



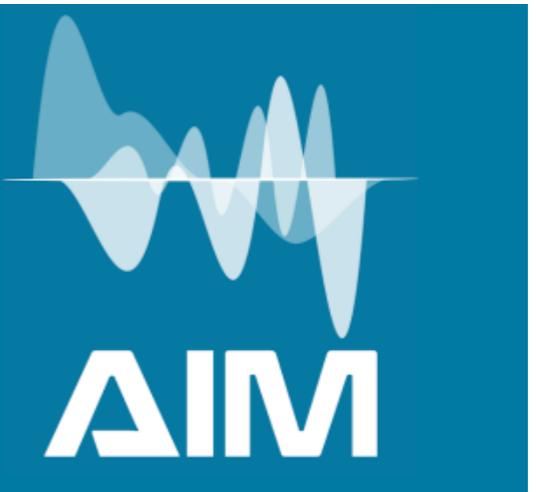
UNIVERSITÀ DI PAVIA
Dipartimento di Fisica



Main activities of AIM - Pavia section

Local Responsible
prof. Alessandro Lascialfari

Artificial
Intelligence in
Medicine



Standardization and harmonization of MRI relaxation time mapping techniques

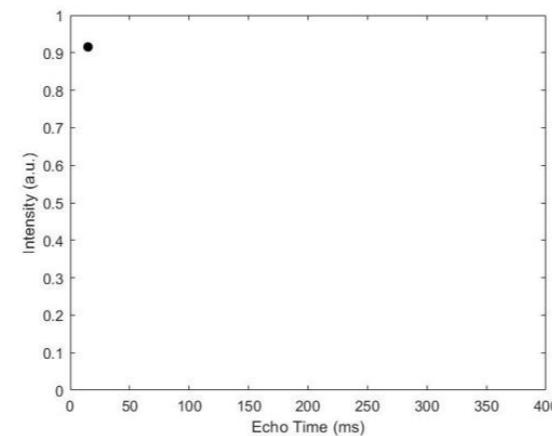
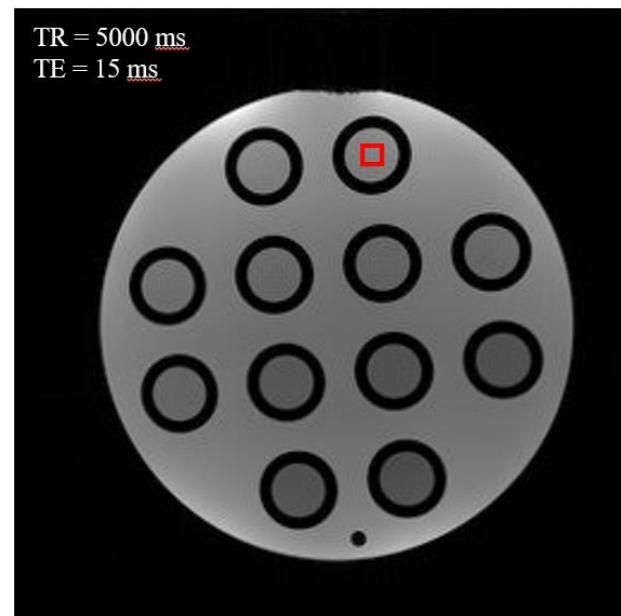
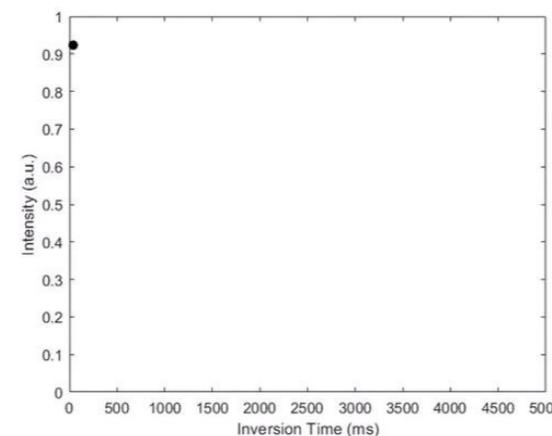
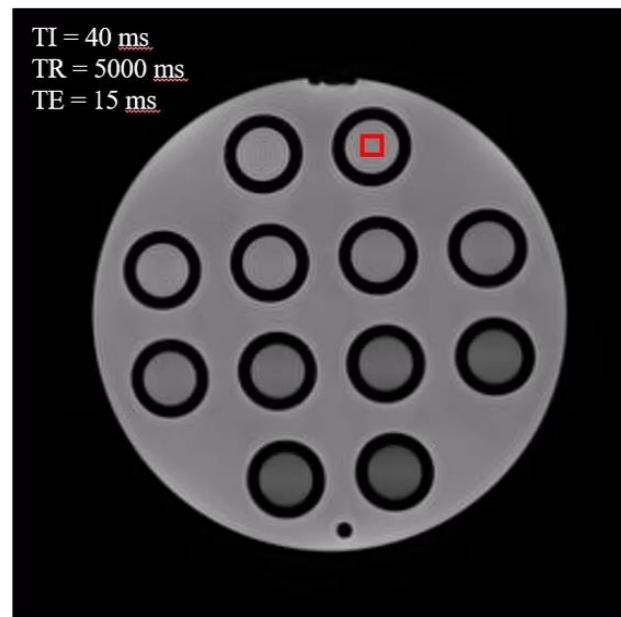
Part 1

TRADITIONAL MAPPING

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Standardization and harmonization of MRI relaxation time mapping techniques



Application of Relaxation Time Maps:

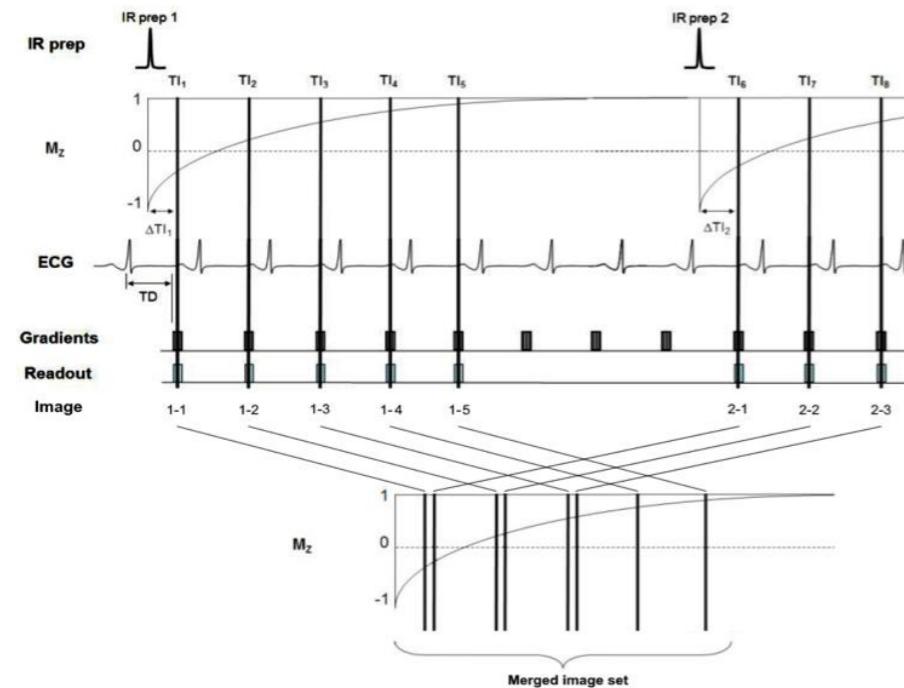
- Identify tissue and morphological changes
- Correlate and monitor disease progression

