

Abstract Submitted  
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**Phonon assisted carrier motion on the Wannier-Stark ladder** ALFRED CHEUNG, MONA BERCIU, Univ of British Columbia — It is well known that at zero temperature and in the absence of electron-phonon coupling, the presence of an electric field leads to localization of carriers residing in a single band of finite bandwidth. In this talk, we will present an implementation of the self-consistent Born approximation (SCBA) to study the effect of weak electron-phonon coupling on the motion of a carrier in a biased system. At moderate and strong electron-phonon coupling, we supplement the SCBA, describing the string of phonons left behind by the carrier, with the momentum average approximation to describe the phonon cloud that accompanies the resulting polaron. We find that coupling to the lattice delocalizes the carrier, as expected, although long-lived resonances resulting from the Wannier-Stark states of the polaron may appear in certain regions of the parameter space. We end with a discussion of how our method can be improved to model disorder, other types of electron-phonon coupling, and electron-hole pair dissociation in a biased system.

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