

# Frank Ludwig

## List of Publications by Year in descending order

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95  
papers

2,569  
citations

172457

29  
h-index

233421

45  
g-index

98  
all docs

98  
docs citations

98  
times ranked

2235  
citing authors

#	ARTICLE	IF	CITATIONS
1	Magnetic-field dependence of Brownian and Néel relaxation times. <i>Journal of Applied Physics</i> , 2016, 119, .	2.5	135
2	Relating Magnetic Properties and High Hyperthermia Performance of Iron Oxide Nanoflowers. <i>Journal of Physical Chemistry C</i> , 2018, 122, 3068-3077.	3.1	107
3	Size dependent structural and magnetic properties of FeO@Fe <sub>3</sub> O <sub>4</sub> nanoparticles. <i>Nanoscale</i> , 2013, 5, 12286.	5.6	103
4	Magnetorelaxometry of magnetic nanoparticles in magnetically unshielded environment utilizing a differential fluxgate arrangement. <i>Review of Scientific Instruments</i> , 2005, 76, 106102.	1.3	82
5	Toward Rapid and Sensitive Detection of SARS-CoV-2 with Functionalized Magnetic Nanoparticles. <i>ACS Sensors</i> , 2021, 6, 976-984.	7.8	76
6	Homogeneous Biosensing Based on Magnetic Particle Labels. <i>Sensors</i> , 2016, 16, 828.	3.8	75
7	Colloidal Flower-Shaped Iron Oxide Nanoparticles: Synthesis Strategies and Coatings. <i>Particle and Particle Systems Characterization</i> , 2017, 34, 1700094.	2.3	71
8	Magnetorelaxometry of magnetic nanoparticles with fluxgate magnetometers for the analysis of biological targets. <i>Journal of Magnetism and Magnetic Materials</i> , 2005, 293, 690-695.	2.3	67
9	Fluxgate based detection of magnetic nanoparticle dynamics in a rotating magnetic field. <i>Applied Physics Letters</i> , 2011, 99, .	3.3	61
10	Optimization of Magnetic Nanoparticles for Magnetic Particle Imaging. <i>IEEE Transactions on Magnetics</i> , 2012, 48, 3780-3783.	2.1	61
11	Characterization of magnetic nanoparticle systems with respect to their magnetic particle imaging performance. <i>Biomedizinische Technik</i> , 2013, 58, 535-45.	0.8	60
12	Classification of Magnetic Nanoparticle Systems—Synthesis, Standardization and Analysis Methods in the NanoMag Project. <i>International Journal of Molecular Sciences</i> , 2015, 16, 20308-20325.	4.1	59
13	Characterization of superparamagnetic nanoparticles by analyzing the magnetization and relaxation dynamics using fluxgate magnetometers. <i>Journal of Applied Physics</i> , 2007, 101, 113909.	2.5	56
14	Determination of core and hydrodynamic size distributions of CoFe <sub>2</sub> O <sub>4</sub> nanoparticle suspensions using ac susceptibility measurements. <i>Journal of Applied Physics</i> , 2010, 108, .	2.5	54
15	Fe <sup>2+</sup> Deficiencies, FeO Subdomains, and Structural Defects Favor Magnetic Hyperthermia Performance of Iron Oxide Nanocubes into Intracellular Environment. <i>Nano Letters</i> , 2018, 18, 6856-6866.	9.1	53
16	Self-consistent magnetic properties of magnetite tracers optimized for magnetic particle imaging measured by ac susceptometry, magnetorelaxometry and magnetic particle spectroscopy. <i>Journal of Magnetism and Magnetic Materials</i> , 2014, 360, 169-173.	2.3	50
17	Effect of alignment of easy axes on dynamic magnetization of immobilized magnetic nanoparticles. <i>Journal of Magnetism and Magnetic Materials</i> , 2017, 427, 162-167.	2.3	45
18	Modeling and Development of a Biosensor Based on Optical Relaxation Measurements of Hybrid Nanoparticles. <i>ACS Nano</i> , 2012, 6, 791-801.	14.6	44

