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Landauer's Principle and finite-size effects in quantum thermodynamics

- Hour 1: *Conventional treatments of Landauer's Principle*

See Landauer's original paper "Irreversibility and heat generation in the computing process", IBM J. Res. Dev. 5, 183 (1961), e.g. at the URL here:
http://worrydream.com/refs/Landauer%20-%20Irreversibility%20and%20Heat%20Generation%20in%20the%20Computing%20Process.pdf
Recommended reading are also Chapters 1 and 4 and 7 in the book "Maxwell's Demon 2: Entropy, Classical and Quantum Information, Computing" (2nd. edition, 2003) by Harvey S Leff and Andrew F Rex.

- Hour 2: *Minimal microscopic formulation of Landauer's Principle*

Covered Sections 2.1, 3.1, 3.2 (and a little bit of 3.3) of the paper "An improved Landauer's Principle with finite-size corrections" by D. Reeb and M. Wolf [arXiv:1306.4352v3].

- Hour 3: *Finite-size effects in thermodynamics*

Covered Section 4 of arXiv:1306.4352 (see esp. Theorem 6 and Figure 2), and in particular discussed the finite-size entropy inequalities which are given as Theorems 1, 2, 8, Corollary 10, and Remark 11 in the paper "Tight lower bound on relative entropy by entropy difference" by D. Reeb and M. Wolf [arXiv:1304.0036v3].

- Hour 4: *Achievability - reversible processes*

Discussed the reversible process consisting of iterated SWAP operations in the context of Landauer erasure, see Section 6 in arXiv:1306.4352v3. Similar reversible processes have been investigated for different scenarios in the area of quantum thermodynamics, see e.g. arXiv:1110.6121 (work extraction), arXiv:1211.0183 (Clausius inequality), arXiv:1307.1558 (Second Law of Thermodynamics).