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New wavefront sensor for renewed differential pumping unit at FLASH2 beamlines

In the past years, DESY developed in collaboration with the Institut für Nanophotonik Göttingen e.V. several Hartmann wavefront sensors (WFS) for FEL focus characterization and optics alignment in the soft x-ray spectral range, approx. 5 - 40 nm. In principle, a WFS is used in the direct beam at an appropriate position behind the focusing system which is to be characterized. Practically, at FLASH this straight direction is often blocked by an experimental setup, thus prohibiting fast focal spot characterization and in-situ adjustment during the experiments. For this reason and as a first improvement, the FEL beam at beamline FL24 can be deflected at 90° just before the experiment and guided to a WFS located in a distance of about 3 m behind the focus position.

As this concept is very space consuming, a new differential pumping unit with a permanently integrated WFS located directly after the K-B focusing optics system, was developed. This newly designed WFS is located in front of the nominal beamline focus position under an angle of 45° to the beam. The beam is directed to the WFS by means of a Ni mirror, which is adjustable in 6 degrees of freedom. This deflecting mirror can be moved in very fast for optics alignment and focus optimization. Although not in-situ this allows one to efficiently prepare the beamline focus for user experiments.

This fast and space-saving method will be presented and first results will be shown. A new and compact WFS under development will be presented.

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no

Primary author: KEITEL, Barbara (DESY)

Co-authors: BRACHMANSKI, Maciej (DESY); BRENNER, Günter (DESY); CHOPRA, Pragya (DESY); DZIARZHYTSKI, Siarhei (Deutsches Elektronen Synchrotron (DESY)); KREIS, Svea (DESY); KUHLMANN, Marion (DESY); RUIZ LOPEZ, Mabel (DESY); TOLEIKIS, Sven (DESY); WEIGELT, Holger (DESY); MANN, Klaus (IFNANO); LÜBBECKE, Maik (IFNANO); SCHÄFER, Bernd (IFNANO); PLÖNJES, Elke (Deutsches Elektronen-Synchrotron DESY)

Presenter: KEITEL, Barbara (DESY)

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