

# An overview of the GALAXIES beamline

## Inelastic X-ray Scattering and Electron spectroscopy

J.-P. Rueff, J. M. Ablett, T. Moreno, D. P. Prieur, S. Lecouster  
Synchrotron SOLEIL



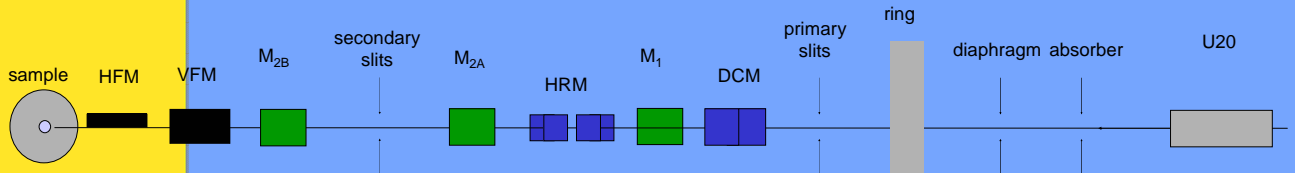
Collaborations : M. Simon (LCP-MR / CNRS); A. Shukla, (IMPMC / UPMC);

The GALAXIES beamline is located at the third-generation synchrotron SOLEIL (Orsay, France). The beamline is dedicated to **inelastic x-ray scattering (IXS)** and **high energy x-ray photoemission (HAXPES)** in the hard x-ray range. The beamline is designed to provide a monochromatic and micro-focused beam with the highest flux possible in the 2.3-12 keV spectral range and an adaptable energy bandwidth between 50 meV and 1 eV.

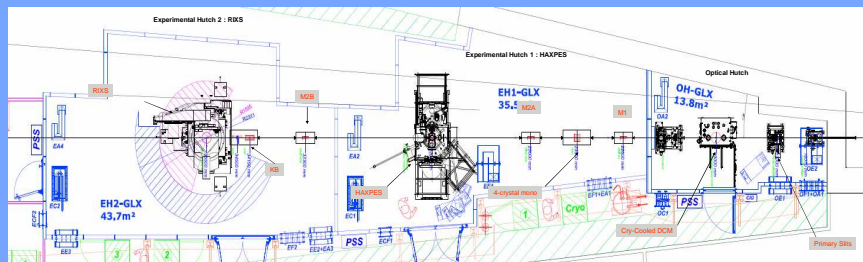
The beamline setup is based on a 2-stage monochromator and focusing optics comprising a toroidal mirror and a set of KB mirrors to achieve a micron-spot on the sample position. The beamline can also be operated in a high flux / medium focalization mode at the same focal position. The experimental hutches will be equipped with a versatile inelastic X-ray scattering spectrometer working in the horizontal and vertical planes and an XPS/Auger high energy spectrometer.

### Characteristics

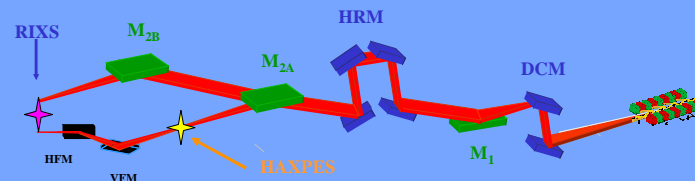
Top view



- U20, short section
- 2.3-12 keV,  $\Delta E=50$  meV - 1 eV
- Linear Polarisation
- Focalisation :  $80 \times 20 \mu\text{m}^2$ ,  $5 \times 5 \mu\text{m}^2$
- Experimental end-stations:
  - RIXS, HAXPES
- Phase 2' beamline
- Operations in 2010



### Beamline Layout



### Instrumentation

#### Inelastic x-ray scattering spectrometer

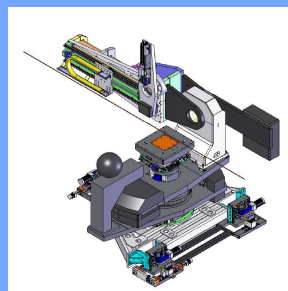
#### High energy photoemission analyzer

##### RIXS

- 2-m arm
- Horizontal / Vertical geom.
- High resolution

Analyzer developed in collaboration with Institut de Minéralogie et de Physique des Milieux Condensés (IMPMC), France

- 0.5-m arm
- multi analyzers setup
- High flux

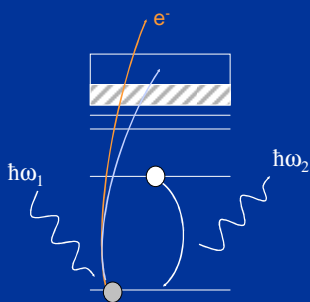
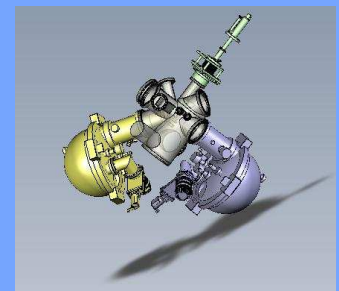


##### HAXPES

- Kinetic energy  $E_c$  up to 12 keV
- 50 meV resolution
- solid / gas phase

- Collaboration M. Simon (LCP-MR)

Funded by Agence Nationale de la Recherche (ANR), France



- Resonant inelastic x-ray scattering
- X-ray emission (fluorescence)
- Resonant x-ray emission spectroscopy
- High-resolution x-ray absorption
- (Partial fluorescence yield)
- Non-resonant inelastic scattering
- X-ray Photoemission
- Resonant Auger spectroscopy

### Applications

- Valence instabilities in f electrons systems
- Electronic properties of transition metals compounds
- High pressure physics
- Coordination chemistry
- etc.

- Strongly correlated materials
- Nuclear dynamics in gas phase, clusters
- etc.

