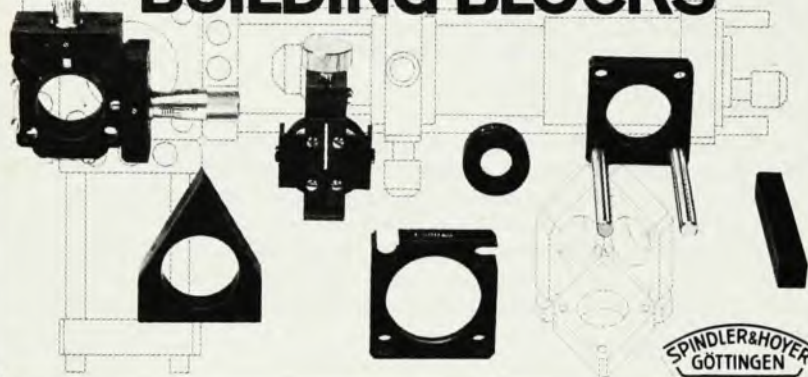


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erence lists are very comprehensive and take us well through the 1972 literature. Actually this collection of articles would be a good choice for bright intermediate graduate students who wish to get a fairly comprehensive insight into problems of concern to cosmic-ray researchers. The emphasis is that of physicists of the British Midlands, who have contributed so importantly to our current state of understanding, and, in the spirit of George Rochester, their reports have related very clearly and unselfishly to the parallel work done at other places in the world. The publisher has done a handsome production job as well.

ROBERT L. CHASSON
University of Denver
Denver, Colorado

Physics of Atoms and Molecules

U. Fano, L. Fano

592 pp. U. of Chicago Press, Chicago, Ill.
1973. \$14.50

As evidence by a burgeoning number of new and occasionally novel physics textbooks, the past several years have seen a marked overhaul in the undergraduate physics curricula of many colleges and universities. Although the most noticeable course-content revisions have been established at the introductory level and in courses designed for nonphysics majors, significant changes also have occurred in the advanced-undergraduate course sequences.

In the undergraduate curriculum it has been customary to include a survey course on modern physics as a prerequisite to formal quantum-theory courses. The long list of recent modern-physics texts and elementary quantum-mechanics texts suggests that the evolution of courses providing a first exposure to modern physics has been especially active. *Physics of Atoms and Molecules* by U. Fano and L. Fano deals with the quantum mechanics of isolated atoms and molecules and is intended to provide the basic ideas necessary for more advanced treatments of quantum theory and of specialized topics. In that respect, and unlike the more frenetic character of many modern-physics survey texts, this book offers an introduction to the fundamentals of quantum theory in the same way that traditional undergraduate courses in mechanics or electricity and magnetism serve as bases for analytical dynamics or electrodynamics.

Both in their design and in its realization, the Fanos have succeeded extraordinarily well. With many new, thoughtful and thought-provoking

treatments of standard topics in the quantum mechanics of atoms and molecules, the Fanos' text is a pedagogical *tour de force* and a delight to read. Excellent physical arguments and inductive reasoning are apparent throughout, and mathematics is brought to bear in a way that best illuminates the physics. Particularly noteworthy in this regard is the masterful discussion of the two-level system, which serves both as basis and as point of departure for the description of more complex systems.

The pace of *Physics of Atoms and Molecules* is leisurely and discursive with the consequence that some traditional modern-physics course topics such as kinetic theory, special relativity and nuclear and particle physics are absent from the book. No matter, for the depth of treatment and insight lavished on the subjects that are covered more than compensate for the often inadequate treatment of the varied topics found in traditional texts.

The Fanos are to be congratulated for having produced a text that should become a standard for the time-honored modern-physics course for undergraduates. Although coverage of the book's contents could be extended over a two-semester course, it is recommended that the material be presented in one semester—a semester that ought to prove most profitable to student and teacher.

PETER G. CABLE

Naval Underwater Systems Center
New London, Connecticut

The Large Scale Structure of Space-Time

S. W. Hawking, G. F. R. Ellis
391 pp. Cambridge U. P., New York, 1973. \$28.50

In principle, nonquantum general relativity is one of the two basic theories in current physics; the other is special relativistic-quantum theory. The empirical evidence for general relativity is comparatively very weak. But there has recently been a considerable increase of interest in general relativity, generated mainly by actual or potential applications in astrophysics.

During the last year or so, three thoroughly modern texts on general relativity have appeared. Steven Weinberg's *Gravitation and Cosmology* emphasizes observations and the relation of general relativity to quantum theory. *Gravitation* by Charles Misner, Kip Thorne and John Wheeler is encyclopedic. This book by S. W. Hawking and G. F. R. Ellis emphasizes the geometric aspects of nonquantum general relativity and its fundamental the-

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