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On the quantum geometry of gravity

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The quantum algebra of observables of particles in homogeneous space from bicrossed product model $\mathcal{C}[x]$ *blacktriangleright* *right* *joinrel* $\triangleleft \mathcal{C}[p]$ forms a Hopf algebra $A(+, \mu, \eta, \Delta, \epsilon)$. Quantum mechanics is formulated algebraically while gravity is more geometric. Quantum geometry which is a non commutative geometry, with Hopf algebra give us an access to an algebraic language of gravity. The duality of Hopf algebra with Von Neuman algebra (Hopf duality) which relates observables and states give a quantification of gravity if one can show that the non commutativity of the coproduct Δ curves the phase space.

Keyword: Quantum gravity, Quantum group, Hopf algebra

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