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Drag on intruder in dense granular flows[1] HU ZHENG, Hohai University; Duke 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. We find that the forward motion of the intruder happens at the fragile state during shear reversals, while only reversible affine motion could be found at the Jammed state. There is a burst of non-affine motion for the granular particles at each shear reversal. For a range of packing fractions, the cumulative intruder displacement shows a linear increase proportional to the number of cycles of shear. To explain the behavior of intruder motion, we analyze the coordination number, density, affine and non-affine motion of disk-granular system variations as the shear strain.

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