Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

3D positional tracking of ellipsoidal particles in a microtube flow using holographic microscopy HYEOK JUN BYEON, KYUNG WON SEO, SANG JOON LEE, POSTECH — Understanding of micro-scale flow phenomena is getting large attention under advances in micro-scale measurement technologies. Especially, the dynamics of particles suspended in a fluid is essential in both scientific and industrial fields. Moreover, most particles handled in research and industrial fields have non-spherical shapes rather than a simple spherical shape. Under various flow conditions, these non-spherical particles exhibit unique dynamic behaviors. To analyze these dynamic behaviors in a fluid flow, 3D positional information of the particles should be measured accurately. In this study, digital holographic microscopy (DHM) is employed to measure the 3D positional information of non-spherical particles, which are fabricated by stretching spherical polystyrene particles. 3D motions of those particles are obtained by interpreting the holograms captured from particles. Ellipsoidal particles with known size and shape are observed to verify the performance of the DHM technique. In addition, 3D positions of particles in a microtube flow are traced. This DHM technique exhibits promising potential in the analysis of dynamic behaviors of non-spherical particles suspended in micro-scale fluid flows.

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Date submitted: 30 Jul 2014 Electronic form version 1.4