (ICRC2019)

Search for High-Energy Neutrinos from AGN Cores (IceCube Collaboration, Bradascio et al.), PoS 845 (ICRC2019)

AMON: TeV Gamma and TeV Neutrino Coincidence Alerts from HAWC and IceCube Subthreshold Data (IceCube Collaboration, Ayala et al.), PoS 841 (ICRC2019)

IceCube Results and Limits on the Neutrino Production from 3FHL Blazars Using 8 yrs of Through-Going Muon Data from the Northern Hemisphere [poster] (IceCube Collaboration, M. Huber et al.), PoS 916 (ICRC2019)

A Method for an Untriggered, Time-Dependent, Source-Stacking Search for Neutrino Flares [poster] (IceCube Collaboration, Luszczak et al.), PoS 950 (ICRC2019)

A Catalog of Astrophysical Neutrino Candidates for IceCube [poster] (IceCube Collaboration, Chen et al.), PoS 852 (ICRC2019)

IceCube Search for High-Energy Neutrinos Produced in the Precursor Stages of Gamma-Ray Bursts [poster] (IceCube Collaboration, Coppin et al.), PoS 859 (ICRC2019)

Searches for Neutrinos from Fast Radio Bursts with IceCube [poster] (IceCube Collaboration, Pizzuto et al.), PoS 982 (ICRC2019)

SkyLLH – A Generalized Python-based Tool for Log-likelihood Analyses in Multi-messenger Astronomy [poster] (IceCube Collaboration, Wolf et al.), PoS 1035 (ICRC2019)

Investigation of Ultra-Luminous Infrared Galaxies as Obscured High-Energy Neutrino Source Candidates [poster] (IceCube Collaboration, Correa et al.), PoS 860 (ICRC2019)

Neutrinos from Primordial Black Hole Bursts [poster] (IceCube Collaboration, Dave et al.), PoS 863 (ICRC2019)

Searching for Neutrino Emission from Hard X-Ray Sources with IceCube [poster] (IceCube Collaboration, Santander et al.), PoS 1002 (ICRC2019)

Search for Correlations of High-Energy Neutrinos and Ultra-High-Energy Cosmic Rays (ANTARES, IceCube, Auger and Telescope Array collaborations, Barbano et al.), PoS 842 (ICRC2019)

Measurement of the Diffuse Astrophysical Muon Neutrino Spectrum with 10 yrs of IceCube Data (IceCube Collaboration, Stettner et al.), PoS 1017 (ICRC2019)

Measurement of the High-Energy All-Flavor Neutrino-Nucleon Cross-Section with IceCube (IceCube Collaboration, Yuan et al.), PoS 1040 (ICRC2019)

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- Unfolding the True Atmospheric Neutrino Event Rate in the 1Gev -- 1TeV Range Using IceCube/DeepCore (IceCube Collaboration, Sandroos et al.), PoS 999 (ICRC2019)
- First Double-Cascade Tau Neutrino Candidates in IceCube & a New Measurement of the Flavor Composition (IceCube Collaboration, Stachurska et al.), PoS 1015 (ICRC2019)
- Model-Independent Measurement of the Atmospheric Muon Neutrino Energy Spectrum up to 2.5 PeV (IceCube Collaboration, Hoinka et al.), PoS 912 (ICRC2019)
- Characterization of the Astrophysical Diffuse Neutrino Flux with High-Energy Starting Events and Prospects for Future Measurements with IceCube (IceCube Collaboration, Schneider et al.), PoS 1004 (ICRC2019)
- Astrophysical Tau Neutrino Identification with IceCube Waveforms (IceCube Collaboration, Wille et al.), PoS 1036 (ICRC2019)
- A Novel Method of Rejecting Muon Backgrounds for the Detection of the Highest-Energy Neutrinos [poster] (IceCube Collaboration, Lu et al.), PoS 945 (ICRC2019)
- Search for Astrophysical Tau Neutrinos with an Improved Double-Pulse Method [poster] (IceCube Collaboration, Soedingrekso et al.), PoS 960 (ICRC2019)
- Measurement of the Multi-TeV Neutrino Cross-Section with IceCube Using Earth Absorption [poster] (IceCube Collaboration, Robertson et al.), PoS 990 (ICRC2019)
- Measurement of the Diffuse Muon Neutrino Flux Using Starting-Track Events in IceCube [poster] (IceCube Collaboration, Robertson et al.), PoS 1010 (ICRC2019)
- Constraints on Light Meson Production in Air Showers with Atmospheric Neutrinos Below 1 TeV Interacting in IceCube's DeepCore [poster] (IceCube Collaboration, Robertson et al.), PoS 882 (ICRC2019)
- IceTop as Veto for IceCube: Results (IceCube Collaboration, Tosi, Pandya et al.), PoS 445 (ICRC2019)
- The Scintillator Upgrade of IceTop: Performance of the Prototype Array (IceCube Collaboration, Kauer et al.), PoS 309 (ICRC2019)
- IceAct, SiPM-Based Imaging Air Cherenkov Telescopes for IceCube (IceCube Collaboration, Schaufel, Andeen et al.), PoS 179 (ICRC2019)
- Low-Energy Cosmic-Ray Spectrum from 250 TeV to 10 PeV using IceTop (IceCube Collaboration, Koirala et al.), PoS 318 (ICRC2019)
- Studying the Temporal Variation of the Cosmic-Ray Sun Shadow Using IceCube Data (IceCube Collaboration, Tenholt, Desiati et al.), PoS 437 (ICRC2019)

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Seasonal Variations of Atmospheric Neutrinos in IceCube (IceCube Collaboration, Tilav et al.), PoS 465 (ICRC2019)

Cosmic-Ray Spectrum and Composition from PeV to EeV from the IceCube Neutrino Observatory (IceCube Collaboration, Andeen et al.), PoS 172 (ICRC2019)

Working-Group Report on the Combined Analysis of Muon Density Measurements from Eight Leading Air-Shower Experiments (IceCube Collaboration, Soldin et al.), PoS 214 (ICRC2019)

A Three-Dimensional Reconstruction of Cosmic-Ray Events in IceCube [poster] (IceCube Collaboration, Bai, Dvorak et al.), PoS 244 (ICRC2019)

Seasonal Variations of Atmospheric Muons in IceCube [poster] (IceCube Collaboration, Tilav et al.), PoS 894 (ICRC2019)

Simulation and Reconstruction Study of Surface Scintillator Array at the IceCube Observatory [poster] (IceCube Collaboration, Leszczyńska, Plum et al.), PoS 332 (ICRC2019)

Science Case of a Scintillator and Radio Surface Array at IceCube [poster] (IceCube Collaboration, Schröder et al.), PoS 418 (ICRC2019)

First Measurements of Prototype Radio Antennas for the IceTop Detector Array [poster] (IceCube Collaboration, Renschler et al.), PoS 401 (ICRC2019)

Cosmic-Ray Composition Study Using Machine Learning at the IceCube Neutrino Observatory [poster] (IceCube Collaboration, Plum et al.), PoS 394 (ICRC2019)

Probing Neutrino Emission at GeV Energies from Compact Binary Mergers with IceCube (IceCube Collaboration, de Wasseige et al.), PoS 865 (ICRC2019)

First Search for GeV Neutrinos from Bright Gamma-Ray Solar Flares Using the IceCube Neutrino Observatory [poster] (IceCube Collaboration, de Wasseige et al.), PoS 1075 (ICRC2019)

Using SNOwGLoBES to Calculate Supernova Neutrino Detection Rates in IceCube Observatory [poster] (IceCube Collaboration, O'Sullivan et al.), PoS 975 (ICRC2019)

IceCube Supernova Search and Multi-Messenger Efforts [poster] (IceCube Collaboration, Fritz et al.), PoS 889 (ICRC2019)

Combined Search for Neutrinos from Dark-Matter Annihilation in the GC using ANTARES and IceCube (IceCube Collaboration, Iovine et al.), PoS 552 (ICRC2019)

Enabling a New Detection Channel for BSM Physics with *in-situ* Measurements of Ice Luminescence (IceCube Collaboration, Pollman et al.), PoS 983 (ICRC2019)

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- Quest for New Physics Using Astrophysical Neutrino Flavour in IceCube [poster] (IceCube Collaboration, Farrag et al.), PoS 879 (ICRC2019)
- Search for a Dark-Matter Annihilation in the Center of the Earth with the IceCube Detector [poster] (IceCube Collaboration, Renzi et al.), PoS 541 (ICRC2019)
- The search for dark matter with metastable mediators with the IceCube observatory [poster] (IceCube Collaboration, Tönnis et al.), PoS 548 (ICRC2019)
- Dark-Matter Searches with the IceCube Upgrade [poster] (IceCube Collaboration, Baur et al.), PoS 506 (ICRC2019)
- Solar WIMP Annihilation Search with IceCube [poster] (IceCube Collaboration, Lazar, Liu et al.), PoS 527 (ICRC2019)
- Searches for Connections Between Dark Matter and Neutrinos with the IceCube High-Energy Starting-Event Sample IceCube [poster] (IceCube Collaboration, Djumović, Argüelles et al.), PoS 839 (ICRC2019)
- Light Diffusion in Birefringent Polycrystals and the IceCube Ice Anisotropy (IceCube Collaboration, Chirkin, Rongen et al.), PoS 839 (ICRC2019)
- The POCAM as Self-Calibrating Light Source for the IceCube Upgrade [poster] (IceCube Collaboration, Henningsen et al.), PoS 908 (ICRC2019)
- Calibration LEDs in the IceCube Upgrade D-Egg Modules [poster] (IceCube Collaboration, Kiriki et al.), PoS 923 (ICRC2019)
- The Camera System for the IceCube Upgrade [poster] (IceCube Collaboration, Kiriki et al.), PoS 923 (ICRC2019)
- The SpiceCore Hole Camera System [poster] (IceCube Collaboration, Jeong, Tönnis et al.), PoS 926 (ICRC2019)
- Improving the Muon-Track Reconstruction of IceCube [poster] (IceCube Collaboration, Bradascio et al.), PoS 846 (ICRC2019)
- Application of Deep Neural Networks to Event-Type Classification in IceCube [poster] (IceCube Collaboration, Kronmüller et al.), PoS 257 (ICRC2019)
- Capturing Cosmic-Ray Research and Researchers with Art (IceCube Collaboration, Madsen et al.), PoS 951 (ICRC2019)
- Synergy between Art and Science: Collaboration at the South Pole [poster] (IceCube Collaboration, Fortescue et al.), PoS 867 (ICRC2019)
- The IceCube Upgrade - Design and Science Goals (IceCube Collaboration, Ishihara et al.), PoS 1031 (ICRC2019)

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A Multi-PMT Optical Module for the IceCube Upgrade [poster] (IceCube Collaboration, Classen et al.), PoS 855 (ICRC2019)

Electronics Development for the New Photo-Detectors (PDOM and D-Egg) for IceCube Upgrade [poster] (IceCube Collaboration, Nagai et al.), PoS 966 (ICRC2019)

