

Abstract Submitted
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Design and simulation of a single 100GeV stage Laser Wakefield Accelerator.¹ WEI LU, MICHAIL TZOUFRAS, CHENGKUN HUANG, FRANK TSUNG, WARREN MORI, UCLA, JORGE VIEIRA, RICARDO FONSECA, LUIS SILVA, IST (Portugal), JAMES COOLEY, THOMAS ANTONSEN, U. Maryland — The design of a laser wakefield accelerator involves understanding and control of various plasma physics phenomena related to the laser evolution, the response of the plasma medium and its effect on the accelerating particles. Within the framework developed by W. Lu et al. [1] we study these phenomena in the weakly nonlinear blowout regime, where the laser power is similar to the critical power for self-focusing. High quality electron beams can be accelerated in this regime in a single stage with average gradient 3.6GeV/m to reach 100 GeV. Full and reduced particle-in-cell simulations are presented to illuminate the physics and verify the applicability of the design.

[1] W. Lu et al, “Generating multi-GeV electron bunches using single stage laser wakefield acceleration in a 3D nonlinear regime,” Phys. Rev. ST Accel. Beams 10, 061301 (2007)

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