

## Exploring The Solar System Jovian Planets

Development of cryogenic storage systems for manned space flight.

Beyond Earth's small, red neighbor Mars lie the gaseous, giant planets of the Outer Solar System. This book investigates these behemoths and dwarf planet Pluto, as well as other curiosities within the solar system's farthest reaches, such as asteroid fields and the Kuiper belt.

The first in-depth, fully illustrated history of global space discovery and exploration from ancient times to the modern era. The Smithsonian History of Space Exploration is a comprehensive history of international space exploration paired with photographs, illustrations, graphics, and sidebars on key scientific and technological developments, influential figures, and pioneering spacecraft. Former NASA and Smithsonian space curator and historian Roger D. Launius presents human's endeavors to understand the universe, honoring millennia of human curiosity, ingenuity, and achievement. The book examines space exploration's origins in the pioneering work undertaken by the ancients of Greece, Rome, and China, and moves through the great discoveries of Renaissance thinkers including Copernicus, Galileo, and Kepler. It offers new insight into well-known moments such as the launch of Sputnik 1 and the Apollo Moon landing and explores the unexpected events and hidden figures of space history. Presenting the technological and mechanical breakthroughs enabling humans to explore far beyond our own planet in recent decades, it also speculates on the future of space exploration, including space tourism and our possible future as an extraterrestrial species. This is a must-read for space buffs and everyone intrigued by the history and future of scientific discovery. The sources, distributions, and transformation of organic compounds in the solar system are active study areas as a means to provide information about the evolution of the solar system and the possibilities of life elsewhere in the universe. There are many organic synthesis processes, however, and ambiguity surrounds the relative effectiveness of these processes in explaining the distribution of organic compounds in the solar system. As a consequence, NASA directed the NRC to determine what processes account for the reduced carbon compounds found throughout the solar system and to examine how planetary exploration can advance understanding of this central issue. This report presents a discussion of the chemistry of carbon; an analysis of the formation, modification, and preservation of organic compounds in the solar system; and an assessment of research opportunities and strategies for enhancing our understanding of organic material in the solar system.

Exploring the Ocean Worlds of Our Solar System

Solar Terrestrial (ST)

Advances in Space Science and Technology

Planetary and Lunar Exploration

Telecourse Study Guide for Seeds/Backman's Horizons: Exploring the Universe, 13th

Discovering the Solar System

*On October 25-26, 2012, a symposium was held in Washington, DC to commemorate the 50th anniversary of the first successful planetary mission, Mariner 2. The purpose of this symposium was to consider, over the history of the Space Age, what we have learned about the other bodies of the solar system and the processes by which we have learned it. In this collection of selected papers presented at the event, broad topics relating to the history of solar system exploration are addressed.*

*This fascinating book is a must-have text for space enthusiasts with an engineering bent. It is a detailed history of unmanned missions that have explored our solar system. The subject is treated wherever possible from an engineering and scientific standpoint and includes technical descriptions of the spacecraft, their mission designs and their instrumentations. Scientific results are discussed in depth, together with details of mission management. The book is fantastically comprehensive, covering missions and results from the 1950s right up to the present day. Some of the latest missions and their results appear in a popular science book for the first time.*

*In the last 25 years, planetary science experienced a revolution, as vast oceans of liquid water have been discovered within the heart of the icy moons of our Solar System. These subsurface oceans lie hidden under thick layers of ice. We call them ocean worlds. Some of these icy moons, such as Ganymede, may hold two to three times more liquid water than all the water present on Earth, while others, such as Enceladus and Europa, are thought by astrobiologists to be our best hope of finding extraterrestrial life. In this book, we will explore and compare a variety of Solar System ocean worlds, meeting in the process 22 of the most intriguing objects, from the giant asteroid Ceres to the enigmatic, distant Sedna. In doing so, we will also encounter the multiple spacecraft that brought back most of what we know of these worlds (Pioneers, Voyagers, Cassini-Huygens, etc.), as well as the latest scientific research on this new topic. We will also entertain the possibility of life on each of these ocean worlds by assessing their habitability, as ultimately, these ocean worlds might hold the key to answering the fundamental questions in life: How did life appear? Where do we come from? Is there life out there? With the contributions of leading planetary scientists from NASA, ESA, and other institutions, this book aims to be the go-to reference for anyone wanting to know more about this fascinating topic. The outer Solar System is rich in resources and may be the best region in which to search for life beyond Earth. In fact, it may ultimately be the best place for Earthlings to set up permanent abodes. This book surveys the feasibility of that prospect, covering the fascinating history of exploration that kicks off our adventure into the outer Solar System. Although other books provide surveys of the outer planets, Carroll approaches it from the perspective of potential future human exploration, exploitation and settlement, using insights from today's leading scientists in the field. These experts take us to targets such as the moons Titan, Triton, Enceladus, Iapetus and Europa, and within the atmospheres of the gas and ice giants. In these pages you will experience the thrill of discovery awaiting those who journey through the giant worlds and their moons. All the latest research is included, as are numerous illustrations, among them original paintings by the author, a renowned prize-winning space artist.*

