Direction of Time

Contents

Fields of interest
History of Science; Theoretical, Mathematical and Computational Physics; History and Philosophical Foundations of Physics

Target groups
Research

Discount group
Professional Non-Medical

Physics of Graphene

This book provides a state of the art report of the knowledge accumulated in graphene research. The fascination with graphene has been growing very rapidly in recent years and the physics of graphene is now becoming one of the most interesting as well as the most fast-moving topics in condensed-matter physics. The Nobel prize in physics awarded in 2010 has given a tremendous impetus to this topic. The horizon of the physics of graphene is ever becoming wider, where physical concepts go hand in hand with advances in experimental techniques. Thus this book is expanding the interests to not only transport but optical and other properties for systems that include multilayer as well as monolayer graphene systems. The book comprises experimental and theoretical knowledge. The book is also accessible to graduate students.

Features
- Edited and written by leaders in the field
- Gives the physical basis for micro- and nano electronic applications of graphene
- Presents unusual properties of graphene systems
- Provides the experimental techniques to study graphene
- Summarizes research on multilayer and monolayer graphene systems

Contents

Fields of interest
Nanoscale Science and Technology; Nanotechnology; Nanotechnology and Microengineering

Target groups
Research

Discount group
Professional Non-Medical
The Stars of Galileo Galilei and the Universal Knowledge of Athanasius Kircher

In this fascinating book, the author traces the careers, ideas, discoveries, and inventions of two renowned scientists, Athanasius Kircher and Galileo Galilei, one a Jesuit, the other a sincere man of faith whose relations with the Jesuits deteriorated badly. The Author documents Kircher’s often intuitive work in many areas, including translating the hieroglyphs, developing sundials, and inventing the magic lantern, and explains how Kircher was a forerunner of Darwin in suggesting that animal species evolve.

Features
➤ A fascinating comparison of the careers, ideas, discoveries, and inventions of two renowned scientists at the crossroads of the seventeenth century  ➤ Describes Kircher’s intuitive work and his ability to achieve extraordinary insights by unconventional means  ➤ Places Galileo’s work on scales, telescopes, and sun spots within its cultural context

Contents
The World Theatre.- Watches and sunflowers rotating upon a motionless Earth. - Jesuits, scales and telescopes.- Light and shadows.- Spots upon an unchangeable Sun.- The Deluge.- Hieroglyphs and the dream of Universal Wisdom.- Crystal Skies and the circles of Hell.- Conclusion.- Galileo Galilei and Athanasius Kircher: parallel lives

Fields of interest
Astronomy, Astrophysics and Cosmology; Popular Science in Mathematics/Computer Science/Natural Science/Technology; History and Philosophical Foundations of Physics

Target groups
Graduate

Discount group
Professional Non-Medical

Due April 2014


GaP heteroepitaxy on Si(100)
Benchmarking Surface Signals when Growing GaP on Si in CVD Ambients

Epitaxial integration of III-V semiconductors on silicon substrates has been desired over decades for high application potential in microelectronics, photovoltaics, and beyond. The performance of optoelectronic devices is still severely impaired by critical defect mechanisms driven by the crucial polar-on-non-polar heterointerface. This thesis reports almost lattice-matched growth of thin gallium phosphide films as a viable model system for III-V/Si(100) interface investigations. The impact of antiphase disorder on the heteroepitaxial growth surface provides quantitative optical in situ access to one of the most notorious defect mechanisms, even in the vapor phase ambient common for compound semiconductor technology. Precise control over the surface structure of the Si(100) substrates prior to III-V nucleation prevents the formation of antiphase domains.

Features
➤ Winner of a 2012 German Physical Society Dissertation Award  ➤ An important contribution to improving optoelectronic devices and performance of photovoltaic materials  ➤ Interesting for all experimentalists working on the integration of III-V semiconductors and silicon

Contents
Introduction.- Experimental.- Si(100) surfaces in chemical vapor environments.- GaP(100) and InP(100) surfaces.- GaP growth on Si(100) and anti-phase disorder.- Conclusion.

