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Microrheology Using Optical Tweezers at the Air-Water Interface[1] THOMAS BOATWRIGHT, University of California, Irvine, ALEX LEVINE, University of California, Los Angeles, MICHAEL DENNIN, University of California, Irvine — Microrheological techniques have been used successfully to determine mechanical properties of materials important in cellular structure. Also critical to cellular mechanical functions are biological membranes. Many aspects of biological membranes can be modeled using Langmuir monolayers, which are single layers surfactants at the air-water interface. The macroscopic mechanical properties of Langmuir monolayers have been extensively characterized. In contrast to macroscopic measurements, we report on experimental methods for studying the rheological properties of Langmuir monolayers on the micron scale. A water immersion optical tweezers system is used to trap $\sim$1 micron diameter beads in a monolayer. The passive motion of the trapped beads is recorded at high frequency and the complex shear modulus is calculated. Preliminary microrheological data of a fatty acid monolayer showing dependence on surface pressure will be presented. Experimental obstacles will also be discussed.

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