

# Large-Area Photosensor, Large-Area Radiation Detector And Medical PET Scanner

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## ABSTRACT

Available for licensing rights are large-area photosensor panels and large-area radiation detectors, and/or positron emission tomography (PET) scanner that can be formed by assembling the large-area photosensor panels. The sensor panels are made of closely packed "ABALONE" photosensors (described in US patent publication 2013/0112856 A1), and these panels can be easily shipped and assembled into a large, full-body PET scanner. This would be the first ever full-body PET scanner capable of enclosing the entire human body within a seamless gamma-ray sensitive surface, simultaneously, during the examination time. The expected gain in the detection efficiency leads to a proportional reduction in the radioactive dose given to the patient, which in turn opens up the PET diagnostic technique to the general population, through preventive mass screenings of still healthy people for the presence of otherwise hardly detectable malignancies.

## FULL DESCRIPTION

PET scanners are widely used in the medical field for functional and molecular imaging. Their use as a comprehensive, non-invasive early-stage cancer screening technology is of particular interest because of the PET scanner's ability to detect abnormal metabolic activity that is typical of malignant tumors. However, the wide-spread use of PET scanners for such purposes is presently limited by dated photomultiplier tube (PMT) technology that limits the potential size and functionality of PET scanners. Thus, the majority of scanners in use are small, ring-like structures that can only scan a small portion of a patient's body at a time. Full-body scans can therefore take up to an hour to complete and because of this long scan time, require patients to take large doses of radioactive tracers that the scanners use for detection.

Researchers at the University of California, Davis have previously developed a new, inexpensive and durable photo-sensing technology (ABALONE, U.S. patent publication 2013/0112856 A1) that can be used in place of PMT technology. The same researchers have now used ABALONE sensors to build larger, significantly thinner and more functional photosensor panels compared to ring-like structures built using PMTs. These panels can, in turn, be easily assembled into scanners that enclose the entire body, allowing for quick and efficient full-body PET scans. Patients will therefore be required to take only minimal doses of radioactive tracers for the procedure. In addition to improved ergonomics, accuracy of full-body PET scans will also be increased with this new design compared to ring-PET full-body scans. In incremental ring-scans, many of the gamma rays that are emitted from the tracers in the patient miss detection because of the angle at which they are emitted. This issue is easily resolved with the large-area photosensor panels capable of encompassing the whole body, leading to improved accuracy.

## APPLICATIONS

Large-area photosensor panels can be used to construct affordable and durable full-body PET scanners.

## FEATURES/BENEFITS

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## OTHER INFORMATION

### KEYWORDS

PET, PMT, Photosensors,  
Positron emission  
technology, radiation  
detectors

### CATEGORIZED AS

- **Biotechnology**
  - Health
- **Imaging**
  - Medical
- **Medical**
  - Devices
  - Imaging
  - Screening

### RELATED CASES

2014-870-0

Because of the use of the previously described ABALONE photosensor technology, researchers have been able to develop large-area photosensor panels that are larger, significantly thinner, cheaper to produce, and more durable than photosensor panels made with dated PMT technology. These panels can be easily shipped and assembled into full-body scanners that allow for more efficient and ergonomic procedures than current ring-like PET scanners.

PATENT STATUS

Country	Type	Number	Dated	Case
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