Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Nonlinear gyrokinetic simulations of tearing instability[1] RYUSUKE NUMATA, University of Hyogo — We present numerical results of nonlinear tearing mode simulations in a strong guide magnetic field limit using the `AstroGK` astrophysical gyrokinetics code. From the comparative study of linear tearing mode between gyrokinetics and two-fluid MHD, significant discrepancy of the growth rate scaling have been observed in relatively high-beta plasmas [1] while they show good agreement in low-beta. Since the Alfvén wave dynamics is coupled with the ion sound wave dynamics in high-beta plasmas, it is required to solve parallel ion dynamics kinetically rather than assuming simple adiabatic relations. In this work, we extend our study of the tearing mode to the nonlinear stage where discrepancy between gyrokinetics and fluid models is expected to become more significant. We discuss magnetic island evolution, saturation, and plasma heating due to magnetic reconnection in high-beta plasmas.

[1] R. Numata et al., Phys. Plasmas **18**, 112106 (2011).

[1]This work was supported by Grant-in-Aid for Young Scientists (B). Numerical simulations were performed at IFERC-CSC.

Ryusuke Numata
University of Hyogo

Date submitted: 18 Jul 2012 Electronic form version 1.4