Quantum Optics and Photon Counting

This conference has an open **call for papers:**

SUBMIT AN ABSTRACT
(SIGN IN REQUIRED)

Submission guidelines for Authors and Presenters

Important Dates

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Abstract Due:
24 October 2018

Author Notification:
18 January 2019

Manuscript Due Date:
6 March 2019

Conference Committee

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Conference Chairs

Ivan Prochazka, Czech Technical Univ. in Prague (Czech Republic)
Roman Sobolewski, Univ. of Rochester (United States)
Ralph B. James, Savannah River National Lab. (United States)
Peter Domokos, Wigner Research Ctr. for Physics, Institute for Solid State Physics and Optics (Hungary)
Adam Gali, Wigner Research Ctr. for Physics, Institute for Solid State Physics and Optics (Hungary)

Program Committee

Josef Blazej, Czech Technical Univ. in Prague (Czech Republic)
Ulrich Schreiber, Technische Univ. München (Germany)
Valery Zwiller, KTH Royal Institute of Technology (Sweden)

Call for Papers

[Photon counting represents the ultimate level of sensitivity in optical measurements. The feasibility of individual photon detection has opened a broad spectrum of new applications in both research and industry now.

The fast emerging types of solid state photon detectors are providing simple, cheap and rugged tools to register and time tag photons. Superconducting photon detectors, either in the form of an ultrathin superconducting nano-stripe or a transition-edge sensor, are presently the highest performance devices, especially in the near-infrared optical spectrum. These devices are routinely used in quantum information experiments. They exhibit high quantum efficiency, MHz counting rate, and very low jitter, and can be implemented as photon-number and/or photon-energy resolving devices. Avalanche photodiodes specifically designed for single photon counting have been developed on the basis of various materials during the last 30 years. They have been tailored for numerous applications in optical sensors, quantum cryptography, optical ranging and Lidar, time resolved spectroscopy, laser-induced fluorescence, astronomy and optical time transfer, to name just a few. Finally, there is a fast growing area of photon counters based on various nanostructures and nanodevices, as well as high energy radiation photon detectors for nonproliferation, security and medical uses. The conference will gather an audience from the contributing research community active in the academic, industrial, space related, physics and research fields.

Quantum Optics incorporates a variety of experimental systems in which the interaction of single quantum objects can be controlled close to the ultimate limit of fundamental quantum fluctuations. These quantum objects include atoms, ions and photons, as well as artificial solid-state based objects like electrons in quantum dots, color-centers in solids or superconducting qubits. The research focus is on the realization of strong enough coupling between quantum objects so that the controlled interaction can be employed as a building block of quantum information processing. Quantum state transfer of photons into quantum memories and two-qubit quantum gates have been recently realized and are ready to be upgraded for being used in larger quantum networks and for extending the scope of applications. All these efforts require the most possible detailed understanding of quantum physics of these objects and their interactions in hybrid systems. This objective stimulates a large scope of experimental and theoretical researches, ranging from entanglement theory as far as to material sciences, which fields exhibit a convergence in their objectives and terminology. In order to survey the current state-of-the-art in photon-based quantum information processing, the discussion is open to both fundamental aspects as well as basic and applied research oriented on the realization of qubits and controlled interactions.

The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

Photon Counting

- new photon counting detectors, both semiconducting and superconducting

- time correlated photon counting advances
- photon number resolving detection
- laser ranging and laser time transfer
- photon counting devices in astronomy
- laser-induced fluorescence
- single molecule detection
- optical time domain reflectometry
- optical sensors
- high-energy radiation photon detectors
- imaging applications using multipixel photon detectors
- new and emerging applications of photon counting.

Quantum Optics
- quantum communication and cryptography
- quantum simulation and computing
- quantum sensing
- quantum imaging and entanglement enhanced metrology
- basic components for quantum information processing
- low dimensional interacting quantum systems
- quantum amplifiers, memories and interfaces
- open quantum systems: driving, dissipation and control
- measurement theory
- detection and metrology for quantum information processing components.

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