

## Employment and Education

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|--|-----------|
| <b>UC Berkeley / Lawrence Berkeley National Lab</b><br>Postdoctoral Researcher                         | from 2024 |
| <b>Stanford University</b><br>PhD in Physics (advisor: Natalia Toro)                                   | 2024      |
| <b>Oxford University</b> (New College)<br>MSc in Mathematical and Theoretical Physics with distinction | 2019      |
| <b>Cambridge University</b> (St. John's College)<br>MASt in Mathematics with distinction               | 2018      |
| <b>Massachusetts Institute of Technology</b><br>BS in Physics and Mathematics                          | 2017      |

## Publications

|                   |   |
|-------------------|---|
| <b>2504.02927</b> | Determining Spin-Dependent Light Dark Matter Rates from Neutron Scattering<br>A. Berlin, A. J. Millar, T. Trickle, K. Zhou  |
| <b>2502.01725</b> | Ponderomotive Effects of Ultralight Dark Matter<br>K. Zhou  |
| <b>2312.11601</b> | Physical Signatures of Fermion-Coupled Axion Dark Matter<br>A. Berlin, A. J. Millar, T. Trickle, K. Zhou, JHEP 05, 314 (2024)   |
| <b>2303.04816</b> | Interactions of Particles with “Continuous Spin” Fields<br>P. Schuster, N. Toro, K. Zhou, JHEP 04, 010 (2023)   |
| <b>2209.12901</b> | Discovering QCD-Coupled Axion Dark Matter with Polarization Haloscopes<br>A. Berlin, K. Zhou, Phys. Rev. D 108, 035038 (2023)   |
| <b>2112.02104</b> | Probing Invisible Vector Meson Decays with the NA64 and LDMX Experiments<br>P. Schuster, N. Toro, K. Zhou, Phys. Rev. D 105, 035036 (2022)  |
| <b>2106.09033</b> | Stellar Shocks From Dark Matter Asteroid Impacts<br>A. Das, S. A. R. Ellis, P. Schuster, K. Zhou, Phys. Rev. Lett. 128, 021101 (2022)   |
| <b>2007.15656</b> | Heterodyne Broadband Detection of Axion Dark Matter<br>A. Berlin, R. T. D’Agnolo, S. A. R. Ellis, K. Zhou, Phys. Rev. D 104, L111701 (2021)   |
| <b>1912.11048</b> | Axion Dark Matter Detection by Superconducting Resonant Frequency Conversion<br>A. Berlin, R. T. D’Agnolo, S. A. R. Ellis, C. Nantista, J. Neilson,<br>P. Schuster, S. Tantawi, N. Toro, K. Zhou, JHEP 07, 088 (2020) |

- 1704.06266** Casimir Meets Poisson: Improved Quark/Gluon Discrimination with Counting Observables  
C. Frye, A. Larkoski, J. Thaler, K. Zhou, JHEP 09, 083 (2017)
- 1704.05456** Generalized Fragmentation Functions for Fractal Jet Observables  
B. Elder, M. Procura, J. Thaler, W. Wallewijn, K. Zhou, JHEP 06, 085 (2017)
- 1703.04722** Minimum Energetic Cost to Maintain a Target Nonequilibrium State  
J. Horowitz, K. Zhou, J. England, Phys. Rev. E 95, 042102 (2017)

## Community White Papers

- 2203.14923** Axion Dark Matter  
Contributed writing for a subsection, and editing for all sections
- 2203.08192** Current Status and Future Prospects for the Light Dark Matter eXperiment  
Contributed theoretical projections for experimental sensitivity, and figures
- 2203.12714** Searches for New Particles, Dark Matter, and Gravitational Waves with SRF Cavities  
Contributed writing and feedback

## Other Works

- [Physics Olympiad Handouts](#)  
Solo-authored proto-textbook used by students in dozens of countries
- 2411.08283** The surprising subtlety of electrostatic field lines  
K. Zhou and T. Brauner, Am. J. Phys. 93, 234–240 (2025)
- 2203.15821** Comment on “Poynting vector controversy in axion modified electrodynamics”

## Fellowships and Awards

|   |             |
|---|-------------|
| NSF Graduate Research Fellowship                        | 2017 – 2022 |
| Marshall Scholarship                                    | 2017 – 2019 |
| Demuth Prize, New College                               | 2019        |
| Dirac Prize, St. John's College                         | 2018        |
| Finalist, Hertz Fellowship                              | 2017        |
| Joel Matthew Orloff Award for Outstanding Research, MIT | 2017        |
| Honorable Mention, Putnam Mathematical Competition      | 2016, 2017  |
| Gold Medal, International Physics Olympiad              | 2012, 2013  |
| Winner, USA Junior Mathematical Olympiad                | 2011        |

## Seminars

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| <a href="#">Physical Signatures of Fermion-Coupled Axion Dark Matter</a>   |      |
| UC Davis “Xperiment” Seminar   | 5/25 |
| University of Chicago Particle Theory Seminar                              | 4/25 |
| UC Berkeley “4D” Seminar   | 8/24 |
| Flatiron Institute, Particle Astrophysics and Cosmology Meeting Around NYC | 4/24 |

