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Charge Transport Phenomena in Detectors of the Cryogenic Dark Matter Search KYLE SUNDQVIST, University of California, Berkeley, CDMS COLLABORATION — The Cryogenic Dark Matter Search (CDMS) seeks to detect putative weakly-interacting massive particles (WIMPS), which could explain the dark matter problem in cosmology and particle physics. By simultaneously measuring the number of charge carriers and the energy in athermal phonons created by particle interactions in intrinsic Ge and Si crystals at a temperature of 40 mK, a signature response for each event is produced. This response, combined with phonon pulse-shape information, allows CDMS to actively discriminate candidate WIMP interactions with nuclei apart from electromagnetic radioactive background which interacts with electrons. The challenges associated with these techniques are unique. Carrier drift-fields are maintained at only a few V/cm, else drift-emitted Luke-Neganov phonons would dominate the phonons of the original interaction. Under such conditions, carrier scattering is dominated by zero-point fluctuations of the lattice ions. It has been an open question how well the 8 Kelvin data prominent in the literature depicts this case. We compare the simulated transport properties of electrons and holes in $< 100 >$ Ge at 40 mK and at 8 K, and apply this understanding to our detectors.

Kyle Sundqvist
University of California, Berkeley

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