Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Dilation dynamics of granular suspensions during the shear thickening transition QIN XU, SAYANTAN MAJUMDAR, HEINRICH JAEGER, Department of Physics and James Franck Institute, University of Chicago — We experimentally investigate the dilation dynamics of dense granular (non-Brownian) suspensions under shear. We focus on the scenario where the packing fraction is close to the dynamic jamming point and combine oscillatory rheological measurements with *in situ* high-speed imaging to study the particle dynamics throughout the shear-thickening (ST) transition. By visualizing the shear profile at different strain amplitudes, we show that, although frustrated dilation is the dominant factor for ST in granular suspensions, viscous hydrodynamic stress τ_μ still plays an important role in determining the velocity profile and shear localization during the dilation process. Moreover, when the suspending liquid becomes highly viscous, τ_μ affects the magnitude of the stress increment. By imaging the air-suspension boundary during shear, we demonstrate that the upper stress limit of the observable ST regime in suspensions of hard particles corresponds to the point where the confining pressure due to capillary forces is exceeded, as signaled by movement of the contact line between suspension and substrate.

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Date submitted: 14 Nov 2013 Electronic form version 1.4