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# 3D reconstruction of point-like sources in a J-PET scanner using total variation regularization

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In this presentation we provide a comparative studies of two image reconstruction algorithms for positron emission tomography (PET): a novel reconstruction method based on the concept of total variation (TV) regularization and a reference time-of-flight filtered back-projection (TOF-FBP) technique. The methods are validated using experimental data of the Jagiellonian-PET (J-PET) scanner from measurement of six point-like sources. The reconstruction of the three-dimensional (3D) image of the point-like source, so called point spread function (PSF), is crucial for the estimation of spatial resolution of J-PET detector. The spatial resolution of the J-PET scanner was determined by estimation of full width half maximum in transverse and longitudinal directions of PSF at six position inside the scanner volume. The comparison results shown superior spatial resolution of reconstructed images from the proposed TV-based method in respect to the TOF-FBP algorithm. Simultaneously, reconstruction time in proposed technique was approximately 2.5 times shorter than required by reference method.

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