I16

Materials and Magnetism

Advanced materials continue to be at the forefront of science and technology. Understanding the structure and properties - electronic, mechanical, magnetic - of these materials remains one of the most challenging and active areas of science research.

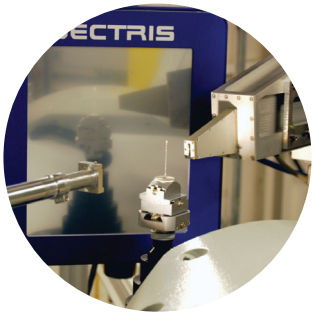
The Materials and Magnetism beamline provides a unique, world-class X-ray diffraction facility for studying a diverse range of materials. This versatile diffraction facility is fully optimised to combine high flux and high resolution over a wide and continuously tuneable energy range, for diffraction and scattering experiments on both single crystals, thin films and surfaces.

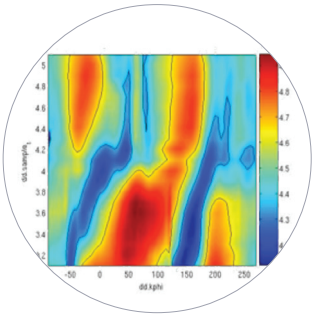
The high flux on this beamline is essential for two key categories of study:

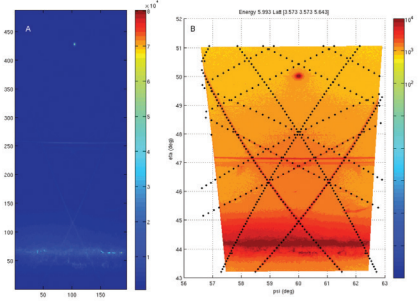
- measurements on very small sample volumes, including artificial nanostructures, thin films and surfaces.
- measurements of very weak scattering processes.

Beamline Specification

Techniques available	Diffraction / Resonant Scattering
Energy range (keV / Å)	3.3 – 15 / 0.83 – 3.76
Beam size (µm)	< 50 (V) x 200 (H)
Sample environments	Cryostat (~6 – 300K) High temperature cryostat (~12 – 800K)
Polarisation	Linear or Circular
Detectors	High resolution analyser Area detectors (Pilatus 100K and 2M)
Geometry	6 – circle kappa goniometer





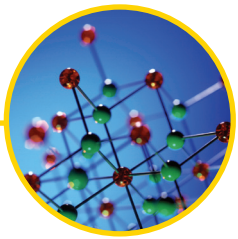


I16 APPLICATIONS

Thin Films & Multilayers

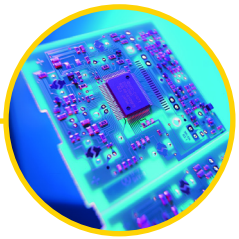
- Examine the structure of thin films and coatings;
- Near surface depth profiling of thin films;
- Investigate of oxidation and corrosion at surfaces;
- Thin film deposition studies including *in situ* studies.

Metals, Minerals & Inorganic Materials



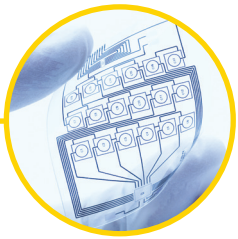
- Characterise inorganic materials including phase identification;
- Residual stress in crystalline materials;
- Texture development and grain orientation;
- Obtain structural information from glasses, ceramics, minerals and catalyst materials.

Electronic & Magnetic Properties



- Study spin, charge and orbital ordering on single crystal samples;
- Explore the structure of magnetic and ferromagnetic materials;
- Understand electronic and magnetic phenomena in novel crystalline materials.

Organic Materials



- Structural analysis of organic semiconductor films;
- Characterise the structure of crystalline structure of packaging materials;
- Small molecule single crystal diffraction studies.

For further information

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