

Dynamics of Optically Driven Exciton and Quantum Decoherence

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Abstract: By using the normal ordering method, we study the state evolution of an optically driven excitons in a quantum well immersed in a leaky cavity, which was introduced by Yu-Xi Liu et al. [Phys. Rev. A 63 (2001) 033816]. The influence of the external laser field on the quantum decoherence of a mesoscopically superposed state of the excitons is investigated. Our result shows that, the classical field can compensate the energy dissipation of the excitons. Although the decoherence rate of the excitonic Schrödinger cat state does not depend on the external field, the phase of the decoherence factor can be well controlled by adjusting the amplitude of the external field as well as the detuning between the field and the transition frequency of the atom.

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