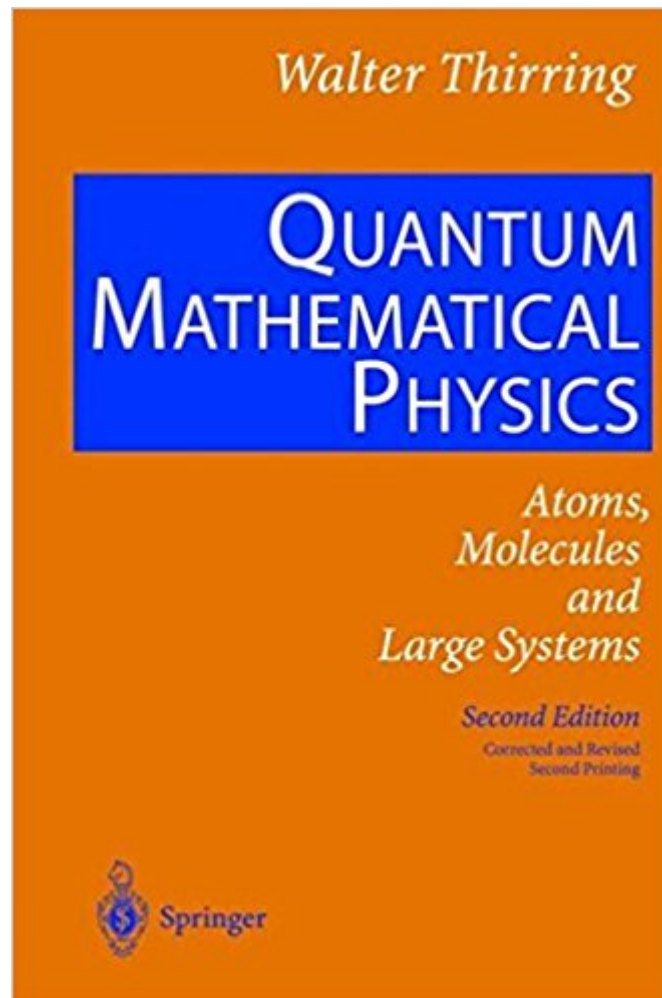




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Quantum Mathematical Physics



Synopsis

This book is a new edition of Volumes 3 and 4 of Walter Thirring's famous textbook on mathematical physics. The first part is devoted to quantum mechanics and especially to its applications to scattering theory, atoms and molecules. The second part deals with quantum statistical mechanics examining fundamental concepts like entropy, ergodicity and thermodynamic functions.

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From the reviews of the second edition: "Just as the general theory of relativity leads to many new mathematical advances and applications, the same is true of quantum mechanics. It is these mathematical advances that are the topic of this extensive volume, a volume which also delineates how these advances made possible the difficult transition from understanding hydrogen to understanding complex atoms, molecules, and $\hat{\text{large systems}}$. As such this volume will serve as an excellent source book for the mathematical basis of the many recent advances in quantum mechanics. It will also serve as an excellent text book for an advanced course in either quantum physics or applied mathematics." (Physicalia, 25/3, 2003) "This work is written uncompromisingly for the mathematical physicist $\hat{\text{ }}$. Thirring writes concisely but with a clarity that makes the book easy to read. $\hat{\text{ }}$ There are extensive bibliographies, with references mostly to articles in journals $\hat{\text{ }}$. There are copious problems and $\hat{\text{ }}$ "even better-all the solutions. $\hat{\text{ }}$ the volume would make a valuable addition to the library of $\hat{\text{ }}$ a mathematical physicist." (Prof. A.I. Solomon, Contemporary

Physics, Vol. 46 (4), 2005) "This volume will serve as an excellent source book for the mathematical basis of the many recent advances in quantum mechanics. It will also serve as an excellent textbook. Each chapter is chock full of mathematical derivations and proofs but perhaps the most interesting part of each proof is the following section entitled "Remarks" sections which are full of interesting details, ideas, drawbacks, comments, and references. As is usually the case with Springer-Verlag, this book has been beautifully produced." (Fernande Grandjean and Gary J. Long, Physicalia, Vol. 25 (3), 2003)

This book is a new edition of Volumes 3 and 4 of Walter Thirring's famous textbook on mathematical physics. The first part is devoted to quantum mechanics and especially to its applications to scattering theory, atoms and molecules. The second part deals with quantum statistical mechanics examining fundamental concepts like entropy, ergodicity and thermodynamic functions. The author builds on an axiomatic basis and uses tools from functional analysis: bounded and unbounded operators on Hilbert space, operator algebras etc. Mathematics is shown to explain the axioms in depth and to provide the right tool for testing numerical data in experiments.

Thirring presents a logical mathematical foundation for quantum physics. This book is meant for theorists who desire a rigorous presentation and who already have a strong math background, especially in functional analysis. Naturally, much of the discussion centres on the properties of a Hilbert space (ie. a complete inner product space). Simpler texts in quantum mechanics might often state that the wavefunctions or operators reside in a Hilbert space, but really don't explore more the consequences. Whereas Thirring takes you much deeper into this realm.

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