

Garbaczewski, Piotr**Information dynamics in quantum theory.** (English) Zbl 1139.81017

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Summary: Shannon entropy and Fisher information functionals are known to quantify certain information-theoretic properties of continuous probability distributions of various origins. We carry out a systematic study of these functionals, while assuming that the pertinent probability density has a quantum mechanical appearance $\rho \doteq |\psi|^2$, with $\psi \in L^2(\mathbb{R})$. Their behavior in time, due to the quantum Schrödinger picture evolution induced dynamics of $\rho(x, t)$ is investigated as well, with an emphasis on thermodynamical features of quantum motion.

MSC:

- 81P68 Quantum computation
- 94A17 Measures of information, entropy
- 81P05 General and philosophical questions in quantum theory
- 80A05 Foundations of thermodynamics and heat transfer

Keywords:

information entropy; entropy methods; dynamics of densities; entropy dynamics; Fisher information; indeterminacy relations; entropic inequalities; laws of thermodynamics; Helmholtz free energy; quantum motion