

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Orientation Effects for Ellipses Flowing in a 2D Hopper¹ JUNYAO TANG, ROBERT BEHRINGER, Duke University, Physics Department — Hopper flow of disks has been extensively studied in the past decades. In this work, we investigate how ellipses (aspect ratio = 2) flow in a hopper. This study address the fact that many real-world examples of granular materials have ellipsoidal shapes. We use a quasi-two-dimensional hopper system with photoelastic ellipses so we can obtain stress/force information during the flow. Through synchronized data of particle tracking and stress, we can quantify the orientation of the force networks relative to the orientation of ellipses. The analysis shows that the ellipses which form the force chains have a strong orientation preference, particularly for force chains that form across the opening of the hopper and cause a jam. More generally, the relative orientation of ellipses plays an important role in controlling the flow rheology of ellipses.

¹This work is supported by IFPRI (International Fine Particles Research Institute).

Junyao Tang
Duke University, Physics Department

Date submitted: 09 Nov 2012

Electronic form version 1.4