

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Cooperativity in glassy dynamics investigated by higher-harmonic dielectric spectroscopy¹ THOMAS BAUER, PETER LUNKENHEIMER, ALOIS LOIDL, University of Augsburg, EXPERIMENTAL PHYSICS V TEAM — In recent years, due to experimental advances initiated by hole burning experiments, nonlinear dielectric spectroscopy has gained increasing interest in the field of glass-forming matter. For example, refining the technique of high-field permittivity measurements, we found a surprising lack of nonlinearity in the so-called excess wing region, that could not be accessed by this method before [1]. In the present contribution, we report new, detailed measurements of the third-order nonlinear dielectric susceptibility χ_3 of four glass-forming liquids for a broad temperature range [2]. We find a significant hump in $\chi_3(\nu)$, from which we deduce the number of correlated molecules N_{corr} . We detect a continuous increase of N_{corr} on approaching the glass-transition temperature. Comparing these results with the temperature-dependent apparent energy barriers in these systems, our experiments finally prove the old notion that intermolecular correlations of glassy systems are responsible for the non-canonical temperature development of glassy dynamics. [1] Th. Bauer, P. Lunkenheimer, S. Kastner, A. Loidl, Phys. Rev. Lett. **110**, 107603 (2013) [2] Th. Bauer, P. Lunkenheimer, A. Loidl, Phys. Rev. Lett., in press (arXiv:1306.4630)

¹This work was supported by the Deutsche Forschungsgemeinschaft via Research Unit FOR1394.

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Date submitted: 15 Nov 2013

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