**ODE: Optique Dispersive EXAFS (= Dispersive Optics EXAFS)**

**SOLEIL staff:**
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**Areas of application, instrumentation and methodologies used**
Energy range: 3.5-25 KeV

XAS and X-ray Magnetic Circular Dichroism (XMCD) are probes of local order and microscopic magnetic properties. XMCD is a selective probe, which can access to a large variety of elements. The dispersive EXAFS station at SOLEIL, at ODE beamline, gives the possibility to perform numerous pressure XAS and XMCD experiments with an excellent statistic and very fast XAS kinetic. We present high pressure XAS and XMCD results and kinetic XAS for chemistry studies.

ODE uses a bent crystal as monochromator. The continuous change of the Bragg incidence along the bent crystal opens an energy range in the reflected beam. The correlation between position and energy of the X-ray is exploited thanks to a position sensitive detector.
The main advantages of Dispersive XAFS are the focusing optics, the short acquisition time (few µs) and the great stability during the measurements due to the absence of any mechanical movement. These three advantages allow the study of small samples, 70µm at SOLEIL, to follow kinetics, and to perform experiments demanding a small signal to noise ratio (typically $10^{+5}$). Small samples are mandatory in the case of high pressure studies, the smaller the sample, the higher the available pressure will be: up to 100GPa at SOLEIL.

Spectroscopies: Dispersive EXAFS, XMCD (X-ray magnetic circular dichroism). Kinetic studies *in-situ* of chemical reactions using EXAFS and XANES (temporal resolution of 60 microseconds).
Sample environment: high pressure cells for high and low temperatures: 3 K – 500 K
- Stopped-flow technique
- Cryostat down to 4.2 K
- Magnetic field up to 1.5 T

**Major disciplines**
Pressure and temperature phase diagrams. Time resolved chemistry spectroscopy Characterization of magnetic materials. XMCD measurements on ODE involve analysis of bulk or nano-objects. The study of magneto-volume effects under the combined effect of high pressure, magnetic field and low temperature.