The dependence of energy on the QD deformation and polarization charges

Bilynskyi I.V.[1,2] , Leshko R.Ya.[2], Bandura H.Ya.[2]

[1]*Physics Department, Kryvyi Rih State Pedagogical University, 54 Gagarin Avenue, 50086, Kryvyi Rih, Ukraine, iv.bilynskyi@gmail.com*

[2]*Physics Department, Drohobych Ivan Franko State Pedagogical University, 3 Stryiska Street, 82100, Drohobych, Ukraine, galinka.bandura@gmail.com*

Recently much attention has been paid to the physics of low-dimensional semiconductor structures. This has been stimulated by the rapid progress in nanometer-scale fabrication technology. Among them, quantum dots, which are also defined as nanocrystals and microcrystallites, or nanoclusters, are of particular interest. The effect of quantum confinement on the electrons and holes in semiconductor QD's has been studied in [1-3].

As in massive semiconductors as in quantum dots optical excitations can lead to exciton states. Real structures can contain various defects. Therefore, conditions may change. For heterosystems in which there is a large difference between the dielectric constants, the effect of polarization charges will be significant. The change in the dielectric properties of the matrix taking into account the polarization or deformation charges leads to a significant change in the energy of both the electron and the hole.

In view of this, in our work we have been calculated the energies of the electron and the hole in the singleband and multibandband (with large, small and intermediate spin-orbital interaction) approximation in the standard form, the energy during deformation or polarization. And we also have been calculated the energies with account both the QD deformation and polarization charges on the QD-matrix interface.

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