Douglas R. Bergman

University of Utah
Department of Physics and Astronomy
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Salt lake City, UT 84112-0830

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bergman@physics.utah.edu (e-mail)

EDUCATION

Yale University, New Haven, CT, Ph.D. in physics, July 1997.

Yale University, New Haven, CT, M.Phil. in physics, May 1991.

Yale University, New Haven, CT, M.S. in physics, Dec. 1990.

University of Chicago, Chicago, IL, A.B. in physics, June 1989.

EMPLOYMENT

Associate Professor, Univ. of Utah	Aug 2009 – pres.
Assistant Professor, Rutgers Univ.	July 2005 – June 2009.
Research Assistant Professor, Rutgers Univ.	July 2004 – June 2005.
Research Associate, Rutgers University	July 2000 – June 2004
Postdoctoral Fellow, Rutgers University	July 1997 – July 2000
Graduate Research Assistant, Yale University	Feb. 1991 – July 1997
Math and Science Tutor, Pierson Coll., Yale	Sept. 1991 – May 1995
Graduate Teaching Fellow, Yale University	Sept. 1989 – May 1997
Undergraduate Research Assistant, Chicago	Jan. 1988 – Aug. 1989
Teaching Assistant, University of Chicago	Oct. 1986 – Mar. 1987
Summer Intern, General Electric, Cleveland	June – Sept. 1986

RESEARCH

University of Utah, Salt Lake City, UT Mar. 2018 – pres.
Member of a collaboration, "Modeling of the Air Shower Signals from Cosmic Neutrinos for Space-based Experiments."

University of Utah, Salt Lake City, UT Feb. 2017 – pres.
Member of the Probe Of Extreme Multi-messenger Astrophysics (POEMMA) Collaboration.

- Convener of the Focal Surface Group.

University of Utah, Salt Lake City, UT Aug. 2011 – pres.
Development of the Non-Imaging Cherenkov (NICHE) array as a low-energy extension of TA & TALE.

University of Utah, Salt Lake City, UT Aug. 2009 – pres.
Member of the Telescope Array (TA) and TA Low Energy Extension

(TALE) Collaborations.

- Helped build and deploy the TALE Fluorescence Detector.
- Performed a stereo measurement of the UHECR nuclear composition.
- Performed the first analysis of the UHECR spectrum using monocular fluorescence data in TA.

Rutgers University, Piscataway, NJ Sep. 2004 – Jun. 2009

Member of the Telescope Array (TA) and TA Low Energy Extension (TALE) Collaborations.

- TA Fluorescence Detector Analysis Coordinator.
- Built, deployed and tested a prototype TALE Tower Detector mirror.

Rutgers University, Piscataway, NJ Jun. 2002 – 2008

Member of the FLASH Collaboration (E-165 at SLAC), an experiment to measure to fluorescence yield of electrons in air.

Rutgers University, Piscataway, NJ Jan. 1999 – 2009

Member of the High Resolution Fly's Eye Experiment.

- Observed the GZK Cutoff in the UHECR flux spectrum.
- Measured the UHECR composition using the distribution of shower maxima in the atmosphere.
- Fit the measured HiRes UHECR spectra to a number of different source models.
- Developed phenomenological model of UHECR propagation to determine the expected shape of the UHECR spectrum from extragalactic sources.
- Measured the spectrum of UHECR's in a monocular analysis using time-binned FADC data.
- Developed analysis and visualization programs to work with FADC data.
- Surveyed PMT pointing directions using CCD camera to view star images on a screen at the PMT plane.
- Surveyed mirror positions using differential GPS unit.

Rutgers University, Piscataway, NJ July 1997 – Dec. 2001

Member of the KTeV Experiment: Analyzed data from the 1997 run of KTeV (E832/E799) at the Fermilab Tevatron, measuring the branching ratio and photon spectrum for radiative K_{e3} decays.

Rutgers University, Piscataway, NJ July 1997 – June 1999

Worked on the proposal for the CP/T experiment, an experiment to study K_L-K_S interference immediately downstream of a K^0 production target. Specifically worked on determining the systematic errors involved in measuring x, the $\Delta S = -\Delta Q$ amplitude in K_{e3} decays.

