JOSHUA A. APANAVICIUS

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EDUCATION

Indiana University Bloomington *August 2015 - May 2019*
B.S. in Physics *with Honors & Distinction*
B.S. in Mathematics *with Distinction*

COMPUTER SKILLS

Computer Languages	Python, SQL, Bash
Software & Tools	LaTeX, Excel, Mathematica, LabVIEW, Linux, Git, TensorFlow, Keras, scikit-learn

EXPERIENCE

Brookhaven National Laboratory January - April 2020
Quantum Computing *Science Undergraduate Laboratory Internships (SULI)*

- Used the hierarchy of Hamiltonian approach along with the Quantum Information Software Kit (QISKit) from IBM to implement the Variational Quantum Eigensolver (VQE) algorithm to calculate bound energy states of the Morse potential on a quantum computer.
- Gained experience in computational physics, quantum computing, software development.

Los Alamos National Laboratory August - December 2019
Magnetic Impurity Detection for nEDM Experiments *SULI*

- Aided in design, fabrication, & construction of an apparatus capable of detecting magnetic impurities in copper on the order of femtotesla.

Snow Research Group May - August 2019
Axion Resonant InterAction Detection Experiment (ARIADNE) *Post-Undergraduate Research*

- Collaborative effort to search for the QCD Axion using techniques based on Nuclear Magnetic Resonance.
- Designed & built insulation for helium three cryostat.
- Adapted resonating circuit to achieve meta-stable helium three plasma.
- Performed simulations in COMSOL to model thermodynamic variations in a glass tube placed in a Helium three cryostat.

SRI International May 2018 - July 2018
Ultra-Fast PCR *Research Experience for Undergraduates (REU)*

- Aided in the development and testing of a device that performs ultra-fast quantitative real time PCR.
- Gained experience with wet chemistry, instrumentation, and running/debugging LabVIEW virtual instruments.

Snow Research Group May 2015 - April 2019
Short Range Exotic Gravity *Undergraduate Research*

- Aided in the planning, design, development, and construction of a scientific apparatus used in a search for short range exotic gravity as well as other exotic forces.
- Provided experience working in a professional physics lab, as well as an extensive introduction to CAD software such as Autodesk Inventor and Fusion 360.

Snow Research Group May 2015 - April 2019
Gravity Refractometry *Undergraduate Research*

- Used previously measured neutron scattering lengths for heavy nuclei to try and show small effects of short range Yukawa Interactions consistent with short range exotic gravity.
- Provided me with a lot of experience in neutron optics, as well as various software tools such as Python & Mathematica.

PUBLICATIONS

Cornell Physics arXiv (arXiv:1910.14271v1) 2019

"Internal Consistency of Neutron Coherent Scattering Length Measurements from Neutron Interferometry and from Neutron Gravity Reflectometry for Exotic Yukawa Analyses"

Indiana University Journal of Undergraduate Research (IUJUR) 2017

"A Proposed Experiment to Test Spin-Dependent Effects Beyond Einstein's Theory of Gravitation: The Pound-Rebka Experiment with Spin"

Proceedings of the 7th Meeting on CPT & Lorentz Symmetry (CPT'16), 268 2016

"An Angstrom-Scale Short-Range Yukawa-Interaction Search using Neutron Interferometry and the Neutron Fizeau Effect"

AWARDS

Jesse H. & Beulah Chanley Cox Engagement Scholarship (Full Ride) *2015*

RELEVANT PHYSICS & MATH COURSES

Physics Courses
Intro. to Newtonian Mechanics & EM
Modern Physics
Statistical Mechanics & Thermodynamics
Theory of Electricity & Magnetism (I & II)
Analytical Mechanics (I & II)
Quantum Mechanics (I & II)
Modern Optics
Applied Physics Instrumentation Lab

Math Courses
Calculus I, II, III, & IV
Ordinary Differential Equations (I & II)
Linear Algebra
Numerical Analysis
Real Analysis
Complex Variables
Probability Theory

POSITION OF RESPONSIBILITY

Advocate for Community Engagement (ACE) August 2015 - May 2019
Community Outreach *Indiana University Bloomington*

- Served as a liaison between Indiana University & local non-profit organization People and Animal Learning Services (PALS)
- In charge of multiple administrative tasks such as tracking & recording volunteer hours
- Worked 8 to 10 hours a week organizing and facilitating service learning partnerships between PALS and students in service learning courses offered at IU.