

Resonant magnetic excitations in high- T_c cuprates: influence of orthorhombicity and upward dispersion

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Recent inelastic neutron scattering (INS) experiments in the superconducting (SC) state of YBCO [1] detected a new resonant magnetic excitation at incommensurate momenta, but at frequencies *larger* than $\Omega_{res}(\mathbf{Q})$. We show that a new resonant magnetic excitation at incommensurate momenta, observed recently by inelastic neutron scattering experiments on $\text{YBa}_2\text{Cu}_3\text{O}_{6.85}$ and $\text{YBa}_2\text{Cu}_3\text{O}_{6.6}$, is a *spin exciton*. We identify several features that distinguish this novel mode from the previous resonance mode observed near $\mathbf{Q} = (\pi, \pi)$ [2]. Furthermore, we have analyzed the in-plane magnetic anisotropy in high- T_c superconductors with orthorhombic distortions and compared our results with INS data on fully untwinned YBCO [3].

[1] S. Pailhes *et al.*, Phys. Rev. Lett. **93**, 167001 (2004); S.M. Hayden *et al.*, Nature (London) **429**, 531 (2004).

[2] I. Eremin *et al.*, cond-mat/0409599, Phys. Rev. Lett., in press.

[3] I. Eremin and D. Manske, Phys. Rev. Lett. **94**, 067006 (2005).

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