



Contribution ID: 197

Type: **not specified**

Flat beam plasma wakefield experiment at the AWA facility

Monday, 22 July 2024 17:15 (25 minutes)

A wakefield experiment that will utilize electron beams with highly asymmetric transverse emittances, or flat beams, to drive plasma wakefields is underway at the Argonne Wakefield Accelerator (AWA) facility. In the underdense regime, the flat beams create an elliptical blowout structure, resulting in asymmetric focusing forces in the transverse planes. The beam evolution and matching conditions within the elliptical blowout are presented. The results are used as the foundation for a novel experiment that uses a compact, 8-cm long, capillary discharge plasma source developed at UCLA. The plasma source is capable of generating plasmas with particle densities in the range of 10^{14} - 10^{16} cm⁻³. The main facets of the program include analytic representations of the blowout ellipticity and matching conditions, supported by particle-in-cell simulations for the beam-plasma interaction. Detailed engineering preparations for the experiment at the AWA are also presented including a differential pumping installation to preclude the use of plasma-isolation windows that would have deleterious effects on beam emittance during transport. Diagnostics for both beam properties, and plasma wakefield effects in transverse and longitudinal dimensions are included.

Working group

WG3 : Beam-driven plasma acceleration

Primary authors: CHOW, Derek (University of California, Los Angeles); MANWANI, Pratik (University of California, Los Angeles); ANDONIAN, Gerard (UCLA/Radiabeam); ROSENZWEIG, James (UCLA); MAJERNIK, Nathan (SLAC); KANG, Yunbo (PBPL)

Presenter: MANWANI, Pratik (University of California, Los Angeles)

Session Classification: WG3