Record Nr.	UNINA9910795870603321
Autore	Weinstein Galina
Titolo	Einstein's pathway to the special theory of relativity / / Galina Weinstein
Pubbl/distr/stampa	Newcastle upon Tyne : , : Cambridge Scholars Publishing, , [2017] ©2017
ISBN	9781527585157 9781443895125
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (660 pages)
Disciplina	530.078
Soggetti	Physics - Experiments - History Special relativity (Physics)
Formato	
Livello bibliografico	Monografia
Nota di contenuto	Intro Table of Contents Preface to the Second Edition Introduction The First Chapter (A) The Second Chapter (B) The Third Chapter (C) The Fourth Chapter (D) The Fifth Chapter (E) The Final Chapter (F) Chapter A 1 Einstein's Parents and Sister Maja 2 The Move to Munich and the Electric Firm 3 Rebellious and Creative 4 Einstein Cannot Take Authority and Demands for Obedience 4.1 Primary School 4.2 Secondary School 5 Einstein Teaches Himself Natural Science and Philosophy 5.1 Max Talmud Recommends Bernstein and Kant 5.2 Einstein Reads a Small Geometry Book 5.3 Einstein Is Free in Italy 6 Secondary School in Aarau 7 Polytechnic in Zurich 7.1 Professors Weber and Pernet Turn On Einstein 7.2 Einstein Never Shows Up or Skips the Classes of Mathematicians 7.3 Einstein's Friends: Grossmann, Besso and Maric 7.4 Einstein's Residence in Zurich 8 Einstein Seeks a Position 8.1 The Rebel Graduate Einstein Is Rejected 8.2 Professor Weber Is Behind Einstein's Difficulties 8.3 Einstein Finds Temporary Positions and Grossmann Rescues Him 9 Physics Group 9.1 The Patent Office 9.2 Michele Besso, Joseph Sauter, Lucian Chavan and Heinrich Zangger 10 Philosophy Group 10.1 Maurice Solovine and Conrad Habicht 10.2 The Olympia Academy 10.3 The Reading List of the Academy 11 Annus Mirabilis 11.1 Letters to Habicht

1.

11.2 Einstein's Annus Mirabilis Papers -- 12 German Scientists Respond to Einstein's Relativity Paper -- 12.1 Professor Max Planck Writes to Einstein -- 12.2 Max Laue Meets Einstein -- 13 Einstein Teaches His Three Friends at the University of Bern -- 13.1 Patent Clerk Rebels against Academic Rules -- 13.2 Jakob Johann Laub Meets Einstein in Bern -- 13.3 Einstein's Students: Besso and Chavan. 14 Einstein Leaves the Patent Office for his First Post in Zurich -- 14.1 A University Professor at Zurich -- 14.2 Einstein Invents with the Habicht Brothers -- 14.3 Einstein's First Lecture at the Salzburg Meeting -- 14.4 Zurich-Prague-Zurich-Berlin -- 14.5 Einstein as a Weirdly Shabby Dressed Genius -- Chapter B. -- 1 Fresnel's Dragging Coefficient and Fizeau's Experiment of 1851 -- 1.1 Emission and Wave Theories of Light -- 1.2 Arago and Fresnel -- 1.3 Fizeau's Water Tube Experiment of 1851 -- 1.4 Lorentz Derives Fresnel's Dragging Coefficient in his Electron Theory -- 2 The Michelson and Michelson-Morley Experiment -- 2.1 Maxwell's Letter