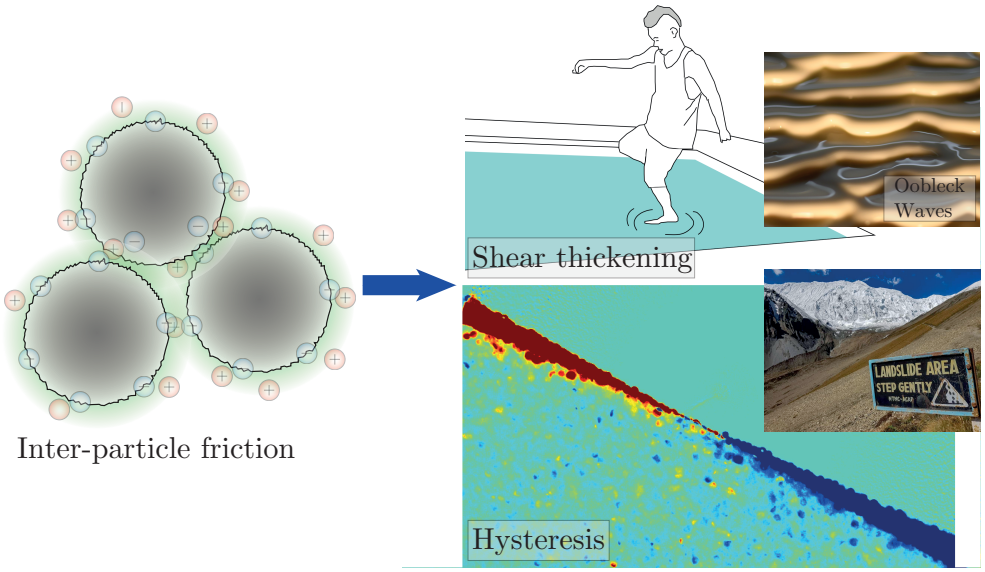
Role of friction in dense granular suspensions

C. Clavaud[1], A. Bérut[1], B. Darbois Texier[1], H. Perrin[1], Y. Forterre[1], H. Lhuissier[1], M. Wyart[2], B. Metzger[1]

[1]IUSTI-CNRS, Aix-Marseille University, Marseille, France.
[2]EPFL, Lausanne, Switzerland.



Inter-particle friction can strongly affect the way dense granular suspensions flow. This is the case for shear-thickening suspensions, whose dramatic increase in viscosity has recently been captured by the so-called *frictional-transition* model. After presenting this framework and its recent experimental validations, I will discuss how it opens interesting possibilities, such as understanding new hydrodynamic instabilities or controlling the flow properties of shear thickening suspensions. We will then see that for an immersed granular layer flowing under gravity, inter-particle friction controls the hysteresis of the avalanche angle. So far associated to inertial effects such as shocks between grains or self-induced acoustic noise, hysteresis has recently been observed for immersed frictional granular avalanches in the over-damped limit (without inertia) and explained as arising from non-monotonic constitutive flow rules. Hysteresis only vanishes when the inter-particle friction is turned off. These results could provide a new ground for better understanding avalanche failures in geophysical flows.

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