

Quantum Mechanics II: Advanced Topics

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Why the Quantum Field Theory?

Quantum Mechanics II: Advanced Topics uses more than a decade of research and the authors' own teaching experience to expound on some of the more advanced topics and current research in quantum mechanics. A follow-up to the authors introductory book **Quantum Mechanics I: The Fundamentals**, this book begins with a chapter on quantum field theory, and goes on to present basic principles, key features, and applications. It outlines recent quantum technologies and phenomena, and introduces growing topics of interest in quantum mechanics. The authors describe promising applications that include ghost imaging, detection of weak amplitude objects, entangled two-photon microscopy, detection of small displacements, lithography, metrology, and teleportation of optical images. They also present worked-out examples and provide numerous problems at the end of each chapter.

Establishes a Need for the Quantum Field Theory

Consisting of ten chapters, this illuminating text:

- Covers the basic ideas of both classical and quantum field theories
- Highlights path integral formalism, supersymmetric quantum mechanics, coherent and squeezed states, Berry's phase, Aharonov-Bohm and Sagnac effects, and Wigner function
- Addresses basic principles, salient features, and applications
- Describes basic concepts of quantum computers, some of the quantum algorithms, and features of quantum computation
- Explores advances made in the field of quantum cryptography
- Provides a brief and compact introduction to topics of growing interest including quantum versions of

theory of gravity, Zeno effect, teleportation, games, cloning, diffusion, and chaos

- Focuses on the theoretical aspects of various advanced topics
- Outlines some of the quantum technologies and/or technological applications of quantum phenomena
- Presents the basic principles and salient features of ghost imaging, detection of weak amplitude object and small displacements, entangled two-photon microscopy, quantum lithography, metrology, and teleportation of optical images
- Contains several worked-out problems at the end of each chapter
- Includes material that can be covered in an advanced course on quantum mechanics

Quantum Mechanics II: Advanced Topics addresses the basic principles and current research on various topics in quantum mechanics, and is a valuable resource for advanced undergraduate and graduate students in physics, chemistry, and engineering with an interest in quantum mechanics.

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