

Abstract Submitted
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Decoupling of Rotational and Translational Diffusion in a 2D Granular Experiment NABIHA SAKLAYEN, GARY L. HUNTER, ERIC R. WEEKS, Emory University — We experimentally study the rotation and diffusion of granular clusters in a 2D binary granular system. Our apparatus vibrates a 2D system of densely packed granular bidisperse disks (to avoid crystallization) containing trackable 3-particle clusters. We use this system to mimic hard-sphere fluids and the clusters probe the system's local translational and rotational dynamics. As the area fraction of the bidisperse disks is increased, diffusion within the sample becomes slower, and above a critical area fraction, the sample behaves as a granular glass. We analyze the rotational and translational motions of the clusters to determine whether they decouple with changing area fraction of the system. As we approach the glass transition, we observe a decoupling between the two motions.

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