Quasi-probability information in a coupled two-qubit system interacting non-linearly with a coherent cavity under intrinsic decoherence

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Abstract:

We explore the phase space quantum effects, quantum coherence and non-classicality, for two coupled identical qubits with intrinsic decoherence. The two qubits are in a nonlinear interaction with a quantum field via an intensity-dependent coupling. We investigate the non-classicality via the Wigner functions. We also study the phase space information and the quantum coherence via the Q-function, Wehrl density, and Wehrl entropy. It is found that the robustness of the non-classicality for the superposition of coherent states, is highly sensitive to the coupling constants. The phase space quantum information and the matter-light quantum coherence can be controlled by the two-qubit coupling, initial cavity-field and the intrinsic decoherence.

Keywords:

Quasi-probability information; coupled two-qubit system; coherent cavity; intrinsic decoherence

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