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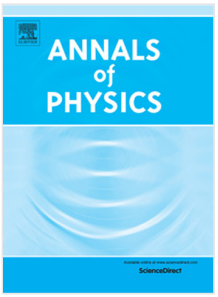

Enhancing non-local correlations in the bipartite partitions of two qubit-system with non-mutual interaction

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Enhancing non-local correlations in the bipartite partitions of two qubit-system with non-mutual interaction

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Abstract. Several quantum-mechanical correlations, notably, quantum entanglement, measurement-induced nonlocality and Bell nonlocality are studied for a two qubit-system having no mutual interaction. Analytical expressions for the measures of these quantum-mechanical correlations of different bipartite partitions of the system are obtained, for initially two entangled qubits and the two photons are in their vacuum states. It is found that the qubits-fields interaction leads to the loss and gain of the initial quantum correlations. The lost initial quantum correlation transfer from the qubits to the cavity fields. It is found that the maximal violation of Bell's inequality is occurring when the quantum correlations of both the logarithmic negativity and measurement-induced nonlocality reach particular values. The maximal violation of Bell's inequality occurs only for certain bipartite partitions of the system. The frequency detuning leads to quick oscillations of the quantum correlations and inhibits their transfer from the qubits to the cavity modes. It is also found that the dynamical behavior of the quantum correlation clearly depends on the qubit distribution angle.

Keywords: Quantum correlation; measurement-induced nonlocality; Bell inequality

1. Introduction

Quantum correlations have some distinct advantages over their classical counter parts, that caused a phenomenal advancements in quantum information processing science and quantum computing in the recent past. These quantum-mechanical correlations

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