Design and Performance of a UV-Calibration Device for the SpiceCore Hole [poster] (IceCube Collaboration, Brostean-Kaiser et al.), PoS 847 (ICRC2019)

An Acoustic Calibration System for the IceCube Upgrade [poster] (IceCube Collaboration, Weibusch et al.), PoS 1030 (ICRC2019)

Characterization of Two PMT Models for the IceCube Upgrade mDOM [poster] (IceCube Collaboration, van Eijk et al.), PoS 1022 (ICRC2019)

2017 – Busan, South Korea

IceCube Collaboration contributions to the 2017 ICRC are grouped together on astro-ph.HE/ and .IM in 6 distinct files. Part I – Point source searches – astro-ph.HE/1710.01179; II – Atmospheric and astrophysical diffuse neutrino searches of all flavors – astro-ph.HE/1710.01191; III - Cosmic rays – astro-ph.HE/1710.01194; IV – Dark matter and exotic particles – astro-ph.HE/1710.01197; V – Neutrino oscillations and supernova searches – astro-ph.HE/1710.01201; and IceCube-Gen2 - astro-ph.IM/1710.01207

Combined Analysis of Cosmic-Ray Anisotropy with IceCube and HAWC (IceCube Collaboration, Díaz-Vélez et al.), PoS 539 (ICRC2017); astro-ph.HE/1708.03005

Search for PeV Gamma-Ray Point Sources with IceCube (IceCube Collaboration, Griffith et al.), PoS 715 (ICRC2017); astro-ph.HE/1710.01194, p. 6

Search for Diffuse Gamma-Ray Emission from the Galactic Plane with IceCube (IceCube Collaboration, Pandya et al.), PoS 705 (ICRC2017); astro-ph.HE/1710.01194, p. 14

A Composition-Sensitive Log-Likelihood Ratio for Cosmic Rays and Gamma Rays (IceCube Collaboration, Pandya et al.), PoS 514 (ICRC2017); astro-ph.HE/1710.01194, p. 22 (poster)

Cosmic-Ray Anisotropy with 7 Years of Data from IceCube and IceTop (IceCube Collaboration, Bourbeau et al.), PoS 474 (ICRC2017); astro-ph.HE/1710.01194, p. 30 (poster)

Sensitivity of IceCube Cosmic-Ray Measurements to the Hadronic Interaction Models (IceCube Collaboration, De Ridder et al.), PoS 319 (ICRC2017); astro-ph.HE/1710.01194, p. 38 (poster)

GeV Solar Energetic Particle Observation and Search by IceTop from 2011 to 2016 (IceCube Collaboration, Evenson et al.), PoS 132 (ICRC2017); astro-ph.HE/1710.01194, p. 46 (poster)

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Impulsive Increase of Galactic Cosmic-Ray Flux Observed by IceTop (IceCube Collaboration, Evenson *et al.*), PoS 133 (ICRC2017); astro-ph.HE/1710.01194, p. 54

Performance of IceTop as Veto for IceCube (IceCube Collaboration, Pandya *et al.*), PoS 967 (ICRC2017); astro-ph.HE/1710.01194, p. 61 (poster)

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- The IceTop Scintillator Upgrade (IceCube Gen2 collaboration, Kunwar *et al.*), PoS 401 (ICRC2017); astro-ph.HE/1710.01207, p. 62 (poster)
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- Searching for VHE Gamma-Ray Emission Associated with IceCube Astrophysical Neutrinos Using FACT, H.E.S.S., MAGIC and VERITAS (VERITAS, FACT, IceCube and H.E.S.S. collaborations, Santander et al.), PoS 618 (ICRC2017); astro-ph.HE/1708.08945
- All-Sky Search for Correlations in the Arrival Directions of Astrophysical Neutrino Candidates and Ultrahigh-Energy Cosmic Rays (IceCube, Auger and Telescope Array collaborations, Al Samarai, et al.), PoS 960 (ICRC2017); astro-ph.HE/1710.01179, p. 23

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Recent Observations of Atmospheric Neutrinos with the IceCube Observatory (IceCube Collaboration, Desiati *et al.*), highlight talk, PoS 028 (ICRC2015)

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Recent Highlights from IceCube (IceCube Collaboration, Klein *et al.*), Braz. J. Phys. **44** 5 540 (2014); astro-ph.HE/1311.6519.

Measurement of the Cosmic-Ray Energy Spectrum with IceTop-73 (IceCube Collaboration, Gonzalez *et al.*), cbpf.br/~icrc2013/proc_icrc2013.html 0246; astro-ph.HE/1309.7006 ICO-III 5.

Results from Low-Energy Neutrino Searches for Dark Matter in the Galactic Center with IceCube-DeepCore (IceCube Collaboration, Wolf *et al.*); astro-ph.HE/1309.7007 ICO-IV 5.

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Detection of Galactic-Core–Collapse Supernovae with IceCube (IceCube Collaboration, Kroll *et al.*); astro-ph.HE/1309.7008 ICO-V 9.

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Multipole Analysis with IceCube to Search for Dark Matter Accumulated in the Galactic Halo (IceCube Collaboration, Reimann *et al.*); astro-ph.HE/1309.7007 ICO-IV 13.

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Earth WIMP Searches with IceCube (IceCube Collaboration, Kunnen *et al.*); astro-ph.HE/1309.7007 ICO-IV 17.

The Future of Neutrino Oscillations with IceCube / DeepCore (IceCube Collaboration, Wiebusch *et al.*); astro-ph.HE/1309.7008 ICO-V 21.

Searches for Multiple Neutrino Sources in the Cygnus Region and Beyond with Three Years of IceCube Data (IceCube Collaboration, Bernhard *et al.*); astro-ph.HE/ 1309.6979 ICO-I 12.

Seasonal Variations of Atmospheric Neutrino Flux Detected by the IceCube Observatory (IceCube Collaboration, Gaisser *et al.*); astro-ph.HE/1309.7003 ICO-II 13.

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2011 – Beijing, China

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The IceCube Upgrade (IceCube Collaboration, Delia Tosi et al.), 5th Workshop of the SCAR Astronomy and Astrophysics from Antarctica (ScarAAA2019), Mont Blanc, Switzerland; docushare.icecube.wisc.edu/dsweb/Get/Document-86650/IceCubeUpgrade_v2.pdf

Recent Results from the IceCube Neutrino Observatory (IceCube Collaboration, Jim Madsen et al.), ScarAAA2019; docushare.icecube.wisc.edu/dsweb/Get/Document-86625/IceCubeResults_SCAR_AAA_2019_final.pdf

Recent IceCube Measurements Using High-Energy Neutrinos (IceCube Collaboration, Hans Niederhausen et al.), 18th Conf. on Elastic and Diffractive Scattering (EDS Blois 2019), Quy Nhon, Vietnam; docushare.icecube.wisc.edu/dsweb/Get/Document-86714/Niederhausen%20slides.pdf

Searching for the Galactic Sources of High-Energy Neutrinos (IceCube Collaboration, Ali Kheirandish et al.), IGC@25: Multimessenger Universe, State College, Pennsylvania (2019); docushare.icecube.wisc.edu/dsweb/Get/Document-86715/Kheirandish%20slides.pdf

Cosmic-Ray Composition and Spectrum from 3 PeV to 1 EeV Using the IceCube and IceTop Detectors (IceCube Collaboration, Katherine Rawlins et al.), Intl. Symposium on Cosmic Rays and Astrophysics (ISCRA 2019), Moscow, Russia; docushare.icecube.wisc.edu/dsweb/Get/Document-86656/iscra_composition_v3.pdf

Measurements of Cosmic-Ray Muon Distributions with IceTop and IceCube (IceCube Collaboration, Katherine Rawlins et al.), ISCRA 2019; docushare.icecube.wisc.edu/dsweb/Get/Document-86655/iscra_muons_v3.pdf

Expected Spectra of Muon-Induced Cascades in IceCube (IceCube Collaboration, Semyon Khokhlov et al.), ISCRA 2019; docushare.icecube.wisc.edu/dsweb/Get/Document-86672/proceedings_Khokhlov.pdf

High-Energy Neutrino Astronomy: Current Status and Prospects (IceCube Collaboration, Gwenhaël de Wasseige et al.), European Physics Society Conf. on High-Energy Physics (EPS HEP 2019), Ghent, Belgium, PoS EPS-HEP2019 (2020), 042; docushare.icecube.wisc.edu/dsweb/Get/Document-87087/de%20Wasseige%20HE%20nu%20slides.pdf

Detection of a Neutrino Event at the Glashow Resonance Energy in IceCube (IceCube Collaboration, Christian Haack et al.), EPS HEP 2019; indico.cern.ch/event/577856/contributions/3422129/

Neutrino Oscillations in IceCube (IceCube Collaboration, Christian Haack et al.), EPS HEP 2019; indico.cern.ch/event/577856/contributions/3457522/

IceCube's Latest and IceCube-Gen2 Prospectives (IceCube Collaboration, Alessio Porcelli et al.), 15th Intl. Conf. on the Dark Side of the Universe, Buenos Aires, Argentina (2019); docushare.icecube.wisc.edu/dsweb/Get/Document-87091/Porcelli%20slides.pdf

Conference Presentations and Proceedings

Results and Highlights from IceCube (IceCube Collaboration, Tianlu Yuan et al.), Precision Investigations of the Neutrino Sector, Menlo Park, California (2019); docushare.icecube.wisc.edu/dsweb/Get/Document-86787/pins19.pdf

Cosmic Neutrinos and the Cosmic-Ray Accelerator TXS 0506+056, 36th International Cosmic Ray Conference, Madison, WI (2019); [astro-ph.HE/1909.09468](https://arxiv.org/abs/astro-ph.HE/1909.09468).

Neutrino oscillations and PMNS unitarity with IceCube/DeepCore and the IceCube Upgrade (IceCube Collaboration, Tom Stuttard et al.), PoS NuFact2019 099 (2020); DOI: 10.22323/1.369.0099.

Probing Beyond Standard Model Physics via Oscillations with IceCube DeepCore (IceCube Collaboration, S. Blot et al.), J. Phys. Conf. Ser. **1468** 1 012168 (2020); DOI: 10.1088/1742-6596/1468/1/012168.

D-Egg: new optical sensors for the IceCube Upgrade and Gen2 (IceCube Collaboration, Aya Ishihara et al.), J. Phys. Conf. Ser. **1468** 1 012166 (2020); DOI: 10.1088/1742-6596/1468/1/012166.

Physics Potential of the IceCube Upgrade (IceCube Collaboration, Wing Yan Ma et al.), J. Phys. Conf. Ser. **1468** 1, 012169 (2020); DOI: 10.1088/1742-6596/1468/1/012169.

Status of standard oscillation physics with IceCube DeepCore (IceCube Collaboration, J.P. Yanez et al.), J. Phys. Conf. Ser. **1468** 1 012122 (2020); DOI: 10.1088/1742-6596/1468/1/012122.

