



Solar wind effect. The tail of this comet (Bennett 1969i) is blown by the solar wind, in a direction opposite to that of the sun.

mechanics and thermodynamics is the best of the book. Its level is comparable with that of *Statistical Physics* by Frederick Reif (volume 5 of the Berkeley Physics Course), by which it was admittedly inspired. As such, it is somewhat too advanced for the purpose intended. The last 90 pages of the book concern themselves with "time-independent electrical phenomena," meaning electrostatics, direct current and time-independent magnetism. Again, the level is often too advanced for a first-year physics course, particularly sections involving Laplacians, curls and line integrals.

Still, on balance, my impression of the book is favorable. Clarity of style, the 319 elucidative diagrams, and a typography that is uncluttered and pleasing to the eye, make for a welcome departure from the traditional format of European physics texts.

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Introduction to the Solar Wind

By J. C. Brandt
199 pp. Freeman, San Francisco, 1970. \$10.00

The earth is imbedded in an interplanetary stream of plasma, a nonstatic

extension of the outer atmosphere of the sun—the corona. This "solar wind" is a relative newcomer among astrophysical topics, with a wide range of implications, from space travel to stellar evolution. John C. Brandt, of NASA-Goddard and the University of Maryland, gives a concise account of this phenomenon covering all its observational and theoretical aspects.

Solar wind evolves from an extremely rarefied corona, heated to some two million degrees by turbulent shocks that emanate from the hydrogen convection zone in the outer layers of the sun. Such convection zones must exist in solar-type stars and other stars of not-too-early spectral type. These must possess hot coronas and emit "stellar winds," which lead to considerable, almost complete braking of stellar rotation, and to a less considerable loss of mass (a fraction of 10^{-4} for the sun during its lifetime). Early-type stars do not have convection zones and hot coronas, but even more intense "winds" emitted by superluminous stars are apparently caused by radiation pressure, which depends on the luminosity to mass ratio.

The presence of solar wind has been first clearly demonstrated by ground-based observations of comet tails. Being in extreme cases connected with auroral and ionospheric phenomena, it is now more directly being explored by space vehicles and shown to be always present, though variable. It consists mainly of a stream of protons, with some alpha particles and heavier ions, and with electrons balancing the space charge, traveling with a velocity around 450 km/sec, at a number density of some 5 ions per cm^3 and carry-

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■ Physics Laboratory Manual Third Edition, 1972

CLIFFORD N. WALL, *University of Minnesota*, RAPHAEL B. LEVINE, *Metropolitan Atlanta Council for Health*, and FRITJOF E. CHRISTENSEN, *St. Olaf College*. Completely updated for introductory physics—enables the student to conduct experiments without outside aids. 1/72, approx. 464 pp., (67410-1)

■ Nuclear Radiation Physics Fourth Edition, 1972

RALPH E. LAPP, *Quadri-Science, Inc.* and HOWARD L. ANDREWS, *University of Rochester*. Completely revised, this edition includes new material on elementary wave mechanics, space radiation, thermonuclear reactions, and radioactive decay. 1/72, approx. 464 pp., (62598-8)

■ Introduction to Classical and Modern Optics

JURGEN R. MEYER-ARENDT, *Pacific University*. NEW—an in-depth examination that ranges from classical concepts to the modern topics of matrix operation in lens design, holography, and lasers. 1/72, approx. 640 pp., illus., (47943-6)

■ Waves in Physical Systems

CHARLES F. SQUIRE. A unique blend of the new quantum physics with the classical. This text chronicles the work done on scalar waves in simple physical systems in the past 100 years. 1/72, 154 pp., (94608-7)

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M. W. FRIEDLANDER, *Washington University, St. Louis*. NEW—explains the methodology used in science, and provides a basis for a better understanding of the scientific role in modern society. 4/72, approx. 176 pp., (16726-2)

■ Used Math: For the First Two Years of College Science

CLIFFORD E. SCHWARTZ, *State University of New York at Stony Brook*. Emphasizes the student's understanding *how* and *why* mathematical relationships occur. Includes an examination of error analysis, and a reference section with tables and index. 9/72, paper (93973-6), cloth (93974-4)

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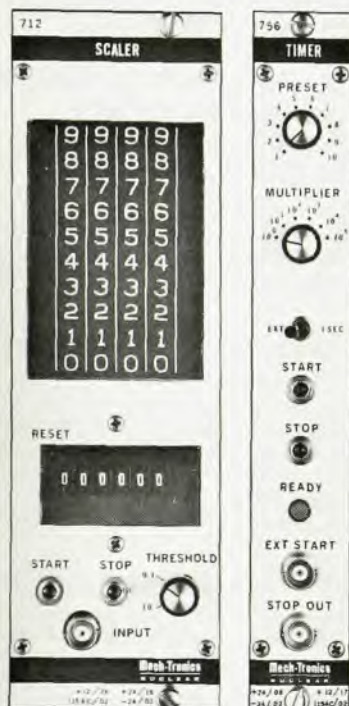
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ing with it from the sun a radially ex-
tended magnetic field of the order of
 10^{-5} - 10^{-4} gauss in the earth's veloc-
ity.

