Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Tunable Laser Plasma Accelerator based on Longitudinal Density Tailoring[1] ANTHONY GONSALVES, KEI NAKAMURA, CHEN LIN, DMITRIY PANASENKO, SATOMI SHIRAISHI, THOMAS SOKOLIK, CARLO BENEDETTI, CARL SCHROEDER, CAMERON GEDDES, JEROEN VAN TILBORG, ERIC ESAREY, CSABA TOTH, WIM LEEMANS, Lawrence Berkeley National Laboratory — Laser plasma accelerators (LPAs) have produced high-quality electron beams with GeV energies from centimeter scale devices and are being investigated as drivers of hyperspectral femtosecond light sources and high-energy colliders. Such applications require a high degree of stability, beam quality, and tunability. Here we report on a technique to inject electrons into the accelerating field of a laser-driven plasma wave and coupling of this injector to a lower-density, separately-adjustable plasma for further acceleration. The technique relies on a single laser pulse powering a plasma structure with a tailored longitudinal density profile, to produce beams that can be tuned in the range of 100 to 400MeV with percent level stability, using 40TW laser pulses.

[1]Work supported by US DOE Contract No. DE-AC02- 05CH11231.

Anthony Gonsalves
Lawrence Berkeley National Laboratory

Date submitted: 15 Jul 2011 Electronic form version 1.4