1. Record Nr. UNINA9910254624103321

Autore	Economou E. N. <1940->
Titolo	From Quarks to the Universe : A Short Physics Course / / by Eleftherios N. Economou
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2016
ISBN	3-319-20654-0
Edizione	[2nd ed. 2016.]
Descrizione fisica	1 online resource (323 p.)
Disciplina	530
Soggetti	Astrophysics Atoms Physics Gravitation Elementary particles (Physics) Quantum field theory Astrophysics and Astroparticles Atomic, Molecular, Optical and Plasma Physics Classical and Quantum Gravitation, Relativity Theory Elementary Particles, Quantum Field Theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Introduction: The World According to Physics -- Part I: Three Key Ideas and a Shortcut -- The Atomic Idea -- The Wave-Particle Duality -- Equilibrium and Minimization of Total Energy -- Dimensional Analysis: A Shortcut to Physics Relations -- Part II: Structures Mediated by Strong Interactions -- From Quark and Gluons to Hadrons -- From Protons and Neutrons to Nuclei -- Part III: The Realm of Electromagnetism -- From Nuclei and Electrons to Atoms -- From Atoms to Molecules -- From Atoms and Molecules to Solids (or Liquids) -- Part IV: Gravity at the Front Stage -- Planets -- Stars, Dead or Alive -- The Observable Universe -- Epilogue: The Anthropic Principle -- Answers to Multiple-Choice Questions -- Answers to Some Unsolved Problems.
Sommario/riassunto	This book takes the reader for a short journey over the structures of

matter showing that their main properties can be obtained even at a quantitative level with a minimum background knowledge including, besides first year calculus and physics, the extensive use of dimensional analysis and the three cornerstones of science, namely the atomic idea, the wave-particle duality and the minimization of energy as the condition for equilibrium. Dimensional analysis employing the universal physical constants and combined with “a little imagination and thinking”, to quote Feynman, allow an amazing short-cut derivation of several quantitative results concerning the structures of matter. In the current 2nd edition, new material and more explanations with more detailed derivations were added to make the book more student-friendly. Many multiple-choice questions with the correct answers at the end of the book, solved and unsolved problems make the book also suitable as a textbook. This book is of interest to students of physics, engineering and other science and to researchers in physics, material science, chemistry and engineering who may find stimulating the alternative derivation of several real world results which sometimes seem to pop out the magician’s hat.