

SFB 608

Einladung zum Kolloquium

- Ort:** Universität zu Köln
II. Physikalisches Institut, Seminarraum 201
- Zeit:** 01. Juni 2005, 14 Uhr c.t.
- Sprecher:** Dr. Philippe Bourges
Laboratoire Léon Brillouin, CEA Saclay - France
- Thema:** Spin dynamics in the high- T_c cuprates

The spin dynamics of high- T_c superconductors measured by inelastic neutron scattering will be presented. Over the years, these measurements have evidenced a magnetic resonance peak in various cuprates with crystal structures comprised of CuO_2 monolayer units $\text{Tl}_2\text{Ba}_2\text{CuO}_{6+\delta}$ and bilayer units $\text{YBa}_2\text{Cu}_3\text{O}_7$ (YBCO) and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ (Bi2212). Recently, we extend this observation in the 3-layers $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10+\delta}$ (Bi2223) system near optimum doping $T_c = 110$ K. This novel excitation must hence be considered as a generic excitation of the superconducting state at least of those cuprates with a high maximum T_c . Detailed momentum dependences reveal a downward and an upward dispersions of the resonant excitation from the antiferromagnetic wave-vector, yielding incommensurate-like excitations at a fixed energy transfer. Measurements in detwinned YBCO samples show that the characteristic geometry of these incommensurate excitations is basically two dimensionnal. These findings point towards Fermi-liquid-based theoretical scenarios rather than rigid one-dimensional stripe arrays. Further, we also reported a second distinct magnetic resonant mode (with an even symmetry with respect to exchange between adjacent copper oxide layers). From the relative spectral weight of both resonant modes, one can infer the manifestation of the Stoner electronic continuum of d-wave superconductors.

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