1. Record Nr. UNINA9910809163703321

Titolo	Materials and wave control / / edited by Éric Lheurette ; series editor, Pierre-Noel Favennec
Pubbl/distr/stampa	Hoboken, New Jersey : , : John Wiley and Sons, Incorporation, , 2013 ©2013
ISBN	1-118-76208-8 1-118-76214-2 1-118-76185-5
Descrizione fisica	1 online resource (242 p.)
Collana	Waves series
Altri autori (Persone)	LheuretteEacute}ric FavennecPierre-Noel
Disciplina	539.2
Soggetti	Electromagnetic waves - Transmission Wave functions Metamaterials
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Title page; Contents; Introduction; Chapter 1. Overview of Microwave and Optical Metamaterial Technologies; 1.1. Introduction and background; 1.2. Omega-type arrays; 1.2.1. Dispersion and angular properties; 1.2.2. Tunable omega-type structure; 1.2.3. Omega-type pattern at millimeter wavelengths; 1.2.4. SRRs at infrared; 1.3. Transmission lines with series capacitances and shunt inductances; 1.3.1. Tuneable phase shifter for centimeter wavelengths; 1.3.2. Left-handed transmission lines at tetrahertz frequencies; 1.4. Fishnet approach; 1.4.1. Tunable fishnet for centimeter wavelengths 1.4.2. Terahertz subwavelength holes arrays1.4.3. Wedge-type devices; 1.4.4. Fishnet with twisted apertures: chiral device; 1.5. Full dielectric approach: Mie resonance based devices; 1.5.1. BST cube technology; 1.6. Photonic crystal technology; 1.6.1. Principle; 1.6.2. Flat lens; 1.6.3. Carpet cloaking devices; 1.7. Conclusion and prospects; 1.8. Acknowledgments; 1.9. Bibliography; Chapter 2. MetaLines: Transmission Line Approach for the Design of Metamaterial Devices; 2.1. Introduction; 2.2. Historical concepts of transmission lines and

homogenization; 2.2.1. Electrical model
2.2.2. Homogenization 2.3. CRLH transmission lines; 2.3.1. MetaLine cell; 2.3.2. Case with S p; 2.3.4. Balanced case with S = p; 2.4. Some technical approaches to realize MetaLines; 2.4.1. Context; 2.4.2. Discrete component approach; 2.4.3. Distributed or semi-lumped element approach in microstrip technology; 2.4.4. Distributed element approach in coplanar waveguide technology; 2.4.5. The resonant approach; 2.5. Toward tunability; 2.5.1. The dual-band behavior; 2.5.2. Mechanical agility; 2.5.3. CRLH line controlled with activecomponents 2.5.4. Ferroelectric agility 2.5.5. Ferrimagnetic agility; 2.6. Conclusion; 2.7. Bibliography; Chapter 3. Metamaterials for Non-Radiative Microwave Functions and Antennas; 3.1. Introduction; 3.2. Metamaterials for non-radiative applications; 3.2.1. Miniaturization; 3.2.2. Bandwidth improvement; 3.2.3. Dual band; 3.2.4. Zeroth-order resonator (ZOR); 3.3. Metamaterials for antennas at microwave frequencies; 3.3.1. Antenna miniaturization; 3.3.2. Efficient electrically small antennas with metamaterials; 3.3.3. Patch antenna miniaturization considering metamaterial substrate
3.3.4. Miniature metamaterial antennas: numerical and experimental attempts 3.4. Conclusion; 3.5. Bibliography; Chapter 4. Toward New Prospects for Electromagnetic Compatibility; 4.1. Introduction; 4.2. Electromagnetic compatibility; 4.2.1. Trends in the transport and telecommunication industries; 4.2.2. EMC challenges induced by recent industrial trends - metamaterials for EMC; 4.3. Electromagnetic shielding - potential of metamaterials; 4.3.1. Figures of merit for shielding configurations; 4.3.2. One-dimensional metamaterial shield 4.4. Metamaterials for 3D shielded cavities - application to electromagnetic reverberation chambers

Sommario/riassunto

Since the concept was first proposed at the end of the 20th Century, metamaterials have been the subject of much research and discussion throughout the wave community. More than 10 years later, the number of related published articles is increasing significantly. On the one hand, this success can be attributed to dreams of new physical objects which are the consequences of the singular properties of metamaterials. Among them, we can consider the examples of perfect lensing and invisibility cloaking. On other hand,metamaterials also provide new tools for the design of well-known wave