Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Electrostatic Drift-Wave Instability in Field-Reversed Configuration[1] CALVIN LAU, DANIEL FULTON, IHOR HOLOD, ZHIHONG LIN, UCI, MICHL BINDERBAUER, TAE, TOSHIKI TAJIMA, TAE, UCI, LOTHAR SCHMITZ, UCLA — Recent progress in the C-2 advanced beam-driven field-reversed configuration (FRC) experiment [Binderbauer 2015] at Tri Alpha Energy has led to consistently reproducible plasma lifetimes of 5+ ms, ie. transport regimes. To understand the mechanisms, gyrokinetic particle-in-cell simulations of drift-wave instabilities have been carried out for the FRC [Fulton 2015]. The realistic magnetic geometry is represented in Boozer coordinates in the upgraded gyrokinetic toroidal code (GTC) [Lin 1998]. Radially local simulations find that, in the FRC core, ion scale modes are stable for realistic pressure gradients while the electron scale modes are unstable. On the other hand, in the scrape-off layer (SOL) outside of the separatrix, both ion and electron scale modes are unstable. These findings and linear instability thresholds found in simulation are consistent with the C-2 experimental measurements of density fluctuations [Schmitz 2015]. Collisional effects and instability drive mechanism will be clarified. Nonlocal and nonlinear simulation results will also be reported.

[1]supported by TAE

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Date submitted: 24 Jul 2015 Electronic form version 1.4