Keaten Wood

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Phd in Physics, Cosmology
Arizona State University
Expected May 2027

B.S. in Physics and Mathematics
Barrett, the Honors College at Arizona State University
May 2022

Graduate Research Assistant
Arizona State University (Dr. William Terrano)
May 2021 - Present

- Directing the design and optimization of a high-sensitivity Rb-Xe-He comagnetometer for dark matter and axion searches.
- Constructing a superconducting SQUID magnetometer system tailored for precision cosmological measurements and supernova detection experiments.
- Developed quantum topography techniques to measure transverse and longitudinal components of spin species in a single probe beam magnetometer.
- Write and maintain full density matrix simulation in Python incorporating rubidium, xenon, and non-uniform cell pumping to compare with experimental data.
- Analytically derived a new class of state-transition pulses capable of simultaneously preparing two ensembles that cannot be addressed independently, and wrote numerical code to make these pulses robust to error.
- Designed magnetic shielding using Solidworks, CST Studio, Python, and analytic calculations to mitigate Johnson noise in SQUID experiments.
- Engineered custom laboratory infrastructure, including environmental monitoring and data visualization tools.

Theoretical Cosmology Researcher
Arizona State University (Dr. William Terrano)
Fall 2023 - Present

- Investigating particle evolution and calculating Next-to-Leading-Log (NLL) corrections to stochastic inflation in de-Sitter space.
- Developed a novel technique utilizing group-theoretic arguments to resum the NLL equation of motion to all orders in interaction strength, generalizable to NNLL and beyond.
- Derived explicit Feynman rules for in-in diagrams under the formalism constructed in Baumgart and Sundrum (2019) to address IR physics dependence.

Research Collaborator (Xe129 EDM)
Los Alamos National Lab
May 2022 - Present

- Assisting in searches for CP violation to probe Baryogenesis and potential axion existence.
- Conducted calculations for signal-to-noise ratios in SQUID pickup coils.
- Traveled on-site to assist with experiment construction and baseline magnetic noise measurements.