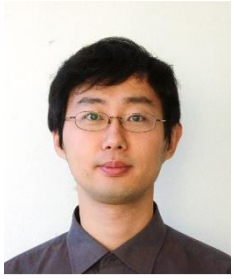
量子信息科技学术研讨会 **(2018.9.17-21)**

报告



通過量子測量來進行自旋環境的操縱

Towards Measurement Induced Quantum State Engineering

楊森教授 | 香港中文大學物理系助理教授

讲者介绍 Biography

Sen Yang graduated from Tsinghua University in 2002, and got his Ph.D. from University of California, San Diego. He did postdoc in UT Austin and Uni Stuttgart. In 2016, he joined the Chinese University of Hong Kong as an assistant professor.

报告摘要 Abstract

Quantum theory predicts that a quantum system will collapse from superposition of several possible states, to just one, in the moment it is measured. As quantum systems are never isolated from their surrounding environment (quantum bath), its measurement and the associated collapse should also affect the environment coupled to it. The affected spin bath will then effect the trajectory of the quantum system. We demonstrate the role of measurement back-action of a coherent spin environment on the dynamics of a spin (qubit) coupled to it, by inducing non-classical (Quantum Random Walk like) statistics on its measurement trajectory. We show how the long-life time of the spin-bath allows it to correlate measurements of the qubit over many repetitions. We have used Nitrogen Vacancy centers in diamond as a model system, and the projective single-shot readout of the electron spin at low temperatures to simulate these effects. We show that the proposed theoretical model, explains the experimentally observed statistics and their application for quantum state engineering of spin ensembles towards desired states.