Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Simulation study on non-collisional thermalization of fast ions in magnetized plasma[1] TSUNG-HUA TSAI, Physics Department, National Cheng Kung University, Taiwan, KUAN-REN CHEN, Physics Department, Institute of Electro-optics, Plasma and Space Science Center, National Cheng Kung University, Taiwan, JIAN-YU LAI, Institute of Electro-optics, National Cheng Kung University, Taiwan — The first non-collisional process causing the perpendicular energy of fast ions to be thermalized toward Maxwellian [K. R. Chen, Phys. Rev. Lett. 72, 3534 (1994)] was done by Particle-In-Cell (PIC) simulation with limited particle numbers. Due to a two-gyro-stream relativistic cyclotron instability driven by fast ions, harmonic ion cyclotron waves are excited and the wave-ion interaction induces this non-collisional thermalization process. This is investigated in detail and further with much more particles to reduce system noise and to achieve high precision in statistics. Thus, the fluctuation at low energy portion and the limitation on the high energy tail can be improved. With more particle numbers, the fluctuation is greatly reduced and the fast ion perpendicular energy distribution becomes a smooth curve and is closer toward Maxwellian.

[1]This work is supported by National Science Council, Taiwan. (94-2112-M-006-012)

Physics Department, Institute of Electro-optics, Plasma and Space Science Center, National Cheng Kung U

Date submitted: 31 Jul 2006 Electronic form version 1.4