Advanced Photon Counting Techniques VII

Mark A. Itzler
Joe C. Campbell
Editors

1–2 May 2013
Baltimore, Maryland, United States

Sponsored and Published by
SPIE

Volume 8727
Contents

vii Conference Committee

APPLICATIONS I: SINGLE PHOTON COMMUNICATIONS AND TCSPC

8727 02 Hyperentanglement for quantum telecommunications (Invited Paper) [8727-1]
N. A. Peters, A. Agarwal, T. E. Chapuran, P. Toliver, Applied Communication Sciences
(United States)

SUPERCONDUCTING SPDs I

8727 08 Technologies for superconducting nanowire single-photon detector array system (Invited Paper) [8727-8]
S. Miki, T. Yamashita, H. Terai, K. Makise, Z. Wang, National Institute of Information and
Communications Technology (Japan)

8727 0A Superconducting nanowire single-photon detectors integrated with waveguide circuits for
quantum information science (Invited Paper) [8727-10]
A. Gaggero, Istituto di Fotonica e Nanotecnologie, CNR (Italy); D. Sahin, Technische Univ.
Eindhoven (Netherlands); F. Mattioli, R. Leoni, Istituto di Fotonica e Nanotecnologie, CNR
(Italy); G. Frucci, S. Jahanmirinejad, J. P. Sprengers, Technische Univ. Eindhoven
(Netherlands); J. Beetz, M. Lermer, S. Höfling, M. Kamp, Julius-Maximilians-Univ. Würzburg
(Germany); A. Fiore, Technische Univ. Eindhoven (Netherlands)

SUPERCONDUCTING SPDs II

8727 0B Multiphoton detection in superconducting nanowires: nonlinear optics in the detector
(Invited Paper) [8727-11]
Z. Zhou, G. Frucci, Technische Univ. Eindhoven (Netherlands); F. Mattioli, A. Gaggero,
R. Leoni, Istituto di Fotonica e Nanotecnologie, CNR (Italy); S. Jahanmirinejad, T. B. Hoang,
A. Fiore, Technische Univ. Eindhoven (Netherlands)

SPADs I: GATED OPERATION

8727 0F Gigahertz-gated InGaAs SPAD system with avalanche charge sensitivity approaching the
fundamental limit (Invited Paper) [8727-15]
A. Restelli, Joint Quantum Institute (United States); J. C. Bienfang, A. L. Migdall, Joint
Quantum Institute (United States) and National Institute of Standards and Technology
(United States)

8727 0G Advantages of gated silicon single photon detectors [8727-16]
M. Legré, ID Quantique SA (Switzerland); T. Lunghi, Univ. of Geneva (Switzerland); D. Stucki,
ID Quantique SA (Switzerland); H. Zbinden, Univ. of Geneva (Switzerland)
Balanced detection in single photon counting [8727-17]
Z. Lu, W. Sun, J. Campbell, Univ. of Virginia (United States); X. Jiang, M. A. Itzler, Princeton Lightwave, Inc. (United States)

Near-IR photon number resolving detector design [8727-18]
J. Bogdanski, E. H. Huntington, The Univ. of New South Wales (Australia)

Precise Monte Carlo simulation of single-photon detectors [8727-33]
M. Stipčević, Duke Univ. (United States) and Institut Ruder Boškovic (Croatia); D. J. Gauthier, Duke Univ. (United States)

SPADs II: ARRAYS

MiSPIA: microelectronic single-photon 3D imaging arrays for low-light high-speed safety and security applications (Invited Paper) [8727-20]
F. Zappa, A. Tosi, Politecnico di Milano (Italy)

New silicon technologies enable high-performance arrays of single photon avalanche diodes (Invited Paper) [8727-21]
A. Gulinitti, L. Rech, Politecnico di Milano (Italy); P. Maccagnani, Istituto per la Microelettronica e Microsistemi, CNR (Italy); S. Cova, M. Ghioni, Politecnico di Milano (Italy) and Micro Photon Devices S.r.l. (Italy)

