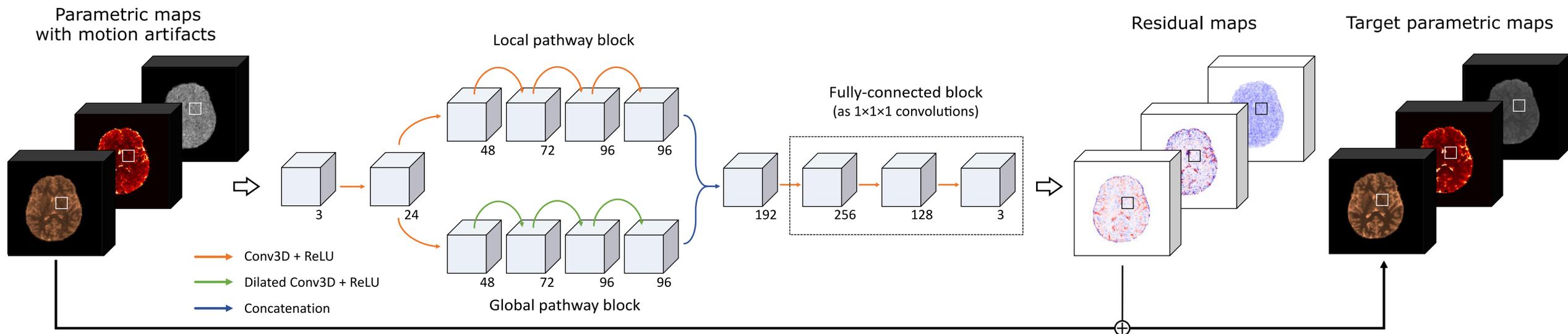


# Residual learning for 3D motion corrected quantitative MRI: Robust clinical T1, T2 and proton density mapping

Carolin M. Pirkl, Matteo Cencini, Jan W. Kurzawski, Diana Waldmannstetter, Hongwei Li, Anjany Sekuboyina, Sebastian Endt, Luca Peretti, Graziella Donatelli, Rosa Pasquariello, Mauro Costagli, Guido Buonincontri, Michela Tosetti, Marion I. Menzel†, Bjoern H. Menze†

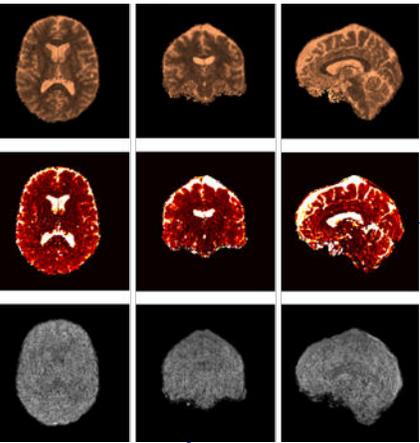
- 1) Residual learning strategy
- 2) 3D multiscale CNN
- 3) Physics-informed motion simulation



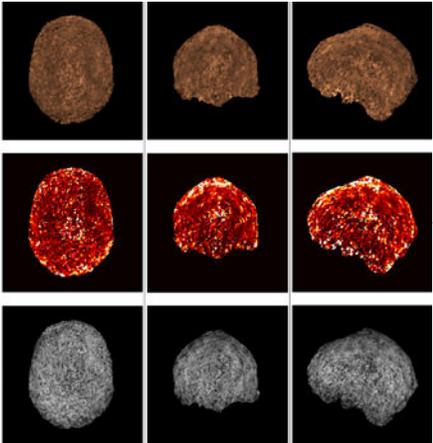
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## Physics-informed simulation of motion artifacts

