Abstract Submitted
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A Reduction of the Vlasov–Maxwell System Using Phase-Space Blobs[1] B.A. SHADWICK, Department of Physics & Astronomy, University of Nebraska - Lincoln, FRANK M. LEE, Department of Physics, The University of Texas at Austin, LUKE FAEH, Department of Physics & Astronomy, University of Nebraska - Lincoln — We develop a new computational approach to solving the Vlasov-Maxwell equation by representing the distribution function by a supper-position of finite-extent phase- space "blobs." Each blob evolves as a warm beamlet[2] driven by the collective plasma fields. The underlying approximation treats each blob as a different plasma species and, as such, makes a counting error which we expect to be reflected in the system entropy. This approach results in a non-canonical Hamiltonian model, inheriting various properties of the original system. The primary advance of this technique over traditional Lagrangian particle methods is the near elimination of macro-particle "noise." Since we are evolving elements of phase-space, the distribution function can be readily reconstructed at any instant. We discuss the performance and convergence of this model using a variety of standard examples.

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[2]B. A. Shadwick, *et al.*, "Hamiltonian Reductions for Modeling Relativistic Laser-Plasma Interactions," **Commun. Nonlinear Sci. Numer. Sim.** in press (2011).

Brad Shadwick
UNL

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