Fields of interest
Semiconductors, Optics, Optoelectronics, Plasmonics and Optical Devices; Optical and Electronic Materials

Target groups
Research

Discount group
Professional Non-Medical

Due December 2013

2014. XIV, 150 p. 80 illus., 33 in color. (Springer Theses) Hardcover  ➤ $129.00 ISBN 978-3-319-02879-8

Measurements of Spin-Orbit Angles for Transiting Systems

Toward an Understanding of the Migration History of Exoplanets

This thesis presents accurate analyses of the spin-orbit angle for many remarkable transiting exoplanetary systems, including for the first time a multiple transiting system. The author presents the observational methods needed to probe the spin-orbit angle, the relation between the stellar spin axis and planetary orbital axis. Measurements of the spin-orbit angle provide us a unique and valuable opportunity to understand the origin of close-in giant exoplanets, called “hot Jupiters”.

Features
➤ Involves the first detection of the RM effect for a Neptune-sized exoplanet (HAT-P-11b), which showed a significant spin-orbit misalignment  ➤ Presents the first discovery of an overlapping event of two transiting exoplanets (planet-planet eclipse) for KOI-94  ➤ Provides a tight constraint on the mutual inclination of the two planetary orbits by a precise modeling the planet-planet eclipse event  ➤ Nominated as an outstanding contribution by the University of Tokyo’s Physics Department in 2013

Contents

Fields of interest
Extraterrestrial Physics, Space Sciences; Planetology; Astronomy, Observations and Techniques

Target groups
Research

Discount group
Professional Non-Medical

Due December 2013

2014. 134 p. 74 illus., 30 in color. (Springer Theses) Hardcover  ➤ approx. $139.00 ISBN 978-4-431-54585-9
Electronic Structure of Metal Phthalocyanines on Ag(100)

The application of molecules in technological devices hinges on the proper understanding of their behavior on metallic electrodes or substrates. The intrinsic molecular electronic and magnetic properties are modified at a metallic interface, and greatly depend on the atomic configuration of the molecule-metal bond. This poses certain problems, such as the lack of reproducibility in the transport properties of molecular junctions, but also offers the possibility to induce new charge and spin configurations that are only present at the interface. The results presented in this thesis address this issue, providing a comprehensive overview of the influence of molecule-metal and molecule-molecule interactions on the electronic and magnetic properties of molecules adsorbed on metallic substrates.

Features

► Nominated as an outstanding Ph.D. thesis by the Universitat Autònoma de Barcelona, Spain
► Offers a comprehensive introduction to the Kondo effect
► Point-by-point summary of the most important results in each chapter

Contents

Abstract.- Introduction.- Molecular electronics.- Experimental techniques.- Introduction to the Kondo effect.- Adsorption of Metal Phthalocyanines on Ag(100).- Electronic and magnetic properties of MePc on Ag(100).- Doping of MePc: Alkali and Fe atoms.- Conclusions and Outlook.- Appendix: CuPc on Au(111).

Fields of interest

Surface and Interface Science, Thin Films; Optical and Electronic Materials; Organometallic Chemistry

Target groups

Research

Discount group

Professional Non-Medical
Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology - New Series

Editor-in-chief: W. Martienssen

Molecules and Radicals
Subvolume 30 A

K. Kuchitsu, Tokyo University of Agriculture 
& Technology, Tokyo, Japan; M. Tanimoto, Shizuoka University Dept. Chemistry, Shizuoka, Japan; N. Vogt, Universität Ulm AG Chemieinformationssysteme, Ulm, Germany (Eds)

Molecules Containing no Carbon Atoms and Molecules Containing one or two Carbon Atoms

Structure Data of Free Polyatomic Molecules (Supplement to II/25,II/28)

With contrib. by: E. Hirota, Graduate University for Advanced Studies, Hayama, Kanagawa, Japan; K. Kuchitsu, Tokyo University of Agriculture 
& Technology, Tokyo, Japan; T. Steimle, Arizona State University Dept. Chemistry 
& Biochemistry, Tempe, AZ, USA; M. Tanimoto, Shizuoka University Dept. Chemistry, Shizuoka, Japan; J. Vogt, N. Vogt, Universität Ulm AG Chemieinformationssysteme, Ulm, Germany

Fields of interest
Spectroscopy and Microscopy; Atomic/Molecular Structure and Spectra

Target groups
Research

Discount group
Short Discount

Due February 2014
2014. 420 p. / Molecules and Radicals, Subvolume 30 A) Hardcover
➤ approx. $4989.00
ISBN 978-3-540-70613-7

Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology - New Series

Physical Chemistry
Subvolume 14G

R. X. Fischer, Univ. Bremen FB Geowissenschaften, Bremen, Germany; W. Baur, Western Springs, IL, USA (Eds)

Zeolite-Type Crystal Structures and their Chemistry. Supplements with New Framework Type Codes

