

Quantum kinematics and boson ladder operators of Non-Abelian Non-Compact Lie groups

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Abstract

Quantum kinematics is revisited, as a group-theoretic quantization procedure within the regular representation of non-Abelian non-compact r -dimensional Lie groups. The set of r basic quantum-kinematic invariant operators is exhibited; generalized Heisenberg commutation relations and the structure of the closed generalized Weyl-Heisenberg algebra of the quantized group are also discussed. Then it is shown how these structures yield a complete set of r 'annihilation' and 'creation' boson operators, which give rise to several intrinsic (i.e. embedded) Lie algebras, obtained in the standard way, within the quantized group model. As a miscellaneous example, these features are discussed within the quantum-kinematic theory of the Poincare group $P_+^{\text{up arrow}}(1,1)$, and some interesting possibilities for elementary particle theory are conjectured in the light of the attained results.