



Contribution ID: 686

Type: Invited Talk

## Physics and Application of the ELI betatron radiation source

Thursday 25 September 2025 09:30 (30 minutes)

The realization of compact, broadband X-ray sources is one of the most promising applications of laser-plasma accelerators (LPAs). State-of-the-art LPA-based X-ray sources currently deliver photon fluxes exceeding  $10^{11}$  photons per shot [1]. In this contribution, we present a summary of compact X-ray sources offered to user applications at the ELI Beamlines facility. One of the key developments is the Gammatron beamline [2], which generates a collimated, bright, and partially coherent X-ray beam suitable for a wide range of multidisciplinary applications. Furthermore, we introduce a novel optical probing technique allowing precise characterization of low-density gas targets used in LPAs [3].

A second LPA-based X-ray source, the Betatron source, is currently under development at the ELI Plasma Physics Platform (P3) [4]. This source is specifically designed to serve as a back lighter for laser-matter interaction studies, High energy density (HED) physics & Inertial fusion energy (IFE) experiments and advanced investigations in plasma physics.

### References

1. S. Fourmaux, et al., Opt. Express 28.3,3147-3158 (2020)
2. U. Chaulagain, et al., Photonics, 9.11 (2022).
3. M. Raclavsky et al., Opt. Letters 49.9 2253-2256 (2024).
4. U. Chaulagain et al., SPIE Conf. Proc. (2018)

**Author:** CHAULAGAIN, Uddhab (ELI beamlines)

**Co-authors:** MORABITO, Antonia (Extreme Light Infrastructure ERIC, ELI beamlines Facility, Dolni Brezany, Czech Republic); Mr CAP, Dominik (Extreme Light Infrastructure ERIC, ELI beamlines Facility, Dolni Brezany, Czech Republic); NEJDL, Jaroslav (ELI Beamlines Facility, Extreme Light Infrastructure ERIC); TA PHUOC, Kim (Université de Bordeaux, CNRS, CEA, Centre Lasers Intenses et Applications); LAMAC, Marcel (ELI Beamlines); Ms MORVAI, Orsolya (Extreme Light Infrastructure ERIC, ELI beamlines Facility, Dolni Brezany, Czech Republic); CIPIC-CIA, Silvia (University College London); Mr JANOTA, Vojta (Extreme Light Infrastructure ERIC, ELI beamlines Facility, Dolni Brezany, Czech Republic)

**Presenter:** CHAULAGAIN, Uddhab (ELI beamlines)

**Session Classification:** Plenary Session

**Track Classification:** Invited Talk