Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Temperature fluctuations and their statistics in electron systems out of equilibrium TERO HEIKKILÄ, MATTI LAAKSO, Low Temperature Laboratory, Aalto University, YULI NAZAROV, Kavli Institute of Nanoscience, Delft University of Technology — We study the fluctuations of the electron temperature in a metallic island coupled to reservoirs via resistive contacts and driven out of equilibrium by either a temperature or voltage difference between the reservoirs in the regime in which the electrons are completely decoupled from the lattice phonons. We quantify these fluctuations in the regime beyond the Gaussian approximation and elucidate their dependence on the nature of the electronic contacts.[1] Besides normal noninteracting contacts, we also study the temperature fluctuations and their effects on other transport properties in single-electron transistors. We find three distinct regimes corresponding to cotunneling, sequential tunneling, and their coexistence. We find that the Fano factor of current fluctuations is enhanced around the crossover from coexistence to sequential tunneling by several orders of magnitude. This is because the SET is very sensitive to temperature fluctuations around this crossover. We also study the statistics of temperature fluctuations in these regimes and find the distribution to be strongly non-Gaussian.

[1]Tero T. Heikkilä and Yuli V. Nazarov, Phys. Rev. Lett. **102**, 130605 (2009).

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Date submitted: 13 Nov 2009 Electronic form version 1.4