



Seminar

Engineering advanced quantum control for quantum simulation and sensing

Guoqing Wang

*Massachusetts Institute of Technology & MIT-Harvard Center
for Ultracold Atoms*



Time: 10:00am, March 19, 2024 (Tuesday)

时间: 2024年03月19日 (周二) 上午 10:00

腾讯会议链接: <https://meeting.tencent.com/dm/dAkEWleehBp4>

腾讯会议ID: 661-358-863

Abstract

With the advancement of quantum technologies, various quantum applications have emerged, ranging from quantum sensing and simulation with solid-state spins to quantum simulation and computation with atom arrays trapped in optical tweezers. Quantum control stands at the heart of ensuring the operational success of these applications. In this talk, I will first introduce how the development of quantum control is driving the progress of quantum simulation and sensing applications, from exploring dynamical symmetries, protecting quantum coherence, to the development of powerful sensor capable of probing arbitrary frequency, vector signals at nanoscale. Furthermore, I will introduce how to leverage state-of-the-art control of atom-light interactions with novel cavity QED systems to develop the next-generation atom array platforms featuring fast operation and arbitrary connectivity. I will conclude with an outlook on the next-generation techniques and the new opportunities they unlock for quantum applications.

- [1] Wang et al., **PNAS** 120 (32) e2305621120 (2023)
- [2] Wang et al., **PRX** 12, 021061 (2022), Featured in Physics
- [3] Wang et al., **PRL** 127, 140604 (2021), Editors' Suggestion
- [4] Wang et al., **PRL** 131,043602 (2023)
- [5] Wang et al., **Nano Lett.** 21, 5143-5150 (2021)

About the Speaker

王国庆, 麻省理工学院-哈佛大学超冷原子中心博士后, 麻省理工学院跨学科量子信息科学与工程学会 (MIT iQuISE) 副主席, 曾获普林斯顿大学量子博士后奖学金 (PQI Postdoctoral Fellowship)、国家优秀自费留学生奖学金、MathWorks研究生奖学金。王国庆2018年本科毕业于北京大学物理学院, 荣获北京市、北京大学优秀毕业生等荣誉; 2023年博士毕业于麻省理工学院。他的研究兴趣为基于冷原子和固态自旋系统的量子模拟、量子传感、量子计算, 以及结合腔量子电动力学的下一代里德堡原子阵列平台开发及其量子应用。