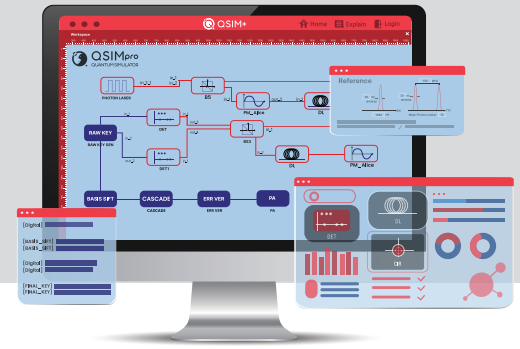
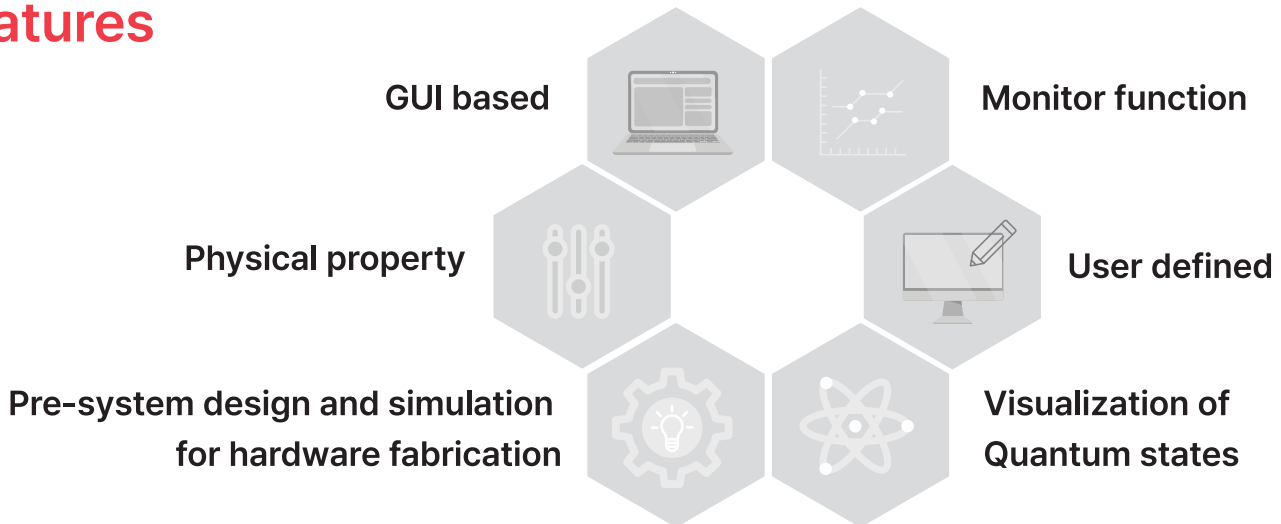


