

Abstract Submitted
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Inner–outer interactions in a turbulent boundary layer overlying complex roughness GOKUL PATHIKONDA, Univ of Illinois, Urbana-Champaign, KENNETH T. CHRISTENSEN, Univ of Notre Dame, Notre Dame — Stereo PIV and hot-wire measurements were performed in a rough-wall turbulent boundary layer to investigate the inner-outer interactions across the roughness sublayer. The sPIV was performed in a spanwise–wall-normal plane and hot-wire measurements were conducted with single- and two-probe methods. The complex roughness with a wide distribution of roughness scales has been shown previously to induce alternating high- and low- momentum pathways (HMPs and LMPs)— imprints of roughness-induced secondary flows. Differences in the streamwise velocity and turbulent kinetic energy between a HMP-LMP pair are established in the current study. The respective inner-outer interactions are quantified by the amplitude modulation correlation coefficient, the time-delayed velocity correlation coefficient maps and by a 2-point calibration method proposed by Mathis et al. (*J. Fluid Mech.* 681 (2011): 537-566). It is observed that the strength of such interactions, as measured in this calibration-framework, is generally stronger in the rough-wall than smooth-wall flow, and relatively stronger at an LMP than at a corresponding HMP.

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