Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Detailed Quantification of String-Like Cooperative Motion Provides Insight into the Dynamic Crossover in Glass-Forming Liquids DILLON SANDERS, JACOB EAPEN, None — Using atomistic simulations, we conduct a detailed investigation of string-like cooperative motion, and in particular the formation of strings of various lengths in model glass-formers. We show that the maximum values of the average string length and the fraction of atoms that are participating in string-like motion exhibit non-Arrhenius behavior, in which a transition is seen to occur at the dynamic crossover temperature T_X. Interestingly, we observe that the population of atoms participating in cooperatively-rearranging pairs (strings composed of two atoms) exhibits a non-monotonic variation in temperature. The population variance with temperature of longer strings is monotonic and becomes increasingly Arrhenius with increasing string length. As a consequence of our analysis, we propose a mechanism for string formation by which single, mobile atoms "latch on" to existing shorter strings to form longer strings. Our findings lend support to the hypothesis that the temperature T_X corresponds to increased presence of activated dynamics in glass-forming liquids at lower temperatures.

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None

Date submitted: 10 Nov 2016 Electronic form version 1.4