In this reviewers' opinion, the volume will be a valuable addition to the armoury of all those engineers and scientists involved in designing and using solid-state lasers for a range of practical applications, not limited to materials processing. A major strength is in the area of practical optical design. The original German language edition was first published in 1990.

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Electromagnetic fields in unconventional materials and structures
O.N. Singh and A. Lakhtakia (Eds.), Wiley Series in Microwave and Optical Engineering, Wiley & Sons, New York, 2000, ISBN 0-471-36356-1, pp. 520, $110.

This is an edited volume of 10 chapters, the majority of which are highly theoretical. The title accurately reflects the contents. The book looks at electromagnetic propagation phenomena in unusual structures and material configurations.

The book starts with a paper from J.C. Bose, published over a century ago, in the Proceedings of the Royal Society of London which, without a single equation, ingeniously argues for polarisation rotation in a range of structures from jute ropes to dextrose. It is an interesting introduction, since what follows are effectively more rigorous presentations on essentially the same theme.

The book is written primarily by theoretical physicists and mathematicians, whilst I am viewing this through the rather more pragmatic eyes of an engineer with an interest in applying electomagnetics to practical problems. The links to practical situations are—with the exception of a couple of chapters—rarely made overtly. Bishnu Pal's contribution on "All Fibre guided wave components" is the one with the most applications focus. This is an account of optical fibre couplers and optical fibre gratings from a very practical perspective and provides an excellent physical insight into the operation of these very important elements. Waveguiding also feature in Choudhury and Singh's project on multilayer light guides. This—perhaps surprisingly—examines a range of general situations without venturing into the very important emerging domain of photonic crystal waveguides and fibres, which have recently been creating considerable practical and theoretical interests. These certainly fall within the "unconventional" remit and whilst they can be extrapolated from the chapter, it would have certainly been useful to include them.

The remainder of the book concentrates essentially on the impacts of material symmetry at various levels on electromagnetic propagation. A chapter on propagation on helical structures examines helical coupling in structures such as travelling wave tubes and is essentially about metallic twisted structures implicitly operating in the microwave domain. At the microscopic level, the

introductory review of chiral media is an extensive treatment of an important material category. It links molecular symmetry and microscale dielectric symmetry. This leads to two related chapters. The account of sculptured thin films combines an overview of the physical appearance and preparation of a variety of such device configurations with a comprehensive theoretical analysis of their properties. There are also some useful hints towards applications in optical filtering and gas sensing, which highlights the potential, which this technique may offer. Fabrication methods pioneered through, for example, laser assisting micromachining, promise to bring some of these concepts into reality. Carbon nanotubes have excited curiosity for the past decade and the chapter on the electrodynamic properties of these fascinating structures provide some insight into their potential as electromagnetic components, sitting alongside the multiplicity of other prospects in mechanics, electrochemistry and semiconductor physics. At present, the carbon nanotube retains the status of the universal panacea which will undoubtedly emerge as an important contributor to something, though at present, describing this "something", remains elusive.

Bianisotropic materials feature strongly in the remaining three chapters. Whilst bianisotropy has been with us for some time, it is only recently that the fabrication techniques at the thin film level have begun to make such media possible, combining chirality with normal anisotropy, typically as composite media. Some important potential implications of these media are highlighted including controllable microwave conductivity, polarisation sensitivity and potential non-reciprocal operation through controlled Faraday rotation.

The book is potentially useful, though predominately, to the electromagnetic theorist intent in pursing research into interesting material symmetries and their electromagnetic properties. It is about the influence of geometrical symmetry on electromagnetic propagation—an old topic but one, which is increasingly important as the practical potential of nano and microstructural machining, becomes more apparent. The theoretical treatments are sometimes difficult to interpret for the non-specialists (like this reviewer). However, I believe that the effort would be justified by those circling around the edge of optical devices and micromachining, who would like to bring together the exotic electromagnetism described in the book with a real device, which will at least provide a demonstration and could well lead to something really useful. Research students and postdoctoral workers with interest in this area could very usefully spend the time.