Compound semiconductor SPAD arrays (Invited Paper) [8727-22]
E. S. Harmon, M. Naydenkov, J. T. Hyland, LightSpin Technologies, Inc. (United States)

SPADs III: NOVEL STRUCTURES

Multiple gain mechanisms integrated in APDs biased below breakdown for sensitivity improvement (Invited Paper) [8727-24]
S. N. Rahman, D. Hall, Univ. of California, San Diego (United States); Z. Mei, Beijing Institute of Technology (China) and Univ. of California, San Diego (United States); Y. H. Lo, Univ. of California, San Diego (United States)

QUANTUM STRUCTURES FOR SPC

Single nanocrystal spectroscopy approaches for investigation of emission efficiency and recombination dynamics of multi-excitons (Invited Paper) [8727-27]
B. D. Mangum, Y.-S. Park, Y. Ghosh, J. A. Hollingsworth, H. Htoon, Los Alamos National Lab. (United States)

PMTs AND PHOTON COUNTING IMAGERS

Performance of a compact position-sensitive photon counting detector with image charge coupling to an air-side anode (Invited Paper) [8727-28]
O. Jagutzki, A. Czasch, S. Schößler, RoentDek Handels GmbH (Germany)
Study on the detection efficiency of gaseous photomultipliers [8727-30]
G. Baishali, Indian Institute of Science (India); V. Radhakrishna, V. Koushal, K. Rakhee, ISRO Satellite Ctr. (India); K. Rajanna, Indian Institute of Science (India)

POSTER SESSION

High speed multichannel time-correlated single photon counting electronics based on SiGe integrated time-to-digital converters [8727-32]
M. Wahl, T. Röhlicke, H.-J. Rahn, V. Buschmann, PicoQuant GmbH (Germany); N. Bertone, PicoQuant Photonics North America Inc. (Canada); G. Kell, Fachhochschule Brandenburg (Germany)

Author Index
Conference Committee

Symposium Chair

Kenneth R. Israel, Major General (USAF Retired) (United States)

Symposium Cochair

David A. Whelan, Boeing Defense, Space, and Security (United States)

Conference Chair

Mark A. Itzler, Princeton Lightwave, Inc. (United States)

Conference Cochair

Joe C. Campbell, University of Virginia (United States)

Conference Program Committee

Gerald S. Buller, Heriot-Watt University (United Kingdom)
Sergio Cova, Politecnico di Milano (Italy)
William H. Farr, Jet Propulsion Laboratory (United States)
Robert H. Hadfield, Heriot-Watt University (United Kingdom)
Majeed Hayat, The University of New Mexico (United States)
Michael A. Krainak, NASA Goddard Space Flight Center (United States)
Robert A. Lamb, SELEX Galileo Ltd. (United Kingdom)
K. Alex McIntosh, MIT Lincoln Laboratory (United States)
Alan L. Migdall, National Institute of Standards and Technology (United States)
Michael Wahl, PicoQuant GmbH (Germany)
Hugo Zbinden, University of Geneva (Switzerland)

Session Chairs

1 Applications I: Single Photon Communications and TCSPC
   Mark A. Itzler, Princeton Lightwave, Inc. (United States)

2 Applications II: Single Photon Laser Radar
   Mark A. Itzler, Princeton Lightwave, Inc. (United States)

3 Superconducting SPDs I
   Joe C. Campbell, University of Virginia (United States)
4 Superconducting SPDs II
Robert H. Hadfield, Heriot-Watt University (United Kingdom)

5 SPADs I: Gated Operation
Simon Verghese, MIT Lincoln Laboratory (United States)

6 SPADs II: Arrays
Joe C. Campbell, University of Virginia (United States)

7 SPADs III: Novel Structures
Mark A. Itzler, Princeton Lightwave, Inc. (United States)

8 Quantum Structures for SPC
Alan L. Migdall, National Institute of Standards and Technology (United States)

9 PMTs and Photon Counting Imagers
Alan L. Migdall, National Institute of Standards and Technology (United States)