Search for Dark Matter and BSM Physics with the IceCube Neutrino Observatory (IceCube Collaboration, Aguilar Sanchez et al.), PoS NuFact2019 11 (2020); DOI: 10.22323/1.369.0110.

IceCube Search for Galactic Neutrino Sources based on Very High Energy γ -ray Observations (IceCube and HAWC Collaborations, Ali Kheirandish et al.), J. Phys. Conf. Ser. **1468** 1 012081 (2020); DOI: 10.1088/1742-6596/1468/1/012081.

High-energy particle physics with IceCube (IceCube Collaboration, Tianlu Yuan et al.), J. Phys. Conf. Ser. **1468** 1 012140 (2020); DOI: 10.1088/1742-6596/1468/1/012140.

Indirect Dark Matter Searches with IceCube (IceCube Collaboration, Morten Medici et al.), J. Phys. Conf. Ser. **1342** 1 012074 (2020); DOI: 10.1088/1742-6596/1342/1/012074.

Testing the Neutrino Mass Ordering with Four Years of IceCube/DeepCore Data (IceCube Collaboration, Martin Leuermann et al.), J. Phys. Conf. Ser. **1342** 1 012030 (2020); DOI: 10.1088/1742-6596/1342/1/012030.

Searches for Dark Matter with the IceCube neutrino telescope (IceCube Collaboration with S. Baur), NDM-2020 (2020); DOI: 10.31526/ACP.NDM-2020.4.

The Forward Physics Facility: Sites, Experiments, and Physics Potential (with L. Anchordoqui et al.), report number BNL-222142-2021-FORE, CERN-PBC-Notes-2021-025, DESY-21-142,

Conference Presentations and Proceedings

FERMILAB-CONF-21-452-AE-E-ND-PPD-T, KYUSHU-RCAPP-2021-01, LU TP 21-36, PITT-PACC-2118, SMU-HEP-21-10, UCI-TR-2021-22; arXiv:2109.10905.

The Observation of High-Energy Neutrinos from the Cosmos: Lessons Learned for Multimessenger Astronomy, the 16th Marcel Grossmann Meeting (2021); arXiv:2110.01687.

Students

Graduates

M. Chaves, Calculation of Multiple Bremsstrahlung in Gauge Theories (1982).

Jean-René Cudell, Experimental Challenges to the Standard Model: A Reevaluation (1987).

Choong Sun Kim, The Standard Model with Three Generations (1988).

Robert S. Fletcher, Effects of Soft Gluons at High Energy Colliders (1990).

Stéphane Keller, Hadronic Structure of the Photon (1991).

Kavoos Deilamian, Spectroscopic Test of the Symmetrization Postulate and Pauli Exclusion Principle (1991).

Mary Louise Stong, Two-Loop Corrections and Top Threshold Effects in Calculation of Observables at Z Peak (1993).

Timothy Stelzer, Radiation Patterns in Diffractive and Electroweak Events (1993).

Ricardo Vázquez, Física de Partículas a Altas Energías y Astrofísica (Santiago de Compostella, Spain); On the Precision of Tests of the Quantum Structure of the Standard Model (Madison) (both 1994).

Vijaya Kandahadai, Transparency Measurements of the South Pole Ice: Implications for AMANDA (1995).

Lori Gray, On the Architecture of High Energy Neutrino Telescopes (1996).

John Jacobsen, Simulating the Detection of Muons and Neutrinos in Deep Antarctic Ice (1996).

Igor Liubarski, Corporeal Manifestations in the Antarctic Muon and Neutrino Detector Array (1997).

Kevin Stenson, A Study of D^0 Production from 500 GeV π^- -Nucleon Interactions (1998).

Scott Radeztsky, A Dalitz Analysis of the Decay $D_s^+ \rightarrow \pi^+ \pi^- \pi^+$ (1999).

Tyce de Young, Observation of Atmospheric Neutrinos with the Antarctic Muon and Neutrino Detector Array (2001).

Rellen Hardtke, Search for Gamma Ray Bursts with the AMANDA Detector (2002).

Dan Hooper, Astroparticle Physics beyond the Standard Model (2003).

David Steele, Search for Extraterrestrial Point Sources with the AMANDA-II Detector (2003).

Students

Magdalena Gonzalez, Gamma Ray Bursts: Their High Energy Emission as Observed by EGRET (2005).

Melanie Clarke, Search for Gamma Ray Bursts with the AMANDA Detector (2005).

Michael Stamatikos, Probing for Correlated Neutrino Emission from Gamma-Ray Bursts with Antarctic Cherenkov Telescopes: A Theoretical Modeling and Analytical Search Paradigm in the Context of the Fireball Phenomenology (2005).

Aongus Ó Murchadha, The Search for Galactic Cosmic-Ray Sources with IceCube (2011).

Nathan Whitehorn, A Search for High-Energy Neutrino Emission from Gamma-Ray Bursts (2012).

Benedikt Riedel, Modeling and Understanding Supernova Signals in the IceCube Neutrino Observatory (2014).

Carlos Alberto Argüelles Delgado, New Physics with Atmospheric Neutrinos (2015).

Ali Kheirandish, Particle Astrophysics with Cosmic Neutrinos (2016).

Kevin Ghorbani, The Search for Sterile Neutrinos with IceCube (2018).

Logan Wille, Search for Tau Neutrinos Using IceCube (2019).

Vanessa López Barquero, The Role of Chaos and Magnetic Fields in the Cosmic Ray Anisotropy (2021)

Qinrui Liu, High-Energy Cosmic Neutrinos as a Window to the Universe (2021)

Invited Talks

Vosbergen Conference, Vlieland, Netherlands (1967 and 1968).

International Conference on High Energy Physics, Lund, Sweden (mini-rapporteur, 1969).

Symposium on $\pi\pi$ Scattering, Niels Bohr Institute, Copenhagen, Denmark (1969).

Rencontres de Moriond, Meribel, France (1971).

International Conference on High Energy Physics, Chicago, Illinois (mini-rapporteur, 1973).

Rencontres de Moriond, Meribel, France (1973).

Nimrod Lecture at Rutherford Laboratory, Oxford, England (1973).

International Summer Institute on Particle Interactions at Very High Energies, Louvain, Belgium (1973).

Total Cross Sections and High- p_T Phenomena above ISR Energies, at the 1974 June Meeting of the American Physical Society, Salt Lake City, Utah. Bull. Am Phys. Soc. II **15** 648 (1974).

ANL Summer Study on Polarized Proton Experiments and Beams (1974).

Canadian Physical Society, Montreal, Quebec (1975).

Probing the New Particles with Hadron Beams, International Conf. on Production of Particles with New Quantum Numbers, University of Wisconsin, Madison (1976).

Conference on Charm, University of Leuven, Belgium (1977).

Cosener's House Meeting on New Accelerators, Abingdon, Oxford, England (1978).

Sixth International Workshop on Weak Interactions, Ames, Iowa (1978).

Meeting of the American Physical Society, Blacksburg, Virginia (1979).

US – Japan Seminar on Cosmic Ray Physics, University of Delaware (1979).

Workshop on a Central Detector Facility for the Fermilab $\bar{p}p$ Collider, Fermilab (1981).

XXIst Cracow School of Theoretical Physics (1981).

Second Topical Workshop on Forward Collider Physics, Madison, Wisconsin (1982).

Workshop on Very High Energy Interactions in Cosmic Rays, University of Pennsylvania (1982).

British Forum on High Energy Physics (1982).

Workshop on ISABELLE Experiments, Brookhaven (1982).

Invited Talks

Annual Symposium on Theoretical Physics, Rutherford Appleton Laboratory, Oxford, England (1982).

Japanese Physical Society Meeting (1982).

Tsukuba Workshop on $\bar{p}p$ Colliders, Tsukuba University, Japan (1983).

Meeting of the Physical Society of Finland (1983).

CDF Forward Components Workshop, University of Wisconsin, Madison (1984).

Oregon Workshop on Super High Energy Physics, Eugene, Oregon (1984).

Wisconsin Association of Physics and Science Teachers, Madison, Wisconsin (1985).

8th International Conf. on Ultra-Relativistic Nucleus-Nucleus Collisions, Lawrence Berkeley Laboratory (1986).

VIth Astrophysics Meeting on Accretion Processes in Astrophysics, Les Arcs, France (1986).

Lewis Center for Physics: Workshop on Binary X-ray Sources, Princeton, New Jersey (1986).

Neutrino Masses and Neutrino Astrophysics, Ashland, Wisconsin (1987).

From Colliders to Supercolliders, Madison, Wisconsin (1987).

Landelijk Seminarie, NIKHEF, Amsterdam, Netherlands (1987).

INFN-Eloisatron Project International Workshop on Very High Energy Proton-Proton Physics, Erice, Italy (1987).

Aspen Winter Physics Conference on Elementary Particle Physics (1988).

QCD in Astrophysics, Fermilab (1988).

TeV Physics, Johns Hopkins Workshops on Current Problems in Particle Physics (1988).

Snowmass 88, Aspen, Colorado (1988).

APS Meeting of the Division of Particles and Fields, Storrs, Connecticut (1988).

Fifth International Symposium on Very High Energy Cosmic Ray Interactions, Lodz, Poland (1988).

Beyond the Standard Model, Iowa State University, Ames (1989).

Symposium on Collider Phenomenology, Argonne National Laboratory, Illinois (1989).

Invited Talks

Astrophysics and Particle Physics, San Miniato, Italy (1989).

21st International Cosmic Ray Conference, Adelaide, Australia (1989).

Z Phenomenology Symposium, Madison, Wisconsin (1990).

Polarized Collider Workshop, Penn State University (1990).

International Conference on High Energy Gamma-Ray Astronomy, University of Michigan, Ann Arbor (1990).

Astrophysical Aspects of the Most Energetic Cosmic Rays, Kofu, Yamanashi, Japan (1990).

Symposium for the 60th Birthday of R.J.N. Phillips, Rutherford Appleton Laboratory, Oxford, England (1990).

SSC Physics Symposium, University of Wisconsin, Madison (1990).

APS Division of Particles and Fields, Vancouver, Canada (1991).

22nd International Cosmic Ray Conference, Dublin (1991).

The Many Aspects of Neutrino Physics, Fermilab (1991).

SSC Full Acceptance Detector Organizational Meeting, Stanford (1992).

Second Gleb Wataghin Summer School on High Energy Phenomenology, State University of Campinas, Brazil (1992).

International Symposium on Neutrino Telescopes for the 400th Anniversary of Galileo, appointed by the Serenissima Republic of Venice, Italy (1992).

Gordon Research Conference, Proctor Academy, Andover, New Hampshire (1992).

SSC Physics Symposium, University of Wisconsin, Madison (1992).

CDF Workshop on Forward Physics, Fermilab (1992).

Workshop on Small-x and Diffractive Physics at the Tevatron, Fermilab (1992).

DAPHNE and Other Topics in Particle Physics, Frascati, Italy (1992).

