

Abstract Submitted
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Interplay between packing and flow in the shear zone at the wall of a granular hopper flow¹ BRENDA CARBALLO-RAMIREZ, MAYA LEWIN-BERLIN, NALINI EASWAR, Smith College, Northampton, MA, NARAYANAN MENON, University of Massachusetts, Amherst, MA — A granular medium flowing through a vertical channel has a flat velocity profile in the bulk with a shear zone at the wall. The size of the shear zone and the dependence on flow parameters is poorly understood. To address this issue we image the flow of spherical steel spheres under gravity in a vertical, straight-walled 2-dimensional hopper, where the flow velocity is controlled by a taper at the outlet. Our measurements focus on the role of microstructure in controlling the shear zone. We have found that the size of this zone is larger in bidisperse, disordered flow than in monodisperse, nearly-crystalline flows. We report the effect of packing as quantified by local dilation, as a function of flow rate for systems of both bidisperse and monodisperse grains.

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