1. Record Nr. UNINA9910810930603321

Autore	Mishra Vinod K.
Titolo	An introduction to quantum communication / / Vinod K. Mishra
Pubbl/distr/stampa	New York, NY : , : Momentum Press, , [2016] ©2016
ISBN	1-60650-557-2
Descrizione fisica	1 online resource (xi, 68 pages) : illustrations
Collana	Communications and signal processing collection
Disciplina	005.8
Soggetti	Quantum communication - Security measures
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references (page [63]) and index.
Nota di contenuto	1. Why quantum communication? -- 1.1 Classical communication and its limits -- Concept of probability distribution -- Information or Shannon entropy -- Shannon-Hartley theorem -- Noisy-channel coding theorem -- Limits of classical communication -- 1.2 Role of quantum communication -- 2. Physical basis of quantum communication -- 2.1 Basic quantum mechanics for QC -- Wave function -- Schrodinger's equation -- Bra and Ket -- Probability function -- Superposition principle -- 2.2 Einstein-Podolsky-Rosen paradox -- 2.3 Some inequalities -- 2.4 Idea of entanglement -- 2.5 Quantum zeno effect -- 2.6 Decoherence -- 2.7 Propagation of light in an optical fiber -- 3. Information theory for quantum communication -- 3.1 Mathematical representation of a single qubit -- 3.2 Entropies for information -- Von Neumann entropy -- Shannon entropy -- Renyi entropy -- Collision entropy -- Min-entropy -- Tsallis entropy -- Sharma-Mittal entropy -- 3.3 Shannon-like capacity theorems for QC -- 3.4 No-go theorems for qubits -- 3.5 A general model for quantum communication -- 3.6 Entanglement measures -- 3.7 Entanglement processing -- Appendix 3A. Special 3-qubit quantum states -- Appendix 3B. Peres-Horodecky criterion -- Appendix 3C. Von Neumann entropy -- Appendix 3D. Other information entropies -- 4. Quantum error correction coding and cryptography -- 4.1 Need for coding in communication -- Source coding (classical) -- Channel coding (classical) -- 4.2 Source coding (quantum) -- 4.3 Error

Sommario/riassunto

Quantum mechanics is the most successful theory for describing the microworld of photons, atoms, and their aggregates. It is behind much of the successes of modern technology. It has deep philosophical implications to the fundamental nature of material reality. A few decades ago, it was also realized that it is connected to the computer science and information theory. With this understanding were born the new disciplines of quantum computing and quantum communication. The current book introduces the very exciting area of quantum communication, which lies at the intersection of quantum mechanics, information theory, and atomic physics. The relevant concepts of these disciplines are explained, and their implication for the task of unbreakably secure communication is elucidated. The mathematical formulation of various approaches has been explained. An attempt has been made to keep the exposition self-contained. A senior undergraduate with good mathematics and physics background should be able to follow the current thinking about these issues after understanding the material presented in this book.