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Quantum Communication with Coherent States of Light

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Abstract

Quantum Communication Protocols can realize a qualitative or quantitative advantage with surpringly simple tools, such as linear optics and laser pulses. We will present recent advances made by our group in this area.

Quantum Communication Protocols offer either qualitative advantages (Quantum Key Distribution) or quantitative advantages (Quantum Communication Protocols like Quantum Fingerprinting). We can realize such protocols resorting to tools that are readily available for implementation using simple tools like coherent states (laser pulses) and linear optics. Translation tools have been developed [1,7]. I will outline the different type of tasks that as a result can be translated this way, such as quantum fingerprinting [3,8], quantum scheduling [4], Quantum Retrieval Games [5]. Quantum Finger Printing has been realized [6] and has been shown to have quantum information complexity advantage [2]. This opens also the opportunity to explore topics in secure multi-party computation, which offers to balance privacy and security aspects in our word. I also report our investigations into Quantum Key Distribution that uses related tools [9]. Our goal is to drive research towards delivering protocols with a quantitative advantage that can be practically implemented and that address a real-world problem.

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