## Software simulator for Quantum communication

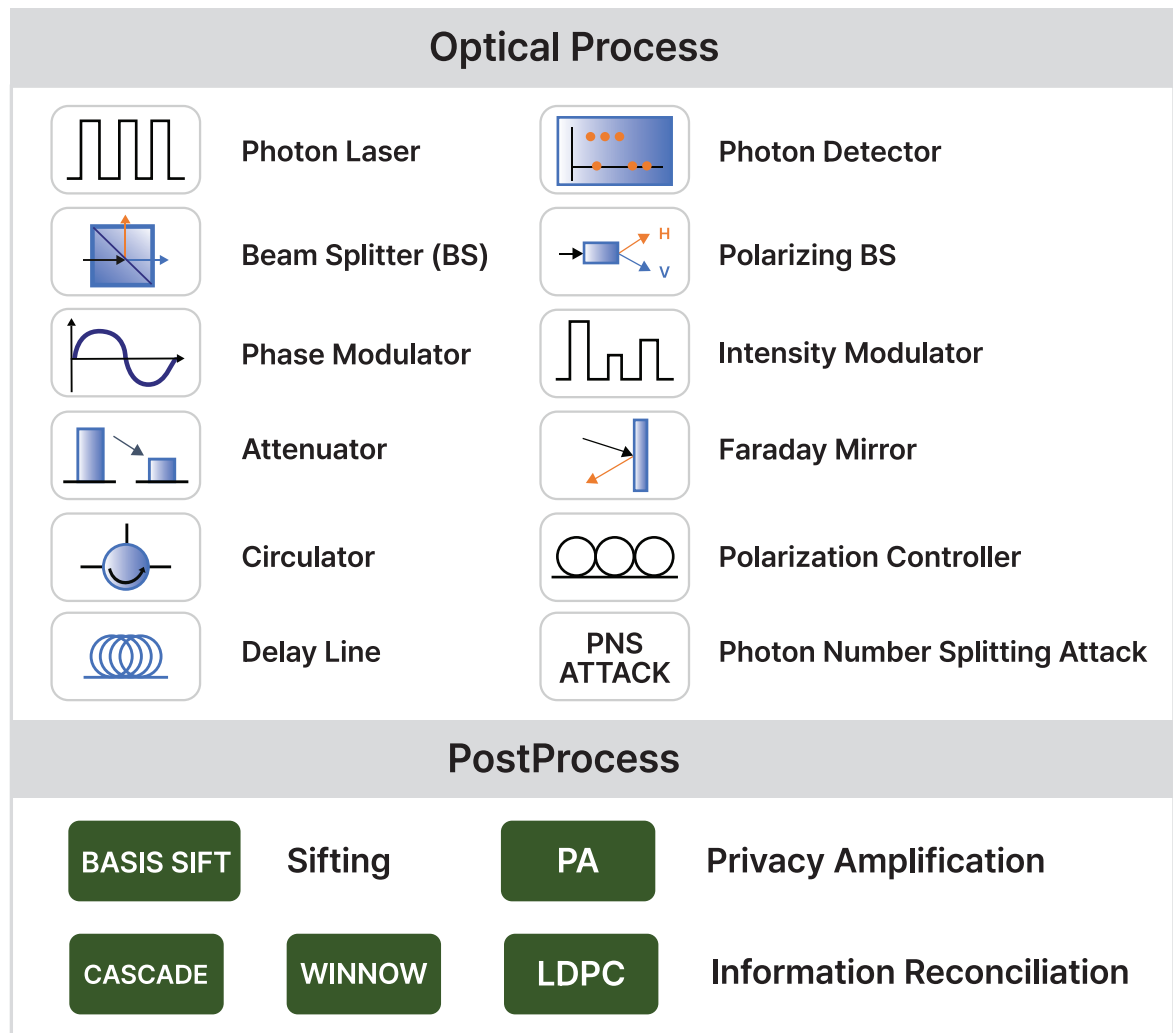
- ✓ Training for Students and non-experts
- ✓ Pre-verification of Quantum communication system



## Features



## Main Blocks



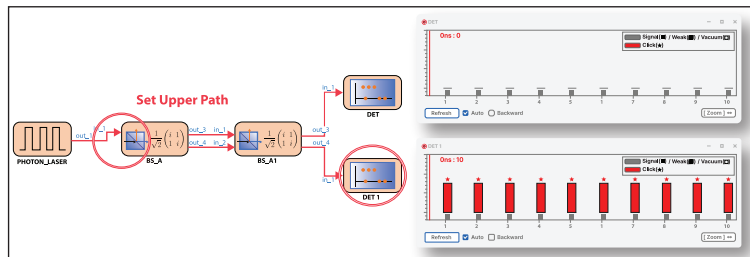
## Key Functions

### ➤ Mach-Zehnder Interferometer (MZI)

- $\text{PhotonState(UpperPath)} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$
- $BS \text{ State} = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix}$
- $BS \times \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{i}{\sqrt{2}} \end{pmatrix}$
- $BS_1 \times \begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{i}{\sqrt{2}} \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix} \begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{i}{\sqrt{2}} \end{pmatrix} = i \times \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

