CORRELATED PHOTON PAIR SOURCES

Features

- Rugged, alignment free and all-in-fiber design
- High heralding efficiency
- Turn-key, highly-stable and room-temperature operation
- Built-in pump laser and noise-suppression filters
- Selectable wavelength, counts rate and bandwidth
- Customizable

Applications

- Highly-stable, turn-key and user-friendly solution for:
  - Fundamental quantum information science
  - Quantum key distribution
  - Quantum computing
  - Quantum metrology

Bright correlated photon source with a built-in pump laser

Product Description

The sources of the correlated photon pairs produce time/energy entangled photon pairs via the process of spontaneous parametric down conversion (SPDC). After creating photon pairs, the pump photons are removed from the output of the remaining pairs via a built-in set of optical filters.

OZ Optics correlated pair sources come equipped with a stabilized pump laser along with pump power control via an internal variable optical attenuator. The SPDC medium is thermally stabilized to maintain ideal phase matching condition providing the highest photon conversion efficiency.

The photon pairs are separated either by a wavelength splitter (WDM) or polarizing beam splitter (PBS) depending on the spectral bandwidth of the unit ordered.

Standard sources

A) Broadband: The photon pairs are generated at a center wavelength of 1550 nm and cover a broad spectral bandwidth of 80 nm within C- and L- bands, as shown in Figure 1. The photon pairs are separated using a WDM to Single and Idler outputs.

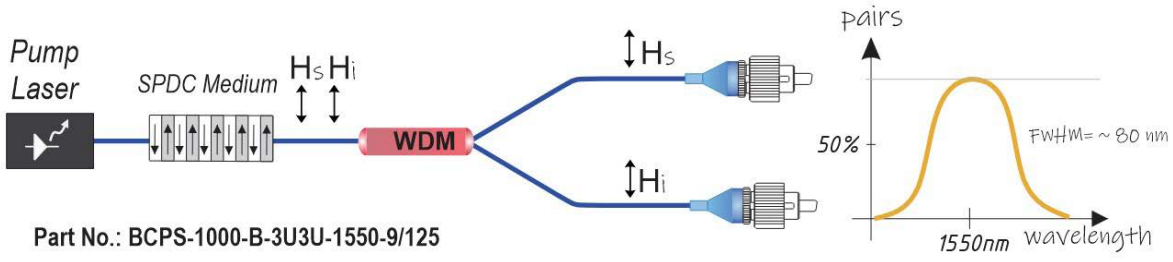


Figure 1. Schematic of a standard broadband bright correlated photon source implementing a type-0 waveguide with two output ports.

Standard sources cont.

B) Narrowband: The photon pairs are generated at two main wavelengths 1550 nm and 810 nm within a few nanometers spectral bandwidth. The photon pairs are separated using a PBS that is coupled to two output ports as shown in Figure 2.

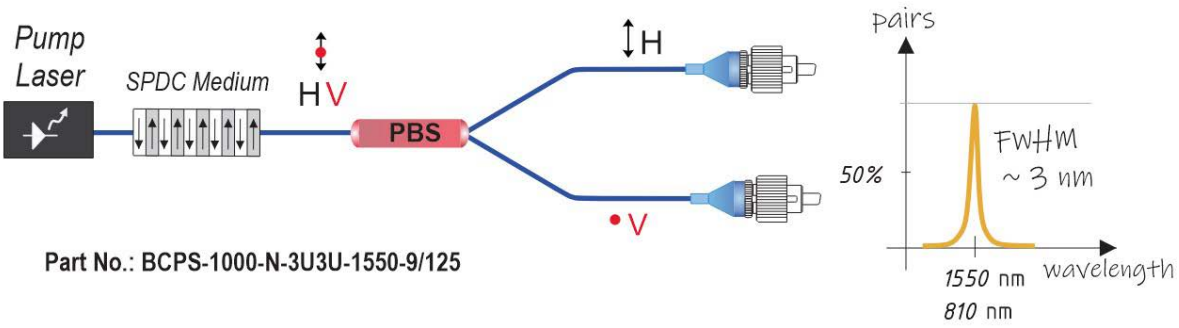


Figure 2. Schematic of a standard narrowband bright correlated photon source implementing a type-2 waveguide with two output ports.

Performance Specifications[1]

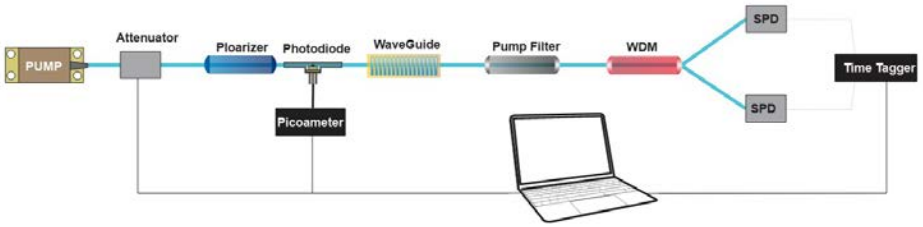
Bright sources | Part number: BCPS-1000-B-3U3U-1550-9/125 and BCPS-1000-N-3U3U-1550-9/125					
Parameter		**Max.**	**Typical**	**Min.**	**Unit**
Signal/Idler degeneracy wavelength[2]		–	1550, 810	–	nm
Signal/Idler degeneracy wavelength accuracy		–	0.5	–	nm
Photon Pairs bandwidth FWHM		–	~80 or ~3	–	nm
Noise supression		–	75	–	dB
Pair-generation rate[3]	For Broad bandwidth	–	$10x10^6$	–	Pairs/second
	For Narrow bandwidth	–	$2x10^6$	–	Pairs/second
Variable output power of Pump laser		12	variable	0	mW
Physical Dimensions	Width x depth x height (cm)	39 x 34.4 x 8.6			
	Weight (kg)	~4			
	Front panel color	Green			

