

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.



A FIRST OF ITS KIND

Title Electron-Stream Interaction with Plasmas

Author Richard J. Briggs

Publisher The MIT Press, 1964

Pages xi + 187

Price \$7.50

Reviewer Gordon S. Kino

This MIT research monograph is derived from the author's PhD dissertation. It provides an excellent review of the interaction of electron and ion beams with a plasma. The methods used derive more from the microwave tube field than the fusion plasma field, and so the emphasis is far more on the boundary conditions pertaining to finite systems rather than the effect of temperature, although this is taken into account to some extent.

The second chapter of the book gives a very detailed description of mathematical criteria for distinguishing between amplifying waves and absolute instabilities. These criteria, which were first presented by Sturrock, Landau, and Lifschitz, have been generalized by the author and Bers so that they are now applicable to almost any linear physical system. This material should be of interest in many research fields where instabilities are of importance and certainly not just the plasma field.

The rest of the book is devoted to detailed derivations of dispersion relations and physical discussions of beam-plasma interaction. The book will be extremely useful to anyone interested in this subject, as it is the first published work of this kind outside of research papers. I would expect it to become a standard reference on the subject.

Gordon S. Kino is Professor of Electrical Engineering at Stanford University's Institute for Plasma Research, where he has been since 1957. He has done fundamental studies on electron and ion guns and is in charge of a group which was the first to verify quantitatively the growth rates in beam-plasma interaction and to develop techniques of design and

analysis of space charge flow of ion and electron beams that have been adopted by others as standard. Formerly with the Mullard Radio Valve Co. (England) and Bell Telephone Laboratories (New Jersey) as a researcher, he holds BS and MS degrees from London University and the PhD degree from Stanford.

UNLABELED MIXTURE OF IMMISCIBLE INGREDIENTS

Title Nuclear Space Propulsion

Author Holmes F. Crouch

Publisher Astronuclear Press

Pages xv + 432

Price \$15.00

Reviewer R. E. Schreiber

This newest book on nuclear space propulsion is intended, according to the publisher's preface, to fill the need of the "professionally oriented nonexpert" and is represented as a "blend" of design principles, design philosophy, practical applications, and advanced concepts. In the opinion of the reviewer, the blend is more an unlabeled mixture of immiscible ingredients with the overall flavor dominated by the author's pet enthusiasms rather than by the information being developed in the ROVER program.

A major criticism of the book is the lack of differentiation between recognized basic principles and "rules" stated without proof and between established design considerations and untried concepts. These are mixed together in a continuous (but sometimes discursive) narrative, presumably to present a unified picture to the nonexpert. This is exasperating to the expert who sees controversial and sometimes incorrect statements presented with the same assurance as Newton's laws of motion. It is surprising to read that: it is almost impossible to design a reactor which will operate smoothly and consistently in the resonance region because of the unpredictability of the fission cross section; it is generally agreed that 2 MeV is