Abstract Submitted
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**Shear-driven segregation of dense granular mixtures** YI FAN, KIMBERLY HILL, University of Minnesota — Shear-driven segregation of dense granular mixtures has been associated with a number of interesting pattern formation problems. We use experimental and computational split-bottom cells to isolate segregation effects associated with shear gradients from those associated with gravity. We find the effect of shear gradients much less dramatic than initial observations of segregation suggest. While a segregation pattern emerges in a circular split-bottom cell that appears coincident with the shear gradient, we find the pattern is orthogonal to the active segregation flux. We measure a toroidal convection roll that, in conjunction with gravity-driven segregation, is likely responsible for the dramatic horizontal segregation pattern. On the other hand, computational results from a parallel split-bottom cell indicate a subtle segregation flux associated with the shear gradient. A current predictive form of kinetic theory based on binary collisions dominating the particle dynamics predicts segregation in the opposite direction from observed trends. This indicates the direction of shear-driven segregation depends on the nature of the flow itself, collisional or frictional.

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