CHARGE TRANSFER POLARISATION WAVE AND CARRIER PAIRING IN THE HIGH Tc COPPER OXIDES

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ABSTRACT

The High T_c oxides are highly polarisable materials and are charge transfer insulators. The charge transfer polarisation wave formalism is developed in these oxides. The dispersion relationships due to long range dipole-dipole interaction of a charge transfer dipole lattice are obtained in three and two dimensions. These are high frequency bosons and their coupling with carriers is weak and antiadiabatic in nature. As a result, the mass renormalisation of the carriers is negligible in complete contrast to conventional electron-phonon interaction, that give polarons and bi-polarons. Both bound and superconducting pairing is discussed for a model Hamiltonian valid in the antiadiabatic regime, both in three and two dimensions. The stability of the charge transfer dipole lattice has interesting consequences that will be discussed.

References:

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(2) B.K. Chakraverty, Submitted to Phys. Rev. B.