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“Computerized Tomography and Magnetic Particle Imaging using a Field-Free Line - Similarities and Differences”

Computerized tomography (CT) is a well-known medical imaging scheme indispensable for diagnostics in clinical everyday life. Based on measuring the intensity loss of X-rays traversing the patient's body from different positions and directions it allows for imaging inner structures. Magnetic particle imaging (MPI) is a relatively new but promising medical imaging technique. It allows for the reconstruction of the spatial distribution of superparamagnetic iron oxide nanoparticles via exploiting their non-linear magnetization response to changing magnetic fields. In this talk, we dedicate ourselves towards MPI using a field-free line (FFL) for spatial encoding and consequent similarities and differences to CT. Indeed, in the ideal setting corresponding MPI data can be traced back to the Radon transform of the particle concentration. Further, we will have a look at some related reconstruction results and end with problems we have to encounter when making the step to a more realistic basis.