SPW 2011

Single Photon Workshop 2011

Monday 27th June 2011 – Thursday 30th June 2011

PTB Braunschweig, Germany

Program

Monday, June 27th

08:00 **Registration open**

09:00 – 09:30 **Opening, Presentation of the Vendors**

ID QUANTIQUE SA, Carouge/Geneva, Switzerland,

MICRO PHOTON DEVICES S.r.l., Bozen, Italy,

PicoQuant GmbH, Berlin, Germany,

qutools GmbH, Munich, Germany,

09:30 – 10:30 **Applications**

09:30 – 10:00 Figer (invited)
Single Photon Imaging Array Detectors for Astrophysics and Biophotonics

10:00 – 10:15 Krainak
Photon number detectors for NASA applications

10:15 – 10:30 Krichel
Time-of-Flight Depth Profiling Applications Based on Single-Photon Detection

10:30 – 11:00 **Coffee break**

11:00 – 12:30 **Optical Communication and Quantum Information Processing**

11:00 – 11:30 Farr (invited)
Single Photon Detectors for Capacity Achieving Optical Communication

11:30 – 11:45 Gerrits
Characterization of high-purity, pulsed squeezed light at telecom wavelengths from pp-KTP for quantum information applications

11:45 – 12:00 Guha
Superadditive Optical Communications: New Applications of Integrated Coherent Photonics and Single Photon Detectors

12:00 – 12:15 Walther
Challenges in Photonic Quantum Information Processing

12:15 – 12:30 Ma
Single photon frequency up-conversion and its applications in quantum information systems

12:30 – 13:30 **Lunch break**

13:30 – 15:00 **Superconducting Detectors I**

13:30 – 14:00 Nam (invited)
Optical and near-infrared photon detection with superconducting devices

14:00 – 14:15 Gerrits
Extending Single-Photon Optimized Superconducting Transition Edge Sensors Beyond the Single-Photon Counting Regime

14:15 – 14:30 Bagliani
Hundred parallel connected TES array for single photon detection

14:30 – 14:45 Akhlaghi
Quantum Tomography and Modelling of a Superconducting Nanowire Single Photon Detector

14:45 – 15:00 Tanner
Spatially Dependent Timing in a Superconducting Single Photon Detector

15:00 – 15:30 **Coffee break**

15:30 – 17:00 **Single Photon Avalanche Detectors I**

15:30 – 16:00 Smith (invited)
Quantum-enhanced metrology in the real world: Losses, decoherence, and noise make life on the quantum edge challenging

16:00 – 16:15 Itzler
What Does SPAD Afterpulsing Actually Tell Us About Defects in InP?

16:15 – 16:30 Bahgat Shehata
InGaAs/InP single-photon detection module with clean temporal response

16:30 – 16:45 Patel
Gigacounts-per-Second Single Photon Detection Based on a Single-Pixel Avalanche Photodiode

16:45 – 17:00 Acerbi
Dark counts, afterpulsing and timing jitter of latest InGaAs/InP Single-Photon Avalanche Diodes

Tuesday, June 28th

08:00 Registration open

09:00 – 10:30 Quantum Information Processing, Quantum Key Distribution, Theory

09:00 – 09:30 Kwiat (invited)
Optimized (Non)Entanglement: Designer Sources for Next-Generation Quantum Information

09:30 – 09:45 Almeida
Exponentially faster measurements of quantum dynamics via compressive sensing

09:45 – 10:00 Collins
An Analysis of Single-Photon Detectors in a GigaHertz Clock Rate Robust Quantum Key Distribution System

10:00 – 10:15 Lenhart
Latest Results on the Standardization of Quantum Key Distribution

10:15 – 10:30 Meyer-Scott
Demonstration of Quantum Key Distribution System Suitable for High Loss Satellite Uplink

10:30 – 11:00 Coffee break

11:00 – 12:30 Superconducting Detectors II

11:00 – 11:15 Leoni
Waveguide superconducting single photon detectors

11:15 – 11:30 Baek
Single-Photon Detectors Based on a Superconducting a-WxSi1-x Nanowire

11:30 – 11:45 Correa

Single infrared-emitting nanocrystal fluorescence dynamics using superconducting nanowire detectors

11:45 – 12:00 Grein
A Photon-Counting Optical Receiver Based on Superconducting Nanowire Detector Arrays for the Lunar Laser Communications Demonstration

12:00 – 12:15 Natarajan
High Efficiency Superconducting Nanowire Single-Photon Detectors For Optical Quantum Information Science Applications

12:15 – 12:30 Zwiller
Detecting single photons with superconducting nanowires

12:30 – 13:30 Lunch break

13:30 – 15:00 FPGA and Multichannel

13:30 – 13:45 Crotti
High performance Time-to-Amplitude Converter array

13:45 – 14:00 Pooser
FPGA-based gating and logic for multichannel single photon counting

14:00 – 14:15 Cuccato
Ultra-Compact Single-Channel Acquisition System For TCSPC Measurements

14:15 – 14:30 Chen
Experimental Demonstration of the Conditional Nulling Receiver

14:30 – 14:45 Williams
64-Channel Binary Pulse Processing Instrument

14:45 – 15:00 Dell'Anna
Prototype of THz photon spectroscopic camera based on mesoscopic devices

15:00 – 15:30 **Coffee break**

15:30 – 17:00 **Single Photon Avalanche Detectors II**

15:30 – 16:00 Gulinatti (invited)
New Silicon SPAD technology for enhanced red-sensitivity, high-resolution timing and system integration

