

Overview and Motivation

Magnetic Resonance Fingerprinting (MRF) is a quantitative MR imaging technique which aims at providing simultaneous measurements of multiple tissue properties using a single acquisition [1]. Compared to standard MR imaging, this technique has the potential to drastically improve the information for diagnosis, prognosis and/or therapeutic assessment. It is therefore important that this technique is reliable and accurate [2].

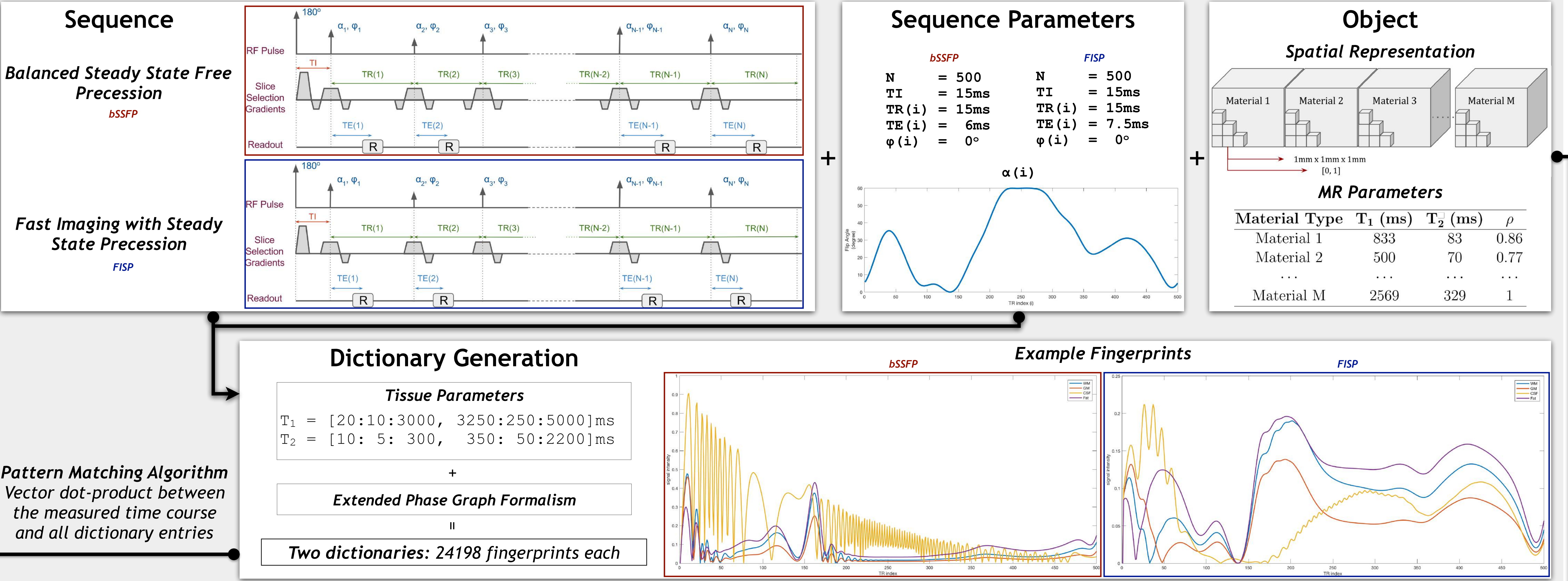
Context: To the best of our knowledge, most MRF studies rely on real data for validation. We present here an alternative, by simulating the entire pipeline of a magnetic resonance fingerprinting experiment.

Aim: To simulate the image space acquisition of a Magnetic Resonance Fingerprinting experiment, with a balanced steady state free precession sequence (bSSFP) and a digital phantom, using the open source MRI simulator POSSUM.

