

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Slow flows of yield stress fluids: complex spatio-temporal behaviour within a simple elasto-plastic model LYDERIC BOCQUET, Université Lyon I, France, GUILLEMETTE PICARD, ARMAND AJDARI, FRANCOIS LEQUEUX, ESPCI, Paris, France — A minimal athermal model for the flow of dense disordered materials is proposed, based on two generic ingredients: local plastic events occurring above a microscopic yield stress, and the non-local elastic release of the stress these events induce in the material. A complex spatio-temporal rheological behaviour results, with features in line with recent experimental and numerical observations. At low shear rates, macroscopic flow actually originates from collective correlated bursts of plastic events, taking place in dynamically generated fragile zones. The related correlation length diverges algebraically at small shear rates. In confined geometries bursts occur preferentially close to the walls yielding an intermittent form of flow localization.

Lyderic Bocquet
University Lyon, France

Date submitted: 24 Nov 2004

Electronic form version 1.4