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Two-Dimensional Microfluidics: hydrodynamics of drops and interfaces in flowing smectic liquid crystal channels[1]
ZHIYUAN QI, ZOOM NGUYEN, CHEOL PARK, JOE MACLENNAN, MATT MACLENNAN, NOEL CLARK, Physics, University of Colorado at Boulder, LC TEAM — The quantization of film thickness in freely suspended fluid smectic liquid crystal film enables the study of the hydrodynamics of drops and interfaces in 2D. We report microfluidic experiments, in which we observe the hydrodynamics of 2D drops flowing in channels. Using high-speed video microscopy, we track the shape of 2D drops and interfaces, visualizing the deterministic lateral displacement-based separation and pinched flow separation phenomena previously observed only in 3D. Finally, we demonstrate techniques for 2D drop generation and sorting, which will be used for 2D microfluidic applications.

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