

Abstract Submitted
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Structural Properties of a Sheared Dense Emulsion¹ S.K. DUTTA, E.D. KNOWLTON, D.L. BLAIR, Department of Physics, Georgetown University — The flow of a compressed emulsion above its yield point can be described by a velocity profile in addition to a rearrangement of individual droplets on top of this time averaged motion. Using a confocal microscope, we have tracked the droplets of an oil-in-water emulsion as they are sheared in a rheometer. When the applied stress is large, the velocity profile shows a nearly affine deformation, while there is strong strain localization close to yield. The crossover between these two behaviors occurs at higher shear rates as the volume fraction of the droplets is increased. At shorter length scales, rearrangement events are heterogeneously distributed, reflecting the disordered packing of the emulsion droplets. This characterization is a step towards linking bulk viscoelastic properties to local structural relaxation as the system leaves the jammed state.

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