

武汉物数所理论交叉学术交流系列报告

(第一八〇期)

Quantum metrology with Fisher information

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2017年12月13日-15日 磁共振楼

10楼1016-17报告厅

13日(周三) 上午10:00-11:30 Lecture 1: Brief introduction on Quantum metrology

14日(周四) 上午10:00-11:30 Lecture 2: Quantum entanglement (generating and quantifying)

14日(周四) 下午14:30-16:30 Lecture 3: Phase encoding (Controllable Quantum Dynamics)

14楼1417报告厅

15日(周五) 上午10:00-11:30 Lecture 4: Phase estimation (Bayesian and Frequency Bounds)

15日(周五) 下午14:30-16:30 Lecture 5: Some discussion on exactly solvable model and quantum metrology

报告人简介:

李卫东教授2002年毕业于中国科学院物理研究所获得博士学位。同年赴意大利Trento大学玻色爱因斯坦凝聚中心从事博士后研究。2008年入选教育部新世纪优秀人才计划, 现任中国核学会计算物理学会第七届理事会理事及《中国物理快报》特约评审, 曾在美国德克萨斯大学、香港中文大学、法国巴黎第十一大学、意大利科学院光学研究所等多地访学、作报告。主要从事非线性量子理论、强激光场中原子分子电离等原子、分子体系在受限或极端条件下量子理论的研究工作。近年主要从事与超冷原子相关的精密测量理论的研究。至今, 发表70余SCI篇论文, 包括顶级期刊PNAS一篇, Phys. Rev. Lett.三篇, Phys. Rev. 系列二十余篇。



Abstract:

Recently, quantum metrology is becoming a hot topic in cold atom and related field. Specially, with the help of quantum entanglement, the measurement accuracy could be greatly improved. Since 2009, Quantum Fisher information plays an important role in this interdisciplinary field.

In this series of seminar, a brief introduction on Quantum metrology is going to present in the form of Quantum Fisher information. Specially explain why and how entanglement makes the measurement with high sensitivity. Based on Fisher information, a new method to generate hybrid-entanglement state and how extract Fisher information from experiment data is introduced. Starting from a simple and experimental easy controllable model, a novel gravity atomic interferometer is explained; Based on two kind of statistical model, various bounds are given, with the help of one experimental conditions. Finally, we will make discussion on how 1-D exactly solvable model may help for Quantum metrology.

主办单位:武汉物数所理论与交叉研究部