

MP 13: HV 4: Quantum Field Theory in Noncommutative Spacetime

Time: Thursday 11:00–11:40

Location: H6

Invited Talk

MP 13.1 Thu 11:00 H6

Exact solution of the scalar QFT Φ^4 model on the 4-dimensional noncommutative Moyal space — ●ALEXANDER HOCK — Mathematisches Institut Münster, Deutschland

Local QFT, as it is used in the Standard Model, can be generalized to a non-local QFT by introducing a noncommuting \star -product in the action functional. Mainly, we will focus on the scalar Φ^4 Model, which breaks down at the self-dual point and for large noncommutativity to

a Matrix Model. In this limit, the tower of Dyson-Schwinger equations decouple to nonlinear integral equations. We will solve these equations and show the exact solution of the planar 2-point function in 4 dimensions.

Expanding this result for small coupling constants fits perfectly with the perturbative expansion into Feynman graphs renormalized by Zimmermann's forest formula. We emphasize that this model admits perturbatively the renormalon problem, but is nevertheless resumable.