

Abstract Submitted
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Plasma Wakefield Acceleration Experiments at FACET¹

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FACET PLASMA WAKEFIELD ACCELERATION COLLABORATION —
FACET (Facility for Advanced Accelerator Experimental Tests) is a new facility
at SLAC primarily dedicated to the study of beam-driven plasma wakefield accel-
eration (PWFA), an advanced particle acceleration technique which can produce
longitudinal electric fields that are orders of magnitude stronger than those in con-
ventional metal structures, and can sustain those fields over a distance of meters.
These features make PWFA an attractive technology for the design of future linear
colliders and light sources. The experiments at FACET will roughly mimic a single
stage of a plasma-based accelerator by demonstrating the uniform acceleration of
a discrete electron witness bunch, increasing its energy by about 20 GeV over a
distance of 1 m in a plasma wake induced by a separate driver bunch of electrons.
Another major goal of FACET is to study PWFA using various combinations of
positrons and electrons in the roles of driver and witness bunch for the first time.

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