

Im Oberseminar

Deformationsquantisierung

spricht am **24. 4. 2015 um 14 Uhr c.t.**,

im Seminarraum 00.009 (Physik Ost)

ALEXANDER SCHENKEL

über das Thema:

Gauge theories in locally covariant quantum field theory

Locally covariant quantum field theory (LCQFT) has been proposed by Brunetti, Fredenhagen and Verch as an axiomatic setting for describing quantum field theories on generic (globally hyperbolic) Lorentzian manifolds. In my talk I will give a brief introduction to LCQFT and present our results on the construction of (mostly Abelian) gauge theories in this framework. The most elegant and transparent construction of Abelian $U(1)$ -gauge theory and its higher analogs given by connections on (higher) gerbes is obtained by making use of techniques from differential cohomology. The structure of the resulting quantum field theories can be analyzed in full detail and I will show that these theories violate some important axioms of LCQFT. Trying to understand and resolve the incompatibility between gauge theories and LCQFT naturally leads us to develop a homotopy theoretic generalization of LCQFT. I will present some first results in this direction, which in particular indicate that gauge field observables should be described by a homotopy cosheaf.

gez. Stefan Waldmann