

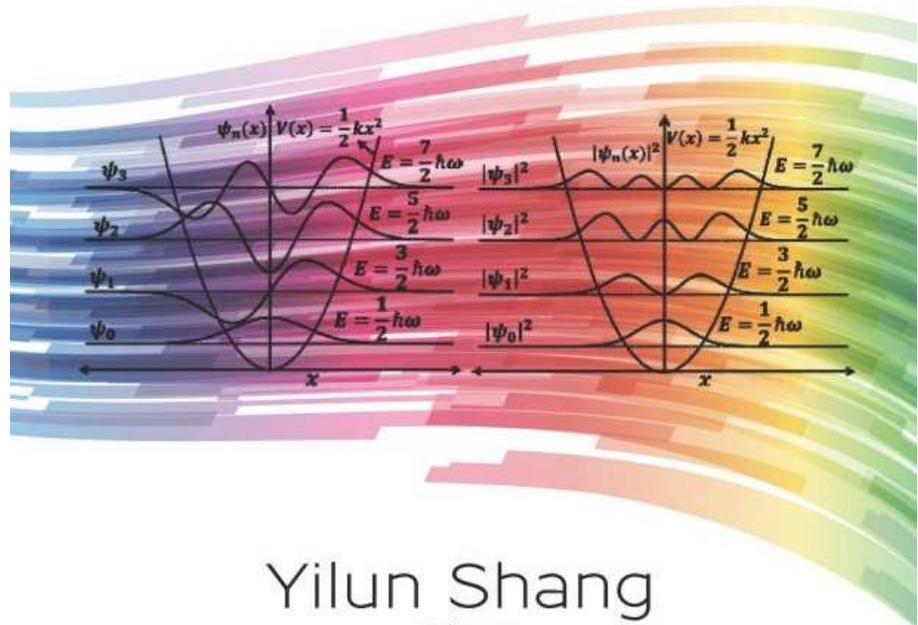


Physics
New Titles

PHYSICS RESEARCH AND TECHNOLOGY

Harmonic Oscillators

Types, Functions and Applications



Yilun Shang
Editor



Titles published by Nova Science

Energy Policies,
Politics & Prices

Energy Science,
Engineering &
Technology

Horizons in World
Physics

Nanotechnology
Science & Technology

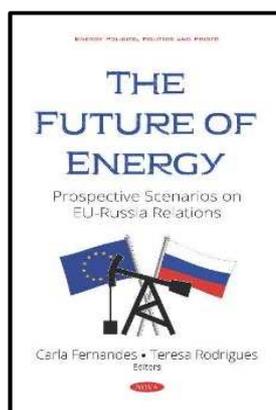
Physics Research &
Technology

Renewable Energy:
Research,
Development &
Policies

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Energy Policies, Politics & Prices



The Future of Energy

Prospective Scenarios on EU-Russia Relations

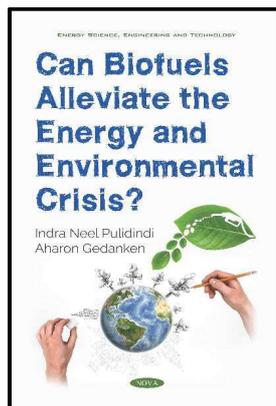
Edited by Carla Fernandes, Teresa Rodrigues

This book presents the main conclusions reached by the academic project “Geopolitics of Gas and the Future of the Euro-Russian Relations (Geo4GER).” This project is being developed at IPRI — Portuguese Institute of International Relations, NOVA University, an academic research institute dedicated to advanced studies in Political Science and International Relations, of NOVA University of Lisbon, Portugal.

Energy security is a key issue on the international political agenda, a prerequisite for political stability and economic development and an indivisible part of a state’s overall security. For Europe, the high-energy insufficiency is a major challenge, given its dependence on external sources, especially from Russia, the lack of diversification of energy sources, and the poor branch of its transmission network. For Russia, energy has been a geopolitical factor of power and a potential strategic vector to its re-emergence as a great power in the international system.

However, in terms of energy, Russia also faces some long-term challenges, given the fall of its production and the low competitiveness of its gas, which is currently saved from the market where competition can hardly enter. Given this scenario, and also the increasingly important role in the political and strategic discussion of energy issues between Europe and Russia, it becomes relevant to diagnose the past and the present to forecast the medium and long term future (2030), taking into account the expected changes in the geopolitical and energetic environment, and the characteristics and dynamics of European-Russian relationship, including its energy interdependence and the energy policies and strategies outlined by Europe and Russia.

HB 9781536156089 £185.99 July 2019 Nova Science Publishers 328 pages



Can Biofuels Alleviate the Energy and Environmental Crisis?

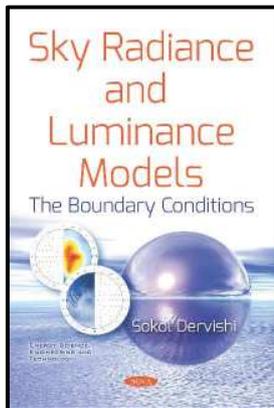
Indra Neel Pulidindi, Aharon Gedanken

Climate change is one of the major challenges society is facing currently. Major spheres of human activity such as health, environment, agriculture, economy, transportation and education were adversely affected because of climate change. Environmental pollution owing to the indiscriminate and ever-increasing consumption of fossil-based resources is the main factor contributing to climate change.

Use of fuels produced from renewable sources like biomass cause reduction in CO₂ emission and guarantee sustainable energy and a clean environment. The problems of environmental deterioration, as well as energy demands, could be alleviated by the paradigm shift to the use of biofuels from fossil fuels. Innovative strategies were recently developed for the exploitation of biomass for biofuels production. The concept of biomass itself is being understood in an unconventional sense in a way that apart from terrestrial plant resources, marine macroalgae, freshwater microalgae, industrial emissions like CO₂, organic remains like glycogen are being explored as feedstock for biofuels production. Biofuel production strategies are also undergoing drastic changes like the use of solar radiation, sonochemical, microwave and accelerated electron beam irradiations to meet the fuel demand and to make the biomass conversion processes more energy- and atom-efficient and sustainable.

