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Nota di contenuto	Part I. Atomic Systems -- Auger Spectroscopy of Multielectron Atoms: Generalized Energy Formalism (Alexander V. Glushkov) -- Advanced Relativistic Energy Approach in Electron-Collisional and Radiative Spectroscopy of Ions in Plasmas (Vasily V. Buyadzhi, Eugeny V. Ternovsky, Alexander V. Glushkov, and Anna A. Kuznetsova) -- The Schrödinger Equation with Power Potentials: Exactly Solvable Problems (Jacek Karwowski and Henryk A. Witek) -- Electron--Nuclear Spectroscopy of Atomic Systems and Many-Body Perturbation Theory Approach to computing -Decay Parameters (Olga Yu. Khetselius, Valentin B. Ternovsky, Yulia V. Dubrovskaya, and Andrei A. Svinarenko) -- Relativistic Quantum Chemistry and Spectroscopy of Some Kaonic

Atoms: Hyperfine and Strong-Interaction Effects (Olga Yu. Khetselius, Valentin B. Ternovsky, Inga N. Serga, and Andrey A. Svinarenko) -- Part II. Molecular Systems -- Atomic Electric Multipole and Polarizability Models for C<sub>6</sub>X<sub>6</sub> Molecules (X = F, Cl, Br) (Claude Millot) -- A Quasiparticle Fermi-Liquid Density Functional Approach to Atomic and Diatomic Systems. Spectroscopic factors (Alexander V. Glushkov, Anna V. Ignatenko, Andrey V. Tsudik, and Alexei L. Mykhailov) -- Molecular Photoionization and Photodetachment Cross Sections Based on L2 Basis Sets: Theory and Selected Examples (Bruno Nunes Cabral Tenorio, Sonia Coriani, Alexandre Braga Rocha, and Marco Antonio Chaer Nascimento) -- Advanced Quantum Approach to the Calculation of Probabilities of Cooperative Electronic-Vibrational-Nuclear Transitions in Spectra of Diatomic Molecules (Alexander V. Glushkov, Eugeny V. Ternovsky, Valery F. Mansarliysky, and Pavel A. Zaichko) -- Advanced Quantum-Kinetic Model of Energy Exchange in Atmospheric Molecule Mixtures and CO<sub>2</sub> Laser-Molecule Interaction (Olga Yu. Khteselius, Alexander V. Glushkov, Sergei N. Stepanenko, Andrey A. Svinarenko, and Vasily V. Buyadzhi) -- Part III. Biochemistry and Biophysics -- Roles of the Phenol OH Groups in the Reducing Ability of Antioxidant Acylphloroglucinols: a DFT study (Liliana Mammino) -- Complexes in which two Hyperjovinol-A Molecules bind to a Cu<sup>2+</sup> Ion: a DFT study (Liliana Mammino) -- Adducts of Hydroxybenzenes with Explicit Acetonitrile Molecules. (Liliana Mammino) -- Part IV. Quantum Theory and Life Sciences -- Nonlinear Dynamics of Complex Neurophysiologic Systems within a Quantum-Chaos Geometric Approach (Alexander V. Glushkov and Olga Yu. Khetselius) -- A Universe in our Brain: Carnot's Engine and Maxwell's Demon (Erkki J. Brändas) -- Structure Waves in Biopolymers and Biological Evolution Paths (Jean Maruani) .

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#### Sommario/riassunto

This book reviews the most significant advances in concepts, methods, and applications of quantum systems in a broad variety of problems in modern chemistry, physics, and biology. In particular, it discusses atomic, molecular, and solid structure, dynamics and spectroscopy, relativistic and correlation effects in quantum chemistry, topics of computational chemistry, physics and biology, as well as applications of theoretical chemistry and physics in advanced molecular and nano-materials and biochemical systems. The book contains peer-reviewed contributions written by leading experts in the fields and based on the presentations given at the Twenty-Fourth International Workshop on Quantum Systems in Chemistry, Physics, and Biology held in Odessa, Ukraine, in August 2019. This book is aimed at advanced graduate students, academics, and researchers, both in university and corporation laboratories, interested in state-of-the-art and novel trends in quantum chemistry, physics, biology, and their applications.

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