



PAUL SCHERRER INSTITUT

PHOTON SCIENCE - SEMINAR

Birefringence, polarization and charge ordering effects in resonant x-ray diffraction

Yves Joly

Institut Néel, Grenoble

DATE: Friday, 28 November 2014
Coffee: 11:00 h
SEMINAR: 11:15 h
PLACE: WBGB/019

Abstract:

The variation with energy of the diffracted peak intensities around the absorption edges has been known for a very long time. The concepts explaining this phenomenon called anomalous diffraction or resonant elastic x-ray scattering (REXS) spectroscopy, are first introduced. It is shown that magnetic and non magnetic, and resonant and non resonant effects can interfere with different dependences on the light polarization. We then discuss about charge ordering effects on the recorded signal and give some examples where REXS can help in the understanding of properties in different classes of material. With some more details, recent results on low quartz are also shown using the analysis of azimuthal scans of a diffracted peak. Their amplitude oscillations vary when changing from right to left the enantiomer or when changing the light helicity. This can be completely explained by the proper taking into account of the polarization characteristics of the incoming electromagnetic wave. More importantly, we show that such experiments are an excellent way to fully determine the light properties, when this one is not perfectly known. These studies are supported by ab initio simulations which permit to validate the theoretical demonstration and to eliminate the other possibilities such as higher contribution in term of transition channels (E1E2 or E2E2) or birefringence effects.

Contact: Urs Staub (4494)