

# Experimental Study of Parametric Dependence of Electron-gyro Scale Turbulence on NSTX

- Electron thermal transport always anomalous
  - Inverse dependence of NSTX confinement on collisionality not understood
  - Electron-gyro scale turbulence responsible for anomalous transport?
  - Study of parametric dependence revealing the characteristics of observed turbulence and its correlation with electron thermal transport
- **First observation of density gradient stabilization of electron-gyro scale turbulence (Ren *et al.*, PRL 2011)**
  - Large density gradient increase induced by an ELM event
  - Density gradient stabilization most effective at  $k_{\perp}\rho_s \lesssim 10$
  - A factor of two decrease in effective thermal diffusivity after the ELM event
  - Quantitative agreements with linear gyrokinetic stability analysis for ETG modes
- **Collisionality dependence of electron-gyro scale turbulence**
  - More than a factor of two change in collisionality achieved
  - Local  $\rho_e$ ,  $\beta_e$ ,  $n_e$  and  $q_{95}$  kept approximately constant
  - Turbulence spectral power decreased as collisionality increases
- Electron-gyro scale turbulence may contribute to anomalous transport but may not be able to explain the observed confinement scaling by itself.