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**A measure of scale-dependent asymmetry in turbulent boundary layer flows** MICHELE GUALA, St. Anthony Falls Laboratory , Dep. Civil , Env. and Geo Eng. , UMN, ARVIND SINGH, Department of Civil, Env. and Construction Eng., UCF — The distribution of scale-dependent, streamwise velocity increments is investigated in turbulent boundary layer flows at laboratory and atmospheric Reynolds number, using the SAFL wind tunnel (Singh et al. Phys. of Fluids 2014) and the SLTEST data (Metzger et al. Phil. Trans Royal Soc. A 2007). The third order moments of velocity increments, or asymmetry index As(a,z), is computed for varying wall distance z and scale separation a, where it was observed to leave a robust, distinct signature in the form of a hump, independent of Reynolds number and located across the inertial subrange. The hump is observed for z+ <5000, with a tendency to increase in amplitude, and shift towards smaller timescales, as the wall is approached. Comparing the two datasets, the hump vertical location, obeying to inner wall scaling, is regarded to as a genuine feature of the canonical turbulent boundary layer. The magnitude cumulant analysis of the scale-dependent velocity increments indicates that intermittency is also enhanced in the same flow region. The combination of asymmetry and intermittency is inferred to point at non-local energy transfer across a range of scales and may thus be used to quantify interactions between structural types in boundary layer flows.

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