Supplementary figures for "Spatial resolution properties of motion-compensated tomographic image reconstruction methods"

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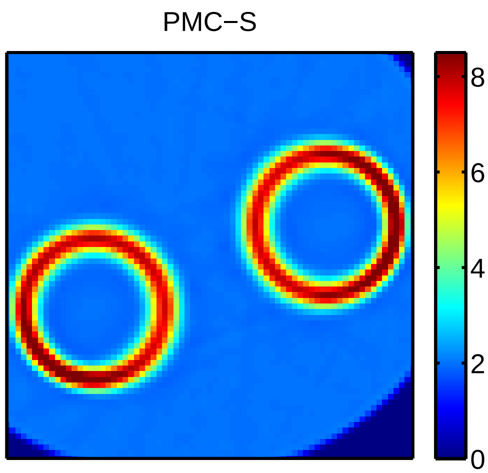
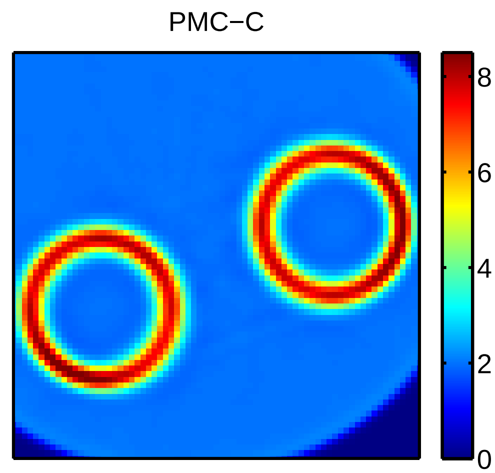
I. Simulation results

A. Simple phantom with affine motion

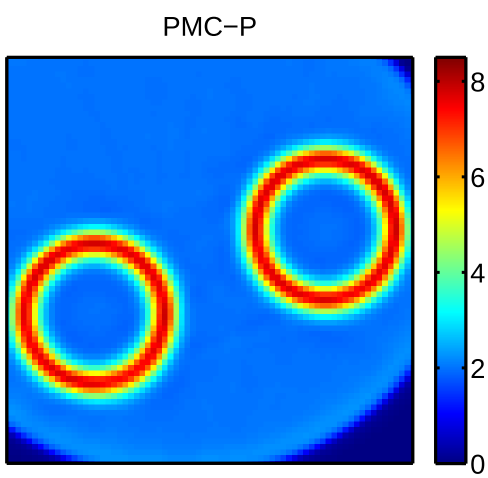
Fig. 1 (a) and (b) show that the image intensities around the rings ade nonuniform due to the anisotropic and/or non-uniform spatial resolutions of PMC-S and PMC-C. Fig. 1 (c) shows our proposed PMC-P, which approximately achieved the same spatial resolution as the target image in Fig. 1 (d) with isotropic and uniform spatial resolution.



