

Invited Talk I

10:10–11:00, Monday, March 29, 2021

**The Status and Potential of Quantum Computers:
From Quantum Computational Supremacy to Fault-Tolerant Quantum Computer**



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Abstract

Supported by extensive experimental efforts for the realization of quantum computing devices, a quantum computer of a hundred qubits is now within reach. This level of a quantum computer is not enough for fully-fledged fault-tolerant quantum computing, which is inevitable for large-scale quantum computing supporting theoretically proven exponential computational speedup. However, state-of-the-art quantum computers still are thought to have a computational advantage against classical computers for certain tasks and called noisy intermediate-scale quantum (NISQ) devices. In this talk, I will provide an overview of the NISQ devices and their applications for quantum simulation and machine learning. In addition, I will show the prospects and challenges for the realization of a fault-tolerant quantum computer in the long term.