

Education

Stanford University PhD in Physics (advisor: Natalia Toro)	2019 – June 2024 (expected)
Oxford University (New College) MSc in Mathematical and Theoretical Physics with distinction	2018 – 2019
Cambridge University (St. John's College) MASt in Mathematics with distinction	2017 – 2018
Massachusetts Institute of Technology BS in Physics and Mathematics	2013 – 2017

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

Publications

2303.04816	Interactions of Particles with “Continuous Spin” Fields P. Schuster, N. Toro, K. Zhou, JHEP (2023)
2209.12901	Discovering QCD-Coupled Axion Dark Matter with Polarization Haloscopes A. Berlin, K. Zhou
2112.02104	Probing Invisible Vector Meson Decays with the NA64 and LDMX Experiments P. Schuster, N. Toro, K. Zhou, Phys. Rev. D (2022)
2106.09033	Stellar Shocks From Dark Matter Asteroid Impacts A. Das, S. A. R. Ellis, P. Schuster, K. Zhou, Phys. Rev. Lett. (2022)
2007.15656	Heterodyne Broadband Detection of Axion Dark Matter A. Berlin, R. T. D’Agnolo, S. A. R. Ellis, K. Zhou, Phys. Rev. D (2021)
1912.11048	Axion Dark Matter Detection by Superconducting Resonant Frequency Conversion A. Berlin, R. T. D’Agnolo, S. A. R. Ellis, C. Nantista, J. Neilson, P. Schuster, S. Tantawi, N. Toro, K. Zhou, JHEP (2020)

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

Talks

Electromagnetism and Gravity with Continuous Spin

ICTP HECAP Seminar	7/2023
CERN BSM Forum	6/2023
UC Davis QMAP Particle/Cosmology Seminar	4/2023
UC Berkeley "4D" Seminar	4/2023
Stanford Phenomenology Seminar	2/2023
Perimeter Institute Theory Seminar	10/2022

Discovering the QCD Axion with Polarization Haloscopes

18th Patras Workshop on Axions, WIMPs and WISPs	7/2023
Phenomenology 2023 Symposium	5/2023
Fermilab Theory Seminar	4/2023
TRIUMF Theory Seminar	10/2022
University of Victoria Theory Seminar	10/2022

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

Johns Hopkins Theory Seminar	9/2022
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Probing Dark Sectors With Invisible Vector Meson Decays

Phenomenology 2022 Symposium	5/2022
APS April Meeting 2022	4/2022
ILC Workshop on Potential Experiments (ILCX2021)	10/2021

Searching for Ultraheavy and Ultralight Dark Matter

SLAC Theory Seminar	3/2022
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Stellar Shocks From Dark Asteroids

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

Heterodyne Detection of Axion Dark Matter

Virtual Axion Institute	8/2020
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Teaching

Physics 120: Intermediate Electricity and Magnetism I	2023
Physics 330: Quantum Field Theory I	2022
<ul style="list-style-type: none"> Ran weekly sections and office hours; helped write, edit, solve, and grade new problem sets 	

Outreach

U.S. Physics Olympiad	2015 – present
<ul style="list-style-type: none">• Wrote and edited the largest physics competition in the United States (6,000 participants)• Developed 1,000 pages of original learning materials, used by students around the world• Taught classes on problem solving and lab skills to finalists at annual training camps• Traveled as deputy leader of the U.S. delegation for the 2023 International Physics Olympiad	
Physics StackExchange	2014 – 2020
<ul style="list-style-type: none">• Wrote 1,000 answers for questions on all fields of physics, with over 2 million total views	
Press coverage	2022
<ul style="list-style-type: none">• Participated in several interviews for “Stellar Shocks From Dark Matter Asteroid Impacts” (Altmetric score of 200+, in top 1% of PRL outputs)	
National Science Bowl	2022
<ul style="list-style-type: none">• Wrote and edited physics questions for the U.S. Department of Energy’s flagship middle school and high school outreach event (~10,000 participants)	
Local outreach, service, and department activities	
<ul style="list-style-type: none">• Taught high school students at six “Splash” events at MIT, Oxford, and Stanford, e.g. on quantum cryptography, dimensional analysis, and particle detectors	2013 – 2019
<ul style="list-style-type: none">• Participated on various panels for undergraduates and incoming graduate students	2020
<ul style="list-style-type: none">• Presented ~10 papers at Stanford and SLAC journal clubs	2020 – 2022
<ul style="list-style-type: none">• Judged research presentations for the US Invitational Young Physicists Tournament	2023