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R&D for Use of Superconducting Qubits as Dark Matter Detectors

Thursday, 9 November 2023 14:00 (15 minutes)

Developments over the last decade have pushed the search for particle dark matter (DM) to new frontiers, including the keV-scale lower mass limit for thermally-produced DM. Galactic DM at this mass is kinematically matched with the energy needed to break a Cooper pair in common superconductors (\sim meV). Quantum sensors such as superconducting qubits are sensitive to these broken Cooper pairs, and can potentially be exploited as low-threshold detectors for particle-like DM scattering. The Quantum Science Center group at Fermilab exploring the use of qubit-based detectors for particle detection in the LOUD surface dilution fridge facility. This talk will discuss recent R&D efforts to understand qubit response to energy depositions through a combination of measurements in LOUD and low-energy G4CMP simulations of our superconducting qubit chips.

Early Career

Yes

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