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Random paths and current fluctuations in nonequilibrium statistical mechanics. (English)

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This paper is an overview of those results which have been obtained in non-equilibrium statistical mechanics in the framework of Hamiltonian classical or quantum dynamics combined with the theory of stochastic processes. One reviews successively chaos-transport modelling, statistics of random paths, statistics of current fluctuations, equilibrium systems. In the considered approach the statistics of random events is performed in time or space-time exactly like the equilibrium statistical mechanics where statistics is performed in space. Various large-deviation relationships can be established between non-equilibrium properties such as transport coefficients, entropy production and other parameters which characterize the underlying microscopic Hamiltonian dynamics.

Reviewer: [Guy Jumarie \(Montréal\)](#)

MSC:

- [82C35](#) Irreversible thermodynamics, including Onsager-Machlup theory
- [82C70](#) Transport processes in time-dependent statistical mechanics
- [37D45](#) Strange attractors, chaotic dynamics of systems with hyperbolic behavior
- [82C31](#) Stochastic methods (Fokker-Planck, Langevin, etc.) applied to problems in time-dependent statistical mechanics
- [81S22](#) Open systems, reduced dynamics, master equations, decoherence

Cited in **3** Documents

Keywords:

[non-equilibrium statistical mechanics](#); [chaos](#); [transport](#); [random paths](#); [entropy](#); [quantum systems](#)

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