

# Astronomy A Handbook Springer

Binocular Astronomy  
 Practical Amateur Spectroscopy  
 Electronic Imaging in Astronomy  
 Asteroseismology  
 Astronomy: a Handbook  
 ASTRONOMY:A HANDBOOK RPT, ED ROTH  
 Encyclopedia of Astrobiology  
 Astronomical Image and Data Analysis  
 Cosmology and Particle Astrophysics  
 The New Cosmos  
 Handbook of Gravitational Wave Astronomy  
 Tourists in Space  
 Handbook of Practical Astronomy  
 An Introduction to Observational Astrophysics  
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 Observational Astrophysics  
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## EDWARD PONCE

**Binocular Astronomy** Springer Nature

Constituting the first holistic overview including practical remedies, this handbook provides the background needed by anyone grappling with the complex issue of outdoor lighting and its effects. It describes not only the problems that astronomers and other night sky observers face in reducing the problems of information loss due to light pollution, as well as the problems lighting technologists face in optimising outdoor lighting installations that cause little or no light pollution. The first part is directed to decision makers and managers of outdoor space and covers the areas of general interest, culminating in recommendations to reduce the impact of light pollution. The second part is directed primarily to scientists and engineers, as a support to the design and maintenance of outdoor lighting installations, with special reference to astronomical observations. Elaborating issues from the first part, these contributions include examples that refer to specific outdoor lighting projects and to more general policy and educational measures. Written for designers of lighting equipment and managers of astronomical observatories, but also aimed at the authorities and decision makers responsible for the organization and maintenance of the public space, it will serve a good purpose in graduate or postgraduate curricula for scientists, engineers, economists and law students. This handbook fills the gap that exists between astronomical textbooks, engineering texts and

popular brochures about light pollution.

**Practical Amateur Spectroscopy** Springer Science & Business Media

If you have ever wanted to understand the basic principles of astronomy and celestial movements, you should read this book. Using pictures of the sky observed from different places on Earth, as well as drawings of ancient astronomical methods and tools, Prof. Sun Kwok tells this story in an entertaining and fascinating way. Since the beginning of human civilization, people have wondered about the structure of the cosmos and our place in the Universe. More than 2,000 years ago, our ancestors knew that the seasons were unequal, the Earth was an unattached object floating in space, and stars existed that they could not see. From celestial observations, they concluded that the Earth was round. Using simple tools and mathematics, ancient astronomers accurately determined the sizes of the Earth and Moon, the distance to the Moon, and the lengths of the months and year. With a clever device called the armillary sphere, Greek astronomers could predict the times of sunrise and sunset on any day of the year, at any place on Earth. They developed sophisticated mathematical models to forecast Mars' motions hundreds of years into the future. Find out how ancient observers achieved these remarkable feats. With minimal use of mathematics, this book retraces the footsteps of our ancestors, explains their intellectual journeys in simple terms, and explores the philosophical implications of these discoveries.

**Electronic Imaging in Astronomy** Springer Science & Business Media

This state-of-the-art reference work includes over 15 sections dealing with all aspects of exoplanets and exobiology research, including historic

aspects, the Solar System as a template, objects at the planet-to-star transition, exoplanet detection and characterization with related instrumentation, technology and software tools, planet and planet-system statistics with recent and planned surveys, their atmosphere and formation and evolution processes, habitability and exobiology implications, and outlooks for future exploration and science development, including visionary contributions. Each section has 10-20 contributions written by the top experts in their subject, including both senior researchers as well as young, smart researchers who represent the future of the discipline. All in all, this handbook comprehensively tackles one of the most challenging and dynamic fields of modern astronomy and astrophysics.

**Asteroseismology** Springer Science & Business Media

Several decades have elapsed since the publication of any similar book in the German language. The lack of such a book has been felt keenly by all friends of astronomy. In our space age, astronomical knowledge arouses public interest more and more. Practical observation at the telescope depends more than anything else on such knowledge. The educational value of such a training is undisputed. On the other hand, the work of the amateur astronomer can also contribute essentially to the work of the professionals. It is from these points of view that this handbook aims to help with versatile advice. At the same time, the book intends to show the wide range of applied astronomy, as it presents itself to the friend of the stars; in mathematical-physical fields, in precision mechanics and optics, and last but not least in the area of social relations. Beyond the circle of amateur astronomers the book is addressed to lecturers, teachers, students and pupils. It wishes to serve them as a guide to "astronomical experiments", which we suggest should be performed in primary and secondary schools, specialist colleges, and extramural courses.

