CURRICULUM VITAE

Francis Halzen

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
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 and Honors

2022 Doctor Honoris Causa, Ruhr University Bochum

2021 Homi Bhabha Prize and Medal, IUPAP

Bruno Rossi Prize, American Astronomical Society

2020 Yodh Lecture, University of California-Irvine

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 Europeae

Gleb Wataghin Colloquium, Instituto de Fisica, Sao Paolo, Brazil

22nd 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 *Physics World* 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

2010 Lecture for the Celebration of the 100th Anniversary of the Birth of Gunnar Kallen

Education, Experience, and Awards

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 *Antarctic Dreams*, published in *The Sciences*, 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, *Great Advances of 1996* for the AMANDA experiment, Washington, DC
1995	Fellow of the American Physical Society

Refereed Publications & arXiv Papers

D-Egg: a Dual PMT Optical Module for IceCube (IceCube Collaboration, Abbasi et al), (2022); astro-ph.IM/2212.14526.

A Search for Coincident Neutrino Emission from Fast Radio Bursts with Seven Years of IceCube Cascade Events (IceCube Collaboration, Abbasi et al), (2022); astro-ph.HE/2212.06792.

Search for sub-TeV Neutrino Emission from Novae with IceCube-DeepCore (IceCube Collaboration, Abbasi et al), (2022); astro-ph.HE/2212.06810.

Searches for Neutrinos from LHAASO ultra-high-energy y-ray sources using the IceCube Neutrino Observatory (IceCube Collaboration, Abbasi et al), (2022); astro-ph.HE/2211.14184.

Detection of astrophysical tau neutrino candidates in IceCube (IceCube Collaboration, Abbasi et al), Eur. Phys. J. C **82** 11 1031 (2022); hep-ex/2011.03561.

Searches for Neutrinos from Gamma-Ray Bursts Using the IceCube Neutrino Observatory (IceCube and Fermi Gamma-ray Burst Monitor Collaborations, Abbasi et al), Astrophys. J. 939 1 116 (2022); Astro-he.HE/2205.11410.

A new and improved IceCube point source analysis (IceCube Collaboration, Bellenghi et al), JINST **16** 11 C11002 (2021); DOI: 10.1088/1748-0221/16/11/C11002.

Graph Neural Networks for low-energy event classification & reconstruction in IceCube (IceCube Collaboration, Abbasi et al), JINST **17** 11, P11003 (2022); hep-ex/2209.03042.

Evidence for neutrino emission from the nearby active galaxy NGC 1068 (IceCube Collaboration, Abbasi et al), Science **378** 6619, 538-543 (2022); astro-ph.HE/2211.09972.

Search for quantum gravity using astrophysical neutrino flavour with Icecube (IceCube Collaboration, Abbasi et al), Nature Phys. **18** 11 1287-1292 (2022); hep-ex/2111.04654.

Searching for High-energy Neutrino Emission from Galaxy Clusters with IceCube (IceCube Collaboration, Abbasi et al), Astrophys. J. Lett. **938** L11 (2022); astro-ph.HE/2206.02054.

Search for Astrophysical Neutrinos from 1FLE Blazars with IceCube (IceCube Collaboration, Abbasi et al), Astrophys. J. **938** 1, 28 (2022); astro-ph.HE/2207.04946.

Constraints on populations of neutrino sources form searches in the directions of IceCube neutrino alerts (IceCube Collaboration, Abbasi et al), (2022); astro-ph.HE/2210.04930.

Search for Unstable Sterile Neutrinos with the IceCube Neutrino Observatory (IceCube Collaboration, Abbasi et al), Phys. Rev. Lett **129** 15 15 (2022); hep-ex/2204.00612.

Low energy event reconstruction in IceCube DeepCore (IceCube Collaboration, Abbasi et al), Eur. Phys. J. C. **82** 9 807 (2022); hep-ex/2203.02303.

Density of GeV muons in air showers measure with IceTop (IceCube Collaboration, Abbasi et al), Phys. Rev. D. 106 3 032010 (2022); hep-ex/2201.12635.

Multiwavelength Search for the Origin of IceCube's Neutrinos (Kun et al) Astrophys. J. **934** 1 180 (2022); astro-ph.HE/2203.14780.

Search for Spatial Correlations of Neutrinos with Ultra-high-energy Cosmic Rays (IceCube and Pierre Auger and Telescope Array and Auger and ANTARES Collaborations, Albert et al), Astrophys. J. 934 2 164 (2022); astro-ph.HE/2201.07313.

Search for neutrino emission from cores of active galactic nuclei (IceCube Collaboration, Abbasi et al), Phys. Rev. D. 106 2 022005 (2022); astro-ph.HE/2111.10169.

The TeV Diffuse Cosmic Neutrino Spectrum and the Nature of Astrophysical Neutrino Sources (Fang, Gallagher), Astrophys. J. 933 2 190 (2022); astro-ph.HE/2205.03740.

The observation of high-energy neutrinos from the cosmos: Lessons learned for multimessenger astronomy (Halzen), Int. J. Mod. Phys. D 31 03 (2022); Astro-ph-HE/2110.01687.

Strong constraints on Neutrino Nonstandard Interactions from TeV-Scale νu Disappearance at IceCube (IceCube Collaboration, Abbasi et al), Phys. Rev. Lett. **129** 1 1 (2022); hep-ex/2201.03566.

