

Analytic Study on Some Properties of the Holstein Model

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Abstract: A new ansatz is presented for analytic study of the properties of the Holstein model. New analytic results for the polaronic band structure, ground state energy, phonon distribution, hopping probability of electron, and effective masses, of the Holstein molecular crystal model, are given in one dimension. All the analytic results obtained are in accord with the numerical results completed recently and valid both in the adiabatic and nonadiabatic regimes, and accurate enough in the region of validity.

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Key words: Holstein model, coherent state

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