



Foundations of Quantum Technology with Lab Manual

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Product Description

Foundations of Quantum Technology with Lab Manual Explore the Future — Learn the Fundamentals — Master the Tools Step into the next revolution in science and technology with Foundations of Quantum Technologies (with Lab Manual) — an all-encompassing guide designed for students, educators, and researchers aiming to understand and work with the principles and real-world applications of quantum mechanics. **WHAT'S INSIDE Part I: Fundamentals of Quantum Mechanics** Begin your journey with a deep dive into the origin and evolution of quantum theory. Understand wave-particle duality, measurement postulates, and the ground-breaking concept of quantum entanglement. Enrich your learning with multiple-choice questions, solved numerical problems, and project ideas at the end of each chapter. **Part II: Core Quantum Technologies** From quantum computing and cryptography to teleportation and metrology, discover how abstract quantum principles power the innovations shaping tomorrow. Learn algorithms like Shor's and Grover's, and explore secure communication via the BB84 Protocol. **Part III: Experimental and Practical Aspects** Get hands-on with quantum hardware platforms like superconducting qubits, trapped ions, and photonic systems. Study experimental realizations from IBM Q, Google Sycamore, and more. It includes detailed insights into quantum gate implementation and optical elements in labs. **Part IV: Lab Manual** Bridge theory with practice in your own quantum lab. Conduct real-world experiments on polarization, entanglement, BB84 protocol, and quantum algorithms using cloud platforms. Learn essential tools like QuTiP, Qiskit, and Cirq for simulating and analyzing quantum systems. **Also Includes**

- Conceptual short Q&A
- MCQs and numerical problems with solutions
- Design-driven project tasks
- Oral questions for viva preparation
- Reference tables for quick access

Whether you're a curious beginner or an aspiring quantum researcher, this book offers a robust, intuitive, and experimentally rich learning experience to help you navigate the quantum frontier.

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