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Response of Electron-scale Turbulence and Thermal Transport to Continuous ExB Shear Ramping-up in NSTX[1] Y. REN, W. GUTTENFELDER, S.M. KAYE, E. MAZZUCATO, PPPL, K.C. LEE, C.W. DOMIER, UC-Davis — Here we present the first observation of the change in electron-scale turbulence wavenumber spectrum (measured by a high-k scattering system) and thermal transport responding to continuous ExB shear ramping-up at the edge of a set of NSTX NBI-heated L-mode plasmas (r/a $\sim$ 0.66-0.78). We observed that as the ExB shearing rate is continuously ramped up, the ratio between the ExB shearing rate and the maximum ITG mode growth rate continuously increases and the maximum power of the measured electron-scale turbulence wavenumber spectra decreases. Meanwhile, both the electron and ion thermal transports are also reduced as long as MHD activities are not important. These observations are consistent with that some of the observed electron-scale turbulence is nonlinearly driven by ITG turbulence and its power decreases as ITG turbulence is progressively suppressed by ExB shear. Heat fluxes predicted by local nonlinear ITG simulations at different radial locations can be larger or significantly smaller than the corresponding local experimental heat fluxes depending on the local ExB shearing rate, which indicates that global effects may have to be included in future simulations. Comparison with gyrokinetic simulations of L-mode plasmas of conventional tokamaks will be also presented.

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