Discussions of plasma waves and plasma stability are deferred until Chaps. 7 and 8, where traditional materials such as Landau damping and kink instabilities are presented. Again, the presentation is well organized and readable.

Chapters 5 and 6 are devoted to plasma equilibria and transport, respectively. Both are very nice treatments that include important materials not contained in other comprehensive texts on plasma physics. For example, Chap. 5 contains descriptions of flux and current profiles required for toroidal equilibrium and Chap. 6 discusses neoclassical and trapped-particle diffusion.

More elaborate treatments of the material in the first eight chapters can be found elsewhere. However, the concise format of the presentation and the integration of these topics into a well-organized text make this work an excellent plasma physics reference.

The material in Chaps. 1 through 8 could easily fill a full semester first-year graduate course in plasma physics. With proper supplemental lectures, this book would be a fine text for such a course. It would be difficult, however, to cover this entire text in one semester and to expect more than a cursory comprehension on the part of the student. It may be prudent, then, in the organization of such a course to delete sections of the earlier chapters so that more time could be devoted to the important material presented in the latter chapters.

Chapters 9 through 14 cover important topics in fusion technology that are essential to current research efforts in magnetic confinement. One chapter each is devoted to plasma heating, radiative losses, plasma wall interaction, and power balance. The level of mathematical sophistication required is below that demanded in the earlier chapters, even though the material presented has been accumulated from recent research efforts in tokamak design. Major references are included, but often refer to voluminous reports and conference proceedings, rather than siting specific papers and authors directly.

Many of the concepts presented in earlier portions of the text are applied to the analysis of tokamak reactors in Chap. 13. Power balance and macroscopic stability of toroidal systems are discussed along with system constraints imposed by magnet performance, radiation shielding requirements, and material damage considerations. Various regimes for tokamak reactor operation are also discussed.

The final chapter covers other magnetic confinement options, including the tandem mirror, the ELMO bumpy torus, and the reversed field pinch. Again, much of this material is extracted from recent research publications but is integrated nicely into the general flow of the text.

In conclusion, this text is well written and organized. However, without a very good introductory course in plasma physics, the student may be hard-pressed to maintain the author's pace through the early chapters. The latter portion of the text is an excellent introduction to problems in fusion engineering. Its inclusion fills a void between theory and application that often exists in plasma physics courses at this level. It should also be noted that an entertaining set of problems, varying in degree of difficulty, accompanies each chapter. This book is recommended to educators as a fine text, and to all those interested in an up-to-date and complete reference in plasma physics and fusion technology.

Robert T. McGrath received his PhD from the University of Michigan and is presently employed as assistant professor of nuclear engineering at The Pennsylvania State University. He has been involved in fusion technology since 1976, and over the years has participated in fusion research efforts at Battelle-Pacific Northwest Laboratories, Exxon Research and Engineering, TRW Corporation, and Argonne National Laboratory.

Nuclear Reactor Safety

Author	David Okrent
Publisher	University of Wisconsin Press, Madison, Wisconsin (1981)
Pages	370
Price	$29.50
Reviewer	Robert S. Wick

This book is an excellent combination of the history of nuclear power and discussions of the continuing changing of the philosophy of qualitative assessment of safety into a combination of safety, risk, and cost-benefit analysis on an ever-increasing quantitative basis. The author, in addition to his technical credentials, has a decided advantage over those of us who have had only very specific interactions with the regulatory process in that he was part of the developing regulatory process during the years of its most significant evolution. In his Preface, he states the purpose of the book is to look at history, not to examine or comment on the question "How safe is safe enough?" In the present era of increasing public scrutiny of engineering judgments and demands for engineering design perfection, it is important from a professional point of view to understand how we (engineers and the profession) reached the present state of environment that we are increasingly expected to work in. Obviously, these changes evolved in an atmosphere of high emotional fervor and social-political forces, which throughout history only occasionally have combined in such a dramatic way. It seems to the reviewer that the evolutionary development of the regulatory process in the nuclear power field is "spilling over" into all aspects of our high-technology-based society and hence the need to understand what has happened and is happening.

The author has added some very useful guides for the reader. For example, he presents a separate chronology of some important events in the history of light water reactor safety and then cites the appropriate chapter for discussion. This is important because many of the chapters are devoted to the discussion of general topics including reactor siting, the China Syndrome, seismic safety, etc. In other words, the book itself is not a straight-ahead chronological record of events but rather an attempt on the author's part to show evolving patterns and shifts in emphasis from one phase of the reactor safety regulatory process to another. This is certainly a difficult task and the author has done admirably.

