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Entanglement-Based Free Space Quantum Key Distribution¹

GREGOR WEIHS, Institute for Quantum Computing, University of Waterloo, 200 University Ave W, Waterloo, Ontario, N2L 3G1, Canada

Free-space optical communication can complement fiber optics, when the latter are not readily available or when transmitting to or from a satellite is the goal. I will report on our free-space quantum key distribution experiment that links a source to receivers in two different buildings with a distance of about 1.8 km. There is no direct line of sight between the endpoints. Our implementation is a complete quantum key distribution system that includes error correction and privacy amplification. It is based on the distribution of polarization-entangled photon pairs via optical telescopes from the source location on the roof of a campus building to the building of the Institute for Quantum Computing and the Perimeter Institute for Theoretical Physics respectively. In the future, we want to achieve daylight operation capability and use brighter sources of entangled photon pairs to increase the achievable key rates.

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