

Stress and Temperature Dependence of Avalanche Dynamics in Metallic Glasses

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Amorphous solids have been discovered, fabricated and used by mankind for more than 2000 years. Despite this fact the understanding of the microscopic origin of plasticity in such materials remain nowadays elusive, since the well established solid state theory cannot be applied due to the lack of a crystalline lattice. Recently such issue has been approached from the perspective of the avalanche dynamics. [1] In this context, the analysis of the statistics in the intermittent behavior of the deformation response of such materials allows to study correlations during deformation, which are otherwise inaccessible by experimental means [2].

We studied the avalanches produced during the deformation in tensile creep tests of $Pd_{77.5}Cu_6Si_{16.5}$ metallic glass at several experimental conditions of stress and temperature. A crossover of the statistics of such avalanches shows up. Such crossover is interpreted as a transition in the deformation mechanism and it is associated to the strain rate [3].

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Literature

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