Frequency Up-conversion via Hot Carrier Luminescence

Tech ID: 21155 / UC Case 2007-156-0

TECHNOLOGY DESCRIPTION

Researchers in the School of Engineering at the University of California, San Diego, have developed a new method for polarization-independent single photon wavelength up-conversion using optical coupling between a primary infrared (IR) Single Photon Avalanche Diode (SPAD) and a CMOS Silicon SPAD.

A primary infrared photon induces an avalanche in the IP SPAD. The photons produced by hot carrier recombination are subsequently sensed by the Silicon SPAD, thus allowing for on-die data processing. Advantages over existing state-of-the-art approaches are minimal power dissipation (1 pW compared to 300 mW), compact solid state device fabricated using proven mass production methods, and can be scaled to large arrays. Reduced after-pulsing is also suppressed compared to present day SPADs.

STATE OF DEVELOPMENT

This technology is in early stage development, but licensing is presently available. Patents pending.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,637,875	01/28/2014	2007-156

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OTHER INFORMATION

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics

RELATED CASES

2007-156-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- STI-bounded Single-photon Detector in a Deep-submicron CMOS Process
- All Optical Inverter, Logic and Memory Circuits based on Vertical Cavity Semiconductor Optical Amplifier-like Devices