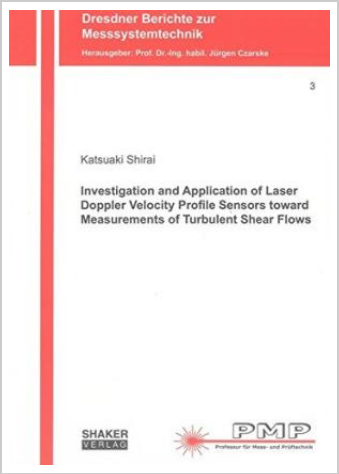

Investigation and Application of Laser Doppler Velocity Profile Sensors toward Measurements of Turbulent Shear Flows

By Katsuaki Shirai

Shaker Verlag Dez 2010, 2010. Buch. Book Condition: Neu. 21x14.8x cm. Neuware - The purpose of this thesis work is to provide a new measurement technique with a spatial resolution sufficiently high compared to the smallest spatial scale of turbulence together with a small uncertainty of velocity measurements. The new measurement technique is aimed to the investigations of fine scale structures in turbulent shear flows. The present thesis reports on the investigations and applications of novel laser Doppler velocity profile sensors for the study of fluid flows. This new sensor achieves a spatial resolution in the range of 10 to the 6 m with a measurement uncertainty in the range of 10 to the 4 at the same time. Hence, the uncertainties are at least one magnitude of order smaller than those of conventional LDA. The high spatial resolution and small measurement uncertainty are achieved without reducing the size of the measurement volume compared to conventional LDA. As the new sensor provides both velocities and positions of individual tracer particles passing through the measurement volume, high spatially resolved velocity profile along one-dimensional line is captured without the needs of any preliminary assumptions on the flow. This feature of the sensor...

Reviews

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