Title:	Optimal performance of a three-level quantum refrigerator
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Abstract:	We study the optimal performance of a three-level quantum refrigerator using two different objective functions: cooling power and χ function. For both cases, we obtain general expressions for the coefficient of performance (COP) and derive its well-known lower and upper bounds for the limiting cases when the ratio of system-bath coupling constants at the hot and cold contacts approaches infinity and zero, respectively. We also show that the cooling power can be maximized with respect to one control frequency, while χ function can be maximized globally with respect to two control frequencies. Additionally, we show that in the low-temperature regime, our model of refrigerator can be mapped to Feynman's ratchet and pawl model, a classical mesoscopic heat engine. In the parameter regime where both cooling power and χ function can be maximized, we compare the cooling power of the quantum refrigerator at maximum χ function with the maximum cooling power.
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