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Laser-driven Radiation Sources for Applications

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High power laser technology is now leading to the realization of new large laser infrastructures aimed at the exploration of new physical domains. Meanwhile, all-optical radiation sources based on acceleration with self-injection are also being considered as Thomson/Compton sources.
At the same time, the practical use of laser-driven sources will require the development of high-efficiency and high-repetition rate laser systems to achieve source performances with the required high average power needed for most applications.
In this paper we show the results of a recent development in all-optical laser-plasma acceleration for electron and secondary radiation sources carried out at ILIL and FLAME laser installations. We will show results of electron microradiography and comparative dosimeter with standard electron sources with sub 10 MeV electrons. Also we will present the status of an all-optical Compton ɣ-ray source driven by self-injection at electron energy range up to 1 GeV, including experimental data on self-injection and numerical simulations using advanced 3D GPU particle in cell code. Finally, an overview will be given of the development of a laser scheme based on Yb for a high energy amplifier for future high-rep rate laser systems.

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