Comparative Planetology and the Atmosphere of Earth

Vision and Voyages for Planetary Science in the Decade 2013-2022

A Report to the Solar System Exploration Division, National Aeronautics and Space Administration

The Smithsonian History of Space Exploration

An Introduction to the Solar System

Exploring the Planets

*The Encyclopedia of the Solar System provides a series of comprehensive and authoritative articles written by more than 50 eminent planetary and space scientists. Each chapter is self-contained yet linked by cross-references to other related chapters. This beautifully designed book is a must for the library of professional astronomers and amateur star-gazers alike, in fact for anyone who wishes to understand the nature of our solar system. Key Features \* Cross-referenced throughout for easy comprehension \* Superbly illustrated with over 700 photos, drawings, and diagrams, including 36 color plates \* Provides 40 thematically organized chapters by more than 50 eminent contributors \* Convenient glossaries of technical terms introduce each*

chapter \* Academic Press maintains a web site for the Encyclopedia at [www.academicpress.com/solar](http://www.academicpress.com/solar); Author-recommended web resources for additional information, images, and research developments related to each chapter of this volume, are available here As our ability to observe space improves with ever-progressing technology, we better grasp the farthest reaches of the cosmos and heighten our understanding of the universe in its entirety. Spacecraft exploration of the outermost planets in our solar system—Jupiter, Saturn, Uranus, and Neptune—reveals many features of these seemingly harsh environments and moves us closer to comprehending the origins of our own planet as well as others. This insightful volume examines the characteristics of these remote planets and the paths they illuminate in our quest for celestial knowledge.

New Scientist magazine was launched in 1956 "for all those men and women who are interested in scientific discovery, and in its industrial, commercial and social consequences". The brand's mission is no different today - for its consumers, New Scientist reports, explores and interprets the results of human endeavour set in the context of society and culture.

"Interplanetary Outpost" follows the mission architecture template of NASA's plan for Human Outer Planet Exploration (HOPE), which envisions sending a crew to the moon Callisto to conduct exploration and sample return activities. To realize such a mission, the spacecraft will be the most complex interplanetary vehicle ever built, representing the best technical efforts of several nations. A wealth of new technologies will need to be developed, including new propulsion systems, hibernation strategies, and revolutionary radiation shielding materials. Step by step, the book will describe how the mission architecture will evolve, how crews will be selected and trained, and what the mission will entail from launch to landing. However, the focus of "Interplanetary Outpost" is on the human element. The extended duration, logistical challenges, radiation concerns, communication lag times, isolation, and deleterious effects on the human body will conspire to not only significantly impair human performance but also affect the behavior of crewmembers. This book addresses each of these issues in detail while still providing the reader with a background to the necessary elements comprising such a mission.

Proceedings of the B0.2 and B0.6 Symposia of COSPAR Scientific Commission B which Were Held During the Thirty-first COSPAR Scientific Assembly, Birmingham, U.K., 14-21 July 1996

Exploring Organic Environments in the Solar System

A Program for Exploration, Report of a Study

Beautiful Planets For Kids

Part I: The Golden Age 1957-1982

Space Exploration of the Outer Space Solar System and Cometary Nuclei

Explore the Solar System! 25 Great Projects, Activities, Experiments introduces kids ages 6-9 to the planets, moons, celestial bodies that surround our star, the sun, as well as the universe beyond. Combining a hands-on element with science, kids investigate solar eclipses, phases of the moon, Jupiter's rings, and what astronauts wear. Who named the Milky Way? Why is there night? By combining a hands-on element with riddles, jokes, fun facts, and comic cartoon the Solar System!, and have a blast along the way.

