

SIZE SEGREGATION IN RAPID, GRANULAR FLOWS WITH CONTINUOUS SIZE DISTRIBUTIONS

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ABSTRACT

Two-dimensional, (dissipative) molecular-dynamics simulations of particulate mixtures with Gaussian and lognormal particle size distributions are employed to gain insight on the segregation behavior of these mixtures when exposed to a granular temperature gradient. Simulations are performed for a collection of smooth, inelastic, hard disks (with constant material density and a constant coefficient of restitution) confined between two walls set to constant, though unequal, granular temperatures. As a result, a gradient in granular temperature develops across the domain. In general, particles of all sizes are found to move toward regions of low granular temperature (overall segregation). Species segregation is also observed. Specifically, large particles demonstrate a higher affinity for the low-temperature regions, and thus accumulate in these cool regions to a greater extent than their smaller counterparts. Furthermore, the *local* particle size distribution remains of the same form (Gaussian or lognormal) as the *overall* (including all particles) size distribution. In addition, the behaviors of Gaussian size distributions and narrow lognormal distributions are found to be quite similar.

Submitted to Physics of Fluids