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A new monochromator chamber design for XUV/ soft X-ray spectroscopy at FLASH

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FLASH, the soft X-ray free-electron laser (FEL) in Hamburg provides high-brilliance ultrashort femtosecond pulses at MHz repetition rate for user experiments. For many spectroscopic and dynamical studies in various research fields a small FEL energy bandwidth and ultrashort pulses are a prerequisite. In order to increase the spectral resolution while still keeping the photon pulses short, a new double grating monochromator beamline has been designed* and taken into operation at FLASH. The new ultra-high vacuum compatible monochromator chamber along with the diffraction grating holders were designed in-house at DESY in collaboration with HZB Berlin. In order to meet the required optics adjustment resolution and stability** special care was taken on the stability and reproducibility of all mechanical movements. Here, we present the new monochromator chamber design. Based on the required specifications regarding resolution and accuracy, the technical implementation, including optics pre-alignment and test results, are shown.

Footnotes

*L. Poletto, F. Frassetto, G. Brenner, M. Kuhlmann and E. Plönjes, Double-grating monochromatic beamline with ultrafast response for FLASH2 at DESY, Special Issue (PhotonDiag2017), J. Synchrotron Rad. 25, 131-137 (2018); <https://doi.org/10.1107/S1600577517013777>

**M. Ruiz-Lopez, L. Samoylova, G. Brenner, M. Mehrjoo, B. Faatz, M. Kuhlmann, L. Poletto and E. Plönjes, Wavefront-propagation simulations supporting the design of a time-delay compensating monochromator beamline at FLASH2, J. Sync

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