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Ultrashort Relativistic Electron Bunch Characterization via High-Gradient THz Streaking

Wednesday 10 September 2025 16:00 (2 hours)

We report progress on a THz streaking experiment at the UCLA Pegasus Laboratory enabling femtosecond-resolution electron bunch length measurements. Single-cycle, 50 μJ THz pulses centered at 0.6 THz are coupled into a metallic horn structure, enhancing field strengths to several hundred MV/m while simultaneously establishing boundary conditions for a strong streaking gradient. A multi-frequency RF photoinjector system produces ultralow-emittance, high-brightness electron beams, which are compressed to sub-femtosecond durations at MeV energies. This setup enables demonstration of THz streaking-based longitudinal point-spread function measurements with femtosecond resolution.

Footnotes

Funding Agency

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Yes

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