

Abstract Submitted  
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**Breakdown of local constitutive relations in flows of glassy systems.** ANNIE COLIN, JULIE GOYON, University Bordeaux 1, GUILLAUME OVARLEZ, LCPC, ARMAND AJDARI, CNRS, LYDERIC BOCQUET, University Bordeaux 1 — Using Particule imaging velocimetry or velocity controlled magnetic resonance imaging, we measure the velocities profiles of a monodisperse emulsion, in various type of flows (shear flow, poiseuille planar flow) and in various type of confinement (wide gap Couette cell or very narrow channel). The velocity profiles cannot be described using a constitutive equation linking the local shear rate to the local shear stress. These experiments point out strong non local effects related to the microscopic mechanisms (T1 events and avalanche process) in charge of the flow. We establish how these cooperativity effects manifest in the rheological behavior and propose a theoretical framework allowing to reproduce all the experimental results. The size of the dynamically correlated regions (typically one to five droplets size) are shown to grow with the concentration and elasticity of the emulsion.

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