SEMINAR: Entanglement distribution and utilization over quantum networks

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12:00 to 13:00
Seminar Room

Abstract:
Quantum networks have the potential to significantly advance quantum information processes, including computation, communication, and metrology. At the heart of these networks lies entanglement, a crucial resource that must be effectively managed.
Current strategies for distributing entanglement among distant parties include quantum repeaters and entanglement distillation. However, these methods are constrained by current Noisy Intermediate-Scale Quantum (NISQ) technologies, where noise in measurements and operations significantly reduces entanglement fidelity, limiting their effectiveness.
My presentation addresses two key questions:
First, how can entanglement be distributed in a quantum network while overcoming the limitations of NISQ technologies, particularly focusing on measurement errors? To address this, I propose a purification protocol for noisy measurement and state preparation.
Second, how can a certification method for entanglement within these networks be developed? I suggest an approach called "teleportation-based estimation of observables," incorporating entanglement witnesses to verify entanglement.