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Recipes for Metastable States in Glasses

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1. Basic Glassy Phenomenology.
2. Order Parameter and Landau Free-energy for glasses.
3. Results of Simulations.

Glasses freeze in configurations that are as disordered as the one of the liquid. In such conditions -even neglecting crystalline configurations- the study of the Gibbs measure fails to detect the difference between the liquid and the glass. Glassy metastability can be studied through the introduction of conditional Gibbs measures, where the role of conditioning order parameter is played by the overlap with a random configuration. Within mean-field theory, the free-energy as a function of the order parameter has a double well shape similar to the ordinary Landau free-energy for first order transitions. I will discuss the theory that ensues and its tests in simulations.

Orateur: Prof. FRANZ, Silvio (Université Paris-Saclay, LPTMS)