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Mechanical Properties of an Actin Filament Network Monolayer[1]
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Actin filament networks present a model system to study the mechanical properties of semi-rigid polymer networks. Because they are a network, the filaments can display behavior that deviates from continuum elasticity theory on sufficiently short length scales, resulting in interesting nonlinear response of the system to applied stresses and strains. We have developed a Couette (concentric cylinders) style apparatus to study monolayers of actin confined to the air-water interface. This talk will present results characterizing the response of the monolayer to continuous and stepwise strains. We will report on measurements of the viscosity of the actin network, as a macroscopic characterization, and on tracking of particles embedded in the network. The particle tracking is used to probe local displacements of the network in response to applied strain. We will report on tests of the predicted transition between affine and non-affine displacements as a function of cross-linking density.

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