Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Point-to-set correlations and rugged landscapes SHO YAIDA, Duke University, LUDOVIC BERTHIER, Université de Montpellier, PATRICK CHARBONNEAU, Duke University, GILLES TARJUS, Université Pierre et Marie Curie — Upon approaching the glass transition a liquid gets sluggish without obvious structural changes. The glassy slowdown is instead attributed to an increasing roughness in the underlying free-energy landscape. Cavity point-to-set (PTS) correlations are real-space tools for characterizing the evolution of this rugged landscape, but their measurement is a serious computational challenge. Here, we first describe how advanced Monte Carlo techniques can be used to dramatically enhance sampling in cavities, extending the range over which PTS correlations can be obtained. By suitably generalizing the notion of PTS correlations to capture any type of growing order in liquids, be it local or amorphous, we then establish a criterion for distinguishing a dynamical slowdown due to critical ordering from one due to glassiness. These methodological advances shed a new light on the interplay between structure and dynamics in model glass formers, and tie in with recent field-theoretic results about the nature of jumps between metastable minima in rough landscapes.

Sho Yaida
Duke University

Date submitted: 05 Nov 2015 Electronic form version 1.4