

Passive PT symmetry can be beneficial for quantum operations

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Decay generally has a detrimental effect on quantum information processing. However, in certain rare situations, decay can actually help in executing quantum operations. For example, cavity decay has been demonstrated to substantially enhance the fidelity of state-mapping operations, as it can counterbalance the effects of atomic decay[1,2].

In this work, we provide an explanation for this behavior: a quantum system subject to two different types of damping can achieve high-fidelity quantum operations when the overall system lies within a passive PT-symmetric regime. In this regime, the periodic evolution of the quantum state is preserved, ensuring the robustness of the operation.

References

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- [2] G. Chimczak, *J. Phys. B: At. Mol. Opt. Phys.* 48, 055502 (2015).

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