

Abstract Submitted
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A mechanism for axial band formation in a rotating drum WOLFGANG LOSERT, MICHAEL NEWEY, University of Maryland — When granular particles, like sand or glass beads, of different sizes are mixed and rotated in a cylindrical drum they tend to segregate into alternating bands along the axis of the drum. We study the mechanism for the formation of these axial bands by studying the flowing surface of the material. The surface height profile is analyzed with a laser line, and the individual particle motions are analyzed by direct imaging with a high speed camera. We propose that the significant differences in surface flow speeds between large and small particles, and the degree of radial segregation are the key factors for the formation of axial band. Our model is consistent with both microscopy observation of individual particle dynamics, and how the banding phenomena scale with parameters. It is also used to analyze the fascinating oscillatory dynamics observed in mixtures of three particle sizes.

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