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PAPER

Thermodynamics of a collisional quantum-dot machine: the role of stages

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Abstract

Sequential (or collisional) engines have been put forward as an alternative candidate for the realisation of reliable engine setups. Despite this, the role of the different stages and the influence of the intermediate reservoirs is not well understood. We introduce the idea of conveniently adjusting/choosing intermediate reservoirs at engine devices as a strategy for optimizing its performance. This is done by considering a minimal model composed of a quantum-dot machine sequentially exposed to various reservoirs at each stage, and for which thermodynamic quantities (including power and efficiency) can be obtained exactly from the framework of stochastic thermodynamics, irrespective the number of stages. Results show that a significant gain can be obtained by increasing the number of stages and conveniently choosing their parameters.

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