



TRR 80 Sonderseminar

Am Donnerstag, den 28. April um 13:30 Uhr

spricht

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über das Thema

***Resonant inelastic soft X-ray scattering instrument
and study on magnetic excitation and CDW
in high-T_c cuprate superconductors***

Resonant Inelastic X-ray Scattering (RIXS) is a photon-in and photon-out technique which becomes popular in recent years due to the fast progress in the instrumentation and by important theoretical achievements [1]. RIXS can be used in a very effective way to study the orbital (crystal field), charge and spin excitations in strongly correlated 3d transition-metal systems. Cu L_3 RIXS has brought significant results complementing several other techniques such as inelastic neutron scattering (for magnetic excitations), optical spectroscopy (for dd excitations), x-ray diffraction (for charge density waves).

I will review some main achievements of RIXS in the recent years. In cuprate high-temperature superconductors, superconductivity emerges from doping the antiferromagnetic Mott insulator thus intense research has been focused on the evolution of the spin excitation spectrum on doping. RIXS has observed the magnetic excitations from undoped antiferromagnetic insulators to overdoped superconductors for both hole- and electron-doped compounds, demonstrating the robustness of magnetic fluctuation across the superconducting phase diagram [2-4]. In superconducting layered cuprates the elusive nature of charge ordering has delayed its observation by bulk sensitive scattering techniques for several years. Resonant soft x-ray scattering has emerged as the most sensitive method that uncover charge density wave (CDW) correlations competing with superconductivity in the YBCO family [5]. These investigations have been extended to other hole and electron doped cuprates [6-7] demonstrating the ubiquity and the universality of the phenomenon. Finally I will discuss some new results obtained in the recently commissioned high-resolution ERIXS spectrometer at ID32 of the ESRF in France.

References

- [1] L. J. P. Ament et al., Rev. Mod. Phys. **83**, 705–767 (2011).
- [2] M. Le Tacon et al., Nat. Phys. **7**, 725 (2011).
- [3] M. P. M. Dean et al., Nat. Mater. **12**, 1019 (2013).
- [4] K. Ishii et al., Nature Commun. **5**, 3714 (2014).
- [5] G. Ghiringhelli et al., Science **337**, 821 (2012).
- [6] R. Comin et al., Science **343**, 390 (2014).
- [7] E. H. da Silva Neto et al. Science **347**, 6219 (2015).

Gäste sind herzlich willkommen.

Der Vortrag findet im Seminarraum S-403 / Institut für Physik, Universität Augsburg statt.

Gastgeber: Dr. Zhe Wang
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