Framework and tools for the simulation and analysis of the radio emission from air showers at IceCube (IceCube Collaboration, Abbasi et al), JINST **17** 06 P06026 (2022); Astro-ph.HE/2205.02258.

Searches for Connection between Dark Matter and High-Energy Neutrinos with IceCube (IceCube Collaboration, Abbasi et al), (2022); hep-ex/2205.12950.

Search for High-energy Neutrino Emission from Galactic X-Ray Binaries with IceCube (IceCube Collaboration, Abbasi et al), Astrophys. J. Lett. **930** 2 L24 (2022); astro-ph.HE/2202.11722.

PeV Tau Neutrinos to Unveil Ultra-High-Energy Sources (with Arguelles, Kheirandish, Safa) (2022); astro-ph.HE/2203.13827.

Improved Characterization of the Astrophysical Muon-neutrino Flux with 9.5 Years of IceCube Data (IceCube Collaboration, Abbasi et al), Astrophys. J. **928** 1 50 (2022); astro-ph.HE/2111.10299.

Search for GeV-scale dark matter annihilation in the Sun with IceCube DeepCore (IceCube Collaboration, Abbasi et al), Phys. Rev. D 105 6 062004 (2022); astro-ph.HE/2111.09970.

Searching for Dark Matter form the Sun with the IceCube Detector (IceCube Collaboration, Abbasi et al), PoS ICRC2021 020 (2022); DOI: 10.22323/1.395.0020.

Search for High-energy Neutrinos from Ultraluminous Infrared Galaxies with IceCube (IceCube Collaboration, Abbasi et al), Astrophys. J. **926** 1 59 (2022); astro-ph.HE/2107.03149.

Search for Relativistic Magnetic Monopoles with Eight Years of IceCube Data (Icecube Collaboration, Abbasi et al), Phys. Rev .Lett. **128** 5 051101 (2022); astro-ph.HE/2109.13719.

IceCube and High-Energy Cosmic Neutrinos (with Kheirandish), Accepted by Neutrino Physics and Astrophysics (2022); astro-ph.HE/2202.00694.

First all-flavor search for transient neutrino emission using 3-years of IceCube DeepCore data (IceCube Collaboration, Abbasi et al), JCAP **01** 027 (2022); Astro-ph.HE/2011.05096.

High-Energy Neutrinos from the Cosmos, Annalen Phys. **533** 11, 2100309 (2021); 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.), Phys. Rev. Lett. **128** 051101 (2022); 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.

Search for High-Energy Neutrinos from Ultraluminous Infrared Galaxies with IceCube (IceCube Collaboration, Abbasi et al.), ApJ **926** 59 (2022); arXiv:2107.03149.

Refereed Publications & arXiv Papers

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. Arguelles, 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.), JCAP **01** 027 (2022); arXiv:2011.05096.

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.

Detection of astrophysical tau neutrino candidates in IceCube (IceCube Collaboration), Eur. Phys. J. C **82** 1031 (2022); 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. C80 (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.

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) 009l; hep-ex/1902.07771.

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.

Refereed Publications & arXiv Papers

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.IM1910.06945.

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.

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.

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.

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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)

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)

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)

Solar Atmospheric Neutrino Search with IceCube (IceCube Collaboration, S. In *et al.*), PoS 965 (ICRC2017); astro-ph.HE/1710.01194, p. 69 (poster)

High-Energy Atmospheric Muons in IceCube and IceTop (IceCube Collaboration,Tenholt *et al.*), PoS 317 (ICRC2017); astro-ph.HE/1710.01194, p. 77 (poster)

Search for Astrophysical Tau Neutrinos in 6 Years of High-Energy Starting Events in IceCube (IceCube Collaboration, Usner *et al.*), PoS 974 (ICRC2017); astro-ph.HE/1710.01191, p. 6

Multi-Flavour PeV Neutrino Search with IceCube (IceCube Collaboration, Lu Lu *et al.*), PoS 1002 (ICRC2017); astro-ph.HE/1710.01191, p. 14

High-Energy Astrophysical Neutrino Flux Measurement Using Neutrino-Induced Cascades Observed in 4 Years of IceCube Data (IceCube Collaboration, Niederhausen *et al.*), PoS 968 (ICRC2017); astro-ph.HE/1710.01191, p. 22

A Measurement of the Diffuse Astrophysical Muon Neutrino Flux Using 8 Years of IceCube Data (IceCube Collaboration, Haack *et al.*), PoS 1005 (ICRC2017); astro-ph.HE/1710.01191, p. 30 (poster)

Characterizing the Flux of Atmospheric Neutrinos with IceCube-DeepCore (IceCube Collaboration, T. Wood *et al.*), PoS 1028 (ICRC2017); astro-ph.HE/1710.01191, p. 38

Measurement of High-Energy Neutrino–Nucleon Cross-Section and Astrophysical Neutrino Flux Anisotropy Study of Cascade Channel with IceCube (IceCube Collaboration, Y. Xu *et al.*), PoS 978 (ICRC2017); astro-ph.HE/1710.01191, p. 46 (poster)

Observation of Astrophysical Neutrinos in 6 Years of IceCube Data (IceCube Collaboration, Kopper *et al.*), PoS 981 (ICRC2017); astro-ph.HE/1710.01191, p. 54

All-Flavor Multi-Channel Analysis of the Astrophysical Neutrino Spectrum with IceCube (IceCube Collaboration, Weaver *et al.*), PoS 976 (ICRC2017); astro-ph.HE/ 1710.01191, p. 62

