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Leveraging Quantum Sensors for Dark Matter Detection

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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 ("meV), making quantum sensors ideally-suited for DM detection applications. At Fermilab, we are constructing QUIET, a dedicated, underground quantum sensor test facility, which will be used as part of the Quantum Science Center to deploy quantum detectors in a low-background environment. I will discuss the current state of the field as well as plans to leverage this facility for DM detection down to the lower mass limit for thermal production in the early universe.

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