Quantum Big Bang Cosmology

The Universe Before the Big BangThe Music of the Big BangCalibrating the CosmosThe Little Book of the Big BangCosmology and ControversyFinding the Big BangThe Big BangIntroduction To The Theory Of The Early Universe: Hot Big Bang TheoryDismantling the Big BangCosmologyFoundations of Big Bang CosmologyWhat Caused the Big Bang?The Big Bang and Georges LemaîtreThe Big Bang ExplainedBig BangThe Big Bang and Other Explosions in Nuclear and Particle AstrophysicsThe Big Bang Never HappenedThe Cosmic Revolutionary's HandbookCosmologyBefore Time Began Maurizio Gasperini Amedeo Balbi Frank Levin Craig J. Hogan Helge Kragh P. James E. Peebles Timothy E Eastman Valery A Rubakov Alex Williams Peter Coles F. Walter Meyerstein Rem Blanchard Edwards A.L. Berger Megan Ansdell Heather Couper David N. Schramm Eric Lerner Luke A. Barnes Norriss S. Hetherington Helmut Satz

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terms such as expanding universe big bang and initial singularity are nowadays part of our common language the idea that the universe we observe today originated from an enormous explosion big bang is now well known and widely accepted at all levels in modern popular culture but what happens to the universe before the big bang and would it make any sense at all to ask such a question in fact recent progress in theoretical physics and in particular in string theory suggests answers to the above questions providing us with mathematical tools able in principle to reconstruct the history of the universe even for times before the big bang in the emerging cosmological scenario the universe at the epoch of the big bang instead of being a new born baby was actually a rather aged creature in the middle of its possibly infinitely enduring evolution the aim of this book is to convey this picture in non technical language accessibile also to non specialists the author himself a leading cosmologist draws attention to ongoing and future observations that might reveal relics of an era before the big bang

ever since its infancy humankind has been seeking answers to some very basic and profound questions did the universe begin if it did how old is it and where did it come from what is its shape what is it made of fascinating myths and brilliant in itions attempting to solve such enigmas can be found all through the history of human thought every culture has its own legends itsownworldcreationtales itsphilosophicalspeculations itsre gious beliefs modern science however cannot content itself with fanciful explanations no matter how suggestive they are no days our theories about the universe built upon rational ded tion have to survive the hard test of experiment and observation cosmology the science which studies the origin and evo tion of the universe had to overcome enormous dif culties before it could achieve the same level of dignity as other physical dis plines at rst it had no serious physical model and mathematical tools that could be used to address the complexity of the problems it had to face then it suffered from a chronic lack of experim tal data which made it almost impossible to test the theoretical speculations given this situation answering rigorously the many questions on the nature of the universe seemed nothing more than a delusion today however things have changed we live in the golden age of cosmology an exciting moment when for the rst time we are able to scienti cally understand our universe

calibrating the cosmos describes hard science but is gently written it explains in clear non mathematical language the measurements and the interpretation of the resulting data that have led to the current understanding of the origin evolution and properties of our expanding big bang universe many people have a sketchy idea of the work of cosmologists but professor levin s experience in teaching both scientific and liberal arts students has enabled him to impart much of our current thinking without resorting to difficult mathematics theoretical concepts are emphasized in particular the symmetries of homogeneity and isotropy enjoyed by our universe on the largest scales how these symmetries lead to only one quantity being needed to describe the growth of the universe from its infancy to the present time and how the so called parameters of the universe are the ingredients used to construct the model universes to which ours the real thing is compared levin includes the 2003 results from the wilkinson microwave anisotropy probe wmap and the 2003 and 2004 results of the sloan digital sky survey to ensure that the book is up to date he explains the relevance of the discoveries done by the new physics nobel laureates smoot and mather background material is provided in the first four chapters the current picture and how it was attained are discussed in the next four chapters and some unsolved problems and conjectured solutions are explored in the final chapter

hogan compresses the fifteen billion year history of the universe into a pleasurable evening in a very direct way he answers the questions everyone asks margaret geller harvard smithsonian center for astrophysics this delightful little primer brings you right up to the cutting edge of modern cosmology george smoot principal investigator cobe and author of wrinkles in time an excellent bridge by which the layperson can enter the domain of the cosmos with understanding robert williams director space telescope science institute

for over three millennia most people could understand the universe only in terms of myth religion and philosophy between 1920 and 1970 cosmology transformed into a

