

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Self-diffusion of Colloidal Spheres and Ellipsoids in Nematic Phases of fd-virus** J. ZHANG, M.F. ISLAM, A.M. ALSAYED, A.G. YODH, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA 19104-6396 — We report on the self-diffusion of micron sized colloidal spheres and ellipsoids in nematic phases of fd-virus. The mean square displacements (MSDs) of the spheres are diffusive along the nematic director, with the diffusion coefficients displaying an inverse dependence on sphere radius. Displacements perpendicular to the nematic director, however, are markedly slower and are sub-diffusive. The colloidal ellipsoids align with their long axis along the nematic director and also exhibit diffusive motion along the nematic director and a sub-diffusive motion perpendicular to the nematic director. The rotational motions of the ellipsoids are sub-diffusive at short time, and exhibit caged behavior at long times. We examine these motions as a function of nematic order parameter, and compare our results to theories of hindered tracer dynamics. This work has been partially supported by the NSF through MRSEC Grants DMR 00-79909 and DMR-0203378, and by NASA Grant NAG8-2172.

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Date submitted: 22 Dec 2004

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