



清华大学
Tsinghua University



清华大学高等研究院 - 凝聚态物理前沿讲座

The concentration-of-measure theory of waves: New perspectives of nonequilibrium statistical physics and mesoscopic physics



高等研究院，科学馆三楼322报告厅



Chushun Tian / 田矗舜
Institute of Theoretical Physics, CAS



Wednesday (Oct. 16)
Thursday (Oct. 17)
Friday (Oct. 18)

10:30 am
|
12:00 am

The foundations of statistical physics are currently being renovated. A number of scenarios for the arising of statistical physics in an individual system have been proposed. However, most efforts have been put on equilibrium statistical physics. In this series of seminars, I will report our recent progress on the fundamental aspects of nonequilibrium statistical physics and mesoscopic physics. By combining the concentration of measure – a high-dimensional geometry effect and “one of the great ideas of analysis in our time” (as Talagrand put it) – and the transmission eigenchannel, it will be shown that the elementary nonequilibrium process of diffusion can arise from a single scattering state of wave equation, without the use of the canonical hypothesis of ensembles. It will be further shown that the emergence of this phenomenon is accompanied by that of a new kind of mesoscopic fluctuations, dubbed the wave-to-wave fluctuation.

Plan

- Background, formulation of the problem, announcement of the results.
- Introduction to the concentration of measure -- from high-dimensional geometry to new perspectives of probability theory.
- Introduction to the transmission eigenchannel -- state-of-art scattering theory of complex wave systems.
- Proof of the results, numerical evidence, physical implications.