Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Rotational statistics in dense granular flows of smooth cylindrical particles JEFFREY OLAFSEN, JACOB JANTZI, Department of Physics, Baylor University — We report the results of an experiment to investigate the dissipation in the rotational degree of freedom for smooth cylindrical particles in a dense, driven granular flow. The flow is studied in a rotating drum of radius R = 30 cm for particles of radius r = 0.635 cm while the cell is rotated at speeds between 0.25 and 0.75 Hz. The 2D geometry of the experimental design allows for the measurement of two translational degrees of freedom as well as the rotation of the disks within the driven flow. The rotational velocity statistics demonstrate non-Gaussian behavior as well as a significant amount of energy being dissipated within the flow via the tangential friction between the particles. The results of this experiment are significant in that many driven granular experiments use smooth cylindrical or spherical particles to investigate granular dynamics, but the contribution from the rotational degrees of freedom are often unmeasured. A novel imaging technique is used to extract both the translational and rotational velocity statistics to a high degree of precision in the entire cell during the experiment.

Jeffrey Olafsen
Department of Physics Baylor University

Date submitted: 18 Nov 2010 Electronic form version 1.4