



**DESIRS: Dichroïsme Et Spectroscopie par Interaction avec le Rayonnement Synchrotron (= dichroism and spectroscopy through interaction with synchrotron radiation)**

**SOLEIL Staff:**

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**Areas of application, instrumentation and methodologies used**

Energy range: 5 – 40 eV (2500 Å – 300Å) on undulator (HU640)

Ultra-high resolution, high flux and variable polarization associated to high spectral purity (gas filter) for VUV photodynamics, dichroism and spectroscopy

This beamline has three branches:

- One ultra-high resolution absorption spectroscopy, using a unique Fourier-transform VUV spectrometer (5 to 30 eV, resolving power RP: 1,000,000). Liquid nitrogen cooled windowless gas absorption cell - molecular beam.
- Two monochromatized branches (branches A and B, RP = 200,000) for photodynamics, electron/ion spectroscopy and dichroism.

Branch A: SAPHIRS: molecular beam (from gaseous, liquid or solid samples), radicals, aerosols/nanoparticles sources and thermally desorbed species. DELICIOUS3: electron/ion coincidence double imaging spectrometer ( $i^2$ PEPICO (= photoelectron/photoion coincidences) and  $i^2$ TPEPICO): Angle-resolved photoemission spectroscopy (AR-PES) on mass-selected and KER (kinetic energy release)-selected samples. Ionic fragment apparition energies and barrier height.

Branch B: free port for any external chamber. Associated experiments CERISES (reactivity of state-selected ions with neutral species) and SRMS2 (ion trap with VUV-photon activation for MS2).

**Major disciplines**

Photon-induced processes via the valence shell on dilute gas phase samples. High resolution spectroscopy, fragmentation dynamics, molecular reactivity, photoionization dynamics of free molecules, laser-excited systems and clusters. Molecular chirality and dichroism.

Biology interface: proteomics, VUV photodynamics and stability of large gas phase biopolymer with SRMS2.

Physical chemistry: Dissociation of molecular cations (radicals, biomimetic and biological molecules) -chemical Reactivity of molecular ions – Chemical reactions (flow tube, flame, aerosol growth, etc.) probed by  $i^2$ PEPICO to disentangle isomers.

Physics: Photoionization dynamics / Vector correlations / Photoelectron Circular Dichroism.

Organic chemistry and exobiology: Enantioselective photolysis and asymmetric synthesis / Photochemistry of prebiotic molecules.

Astrophysics: study of interstellar ice and small molecular systems.