WG 2: Thermodynamic and information theoretic relations for general quantum systems

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- Five goals of Working Group 2 *(from Quantum Thermodynamics website)*.
- Remarks on those five goals.
- Open discussion.

Five goals of Working Group 2

(Quantum Thermodynamics website, short version).

1. Clarify fundamental notions of heat and work in the quantum regime.
2. Establish if and how quantum correlations within a system and with its environment affect standard thermodynamic laws.
3. Performance of thermodynamic devices coupled to novel quantum environments.
4. Full-fledged framework of thermodynamics for micro and nanoscale many-body quantum systems, new quantum engines with improved efficiencies.
5. Information-theoretic implications: Landauer's principle, feedback scenarios, Maxwell's demon breaking of the second law.

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- Correct/ most useful definitions of heat and work, how does the quantum measurement process affect those definitions (website).

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– What about notions beyond heat and work? Genuine quantum concepts such as spin.

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– Zero temperature physics: phase transitions (quantum, topological).

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– Efficiency improvement. Quantum engines.
– Novel quantum environments? 'Quantum fuel' ?
– What are the goals ?

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– There is some gap between 'abstract', statistical mechanics type research and 'realistic', condensed matter type research.