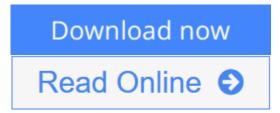


Essential Quantum Optics

By Ulf Leonhardt



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Covering some of the most exciting trends in quantum optics - quantum entanglement, teleportation, and levitation - this textbook is ideal for advanced undergraduate and graduate students. The book journeys through the vast field of quantum optics following a single theme: light in media. A wide range of subjects are covered, from the force of the quantum vacuum to astrophysics, from quantum measurements to black holes. Ideas are explained in detail and formulated so that students with little prior knowledge of the subject can follow them. Each chapter ends with several short questions followed by a more detailed homework problem, designed to test the reader and show how the ideas discussed can be applied. Solutions to homework problems are available at www.cambridge.org/9780521869782.



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Editorial Review

Review

"A masterful and beautifully written exposition of the theoretical ideas and tools of quantum optics that every serious student or researcher, theorist or experimentalist, should have under their belt. Leonhardt tells a connected story, while making each discussion as "simple as possible, but not simpler."

Michael G. Raymer, University of Oregon

"I used Ulf Leonhardt's "Measuring the Quantum State of Light" (MQSL) in my quantum optics course when the book first appeared in 1997, and wished it were longer. Leonhardt writes in a lucid prose that moves quickly from basics to deep applications in clever, efficient derivations that are accessible to advanced undergraduates. "Essential Quantum Optics" expands the earlier work and breaks new pedagogical ground with a "Horizons" chapter on the intersection of optics and general relativity. Topics like Unruh and Hawking radiation are beautifully explained and related to concepts more familiar to the optics and atomic physics community. Leonhardt and colleagues after all "wrote the book" on some of these topics, and we can be grateful that he has taken the time to explain them here to a broad audience. Other new features are a chapter on irreversible processes and a careful treatment of the Casimir effect (in a technically more advanced Appendix) for which many who have struggled with the literature on this effect will be grateful. There will be disagreement on what is "essential" to know about quantum optics. The topics that are included, however, are well motivated and treated with elegance and insight. The figures are outstanding. Questions and exercises at the end of each chapter are well chosen and touch on some of the missing topics. "Essential Quantum Optics" rises to a very high standard for technical exposition. It is an ideal text for this subject."

John Marburger, Stony Brook University

About the Author

Ulf Leonhardt is Professor of Theoretical Physics at the University of St. Andrews. His research interests include quantum electrodynamics in media and state reconstruction in quantum mechanics. He is one of the inventors of invisibility devices and artificial black holes.

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