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Demon driven by geometrical phase

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We theoretically study the entropy production and work extracted from a system connected to two reservoirs by periodic modulations of their electrochemical potentials of the reservoirs and one parameter in the system Hamiltonian under isothermal conditions. We find that the modulation of parameters can drive a geometrical state, which is away from a nonequilibrium steady state. With the aid of this property, we construct a demon in which the relative entropy increases with time such that we can extract the work if we begin with the nonequilibrium steady state without parameter modulations. We employ the Anderson model to demonstrate that the relative entropy can increase with time. [1,2]

[1] R. Yoshii and H. Hayakawa, arXiv:2205.15193,

[2] H. Hayakawa et al. arXiv:2112.12370.