

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

How does particle shape affect the near jamming properties of granular materials? Pentagons vs. disks¹ YIQIU ZHAO, JONATHAN BARES, BOB BEHRINGER, Duke University — Understanding the role of particle shape in system-scale properties is a fundamental challenge in granular physics. We investigated the difference between the response of systems made of pentagons vs. more traditional disks. We performed isotropic compression experiments on 2D photoelastic pentagons and disks near the jamming transition. These experiments show qualitative and quantitative differences in the macroscopic responses of the two systems, such as shifts in the packing fraction at jamming onset and differences in the contact number evolution. Some of these differences are due to a reduction of packing order and the appearance of side-side contacts for the pentagons. We also examined the stress relaxation and dynamical heterogeneity of pentagon particles by performing cyclic compression to allow the system explore phase diagram. We contrast disk and pentagon evolution using four-point-susceptibility and G^2 techniques.

¹Work supported by NSF-DMR1206351, DMS1248071, NASA NNX15AD38G, and the W.M. Keck Foundation

Robert Behringer
Duke University

Date submitted: 05 Nov 2015

Electronic form version 1.4