

Abstract Submitted  
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**MPI implementation of a generalized implicit algorithm for multi-dimensional PIC simulations**<sup>1</sup> GEORGE PETROV, JACK DAVIS, Naval Research Laboratory — The implicit 2D3V particle-in-cell (PIC) code developed to study the interaction of short pulse lasers with matter [G. M. Petrov and J. Davis, *Computer Phys. Comm.* 179, 868 (2008); *Phys. Plasmas* 18, 073102 (2011)] has been parallelized using MPI (Message Passing Interface). Performance evaluation has been made on a Linux cluster for two typical regimes of PIC operation: “particle dominated,” for which the bulk of the computation time is spent on pushing particles, and “field dominated,” for which computing the fields is prevalent. The MPI implementation of the code offers a significant numerical speedup, particularly in the “particle dominated” regime, which will allow extension to three dimensions and implementation of atomic physics.

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