Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Random Organization: A Gift that Keeps on Giving[1] DAVID PINE, SANUEL WILKIN, PAUL CHAIKIN, NYU — Non-Brownian suspensions of spheres periodically sheared at low Reynolds number explore new configurations through collisions in an otherwise reversible flow. Below a critical strain, the particles remain active until they find a configuration with no collisions and fall into an absorbing state. Simulations by Hexner & Levine show that the system becomes hyperuniform near the critical strain as long length-scale density fluctuations are suppressed. Using a compact rotational shear cell, we explore the effect of collision-induced diffusion on the evolution of the structure factor $S(q)$ using a confocal microscope. From dynamical measurements, we see that the effective diffusion constant is equal to the self-diffusion of the particles below the transition and increases linearly with strain amplitude above. For a 40% volume fraction suspension, we see low-q long-wavelength fluctuations suppressed near the critical strain of $\gamma = 0.9$ with as $S(q)$ exhibits hyperuniform scaling. At short length scales, the nearest neighbor correlations ($S(q \approx 2\pi/a)$) reach a peak at critical.

[1]This work is supported by the MRSEC Program of the National Science Foundation under Award Number DMR-1420073.

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Date submitted: 31 Jul 2019 Electronic form version 1.4