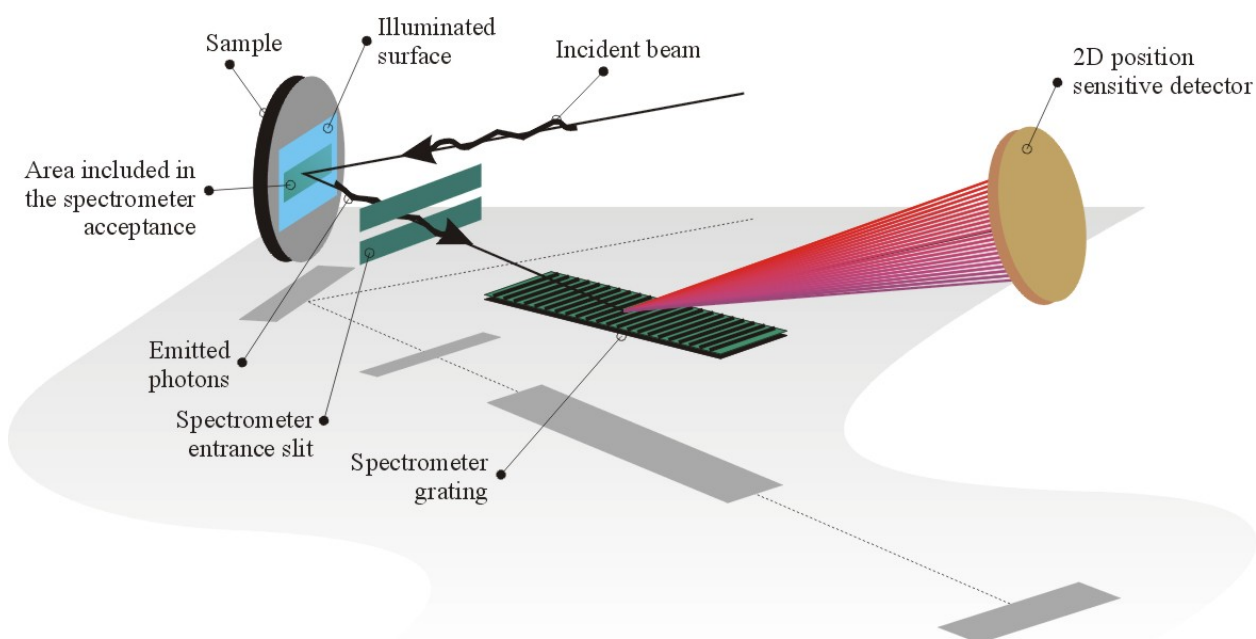


## AXES project

Collaboration between INFM - Politecnico di Milano and the ID08 beam line scientist for the development of innovative x-ray emission and inelastic x-ray scattering techniques.

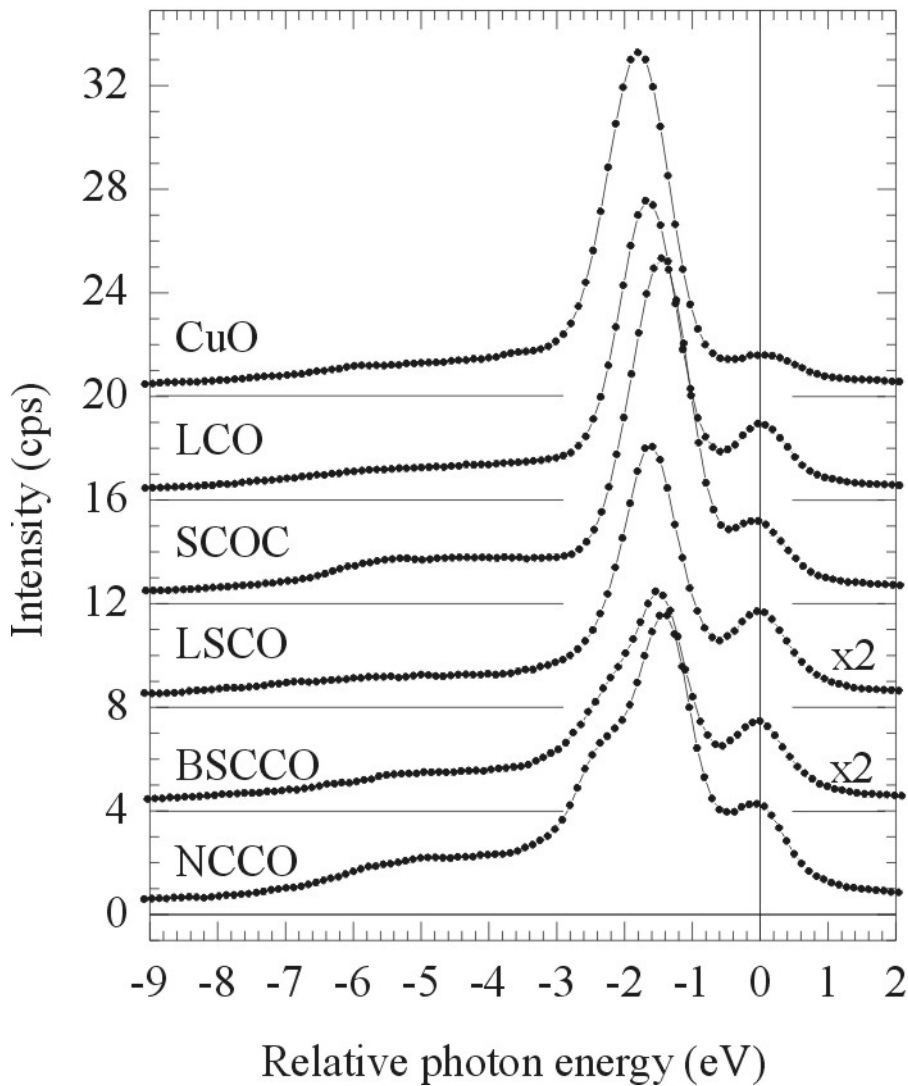
**INFM contact:** Giacomo Ghiringhelli ( [giacomo.ghiringhelli@fisi.polimi.it](mailto:giacomo.ghiringhelli@fisi.polimi.it) )

**Instrumentation:** AXES, high resolution spectrometer with dedicated monochromator for soft x-ray RIXS (Resonant Inelastic X-ray Scattering); angle resolved / polarization selective analyzers for dichroic partial fluorescence yield spectroscopy (IRRS, Integrated Resonant Raman Scattering).



**Figure 1:** optical layout of the AXES spectrometer, based on holographically grooved spherical grating and CCD detector. Typical resolving power: 2500 in the 500-1000 eV energy range.

**Research examples:** *dd*-excitations in 3*d* metal oxides studied by RIXS; 4*f* population in Ce compounds studied with linear dichroism in RIXS; sum rule analysis of IRRS spectra for higher order moments determination in charge and spin distribution ( $L_{2,3}$  edges of Fe, Co, Ni;  $L_3$  edge of Gd and Ho).



**Figure 2:** RIXS spectra measured on insulating and superconducting cuprates at the copper  $L_3$  resonance (931.5 eV): the *dd*- and charge transfer excitations are clearly detected.