

Workshop on the intersections of Quantum Information Science and Nuclear Physics

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Quantum Sensing of Fundamental Symmetry-Violating Nuclear Properties

Tuesday, January 13, 2026 10:00 AM (30 minutes)

This talk will describe three types of experiments that use techniques of single quantum state preparation, state engineering, and projective state readout to measure fundamental symmetry-violating properties of nuclei, often at the standard quantum limit of sensitivity. These are:

1. Ongoing experiments to search for parity (P) and time reversal (T) violating nuclear Schiff moments, which are a powerful probe for CP-violating physics beyond the Standard Model (BSM).
2. Ongoing experiments to measure P-violating (PV) nuclear anapole moments, which are poised to provide a broad new data set for understanding the electroweak structure of nuclei in the SM.
3. New experiments to measure the changes in PV nuclear weak charge and/or neutron radius, across a chain of isotopes of the same element. These can probe for BSM physics and/or provide new information on the nuclear equation of state.

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