branch of physics with this remarkably rapid change came a theory that would finally lend empirical support to many long held beliefs about the origins and development of the entire universe the theory of the big bang in this book helge kragh presents the development of scientific cosmology for the first time as a historical event one that embroiled many famous scientists in a controversy over the very notion of an evolving universe with a beginning in time in rich detail he examines how the big bang theory drew inspiration from and eventually triumphed over rival views mainly the steady state theory and its concept of a stationary universe of infinite age in the 1920s alexander friedmann and georges lemaître showed that einstein s general relativity equations possessed solutions for a universe expanding in time kragh follows the story from here showing how the big bang theory evolved from edwin hubble s observation that most galaxies are receding from us to the discovery of the cosmic microwave background radiation sir fred hoyle proposed instead the steady state theory a model of dynamic equilibrium involving the continuous creation of matter throughout the universe although today it is generally accepted that the universe started some ten billion years ago in a big bang many readers may not fully realize that this standard view owed much of its formation to the steady state theory by exploring the similarities and tensions between the theories kragh provides the reader with indispensable background for understanding much of today s commentary about our universe

a collection of essays on research on cmbr in the 1960s by eminent cosmologists who pioneered the work

the theory that has come to be known as the big bang was originally proposed by a catholic priest to make the bible scientific critics of the big bang theory have subsequently referred to this theory as religion masquerading as science nevertheless the big bang model is the generally accepted theory for the origin of universe nonetheless findings in observational astronomy and revelations in the field of fundamental physics over the past two decades question the validity of the big bang model as a viable theory for the origin of the universe there are numerous factors which undermine the theory of the big bang including the organization of galactic superstructures the cosmic microwave background distant galaxies gravitational waves red shifts and the age of local galaxies admittedly the big bang research program has been successful in generating fruitful scientific hypotheses and tests and there has been some confirmation for many hypotheses however outstanding questions remain and substantial alternative cosmology models which also have been fruitful remain viable and continue to evolve unfortunately there has been a concerted effort to prevent research into alternate cosmologies the big bang has become a sacred cow which must not be questioned one of the greatest challenges facing astrophysics is derivation of remoteness in cosmological objects at large scales it is almost entirely dependent upon the hubble relationship between apparent brightness and spectral redshift for large luminous objects however this data has questionable validity the assumption of scale invariance and universality of the hubble law allowed the adoption of redshift as a standard calibration of cosmological distance however there have been several fields of study in observational astronomy that consistently give apparently anomalous results from ever larger statistical samples and would thus seem to require further careful investigation a major problem is that the big ba big bang model implies the existence of a creator why the universe should have had a beginning or why it would have been created cannot be explained by classical or quantum physics to support the big bang estimates of the age and size of the cosmos including claims of an

accelerating universe are based on an earth centered universe with the earth as the measure of all things exactly as dictated by religious theology however distance from earth is not a measure of the age of far away galaxies the big bang cannot explain why there are galaxies older than the big bang why fully formed galaxies continue to be discovered at distances of over 13 billion light years from earth when according to big bang theory no galaxies should exist at these distances to support the big bang red shifts are purposefully misinterpreted based on pre copernican geo centrism with earth serving as ground zero however red shifts are variable effected by numerous factors and do not provide measures of time age or distance nor can big bang theory explain why galaxies collide why rivers of galaxies flow in the wrong direction why galaxies clump together creating great walls of galaxies which took from 80 billion to 150 billion years to form big bang theory requires phantom forces constantly adjusted parameters and ad hoc theorizing to explain away and to cover up the numerous holes in this theory finally if at first there was a singularity then the big bang was not a beginning but a continuation

this book is written from the viewpoint of a deep connection between cosmology and particle physics it presents the results and ideas on both the homogeneous and isotropic universe at the hot stage of its evolution and in later stages the main chapters describe in a systematic and pedagogical way established facts and concepts on the early and the present universe the comprehensive treatment hence serves as a modern introduction to this rapidly developing field of science to help in reading the chapters without having to constantly consult other texts essential materials from general relativity and the theory of elementary particles are collected in the appendices various hypotheses dealing with unsolved problems of cosmology and often alternative to each other are discussed at a more advanced level these concern dark matter dark energy matter antimatter asymmetry etc

why did ptolemy s theory cause problems for the church what is the big secret concerning the age of the earth why do many scientists reject the use of design in explaining origins the seemingly absurd idea that all matter energy space and time once exploded from a point of extreme density has captured the imagination of scientists and laypersons for decades the big bang has provided a central teaching for the eons of time of cosmic evolution undermining the history and cosmology of the bible it is a theory that fails even violating the very physical laws on which it is purportedly based in this easy to read format authors alex williams and john hartnett explode this naturalistic explanation for the universe and show that the biblical model provides a far better explanation of our origins this fully indexed illustrated analysis of the big bang theory is an invaluable help in understanding and countering a world view that is as chaotic and destructive as its name implies

