Contribution ID: **43** Type: **Poster**

Energy based scatter correction for the Walk-Through PET system

Wednesday, 22 May 2024 16:15 (5 minutes)

We implement and evaluate an energy-based scatter correction method for the Walk-Through PET (WT-PET) system. The WT-PET is a new, long axial field-of-view (AFOV) PET currently under development, based on a vertical, dual flat panel design using monolithic detector technology. In the energy-based scatter correction framework, scatter fractions are estimated from the dual energy distributions of scattered and unscattered photons in coincidence events. An estimate of the attenuation map is not required, enabling CT-less scatter correction for dose reduction purposes on the system. The algorithm is implemented within a custom, iterative listmode image reconstruction framework. Performance is evaluated using GATE Monte Carlo simulations of the NEMA IQ phantom. We find that the influence of scatter is properly corrected for, resulting in a uniform background for the phantom, with only a small loss in contrast recovery compared to a reconstruction using true coincidences only.

Field

Software and quantification

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Session Classification: Poster Session

Track Classification: Total body imaging