

## Physics Division Seminar

# Aaron Miller

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## Superconducting Nanowires for eV-scale Particle Detection

Host: Valentine Novosad

Monday, February 12, 2018 – 203 Auditorium

**NOTE TIME: 11:00 AM**

In this talk I will introduce the technology of superconducting particle detectors for eV-level sensitivity in the detection of several major particle types (e.g., alpha, beta, gamma, x-ray, neutrons, WIMPs) with emphasis on recent developments in nanowire detectors for optical/IR/UV photon counting. These so-called “Superconducting Nanowire Single-Photon Detectors” (SNSPDs) have enabled new scientific measurements and secure communication systems by significantly improving the detection of near-infrared photons, a band that is traditionally problematic for semiconductor- and photomultiplier-based detectors. State-of-the-art devices can achieve >90% near-infrared efficiency, 25 ns dead times, <50 ps jitter, and near zero dark count rates. I will include aspects of detector design, fabrication, and operation. I will also present a brief history of Quantum Opus and how we are working to bring SNSPD technology to researchers through our present commercial systems and new products expected as a result of recent DARPA-sponsored efforts to build a “desktop cryostat” capable of running superconducting devices in a compact, low-power system. I will conclude with some other novel superconducting technologies that may benefit from such a compact cryogenic system.