MP 7: Quantenfeldtheorie I

Time: Wednesday 14:40–15:20 Location: SPA SR125

MP 7.1 Wed 14:40 SPA SR125

Generalization of the KMS condition in quantum field theory — •Michael Gransee — Institut für Theoretische Physik, Universität Leipzig — MPI für Mathematik in den Naturwissenschaften, Leipzig

The KMS condition characterizes thermal equilibrium states in quantum statistical mechanics and quantum field theory. It is based on certain analytical and periodicity conditions of correlation functions. The characterization of non-equilibrium states which locally still have thermal properties constitutes a challenge in quantum field theory. Analyzing the analyticity properties of KMS states, a proposal for a generalized KMS condition is made in the case of the free scalar field. The relations of that condition to a related proposal for characterizing local thermal equilibrium states by D. Buchholz et al. are investigated. This is joint work with Nicola Pinamonti (Genova) and Rainer Verch (Leipzig).

MP 7.2 Wed 15:00 SPA SR125

Low-dimensional quantum matrix models — •Robert Hübener[1], Yasuhiro Sekino[2], and Jens Eisert[1] — [1]Dahlem Center for Complex Quantum Systems, Freie Universität Berlin, 14195 Berlin, Germany — [2]KEK Theory Center, Tsukuba 305-0801, Japan

Matrix models play an important role in studies of quantum gravity, being candidates for a formulation of M-theory, but are notoriously difficult to solve. In this work, we present a fresh approach by introducing a novel exact model provably equivalent with low-dimensional bosonic matrix models. In this equivalent model significant structure becomes apparent and it can serve as a simple toy model for analytical and precise numerical study. We are able to derive a substantial part of the low energy spectrum, find a conserved charge, are able to derive numerically almost linear Regge trajectories, and thereby shed some light on the chaotic dynamics, as well as find a tentative solution for the whole spectrum. To exemplify the usefulness of the approach, we address questions of equilibration starting from a non-equilibrium situation in matrix models. We finally discuss possible generalisations of the approach.