The First Exoplanet

Exoplanet Atmospheres - Sara Seager 2010-08-02 Over the past twenty years, astronomers have identified hundreds of extrasolar planets—planets orbiting stars other than the sun. Recent research in this burgeoning field has made it possible to observe and measure the atmospheres of these exoplanets. This is the first textbook to describe the basic physical processes—including radiative transfer, molecular absorption, and chemical processes—common to all planetary atmospheres, as well as the transit, eclipse, and thermal phase variation observations that are unique to exoplanets. In each chapter, Sara Seager offers a conceptual introduction, examples that combine the relevant physics equations with real data, and exercises. Topics range from foundational knowledge, such as the origin of atmospheric composition and planetary spectra, to more advanced concepts, such as solutions to the radiative transfer equation, polarization, and molecular and condensate opacities. Since planets vary widely in their atmospheric properties, Seager emphasizes the major physical processes that govern all planetary atmospheres. Moving from first principles to cutting-edge research, Exoplanet Atmospheres is an ideal resource for students and researchers in astronomy and earth sciences, one that will help prepare them for the next generation of planetary science. The first textbook to describe exoplanet atmospheres illustrates concepts using examples grounded in real data Provides a step-by-step guide to understanding the structure and emergent spectrum of a planetary atmosphere Includes exercises for students

The Earth as a Distant Planet - M. Vázquez 2010-03-12 In The Earth as a Distant Planet, the authors become external observers of our solar system from a distance and try to determine how one can understand how Earth, the third in distance to the central star, is essentially unique and capable of sustaining life. The knowledge gained from this original perspective is then applied to the search for other planets outside the solar system, or exoplanets. Since the discovery in 1992 of the first exoplanet, the number of planet detections has increased exponentially and ambitious missions are already being planned for the future. The exploration of Earth and the rest of the rocky planets are Rosetta stones in classifying and understanding the multiplicity of planetary systems that exist in our galaxy. In time, statistics on the formation and evolution of exoplanets will be available and will provide vital information for solving some of the unanswered questions about the formation, as well as evolution of our own world and solar system. Special attention is paid to the biosignatures (signs of life) detectable in the Earth's reflected spectra and the search for life in the universe. The authors are experts on the subject of extrasolar planets. They provide an introductory but also very much up-to-date text, making this book suitable for researchers and for advanced students in astronomy and astrophysics.

The First Exoplanet - T. Sedgwick 2014-12-20 Six years after its launch in 2050, Dr Aidan Lemaie makes a stunning discovery with the Helios space telescope array. The Helios array has, for the first time, made the surface features of exoplanets visible to human eyes. Green forests, mountain ranges and blue oceans all seem to be visible on Avendano-185f, 'only' fifteen light-years away. The find is hailed as the saviour of a languishing Earth, locked in the same old cycle of war, poverty and overpopulation that it always has been. But the potential second-Earth would take at least 150 years to reach using the best conventional propulsion methods. Then another 15 years for any message of what is found to reach Earth. Only recently has the Western Global Alliance unveiled the experimental technology that might bridge the fifteen light-year distance across interstellar space. The Faster-Than-Light drive is a revolutionary technology with origins steeped in mystery - it seems at least half a century ahead of its time. Although experimental and imperfect, the technology is of unparalleled strategic value and Russian spymaster, Sergei Bekov, will stop at nothing to acquire it. His beautiful, deep cover agent, Dasha Morozova, has infiltrated the lives of the people heading the project. Will her attempts to mercilessly betray them succeed and further her repressive regime's cause? Meanwhile Yau Min, an eccentric former-SETI scientist, struggles for recognition. He wonders why the transmissions, that he thinks came from the Avendano system, went on for many years then mysteriously fell silent. What caused the signals and what made them stop? Should humanity set off for the promise of a new world, to provide a fresh start for the people of a crowded, ravished Earth? Is it a pristine second-Earth or a post-apocalyptic nightmare? Is there an intelligent civilization or will humankind become the apex species unopposed? The new space race is on and the rewards in land and resources could be huge - but so could be the risks. Astrobologist, Professor Ken Hawkins, senses a trap that could doom humankind - but the human desire to explore is irresistible. How will the actions of Captain Chris Buick and his Special Space Service squad change the course of history forever? With their motto Fortitude in Stellis - 'Bravery Among the Stars' have they got what it takes to provide all they have ever known and loved on Earth? Immerse yourself in a future world of discovery, espionage and struggle in this stimulating epic tale. As the intelligent, interwoven plot unfolds to reveal the shocking truth about humanity's future, you will find yourself hooked until its thrilling conclusion.

