Astrophysics Of Gaseous Nebulae And Active Galactic Nuclei

Written by a leading expert, this monograph presents recent developments on supernova remnants, with the inclusion of results from various satellites and ground-based instruments. The book details the physics and evolution of supernova remnants, as well as provides an up-to-date account of recent multiwavelength results. Supernova remnants provide vital clues about the actual supernova explosions from X-ray spectroscopy of the supernova material, or from the imprints the progenitors had on the ambient medium supernova remnants are interacting with - all of which the author discusses in great detail. The way in which supernova remnants are classified, is reviewed and explained early on. A chapter is devoted to the related topic of pulsar wind nebulae, and neutron stars associated with supernova remnants. The book also includes an extended part on radiative processes, collisionless shock physics and cosmic-ray acceleration, making this book applicable to a wide variety of astronomical sub-disciplines. With its coverage of fundamental physics and careful review of the state of the field, the book serves as both textbook for advanced students and as reference for researchers in the field.

Planetary nebulae are the classic subject of astrophysics. The physical pro cesses occurring in this highly ionized gaseous medium, the formation of emis sion lines in clearly specified conditions, the continuous emission extending from the far ultraviolet up to infrared and radio frequencies, the generation of exotic forms of radiation predicted by atomic physics, along with methods for deciphering the observed spectra and detecting physical and kinematic parameters of the radiating medium, etc. - all these problems form the solid foundations

of the physical theory of gaseous nebulae. They are an essential part of the arsenal of powerful tools and concepts without which one cannot imagine understanding and interpreting the enormous diversity of processes taking place in the Universe - in gaseous envelopes surrounding the stars of various classes, from cool dwarfs and flare stars up to hot supergiants, as well as in stellar chromospheres and coronae, in atmospheres of unstable and anomalous stars, in circumstellar clouds and gaseous shells born in nova and supernova explosions, in diffuse nebulae and the interstellar medium, in interacting binary systems, in galaxies with emission lines, in quasars, etc. The last thirty years have seen a turning-point in our knowledge concern ing the very nature of planetary nebulae (PNs). The radio emission of PNs was discovered after it was predicted theoretically. On the other hand, the powerful infrared emission discovered both in the continuum and in emission lines was never expected.

Proceedings of the 1996 INAOE Summer School of Millimeter-Wave Astronomy held at INAOE, Tonantzintla, Puebla, México, 15-31 July 1996

The field of extreme ultraviolet astronomy will see two major satellite observatories to be launched in 1991, one by ESA (ROSAT mission), one by NASA (EUVE mission). These Proceedings discuss the potential for EUV Astronomy, results from recent missions, approved and possible future missions and new developments in EUV technology.

Spectroscopy enables the precise study of astronomical objects and phenomena. Bridging the gap between physics and astronomy, this is the first integrated graduate-level textbook on atomic astrophysics. It covers the basics of atomic physics and astrophysics, including state-of-the-art research applications, methods and tools. The content is evenly balanced between the physical foundations of spectroscopy and their applications to astronomical objects

and cosmology. An undergraduate knowledge of physics is assumed, and relevant basic material is summarized at the beginning of each chapter. The material is completely self-contained and features sufficient background information for self-study. Advanced users will find it handy for spectroscopic studies. A website hosted by the authors contains updates, corrections, exercises and solutions, as well as news items from physics and astronomy related to spectroscopy. A link to this can be found at www.cambridge.org/9780521825368.

Many important observational clues about our understanding of how stars and planets form in the interior of molecular clouds have been amassed using recent technological developments. ESO's Very Large Telescope promises to be a major step forward in the investigation of stellar nurseries and infant stars. This volume collects papers from the leaders in this very timely field of astrophysical research. It presents theoretical and a host of observational results and many papers show the plans for future observations.

Announcements for the following year included in some vols.

Astrophysics of GaseousNebulae and Active GalacticNuclei, second edition, is a graduate-level text and reference book on gaseous nebulae, nova and supernova remnants. It will bevaluable to anyone seriously interested in astrophysics.

This yearbook presents information on the dates, people, events, and world affairs of 2007. The section entitled "Britannica World Data," updated annually, presents geographic, demographic, and economic details.

A comprehensive introduction to the theory underpinning our study of active galactic nuclei and the ways we observe them.

