

Rasha Abbasi

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Position

2007-present Research Associate at the University of Wisconsin, Madison, WI

Education

Ph.D. (Physics) University of Utah, Salt Lake City, UT;
2003–2007 “Applying New Methods to Finding Patterns in HiRes Stereo Data.”
Adviser: Professor Charles Jui

Masters (Physics) University of Utah, Salt Lake City, UT
2000–2003 “Orbiting Wide-Angle Light Collector”
Adviser: Professor Charles Jui

Bachelor (Physics) University of Jordan, Amman. Jordan.
1995–1999

Research Activities

2007-present IceCube Neutrino Observatory: Anisotropy study with IceCube cosmic ray data.

- Developed the analysis searching for large scale cosmic ray anisotropy.
- Optimized the quality and maintained the stability of the collected data.
- Supervised students in various analysis.
- Maintained and processed the simulation used by the IceCube collaboration.

2003-2007 HiRes: Anisotropy study of HiRes stereo data

- Operated and Repaired HiRes (High Resolution Fly’s Eye) cosmic ray detector on a regular basis.

This experiment studied Ultra High energy cosmic rays (particles with energies greater than $\sim 10^{18}$ eV). It utilized the atmosphere as part of the detector and measured the corresponding air fluorescence from the resulting extensive air shower.

- Developed and applied Hough Transform technique to the HiRes stereo

data.

- Utilized the technique strength to search for arcs in the data.
- Searched for correlations between these arcs and BL-Lacertae objects.
- Developed and applied pattern finding techniques to search for assorted patterns within the HiRes stereo data.

Summer 2003

SLAC E-165 (FLASH): Nitrogen Fluorescence in Air Showers

- Participated in the collection of FLASH (Fluorescence in air showers) experiment at SLAC (Stanford Linear Accelerator Center) to determine the fluorescence yield of charged particles in air. The experiment made a series of measurements to measure the yield as a function of wavelength, pressure, impurities .. etc.
- A second part of the experiment employed a thick target composed of AL₂O₃ to study the effects of particle energy and shower age.

2000–2003

OWL: Orbiting Wide-angle Light Collector

- Calculated the observation aperture for OWL satellite based cosmic ray detector.
- Implemented the optics of the OWL detector into the simulation programs.

Experience

Spring 2002

Teaching assistant for General Physics 2010.

Fall 2001

Teaching assistant for General Physics Lab 2025.

Spring 2001

Teaching assistant for General Physics Lab 2015.

Fall 2000

Teaching assistant for Engineering Physics 2210.

Supervising

2009–present

Craig Price, student at the University of Wisconsin.

2009

Dominick Rocco, student at the University of Wisconsin.

2009

Ryan Birdsall, student at the University of Wisconsin .

2008

Bradley Madajczyk, student at the University of Wisconsin.

List of Talks

- “Large scale Cosmic Rays Anisotropy measurement With IceCube”, 24 March 2010, SnowPAC winter workshops , Salt Lake City, Utah.
- “Large scale Cosmic Rays Anisotropy measurement With IceCube”, 29 February 2010, Seminar, Ohio State University. Columbus, Ohio.

- “IceCube Neutrino Observatory”,
27 October 2009, High energy Phenomena in Relativistic Outflows II. Buenos Aires, Argentina.
- “Large scale Cosmic Rays Anisotropy as Observed With IceCube”,
12 October 2009, Center of Cosmology and Astro Particle Physics. Columbus, Ohio.
- “Large scale Cosmic Rays Anisotropy as Observed With IceCube”,
14 July 2009, International Cosmic Ray Conference. Lodz, Poland.
- “Large scale Cosmic Rays Anisotropy as Observed With IceCube”,
3 May 2009, American Physical Society Meeting. Denver, Colorado.
- “New Methods to Search for Cross-Correlations Between UHECR Data and BL Lac Sources ”,
24 April 2006, American Physical Society Meeting. Dallas, Texas.
- “Search for Cross-Correlations of BL Lacs with HiRes Stereo Data”,
25 October 2005, Four Corners Meeting. University of Colorado, Boulder, Colorado.
- “Cosmic Rays and Their Universe”,
23 September 2004, Undergraduate Seminar at the University of Utah.
- “Characterization of Orbiting Wide-angle Light-Collector (OWL)”,
4 December 2003, Undergraduate seminar at the University of Utah.
- “Characterization of Orbiting Wide-Angle Light-Collector (OWL)”,
25 October 2003, Four Corners Meeting. Arizona State University, Tempe, Arizona.

