Contribution ID: **202** Type: **not specified**

# Quantum Position Verification, Quantum Nonlocal Computation, and Surprising Connections with Holography and classical cryptography

*Friday, 27 June 2025 09:15 (40 minutes)*

"Quantum position verification (QPV) plays a crucial role in secure quantum communication and nonlocal quantum computation. It ensures that a party involved in a communication protocol is at its claimed location, which is essential for secure communication, distributed computing, and location-based services.
In 2012, we established a tight connection between the security of QPV schemes and the entanglement usage in quantum nonlocal computation. Quantum nonlocal computation is the task of performing a unitary operation U on a bipartite quantum state φ_AB held by two parties, Alice and Bob. They can simultaneously send a single message to each other, after which they should hold the state ψ_AB = Uφ_AB. It is always possible to apply U in this manner, but the entanglement usage for arbitrary U's remains unknown. The best known upper bound is exponential, while the best known lower bound is linear.
In this talk, we will discuss recent advances and surprising connections with other fields, such as holography, ADS/CFT correspondence, and classical primitives like conditional disclosure of secrets (CDS) and secure message passing (SMP)"

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**Session Classification:** Friday Plenary Session