Quantum Optics Scully Zubairy

Laser Theory
Introductory Quantum Optics
Quantum Optics for Beginners
Quantum Physics, 3Rd Ed
Including Noise Reduction, Trapped Ions, Quantum Trajectories, and Decoherence
Quantum Theory of Optical Coherence
Quantum Optics
Introduction to Quantum Optics
Mathematical Methods of Quantum Optics
From Light Quanta to Quantum Teleportation
General Principles of Quantum Mechanics
From Basics to Applications
Proceedings of the International Conference on Laser Physics and Quantum Optics
Theory of Nonclassical States of Light
Theoretical Atomic Physics
Optical Coherence and Quantum Optics
Electromagnetic Noise and Quantum Optical Measurements
Frontiers in Optics and Photonics
Principles, Designs, and Analysis
Frontiers of Laser Physics and Quantum Optics
Selected Papers and Lectures
Quantum Optical Processes
Nonlinear Optical Waves
With Applications to Quantum Communication and Quantum Computing
Atomic and Free Electrons in a Strong Light Field
Quantum Mechanics in Phase Space

With Applications to Quantum Communication and Quantum Computing
Quantum Optics
QED
A Guide to Experiments in Quantum Optics
Elements of Quantum Optics
QUANTUM MECHANICS
The Nature of Light
Quantum Optics
A Festschrift in Honor of Marlan O. Scully
What is a Photon?
Quantum Optics
The Strange Theory of Light and Matter
Methods in Theoretical Quantum Optics
From the Semi-classical Approach to Quantized Light

ELLIANA HUANG

Laser Theory CRC Press
From the reviews: "Haus' book provides numerous insights on topics of wide importance, and contains much material not available elsewhere in book form. [...] an indispensable resource for those working in quantum optics or electronics." Optics & Photonics News
Introductory Quantum Optics Springer Science & Business Media
Quantum OpticsCambridge University Press
Quantum Optics for Beginners
Cambridge University Press
Ode to a Quantum Physicist celebrates the scientific achievements of Marlan O. Scully on the occasion of his sixtieth birthday. It combines personal reminiscences from other renowned physicists who have known and worked with him over the years and 60+ scientific articles from the frontiers of Quantum Optics inspired by the work of M. O. Scully. The topics of these articles, published in the special volume 179 of Optics Communications, range from classical optics via atomic physics and quantum mechanics to non-linear optics. The book opens with special greetings from Tony Siegman, the former president of the Optical Society of America and Benjamin Bederson, the Editor-in-Chief Emeritus of Physical Review. A long time friend, Ali Javan, dating back to Marlan's MIT days, highlights some of Marlan's scientific contributions. Heidi Fearn's poems humanize physical phenomena and set the stage for the more personal reminiscences to come. Friends

and colleagues of Marlan from the various stages of his scientific life shed some light on his human side. These stories reflect the admiration and respect the quantum physics community holds for Marlan and bring out many humorous anecdotes of their interactions with him. Judy Scully, his wife, takes us through Marlan's youth and college years in Wyoming. Leon Cohen illuminates the Yale days and Marlan's interactions with Willis E. Lamb. Pierre Meystre describes his arrival in Tucson from Switzerland for his first postdoctoral position with Marlan. The move from Tucson to Albuquerque is one of Suhail Zubairy's memories. Herbert Walther shines light on the impact of the multi-national Marlan and in particular, on the Max-Planck-Institut fü Quantenoptik. Wolfgang Schleich looks at his mentor Marlan from a graduate student's point of view and opens the arena for Reesor Woodling's description of Marlan's cattle business. We conclude the trail by the article of Thomas Walther, Ed Fry and George Welsch, who bring us up to date with Marlan's activities in Texas A & M. The actual birthday party and scientific celebration took place as a special two-day colloquium on Modern Trends in Quantum Optics at the Max-Planck-Institut für Quantenoptic in Garching, Germany on June 29-30, 1999. Included in this book is the program of this meeting, as wel as some excerpts from the celebration, such as, the after dinner speech by Roy J. Glauber followed by a photo album of Marlan's life. The poems by Olga Kocharovskaya poetically describe Marlan's scientific achievements. The concluding talk by Bruce Shore, given at this meeting, begins the connection to the papers by Don Kobe, Danny Greenberger and Mark Hillary, and Shi-Yao Zhu et al. covering topics from gauge invariance via unbreakable codes to photonic band gaps. The articles from the special issue of Optics Communications conclude this Festschrift.

Quantum Physics, 3Rd Ed Springer

Written primarily for advanced undergraduate and masters level students in physics, this text includes a broad range of topics in applied quantum optics such as laser cooling, Bose-Einstein condensation and quantum information processing.

