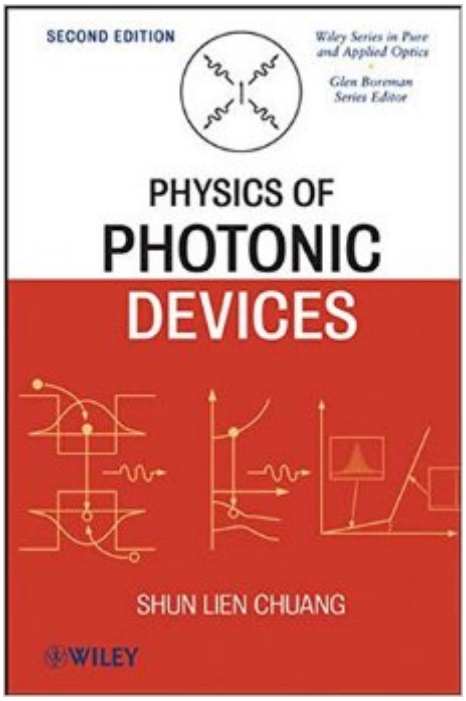
Physics Of Photonic Devices



Synopsis

The most up-to-date book available on the physics of photonic devices This new edition of Physics of Photonic Devices incorporates significant advancements in the field of photonics that have occurred since publication of the first edition (Physics of Optoelectronic Devices). New topics covered include a brief history of the invention of semiconductor lasers, the Lorentz dipole method and metal plasmas, matrix optics, surface plasma waveguides, optical ring resonators, integrated electroabsorption modulator-lasers, and solar cells. It also introduces exciting new fields of research such as: surface plasmonics and micro-ring resonators; the theory of optical gain and absorption in quantum dots and quantum wires and their applications in semiconductor lasers; and novel microcavity and photonic crystal lasers, quantum-cascade lasers, and GaN blue-green lasers within the context of advanced semiconductor lasers. Physics of Photonic Devices, Second Edition presents novel information that is not yet available in book form elsewhere. Many problem sets have been updated, the answers to which are available in an all-new Solutions Manual for instructors. Comprehensive, timely, and practical, Physics of Photonic Devices is an invaluable textbook for advanced undergraduate and graduate courses in photonics and an indispensable tool for researchers working in this rapidly growing field.

Book Information

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Customer Reviews

I have mainly used this book to help me understand how to incorporate the effects of tensile and compressive strain in quantum well calculations. It does this very clearly. It covers many other

topics, but the main points are: 1) This is a graduate-level text probably unsuitable as a first exposure to this area for undergraduates; and 2) the author is not afraid of diving into the technical nitty-gritty of the areas he covers. He does a great job of explaining concepts in a relatively short amount of text (i.e. it is terse, yet understandable for the most part) and he provides good detail, including much data on III-V material properties. As another example, it gives a complete but condensed discussion of the Marcatili and effective index approximations for calculating single mode cutoffs in rectangular dielectric waveguides for lasers or PICs. This is a great reference book for those who actually want to calculate or design something without using a canned program.

The book starts with the very basic equations of electromagnetic and semiconductor theory and builds up to more advanced topics such as band structure calculations for semiconductors including strained quantum wells, various optical transitions processes, optical absorption spectra, etc. In addition, the book covers the basic theory of laser cavity resonance and this includes the distributed feedback laser theory. Various waveguide, electro-optical modulators and photodetector principles are also treated in clear detail. The book brings you up to the level of which the research papers in the optoelectronic area has been written.

First of all, I want to express regret that there is no excellent book covering the area of theory, fabrication, characterization of semiconductor lasers/devices. Some are too easy and some are too difficult. The symbols and convention are not unified at all, even simple "rate equations" have a lot of versions.Overall, this book is good for graduate students. A good companion for advanced study. However, I don’t like too many equations with only few explanations. By the way, on the small signal analysis of laser modulation, I recommend Coldren’s "Diode lasers and photonic integrated circuits". Rate equations there make more sense to me. If you find it hard to understand, maybe try Parker’s "Physics of Optoelectronics", an 5-star book. The strength of this book is its completeness, especially on optics, quantum mechanics and electromagnetics.

CONS: This book looks like it was made by copy/pasting the author’s PPT lecture slides with formulas to the word processor and not adding additional explanations in form of short paragraphs or longer sentences. English style of this book sometime makes it very hard to comprehend the physical essence. It’s very disappointing that in the 2nd edition the author hasn’t improved the language and hasn’t added more verbal explanation of the equations, at least he could have made his graduate students do it for the 2e instead of him if he didn’t want to "waste" time.PROS: It’s very

comprehensive book covering almost all the major (active) optoelectronic devices. Some passive devices are covered but not all the important ones. It’s good as a reference and not as a textbook.

A very complete book on photonics. If there are two books that you must have this is one (the other being diode lasers by Coldren, Corzine, Masanovic). This book covers an incredible breadth of topics such as vertical cavity lasers, quantum cascade lasers, solar cells, LEDs, modulators with incredible depth. Very good coverage of rate equations, gain calculations, electromagnetics, surface plasmons, etc. The discussion and treatment of each topic spans both quantitative as well as qualitative aspects so as to help with theoretical understanding as well as applications knowledge. The author clearly has an amazing grasp of multiple topics in the areas of solid state and device physics. Highly recommended.

The book is clear, concise, up-to-date, and always presents the information within context with regards to fundamental equations, history, and modern-day applications. There are a few typos, as can typically be expected in the first editions. This textbook is by far the most highly regarded and studied within my grad-student research group. I highly recommend it.

This book is new and most importantly is that the price cut. Almost cheaper than a used book. It’s also a prime item, so that I can receive it in two days. That why I bought it.

Kiddie Learners): Physics for Kids - Molecular Theory (Children's Physics Books) Geometry, Topology and Physics, Second Edition (Graduate Student Series in Physics) Physics from Symmetry (Undergraduate Lecture Notes in Physics) Lie Algebras In Particle Physics: from Isospin To Unified Theories (Frontiers in Physics)