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ITG Turbulence Simulations and Plasma Flux Surface Shape[1] R.E. WALTZ, R.L. MILLER, General Atomics — Gyrofluid simulations of ion temperature gradient (ITG) transport in the ballooning mode representation[2] are extended to general geometry tokamaks. Previous treatments of plasma flux surface shape have been organized about surface by surface analysis of global MHD equilibria making it difficult to isolate parametric dependencies. The present study uses a generalization of the local $\hat{s} - \alpha$ equilibrium.[3] This formulation characterizes the local equilibrium for a shifted, elongated, and triangulated ellipse with minor horizontal radius r in terms of nine local flux surface variables: aspect ratio $A = R_0/\mathrm{r}$, Shafranov shift $\partial_\mathrm{r} R_0$, elongation κ, triangularity δ, safety factor q, shear $\hat{s} = (r/q)\ \partial_\mathrm{r} q$, and the MHD pressure gradient $(-\partial_\mathrm{r} P)$ variable α, as well as two nearly degenerate variables $s_\kappa = (r/\kappa)\partial_\mathrm{r}\kappa \approx (\kappa - \kappa_0)/\kappa$, $s_\delta = [r/(1-\delta^2)^{1/2}]\ \partial_\mathrm{r}\delta \approx \delta/(1-\delta^2)^{1/2}$. The careful delineation of the local variables allows systematic study against shape variables A, κ, and δ at fixed r.

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[2]R.E. Waltz *et al.*, Phys. Plasmas **2** (1995) 2408.
[3]R.L. Miller *et al.*, Phys. Plasmas **5** (1998) 973.

☐ Prefer Oral Session
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