#	ARTICLE	IF	CITATIONS
19	Distribution functions of magnetic nanoparticles determined by a numerical inversion method. <i>New Journal of Physics</i> , 2017, 19, 073012.	2.9	42
20	Effective particle magnetic moment of multi-core particles. <i>Journal of Magnetism and Magnetic Materials</i> , 2015, 380, 221-226.	2.3	40
21	Magnetic fluid dynamics in a rotating magnetic field. <i>Journal of Applied Physics</i> , 2012, 111, .	2.5	39
22	Binding assays with streptavidin-functionalized superparamagnetic nanoparticles and biotinylated analytes using fluxgate magnetorelaxometry. <i>Journal of Magnetism and Magnetic Materials</i> , 2009, 321, 1628-1631.	2.3	38
23	Simultaneous Study of Brownian and Néel Relaxation Phenomena in Ferrofluids by Mössbauer Spectroscopy. <i>Nano Letters</i> , 2016, 16, 1150-1155.	9.1	38
24	Multiparametric Magnetic Particle Spectroscopy of $\text{CoFe}_2\text{O}_4$ Nanoparticles in Viscous Media. <i>Journal of Physical Chemistry C</i> , 2019, 123, 6787-6801.	3.1	38
25	Properties of magnetic nanoparticles in the Brownian relaxation range for liquid phase immunoassays. <i>Journal of Applied Physics</i> , 2007, 102, 054901.	2.5	35
26	Dual-frequency magnetic particle imaging of the Brownian particle contribution. <i>Journal of Magnetism and Magnetic Materials</i> , 2017, 427, 156-161.	2.3	35
27	Protein detection with magnetic nanoparticles in a rotating magnetic field. <i>Journal of Applied Physics</i> , 2014, 115, .	2.5	33
28	Direct Protein Detection in the Sample Solution by Monitoring Rotational Dynamics of Nickel Nanorods. <i>Small</i> , 2014, 10, 407-411.	10.0	33
29	Highly stable monodisperse PEGylated iron oxide nanoparticle aqueous suspensions: a nontoxic tracer for homogeneous magnetic bioassays. <i>Nanoscale</i> , 2013, 5, 11447.	5.6	32
30	Influence of clustering on the magnetic properties and hyperthermia performance of iron oxide nanoparticles. <i>Nanotechnology</i> , 2018, 29, 425705.	2.6	31
31	Visualization of spatial and temporal temperature distributions with magnetic particle imaging for liver tumor ablation therapy. <i>Scientific Reports</i> , 2020, 10, 7480.	3.3	31
32	Field-dependent dynamic responses from dilute magnetic nanoparticle dispersions. <i>Nanoscale</i> , 2018, 10, 2052-2066.	5.6	29
33	Drive-Field Frequency Dependent MPI Performance of Single-Core Magnetite Nanoparticle Tracers. <i>IEEE Transactions on Magnetics</i> , 2015, 51, 1-4.	2.1	28
34	Homogeneous Bioassays Based on the Manipulation of Magnetic Nanoparticles by Rotating and Alternating Magnetic Fields—A Comparison. <i>IEEE Transactions on Magnetics</i> , 2012, 48, 3792-3795.	2.1	27
35	Magnetic nanoparticle temperature imaging with a scanning magnetic particle spectrometer. <i>Measurement Science and Technology</i> , 2018, 29, 115903.	2.6	27
36	Characterization of magnetic core-shell nanoparticles by fluxgate magnetorelaxometry, ac susceptibility, transmission electron microscopy and photon correlation spectroscopy—A comparative study. <i>Journal of Magnetism and Magnetic Materials</i> , 2009, 321, 1644-1647.	2.3	26

