

Abstract Submitted
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Edge turbulence and flow behavior preceding L-H and H-L transitions in NSTX Y. SECHREST, T. MUNSAT, University of Colorado, S.J. ZWEBEN, PPPL — Recent Gas Puff Imaging (GPI) observations on the National Spherical Torus Experiment (NSTX) have revealed a quasi-periodic oscillation in the plasma edge preceding the L-H transition in a limited set of neutral beam heated plasmas [1-2]. These ~ 3 kHz flow oscillations exhibit both long wavelength and long correlation lengths, suggesting they are zonal-flow-like. The flow oscillations are strongly correlated with modulations of the level of edge turbulence, thus the system appears to undergo a predator-prey type limit-cycle preceding the L-H transition. However, a clear trigger for the L-H transition was not observed. In addition to these results, analysis of the Reynolds stress profiles obtained from image velocimetry for L-mode periods preceding the L-H transition will be discussed. Imaging data from the GPI diagnostic has also captured several L-H and H-L transitions in RF heated plasmas near the L-H input power threshold. These observations show a very distinct ~ 25 kHz feature present during H-mode that appears to precede large ejections of plasma into the scrape-off-layer. This feature is also seen to grow in amplitude preceding an H-L transition. A detailed characterization of this feature will be presented in addition to the previous results on zonal-flow-like oscillations.

[1] S.J. Zweben et al, Phys. Plasmas 17, 102502 (2010)

[2] Y. Sechrest et al, Phys. Plasmas 18, 012502 (2011)

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