

# *Pulse sequence hands-on*

**Session:** Hands-on primer on Sequences (Design) for Mapping  
**Educational Track 2:** From Hardware to Map

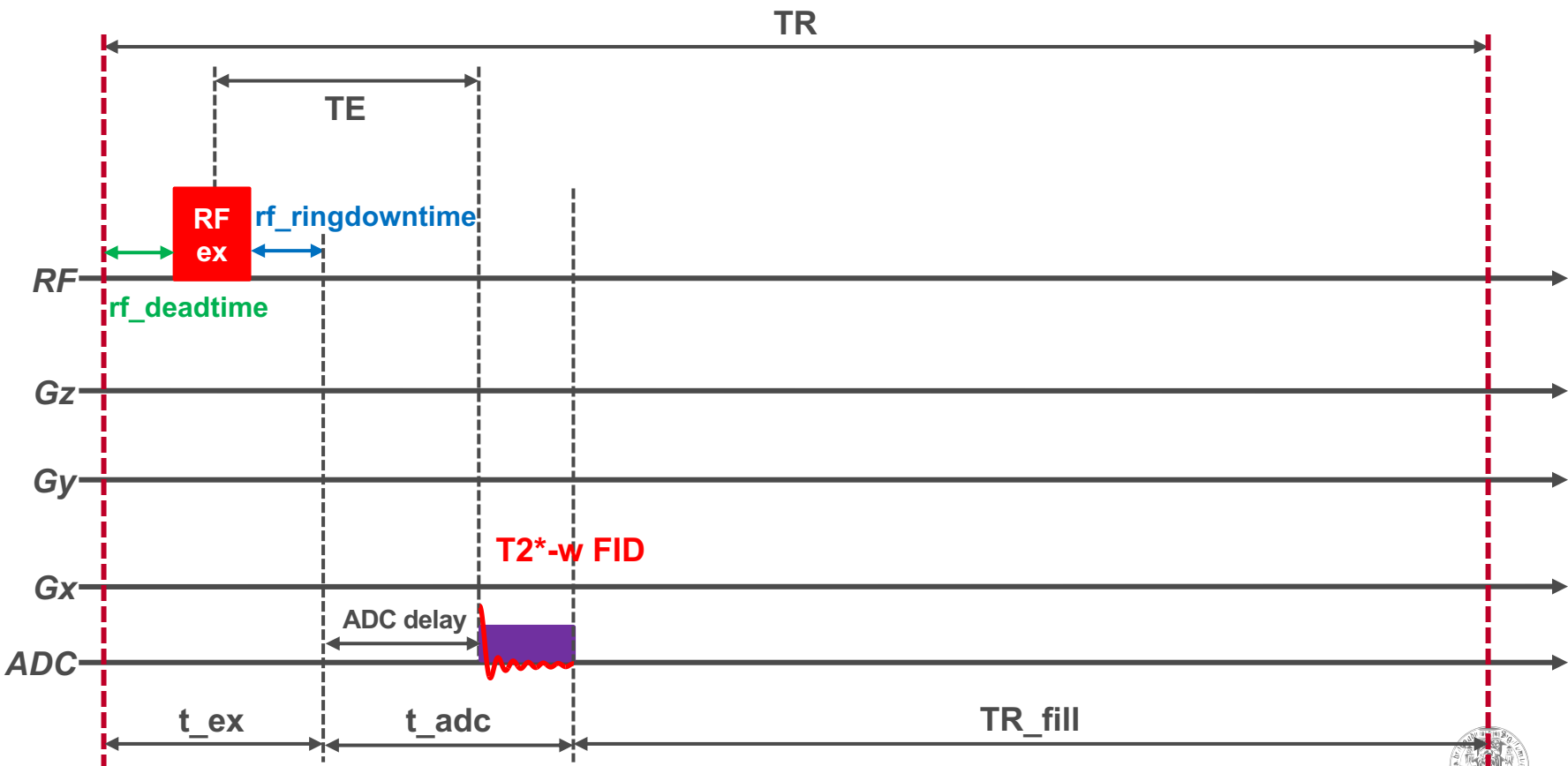
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Oct. 04, 2024*

