

Abstract Submitted  
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**Measurement of particle trajectories, dynamics, surface adhesion and detachment in near-wall shear flows using 3D velocimetry** JEFFREY GUASTO, Brown University, BRIAN SCHMIDT, MICHAEL LAWRENCE, University of Virginia, KENNETH BREUER, Brown University — Three-dimensional total internal reflection velocimetry (3D-TIRV) is used to measure the trajectories of fluorescent tracer particles within 200 nm of a wall. Diffusion and shear-induced motion can result in mean velocity measurement errors, and by taking measurements using different particle sizes and sampling times, we quantify these effects and compare with theory. We also use 3D-TIRV to observe and characterize the adhesion, surface rolling and release dynamics of particles that can adhere to the surface through the action of biological binding proteins. Particles coated with P-Selectin are allowed to adhere to and detach from a PSGL-1-coated microchannel surface, modeling the interaction between leukocytes (white blood cells) and blood vessels, respectively. Binding affinities, bond strengths and hydrodynamic interactions are inferred from the trajectory data.

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