



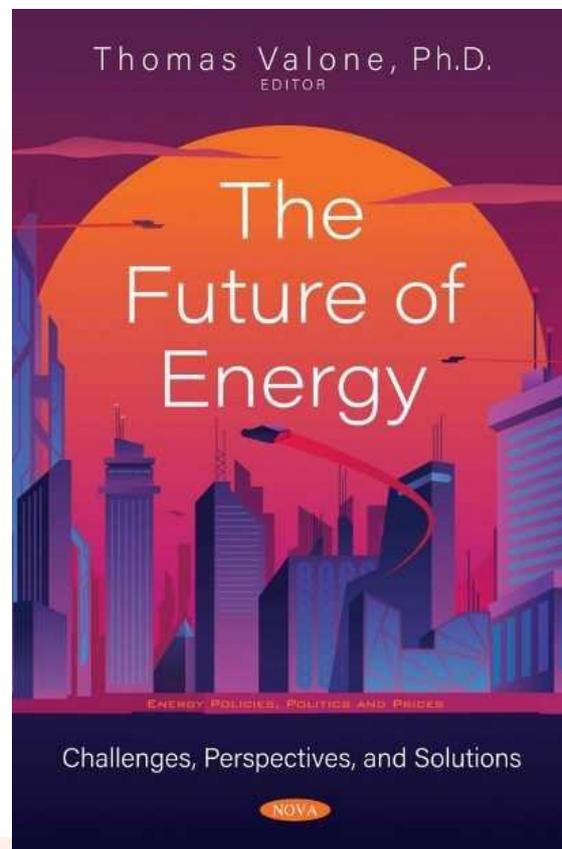
Gazelle Book Services Limited,
Unit 1/4, White Cross Mills,
Hightown, Lancaster LA1 4XS

t: (01524) 528500

e: sales@gazellebookservices.co.uk

www.gazellebookservices.co.uk

PHYSICS



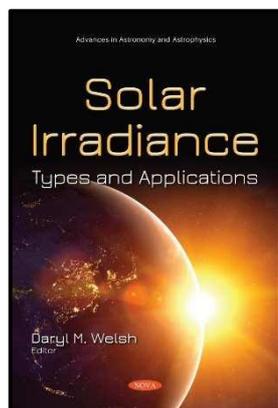
TITLES PUBLISHED BY NOVA SCIENCE

- Advances in Astronomy & Astrophysics
- Advances in Energy Research
- Classical & Quantum Mechanics
- Energy Policies, Politics & Prices
- Energy Science, Engineering & Technology
- Horizons in World Physics
- Nuclear Materials & Disaster Research
- Physics Research & Technology
- Renewable Energy: Research, Development & Policies

Contents

Advances in Astronomy & Astrophysics	2
Advances in Energy Research	2
Classical & Quantum Mechanics	3
Energy Policies, Politics & Prices	6
Energy Science, Engineering & Technology	6
Horizons in World Physics	15
Nuclear Materials & Disaster Research	16
Physics Research & Technology	16
Renewable Energy: Research, Development & Policies	23

Advances in Astronomy & Astrophysics



Solar Irradiance Types and Applications

Edited by Daryl M. Welsh

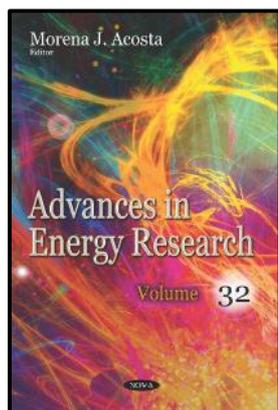
Solar Irradiance: Types and Applications first presents intelligent models for sizing, parameters forecasting and control of a photovoltaic system on the basis of a modified fuzzy neural net. The modified fuzzy neural net provides automatic fulfillment and modification of all proposed intelligent models.

Following this, the authors discuss modeling direct normal irradiance at the Earth's surface. In addition to looking traditionally at direct normal irradiance as a fuel for concentrating solar systems, its use in computing the sunshine number is also explored.

The closing study explores the potential of using simple empirical and artificial neural network models to estimate global solar radiation on a horizontal surface. Algeria was used as a case study and four statistical parameters were chosen to assess the performances of each model or approach.

PB 9781536187861 £75.99 November 2020 Nova Science Publishers 132 pages

Advances in Energy Research



Advances in Energy Research Volume 32

Edited by Morena J. Acosta

Advances in Energy Research. Volume 32 opens with a comprehensive review of technologies for the reutilisation of waste cryogenic energy from the liquefied natural gas regasification process at terminals and on marine vessels.

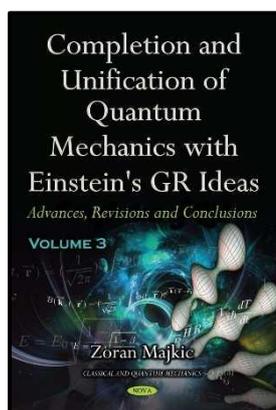
The authors discuss the primary renewable energy source in Cuba; biomass. Although sugarcane biomass has the most significant energy potential, some other biomass energy sources are also relevant at the local level and are convenient from an environmental standpoint.

Invisibility cloaks of various types have been researched extensively in recent years with one of the first being the electrostatic cloak, so-named because it effectively screens an internal volume from, and offers no disturbance to, an external static electric field. As such, this compilation explores this phenomenon and whether the cloaked object (or the cloak itself) could be detected by various means.

The concluding study explores how, in order to reduce the consumption of oil for electricity generation by 20% in Cuba, the country should build a total of 13 wind farms with a capacity of 633 MW.

Volume 32 - HB 9781536170887 £229.99 February 2020 Nova Science Publishers 266 pages

Volume 33 - HB 9781536181364 £229.99 August 2020 Nova Science Publishers 274 pages



Completion and Unification of Quantum Mechanics with Einstein's GR Ideas PART III

Advances, Revisions and Conclusions

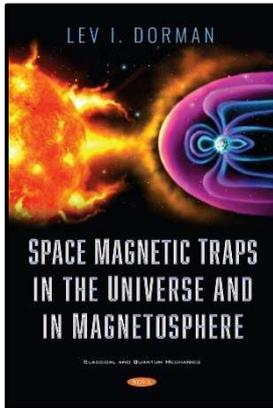
Zoran Majkic

Quantum mechanics, based on the Schrödinger equation (and its relativistic Dirac's extension) is a statistical theory, here denominated as Statistical Quantum Mechanics (SQM), to differentiate it from the new part of the quantum theory, provided in PART I and II, denominated Individual-particles Quantum Mechanics (IQM). Both of them are necessary components of the quantum theory, as are the Classical Mechanics for Individual objects (ICM), based on the Newton equations, Hamiltonian-Jacobi equations or the Euler-Lagrange equation of motion of individual objects, and the Statistical Classical Mechanics (SCM) based on the Liouville equations. The SQM tells us the various possible outcomes of experiments and the corresponding probabilities if we would do a large number of identical experiments on individual quantum systems. The SQM systems are not all identical but this is the same type of fluctuation that occurs in classical statistical descriptions in SCM. At first sight the situation may not appear very different therefore from the description provided by classical statistical mechanics. In that case however, we have an underlying description (ICM) that provides a complete (i.e. non-statistical) description of the world, which in general is far too complex, however, to be of use.

The last PART III of this trilogy is dedicated to the completion of the whole theoretical mechanics, both classical and quantum inside a 9-D time-space manifold of the Universe. Only in this final third volume, this IQM theory, dedicated in the first two volumes only to the elementary particles, is extended also to the non-elementary particles (like hadrons, nucleus, atoms, molecules, and all every-day objects in our common life, up to the biggest non-elementary particles, like the planets, stars, etc.) in our unique Universe.

So, each object in our Universe, from the smallest (elementary) to the biggest, can be mathematically expressed by the same mathematical 9-D complex field expression, in a unifying way at which the physical determinism holds for the individual objects at all micro-macro scales in our Universe.

HB 9781536172003 £211.99 April 2020 Nova Science Publishers 455 pages



Space Magnetic Traps in the Universe and in Magnetosphere

Lev I. Dorman

The importance and actuality of investigation *Space Magnetic Traps in the Universe and in Magnetosphere* are based on following four factors:

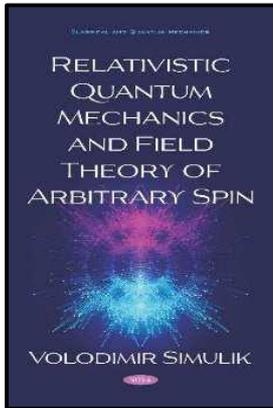
1. Space Magnetic Traps in the Universe for Cosmic Ray particles (Astroparticles, Run Away Particles) on different studies of the Universe's evolution and in different objects (galaxies of different types, quasars, nucleus of galaxies, Sun and stars, Heliosphere and Stellar Spheres, solar and stellar winds, magnetospheres of planets, and so on) are very interested and important in the frame of fundamental science (Astrophysics, Plasma Physics and Magneto-Hydrodynamics, Nuclear and Elementary Particle Physics, Geophysics). This problem is interested also for applications (e.g., problem of controlled thermo-nuclear reactions in magneto-plasmas traps as main source for energy in near future for the Earth's Civilization).

