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On creating macroscopically identical granular systems with different numbers of particles DEVARAJ VAN DER MEER, NICOLAS RIVAS, University of Twente, The Netherlands — One of the fundamental differences between granular and molecular hydrodynamics is the enormous difference in the total number of constituents. The small number of particles implies that the role of fluctuations in granular dynamics is of paramount importance. To obtain more insight in these fluctuations, we investigate to what extent it is possible to create identical granular hydrodynamic states with different number of particles. A definition is given of macroscopically equivalent systems, and the dependency of the conservation equations on the particle size is studied. We show that, in certain cases, and by appropriately scaling the microscopic variables, we are able to compare systems with significantly different number of particles that present the same macroscopic phenomenology. We apply these scalings in simulations of a vertically vibrated system, namely the density inverted granular Leidenfrost state and its transition to a buoyancy-driven convective state.

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