

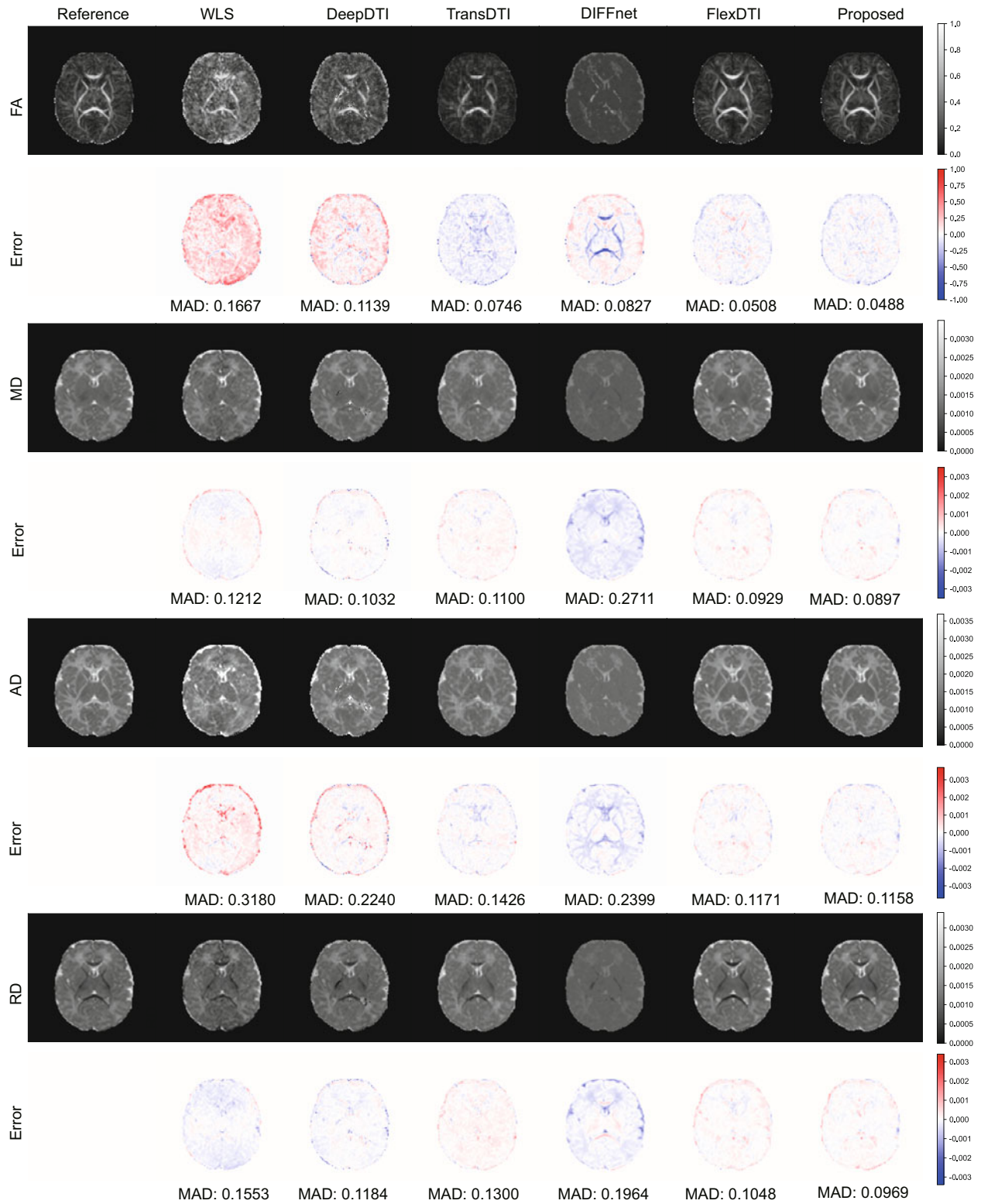


## Supplementary materials for

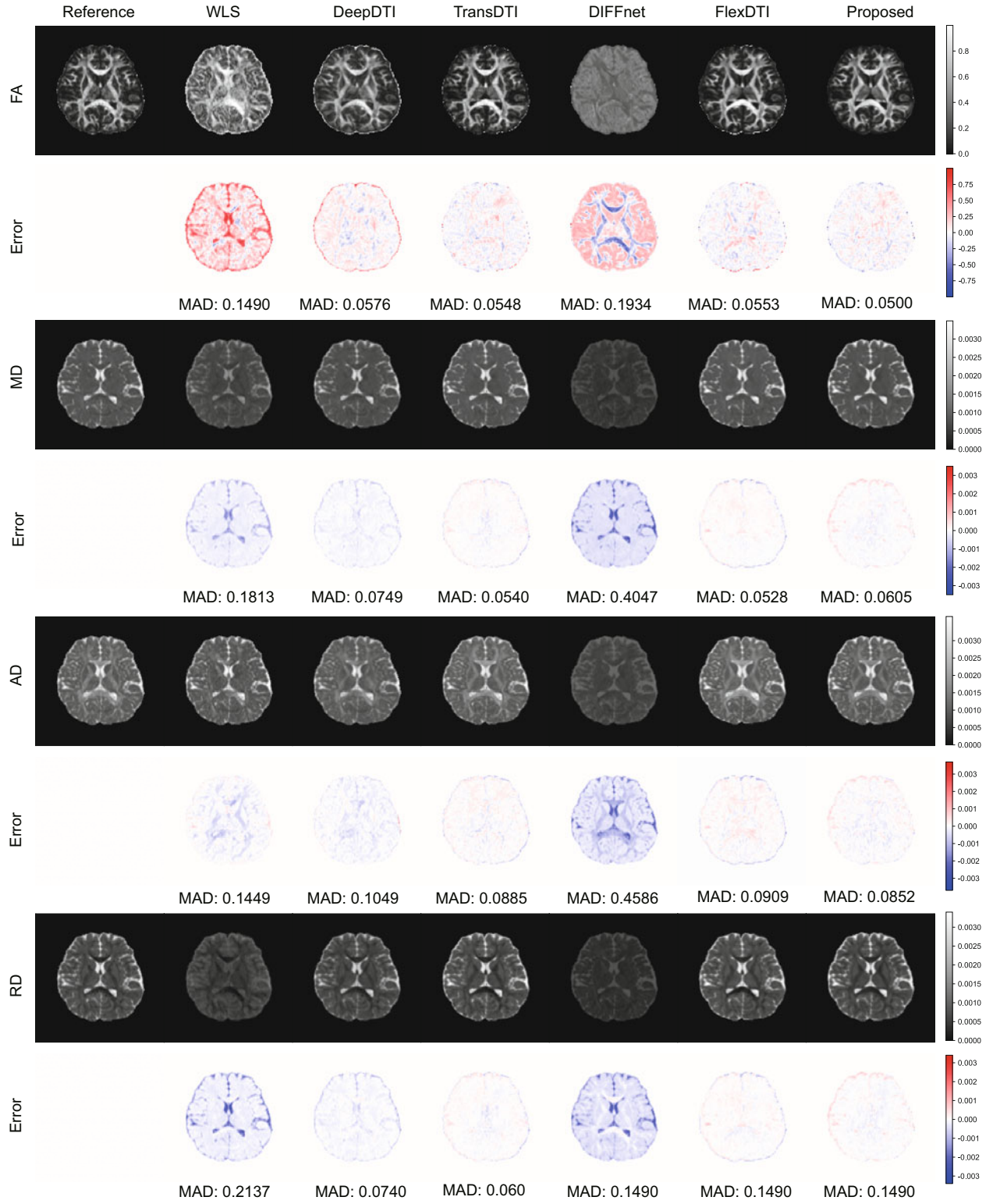
Maokun ZHENG, Zhi LI, Long ZHENG, Weidong WANG, Dandan LI, Guomei WANG, 2025. *Q*-space-coordinate-guided neural networks for high-fidelity diffusion tensor estimation from minimal diffusion-weighted images. *Front Inform Technol Electron Eng*, 26(8):1305-1323. <https://doi.org/10.1631/FITEE.2400766>

To better elucidate the differences between methods on the dHCP dataset, we performed qualitative evaluations on FA, MD, AD, and RD, with results shown in Fig. S1. Our method exhibits the most minor errors on all metrics' residual maps compared to other methods and provides more accurate detail reconstruction. Notably, DeepDTI shows significantly higher errors in FA than TransDTI and our method, as DeepDTI uses a traditional tensor estimation method that is extremely sensitive to noise. This phenomenon further reflects that the dHCP has a higher noise level and more complex brain structures than the HCP, thus highlighting the superiority of our method. Furthermore, FlexDTI achieves good reconstruction performance by incorporating diffusion gradient directions. This result underscores the critical role of diffusion gradient directions in diffusion tensor estimation, significantly enhancing the accuracy of the estimates.

Similarly, to further highlight method differences on the MDM dataset, we conducted qualitative experiments on the quantitative metrics of FA, MD, AD, and RD, with the results presented in Fig. S2. The results indicate that our method is comparable to DeepDTI, TransDTI, and FlexDTI across all metrics, especially with minor errors in the FA metric, providing a more accurate reconstruction of details.



**Fig. S1** Qualitative comparison of different methods on the dHCP dataset. The bottom of the residual maps displays the MAD between each map and the reference brain (including CSF). dHCP: developing human connectome project; FA: fractional anisotropy; MD: mean diffusivity; RD: radial diffusivity; AD: axial diffusivity



**Fig. S2** Qualitative comparison of different methods on the MDM dataset. The bottom of the residual maps displays the MAD between each map and the reference brain (excluding CSF). MDM: multishell diffusion MRI; FA: fractional anisotropy; MD: mean diffusivity; RD: radial diffusivity; AD: axial diffusivity