BOOK REVIEWS

Selection of books for review is based on the editors' opinions regarding possible reader interest and on the availability of the book to the editors. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.

Activation Analysis with Neutron Generators

Authors	S. S. Nargolwalla and E. P. Przybylowicz
Publisher	John Wiley & Sons, Inc.
Pages	658
Price	$29.50
Reviewer	R. K. Skogerboe

This well-written and well-organized presentation provides comprehensive coverage of the topic. The apt discussion of the principles of activation analysis with neutron generators includes an accurate evaluation of the capabilities and limitations of the technique. The discussion dealing with the production of fast neutrons, the theory thereof, and the design and operational characteristics of the required equipment is distinct and complete. The chapter on radiation protection requirements should be very useful to those planning fast-neutron facilities. Sample preparation and transport approaches are considered in depth, as are sources of analytical inaccuracies. Throughout, emphasis is placed on the operational parameters and procedures which must be controlled to optimize results. The last half of the text presents a comprehensive summary of the applications of the technique.

The treatment presented in this text is excellent, and the book will serve a wide segment of the scientific community. The novice will readily benefit from reading it and the expert will find it a good reference source. I recommend it with enthusiasm.

R. K. Skogerboe, professor of chemistry at Colorado State University, is well-known for his work dealing with the development of trace and ultratrace analysis techniques and the application of these to the solution of diverse problems. He has utilized a wide variety of analytical techniques in his research and has published extensively. His publications include several which have critically compared the capabilities and limitations of the instrumental techniques most widely used for trace analysis.

Wave Mechanics and Its Applications

(Volume 58 in the Pergamon Press International Series of Monographs on Natural Philosophy)

Authors	P. Gombas and D. Kisdi
Publisher	Pergamon Press, Inc. (1973)
Pages	238
Price	$10.50
Reviewer	George H. Miley

As explained on its jacket flap, this elementary text is primarily intended for undergraduate students of physics to provide a basis for progressing to more advanced texts. It is split into two parts of roughly equal length: The first provides a concise introduction to the experimental basis of quantum mechanics and key theoretical aspects, while the second presents detailed applications to atomic structure and scattering problems, including the use of perturbation and variational methods. The collection of examples in the second part is a particularly useful and noteworthy aspect of this book. The authors explain that they have done this to ensure that the student becomes adept in applying the newly learned theory. They voice the fear that the young generation hopes to contribute to general theory without going through the labor of learning through the solution of simpler problems. While this tendency is less prevalent among engineering students with whom the reviewer is acquainted, the point is certainly well taken and the examples presented provide a constructive and enticing approach that should help alleviate the situation.

The book is well written and the authors demonstrate an outstanding ability to identify and stress the key concepts involved in each section. These virtues should provide the student with an excellent supplemental text for introductory or intermediate courses in quantum mechanics.

It is the reviewer's opinion, however, that this book would not be suitable as the lead or key text in a course unless the material were carefully augmented with lectures and other reading material. While the introduction to quantum theory (Part 1 of the text) is clear and concise, it simply cannot, in the length allotted, give the neophyite sufficient interpretation of a theory that has frequently discouraged good and poor

students alike. On the other hand, as a supplement or reference, the book has many virtues. Once one begins to feel at home with the formalism of quantum mechanics, the no-nonsense review in Part 1 provides a way of highlighting the key concepts. Further, the collection of detailed examples in Part 2 provides a more useful supplement for the typical text which contains fewer and less complete examples.

The comments to this point have presupposed use in a conventional undergraduate quantum course. For engineering courses, some other possibilities exist. Engineering students, because of their practical bent, often gain their deepest insight into quantum mechanics through applied courses such as a laser or quantum electronics course. The typical quantum electronics text presents numerous applications of QM theory to specific problems related to lasers. Likewise, several popular texts used in nuclear engineering courses on nuclear concepts contain an applied treatment of neutron and charged-particle scattering. However, students still may wish to have a supplemental text for added background and to have at their disposal examples of problems and methodology that covers a wide range of applications. If so, *Wave Mechanics and Its Applications* should receive serious consideration.

