OZ Optics LIMITED
OZ Optics
shop.ozoptics.com
www.ozoptics.com

219 Westbrook Road
Ottawa, ON, Canada, K0A 1L0

Toll free: 1-800-361-5415
Telephone: 1-613-831-0981
Fax: 1-613-836-5089
sales@ozoptics.com

POLARIZATION ENTANGLEMENT TOMOGRAPHY ANALYZER

PRELIMINARY

Features:

- Plug-and-play analyzer with a controller unit
- Customized software and intuitive GUI
- Quick and precise polarization state rotators
- Compact size and small footprint

Applications:

- Polarization state tomography
- Automation of multi-polarization state analysis

Product Description:

This cost-effective analyzer reduces the complexity level, effort, and cost to perform one of the most precise polarization entanglement analysis using two detectors [1]. The analyzer as shown in Figure 1 is provided along with a control unit with a USB port and power supply. The intuitive graphical user interface (GUI) is pre-programed to perform a set of 36 measurements (shown in Figure 2) in the canonical basis {H, V, D, A, R, L}⊗{H, V, D, A, R, L} for generating precise tomography through two single-photon detectors.

This polarization system rotates the polarization states of the photon pairs with a sub-degree precision, which is achieved through built-in encoders enabling closed loop operation. The coincidences rate, which is the core of reconstructing a photon pair polarization state, is thus realized at high precision with excellent repeatability in the course of a quick experiment.

In addition, heralding efficiency of a given polarization entangled-photon source can be maintained thanks to high coupling efficiency between the input and output fibers delivering the photon pairs from the source to the detectors with a negligible optical loss.

FIG. 1. Quantum Polarization State Analyzer illustrating the two rails of motorized rotation stages and the control unit. In each rail, a rotatable quarter waveplate, half waveplate and fixed polarizer combination allows projection into any single-qubit basis. The two-qubit measurements are then recorded from the two rails feeding two single-photon detectors, connected to a time tagging unit.

This device consists of two rotation stages as shown in Figure 1. Each stage contains a rotatable quarter-wave plate (QWP), rotatable half-wave plate (HWP) and fixed polarizer, which can be replaced with a polarizing beam splitter (PBS) if required. The input and output ports are coupled to fiber pigtails. Systems with connector receptacles or collimators for free-space detection can also be provided.

Specifications

Parameters	
Optical Insertion loss	<0.75 dB*
Optical Wavelength (nm)	1550, 810 or upon request
Repeatability	0.1°
DC Voltage Input	5 V
Communication	TTL RS232 via USB port
Environmental Operating Conditions	
Temperature Range	15 to 40 °C
Maximum Relative Humidity	<80% at 31 °C (Non-Condensing)

* Measured at 1550 nm at room temprature

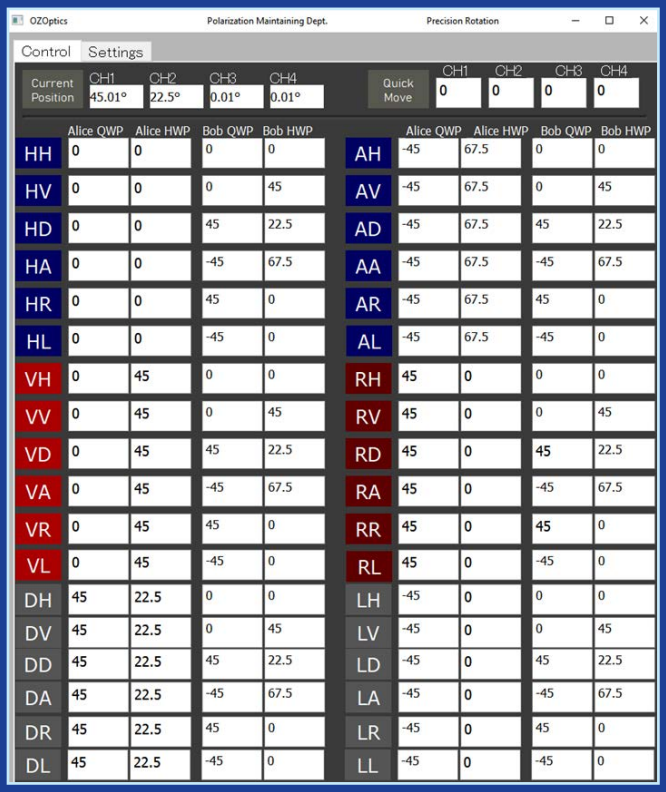

FIG. 2. The GUI of the software showing the set of the 36 measurements, where each measurement is executed by clicking the corresponding button.

Ordering Information:

(Pigtail Style, Polarization Entanglement Analyzer)

MQA-W-a/b-I-O-P-LB-XY-JD-L

W = is the operating wavelength in nm

a/b = Fiber core/cladding

I Input fiber type: S = Singlemode (standard)
P = Polarization maintaining

O Output Fiber type: M= Multimode
S = Singlemode
P = Polarization maintaining

P = Polarizer option 1 = for Polarizer
S&P = for Polarizing beam splitter

LB = Backreflection level: 40, 50, or 60dB
60dB for 1300 and 1550 nm only

JD = Fiber Jacket Type:
1 = 900 Micron OD hytrel jacket
3 = 3 mm OD Kevlar reinforced PVC cable
See Table 7 of the Standard Tables data sheets for other jacket types

XY Input and Output Connector Codes:
3S = Super NTT-FC/PC
3U = Ultra NTT-FC/PC
3A = Angled NTT-FC/PC
LC=LC
LCA= Angled LC
SC = SC
SCA = Angled SC
See Table 6 of the Standard Tables data sheet for other connectors

L = length (meter)

References:

[1] J. B. Altepeter, E. R. Jeffrey, P. G. Kwiat, S. Tanzilli, N. Gisin, and A. Acín "Experimental Methods for Detecting Entanglement" Phys. Rev. Lett. 95, 033601,15 July 2005.