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Spreading of a granular droplet ERIC CLEMENT, PMMH, UMR7636 (CNRS), ESPCI Univ. P6-P7, 10 Rue Vauquelin, 75005 Paris, France, IVAN SANCHEZ, Centro de Fisica, IVIC, Apartado Postal 21827, Caracas 1020-A, Venezuela, FRANCK RAYNAUD, MSC, UMR 7057 (CNRS), Univ. Paris 7, JOSE LANUZA, BRUNO ANDREOTTI, PMMH, UMR7636 (CNRS), ESPCI Univ. P6-P7, 10 Rue Vauquelin, 75005 Paris, France, IGOR ARANSON, Materials Science Division, Argonne National Laboratory, Argonne, IL60439, USA — The influence of controlled vibrations on the granular rheology is investigated in a specifically designed experiment in which a granular film spreads under the action of horizontal vibrations. A nonlinear diffusion equation is derived theoretically that describes the evolution of the deposit shape. A self-similar parabolic shape (the"granular droplet") and a spreading dynamics are predicted that both agree quantitatively with the experimental results. The theoretical analysis is used to extract effective friction coefficients between the base and the granular layer under sustained and controlled vibrations. A shear thickening regime characteristic of dense granular flows is evidenced at low vibration energy, both for glass beads and natural sand. Conversely, shear thinning is observed at high agitation.

Ivan Sanchez
Instituto Venezolano de Investigaciones Cientificas

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