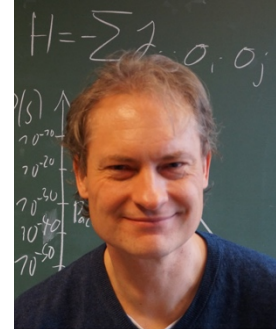




PHYSICS COLLOQUIUM

Speaker: **Prof. Alexander Hartmann**

Institute of Physics,
University of Oldenburg,
Germany



Topic: **Simulation of rare events on networks: random graphs, energy grids, and spread of diseases**

Time and place: Tuesday, January 16, 2024, **2:50 pm** – hybrid event
The colloquium will be held in REC/C213.

Online participation possible:

Zoom-Meeting: Meeting-ID: 631 3817 8900 / passcode: PC-WiSe23

<https://tu-dresden.zoom-x.de/j/63138178900?pwd=am9nSzYyeUh3SWxMdnNBWkpUaXI5UT09>

Host: Prof. Marc Timme

Abstract: Any quantity measured in a random process is only fully characterised by its complete probability distribution. Ideally, it can be obtained analytically. Unfortunately, most physical models are not accessible analytically thus one has to perform numerical simulations. By doing many independent runs, one obtains estimates of the probability distributions in a range down to probabilities like 10^{-10} , if one does 10 billion runs. But how to obtain solve the full scientific question, how to obtain the full distribution? This means we also want to study the rare events but without waiting forever by performing an almost infinite number of simulation runs. Here, we study rare events numerically using a very general black-box method. It is based on Monte Carlo sampling of vectors of random numbers within an artificial finite-temperature (Boltzmann) ensemble to access rare events and large deviations for almost arbitrary equilibrium and non-equilibrium processes. In this way, we obtain probabilities as small as 10^{-500} and smaller, hence (almost) the full distribution can be obtained in a reasonable amount of time.

Bio: Diploma in Computer Science at Fernuniversitaet Hagen (1993) and Diploma in Physics at University of Duisburg (1994). / PhD in theoretical Physics at University of Heidelberg (1998). / Post Doc at University of Goettingen, University of California Santa Cruz (USA) and Ecole Normale Supérieure Paris (France) during 1998 to 2002. / Leader of an independent junior research group at Institute of Theoretical Physics at University of Goettingen, funded by the Volkswagen Foundation (2002-2007). / Since 2007 professor for Computational Theoretical Physics at University of Oldenburg.

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Get-Together:

The colloquium will be followed directly by a Get-Together with Prof. Alexander Hartmann in REC/B101 (around 4:00 p.m.). All students and staff are invited to talk to the speaker and discuss perspectives on the academic career, work-life balance and the professional life as a scientist and professor at the Institute of Physics of the University of Oldenburg.