The objective of the compilation of the book titled “Can Biofuels Alleviate The Energy & Environmental Crisis?” is to reach out to policy makers, scientists, industrialists, and students with a message as well as scientific strategies for alleviating the twin problems of energy and environmental crisis posing a threat to future generations. The book comprises of seven judiciously designed chapters focused on producing biofuels (biodiesel, bioethanol, formic acid, synthesis gas, methane, and ethylene) and biochemicals (glucose, levulinic acid) using feedstock as diverse as lignocellulosic terrestrial biomass, marine macroalgae, glycogen, and CO₂. Biomass is an ideal substitute to fossil mass as almost all the products derived from conventional refinery could be produced in a biorefinery using biomass as a carbon source. In addition to being sustainable, the biorefinery facilities are environmentally benign. The biomass conversion strategies proposed in this book facilitate the paradigm shift from fossil-based to biobased industries and help the proliferation of biorefinery facilities in the 21st century, offering a pathway for the alleviation of the problem of climate change.

HB 9781536150506 £185.99 July 2019 Nova Science Publishers 298 pages



Sky Radiance and Luminance Models The Boundary Conditions

Sokol Dervishi

This research aims to make an original and advanced contribution to state-of-the-art sky models. It focuses on high-resolution sky radiance and luminance models given their essential importance in a host of scientific and engineering applications. For example, improved sky radiance and luminance models can be used to improve the design and operation of energy-efficient and sustainable buildings.

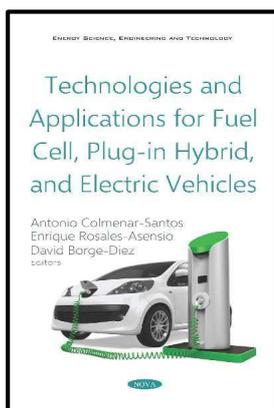
All these applications require high-fidelity information on spatial and temporal distribution of solar irradiance and illuminance on building surfaces. The empirical basis for related decision-making processes is, however, rather limited: Available measured data – collected by typical weather stations – is typically restricted to global horizontal irradiance. Few research-class climatic monitoring stations also record the diffuse component of solar irradiance.

This research will therefore examine a number of such models in detail and explore both improvement possibilities of existing models and the potential for alternative modeling approaches in future developments. Specifically, this research aims at developing accurate high-resolution sky radiance and sky luminance models for the city of Vienna. In order to generate sky radiance maps, the diffuse radiation component of the global horizontal irradiance should be typically derived based on proper diffuse fraction models. Accordingly, this research starts with an attempt to improve the existing diffuse fraction models. When both diffuse and direct horizontal irradiance data are available, the existing models intended for the sky radiance generation can be comprehensively evaluated and further developed to arrive at a more reliable locally verified sky radiance distribution model.

In addition to sky radiance distribution maps, which greatly support the design of buildings' solar energy systems, sky luminance maps are needed to support the design of buildings' daylighting systems. However, to generate sky luminance maps from sky radiance maps, appropriate luminous efficacy information is required, which is not available from typical weather stations. Therefore, this research shall also explore methods with various degrees of resolution to derive illuminance data based on more broadly available global irradiance data.

Solid high-resolution empirical data is needed not only to evaluate the existing models, but also to develop and validate new models. For this purpose, I will deploy our existing monitoring facility to systematically collect both typical weather station data and additional information concerning the diffuse component of the global horizontal irradiance, global horizontal illuminance, vertical irradiance, as well as detailed sky luminance and radiance distributions.

PB 9781536149579 £78.99 June 2019 Nova Science Publishers 192 pages

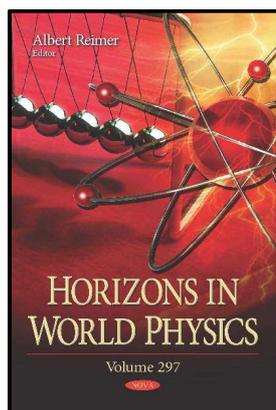


Technologies and Applications for Fuel Cell, Plug-in Hybrid, and Electric Vehicles

Edited by Antonio Colmenar Santos, Enrique Rosales Asensio, David Borge Diez

This book develops a novel and simple, yet rigorous, methodology that, by means of basic techniques and tools available to any engineer, enables the study of solar concentrator performance parameter scattering on the control of the solar field outlet temperature. As a special feature, this book proposes a new model for characterizing the energetic behavior of grid connected PV inverters.

HB 9781536142051 £152.99 January 2019 Nova Science Publishers 158 pages



Horizons in World Physics

Edited by Albert Reimer

Horizons in World Physics. Volume 297 describes the fabrication and characterization of magnetic field tunable capacitors based on $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3/\text{Sr}_x\text{La}_{1-x}\text{TiO}_3$ epitaxial multilayers. The multilayer structures were grown by magnetron sputtering and characterized comprehensively by high resolution transmission electron microscopy combined with electron energy loss spectroscopy, x-ray diffraction, low-angle x-ray reflectivity, direct current charge transport measurements and magnetic field dependent alternating current impedance spectroscopy.

Next, the authors deal with mass spectrometric characterization of atoms, radicals and ions in magnetron sputtering discharges generated in Ne, Ar, Kr and Xe gases. In these discharges, different kinds of species are generated according to the magnetron target and the kind of sputtering gas used.

The procedures and techniques used to suppress Brillouin scattering in lasers are also reviewed. The three different categories of Brillouin suppression methods are discussed in detail, and the authors comment on the effectiveness, ease of implementation and cost of these techniques.

