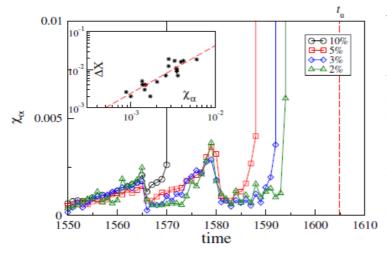# Unjamming Dynamics:
The Micromechanics of a Seismic Fault Model

M. Pica Ciamarra, CNR-SPIN, U.O.S. Napoli
E. Lippiello, Sec. University of Naples, Dep. of Environmental Sicences
C. Godano, Sec. University of Naples, Dep. of Environmental Sicences
L. de Arcangelis, Sec. University of Naples, Dep. of Information Engineering

The unjamming transition of granular systems is investigated in a seismic fault model via three dimensional molecular dynamics simulations. A two-time force-force correlation function, and a susceptibility related to the system response to pressure changes, allow us to characterize the stick-slip dynamics, consisting in large slips and microslips leading to creep motion. The correlation function unveils the micromechanical changes occurring both during microslips and slips. The susceptibility encodes the magnitude of the incoming microslip.

The figure shows the response of the system to perturbations of different intensities, as a function of time, across small and large slips. Before a slip of size ΔX, the susceptibility reaches a maximum χ_α. The inset illustrates that these two quantities are correlated. This implies that by measuring the system's response to external perturbations it is possible to infer the size of the next slip, i.e. the amount of energy the system will release.