George H. Miley is professor of nuclear and electrical engineering at the University of Illinois. He is a frequent contributor to American Nuclear Society journals and is a monograph author. His varied research interests include fusion, direct energy conversion, and nuclear pumped lasers. In connection with the latter, he has taught a nuclear engineering course that includes quantum mechanics at the level of the text reviewed here, and his remarks are largely based on this experience.

Technology of Controlled Thermonuclear Fusion Experiments and the Engineering Aspects of Fusion Reactors

(Proceedings of a Symposium held at Austin, Texas, November 1972)

Editor	E. Linn Draper, Jr.
Publisher	Technical Information Center, Office of Information Services, USAEC (April 1974)
Pages	1040
Price	$16.60
Reviewer	Gerald L. Kulcinski

Critical assessments of conference proceedings are always a difficult process, especially when they contain a large number of diverse papers. This particular proceedings contains 58 papers which vary dramatically in purpose and quality, from philosophical ideas to hard experimental data, from the work of a graduate student on his thesis to the combined efforts of over 20 scientists, and from esoteric conceptual schemes to descriptions of circuit breakers. Only a few of the most salient points of the proceedings can be reported here.

The first thing one notes in reading this book is that there is no clear-cut organization of the subject matter. Theoretical plasma physics papers are thoroughly mixed with experimental results and reactor designs. If the reader wishes to read only those articles of specific interest to him, he must read the table of contents and hope that each author was quite explicit in his choice of a title.

Next, it is noted that most of the work is quite dated, having been completed usually by the summer or fall of 1972. A completely unreasonable time delay between the presentation of the results (November 1972) and the publication date (April 1974) has severely diminished the value of many of the papers. This is especially true for those papers describing research activities current in 1972. In fact, much of the work in this volume has been superseded by papers given at the First Topical Meeting on the Technology of Controlled Nuclear Fusion held in April 1974 and published in July 1974!

As for the makeup of the conference itself, one finds that 52% of the papers came from U.S. national laboratories, with Oak Ridge, a major facility in fusion research, conspicuously absent. Approximately 34% of the papers came from the academic community (60% of those came from the Universities of Texas and Wisconsin), 9% from private industry or laboratories, and only 5% from groups outside the United States.

The breakdown of the papers by categories is given below.

Theory and parameter studies	8
Neutronics	8
Energy storage	6
Reactor designs	6
Materials	5
Experimental results	5
Magnet design	4
Reactor coolants	4
Conceptual ideas	4
Fusion-fission	2
Tritium	2
General	2
Environment	1
Economics	1
	58

Let me try to highlight a few of the more notable contributions from the above list.

Conn et al. showed how sensitive self-consistent D-T plasma energy balance studies are to the limits placed on the poloidal beta. They also showed how one might control plasma operation by purposely injecting impurities to enhance the bremsstrahlung radiation. Hopkins reviewed how high atomic number impurity atoms can radiate energy from plasmas via recombination and line radiation at temperatures of $T \geq 10$ keV. He also established some empirical scaling factors to help in a quantitative analysis of these effects. Keller and Dolan pointed out that the traditional Lawson "break-even" values of $n\tau \approx 10^{14}$ sec cm^{-3} are considerably lower (by a factor of 10) than those characteristic of plasmas with normal density and temperature gradients.

The neutronics papers were quite diverse, ranging from a new way to reduce computation time for parametric studies by using variational methods, to a theoretical calculation of the neutron spectra emanating from the beam stop at LAMPF. Most of the reports treated the traditional topics of tritium breeding, transmutation reactions, and the proper order of S_x-P_y calculations required to obtain reasonable results.

There were several good papers reviewing alternate methods of energy storage, especially for the Theta-Pinch Reactors. Thomassen described a superconducting transfer and storage system that utilized three nested spherical coils and can