This compilation goes on to discuss how computing the capacitance of a system of bodies represents a classical problem, the study of which began in the works of Maxwell and Rayleigh. In practice, bodies may be placed into a medium which can contain defects influencing the mutual capacitance of a pair of bodies and, as a result, the capacitance of the system of bodies. A new design of collimator is proposed that has variable sensitivity and spatial resolution, eliminating the need for exchanging collimators in a radiation camera. Using Monte Carlo simulations, the authors aim to evaluate the shielding of undesirable radiations in a newly proposed collimator.

Using the gravitational mass spectroscopy, the influence of the gravitational noise of the universe on the long-range order in collagen was studied, as well as how the neutrino flows from the neutrino halos of the collagen domains run to the TXS 0506 + 056 blazar. A mechanism of the reversible destruction of the collagen domains was proposed, and an ensemble of black holes was concluded to be present inside the blazar.

Afterwards, the influence of the gravitational noises of our galaxy on long-range order of molecular clusters and super micellar structures in potato and water was analyzed from 2003 to 2018 by the method of gravitational mass spectroscopy. It was found that the appearance of molecular clusters in biomatrix and liquid water is not stable, they reflecting the state of the GN in our sector of galaxy.

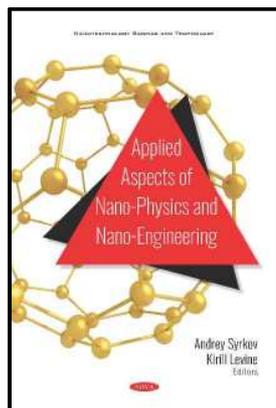
Lastly, the authors propose an approximation for the Schrodinger equation, giving the expressions for spectrum and the corresponding wave functions in an explicit form. This approach is also connected with the extended confluent hypergeometric differential equation to help in obtaining further specifications for spectrum.

Volume 297 HB 9781536147124 £238.99 January 2019 Nova Science Publishers 190 pages

Volume 298 HB 9781536147957 £238.99 January 2019 Nova Science Publishers 215 pages

Volume 299 HB 9781536153613 £238.99 May 2019 Nova Science Publishers 199 pages

Volume 300 HB 9781536160567 £238.99 August 2019 Nova Science Publishers 255 pages



Applied Aspects of Nano-Physics and Nano-Engineering

Edited by Kirill Levine, Andrey G. Syrkov

This volume of a book “Applied Aspects of Nanophysics and Nano-engineering” is partially composed of short communications – proceedings of international symposium “Nanophysics and nano-engineering 2017” (venue: Mining university), and full-sized chapters, covering selected topics in depth.

A variety of phenomena are described in this book. Smart nanostructured coatings, methods of synthesis based on both “top to bottom” (plasma deposition, remote methods) and “bottom to top” approaches are covered, as well as modeling approaches and analytical techniques. As before, ecological issues are highly addressed, such as materials for water purification and pollution prevention.

Permanent interest in fullerenes as to one-dimensional carbon-based structures arises from their ability to be relatively easily modified by species of interest, for the purpose of bio-substrate delivery. Graphite exfoliation is utilized as a method to produce graphite nanoparticles and the modelling of fullers is reported.

Issues of dielectric relaxation of solids have been a stunning topic for at least a few decades, and even now the interest in the dielectric relaxation approach seems to increase. This is because of the sensitivity of this non-destructive method to the conformational changes of flexible molecular moieties, brushes, and interchain segments. This avenue was focused on materials appliances of the method and technical development of the method and resolution, as well as the materials studied.

Semiconductor technologies discussed in the book were related to developing solar concentrator systems (silicon technologies), heterojunction solar cells of eutectic gallium arsenide solid solutions for the development of alternative heterostructures based on the tunneling effect. “Exotic” semiconductors – diamonds with delta-doped layers known for their high temperature resistance – are studied via capacitance measurements.

Directional crystallization was studied to produce rear-Earth compounds with anisotropic properties for the application of thermoelectric materials.

Findings in sorption properties of clay minerals with singlet oxygen is underestimated as global in terms of environmental factors. Oil shale and oil shale ash Baltic basin studies are reported.

Materials with magnetic properties synthesized by the sol-gel method are based on vanadium-titanium ceramic and are studied via a variety of powerful experimental methods: SEM, XRD, SAXC, and SAPNS.

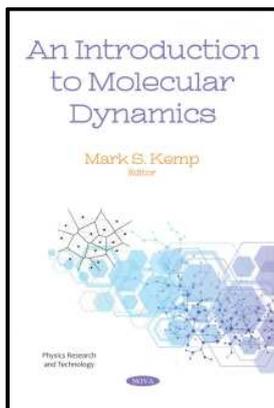
Findings in the surface modification of zinc oxide films are modified by selenium. A special experimental setup is made possible using an ambient pressure approach without isolating the atmosphere to synthesize the hierarchically ordered surface structure.

Interface properties related to water absorption on an aluminum surface are analyzed, and they are of interest for tribology applications of organopolymer compositions.

Composite nanostructured materials for solar concentrator systems are discussed, as well as compounds for thermionic energy converters.

It is believed that this book provides an unbiased sketch of progress in nanotechnology and related areas.

HB 9781536147087 £219.99 June 2019 Nova Science Publishers 322 pages



An Introduction to Molecular Dynamics

Edited by Mark S. Kemp

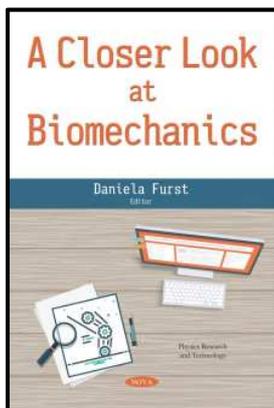
In the opening chapter of *An Introduction to Molecular Dynamics*, the method of statistical geometry, based on the construction of a Voronoi polyhedral, is applied to the pattern recognition of atomic environments and to the investigation of the local order in molecular dynamics-simulated materials.

