

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

The drag mechanics of an intruder moving in sheared granular medium¹ HU ZHENG, Hohai University, JONATHAN BARES, DONG WANG, ROBERT BEHRINGER, Duke University — We perform an experimental study on an intruder dragged at a constant force in a quasi-statically cyclic-sheared granular medium. A Teflon disk is embedded in a layer of bidisperse photoelastic disks. The granular medium is contained in a horizontal square cell, which can be deformed into a parallelogram with the same area, to produce simple shear. To explain the mechanism of intruder motion, we analyze the evolution under cyclic shear of multiple properties: coordination number, density, affine and non-affine motion of disk-granular system. We find that the motion of the intruder is strongly dependent on the fore-and-aft jam state of the intruder. The intruder can move along the drag force or opposite to the drag force, which is determined by the value of the drag force and the packing fraction of the granular system.

¹We acknowledge support from NSF Grant No. DMR1206351, NASA Grant No. NNX15AD38G and the W.M. Keck Foundation

Dong Wang
Duke University

Date submitted: 05 Nov 2015

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