

Laboratoire Léon Brillouin



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MAGNETIC DIFFRACTION BY POLARIZED HARD X-RAYS

Mercredi 21 Mai 2014 à 16h30

Salle de conférence 15 – Bâtiment 563

Neutron and X-ray magnetic scattering are the unique methods to extract complementary information of the ordered magnetic structures and their relations with the crystal symmetries at the atomic level.

X-ray magnetic scattering takes advantage of the characteristic properties of x-ray beams at third generation synchrotron radiation facilities: tuneable photon energy, controllable polarisation and polarisation analysis, excellent stability and emittance.

The relevant scattering methods can be summarized in the following:

- Resonant x-ray scattering (RXS) is a method which uses the photon beam as a quantum probe to investigate structural, magnetic and electronic ordered structures of solids. It combines high-Q resolution x-ray diffraction and atomic spectroscopy for investigating the subtleties of microscopic electronic and magnetic interactions in solids.
- In non-resonant x-ray magnetic scattering regime (NRXMS) the incident photon energy is tuned far from the absorption edges. The magnetic scattering amplitudes are directly related to the spin and orbital magnetic momentum and have peculiar polarisation dependence which can be exploited to determine the magnetic structure of materials into the ordered states.

The aim of this lecture is to introduce the theoretical and the experimental background for these two techniques, comparing the respective strong points, and a short review of the experimental applications.

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