PhotonMEADOW 2023

Contribution ID: **12** Type: **Oral**

Hard X-ray Hartmann wavefront sensor for focus optimization of Compound Refractive Lenses at the European X-ray Free Electron Laser

Wednesday, September 13, 2023 11:50 AM (20 minutes)

The intense X-ray FEL beam delivered by European X-ray Free Electron Laser (EuXFEL) facility gives rise to strong challenges for the optics and their diagnostic. It is important to have an accurate knowledge of the single pulse X-ray wavefront, which affects focal plane intensity and profile, spot size, and spatial resolution, as well as centroid location within the focal plane. Wavefront sensing is important for quantitatively understanding the aligning of X-ray optical components and for conducting scientific experimental analysis. The Hartmann hard X-ray Wavefront sensor (HXWFS) enables measurements over a wide range of energies, as is common on X-ray instruments, with simplified mechanical requirements and is compatible with the high average power pulses delivered by EuXFEL. Hartmann sensor is composed of a grid of holes and a 2D detector that is tightly bound together with mechanics as a single device. Furthermore, the use of a hole array makes the sensor achromatic; wavefront measurement can be performed over a broad energy range. We will present recent preliminary results of the characterization of the focus scheme of SPB/SFX hutch compound refractive lenses (CRLs) at 9.3 keV photon energy using HXWFS (from the Imagine Optic, France) and Talbot wavefront sensor (diamond phase grating + scintillator-based camera) device. It is used to provide real-time measurement of the focal spot by CRLs of a beamline at strategic positions such as at the interaction of sample position.

Journal of Synchrotron Radiation Special Issue: will you submit your contribution?

yes

Primary author: Dr KUJALA, Naresh (EuXFEL)

Co-authors: Dr VAGOVIC, Patrik (EuXFEL); Dr KOLLYADU, Jayanath (EuXFEL); Dr TOKUSHI, Sato (EuXFEL); Mr GAUTAM, Randeer (EuXFEL); Mr MATTIA, Mattia; Mr LOPEZ MORILLO, Luis; Dr BEAN, Richard (EuXFEL); Dr GRUENERT, Jan (European XFEL)

Presenter: Dr KUJALA, Naresh (EuXFEL)

Session Classification: Wavefront sensing