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The Sun - Michael Stix 2012-12-06
A wealth of new experimental and theoretical results has been obtained in solar physics since the first edition of this textbook appeared in 1989. Thus all nine chapters have been thoroughly revised, and about 100 pages and many new illustrations have been added to the text. The additions include element diffusion in the solar interior, the recent neutrino experiments, methods of image restoration, observational devices used for spectroscopy and polarimetry, and new developments in helioseismology and numerical simulation. The book takes particular advantage of the results of several recent space missions, which lead to substantial progress in our understanding of the Sun, from the deep interior to the corona and solar wind.
Special and General Relativity - Norman K. Glendenning 2010-04-28
Special and General Relativity are concisely developed together with essential aspects of nuclear and particle physics. Problem sets are provided for many chapters, making the book ideal for a course on the physics of white dwarf and neutron star interiors. Norman K. Glendenning is Senior Scientist Emeritus at the Nuclear Science Division, Institute for Nuclear and Particle Astrophysics, Lawrence Berkeley National Laboratory at the University of California, Berkeley. He is the author of numerous books.
Galaxy Formation - Malcolm Longair 2007-12-12
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.
The Irish Astronomical Journal - 2000

The Solar System - Therese Encrenaz 2004-01-26
In this third corrected and revised edition students and lecturers in astronomy and planetary science as well as planet observers will find a mine of up-to-date information on the solar system and its interaction with the interplanetary medium, its various objects, comparative planetology, discussion of questions for further research and future space

exploration.

Planetary Systems - Marc Ollivier 2008-11-27

Over the past ten years, the discovery of extrasolar planets has opened a new field of astronomy, and this area of research is rapidly growing, from both the observational and theoretical point of view. The presence of many giant exoplanets in the close vicinity of their star shows that these newly discovered planetary systems are very different from the solar system. New theoretical models are being developed in order to understand their formation scenarios, and new observational methods are being implemented to increase the sensitivity of exoplanet detections. In the present book, the authors address the question of planetary systems from all aspects. Starting from the facts (the detection of more than 300 extraterrestrial planets), they first describe the various methods used for these discoveries and propose a synthetic analysis of their global properties. They then consider the observations of young stars and circumstellar disks and address the case of the solar system as a specific example, different from the newly discovered systems. Then the study of planetary systems and of exoplanets is presented from a more theoretical point of view. The book ends with an outlook to future astronomical projects, and a description of the search for life on exoplanets. This book addresses students and researchers who wish to better understand this newly expanding field of research.

Compact Objects in Astrophysics - Max Camenzind 2007-02-24

Modern comprehensive introduction and overview of the physics of White Dwarfs, Neutron Stars and Black Holes, including all relevant observations. Contains a basic introduction to General Relativity, including the modern 3+1 split of spacetime and of Einstein’s equations. The split is used for the first time to derive the structure equations for rapidly rotating neutron stars and Black Holes. Detailed discussions and derivations of current theoretical results. In particular also the most recent equations of state for neutron star matter are explained. Topics , such as colour superconductivity are discussed and used for modelling. A book for graduate students and researchers. Contains exercises and some solutions.

Physics, Formation and Evolution of Rotating Stars - Andre Maeder 2008-12-19

Rotation is ubiquitous at each step of stellar evolution, from star formation to the final stages, and it affects the course of evolution, the timescales and nucleosynthesis. Stellar rotation is also an essential prerequisite for the occurrence of Gamma-Ray Bursts. In this book the author thoroughly examines the basic mechanical and thermal effects of rotation, their influence on mass loss by stellar winds, the effects of differential rotation and its associated instabilities, the relation with magnetic fields and the evolution of the internal and surface rotation. Further, he discusses the numerous observational signatures of rotational effects obtained from spectroscopy and interferometric observations, as well as from chemical abundance determinations, helioseismology and asteroseismology, etc. On an introductory level, this book presents in a didactical way the basic concepts of stellar structure and evolution in "track 1" chapters. The other more specialized chapters form an advanced course on the graduate level and will further serve as a valuable reference work for professional astrophysicists.