Solar-wind problems are far from be-
ing exhaustively interpreted, and the
book everywhere underlines uncertain-
ties in this respect. Also, the author's
treatment is laconic and presumes con-
siderable background knowledge by the
reader, who will often have to consult
other sources to obtain clear under-
standing of theory and fact.

Therefore, the stated aim of the text,
destined for the "advanced undergrad-
uate... the beginning graduate stu-
dent" and "scientists in other fields,"
may be somewhat over-optimistic. A
reader who will master and under-
stand the book completely, will have to
perform much more work and thinking
than simply reading it as it stands. After
that, he may qualify as a full-
fledged researcher in the field, far more
than merely an "undergraduate." Thus,
while being a hard nut to crack for an
unprepared reader, the mono-
graph may offer good training toward in-
dependent thinking. This in particu-
lar refers to some incomplete label-
ling of the copious illustrations, to half-
finished sentences, or to obvious slips of
the pen such as the contention (on page
8) that electrostatic repulsion leads to
one-half "the effective proton mass,"
"mass" being here confused with
"weight." However, the algebra is
generally correct.

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Interpretation of Spectra and Atmospheric Structure in Cool Stars

By Y. Fujita

145 pp. University Park Press, Baltimore,
Md., 1970. \$10.00

The study of the atmospheric structure
of cool stars has become a very active
field of research in the past decade.
Y. Fujita has summarized in this book
some of the work done in this area up
to 1968. Fujita and his associates in
Japan have been working on cool stars
for a long time. This book deals pri-
marily with their work.

The topics discussed in this book
include: identification of spectral lines,
dissociative equilibrium, opacities and
model atmospheres, spectral classifi-
cation, quantitative analysis of spectra
and chemical composition. The book
gives a fairly detailed discussion of the
observed spectra of cool stars, and quite
a few spectrograms and tracings have
been included. I was surprised not to
see any discussion of the observations
on mass loss from cool stars, on infrared
stars and on flare stars. The discussions

of opacities and model atmospheres are
brief and dated. There is no mention of
the early work on nongray atmospheres
of cool stars by Owen Gingerich and
his colleagues. Convective energy
transport plays an important role in the
atmospheres of cool stars and a detailed
discussion of this problem should have
been given.

Fujita's contributions to the study
of carbon stars are well known, and the
book gives a fairly detailed discussion
of these stars. One chapter of the book
is devoted to the interesting problem of
the C^{12}/C^{13} ratio in carbon stars.

Although this book deals only with
selected topics concerning cool stars,
I am sure that all workers interested
in this rapidly developing field will
find it very useful. The book is hand-
somerly produced and reasonably priced.

Shiv. S. Kumar

University of Virginia, Charlottesville

Nuclear Collective Motion: Models and Theory

By D. J. Rowe

340 pp. Barnes and Noble, New
York, 1970. \$17.50

The subject matter of this book is ap-
propriately divided into two parts.
The first part treats the purely phe-
nomenological aspects of collective
nuclear motion, while the second delves
into the microscopic theory. The
author avoids an historical development,
as ample scientific perspective now
exists on this subject for a more logical
presentation. The material is well
organized, and his logical approach is
quite successful.

One of the primary highlights, in my
opinion, is a large number of clever
pedagogical examples that the author
uses to clarify comparatively subtle
theoretical aspects of the model. Many
of these examples are real gems, not
readily available elsewhere in the lit-
erature. In general, even the most so-
phisticated aspects of the subject are
presented with exceptional clarity.
The book is particularly well suited for
graduate students and physicists who
are encountering the material for the
first time. The academic level is ap-
propriate to a second-year graduate stu-
dent who has had a standard course in
quantum mechanics and a rudimentary
knowledge of nuclear physics. Spe-
cialized mathematical methods are con-
veniently presented in the appendices.

Most of the defects are pointed out
by D. J. Rowe himself. No attempt
was made toward complete referencing.
I would strongly recommend that an
extensive bibliography for this text
should be compiled, if the author con-
templates a revised edition. Similarly,
I would like to see a larger selection of