

Quincy Abarr

qabarr@gmail.com
qabarr@udel.edu

(574) 304-7779

EDUCATION

Washington University in St. Louis

Ph.D. in Physics: X-rays from Warped Black Hole Accretion Disks

2020

M.A. in Physics

2017

DePauw University

B.A. in Physics, Summa Cum Laude

2015

Minors in Astronomy, Computer Science, and Mathematics

RESEARCH EXPERIENCE

Postdoctoral Research Fellow – University of Delaware & Bartol Research Institute November 2021 - present

- Development of navigation subsystem, including GNSS and INS devices, and techniques to enable high accuracy pointing during the upcoming PUEO flight
- Continued development of PUEO simulations pipeline

Postdoctoral Research Fellow – Washington University in St. Louis September 2020 - November 2021

– Advisor: Brian Rauch

– Visiting Scholar at the University of Delaware, June to November 2021

- Simulations of ultra-high energy neutrinos and cosmic rays for detection by the balloon-borne ANITA and PUEO instruments with `icemc` and development of `nicemc`

Graduate Researcher – Washington University in St. Louis

January 2016 - August 2020

– Advisor: Henric Krawczynski

- X-ray signatures of warped accretion disks around black holes
 - Developed ray-tracing code to simulate polarized X-rays from warped disks
 - Created synthetic polarization spectra of thermal X-rays
 - Created synthetic energy spectra of the iron line profile to fit with XSPEC
- Construction, calibration, and operation of the balloon-borne hard X-ray polarimeter X-Calibur
 - Tested and calibrated Cadmium Zinc Telluride detectors for use in the polarimeter
 - Developed and tested portable optical aligner to verify mirror-detector alignment
 - Contributed to software (written in Python, HTML, and CSS) used to operate, command, and monitor instrument during flight

Undergraduate Researcher – DePauw University

2011-2015

- Analyzed VERITAS data to study the supernova remnant IC 443
- Learned to observe transiting exoplanets from the ground
- Used high-speed photography to study the Leidenfrost effect
- Built radio telescope to monitor activity of Jupiter

PUBLICATIONS

- Abarr, Q., Beheshtipour, B., Beilicke, M., Bose, R., de Geronimo, G., Dowkontt, P., Errando, M. et al. (2022) Performance of the X-Calibur hard X-ray polarimetry mission during its 2018/19 long-duration balloon flight. *Astroparticle Physics*, 143, 102749.
- Abarr, Q., Allison, P., Ammerman Yebra, J., Alvarez-Muñiz, J., Beatty, J. J., Besson, D.Z., Chen, P. et al. (2021) The Payload for Ultrahigh Energy Observations (PUEO): a white paper. *Journal of Instrumentation*, 16(8), Po8035.
- Abarr, Q., Awaki, H., Baring, M. G., Bose, R., De Geronimo, G., Dowkontt, P., Errando, M. et al. (2021) XL-Calibur - a second-generation balloon-borne hard X-ray polarimetry mission. *Astroparticle Physics*, 126, 102529.
- Abarr, Q. & Krawczynski, H. (2020) The Iron Line Profile from Warped Black Hole Accretion Disks. *The Astrophysical Journal*, 906(1), 28.
- Abarr, Q. & Krawczynski, H. (2020) The Polarization of X-rays from Warped Black Hole Accretion Disks. *The Astrophysical Journal*, 889(2), 111.
- Abarr, Q., Baring, M., Beheshtipour, B., Beilicke, M., deGeronimo, G., Dowkontt, P., M. Errando et al. (2020). Observations of a GX 301-2 Apastron Flare with the X-Calibur Hard X-Ray Polarimeter Supported by NICER, the Swift XRT and BAT, and Fermi GBM. In press at *The Astrophysical Journal*.
- Kislat, F., Abarr, Q., Beheshtipour, B., De Geronimo, G., Dowkontt, P., Tang, J., & Krawczynski, H. et al. (2018). Optimization of the design of X-Calibur for a long-duration balloon flight and results from a one-day test flight. *Journal of Astronomical Telescopes, Instruments, and Systems*, 4(1), 011004.