2. The Magnetosphere is the nearest giant natural laboratory where with satellites and ground measurements is possible to investigate different plasmas and energetic processes in space caused by interaction of high kinetic energy solar wind plasmas with frozen in Interplanetary Magnetic Fields–IMF and its perturbations (Interplanetary Coronal Mass Ejections–ICMEs, Interplanetary Shock Waves–ISWs, Interplanetary Interaction Regions–IIRs, and so on) with the rotated main geomagnetic field. This interaction leads to a dynamic transformation of magnetic fields in the Magnetosphere, formation Space Magnetic Traps (Radiation Belts), generation and trapping of high energy particles (which can be called Magnetospheric Cosmic Rays–MCR), and generation of different types of instabilities and electromagnetic radiations. These processes are similar to processes in magnetospheres of other planets and their moons, in the atmosphere of the Sun and other stars, in interplanetary and in interstellar space, and in many different astrophysical objects in the Universe. This research presents an important basis for fundamental space in frame of Astrophysics, Plasma Physics and Magneto-Hydrodynamics, Nuclear and Elementary Particle Physics, Geophysics.

3. In modern time, technology, economics, navigation, TV, internet, radio-connections, military aspects, and the life of people on our planet are strongly connected by the work of many satellites moving inside the Magnetosphere. Different processes and MCR in the magnetosphere influence how the satellites work and often lead to satellite malfunctions, sometimes completely destroying their electronics and satellites become 'dead'. The described research can be considered as a basis for developing methods of forecasting dangerous situations for satellites on different orbits and to decrease the risk of satellite malfunctions and of losing them. It means that this research has important practical applications.

4. The interaction of ICME, ISW, and IIR with the Magnetosphere leads to the generation of big magnetic storms accompanied by Cosmic Ray Forbush–decrease and precursory effects in Galactic Cosmic Ray (GCR) intensity. These magnetic storms are dangerous, not only for satellites, but also for Earth's surface regarding technology, radio-connections, car accidents, and human health (e.g., increasing frequency of infarct myocardial and brain strokes). Investigation of causes of magnetic storms can help to develop methods of their forecasting and decrease the level of magnetic storm hazards. Therefore, the other practical application of this research is connected with the problem of space weather and space climate influence on the technology, radio-connections, navigation, transportation, and human health on the Earth in dependence of altitude and geomagnetic latitude.

HB 9781536183221 £288.99 September 2020 Nova Science Publishers 610 pages



Relativistic Quantum Mechanics and Field Theory of Arbitrary Spin

Volodimir Simulik

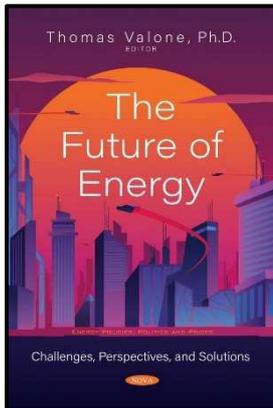
Foundations of the relativistic quantum mechanics and field theory of arbitrary spin are presented. New relativistic wave equations without redundant components for the particle-antiparticle doublets of arbitrary spin are considered. The comparison with known arbitrary spin equations of Bhabha, Bargman-Wigner and with Pauli-Fierz, Rarita-Schwinger equations (for the spin $s=3/2$) demonstrates the advantages of the presented approach. The special procedure of synthesis of higher spin relativistic wave equations is suggested. New equations are considered on three levels of (i) relativistic canonical quantum mechanics, (ii) canonical Foldy-Wouthuysen type field theory, and (iii) manifestly covariant field theory. The derivation of field equations based on the start from the relativistic canonical quantum mechanics is given. The corresponding transition operator, which is the extended Foldy-Wouthuysen transformation, is suggested and described. This model of relativistic quantum mechanics is described here on the level of von Neumann's consideration of non-relativistic case. The Lagrange approach for the spinor field in the Foldy-Wouthuysen representation is analyzed.

The proof of the Fermi-Bose duality property of a few main equations of field theory, which before were known to have only single Fermi (or single Bose) property, is given. Hidden Bose properties (symmetry, solutions, and conservation laws) of the Dirac equation are proved. Both cases of non-zero and zero mass are considered. New useful mathematical objects, which are the pure matrix representations of the 64-dimensional Clifford and 28-dimensional $SO(8)$ algebras over the field of real numbers, are put into consideration. The application of such algebras to the Dirac and Dirac-like equations properties analysis is demonstrated. Fermi and Bose $SO(4)$ symmetries of the relativistic hydrogen atom are found.

New symmetries and solutions of the Maxwell equations are considered. The Maxwell equations in the form, having maximal symmetry, are suggested and described. The application of such field-strength equations to the atomic microworld phenomena is demonstrated. On the basis of such Maxwell system the relativistic hydrogen atom spectrum and quantum properties of this atom are described. The Sommerfeld-Dirac fine structure formula, Planck constant and the Bohr postulates are derived in the frameworks of classical electrodynamics. The limits and borders of classical physics applications in inneratomic microworld are discussed. In order to determine the place of our approach among other investigations the 26 variants of the Dirac equation derivation are considered.

HB 9781536169874 £211.99 February 2020 Nova Science Publishers 360 pages

Energy Policies, Politics & Prices



The Future of Energy Challenges, Perspectives, and Solutions Edited by Thomas Valone

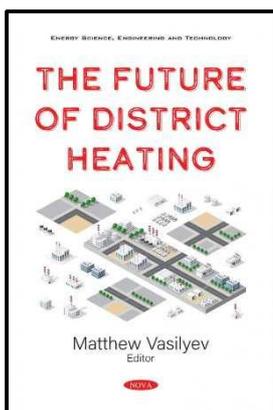
The anthology entitled, “*The Future of Energy: Challenges, Perspectives, and Solutions*” includes a wide range of topics related to the probable and also possible future developments of energy technologies. The collection of papers offers a series of unprecedented perspectives on energy science, unavailable elsewhere. The authors have considered developments in renewable energy, novel energy discoveries, environmental climate futures, possible technological advances, temporal distortion, and gravitational electromagnetism. Specific energy inventors reporting breakthrough results have also been showcased in individual chapters, including Searl, Manelas, Kozyrev, and Storms. The future of energy is presented with possible scenarios such as with microgrids, solar systems, fusion-fission reactors, smart cities, energy storage, electric vehicles, low energy nuclear reactors, electromagnetic devices, proton and electron conversion, theoretical antigravity, and time manipulation. Several interesting models have been considered to provoke and stretch the reader’s imagination and awareness of the study of the future.

This collection of works provides a broad range of conceptual understanding of energy conversion that is both conventional and unconventional. Each chapter includes a significant use of graphs and charts, as well as explanatory equations where necessary, with plenty of vital references and links to substantiate any new scientific concepts and assist further research. More than one new phenomena of electrical power production have been discovered and the results documented in detail within the pages of this anthology. While the time schedule and specific cause of global warming is detailed, the plan for advanced energy applications is also explored.

The collection of works provides a unique perspective on the evolving landscape of future energy which is provocative and enlightening. The reader will find it enriches and enlivens the discussion of what is to come.

HB 9781536181869 £211.99 August 2020 Nova Science Publishers 397 pages

Energy Science, Engineering & Technology

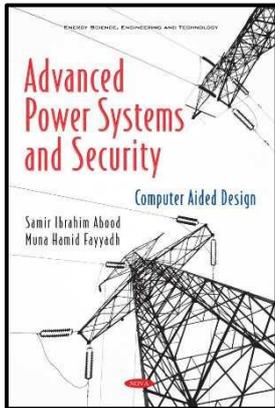


The Future of District Heating Edited by Matthew Vasilyev

The Future of District Heating begins by discussing the way in which designing district heating systems to operate below 167F (75C) reduces the overall delivered cost of heat by reducing the capital cost of the heat source, allowing for the use of non-traditional and renewable sources, reducing the cost of piping, and allowing for the use of large-scale thermal storage. The authors describe the development of the provisions of the European Union law which apply to district heating to examine the particular legal acts in force, and provide an outlook on future developments.

In closing, an experimental investigation is presented on a closed-loop earth-to-air heat exchanger (underground air tunnel) in heating mode.

PB 9781536186550 £75.99 October 2020 Nova Science Publishers 137 pages



Advanced Power Systems and Security Computer Aided Design

Samir Ibrahim Abood

ADVANCED POWER SYSTEMS AND SECURITY: Computer-Aided Design is a textbook that provides an excellent focus on the advanced topics of the power system and gives exciting analysis methods and a cover of the important applications in the power systems. At the beginning of each chapter, an abstract that states the chapter objectives. And then the introduction for each chapter. All principles are presented in a lucid, logical, step-by-step approach. As much as possible, the authors avoid wordiness and detail overload that could hide concepts and impede understanding, and In each chapter, the authors present some of the solved examples and applications using a computer program.

Toward the end of each chapter, the authors discuss some application aspects of the concepts covered in the chapter using a computer program.

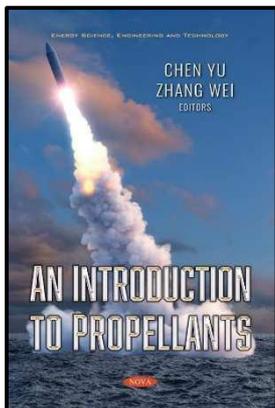
In recognition of requirements by the Accreditation Board for Engineering and Technology (ABET) on integrating computer tools, the use of MATLAB® and ATP version of the Electromagnetic Transients Program (EMTP) are encouraged in a student-friendly manner. MATLAB® is introduced in Appendix C and applied gradually throughout the book.

Each illustrative example is immediately followed by practice problems. Students can follow the example step by step to solve the practice problems without flipping pages or looking at the end of the book for answers. These practice problems test students' comprehension and reinforce key concepts before moving on to the next section.

The book is intended as a textbook for a senior-level undergraduate student in electrical and computer engineering departments, and appropriate for Graduate Students Industry Professionals, Researchers, and Academics.

The book has more than 11 categories and millions of power readers, and it can use in more than 400 electrical engineering departments at the top of universities all over the world.

