

Physical Mathematics Seminar

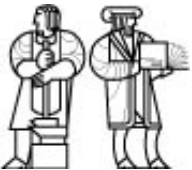
Random Close Packing Revisited: How Many Ways Can We Pack Smooth, Spherical Grains?

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Tuesday November 2, 2004
2:30 PM
Building 2, Room 338

Abstract

We create jammed packings of smooth, spherical particles using an algorithm in which we successively compress or expand soft particles and minimize the total energy of the system at each step. We focus on small systems and thus are able to find (nearly) all of the jammed states. We decompose the probability for obtaining a jammed state at a particular volume fraction into two composite functions: 1) the density of jammed states, which only depends on geometry and 2) the basin of attraction for each jammed state, which depends on the protocol used to create them. By studying the density of states and basins of attraction separately, we are able to show why it is easy to create random close-packed states in 3D monodisperse systems but not in 2D monodisperse systems.



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