Simulation and calculation of particle trapping using a quasistatic 2D simulation code[1] SEPEHR MORSHED, THOMAS ANTONSEN, University of Maryland, College Park, CHENGKUN HUANG, WARREN MORI, UCLA — In LWFA schemes the laser pulse must propagate several centimeters and maintain its coherence over this distance, which corresponds to many Rayleigh lengths. These Wakefields and their effect on the laser can be simulated in quasistatic approximation [1, 2]. In this approximation the assumption is that the driver (laser) does not change shape during the time it takes for it to pass by a plasma particle. As a result the particles that are trapped and moving with near-luminal velocity can not be treated with this approximation. Here we have modified the 2D code WAKE with an alternate algorithm so that when a plasma particle gains sufficient energy from wakefields it is promoted to beam particle status which later on may become trapped in the wakefields of laser. Similar implementations have been made in the 3D code QUICKPIC [2]. We also have done comparison between WAKE and results from 200 TW laser simulations using OSIRIS [3]. These changes in WAKE will give users a tool that can be used on a desk top machine to simulate GeV acceleration.

[1] P. Mora and T. M. Antonsen Jr., Phys Plasma 4, 217 (1997)
[2] C. Huang et al. Comp Phys. 217 (2006)
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