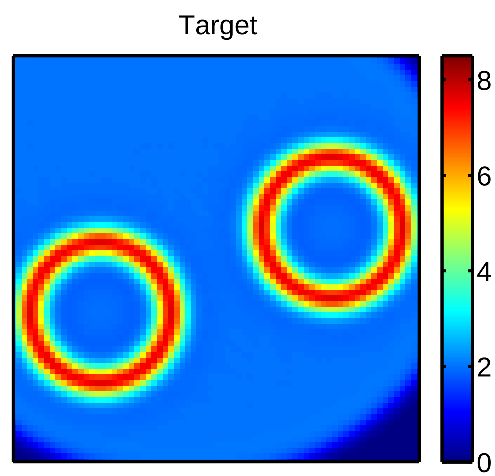
(a) PMC-S



(b) PMC-C

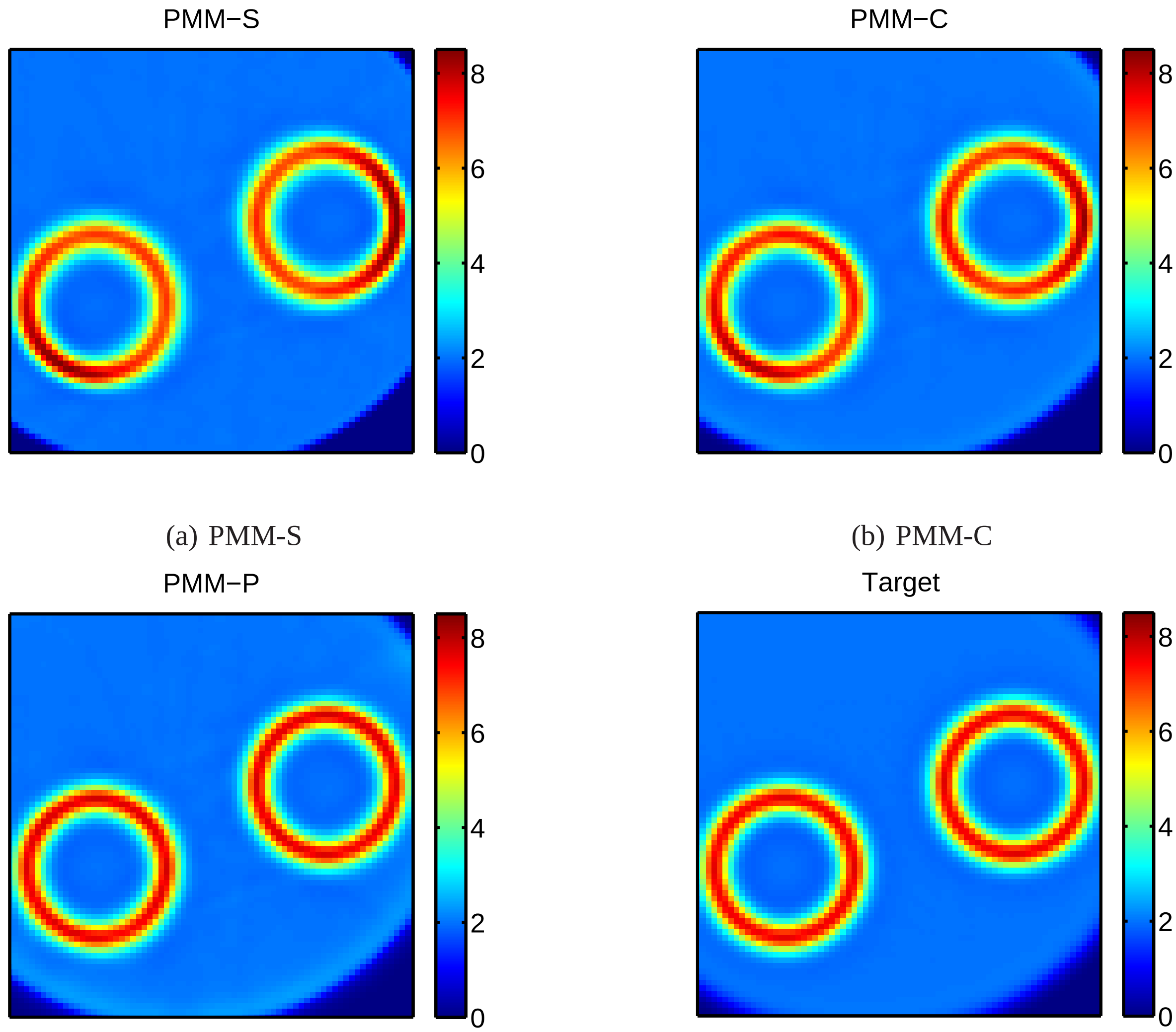


(c) PMC-P



(d) Target

Fig. 1. Reconstructed images of PMC with different spatial regularizers from the noiseless projection data. Nonuniform and/or anisotropic LIRs lead to non-uniform estimation bias in small or narrow structures such as small lesions or rings.



