

Workshop on the intersections of Quantum Information Science and Nuclear Physics

Contribution ID: 6

Type: **not specified**

Quantum Sensing Radiative Decays of Neutrinos and Dark Matter Particles

Thursday, January 15, 2026 12:30 PM (30 minutes)

We present a new approach to search for radiative decays of very weakly interacting particles using quantum sensors. Superconducting transmon qubits and trapped ion systems can detect extremely small electromagnetic signals produced by decay photons. We study two physics cases: dark matter and the cosmic neutrino background. We show that current quantum devices can already probe radiative decays of dark matter, while reaching sensitivity to neutrino magnetic moments will require larger and more coherent quantum systems.

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Session Classification: Session 5