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Colliding laser pulses in plasmas: Nonlinear waves and electron acceleration[1] E. ESAREY, G. FUBIANI, C. SCHROEDER, W.P. LEEMANS, LBNL, J.R. CARY, R. GIACONE, C. NIETER, U CO, Boulder, D. BRUHWILER, D. DIMITROV, Tech-X Corp. The LBNL l'OASIS Group is pursuing electron acceleration in plasma with colliding pulse injection (CPI). In CPI, an intense pump pulse excites a large amplitude plasma wakefield. Two counter-propagating injection pulses collide in the wake and generate a slow phase velocity beat wave. This injects electrons into the fast wake for acceleration to high energy. The initial LBNL experiments using a 10 TW, 40 fs laser system (100 TW upgrade underway) will rely on two laser pulses: a pump pulse to excite the wake and a single backward injection pulse.[2] Simulations of CPI will be presented using particle codes that include the effects of finite crossing angles, equal pulse frequencies, and density gradients. Other important physics include the generation of nonlinear standing waves and stochastic electron acceleration. Preliminary experimental data will also be presented.

[1]This work supported by DoE, DE-AC03-76SF0098.
[2]G. Fubiani et al., Phys. Rev. E, submitted (2003).

☐ Prefer Oral Session
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