Quantum Physics

Quantum memory as a perpetuum mobile of the second kind

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It is argued that a scalable quantum memory could be used as a perpetuum mobile of the second kind and hence cannot be realized in Nature. The reasoning is based on the assumption that the Landauer's principle for measurements is a consequence of the second law of thermodynamics and not an independent postulate. This implies a modification of the Landauer's principle when applied for discrimination of equilibrium states. In Appendices I,II the entropy, heat and work balance for open systems is discussed. In Appendix III a model of measurement violating the standard formulation of Landauer's principle is presented.

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