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Pauli matrices; 4.2 Dense coding; 4.3 Teleportation; 4.4 Entanglement swapping

4.5 No instantaneous transfer of information 4.6 The extended-Hilbert-space view; 4.7 Summary; 5 Quantum information I; 5.1 Fidelity; 5.2 Helstrom's discrimination; 5.3 Quantum data compression; 5.4 Entropy of observation; 5.5 Conditional entropy and mutual information; 5.6 Relative entropy; 5.7 Statistical interpretation of relative entropy; 5.8 Summary; 6 Quantum information II; 6.1 Equalities and inequalities related to entropy; 6.2 The Holevo bound; 6.3 Capacity of a bosonic channel; 6.4 Information gained through measurements; 6.5 Relative entropy and thermodynamics

6.6 Entropy increase due to erasure 6.7 Landauer's erasure and data compression; 6.8 Summary; PART II: QUANTUM ENTANGLEMENT; 7 Quantum entanglement-introduction; 7.1 The historical background of entanglement; 7.2 Bell's inequalities; 7.3 Separable states; 7.4 Pure states and Bell's inequalities; 7.5 Mixed states and Bell's inequalities; 7.6 Entanglement in second quantization; 7.7 Summary; 8 Witnessing quantum entanglement; 8.1 Entanglement witnesses; 8.2 The Jamiołkowski isomorphism; 8.3 The Peres-Horodecki criterion; 8.4 More examples of entanglement witnesses; 8.5 Summary

9 Quantum entanglement in practice 9.1 Measurements with a Mach-Zehnder interferometer; 9.2 Interferometric implementation of Peres-Horodecki criterion; 9.3 Measuring the fidelity between [omitted] and ; 9.4 Summary; 10 Measures of entanglement; 10.1 Distillation of multiple copies of a pure state; 10.2 Analogy with the Carnot Cycle; 10.3 Properties of entanglement measures; 10.4 Entanglement of pure states; 10.5 Entanglement of mixed states; 10.6 Measures of entanglement derived from relative entropy; 10.7 Classical information and entanglement; 10.8 Entanglement and thermodynamics

10.9 Summary

Sommario/riassunto

Making smaller and faster computers is one of the main goals of current technological progress, and is determined by the laws of physics. Quantum mechanics allows us to encode and manipulate information in ways much more efficient than with existing (classical) computers. The book is an introduction to this exciting subject. - ; This book offers a concise and up-to-date introduction to the popular field of quantum information. It has originated in a series of invited lecture courses at various universities in different countries. This is reflected in its informal style of exposition and presen
