

# Ethan Baker Curriculum Vitae

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## EDUCATION

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**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

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**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

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*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

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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

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**Teaching Fellow**, Boston University Physics Department Fall 2024  
Course: General Physics 2 (PY212)

**Teaching Assistant**, Haverford College Department of Physics Spring 2022 - Spring 2023  
Courses: Introductory Quantum Mechanics (PY214), Fundamental Physics 2 (PY106)

**Grader**, Haverford College Department of Physics Fall 2021- Spring 2023  
Courses: Computational Physics (PY304), Fundamental Physics 1 (PY105)

## **SCHOOLS AND EXTERNAL TRAINING**

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

**August 2025**  
**June 2025**

## **MEMBERSHIPS**

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Phi Beta Kappa Honor Society

American Physical Society

## **RESEARCH INTERESTS**

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Radio Cosmology, Beyond Standard Model Physics, High Energy Phenomenology