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Rheology and Microrheology of Actin-Lipid Composites at the Air-Water Interface[1] ROBERT WALDER, University of California, Irvine, ALEX LEVINE, University of California, Los Angeles, CHRISTOPH SCHMIDT, Third Physical Institute: Biophysics Georg-August-Universität, Göettingen, Germany, MICHAEL DENNIN, University of California, Irvine — We report on the mechanical properties of a composite material that is a combination of a Langmuir monolayer chemically linked to an actin filament network. This composite system is a 2 dimensional analogue of a cellular membrane and is also expected to have interesting nonlinear mechanical properties. To measure these mechanical properties, we employ traditional rheology and have developed unique microrheological capabilities based on an optical tweezer setup combined with a Couette surface rheometer. This combination of techniques will allow the study of both bulk and local mechanical responses of the composite material to external forces. Studying such materials allows us to simultaneously study a biomimetic material that should provide useful insights into the mechanical properties of biological cells, while also providing a 2 dimensional soft matter system to study the properties of semi-flexible polymer networks.

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