



POLARIZATION ENTANGLED PHOTON SOURCES: GERSHWIN & GUARALDI - OEM

PRELIMINARY

Features:

- Customizable: Supports type-0, type-1, and type-2 phase matching, custom beam waist selection, and coupling optics.
- Tunable Entanglement (Fidelity range 0–95%).
- Pre-aligned and stable.
- Pump blocking for basis alignment.
- Fiber coupled or free space options.
- Count rates (Kcps → Mcps)¹
- Heralding efficiencies (>0.1 → 0.5)¹

Applications:

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

Product Description:

Crystal based, the OEM polarization entangled photon source product line produces polarization entangled photon pairs through the process of spontaneous parametric down conversion (SPDC). These OEM sources are compact interferometers which can be configured for type-0, type-1, or type-2 phase matching. Variants which support type-0 / type-1 are called Guaraldi, while those supporting type-2 are called Gershwin. Both Guaraldi and Gershwin come optically coupled via fiber to free space focusers with pre-selected beam waists which can be customized upon request. Guaraldi and Gershwin are OEM style devices designed to support the quantum optics R&D community.

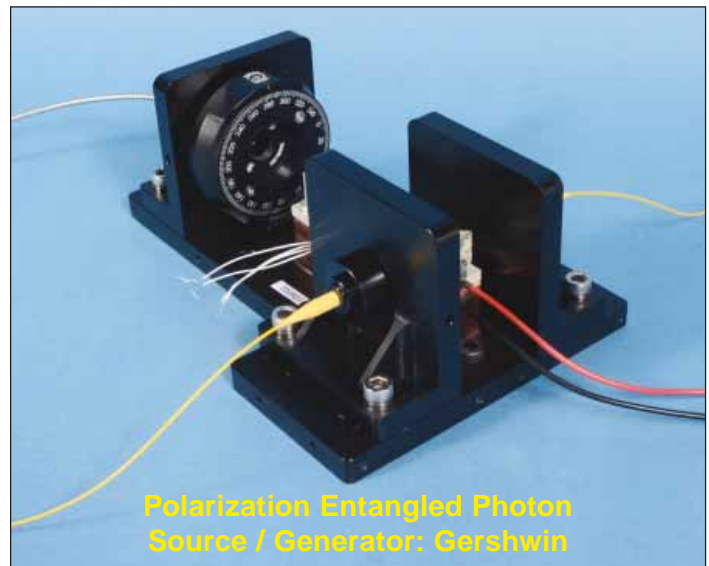
Supporting Equipment:

Using a laser, 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.

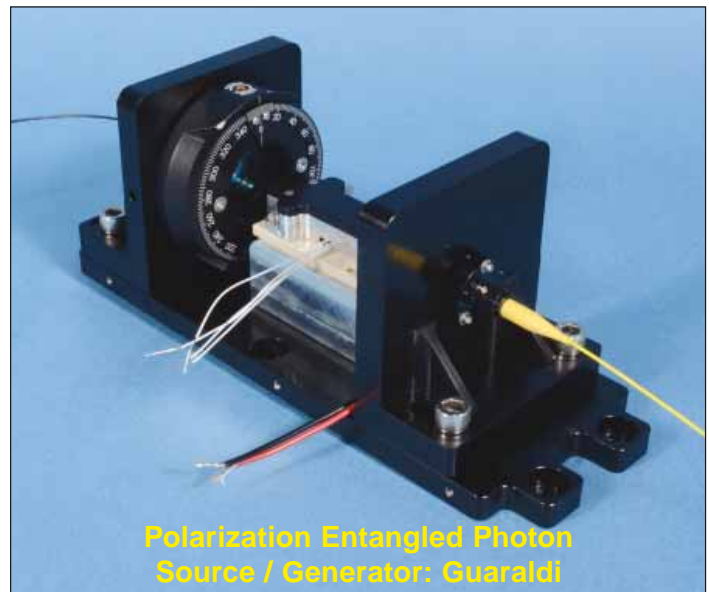
Device Operation²:

Guaraldi and Gershwin can be operated in two modes: Pair Production and Polarization entanglement mode:

Pair production mode: To create pairs, the HWP is set to 0 or 45 degrees. The generator is pumped with a suitable (correct wavelength) laser and the output can be split with either a 50:50 beam splitter or a dichroic.



Polarization Entangled Photon Source / Generator: Gershwin



Polarization Entangled Photon Source / Generator: Guaraldi

Polarization entanglement mode: In polarization entanglement mode, the operation is identical to pair production mode except that the HWP is set to 22.5 degrees. Further optimization of the entanglement quality can be achieved by small adjustments to the HWP setting if desired.

