High Energy Physics - Theory

Krein Spaces in de Sitter Quantum Theories

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Experimental evidences and theoretical motivations lead to consider the curved space-time relativity based on the de Sitter group $SO_0(1,4)$ or $Sp(2,2)$ as an appealing substitute to the flat space-time Poincare relativity. Quantum elementary systems are then associated to unitary irreducible representations of that simple Lie group. At the lowest limit of the discrete series lie remarkable family of scalar representations involving Krein structures and related undecomposable representation cohomology which deserves to be thoroughly studied in view of quantization of the corresponding carrier fields. The purpose of this note is to present the mathematical material needed to examine the problem and to indicate possible extensions of an exemplary case, namely the so-called de Sitterian massless minimally coupled field, i.e. a scalar field in de Sitter space-time which does not couple to the Ricci curvature.

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