

## Engineering Two-Atom Thermal Entanglement via Two-Photon Process

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**Abstract:** We study that two atoms simultaneously interact with a single mode thermal field via different couplings and different spontaneous emission rates when two-photon process is involved. It is found that we indeed can employ the different couplings to produce the two-atom thermal entanglement in two-photon process. The different atomic spontaneous emission rates are also utilizable in generating thermal entanglement. We also investigate the effect of the cavity leakage. To the initial atomic state  $|e\rangle$ , a slight leakage can relieve the restriction of interaction time so that we can obtain a strong and steady entanglement.

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Key words: thermal entanglement, two-photon process, master equation, spontaneous emission, Wootters concurrence

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