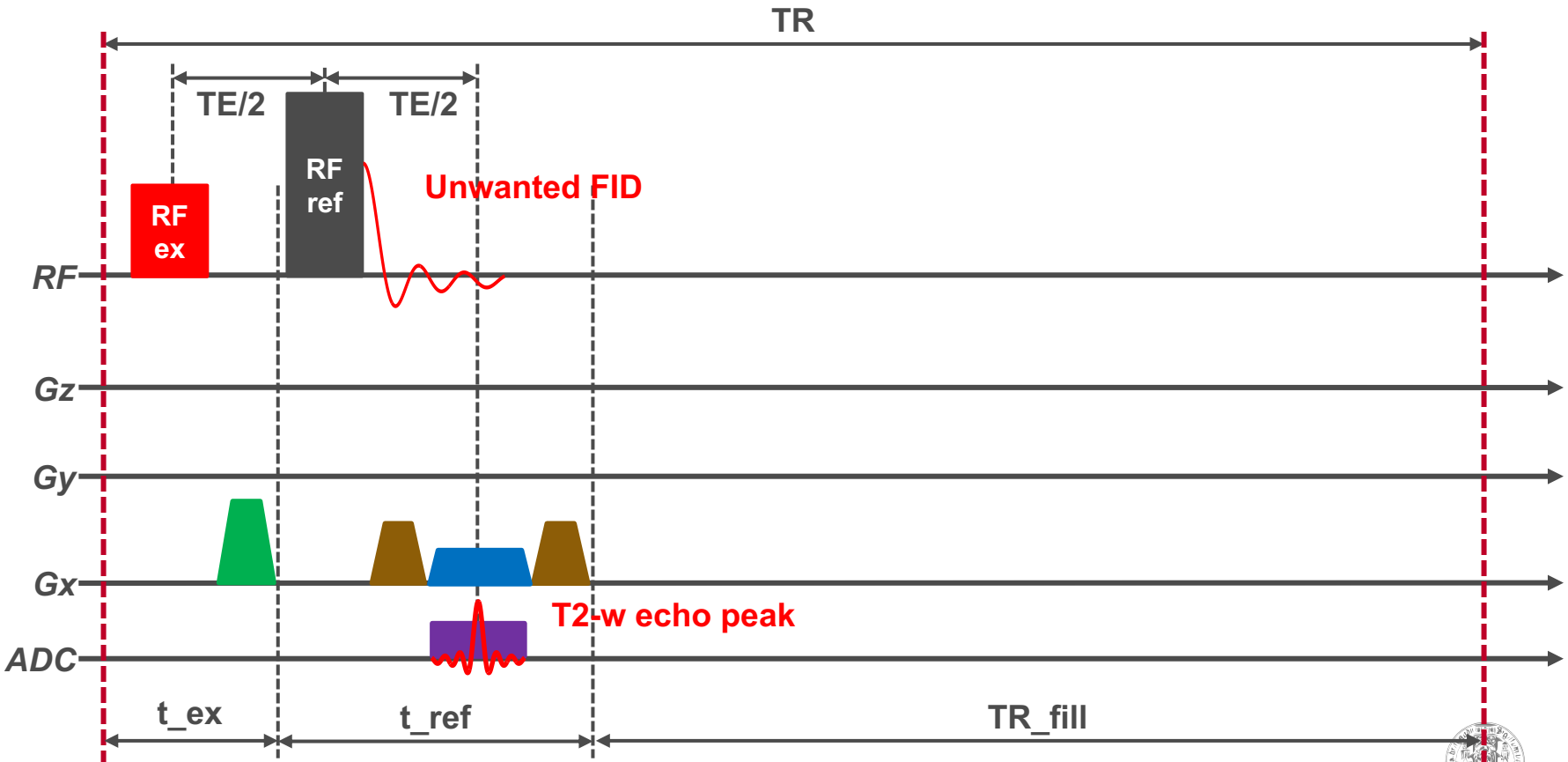
# Outline

- Basic MR spectroscopy
  - **s00\_fid**: Free induction decay (FID)
  - **s01\_from\_fid\_to\_1d\_se**: from FID to spin echo (SE) with 1D spatial encoding
- 3D spin-echo sequence
  - **s10\_from\_1d\_se\_to\_3d\_se**: extend 1D SE to 3D SE
  - **s11\_optimized\_3d\_se**: optimize 3D SE with time-optimized gradient
  - **s12\_optimized\_3d\_se\_portableScanner**: adapt the optimized 3D SE for the portable scanner
- 3D multi-echo SE for T2 mapping (**Andreia Gaspar's** lecture)
  - **s20\_optimized\_3d\_mse\_portableScanner** : 3D multi-echo SE with time-optimized gradient adapted for the portable scanner
- Link to sequence source code and related materials:  
[https://github.com/mritogether/ESMRMB2024\\_Hardware\\_to\\_Map/tree/main/02\\_sequence\\_design\\_for\\_mapping](https://github.com/mritogether/ESMRMB2024_Hardware_to_Map/tree/main/02_sequence_design_for_mapping)

