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Core Turbulence and Flow Dynamics Across L-H Transition on DIII-D[1] G. WANG, W.A. PEEBLES, T.L. RHODES, J.C. HILLESHEIM, E.J. DOYLE, L. SCHMITZ, L. ZENG, UCLA, A.E. WHITE, ORISE, G.R. MCKEE, U. Wisc., C.C. PETTY, K.H. BURRELL, General Atomics, W.M. SOLOMON, PPPL
— First measurements of core low and intermediate-k correlation lengths as well as the dynamic turbulence amplitude behavior across near-balanced NBI-heated L- to H-mode transitions have been obtained on DIII-D. In these discharges, poloidal turbulence flow increases with little change in its shear as the L-H transition is approached. Leading up to the transition, fluctuation levels ($\tilde{n}/n$) of low-k (<3 cm^{-1}) show little variation, while that of intermediate- ($3-6$ cm^{-1}) and high-k ($\sim$ 35 cm^{-1}) increase. At the same time, core radial correlation lengths of both low and intermediate-k decrease. In contrast, electron temperature fluctuation levels ($\tilde{T}_e/T_e$) first increase then drop. With these data a multi-scale and multi-field picture of the L to H transition dynamics is being developed allowing detailed comparison to theory and simulation (e.g. linear gyrokinetic stability simulations, TGLF).

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