

The SuperCDMS experiment at SNOLAB

Wednesday 26 March 2025 10:30 (15 minutes)

The Super Cryogenic Dark Matter Search (SuperCDMS) experiment, currently being installed 2 km underground at SNOLAB Canada, is a collaborative effort to search for low-mass dark matter particles ($<10 \text{ GeV}/c^2$) via direct detection. The experiment utilizes 24 silicon and germanium crystals instrumented with either phonon sensors, called HV detectors, or, phonon and charge sensors, called iZIP detectors. These detectors will be stacked in 4 towers, with each tower containing 6 detectors. The HV detectors operate at high voltage ($\sim 100 \text{ V}$), leveraging the Neganov-Trofimov-Luke effect to amplify phonon signals and achieve a lower energy threshold. The iZIP detectors provide precise discrimination between electronic and nuclear recoils, substantially reducing the background. The combination of these technologies positions SuperCDMS uniquely to explore low-mass, low cross-section dark matter particles.

Installation is set to conclude by mid-2025 and will be followed by the commissioning phase. The first science run is anticipated to begin by late 2025. Additionally, the collaboration recently tested one HV detector tower between October 2023 and February 2024 in the Cryogenic Underground TEst facility (CUTE), located adjacent to the main experimental area at SNOLAB. This talk will provide an overview of the SuperCDMS experiment, its current progress, and key results from the CUTE tower testing.

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Session Classification: SESSION 11: Direct Detection: status of crystalline WIMP detectors