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Anisotropic Carrier Transport in n-Doped 6H-SiC

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In this paper, a study is presented on the charge transport in n-type doped semiconductor 6H-SiC (in both transient and steady state) using a Non-Equilibrium Quantum Kinetic Theory derived from the method of Nonequilibrium Statistical Operator (NSO), which furnishes a clear description of the irreversible phenomena that occur in the evolution of the analyzed system. We obtain theoretically the dependence on the electric field (applied in the orientation perpendicular or parallel to the c-axis) of the basic macrovariables: the „electron drift velocity" and the „non-equilibrium temperature". The „peak points" in time evolution of this macrovariables are derived and analyzed.

Keywords: semiconductors, 6H-SiC, charge transport, drift velocity.