This is a collection of six papers that were presented at COSPAR96, in Birmingham, U.K. This session showcased current planned exploration activities for the giant planets, Jupiter and Saturn.

In recent years, planetary science has seen a tremendous growth in new knowledge. Deposits of water ice exist at the poles of Mars. Discoveries on the surface of Mars point to an early warm wet climate, and perhaps conditions under which life could have existed. Liquid methane rain falls on Saturn's moon Titan, creating rivers, lakes, and geologic landscapes with uncanny resemblance to Earth's. Vision and Voyages for Planetary Science in the Decade 2013-2022 surveys the current state of knowledge of the solar system and recommends a suite of planetary science flagship missions for the decade 2013-2022 that could provide a wealth of important new discoveries about the solar system. Research priorities defined in the report were selected through a review that included input from five expert panels. NASA's highest priority large mission should be the Mars Astrobiology Explorer-Cacher (MAX-C), a mission to Mars that could help determine whether the planet ever supported life and could also address key questions about its geologic and climatic history. Other projects should include a mission to Jupiter's icy moon Europa to explore its subsurface ocean, and the Uranus Orbiter and Probe mission to investigate that planet's interior structure, atmospheric composition. For medium-size missions, Vision and Voyages for Planetary Science in the Decade 2013-2022 recommends that NASA select two new missions to be included in its New Frontiers program, which explores the solar system with frequent small spacecraft missions. If NASA cannot stay within budget for any of these proposed flagship projects, it should focus on the most expensive missions first. Vision and Voyages for Planetary Science in the Decade 2013-2022 suggests that the National Science Foundation expand its funding for existing laboratories and establish new facilities as needed. It also recommends that NASA enlist the participation of international partners. This report is a vital resource for government agencies supporting the planetary science community, and the public.

EXPLORE THE SOLAR SYSTEM! 25 GREAT PROJECTS, ACTIVITIES, EXPERIMENTS Nomad Press

Jupiter

Moon Hunters

The Story of NASA's Galileo Mission

Scientific Rationale : a Report

Historical Perspectives

This is the 2006 Solar System Exploration Roadmap for NASA's Science Mission Directorate

**Updated third edition introduces undergraduates to the Solar System's bodies, the processes upon and within them, and their origins and evolution.**

**With temperatures dipping to -366 degrees Fahrenheit and the theory that there may be a layer of diamonds below its surface, Uranus will fascinate any student. This book offers a detailed look at the planet's magnetic field, climate, composition, and possibilities for life. Full-color images make this a wonderful read and a handy reference tool for young adults. This revised edition of Uranus includes new information on the first discovery of the planet's rings almost 200 years earlier than believed, the 2005 discovery of a pair of rings and two small**

**satellites previously unknown, and recently observed large clouds and a dark spot on the planet's surface. This revision also includes updated references to Pluto's new status as a "dwarf planet," having been demoted from full planethood.**

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**A look at the scientists who design and fly the spacecraft exploring the outer reaches of the solar system discusses unmanned missions to Jupiter, Saturn, and Neptune.**

**NASA's Voyager Missions**

**The Solar System for Kids**

**Jupiter, Saturn, Uranus, Neptune and the Dwarf Planets**

**The Human and Technological Challenges of Exploring the Outer Planets**

**50 Years of Solar System Exploration**

**Geophysical Exploration of the Solar System**

¿Learning Spanish with the Solar System, Part 2¿ continues the voyage around the Solar System exploring in depth all the elements that makes the Solar System. The book is intended for kids that want to explore and discover the Solar System and at the same time sharpen their skills or learn Spanish. The book provides a simple and short explanation on the Solar System, Terrestrial planets, Jovian planets, Dwarf Planets, Asteroids, Meteorites, Moons and many other interesting things. It also provides a hands on activity so that kids can create their own Solar System. We integrate science, mathematics, history, art and languages. The images on the book are provided by NASA and drawings from various artist. Is the perfect gift for someone trying to learn a new language or someone interested in discovering the wonders that the Universe can bring.

