detection line, which could be substantially reduced by direct integration of the optical filters and detectors into the SOI chip [33, 34]. Otherwise, different kinds of resonators based on photonic crystals [35, 36] and photonic crystals cavities [37] have been already proposed and employed to enhance optical nonlinearities [38, 39]; using photonics crystal cavities alternative approaches could be used, which do not involve heralding, but generate Fock states via photon-photon repulsion [40].

## 4. Conclusion

We have studied the efficient emission of correlated photon pairs from a silicon ring resonator, reporting remarkably high values of CAR as well as the emission rate [41]. The observed rates are in excellent agreement with the theoretical prediction.

This results show that silicon micro-ring resonators are appealing and promising devices for integrated quantum optics applications: they are in fact extremely compact, CMOS compatible and they work at room temperature. Our findings open the route to the demonstration of heralded photon sources and the generation of quantum correlated photonic states in an integrated environment.

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