

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

PIC Simulations of Colliding Pulse Injection for Laser Wakefield Acceleration¹ DAVID BRUHWILER, BEN COWAN, KEVIN PAUL, JOHN CARY, Tech-X Corporation, CAMERON GEDDES, ESTELLE CORMIER-MICHELLE, ERIC ESAREY, CARL SCHROEDER, WIM LEEMANS, LBNL — The use of colliding laser pulses to control the injection of plasma electrons into the plasma wake of a laser wakefield accelerator (LWFA) is a promising approach to obtaining GeV scale electron bunches with orders of magnitude smaller emittance and energy spread. Colliding pulse injection (CPI) is being explored experimentally by groups around the world. We will present recent particle-in-cell (PIC) simulations of colliding pulse injection, using the parallel VORPAL framework, for physical parameters relevant to ongoing experiments of the LOASIS Program at Lawrence Berkeley Laboratory. The details of how particle trapping starts and stops, in the presence of counter-propagating laser pulses and nonlinear beam loading, is sensitive to noise and other errors in the PIC simulation. Hence, we will present results of different algorithmic choices, including high-order particle shapes and spatial smoothing.

¹Work supported by U.S. Department of Energy High Energy Physics, including DE-AC02-05CH11231 and SciDAC, and by NA-22, and used computational facilities at NERSC.

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Date submitted: 17 Jul 2009

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