This book is intended for kids that want to explore and discover the Solar System and at the same time sharpen or learn Spanish. The book provides simple and short explanation on the Solar System, all the planets including: The Terrestrial planets (Mercury, Venus, Earth and Mars), the Jovian planets (Jupiter, Saturn, Uranus and Neptune) and the Dwarf Planets recognized by NASA. It also provides a hand on activity so that kids can create their own planet. We integrate science, mathematics, history, art and languages. The images on the book are provided by NASA and drawings from various artist. Is the perfect gift for someone trying to learn a new language or someone interested in discovering the wonders that the Universe can bring.

Focusing on the Galileo Mission, the story will relate this remarkable spacecraft's protracted gestation and the ordeal of its long haul out to Jupiter and its ultimate triumph: 5 years exploration within the Jovian system. The story spans a full quarter of a century, drawing on the press conferences, technical papers and essays of engineers and scientists involved in the mission which provide a real sense of participation as the discoveries poured in - it will bring the mission of the Galileo spacecraft to life and provide a more engaging account than would simply be achieved by recounting scientific results. The book will conclude with a snapshot "look ahead" into the Cassini flyby of Jupiter in December 2000 shortly after publication - the book released to coincide with this media event.

Describes the biggest planet in the solar system, including the atmosphere, surface, rotation, orbit, and location.

Jupiter, Saturn, Uranus, and Neptune

The Outer Solar System

Exploring the Outer Solar System and Beyond

Jupiter Odyssey

Technical Papers Selected from AIAA/AGU Space Science Conference, Exploration of the Outer Solar System, July 1973, Subsequently Revised for this Volume

EXPLORE THE SOLAR SYSTEM!

For the first time, in one volume, Ben Evans with David Harland will not only tell the story of the hugely successful Voyager missions, but also that of the men and women who have devoted their entire working lives to them. Illustrated with stunning images, some in color, they describe the missions from their conception, through their spectacular encounters with the outer planets and on to their ultimate and, as yet, unknown destination among the stars in the so-called Voyager Interstellar Mission Majestic and untwinkling, Jupiter is the grandest of all planets. It is the largest planet in our solar system and among the brightest objects in the night sky. It shines with a noble, steady luster, and its calming presence has inspired humans for centuries. Jupiter was the "beloved star" of the first serious observers of the planets, the ancient Sumerians and Babylonians, and has inspired poetic utterances from eminent writers such as William Wordsworth and Walt Whitman. It also continues to inspire contemporary astronomers and stargazers, and this beautifully illustrated volume brings our understanding of Jupiter right up to date. The scientific study of Jupiter is at a watershed: NASA's Juno space probe has entered orbit about Jupiter to investigate the planet, while information gleaned from improved telescopes and other robotic explorers in space continues to improve our understanding of the planet's origin, evolution, and composition. Jupiter provides a concise and expert overview of the history of our observations of this largest of planetary spheres, as well as reports on the much-anticipated initial findings from the Juno space probe. Also incorporating other recent research that is not widely available, Jupiter is an accessible and engaging introduction to planetary science that will deepen our knowledge both of this magnificent planet and of our own place in the solar system.

Advances in Geophysics serial highlights new advances in the field with this new volume presenting interesting chapters. Each chapter is written by an international board of authors. Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in Advances in Geophysics serials Updated release includes the latest

information on geophysical exploration of the solar system

Table of Contents Introduction Chapter 1: The Sun Chapter 2: Some Planet Basics Chapter 3: Mercury Chapter 4: Venus Chapter 5: Earth Chapter 6: Mars Chapter 7: Jupiter Chapter 8: Saturn Chapter 9: Uranus Chapter 10: Neptune Chapter 11: Pluto Chapter 12: Interesting Facts Conclusion: Sources: Author Bio Publisher Introduction Space, the final frontier... to explore strange new worlds, to seek out new life and new civilizations, to boldly go where no man has gone before. ~ Gene Roddenberry We are living in an amazing place in the universe called: The Milky Way Galaxy. It is surrounded by lots and lots of stars, planets, asteroids, comets, and other celestial objects. One neat place in the Milky Way Galaxy is where planet earth is found. Can you guess where we are? Did you guess: The solar system? Good job! The solar system has lots of fascinating things to discover. Let ' s learn about some of them and don ' t forget to share with others! First, let ' s define our solar system. What is it? If someone asked you that question, what would you say? ESA for kids explains it in a nice and simple way: " The Solar System is made up of the Sun and all of the smaller objects that move around it. " Simple enough, right? It might sound that way, but it isn ' t! The solar system has eight planets. Let ' s start with the sun. It is the biggest part of our solar system and everything moves around this bright star.

