

Applications in structural dynamics at the ELI Beamlines user facility

Located in Dolni Brezany, next to Prague in the Czech Republic, the ELI Beamlines facility develops state of the art, high intensity, lasers for fundamental and applied research. As a user facility ELI Beamlines will make high intensity lasers, laser driven XUV, X-ray and particle sources available for the international user community. Within ELI Beamlines the objective of the Department of Structural Dynamics is to develop and operate user stations for research into the structure, dynamics and function of samples ranging from isolated atoms to complex biological samples and the solid state using ultrashort pulses from laser-driven XUV / X-ray sources as well as pulses from the primary infrared lasers. A key advantage of the ELI Beamlines facility is in the possibility to utilize unique combinations of lasers and laser driven sources with near-perfect synchronization. This makes it possible to carry out demanding pump-probe experiments, with the particular aim at understanding the complex dynamics underpinning advanced functions or fundamental processes. Users will be able to study the mechanisms of physical, chemical and biological processes at the atomic level and on time scales ranging from femto- to milliseconds, study and control electronic processes and study complex systems in a range of environments. Central experimental technologies include time-resolved diffraction, scattering and imaging techniques, optical (IR to DUV), XUV and X-ray spectroscopy. Instruments presently available for user experiments, or in an advanced commissioning state are:

A multi purpose end station for AMO science and Coherent Diffractive imaging

Ultrafast optical spectroscopy:

- Femtosecond Stimulated Raman Scattering and transient optical absorption.
- Time resolved spectroscopic ellipsometry.
- IR spectroscopy

A station for X-ray experiments, in particular diffraction/scattering and spectroscopy