Qi Feng

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Education

2015 • Ph.D. Physics, Purdue University.

2009 • B.S. Physics, University of Science & Technology of China.

Experience

2017–present • Postdoctoral researcher at Nevis Laboratories/Department of Physics, Columbia University.
Supervisors: Prof. Brian Humensky, Prof. Reshmi Mukherjee

- Participating the commissioning of the prototype 9.7m Schwarzschild-Couder telescope for the Cherenkov Telescope Array, and the calibration of its optics system.
- Co-leading the VERITAS blazars science working group (2018–present).
- Continuing the multiwavelength monitoring of TeV blazars, focusing on their variability.
- Using deep learning algorithms (e.g. convolutional neural networks) for event classification and image segmentation of gamma-ray data and simulations with Python.
- Continuing to lead the effort of the data quality monitoring of the VERITAS experiment.
- Continuing the search for gamma-ray signals from primordial black hole evaporation events in the VERITAS archival data, setting an upper limit on the rate of such evaporation events.

2015–2017 • Postdoctoral research fellow at the Department of Physics, McGill University.
Supervisor: Prof. David Hanna

- Used different machine learning algorithms (e.g. gradient boosting, boosted decision trees, and convolutional networks) to classify signal/background events in astronomical data with Python.
- Principle investigator of a program that focuses on variable AGN time series with coordinated observations from multiple instruments, eligible for a NASA grant of $40k.
- Led the effort of the data quality monitoring of the VERITAS experiment, working with Python and ROOT, a C++ based analysis/visualization package similar to R.
- Searched for gamma-ray signals from primordial black hole evaporation events in the VERITAS archival data, setting an upper limit on the rate of such evaporation events.
- Built a citizen science project "Muon Hunter" with a team to obtain reliably labelled data sets for the training of convolutional neural networks, and to advertise gamma-ray astrophysics.

2011–2015 • Research assistant at the Department of Physics & Astronomy, Purdue University.
Advisor: Prof. Wei Cui

- Led the studies of multivariate astronomical time series of two TeV blazars, using e.g. power spectrum, cross correlation, and spectrogram.
- Improved the sensitivity of the realtime analysis by 15% for observations taken in special modes under moonlight through parameter optimization.
- Produced Monte Carlo simulations of cascades of particles in the atmosphere to improve the calibration of the VERITAS experiment.

2008–2009 • Undergraduate research at Center for Astrophysics, Univ. of Science & Technology of China. Advisor: Prof. Junxian Wang

- Measured the black hole mass of AGN using narrow Fe K_α line reverberation mapping.

Skills

Programming

• Working knowledge of Python, Shell, IDL, R, C/C++, ROOT, MySQL, HTML, Fortran, Perl.

Languages

• Chinese - native • English - fluent

Teaching

Teaching assistant at Department of Physics & Astronomy, Purdue University:

2011 Spring • Intermediate Astronomy II (ASTR364).
2010 Fall • Intermediate Astronomy I (ASTR363).
2010 Spring • Descriptive Astronomy: Stars and Galaxies Lab (ASTR264).
2009 Fall • Intermediate Astronomy I (ASTR363) and Cosmology (ASTR370).

Academic service

• Reviewer for multiple NASA programs.
• Referee for *MNRAS*.

Publications

Primary-author journal articles

• *MWL observations of the blazar BL Lacertae: a new fast TeV gamma-ray flare*, Abeysekara, A. U., et al. 2018, ApJ 856, 95.
• *A search for Primordial Black Hole Evaporation with the VERITAS experiment*, the VERITAS collaboration, in prep.
• *Long-term investigation of the multi-wavelength behaviour of the TeV blazar 1ES 1215+303: 2008 – 2017*, The *Fermi* and VERITAS collaborations, 2018, in prep.
• *MWL observations of the blazar VER J0521+211*, The VERITAS collaboration and MWL partners, 2017, in prep.
• *A search for spectral hysteresis and energy-dependent time lags from X-ray and TeV gamma-ray observations of Mrk 421*, Abeysekara, A. U., et al. 2017, ApJ, 834, 2
• *Rapid TeV Gamma-Ray Flaring of BL Lacertae*, Arlen, T., et al. 2013, ApJ, 762, 92

Conference Proceedings

• *Multiwavelength Observations of the Blazar BL Lacertae: a new fast TeV gamma-ray flare*, Feng, Q., for the VERITAS Collaboration, Jorstad, S. G., et al. 2017, arXiv:1708.06386
• *A citizen-science approach to muon events in imaging atmospheric Cherenkov telescope data: the Muon Hunter* Feng, Q., for the VERITAS Collaboration, & Jarvis, J. 2017, arXiv:1708.06393
• *The analysis of VERITAS muon images using convolutional neural networks*, Feng, Qi, & Lin, T. Y., for the VERITAS collaboration, 2017, Astroinformatics, 325, 173

Contributing-author journal articles

• *Multi-wavelength Study of Quiescent States of Mrk 421 with Unprecedented Hard X-ray Coverage Provided by NuSTAR in 2013*, Baloković, et al. 2016, ApJ, 819, 156
• *Multiwavelength Observations of the Previously Unidentified Blazar RX J0648.7+1516*, Aliu, E., Aune, T., Beilicke, M., et al. 2011, ApJ, 742, 127
• *Multiwavelength Observations of the blazar 1ES 1959+650*, The VERITAS collaboration and MWL partners, in prep.
• *Multiwavelength Observations of the Radio Galaxy NGC 1275 during a flare*, The VERITAS collaboration and MWL partners, in prep.
• *Multi-wavelength observations of Mrk 421 during the great flare of February 2010*, the VERITAS collaboration and MWL partners, in prep.
• *VERITAS discovery of VHE gamma-ray emission from the blazar 1ES 0502+675*, the VERITAS collaboration, in prep.

Co-author journal articles

54 co-signed publications within the VERITAS collaboration (*link to ADS library*).

Conference presentations

• *A search for primordial black hole evaporation events with the VERITAS experiment*
Feng, Q., Zitzer, B, for the VERITAS Collaboration, The 30th Rencontres de Blois, 03-08 June, 2018, Blois, France.
• *MWL Observations of the Blazar BL Lacertae: a new fast TeV gamma-ray flare*
Feng, Q., for the VERITAS Collaboration, Jorstad, S. G., et al., 35th International Cosmic Ray Conference, 12-20 July, 2017, Busan, Korea.
• *A citizen-science approach to muon events in VHE data: the Muon Hunter*
Feng, Q., for the VERITAS Collaboration, and Jarvis, J., 35th International Cosmic Ray Conference, 12-20 July, 2017, Busan, Korea.
• *The analysis of VERITAS muon images using convolutional neural networks*
Feng, Q., Lin, Tony T. Y., for the VERITAS Collaboration, IAU Symposium 325 on Astroinformatics, Oct 20-24, 2016, Sorrento, Italy.
• *Recent Highlights from VERITAS*
Feng, Q., for the VERITAS Collaboration, 11th SciNeGHE workshop, Oct 18-21, 2016, Pisa, Italy.
• *Simultaneous X-ray and gamma-ray observations of Mrk 421 during a strong flaring episode*
Feng, Q., & Cui, W., HEAD 2014, Aug 17-21, 2014, Chicago, USA.
• *Highlights from the VERITAS Blazar Observation Program*
Feng, Q., Cui, W., & the VERITAS Collaboration, AAS 222, Jun 2-6, 2013, Indianapolis, USA.
• *Rapid TeV Gamma-ray Variability of BL Lacertae*
Feng, Q., HEAD 2011, Sep 7-10, 2011, Newport, USA.