JYOTIRMAI SINGH

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EDUCATION

Stanford University September 2019-Present
Ph.D. Physics

University of California, Berkeley August 2015-May 2019
B.A. Physics GPA 3.99/4.00
Departmental Honours and Highest Distinction in General Scholarship

RESEARCH EXPERIENCE

Honours Thesis Project, Lawrence Berkeley National Laboratory May 2018-May 2019
Undergraduate Researcher *Berkeley, CA*

- Studying the optical properties of Tetraphenyl Butadiene (TPB) to better understand its behaviour in the VUV spectrum in vacuum and liquid argon (LAr) scintillator.
- Created Monte Carlo simulation for experiment to model optical properties of TPB, such as reflectivity and wavelength shifting.

SuperCDMS Collaboration, UC Berkeley June 2018-Present
Undergraduate Researcher *Berkeley, CA*

- Analysing acoustic and optical phonon behaviour as part of preliminary work concerning new nuclear-recoil detection based higher sensitivity dark matter detector designs.
- Developed algorithms to simulate new phonon physics in the SuperCDMS Monte Carlo, such as surface reflection downconversion.
- Optimised SuperCDMS Monte Carlo by implementing diffusive propagation of phonons to achieve substantial speedup.

SNO Collaboration, Lawrence Berkeley National Laboratory June 2016-May 2018
Undergraduate Researcher *Berkeley, CA*

- Measured neutron production from atmospheric neutrino interactions at the Sudbury Neutrino Observatory.
- Investigated efficiency of energy fitters and propagated low energy systematic uncertainties through the atmospheric event analysis.
- Combined low and high energy systematic uncertainty propagation to create new analysis code that enables simultaneous propagation of uncertainties in position/energy resolutions for low and high regimes.
- Calibrated atmospheric neutrino event selection criteria to optimise event selection efficiencies.

SNO+ Collaboration, Lawrence Berkeley National Laboratory November 2015-June 2016
Undergraduate Researcher *Berkeley, CA*

- Focused on analytic work regarding the SNO+ detector, primarily on simulations which aid in error analysis and position/energy reconstructions.
- Evaluated multiple bias and resolution characterisations of detector sensitivity to determine which was best for the detector.
- Created a substantially simpler script-based analysis code to assess bias and resolution residuals for a full characterization of particle energies/positions.

AWARDS/HONOURS

Phi Beta Kappa Society (inducted as junior) - UC Berkeley — May 2018
Isadore Pomerantz Scholarship - Department of Physics, UC Berkeley — October 2018
Berkeley Physics Undergraduate Research Scholar - Department of Physics, UC Berkeley — February 2017
Dean's Honours List - UC Berkeley — December 2015–May 2018
Kraft Award for Freshmen - UC Berkeley — December 2015
Silver Medal - British Physics Olympiad — June 2014

PUBLICATIONS

1. **Measurement of neutron production in atmospheric neutrino interactions at the Sudbury Neutrino Observatory**
   B. Aharmim *et al.* (SNO Collaboration), arXiv:1904.01148.

SKILLS

Programming Languages	Python, Java, C++, Scheme, R, SQL, HTML/CSS
Languages	Native: English, Hindi Intermediate Proficiency: French Elementary Proficiency: Turkish, Persian
Tools	Git, Vim, ROOT, Mathematica, LabVIEW, LaTeX

ORGANISATIONAL INVOLVEMENT

Quantum Computing at Berkeley — February 2018-Present
VP of Research Communication — *Berkeley, CA*

- Responsible for content on QCB's website focusing on conveying the latest advances in quantum computing to a lay audience.
- Authored introductory articles on quantum mechanics and computing for the club's membership.
- Previously taught members about fundamentals of quantum computing such as qubits and gates, with the goal of helping them implement their own N-qubit register.

Undergraduate Lab at Berkeley — October 2017-May 2018
Mentor - Particle Physics — *Berkeley, CA*

- ULAB is a research lab run entirely by undergraduates who direct their own research projects under guidance from experienced mentors. Winner of the annual Big Ideas @ Berkeley contest in 2017.
- Advisor for the ULAB particle physics lab. Led a project titled *Designing an Electromagnetic Shield to Block Secondary Cosmic Rays*, giving students support with detector design and manufacture.

TEACHING EXPERIENCE

UC Berkeley Department of Physics — March 2018-May 2018
Reader, PHYS 5B: Introductory Electromagnetism, Waves, and Optics — *Berkeley, CA*

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

Computer Science Mentors at Berkeley — February 2017-May 2017
Tutor, CS 61B: Data Structures — *Berkeley, CA*

- Served as a 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 while answering conceptual questions.
- Given a 4.7/5 average rating by students.