

Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Geant4 Simulations of SuperCDMS iZip Detector Charge Carrier Propagation and FET Readout ROB AGNESE, University of Florida, SUPERCDMS COLLABORATION — The SuperCDMS experiment aims to directly detect dark matter particles called WIMPs (Weakly Interacting Massive Particles). The detectors collect phonon and ionization energy of incident particles for analysis. The SuperCDMS Detector Monte Carlo group is implementing low temperature phonon and ionization simulations in Geant4 in order to study the response of the detectors to incident events. Phonons and electron-hole pairs are tracked in a low temperature crystal detector. The resulting TES phonon readout, as well as the FET charge readout are simulated. The Geant4 framework is well-suited to these tasks. The charge transport in the presence of a complex electric field is performed by calculating a tetrahedral mesh of potentials across the crystal volume. To calculate the FET readout, the Shockley-Ramo theorem is applied to simulate the current in the FET. The focus of this presentation will be on incorporating and using the software package, Qhull, to calculate a tetrahedral mesh from known potentials and then using barycentric coordinates to perform a linear interpolation to calculate the field. After calculating the field at each charge carrier's position, the Shockley-Ramo theorem is applied and the previous triangulation technique is performed to simulate the FET response

Rob Agnese
University of Florida

Date submitted: 11 Jan 2013

Electronic form version 1.4