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Spatial Imaging of Charge Transport in Germanium at Low Temperature ROBERT MOFFATT, BLAS CABRERA, Stanford Univ, FEDJA KADRIBASIC, Texas A&M University, PETER REDL, BENJAMIN SHANK, Stanford Univ, BETTY YOUNG, Santa Clara University, DANIEL BRANDT, PAUL BRINK, MATTHEW CHERRY, ASTRID TOMADA, SLAC National Accelerator Laboratory — Because germanium is an indirect-gap semiconductor, the energy minima of the conduction band occur at four locations on the edges of the Brillouin zone. These minima have differing anisotropic mass tensors, causing electrons to travel obliquely to an applied electric field and to separate into four distinct clusters. A better understanding this process may improve the reconstruction of particle interactions in the germanium detectors used by the Cryogenic Dark Matter Search (CDMS). In addition, the possibility exists that the distribution of electrons among the four minima may preserve some information about the initial direction of a dark matter recoil event. To observe this oblique propagation, we excited a point source of charge carriers with a focused laser pulse on one face of a 4mm thick germanium crystal. After the electrons were drifted through a uniform electric field, the pattern of charge density arriving on the opposite face was mapped and used to reconstruct the trajectories of the four clusters. This talk will present the latest results of the charge-transport experiment, including measurements of the electron and hole charge density patterns and the scattering rate between energy minima as a function of both temperature and electric field strength.

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