Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Institut für Energietechnik: Prof. R.S. Abhari (LEC), Prof. K. Boulouchos (LAV)
Prof. Ch. Müller (ESE), Prof. H.G. Park (NETS), Prof. D. Poulikakos (LTNT)
Prof. H.-M. Prasser (LKE), Prof. A. Steinfeld (PRE)
Institut für Fluiddynamik: Prof. P. Jenny, Prof. T. Rösgen
Computational Science & Engineering Laboratory: Prof. P. Koumoutsakos

28/10/2016

E I N L A D U N G

zu einem Vortrag im Rahmen des

Kolloquiums Thermo- und Fluiddynamik

und des

ERCOFTAC Visitors Programme

Datum: **Mittwoch, 2. November 2016**

Zeit: ***>> 17:15 Uhr <<***

Ort: Maschinenlaboratorium ETH Zürich
Hörsaal ML H 44

Referent: **Christian E. Willert, Ph.D.**
Institute of Propulsion Technology
German Aerospace Center (DLR), Koeln, Germany

Titel: **High-Speed Particle Image Velocimetry for the Efficient Measurement of Turbulence Statistics - Can PIV Replace the Hotwire?**

The presentation describes the extension of the particle image velocimetry (PIV) technique to capture long time series of O(1e4 - 1e6) images with sampling frequencies O(10-400kHz). The combination of large image number and high frame rate is possible by limiting the field of view to a narrow strip to primarily capture a profile of velocity data and derived quantities, such as vorticity. For illumination either a CW-laser or high-frequency pulsed laser is used. Multi-frame PIV processing algorithms are employed to improve the dynamic range of velocity data. The recovered data is temporally well resolved and provides sufficient samples for statistical convergence of the fluctuating velocity components and higher order moments. By means of line-wise image-analysis it is further possible to extract the near wall velocity profiles in the viscous sub-layer, both time-averaged as well as instantaneous, which can then be used to estimate the wall shear rate and with it the shear stress τ_w and friction velocity u_τ. The technique was applied in the framework of two recent EuHIT (www.euhit.org) funded measurement campaigns: (1) a turbulent boundary layer with adverse pressure gradient at the boundary layer wind tunnel of the Laboratoire de Mécanique de Lille and (2) a high-Reynolds number turbulent boundary layer inside a pipe measured at the CICLoPE facility of Bologna University.

Host: Prof. T. Rösgen

Gäste sind willkommen!