



Einladung zum Oberseminar Wissenschaftliches Rechnen

Julius-Maximilians-Universität Würzburg
Lehrstuhl für Wissenschaftliches Rechnen IX

Prof. Guofeng Zhang

Department of Applied Mathematics, The Hong Kong Polytechnic University

Linear quantum systems and their applications in experimental quantum physics

In this talk, we discuss quantum linear systems from a control-theoretic point of view. We present the Kalman canonical form for quantum linear systems. As an application, we show how it can be used to study decoherence-free (DF) modes, quantum non-demolition (QND) variables, and back-action evading (BAE) measurements in quantum information science. The proposed theory will be demonstrated by several experiments from quantum optics and opto-mechanical systems, including:

1. Optomechanical dark mode, Dong et al., *Science*, 338:609–1613, 2012.
2. Quantum backaction evading measurement of collective mechanical modes, Ockeloen-Korppi, et al., *Physical Review Letters*, 117:140401, 2016.
3. Light-mediated strong coupling between a mechanical oscillator and atomic spins 1 meter apart, Karg, et al., *Science* 369:174–179, 2020.
4. Quantum mechanics-free subsystem with mechanical oscillators, de Lepinay, et al., *Science* 372:625–629, 2021 .

Bio: Guofeng Zhang received the Ph.D. degree in applied mathematics from the University of Alberta, Edmonton, AB, Canada, in 2005. He joined the University of Electronic Science and Technology of China, Chengdu, China, in 2007. He joined the Hong Kong Polytechnic University, Hong Kong, in December 2011, and is currently a professor. He is an Associate Editor of IET Control Theory and Applications, Journal of Control and Decision, Guest Associate Editor of International Journal of Bifurcation and Chaos, and the Manage Guest Editor for the Special Issue on Quantum Control and Quantum Machine Learning for Journal of The Franklin Institute. He was the General Chair of 2025 IEEE International Conference on Quantum Control, Computing and Learning (IEEE qCCL2025), June 25 – 28, 2025, Hong Kong. His research interests include quantum control and tensor-based quantum computing.

Ort: Raum 30.02.003 (Mathematik West, 2.Stock)

Zeit: Do. 25.06.2026, 10:00 Uhr

Zu diesem Vortrag laden wir Sie herzlich ein.
You are cordially invited to this lecture.

gez. Prof. Dr. Alfio Borzi
gez. Prof. Dr. Frank Werner