Thermoelectric performance and the tunability of an Aharonov-Bohm heat engine in the non-linear regime

Jayasmita Behera and Malay Bandyopadhyay

School of Basic Sciences, IIT Bhubaneswar, Argul, Jatni, Khurda, Odisha, India 752050

[jb12@iitbbs.ac.in](mailto:Jb12@iitbbs.ac.in) and [malay@iitbbs.ac.in](mailto:malay@iitbbs.ac.in)

**Abstract**. In recent days thermoelectric transport and quantum thermodynamics at the nanoscale are exciting and active areas in the context of quantum technologies. In this perspective, we present a triple-dot quantum heat engine based on an Aharonov-Bohm interferometer operating in the non-linear regime. In this work, we analyze the excellent tunability, large thermopower, and sizeable efficiency of this mesoscopic quantum machine. Our investigation reveals that varying the magnetic flux and the asymmetry of the coupling, changing the gate or bias voltage, and tuning the transmission of the T junctions connecting the AB ring to the contacts enables us to adjust the functioning of the quantum heat engine elegantly. We observe that this Aharonov-Bohm two-terminal quantum heat engine is very much stable over a wide range of temperatures, bias voltage, and external magnetic flux, and this makes it a promising candidate for experimental realization.

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