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Performance of a Silicon SuperCDMS HVeV Detector Operated Underground at NEXUS

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The Super Cryogenic Dark Matter Search (SuperCDMS) experiment uses silicon and germanium calorimeters operating at cryogenic temperatures to search for dark matter interactions. In recent years, SuperCDMS HVeV (high voltage with eV resolution) detectors have enabled searches for sub-GeV dark matter candidates coupling to either nuclei or electrons such as low mass Weakly Interacting Massive Particles, dark photons, and axion-like particles. HVeV detectors are equipped with transition-edge sensors (TESs) connected to superconducting aluminum fins to achieve high-resolution athermal phonon sensing. The excellent phonon resolution enables single-charge sensitivity by applying an electric field across the crystal to achieve phonon-based charge amplification via the Neganov-Trofimov-Luke (NTL) effect. In this talk, I will present the performance of a newly commissioned 1-gram silicon HVeV detector operated at the NEXUS (Northwestern EXperimental Underground Site) facility hosted at Fermilab (Batavia, IL).

Keyword-1

Dark matter search

Keyword-2

SuperCDMS

Keyword-3

Detector R&D

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