**QUALITATIVE
AND
QUANTITATIVE
INFORMATION!!!**

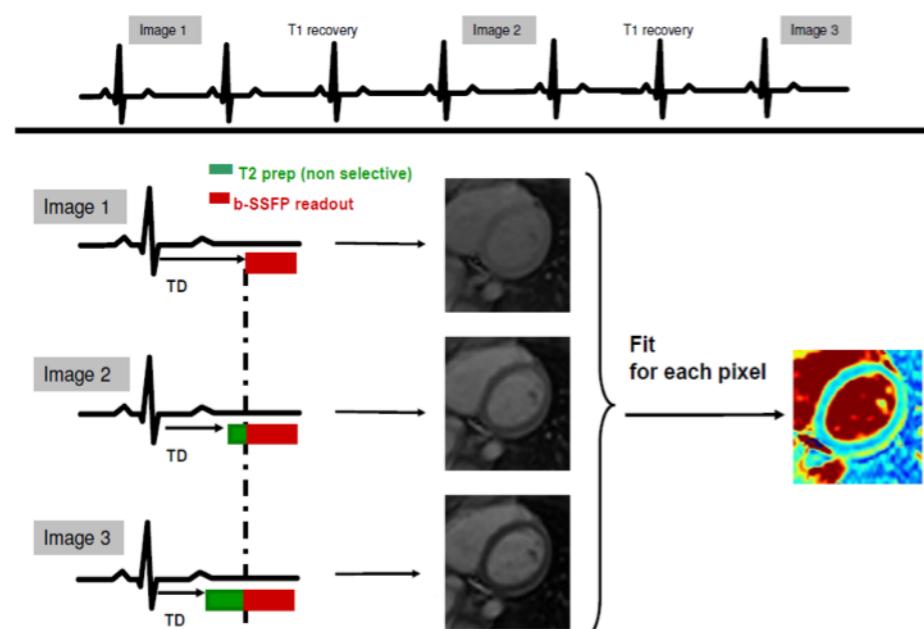
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Standardization and harmonization of MRI relaxation time mapping techniques

MOLLI



T₂-prep
TrueFISP



Advantages:

- ECG triggered
- Fast
- Motion corrected
- High precision
- High reproducibility

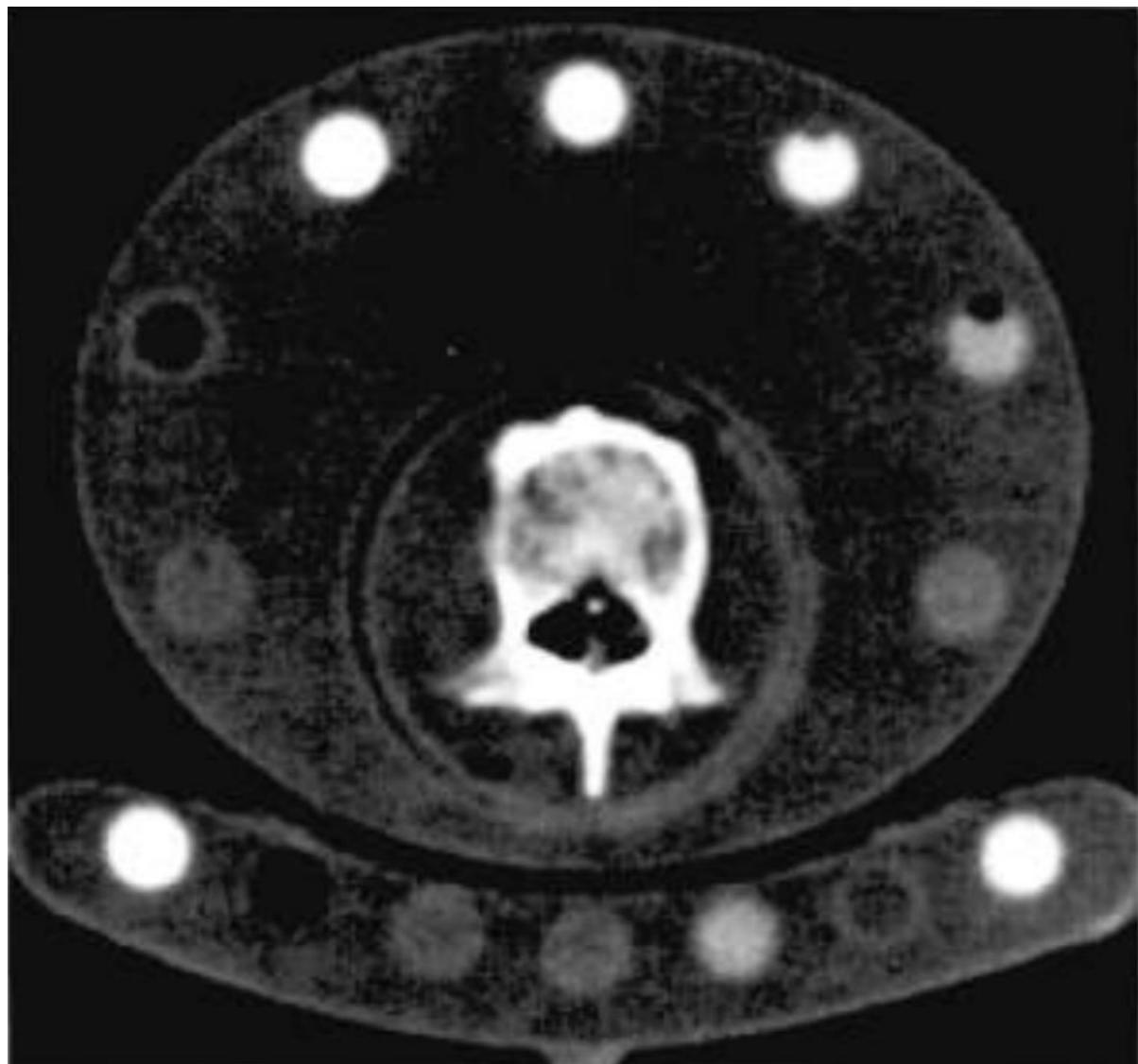
Disadvantages:

- Accuracy
- Scanner dependence
- Software dependence
- Center dependence

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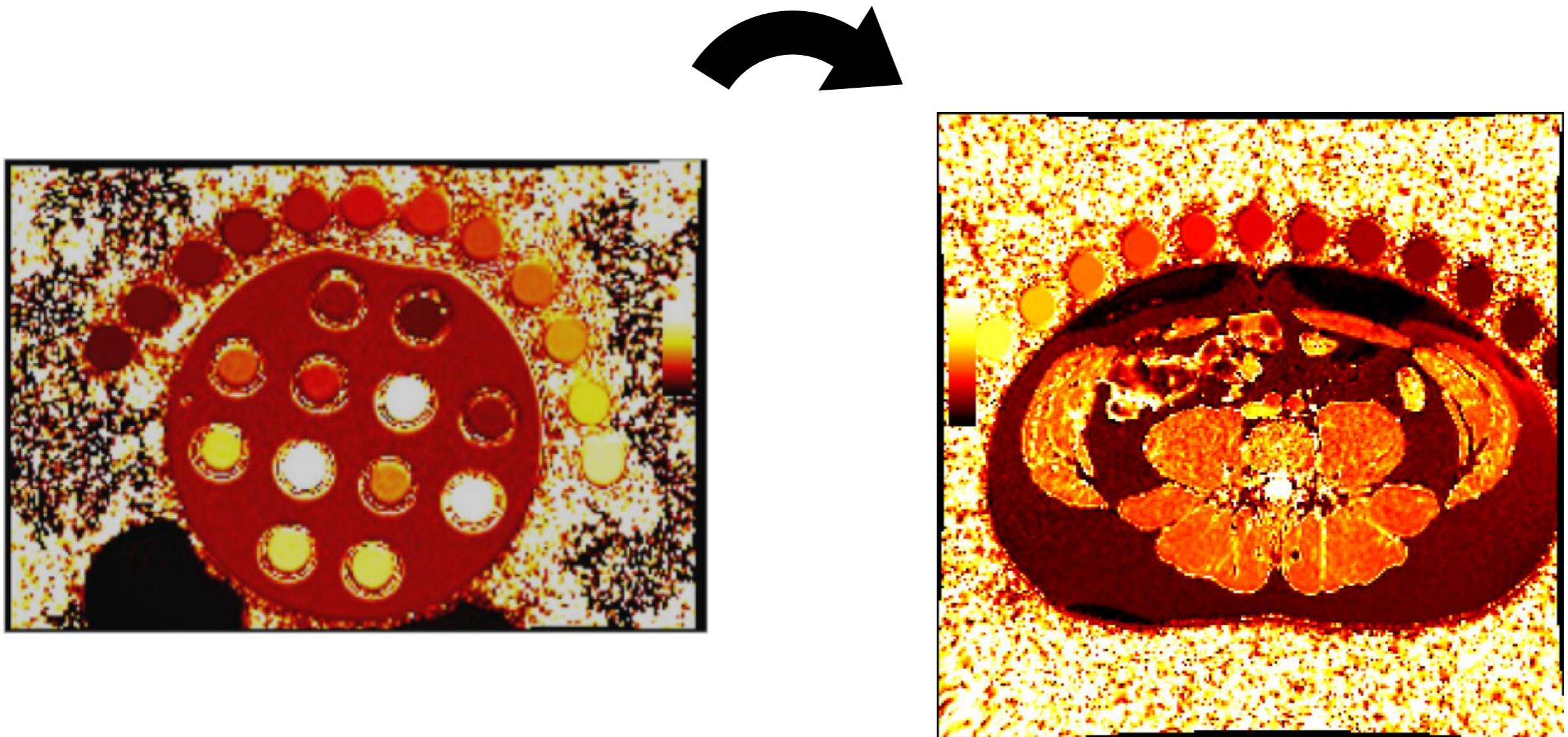
Cann, 1980



