



## POLARIZATION-ENTANGLED PHOTON SOURCE NARROWBAND 810 nm

### Features

- Turn-key and room-temperature operation
- Built-in pump laser and noise-suppression filters
- Controllable accidental photons rate

### Applications

- Quantum information science
- Quantum metrology
- Quantum key distribution
- Quantum computing and information processing

### Product Description

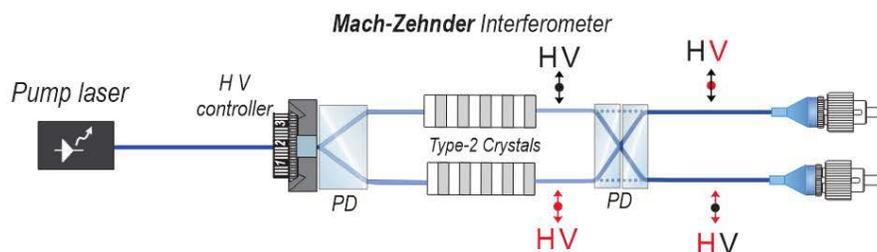
OZ Optics offers entangled photon sources, which implement a pair of periodically poled crystals inside a Mach-Zehnder interferometer. Polarization entangled photon pairs are generated via type-2 spontaneous parametric down-conversion (SPDC). Multiple polarization displacers (PDs) are deployed to separate the pairs into two output ports, installed on the front panel as shown in the photo.

The photon pairs are centered at 810 nm with a bandwidth of a few nanometers. Each source comes equipped with a wavelength stabilized pump laser, variable optical attenuator, and temperature controller to fine tune phase matching parameters to realize the optimal efficiency.

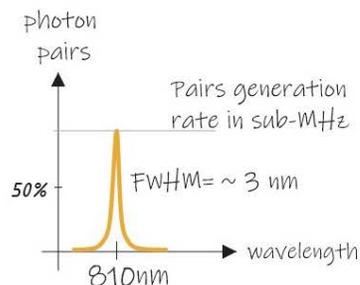
A rotatable half-wave plate (HWP) is integrated to control the number of the photon pairs generated in each crystal (see Figure 1.). Consequently, the polarization reference bases can be set while the entanglement is switched between the polarization and energy domains can be frame, the polarization-entanglement can readily be set by the user. This feature is expected to support the quantum optics R&D community.



Polarization-entangled photon source narrowband at 810 nm



Part No. EPS-1000-3U3U-810-5/125



**Figure 1.** Simplified schematic of a standard narrowband polarization-entangled photon source implementing two type-2 crystals in a Mach-Zehnder interferometer formed using multiple polarization displacers (PDs).

## Performance Specifications<sup>1</sup>

| Part number: EPS-1000-3U3U-810-5/125                                     |                             |                    |      |              |
|--|-----------------------------|--------------------|------|--------------|
| Parameter  | Max.                        | Typical            | Min. | Unit         |
| Signal/Idler degeneracy wavelength                                       | –                           | 810                | –    | nm           |
| Signal/Idler degeneracy wavelength accuracy                              | –                           | 1                  | –    | nm           |
| Photon pairs bandwidth FWHM  | –                           | ~3                 | –    | nm           |
| Pair-generation rate <sup>2</sup>  | –                           | >1x10 <sup>5</sup> | –    | Pairs/second |
| Fidelity <sup>3</sup> to $ \Psi\rangle=( HV\rangle+ VH\rangle)/\sqrt{2}$ | –                           | >98%               | –    |              |
| Two-photon interference visibility                                       | –                           | >98%               | –    |              |
| 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           | Yellow/Gold        |      |              |

**Note:**

- Under continuous-wave (CW) operation.
- Pump power dependent that can be controlled using the built-in attenuator.
- Limited by detector dark counts.

## 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 the source includes the pump laser and HWP.

## Narrowband Polarization-Entangled Photon Sources

**EPS-1000- XY- W- E**

**XY:** 3A = FC/APC  
3S = FC/SPC  
3U = FC/UPC

**E=** 5/125 single mode

**W=** Specify in nanometers  
810: 810 nm

**Example: EPS-1000-3U3U-810-5/125**



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