

Investigation of the Impact of MR Hardware Attenuation on TOF and non-TOF PET/MR Images

N. Jurjew¹, P. Schleyer², D. Atkinson³, K. Thielemans¹

1) Institute of Nuclear Medicine, UCL; 2) Siemens Medical Solutions USA, Inc.; 3) Centre for Medical Imaging, UCL



Simulation studies

- Analytical simulations of different phantom and HW setups:
- Cylinder with headphones (HP), brainweb data w. HP, cylinder w. MR-coil
- nonTOF vs. TOF data were compared
- OSEM reconstructions with incorrect μ -map were compared to reconstructions with correct μ -map

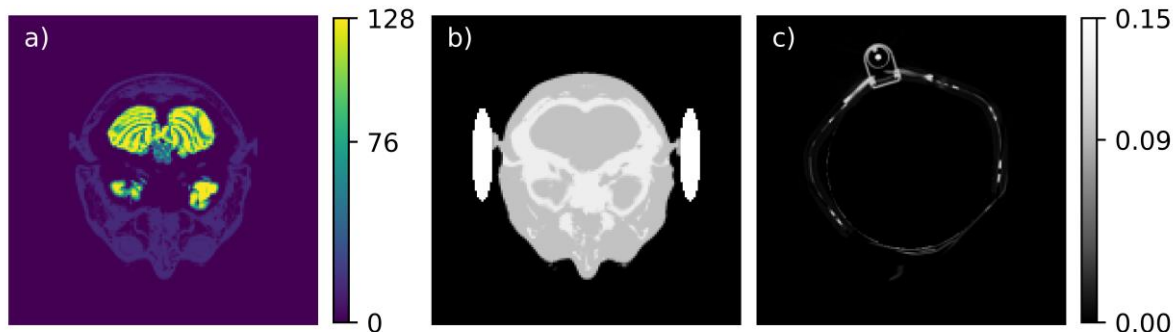


Fig. 1 a) Activity and b) attenuation images of the brainweb data used. Activity ratios roughly correspond to an FDG scan in a). c) Attenuation image of the multichannel MR coil used in simulations.

Results

- Mean error over ROIs is negative for all simulation settings
- Strong variation for different simulation setups
- TOF strongly affects structure of relative error, but doesn't decrease its mean for cylinder data

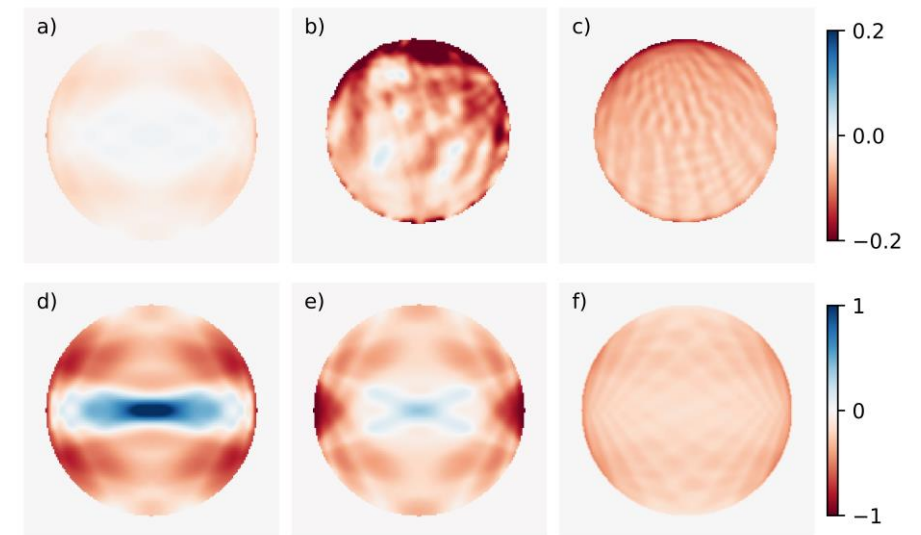


Fig. 2 Relative error images of reconstructions with different att.: a) foam, non-TOF; b) MR-coil, non-TOF; c) MR-coil, TOF d) PVC att. non-TOF; e) PVC att. no cylinder att., non-TOF and f) PVC att., TOF