Kalender, 1987

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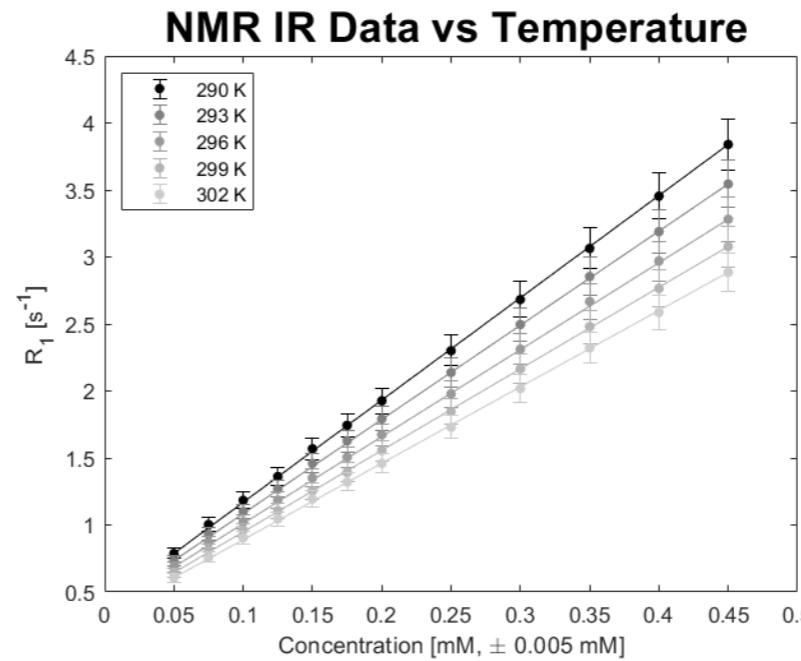
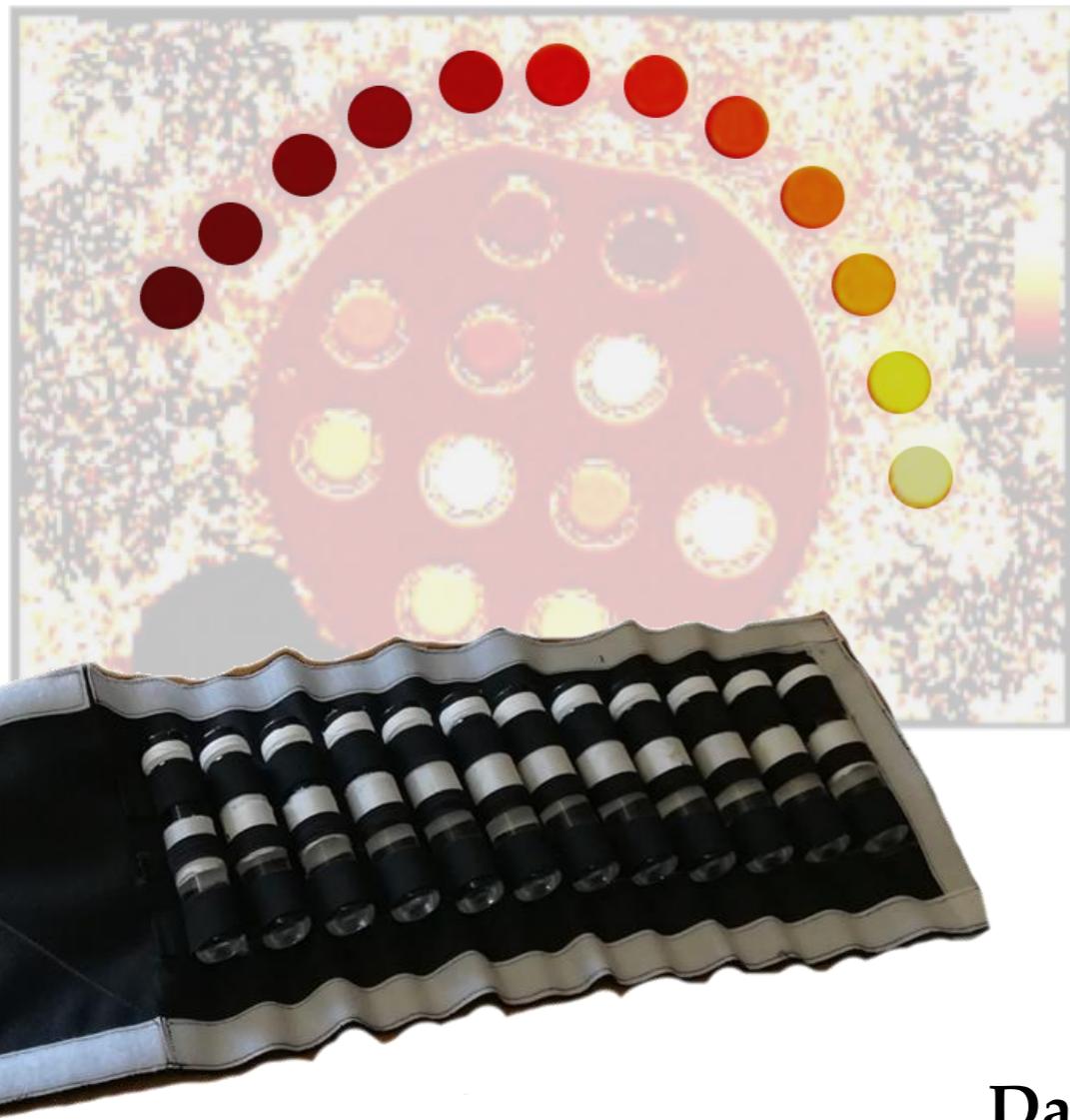


