

CONTENTS

1. Introduction	6
1.1 Volumetric Metamaterial	9
1.2 Planar Version of a Metamaterial	12
2. Left-Handed Coplanar Line	15
3. 1D Volumetric Metamaterial	16
4. 3D Wire Medium	18
5. Planar Resonators	18
5.1 Split Ring Resonator	19
5.2 Electric Dipole	19
5.3 Double H-Shaped Resonator	20
6. Cubic Cells with an Isotropic Response	23
7. 2D Random Distribution of Elements in Space	24
8. Isotropic Single-Negative Metamaterials	26
9. Conclusion	28
Acknowledgements	30
References	30
Curriculum Vitae	36
Education and Scientific Work, Research Group of Electromagnetics and Metamaterials, Future Prospects	41