Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Spontaneous transition from drift wave turbulence to multi-instability turbulence: bifurcation, hysteresis and plasma detachment. SAIKAT CHAKRABORTY THAKUR, RONGJIE HONG, KYLE ADRIANY, GEORGE TYNAN, Univ. of California, San Diego — Recent studies in the Controlled Shear Decorrelation eXperiment show a spontaneous self-organized global transition in the plasma dynamics via a transport bifurcation during the transition to broadband turbulence [1, 2] with increasing magnetic field (B). For B $<B_{crit}$, the plasma is dominated by density gradient driven resistive drift waves. For B $>B_{crit}$ the plasma is characterized by steepened density and ion temperature gradients and both azimuthal and parallel velocity shear layers, along with multiple plasma instabilities. In this new equilibrium, we find high azimuthal mode number fluctuations rotating in the ion diamagnetic drift direction at the core, resistive drift waves near the density gradient and turbulence driven sheared flows near the edge. The plasma also seems to simultaneously detach from the end of the device and the length of the plasma column shortens. We use spectroscopy to study the detachment, which also follows the hysteresis curves associated with the transport bifurcation that led to steepened profiles. We find that the value of B_{crit}, depends on operating pressure, gas flow rate and RF input power. [1] L. Cui *et. al.*, *PoP* **23** 055704 (2016) [2] S. C. Thakur *et. al.*, *PSST* **23** 044006 (2014)

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Date submitted: 15 Jul 2016 Electronic form version 1.4