清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

Title: **Entanglement, Gravity, and Quantum Error Correction**

Speaker: **Xi Dong**
(***Institute for Advanced Study, Princeton***)

Time: **3:30pm,Wednesday, 2016-08-03**

Venue: **Conference Hall 322, Science Building, Tsinghua University**

Abstract

Over the last few years it has become increasingly clear that there is a deep connection between quantum gravity and quantum information. The connection goes back to the discovery that black holes carry entropy with an amount given by the horizon area. I will present evidence that this is only the tip of the iceberg, and prove that a similar area law applies to more general Renyi entanglement entropies. To demonstrate the simplicity of this prescription, I will use it to calculate the mutual Renyi information between two disks of arbitrary dimension. I will comment on the prospect of verifying this area law experimentally in light of recent advances in measuring Renyi entropies. Furthermore, I will provide quantum corrections to the area law and use it to solve the following important problem: what region of the dual spacetime is described by a subregion in a holographic theory? The answer to this question lies in a new perspective that I will advocate: holography is a quantum error correcting code.