HB 9781536187854 £247.99 November 2020 Nova Science Publishers 464 pages



An Introduction to Propellants

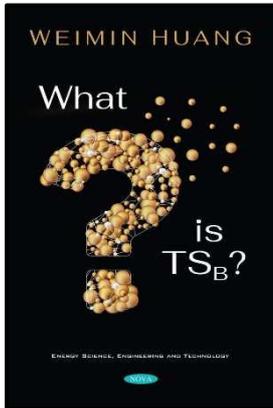
Edited by Chen Yu

Solid propellant is the most important energy source for rocket, missile and other weapons to launch, and is the key material to realize the firing range and damage effect of weapons. In order to meet the requirements of weapon application, the overall requirements for the energy performance, combustion performance, mechanical performance, storage performance, safety performance and process performance of solid propellant are put forward. Therefore, there are many challenges to fully meet the requirements of solid propellant and apply it to weapons. In recent years, with the development of material science, computational science and experimental technology, there are many reports about the composition, structure, performance research and prediction of solid propellants.

This book reviews the research progress in solid propellant binder, energy performance prediction and thermodynamic calculation, combustion gas flow and combustion performance regulation, material storage performance research and safety performance simulation, and discusses the key development direction. The summary and prospect of this paper are expected to provide guidance, reference and inspiration for relevant researchers to carry out the research of solid propellant.

This book is suitable for researchers, technicians and students who are engaged in solid propellant, weapons, chemistry and other work to read, for reference in specific research work.

HB 9781536180541 £178.99 July 2020 Nova Science Publishers 298 pages



What is TSB?

Edited by Weimin Huang

Physics to date discusses only how motion is generated, not how the universe evolves. We do not even know how the surrounding material tri-states are phase-transformed.

The Maxwell demon problem presents a sharp problem: is the particle motion with different momentum also divisibility in space? How will the thermodynamic statistics change if the momentum is likely to be order distributed in space by its size, i.e. the microscopic states of the momentum can be degenerated in different spatial regions? The Boltzmann entropy of an ideal gas under thermodynamic equilibrium is no longer a probability but a defined value $S_B = kN$.

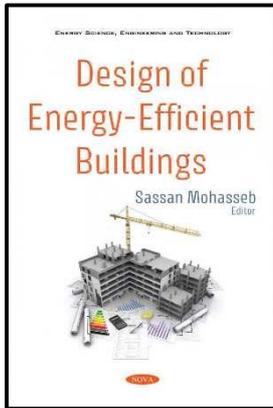
As Kant tells us that the world without “quantities” is not recognizable. The ideal gas again becomes the inlet for new recognition. We see not only the unity of contingency or randomness and certainty. We also see the “momentum field” constructed in time and space that is specified by the motion of particle momentum. The gas state equation hides the symmetry: principle of constant force. Two kinds of potentials energy for each momentum correspond to the same interaction. When we review the second law of thermodynamics, Boltzmann entropy of the process of spontaneous heat transfer from a high temperature object to a low temperature object is reduced. It directly contrasts to the Clausius entropy increase calculated by “heat”. The most mysterious dense fog in thermodynamics can be revealed only by using two entropies and two entropy criteria. The Boltzmann entropy reduction is just only evolution trend of the cosmic. Even ordered life results from spontaneous generation of Boltzmann entropy reduction upon electron entanglement and mixing. It is the reason of natural dialectics in the universe.

This potential energy TS_B , defined by Boltzmann entropy, is the configuration potential of a momentum field whose momentum is ordered in space according to its magnitude. This is a missing energy. It has been mistaken for “heat” that can be taken from or stored in other energies. Only the first thermodynamic law defined in this way actually satisfies time-translational symmetry and is the energy conservation equation for the first time.

The micro-state degeneracy generated the reverse potential due to the released energy has to make the dynamic evolution process between different levels of momentum in the form of wave. This can help us construct the thermal wave equation with finite thermal conduction velocities that Maxwell looks for. The vorticity degeneracy can help us to understand the concentrated vortex which can't be simulated and calculated by the N-S equation, so that typhoon and tornado can be better researched; it can also explain how Maxwell demon in cyclone tube refrigeration can accomplish total temperature separation. The energy missing in the hydrogen molecular spectrum is found from the entropy change generated during electron entanglement. How cells generate functionality by building structures (including protein folding) via Boltzmann entropy reduction.

Some of the problems discussed in real-world scientific practice: For example, time arrow, measurement intervention in quantum mechanics, cosmic expansion and background radiation related with dark energy, and whether TS_B potential energy exists in gravitational field with dark mass are only discussed primarily or shallowly. It is only desirable to use this energy to find more keys that open the mystery of nature.

HB 9781536180039 £178.99 July 2020 Nova Science Publishers 239 pages



Design of Energy-Efficient Buildings

Edited by Sassan Mohasseb

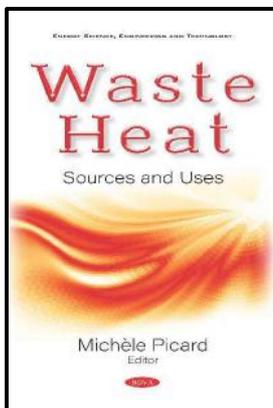
Nowadays, the energy crisis is one of the controversial issues around the world. Regarding the fact that the largest energy end use in the world belongs to the construction and residential sector, it seems necessary to analyze the energy flow in the buildings. The most sustainable energy design technique is to conserve energy as much as possible. There are various methods to reduce the use of conventional energy from fossil fuels to meet the energy requirement for the building. Various strategies including photovoltaic-thermal systems and insulation systems with the aim of minimizing building energy in different climate conditions (Cold-weather/Hot weather) were presented and assessed in the first chapter.

A comprehensive work was carried out to investigate the effect of adding nanoparticles as concrete additives on both pore structure and thermophysical properties of the concrete at different ages. Besides, the behavioral models using Genetic Algorithm (GA) programming were developed to describe the time-dependent behavioral characteristics of nanoparticle blended concrete samples in various compressive and tensile stress states.

Chapter 3 deals with the traditional energy saving techniques to highlight the potential of learning from traditional architecture and adopting their experiences to fulfill modern expectations. In this regard, Iranian classical architecture, particularly at hot arid climate, is taken into account. On the other hand, geothermal energy as one of the most significant alternative sources of thermal and electrical energy have been discussed.

To address the growing demand of power generation and its related challenges of the existing electrical power grid, Smart Grid (SG) systems comes as a solution that lays in taking the world forward to reach energy independence and environmentally sustainable economic growth. The final chapter provides various information about the smart grid systems and the efficiency of such systems is analyzed through a detailed case study.

PB 9781536178623 £87.99 June 2020 Nova Science Publishers 182 pages



Waste Heat

Sources and Uses

Edited by Michèle Picard

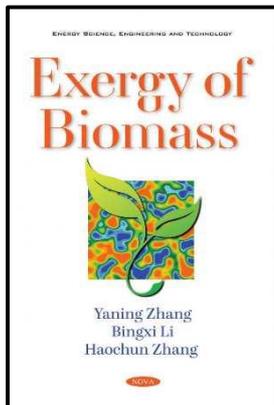
Waste Heat: Sources and Uses introduces the main waste heat sources that come from the industrial, electric, commercial, residential and transportation sectors of society. The wide applications of waste heat through heat pumps are then detailed, mainly including gas heating, hot water production, and steam production (for sterilization, distillation, rectification, etc.).

A summary of the main findings and trends in the area of ejector-enhanced efficiency of waste heat recovery cycles and systems using low boiling point working fluids. Following a brief overview of the ejector, selected configurations of interest are presented and discussed in a variety of applications.

The purpose of the following chapter is to provide a concise overview of waste heat availability and energy capturing potential, and the different technologies available for its recovery as well as their advantages and challenges.

In closing, the different types of waste heat recovery technologies that are used in cement plants to produce electricity are reviewed, and the potential for electricity production from heat exhaust gases of three cement plants by using waste heat recovery technology is discussed.

HB 9781536173550 £146.99 March 2020 Nova Science Publishers 214 pages



Exergy of Biomass

Edited by Yaning Zhang

Determination of the exergy of biomass is the first step to evaluate and study the fuel characteristics, transfer processes and utilization systems of biomass from exergy aspect. This book aims to present up-to-date research on the exergy of biomass.

Chapter 1 (Resources and Advantages of Biomass) mainly introduces the definition and classification of biomass as well as the resources and advantages of biomass.

Chapter 2 (Equations for Estimating the Exergy of Biomass) mainly presents the various equations proposed or developed to estimate the exergy of biomass and these include the simple, complicated and developed equations.

Chapter 3 (Analysis of the *Exergy of Biomass*) mainly defines the basic knowledge for the exergy characteristics (moisture related exergy, ash related exergy, S related exergy, LHV related exergy and total exergy) and distribution (percentages of moisture related exergy, ash related exergy, S related exergy and LHV related exergy) of biomass.

Chapter 4 (Exergy of Woody Biomass) mainly presents the basic properties of woody biomass (i.e., moisture content, ash content, ash compositions, elemental compositions and heating values) as well as the exergy characteristics and distribution of woody biomass. HHV related relationship, LHV related relationship and ash related relationships are also proposed to estimate the exergy of woody biomass.

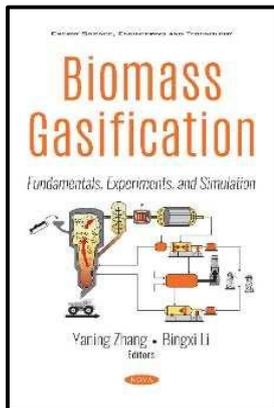
Chapter 5 (Exergy of Rice Husk) mainly presents the basic properties of rice husk (i.e., moisture content, ash content, ash compositions, elemental compositions and heating values) as well as the exergy characteristics and distribution of rice husk. HHV related relationship and LHV related relationship are then proposed to estimate the exergy of rice husk.

