



Planetary atmospheres have been explored during the past decade by many interplanetary probes. NASA renditions show a Mariner craft (left), one of a series to explore the inner planets. Pioneer probes (right) have sent abundant information about Jupiter's atmosphere.

Statistical Mechanics of Simple Liquids by Stuart Rice and Peter Gray (Interscience, 1965). In several cases, without using quotation marks, Croxton has extracted sentences verbatim from published articles by other authors.

Liquid State Physics can be characterized as a survey. Many literature references are given. This is the major virtue of the book. I am sure I will use it to help me track down particular references. But the frequency of errors, the lack of pedagogy, and the price will probably not allow this book to become a standard text.

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Physics of Planetary Ionospheres

S. J. Bauer
230 pp. Springer-Verlag, New York, 1973.
\$32.00

A comprehensive and complicated picture of the response of our planet's atmosphere to solar radiation has been developed during the last decade as rocket and satellite-borne instrumentation has provided detailed measurements of the atmospheric properties. Because of their importance to radio communication, considerable emphasis has been placed on the ionospheric regions of the atmosphere, and a large body of data is available on electron densities, temperatures and velocity distributions on ionic and neutral-particle distributions and on airglow emissions. These data have stimulated the construction of numerically sophisticated models of the ionosphere that incor-

porate a wide range of elementary physical and chemical collision processes modified by the effects of diffusion and transport in the magnetic and gravitational fields of the rotating Earth. The essentials of the models should apply also to the other planets and to those satellites, such as Titan and Io, that have atmospheres. Substantial information about the ionospheres of Mars and Venus, for which the primary neutral component is carbon dioxide, has been obtained by US and Russian spacecraft, and the study of the Jovian planets, for which the primary neutral particle is hydrogen, is a major part of the projected planetary exploration program of NASA. A beginning was made this year with a fly-by past Jupiter, which suggested the presence of a layered ionosphere in Jupiter's atmosphere.

Siegfried Bauer's monograph on planetary ionospheres thus appears at an appropriate time. It is a coherent account of the physical processes that lead to the production of ionization in a planetary atmosphere and of the reactions that subsequently occur. Considerable attention is given to ionospheric dynamics and the role of plasma transport processes. The book studies also the thermal structure of an ionosphere by relating the temperature distributions to the best sources and including the process of thermal conduction. Bauer includes brief accounts of experimental techniques and the characteristics of the ionospheres of the planets Earth, Mars, Venus and Jupiter are summarized and contrasted.

The intent of the book is the presentation of the fundamental theory of a planetary ionosphere, which is applicable generally to any planetary system that possesses an atmosphere. Bauer

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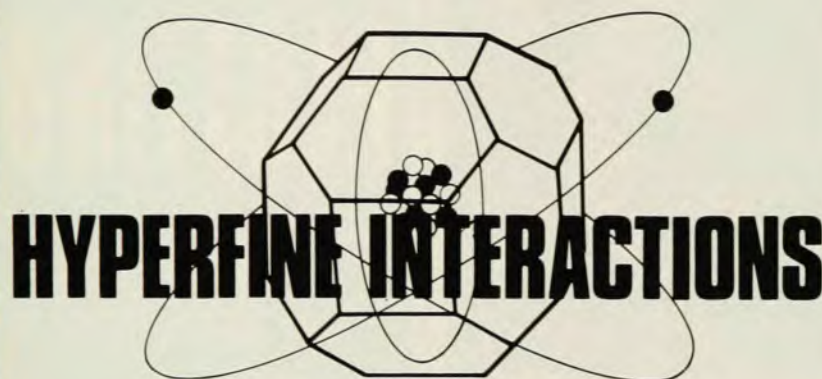
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Scope

The journal is concerned with research in the border regions of solid-state, atomic, and nuclear physics. Although the title and subject *HYPERFINE INTERACTIONS* is one of the best examples of such a topic, other studies which utilize the modern techniques of atomic and nuclear physics may fall within the domain of the journal. The main concern is the understanding of border region physics, no matter what are the disguised varied forms in which it appears.

