

Reminiscences
about a great physicist

Paul Adrien Maurice Dirac



Edited by Behram N. Kursunoglu & Eugene P. Wigner

Paul Adrien Maurice Dirac Reminiscences About A Great Physicist

Jagdish Mehra, Helmut Rechenberg



Paul Adrien Maurice Dirac Reminiscences About A Great Physicist:

Paul Adrien Maurice Dirac Behram N. Kursunoglu, Eugene Paul Wigner, 1990-04-26 Paul Dirac who died in 1984 was without question one of the greatest physicists of the twentieth century His revolutionary contribution to modern quantum theory is remembered for its insight and creativity He is especially famous for his prediction of the magnetic moment and spin of the electron and for the existence of antiparticles He was awarded the Nobel Prize for physics in 1933 at the age of 31 In this memorial volume 24 of Dirac s friends colleagues and contemporaries remember him with affection There are chapters describing Dirac s personality and many anecdotes about the man with a reputation for silence Other chapters describe Dirac s science and its impact on modern physics [The Outer Limits of Reason](#) Noson S. Yanofsky, 2016-11-04 This exploration of the scientific limits of knowledge challenges our deep seated beliefs about our universe our rationality and ourselves A must read for anyone studying information science Publishers Weekly starred review Many books explain what is known about the universe This book investigates what cannot be known Rather than exploring the amazing facts that science mathematics and reason have revealed to us this work studies what science mathematics and reason tell us cannot be revealed In [The Outer Limits of Reason](#) Noson Yanofsky considers what cannot be predicted described or known and what will never be understood He discusses the limitations of computers physics logic and our own intuitions about the world including our ideas about space time and motion and the complex relationship between the knower and the known Yanofsky describes simple tasks that would take computers trillions of centuries to complete and other problems that computers can never solve perfectly formed English sentences that make no sense different levels of infinity the bizarre world of the quantum the relevance of relativity theory the causes of chaos theory math problems that cannot be solved by normal means statements that are true but cannot be proven Moving from the concrete to the abstract from problems of everyday language to straightforward philosophical questions to the formalities of physics and mathematics Yanofsky demonstrates a myriad of unsolvable problems and paradoxes Exploring the various limitations of our knowledge he shows that many of these limitations have a similar pattern and that by investigating these patterns we can better understand the structure and limitations of reason itself Yanofsky even attempts to look beyond the borders of reason to see what if anything is out there

From c-Numbers to q-Numbers Olivier Darrigol, 2023-11-15 *From c Numbers to q Numbers* The Classical Analogy in the History of Quantum Theory explores the critical role of classical analogies in the development of quantum theory examining how key figures such as Planck Bohr Heisenberg and Dirac employed these analogies to bridge the gap between classical and quantum mechanics At the heart of the book is the idea that quantum mechanics while radically different from classical theories still relies heavily on formal structures and mathematical procedures inherited from classical physics By analyzing three major stages in quantum theory Planck s radiation theory Bohr s atomic theory and Dirac s quantum mechanics the book reveals how analogies with classical theories not only facilitated the formation of quantum ideas but also provided a

framework that allowed quantum mechanics to evolve from classical roots The book identifies four distinct types of classical analogies Planck's horizontal analogy which merely extended classical methods Bohr's vertical analogies which involved more direct though incomplete translations of classical laws Heisenberg's and Dirac's analogies which mathematically aligned classical and quantum mechanics and Dirac's use of relativistic strategies for theory building These analogies were essential in navigating the intellectual challenges of quantum mechanics especially in the absence of complete theories The study underscores the continuity between classical and quantum physics illustrating how quantum theory through its innovative use of mathematical formalisms preserved the elegance of classical mechanics while embracing new non intuitive principles This approach shows that the construction of quantum theory was deeply intertwined with classical precedents allowing quantum mechanics to mature while maintaining connections to earlier frameworks of understanding This title is part of UC Press's Voices Revived program which commemorates University of California Press's mission to seek out and cultivate the brightest minds and give them voice reach and impact Drawing on a backlist dating to 1893 Voices Revived makes high quality peer reviewed scholarship accessible once again using print on demand technology This title was originally published in 1992

Faust in Copenhagen Gino Segre, 2007-06-14 A physicist himself Gino Segre writes about what scientists do and why they do it with intimacy clarity and passion In *Faust in Copenhagen* he evokes the fleeting magical moment when physics and the world was about to lose its innocence forever Known by physicists as the miracle year 1932 saw the discovery of the neutron and antimatter as well as the first artificially induced nuclear transmutations However while scientists celebrated these momentous discoveries which presaged the nuclear era and the emergence of big science during a meeting at Niels Bohr's Copenhagen Institute Europe was moving inexorably toward totalitarianism and war

