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A Phase Space for Jamming

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In a remarkably diverse range of systems, the transition from a flowing, liquid state to a jammed, solid state is heralded by a dramatic slowing down of relaxations. Does an equilibrium phase transition underlie this glassy dynamics? To even begin to address this question, we need a statistical framework for describing systems out of thermal equilibrium. Can we construct a phase space for describing phase transitions in such non-equilibrium systems? In this talk, I will show how to construct a statistical ensemble for grain packings and use this statistical ensemble to construct a phase space for jamming and a field theory of two dimensional, zero-temperature, frictionless grain packings.