Next, the authors discuss the methodology of bimolecular simulations and their advancements, as well as their applications in the field of nanoparticle-biomolecular interactions. The theory of molecular dynamics simulation and some of the recent molecular dynamics methods such as steered molecular dynamics, umbrella sampling, and coarse-grained simulation are also discussed.

The use of auxiliary programs in the cases of modified cyclodextrins is discussed. Additionally, results from molecular dynamics studies on cases of inclusion compounds of molecules of different sizes and shapes encapsulated in the same host cyclodextrin have been examined and compared.

In closing, the authors discuss the methodology of molecular dynamics simulation with a non-constant force field. In the context of molecular simulations, the term “force field” refers to a set of equations and parameters for the calculation of forces acting on the particles of the system and its potential energy.

PB 9781536160543 £90.99 August 2019 Nova Science Publishers 184 pages



A Closer Look at Biomechanics

Edited by Daniela Furst

The research presented in the opening chapter of *A Closer Look at Biomechanics* discusses the use of bone cements, and tests how a novel bone cement, medical grade two-component injectible polymer on silicone basis, can be used.

The second chapter demonstrates that the use of finite element modeling to simulate static and dynamic behavior in an anterior cervical plate design shows that load transmission is superior when the plate works dynamically.

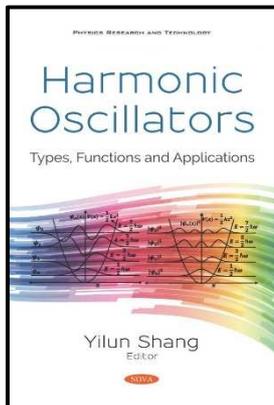
The third chapter continues to examine the purpose of simulate static and dynamic behavior with the same anterior cervical plate design in two different clinical scenarios: in the immediate postoperative state and after simulated graft subsidence by means of biomechanical assays.

There are contradictory results from previous studies on the effects of laterality on walking, such as the existence of symmetry or asymmetry as well as the role of the dominant leg. Thus, the effects of laterality on walking asymmetry during walking on a treadmill is examined in this compilation.

The penultimate chapter discusses the localization of the body’s center of mass and how that helps in the analyses of sport technique, while information on moment of inertia helps in explaining body angular movements.

The final chapter aims to show how the large number of pedobarographic parameters, which vary from 72 to 198 per foot, can be aggregated into a single indicative parameter: the Relative Midfoot Index. This indicates that clinicians do not have to analyze hundreds of pedobarographic parameters in order to reach a meaningful interpretation.

PB 9781536158663 £90.99 August 2019 Nova Science Publishers 182 pages



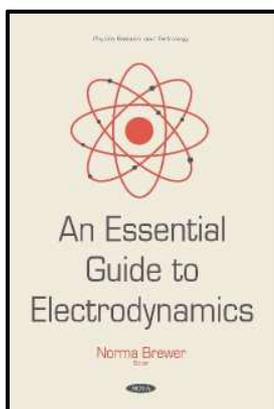
Harmonic Oscillators Types, Functions and Applications

Yilun Shang

This book gathers state-of-the-art advances on harmonic oscillators including their types, functions, and applications. In Chapter 1, Neetik and Amlan have discussed the recent progresses of information theoretic tools in the context of free and confined harmonic oscillator. Confined quantum systems have provided appreciable interest in areas of physics, chemistry, biology, etc., since its inception. A particle under extreme pressure environment unfolds many fascinating, notable physical and chemical changes.

The desired effect is achieved by reducing the spatial boundary from infinity to a finite region. Similarly, in the last decade, information measures were investigated extensively in diverse quantum problems, in both free and constrained situations. The most prominent amongst these are: Fisher information, Shannon entropy, Renyi entropy, Tsallis entropy, Onicescu energy and several complexities. Arguably, these are the most effective measures of uncertainty, as they do not make any reference to some specific points of a respective Hilbert space. These have been invoked to explain several physic-chemical properties of a system under investigation. Kullback Leibler divergence or relative entropy describes how a given probability distribution shifts from a reference distribution function. This characterizes a measure of discrimination between two states. In other words, it extracts the change of information in going from one state to another.

HB 9781536158106 £152.99 August 2019 Nova Science Publishers 214 pages



An Essential Guide to Electrodynamics

Norma Brewer

The opening chapter of *An Essential Guide to Electrodynamics* describes a new theory of the electron, from which derives a fully deductive explanation of the chemical inertness of the group 18 elements of the periodic system.

The authors propose that there is a need to present the detailed mathematical steps that are required to prove the equations of Maxwell textbooks and course instruction to help students gain a firm grasp of the equations and their applications.

Additionally, this compilation examines the wave equation for the electromagnetic 4-potential, which has a form that explicitly involves the 4-velocity vector of a moving frame. Hence, Minkowski electrodynamics implies the absolute nature of mechanical motion in medium.

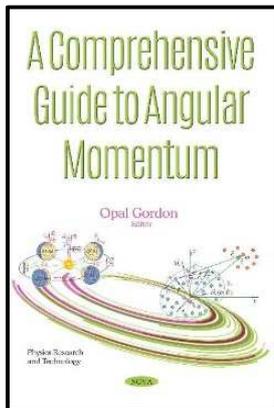
Next, the authors represent the electromagnetic field from different and unknown points of view, and the duality of natural time is considered.

Chapter five is focused on an accurate and profound investigation, interpretation and explanation of resonant and anomalous phenomena in radiated electromagnetic fields that arises due to the passage of charged particle beams over arbitrary-shaped periodic interfaces of natural or artificial material.

Later, it is shown that a suitable modification of the Lee-Wick idea can also lead to linear potential at large distances. For this purpose, the authors study an Abelian model that “simulates” the quantum chromodynamics confining phase while maintaining the Coulomb behaviour at short distances.

