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Decoherence of Polaron in Triangular Quantum Well

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In this paper, we examine the time evolution of the quantum mechanical state of a polaron Using Pekar Variational method. The ground and first excited state energies of polaron in triangular quantum well are derived. This system in nanostructure can be treated as a two-level quantum system qubit. The effect of electric field is studied and the decoherence of the polaron is study via the Shannon entropy. Numerical results show that the ground and first excited state energies are the decrease function of the electric strength. It is found that the quantum decoherence process and electron's probability density are affected by the electric field strength and the information is gained and conserved in the system due to the decrease of entropy. The presence of electric field increases the emission rate of polaron.

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