

Astronomy, Astrophysics and Planetary Science 2008

TEXTBOOK

Introduction to High-Energy Astrophysics

Stephan Rosswog
Jacobs University Bremen
and Marcus Brüggen
Jacobs University Bremen

High-energy astrophysics covers cosmic phenomena that occur under the most extreme physical conditions. This textbook is a self-supporting, timely exploration of this exciting field. Written for undergraduate students studying high-energy astrophysics, each chapter ends with exercises.

Contents: Preface; 1. Special relativity; 2. Gas processes; 3. Radiation processes; 4. Supernovae; 5. Neutron stars, pulsars and magnetars; 6. Compact binary systems; 7. Gamma-ray bursts; 8. Active galactic nuclei; Appendix A. Some recent high-energy astrophysics instruments; Appendix B. Physical constants; Appendix C. Distances; Appendix D. Luminosity, brightness, magnitude, colour; Index.

2007 247 x 174 mm 366pp
63 line diagrams 37 half-tones 72 exercises
978-0-521-85769-7 Hardback £35.00

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TEXTBOOK

Galaxies in the Universe

An Introduction

Second edition

Linda S. Sparke
University of Wisconsin, Madison
and John S. Gallagher, III
University of Wisconsin, Madison

This extensively illustrated book has been up-dated and thoroughly revised to include the most recent observational data and theoretical developments. It includes several homework problems with hints and is ideal for advanced undergraduate students in astronomy and astrophysics.

'Sparke and Gallagher have produced a remarkably comprehensive and easy-to-read account of extragalactic astronomy and cosmology. Aimed at third and fourth year undergraduates, but invaluable for researchers at all levels, frontier topics in this exciting and popular area of astronomy are discussed with admirable clarity, with the physical principles carefully explained and well-illustrated.'

Richard Ellis, Steele Professor of Astronomy,
California Institute of Technology

Contents: 1. Introduction; 2. Mapping our Milky Way; 3. The orbits of the stars; 4. Our backyard: the Local Group; 5. Spiral and SO galaxies; 6. Elliptical galaxies; 7. Galaxy groups and clusters; 8. Large-scale distribution of galaxies; 9. Active galactic nuclei and the early history of galaxies; Appendices; Index.

2007 253 x 177 mm 442pp
40 line diagrams 10 half-tones 56 exercises
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TEXTBOOK

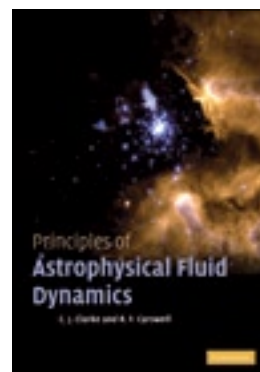
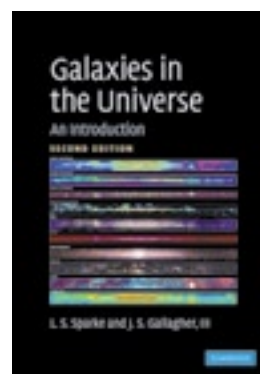
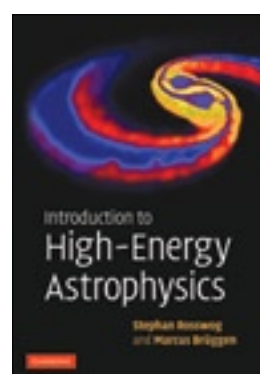
Principles of Astrophysical Fluid Dynamics

