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	Autore	Moiraghi, Mario
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	Nota di contenuto	1.: Origine sviluppi e metodi
2.	Record Nr.	UNINA9910427674103321
	Autore	Dick Rainer
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	Nota di contenuto	Chapter1. The Need for Quantum Mechanics -- Chapter2. Self-adjoint Operators and Eigenfunction Expansions -- Chapter3. Simple Model Systems -- Chapter4. Notions from Linear Algebra and Bra-Ket Notation -- Chapter5. Formal Developments -- Chapter6. Harmonic

Oscillators and Coherent States -- Chapter7. Central Forces in Quantum Mechanics -- Chapter8. Spin and Addition of Angular Momentum Type Operators -- Chapter9. Stationary Perturbations in Quantum Mechanics -- Chapter10. Quantum Aspects of Materials I -- Chapter11. Scattering Off Potentials -- Chapter12. The Density of States -- Chapter13. Time-dependent Perturbations in Quantum Mechanics -- Chapter14. Path Integrals in Quantum Mechanics -- Chapter15. Coupling to Electromagnetic Fields -- Chapter16. Principles of Lagrangian Field Theory -- Chapter17. Non-relativistic Quantum Field Theory -- Chapter18. Quantization of the Maxwell Field: Photons -- Chapter19. Epistemic and Ontic Quantum States -- Chapter20. Quantum Aspects of Materials II -- Chapter21. Dimensional Effects in Low-dimensional Systems -- Chapter22. Relativistic Quantum Fields -- Chapter23. Applications of spinor QED.

Sommario/riassunto

This textbook, now in an expanded third edition, emphasizes the importance of advanced quantum mechanics for materials science and all experimental techniques which employ photon absorption, emission, or scattering. Important aspects of introductory quantum mechanics are covered in the first seven chapters to make the subject self-contained and accessible for a wide audience. Advanced Quantum Mechanics: Materials and Photons can therefore be used for advanced undergraduate courses and introductory graduate courses which are targeted towards students with diverse academic backgrounds from the Natural Sciences or Engineering. To enhance this inclusive aspect of making the subject as accessible as possible, introductions to Lagrangian mechanics and the covariant formulation of electrodynamics are provided in appendices. This third edition includes 60 new exercises, new and improved illustrations, and new material on interpretations of quantum mechanics. Other special features include an introduction to Lagrangian field theory and an integrated discussion of transition amplitudes with discrete or continuous initial or final states. Once students have acquired an understanding of basic quantum mechanics and classical field theory, canonical field quantization is easy. Furthermore, the integrated discussion of transition amplitudes naturally leads to the notions of transition probabilities, decay rates, absorption cross sections and scattering cross sections, which are important for all experimental techniques that use photon probes.
