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Progress on the Commissioning of a Terahertz-Driven Velocity Bunching Experiment

Wednesday, September 18, 2019 7:00 PM (1 hour)

Terahertz-driven electron beam manipulation promises femtosecond control of bunches with femtosecond timing jitter. A compact, terahertz-driven velocity bunched electron beam demonstration is under development at the Cockcroft Institute. A lithium niobate terahertz radiation source using the tilted pulse front scheme has been established experimentally and its interaction with a 100 keV electron bunch, generated from a previously characterised photoemission gun, has been simulated. This is part of a larger group effort which hopes to demonstrate an apparatus capable of generating, deflecting and accelerating a high quality, ultra-short electron bunch, using one laser system to guarantee synchronisation between stages. Such a short bunch accelerator can be readily applied to ultrafast electron diffraction application, and has potential for solving long-standing challenges of external injection into high-gradient accelerators, such as laser wakefield accelerators.

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