

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.



Proceedings of the International Conference on Nuclear Physics, Vols. I and II

<i>Editors</i>	J. deBoer and H. J. Mang
<i>Publisher</i>	North-Holland/ American Elsevier
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<i>Reviewer</i>	W. D. Loveland

These volumes contain a summary of the information presented at the International Union of Pure and Applied Physics International Conference on Nuclear Physics held in Munich, Germany in late August 1973. Volume I of these *Proceedings* is a collection of photoreproduced, author-written, one-page abstracts of 700+ papers contributed to this Conference. Volume II contains the full text of the 28 invited papers presented at this Conference, along with discussion of these papers. In addition, there are some comments upon and expanded versions of a few of the 64 contributed papers actually presented orally at the meeting.

International Conferences on Nuclear Physics, such as the Munich Conference, occur approximately every four years and furnish nuclear physicists with a valuable opportunity to review the current status of the field and exchange information concerning new experiments and new directions in research. As shown by the papers given at the Munich Conference, nuclear physics is a mature science. Progress in recent years has largely been in filling in the details of phenomenologically based

nuclear structure and reaction models, plus gaining new insights in heavy ion and medium energy nuclear physics. While these endeavors are intellectually exciting to the participants, their immediate practical importance to people primarily interested in nuclear technology is dubious. This review is then written from the point of view that a practicing nuclear engineer or technologist will find little of immediate practical importance in these *Proceedings* but, recognizing the long-range importance of basic nuclear science to the nuclear industry, he may wish to read or purchase this work to keep abreast of current developments in nuclear physics.

The one-page abstracts of the contributed papers in Vol. I are, in general, very well written and do summarize the essential features of the research discussed. Among the topics discussed are nuclear interactions, the nuclear shell, cluster and collective models, nuclear spectroscopy, electromagnetic moments, inelastic and elastic scattering, transfer reactions, compound nuclear processes, including pre-equilibrium decay, fission and fusion, electron scattering, photonuclear reactions, and medium energy reactions. Some of the contributions summarize work that is now available elsewhere in the literature in a more complete form. In short, Vol. I is strictly a reference work, to be obtained by libraries and to be used in searching for information on a topic. After reading one of the abstracts in this volume, one would presumably write to the author or look elsewhere for further details about the work.

Volume II contains several significant complete papers summarizing recent experimental and theoretical work in nuclear physics. After a

short introductory paper by Goldhaber on the ties between low- and high-energy nuclear physics, there is an excellent (~70-page) review article describing recent developments by Bromley. Bromley carefully selects important examples of the best recent work in a number of areas and shows many well-drawn figures illustrating the points discussed. Bromley's article is followed by a short, interesting discussion of the relationship between the nucleon-nucleon force and effective interactions by Baranger. Next are papers on Hartree-Fock calculations by Vautherin, large computer shell model calculations by McGrory, electromagnetic moments by Goldring, and cluster models by Arima. A large number of papers are devoted to nuclear reactions. Heavy ion reactions are discussed by Scott (transfer reaction), Pelte (scattering), and Volkov (production of n -rich nuclei). Specht contributed a fine summary of many of the most important developments in nuclear fission physics with special attention to the excellent, recent work of his group in Munich. Parenthetically one might note that a more detailed summary of the current state of this field can be found in the Proceedings of the Rochester Conference on Nuclear Fission, held a few weeks before the Munich Conference. [*Physics and Chemistry of Fission 1973* (IAEA, Vienna, 1973)]. Oganessian summarizes recent unsuccessful Russian attempts to synthesize superheavy elements. Stephens and Szymanski each present papers on high spin states in nuclei. Engfer, Bishop, Walcher, and Tzara each contribute discussions of the electromagnetic properties of the nucleus and electron scattering. Satchler summarizes a great deal of the large amount

of work on direct reactions with light ions while Miller and Feshbach contribute useful, clear, very well-written reviews of pre-equilibrium emission and intermediate structure, respectively. Blann summarizes (in a discussion now severely out-of-date) data on fusion of two heavy ions. The Conference Proceedings are further enriched by interesting discussions of nuclear archaeology by Perlman, solar neutrinos by Bahcall, and astrophysics by Clayton. Papers summarizing recent high energy results by Thirion and Rook round out Vol. II. While the price of these volumes is outrageous, Vol. II seems to me to be well worth the money for the person who wants a thorough, well-written summary of the state of nuclear physics as of 1973 for his bookshelf.

