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Mapping dynamical heterogeneity in structural glasses to correlated fluctuations of the time variables KARINA E. AVILA, HORACIO E. CASTILLO, Ohio University, AZITA PARSAEIAN, Northwestern University — Dynamical heterogeneity is believed to play an important role in the dynamical behavior of slowly relaxing disordered materials. In this work, we test one hypothesis for its origin, namely that it emerges from soft (Goldstone) modes associated with a broken continuous symmetry under time reparametrizations. We do this by constructing coarse grained observables and decomposing the fluctuations of these observables into transverse components, which are associated with the postulated time-fluctuation soft modes, and a longitudinal component, which is unrelated to them. We perform our test on data obtained in simulations of four models of structural glasses. We find that as temperature is lowered and timescales are increased, the time reparametrization fluctuations become increasingly dominant. In particular, the ratio between the strengths of the transverse fluctuations and the longitudinal fluctuations grows as a function of the dynamical susceptibility χ_4, which represents the strength of the dynamical heterogeneity; and the correlation volumes for the transverse fluctuations are approximately proportional to those for the dynamical heterogeneity, while the correlation volumes for the longitudinal fluctuations remain small and approximately constant.

Karina Avila
karina$_0$03@*hotmail.com*
Ohio University

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