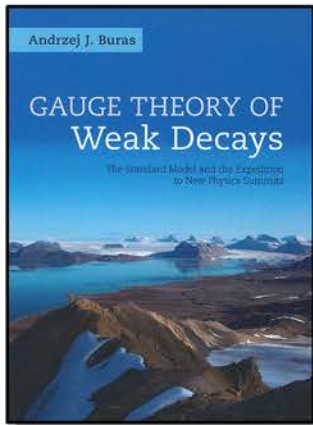# new in the library
Physics - June-August 2020

ICTP The Abdus Salam International Centre for Theoretical Physics

Gauge Theory of Weak Decays
Andrzej J. Buras
A travel guide to physics far beyond the scales explored by the CERN LHC which offers a systematic introduction to the field of theoretical methods used in weak decays and provides a general view of flavour physics, crucial for the identification of new physics through quantum fluctuations.
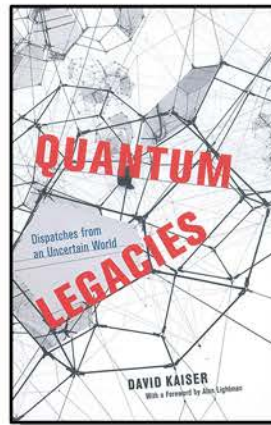
Quantum Legacies
David Kaiser
"Superb popular science" says Philip Ball "It is hard for me to imagine any physicist who wouldn't enjoy the fine cloth from which it is cut, nor the pleasing effect it makes."
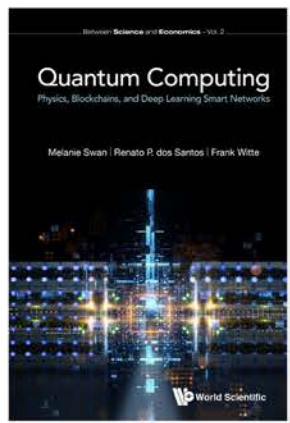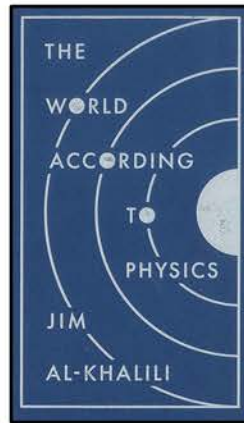
Quantum Computing
M. Swan, R.P. dos Santos, F. White
"It is an intellectual tour de force that bridges the borders between modern physics and computing and illustrates how obscure quantum-mechanical phenomena can ultimately result in computing applications that will severely impact our daily life."
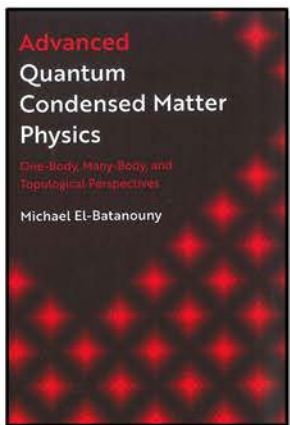*Horst Treiblmaier,*
Modul University Vienna

The World According to Physics
Jim Al-Khalili
"A refreshing, equations-free, occasionally philosophical take on what physics is all about that should appeal to physicists and the public alike."
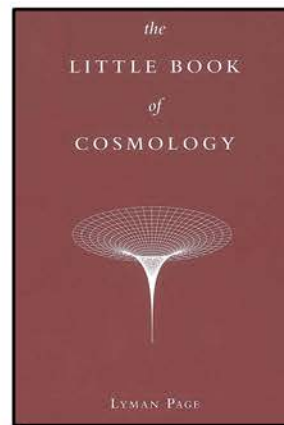*Nature Astronomy*

