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[ ] Theory [X] Experiment

Multi-scale, Multi-field Turbulence Response During Electron Cyclotron Heating (ECH),* W.A. Peebles, T.L. Rhodes, A.E. White, G. Wang, J.C. Hillesheim, L. Schmitz, L. Zeng, E.J. Doyle, *UCLA*, G.R. McKee, M.W. Shafer, *UW-Madison*, J.C. DeBoo, M.A. Van Zeeland, *General Atomics* – ECH at r/a ~ 0.4 significantly modifies the electron temperature of LSN Ohmic plasmas with minimal effect on local ion temperature and electron density. A unique array of turbulence diagnostics was used to study the turbulence response across all turbulent scales ($0 < k\rho_s < 10$) and for two distinct turbulent fields. At r/a ~ 0.6, low-k electron temperature fluctuations increased significantly (~3) with ECH. In contrast, low and intermediate-k density fluctuations remained unchanged or reduced slightly. High-k (~35 cm^{-1}) density fluctuations, associated with the electron temperature gradient driven mode, increased by >30%. Interestingly, low-k density and electron temperature fluctuations were found to be locally correlated across the frequency range ~10-100 kHz. This unique data set can be utilized to rigorously test the turbulence physics inherent in nonlinear gyrokinetic turbulence codes.

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