atomic radial distribution function. To whom is the book addressed? Certainly not to seasoned specialists; they will find deeper nourishment in such books as the monumental and rather expensive *Handbook on Synchrotron Radiation* (North-Holland, New York, 1983 and 1987; volume 2 reviewed in PHYSICS TODAY, May, page 72), two volumes of which are already published and two further volumes promised. Margaritondo's book should find a receptive audience among newcomers to the field and readers with a more general interest. I would recommend it especially to those managers of research organizations and officers of funding agencies who feel that they have neglected their education about synchrotron radiation and who would welcome a quick way to catch up. Active researchers will no doubt wish to keep a copy or two on their shelves to lend out to students contemplating thesis projects using synchrotron radiation.

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Models of the Nucleon: From Quarks to Soliton

Rajat K. Bhaduri
Addison-Wesley, Redwood City, Calif., 1988. 360 pp.
$41.95 hc ISBN 0-201-15673-3

Three decades ago the nucleon and pion–nucleon resonances were very revered topics in elementary-particle physics. After discovering that the nucleon was composed of quarks, elementary-particle physicists dropped the study of the nucleon and its excited states. Of course, just because elementary-particle types have abandoned the nucleon, it does not follow that all is well understood and finished. Nuclear physicists have now moved in, claiming the study of the nucleon for nuclear physics and continuing research. Thus there is a need for books to teach nuclear physicists what is known and to direct them into the unknown. Instruction is the motivation of Rajat Bhaduri's *Models of the Nucleon*. Bhaduri is a well-known nuclear theorist who made such a transition to nucleon physics successfully in his own research; so he is in a good position to teach others this material.

However, the book covers a great deal more than the modest title suggests. Indeed most of the standard model is surveyed: quarks, deep inelastic scattering, bag models, chiral anomalies, gauge theories, the electroweak model, the Higgs mechanism, instantons. The expedient Bhaduri uses to cover so much in so little space is to deliver much of the material in the form of exercises. The reader who is capable of solving all the exercises will learn a great deal. However, for most others, a lot of unnecessary frustration will result, since I would guess that much of the material is neither essential to understanding the nucleon nor easy to absorb. In addition the material that is closer to the book's title is disposed of very briefly. As a result the book overlaps a great deal with other texts on the standard model, such as Frank Close's *An Introduction to Quarks and Partons* (Academic, Orlando, Fla., 1979). On the other hand, some of the recent material Bhaduri covers is not yet in most physics books, such as the Skyrme model and the large-N limit of quantum chromodynamics. This recent work shows that hadron physics is very much alive, and its inclusion shows that Bhaduri is keeping himself well informed about new developments. Perhaps unavoidably, the new material is not well integrated with the traditional material: Is the proton a bag of quarks or a topological monstrosity? There is no consensus on this question as yet, so we should not blame Bhaduri for failing to tell us what to think.

I think that the book will be very useful to those who are already familiar with the material—as a good source of references and a compact guide to the main ideas. The book is less suitable as a starting point for graduate students or others unfamiliar with the field. There are many misprints and some mistakes. In particular, many names are misspelled and some formulas are incorrect. Despite some problems, the book is a useful addition to the literature on the standard model and the nucleon.

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One-Dimensional Conductors

S. Kagoshima, H. Nagasawa and T. Sambongi
Springer-Verlag, New York, 1988 [1982]. 235 pp.
$65.00 hc ISBN 0-387-18154-7

The general area of one-dimensional conductors became a subject of wide research interest at the beginning of the 1970s. The successful fabrication of several chain-like organic and inorganic conducting compounds has led to a tremendous volume of published papers, the bulk of them having appeared from the beginning of the 1970s to the early 1980s. The initial impetus for the unusually large interest in the subject was a paper by Anthony Garito, Alan Heeger and their collaborators (*Solid State Commun.* **12**, 1125, 1973) in which they published results for the electrical conductivity of the one-dimensional charge-transfer compound TTF-TCNQ. They found that in TTF-TCNQ the rate of increase in the conductivity as the temperature decreases is larger than that in normal conductors. From their results these authors conjectured that they had found what—at that time—could have been called a high-temperature superconductor. But the unusual properties of TTF-TCNQ were not due to superconducting fluctuations; instead they were related to the "Peierls instability" that is characteristic of one-dimensional conductors—of which TTF-TCNQ became the prototype.

Researchers from several camps then realized that the physics of one-dimensional conductors is inherently quite interesting. For example, concepts like the Peierls transition, the Kohn anomaly, the Peierls–Frölich mechanism, charge-density waves, spin-density waves, charged solitons and phasons have become part of the standard language of research on one-dimensional condensed matter.

One-Dimensional Conductors by Seiichi Kagoshima, Hiroshi Nagasawa and Takashi Sambongi is the first attempt at giving an overview of the field at an introductory level. It is a translation of a book published in Japanese in 1982; the English edition has been briefly updated. Some of the topics covered were still evolving at the time the book was written. Therefore there are important new results not covered in the book. The authors are experimenters, and the book is to a large extent directed to an audience of experimenters.

The book is divided into seven chapters. The first one is an introduction to the field, while the second gives a brief theoretical review of some of the basic ideas behind the Peierls transition, the Kohn anomaly and other typical one-dimensional concepts. This theoretical discussion is written clearly enough for the novice. The remaining five chapters deal with experimental results for different chain-like materials that have been the subjects of significant amounts of research.

Each of the experimental chapters starts with a discussion of the chemical structure of the materials and a

brief description of how they can be prepared, followed by a discussion of some of their physical properties. In chapters 3–7 the description is clearly from an experimenter's point of view, although theoretical explanations are given for some of the experimental results.

Although the authors suggest that the book could be used in a senior undergraduate or first-year graduate course, it appears to be too specialized for any of the general courses that form the core of most curricula. On the other hand, the book may seem to be of marginal interest to someone who already has some knowledge of the field. However, it does cover a large number of issues in one-dimensional physics that hitherto could be found only in reviews, conference proceedings or specialized articles. It also may serve as a good starting point for physicists, chemists or materials scientists unfamiliar with the field.

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Large Ion Beams: Fundamentals of Generation and Propagation

A. Theodore Forrester
Wiley, New York, 1988. 325 pp. $41.95 hc ISBN 0-471-62557-4

Large Ion Beams is an outgrowth of undergraduate courses A. Theodore Forrester taught during his tenure as a professor of physics and electrical engineering at UCLA. The book represents the first text devoted exclusively to the physics of ion-beam generation and extraction from high-intensity ion sources, subjects not covered in detail in elementary classical electrostatics, electrodynamics or introductory plasma physics courses. While a number of books have been written on high-intensity ion sources, these texts in general have not had the detailed, pedagogical style used by Forrester and therefore are not suitable for classroom use. This book goes a long way toward meeting the long-standing need for an introductory text on the subject that is suitable for undergraduate training. It should be a welcome addition to the libraries of teaching institutions as well as to those of graduate neophytes and experienced ion-source physicists.

The book is sensibly structured, with chapters devoted to the following topics: space-charge phenomena; collisionless plasmas; collisional effects; positive-ion extraction and ac-