Abstract Submitted
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**Dominant length scale of the "pure" turbulent fluctuations in the outer region of wall turbulence**[1] YONG SEOK KWON, JASON MONTY, NICK HUTCHINS, Univ of Melbourne — A new method of decomposing the total velocity in boundary layers, which removes the influence of instantaneous boundary layer thickness variations to the fluctuating velocity component, is proposed. The recent proposition of the quiescent core of turbulent channel flow by Kwon et al. (J. Fluid Mech., vol. 751, 2014, pp. 228–254) permits us to apply the same decomposition to channel flows where the quiescent core is analogous to the free-stream. Using this decomposition, it is observed that the majority of the large-scale streamwise velocity fluctuation within the intermittent region is attributed to the oscillation of the turbulent/non-turbulent interface or the quiescent core. It suggests that the quiescent core and the free-stream play a similar role and the flow nearer to the wall in both flows is more similar than previously thought while the different characteristics of the free-stream and the quiescent core account for the differences in the outer region of two flows. These findings re-affirm the analogy between the quiescent core and the free-stream, which could potentially lead to the unified conceptual model between internal and external flows.

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