Yale University, New Haven, CT Aug. 1995 – July 1997

Analyzed data from the 1995 run of E865 at the AGS, looking for the decay, $K^+ \to \pi^+\mu^+e^-$. Wrote and defended Ph.D thesis, *A Search for the Decay* $K^+ \to \pi^+\mu^+e^-$, under the supervision of Professor Michael E. Zeller.

Yale University, New Haven, CT July 1990 – June 1995

Participated in all aspects of the design, construction and installation of the E865 detector apparatus at the AGS.

- Wrote a Monte Carlo simulation of the detector using the GEANT package from CERN.
- Over-saw the mapping of the two large spectrometer magnets used in the experiment. Checked this map for consistency against Maxwell's equations and corrected discrepancies therefrom.
- Installed and helped to design the fast trigger system.
- Participated in the design and prototyping of novel proportional wire chambers using graphite on mylar anode planes.
- Studied the feasibility of looking for CP violation in the decay $K \to \pi\pi\pi$.
- Ran simulations of the low halo beam-line design to determine background rates.

University of Chicago, Chicago, IL June 1988 – Sept. 1989

Assisted in the design of THISTLE, a balloon-borne experiment to measure the relative abundances of nuclear isotopes in cosmic rays. Worked to port Monte Carlo simulation code for these abundances to an IBM PC platform.

University of Chicago, Chicago, IL Jan. – June 1988

Assisted in the construction of modules for the Chicago Air Shower Array, a high-energy cosmic ray detector that was deployed at Dugway Proving Grounds, UT.

General Electric, Nela Park, Cleveland, OH June – Sept. 1986

Summer Intern: Studied the intensity of light from the UV lines of mercury vapor lamps under various conditions, including temperature and vapor pressure. Wrote this work up in an internal company memo.

PRESENTATIONS †*invited talks*

†*Highlights of Telescope Array*, TeV Particle Astrophysics 2021 (TeVPA 2021), Chengdu (virtual), Oct. 2021.

†*TA, TALE and TAx4, Latest Results*, 17$^{\text{th}}$ International Conference on Topics in Astroparticle and Underground Physics (TAUP 2021), Valencia (virtual), Aug. 2021.

Telescope Array 10-Year Monocular Spectrum Measurement, 37$^{\text{th}}$ International Cosmic Ray Conference, Berlin (virtual), July 2021.

Telescope Array Combined Fit to Cosmic Ray Spectrum and Composition, 37$^{\text{th}}$ International Cosmic Ray Conference, Berlin (virtual), July 2021.

Searching for the Sources of the Most Energetic Particles in the Universe, Colloquium, University of Utah, Sept. 2020.

†*Telescope Array: Latest Results and Plans*, TAUP 2019, Toyama, Sept. 2019.

First Results from NICHE and the NICHE-TALE Hybrid Detector, 36$^{\text{th}}$ International Cosmic Ray Conference, Madison, July 2019.

Combined Fit of the Spectrum and Composition from Telescope Array, 36$^{\text{th}}$ International Cosmic Ray Conference, Madison, July 2019.

TA 10-Year Stereo Composition Measurement, 36$^{\text{th}}$ International Cosmic Ray Conference, Madison, July 2019.

The Non-Imaging CHErenkov Array(NICHE): First Analyses, APS April Meeting, Denver, CO, April 2019.

†*NICHE: Air-Cherenkov light observation at the TA site*, UHECR 2018, Paris, France, Oct. 2018.

The Non-Imaging CHErenkov (NICHE) Array: A TA/TALE extension using Cherenkov radiation to measure Cosmic Ray Composition to sub-PeV energies, APS April Meeting, Columbus, OH, April 2018.

j-NICHE: Prototype detectors of a non-imaging Cherenkov array at the Telescope Array site, 35$^{\text{th}}$ International Cosmic Ray Conference, Busan, S. Korea, July 2017.

