

A Monte Carlo Model of Piezoelectric Scattering in GaN

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A non-parabolic piezoelectric model of electron-phonon interaction in Gallium Nitride is discussed. The Monte Carlo aspects of the model, needed for the simulation tools which provide the characteristics of GaN-based devices are analyzed in details. The piezo-scattering rate is derived by using quantum-mechanical considerations. The angular dependence is avoided by a proper spherical averaging and the non-parabolicity of the bands is accounted for. For the selection of the after-scattering state we deploy the rejection technique. The model is implemented in a simulation software. We employ a calibrated experimentally verified set of input material parameters to obtain valuable data for the transport characteristics of GaN. The simulation results are in good agreement with experimental data available for different physical conditions.