Including Noise Reduction, Trapped Ions, Quantum Trajectories, and Decoherence

CRC Press

Publisher Description

Quantum Theory of Optical Coherence

Oxford University Press, USA

Atomic correlations have been studied in physics for over 50 years and known as collective effects until recently when they came to be recognized as a source of entanglement. This is the first book that contains detailed and comprehensive analysis of two currently extensively studied subjects of atomic and quantum physics—atomic correlations and their relations to entanglement between atoms or atomic systems—along with the newest developments in these fields. This book assembles accounts of many phenomena related to or resulting from atomic correlations. The essential language of the book is in terms of density matrices and master equations that provide detailed theoretical treatments and experimental analysis of phenomena such as entanglement between atoms, spontaneously or externally induced atomic coherence, engineering of atomic correlations, storage and controlled transfer of correlations, and dynamics of

correlated systems.

Quantum Optics Springer Science & Business Media

Wigner's quasi-probability distribution function in phase space is a special (Weyl) representation of the density matrix. It has been useful in describing quantum transport in quantum optics; nuclear physics; decoherence, quantum computing, and quantum chaos. It is also important in signal processing and the mathematics of algebraic deformation. A remarkable aspect of its internal logic, pioneered by Groenewold and Moyal, has only emerged in the last quarter-century: it furnishes a third, alternative, formulation of quantum mechanics, independent of the conventional Hilbert space, or path integral formulations.In this logically complete and self-standing formulation, one need not choose sides ? coordinate or momentum space. It works in full phase space, accommodating the uncertainty principle, and it offers unique insights into the classical limit of quantum theory. This invaluable book is a collection of the seminal papers on the formulation, with an introductory overview which provides a trail map for those papers; an extensive bibliography; and simple illustrations, suitable for applications to a broad range of physics problems. It can provide supplementary material for a beginning graduate course in quantum mechanics.

Introduction to Quantum Optics Springer

After a brief review of quantum mechanics and a summary of conventional atomic theory, H. Friedrich discusses the structure of atomic spectra on the basis of quantum defect theory, which is treated for the first time at such a basic level in a textbook. Special attention is given to highly excited states and to the influence of external fields, which can cause intricate and interesting effects in seemingly simple systems. After a chapter on reaction theory the final chapter treats special topics such as multiphoton absorption and chaos. The book contains the kind of advanced quantum mechanics needed for practical applications in modern atomic physics. The presentation is kept deliberately simple and avoids abstract formalism as far as possible.

Mathematical Methods of Quantum Optics Springer Science & Business Media

Covering a number of important subjects in quantum optics, this textbook is an excellent introduction for advanced undergraduate and beginning graduate students, familiarizing readers with the basic concepts and formalism as well as the most recent advances. The first part of the textbook covers the semi-classical approach where matter is quantized, but light is not. It describes significant phenomena in quantum optics, including the principles of lasers. The second part is devoted to the full quantum description of light and its interaction with matter, covering topics such as spontaneous emission, and classical and non-classical states of light. An overview of photon entanglement and applications to quantum information is also given. In the third part, non-linear optics and laser cooling of atoms are presented, where using both approaches allows for a comprehensive description. Each chapter describes basic concepts in detail, and more specific concepts and phenomena are presented in 'complements'.

From Light Quanta to Quantum Teleportation North Holland

I am very happy to accept the translators'

invitation to write a few lines of introduction to this book. Of course, there is little need to explain the author. Pauli's first famous work, his article on the theory of relativity in the Encyklopädie der Mathematischen Wissenschaften was written at the age of twenty. He afterwards took part in the development of atomic physics from the still essentially classical picture of Bohr's early work to the true quantum mechanics. Thereafter, some of his work concerned the treatment of problems in the framework of the new theory, especially his paper on the hydrogen atom following the matrix method without recourse to Schrodinger's analytic form of the theory. His greatest achievement, the exclusion principle, generally known today under his own name as the Pauli principle, that governs the quantum theory of all problems including more than one electron, preceded the basic work of Heisenberg and Schrodinger, and brought him the Nobel prize. It includes the mathematical treatment of the spin by means of the now so well known Pauli matrices. In 1929, in a paper with Heisenberg, he laid the foundation of quantum electrodynamics and, in doing so, to the whole theory of quantized wave fields which was to become the via regia of access to elementary particle physics, since here for the first time processes of generation and annihilation of particles could be described for the case of the photons.

General Principles of Quantum Mechanics Cambridge University Press

This book presents a systematic account of optical coherence theory within the framework of classical optics, as applied to such topics as radiation from sources of different states of coherence, foundations of radiometry, effects of source coherence on the spectra of radiated fields, coherence theory of laser modes, and scattering of partially coherent light by random media.

From Basics to Applications Springer Science & Business Media

An in-depth and wide-ranging introduction to the field of quantum optics.

