Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Translational and Rotational Diffusion of Nanoparticle Aggregates of Irregular Shape in 2D Fluid Membranes[1] KYLE MEIENBERG, JOHN PAPAIOANNOU, CHEOL PARK, MATT GLASER, JOE MACLENNAN, NOEL CLARK, Physics, University of Colorado, TATIANA KURIABOVA, Physics Department, California Polytechnic State University, THOMAS POWERS, School of Engineering and Department of Physics, Brown University — We observe directly the diffusion and aggregation of nanoparticles (buckyballs) embedded in thin, freely suspended smectic A liquid crystal films of 8CB using reflected light microscopy Individual buckyballs, initially homogeneously dispersed in the film, are too small to see but after some hours form nanoscale clusters. These, in turn, aggregate to form extended, micron-scale objects which diffuse in the film, enabling the measurement of 2D rotational and translational mobilities of inclusions with a wide variety of different shapes. The experimental mobilities are compared with predictions of the extended Saffman-Delbrück (SD) model used successfully to describe the diffusion of micron-sized objects in thin fluid membranes in a variety of experimental systems.

[1]This work was supported by NASA Grant No. NNX-13AQ81G, NSF MRSEC Grant No. DMR-0820579, and by NSF Grant No. CBET-0854108.

Cheol Park
Physics, University of Colorado

Date submitted: 14 Nov 2014 Electronic form version 1.4