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3-Photon Pair Source

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One of the essential ingredients for photonic quantum technologies, namely secure quantum communications, are entangled photon pair sources. Entanglement is a quantum property of particles that allows secure communications, in particular in the context of device-independent (DI) cryptography. The entangled photon pair source may additionally be used as a heralded single photon source for semi-device independent (SDI) quantum key distribution (QKD). The objective of this project is to develop an entangled photon pair source for DI and SDI QKD. To generate quantum entanglement, we will use non-linear optical processes, such as spontaneous parametric down-conversion, linear optics elements, and photon detectors which are sensitive enough to detect the arrival of a single photon.

The work will be developed at the Quantum Technologies Laboratory of the Physics of Information and Quantum Technologies Group (IT and IST), and will involve the collaboration of Dr. Emmanuel Zambrini Cruzeiro.

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