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SuperCDMS IMPACT: Measuring the sub-keV Ionization Yield in Cryogenic Solid-State Detectors

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The SuperCDMS collaboration uses cryogenic silicon and germanium detectors to directly search for dark matter. Dark matter particles in the mass range of 1-10 GeV/c^2 interacting via nuclear recoils would deposit energies below 1 keV. Such interactions produce both phonons and electron-hole pairs. The number of electron-hole pairs produced per unit energy deposited in an electron recoil, called the ionization yield, is a critical quantity for reconstructing the recoil energy and properly modeling the dark matter signal. However, the ionization yield has not been well-characterized for sub-keV nuclear recoils. IMPACT is a neutron scattering measurement campaign that aims to measure the ionization yield in Si and Ge down to 100 eV recoil energies. This talk will describe the first data taking campaign at the Triangle Universities Nuclear Laboratory using a Si detector and present the results obtained from the data.

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