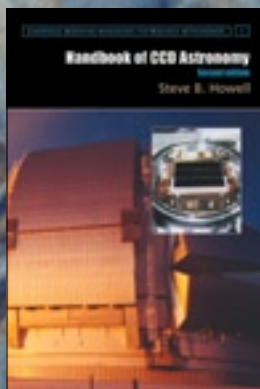
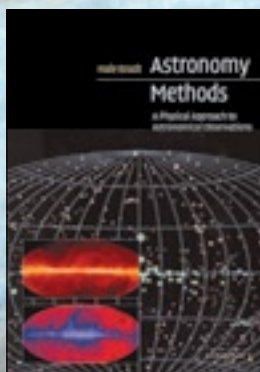
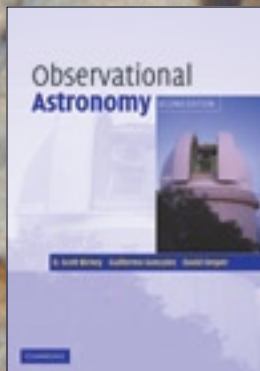
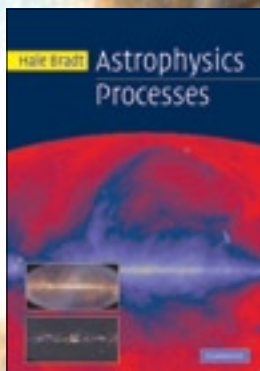
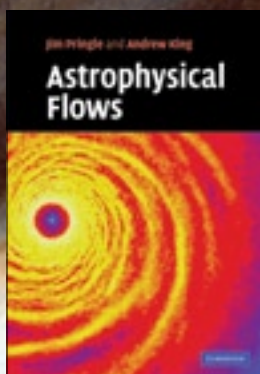
Cathie Clarke
University of Cambridge
and Bob Carswell
University of Cambridge

This comprehensive textbook introduces the necessary fluid dynamics to understand a wide range of astronomical phenomena. The authors introduce the fundamental equations, supplemented by explanatory text, and emphasise the observable phenomena that rely on these processes. It will be used by final year undergraduate and starting graduate students of astrophysics.

Contents: 1. Introduction to concepts; 2. The fluid equations; 3. Gravitation; 4. The energy equation, 5. Hydrostatic equilibrium; 6. Propagation of sound waves; 7. Supersonic flows; 8. Blast waves; 9. Bernoulli's equation; 10. Fluid instabilities; 11. Viscous flows; 12. Accretion disks in astrophysics; 13. Plasmas; Appendix 1. Equations in curvilinear coordinates; Appendix 2. Exercises; Bibliography; Index.

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GRADUATE TEXTBOOK

Astrophysical Flows

James E. Pringle
University of Cambridge
and Andrew King
University of Leicester

Developed from a course in astrophysical fluid dynamics, this new graduate textbook provides a basic understanding of the fluid dynamical processes relevant to astrophysics. Covering topics including wave propagation, shocks, spherical flows and stellar oscillations, this book is suitable for graduate students in astrophysics, physics and applied mathematics.

Contents: 1. The basic fluid equations; 2. Compressible media; 3. Spherically symmetric flows; 4. Stellar models and stellar oscillations; 5. Stellar oscillations – waves in stratified media; 6. Damping and excitation of stellar oscillations; 7. Magnetic instability in a static atmosphere; 8. Thermal instabilities; 9. Gravitational instability; 10. Linear shear flows; 11. Rotating flows; 12. Circular shear flow with self-gravity; 13. Modes in rotating stars; 14. Cylindrical shear flow – non-axisymmetric instability; References; Index.

2007 247 x 174 mm 216pp
16 line diagrams 1 half-tone 40 exercises
978-0-521-86936-2 Hardback £45.00

TEXTBOOK

Astrophysics Processes

Hale Bradt
Massachusetts Institute of Technology

Written for advanced undergraduates and graduate students, this book provides physical explanations of twelve fundamental astrophysical processes underlying a wide range of phenomena in astronomy. It contains tutorial figures, review exercises, and step-by-step mathematical and physical development, providing a stepping stone to more specialized books and primary literature.

Contents: Preface; 1. Kepler, Newton, and the mass function; 2. Equilibrium in stars; 3. Equations of state; 4. Stellar structure and evolution; 5. Thermal bremsstrahlung radiation; 6. Blackbody radiation; 7. Special theory of relativity in astronomy; 8. Synchrotron radiation; 9. Compton scattering; 10. Hydrogen spin-flip radiation; 11. Dispersion and Faraday rotation; 12. Gravitational lensing; References; Acronyms; Appendix; Index.

2008 247 x 174 mm 470pp
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Astronomy

TEXTBOOK

Observational Astronomy

Second edition
D. Scott Birney
Wellesley College, Massachusetts

Guillermo Gonzalez
Iowa State University
and David Oesper
Iowa State University

New and updated edition of advanced undergraduate or beginning graduate textbook on observational astronomy.

Birney's original text has been revised and updated, and suits once again its original purpose to provide a reference source for undergraduates and beginning graduate students in need of some background on observational methods ... I will recommend this book highly to my students.'