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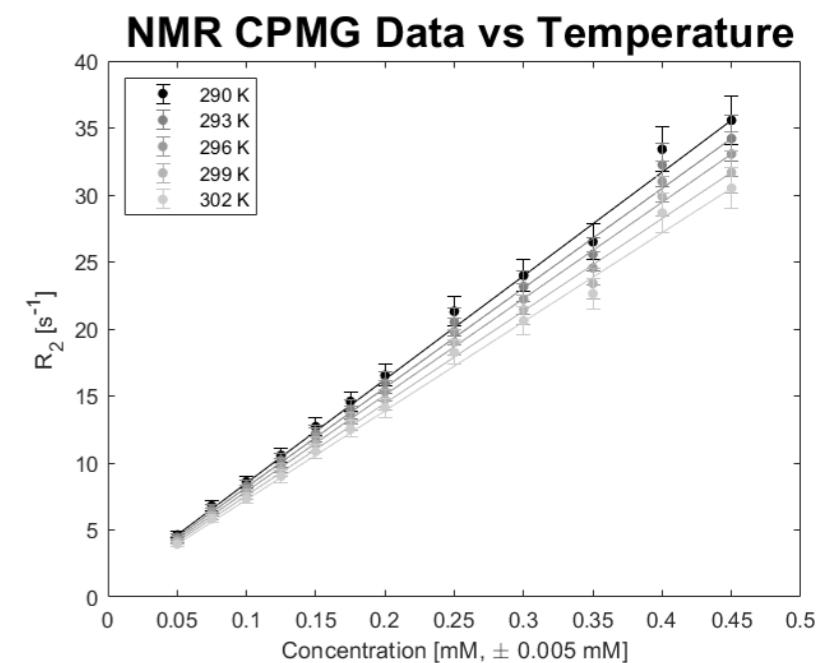
The Belt



$$R_i = \frac{1}{T_i} \propto [MnCl_2]$$

Relaxation of paramagnetic aqueous dilute solutions

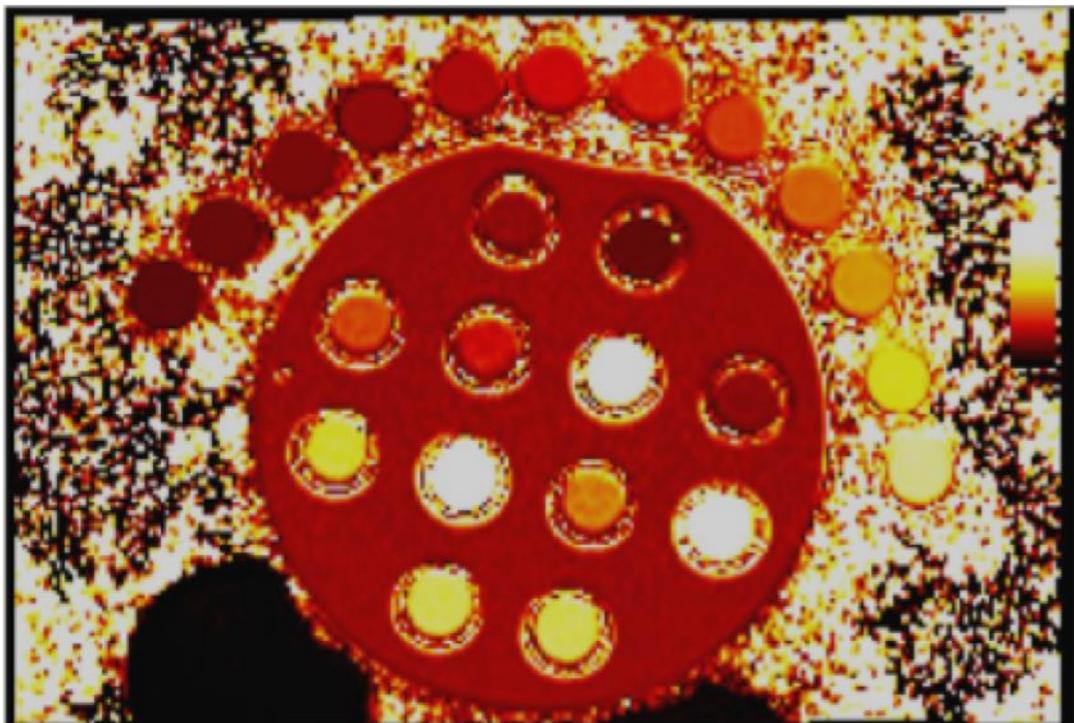
SBM Theory



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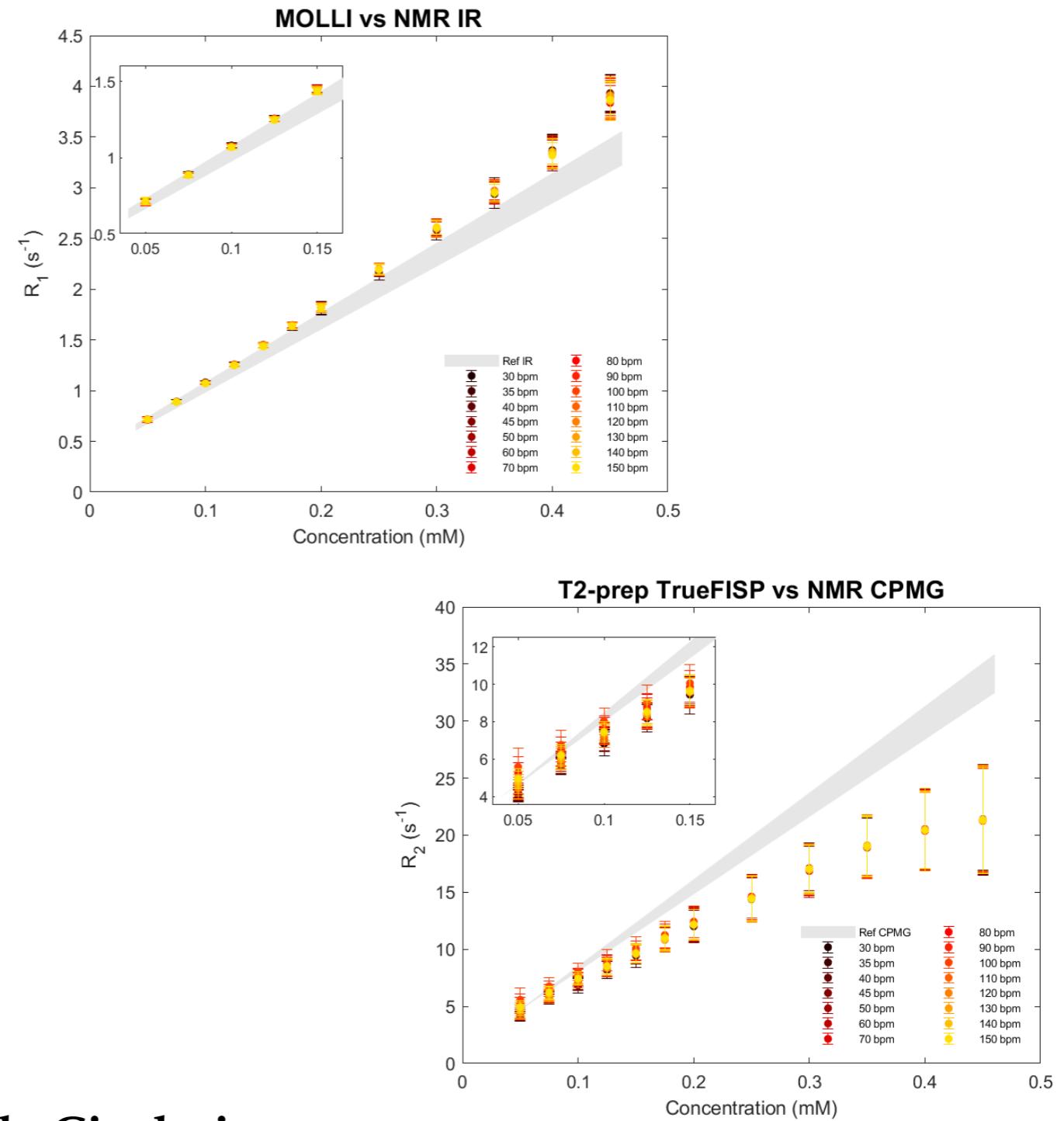
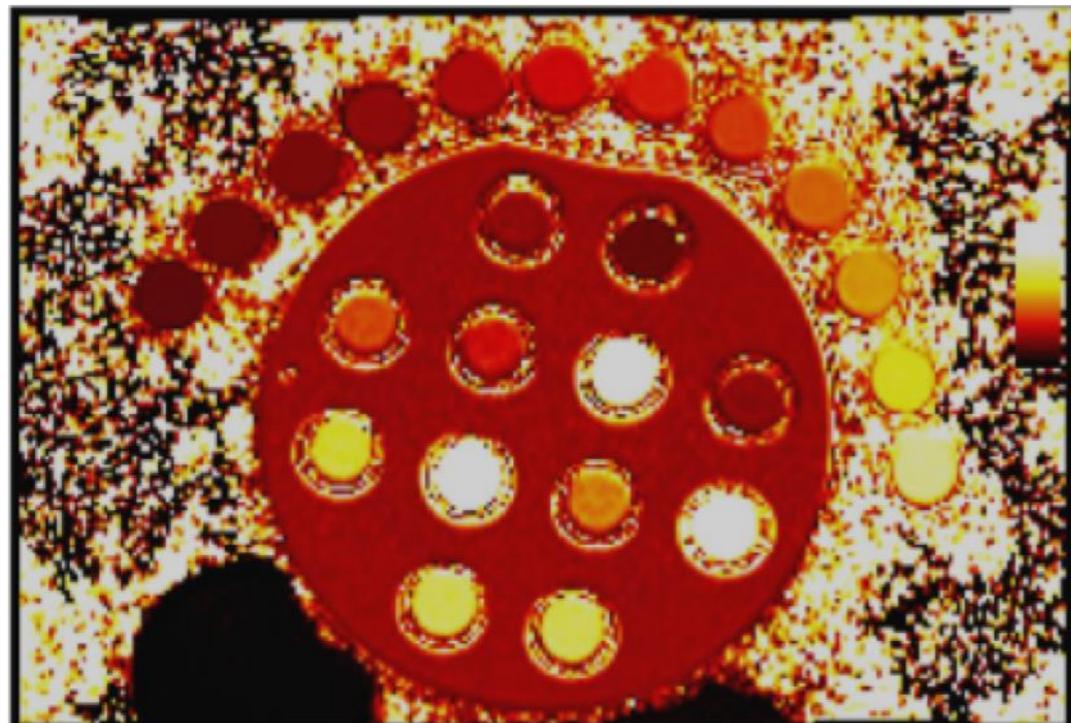
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- Siemens Aera 1.5 T
- Optical Fibers for Temperature Monitoring

