

Computer Simulation of Gravity-Driven Granular Flow

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Abstract

This applied mathematics talk will consist of two parts: First, we investigate using simulations, collision times and stress distributions in two and three-dimensional steady-state granular matter in jammed versus diffuse flows. We find that the level of order or disorder in the grains dictates values of collision time power-laws. This observation is consistent in both two and three dimensions. We compare our simulations to experimental results. Second, we study the phenomena of disorder-order transitions, or simply the glass transition from a granular hard sphere fluid to a jammed glass. We find a diverging length scale and a diverging viscosity at this transition and compare our simulation to experiment on the connection between local viscosity fluctuations and shear rate.