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Unified concepts in internal and external wall-turbulence[1] YONG SEOK KWON, CHENG CHIN, NICHOLAS HUTCHINS, JASON MONTY, Univ of Melbourne — Recently, Kwon, Hutchins and Monty (J. Fluid Mech., submitted) reported that the oscillation of turbulent/non-turbulent interface (TNTI) in a turbulent boundary layer can contaminate the fluctuating velocity component under the traditional Reynolds decomposition, which overestimates the extent of spatial coherence of velocity fluctuations. In order to overcome this issue, they proposed a new velocity decomposition method which removes the influence of the TNTI oscillation from the velocity fluctuations. Extension of their decomposition method to internal flows via the analogy between the free-stream and quiescent core (Kwon et al., J. Fluid Mech., vol. 751, 2014, pp. 228-254) reveals that both the scale and structure of turbulence are, in fact, similar in internal and external flows even up to the edge of the outer region. Based on this result, a new conceptual model for internal flows, that is similar to external flows, is proposed.

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