



quED

The Entanglement Demonstrator



Hardware

qutools' quED is a state-of-the-art physics experiment for the generation and analysis of polarization-entangled photon pairs. Its design combines recent achievements of quantum optics technology into a simple and user-friendly system for academic, research and applied purposes.

The setup is perfectly suited to demonstrate the physics of entanglement in student lab courses at colleges and universities. The high performance enables its integration into modern scientific experiments and commercial applications. A fully automated motorized version is available.

quED Specifications

	Basic model	High rate option
Single-count rate	> 10 kHz	> 50 kHz
Coincident-count rate	> 1 kHz	> 5 kHz
Pump laser power @405nm	15 mW	> 50 mW
Output laser power	< 10 μ W	
Operating wavelength	810 nm	
Entanglement quality	$S > 2.3$	
Phase-matching	Type I	
SPDC	Degenerate; non-collinear	
Coincidence window length	Approx. 40 ns	
Dimensions (in mm)	Optical unit: < 450 x 600 x 100 Electronic unit: 480 x 300 x 150	
Counting rate interface	Graphical touch display	
Connections	USB, Ethernet	

Key Features

- Easy-to-use
- Generation / analysis of true polarization-entangled photon pairs
- Complete system to violate Bell's inequalities (CHSH)
- Hands-on study of quantum phenomena
- Custom configuration
- Motorized version available
- Additional polarization control and polarization analysis optics available

Add-Ons

quED-MI Michelson Interferometer

Demonstrate the wave nature of single photons through their interference or build a quantum eraser. Also available in a motorized version.

quED-HBT Hanbury Brown-Twiss

Explore the particle nature of single photons or generate random numbers.

quED-HOM Hong-Ou-Mandel Effect

Experience the purely quantum 2-photon interference effect by revealing the Hong-Ou-Mandel dip. Also available in a motorized version.

quED-QKD Quantum Key Distribution

Exploit quantum resources to demonstrate secure key generation using the BB84 key distribution protocol. Also available in a motorized version.

System includes

- Two silicon avalanche photodiodes
- Four channel counter with integrated coincidence logic
- Two polarizers in rotation mounts
- Control and readout unit with touch display and rotary knob - quCR
- Alignment utilities including auxiliary low-power laser module
- Connection to a PC

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