

Abstract Submitted
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Experimental application of multilayer nano-particle image velocimetry HAIFENG LI, MINAMI YODA, Georgia Institute of Technology — Nano-particle image velocimetry (nPIV) uses evanescent-waves with an intensity that decays exponentially along z or the direction normal to the wall as the illumination source to measure the tangential velocity components within the first 300 nm next to the wall. Illuminated tracers in nPIV that are closer to the wall should therefore have images brighter than those farther from the wall. This variation in tracer intensity is the basis of “multilayer nPIV,” where the velocity parallel to the wall is estimated at a few distinct z -locations within the region illuminated by the evanescent wave. The feasibility of this technique has already been demonstrated using synthetic images of plane Couette flow (Li *et al.* (2006) *Exp Fluids* DOI: 10.1007/s00348-006-0155-4). Initial experimental results will be presented where velocities at a few z locations within 300 nm of the wall are extracted from experimental images of Poiseuille flow through a rectangular microchannel (cross-section dimensions $40\ \mu\text{m} \times 300\ \mu\text{m}$). The experimental parameters are chosen based upon the results of Li *et al.* to minimize bias due to the asymmetric nature of Brownian diffusion in the near-wall region.

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