Co colloquium

**Topic:** From coherent Raman microscopy to coherent Raman endoscopy

**Date:** 16.04.18

**Time:** 16:15

**Place:** H6

**Guest:** Prof. Hervé Rigneault

Institut Fresnel, Marseille

Coherent Raman scattering (CRS) microscopy has become an established imaging techniques that as proved to have ground breaking potential in various application fields including cell machinery and tissue imaging. Recently the ability of CRS to distinguished cell nuclei from cell cytoplasm has opened the route toward coherent Raman histology, with potential applications in real time intra-operative cancer tissue diagnostic. However CRS for in vivo applications would require to access the vibrational spectrum information for every pixel in few microseconds only.

**Abstract:** We have developed a fast ratio-metric stimulated Raman (SRS) technology using a frequency modulation scheme to access vibrational information in few microseconds and suitable for tissue drug penetration monitoring and stimulated Raman histology. We are also working to extend the CRS imaging ability into flexible endoscopes that would enable intra vital exploration and remote CRS histology. Using hollow core fiber and resonant distal scanner we perform CRS images at few frames/s over a 350 microns field of view. This brings label free nonlinear imaging at the distal end of a flexible probe.

**Contact person:** T. Huser

Colloquium Mathematical Physics

**Topic:** tba
Date: 01.06.18

Time: 16:15

Place: U2-222

Guest: Ivan Veselic
TU Dortmund

Abstract:

Contact person: M. Baake

Seminar High Energy Physics

Topic: Complex Langevin simulations of a finite density matrix model for QCD

Date: 12.04.18

Time: 14:15

Place: D6-135

Guest: Savvas Zafeiropoulos
Univ. Heidelberg

We study the Stephanov model, which is an RMT model for QCD at finite density, using the Complex Langevin algorithm. The Langevin algorithm (Stochastic Quantization) is not based on Markov Chain Monte Carlo methods and consequently does not suffer from the infamous sign problem that hampers studies at finite baryon density. Naive implementation of the algorithm shows convergence towards the phase quenched or quenched theory rather than to the intended theory with dynamical quarks. A detailed analysis of this issue and a potential resolution of the failure of this algorithm are discussed. We study the effect of gauge cooling on the Dirac eigenvalue distribution and time evolution of the norm for various cooling norms, which were specifically designed to remove the pathologies of the complex Langevin evolution. The cooling is further supplemented with a shifted representation for the random matrices. Additionally, we study the newly proposed deformation technique and a novel form of reweighting.
Seminar Condensed Matter

Topic: **Realistische thermodynamische Kreisprozesse**

Date: 19.04.18

Time: 14:15

Place: D5-153

Guest: Christian Beckmann

Universität Bielefeld

Abstract:

Contact person: Jürgen Schnack

Seminar Mathematical Physics

Topic: **Eigenvector-related correlation functions and their connection with generalized chiral random matrix ensembles with a source**

Date: 11.01.18

Time: 16:00

Place: D5-153

Guest: Jacek Grela

LPTMS Université Paris-Sud

We will introduce eigenvector-related correlation functions, discuss briefly their significance in

Contact person: Gernot Akemann

Seminar AG Zufallsmatrizen

On statistics of bi-orthogonal eigenvectors in real and complex Ginibre ensembles: combining partial Schur decomposition with supersymmetry

Topic: On statistics of bi-orthogonal eigenvectors in real and complex Ginibre ensembles: combining partial Schur decomposition with supersymmetry

Date: 18.04.18

Time: 16:00

Place: V3-201

Guest: Yan Fyodorov

King's College London

I will present a method of studying the joint probability density (JPD) of an eigenvalue and the associated 'non-orthogonality overlap factor' (also known as the condition number) of the left and right eigenvectors for non-selfadjoint Gaussian random matrices. First I derive the exact finite-N expression in the case of real eigenvalues and the associated non-orthogonality factors in the real Ginibre ensemble, and then analyse its 'bulk' and 'edge' scaling limits. The ensuing distributions are maximally heavy-tailed, so that all integer moments beyond normalization are divergent. Then I present results for a complex eigenvalue and the associated non-orthogonality factor in the complex Ginibre ensemble complementing recent studies by P. Bourgade & G. Dubach. The presentation will be mainly based on the paper arXiv: 1710.04699 and a joint work with Jacek Grela and Eugene Strahov arXiv: 1711.07061.
Contact person: Gernot Akemann