

Abstract Submitted  
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**3D-flow measurements in micro channel and pipe with high time resolution using micro digital-holographic particle-tracking velocimetry**  
SHIN-ICHI SATAKE, Tokyo University of Science, TOMOAKI KUNUGI, Kyoto University, KAZUHO SATO, Toyota Industries Corp., TOMOYOSHI ITO, Chiba University, JUN TANIGUCHI, HIROYUKI KANAMORI, Tokyo University of Science — A micro digital-holographic particle-tracking velocimetry (micro-DHPTV) method for high time-resolution flow field measurement in a micro-channel was developed by Satake et al. (2005). The system consists of an objective lens, a high-speed camera and a single high-frequency double pulsed laser. Particle positions in a three-dimensional field can be reconstructed by a computer-generated hologram. The time evolution of a three-dimensional water flow in a semicircular micro-channel of 100- $\mu\text{m}$  width and 40- $\mu\text{m}$  depth and in a circular micro-pipe of 100- $\mu\text{m}$  inner diameter are obtained successfully using this micro-DHPTV system. The three-dimensional measurement volume of the system is 410  $\mu\text{m} \times 100 \mu\text{m} \times 40 \mu\text{m}$  and is irradiated by one laser beam with the time resolution of 100  $\mu\text{sec}$  and a repetition rate of 1 kHz. Consequently, 130 velocity vectors in the semicircular micro-channel can be obtained instantaneously. Satake, S., Kunugi, T., Sato, K., Ito T., Taniguchi, J., “Three-dimensional flow tracking in a micro channel with high time resolution using micro digital-holographic particle-tracking velocimetry,” To appear in Optical Review, 2005.

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