

PHYSICAL MATHEMATICS SEMINAR

TOPIC: GASES, LIQUIDS AND CRYSTALS IN GRANULAR SEGREGATION

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ABSTRACT:

We report the results of an investigation of segregation in a binary mixture of dry particles subjected to horizontal oscillatory excitation. In our experiments, a thin layer of particles is driven by the stick-slip frictional interaction with the surface of a horizontal tray. As the packing fraction of the mixture is increased the evolution of distinct phases is observed, which we identify as binary gas, segregation liquid and segregation crystal. Both microscopic and macroscopic measures are used to study the properties of these three phases and study the associated transitions. We develop a reductionist model for our system and explore it via Event Driven simulations. This model is found to reproduce much of the experimentally observed behaviour, most importantly the transition between the mixed to segregated state. Finally, we draw some speculative analogies between segregation in our granular system and self-assembly in binary colloidal mixtures.

(Dr. Pedro Miguel Reis is currently visiting the Levich Institute, CCNY, New York.)

TUESDAY, MAY 18, 2004
2:30 pm
Building 2, Room 338

Refreshments will be served at 3:30 PM in Room 2-349

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