Dertig Jaar Instituut Theoretische Fysica te Leuven, Belgium (1992).

American Physical Society Meeting, Astrophysics Division, Washington, DC (1992).

SSC Physics Symposium, University of Wisconsin, Madison (1993).

Invited Talks

Workshop on Physics at Current Accelerators and the Supercollider, Argonne National Laboratory (1993).

Escuela Latino Americana de Fisica, Mar del Plata, Argentina (1993).

Summer Symposium on Physics at the CERN Large Hadron Collider and Astroparticle Physics, Uto, Sweden (1993).

TAUP 93: Theory and Phenomenology in Astroparticle and Underground Physics, Gran Sasso, Italy (1993).

XXIII International Symposium on Multiparticle Dynamics, Aspen, Colorado (1993).

New Physics at New Facilities, Case Western Reserve University, Cleveland (1993).

Aspen Winter Conference, "Particle Physics before the Year 2000," Aspen, Colorado (1994).

JPL/Caltech Neutrino Astrophysics Technology Workshop, Pasadena, California (1994).

Workshop on Gamma-Gamma Colliders, Lawrence Berkeley Laboratory, Berkeley, California (1994).

International Symposium on Very High Energy Cosmic Ray Interactions, Waseda University, Tokyo, Japan (1994).

APS Division of Particles and Fields Meeting, Albuquerque, New Mexico (1994).

Cosmic Rays: Physics and Astrophysics (with T. Gaisser et *al.*), National Academy of Sciences, research briefings, NAS/NRC, Washington, DC (1994).

CAM 94 Physics Meeting, Cancun, Mexico (1994).

LBL Meeting on Physics and Simulation Issues for km^3 Neutrino Astronomy, Berkeley, California (1995).

Arkansas Space Grant Consortium (1995).

Antarctic Experimenters Meeting, NSF, Washington, DC (1995).

TAUP 95: IVth International Workshop on Theoretical and Phenomenological Aspects of Underground Physics, Toledo, Spain (1995).

WIN 95: XVth Workshop on Weak Interactions and Neutrinos, Talloires, France (1995).

Topics in the Weak Interaction, Vanderbilt University, Nashville, Tennessee (1996).

Invited Talks

US Meeting on Future Prospects for Kilometer-Scale Neutrino Detectors, Jet Propulsion National Laboratory, Pasadena, California (1996).

International Symposium on the Occasion of the Retirement of Martin Block from Northwestern University, Evanston, Illinois (1996).

Nordita/Uppsala Astroparticle Workshop on High Energy Neutrino Astronomy, Uppsala, Sweden (1996).

Workshop on High Energy Neutrino Astronomy, Aspen Center for Physics Summer Program, Aspen, Colorado (1996).

IV Gleb Wataghin School on High Energy Phenomenology, Campinas, Brazil (1996).

International Workshop, "New Worlds in Astroparticle Physics," Algarve, Portugal (1996).

XXI School on Theoretical Physics, Silesia, Poland (1996).

Third Workshop on Small-x and Diffractive Physics, Argonne National Laboratory (1996).

HEPAP Subpanel on Planning for the Future of US High Energy Physics, Stanford Linear Accelerator Center (1997).

Symposio en Honor de José Adem, Cinvestav, Mexico (1997).

ADM60-FEST: Topical Issues in Deep Inelastic Scattering, Durham, England (1997).

Vietnam School on Cosmic Ray Physics, Hanoi, Vietnam (1997).

Aspen Winter Conference on Particle Physics, Aspen, Colorado (1998).

Aspen Rotary Club, Aspen, Colorado (1998).

IceCube Neutrino Detector Workshop, University of California, Irvine (1998).

Workshop on Perspectives of High-Energy Particle Astrophysics: Physics at Cosmic Accelerators, Burg Liebenzell, Germany (1998).

TASI-98, Boulder, Colorado (1998).

South African Institute of Physics Conference (SAIP98), Cape Town, South Africa (1998).

Erice Summer School, Palermo, Italy (1998).

Aspen Winter Conference on Particle Physics, "Advances in Particle Physics: Recent Results and Open Questions," Aspen, Colorado (1999).

Fred Reines Memorial Symposium, University of California, Irvine (1999).

Invited Talks

Gamma Ray Burst Workshop, Institute for Theoretical Physics, University of California, Santa Barbara (1999).

Workshop on Particle Astrophysics with High Energy Neutrinos, Arlington, Virginia (1999).

National Academy Decadal Review, Atlanta, Georgia (1999).

Inner-Outer Space, Fermilab (1999).

Neutrino Summer, CERN, Switzerland (1999).

Low Energy Neutrino Workshop, INP, University of Washington, Seattle (1999).

New Perspectives, Fermilab (1999).

QCD (Multiparticle Production), Brown University, Providence, Rhode Island (1999).

OWL/Airwatch Workshop, University of California, Los Angeles (1999).

7th Course: Current Topics in Astrofundamental Physics, International School of Astrophysics “D. Chalonge,” Erice, Italy (1999).

American Astronomical Society, Atlanta, Georgia (2000).

Aspen Summer Workshop: Neutrinos with Mass (2000).

Scandinavian Summer School, Niels Bohr Institute, Copenhagen, Denmark (2000).

Nederlandse Natuurkundige Vereniging, Amsterdam, Netherlands (2000).

Snowmass 2001: The Future of Particle Physics.

Green Bay Retired Men’s Club (2001).

18th International Workshop on Weak Interactions and Neutrinos, Christchurch, New Zealand (2002).

Aspen Winter Conference on Ultra–High-Energy Particles from Space, Aspen, Colorado (2002).

Aspen Winter Conference on High-Energy Particle Physics, Aspen, Colorado (2002).

Michaelfest, Liverpool, England (2002).

Symposium on Neutrinos and Particle Astrophysics, Beijing, China (2002).

School on Neutrino Physics and Astrophysics (NEUPAST), Trieste, Italy (2002).

Invited Talks

Lion's Club, Madison, Wisconsin (2002).

Symposium on Neutrino Astronomy for High School Teachers, Antwerp, Belgium (2002).

10th International Workshop on Neutrino Telescopes, Venice, Italy (2003).

VERITAS collaboration Meeting, Adler Planetarium, Chicago, Illinois (2003).

Int'l Workshop on UHE Neutrino Telescopes, Chiba University, Chiba, Japan (2003).

127th Natl. Mtg. on the American Association of Physics Teachers, Madison, Wisconsin (2003).

Nijmegen 03: International Summer School on Particle and Nuclear Astrophysics, Nijmegen, Netherlands (2003).

COSMO 03: Intl. Workshop on Particle Physics and the Universe, Ambleside, England (2003).

NSF Symposium, "The Universe from the Ground Up," Ground-Based Astronomy in the 21st Century, Washington, DC (2003).

Kavli-CERCA Conference on the Future of Cosmology, Case Western Reserve University, Cleveland, Ohio (2003).

Teachers Experiencing Antarctica and the Arctic (TEA), Polar Science Seminar, Crystal Lake, Illinois (2003).

219th Reunion, Nederlandse Astronomen Club, University of Nijmegen, Netherlands (2003).

6th RESCUE International Symposium, Frontier in Astroparticle Physics and Cosmology, University of Tokyo, Tokyo, Japan (2003).

42nd Junior Science, Engineering and Humanities Symposium, Madison, Wisconsin (2004).

3rd International Workshop on Ultra High Energy Cosmic Rays, Leeds, England (2004).

International WE-Heraeus Summer School, "Physics with Cosmic Accelerators," Bad Honnef, Germany (2004).

Intl. Saldome Shower Array Workshop (SaISA 2005), SLAC, Stanford, California (2005).

Annual Meeting of the German Physical Society, "Einstein and the Year of Physics," Berlin, Germany (2005).

Midwest Regional Polar Science Workshop, St. Benedictine University, Lisle, Illinois (2005).

XXII Intl. Symposium on Lepton-Proton Interactions at High Energy, Uppsala, Sweden (2005).

TeV Particle Astrophysics Workshop, Fermilab, Batavia, Illinois (2005).

Invited Talks

LHC Summer School, Maria Laach, Germany (2005).

Madrid Neutrino Mini-Workshop, “What is the Neutrino,” U. Autonoma, Madrid, Spain (2005).

Joint Annual Conf. of the National Society of Black Physicists and the National Society of Hispanic Physicists, San Jose, California (2006).

Be-Poles, Brussels, Belgium (2006).

Science@Poles, joint meeting of Italian, French and US polar programs. Embassy of Italy, Washington, DC (2006).

The Multi-Messenger Approach to High-Energy Gamma-Ray Sources, Barcelona, Spain (2006).

Eleventh Marcel Grossman Meeting on General Relativity, Berlin, Germany (2006).

PASCOS 2006, Ohio State University (2006).

German School of Particle Astrophysics, Erlangen, Germany (lecturer – 2006).

CHIPP Workshop on Neutrino Physics, Bern, Switzerland (2006).

XXIII Texas Symposium on Relativistic Astrophysics – Texas in Melbourne, Australia (2006).

Colliders to Cosmic Rays 2007, Granlibakken, Tahoe City, California (intro. lecture – 2007).

XII International Workshop on Neutrino Telescopes, Venice, Italy (2007).

The Violent Universe Winter School, Les Houches, France (lecturer – 2007).

Ultra-High–Energy Cosmic Rays, Neutrinos and Photons, Penn State University (2007).

Dark Side of the Universe 2007 Workshop (DSU07), University of Minnesota (2007).

30th International Cosmic Ray Conference, Merida, Mexico (highlight talk - 2007).

10th Intl. Conf. on Topics in Astroparticle and Underground Physics, Sendai, Japan (2007).

Abelson Advancing Science Seminar, AAAS, Washington DC (2007).

The Centenary of the Birth of Professor Marian Miesowicz, University of Krakow, Poland (2007).

PASC Winter School, Sesimbra, Portugal (2007).

Neutrino Oscillations in Venice, Venice, Italy (2008).

Huberfest, University of Wisconsin, Madison (2008).

Invited Talks

Carolina International Symposium on Neutrino Physics, South Carolina (2008).

Neutrino 2008, Organizer with J. Adams and S. Parke, Christchurch, New Zealand (2008).

AAS Meeting, St. Louis (2008).

50 years of MPI for Physics in Munich, Munich, Germany (2008).

Neutrino Frontiers, University of Minneapolis, Minneapolis (2008).

PANIC 08, Student Day Lecturer on Particle Astrophysics, Eilat, Israel (2008)

Discrete 08, Valencia University, Valencia, Spain (2008).

XIII International Workshop on Neutrino Telescopes, Venice, Italy (2009).

National Science Teacher Association, New Orleans, Louisiana (2009).

American Association of Physics Teachers, Harrisburg, Pennsylvania (2009).

American Association for Physics Teachers, Boston University (2009).

Multi-Messenger Relativistic Astrophysics, Georgia Tech (2009).

Nuclear Physics talk, APS Meeting, San Diego, California (2009).

