

the book, with no introduction provided for this important concept.

The authors introduce the general concept of the transducer early, and to good effect: The surprising inclusion of the wave analyzer in the list of transducers proves its pedagogical worth rather soon. The book closes with additional material on electroacoustic transducers. It is unfortunate that the discussion of actual devices is sometimes confusing, even to the point of wrong physics.

A good account of standing and running waves includes (praise be!) a clear explanation of the sine *versus* cosine relation

between the pressure and displacement aspects of a wave. Strong and Plitnik handle the synthesis of complex waveforms well except for one shocking feature: They write each sinusoid as $A \sin(ft + \phi)$, with no helpful 2π or 360° included to keep the books straight. The appendix gives $\sin \theta$ tabulated in fractions of a period, which adds further confusion to the hapless student struggling with an otherwise excellent set of exercises.

The physiology and signal properties of speech and of hearing receive a great deal of attention, centering on the response to sinusoids, and on the formant properties

of the speech-recognition process. Strong and Plitnik excellently discuss speech recognition and production machines as well as the hearing impairments caused by long- and short-term noise. An abundance of realtime data displays, and a particularly extensive bibliography in this part of the book, point up the special interests and skills of its authors.

Building acoustics receives brief attention, in both its transmission-loss and its reverberation-time aspects. The authors present the inevitable tables giving absorption coefficients and optimum reverberation times. They also clearly outline the geometrical optics of sound distribution from player to audience, and discuss frankly acoustical successes and failures in various halls.

Strong and Plitnik survey the orchestral instruments primarily in terms of their resonance curves and of the various sorts of time-varying spectra that may be obtained from them. These chapters are particularly valuable in bringing the instrument-physics work of Carleen Hutchins, John Backus, myself and others together with studies of instrumental sounds carried on by, among others, Melville Clark and his associates.

Electronic-music production systems receive only a brief explanation, whereas the sections devoted to sound reproduction are quite detailed.

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Solar Noise Storms

O. O. Elgarøy

363 pp. Pergamon, Elmsford, N.Y., 1977.

\$18.00

This is a book that perhaps should not have been written in the first place, especially since the subject matter is only a small part of solar radio astronomy as a whole. Solar radio astronomy, in turn, is only a branch of solar physics or of radio astronomy, depending on one's way of approaching the subject. It appears that the book is not even concerned generally with solar noise storms, but mostly with a component of noise storms, namely type-I bursts.

Oystein O. Elgarøy has worked for more than twenty years on solar radio storms, particularly from an observational point of view. He has been involved mostly with studies of noise storms at meter wavelengths, and the specialized nature of his work seems to be largely reflected in the contents of the book. He hardly mentions observations at decimeter or hectometer wavelengths. Thus, for instance, he deals with the satellite observations of the Goddard Space Flight Center group in about half a page, and

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The enthusiastic response to the original 1970 work has led to the publication of this revised edition. The editors have added many new, up-to-date articles, thereby greatly expanding the scope of this book.

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This extremely readable collection of articles provides stimulating material for both scientists and graduate and postgraduate students, and is particularly appropriate for courses in electron microscopy, electron diffraction and x-ray topography.

CONTRIBUTORS: **Volume I:** S. Amelinckx, D. van Dyck, D. J. H. Cockayne, R. Gevers, A. Guinier, P. Humble, J. van Landuyt, R. de Ridder, G. Thomas, C. M. Wayman, M. J. Whelan, M. Wilkens. **Volume II:** A. Authier, A. B. Bok, V. E. Cosslett, P. J. Estrup, A. Guinier, A. Howie, A. R. Lang, E. W. Müller.

Atomic Energy - Level and Grotrian Diagrams

by STANLEY BASHKIN and JOHN O. STONER JR.,
Department of Physics, University of Arizona,
Tucson, Arizona, U.S.A.

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1978 600 pages
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ISBN 0-444-85149-6

This volume continues the pictorial representation of energy levels and electronic transitions for atoms and ions in a style similar to that of Volume I. Two types of drawings have been prepared: one that shows the energy-levels in order of increasing excitation energy, and one that shows the transitions between levels. The data are the most complete to be found in a single volume, and the main contents of each reference are briefly described.

Volume I:

Addenda

1978 viii + 178 pages
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ISBN 0-444-85236-0

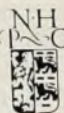
This Addenda is intended to extend and correct the information presented in Volume I. In several cases the editors have constructed new diagrams and have revised spectroscopic data that became available prior to about June 1976. In other cases they have provided brief lists or transitions and/or levels that the reader may add to Volume I, as well as references to sources of such information.

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does not mention even a word about the work of the group at Michigan.

Almost every chapter starts abruptly without any relevant introduction to the subject matter and no apparent objective of where the data will lead. Elgarøy does not synthesize observational material; in chapter after chapter he discusses each and every piece of such material that exists in the world, without ever telling us what data will lead to what physics. The only good point in this regard is that he has collected all the observational material in one place, but it is not clear if a student or a researcher will have an

overall picture of the phenomena from reading these chapters.

Elgarøy describes in detail the different theories that have been advanced to explain the generation of type-I bursts. Chapters 9 and 10, intended as an introduction to the theories, constitute probably the most useful part of the book, since they give radio astronomers a quick look into some current terminology of the relevant plasma physics. Basically, he gives all the theories equal importance, without regard to their degree of acceptance, either by himself, or by other solar radioastronomers. Thus the reason for

introducing five or six different theories to explain the storms is hard to understand. Generally speaking Elgarøy tries not to commit himself to any particular theory. A good example can be found on page 210: "But there have been several proposals, and one of them, or some of them, may one day prove to be correct." Similar sentences appear in the book in every chapter. The book needed considerable editing.

Finally, Elgarøy makes no attempt to relate solar noise-storm phenomena to recent and modern observations of solar activity made at other wavelengths such as x ray and ultraviolet. Therefore, the loop prominence in the extreme ultraviolet that appears on the book cover does not seem to have any relevance to the text.

To sum up, this book will be useful only to a small number of very specialized people. It should be pointed out, however, that its very specialized nature will also cause the book to be soon outdated.

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Optical and Infrared Detectors (Topics in Applied Physics, Vol. 19)

R. J. Keyes, ed.
305 pp. Springer-Verlag, Heidelberg, 1977.
\$37.90

The development of solid-state technology in recent years has led to a large variety of new and improved infrared detectors. The availability of these detectors in turn has made possible many new applications. Their success has further increased the thirst for new detectors that could be tailor-made for particular applications. It is not surprising, then, that in such a rapidly growing field a large number of books, review articles and special editions of journals exist. While some are quite similar, most differ in approach and emphasis and are written for readers with different interests, ranging anywhere from the detector user to the detector developer.

Optical and Infrared Detectors, according to its editor Robert J. Keyes, is written "for those who desire a comprehensive analysis of the latest developments in infrared detector technology and a basic insight into the fundamental processes which are important to evolving detection techniques." Keyes and contributors Paul W. Kruse, E. H. Putley, Donald Long, H. R. Zwicker, A. Fenner Milton and Malvin C. Teich have succeeded in reaching their objective. This is due in no small part to their expertise. Each has worked for many years in the

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