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Jamming of soft spheres at finite temperature : a granular experiment CORENTIN COULAIS, CEA Saclay, OLIVIER DAUCHOT, ESPCI, ROBERT BEHRINGER, Duke University, GIT - SPEC - CEA SACLAY TEAM, ESPCI TEAM[1], GIT-SPEC-CEA SACLAY / BEHRINGER'S GROUP AT DUKE COLLABORATION
— At large packing fraction, disordered packings of particles with repulsive contact interactions jam into a rigid state where they withstand finite shear stresses before yielding. For frictionless particles and at zero temperature, the jamming transition coincides with the onset of iso-staticity and many geometrical and mechanical properties scale with the distance to the jamming point. What are the vestige of jamming at finite temperature and how jamming impacts the thermodynamics of glasses remain open issues. We address these questions experimentally by investigating the dynamics of both the density field and the force network of an horizontally shaken bi-disperse packing of photo-elastic disks. The average number of contact clearly displays an abrupt transition which we interpret as the jamming transition. Besides, dynamical heterogeneities are observed and their amplitude exhibits a maximum, which, in turn, signs a dynamical transition. We discuss in detail the interplay between these two transitions and how they depend on the particle softness and amplitude of the horizontal vibration.

[1]The Team is in Saclay and Olivier Dauchot has recently move to ESPCI

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