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κ -Minkowski spacetime as the result of Jordanian twist deformation

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Sažetak:

Two one-parameter families of twists providing κ -Minkowski $*$ -product deformed spacetime are considered: Abelian and Jordanian. We compare the derivation of quantum Minkowski space from two perspectives. The first one is the Hopf module algebra point of view, which is strictly related with Drinfeld's twisting tensor technique. The other one relies on an appropriate extension of "deformed realizations" of nondeformed Lorentz algebra by the quantum Minkowski algebra. This extension turns out to be de Sitter Lie algebra. We show the way both approaches are related. The second path allows us to calculate deformed dispersion relations for toy models ensuing from different twist parameters. In the Abelian case one recovers κ -Poincaré dispersion relations having numerous applications in doubly special relativity. Jordanian twists provide a new type of dispersion relations which in the minimal case (related to Weyl-Poincaré algebra) takes an energy-dependent linear mass deformation form.

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