The **Center for Detectors** presents a talk in the Detector Virtual Workshop

Photon Counting with InGaAsP Single Photon Avalanche Diodes

Dr. Mark Itzler

CEO & CTO at Princeton Lightwave Inc.

Monday, March 12, 2012, 11:00 am – 12:00 pm, Innovation Center, Room 1600
Cookies & Coffee at 10:30 am
Presentation will be broadcast at: https://connect.rit.edu/dvw

Abstract

Single-photon detectors based on avalanche diode structures are frequently the preferred choice for photon counting applications in the short-wave infrared wavelength range from 0.9 – 1.7 μm requiring not only high performance, but also ease of implementation, scalability, and high reliability. Over the past decade, significant progress has been achieved for many properties of single photon avalanche diodes (SPADs) based on the InGaAsP materials system. There has been notable improvement in the fundamental tradeoff between photon detection efficiency and dark count rate, and high precision timing jitter has been demonstrated. One recent trend has been the focus on dramatically increasing the photon counting rates of these devices for communications applications, and enhanced counting rates been realized through advances in hybrid back-end electronic circuitry. There has also been impressive scaling of these detectors to large format arrays to support applications such as 3-D LIDAR imaging, free space optical communications, and low light level sensing. New chip-level monolithic integration has also been implemented to achieve avalanche self-quenching, which promises high levels of SPAD performance and functionality with greatly simplified operational requirements. I will discuss the challenges inherent in further progress beyond these recent developments as well as the long-term prospects for the evolution of InGaAsP SPAD technology.

About the Speaker

Dr. Mark Itzler is currently CEO and CTO at Princeton Lightwave, Inc. For the past 15 years, he has engaged in the development and commercialization of InP-based photodetectors, with a focus on single photon avalanche diodes and on avalanche photodiodes for high-speed fiber optic receivers. Dr. Itzler is a past Chair of the IEEE LEOS Technical Committee on Photodetectors and Imaging; he is presently the Chair of the Advanced Photon Counting Techniques Conference held as part of the SPIE Defense, Security + Sensing Symposium; and he is an Associate Editor of Photonic Technology Letters. Dr. Itzler has authored about 70 technical papers and conference presentations, has been granted 12 patents, and is a Fellow of the IEEE. He recently co-authored a topical review on InGaAsP SPADs [J. Modern Optics 58, 174–200 (2011)].

About the Detector Virtual Workshop

The Detector Virtual Workshop is a year-long NSF-funded program dedicated to the advancement of UV/O/IR detectors. It brings together people from around the world to discuss detector technologies. For more information, visit http://ridl.cfd.rit.edu/ and click on the DVW tab.