

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.



Title Physics and Chemistry of Fission (Proceedings of the Second IAEA Conference, Vienna, July 28-August 1, 1969)

Publisher Unipub, Inc.

Pages 983

Price \$25.00

Reviewer Joel H. Ferziger

Fission physics has made great strides in the last few years and the Proceedings under review provide an excellent summary of what has been accomplished. The fifty or so papers published in this volume are divided into eight subject groups and are, in the main, devoted to the attempt to understand in detail the nature of the fission process and to explain some of the unusual features observed experimentally. The mix of theoretical and experimental papers is excellent.

By far the most important advance in fission physics in the last ten years is Strutinsky's introduction in 1968 of the idea that the fission barrier is double humped. (Actually it may have three or more humps.) This unusual barrier results from the effects of nuclear shape on the shell structure of the nucleus. As the nucleus deforms, it successively passes through configurations for which its nucleon complement is magic and others for which it is non-magic. Shell effects modulate the liquid drop potential barrier in such a way as to produce the double-humped potential. This model has been able to explain many data that could not be explained by earlier models. Included in this category are isomeric fission, dependence of

fission cross section on energy, variation of the fission width from resonance to resonance, and a number of others. The review papers of Strutinsky and Pauli and of Lynn in this volume provide a review of this work that is easily read by the non-specialist.

Aside from their importance in basic physics, these advances may well have an effect on the methods of fast reactor calculation. It appears that at least some of the simple methods by which fission resonances are handled will require modification; the effect will probably be felt most in the calculation of Doppler coefficients. Naturally, the effects are not likely to be large but, on the other hand, there is no reason to expect them to be negligible.

A number of other papers in this volume provide new data that should be of interest to reactor designers. These appear in Sections F (Prompt Neutrons and Gamma Rays), G (Delayed Neutrons and Gamma Rays), and H (Energy, Mass and Charge Distribution). While many of these papers contain work undertaken to supply data to aid in systematizing what is known about fission, several contain data with direct application in reactor design.

To sum up, this is a book for the specialist and, in view of its high price, cannot be recommended to everyone with an interest in reactor physics. It should, however, be in the library of every company and university with an interest in the field.

Joel H. Ferziger received his PhD from the University of Michigan in 1962 and has been at Stanford University since 1961; he is currently associate professor of nuclear en-

gineering. In collaboration with his students he has worked on theoretical problems in nuclear reactor physics, neutron transport theory, radiative transfer, and nuclear physics. He has also been a consultant on fast reactor physics and nuclear physics for General Electric Company.

Title Large Radiation Sources for Industrial Processes

Editor International Atomic Energy Agency, Vienna, 1969

Publisher Unipub, Inc., 1970

Pages 693 + front and rear material

Price \$19.00

Reviewer E. Alfred Burrill

This book is essentially the full Proceedings (including discussions and concluding remarks) of a Symposium on the Utilization of Large Radiation Sources and Accelerators in Industrial Processing, held by the IAEA in Munich, August 18-22, 1969. Two previous meetings on the same general subject had been sponsored by the IAEA in Warsaw (1959) and in Salzburg (1963).

The title of this volume is not an accurate abbreviation of the full title of the Symposium, because most of the papers describe developments in radiation-induced processes, and only about 20% of the papers are chiefly concerned with radiation sources or irradiation systems for pilot-plant or production-line use. The 49 papers are divided into 4 main topics: