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Semiconducting Metal Oxide Thin-Film Transistors

Editor　Ye Zhou

Published　December 2020

Online ISBN: 978-0-7503-2556-1 • Print ISBN: 978-0-7503-2554-7

Semiconducting metal oxide thin-film transistors (TFTs) are promising candidates for functional electronic devices. This reference text covers the latest developments in the field, including the design, materials characteristics, device operation principles, specialised device applications and mechanisms, including the latest semiconducting TFT technologies. The book introduces the concepts and working mechanisms of semiconducting metal oxide TFTs, with a focus on metal oxide thin films that have desirable electrical and optical properties. The relationship between material properties and device performance is analysed, and materials and device challenges, as well as possible strategies, are discussed.

全文：https://iopscience.iop.org/book/edit/978-0-7503-2556-1

Rays, Waves and Photons： A compendium of foundations and emerging technologies of pure and applied optics

Author　William L Wolfe

Published　August 2020

Online ISBN: 978-0-7503-2612-4 • Print ISBN: 978-0-7503-2610-0

Rays Waves and Photons presents the foundational concepts of optical science. Written by subject, each topic is presented in a standalone chapter with a brief historical foundation, current developments, and future predictions. With non-technical language, this book provides accessible content with terms, concepts and definitions, a glossary, and appendices to enhance the reader's experience. More than forty subjects are discussed including: optical design, lenses, cameras,

microscopes, telescopes, lasers, fibers, missiles, autonomous cars and remote sensing. This book will provide a useful resource for students, teachers, professionals, and general audiences interested in the complexity of optical phenomena and devices. Part of https://iopscience.iop.org/bookListInfo/emerging-technologies-in-optics-and-photonics#series.

全文：https://iopscience.iop.org/book/mono/978-0-7503-2612-4

Wide Bandgap Semiconductor-Based Electronics

Editors Fan Ren and Stephen J Pearton

Published September 2020

Online ISBN: 978-0-7503-2516-5 • Print ISBN: 978-0-7503-2514-1

Advances in wide bandgap semiconductor materials are enabling the development of a new generation of power semiconductor devices that far exceed the performance of silicon-based devices. These technologies offer potential breakthrough performance for a wide range of applications, including high-power and RF electronics, deep-UV optoelectronics, quantum information and extreme-environment applications.

全文：https://iopscience.iop.org/book/edit/978-0-7503-2516-5

Nanofabrication：Nanolithography techniques and their applications

Editor José María De Teresa

Published December 2020

Online ISBN: 978-0-7503-2608-7 • Print ISBN: 978-0-7503-2606-3

A comprehensive edited volume on important and up-to-date nanolithography techniques and applications. The book includes an introduction on the importance of nanolithography in today's research and technology, providing examples of its applications.

全文：https://iopscience.iop.org/book/edit/978-0-7503-2608-7

Optics Experiments and Demonstrations for Student Laboratories

Author Stephen G Lipson

Published August 2020

Online ISBN: 978-0-7503-2300-0 • Print ISBN: 978-0-7503-2298-0

This book provides a comprehensive guide to a wide range of optical experiments. Topics covered include classical geometrical and physical optics, polarization, scattering and diffraction, imaging, interference, wave propagation, optical properties of materials, atmospheric and relativistic optics. There are a few selected suggestions on lasers and quantum optics. The book is an essential practical guide for optics students and their mentors at undergraduate and postgraduate levels. The experiments described are based on the author's experience during many years of laboratory teaching in several universities and colleges and the emphasis is on setups which use equipment that is commonly available in student labs, with minimal dependence on special samples or instruments. A basic background in physics and optics is assumed, but commonly encountered problems and mistakes are discussed. There are several appendices describing specialized points which are difficult to locate in the literature, and advice is provided about computer simulations which accompany some of the experiments. Part of IOP Series in Emerging Technologies in Optics and Photonics.

全文：https://iopscience.iop.org/book/mono/978-0-7503-2300-0

Lens Design (Second Edition)

Author Donald C Dilworth

Published December 2020

Online ISBN: 978-0-7503-3695-6 • Print ISBN: 978-0-7503-3693-2

Lens Design: Automatic and Quasi-Autonomous Computational Methods and Techniques (Second Edition) shows how these new tools can design systems in minutes that would have required weeks or months of labor using older methods. Powerful search routines that can quickly produce excellent designs starting with plane-parallel plates are described. The principles are explained, and data files are provided so the user can duplicate these systems and learn how to use the new software to solve unexpected problems should they occur. Automatic substitution of

real glass types for a glass model, and automatic matching to the testplates of a selected vendor, are fully explained, with examples. Part of IOP Series in Emerging Technologies in Optics and Photonics.

