

Multi-laser accelerator facility ELI Beamlines: Laser Safety Challenges

Petr Procházka, Veronika Olšovcová, Marek Bizdra, Jiří Trdlička

ELI-Beamlines is the Czech Republic based pillar of the Extreme Light Infrastructure, a European Research Infrastructure Consortia, for the next generation of high energy and high intensity lasers. It aims at the development of high-brightness sources of X-rays and the acceleration of proton, electron, and ion beams, to be used both for pure research and practical applications for users. The user facility is to host 4 main high intensity and ultrashort (femtosecond) laser systems with power ranging from hundreds of TW to 10 PW. Besides, local laser systems are used not only for alignment procedures but also for basic experiments operation.

The laser beams are to be delivered from laser halls to the experimental halls through beam transportations system that is capable of switching the direction of the laser beams to various experimental halls. Therefore, special considerations on safety systems have to be taken into account beside careful experiment organization. As some experimental halls accommodate workstations with different modes of operation and various laser beam parameters, it is fundamental to implement engineering and administrative controls that guarantee operational safety of both employees and users.

For the future routine operation it is essential to plan and develop comprehensive laser safety management program. Additionally, to assure clear understanding of laser safety mission it is crucial to design and implement efficient and easy to use engineering controls.

This contribution will address the most significant laser safety challenges at ELI Beamlines facility, and describe laser safety approach and controls designed, implemented, and used.