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On Possible Minimal Length Deformation of Metric Tensor and Affine Connection

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When the minimal length approach emerges from noncommutative Heisenberg
algebra, generalized uncertainty principle (GUP), and thereby integrating gravitational fields to this fundamental theory of quantum mechanics (QM) is thoughtfully extended to Einstein field equations, the possible deformation of the metric tensor could be suggested. This is a complementary term combining the effects of QM and general relativity (GR) and comprising noncommutative algebra together with maximal spacelike four–acceleration. This deformation compiles with GR as curvature in relativistic eight–dimensional spacetime tangent bundle, generalization of Riemannian spacetime, is the recipe applied to derive the deformed metric tensor. This dictates how the affine connection on the Riemannian manifold is straightforwardly deformed. We have discussed the symmetric property of the deformed metric tensor and affine connection. Also, we have evaluated the dependence of a parallel transported tangent vector on the spacelike four–acceleration given in units of L, where L, where $L = \sqrt{dfrachslashGc^3}$ is a universal constant, c is the speed of light, and $\hbar$ is Planck constant, and G is Newton's gravitational constant.

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