

Pekola, Jukka: *“Towards quantum thermodynamics in electric circuits”*

I will discuss our work on non-equilibrium thermodynamics in single-electron and superconducting circuits. The focus is on fluctuation relations [1,2], Maxwell's demon [3,4] and calorimetry for quantum thermodynamics[5-7].

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[2] J. V. Koski, T. Sagawa, O.-P. Saira, Y. Yoon, A. Kutvonen, P. Solinas, M. Möttönen, T. Ala-Nissila, and J. P. Pekola, Distribution of Entropy Production in a Single-Electron Box, *Nature Physics* 9, 644 (2013).

[3] Jonne V. Koski, Ville F. Maisi, Jukka P. Pekola, and Dmitri V. Averin, Experimental realization of a Szilard engine with a single electron, *PNAS* 111, 13786 (2014).

[4] Jonne V. Koski, Ville F. Maisi, Takahiro Sagawa, and Jukka P. Pekola, Experimental study of mutual information in a Maxwell Demon, *Physical Review Letters* 113, 030601 (2014).

[5] J. P. Pekola, P. Solinas, A. Shnirman, and D. V. Averin, Calorimetric measurement of work in a quantum system, *New Journal of Physics* 15, 115006 (2013).

[6] F. W. J. Hekking and J. P. Pekola, Quantum jump approach for work and dissipation in a two-level system, *Physical Review Letters* 111, 093602 (2013).

[7] S. Gasparinetti, K. L. Viisanen, O.-P. Saira, T. Faivre, M. Arzeo, M. Meschke, and J. P. Pekola, Fast electron thermometry towards ultra-sensitive calorimetric detection, *Physical Review Applied* 3, 014007 (2015).