Proceedings of the International Conference on Laser Physics and Quantum Optics Quantum Optics

Quantum Physics is a unique book in that it has a mathematical orientation and focuses only on the core quantum concepts.· The Emergence of Quantum Physics· Wave Particle Duality, Probability, and the Schrödinger Equation· Eigenvalues, Eigenfunctions, and the Expansion Postulate· One-Dimensional Potentials· The General Structure of Wave Mechanics· Operator Methods in Quantum Mechanics· Angular Momentum· The Schrödinger Equation in Three Dimensions and the Hydrogen Atom· Matrix Representation of Operators· Spin· Time-Independent Perturbation Theory· The Real Hydrogen Atom· Many Particle Systems· About Atoms and Molecules· Time-Dependent Perturbation Theory· The Interaction of Charged Particles with the Electromagnetic Field· Radiative Decays· Selected Topics on Radiation· Collision Theory· Entanglement and Its Implications· Physical Constants

Theory of Nonclassical States of Light John Wiley & Sons

Starting from first principles, this reference treats the theoretical aspects of quantum optics. It develops a unified approach for determining the dynamics of a two-level and three-level atom in combinations of quantized field under certain conditions.

Theoretical Atomic Physics Springer Science & Business Media
A non-linear wave is one of the fundamental objects of nature. They are inherent to aerodynamics and hydrodynamics, solid state physics and plasma physics, optics and field theory, chemistry reaction kinetics and population dynamics, nuclear physics and gravity. All non-linear waves can be divided into two parts: dispersive waves and dissipative ones. The history of investigation of these waves has been lasting about two centuries. In 1834 J. S. Russell discovered the extraordinary type of waves without the dispersive broadening. In 1965 N. J. Zabusky and M. D. Kruskal found that the Korteweg-de Vries equation has solutions of the solitary wave form. This solitary wave demonstrates the particle-like properties, i. e. , stability under propagation and the elastic interaction under collision of the solitary waves. These waves were named solitons. In succeeding years there has been a great deal of progress in understanding of soliton nature. Now solitons have become the primary components in many important problems of nonlinear wave dynamics. It should be noted that non-linear optics is the field, where all soliton features are exhibited to a great extent. This book had been designed as the tutorial to the theory of non-linear waves in optics. The first version was projected as the book covering all the problems in this field, both analytical and numerical methods, and results as well. However, it became evident in the process of work that this was not a real task.
Optical Coherence and Quantum Optics Princeton University Press
Advanced text in quantum optics.
Electromagnetic Noise and Quantum Optical Measurements Oxford University Press
From the reviews: "This is a book that should be found in any physics library. It is extremely useful for all graduate students, Ph.D. students and researchers interested in the quantum physics of light." Optics & Photonics News
Frontiers in Optics and Photonics World Scientific
The field of quantum optics has witnessed significant theoretical and experimental developments in recent years. This book provides an in-depth and wide-ranging introduction to the subject, emphasising throughout the basic principles and their applications. The book begins by developing the basic tools of quantum optics, and goes on to show the application of these tools in a variety of quantum optical systems, including lasing without inversion, squeezed states and atom optics. The final four chapters are devoted to a discussion of quantum optical tests of the foundations of quantum mechanics, and to particular aspects of measurement theory. Assuming only a background of standard quantum mechanics and electromagnetic theory, and containing many problems and references, this book will be invaluable to graduate students of quantum optics, as well as to researchers in this field.
Principles, Designs, and Analysis World Scientific
This book, written by one of the pioneers of laser theory, is now considered a classic by many laser physicists. Originally published in the prestigious Encyclopedia of Physics series, it is now being republished in paperback to make it available not only to professors and scientists, but also to students. It presents

a thorough treatment of the theory of laser resonators, the quantum theory of coherence, and the quantization of electromagnetic fields. Especial emphasis is placed on the quantum-mechanical treatment of laser light by means of quantum-mechanical Langevin equations, the density matrix equation, and the Fokker-Planck equation. The semiclassical approach and the rate equa tion approach are also presented. The principles underlying these approaches are used to derive the relevant equations, from which, in turn, the various properties of laser light are derived. Preface. The concept of the laser came into existence more than a decade ago when SCHAWLOW and TOWNES showed that the maser principle could be extended to the optical region. Since then this field has developed at an incredible pace which hardly anybody could have foreseen. The laser turned out to be a meeting place for such different disciplines as optics (e. g. spectroscopy). optical pumping, radio engineering, solid state physics, gas discharge physics and many other fields. The underlying structure of the laser theory is rather simple.

Frontiers of Laser Physics and Quantum Optics Springer Nature

An introduction to the fascinating subject of quantum mechanics. Almost entirely algebra-based, this book is accessible to those with only a high school background in physics and mathematics. In addition to the foundations of quantum mechanics, it also provides an introduction to the fields of quantum communication and quantum computing.