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Nota di contenuto	Concepts of Highly Excited Electronic Systems; Contents; Preface; 1 The two-body Kepler problem: A classical treatment; 2 Quantum mechanics of two-body Coulomb systems; 2.1 Historical background; 2.2 Group theoretical approach to the two-body problem; 2.2.1 The bound spectrum; 2.2.2 Eigenstates of two charged-particle systems; 2.3 The two-body Coulomb wave functions; 2.3.1 Spherical coordinates; 2.3.2 Parabolic coordinates; 2.3.3 Analytical continuation of the two-body Coulomb wave functions; 3 One particle in an arbitrary potential; 3.1 The variable-phase method 3.2 Phase-amplitude equations for non-local potentials3.2.1 The local potential case; 3.2.2 Numerical considerations; 3.3 The scattering amplitude representation; 3.4 Illustrative examples; 4 Ground states of many-electron systems; 4.1 Time-scale separation; 4.2 Hartree-Fock approximation; 4.2.1 Basis set expansion; 4.3 Configuration interaction; 4.4 The coupled cluster method; 4.5 Variational and

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4.6.5 Implicit orbital functionals4.6.6 Self-interaction corrections; 4.6.7 Extensions of DFT; 5 Electronic excitations; 5.1 Electric dipole transitions; 5.2 Single-photoelectron emission; 5.2.1 One-electron photoemission from unpolarized targets; 5.2.2 Single photoemission from polarized targets; 5.3 General properties of emitted dipole radiation; 5.4 Symmetry properties of many-body photoexcitations; 5.4.1 Propensity rules for the dichroism in multiple photoionization; 5.5 Resonant photoexcitaions processes; 5.5.1 Single channel; 5.5.2 Multi-channel resonant photoexcitations
5.6 Few-body resonances5.6.1 Regularities and classifications of doubly excited states; 5.6.2 Complex rotation method; 6 Two-electrons systems at the complete fragmentation threshold: Wannier theory; 6.1 Classical mechanics of two excited electrons at the double escape threshold; 6.1.1 Wannier threshold law: a classical approach; 6.1.2 Remarks on the classical treatment of two electrons at threshold; 7 Quantum mechanics of many-electron systems at the double escape threshold; 7.1 Generalities of many-electron threshold escape; 7.1.1 Cross section dependence on the number of escaping particles
7.1.2 Structure of the total potential surface for N electron systems7.1.3 Quantum mechanics of N electrons at low kinetic energies; 7.1.4 Quantal calculations of the universal threshold behaviour; 7.1.5 Incorporation of symmetry and spin in many-particle wave functions; 8 Highly excited states of many-body systems; 8.1 General remarks on the structure of the N particle Schrodinger equation; 8.1.1 The Fock expansion; 8.1.2 The Kato cusp conditions; 8.1.3 Boundary conditions for the N-body problem; 9 The three-body Coulomb system; 9.1 Appropriate coordinate systems
9.1.1 Separation of internal and external coordinates

Sommario/riassunto

Knowledge of the excitation characteristics of matter is decisive for the descriptions of a variety of dynamical processes, which are of significant technological interest. E.g. transport properties and the optical response are controlled by the excitation spectrum. This self-contained work is a coherent presentation of the quantum theory of correlated few-particle excitations in electronic systems. It begins with a compact resume of the quantum mechanics of single particle excitations. Particular emphasis is put on Green function methods, which offer a natural tool to unravel the relations

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innovative concepts; 1.11.2. Scientific, technological, commercial and sociological challenges; 1.12. Preparing the competences needed for the development of SmartGrids; 1.13. Conclusion; 1.14. Bibliography Chapter 2. From the SmartGrid to the Smart Customer: the Paradigm Shift2.1. Key trends; 2.1.1. The crisis; 2.1.2. Environmental awareness; 2.1.3. New technologies; 2.2. The evolution of the individual's relationship to energy; 2.2.1. Curiosity; 2.2.2. The need for transparency; 2.2.3. Responsibility; 2.3. The historical model of energy companies; 2.3.1. Incumbents in a natural monopoly; 2.3.2. A clear focus on technical knowledge; 2.3.3. Undeveloped customer relationships; 2.4. SmartGrids from the customer's point of view; 2.4.1. The first step: the data revolution
2.4.2. The second step: the establishment of a smart ecosystem2.4.3. The consumers' reluctance; 2.5. What about possible business models?; 2.5.1. An unprecedented global buzz... and the search for a business model; 2.5.2. Government research into a virtuous model of regulation; 2.5.3. An opening for new stakeholders; 2.6. Bibliography; Chapter 3. Transmission Grids: Stakeholders in SmartGrids; 3.1. A changing energy context: the development of renewable energies; 3.2. A changing energy context: new modes of consumption; 3.3. New challenges; 3.4. An evolving transmission grid; 3.5. Conclusion
3.6. BibliographyChapter 4. SmartGrids and Energy Management Systems; 4.1. Introduction; 4.2. Managing distributed production resources: renewable energies; 4.2.1. Characterization of distributed renewable production; 4.2.2. Integrating renewable energies into the management process; 4.3. Demand response; 4.4. Development of storage, microgrids and electric vehicles; 4.4.1. New storage methods; 4.4.2. Microgrids; 4.4.3. Electric vehicles; 4.5. Managing high voltage direct current connections; 4.6. Grid reliability analysis; 4.6.1. Model-based stability analysis
4.6.2. Continuous measurements-based analysis: phasor measurement units

Sommario/riassunto

On a worldwide basis, the development of SmartGrids is a consistent answer to the problem of an efficient and sustainable delivery of electric energy through distribution grids. SmartGrids are a combination of information and communication technologies and new energy technologies. There are many different definitions of the concept of SmartGrids and thus it appears indispensable to gather the knowledge available from both industry and research laboratories in one book. Distributed generation is rightly receiving an increased amount of attention and will become an integral part of urban ener