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Foundation of the Lie - Admissible Fock Space of the Hadronic Mechanics

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Abstract

In the present paper we study the case of coupling harmonic oscillators in hadronic mechanics. The non-canonical commutation relations of position and momentum operators are reduced, by Fock representation, to the known relations of $Q-$ algebra.

In the general case:

$$[\,\hat{A},\ \hat{A}^{+}\,] = \hat{A}\hat{A}^{+} - \hat{A}^{+}\hat{Q}\hat{A},$$

of a Lie-admissible algebra, where $\hat{Q}$ is an operator, we can define new Fock creation and annihilation operators, which describe some particles only under certain conditions, which must be fulfilled by the operator $\hat{Q}$. When we have a simple hadronic harmonic oscillator, the $\hat{Q}$ is a scalar less than 1 and we have energic saturation in eigenvalues spectrum. In this case the generalized uncertainty principle of Heisenberg is valid according to Santillis theory. Finally, the coherent states of annihilation operator A are given and the Weyl displacement operator is generalized in $Q-$ algebra.