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Effective Interactions Between Intruders in Vibrated Granular Materials RACHEL DERBY, University of Maryland, Baltimore County, BRIAN UTTER, James Madison University — Despite the strong fluctuations in a rapidly moving granular material, dissipation and correlations in collisions can lead to long range forces in granular materials. In this experiment, we study the long-range attraction between two objects when immersed in a vibrated granular system. Depending on the strength of vibration, a granular system can take the form of a gas or be fluidized. We place two large intruders in each of these systems to track the effective interactions between the intruders, varying frequency, amplitude, size of grains, and the shape of the intruder. In particular, we study the interaction of spheres in a granular gas and the effective force between plates in a granular fluid. Using image processing, we track the separation of the intruders over time. We find that parallel plates attract if they are separated by less than approximately 15 particle diameters and reach a final position in which one ordered layer of grains is between them. Granular gas experiments suggest a long-range interaction, but observed effects in the mean position are much weaker than the fluctuations. Ongoing work focuses on varying the vibration parameters (amplitude, frequency, & waveform) and increasing statistics.

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