PHYSICAL MATHEMATICS SEMINAR

SHOCK DRIVEN JAMMING AND PERIODIC FRACTURE IN PARTICULATE RAFTS

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ABSTRACT:

A tenuous monolayer of hydrophobic particles at the air-water interface often forms a scum or raft. When such a monolayer is disturbed by the introduction of a localized surfactant droplet, a radially divergent surfactant shock front emanates from the origin of the surfactant and packs the particles into a jammed compact annular band that grows with time. The resulting two-dimensional, disordered, elastic solid locally has a packing fraction that saturates at random close packed density and fractures as it is driven outwards radially, to form periodic triangular cracks with robust geometrical features. In this talk, I will discuss an experimental and numerical study, backed by simple geometrical arguments that will predict the number of cracks, and their geometrical features. More broadly, I will make a case that the the ability to control the nature and geometry of dynamical failure in these model systems presents a powerful technique to probe outstanding questions in amorphous plasticity.

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TUESDAY, NOVEMBER 9, 2010
2:30 PM
Building 2, Room 105

Refreshments at 3:30 PM in Building 2, Room 290

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