Abstract Submitted
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Turbulence, Transport and Energy Confinement Dependence on Plasma Current in DIII-D[1] GEORGE MCKEE, ZHENG YAN, University of Wisconsin - Madison, YAN ZHAO, ASIPP, CHRIS HOLLAND, University of California-San Diego — The measured characteristics of long-wavelength turbulence vary strongly with q_{95}, including the normalized fluctuation amplitude profile $0.45<r/a<0.9$ increasing strongly with q_{95}. This is demonstrated by a systematic variation of the plasma current while other global parameters are held nearly fixed. Multichannel transport changes consistently, with both reduced thermal energy and momentum transport at lower q_{95}. This dependence is observed in the core of L-mode and hybrid H-mode regimes. Correlation lengths and decorrelation times of turbulence show weaker variation with q_{95}. Zonal flows decrease in amplitude, while Geodesic Acoustic Modes (GAM) increase in amplitude with q_{95} in L-mode, qualitatively consistent with theoretical predictions. Empirical scaling relations show that energy confinement time depends approximately linearly on plasma current in regimes with monotonically increasing q-profiles. Given this strong dependence of transport and confinement on plasma current, it is critical to understand the relationship of turbulence on q_{95}, as well as the q-profile shape, to identify regimes of improved performance with optimized q-profiles. Initial results from TGLF modeling will be presented with the experimental data.

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