

## **Theoriekolloquium**

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Am **11. November 2010** um **14.15 Uhr** in **W2 1-143** hält

**Frau Katharina Janzen (Uni Oldenburg)**

einen Vortrag mit dem Titel

### **Freezing transition in disordered systems**

Freezing transitions are common in nature: when the temperature is decreased many systems show a transition from a high temperature phase into a glassy phase. To describe these effects in the framework of statistical mechanics one has to give up the ergodicity hypothesis and decompose the phase space into many ergodic components.

To gain some intuition on how this decomposition may be accomplished it is instructive to consider pure systems first, where the ergodic components are related by symmetry. Projection techniques on the relevant components are realized via conjugate fields in this case. For disordered systems the situation is more involved: the decomposition of the phase space becomes a random object due to the random nature of the system. New techniques have to be invoked to identify the ergodic components. The replica trick is a powerful tool used to describe disordered systems - a copy of the system itself helps to find the ergodic components.

Spin Glasses are disordered systems which show a transition from a paramagnetic phase to a frozen phase. The phase boundary, known as the de Almeida Thouless line, separates the ergodic from non ergodic regions. Within the replica formalism for spin glasses the freezing transition is signaled by an instability of the replica-symmetric saddle-point. In this approach the transition to the low temperature phase can be reformulated as an eigenvalue problem. Using the symmetry of the replica-symmetric fluctuation matrix the eigenvalue problem is reduced by techniques from representation theory of the permutation group and it is shown how de Almeida-Thouless-lines can be computed.

Interessierte sind herzlich eingeladen.

gez. Prof. Dr. Andreas Engel