物理科学セミナー

Irreversibility as an exact dynamical process based on the fundamental laws in physics

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2013 年 7 月 24 日（水）4 コマ（14：35～16：05）

サイエンスホール（A12 棟）

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Abstract :

Without relying upon phenomenological theory for irreversible process, such as Boltzmann's kinetic theory, or linear response theory, we will show transport coefficients that characterize irreversibillity can be derived as purely dynamical properties from the fundamental laws in physics, i.e., the Liouville – von Neumann equation. As an example, we discuss one-dimensional quantum Lorentz gas. We especially focus our attention on non-hydrodynamic situation of the Lorenz gas with a localized distribution of the Lorenz particle in much smaller area than the mean-free-length, where no phenomenological approaches could analyze. Non-Markovian process and the causality are also discussed.