

Energy-selective neutron imaging on IMAT

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A new facility for neutron imaging and neutron diffraction called IMAT (Imaging and Materials Science) is currently being built at the pulsed neutron spallation source ISIS. IMAT will be available for a wide range of materials science applications with a main emphasis on engineering science. The special feature of IMAT will be energy-dependent imaging combined with neutron diffraction. The pulsed source operation facilitates a very flexible selection of neutron wavelength bands and a good energy resolution. Energy-selective imaging applications on IMAT will take advantage of the Bragg edge features in the total cross sections of many engineering materials. High-resolution Bragg edge mapping will allow visualizing structure properties in a material, for example strain and texture components, and show features which are invisible in conventional white-beam radiography data. An interesting aspect of IMAT will be tomography-driven diffraction for studying structurally and geometrically complex samples. The structures and materials inside engineering-sized samples can be more effectively analysed if the diffraction scans are guided by radiographic data. Vice versa, diffraction data may be indispensable for a physical interpretation of the wavelength-dependent attenuation features in radiography data.

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