

An Neutron Scattering in High- T_c Cuprates: Two Component Spin-Fermion Model

Yunkyu Bang

Chonnam National University, Kwangju, Korea

Recent neutron scattering experiments have revealed that the generic form of the magnetic excitations in the high- T_c cuprates of wide range of doping has the so-called "hourglass" shape; it features both upward and downward excitations at the incommensurate (IC) momenta spanning from the resonance peak at the commensurate momentum (π, π) . We propose the two-component spin-fermion model as a minimal phenomenological model which has both local spins and itinerant fermions as independent degrees of freedom. Our calculations of the dynamic spin correlation function provide good agreement with experiments and show: (1) the upward dispersion branch of magnetic excitations is mostly due to the local spin excitations; (2) the downward dispersion branch is from collective spin excitations of fermions; (3) the resonance mode is a mixture of both degrees of freedom.

keywords : High- T_c Superconductors, Neutron scattering, Spin-fermion model