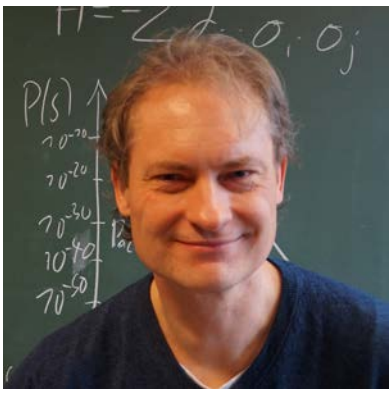
TECHNISCHE UNIVERSITÄT
IN DER KULTURHAUPTSTADT EUROPAS
CHEMNITZ

Institut für Physik
Physikalisches Kolloquium



Donnerstag, 21.11.2024, 15:30 Uhr

Ort: Reichenhainer Str. 90;
Zentrales Hörsaal- und Seminargebäude, Raum C10.013

Prof. Dr. Alexander K. Hartmann

Universität Oldenburg

Complex behavior for numerically simple problems

The description of complex systems by the concept of Replica Symmetry Breaking (RSB), which was introduced by Giorgio Parisi in the 1980s, was honored by the Nobel price in 2021. RSB has been used to analyze and describe the behavior of many systems, such as spin glasses, neural networks, optimization problems, or data analysis using machine learning. From the numerical side, for a thorough analysis of almost all RSB-exhibiting problems, only algorithms are available with exponentially growing running times, which has restricted the system sizes considerably.

Here two models are considered, directed polymers in random media and increasing subsequences (called Ulam's problem for the ground states). For both models it is possible to sample exactly in perfect thermal equilibrium with algorithms where the running time increases only polynomially with the system size. This means, large system sizes are accessible and good statistics can be obtained, in contrast to, e.g., the case of spin glasses.

For both problems, ensembles are considered, where the numerical data, namely the distribution of overlaps and the clustering of the configuration space, strongly indicates that RSB is present. Thus, these models exhibit a convenient approach to study RSB by computer simulations, at least for some variants.

Alle Zuhörer sind ab 15:15 Uhr zum Kaffee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt:
Prof. Dr. Martin Weigel, Tel. 0371 531 34570

www.tu-chemnitz.de/physik