

## Development of the J-PEM for breast cancer detection and diagnosis using positronium imaging

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A detection system of the conventional PET tomograph is set-up to record data from  $e^+e^-$  annihilation into two photons with energy of 511 keV, and it gives information on the spatial density distribution of a radiopharmaceutical in the body of the object [1].

Our goal is to design, construct and to establish the characteristic performance of the J-PEM (Jagiellonian Positron Emission Mammography), which is imaging modality for the detection and diagnosis of breast cancer, based on a novel idea with plastic scintillator [2,3] and wavelength shifter (WLS) [4]. Out of all imaging modalities, J-PEM is a type of Positron Emission Mammography (PEM) which is a dedicated and well-recognized technique to diagnosis the breast cancer which is based on the same principle as that of PET.

J-PEM can be an effective system for the detection and diagnosis of breast cancer in its early stage by improving sensitivity and specificity and it can be achieved by the combined use of plastic scintillators, which have superior timing properties, with the WLS. In addition this device will be developed in view of classification of malignancy based on the possibility of positronium mean lifetime imaging [1].

### References

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