Advanced Quantum Condensed Matter Physics
Michael El-Batanouny
The first textbook that presents a comprehensive coverage of topological aspects of condensed matter as a distinct yet integrated component. It covers topological fundamentals and their connection to physics, introduces Berry phase and Chern numbers, describes general topological features of band structures and delineates its classification.
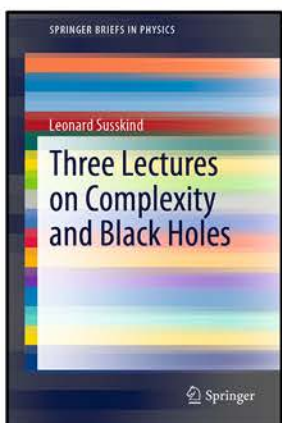
The Little Book of Cosmology
Lyman Page
"It's no small feat, trying to describe the Universe in 152 pages. But this very aptly named book takes this task head-on, by stripping the narrative down to its bare essentials."
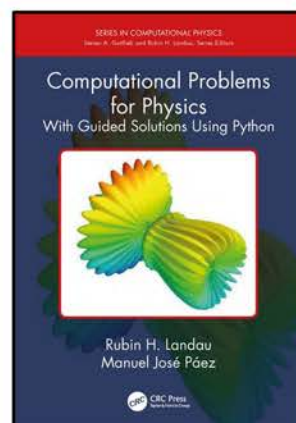*Nature Astronomy*

Three Lectures on Complexity and Black Holes
**Leonard Susskind**
Pedagogically written, serves as a fundamental introduction to black holes and their complex physical interpretation revealing their interior world well behind horizons.

### Computational Problems for Physics
Rubin H. Landau, Manuel José Páez
In order to facilitate integration of computer methods into existing physics courses, this textbook offers a large number of worked examples and problems with fully guided solutions in Python as well as other languages.
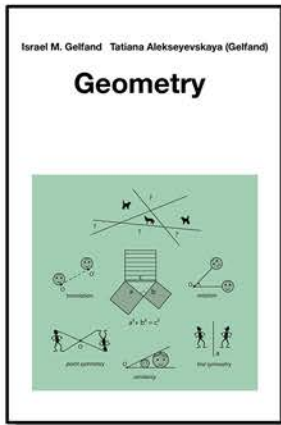
Geometry
Israel Gelfand, Tatiana Alekseyevskaya
"Gelfand gets to the intuitive core of geometry, to the phenomena of shapes and how they move in the plane, leading us to a better understanding of what coordinate geometry and axiomatic geometry seek to describe."
*Mark Saul, PhD*
Executive Director, Julia Robinson Mathematics Festival
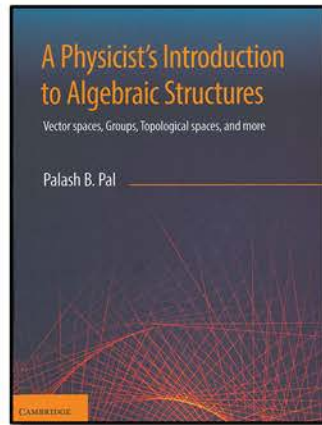
A Physicist's Introduction to Algebraic Structures
**Palash B. Pal**
Catering to the needs of graduate students and researchers in mathematical and theoretical physics, this text discusses the essential concepts of algebraic structures such as metric space, group, modular numbers, algebraic integers, field, vector space, Boolean algebra, measure space and Lebesgue integral.
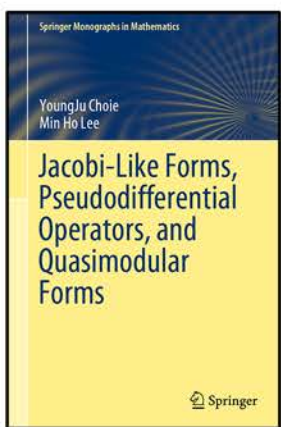
Jacobi-Like Forms, Pseudodifferential Operators, and Quasimodular Forms
**YoungJu Choie, Min Ho Lee**
The first book on quasimodular forms. It presents all of the necessary basic materials on quasimodular forms and their relation to pseudodifferential operators, making the book accessible also to non-specialists and contains a nice selection of applications of the theory to a variety of other areas.
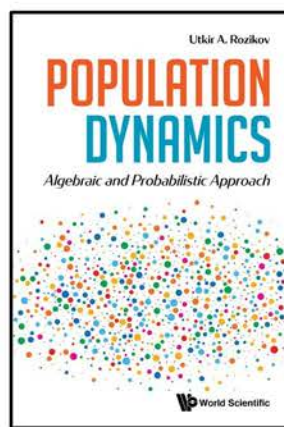
Population Dynamics
Utkir A. Rozikov (ICTP)
Focusing on a very popular topic since the number of young scientists interested in dynamical systems is increasing and there are a multitude of applications in biology, mathematics, medicine, and physics. It is the first-ever book published in English on this topic with results of many recent papers related to population dynamics.
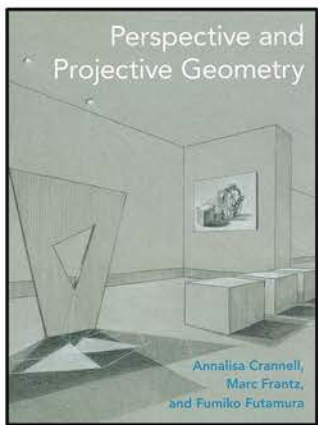
Perspective and projective geometry
Annalisa Crannell, Marc Frantz, and Fumiko Futamura
"This book invites students to connect math with art and aesthetics. It pulls no punches with respect to the rigor of the mathematics. But it also gives newer math students the necessary tools to engage with the material and discover knowledge for themselves."
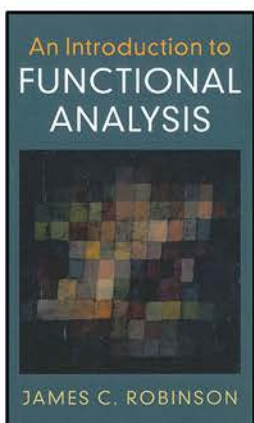*Evelyn Lamb, Scientific American*
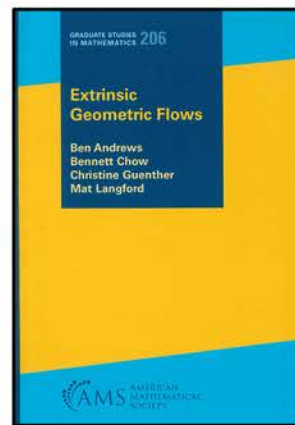
Extrinsic Geometric Flows
Ben Andrews, Bennett Chow, Christine Guenther, Mat Langford
Aiming at giving an extensive introduction to some of the most prominent extrinsic flows, the authors highlight techniques and behaviors that frequently arise in the study of these (and other) flows.

