

Low frequency MHD modes study on NSTX*

J. Zhang, N. A. Crocker, W. A. Peebles, T. A. Carter, S. Kubota (*UCLA*), W. Guttenfelder (*PPPL*)

National Spherical Torus Experiment (NSTX) plasmas feature low frequency MHD modes, such as Neoclassical Tearing Modes (NTMs) [E. D. Fredrickson et al., Bull. Am. Phys. Soc. **49**, 68 (2004)] and kinks [J. E. Menard et al., Nucl. Fusion **45**, 539 (2005)]. It is important to understand the underlying physics, because they can lead to disruption if left uncontrolled. Their radial density perturbation mode structures are currently being investigated via the recently upgraded 16-channel fixed-frequency reflectometer array on NSTX. The reflectometer frequency ranges 30 – 75 GHz ($n_{cutoff} = 1.1 - 6.9 \times 10^{19} m^{-3}$ in O-mode). A 288 GHz polarimeter currently under development for NSTX is expected to contribute to this investigation. Modeling of the polarimeter, using simulation data, also shows the feasibility of detecting microtearing modes. Microtearing modes are believed to be one of the dominant electron transport mechanisms on NSTX. [K. L. Wong et al., Phys. Rev. Lett. **99**, 135003 (2007)]

*Supported by USDOE Contracts DE-FG02-99ER54527 and DE-AC02-09CH11466