Critical Scaling at the Jamming Transition for Zero and Finite Applied Shear Stress

PETER OLSSON, Umea University, STEPHEN TEITEL, University of Rochester — We carry out numerical simulations to study the jamming transition of a model granular material in two dimensions at zero temperature. Behavior is simulated as a function of particle density and applied shear stress. We find a collapse of our data to scaling curves that provides evidence for a sharp 2nd order jamming transition in non-equilibrium steady states at finite shear, that ends at a critical point (point “J”) as the shear stress vanishes. We estimate the values of the critical exponents at both zero and finite shear stress.

supported in part by DOE grant DE-FG02-06ER46298.