Quantum Information Theory
Finaly, here is a modern, self-contained text on quantum information theory suitable for
graduate-level courses. Developing the subject 'from the ground up' it covers classical results as
well as major advances of the past decade. Beginning with an extensive overview of classical
information theory suitable for the non-expert, the author then turns his attention to quantum
mechanics for quantum information theory, and the important protocols of teleportation,
super-dense coding and entanglement distribution. He develops all of the tools necessary for
understanding important results in quantum information theory, including capacity theorems for
classical, entanglement-assisted, private and quantum communication. The book also covers
important recent developments such as superadditivity of private, coherent and Holevo information,
and the superactivation of quantum capacity. This book will be warmly welcomed by the upcoming
generation of quantum information theorists and the already established community of classical
information theorists.

**Book Information**

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**Customer Reviews**

Quantum information theory (QIT)--a generalization of Shannon's classical information theory to
account for the quantum-physical nature of information, information carriers, channels, and
measurements--is a fast developing field, which has matured immensely over the past two decades
or so. The literature in QIT is quite extensive by now, and scattered. There has been a growing
need for a book that puts all the major concepts together in one place--in a unified and simple
notation and style—that is understandable by a beginner in the field (with very little or no background in quantum physics), as well as an experienced physicist, engineer, or a computer scientist who would like to learn specific concepts as per their need. I feel that this book by Mark Wilde fills this gap really well. It puts quantum information theory in a unified footing with the classical (Shannon’s) theory of information, and builds up—in a ground-up fashion—several nuances and properties of information in the quantum setting. I have collaborated with Mark quite fruitfully on several projects, and I can say that his depth and breadth of knowledge of quantum information theory is very impressive. Mark’s clarity of thought and knowledge of quantum information theory and his propensity to teach difficult concepts in a simple fashion to someone not so knowledgeable in the field, are both reflected in his book. My own research focuses on application of quantum theories of information and estimation to optical communication and sensing, and I have lately found myself using Mark’s book quite often as a reference, as opposed to looking through articles in journals and arxiv.org.

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