**Non-linear rheology of granular matter under large amplitude oscillatory shear**

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The structure and dynamics of granular materials is a problem of fundamental and industrial interest. Investigating the granular flow near jamming transition can yield insight into the energy landscape of granular media. Large amplitude oscillation shear rheometry is a well-defined technique that offers to shear material at rates similar to huge deformation that occurs in industrial processing operations. In this study, we show that the viscosity of granular materials can be significantly tuned by orders of magnitude by applying normal force of an order of few Newton. Also our comparative study of dry and wet granular systems confirms that dry granular media flow considerably slower than wet granular systems, contradicting to the common assumption of wet granular material being more viscous than dry granular material. We have utilized a new framework to characterize the non-linear stress-strain response and seemingly have identified different dynamical regimes of granular materials in the context of LAOS rheometry.