Steve Fossey, *The Observatory*

2006 247 x 174 mm 322pp
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978-0-521-85370-5 Hardback £32.00

TEXTBOOK

Astronomy Methods

A Physical Approach to Astronomical Observations
Hale Bradt
Massachusetts Institute of Technology

An introduction to basic practical tools, methods and phenomena that underlie quantitative astronomy.

'... a brilliant addition to the pedagogy. It is timely, focused, well written, and at the appropriate level ... Astronomy Methods will be useful to all students of astronomy and astrophysics, irrespective of whether they intend to specialize in observational astronomy. The material can be adapted easily for various related courses, which makes the book even more valuable.'

Physics Today

Contents: 1. Astronomy through the centuries; 2. Electromagnetic radiation; 3. Co-ordinate systems and charts; 4. Gravity, celestial motions, and time; 5. Telescopes; 6. Detectors and statistics; 7. Multiple telescope interferometry; 8. Point-like and extended sources; 9. Properties and distances of celestial objects; 10. Absorption and scattering of photons; 11. Spectra of electromagnetic radiation; 12. Astronomy beyond photons.

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GRADUATE TEXTBOOK

Handbook of CCD Astronomy

Second edition
Steve B. Howell
WIYN/NOAO

New updated edition of popular handbook; a concise and accessible reference on all practical aspects.

'[Howell's] broad experience in CCD astronomy is evident throughout the book. Overall the book is well written and nicely printed ... I highly recommend it for anyone interested in CCD astronomy.'

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Contents: Prefaces; 1. Introduction; 2. CCD manufacturing and operation; 3. Characterization of CCDs; 4. CCD imaging; 5. Photometry and astronomy; 6. Spectroscopy with CCDs; 7. CCDs used in space and at short wavelengths; Appendices; References; Index.

Cambridge Observing Handbooks for Research Astronomers, 5

2006 228 x 152 mm 222pp
65 line diagrams
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978-0-521-61762-8 Paperback £25.99

Introduction to Astronomical Photometry

Second edition
Edwin Budding
Çanakkale University, Turkey
and Osman Demircan
Çanakkale University, Turkey

Completely updated and highly illustrated, this second edition gives a broad review of astronomical photometry to provide an understanding of astrophysics from a data-based perspective. It is ideal for graduate students, academic researchers and advanced amateurs interested in practical and observational astronomy.

Review from the first edition:
'This book usefully fills a gap between a simple popularist approach to photometry and a full-scale research monograph, and is a perfect starting-point for more advanced levels.'

Europe Astronomy

Cambridge Observing Handbooks for Research Astronomers, 6

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100 line diagrams
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GRADUATE TEXTBOOK

The Physics and Chemistry of the Interstellar Medium

A. G. G. M. Tielens

Kapteyn Astronomical Institute

'The book is modern, logical and clear, and will make a good textbook for advanced university courses.'

Times Higher Education Supplement

'Alexander Tielens, a well-known and highly-regarded expert in the field, has written this book to meet the need for a comprehensive and wide-ranging high-level textbook on the subject ... The text in each chapter is quite dense, and graduate students must expect to work hard; but each chapter is accompanied by a helpful discussion of further reading. The serious student will find the bibliography invaluable. ... This authoritative book, written by an expert in the subject, and – for these days – modestly priced, is highly recommended.'

The Observatory

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GRADUATE TEXTBOOK

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David F. Gray

University of Western Ontario

Updated and improved third edition textbook for use on advanced courses on stellar physics.

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The Observatory

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lines; 14. The measurement of stellar radii and temperatures; 15. The measurement of photospheric pressure; 16. Chemical analysis; 17. Velocity fields in stellar photospheres; 18. Stellar rotation.

2005 247 x 174 mm 550pp
201 line diagrams 39 half-tones
978-0-521-85186-2 Hardback £53.00

Extrasolar Planets

Edited by Hans Deeg

Instituto de Astrofísica de Canarias, Tenerife

Juan Antonio Belmonte

Instituto de Astrofísica de Canarias, Tenerife

and Antonio Aparicio

Instituto de Astrofísica de Canarias, Tenerife

This volume is a balanced and varied introduction to extrasolar planets for research astronomers and graduate students. It covers a wide range of issues, from the state-of-the-art observational techniques, to the characterizations of these planets, and the techniques used in the remote detection of life.

