Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Efficient simulation of 2+2-D multi-species plasmas waves using an Eulerian Vlasov code JEFFREY BANKS, RICHARD BERGER, THOMAS CHAPMAN, JEFFREY HITTINGER, LLNL, STEPHAN BRUNER, EPFL — We discuss multi-species aspects of the Eulerian-based kinetic code LOKI that evolves the Vlasov-Poisson system in 2+2-dimensional phase space (Banks et al., Phys. Plasmas 18, 052102 (2011)). In order to control the inherent cost associated with phase-space simulation, our approach uses a minimally diffuse, fourth-order-accurate finite-volume discretization (Banks and Hittinger, IEEE T. Plasma Sci. 39, 2198–2207). The scheme is discretely conservative and controls unphysical oscillations. The details of the numerical scheme will be presented, and the implementation on modern highly concurrent parallel computers will be discussed. We will present results of 2D simulations of propagating ion acoustic waves (IAWs) created using an external driving potential. The evolution of the plasma wave field and associated self-consistent distribution of trapped electrons and ions is studied after the external drive is turned off. *This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 and funded by the Laboratory Research and Development Program at LLNL under project tracking code 12-ERD-061.*

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Date submitted: 07 Jul 2013 Electronic form version 1.4