Contribution ID: **2** Type: **not specified**

ELI ERIC: new capabilities for applications in molecular, bio-medical and material science

Friday 23 June 2023 11:10 (20 minutes)

Extreme Light Infrastructure (ELI) is a European Project forming a pan-European Laser facility to provide the most intense femtosecond lasers in the world for fundamental and applied research. The Extreme Light Infrastructure European Research Infrastructure Consortium (ELI ERIC) was established in 2021 to jointly manage operations of ELI Beamlines in the Czech Republic and ELI-ALPS in Hungary. ELI ERIC founding Members are the Czech Republic (Host), Hungary (Co-host), Italy, and Lithuania, with founding Observers Germany and Bulgaria. The scientific activities of ELI facilities are based on the utilization of ultrashort pulse lasers with a unique combination of pulse profile, repetition rate, and intensity. One of the important missions of ELI is to develop a new generation of laser-driven sources for ultrashort pulses covering the ultrabroad electromagnetic radiation range (from THz to γ-ray) based on plasma effects in gases, solids as well as relativistic electron acceleration.

Here we introduce the experimental research capabilities offered by ELI ERIC to researchers working in molecular, bio-medical and material science. In particular, we highlight unique infrastructure available at ELI Beamlines facility which is focused on developing the complementary capabilities in optical, VUV and X-ray science in one location, with advanced sample preparation abilities. The complex ultrafast phenomena in solids, liquids or gas phase can be studied utilizing pulsed lasers and laser-driven X-ray sources.

ELI is thought of as a user facility open to all scientists. Details of how to submit a proposal to carry on experiments using ELI ERIC infrastructure will be also provided.

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Session Classification: Facilities