

DY 78: Talk M. Fuchs

Time: Friday 9:30–10:00

Location: BH-N 334

Invited Talk

DY 78.1 Fri 9:30 BH-N 334

Emergence of long-ranged stress correlations at the liquid to glass transition — MANUEL MAIER¹, ANNETTE ZIPPELIUS², and
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A theory for the non-local shear stress correlations in supercooled liquids is derived from first principles [1]. It captures the crossover from viscous to elastic dynamics at the liquid to glass transition and explains the emergence of long-ranged stress correlations in glass, as expected from classical continuum elasticity. The long-ranged stress correlations

can be traced to the coupling of shear stress to transverse momentum, which is ignored in the classic Maxwell model. To rescue this widely used model, we suggest a generalization in terms of a single relaxation time for the fast degrees of freedom only. This generalized Maxwell model implies a divergent correlation length as well as dynamic critical scaling and correctly accounts for the far-field stress correlations. It can be rephrased in terms of generalized hydrodynamic equations, which naturally couple stress and momentum and furthermore allow to connect to fluidity and elasto-plastic models.

[1] M. Maier, A. Zippelius, and M. Fuchs, Phys. Rev. Lett. 119, 265701(2017)