

The Light-Effect in Cylindrical Quantum Wire with an Infinite Potential for the Case of Electrons: Optical Phonon Scattering

Authors : Hoang Van Ngoc, Nguyen Vu Nhan, Nguyen Quang Bau

Abstract : The light-effect in cylindrical quantum wire with an infinite potential for the case of electrons, optical phonon scattering, is studied based on the quantum kinetic equation. The density of the direct current in a cylindrical quantum wire by a linearly polarized electromagnetic wave, a DC electric field, and an intense laser field is calculated. Analytic expressions for the density of the direct current are studied as a function of the frequency of the laser radiation field, the frequency of the linearly polarized electromagnetic wave, the temperature of system, and the size of quantum wire. The density of the direct current in cylindrical quantum wire with an infinite potential for the case of electrons – optical phonon scattering is nonlinearly dependent on the frequency of the linearly polarized electromagnetic wave. The analytic expressions are numerically evaluated and plotted for a specific quantum wire, GaAs/GaAsAl.

Keywords : the light-effect, cylindrical quantum wire with an infinite potential, the density of the direct current, electrons-optical phonon scattering

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