



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



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## Metrology of and Metrology using Single Photon Detectors

**Alan Migdall**

Fellow of the Joint Quantum Institute at the National Institute of Standards and Technology (NIST) and  
the University of Maryland

Monday, Nov 28, 2011, 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**

Given the tiny energies involved, the generation and detection of one photon at a time is an extraordinary feat. Even with this difficulty, the development of single-photon technology is rapidly advancing. Because this technology involves dealing directly with individual quantum states, it opens up many areas that push the conventional limits, and thus is a strong motivation for this development. One big driver has been the field of quantum information which offers the potential of nothing less than revolutionizing our abilities to calculate here-to-fore intractable calculational problems, to test fundamental principles of the nature, to provide communication where absolute security is based on fundamental physical principles, and to make measurements beyond what are fundamental limits in the classical world. With all this potential, it is no wonder there is such interest in improving single-photon devices. This talk will review single photon detector and source technology and some applications. One area of particular interest to NIST is their use in metrology. I will present techniques that use this technology for measurements that are not possible any other way and to, in turn, use the techniques made possible by these devices, to characterize the devices themselves. This talk will also discuss their use in a fundamental test of nature.

### **About the Speaker**

Alan Migdall is a Fellow of the Joint Quantum Institute at the National Institute of Standards and Technology (NIST) and the University of Maryland, where he works with nonclassical light sources and detectors for use in absolute metrology, quantum information, and fundamental physics applications. He is also engaged in efforts aimed at advancing single-photon technologies for these applications. Migdall leads the Quantum Optics Group of the Quantum Measurement Division at NIST. He has organized a number of conferences and workshops on single-photon detector and source technology, as well as the applications and metrology of that technology. He founded the Single Photon Workshop, which debuted at NIST in Gaithersburg in 2003 and has continued biannually at metrology labs in the UK and Italy, NIST-Boulder, and Germany in 2011. He has recently co-authored a review of single-photon sources and detectors (Review of Scientific Instruments 82 071101(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.

