Radiation Free Photon Detection Device

Tech ID: 23207 / UC Case 2008-611-0

SUMMARY

Researchers at UCLA have developed a Hybrid Avalanche Photodiode (HAPD) that exhibits enhanced sensitivity by eliminating radiation contamination that arises from materials present in traditional photomultipliers.

BACKGROUND

As the demand for photon detectors with greater sensitivity increases, Avalanche Photodiodes (APD) are being incorporated in conventional photomultiplier tubes (PMT) due to their high quantum conversion efficiency and small size. Nonetheless, the performance of these HAPD devices is degraded by the background noise that is radiated from the radioactive impurities contained in the photomultiplier components.

INNOVATION

Researchers at UCLA have designed an ultra-low background HAPD device that is built primarily with ultra-pure quartz material which possesses intrinsically low radioactive contaminations. As a result, the residual background that remains in conventional HAPD devices is reduced by a factor of 100, leading to imaging techniques with higher resolution and accuracy.

APPLICATIONS

- Medical imaging technologies
  - Positron Emission Tomography (PET), Magnetic Resonance Imaging (MRI), X-ray computed tomography (CT)
- Experimental nuclear and particle physics

ADVANTAGES

- High sensitivity
- Low radioactive contamination
- Low rate detection

STATE OF DEVELOPMENT

Theoretical study is competed, prototype in progress.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,080,806	12/20/2011	2008-611

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OTHER INFORMATION

KEYWORDS

Imaging, Optics, Photon detection, Low background, PET, MRI, CT

CATEGORIZED AS

- **Imaging**
  - Medical
- **Medical**
  - Imaging
- **Sensors & Instrumentation**
  - Scientific/Research

RELATED CASES

2008-611-0

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