Exoplanets - Sara Seager 2010 For the first time in human history, we know for certain the existence of planets around other stars. Now the fastest-growing field in space science, the time is right for this fundamental source book on the topic which will lay the foundation for its continued growth. Exoplanets serves as both an introduction for the non-specialist and a foundation for the techniques and equations used in exoplanet observation by those dedicated to the field.
The past decade has delivered remarkable discoveries in the study of exoplanets. Hand-in-hand with these advances, a theoretical understanding of the myriad of processes that dictate the formation and evolution of planets has matured, spurred on by the avalanche of unexpected discoveries. Appreciation of the factors that make a planet hospitable to life has grown in sophistication, as has understanding of the context for biosignatures, the remotely detectable aspects of a planet’s atmosphere or surface that reveal the presence of life.

Exoplanet Science Strategy
National Academies of Sciences, Engineering, and Medicine 2019-01-17
The past decade has delivered remarkable discoveries in the study of exoplanets. Hand-in-hand with these advances, a theoretical understanding of the myriad of processes that dictate the formation and evolution of planets has matured, spurred on by the avalanche of unexpected discoveries. Appreciation of the factors that make a planet hospitable to life has grown in sophistication, as has understanding of the context for biosignatures, the remotely detectable aspects of a planet’s atmosphere or surface that reveal the presence of life.

Exoplanet Science Strategy highlights strategic priorities for large, coordinated efforts that will support the scientific goals of the broad exoplanet science community. This report outlines a strategic plan that will answer lingering questions through a combination of large, ambitious community-supported efforts and support for diverse, creative, community-driven investigator research.

Alpha Centauri
Martin Beech 2014-10-15
As our closest stellar companion and composed of two Sun-like stars and a third small dwarf star, Alpha Centauri is an ideal testing ground of astrophysical models and has played a central role in the history and development of modern astronomy—from the first guesses at stellar distances to understanding how our own star, the Sun, might have evolved. It is also the host of the nearest known exoplanet, an ultra-hot, Earth-like planet recently discovered. Just 4.4 light years away, Alpha Centauri is also the most obvious target for humanity’s first directed interstellar space probe. Such a mission could reveal the small-scale structure of a new planetary system and also represent the first step in what must surely be humanity’s greatest future adventure—exploration of the Milky Way Galaxy itself. For all of its closeness, a Centauri continues to tantalize astronomers with many unresolved mysteries, such as how did it form, how many planets does it contain and where are they, and how might we view its extensive panorama directly? In this book we move from the study of individual stars to the study of our Solar System and our nearby galactic neighborhood. On the way we will review the rapidly developing fields of exoplanet formation and detection.

Probing the New Solar System
John Wilkinson 2009-01-01
Probing the New Solar System discusses the latest findings that have contributed to a changed understanding of the solar system - and how the revised definition of a planet in 2006 by the International Astronomical Union affected this understanding.

Asteroseismology and Exoplanets: Listening to the Stars and Searching for New Worlds
Tiago L. Campante 2017-11-03
This book presents the proceedings of the IVth Azores International Advanced School in Space Sciences entitled "Asteroseismology and Exoplanets: Listening to the Stars and Searching for New Worlds". The school addressed the topics at the forefront of scientific research being conducted in the fields of asteroseismology and exoplanetary science, two fields of modern astrophysics that share many synergies and resources. These proceedings comprise the contributions from 18 invited lecturers, including both monographic presentations and a number of hands-on tutorials.

The Doppler Method for the Detection of Exoplanets
A. P. Hatzes 2020
The study of exoplanets is one of the most vibrant fields of astrophysics today. Precise radial velocity (RV, or Doppler) measurements created the field by discovering the first exoplanets. Although employed for more than 30 years, RV measurements are still relevant today; when used with the transit method it provides the first characterization of exoplanets in terms of its mass, radius, and bulk density. These provide the first clues as to the internal structure of the exoplanet. With this text, Hatzes provides a deep understanding of the Doppler method, including how to achieve RV measurement precision, as well as the challenges, limitations, and potential of the technique. It also covers other aspects of the
method such instrumentation, wavelength calibration, finding periodic signals in RV time series, signal interpretation, and Keplerian orbits. It’s an essential reference for researchers and graduate students in the field of exoplanets, and additionally stellar spectroscopists and instrumentalists.