The Early Universe - Gerhard Börner 2013-03-14

This fourth edition of Börner's "The Early Universe" is practically a new book, not just updated version. In particular, it is now organized so as to make it more useful as a textbook. And problem sections are also added. In the centre are the connections between particle physics and cosmology: The standard model, some basic implications of quantum field theory and the questions of structure formation. Special emphasis is given to the observed anisotropies of the cosmic microwave background and the consequences drawn for cosmology and for the structure formation models. Nuclear and particle physicists and astrophysicists, researchers and teachers as well as graduate students will welcome this new edition of a classic text and reference.

Tools of Radio Astronomy - T. L. Wilson 2012-12-06

Covering topics of radio astronomy, this book contains graduate-level problems with carefully

presented solutions. The problems are arranged following the content of the book "Tools of Radio Astronomy" by Rohlfs and Wilson (also available in this series) on a chapter-by-chapter basis. Some of these problems have been formulated to provide an extension to the material presented in "Tools of Radio Astronomy".

Eclipsing Binary Stars: Modeling and Analysis - Josef Kallrath 2009-08-14

Astronomers learn much of what they know about the mass, brightness, and size of stars by observing binary systems, in which two stars orbit each other, periodically cutting off the others light. This book provides astronomers with a guide to specifying an astrophysical model for a set of observations, selecting an algorithm to determine the parameters of the model, and estimating the errors of the parameters.

Tools of Radio Astronomy - Thomas Wilson 2008-12-19

Four signi?cant factors have led us to update this text. The ?rst is the breathtaking progress in technology, especially in receiver and digital techniques. The second is the advance of radio astronomy to shorter wavelengths, and the increased availab- ity of astronomical satellites. The third is a need to reorganize some of the chapters in order to separate the basic theory, that seldom changes, from practical aspects that change often. Finally, it is our desire to enhance the text by including problem sets for each chapter. In view of this ambitious plan, we have expanded the number of authors. In the reorganization of this edition, we have divided Chap. 4 of the 4th edition into two Chaps. 4 and 5. The ?rst remains Chap. 4, with a slightly different - tle, Signal Processing and Receivers: Theory. This was expanded to include digital processing and components including samplers and digitizers. In Chap. 5, Prac- cal Receiver Systems. we have relegated the presentations of maser and parametric ampli?er front ends, which are no longer commonly used as microwave receivers in radio astronomy, to a short section on “historical developments” and We have retained and improved the presentations of current state-of-the-art devices, cooled transistor and superconducting front ends. We have also included descriptions of local oscillators and phase lock loops. Chapters 5 and 6 in the 4th edition has now become Chap. 6, Fundamentals of Antenna Theory and Chap.

Asymptotic Giant Branch Stars - Harm J. Habing 2013-04-17

The underlying astrophysical mechanisms of the objects known as asymptotic giant branch stars - the structures that occur during the dramatic period prior to a star's death - is the main theme of this text. Over the past three decades, asymptotic giant branch stars have become a topic of their own, and the contributions to this volume all focus on these entities themselves, rather than their connections to other fields of astronomy. Among the many topics covered are new methods of high- quality infrared observation and the more detailed and realistic simulations made possible by increasingly fast computers. This collection should be useful to graduate students who work in the field, teachers who want to address the subject in their courses, and to astronomers from various backgrounds who are interested in the astrophysics of AGB stars.

Principles of Star Formation - Peter Bodenheimer 2011-07-10

Understanding star formation is one of the key fields in present-day astrophysics. This book treats a wide variety of the physical processes involved, as well as the main observational discoveries, with key points being discussed in detail. The current star formation in our galaxy is emphasized, because the most detailed observations are available for this case. The book presents a comparison of the various scenarios for star formation, discusses the basic physics underlying each one, and follows in detail the history of a star from its initial state in the interstellar gas to its becoming a condensed object in equilibrium. Both theoretical and observational evidence to support the validity of the general evolutionary path are presented, and methods for comparing the two are emphasized. The author is a recognized expert in calculations of the evolution of protostars, the structure and evolution of disks, and stellar evolution in general. This book will be of value to graduate students in astronomy and astrophysics as well as to active researchers in the field.

