

## **Modeling of Electronic Dynamics in Swift Heavy Ion Irradiated Semiconductors**

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Knowledge of high energy particle interactions within semiconductor materials plays an important part in detector reliability and hardness insurance. In this paper, we consider a bulk GaAs semiconductor doped with electron concentration and establish a Boltzmann scattering equation for the description of the relative scattering motion of electrons interacting with a swift heavy ion by including the impurity- and phonon-assisted photon absorption processes as well as the Coulomb scattering between two electrons. The potential created by the ion projectile turns out to be only time dependent due to a choice of the coordinate system and electrons cannot directly couple to it without the assistance from phonons and impurities. We study the thermodynamics of hot electrons by calculating the average kinetic energy (effective electron temperature) as a function the impact parameter of the ion projectile and its charge number. Numerical results are given for the distribution of electrons and the dependence of electron temperature on the projectile impact parameter and charge number.