Chapter 6 (Exergy of Rice Straw) mainly presents the basic properties of rice straw (i.e., moisture content, ash content, ash compositions, elemental compositions and heating values) as well as the exergy characteristics and distribution of rice straw. HHV related relationship and LHV related relationship are then proposed to estimate the exergy of rice straw.

Chapter 7 (Exergy of Cereal Straw) mainly presents the basic properties of cereal straw (i.e., moisture content, ash content, ash compositions, elemental compositions, and heating values) as well as the exergy characteristics and distribution of cereal straw. HHV related relationship and LHV related relationship are then proposed to estimate the exergy of cereal straw.

Hopefully, the content of this book can supply a good guide to the up-to-date research on the exergy of biomass.

HB 9781536176032 £177.99 June 2020 Nova Science Publishers 277 pages



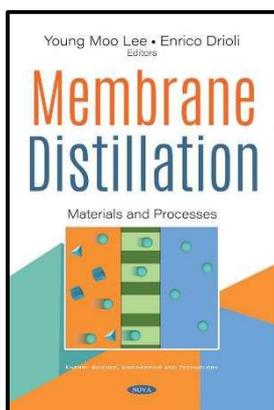
Biomass Gasification Fundamentals, Experiments, and Simulation

Edited by Yaning Zhang

Biomass gasification has received tremendous research attention all over the world because (a) biomass is abundant, diverse, renewable, and environmentally friendly, (b) the produced biogas/syngas is clean, versatile, efficient, and easily controllable, and (c) the system used is generally simple. This book aims to present up-to-date research on biomass gasification. The content of this book is divided to three parts or sections: the fundamentals of biomass gasification as presented in chapters 1 to 4, experimenting of biomass gasification as presented in chapters 5 and 6, and simulation of biomass gasification as presented in chapters 7 to 8.

Hopefully, the content of this book can supply a helpful guide to the up-to-date research on the fundamentals, experimental, and simulation of biomass gasification.

HB 9781536174625 £211.99 April 2020 Nova Science Publishers 335 pages



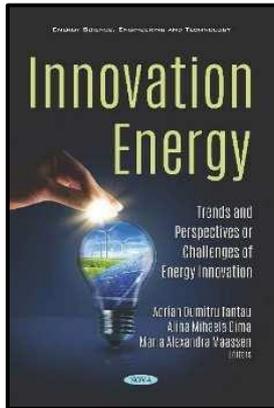
Membrane Distillation Materials and Processes

Edited by Young Moo Lee

Desalination is imperative to mitigate the global water scarcity as it produces drinking water from unpotable water. Currently, reverse osmosis membrane processes are widely used and account for 60% of desalination plants globally as they have lower energy requirements than other techniques, such as thermal desalination. Another promising alternative to desalination is membrane distillation (MD), which has been highlighted as one of the most promising and cost-effective desalination technologies over the last five decades. MD is a thermally driven desalination process that uses microporous and hydrophobic membranes through which only vapor can pass. Because non-volatile ions cannot pass through the membrane, MD theoretically achieves 100% salt rejection. In addition, MD is superior to other techniques as it is conducted at relatively low temperature and pressure, and is less sensitive to the feed concentration. MD is a desalination process that uses the vapor pressure difference between the feed and permeate as the driving force through the membranes.

Over 2,800 scientific publications appeared in Web of Science as of September 2019 (over 400 just in 2019) describing the current state of development and potential future applications of MD. Although these publications provide excellent knowledge regarding MD, they are rather fragmented, and it is difficult to gain a complete overview of the basic principles and functions of membranes for MD configurations and their application to real plants. In this book, we introduce MD from the invention of this technique to the recent developments in membranes and processes. The membrane materials and configurations of MD processes are systematically discussed, along with an introduction to real pilot plants that have been installed and tested in the field, and an economic analysis of MD. The objective of this book is to provide a short, but reasonably comprehensive, introduction to MD to graduate students and persons with an engineering or natural science background, to gain a basic understanding of MD, and the associated materials, configurations, and applications, without studying a large number of different reference books.

HB 9781536174489 £211.99 May 2020 Nova Science Publishers 347 pages



Innovation Energy **Trends and Perspectives or Challenges of Energy Innovation**

Edited by Adrian Dumitru Tantau

The book *"Innovation Energy: Trends and Perspectives or Challenges of Energy Innovation"* is a source of information for researchers and experts mainly, as well as any party interested of gaining knowledge in this field. The volume brings a new and updated perspective on the current innovations in the energy field regarding technological and strategic approaches.

The book is a result of the Second Open Meeting of the Balkan UNESCO Chairs 2017, organised by the UNESCO Chair for Business Administration (Chaire UNESCO pour la formation et la recherche appliquée au développement de l'entreprise dans les pays en conversion économique) within the Faculty of Business Administration, the Bucharest University of Economic Studies and Romania in partnership with the Romanian National Commission for UNESCO (CNR UNESCO). This event brought together the Balkan UNESCO Chairs on the topic of "Education for Entrepreneurship, Innovation and Sustainability in the Knowledge Economy" on the 26-27th October 2017 at the Bucharest University of Economic Studies.

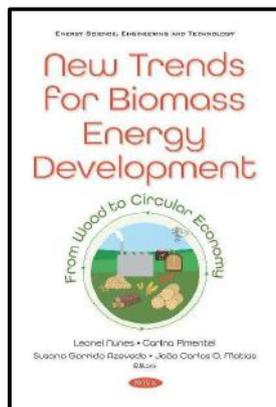
The book comprises the research of experts and scholars in the field of energy and business from various countries, especially from Europe.

The research areas covered by the chapters include topics referring to: the developments of the innovative process in the electrical energy field in Romania, initiatives for promoting new investments in the energy sector, new sources of energy for diminishing hazardous waste, infrastructure protection as a security factor, promoting electricity from renewable energy sources, floating wind turbines, multipurpose hydropower projects under climate change, innovations in landscape of nuclear power, innovations in energy trading, energy policy, patents and its application process in the energy field.

This book seeks to bridge an important research gap by questioning and studying the progress of different types of innovations in the energy field and their impact on developing and advanced economies globally. It aims to explore and present trends, dynamics and implications of the innovations and progress in energy technologies and sustainable business, economic and political strategies and the most recent developments in the green energy field.

Furthermore, it explores opportunities and threats in the way of innovative challenges in these economies through a wealth of insights by researchers in the field with the objective of emphasizing possible strategies to global sustainability.

HB 9781536172904 £178.99 June 2020 Nova Science Publishers 284 pages



New Trends for Biomass Energy Development From Wood to Circular Economy

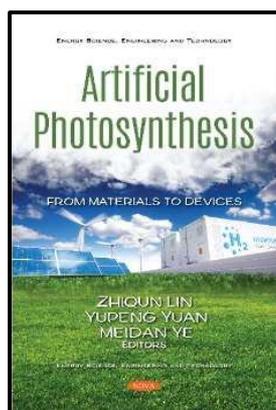
Edited by João Carlos O. Matias

Nowadays, biomass presents itself as a very viable alternative for the production of energy, both electrical and thermal, quickly recovering its role, both in the universe of domestic and industrial use. With growing concerns about climate change, it is becoming increasingly urgent to use environmentally harmful forms of energy production that contribute to the decarbonization of the economy. Biomass is capable of making a significant contribution to achieving this overall objective, since its use proves to be neutral from the point of view of the emission of carbon dioxide.

However, the simple production of energy from biomass presents and encompasses a large number of variables, which justify its study for a better understanding. The aim that the editors intend to achieve with this book is to take an inclusive approach to all components that cover the use of biomass for energy production. At present, this form of energy production has been studied and used in an increasingly intensive way. However, in all the studies and research that can be found, what is verified is a traditional approach, based on an economy of a linear type, purely technical, both in terms of use and in terms of logistics.

This book aims to address the issue of energy production from biomass in a circular economy perspective, in all its aspects, namely in all components of the supply chain, production organization, new technologies of use and reuse and revaluation of biomass forms from a circular economy perspective.

HB 9781536171891 £178.99 March 2020 Nova Science Publishers 274 pages



Artificial Photosynthesis From Materials to Devices

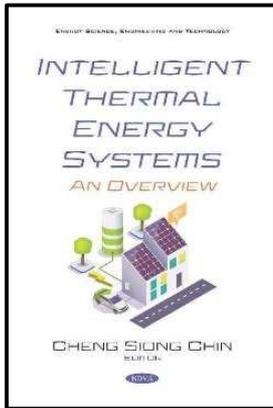
Edited by Zhiqun Lin

Since the first report on solar fuels production by Fujishima and Honda in 1972, photoelectrochemical/electrochemical production of fuels, such as H₂, carbohydrates, etc., has significantly advanced over the past few decades with the remarkable development in new catalytic materials, fundamental knowledge, and new applications. In particular, the efficiency for solar fuels production steadily increases, for example, solar H₂ production efficiency has reached 1.1% in term of the solar-to-hydrogen energy conversion efficiency. These progresses render solar fuels as promising candidates for use in modern technology. In the book *Artificial Photosynthesis: From Materials to Devices*, experts in the photoelectrochemical/electrochemical field discuss new catalytic materials as well as their photophysical properties and applications for artificial photosynthesis.

