Abstract Submitted
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Gyrokinetic and experimental investigations of multi-scale turbulence in Alcator C-Mod and DIII-D plasmas[1] N.T. HOWARD, MIT-PSFC, C. HOLLAND, UCSD, T.L. RHODES, UCLA, A.E. WHITE, MIT-PSFC, J. CANDY, General Atomics, A.J. CREELY, M. GREENWALD, MIT-PSFC, G.R. MCKEE, U-Wisconsin, P. RODRIGUEZ-FERNANDEZ, MIT-PSFC, DIII-D TEAM TEAM
— Extensive comparisons of high physics fidelity, multi-scale gyrokinetic simulations (m_i/m_e = 60, realistic geometry, collisions, rotation, experimental inputs) with L-mode and ITER-relevant H-mode experiments have been performed on the Alcator C-Mod and DIII-D tokamaks. These simulations suggest that cross-scale interactions of ion and electron-scale turbulence play an important, even dominant, role in setting the experimental levels of both the ion and electron heat fluxes in reactor-relevant conditions. The validation of multi-scale gyrokinetic simulations has been extended further by comparing with turbulence measurements in reactor-relevant scenarios. Experiments on DIII-D in the ITER baseline scenario (H98=1, beta_N = 1.9, q95=3.3, Te˜Ti) documented possible signatures of cross-scale coupling in the wavenumber spectrum of intermediate-k (k*rho_s ˜2.5-5.0) density fluctuations measured with the Doppler backscattering (DBS) diagnostic. Results from multi-scale simulations of Alcator C-Mod plasmas and progress on analysis and simulation of the DIII-D experiments will be presented.

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