An Introduction to Functional Analysis
James C. Robinson
"This excellent introduction to functional analysis brings the reader at a gentle pace from a rudimentary acquaintance with analysis to a command of the subject sufficient, for example, to start a rigorous study of partial differential equations. The choice and order of topics are very well thought-out, and there is a fine balance between general results and concrete examples and applications."
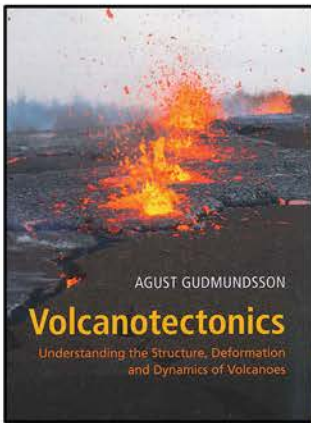*Charles Fefferman*
Princeton University, U.S.A.
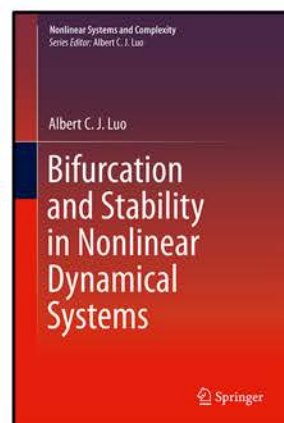
Bifurcation and Stability in Nonlinear Dynamical Systems
Albert C.J. Luo
Presents an efficient way to investigate stability and bifurcation of dynamical systems with higher-order singularity equilibriums, discusses dynamics of infinite-equilibrium systems and demonstrates higher-order singularity.
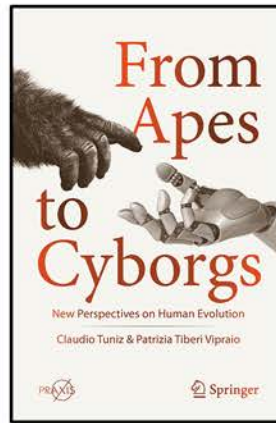
Volcanotectonics
Agust Gudmundsson
An overview of the scientific field of volcanotectonics, a cutting-edge and interdisciplinary topic in volcanological research, which incorporates principles and methods from structural geology, tectonics, volcano-deformation studies, physical volcanology, seismology, and physics.