This book covers the topical research in artificial photosynthesis from conventional particulate catalysts and porous/2D materials to the cutting-edge use of these materials in device fabrication for photoelectrochemistry and electrochemistry, as well as theoretical studies. In terms of applications, this book centers on CO₂ photoreduction to valuable carbohydrates and water dissociation into high energy density H₂. Throughout the book, examples and illustrations of applications are chosen to help the readers comprehend the achievements and trends in this rapidly evolving field.

This book also provides the state-of-the-art research techniques in artificial photosynthesis. This book is informative and helpful for researchers, graduates, and advanced undergraduates interested in the CO₂ reduction and water splitting and will assist them to quickly appreciate the research progresses in this field.

HB 9781536170351 £211.99 April 2020 Nova Science Publishers 334 pages



Intelligent Thermal Energy System An Overview

Edited by Cheng Siong Chin

This book covers an overview and applications of the thermal storage systems used in batteries for the electric automotive industry such as in electric vehicles, thermal storage system in smart grid systems, thermal harvesting for battery-less use for wireless sensor networks, thermo-electric generators and biomedical sensing. The thermal storage system can be used to harvest energy for implementation of battery-less, zero-maintenance and place-and-forget electronic systems. This book has been prepared for the needs of those who seek an application on developing the thermal system. The choice of material is guided by the basic objective of making an engineer or student capable of dealing with thermal system design. The book can be used as reference book for undergraduate and postgraduate students in the area of thermal system overview, design and applications.

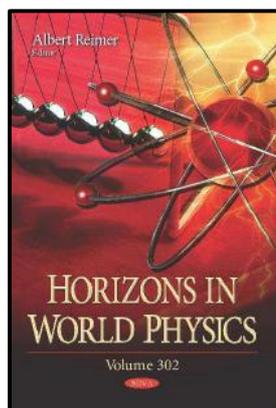
Lithium iron phosphate (LiFePO₄) batteries have gained significant traction in the electric automotive industry in the recent years mainly due to their high safety performance, flat voltage profile and low cost. Although LiFePO₄ batteries have excellent thermal stability, they still suffer from thermal runaway like other lithium-ion type cells. Thermal volatility is a major drawback in the lithium-ion and sufficient knowledge of the thermal distribution and heat generation of the LiFePO₄ battery is necessary to avoid catastrophic thermal failure.

The first chapter details the thermal analysis of a LiFePO₄ battery cell with a latent heat thermal cooling wrap. The model has been developed as a tool to study the cooling effects of the wrap on the battery cell during discharging. The proposed latent heat storage based battery cooling wrap is used to passively manage the heat produced by the cell and absorbing and maintaining the battery temperature within operational temperatures and below thermal runaway temperature.

Thermal energy storage (TES) is another important concept of the smart grid systems. For non-renewable, the benefit of TES systems is the improvement of the generation performance by supporting the energy demand during peak hours. Also, TES is often able to improve the system efficiency in a way that is more energy and cost effective. The best-known method for thermal energy storage is by utilizing the latent heat of fusion of energy storage material known as phase change materials (PCM). TES systems are classified into two main categories such as sensible and latent heat storage. An overview of the research on performance improvement are also delineated.

Hence, the thermal energy harvesting has indeed gained attention in the last decade due to its promising possibilities in area such as wireless sensor networks (WSN) for wide range of IoT (Internet of Things) applications. Thermal energy scavenging from waste heat can enable implementation of battery-less, zero-maintenance and place-and-forget electronic systems. Scavenging energy from the temperature difference between human body heat and ambiance is an attractive solution for powering wearables for continuous health monitoring, biomedical sensing and body area sensor networks (BASN). The low energy efficiency and low voltage output of the thermo-electric generators (TEG) pose challenges to the deployment of industry ready powering systems.

PB 9781536168273 £75.99 April 2020 Nova Science Publishers



Horizons in World Physics

Edited by Albert Reimer

Horizons in World Physics. Volume 302 considers the explanation of (bio)corrosion and (bio)leaching on the base of changes of electric potentials. (Bio)corrosion and (bio)leaching are terms related to the reaction of dissolution of the metals. While (bio)leaching is desirable, (bio)corrosion is an undesirable phenomenon.

Liquid film flows coating a solid surface have received much attention in recent decades due to their vast industrial applications, such as surface protection, lubrication and cooling. The authors suggest several future research directions, including flow control and optimization and machine learning.

Additionally, theoretical and experimental studies on the generation of ultra-bright internal second harmonics are presented. A model based on one-dimensional nonlinear Maxwell curl equations without taking into consideration the slowly-varying envelope approximation has been developed.

In quantum mechanics and particle physics, Spin is considered as an intrinsic form of the quantum angular momentum of a point particle. As such, the authors aim to demonstrate that in accordance with the creative original idea of Kronig, Uhlenbek and Goudsmit, we can associate Spin with an intrinsic form of two angular momenta of the quantum Spherical Top.

The soft physical effects of various forms of shock waves are assessed in the context of molecular ensembles in liquids and polymers for the selective control of the energy state of its individual structural components.

In order to describe Hadron dynamics properly, the embedding of 4-dimensional space to 5-dimensional space is tried in lattice simulations, and in the light front holographic quantumchromo dynamics approach in which symmetric light-front dynamics without ghost are embedded in AdS5.

This compilation also examines gluons, vector gauge bosons that mediate strong interactions of quarks in quantum chromodynamics.

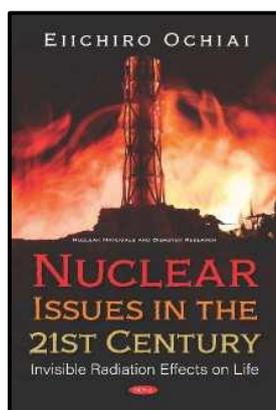
In closing, to solve nonlinear diffusion problems on a sphere, apart from the pole-bordering method, two implicit, balanced and unconditionally stable finite-difference schemes of the second and fourth approximation orders in spatial variables are proposed.

Volume 302 - HB 9781536171808 £229.99 February 2020 Nova Science Publishers 269 pages

Volume 303 - HB 9781536176230 £229.99 April 2020 Nova Science Publishers 272 pages

Volume 304 - HB 9781536184402 £229.99 September 2020 Nova Science Publishers 198 pages

Nuclear Materials & Disaster Research



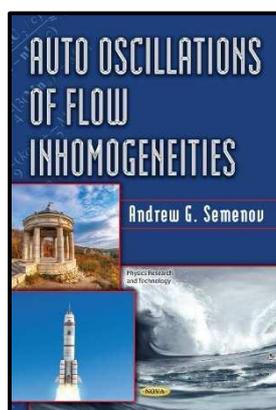
Nuclear Issues in the 21st Century Invisible Radiation Effects on Life

Eiichiro Ochiai

Ionizing Radiation due to radioactive material produced by the nuclear industry in both military and peaceful uses is causing subtle, invisible, yet very serious effects on life including our own. The effects have been observed in many situations including the nuclear weapon tests, nuclear power plant accidents and others all around the world. This treatment outlines these facts, and discusses the scientific bases for the radiation effects.

HB 9781536169492 £211.99 February 2020 Nova Science Publishers 396 pages

Physics Research & Technology

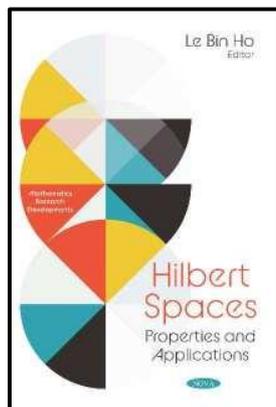


Auto Oscillations of Flow Inhomogeneities

Andrey Semenov

The book provides the analysis and researches results related to flow inhomogeneities auto oscillations observed in free subsonic and supersonic jet flow as well as during jet flow interaction with adjacent bodies, acoustic resonators, ejectors and valves. It demonstrates the laws, relationships and experimental evidences for various auto oscillations phenomena directly related to incident flow regimes based on conditions of flow boundary instability and feed back mechanism realized by corresponding sound field radiated due to periodic hydrodynamic disturbances reflection propagating in opposite to flow direction in the form of sound impulses exciting flow origin. Book results allow devoting particular attention to auto oscillations condition prediction and in a sense to their control. Book is addressed to physicists, acousticians and hydrodynamics engineers developing low noise and vibration aircrafts, ships and space vehicles with aid of adjacent flow and jet flow auto oscillations cancellation as well as to specialists involved in flow induced auto oscillations sound sources efficiency increase research, say, related to musical instruments or to biological research of man and animal voice properties. Book will be useful as well to undergraduate and graduate students of these specialties.

HB 9781536186963 £284.99 December 2020 Nova Science Publishers 326 pages

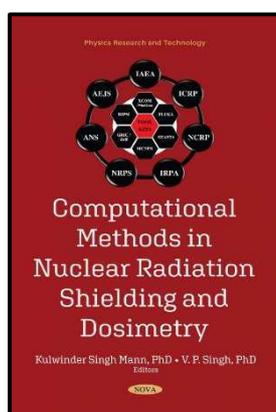


Hilbert Spaces Properties and Applications

Edited by Le Bin Ho

This collective book presents selected topics in the modern research of Hilbert space. Throughout this book, various mathematical properties of the Hilbert space and extended Hilbert space are given, accompanied by reliable solutions and exciting applications to scientific and engineering problems. It first provides some general viewpoints on convex sets, projections, and orthogonality in Hilbert spaces and then focuses on the mild solutions, the stability, and the controllability of various classes of differential equations in Hilbert spaces and applications. It also is devoted to a discussion of the extended Hilbert space, including the hypercomplex Hilbert space, the Bargmann-Hilbert space, and the enlarged Hilbert space where various mathematical and physical applications are given. A reduced Hilbert space for model Hamiltonians is also given. Together, the book presents to readers a picture of the modern theory of Hilbert space in its complexness and usefulness. The book is accessible for graduate students and could be served as a reference for scholars.

