Error correction methods for Near-term and Fault-tolerant Quantum Computing

Abstract:

Though promised to solve intractable problems, quantum computers are much noisier than classical computers. To make quantum computers practical, efficient error correction schemes have to be developed. In the first half of the talk, I will first introduce the theory of Quantum Error Correction (QEC) and current proposals of using QEC to achieve fault-tolerant quantum computing, then I will talk about a new scheme that can greatly lower the cost of QEC. In the second half, I will talk about a promising near-term qubit encoding called the GKP qubit that has error-correcting abilities and a protocol to prepare such qubits.