The Exoplanet Handbook - Michael Perryman 2011-05-26 Exoplanet research is one of the most explosive subjects in astronomy today. More than 500 exoplanets are now known, and groups worldwide are actively involved in a broad range of observational and theoretical efforts. This book ties together these many avenues of investigation - from the perspectives of observation, technology and theory - to give a comprehensive, up-to-date review of the entire field. All areas of exoplanet investigation are covered, making it a unique and valuable guide for researchers in astronomy and planetary science, including those new to the field. It treats the many different techniques now available for exoplanet detection and characterisation, the broad range of underlying physics, the overlap with related topics in solar system and Earth sciences, and the concepts underpinning future developments. It emphasises the interconnection between the various fields and provides extensive references to more in-depth treatments and reviews.

Transiting Exoplanets - Carole A. Haswell 2010-07-29 The methods used in the detection and characterisation of exoplanets are presented in this unique textbook for advanced undergraduates.

Exoplanets - John Mason 2008-08-29 This is the first collection of review articles in one volume covering the very latest developments in exoplanet research. This edited, multi-author volume will be an invaluable introduction and reference to all key aspects in the field this field. The reviews cover topics such as the properties of known exoplanets and searching for exoplanets in the stellar graveyard. The book provides an easily accessible point of reference in a fast moving and exciting field.

Revista Mexicana de Astronomía Y Astrofísica - 2007

The Exoplanet Handbook - Michael Perryman 2018-08-31 With the discovery of planets beyond our solar system 25 years ago, exoplanet research has expanded dramatically, with new state-of-the-art ground-based and space-based missions dedicated to their discovery and characterisation. With more than 3,500 exoplanets now known, the complexity of the discovery techniques, observations and physical characterisation have grown exponentially. This Handbook ties all these avenues of research together across a broad range of exoplanet science. Planet formation, exoplanet interiors and atmospheres, and habitability are discussed, providing in-depth coverage of our knowledge to date. Comprehensively updated from the first edition, it includes instrumental and observational developments, in-depth treatment of the new Kepler mission results and hot Jupiter atmospheric studies, and major updates on models of exoplanet formation. With extensive references to the research literature and appendices covering all individual exoplanet discoveries, it is a valuable reference to this exciting field for both incoming and established researchers.

Exoplanets - Karen Latchana Kenney 2017-01-01 Until the mid-1990s, scientists only guessed that the universe held exoplanets, or planets beyond our solar system. But using advanced physics and powerful telescopes, scientists have since identified more than three thousand exoplanets. This work has revealed fascinating worlds, including a planet that oozes lavalike fluids and a planet that glows bright pink. Even more fascinating, scientists think that some exoplanets might contain life. Many orbit in the Goldilocks zone, the region around a star that's not too hot or too cold for liquid water, a key ingredient for life. This book examines exoplanets, the possibilities for life beyond Earth, and the cutting-edge technologies scientists use to learn about distant worlds.

How Do You Find an Exoplanet? - John Asher Johnson 2015-12-29 Alien worlds have long been a staple of science fiction. But today, thanks to modern astronomical instrumentation and the achievements of many enterprising observational astronomers, the existence of planets outside our solar system—also known as exoplanets—has moved into the realm of science fact. With planet hunters finding ever smaller, more Earth-like worlds, our understanding of the cosmos is forever changed, yet the question of how astronomers make these discoveries often goes unanswered. How Do You Find an Exoplanet? is an authoritative primer on the four key techniques that today's planet hunters use to detect the feeble signals of planets orbiting distant stars. John Johnson provides you with an insider’s perspective on this exciting cutting-edge science, showing how astronomers detect the wobble of stars caused by the gravitational tug of an orbiting planet, the slight diminution of light caused by a planet eclipsing its star, and the bending of space-time by stars and their planets, and how astronomers even directly take pictures of planets next to their bright central stars. Accessible to anyone with a basic foundation in college-level physics, How Do You Find an Exoplanet? sheds new light on the prospect of finding life outside our solar system, how surprising new observations suggest that we may not fully understand how planets form, and much more.
Space Exploration and Humanity: A Historical Encyclopedia [2 volumes]. American Astronautical Society 2010-08-23 A complete history of human endeavors in space, this book also moves beyond the traditional topics of human spacelfight, space technology, and space science to include political, social, cultural, and economic issues, and also commercial, civilian, and military applications. • 580 articles describing various aspects of manned and unmanned space exploration, including a full range of social, technological, and political issues, such as government policy, nationalism, and the technology/military-driven economy • Six overview essays, introducing each of the encyclopedia’s major sections and putting that aspect of space exploration into historical context • 136 contributors, many who are leading space historians and experts affiliated with the American Astronautical Society, make firsthand knowledge and fresh insights accessible to all audiences • Numerous photos, including stunning shots from space, star charts, technical drawings, and more • Short bibliographies conclude each entry, pointing readers to the best sources to find out more about the topic • A Glossary defining the various technical terms encountered in the encyclopedia