PB 9781536166330 £87.99 January 2020 Nova Science Publishers 196 pages

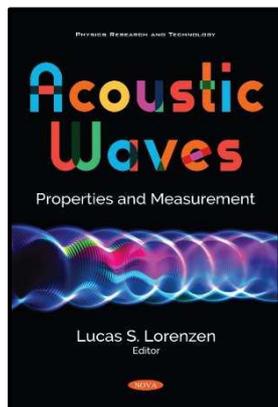


Computational Methods in Nuclear Radiation Shielding and Dosimetry

Edited by Kulwinder Singh Mann

This book is a compilation of the most widely used computational methods and techniques for calculating shielding parameters that are required for radiation-shielding investigations of dosimetric materials. The theoretical, experimental, and simulation methods and their applications are described. The book is divided into thirteen chapters that are arranged in a systematic order and written by experienced scientists and academicians worldwide. The gamma-ray shielding parameter calculations with the Monte Carlo simulation techniques viz. MCNP, GEANT4, FLUKA, and EGS5 codes are illustrated. Descriptions of various software such as XCOM, WinXCom, FLUKA, Phy-X, BMIX, ASFIT, and ANSI are provided. A review of fundamental quantities for calculation of ambient dose, i.e., photon and neutron buildup factors, is presented. A phantom-based computation model has been included to indicate the applications of radiation dosimetry in medical diagnostics. The chapters on computed-tomography (CT) have been included to provide insight into the radiations' diagnostic capabilities and applications. The shielding effectiveness of some materials such as ignimbrite rocks, amorphous metals, marbles, dosimetric materials, and novel shielding materials have been investigated. The most recent concept of multi-layered shielding and related buildup factors' influence on the shielding effectiveness is described with a computer program, the RIMP-TOOLKIT. This book is the result of the authors' hard-work and determination during the worldwide lockdown period caused by the spread of COVID-19. The conclusions presented in this book will be useful in nuclear radiation shielding and for dosimetric purposes. Additionally, this book will be helpful for postgraduate students of physics and chemistry.

HB 9781536185270 £211.99 October 2020 Nova Science Publishers 375 pages



Acoustic Waves Properties and Measurement

Edited by Lucas S. Lorenzen

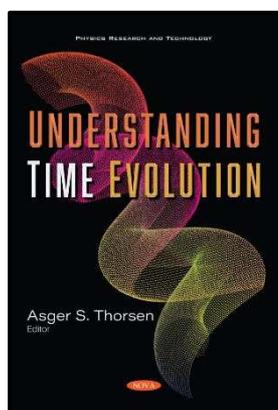
Acoustic signal analysis is commonly used for non-invasive pipeline condition assessment and diagnosis. Considering that pipeline systems are made of different materials ranging from steel to polymers, the analysis method is also contingent on the vibroacoustic properties of the pipe wall material.

In this compilation, an adaptive, locally defined time marching technique is presented to analyze wave propagation models. The methodology is based on two time integration parameters, namely α and γ .

Additionally, the authors present recent improvements in acoustic impedance methods to describe the transduction and propagation of guided elastic waves in MEMS devices electrostatically actuated through thin air-gaps.

The closing study focuses on the way in which the Lorentz force acting on a continuous medium from the side of the magnetic field has a significant effect on the behavior of magnetoacoustic waves.

PB 9781536184051 £87.99 September 2020 Nova Science Publishers 185 pages



Understanding Time Evolution

Edited by Asger S. Thorsen

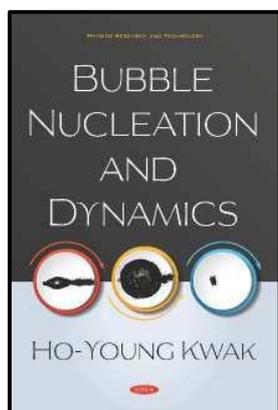
Understanding Time Evolution first considers that the evolution of quantum operators is canonical with the total Hamiltonian, and that the generator of the temporal evolution of the classical variables is the mean value of this Hamiltonian, evaluated with a purely quantum Density Matrix.

The authors introduce the general MaxEnt Density Matrix for systems where quantum and classical degrees of freedom interact. This methodology can describe the interaction between microscopic and macroscopic degrees of freedom.

Next, the objectivity of the mathematical description of electric charge transport is explored. It is shown that the description of electric charge transport using fractional order derivatives is non objective.

Similarly, the closing study explores the mathematical description of mechanical movement.

PB 9781536178746 £75.99 June 2020 Nova Science Publishers 140 pages

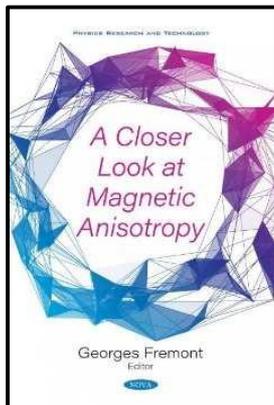


Bubble Nucleation and Dynamics

Ho-Young Kwak

This book treats various gaseous and vaporous bubble nucleation phenomena using the molecular cluster model and how a critical cluster becomes a critical size bubble. Examples of gaseous bubble formation are bubble formation in gas-water solutions, the formation of microcellular foams in polymers and the nucleation of nano-sized H₂O bubbles in rhyolite melts. Examples of the vapor bubble formation include bubble formation on a cavity-free surface, and bubble nucleation near the absolute zero temperature by quantum tunneling in liquid helium. For bubble dynamics phenomena, a set of homologous solutions of the Navier-Stokes equations for evolving spherical bubbles are used to treat gaseous bubble growth in organic solutions, polymer solutions, and in viscous rhyolitic melts. The growth and collapse of laser-induced vapor bubbles in liquid is discussed as an example of homologous motion of the spherical object. Sonoluminescence phenomena in water and in sulfuric acid solutions, the pressure and shock wave propagation in bubbly mixtures, the gravitational collapse of Newtonian stars, and the core collapse of supernovas are also treated using these homologous solutions.

HB 9781536169973 £211.99 February 2020 Nova Science Publishers 406 pages



A Closer Look at Magnetic Anisotropy

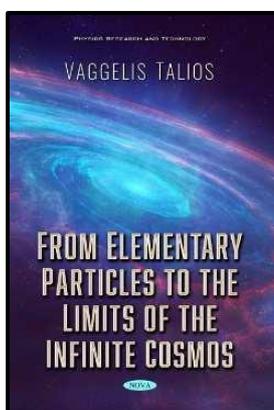
Edited by Georges Fremont

A Closer Look at Magnetic Anisotropy reports on results related to the impact of magnetic anisotropy on the properties of a new type of nanocomposite consisting of ferromagnetic nanoparticles embedded in carbon nanotubes. The authors demonstrate that when each nanotube contains only one ferromagnetic nanoparticle, the magneto-elastic anisotropy leads to the formation of densely packed arrays of magnetically isolated nanoparticles.

Following this, the aspects of perpendicular magnetic anisotropy of FeCoZr-CaF₂ nanocomposite films induced by shape anisotropy of metallic nanoparticles are explored, as well as the methods of anisotropy enhancement by the films treatment.

Several examples of the prospective technical applications of magnetic liquids are presented. Three examples are discussed in more detail in the final chapter: controlled torsion dampers for applications in transportation, ferrofluid controlled capacitors for applications in sensor technology, and peristaltic pumps that take advantage of magneto-elastic properties.

PB 9781536175660 £75.99 April 2020 Nova Science Publishers 156 pages



From Elementary Particles to the Limits of the Infinite Cosmos

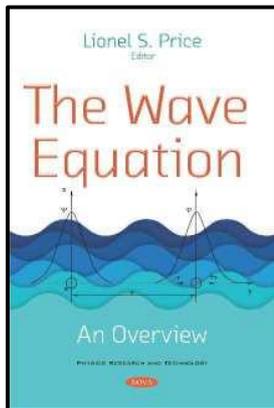
Vaggelis Talios

The book describes our up-to-date knowledge of the Universe and suggests a new theory, the “Theory of the Chain Reaction”, which explains the creation and the functioning of the material part of our Universe and the whole Cosmos. The first five chapters described herein cover the evolution of human knowledge about the Universe, the Universe as it is known today, the elementary particles and the fundamental forces, the theory of the big bang and the other existing cosmological theories about the creation.

After the above, the author presents the “Theory of the Chain Reaction”, a revolutionary theory that explains in an original and innovative way the creation and the evolution of our Cosmos. Next the reader will find the answers, according to the “Theory of the Chain Reaction”, to some questions that still remain unanswered today about the creation such as where have the huge amounts of energy that exist in the universe been found? Does antimatter exist and, if so, where is it? Etc.

The last chapter is a brief summary of the theory of the unification of the fundamental forces and physical theories. This chapter, in any case, is an introduction to the subject of the unifications and was written for readers who want to know more about this issue.

PB 9781536174564 £87.99 May 2020 Nova Science Publishers 205 pages



The Wave Equation An Overview

Edited by Lionel S. Price

In *The Wave Equation: An Overview*, a quantum gravity theory based on unification of all quantum fields into a single field is presented.

The authors aim to assess whether the equations of motion or the conservation equations are more fundamental. The application of this resolution to the Transmission Line Matrix modeling method for numerically solving the wave equation is also addressed.

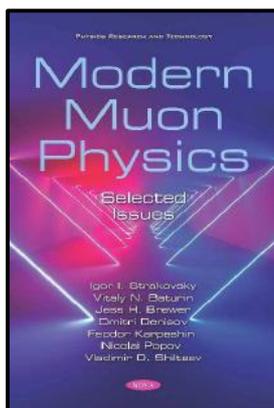
Flux density is proportional to the density of momentum. As such, the general procedure is described wherein this concept is applied to other Hermitian operators.

