The magnetic materials beamlines at Diamond Light Source

Dan Porter

Diamond Light Source Ltd, Didcot, United Kingdom

dan.porter@diamond.ac.uk

The magnetic materials group at Diamond Light Source contains 4 world leading instruments for the study of different aspects of magnetic and strongly correlated materials.

- I06 - The Nanoscience beamline exploits the brightest region in Diamond's spectrum, providing a high photon flux density for soft X-ray experiments. It combines microfocused soft X-rays with variable linear and circular polarisation and X-ray photoelectron emission microscopy (PEEM) to provide spectroscopic data on nanometre length scales. The intense polarised beam can be focused to a spot several microns in diameter, allowing the PEEM to probe nanomagnetism and nanostructures.
- I10 - Beamline for Advanced Dichroism Experiments (BLADE). BLADE delivers soft X-ray beam in the energy range from 0.4 to 2 keV. The research focuses on the magnetisation and the magnetic structure of novel nanostructured systems. These magnetic properties can be probed thanks to high dichroic effects in the soft X-ray region. The dichroic effect can be studied both in absorption and scattering experiments.
- I16 - Hard x-ray materials and magnetism beamline. This beamline provides high flux in the tender-hard x-ray energy regime, from 2.7-15 keV, ideal for looking at resonant edges of most 3d, 4d and 5d metals. A large kappa-diffractometer allows diffraction in a range of geometries from several sample environments including a 4K cryostat and 1T magnet. Full polarisation control and analysis is available with a double-crystal phase retarder and linear polarisation analyser.
- I21 - This is a dedicated Resonant Inelastic soft X-ray Scattering (RIXS) beamline that provides a highly monochromatised, focused and tunable X-ray beam onto materials, while detecting and energy-analysing scattered X-rays using a spatially-resolved two-dimensional detector. By studying the energy and momentum differences between the incident and the outgoing X-rays, one can obtain information such as the local lattice structure (local crystal field), electron orbitals (orbital excitations), collective lattice vibration (phonons), magnetic (spinons/magnons) and charge excitations of the material under investigation.

For more information, please come to the poster or see https://www.diamond.ac.uk/Instruments/Magnetic-Materials.html

https://www.diamond.ac.uk/Users/Apply-for-Beamtime.html

Keywords: X-ray scattering, magnetism, user facility, instruments