In the final chapter, the authors present a generalization of the transformation of the electromagnetic field from the frame co-moving with an accelerated particle into an inertial frame of reference and from an inertial frame into the frame co-moving with a moving particle.

HB 9781536157055 £219.99 July 2019 Nova Science Publishers 282 pages



A Comprehensive Guide to Angular Momentum

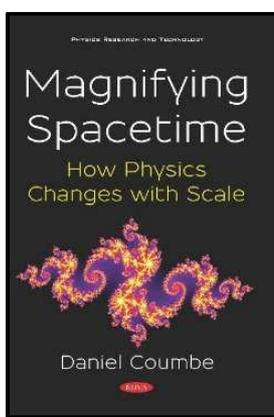
Opal Gordon

A Comprehensive Guide to Angular Momentum begins by considering substantiations of the theorem of angular momentum change and the law of conservation of angular momentum, as the change of angular momentum indicates an error in the method of calculating the dynamics of the Solar system.

Following this, different techniques for the analysis of the orbital angular momentum of electromagnetic fields are reviewed and discussed, describing their main advantages and disadvantages, and providing key ready-to-use methods for detection.

The concluding chapter provides a theoretical explanation of photonic orbital angular momentum and explains its distinction from atomic orbital angular momentum. Global conservation of angular momentum implies that light must transfer not only its spin, but also its orbital angular momentum in order to matter.

PB 9781536157079 £78.99 July 2019 Nova Science Publishers 111 pages



Magnifying Spacetime

How Physics Changes with Scale

Daniel Nathan Coumbe

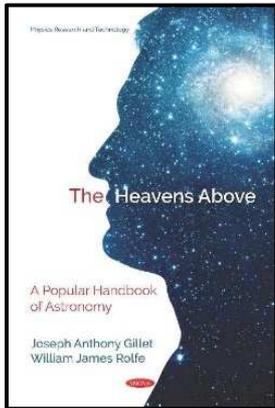
Fundamental physics has now been stuck for almost a century. Ever since the discovery of general relativity and quantum mechanics in the early 1900s, the brightest minds in physics have been striving to combine these two paradigms into a single unified theory of quantum gravity, without success. The general consensus is that we are missing a big piece of the puzzle.

Now, there are exciting new hints coming from fundamental physics research that may finally unlock the enigma of quantum gravity, the holy grail of modern physics. Recent results point toward one central idea; the importance of scale transformations in physics. *Magnifying Spacetime* delivers new insights into the role of scale in quantum gravity from the cutting-edge of modern research using an accessible and pedagogical style. The ideal complementary text for undergraduate and graduate students, this book also serves as an essential resource for professional physicists working on related topics. However, the scientifically literate layman should also find this work accessible due to the emphasis on conceptual understanding.

Daniel Coumbe takes readers on a journey from the basics of scale transformations to the frontiers of quantum gravity research, including fractal geometry, minimum length scenarios, the renormalization group, Weinberg's asymptotic safety scenario, causal dynamical triangulations, spontaneous dimensional reduction, and Weyl's modification of Einstein's general relativity.

Isaac Asimov said, "The most exciting phrase to hear in science, the one that heralds new discoveries, is not, Eureka! I've found it, but, that's odd!" The recent discovery that the world may be two-dimensional at extremely small distances, which is one of many striking results covered in this book, certainly counts as odd. There is now a small window of opportunity in which to get ahead of the curve by understanding such phenomena and developing new theoretical models and predictions, before the coming surge of experimental results.

PB 9781536153194 £78.99 July 2019 Nova Science Publishers 184 pages



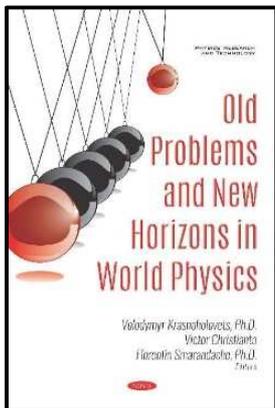
The Heavens Above A Popular Handbook of Astronomy

Joseph A Gillet, William J Rolfe

It has been the aim of the authors to give in this book a brief, simple, and accurate account of the heavens as they are known to astronomers of the present day. It is believed that there is nothing in the book beyond the comprehension of readers of ordinary intelligence, and that it contains all the information on the subject of astronomy that is needful to a person of ordinary culture.

The authors have carefully avoided dry and abstruse mathematical calculations, yet they have sought to make clear the methods by which astronomers have gained their knowledge of the heavens. The various kinds of telescopes and spectroscopes have been described, and their use in the study of the heavens has been fully explained.

HB 9781536154917 £219.99 May 2019 Nova Science Publishers 377 pages



Old Problems and New Horizons in World Physics

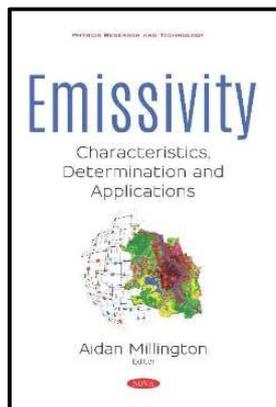
Edited by Volodymyr Krasnoholovets, Victor Christiano, Florentin Smarandache

Written by 13 contributors from different regions of the World, this book is a collection of papers written by researchers who have been working toward defining new concepts in the sciences for years. Among the new approaches, new views have been developed based on the emerging mathematical principles, the observation of possible relationships between physical processes, and ideas inspired by firsthand experience penetrating elusive realms.

In the frame of the new explanatory theoretic models, matter and energy may be different characteristics of a physical system and "equivalence" between matter and energy becomes not so obvious. Quantum Mechanics was developed based on the assumption that electron mass is constant. Variable electron mass automatically rules out the entirety of quantum mechanics. Electron mass can change during chemical and biological processes and then other characteristics modify correspondingly.

