

Abstract Submitted
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Flow Meter Based on Freely Suspended Smectic Liquid Crystal Films¹ ADAM GREEN, None, ZHIYUAN QI, CHEOL PARK, MATTHEW GLASER, JOSEPH MACLENNAN, NOEL CLARK, Soft Materials Research Center, University of Colorado, Boulder, CO 80309 — We present the realization of an idealized 2D hydrodynamic system coupled to air-flow, and show that freely suspended films (FSF) of smectic liquid crystals can be used as a novel flow-meter. Freely-suspended films of liquid crystals are one of the closest physical realizations of an idealized 2D fluid. The velocity of air-flow above a film suspended above a channel can be inferred by studying the velocity profile of the smectic film. This velocity profile can be measured using digital video microscopy to track the inclusions present in the moving film. The velocity profile is then fitted to the coupled 2D solutions of an embedded fluid in air, and the velocity of the air can then be extracted. This flow meter serves as a demonstration of a robust test-bed for further exploration of 2D hydrodynamics.

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