Abstract Submitted
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Dynamical Slowing Down for Sheared Granular Materials[1] SOMAYEH FARHADI, ROBERT P. BEHRINGER, Duke University — We have performed Couette shear experiments on both circular and elliptical shaped particles below the isotropic jamming point. The dynamics of the system was studied for density regions of $0.85 \leq \phi \leq 0.87$ in ellipses, and $0.80 \leq \phi \leq 0.83$ in disks. In a very small density region, both systems of ellipses and disks evolve slowly in response to continious shear. In particular, we observe that by starting from an essentially unstressed state and applyinmg shear strain, the average displacements of the particles initially grow rapidly, and then slowly decrease for very large strains. In a similar set of experiments performed on disks, slow relaxation was observed as well. However, we observed fundamental differences between the evolution of systems of disks and ellipses. We characterize this slow dynamics by measuring the evolution of velocity profile, density, and orientational order in the course of experiment. Our data suggests that the slow relaxation in ellipses is associated with the small and slow changes in the orientation of particles, which then allow a more efficient packing.

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