The Sun from Space - Kenneth R. Lang 2013-04-18

A comprehensive account of solar astrophysics

and how our perception and knowledge of this star have gradually changed as mankind has elucidated ever more of its mysteries. The emphasis here is on the last decade, which has seen three successful solar spacecraft missions: SOHO, Ulysses and Yohkoh. Together, these have confirmed many aspects of the solar standard model and provided new clues to the numerous open questions that remain. The author, a leading researcher in the field, writes in a clear and concise style. Known also for his famous books "Astrophysical Formulae", "Sun, Earth and Sky" and the prize-winning "Wanderers in Space", he has succeeded once again in addressing a complex scientific topic in a very approachable way.

Mitteilungen der Astronomischen Gesellschaft - Astronomische Gesellschaft (Germany) 2001

Tools of Radio Astronomy - Thomas Wilson 2005-06-24

Covering topics of radio astronomy, this book contains graduate-level problems with carefully presented solutions. The problems are arranged following the content of the book "Tools of Radio Astronomy" by Rohlfs and Wilson (also available in this series) on a chapter-by-chapter basis. Some of these problems have been formulated to provide an extension to the material presented in "Tools of Radio Astronomy".

General Relativity, Astrophysics, and Cosmology - A.K. Raychaudhuri 2003-11-14

For about half a century the general theory of relativity attracted little attention from physicists. However, the discovery of compact objects such as quasars and pulsars, as well as candidates for black holes on the one hand, and the microwave background radiation on the other hand completely changed the picture. In addition, developments in elementary particle physics, such as predictions of the behavior of matter at the ultrahigh energies that might have prevailed in the early stages of the big bang, have greatly en hanced the interest in general relativity. These developments created a large body of readers interested in general relativity, and its applications in astrophysics and cosmology. Having neither the time nor the inclination to delve deeply into the technical literature, such readers need a general introduction to the subject before exploring applica tions. It is for these readers that the present volume is intended. Keeping in mind the broad range of interests and wanting to avoid mathematical compli cations as much as possible, we have ventured to combine all three topics relativity, astrophysics, and cosmology-in a single volume. Naturally, we had to make a careful selection of topics to be discussed in order to keep the book to a manageable length.

Medical Imaging: Concepts, Methodologies, Tools, and Applications - Management Association, Information Resources 2016-07-18

Medical imaging has transformed the ways in which various conditions, injuries, and diseases are identified, monitored, and treated. As various types of digital visual representations continue to advance and improve, new opportunities for their use in medical practice will likewise evolve. Medical Imaging: Concepts, Methodologies, Tools, and Applications presents a compendium of research on digital imaging technologies in a variety of healthcare settings. This multi-volume work contains practical examples of implementation, emerging trends, case studies, and technological innovations essential for using imaging technologies for making medical decisions. This comprehensive publication is an essential resource for medical practitioners, digital imaging technologists, researchers, and medical students.

Astrophysics - Wolfgang Kundt 2004-11-22

Devised for a quantitative understanding of the physics of the universe from the solar system through the milky way to clusters of galaxies all the way to cosmology, this acclaimed text offers among the most concise and most critical ones of extant works. Special chapters are devoted to magnetic and radiation processes, disks, black-hole candidacy, bipolar flows, cosmic rays, gamma-ray bursts, image distortions, and special sources. At the same time, planet earth is viewed as the arena for life, with plants and animals having evolved to homo sapiens during cosmic time. This text is unique in covering the basic qualitative and quantitative tools, formulae as well as numbers, needed to for the precise interpretation of frontline phenomena.