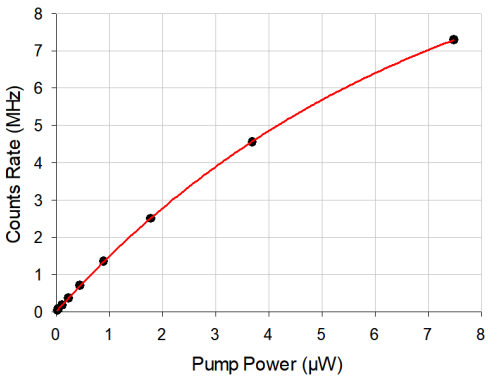
Moderate Sources | Part number: CPS-1000-B-3U3U-1550-9/125 and CPS-1000-N-3U3U-1550-9/125					
Parameter		**Max.**	**Typical**	**Min.**	**Unit**
Signal/Idler degeneracy wavelength[2]		–	1550, 810	–	nm
Signal/Idler degeneracy wavelength accuracy		–	0.5	–	nm
Photon Pairs bandwidth FWHM		–	~80 or ~3	–	nm
Noise supression		–	75	–	dB
Pair-generation rate	For Broad bandwidth	–	$4x10^5$	–	Pairs/second
	For Narrow bandwidth	–	$2x10^5$	–	Pairs/second
Variable output power of Pump laser		12	variable	0	mW
Physical Dimensions	Width x depth x height (cm)	39 x 34.4 x 8.6			
	Weight (kg)	~4			
	Front panel color	Green			

Note:

1. Under continuous-wave (CW) operation.
2. Can be customized for high volume orders (2).
3. Measured at low power level in µW regime. Refer to Figure 3 and 4.

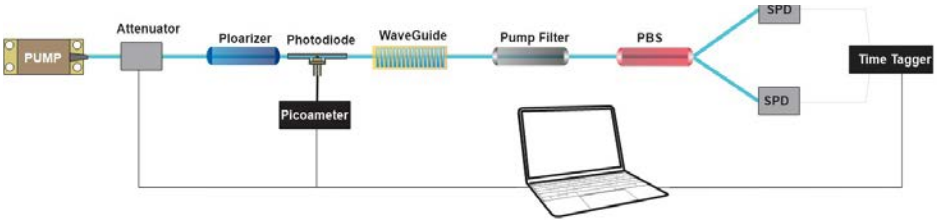
Optical Specifications

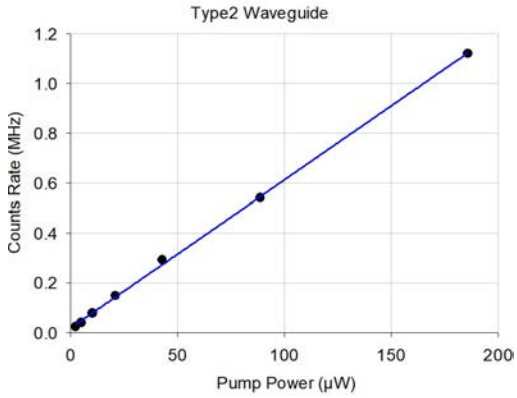




(a) **(b)**

Figure 3. (a) Schematic of the setup used to measure the counts rate of type-0 periodically poled nonlinear waveguide (PPNW). The correlated pairs are separated using a WDM. (b) Counts rate of a broadband type-0 PPNW as a function of the pump power





(a) **(b)**

Figure 4. (a) Schematic of the setup used to measure the counts rate of type-2 periodically poled nonlinear waveguide (PPNW). The correlated pairs are separated using a PBS. (b) Counts rate of type-2 PPNW as a function of the pump power, where the photon pairs are generated within a narrow spectral bandwidth

Operating and Storage Conditions

Parameter	Min.	Max.
Preferred operating temperature 15°C 25°C	15°C	25°C
Operating relative humidity (% RH)	5	60
Storage temperature	0°C	40°C
Storage relative humidity (% RH)	0	90

Part Numbers

As illustrated in Figure 1 and 2, the standard source includes a pump laser, wavelength splitter, accessible HWP, accessible attenuator and controllable optical switch.

Bright Correlated Photon Sources

Bright Correlated Photon Sources

BCPS-1000-Z-XY- W- F

Z = B Broadband
N Narrowband

XYZ: 3A = FC/APC
3S = FC/SPC
3U = FC/UPC

F= 9/125 single mode

W = Specify in nanometers
1550: 1550 nm

Example: BCPS-1000-3U3U-1550-9/125

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Please contact OZ optics for special requirements or integration purposes