

Abstract Submitted  
for the DPP20 Meeting of  
The American Physical Society

**Electron Beam Transport Characterization for the Laser Plasma Driven FEL Project at the Bella Center**<sup>1</sup> SAMUEL BARBER, JEROEN VAN TILBORG, FUMIKA ISONO, CURTIS BERGER, CAMERON GEDDES, CARL SCHROEDER, ERIC ESAREY, Lawrence Berkeley National Laboratory — At the BELLA Center an electron beamline was designed and built to deliver electrons generated by a laser plasma accelerator into a 4 meter long undulator. In addition to the usual dipole magnets found in an undulator, a series of permanent magnets are embedded along the whole length of the undulator to produce a focusing channel based on standard quadrupole focusing and FODO lattice concepts. This channel ensures the electron beam transverse size is kept small along the full 4 m propagation length, which has significant advantages in the context of generating FEL radiation. This focusing channel naturally requires the incoming beam to be properly matched to ensure stable propagation. It is therefore critical to have a well characterized transport line preceding the undulator. We discuss here salient aspects of the beamline design as well as some preliminary measurements and characterization of our electron beamline.

<sup>1</sup>This work was supported by the U.S. Department of Energy (DOE) under Contract No. DE-AC02-05CH11231, and by the Gordon & Betty Moore Foundation under Grant ID GBMF4898.

Samuel Barber  
Lawrence Berkeley National Laboratory

Date submitted: 01 Jul 2020

Electronic form version 1.4