

Abstract Submitted  
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**Experimental tests of a statistical mechanics of static granular media** MATTHIAS SCHRÖTER, STACY SIDLE, HARRY SWINNEY, CNLD, UT Austin — In 1989 Edwards and Oakeshott proposed a statistical mechanics theory of static granular materials described by a temperature-like state variable named compactivity [1]. We have made the first measurement of the compactivity of a granular material [2]. We have examined a granular column driven by flow pulses and have found that the system explores its phase space of mechanically stable configurations in a history-independent way. The system quickly approaches a steady state; the volume fluctuations about this steady state are Gaussian. The mean volume fraction can be varied by changing the flow rate of the pulses. We calculate the compactivity from the standard deviation of the volume fluctuations [3]. This talk will address the following two questions: (a) Are compactivity values measured with our “thermometer” different from values one might measure with a “thermometer” based on the grain volume distribution [4]? (b) Can compactivity be a control parameter of granular systems, for example, in size segregation in binary granular mixtures?

[1] Edwards and Oakeshott, *Physica A* **157**, 1080 (1989).

[2] Schröter, Goldman, and Swinney, *Phys. Rev. E* **71**, 030301 (2005).

[3] Nowak, Knight, Ben-Naim, Jaeger, and Nagel, *Phys. Rev. E* **57**, 1971 (1988).

[4] Edwards, Brujić, and Makse, in *Unifying Concepts in Granular Media and Glasses*, edited by Coniglio *et al.* (Elsevier, Amsterdam, 2004)

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