Aktuelle Veranstaltungen

Kolloquium

Thema: Antrittsvorlesung tba
Datum: 08.10.18
Uhrzeit: 16:15
Ort: H6
Vortragender: Prof. Dr. Luana Caron
Universität Bielefeld

Inhalt:

Ansprechpartner: Dekan

Kolloquium Mathematische Physik

Thema: Upper and lower Lipschitz bounds for the perturbation of edges of the essential spectrum
Datum: 01.06.18
Uhrzeit: 16:15
Ort: V3-204
Vortragender: Ivan Veselic
Let $A$ be a selfadjoint operator, $B$ a bounded symmetric operator and $A+tB$ a perturbation. I will present upper and lower Lipschitz bounds on the function of $t$ which locally describes the movement of edges of the essential spectrum. Analogous bounds apply also for eigenvalues within gaps of the essential spectrum. The bounds hold for an optimal range of values of the coupling constant $t$. This is result is applied to Schroedinger operators on unbounded domains which are perturbed by a non-negative potential which is mostly equal to zero. Unique continuation estimates nevertheless ensure quantitative bounds on the lifting of spectral edges due to this semidefinite potential. This allows to perform spectral engineering in certain situations. The talks is based on the preprint https://arxiv.org/abs/1804.07816

Ansprechpartner: G. Akemann

Seminar Hochenergiephysik

Thema: Extended Effective Field Theory of Inflation

Datum: 02.08.18

Uhrzeit: 14:15

Ort: D6-135

Vortragender: Amjad Ashoorioon

Institute for Research in Fundamental Sciences (IPM) Tehran

I present a general framework where the effective field theory of single field inflation is extended by the inclusion of operators with mass dimension 3 and 4 in the unitary gauge. The extended setup yields a six order polynomial dispersion relation for the Goldstone mode whose coefficients are in general time-dependent, although they can be arranged to be constant in time too. In the time-independent case, I study the regime of validity of this extended effective field theory of inflation and the effect of these higher dimensional operators on the CMB observables associated with scalar perturbations, such as the speed of sound, the amplitude of the power spectrum and the tensor-to-scalar ratio. Tensor perturbations remain instead unaltered. In the time-dependent case, which violates unitarity when the physical wavelengths of the modes are very small, starting from the vacuum, the two-point function either diverges or is finite for a very confined region of parameter space, depending on the values of the parameters in the unitary gauge action. On the other hand, the mode function that yields a finite power spectrum in the infinite IR for all region of parameter space, is shown to be emanated from an excited mode. We interpret this result in the light of unitarity
I present a general framework where the effective field theory of single field inflation is extended by the inclusion of operators with mass dimension 3 and 4 in the unitary gauge. The extended setup yields a six order polynomial dispersion relation for the Goldstone mode whose coefficients are in general time-dependent, although they can be arranged to be constant in time too. In the time-independent case, I study the regime of validity of this extended effective field theory of inflation and the effect of these higher dimensional operators on the CMB observables associated with scalar perturbations, such as the speed of sound, the amplitude of the power spectrum and the tensor-to-scalar ratio. Tensor perturbations remain instead unaltered.

In the time-dependent case, which violates unitarity when the physical wavelengths of the modes are very small, starting from the vacuum, the two-point function either diverges or is finite for a very confined region of parameter space, depending on the values of the parameters in the unitary gauge action. On the other hand, the mode function that yields a finite power spectrum in the infinite IR for all region of parameter space, is shown to be emanated from an excited mode. We interpret this result in the light of unitarity violation at very small mode wavelengths and discuss how this constrains the UV completion of such scenarios.

Ansprechpartner: D. Schwarz

Seminar Kondensierte Materie

Thema: **Physikalische Erlebnispädagogik für Kinder**

Datum: 28.06.18

Uhrzeit: 14:15

Ort: D5-153

Vortragender: Maria-Bernadette Riedl

Universität Bielefeld

Inhalt:

Ansprechpartner: Jürgen Schnack

Seminar Mathematische Physik

Thema: **Symmetry Transition from GUE to chGUE protecting Chirality**

Datum: 12.07.18

Uhrzeit: 16:15

Ort: D5-153

Vortragender: Mario Kieburg

Bielefeld University
Symmetry transitions of systems have been always of particular interest in physics. There are only few real systems, that are pure and ideal yielding the desired results predicted by simplified, analytically feasible models. This is also the case for the spectral statistics of linear operators corresponding to such realistic systems, which are usually described by random matrices. Especially the global symmetries can be well-captured by random matrices, since the local spectral statistics on the level of the mean level spacing is extremely sensitive to these symmetries. Therefore, the question arises what the statistics would look like when a symmetry transition takes place to compare these results efficiently with physical measurements. Exactly this has been the goal of my joint work with Takuya Kanazawa when we studied an interpolation between the Gaussian unitary ensemble (GUE) and the chiral Gaussian unitary ensemble (chGUE) while protecting the chirality of the matrix. This transition is motivated by several QCD applications. Particularly the protection of the chirality leads to surprising effects. I am going to report on these results which comprise finite matrix size as well as the limit of large matrix dimensions.

Ansprechpartner: Gernot Akemann

Seminar AG Zufallsmatrizen

Thema: Symmetry Transition from GUE to chGUE protecting Chirality

Datum: 12.07.18

Uhrzeit: 16:15

Ort: D5-153

Vortragender: Mario Kieburg

Bielefeld University
Symmetry transitions of systems have always been of particular interest in physics. There are only few real systems, that are pure and ideal yielding the desired results predicted by simplified, analytically feasible models. This is also the case for the spectral statistics of linear operators corresponding to such realistic systems, which are usually described by random matrices. Especially the global symmetries can be well-captured by random matrices, since the local spectral statistics on the level of the mean level spacing is extremely sensitive to these symmetries. Therefore, the question arises what the statistics would look like when a symmetry transition takes place to compare these results efficiently with physical measurements. Exactly this has been the goal of my joint work with Takuya Kanazawa when we studied an interpolation between the Gaussian unitary ensemble (GUE) and the chiral Gaussian unitary ensemble (chGUE) while protecting the chirality of the matrix. This transition is motivated by several QCD applications. Particularly the protection of the chirality leads to surprising effects. I am going to report on these results which comprise finite matrix size as well as the limit of large matrix dimensions.

Ansprechpartner: Gernot Akemann