Telescope Array measurement of UHECR composition from stereoscopic fluorescence detection, 35$^{\text{th}}$ International Cosmic Ray Conference, Busan, S. Korea, July 2017.

†*Results from Telescope Array and TALE*, STARS2017, Havana, Cuba, May 2017.

NICHE: Using Cherenkov Radiation to Extend Telescope Array to Sub-PeV Energies, APS April Meeting, Salt Lake City, UT, April 2016.

† *Results from Telescope Array and TALE*, HAP Workshop Composition 2015, Karslruhe, Sept. 2015.

Imaging and Non-Imaging Cherenkov Hybrid Reconstruction, 34$^{\text{th}}$ International Cosmic Ray Conference, The Hague, July 2015.

The NICHE Array: Status and Plans, 34$^{\text{th}}$ International Cosmic Ray Conference, The Hague, July 2015.

The distribution of shower longitudinal profiles widths as measured by Telescope Array in stereo mode, 34$^{\text{th}}$ International Cosmic Ray Conference, The Hague, July 2015.

† *Results from Telescope Array*, IceCube Particle Astrophysics Symposium, Madison, May 2015.

† *The Non-Imaging CHErenkov Array (NICHE): A TA/TALE Extension to Measure the Flux and Composition of Very-High Energy Cosmic Rays*, Conference on Ultrahigh Energy Cosmic Rays (UHECR2014), Springdale, UT, Oct. 2014.

† *Cosmic Ray Measurements at the Highest Energies: Results from Telescope Array*, 40th Cospar Scientific Assembly, Moscow, Russia, Aug. 2014.

The Spectrum of UHECRs, Colloquium, University of Utah, Sept. 2013.

† *Telescope Array: Recent Results, Future Plans*, Cosmic Ray Anisotropy Workshop, Madison, WI, Sept. 2013.

TA Spectrum Summary, 33$^{\text{rd}}$ International Cosmic Ray Conference, Rio de Janeiro, Brazil, July 2013.

An Efficient Technique for the Reconstruction of Extensive Air Showers using Non-Imaging Cherenkov Measurements (poster), 33$^{\text{rd}}$ International Cosmic Ray Conference, Rio de Janeiro, Brazil, July 2013.

The Non-Imaging CHErenkov Array (NICHE): A TA/TALE extension to measure the flux and composition of Very-High Energy Cosmic Rays, APS April Meeting, Denver, CO, April 2013.

† *Telescope Array: Recent Results, Future Plans*, 4th Workshop on Air Shower Detection at High Altitudes, Naples, Italy, Jan. 2013.

† *HiRes and TA Spectrum Measurements*, The International Symposium on Future Directions in UHECR Physics, Geneva, Switzerland, Feb. 2012.

Five Decades of Cosmic Rays, Colloquium, University of Utah, Sept. 2011.

The Energy Spectrum of UHECRs using the Telescope Array Fluorescence Detectors in Monocular Mode, 32$^{\text{nd}}$ International Cosmic Ray Conference, Beijing, China, Aug. 2011.

Detecting UHECRs using Cherenkov Light, APS April Meeting, Anaheim, CA, April 2011.

†*HiRes Results, the Final Word (almost)*, Workshop on Hadron-Hadron and Cosmic-Ray Interactions at multi-TeV Energies, ECT* Centre, Trento, Italy, Dec. 2010.

Non-Imaging Cherenkov Detection, Informal Seminar, University of California, Irvine, Irvine CA, Aug. 2010.

†*HiRes UHECR Spectrum Measurements*, Bartol Mini-workshop, University of Delaware, Newark DE, Dec. 2009.

The HiRes Stereo Measurement of the UHECR Spectrum, Fall 2009 Meeting of the Four Corners Section of the APS, Colorado School of Mines, Golden CO, Oct. 2009.

†*UHECR's in the Northern Hemisphere: A Status Report: Recent Results from HiRes*, CCAPP Inaugural Seminar, Ohio State University, Columbus OH, Oct. 2009.

Stereoscopic Measurement of the Flux of Ultra High Energy Cosmic Rays by the High Resolution Fly's Eye, 31$^{\text{st}}$ International Cosmic Ray Conference, Łódź, Poland, July 2009.

