

DY 7: Focus Session: GPU Computing (with SOE)

Time: Monday 14:00–15:00

Location: GÖR 226

Invited Talk

DY 7.1 Mon 14:00 GÖR 226

Applications of GPU-Computing in Statistical Physics —
•PETER VIRNAU — Institut für Physik, Staudinger Weg 7, Uni Mainz

Although simulations and data analysis on Graphic Processing Units require additional programming efforts, and even though not all problems are well-suited for this particular environment, GPU-computing has emerged as a viable low-cost complement to conventional supercomputers in the past three years. In this talk I will highlight recent applications which focus on classical problems of statistical physics and related fields. I will present an extremely fast, freely available Ising code based on multispin coding concepts, which is able to run on multi-GPU clusters, as well as recent results from large-scale molecular dynamics simulations of polymer loops and melts. I will also present interdisciplinary research on econophysics, which focuses on analysis of financial market time series, and discuss future challenges of GPU-computing.

Invited Talk

DY 7.2 Mon 14:30 GÖR 226

Accelerating Monte Carlo Simulations in Statistical Physics with GPU's — •DAVID LANDAU and JUNQI YIN — University of Georgia, Athens, GA 30622, U.S.A.

High resolution Monte Carlo simulations are often limited by available resources. This is because long sampling times and large systems are often needed to overcome long correlation times and finite size effects for the systems under study. We will describe how GPU's can be used to formulate multi-threaded algorithms that dramatically accelerate performance of Monte Carlo simulations of condensed matter systems. We give examples of the application to parallel tempering simulation of magnetic lattice models and Wang-Landau sampling of water clusters in the continuum. In both cases a speedup of more than a factor of 50 was achieved compared to a single, current generation CPU; moreover, our implementation scales nearly linearly with the number of GPU's.