This is a comprehensive and richly illustrated textbook on the astrophysics of the interstellar and intergalactic medium--the gas and dust, as well as the electromagnetic radiation, cosmic rays, and magnetic and gravitational fields, present between the stars in a galaxy and also between galaxies

themselves. Topics include radiative processes across the electromagnetic spectrum; radiative transfer; ionization; heating and cooling; astrochemistry; interstellar dust; fluid dynamics, including ionization fronts and shock waves; cosmic rays; distribution and evolution of the interstellar medium; and star formation. While it is assumed that the reader has a background in undergraduate-level physics, including some prior exposure to atomic and molecular physics, statistical mechanics, and electromagnetism, the first six chapters of the book include a review of the basic physics that is used in later chapters. This graduate-level textbook includes references for further reading, and serves as an invaluable resource for working astrophysicists. Essential textbook on the physics of the interstellar and intergalactic medium Based on a course taught by the author for more than twenty years at Princeton University Covers radiative processes, fluid dynamics, cosmic rays, astrochemistry, interstellar dust, and more Discusses the physical state and distribution of the ionized, atomic, and molecular phases of the interstellar medium Reviews diagnostics using emission and absorption lines Features color illustrations and detailed reference materials in appendices Instructor's manual with problems and solutions (available only to teachers)

Some 400 years after the first known patent application for a telescope by Hans Lipperhey, The Astronomy Revolution: 400 Years of Exploring the Cosmos surveys the effects of this instrument and explores the questions that have arisen out of scientific research in astronomy and cosmology. Inspired by the international New Vision 400 conference held

This first course in fluid dynamics covers the basics and introduces a wealth of astronomical applications.

to the Second Edition The development of astronomy in the last ten years has been nothing short of explosive. This second edition of The New Cosmos, considerably revised and

enlarged, tries to share this development with its readers. Let us mention a few key words: from mo on landings, planetary probes, aild continental drift through pulsars, X-ray and y-ray sources, interstellar molecules, quasars, and the structure and evolution of stars and stellar systems right up to cosmological models. As before, the most important task of this book is to give a not too difficult introduction to present-day astronomy and astrophysics, both to the student of astronomy and to the specialist from a neighboring discipline. We therefore draw to the attention of the reader, as an essential part of our description, the numerous illustrations-many of them new-and their detailed captions. As far as possible we link a description of important observations with basic features of the theory. On the other hand, when it comes to detail we often content ourselves with abrief description, leaving the detailed explanation to the specialist literature. The transition to the specialist literature should be eased by the Bibliography at the end of the book. Important new investigations are noted in the text by their year, not so much for historical reasons as to enable the original work to be found in the Astronomy and Astrophysics Abstracts (1969 on).

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.

An advanced textbook on AFD introducing astrophysics students to the necessary fluid dynamics, first published in 2007.

Describing interstellar matter in our galaxy in all of its various forms, this book also considers the physical and chemical processes that are occurring within this matter. The first seven chapters present the various components making up the interstellar matter and detail the ways that we are able to study them. The following seven chapters are devoted to the physical, chemical and dynamical processes that control the behaviour of interstellar matter. These include the instabilities and cloud collapse processes that lead to the formation of stars. The last chapter summarizes the transformations that can occur between the different phases of the interstellar medium. Emphasizing methods over results, The Interstellar Medium is written for graduate students, for young astronomers, and also for any researchers who have developed an interest in the interstellar medium.

This book shows that astronomical discovery is a complex and ongoing process comprising various stages of research, interpretation and understanding.

Written by leading experts in the field, Stellar Spectral Classification is the only book to comprehensively discuss both the foundations and most up-to-date techniques of MK and other spectral classification systems. Definitive and encyclopedic, the book introduces the astrophysics of spectroscopy, reviews the entire field of stellar astronomy, and shows how the well-tested methods of spectral classification are a powerful discovery tool for graduate students and researchers working in astronomy and astrophysics. The book begins with a historical survey, followed by chapters discussing the entire range of stellar phenomena, from brown dwarfs to supernovae. The authors account for advances in the field, including the addition of the L and T dwarf classes; the revision of the carbon star, Wolf-Rayet, and white dwarf classification schemes; and the application of neural nets to spectral classification. Copious figures illustrate the morphology of stellar spectra, and the book incorporates recent discoveries from earth-based and satellite data. Many examples of spectra are given in the red, ultraviolet, and infrared regions, as well as in the traditional blue-violet optical region, all of which are useful for researchers identifying stellar and galactic spectra. This essential reference includes a glossary, handy appendixes and tables, an index, and a Web-based resource of spectra. In addition to the authors, the contributors are Adam J.

Burgasser, Margaret M. Hanson, J. Davy Kirkpatrick, and Nolan R. Walborn.

