1.	Record Nr.	UNINA9910503008003321
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	Titolo	A Mathematical Journey to Quantum Mechanics / / by Salvatore Capozziello, Wladimir-Georges Boskoff
	Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2021
	ISBN	3-030-86098-1
	Edizione	[1st ed. 2021.]
	Descrizione fisica	1 online resource (294 pages)
	Collana	UNITEXT for Physics, , 2198-7890
	Disciplina	530.12
	Soggetti	Quantum physics
		Atomic structure
		Molecular structure
		Mathematical physics
		Functional analysis
		Quantum Physics
		Atomic and Molecular Structure and Properties
		Theoretical, Mathematical and Computational Physics
		Functional Analysis
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di bibliografia	Includes bibliographical references and index.
	Nota di contenuto	Introduction: How to read this book -- Newtonian, Lagrangian and Hamiltonian Mechanics -- Can Light be described by Classical Mechanics? -- Why Quantum Mechanics? -- The Schrödinger Equations and Their Consequences -- The Mathematics behind the Harmonic Oscillator -- From Monochromatic Plane Waves to Wave Packets -- The Heisenberg Uncertainty Principle and the Mathematics behind -- The Principles of Quantum Mechanics -- Consequences of Quantum Mechanics Principles -- Quantum Mechanics at the Next Level -- Conclusions.
	Sommario/riassunto	This book provides an itinerary to quantum mechanics taking into account the basic mathematics to formulate it. Specifically, it features the main experiments and postulates of quantum mechanics pointing out their mathematical prominent aspects showing how physical concepts and mathematical tools are deeply intertwined. The material

covers topics such as analytic mechanics in Newtonian, Lagrangian, and Hamiltonian formulations, theory of light as formulated in special relativity, and then why quantum mechanics is necessary to explain experiments like the double-split, atomic spectra, and photoelectric effect. The Schrödinger equation and its solutions are developed in detail. It is pointed out that, starting from the concept of the harmonic oscillator, it is possible to develop advanced quantum mechanics. Furthermore, the mathematics behind the Heisenberg uncertainty principle is constructed towards advanced quantum mechanical principles. Relativistic quantum mechanics is finally considered. The book is devoted to undergraduate students from University courses of Physics, Mathematics, Chemistry, and Engineering. It consists of 50 self-contained lectures, and any statement and theorem are demonstrated in detail. It is the companion book of "A Mathematical Journey to Relativity", by the same Authors, published by Springer in 2020.