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Minimal Length Deformation of Spacetime Curvature

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When generalized noncommutative Heisenberg algebra accommodating impacts of finite gravitational fields as specified by loop quantum gravity, doubly–special relativity, and string theory, for instance, is thoughtfully applied to the eight-dimensional manifold, the generalization of the Riemannian manifold. By constructing the deformed affine connections on a four-dimensional Riemannian manifold, we have determined the minimal length deformation of Riemann curvature tensor and its contractions, the Ricci curvature tensor, and Ricci scalar. Consequently, we have been able to construct the deformed Einstein tensor. As in Einstein's classical theory of general relativity, we
have proved that the covariant derivative of the deformed Einstein tensor vanishes, as well. We conclude that the minimal length correction suggests a correction to the spacetime curvature like the additional curvature terms in corrected Riemann tensor, and its contractions. Accordingly, the spacetime curvature endows additional curvature and geometrical structure

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