Docket #: S09-377

A Method for Ultra-Fast Detection of Ionizing Radiation

Stanford Researchers have patented a method and apparatus for detecting ionizing radiation, that, if successful, would achieve a coincidence time resolution 100x better than current positron emission tomography (PET) detectors. The improvement in photon coincidence time resolution, which increases reconstructed image signal-to-noise ratio and contrast-to-noise ratio, improves PET's ability to visualize and accurately quantify a fewer number of diseased cells. Scan time, patient injected dose, and/or image reconstruction time, could be reduced by a factor of 100. Alternatively, a hundred-fold smaller cross-sectional area detector could be used in clinical whole-body PET systems. These benefits could expand PET's role in earlier disease detection and management, including, real-time imaging applications such as guiding surgical interventions and procedures in disease treatment. The proposed method can also be applied to the detection of other ionizing radiation or types of particles that interact with crystal materials for their detection.

Applications

- **Detection of ionizing radiation** including gamma rays, X-rays, beta rays, alpha rays, and annihilation photons with end user applications including:
    - Advanced time-of-flight (ToF) positron emission tomography
    - Real-time imaging applications such as guiding surgical interventions and disease treatments

Advantages

- Increased accuracy and speed:
    - 100x better coincidence time resolution (1-10 ps PET coincidence time resolution vs. current values of 300-900 ps)

    - 100x reduced scan times or injected radiation dose
    - Increased image signal to noise results in better lesion detection or detection of diseased cells in earlier stages

Patents

- Published Application: 20110204241
- Issued: 8,946,656 (USA)

Innovators

- Peter Olcott
- Craig Levin

Licensing Contact

David Mallin

Licensing Manager, Physical Sciences

Email