

LECTURES ON FRONTIERS OF QUANTUM MATTERS

量子物质前沿讲座



清华大学
Tsinghua University

TITLE |

Sachdev-Ye-Kitaev Models and Their Generalizations

SPEAKER |

Wenbo Fu
(Harvard University)



TIME |

10:30-12:00 June 12, 13, 15, 16,
2017



VENUE |

Room 322, Science Building
Tsinghua University

主办方：清华大学高等研究院

ABSTRACT

The Sachdev-Ye-Kitaev (SYK) models are quantum models of N fermions with random interactions. They are solvable in the large N limit. At low energy, they develop an emergent conformal symmetry and exhibit an extensive zero temperature entropy. And the out of time order correlators grow exponentially which gives maximal chaos.

In these lectures, I will show how to derive and understand these properties. I will also introduce some generalizations of the model, including higher dimensional generalizations, complex fermions versions with $U(1)$ symmetry, and supersymmetric generalizations etc. I will discuss some physical properties of the models which can also be obtained from holographic computations.

The four lectures will cover: the basic formalisms for the SYK model and zero-temperature entropy; Schwarzian effective action from the normal mode analysis; the Lyapunov exponent using Schwarzian action; and generalizations of the SYK models and verification of $D \sim v^2/T$.