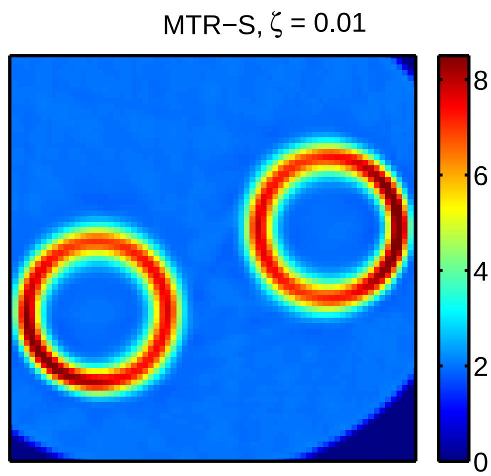
(a) PMM-S (b) PMM-C

(c) PMM-P (d) Target

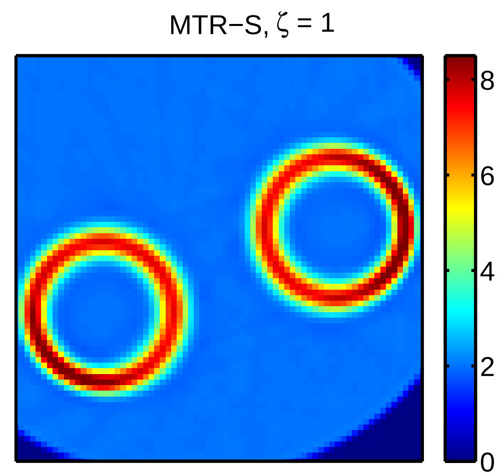
Fig. 2. Reconstructed images of PMM with different spatial regularizers from the noiseless projection data. Nonuniform and/or anisotropic LIRs lead to non-uniform estimation bias in small or narrow structures such as small lesions or rings.

Fig. 2 also shows similar results: PMM-S and PMM-C caused non-uniform estimation bias due to the spatial-variant data statistics and the motion, but PMM-P achieved approximately the same isotropic and uniform spatial resolution as those of the target PULS estimator.

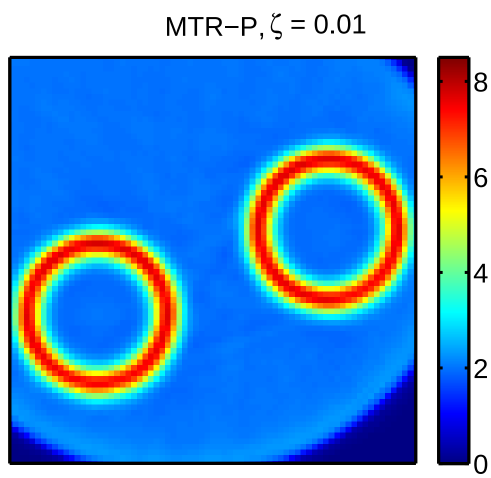
Fig. 3 shows that our proposed spatial regularization method for MTR, denoted MTR-P, approximately achieved the same spatial resolution regardless of ζ, whereas the spatial resolution of MTR-S changes with ζ.



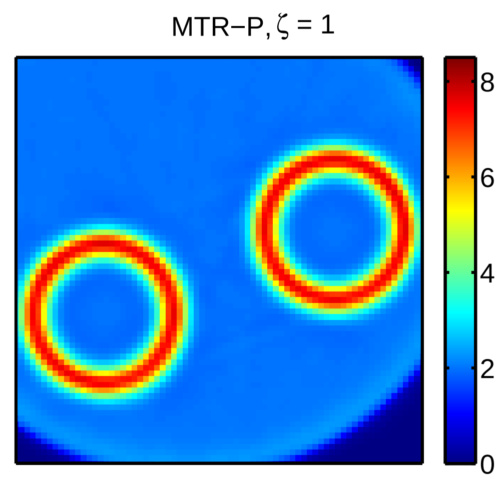
(a) MTR-S, $\zeta = 0.01$



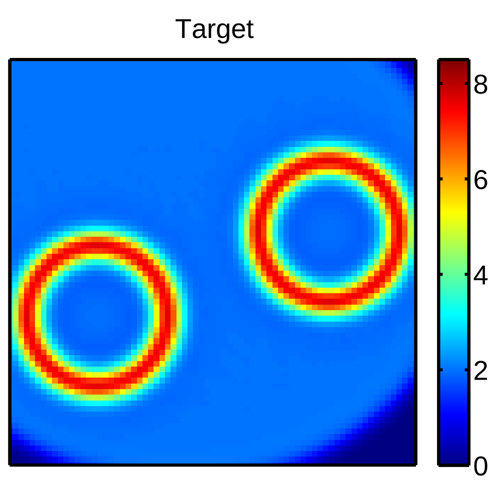
(b) MTR-S, $\zeta = 1$



(c) MTR-P, $\zeta = 0.01$



(d) MTR-P, $\zeta = 1$



(e) Target

Fig. 3. Reconstructed images of MTR-S, MTR-P with different ζ values from the noiseless projection data. Nonuniform and/or anisotropic LIRs lead to non-uniform estimation bias in small or narrow structures such as small lesions or rings.