

Engineering entanglement, geometric phase and quantum Fisher information of a three-level system with energy dissipation

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Abstract

Quantum Fisher information (QFI) and geometric phase have recently been performed different tasks in quantum information technology. We investigate the QFI and entanglement of a three-level atom in Λ configuration interacting with a quantized field mode by using linear entropy. We study the dynamical behavior of the geometric phase based on the engineering of a three-level atomic configuration. We analyze the effect of energy dissipation of the dynamical properties of the geometric phase and the QFI as an entanglement quantifier between the three-level atom and field. We explore the correlation between the engineering geometric phase and QFI in the absence and presence of energy dissipation effect. We have found that the QFI is very sensitive to the effect of the time dependent coupling and energy dissipation.

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