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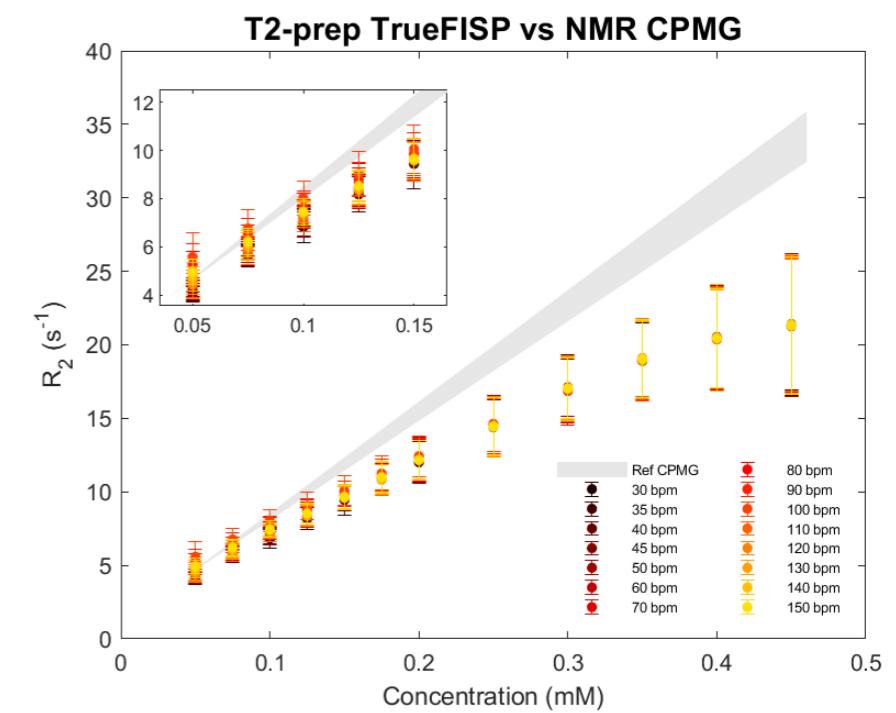
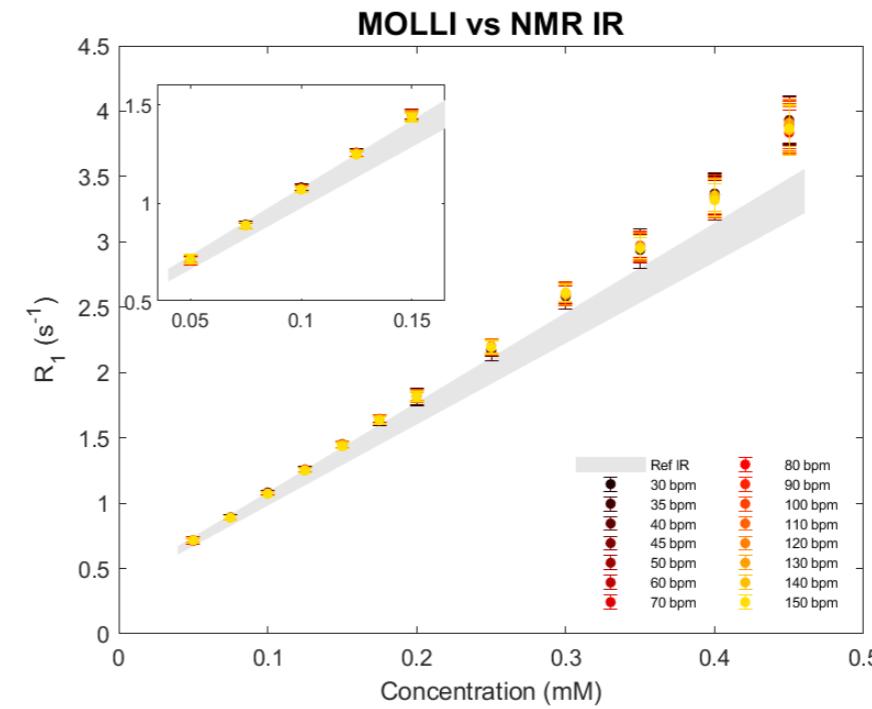
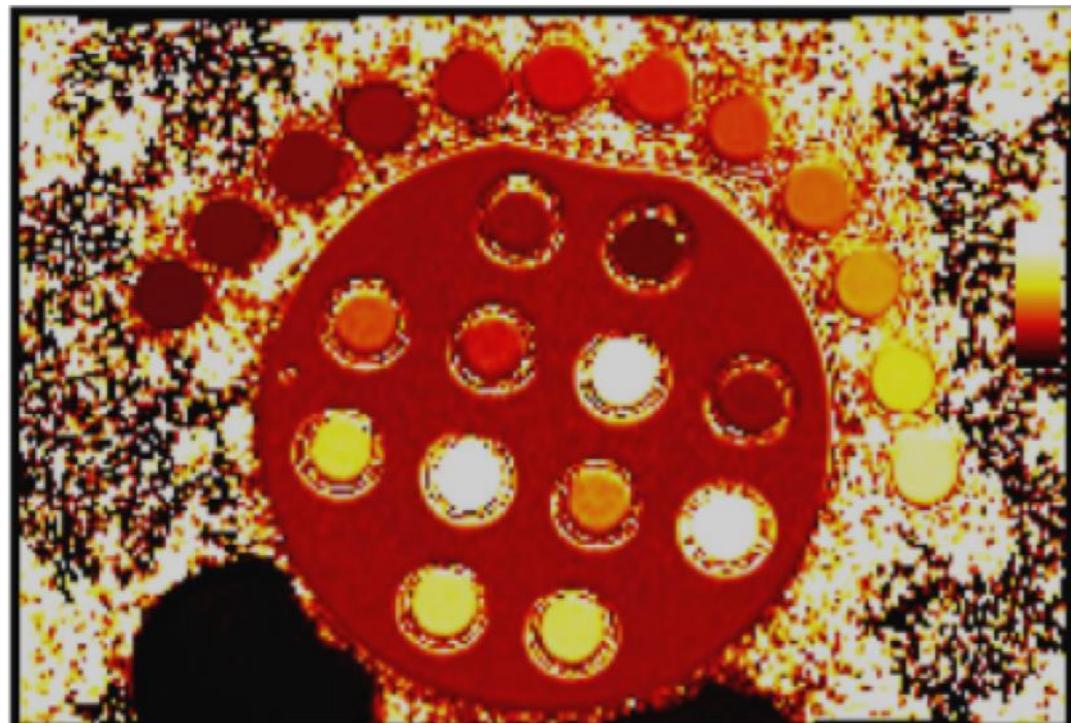
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Standardization and harmonization of MRI relaxation time mapping techniques



A clinical trial will be started soon!!!

