Dipartimento di Fisica
Università di Cagliari
INFN, Sezione di Cagliari

High Energy Physics Colloquia

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Souvik Pramanik

Indian Statistical Inst., Calcutta

Effects of Cutoff Scale Inspired Non-Commutative Geometries in Many Contexts of High Energy Physics

Abstract

Recently, non-commutative geometry has been considered as an important area of research, due to its impact on many conceptual issues in high energy physics. Among them, one of the major contribution of non-commutative geometry in theoretical physics is the implementation of a minimum measurable length, which has been conjectured to exist in nature from diverse approaches of Quantum Gravity. In order to incorporate the minimum length the Heisenberg Uncertainty Principle has been modified to so called Generalized Uncertainty Principle. In the context of Doubly Special Relativity, a minimum length scale has been generated for the consideration of the upper bound of energy scale into the theory. On the other hand, there is another way to incorporate the minimum length by introducing a smeared matter source like a Gaussian distribution into the black hole metric. Here, we explicitly show the applications of the above non-commutative geometries in many contexts of theoretical physics, especially on point particle dynamics, quantum mechanical path integral and in the late time cosmology scenario.

Contatti:

S. Mignemi (smignemi@unica.it)

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