to Todd -- 2.2 Michelson in Helmholtz's Lab -- 2.3 Michelson in Paris -- 2.4 Michelson Returns to Cleveland and Works with Morley -- 3 Giving Up the Ether in Fin De Siècle Physics -- 4 The Contraction Hypothesis -- 5 Variation of Mass with Velocity -- Chapter C. Part One -- 1 Introduction -- 2 Einstein Believes in the Ether -- 3 The Chasing a Light Beam Thought Experiment -- 4 Magnet and Conductor Thought Experiment -- 4.1 Maxwell's Equations and Induction -- 4.2 What Prompted Einstein to Invent the Magnet and Conductor Thought Experiment? -- 5 Ether Drift and Michelson and Morley's Experiment -- 5.1 Einstein Designs Ether Drift Experiments between 1899 and 1901 -- 5.2 Einstein's Different Statements as to the Role that Michelson's Experiment Played in his Development -- 5.3 Robert Shankland's Interviews with Einstein on Michelson's Experiments -- 6 Emission Theory and Ether Drift Experiments -- 6.1 Ritz's Emission Theory -- 6.2 Einstein's First Reaction to Ehrenfest's Paper -- 6.3 Einstein Falls into the Jungle -- 7 Einstein's Route to Special Relativity from 1895 to 1903-1904 -- 8 "The Step -- 9 Einstein's Steps Toward the "The Step -- 9.1 Five to Six Weeks between the Discovery and the Relativity Paper. 9.2 The Einstein-Besso Meeting -- 9.3 The Final Discovery within Five Weeks -- 10 The Relativity Paper -- 10.1 A "Rigid Body" and Contraction -- 10.2 1905 -- 10.3 Definition of Distant Simultaneity without Reference to Synchronized Clocks -- 10.4 On the Relativity of Lengths and Times -- 10.5 Challenges to Einstein's Connection of Synchronization and Contraction -- 10.6 The Lorentz Transformations Derived by the Principle of Relativity and the Light Postulate -- 10.7 Lorentz Transformations Derived without the Light Postulate -- 10.8 Relativistic Addition Theorem for Velocities and Fizeau's experiment --10.9 Time Dilation -- 10.10 Clock Paradox and Twin Paradox -- 10.11 Magnet and Conductor Experiment -- 10.12 Relativity and the Light Quantum -- 10.13 The Mass of the Electron -- 11. The Inertial Mass-Energy Equivalence -- 12 Kaufmann's Experiments -- Chapter C. Part Two -- 1 Biographical Sketch of Poincaré -- 1.1 A Mathematics Monster -- 1.2 Henri Poincaré and Paul Appell -- 1.3 The École Polytechnique -- 1.4 École des Mines -- 1.5 An Academic Career -- 1.6 Professor at the Faculty of Sciences in Paris -- 1.7 The Bureau des Longitudes -- 1.8 The 1900 Congresses -- 1.9 The End -- 2 Poincaré's Possible Influence on Einstein's Pathway toward Special Relativity -- 2.1 Poincaré's Dynamics of the Electron -- 2.2 The May 1905 Letters to Lorentz -- 2.3 Introducing the Problems -- 2.4 The Lorentz Transformations -- 2.5 Did Poincaré's Dynamics of the Electron Influence Einstein? -- 3 Did Poincaré Explore the Inertial Mass-Energy Equivalence? -- 3.1. Poincaré 1900 - The "Hertzian Oscillator -- 3.2.