More Than Nothing Aaron Sidney Wright, 2024 Across decades and disciplines *More than Nothing* offers a scoping history of the vacuum as a lens into the development of modern physics

The Strangest Man Graham Farmelo, 2009-08-25 Paul Dirac was among the greatest scientific geniuses of the modern age One of Einstein's most admired colleagues he helped discover quantum mechanics and his prediction of antimatter was one of the greatest triumphs in the history of physics In 1933 he became the youngest theoretician ever to win the Nobel Prize in Physics Dirac's personality like his achievements is legendary *The Strangest Man* uses previously undiscovered archives to reveal the many facets of Dirac's brilliantly original mind

QED and the Men Who Made It S. S. Schweber, 2020-05-05 In the 1930s physics was in a crisis There appeared to be no way to reconcile the new theory of quantum mechanics with Einstein's theory of relativity Several approaches had been tried and had failed In the post World War II period four eminent physicists rose to the challenge and developed a calculable version of quantum electrodynamics QED probably the most successful theory in physics This formulation of QED was pioneered by Freeman Dyson Richard Feynman Julian Schwinger and Sin Itiro Tomonaga three of whom won the Nobel Prize for their work In this book physicist and historian Silvan Schweber tells the story of these four

physicists blending discussions of their scientific work with fascinating biographical sketches Setting the achievements of these four men in context Schweber begins with an account of the early work done by physicists such as Dirac and Jordan and describes the gathering of eminent theorists at Shelter Island in 1947 the meeting that heralded the new era of QED The rest of his narrative comprises individual biographies of the four physicists discussions of their major contributions and the story of the scientific community in which they worked Throughout Schweber draws on his technical expertise to offer a lively and lucid explanation of how this theory was finally established as the appropriate way to describe the atomic and subatomic realms

FROM EROS TO GAIA Freeman Dyson, 2013-07-10 Readers of Freeman Dyson's previous books *Disturbing the Universe* *Weapons and Hope* and *Infinite in All Directions* have discovered for themselves what Dyson reveals here that he was a writer long before he became a distinguished scientist The aim of this new book as Dyson says is to open windows to let the experts inside the temple of science see out and to let the ordinary citizens outside see in In this process an immensely broad range of ideas people contemporary history and discoveries of many sorts pass in review Beginning with a piece of writing he did as a child and ending with recent work he goes from Eros the god of youthful passion to Gaia the fertile life giving mother planet Earth The pilgrimage is a good metaphor for the life of a writer This book is full of discoveries In the company of one of the most lucid minds of our time one approaches great men and problems central to our common existence Always there is warmth kindness high intelligence and humor Dyson is intimate with both science and man Whether he is dealing with the problems of physics or politics whether he is engrossed in astronomy or literature whether he is concentrating on an African village or space science Dyson's view is always infinite in all directions always following the path of diversity always keeping his eye on the wonder of our earth and the health and happiness of its inhabitants

The Conceptual Completion and Extensions of Quantum Mechanics 1932-1941. Epilogue: Aspects of the Further Development of Quantum Theory 1942-1999 Jagdish Mehra, Helmut Reichenberg, 2001-04-20 Quantum Theory together with the principles of special and general relativity constitute a scientific revolution that has profoundly influenced the way in which we think about the universe and the fundamental forces that govern it The Historical Development of Quantum Theory is a definitive historical study of that scientific work and the human struggles that accompanied it from the beginning Drawing upon such materials as the resources of the Archives for the History of Quantum Physics the Niels Bohr Archives and the archives and scientific correspondence of the principal quantum physicists as well as Jagdish Mehra's personal discussions over many years with most of the architects of quantum theory the authors have written a rigorous scientific history of quantum theory in a deeply human context This multivolume work presents a rich account of an intellectual triumph a unique analysis of the creative scientific process The Historical Development of Quantum Theory is science history and biography all wrapped in the story of a great human enterprise Its lessons will be an aid to those working in the sciences and humanities alike Comments by distinguished physicists on The Historical Development of

