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Statistical structure of spanwise vorticity in high Reynolds number rough-wall turbulent boundary layers[1] CALEB MORRILL-WINTER, University of Melbourne, JOSEPH KLEWICKI, University of Melbourne, University of New Hampshire, IVAN MARUSIC, University of Melbourne — A defining characteristic of boundary layers is the presence of vorticity. Within the 2-D turbulent boundary layer the only component of vorticity to have a non-negligible mean value is the spanwise component, ω_z. In the present experiments, a compact four element ("Foss-style") hotwire probe was used to acquire well-resolved ω_z fluctuations over the range, $3,000 \leq \delta^+ = \delta u_\tau/\nu \leq 20,000$ for 36 grit sandpaper roughness. Over the entire Reynolds number range good spatial resolution was maintained by utilizing the low speed, large scale attributes of the HRNBLWT at the University of Melbourne. The present talk addresses the statistical structure of ω_z above a rough wall including comparisons with its smooth wall counterpart. The observed low Reynolds number smooth wall self-similarity between the mean and the rms profiles of ω_z is clarified for the rough-wall case. The rough wall ω_z behavior is described in a context consistent with the mean momentum equation.

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