Methods of Detecting Exoplanets-Valerio Bozza 2016-04-12 In this book, renowned scientists describe the various techniques used to detect and characterize extrasolar planets, or exoplanets, with a view to unveiling the “tricks of the trade” of planet detection to a wider community. The radial velocity method, transit method, microlensing method, and direct imaging method are all clearly explained, drawing attention to their advantages and limitations and highlighting the complementary roles that they can play in improving the characterization of exoplanets’ physical and orbital properties. By probing the planetary frequency at different distances and in different conditions, these techniques are helping astrophysicists to reconstruct the scenarios of planetary formation and to give robust scientific answers to questions regarding the frequency of potentially habitable worlds. Twenty years have passed since the discovery of a Jupiter-mass companion to a main sequence star other than the Sun, heralding the birth of extrasolar planetary research; this book fully conveys the exciting progress that has been achieved during the intervening period.


Exoplanets and Alien Solar Systems-Tahir Yaqoob 2011-11 An unprecedented number of planets outside of the solar system have been found, with an explosion in the number of discoveries in recent years. Find out what has been happening in this rapidly advancing arena of human exploration, what these extrasolar planets are like, and why some traditional ideas face being thrown out.

Exoplanet Observing for Amateurs-Bruce L. Gary 2007-08-01

Envisioning Exoplanets-Michael Carroll 2020 “Envisioning Exoplanets traces the journey of astronomers and researchers on their quest to explore the universe for a planet like Earth”--

Doppler Method Detection Extrasolar Pl-Artie Hatzes 2019-12-24 The Doppler method is a key instrument in exoplanet detection, covering a wide range of techniques and expertise: high-resolution stellar spectroscopy, time series analysis, and periodic signal detection within non-Gaussian noise. This book provides a deep understanding of the Doppler method, including how to achieve a high RV measurement precision, as well as the challenges, limitations, and potential of the technique. It also covers other aspects of the method such instrumentation, wavelength calibration, finding periodic signals in RV time series, signal interpretation, and Keplerian orbits. It is an essential reference for researchers and graduate students in the field of exoplanets, and additionally stellar spectroscopists and instrumentalists.

Extra-Solar Planets-Bonnie Steves 2010-12-07 Since the discovery of the first exoplanet orbiting a main sequence star in 1995, nearly 500 planets have been detected, with this number expected to increase dramatically as new ground-based planetary searches begin to report their results. Emerging techniques offer the tantalizing possibility of detecting an Earth-mass planet in the habitable zone of a solar-type star as well as the exciting prospect of studying exoplanetary atmospheres that could reveal the presence of biomarkers, such as water vapor, oxygen, and carbon dioxide. Can we find the “Holy Grail” of exoplanets? Cutting-edge research may reveal the answer Written by internationally renowned scientists at the forefront of the field, Extra-Solar Planets: The Detection, Formation, Evolution and Dynamics of Planetary Systems presents powerful analytical tools and methods for investigating extra-solar planetary systems. It discusses new theories on planetary migration and resonant capture that elucidate the existence of “hot Jupiters.” It also examines the astrophysical mechanisms required to assemble gas giant planets close to their parent star. In addition, the expert contributors describe how mathematical tools involving periodicity, chaos, and resonance are used to study the diversity and stability of observed planetary systems. By presenting the fundamental analyses that underpin modern studies of extra-solar planetary systems, this graduate-level book enables readers to thoroughly understand important recent developments and offers a platform for future research. It also improves readers’ understanding of our own solar system and its place in the diverse range of planetary systems discovered so far.
Super-Earth and Sub-Neptune Exoplanets - Zachary Kaczmareczzyk Berta 2013 Exoplanets that transit nearby M dwarfs allow us to measure the sizes, masses, and atmospheric properties of distant worlds. Between 2008 and 2013, we searched for such planets with the MEarth Project, a photometric survey of the closest and smallest main-sequence stars. This thesis uses the first planet discovered with MEarth, the warm 2.7 Earth radius exoplanet GJ1214b, to explore the possibilities that planets transiting M dwarfs provide.

