

Abstract Submitted  
for the DFD07 Meeting of  
The American Physical Society

**Studies in a 2D granular pure shear experiment** JIE ZHANG, PEI-DONG YU, Department of Physics and Center for Nonlinear and Complex Systems, Duke University, NC 27708, USA, TRUSH MAJMUDAR, ROBERT BEHRINGER, Department of Mechanical Engineering, MIT, Boston 02139, USA — We have performed two dimensional granular experiments under pure shear using bidisperse photo-elastic disks. Starting from a stress free state, a square box filled with granular particles is subject to shear. The forward shear involved thirty steps, leading to maximum strain of 0.1. The network of force chains gradually built up as the strain increased, leading to increased pressure and shear stress. Backward shear was then applied to return the system to zero strain in the next thirty steps. Following each change of the system, contact forces of individual disks were measured by applying an inverse algorithm. We also kept track of the displacement and angle of rotation of every particle from frame to frame. We present the results for the contact forces, particle displacement, particle rotations, fabric, etc. Work supported by NSF grant DMR0555431.

Jie Zhang  
Department of Physics and Center for Nonlinear and  
Complex Systems, Duke University, NC 27708, USA

Date submitted: 01 Aug 2007

Electronic form version 1.4