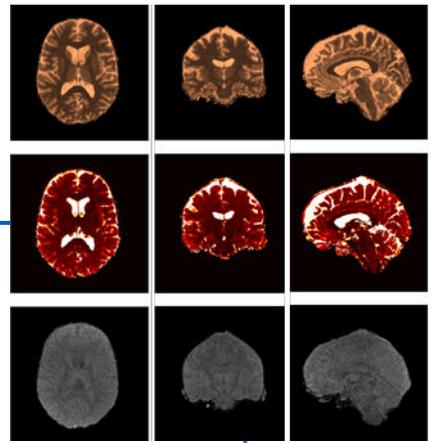
Remaining motion artifacts



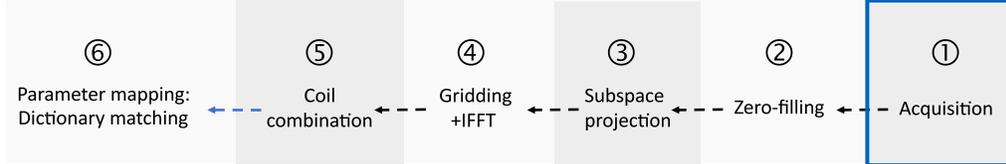
Artificial motion artifacts



Motion-free (raw) data

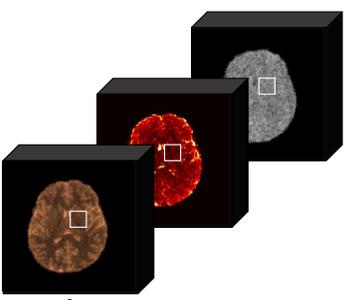


Navigator correction

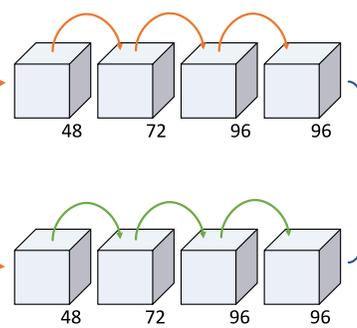


Continuous rigid motion patterns

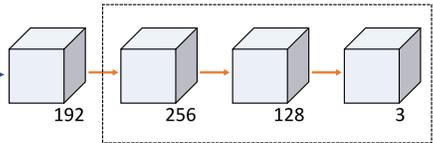
Parametric maps with motion artifacts



Local pathway block

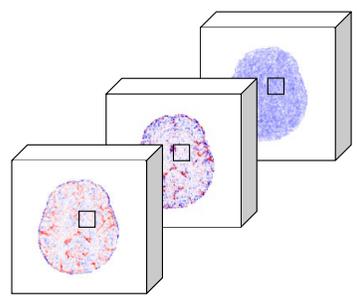


Fully-connected block (as 1x1x1 convolutions)

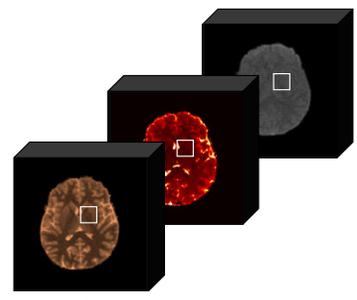


- Conv3D + ReLU
- Dilated Conv3D + ReLU
- Concatenation

Residual maps



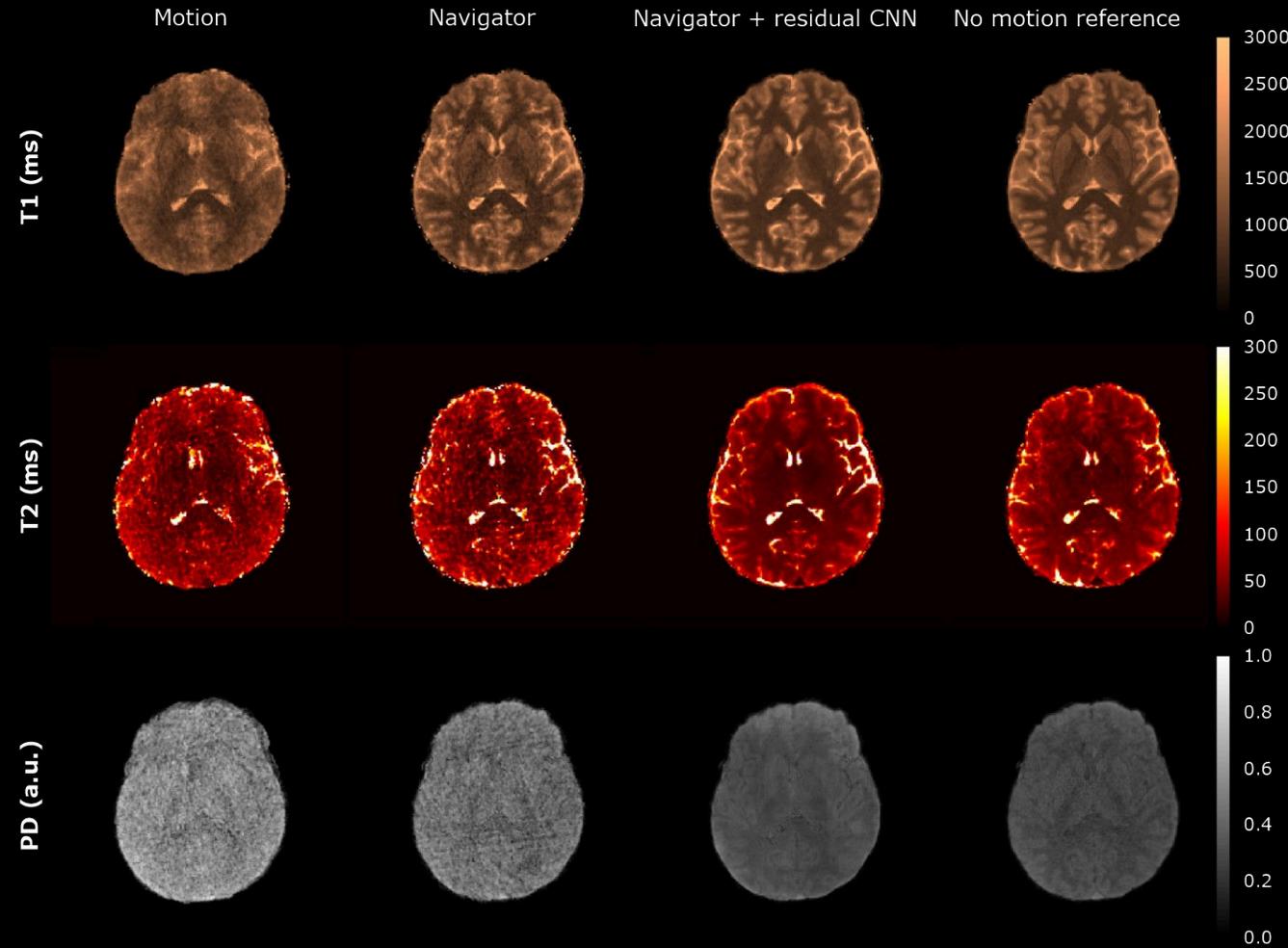
Target parametric maps



⊕

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## Volunteer scan (3T)



## Pediatric patient (1.5T)