The Energy Spectrum of UHECR's using the TA Fluorescence Detectors in Monocular Mode, 31$^{\text{st}}$ International Cosmic Ray Conference, Łódź, Poland, July 2009.

Why HiRes was Able to Observe the GZK Cutoff, Colloquium, University of Utah, April 2009.

†*Recent Results from HiRes*, 20$^{\text{th}}$ Recontres de Blois, Blois, France, May 2008.

†*Observation of the GZK Suppression by HiRes*, International Astrophysics Symposium, Golden, CO, May 2008.

Observation of the GZK Cutoff Using by the HiRes Experiment, 30$^{\text{th}}$ International Cosmic Ray Conference, Merida, Mexico July 2007.

The TALE Tower Detector (poster), 30$^{\text{th}}$ International Cosmic Ray Conference, Merida, Mexico July 2007.

†*TA/TALE Usage*, Aspen Workshop on Cosmic Ray Physics, Aspen CO, April 2007.

†*Observation of the GZK Cutoff Using the HiRes Detector*, SUSY06, Irvine CA, June 2006.

†*Observation of the GZK Cutoff Using the HiRes Detector*, CRIS 2006, Catania, Italy, May 2006.

Fitting the HiRes Spectra, 29$^{\text{th}}$ International Cosmic Ray Conference, Pune, India, Aug. 2005.

UHECR Composition Measurements Using the HiRes-II Detector (poster), 29$^{\text{th}}$ International Cosmic Ray Conference, Pune, India,

Aug. 2005.

Monocular UHECR Spectrum Measurements from HiRes (poster), 29$^{\text{th}}$ International Cosmic Ray Conference, Pune, India, Aug. 2005.

†*Fitting the HiRes Spectra*, Physics at the End of the Galactic Cosmic Ray Spectrum, Aspen, Apr. 2005.

From HiRes to the Telescope Array: A Tale of Hybrid Vigor, Colloquium, University of Delaware, Nov. 2004.

Fitting the HiRes Spectra and Monocular Composition, CRIS 2004, Catania, Italy, May 2004.

The Advent of Cosmic Ray Astronomy, Colloquium, University of Oklahoma, Feb. 2004.

Fits of the HiRes Spectra to Astrophysical Models, 28$^{\text{th}}$ International Cosmic Ray Conference, Tsukuba, Japan, Aug. 2003.

Measurement of the Flux of UHE Cosmic Rays by the HiRes Detectors Observing in Monocular Mode, 28$^{\text{th}}$ International Cosmic Ray Conference, Tsukuba, Japan, Aug. 2003.

Fits of the HiRes Spectra to Astrophysical Models, 2003 APS April Meeting, Philadelphia, PA, April 2003.

The GZK with HiRes, Invited Seminar, The Pennsylvania State University, Oct. 2002.

The GZK with HiRes, Invited Seminar, Brookhaven National Laboratory, Sep 2002.

The UHECR Spectrum with HiRes, 31$^{\text{st}}$ International Conference on High Energy Physics, Amsterdam, July 2002.

The UHECR Spectrum with HiRes, 2002 APS April Meeting, Albuquerque, NM, April 2002.

†*Monocular UHECR Spectra with HiRes*, 2002 Aspen Winter Conference on Ultra High Energy Particles from Space, Jan 2002.

A Monocular Spectrum Analysis Using FADC Timing at HiRes, 27$^{\text{th}}$ International Cosmic Ray Conference, Aug 2001.

Determining the Alignment of HiRes Optics Using a CCD Camera, 27$^{\text{th}}$ International Cosmic Ray Conference, Aug 2001.

Recent Results from the High Resolution Fly's Eye Experiment, 20$^{\text{th}}$ Texas Symposium on Relativistic Astrophysics, Dec. 2000.

†*A New Measurement of the Radiative K^0_{e3} Branching Ratio and Photon Spectrum*, Meson 2000, May 2000.

