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Spanwise vorticity and wall normal velocity structure in the inertial region of turbulent boundary layers[1] JUAN CARLOS CUEVAS BAUTISTA, University of New Hampshire, CALEB MORRILL-WINTER, University of Melbourne, CHRISTOPHER WHITE, GREGORY CHINI, JOSEPH KLEWICKI, University of New Hampshire — The Reynolds shear stress gradient is a leading order mechanism on the inertial domain of turbulent wall-flows. This quantity can be described relative to the sum of two velocity-vorticity correlations, $\overline{v\omega_z}$ and $\overline{w\omega_y}$. Recent studies suggest that the first of these correlates with the step-like structure of the instantaneous streamwise velocity profile on the inertial layer. This structure is comprised of large zones of uniform momentum segregated by slender regions of concentrated vorticity. In this talk we study the contributions of the v and ω_z motions to the vorticity transport ($\overline{v\omega_z}$) mechanism through the use of experimental data at large friction Reynolds numbers, δ^+. The primary contributions to v and ω_z were estimated by identifying the peak wavelengths of their streamwise spectra. The magnitudes of these peaks are of the same order, and are shown to exhibit a weak δ^+ dependence. The peak wavelengths of v, however, exhibit a strong wall-distance (y) dependence, while the peak wavelengths of ω_z show only a weak y dependence, and remain almost $O(\sqrt{\delta^+})$ in size throughout the inertial domain.

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