2007 247 x 174 mm 288pp
62 line diagrams 26 half-tones
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Innovation in Astronomy Education

Jay M. Pasachoff

Williams College, Massachusetts

Rosa M. Ros

Universitat Politècnica de Catalunya, Barcelona

and Naomi Pasachoff

This volume highlights the general strategies for effective teaching and introduces innovative points of view regarding methods of teaching and learning. This valuable overview is based on papers and posters presented by many of the world's leading astronomy educators at a Special Session of the International Astronomical Union.

2008 247 x 174 mm 300pp
60 line diagrams 40 half-tones
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Astrophysics

Handbook of Space Astronomy and Astrophysics

Third edition

Martin V. Zombeck

Harvard-Smithsonian Center for Astrophysics

Fully updated with data from space-based observations and a comprehensive index and bibliography, this third edition contains the most frequently used information in modern astrophysics. This handbook will be an essential reference for graduate students, researchers and professionals working in astronomy and the space sciences.

2006 247 x 174 mm 780pp
309 line diagrams 29 half-tones 247 tables
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Classical Novae

Second edition

Edited by Michael Bode

Liverpool John Moores University

and Aneurin Evans

Keele University

This second edition has been fully updated and revised and contains all new contributions covering important developments in this field. The only book devoted solely to the study of classical novae, this is an important reference for researchers actively engaged in the subject and graduate students seeking an introduction.

Cambridge Astrophysics, 43

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Ultraviolet and X-ray Spectroscopy of the Solar Atmosphere

Kenneth J. H. Phillips

UCL–Mullard Space Science Laboratory

Uri Feldman

US Naval Observatory

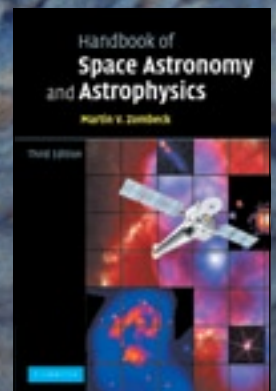
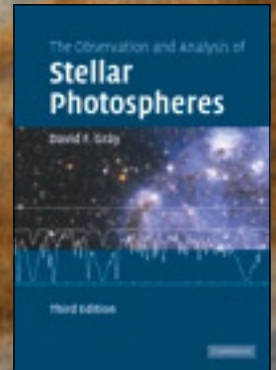
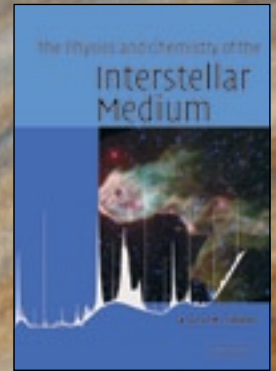
and Enrico Landi

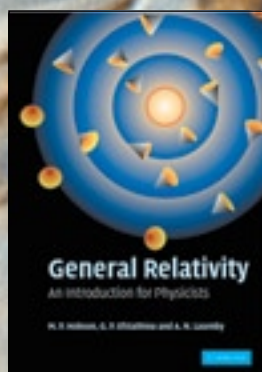
US Naval Observatory

This new monograph describes how the Sun's UV and X-ray spectrum can help us understand the Sun's atmosphere. Includes an extensive Appendix listing emission lines in the UV and soft X-ray region.

Cambridge Astrophysics, 44

2008 247 x 174 mm c. 450pp
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Luminous Hot Stars and Starburst Galaxies

Peter S. Conti

JILA, University of Colorado

Paul Crowther

University of Sheffield

and Claus Leitherer

Space Telescope Science Institute, Baltimore

A comprehensive review of our current knowledge of luminous hot stars, their impact on their local environment and their parent galaxy as a whole.

Contents: 1. Introduction; 2. Observed properties; 3. Stellar atmospheres; 4. Stellar winds; 5. Evolution of single stars; 6. Binaries; 7. Birth of massive stars and star clusters; 8. The interstellar environment; 9. From Giant H II regions To H II galaxies; 10. Starburst phenomena; 11. Cosmological implications.

Series: Cambridge Astrophysics, 45

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The Metal-Rich Universe

Edited by Garik Israelian

Instituto de Astrofísica de Canarias, Tenerife

and Georges Meynet

Geneva Observatory

This book is the first on metal-rich stars, and it covers many aspects, from spectral line formation to stellar formation and evolution in high metallicity regimes. It is invaluable to researchers and graduate students in stellar evolution, extragalactic astronomy, and planet formation.

