Richard Davison

Abstract:
Interacting quantum field theories typically thermalize, leading to the emergence of hydrodynamics at late times. I will talk about (1+1)d QFTs at high temperatures, where the proximity to a CFT results in parametrically slow thermalization, with much of the associated dynamics tractable. I will first explain how the UV effective theory – conformal perturbation theory – breaks down at late times giving room for hydrodynamics to emerge. Specialising to the case of large central charge, I will then argue that the IR effective theory – hydrodynamics -- has universal transport coefficients and use this to show that it breaks down at early times due to the existence of thermal CFT excitations. The timescales at which the two effective theories break down agree.

Kostas Skenderis

Abstract:
We show that AdSd+1 gravity is a d-dimensional CFT by showing that the AdS amplitudes to all orders in bulk perturbation theory satisfy the appropriate CFTd Ward identities. We explain how to renormalize UV and IR divergences in AdS and how these are related to renormalization in CFT and illustrate the renormalization via loop computations.

Elli Pomoni

Abstract:
In this talk, we explore the structure and solution of thermal conformal field theories (CFTs) using the conformal bootstrap approach. At finite temperature, the role of crossing symmetry is played by the Kubo-Martin-Schwinger (KMS) condition, which imposes periodicity on thermal correlation functions. We present two methods for solving the resulting KMS sum rules for thermal one-point functions, assuming knowledge of the zero-temperature CFT data. The first is a numerical method that incorporates the asymptotic operator product expansion (OPE) density of heavy operators, derived using Tauberian theorems. The second is an analytical approach based on dispersion relations. We benchmark both methods against known results in free theories and two-dimensional CFTs, and subsequently apply them to O(N) models for N=1,2,3, as well as in the large-N limit.

Matthew Dodelson

Abstract:
Thermal correlators in large N systems equilibrate at late times, but the precise late-time behavior is unknown away from holographic and free field limits. In this talk I will analyze this problem in the case of the SYK model away from the low-temperature limit. Even at infinite temperatures, the correlator decomposes into a sum over quasinormal modes, and I will explain how to think about the result in terms of a stringy black hole. I will also briefly discuss the example of cellular automata, and explain several methods for addressing the problem more generally.