

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Effects of interplay between electron-electron and electron-phonon interactions in two-dimensional systems FILIPPOS KLIRONOMOS, SHAN-WEN TSAI, Physics Department, University of California, Riverside — We study the two-dimensional Hubbard model in the presence of electron-phonon interaction which is integrated into an effective electron-electron coupling producing a retardation effect [S.-W. Tsai *et al* Phys. Rev. B **72**, 054531 (2005)]. We work in the context of the functional renormalization group method [R. Shankar, Rev. Mod. Phys. **66**, 129 (1994)] to one loop accuracy, where self-energy corrections are included, and investigate the effect that isotropic and anisotropic phonons have near van Hove band fillings. This approach conveniently takes into consideration the effect of phonons at every step of the renormalization group method. We focus on the two-patch and many-patch schemes, where the Fermi surface is subdivided into two or multiple patches that label the electrons involved in each interaction process and produce a phase diagram for the different instabilities associated with the Hubbard model. We also depart from half-filling and investigate various specific cases of momentum transfer as well.

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Date submitted: 11 Jan 2006

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