Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

**Heterogeneities in granular dynamics** ANITA MEHTA, S N Bose National Centre for Basic Sciences, Calcutta, India — The absence of Brownian motion in granular media is a source of much complexity; among these is the presence of heterogeneity, whether static or dynamic, within a given system. Such strong heterogeneities can exist as a function of depth in a box of grains; this is the system we study here. We present results from three-dimensional, cooperative and stochastic Monte Carlo shaking simulations of spheres on heterogeneous density fluctuations. These are justaposed with results obtained from a theoretical model of a column of grains under gravity; frustrations via competing local fields is included in our model, while the effect of gravity is to slow down the dynamics of successively deeper layers. The combined conclusions suggest that the dynamics of a real granular column can be divided into different phases – *ballistic*, *logarithmic*, *activated* and *glassy* – as a function of depth. The nature of the ground states and their retrieval, in the glassy phase, shows clear evidence of *intrinsic* states, which lie below a band of approximately degenerate ground states. In the other three phases, by contrast, the system jams into a state chosen randomly from this upper band of metastable states.

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Date submitted: 28 Nov 2007 Electronic form version 1.4