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## Algorithm for recovery of the annihilation pairs from multi-photon events for the J-PET scanner with non-pure radioisotopes.

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J-PET scanner is the multi-layer, large field-of-view, cylindrical-shape PET tomography device made of plastic scintillators. Its unique capabilities allows to investigate various extensions to the traditional 2-photon tomography. In this contribution we investigate the method to recover 511 keV annihilation photons from the multi-photon events. The obtained fraction of events can be used to increase the statistics and improve the quality of the reconstructed image. The studies are based on the GATE Monte Carlo simulations with the  $^{44}\text{Sc}$  source. The preliminary results of theselection algorithm based on energy, geometrical and temporal conditions will be presented. The presented technique can be further extended towards 2+1 tomography, where the additional information based on the registration of the high-energy de-excitation gamma is incorporated into the image reconstruction procedure.

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