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### PET vs. SPECT: in the Context of Ongoing Developments

Arman Rahmim

#### Abstract:

This paper intends to compare the abilities of the two major imaging modalities in nuclear medicine imaging: Positron Emission Tomography (PET) and Single Photon Emission Computed Tomography (SPECT). The motivations are many-fold: (i) To gain a better understanding of the strengths and limitations of the two imaging modalities in the context of recent and ongoing developments in hardware and software design; (ii) To emphasize that certain issues, historically and commonly thought as limitations, may now be instead viewed as challenges that can be addressed; (iii) To point out that existing PET and SPECT scanners in the field can (much) benefit from improvements in image-reconstruction software; (iii) To point-out (to engineers, physicists and software-developers) important areas of research in PET and SPECT imaging that will be instrumental to further improvements in the two modalities;

#### Keywords:

PET , Sensitivity , SPECT , Spatial resolution , Temporal resolution , Dynamic imaging , Attenuation , Collimator , Random coincidence , Animal imaging , Dual isotope imaging , Time-of-Flight

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