Abstract Submitted
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Efficient Implicit Plasma Simulation Using Quadrature Moment Inverson[1] DAVID LARSON, LLNL — Quadrature moment inversion algorithms [1-3] are one route to reducing the computational effort required for fully implicit PIC plasma simulation. These algorithms compute a sparse quadrature representation of the velocity distribution from a set of velocity moments. A Jacobian-free Newton Krylov (JFNK) solver can then be used to concurrently solve Maxwells equations and the quadrature node equations of motion implicitly differenced in time using the midpoint rule [4], retaining the fully kinetic character of the overall system. The results of several test problems will be presented along with an exploration of routes to achieving convergence of the complete set of PIC particles and field equations. [1] R.O. Fox, J. Comp. Phys. 227 (2008) [2] O. Desjardins, et. al., J. Comp. Phys. 227 (2008) [3] Yuan, C., and R. O. Fox, J. Comp. Phys. 230 (2011) [4] S. Markidis and G. Lapenta, J. Comp. Phys. 230.18 (2011)

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