Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Coarsening of segregation patterns in quasi-two-dimensional granular tumblers[1] DIEGO A. MELANI, Massachusetts Institute of Technology, STEVEN W. MEIER, JULIO M. OTTINO, RICHARD M. LUEPTOW, Northwestern University — A fundamental characteristic of granular flows is segregation based on particle size or density. In previous studies, a segregation pattern of several radial streaks occurs within $O(10)$ revolutions in quasi-two-dimensional rotating tumblers with fill fractions between 50% and 70%. By extending the duration of the experiments, we observe coarsening of the radial streak pattern to as few as one streak over $O(10^2– 10^3)$ tumbler revolutions for a wide range of conditions. We observe coarsening in 55%-full circular and square tumblers containing bidisperse size varying mixtures of glass particles of varying concentrations (20–75% by volume small particles) for a range of rotation rates. Bidisperse size and density varying mixtures of small steel and large glass particles also exhibit coarsening. The coarsening mechanism appears to occur by transport from one streak to another via the radial core.

[1]Supported by NSF and DOE

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Date submitted: 02 Aug 2007 Electronic form version 1.4