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κ-deformed complex scalar field: from theory to phenomenology

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It is commonly expected that the usual description of spacetime as a smooth manifold is no longer reliable as we approach the Planck scale when quantum effects of the geometry can no longer be neglected. Noncommutativity of spacetime has been advocated as a possible way to effectively model quantum gravitational effects in regimes of negligible curvature. A widely studied incarnation of this idea suggests that the scale of noncommutativity should be seen as an observer-independent length scale and that, in order to accommodate such a fundamental scale, ordinary relativistic symmetries should be deformed (keeping in mind that they should reproduce the usual Poincaré algebra in the limit of vanishing noncommutativity). The κ-Poincaré algebra is an example of such deformation.

In this talk I will briefly describe a construction of a κ-deformed complex scalar field theory, while at the same time shedding light on the behaviour of discrete and continuous symmetries in this formalism. This in turn will open the way to the study of the application of this formalism to actual physical processes. I will then conclude with some comments and prospects for the future.

Presenter(s) : BEVILACQUA, Andrea (NCBJ Warsaw)