Poincaré 1900 - The Fictitious Fluid -- 3.3. Lorentz's Response to Poincaré's 1900 Paper -- 3.4. Inseparability of Theorem of Conservation of Mass and of Energy -- 3.5. Inertia of Energy --Chapter D. -- 1. Act One -- 1.1 1907 -- 1.2 1911. 2. Static Gravitational Field Theory -- 2.1 1912 -- 2.2 1912 -- 2.3 1912 -- 2.4 Mach's Ideas/Mach's Principle -- 3. Act Two -- 3.1 The Metric Tensor -- 3.2 The Zurich Notebook -- 4. Intermezzo -- 4.1 1913 -- 4.2 1913 -- 4.3 1913 -- 4.4 Rotation Metric -- 4.5 1914 --4.6 1914 -- 4.7 1914 -- 4.8 1914 -- 4.9 Einstein Loses Confidence in the Entwurf Theory -- 5. Act Three -- 5.1 1915 -- 5.2 Conservation of Energy-Momentum -- 5.3 The Newtonian Limit -- 5.4 Einstein Adopts 1 as a Coordinate Condition -- 5.5 1915 -- 5.6 1915 -- 5.7 The Schwarzschild Solution -- 6 1916 -- 6.1 1916 -- 6.2 1916 -- 6.3 1916 -- 6.4 1916-1918 -- 6.5 1916 -- 7 Einstein's Cosmological Model -- 7.1 The Cosmological Constant -- 7.2 Einstein Gives Up the Cosmological Constant -- Chapter E. -- 1 Einstein's Methodology and Creativity -- 1.1 Invention or Discovery? -- 1.2 The Significance of Music for Einstein -- 1.3 The Significance of a Wonder for Einstein --1.4 Einstein's Creativity -- 1.5 Einstein's Sounding Boards -- 1.6 The Principles of Relativity as Heuristic Principles -- 1.7 Theories of Principle and Constructive Theories -- 1.8 Principles Cannot Be Modified -- 1.9 Einstein is Guided by Heuristic Principles -- 1.10 Substantivalism versus Relationalism -- 2 Poincaré's Conventions and Creativity -- 2.1 Poincaré's Creativity -- 2.2 Poincaré's Conventionalism of Geometry -- 2.3 Poincaré's Fourth Geometry -- 2.4 Einstein's Response to Poincaré's Conventionalism of Geometry -- 2.5 Poincaré's Conventionalism of Principles (Classical Mechanics and Physics) --Chapter F. -- 1. Introduction -- 2. Documentary and Non-Documentary Biographies -- 2.1 Clark, Isaacson, Fölsing and Flückiger -- 2.2 Moszkowski's Einstein -- 2.3 Maja's Biography of Her Brother -- 2.4 Reiser's Einstein -- 2.5 Frank's Einstein -- 2.6 Seelig's Einstein -- 2.7 Vallentin's and Plesch's Einstein. 2.8 Herneck's Einstein -- 2.9 Helen Dukas's Recollections -- 2.10 Pais's Einstein -- 2.11 How to Cross-Reference the Documentary Biographies -- 3 Autobiographies, Memories and Popular Accounts -- 3.1 Einstein's Autobiography -- 3.2 Infeld's Autobiography and the Evolution of Physics -- 3.3 Einstein's Book On the Special and the General Theory of Relativity -- 3.4 Fantova's Journal of the Older Einstein -- 3.5 Minkowski, Sommerfeld and the BookThe Principle of Relativity -- 4 Primary Sources for the Historical Road that Led Einstein to Special and General Relativity -- 4.1 Special Relativity -- 4.2 The Kyoto Talk -- 4.3 Wertheimer's Interviews with Einstein -- 4.4 Shankland's Interviews with Einstein -- 4.5 Interviews with Einstein's Son, Hans Albert Einstein -- 4.6 Einstein's Notebooks and Manuscripts -- 5 Old Biographies of Poincaré -- References -- Notes -- Index. This book is a comprehensive monograph on Albert Einstein's Odyssey Sommario/riassunto to Special and General Relativity. This second edition brings together the most recent studies regarding the discovery of Special Relativity between 1895 and 1905 and pertaining to the genesis of General Relativity between 1905 and 1918. The book encompasses an in-depth historiographical analysis of Einstein's theory of relativity and Einstein's own derivations and philosophical perspectives of his work. The first chapter provides a narrative of Einstein's early life until 1914 without resorting to hagiography. The second chapter discusses Fin de siècle physics; the third deals with Einstein's path to the Special Theory of Relativity and Henri Poincaré's Dynamics of the Electron; the fourth focuses on the genesis of the General Theory of Relativity; the fifth chapter centralizes on Einstein's methodology and creativity, and on

Poincaré's philosophy; and the final section analyses the sources used in compiling this book.