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Spectral Distributions of Localized and Delocalized States in Triple Quantum Dots with Geometry Asymmetry

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Abstract. Electron localization and tunneling in triple quantum dot (TQD) are studied and the electron energy spectrum is deduced. Laterally distributed InAs/GaAs TQDs were modeled using single sub-band effective mass approach with effective potential simulating the strain effect. Electron localization dynamics in TQD over the whole spectrum is studied by varying the inter-dot distances. The effect of adding a third dot to a double quantum dot (DQD) is investigated as a weakly coupled system. Triangular and linear chain configurations of TQDs are considered. We show that the presence of a third dot increases the tunneling in the DQD and that the tunneling is sensitive to small violations of the TQD mirror symmetry.

Keywords: quantum dots, electron states, single-electron tunneling

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