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Local Perturbation of Quasi Two-Dimensional Colloidal Glasses[1] KEVIN APTOWICZ, West Chester University, TIM STILL, KE CHEN, PETER YUNKER, ARJUN YODH, University of Pennsylvania — Colloids are promising and widely used model systems to investigate the phase behavior of matter at length scales and timescales accessible to optical microscopy. We utilize disordered quasi two-dimensional colloidal systems in the jammed state to study the properties of glasses. It was recently found in simulation and experiment that so-called 'soft spots', where low frequency quasi-localized modes concentrate, are the locations in glasses prone to rearrangements. Therefore, we utilize short laser pulses to perturb colloidal glasses locally. By varying the pulse intensity of the laser, the strength of the perturbation is tunable, which allows us to induce either elastic or plastic deformations in the glasses. With this experimental geometry in combination with video microscopy, we investigate the correlation between locally induced rearrangements in the colloidal glass and the location of soft spots determined from analysis of the system's vibrational eigenmodes. The dependence of the mechanical response of a glass on the local environment in terms of these dynamic heterogeneities and their persistence is discussed.

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Kevin Aptowicz
West Chester University

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