Abstract Submitted
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Comparison of simulated heat transport in NSTX via high frequency Alfvén eigenmode-induced electron orbit modification with TRANSP power balance modeling.[1] N. A. CROCKER, UCLA, K. TRITZ, JHU, R. B. WHITE, E. D. FREDRICKSON, N. N. GORELENKOV, PPPL, NSTX-U TEAM — Compressional (CAE) and global (GAE) AEs have been hypothesized to cause an anomalously high electron thermal diffusivity (χ_e) routinely inferred via TRANSP power balance modeling in the core ($r/a <\sim 0.3$) of NSTX beam heated plasmas. New simulations with the guiding-center code ORBIT test a leading proposed transport mechanism: electron orbit stochastization by multiple modes. Simulations with a set of modes identified as GAEs in a high performance, beam heated plasma—using experimentally determined amplitudes, frequencies and wave numbers—yield a χ_e insufficient to match TRANSP. To produce a comparable χ_e, the amplitudes must be increased by a factor of ~ 10, which is outside the bounds of measurement uncertainty. Many observed modes, identified as CAEs, could not be included without modifications to ORBIT. These are in progress. However, given the uncertainties in identification, it is informative to calculate χ_e assuming all the observed modes are GAEs. This leads to substantially higher χ_e, although an amplitude increase by a factor $>\sim 3$ is still necessary to match TRANSP.

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