Abstract:

There are strong restrictions on the possible representations and in general matter content of gauge theories formulated on noncommutative Moyal spaces, termed as Noncommutative No-Go theorem [arXiv:hep-th/0107037]. According to the no-go theorem matter fields in the noncommutative $U(1)$ gauge theory can only have ± 1 or zero charges and for a generic noncommutative $\prod_{i=1}^n U(N_i)$ gauge theory matter fields can at most be charged under two of the $U(N_i)$ gauge group factors. On the other hand it has been argued that a noncommutative $U(N)$ gauge theory can be mapped to a commutative $U(N)$ gauge theory, via the Seiberg-Witten map [arXiv:hep-th/9908142] and hence seemingly bypass the no-go theorem. In this talk we show that the Seiberg-Witten map can only be consistently defined and used for the gauge theories which respect the no-go theorem stated in [arXiv:hep-th/0107037]. We discuss the implications of these arguments for the particle physics model building on noncommutative space.