Antarctic Deepfreeze Association Reunion, Middleton, Wisconsin (2009).

XXIèmes Rencontres de Blois, Windows on the Universe, Blois, France (2009).

Summer School on Nuclear and Particle Astrophysics, University of Washington, Seattle (2009).

Intl. Summer School on Particle and Nuclear Astrophysics, Nijmegen, Netherlands (2009).

COSMO 09: Intl. Workshop on Particle Physics and the Universe, Geneva, Switzerland (2009).

Meeting Honoring the 100th Anniversary of the Birthday of Gunnar Kallen, Lund, Sweden (2010).

Karpathian Summer School, Bucharest, Romania (2010).

Erice Summer School, Italy (2010).

Tokyo Summer School, Japan (2010).

Space Place, UW-Madison (2010).

Christmas Meeting, Barcelona, Spain (2010).

Invited Talks

EPS Meeting on Nuclear Physics in Astrophysics, Eilat, Israel (2011).

Multi-Messenger Astronomy of Cosmic Rays, Kavli Workshop, Beijing, China (2011).

Experiments on the Cosmic Frontier, Fermilab (2011).

Swieca Summer School on Particles and Fields, Campos de Jordao, Sao Paulo, Brazil (2011).

2nd Intl. Conference on Advancements in Nuclear Instrumentation, Measurement Methods and their Applications (ANIMMA), Ghent, Belgium (2011).

51st Cracow School of Theoretical Physics: Soft Side of the LHC, Zakopane, Poland (2011).

Intl. Workshop on Cosmic Rays and Cosmic Neutrinos: Looking at the Neutrino Sky (NUSKY), Trieste, Italy (2011).

European Physical Society Intl. Europhysics Conference on High Energy Physics, Grenoble, France (2011).

XIIIth Intl. Workshop on Neutrino Factories, Super Beams and Beta Beams (NuFact 11), CERN.

Dark Matter Underground and in the Heavens, CERN, Geneva, Switzerland (2011).

ECFA Meeting, CERN, Geneva, Switzerland (2011).

Radiography of the Earth, University of Tokyo, Japan (2011).

Quantum Universe 2, Groningen, Netherlands (2012).

Public Lecture, Edgewood College, Madison, Wisconsin (2012).

100 Years of Cosmic Particles, Victor Hess Symposium, Vienna, Austria (2012).

University of Geneva, Switzerland (2012).

World Science Festival, New York, New York (2012).

University of Wisconsin Alumni, Pittsburgh, Pennsylvania (2012).

11th Intl. Conference on Nucleus-Nucleus Collisions, San Antonio, Texas (2012) – public lecture.

Technical University of Munich Affiliated Professor Lecture, Munich, Germany (2012).

Erice Summer School, Italy (2012).

Dark Attack, Ascona, Switzerland (2012).

Invited Talks

100 Years of Cosmic Rays, Bad Saarow, Germany (2012).

International Astronomical Union, Beijing, China (2012).

Neutrino Oscillation Workshop, Conca Specchiulla, Italy (2012).

Cycle of Cosmology and Astrophysics, Madrid, Spain (2012).

Texas Symposium on Relativist Astrophysics, São Paulo, Brazil (2012).

9th Intl. Symposium on Cosmology and Particle Astrophysics, Taipei, Taiwan (2012).

NASA / Goddard Space Flight Center, Greenbelt, Maryland (2013).

American Physical Society, Denver, Colorado (2013).

Cosmic Frontier Workshop, Stanford, Menlo Park, California (3 talks, 2013).

Jefferson Laboratory, Newport News, Virginia (2013).

Institute for Advanced Study, Princeton, New Jersey (2013).

International Cosmic Ray Conference, Rio de Janeiro, Brazil (highlight talk, 2013).

Pontecorvo 100, Pisa, Italy (2013).

150th Anniversary of the German Astronomical Society, Tübingen, Germany (2013).

Trevorfest, Tucson, Arizona (2013).

CosPA, Honolulu, Hawaii (2013).

MERCUR Winter School, Bad Honnef, Germany (2014).

Erlangen School for Astroparticle Physics, Bärnfels, Germany (2014).

Masterclass for Ph.D. Students, Veldhoven, Netherlands (2014).

IDPASC School, Braga, Portugal (2014).

Neutrinos Beyond IceCube, Arlington, Virginia (2014).

Art of Experiment, Honoring David Nygren, Berkeley, California (2014).

ARENA 2014, Annapolis, Maryland

Royal Swedish Academy of Sciences (public lecture – 2014).

Invited Talks

CosmoParticle Physics in Belgium, Gent University (2014).

SWAPS, Geneva, Switzerland (2014).

International Meeting for Large Neutrino Infrastructures, Paris, France (2014).

MIAPP Workshop, Garching, Germany (2014).

Frontiers of Fundamental Physics, Marseille, France (2014).

High Energy Astrophysics Division, American Astronomical Society, Chicago, Illinois (2014).

Multiple Messengers and Challenges in Astroparticle Physics, Gran Sasso (2014).

Ultra High Energy Cosmic Rays, Springdale, Utah (2014).

International Committee for Future Accelerators, Beijing, China (2014).

Neutrinos: Recent Developments and Future Challenges, Santa Barbara, California (2014).

Multimessenger Astronomy in the Era of PeV Neutrinos, Annapolis, MD (2014).

The Physics of Neutrinos, Brussels, Belgium (2015).

The Successful Story of Neutrino Telescopes, Venice, Italy (2015).

American Physical Society, Baltimore, MD; also at CalTech, Pasadena, CA (2015).

Rencontres de Blois, Particle Physics and Cosmology, France (2015).

Solvay-Francqui Workshop, *Neutrinos: From Reactors to the Cosmos*, Brussels (2015).

Workshop on Weak Interactions and Neutrinos (WIN2015), Heidelberg, Germany (2015).

European Physical Society Conference on High Energy Physics, Vienna, Austria (2015).

Canadian Association of Physics, Edmonton, Alberta (2015).

Invisibles 15 Workshop, Madrid, Spain (2015).

Marcel Grossman Meeting, Rome, Italy (2015).

Summer Program for Physics, Aspen, Colorado (2015).

Opening lecture, SLAC Summer Institute, Menlo Park, California (2015).

NuAtmospheres, Royal Society of London, UK (2015).

Invited Talks

TEXAS Symposium, Geneva, Switzerland (2015).

Very High Energy Particle Astrophysics, Honolulu, Hawaii (2016).

UCLA Dark Matter Symposium, Los Angeles, California (2016).

David Cline Memorial, Los Angeles, California (2016).

Intl. Conf. on Computational Photography (ICCP 2016), Northwestern, Evanston, Illinois (2016).

Pheno 2016, Pittsburgh, Pennsylvania (2016).

QCD-21, Paris, France (2016).

53rd Course of the International School of Subnuclear Physics, Erice, Italy (2016).

20th Course of the International School of Cosmic Ray Astrophysics, Erice, Italy (2016).

Aspen Summer Physics Program (2016).

14th Workshop on Non-Perturbative Quantum Chromodynamics, Paris (2016).

54th Course New Physics Frontiers in the LHC-2, Erice, Italy (2016).

School for Cosmic Ray Physics, Erice (2016).

RAPP Center Inauguration, Bochum, Germany (2016).

KVAB Forward Look, Palace of the Academies, Brussels, Belgium (2016).

Universidad Autónoma de Madrid, Spain (2016).

École Polytechnique Fédérale de Lausanne, Switzerland (2016).

International Symposium on Parity Violation and Neutrino Physics, Shanghai, China (2016).

Sources of Galactic Cosmic Rays, Paris, France (2016).

High Energy Neutrino and Cosmic-Ray Astrophysics, Weizmann Institute, Rehovot, Israel (2016).

XLV Intl. Meeting for Fundamental Physics, Granada, Spain (2017).

Nederlandse Astronomenconferentie, Nijmegen, Netherlands (2017).

Veritas 10-Year Celebration, Tucson, Arizona (2017).

Tri-Institute Summer School on Elementary Particle Physics, Sudbury, Ontario (2017).

Invited Talks

Physics Summer School, Aspen, Colorado (2017).

Dark Matter, Neutrinos and Their Connections, Odense, Denmark (2017).

Cosmo 2017, Paris, France (2017).

RAPP Center Inauguration, Bochum, Germany (2017).

Erice Summer School, Neutrinos in Cosmology, in Astro, in Particle and in Nuclear Physics, Erice, Italy (2017).

Perspectives in Astroparticle physics from High Energy Neutrinos (PAHEN), Naples, Italy (2017).

Supernova Neutrino OBServations (SNOBS), Mainz, Germany (2017).

10th Anniversary of Gravitation Astroparticle Physics Amsterdam (GRAPPA), Amsterdam, Netherlands (2017).

The Transient Universe, Singapore (2018)

American Astronomical Society, Ft. Washington, Maryland (2018).

High Energy Universe: Gamma Ray, Neutrino and Cosmic Ray Astronomy Workshop, Munich, Germany (2018).

Pierre Binétruy: From Theory to Strategy of Discovery, Paris, France (2018).

Phenomenology 2018, Pittsburgh, Pennsylvania (2018).

Conference on the Intersections of Particle and Nuclear Physics (CIPANP), Palm Springs, California (2018).

Particles. Strings & COSmology (PASCOS), Cleveland, Ohio (2018).

Astrophysics – MAGIC, La Palma, Canary Islands (2018).

Erice International School of Subnuclear Physics 54th Course Particle Physics: Yesterday, Today and Tomorrow, Erice, Italy (2018).

15th Marcel Grossman Meeting, Rome, Italy (2018).

Tri-Institute Summer School in Elementary Particles, Waterloo, Ontario, Canada (2018).

Intl. School of Cosmic Ray Astrophysics 21st Course, Italy (2018).

Particle Flavour Fever Summer School, Paul Scherrer Institute, Zuz, Switzerland (2018).

Invited Talks

Julius Wess Lectures at Karlsruhe Institute of Technology, Germany (2018).

$\int d k$ II Doktoratskolleg Particles and Interactions Summer School, Hirschwang, Austria (2018).

Searching for the Sources of Galactic Cosmic Rays, Paris, France (2018).

Annual Theory Meeting, Durham, UK (2018).

Kaczmarczik Lecture, Philadelphia, Pennsylvania (2018).

57th Intl. Winter Meeting on Nuclear Physics, Bormio, Italy (2019).

Ewan Lecture, Queens University, Kingston, Ontario, Canada (2019).

XVII Intl. Workshop on Neutrino Telescopes, Venice, Italy (2019).

Cluster of Excellence Inauguration, Mainz, Germany (2019).

1st CTA Science Symposium, Bologna, Italy (2019).

CERN Council Open Symposium on the Update of European Strategy for Particle Physics, Granada, Spain (2019).

HTCondor Meeting, Madison, Wisconsin (2019).

DC Meets Madison, Washington, DC (2019).

Invisibles19 Workshop, Valencia, Spain (2019).

