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A microstructural description of shear thickening in dense suspensions. ABHINENDRA SINGH, Levich Institute, City College of New York, ROMAIN MARI, DAMTP, University of Cambridge, RYOHEI SETO, Mathematical Soft Matter Unit, Okinawa Institute of Science and Technology, JEFF MORRIS, MORTON DENN, Chemical Engineering Department, City College of New York — The mechanism of shear thickening in dense suspensions has been recently linked to a transition from a lubricated "frictionless" to an unlubricated "frictional" rheology. Recent particle simulations have been successful to quantitatively reproduce both the continuous and discontinuous shear thickening as observed experimentally. However, a microstructural description of these suspensions is still lacking, which would aid in understanding and predicting the flow behavior of shear thickening suspensions. To tackle this challenging issue, we explore various microscopic properties, like the inter-particle force distribution, the particle motion correlations, and the anisotropy (in both contact and force network). Further, we also attempt to link the observed rheological behavior observed at the macro scale to mean displacement and fluctuations at the particle scale.

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