

# Aktuelle Veranstaltungen

---

## Kolloquium

**Thema:** Intelligente Energieversorgungsnetze

**Datum:** 08.11.21

**Uhrzeit:** 16:15

**Ort:** H4

**Vortragender:** [Prof. Jens Haubrock](#)

FH Bielefeld

**Inhalt:**

**Ansprechpartner:** [W. Pfeiffer](#)

## Kolloquium Mathematische Physik

**Thema:** [Random matrices, spin glasses, and machine learning](#)

**Datum:** 23.07.21

**Uhrzeit:** 16:15

**Ort:** ZOOM/Konferenzschaltung

**Vortragender:** [Jon Keating](#)

Oxford University

**Inhalt:** I will describe some problems relating to machine learning and their connections to random matrix theory and spin glasses. These connections give a mathematical framework for understanding in qualitative terms the effectiveness of certain algorithms that are important in machine learning, but developing them into precise models remains a major challenge. I will reflect on the different roles played by models in computer science and physics, focussing on those involving random matrices.

**Ansprechpartner:** [G. Akemann](#)

## Seminar Hochenergiephysik

**Thema:** [Machine Learning for Thermodynamic Observables in Lattice Field Theories](#)

**Datum:** 06.07.21

**Uhrzeit:** 14:15

**Ort:** Online, via ZOOM

**Vortragender:** [Lena Funcke](#)

Perimeter Institute, Ontario, Canada

**Inhalt:** In this talk, I will discuss how applying machine learning techniques to lattice field theory is a promising route for solving problems where Markov Chain Monte Carlo (MCMC) methods are problematic. More specifically, I will show that deep generative models can be used to estimate thermodynamic observables like the free energy, which contrasts with existing MCMC-based methods that are limited to only estimate free energy differences. I will demonstrate the effectiveness of the proposed method for two-dimensional  $\phi^4$  theory and compare it to MCMC-based methods in detailed numerical experiments.

**Ansprechpartner:** [G. Endrödi](#)

## Seminar Kondensierte Materie

**Thema:** 14:30 Untersuchung von frustrierten Spin-1/2-Systemen mit Hilfe von quantum-three-coloring am Beispiel des Kuboktaeders

**Datum:** 14.10.21

**Uhrzeit:** 14:30

**Ort:** Hybrid - Zoom/D5-153

**Vortragender:** Florian Brökemeier

Universität Bielefeld

**Inhalt:**

**Ansprechpartner:** [Jürgen Schnack](#)

## Seminar Mathematische Physik

**Thema:** [On Non-Hermitian Beta-Ensembles](#)

**Datum:** 14.10.21

**Uhrzeit:** 16:00

**Ort:** D5-153

**Vortragender:** [Patricia Päßler](#)

Universität Bielefeld

**Inhalt:**

Log-gases with inverse temperature  $\beta$  are systems with many applications in physics, for example in the theory of superconductors or the fractional quantum Hall effect. For some specific values of  $\beta$  a correspondence to random matrix theory (RMT) is well established. The advantage of this connection is the usage of the RMT methods in the study of those systems. The goal of this talk is the discussion of Log-gases in two dimensions, i.e. in the non-Hermitian case, for more general values of the inverse temperature. Therefore, we study in the first part a model of normal  $2 \times 2$  matrices with  $\beta$  in  $[0,2]$  and discuss whether we find a surmise for the nearest-neighbour spacing distribution of large matrices. In the second part of the talk we introduce the study of symmetry classes in non-Hermitian RMT. We conjecture that the classes of complex symmetric and complex quaternion matrices can be effectively described by Log-gases in two dimensions with non-integer inverse temperatures.

**Ansprechpartner:** [Gernot Akemann](#)

## **Seminar Bielefeld-Melbourne Zufallsmatrizen**

**Thema:** [Planar symplectic ensembles: from scaling limits to Wronskian structures](#)

**Datum:** 27.10.21

**Uhrzeit:** 09:00

**Ort:** ZOOM / Konferenzschaltung

**Vortragender:** [Sungsoo Byun](#)

Korea Institute for Advanced Study

**Inhalt:** In this talk, I will discuss complex eigenvalues of non-Hermitian random matrices with symplectic symmetry, which are known to form Pfaffian point processes. In particular, I will present various scaling limits of symplectic ensembles and explain their unified integrable structure of Wronskian form. Examples include edge scaling limits of the Ginibre ensemble (with boundary confinements) and bulk/edge scaling limits of the elliptic Ginibre ensemble in the almost-Hermitian regime. Beyond standard universality classes, I will also introduce scaling limits of the Mittag-Leffler ensemble at the singularity. Furthermore, for symplectic ensembles with general external potentials, I will present the characterization of translation invariant scaling limits by virtue of rescaled mass-one and Ward's equations. This talk is based on two joint works: one with Gernot Akemann and Nam-Gyu Kang and the other with Markus Ebke and Seong-Mi Seo.

**Ansprechpartner:** [Gernot Akemann](#)