Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

**Predictive design and interpretation of colliding pulse injected laser wakefield experiments**[1] ESTELLE CORMIER-MICHEL, VAHID H. RANJBAR, BEN M. COWAN, DAVID L. BRUHWILER, Tech-X Corporation, CAMERON G.R. GEDDES, MIN CHEN, BENJAMIN RIBERA, ERIC ESAREY, CARL B. SCHROEDER, WIM P. LEEMANS, Lawrence Berkeley National Laboratory — The use of colliding laser pulses to control the injection of plasma electrons into the plasma wake of a laser plasma accelerator is a promising approach to obtaining stable, tunable electron bunches with reduced emittance and energy spread. Colliding Pulse Injection (CPI) experiments are being performed by groups around the world. We will present recent particle-in-cell simulations, using the parallel VORPAL framework, of CPI for physical parameters relevant to ongoing experiments of the LOASIS program at LBNL. We evaluate the effect of laser and plasma tuning, on the trapped electron bunch and perform parameter scans in order to optimize the quality of the bunch. Impact of non-ideal effects such as imperfect laser modes and laser self focusing are also evaluated. Simulation data are validated against current experimental results, and are used to design future experiments.

[1]Work supported by the National Nuclear Security Administration, NA-22, U.S. Department of Energy and by the Office of Science, High Energy Physics, U.S. Department of Energy.

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Date submitted: 16 Jul 2010 Electronic form version 1.4