



Contribution ID: 199

Type: Oral

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

*Thursday, November 9, 2023 2:00 PM (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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**Session Classification:** RDC8

**Track Classification:** RDC Parallel Sessions: RDC8: Quantum and Superconducting Sensors