Recent Publications

- IceCube Neutrino Observatory
 - “Measurement of the Large Scale Anisotropy of Cosmic Ray Arrival Directions with IceCube” with the IceCube Collaboration, submitted. (Primary Author)
 - “Limits on the WIMP-Nucleon Scattering Cross-Section from Neutrino Telescopes” with the IceCube Collaboration, *Astrophys. J.* **04**:009, 2009.
 - “First Neutrino Point-Source Results From the 22-String IceCube Detector” with the the IceCube Collaboration, arXiv:0905.2253
 - “Search for Point Sources of High Energy Neutrinos with Final Data from AMANDA-II” with the IceCube Collaboration, *Phys. Rev. D.* **79**: 062001, 2009.
 - “Limits on a Muon Flux from Neutralino Annihilation in the Sun with the IceCube 22-string Detector” with the IceCube Collaboration, arXiv:0902.2460. Submitted to *Phys. Rev. Lett.*

- “Determination of the Atmospheric Neutrino Flux and Searches for New Physics with AMANDA-II” with the IceCube Collaboration, arXiv:0902.0675.
 - “Search for High-Energy Muon Neutrinos from the Naked-Eye GRB 080319B with the IceCube Neutrino Telescope” with the IceCube Collaboration, *Astrophys. J.* **691**:723-737, 2009.
 - “The IceCube Data Acquisition System: Signal Capture, Digitization, and Timestamping” with the IceCube Collaboration, arXiv:0810.4930. 2008.
 - “Solar Energetic Particle Spectrum on 13 December 2006 Determined by IceTop” with the IceCube Collaboration *Astrophys. J. Lett.* **689**: 65-68, 2008 .
- Telescope Array/ TA
 - “The Telescope Array experiment: status and prospects” with the Telescope Array collaboration, *J. Phys.: Conf. Ser.* 120 062027 (3pp), 2008.
- High Resolution Fly’s Eye / HiRes
 - “Measurement of the Flux of Ultra High Energy Cosmic Rays by the Stereo Technique” with the HiRes Collaboration, arXiv:0904.4500.
 - “A Search for Three and Four Point Correlation in HiRes Stereo Data” with the HiRes Collaboration, arXiv:0901.3740, 2009. (Primary Author)
 - “Search for correlations between HiRes stereo events and active galactic nuclei” with the HiRes Collaboration, *Astrophys. Volume 30, Issue 4*, p175-179, 2008.
 - “First Observation of the Greisen-Zatsepin-Kuzmin Suppression” with the HiRes Collaboration, *Phys. Rev. Lett.* **100**: 101101, 2008.
 - “An Upper Limit on the Electron-Neutrino Flux from the HiRes Detector” with the HiRes Collaboration, *Astrophys. J* **684**: 790-793, 2008.
 - “Alternative Methods for Finding Patterns in HiRes Stereo Data” with the HiRes Collaboration, *Astrophys. Volume 28, Issue 4-5*, p385, 2007.(Primary author).
 - “Techniques for measuring atmospheric aerosols at the high resolution Fly’s eye experiment” with the HiRes Collaboration, *Astrophys. Volume 25, Issue 1*, p74-83, 2006.
 - “A measurement of time-averaged aerosol optical depth using air-showers observed in stereo by HiRes” with the HiRes Collaboration, *Astropart. Phys.*, **25**: 93-97, 2006.
 - “Search for Cross-Correlation of Ultra-High Energy Cosmic Rays with BL Lacertae Objects” with the HiRes Collaboration, Submitted to *Astrophys. J.* July 2005, astro-ph/0507120.
 - “Search for Point-Like Sources of Cosmic Rays with Energies above $10^{18.5}$ eV in the HiRes-I Monocular Data set” with the HiRes collaboration, submitted to *Astropart. Phys.*, astro-ph/0507663

