At-Wavelength Metrology facility for XUV optics at BESSY-II

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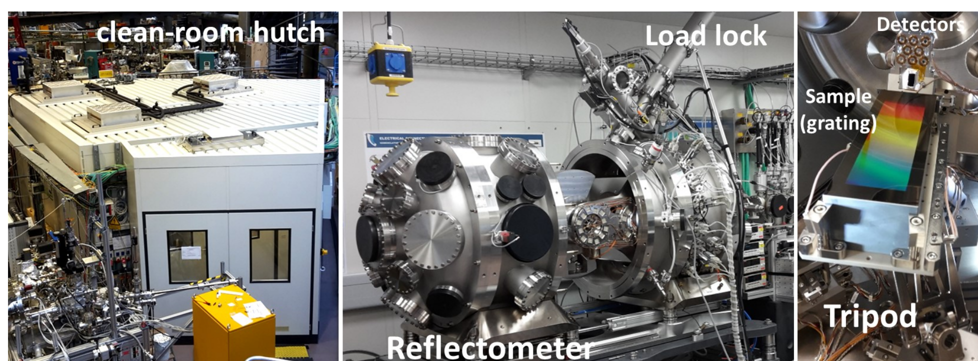
The At-Wavelength Metrology Station in a clean-room hutch at the BESSY-II storage ring is in operation since 2015 [1, 2]. It consists of a plane grating monochromator beamline in collimated light (c-PGM) at a bending magnet and a versatile UHV-reflectometer with 11 axes. The energy range covers the EUV and XUV. High spectral purity of the incident beam is achieved by a set of 12 absorption filters and a High-Order Suppressor System (HiOS) consisting of 4 mirrors which can be inserted into the incident beam under variable angles of incidence without changing of the original beam path. It was experimentally tested that this system gives a nearly high-order free beam between 13.5 eV and 1800 eV. A flexible sample support system based on an UHV-tripod gives 6 degrees of freedom for a precise alignment and mapping of optical elements under test. A load-lock system for up to five samples of 60 $\times$ 40 $\times$ 10 mm^3 has recently been installed.

In more than three years of operation the station was successfully used to perform precise characterization of the efficiency of our in-house produced diffraction gratings [3] as well as to develop novel optical concepts employing e.g. reflection zone plates (RZP), multilayer mirrors, multilayer coated gratings [4], poly-capillary lenses and copy-stamp gratings. Part of the beamtime is dedicated to commercial measurements and to scientific user projects focused on investigation of optical properties as well as internal microstructure and interfaces in (ultra-)thin layered systems. The present status of the metrology station, its upgrade projects and challenging recent results will be presented at the conference.



Optics beamline - At-Wavelength Metrology facility

References

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