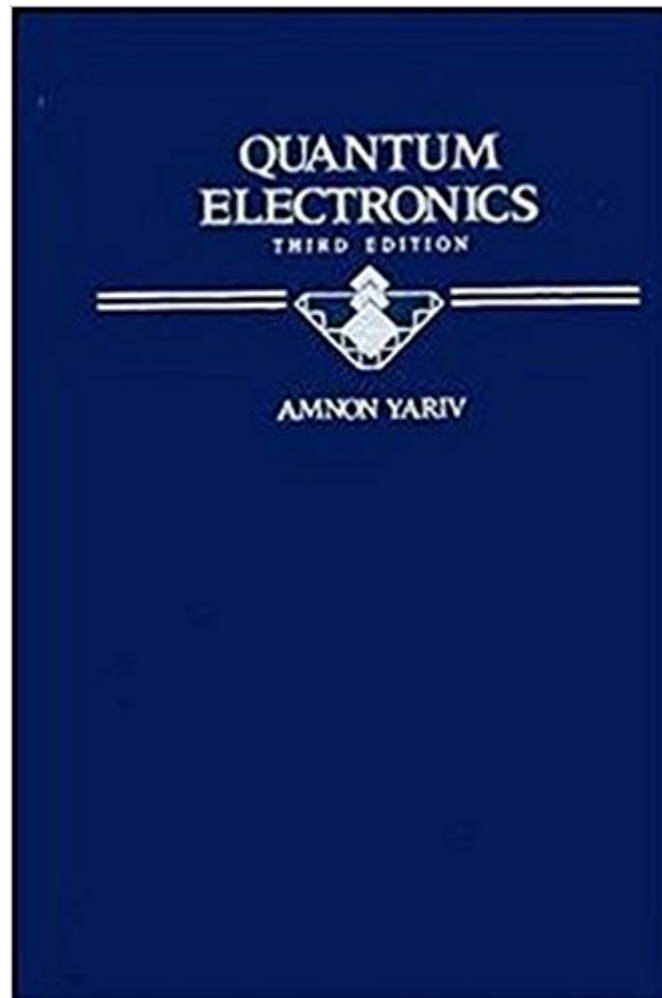




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Quantum Electronics



Synopsis

This Third Edition of the popular text, while retaining nearly all the material of the previous edition, incorporates material on important new developments in lasers and quantum electronics. Covers phase-conjugate optics and its myriad applications, the long wavelength quaternary semiconductor laser, and our deepened understanding of the physics of semiconductor lasers--especially that applying to their current modulations and limiting bandwidth, laser arrays and the related concept of supermodes, quantum well semiconductor lasers, the role of phase amplitude coupling in laser noise, and free-electron lasers. In addition, the chapters on laser noise and third-order nonlinear effects have been extensively revised.

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Customer Reviews

I bought the 2nd edition of this text but I used the third so I'm comfortable reviewing both. The 3rd edition has three extra chapters on laser systems and a chapter on phase conjugate optics. In addition the chapter on dielectric waveguides has been expanded to include optical fibers. Here the fiber is treated as a waveguide rather than the usual geometrical optics approach which uses Brewster's law or critical angle. In the waveguide approach the electromagnetics vector wave equation is used. Since the speed of light appears as an inverse square in this equation it should come as no surprise that in a dielectric medium the square of the refractive index will also make its appearance here. He uses a quadratically varying refractive index here in his example and on variable transformation shows this example to be equivalent to Schroedinger's equation for the

harmonic oscillator and the modes are displayed or enumerated accordingly. This vector wave equation appears quite regularly in this text. If you've seen it and used it before and you're aware that a mode is just a solution and if you're not surprised or impressed when a particular mode is characterized by a group of integers (Fourier series and boundary conditions) you likely have the required knowledge of electromagnetics for this text. Even so the text by Born and Wolf on optics may be of great help since the E&M treated is applied to physical optics and Born and Wolf is highly detailed here (the standard). This will help you fill in some of the gaps in the derivations. The first three chapters cover the quantum mechanics used in the text. They're quite good. The creation/annihilation operator approach is used for the harmonic oscillator, the ladder operators for angular momentum, and perturbation theory with Fermi's Golden Rule is given. If you can work the exercises and can apply commutator algebra-you're up to speed. If you need more review, Schiff's text on quantum mechanics is available online as a free PDF. The text as a whole deals with those systems which will support or are part of a laser system like an optical resonator and the closely related topic of Gaussian beams (uses paraxial approximation here in geometrical optics-Born and Wolf). Will you be able to construct or design a laser system solely from its contents? Likely not but I'm sure you'll consult it along the way, e.g., laser oscillation condition. Definitely a valuable reference for the laser scientist.

This is a classic book that covers quantum mechanics, optics and lasers, and more. Recommended for anyone doing laser diagnostics. The used version I bought is in near mint condition.

Although I ordered a used book, the book I received is almost a new one in good quality. Nice book!

I love this book and its beautiful price. Thank you.

FANTASTISCO. PERIOD.

Yariv's Quantum Electronics has not been updated in a long while. This is the "higher level" version of Photonics by Yariv (and now Yeh). I own both Quantum Electronics and Optical Electronics in Modern Communications (which was the title of the previous edition of Photonics). As others have said, there is a lot of overlap between the two. Quantum Electronics is in desperate need of a complete makeover. The book has the bones of a good text but lacks a coherent high level vision and the attention to detail that a good text has. Notation is wildly inconsistent and makes you pull

your hair out trying to figure what convention he's adopted for the topic at hand. There are few worked examples. And the reliance on references to teach the material the text should teach is heavy, to the point of being ridiculous: there's at least one spot where the text sends the reader to a reference for a derivation, and the reference happens to be an earlier edition of Quantum Electronics! It makes you wonder if it's a mistake or if you really need that first edition. I'd bet that another reviewer got it right when they said it was a collection of papers bound into a book. It would explain a lot of the text's shortcomings. And yet, when I compare information from the quantum book with that in Photonics, I realize that some critical information from QE somehow got lost in the various updates. So I have to wonder if any attempt to edit Quantum Electronics will just make it worse. Maybe that's why there are references to old editions of the book. You've got to have quantum mechanics under your belt (and then some) to really get this book. This book won't teach you enough quantum mechanics to do you any good. I hate this book. I'm not well-read enough to say what a better text is. But the field deserves a better text than this.

I used this book for a graduate level course on quantum electronics. I agree with the other reviewers that the book requires a good background in a variety of subjects (primarily quantum mechanics and E&M), and also that the book is very comprehensive and covers a lot of topics (and consequently might serve as a reasonable reference to look up topics). Although, I was somewhat surprised at a previous reviewers comparison to Jackson Electrodynamics book, which, while similarly advanced, has a much clearer presentation. In my opinion, the book has several major shortcomings. Firstly, its presentation is unorganized, and terse. Rather than providing physical insight, or useful discussion, Yariv opts for a barrage of messy formulas with haphazardly chosen (and often inconsistent) notation. Additionally, the book's ordering of topics is far from logical. There is no consistent narrative, and most of the chapters and subsections are at best, loosely correlated. Perhaps the most glaring weakness that I have discovered so far is Yariv's treatment of Gaussian beam propagation. The formulas are unnecessarily complicated, and the presentation is practically incoherent (it could certainly use a good converging lens!). In short, this is a mediocre book at best, certainly not well suited for a course textbook. While, I have not had much exposure to other texts in the field, there are certainly better ones out there.

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