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【568】 High-rate photon pairs and sequential Time-Bin entanglement with Si₃N₄ ring microresonators

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Integrated photonic sources represent a key building block as practical, low-cost, schemes for quantum communication. In the context of photon pair sources, microring-resonators (MRR) are emerging as a viable solution for integrated photon pair sources with advantages for multiplexing and high dimensional entanglement generation.

By exploiting MRR as a photon pair source, sequential time-bin entanglement is generated with 750 MHz pump rate and interference fringes with raw visibility up to 98%. Detected coincidence counts rate of up to 80 kHz was achieved by relying on low loss commercial telecom filters, and state of the art superconducting single photon detectors. We also present several techniques that we have incorporated to characterise and mitigate noise while improving pump rejection and channel selection.

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