北京大学前沿计算研究中心
Center on Frontiers of Computing Studies, Peking University

静园5号院
青 年 讲 座

Quantum AI: From near-term to fault-tolerance

Dr. Junyu Liu

Postdoc Scholar
University of Chicago & IBM

Host：李彤阳 助理教授
2023年7月10日 星期一 16:00
静园五院204室

Abstract

Quantum machine learning, namely, running machine learning algorithms on quantum devices, has been considered a flag-ship application of quantum computing. In this talk, we will describe two perspectives of quantum machine learning: near-term algorithms and fault-tolerant algorithms. In the near-term realizations, I will discuss applications of variational quantum circuits in machine learning problems, and how a theory of quantum neural tangent kernel could be an analytic principle to optimize quantum neural networks. In the fault-tolerant realizations with quantum error correction, I will briefly discuss some ongoing works with end-to-end applications of the HHL algorithm that provides a provable, generic and efficient quantum algorithm to a class of machine learning problems.

Biography

Dr. Junyu Liu(刘峻宇) is a theoretical physicist and postdoc scholar currently working for the University of Chicago and IBM, associated with the Chicago Quantum Exchange. He graduated from California Institute of Technology with a PhD in physics in June 2021, with the working experiences from the Walter Burke Institute for Theoretical Physics and the Institute for Quantum Information and Matter, supervised by Clifford Cheung, John Preskill and David Simmons-Duffin. Starting in 2022, He is a co-founder of SeQure (a software company for blockchain security using AI and cryptography), and a research scientist of qBraid co. He graduated from School of the Gifted Young in the University of Science and Technology of China in 2016 with a bachelor degree in physics. He is interested in theoretical physics and its relation to computation, including blockchains, machine learning, optimization, quantum computing, data science, data security, cryptography and the commercial value of modern computing technologies.