

Tribology of wet systems: from hydrodynamic to boundary contacts

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In this overview talk I will start by introducing the two main modes of dissipation between surfaces of particles in relative motion within a surrounding liquid medium: hydrodynamic and boundary contacts.

I will then describe which factors influence the transition between these two modes and the implications that breaking through lubricating fluid films have in the rheology of dense particulate suspensions, with a focus on viscosity divergence and shear thickening. I will review recent models that link the friction coefficients between particles in boundary contacts to a maximum packing fraction of solids, commonly termed f_m , and question whether there are other rheological signatures beyond steady shear viscosity, which is commonly accepted to depend only on the distance to f_m , that depend on the details of frictional interactions. I will move on to a brief description of how the transition between hydrodynamic to boundary lubrication can be experimentally controlled and finish by posing outstanding open questions that I strongly believe this community should be working on in the near future.