

# JYOTIRMAI SINGH

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## EDUCATION

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<b>Stanford University</b>	2019 – Present
Ph.D. Physics	
M.S. Physics	2022
<b>University of California, Berkeley</b>	2015 – 2019
B.A. Physics	GPA 3.99/4.00
<i>Highest Honors in Physics, Highest Distinction in General Scholarship, 2018 Phi Beta Kappa</i>	

## RESEARCH EXPERIENCE

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<b>Graduate Student Researcher, Stanford University</b>	09/2019 – Present
<i>Advisor: Kent Irwin</i>	<i>Stanford, CA</i>
<ul style="list-style-type: none"><li>· Building experiments to measure quantum backaction noise of dc Superconducting Quantum Interference Device (SQUID) sensors in the RF frequency range.</li><li>· Created superconducting RF resonators with quality factors <math>Q \sim 10^5 - 10^6</math> for use in 4K and dilution refrigerator environments.</li><li>· Developing next generation phase sensitive amplifiers with quantum enhanced sensitivity for signals below 300 MHz.</li><li>· Integrating quantum sensor readout package in the DMRadio experiment search for axion dark matter.</li></ul>	
<b>Undergraduate Researcher, Lawrence Berkeley National Laboratory</b>	11/2015 – 05/2019
<i>Advisor: Gabriel Orebi Gann</i>	<i>Berkeley, CA</i>
<ul style="list-style-type: none"><li>· Studied the optical properties of Tetraphenyl Butadiene (TPB) in the VUV spectrum in liquid argon (LAr) scintillator for future LArTPC experiments in Honours Thesis.</li><li>· Produced analysis code that enabled simultaneous propagation of uncertainties in position/energy resolutions for low and high neutron energy regimes at the Sudbury Neutrino Observatory.</li></ul>	
<b>Undergraduate Researcher, SuperCDMS Collaboration, UC Berkeley</b>	06/2018 – 05/2019
<i>Advisor: Matt Pyle</i>	<i>Berkeley, CA</i>
<ul style="list-style-type: none"><li>· Developed algorithms to simulate new phonon physics in the SuperCDMS Monte Carlo, such as surface reflection downconversion.</li><li>· Optimised SuperCDMS Monte Carlo by implementing diffusive propagation of phonons to achieve substantial speedup.</li></ul>	

## AWARDS/HONOURS

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Quad Fellowship (\$50,000)	2023-24
Student Presentation Award - APS Group on Instrument & Measurement Science	2021
Isidore Pomerantz Scholarship (\$1000) - Department of Physics, UC Berkeley	2018
Berkeley Physics Undergraduate Research Scholar - Department of Physics, UC Berkeley	2017
Kraft Award for Freshmen - UC Berkeley	2015

## PEER-REVIEWED PUBLICATIONS

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[Google Scholar](#)

1. **G4CMP: Condensed Matter Physics Simulation Using the Geant4 Toolkit**  
M. H. Kelsey *et al.* [Nuclear Inst. and Methods in Physics Research, A 1055, 168473 \(2023\)](#)
2. **Quantum metrology of low frequency electromagnetic modes with frequency upconverters**  
S. E. Kuenstner, E. C. van Assendelft, S. Chaudhuri, H. M. Cho, J. Corbin, S.W. Henderson, F. Kadribasic, D. Li, A. Phipps, N.M. Rapidis, M. Simanovskaia, J. Singh, C. Yu, K. D. Irwin, [arXiv:2210.05576 \(2022\)](#)
3. **Projected Sensitivity of DMRadio-m<sup>3</sup>: A Search for the QCD Axion Below 1  $\mu$ eV**  
L. Brouwer *et al.* (DMRadio Collaboration), [Phys. Rev. D 106, 103008 \(2022\)](#)
4. **Proposal for a definitive search for GUT-scale QCD axions**  
L. Brouwer *et al.* (DMRadio Collaboration), [Phys. Rev. D 106, 112003 \(2022\)](#)
5. **Measurement of neutron production in atmospheric neutrino interactions at the Sudbury Neutrino Observatory**  
B. Aharmim *et al.* (SNO Collaboration), [Phys. Rev. D 99, 112007 \(2019\)](#)

## SCIENTIFIC TALKS

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| 1. <b>LC Resonators in the DM Radio 50L Experiment</b><br>APS April Meeting 2021                 | 04/2021 |
| 2. <b>Precision Metrology with Radiofrequency Quantum Upconverters</b><br>APS March Meeting 2021 | 03/2021 |

## OTHER PUBLICATIONS

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1. **Investing in the future of Indian Science**  
J. Singh, P. Shah, [Observer Research Foundation \(2022\)](#)

## PROFESSIONAL AFFILIATIONS

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|---|----------------|
| 1. <b>Q-NEXT National Quantum Information Science Research Center</b> | 2021 – Present |
| 2. <b>Kavli Institute for Particle Astrophysics and Cosmology</b>     | 2021 – Present |

## SKILLS

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<b>Programming Languages</b>	Python, Java, C++, HTML/CSS
<b>Natural Languages</b>	Native: English, Hindi Intermediate Proficiency: French
<b>Tools</b>	Git, Vim, ROOT, L <sup>A</sup> T <sub>E</sub> X, SolidWorks, Machining Tools (Mill, Lathe etc.)

## SERVICE

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|---|-----------------------------------|
| <b>Mentorship Chair</b><br><i>Phi Beta Kappa Northern California Chapter</i>  | 08/2022 – 08/2023<br>Stanford, CA |
| · Established the first ever mentorship program for PBK's Northern CA chapter, helping young professionals expand their networks and get guidance from experienced PBK members. |                                   |
| <b>Councilor, Natural Sciences Representative</b><br><i>Stanford Graduate Student Council</i>   | 05/2021 – 04/2022<br>Stanford, CA |
| · Advocated for the interests of natural sciences and international graduate students.  |                                   |
| · Achieved significant concessions on affordability, including fully subsidised health insurance for PhD students across all departments.                                       |                                   |

## TEACHING EXPERIENCE

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| <b>Teaching Assistant, Stanford University Department of Physics</b><br><i>PHYS 45: Thermodynamics and Optics</i> | 09/2023 – 12/2023<br>Stanford, CA |
| · Teaching Assistant for PHYS 45 taught by Prof. Patrick Hayden.  |                                   |

**Teaching Assistant, Stanford University Department of Physics**

*PHYS 43: Electricity and Magnetism*

03/2020 – 06/2020

Stanford, CA

- Teaching Assistant for PHYS 43 taught by Prof. Mark Kasevich.

**Grader, UC Berkeley Department of Physics**

*PHYS 5B: Introductory Electromagnetism, Waves, and Optics*

03/2018 – 05/2018

Berkeley, CA

- Graded problem sets for Physics 5B, taught by Prof. Jonathan Wurtele.

**Tutor, Computer Science Mentors at Berkeley**

*CS 61B: Data Structures*

02/2017 – 05/2017

Berkeley, CA

- Tutor for UC Berkeley's introductory Data Structures class, taught by Prof. Josh Hug.
- Held weekly sessions which involved presenting course topics and helping students with problems and conceptual questions.