

Penrose (*Techniques of Differential Topology in Relativity*). The Hawking-Ellis book contains a few minor errors, but none affect the main results. Unfortunately there are no exercises; the book and the reader deserve a carefully thought out set.

On balance, the book is a model presentation of how elegant the interplay between mathematics and nature is. Fortunately, it will be widely studied and will exert a strong influence on research for quite some time to come.

R. K. SACHS
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Astrophysics

W. K. Rose
287 pp. Holt, Rinehart and
Winston, New York, 1973. \$14.00

The past decade has provided sharp advances in astrophysics, with the discovery of the 3K cosmic background radiation, the quasars and above all, pulsars (and therefore neutron stars). *Astrophysics* provides a compact and

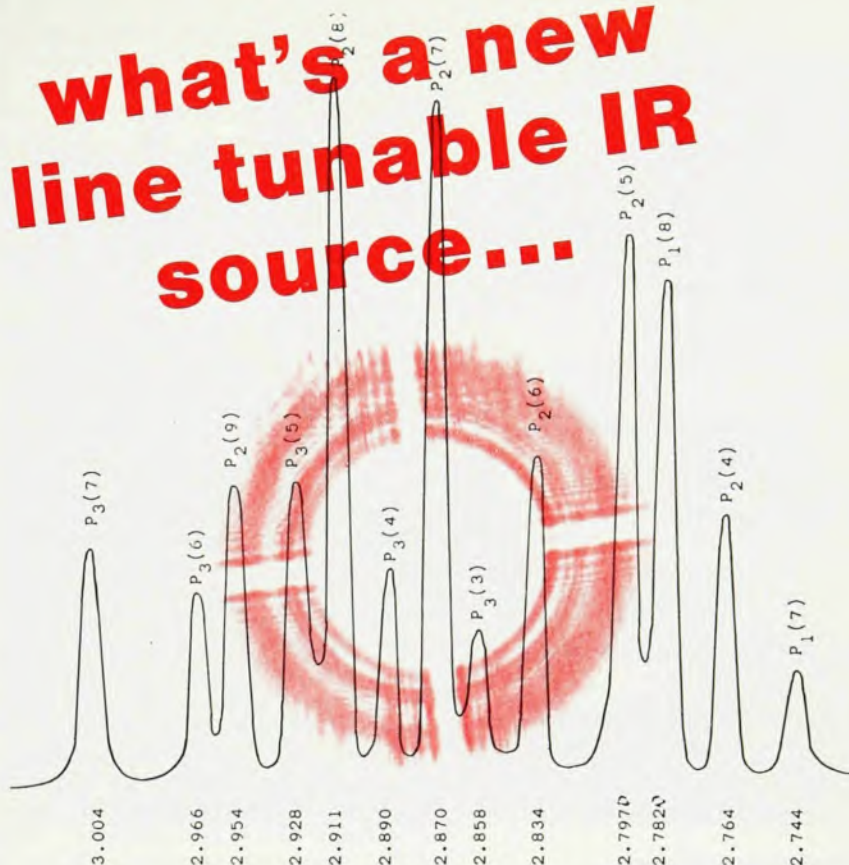
THE HALE OBSERVATORIES



well written guide to the physics underlying these and many other celestial phenomena. The book does not claim to be a text, and no problems or questions are provided. It is written at about the first-year graduate level, but I will probably use it as a text for my senior undergraduate course in astrophysics, just because of the lack of any really appropriate text at that level.

William K. Rose is a distinguished and able researcher into what is perhaps the most important area of astrophysics today, the evolutionary history of stellar interiors with particular reference to the end points of stellar evolution. Perhaps as a result, the chapters on stellar theory, red giants, white

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dwarfs, supernovae and neutron stars are particularly well executed. On the other hand Rose does not deal with the process of spectral-line formation in stellar atmospheres at all, and he discusses stellar atmospheres as a whole in only a few pages. This does not appear adequate for a book bearing this broad title, especially considering what a great fraction of our astrophysical information has been obtained through the study of stellar atmospheres and spectral lines.

I would be happier if the book were somewhat longer. The discussion in many places is too abrupt, and even given the existence of a short bibliography referring to each chapter, I would liked multiple references for specific points in the text. Also, a physicist without some background in astronomy will find the book a bit frustrating. For example, stellar-color indices are used in various places in the book, but the index does not tell where to look for a definition of stellar magnitude.

A number of slips (equations 12-23, 24, >, not <) and errors occur. The text says figure 2-8 is a stellar evolutionary path, but the caption says it is a color-magnitude diagram of a globular cluster. The reference in the text to figure 10-2 is also incorrect. Figure 12-1 incorrectly represents E0 and E4 galaxies, and Cepheids, not novae, as deciding the question of whether some nebulae are actually "island universes."

Chapters on galaxies, cosmology, novae, planetary nebulae, star formation, and matter and energy in space are all handled exceptionally well. In many sections, Rose shows a great ability to get to the physical heart of the matter, and describe it compactly and concisely. The book is a pleasure to read, and succeeds in partially filling a very important gap.

RICHARD C. HENRY

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Baltimore, Maryland*

Weak Interactions

E. D. Commins

378 pp. McGraw-Hill, New York,
1973. \$18.50

Not since the discovery of parity violation during the 1950's has the field of weak interactions generated such excitement as in the past four years. On the one hand, high-energy neutrino experiments at CERN and more recently at NAL on the inclusive reactions

$$\nu_\mu(\bar{\nu}_\mu) + N \rightarrow \mu^-(\mu^+) + \text{anything}$$

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