Docket #: S11-011

Methods and Systems for increasing the sensitivity of simultaneous multi-isotope positron emission tomography

Stanford researchers have prototyped a system to enhance the sensitivity of triple coincidences for multi-isotope PET by adding an extra detector dedicated for the detection of the third prompt gamma in coincidence with the annihilation photons. Adding this simple, inexpensive, high energy gamma ray scintillation detector to the PET scanner allows for increased detection sensitivity of three gammas in coincidence. This invention significantly improves the observation of multiple positron emitters in PET. It has been experimentally validated and is ready to be commercialized.

Stage of Research:

- Working prototype of a high energy gamma ray detector completed
- Experimentally validated the increase in sensitivity for multi-isotope PET imaging.
- Reduced to working practice, and no further advanced technical development is needed to commercialize the technology.

Applications

- **PET systems**- Simultaneous observation of two positron emitting isotopes with a modified PET scanner. This system is optimized for simultaneously creating F-18 and Zr-89 images for clinical and small animal PET scanners.

Advantages

- **High sensitivity**– adds extra detectors to the PET scanner for increasing the detection sensitivity of three gammas in coincidence
- **Flexible** - The position, the number, geometry, scintillation material, and size of both the extra detectors and shielding can be varied
- **Efficient/Low cost** - Reduces two separated PET scans with different assays into one scan with the two assay combined.

Publications

- Gonzales, E., Olcott, P.D. , Bieniosek, M., Levin, C.S. "Methods and Systems for increasing the sensitivity of simultaneous multi-isotope positron emission tomography"Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC), 2011 IEEE

Patents

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