this book is a simple non technical introduction to cosmology explaining what it is and what cosmologists do peter coles discusses the history of the subject the development of the big bang theory and more speculative modern issues like quantum cosmology superstrings and dark matter about the series the very short introductions series from oxford university press contains hundreds of titles in almost every subject area these pocket sized books are the perfect way to get ahead in a new subject quickly our expert authors

combine facts analysis perspective new ideas and enthusiasm to make interesting and challenging topics highly readable

this book critically explores answers to the big question what produced our universe around fifteen billion years ago in a big bang it critiques contemporary atheistic cosmologies incl steady state oscillationism big fizz that affirm the eternity self sufficiency of the universe without god it defends and revises process theology and arguments for god s existence from the universe s life supporting order contingent existence

ix fully aware of the work accomplished by mgr lemattre his majesty king baudouin enhanced this occasion by placing it under his high patronage his holiness the pope jean paul ii accepted to testify his paternel solicitude for the work of the scientists participating in the symposium the president of the pontifical academy of sciences and the director of the vatican observatory transmitted their fervent wishes for the full success of the symposium numerous other eminent people graced the ceremony with their patronage the academic opening the addresses of which are pub lished by the revue des questions scientifiques de bruxelles was presided over by mgr e massaux rector of the catholic university of louvain who spoke about lemattre the university professor professor ch de duve nobel prize winner in medicine called to mind the role of lemattre as president of the pontifical academy of sciences the emeritus professor o godart founder of the institute recalled the life and work of mgr lemattre professor a deprit senior mathematician at the national bureau of standards spoke about lemattre s work in celestial mechanics and his keen interest for computers professor j peebles professor of physics at princeton university summarized the fundamental contributions of lemattre to modern cosmology the attendance of more than three hundred people was enhanced by the presence of mgr a pedroni papal nuncio mr ph maystadt minister of research policy mr e knoops secretary of state mr y de wasseige senator professor e

the big bang theory describes the very beginnings of the universe when it was infinitesimally small and infinitely dense and follows its rapid expansion and evolution from the formation of nuclei within the first few minutes to the creation of the first galaxies a billion years later the big bang theory is a cornerstone of modern cosmology and although astronomers cannot directly observe the birth of the universe the theory is widely accepted because it makes concrete predictions of the current observable universe which have been tested repeatedly with striking success supporting the next generation science standards emphasis on scientific collection and analysis of data and evidence based theories this book will help students understand the observational evidence supporting the big bang theory and speculate on the ultimate fate of the universe it implies

explores the big bang theory of how the universe may have begun

this volume of important papers by one the world s leading astrophysicists provides a sweeping survey of the incisive and exciting applications of nuclear and particle physics to a wide range of problems in astrophysics and cosmology the prime focus of the book is on big bang cosmology and the role of primordial nucleosynthesis in establishing the modern consensus on the big bang this leads into the connection of cosmology to particle physics and the constraints put on various elementary particles by astrophysical

arguments big bang nucleosynthesis has also led to the argument for nonbaryonic dark matter and is thus related to the major problem in physical cosmology today namely structure formation the nuclear particle interface with astrophysics also extends to the other topics of major interest such as the age of the universe cosmic rays supernovae and solar neutrinos each of which will be discussed in some detail each section contains historical papers current papers and frequently a popular article on the subject which provides an overview of the topic this volume is testimony to the success of the integration of nuclear and particle physics with astrophysics and cosmology and to the ingenuity of the work in this area which has earned the author numerous prestigious awards the book which is accessible to beginning graduate students should be of particular interest to researchers and students in astronomy astrophysics cosmology and gravitation and also in high energy and nuclear physics

a mesmerizing challenge to orthodox cosmology with powerful implications not only for cosmology itself but also for our notions of time god and human nature with a new preface addressing the latest developments in the field far ranging and provocative the big bang never happened is more than a critique of one of the primary theories of astronomy that the universe appeared out of nothingness in a single cataclysmic explosion ten to twenty billion years ago drawing on new discoveries in particle physics and thermodynamics as well as on readings in history and philosophy eric j lerner confronts the values behind the big bang theory the belief that mathematical formulae are superior to empirical observation that the universe is finite and decaying and that it could only come into being through some outside force with inspiring boldness and scientific rigor he offers a brilliantly orchestrated argument that generates explosive intellectual debate

presents the observations that helped establish our theories of the cosmos from a unique and engaging perspective

this book is a collection of contributions examining cosmology from multiple perspectives it presents articles on traditional native american and chinese cosmologies and traces the historical roots of western cosmology from mesopotamia and pre socratic greece to medieval cosmology

what is the origin of the universe what was there before the universe appeared we are presently witnessing a second copernican revolution neither our earth and sun nor our galaxy nor even our universe is the end of all things this account of recent developments in modern cosmology introduces how the big bang took place and what preceded it

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