It is accepted that the Special Theory of Relativity (STR) does not contradict quantum mechanics, but in reality, the opposite is true. Even for a non-rocket scientist, this contradiction becomes evident with the simplest analysis of energy mass and energy equivalence formula. In simple words, the formula assumes that if energy is quantized, mass must be quantized too. How do atomic particles know how much mass to convert into energy and keep the same proportion in the conversion? Maybe one proton or one neutron converts more mass than his neighbor does! If protons and neutrons can be fragmented and divided using the MeV energy order, then why do we need CERN or other large nuclear facilities?

HB 9781536154306 £219.99 May 2019 Nova Science Publishers 376 pages



Emissivity

Characteristics, Determination and Applications

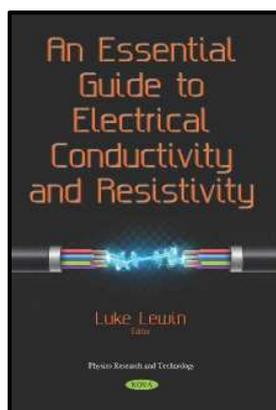
Edited by Aidan Millington

Emissivity: Characteristics, Determination and Applications opens with an overview of a variety of remote sensing retrieval methods of land surface emissivity from space. The authors provide some theoretical background about land surface emissivity and recall various retrieval methods. During the atmospheric hypersonic re-entry of a space vehicle, the extremely high temperatures generated in the shock layer between the bow shock and the vehicle lead to very high temperatures at the wall, the values of which depend mainly on the total heat flux impinging the surface, and its emissivity. The higher the emissivity of the surface, the lower the temperature that is achieved. Thus, in order to perform reliable temperature predictions at the surface during space re-entry into the atmosphere, the authors suggest that proper knowledge of material surface emissivity is mandatory.

In the penultimate chapter, the emissivity due to neutrino-pair production in e+e- annihilation in the context of the 331RHv model is calculated in a way that can be used in supernova models.

Lastly, a photoacoustic cell is constructed to view two different surfaces through a pair of out of phase optical chopping wheels records the difference in radiation fluxes from the two surfaces. The point at which a lock-in amplifier records a null in the photoacoustic signal is where the radiation fluxes from the two surfaces are identical, permitting the relative emissivities of the two surfaces to be determined.

PB 9781536151374 £78.99 March 2019 Nova Science Publishers 96 pages



An Essential Guide to Electrical Conductivity and Resistivity

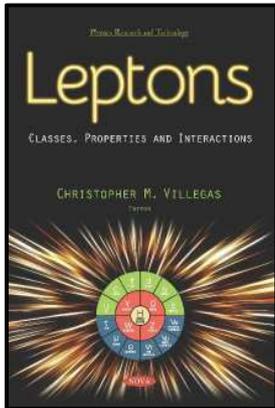
Edited by Luke Lewin

An Essential Guide to Electrical Conductivity and Resistivity opens with experimental and theoretical data on the important structurally sensitive property of the molten oxide-chloride systems KCl (50 mol. %)-PbCl₂ (50 mol. %), CsCl (18.3 mol. %)-PbCl₂ (81.7 mol. %) and CsCl (71.3 mol. %)-PbCl₂ (28.7 mol. %) with PbO concentration reaching 20 mol.% in the temperature range of 764 – 917 K.

This compilation also reports on recent developments in the stabilization, carbonization, and activation of naturally grown biomass, their physical and chemical properties, and major applications in supercapacitors.

A brief overview of the application areas of the electrical resistivity method, a non-destructive and inexpensive geophysical technique, as well as comprehensive and practical overview of its results in environmental and geotechnical projects, archeology and stone cultural heritage is presented.

PB 9781536150476 £90.99 June 2019 Nova Science Publishers 107 pages



Leptons Classes, Properties and Interactions

Edited by Christopher M. Villegas

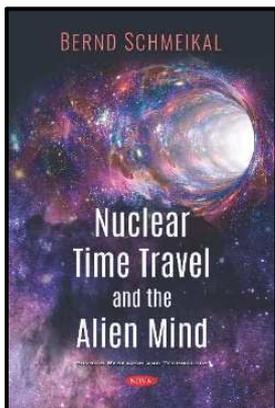
In *Leptons: Classes, Properties and Interactions*, the authors develop a model to calculate the masses of charged leptons by quantifying the electrostatic field generated by these particles. This model is extended to weak and strong interactions in order to calculate the masses of all elementary fermions.

Next, by taking the $SU(2)$ group of weak interactions in the presence of Electric Charge Swap-symmetry as a starting point, this compilation show that ordinary and non-regular leptons are related by the ECS-rotational $SO(3)$ group. By considering the ECS-Hamiltonian quaternions for leptons, the authors find that the $SU(5)$ Grand Unified Theory originates from the image of normalized quaternions group $N(Q8)$ under the ECS-rotations.

The differential cross-section corresponding to a dispersion process in the context of the 331RHV model is calculated in order to use the results in terrestrial and astrophysical experiments. The differential cross-section is written in terms of the mass of the new gauge boson Z' , the mixing angle, the magnetic moment of the neutrino, and the charge radius.

In closing, the authors obtain analytical expressions for the total cross section of the process $e+e-\tau+\tau-\gamma$ in the context of the B-L model. The total cross section is analyzed in terms of the mass of the new gauge boson Z' , the mixing angle θ' of the B-L model, the magnetic moment and the electric dipole moment of the τ -lepton.