59th Cracow School of Theoretical Physics, Zakopane, Poland (2019).

New Windows to the Universe Summer School, Santander, Spain (2019).

Great Lakes Cosmology Workshop, Rochester, New York (2019).

INSS International Neutrino Summer School, Fermilab, Chicago, Illinois (2019).

SLAC Summer Institute, Menlo Park, CA (2019).

36th International Cosmic Ray Conference, Madison, WI (2019).

Brookhaven Forum 2019 (BF2019): Particle Physics and Cosmology in the 2020s, Brookhaven, New York (2019)

Multi-Messenger Astrophysics in the Gravitational Wave Era, Yukawa Institute, Kyoto, Japan (2019)

Invited Talks

Gunnar Källén Symposium “The Elusive Neutrino,” Lund University, Lund, Sweden (2019).

Particle Physics Christmas Lecture, Oxford, UK (2019).

AMEGO Splinter Meeting, AAS Meeting, Honolulu, Hawaii (2020).

Padova Excellence School of Physics of the Universe, Asiago, Italy (2020).

Neutrino 2020, Headline Talk, Fermilab, Chicago (2020).

Cosmic Rays and Neutrinos in the Multi-Messenger Era, APC Paris, France (2020).

XIX International Workshop on Neutrino Telescopes, Venice, Italy (2021).

La Thuile 2021 – Les Rencontres de Physique de la Vallée d'Aoste, Italy (2021)

Forward Physics Facility – Kickoff Meeting, University of California, Irvine (2021)

16th Marcel Grossmann Meeting, Rome, Italy (2021)

Colloquium and Seminar Talks

1966 – 1967

University of Leiden

1969 – 1970

CERN

E.T.H., Zurich

University of Liège, Belgium

1970 – 1971

Duality for Pedestrians, lectures delivered at the Belgian-Dutch Summer School and the CERN Academic Program

E.T.H., Zurich

Rutherford Laboratory

University of Durham

University of Birmingham

Westfield College, London

University of Nice

1971 – 1972

University of Wisconsin (colloquium)

Northwestern University

Michigan State University

Arizona State University (colloquium)

CERN

Rutherford Laboratory

Case Western Reserve University

Fermilab

University of Minnesota.

1972 – 1973

University of Illinois

Fermi Institute, University of Chicago

Argonne National Laboratory (2 separate visits)

Rutherford Laboratory

Model Independent Features of Diffraction, lectures delivered at the Summer Institute on Particle Interactions, Louvain, Belgium

1974 – 1975

Louisiana State University (colloquium)

McGill University

University of Wisconsin (colloquium)

University of Indiana

1976 – 1977

Rutherford Laboratory (Nimrod Lecture)

University of Liverpool (colloquium)

Imperial College

Colloquium and Seminar Talks

University of Oxford
University of Durham
University of Birmingham
University of Southampton
University of Cambridge, D.A.T.M.P.
Cavendish Laboratory, Cambridge
University College, London
Westfield College, London
University of Leuven
University of Mons
University of Antwerp
University of Wuppertal
University of Bielefeld
University of Liverpool (high-energy physics seminar)

1977 – 1978

Iowa State University
University of Toronto
Fermilab
University of Chicago
Ohio State University
McGill University

1978 – 1979

University of Delaware (colloquium)
University of Louvain-la-Neuve
University of Paris-Sud
Rutherford Laboratory
University of Hawaii
Mathematics Department, University of Wisconsin

1979 – 1980

Duke University (seminar and colloquium)
Fermilab
DESY
University of Zaragoza
University of Madrid
University of Barcelona
University of Hawaii
University of Oregon
University of California – Berkeley
University of Washington – Seattle

1980 – 1981

Fermilab
Johns Hopkins University (colloquium)
Argonne National Laboratory (colloquium)
University of Louvain

Colloquium and Seminar Talks

University of Liège
Rice University (colloquium)
Texas A & M (colloquium)
University of Wisconsin – Madison (colloquium)
University of Wisconsin – Parkside (colloquium)
University of Wisconsin – Madison (lecture for HS students visiting campus)
Rutherford Laboratory
University of Durham
University of Liverpool

1981 – 1982

University of Michigan
University of Guelph (colloquium)
Purdue University (nuclear physics and theory seminars)
University of California
University of Hawaii (colloquium)
University of Arizona
Argonne National Laboratory

1982 – 1983

Rutherford Laboratory
University of Cambridge
University of Durham
University of Leuven
University of Brussels
University of Arizona (colloquium)
University of Liverpool
University of Leeds (colloquium)
University College, London
University of Tokyo
Waseda University, Tokyo
University of Tokyo, Institute for Nuclear Study
University of Tokyo (nuclear physics seminar)
Hiroshima University
University of Bristol (colloquium)
Imperial College
University of Southampton
KEK – Tsukuba
Tokyo Metropolitan University
Tokyo Metropolitan University (experimental seminar)
University of Tokyo, Komaba
Kyoto University
Kyoto University, Research Institute for Fundamental Research
Kobe University
Osaka City University
University of Helsinki
Yuvaskula University, Finland
Nordita, Copenhagen

Colloquium and Seminar Talks

1983 – 1984

Duke University (colloquium)
Carnegie-Mellon University
University of Durham

1984 – 1985

Interagency Colloquium, Washington, DC
Northwestern University (colloquium)
University of Wisconsin – Madison (mathematics department)
University of Oregon
Fermilab
University of Durham
University of Manchester
Westfield College, London
Cavendish Laboratory, Cambridge

1985 – 1986

McGill University (seminar and colloquium)
Duke University (colloquium)
University of Tokyo, Institute for Nuclear Study
Tokyo Metropolitan University

1987 – 1988

University of British Columbia (colloquium)
Rice University (colloquium)
Argonne National Laboratory (colloquium)
University of Kansas
Johns Hopkins University
McGill University
Rutgers University
Harvard University
University of Wisconsin – Platteville (public lecture)
University of Durham

1988 – 1989

Penn State University (colloquium)
Northwestern University (colloquium)
Louisiana State University (colloquium)
University of Michigan
Los Alamos National Laboratory (colloquium)
Fermilab
McGill University

1989 – 1990

University of California, Riverside (colloquium)

Colloquium and Seminar Talks

1990 – 1991

Fermilab
University of Guelph (colloquium)
KEK – Tsukuba
University of Iowa (colloquium)
Purdue University
University of Hawaii

1991 – 1992

The New Astronomy, lectures at the IInd Gleb Wataghin Summer School, São Paulo, Brazil
Northwestern University (colloquium)
Rice University (colloquium)
Florida State University (colloquium)
University of Utah (colloquium)
Fermilab (colloquium)
Indiana University (colloquium)
Ohio University (colloquium)
University of Chicago
University of Hawaii

1992 – 1993

University of Leuven (colloquium)
University of Liège (colloquium)
Nagoya University (colloquium)
University of New Mexico (colloquium)
University of Louvain-la-Neuve
Brookhaven National Laboratory
University of Hawaii

1993 – 1994

University of Cincinnati (colloquium)
University of Michigan
California Institute of Technology
University of Santiago de Compostella
Stanford Linear Accelerator Center (SLAC) (colloquium)
University of Wisconsin – River Falls ($\Sigma\pi\Sigma$ colloquium)
National Science Foundation (colloquium)

1994 – 1995

University of Pittsburgh (colloquium)
Lawrence Radiation Laboratory, Berkeley (colloquium)
University of California, Berkeley
Ecole Polytechnique, Paris
Argonne National Laboratory (colloquium)
Fermilab
Carleton University, Ottawa
McGill University

Colloquium and Seminar Talks

Iowa State University (colloquium)
University of Arkansas, Little Rock
University of Arkansas, Pine Bluff (public lecture)
California Institute of Technology
University of Hawaii (colloquium)
University of Florida (colloquium)
Los Alamos National Laboratory (colloquium)
Los Alamos National Laboratory (astrophysics seminar)

1995 – 1996

DESY-Zeuthen (colloquium)
DESY-Hamburg (colloquium)
State University of New York, Buffalo (colloquium)
Johns Hopkins University (particle physics seminar and colloquium)
Rice University (colloquium)
New Mexico State University (astronomy seminar and colloquium)
Fermilab (colloquium)
Northwestern University (colloquium)
Columbia University
University of Stockholm (colloquium)
University of Guelph (colloquium)
Argonne National Laboratory
University of North Carolina
Duke U
Electroweak Interactions: Loop for Cyclists, lectures presented at the IVth Gleb Wataghin
School on HE Phenomenology, UNICAMP, Campinas, Brazil

1997

Case Western Reserve University (colloquium)
Penn State University
University of California, San Diego (colloquium)
CINVESTAV, Mexico City
UNAM, Mexico City (colloquium)
University of Illinois, Urbana-Champaign
University of Indiana (colloquium)
Wayne State University (colloquium)

1998

Ohio State University (colloquium)
Michigan State University (colloquium)
Space Place, UW–Madison
Uppsala University
Jefferson National Laboratory, Newport News, VA
Seoul National University
Korean Institute for Advanced Studies
Yonsei University, Seoul
NASA Goddard Space Flight Center (colloquium)
McGill University (colloquium)

Colloquium and Seminar Talks

Columbia University (colloquium)

1999

SLAC (experimental physics seminar)
California Institute of Technology (experimental physics seminar)
University of California, Berkeley (LBNL research progress meeting)
CERN (laboratory colloquium)
Argonne National Laboratory (theory seminar)
Clark Atlanta University (seminar)
Stanford University (colloquium)
Uppsala University (public lecture)
CERN (theory seminar)
University of Washington, Institute for Nuclear Physics (seminar)
University of Chicago, Enrico Fermi Institute for Nuclear Physics (seminar)
University of California, Los Angeles (experimental physics seminar)
Iowa State University (colloquium)
University of Utrecht (experimental physics seminar)
26th Intl. Cosmic Ray Conference: Symposium on the Observation of EHE Particles & Neutrinos, & Symposium for Gaurang Yodh, Salt Lake City, UT

2000

University of Illinois, Chicago (colloquium)
University of Kentucky (colloquium)
University of Vienna (colloquium)
University of Brussels (public lecture)
Aspen Center for Physics
Stanford University (colloquium)
Argonne National Laboratory (Dept. of Physics colloquium)
University of Illinois (high-energy physics seminar)

2001

Naval Research Laboratory, Washington, DC (colloquium)
University of Alabama (colloquium)
Fermilab (colloquium)
Massachusetts Institute of Technology (colloquium)
University of Wuppertal (public lecture)

2002

National Taiwan University (colloquium)
Michigan State University (colloquium)
Princeton University (colloquium)
Oklahoma State University (colloquium)
Durham University, England (colloquium)
Imperial College, London
National Research Council
University of Wisconsin roundtable talk