Zeolites and zeolite-like materials became important because of their ion exchange capacities and their outstanding catalytic properties. Millions of tons of zeolites have been produced in the past years for the oil refining industry alone and, in even greater quantities, as ion-exchanging softening agents for detergents. Numerous other applications, e.g., in environmental protection, farming, gas separation, medicine, and pharmacy, are known, making zeolites almost a necessity for daily life. Consequently, there are many research activities dealing with zeolite properties and characterization. However, a strictly systematic description of zeolite-type crystal structures was not available but is now presented in this series of volumes. It is designed as a reference work for zeolite chemists and materials scientists, but it also serves as a tool to interpret structural similarities and to derive new structures from known topologies.

Fields of interest
Mineralogy; Catalysis; Crystallography

Target groups
Research

Discount group
Short Discount

Due February 2014
2014. Approx. 415 p. / Physical Chemistry, Subvolume 14G) Hardcover
➤ approx. $4849.00
ISBN 978-3-642-41451-0

Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology - New Series

Physical Chemistry
Part 15B

M. D. Lechner, Universität Osnabrück Inst. Physikalische Chemie, Osnabrück, Germany; C. Wohlfarth, Universität Halle-Wittenberg Inst. Chemie - Physikalische Chemie, Halle, Germany (Eds)

Diffusion of Liquids in Liquids and Liquid Mixtures

Features
➤ Standard reference book with selected and easily retrievable data from the fields of physics and chemistry collected by acknowledged international scientists ➤ Also available online on www.SpringerMaterials.com

Fields of interest
Physics, general; Classical Continuum Physics; Physical Chemistry

Target groups
Research

Discount group
Short Discount

Due March 2014
2014. 500 p. / Physical Chemistry, Part 15B) Hardcover
➤ approx. $5119.00
ISBN 978-3-540-73734-6
Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology - New Series

Editor-in-chief: W. Martienssen

Physical Chemistry

Part 19C2

P. Franke, Karlsruhe Inst. of Technology Inst. for Applied Mat., Eggenstein-Leopoldshafen, Germany; H. Seifert, Karlsruhe Inst. of Technology (KIT), Eggenstein-Leopoldshafen, Germany (Eds)

Ternary Systems from Cr-Mn-N to Ni-Si-Ti

Thermodynamic Properties of Inorganic Materials Compiled by SGTE, Subvolume C: Ternary Steel Systems, Phase Diagrams and Phase Transition Data, Part II

Features

- Standard reference book with selected and easily retrievable data from the fields of physics and chemistry collected by acknowledged international scientists
- Also available online on Springermaterials.com

Fields of interest

Physics, general; Classical Continuum Physics; Physical Chemistry

Target groups

Research

Discount group

Short Discount

Due January 2014

2014. 500 p. / Physical Chemistry, Part 19C2) Hardcover

$4489.00

ISBN 978-3-540-88153-7

Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology - New Series

Editor-in-chief: W. Martienssen

Physical Chemistry

Subvolume 9B

R. Holze, TU Chemnitz Fak. Naturwissenschaften, Chemnitz, Germany

M. D. Lechner, Universität Osnabrück Inst. Physikalische Chemie, Osnabrück, Germany (Ed)

Electrochemistry

Subvolume B: Electrical Conductivities and Equilibria of Electrochemical Systems

Features

- Standard reference book with selected and easily retrievable data from the fields of physics and chemistry collected by acknowledged international scientists Also available online

Fields of interest

Physics, general; Classical Continuum Physics; Physical Chemistry

Target groups

Research

Discount group

Short Discount

Due January 2014

2014. 500 p. / Physical Chemistry, Subvolume 9B) Hardcover

$5119.00

ISBN 978-3-642-02722-2

Quirky Quantum Concepts

E. L. Michelsen, Poway, CA, USA

Physical, Conceptual, Geometric, and Pictorial Physics that Didn’t Fit in Your Textbook

Quirky Quantum Concepts explains the more important and more difficult concepts in theoretical quantum mechanics, especially those which are consistently neglected or confusing in many common expositions. The emphasis is on physical understanding, which is necessary for the development of new, cutting edge science. In particular, this book explains the basis for many standard quantum methods, which are too often presented without sufficient motivation or interpretation. The book is not a simplification or popularization: it is real science for real scientists. Physics includes math, and this book does not shy away from it, but neither does it hide behind it. Without conceptual understanding, math is gibberish.

