Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Investigation of Rejuvenation and Overaging in Glassy Energy Landscapes MYA WARREN, JOERG ROTTLER, University of British Columbia — Many glassy systems experience a change in their aging dynamics under the influence of mechanical load. It has long been known that large stresses can cause an apparent decrease in relaxation times (rejuvenation) in polymer glasses, but in colloidal glasses an increase (overaging) has also been observed depending on the strain amplitude. The conditions under which rejuvenation or overaging occur are not yet fully understood. Additionally, there is still considerable controversy over the nature of the resultant states. In order to gain intuition on these outstanding questions, we investigate the aging dynamics under load though stochastic simulations of the Soft Glassy Rheology (SGR) model. For both stress controlled and strain controlled loading, the SGR model exhibits clear regions of overaging and rejuvenation in a parameter space defined by the noise temperature, the quench history, and the strain. Additionally, results show that the states produced under loading are distinct from those that would naturally be visited during aging, and this has effects on the subsequent aging trajectory. Results from the energy landscape picture are compared to pertinent molecular dynamics studies.

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Date submitted: 23 Nov 2007 Electronic form version 1.4