elicited the response that there is a 50% discount in quantities of five or more intended for classroom use.

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## Optical Bistability: Controlling Light by Light

**Hyatt M. Gibbs**

471 pp. Academic, New York, 1985.
ISBN 0-12-281940-3 $54.50 hardcover;
ISBN 0-12-281941-1 $34.95 paper

An optical system is said to be bistable if it has two output states for the same optical input. Although no optical bistability is required for optical computing, which is one of the main thrusts for developing this phenomenon, it serves as a focal point for quite a large number of associated fields, and derives its importance from that fact. The diversity of the field is illustrated by noting that the research in optical bistability involves physics, engineering and materials science. From the physics aspect, one studies the contribution from excitons, biexcitons and plasma to band renormalization, band filling, screening of the Coulomb interaction and phase-space filling, and how these affect the nonlinear processes in semiconductors, multiple-quantum-well structures and semiconductor-doped glasses. The development of fast characterization techniques, using pump and probe beams, have proved to be powerful tools for studying the time evolution of the various nonlinear processes.

The engineering of the optically bistable devices involves the design of nonlinear etalons or waveguides; these can be either active or passive, intrinsic or hybrid, and they can rely for optical feedback on mirrors, gratings or a nonlinear absorption mechanism. Issues asssociated with the performance of bistable devices include figures of merit that deal with the minimum energy required to switch on a device, transient and transverse effects and chaos.

Materials science is involved in the various techniques used for the fabrication of the bistable devices, such as molecular-beam epitaxy, photolithography and plasma etching.

The book attempts to cover most of these topics in the chronological order of their development, supplementing the discussions with practically all the relevant references of who did what and when. As the author states, "it is a research book intended for new entrants and active workers in the field of optical bistability." The book consists of a preface, 7 chapters, 9 appendices,

79 pages of references through 1984, a 7-page glossary of symbols and an index. It is unique in that no other book covers the same topics in the context of optical bistability.

H. Seidel, in 1969, was apparently the first to officially record the idea of a passive bistable optical device. Abraham Szoke, V. Daneu, Julius Goldhar and Norman A. Kurnit did the pioneering and independent work on absorptive bistability in 1969. The first observation of optical bistability was in Na vapor by Samuel L. McCall, Hyatt M. Gibbs, G. G. Churchill and T. N. C. Venkatesan in 1975.

The book is self-contained so that the reader can follow all the arguments in the main text with the help of the appendices. Therein lies its strength: One can become familiar with the various subfields up to the end of 1984. It is truly a *tour de force*, giving credit where credit is due, especially to the concurrent contributions of other groups working in these subfields.

Optical bistability has gained such momentum since this book was published that for an update one would have to invest a considerable amount of time searching the literature of the past two years. The three conferences on optical bistability, for example, supplemented by a large collection of papers, review articles and conference papers, could probably constitute a source for a sequel to the original book.

I highly recommend this book to students and teachers interested in optical bistability and its associated fields; it can serve well as a textbook for a graduate level course.

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## Fiber Optics: Devices and Systems

**Peter K. Cheo**
304 pp. Prentice–Hall, Englewood Cliffs, N. J., 1985.
ISBN 0-13-314204-3. $41.67

Peter Cheo has written a text based upon the notes that he used to teach a first year graduate course in optical-fiber communications at the Hartford Graduate Center. The strength of the book lies in the thorough treatment he has given to optical sources and receivers and to the coverage given to the theory of optical waveguides. He also covers briefly the areas of glass materials, fiber fabrication and characterization techniques.

While there are many reference books for workers in the field of fiber optic communications that cover the topics addressed by Cheo, there is only a limited number of pedagogical books for graduate students who wish to study this field. Other text books at approximately the same level are: *An Introduction to Optical Fibers* by Allen H. Cherin (McGraw–Hill, New York, 1983), *Optical Fibers* by Takanori Okoshi (Academic, New York, 1982) and *Optical Fiber Transmission Systems* by Stewart D. Personick (Plenum, New York, 1981). Cheo's text is a welcome addition to the group. It excels in its discussion of light emission processes in semiconductor devices, semiconductor lasers and light-emitting diodes, and in its presentation of the characteristics of optical transmitters, photodetectors and optical receivers. In an attempt to cover the entire field of optical fiber communications, however, Cheo provides very weak coverage of the important areas of fiber fabrication, characterization and components. Its strength lies instead in its coverage of semiconductor devices used for optical communications.

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## Story of the W and Z

**Peter Watkins**
240 pp. Cambridge U. P., New York, 1986.
ISBN 0-521-26801-X $44.50 hardcover;
ISBN 0-521-31875-0 $13.95 paper

This account of the discovery of the W and Z bosons by the UA1 collaboration at the CERN $\bar{p}p$ collider was written by one of the members of that collaboration. Accordingly, the reader might expect either a serious technical discussion of the experiment, including both the history of the collider and detector and the problems and triumphs in the analysis, or perhaps a study of the new sociology of performing high energy physics experiments in large international collaborations. The reader might also expect insights into how the many disparate elements of a major experiment are made to come together and work, all from an insider's point of view. Unfortunately, we get none of these things in this book.

Peter Watkins intends his book primarily for the general reader as he begins with a sketchy history of high-energy physics going all the way back to "inside the atom," the quark model, leptons, strangeness and charm, unification of forces, and the prediction of the W and Z. He also includes chapters on accelerators and detectors. Such an approach would be reasonable if the reader could learn something. Unfortunately, this book will only annoy the physicist because of the superficial, verbose and repetitive discussions, and will leave the general reader at a loss since nothing is really explained, but only labeled.

Further, the point of view is both parochial and disingenuous. For example, after mentioning briefly the contamination of the UA1 central detector in early 1982, Watkins writes: "CERN management decided to delay the 1982 collider running to a single long period at the end of the year, starting in October." Surely, the reader is entitled to a lot more than that. Watkins says nothing about the UA2 experiment and nothing about any of the factors, scientific and political, that went into that important decision.

To make maters worse, Watkins has a clumsy style and often talks down to the reader. One example: "The single coffee machine in this area begins to increase its sales by an enormous factor and change for this becomes the next most important item to the identity card which is needed to enter the building. During the run an enormous box of small change accumulates in the control room so that people can always obtain a coffee to help them through the night."

Nobody should have to read prose like that.

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*Iowa State University*

## Los Alamos Experience

**Phyllis K. Fisher**
266 pp. Japan Pub., New York, 1985.
ISBN 0-87040-623-X. $14.95

"A larger family rates a larger house and no increase in rent! Interesting, huh? Tempting? We'll see . . . Medical care seems very adequate and best of all, is completely free." Thus, in the very first letter to her mother from the time she arrived at Los Alamos, Phyllis Fisher has been inspired by the quintessential wifely Los Alamos experience. Employees of the Manhattan Project were not enrolled in Social Security or in any retirement plan; medical care was the greatest perquisite. The young population rushed to avail themselves of this oppportunity in such numbers that General Groves appealed to Robert Oppenheimer, the Director of the bomb project, to do something about it. Not surprisingly, nothing could be done.

The book is at its best when Fisher is writing about her own life. When Fisher is reporting about events before she arrived on the mesa or philosophizing about war and peace, she is careless. Robert Oppenheimer did not die in 1965, a "cyclotron" did not arrive at the site from the University of Illinois (a betatron, perhaps?), and the majority