

Abstract Submitted
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Calculation of beam loading and particle trapping using a quasistatic simulation code¹ SEPEHR MORSHED, THOMAS ANTONSEN, IREAP, University of Maryland, CHENGGUN HUANG, WARREN MORI, UCLA — Plasma based particle acceleration requires the generation of plasma wave wakes which maintain their coherence over long distances. For example in Laser Wake Field Acceleration (LWFA) schemes the laser pulse must propagate tens of centimeters, which corresponds to many Rayleigh lengths, and in Plasma Wake Field Acceleration (PWFA) the particle beam must be propagated many meters. These wakes, and their effect on the driver (Laser or particle beam) can be simulated efficiently in the quasistatic approximation [1,2]. In this approximation the driver does not evolve during the time a plasma electron spends in the driver. Particles that are trapped in the wake must be treated by an alternate algorithm. Here we modify the 2D code WAKE [1] to treat such particles. We also implement an algorithm that allows for plasma particle to become trapped particles if they gain sufficient energy. Similar implementations have been made in the 3D code QUICKPIC [2]. These changes in WAKE will give users a tool that can be used on a desk-top machine to simulated GeV acceleration.

[1] P. Mora and T. M. Antonsen Jr., Phys Plasma 4, 217 (1997)

[2] C. Huang et al., J. Comp Phys., to be published.

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