Colloquium and Seminar Talks

2003

Carnegie Mellon University (colloquium)
University of California, Los Angeles (colloquium)
Max Planck Institute, Munich (colloquium)
University of Rome (colloquium)
Katholieke Universiteit, Leuven (colloquium)
WARF Trustees, Madison (after dinner talk)
Science Visitors Board, Madison (after-dinner talk)
Melbourne University (colloquium)
University of Chicago (colloquium)
Atmospheric and Oceanographic Sciences, Madison (colloquium)
Toronto University (colloquium)
Perimeter Institute, Waterloo, Ontario (colloquium)

2004

University of Dortmund (colloquium)
DESY – Zeuthen (colloquium)
University of Minnesota (colloquium)
University of Florida (colloquium)
Rutgers University (colloquium)
Fermilab (wine and cheese colloquium)
SLAC (high-energy experimental physics seminar)

2005

Kavili Institute, Santa Barbara
Rotary Club, Madison
Oxford University (public lecture)
Argonne National Laboratory (colloquium)
University of Connecticut (colloquium)
University of Groningen (colloquium)
University of Amsterdam (colloquium)
University of Utrecht (colloquium)
Illinois Institute of Technology, Chicago (colloquium)
University of Illinois (colloquium)
Vanderbilt University (colloquium)

2006

Perimeter Institute (colloquium)
University of Guelph (colloquium)
University of Waterloo (colloquium)
Syracuse University (colloquium)
Southern University, Baton Rouge (public lecture)
DESY – Hamburg (Jentschke lecture)
Princeton University (Spitzer lectures)
Annual Meeting of Wisconsin Orthopedic Surgeons
Princeton University (colloquium)
CERN (colloquium)
Pisa University (colloquium)

Colloquium and Seminar Talks

2007

Brookhaven National Laboratory (colloquium)
EPFL Lausanne (colloquium)
University of Wisconsin, Milwaukee (colloquium)

2008

Harvard University (colloquium)
Brown University (colloquium)
Wichita State University (Watkins lecture)
University of California, Davis (colloquium)
Rice University (colloquium)
Bonn University (colloquium)
Aachen University (colloquium)
Humboldt University (colloquium)
Carnegie Mellon University (colloquium)
University of Wisconsin (Fourth Tuesday Science Lecture)
Goddard Space Flight Center, Washington, DC (colloquium)
Penn State University (colloquium and astrophysics seminar)
Barcelona, Spain (colloquium)

2009

Pennsylvania State University (public lecture)
Virginia Tech, Blacksburg, Virginia (colloquium)
Pennsylvania State University, Mont Alto (public lecture)
MIT, Boston (colloquium)
University of Leuven, Belgium (colloquium)
Gothenburg University, Sweden (colloquium)
University of Wuppertal, Germany (colloquium)
Center for Cosmology and AstroParticle Physics, Ohio State (public lecture)

2010

University of Utah (colloquium)
University of New Mexico (colloquium)

2011

University of Illinois at Chicago (colloquium)
Washington University at Saint Louis (colloquium)
Bochum University, Germany (colloquium)
Laboratório de Instrumentação e Física Experimental de Partículas, Lisbon, Portugal
(public lecture)
Cline Observatory at Guilford College, Greensboro, North Carolina (colloquium and
public lecture)
Duke University, North Carolina (colloquium)

2012

West High School Madison (class lecture)
Edgewood College, Madison (colloquium)

Colloquium and Seminar Talks

Wisconsin Institute of Discovery (public lecture)
University of Geneva (colloquium)
Pittsburgh Badgers (public lecture)
New York Science Festival (panel and salon on neutrinos)
Technical University Munich (colloquium)
University of Wisconsin-Milwaukee (colloquium)
Taiwan National University (colloquium)
Fundacion BBVA, Madrid (public lecture)
Space Place Madison (public lecture)

2013

Goddard Space Flight Center, Maryland (colloquium)
SLAC, Stanford University (colloquium)
State University of New York at Stony Brook (colloquium)
Frontiers of Science, Salt Lake City, Utah (public lecture)
University of Toronto (colloquium)
High Energy Seminar, Enrico Fermi Institute, University of Chicago
Radboud University, Nijmegen (colloquium)
Valencia University (colloquium)

2014

University of Massachusetts, Amherst (colloquium)
University of Washington (colloquium)
Technische Universität Dresden, Germany (colloquium)
Institut Astrophysique de Paris, France
Università di Roma Sapienza, Italy
Universität Heidelberg, Germany
Aspen Center for Physics High Energy Neutrino Workshop
University of Notre Dame (colloquium)
University of Florida (colloquium)
Swedish Physics Society (colloquium)
Brussels IceCube Software Bootcamp
Ohio State University (colloquium)
Purdue University (colloquium)
Indiana University (colloquium)
Korean Physical Society (colloquium)
Florida State University (colloquium)

2015

University of Valencia (colloquium)
Caltech (colloquium)
Universiteit Antwerpen (colloquium)
University of Texas-Arlington (colloquium)
Virtual Institute of Astroparticle Physics (VIA) lecture
Fermilab (public lecture)
Aspen Institute for Physics (public lecture and colloquium)
Marquette University (public lecture)
University of Houston (colloquium)

Colloquium and Seminar Talks

Rutgers University (colloquium)
UW Alumni Association, New York (public lecture)
University of Michigan (colloquium)
Walker Lecture, University of Michigan (public lecture)
Belgian Society for Cosmology and Particle Physics (colloquium)
University of Houston (colloquium)
University of Texas, Austin (colloquium)
Columbia University (colloquium)
University of New York at Buffalo (colloquium)
University of California at Davis (colloquium)

2016

Humboldt Kolleg on Particle Physics, Kitzbuhel, Austria
Georgia Institute of Technology (public lecture)
University of Münster, Germany
University of California, Davis
Université de Genève, Switzerland

2017

Kiel University, Germany (colloquium)
Kiwanis, Madison
Fermilab, Chicago (colloquium)
University of Minnesota, Minneapolis (colloquium)
University of Virginia, Charlottesville (public lecture)
Madison West Businessmen Association, Madison
Madison Science Museum, Madison
Southern Methodist University (public lecture), University Park, Texas
50th Anniversary Physical Sciences Laboratory, Stoughton
German Physical Society, Berlin (public lecture)
JGU University, Mainz, Germany (colloquium)
Accademia dei Lincei, Rome (public lecture)
All-Amsterdam Physics Colloquium, Amsterdam
National Science Teachers Association, Milwaukee

2018

William & Mary University, Williamsburg, Virginia (colloquium)
Astronomy Day Keynote, University of South Dakota, Vermilion, SD
Roma Tre, INFN, Italy (colloquium)
Christian-Albrechts Universität, Kiel, Germany (colloquium)
Carnegie Mellon University and Pittsburgh University joined colloquium, Pennsylvania
KIT, Karlsruhe, Germany (colloquium)
Wisconsin Science Festival (public lecture)
WARF Lecture, Wisconsin Institutes for Discovery (public lecture)
Queens University, Kingston, Ontario (colloquium)
Wayne State University, Detroit, Michigan (colloquium)
Rome University, Italy (colloquium)

Colloquium and Seminar Talks

2019

Niels Bohr Institute, Copenhagen, Denmark (colloquium)
Tufts University, Boston, Massachusetts (colloquium)
University of Florida, Gainesville (colloquium and HEP seminar)
FAU Erlangen-Nurnberg, Germany (colloquium)
Erlangen, Germany (colloquium)
JINR, Dubna, Russia
The MIT Club at Washington DC, Washington (public lecture)

2020

University of Padua, Padua, Italy (colloquium)
University of California, Irvine (Gaurang Yodh Lecture and HEP seminar)
Notre Dame, South Bend, Indiana (colloquium)
University of Hawaii, Honolulu (colloquium)
University of Sao Paulo, San Carlos, Brazil (colloquium)
University of Sao Paulo, Sao Paulo, Brazil (colloquium)

2021

Gran Sasso Science Institute, L'Aquila, Italy (colloquium)
American Physical Society, Editors Colloquium series, Upton, NY (colloquium)
Institute for Nuclear Theory (INT), Seattle, USA
Arizona State University, Tempe, USA (colloquium)
Wednesday Night at the Lab, Madison, USA (special edition talk for IceCube 10th anniversary)
Munich Joint Astronomy Colloquium, Munich, Germany (colloquium)
American Physical Society (virtual talk as part of their Colloquium series)

Service

Committees and Panels

- 2021 Science Advisory Committee, University of Santiago de Compostella, Spain
Karlsruhe Institute of Technology Advisory Board, Karlsruhe, Germany
Program Advisory Committee, Fermilab, Chicago, IL
CCAPP Review Committee, The Ohio State University, Columbus, OH
Midterm Review of the McDonald Canadian Astroparticle Physics Research Institute,
Queens University, Canada
- 2020 DOE CAREER Awards Selection Panel
Science Advisory Committee, University of Santiago de Compostella, Spain
Program Advisory Committee, Fermilab
CCAPP Review Committee, The Ohio State University, Columbus, OH
High Level Strategy Group for the Latin American Strategy Forum for Research
Infrastructure
- 2019 DOE CAREER Awards Selection Panel
Science Advisory Committee, University of Santiago de Compostella, Spain (chair)
Program Advisory Committee, Fermilab
Karlsruhe Institute of Technology Advisory Board, Karlsruhe, Germany
- 2018 Instituto de Fisica Corpuscular Advisory Committee, Valencia, Spain
IIHE Advisory Committee, Vrije University, Brussels, Belgium (chair)
Program Advisory Committee, Fermilab
- 2017 Program and Science Advisory Committees, Fermilab
HEPAP Operations Review, Washington
Instituto de Fisica Corpuscular Advisory Committee, Valencia, Spain
Theoretical Nuclear Physics Review Panel, NSF, Washington
- 2016 Spinoza Prize Committee, Utrecht, Netherlands
Max Planck Institute - Munich Advisory Committee
Advisory Committee for the Utah Telescope Array, Chair
Alpha Magnetic Spectrometer (AMS) Review
- 2015 Vrije Universiteit Brussel Advisory Committee
Astroparticle Physics European Consortium (ApPEC) Advisory Committee
Spinoza Prize Committee, Utrecht, Netherlands
Auger Upgrade Advisory Committee
Max Planck Institute - Munich Advisory Committee
Advisory Committee for the Utah Telescope Array, Chair
- 2014 HEP Review of Cosmic Frontier Program Experimental Operations
Spinoza Prize Committee, Utrecht, Netherlands
P5 (Particle Physics Project Prioritization Panel), US Department of Energy Selection
Committee
Astroparticle Physics European Consortium

