

Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Laser pulse group velocity in electrically-discharged capillary waveguides¹ JOOST DANIELS, Lawrence Berkeley National Lab, Eindhoven University of Technology, JEROEN VAN TILBORG, ANTHONY GONSALVES, CARLO BENEDETTI, CARL SCHROEDER, ERIC ESAREY, WIM LEEMANS, Lawrence Berkeley National Lab, LOASIS/BELLA TEAM — Plasma channels are critical in maintaining high intensity laser fields over extended distances, such as required in efficient laser-plasma accelerators (LPAs). In LPAs, the background plasma electron density is a critical parameter as it influences the dephasing length - the distance of optimum acceleration - as well as laser guiding, accelerating wake-field amplitude and particle injection. In this talk a novel method is presented that measures the group velocity in the plasma through two-pulse spectral interferometry, from which the on-axis electron density can be determined. We will show results on parabolic plasma channels created in discharged capillaries, for a range of pressures as relevant for current-day LPAs. The obtained knowledge on the group velocity allows us to improve the design of guiding channels and accelerator structures.

¹This work was supported by the Director, Office of Science, Office of High Energy Physics, of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.

Joost Daniels
Lawrence Berkeley National Lab, Eindhoven University of Technology

Date submitted: 11 Jul 2014

Electronic form version 1.4