

As nowadays the users are different persons from the builders of accelerators, this book should be particularly useful for the users to help them to talk to the accelerator specialists. The topics covered include dc accelerators, linear accelerators, cyclotrons and synchrotrons. Alternating gradient focusing is described in some detail, together with its applications to synchrotrons (including some discussion of the importance of momentum compaction; though perhaps it is sad that there is no discussion of how this increases one's ability to steer the beam for purposes of targeting and extraction), and to azimuthally varying field cyclotrons. A brief account of future possibilities is given in the last chapter. This chapter is a little too condensed so that one cannot see which are the really important ideas for the future. This is, however, not surprising: it would be difficult to do otherwise in this particular area, where ideas have so frequently run some way ahead of technological and economic possibilities.

A. B. CLEGG

## THERMAL NEUTRON SCATTERING

### Low-Energy Neutron Physics

By I. I. Gurevich and L. V. Tarasov. Translated by Scripta Technica. Edited by R. I. Sharp and S. Chomet. Pp. xiv + 607. (North-Holland: Amsterdam, 1968.) 210s.

THIS is a valuable and well written book which may fail to reach its right readers because of the inappropriateness of its title. It is not for the nuclear physicist, nor even for the neutron physicist, but for the student of solids and liquids. "Thermal neutron scattering" is the real topic of the book, with the proviso, as the authors point out in the foreword, that the emphasis is "appreciably displaced towards nuclear scattering as compared with magnetic scattering". Indeed, of the book's six hundred pages, all but about thirty refer to the use of neutron beams for the study of condensed matter. The remainder is covered by short sections on "properties of the neutron"—including, for example, an account of the search for an electric charge and a dipole moment—and "parity conservation".

To research workers on solids and liquids, and perhaps particularly to ones who are not themselves using neutrons, the book is highly recommended. The general descriptions of topics such as neutron optics, crystal and liquid dynamics and the Van Hove correlation functions have probably never been bettered—pursuing as they do a midway course between an excessively detached theoretical approach and an over-concern with a review of experimental measurements on a multitude of substances. The text will certainly repay very careful reading.

There are over six hundred entries to books and original papers and there is an index of over eight pages. The latter, however, is a great disappointment and does not do the book justice. For example, almost three pages of references are sub-entries beneath "neutrons" or "scattering" and such topics as absorption, dipole moment, electric charge and fission do not appear in their own right. Nevertheless the reader is recommended to persevere and is assured that he will find the book increasingly useful as he becomes more familiar with its contents.

G. E. BACON

## COLOUR CENTRES

### Physics of Color Centers

Edited by W. Beall Fowler. Pp. xiii + 655. (Academic Press: New York and London, June 1968.) 228s. 8d.

THIS book presents a timely collection of review articles by different authors of recent progress made in under-

standing the physical properties of colour centres. It concentrates heavily on selected areas of research where dramatic advances in both theory and experiment have been made in recent years. In the preface, the editor stresses that the book is neither an introductory nor a comprehensive one. Nevertheless, it is still regrettable to find no chapter devoted to the F-centre, the prototype colour centre, or to trapped hole centres. After all, a considerable body of knowledge has been amassed concerning these centres, which have contributed as much to the "Physics of Colour Centres" as, for example, the studies of  $F_A$ -centres. Similarly, no single chapter is devoted to aggregate centres, and colour centre formation mechanisms are excluded by the editor on the doubtful grounds that they are not well enough understood. The title implies a breadth of scope which is not really apparent in this book because little discussion is evident of colour centres in materials other than the alkali halides. Colour centres do exist in other solids and much is known about them. Despite these rather minor deficiencies, the very high quality achieved by the authors will ensure a wide readership.

The book synthesizes the collective influences of elementary excitations and external perturbations on the manifest properties of numerous colour centres. Knox and Teegarden, in the first chapter, summarize the applicability of standard semiconductor techniques in investigating the band structure of the alkali halides. The second chapter, by the editor, is a necessarily superficial account of the theoretical and experimental situation in locating the spectral position of colour centre transitions in all their multitudinous variety. The  $F_A$ -centres are discussed by Lüty in the third chapter with characteristic panache and expertise. New optical phenomena, especially excited state and two photon spectroscopy, which became feasible with the advent of the laser, are described by Mahr (chapter 4). The influences of external perturbations, stress, magnetic field and electric field are dealt with very thoroughly by Fitchen (chapter 5) and by Henry and Slichter (chapter 6). The latter is possibly the best chapter in the book, giving a beautifully clear and concise account of the usefulness of "moments analysis" in the interpretation of magneto-optic, stress, electric field and Raman scattering experiments. The final two chapters are concerned with "Localized Modes and Resonant States" by Klein and "ESR and ENDOR Spectroscopy" by Seidel and Wolf. The standard of presentation is almost uniformly good. There are few errors, and few topics, except those already noted, have been omitted.

This is perhaps the most important book yet published in the field and will be essential reading for all those currently active in this study of colour centres. Post-graduates studying more diffuse regions of solid state spectroscopy will also find reference to this text profitable. The exorbitant price, however, will probably place it beyond the bookshelf of most individual scientists. Consequently, *Physics of Color Centers* is scarcely likely to be a best-seller. Instead it seems fated to become a well-thumbed library reference book.

B. HENDERSON

## PROBABILITY IN APPLIED MATHS

### Probabilistic Methods in Applied Mathematics

Vol. 1. Edited by A. T. Bharucha-Reid. Pp. x + 291. (Academic Press: London and New York, 1968.) 140s.

THIS book constitutes the first volume of a new series of books which are to deal with the place of modern probability theory, especially the theory of stochastic processes, in applied mathematics generally. Each volume will contain several articles, not of the survey type but more like monographs serving as introductions to research in the field at hand. In volume one there are three articles,