Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Coupling laser pulses and low-emittance lepton bunches into 10 GeV laser plasma stages[1] DAVID BRUHWILER, ESTELLE CORMIER-MICHEL, BEN COWAN, JOHN CARY, Tech-X Corporation, CAMERON GEDDES, MIN CHEN, ERIC ESAREY, Lawrence Berkeley Lab — The ponderomotive laser-envelope algorithm of the parallel VORPAL framework [1] is used to simulate 10 GeV scale laser plasma accelerator (LPA) stages in the quasilinear regime. We generalize previous work on coupling intense ultra-short laser pulses into a plasma channel with minimal betatron oscillations [2]. Low-emittance, externally injected electron and positron bunches are considered, using the quasistatic "space charge" approach of accelerator tracking codes to reduce numerical noise and the associated artificial emittance growth by orders of magnitude, which also enables correct cancellation of transverse forces due to beam self-fields.

[1] Cowan, Bruhwiler, Cormier-Michel et al., J. Comput. Phys. (2011).
[2] Dimitrov, Giacone, Bruhwiler et al., Phys. Plasmas (2007).

[1]This work is supported by the US DOE Office of Science, Office of High Energy Physics, including grant No.'s DE-SC0004441 and DE-FC02-07ER41499. Resources of NERSC were used, supported by the US DOE Office of Science under contract No. DE-AC02-05CH11231.

David Bruhwiler
Tech-X Corporation

Date submitted: 26 Jul 2011 Electronic form version 1.4