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Compactivity measurements for a bidimensional granular FRED-ERIC LECHENAULT, CEA, FREDERIC DACRUZ, OLIVIER DAUCHOT, CEA SPEC, ERIC BERTIN, Department of Theoretical Physics, University of Geneva — We investigate experimentally the statistical properties of the free volumes inside a bidimensional granular packing. Having in mind the more general issue of the measure of intensive thermodynamical parameters in out-of-equilibrium systems, we propose an experimental procedure to access the compactivity of the packing from the free volume distributions over clusters of grains, varying the size of the cluster. Our main result is that the logarithm of the probability to find a given free volume in a cluster scales in a nonextensive way. The compactivity of the packing is then extracted from the corresponding scaling function for two different kinds of grains, and two levels of compaction.

Frederic Lechenault
CEA

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