Service

- 2013 Review Committee of the Institute for Cosmic Ray Research, University of Tokyo, Japan
Max Planck Institute - Munich Advisory Committee
Auger Upgrade Advisory Committee
Auger Finance Board
Vrije University Brussels High Energy Physics Advisory Committee
Astroparticle Physics European Consortium (APPEC)
P5 (Particle Physics Project Prioritization Panel), US Department of Energy Selection Committee
- 2012 Review of Operations of Particle Astrophysics Experiments for Department of Energy, Washington DC
Advisory Committee for the Utah Telescope Array, Chair
KIT-Karlsruhe Review of Selected Physics Programs
Munich Institute for Astro- and Particle Physics (MIAPP) Advisory Committee
Member of the International Neutrino Commission, Kyoto, Japan
- 2011 Director's Review of Pierre Auger Observatory, Fermilab, Illinois
Karlsruhe KCETA Advisory Committee, Germany
ASPERA Evaluation Committee, Paris, France
ECFA Committee for Future Large Infrastructures for Neutrino Oscillation Experiments, Daresbury, UK
Director's Review of Pierre Auger Observatory, Fermilab, Illinois
Committee on Space Research, Associate
- 2010 KCETA Advisory Committee, Karlsruhe, Germany
Committee of Visitors of the Department of Energy, Division of High-Energy Physics: Chair for Particle Astrophysics
Advisory Committee for the Utah Telescope Array, Chair
- 2009 Advisory Committee of the Max Planck Institute for Nuclear Physics, Heidelberg, Germany
CCAPP Advisory Board, The Ohio State University
- 2008 KIT Advisory Committee, Karlsruhe, Germany
Comité d'Evaluation du APC, Paris, France
- 2007 Sudbury Neutrino Detector Advisory Committee
Comité d'Evaluation du CPPM à Marseille, France (chair)
Canada Foundation for Innovation (CFI) review of Cryopit at SNOLab, Ottawa (chair)
KVI Groningen Advisory Committee
Max Planck Institute Scientific Council (Munich).
- 2005 NSF Review of proposals submitted for NUSEL (National Underground Science and Engineering Laboratory)
Sudbury Neutrino Detector Advisory Committee
- 2004 Ad Hoc Advisory Committee, Cosmic Ray Group, U of Utah (chair)

Service

2003	Sudbury Neutrino Detector Advisory Committee
2001	Member of SAGENAP, Washington, DC Keck Advisory Committee, University of California – Berkeley NASA Review of Astrophysics Proposals, Washington, DC NSF Review Panel of the NUSEL Underground Laboratory Ad Hoc Advisory Committee, Cosmic Ray Group, U of Utah (chair) Sudbury Neutrino Detector Advisory Committee Keck Advisory Committee, University of California - Riverside
2000	Ad Hoc Advisory Committee, Cosmic Ray Group, University of Utah (chair) Sudbury Neutrino Detector Advisory Committee Keck Advisory Committee, University of California - Riverside
1999	Sudbury Neutrino Detector Advisory Committee Keck Advisory Committee, University of California - Riverside
1998	Ad Hoc Advisory Committee, Cosmic Ray Group, University of Utah (chair) Keck Advisory Committee, University of California - Riverside
1995	Ad Hoc Advisory Committee, Cosmic Ray Group, University of Utah Review of the Auger Project, Fermilab (chair)
1995	Visiting Committee, Bartol Research Institute
1994	California Institute of Technology (Jet Propulsion Laboratory) Neutrino Astronomical Observatory (member of Local Working Group) DOE Committee Review of Lawrence Radiation Laboratory, Berkeley Blue Ribbon Panel on South Pole Station Redevelopment National Research Council, Committee on Cosmic Rays Visiting Committee, Bartol Research Institute
1993	Ad Hoc Advisory Committee, Cosmic Ray Group, University of Utah DOE Committee Review of Lawrence Radiation Laboratory, Berkeley Visiting Committee, Bartol Research Institute
1992	Visiting Committee, Bartol Research Institute
1991	Visiting Committee, University of Utah, Department of Physics
1989	Space Station Attached Payloads Review Panel
1988	NSF Review of Science and Technology Centers: Review of University of Utah's Fly's Eye Facility
1987	DOE Committee Review of Argonne National Laboratory NSF Committee Review of University of Chicago

Service

- 1986 Panel Review of the Research and Technology Grants of the NASA Astrophysics Program
- 1984 DOE Committee Review of Brookhaven National Laboratory

University Committees

- 2015 Search Committee for Vice Chancellor of Research
- 2005 – 2008 Committee on Honorary Degrees
- 2003 Campus Research Computing Committee
- 1999 – 2003 Council of the Space Science and Engineering Center
- 1995 Committee on Vilas, Hilldale and Bascom Selections
- 1992 – 1993 Computer Sciences L & S Review Committee (chair)
Committee on Vilas, Hilldale and Bascom Selections

Courses Summary

Courses Taught by Year

Academic Year	Course # (Fall)	Course # (Spring)
1972 – 73	--	731
1973 – 74	732	107
1974 – 75	107	103
1975 – 76	104	103
1976 – 77	104	--
1977 – 78	107	202
1978 – 79	208	--
1979 – 80	202	170 (U of Hawaii)
1980 – 81	801	--
1981 – 82	109	735
1983 – 84	109	735
1984 – 85	107	109
1985 – 86	109	103
1986 – 87	--	735
1987 – 88	109	505
1988 – 89	109	109
1989 – 90	109	801
1990 – 91	735	109
1991 – 92	--	735
1992 – 93	835	109
1993 – 94	835	109
1994 – 95	835	835
1995 – 96	801	109
1996 – 97	109	109
1997 – 98	109	109
1998 – 99	801	--
1999 – 2000	109	--
2003 – 04	--	107
2004 – 05	805	109
2006 – 07	109	--
2007 – 08	109	--
2008 – 09	805	--
2009 – 10	107	--
2010 – 11	107	--
2011 – 12	--	107
2014 – 15	--	535
2015 – 16	--	535
2016 – 17	--	107
2019 – 20	109	--

Funding History

Grants and Contracts since 1980

National Science Foundation (NSF) (<i>IceCube</i>)	\$8,240,000	2019
	\$8,240,000	2018
	\$8,240,000	2017
	\$8,240,000	2016
	\$6,900,000	2015
	\$8,280,000	2014
	6,900,000	2013
	1,950,000	2012
	9,320,000	2011
	9,460,000	2010
	11,300,000	2009
	13,300,000	
	17,000,000	2008
	27,000,000	2007
	52,000,000	2006
	48,000,000	2005
NSF (<i>GLOW Project, M. Livny, PI – CS Department</i>)	1,186,405	2004
NSF (<i>IceCube</i>)	42,000,000	2003 – 04
NSF (<i>IceCube</i>)	15,000,000	2001 – 02
National Science Foundation (<i>AMANDA, shared with B. Morse</i>)	1,246,000	2004 – 08
	800,000	2003 – 04
	750,000	2002 – 03
	850,000	2001 – 02
	850,000	2000 – 01
National Science Foundation (<i>AMANDA, shared with B. Morse</i>)	2,785,682	1997 – 2000
	628,600	1996 – 97
National Science Foundation (<i>AMANDA, shared with B. Morse</i>) (Academic Research Infrastructure)	950,000	1995 – 99
NSF (<i>GASP, shared with B. Morse</i>)	50,234	1994 – 95
National Science Foundation (<i>AMANDA, shared with B. Morse</i>)	450,000	1994
National Science Foundation (<i>GASP, shared with B. Morse</i>)	65,060	1994
National Science Foundation (<i>AMANDA, shared with B. Morse</i>)	490,938	1993
National Science Foundation (<i>GASP, shared with B. Morse</i>)	617,350	1992 – 95
NSF (<i>AMANDA, shared with B. Morse</i>)	321,654	1992
National Science Foundation (<i>Exploratory grant “Muon and Neutrino Detection in South Pole Ice” shared with B. Price et al., U. of California, Berkeley</i>)	50,000	1990
Balzan Prize	369,385	2016 - 2017
Polar Ice Coring Office (PICO) (<i>AMANDA, shared with B. Morse</i>)	130,205	1993
University of Alaska, Fairbanks	12,290	1993
Wallenberg Foundation, Sweden (<i>AMANDA, shared w/ B. Morse</i>)	238,156	1993
Berkeley Particle Astrophysics Center (<i>shared w/B. Price et al.</i>)	80,000	1993 – 94
	100,000	1992 – 93
Department of Energy (<i>shared w/V. Barger, T. Han & F. Petriello</i>)	514,571	2006 – 07

Funding History

Department of Energy <i>(shared with V. Barger & T. Han)</i>	471,000	2005 – 06
Department of Energy <i>(shared w/Barger, Han & M.G. Olsson)</i>	485,000	2004 – 05
Department of Energy <i>(shared w/Barger, Han, Olsson & D. Zeppenfeld)</i>	665,000	2003 – 04
	685,000	2002 – 03
	700,000	2001 – 02
Department of Energy Graduate Fellowship	\$56,590	1998 – 2001
Department of Energy <i>(shared with Barger, Han, Olsson & Zeppenfeld)</i>	760,000	2000 – 01
	800,000	1999 – 2000
	785,000	1998 – 99
Department of Energy <i>(shared with Barger, Olsson & Zeppenfeld)</i>	725,000	1997 – 98
	620,000	1996 – 97
	646,000	1995 – 96
	680,000	1995
Department of Energy <i>(shared with Barger & Olsson)</i>	725,000	1994
	755,000	1993
	705,000	1992
	806,000	1991
	750,000	1990
	750,000	1989
	685,000	1988
	615,000	1987
	535,000	1985 – 86
	425,000	1984 – 85
	355,000	1983 – 84
	320,000	1982 – 83
	290,000	1981 – 82
	227,000	1980 – 81
National Science Foundation <i>(shared with Barger, Han, (US – Brazil Cooperative Research) & Zeppenfeld; also S. Pakvasa & X. Tata, U of Hawaii)</i>	17,050	1998 – 2001
National Science Foundation <i>(shared with Barger (US – Japan Cooperative Research) & Zeppenfeld; also P. Langacker, U of PA, & Pakvasa & Tata, U of Hawaii)</i>	30,000	1995 – 98
National Science Foundation <i>(shared with Barger (US – Brazil Cooperative Research) & Zeppenfeld)</i>	10,000	1992 – 94
Texas National Research Laboratory Commission <i>(shared with Barger, Olsson & Zeppenfeld)</i>	100,000	1993 - 94
	100,000	1992 - 93
	130,000	1991 – 92
Hilldale Professorship	25,000	2018 - 19
	25,000	2017 - 18
	25,000	2016 - 17
	25,000	2015 - 16
	25,000	2014 - 15
	25,000	2013 - 14
	25,000	2012 - 13
	25,000	2011 – 12
	25,000	2010 – 11
	25,000	2009 – 10
	25,000	2008 – 09
	25,000	2007 – 08
	25,000	2006 – 07

Funding History

	25,000	2005 – 06
	25,000	2004 – 05
	25,000	2003 – 04
	25,000	2002 – 03
	25,000	2001 – 02
	25,000	2000 – 01
	25,000	1999 – 2000
	25,000	1998 – 99
	25,000	1997 – 98
	25,000	1996 – 97
	25,000	1995 – 96
	25,000	1994 – 95
	20,000	1993 – 94
	20,000	1992 – 93
	20,000	1991 – 92