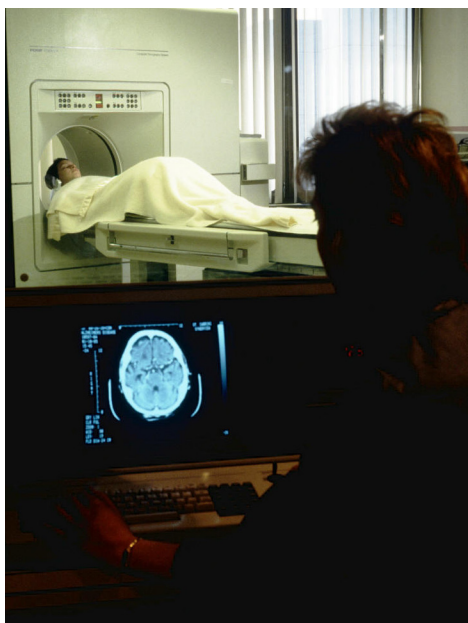




## Edge-on Imaging Probe Detector for Nuclear Medicine

### Creating a multi-purpose imaging probe with excellent resolution

Two important imaging methods in nuclear medicine are Single Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET). Both are molecular imaging techniques that use radio-labeled molecules to image molecular biological processes in vivo. Nowadays there is a great effort to make SPECT/PET devices with increased sensitivity and improved spatial resolution. This is dictated from the needs of imaging single organs (brain, breast, prostate, etc.) and small animals.



At this time the dominant imaging system used in nuclear medicine is the “face-on” SPECT gamma camera (sometimes used as a PET camera). A face-on detector images radiation that hits the detection surface approximately perpendicular to the planar crystal entrance and readout faces.

Edge-on detectors (where the readout surface is perpendicular to the crystal entrance and roughly parallel to the incident radiation) can be used as an alternative to face-on detectors in order to alleviate energy dependent effects. The path length of the scintillation signal is shorter, which results in better image quality and use of a broad range of imaging energies (from <80 keV to 511 keV).

Dr. Robert Nelson at San Diego State University has developed an edge-on detector, which, coupled with his proprietary Sub-Aperture Resolution (SAR) technique lowers cost and increases overall detection efficiency. SAR also allows meaningful corrections to expected signal losses, which leads to improved energy resolution.

This system improves image quality, expands the useful range of gamma ray energies that can be analyzed by a single camera and reduces a patient’s radiation dose during nuclear medical procedures. All of this is accomplished within a compact format suitable for portable cameras.

#### Advantages

- **Reduces camera size.**
- **Increases energy range of useful radiation.**
- **Reduces patient irradiation.**
- **Improves energy resolution.**
- **Enhances image quality.**

#### Applications

- SPECT, PET, Compton cameras.
- Radiopharmaceutical detection using imaged probes.

rev. 4/2007

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