

## CONTENTS

|  |           |
|--|-----------|
| <b>Keynote .....</b>   | <b>1</b>  |
| Particle Dynamics of Mono-Domain Particles in Magnetic Particle Imaging<br><i>J. Weizenecker, B. Gleich, J. Rahmer, J. Borgert .....</i>   | 3         |
| <b>Magnetic Nanoparticles.....</b>   | <b>17</b> |
| The Effects of Molecular Binding on the Phase of MSB Measurements<br><i>J. B. Weaver, A. M. Rauwerdink .....</i>   | 19        |
| SPIO Nanoparticles Encapsulation into Human Erythrocytes for MPI Application<br><i>D. Markov, H. Boeve, B. Gleich, J. Borgert, A. Antonelli, C. Sfara, M. Magnani ...</i>                                    | 26        |
| Use of Resovist in Magnetic Particle Imaging<br><i>G. Schütz, J. Lohrke, J. Hütter .....</i>   | 32        |
| Larger Single Domain Iron Oxide Nanoparticles for Magnetic Particle Imaging<br><i>S. Dutz, R. Müller, M. Zeisberger .....</i>  | 37        |
| Superparamagnetic Iron Oxide Nanoparticles for Magnetic Particle Imaging<br><i>K. Lüdtke-Buzug, S. Biederer, M. Erbe, T. Knopp, T. F. Sattel, T. M. Buzug .....</i>  | 44        |
| <b>Magnetic Particle Spectrometry .....</b>  | <b>51</b> |
| Size-Optimized Magnetite Nanoparticles for Magnetic Particle Imaging<br><i>R. M. Ferguson, A. P. Khandar, K. R. Minard, K. M. Krishnan.....</i>  | 53        |
| A Spectrometer to Measure the Usability of Nanoparticles for Magnetic Particle Imaging<br><i>S. Biederer, T. F. Sattel, T. Knopp, M. Erbe, K. Lüdtke-Buzug, F. M. Vogt, J. Barkhausen, T. M. Buzug .....</i> | 60        |
| Evidence of Aggregates of Magnetic Nanoparticles in Suspensions Which Determine the Magnetisation Behaviour<br><i>D. Eberbeck, F. Wiekhorst, L. Trahms .....</i>   | 66        |
| Investigation of The Magnetic Particle Imaging Signal's Dependency on Ferrofluid Concentration<br><i>J.-P. Gehrcke, M. A. Rückert, T. Kampf, W. H. Kullmann, P. M. Jakob, V. C. Behr.....</i>                | 73        |

|   |            |
|---|------------|
| Magnetization Harmonics as a Remote Method for Monitoring Endocytosis of Nanoparticles<br><i>A. M. Rauwerdink, A. J. Giustini, P. J. Hoopes, J. B. Weaver</i> ..... | 79         |
| Magnetic Particle Spectrometry for the Evaluation of Field-Dependent Harmonics Generation<br><i>T. Wawrzik, J. Hahn, F. Ludwig, M. Schilling</i> .....              | 86         |
| <b>Magnetic Particle Imaging .....</b>  | <b>91</b>  |
| Narrowband Magnetic Particle Imaging in a Mouse<br><i>P. Goodwill, S. Conolly</i> .....   | 93         |
| Two-Dimensional Magnetic Particle Imaging<br><i>T. Wawrzik, F. Ludwig, M. Schilling</i> .....   | 100        |
| Resolution Distribution in Single-Sided Magnetic Particle Imaging<br><i>T. F. Sattel, T. Knopp, S. Biederer, M. Erbe, K. Lüdtkke-Buzug, T. M. Buzug</i> .....       | 106        |
| The Effect of Relaxation on Magnetic Particle Imaging<br><i>Y. Wu, Z. Yao, G. Kafka, D. Farrell, M. Griswold, R. Brown</i> .....                                    | 113        |
| Efficient Field-Free Line Generation for Magnetic Particle Imaging<br><i>T. Knopp, S. Biederer, T. F. Sattel, K. Lüdtkke-Buzug, M. Erbe, T. M. Buzug</i> .....      | 120        |
| 3D Real-Time Magnetic Particle Imaging: Encoding and Reconstruction Aspects<br><i>J. Rahmer, B. Gleich, J. Borgert, J. Weizenecker</i> .....                        | 126        |
| <b>Imaging Technology and Safety Aspects .....</b>  | <b>133</b> |
| Concept for a Digital Amplifier with High Quality Sinusoidal Output Voltage for MPI Drive Field Coils<br><i>C. Loef, P. Luerkens, O. Woywode</i> .....              | 135        |
| A Novel Compensated Coil System with High Homogeneity and low Strayfields<br><i>R. Hiergeist, J. Lüdke, R. Ketzler, M. Albrecht, G. Ross</i> .....                  | 141        |
| JFET Noise Modelling for MPI Receivers<br><i>I. Schmale, B. Gleich, J. Borgert, J. Weizenecker</i> .....  | 148        |
| Noise Within Magnetic Particle Imaging<br><i>I. Schmale, B. Gleich, J. Borgert, J. Weizenecker</i> .....  | 154        |
| Calculation and Evaluation of Current Densities and Thermal Heating in the Body During MPI<br><i>J. Bohnert, O. Dössel</i> .....                                    | 162        |
| A Surveillance Unit for Magnetic Particle Imaging Systems<br><i>S. Kaufmann, S. Biederer, T. F. Sattel, T. Knopp, T. M. Buzug</i> .....                             | 169        |

