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Shape and Velocity Profile of the Core in a Radially Segregated Rotating Cylinder of Granular Particles LORI SANFRATELLO, University of New Mexico, EIICHI FUKUSHIMA, ABQMR — We experimentally investigate a 3D biparticulate system that segregates only radially, with no evidence of axial segregation either at or below the surface even after hours of rotation. We compare the location and shape of the core of smaller particles, as well as the location of the bottom of the flowing layer, at various rotation rates using magnetic resonance imaging (MRI) in a 5mm slice at the axial center of a 3D cylinder. MRI is used because of its ability to non-invasively measure bulk behavior as well as spatially resolve dynamic variables (e.g. velocity, diffusion) at any location within a 1-, 2- or 3D system. We also compare the velocity depth profile of the radially segregated system with that of pure small and pure large particle systems and provide an explanation for the observed differences. These investigations may help clarify not only what is occurring within a radially segregating system of particles, but also which mechanisms influence the development of axial segregation.

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