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Hybrid Approach"; "2.6.6 1D System Function for Ideal Conditions";
"2.7 Reconstruction"; "2.8 MPI Signal Chain"
"CHAPTER 3 Introduction of a Field Free Line for Magnetic Particle
Imaging""3.1 Motivation"; "3.1.1 Increased Sensitivity"; "3.1.2 FFL
versus FFP Imaging: a Simulation Study"; "3.1.3 Efficient Radon-based
Reconstruction Algorithms"; "3.2 The FFL Field and Trajectory"; "3.3
The FFL Scanner Design"; "3.4 Field Free Line Imaging Techniques";
"3.4.1 Preliminaries: Static Field Free Line Generation"; "3.4.2 Field
Free Line Projection Imaging"; "3.4.3 Dynamic Field Free Line
Imaging"; "CHAPTER 4 Theory of Magnetic Field Free Line
Generation"; "4.1 FFP Field Generation"
"4.2 On Axis FFL Field Generation""4.3 FFL Field Rotation"; "4.4
Current Considerations"; "4.5 FFL Field Translation"; "CHAPTER 5 A
Field Free Line Field Demonstrator"; "5.1 Introduction"; "5.2
Materials and Methods"; "5.2.1 FFL Field Demonstrator Construction";
"5.2.2 FFL Field Demonstrator Electromagnetic Coils"; "5.2.3 FFL Field
Demonstrator Measurement Process"; "5.3 Results"; "5.3.1 FFL
Rotation"; "5.3.2 FFL Translation"; "5.3.3 Magnetic Field Quality";
"5.4 Discussion"
"CHAPTER 6 Scanner Efficiency and Magnetic Field Quality Analysis for
Different Coil Topologies""6.1 Dynamic FFL Selection Field
Generation"; "6.1.1 Coil Topologies for Dynamic FFL Selection Field
Generation"; "6.1.2 Current Optimization"; "6.1.3 Magnetic Field
Quality"; "6.1.4 Electrical Power Consumption"; "6.1.5 Summary";
"6.1.6 Experimental Validation"; "6.1.7 Discussion"; "6.2 FFL Drive
Field Generation"; "CHAPTER 7 Efficient Reconstruction Algorithms";
"7.1 Theory"; "7.1.1 Magnetic Fields"; "7.1.2 Particle
Magnetization"; "7.1.3 Induced Signal"
"7.1.4 Signal Transformations"

Sommario/riassunto

Marlitt Erbe provides a detailed introduction into the young research field of Magnetic Particle Imaging (MPI) and field free line (FFL) imaging in particular. She derives a mathematical description of magnetic field generation for FFL imaging in MPI. To substantiate the simulation studies on magnetic FFL generation with a proof-of-concept, the author introduces the FFL field demonstrator, which provides the world's first experimentally generated rotated and translated magnetic FFL field complying with the requirements for FFL reconstruction. Furthermore, she proposes a scanner design of considerably enhanced magnetic field quality and efficiency. The author discusses the influence of magnetic field quality optimization on the image quality achieved using efficient Radon-based reconstruction methods, which arise for a line detection scheme, and based on this optimized design, presents a dynamic FFL scanner assembly. Contents Introduction of a Field Free Line for Magnetic Particle Imaging Magnetic Field Free Line Generation A Field Free Line Field Demonstrator Scanner Efficiency and Magnetic Field Quality Analysis Efficient Reconstruction Algorithms A Dynamic Field Free Line Imaging Device Target Groups Academics and practitioners in the fields of magnetic particle imaging, computed tomography, and medical imaging; radiologists and physicians. The Author Marlitt Erbe earned her doctoral degree at the Institute of Medical Engineering, University of Lübeck, under the supervision of Prof. Thorsten M. Buzug. The Editor The series Aktuelle Forschung Medizintechnik is edited by Thorsten M. Buzug.
