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Cross-spectral analysis of cross-plane data from 143 hot-wires in zero-pressure gradient turbulent boundary layer at $\mathbf{R}_\theta = 9800$ and 19,100[1]

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— Zero pressure gradient flat plate experiments have been performed using a hot-wire rake of 143 single wire probes. The experiments were conducted in the large (21.6 m in length, 2 m in width and 1 m in height) LML boundary layer facility of Laboratoire de Mécanique de Lille as part of the European WALLTURB program (http://wallturb.univ-lille1.fr/). Experiments were conducted at freestream velocities of 10 m/s and 5 m/s, respectively. For both, $\delta_{99} \approx 0.3$ m. 13 rakes of 11 probes each were distributed approximately logarithmically over a 0.3×0.3 m^2 cross-section. (The probes and wires, 0.5 mm long, were contributed by J. Delville and co-workers at LEA/Poitier.) For each block, 200 integral time scales of the streamwise velocity were recorded at 30 kHz. In total, 2200 blocks of data were obtained for each Reynolds numbers. Simultaneously, several SPIV planes were recorded upstream by M. Stanislas and co-workers at LML/Lille. This talk focuses only on the results of the hot-wire measurements, with particular attention to their implications for turbulence structures and their temporal evolution, and how these vary with Reynolds number.

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