

Abstract Submitted
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Phonons in an optical lattice TUN WANG, SUSANNE YELIN, University of Connecticut — The role of phonons for high-temperature superconductors has been an issue of considerable controversy [1], although some recent experiments using isotopes find phonons are important for such material [2]. In expectation of experimentally easily controllable parameters in an optical lattice, we study the phonon-fermion interaction in the optical lattice, which is the counterpart of the phonon-electron interaction in a crystal lattice. In our case, the phonons are the Bogoliubov excitations of the bosonic atoms. We show how these phonons are coupled with the fermionic atoms in the optical lattice and arrive at the desired Hamiltonian. We then study the phase transition properties of such a system. [1] Phys. Stat. Sol. 242, 11-29 (2005); [2] Nature, 430, 187-190 (2004);

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