A Search for the Decay $K^+ \to \pi^+\mu^+e^-$, KTeV Lunch Talk, Aug. 1997

A Search for the Decay $K^+ \to \pi^+\mu^+e^-$, APS Washington Meeting, April 1997

E865: A Status Report, RHIC-AGS Users Meeting, May 1996

FUNDING

(pending) NASA 21-APRA21-0071, $136,423, John Krizmanic *et al.*, *nuSpaceSim: Modeling of Extensive Air Shower Signals from Cosmic Neutrinos for Space-based Experiments*, Jul. 2022–Jun. 2025.

(pending) NSF PHY-2209584, $3,162,069, Charles Jui, Douglas Bergman, Carsten Rott, John Matthews, *Analysis of Data from the Telescope Array Observatory*, Aug. 2022–Jul. 2025.

(pending) NSF PHY-2209583, $3,421,449, Charles Jui, Douglas Bergman, Carsten Rott, John Matthews, *Operation of the Telescope Array Observatory*, Aug. 2022–Jul. 2025.

NSF PHY-2112904, $3,056,458, Charles Jui, Douglas Bergman, Carsten Rott, John Matthews, *Operation of the Telescope Array Observatory*, Aug. 2021–Jul. 2024.

NSF PHY-2012934, $841,026, Charlie Jui, Douglas Bergman, John Matthews, Pierre Sokolsky, University of Utah, *Operation of the Telescope Array, TALE, and the TA×4 Expansion by the University of Utah*, Sep. 2020–Aug. 2021.

NASA 17-APRA17-0066, $107,381, John Krizmanic *et al.*, University of Utah, *Modeling of the Air Shower Signals from Cosmic Neutrinos for Space-based Experiments*, Feb. 2019–Feb. 2023.

NSF PHY-1806797, $2,172,872, Gordon Thomson *et al.*, University of Utah, *Baseline Support of the University of Utah Cosmic Ray Physics Group Including Analysis of Telescope Array, TALE, and TAx4 Data*, July 2018–Jun. 2021.

NSF PHY-1712517, $2,424,080, Gordon Thomson *et al.*, University of Utah, *University of Utah - Operation of the Telescope Array, TALE, and the TAx4 Expansion*, Aug. 2017–Jul. 2020.

NSF PHY-1607727, $1,775,000, Gordon Thomson *et al.*, University of Utah, *Telescope Array TAx4 Upgrade Deployment Proposal*, Aug. 2016–Jul. 2019.

NSF PHY-1404502, $2,311,356, Pierre Sokolsky *et al.*, University of Utah, *Telescope Array Operations and Data Analysis by the University of Utah Cosmic Ray Group*, Sep. 2014–Aug. 2017.

NSF PHY-1404495, $1,846,443, Pierre Sokolsky *et al.*, University of Utah, *Baseline Support of the University of Utah Cosmic Ray Physics Group Including Analysis of the Telescope Array*, Sep. 2014–Aug. 2017.

NSF PHY-1069286, $1,707,240, Pierre Sokolsky *et al.*, University of Utah, *Telescope Array Operations and Data Analysis by the University of Utah Cosmic Ray Group*, Sep. 2011–Aug. 2014.

NSF PHY-1069280, $3,124,772, Pierre Sokolsky *et al.*, University of

Utah, *Baseline Support of the University of Utah Cosmic Ray Physics Group Including Analysis of the Telescope Array*, Sep. 2011–Aug. 2014.

NSF PHY-0968374, $400,000, Gordon Thomson & Douglas Bergman, University of Utah, *Research in Ultrahigh Energy Cosmic Ray Physics*, May 2010–Apr. 2011.

NSF PHY-0649681, $1,173,500, Gordon Thomson & Douglas Bergman, Rutgers University, *Experimental Research in Ultrahigh Energy Cosmic Ray Physics*, May 2007–Apr. 2010.

NSF PHY-0305516, $3,474,000, Gordon Thomson, Thomas Devlin, Stephen Schnetzer, Sunil Somalwar, Amitabh Lath, Douglas Bergman and Eva Halkiadakis, Rutgers University, *Experimental Research In Elementary Particle Physics*, Jan 2004–Apr. 2007.

