Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Turbulent boundary layer investigation at large Re with micron resolution CHRISTIAN J. KAEHLER, CHRISTIAN CIERPKA, SVEN SCHARNOWSKI, Institute of Fluid Mechanics and Aerodynamics, Bundeswehr University Munich — The reliable measurement of statistical quantities in turbulent boundary layer flows down to the wall is a challenging problem for many decades. However, due to the progress in laser based experimental techniques in the last years, it is now non-intrusively possible to measure statistical quantities, such as the mean velocity profile, wall-shear stress, Reynolds stresses or the probability density functions of the turbulent fluctuations, with micron resolution (Kähler et al. Exp. Fluids, 2012). The high spatial resolution allows for accurate measurements as typical bias errors, caused by spatial averaging effects of the probe size, can be avoided. Using advanced optical techniques, we have investigated a turbulent boundary layer flow along a 22 m long flat plate, installed in a wind-tunnel with a 2m by 2m cross-section, at different Reynolds numbers. The statistical results of the investigation will be discussed in the contribution.

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Date submitted: 10 Aug 2012 Electronic form version 1.4