Magneto-Fluid Dynamics - Paul Lorrain 2007-10-31

This book provides an understanding of the

physics at work in sunspots and solar coronal loops, and offers a new approach to Magneto-Fluid-Dynamics (or Magneto-Hydro-Dynamics).The book stresses the use of electric currents in Magneto-Fluid-Dynamics. As a rule, authors discuss magnetic field lines without referring to the required electric currents. It also stresses the importance of electric space charges inside conductors that move in magnetic fields.

Principles of Stellar Interferometry - Andreas Glindemann 2011-01-04

The imaging process in stellar interferometers is explained starting from first principles on wave propagation and diffraction. Wave propagation through turbulence is described in detail using Kolmogorov statistics. The impact of turbulence on the imaging process is discussed both for single telescopes and for interferometers. Correction methods (adaptive optics and fringe tracking) are presented including wavefront sensing/fringe sensing methods and closed loop operation. Instrumental techniques like beam combination and visibility measurements (modulus and phase) as well as Nulling and heterodyne interferometry are described. The book closes with examples of observing programmes linking the theory with individual astrophysical programmes.

Radio Astronomy - Thomas Lauterbach 2022-09-06

Radio technology enables the extension of astronomical observations beyond light to other frequency ranges. This has led to the discovery of numerous cosmic radio sources, the physical causes of which are explained as well as how a radio telescope works. Even small radio telescopes can observe radiation from the Sun and other radio sources, as well as the 21-cm radiation from the Milky Way. Through interferometry, much higher resolution can be achieved than with individual radio telescopes. As a result, radio astronomical research can contribute to many current questions in astronomy, cosmology, and physics. This Springer essential is a translation of the original German 1st edition essentials, Radioastronomie by Thomas Lauterbach, published by Springer Fachmedien Wiesbaden GmbH, part of Springer Nature in 2020. The translation was done with the help of artificial intelligence (machine translation by the service DeepL.com). A subsequent human revision was done primarily in terms of content, so that the book will read stylistically differently from a conventional translation. Springer Nature works continuously to further the development of tools for the production of books and on the related technologies to support the authors.

High-Redshift Galaxies - Immo Appenzeller 2009-06-17

The high-redshift galaxies became a distinct research ?eld during the ?nal decade of the20thcentury. AtthattimetheLyman-breaktechniquemadeitpossibletoidentify signi?cant samples of such objects, and the new generation of 8 to 10-m telescopes resulted in ?rst good spectroscopic data. Today the high-redshift galaxies have developed into one of the important topics of astrophysics, accounting for about 5–10% of the publications in the major scienti?c journals devoted to astronomy. Because high-redshift galaxies is a rapidly developing ?eld and since new results are published constantly, writing a book on this topic is challenging. On the other hand, in view of the large amount of individual results now in the literature, and in view of the still growing interest in this topic, it appears worthwhile to summarize and evaluate the available data and to provide an introduction for those who wish to enter this ?eld, or who, for various reasons, might be interested in its results. The end of the ?rst decade of the 21st century appears to be a good point in time to attempt such a summary. The current generation of ground-based 8 to 10-m - optical telescopes, the Hubble Space Telescope, and the most important large radio telescopes have by now been in operation since about one or two decades. Although these instruments will continue to produce important scienti?c results for some time to come, many of the initial programs exploiting their unique new possibilities have been completed.

Sterne und Weltraum - 2000

Astrometry of Fundamental Catalogues - Hans G. Walter 2000-07-26

Celestial fundamental catalogues are a prerequisite for the determination of absolute positions and motions in space. Presently, positional astrometry is at the watershed

between classical fundamental catalogues, based on moving reference stars, and modern catalogues, based on extragalactic reference objects with non-measurable motion. This book addresses the concepts and methods of the respective construction techniques leading to the stellar frame of the FK5 (fifth fundamental catalogue) and to the newly adopted extragalactic radio reference frame, ICRF (international celestial reference frame), with its extension to optical wavelengths by the Hipparcos Catalogue. While principal outlines of meridian circle observations are given, emphasis is put in some detail on the VLBI technique as applied to astrometry, and to the observational techniques used in the Hipparcos mission, including the tie of the originally non-anchored rigid Hipparcos sphere into the ICRF.

