



European XFEL Science Seminar

Tuesday, 13th June 2017, 17:00 (Tea/Coffee at 16:45)
Campus Schenefeld, Main building (XHQ), Room E1.173

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Development of X-ray optics for SACLA

Advent of XFEL sources has promoted development of new X-ray optics to enable new experimental schemes. In the last decade, we have continuously developed X-ray optics for SACLA [Ishikawa et al., Nat. Photon 2012] based on experiences of SPring-8, a 3rd generation synchrotron light source. One of the most important developments was to produce ultraintense x-ray beam over $1e20$ W/cm² by reflective focusing optics [Mimura et al., Nat. Com. 2014], which was used for achievement of Cu Ka lasing [Yoneda et al. Nature 2015]. A split-and-delay optical system composed of flat crystals and channel-cut crystals, which is able to produce two pulses with a variable temporal separation from a fs to sub-ns range, has been successfully tested [Osaka et al, under review]. For photon diagnostics, we have proposed to use a grating beam splitter to construct dedicated diagnostic branches, and installed it as a permanent device [Katayama et al., Str. Dyn. 2016] in collaboration with PSI. In the arrival-timing diagnostic branch, we have utilized a one-dimensional X-ray focusing mirror to increase the X-ray intensity for cross correlation analysis, which is now utilized for routine user operation to improve a temporal resolution in pump-probe experiments to much better than 100 fs. In the spectrum diagnostic branch, we have installed a dispersive crystal spectrometer that can switch an energy resolution [Yabashi et al. PRL 2006; Inubushi et al. PRL 2012].

Recently, we started design and development of X-ray optics for SPring-8-II, an upgrade project of SPring-8. Experiences and know-how accumulated at SACLA are now exported to development for the new ring. Some of the ongoing studies will be presented in my talk.

Host: Ulrike Bösenberg