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Density and Size Dependence of Dense Granular Flow K. HILL, St. Anthony Falls Laboratory, University of Minnesota, J. ZHANG, Theoretical and Applied Mechanics, University of Illinois — We experimentally investigate the kinematics of dense granular mixtures in rotating drums to ascertain how the properties of the mixture components affect the kinematic details of the flow. Then, we discuss how differences in the kinematic details of the flow may in turn be responsible for observed differences in segregation behaviors for the different mixtures. In contrast with more energetic and sparse granular systems, in these dense flows, the velocity fluctuations - often associated with a granular temperature - scale inversely to the size of the beads and are independent of particle density. We show this supports the premise that the structure of the flow determines the size of the velocity fluctuations in these systems. For mixtures with higher concentrations of small particles, the reduction in velocity fluctuation appears related to a measurable increase in the mixture velocity. We show through a simple model how this may be responsible for certain segregation behaviors only seen in particle mixtures where the components differ in size.

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