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Nota di contenuto	Part I Condensed matter theory -- 1 Peierls and spin-density instability: from polyacetylene to grapheme -- 2 Can the d-orbital splitting unveil the local structure of Cu2+ ions? -- 3 Title to be announced -- 4 Regularities in transition temperatures for superconducting high-Tc cuprates as well as for BCS-like materials -- 5 Title to be announced by G. G. N. Angilella and N. H. March -- 6 Electronic Topological Transitions in low-dimensional -- 7 Band gaps and effective oscillator models for solid hydrogen and H2O ice at high pressure -- 8 Anomalous magnetism and superconductivity in lanthanide metals at extreme pressure -- 9 Equations of state for solids under strong compression with fingerprints for electronic anomalies -- 10 One-dimensional interacting systems: from

condensed matter to cold atoms -- 11 Spatial pathways of supercurrents and collective dynamics -- 12 Electron structure and transport in disordered low dimensional systems -- 13 Transport properties of strained grapheme -- 14 Defect-induced magnetism in graphene: an ab initio pan study -- 15 Title to be announced, by A. Pidatella and R. Mazzarello -- 16 Hydrogen-bonded systems under intense electric fields -- 17 Title to be announced, by G. Compagnini -- Part II Molecular chemistry -- 18 Novel common methodologies between physics and theoretical chemistry: density functional theory -- 19 Electron density, Kohn-Sham frontier orbitals, and Fukui functions -- 20 Exact density functionals -- 21 Electrides and their high-pressure chemistry -- 22 Structure of small molecules predicted by second-order density matrix theory without an underlying antisymmetric wave function -- 23 Correlation of large polarons in non-linear low-dimensional molecular systems -- 24 Simple approaches to calculate correlation energy in polyatomic molecular systems -- 25 Non equilibrium steady states and electron transport in molecular systems -- Part III Theoretical physics -- 26 From condensed matter to QCD: a journey through gauge theories on board of a variational tool -- Part IV Philosophy and history of science -- 27 The languages of science, religion, and theology -- 28 Symmetries and physics -- 29 Science and religion: a difficult relationship -- 30 The bold and the humble: physics and epistemology -- 31 Majorana: from atomic and molecular, to nuclear physics -- 32 Einstein and his struggle for peace -- Author index -- Keyword index.

Sommario/riassunto

This book addresses a wide range of topics relating to the properties and behavior of condensed matter under extreme conditions such as intense magnetic and electric fields, high pressures, heat and cold, and mechanical stresses. It is divided into four sections devoted to condensed matter theory, molecular chemistry, theoretical physics, and the philosophy and history of science. The main themes include electronic correlations in material systems under extreme pressure and temperature conditions, surface physics, the transport properties of low-dimensional electronic systems, applications of the density functional theory in molecular systems, and graphene. The book is the outcome of a workshop held at the University of Catania, Italy, in honor of Professor Renato Pucci on the occasion of his 70th birthday. It includes selected invited contributions from collaborators and co-authors of Professor Pucci during his long and successful career, as well as from other distinguished guest authors.