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Quantum-enhanced performance of nanoscale thermoelectrics JUSTIN BERGFIELD, CHARLES STAFFORD, University of Arizona — In a recent paper, we predicted that the linear thermoelectric response of a nanoscale junction is strongly enhanced by quantum interference in the vicinity of a transmission node.[1] In this talk, we use our nonequilibrium many-body transport theory[2] to investigate the performance of thermoelectric devices based on single-molecule junctions, determining the thermodynamic efficiency and power at finite bias. By comparing the linear and nonlinear device characteristics, the applicability of the dimensionless thermoelectric figure-of-merit ZT to predict device performance at the nanoscale is tested. Finally, we report on a class of high-impedance nanoscale devices which possess additional quantum-enhancement, and exhibit high thermodynamic efficiency and $ZT > 10$ limited only by the coherence length.

[1]J. P. Bergfield and C. A. Stafford, Nano Letters **9**, 3072 (2009).
[2]J. P. Bergfield and C. A.Stafford, Phys. Rev. B **79**, 245125 (2009)

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