Informal Seminar

Towards universal fault-tolerant quantum computation with Rydberg atoms

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Time: 3:30 pm, Dec. 29, 2023 (Friday)

时间：2023年12月29日 （周五）下午3:30

Venue: Room w563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

Fault-tolerant quantum computation (FTQC) is a major goal of quantum information science, as it allows reliable manipulation of quantum information in the presence of noise and errors. In this talk, I will provide an overview of the main challenges and methods for achieving FTQC, such as quantum error correction (QEC), transversal and non-transversal logical gates, and their implications for universality. I will then focus on the specific advantages and opportunities of Rydberg atom arrays as a platform for FTQC, and show how their unique features, such as non-local connectivity, parallel gate action, collective mobility, and native multi-controlled-Z gates, can be used to implement a universal set of gates efficiently and robustly, through techniques like magic state distillation, concatenated code arrays and FT multi-controlled-Z codes (https://arxiv.org/abs/2312.09111).

About the speaker

王逸飞，现就读于清华大学高等研究院，导师为顾颖飞。2022年本科毕业于北京大学物理学院，获“未名物理学子”荣誉学位。研究方向为量子计算和凝聚态理论，近期主要关心里德堡平台上的量子模拟和量子计算问题。