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Single Electron in Systems of Two and Three Quantum Dots[1]
IGOR FILIKHIN, BRANISLAV VLAHOVIC, North Carolina Central University
— We consider the single electron confinement states in the system of two and three quantum dots (QDs). The InAs/GaAs QDs are modeled as laterally distributed dots, using single sub-band effective mass approach with effective potential simulating the strain effect. Electron localization in double quantum dots (DQDs) and in triple quantum dots (TQDs) is studied over the entire electron energy spectrum by varying the geometry parameters of these QDs arrays. It is shown that a small violation of the DQD shape symmetry drastically affects tunneling. This effect also appears as a numerical instability in calculations of spectral distribution of localized/delocalized electron states for small variations of the input parameters of numerical procedure. The effect of adding a third dot to a DQD is investigated. We show that the presence of a third dot increases the tunneling in the initial DQD. The spectral distribution of localized/delocalized states appears sensitive to the violation of the mirror symmetry of TQDs.

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Branislav Vlahovic
North Carolina Central University

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