Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Multi-Point Holographic Micro-Velocimetry ROBERTO DI LEONARDO, INFM-CNR Dipartimento di Fisica, Universita' di Roma "La Sapienza", Roma, Italy, JONATHAN LEACH, Department of Physics and Astronomy, University of Glasgow, Glasgow, Scotland, HASAN MUSHFIQUE, Department of Electrical Engineering, University of Glasgow, Glasgow, Scotland, JOHN COOPER, Department of Electrical Engineering, University of Glasgow, Glasgow, Scotland, GIANCARLO RUOCCO, INFM-CNR Dipartimento di Fisica, Universita' di Roma "La Sapienza", Roma, Italy, MILES PADGETT, Department of Physics and Astronomy, University of Glasgow, Glasgow, Scotland — We show how holographic optical trapping can be used for the multi-point measurement of fluid flow in microscopic geometries. An array of microprobes can be simultaneously trapped and used to map out the fluid flow in a microfluidic device. The optical traps are alternately turned on and off such that the probe particles are displaced by the flow of the surrounding fluid and then retrapped. The particles' displacements are monitored by digital video microscopy and directly converted into velocity field values. The validity of the technique is demonstrated for the case of the flow around a spinning sphere and the flow at the outlet of a micro-channel.

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Date submitted: 30 Nov 2005 Electronic form version 1.4