Differential Limit on an EHE Neutrino-Flux Component in the Presence of Astrophysical Background from 9 Years of IceCube Data (IceCube Collaboration, Yoshida *et al.*), PoS 975 (ICRC2017); astro-ph.HE/1710.01191, p. 70

Improving Future High-Energy Tau-Neutrino Searches in IceCube (IceCube Collaboration, Usner *et al.*), PoS 973 (ICRC2017); astro-ph.HE/1710.01191, p. 78 (poster)

Search for Astrophysical Tau Neutrinos with the IceCube Waveforms (IceCube Collaboration, Wille *et al.*), PoS 1009 (ICRC2017); astro-ph.HE/1710.01191, p. 86

Delayed Light Emission to Distinguish Astrophysical Neutrino Flavors in IceCube (IceCube Collaboration, Steuer *et al.*), PoS 1008 (ICRC2017); astro-ph.HE/1710.01197, p. 6 (poster)

Search for Signatures of Heavy Decaying Dark Matter with IceCube (IceCube Collaboration, Stettner *et al.*), PoS 923 (ICRC2017); astro-ph.HE/1710.01197, p. 14

Latest Results and Sensitivities for Solar Dark Matter Searches with IceCube (IceCube Collaboration, S. In *et al.*), PoS 912 (ICRC2017); astro-ph.HE/1710.01197, p. 22 (poster)

Searches for Annihilating Dark Matter in the Milky Way Halo with IceCube (IceCube Collaboration, Flis *et al.*), PoS 906 (ICRC2017); astro-ph.HE/1710.01197, p. 30

Searches for Dark Matter in the Center of the Earth with the IceCube Detector (IceCube Collaboration, Ansseau *et al.*), PoS 896 (ICRC2017); astro-ph.HE/1710.01197, p. 38 (poster)

Measurement of Water Luminescence – A New Detection Method for Neutrino Telescopes (IceCube Collaboration, Pollman *et al.*), PoS 1060 (ICRC2017); astro-ph.HE/1710.01197, p. 46 (poster)

Combined Search for Neutrinos from Dark-Matter Annihilation in the Galactic Center using IceCube and ANTARES (IceCube and ANTARES collaborations, Aguilar *et al.*), PoS 911 (ICRC2017); astro-ph.HE/1710.01197, p. 54 (poster)

Search for Point-Like Sources in the Astrophysical Muon Neutrino Flux with IceCube (IceCube Collaboration, Reimann *et al.*), PoS 997 (ICRC2017); astro-ph.HE/ 1710.01179, p. 7 (poster)

Search for Weak Neutrino Point Sources Using Angular Auto-Correlation Analyses in IceCube (IceCube Collaboration, Glauch *et al.*), PoS 1014 (ICRC2017); astro-ph.HE/ 1710.01179, p. 15 (poster)

Results of IceCube Searches for Neutrinos from Blazars Using 7 Years of Through-Going Muon Data (IceCube Collaboration, M. Huber *et al.*), PoS 994 (ICRC2017); astro-ph.HE/ 1710.01179, p. 31 (poster)

IceCube Search for Neutrinos from 1ES 1959+650: Completing the Picture (IceCube, FACT and MAGIC collaborations, Kintscher *et al.*), PoS 969 (ICRC2017); astro-ph.HE/1710.01179, p. 39 (poster)

Using All-Flavor and All-Sky Event Selections by IceCube to Search for Neutrino Emission from the Galactic Plane (IceCube Collaboration, Krings *et al.*), PoS 995 (ICRC2017); astro-ph.HE/ 1710.01179, p. 47 (poster)

Constraints on Diffuse Neutrino Emission from the Galactic Plane with 7 Years of IceCube Data (IceCube Collaboration, Haack *et al.*), PoS 1011 (ICRC2017); astro-ph.HE/1710.01179, p. 55

Search for Extended Sources of Neutrino Emission with 7 Years of IceCube Data (IceCube Collaboration, Pinat *et al.*), PoS 963 (ICRC2017); astro-ph.HE/1710.01179, p. 63 (poster)

Search for a Cumulative Neutrino Signal from Blazar Flares Using IceCube Data (IceCube Collaboration, Raab *et al.*), PoS 957 (ICRC2017); astro-ph.HE/1710.01179, p. 71 (poster)

Investigation of Obscured Flat Spectrum Radio AGN with the IceCube Neutrino Observatory (IceCube Collaboration, Maggi *et al.*), PoS 1000 (ICRC2017); astro-ph.HE/1710.01179, p. 79 (poster)

Realtime Neutrino Alerts and Follow-Up in IceCube (IceCube Collaboration, Blaufuss *et al.*), PoS 982 (ICRC2017); astro-ph.HE/1710.01179, p. 87 (poster)

Search for High-Energy Neutrino Emission from Fast Radio Bursts (IceCube Collaboration, D. Xu *et al.*), PoS 980 (ICRC2017); astro-ph.HE/1710.01179, p. 95

IceCube as a Neutrino Follow-Up Observatory for Astronomical Transients (IceCube Collaboration, Meagher *et al.*), PoS 1007 (ICRC2017); astro-ph.HE/1710.01179, p.103

Search for GeV Neutrinos Associated with Solar Flares with IceCube (IceCube Collaboration, Gwen de Wasseige *et al.*), PoS 1010 (ICRC2017); astro-ph.HE/1710.01201, p. 6

