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Advanced THz Deflectors for Attosecond MeV-UED Timing

Tuesday 12 August 2025 11:50 (20 minutes)

Timestamping electron pulses is a promising strategy for improving the overall temporal resolution of the MeV UED beamline. Timestamping can be achieved with a time-varying deflection of the beam: the deflection angle records the time of arrival of the pulse, from which it is possible to accurately read back the pump-probe delay shot-by-shot. This proposal targets the demonstration of ultrastrong deflection from an optimized, precision machined copper horn structure excited by a tilted pulse front THz source. The tapered horn structure provides an extremely high deflecting field.
We show results of a recent experiment aims to go beyond earlier successful proof-of-concept results by determining optimal design parameters for UED. One important parameter is the diameter of the exit aperture in the horn (through which the electron beam must pass before being collected on the detector). The choice of aperture diameter involves a trade-off between (a) field enhancement from a small aperture diameter, delivering a larger kick for a given THz pulse energy, and (b) higher electron beam transmission from a larger aperture, providing better statistics for measuring the beam centroid and finer substructure.

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Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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