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Standardization and harmonization of MRI relaxation time mapping techniques

Part 2

MR FINGERPRINTING

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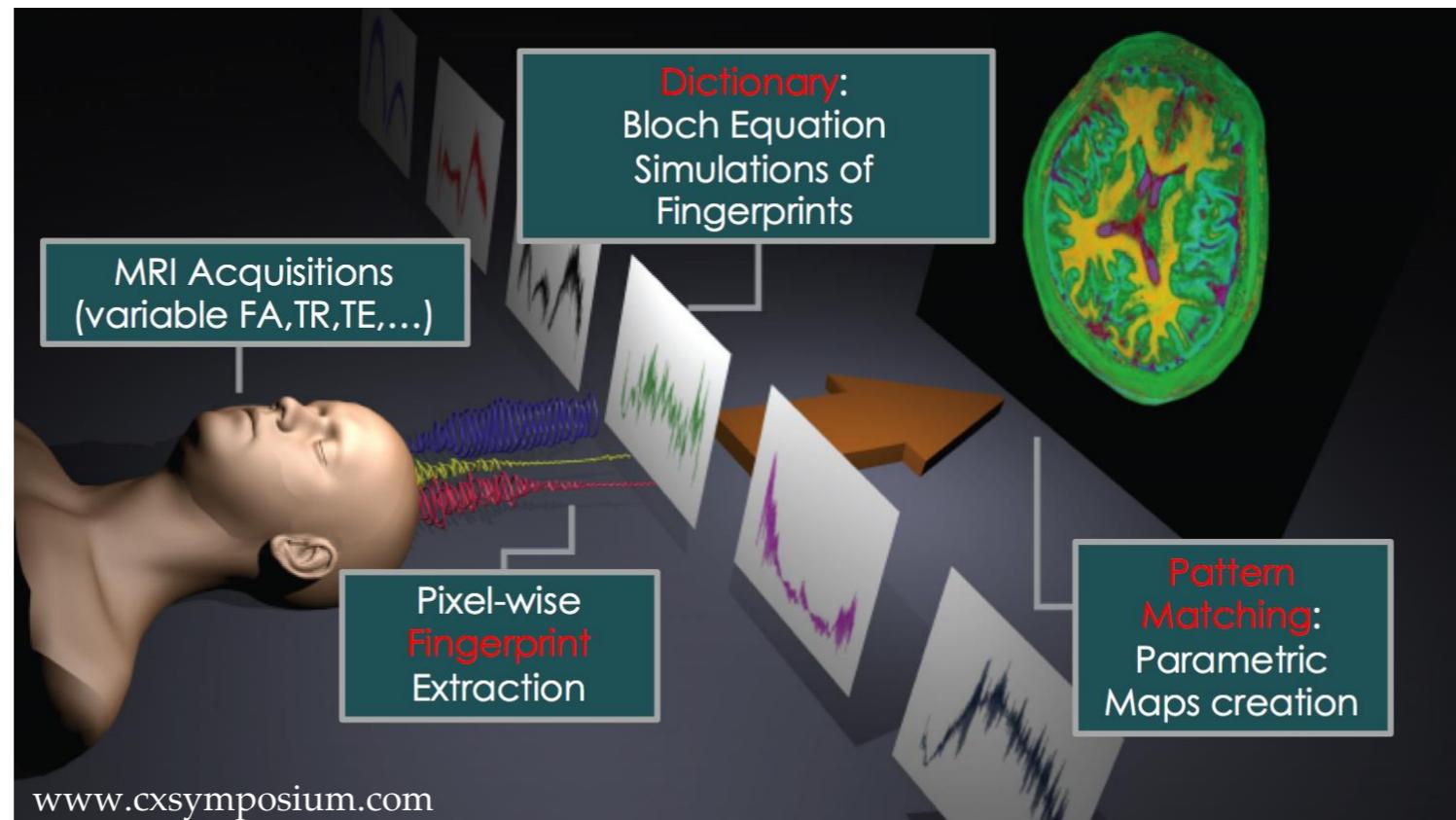
Standardization and harmonization of MRI relaxation time mapping techniques

Advantages:

- «One-scan, multiple properties»

Disadvantages:

