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SUPERMASSIVE BLACK HOLES IN THE DISTANT UNIVERSE

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Supermassive Black Holes In The Distant Universe

Astrophysics And Space Science Library

Kohei Narisada, Duco Schreuder



Supermassive Black Holes In The Distant Universe Astrophysics And Space Science Library:

Supermassive Black Holes in the Distant Universe A.J. Barger, 2013-11-09 Quasars and the menagerie of other galaxies with unusual nuclei now collectively known as Active Galactic Nuclei or AGN have in one form or another sparked the interest of astronomers for over 60 years The only known mechanism that can explain the staggering amounts of energy emitted by the innermost regions of these systems is gravitational energy release by matter falling towards a supermassive black hole a black hole whose mass is millions to billions of times the mass of our Sun AGN emit radiation at all wavelengths X rays originating at a distance of a few times the event horizon of the black hole are the emissions closest to the black hole that we can detect thus X rays directly reveal the presence of active supermassive black holes Oftentimes however the supermassive black holes that lie at the centers of AGN are cocooned in gas and dust that absorb the emitted low energy X rays and the optical and ultraviolet light hiding the black hole from view at these wavelengths Until recently this low energy absorption presented a major obstacle in observational efforts to map the accretion history of the universe In 1999 and 2000 the launches of the Chandra and XMM Newton X ray Observatories finally broke the impasse The impact of these observatories on X ray astronomy is similar to the impact that the Hubble Space Telescope had on optical astronomy The astounding new data from these observatories have enabled astronomers to make enormous advances in their understanding of when accretion occurs [The Multiwavelength Atlas of Galaxies](#) Glen Mackie, 2011-01-06 Since the radio signature of our own Milky Way was detected in 1931 galaxies have been observed from ultra high energy gamma rays to long wavelength radio waves providing fundamental insights into their formation evolution and structural components Unveiling the secrets of some of the best observed galaxies this atlas contains over 250 full color images spanning the whole electromagnetic spectrum The accompanying text explains why we see the component stars gas and dust through different radiation processes and describes the telescopes and instruments used This atlas is a valuable reference resource on galaxies for students seeking an overview of multiwavelength observations and what they tell us and researchers needing detailed summaries of individual galaxies An accompanying website hosted by the author contains slide shows of the galaxies covered in the book This is available at www.cambridge.org/9780521620628 **The First Galaxies** Tommy Wiklind, Bahram Mobasher, Volker Bromm, 2012-12-15 New observations of the period between the cosmic recombination and the end of reionization are posing intriguing questions about where the first generations of stars were formed how the first galaxies were assembled whether these galaxies have low redshift counterparts and what role the early galaxies played in the reionization process Combining the new observational data with theoretical models can shed new light on open issues regarding the star formation process its role in the reionization of the Universe and the metal enrichment in galaxies at those early epochs This volume brings together leading experts in the field to discuss our current level of understanding and what may come in the near future as our observational as well as theoretical tools improve The book confronts the theory of how

the first stars black holes and galaxies formed with current and planned observations This synthesis is very timely just ahead of the establishment of major new facilities such as the James Webb Space Telescope JWST a next generation millimeter sub millimeter observatory in the Atacama desert ALMA and ground based Extremely Large Telescopes ELT Together they will revolutionize the study of the most distant objects in the Universe This volume is aimed at beginning graduate students but can also serve as a reference work for active researchers in the field Apart from presenting the fundamental concepts involved it also provides an introduction to the methods and techniques used The book will also be useful to anyone with an astrophysical background who needs an effective starting point for learning about the first stars and galaxies

The Sun and the Heliosphere as an Integrated System Giannina Poletto, Steve T. Suess, 2013-06-05 9 MHD Turbulence in the Heliosphere Evolution and Intermittency 253 Bruno Bavassano Roberto Bruno and Vincenzo Carbone 1 Introduction 254 2 MHD Turbulence Evolution 255 2 1 Ecliptic Turbulence 256 2 2 Polar Turbulence 258 2 3 Conclusions on Turbulence Evolution 263 3 Intermittency 264 3 1 Probability Distribution Functions of Fluctuations and Self similarity 269 3 2 Radial Evolution of Intermittency 271 3 3 Identifying Intermittent Events 273 3 4 Conclusions on Intermittency 277 10 283 Waves and Turbulence in the Solar Corona Eckart Marsch 1 Introduction 284 2 Coronal Magnetic Field Structures 284 3 Magnetic Network Activity and Coronal Heating 287 4 Waves and Flows in Loops and Funnels 290 5 Magnetohydrodynamic Waves and Flux Tube Oscillations 293 5 1 Observation and Theory 293 5 2 Oscillations of Thin Flux Tubes 295 5 3 Wave Amplitudes Versus Height from Numerical Mod 2 5 4 A Standing Slow Magnetoacoustic Wave 299 6 Plasma Waves and Heating of Particles 301 7 Generation Transfer and Dissipation of Coronal Turbulence 303 7 1 Generation of Magnetohydrodynamic Waves 303 7 2 Wave Energy Transfer and Turbulent Cascade 304 7 3 Wave Dissipation in the Kinetic Domain 307 7 4 Origin and Generation of Coronal High Frequency Waves 308 7

