Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Inertia and universality of avalanche statistics: the case of slowly deformed amorphous solids KAMRAN KARIMI, EZEQUIEL FERRERO, JEAN-LOUIS BARRAT, University of Grenoble — We report a numerical study on the role of dissipation in the quasi-static flow of amorphous solids [arXiv preprint arXiv:1610.00533 (2016)]. Using a two-dimensional finite-elements based approach, we analyze avalanche size and duration distributions, as well as yielding threshold statistics, at different damping ratios. We show that the overdamped dynamics can be characterized by a set of scale-free statistics which are governed by universal scaling exponents, in quantitative agreement with previous studies. At low damping ratios, however, the range of the scale-free regime diminishes by the emergence of damping-dependent characteristic peaks in the statistics of avalanches. Despite this break-down of universality, we argue that some generic properties of avalanches hold, enabling us to propose new scaling laws in the underdamped limit.

Jean-Louis Barrat
University of Grenoble

Date submitted: 11 Nov 2016 Electronic form version 1.4