

MP 9: Quantum Field Theory

Zeit: Mittwoch 16:45–18:00

Raum: JUR H

MP 9.1 Mi 16:45 JUR H

Continuous spectrum of automorphism groups and particle aspects in QFT — •WOJCIECH DYBALSKI — Technical University of Munich, Germany

This talk presents a general framework for refined spectral analysis of a group of isometries acting on a Banach space, which extends the spectral theory of Arveson. The concept of continuous Arveson spectrum is introduced and the corresponding spectral subspace is defined. The absolutely continuous and singular-continuous parts of this spectrum are specified. Conditions are given, in terms of the transposed action of the group of isometries, which guarantee that the pure-point and continuous subspaces span the entire Banach space. In the case of a unitarily implemented group of automorphisms, acting on a C^* -algebra, relations between the continuous spectrum of the automorphisms and the spectrum of the implementing group of unitaries are found. The group of spacetime translation automorphisms in QFT is analyzed in detail. In particular, it is shown that the structure of its continuous spectrum is relevant to the problem of existence of (infra-)particles in a given theory.

MP 9.2 Mi 17:10 JUR H

Geometric modular action for disjoint intervals and boundary conformal field theory — ROBERTO LONGO¹, •PIERRE

MARTINETTI², and KARL-HENNING REHREN² — ¹Università di Roma "Tor Vergata" — ²Universität Göttingen & Courant Centre

In suitable states, the modular group of local algebras associated with unions of disjoint intervals in chiral conformal quantum field theory acts geometrically. We translate this result into the setting of boundary conformal quantum field theory and interpret it as a relation between temperature and acceleration.

MP 9.3 Mi 17:35 JUR H

Connection between the renormalization groups of Stückelberg-Petermann and Wilson — •MICHAEL DÜTSCH¹, ROMEO BRUNETTI², and KLAUS FREDENHAGEN³ — ¹Courant Research Centre in Mathematics, Universität Göttingen — ²Dipartimento di Matematica, Università di Trento, Italien — ³II. Institut für Theoretische Physik, Universität Hamburg

The Stückelberg-Petermann renormalization group (RG) relies on the non-uniqueness of the S-matrix in causal perturbation theory (i.e. Epstein-Glaser renormalization); it is the family of all finite renormalizations. The RG in the sense of Wilson refers to the dependence of the theory on a cutoff. A new formalism for perturbative algebraic quantum field theory allows to clarify the relation between these different notions of RG. In particular we relate the approach to renormalization in terms of Polchinski's Flow Equation to the Epstein-Glaser method.