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Comparison of Plasma Wake Fields between WAKE and QUICKPIC[1] NEERAJ JAIN, W. ZHU, J.P. PALASTRO, T.M. ANTONSEN, University of Maryland, College Park, W. AN, W. LU, W.B. MORI, University of California, Los Angeles, C. HUANG, Los Alamos National Laboratory — Simulation of Plasma Wake Field Acceleration (PWFA) over long distances requires efficient algorithms for computation of the wake fields. The codes WAKE (2D) and QUICKPIC (3D) achieve efficiency by making the quasi-static approximation. The QUICKPIC simulations of PWFA have been carefully benchmarked against the full PIC code OSIRIS, with speed ups of 100-1000 over OSIRIS. However, for axisymmetric beams a full 3D code is not necessary and the 2d axisymmetric code WAKE, which has recently been modified to simulate self-consistent evolution of the beam driver particles, can be used. We compare the results from WAKE and QUICKPIC. The two codes currently use different choices for the set of quasi-static equations to be solved. Differences in the accuracy and efficiency arising from these choices are also explored. The synergistic use of 2D axisymmetric (WAKE) and 3D (QUICKPIC) codes will provide an important tool to simulate upcoming PWFA experiments.

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