



Engineering Non-classical Light in Photonic Integrated Devices

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Integrated micro- and nano-structures allows for the efficient generation of photon pairs via parametric fluorescence, thanks to the enhancement of the light-matter interaction associated with light confinement in small volumes. For instance, the efficiency of spontaneous four wave mixing in a silicon micro ring resonator can range up to 10 orders of magnitude larger than in bulk silicon. Yet the advantages of using integrated devices go well beyond the sole efficiency improvement, for micro structures grant an unprecedented control over the properties of generated non-classical light. For instance, in a single photonic integrated circuit, one can exploit the interferences of many optical elements to construct complex multipartite states in a compact, stable, and scalable system.

In this talk I will focus on the generation of photon pairs and show how their spectral properties can be engineered in an integrated device for use as building blocks in the construction of a whole variety of states, from heralded single-photons to multipartite states.

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