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Laser diagnostics for a laser-plasma electron accelerator

Bachelor Thesis

Abstract

Laser-plasma accelerators are the new frontier for compact particle accelerators. By using ultrashort high-power lasers it is possible to accelerate electrons up to GeV energies in few cm distances. However, to fully exploit this potential, the laser parameters at the point of interaction must be fully measured in space and time, and hence optimized to have the highest intensity possible.

The candidate work will be done in the Electron Acceleration Group at ELI-Beamlines and will consist in the short laser pulse description and characterization in general, having an overview of the analytical description of the laser pulse and all the basic diagnostics usually needed in a real experiment. Particular attention will be given to one advanced diagnostics device (for ex. pulse duration measurement by spectral interferometry or spatial profile imaging).

The candidate is expected to implement a measurement technique in a real laboratory setup, by installing a device and doing data analysis.

No particular software skill is required, data analysis and presentation will be done in Matlab.

Supervisor

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