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Development of the quasi-static Particle-In-Cell code HiPACE

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High intensity laser- or particle beams excite large amplitude plasma waves when propagating in appropriate gas targets. The fields, carried by these plasma waves, can exceed 100 GV/m and are capable of accelerating particles to high energies within short distances. To design, advance and understand experiments, numerical investigations of the dynamics in such plasma accelerators are vital. Full Particle-In-Cell (PIC) simulations, however, are often computationally too expensive for parameter scans or detailed analyses. This talk will present a Highly efficient Plasma ACcelerator Emulation (HiPACE), which can allow for order of magnitude speedup compared to full PIC codes for a class of problems. The physical basis, numerical implementation, computational framework and parallel performance of this code will be discussed.

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