PB 9781536149296 £78.99 March 2019 Nova Science Publishers 107 pages



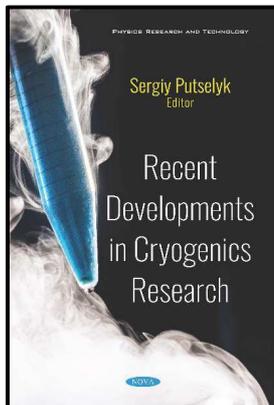
Nuclear Time Travel and the Alien Mind

Anton Bernd Schmeikal

Some of the unfunded opportunities (UFOs), like the TR3B or TR6, are already flying; with this in mind, it may appear that this book is published too late. However, this is not the case. Both extraterrestrials and humans have developed craft of similar a "planform." Officials and the media continuously feed the masses incorrect information. Drive technology of the honestly endeavoring "human" is outdated. It seems to have been copied from some ancient Indian scriptures.

Indeed, electrostatic, electromagnetic and rotating plasma drives deliver fermionic power, but they are far from allowing humanity to harness the power of a hyperspace jump. In 2017, NASA ensured us that "for the near future, [a] warp drive remains a dream." As a matter of fact, both human and extraterrestrial humanoids have hypothesized the use anti-gravity, warping and time travelling vehicles, even what they call "living vessels." However, both have no theory, no theoretical foundations for nuclear time travel technology. This book delivers a few necessary basics concerning the possible future where this nuclear time travel could potentially become a reality.

PB 9781536145700 £78.99 January 2019 Nova Science Publishers 121 pages



Recent Developments in Cryogenics Research

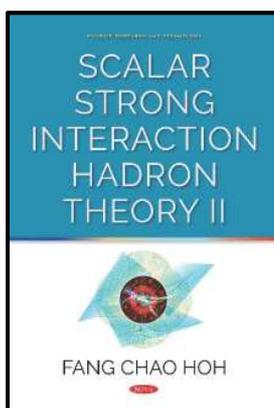
Edited by Sergiy Putselyk

Cryogenics, a term commonly used to refer to very low temperatures, had its beginning in the latter half of the 19th century. Traditionally, this field is separated from Cryogenic Engineering and Low Temperature Physics (LTP). Cryogenic engineering is concerned with the design and development of low-temperature systems and components, while low temperature physics is more related to the fundamental research of material or fluid properties. This book discusses some recent findings and developments as well as gives an outlook on the fields of helium cryogenics and LTP. The main focus will be given to the helium cryogenics, though a smaller review is also presented for the fields of cryogenic energy storage facilities. Some future trends and R&D activities are also discussed. To orient the reader, the first four chapters are related to LTP, while the major part of the book is then devoted to helium cryogenics, for example, refrigeration techniques, cryostats, low temperature electronics, safety, etc.

It should be particularly suited for advanced students, young researchers or engineers, who are intending to proceed with careers in helium cryogenics or LTP. However, the authors believe that the book will also be of value to experienced scientists, since it describes several very recent advances in experimental low temperature physics and technology, for example, ultra-low temperature technique and thermometry, as well as progress in helium cryogenics, such as heat transfer, cryostat designs for large facilities, and refrigerator developments. Extensive references are provided for the readers interested in the details of the cryogenic engineering advances. And last but not least, the authors hope that this book will widen the horizons of many without a solid state background, but with a general interest in low temperature physics and helium cryogenics.

In attempting to cover such a wide field, a large degree of selection has been necessary, as complete volumes have been written on many topics which here have had to be covered in very few pages or less. It is inevitable that not everyone will agree with the present choice, especially if it is their own subject which has been discussed very briefly or not mentioned at all, and the editor accepts full responsibility for the selections made. The book is written at a level which should be followed by a university graduate in science or engineering, although, if their background has not included a course in cryogenic engineering, general or solid-state physics, some groundwork may be lacking.

HB 9781536149036 £219.99 March 2019 Nova Science Publishers 254 pages



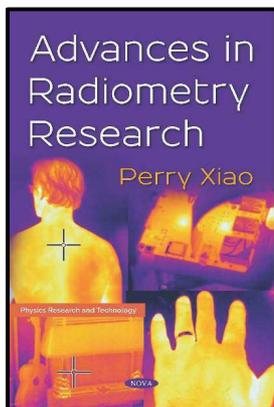
Scalar Strong Interaction Hadron Theory II

Fang Chao Hoh

The current theory for strongly interacting elementary particles QCD cannot account for low energy phenomena. The present theory described in this book aims at replacing low energy QCD and has far more predictive power.

Equations of motion for mesons and baryon are proposed, accounting for many basic mesonic data and, presently, a few baryon data. It is supposedly still at its early stage of development.

HB 9781536147278 £219.99 May 2019 Nova Science Publishers 316 pages



Advances in Radiometry Research

Perry Xiao

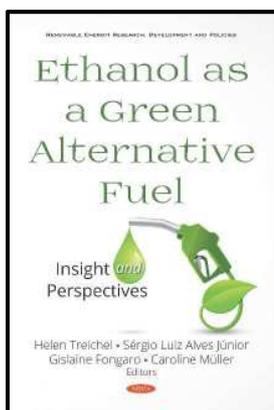
Radiometry is a fascinating, fast growing research area, and there are many interesting real life applications. This book is intended to provide readers the theoretical background of radiometry, a resource of the latest radiometry technology, as well as the latest research in radiometry. It is aimed at university/college students, researchers and engineers. It assumes readers have basic knowledge and skills concerning electronics, physics and mathematics at the university level. This book is divided into three parts. Part I is the Introduction to Radiometry, which includes the theoretical background of radiometry, radiometry sources, radiometry detectors, and radiometry optical systems.

This part also includes the latest technologies available, such as different Quantum Cascade Lasers, wavelength tuneable detectors, thermal electric cooled and Stirling cooled detectors, multispectral and hyperspectral thermal cameras, high resolution and high speed thermal cameras, and various radiometry optical detection systems. Part II is called the Advances in Radiometry Research, which contains the development of the latest research in areas of biomedical applications, industrial applications, non-destructive testing, astronomy and environmental applications.

