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Initial characterization of a laser-driven betatron radiation source in the EuAPS project

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Betatron radiation is the spontaneous emission of radiation produced by the betatron oscillations of electrons in a plasma during the Laser Wakefield Acceleration (LWFA) process. A high-intensity and ultra-short laser pulse is focused on a supersonic gas jet, simultaneously creating a plasma, injecting, and accelerating electrons, which then emit this radiation. In the framework of the EuPRAXIA project, EuAPS (EuPRAXIA Advanced Photon Source) will be the first user-oriented radiation source based on betatron radiation developed at LNF-INFN Frascati in collaboration with CNR and the University of Rome Tor Vergata.
This radiation source has a wide range of applications, including materials science, medical and biological research. The user facility aims to deliver 1-10 keV photons using a compact laser-driven plasma accelerator operating in a self-injection mechanism, which occurs in highly nonlinear laser-plasma interaction. In this contribution, we present the expected parameters of the source and the result of several dedicated experimental campaigns conducted within the EuAPS project to provide the preliminary characterization of the x-rays betatron radiation source.

Footnotes

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