

Abstract Submitted  
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**The granular Leidenfrost effect: Experiment and theory of floating particle clusters** PETER ESHUIS, KO VAN DER WEELE, DEVARAJ VAN DER MEER, DETLEF LOHSE, Physics of Fluids Group, University of Twente, P.O.Box 217, 7500 AE Enschede, The Netherlands — Granular material is vertically vibrated in a 2-D container: Above a critical shaking strength, and for a sufficient number of beads, a crystalline cluster is elevated and supported by a dilute gaseous layer of fast beads underneath. We call this phenomenon the *granular Leidenfrost effect*. The experimental observations are explained by a hydrodynamic model featuring three dimensionless control parameters: The energy input  $S$ , the number of particle layers  $F$ , and the inelasticity of the particle collisions  $\varepsilon$ . The  $(S, F)$  phase diagram, in which the Leidenfrost state lies between the purely solid and gas phases, shows accurate agreement between experiment and theory.

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