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BOOK REVIEWS

Implications of Probabilistic Risk Assessment, M. C. CULLINGFORD, S. M. SHAH and J. H. GITTUS, Eds. Elsevier, Amsterdam (1987) £95.00. 766 pages.

The use of probabilistic methods to assess the safety of nuclear power plants is now being taken very seriously by Government agencies and utilities. It is a useful technique because it allows power plant designers, regulators and operators to discriminate between various issues important to safety, some of which may be significant and others trivial. It helps in deciding where more effort should be placed and therefore contributes to cost saving as well as to safety: two usually mutually incompatible quantities.

An international seminar on the implications of probabilistic risk assessment was held at Blackpool in the U.K. on 18–22 March 1985 and was organized by the IAEA with the cooperation of the safety and reliability directorate of the UKAEA. This book contains the proceedings of that seminar. The 153 participants from 27 different countries and from international organizations discussed international development in, and implications of, safety policy of probabilistic risk assessment, review of probabilistic risk assessment, treatment of uncertainties, safety goals, applications to design and operation, licensing issues and future trends. These papers presented an account of the present state-of-the-art and indicated priority areas for future study.

The topics covered vary in depth and quality from fairly-trivial discussions of elementary probability theory to some very profound philosophical ideas about safety. Moreover, although the book concentrates on nuclear energy issues, the basic ideas are applicable to other technologies. This is a very timely book and, although it lacks the cohesion of a single author text, it is an excellent introduction to the methods of probabilistic risk assessment since many references are given and current "jargon" explained. It can be recommended as background reading to graduate courses on nuclear safety as well as to practising engineers who wish to enter the subject.

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Elements of Nuclei Many-Body Physics with Strong Interaction, P. J. SIEMENS and A. S. JENSEN. Addison-Wesley, California, U.S.A. (1987) U.S.$39.95. 369 pages.

According to the authors, this book has been written to serve as a text for a *first course* in nuclear physics *for graduate students* in both experimental and theoretical physics who have not as yet decided to concentrate on nuclear physics.

The text does provide a fine, concise and easy-to-read look at nuclear physics from the many-body systems point of view. However, the "average" graduate student is probably not thoroughly enough grounded in undergraduate nuclear physics and quantum mechanics to be ready to absorb the material in this book—at least not without the help of a very capable instructor.

The book, in 11 chapters and using only 348 pages, does provide useful insight and understanding that could be used as part of an advanced or special topics course in (graduate) nuclear physics. After an introductory chapter that seems to serve no useful purpose, the text proceeds to cover nuclear forces beginning with the study of the deuteron, pion exchange force and scattering processes. It then advances through the phenomenological optical model into a study of bound nuclear systems, and from there into various other models (e.g. independent-particle model, deformed IP model, liquid-drop model, etc.). The remaining chapters cover pairing, stability and decay, and ground state properties, nuclear collective motion, rotational motion models, decay of excited states and finally a brief look at heavy nuclei collisions.

The chief advantage of the book is its conciseness. Its chief weakness, if it can be called a weakness, is that it does not accomplish the purpose the authors set out to achieve.

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Tokamaks, JOHN WESSON. Oxford University Press, New York, U.S.A. (1987) $85.00.

In its brief 309 pages John Wesson and his colleagues endeavor to communicate a feeling for the state-of-the-art understanding of plasma behavior in the Tokamak magnetic field configuration. The author holds forth a rather ambitious set of goals. The book is to be useful: (1) to those just entering the subject of Tokamak physics; (2) to specialists within Tokamak research who wish to acquire knowledge of other areas in the subject; (3) to those plasma physicists outside Tokamak research who would like to learn something of the principle concepts, methods and problems involved; and (4) to provide a handbook of the equations, formulae and data that the research worker frequently needs.

This book accomplishes tasks (2–4) in a magnificent fashion. Simply put, the book is excellent and is a must for all accomplished fusion researchers.

However, the material is too sophisticated for those just entering the field. The book's strength is its concise presentation of the latest (*ca* 1985) information. It is this conciseness and the occasional introduction of Tokamak vernacular before it is sufficiently explained that will make it difficult for the unguided and inexperienced nonplasma physicist to understand the important material contained in the 11 basic chapters.