Title:	Coupled quantum Otto cycle
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Abstract:	We study the one-dimensional isotropic Heisenberg model of two spin-1/2 systems as a quantum heat engine. The engine undergoes a four-step Otto cycle where the two adiabatic branches involve changing the external magnetic field at a fixed value of the coupling constant. We find conditions for the engine efficiency to be higher than in the uncoupled model; in particular, we find an upper bound which is tighter than the Carnot bound. A domain of parameter values is pointed out which was not feasible in the interaction-free model. Locally, each spin seems to cause a flow of heat in a direction opposite to the global temperature gradient. This feature is explained by an analysis of the local effective temperature of the spins. © 2011 American Physical Society.
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