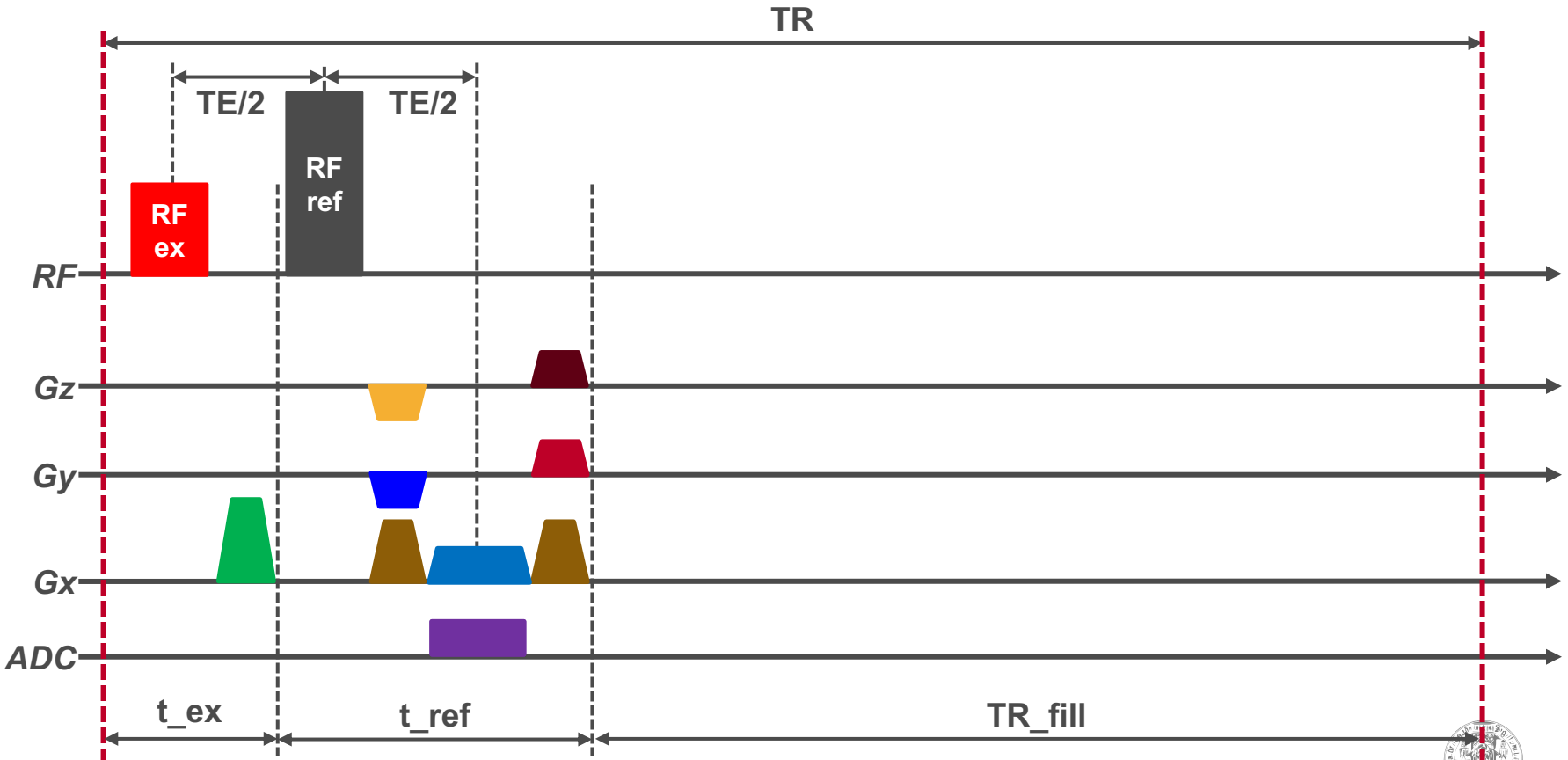
# s00\_fid



