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Core electron thermal transport in NSTX due to orbit stochastization by high frequency Alfvén eigenmodes[1] N.A. CROCKER, UCLA, E. BELOVA, E.D. FREDRICKSON, N.N. GORELENKOV, PPPL, K. TRITZ, JHU, W.A. PEEBLES, S. KUBOTA, UCLA, R.E. BELL, A. DIALLO, B.P. LEBLANC, J.E. MENARD, R.B. WHITE, PPPL, H. YUH, Nova Photonics — Progress is reported in understanding the role of high frequency Alfvén eigenmodes (AE) in anomalously high electron thermal transport in the core of high performance, beam-heated NSTX plasmas. Compressional (CAE) and global (GAE) AEs have been hypothesized to cause the transport by stochastization of electron guiding-center drift orbits. Results reported here, arrived at via new measurements of CAE and GAE δn_e coupled with the guiding-center code ORBIT, support this. The measurements are also compared to eigenmodes from the initial value code HYM—which simulates an MHD plasma coupled to fully kinetic fast-ions. Reflectometer measurements are inverted using a synthetic diagnostic to obtain δn_e. The measurements show that the CAEs peak in the core, while the GAEs peak in the edge. Simulation also shows edge peaking for the GAEs, but with notable differences in structure. The differences will be examined with HYM to elucidate the importance of effects such as coupling of shear and compressional Alfvén waves. The measured modes are used in ORBIT simulations to model the effects on electron orbits and the resulting transport is compared with that inferred from the experimental power balance calculated with TRANSP.

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