

Abstract Submitted
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Bulk Evolution During Axial Segregation and Coarsening In a Rotating Cylinder L. SANFRATELLO, UNM, E. FUKUSHIMA, S. ALTABELLI, NMR — Axial segregation of granular material in a rotating drum is an incompletely understood phenomenon. Theories which cite only surface effects cannot account for the experimental observation that the radial core of the smaller particles may develop undulations which do not reach the surface of the system. These theories also fail to explain recent experimental results in which even large differences in the dynamic angle of repose between the constituents of a biparticulate system was insufficient to induce segregation. To help elucidate what is occurring in the bulk of the system during the formation of axial banding we used MRI to track core evolution at a temporal resolution of 2Hz. We tracked both the long-term development of the axial segregation and the later band coarsening within the bulk. Furthermore, we found differences in the velocity depth profiles along the length of the cylinder that depended on the axial composition profile. These differences may drive the segregation patterns we have observed in the bulk. Results for various rotation rates, cylinder lengths, particle concentrations, and initial conditions will be discussed.

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