POSTDOCTORAL FELLOWS

JiHyun Kim, University of Utah	Oct. 2020 – pres.
Thomas Stroman, University of Utah	Jul. 2010 – Aug. 2015
Lauren Scott, Rutgers University	Jul. 2005 – Jul. 2010

GRADUATE STUDENTS

Zane Gerber, University of Utah	May 2021 – pres.
Isaac Buckland, University of Utah	May 2020 – pres.
Greg Furlich, University of Utah	Aug. 2015 – May 2020
Jian Lan, University of Utah	Aug. 2012 – Apr. 2016
Saskia Innemee, University of Utah	Aug. 2010 – May 2012
Rhett Zollinger, University of Utah	Aug. 2010 – Apr. 2011
Sean Stratton, Rutgers University	Aug. 2005 – May 2012

UNDERGRAD STUDENTS

Faizah Siddique, UMass Amherst (REU)	May 2020 – Aug. 2020
Zane Gerber, University of Utah	Aug. 2018 – Aug. 2019
Connor Houghton, University of Utah	Jan. 2018 – Apr. 2020
Matthew Dutson, University of Utah	Jan. 2016 – Dec. 2017
Jeffrey Rodgers, University of Utah	Jan. 2016 – Apr. 2018
Nathan Waugh, Weber State University (REU)	Jun. 2014 – Jul. 2014
Bingran Wang, University of Utah	Dec. 2012 – Apr. 2015
Saskia Innemee, Rutgers University	Sep. 2008 – May 2010
Oren Levi, Rutgers University	May 2008 – Aug. 2008
Aneta Biesiedecka, Rutgers University	May 2007 – Aug. 2008

TEACHING

University of Utah

- **PHYS 7320: Quantum Theory II** S2022

- **PHYS 7320: Quantum Theory II** S2021
- **PHYS 5110: Nuclear & Particle Physics** F2020
- **PHYS 7320: Quantum Theory II** S2020
- **PHYS 5210: Introduction to Gravity** F2018
- **PHYS 4420: Classical Physics II** S2018
- **PHYS 4410: Classical Physics I** F2017
- **PHYS 3730: Computing in Physics** (2 sect.) F2016
- **PHYS 3719/3729: Undergrad Lab** S2016
- **PHYS 3610/6610: Electronics I** F2015
- **PHYS 3740: Modern Physics** S2015
- **PHYS 3610/6610: Electronics I** F2014
- **PHYS 3740: Modern Physics** S2014
- **PHYS 3610/6610: Electronics I** F2013
- **PHYS 7910-013: Astroparticle Physics** S2013
- **PHYS 3610/6610: Electronics I** F2012
- **PHYS 3620/6620: Electronics II** S2012
- **PHYS 3610/6610: Electronics I** F2011
- **PHYS 3620/6620: Electronics II** S2011
- **PHYS 3610/6610: Electronics I** F2010
- **PHYS 3620/6620: Electronics II** S2010

Rutgers University

- **PHYS 272: Honors Physics II** S2009
- **PHYS 271: Honors Physics I** F2008
- **PHYS 272: Honors Physics II** S2008
- **PHYS 271: Honors Physics I** F2007
- **PHYS 272: Honors Physics II** S2007
- **PHYS 271: Honors Physics I** F2006
- **PHYS 124: Analytical Physics I-B** S2006
  Recitation Section Leader

SERVICE

Utah, University Committees

- Senate Committee on Academic Freedom and Faculty Rights 2017–pres.

Utah, College Committees (Science)

- College of Science Council 2012–2013

Utah, Departmental Committees (Physics)

- Director of Graduate Studies 2021–pres.
- Graduate Recruitment & Admissions, chair 2020–2021
- Seminar Series – Virtual 2020–2021.

