Time-of-Flight PET Breast Imaging Assembly

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Breast Imaging with PET

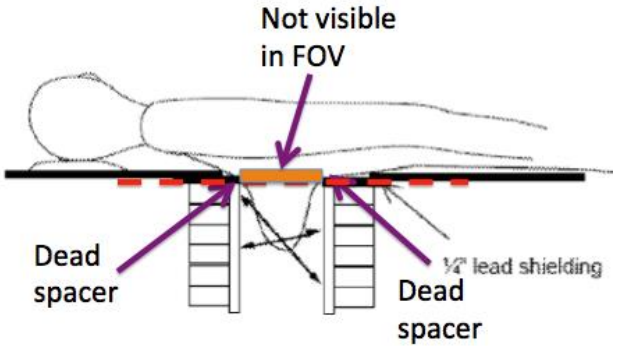
- Use of tumor-avid radiotracers with positron emission tomography (PET) results in a powerful method for identifying small breast lesions even in dense fibroglandular breasts.

- Specialized breast PET imagers achieve high resolutions approaching 1mm and high sensitivity which reduces the amount of radiotracer required to produce a high quality image.

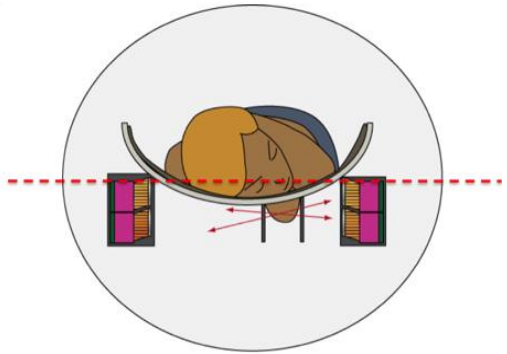
- **Clinical Problem**:
  - PET detection efficiency drops quickly at the detector edges
  - Systems suffer from a serious deficiency of missing a large volume of the breast at the base of the breast (close to the chest wall)
  - In some systems the dead region is as high as one inch

Improved Design Addresses Geometrical Challenge

Current PET imaging modalities have a limited field of view, particularly close to the chest wall.



In the proposed design, the detector heads are place further apart and <u>past</u> the base of the breast increasing the field of view up to the chest wall.



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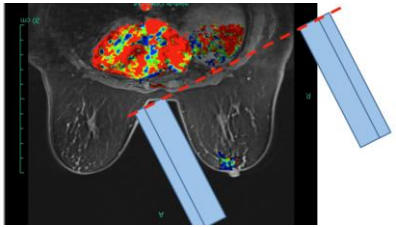
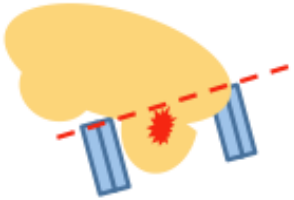
Improved Design Addresses Geometrical Challenge

Novel, circular configuration of detectors improves coverage of the base of the breast. Time-of-flight is used to reconstruct the top and bottom sampling angles that are outside the range of the detector.





Tilting both the detector panels and the patient so that the detector is placed partially under the arm increases coverage and accommodates the base of the breast.

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Intellectual Property

- UVA TechID: MAJEWSKI-TOFPET (2016-090)
  - Title: Time-of-flight positron emission tomography (TOFPET) assembly and related method thereof
  - International patent application no. PCT/US2016/067537 filed December 19, 2016

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