Trap Models and Aging for Spin Glasses

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Spin glasses are highly disordered systems and their out-of-equilibrium dynamics have age dependent decorrelation properties, a phenomena known as aging. First, I will explain the results on the aging properties of the mean field spin glass models on short time scales where Bouchauds REM-like trap models have been confirmed as a universal aging scheme. However, due to the famous Parisi ansatz, on longer time scales, the dynamics should live on a hierarchically organized energy landscape. As a first attempt to understand the effects of this hierarchical structure on the dynamics we introduce the so-called GREM-like trap models. In this model the energy landscape is given through a tree with L levels. We prove that there exists various time scales where aging happens with different limiting functions depending on how many levels of the tree has been equilibrated.
(Joint work with V. Gayrard.)