Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Transiently Jammed State in Shear Thickening Suspensions under Shear SHOMEEK MUKHOPADHYAY, BENJAMIN ALLEN, ERIC BROWN, Yale University — We examine the response of a suspension of cornstarch and water under normal impact at controlled velocities. This is a model system to understand why a person can run on the surface of a discontinuous shear thickening fluid. Using simultaneous high-speed imaging of the top and bottom surfaces along with normal force measurements allows us to investigate whether the force response is a result of system spanning structures. We observe a shear thickening transition where above a critical velocity the normal force increases by orders of magnitude. In the high force regime the force response is displacement dependent like a solid rather than velocity dependent like a liquid. The stresses are on the order of 10^6 Pa which is enough to hold up a person's weight. In this regime imaging shows the existence of a solid like structure that extends to the bottom interface.

Shomeek Mukhopadhyay
Yale University

Date submitted: 15 Nov 2013 Electronic form version 1.4