Abstract Submitted
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Propagation of electron and positron beams in long, dense plasmas[1] PATRIC MUGGLI, USC, BRENT BLUE, CHRIS CLAYTON, UCLA, FRANZ-JOSEPH DECKER, MARK HOGAN, SLAC, CHENGKUN HUNAG, CHAN JOSHI, UCLA, TOM KATSOULEAS, USC, WEI LU, WARREN MORI, UCLA, CAOLLIONN O'CONNELL, ROBERT SIEMANN, DIETER WALZ, SLAC, MIAOMIAO ZHOU, UCLA — Electron beams with density larger than the plasma density can propagate through plasmas without significant emittance growth. The electron beam expels the plasma electrons from the bunch volume and propagate in a pure, uniform ion column. In contrast, positron beams attract plasma electrons that flow through the positron bunch. As a result the plasma focusing force is nonlinear, a charge halo forms around the bunch, and the bunch emittance grows. After some distance into the plasma, the bunch emittance reaches an approximately constant value, and the beam and the plasma focusing force reach a steady state. Experimental results obtained with electron and positron bunches, as well as numerical simulation results will be presented.

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