Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Coexistence of drift-like and tearing instabilities in non-uniform plasma[1] V.V. MIRNOV, C.C. HEGNA, J.P. SAUPPE, C.R. SOVINEC, University of Wisconsin-Madison and Center for Magnetic Self-Organization — The simultaneous presence of drift-like and tearing instabilities is investigated with the use of two-fluid extended MHD code NIMROD and analytical methods. The model includes electron compressibility and the physics of electron-ion decoupling on short scales as well as the effect of diamagnetic flows caused by non-uniform density profile. Linear numerical simulations are performed for plasma slab with cold ions and hot electrons in a doubly periodic box bounded by two perfectly conducting walls. Magnetic shear configuration utilizes a sinusoidal profile for the reconnecting magnetic field which is unstable with respect to current-driven drift-tearing instability. This instability is characterized by a clear magnetic perturbation. Additionally, there is an unstable pressure-gradient driven mode suggestive of a resistive-drift type with largely electrostatic perturbations. Both modes are observed in NIMROD simulations. Simplified two-fluid linear analytical model confirms coexistence of drift-tearing and resistive-drift unstable modes. We investigate the nature (physical or numerical) of the newly observed drift-like mode and its role in the dynamics of the system.

[1]The work is supported by the U. S. DOE and NSF

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Date submitted: 11 Jul 2013 Electronic form version 1.4