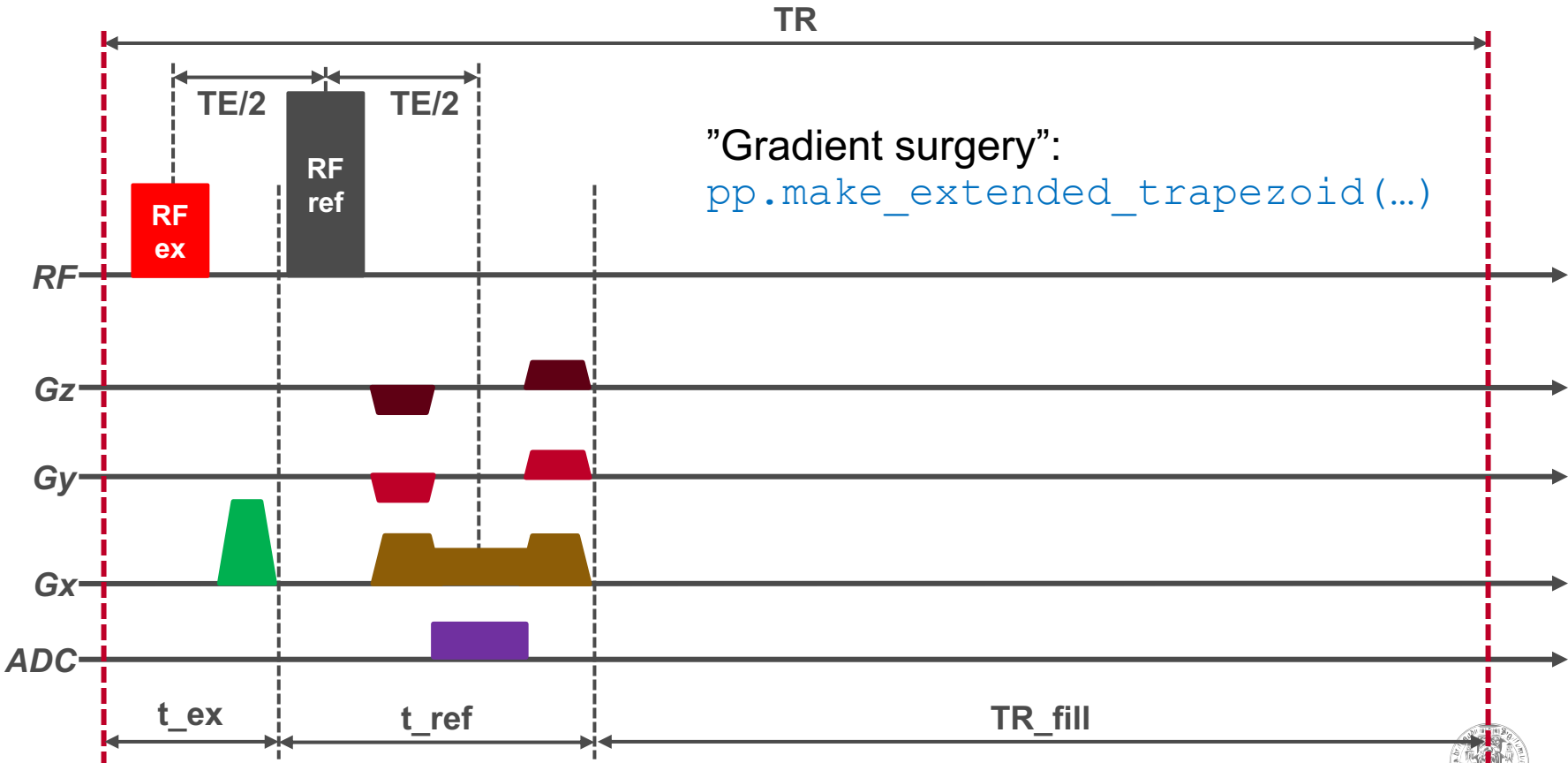
# s01\_from\_fid\_to\_1d\_se



