Contribution ID: 3 Type: Oral

## Ultrafast structural changes in Fe studied by time-resolved X-ray diffraction

Monday, November 4, 2024 2:30 PM (15 minutes)

The atomic structure of the thin Fe layer after sub-ps pulsed laser annealing has been studied by time-resolved X-ray diffraction [1]. The laser pulse energy is transferred to the lattice within about 1 ps due to the strong electron-phonon coupling. This rapid heating leads to ultrafast melting. However, solid-solid structural transformations occur below the threshold of complete melting. At high temperatures, phonon softening occurs, leading to lattice distortion, as predicted by ab initio theoretical simulations.

[1] J. Antonowicz et al., Acta Materialia 276 (2024) 120043

## Type of presence

Presence online

Primary author: Dr LIUBCHENKO, Oleksii (Institute of Physics Polish Academy of Sciences)

**Co-authors:** Dr KLINGER, Dorota (Institute of Physics, Polish Academy of Sciences); JACYNA, Iwanna (Institute of Physics, Polish Academy of Sciences); Dr ANTONOWICZ, Jerzy (Faculty of Physics, Warsaw University of Technology); Prof. SOKOLOWSKI-TINTEN, Klaus (Faculty of Physics, University of Duisburg-Essen, Center for Nanointegration Duisburg-Essen (CENIDE), University of Duisburg-Essen); Dr ZALDEN, Peter (European XFEL); Dr MINIKAYEV, Roman (Institute of Physics, Polish Academy of Sciences); SOBIERAJSKI, Ryszard (Institute of Physics, Polish Academy of Sciences); Mr ALBERT, Thies (Faculty of Physics, University of Duisburg-Essen)

Presenter: Dr LIUBCHENKO, Oleksii (Institute of Physics Polish Academy of Sciences)

**Session Classification:** Exploring Ultrafast Phenomena with the XFEL: Instruments, Capabilities, and Applications

Track Classification: USyNC Workshop