- Acquisition parameters dependence
- Model-based
- Huge amount of data

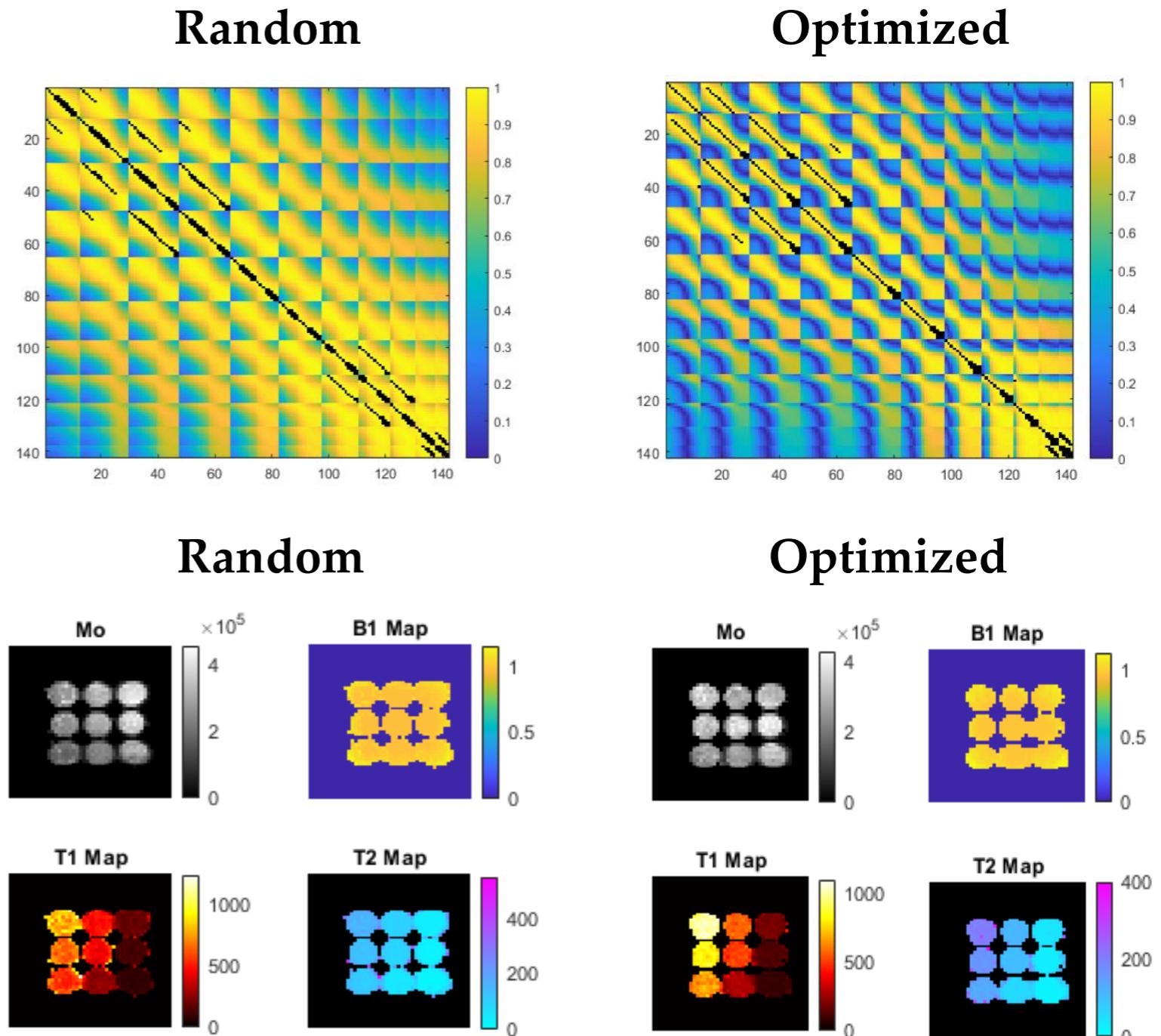


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Standardization and harmonization of MRI relaxation time mapping techniques

Strategies:

- Dictionary D
- Self-Correlation Matrix D^+D
- Calibration phantom



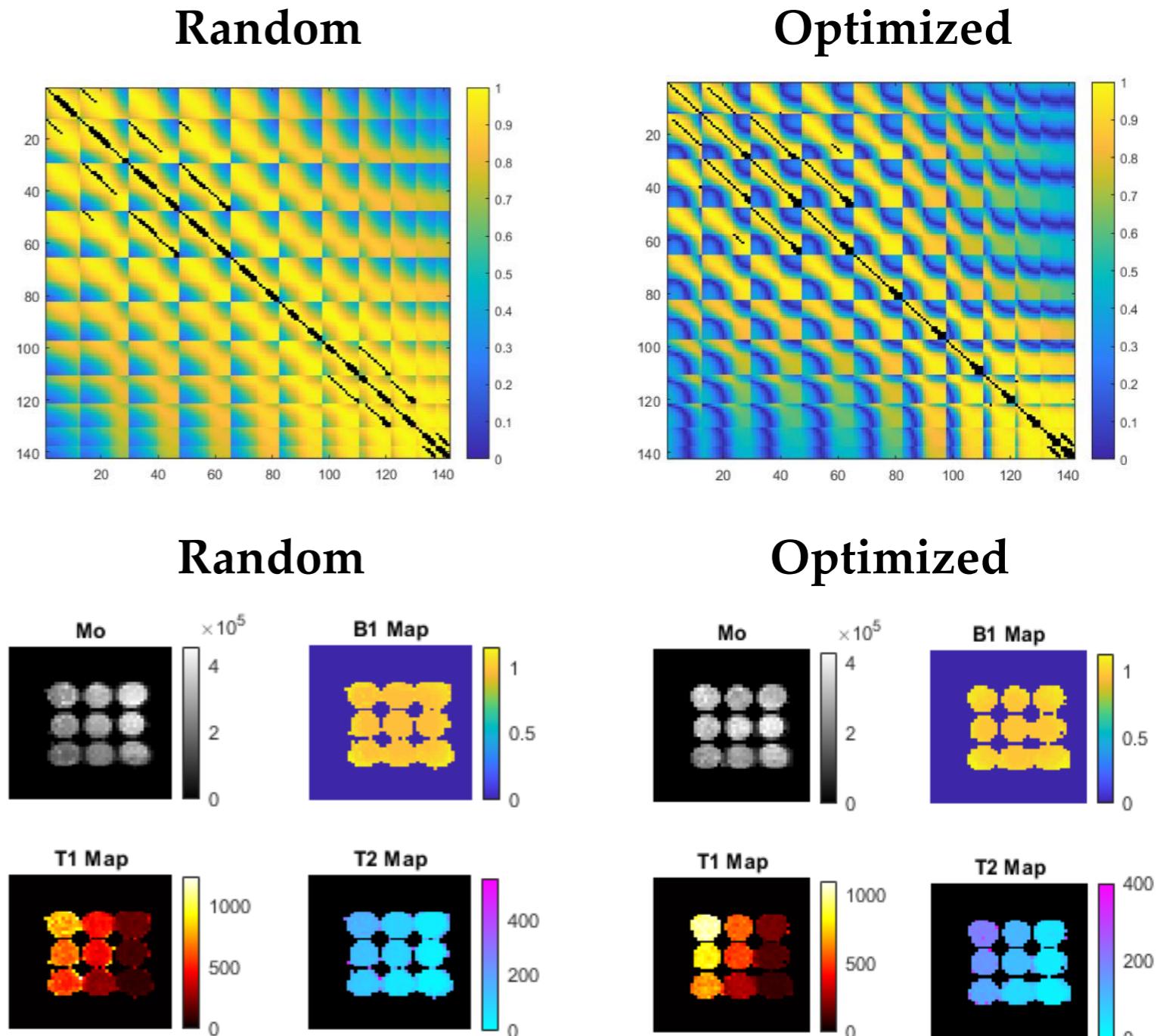
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Standardization and harmonization of MRI relaxation time mapping techniques

Strategies:

- Dictionary D
- Self-Correlation Matrix D^+D
- Calibration phantom



Thank you!

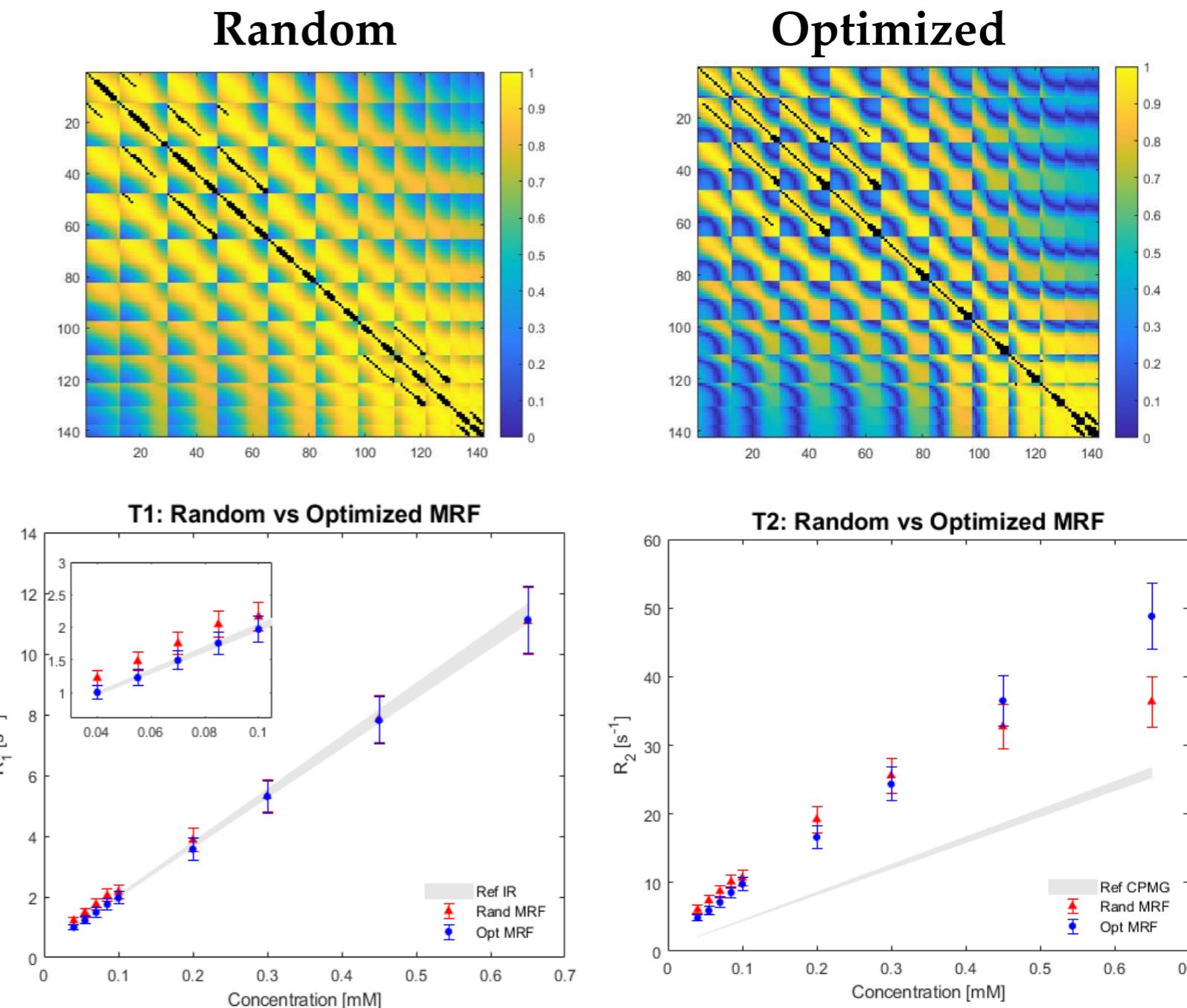
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Standardization and harmonization of MRI relaxation time mapping techniques

