Upcoming Events

Colloquium

Topic: tba
Date: 08.01.18
Time: 16:15
Place: H6
Guest: Prof. Dr. Ralf Seidel
Universität Leipzig

Abstract:

Contact person: D. Anselmetti

Colloquium Mathematical Physics

Topic: Mesoscopic eigenvalue correlations of random matrices
Date: 01.12.17
Time: 16:00
Place: V2-210/216
Guest: Antti Knowles
University of Geneva
Ever since the pioneering works of Wigner, Gaudin, Dyson, and Mehta, the correlations of eigenvalues of large random matrices on short scales have been a central topic in random matrix theory. On the microscopic spectral scale, comparable with the typical eigenvalue spacing, these correlations are now well understood for Wigner matrices thanks to the recent solution of the Wigner-Gaudin-Dyson-Mehta universality conjecture. In this talk I focus on eigenvalue density-density correlations between eigenvalues whose separation is much larger than the microscopic spectral scale; here the correlations are much weaker than on the microscopic scale. I discuss to what extent the Wigner-Gaudin-Dyson-Mehta universality remains valid on such larger scales, for Wigner matrices and random band matrices.

Contact person: G. Akemann

Seminar High Energy Physics

Topic: The Canadian Hydrogen Intensity Mapping Experiment

Date: 09.01.18

Time: 14:15

Place: D6-135

Guest: Carolin Hoefer

Univ. of British Columbia, Vancouver, CA

21 cm Intensity Mapping is a new technique to map the large-scale structure in the Universe in three dimensions using the red-shifted emission from cosmic neutral hydrogen. Without needing to resolve individual galaxies, it can survey unprecedented volumes, which makes it an ideal method to measure the Baryon Acoustic Oscillations as a function of redshift and thus place constraints on the cosmic expansion history H(z) and the dark energy equation of state w(z). However, foreground removal is quite challenging, since the cosmic signal is several orders of magnitude below the bright galactic signal. The Canadian Hydrogen Intensity Experiment (CHIME) is a new digital radio telescope with no moving parts. Situated in Canada, it will observe the northern sky every day over the wide radio frequency band of 400 - 800 MHz, which maps to a redshift range of 0.8 < z < 2.5 for 21 cm emission. This cosmic epoch has been poorly surveyed to date, but it includes the era in which dark energy came to dominate the energy density of the Universe. In this talk I will introduce CHIME, explain its design, its science goals, and its associated data analysis challenges. Analyzing CHIME data is a complex task, so we employ end-to-end simulations of the experiment, with known inputs, to develop and validate our data reduction and foreground filtering techniques.
Seminar Condensed Matter

Brownian motion of an ellipsoidal particle in a tilted periodic potential: long-term velocity and diffusion

Date: 22.02.18

Time: 14:15

Place: D5-153

Guest: Ralf Eichhorn

NORDITA, Stockholm

Abstract:

Contact person: Peter Reimann

Seminar Mathematical Physics

Topic: tba

Date: 11.01.18

Time: 16:00

Place: D5-153

Guest: Jacek Grela

LPTMS Université Paris-Sud
Abstract:

Contact person: Gernot Akemann

Seminar AG Zufallsmatrizen

Topic: Local inhomogeneous circular law

Date: 18.12.17

Time: 14:15

Place: V3-201

Guest: Johannes Alt

Institute of Science and Technology, Austria

The density of eigenvalues of large random matrices typically converges to a deterministic limit as the dimension of the matrix tends to infinity. In the Hermitian case, the best known examples are the Wigner semicircle law for Wigner ensembles and the Marchenko-Pastur law for sample covariance matrices. In the non-Hermitian case, the most prominent result is Girko’s circular law: The eigenvalue distribution of a matrix X with centered, independent entries converges to a limiting density supported on a disk. Although inhomogeneous in general, the density is uniform for identical variances. In this special case, the local circular law by Bourgade et al. shows this convergence even locally on scales slightly above the typical eigenvalue spacing. In the general case, the density is obtained via solving a system of deterministic equations. In my talk, I explain how a detailed stability analysis of these equations yields the local inhomogeneous circular law in the bulk spectrum for a general variance profile of the entries of X. This result was obtained in joint work with László Erdos and Torben Krüger.

Contact person: Friedrich Götze