Stellar Physics - G.S. Bisnovatyi-Kogan 2001-01-26

Stellar Physics is a rather unique book among the growing literature on star formation and evolution. Not only does the author, a leading expert in the field, give a very thorough description of the current knowledge about stellar physics but he handles with equal care the many problems that this field of research still faces. A bibliography with well over 650 entries makes this book an unparalleled source of references. Fundamental Concepts and Stellar Equilibrium is the first of two volumes, and can be read, as can the second volume, as an independent work. It provides an extensive introduction into all physical processes that play a role in star formation and evolution. The basic equations describing stellar equilibrium are discussed, where attention is paid to both the theoretical and the numerical aspects.

Relativistic Astrophysics and Cosmology - Peter Hoyng 2007-01-10

Relativistic Astrophysics and Cosmology offers a succinct and self-contained treatment of general relativity and its application to compact objects, gravitational waves and cosmology. The required mathematical concepts are introduced informally, following geometrical intuition as much as possible. The approach is theoretical, but there is ample discussion of observational aspects and of instrumental issues where appropriate. The book includes such topical issues as the Gravity Probe B mission, interferometer detectors of gravitational waves, and the physics behind the angular power spectrum of the cosmic microwave background (CMB). Written for advanced undergraduates and beginning graduate students in (astro)physics, it is ideally suited for a lecture course and contains 140 exercises with extensive hints. The reader is assumed to be familiar with linear algebra and analysis, ordinary differential equations, special relativity, and basic thermal physics.

Modern Astrometry - Jean Kovalevsky 2013-03-09

An introduction to practical astrometry, dealing with the determination of positions, motions, distances and dimensions of celestial bodies ranging from quasars to artificial satellites. For this 2nd edition, the release of the Hipparcos and Tycho catalogs, the rise in CCD astrometry and the adoption of a new celestial reference frame by the IAU led to a significant modification of the text. And, especially, the outlook for astrometry has been completely rewritten.

Astrophysical Formulae - Kenneth R. Lang 2013-12-21

This is a definitive reference of 2,100 fundamental formulae used in astronomy and astrophysics. It not only makes accessible all the indispensable equations employed in the field, but also carefully explains the physical assumptions and constants underlying them. The bibliography contains more than 1,900 citations of original papers. Accounting for nearly 20 years since the previous edition, this volume is significantly revised and expanded.

Tools of Radio Astronomy - Problems and Solutions - T.L. Wilson 2018-07-12

Covering topics of radio astronomy, this book contains graduate-level problems with carefully presented solutions. The problems are arranged following the content of the book "Tools of Radio Astronomy" by Rohlfs and Wilson (also available in this series) on a chapter-by-chapter basis. Some of these problems have been formulated to provide an extension to the material presented in "Tools of Radio Astronomy".

The Observatory - 2003

"A review of astronomy" (varies).

Methods of Celestial Mechanics - Gerhard Beutler 2006-03-30

G. Beutler's Methods of Celestial Mechanics is a coherent textbook for students as well as an excellent reference for practitioners. The first volume gives a thorough treatment of celestial mechanics and presents all the necessary mathematical details that a professional would need. The reader will appreciate the well-written chapters on numerical solution techniques for ordinary differential equations, as well as that on orbit determination. In the second volume applications to the rotation of earth and moon, to artificial earth satellites and to the planetary system are presented. The author addresses all aspects that are of importance in high-tech applications, such as the detailed gravitational fields of all planets and the earth, the oblateness of the earth, the radiation pressure and the atmospheric drag. The concluding part of this monumental treatise explains and details state-of-the-art professional and thoroughly-tested software for celestial mechanics.