- Graduate Recruitment & Admissions 2018–pres.
- Director of Graduate Studies 2018–2019
- Policy Board 2017–2019
- Admissions Committee 2011–2018
- Director of Graduate Studies, elect 2017–2018
- Recruitment Committee 2017–2018
- HEAP Seminar Committee 2014–2018
- Colloquium Committee, chair 2016–2017
- Colloquium Committee 2014–2017
- HEAP Seminar Committee, chair 2015–2016
- Admissions Committee, chair 2012–2015
- Advising Committee (Graduate) 2012–2014
- Public Education & Outreach 2012–2013
- Common Exam Committee 2011–2012
- HEAP Seminar Committee, chair 2011–2012
- Space Committee 2010–2012
- Futures Committee 2010–2011
- HEAP Seminar Committee 2009–2010

Rutgers, Departmental Committees (Physics)

- Society of Physics Students Faculty Liaison 2008–2009
- Undergraduate Studies 2006–2009
- Computer Services 2005–2009
- Graduate Recruitment Committee 2005–2006
- Written Qualifier Grading Committee 2005–2006

Organizing

- International Orgainzing Committee, HAP Workshop Composition 2015, Karslruhe, Germany, Sept. 2015.
- Local Organizing Committee & session chair, UHECR 2014, Springdale UT, Sept. 2014.

Reviewing

- Advances in Space Research (3)
- Astrophysical Journal (1)
- Astroparticle Physics (7)
- NASA APRA-SAT Review Panel
- Nazarbaev University
- Modern Physics Letters A (1)
- National Science Foundation (12)
- Textbook: Bauer & Westfall, *University Physics.*

Coaching

- Science Olympiad, Sounds of Music, Torrey Pines High School 2010–2011

Judging

- North Jersey Regional Science Fair 2005–2006

Published Articles by D. R. Bergman

[1] R. U. Abbasi et al. "The Cosmic-Ray Composition between 2 PeV and 2 EeV Observed with the TALE Detector in Monocular Mode". In: *Astrophys. J.* 909.2 (2021), p. 178. DOI: 10.3847/1538-4357/abdd30. arXiv: 2012.10372 [astro-ph.HE].

[2] A. V. Olinto et al. "The POEMMA (Probe of Extreme Multi-Messenger Astrophysics) observatory". In: *JCAP* 06 (2021), p. 007. DOI: 10.1088/1475-7516/2021/06/007. arXiv: 2012.07945 [astro-ph.IM].

[3] R. U. Abbasi et al. "Search for Large-scale Anisotropy on Arrival Directions of Ultra-high-energy Cosmic Rays Observed with the Telescope Array Experiment". In: *Astrophys. J. Lett.* 898.2 (2020), p. L28. DOI: 10.3847/2041-8213/aba0bc. arXiv: 2007.00023 [astro-ph.HE].

[4] Luis A. Anchordoqui et al. "Performance and science reach of the Probe of Extreme Multimessenger Astrophysics for ultrahigh-energy particles". In: *Phys. Rev. D* 101.2 (2020), p. 023012. DOI: 10.1103/PhysRevD.101.023012. arXiv: 1907.03694 [astro-ph.HE].

[5] R. U. Abbasi et al. "Constraints on the diffuse photon flux with energies above 10^{18} eV using the surface detector of the Telescope Array experiment". In: *Astropart. Phys.* 110 (2019), pp. 8–14. DOI: 10.1016/j.astropartphys.2019.03.003. arXiv: 1811.03920 [astro-ph.HE].

[6] R. U. Abbasi et al. "Testing a Reported Correlation between Arrival Directions of Ultra-high-energy Cosmic Rays and a Flux Pattern from nearby Starburst Galaxies using Telescope Array Data". In: *Astrophys. J. Lett.* 867.2 (2018), p. L27. DOI: 10.3847/2041-8213/aaebf9. arXiv: 1809.01573 [astro-ph.HE].

[7] R. U. Abbasi et al. "Mass composition of ultrahigh-energy cosmic rays with the Telescope Array Surface Detector data". In: *Phys. Rev. D* 99.2 (2019), p. 022002. DOI: 10.1103/PhysRevD.99.022002. arXiv: 1808.03680 [astro-ph.HE].

