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Interactions among microdroplets at the water-air interface CHUAN ZENG, Department of Physics, University of Massachusetts Amherst, ANTHONY D. DINSMORE — There has been a great mystery concerning the origin of measured long-range attraction among microparticles at fluid interfaces. Recent theoretical work[1] showed that electrostatic interactions should not lead to long-range attraction, but the possibility remains that attraction arises from an irregular contact line on the particles' surfaces. Replacing the solid particles with liquid droplets eliminated surface roughness and thus reduced the complexity of the system. We captured micron-sized oil droplets at water-air interface and measured the interaction between them. The dynamics of droplets at interface were imaged using optical microscopy, from which the droplets' motions were tracked and analyzed. The interaction between two isolated droplets was calculated from their trajectories through the Markovian dynamics extrapolation method developed by J. C. Crocker and D. G. Grier[2]. We acknowledge support from NASA through the Fluid Physics program (NRA 02-OBPR-03-C) and from the NSF-supported MRSEC on Polymers (DME-0213695).

[1] See, for example, M. Oettel, A. Dominguez, and S. Dietrich, *Phys. Rev. E* **71**, 051401 (2005).

[2] J. C. Crocker and D. G. Grier, *Phys. Rev. Lett.* **73**, 352 (1994).

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