

Rheology of dense granular suspensions

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Suspensions are composed of mixtures of particles and fluid and are ubiquitous in industrial processes (e.g. waste disposal, concrete, drilling muds, metal-working chip transport, and food processing) and in natural phenomena (e.g. flows of slurries, debris, and lava). The present talk focusses on the rheology of concentrated suspensions of non-colloidal particles. It addresses the classical shear viscosity of suspensions but also non-Newtonian behaviour such as normal-stress differences and shear-induced migration. The rheology of dense suspensions can be tackled via a diversity of approaches that are introduced. In particular, the rheometry of suspensions can be undertaken at an imposed volume fraction but also at imposed values of particle normal stress, which is particularly well suited to yield examination of the rheology close to the jamming transition. The influences of particle roughness and shape are discussed.