

Abstract Submitted
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Trapping and heating with colliding laser pulses¹ ERIC ESAREY, C.B. SCHROEDER, E. CORMIER-MICHEL, C.G.R. GEDDES, W.P. LEEMANS, LBNL, D. BRUHWILER, J.R. CARY, Tech-X — Colliding pulse injection (CPI), in which two counterpropagating laser pulses intersect in a plasma, has been proposed as a method of injecting short electron bunches into a laser wakefield accelerator.² When the two laser pulses overlap, the laser beat wave alters the momenta and phases of the electrons, allowing trapping in the wakefield. Recent experiments have demonstrated that CPI is capable of producing energetic electron bunches.³ Here, theory and simulations of the beat wave injection process are presented, allowing the calculation of the bunch properties such as charge, energy, and duration. Methods for enhancing the amount of trapped charge are proposed and analyzed.

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²E. Esarey et al., Phys. Rev. Lett. 79, 2682 (1997); G. Fubiani et al., Phys. Rev. E 70, 016402 (2004).

³J. Faure et al., Nature 444, 737 (2006).

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