Unexpected links between stochastic thermodynamics and criticality at Anderson localization transition

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Using the formal analogy between the statistics of work in non-equilibrium statistical mechanics, large deviation principle [1] and the phenomenon of multifractality of random eigenfunctions in the field of Anderson localization [2] we generalize the Jarzynski equality [3] by specifying the low-temperature behavior of the work generating function [4]. We checked the new relations experimentally by measuring the dissipated work in a driven single electron box and found a remarkable correspondence. The results represent an important universal feature of the work statistics in systems out of equilibrium and help to understand the nature of the symmetry of multifractal exponents in the theory of Anderson localization [5].

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