The generation of optical quantum states on an integrated platform will enable low-cost and accessible advances for quantum technologies such as secure communications and quantum computation. We demonstrate that integrated quantum frequency combs (based on high-Q microring resonators made from a CMOS-compatible, high refractive-index glass platform) can enable, among others, the generation of pure heralded single photons, cross-polarized photon pairs, as well as bi- and multi-photon entangled qubit and quDit states over a broad frequency comb covering the S, C, L telecommunications band, constituting an important cornerstone for future practical implementations of photonic quantum information processing.

Biography:

Prof Morandotti received a MSc in Physics from the University of Genova (Italy) in 1993 and a PhD in Electronic Engineering from the University of Glasgow (Scotland) in 1999, where his research activity focused on the study of the linear and nonlinear properties of optical discrete systems.

In June 2003 he joined INRS-EMT (University of Quebec) in Montreal, where he is a Full Professor since 2008. His research interests mainly deal with the linear, nonlinear and quantum properties of periodic structures, both in III-V semiconductors and silica, as well as with optics at unusual wavelengths, including THz. Prof. Morandotti is author and coauthor of more than 800 papers in scientific journals and conferences (including 20 in Nature, Science, Nature Photonics, Nature Physics, Nature Communication and Science Advances, as well as 38 in Physical Review Letters) and gave over 100 invited keynote and plenary talks in various international conferences. He is currently serving/has served as a subcommittee chair/technical committee member for several OSA, IEEE and SPIE meetings. Prof. Morandotti is a Canada Research Chair, an E.W.R. Steacie Memorial Fellow 2011 (awarded to the 6 best early career scientists in Canada), a NSERC Synergy recipient 2018 (outstanding collaboration with industry), a Fellow of the Royal Society of Canada, a Fellow of the Optical Society of America, a Fellow of the American Physical Society, a Fellow of the Institute of Physics and a Fellow of the SPIE, among others.