

C. M. Becchi, M. D'Elia, Università di Genova, Italy

## Introduction to the Basic Concepts of Modern Physics

These notes are designed as a text book for a course on the Modern Physics Theory for undergraduate students. The purpose is providing a rigorous and self-contained presentation of the simplest theoretical framework using elementary mathematical tools. A number of examples of relevant applications and an appropriate list of exercises and answered questions are also given.

### Features

► These notes are designed as a text book for a course on the Modern Physics Theory for undergraduate students ► The purpose is providing a rigorous and self-contained presentation of the simplest theoretical framework using elementary mathematical ► tools ► A number of examples of relevant applications and an appropriate list of exercises and answered questions are also given

### Contents

1. Introduction to Special Relativity.- 2. Introduction to Quantum Physics.- 3. Introduction to the Statistical Theory of Matter.- Appendix A. Quadriectors.- Appendix B. Spherical Harmonics as Tensor Components.- Appendix C. Thermodynamics and Entropy.

### Fields of interest

Quantum Physics; Statistical Physics, Dynamical Systems and Complexity; Cosmology

### Target groups

Lower undergraduate

### Type of publication

Undergraduate textbook

A. K. Chandra, Saha Institute of Nuclear Physics, Kolkata, India; A. Das, The Abdus Alam International Center for Theoretical Physics, Trieste, Italy; B. K. Chakrabarti, Saha Institute of Nuclear Physics, Kolkata, India (Eds.)

## Quantum Quenching, Annealing and Computation

The process of realizing the ground state of some typical (frustrated) quantum many-body systems, starting from the 'disordered' or excited states, can formally be mapped onto the search of solutions for computationally hard problems. The dynamics through quantum critical points are especially crucial in the context of such computational optimization problems and have been investigated intensively in recent times.

Several successful methods are now well-established, and this volume compiles a collection of introductory reviews on such developments and related aspects. Written by well known experts, these lectures concentrate on quantum phase transitions and their dynamics as the transition or critical points are crossed. Both the quenching and annealing dynamics are extensively covered. The style has been kept as tutorial as possible in order to make this volume a suitable reference for young researchers joining this exciting and burgeoning field of research.

### From the contents

Quantum Approach to Classical Thermodynamics and Optimization.- Nonequilibrium of Dynamics of Quantum Systems: Order Parameter Evolution, Defect Generation, and Qubit Transfer.- Defect Production Due to Quenching Through a Multicritical Point and Along a Gapless Line.- Adiabatic Perturbation Theory: From Landau-Zener Problem to Quenching Through a Quantum Critical Point.- Quench Dynamics of Quantum and Classical Ising Chains: From the Viewpoint of the Kibble-Zurek Mechanism.

### Fields of interest

Phase Transitions and Multiphase Systems; Quantum Physics; Quantum Information Technology, Spintronics

### Target groups

Research

### Type of publication

Monograph

M. Gasperini

## Manuale di Relatività Ristretta

Per la Laurea triennale in Fisica

Una moderna presentazione della teoria della Relatività Ristretta, specificatamente progettata per i nuovi corsi della Laurea Triennale in Fisica. Un testo essenziale ma autosufficiente, che adotta lo stile e il linguaggio delle lezioni svolte in aula, e che introduce alle trasformazioni di Lorentz, alla formulazione covariante dell'elettromagnetismo e alle basi della cinematica e dinamica relativistiche. Include una discussione della cinematica dei processi d'urto e una derivazione dettagliata dell'effetto Cherenkov.

### Features

► Una moderna presentazione della teoria della Relatività Ristretta, specificatamente progettata per i nuovi corsi della Laurea Triennale in Fisica ► Un testo essenziale, che adotta lo stile e il linguaggio delle lezioni svolte in aula, e che introduce alle trasformazioni di Lorentz, alla formulazione covariante dell'elettromagnetismo e alle basi della cinematica e dinamica relativistiche, una discussione della cinematica dei processi d'urto e una derivazione dettagliata dell'effetto Cherenkov

### Fields of interest

Cosmology; Meccanica; Particelle elementari e teoria dei quanti

### Target groups

Lower undergraduate

### Type of publication

Libro di testo introduttivo

 Physics and Astronomy

Due April 2010

2nd ed. 2010. X, 175 p. (UNITEXT / Collana di Fisica e Astronomia) Softcover

► € 39,95 | £35.99  
► \* € (D) 42,75 | € (A) 43,95 | sFr 62,00  
ISBN 978-88-470-1615-6



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 Physics and Astronomy

Due April 2010


2010. XII, 320 p. (Lecture Notes in Physics, Volume 802) Softcover

► € 69,95 | £62.99  
► \* € (D) 74,85 | € (A) 76,95 | sFr 109,00  
ISBN 978-3-642-11469-4