Estimating the Sensitivity of IceCube to Signatures of Axion Production in a Galactic Supernova (IceCube Collaboration, BenZvi *et al.*), PoS 892 (ICRC2017); astro-ph.HE/1710.01201, p. 14 (poster)

Searching for Arbitrary Low-Energy Neutrino Transients with IceCube (IceCube Collaboration, Cross *et al.*), PoS 936 (ICRC2017); astro-ph.HE/1710.01201, p. 22 (poster)

IceAct: Imaging Air Cherenkov Telescopes with SiPMs at the South Pole for IceCube-Gen2 (IceCube Gen2 collaboration, Auffenberg *et al.*), PoS 1055 (ICRC2017); astro-ph.HE/ 1710.01207, p. 14

Overview and Performance of the D-Egg Sensor for IceCube-Gen2 (IceCube Gen2 collaboration, Ishihara *et al.*), PoS 1051 (ICRC2017); astro-ph.HE/1710.01207, p. 69 (poster)

Muon Track Reconstruction and Veto Performance with the D-Egg Sensor for IceCube-Gen2 (IceCube Gen2 collaboration, Stöβl *et al.*), PoS 1038 (ICRC2017); astro-ph.HE/1710.01207, p. 30 (poster)

In-Ice Self-Veto Techniques for IceCube-Gen2 (IceCube Gen2 collaboration, Luenemann *et al.*), PoS 945 (ICRC2017); astro-ph.HE/1710.01207, p. 38 (poster)

IceCube-Gen2: The Next-Generation Neutrino Observatory for the South Pole (IceCube Gen2 collaboration, van Santen *et al.*), PoS 991 (ICRC2017); astro-ph.HE/1710.01207, p. 6

A Camera System for IceCube-Gen2 (IceCube Gen2 collaboration, Jeong *et al.*), PoS 1040 (ICRC2017); astro-ph.HE/1710.01207, p. 46 (poster)

The mDom – A Multi-PMT Digital Optical Module for the IceCube-Gen2 Neutrino Telescope (IceCube Gen2 collaboration, Classen *et al.*), PoS 1047 (ICRC2017); astro-ph.HE/ 1710.01207, p. 54 (poster)

The IceTop Scintillator Upgrade (IceCube Gen2 collaboration, Kunwar *et al.*), PoS 401 (ICRC2017); astro-ph.HE/1710.01207, p. 62 (poster)

Overview and Performance of the Wavelength-Shifting Optical Module (WOM) (IceCube Gen2 collaboration, Peiffer *et al.*), PoS 1052 (ICRC2017); astro-ph.HE/1710.01207, p. 69 (poster)

The Precision Optical CAlibration Module for IceCube-Gen2: First Prototype (IceCube Gen2 collaboration, Resconi *et al.*), PoS 934 (ICRC2017); astro-ph.HE/1710.01207, p. 77 (poster)

Deep Learning in Physics Exemplified by the Reconstruction of Muon-Neutrino Events in IceCube (IceCube Collaboration, Hünnefeld *et al.*), PoS 1057 (ICRC2017); astro-ph.HE/1710.01201, p. 30 (poster)

Connecting Beyond the Research Community: IceCube Education, Outreach and Communication Efforts (IceCube Collaboration, Madsen *et al.*), PoS 1072 (ICRC2017); astro-ph.HE/1710.01201, p. 38 (poster)

GeV Solar Energetic Particle Observation and Search by IceTop from 2011 to 2016 (IceCube Collaboration, P-S Mangeard, et al.), PoS 132 (ICRC2017)

Impulsive Increase of Galactic Cosmic Ray Flux Observed by IceTop (IceCube Collaboration, P-S Mangeard, et al.), PoS 133 (ICRC2017)

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

2015 – The Hague, Netherlands

IceCube Collaboration Contributions to the 2015 ICRC *are grouped together on astro-ph.HE/ and .IM in 6 distinct files. Part I – Point source searches – astro-ph.HE/1510.05222; II – Atmospheric and astrophysical diffuse neutrino searches of all flavors – 1510.05223; III - Cosmic rays – 1510.05225; IV – Dark matter and exotic particles – 1510.05226; V – Neutrino oscillations and supernova searches – 1510.05227; and IceCube-Gen2 – astro-ph.IM/1510.05228.*

Surface Muons in IceTop (IceCube Collaboration, Dembinski & Gonzalez *et al.*), PoS 267 (ICRC2015); astro-ph.HE/1510.05225 p. 21

Studying Cosmic Ray Composition with IceTop Using Muon and Electromagnetic Lateral Distributions *(poster)* (IceCube Collaboration, Gonzalez *et al.*), PoS 338 (ICRC2015); astro-ph.HE/1510.05225 p. 45

High p_T Muons from Cosmic Ray Air Showers in IceCube *(poster)* (IceCube Collaboration, Soldin *et al.*), PoS 256 (ICRC2015); astro-ph.HE/1510.05225 p. 13

A Function to Describe Attenuation of Cosmic Ray Air Shower Particles in Snow *(poster)* (IceCube Collaboration, Rawlins *et al.*), PoS 628 (ICRC2015); astro-ph.HE/1510.05225 p. 68

Latest Results on Cosmic Ray Spectrum and Composition from 3 Years of IceTop and IceCube (IceCube Collaboration, Rawlins *et al.*), PoS 334 (ICRC2015); astro-ph.HE/1510.05225 p. 37

