Specifications of the microscopes available on SOLEIL beamlines

Line name	DIFFABS Micro-beam mode	DISCO	LUCIA	Soft x-ray microscopy	Microscopium	SMIS
Imaging type	X fluorescence XAS X diffraction	Fluorescence UV-visible	Spectroscopy and imaging	*X-PEEM* STXM	X fluorescence XAS X diffraction	Molecular imaging from spectroscopy
Energy domain (eV)	3000 - 18,000	1 - 5	800 - 8000	100 – 2500	4000 - 20,000	0.06 - 0.6
Lateral resolution	Routinely ~ 12 µm, up to 5 µm at lower intensity	Up to 100 nm	2.5 µm x 2.5 µm	< 0.04 µm	Routinely ~ 2-3 µm, up to 0.5 µm at lower intensity	1-10 µm according to the incident energy
Analysis depth	Depends on the sample and the energy of incident and detected photons	Up to 10 µm	0.1 µm to 10 µm according to detection mode	*X-PEEM*: between 5 and 10 nm STXM: between 100 and 500 nm	Depends on the sample and the energy of incident and detected photons	1-10 µm
Energy resolution (eV)	$\Delta E/E \sim 10^{-4}$	1/1000	0.3 to 0.7 according to incident energy	> 0.02 eV to 100 eV > 0.4 eV to 2.000 eV	$\Delta E/E \sim 10^{-4}$	1.2×10^{-5}
Sample	No real restriction	Thin; can be hydrated, solid, etc.	No real restriction	*X-PEEM*: flat and conductive STXM: thin section < 0.5 µm	No real restriction	Thin sections: 5-30 µm
Analysis mode	Transmission, reflection, fluorescence	Spectroscopy of fluorescence and lifetime	Transmission, fluorescence, total yield of electrons	*X-PEEM*: TEY, XPS, XAS, XPD; STXM: transmission, TEY and reflection	Transmission, reflection, fluorescence	Transmission reflection
Sensitivity	XRF: ~ 0.1 ppm/s/pixel XANES: ~ 1000 ppm	10^{-9} mol/l	A few ppm	*X-PEEM: 0.1 monolayer* *STXM: 1 nm*	XRF: ppb/s/pixel XANES: ~ 100 - 1000 ppm	10^{-11} g
Cartography	Scan	Scan or full field	Scan	*X-PEEM: parallel acquisition;* *STXM: scan*	Scan	Scan
Sample environment	Air, controlled environment, high-pressure cell	Air, liquid medium, temperature: from 5 to 50°C	Mainly in vacuum; temperature: from 90K to 2000°C; liquid cells	*X-PEEM: UHV, 150-1500K.* *Partial vacuum (10-5 mbar)* *STXM: high vacuum; Wet cell;* *controlled environment;* *100-600K; Field: 1 tesla*	Air, controlled environment, high-pressure cell	Air, controlled environment, high-pressure cell; from -100 to +400°C
Opening to users in	2009	2009	2009 *(currently open* *to users at SLS)*	2010 *(currently open* *to users at ELETTRA)*	2010 - 2011	2007

Support laboratories

In addition to the microscopes in the SOLEIL beamlines, the **Surface Laboratory** (LaSu) is equipped most notably with a tunnel effect microscope as well as the ultravacuum equipment required for this type of study (mobile UHV chamber for the transfer of samples from LaSu to the lines).

A scanning phase microscope and an atomic force microscope with useful characteristics for the observation of samples from mm to nm size are also available in the **Optics Group Metrology Lab** (LMO).