Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Studies of Electron-scale Turbulence and Thermal Transport in NSTX L-mode Plasmas Y. REN, W. GUTTENFELDER, S.M. KAYE, B.P. LEBLANC, E. MAZZUCATO, W. WANG, J. LANG, PPPL, K.C. LEE, C.W. DOMIER, UC-Davis, H. YUH, Nova Photonics, THE NSTX TEAM — Electron-scale turbulence and thermal transport in NSTX HHFW/NBI-heated L-mode plasmas are studied with a high-k scattering system and power balance analysis. One interesting observation is that measured turbulence spectral power is observed to reduce by almost an order of magnitude after HHFW heating is terminated in a set of NSTX L-mode plasmas with $I_P = 300$ kA, $B_T = 5.5$ kG and HHFW power about 1 MW. This sudden drop in the turbulence spectral power and the termination of HHFW are not exactly synchronized, and the drop in the spectral power happens approximately 1 ms after the HHFW termination. This correlation and the time delay indicate a causal relation between the measured turbulence and heat flux. However, we also found that such a sudden drop in turbulence spectral power is not obvious with HHFW termination in HHFW-heated L-mode plasmas with higher plasma current, e.g. 600 kA. Trying to explain this difference, we will compare global and local plasma parameters coupled with gyrokinetic simulations. In addition, we will present further gyrokinetic simulations on ExB shear-induced reduction in turbulence and thermal transport in NSTX NBI-heated L-mode plasmas reported in [1].

[1] Y. Ren et al., Nucl. Fusion 53 (2013) 083007.

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Date submitted: 12 Jul 2013 Electronic form version 1.4