Anisotropy in Cosmic-Ray Arrival Directions Using IceCube and IceTop (IceCube Collaboration, Westerhoff *et al.*), PoS 274 (ICRC2015); astro-ph.HE/1510.05225 p. 29

Search for High Energy Neutron Point Sources in IceTop (IceCube Collaboration, Sutherland *et al.*), PoS 250 (ICRC2015); astro-ph.HE/1510.05225 p. 5

IceTop as Veto for IceCube *(poster 2)* (IceCube Collaboration, Tosi & Jero *et al.*), PoS 1086 (ICRC2015); astro-ph.HE/1510.05225 p. 76

An IceTop Module for the IceCube MasterClass *(poster)* (IceCube Collaboration, Dembinski *et al.*), PoS 576 (ICRC2015); astro-ph.HE/1510.05225 p. 61

Full-Sky Analysis of Cosmic-Ray Anisotropy with IceCube and HAWC (IceCube and HAWC collaborations, Díaz-Vélez *et al.*), PoS 444 (ICRC2015); astro-ph.HE/ 1510.04134

A Measurement of the Diffuse Astrophysical Muon Neutrino Flux Using Multiple Years of IceCube Data (IceCube Collaboration, Rädel *et al.*), PoS 1079 (ICRC2015); astro-ph.HE/1510.05223 p. 37

A Search for Astrophysical Tau Neutrinos in 3 Years of IceCube Data (IceCube Collaboration, Williams *et al.*), PoS 1071 (ICRC2015); astro-ph.HE/1510.05223 p. 29

Unfolding Measurement of the Atmospheric Muon Spectrum Using IceCube-79/86 (IceCube Collaboration, Börner *et al.*), PoS 1098 (ICRC2015); astro-ph.HE/ 1510.05223 p. 53

Medium-Energy (Few TeV – 100 TeV) Neutrino Point-Source Searches in the Southern Sky with IceCube *(poster 3)* (IceCube Collaboration, Altmann *et al.*), PoS 1056 (ICRC2015); astro-ph.HE/1510.05222 p. 37

Low-Energy (100 GeV – Few TeV) Neutrino Point-Source Searches in the Southern Sky with IceCube *(poster 2)* (IceCube Collaboration, Ström *et al.*), PoS 1053 (ICRC2015); astro-ph.HE/1510.05222 p. 29

Results of Neutrino Point-Source Searches with 2008 - 2014 IceCube Data above 10 TeV (IceCube Collaboration, Coenders *et al.*), PoS 1047 (ICRC2015); astro-ph.HE/1510.05222 p. 5

Search for Neutrino Emission from Extended Sources with the IceCube Detector *(poster 3)* (IceCube Collaboration, Pinat *et al.*), PoS 1091 (ICRC2015); astro-ph.HE/ 1510.05222 p. 59

Search for a Correlation between the UHECRs Measured by the Pierre Auger Observatory and the Telescope Array and the Neutrino Candidate Events from IceCube (IceCube Collaboration, Golup *et al.,* with Auger and CTA collaborations), PoS 1082 (ICRC2015), hep-ex/1511.02109

Searching for TeV Gamma-Ray Emission Associated with IceCube High-Energy Neutrinos Using VERITAS (IceCube and VERITAS collaborations, Santander *et al.*), PoS 785 (ICRC2015); astro-ph.HE/1509.00517

Neutrino-Triggered Target-of-Opportunity Programs in IceCube *(poster 2)* (IceCube Collaboration, Góra *et al.*), PoS 1052 (ICRC2015); astro-ph.HE/1510.05222 p. 21

The Online Follow-Up Framework for Neutrino-Triggered Alerts from IceCube (IceCube Collaboration, Stasik *et al.*), PoS 1069 (ICRC2015); astro-ph.HE/1510.05222 p. 45

A Search for Neutrinos from Gamma-Ray Bursts with the IceCube Neutrino Detector *(poster 2)* (IceCube Collaboration, Brayeur and Casier *et al.*), PoS 1048 (ICRC2015); astro-ph.HE/1510.05222 p. 13

Online and Near Realtime Searches for Neutrinos from GRBs with IceCube *(poster 2)* (IceCube Collaboration, Felde *et al.*), PoS 1089 (ICRC2015); astro-ph.HE/1510.05222 p. 51

Recent Improvements in the Detection of Supernovae with the IceCube Observatory *(poster 3)* (IceCube Collaboration, Baum *et al.*), PoS 1096 (ICRC2015); astro-ph.HE/1510.05227 p. 5

Search for Sterile Neutrinos with the IceCube Neutrino Observatory (IceCube Collaboration, Wallraff *et al.*), PoS 1100 (ICRC2015); astro-ph.HE/1510.05227 p. 13

Simulation Studies for a Surface Veto Array to Identify Astrophysical Neutrinos at the South Pole *(poster 2)* (IceCube Collaboration, Euler and Gonzales *et al.*), PoS 1070 (ICRC2015); astro-ph.IM/1510.05228 p. 6

Motivations and Techniques of a Surface Detector to Veto Air Showers for Neutrino Astronomy with IceCube at the Southern Sky (IceCube Collaboration, Auffenberg *et al.*), PoS 1156 (ICRC2015); astro-ph.IM/1510.05228 p. 70