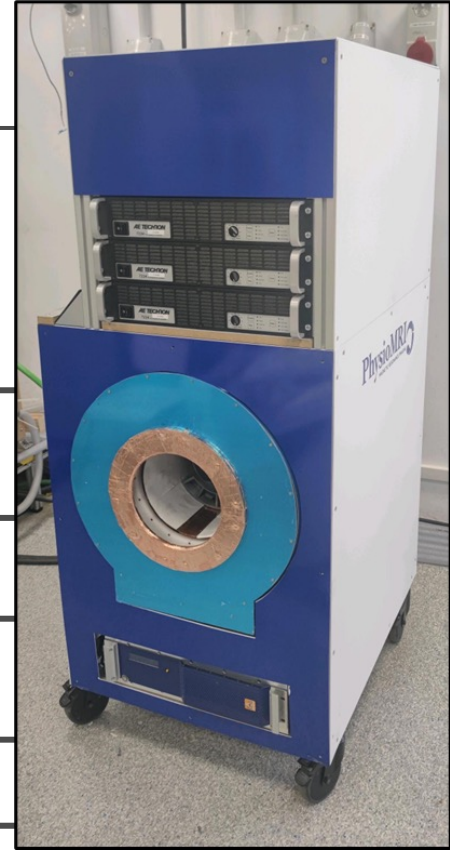
