



Weekly Seminar

Interesting Dynamics interplay with Symmetry, Topology and Entropy

Hui Zhai

Institute for Advanced Study, Tsinghua University

Time: 4:00pm, March.1, 2017 (Wednesday)

时间: 2017年3月1日 (周三) 下午4:00

Venue: Room w563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

In this talk I will discuss several examples of interesting universal dynamics with quantum simulation. In the first example, I will discuss an expansion dynamics of scale invariant quantum gases in a time-dependent harmonic trap, that displays a discrete temporal scaling symmetry, and we term it as “the Efimovian expansion”. This dynamics reveals the scaling symmetry and the emergent conformal symmetry of strongly interacting quantum system. In the second example, I will discuss quench dynamics from a topological trivial Chern insulator to a topological nontrivial one, and we show how to extract a quantized value from the quench dynamics, that exactly equals to the topological Chern number of the final Hamiltonian after the quench. In the third example, I will prove a theorem that relates the entropy growth after a quench to the out-of-time-ordered correlation that recently discussed in the content of quantum chaos and holographic duality. This three examples reveal the interplay between quantum dynamics with symmetry, topology and entropy, respectively.

[1] Shujin Deng, Zhe-Yu Shi, Pengpeng Diao, Qianli Yu, Hui Zhai, Ran Qi and Haibin Wu, *Science*, 353, 371 (2016)

[2] Ce Wang, Pengfei Zhang, Xin Chen, Jinlong Yu and Hui Zhai, arXiv: 1611.03304

[3] Ruihua Fan, Pengfei Zhang, Huitao Shen and Hui Zhai, arXiv: 1608.01914

[4] Jun Li, Ruihua Fan, Hengyan Wang, Bingtian Ye, Bei Zeng, Hui Zhai, Xinhua Peng, Jiangfeng Du, arXiv: 1609.01246

About the speaker

Hui Zhai obtained his PhD in Physics in Tsinghua University in 2005. After four years' postdocs in Ohio-State University and University of California at Berkeley, he joined Institute for Advanced Study of Tsinghua University as faculty member in 2009, became tenured in 2012 and became an IAS full Professor in 2015. His research mainly focuses on cold atom theory and partly on condensed matter theory.