Features

- A supplement to almost any existing quantum mechanics text
- Focuses on conceptual understanding, which allows the reader to adapt the concepts to his specific application and needs
- Covers all the fundamental aspects of quantum mechanics: position, momentum, angular momentum

Contents


Fields of interest

Quantum Physics; Mathematical Physics; Mathematical Methods in Physics

Target groups

Upper undergraduate

Discount group

Professional Non-Medical

Due December 2013

2014. I, 266 p. 69 illus. in color. (Undergraduate Lecture Notes in Physics) Softcover

$49.99

ISBN 978-1-4614-9304-4
Longitudinal Double-Spin Asymmetry of Electrons from Heavy Flavor Decays in Polarized p + p Collisions at $\sqrt{s} = 200$ GeV

In this thesis, the measurement of double-spin asymmetry for electron production from heavy flavor decays was performed in a Relativistic Heavy Ion Collider (RHIC) in the PHENIX experiment at Brookhaven National Laboratory to measure the polarized parton distribution function of gluon in the small Bjorken x region ($x \sim 0.01$).

Features
- Provides the detailed current states of the gluon polarization measurement, including recent results from the PHENIX and STAR experiment and the global analysis of the DSSV group
- Introduces the options of rejecting and estimating the photonic electron background using the Hadron Blind Detector
- Provides the world-first result of double-spin asymmetry of electrons from heavy flavor decays in proton-proton collisions and the constraint of the gluon polarized parton-distribution-function in the small Bjorken x region
- Nominated as an outstanding contribution by Kyoto University’s Physics Department in 2013

Contents
Nucleon Spin Physics.- Experimental Setup.- Electron Analysis.- Results.- Discussion.- Conclusion.- Appendix.

Fields of interest
Nuclear Physics, Heavy Ions, Hadrons; Particle Acceleration and Detection, Beam Physics; Measurement Science and Instrumentation

Target groups
Research

Discount group
Professional Non-Medical

Due March 2014
2014. 155 p. 134 illus., 35 in color. (Springer Theses) Hardcover
> approx. $139.00
ISBN 978-4-431-54615-3

Lasers in Materials Science

This book covers various aspects of lasers in materials science, including a comprehensive overview on basic principles of laser-materials interactions and applications enabled by pulsed laser systems. The material is organized in a coherent way, providing the reader with a harmonic architecture. While systematically covering the major current and emerging areas of lasers processing applications, the Volume provides examples of targeted modification of material properties achieved through careful control of the processing conditions and laser irradiation parameters. Special emphasis is placed on specific strategies aimed at nanoscale control of material structure and properties to match the stringent requirements of modern applications.

Features
- Systematically reviews the current and emerging areas of laser processing applications
- Covers applications in photonics, photovoltaics, sensing and biomedicine
- Written in a tutorial style

Contents
Laser Physics for Materials Scientists: A Primer.- Material Response to Laser Energy Deposition (Thermal and Hyper thermal Processes).- Non-Thermal Material Response to Laser Energy Deposition.- Atomic Movies of Laser-Induced Structural and Phase Transformations from Molecular Dynamics Simulations. [...]
Physics

Dynamics of Magnetically Trapped Particles

Foundations of the Physics of Radiation Belts and Space Plasmas


Features
- 2nd edition of a classic and widely used textbook
- Extended by a wealth of data on the planetary radiation belts and plasmas
- Provides a tutorial-like presentation of the physics of radiation belts and plasmas
- Describes the dynamic properties of magnetically trapped particles and plasmas in space
- Provides a solid and clear understanding of basic physical mechanisms and dynamic processes
- Gives practical advice to particle flux mapping, numerical modeling and data interpretation
- Reaches from the motion of a single charged particle in a magnetic field to the motion of complex plasma in the radiation environments of planets

Contents
- Particle Drifts and the First Adiabatic Invariant - Particle Trapping, Drift Shells and the Second Adiabatic Invariant - Periodic Drift Motion and the Third Adiabatic Invariant - Trapped Particle Distributions and Flux Mapping - Violation of the Adiabatic Invariants and Trapped Particle Diffusion - Introduction to Plasma Physics

Fields of interest
Extraterrestrial Physics, Space Sciences; Plasma Physics; Geophysics/Geodesy

