The inhomogeneous distribution of the potential leads to a large vertical piezoelectric field that tends to separate the electrons and holes inside the dot. This spatial separation, that can be visualized in the right side of Fig. 1, where we show the probability density distribution for the electron and hole ground states, results into a decrease of the oscillator strength and, consequently, into a reduction of the absorption (emission) intensity as compared to the case of quantum dots based on the zincblende structure.

In addition, we have calculated the exciton and biexciton states by a direct-diagonalization of the many-body Hamiltonian [5], and the corresponding absorption spectrum. We report also the dependence of the absorption on the light polarization and on the structural parameters of the system, such as quantum dot size and shape. In Fig. 2 we show how the Coulomb interaction induces a global redshift of the absorption spectra (solid line) with respect to the non-correlated case (dashed line). The binding energy of the exciton ground state Δ_x is also indicated.

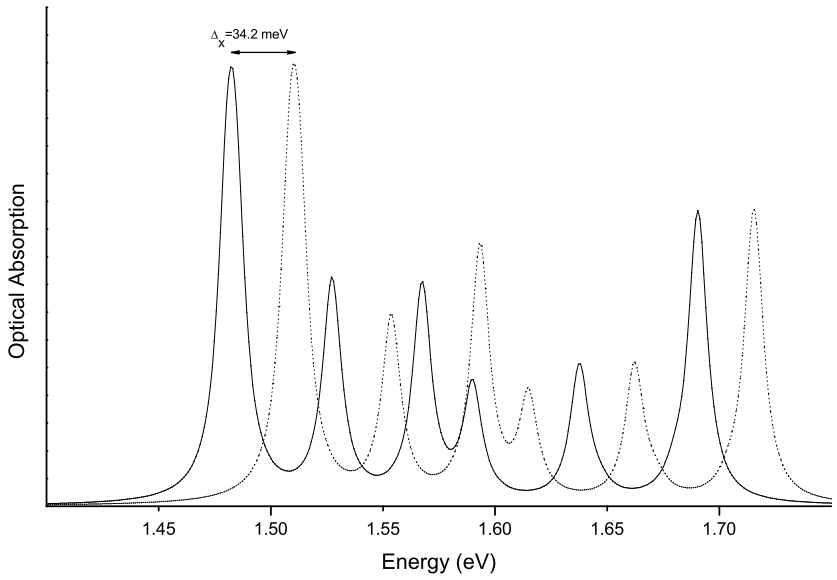

Figure 2:

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