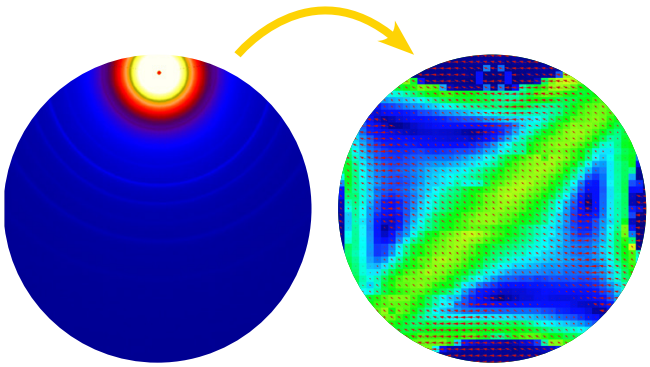
I22

Small Angle Scattering and Diffraction

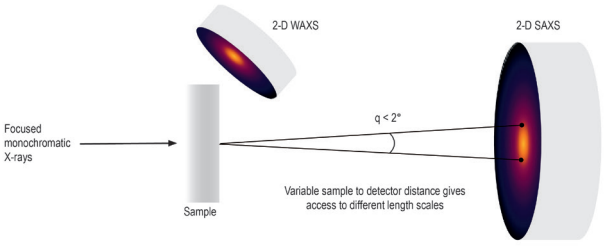
Small angle scattering is a powerful tool for structural investigations of soft condensed matter. It can be applied to samples that are either difficult or impossible to crystallise, may be complex or composite systems or materials with multi-length scale self-organisation. Due to the wide range of sample types, small angle scattering has been employed in a wide range of applications; from drug delivery systems and protein shape analysis through to catalysis, advanced materials development and engineering.

The high intensity of the X-rays on I22 allows structural investigation of non crystalline materials under *in situ* conditions (for example fluid flow at high pressures and temperatures). I22 provides reliable access to millisecond and shorter time scales, essential to understanding kinetic processes such as early folding events in proteins or ordering and alignment in liquid crystalline materials. Information can be obtained on the shape and size of particles and macromolecules such as polymers and proteins which may not be possible using other techniques.



Beamline Specification

Accessible Length Scales [nm]	0.1 - 500
Energy Range [keV] / **Wavelength** [Å]	8 – 20 / 0.62 – 1.55
Beam Size at Sample [µm]	250 x 80 (H x V) Microfocus beam - a minimum of 10 x 10 micron
Sample Environments	Temperature range 90 - 873 K
Detectors	2D SAXS high resolution detector (Pilatus P3-2M) 2D WAXS high resolution detector (Pilatus P3-2M-L)



I22 APPLICATIONS

Proteins & biomaterials

- Investigation of phase behaviour of lipid and biomimetic systems under a wide variety of conditions;
- Biological fibres such as collagen structure in corneal tissue to understand eye disease.

Polymers

- Simultaneous structural and rheological studies of polymers under shear for use in food packaging;
- Block copolymer phase behaviour can be investigated with simultaneous DSC measurements;
- Self-assembled microstructures identified for drug delivery technologies, for example slow release (gel) or encapsulation (core shell particles).

Environmental

- Following corrosion processes including pit formation;
- Time resolved measurements of nanoparticle nucleation and growth;
- Structural investigations of ceramics, glasses and advanced materials.

Colloids & surfactants

- Particle shape analysis and particle size distribution information can be obtained for colloidal suspensions;
- Complex liquid crystalline phases can be identified and used as templates for catalysts;
- Phase behaviour in self-assembled systems such as paints, cosmetics and detergents and lubricants.

For further information

Diamond Industrial Liaison Team

+44 1235 778797
industry@diamond.ac.uk
diamond.ac.uk/industry
@DiamondILO

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