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 Physics and Astronomy

Pubblicazione prevista per il mese di maggio 2010

2010. X, 140 pagg. (UNITEXT / Collana di Fisica e Astronomia) Brossura

► approx. € 19,23 | £17.99  
► approx. \* € (D) 20,58 | € (A) 21,15 | sFr 30,00  
ISBN 978-88-470-1604-0



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T. Kuhr, University of Karlsruhe, Germany

## Flavor Physics at the Tevatron

Decay, Mixing and CP-Violation  
Measurements in p-Collisions

The book reviews the latest experimental results of charm and bottom flavor physics at the Tevatron proton-antiproton collider. The measurements of lifetimes, branching ratios and mixing properties of heavy flavored hadrons provide important constraints on fundamental parameters of the standard model – the elements of the CKM matrix. Comparisons of experimental results with theoretical predictions allow to search for physics beyond the standard model or to set bounds on parameters of new physics models. The experimental techniques developed at the Tevatron are highly relevant for the next generation flavor physics experiments at the LHC. This book provides the reader a detailed summary of the status of heavy flavor physics at the end of the Tevatron data taking period and the start of the LHC program.

### Features

- Comprehensive overview

### Contents

Introduction.- Flavor in the Standard Model.- Flavor Physics Beyond the Standard Model.- Experimental Techniques.- Lifetime and Decay of B-Hadrons.- Flavor Oscillations.- CP-Violation in the Interference of Mixing and Decay.- Direct CP-Violation.- Rare Decays.- Summary and Outlook.

### Fields of interest

Particle and Nuclear Physics

### Target groups

Research

### Type of publication

Monograph

A. Mazure, CNRS Laboratoire d'Astrophysique de Marseille France; S. Basa, Laboratoire d'Astronomie Spatiale marseille, France

## Superstelle in esplosione

Fare cosmologia con le supernovae e i gamma-ray burst

Le supernovae e i gamma-ray burst, gli eventi più catastrofici che si verificano nell'Universo, sono oggetto di studio nei campi più dinamici della moderna ricerca astronomica. Dei secondi ancora non conosciamo con precisione i meccanismi che li innescano e tuttavia forti indizi suggeriscono che, come nelle supernovae, la causa scatenante sia il collasso esplosivo di stelle di grande massa. Nell'ultimo decennio, questi fenomeni sono diventati strumenti molto efficaci nello studio dell'origine e dell'evoluzione dell'Universo. I cosmologi li utilizzano come "fari" cosmici che illuminano i loro immediati dintorni e anche come sonde per ricostruire la dinamica dell'espansione dell'Universo. Grazie ad essi, oggi sappiamo che circa il 70% del contenuto di energia-materia dell'Universo è costituito di un'energia oscura la cui natura ci è ancora completamente ignota.

### Features

► Questo libro getta un po' di luce sui curiosi destini delle superstelle in esplosione e sulle affascinanti conclusioni cosmologiche che possiamo trarre dalla loro osservazione ► Le supernovae e i gamma-ray burst, gli eventi più catastrofici che si verificano nell'Universo, sono oggetto di studio nei campi più dinamici della moderna ricerca astronomica ► Nell'ultimo decennio, questi fenomeni sono diventati strumenti molto efficaci nello studio dell'origine e dell'evoluzione dell'Universo

### Fields of interest

Astronomy, Observations and Techniques; Scienza divulgativa in astronomia; Astronomia, astrofisica e cosmologia

### Target groups

Popular/general

### Type of publication

Libro di interesse generale

M. Möser, Technical University, Berlin; G. Müller, Müller-BBM, Planegg (Eds.)

## Handbook of Engineering Acoustics

The book treats the physical background of engineering acoustics, focussing on empirically obtained engineering experience as well as on measurement techniques and engineering methods for prognostics. Its goal is not only to describe the state of art of engineering acoustics but also to give practical help to engineers in order to solve acoustical problems. It deals with the origin and the transmission and with the methods of the abatement of air-borne and structure-borne sound of different kinds – from traffic to machinery and flow-induced sound. In addition the modern aspects of room and building acoustics, as well as psychoacoustics and active noise control, are covered.

### Features

► The only real acoustics handbook for mechanical and architectural applications ► Application-oriented information on a sound scientific basis ► Written by an academician and an industrial practitioner ► Translation of the German standard book

### From the contents

Acoustic Measurements.- Numerical Acoustics.- The Effects of Sound on Humans.- Noise Immersion Assessment.- Noise Emission Assessment.- Sound propagation in the Open Space.- Building Acoustics.- Sound Absorption.- Structure Borne Sound.- Room Acoustics.- Silencers.- Active Noise and Vibration Control.- Noise caused by Construction Work.- Sound Sources.- Traffic Noise – Road.- Traffic Noise and Vibrations – Railway.- Traffic Noise – Aircraft.- Sound Reinforcement Techniques.- Urban Noise Protection.- Flow-Induced Noise.- Ultrasound.- Vibrations.

