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Science and technology of laser-driven X-ray sources at ELI Beamlines

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X-ray sources driven by femtosecond lasers with high peak power provide compact alternatives to large-scale facilities such as synchrotrons and X-ray Free electron lasers. ELI Beamlines facility is devoted to providing various beamlines of laser-driven X-rays and accelerated particles to the user community [1]. While the X-rays sources driven by kHz lasers such as high-order harmonic beamline [2] and plasma X-ray sources [3] have entered the operation phase with regular experiments performed together with external users, the sources driven by PW-class L3 laser [4] are about to be commissioned soon.
In this contribution, I will provide a review of the technical implementation of the laser-driven X-ray sources and present selected results from recent application experiments.

1. B. Rus et al. "Outline of the ELI-Beamlines facility", Proc. SPIE 8080, 808010 (2011).
2. O. Hort et al., "High-flux source of coherent XUV pulses for user applications", Opt. Exp. **27**, 8871 (2019).
3. J. Nejdl et al, "Progress on laser-driven X-ray sources at ELI Beamlines", Proc. SPIE 11111, 111110I (2019).
4. U. Chaulagain et al. ELI Gammatron Beamline: A Dawn of Ultrafast Hard X-ray Science, Photonics **9** (11), 853 (2022)

Summary

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