Lunar and Planetary Surface Conditions

Explore the Solar System

NASA's Remarkable Expeditions to the Ends of the Solar System

Horizons: Exploring the Universe

Space Science in the Twenty-First Century -- Imperatives for the Decades 1995 to 2015

Interplanetary Outpost

***This book tells of recent discoveries concerning the planets, and also assesses what we now know about our Solar System in the light of those discoveries.***

***From IGY to eGY: the importance of Real-time data in space physics / Y. Kamide -- A new perspective on the relationship between substorms and magnetic storms / B.T. Tsurutani and W.D. Gonzalez -- Storm-substorm relationship:***

***Controversies and recent development / T. Hori -- Temporal development of dayside TEC Variations during the October***

***30, 2003 Superstorm: matching modeling to observations / O.P. Verkhoglyadova, B.T. Tsurutani and A.J. Mannucci -- Cutoff L-values of solar protons in comparison with ring current protons during a Storm:NOAA/POES observations / K.T.***

***Asai -- Geomagnetic activity and auroras caused by high-speed streams: a review / F.L. Guarnieri [und weitere] --***

***Development of pulsation index for space weather / K. Kitamura, S. Watari and M. Kunitake -- Atmospheric neutral analyzer for in-situ neutral mass composition and velocity distribution measurements in Ionosphere=Thermosphere***

***Coupling Studies / P.V. Amerl, E.P. King and A.W. Yau -- Reconstruction of nonlinear force-free fields and solar flare prediction / M.S. Wheatland -- Solar Radio Fine Structures detected with Super-High Temporal Resolution in Decimeter***

***Waveband / S.J. Wang [und weitere] -- Comments on the Observed Galactic Cosmic Ray Modulations in monitor and satellite data / L. Dorman -- Radiation hazard from large SEP events for aircraft from galactic cosmic rays / L. Dorman --***

***Comparative measurements of cosmic radiation monitors for aircrew exposure assessment / I.L. Getley [und weitere] -- Modelling of aircrew radiation exposure from galactic cosmic rays and solar particle events / M. Takada .. [und weitere]***

***The 13th Edition of HORIZONS means the proven Seeds/Backman approach and trusted content, fully updated with the latest discoveries and resources to meet the needs of today's diverse students. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.***

***Advances in Geosciences is the result of a concerted effort in bringing the latest results and planning activities related to earth and space science in Asia and the international arena. The volume editors are all leading scientists in their research fields covering six sections: Hydrological Science (HS), Planetary Science (PS), Solar Terrestrial (ST), Solid Earth (SE), Ocean Science (OS) and Atmospheric Science (AS). The main purpose is to highlight the scientific issues essential to the study of earthquakes, tsunamis, atmospheric dust storms, climate change, drought, flood, typhoons, monsoons, space weather, and planetary exploration. This volume is abstracted in NASA's Astrophysics Data System: <http://ads.harvard.edu> Contents:Volume 6: Hydrological Science (HS)Stochastic Generation of Multi-Site Rainfall Occurrences (R Srikanthan & G G S Pegram)Monte Carlo Simulation for Calculating Drought Characteristics (C Chaleeraktragoon & S Noikumsin)On Regional Estimation of Floods for Ungaged Sites (V-T-V Nguyen)and other papersVolume 7: Planetary Science (PS)Some Similarities and Differences Between the Mars and Venus Solar Wind Interactions (J-G Trotignin)Asteroid Compositions: Some Evidence from Polarimetry (A Cellino et al.)Formation of Alumina Nanoparticles in Plasma (M Kurumada & C Kaito)From Nuclear Blasts to Cosmic Bombardment (K O'Brien)and other papersVolume 8: Solar Terrestrial (ST)A New Perspective on the Relationship Between Substorms and Magnetic Storms (B T Tsurutani & W D Gonzalez)Comparative Measurements of Cosmic Radiation Monitors for Aircrew Exposure Assessment (I L Getley et al.)Modeling of Aircrew Radiation Exposure from Galactic Cosmic Rays and Solar Particle Events (M Takada et al.)and other papersVolume 9: Solid Earth (SE), Ocean Science (OS) & Atmospheric Science (AS)***

