

Abstract Submitted
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**Rearrangements, Vibrations and Microscopic Glassy
Dynamics and Structure in Quasi-2D Dense Colloidal Gels¹**

MATTHEW LOHR, ARJUN YODH, University of Pennsylvania — In this work, we investigate the microscopic dynamics of quasi-2D dense attractive colloidal systems. We confine bidisperse polystyrene spheres between glass coverslips in a suspension of water and 2,6-lutidine; as we increase the temperature of the sample into a critical regime, lutidine wets the colloids, creating a strong attractive interaction ($> 4kT$). We specifically study suspensions in the “dense gel” regime, i.e., at a volume fraction high enough that the attractive particles form a spanning cluster, yet just low enough that there exists some structural heterogeneity larger than the individual particle size. We track the particle locations via bright-field video microscopy and analyze the dynamics of both lower-volume-fraction gel states and higher-volume-fraction glassy states. Specifically, we make correlations between local structure, rearrangement-prone regions, and low-frequency vibrational modes. In doing so, we not only characterize the structural and dynamical differences and similarities between colloidal gels and glasses, but we also gain further insight into the origins of dynamic heterogeneity in glassy systems.

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