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[ ] Theory [X] Experiment

Interaction of Turbulence-Driven and Equilibrium Flows in Limit-Cycle L-H and H-L Transitions,* L. Schmitz, L. Zeng, T.L. Rhodes, E.J. Doyle, W.A. Peebles**,** G. Wang, *UCLA***;** G.R. McKee, Z. Yan, *U. Wisc.;* G.R. Tynan, J.A. Boedo, P. Diamond, D. Eldon, *UCSD*; R.J. Groebner, K.H. Burrell, *GA* – The detailed spatio-temporal evolution of turbulence-driven flow and equilibrium flow have been investigated during limit cycle oscillations (LCO) [1,2] preceding the L-H transition and the H-L back-transition in DIII-D. The phasing between **E**x**B** flow and turbulence envelope indicates radially separated regions of flow drive and flow damping. The ion pressure gradient periodically steepens during transient transport barrier formation in the LCO and initially lags the flow shearing rate $\omega_{\mathbf{E}\times\mathbf{B}}$, but leads $\omega_{\mathbf{E}\times\mathbf{B}}$ once equilibrium shear has become dominant before the final transition to H-mode. The first simultaneous measurements of main ion flow evolution across the L-LCO-H-mode transition (via He plasmas) will be discussed, as well as initial evidence of hysteresis in turbulence/flow evolution between forward and back transitions.

[1] L. Schmitz, L. Zeng, et al., Phys. Rev. Lett. **108**, 155002 (2012).
[2] K. Miki and P.H. Diamond, Phys. Plasmas **19**, 092306 (2012).

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