上海数学与交叉学科研究院



Shanghai Institute for Mathematics and Interdisciplinary Sciences

SIMIS Seminar series on Quantum computing, Quantum simulation and Strongly-correlated systems

Prof. Xiu-Hao Deng

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"A geometric perspective for noisy dynamics of driven quantum systems and its

application"

Abstract

Quantum systems are fragile to noisy environment which makes them hard to control for computing or metrology. In this talk, I will introduce the geometric picture of noisy quantum dynamics and present a generic framework, in combined with a diagrammic approach, to study the driven quantum dynammics with uncertainty. I will show how to utilize this framework to construct arbitrary robust control pulses, error suppressing quantum circuits, and enhanced quantum sensing. In these tasks, quantum errors are corrected dynamically. This approach is friendly for scalable quantum chips. I will also illustrate some experimental results we obtained.

Biography of the speaker

Xiu-Hao Deng, Researcher (PI) at the Shenzhen International Quantum Academy, adjunct researcher of Hefei Lab, Shenzhen branch. He obtained a B.S. and M.S. from the Department of Modern Physics, University of Science and Technology of China (USTC), where he worked with Professor Sixia Yu on quantum error correction. He got a Ph.D. at University of California, Merced, working with Professor Raymond Chiao on quantum optics using superconducting circuits. He worked as a postdoc for Sophia and Ed Barnes in VirginiaTech on quantum control. From late 2018 to Jan 2025, he worked in SUSTech and helped built Quantum Center in Pengcheng Lab. He has transfered to current institute in January 2025. Xiu-Hao produced some original work in quantum control theory and quantum dynamics. He also did some innovative work in superconducting quantum circuits and quantum simulation. His current interests include practical quantum algorithms, quantum error correction and quantum simulation leading to quantum advantages, quantum control on solid-state qubits, many-body quantum dynamics, and so on.

Date and Place: May 30th 2025, 11:00h-12:00h. Room: 1210. Send comments or questions to Miguel Tierz (Seminar organizer) to tierz at simis.cn