Abstract Submitted
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Thin soap films are quasi-2D fluids and thick soap films are not SKANDA VIVEK, ERIC R. WEEKS, Physics Department, Emory University — We use microrheology to measure the 2D (interfacial) viscosity of soap films. Microrheology uses the diffusive motion of tracer particles suspended in the soap film to infer the viscosity. Our particles are colloids of diameter $d = 0.5$ μm. We measure the interfacial viscosity of soap films ranging in thickness from $h = 0.5$ μm to 2.0 μm. The thickness of these films is measured using the infrared absorbance of the water based soap films, based on a previous setup [X. L. Wu, R. Levine, M. A. Rutgers, H. Kellay, W.I. Goldburg, *Rev. Sci. Inst.* **72**, 2467 (2001)]. From the knowledge of the film thickness and the viscosity of the fluid used to make the film, we can infer the interfacial viscosity due to the surfactant layers at the film/air interfaces. Consistent results are found for thin films ($h/d < 3$) whereas for thicker films inconsistent and unphysical results are found indicating 3D effects begin to play a role. The transition from 2D to 3D properties as a function of h/d is sharp.

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