1. Record Nr. UNINA9910502667403321

Autore	LaPierre Ray
Titolo	Introduction to quantum computing / / Ray LaPierre
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-69318-X
Descrizione fisica	1 online resource (xvi, 366 pages) : illustrations (some color)
Collana	Materials Research Society series
Disciplina	530.12
Soggetti	Quantum theory Quantum computing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Chapter 1: Superposition -- Chapter 2: Quantization -- Chapter 3: Spin -- Chapter 4: Qubits -- Chapter 5: Entanglement -- Chapter 6: Quantum Key Distribution -- Chapter 7: Quantum Gates -- Chapter 8: Teleportation -- Chapter 10: Computational Complexity -- Chapter 11: Deutsch Algorithm -- Chapter 12: Grover Algorithm -- Chapter 13: Shor Algorithm -- Chapter 14: Physical Implementation of Single-Qubit Gates -- Chapter 15: Electron Spin Resonance -- Chapter 16: Two-state Dynamics -- Chapter 17: Physical Implementation of Two-qubit Gates -- Chapter 18: DiVincenzo Criteria -- Chapter 19: Nuclear Magnetic Resonance -- Chapter 20: Solid-state Spin Qubits -- Chapter 21: Trapped Ion Quantum Computing -- Chapter 22: Superconducting Qubits -- Chapter 23: Adiabatic Quantum Computing -- Chapter 24: Optical Quantum Computing -- Chapter 25: Quantum Error Correction -- Chapter 26: Topological Quantum Computing.
Sommario/riassunto	This book provides a self-contained undergraduate course on quantum computing based on classroom-tested lecture notes. It reviews the fundamentals of quantum mechanics from the double-slit experiment to entanglement, before progressing to the basics of qubits, quantum gates, quantum circuits, quantum key distribution, and some of the famous quantum algorithms. As well as covering quantum gates in depth, it also describes promising platforms for their physical implementation, along with error correction, and topological quantum

computing. With quantum computing expanding rapidly in the private sector, understanding quantum computing has never been so important for graduates entering the workplace or PhD programs. Assuming minimal background knowledge, this book is highly accessible, with rigorous step-by-step explanations of the principles behind quantum computation, further reading, and end-of-chapter exercises, ensuring that undergraduate students in physics and engineering emerge well prepared for the future.