

## Standards and Measurement Technology

# Investigation of Measuring Technique for Liquid Volume in Micro-Gravity

Measurement of liquid volume in a micro-gravity condition is an important aspect of space technologies. In an attempt to create an effective and low cost measurement system, we have proposed a new measuring technique based on Helmholtz resonance. We have tested our methods with a micro-gravity experiment using water and liquid nitrogen as test liquids. It was found that the measurement technique is applicable in a micro-gravity condition. However, it was also found that the measurement of the spatial temperature distribution in a container is necessary to apply this measurement technique to cryogenics because the veloc-

ity of sound has a strong temperature dependency.



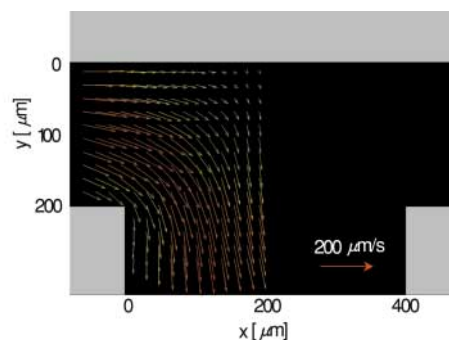
Picture of the experimental set up for water

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# Temperature and Velocity Measurement Techniques in Microspace

Two-dimensional temperature and velocity measurement techniques in microspace were developed using a CCD camera and microscope in order to investigate flow structure in a microchannel. Velocity measurements were performed using 400 nm fluorescent particles that induce the Brownian motion affecting velocity detection. The present study proposed a new method to eliminate the effect of Brownian motion on velocity information. Temperature measurements utilized fluorescence dye whose fluorescent intensity is strongly dependent on temperature. The present technique

enabled us to measure a microchannel flow with high spatial resolution.



Distribution of velocity vectors in a T-type microchannel

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