[8] R. U. Abbasi et al. "Study of muons from ultrahigh energy cosmic ray air showers measured with the Telescope Array experiment". In: *Phys. Rev. D* 98.2 (2018), p. 022002. DOI: 10.1103/PhysRevD.98.022002. arXiv: 1804.03877 [astro-ph.HE].

[9] R. U. Abbasi et al. "The Cosmic-Ray Energy Spectrum between 2 PeV and 2 EeV Observed with the TALE detector in monocular mode". In: *Astrophys. J.* 865.1 (2018), p. 74. DOI: 10.3847/1538-4357/aada05. arXiv: 1803.01288 [astro-ph.HE].

[10] R. U. Abbasi et al. "Evidence of Intermediate-Scale Energy Spectrum Anisotropy of Cosmic Rays E≥$10^{19.2}$ eV with the Telescope Array Surface Detector". In: *Astrophys. J.* 862.2 (2018), p. 91. DOI: 10.3847/1538-4357/aac9c8. arXiv: 1802.05003 [astro-ph.HE].

[11] R. U. Abbasi et al. "Depth of Ultra High Energy Cosmic Ray Induced Air Shower Maxima Measured by the Telescope Array Black Rock and Long Ridge FADC Fluorescence Detectors and Surface Array in Hybrid Mode". In: *Astrophys. J.* 858.2 (2018), p. 76. DOI: 10.3847/1538-4357/aabad7. arXiv: 1801.09784 [astro-ph.HE].

[12] R. U. Abbasi et al. "The bursts of high energy events observed by the telescope array surface detector". In: *Phys. Lett. A* 381.32 (2017), pp. 2565–2572. DOI: 10.1016/j.physleta.2017.06.022.

[13] R. U. Abbasi et al. "Gamma-ray Showers Observed at Ground Level in Coincidence With Downward Lightning Leaders". In: *J. Geophys. Res. Atmos.* 123 (2018), p. 6864. DOI: 10.1029/2017JD027931. arXiv: 1705.06258 [physics.ao-ph].

[14] R. U. Abbasi et al. "Search for EeV Protons of Galactic Origin". In: *Astropart. Phys.* 86 (2017), pp. 21–26. DOI: 10.1016/j.astropartphys.2016.11.001. arXiv: 1608.06306 [astro-ph.HE].

[15] R. U. Abbasi et al. "First Upper Limits on the Radar Cross Section of Cosmic-Ray Induced Extensive Air Showers". In: *Astropart. Phys.* 87 (2017), pp. 1–17. DOI: 10.1016/j.astropartphys.2016.11.006. arXiv: 1603.05217 [astro-ph.IM].

[16] M. G. Aartsen et al. "Search for correlations between the arrival directions of IceCube neutrino events and ultrahigh-energy cosmic rays detected by the Pierre Auger Observatory and the Telescope Array". In: *JCAP* 01 (2016), p. 037. DOI: 10.1088/1475-7516/2016/01/037. arXiv: 1511.09408 [astro-ph.HE].

[17] R. U. Abbasi et al. "The energy spectrum of cosmic rays above $10^{17.2}$ eV measured by the fluorescence detectors of the Telescope Array experiment in seven years". In: *Astropart. Phys.* 80 (2016), pp. 131–140. DOI: 10.1016/j.astropartphys.2016.04.002. arXiv: 1511.07510 [astro-ph.HE].

[18] R. U. Abbasi et al. "The hybrid energy spectrum of Telescope Array's Middle Drum Detector and surface array". In: *Astropart. Phys.* 68 (2015), pp. 27–44. DOI: 10.1016/j.astropartphys.2015.02.008.

[19] R. U. Abbasi et al. "Measurement of the proton-air cross section with Telescope Array's Middle Drum detector and surface array in hybrid mode". In: *Phys. Rev. D* 92.3 (2015), p. 032007. DOI: 10.1103/PhysRevD.92.032007. arXiv: 1505.01860 [astro-ph.HE].

[20] B. K. Shin et al. "Gain monitoring of telescope array photomultiplier cameras for the first 4 years of operation". In: *Nucl. Instrum. Meth. A* 768 (2014), pp. 96–103. DOI: 10.1016/j.nima.2014.09.059.

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