PLEIADES: Polarized Light source for Electron and Ion Analysis from Diluted Excited Species

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Areas of application, instrumentation and methodologies used
Energy range: 9 - 1000 eV

PLEIADES is an ultra-high resolution soft X-ray beamline (ultimate resolving power RP of about 100,000 at 50 eV) dedicated to spectroscopy-based atomic and molecular physics studies of diluted samples (atoms, molecules, ions, clusters, nanoparticles).
Adjustable polarization – plane grating monochromator with varied line spacing (VLS) and varied groove depth (VGD) – high resolution electron spectrometer (VG-Scienta R4000)- EPICEA high-energy electron/ion coincidence setup – dedicated MAIA station for positive and negative ion photoionization studies (**ECR** source).
The beamline has 3 optical branches with different beam focusing properties.
Sample environment: Gas cell for high-resolution electron spectroscopy – ECR ion source – Multi-purpose source chamber (MPSC) for molecules of biological interest, nanoparticles and clusters.

Major disciplines
Ultrafast dissociation processes in core-excited molecules and clusters: Ultra-fast dissociation (fs) / degradation of biological material under irradiation, Photo dissociation processes in inner-shell excited molecules
Structural characterization of isolated species: Molecular-frame photoelectron/Auger angular distributions (MFPAD) / electron diffraction effects / free nanoparticle structural characterization
Multiple photoionization of atoms and molecules: Multi-electron processes, electron correlations, multiple core-hole spectroscopy
Ion photoionization: absolute cross sections / auto detachment of negative ions / spectroscopy of molecular ions
Photochemistry: Selective photochemistry / Chemical reactivity of isolated (functionalized) nanoparticles.