

Review of Beam-Driven Plasma Wakefield Experiments at SLAC

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We review the history and progress of beam-driven plasma wakefield acceleration [1,2,3] at SLAC National Accelerator Laboratory. Beginning with the FFTB facility and continuing with FACET and FACET-II, SLAC has 25 years' experience with PWFA experiments. We highlight the first plasma lens experiment [4], positron acceleration [5] and “energy doubling” experiment [6] at FFTB, demonstration of two-bunch acceleration [7] and mono-energetic positron acceleration [8] at FACET, and recent results on high-quality plasma acceleration [9] at FACET-II. We conclude with a discussion of the P5-recommended 10 TeV Wakefield Collider Design Study [10], and describe future plasma acceleration initiatives at SLAC, including PWFA for near-term HEP applications.

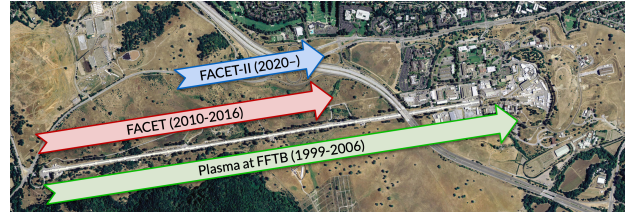


Fig. 1: Aerial view of SLAC National Accelerator Laboratory showing the evolution of plasma wakefield accelerator beam test facilities from FFTB (1999 - 2006) to FACET (2010 - 2016) to FACET-II (2020 -).

References

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