

tion and techniques over wavelengths from the radio through gamma rays and includes short sections on cosmic rays, neutrino observatories and gravitational wave detection. The emphasis is on ground-based radio and optical techniques. This portion of the book reads well and contains a large amount of information that every astronomy graduate student should have. The information is occasionally curiously out of date, however. For example, there are 14 pages devoted to photographic emulsions and phototubes and only 3 pages devoted to charge-coupled-device detectors, which have been, by an enormous margin, the most widely used detectors since the late 1980s.

The second third of the book covers the properties of stars, stellar structure and stellar evolution. These sections are the best in the book. The author is well versed in these areas and gives a clear, organized presentation. The level of the presentation is also at its highest through these sections.

The remainder of the book covers galaxies, the structure and inferred history of the Milky Way, the extragalactic distance scale, large-scale structure in the universe, and cosmology. The depth and quality of presentation vary considerably through these last sections. The basics of cosmology are explained well and the introduction to large-scale structure is fine, but many of the past decade's important advances in these fields are not included. The section on properties of galaxies is perhaps the weakest part of the book and contains a few glaring errors. For example, the presence of giant stars is ignored in the discussion of mass-to-light ratios in galaxies.

The strength of *Observational Astrophysics* is that it covers a lot of ground at a level that would make it useful as a reference book for many graduate students in astronomy and astrophysics. In particular, information on telescope optics and design, spectrographs and signal-to-noise considerations in photometry and interferometry is brought together in a few well-written chapters early in the book. They provide a good introduction to these topics for a student or any physical scientist, and they even provide a useful reference for a practicing astronomer requiring a quick refresher. The sections on observations of stars and stellar structure and evolution are clear presentations of these topics at a level that would be useful for a student learning astrophysics or for a physicist teaching lower-level astronomy classes and looking for more complete explanations of the physics.

However, the book has weaknesses as well. Several sections contain dated

material and material that varies considerably in level of quality. Extragalactic astronomy, for example, is superficially covered, and the sections covering it contain some errors. On balance, I would be reluctant to give *Observational Astrophysics* a strong recommendation as a textbook for a comprehensive course in astrophysics at any level.

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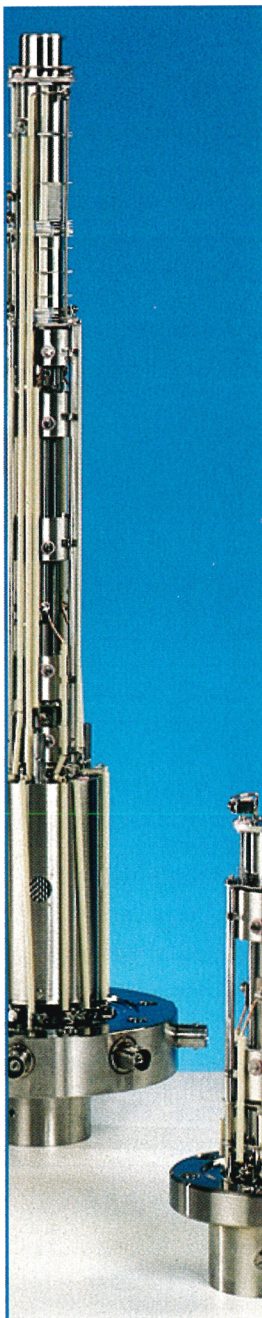
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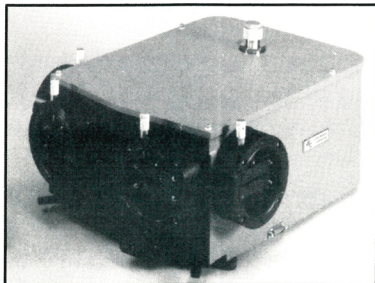
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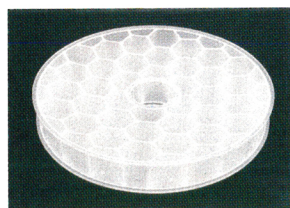
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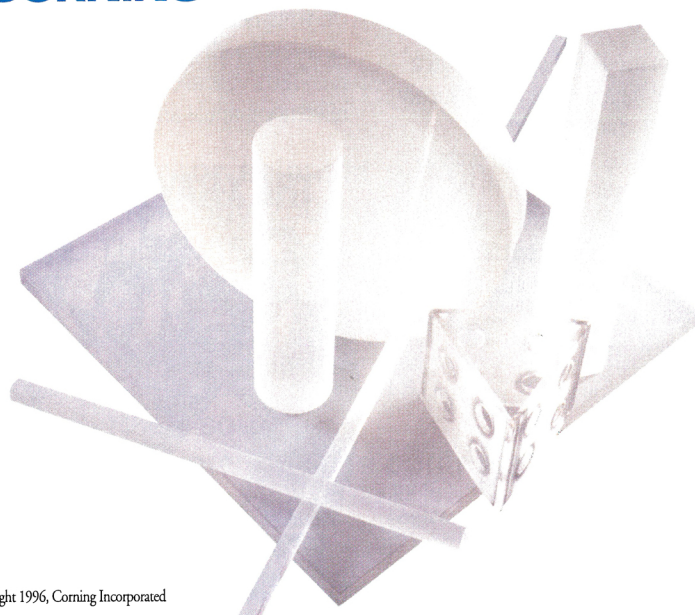
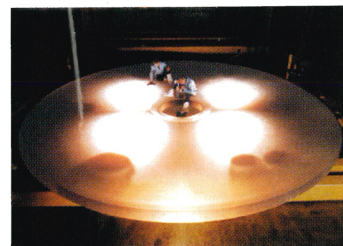


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