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Frontiers of Inverse Free Electron Laser acceleration

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Here we review the status of Inverse Free Electron Laser as a high gradient advanced accelerator presenting recent results on applications of IFEL beams for X-ray generation and the demonstration of high repetition rate laser acceleration using this efficient advanced accelerator scheme. We will then discuss the next steps in the development of IFEL. In particular we analyze the possibility of lowering the injection beam energy using short period undulators and of using waveguides to limit diffraction effects, increase the interaction length and control the output longitudinal phase space.

Primary author: MUSUMECI, Pietro (UCLA)

Co-authors: SUDAR, Nicholas (University of California, Los Angeles Department of Physics and Astronomy); FISHER, A.

Presenter: MUSUMECI, Pietro (UCLA)

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