

Actual trajectory measurement for multi-echo GRE at 7T using a field camera system

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Ultrahigh Field (UHF) MRI can provide images with unprecedented spatial resolution and SNR. Together with the increased sensitivity towards longitudinal relaxation time and magnetic susceptibility effects, this allows for a better tissue characterization (i.e., QSM, T1/T2 relaxometry). Efficient quantification of such parameters requires k-space sampling strategies which fully exploit the capability of the gradient system (e.g., Non-Cartesian, EPI). However, these are more sensitive to the effects of the eddy current fields induced by the waveforms themselves, leading to deviations from theoretical k-space trajectories and subsequent image distortions. To fully take advantage of the benefits offered from UHF, it is necessary to correct these artifacts by measuring the actual sampling pattern. Here, we used a field-camera (Skope Magnetic Resonance Technologies) to measure the actual gradient waveforms employed during the acquisition and reconstruct artifact-free quantitative T2* maps of the brain of a healthy volunteer at 7 T. In future works, we will apply the corrections to more efficient but more error-prone acquisition strategies such as non-Cartesian and EPI-based Magnetic Resonance Fingerprinting, QSM, fMRI and Diffusion.

Field

Systems and applications

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