Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Soft spots correlate with rearrangements in sheared glasses SAMUEL SCHOENHOLZ, ANDREA LIU, ROBERT RIGGLEMAN, University of Pennsylvania, JOERG ROTTLER, University of British Columbia — Solids flow under shear via localized rearrangements. In crystals it is known that these rearrangements occur at topological defects, particularly dislocations. In disordered solids, Manning and Liu showed that discrete "soft spots" - analogous to defects in crystalline solids and constructed from the low-frequency vibrational modes of the material - exist in athermal suspensions of soft finite repulsive disks under quasistatic shear. These soft spots were shown to predict where rearrangements would occur, to be long lived with respect to the time between individual rearrangements, and to be distinct from the rest of the sample in terms of commonly-used structural quantities such as free volume and bond orientational order (although such quantities alone could not *a priori* identify the soft spot population.) In this work we show that soft spots remain a valid description of plastic flow in sheared Lennard-Jones glasses over a range of strain rates at temperatures extending up to the glass transition and beyond. We further discuss soft spot lifetimes and conclude that the α-relaxation time sets the lifetime of the soft spot population.

Samuel Schoenholz
University of Pennsylvania

Date submitted: 15 Nov 2013 Electronic form version 1.4