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A new dimensionless number governing dethickening in orthogonally perturbed shear thickened suspensions MEERA RAMASWAMY, Department of Physics, Cornell University, ABHISHEK SHETTY, Rheology department, Anton Paar USA, ITAI COHEN, Department of Physics, Cornell University
— When concentrated colloidal suspensions are under stress, their viscosity can increase by over an order of magnitude. Previous work has shown that this shear thickened viscosity can be tuned by applying fast oscillatory perturbations orthogonal to the primary shear flows in the system. In this talk, I show that dethickening in the regime where the primary shear flow has fully thickened the suspension, is governed by a single dimensionless parameter – the ratio of the orthogonal shear rate amplitude to that of the primary shear rate. In contrast, a second parameter is required to describe the data in the primary shear flow regime where the suspension is thickening. Understanding these parameters will enable better strategies to tune the properties of shear thickening suspensions for applications ranging from 3D printing to the processing of cement.

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