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SuperCDMS IMPACT: an Ionization Yield Calibration Program

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The SuperCDMS collaboration has been developing cryogenic silicon and germanium detectors optimized for phonon signals from dark matter-nucleus collisions. The detectors are sensitive to dark matter masses between about 1 and 10 GeV/c², which corresponds to sub-keV energy deposits from the nuclear recoil signal. The sensitivity of a SuperCDMS high voltage detector is achieved by applying a high voltage across the crystal. Under the electric field, the signal from electron-hole pairs generated from nuclear recoil events is amplified through the Neganov-Trofimov-Luke (NTL) effect. However, the yield of electron-hole pairs, which is critical to reconstructing the energy of the recoiling nucleus, is not well characterized in the sub-keV nuclear recoil energy region. I will describe a neutron scattering experiment called IMPACT (Ionization Measurement with Phonons At Cryogenic Temperatures), which is designed to measure the ionization yield in SuperCDMS style detectors.

Less than 5 years of experience since completion of Ph.D

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