Katedra

Katedra laserové fyziky a fotoniky (14112)

Program

Fyzikální inženýrství

Školitel

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Téma práce THz-Based Time-Domain Diagnostics for Laser-Plasma Accelerator Electron Beams

Thesiss Frame

The PhD study will be proceeded as full-time CTU internal project under Czech-Switzerland “SWISSELITE” grant, Call 8K2501. Grant was obtained by ELI ERIC, Czech Republic under cooperation with Paul Scherrer Institute, Switzerland. The goal is to build and study THz-Based Time-Domain Diagnostics for Laser-Plasma Accelerator Electron Beams driven by L2 DUHA Auxiliary beam for E5 Luis beamline. The research focuses on utilizing coherent transition radiation (CTR) in the THz regime as a primary tool for non-destructive measurement of bunch length and temporal profile. A key contribution of this work is the design and implementation of a high-resolution spectrometer enabling real-time charge density reconstruction. The experimental section analyzes how laser pulse parameters and plasma density fluctuations influence the stability and duration of the produced electron bunches. The results can that THz-based diagnostics are essential for optimizing beam quality for demanding applications, such as free-electron lasers (FELs)