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Structure and dynamics of foam-like emulsions VINOTHAN MANOHARAN, Dept of Physics and Division of Engineering and Applied Sciences, Harvard University, JOHN C. CROCKER, Chemical and Biomolecular Engineering, University of Pennsylvania — We report the results of real-space, microscopic experiments on model concentrated emulsions ($\phi > 0.65$) in which the continuous and dispersed phases are both index- and density-matched. Like foams, these systems coarsen and age due to diffusion of fluid from small to large droplets, but unlike foams, they are transparent and do not drain during the course of an experiment. Thus we are able to probe their internal structure and dynamics at volume fractions ranging from 0.65 to 0.90. Measurements of the mean-squared displacement of small tracer particles embedded in the emulsion reveal that the system exhibits non-thermal stress fluctuations with Lorentzian power spectral density. We relate these fluctuations to intermittent droplet rearrangements, presumably driven by coarsening, that we observe directly through confocal microscopy.

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