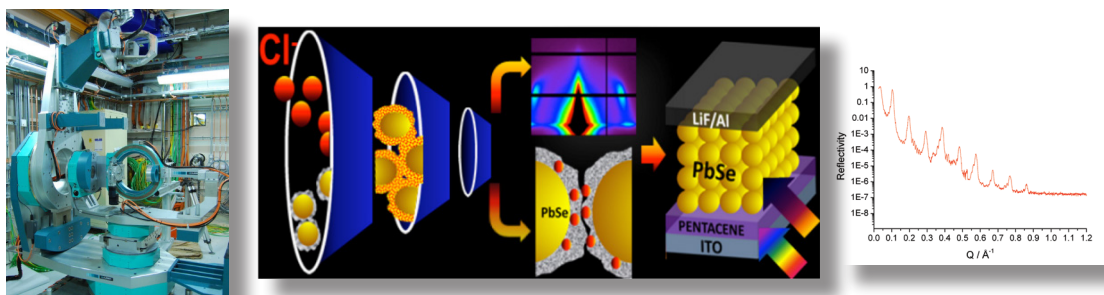


107 Surface and Interface Diffraction

Understanding interfacial phenomena is key to the development of many new technologies answering vital questions relating to biological and chemical processes. 107 is a high-resolution X-ray scattering beamline for investigating the structure of surfaces and interfaces under different environmental conditions, including ultra-high vacuum and real-world controlled atmosphere and liquid environments.

The beamline capabilities include the X-ray Reflectivity (XRR) and Grazing Incidence X-ray Diffraction (GIXD) techniques in addition to Grazing Incidence Small Angle X-ray Scattering (GISAXS).

Structural investigations of solid, liquid and air interfaces can be performed giving information on the number of layers, layer thickness, layer roughness (XRR) and in-plane structure (GIXD, GISAXS). These techniques can be applied in diverse fields ranging from semiconductor design, polymer thin films, surfactants and catalysis through to biological applications



Beamline Specification

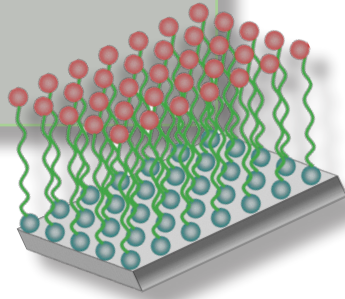
Energy Range [keV] / Wavelength [Å]	8 – 30 / 0.41 – 1.55
Beam Size at Sample [µm]	100 x 60 (H x V)
Diffractometer and Sample Stages	2+3 circle diffractometer Double-crystal-deflector for studies of liquid interfaces Hexapod (up to 30 kg vertical, 50 kg horizontal) or Eulerian cradle
Sample Environments	UHV chambers Controlled atmosphere environments Solid-Liquid cells Langmuir Trough
Detectors	Pilatus 2M, Pilatus 100K , Merlin, APD, Scintillator
GI-SAXS geometry	Sample-detector distance from 1.5 to 3 m Angular range up to ~20°

For further information please contact the Diamond Industrial Liaison Office on

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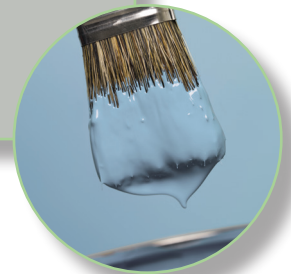
Molecular Adsorption & Self Assembly

- Investigation of the thermodynamic, structural and dynamic properties of adsorbed molecular films;
- Real-time structural information during templated growth and self-assembly processes;
- Molecular purification via selective surface adsorption (i.e. chiral specificity).



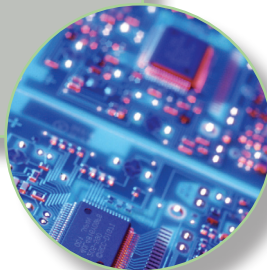
Soft Matter & Biology

- Understanding interfacial interactions in surfactants and polymers at a molecular level;
- Physical influences on model membranes and their interactions with proteins;
- Surface structure and ordering in systems ranging from paints and coatings to cosmetics, drug delivery & organic photovoltaics.



Structure of Solid Surfaces

- UHV measurements of materials with complex surface structures or containing weakly scattering atoms;
- Buried (solid-solid) interfaces such as the grain boundary between well ordered crystals or quantum dot interfaces;
- Multilayer structures which exhibit enhanced properties due to indirect coupling across the layers e.g. photovoltaics.



Solid-Liquid & Air-Liquid Interfaces

- Studies of the surface structure of heterogeneous catalysts;
- *In situ* investigation of the catalytic behaviour of electrochemical cells;
- Understanding interfacial phenomena relating to friction, lubrication and wear;
- Ability to directly probe and obtain structural information from air-liquid and liquid-liquid interfaces.



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