This is the core part of the book and provides a review of the latest research trends in radiometry in different application areas. It also includes a chapter on prototyping low cost radiometry devices, which provides a list of low cost lasers and detectors, low cost and compact thermal cameras, low cost optics, low cost PCB making, and finally low cost 3D printers and CNC machines. Part III is the Appendices, which includes symbols used in the book, some MATLAB example codes including least squares fitting and the latest deep learning GoogLeNet, the introduction to WolframAlpha, a list of optical, infrared and laser components suppliers, and radiometry books. This book can be used as a textbook as well as a background reading textbook, or as a resource book.

HB 9781536147261 £219.99 March 2019 Nova Science Publishers 149 pages

Renewable Energy: Research, Development & Policies



Ethanol as a Green Alternative Fuel

Insight and Perspectives

Edited by Helen Treichel, Sergio Luiz Alves Junior, Gislaine Fongaro, Caroline Muller

In face of the increasingly obvious need to ensure the sustainability of the environment, alternative and renewable energy sources are no longer just the concern of environmentalists and have become commitments of governments virtually everywhere in the world. In this context, ethanol emerges as an excellent substitute for petroleum derivatives. This green alternative fuel is sustained by its own burning because when CO₂ serves as a carbon source for the growth of plants, it will allow the carbohydrates to be fermented. In addition, currently different generations of this fuel are being proposed, considering the utilization of their own waste.

However, challenges still need to be overcome to enable the second, third and fourth generations of ethanol. At the same time, other renewable fuel alternatives emerge to compete with it. The automobile industry, for example, has been developing new engines, hybrids or not, that can be powered by electricity or H₂. In this regard, this book addresses, under different aspects, the main strategies to surpass the remaining obstacles, as well as the advantages and disadvantages of ethanol as a fuel of the future. In this context, the "Ethanol as a Green Alternative Fuel" book shows present and future scenarios about bioethanol and perspective in their chain, considering the economic and environmental impact mitigations approach.

HB 9781536157192 £219.99 July 2019 Nova Science Publishers 304 pages



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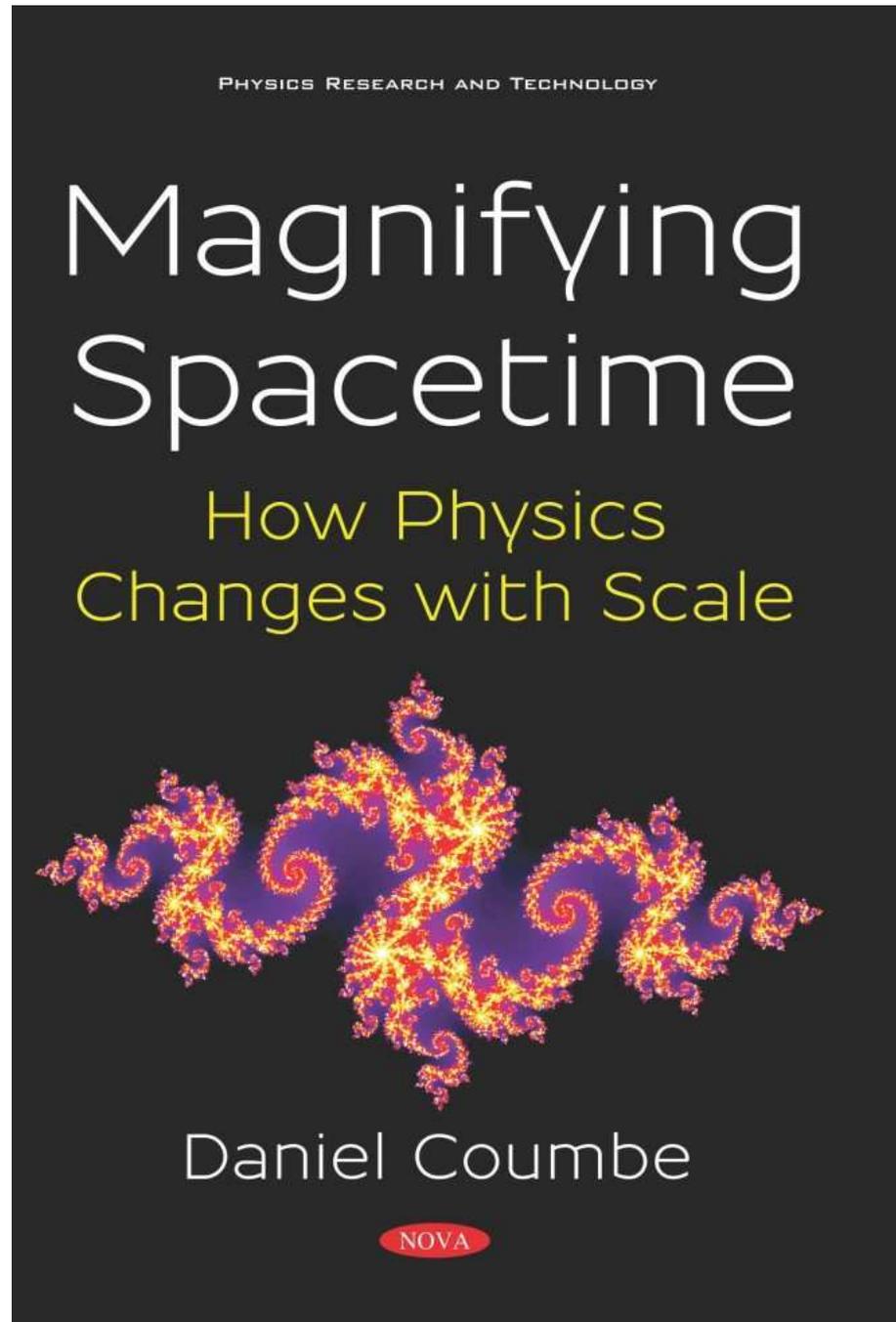
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