Black Holes, Quantum Chaos, and Solvable Quantum Systems Workshop

January 29-Feb 2, 2018

(1) Herman Verlinde, Princeton

Title: Black Hole Horizons, Chaos and Quantum Error Correction

Abstract:

(2) Ling Yi, IHEP CAS

Title: Holographic Butterfly Effect and Phase Transition

Abstract: When the Lyapunov exponent in a quantum chaotic system saturates the bound, it is proposed that this system has a holographic dual described by a gravity theory. In particular, the butterfly effect as a prominent phenomenon of chaos can ubiquitously exist in a black hole system characterized by a shockwave solution near the horizon. We firstly propose that the butterfly velocity can be used to diagnose phase transition in holographic theories. We provide evidences for this proposal with two sorts of holographic models. Then we investigate the universal behavior of holographic butterfly effect near the quantum critical region and low temperature region with different phases. We argue that their criticality is controlled by the holographic scaling geometry with deformations induced by a relevant operator at finite temperature.

(3) Alejandra Castro, Amsterdam University

Title: Wilson Lines and Ishibashi states in AdS_3/CFT_2

Abstract: In this talk I will discuss a refined interpretation of a gravitational Wilson line in AdS_3 in terms of Ishibashi states in the dual CFT_2. Our strategy is to give a method to evaluate the Wilson line that accounts for all the information contained in the representation, and clarify the role of boundary conditions at the endpoints of the line operator. This gives a novel way to explore and reconstruct the local bulk dynamics.

(4) Diego Hofman, Amsterdam University

Title:

Abstract:

(5) Dionysios Anninos, IAS, Princeton

Title:

Abstract:

(6) Monica Guica, Saclay

Title: An integrable Lorentz-breaking deformation of two-dimensional CFTs

Abstract: It has been recently shown that the deformation of an arbitrary two-dimensional conformal field theory by the composite irrelevant operator $T\bar{T}$, built from the components of the stress tensor, is solvable; in particular, the finite-size spectrum of the deformed theory can be obtained from that of the original CFT through a universal formula. We study a similarly universal, Lorentz-breaking deformation of two-dimensional CFTs that posess a conserved U(1) current, J. The deformation takes the schematic form $J\bar{T}$ and is interesting because it preserves an $SL(2,R)\times U(1)$ subgroup of the original global conformal symmetries. For the case of a purely (anti)chiral current, we find the finite-size spectrum of the deformed theory and study its thermodynamic properties. We test our predictions in a simple example involving deformed free fermions.