

Ethan Baker Curriculum Vitae

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EDUCATION

Boston University, Boston, MA
PhD Student, Physics Department
Advisor: Hongwan Liu

September 2024 - Present

Haverford College, Haverford, PA
Bachelor of Science, *summa cum laude*, Physics and Mathematics
High Honors in Physics, Honors in Mathematics
Physics Thesis: *Particle Self-Energies in the BSBM Model of a Varying Fine Structure Constant*, Advisor: Daniel Grin
Mathematics Thesis: *The Order of Selmer Groups of Congruent Number Curves over Real Quadratic Fields*, Advisor: Anthony Kling

May 2024

PUBLICATIONS

E. Baker, H. Liu, *Dark Photons in the Radio Sky: I. Resonant Conversions in Halos*, arXiv:2511.09630.

E. Baker, H. Liu, *Dark Photons in the Radio Sky: II. Resonant Conversions in the Intergalactic Medium*, arXiv:2511.09637.

E. Baker, D. Bollweg, P. Boyle, I. Cloët, X. Gao, S. Mukherjee, P. Petreczky, R. Zhang, Y. Zhao, *Lattice QCD calculation of the pion distribution amplitude with domain wall fermions at physical pion mass*, *J. High Energy Phys.* 2024, 211 (2024), arXiv:2405.20120.

H. Tohfa, J. Crump, **E. Baker**, L. Hart, D. Grin, M. Brosius, and J. Chluba, *Cosmic microwave background search for fine-structure constant evolution*, *Phys. Rev. D* 109, 103529 (2024), arXiv:2307.06768.

PRESENTATIONS

New Sensitivity to Dark Photons from the 21-cm Power Spectrum, Pheno 2025, University of Pittsburgh, May 2025

QFT Calculation of Nuclear Electromagnetic Self-Energy in the Presence of Alpha Variation, Undergraduate Cosmology Workshop, MIT, July 2024

Quantum Field Theory Calculations in the BSBM Model of a Varying Fine Structure Constant, American Physical Society April Meeting, April 2024

Lattice QCD Calculation of Pion Distribution Amplitude Using Domain-Wall Fermions at Physical Pion Mass, International Symposium on Lattice Field Theory, August 2023

A Simulation-Based Approach to Bekenstein's Model of a Varying Fine Structure Constant, American Physical Society April Meeting, April 2023

AWARDS AND SCHOLARSHIPS

SKA-CH travel award to attend Cosmology in the Alps 2026, awarded November 2025

PITT PACC travel award to attend Pheno '25, awarded April 2025

Dean's Fellowship, Boston University (2024)

The Faculty-Student Collaborative Research Prize, Haverford College (2024)

This prize awards funds in support of research conference attendance to present research based on the senior thesis.

J. McLain King 1928 Scholarship, Haverford College (2023)

Haverford KINSC Summer Scholar, Haverford College (2022)

TEACHING EXPERIENCE

Teaching Fellow, Boston University Physics Department
Course: General Physics 2 (PY212)

Fall 2024

Teaching Assistant, Haverford College Department of Physics
Courses: Introductory Quantum Mechanics (PY214), Fundamental Physics 2 (PY106)

Spring 2022 - Spring 2023

Grader, Haverford College Department of Physics
Courses: Computational Physics (PY304), Fundamental Physics 1 (PY105)

Fall 2021- Spring 2023

SCHOOLS AND EXTERNAL TRAINING

NSF Institute for Artificial Intelligence and Fundamental Interactions Summer School, Harvard University **August 2025**
Michigan Cosmology Summer School, University of Michigan **June 2025**

MEMBERSHIPS

Phi Beta Kappa Honor Society

American Physical Society

RESEARCH INTERESTS

Radio Cosmology, Beyond Standard Model Physics, High Energy Phenomenology