

ANIRUDH (ANI) PRABHU

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ACADEMIC POSITIONS

Associate Research Scholar & Postdoctoral Fellow

Sept. 2022–

Princeton Center for Theoretical Science (PCTS) & Department of Physics

EDUCATION

Ph.D. in Physics, Stanford University

Sept. 2016– Sept. 2022

Thesis Advisor: Savas Dimopoulos

Thesis Title: *Astrophysical Signatures of Axion-Like Particles*

B.S. in Physics, Massachusetts Institute of Technology

Sept. 2012– June 2016

Research Advisors: David Kaiser (Thesis Advisor) & Alan Guth

Thesis Title: *Preheating in Multifield Inflation* (Barrett Astrophysics Prize, MIT)

GPA: 5.0/5.0,

PUBLICATION LIST

1. Pierce Giffin, Andrew Liu, Jeremias Boucsein, Akaxia Cruz, **Anirudh Prabhu**, Stefano Profumo, & M. Grant Roberts, *Structure Formation with Dark Magnetohydrodynamics*, [arXiv:2511.15810](#) (2025).
2. Rohan Arni, Carlos Blanco, and **Anirudh Prabhu**, *Using Deep Learning for Robust Classification of Fast Radio Bursts*, [arXiv:2511.02634](#) (2025).
3. Kim V. Berghaus, Liam Connor, Yufeng Du, Vincent S. H. Lee, **Anirudh Prabhu**, Robert Reichke, & Kathryn M. Zurek, *Physics beyond the Standard Model with the DSA-2000*, [arXiv:2505.23892](#), *accepted for publication*, (Journal of Cosmology and Astroparticle Physics) (2025).
4. Sandip Roy, **Anirudh Prabhu**, Christopher Thompson, Samuel J. Witte, Carlos Blanco, & Jonathan Zhang *Searching for Axion Dark Matter Near Relaxing Magnetars*, [arXiv:2505.20450](#) *in review*, (Physical Review D) (2025).
5. C. Dessert, N. Gendler, A. Hebecker, J. Jaeckel, D. J. E. Marsh, J. Moritz, **Anirudh Prabhu**, A. Schachner and A. Westphal, *Prospects for the String Axiverse*, [Banff International Research Station Workshop Report](#), January 2025.
6. Mariia Khelashvili, Mariangela Lisanti, **Anirudh Prabhu**, & Benjamin Safdi, *An Axion Pulsarscope*, [Phys. Rev. D 111, 083027](#) (2025).
7. Sandip Roy, Carlos Blanco, Christopher Dessert, **Anirudh Prabhu**, & Tea Temim, *Sensitivity of JWST to eV-Scale Decaying Axion Dark Matter*, [Phys. Rev. Lett. 134, 071003](#) (2025).
8. Carlos Blanco, Ian Harris, Yonatan Kahn, & **Anirudh Prabhu**, *Constraining Dark Matter-Proton Scattering from Molecular Cloud Ionization*, [Physical Review D 110, 035006](#) (2024).
9. Dion Noordhuis, **Anirudh Prabhu**, Christoph Weniger, & Samuel J. Witte, *Axion Clouds around Neutron Stars*, [Physical Review X 14, 041015](#) (2024).
10. Jamie A. P. Law-Smith, Georges Obied, **Anirudh Prabhu**, & Cumrun Vafa, *Astrophysical Constraints on Decaying Dark Gravitons*, [Journal of High Energy Physics](#) 06 (2024) 047.

11. **Anirudh Prabhu**, *Axion-mediated Transport of Fast Radio Bursts Originating in Inner Magnetospheres of Magnetars*, [The Astrophysical Journal Letters](#), **946** L52 (2023).
12. **Anirudh Prabhu** and Carlos Blanco, *Constraints on Dark Matter-Electron Scattering from Molecular Cloud Ionization*, [Physical Review D](#) **108**, 035035 (2023).
13. Dion Noordhuis, **Anirudh Prabhu**, Samuel J. Witte, Alexander Y. Chen, Fábio Cruz, Christoph Weniger, *Novel Constraints on Axions Produced in Pulsar Polar Cap Cascades*, [Physical Review Letters](#) **131**, 111004 (2023).
14. Robert Lasenby and **Anirudh Prabhu**, *Dark Matter-Electron Scattering in Materials: Sum Rules and Heterostructures*, [Physical Review D](#) **105**, 095009 (2022).
15. **Anirudh Prabhu**, *Axion Production in Pulsar Magnetosphere Gaps*, [Physical Review D](#) **104**, 055038 (2021).
16. **Anirudh Prabhu**, *Optical Lensing by Axion Stars: Observational Prospects with Radio Astrometry*, [arXiv:2006.10231](#), in review (Physical Review D).
17. **Anirudh Prabhu** and Nicholas Rapidis, *Resonant Conversion of Dark Matter Oscillons in Pulsar Magnetospheres*, [Journal of Cosmology and Astroparticle Physics](#) 10(2020)054.
18. Matthew P. DeCross, David I. Kaiser, **Anirudh Prabhu**, Chanda Prescod-Weinstein and Evangelos I. Sfakianakis, *Preheating after v Multifield Inflation with Nonminimal Couplings. III: Dynamical Spacetime Results*, [Physical Review D](#) **97**, 023528 (2018).
19. Matthew P. DeCross, David I. Kaiser, **Anirudh Prabhu**, Chanda Prescod-Weinstein and Evangelos I. Sfakianakis, *Preheating after Multifield Inflation with Nonminimal Couplings. II: Resonance Structure*, [Physical Review D](#) **97**, 023527 (2018).
20. Matthew P. DeCross, David I. Kaiser, **Anirudh Prabhu**, Chanda Prescod-Weinstein and Evangelos I. Sfakianakis, *Preheating after Multifield Inflation with Nonminimal Couplings I: Covariant Formalism and Attractor Behavior*, [Physical Review D](#) **97**, 023527 (2018).
21. **Anirudh Prabhu** and Hari M. Srivastava, *Some Limit Formulas for the Gamma and Psi (or Digamma) Functions at Their Singularities*, [Integral Transforms and Special Functions](#), Vol. 22, No. 8, 587-592, 2011.
22. **Anirudh Prabhu**, *Lower Bounds for Odd Perfect Numbers*, [International Journal of Contemporary Mathematics](#), Vol. 2, No. 1-2, 59-68, 2011.

