

Abstract Submitted
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Trapping of three-dimensional Holstein polarons by various impurities¹ HADI EBRAHIMNEJAD, MONA BERCIU, University of British Columbia, MONA BERCIU'S TEAM — We study the bound states of a three-dimensional Holstein polaron near various kinds of single impurities, using the momentum-average approximation. We show that the electron-phonon coupling renormalizes the impurity potential into a strongly retarded effective potential, which describes essential physics ignored by “instantaneous” approximations. The accuracy of our method is gauged by comparison with results from diagrammatic Monte Carlo for the case of an impurity that modifies the on-site energy of the electron. We also discuss impurities that modify the local strength of the electron-phonon coupling as well as isotope substitutions that change both the electron-phonon coupling and the phonon frequency. For the latter, we recover a threshold value of the electron-phonon coupling below which, no matter how strong the impurity is, polaron can not be trapped.

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