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BOOK EXHIBIT

A.P.S. SPRING MEETING

April 25-28

Washington, D. C.

There will be a book exhibit at the Spring Meeting, located in the Florentine Foyer, Sheraton Park Hotel. The hours are 9 a.m. to 5:30 p.m., April 25, 26, 27; 9 a.m. to 2 p.m., April 28. All of the leading publishers will be on hand and everyone is cordially invited to visit.

have earned and received recognition in the technical fields of their specialties, one can properly expect this to be a highly authoritative treatment of this vital new part of engineering and physics. It is refreshing to see that so much information on missiles and their propulsion and guidance has now emerged from the classified literature and is readily available to the engineers and other applied scientists who need it. Persons interested in ballistics and flight dynamics, in the propulsion of space vehicles, in their guidance and in the problems of communicating between space vehicles and the earth, and finally in problems of putting man into space and of using space vehicles scientifically—each of these persons will profit by having a copy of this excellent volume close at hand.

Elements of Solid State Theory. By Gregory H. Wannier. 270 pp. Cambridge U. Press, New York, 1959. \$6.50. Reviewed by A. Maradudin, *Institute for Fluid Dynamics and Applied Mathematics, University of Maryland.*

At a time when almost every topic in solid-state physics is the subject of a separate book or comprehensive review article, the appearance of a new book which purports to survey solid-state physics perhaps requires some justification. How does it present standard material from a different point of view, and what does it say that has not already been said in earlier books? Fortunately this little book, written by a man who has made notable contributions to several branches of solid-state physics, provides a demonstration of how both of these aims may be realized. A comparison of the first chapter, on crystallography (in which, for example, the theory of two-dimensional Bravais lattices is developed from a purely formal mathematical point of view), with the equally fine but more pictorial treatment of the same subject in Kittel provides a good illustration of how the former aim is achieved. The chapters on lattice dynamics and cooperative phenomena are perhaps the most sophisticated to be found in any book not devoted exclusively to these subjects, both from the standpoint of the topics discussed and the level of the discussion. Indeed, the same remark can be made about the treatments of most of the remaining topics in this book: x-ray diffraction by crystals, the behavior of electrons in a periodic potential, the theory of semiconductors, electron transport processes, and the theory of cohesion. This general excellence, however, is not achieved without some sacrifices, which are represented either by the complete omission of certain topics, or by the brevity of the discussions of other topics, which, however, never become perfunctory. For example, there is no discussion of the more technological aspects of semiconductor theory, such as semiconductor devices, and the theory of ionic crystals receives only brief mention. However, since these and other topics are well covered in other books, the result of their neglect here is a gain in the excellence of the

treatment of those topics emphasized by Dr. Wannier. Finally, each chapter is accompanied by a set of exercises, which should make this book useful as a text in a graduate course in solid-state physics.

Circuit Theory of Linear Noisy Networks. By Hermann A. Haus and Richard B. Adler. 79 pp. The Technology Press of MIT & John Wiley & Sons, Inc., New York, 1959. \$4.50. Reviewed by T. Teichmann, *Lockheed Missiles and Space Division*.

THE determination of noise figures for complex electric circuits and amplifiers has in the past been carried out on an individual basis without reference to any comprehensive theory. The authors of this, the second volume of the Technology Press Research Monographs, have essayed to present a systematic and reasonably comprehensive theory of complex linear noisy networks including amplifiers, feedback problems, and negative resistances.

The presentation is an elaboration and extension of a series of journal articles by these two authors and a major portion of the work consists in the exposition of the matrix theory of linear noisy networks, and the reduction to canonical form of certain important matrices, noise parameters, and linear noisy networks. The important notions discussed include the noise matrix, the lossless imbedding of a multipole network, the characteristic noise matrix in the impedance representation, the exchange noise power and the canonical form of a linear noisy network. The main results of these sections are that the exchange power of a multipole network is the negative of the trace of the characteristic noise matrix and that every n -terminal-pair network can be reduced by lossless imbedding (at any particular frequency) to the canonical form consisting of n -separate negative or positive resistances in series with noncorrelated noise voltage generators.

The discussion then continues with a description of more general matrix representations of linear noisy networks and of the corresponding characteristic noise matrices. This is followed by an extended discussion of the noise measure with special reference to the general circuit matrix representation. The remaining chapters deal basically with two external pair amplifiers and circuits, but rest heavily on the invariant notions introduced earlier. The main topic of discussion is the realization of optimum amplifier noise performance and this is dealt with in some detail.

The matrix manipulation carried out in the earlier part of the book is remarkably clear and concise which has been accomplished by a close relation of the mathematical arguments and the physical situations with which they deal. While the book does not pretend to deal with the many complex situations which arise in some of the new developments (parametric amplifiers, etc.) there does not seem much doubt that the methods described will play an increasingly important part in clarifying the analysis of noisy electric circuits in general.

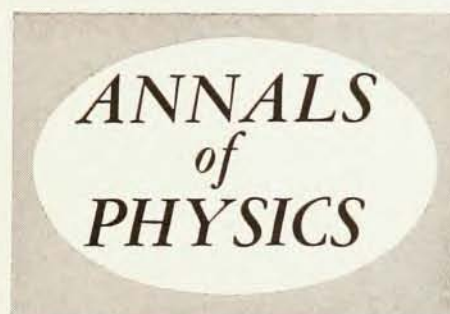
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