Quantum Theory the most definitive work undertaken by anyone on this vast and most important development in the history of physics Jagdish Mehra trained in theoretical physics under Pauli Heisenberg and Dirac pursued the vision of his youth to write about the historical and conceptual development of quantum theory in the 20th century This series of books on the HDQT has thus become the most authentic and permanent source of our knowledge of how quantum theory its extensions and applications developed My heartfelt congratulations Hans A Bethe Nobel Laureate A thrilling and magnificent achievement Subrahmanyan Chandrasekhar FRS Nobel Laureate capture s precisely accurately and thoroughly the very essence and all the fundamental details of the theory and that is a remarkable achievement I have greatly enjoyed reading these books and learned so many new things from them This series of books will remain a permanent source of knowledge about the creation and development of quantum theory Congratulations Paul A Dirac FRS Nobel Laureate The wealth and accuracy of detail in The Historical Development of Quantum Theory are breathtaking Richard P Feynman Nobel Laureate

“The” Conceptual Completion and the Extensions of Quantum Mechanics 1932 - 1941 ; Epilogue: Aspects of the Further Development of Quantum Theory 1942 - 1999 Jagdish Mehra, Helmut Rechenberg, 2001-06-29 Quantum Theory together with the principles of special and general relativity constitute a scientific revolution that has profoundly influenced the way in which we think about the universe and the fundamental forces that govern it The Historical Development of Quantum Theory is a definitive historical study of that scientific work and the human struggles that accompanied it from the beginning Drawing upon such materials as the resources of the Archives for the History of Quantum Physics the Niels Bohr Archives and the archives and scientific correspondence of the principal quantum physicists as well as Jagdish Mehra s personal discussions over many years with most of the architects of quantum theory the authors have written a rigorous scientific history of quantum theory in a deeply human context This multivolume work presents a rich account of an intellectual triumph a unique analysis of the creative scientific process The Historical Development of Quantum Theory is science history and biography all wrapped in the story of a great human enterprise Its lessons will be an aid to those working in the sciences and humanities alike Comments by distinguished physicists on The Historical Development of Quantum Theory the most definitive work undertaken by anyone on this vast and most important development in the history of physics Jagdish Mehra trained in theoretical physics under Pauli Heisenberg and Dirac pursued the vision of his youth to write about the historical and conceptual development of quantum theory in the 20th century This series of books on the HDQT has thus become the most authentic and permanent source of our knowledge of how quantum theory its extensions and applications developed My heartfelt congratulations Hans A Bethe Nobel Laureate A thrilling and magnificent achievement Subrahmanyan Chandrasekhar FRS Nobel Laureate capture s precisely accurately and thoroughly the very essence and all the fundamental details of the theory and that is a remarkable achievement I have greatly enjoyed reading these books and learned so many new things from them This series of books will remain a permanent source of knowledge

about the creation and development of quantum theory Congratulations Paul A Dirac FRS Nobel Laureate The wealth and accuracy of detail in The Historical Development of Quantum Theory are breathtaking Richard P Feynman Nobel Laureate

Principles of Quantum General Relativity Eduard Prugove?ki,1995 This monograph explains and analyzes the principles of a quantum geometric framework for the unification of general relativity and quantum theory By taking advantage of recent advances in areas like fibre and superfibre bundle theory Krein spaces gauge fields and groups coherent states etc these principles can be consistently incorporated into a framework that can justifiably be said to provide the foundations for a quantum extrapolation of general relativity This volume aims to present this approach in a way which places as much emphasis on fundamental physical ideas as on their precise mathematical implementation References are also made to the ideas of Einstein Bohr Born Dirac Heisenberg and others in order to set the work presented here in an appropriate historical context *Ether and Modernity* Jaume Navarro,2018-09-05 Ether and Modernity offers a snapshot of the status of an epistemic object the ether or aether in the early twentieth century The contributed papers show that the ether was often regarded as one of the objects of modernity hand in hand with the electron radioactivity or X rays and not simply as the stubborn residue of an old fashioned long discarded science The prestige and authority of scientists and popularisers like Oliver Lodge and Arthur Eddington in Britain Phillip Lenard in Germany or Dayton C Miller in the USA was instrumental in the preservation defence or even re emergence of the ether in the 1920s Moreover the consolidation of wireless communications and radio broadcasting indeed a very modern technology brought the ether into audiences that would otherwise never have heard about such an esoteric entity The ether also played a pivotal role among some artists in the early twentieth century the values of modernism found in the complexities and contradictions of modern physics such as wireless action or wave particle puzzles a fertile ground for the development of new artistic languages in literature as much as in the pictorial and performing arts Essays on the intellectual foundations of Umberto Boccioni s art the linguistic techniques of Lodge and Ernst Mach s considerations on aesthetics and physics witness to the imbricate relationship between the ether and modernism Last but not least the ether played a fundamental part in the resurgence of modern spiritualism in the aftermath of the Great War This book examines the complex array of meanings strategies and milieus that enabled the ether to remain an active part in scientific and cultural debates well into the 1930s but not beyond This portrait may be easily regarded as the swan song of an epistemic object that was soon to fade away as shown by Paul Dirac s unsuccessful attempt to resuscitate some kind of aether in 1951 with which this book finishes **Biographies of Scientists**

