Contribution ID: **16** Type: **not specified**

Modeling and analyzing resonant x-ray diffraction from solids irradiated by XFEL pulses

The experiments at X-ray Free Electron Lasers (XFEL) enable the study of an unexplored regime of high-intensity x–ray–matter interaction. By means of focused XFEL pulses, it is possible to create a transient state of matter where crystalline order is preserved while atoms are core-excited. Such atoms couple strongly to x-ray radiation resonant with core-level transition, hence creating a medium with unusual x–ray–matter interaction properties. As a result, phenomena such as x-ray amplification and enhanced scattering can take place.

Within the project, the x-ray propagation and scattering from the resonant medium will be investigated to describe the recent experiments at European XFEL (Germany) and SACLA (Japan). To model the x–ray–matter interaction, the code developed in the group will employed and extended. The expressions for resonant x-ray diffraction signals will be analytically derived and implemented in the code. The results of the modeling will be compared to the experimental data. To this aim, the data analysis methods will be developed to extract the quantities of interest from the recorded detector signals.

Group

FS-TUXS

Project Category

A6. Theory and computing

Special Qualifications

Primary author: BENEDIKTOVITCH, Andrei (FS-TUX (Theoretical ultrafast X-ray science))

Co-author: ROHRINGER, Nina (FS-TUX (Theoretical ultrafast X-ray science))