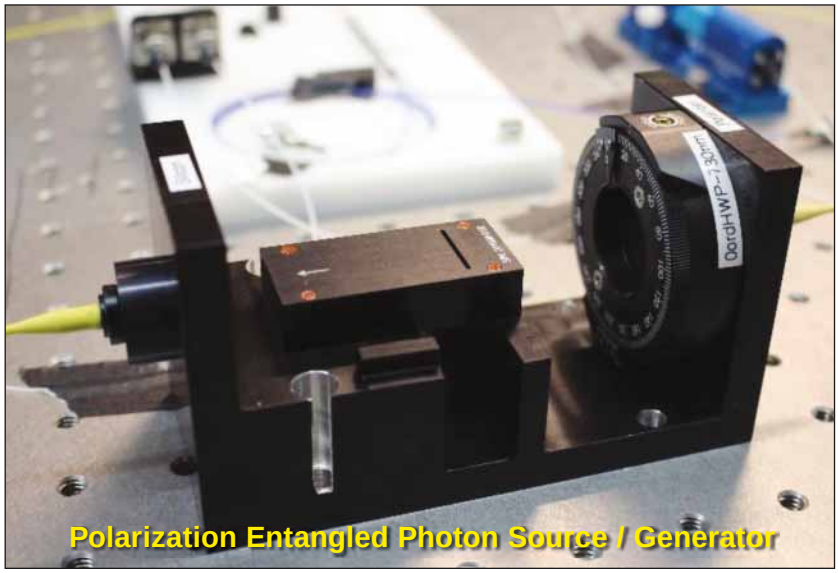
OZ Optics LIMITED
OZ Optics
shop.ozoptics.com
www.ozoptics.com
te lintelo systems bv
photonics. our passion!
www.tlsbv.nl +31 316 340804
CONTACT US
Fax: 1-613-836-5089
sales@ozoptics.com

POLARIZATION ENTANGLED PHOTON SOURCE / GENERATOR GERSHWIN & GUARALDI

PRELIMINARY



Features

- Supports type-0, type-1, type-2 phase matching
- Customizable (crystal material, beam waists, etc.)
- Tunable entanglement (Fidelity range 0➞ >95%)
- Pre-aligned and stable
- Pump blocking for easy basis alignment
- Fiber coupled or free space options
- Count rates (Kcps ➞ Mcps)*
- Heralding efficiencies (>0.1 ➞ 0.5)*

* Design dependent parameters

Applications

- Fundamental quantum information science
- Quantum key distribution
- Quantum computing
- Quantum metrology

Product Description

Crystal based, the EPG product line supports the generation of polarization entangled photon pairs through the well-established process of spontaneous parametric down conversion (SPDC). The heart of the EPG is a compact interferometer which supports type-0/type-1 phase matching (Guaraldi) and type-2 phase matching (Gershwin). Gershwin and Guaraldi can be offered standalone, but can also be purchased fiber coupled and can include a pump laser and crystal temperature control. The generators are fully customizable and designed to support today's quantum optics R&D community.

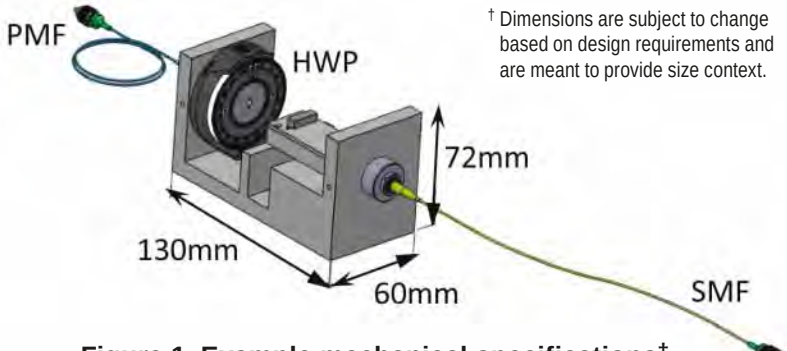


Figure 1. Example mechanical specifications†

Supporting Equipment

Using a dichroic beam splitter, tomographic measurement equipment (HWP, QWP, PBS) and single photon detectors (eg. IDQube) it takes seconds to measure photon pairs, and only a few trial settings of the HWP to generate and confirm very high quality (>95% fidelity) polarization entanglement.

Device Operation

(assumes you have the supporting equipment required)

The EPG can be operated in two modes: Pair Production and Polarization Entanglement mode.

Pair production mode: Pump the generator at the stated phase matching wavelength, and, depending on the variant, split the signal/idler pair using a standard beam splitter or dichroic mirror and send the outputs into suitable single photon detector/detectors.

Polarization Entanglement Mode (3 easy steps!)

1. Make a measurement: Enter pair production mode and choose a polarization measurement
2. Optimize the HWP position: Insert the provided beam block Into the device and minimize all count rates by rotating the HWP. Zero the HWP and engage the click-lock or simply note its position.
3. Click the HWP mount to the 22.5 degree position.

The generator is now producing entangled photon pairs!!. Further optimization can be achieved if desired.

