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Core Turbulence and Flow Dynamics Across L-H Transition on DIII-D,* 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, *GA*, and 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 (ñ/n) of low-k (<3 cm^{-1}) show little variation, while that of intermediate- (3–6 cm^{-1}) and high-k (~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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