北京大学量子材料科学中心
International Center for Quantum Materials, PKU

中心系列讲座 ICQM Weekly Seminar Series

"Deterministic generation of NOON states in a superconducting quantum circuit"

Prof. Haohua Wang(王浩华)

Physics Department

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Time: 4:00pm, Sep. 7, 2011 (Wednesday)

时间：2011年9月7日 （周三）下午4:00

Venue: Room 607, Conference Room A , Science Building 5

地点：理科五号楼607会议室

Abstract

A superconducting qubit, with two energy levels available, is one of the most nonlinear systems in nature; In contrast, a superconducting resonator, essentially modeled as a harmonic oscillator, is a linea system possessing infinite number of degenerate energy levels. Although it is impossible to control the non-classical states in a resonator using classical meanings, it has been demonstrated that coupling of a qubit to a resonator is effective to deterministically generate large photon number Fock states and arbitrary superpositions of Fock states in the resonator. Here we have pursued one step further: Utilizing a two-qubit-three-resonator architecture, we have successfully generated NOON states with N up to 3 in two resonators separated by a millimeter distance, and unambiguously verified the entanglement using the bipartite Wigner tomography.

(in colaboration with the UCSB phase qubit group)

About the Speaker

Haohua Wang received BS in physics from Nankai University in 1999, and Ph.D. in physics from Penn State University in 2006. From 2007 to 2010 he worked as a postdoc in the superconducting phase qubit group at UC Santa Barbara. In August 2010, he joined the Physics Department at Zhejiang University, starting to build a superconducting quantum circuit group focusing on Josephson junction related experiments. He is also interested in the exotic phenomena in mesoscopic superconductors. He has published over 30 refereed journal articles, including 5 in Nature，2 in Science，3 in Nature Physics，and 8 in PRL. His recent work on controlling and entangling microwave photons using superconducting quantum circuits has been featured in various scientific news and reports, including the cover page of Physics Today.