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Hydrodynamics of soap films probed by two-particle microrheology VIKRAM PRASAD, ERIC R. WEEKS, Emory University — A soap film consists of a thin water layer that is separated from two bulk air phases above and below it by surfactant monolayers. The flow fields in the soap film created in response to a perturbation depend on coupling between these different phases, the exact nature of which is unknown. In order to determine this coupling, we use polystyrene spheres as tracer particles and track their diffusive motions in the soap film. The correlated Brownian motion of pairs of particles (two-particle microrheology) maps out the flow field, and provides a measure of the surface viscosity of the soap film as well. This measured surface viscosity agrees well with the value obtained from self diffusion of single particles (one-particle microrheology) in the film.

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