Upcoming Events

Colloquium

Topic: **Nanoscopy of 2D materials**

Date: 08.04.19

Time: 16:15

Place: H 5

Guest: Prof. Aleksandra Radenovic

Laboratory of Nanoscale Biology, EPFL Lausanne

Abstract: In this talk, I will detail our strategy on how to translate nanoscopy techniques into the field of materials science. We have developed and applied different modalities of nanoscopy techniques that provide unique insights about the type and density of defects together with the spectral characterization at locations determined with nanometre-scale precision. We focus on defects hosted in two classes of 2D materials: hexagonal boron nitride (h-BN) and transition metal dichalcogenides (TMDs), such as MoS2, WS2, MoSe2, WSe2, and MoTe2. Defects hosted in 2D materials such as h-BN and TMDs are particularly interesting due to their single photon emission. SP emitters are stable concerning transfer onto other substrates, opening the possibility of integrating them into more complex nanophotonic devices and paving the way for future semiconductor quantum information processing technologies. Transmission electron microscopy and scanning probe microscopy can provide atomic resolution. However, both techniques require strict sample preparation protocols and are not optimal for fast in-situ operation or applications requiring the characterization of large areas. In contrast, Nanoscopy can operate in-situ under ambient conditions and is compatible with the probing of defect chemistry and dynamics in different pH environments and under different solvents. We also demonstrated high-content characterization of 2D materials using silicon nitride waveguides as imaging platforms that allow integration of more complex nanophotonic circuits.

Contact person: T. Huser

Colloquium Mathematical Physics

Topic: **tba**

Date: 05.07.19

Time: 16:15

Place: V4-119

Guest: Dirk Hundertmark

Karlsruher Institut für Technologie

Abstract:

Contact person: B. Gentz

Seminar High Energy Physics

Topic: **Stress-energy-momentum tensor on the lattice**

Date: 02.04.19

Time: 14:15

Place: D6-135

Guest: Masakiyo Kitazawa

Osaka University

Abstract: We perform various lattice numerical simulations with the stress-energy-momentum tensor in SU(3) Yang-Mills theory. The energy-momentum tensor defined through the Yang-Mills gradient flow is used in these analyses. We explore thermodynamics, spatial distribution of stress tensor in quark-anti-quark system, nonzero-temperature Casimir effect, as well as the correlation functions. Extensions of the analysis to other new observables and full-QCD simulations will also be discussed.

Contact O. Kaczmarek

person: O. Kaczmarek

Seminar Condensed Matter

Topic: **Aspects of spin wave theory**

Date: 19.03.19

Time: 11:00

Place: E5-102

Guest: Nedko Ivanov

Bulgarian Academy of Sciences, Sofia

Abstract:

Contact person: Jürgen Schnack

Seminar Mathematical Physics

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

Date: 17.01.19

Time: 17:15

Place: D5-153

Guest: 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

Abstract: 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.

Contact person: Gernot Akemann

Seminar AG Zufallsmatrizen

Topic: **On Kac polynomials and truncations of random orthogonal matrices**

Date: 30.01.19

Time: 16:00

Place: V3-201

Guest: Mihail Poplavskyi

King's College London

Abstract: Zeros of random polynomials give a rise to a point process which does look similar to the ones arising in RMT but has no integrable structure. We discuss a long standing problem of finding persistence probability asymptotic behaviour for the family of Kac polynomials of even large degree. We first use imprecise connection to the model of truncations of random orthogonal matrices and calculate persistence probability by using integrability of corresponding RMT model. We then present recent progress in solving another integrable model, namely Gaussian Stationary Process with sech correlations, which was shown in 2002 [Dembo, Poonen, Shao, Zeitouni] to give a precise approximation for Kac polynomials. The talk is based on joint works with M. Gebert (QMUL/UC Davis), G. Schehr (LPTMS).

Contact person: Gernot Akemann