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Dynamic shear jamming in dense suspensions IVO PETERS, University of Southampton, SAYANTAN MAJUMDAR, HEINRICH JAEGER, University of Chicago — Shear a dense suspension of cornstarch and water hard enough, and the system seems to solidify as a result. Indeed, previous studies have shown that a jamming front propagates through these systems until, after interaction with boundaries, a jammed solid spans across the system. Because these fully jammed states are only observed if the deformation is fast enough, a natural question to ask is how this phenomenon is related to the discontinuous shear thickening (DST) behavior of these suspensions. We present a single experimental setup in which we on the one hand can measure the rheological flow curves, but on the other hand also determine if the suspension is in a jammed state. This we do by using a large-gap cylindrical Couette cell, where we control the applied shear stress using a rheometer. Because our setup only applies shear, the jammed states we observe are shear-jammed, and cannot be a result of an overall increase in packing fraction. We probe for jammed states by dropping small steel spheres on the surface of the suspension, and identify elastic responses. Our experiments reveal a clear distinction between the onset of DST and Shear-Jammed states, which have qualitatively different trends with packing fraction close to the isotropic jamming point.

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