Abstract Submitted
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Current Driven Drift Wave Turbulence C.J. LEE, P.H. DIAMOND, UCSD, M. PORKOLAB, PSFC, MIT — Recent and ongoing analyses [1] have indicated that the "usual suspects" for the mechanism of electron thermal transport, such as ITG, ETG, CTEM modes, etc., cannot explain results from modest density, $T_e > T_i$ plasmas in either OH or ECH heating regimes. Interestingly, such plasmas exhibit very large toroidal current drift parameters v_d/c_s, thus naturally suggesting revisitation of current driven drift waves. In this work, we examine the linear and nonlinear theory of current driven drift wave turbulence. Special attention is focused on the eigenfunction structure and spectral centroid shift induced by finite current. Note that the spatial asymmetry is a signature of current drive and has implications for flow generation and intrinsic rotation as well. We further explore nonlinear saturation mechanisms. In particular, the implications of spectral asymmetry for zonal flow generation and possible synergy or competition between $\mathbf{E}\times\mathbf{B}$ shear and current-induced shifts, and the effects of electron scattering, both in space and velocity; specifically magnetic shear-induced resonance broadening effects on the electron response and its implication for saturation levels.

[1] L. Lin, M. Porkolab et al., PPCF, 2009

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