



Contribution ID: 345

Type: talk

## Frontiers of Inverse Free Electron Laser acceleration

*Tuesday, 17 September 2019 16:20 (20 minutes)*

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.

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**Session Classification:** WG4 - FEL

**Track Classification:** WG4 - Application of compact and high-gradient accelerators