The Smallest Lights in the Universe - Sara Seager 2021-08-03 In this luminous memoir, Canadian MIT astrophysicist Sara Seager must reinvent herself in the wake of tragedy and discovers the power of connection on this planet, even as she searches our galaxy for another Earth. Sara Seager has always been in love with the stars: so many lights in the sky, so much possibility. Now a pioneering planetary scientist, she searches for exoplanets—and especially that distant, elusive world that sustains life. But with the unexpected death of Seager's husband, the purpose of her own life becomes hard for her to see. Suddenly, at forty, she is a widow and the single mother of two young boys. For the first time, she feels alone in the universe. As she struggles to navigate her life after loss, Seager takes solace in the alien beauty of exoplanets and the technical challenges of exploration. At the same time, she discovers earthbound connections that feel every bit as wondrous, when strangers and loved ones alike reach out to her across the space of her grief. Among them are the Widows of Concord, a group of women offering advice on everything from home maintenance to dating, and her beloved sons, Max and Alex. Most unexpected of all, there is a kind of one-in-a-billion match, not in the stars but here at home. Probing and invigoratingly honest, The Smallest Lights in the Universe is its own kind of light in the dark.

Out of This World - Jacob Berkowitz 2009 Presents the efforts being made to search for intelligent life in the universe, discussing exoplanets, their characteristics, the Search for Extraterrestrial Intelligence or SETI project, and the Drake Equation, used to calculate the odds of finding life.

Guide to The Planets - Richard Pearson 2019-01-21 The night sky is a wonder, from the fixed and almost changeless stars to the brief appearances of comets it offers a universe of fascinating objects to view. With little more than a pair of binoculars or a small telescope millions of light years of space are available to all. Guide to the Planets has been written by Richard Pearson with amateur astronomers in mind. This book will guide you through space and introduce you to the pleasures of amateur astronomy.

Alien Skies - Frédéric J. Pont 2014-04-23 Planetary atmospheres are complex and evolving entities, as mankind is rapidly coming to realise whilst attempting to understand, forecast and mitigate human-induced climate change. In the Solar System, our neighbours Venus and Mars provide striking examples of two endpoints of planetary evolution, runaway greenhouse and loss of atmosphere to space. The variety of extra-solar planets brings a wider angle to the issue: from scorching "hot jupiters" to ocean worlds, exo-atmospheres explore many configurations unknown in the Solar System, such as iron clouds, silicate rains, extreme plate tectonics, and steam volcanoes. Exoplanetary atmospheres have recently become accessible to observations. This book puts our own climate in the wider context of the trials and tribulations of planetary atmospheres. Based on cutting-edge research, it uses a grand tour of the atmospheres of other planets to shine a new light on our own atmosphere, and its relation with life.

The Lidov-Kozai Effect - Applications in Exoplanet Research and Dynamical Astronomy - Ivan I. Shevchenko 2016-09-16 This book deals with an effect in celestial mechanics that has become quite important in exoplanet research. The Lidov-Kozai effect reveals itself in coherent periodic variations (which can be very large) of the inclination and eccentricity of an orbiting body in the presence of an inclined perturber. The effect is known to be important in the motion of many asteroids and planetary satellites. What is more, now it attracts more and more interest in the astronomical and astrophysical community due to its relevance for many exoplanetary systems. Recent years witnessed major advancements in its theory. It would be no exaggeration to say that nowadays the Lidov-Kozai effect becomes one of the most studied astrophysical effects. This book covers the multitude of the Lidov-Kozai effect's modern applications and its theory developments. It will be useful for researchers and students working in astrophysics, celestial mechanics, stellar dynamics, theoretical mechanics, space missions design, depending on the interests of the reader. The book is self-contained. It provides the full detailed coverage of the effect's theory and applications.

