Technische Universität Berlin
Institut für Theoretische Physik

Festkolloquium anläßlich des 80. Geburtstags von Prof. Dr. Karl-Eberhard Hellwig

Freitag, den 29.04.2016, ab 14:00 im Raum EW-015

14:00 - 14:05 Uhr
Eröffnung des Kolloquiums durch
Prof. Dr. Horst-Heino von Borzeszkowski

14:05 - 14:40 Uhr
Prof. Dr. Bassano Vacchini
Theor. Phys. Group, University Milano and Istituto di Fisica Nucleare
Recent developments in the characterization of non-Markovian open quantum systems dynamics

We discuss recent developments in the characterization of the dynamics of open quantum systems which allow for a possible definition of quantum non-Markovianity. The notion of non-Markovianity has recently been defined and quantified in terms of the underlying quantum dynamical map, using either its divisibility properties or the behaviour of the trace distance between pairs of initial states. We investigate and compare these definitions, further discussing how these notions are connected to the definition of Markovian process in the classical setting.

14:40 - 15:15 Uhr
Prof. Dr. Reinhard F. Werner
Institut für Theoretische Physik, Universität Hannover
Measurement uncertainty

The textbook uncertainty relation due to Kennard, Weyl and Robertson has nothing to say about error and disturbance of setups like Heisenberg's gamma-ray microscope. In order to provide rigorous bounds for such setups it is best to look for quantitative constraints on the joint measurability of two observables. I will define such "measurement uncertainty relations" and summarize the results obtained in the last two years.

15:15 - 15:50 Uhr

Prof. Dr. Rainer Verch

Institut für Theoretische Physik, Universität Leipzig

Unruh effect and Tolman Temperature

The Unruh effect asserts that a pointlike detector system which is coupled to a quantum field in the inertial vacuum state, and which is uniformly accelerated, will be found in a Gibbs-state in the the limit of large times and weak couplings, with the detector temperature proportional to the acceleration. We argue that the Unruh temperature indicated by the detector should not be identified with the the Tolman temperature of a medium in a static gravitational field in thermal contact with the detector. Furthermore, we show that a suitable local temperature observable gives rise to the Tolman temperature relation for quantum field states, assigning temperature zero to the inertial vacuum state. The talk is based on recent joint work with Detlev Buchholz.

15:50 - 15:55 Uhr

Grußworte der Geschäftsführenden Direktorin des Instituts für Theoretische Physik der TU Berlin Prof. Dr. Sabine Klapp

15:55 - 16:25 Uhr

Kaffeepause: Stehempfang auf der Galerie im ersten Stock

16:25 - 17:00 Uhr

Prof. Dr. Jan Slawianowski

Polish Academy of Science, Warszaw

Bertrand systems on spaces of constant sectional curvature. The action-angle analysis. Classical, quasi-classical and quantum problems

Discussed are Bertrand models on three-dimensional spaces of constant sectional curvature. By Bertrand we mean isotropic potential models for which all bounded orbits are closed. The special stress is laid on the analysis in terms of action-angle variables and the corresponding problems of quasi-classical analysis and quantization. It is shown that from the action-angle point of view these models are described by formulas additively combining the corresponding expressions in Euclidean space and expressions characterizing free geodetic motion. Certain cosmological aspects of the problems are mentioned. In spite of some formal similarities there are also some rather surprising differences between quasi-classical and quantum models.

17:00 - 17:35 Uhr

Prof. Dr. Michael Keyl

Zentrum Mathematik, TU München

Symmetry principles in quantum control theory

It is generally recognized that optimal control algorithms are key tools needed for further advances in experimentally exploiting quantum systems for simulation as well as for computation. In the implementation of such algorithms it is crucial to know before-hand to which extent the system can be controlled. For instance: which states can be reached from a given initial state under given controls? or likewise: which quantum operations can be simulated in a given set-up? To answer these questions symmetry principles and in particular the study of Lie algebras generated by control Hamiltonians turned out to be a very powerful tool. This talk will provide a short introduction into the field and discuss the control of a two-level atom as a particular example.

17:35 - 18:10 Uhr

PD Dr. Volker Perlick

ZARM, Universität Bremen

The shadow of a black hole

If a black hole is observed in the sky in front of a backdrop of light sources, it is seen as a black disc which is known as the "shadow" of the black hole. The shadow is circular for a spherically symmetric black hole but characteristically distorted for a spinning black hole. In the first part of the talk I explain how, for a certain class of black hole models, the boundary curve of the shadow can be analytically calculated. In the second part I discuss the perspectives of actually observing the shadow of the supermassive black hole that is assumed to exist at the centre of our galaxy.

Voraussichtlich ab 18:30 Uhr findet ein Empfang auf der Galerie im ersten Stock des Physikneubaus statt.