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Nonlinear Motion of Optically Torqued Nanorods KEITH BONIN, W. ANDREW SHELTON, Department of Physics, Wake Forest University, Winston-Salem, NC 27109, THAD WALKER, Department of Physics, University of Wisconsin, Madison, WI 53706 — We apply light torques to single optically trapped glass nanorods suspended in water. The resulting motion is carefully studied experimentally and consists of two distinct regimes: a linear regime where the rod angle increases linearly with time and a nonlinear regime where the rod angle changes nonlinearly, experiencing accelerations and rapid reversals. We motivate a theoretical model for the motion of such nanorods, which agrees extremely well with the observed motion. In this report, the trapped and torqued nanorods move without influence from surfaces. Such a model system is helpful to understanding the more complex motion that occurs near a surface. Studying such nonlinear motion both free of, and near, a surface is important for understanding nanofluidics and hydrodynamic motion at the nanoscale. As such, we will also present some data on how the motion is different close to a surface.

Keith Bonin
Department of Physics, Wake Forest University, Winston-Salem, NC 27109

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