Abstract Submitted
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Spatially resolved dynamical transitions in shear thickening fluids[1] JEFFREY URBACH, VIKRAM RATHEE, DANIEL BLAIR, Department of Physics, Georgetown University — Dense particulate suspensions exhibit a dramatic increase in average viscosity above a critical, material-dependent shear stress, but the microscopic origins of this shear thickening (ST) remains poorly understood. Using boundary stress microscopy (BSM), we have directly measured the spatially resolved surface stresses during ST, and reported clearly defined dynamic localized regions of substantially increased stress that appear intermittently at stresses above a critical value [1]. Here we present measurements that reveal localized transitions to a fully jammed solid-like phase (SLP) that makes direct contact with the shearing boundaries. The SLPs fracture, bifurcate, and interact in a complex manner that depends on the measurement conditions (constant shear rate vs constant stress). These results demonstrate the ability of BSM reveal rich spatiotemporal dynamics of the thickening transition that are not observable in standard bulk rheology.1 [1] V. Rathee, D. L. Blair, J. S. Urbach, *PNAS* **114**, 8740 (2017).

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