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Microscopic dynamics of recovery in sheared concentrated depletion gels R. L. LEHENY, B. CHUNG, R. BANDYOPADHYAY, D. LIANG, Johns Hopkins U., S. RAMAKRISHNAN, C. F. ZUKOSKI, UIUC, J. L. HARDEN, U. of Ottawa — We describe x-ray photon correlation spectroscopy and diffusing wave spectroscopy investigations of concentrated depletion gels formed from nanoscale silica colloids in solutions of nonabsorbing polymer. The experiments track the changing microscopic dynamics as these jammed, nonergodic systems recover following the cessation of large shear. The two techniques provide a quantitatively coherent picture of the dynamics as ballistic or convective motion of colloidal clusters whose internal motion is arrested. While the evolution of the dynamics possesses features characteristic of nonergodic soft solids, including a characteristic relaxation time that grows linearly with the time since cessation of shear, comparison with the behavior of quenched supercooled liquids indicates the dynamics are not directly related to traditional aging and rejuvenation phenomena in glasses.

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