

Abstract Submitted
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Measurements of Translational and Rotational Mobilities of Inclusions near a Boundary in Tilted Freely-Suspended Smectic Liquid Crystal Films¹ IAN CADENHEAD, ADAM GREEN, CHEOL PARK, MATT GLASER, JOE MACLENNAN, NOEL CLARK, Physics Department and Soft Materials Research Center, University of Colorado — Freely-suspended liquid crystal films serve as an excellent model system for investigating two-dimensional hydrodynamics, including the study of inclusion mobilities near fixed boundaries. We present experimental measurements using digital video microscopy of the translational and rotational mobilities of smectic islands near the boundary of a rectangular smectic A film a few molecular layers thick. The islands are thicker, circular domains that behave as large particles embedded in the film. Tilting the film causes the islands to drift under gravity. Measuring the diffusion and velocities of these islands allows us to extract the translational and rotational mobilities of the inclusions as a function of distance from the film boundary. The results are compared to Saffman-Delbrück theory using the general approach of Levine and MacKintosh.

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