



PHYSICS AND ASTRONOMY SEMINAR

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“Complexity in Holography and QFT”

Abstract

I will review the concept of quantum complexity of a state and the related holographic conjectures. I will discuss certain properties of holographic complexity, namely, the structure of divergences, the complexity of forming a thermal state, and the time dependence of complexity. I will then move to the QFT side and describe our proposal for defining the complexity in free scalar field theories for Gaussian states based on the Fubini-Study metric. This gives rise to a beautiful geometric picture where circuits are represented as trajectories on a product space of hyperbolic planes with minimal complexity circuits corresponding to geodesic lines. Despite working with quantum field theories far outside the regime where Einstein gravity duals exist, we find striking similarities between our results and the two holographic complexity proposals. If time permits, I will describe additional developments related to the complexity of thermofield double states and its time dependence.

Friday, October 13, 2017

2:00 p.m.

Clearihue Building

Room C316