Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Microscale Curveballs: Translational and Rotational Coupling of Colloids STEPHEN ANTHONY, Department of Chemistry, University of Illinois, MINSU KIM, Department of Physics, University of Illinois, STEVE GRANICK, Department of Materials Science and Engineering, University of Illinois — Optically anisotropic MOON particles (modulated optical nanoparticles) allow the simultaneous measurement of translation and rotation for individual particles. Through chemical modification, these particles can be made hydrophilic, amphiphilic, or hydrophobic. Among those three, the boundary condition exhibits varying amounts of slip, which registers in the value of the rotational diffusion constant. Additionally, for the amphiphilic case, the translational and rotational motions are no longer independent of each other, exhibiting coupling due to the asymmetric hydrodynamic drag. Understanding these processes is fundamental to particle dynamics, with implications to kinetically limited processes such as the self-assembly of multiunit proteins. Addressing the influence of these varied boundary conditions, this study presents single-particle tracking of micron-sized spherical colloids suspended in deionized water, tracked and quantified using home-written algorithms.

Stephen Anthony
Department of Chemistry, University of Illinois

Date submitted: 14 Nov 2006 Electronic form version 1.4