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Multi-scale, Multi-field Turbulence Response During Electron Cyclotron Heating (ECH)[1] W.A. PEEBLES, T.L. RHODES, A.E. WHITE, G. WANG, J.C. HILLESHEIM, L. SCHMITZ, L. ZENG, E.J. DOYLE, University of California-Los Angeles, G.R. MCKEE, M.W. SHAFER, University of Wisconsin-Madison, J.C. DEBOO, M.A. VAN ZEELAND, General Atomics — ECH at $r/a \sim 0.4$ 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 $r/a \sim 0.6$, 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 ($\sim$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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W.A. Peebles
University of California-Los Angeles

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