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Nota di contenuto	Part I: Introduction -- 1. Quantum Science: Interdisciplinary Research Between Chemistry and Physics -- Part II: Quantum Electronic Structure -- 2. Chracteristic Fermi Surface Properties in f-electron Systems -- 3. Quantum Chemistry in Battery Materials -- 4. Minimum structures of water clusters (H2O)n -- Part III: Dynamics and Chemical Reaction -- 5. The new reaction scheme “Transition Surface Dynamics (TSD)” for chemical and photodissociation reactions: A key to unveil the roaming mechanisms -- 6. Molecular Dynamics in Quantum Biological System -- Part IV: Quantum Theory of Angular Momentum -- 7. Elements of Theory of Angular Moments: Molecular Spectroscopy and Quantization

Methods of a Free Electromagnetic Field -- 8. Radiation and Absorption of Photons in Quantum Transitions -- Part V: Particle Physics and Cosmology -- 9. Solution for Lithium Problem from Supersymmetric Standard Model -- 10. Dark Matter Chemistry.

Sommario/riassunto

This book focuses on recent topics of quantum science in both physics and chemistry. Until now, quantum science has not been fully discussed from the interdisciplinary vantage points of both physics and chemistry. This book, however, is written not only for theoretical physicists and chemists, but also for experimentalists in the fields of physical chemistry and condensed matter physics, as collaboration and interplay between construction of quantum theory, and experimentation has become more important. Tips for starting new types of research projects will be found in an understanding of cutting-edge quantum science. In Part I, quantum electronic structures are explained in cases of strongly correlated copper oxides and heavy elements. In Part II, quantum molecular dynamics is investigated by computational approaches and molecular beam experiments. In Part III, after lithium problem in big bang nucleosynthesis scenario is considered using supersymmetric standard model, quantum theories in atomic and molecular systems are reviewed. Finally, in Part IV, the development of quantum computational method is introduced. .