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Mark A. Itzler
Joe C. Campbell
Editors

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Introduction

The conference on Advanced Photon Counting Techniques had a successful second year after transitioning to the SPIE Defense, Security, and Sensing Symposium in Orlando last year. This conference again exhibited strong relevance to applications and topics addressed by other conferences at this venue.

The two-day conference began with three sessions dedicated to the applications and techniques of photon counting. Two of the most prevalent applications of photon counting—viz., fluorescence techniques for biological systems, and single-photon time-of-flight measurements for three-dimensional imaging—were well-represented in these sessions. Additional sessions provided treatments of other areas of photon counting technology such as superconducting single-photon detectors and single-photon sources.

The second day of the conference was primarily dedicated to four sessions covering advances related to single-photon avalanche diodes (SPADs). Once again, talks in these sessions covered devices employing a variety of materials systems. Considerable progress was described for more established device technologies represented by Si and InP/InGaAs SPADs, and the use of more novel material systems included recent studies of antimonide-based SPADs for midwave infrared detection and silicon-based devices with infrared absorbers. Specific SPAD performance attributes such as afterpulsing and timing jitter were described in more focused studies, and the role of electronic circuits required for SPAD operation was also covered. Finally, several papers covering recent progress in the design of self-quenching SPADs for longer wavelength ($> 1 \mu\text{m}$) single-photon detection demonstrated the continued interest in this area.

The recent growth in the science, technology, and application of photon counting for advanced sensing has continued steadily over the last year. As the content of these Proceedings show, the SPIE annual conference on Advanced Photon Counting Techniques has established itself as an important event in this field.

Mark A. Itzler
Joe C. Campbell