Civic Astronomy George Wise, 2012-11-07 The founding of the Dudley Observatory at Albany N Y in 1852 was a milestone in humanity's age old quest to understand the heavens As the best equipped astronomical observatory in the U S led by the first American to hold a Ph D in astronomy Benjamin Apthorp Gould Jr the observatory helped pioneer world class astronomy in America It also proclaimed Albany's status as a major national center of culture knowledge and affluence This book explores the story of the Dudley Observatory as a 150 year long episode in civic astronomy The story ranges from a bitter civic controversy to a venture into space from the banks of the Hudson River to the highlands of Argentina It is a unique glimpse at a path not taken a way of doing science once promising now vanished As discoveries by the Dudley Observatory's astronomers especially its second director Lewis Boss made significant contributions to the modern vision of our Milky Way galaxy as a rotating spiral of more than a million stars the advance of astronomy left that little observatory behind

Organizations and Strategies in Astronomy Andre HECK, 2013-06-05 Anyone who doubts that astronomy is enjoying a golden age has only to browse the pages of Organizations and Strategies in Astronomy Vol 5 Our golden age is defined not only by the enormity of new discoveries of dark energy dark matter extra

solar planets and the evolution of Mars but also by the breadth diversity and creativity within our community This volume records our history in a period of such rapid change and growth that individual astronomers are hard pressed to keep abreast of their own fields and neighborhoods much less of developments world wide Since the 1950 s changes in the landscape of astronomy are manifold We have witnessed two epochs of big telescope construction the 4 meter class telescopes of the 60s and 70s and the 8 to 10 meter class telescopes of the 90s continuing through today We accomplished the transition from photographic to digital data and we continue to improve the size and sensitivity of astronomical detectors We have witnessed the flowering of radio astronomy and the opening of the full electromagnetic spectrum through space astronomy We have seen the growth of national and international astronomy facilities and a dramatic broadening of the accessibility of data both through observing facilities available through open competition based on scientific merit and through deep rich archives of data

Adventures in Order and Chaos George Contopoulos, 2007-09-21 For many years I was organizing a weekly seminar on dynamical astronomy and I used to make some historical remarks on every subject including some anecdotes from my contacts with many leading scientists over the years I described also the development of various subjects and the emergence of new ideas in dynamical astronomy Then several people prompted me to write down these remarks which cannot be found in papers or books Thus I decided to write this book which contains my experiences over the years I hope that this book may be helpful to astronomy students all over the world During my many years of teaching as a visiting professor in American Universities 1962 1994 Yale Harvard MIT Cornell Chicago Maryland and Florida I was impressed by the quality of my graduate students Most of them were very bright asking penetrating questions and preparing their homework in a perfect way In a few cases instead of a final examination I assigned to them some small research projects and they presented their results at the end of the course They were excellent in preparing the appropriate slides and in presenting their results in a concise and clear way

Kristian Birkeland Alv Egeland, William J. Burke, 2005-10-04 At the beginning of the 20th century Kristian Birkeland 1867 1917 a Norwegian scientist of insatiable curiosity addressed questions that had vexed European scientists for centuries Why do the northern lights appear overhead when the earth's magnetic field is disturbed How are magnetic storms connected to disturbances on the sun To answer these questions Birkeland interpreted his advance laboratory simulations and daring campaigns in the Arctic wilderness in the light of Maxwell's newly discovered laws of electricity and magnetism Birkeland's ideas were dismissed for decades only to be vindicated when satellites could fly above the earth's atmosphere Faced with depleting stocks of Chilean saltpeter and the consequent prospect of mass starvation Birkeland showed his practical side inventing the first industrial scale method to extract nitrogen based fertilizers from the air Norsk Hydro one of modern Norway's largest industries stands as a living tribute to his genius Hoping to demonstrate what we now call the solar wind Birkeland moved to Egypt in 1913 Isolated from his friends by the Great War he yearned to celebrate his 50th birthday in Norway The only safe passage home via the Far East brought him to Tokyo where

