Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Full Orbit PIC in NIMROD CHARLSON KIM, PSI-Center, Univ. of Washington — 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 PSI Center has extended 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, in particular large Larmour radius. The Boris push has been implemented for particles in NIMROD. However, this places a severe time step restriction on the particle time step. Time step restrictions have been decreased by using orbit averaging. Orbit averaging has been implemented for both full and drift kinetic equations and shows no significant impact on linear growth rates for tested regimes. We will show preliminary results from the implementation of full orbit (Lorentz force) particles coupled to the NIMROD code.

[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.

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Date submitted: 21 Jul 2006 Electronic form version 1.4