

OXFORD MASTER SERIES IN ATOMIC, OPTICAL,
AND LASER PHYSICS

Books in this series are written at the final year undergraduate and beginning graduate level, and provide straightforward introductions to key topics in physics today. Background material and applications as well as pointers to more advanced work are included, along with ample tutorial material, examples, illustrations, chapter summaries, and graded problem sets (with some answers and hints).

Quantum information—the subject—is a new and exciting area of science, which brings together physics, information theory, computer science, and mathematics. *Quantum Information*—the book—is based on two successful lecture courses given to advanced undergraduate and beginning graduate students in physics. The intention is to introduce readers at this level to the fundamental, but often rather simple, ideas behind groundbreaking developments including quantum cryptography, teleportation, and quantum computing. The text is necessarily rather mathematical in style, but the mathematics are nowhere allowed priority over the key physical ideas. The aim throughout is to be complete and self-contained but to avoid, as far as possible, lengthy and formal mathematical proofs. Each of the eight chapters is followed by about forty exercise problems with which the reader can test their understanding and hone their skills. These will also provide a valuable resource to tutors and lecturers.

Stephen M. Barnett is Professor of Quantum Optics in the Department of Physics at the University of Strathclyde, Glasgow.

IN THE SAME SERIES
ATOMIC, OPTICAL, AND
LASER PHYSICS

Atomic physics
C.J. Foot

Modern classical optics
G.A. Brooker

Laser physics
S.M. Hooker, C.E. Webb

Quantum optics: an introduction
A.M. Fox

STATISTICAL, COMPUTATIONAL,
AND THEORETICAL PHYSICS

**Statistical mechanics:
algorithms and computations**

W. Krauth

**Statistical mechanics: entropy,
order parameters, and complexity**

J.P. Sethna

**A modern introduction to quantum
field theory**

M. Maggiore

OXFORD
UNIVERSITY PRESS

www.oup.com

ISBN 978-0-19-852763-3



9 780198 527633

OXFORD

Quantum Information
Barnett

OMS IN AOP

OXFORD MASTER SERIES IN ATOMIC, OPTICAL,
AND LASER PHYSICS

Quantum Information

Stephen M. Barnett

Cover image: A quantum circuit for teleportation (cf. Fig. 6.24)