he passed away in the late spring of 1917 Light Pollution Handbook Kohei Narisada, Duco Schreuder, 2013-06-05 This book deals with light pollution and about the ways to reduce it Light pollution is one of the negative side effects of artificial outdoor lighting The term light pollution is an unhappy one but as no better alternative seems to exist it will be used throughout this book The function of all outdoor lighting is to enhance the visibility or the aesthetics in the nighttime environment The light should come where it is needed If not it is spilled causing economic and environmental losses as well as disturbance and discomfort The overall effects are termed light pollution a major form of light pollution is the glow extending over the night sky Sky glow is discussed in many astronomical textbooks and in many popular brochures The present book is primarily aimed at those responsible for outdoor lighting installations Thus an engineering approach has been chosen The level of the book is that of college or University level The book is organized in two parts The first seven chapters cover the areas of general interest and conclude with recommendations The second part deals with the scientific and engineering elaboration of the first part A number of examples are included that refer to specific outdoor lighting installations and projects that are directly related to the reduction of light pollution Finally some information is given about the authors **The New Rosetta Targets** Luigi Colangeli, Elena Mazzotta Epifani, Pasquale Palumbo, 2013-11-08 This volume collects papers presented as invited and contributed talks or posters at the workshop on The NEW Rosetta targets

Observations simulations and instrument performances which was held in Capri on October 13-15 2003 More than 100 scientists covering different fields such as optical and radio astronomy laboratory experiments and modelling of comet physics and processes as well as several Principal Investigators of the instruments on board Rosetta participated to this highly interdisciplinary workshop The Rosetta mission was programmed for launch in January 2003 towards the short period comet 46P Wirtanen and the asteroids 140 Siwa and 4979 Otawara However due to problems with the Ariane V launcher the launch was postponed and the European Space Agency had to identify new mission targets suitable for a launch window at the end of February 2004 The short period comet 67P Churyumov

Gerasimenko was chosen as primary target for the new baseline together with one or two asteroids to be selected depending on the v available after the Rosetta probe interplanetary orbit insertion After the successful launch of the mission on March 2nd 2004 the new baseline foresees a double flyby with asteroids 21 Lutetia and 2867 Steins on the way towards the rendezvous with the primary target that will be reached in 2014 The papers included in this volume cover different complementary fields observations of the new Rosetta targets laboratory experiments theoretical simulation of comet environment and processes performances of the experiments on board Rosetta spacecraft also in view of the new mission targets

After the postponement of the mission launch comet 67P Churyumov Gerasimenko was the subject of an intense observation campaign between February and June 2003 **Scientific American** , 2005 How does the Galaxy work? Emilio Javier Alfaro, Enrique Perez, José Franco, 2006-03-30 The international conference How does the Galaxy work Agalactic tertulia started with

Don Cox and Ron Reynolds was held during the week of 23 to 27 of June 2003 in the marvelous city of Granada Spain This week marked the beginning of one of the hottest summers that we have ever lived but in contrast the meeting was one of the coolest events that we can remember First it certainly was a first class scientific reunion with an excellent program talented speakers and alive discussions in a friendly atmosphere Second the whole event was embedded in the passionate Andalusian way of life a true tertulia well seasoned with tasty tapas and perfectly marinated in cool and dry sherry wine Third the celebration was framed by some of the most beautiful settings that one can imagine we enjoyed the magnificent splendor of the Alhambra the unique Muslim Jewish Christian flavor of the Albaicin and the magical gipsy heartbeat of Sacromonte Last but not least all discussions whether they were during the sessions or at a bar table were sprinkled with the charm and wit of the two guests of honor Don Cox and Ron Reynolds The idea of having a scientific feast to celebrate their 60th birthday in Granada was actually conceived at a bar table in Seville with plenty of manzanilla at hand a couple of summers ago That perhaps was the difficult part of the project The rest was relatively easy to achieve because Don and Ron are not only remarkable astronomers but they are also great human beings Indeed we had a very positive response from all parties involved every person we talked to was enthusiastic about the celebration and wanted to give their own point of view in this tertulia

Solar Magnetic Phenomena
A. Hanslmeier, A. Veronig, M. Messerotti, 2006-03-30 The concept of summerschools and workshops at the Kanzelhöhe Solar Observatory Karn ten Austria devoted to up to date topics in solar physics has been proven to be extremely successful and thus in August September 2003 the third combined summerschool and workshop was held there This book contains the proceedings of the Summerschool and Workshop Solar Magnetic Phenomena held from 25 August to 5 September 2003 at the Solar Observatory Kanzelhöhe which belongs to the Institute for Geophysics Astrophysics and Meteorology of the University of Graz Austria The book contains the contributions from six invited lecturers They give an overview on the following topics observations of the photosphere and chromosphere solar observations and theory coronal mass ejections and the relevance of magnetic helicity high energy radiation from the Sun the physics of solar prominences and highlights from the SOHO mission The lectures contain about 25 to 30 pages each and provide a valuable introduction to the topics mentioned above The comprehensive lists of references at the end of each contribution enable the interested reader to go into more detail The second part of the book contains contributed papers These papers were presented and discussed in the workshop sessions during the afternoons The sessions stimulated intensive discussions between the participants and lecturers

