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Underdense Plasma Lens Commissioning at FACET-II and Future Experimental Plans

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With the commissioning of the 10 GeV FACET-II accelerator underway, early experimental shifts of the plasma lens have been taken. These shifts use a single electron bunch propagating through a laser-ionized elongated gas jet, with an electron beam imaging spectrometer set up to disperse the beam in energy for one transverse axis and image the beam directly in the other. Currently, a laser co-propagating to the electron beam axis is used to ionize the gas jet at the focus of an axilens. Here we discuss the early findings of these plasma/electron beam interactions and state future experimental upgrades and plans. The most important of these upgrades are modifications of the laser in order to ionize a small thickness plasma lens, the upgrading of FACET-II to accommodate a drive and witness bunch, and investigating the effects of a transverse plasma density gradient due to the gas jet density profile.

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Primary author: DOSS, Christopher (University of Colorado Boulder)

Co-authors: LEE, Valentina (University of Colorado Boulder); HANSEL, Claire (University of Colorado Boulder); CARY, John (University of Colorado Boulder); SUTHERLAND, Andrew (University of Strathclyde); HIDDING, Bernhard (University of Strathclyde); KNETSCH, Alexander; Prof. CORDE, Sebastien (LOA, ENSTA Paris, CNRS, Ecole Polytechnique, 15 Institut Polytechnique de Paris, 91762 Palaiseau, France); ARINIELLO, Robert (SLAC National Accelerator Laboratory); EKERFELT, Henrik (SLAC National Accelerator Laboratory); GERSTMAYR, Elias (SLAC National Accelerator Laboratory); STOREY, Doug (SLAC National Accelerator Laboratory); O'SHEA, Brendan (SLAC National Accelerator Laboratory); GESSNER, Spencer (SLAC); CLARKE, Christine (SLAC National Accelerator Laboratory); Dr HOGAN, Mark (SLAC National Accelerator Laboratory); LITOS, Michael (University of Colorado Boulder)

Presenter: DOSS, Christopher (University of Colorado Boulder)

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