Effect of atomic spontaneous decay on dynamics of negativity of the Wigner function of radiation

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Abstract:

The exact solution of the master equation for the case of a high-Q cavity with atomic decay is found. We use the negativity of the Wigner function (WF) as an indicator of non-classicality. It is found that the negative values of the field WF are very sensitive to any change in the damping parameter. The atomic spontaneous decay leads to the simultaneous disappearance of both entanglement and nonclassicality of quantum states. Moreover, the purity of the field states is lost completely.

Keywords:

non-classicality, entanglement, atomic decay

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