**Astronomy: a Handbook** Springer

The interdisciplinary field of Astrobiology constitutes a joint arena where provocative discoveries are coalescing concerning, e.g. the prevalence of exoplanets, the diversity and hardness of life, and its increasingly likely chances for its emergence. Biologists, astrophysicists, biochemists, geoscientists and space scientists share this exciting mission of revealing the origin and commonality of life in the Universe. The members of the different disciplines are used to their own terminology and technical language. In the interdisciplinary environment many terms either have redundant meanings or are completely unfamiliar to members of other disciplines. The Encyclopedia of Astrobiology serves as the key to a common understanding. Each new or experienced researcher and graduate student in adjacent fields of astrobiology will appreciate this reference work in the quest to understand the big picture. The carefully selected group of active researchers contributing to this work and the expert field editors intend for their contributions, from an internationally comprehensive perspective, to accelerate the interdisciplinary advance of astrobiology.

**ASTRONOMY: A HANDBOOK RPT. ED ROTH** Springer Science & Business Media

Small and large telescopes are being installed all around the world. Astronomers have thus acquired better access to more modern equipment; not in the least to photometers, which are very important tools for the contemporary observer. This development of higher quality and more sensitive equipment makes it very necessary to improve the accuracy of the measurements. This guide helps the astronomer and astronomy student to improve the quality of their photometric measurements and to extract a maximum of information from their observations. The book is based on the authors' observing experience, spending numerous nights behind various instruments at many different observatories.

**Encyclopedia of Astrobiology** Springer

Delineating the huge strides taken in cosmology in the past ten years, this much-anticipated second edition of Malcolm Longair's highly appreciated textbook has been extensively and thoroughly updated. It tells the story of modern astrophysical cosmology from the perspective of one of its most important and fundamental problems - how did the galaxies come about? Longair uses this approach to introduce the whole of what may be called "classical cosmology". What's more, he describes how the study of the origin of galaxies and larger-scale structures in the Universe has provided us with direct information about the physics of the very early Universe.

**Astronomical Image and Data Analysis** Springer Science & Business Media

Comprises a comprehensive reference source that unifies the entire fields of atomic molecular and optical (AMO) physics, assembling the principal ideas, techniques and results of the field. 92 chapters written by about 120 authors present the principal ideas, techniques and results of the field, together with a guide to the primary research literature (carefully edited to ensure a uniform coverage and style, with extensive cross-references). Along with a summary of key ideas, techniques, and results, many chapters offer diagrams of apparatus, graphs, and tables of data. From atomic spectroscopy to applications in comets, one finds contributions from over 100 authors, all leaders in their respective disciplines. Substantially updated and expanded since the original 1996 edition, it now contains several entirely new chapters covering current areas of great research interest that barely existed in 1996, such as Bose-Einstein condensation, quantum information, and cosmological variations of the fundamental constants. A fully-searchable CD-ROM version of the contents accompanies the handbook.

**Cosmology and Particle Astrophysics** Springer

The Springer Handbook of Spacetime is dedicated to the ground-breaking paradigm shifts embodied in the two relativity theories, and describes in detail the profound reshaping of physical sciences they ushered in. It includes in a single volume chapters on foundations, on the underlying mathematics, on physical and astrophysical implications, experimental evidence and cosmological predictions, as well as chapters on efforts to unify general relativity and quantum physics. The Handbook can be used as a desk reference by researchers in a wide variety of fields, not only by specialists in relativity but also by researchers in related areas that either grew out of, or are deeply influenced by, the two relativity theories: cosmology, astronomy and astrophysics, high energy physics, quantum field theory, mathematics, and philosophy of science. It should also serve as a valuable resource for graduate students and young researchers entering these areas, and for instructors who teach courses on these subjects. The Handbook is divided into six parts. Part A: Introduction to Spacetime Structure. Part B: Foundational Issues. Part C: Spacetime Structure and Mathematics. Part D: Confronting Relativity theories with observations. Part E: General relativity and the universe. Part F: Spacetime beyond Einstein.