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37	Dynamics of magnetic nanoparticles in viscoelastic media. <i>Journal of Magnetism and Magnetic Materials</i> , 2017, 427, 331-335.	2.3	25
38	Analysis of AC Susceptibility Spectra for the Characterization of Magnetic Nanoparticles. <i>IEEE Transactions on Magnetics</i> , 2017, 53, 1-4.	2.1	24
39	Size analysis of single-core magnetic nanoparticles. <i>Journal of Magnetism and Magnetic Materials</i> , 2017, 427, 19-24.	2.3	23
40	Size Distribution and Magnetization Optimization of Single-Core Iron Oxide Nanoparticles by Exploiting Design of Experiment Methodology. <i>IEEE Transactions on Magnetics</i> , 2013, 49, 201-207.	2.1	22
41	Characterization of superparamagnetic Fe <sub>3</sub> O <sub>4</sub> nanoparticles by fluxgate magnetorelaxometry for use in biomedical applications. <i>Journal of Applied Physics</i> , 2008, 103, 07A314.	2.5	20
42	Influence of static magnetic field strength on the temperature resolution of a magnetic nanoparticle thermometer. <i>Journal of Applied Physics</i> , 2016, 120, 143902.	2.5	20
43	A novel characterization technique for superparamagnetic iron oxide nanoparticles: The superparamagnetic quantifier, compared with magnetic particle spectroscopy. <i>Review of Scientific Instruments</i> , 2019, 90, 024101.	1.3	20
44	Magnetic particle imaging scanner with 10-kHz drive-field frequency. <i>Biomedizinische Technik</i> , 2013, 58, 557-63.	0.8	19
45	Debye-Based Frequency-Domain Magnetization Model for Magnetic Nanoparticles in Magnetic Particle Spectroscopy. <i>IEEE Transactions on Magnetics</i> , 2015, 51, 1-4.	2.1	19
46	Dynamics of CoFe <sub>2</sub> O <sub>4</sub> Single-Core Nanoparticles in Viscoelastic Media. <i>Physics Procedia</i> , 2015, 75, 1150-1157.	1.2	19
47	Polymer/Iron Oxide Nanoparticle Composites – A Straight Forward and Scalable Synthesis Approach. <i>International Journal of Molecular Sciences</i> , 2015, 16, 19752-19768.	4.1	18
48	Homogeneous Protein Analysis by Magnetic Core-Shell Nanorod Probes. <i>ACS Applied Materials &amp; Interfaces</i> , 2016, 8, 8893-8899.	8.0	18
49	Scale-dependent particle diffusivity and apparent viscosity in polymer solutions as probed by dynamic magnetic nanorheology. <i>Soft Matter</i> , 2020, 16, 7562-7575.	2.7	18
50	Magnetic Relaxation of Agglomerated and Immobilized Iron Oxide Nanoparticles for Hyperthermia and Imaging Applications. <i>IEEE Magnetics Letters</i> , 2018, 9, 1-5.	1.1	17
51	Biophysical Characterization of (Silica-coated) Cobalt Ferrite Nanoparticles for Hyperthermia Treatment. <i>Nanomaterials</i> , 2019, 9, 1713.	4.1	17
52	Liquid Phase Immunoassay Using Magnetic Markers and Superconducting Quantum Interference Device. <i>Japanese Journal of Applied Physics</i> , 2007, 46, 7524.	1.5	16
53	Spatial and Temperature Resolutions of Magnetic Nanoparticle Temperature Imaging with a Scanning Magnetic Particle Spectrometer. <i>Nanomaterials</i> , 2018, 8, 866.	4.1	16
54	Dependence of biomolecule detection on magnetic nanoparticle concentration. <i>Journal of Magnetism and Magnetic Materials</i> , 2021, 517, 167408.	2.3	16

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55	Characterization of Magnetic Core-Shell Nanoparticle Suspensions Using AC Susceptibility for Frequencies up to 1 MHz. AIP Conference Proceedings, 2010, , .	0.4	15
56	Magnetic nanoparticle thermometry independent of Brownian relaxation. Journal Physics D: Applied Physics, 2018, 51, 015001.	2.8	14
57	Magnetic field dependence of the effective magnetic moment of multi-core nanoparticles. Journal of Applied Physics, 2020, 127, .	2.5	14
58	Magnetic, Structural, and Particle Size Analysis of Single- and Multi-Core Magnetic Nanoparticles. IEEE Transactions on Magnetics, 2014, 50, 1-4.	2.1	13
59	Magnetic Field Dependence of Ni Nanorod Brownian Relaxation. IEEE Transactions on Magnetics, 2017, 53, 1-4.	2.1	13
60	Estimation of the effective magnetic anisotropy constant of multi-core based magnetic nanoparticles from the temperature dependence of the coercive field. Journal of Applied Physics, 2020, 127, .	2.5	13
61	New Perspectives for MPI: A Toolbox for Tracer Research. Springer Proceedings in Physics, 2012, , 99-103.	0.2	13
62	Point-of-need detection of pathogen-specific nucleic acid targets using magnetic particle spectroscopy. Biosensors and Bioelectronics, 2021, 192, 113536.	10.1	12
63	Comparison and Calibration of Fluxgate and SQUID Magnetorelaxometry Techniques for the Characterization of Magnetic Core-Shell Nanoparticles. IEEE Transactions on Magnetics, 2009, 45, 4857-4860.	2.1	11
64	Homogeneous biosensor based on optical detection of the rotational dynamics of anisotropic nanoparticles. Procedia Engineering, 2010, 5, 1107-1110.	1.2	11
65	Direct protein quantification in complex sample solutions by surface-engineered nanorod probes. Scientific Reports, 2017, 7, 4752.	3.3	11
66	Noise Optimization of Racetrack Fluxgate Sensors. Sensor Letters, 2009, 7, 317-321.	0.4	11
67	Resolving particle size modality in bi-modal iron oxide nanoparticle suspensions. Journal of Magnetism and Magnetic Materials, 2015, 380, 140-143.	2.3	10
68	The Anisotropy of the AC Susceptibility of Immobilized Magnetic Nanoparticlesâ€”the Influence of Intra-Potential-Well Contribution on the AC Susceptibility Spectrum. IEEE Transactions on Magnetics, 2017, 53, 1-4.	2.1	10
69	Determination of the effective anisotropy constant of magnetic nanoparticles â€” Comparison between two approaches. Journal of Magnetism and Magnetic Materials, 2021, 519, 167402.	2.3	10
70	Static magnetic response of multicore particles. Physical Review E, 2020, 102, 032603.	2.1	10
71	Simultaneous Imaging of Magnetic Nanoparticle Concentration, Temperature, and Viscosity. Physical Review Applied, 2021, 16, .	3.8	10
72	Multivariate Magnetic Particle Spectroscopy for Magnetic Nanoparticle Characterization. , 2010, , .		9

