Abstract Submitted
for the APR10 Meeting of
The American Physical Society

Monte Carlo of Cryogenic Dark Matter Search large germanium detectors STEVEN LEMAN, KEVIN MCCARTY, MIT, BLAS CABRERA, MATTHEW PYLE, Stanford University, KYLE SUNDQVIST, BERNARD SADOULET, U.C. Berkeley, THE CRYOGENIC DARK MATTER SEARCH COLLABORATION — A description of the Cryogenic Dark Matter Search (CDMS) detector Monte Carlo (MC) is given along with a comparison to calibration data obtained in 3" diameter, 1" thick [100] germanium crystals. Prompt phonons are generated from electron-recoil interactions along with Luke phonons created by charges as they drift through the crystal via our ionization channels' electric field. The MC phonon transport is described by quasidiffusion, which includes anisotropic propagation, isotope scattering and anharmonic decay, until the phonons are absorbed in either the Transition Edge Sensor based phonon channels or lost in surface interactions. Charge creation is a powerful discriminator for electron-recoil and nuclear-recoil events and also surface interaction rejection. Unlike holes, electrons transports obliquely to the electric field in our detectors due to the germanium [100] crystal orientation and the indirect semiconductor band structure. We are improving the agreement between MC and calibration data in different detector designs, which provides a powerful consistency test of our phonon and charge models.

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Date submitted: 26 Oct 2009 Electronic form version 1.4