



Ben-Gurion University of the Negev
Blaustein Institutes for Desert Research
The Swiss Institute for Dryland Environmental and Energy Research
Alexandre Yersin Department of Solar Energy and Environmental Physics

Title:

Reversibility and Criticality in Amorphous Solids

Speaker:

Dr. Ido Regev
BIDR
Ben-Gurion University of the Negev

Abstract:

The physical processes governing the onset of yield, where a material changes its shape permanently under external deformation, are not yet understood for amorphous solids which are intrinsically disordered. Using molecular dynamics simulations and mean field theory, we show that at a critical strain amplitude the sizes of clusters of atoms undergoing cooperative rearrangements of displacements (avalanches) diverges. We compare this non-equilibrium critical behavior to the prevailing concept of a "front depinning" transition which has been used to describe steady-state avalanche behavior in different materials. We explain why a depinning-like process can result in a transition from periodic to chaotic behavior and why chaotic motion is not possible in pinned systems. These findings suggest that, at least for highly jammed amorphous systems, the irreversibility transition may be a side effect of depinning which occurs in systems where the disorder is not quenched.

Tuesday, November 22, 2016, 11:00
Lecture room, Physics Building (ground floor)