

The At-Wavelength Metrology facility for UV- and XUV reflection and diffraction optics at BESSY-II

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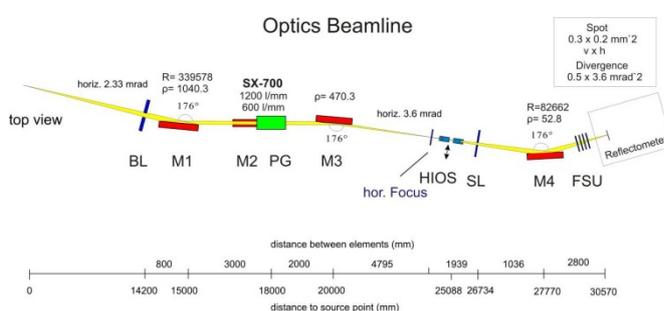
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We have established a technology center for the production of high precision reflection gratings. Within this project a new optics beamline and a versatile reflectometer for at-wavelength characterization of UV- and XUV reflection gratings and (nano-) optical elements has been set up in a clean-room surrounding at a bending magnet of the BESSY-II storage ring.

The Plane Grating Monochromator beamline operated in collimated light (c-PGM) is equipped with an old broad-range SX700 monochromator. The blazed gratings (600 and 1200 l/mm) have been exchanged by new ones of better performance produced in-house. Over the operating range from 10 to 2000 eV this beamline has very high spectral purity achieved by (1) a four-mirror arrangement of different coatings which can be inserted into the beam at different angles and (2) absorber filters for high-order suppression. Stray light and scattered radiation is suppressed efficiently by in-situ exchangeable apertures and slits. The beamline can be adjusted to either linear or elliptical polarization by use of off-plane synchrotron radiation.

The main feature of the novel 4-circle and 6-axes reflectometer is the possibility to incorporate real lived-sized gratings (up to >300mm in length). The samples are adjustable within six degrees of freedom by a specially developed UHV-tripod system compatible with a sample load up to 4 kg. Reflection properties can be measured between 0 and 89.9 degrees incidence angle for both s- and p-polarization geometry. A 360°-azimuthal rotation of the sample allows investigation of polarization properties.

This novel powerful metrology facility is in operation and is open for sophisticated reflection spectroscopy experiments. Results on optical performance and measurements on (multilayer-) gratings and interface structures will be presented at the workshop.



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REFERENCES

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