

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Effects of Outer Scales on Near-Wall Reynolds Stresses and Higher-Order Statistics M.H. BUSCHMANN, Universitat Dresden, M. GAD-EL-HAK, Virginia Commonwealth University — The classical view of wall-bounded turbulence suggests that the near-wall region should be scaled with characteristic scales that are closely related to that region. For the last decade, however, alternative concepts considering the influence of outer scales were proposed. Herein, we show that the near-wall Reynolds stresses as well as higher-order statistics in different geometries (e.g., zero-pressure-gradient boundary layers, and pipe and channel flows) collapse in single Reynolds-number-independent curve when scaled with an alternative mixed scaling based on $\mathbf{u}_\tau^{3/2} \mathbf{u}_e^{1/2}$.

Mohamed Gad-el-Hak
Virginia Commonwealth University

Date submitted: 16 Jun 2011

Electronic form version 1.4