Abstract Submitted
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Investigating phonon-mediated interactions with polar molecules[1] JOHN SOUS, KIRK MADISON, MONA BERCIU, Department of Physics and Astronomy, University of British Columbia, Vancouver, British Columbia, Canada, V6T 1Z1, ROMAN KREMS, Department of Chemistry, University of British Columbia, Vancouver, British Columbia, Canada, V6T 1Z1 — We show that an ensemble of polar molecules in an optical lattice realizes the Peierls polaron model for hard-core particles/pseudospins. We analyze the quasiparticle spectrum in the one-particle subspace, the two-particle subspace and at finite concentrations. We derive an effective model that describes the low-energy behavior of the system. We show that the Hamiltonian includes phonon-mediated repulsions and phonon-mediated "pair-hopping" terms which move the particle pair as a whole. We show that microwave excitations of the system exhibit signatures of these interactions. These results pave the way for the experimental observation of phonon-mediated repulsion.

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