eBook Available

From Apes to Cyborgs
Claudio Tuniz (ICTP), Patrizia Tiberi Vipraio
A fascinating insight into the lives of our ancestors, investigating the dynamic processes that led to the establishment of complex human societies. The aim is to unveil the deep roots of our social behaviour and how it is going to intertwine with the development of digital technologies and social networks.
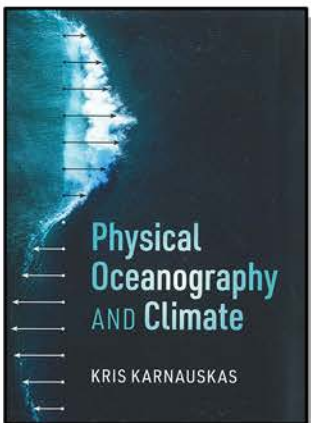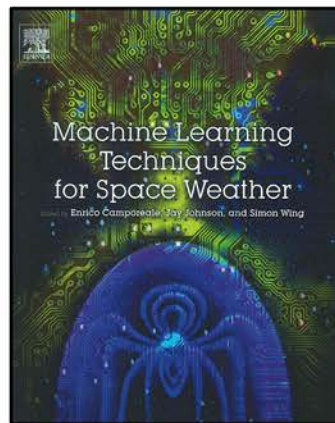
Physical Oceanography and Climate
Kris Karnauskas
"A focused view of the essential place of the ocean in the coupled climate system. With vivid prose and clear explications of mathematical necessities Karnauskas has created an exceptionally efficient means to understand the climate system"
Mark A. Cane
Columbia University , U.S.A.

Machine Learning Techniques for Space Weather
Enrico Camporeale, Jay Johnson, and Simon Wing
Providing a thorough and accessible presentation of machine learning techniques that can be employed by space weather professionals, it presents an overview of real-world applications in space science.
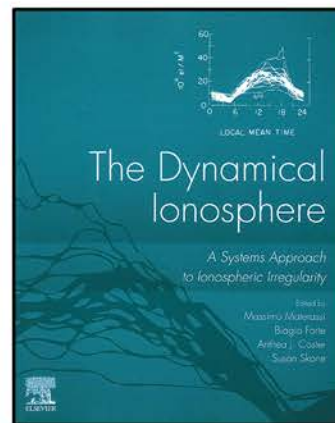
Archaeology from Space
Sarah Parcak
"Parcak's love for her work and the people she studies is evident, and her enthusiasm is contagious. From Vikings in Iceland and Canada to amphitheaters in Italy and back to her first love, pharaonic Egypt, she brings both the present and the past to life."
*Science Magazine*

The Dynamical Ionosphere
Massimo Materassi, Biagio Forte, Anthea J. Coster, Susan Skone
Presents studies addressing Earth's ionosphere as a complex dynamical system, offers new data-driven models for different ionospheric variability phenomena and provides results and data analysis tools of the "worst case" behavior in ionospheric configurations.
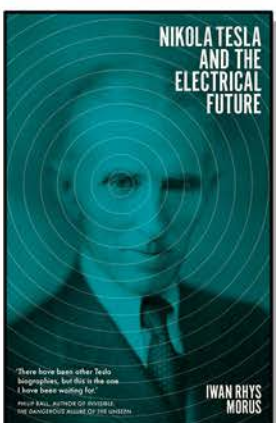
Nikola Tesla and the Electrical Future
Iwan Rhys Morus
"This crisply succinct, beautifully synthesized study brings to life Tesla, his achievements and failures and the hopeful thrum of an era before world wars."
Nature

LPWAN Technologies for IoT and M2M Applications
Bharat Chaudhari, Marco Zennaro (ICTP)
This book intends to provide a one-stop solution for study of LPWAN technologies as it covers a broad range of topics and multidisciplinary aspects of LPWAN and IoT.