Upcoming Events

Colloquium

Topic: Antrittsvorlesung

Date: 13.07.20

Time: 16:15

Place: H6

Guest: Prof. Dr. Gergely Endrödi

Universität Bielefeld

Abstract:

Contact person: Dekan

Colloquium Mathematical Physics

Topic: The problem of latency in estimating the Covid-19 replication number

Date: 08.05.20

Time: 16:15

Place: ZOOM/Konferenzschaltung

Guest: Lorenzo Sadun

University of Texas at Austin
Gähler, 14:15
On 23.06.20
cyberspace
Kevin
Seminar

Abstract: exposed and becoming infectious. Simple SEIR models are unstable; working with a fixed set of data, small changes to the model can result in large changes to the estimated value of $R_0$. More realistic models are more complicated and are even less stable. The upshot is that we know much less about $R_0$ than is generally believed, and the error bars on the high side are particularly large. Containing the outbreak for an extended period may be a lot harder than our leaders think.

Contact person: Gähler, Dr. Franz

Seminar High Energy Physics

Topic: **On the multiple thimbles decomposition in lattice field theory**

Date: 23.06.20

Time: 14:15

Place: cyberspace

Guest: Kevin Zambello

INFN Parma

The study of the QCD phase diagram by lattice simulations is hindered by the sign problem: at finite chemical potentials, the fermion action is complex and this prevents the definition of $e^{\Sigma}$ as a probability distribution suitable for importance sampling. Deforming the domain of integration after complexification of the field variables is an elegant approach to circumvent the sign problem. In thimble regularization one complexifies the degrees of freedom of the theory and decomposes the original integrals into a sum of integrals over manifolds attached to the critical points of the complexified theory. These manifolds are called Lefschetz thimbles. On each thimble the imaginary part of the fermion action is constant and can be factored out, therefore on each thimble the sign problem disappears, apart from a residual sign problem coming from the different orientation between the tangent space of the thimble and the canonical integration measure. But this is usually mild and can be dealt with by reweighting. Initially it was hoped that only one thimble would give a relevant contribution to the thimble decomposition, at least in the thermodynamic limit. In this case, after computing the contribution of the dominant thimble the job is done. However many counterexamples are now known where more than one thimble give a relevant contribution. Then one is also faced with the difficult task of finding out
The study of the QCD phase diagram by lattice simulations is hindered by the sign problem: at finite chemical potentials, the fermion action is complex and this prevents the definition of $e^S$ as a probability distribution suitable for importance sampling. Deforming the domain of integration after complexification of the field variables is an elegant approach to circumvent the sign problem. In thimble regularization one complexifies the degrees of freedom of the theory and decomposes the original integrals into a sum of integrals over manifolds attached to the critical points of the complexified theory. These manifolds are called Lefschetz thimbles. On each thimble the imaginary part of the fermion action is constant and can be factored out, therefore on each thimble the sign problem disappears, apart from a residual sign problem coming from the different orientation between the tangent space of the thimble and the canonical integration measure. But this is usually mild and can be dealt with by reweighting. Initially it was hoped that only one thimble would give a relevant contribution to the thimble decomposition, at least in the thermodynamic limit. In this case, after computing the contribution of the dominant thimble the job is done. However many counterexamples are now known where more than one thimble give a relevant contribution. Then one is also faced with the difficult task of finding out what is the weight to assign to each contribution that enters the decomposition. Or one may Taylor expand observables around points where the single-thimble approximation holds in order to reach regions where such approximation does not hold. In this talk I’ll give an introduction to the thimble regularization method and I’ll discuss the multiple thimbles calculation techniques we are employing in Parma.

Contact person: Ch. Schmidt

Seminar Condensed Matter

22-05-2020-14.15 hrs - D5-153 - Construction of tight binding models from ab initio calculations using maximally localized Wannier functions

Date: 22.05.20

Time: 14:15

Place: D5-153

Guest: Thomas Benkenstein

Universtität Bielefeld

Abstract:

Contact person: Thomas Dahm

Seminar Mathematical Physics

Topic: Statistics of Extremes in Eigenvalue-counting Staircases

Date: 04.06.20

Time: 16:00

Place: ZOOM / Konferenzschaltung
Guest: Yan Fyodorov

King's College London

Abstract:
We consider the counting function (“spectral staircase”) for eigenvalues of a random unitary matrix, drawn from the corresponding beta-ensemble. Our goal is to characterize the statistics of maximum deviation of this staircase from its mean slope in a fixed interval, when size of the matrix \( N \gg 1 \). We will show that one-sided extremes can be addressed by exploiting a mapping onto the statistical mechanics of log-correlated random processes and using an extended Fisher-Hartwig conjecture. The resulting statistics exhibit combined features of counting statistics of Fermions with Sutherland-type interaction and extremal statistics of the fractional Brownian motion with Hurst index \( H = 0 \). Some of the features are expected to be universal. The talk is based on the paper Fyodorov-Le Doussal arXiv:2001.04135.

Contact person: Gernot Akemann

Seminar AG Zufallsmatrizen

>>> 0900 hrs <<< Fluctuations of Beta-Ensembles in the High Temperature Regime

Date: 24.06.20

Time: 09:00

Place: ZOOM / Konferenzschaltung

Guest: Gaultier Lambert

Universität Zürich

Abstract:
I will report on recent results from arXiv:1909.01142 (joint work with Adrien Hardy) and arXiv:1912.10261 on beta-ensembles (and Coulomb gas in higher dimension) in the so-called high temperature regime. I will first explain what is the high temperature regime, how it differs from the usual fixed beta regime and why it is interesting. Then, I will present different theorems which characterize the fluctuations of the particles in the large N limit. I will first explain the large deviations principle and a central limit theorem which describes the fluctuations of the empirical measure. Then, I will show that local configurations converge to a Poisson point process in the bulk.

Contact