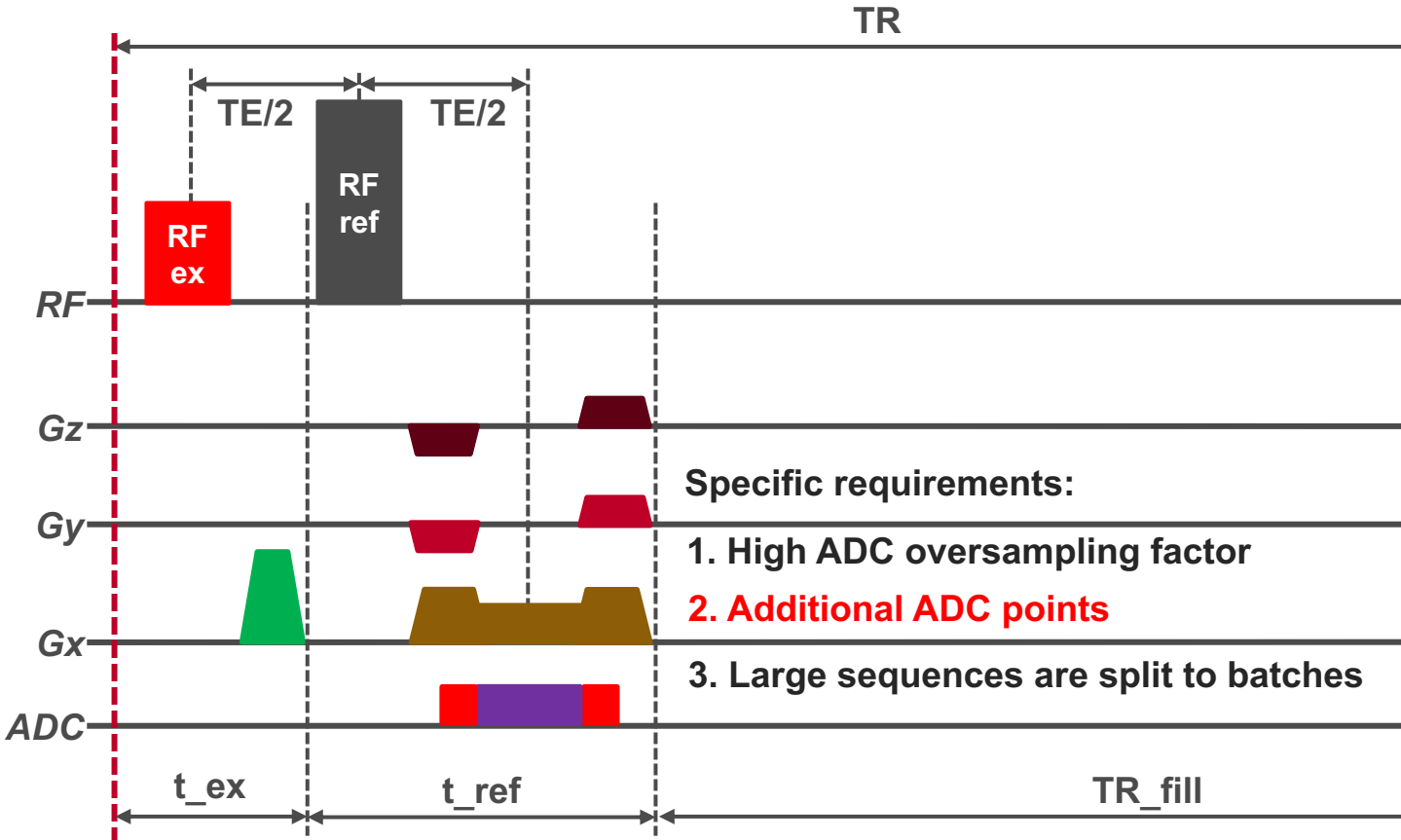
# s10\_from\_1d\_se\_to\_3d\_se



