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Two-Dimensional Diffusion of a Droplet near the Rigid Boundary of a Fluid Smectic Film[1] ZHIYUAN QI, CHEOL PARK, JOSEPH MACLENNAN, MATTHEW GLASER, NOEL CLARK, University of Colorado, TATIANA KURIABOVA, THOMAS POWERS, Brown University — Homogeneous, freely-suspended fluid smectic A liquid crystal films in vacuum provide an ideal system for studying two-dimensional (2D) hydrodynamics in the absence of additional drag from the surrounding air. The 2D Brownian motion of a single oil droplet embedded in such a film and diffusing near a rigid wall was captured using digital video microscopy. Analysis confirms that the diffusion is anisotropic, with different mobilities for droplet motion parallel and perpendicular to the wall, in qualitative agreement with calculations based on the Oseen tensor assuming non-slip boundary conditions.

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