
UNCERTAINTY RELATIONS AND ENTANGLEMENT FOR PQ-DEFORMED SUPERSYMMETRIC COHERENT STATES

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ABSTRACT

We propose supersymmetric extension of deformed quantum oscillator with two parameters quantum group structure. As particular cases, specified by values of P and Q parameters it includes symmetric and non-symmetric q -oscillators, Fibonacci and Fibonacci divisors hierarchy of Golden oscillators, Tamm-Dankov oscillator etc. By PQ -deformed supersymmetric annihilation operator, the set of corresponding supersymmetric coherent states is introduced. The states are characterized by the pair of PQ -quantum states from the Fock space or equivalently, by the set of infinite number of qubit states. Entanglement of fermions with PQ -deformed bosons is characterized by the concurrence as the linear entropy, taking form of the Gram determinant of inner products. As shown, for two types of the reference states, the concurrence depends on values of P or Q parameters, which are equal to one for the maximally entangled states. Entanglement of the super-coherent states and the uncertainty relations for the coordinate and momentum in these states are calculated. Non-classical nature of the entangled states is reflected in non-minimal character of the uncertainty relations.

Keywords Coherent states · Supersymmetry · Quantum group · Entanglement

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