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Stochastic thermodynamics of information processing

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We consider two recent advancements on theoretical aspects of thermodynamics of information processing. First we show that the theory of stochastic thermodynamics can be generalized to include information reservoirs. These reservoirs can be seen as a sequence of bits which has its Shannon entropy changed due to the interaction with the system. Second we discuss bipartite systems, which provide a convenient description of Maxwell's demon. Analyzing a special class of bipartite systems we show that they can be used to study cellular information processing, allowing for the definition of an entropic rate that quantifies how much a cell learns about a fluctuating external environment and that is bounded by the thermodynamic entropy production. Refs: [1] A. C. Barato and U. Seifert, Phys. Rev. Lett. 112, 090601 (2014); [2] A. C. Barato and U. Seifert, Phys. Rev. E 90, 042150 (2014); [3] A. C. Barato, D. Hartich, and U. Seifert, New J. Phys. 16, 103024 (2014).