

Abstract Submitted
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Axial Band Dependence on Relative Particle Concentration in Bidisperse Mixtures GABRIEL JUAREZ, JULIO M. OTTINO, RICHARD M. LUEPTOW, Northwestern University — Although axial band formation in long rotating tumblers has been long-studied, the dependence of band formation on the relative concentration of the bidisperse particles has not been addressed. We examine axial band formation for dry and liquid granular systems of bidisperse mixtures of particles with the volume composition of small particles ranging from 10% to 90% in a half filled tumbler for various rotation rates. Experiments were conducted in a tumbler of length 75 cm and diameter of 6.35 cm, with mixtures of 0.6 and 2 mm, and 1 and 2 mm particles. Single bands form for small particle concentrations as low as 10% and as high as 90%, usually near the end walls, although band formation along the entire tumbler is less likely for very low or very high concentrations. Bands then merge, or coarsen, and for small particle concentrations of 50% and greater, the coarsening is logarithmic. For very low or very high particle concentrations, the rate of coarsening is not logarithmic or coarsening does not occur within the duration of the experiment (600 revolutions). The band width of small and large particles scales with the tumbler diameter.

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