

Paper 27.2

Turbulent boundary layer manipulation by longitudinal embedded vortices

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ABSTRACT

Digital Particle Image Velocimetry has been applied to the study of a flat plate turbulent boundary layer "manipulated" by streamwise large scale vortices. The vortical field was generated by a series of jets at 45 degrees with respect to the wall and in a plane transversal to the mean flow direction. Images in planes perpendicular and parallel to the wall were analyzed.

Results from the manipulated flow are compared to the ones from the natural boundary layer. Measurements in planes at $y \approx 20$ reveal that, at least for the flow condition tested here, there is no evidence of changes in the global organization of structures in the near wall flow.

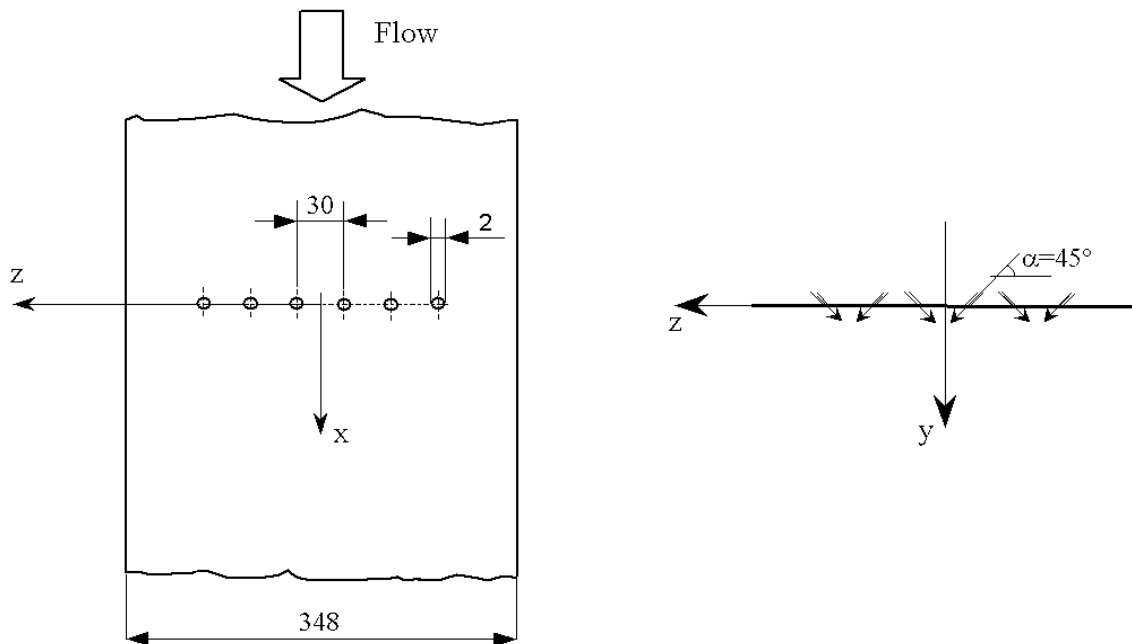


Fig. 1. Sketch of the flat plate with jet holes configuration and reference system. Dimensions in millimeters.