

PHYSICAL MATHEMATICS SEMINAR

Fluctuations, Response, Entropy and Temperature in Granular Packings

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ABSTRACT:

Understanding jamming, the transition from a flowing fluid state to a disordered solid state, in granular systems is important from a technological, environmental, and basic science perspective. Jamming of grains in silos cause catastrophic failures. Avalanches are examples of unjamming, which we need to understand to prevent and control. The phenomenon poses fundamental challenges in basic science because there is no known framework leading from the microscopic, grain level interactions to the macroscopic properties that reflect collective behavior. Jamming in granular matter is intimately related to stress propagation, and the nature of jamming will depend on whether the material is under shear or isotropic compression. It will also depend on whether there is sustained motion with the grains having a finite kinetic energy or if the system is at rest and being slowly deformed. In this talk, I will present a statistical mechanics framework that bridges the microscopic with the macroscopic, and present results for stress fluctuations and force chains in granular packings.

TUESDAY, OCTOBER 21, 2008

2:30 PM

Building 2, Room 105

*Refreshments at 3:30 PM in Building 2, Room 349
(Applied Math Common Room)*



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