

MS50-03 **Multilayer Optics for X-ray Analytical Equipment – The past, the present and the future.** Jörg Wiesmann, Andreas Kleine, Bernd Hasse, Jürgen Graf, Uwe Heidorn, Steffen Kroth, Frank Hertlein, Carsten Michaelsen *Incoatec GmbH, Geesthacht, Germany.*
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Even 100 years after the first publication of the Bragg equation, there are current developments which are still mainly based on this fundamental law. One of these developments are multilayer optics which are used for beam shaping of X-rays e.g. for focusing the X-rays onto the sample. The multilayer optics simulate an artificial crystal with the typical distance d of the Bragg equation. It is advantageous that this distance can be changed and thus adapted to the specific application and setup. The development of multilayer optics allowed a performance increase of modern diffractometers by more than one order of magnitude.

In this contribution, we will give an overview of current developments of multilayer optics. We will explain the design and the manufacturing process of the optics and give some examples of typical applications which benefit from the new possibilities, especially in combination with modern microfocus X-ray sources. Applications like GISAXS, highpressure XRD or micro-diffraction known from synchrotrons, can be realized now in the home-lab.

Keywords: X-ray optics; multilayer thin films; new XRD technology

MS50-04 **The New Neutron Laue Diffractometer at HZB** Gail N. Iles, Susan Schorr *Helmholtz-Zentrum-Berlin, Germany*
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Neutron Laue Diffraction is an important method of neutron scattering for measuring single crystals. Utilising a white beam consisting of a range of wavelengths, Laue diffraction patterns can be generated in a matter of seconds from very small crystals i.e. $<1\text{mm}^3$. The Laue instrument produces a 2D projection of a large volume of reciprocal space in a single Laue pattern. Such images can be used to index complex crystal structures, characterise features such as twinning or preferred orientation whilst phase transitions can be investigated using a full range of sample environments. The Laue Diffractometer at the Helmholtz-Zentrum-Berlin (HZB) is currently under construction in the Experimental Hall at the research reactor, BER II. Utilising a direct beam from the D1S beamtube the instrument will sit just 7m from the 10MW neutron source providing a high-flux, uninterrupted neutron beam approximately 10mm in diameter. Two scintillating plates arranged in back-scattering and transmission geometry will be coupled to 4xCCD cameras each, providing fast readout time and zero deadtime between measurements. As a specialist centre for Sample Environment, the Laue Diffractometer at HZB will offer a full range of sample environments to users including Low/High temperature, Magnetic field and High Pressure and combinations of these. As a unique opportunity in the field of neutron research we aim to offer high-temperature, high-pressure single-crystal experiments to users by 2014. Such conditions are desirable for a more complete analysis of geological samples. After commissioning of the neutron Laue Diffractometer at the end of 2013 we invite users to submit proposals for experiments in all fields of science.

Keywords: neutron; laue; diffractometer