

[P6] Efficiency fluctuation in a linear heat engine model

Jong-Min Park, University of Seoul

The efficiency of a microscopic heat engine is stochastic as well as other thermodynamic quantities. Its long time behavior is described by a large deviation function (LDF) for its probability distribution. Recently, Verley et al. found a universal property of the LDF that the ideal Carnot efficiency is least probable [Nat. Commun. 5, 5721 (2014)]. This result was derived for systems with a bounded energy function and believed to be also valid for systems with an unbounded energy function. In order to investigate whether the universal property is valid in general systems, we introduce a heat engine model consisting of two particles which are coupled by a linear force. In this model, we calculate the LDF for the engine efficiency analytically. Our results show that the Carnot efficiency is not least probable any more.