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Shear Induced Structural Relaxation in a Supercooled Colloidal Liquid DANDAN CHEN, DENIS SEMWOGERERE, ERIC R. WEEKS, Physics Dept., Emory University — The rheology of dense amorphous materials under large shear strain is not fully understood, partly due to the difficulty of directly viewing the microscopic details of such materials. We use a colloidal suspension to simulate amorphous materials, and study the shear-induced structural relaxation with fast confocal microscopy. We quantify the plastic rearrangements of the particles in two ways. First, we consider "non-affine mobility" by subtracting the global linear applied strain from the particle motion. Second, we examine "local deformation" by subtracting the local linear apparent strain (as measured from the particle motion). We find these measures of plasticity are spatially heterogeneous, with localized regions where many particles are strongly rearranging by these measures. We examine the shapes of these regions and find them to be essentially isotropic, with no alignment in any particular direction.

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