Target groups
Research

Discount group
Professional Non-Medical

Due December 2013


The ARTEMIS Mission

The ARTEMIS mission was initiated by skillfully moving the two outermost Earth-orbiting THEMIS spacecraft into lunar orbit to conduct unprecedented dual spacecraft observations of the lunar environment. ARTEMIS stands for Acceleration, Reconnection, Turbulence and Electrodynamics of the Moon’s Interaction with the Sun. Indeed, this volume discusses initial findings related to the Moon’s magnetic and plasma environments and the electrical conductivity of the lunar interior. This work is aimed at researchers and graduate students in both heliophysics and planetary physics. Originally published in Space Science Reviews, Vol. 165/1-4, 2011.

Features
- The only book that presents data from ARTEMIS, the first mission to put two spacecraft in lunar orbit to study the Moon’s tenuous atmosphere
- Presents detailed mission observations of the Moon’s magnetic and plasma environments and the electrical conductivity of the lunar interior
- Discusses THEMIS spacecraft used for mission

Contents
- The ARTEMIS Mission - ARTEMIS Science Objectives - ARTEMIS Mission Design - First Results from ARTEMIS, a New Two-Spacecraft Lunar Mission: Counter-Streaming Plasma Populations in the Lunar Wake

Fields of interest
Extraterrestrial Physics, Space Sciences; Atmospheric Sciences; Geophysics/Geodesy

Target groups
Research

Discount group
Professional Non-Medical

Due December 2013


Probing the Limits of the Universe

In the last hundred years, modern physics and cosmology have shown that there exist regions of the universe forever beyond our reach, hidden by truly ultimate horizons. Such regions exist in those remote parts of the universe where, from our point of view, space expands faster than the speed of light. They are found in black holes, where the gravity is strong enough to retain even light within its field of attraction. And in the realm of the very small, quarks must remain forever confined to their world of extreme density and can never be removed from it. The aim of this book is to describe these ultimate horizons, how they were discovered, how they shape our view of the world, and what clues we have about a world beyond them.

Features
- A unique investigation of the limits placed by physics itself on what scientists can discover about the universe
- Author is an eminent theoretical physicist with broad experience and a deep knowledge of each of the domains described
- A book that will fascinate top-level researchers and interested nonspecialists alike

Contents
- Horizons - The Vanishing Stars - The Secret Glow of Black Holes - The Visions of the Accelerating Observer - The Smallest Possible Thing - Primordial Matter - The Last Veil

Fields of interest
Astronomy, Astrophysics and Cosmology; Elementary Particles, Quantum Field Theory; Epistemology

Target groups
Research

Discount group
Professional Non-Medical

Due December 2013

2nd ed. 2014. 200 p. 200 illus. (Astrophysics and Space Science Library, Volume 403) Hardcover
- $129.00
ISBN 978-3-642-41529-6

Due December 2013

2014. V, 107 p. 46 illus., 44 in color. Hardcover
- approx. $129.00

Due December 2013

- $129.00
ISBN 978-3-642-41656-9
Laser Technology in Biomimetics
Basics and Applications

Lasers are progressively more used as versatile tools for fabrication purposes. The wide range of available powers, wavelengths, operation modes, repetition rates etc. facilitate the processing of a large spectrum of materials at exceptional precision and quality. Hence, manifold methods were established in the past and novel methods are continuously under development. Biomimetics, the translation from nature-inspired principles to technical applications, is strongly multidisciplinary. This field offers intrinsically a wide scope of applications for laser based methods regarding structuring and modification of materials. This book is dedicated to laser fabrication methods in biomimetics. It introduces both, a laser technology as well as an application focused approach. The book covers the most important laser lithographic methods and various biomimetics application scenarios ranging from coatings and biotechnology to construction, medical applications and photonics.

Features
▶ Provides a survey of laser systems in biomimetics for users and manufacturers alike
▶ Presents the most important laser-based fabrication methods currently used in biomimetics
▶ Scientists non-familiar with laser technology gain insight in laser-based processing in their respective fields

Contents

Fields of interest
Biophysics and Biological Physics; Laser Technology, Photonics; Biomedical Engineering

Target group
Research

Discount group
Professional Non-Medical

Due January 2014
2014. 320 p. 55 illus., 5 in color. (Biological and Medical Physics, Biomedical Engineering) Hardcover
▶ $179.00
ISBN 978-3-642-41340-7

Due November 2013
▶ $229.00