Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Shear-Alfvén Waves in Gyrokinetic Particle Simulation THOMAS D. DICKERSON, EDWARD A. STARTSEV, W.W. LEE, Princeton Plasma Physics Laboratory — Numerical properties of shear-Alfvén waves in slab geometry have been studied using a Particle-in-Cell code implementing the recently developed double split-weight scheme [1]. This scheme separates the non-adiabatic response of the particles from both their adiabatic responses and the field-line bending effects arising from the background density and temperature gradients of both the electrons and the ions. This scheme is an improvement over the original split-weight scheme [2] in the presence of the zeroth-order inhomogeneities. The present studies consist of testing numerical restrictions on temporal resolution in the simulation of these waves in one and two dimensions, and on spatial resolutions on the formation of shear Alfvén eigenmodes in two dimensional sheared slab simulations. For example, it is found that the correct behavior of ion temperature gradient modes in terms of frequencies and growth rates can be maintained with time steps larger than the limit imposed by the shear-Alfven waves. Details will be reported.

[1] E. A. Startsev and W. W. Lee, "Finite-Beta Simulation of Microinstabilities," manuscript in preparation (2012).
[2] W. W. Lee, J. L. V. Lewandowski, T. S. Hahm and Z. Lin, "Shear-Alfén Waves in Gyrokinetic Plasmas," Phys. Plasmas 10, 4435 (2001).

Thomas D. Dickerson
Princeton Plasma Physics Laboratory

Date submitted: 23 Jul 2012 Electronic form version 1.4