16:00 – 16:15 Rochas
Asynchronous & 100MHz-gated photon detection at telecom wavelengths

16:15 – 16:30 Restelli
Time-domain measurements of afterpulsing in a periodically-gated InGaAs SPAD

16:30 – 16:45 Bülter
A new red sensitive single photon counting module for timing applications

16:45 – 17:00 Williams
Single Photon Counting Linear-Mode Avalanche Photodiodes

18:00 – 20:00 Poster session (poster size: 1.18 m x 1.45 m)

Lunghi

Free Running Single Photon Detection based on a negative feedback InGaAs APD

Heath

Nano-optical studies of single and parallel nanowire superconducting single photon detectors

Blazej

Picosecond stability photon counting detector package for space missions

Hepp

Color Centers in Diamond for Bright, Narrow-Band Single Photon Emission

Villegier

SWIFTS-SNSPD micro-spectrometer integration with a SiN waveguide

Slattery

Towards narrow linewidth non-degenerate correlated photon pairs

Racu

Impurity centres in GaN and AlN for novel single photon sources

Lamas-Linares

Multimode fiber coupling to transition edge sensors in the visible range

Gu
Photon-number-resolving detection based on synchronized frequency upconversion at 1.04 μm

Senekane

Review of Single Photon Detectors and Their Applicability to Quantum Key Distribution

Witek
Engineering quantum dots for single photon to single spin interfaces

Wu

1550nm laser ranging with a quasi-continuous mode InGaAs APD single-photon detector

Lemmens

Control of Spontaneous Emission and Dynamics of Quantum Dots, Organic Dyes and Molecular Magnets in Confinement

Zhang

Multi-Channel 30 MHz Gating InGaAs/InP Single-Photon Avalanche Diodes for Practical Decoy-State Quantum Key Distribution

Polyakov

Field Programmable Gate Array Technology – enabling real-time data handling in photon-counting applications

Heindel

Quantum key distribution using electrically triggered quantum dot - micropillar single photon sources

Wednesday, June 29th

08:00 **Registration open**

09:00 – 10:30 **Entanglement and Photon Manipulation**

09:00 – 09:30 Zbinden (invited)
What are Single Photons good for?

09:30 – 09:45 Chen
Entangled Photons from a Si-on-Insulator Microring

09:45 – 10:00 Grice
Photon Pair Source Optimized for Multi-Photon Entanglement

10:00 – 10:15 Beveratos
Purcell effect for high fidelity entangled photon pairs

10:15 – 10:30 Evans
Polarization Manipulating Quantum Lightwave Circuits

10:30 – 11:00 Coffee break

11:00 – 12:15 Sources I

11:00 – 11:30 Wrachtrup (invited)
Interfacing diamond defects

11:30 – 11:45 Stevens
Third-Order Antibunching of a Single-Photon Source

11:45 – 12:00 Steudle
Fiber-Integrated Single-Photon Generation and Detection

12:00 – 12:15 Wahl
High Speed Quantum Random Number Generator with Provably Bounded Bias

12:30 – 13:30 Lunch break

13:30 – 15:00 Detection efficiency

13:30 – 14:00 Andrew Shields / Oliver Thomas (invited)
Resolving the Photon Number with fast-gated Silicon Avalanche Photodiode

14:00 – 14:15 Guerreiro
Quantum Cloning Radiometer: towards higher accuracy

14:15 – 14:30 Müller
Towards Traceable Calibration of Single Photon Detectors Using Synchrotron Radiation

14:30 – 14:45 Taralli
Quantum characterization of photon number resolving Transition-Edge Sensor

14:45 – 15:00 Brida
Multimode Spatial Correlation in PDC: Sub-Shot-Noise Quantum Imaging and CCD Calibration

15:00 – 15:30 Coffee break

15:30 – 17:15 Special session: Towards realizing photon-based standards

15:30 – 16:00 Migdall (invited)
Single-Photon Tools, Techniques, and Prospects for Metrology

16:00 – 16:30 Rastello (invited)
Metrology Towards Quantum-Based Photon Standards

16:30 – 16:45 Porrovecchio
A transfer standard for the low power / few photon regime – the trap detector plus switched integrator amplifier

16:45 – 17:00 Schmunk
Relative detection efficiency calibration of single photon avalanche photo detectors using non-classical light

17:00 – 17:15 Degiovanni
Experimental realization of a shuttered heralded single-photon source

19:00 – 22:00 Conference Dinner - Barbecue

Thursday, June 30th

08:00 Registration open

09:00 – 10:30 Sources II

09:00 – 09:30 Goetzinger (invited)
Planar dielectric antennas for collecting photons from a single emitter with near unity efficiency

09:30 – 09:45 Goldschmidt
Toward single photon generation and storage in a rare-earth ion-doped crystal

09:45 – 10:00 Lukishova
Room-Temperature Single-Photon Sources with Definite Circular and Linear Polarizations

10:00 – 10:30 Bleuse (invited)
Quantum Dots in Tapered Photonic Wires: towards Unit-Efficiency Single-Photon Sources

10:30 – 11:00 Coffee break

11:00 – 12:15 Sources III

11:00 – 11:30 Rarity (invited)
Progress in single photon sources, heralded versus true single photons

11:30 – 11:45 Michler
High-frequency electrically driven quantum dot single-photon source

11:45 – 12:00 Reimer
Single photon emitter in a tapered nanowire waveguide

12:00 – 12:15 Zwiller
Slow single photons: merging quantum dots and atomic vapors

12:15 – 12:30 Closing session

12:30 – 13:30 Lunch