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Toward an implicit Drift-Lorentz mover[1] R.H. COHEN, A. FRIEDMAN, D.P. GROTE, LLNL, J.-L. VAY, LBNL — In order to efficiently perform particle simulations in systems with widely varying magnetization, we have developed a "drift-Lorentz mover," which interpolates between full particle dynamics and drift kinetics in such a way as to preserve a physically correct gyroradius and particle drifts for both large and small ratios of the timestep to the cyclotron period[2]. We are now adding implicitness to the mover and the associated field solver in order to extend the mover's applicability to systems with plasma frequency exceeding the cyclotron frequency. A first step was adding the polarization charge to the field solver and a two-time-level predictor corrector procedure [3]. We outline here two approaches to adding further implicitness. In both, we add a direct-implicit algorithm to the Lorentz portion of the mover; the drift portion can then be treated as in Ref. 3, or fully implicitly, with a modified predictor-corrector procedure. We describe the algorithms, stability analyses, and status of implementation.

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[2]R.H. Cohen, A. Friedman, M. Kireeff Covo, et. al., Phys. Plasmas **12**, 056708 (2005).
[3]R.H. Cohen, A. Friedman, D.P. Grote and J.-L. Vay, Nucl. Inst. Methods A 577, 52 (2007).

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