¹ Design and implementation dependent parameters.

² Supporting equipment assumed.

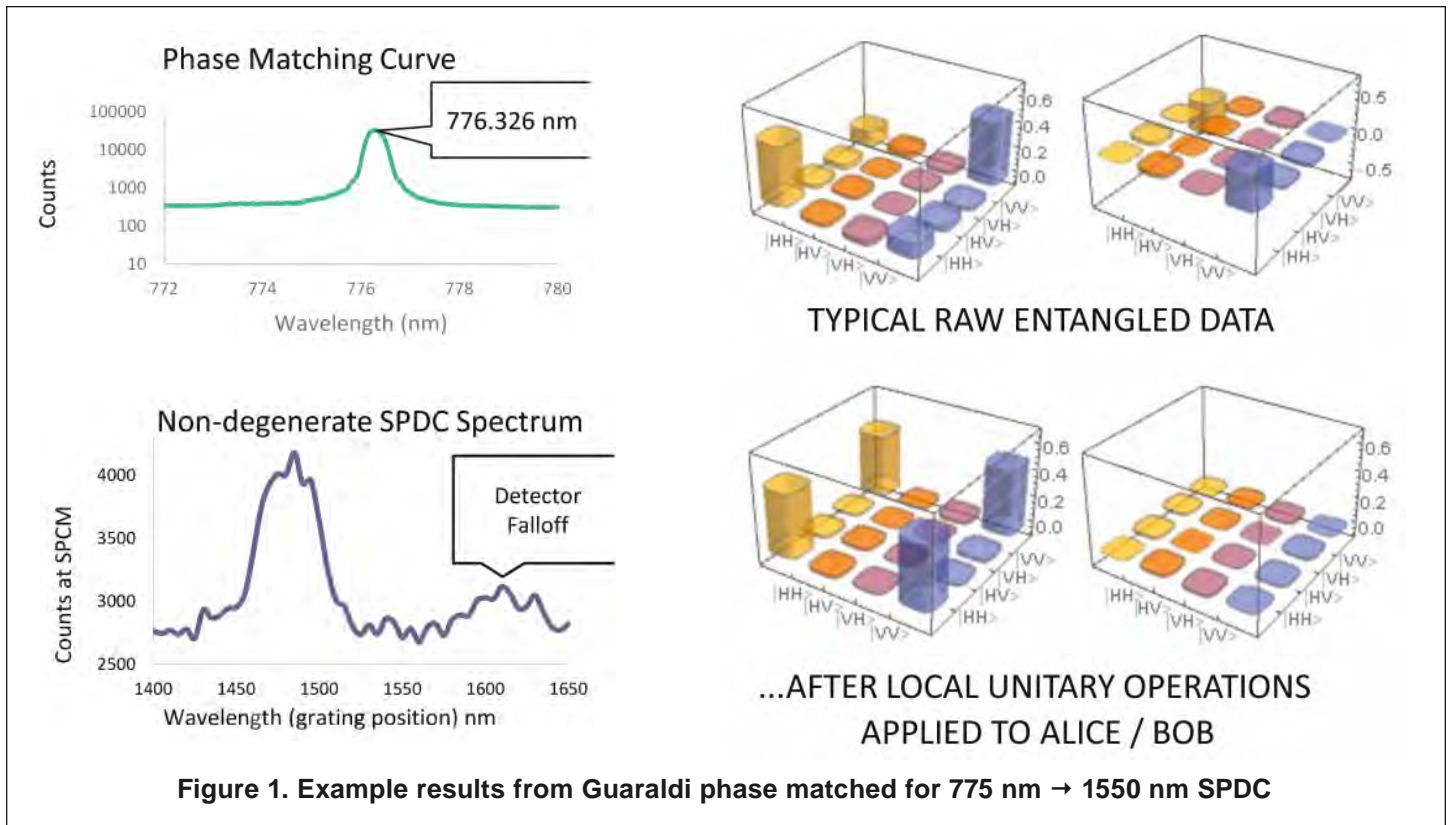


Figure 1. Example results from Guaraldi phase matched for 775 nm → 1550 nm SPDC

Standard Product Specifications:

	Gershwin	Guaraldi
Mechanical		
Dimensions (mm) L x W x H	192 mm x 130 mm x 76 mm	204 mm x 66 mm x 76 mm
Electrical		
TEC	Max.	Max.
Current (A)	6 A	6 A
Voltage (V)	5.8 V maximum	5.6 V maximum
Operating Temperature (°C)	80°C maximum	80°C maximum

Suggested Ordering Information For Custom Parts:

Part Number **EPG-1O-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

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

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

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

L = Specify the fiber length (meter)

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