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Charge-current generations and optical specifications of Gaussian quantum dot with energy-dependent potential

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Abstract:

We consider the energy-dependent quantum dot with GaAs/GaAlAs Gaussian potential encompassment. Depending on the experimental or theoretical results for different types of interactions, the energy dependency can also be chosen as quadratic, fractional or any other type. The solutions of the wave equation for the energy dependent Gaussian quantum dot are performed numerically by employing the Runge-Kutta-Fehlberg method. The optical specifications of the structure are examined by using the compact-density-matrix formalism within iterative method. The total refractive index changes, the total absorption coefficients, the charge-currents and the induced magnetic fields are studied for different values of the energy dependency parameter.

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Author Keywords: Quantum dot; Energy-dependent potential; Charge-current; Induced magnetic field; Optical properties

Keywords Plus: EFFECTIVE-MASS; SCATTERING; EQUATION; STATES

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