Abstract Submitted
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Luttinger's approach to thermal transport in nanoscale conductors[1] F.G. EICH, A. PRINCIPI, Department of Physics, University of Missouri-Columbia, Columbia, Missouri 65211, USA, M. DI VENTRA, Department of Physics, University of California, San Diego, La Jolla, California 92093, USA, G. VIGNALE, Department of Physics, University of Missouri-Columbia, Columbia, Missouri 65211, USA — The description of thermoelectric transport from first principles has recently attracted renewed interest due to its potential role in the development of sustainable energy sources. We will present our recent work [1] comparing Luttinger's approach [2] to thermal transport to the widely used Landauer-Büttiker formalism. We show that they coincide in the linear regime and highlight their differences in the nonlinear regime. Moreover, we discuss the asymptotic (steady state) and transient currents for a simple two-terminal setup. We will put these results in context with our recently proposed thermal Density-Functional Theory [3] and discuss strategies to define a local temperature.

[1] F. G. Eich, A. Principi, M. Di Ventra, and G. Vignale, Phys. Rev. B 90, 115116 (2014)
[2] J. M. Luttinger, Phys. Rev. 135, A1505 (1964)
[3] F. G. Eich, M. Di Ventra, and G. Vignale, Phys. Rev. Lett. 112, 196401 (2014)

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