UNIVERSITY OF CRETE
DEPARTMENT OF PHYSICS

CRETE CENTER FOR
QUANTUM COMPLEXITY
AND NANOTECHNOLOGY

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

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17:00 -18:00
3rd Floor Seminar Room

"Effective temperatures"

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Abstract

One of the core ideas of statistical mechanics is that equilibrium states can be accurately described in terms of a small number of thermodynamic variables, such as temperature and pressure. At present there is no equivalent framework for generic out-of-equilibrium macroscopic systems, and one is forced to solve their dynamics on a case-by-case basis. Out-of-equilibrium macroscopic systems are of many different kinds. An interesting class is the one in which the relaxation is slow—with observables decaying, say, as power laws instead of exponentially. Typical instances are coarsening phenomena and generic glasses, realized as molecular, polymeric or magnetic materials, among others. Another intriguing group is the one of non-equilibrium steady states in the weak drive limit. Examples are gently vibrated granular matter and weakly sheared super-cooled liquids. The quest for an approximate thermodynamic description of such systems or, to start with, the identification of effective parameters acting as the equilibrium ones, has a long history that we will not review in detail here. In contrast, we will focus on the development of the effective temperature notion that has proven to be a successful concept at least within certain limits that we will discuss.