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Citizens Groups and the Nuclear Power Controversy

<i>Authors</i>	Steven Ebbin and Raphael Kasper
<i>Publisher</i>	The MIT Press
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<i>Reviewer</i>	Dick Duffey

Citizens Groups and the Nuclear Power Controversy reports on a study by a political scientist (Ebbins)

and a physicist (Kasper) of George Washington University financed by the National Science Foundation. An advisory committee (mostly with environmental connections), interviews with over 100 individuals concerned with plant regulatory procedures, 48 days at hearings, and over 200 referenced sources provided input.

The development of the controversy from the Fermi reactor in 1956 to the recent more direct citizen intervention is outlined. The motivation of citizen groups is attributed to concern over (a) the environmental issues of a nuclear accident, (b) radiation safety, and (c) a general fear of unknowns in advanced technology. The alarming hazards of the 1957 WASH 740 report, "Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants," are again paraded. The environmental impact statements following the 1970 National Environmental Policy Act (NEPA), dramatized by the Calvert Cliff decision, are said to have added to the opportunity of citizen participation.

The regulatory procedures are well reviewed by the authors: the reactor safety analyses to satisfy the U.S. Atomic Energy Commission (AEC) regulatory staff, the hearings of the Atomic Safety and Licensing Board (ASLB) and, finally, licensing.

In addition, the procedures for examining more generic safety matters common to many plants, e.g., emergency core cooling systems (ECCS), are described.

To illustrate the extent of citizen involvement and the complexity of the technical and legal procedures, the following three cases are detailed with particular comments on controversial issues. The Midland, Michigan plant of the Consumer Power Company (pressurized water reactor), designed to furnish utility power and supply steam to the Dow Chemical Company, was examined from the point of view of the construction permit procedures. The operational licensing hearings of the Vermont Yankee reactor (boiling water) were studied. Finally, the ECCS hearings for rule-making were considered.

Many quotations reveal the involvement in hearings of a large cast of participants. Intervenor attorneys Myron Cherry (Midland and ECCS) and Anthony Roisman (Vermont Yankee) receive star billing. The mass

of reports and testimony resulted in some plant changes but, in the main, lengthened the proceedings. The Midland plant, announced in 1968, received its construction permit in late 1972, with operations scheduled for about 1980. The Vermont Yankee plant, announced in 1966, received a construction permit in late 1967, with operations in 1972.

Analysis and interpretation occupy much of the book and are pointed toward the procedural roles of citizen and scientific groups, attorneys, the ASLB, and the AEC. Although enlisting public support may have been an AEC motive for the hearing procedure, the authors conclude that the hearings have evolved more into an opportunity for public complaint. The shortcomings of this adversary method to resolve technical issues are brought out by the prolonged acrimonious hearings. Both citizens and attorneys are said to be technically uninformed, and even scientific intervenors are lacking in data. The book is probably dry reading to a technical person; nevertheless, a few clever comments are included. For example, Friends of the Earth, an environmental group, said of the hearings: "Sometimes the dialogue comes across like missing pages of Lewis Carroll." Indeed by comparison, "Who Stole the Tarts" is a model of rational coherence.

The authors find the hearing process a failure and consider the process heavily weighted against the intervening citizen, who has little financing while applicant costs are passed to the public via power charges. Listed recommendations are

1. government-financed independent assessment centers to consider impacts on the environment
2. government adjudication bodies independent of mission-oriented agencies
3. separation of promotional and regulatory activities of the AEC
4. early public announcements of nuclear plants
5. public hearings at both construction and operation stage, but the latter only to check adherence to construction plans
6. more generic hearings