for Sci-Tech Libraries Tony Stankus,2019-12-05 This book first published in 1991 is an invaluable guide to biographies of scientists from a wide variety of scientific fields The books selected for this highly descriptive bibliography help librarians shatter readers stereotypes of scientists as monomaniacal and uninteresting people by providing interesting and provocative titles to capture the interest of students and other readers The biographies included in this very special bibliography were

carefully selected for their humour and human insights to give future scientists encouragement inspiration and an understanding of the origins of particular scientific fields These biographies are unique in that they explore the whole personality of the scientist giving students a glimpse at the variety and drama of the lives beyond well known contributions or Nobel prize accomplishments A Philosophical Approach to Quantum Field Theory Hans Christian Öttinger,2018-01-11

This text presents an intuitive and robust mathematical image of fundamental particle physics based on a novel approach to quantum field theory which is guided by four carefully motivated metaphysical postulates In particular the book explores a dissipative approach to quantum field theory which is illustrated for scalar field theory and quantum electrodynamics and proposes an attractive explanation of the Planck scale in quantum gravity Offering a radically new perspective on this topic the book focuses on the conceptual foundations of quantum field theory and ontological questions It also suggests a new stochastic simulation technique in quantum field theory which is complementary to existing ones Encouraging rigor in a field containing many mathematical subtleties and pitfalls this text is a helpful companion for students of physics and philosophers interested in quantum field theory and it allows readers to gain an intuitive rather than a formal understanding *The*

Constants of Nature John Barrow,2009-05-06 Reality as we know it is bound by a set of constants numbers and values that dictate the strengths of forces like gravity the speed of light and the masses of elementary particles In *The Constants of Nature* Cambridge Professor and bestselling author John D Barrow takes us on an exploration of these governing principles Drawing on physicists such as Einstein and Planck Barrow illustrates with stunning clarity our dependence on the steadfastness of these principles But he also suggests that the basic forces may have been radically different during the universe's infancy and suggests that they may continue a deeply hidden evolution Perhaps most tantalizingly Barrow theorizes about the realities that might one day be found in a universe with different parameters than our own

Reflections on Quanta, Symmetries, and Supersymmetries V.S. Varadarajan,2011-05-20 This is a collection of essays based on lectures that author has given on various occasions on foundation of quantum theory symmetries and representation theory and the quantum theory of the superworld created by physicists The lectures are linked by a unifying theme how the quantum world and superworld appear under the lens of symmetry and supersymmetry In the world of ultra small times and distances such as the Planck length and Planck time physicists believe no measurements are possible and so the structure of spacetime itself is an unknown that has to be first understood There have been suggestions Volovich hypothesis that world geometry at such energy regimes is non archimedian and some of the lectures explore the consequences of such a hypothesis Ultimately symmetries and supersymmetries are described by the representation of groups and supergroups The author's interest in representation is a lifelong one and evolved slowly and owes a great deal to conversations and discussions he had with George Mackey and Harish Chandra The book concludes with a retrospective look at these conversations **Spin Glasses** Marco Baity Jesi,2016-06-28 This thesis addresses the surprising features of zero

temperature statics and dynamics of several spin glass models including correlations between soft spins that arise spontaneously during avalanches and the discovery of localized states that involve the presence of two level systems It also presents the only detailed historiographical research on the spin glass theory Despite the extreme simplicity of their definition spin glasses display a wide variety of non trivial behaviors that are not yet fully understood In this thesis the author sheds light on some of these focusing on both the search for phase transitions under perturbations of Hamiltonians and the zero temperature properties and responses to external stimuli After introducing spin glasses and useful concepts on phase transitions and numerics the results of two massive Monte Carlo campaigns on three dimensional systems are presented The first of these examines the de Almeida Thouless transition and proposes a new finite size scaling ansatz which accelerates the convergence to the thermodynamic limit The second reconstructs the phase diagram of the Heisenberg spin glass with random exchange anisotropy

