



Contribution ID: 92

Type: **Early Career (Eligible for Oral or Poster)**

Status Report on the Magnetohydrodynamic Simulations of a Tapered Plasma Lens for Optical Matching at the ILC e^+ Source

Thursday, 18 May 2023 11:30 (10 minutes)

The International Linear Collider is a planned electron-positron linear collider with its positron source producing positrons by aiming undulator radiation onto a rotating target. The resulting, highly divergent positron beam requires immediate optical matching to improve the luminosity and therefore the success of the intended collision experiments. Here, optical matching refers to the process of capturing particles and making them available for downstream beamline elements like accelerators. In the past, this has been done with sophisticated coils, but more recently the usage of a current-carrying plasma, a so-called plasma lens, has been proposed as an alternative. For the International Linear Collider idealized particle tracking simulations have already been done with the purpose of finding the optimal plasma lens design with respect to the captured positron yield. The proposed design is characterized by a linearly widened radius in beam direction. Now further research and development of this design is required, including both experiments with a prototype set-up as well as corresponding simulations modeling the hydrodynamics of the current-carrying plasma and the resulting magnetic field. The accuracy of the latter will benefit greatly from the former.

Primary authors: FORMELA, Manuel (University of Hamburg); MOORTGAT-PICK, Gudrid; LOISCH, Gregor (DESY); HAMANN, Niclas (University of Hamburg); MAXENCE THÉVENET; GREGORY BOYLE; OSTERHOFF, Jens (DESY)

Presenters: FORMELA, Manuel (University of Hamburg); HAMANN, Niclas (University of Hamburg); MAXENCE THÉVENET; GREGORY BOYLE; OSTERHOFF, Jens (DESY)

Session Classification: Accelerator: Particle Sources

Track Classification: Accelerator: Particle Sources