

ANIRUDH (ANI) PRABHU

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ACADEMIC POSITIONS

John Archibald Wheeler Postdoctoral Fellow

Sept. 2022–

Princeton Center for Theoretical Science (PCTS), Princeton University

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. Mariia Khelashvili, Mariangela Lisanti, **Anirudh Prabhu**, & Benjamin Safdi, *An Axion Pulsarscope*, [arXiv:2402.17820](#) *in review*, (Physical Review Letters) (2024).
2. Sandip Roy, Carlos Blanco, Christopher Dessert, **Anirudh Prabhu**, & Tea Temim, *Sensitivity of JWST to eV-Scale Decaying Axion Dark Matter*, [arXiv:2311.04987](#) *in review*, (Physical Review Letters) (2023).
3. Carlos Blanco, Ian Harris, Yonatan Kahn, & **Anirudh Prabhu**, *Constraining Dark Matter-Proton Scattering from Molecular Cloud Ionization*, [Physical Review D 110, 035006](#) (2024).
4. Dion Noordhuis, **Anirudh Prabhu**, Christoph Weniger, & Samuel J. Witte, *Axion Clouds around Neutron Stars*, [Physical Review X 14, 041015](#) (2024).
5. 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.
6. **Anirudh Prabhu**, *Axion-mediated Transport of Fast Radio Bursts Originating in Inner Magnetospheres of Magnetars*, [The Astrophysical Journal Letters](#), **946** L52 (2023).
7. **Anirudh Prabhu** and Carlos Blanco, *Constraints on Dark Matter-Electron Scattering from Molecular Cloud Ionization*, [Physical Review D 108](#), 035035 (2023).
8. 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).

9. Robert Lasenby and **Anirudh Prabhu**, *Dark Matter-Electron Scattering in Materials: Sum Rules and Heterostructures*, [Physical Review D](#) **105**, 095009 (2022).
10. **Anirudh Prabhu**, *Axion Production in Pulsar Magnetosphere Gaps*, [Physical Review D](#) **104**, 055038 (2021).
11. **Anirudh Prabhu**, *Optical Lensing by Axion Stars: Observational Prospects with Radio Astrometry*, [arXiv:2006.10231](#), in review (Physical Review D).
12. **Anirudh Prabhu** and Nicholas Rapidis, *Resonant Conversion of Dark Matter Oscillons in Pulsar Magnetospheres*, [Journal of Cosmology and Astroparticle Physics](#) 10(2020)054.
13. 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).
14. 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).
15. 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).
16. **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.
17. **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
<i>U.S. Navy Scholarship</i>	2012
<i>Third Place, Karl Menger Award</i> , American Mathematical Society,	2012, 2011
<i>Davidson Fellows Scholarship</i> , Davidson Institute	2011

INVITED TALKS & CONFERENCES

<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
<i>Density Perturbation Group Talk</i> , MIT	July 27, 2015
<i>Kenyon/Dartmouth/MIT Undergrad Cosmology Workshop</i> , MIT	August 11, 2014

PROFESSIONAL ACTIVITY

Member (Affiliated Scientist)

Simons Collaboration on Extreme Electrodynamics of Compact Sources 2023–

Co-organizer/Host

Cosmology Beyond Lambda CDM (PCTS) May, 2025

Extreme Physics of Neutron Star Interiors (PCTS) May, 2025

Dark Cosmos Seminar Series, (Princeton University) 2023–

Astrophysics Coffee, (Princeton University) 2023–

Quantum Probes of Wave-like and Sub-GeV Dark Matter (PCTS) October, 2023

Cosmological and Astrophysical Probes of New Physics (PCTS) April, 2022

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

TEACHING & MENTORING

Teaching Assistant

Mechanics (Stanford University) Autumn, 2020

Electricity and Magnetism (Stanford University) Spring, 2020, Winter, 2021

Intermediate Electricity and Magnetism I (Stanford University) Winter, 2020

Light and Heat (Stanford University) Autumn, 2019

Students Mentored/Co-mentored*

* Student stage is listed at the time collaboration began.

Nicholas Rapidis, 1st year PhD candidate (Stanford University) 2019–2020

Dion Noordhuis, 2nd year PhD candidate (University of Amsterdam) 2022–2023

Sandip Roy, 3rd year PhD candidate (Princeton University) 2023–

Mariia Khelashvili, visiting 4th year PhD student (Princeton University) 2023–

Hanako Helton, Junior undergraduate student (Princeton University) 2023–

Dawei Dai, Undergraduate exchange student (Tsinghua University) 2023–

Jasmine Parsons, 2nd year PhD candidate (Princeton University) 2024–

Andrew Liu, Junior undergraduate student (Princeton University) 2024–

Rohan Arni, Junior high school student (High Technology High School) 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.

Guest Speaker, 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.