The hyperfine interaction Hamiltonian is the logical basis for a large part of the subject matter to which this journal will be devoted because it contains products of atomic and nuclear quantities. In condensed matter, the Hamiltonian even spans solid-state physics. Hence such fields as: perturbed angular correlations, nuclear magnetic resonance, electric quadrupole resonance, beam-foil spectroscopy, nuclear orientation, and Mössbauer effect studies fall immediately within the journals domain. In addition, any atomic or solid-state studies via hyperfine spectroscopy (utilizing mesons, gamma rays, electrons, etc.) are within the scope. It can include problems related to solid, liquid and gaseous states as well as studies with biological material.

The title *HYPERFINE INTERACTIONS* is not meant to prevent contributions that do not directly involve such interactions from reaching the journal. For example, the journal is receptive to particle-beam studies which also explore the border physics region but

do not necessarily utilize hyperfine effects. Under this category lie channeling, nuclear lifetimes studied via channeling and implantation phenomena. In fact, studies which incorporate one of the disciplines of physics: solid-state, atomic or nuclear physics to study another would be generally acceptable.

Advisory editorial board

An editorial board is being formed and to-date the following scientists already accepted our invitation: B. Herskind, Copenhagen; E. Matthias, Berlin; J. A. Davies, Chalk River; N. Stone, Oxford; E. Bodenstedt, Bonn; G. Goldring, Rehovot; V. I. Goldanski, Moscow; T. Yamazaki, Tokyo;

Invitation to authors

The editors cordially invite colleagues to submit papers for publication within the scope of the journal. It should be realised that the refereeing criteria will be high. Guidelines for preparing the manuscripts are available from the editors and publisher. Contributions should be sent to B. Deutsch, University of Aarhus.

Subscription information

The journal will be published in volumes of 6 issues; each issue will contain some 100 pages, first issue is scheduled to appear in spring 1975; In principle the journal will appear bi-monthly. Subscription price: US \$43.95 Dfl.110.00 per volume, postage included. Specimen copies will be supplied by the publisher.

has made notable contributions to the subject, especially in connection with the top-side ionospheres where transport processes play a dominating role, and his book is particularly valuable for its emphasis on the relationships between dynamics and chemical processes. The discussion is comprehensive and authoritative, but the writing is condensed to a point where it is sometimes difficult to read. It is suitable for those who have absorbed a simpler introduction and it would be appropriate as the basis upon which to construct an advanced seminar, supplemented by additional observational material on the planetary ionospheres. It is a valuable reference source for research, and because of its emphasis on fundamentals will remain so for some time to come.

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Optics

E. Hecht, A. Zajac

565 pp. Addison Wesley, Reading,
Mass., 1974. \$16.95

I suppose it is trite to say that optics is that branch of physics that is concerned with light; trite and perhaps a little inaccurate in this day of radio telescopes, information theory, acoustical holograms, and liquid crystals all occupying comfortable niches in optics. Perhaps the proper touchstone for optics is not *light* but *image*. A device, or a concept, or an application is optical if, in some way, it has to do with the creation, propagation, recording, transmission, or decoding of an image. The concept of an image is broadened to include laser speckle patterns, stellar spectra, masks for producing circuit components, interferometrically produced diffraction gratings, as well as "La Gioconda" and other favorite snapshots.

The authors of *Optics*, physicists on the faculty of Adelphi University, have assembled a textbook spanning the fundamentals of classical physical and geometrical optics as well as some of the fascinating developments that have occurred in the last twenty years. While the scope of the book is immense, it is, perhaps necessarily, lacking in depth. Mathematically it is unsophisticated; the student needs to know the basics of calculus, linear algebra, and vectors, but real mastery is not demanded. The emphasis is on demonstrating physical and optical principles. Explanations are in short, uncomplicated sentences. The mathematics is used more to demonstrate and simplify than to derive and prove. Problems to work out form an important part of the volume.

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