Although this book is not light or casual type reading matter, the reviewer found it hard to put down at times. The author has a very good narrative style, which he employs very effectively to describe the unfolding of events and

the shifting of emphasis from one aspect of reactor safety to another. This book would be a useful supplement to readings on "technology and society"-type courses at the university for engineering students. For the practitioner, it is the only book-length broad historical perspective of the evolution of the nuclear regulatory process that the reviewer knows of. This book is not just another book on reactor safety; it is much more.

Robert S. Wick (BS, mechanical engineering, Rensselaer Polytechnic Institute, 1946; MS, Stevens Institute of Technology, 1948; PhD, mechanical engineering, University of Illinois, Urbana, 1952) has been professor of nuclear and aerospace engineering at Texas A&M University since 1966. Before that he was at the Westinghouse Bettis Atomic Power Laboratories (starting in 1955), where he was associated with various reactor design projects.

Atomic Physics 7

Editors	Daniel Kleppner and Francis M. Pipkin
Publisher	Plenum Publishing Corp., New York (1981)
Pages	573
Price	$69.50
Reviewer	Howard Grotch

Atomic Physics 7 is a collection of invited papers presented at the Seventh International Conference on Atomic Physics, held August 4-8, 1980, at the Massachusetts Institute of Technology.

There are 22 manuscripts, which cover a broad spectrum of topics in theoretical and experimental atomic physics. In all cases, the authors write about "state-of-the-art" research in their respective areas. As is usually the case for such a collection of manuscripts, the mode of presentation of the individual contributions varies according to the author's conception of the expertise of the average reader. Thus some of the papers are carefully developed, with extensive reference to earlier work, and are clearly intended for an individual who needs an overview, while others are more suited to the expert intent on learning the most recent details of work in the field.

A large subset of papers involves theoretical and experimental discussions in which atomic physics is being utilized as a tool to shed light on our understanding of fundamental theories in physics. In this category, I would place the following articles:

Experiments on Time Reversal Symmetry and Parity
Norman F. Ramsey

Parity Violation Effects Induced by Neutral Currents in Atoms
C. Bouchiat

Status of Experimental Searches for Parity Violation in Atoms
E. D. Commins

Stable Lasers and Optical Frequency Standards for Testing the Postulates of Physics
J. L. Hall

Theoretical Advances in Quantum Electrodynamics
G. Peter Lepage

Tests of Quantum Electrodynamics Using Hydrogen, Muonium, and Positronium
D. W. Gidley and A. Rich

Invariant Frequency Ratios in Electron and Positron Geonium Spectra Yield Refined Data on Electron Structure
Hans Dehmelt

Muonic Helium
Patrick O. Egan

There are four papers that deal with electrons in highly excited states (called "Rydberg states"). In such states, the electrons are far from the nucleus and effects of external fields are enhanced. The papers are:

Rydberg Atoms and Radiation
Serge Haroche

Two Electron Rydberg States
William E. Cooke

Precise Studies of Hydrogen Stark Resonances
Peter M. Koch

Excited States of Atoms in Strong External Fields
Richard R. Freeman

Several other papers also discuss work in strong fields. The paper, "Atomic Physics of High Z-Systems," by P. Kienle, provides a comprehensive treatment of spontaneous positron emission during uranium-uranium collisions. For a short time, the inner electrons see a field produced by two nearby uranium nuclei.

The paper, "Atomic Physics with Relativistic Beams," by H. C. Bryant, K. B. Butterfield, D. A. Clark, C. A. Frost, J. B. Donahue, P. A. M. Gram, M. E. Hamm, R. W. Hamm, and W. W. Smith, involves strong electric fields induced by passing rapidly moving ions through a magnetic field. Lasers are then utilized to study atomic resonances.

The remaining manuscripts, which cover a variety of topics, are:

Nuclear Properties Studies by Atomic Physics
R. Klapisch

Coherent Decay of Collisionally Excited Autoionizing Atoms
Reinhard Morgenstern

Laser Induced Collisional Energy Transfer
S. E. Harris, J. F. Young, R. W. Falcone, W. R. Green, D. B. Lidow, J. Lukasik, J. C. White, M. D. Wright, and G. A. Zdasiuk

Correlation Effects in Electron-Atom Scattering
Frank H. Read

Continuum Capture in the Three-Body Problem
Ivan A. Sellin

Atomic Physics with Synchrotron Radiation: Past, Present, and Future
Francois J. Wuilleumier