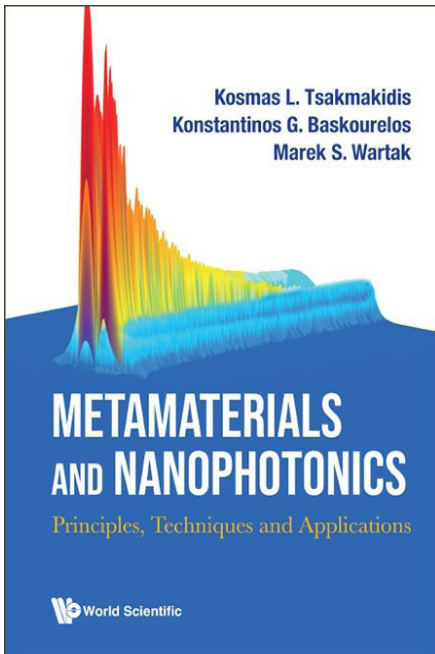


## Metamaterials and Nanophotonics

### Principles, Techniques and Applications



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### ABOUT THE BOOK

This monograph is a detailed introduction to the nascent and ever-evolving fields of metamaterials and nanophotonics, with key techniques and applications needed for a comprehensive understanding of these fields all detailed. These include the 'standard' and high-accuracy 'nonstandard' FDTD techniques, finite-difference frequency-domain mode solvers, the transfer matrix method, analytic calculations for dielectric and plasmonic waveguides, dispersion, Maxwell-Bloch and density functional theory, as well as design methods for constructing metamaterials and nanolasers, and quantum plasmonics. The book is intended for final-year undergraduates, as well as postgraduates or active researchers who wish to understand and enter these fields in a 'user-friendly' manner, and who have a basic understanding of and familiarity with electromagnetic theory.

### READERSHIP

Graduate students, advanced undergraduate students, and active researchers in: nanoscale physics, nanophotonics, optics, condensed matter physics.

## CONTENTS

- Vectorial Field Theory and Modelling of 3D Dielectric Waveguides
- Conventional and Nonstandard Finite-Difference Time-Domain Method
- Light Propagation in Negative-Refractive-Index Metamaterials and Waveguides
- Plasmonic and Metamaterial Waveguides
- Design Methods for Constructing Metamaterials
- “Trapped Rainbow”: Stopping of Light in Metamaterials
- Passive Stopped-Light Waveguides
- Impact of Surface Roughness on Stopped-Light
- Maxwell–Bloch Theory and Gain
- Summary of Surface Plasmons and Active Plasmonics
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