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Silicon and Germanium Ionization Yield Measurements with Neutron Beams

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SuperCDMS SNOLab is using low energy threshold Si/Ge detectors for dark matter direct searches. One mode of operation for the experiment runs detectors in a high-voltage-biased mode, to use Neganov-Luke Amplification. Understanding the ionization yield of low-energy nuclear recoils is essential for interpreting dark matter search data taken in this mode. We present two calibration experiments designed to measure the ionization yield with the CDMS-style detectors in monoenergetic neutron beams. One experiment is performed with an Adiabatic-Demagnetization Refrigerator at the TUNL facility, and the other one with a Dilution Refrigerator in the NEXUS@FNAL facility with a DD neutron generator. In this poster, we show the experimental setups and simulation results of this calibration program.

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