



Colloquium

Quantum Walk Finds a Way for GKP!!

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Venue: S4-625

Time: 14:00

Abstract :

In this talk, I will explain a theoretical framework for encoding a quantum bit (qubit) into a continuous-variable quantum mode (often referred to as a “bosonic mode”) through quantum walks, which I had developed along with my colleagues a few years ago. Starting with a squeezed-vacuum state of a bosonic mode, I will show that quantum walk of the state in phase space can generate variants of codestates originally put forward by Gottesman, Kitaev, and Preskill (GKP) [Phys. Rev. A 64, 012310 (2001)]. In particular, with a coin-toss operation that projects the quantum coin onto the diagonal coin-state, I will show that the resulting “dissipative” quantum walk provide pathways to generating approximate GKP qubits. Besides its possible implementation through superconducting circuit systems, in particular, I will present a linear-optical approach to realizing this encoding scheme that we have recently discovered.