

group theory traditionally used by physicists, and might also be useful.

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## From the Black Hole to the Infinite Universe

D. Goldsmith, D. Levy  
330 pp. Holden-Day, San Francisco,  
1974. \$6.95

The approach of this paperback book, intertwining a science fiction story with textual material, is interesting, but often the connection between the two is artificial. For example, in the science-fiction part of chapter 8, "Lumps of Matter," space hero Cyril Zaki happens to reminisce about the school classes he had muddled through with formulas such as "PeeVee equals Arty" and then later the chapter describes the bulk properties of gases. Also, the fifteen chapters themselves do not follow an obvious order; each appears to be a nearly self-contained description of one selected astrophysical phenomenon or concept.

The authors, D. Goldsmith and D. Levy, have keen insight, and a number of their descriptions (such as presenting the Doppler shift in terms of the photon's energy) were very enlightening. The figures and captions, with a casual style, are generally good and informative although sometimes misleading. The Hertzsprung-Russell diagram, plotted with temperature increasing toward the right, may be a logical manner of presenting the information, but it is one of a kind because the convention in astronomy and astrophysics is always to have temperature increase toward the left. Two colleagues to whom I showed this figure immediately remarked "Hey, that must be Goldsmith's book!" He was considered the most likely astronomer to ignore the traditions of the field.

By putting the mathematical devel-

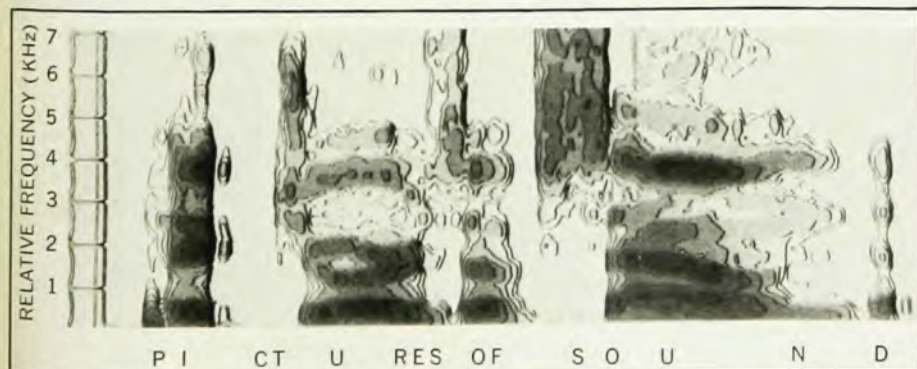
opments at the end of the chapters after the descriptive explanations, the authors have attempted to tell a wide audience that "understanding modern astrophysics is fun." Much of the discussion is still complex, however, or presupposes knowledge given later, such as the suggestion in chapter 1 that black holes may provide enough mass to reverse the present expansion of the universe, a concept not discussed until chapter 9. Thus the book is recommended as fun reading for scientists and might be a useful text in a one-semester course for people who have had at least a good high-school physics course or its equivalent.

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## Speech Synthesis

J. L. Flanagan, L. R. Rabiner, eds.  
511 pp. Dowden, Hutchinson & Ross,  
Stroudsburg, Pa., 1973. \$22.00

Of the various problems that have been the concern of speech scientists over the past few decades, the synthesis of speech has come closest to achieving a degree of success in practical application. Speech synthesis has also provided an effective tool for the study of the speech process, because it can be used to produce well-controlled stimuli for investigation of speech perception and it involves modelling of the speech production mechanisms. It is appropriate, therefore, that a collection of papers in the area of speech synthesis constitutes one of the series of books entitled "Benchmark Papers on Acoustics." A group of 46 papers, selected carefully by the editors, James L. Flanagan and Lawrence R. Rabiner, represent a wide variety of subjects ranging from those that are of historical interest (but formed significant and exciting contributions at the time they appeared) to more recent topics on digital techniques for synthesis of speech and on com-



The words "pictures of sound" are graphically displayed on a contour spectrogram. This type of representation provides for more accurate amplitude measurements. Photo from Bell Labs.

## QUANTUM COLLISION THEORY

by CHARLES J. JOACHAIN, Université Libre de Bruxelles

1974. 708 pages. US\$86.50/DFL. 225.00

This book gives a self-contained and unified presentation of the methods of quantum collision theory, with applications to the fields of atomic, nuclear and high-energy physics.

The book contains four parts. The first one is devoted to the presentation of the basic definitions and the study of collision kinematics. In the second part a detailed discussion is made of the simplest collision problem, namely non-relativistic potential scattering. The general treatment of quantum collisions is the subject matter of the third part of the book. This includes S-matrix theory, the determination of cross-sections and the discussion of various approximation methods. In the last part of the book the general theory developed in Part III is applied to various collision processes which are of fundamental interest in microphysics.

## HIGH ENERGY PHYSICS AND NUCLEAR STRUCTURE

Proceedings of the Fifth International Conference on High-Energy Physics and Nuclear Structure, held in Uppsala, Sweden, June 18 - 22, 1973.

edited by GUNNAR TIBELL, University of Uppsala

1974. 480 pages. US\$61.50/DFL. 160.00

The diversity of the topics chosen for the program is thought to be in the spirit of those physicists from CERN and the Weizmann Institute who in 1963 took the initiative to arrange the first conference of this kind, intending to bring together scientists from the fields of high-energy physics and nuclear physics.

Main chapter headings: I. Elementary particles and interaction symmetries. II. Coherent production. III. Nuclear scattering. IV. Production, capture and absorption processes. V. Nuclear structure. VI. New developments and applications to other fields.

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