Contribution ID: **17** Type: **not specified**

Generation and Characterization of Secondary Radiation from Laser Wakefield Acceleration

Wednesday 15 October 2025 17:20 (20 minutes)

Laser Wakefield Acceleration (LWFA) is a promising technique for generating relativistic electron beams and secondary radiation in compact experimental setups, through the interaction of an ultra-short, high-intensity laser pulse with a supersonic gas jet. Beams of X-rays, known as betatron radiation, are generated by the transverse oscillations of electrons in the plasma channel created from the interaction. In addition, THz radiation can be emitted when the electrons leave the plasma–vacuum boundary.
For the EuPRAXIA Advanced Photon Source (EuAPS) project, the first user-dedicated betatron source is under development at INFN-LNF. The facility will deliver photons with 1-10 keV critical energy, operating at 1 Hz under highly non-linear laser–plasma interaction conditions.

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