

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](#)

Inhalt:

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 result is applied to Schrödinger 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 talk is based on the preprint <https://arxiv.org/abs/1804.07816>

Ansprechpartner: [G. Akemann](#)

Seminar Hochenergiephysik

Thema:

[Perturbative construction of a string-localized Dirac field in a Hilbert space representation of QED - A programme and some results.](#)

Datum:

13.07.18

Uhrzeit:

14:15

Ort:

D5-153

Vortragender:

Jens Mund

UFJF, Juiz de Fora, Brazil

Inhalt:

The construction of charged physical states in QED [Morchio and Strocchi 1983/2003; Steinmann 1984] has been a difficult task due to the infrared problems related to Gauss' law, which imply that the charge cannot be localized in finite regions and that the electron is an infra-particle, i.e., it does not correspond to a discrete eigenvalue of the mass operator. I propose a new strategy for a straightforward perturbative construction of the interacting Dirac field acting in a Hilbert space, which describes the electron as an infra-particle. It is not point- but "string-localized", i.e., localized on half-rays extending to space-like infinity. The construction works in a new framework which relates the free (Gupta-Bleuler) vector potential acting in a Krein space with its string-localized version acting in the physical (positive semidefinite) subspace. I construct the string-localized scalar field χ which implements the gauge transformation between the two potentials, and consider the free string-localized "dressed Dirac field" $\exp(i e \int \chi) \psi$, where ψ is the free Dirac field and e is the electron charge. The adiabatic limit of its interacting version in the Epstein-Glaser

perturbative scheme is my candidate for the Dirac field. My conjecture that it exists and satisfies the mentioned properties has the following basis. Firstly, it has been verified at lower orders that this field leaves the physical subspace invariant before the adiabatic limit. Therefore the weak adiabatic limit (whose existence was shown by Blanchard and Seneor) satisfies positivity by a recent result of Duch. Secondly, the field χ has the same infrared structure as the free scalar field in 2 dimensions, whose exponentiation leads to an infraparticle representation [Schroer 1963]. I expect that the same holds true for our χ in the adiabatic limit. This would mean that our free "dressed Dirac field" already describes the free (but dressed) electron as an infra-particle. Then there is no obstruction from general reasons to the conjecture that the Hilbert space of the free dressed Dirac field is the GNS space of the adiabatic limit.

Ansprechpartner: [F. Karsch](#)

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

Inhalt: 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

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