

Abstract Submitted
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ICET - International Collaboration on Experiments in Turbulence: Coordinated Measurements in High Reynolds Number Turbulent Boundary Layers from Three Wind Tunnels H. NAGIB, A. SMITS, I. MARUSIC, P.H. ALFREDSSON, AND ICET TEAM — Zero pressure gradient (ZPG) boundary layers are one of the canonical, wall-bounded, turbulent flows that have been the focus of experimental and analytical investigations for several decades. Over the past few years, four groups have focused on systematic comparison between several measurement techniques and three facilities. Two closed return wind tunnels with ZPG boundary layers developed on a plate suspended near the mid-height of the test section (at KTH and IIT), and an open return facility with a large and long test section and a boundary layer developing along its floor (at the University of Melbourne), are used for these coordinated efforts. The development length of the boundary layers and the free-stream velocity in the three facilities range from 5.5 to 22 m, and from 10 to 60 m/s, respectively. Various arrangements for adjustable test section ceilings are employed to generate ZPG boundary layers over the range of momentum thickness Reynolds numbers from 11,000 to 70,000. Oil film interferometry (OFI) is employed to directly measure the wall shear stress, and various sizes of Pitot probes and types of hot-wire sensors are used to measure wall-normal velocity profiles at different locations and free-stream velocities. Mean velocity, turbulence statistics and integral parameters are examined.

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