Anomalous normal-state and resonant magnetic response in cuprates

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Magnetic spin response in hole-doped cuprates, as measured by inelastic neutron scattering (INS) experiments, reveals an anomalous non-Fermi-liquid ω/T scaling in the normal state (NS) and a dispersive resonant peak in the superconducting (SC) phase. A theory unifying the NS and SC spin dynamics based on the memory-function approach will be presented. A phenomenological damping function combined with a T-independent sum rule is used to describe the NS scaling. The emphasis is on the doping dependence of the response and on the analysis of recent INS experiments of underdoped YBa_2CuO_{6+x} (YBCO). Within the SC phase the SC gap induces a resonant mode, which shows an hour-glass-like dispersion at intermediate doping and a spin-wave dispersion at higher energies at low doping. The intensity and position of the resonant peak will be analysed in relation with the NS response. Existence of resonant mode in heavily underdoped YBCO and electron-doped cuprates will be also discussed.

9.7 cm

13.4 cm

Subject category :

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