PHYSICAL MATHEMATICS SEMINAR

TOPIC: Topological Classification of Jammed States

SPEAKER: Corey S. O'Hern
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Abstract:

We enumerate and classify jammed configurations that occur at zero temperature in small 2D and 3D periodic systems composed of monodisperse and polydisperse particles that interact via hard-sphere and soft finite-range potentials. Jammed configurations are created using two algorithms: 1) random displacements of individual hard particles followed by particle growth and 2) collective moves of soft particles based on potential energy minimization followed by compression. In algorithm 1, configurations are jammed when a given particle cannot be displaced when all other particles are held fixed. In algorithm 2, configurations are jammed when no group of particles can be displaced simultaneously. We find that jammed states occur in continuous topological families when only single-particle moves (algorithm 1) are allowed. However, when collective moves (algorithm 2) are allowed, jammed states are discrete, i.e. each possesses a distinct network of particle contacts. We decompose the frequency distribution of jammed states into distributions for each topology and then calculate the density of jammed states and their basins of attraction.

DATE: Tuesday, April 27, 2004

TIME: 2:30 PM

LOCATION: Building 2, Room 338

Refreshments at 3:30 PM in Building 2, Room 349.

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