Geometry of Quantum States

An Introduction to Quantum Entanglement

2nd edition

Ingemar Bengtsson
Stockholms Universitet

Karol Życzkowski
Uniwersytet Jagiellonski, Poland

Quantum information theory is a branch of science at the frontier of physics, mathematics, and information science, and offers a variety of solutions that are impossible using classical theory. This book provides a detailed introduction to the key concepts used in processing quantum information and reveals that quantum mechanics is a generalisation of classical probability theory. The second edition contains new sections and entirely new chapters: the hot topic of multipartite entanglement; in-depth discussion of the discrete structures in finite dimensional Hilbert space, including unitary operator bases, mutually unbiased bases, symmetric informationally complete generalized measurements, discrete Wigner function, and unitary designs; the Gleason and Kochen–Specker theorems; the proof of the Lieb conjecture; the measure concentration phenomenon; and the Hastings' non-additivity theorem. This richly-illustrated book will be useful to a broad audience of graduates and researchers interested in quantum information theory. Exercises follow each chapter, with hints and answers supplied.

244 x 170 mm 635pp 139 b/w illus. 22 tables

Paperback 978-1-107-65614-7

Original price	*Discount price*
£44.99	£35.99
$68.99	$55.19

'True story: A few years ago my daughter took a break from her usual question, 'Dad, what is your favourite colour?' and asked instead, 'What is your favourite shape?' I was floored! 'What a wonderful question; my favourite shape is Hilbert space!' 'What does it look like?' she asked. My answer: 'I don't know! But every day when I go to work, that's what I think about.' What I was speaking of, of course, is the geometry of quantum-state space. It is as much a mystery today as it was those years ago, and maybe more so as we learn to focus on its most key and mysterious features. This book, the worn first-edition of which I've had on my shelf for 11 years, is the indispensable companion for anyone's journey into that exotic terrain. Beyond all else, I am thrilled about the inclusion of two new chapters in the new edition, one of which I believe goes to the very heart of the meaning of quantum theory.'
Christopher A. Fuchs
University of Massachusetts, Boston