Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Simulation of propagation and absorption of IBW via reduced 5D high frequency gyrokinetic (HFGK) particle simulation ROMAN KOLESNIKOV, W.W. LEE, HONG QIN, ED STARTSEV, PPPL — We developed a reduced 5D high frequency gyrokinetic (HFGK) algorithm for particle-in-cell simulation of arbitrary frequency phenomena in magnetized plasmas. This new algorithm is based on the gyrocenter-gauge kinetic theory [H. Qin, W. M. Tang, W. W. Lee and G. Rewoldt, Phys. Plasmas **6**, 1575 (1999)], which utilizes the separation of the ion gyromotion from its gyrocenter motion. While the 5D HFGK description [R. A. Kolesnikov, W. W. Lee, H. Qin, E. Startsev, APS (2006)] is an alternative to the original 6D Lorentz-force description for $\rho/L_B \ll 1$, the former approach takes much less computer time since the gyrophase dependence is removed from the kinetic system (but which still describes an arbitrary frequency dynamics). We performed a nonlinear δf particle simulation of electrostatic system in slab geometry using the new 5D HFGK algorithm. We study propagation of the ion Bernstein wave (IBW) launched by an antenna in inhomogeneous system as well as its absorption near resonant layer via linear and nonlinear mechanisms. Illustrations of numerical efficiency of the new 5D algorithm compared to the direct 6D Lorentz-force simulation are given.

Roman Kolesnikov
PPPL

Date submitted: 11 Jan 2007 Electronic form version 1.4