

Abstract Submitted
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Two-point correlations of adverse pressure gradient turbulent boundary layer at high Reynolds number¹ MURAT TUTKUN, Norwegian Defence Research Establishment (FFI), WILLIAM K. GEORGE, MICHEL STANISLAS, Laboratoire de Mécanique de Lille, CNRS — Two-point correlations are analyzed to investigate structure of adverse pressure gradient turbulent boundary layer at high Reynolds number. The experiment was carried out in the large wind tunnel of Laboratoire de Mécanique de Lille (LML) using synchronized PIV systems and a hot-wire rake of 143 single probes. A specially designed, 30 cm thick, bump was used to obtain the decelerating flow within the test section of the wind tunnel. The thickness of the boundary layer was about 30 cm and Reynolds number based on momentum thickness, Re_θ , was 30 000 for 10 m/s external free stream velocity. Simultaneously measured hot-wire data show that extent of the two-point correlations on streamwise – spanwise plane in this flow is similar to that computed for flat plate turbulent boundary layers case (J. Turbulence, Vol 10, No 21, pp 1-23, 2009). Two-point correlations are also studied on streamwise – wall-normal plane. Shape of the correlations in this plane, especially in the outer layer, is found to be different than those for flat plate turbulent boundary layer.

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