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| University of Geneva High Energy Particle Physics Seminar | 3/24  |
| HEP/Astro Results Forum                                   | 3/24  |
| SLAC Theory Seminar                                       | 11/23 |

#### Electromagnetism and Gravity with Continuous Spin

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| UIUC High Energy Physics Seminar                      | 10/24 |
| Hunting Invisibles (HIDDeN) Virtual Institute Seminar | 11/23 |
| Caltech High Energy Physics Seminar                   | 10/23 |
| UC Santa Cruz SCIPP Seminar                           | 10/23 |
| University of Maryland EPT Seminar                    | 9/23  |
| ICTP HECAP Seminar                                    | 7/23  |
| CERN BSM Forum  | 6/23  |
| UC Davis QMAP Particle/Cosmology Seminar              | 4/23  |
| UC Berkeley "4D" Seminar                              | 4/23  |
| Stanford Phenomenology Seminar                        | 2/23  |
| Perimeter Institute Theory Seminar                    | 10/22 |

#### Discovering the QCD Axion with Polarization Haloscopes

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|---------------------------------------|-------|
| Fermilab Theory Seminar               | 4/23  |
| TRIUMF Theory Seminar                 | 10/22 |
| University of Victoria Theory Seminar | 10/22 |

#### Flashes in the Dark: New Searches for Axions and Macroscopic Dark Matter

|                              |      |
|------------------------------|------|
| Johns Hopkins Theory Seminar | 9/22 |
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#### Searching for Ultraheavy and Ultralight Dark Matter

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| SLAC Theory Seminar | 3/22 |
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#### Heterodyne Detection of Axion Dark Matter

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| Virtual Axion Institute | 8/20 |
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## Conferences and Workshops

#### Physical Signatures of Fermion-Coupled Axion Dark Matter

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| Phenomenology 2024 Symposium | 5/24 |
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#### Discovering the QCD Axion with Polarization Haloscopes

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| 18th Patras Workshop on Axions, WIMPs and WISPs | 7/23 |
| Phenomenology 2023 Symposium                    | 5/23 |

#### Probing Dark Sectors With Invisible Vector Meson Decays

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| Phenomenology 2022 Symposium                     | 5/22  |
| APS April Meeting 2022                           | 4/22  |
| ILC Workshop on Potential Experiments (ILCX2021) | 10/21 |

#### Stellar Shocks From Dark Asteroids

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| 24th International Conference on Particle Physics and Cosmology (COSMO'21) | 8/21 |
| APS Division of Particles & Fields Meeting (DPF21)                         | 7/21 |
| Phenomenology 2021 Symposium   | 5/21 |

## Proposals

### [An SRF Cavity for Dark Matter Axion Detection](#)

2022 – 2024

- SLAC LDRD grant, with principal investigator Zenghai Li
- Participated in design discussions, writing and editing of proposal and progress updates

## Outreach and Service

### U.S. Physics Olympiad

2015 – 2024

- [Wrote and edited](#) the largest physics competition in the United States (6,000 participants)
- Taught classes on problem solving and lab skills to finalists at annual training camps
- Directed the theoretical training of the U.S. traveling team from 2021 to 2024

### Physics StackExchange

2014 – 2020

- Wrote 1,000 [answers](#) for questions on all fields of physics, with 2.5 million total views

### Press coverage

2022

- Participated in several interviews for “Stellar Shocks From Dark Matter Asteroid Impacts” (Altmetric score of 200+, in top 1% of Physical Review Letters)

### National Science Bowl

2023 – 2024

- Wrote and edited physics questions for the U.S. Department of Energy’s flagship middle school and high school outreach event (~10,000 participants)

### Department service

- Co-organized the Berkeley/LBNL particle theory seminar Spring 2025
- Served as student representative for the physics department’s Graduate Studies Committee 2023
- Participated on various panels for undergraduates and incoming graduate students 2020

### Local outreach

- Mentored a local undergraduate research intern Summer 2024
- Judged research presentations for the US Invitational Young Physicists Tournament 2023
- Taught high school students at “Splash” events at MIT, Oxford, and Stanford 2013 – 2019

### Peer review

- Refereed research papers for *JHEP*, *Phys. Rev. D*, and *Nature Communications*
- Refereed pedagogical papers and books for *Am. J. Phys.*, *Cambridge University Press*, and *World Scientific*

## Teaching and Education

### [Humanity’s Last Exam](#)

2025

- Contributed some tough physics problems to help benchmark AI, interviewed in [New York Times](#)

### Physics 230: Graduate Quantum Mechanics I

2024

### Physics 120: Intermediate Electricity and Magnetism I

2023

### Physics 330: Quantum Field Theory I

2022

- Ran weekly sections and office hours; helped write, edit, solve, and grade [new problem sets](#)