INFLUENCE OF ELECTRON-DEFORMATION EFFECTS ON THE ELECTRON STRUCTURE OF QUANTUM DOTS IN STRESSED NANOHETEROSYSTEMS

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S u m m a r y

In the framework of the self-consistent electron-deformation model, the theory describing the formation of the quantum potential band profile and the energy levels of an electron and a hole in a stressed nanoheterosystem with coherently-strained quantum dots has been developed, and their dependences on the degree of doping of the nanoheterosystem matrix and the quantum dot surface concentration have been analyzed. The character of the quantum potential in the nanoheterosystem is shown to be governed not only by the mechanical component of the electron-deformation potential, but also by the energy of electrostatic interaction between charges in a vicinity of the quantum dot–matrix interface, where the latter induces additional quasi-triangular potential barriers and wells.