The Optical Polaron in a Tunable Potential Well

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Abstract

The optical polaron confined to quantum well with tunable dimensions is investigated within the framework of a variational technique intending to give a unified characterization of problem for all the coupling strengths. The ground state energy and the number of phonons around the electron are studied as a function of the degree of confinement of the quantum well to interpolate between all possible confinement geometries. A comparison is made with the pure strong-coupling and the pure weak-coupling theories and a good agreement is obtained.

Keywords: polaron; optical phonons; low dimensional systems