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Superadiabatic STIRAP: Population transfer and quantum rotation gates

(Conference Paper)

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Abstract

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Stimulated Raman Adiabatic Passage is an important process for population transfer as well as for implementing quantum gates. This process requires large Rabi frequencies, which is an undesirable in many experimental applications. To overcome this problem transitionless (superadiabatic) STIRAP was proposed. In this paper we study the role of superadiabatic STIRAP in two examples, population transfer and quantum rotation gates. The effect of dephasing was also investigated by computing the fidelity. We have shown that the damping of the excited state has a little effect but the dephasing of the ground state leads to imperfect population transfer and imperfect rotation gates.

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