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Improvements and recent PWFA simulation results with QuickPIC[1] WEIMING AN, VIKTOR DECYK, WEI LU, CHAN JOSHI, WARREN MORI, UCLA, CHENGKUN HUANG, LANL — QuickPIC is a 3D parallel quasi-static Particle-In-Cell (PIC) code, which is developed with a PIC framework UPIC. Recently, a new 2D field solver for calculating the plasma response to the drive beam in QuickPIC has been developed. It is based on a new set of Maxwell equations (under the quasi-static approximation) which is using transverse Coulomb gauge. With this new solver, QuickPIC can obtain an accurate solution with only 1 iteration (3 or 4 iterations were needed with the old version). The new 2D field solver is also purely spectral (as compared to the older field solver which uses both finite difference and spectral method), which is not only more accurate. Furthermore, the new solver also reduce the total number of FFT calls, which led to a significant time saving. Comparisons between the results for the old and new solver will be given. In addition, we will show QuickPIC results on modeling two bunch FACET experiments, proton driven PWFA and parameters for a future collider based on PWFA stages.

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