Exploring the Solar System - Peter Bond 2012-02-29 The exploration of our solar system is one of humanity's greatest scientific achievements. The last fifty years in particular have seen huge steps forward in our understanding of the planets, the sun, and other objects in the solar system. Whilst planetary science is now a mature discipline - involving geoscientists, astronomers, physicists, and others - many profound mysteries remain, and there is indeed still the tantalizing possibility that we may find evidence of life on another planet in our system. Drawing upon the latest results from the second golden age of Solar System exploration, author Peter Bond provides an authoritative and up-to-date account of the planets, satellites, and smaller debris orbiting the Sun. Written in an informal style, with minimal use of mathematics, this book is the ideal introductory text for non-science students and other readers with little or no science background. With the aid of numerous illustrations, many in full colour, this exciting book brings to life the weird and wonderful worlds that populate our corner of the Universe. This book: Assumes no background in physics, astronomy or
mathematics Carefully explains key concepts Gives balanced coverage to areas of controversy or uncertainty in planetary science Is in in full color throughout and richly illustrated An interview with Peter can be found at http://wisciblog.com/2012/02/28/exploring-the-solar-system/

The Lost Planets - John Wenz 2019-10-08 A fascinating account of the pioneering astronomer who claimed (erroneously) to have discovered a planet outside the solar system. There are innumerable planets revolving around innumerable stars across our galaxy. Between 2009 and 2018, NASA's Kepler space telescope discovered thousands of them. But exoplanets—planets outside the solar system—appeared in science fiction before they appeared in telescopes. Astronomers in the early decades of the twentieth century spent entire careers searching for planets in other stellar systems. In The Lost Planets, John Wenz offers an account of the pioneering astronomer Peter van de Kamp, who was one of the first to claim discovery of exoplanets. Van de Kamp, working at Swarthmore College's observatory, announced in 1963 that he had identified a planet around Barnard's Star, the second-closest star system to the Sun. He cited the deviations in Barnard's star's path—"wobbles"—that suggested a large object was lurching around the star. Van de Kamp became something of a celebrity (appearing on a television show with "Mr. Wizard," Don Henry), but subsequent research did not support his claims. Wenz describes van de Kamp's stubborn refusal to accept that he was wrong, discusses the evidence found by other researchers, and explains recent advances in exoplanet detection, including transit, radial velocity, direct imaging, and microlensing. Van de Kamp retired from Swarthmore in 1972, and died in 1995 at 93. In 2009, Swarthmore named its new observatory the Peter van de Kamp Observatory. In the 1990s, astronomers discovered and confirmed the first planet outside our solar system. In 2018, an exoplanet was detected around Barnard's Star—not, however, the one van de Kamp thought he had discovered in 1963.

Exoplanets - Michael E. Summers 2017 The past few years have seen an incredible explosion in our knowledge of the universe. Since its 2009 launch, the Kepler satellite has discovered more than two thousand exoplanets, or planets outside our solar system. More exoplanets are being discovered all the time, and even more remarkable than the sheer number of exoplanets is their variety. In Exoplanets, astronomer Michael Summers and physicist James Trefil explore these remarkable recent discoveries: planets revolving around pulsars, planets made of diamond, planets that are mostly water, and numerous rogue planets wandering through the emptiness of space. This captivating book reveals the latest discoveries and argues that the incredible richness and complexity we are finding necessitates a change in our questions and mental paradigms. In short, we have to change how we think about the universe and our place in it, because it is stranger and more interesting than we could have imagined.

