
**ELECTROMAGNETIC
WAVES** **PIER 51**

Progress

In

Electromagnetics

Research

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Chief Editor: J. A. Kong

**Metamaterials Exhibiting
Left-Handed Properties and
Negative Refraction**

Editor: Tomasz M. Grzegorzcyk

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METAMATERIALS EXHIBITING LEFT-HANDED PROPERTIES AND NEGATIVE REFRACTION

PREFACE

This issue of the Progress in Electromagnetics Research (PIER) is a special issue on metamaterials exhibiting left-handed properties and negative refraction. These materials were first postulated theoretically in 1968, and one of their property – the negative refraction – was verified experimentally in 2001. Since then, the topic challenged all aspects of scientific research: theory, numerical simulations, and experiments. Currently, numerous teams all around the world are involved in research on left-handed materials in one or more of these aspects.

Not surprisingly, the papers gathered here originate from an extreme variety of geographical locations and discuss topics that spread over a wide spectrum of scientific interests. The volume starts by presenting some important theoretical considerations of these new substances as bulk media. Various configurations are emphasized, from infinite space, single boundary, double boundary, to closed media. It then continues by analyzing the essential building blocks of the metamaterials, currently implemented as rings and rods. Finally, it presents recent experimental works performed toward the characterization of these new materials, as well as toward some possible applications. Collectively, this volume represents an impressive body of work that reflects the breadth of topics encompassed by these substances, and their reach toward the interest of researchers worldwide. For such a contribution, I would like to thank all the authors.

All the papers in this collection have been peer reviewed. I would therefore like to extend my acknowledgments to all the reviewers for their suggestions and criticisms. Finally, I would like to thank Prof. J. A. Kong, editor of the PIER book series, for allowing me to work on the present issue.

Tomasz M. Grzegorzczuk
Cambridge MA, USA
December 2004

CONTENTS

SOME REFLECTIONS ON DOUBLE NEGATIVE MATERIALS*W. C. Chew*

1	Introduction	2
2	Symmetry in Physical Laws	2
3	Left-Handed Vacuum versus Right-Handed Vacuum	3
4	Mixing of LHV and RHV	4
5	Frequency Dispersive Left-Handed Material	6
6	Far Field Radiation and Loss Conditions for BWM	6
7	Point Source over an LHM Half Space	8
8	Surface Plasmon Resonance	11
9	Asymptotic Analysis–Ray Optics Solution	15
10	Point Source over an LHM Slab	17
11	Super-Resolution Analysis	19
12	Conclusions	23
	References	24

SURFACE INTEGRAL EQUATION FORMULATIONS FOR LEFT-HANDED MATERIALS*D. L. Smith, L. N. Medgyesi-Mitschang, and D. W. Forester*

1	Introduction	28
2	Implications of a LHM Medium	35
3	A Limiting Case	35
4	Discussion of Examples	36
5	Summary	45
	Acknowledgment	45
	References	46

ANOMALOUS PROPERTIES OF SCATTERING FROM CAVITIES PARTIALLY LOADED WITH DOUBLE-NEGATIVE OR SINGLE-NEGATIVE METAMATERIALS*F. Bilotti, A. Alù, N. Engheta, and L. Vegni*

1	Introduction	50
2	Formulation of the Problem	51

3	Anomalous Properties of Scattering from Metallic Cavities with Metamaterial Loading: Theoretical Background and Numerical Results	54
4	Conclusion	59
	References	59

METAMATERIALS AND DEPOLARIZATION FACTORS

A. Sihvola

1	Introduction	66
2	Depolarization Factors of Ellipsoids in Anisotropic Material ..	68
3	Depolarization Factors for Indefinite Media	72
4	Observations Concerning the Effective Permittivity Components	76
5	Conclusion	80
	References	81

REFLECTION COEFFICIENTS AND GOOS-HÄNCHEN SHIFTS IN ANISOTROPIC AND BIANISOTROPIC LEFT-HANDED METAMATERIALS

T. M. Grzegorzczk, X. Chen, J. Pacheco Jr., J. Chen, B.-I. Wu and J. A. Kong

1	Introduction	84
2	Formulation of the Problem	86
3	Reflection Coefficients and Goos-Hänchen Shifts	92
4	Conclusion	107
	Acknowledgment	110
	References	110

THE EFFECTIVE CONSTITUTIVE PARAMETERS AT INTERFACE OF DIFFERENT MEDIA

L.-G. Zheng and W.-X. Zhang

1	Introduction	116
2	Notations	117
3	Effective Media Parameters for Isotropic Media	118
4	Effective Media Parameters for Complex Media, Old Approach	118
5	Effective Media Parameters for Complex Media, New Approach	119
6	Conclusion	124

Appendix A.	124
Acknowledgment	125
References	125

SURFACE WAVE CHARACTER ON A SLAB OF METAMATERIAL WITH NEGATIVE PERMITTIVITY AND PERMEABILITY

S. F. Mahmoud and A. J. Viitanen

1 Introduction.....	128
2 Surface Wave Modes	129
3 Modes with Evanescent Fields on both Sides of the Interface	132
4 Concluding Remarks	134
References	135

