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Numerical study of polaron problem in the adiabatic limit FRANK MARSIGLIO, ZHOU LI, Department of Physics, University of Alberta, CINDY BLOIS, University of British Coulombia, DEVIN BAILLIE, Department of Physics, University of Alberta — We study the polaron problem in a one dimensional chain and on a two dimensional square lattice. The models we have used are the Holstein model and the Su-Schrieffer-Heeger (SSH) model. By a variational procedure based on the Lanczos method, we are able to examine the polaron problem in the limit when the mass of the ion is very large, i.e. close to the adiabatic limit. It is known that for the Holstein model there is no phase transition [1] for any nonzero phonon energy. It is also known that for the one dimensional Holstein or SSH model there will be long range order [2] (e.g. dimerization) in the adiabatic limit at half-filling. It is then interesting to study the long range order on a two dimensional square lattice in and away from the adiabatic limit. Moreover, recent progress for the single polaron near an impurity (disorder) [3] make it an interesting problem for studying bond length disorder which can change the hopping energy in a specific direction in the Holstein model. Reference: [1] H. Lowen, Phys.Rev.B 37, 8661 (1988) [2] J.E.Hirsch and E. Frandkin, Phys. Rev. Lett. 49, 402 (1982) [3]A.S.Mishchenko et.al Phys.Rev.B 79(2009) 180301(R)

Frank Marsiglio
Department of Physics, University of Alberta

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