

# SEMINAR: Frequency-bin quantum information processing on a silicon photonic chip

SARA CONGIA

April 28, 2026

17:00 to 18:00

Elements Room

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Frequency-bin encoding has recently emerged as a powerful approach for photonic quantum information processing, offering high dimensionality, gate-parallelization, and compatibility with existing telecommunication infrastructure. However, its scalable deployment has so far been hindered by the lack of an integrated platform capable of unifying quantum state generation, coherent frequency mixing, and programmable spectral control. In this seminar, I will present the first fully integrated quantum frequency processor, monolithically integrating on the same silicon photonic chip a microresonator-based biphoton quantum frequency comb source, a pump-rejection filter, high-speed phase modulators, and a four-channel, line-by-line pulse shaper.

**Hosted by:** Prof. Dr. Valerio Pruneri