Aktuelle Veranstaltungen

Kolloquium

**Thema:** Computational magnetism with classical spins – adventures and challenges in the nano, micro, and macro regime

**Datum:** 15.04.19

**Uhrzeit:** 16:15

**Ort:** H6

**Vortragender:** Prof. Dr. Christian Schröder

FH Bielefeld

``Everything should be made as simple as possible, but not simpler." -- This sentence said by Albert Einstein almost a century ago may act as a synonym for the balancing act that one has to face when dealing with classical atomistic spin dynamics methods within the nanomagnetism community. There is for sure no doubt about the tremendous success of the classical spin dynamics approach for the prediction of physical properties of (infinite) bulk magnetic systems over the past 40 years. However, when it comes to molecular magnets it seems to be questionable to what extend a classical approach, usually exploiting the Heisenberg model, would be accurate enough to describe these systems or whether one over-simplifies the problem by totally ignoring quantum effects. Reality, however doesn’t leave us a choice! Always limited by and hungry for more computational power, numerical simulations based on classical spins appear just too tempting compared to exact quantum calculations which are still very often beyond today’s most advanced computational capabilities even for relatively small and simple systems. In this talk I will show that numerical simulations based on classical atomistic spin dynamics methods serve as an excellent tool to complement exact and approximate quantum methods. Moreover, classical spin dynamics methods as such and in combination with molecular dynamics allow us to explore interacting magnetic systems at the nano and micro scale very efficiently which has led to the discovery of a variety of new and surprising physical phenomena.

**Inhalt:**

**Ansprechpartner:** J. Schnack
Kolloquium Mathematische Physik

Thema: tba
Datum: 05.07.19
Uhrzeit: 16:15
Ort: V4-119
Vortragender: Dirk Hundertmark
Karlsruher Institut für Technologie

Inhalt:

Ansprechpartner: B. Gentz

Seminar Hochenergiephysik

Thema: tba
Datum: 28.05.19
Uhrzeit: 14:15
Ort: D6-135
Vortragender: Mikko Laine
Univ. Bern

Inhalt:

Ansprechpartner: D. Bödeker
Seminar Kondensierte Materie

Thema:  **Is there a spinon-spinon singlet?**

Datum:  26.03.19

Uhrzeit:  11:00

Ort:  E5-102

Vortragender:  Nedko Ivanov

Bulgarian Academy of Sciences, Sofia

Inhalt:

Ansprechpartner:  Jürgen Schnack

Seminar Mathematische Physik

Thema:  **Rate of Convergence to the Circular Law**

Datum:  17.01.19

Uhrzeit:  17:15

Ort:  D5-153

Vortragender:  Jonas Jalowy

Bielefeld University

> It is well known that the (complex) empirical spectral distribution of a non-Hermitian random matrix with i.i.d. entries will converge to the uniform distribution on the complex disc as the size of the matrix tends to infinity. In this talk, we investigate the rate of convergence to the Circular Law in terms of a uniform, 2-dimensional Kolmogorov-like distance. The optimal rate of convergence is determined by the Ginibre ensemble and is given by $n^{-1/2}$. I will present a
It is well known that the empirical spectral distribution of a non-Hermitian random matrix with i.i.d. entries will converge to the uniform distribution on the complex disc as the size of the matrix tends to infinity. In this talk, we investigate the rate of convergence to the Circular Law in terms of a uniform, 2-dimensional Kolmogorov-like distance. The optimal rate of convergence is determined by the Ginibre ensemble and is given by $n^{-1/2}$. I will present a smoothing inequality for complex measures that quantitatively relates the Kolmogorov-like distance to the concentration of logarithmic potentials. Combining it with results from local circular laws, it is applied to prove nearly optimal rate of convergence to the circular law with overwhelming probability. Furthermore I will relate the result to other distances, present an analogue for the empirical root measure of Weyl random polynomials with independent coefficients and discuss a possible generalization for products of independent matrices. The talk is based on joint work with Friedrich Götze.

Ansprechpartner: Gernot Akemann

Seminar AG Zufallsmatrizen

**Universal Broadening of Zero Modes: A General Framework and Identification**

**Thema:**

**Datum:** 03.04.19

**Uhrzeit:** 16:00

**Ort:** V3-201

**Vortragender:** Adam Mielke

Bielefeld University

We consider the smallest eigenvalues of perturbed Hermitian operators with zero modes, either topological or system specific. To leading order for small generic perturbation we show that the corresponding eigenvalues broaden to a Gaussian random matrix ensemble of size $\nu \times \nu$, where $\nu$ is the number of zero modes. This observation unifies and extends a number of results within chiral random matrix theory and effective field theory and clarifies under which conditions they apply. The scaling of the former zero modes with the volume differs from the eigenvalues in the bulk, which we propose as an indicator to identify them in experiments. These results hold for all ten symmetric spaces in the Altland-Zirnbauer classification and build on two facts. Firstly, the broadened zero modes decouple from the bulk eigenvalues and secondly, the mixing from eigenstates of the perturbation form a Central Limit Theorem argument for matrices.

Ansprechpartner: Gernot Akemann