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Flow of a dense granular model suspension CLAIRE BONNOIT, ANKE LINDNER, ERIC CLEMENT, PMMH-ESPCI — We experimentally study the flow of dense granular suspensions on an inclined plane. The model suspensions are made of mono-disperse, spherical, non-Brownian polystyrene beads immersed in a density-matched silicon oil. The volume fraction ϕ varies from 30% to 61%. During the flow on the inclined plane we measure simultaneously the surface velocity and the layer thickness. We identify two different scalings: one identical to flow of a viscous liquid at high thickness and one identical to flow of a dry granular media at low thickness. We show that particle migration can be neglected. In the viscous regime, this set-up thus allows for directly measuring the shear viscosity up to volume fractions of 61%, which is a challenge in a classical rheometer. We find that the inclined plane is a useful apparatus to explore the continuous transition from an effective viscous flow to a dense granular flow. As this geometry fixes the ratio of normal to tangential forces in the layer with respect to the angle, we are able to propose a rheological model based on a friction law.

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