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Compact Spectrometer for On-Line Photon Diagnostics at FLASH

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We present the design and characterization of a compact and portable spectrometer especially realized to analyse in real time the high-order harmonic contents of the FEL beam at FLASH.

The instrument can be installed behind a generic experiment, at the end of a FEL beam line. It can monitor both the fluctuations of the fundamental FEL emission and its high-order harmonic content. The design is based on the use of two flat-field grazing-incidence gratings and a EUV-enhanced CCD detector to cover the spectral range 2–40 nm. The absolute response of the instrument has been calibrated in the whole spectral region of operation to make calibrated measurements.

We present here the design of the instrument, the calibration procedure and some experimental data taken at FLASH in the beamline BL1. High-order harmonic emission up to the V harmonic has been measured.

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