**The New Cosmos** Springer

This second edition has been updated and substantially expanded. Starting with the description of our home galaxy, the Milky Way, this cogently written textbook introduces the reader to the astronomy of galaxies, their structure, active galactic nuclei, evolution and large scale distribution in the

Universe. After an extensive and thorough introduction to modern observational and theoretical cosmology, the focus turns to the formation of structures and astronomical objects in the early Universe. The basics of classical astronomy and stellar astrophysics needed for extragalactic astronomy are provided in the appendix. While this book has grown out of introductory university courses on astronomy and astrophysics and includes a set of problems and solutions, it will not only benefit undergraduate students and lecturers; thanks to the comprehensive coverage of the field, even graduate students and researchers specializing in related fields will appreciate it as a valuable reference work.

**Handbook of Gravitational Wave Astronomy** Springer Nature

This book contains everything an amateur astronomer needs to know to begin observing whilst going relatively deeply into the subject for those who are already involved. Covers a very wide range of available equipment, from simple DIY spectrometers to the most expensive commercially-made instruments. Describes basic principles so that the reader understands how to analyse the spectra he/she sees or records. Contributions by leading amateurs astronomers from the USA and Europe.

**Tourists in Space** Springer Science & Business Media

All three volumes sold as a combined set for a one-time purchase! This comprehensive three-volume set takes you on an incomparable journey of our closest celestial neighbor. Not since the golden age of 19th-century lunar guidebooks has one author managed to cover the Moon in such detail as this all-in-one handbook. Volume 1 begins with a section on the Moon's place in human history, mythology and lore, before gravitating closer to the Moon itself through scientific sections on the Earth-Moon system, lunar motions and cycles. Following these are technical chapters on how to purchase, use and care for lunar observing and photography equipment. Techniques for observing the Moon (both with the naked eye and optical instruments) are detailed as the reader approaches the Moon's surface on this visual tour-de-force. A close-up exploration of the Moon is the result. The "crater-hop" chapters in Volumes 1 and 2 discuss the physical aspects of the Moon's features, offering brief biographical information on the person for whom the feature is named, as well as how each individual was involved in the development of science and selenography from ancient to modern times. Volume 3 contains a plethora of useful appendices that cover a range of topics, from catalogues of lunar features such as nearside lunar domes to a comprehensive list of publishers and observing organizations. Luna Cognita goes far beyond any recent work in both breadth and depth of coverage on the Moon. Written in an accessible, engaging manner for readers of all backgrounds and levels of expertise, this handbook is thus an invaluable resource for anybody who looks up at the glowing sphere in the night sky and wants to learn more about the "Known Moon."

**Handbook of Practical Astronomy** Springer Science & Business Media

Forget Hawaii or the Mediterranean. Soon - very soon - you'll be able to add a much more exotic stamp to your passport: space. How will you get there, what will the trip be like and how much training will you need? All you need to know is right here in this guide. Tourists in Space: A Practical Guide supplies all the advice and information you need to make your spaceflight the most rewarding experience of your life. This definitive, real-world guide is packed with helpful facts and suggestions on everything from training, equipment, safety and in-flight procedures to techniques for avoiding space motion sickness and bone demineralization. You'll also find: • Advice on choosing your training agency • Techniques for minimizing the risk of space motion sickness • Information you need to prepare for your medical examination, training and flight • Tips on activities near your training location and much more.

**An Introduction to Observational Astrophysics** Springer Science & Business Media

For the last twenty years astronomy has been developing dramatically. Until the nineteen-fifties, telescopes, spectrometers, and photographic plates constituted a relatively simple set of tools which had been refined to a high degree of perfection by the joint efforts of physicists and astronomers. Indeed these tools helped at the birth of modern astrophysics: the discovery of the expansion of the Universe. Then came radioastronomy and the advent of electronics; the last thirty years have seen the application to astrophysics of a wealth of new experimental techniques, based on the most advanced fields of physics, and a constant interchange of ideas between physicists and astronomers. Last, but not least, modern computers have sharply reduced the burden of dealing with the information painfully extracted from the skies, whether from ever scarce photons, or from the gigantic data flows provided by satellites and large telescopes. The aim of this book is not to give an extensive overview of all the techniques currently in use in astronomy, nor to provide detailed instructions for preparing or carrying out an astronomical project. Its purpose is methodological: photons are still the main carriers of information between celestial sources and the observer. How we are to collect, sample, measure, and store this information is the unifying theme of the book. Rather than the diversity of techniques appropriate for each wavelength range, we emphasize the physical and mathematical bases which are common to all wavelength regimes.

