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Effects of Plasma Shaping on Nonlinear Gyrokinetic Turbulence
E.A. BELLI, G.W. HAMMETT, PPPL, W. DORLAND, U. Maryland — The effects of flux surface shape on the gyrokinetic stability and transport of tokamak plasmas have been studied using the GS2 code. Studies of the scaling of nonlinear turbulence with shaping parameters have been performed starting with a representative JET-like flux surface and artificially varying elongation, triangularity and their radial gradients together using the Miller analytic equilibrium formalism[1] to approach the circular limit via linear interpolation. Both linearly and nonlinearly, high elongation coupled with high triangularity was found to be stabilizing on the ITG turbulence. However, while shaping had little effect on the linear critical temperature gradient, high shaping resulted in a larger upshift of the nonlinear critical gradient due to enhanced zonal flows. The effects of electromagnetic dynamics coupled with shaping are also presented. For electromagnetic runs, beta is also varied with shaping to keep the Troyon-normalized beta fixed while also holding q_{95} fixed. Preliminary results indicate that beta strongly effects the electron transport and may lead to unsaturated transport in some cases, even well below the linear ballooning limit.

[1]R. Miller, et al, Phys. Plasmas **5, 973 (1998).**

Emily Belli
PPPL

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