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Controlled laser plasma wakefield acceleration of electrons via colliding pulse injection in non-collinear geometry CSABA TOTH, KEI NAKAMURA, CAMERON GEDDES, DMITRIY PANASENKO, GUILLAUME PLATEAU, NICHOLAS MATLIS, CARL SCHROEDER, ERIC ESAREY, WIM LEEMANS, Lawrence Berkeley National Laboratory — Colliding laser pulses [1] have been proposed as a method for controlling injection of electrons into a laser wakefield accelerator (LWFA) and hence producing high quality electron beams with energy spread below 1% and normalized emittances < 1 micron. The. One pulse excites a plasma wake, and a collinear pulse following behind it collides with a counterpropagating pulse forming a beat pattern that boosts background electrons into accelerating phase. A variation of the original method uses only two laser pulses [2] which may be non-collinear. The first pulse drives the wake, and beating of the trailing edge of this pulse with the colliding pulse injects electrons. Non-collinear injection avoids optical elements on the electron beam path (avoiding emittance growth). We report on progress of non-collinear experiments at LBNL, using the Ti:Sapphire laser at the LOASIS facility of LBNL. New results indicate that the electron beam properties are affected by the presence of the second beam.
[1] E. Esarey, et al, Phys. Rev. Lett 79, 2682 (1997)
[2] G. Fubiani, Phys. Rev. E 70, 016402 (2004)

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