MP 3: Quantenfeldtheorie

Zeit: Montag 17:30–18:50 Raum: HS 23

Hauptvortrag MP 3.1 Mo 17:30 HS 23

Ricci Flow from the Renormalization of Nonlinear Sigma Models in Euclidean Algebraic Quantum Field Theory — •Claudio Dappiaggi[1,2,3], Mauro Carfora[1,2,3], Nicolò Drago[1,2,3], and Paolo Rinaldi[1] — [1]University of Pavia, Pavia, Italy — [2]INFN, Sezione di Pavia, Pavia, Italy — [3]INDAM, Sezione di Pavia, Pavia, Italy

We discuss the perturbative approach to nonlinear Sigma models and the associated renormalization group flow within the framework of Euclidean algebraic quantum field theory and of the principle of general local covariance. In particular we show how to define Wick ordered powers of the underlying quantum fields and we classify the freedom in such procedure by extending to this setting a recent construction of Khavkine, Melati and Moretti for vector valued free fields. As a by-product of such classification, we prove that, at first order in perturbation theory, the renormalization group flow of the nonlinear Sigma model is the Ricci flow.

MP 3.2 Mo 18:10 HS 23

Asymptotic Completeness in Wedge-local Quantum Field Theory — •Maximilian Duell and Wojciech Dybalski — Zentrum Mathematik, Technische Universität München, Deutschland, 85748 Garching

We show that an interacting wedge-local QFT in four-dimensional Minkowski spacetime constructed by Grosse and Lechner has a complete particle interpretation. The scattering states are constructed with our recently developed wedge-local N-particle Haag-Ruelle scattering theory. This theory dispels a long-standing belief that only two-particle states are meaningful in the wedge-local setting.

MP 3.3 Mo 18:30 HS 23

Asymptotic constants of motion for the Maxwell-Newton system — Wojciech Dybalski[1] and •Duc Viet Hoang[2] — [1]TUM, Munich, Germany — [2]LMU, Munich, Germany

We consider the model of extended charges in interaction with the classical electromagnetic field. In this approach, we couple the Maxwell equations with Newton's equation to study the dynamics of charges. Relying on the work of Spohn et al. on this system of differential equations, we found asymptotic constants of motion of the form $\lim_{|x|\to\infty} x^2 E(x,t)$ and $\lim_{|k|\to 0} |k|\hat{E}(k,t)$, where E and $\hat{E}$ are the electric field and its Fourier transform, respectively. This gives a rigorous proof of conservation of the spacelike asymptotic flux of the electric field, which is relevant for infrared problems. Perspectives for proving soft-photon theorems for the Maxwell-Newton system will also be discussed.