Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Experimental Observation of High-k Turbulence Evolution across L-H Transition in NSTX Y. REN, R.E. BELL, PPPL, D.R. SMITH, UW-Madison, S.J. ZWEBEN, W. GUTTENFELDER, S.M. KAYE, B.P. LEBLANC, E. MAZZUCATO, PPPL, K.C. LEE, NFRI, C.W. DOMIER, UC-Davis, L. SHAO, ASIPP, H. YUH, Nova Photonics — It is well accepted that L-H transition is due to suppression of edge turbulence and thus forming Edge Transport Barrier(ETB). While suppression of low-k (ion-scale) turbulence across L-H transition was widely reported, here we report high-k turbulence evolution across L-H transition in NSTX for the first time. The high-k turbulence at r/a≈0.7-0.8 was measured using a microwave scattering system with the ETB located at r/a $\gtrsim$ 0.9. An intermittent phase for the high-k turbulence is observed after the L-H transition with gradual decrease in the overall turbulence spectral power and intermittent periods (about 0.5-1 ms) of minimum high-k turbulence. A phase of minimum high-k turbulence is observed following the intermittent phase, and the high-k turbulence suppression is found to occur only at lower wavenumbers, namely $k_\perp \rho_s \lesssim$ 9-10. The suppression is found to be consistent with the decrease in maximum ETG linear growth rate from gyrokinetic stability analysis. However, the observed intermittency cannot be explained by the linear analysis. Low-k turbulence, measured by Beam Emission Spectroscopy and Gas Puff Imaging, shows similar temporal behavior as the measured high-k turbulence.

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Date submitted: 11 Jul 2014 Electronic form version 1.4