**Compendium of Practical Astronomy** Springer

In order to analyze the light of cosmic objects, particularly at extremely great distances, spectroscopy is the workhorse of astronomy. In the era of very large telescopes, long-term investigations are mainly performed with small professional instruments. Today they can be done using self-designed spectrographs and highly efficient CCD cameras, without the need for large financial investments. This book explains the basic principles of spectroscopy, including the fundamental optical constraints and all mathematical aspects needed to understand the working principles in detail. It covers the complete theoretical and practical design of standard and Echelle spectrographs. Readers are guided through all necessary calculations, enabling them to engage in spectrograph design. The book also examines data acquisition with CCD cameras and fiber optics, as well as the constraints of specific data reduction and possible sources of error. In closing it briefly highlights some main aspects of the research on massive stars and spectropolarimetry as an extension of spectroscopy. The book offers a comprehensive introduction to spectroscopy for students of physics and astronomy, as well as a valuable resource for amateur astronomers interested in learning the principles of spectroscopy and spectrograph design.

**Fundamental Astronomy** Springer Science & Business Media

Observational Astrophysics follows the general outline of an astrophysics undergraduate curriculum targeting practical observing information to what will be covered at the university level. This includes the basics of optics and coordinate systems to the technical details of CCD imaging, photometry, spectrography and radio astronomy. General enough to be used by students at a variety of institutions and advanced enough to be far more useful than observing guides targeted at amateurs, the author provides a comprehensive and up-to-date treatment of observational astrophysics at

undergraduate level to be used with a university's teaching telescope. The practical approach takes the reader from basic first year techniques to those required for a final year project. Using this textbook as a resource, students can easily become conversant in the practical aspects of astrophysics in the field as opposed to the classroom.

**Extragalactic Astronomy and Cosmology** Springer Science & Business Media

This book contains everything an astronomer needs to know about binocular observing. The book takes an in-depth look at the instruments themselves. It has sections on evaluating and buying binoculars and binocular telescopes, their care, mounting, and accessories. In addition there is a selection of fifty fine objects to be seen with 50mm and 100mm binoculars. The advantages of using both eyes for astronomical observing are many and considerable, largely because of the way the human brain processes visual information. This book enables the astronomer to maximize those advantages.

**Springer Handbook of Spacetime** Springer Science & Business Media

The Compendium of Practical Astronomy is unique. The practical astronomer, whether student, novice or accomplished amateur, will find this handbook the most comprehensive, up-to-date and detailed single guide to the subject available. It is based on Roth's celebrated German language handbook for amateur astronomers, which first appeared over 40 years ago.

**Observational Astrophysics** Springer Science & Business Media

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This new edition of the classic textbook The New Cosmos presents a comprehensive introductory survey of the whole field of astronomy and astrophysics. Among the topics covered are: - Classical astronomy and the Solar System - Instruments and observational methods - The Sun and the stars - The Milky Way and other galaxies - Cosmology - The origin of the Solar System - The evolution of the Earth and of life The observational methods and results of astronomical research as well as their theoretical foundations and interrelations are presented in an understandable format. The rapid progress of observational techniques and of theoretical understanding in the past decade are introduced and summarized in this timely and readable volume. This revised and extended new printing demonstrates the rapid advances in astronomical research and observation in the three years since the appearance of the 5th edition. The most important new results can be found within, providing in particular up-to-date information on our solar system, neutrino radiation from the Sun, the farthest galaxies and quasars and the development of the Universe.

**Handbook of Exoplanets** Springer Science & Business Media

This book outlines the fundamentals of this fascinating branch of astronomy, and explores the forefront of astronomical research. The author's passion for the topic shines with an intensity that rivals the book's many colourful illustrations, and will deeply inspire the reader. The cogently written text introduces the reader to the astronomy of galaxies, their structure, their active galactic nuclei, their evolution and their large scale distribution. Starting with a detailed description of our Milky Way, and a review of modern observational and theoretical cosmology, the book goes on to examine the formation of structures and astronomical objects in the early universe.