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73	Scanner setup and reconstruction for three-dimensional magnetic particle imaging. , 2013, , .		9
74	Magnetic field orientation dependent dynamic susceptibility and Brownian relaxation time of magnetic nanoparticles. Applied Physics Letters, 2019, 115, .	3.3	9
75	In-Field Orientation and Dynamics of Ferrofluids Studied by Mössbauer Spectroscopy. ACS Applied Materials & Interfaces, 2019, 11, 3160-3168.	8.0	9
76	Excitation frequency dependence of temperature resolution in magnetic nanoparticle temperature imaging with a scanning magnetic particle spectrometer. Journal of Magnetism and Magnetic Materials, 2019, 471, 340-345.	2.3	9
77	The Dissociation Rate of Acetylacetonate Ligands Governs the Size of Ferrimagnetic Zinc Ferrite Nanocubes. ACS Applied Materials & Interfaces, 2020, 12, 217-226.	8.0	9
78	Magnetic nanoparticle-based biomolecule imaging with a scanning magnetic particle spectrometer. Nanotechnology, 2020, 31, 225101.	2.6	9
79	Dynamic Magnetic Properties of Optimized Magnetic Nanoparticles for Magnetic Particle Imaging. IEEE Transactions on Magnetics, 2014, 50, 1-4.	2.1	8
80	Suitability of magnetic single- and multi-core nanoparticles to detect protein binding with dynamic magnetic measurement techniques. Journal of Magnetism and Magnetic Materials, 2015, 380, 236-240.	2.3	8
81	Single harmonic-based narrowband magnetic particle imaging. Measurement Science and Technology, 2022, 33, 095405.	2.6	8
82	Magnetic Characterization of Clustered Core Magnetic Nanoparticles for MPI. IEEE Transactions on Magnetics, 2015, 51, 1-4.	2.1	7
83	Evaluation of effective magnetic anisotropy constant of magnetic nanoparticles from coercive field of AC magnetization curve. Journal of Applied Physics, 2021, 130, .	2.5	6
84	Spatial and field resolution of wire-wound fluxgates in magnetic dipole fields. Sensors and Actuators A: Physical, 2012, 173, 30-35.	4.1	5
85	Single-core magnetic markers in rotating magnetic field based homogeneous bioassays and the law of mass action. Journal of Magnetism and Magnetic Materials, 2015, 380, 205-208.	2.3	4
86	Dynamic gelation process observed in Cartesian magnetic particle imaging. Journal of Magnetism and Magnetic Materials, 2021, 522, 167478.	2.3	4
87	Robust approaches for model-free small-angle scattering data analysis. Journal of Applied Crystallography, 2022, 55, 586-591.	4.5	4
88	Optical biosensor technologies for molecular diagnostics at the point-of-care. , 2015, , .		3
89	A shielded fluxgate sensor for spatially resolved measurements of magnetic dipole fields. Sensors and Actuators A: Physical, 2016, 238, 229-233.	4.1	3
90	Magnetic dynamics in suspensions of ferrimagnetic platelets. Journal of Molecular Liquids, 2022, 360, 119484.	4.9	3

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91	A Phenomenological Description of the MPS Signal Using a Model for the Field Dependence of the Effective Relaxation Time. IEEE Transactions on Magnetics, 2015, 51, 1-4.	2.1	2
92	Tailoring the surface plasmon resonance energy of Au nanowire arrays by defect management and thermal treatment. Physica E: Low-Dimensional Systems and Nanostructures, 2020, 121, 114092.	2.7	2
93	Rotational dynamics of magnetic nanoparticles in different matrix systems. ChemistrySelect, 2022, 7, 981-1008.	1.5	2
94	Optimization of MNPs by size fractionation for MPI application. , 2015, , .		0
95	NanoMag &#x2014; Standardization of analysis methods for magnetic nanoparticles. , 2015, , .		0