Anisha Yeddanapudi

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Education

University of California, Berkeley: B.A. in Applied Math and Physics with a concentration in Solid State Physics

GPA: 3.75/4.00

Expected Graduation: May 2024

Related Coursework: Linear Algebra, Complex Analysis, Introduction to PDEs and ODEs, Solid State Physics, Instrumentation Lab

San Joaquin Delta College: Concurrent enrollment during high school

Work Experience

Research

JAN 2022 - MAY 2023

Analytis Lab: University of California, Berkeley

4Hb-$TaS_{2-x}Se_x$ Synthesis Analysis

Advisors: Prof. James Analytis (PI), Dr. Ryan Patrick Day

Following the recent trend of papers synthesizing samples of 4Hb-TaS_2 with small amounts of Selenium, these crystals have demonstrated new properties such as residual linear heat capacity below the superconducting transition temperature and the breaking of time-reversal symmetry in the superconducting phase. Originally, 4Hb showed only filamentary superconductivity, the addition of Se has resulted in the development of entirely new properties, and my goal was to further study this material within this new context.

- Synthesized batches of 4Hb-$TaS_{2-x}Se_x$ and characterized using Powder X-Ray Diffraction
- Analyzed superconducting transition using electric transport and magnetometry measurements
- Addressed the breaking of time-reversal symmetry using optical Kerr microscopy
- Conducted thermal transport measurements (using dilution fridge at ultralow temperatures) to explore residual heat capacity at superconducting state

JAN 2022 - PRESENT

Kolomensky Lab: University of California, Berkeley

CUORE (Cryogenic Underground Observatory for Rare Events)

Advisor: Prof Yury G. Kolomensky (PI), Dr. Erin V. Hansen

Currently working to classify the energy escape events based on topology to better understand the energy reconstruction biases as a function of energy and the position of escape events inside the TeO_2 crystals operated by CUORE. By analyzing these events we will be able to understand the energy bias present in these detectors and move closer to finding neutrino-less double beta decay.

- Organized the calibration data collected from various energy events
- Extracted the relationships between crystal position topology and event energy for varying multiplicities
- Completion of this project would result in a Senior Honors Thesis paper

CUPID (CUORE with Upgraded Particle Identification)

Advisor: Prof Yury G. Kolomensky (PI), Dr. Erin V. Hansen

To analyze the neutron-induced gamma ray background of ^{100}Mo an experiment was conducted at TUNL where tandem beams of 4-8 MeV were targeted at varying samples of ^{100}Mo, ^{56}Fe, and Cu. HPGe detectors were used to catch any forms of decay. We analyzed the TOF (Time of Flight) data for ^{100}Mo and ^{56}Fe to determine the neutron-^{100}Mo cross sections.

- Evaluated major gamma-ray spectra for contributions from ^{100}Mo, ^{56}Fe, and a mixed gamma source.
- Collaborated with fellow researchers to fit gamma spectra using LANL GoodFit and calculate ^{100}Mo cross-sections from neutron-^{56}Fe cross sections.
- Publication of this work is expected in Physical Review C (late 2023)

JAN 2022 - PRESENT

Nanotech Lab At Berkeley: University of California, Berkeley

Advisor: Prof. Waqas Khalid (PI)

Worked on nanostructure based devices to develop a multi-analyze sensor platform along with carbon nanotube based biosensors, chip holder/interface, custom electronics, and software for data processing.

- Designed a microfluidics pump using CAD to develop a self-contained carbon nanotube based biosensor (specifically to be used for Kidney Dialysis).
- Developed the theoretical framework for the biosensors and energy storage devices.
- Designed a GUI using Rust to assist in data collection and analysis for all carbon nanotube devices.
- Currently creating the software for controlling the e-beam lithography set-up.

SUMMER 2023

Garcia Lab: University of California, Berkeley
Gene Regulatory Input-Output Function
Advisor: Prof. Hernan Garcia (PI), Yasemin Kirisciogl

Currently, the study of the cell input-output function has been focused in fixed tissue, which means that the embryo is fixed in time using various solutions and data is collected. There are benefits to this approach, but we are unable to study the change and conservation of the input-output function. So, I worked to understand the information transfer and regulation between genes Bicoid and Hunchback over a variation of specific parameters.

- Imaged developing fly embryos using the Leica microscope
- Used Fiji/Weka's Image Analysis pipeline to extract the data for graphing various input-output function
- Analyzed the changes within the (sometimes fitted) input-output functions when varying time and the anterior-posterior position across the embryo.

Teaching & Mentoring

AUG 2023-PRESENT

Undergraduate Lab at Berkeley[1] (ULAB): University of California, Berkeley
As an undergraduate research mentor, part of the ULAB program, I led discussions on research topics, created lecture presentations, and guided freshman researchers through their respective projects.

- Understanding and Analyzing Variations within the Delayed-Choice Quantum Eraser Experiment

NOV 2023

Splash at Berkeley[2]: University of California, Berkeley
As a undergraduate lecturer, part of the SPLASH program, I developed and presented a class on Linear Algebra and it's various applications in physics applicable to incoming high school Seniors and Juniors. Here are my lecture notes and presentation.

Software

SUMMER 2022

MetaMahaw
Developed the front end using CSS/HTML and Javascript for a cryptocurrency and metaverse startup.

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[1] https://ulab.berkeley.edu/labs/physics

[2] https://berkeley.learningu.org/teach/splash.html

Publications & Presentations

Conference Talks

OCT 2022

Fall Meeting of the Division of Nuclear Physics of the American Physical Society (CEU22): New Orleans, LA

S. Puranam, and **A. Yeddanapudi,** (October 2022). *Measurements of Neutron-Induced Gamma Ray Background of 100Mo for CUPID.*

Measurements of Neutron-Induced Gamma Ray Background of ^{100}Mo for CUPID [Poster]

S. Puranam, and **A. Yeddanapudi**. Fall Meeting of the Division of Nuclear Physics of the American Physical Society. Oct 27-30, 2022. Hyatt Regency Hotel, New Orleans, LA

Other Works

Determining the Verdet Coefficient of Olive Oil with Faraday Rotation [Poster]

M. Dharmawan, S. Mogan, O. Khoshsorour, **A. Yeddanapudi,** & T. Zhou. Undergraduate Lab at Berkeley Poster Symposium. May 3, 2022. University of California, Berkeley, Berkeley, CA

Physics for All [Book]

A. Yeddanapudi. ASIN: B08P9857QS

Developed an introductory level physics novel, published via Amazon, to help students understand basic concepts without an over reliance on complicated mathematics.

Honors & Awards

Selected Honors

UC Berkeley Physics Graduate with Honors - in progress

Completion of the UC Berkeley Honors Program in Physics required:

- Completion of 2 semesters of research
- Enrollment in Physics H195A, H195B, and H190 seminar
- Maintain a GPA of higher than 3.3
- Complete an Honors Thesis approved by a Physics Advisor

Berkeley Physics-and-Astronomy Undergraduate Research Scholar - awarded October 2023

A monetary stipend provided by the UCB Physics Department to students who show exceptional interest in research which culminates in a research paper, authorship on a published paper, or senior thesis.

Travel Grant through APS DNP - awarded October 2022

The Division of Nuclear Physics (DNP) of the American Physical Society (APS) provides a limited number of travel grants to students presenting as part of Conference Experience for Undergraduates (CEU).