Snowmass21-AF5-AF6-170: Beamdump Experiments Driven by a Plasma Wakefield Accelerator

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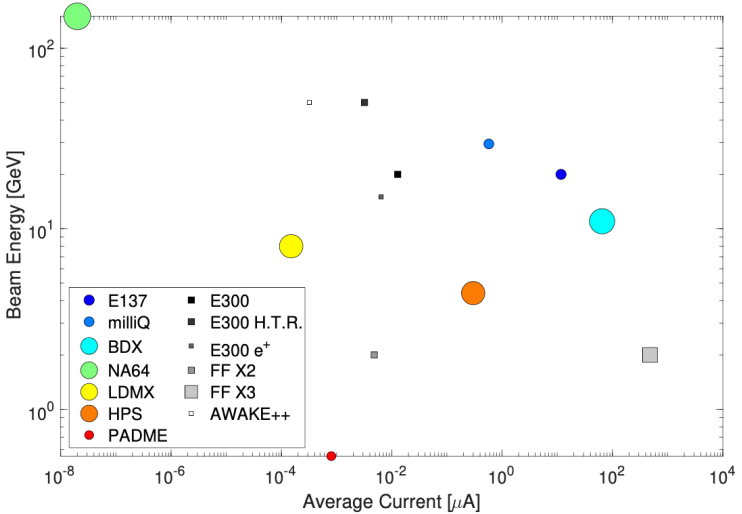
SLAC NATIONAL ACCELERATOR LABORATORY

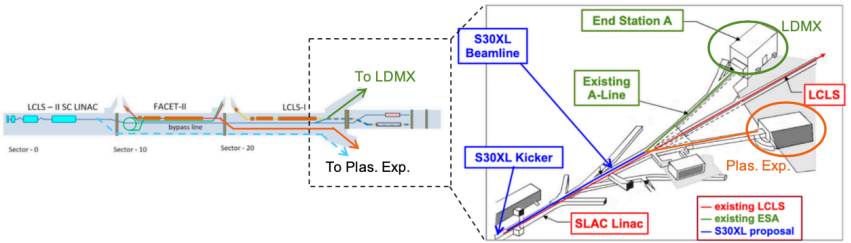
Overview

- The Plasma Linear Collider is the gold standard for our field, but it is also the most challenging application.
- HEP has recognized the need to explore well-motivated physics models at the Intensity Frontier using beams with 100 MeV – 100 GeV energies.
- These “Dark Sector” models are studied with beamdump or fixed target experiments.
- For beamdump experiments, the constraints on beam quality are relaxed. The main figure of merit is Electrons-on-Target (EOT).
- This is an excellent opportunity for early applications of plasma technology in HEP!

Beam Parameters and Facility



This plot shows beam parameters for past and planned experiments. Plasma wakefield accelerators can already achieve some of these parameters, but we need to push for higher rep-rate to be relevant.



For example, at SLAC we could take unused beam from LCLS-II for beamdump experiments. Lower energy experiments could take beam directly, and higher energy experiments could use plasma to boost the beam energy.

Author List

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Beamdump Experiments Driven by a Plasma Wakefield Accelerator

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