At the Edge of the Universe: Latest Results from the Deepest Astronomical Surveys José Afonso, 2007 This volume contains the proceedings of an international conference held in October 2006 in Sintra Portugal on the recent results from the deepest astronomical observations of the Universe Focused on the latest observational developments in galaxy and structure formation and evolution as given by the use of the most powerful telescopes working throughout the electromagnetic spectrum the conference assembled some of the most active researchers in the field The ninety eight contributions included

in this volume represent the state of the art of research covering such topics as the first billion years of galaxy formation probing the reionization epoch obscured galaxy populations and their role in galaxy evolution early AGN activity the star formation and mass assembly history of the Universe massive galaxies at high redshift and the metallicity history of galaxies A particular emphasis is given to the unification of the different views given by observations at different wavelengths making the books a valuable reference for researchers and graduate students interested in the exploration of the distant universe publisher s website

Penetrating Bars through Masks of Cosmic Dust David L. Block, Iv  nio Puerari, K. C. Freeman, R. Groess, Elizabeth K. Block, 2004-11-29 THE EDITORS DAVID L BLOCK AND KENNETH C FREEMAN SOC CO CHAIRS IVANIO PUERARI ROBERT GROESS AND LIZ K BLOCK 1 Harvard College Observatory 1958 The past century has truly brought about an explosive period of growth and discovery for the physical sciences as a whole and for astronomy in particular Galaxy morphology has reached a renaissance The year 1958 The date October 1 The venue Harvard College Observatory The lecturer Walter Baade With amazing foresight Baade penned these words Young stars supergiants and so on make a terrific splash lots of light The total mass of these can be very small compared to the total mass of the system Dr Layzer then asked the key question the discussion raises the point of what this classification would look like if you were to ignore completely all the Population I and just focus attention on the Population II We stand on the shoulders of giants The great observer E E Barnard in his pioneering efforts to photograph the Milky Way devoted the major part of his life to identifying and numbering dusty holes and dust lanes in our Milky Way No one could have dreamt that the pervasiveness of these cosmic dust masks not only in our Galaxy but also in galaxies at high redshift is so great that their penetration is truly one of the pioneering challenges from both space borne telescopes and from the ground

Recollections of "Tucson Operations" M.A. Gordon, 2006-03-30 A personal account of the evolution of millimeter wave astronomy at the US National Radio Astronomy Observatory The author recounts the behind the scenes activities of the staff from the beginnings at Kitt Peak to the closing of the Tucson offices

Formation and Evolution of Cosmic Structures Siegfried R  ser, 2010-02-16 This 21st volume in the series contains 15 invited reviews and highlight contributions presented during the 2008 International Scientific Conference of the German Astronomical Society on the topic of New Challenges to European Astronomy held in Vienna Austria The papers discuss a wide range of hot topics including cosmology high energy astrophysics astroparticle physics gravitational waves extragalactic and stellar astronomy together representing the roadmap for modern astrophysical research

A Companion to Astronomy and Astrophysics Kenneth R. Lang, 2007-01-15 Astronomy and Astrophysics is a comprehensive fundamental up to date reference book It is filled with vital information and basic facts for amateur astronomers and professional astrophysicists and for anyone interested in the Universe from the Earth and other planets to the stars galaxies and beyond Although serious and thorough the language and ideas will attract the general reader as well as students and professionals Astronomy and Astrophysics consists of two main parts a Timeline and a

Dictionary The Timeline is a concise history arranged chronologically which provides the complete story of cosmic discovery from early Chinese and Greek astronomy to the latest findings of modern astrophysics and robotic spacecraft It provides a sense of destination and flow in our growing awareness of the Universe Each entry in the unfolding narrative is written in a concise light and friendly style that will be appreciated by all without being weighted down with incomprehensible specialized terms The story of science is one of individuals as well as discoveries and ideas So our Timeline includes the people who have made major scientific contributions that are related to astronomy and astrophysics The Dictionary defines all terms and acronyms that deal with our celestial science from important concepts to individual objects and space missions It is arranged alphabetically and complemented by numerous tables of fundamental data for bright cosmic objects including the celestial coordinates required to observe them Line drawings are also used to forcefully compact a scientific insight with clear labels and captions An exceptionally thorough Index cross references concepts discoveries and individuals in both the Timeline and Dictionary The combined result is a unique comprehensive stand alone reference volume in which the reader can quickly locate information while also discovering new and unexpected knowledge

The British National

Bibliography Arthur James Wells,2004 American Book Publishing Record ,2006

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