Cambridge Contemporary Astrophysics

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The de Vaucouleurs Atlas of Galaxies

Ronald J. Buta

University of Alabama

Harold G. Corwin

California Institute of Technology

and Stephen C. Odewahn

University of Texas, Austin

This atlas provides a comprehensive illustration of the morphology of galaxies and how they are classified in the revised Hubble system developed by Gérard de Vaucouleurs. This volume makes his classification more accessible and more understandable so that modern astronomy researchers, students, and amateurs can apply the system with ease.

- Contains descriptions and classifications of more than 500 galaxies, allowing readers to see how the de Vaucouleurs classification system is applied

- First comprehensive galaxy atlas to use colour index maps

- Covers new topics so readers are kept abreast of developments in the field

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Bernard E. J. Pagel

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Chemistry in Britain

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General Relativity and Cosmology

GRADUATE TEXTBOOK

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University of Cambridge

G. P. Efstathiou

University of Cambridge

and A. N. Lasenby

University of Cambridge

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368 exercises

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Ruth Durrer

Université de Genève

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Contents: Preface; 1. The homogeneous and isotropic universe; 2. Perturbation theory; 3. Initial conditions; 4. CMB anisotropies; 5. CMB polarization and the total angular momentum approach; 6. Cosmological parameter estimation; 7. Lensing and the CMB; 8. The CMB spectrum; Appendixes; References; Index

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The Physics of the Cosmic Microwave Background

Pavel D. Naselsky

Niels Bohr Institutet, Copenhagen

Dmitry I. Novikov

Imperial College of Science, Technology and Medicine, London

and Igor D. Novikov

Niels Bohr Institutet, Copenhagen

Taking a physical approach, the authors provide an up-to-date and accessible review of this fascinating and complex subject in light of observational breakthroughs made by the WMAP satellite. Highlighting recent progress and looking ahead to future experiments, this text will be valuable to advanced students and researchers in cosmology.

Contents: Prefaces; 1. Observational foundations; 2. Kinetics of electromagnetic radiation; 3. The ionization history of the Universe; 4. Primordial cosmic background radiation and small perturbations of uniform cosmological model; 5. Primary anisotropy of CMB; 6. Primordial polarization of the cosmic microwave background; 7. Statistical properties of random fields; 8. The Wilkinson Microwave Anisotropy Probe (WMAP); 9. The 'Planktonian era' in the study of anisotropy and polarization of the CMB; 10. Conclusion; References; Index.

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Gravitational Collapse and Spacetime Singularities

Pankaj S. Joshi

Tata Institute of Fundamental Research, Mumbai, India

Investigating the issues involved in gravitational collapse, this book includes a detailed review of recent research into the subject, and several examples of collapse models are investigated in detail. It will be of interest to graduate students and academic researchers in gravitation physics, fundamental physics, astrophysics, and cosmology.

Cambridge Monographs on Mathematical Physics

2007 247 x 174 mm 280pp
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Universe or Multiverse?

Edited by Bernard Carr

Queen Mary, University of London

Is our universe unique or just one of many? Eminent physicists explain how recent scientific developments lead to the 'multiverse' proposal. Suitable for professional physicists and scientifically-minded lay people, the articles reflect the full diversity of views on this highly speculative and untestable theory.

Contributors: Bernard Carr, Steven Weinberg, Frank Wilczek, Martin J. Rees, S. W. Hawking, Max Tegmark, Andrei Linde, Alexander Vilenkin, James D. Bjorken, Renata Kallosh, Savas Dimopoulos, Scott Thomas, Craig J. Hogan, John F. Donoghue, Leonard Susskind, V. F. Mukhanov, James B. Hartle, Brandon Carter, Lee Smolin, Anthony Aguirre, George Ellis, Don N. Page, Nick Bostrom, William R. Stoeger, Robin Collins, John D. Barrow, Paul Davies

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29 line diagrams 16 half-tones 45 figures
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Facts and Speculations in Cosmology

Jayant V. Narlikar

IUCAA, Pune, India

Geoffrey Burbidge

University of California, San Diego

Presents our current ideas on the origin and large-scale structure of the Universe against a historical backdrop of how the subject has progressed in the last two millennia. It will provide appealing background reading for students of astronomy at all levels.

