

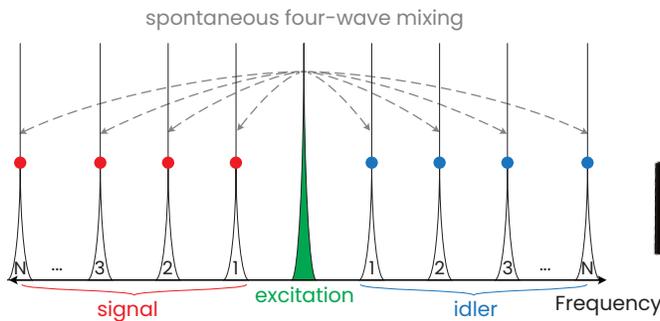


### Multichannel Entangled Photon Source

The **Ki3 Q.COMB** is a high-performance, room-temperature entangled photon source designed for applications in secure quantum communication, precision sensing, and advanced information processing.

The unit seamlessly integrates with existing network infrastructure, requiring no modifications. Once plugged in and powered on, it automatically generates and distributes entangled photons through standard optical fiber, making quantum resources readily available within the client's optical network.

At its core, the **Ki3 QUANTUM COMB** leverages spontaneous four-wave mixing (SFWM) to generate entangled photon pairs distributed across an optical frequency comb. This comb is a broad-spectrum light source emitted from an on-chip silicon nitride ring resonator to ensure high spectral purity and efficient photon generation.

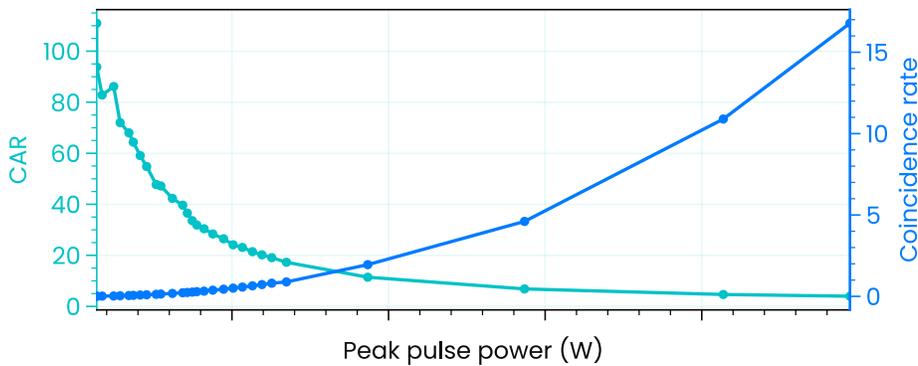


#### Features and benefits:

- Deploy instantly with turn-key, room-temperature operation – No cryogenic cooling required.
- Achieve high-fidelity entanglement (>95% Bell state purity) – Ensures reliable and secure quantum data transfer.
- Generate pulsed photon pairs – Enables precise synchronization in quantum systems.
- Enable time-bin and frequency-bin encoding – Ideal for robust quantum communication; a key advantage over polarization-based sources.
- Ensure narrowband photon channels (<800 MHz) – Provides high spectral purity, at linewidths compatible with quantum memory.
- Support multi-user and high-dimensional quantum networking – Expands connectivity and scalability.
- Integrate seamlessly with the telecom grid – Compatible with standard DWDM spacing (100/200 GHz ITU).
- Scale efficiently with a compact design – Optimized for lab setups, field deployments, and quantum networking applications.

Specification <sup>a</sup>	Pulsed	Continuous-wave
Center wavelength <sup>b</sup>	1550.12 nm	1550.12 nm
Channel spacing	200 GHz	200 GHz
Channel linewidth	< 500 MHz	< 500 MHz
Maximum CAR <sup>c</sup>	> 100	> 500
Max pair/second <sup>d</sup>	>100 kHz	> 100 kHz
Fidelity <sup>e</sup>	> 95%, > 85%	> 95%, > 85%
Schmidt number	< 1.5	-
Heralding efficiency <sup>g</sup>	> 0.15	> 0.1
Pump repetition rate	25 MHz, reconfigurable	-
Output fiber type	PM	PM
Footprint	2U rack mount (19"×3.5"×13")	2U rack mount (19"×3.5"×13")

- Custom specifications available, please contact [info@ki3photonics.com](mailto:info@ki3photonics.com).
- The signal (idler) photons are found at  $f_c \pm n \times \text{FSR}$ , with  $f_c$  being the center frequency and  $n$  the number of the resonance pair.
- Coincidence to accidental ratio.
- For a 3mW of average pump power.
- To the Bell state  $|+\rangle = (|00\rangle + |11\rangle) / \sqrt{2}$  for time-bin qubit or frequency-bin qubit encoding, respectively.
- Schmidt number (also known as effective mode number) is a measure of the spectral purity and is defined as  $K = (\sum_k e_k^2)^{-1}$ , where  $e_k$  are eigenvalues of the reduced density operator. It is obtained from measuring the  $g^{(2)}(0)$  via relation  $K \approx (g^{(2)}(0) - 1)^{-1}$  for the third idler photon.
- Heralding efficiency is defined as  $\mu_{si} = C / P_i P_s$ , with  $C$  being the rate of coincidence and  $P_i$  and  $P_s$  the rate of idler and signal photons, respectively.



**Fig. 2:** Coincidence and coincidence-to-accidental (CAR) values of the Ki3 Q.COMB multichannel entangled photon source, operating in continuous-wave mode.