

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Measuring nanorod diffusion in 3D with holographic video microscopy** FOOK CHIONG CHEONG, DAVID GRIER, New York University — In this work, we demonstrate the use of holographic video microscopy for imaging nanorods in three dimensions with video-rate time resolution. We use computer reconstructions of the light fields captured in each video snapshot to measure the nanorod's position and orientation. Information from a video sequence then enable us to measure the nanorod's three-dimensional translational and rotational diffusion in water. Comparison with predictions for the diffusion of prolated ellipsoids reveals excellent agreement with the nanorod dimensions measured holographically and those deduced from the nanorod's dynamics.

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Date submitted: 06 Nov 2009

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