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Deformation of Colloidal Glasses PETER SCHALL, WZI, University of Amsterdam, ITAI COHEN, Physics Department, Cornell University, FRANS SPAEPEN, DAVID WEITZ, DEAS, Harvard University — Amorphous colloidal suspensions are known to be powerful models for studying dynamical processes in glasses. Since the particles can be observed optically in real time, colloidal systems offer the unique opportunity of studying important mechanisms at the single particle level. We use confocal microscopy to investigate structural rearrangements in colloidal glasses under applied shear. Our setup allows us to track the motion of the individual particles in three dimensions while the suspension is sheared. We use the particle positions determined by confocal microscopy to calculate the local strain tensor and to identify regions of non-affine deformation. We observe “shear zones” that are accompanied by a complex strain field around them. Using the single particle data, we elucidate the particle rearrangements in the shear zones, and we investigate correlations between the location of these shear events and regions of high free volume.

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