Challenges in image reconstruction of dynamic magnetic particle imaging

Magnetic particle imaging (MPI) is a relatively new but promising medical imaging technique allowing for the reconstruction of the spatial distribution of magnetic nanoparticles injected into the patient's body. It measures the non-linear response of the particles to a dynamic magnetic field. Key feature is the short measuring time which allows the reconstruction of moving objects from a time-series of measured frames. However, on the other side, compensation of motion artifacts and online-reconstruction are still challenging. Moreover, the state-of-the-art model for MPI assumes a static particle concentration during the scan of each frame. While this approach is feasible for limited velocities, it results in data gaps leading to artifacts for strong dynamics. We will present some approaches for compensating motion artifacts and for the reconstruction of dynamic concentrations. We show reconstruction results for simulated dynamic data.