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Experiments on Hyperuniformity induced by Random Organization SAM WILKEN, RODRIGO GUERRA, DAVID PINE, PAUL CHAIKIN, New York Univ NYU — Periodically sheared dilute, non-Brownian suspensions 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 reach an absorbing state. Recent simulations by Hexner and Levine have shown that the configuration of particles in the critically absorbing state is hyperuniform. The structure factor of a hyperuniform system goes to zero as approaches zero ($S(q \to 0) \to 0$), as opposed to a constant positive value for the same suspension away from the critical state. Simulations predict a power law behavior of S(q) for length scales larger than the particle separation. We built a compact, uni-axial shear cell in order to shear dilute suspensions while using small-angle light scattering to measure S(q) from angles of 0.1° to 1.5°. We are able to identify hyperuniform structures via light scattering for colloidal suspensions of up to 40% volume fraction at the critically absorbing state.

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