



## Quantum information measure of space-time correlation

### 【摘要】

Recent developments in quantum gravity suggests that the concept of spacetime is deeply related to quantum information. Most quantum information measures are defined for quantum states. For example, mutual information measures the correlation between two subsystems in a quantum state. It is natural to ask whether correlation in spacetime can be characterized by some generalization of mutual information. In this work, we propose a space-time generalization of mutual information. The key idea is to consider a general "quantum experiment" that measures the correlation between two space-time regions, and use the setup of hypothesis testing. We discuss various properties of the spacetime mutual information, including how it provides an upper bound for all connected correlation functions, which is a direct generalization of the similar property of ordinary mutual information.

### 【报告人简介】



Xiao-Liang Qi finished his Ph. D. at the Institute for Advanced Study, Tsinghua University in 2007. He did postdoctoral research at Stanford University and UC Santa Barbara, and joined the faculty of Stanford University in 2010. In recent years, he has been mainly working on the relation of quantum information, quantum gravity and quantum many-body physics. He has also worked on topological states of matter and strongly correlated systems.

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