1. Record Nr. UNINA9910780864003321

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Titolo	Wave propagation [[electronic resource]] : from electrons to photonic crystals and left-handed materials / / Peter Markos, Costa M. Soukoulis
Pubbl/distr/stampa	Princeton, : Princeton University Press, 2008
ISBN	1-68015-901-1 1-282-53177-8 9786612531774 1-4008-3567-4
Edizione	[Course Book]
Descrizione fisica	1 online resource (367 p.)
Altri autori (Persone)	SoukoulisC. M
Disciplina	530.14/1 530.141 621.38131
Soggetti	Electric waves Electromagnetic waves - Mathematics Matrices Wave-motion, Theory of
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	Frontmatter -- Contents -- Preface -- 1 Transfer Matrix -- 2 Rectangular Potentials -- 3 -Function Potential -- 4 Kronig-Penney Model -- 5 Tight Binding Model -- 6 Tight Binding Models of Crystals -- 7 Disordered Models -- 8 Numerical Solution of the Schrödinger Equation -- 9 Transmission and Reflection of Plane Electromagnetic Waves on an Interface -- 10 Transmission and Reflection Coefficients for a Slab -- 11 Surface Waves -- 12 Resonant Tunneling through Double-Layer Structures -- 13 Layered Electromagnetic Medium: Photonic Crystals -- 14 Effective Parameters -- 15 Wave Propagation in Nonlinear Structures -- 16 Left-Handed Materials -- Appendix A. Matrix Operations -- Appendix B. Summary of Electrodynamics Formulas -- Bibliography -- Index
Sommario/riassunto	This textbook offers the first unified treatment of wave propagation in electronic and electromagnetic systems and introduces readers to the

essentials of the transfer matrix method, a powerful analytical tool that can be used to model and study an array of problems pertaining to wave propagation in electrons and photons. It is aimed at graduate and advanced undergraduate students in physics, materials science, electrical and computer engineering, and mathematics, and is ideal for researchers in photonic crystals, negative index materials, left-handed materials, plasmonics, nonlinear effects, and optics. Peter Markos and Costas Soukoulis begin by establishing the analogy between wave propagation in electronic systems and electromagnetic media and then show how the transfer matrix can be easily applied to any type of wave propagation, such as electromagnetic, acoustic, and elastic waves. The transfer matrix approach of the tight-binding model allows readers to understand its implementation quickly and all the concepts of solid-state physics are clearly introduced. Markos and Soukoulis then build the discussion of such topics as random systems and localized and delocalized modes around the transfer matrix, bringing remarkable clarity to the subject. Total internal reflection, Brewster angles, evanescent waves, surface waves, and resonant tunneling in left-handed materials are introduced and treated in detail, as are important new developments like photonic crystals, negative index materials, and surface plasmons. Problem sets aid students working through the subject for the first time.