"Detected Only At Lower DET"

Formular Result



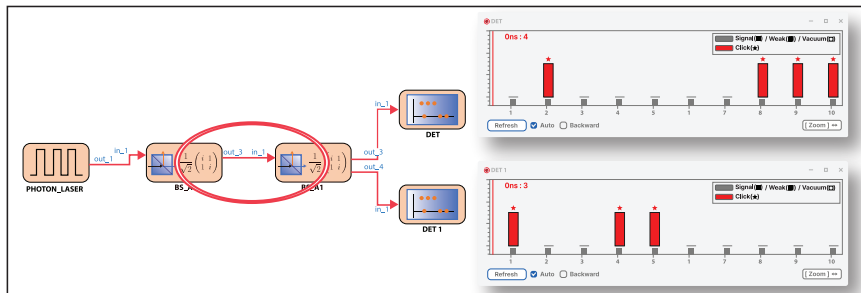
QSIMpro Simulation Result

### ✓ When Blocking the Lower Optical Path

- $\text{PhotonState(UpperPath)} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$
- $BS \text{ state} = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix}$
- $BS \times \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} = \begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{i}{\sqrt{2}} \end{pmatrix}$
- $BS_1 \times \begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{i}{\sqrt{2}} \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ i & 1 \end{pmatrix} \begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{i}{\sqrt{2}} \end{pmatrix} = \begin{pmatrix} \frac{1}{2} \\ \frac{i}{2} \end{pmatrix}$
- $\begin{pmatrix} \frac{1}{2} \\ \frac{i}{2} \end{pmatrix} = \frac{1}{2} \times \begin{pmatrix} 1 \\ 0 \end{pmatrix} + \frac{i}{2} \times \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

"Detected in Both DETs"

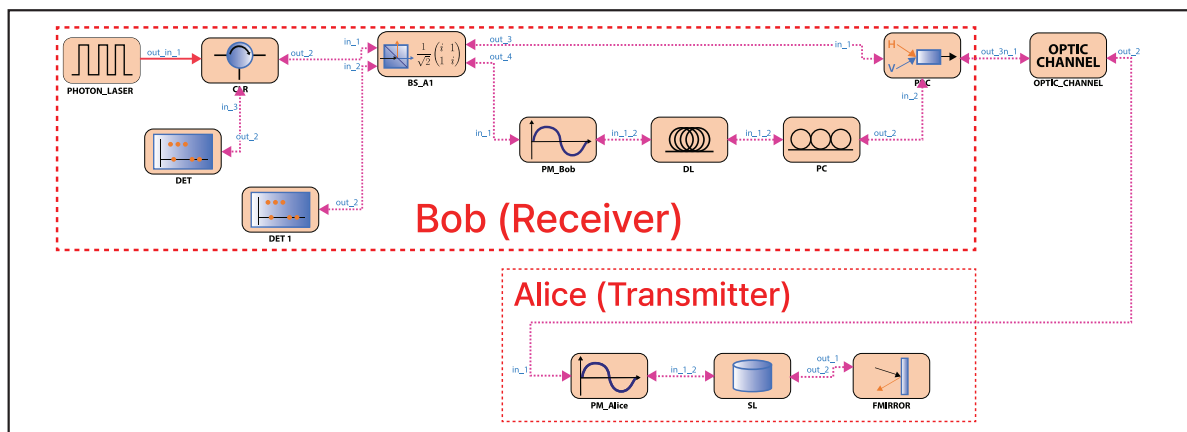
Formular Result



QSIMpro Simulation Result of Blocking the Lower Optical Path Between BS and BS1

### ➤ Capability to Verify Quantum State Characteristics

### ➤ Plug & Play BB84 Protocol



- Simulation of Bidirectional Transmission Operation
- Ability to free Adjust Phase Values
- Verification of Operation Based on Laser Configuration Settings

**?** ANY  
QUESTION?

**Contact us**  
[www.qsimplus.com](http://www.qsimplus.com)  
[info@qsimplus.com](mailto:info@qsimplus.com)