TALKS

- **International Cosmic Ray Conference**, July 29th, 2023 – *Design of the next-generation ultrahigh energy neutrino observatory PUEO*
- **Astronomy on Tap** in Newark, Delaware, February 21st 2022 – *Ballooning from Antarctica to Observe the High-Energy Universe*
- **University of Delaware Summer REU program**, July 8th 2021 – *PEUO, and The Hunt for Ultrahigh-Energy Neutrinos*
- **Washington University in St. Louis Astrophysics Seminar**, May 7th 2021 – *PUEO, and The Hunt for Ultrahigh-Energy Neutrinos*
- **American Astronomical Society meeting**, January 14th 2021 – *The Reflected Iron Line Emission from Warped Accretion Disks*
- **Astronomy on Tap** public talk in St. Louis, March 9th 2020 – *Black Holes & Disk Warps: Exploring Warped Accretion Disks with X-ray Polarimetry*
- **American Astronomical Society meeting**, January 7th 2020 – *Exploring the Physics of Warped Accretion Disks with the Imaging X-ray Polarimetry Explorer*
- **Texas Symposium on Relativistic Astrophysics**, December 16th 2019 – *Exploring the Physics of Warped Accretion Disks with the Imaging X-ray Polarimetry Explorer*
- **Washington University in St. Louis Physics Graduate Student Seminar**, September 27th 2019 – *Exploring the Physics of Warped Accretion Disks with X-ray Polarimetry*
- **American Astronomical Society meeting**, June 10th 2019 – *XL-Calibur: Plans for the Second-Generation X-Ray Polarimeter*
- **American Physical Society meeting**, April 15th 2019 – *First Results from the Hard X-Ray Polarimetric Observations of the Accreting X-Ray Pulsar GX 301-2 with the X-Calibur Mission*
- **American Physical Society meeting**, April 15th 2019 – *First Results from the Hard X-Ray Polarimeter X-Calibur, and Plans for the Second-Generation Mission XL-Calibur*

- **Washington University in St. Louis Physics Graduate Student Seminar**, March 29th 2019 – *X-Calibur: Piercing the Veil of the High-Energy Universe; Also Some Penguins*
- **McMurdo Station Sunday Science Lecture**, January 6th 2019 – *X-Calibur: Piercing the Veil of the High-Energy Universe*
- **Washington University in St. Louis Physics Graduate Student Seminar**, April 21st 2017 – *Investigating Warped Accretion Disks Using X-Ray Polarization*

POSTERS

- **20 Years of Chandra Symposium**, December 2019 – *Exploring the Physics of Warped Accretion Disks with the Imaging X-ray Polarimetry Explorer*
- **20 Years of Chandra Symposium**, December 2019 – *XL-Calibur: The Balloon-Borne Hard X-ray Polarimeter*
- **Washington University Physics Research Symposium**, September 2019 – *X-ray Polarization as a Tool to Study Warped Accretion Disks of Compact Stellar Remnants*
- **High Energy Astrophysics Division of the American Astronomical Society meeting**, March 2019 – *Study of the Systematic Errors of the X-Calibur Hard X-ray Polarimetry Mission*

HONORS

- Best Student Presentation in 'Disks and Jets' session at 2019 Texas Symposium
- Fellowship from the McDonnell Center for the Space Sciences, WUSTL
- Antarctic Service Medal, July 2019
- Phi Beta Kappa
- Sigma Pi Sigma

TEACHING EXPERIENCE

Teaching Assistant – Washington University in St. Louis

471: *Quantum Mechanics* for undergraduates

Fall 2019

- Led three classes: two Python project tutorials, one lecture on the solar neutrino problem
- Nominated by professor for departmental prize for excellence in teaching

505: *Classical Electrodynamics I* for graduate students

Fall 2018 and Fall 2019

463: *Statistical Mechanics and Thermodynamics* for undergraduates

Fall 2018

Observatory Assistant – McKim Observatory at DePauw University

2013 - 2015

- Assisted students during introductory astronomy courses and observatory open houses

BROADER IMPACTS

Graduate Student Mentors – Department of Physics, Washington University in St. Louis 2016 - 2020

- Organized academic and social programs for prospective and incoming graduate students

Young Scientist Program – Washington University in St. Louis 2018 - 2020

- Fulfilled requests by local teachers for physics lessons and demonstrations
- Head of Physics Teaching Team from Summer 2018 to Summer 2020

Outreach Committee – Department of Physics, Washington University in St. Louis 2016 - 2020

Diversity, Inclusion, & Equity Committee – Department of Physics and Astronomy, University of Delaware
May 2023 - present

Diversity & Inclusion Committee – Department of Physics, Washington University in St. Louis 2016 - 2018