- “Arrival Directions of Ultra-High Energy Cosmic Rays within the HiRes-I Monocular Data set: A Search for Overlaps with the Reported AGASA Clusters”, with the HiRes collaboration, submitted to *Astropart. Phys.*
 - “Monocular Measurement of the Spectrum of UHE Cosmic Rays by the FADC Detector of the HiRes Experiment”, with the HiRes collaboration, *Astropart. Phys.* **23**: 157, 2005.
 - “Observation of the Ankle and Evidence for a High-Energy Break in the Cosmic Ray Spectrum”, with the High Resolution Fly’s Eye Collaboration, *Phys. Lett. B* **619**: 271-280, 2005
 - “Search for Point Sources of Ultra-High Energy Cosmic Rays Above 4×10^{19} eV Using a Maximum Likelihood Ratio Test”, with The High Resolution Fly’s Eye Collaboration, *Astrophys. J.* **623**: 164-170, 2005.
 - “A Study of the Composition of Ultra-High Energy Cosmic Rays Using the High Resolution Fly’s Eye”, with The High Resolution Fly’s Eye Collaboration, *Astrophys. J.* **622**: 910-926, 2005.
 - “Measurement of the Flux of Ultrahigh Energy Cosmic Rays from Monocular Observations by the High Resolution Fly’s Eye Experiment”, with the HiRes collaboration, *Phys. Rev. Lett.* **92**: 151101, 2004.
 - “A Search for Arrival Direction Clustering in the HiRes-I Monocular Data above $10^{19.5}$ eV”, with the HiRes collaboration, *Astropart. Phys.* **22** (2004) 139-149.
 - “Search for Global Dipole Enhancements in the HiRes-I Monocular Data above $10^{18.5}$ eV”, with the HiRes collaboration, *Astropart. Phys.* **21**:111,2004.
 - “Study of Small-Scale Anisotropy of Ultrahigh Energy Cosmic Rays Observed in Stereo by HiRes”, with the HiRes collaboration, *Astrophys. J.* **610**:L73,2004.
- FLASH: Nitrogen Fluorescence in Air Showers
 - “Techniques of the FLASH thin target experiment” with the FLASH collaboration, *Nucl. Instrum. Meth. A* ,Volume 597, Issue 1, p. 32-36.,2008.
 - “The FLASH thick-target experiment” with the FLASH collaboration, *Nucl. Instrum. Meth. A* , Volume 597, Issue 1, p. 37-40., 2008.

Proceedings

- “IceCube Neutrino Observatory”,
Sumbitted to the High energy Phenomena in Relativistic Outflows II for the IceCube Collaboration.
- “Cosmic Rays Anisotropy With IceCube”,
Sumbitted to the Center of Cosmology and Astro Particle Physics 2009 for the IceCube Collaboration.

- “ Large scale Cosmic Rays Anisotropy as Observed With IceCube”,
Submitted to the International Cosmic Ray Conference 2009 for for the IceCube Collaboration.
- “ Search for Multi-Point Correlation in Arrival Direction of Events Observed in Stereo by the High Resolution Fly’s Eye ”,
Submitted to the International Cosmic Ray Conference 2009 for the HiRes Collaboration.
- “An Alternative Method to Finding Patterns in HiRes Stereo Data ”,
Submitted to to the International Cosmic Ray Conference 2007 for the HiRes Collaboration.

References

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