

1. Record Nr.	UNINA9910808705503321
Autore	Benslama Malek
Titolo	Quantum communications in new telecommunications systems // Malek Benslama, Achour Benslama, Skander Aris
Pubbl/distr/stampa	Hoboken, New Jersey : , : ISTE Ltd/John Wiley and Sons Inc, , 2016 [Piscataqay, New Jersey] : , : IEEE Xplore, , [2017]
ISBN	1-119-33251-6 1-119-39085-0 1-119-39086-9
Descrizione fisica	1 online resource (211 pages)
Disciplina	621.382
Soggetti	Quantum communication
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	-- Foreword ix -- Preface xi -- Introduction xiii -- Chapter 1. The State of the Art in Quantum Communications 1 -- 1.1. Quantum mechanics as a generalized probability theory 1 -- 1.2. Contextuality 3 -- 1.3. Indeterminism and contextuality 3 -- 1.4. Contextuality and hidden variables 4 -- 1.5. Non-locality and contextuality 5 -- 1.6. Bell states 6 -- 1.7. Violation of the Leggett / Garg inequality 7 -- 1.8. Violation of the Bell inequality 8 -- 1.9. EPR paradox 8 -- Chapter 2. Concepts in Communications 13 -- 2.1. Quantum limits 13 -- 2.2. Qubits 15 -- 2.3. Qudit and qutrit 20 -- 2.3.1. Qudit 20 -- 2.3.2. Qutrit 23 -- 2.4. Pauli matrices 24 -- 2.4.1. Definition 24 -- 2.4.2. Properties of these matrices 25 -- 2.5. Decoherence 26 -- 2.6. Entanglement 28 -- Chapter 3. Quantum Signal Processing 31 -- 3.1. Wigner distribution 32 -- 3.2. Quantum Fourier transform 34 -- 3.3. Gauss sums in a quantum context 36 -- 3.4. Geometry for quantum processing 37 -- Chapter 4. Quantum Circuits 41 -- 4.1. Reversible logic 41 -- 4.1.1. Physical reversibility 41 -- 4.2. Reversible circuits 42 -- 4.2.1. Reversible calculation models 42 -- 4.2.2. Reversibility in quantum calculation 43 -- 4.3. Quantum gates 44 -- 4.3.1. Hadamard gate 44 -- 4.3.2. Pauli-X gate 45 -- 4.3.3. Pauli-Y gate 45 -- 4.3.4. Pauli-Z gate 46 -- 4.3.5. Swap gate 46 -- 4.4. Toffoli gate 47 -- 4.5. Deutsch gate 48 -- 4.6. Quantum dots 49 -- 4.7. QCA 52 -- Chapter

5. Optical Fibers and Solitons 53 -- 5.1. Introduction 53 -- 5.2. Optical fibers 54 -- 5.2.1. The fiber's parameters 55 -- 5.2.2. Birefringence in optical fibers 58 -- 5.2.3. Dispersion in optical fibers 58 -- 5.3. Soliton solutions for differential equations 60 -- 5.3.1. Introduction 60 -- 5.3.2. Nonlinear Schrodinger equation 61 -- 5.3.3. Focusing soliton oscillations 63 -- 5.3.4. Wave packet autostriction (modulation instability) 65 -- 5.3.5. Evolution of the initial disturbance 69 -- 5.4. Conclusion 73 -- Chapter 6. Photonic Crystals 75.
6.1. General introduction 75 -- 6.2. Photonic crystals 76 -- 6.2.1. Photonic crystals with one dimension (Bragg network) 77 -- 6.2.2. Band diagram 80 -- 6.2.3. Maps of forbidden bands 81 -- 6.3. Three-dimensional photonic crystals 82 -- 6.4. Filters and multiplexors 82 -- 6.5. Add-drop filters 83 -- 6.6. Digital methods for photonic crystal analysis 84 -- 6.6.1. Introduction 84 -- 6.6.2. Modeling periodic dielectric structures 85 -- 6.6.3. FDTD method 85 -- 6.6.4. Available digital tools 86 -- 6.7. Conclusion 88 -- Chapter 7. ROADM 89 -- 7.1. Technological advances 89 -- 7.2. "Router"-type filter 90 -- Chapter 8. WDM 95 -- 8.1. Operating principle 95 -- 8.2. Using WDM systems 96 -- 8.3. DWDM networks 98 -- Chapter 9. Quantum Algorithms 99 -- Chapter 10. Applications 101 -- 10.1. Laser satellites 101 -- 10.1.1. The Doppler effect in inter-satellite laser communications 102 -- 10.1.2. Modeling the Doppler effect in inter-satellite laser communications 103 -- 10.1.3. Calculation software 108 -- 10.1.4. Calculation software 108 -- Chapter 11. Quantum Cryptography 121 -- 11.1. Cloning photons 123 -- 11.2. Quantum cryptography 123 -- 11.2.1. Introduction 123 -- 11.2.2. Methodology 124 -- 11.2.3. Results and discussion 126 -- 11.2.4. Conclusion 129 -- 11.3. Solutions to the practical limits of quantum cryptography 130 -- 11.3.1. Introduction 130 -- 11.3.2. Theoretical considerations 130 -- 11.3.3. Practical considerations 131 -- 11.3.4. Quantum noise 132 -- 11.3.5. The QBER in quantum transmissions 133 -- 11.3.6. Error correction methods in quantum cryptography 138 -- 11.3.7. The correcting code for error correction in BB84 140 -- 11.3.8. Time coding for error correction in BB84 142 -- 11.3.9. Conclusion 144 -- 11.4. Quantum error correcting codes 145 -- 11.4.1. Introduction 145 -- 11.4.2. Classical error correcting code 145 -- 11.4.3. Quantum error correcting code 148 -- 11.4.4. The time coding method for error correction: application in BB84 157 -- 11.4.5. Correction of time code errors using the repetition method 158.
11.4.6. Conclusion 161 -- Conclusion 163 -- Bibliography 167 -- Index 179.
