Physics Reports **65**, 1331 (1993).

One unique aspect of this book is its emphasis on numerical techniques, ranging from a brief discussion of algorithms for pseudo-random number generators and Monte Carlo techniques for problems such as the Ising model to moment expansion techniques for stochastic differential equations. Unfortunately, the treatment is all too brief, and we must refer to such definitive works as Donald Knuth's *Seminumerical Algorithms* (Addison Wesley, 1969) for the complete story.

Except for its price, this text would be appropriate for a first- or second-year physics graduate course on stochastic processes and probability methods. I do not recommend it as a definitive treatment of these subjects, however, since the broad range of topics limits its depth. And I am still looking for a book that really is about stochastic dynamical systems.

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Semiconductor Optoelectronic Devices

Pallab Bhattacharya
Prentice-Hall, Englewood Cliffs, N. J., 1994. 535 pp. $62.00 hc ISBN 0-13-805748-6

The invention of semiconductor lasers in 1962 and the success of optical fibers as a new information transmission medium have led to enormous progress in optoelectronics over the past two decades. It is difficult as well as time-consuming to seek the essence of this rapidly growing field through scattered materials in the journal literature and a half-dozen texts and treatises. Pallab Bhattacharya's *Semiconductor Optoelectronic Devices* summarizes the important aspects of the field, along with recent experimental results, in a clear and coherent fashion. As such, it is a good introductory textbook for senior-level undergraduate and first-year graduate students. It can also serve as a tutorial book for those who wish to enter optoelectronics.

The first four chapters lay the foundation for an understanding of the operating principles of various optoelectronic devices: Bhattacharya has succeeded in providing a clear and elementary treatment of the fundamental concepts of crystallography and epitaxy, electronic properties, optical processes and junction theory of semiconductors. I was amazed at how well those four chapters gave me a focused and coherent review of the materials necessary to an understanding of the device operations. The rest of the book—eight chapters and eleven appendixes in all— gives a good, comprehensive survey of various semiconductor optoelectronic devices: lasers, light-emitting diodes, solar cells, photodetectors, modulators and switches.

In presenting the principles of device operation, Bhattacharya emphasizes physical pictures along with the mathematical derivations. The physical explanation is clear and well written. I was impressed by the simplicity of the explanations and arguments. To help readers gain a clear physical understanding of the relevance of the mathematics and a feeling for real values, Bhattacharya includes device applications, measurement techniques and recent experimental results, in addition to the theoretical treatments. The level of detailed derivations of equations presented in the chapters is appropriate, and more details are given in the appendixes. A reader will not have to consult the book's list of references or the suggested reading list to learn about semiconductor optoelectronic devices, nor will the reader be lost in the book's mathematics.

Bhattacharya also discusses practical engineering issues, such as device packaging, fiber coupling, reliability and manufacturing processes. He touches upon many new device concepts, including electrically pumped rare-earth-doped semiconductor lasers and wavelength-selective detection schemes. As such, his book is a useful reference for the engineer who is already working in optoelectronics. I feel the book would be very helpful in the design and fabrication of optoelectronic devices. It is an excellent addition to the library of optoelectronic text and reference books.

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The Physics of Stars

A. C. Phillips
Wiley, New York, 1994. 208 pp. $59.95 pb ISBN 0-471-94155-7

The title tells it all: This is a compact and well-organized book about what physics reveals about stars. It is not a treatise for the specialist, however. It is, as it was meant to be, a book for the advanced undergraduate, and it achieves wonderful success in presenting the physics of approximation, intuition and understanding.

Its strengths are many. Barely is a concept introduced before it is exploited. And with foreshadowing and back-referencing, the important concepts are used repeatedly, so that the reader–student's mastery is assured. When faced with the prospect of the "gray areas" in stellar structure—such as the transitions between degeneracy and nondegeneracy, and between relativistic and nonrelativistic or the boundary conditions on stellar structure—the book keeps the reader focused on the extremes to illustrate the real consequences of the differences in the physics. Don Clayton's wonderful approach to analytic solutions for stellar structure (Am. J. Phys. **54**, 354, 1986) is used to explore the structure and properties not only of normal stars but of white dwarfs and neutron stars as well.

Use of the book in an undergraduate course will leave the motivated student with an improved grasp both of the physics and its application to stars. The problems at the end of each chapter are challenging and rewarding (and hints are given at the end of the book). Indeed, anyone who teaches a course on stellar structure ought to read the book for its insights.

But how suitable is it for undergraduates? Very, if they have had some thermodynamics and perhaps are taking some quantum mechanics at the same time. However, unless the sole purpose of the course is to illustrate the application of physics and physical insight, the book will require considerable additional material from the instructor. The book acknowledges some of the most basic observational material, but it pays almost no attention to the particular importance of stellar interiors and stellar evolution in larger contexts. (How do we measure the ages of stars and clusters? How is the light of clusters of stars, or of distant galaxies, affected by star formation and evolution? How can we test nucleosynthesis and stellar evolution models from photospheric abundance analyses? How can we exploit pulsation to test models, opacities and white-dwarf cooling?)

The lack of such material indicates that the book should probably not be the sole text for a course but instead should be supplemented by the instructor and guided readings. It would then help create a very rewarding undergraduate course.

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