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:

Following the evolution of metastable glasses under external adiabatic perturbations: compression and shear-strain

Speaker:

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Abstract:
I shall report on a series of recent works focusing on the theoretical study of metastable glasses prepared through non-equilibrium protocols. I will first begin with a short review of the basic phenomenology of supercooled liquids and the glass transition, along with a perspective on the theories formulated so far to explain their nature. I shall then talk about the phenomenology of metastable glasses prepared through slow annealing protocols (including the recently introduced ultra-stable glasses), focusing in particular on DSC calorimetry experiments and response to shear deformations.
In the following I will then present our main result, namely a mean-field, fully analytic theory of metastable glasses which, as we show, is both able to reproduce known observations and to formulate new predictions and insights into the very nature of the glass phase, with tangible consequences in terms of behavior at high densities (or equivalently, low temperatures) and elasto-plastic response under strain. After an exposition of some numerical evidence in support of our theoretical picture, I will conclude with a discussion of the perspectives for further research.

Tuesday, December 6, 2016, 11:00
Lecture room, Physics Building (ground floor)