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The SuperCDMS SNOLAB Dark Matter Experiment (I)

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SuperCDMS SNOLAB is a dark matter experiment currently under construction and slated for installation in SNOLAB in 2019. SuperCDMS SNOLAB will use cryogenic silicon and germanium detectors to search for nuclear recoils produced by dark matter particles interacting in the detectors. These nuclear recoils will produce both phonon excitations and ionization (electron/hole pairs) in the detector, which can be read out by sensitive elements on the surface of the detector. Applying a voltage across the detector can amplify the ionization signal into a large phonon signal through the conversion of the charge carriers' kinetic energies into phonon vibrations, greatly lowering the energy threshold of the experiment. This low energy threshold will give SuperCDMS SNOLAB world-leading sensitivity for dark matter particles with masses below $\sim 10 \text{ GeV}/c^2$. SuperCDMS SNOLAB can also search for hypothesized dark photons that produce electrons in the detectors through an analog of the photoelectric effect. In this talk I will review the scientific program of SuperCDMS SNOLAB, its current status, and the latest science results from this unique detection technology.

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