

BOOK REVIEW

Astronomical Observations - An Optical Perspective

Gordon Walker, 1987, 347 pages. ISBN 0 521 32587 0 hard cover \$79.50, ISBN 0 521 33907 3 paperback \$29.95, Cambridge University Press, New York.

Observational astronomy has undergone a dramatic transformation in the last half century. From an era when the eye and the photographic plate were the observer's primary tools, the modern era has produced a cornucopia of new detection methods, sensitivities, and wavelength options almost unimaginable 50 years ago.

Gordon Walker has produced a book of great utility since it reviews both the fundamental physical limitations of observational astronomy and provides a grand tour of all of the current methodologies and options for instrumentation that modern astronomers have at their disposal. This book is intended for the advanced undergraduate student and assumes a working knowledge of physics and optics. With an average of at least one graphic per page, many insights are provided that would have been otherwise obscured in a more text-oriented work. It would also make an excellent reference work for anyone involved in scientific instrumentation related to astronomy. One of the particular strengths of this work is that over 400 references to the astronomical literature are listed, making it an invaluable starting point for anyone needing guidance in a new area.

Walker first reviews the nature of the radiation from astronomical sources, the observational limits due to the physics of photons and waves, the conceptual differences between classes of detectors, and the variety of telescopes with their respective advantages and weaknesses. He tackles these topics over the entire wavelength range from radio to gamma rays.

Following chapters deal with the various observational methods now available, including interferometry, spectroscopy, dilute apertures, single-element detectors, and multi-element detector arrays both linear and two-dimensional. Within each chapter the entire spectral range is covered so that the reader is led through the diverse approaches needed in each wavelength region to accomplish the featured investigation.

As an example, in the multi-element detector chapter the following areas are explored: photographic emulsions and microdensitometers, image intensifiers, television-type detectors, solid-state arrays, and microchannel plates.

A few minor disagreements with the text include the calculation of exposure times for the Hubble Space Telescope using a five-pixel detection area whereas the undersampling of the cameras would almost certainly limit the active area to a single pixel, the assertion that refraction causes the stars to rise faster than the sidereal rate whereas the effect is actually completely symmetrical between rising and setting (slower rates in each case), and the apparently incorrect geometry proposed for a stationary point of the Moon relative to an orbiting spacecraft.

In these fast-moving times of advancements in astronomical techniques, a book like **Astronomical Observations - An Optical Perspective** brings order to the bewildering variety of telescopes, detectors, and wavelength regions available to the astronomer trying to answer a new scientific question. I would recommend this book to anyone who works with, or is curious about, modern astronomical instruments.

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