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**Challenges in Hot Wire Measurements in Wall-Bounded Turbulent Flows** R. OERLUE, N. HUTCHINS, T. KURIAN, A. TALAMELLI, AND ICET TEAM — Despite the rapid development of optical velocimetry methods (like LDV, PIV, etc.) the hot-wire anemometer remains the main instrument used in wind tunnel studies of turbulence. To obtain precise results close to walls in turbulent boundary layers, requires the user to have accurate procedures for a good calibration at low velocities, knowledge of effects of blockage and heat conduction to the wall, and how spatial resolution influences the results. We have carried out measurements in three different wind tunnels (at KTH, Univ. Melbourne and IIT) with various hot-wire probes (stubbed and stubless, as well as straight and boundary layer type) operated with commercially available and home-made anemometer systems. The use of different facilities enabled measurements at similar Reynolds numbers, but with different free stream velocities, resulting in a wide range of viscous scales for the hot-wire sensor lengths. The results indicate that poor spatial resolution influences the measured fluctuating velocity distribution well into the overlap region and clarifies controversial aspects regarding the scaling of the near-wall peak and the apparent existence of an outer peak in the rms distribution. The mean velocity within the buffer region has been found to be affected by probe geometry and size, an influence that is especially important when correcting for the absolute wall position by means of common correction methods.

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