An alternative metric is presented in this compilation which satisfies Einstein's field equations. This metric does not depend on weak field approximation, however it replaces Schwarzschild metric under certain conditions and provides an elegant solution for the rotation curves of galaxies as well as the energy levels of hydrogen atom.

An optical wave equation for scattered light in materials with macroscopic spatial inhomogeneities is presented and analysed. The equation is applicable to variety of linear and nonlinear optical interactions in media with intrinsic, induced or engineered inhomogeneities.

Lastly, the authors explore a black hole solution to the Jackiw-Teitelboim field equations for two-dimensional gravity. It turns out that the wave frequency is also connected to a suitable black hole metric, dilaton field, and cosmological constant.

PB 9781536172805 £87.99 January 2020 Nova Science Publishers 198 pages



Modern Muon Physics

Selected Issues

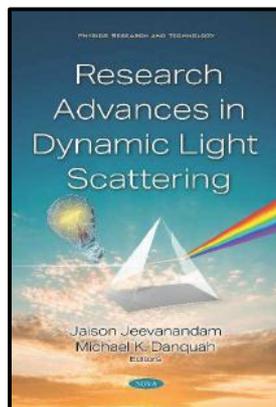
Igor I. Strakovsky

Muon plays an increasingly important role in particle, nuclear, and atomic physics, and in applied research. The muon with the muon neutrino and strange and charm quarks create second generation of the Standard Model particles. Unique properties of muons, including its electric charge, mass, and lack of interaction via strong force made this particle a unique tool for discoveries of new elementary particles, including the Higgs boson, over last half a century. The prompt (by cascade transitions) and delayed (by weak muon capture) fission of heavy nuclei in muonic atoms became an important aspect of research. Use of muons as a probe particle to study various solid state samples recently developed in a separate branch of science. Muons can be used in the cold fusion for efficient energy production in the future.

The studies of the processes beyond the Standard Model, the proton radius puzzle, the rare decays of the muon and its conversion into an electron and muonium into antimuonium, and hints of a difference in the anomalous magnetic moment of the muon from predicted by the Standard Model, have become hot research topics. Muons are proposed to be used in accelerators providing ultra high intensity neutrino beams which will be used for studies of neutrinos, including their oscillations, which could shed a light on matter-antimatter universe asymmetry as well as for "Higgs factories" where a large number of Higgs bosons can be produced for in depth understanding of this recently discovered particle.

This book describes various aspects of modern physics involving muons.

HB 9781536170856 £211.99 March 2020 Nova Science Publishers 294 pages



Research Advances in Dynamic Light Scattering

Edited by Jaison Jeevanandam

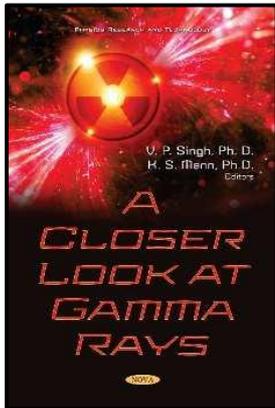
Dynamic light scattering (DLS) is an important concept that has found applications in the characterization of the biophysical properties of materials for a wide range of applications. DLS studies are extensively employed in material science and engineering to evaluate particle size distribution and surface charge for applications in nanomaterial synthesis, biomolecular analysis, pharmaceutical development and environmental applications. The aim of this book is to provide an overview of research advances relating to the principle and applications of DLS in various fields.

The book is divided into two parts - Part 1 discusses the uses of DLS in material science and engineering applications and Part 2 focuses on applications of DLS in biological sciences. Chapter 1—DLS Studies: Recent Trends in Characterization—aims to provide an overview of the working principle, mathematical models and different types of DLS analysis methods. In addition, recent trends in DLS studies and applications in various fields are also discussed. Chapter 2—Application of DLS Technique in Nanomaterial Characterization—discusses the uses of DLS for nanomaterial characterization in terms of the size, size distribution and zeta potential of particles. Chapter 3—Potentialities of DLS with SAXS Studies to Analyze Heterogenous Nanocatalyst— compares two techniques (DLS and SAXS) and provides evidence that nanocatalyst can be characterized more effectively by modifying DLS with SAXS. In Chapter 4—DLS Studies on Self-Assembling Copolymer Nanostructures—the authors demonstrate the application of DLS in characterizing self-assembling and stimuli-responsive di-block copolymers in aqueous media and their association with low molecular weight drugs. Chapter 5— Slow and Ultraslow Relaxations in Molecular and Ionic Liquids-based Unary and Binary Systems—discusses slow and ultraslow dynamics, probed by DLS measurements, in common organic molecular liquids, ionic liquids (ILs), aqueous solutions of salts and molecular solids and liquid-liquid binary mixtures.

In part 2, Chapter 6—Applications of DLS Studies in Phytochemical Analysis— discusses the application of dynamic light scattering for particle size determination using natural phytochemicals derived from plants. Chapter 7—Applications of DLS in Pharmaceutical Industry— is a comprehensive review of DLS analysis in pharmaceutical research, development and production. Chapter 8—DLS Studies of the Protein-Surfactant System—discusses the relationship between viscosity and DLS measurement using the growth behavior of SDS micelle. The authors of Chapter 9—Applications of DLS Studies in Microbial Surface Charge Analysis—provides an overview of the wider applications of DLS studies in evaluating the surface charge of microbes via zeta potential analysis. Additionally, the mechanisms of microbial surface charge in elevating their growth rate is also discussed. The final chapter—Overview and Future Perspective of DLS Studies—is a brief summary of the application of DLS analysis in various fields and the relevant considerations for DLS analysis in particle characterization. In addition, hybrid instrumentation and DLS coupling with other techniques are discussed.

We hope that this book will help to enlighten undergraduates and graduates research students as well as early and seasoned researchers on advances in DLS techniques and emerging applications.

HB 9781536172607 £211.99 February 2020 Nova Science Publishers 330 pages



A Closer Look at Gamma Rays

Edited by V. P. Singh

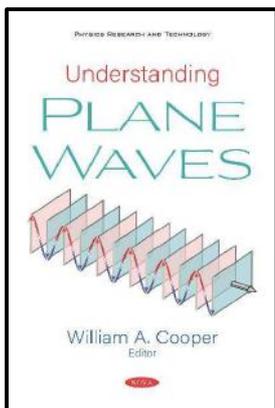
In this book, authors present current research, studies and technologies to look deeper into gamma rays. The chapters discussed in this book are useful for shielding and dosimetric application for gamma rays in science and engineering. This book focuses on knowledge about production, absorption and measurement of gamma rays, geological objects and gamma radiation, interaction parameters for shielding and dosimetric interest, induced gamma rays, shielding materials, back scattering and various applications.

The book demonstrates the theoretical, experimental and simulation for interaction of gamma rays with different types of materials. A thorough description of gamma rays interaction, application of interaction parameters, shielding assessment and dosimetric applications are seen throughout the chapters. Summarized highlights are depicted in each chapter for further utilization of knowledge. This book is an excellent learning tool for the radiation physics scientific community. It can also be used as a self-learning book to understand gamma rays. This book is a collection of investigations for students, researchers and scientists working in the field of radiation physics.

Authors of respective chapters are solely responsible for plagiarism of content in their chapters, and regarding the permissions for the previously published work (text and diagrams).

The journey of writing the book could only be completed with the strong support of editor's organizations, family members and authors. Authors have participated by sharing research work in the form of chapters. A collection of suitable chapters forms the present book.

HB 9781536169935 £178.99 March 2020 Nova Science Publishers 266 pages



Understanding Plane Waves

Edited by William A. Cooper

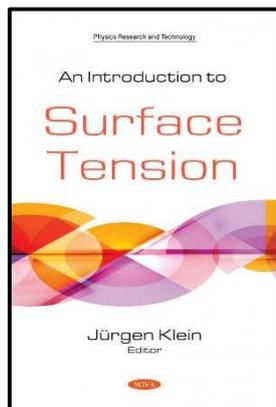
As a critical theoretical advance, *Understanding Plane Waves* discusses the acoustic Goos-Hänchen effect. The important applications of this effect are discussed, including plane wave propagating inside transversely isotropic elastic-solids, reflection/refraction at interface between two anisotropic rocks, and acoustical applications to petroleum logging and seismic exploration.

Next, the authors explore a newly developed acoustic-measurement system with emphasis on measurement process and recent improvements that make an acoustic-measurement more accurate.

Three approaches which are used to analyze the evolution of the plane longitudinal and transverse waves that are propagated in a nonlinear hyperelastic medium are discussed: the method of successive approximations, the method of slowly varying amplitudes and the method of restriction on the displacement gradient.

Lastly, the subject of relativistic quantum particles interacting with classical plane wave fields is examined from the standpoint of space-time symmetries which have been found to be encoded in the solutions of relativistic equations.

HB 9781536167795 £146.99 February 2020 Nova Science Publishers 232 pages



An Introduction to Surface Tension

Edited by Jürgen Klein

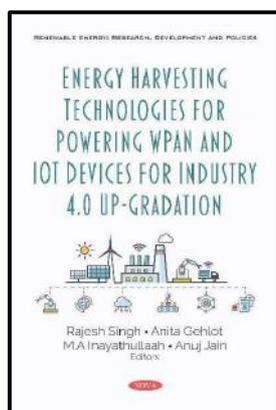
The term “surface tension” reflects the nature of intermolecular forces in neighboring liquid and vapor phases. Surface tension decreases with increasing temperature, and drops to zero value at critical temperature. To a small extent, it is influenced by pressure and the interface curvature.

