

# Lorentzian and Newtonian Spacetimes and Their Quantum (Noncommutative) Deformations

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## ABSTRACT

A unified approach to the (3+1)-dimensional anti-de Sitter, Minkowskian, and de Sitter spacetimes along with their non-relativistic limit, Newton-Hooke and Galilean ones, is firstly presented. The curvature of the spacetime (or the cosmological constant) and the speed of light are considered as two explicit (graded) contraction parameters within their corresponding motion Lie algebras/groups. Secondly, a construction of their possible noncommutative counterpart is developed by following a similar unified procedure through quantum groups, mainly focusing on the so called kappa-deformation. As a byproduct, the corresponding results concerning the three classical four-dimensional Riemannian spaces of constant curvature, sphere, Euclidean and hyperbolic ones, are straightforwardly obtained as well.