

(appreciated) and many references (greatly appreciated), and ending (quite conveniently for the struggling reader) with a terse summary.

The attention to detail, the thoroughness of discussion and the frequent and persistent references, both to supplementary and to parallel discussions of each topic, as well as to interesting applications, make this volume important for the practitioner of radiative-flow astrophysics. Because it is fairly self-contained, this book is a likely text for a graduate-level course in radiation hydrodynamics; despite the significance of the field, few such courses exist, probably in part because the body of possible textual material is ill-defined.

Radiation hydrodynamics—seemingly by nature—lacks the elegance and exotic flavor of other branches of physics relevant to the study of high-energy phenomena in astronomy; its beauty lies in the pretty pictures one produces from the solutions, however crude and numerical, of a set of complicated nonlinear differential equations. *Foundations of Radiation Hydrodynamics*, while presenting few of these pictures itself, does provide the important drawing instruments. As a general reference for a major subject in theoretical astrophysics, it is unsurpassed; we recommend it without hesitation.

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White-Light Optical Signal Processing

Francis T. S. Yu
316 pp. Wiley, New York, 1985. \$44.95

Francis Yu is a longtime active researcher in optical processing and has collected in this, his fourth book on modern optics, many of his recent results.

For the most part the material in this text is based on the fact that strictly coherent illumination is not required for optical signal processing. The application of the Van Cittert-Zernike theorem allows one to relax the stringent coherence requirement, although one then has to take artifact noise and other drawbacks into consideration. The book presents the case for performing optical processing with partially coherent or white-light illumination.

The book begins with an introduction to the theory of partial coherence and ends with copious applications. In between, the material is clearly presented and well balanced. It is a pity that all the fine illustrations are in black and white; printing costs must have precluded the use of color.

The text examines early on such

topics as coherence requirements, the apparent transfer function and noise performance. A brief sampling of the applications discussed includes color-image deblurring, broad-band matched-filter synthesis and visualization of phase objects. All the major results are well illustrated with photographs and all chapters are amply documented with proper references.

Some readers will no doubt take issue with the material on noise. In fact, a more precise account of noise and its statistical description would have improved the presentation. Moreover, it is dubious whether one can treat granularity as additive noise obeying a Gaussian distribution with an exponential correlation function. Doob's theorem would require some reason for assuming that it is a Markov process.

Nevertheless, on balance the book is an important addition to the field of modern optical processing. The text contains two appendices and no problems.

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book note

Solitons and Particles

Edited by Claudio Rebbi and Giulio Soliani
819 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985.
\$75.00 hardcover; \$33.00 paper

"Soliton" is a quite recent term for a wave phenomenon already described by J. Scott Russell in 1842. It was coined by Norman J. Zabusky and Martin D. Kruskal in a 1965 paper in *Physical Review Letters*. Around the same time, physicists started applying the soliton concept to particle physics, for example, in a paper that T. H. R. Skyrme published in *Nuclear Physics* in 1962. Both papers are published in *Solitons and Particles*, a collection of reprints on soliton theory and solitons in particle physics. In addition to the 76 reprinted papers, the book contains an introductory chapter, an outline of the mathematical theory of solitons and a guide through the literature of solitons in particle physics.

The editors note that in selecting the papers they have tried to provide "a broad and yet coherent panorama of concepts, methods and results." Consequently, the reprinted papers are not arranged chronologically but divided roughly into groups with topics ranging from the mathematics of solitons to their application in the description of monopoles. The introductory chapters serve as a guide to the study of the field by directing the reader through the text to the reprinted papers and to papers, review articles and books listed in bibliographies with each chapter.

new books

Acoustics

Fundamentals of Noise Control Engineering. A. Thumann, R. K. Miller. 287 pp. Fairmont, Atlanta, Ga., 1986. \$29.95. Text

Astronomy, cosmology and space physics

Birth and Evolution of Massive Stars and Stellar Groups. Proc. Int. Symp., Dwingeloo, Holland, January 1985. W. Boland, H. van Woerden, eds. 377 pp. Reidel, Boston, 1985. \$59.00

Cosmic Rays in Interplanetary Magnetic Fields. I. N. Toptygin. 375 pp. Reidel, Boston, 1985. \$64.50

From Quark to Quasar: Notes on the Scale of the Universe. P. Cadogan. 183 pp. Cambridge U.P., New York, 1985. \$24.95. Lay readers

Guide to Observing the Moon. British Astronomical Association. 128 pp. Enslow, Aldershot, England, 1986. \$14.95. Lay readers

International Directory of Astronomical Associations and Societies, 1986. A. Heck, J. Manfroid, eds. 266 pp. Observatoire de Strasbourg, France, 1985. Price not stated

Solar Radiophysics: Studies of Emission from the Sun at Metre Wavelengths. D. J. McLean, N. R. Labrum, eds. 516 pp. Cambridge U.P., New York, 1985. \$59.50. Compendium

The Solar System: Observations and Interpretations. M. G. Kivelson. 436 pp. Prentice-Hall, Englewood Cliffs, N.J., 1986. \$43.95. Compendium

A Brief View of Astronomy. J. M. Pasachoff. 285 pp. Saunders, Philadelphia, 1985. \$19.95. Text

Data Analysis in Astronomy. Ettore Majorana International Science Series 24. Proc. Int. Wksp., Erice, Sicily, May-June 1984. V. Di Gesù, L. Scarsi, P. Crane, J. H. Friedman, S. Levialdi, eds. 541 pp. Plenum, New York, 1985. \$85.00

Mass Loss From Red Giants. *Astrophysics and Space Science Library 117.* Proc. Conf., Los Angeles, June 1984. M. Morris, B. Zuckerman, eds. 320 pp. Reidel, Boston, 1985. \$49.00

Properties and Interactions of Interplanetary Dust. *Astrophysics and Space Science Library 119.* Proc. Colloq. Int. Astron. Union, Marseille, July 1984. R. H. Giese, P. Lamy, eds. 444 pp. Reidel, Boston, 1985. \$64.00

Relativistic Astrophysics. *International Series in Natural Philosophy 10.* M. Demianski. 341 pp. Pergamon, Elmsford, N.Y., 1985. \$45.00. Text

Atomic, molecular and chemical physics

Progress in Solid State Chemistry, Vol. 15. G. M. Rosenblatt, W. L. Worrell, eds. 374 pp. Pergamon, New York, 1985. \$132.00

Organic Structures from Spectra. S.