|   |            |
|---|------------|
| <b>Magneto-Relaxometry .....</b>  | <b>175</b> |
| Cancer Therapy with Magnetic Nanoparticles Visualized with X-Ray-<br>Tomography, Magnetorelaxometry and Histology<br><i>S. Lyer, R. Tietze, L. Trahms, S. Odenbach, C. Alexiou .....</i>  | 177        |
| Localization and Quantification of Magnetic Nanoparticles by Multichannel<br>Magnetorelaxometry for Thermal Ablation Studies<br><i>H. Richter, F. Wiekhorst, U. Steinhoff, L. Trahms, M. Kettering, W. A. Kaiser,<br/>I. Hilger.....</i>              | 184        |
| Imaging of Magnetic Nanoparticles Based on Magnetorelaxation and Minimum<br>Norm Estimations<br><i>D. Baumgarten, J. Haueisen .....</i>   | 191        |
| <b>Medical Applications .....</b>   | <b>199</b> |
| Developing Cellular MPI: Initial Experience<br><i>J. W. M. Bulte, P. Walczak, S. Bernard, B. Gleich, J. Weizenecker, J. Borgert,<br/>H. Aerts, H. Boeve.....</i>  | 201        |
| Sentinel Lymphnode Detection in Breast Cancer by Magnetic Particle Imaging<br>Using Superparamagnetic Nanoparticles<br><i>D. Finas, B. Ruhland, K. Baumann, T. Knopp, T. Sattel, S. Biederer,<br/>K. Luedtke-Buzug, T. M. Buzug, K. Diedrich.....</i> | 205        |
| Magnetic Sensing Methods and Materials for Medical Applications<br><i>B. Ten Haken, M. Visscher, M. Sobik, A. H. Velders .....</i>  | 211        |
| Superparamagnetic Iron Oxides for MR-Visualization of Textile Implants<br><i>I. Slabu, T. Schmitz-Rode, M. Hodenius, U. Klinge, J. Otto, G. A. Krombach,<br/>N. Krämer, H. Donker, M. Baumann .....</i>   | 217        |
| Detection of Autologous Chondrocytes at Polyethylene Scaffolds in Vivo -<br>Experimental Study<br><i>I. Schoen, F. Angenstein, K. Neumann, E. Roepke.....</i>   | 224        |
| Current Iron Oxide Nanoparticles - Impact on MRI and MPI<br><i>F. M. Vogt, J. Barkhausen, S. Biederer, T. F. Sattel, T. Knopp, K. Lüdtke-Buzug,<br/>T. M. Buzug.....</i>  | 231        |
| <b>Short Contributions .....</b>  | <b>235</b> |
| Colloidal Stability of Water Based Dispersions Containing Large Single Domain<br>Particles of Magnetite<br><i>N. Buske, S. Dutz .....</i>   | 237        |

Clinical Application of Iron Oxide Nanoparticles in Magnetic Resonance Imaging and Research Perspectives

*M. Port, C. Corot, I. Raynal, C. Robic, P. Robert, J. M. Idee, G. Louin, J. S. Raynaud, O. Rousseaux*..... 238

The Lack of a Mucosal Glycocalyx as a Potential Marker for the Detection of Colorectal Neoplasia by Magnetic-Particle-Imaging

*K. Ramaker, N. Röckendorf, A. Frey*..... 239

**Author Index ..... 241**