Astrophysical Formulae - Kenneth Lang 2006-02-22

This classic reference for the fundamental formulae of physics and astrophysics has become part of nearly every astronomers and astrophysicists library. "A magnificent compendium" - OPTICA ACTA (ON THE FIRST EDITION)

Astroparticle Physics - Claus Grupen 2020-01-27

Describes the branch of astronomy in which processes in the universe are investigated with experimental methods employed in particle-physics experiments. After a historical introduction the basics of elementary particles, Explains particle interactions and the relevant detection techniques, while modern aspects of astroparticle physics are described in a chapter on cosmology. Provides an orientation in the field of astroparticle physics that many beginners might seek and appreciate because the underlying physics fundamentals are presented with little mathematics, and the results are illustrated by many diagrams. Readers have a chance to enter this field of astronomy with a book that closes the gap between expert and popular level.

Solar-Type Activity in Main-Sequence Stars - Roald E. Gershberg 2006-01-31

The first comprehensive monograph on this active and productive field of research investigates solar-type activity amongst the large spectrum of low- and middle-mass main sequence stars, and presents the subject in a systematic and comprehensive fashion.

Stellar Interiors - Carl J. Hansen 2004-02-26

The?rsteditionofthistextappearedin1994.Shortlyafterthethirdprinting, our editor suggested that we attempt a second edition because new develmentsinstellarstructureandevolutionhadmadeouroriginalworkoutdated. We (the original authors, CJH and SDK) reluctantly agreed but with resvations due to the e?ort involved. Our initial reluctance disappeared when we were able to convince (cajole, twist the arm of, etc.) our new coauth- colleague Virginia Trimble to join us. (Welcome Virginia!) We (i.e., all three of us) hope that you agree that the present edition is a great improvement compared to the 1994 e?ort. Our objectives in this edition are the same ones we set forth in 1994: Whatyouwill?ndisatextdesignedforourtargetaudience:thety- cal senior undergraduate or beginning graduate student in astronomy or astrophysics who wishes an overview of stellar structure and e- lution with just enough detail to understand the general picture. She or he can go on from there to more specialized texts or directly to the research literature depending on talent and interests. To this end, this text presents the basic physical principles without chasing all the (interesting!) details. For those of you familiar with the ?rst edition, you will ?nd that some things have not been changed substantially (F = ma is still F = ma), while othersde?nitelyhave.Forexample,Chapter2hasbeencompletelyrewritten.

Remote Instrumentation Services on the e-Infrastructure - Franco Davoli 2010-11-19

The book focuses on all aspects related to the effective exploitation of remote instrumentation and to the building of complex virtual laboratories on top of real devices and infrastructures. These include service oriented architecture (SOA) and related middleware, high-speed networking in support of Grid applications, wireless Grids for acquisition devices and sensor networks, Quality Service (QoS) provisioning for real-time control, measurement instrumentation and methodology, as well as metrology issues in distributed systems.

The Universe in X-Rays - Joachim E. Trümper 2008-02-05
With contributions from leading scientists in the field, and edited by two of the most prominent astronomers of our time, this is a totally authoritative volume on X-ray astronomy that will be essential reading for everyone interested – from students to astrophysicists and physicists. All the aspects of this exciting area of study are covered, from astronomical instrumentation to extragalactic X-ray astronomy.
Astrophysics of the Diffuse Universe - Michael A. Dopita 2013-06-29
The reference work on astrophysics to provide a comprehensive introduction to the physics of Interstellar Matter. The objective of the book is to show how physics can be applied to the understanding and diagnosis of the phase structure, the physical conditions and the chemical make-up and evolution of the interstellar medium. Unlike other textbooks in the field, here a more systematic approach has been adopted based on the authors' lecture course experience. It is aimed primarily at those undertaking post-graduate courses, or those doing advanced projects as part of honours undergraduate courses in physics or astrophysics.