Strategies:

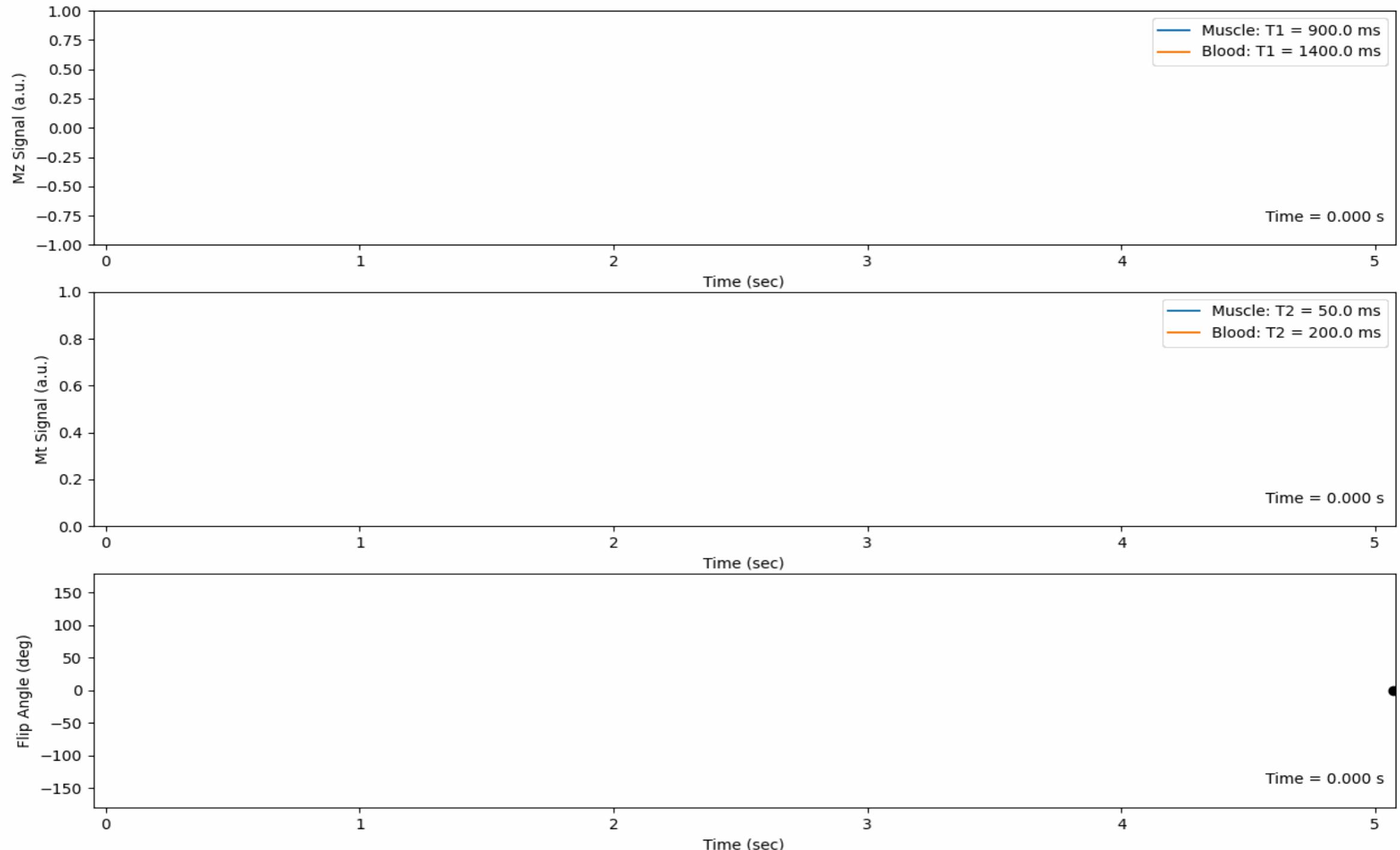
- Dictionary D
- Self-Correlation Matrix D^+D
- Calibration phantom
- ML (?)



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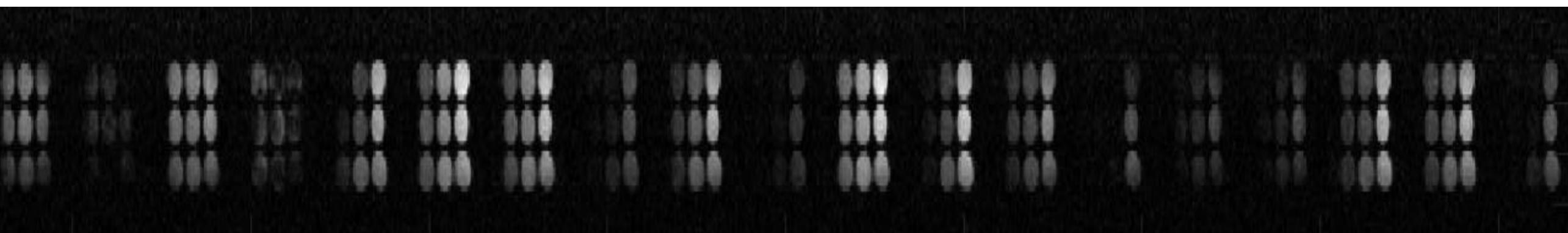
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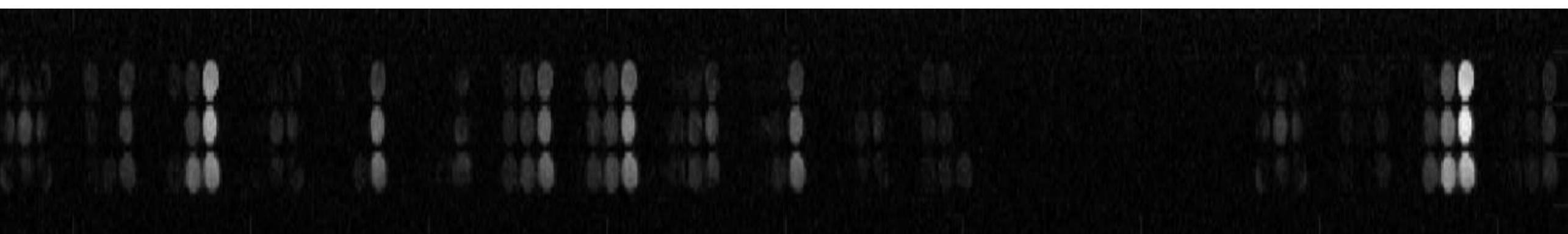
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Standardization and harmonization of MRI relaxation time mapping techniques

Random



Optimized



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