MAR05-2004-001866

Abstract for an Invited Paper
for the MAR05 Meeting of
the American Physical Society

Electron-Phonon Coupling in the t-J Model

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We present numeric results for ground state and angle resolved photoemission spectra (ARPES) for single hole in $tt't'' - J$ model coupled to optical phonons. The systematic-error free diagrammatic Monte Carlo [1,2] is employed where the Feynman graphs for the Matsubara Green function in imaginary time are summed up completely with respect to phonons variables. It is found that interplay of electron-phonon interaction with intrinsic to the holes in Mott insulator interaction with magnons can explain the main puzzles encountered in ARPES experimental studies: anomalous damping in underdoped and moderately doped regime, "kink," anomalous "universal velocity," and giant anomalous isotope effect. Crucial discussions with N. Nagaosa and Z.-X. Shen are acknowledged. ([1] A. S. Mishchenko et. al. Phys. Rev. B **62** 6317 (2000); [2] A. S. Mishchenko and N. Nagaosa Phys. Rev. Lett. **93** 036402 (2004).)