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The information-theoretic foundation of thermodynamic work extraction

Monday 23 September 2024 14:20 (35 minutes)

I will present a general theorem stating that if one can extract different amounts of work deterministically from a system prepared in any one of a set of states, then those states must be perfectly distinguishable from one another. This result is formulated independently of scale and of particular dynamical laws; it also provides a novel connection between thermodynamics and information theory, established via the law of conservation of energy rather than via the second law of thermodynamics. I will briefly discuss the implications of this result for the theory of von Neumann's universal constructor and for the recently proposed witnesses of non-classicality in hybrid quantum systems.

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