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"Preliminary Study of the X-ray Betatron Radiation Source in the EuAPS Project"

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X-rays radiation produced by electrons oscillating in a plasma in the Laser WakeField Acceleration (LWFA) process is called betatron radiation.
When an ultra-short, high-intensity laser pulse interacts with a supersonic gas jet, it simultaneously ionizes the gas, creating a plasma, and injects and accelerates electrons into the plasma wave, leading to the emission of this radiation.

As part of the EuPRAXIA project, EuAPS (EuPRAXIA Advanced Photon Source) will be the first user dedicated betatron radiation source developed at INFN Frascati. This source has significant potential for applications in fields such as materials science, medical imaging and biological research.
The facility is designed to produce 1-10 keV photons using a compact laser-driven plasma accelerator operating at 1 Hz, in the self-injection regime under highly nonlinear laser-plasma interaction conditions.

This contribution presents the expected parameters of the radiation source and the results of several experimental campaigns conducted within the EuAPS project to characterize the acceleration process and the X-ray radiation source.

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