Aktuelle Veranstaltungen

Kolloquium

Thema:	**Soft Pions and the Dynamics of the Chiral Phase Transition**
Datum:	11.07.22
Uhrzeit:	16:15
Ort:	Y0-111
Vortragender:	Derek Teaney
	Stony Brook University
Inhalt:	I will first review lattice simulations of the QCD phase diagram, focusing on chiral symmetry and chiral symmetry breaking. In the limit of two massless quark flavors (up and down) the chiral phase transition is second order and is in the O(4) universality class. The fingerprints of this critical point are seen in lattice simulations of real world QCD. Next I will review heavy ion experiments, presenting an overview of some of the most important measurements from heavy ion collisions. These measurements provide compelling evidence that classical hydrodynamics is an appropriate effective theory for understanding these collisions. In current hydrodynamic simulations of these events, chiral symmetry breaking and its consequences are largely ignored. However, if the quark mass is small enough, one would expect that the pattern of chiral symmetry breaking seen on the lattice could provide a useful organizing principle for hydrodynamics, increasing its predictive power. I describe our efforts to simulate the real time dynamics of the O(4) critical point using hydrodynamics. Then I point out some discrepancies between the measured yields of soft pions and current hydrodynamic simulations. I suggest that incorporating the chiral phase transition into the hydrodynamic description could fix the discrepancies.

Ansprechpartner: S. Schlichting / TR211

Kolloquium Mathematische Physik

Thema:	[**Vertex Algebras for 2- and 4-Dimensional Conformal Field Theories**](#)
Datum:	01.07.22
Uhrzeit:	16:15
Ort:	D5-153
Vortragender:	[Sven Möller](#)
	Universität Hamburg
Inhalt:	Vertex (operator) algebras axiomatise 2-dimensional conformal field theories in physics. They were introduced in the 1980s to explain mysterious connections between number and representation theory (monstrous moonshine). Not long ago, they were also shown to capture certain aspects of 4-dimensional superconformal field theories. In this talk I will describe recent classification results for holomorphic vertex algebras of central charge 24 by means of certain modular forms (vector-valued Eisenstein series). Moreover, I will sketch classification problems arising in the context of 4-dimensional field theories.
Ansprechpartner:	[G. Akemann](#)

Seminar Hochenergiephysik

Thema:	[**Schwinger Model at Finite Temperature and Density with Beta VQE**](#)
Datum:	16.08.22
Uhrzeit:	14:15
Ort:	D6-135
Vortragender:	[Akio Tomiya](#)
	International Professional University of Technology in Osaka
	We investigate a quantum gauge theory at finite temperature and density using a variational algorithm for near-term quantum devices. We adapt ?-VQE to evaluate thermal and quantum expectation values and study the phase diagram for massless

| **Inhalt:** | Schwinger model along with the temperature and density. By compering the exact variational free energy, we find the variational algorithm work for T>0 and ?>0 for the Schwinger model. No significant volume dependence of the variational free energy is observed in ?/g?[0,1.4]. We calculate the chiral condensate and take the continuum extrapolation. As a result, we obtain qualitative picture of the phase diagram for massless Schwinger model. |

Ansprechpartner: O. Kaczmarek

Seminar Kondensierte Materie

Thema:	**9.00 - 16.00: Seminartag FFM@UBI**
Datum:	19.08.22
Uhrzeit:	09:00
Ort:	D5-153
Vortragender:	4 x FFM + 4 x UBI
	FFM & UBI
Inhalt:	Das wird ein großartiger Seminartag.

Ansprechpartner: Jürgen Schnack

Seminar Mathematische Physik

Thema:	**Many-particles diffusing with resetting: study of the large-deviation properties of the flux distribution**
Datum:	05.05.22
Uhrzeit:	16:00
Ort:	D5-153

Vortragender: Costantino Di Bello

Inhalt: In this paper we studied a model of noninteracting particles moving on a line following a common dynamics. In particular we considered either a diffusive motion with Poissonian resetting, and a run-and-tumble motion with Poissonian resetting. We were interested in studying the distribution of the random variable Q_t defined as the flux of particles through origin up to time t. We used the notation $P(Q,t)$ to identify the probability $\mathbb{P}\{Q_t=Q\}$. We considered particles initially located on the negative half line with a fixed density ρ. In fully analogy with disordered systems, we studied both the annealed and the quenched case for initial conditions. In the former case we found that, independently from the specific dynamics, $P_\mathrm{an}(Q,t)$ has a Poissonian shape; while in the latter case, for what concerns the diffusive dynamics with resetting, the large deviation form of the quenched distribution reads $P_\mathrm{qu}(Q,t)\sim \exp\left[-r^2t^2 \Psi_\mathrm{diff}\left(\dfrac{Q}{\rho t}\right)\right]$ with the large deviation function $\Psi_\mathrm{diff}(x)$ exhibiting a discontinuity in the third derivative, hence aiming, despite the simplicity of the model, at the exhistence of a dynamical phase transition. The quenched distribution for the run-and-tumble dynamics, instead, does not exhibit any kind of phase transition. Importance sampling Monte Carlo simulations were performed to prove the analytical results. References: Current fluctuations in noninteracting run-and-tumble particles in one dimension Tirthankar Banerjee, Satya N. Majumdar, Alberto Rosso, and Grégory Schehr, Phys. Rev. E 101, 052101 https://doi.org/10.1103/PhysRevE.101.052101 Current Fluctuations in One Dimensional Diffusive Systems with a Step Initial Density Profile B. Derrida and A. Gerschenfeld, J. Stat. Phys. 137, 978 (2009) https://doi.org/10.1007/s10955-009-9830-1

Ansprechpartner: Gernot Akemann

Seminar Bielefeld-Melbourne Zufallsmatrizen

Thema: **Multiplicative statistics of random matrices and the integro-differential Painlevé II equation**

Datum: 31.08.22

Uhrzeit: 09:00

Ort: ZOOM / Konferenzschaltung

Vortragender: Guilherme Silva

Universidade de Sao Paulo

Inhalt: In this talk we consider a large family of multiplicative statistics of eigenvalues of hermitian random matrix models with a one-cut regular potential. We show that they converge to an universal multiplicative statistics of the Airy2 point process which, in turn, is described in terms of a particular solution to the integro-differential Painlevé II equation. The same solution to this integro-differential equation appeared for the first time in the description of the narrow wedge solution to the KPZ equation, so our results connect the KPZ equation in finite time with random matrix theory in an universal way. The talk is based on joint work with Promit Ghosal (MIT).

Ansprechpartner: Leslie Molag