

Abstract Submitted
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An experimental study of particle-laden thin film flow down an inclined plane CHI WEY, THOMAS WARD, ANDREA BERTOZZI, UCLA, ANETTE HOSOI, MIT — We experimentally investigate a flowing slurry solution with particle density higher than the background fluid density. The slurry exhibits observable behavioral differences as we approach in the limit of maximum packing. To study such differences, a finite volume of slurry is flowed down a walled incline plane of dimensions 1 m x 14 cm. By analyzing the average front position as a function of time and varying parameters such as the inclination angle, particle concentrations, and volume, we observe trends in the effective viscosity for film thicknesses $O(500 \mu\text{m} - 2000 \mu\text{m})$ where the poly-disperse particles are in the range of $200 \mu\text{m} - 400 \mu\text{m}$. At low concentration, the data follows trends predicted by the classical Huppert [Nature 300(2), 1982] solution for a homogeneous fluid flowing down an inclined plane. At intermediate and high concentrations, the average front speed scales with the exponent predicted by the Huppert, but there are interesting observations in the measured viscosity as a function of inclination angle and volume.

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