Aktuelle Veranstaltungen

Kolloquium

**Abschiedskolloquium für Prof. Dr. Edwin Laermann: Future perspectives of supercomputing - fighting the limits of scalability**

**Thema:**

**Datum:** 28.01.19

**Uhrzeit:** 16:00

**Ort:** H6

**Vortragender:** Prof. Dr. Dr. Thomas Lippert

Forschungszentrum Jülich

**Inhalt:**

**Ansprechpartner:** F. Karsch

Kolloquium Mathematische Physik

**Introduction to the non commutative topology of topological insulators**

**Thema:**

**Datum:** 25.01.19

**Uhrzeit:** 16:15

**Ort:** T2-213

**Vortragender:** Johannes Kellendonk
Topological insulators are insulating materials which are in a topological non-trivial phase. Perhaps the most exciting consequence of this is the existence of boundary resonances (for instance boundary currents) which are robust against disorder. Mathematically this is related to a bulk boundary correspondence linking topological invariants of the bulk of the material to topological invariants associated to the boundary. Our approach uses K-theory and cyclic cohomology of operator algebras.

Ansprechpartner: M. Baake

Seminar Hochenergiephysik

Thema: Abundant sets of internal spaces for string theory

Datum: 31.01.19

Uhrzeit: 14:15

Ort: D6-135

Vortragender: Harald Skarke

TU Wien und Univ. Bielefeld

The ten-dimensional spacetime of string theory is usually interpreted as a cartesian product of a four-dimensional manifold corresponding to the universe we observe and a six-dimensional compact space which is taken to be a Calabi-Yau (CY) threefold (a space of three complex, i.e. six real dimensions). A different construction known as F-theory combines the data of the internal space and of some background fields into those of a CY fourfold. The most fertile construction method for CY manifolds comes from a branch of algebraic geometry known as toric geometry, where families of CY n-folds are associated to (n+1)-dimensional polytopes that have a certain property called reflexivity. I will explain the concepts introduced above. Then I will outline how we managed to classify all 476,800,776 reflexive 4-polytopes almost 20 years ago, which corresponds to the world's largest list of CY threefolds. Finally I will report on recent work on the classification of a particular class of reflexive 5-polytopes (there are 322,383,760,930), which resulted in the largest existing database for CY fourfolds.

Ansprechpartner: D. Schwarz

Seminar Kondensierte Materie
**Thema:** Molecular Nanomagnets: Quantum Spins in a Box

**Datum:** 24.01.19

**Uhrzeit:** 14:15

**Ort:** D5-153

**Vortragender:** Oliver Waldmann

Universität Freiburg

Molecular nanomagnets establish a new class of magnetic materials, which are not only aesthetically pleasing but provide a fascinating view on the quantum magnetism in small, mesoscopic objects. These molecules typically consist of tens of magnetic metal ions, which are linked by organic ligands such as to form well defined geometrical structures. They thus represent magnetic nanoclusters with ideal properties: They don't exhibit any form or shape dispersion and are virtually decoupled magnetically from each other. This allows for the unique opportunity to study the quantum phenomena due to the interaction of a dozen or so of quantum spins by controlled experiments. In this talk the particular class of ferromagnetic molecular nanomagnets is discussed, in which the exchange interactions between the spin centers are predominantly of ferromagnetic type. Even though ferromagnetic compounds are generally considered to be scientifically of less interest, it is shown by the example of the so called Mn19 molecule that in the case of systems consisting of only a dozen of spin centers indeed fascinating novel questions arise and unique phenomena can be observed.

**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
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 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

Thema: tba

Datum: 30.01.19

Uhrzeit: 16:00

Ort: V3-201

Vortragender: Mihail Poplavskyi

King's College London

Inhalt:

Ansprechpartner: Gernot Akemann