



Contribution ID: 41

Type: Talk

Fusion-based quantum computing with deterministic entanglement sources

Friday 9 May 2025 11:15 (30 minutes)

Fusion-based quantum computing (FBQC) is a promising model for realizing photonic quantum computers. Compared to measurement-based quantum computing (MBQC), FBQC does not require the generation of a full photonic cluster state prior to measurements. Instead, the cluster state is generated and simultaneously measured by fusions between smaller entangled states. The current approach to generate these states, as mainly pursued by big companies like PsiQuantum, uses probabilistic linear optics which might not be scalable in the long run due to low success rates.

In this talk, I will discuss our recent efforts in creating these small entangled states with solid-state quantum dots. An electron spin trapped in the quantum dot can be periodically excited to emit multi-photon entangled states in demand, which might significantly boost the success rate and reduce resource cost. I will then show how these deterministic entangled-photon sources can be integrated into a bigger picture to realize FBQC and describe the architectural blueprint.

Presenter: CHAN, Ming Lai (Sparrow Quantum/ Niels Bohr Institute)