### Fields of interest

Acoustics; Vibration, Dynamical Systems, Control; Engineering Design

### Target groups

Professional/practitioner

### Type of publication

Handbook

 Physics and Astronomy

Due June 2010

2010. Approx. 150 p. 80 illus. (Springer Tracts in Modern Physics, Volume 7017) Hardcover

► **approx.** € 99,95 | £90.00  
► **approx.** \* € (D) 106,95 | € (A) 109,95 | sFr 166,00  
ISBN 978-3-642-10299-8



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 Physics and Astronomy

Pubblicazione prevista per il mese di maggio 2010

2010. X, 150 pagg. 67 figg. (Le Stelle) Brossura

► **approx.** € 19,23 | £17.99  
► **approx.** \* € (D) 20,58 | € (A) 21,15 | sFr 30,00  
ISBN 978-88-470-1624-8



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 Physics and Astronomy

Due June 2010

2010. Approx. 650 p. 10 illus. in color. Hardcover

► **approx.** € 159,95 | £145.50  
► **approx.** \* € (D) 171,15 | € (A) 175,95 | sFr 265,50  
ISBN 978-3-540-24052-5



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R. Reichelt, University of Münster, Germany;  
L. Reimer

## Scanning Electron Microscopy

Physics of Image Formation and  
Microanalysis

Scanning Electron Microscopy provides a description of the physics of electron-probe formation and of electron-specimen interactions. The different imaging and analytical modes using secondary and backscattered electrons, electron-beam-induced currents, X-ray and Auger electrons, electron channelling effects, and cathodoluminescence are discussed to evaluate specific contrasts and to obtain quantitative information.

### Contents

Introduction.- Electron optics of a Scanning Electron Microscope.- Electron Scattering and Diffusion.- Emission of Backscattered and Secondary Electrons.- Electron Detectors and Spectrometers.- Image Contrast and Signal Processing.- Electron-Beam-Induced Current and Cathodoluminescence.- Special Techniques in SEM.- Crystal Structure Analysis by Diffraction.- Elemental Analysis and Imaging with X-Rays.

### Fields of interest

Solid State Physics; Optics and Electrodynamics;  
Physics, general

### Target groups

Research

### Type of publication

Monograph

P. Pugh, Wiltshire, UK

## Observing the Messier Objects with a Small Telescope

In the Footsteps of a Great Observer

Observing the Messier Objects with a Small Telescope contains descriptions and photographs of the 103 Messier objects, with instructions on how to find them without a computerized telescope or even setting circles. The photographs show how the objects appear through a 127mm Maksutov (and other instruments, where applicable). The visual appearance of a Messier object is often very different from what can be imaged with the same telescope, and a special feature of this book is that it shows what you can see with a small telescope. It will also contain binocular descriptions of some objects. Messier published the final version of his catalog in 1781 (it contains 103 different objects), a catalog so good that it is still in common use today, well over two centuries later. In making a catalog of all the 'fixed' deep-sky objects that observers might confuse with comets, Messier had succeeded in listing all the major interesting deep-sky objects that today are targets for amateur astronomers.

### Features

► Lets amateur astronomers locate and observe the Messier objects using only a small telescope or binoculars - just as Messier observed them! Author recommends affordable equipment ► Photographs show the visual appearance of the objects (i.e. what you can see, which is very different from what you can image) ► Can be used as Messier intended - to identify objects that could be confused with comets ► Doubles as a history lesson on early observing and cataloging

### Contents

Ch. 1: Preface.- Ch. 2: Introduction.- Ch. 3: Messier's Catalogue.- Appendix A: Observing Techniques.- Appendix B: Photographic Techniques.

### Fields of interest

Astronomy, Observations and Techniques; Popular Science in Astronomy; Popular Science, general

### Target groups

Popular/general

### Type of publication

Popular science

 Physics and Astronomy

Due June 2010

3rd ed. 2010. Approx. 510 p. 260 illus. Hardcover

► **approx. € 149,95 | £130.00**

► **approx. \* € (D) 160,45 | € (A) 164,95 |**

**sFr 249,00**

ISBN 978-3-540-85317-6



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 Physics and Astronomy

Due July 2010

2010. Approx. 225 p. 130 illus., 10 in color.

(Patrick Moore's Practical Astronomy Series) Softcover

► **approx. € 23,10 | £22.99**

► **approx. \* € (D) 24,72 | € (A) 25,41 | sFr 50,00**

ISBN 978-0-387-85356-7