A Precision Optical Calibration Module for IceCube-Gen2 *(poster 1)* (IceCube Collaboration, Krings *et al.*), PoS 1133 (ICRC2015); astro-ph.IM/1510.05228 p. 22

PINGU Camera *(poster 1)* (IceCube Collaboration, Bose and Rott *et al.*), PoS 1145 (ICRC2015); astro-ph.IM/1510.05228 p. 38

The IceCube-Gen2 High-Energy Array (IceCube Collaboration, Blaufuss *et al.*), PoS 1146 (ICRC2015); astro-ph.IM/1510.05228 p. 46

Generation-2 IceCube Digital Optical Module & DAQ *(poster 1)* (IceCube Collaboration, DuVernois *et al.*), PoS 1148 (ICRC2015); astro-ph.IM/1510.05228 p. 62

Multi-PMT Optical Modules for IceCube-Gen2 *(poster 1)* (IceCube Collaboration, Classen *et al.*), PoS 1147 (ICRC2015); astro-ph.IM/1510.05228 p. 54

A Dual-PMT Optical Module (D-Egg) for IceCube-Gen2 *(poster 1)* (IceCube Collaboration, Lu *et al.*), PoS 1137 (ICRC2015); astro-ph.IM/1510.05228 p. 30

Cosmic-Ray Science Potential for an Extended Surface Array at the IceCube Observatory (IceCube Collaboration, Seckel *et al.*), PoS 694 (ICRC2015); astro-ph.IM/1510.05228 p. 6

Status of the PINGU Detector (IceCube Collaboration, Clark *et al.*), PoS 1174 (ICRC2015); astro-ph.IM/1510.05228 p. 78

An Estimate of the Live Time of Optical Measurements of Air Showers at the South Pole *(poster)* (Segev BenZvi), CR-IN; indico.cern.ch/event/344485/session/138/contribution/220

Evaluation of Expected Solar Flare Neutrino Events in the IceCube Observatory *(poster 3)* (Gwenhaël De Wasseige *et al.*); indico.cern.ch/event/344485/session/136/contribution/194

Recent Results on Cosmic Ray Physics with the IceCube Observatory (IceCube Collaboration, Karg *et al.*), PoS 365 (ICRC2015)

Search for Point-Like Neutrino Sources over the Southern Hemisphere with the ANTARES and IceCube Neutrino Telescopes (ANTARES and IceCube collaborations, Martí and Finley *et al.*), PoS 1076 (ICRC2015)

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

2013 – Rio de Janeiro, Brazil

IceCube Collaboration Contributions to the 2013 ICRC *are grouped together on astro-ph.HE/ and .IM in 6 distinct files. ICO-I is Point Source Searches, ICO-II is Atmospheric and Diffuse, ICO-III is Cosmic Rays, ICO-IV is Dark Matter and Exotic Particles, ICO-V is Neutrino Oscillations and Supernova, and ICO-VI is Ice Properties, Reconstruction and Future Developments. Search at 143.107.180.38/indico/contributionListDisplay.py?confId=0*

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.

Model Independent Search for GRB Neutrinos Interacting inside IceCube (IceCube Collaboration, Casey *et al.*), cbpf.br/~icrc2013/proc_icrc2013.html 0367; astro-ph.HE/ 1309.6979 ICO-I 5.

Ground-Level Enhancement of May 17, 2012 Observed at South Pole (IceCube Collaboration, Kuwabara *et al.*), SH-EX 368; astro-ph.HE/1309.7006 ICO-III 9.

Search for Extraterrestrial Neutrino-Induced Cascades Using IceCube 79-Strings (IceCube Collaboration, Lesiak-Bzdak *et al.*), cbpf.br/~icrc2013/proc_icrc2013.html 0370; astro-ph.HE/ 1309.7003 ICO-II 5.

IceTop as a Veto in Astrophysical Neutrino Searches for IceCube (poster) (IceCube Collaboration, Auffenberg *et al.*), cbpf.br/~icrc2013/proc_icrc2013.html 373; astro-ph.HE/ 1309.7010 ICO-VI 5.

IceVeto: An Extension of IceTop to Veto Horizontal Air Showers (poster) (IceCube Collaboration, Auffenberg *et al.*); astro-ph.HE/1309.7010 ICO-VI 9.

An Update on Cosmic-Ray Anisotropy Studies with IceCube (IceCube Collaboration, Santander *et al.*); astro-ph.HE/ 1309.7006 ICO-III 13.

Ultra–High-Energy Neutrino Alert System for GRB and Transient Astronomical Sources (IceCube Collaboration, Ishihara *et al.*), NU-EX 409; astro-ph.HE/1309.6979 ICO-I 9.

Study of Time-Dependence of the Cosmic-Ray Anisotropy with IceCube and AMANDA (IceCube Collaboration, Karg *et al.*); astro-ph.HE/1309.7006 ICO-III 17.

Measurement of the Atmospheric ν_μ Spectrum with IceCube-59 (poster) (IceCube Collaboration, Ruhe *et al.*); astro-ph.HE/1309.7003 ICO-II 9.

Search for Relativistic Magnetic Monopoles with the IceCube Neutrino Telescope (IceCube Collaboration, Posselt *et al.*); astro-ph.HE/1309.7007 ICO-IV 5.

An Improved Data Acquisition System for Supernova Detection with IceCube (IceCube Collaboration, Baum *et al.*); astro-ph.HE/ 1309.7008 ICO-V 5.