The book is expensive and heavy going but it would be a useful addition, not only to the libraries of those in mainstream electromagnetism and materials analysis, but also at the emerging community of thin film engineers and micromechanical designers. I am sure that thorough study and interpretation of its contents targeted towards a specific activity could be valuable.

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Electromagnetic Fields in Unconventional Materials and Structures. Onkar N. Singh (Editor), Akhlesh Lakhtakia (Editor). ISBN: 978-0-471-36356-9 October 2000 520 Pages.Â A Mini-Review on Isotropic Chiral Mediums (A. Lakhtakia). Sculptured Thin Films: Conception, Optical Properties, and Applications (V. Venugopal & A. Lakhtakia). Electrodynamic Properties of Carbon Nanotubes (S. Maksimenko & G. Slepyan).Â "In summary, Electromagnetic Fields in Unconventional Materials and Structures is an advanced book, written by experts, that is bound to be useful to serious researchers" (Int. Jnl. of Electronics and Communications, Vol.55, No.5, 2001) "Congratulations! The book is a pearl. It is like a treasury." (Optik - Int. Start by marking â€œElectromagnetic Fields in Unconventional Materials and Structuresâ€ as Want to Read: Want to Read savingâ€¦ Want to Read.Â Let us know whatâ€™s wrong with this preview of Electromagnetic Fields in Unconventional Materials and Structures by Tatla Dar Singh. Problem: Itâ€™s the wrong book Itâ€™s the wrong edition Other.Â Akhlesh Lakhtakia. 0.00 Â· Rating details. Â· 0 ratings Â· 0 reviews. Foimdationi for Microwave Engineering, Second Edition, has extensive coverage of transmission lines, waveguides, microwave circuit theory, impedance matching, and cavity resonators. It devotes an entire chapter to fundamental microwave tubes, as well as other chapters on periodic structures, microwave filters, small signal solid-state microwave mplifier and oscillator design, and negative resistance devices and circuits.Â C. T, Generalized Vector and Dyadic Analysis: Applied Mathematics in Field Theory Tai. C. T. Dyadic Green Functions in Electromagnetic Theory.Â 2 foundations for microwave engineering. TABLE 1.1 Frequency band designation. Wicks, Magdalena Salazar-Palma, and Robert J. Bonneau NONLINEAR OPTICS â€¢ E. G. Sauter APPLIED ELECTROMAGNETICS AND ELECTROMAGNETIC COMPATIBILITY â€¢ Dipak L. Sengupta and Valdis V. Liepa COPLANAR WAVEGUIDE CIRCUITS, COMPONENTS, AND SYSTEMS â€¢ Rainee N. Simons ELECTROMAGNETIC FIELDS IN UNCONVENTIONAL MATERIALS AND STRUCTURES â€¢ Onkar N. Singh and Akhlesh Lakhtakia (eds.)Â 11/9/2010 10:18:54 AM. WILEY SERIES IN MICROWAVE AND OPTICAL ENGINEERING KAI CHANG, Editor Texas A&M University. A complete list of the titles in this series appears at the end of this volume. ffirs02.indd ii. 11/9/2010 10:18:55 AM. Electromagnetic fields in unconventional materials and structures by Oá¹…kÄra NÄtha Siá¹ƒha, A. Lakhtakia, 2000, J. Wiley edition, in English.Â An edition of Electromagnetic fields in unconventional materials and structures (2000). Electromagnetic fields in unconventional materials and structures. by Oá¹…kÄra NÄtha Siá¹ƒha, A. Lakhtakia. 0 Ratings. 0 Want to read. 0 Currently reading. 0 Have read. This edition was published in 2000 by J. Wiley in New York. Written in English. â€” 489 pages. This edition doesn't have a description yet.Â "A Wiley-Interscience publication." Includes bibliographical references (p. 475-479) and index. Series. Wiley series in microwave and optical engineering. Classifications. Library of Congress.