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Wakefield Acceleration in Nanostructures: The E336 Experiment at FACET-II

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When a high intensity electron beam is passed through a structured nano target, the solid-state density plasma created can support ultra-high accelerating gradients, on the order of 1-10 TeV/m. The similarly strong transverse focusing fields are expected to produce beams with small equilibrium emittance. Driving these extreme wakefields in the self-modulated regime requires high energy and high-density electron bunches. Such bunches are now within reach at the FACET-II facility at SLAC National Accelerator Laboratory. The E336 experiment at FACET-II is a proof of principle experiment that will utilize the high-density electron beams produced by the facility to demonstrate the unique processes expected to occur in structured solid targets. We discuss the motivation, status, and future plans for the experiment.

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