Unified Symmetry Behram N. Kursunogammalu, Stephan L. Mintz, Arnold Perlmutter, 2012-12-06 The twenty second Coral Gables conference UNIFIED SYMMETRY In the Small and In the Large continued with the efforts to unify the small and the large The information gathered with the Hubble telescope has in part in the absence of the SCC provided a basis for the physicists to unify cosmology and elementary particle physics The congressional cancellation of the biggest experimental project on the frontiers of physics should not be regarded as an insurmountable obstacle to progress in theoretical physics The physicists rise to prominence was mostly reached through their creation of the nuclear era The post cold war era has somewhat reduced the political military and in part the social role of the physicist Some in the administration and the Congress would like physicists to focus on the directly utilitarian aspects of science Thus some people do not realize that this regimentation of science would inhibit the creativity The contributions of solid state physics research to the advancement of technology is the result of physics freely pursued independently of its applications Modern Physics beginning with Newton's theory of gravity has enabled us to create the space age to contribute to various technologies and to impact on our technological modus vivendi

The Collected Works of P. A. M. Dirac: Volume 1 P. A. M. Dirac, 1995-10-26 A comprehensive collection of the scientific papers of one of this century's most outstanding physicists

The Neutron and the Bomb: A Biography of Sir James Chadwick Andrew Brown, 2019-08-15 James Chadwick 1891-1974 came from a humble background his father was a cotton spinner He was accepted in the physics department of Sir Ernest Rutherford at Manchester University in 1908 on a scholarship and soon started publishing new findings about radioactivity This led to a traveling scholarship to Berlin where he made the important discovery of the continuous spectrum of particles When the World War I broke out Chadwick was interned by the Germans as an enemy alien for the next four years but continued experiments in the prison camp On his return to England in broken health Rutherford invited Chadwick to join the Cavendish Laboratory in Cambridge where he became Rutherford's deputy and oversaw much groundbreaking physics research over the next 15 years Chadwick concentrated on finding evidence for the neutron an uncharged nuclear

particle whose existence was first proposed by Rutherford in 1920 Having noticed anomalous results from the Curie laboratory in Paris in 1932 Chadwick used simple bench top apparatus to convince himself after weeks of intense observations that he had definite evidence for the existence of the neutron The Nobel Prize for physics followed in 1935 that year he moved to Liverpool University to head his own department At the outbreak of World War II the feasibility of atomic bombs of unprecedented explosive power was already being discussed Chadwick drafted the British MAUD committee's historic reports in the summer of 1941 which concluded that atomic bombs were indeed feasible with sufficient industrial capacity In wartime Britain this was impossible but in 1943 Chadwick moved to the US as head of the British scientists working on the Manhattan Project He formed an unlikely alliance with its leader General Leslie Groves and became an adroit scientist diplomat Witnessing the first explosion of a plutonium fueled device at the Trinity Test shattered him Chadwick believed that dropping atomic bombs on Japanese cities was justified but the development of nuclear weapons as an unintended consequence of his discovery of the neutron caused him deep personal anguish Until this excellent book by Andrew Brown Chadwick has remained the most shadowy of the atomic scientists who for better or worse gave the human species mastery over nuclear energy Nigel Calder New Scientist Andrew Brown's biography beautifully reveals Chadwick's scientific diplomatic and personal achievements Roger H Stuewer Physics Today I can warmly recommend this book to all interested in the life of a remarkable scientist who played a crucial role in a formative period of the modern world Hermann Bondi Times Higher Education Supplement This is the biography of a physicist who made one of the most important discoveries in nuclear physics but retained to his old age the shyness of a young lad Andrew Brown takes us through Chadwick's life as an adventure I found it a very good read Hans Bethe American Journal of Physics The tale of so sterling a character even when told as well as in this book may be a little short on light moments but any reader interested in the evolution of physics from an academic passion to a leading role on the world stage will find it a fascinating story and a worthy tribute to a great scientist Brian Pippard Nature makes absorbing reading more than the life story of a remarkable man unfolds the tremendous transformation that science underwent in the 20th century Joseph Rotblat avidly researched and artfully written This biography blends elegantly direct scientific descriptions with often witty episodes and character summaries William Lanouette Bulletin of the Atomic Scientists

The book delves into Paul Adrien Maurice Dirac Reminiscences About A Great Physicist. Paul Adrien Maurice Dirac Reminiscences About A Great Physicist is an essential topic that must be grasped by everyone, ranging from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Paul Adrien Maurice Dirac Reminiscences About A Great Physicist, encompassing both the fundamentals and more intricate discussions.

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 - Chapter 2: Essential Elements of Paul Adrien Maurice Dirac Reminiscences About A Great Physicist
 - Chapter 3: Paul Adrien Maurice Dirac Reminiscences About A Great Physicist in Everyday Life
 - Chapter 4: Paul Adrien Maurice Dirac Reminiscences About A Great Physicist in Specific Contexts
 - Chapter 5: Conclusion
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- This book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Paul Adrien Maurice Dirac Reminiscences About A Great Physicist.

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