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Bragg edge neutron imaging

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Energy resolved neutron imaging is a non-invasive technique based on spatially resolved measurements of the intensity of the neutron beam transmitted through the sample as a function of neutron energy / wavelength. When neutrons pass through a polycrystalline material so-called Bragg edges occur in the transmission or attenuation patterns. These features in the wavelength dependent attenuation spectra occur at the wavelength values corresponding to the lattice spacing, and thus can be used to achieve information about crystal structure, crystalline phases, texture or distortions of the lattice plains due to strain or temperature, that are present in a sample.

Since Bragg edge patterns are obtained through measurements performed in an imaging geometry, the measured crystallographic information is provided with spatial resolution.

Principles of the Bragg edge neutron imaging technique, required instrumentation and examples of applications will be presented.

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