

# Bad Honnef Physics School

supported by the Wilhelm and Else Heraeus-Foundation

## Entropy and Information: the statistical mechanics perspective

13 – 18 September, 2015, Physikzentrum Bad Honnef, Germany

Andreas Engel (Oldenburg), Christian van den Broeck (Hasselt)  
and Massimiliano Esposito (Luxembourg)

The school aims at providing a pedagogical introduction into the role of information as thermodynamic resource. The problems discussed include the formulation of the Second Law at the nano-scale, the efficiency of biological motors, realizations of Maxwell's demon, the thermodynamic cost of information erasure, and the meaning of quantum information.

Major topics (3 lectures, 1 exercise):

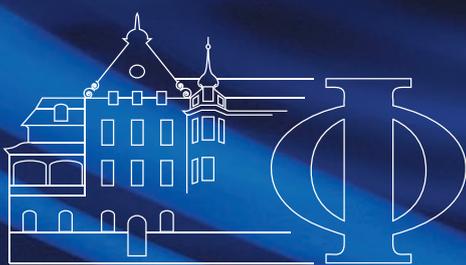
- Basic notions of information theory, Haye Hinrichsen (Würzburg)
- Stochastic thermodynamics, Massimiliano Esposito (Luxembourg)
- Maxwell's demon, Jordan Horowitz (Boston)
- Quantum information, Janet Anders (Exeter)

Specialized topic:

- Experimental relevance of information, John Bechhoefer (Burnaby)
- Efficiency of engines: small and big, Christian van den Broeck (Hasselt)
- Fluctuation theorems for developed turbulence, Daniel Nickelsen (Oldenburg)
- Stochastic thermodynamics of chemical networks, Matteo Polettoni (Luxembourg)
- Non-equilibrium methods for equilibrium free energy computations, Christoph Dellago (Vienna)
- Entropy and information in black holes, Claus Kiefer (Cologne)

**Fees:**

Covering full board and lodging at the Physikzentrum Bad Honnef  
200 € (for DPG members 100 €).



Physikzentrum Bad Honnef

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Deutsche Physikalische Gesellschaft



# Bad Honnef Physics School

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## Computational Physics of Complex and Disordered Systems

*20 – 25 September, 2015, Physikzentrum Bad Honnef, Germany*

Alexander K. Hartmann (U Oldenburg) and A. Peter Young (University of California)

Computer simulations play an ever-increasing role in physics research. This is particularly true for non-regular, or disordered, systems such as metallic alloys, glasses, cell membranes, polymer mixtures, or even trans-physics problems such as optimization problems and social networks.

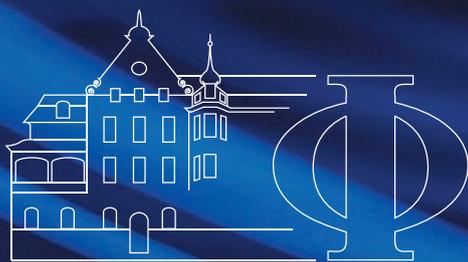
The school will provide an introduction to the field, including algorithmic techniques and selected up-to-date research topics. In addition to lectures, an important part of the school will be hands-on exercises at the computer. The school is suitable for students with a physics background, including basic knowledge in Statistical Mechanics, and experience with a high-level programming language.

### Lecturers:

- Albert-László Barabási (Northeastern University, Boston, USA)
- Baruch Barzel (Bar-Ilan University, Ramat-Gan, Israel)
- Daniele Coslovich (Université Montpellier, France)
- Helmut G. Katzgraber (Texas A&M; University, College Station, USA)
- Walter Kob (Université Montpellier, France)
- Werner Krauth (Ecole Normale Supérieure, Paris, France)
- Andrew J. Ochoa (Texas A&M; University, College Station, USA)
- Roberta Sinatra (Northeastern University, Boston, USA)
- Zheng Zhu (Texas A&M; University, College Station, USA)
- ...

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