2008 247 x 174 mm c. 260pp
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The Evolution of Matter

From the Big Bang to the Present Day

Igor Tolstikhin

Kola Scientific Centre, Russian Academy of Sciences

Jan Kramers

Universität Bern, Switzerland

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Solar and Plasma Physics

TEXTBOOK

An Introduction to Space Weather

Mark B. Moldwin

University of California, Los Angeles

One of the first undergraduate textbooks on space weather for non-science majors, it introduces the relationship between the Sun and Earth, and shows how it impacts our technological society. It contains definitions of important terms, key concepts, supplements, and review questions, and is ideal for introductory space physics courses.

Contents: 1. What is space weather?; 2. The variable sun; 3. The heliosphere; 4. Earth's space environment; 5. Earth's upper atmosphere; 6. The technological impacts of space storms; 7. The perils of living in space; 8. Other space weather phenomena; Appendices; References; Historical bibliography; Index.

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15 line diagrams 15 half-tones 55 exercises
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GRADUATE TEXTBOOK

Physics of Space Plasma Activity

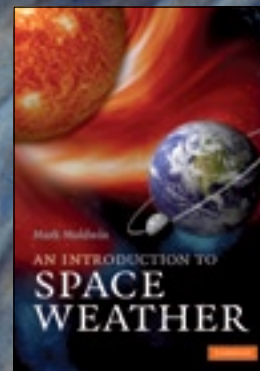
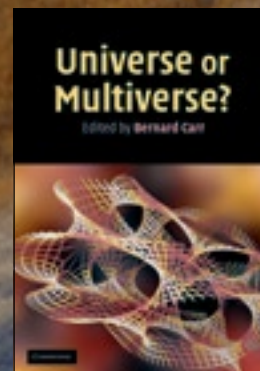
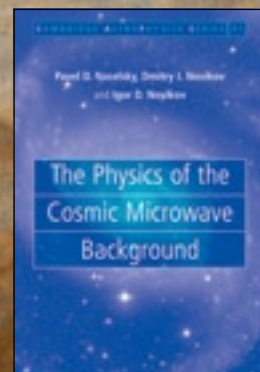
Karl Schindler

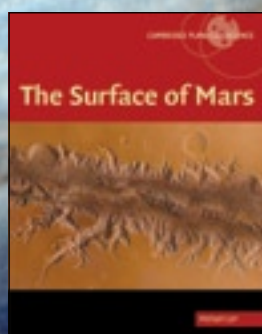
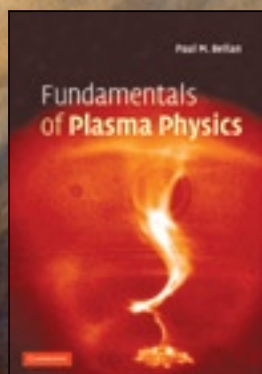
Ruhr-Universität, Bochum, Germany

This book provides a coherent and detailed treatment of the physical background of large plasma eruptions in space and provides the background necessary for dealing with space plasma activity. This forms a fascinating reference for graduate students and academic researchers in the fields of astrophysics and plasma physics.

Contents: 1. Introduction; Part I. Setting the Scene: 2. Sites of activity; 3. Plasma models; Part II. Quiescence: 4. Introduction; 5. Magnetohydrodynamic states; 6. Particle picture of steady states; 7. A unified theory of steady states; 8. Quasistatic evolution and thin current sheets (TCS); Part III. Dynamics: 9. Non-ideal effects; 10. Selected macroinstabilities; 11. Magnetic reconnection; 12. Aspects of bifurcation and nonlinear dynamics; Part IV. Applications: 13. Magnetospheric activity; 14. Models of solar activity; 15. Discussion; Appendix 1. Unified theory: details and derivations; Appendix 2. Variational principle for collisionless plasmas; Appendix 3. Symbols and fundamental constants; Index.

2006 247 x 174 mm 522pp
88 line diagrams 45 half-tones
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GRADUATE TEXTBOOK

Fundamentals of Plasma Physics

Paul M. Bellan

California Institute of Technology

Advanced textbook covering essential and advanced topics in plasma physics relevant to many disciplines.

'... gives an exceptionally lucid and compelling overview of recent progress in this broad branch of physics. The unique organization of the book and straightforward writing style reflect the extensive teaching background of the author. ... a welcome addition to the library of both the expert and the newcomer to the field.'