An Introduction to Surface Tension discusses the possibility of a significant use of surfactants, polymers, alkali and microbes for surface tension alteration based on work done in the last decades, with new insight on the chemical aspects, especially for gas recovery from shale by altering surface tension.

In closing, the authors propose a model based on the concept that surfactant and polymer molecules rotate during the process reaching the equilibrium surface state, which is different from the conventional adsorption theory.

PB 9781536183788 £87.99 September 2020 Nova Science Publishers 165 pages

Renewable Energy: Research, Development & Policies



Energy Harvesting Technologies for Powering WPAN and IoT Devices for Industry 4.0 Up-Gradation

Rajesh Singh

Energy harvesting is the procedure for deriving, capturing and storing energy from external sources. Power is a very important part of any system, and for Internet of Things and WPAN, managing power is the biggest challenge.

This book aims to explore the methods and systems to generate energy and use it efficiently for IoT applications to upgrade the Industries.

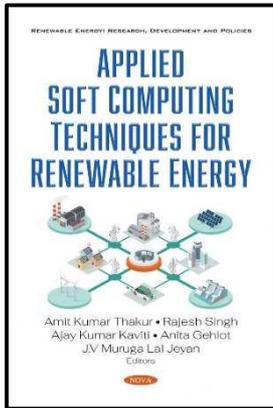
The book comprises of ten chapters. Chapter 1 describes the low power renewable power supply through thermo electric generators. The main aim of this chapter is to familiarize the energy harvesting among the various sources of renewable energy (Solar light, Vibration, Heat, RFID, Wind and Hybrid energy) and to provide electrical output in the range of 1 μ W to few Watts for low power devices (Wireless Networks/ IoTs). Chapter 2 describes the concept of distributed generation as a part of the smart grid that is proposed at IKG Punjab Technical University. The proposed smart micro grid includes the Distributed Generation based on renewable resources like solar PV and biogas as an individual and hybrid energy system.

Chapter 3 proposed the energy harvesting types for end sensor nodes for pipeline monitoring in remote areas and addressed challenges for future advanced energy harvesting for sensor nodes. Chapter 4 described the fundamental concept, latest developments and applications addressing the related theoretical and practical aspects on wireless communication.

In Chapter 5 different renewable energy harvesting technique has been discussed. Solar power optimization has been done to make more efficient harvesting techniques. Chapter 6 gives a review on energy harvesting and storage. In Chapter 7 the design and development of energy harvesting system is reviewed. Chapter 8 proposed an idea to implement a street light management system which can work on self power generation method based on piezoelectric techniques and communication module for analysing and transferring of data to the cloud or the web server for real time application.

Chapter 9 proposed an architecture where in the bins XBee network is used to connect nearby control unit of local municipal authority and from the control authority, LoRa network is used to communicate to long range and also these bins are assisted with solar panel for providing the power supply to devices that are existed in the architecture. Chapter 10 presented the study to optimize the process parameters for biofuel production by transesterification of algal oil using KOH as catalyst.

HB 9781536169430 £146.99 April 2020 Nova Science Publishers 253 pages



Applied Soft Computing Techniques for Renewable Energy

Edited by Amit Kumar Thakur

This book provides a better understanding of Fuzzy set theory, Fuzzy logic and Neural Networks and various other techniques seem very well suited for modeling and controlling a real system. Energy is of major importance to civilization, because it is driving force which binds human race. The estimation of energy in the form of renewable and sustainable is one of the important aspects to understand the how resources are harnessed and to predict what might happen under various possible future conditions. Using available modelling techniques to generate the best algorithms, the objective is to determine the best solution in terms of comparing the performances of the solutions through different parameters for a specific case. Consumption of Fossil fuels at a rapid pace has generated an alarming situation and with the subsequent increase in the number of vehicle the pollution level has reached well beyond human's control. This is frightening enough to observe the fact that the pollution level has surpassed all records and the need of the hour is to find an alternate fuel which can really be of great assistance in reducing the exhaust emission and augment the performance parameters of engine. Major researches are carried out on various engines to draw closer towards a realistic solution. Experiments performed on various engines are considered to be time consuming and the expenses met to perform these experiments are too costly, so the need of soft computing techniques involved in this area.

Soft computing can be better described as the process to find the solution to an inexact problem. Soft computing has showed lot of potential in giving the researchers the exact solution may be in case of validating or predicting the performance and emission parameters. Artificial Neural Network (ANN), Adaptive Neuro Fuzzy Inference system (ANFIS), Fuzzy Expert System (FES), Response Surface Methodology (RSM) and Support Vector Machine (SVM) are the various soft computing techniques widely used.

This book focuses on to carry out the comprehensive review and various other experimental works of various researchers who have carried out the work on these various soft computing techniques on various engines with various alternative fuels On the basis of modelling techniques, time is saved to a great extent and the capital investment involved is comparably very low. Various modelling techniques are being readily used to predict the performance parameters for various engines and modelling techniques have become the readily available tool to compare and validate the experimental work being carried out by researchers to get accurate matching with the experimental data. The benefit of this issue will be at large in connecting with varieties of work done in the field of Biomass which includes wood and wood waste, municipal solid waste. Landfill gas and biogas. Ethanol, Biodiesel, Hydropower, Geothermal, Wind, Solar. Thus soft computing techniques are fast and reliable hence, they can be a substitute for conventional experiments.

HB 9781536181807 £178.99 July 2020 Nova Science Publishers 278 pages



Gazelle Book Services Limited,
Unit 1/4, White Cross Mills,
Hightown, Lancaster LA1 4XS

t: (01524) 528500

e: sales@gazellebookservices.co.uk

www.gazellebookservices.co.uk

Gazelle Book Services Order Form - (Books listed alphabetically by title)

Title	Format	ISBN	RRP (£)	Qty	Total
A Closer Look at Gamma Rays	HB	9781536169935	£ 178.99		
A Closer Look at Magnetic Anisotropy	PB	9781536175660	£ 75.99		
Acoustic Waves	PB	9781536184051	£ 87.99		
Advanced Power Systems and Security	HB	9781536187854	£ 247.99		
Advances in Energy Research - Volume 32	HB	9781536170887	£ 229.99		
Advances in Energy Research - Volume 33	HB	9781536181364	£ 229.99		
An Introduction to Propellants	HB	9781536180541	£ 178.99		
An Introduction to Surface Tension	PB	9781536183788	£ 87.99		
Applied Soft Computing Techniques for Renewable Energy	HB	9781536181807	£ 178.99		
Artificial Photosynthesis	HB	9781536170351	£ 211.99		
Auto Oscillations of Flow Inhomogeneities	HB	9781536186963	£ 284.99		
Biomass Gasification	HB	9781536174625	£ 211.99		
Bubble Nucleation and Dynamics	HB	9781536169973	£ 211.99		
Completion and Unification of Quantum Mechanics with Einstein's GR Ideas PART III	HB	9781536172003	£ 211.99		
Computational Methods in Nuclear Radiation Shielding and Dosimetry	HB	9781536185270	£ 211.99		
Design of Energy-Efficient Buildings	PB	9781536178623	£ 87.99		
Energy Harvesting Technologies for Powering WPAN and IoT Devices for Industry 4.0 Up-Gradation	HB	9781536169430	£ 146.99		
Exergy of Biomass	HB	9781536176032	£ 177.99		
From Elementary Particles to the Limits of the Infinite Cosmos	PB	9781536174564	£ 87.99		
Hilbert Spaces	PB	9781536166330	£ 87.99		
Horizons in World Physics - Volume 302	HB	9781536171808	£ 229.99		
Horizons in World Physics - Volume 303	HB	9781536176230	£ 229.99		
Horizons in World Physics - Volume 304	HB	9781536184402	£ 229.99		
Innovation Energy	HB	9781536172904	£ 178.99		
Intelligent Thermal Energy System	PB	9781536168273	£ 75.99		
Membrane Distillation	HB	9781536174489	£ 211.99		
Modern Muon Physics	HB	9781536170856	£ 211.99		
New Trends for Biomass Energy Development	HB	9781536171891	£ 178.99		
Nuclear Issues in the 21st Century	HB	9781536169492	£ 211.99		
Relativistic Quantum Mechanics and Field Theory of Arbitrary Spin	HB	9781536169874	£ 211.99		



Gazelle Book Services Limited,
Unit 1/4, White Cross Mills,
Hightown, Lancaster LA1 4XS

t: (01524) 528500

e: sales@gazellebookservices.co.uk

www.gazellebookservices.co.uk

Title	Format	ISBN	RRP (£)	Qty	Total
Research Advances in Dynamic Light Scattering	HB	9781536172607	£ 211.99		
Solar Irradiance	PB	9781536187861	£ 75.99		
Space Magnetic Traps in the Universe and in Magnetosphere	HB	9781536183221	£ 288.99		
The Future of District Heating	PB	9781536186550	£ 75.99		
The Future of Energy	HB	9781536181869	£ 211.99		
The Wave Equation	PB	9781536172805	£ 87.99		
Understanding Plane Waves	HB	9781536167795	£ 146.99		
Understanding Time Evolution	PB	9781536178746	£ 75.99		
Waste Heat	HB	9781536173550	£ 146.99		
What is TSB?	HB	9781536180039	£ 178.99		



Gazelle Book Services Limited,
Unit 1/4, White Cross Mills,
Hightown, Lancaster LA1 4XS

t: (01524) 528500

e: sales@gazellebookservices.co.uk

www.gazellebookservices.co.uk



GazelleBookServices



GazelleBookServices



@Gazellian



GazelleBooks