Hard x-ray focus characterization at the European X-ray Free Electron Laser using a fluorescent crystal detector

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Information upon the wavefront of x-ray radiation and its intensity distribution at the focusing point is extremely important for experiments that are carried out using x-ray free electron lasers (XFELs). In our experiments at the European XFEL, the focus of hard x-ray radiation was characterized at a High Energy Density beamline for the first time with using a LiF detector. Two compact refractive lens systems have been tested for achieving of μm–nm spot size. Due to the high spatial resolution (no less than 0.7 μm) and dynamic range (no less 10^6) of the LiF crystal, a real energy distribution of radiation and spot size in focus point were found.