

Séminaire du SPEC
Mercredi 24 janvier 2007, 14h00

Bt. 774 - Salle Claude ITZYKSON
Centre d'Etudes de Saclay, Orme des Merisiers
91191 Gif-sur-Yvette

ATTENTION : heure inhabituelle

Séminaire exceptionnel du groupe théorie
Fragility of glassy systems
at mesoscopic and macroscopic scales

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Glassy systems exhibit smaller susceptibilities by aging for longer times suggesting that they become more "stable" with time.

Yet paradoxically sometimes they can rejuvenate even by small changes of the applied external fields. For instance spin-glasses can rejuvenate by small variations of the applied magnetic field or temperature as demonstrated by experiments. In this sense these systems are similar to the so called fragile matters like granular systems which unjam and re-jam by small rotations of the external load. We studied the underlying static problem within a class of mean field models which exhibit one step replica symmetry breaking by a replica method and a low temperature expansion method. We found sequences of step-wise, singular responses on finite size samples under variation of the external field. The response curves become continuous and self-averaging in the thermodynamic limit due to vanishing of the spacing of the steps.

We also analyzed the problem by means of a real space renormalization group (RG) method. Comparisons of the mean field and the real space RG analyses suggest that finite sized mean field models behave like putative droplets of finite sizes. We discuss physical implications of the results for mesoscopic and macroscopic measurements in experiments.

Invitant :

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