Introduction to the available capabilities for material science applications at the ELI Beamlines facility

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We introduce the activities of the research programme Applications in Molecular, Bio-medical and Material (MBM) science at the ELI Beamlines (ELI BL) facility in the Czech Republic. The MBM research programme develops methods for time resolved studies (spectroscopy, diffraction and imaging) of ultrafast phenomena in physics, chemistry and biology utilizing pulsed lasers and laser driven X-ray sources.

This talk will focus mainly on the experimental capabilities in the field of material science that are under development using the High Harmonics Generation (HHG) source and Plasma X-ray Source (PXS) driven by high power kHz lasers. Basing on these VUV and X-ray sources the MBM research programme develops experimental stations for VUV ellipsometry, AMO science, Coherent Diffractive Imaging, time- resolved X-ray diffraction and absorption as well as pulse radiolysis. We will also present how these X-ray and VUV instruments are complemented by time resolved VIS-IR spectroscopy which is also developed at ELI BL. As an example we will present the transient dielectric function obtained for the first time for excited ZnO and Ge using time resolved ellipsometry. At the end, we will provide details of the First Call for Users currently opened at ELI BL.