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

Measurement of Neutrino Oscillations with the Full IceCube Detector (IceCube Collaboration, Yañez *et al.*); astro-ph.HE/1309.7008 ICO-V 13.

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.

Search for Sterile Neutrinos with the IceCube Neutrino Observatory (IceCube Collaboration, Wallraff *et al.*); astro-ph.HE/1309.7008 ICO-V 17.

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.

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Cosmic Ray Measurement with IceCube and IceTop (IceCube Collaboration, Soldin et al), (2022); astro-ph.HE/2208.01911.

Dark matter searches in the center of the Milky Way with IceCube (IceCube Collaboration, Iovine et al), PoS ICHEP2022 **311** (2022); DOI: 10.22323/1.414.0311.

Selected results from IceCube (IceCube Collaboration, Montaruli et al), Proceedings of CRIS 2022 Conference (2022); astro-ph.HE/2211.01737.

Search for Heavy Neutral Lepton Production and Decay with the IceCube Neutrino Observatory (IceCube Collaboration, Fischer et al), PoS ICHEP2022 **190** (2022); DOI: 10.22323/1.414.0190.

Multiplicity of TeV muons in air showers detected with IceTop and IceCube (IceCube Collaboration, Verpoest et al), (2022); astro-ph.HE/2211.16970.

Cosmic-Ray Composition analysis at IceCube using Graph Neural Networks (IceCube Collaboration, Koundal et al), (2022); astro-ph.HE/2211.17198.

Detecting neutrinos in IceCube with Cherenkov light in the South Pole ice (IceCube Collaboration, Yuan et al), (2022); astro-ph.IM/2212.12142.

Non-standard neutrino interactions in IceCube (IceCube Collaboration, Abbasi et al), PoS EPS-HEP2021 245 (2022); DOI: 10.22323/1.398.0245.

Searching for High-Energy Neutrinos from Ultra-Luminous Infrared Galaxies with IceCube (IceCube Collaboration, Abbasi et al), PoS EPS-HEP2021 092 (2022); DOI: 10.2232/1.398.0092.

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 Energias y Astrofísca (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 $D_\varsigma^+ \rightarrow \pi^+\pi^-\pi^+$ (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).

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

Students

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)

Kayla Leonard DeHolton, Measuring the Atmospheric Neutrino Oscillation Parameters with IceCube DeepCore (2022)

Ibrahim Safa, New Physics with PeV Astrophysical Neutrino Beams (2022)

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).

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

Invited Talks

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).

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

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

Invited Talks

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: IV^{th} International Workshop on Theoretical and Phenomenological Aspects of Underground Physics, Toledo, Spain (1995).

WIN 95: XV^{th} Workshop on Weak Interactions and Neutrinos, Talloires, France (1995).

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

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).

Invited Talks

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).

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).

Invited Talks

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).

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. Saltdome Shower Array Workshop (SalSA 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).

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).

Invited Talks

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).

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).

Invited Talks

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).

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.

Invited Talks

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).

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).

Invited Talks

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).

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).

Invited Talks

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).

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, Rehevot, 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).

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).

Invited Talks

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, Zuoz, Switzerland (2018).

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

$\int d\,k\,\Pi$ 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).

Invited Talks

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)

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)

38th Epiphany Conference on Recent Advances in Astroparticle Physics, Krakow, Poland (2022)

XV Scientific Meeting of the Spanish Astronomical Society, Tenerife, Spain (2022)

X- and Gamma-ray Counterparts of New Transients in the Multimessenger Era, COSPAR 22, Athens, Greece (2022)

Lectures at IDPASC school for doctoral students, Olomouc, Czech Republic (2022)

Plenary Lecture at Astronomical Physical Society Meeting, Pasadena, California (2022)

NASA Physics of Cosmos Analysis Group (PhysPAG) at the American Physical Society Meeting, New York, New York (2022)

ISCRA Erice Summer School on Cosmic Ray Physics, Erice, Italy (2022)

Invited Talks

Multi-messenger Tomography of Earth (MMTE 2022) Workshop, Snowbird, Utah (2022)

NCRAL VISION 2022, Port Washington, Wisconsin (2022)

Kickoff Meeting of the RAPP Center, Ruhr-Universität Bochum, Germany (2022)

Snowmass Cosmic Frontier Colloquium, virtual (2022)

58th International School of Subnuclear Physics, Erice, Italy (2022)

Cosmic Rays and Neutrinos in the Multi-Messenger Era, Louvain-La-Neuve, Belgium (2022)

Colloquium on 50 years of particle physics research, National Academy of Sciences, Brussels, Belgium (2022)

Cosmic Rays in the Multi-Messenger Era, APC, Paris, France (2022)

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
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
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

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)

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 Paolo, 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 (∑∏∑ 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
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)
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

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)

Colloquium and Seminar Talks

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)

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)
Gotheborg 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)
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)
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 Géneve, 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)

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)
Neutrino Social Global, Fermilab

2022

Warwick University (colloquium
Pennsylvania State University (colloquium)
Palacky University, Olomouc, Czech Republic (public lecture)
NASA Night Sky Network, webinar
STEAM Leon Lederman Seminar Series, webinar (two lectures)
Fermilab's Neutrino University, Fermilab
Extreme Non-Thermal Universe CDY Lecture, Columbia University

Cosmos Club, Washington, DC (public lecture)
INTO THE IMPOSSIBLE Podcast
Weekly Space Hangout, Planetary Science Insitute, YouTube
NASA Night Sky Network webinar

