Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

**Extension of Drift Kinetic Hot Particles to Full Orbits in NIMROD** CHARLSON C. KIM, University of Washington, PSI Center, CARL R. SOVINEC, University of Wisconsin, Madison, RICHARD D. MILROY, Unviersity of Washington, PSI Center, NIMROD TEAM — The primary goal of the Plasma Science and Innovation Center (PSI Center) is to refine and optimize existing MHD codes to achieve improved predictability for emerging concept (EC) experiments. Kinetic effects have been shown to play a dominant role in some EC experiments, particularly in FRC stability[1]. The Center will extend the hybrid kinetic-MHD implementation in NIMROD[2] from the drift kinetic model to the full kinetic model to include sufficient physics to accurately account for these effects. We outline the algorithmic issues involved, in particular as it relates to incorporation in a semi-implicit MHD code using finite element (FE) basis functions. Particular issues addressed will be particle-in-cell (PIC) in FE, timestep disparity between particles and MHD fields, and the potential for advanced timestepping algorithms for the particles in the semi-implicit code. Initial progress along these lines will be presented.

[1]E. Belova, et.al. "Numerical Study of tilt stability of prolate field-reversed configurations," PoP, **7**, 4996, 2000
[2]C.C. Kim, et.al. "Hybrid Kinetic-MHD Simulations in General Geometry," CPC, **164**, 448, 2004

Charlson C. Kim
University of Washington, PSI Center

Date submitted: 21 Jul 2005 Electronic form version 1.4