Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Influence of Parallel Dynamics and Electron Temperature Fluctuations on Collisional Drift-Wave Simulations of CSDX PAYAM VAEZI, CHRISTOPHER HOLLAND, GEORGE TYNAN, SAIKAT CHAKRABORTY THAKUR, CHRISTIAN BRANDT, Univ of California - San Diego — Previous 2D numerical simulations of collisional drift-wave turbulence in the linear Controlled Shear Decorrelation Experiment (CSDX) device were unable to reproduce experimental observations at magnetic fields above 1.4 kG at either the quantitative or qualitative level. Experimental observations [1] suggest that dynamics of previously neglected ion parallel velocity and associated parallel shear-flow driven instabilities become important at the higher fields. In this poster, we present comparisons of new 3D simulations performed with the BOUT++ framework [2] which include parallel ion velocity dynamics, as well as self-consistent electron temperature fluctuations, to the CSDX observations at multiple magnetic field strengths. We compare the simulated scalings of density and potential fluctuation spectra with magnetic field, as well as radial particle flux and Reynolds stress to 2D results and experimental observations. The comparisons are made using synthetic probe and fast camera diagnostics that incorporate both the electron density and temperature dynamics.

[1] S. Chakraborty Thakur et al., Plasma Sources Science and Technology (2014)
[2] B. D. Dudson, et al., Comp. Phys. Comm. 180 (2009) 1467

Payam Vaezi
Univ of California - San Diego

Date submitted: 11 Jul 2014 Electronic form version 1.4