

Abstract Submitted
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A conditioned volumetric view of “superstructure” events in turbulent boundary layers NICHOLAS HUTCHINS, University of Melbourne, BHARATHRAM GANAPATHISUBRAMANI, Imperial College London, JASON MONTY, IVAN MARUSIC, MIN CHONG, University of Melbourne — A conditionally averaged view of “superstructure” type events is presented for the case of zero pressure gradient turbulent boundary layers at friction Reynolds number, $Re_\tau \approx 14000$. Detailed boundary layer traverses are acquired above a simultaneously sampled spanwise rake of 10 flush-mounted hot-film sensors, affixed to the tunnel wall with a spanwise spacing of approximately 0.08 boundary layer thicknesses (δ). The data from the traversing probes are conditioned on the occurrence of superstructure-type footprints sensed by the wall array. The resulting data give a more complete volumetric view of the large-scale meandering log-region features than has previously been afforded by hot-wire rake and PIV measurements. Such detailed views are used to further investigate the existence of an amplitude modulation effect, in which the footprints of large δ -scaled structures (that typify the logarithmic region) have been observed to modulate the viscous-scaled near-wall cycle.

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