THERMAL EQUILIBRIUM STATES FOR QUANTUM FIELD THEORIES ON MOYAL MINKOWSKI SPACETIME

Gandalf Lechner

Institute for Theoretical Physics, University of Leipzig

Deformed quantum field theories on noncommutative (Moyal) Minkowski space are usually constructed in their vacuum representations. We here investigate the question whether such models also have thermal equilibrium states. For non-covariant deformed theories, where the effect of the noncommutativity of spacetime amounts to just a Rieffel deformation of the product of the field algebra, one can show that the KMS states of the deformed and undeformed model at fixed temperature are in 1 : 1 correspondence. The more involved analysis of KMS states for Poincaré covariant field theories on Moyal space, encompassing a full orbit of noncommutativities, is illustrated in the instructive example of the deformed free field. Here all KMS functionals can be calculated in an explicit manner, and their positivity aspects are discussed.