

Improvement of Accidental Coincidence Estimation for Scanditronix PC2048/4096 PET Scanners

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Abstract

In regard to system modeling for a PET scanner, it is common practice to assume that counting errors such as accidental coincidence (randoms) and deadtime loss are well compensated for by the built-in hardware/software correction schemes. However, after these counting error corrections were applied, the first author has shown that an activity-dependent point spread function was necessary to correct partial volume effect [1]. Randoms ratio is one of the adjusting factors that represent the activity dependency of the model [1]. Recently, we discovered that an activity-independent point spread function [2], while it accurately predicted activity concentrations of hot spheres in warm backgrounds, was unable to correctly predict those of cold spheres (data not shown). Because different scanner types and correction schemes were used in the aforementioned studies, the results suggest that activity dependency of system models could be universal and an activity-dependent system model is required in many situations such as studies that simultaneously involve both hot and cold small objects in warm backgrounds.