European XFEL

European XFEL Science Seminar

Tuesday, 14th May 2019, 13:00
Campus Schenefeld, XTOB room E1.01

Byoung-Ick Cho

Gwangju Institute of Science and Technology, Korea

Investigation of Warm Dense Matter with Ultrafast and Ultraintense Lights

Recent advent of XFEL and PW-class lasers, delivering ultrafast light with extreme brilliance, opens up the new era for various fields of research. Warm Dense Matter (WDM) physics, the study of matter in which the thermal energy is comparable to the Fermi energy and the ions are strongly coupled, is one of those benefited enormously from these light sources.

In this seminar, I will introduce a few experiments which my group at GIST has been working on. First, a series of pico and femtosecond XAS measurement for warm dense matter excited with femtosecond laser pulses. We have used various light sources with different wavelengths and durations, such as synchrotron, XFEL and HHG-EUV as probes [1]. Nonequilibrium processes in different time scales involving electrons and phonons in warm dense conditions will be discussed. Second, ultraintense light-matter interaction in optical and x-ray regime [2]. Thin foil targets irradiated by either intense XFEL or 100-TW laser pulse were examined with XES. Determination of temperature, charge states distribution, electron transitions and transport in the extreme condition will be presented.

[1] B. I. Cho *et al*. PRL 106, 167601 (2011), B. I. Cho *et al*. Sci. Rep. 6, 18843 (2016), J. W. Lee *et al*. – *submitted*

[2] B. I. Cho *et al*. PRL 109, 245003 (2012), B. I. Cho *et al*. PRL 119, 075002 (2017), L. J. Bae *et al*. Opt. Exp. 26 6294 (2018)

Host: Karen Appel