Maps and Masses of Transiting Exoplanets - Julien De Wit 2014 With over 1800 planets discovered outside of the Solar System in the past two decades, the field of exoplanetology has broadened our perspective on planetary systems. Research priorities are now moving from planet detection to planet characterization. In this context, transiting exoplanets-planets that cross in front of their star from our point-of-view-are of special interest due to the wealth of data made available by their orbital configuration. In this thesis, I introduce two methods, and their Markov chain Monte Carlo implementations, to gain new insights into the atmospheric and interior properties of exoplanets. The first method aims to map an exoplanet's atmosphere based on the eclipse scanning which is obtained while a planet is occulted by its host star. Ultimately temperature mapping, its caveats (particularly, the correlation between the planet's shape, brightness distribution, and four system parameters), and a framework to mitigate the caveats' effects via global analyses including transits, phase curves, and radial velocity measurements. I introduce the basics of eclipse mapping, its caveats (particularly, the correlation between the planet's shape, brightness distribution, and four system parameters), and a framework to mitigate the caveats' effects via global analyses including transits, phase curves, and radial velocity measurements. I use this method to create the first two-dimensional map and the first cloud map of an exoplanet for the hot-Jupiters HD 189733b and Kepler-7b, respectively. The second method, MassSpec, aims to determine transiting planet masses and atmospheric properties solely from transmission spectra, i.e. the starlight filtered by a planet's atmosphere during transits. Determination of an exoplanet's mass is key to understanding its basic properties, including its potential for supporting life. To date, mass constraints for exoplanets are predominantly based on radial velocity measurements, which are not suited for planets with low masses, large semi-major axes, or those orbiting faint or active stars. I demonstrate that a planet's mass has to be accounted for by atmospheric retrieval methods to ensure unbiased estimates of atmospheric properties. Utilizing MassSpec, the James Webb Space Telescope (launch date: 2018) could determine the mass and atmospheric properties of half a dozen Earth-sized planets in their host's habitable zones over its lifetime, which could lead to the first identification of a habitable exoplanet.

Astrophysical Techniques, Sixth Edition - C.R. Kitchin 2013-11-18 Long used in undergraduate and introductory graduate courses, Astrophysical Techniques, Sixth Edition provides a comprehensive account of the instruments, detectors, and techniques employed in astronomy and astrophysics. Emphasizing the underlying unity of all astronomical observations, this popular text provides a coherent state-of-the-art account of the instruments and techniques used in current astronomy and astrophysics. As in earlier editions, the author aims to reduce the trend towards fragmentation of astronomical studies. The underlying unity of all astronomical observation is emphasized by the layout of the book: the pattern of detection → imaging → ancillary techniques has been adopted so that one stage of an observation is encountered together with the similar stages required for all other information carriers. The book is written in a very accessible manner, and most of the mathematics is accessible to those who have attended a mathematics course in their final years at school. Nevertheless, the treatment of the topics in general is at a sufficiently high level to be of use to those professionals seeking technical information in areas of astronomy with which they might not be completely familiar.
Exoplanets: Detection, Formation and Dynamics (IAU S249)-International Astronomical Union. Symposium 2008-07-10 The latest theoretical and observational advances in the exciting field of exoplanet research.

Understanding the Universe-Manjunath.R 2020-03-17 We human beings — who are ourselves mere collections of fundamental particles of nature — try to wonder, seek answers and gazing at the immense heavens above, we have always asked a multitude of questions: When did the first black holes form in pre-galactic halos and what is their initial mass and spin? What is the mechanism of black hole formation in galactic nuclei, and how do black holes evolve over cosmic time due to accretion and mergers? What is the role of black hole mergers in galaxy formation? Does gravity travel at the speed of light? Does the graviton have mass? How does gravitational information propagate: Are there more than two transverse modes of propagation? What is the structure of space-time just outside astrophysical black holes? Do their space times have horizons? What happens in a black hole? Many others! Understanding the Universe: Quarks, Leptons and the Big Bang is a clear, readable and self-contained introduction to chaos of physics and related areas of science. It bridges the gap and addresses the questions that are of interest to us all or at least to all of us reading this book and lead us to study science in the first place. This book concentrates on presenting the subject from the understanding perspective of physics and brings the reader right up to date with curious aspects of physics established over the last few centuries. This book assumes science a journey not a destination and the advance of knowledge is an infinite progression towards a goal that forever recedes. This book will be of interest to students, teachers and general science readers interested in fundamental ideas of physics.
Related with The First Exoplanet:

physics syllabus for ss1

piaggio nrg service manual

physics ib exam papers
The First Exoplanet

Yeah, reviewing a book the first exoplanet could accumulate your close connections listings. This is just one of the solutions for you to be successful. As understood, triumph does not suggest that you have fantastic points.

Comprehending as skillfully as understanding even more than new will manage to pay for each success. next-door to, the revelation as with ease as sharpness of this the first exoplanet can be taken as competently as picked to act.

Homepage