



PHOTON SCIENCE - SEMINAR

Resonant inelastic x-ray scattering: an "almost" perfect probe of collective excitations in transition metal oxides

Krzysztof Wohlfeld

Stanford University and SLAC National Accelerator Lab, USA

DATE: Friday, 27 June 2014
COFFEE: 11:00 h
SEMINAR: 11:15 h
PLACE: WBGB/019

Abstract:

During last five years resonant inelastic x-ray scattering (RIXS) has positioned itself as one of the leading spectroscopies in the solid state physics [1]. This is due to the fact that RIXS has turned out to be an ideal probe of the collective spin, orbital, and charge excitations in the transition metal oxides – i.e. the compounds which show strong electron-electron interactions and therefore require a rather advanced and complex theoretical description.

In this talk I would like to first shortly review the basics of RIXS and the reasons why RIXS has become so "fashionable". Next, I will discuss some of the main theoretical and experimental results recently obtained with RIXS.

In particular I will discuss: (i) how RIXS has revealed that the high energy spin excitations in cuprates almost do not change their character upon doping, which is a rather counterintuitive result [2], and (ii) how the measurements of the orbital excitations in the 1D copper oxides has allowed for a first unambiguous observation of dispersive orbitons and has led to the formulation of the spin-orbit separation phenomenon [2].

References:

- [1] L. J. P. Ament et al., Rev. Mod. Phys. 83, 705 (2011).
- [2] C. J. Jia et al., Nature Communications 5, 3314 (2014)
- [3] J. Schlappa et al., Nature 485, 82 (2012)