Method

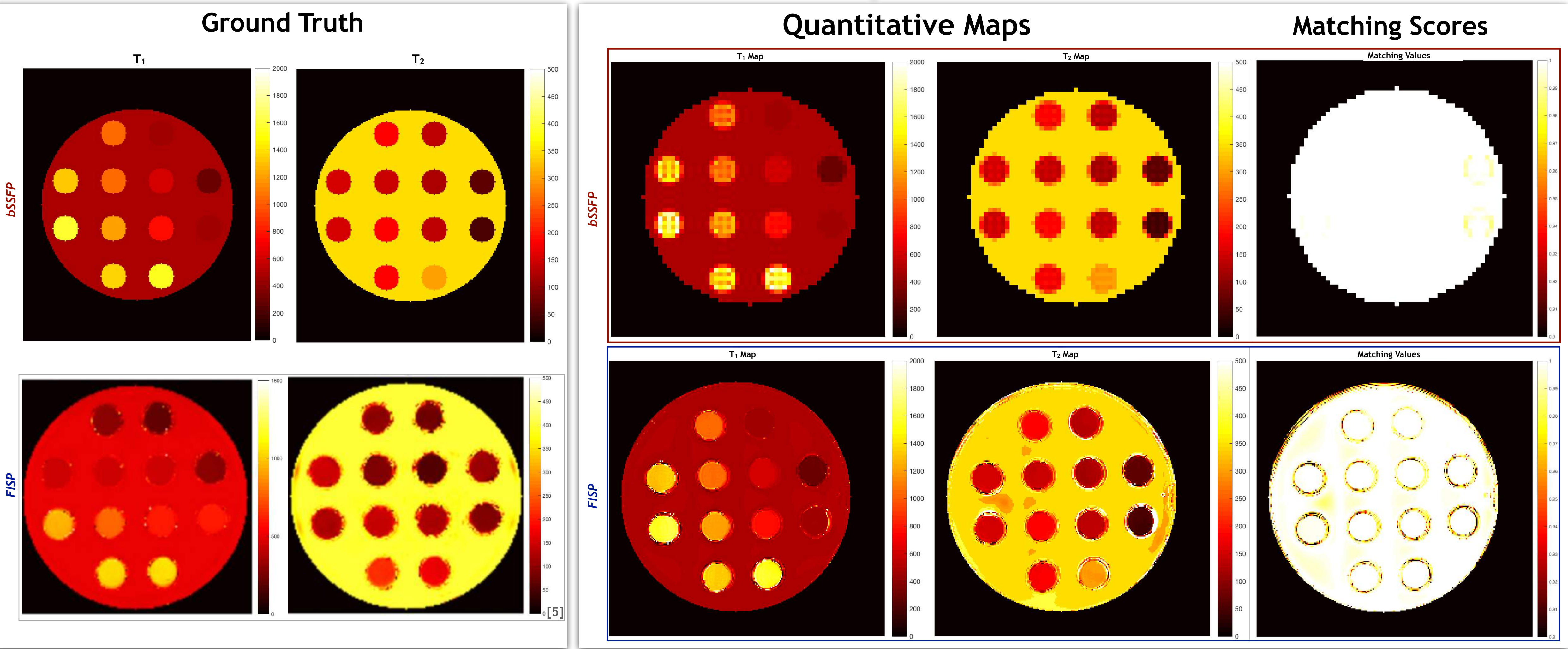
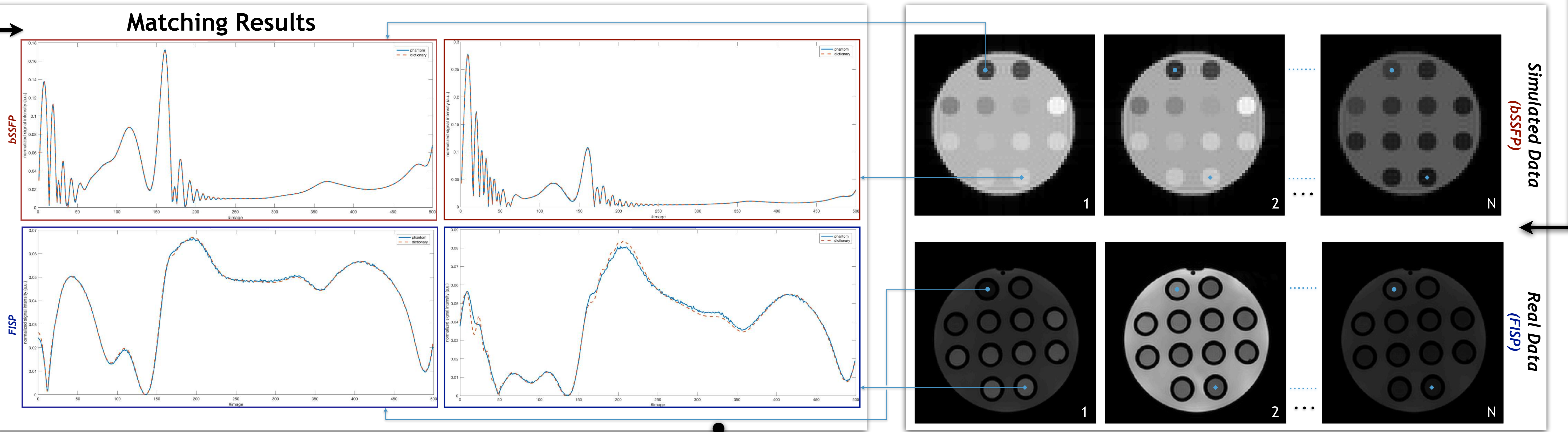
POSSUM (Physics-Oriented Simulated Scanner for Understanding MRI):

- Open source software tool that produces realistic simulated MRI images [6].
- Simulates the physics of MRI acquisition by solving the Bloch equations for each object voxel at each time point in a given sequence.



Pattern Matching Algorithm
Vector dot-product between the measured time course and all dictionary entries

Results



Future Work

- Perform simulations with higher resolution acquisitions.
- Simulate the FISP-type sequence.
- Evaluate the motion sensitivity of the MRF-FISP framework.