***Seismic Characteristics of Strong Deep Focal Earthquakes and Associated Phenomena in Northeastern Asia (J Wang et al.)Moho Depths in the Indian Ocean Based on the Inversion of Satellite Gravity Data (D N Arabelos et al.)Post Earthquake Debris Management — An Overview (R Sarkar)and other papers Readership: Academics, researchers and postgraduate students in geosciences. Key Features: Provides an important source of new and not-yet-published results from the growing Asian and international geoscience community Presents a unique view of the rapid scientific progresses made by Asian researchers in topics crucial to the future of the global environment Highlights a first-hand description of how the largest scientific population in the world is working together to manage the environmental problems which will determine the economic and social growth of the world itselfKeywords:Planetary***

***Science;Atmosphere;Ionosphere;Magnetosphere***

***The Development of Cryogenic Storage Systems for Space Flight***

***The Outer Planets***

***Robotic Exploration of the Solar System***

***Exploring and Settling the Outer Solar System***

***Advances in Geosciences***

***Encyclopedia of the Solar System***

*Lunar and Planetary Surface Conditions* considers the inferential knowledge concerning the surfaces of the Moon and the planetary companions in the Solar System. The information presented in this four-chapter book is based on remote observations and measurements from the vantage point of Earth and on the results obtained from accelerated space program of the United States and U.S.S.R. Chapter 1 presents the prevalent hypotheses on the origin and age of the Solar System, followed by a brief description of the methods and feasibility of information acquisition concerning lunar and planetary data, either from fixed terrestrial observatories or from instrumented or manned space probes. Chapter 2 reviews all conditions pertaining to the surface aspects of the closest celestial neighbor, the Moon. Sections in this chapter deal sequentially with the atmosphere, temperature conditions, subsurface stratification, field intensities (gravitational, electric, and magnetic), and lastly with the biological conditions existing on the lunar surface. This chapter also provides information on the density of the lunar atmosphere under quiescent or high-flux transient conditions, on the topography of the lunar surface, and on the probable proportion of crater-covered areas in the highlands and on the Maria. Chapter 3 is a detailed treatment of the surface conditions on the terrestrial planets, comprising Mercury, Venus, and Mars, while Chapter 4 deals with similar information relating to the so-called Jovian planets (Jupiter, Saturn, Uranus, Neptune) and Pluto. This book will prove useful to lunar and planetary mission planners, both those concerned with the purely scientific aspects of surfaces and immediate subsurfaces, and those involved in the development of roving exploration vehicles.

*Discovering the Solar System, Second Edition* covers the Sun, the planets, their satellites and the host of smaller bodies that orbit the Sun. This book offers a comprehensive introduction to the subject for science students, and examines the discovery, investigation and modelling of these bodies. Following a thematic approach, chapters cover interiors, surfaces and the atmospheres of major bodies, including the Earth. The book starts with an overview of the Solar System and its origin, and then takes a look at small bodies, such as asteroids, comets and meteorites. Carefully balancing breadth of coverage with depth, *Discovering the Solar System, Second Edition*: Offers a comprehensive introduction, assuming little prior knowledge Includes full coverage of each planet, as well as the moon, Europa and Titan. The Second Edition includes new material on exoplanetary systems, and a general update throughout. Presents latest results from the Mars Rover and Cassini-Huygens missions Includes a colour plate section Contains 'stop and think' questions embedded in the text to aid understanding, along with questions at the end of major sections. Answers are provided at the end of the book. Provides summaries at the end of each chapter, and a glossary at the end of the book Praise for the First Edition: "(...) essential reading for all undergraduate students (...) and for those at a more advanced level approaching the subject for the first time." THE SCIENCE BOOK BOARD BOOK REVIEW "One of the best books on the solar system I have seen. The general accuracy and quality of the content is excellent." JOURNAL OF THE BRITISH ASTRONOMICAL ASSOCIATION

*Solar System Exploration*

*Learning Spanish with the Solar System PART 2*

*Learning Spanish with the Solar System*

*From the Ancient World to the Extraterrestrial Future*

*New Scientist*