A few years after the publication of The Physics of Star Formation and Early Stellar Evolution, we received a request from the publisher for an up dated second edition of this popular reference book. As originally intended, the volume had proved to be a useful "text" book for graduate astronomy courses and seminars which dealt with topics related to stellar origins. The book was based on a series of lectures delivered by a distinguished group of leading researchers at a NATO Advanced Study Institute (ASI) held in May 1990 on the island of Crete, Greece. The primary goal of the ASI was in fact to produce a book which "would simultaneously provide a broad and systematic overview of, as well as a rigorous introduction to, the fun damental physics and astronomy at the heart of modern research in star formation and early stellar evolution. " However, by 1995 concern had arisen among those who used the text as a reference for graduate seminars and courses that the book would need to be updated to stay abreast of the discoveries and progress in this rapidly evolving field. After some discussion we concluded that a new edition of the book was warranted and that the goal of producing a new edition would be best accomplished by organizing a second ASI in Crete to review the progress in star formation research.

This written account of the Symposium on Planetary Nebulae was prepared from manuscripts submitted by the participants. Nearly every paper that was presented at the meeting is reproduced here, in either complete or abbreviated form. The dis cussions have been somewhat shortened and rearranged, but we have tried to preserve the essential points and the general tenor of the exchanges. Participants who spoke in the discussion were asked immediately for written remarks, which were then edited, reproduced, and circulated at the meeting by the highly effective local Secretariat organized by Dr Perek. In addition, notes of the discussion taken by Mrs Edith F. Swan and by the undersigned were used. We wish to thank all the authors for their unusually good cooperation. We are especially grateful to Dr Minkowski, who kindly provided many excellent repro ductions of Mount Wilson and Palomar photographs, mostly taken by himself, of various planetary nebulae. We are particularly indebted to Mrs Swan, who attended the Symposium, made notes on the papers and discussions as they occurred, and did much of the checking and editing of the manuscripts. In addition, we are very grateful to Mrs Evelyn Seaver, who also did much of the checking, editing, and retyping of manuscripts, and to Dr B.L. Webster, Miss Rebecca Todd, Mr Joseph Tapscott, and Mr Dennis Schatz, who provided excellent assistance in the preparation

of this volume.

Gaseous nebulae offer outstanding opportunities to atomic physicists, spectroscopists, plasma experts, and to observers and theoreticians alike for the study of attenuated ionized gases. These nebulae are often dusty, heated by radiation fields and by shocks. They are short-lived phenomena on the scale of a stellar lifetime, but their chemical compositions and internal kinematics may give important clues to advanced stages of stellar evolution. The material herein presented is based on lectures given at the University of Michigan, University of Queensland, University of California, Los Angeles, and in more abbreviated form at the Raman Institute, at the Scuola Internazionale di Trieste, and elsewhere. Much of it is derived origionally from the series "Physical Processes in Gaseous Nebulae" initiated at the Harvard College Observatory in the late 1930s. I have tried to emphasize the basic physics of the mechanisms involved and mention some of the uncertainties that underlie calculations of many basic parameters. Emphasis is placed on ionized plasmas with electron temperatures typically in the neighborhood of 10,OOOoK. Dust and other ingredients of the cold component of the interstellar medium are treated briefly from the point of view of their relation to hot plasmas of H II regions and planetaries. Chemical composition determinations for nebulae are

discussed in some detail while the last section deals with interpretations of elemental abundances in the framework of stellar evolution and nucleogenesis. Gaseous nebulae offer some particularly engaging opportunities for studies of stellar evolution.

This new and expanded edition of Astrophysics of Galactic Nuclei, published by W.H.Freeman in 1974, has 3 completely new chapters - one considers nova and supernova remnants, the others discuss active galactic nuclei. The first 9 chapters, based on the earlier book, have been heavily revised and updated.

This book provides a comprehensive, self-contained introduction to one of the most exciting frontiers in astrophysics today: the quest to understand how the oldest and most distant galaxies in our universe first formed. Until now, most research on this question has been theoretical, but the next few years will bring about a new generation of large telescopes that promise to supply a flood of data about the infant universe during its first billion years after the big bang. This book bridges the gap between theory and observation. It is an invaluable reference for students and researchers on early galaxies. The First Galaxies in the Universe starts from basic physical principles before moving on to more advanced material. Topics include the gravitational growth of structure, the intergalactic medium, the formation and evolution of the first stars and black holes, feedback and galaxy evolution, reionization,

21-cm cosmology, and more. Provides a comprehensive introduction to this exciting frontier in astrophysics Begins from first principles Covers advanced topics such as the first stars and 21-cm cosmology Prepares students for research using the next generation of large telescopes Discusses many open questions to be explored in the coming decade

The first comprehensive graduate-level textbook on one of the most dynamic areas of contemporary astronomy - the study of 'active galactic nuclei'.

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