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Recent development on the quasi-static PIC code QuickPIC and QPAD

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QuickPIC is a parallel 3D PIC code that applies the quasi-static approximation. QuickPIC can efficiently simulate both beam driven and laser driven plasma wake field accelerators with a speed that is typically 1000 times faster than the conventional PIC code without losing accuracy. QPAD is a branch of QuickPIC that applies azimuthal decomposition in cylindrical coordinates. In this work, we will introduce the developments of explicit solvers in both QuickPIC and QPAD. The explicit solver does not need predictor-corrector loops when solving the quasi-static Maxwell's equations. We will also introduce the basic algorithm of a GPU + MPI version of QuickPIC. The comparison of computing time between GPU and CPU versions of QuickPIC will be presented.

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