MEDIA COVERAGE

1. Do Neutron Stars Shine in Dark Matter? [PBS Space Time Episode](#), October 18, 2024.
2. *Shrouded in axions*, [EurekAlert!](#), [AlphaGalileo](#), [Princeton Research](#), October 18, 2024.
3. *Axion Clouds Enveloping Pulsars*, [APS Physics](#), October 17, 2024.
4. *Could Axions Help Fast Radio Bursts Escape a Magnetar's Grasp?*, [AAS Nova](#), July 5, 2023.
5. *Pulsars may make dark matter glow*, [Phys.org](#), October 6, 2023.

SELECTED HONORS

<i>John Archibald Wheeler Fellow</i> , Princeton Center for Theoretical Science	2024–
<i>Fletcher Jones Graduate Fellowship</i> , The Fletcher Jones Foundation	2016–2021
<i>NSF Graduate Research Fellowship</i> , The National Science Foundation	2016–2021
<i>Barrett Astrophysics Prize</i> , MIT Department of Physics	2016
<i>Phi Beta Kappa Society</i> , MIT Department of Physics	2016
<i>Society of Physics Students</i> , MIT Department of Physics	2016
<i>Seventh Place</i> , Intel Science Talent Search, Society for Science and the Public	2012

INVITED TALKS & CONFERENCES

<i>TSI Astronomy Seminar (scheduled)</i> , McGill University	February 24, 2026
<i>NHETC Seminar</i> , Rutgers University	November 18, 2025
<i>Cosmology Seminar</i> , Perimeter Institute	October 7, 2025
<i>UNDARK Workshop</i> , Instituto de Astrofísica de Canarias	September 30, 2025
<i>SUSY 2025</i> , UC Santa Cruz	August 21, 2025
<i>Particles vs. New Probes</i> , Flatiron Institute	March 5, 2025
<i>SOTU seminar</i> , Tata Institute for Fundamental Research	February 21, 2025
<i>IDEA seminar</i> , Brown University	February 19, 2025
<i>YITP seminar</i> , Stony Brook University	February 6, 2025
<i>KIPAC seminar</i> , Stanford University	December 2, 2024
<i>Particle Physics seminar</i> , University of Delaware	October 4, 2024
<i>Dark Matter Landscape workshop</i> , Johannes Gutenberg University	September 5, 2024
<i>TeV Particle Astrophysics Conference</i> , University of Chicago	August 28, 2024
<i>Physics and Astrophysics at the eXtreme workshop</i> , King's College London	July 5, 2024
<i>Theoretical High Energy Astrophysics Seminar</i> , Columbia University	April 5, 2024
<i>PCTS Lunchtime Seminar</i> , Princeton University	March 21, 2024
<i>High-energy Physics Seminar</i> , University of California, San Diego	March 12, 2024
<i>Astrophysics Seminar</i> , University of Southern California	March 7, 2024
<i>High-energy Physics Seminar</i> , California Institute of Technology	March 4, 2024
<i>ITC Luncheon Talk</i> , Harvard-Smithsonian Center for Astrophysics	November 16, 2023
<i>High Energy Theory Seminar</i> , University of Minnesota	September 8, 2023
<i>Cosmic Physics Center (CPC) Seminar</i> , Fermilab	June 5, 2023
<i>Astrophysics Coffee Talk</i> , Institute for Advanced Study	May 26, 2023
<i>LCTP Spring Symposium</i> , University of Michigan	May 2, 2023
<i>High Energy Physics Seminar</i> , University of Toronto	April 3, 2023
<i>SITP Wine and Cheese Seminar</i> , Stanford University	February 24, 2023
<i>High Energy Physics Seminar</i> , McGill University	February 13, 2023
<i>PACMAN Seminar</i> , New York University	September 30, 2022
<i>PATRAS Workshop</i> , Johannes Gutenberg University of Mainz	August 8, 2022
<i>Joint Cosmology Seminar</i> , MIT & Tufts	February 8, 2022
<i>Astrophysics Coffee Talk</i> , Institute for Advanced Study	November 29, 2021
<i>Astroparticle Theory Seminar</i> , Max Planck Institute for Physics	November 25, 2021
<i>Bahcall Lunch Talk</i> , Princeton & Institute for Advanced Study	November 23, 2021
<i>Particle Physics Seminar</i> , Perimeter Institute	November 12, 2021
<i>Cosmic Physics Center (CPC) Seminar</i> , Fermilab	October 18, 2021
<i>Elementary Particle Theory Seminar</i> , University of Maryland	September 27, 2021
<i>Theoretical Particle Physics Seminar</i> , Johns Hopkins University	September 13, 2021

