revised material. For example, the section on Saturn's rings is entirely new. Unfortunately, the translation leaves much to be desired. The English is consistently unidiomatic, the proofreading of the text (but not of the equations) is sloppy, and many of the technical terms have been mistranslated. Fortunately, the mathematical arguments are so clearly presented that the inept translation presents a relatively minor annoyance.

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Medical Images and Displays

R. Stuart Mackay
276 pp. Wiley, New York, 1985. $44.95

R. Stuart Mackay's book provides a survey of all the present biomedical imaging systems. It starts with an overview discussing the various imaging modalities and then proceeds to describe each of these, emphasizing the physical principles.

The descriptions are more physical than mathematical so that the book can be read and understood quite easily by the physics or engineering undergraduate student. The major topics covered are: image formation, computed tomography, x rays, ultrasonography, nuclear magnetic resonance, spectral information, motion and flow, image processing, visual methods and displays.

The book is concerned with the explanation of concepts and does so clearly, in a style that is very readable. The figures and photographs are excellent; they are often taken from medical or biological research, including many from Mackay's own research.

Ultrasound imaging is extensively treated in considerable detail, and the material provides an excellent introduction to the advantages and shortfalls of ultrasonic procedures. It is very interesting to see the "observation" of tiny bubbles much smaller than the ultrasonic wavelength utilized for the imaging. The author shows that such observations are physically realizable, both practically and theoretically.

The subject of CAT scans is handled very well. Mackay shows how one obtains multiple projections of geometric objects and how one reassembles these projections to obtain an image. The image-reconstruction method is very well explained and undergraduates in any college program can easily understand it. Having taught this very topic to students of biophysics, bioengineering and electronic engineering, I found the treatment an improvement on my own teaching procedure.

For PET-scanning systems Mackay

provides an easily understood summary of the fundamental physical principles. The basis of the system—positron–electron annihilation and gamma-ray emission—is described in a simple, easily understood way. The limitations of PET-imaging systems are also discussed.

Nuclear-magnetic-resonance imaging, which is now renamed magnetic resonance imaging (mri), is discussed and the fundamentals are outlined. The advances in mri are so rapid that no text can keep current. Nonetheless, a good understanding of the foundations can be obtained here.

In summary, there are excellent discussions of the basic principles of all the imaging modalities. The book provides a suitable text for teaching the elements of modern imaging, and would serve the student well.

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Leptons, Hadrons and Nuclei

Florian Scheck
388 pp. North Holland, New York, 1983. $61.50

Florian Scheck of the Johannes Gutenberg University has written a quite useful book. Topics such as scattering of particles from nuclei, hadronic atoms, electromagnetic interactions with nuclei, and weak interactions are discussed in some detail. There is very little discussion of nuclear structure in this book and it would therefore be most suited for use in the second semester of a one-year course on theoretical nuclear physics. Most of the material is developed using a relativistic or field-theoretic formulation. A lengthy chapter that describes the theory of fermion fields provides more details of spinor representations of the Lorentz group than is usually found in books of this type. Because the description of the nucleus as a relativistic system is of great interest at this time, the introduction to the techniques of relativistic quantum mechanics and quantum field theory presented in this work enhances its value for students of nuclear physics. Students may find the entire book of interest, while more advanced researchers may find individual chapters useful.

I very much enjoyed reading this book because great care has gone into its preparation. The topics chosen reflect the author's research interests and are therefore treated in depth. Scheck has chosen not to include any discussion of models of nucleon structure because that area is undergoing rapid development. However, it is interesting to note that the material that deals with nucleon–nucleus interactions and the optical potential—topics that can be thought of as representing aspects of classical nuclear physics—would require considerable additions to be brought up to date in the light of the recent developments in Dirac phenomenology and the relativistic impulse approximation (see PHYSICS TODAY, March 1984, page 20). Furthermore, if one were to take into account these advances in the description of the scattering of nucleons from nuclei, one could now achieve an even more unified presentation.

My only reservation concerns the section that describes the use of the fixed-scatterer approximation for the description of the meson–nucleus interaction. Although this approximation is commonly used, it always struck me as unjustified when used in the study of pionic atoms and low-energy pion–nucleus scattering.

All in all, this is a fine book. The author has achieved a good balance between the presentation of mathematical material and its use in the description of physical phenomena.

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new books

Quantum Electronics and Lasers

Laser Applications, Vol. 5. J. F. Ready, R. K. Erf, eds. 314 pp. Academic, New York, 1984. $62.00 *Compendium*

Quantum Processes in Polar Semiconductors and Insulators, 2 Vols. H. Stumpf. 364 pp. Vieweg, Wiesbaden, 1983. *Price not stated*

Electronic Properties of Inorganic Quasi-One-Dimensional Compounds, Part I: Theoretical. P. Monceau, ed. 253 pp. Reidel, Boston, 1985. $48.00. *Compendium*

Electronic Properties of Inorganic Quasi-One-Dimensional Compounds, Part II: Experimental. P. Monceau, ed. 323 pp. Reidel, Boston, 1985. $58.00. *Compendium*

Solid-State Physics and Electronics

Advances in Electronics and Electron Physics, Vol. 65. P. W. Hawkes, ed. 441 pp. Academic, New York, 1985. $85.00. *Compendium*

Hot-Electron Transport in Semiconductors. *Topics in Applied Physics 58.* L. Reggiani, ed. 275 pp. Springer-Verlag, New York, 1985. $43.50. *Compendium*

Electronic Properties of Surfaces. M. Prutton, ed. 195 pp. Adam Hilger, Bristol, 1984. $17.00. *Compendium*

Charge Density Waves in Solids. *Lecture Notes in Physics.* Proc. Intl. Conf. Budapest, September 1984. G. Hutiray, J. Sólyom, eds. 541 pp. Springer-Verlag, New York, 1985. $36.50