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Title: H-Theorem in quantum physics

Abstract:

We build on a remarkable progress of the quantum information theory (QIT) that formulated rigorous mathematical theorems for conditions that data-transmitting or data-processing occurs with a non-negative entropy gain and relate the QIT results formulated in terms of the entropy gain in quantum channels, to temporal evolution of the real physical systems. This enables us to formulate the quantum H-theorem in terms of physical observables. We discuss the manifestation of the second law of thermodynamics in quantum physics and uncover special situations where the second law can be violated. We further demonstrate that the typical evolution of energy-isolated quantum systems occurs with non-diminishing entropy.

References:

1. G. B. Lesovik, A. V. Lebedev, I. A. Sadovskyy, M. V. Suslov, and V. M. Vinokur, *Scientific Reports*, 6, 32815 (2016).