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The effect of tracer properties on interfacial particle-image velocimetry results in microflows[1] YUTAKA KAZOE[2], MINAMI YODA, Georgia Institute of Technology — Interfacial effects are important in many cases for microscale transport. One of the few experimental techniques that can resolve interfacial transport at these spatial scales is multilayer nano-particle-image velocimetry (MnPIV), which exploits the exponentially decaying intensity of evanescent-wave illumination to obtain velocities at different distances from the fluid-solid interface within 400 nm of the wall. Although MnPIV results have been validated in steady and creeping Poiseuille flow, the results of this technique, like all tracer-based velocimetry techniques are tracer velocities, which are then assumed to be identical to the fluid velocities. This talk describes MnPIV results using tracers with diameters ranging from 40 nm to 100 nm for otherwise identical flows; changing tracer size should impact both electrostatic interactions and Brownian effects. Results are presented on how tracer size affects near-wall particle and velocity distributions in Poiseuille flow and electroosmotic (*i.e.*, electrokinetically driven) flow, with the additional complication of particle electrophoresis, in channels with a minimum cross-sectional dimension of about 40 μm.

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