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Altri autori (Persone)	ZayatsA. V (Anatoly V.) MaierStefan A
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Nota di contenuto	Active Plasmonics and Tuneable Plasmonic Metamaterials; Contents; Preface; Contributors; 1 Spaser, Plasmonic Amplification, and Loss Compensation; 1.1 Introduction to Spasers and Spasing; 1.2 Spaser Fundamentals; 1.2.1 Brief Overview of the Latest Progress in Spasers; 1.3 Quantum Theory of Spaser; 1.3.1 Surface Plasmon Eigenmodes and Their Quantization; 1.3.2 Quantum Density Matrix Equations (Optical Bloch Equations) for Spaser; 1.3.3 Equations for CW Regime; 1.3.4 Spaser operation in CW Mode; 1.3.5 Spaser as Ultrafast Quantum Nanoamplifier 1.3.6 Monostable Spaser as a Nanoamplifier in Transient Regime 1.4 Compensation of Loss by Gain and Spasing; 1.4.1 Introduction to Loss Compensation by Gain; 1.4.2 Permittivity of Nanoplasmonic Metamaterial; 1.4.3 Plasmonic Eigenmodes and Effective Resonant Permittivity of Metamaterials; 1.4.4 Conditions of Loss Compensation by Gain and Spasing; 1.4.5 Discussion of Spasing and Loss Compensation by Gain; 1.4.6 Discussion of Published Research on Spasing and Loss Compensations; Acknowledgments; References; 2 Nonlinear Effects in Plasmonic Systems; 2.1 Introduction 2.2 Metallic Nonlinearities-Basic Effects and Models 2.2.1 Local

Nonlinearity-Transients by Carrier Heating; 2.2.2 Plasma Nonlinearity-The Ponderomotive Force; 2.2.3 Parametric Process in Metals; 2.2.4 Metal Damage and Ablation; 2.3 Nonlinear Propagation of Surface Plasmon Polaritons; 2.3.1 Nonlinear SPP Modes; 2.3.2 Plasmon Solitons; 2.3.3 Nonlinear Plasmonic Waveguide Couplers; 2.4 Localized Surface Plasmon Nonlinearity; 2.4.1 Cavities and Nonlinear Interactions Enhancement; 2.4.2 Enhancement of Nonlinear Vacuum Effects; 2.4.3 High Harmonic Generation
2.4.4 Localized Field Enhancement Limitations
2.5 Summary;
Acknowledgments; References;
3 Plasmonic Nanorod Metamaterials as a Platform for Active Nanophotonics; 3.1 Introduction; 3.2 Nanorod Metamaterial Geometry; 3.3 Optical Properties; 3.3.1 Microscopic Description of the Metamaterial Electromagnetic Modes; 3.3.2 Effective Medium Theory of the Nanorod Metamaterial; 3.3.3 Epsilon-Near-Zero Metamaterials and Spatial Dispersion Effects; 3.3.4 Guided Modes in the Anisotropic Metamaterial Slab; 3.4 Nonlinear Effects in Nanorod Metamaterials
3.4.1 Nanorod Metamaterial Hybridized with Nonlinear Dielectric
3.4.2 Intrinsic Metal Nonlinearity of Nanorod Metamaterials; 3.5 Molecular Plasmonics in Metamaterials; 3.6 Electro-Optical Effects in Plasmonic Nanorod Metamaterial Hybridized with Liquid Crystals; 3.7 Conclusion; References;
4 Transformation Optics for Plasmonics; 4.1 Introduction; 4.2 The Conformal Transformation Approach; 4.2.1 A Set of Canonic Plasmonic Structures; 4.2.2 Perfect Singular Structures; 4.2.3 Singular Plasmonic Structures; 4.2.3.1 Conformal Mapping of Singular Structures
4.2.3.2 Conformal Mapping of Blunt-Ended Singular Structures

Sommario/riassunto

This book, edited by two of the most respected researchers in plasmonics, gives an overview of the current state in plasmonics and plasmonic-based metamaterials, with an emphasis on active functionalities and an eye to future developments. This book is multifunctional, useful for newcomers and scientists interested in applications of plasmonics and metamaterials as well as for established researchers in this multidisciplinary area.
