Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Numerical method for kinetic dense plasma transport[1] MARK L. ADAMS, LLNL — The development of novel theoretical and computational kinetic models is required to describe the nonlocal and non-Markovian transport channels that exist in a growing number of high energy density physics (HEDP) laboratory experiments. In this poster I develop a numerical method that significantly accelerates the convergence of computational kinetic transport methods in dense plasmas. The method self- consistently couples a kinetic transport model with a set of moment equations that conserve mass, momentum, and energy as well as retain the salient properties of the Boltzmann H-theorem. Extensions of the method to multi-component plasmas and dynamic boundary conditions are considered. I illustrate the method using common parallel plate, shock, and plasma relaxation problems; the examples show rapid convergence in the collisional limit and retain the appealing properties of the kinetic transport computational method in the collisionless limit. The numerical method it is easily extensible to more sophisticated kinetic transport models, computational methods, and higher dimensions.

[1]This work was performed under the auspices of the U.S. DOE by LLNL under Contract DE-AC52-07NA27344.

Mark L. Adams
LLNL

Date submitted: 14 Jul 2011

Electronic form version 1.4