Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Isostatic Frictional Packings: Topology and Response Functions
DAVID WU, Colorado School of Mines — Frictionless disks and spheres are known to spontaneously organize into isostatic contact networks with minimal coordination number under common loadings such as gravity or compression. The isostatic character of such networks has been associated with the force-chain character and constitutive properties of the macroscopic assembly. However, for non-spherical or frictional grains, the conditions for an isostatic network are no longer spontaneously satisfied, most notably due to the indeterminacy associated with frictional contacts. Here I show the existence of a general isostatic limit of frictional packings of general shape grains similar to the case of frictionless disks. I discuss the consequences for force response functions and relationship to experiments showing the onset of network failure at low coordination numbers.

David Wu
Colorado School of Mines

Date submitted: 20 Nov 2006 Electronic form version 1.4