Service

Committees and Panels

2022 HEP@VUB advisory board, VUB, Brussels, Belgium
International Advisory Committee of the Chinese Academy of Sciences for future large science facilities for particle physics
IFIC Scientific Advisory Committee, Valencia, Spain (chair)
KIT Advisory Board Matter Meeting, Karlsruhe, Germany

2021 Science Advisory Committee, University of Santiago de Compostella, Spain
Karlsruhe Institute of Technology Advisory Board, Karlsruhe, Germany
Panel of the Canada First Research Excellence Fund
Program Advisory Committee, Fermilab, Chicago, IL
CCAPP Review Committee, The Ohio State University, Columbus, OH

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

Service

Astroparticle Physics European Consortium

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

1986 Panel Review of the Research and Technology Grants of the NASA Astrophysics Program

Service

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

Funding Source	Amount ($)	Year
National Science Foundation (NSF) *(IceCube)*	1,348,537	2022
	2,861,463	2021
	6,388,850	2020
	8,240,000	2019
	8,240,000	2018
	8,240,000	2017
	6,900,000	2016
	8,280,000	2015
	6,900,000	2014
	1,950,000	2013
	9,320,000	2012
	9,460,000	2011
	11,300,000	2010
	13,300,000	2009
	17,000,000	2008
	27,000,000	2007
	52,000,000	2006
	48,000,000	2005
NSF *(GLOW Project, M. Livny, PI – CS Department)*	1,186,405	2004
NSF *(IceCube)*	42,000,000	2003 – 04
NSF *(IceCube)*	15,000,000	2001 – 02
National Science Foundation *(AMANDA, shared with B. Morse)*	1,246,000	2004 – 08
	800,000	2003 – 04
	750,000	2002 – 03
	850,000	2001 – 02
	850,000	2000 – 01
National Science Foundation *(AMANDA, shared with B. Morse)*	2,785,682	1997 – 2000
	628,600	1996 – 97
National Science Foundation *(AMANDA, shared with B. Morse)* (Academic Research Infrastructure)	950,000	1995 – 99
NSF *(GASP, shared with B. Morse)*	50,234	1994 – 95
National Science Foundation *(AMANDA, shared with B. Morse)*	450,000	1994
National Science Foundation *(GASP, shared with B. Morse)*	65,060	1994
National Science Foundation *(AMANDA, shared with B. Morse)*	490,938	1993
National Science Foundation *(GASP, shared with B. Morse)*	617,350	1992 – 95
NSF *(AMANDA, shared with B. Morse)*	321,654	1992
National Science Foundation (*Exploratory grant "Muon and Neutrino Detection in South Pole Ice" shared with B. Price et al., U. of California, Berkeley)*	50,000	1990
Balzan Prize	369,385	2016 - 2017
Polar Ice Coring Office (PICO) *(AMANDA, shared with B. Morse)*	130,205	1993
University of Alaska, Fairbanks	12,290	1993
Wallenberg Foundation, Sweden *(AMANDA, shared w/ B. Morse)*	238,156	1993
Berkeley Particle Astrophysics Center *(shared w/B. Price et al.)*	80,000	1993 – 94
	100,000	1992 – 93

Funding History

Department of Energy *(shared w/V. Barger, T. Han & F. Petriello)*	514,571	2006 – 07
Department of Energy *(shared with V. Barger & T. Han)*	471,000	2005 – 06
Department of Energy *(shared w/Barger, Han & M.G. Olsson)*	485,000	2004 – 05
Department of Energy *(shared w/Barger, Han, Olsson & D. Zeppenfeld)*	665,000	2003 – 04
	685,000	2002 – 03
	700,000	2001 – 02
Department of Energy Graduate Fellowship	$56,590	1998 – 2001
Department of Energy *(shared with Barger, Han, Olsson & Zeppenfeld)*	760,000	2000 – 01
	800,000	1999 – 2000
	785,000	1998 – 99
Department of Energy *(shared with Barger, Olsson & Zeppenfeld)*	725,000	1997 – 98
	620,000	1996 – 97
	646,000	1995 – 96
	680,000	1995
Department of Energy *(shared with Barger & Olsson)*	725,000	1994
	55,000	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 *(shared with Barger, Han, & Zeppenfeld; also S. Pakvasa & X. Tata, U of Hawaii)* (US – Brazil Cooperative Research)	17,050	1998 – 2001
National Science Foundation *(shared with Barger & Zeppenfeld; also P. Langacker, U of PA, & Pakvasa & Tata, U of Hawaii)* (US – Japan Cooperative Research)	30,000	1995 – 98
National Science Foundation *(shared with Barger & Zeppenfeld)* US – Brazil Cooperative Research)	10,000	1992 – 94
Texas National Research Laboratory Commission *(shared with Barger, Olsson & Zeppenfeld)*	100,000 100,000 130,000	1993 – 94 1992 – 93 1991 – 92
Vilas Research Professorship	60,000 60,000	2022 – 23 2021 – 22
Hilldale Professorship	25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000 25,000	2020 – 21 2019 – 20 2018 – 19 2017 – 18 2016 – 17 2015 – 16 2014 – 15 2013 – 14 2012 – 13 2011 – 12
	25,000	2010 – 11
	25,000	2009 – 10
	25,000	2008 – 09

Funding History

	25,000	2007 – 08
	25,000	2006 – 07
	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