Aktuelle Veranstaltungen

Kolloquium

Thema:	**[Molecular-level ionizing-radiation matter interactions and their consequences](#)**
Datum:	13.12.22
Uhrzeit:	14:15
Ort:	H6
Vortragender:	[Prof. Dr. Arno Ehresmann](#)
	Universität Kassel
Inhalt:	The interaction between ionizing electromagnetic radiation and dense matter and processes following an initial ionization event are fundamental to a variety of important challenges in society and science. If those processes would be fully understood, this could be the basis to develop measures to avoid or cure hazardous effects due to ionizing-radiation exposure of biologically relevant systems, to develop treatments for diseases occurring as consequences of such processes in living entities, or, in a completely different field of science, to understand fundamental processes in astrochemistry. In the presentation I will show how spectroscopy of dispersed fluorescence, electrons and by multi-coincidence methods upon ionization by monochromatized synchrotron and free-electron laser radiation can be used to clarify and quantify those fundamental processes. By increasing the complexity of the investigated systems stepwise from photoionization and photodissociation processes of individual atoms or molecules over processes occurring in clusters towards processes occurring in liquids my group tries to investigate how processes essentially known to us in individual molecules may be changed and which other processes may occur when those molecules are embedded in (approximately) realistic environments.

Ansprechpartner: [T. Kuschel](#)

Kolloquium Mathematische Physik

Thema:	**tba**
Datum:	13.01.23
Uhrzeit:	16:15
Ort:	D5-153
Vortragender:	[Felix Finster](#)
	Universität Regensburg
Inhalt:	
Ansprechpartner:	[G. Akemann](#)

Seminar Hochenergiephysik

Thema:	[**Relativistic dynamics in black hole systems and efforts toward the discovery of nano-Hz GWs**](#)
Datum:	12.12.22
Uhrzeit:	16:15
Ort:	D6-135
Vortragender:	[Prerna Rana](#)
	TIFR Mumbai

The study of bound particle trajectories around a rotating black hole is crucial to understanding many as- trophysical phenomena. I will present a new closed-form analytic solution for the generalized non-equatorial eccentric bound particle trajectories, and their fundamental frequencies, in the Kerr spacetime using general relativity. The trajectories are expressed in the eccentricity, inverse-latus rectum, spin, and Carter's constant (e, ?, a, Q) parameter space. The generalized solutions also enabled us to obtain the necessary bound orbit conditions for (e, ?, a, Q) and novel specialized formulae for equatorial, spherical, and non-equatorial sepa- ratrix orbits. Next, I will

Inhalt: present the Generalized Relativistic Precession Model (GRPM), which utilizes the analytic solutions of trajectories in the Kerr spacetime, to explain the origin of Quasi-periodic oscillations (QPOs) in black hole X-ray binaries (BHXRB). Our analysis of the plasma fluid flow around a Kerr black hole in the relativistic disk edge suggests that instabilities cause QPOs to originate in a torus region spanned by geodesics. The application of the GRPM will also be shown for X-ray QPOs seen in Seyferts galaxies. Toward the end, I will discuss our recent efforts for the first official data release of the Indian Pulsar Timing Array (InPTA), which will be incorporated into the global effort of the International Pulsar Timing Array (IPTA) consortium to discover nano-Hz gravitational waves emitted by the relativistic supermassive black hole binaries.

Ansprechpartner: D. Schwarz

Seminar Kondensierte Materie

Thema:	**Ein Vergleich von kleinen klassischen und quantenmechanischen Spinsystemen**
Datum:	01.12.22
Uhrzeit:	14:15
Ort:	D5-153
Vortragender:	Jonas Steffan
	Universität Bielefeld

Inhalt:

Ansprechpartner: Jürgen Schnack

Seminar Mathematische Physik

Thema:	**String-localized quantum fields and some phenomenological applications**
Datum:	01.12.22

Uhrzeit:	16:00
Ort:	D5-153
Vortragender:	[José Gracia Bondia](#)
	University of Zaragoza, Spain
Inhalt:	Over fifteen years ago, on the basis of modular theory, string-localized quantum fields (SLQF) were developed by Mund, Rehren, Schroer and Yngvason. There were precedents for them, particularly in work by Buchholz and Fredenhagen towards the end of last century. On the theoretical side, SLQFallow to deal with Wigner particles not covered by Wightman's axioms. They provide as well for new viewpoints and techniques in the phenomenology of the Standard Model.

Ansprechpartner: [Gernot Akemann](#)

Seminar Bielefeld-Melbourne Zufallsmatrizen

Thema:	[**Harmonically confined Riesz gas in one dimension**](#)
Datum:	30.11.22
Uhrzeit:	09:00
Ort:	ZOOM / Konferenzschaltung
Vortragender:	[Satya Majumdar](#)
	LPTMS, Universite de Paris-Sud
Inhalt:	I will discuss one dimensional Riesz gas of N particles confined in a harmonic potential. The interaction between any pair of particles at positions x_i and x_j is repulsive and behaves as $\sgn(k) |x_i-x_j|^{-k}$ for $i\ne j$, where k>-2. For k=-1, this model represents the one dimensional one component plasma, for $k\to 0^$, it represents Dyson's log-gas that appears in random matrix theory and for k=2, it represents the classical Calogero-Moser model. We will first compute the average density in the large N limit explicitly for all k>-2. Next, we will compute the exact average density (large N limit) in the presence of a hard wall at x=w. Finally, I will discuss the statistics of the position of the rightmost particle in the gas, and will compute the explicit large deviation functions of its distribution. We will see that the left tail exhibits a third order phase transition for all k>-2.

Ansprechpartner: [Gernot Akemann](#)