**Aktuelle Veranstaltungen**

**Kolloquium**

**Thema:** Coupling electrons and light in electron microscopy

**Datum:** 14.06.21

**Uhrzeit:** 16:15

**Ort:** cyberspace

**Vortragender:** Prof. Claus Ropers

GWDG Göttingen

The interaction of electrons and light is an integral part of our everyday experience. Microscopically, bound electrons in atoms and molecules can change their quantum state by absorbing and emitting photons. A free electron, however, cannot simply absorb a propagating photon, as the photon of a given energy does not carry sufficient momentum. In other words, energy and momentum conservation cannot be simultaneously fulfilled in this process. However, if the light field is confined to subwavelength dimensions, the situation dramatically changes: Electrons passing through an optical near field can both emit and absorb multiple photon energies, creating discrete energetic sidebands in the electron spectrum. This mechanism is at the heart of recent developments combining optical spectroscopy with electron microscopy. In this talk, I will introduce basic principles and selected applications of inelastic electron-light scattering in electron microscopy. Besides the nanoscale imaging of optical fields, the mechanisms described allow for a coherent control of the electron quantum state, spatial and temporal electron beam manipulation, and the preparation of attosecond electron bunches. Finally, recent progress in the coupling of electron beams to whispering gallery mode resonators and related future prospects will be discussed.

**Ansprechpartner:** W. Pfeiffer

**Kolloquium Mathematische Physik**
Seminar Hochenergiephysik

Thema: Is Our Universe the Remnant of Chiral Anomaly in Inflation?

Datum: 27.04.21

Uhrzeit: 14:15

Ort: Online, via ZOOM

Vortragender: Azadeh Maleknejad

CERN, Geneva

Inhalt:

Modern cosmology has been remarkably successful in describing the Universe from a second after the Big Bang until today. However, its physics before that time is still much less certain. It profoundly involves particle theory beyond the Standard Model to explain long-standing puzzles: the origin of the observed matter asymmetry, nature of dark matter, massive neutrinos, and cosmic inflation. In this talk, I will explain that a new framework based on embedding axion-inflation in left-right symmetric gauge extensions of the SM can possibly solve and relate these seemingly unrelated mysteries of modern cosmology. The baryon asymmetry and dark matter today are remnants of a pure quantum effect (chiral anomaly) in inflation which is the source of CP violation in inflation. As a smoking gun, this setup has robust observable signatures for the GW
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Ansprechpartner: D. Bödeker

Seminar Kondensierte Materie

Thema: Electrical control of quantum spins

Datum: 10.06.21

Uhrzeit: 14:15

Ort: ZOOM / Konferenzschaltung

Vortragender: Arzhang Ardavan

University of Oxford

The canonical means of controlling quantum spins in condensed matter is using magnetic fields via the Zeeman interaction. However, under the right circumstances, spins can also be manipulated using electric fields, opening a range of scientific and technological possibilities. I will explain how to measure this effect, and present some of our results from a range of systems exhibiting spin-electric couplings, including paramagnetic defects in piezoelectrics and ferroelectrics, magnetic atoms on surfaces, and molecular magnets.

Ansprechpartner: Jürgen Schnack

Seminar Mathematische Physik

Thema: The Character Expansion in effective Theories for chiral Symmetry Breaking

Datum: 03.12.20

Uhrzeit: 16:30

Ort: ZOOM / Konferenzschaltung
Vortragender: Noah Aygün

Universität Bielefeld

Inhalt:

Ansprechpartner: Gernot Akemann

Seminar Bielefeld-Melbourne Zufallsmatrizen

Thema: Real eigenvalues of elliptic random matrices

Datum: 16.06.21

Uhrzeit: 09:00

Ort: ZOOM / Konferenzschaltung

Vortragender: Sung-Soo Byun

Seoul National University

In this talk, I will discuss the real eigenvalues of the real elliptic Ginibre matrix, the model which provides a natural bridge between Hermitian and non-Hermitian random matrix theories. In the almost-Hermitian regime pioneered by Fyodorov, Khoruzhenko and Sommers, I will present the large-N expansion of the mean and the variance of the number of real eigenvalues. Furthermore I will explain the limiting empirical distributions of the real eigenvalues which interpolate the Wigner semicircle law and the uniform distribution. The proofs are based on the skew-orthogonal representation of the correlation kernel due to Forrester and Nagao. This is a joint work with Nam-Gyu Kang (KIAS), Ji Oon Lee (KAIST) and Jinyeop Lee (LMU).

Ansprechpartner: Gernot Akemann