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{Beyond the standard model from noncommutative geomerty

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Connes' noncommutative geometry (NCG) provides a complete picture to build the full standard model (SM) of particle physics by adding some discrete dimensions to the underlying four-dimensional (continuous) space-time. Within this framework, one can go further and construct models beyond the standard model. But this task is very constrained since all the axioms of the theory must be satisfied. Consequently, one can use it as a guideline to seek for physics beyond SM as an alternative to the usual formulation by means of effective field theories where a huge amount of models are allowed. In this work, I will explore the inclusion of new fermionic and scalar particles in the NCG approach in order to explain some of the experimental facts like the presence of dark matter in the universe and neutrino masses (at tree and loop level), which are ones of the missing pieces of the SM.

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