GENERALIZED SURFACE PLASMON RESONANCE SENSORS USING METAMATERIALS AND NEGATIVE INDEX MATERIALS

A. Ishimaru, S. Jaruwatanadilok, and Y. Kuga

1 Introduction.....	140
2 Formulations for a Generalized Surface Plasmon Resonance Sensor	140
3 Conventional Optical Surface Plasmon Resonance Sensor . . .	141
4 Surface Plasmon for Metamaterials	143
5 Surface Plasmon Resonance Sensor	145
6 Surface Plasmon Sensor with Gap	147
7 Frequency Dependence and Effects of Loss	147
8 Conclusions	150
Acknowledgment	150
References	150

ANALYSIS OF THE DOUBLE-NEGATIVE MATERIALS USING MULTI-DOMAIN PSEUDOSPECTRAL TIME-DOMAIN ALGORITHM

Y. Shi and C.-H. Liang

1 Introduction.....	154
2 Discrete Model for Material Equations of DNG Cylinder . . .	155
3 Time Stepping Scheme	159
4 Numerical Results	159
5 Conclusion	163

References	163
------------------	-----

GUIDED WAVES IN UNIAXIAL WIRE MEDIUM SLAB

I. S. Nefedov and A. J. Viitanen

1 Introduction.....	168
2 Theory	169
3 Arbitrary Directed wires in x - y Plane	170
4 Wires in x - z Plane	176
5 Wires in y - z Plane	178
6 Special Cases.....	181
7 Conclusion	183
References	183

COMPLEX GUIDED WAVE SOLUTIONS OF GROUNDED DIELECTRIC SLAB MADE OF METAMATERIALS

C. Li, Q. Sui, and F. Li

1 Introduction.....	188
2 Eigenvalue Equations for Grounded Slab Made of MTMs....	188
3 Complex Guided Wave Solutions of TE Modes.....	189
4 Complex Guided Wave Solutions of TM Modes	191
5 Discussions and Conclusions.....	192
Acknowledgment.....	194
References	194

MACROSCOPIC PERFORMANCE ANALYSIS OF METAMATERIALS SYNTHESIZED FROM MICROSCOPIC 2-D ISOTROPIC CROSS SPLIT-RING RESONATOR ARRAY

H.-Y. Yao, L.-W. Li, Q. Wu, and J. A. Kong

1 Introduction.....	198
2 Formulation	199
3 Effective Constitutive Parameters of a 3-D SRR Array	203
4 Performances of a Single CSRR and Array	205
5 Conclusion	212
Acknowledgment.....	213
References	213

QUASI-STATIC ANALYSIS OF MATERIALS WITH SMALL TUNABLE STACKED SPLIT RING RESONATORS

S.-W. Lee, Y. Kuga, and A. Ishimaru

1	Introduction	220
2	Quasi-Static Lorentz Theory	220
3	Tunable Stacked Split Ring Resonator with Lumped Elements	222
4	Conclusions	226
	Acknowledgment	227
	References	227

MAGNETIC PROPERTIES OF S-SHAPED SPLIT-RING RESONATORS

*H. S. Chen, L. X. Ran, J. T. Huangfu, X. M. Zhang, K. S. Chen
T. M. Grzegorzczuk, and J. A. Kong*

1	Introduction	232
2	Magnetic Properties of S-SRR	232
3	Conclusion	245
	Acknowledgment	245
	References	245

EXPERIMENTAL STUDY ON SEVERAL LEFT-HANDED METAMATERIALS

*L. Ran, J. Huangfu, H. Chen, X. Zhang, K. Cheng
T. M. Grzegorzczuk, and J. A. Kong*

1	Introduction	250
2	Methods	251
3	Experiments	256
4	Equivalent Circuit Analysis	272
5	Conclusion	276
	Acknowledgment	276
	References	276

EXPERIMENTAL STUDY OF $\lambda/4$ MONOPOLE ANTENNAS IN A LEFT-HANDED META-MATERIAL

Q. Sui, C. Li, L. L. Li, and F. Li

1	Introduction	282
2	Experimental Setup and the Structure of Meta-Material	282

3	Experiment Results and Explanations	284
4	Conclusion	291
	Acknowledgment	291
	References	292

A STUDY OF USING METAMATERIALS AS ANTENNA SUBSTRATE TO ENHANCE GAIN

B.-I. Wu, W. Wang, J. Pacheco, X. Chen, T. M. Grzegorzczuk and J. A. Kong

1	Introduction.....	296
2	Prior Art	298
3	Methodology	299
4	Comparative Study of Different Metamaterial Substrate	310
5	Optimized Metamaterial Structure	316
6	Conclusion	324
	References	324

AXIALLY SLOTTED ANTENNA ON A CIRCULAR OR ELLIPTIC CYLINDER COATED WITH METAMATERIALS

A-K. Hamid

1	Introduction.....	329
2	Formulation of the Radiation Problem	330
3	Numerical Results	334
4	Conclusions	340
	Acknowledgment	340
	References	340