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Accentuated shear thinning of soft sphere suspensions HANS M. WYSS, Harvard University, JOHAN MATTSSON, Chalmers University of Technology, Sweden, ALBERTO FERNANDEZ-NIEVES, Georgia Institute of Technology, GIOVANNI ROMEO, University of Naples Federico II, Italy, MELAKU MULUNEH, Harvard University, ZHIBING HU, University of North Texas, DAVID A. WEITZ, Harvard University — Suspensions of soft colloidal particles exhibit highly unusual rheological behaviors; surprisingly, despite the importance of these materials in a wide range of applications, the underlying physical mechanisms remain poorly understood. Experiments show that suspensions of soft particles exhibit a highly pronounced shear thinning; this decrease in viscosity with increasing shear rate far exceeds the shear thinning observed in suspensions of solid particles. We use soft microgel particles as a model system to elucidate this behavior. Our experimental system allows us to study the mechanical behavior both macrosopically and locally, at the scale of the colloidal particles themselves. We combine data obtained at different length scales to arrive at a simple picture of the observed accentuated shear thinning.

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