Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Analytical and numerical study of the transverse Kelvin-Helmholtz instability in tokamak edge plasmas[1] J.R. MYRA, D.A. D'IPPOLITO, D.A. RUSSELL, Lodestar, M.V. UMANSKY, LLNL, D.A. BAVER, None — Sheared flows perpendicular to the magnetic field can be driven by Reynolds stresses or ion pressure gradient effects and can potentially influence the stability and turbulent saturation level of edge plasma modes. On the other hand, such flows are subject to the transverse Kelvin-Helmholtz (KH) instability. Here, we first review the linear theory of KH instabilities with an analytic model in the asymptotic limit of long wavelengths compared with the flow scale length. The analytic model treats sheared ExB flows, ion diamagnetism, density gradients and parallel currents in a slab geometry, enabling a unified summary of some well-known results. Second, the important role of realistic toroidal geometry is explored numerically using the 2DX eigenvalue code for KH modes both inside and outside the separatrix. Preliminary results indicate that KH modes are often stable in edge tokamak plasmas, but can also be unstable in some interesting cases. Implications for reduced edge turbulence modeling codes will be discussed.

[1]Work supported by US DOE grant DE-FG02-97ER54392.

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Date submitted: 23 Jul 2015 Electronic form version 1.4