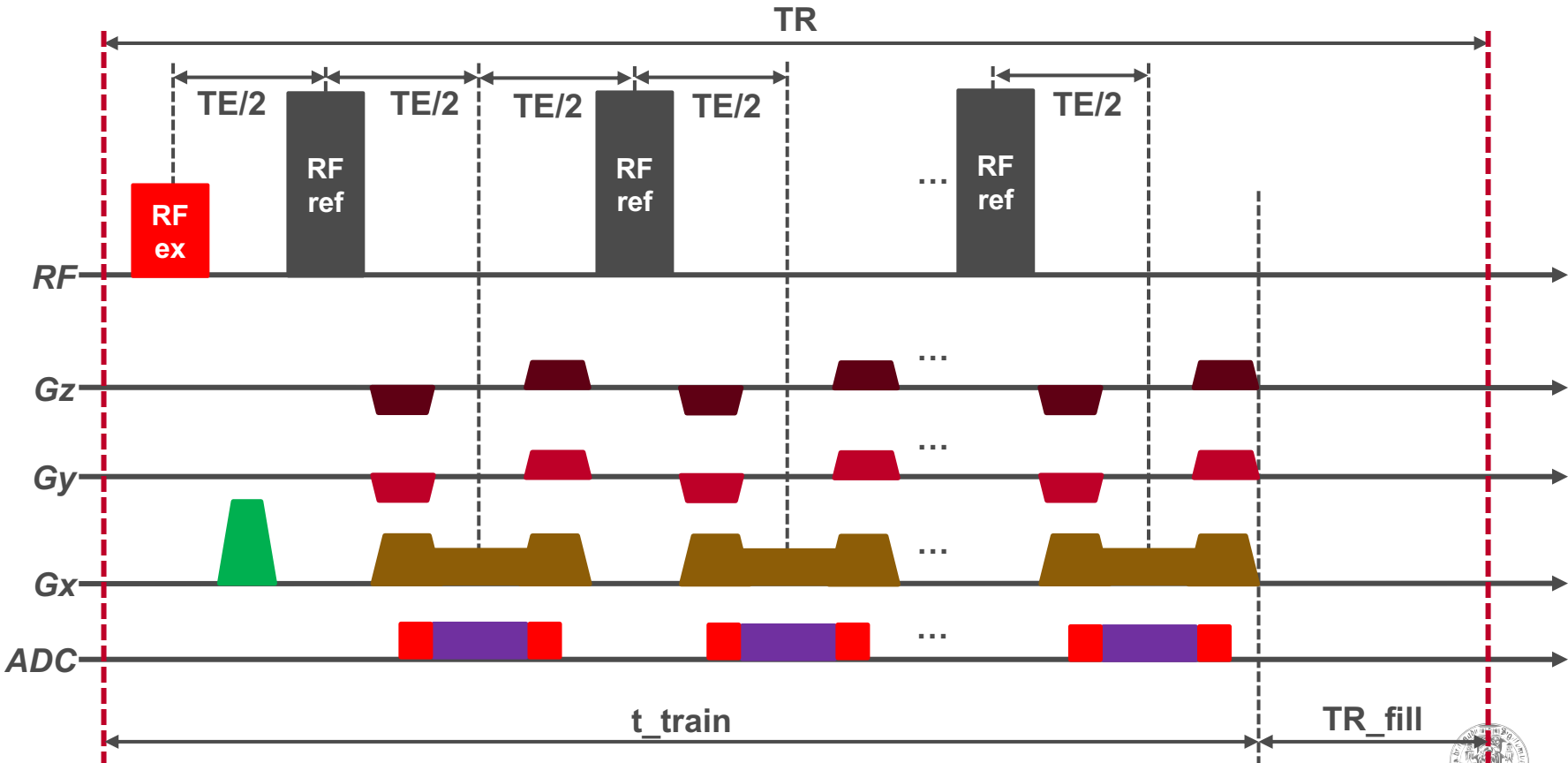
# s11\_optimized\_3d\_se



# s12\_optimized\_3d\_se\_portableScanner



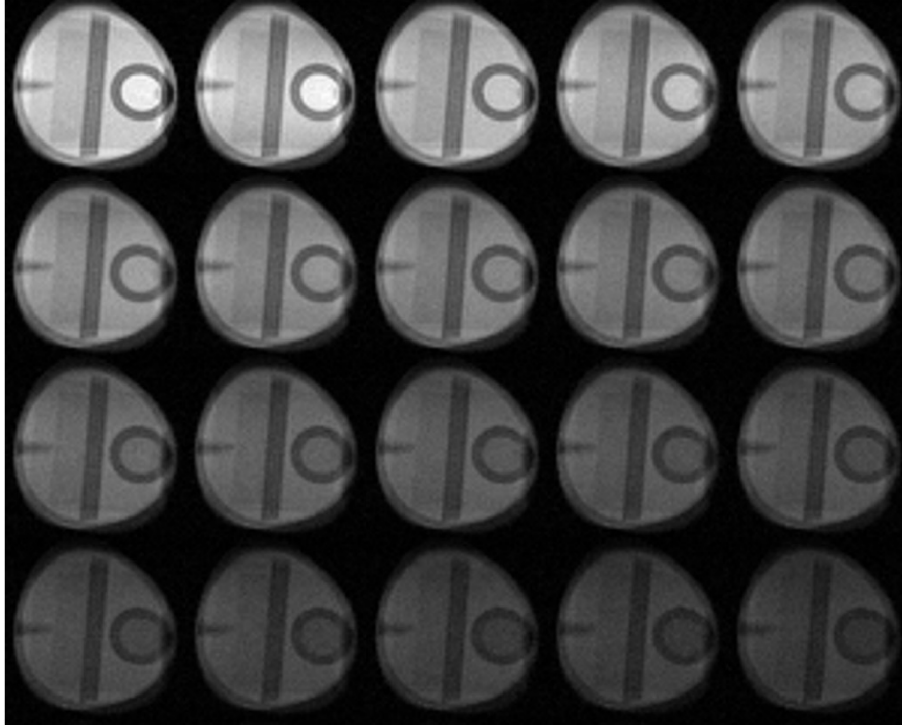
# s20\_optimized\_3d\_mse\_portableScanner



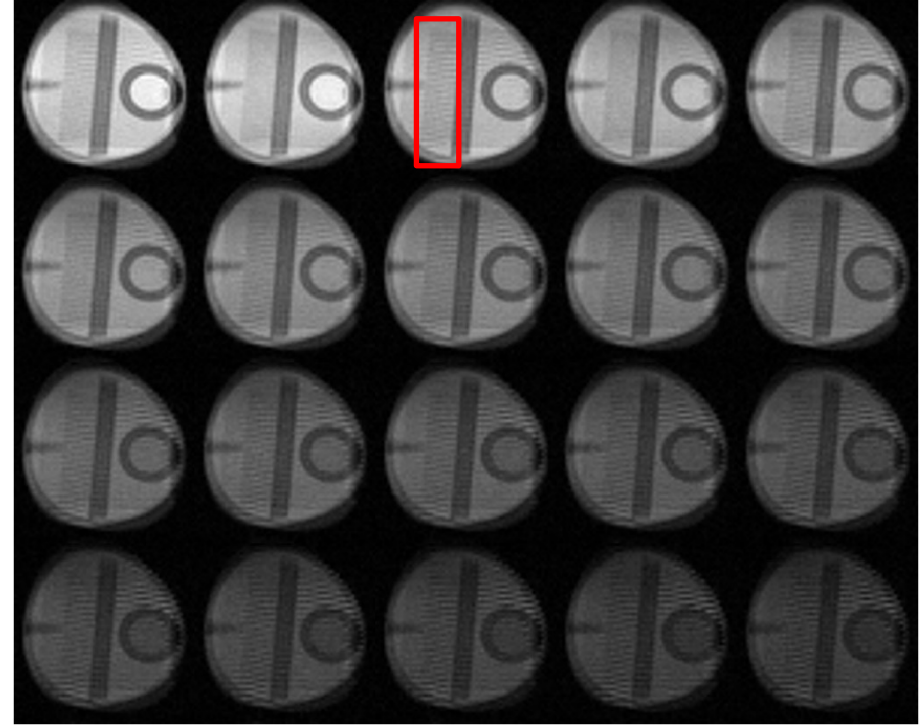


# s20\_optimized\_3d\_mse\_portableScanner

3D SE images from the portable scanner



All echoes with crushers (the center partition)



All echoes without crushers (the center partition)

## Acknowledgements:

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