Geant 4

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Phonon Transport in Geant4

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We present preliminary results of a research and development effort to implement low temperature, quasid-iffusive phonon transport in Geant4. In its current implementation the phonon transport code presented is capable of propagating ballistic phonons of Longitudinal (L), Slow Transverse(ST) and Fast Transverse (FT) po-larization states. We present an overview of the physics processes under consideration and discuss the current level of implementation. The simulated and experimental phonon focusing patterns in germanium crystals are in good agreement, and the simulated, polarization dependent group velocities along the principle crystal axis agree with values in the literature. One of many potential applications of the Geant4 phonon code is the rapidly growing field of cryogenic calorimeters and the design of calorimeter absorbers. We conclude with a short discussion of the technical challenges specific to the implementation of anisotropic phonon propagation in Geant4.

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