Abstract Submitted for the MAR08 Meeting of The American Physical Society

Structural relaxation in sheared two-dimensional foams MATTHIAS MOBIUS, GIJS KATGERT, MARTIN VAN HECKE, University of Leiden — Athermal and disordered systems at rest, such as foams and granular media, are stuck in a meta-stable configuration. Upon shear the system unjams and complex vortex-like rearrangements ensue that are correlated in time and space. In our experiment we investigate what the typical time scales of these structural relaxations are as a function of the local shear rate in a two-dimensional, disordered foam that is linearly sheared. After an initial super-diffusive regime, the bubbles become diffusive at later times. This transition is reflected in the statistics of the bubble displacements, which are initially strongly correlated and non-Gaussian but eventually become Gaussian. We find that the relaxation time decreases with shear rate. For large shear rates the dependence follows a power law with an exponent significantly different from -1.

> Matthias Mobius University of Leiden

Date submitted: 26 Nov 2007

Electronic form version 1.4