Quantum Dot Single-Photon Generation Source

Picosecond Laser for Ultimate Control of the Emission Process of Quantum Dots

picoEmerald & pulseSlicer: Ultimate control of the emission process of quantum dots single-photon generation with a pulsed picosecond laser source

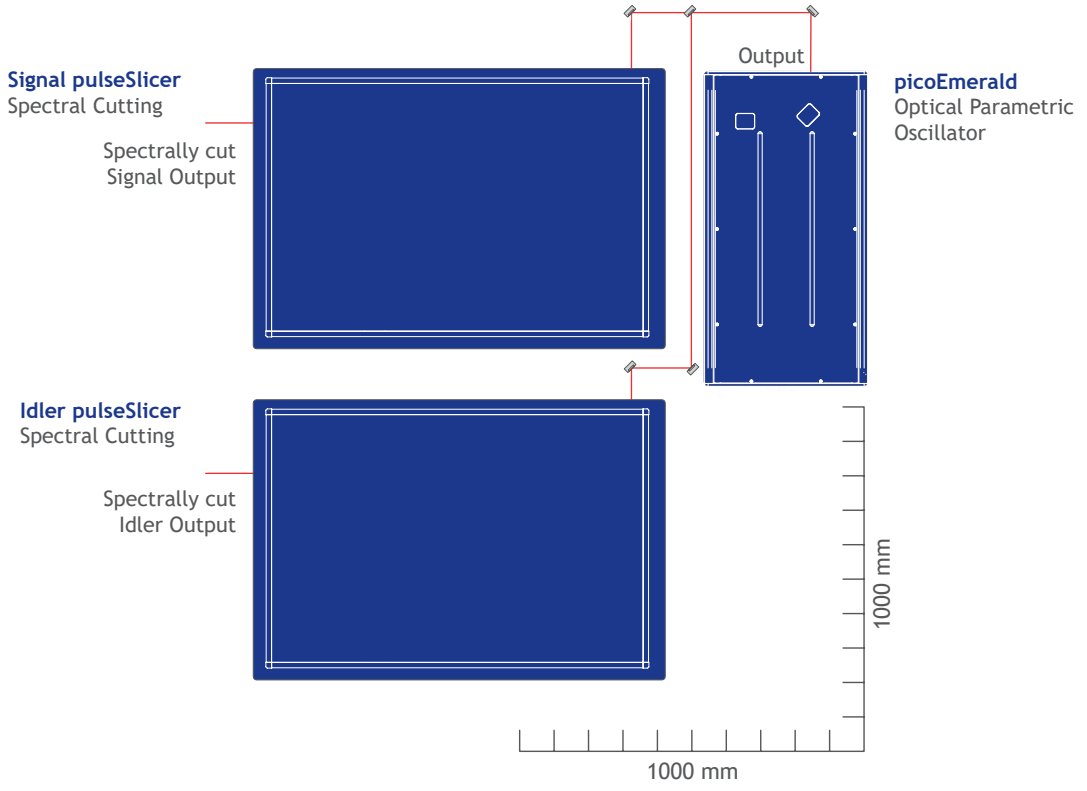
The realization of a quantum dot single-photon source or the creation of entangled photons is often based on two key elements: a quantum dot emitter and a suitable optical excitation source, which allows the appropriate control of the emission process.
Controlled single-photon generation “on demand”, i.e. by means of a trigger event, can be achieved by pulsed excitation of a single photon emitter. Picosecond (ps) lasers are particularly suitable for the pulsed excitation of quantum dots due to their narrow spectral bandwidth in comparison to femtosecond lasers. They therefore enable resonant excitation of the quantum dot (QD) emitter with very high efficiency and without disturbing background emission.
To achieve an optimal resonant excitation condition, the spectral bandwidth of the excitation light source has to match the absorption bandwidth of the desired transition process. Since the optimal spectral bandwidth depends strongly on the properties of the individual QD emitter system, a pulsed excitation source with adjustable spectral bandwidth and the capacity to fine-tune the center wavelength may be considered advantageous.
The combination of the tunable ps laser picoEmerald and the spectrum slicer (laser monochromator) pulseSlicer from APE offers this possibility and supports its customers in the field of quantum research, quantum-microscopy, or ghost imaging.



- NIR and IR wavelength range available, including telecom wavelengths
- Narrow bandwidth to efficiently address specific resonances in quantum dot samples
- Fully automated wavelength and bandwidth adjustment
- Adaption of bandwidth for NIR and IR independently
- High repetition rate to keep measurement time small

Specifications

Specifications	Operation Mode A - Signal - NIR	Operation Mode B - Idler - IR
Wavelength Range	700 ... 990 nm	1080 ... 1950 nm
Spectral Bandwidth	0.04 ... 0.5 nm at 700 nm (2 ... 18 ps) 0.02 ... 1.0 nm at 990 nm (2 ...70 ps)	0.12 ... 1.2 nm at 1080 nm (2 ... 14 ps) 0.03 ... 2.6 nm at 1600 nm (2 ... 90 ps)
Typical Power	> 100 mW at 930 nm with 0.3 nm bandwidth > 10 mW at 930 nm with 0.03 nm bandwidth	> 30 mW at 1550 nm with 0.4 nm bandwidth > 3 mW at 1550 nm with 0.04 nm bandwidth
Repetition Rate	80 MHz	
Polarization	Linear; horizontal > 100:1	
Software and Automation	Included	
Remote Control	Possible via USB / Ethernet TCP/IP / Serial RS232	



Contact

APE Angewandte Physik & Elektronik GmbH

Plauener Str. 163-165|Haus N|13053 Berlin|Germany
T: +49 30 986 011-30
F: +49 30 986 011-333
E: sales@ape-berlin.de
www.ape-berlin.de

Your local contact

PHOTO TECHNICA www.phototechnica.co.jp
フォトテクニカ株式会社
〒336-0017 埼玉県さいたま市南区南浦和 2-18-2

TEL:048-871-0067 FAX:048-871-0068
e-mail:voc@phototechnica.co.jp

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