Kolloquium

Thema:  
**Ultrafast coupling of light with quantum emitters**

Datum:  04.11.19

Uhrzeit:  16:15

Ort:  H6

Vortragender:  Prof. Dr. Mario Agio

Laboratory of Nano-Optics, University of Siegen and National Institute of Optics (INO-CNR), 50125 Fl

Inhalt:

The modification of light-matter interaction by metal nanostructures has gained a considerable attention across a broad range of topics. Our interests focus on the interrogation of single quantum emitters, where we have shown that huge enhancements of the spontaneous emission rate can coexist with large quantum efficiencies. This makes such hybrid systems appealing for exploring ultrafast quantum phenomena on the nanoscale and for developing quantum technologies. We discuss configurations that strongly increase light-matter interaction and address quantum coherence and nonlinear optical processes that occur despite the existence of large dephasing rates. Next, we propose approaches that combine these findings with ultrafast techniques in order to enable the investigation of short-lived coherence and quantum effects in nanoscopic systems under ambient conditions.

Ansprechpartner:  W. Pfeiffer

Kolloquium Mathematische Physik

Thema:  
**Relativistic hydrodynamics, heavy-ion collisions, dynamical black holes and resurgent series**
Datum: 18.10.19

Uhrzeit: 16:15

Ort: V3-201

Vortragender: Michal P. Heller

Max-Planck-Institute for Gravitational Physics, Potsdam

The past 12 years has constituted the golden age for theoretical studies of relativistic hydrodynamics. The experimental motivation for these developments came from ultra-relativistic heavy-ion collision at RHIC and LHC accelerators in which the paradigm of strongly-interacting medium modelled hydrodynamically became the working horse for explaining the data. These experimental and phenomenological developments have come hand-in-hand with theoretical progress in understanding relativistic hydrodynamics as an effective description embedded in quantum field theory. In my colloquium I will review the line of thought based on AdS/CFT (holography), an approach to study strongly-coupled quantum field theories using gravitational techniques, focusing on understanding the limits of applicability of relativistic hydrodynamics in far-from-equilibrium quantum field theory. A beautiful spin-off of this analysis is understanding hydrodynamic gradient expansion as a part of a trans-series, which encodes, through resurgence, information about genuinely non-equilibrium excitations of a collective state of matter. Based on a series of works reviewed in arXiv:1610.02023 and arXiv:1707.02282, as well as some later / ongoing work.

Ansprechpartner: S. Schlichting

Seminar Hochenergiephysik

Thema: Probes for Dark Matter Axions: CMB Birefringence and Background Photon Resonance

Datum: 12.11.19

Uhrzeit: 14:15

Ort: D6-135

Vortragender: Pranjal Trivedi
Inhalt:

Ansprechpartner: D. Schwarz

Seminar Kondensierte Materie

16:00 Finite Temperature Lanczos Methode am Beispiel einer Spinkette

Datum: 06.11.19

Uhrzeit: 16:00

Ort: D5-153

Vortragender: Dennis Westerbeck

Universität Bielefeld

Inhalt:

Ansprechpartner: Jürgen Schnack

Seminar Mathematische Physik

Critical behaviour and characteristic polynomials of non-Hermitian random matrices

Datum: 23.05.19

Uhrzeit: 16:15

Ort: D5-153

Vortragender: Nicholas Simm
I will discuss some recent developments regarding the normal matrix model. In particular my interest will be in certain critical models where the limiting support of the eigenvalues can radically change its topology by slightly adjusting an external parameter. I will discuss how aspects of the model can be explicitly mapped to the study of expectations of characteristic polynomials of non-Hermitian random matrices (e.g. Ginibre or truncated unitary). Many of these averages are related to Painlevé transcendents, and by exploiting this, a precise and non-trivial asymptotic expansion of partition functions can be calculated in the critical models. This is joint work with Alfredo Deaño (University of Kent).

Ansprechpartner: Gernot Akemann

Seminar AG Zufallsmatrizen

Thema: Spectral radius of random matrices with independent entries

Datum: 23.10.19

Uhrzeit: 16:15

Ort: V3-201

Vortragender: Johannes Alt

University of Geneva

We consider random n x n matrices X with independent and centered entries and a general variance profile. We show that the spectral radius of X converges with very high probability to the square root of the spectral radius of the variance matrix of X when n tends to infinity. We also establish the optimal rate of convergence, that is a new result even for general i.i.d. matrices beyond the explicitly solvable Gaussian cases. The main ingredient is the proof of the local inhomogeneous circular law [arXiv:1612.07776] at the spectral edge. This is joint work with László Erdős and Torben Krüger.

Ansprechpartner: Gernot Akemann