Abstract Submitted
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A comparison of spanwise vorticity fluctuations statistics over $\delta^+ =$ 350 - 8000 CALEB MORRILL-WINTER, RACHEL EBNER, University of New Hampshire, RIO BAIDYA, University of Melbourne, PETAR VUKOSLAVCEVIC, University of Montenegro, JOSEPH KLEWICKI, University of New Hampshire, University of Melbourne, JAMES WALLACE, University of Maryland, IVAN MARUSIC, University of Melbourne — The behaviors of the spanwise vorticity fluctuations (ω_z) and their correlation with the wall normal and streamwise velocity fluctuations are central to describing the momentum and kinetic energy transport mechanisms in the turbulent boundary layer. To date, however, well-resolved laboratory measurements of ω_z have been confined to low Reynolds numbers. Compact four-element hot-wire probe measurements are used to explore the statistical structure of the spanwise vorticity fluctuations in zero pressure gradient turbulent boundary layers. Existing well-resolved laboratory data, $\delta^+ = 375$, 970 & 1500, along with recently acquired data from the University of New Hampshire's low-speed boundary layer wind tunnel and University of Melbourne's High Reynolds Number Boundary Layer Wind Tunnel are examined. In the present flows, the spatial resolution of the probe ranged from $l^+ = 4$ - 12. The properties of individual velocity gradient contributions to ω_z are examined, along with the Reynolds number scaling behaviors of the first four statistical moments of ω_z. The present results indicate that the motions bearing spanwise vorticity exhibit a significant Reynolds number dependence in the wake region of the boundary layer.

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