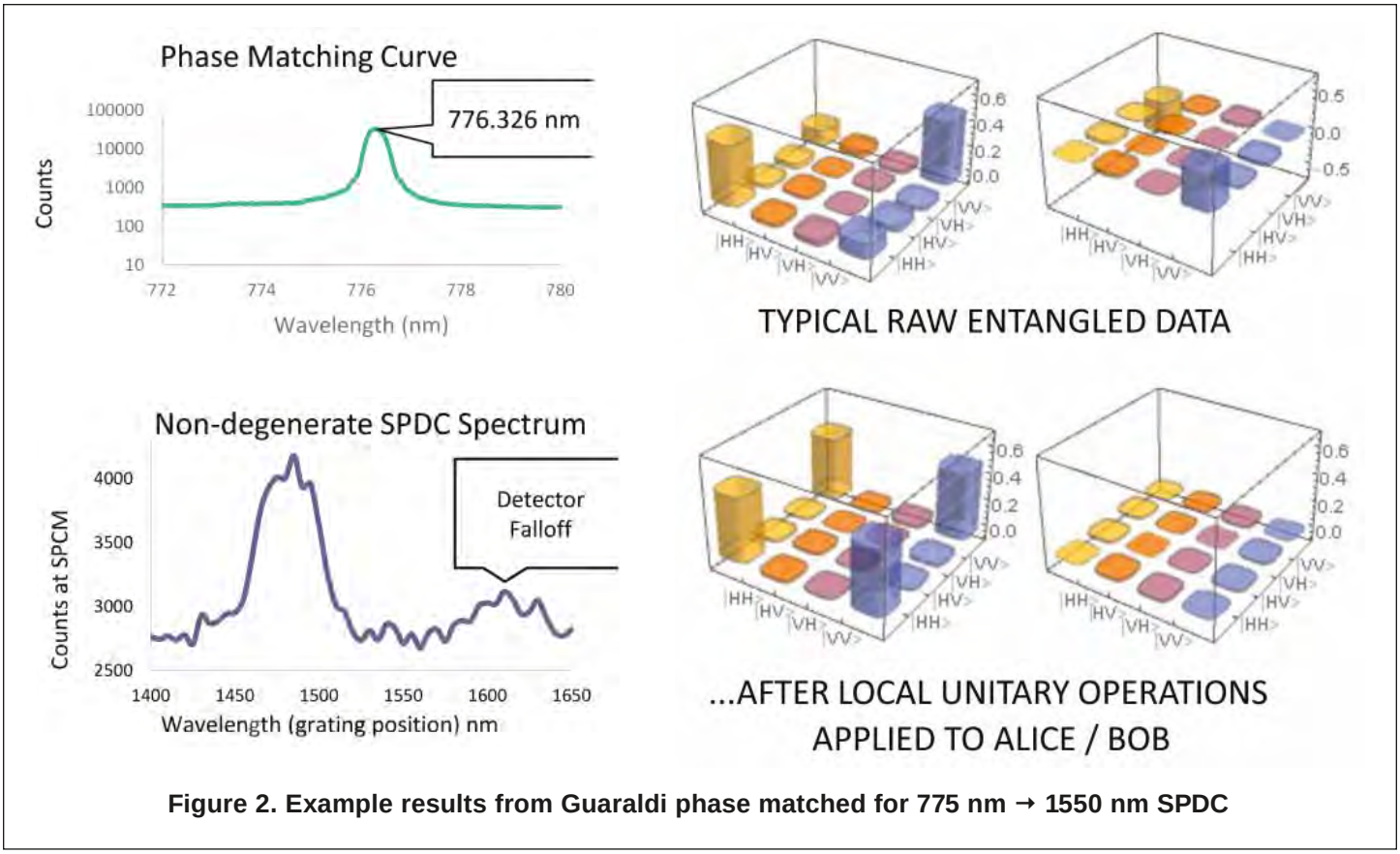


Figure 2. Example results from Guaraldi phase matched for 775 nm → 1550 nm SPDC

Suggested Ordering Information For Custom Parts

Part Number **EPG-1*O*-w_p/w_s/w_i-*T*-*CCC*/*NN*-*a*/*b*-*XYZ*-*JD*-*L***

O = Number of output ports: Specify 1 for signal/idler combined. Specify 2 for signal/idler separated.

w_p/w_s/w_i = Wavelengths of pump, signal and idler in nanometers

T = Type of phase matching:
0: Type 0 (Guaraldi)
1: Type 1 (Guaraldi)
2: Type 2 (Gershwin)

CCC = Crystal material acronym: Example for PPKTP specify KTP, for PPLN specify LNB

L = Specify the fiber length (meter)

JD = Specify jacket diameter.
1 = 0.9 mm loose tube
3 = 3 mm OD PVC cable

XYZ = Connector type of pump, signal, idler. Example 3S, 3U, 3A, 8, SC, SCU, SCA, LC, LCA, MU. Leave idler blank if specifying 2 ports. Use X for no connector / placeholder.

a*/*b = Core/cladding of pump, signal, idler. Use X for specifying free space output. See *Standard Tables* for other connectors.
https://www.ozoptics.com/ALLNEW_PDF/DTS0079.pdf

NN = Crystal length in millimeters: Example NN = 25 specifies a 25 mm long crystal.

Note: We do offer special configuration when needed. Please contact us at sales@tlsbv.nl

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www.tlsbv.nl +31 316 340804