Effects of Global Alfven Eigenmodes on Electron Thermal Transport in NSTX

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High levels of electron thermal transport (power balance $\chi_e \geq 10$'s m^2/s) are correlated with strong Global Alfven Eigenmode (GAE) activity in the deep core of beam heated NSTX plasmas [Stutman, et al., *PRL* **102**, 115002 (2009)]. New measurements and recently proposed theoretical mechanisms offer possible explanations for this process. Overlapping large-amplitude GAE modes can induce stochastic particle trajectories in the bulk, trapped electron population resulting in rapid radial diffusion. However, numerical calculations using the ORBIT guiding center code and measured GAE amplitudes, obtained from a single line-integrated measurement of density fluctuations, have so far under-predicted the inferred χ_e by a factor of 5-10. Recent measurements of the GAE amplitude obtained from line-integrated density fluctuations at multiple tangential locations confirm the central location of the modes, in agreement with predictions of the initial value Hybrid and MHD (HYM) simulation code. Additionally, measurements of the GAE radial mode structure using the newly installed BES diagnostic demonstrate that the region of strong GAE amplitude coincides with that of large χ_e, further supporting a GAE induced transport mechanism. Furthermore, the dynamics of GAE activity (f~500-1000 kHz) demonstrate the bursting nature of these modes. Coupled with the strongly non-linear relation predicted between the mode amplitude and induced χ_e, these results suggest that the *peak* amplitude of the GAEs may be controlling the magnitude of stochastic electron transport, rather than their time-averaged amplitude, as previously used in computations. The ORBIT predictions of χ_e using the peak values of the mode amplitude match well to the experimentally inferred χ_e's. Finally, the experimental observations are examined from the perspective of a recent theory which claims that the central T_e flattening occurs in NSTX through GAE mediated ‘energy-channeling’ of the neutral beam power [Kolesnichenko, et al., *PRL* **104**, 075001 (2010)].