

DEVELOPMENT AND APPLICATION OF VOLUMETRIC VELOCITY MEASUREMENT TECHNIQUES

PROJECT LEADERS

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RESEARCH THEME

Complex dynamics of fluids
Complex structures of fluids

PARTICIPANTS

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COOPERATIONS

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FUNDED

FOM

1st - 2nd 100% 3rd -

START OF THE PROJECT

2008

INFORMATION

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PROJECT AIM

Development and Application of Volumetric Velocity Measurement Techniques based on digital holographic imaging and tomographic imaging. The methods will be employed in the investigation of turbulent and instationary flows at both large scales and small scales. The results will be compared with those obtained from numerical simulations. The project interacts with ongoing research on the role of coherent flow structures in turbulent flows and small-scale flows.

PROGRESS

Stereo PIV set-up has been assembled and tested in measurements for a benchmark flow over a plate and turbulent wake behind the Ahmed body. In March 2009

In cooperation with Teijin Aramid, some study has been done on application of digital holography to micrometer fibers size analysis in a volume with large depth. It has been showed that for slow variation of fibers diameter over length one dimensional Fraunhofer diffraction theory can be applied with accuracy of 5% for fiber diameter of 60 μm . Recently, influence of fibers relative position and density on extraction of their size and position was studied experimentally. Classical holographic approach turned out to work poorly, giving 2-3 pixels precision, that means inaccuracy of 10-20 μm . However, if fibers are in a row, consideration of out of focus reconstructed planes can decrease error to 5 μm . Evaluation of the experimental result for a bunch of fibers is still work in progress.

DISSERTATIONS

1. T.A. Ooms, Digital holographic particle image velocimetry

SCIENTIFIC PUBLICATIONS

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