

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.



VERY READABLE PRIMER

Title Particle Acceleration
Author J. Rosenblatt
Publisher Methuen and Co. Ltd.,
London, 1968
Pages viii + 183
Price \$5.50
Reviewer J. Robb Grover

This small book is intended for those "biologists, chemists, physicians, solid-state and high-energy physicists" who depend on and are concerned with accelerators, mainly as research instruments, but who must nevertheless learn the principles of their operation. "Emphasis has been put on questions such as possibilities and limitations of different machines or their beam structure in space and time---."

Professor Rosenblatt has written a collection of lucid descriptions at the advanced undergraduate level, of how accelerators work. After two short introductory chapters, in which a few necessary facts of mechanics, electromagnetism, and nuclear science are set out, he devotes most of the book to various kinds of accelerators in order of increasing complexity, beginning with the Van de Graaff generator and other static machines, proceeding to linear accelerators, circular machines, and finally, after describing the principle of strong focusing, to alternating gradient synchrotrons and azimuthally varying field cyclotrons. The eighth and final chapter is devoted to some interesting speculations

about the future of particle acceleration, including such topics as colliding beams and the possible use of superconductors. The author has given careful attention to focusing and phase stability, and to their explanation in words, as well as in mathematical expressions. At several points in the book he has used "worked problems" as a pedagogical device to help confer a feeling for the orders of magnitude of the various quantities involved.

The title means exactly what it says, for emphasis is very much on the acceleration process itself, to the virtual exclusion of ion sources or of characteristics and handling of the final beams. In my opinion this limitation is too strict and narrows the book's market, since there could be little or no consideration of important types of accelerator-related topics that the author's intended readers might hope to find included, e.g., polarized beams, intense sub-nanosecond beam pulses (of great interest to radiation chemists), whether a given heavy ion is available in useful beam intensities, etc. Also, the bibliography is too small to provide convenient guidance to the literature for such problems. Contrary to the author's statements on pp. 36 and 39, helium does indeed form negative ions that can be accelerated in a tandem Van de Graaff.

The book is well-edited and reasonably free of typographical and similar errors. However, two that might prove troublesome are the following: on page 42, $C = 0.02 \mu\text{F}$, not 0.02F; equation 5.27, which should relate orbit radius to magnetic field at relativistic energies, was omitted but is repeatedly invoked in the text (it is readily derived by substitution of equation

5.26 into equation 5.24). The index is small, but seems adequate.

In conclusion, this book's main usefulness is for education, and it can be recommended to readers of *Nuclear Applications* as a very readable first introduction to particle acceleration methods for those who know little of accelerators.

J. Robb Grover has been a member of the Department of Chemistry of Brookhaven National Laboratory since 1957 when he received his PhD from the University of California (Berkeley) under Professor Seaborg's guidance. He also serves as Associate Editor of Annual Reviews of Nuclear Science. His past research contributions have been mainly in nuclear reactions, while his current interest is the application of nuclear detection techniques to the study of chemically interesting collisions in crossed molecular beams.

VERY INTERESTING—BUT EXPENSIVE

Title Magnetohydrodynamic Energy Conversion
Author Richard J. Rosa
Publisher McGraw-Hill Book Co.,
1968
Pages xv + 234
Price \$17.50
Reviewer Martin S. Zucker

In our view this book admirably informs the modern engineer or engineering physicist on the application of magnetohydrodynamics (MHD) as