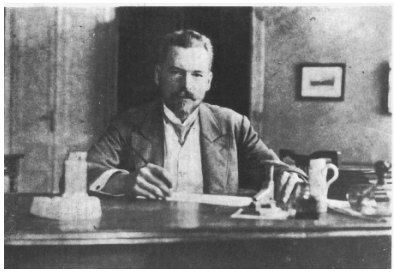

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Power fluctuations close to the Carnot efficiency

Thursday, 6 September 2018 15:00 (3 hours)

We show that work and power fluctuations in quasi-static periodically driven heat engines (PHEs) operating with the Carnot efficiency at nonzero output power are finite and can even vanish. This result contradicts the corresponding findings for steady state HEs (SSHEs), where the Carnot efficiency at nonzero power with finite fluctuations cannot be reached quasi-statically. Moreover, the Fano factor for work done by the SSHEs operating at the Carnot efficiency necessarily diverges, while it is constant for the PHEs. In the studied regime, the PHEs thus can be mapped onto the SSHEs on the level of mean values only. We exemplify our findings for the PHEs using an exactly solvable and experimentally relevant model of an overdamped Brownian HE. In this model, the finite-time quasi-static Carnot cycle can be realized due to the possibility to control the relaxation time of the system. Our results can be used to engineer efficient, powerful and reliable HEs.

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