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Autore	Manoukian Edward B.
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Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XXI, 553 p. 42 illus.)
Disciplina	530.15
Soggetti	Mathematical physics - History Quantum theory Gravitation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Preface -- Introduction -- Emergence of a Fundamental Constant in Physics -- Sorting out Selective Measurements -- QM Re-Invents Complex Numbers, Matrices, Operators and Inner-Product Spaces -- Symmetries and Emergence of $\hbar$ in the Formalism Itself -- Commutation Relations: Statements of Measurability -- Measurements and Interference -- Quantum Dynamics, Time Evolution and Quantum Scattering -- Stability of the H-Atom in Configuration Space -- Do Atomic Electrons Fall to the Center of Atoms? -- How QM Prevents Matter From Collapsing Around Us and Forces it to Occupy Such a Large Volume -- Bell's Tests, Entanglement and Refinements -- Schroedinger's Cat: A Theoretical Description -- Lorentz Frames and Minkowski Spacetime -- The Celebrated Lorentz Group: The Underlying Transformations Derived -- Physics in Minkowski Spcetime: Applications -- First Unified Field Theory: Maxwell's Equations, Lorentz Covariance and the Photon Concept -- Spinors and the Group $SL(2,C)$ -- QM Meets Relativity and the Birth of QFT: Fields & Particles -- The Five Types of Fields You Meet in High-Energy Physics -- Another Look at Symmetry and Quantum Generators of the Lorentz Group -- Gauge Fields -- Quarks, Leptons, Gluons and Massive Vector Fields -- The Three Main Lagrangians You Meet in Quantum Field Theory -- Quantum Dynamics: The Differential and Integral Formalisms of Two

This book aims to integrate, in a pedagogical and technical manner, with detailed derivations, all essential principles of fundamental theoretical physics as developed over the past 100 years. It covers: Quantum physics and Stability Problems in the Quantum World, Minkowski Spacetime Physics Particle Classifications and Underlying Symmetries, Symmetry Violations, Quantum Field Theory of Particle Interactions, Higgs Field Physics, Supersymmetry: A Theory with Mathematical Beauty Superstrings, Gravity and Supergravity, General Relativity Predictions, including Frame Dragging, Intricacies of Black Hole Physics, Perturbative and Non-perturbative Quantum Gravity Intricacies of Modern Cosmology, including Inflation and Power Spectrum If you are in the process of learning, or are lecturing on, any of the subjects above, then this is your book - irrespective of your specialty. With over-specialization and no time to master all the fields given above, students, and perhaps many physicists, may find it difficult to keep up with all the exciting developments going on, and are even less familiar with their underlying technicalities: e.g. they might have heard that the Universe is 13.8 billion years old, but have no idea on how this number is actually computed. This unique book will be of great value to graduate students, instructors and researchers interested in the intricacies and derivations of the many aspects of modern fundamental theoretical physics. And, although a graduate level book, some chapters may also be suitable for advanced undergraduates in their final year.

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