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Titolo	Nanoscale Matter and Principles for Sensing and Labeling Applications / / edited by Dambarudhar Mohanta, Purushottam Chakraborty
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Descrizione fisica	1 online resource (583 pages)
Collana	Advanced Structured Materials, , 1869-8441 ; ; 206
Disciplina	681.2
Soggetti	Nanotechnology Nanoelectromechanical systems Biophysics Nanoscience Nanoscale Design, Synthesis and Processing Nanoscale Devices Nanoscale Biophysics
Lingua di pubblicazione	Inglese
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Nota di contenuto	From Atoms to the Higgs boson -- About teaching quantum mechanics in high-schools -- History of physics for education: the scientific contributions of Enrico Fermi -- Three Tales about Gravity -- Gravity between Physics and Philosophy -- Einstein's theory at the extremes: gravitational waves and black holes -- The Dark Universe -- Gravitational Waves: an historical perspective.
Sommario/riassunto	This book is a compilation of carefully chosen chapters that cover the subjects of nanoscale matter, sensing, and labelling applications. It is aimed primarily at scientists and researchers who are already involved in theme-based research or who are just starting their careers. Despite the diverse nature of the topics covered, which include a range of materials in various forms and uses, the emphasis is primarily on sensing and labelling phenomena. The book begins with materials quantification in nanoscale systems by using an innovative technique like "molecular secondary ion mass spectrometry without calibration standards". Subsequently, the book features an array of materials such as inorganic semiconductor nanoscale particles, carbon dots, rare-

earth oxides, polymer nanocomposites, and a few biomaterials, all of which illustrate their functionality and potential for deployment in a wide variety of sensing applications. Although the book delves into the technical aspects of fabrication workouts to some extent, the focus is predominantly on the physical principles, mechanisms, and relevance involved in sensing and labelling applications. The book covers a wide range of topics that leverage the unique properties of nanoscale materials. By carefully selecting appropriate active materials, the authors explore the detection of LPG, hazardous and explosive gases, as well as humidity sensing and hydrogen evolution. It also delves into photo-sensing and persistent photoconductivity by using nanoscale semiconductors, which are used for heavy metal sensing and UV sensing, respectively. The use of metal nanoparticles in various forms is reviewed to address issues related to water contamination, biofilm protection, and food-borne pathogens. The book also discusses surface plasmon resonance, starting with its basic principles and expanding to its relevance in a broader perspective, with a greater focus on applied biosensing. Nanoscale ferrites and magnetic systems are explored with an emphasis on magnetic sensing and actuation. Lastly, the book explores the use of rare-earth-based nanosystems, highlighting persistent luminescence and up/down-converted transitions, which have unprecedented applications in bioimaging and biolabeling. Every effort has been made to strike a balance between the observed phenomena in the emerging areas of sensing applications and suitable theoretical treatments there in. .
