

## Quantum Statistical Properties of $k$ -Quantum Nonlinear Coherent States

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Abstract: In our preceding work, a class of  $k$ -quantum nonlinear coherent states, i.e., the  $k$  eigenstates of the powers  $\hat{B}^k$  ( $k \geq 3$ ) of the annihilation operator  $\hat{B} = \hat{a} \sqrt{1 + f(\hat{N})}$  of  $f$ -oscillators, are introduced. In this paper, we introduce a new kind of higher-order squeezing and an antibunching effect. The quantum statistical properties of the  $k$  states are studied. The result shows that the  $M$ -th order  $[M = (n+1/2)k; n = 0, 1, \dots]$  squeezing effects exist in all of the  $k$  states when  $k$  is even. There is the antibunching effect in all of the  $k$  states.

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