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Contents: Preface; 1. Basic concepts; 2. The Vlasov, two-fluid, and MHD models of plasma dynamics; 3. Motion of a single plasma particle; 4. Elementary plasma waves; 5. Streaming instabilities and the Landau problem; 6. Cold plasma waves in a magnetized plasma; 7. Waves in inhomogeneous plasmas and wave energy relations; 8. Vlasov theory of warm electrostatic waves in a magnetized plasma; 9. MHD equilibria; 10. Stability of static MHD equilibria; 11. Magnetic helicity interpreted and Woltjer-Taylor relaxation; 12. Magnetic reconnection; 13. Fokker-Planck theory of collisions; 14. Wave-particle nonlinearities; 15. Wave-wave nonlinearities; 16. Non-neutral plasmas; 17. Dusty plasmas; Appendix A. Intuitive method for vector calculus identities; Appendix B. Vector calculus in orthogonal curvilinear coordinates; Appendix C. Frequently used physical constants and formulae; Bibliography; References; Index.

2006 247 x 174 mm 628pp 110 exercises
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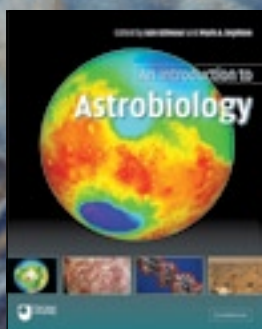
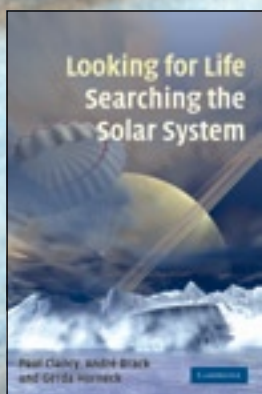
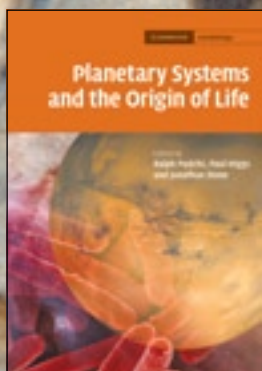
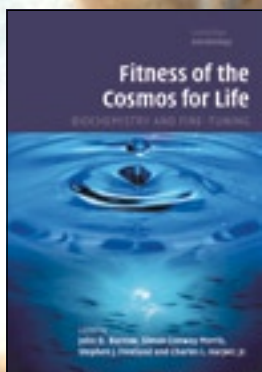
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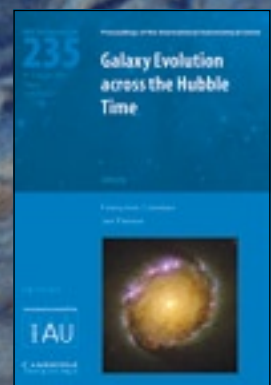
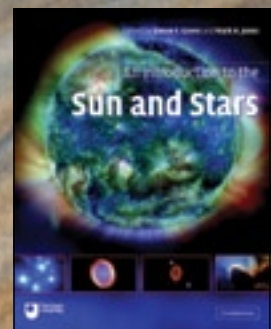
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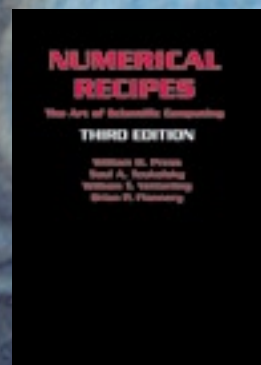
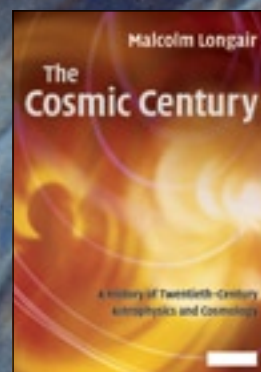
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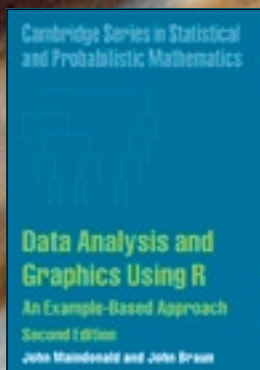
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