<i>PANIC 2021 Conference</i> , Parallel Talk	September 9, 2021
<i>TAUP 2021 Conference</i> , Parallel Talk	August 23, 2021
<i>Particle Theory Seminar</i> , LBNL	June 7, 2021
<i>KIPAC Tea Talk</i> , Stanford University	June 4, 2021
<i>BSM Pandemic Seminar Series</i> , Double Feature Talk	October 27, 2020
<i>SITP Wine and Cheese Seminar</i> , Stanford University	February 21, 2020
<i>SITP Wine and Cheese Seminar</i> , Stanford University	April 28, 2017
<i>Harvard-MIT SPS Research Conference</i> , Invited Talk	September 26, 2015
<i>Kenyon/Dartmouth/MIT Undergrad Cosmology Workshop</i> , MIT	August 11, 2015

PROFESSIONAL ACTIVITY

Member (Affiliated Scientist)

<i>Simons Collaboration on Extreme Electrodynamics of Compact Sources</i>	2023–
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Co-organizer/Host

<i>Cosmology Beyond Lambda CDM</i> (PCTS)	May, 2025
<i>Extreme Physics of Neutron Star Interiors</i> (PCTS)	May, 2025
<i>Dark Cosmos Seminar Series</i> , (Princeton University)	2023–
<i>Astrophysics Coffee</i> , (Princeton University)	2023–
<i>Quantum Probes of Wave-like and Sub-GeV Dark Matter</i> (PCTS)	October, 2023
<i>Cosmological and Astrophysical Probes of New Physics</i> (PCTS)	April, 2022

Referee: EPJC (2021–), PRL (2023–), PRD (2023–), MNRAS (2024–), JHEP (2024–)

TEACHING & MENTORING

Course Instructor

<i>Introductory Physics II</i> (Princeton University)	Spring, 2025
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Teaching Assistant

<i>Mechanics</i> (Stanford University)	Autumn, 2020
<i>Electricity and Magnetism</i> (Stanford University)	Spring, 2020, Winter, 2021
<i>Intermediate Electricity and Magnetism I</i> (Stanford University)	Winter, 2020
<i>Light and Heat</i> (Stanford University)	Autumn, 2019

Students Mentored/Co-mentored*

* Student stage is listed at the time collaboration began.

<i>Nicholas Rapidis</i> , 1st year PhD candidate (Stanford University)	2019–2020
<i>Dion Noordhuis</i> , 2nd year PhD candidate (University of Amsterdam)	2022–2023
<i>Sandip Roy</i> , 3rd year PhD candidate (Princeton University)	2023–
<i>Mariia Khelashvili</i> , visiting 4th year PhD student (Princeton University)	2023–
<i>Hanako Helton</i> , Junior undergraduate student (Princeton University)	2023–2024
<i>Dawei Dai</i> , Undergraduate exchange student (Tsinghua University)	2023–
<i>Jasmine Parsons</i> , 2nd year PhD candidate (Princeton University)	2024–
<i>Andrew Liu</i> , Junior undergraduate student (Princeton University)	2024–
<i>Rohan Arni</i> , Junior high school student (High Technology High School)	2024–
<i>Pierce Giffin</i> , 5th year PhD student (UC Santa Cruz)	2024–

OUTREACH

Co-Writer, PBS SpaceTime Episode “[Do Neutron Stars Shine in Dark Matter?](#)”

I was a co-writer for an episode of PBS Spacetime that highlighted the key findings and implications of my research, making complex scientific concepts accessible to a broad audience.

Co-Host, Princeton Postdoc Podcast

As part of the Princeton Equity, Diversity, & Inclusion Working Group, the Princeton Postdoc Podcast aims to discuss the postdoc experience. [Link to audio.](#)

Participant, Spring into Science Outreach Event

Developed displays and hands-on activities related to theoretical physics for students ages ~9-15 in the Princeton community.