全文：https://iopscience.iop.org/book/mono/978-0-7503-3695-6

Modeling and Design Photonics by Examples Using MATLAB®

Author Dan T Nguyen

Published July 2021

Online ISBN: 978-0-7503-2272-0 • Print ISBN: 978-0-7503-2270-6

As a broad area of science and technology, modeling and computational photonics is an ever-growing and developing topic. Covering the crucial foundations of photonics, as well as delving into the more complex aspects of the field, Modeling and Design Photonics by Examples with MATLAB® is a comprehensive study of computational photonics that will bridge the gap between academic and industrial worlds. Using MATLAB® code to help provide solutions, this book will help readers to use modelling as an effective tool for designing and optimizing photonic systems. Part of IOP Series in Emerging Technologies in Optics and Photonics.

全文：https://iopscience.iop.org/book/mono/978-0-7503-2272-0

Nanoscale Energy Transport: Emerging phenomena, methods and applications

Editor Bolin Liao

Published March 2020

Online ISBN: 978-0-7503-1738-2 • Print ISBN: 978-0-7503-1736-8

This book brings together leading names in the field of nanoscale energy transport to provide a comprehensive and insightful review of this developing topic. The text covers new developments in the scientific basis and the practical relevance of nanoscale energy transport, highlighting the emerging effects at the nanoscale that qualitatively differ from those at the macroscopic scale. Throughout the book, microscopic energy carriers are discussed, including photons, electrons and magnons.

State-of-the-art computational and experimental nanoscale energy transport methods are reviewed, and a broad range of materials system topics are considered, from interfaces and molecular junctions to nanostructured bulk materials. Nanoscale Energy Transport is a valuable reference for researchers in physics, materials, mechanical and electrical engineering, and it provides an excellent resource for graduate students.

全文：https://iopscience.iop.org/book/edit/978-0-7503-1738-2

Lens Design Basics: Optical design problem-solving in theory and practice

Author Christoph Gerhard
Published December 2020

Online ISBN: 978-0-7503-2240-9 • Print ISBN: 978-0-7503-2238-6

This book gives a comprehensive overview on the principles of optical imaging. The first seven chapters provide an extensive summary of optical design, as well as the mechanisms and interrelations leading to the formation of aberrations and the accompanying decrease in imaging performance. Aside from the fundamentals of optics and imaging models, topics covered include calculations of simple optical components and systems, characterisation and quantification of aberrations and defects in optical systems, and optimisation of imaging performance. The second part focuses on problem-based learning via multiple exercises and case examples derived from the first seven chapters. It is an ideal guide for optics and photonics students. Part of IOP Series in Emerging Technologies in Optics and Photonics.

全文：https://iopscience.iop.org/book/mono/978-0-7503-2240-9

Laser Micro- and Nano-Scale Processing: Fundamentals and applications

Editors Ahmed Issa and Dermot Brabazon
Published August 2021

Online ISBN: 978-0-7503-1683-5 • Print ISBN: 978-0-7503-1681-1

This book presents a collection of chapters written by experienced researchers in the fields of laser micro- and nano-scale processing for both surface and bulk processing covering surface modification processes, laser material interaction regimes, laser system construction for micro- and nanomachining applications, and the thermal mathematical modelling of laser processes. As an important reference for researchers in the field of micro- and nano-scale processing, this book aims to assist researchers and postgraduates in becoming familiar with the principles, capabilities and potential of the laser processing of materials quickly. Offering a one-stop reference, this book provides an understanding of the physical phenomena, process principles, latest achievements, and applications from the key researchers and research groups that focus on precision micro- and nano-scale laser processing. Part of IOP Series in Coherent Sources, Quantum Fundamentals, and Applications.

全文：https://iopscience.iop.org/book/edit/978-0-7503-1683-5

Modern Analytical Electromagnetic Homogenization with Mathematica® (Second Edition)

Authors Tom G Mackay and Akhlesh Lakhtakia

Published December 2020

Online ISBN: 978-0-7503-3423-5 • Print ISBN: 978-0-7503-3421-1

This book is an overview of state-of-the-art analytical homogenization formalisms used to estimate the effective electromagnetic properties of complex composite materials. Beginning with an introduction to homogenization, the book progresses to cover both constitutive and depolarization dyadics. The homogenization formalisms for linear and non-linear materials are examined, followed by their applications and multiple examples using Mathematica code. This text is a valuable reference for PhD students and researchers working on the electromagnetic theory of complex composite materials.

全文：https://iopscience.iop.org/book/mono/978-0-7503-3423-5

Butterfly in the Quantum World

Author Indubala I Satija

Published August 2016

Online ISBN: 978-1-6817-4117-8 • Print ISBN: 978-1-6817-4053-9

Butterfly in the Quantum World is the first book ever to tell the story of the "Hofstadter butterfly", a beautiful and fascinating graph lying at the heart of the quantum theory of matter. The butterfly came out of a simple-sounding question: What happens if you immerse a crystal in a magnetic field? What energies can the electrons take on? From 1930 onwards, physicists struggled to answer this question, until 1974, when graduate student Douglas Hofstadter discovered that the answer was a graph consisting of nothing but copies of itself nested down infinitely many times. This wild mathematical object caught the physics world totally by surprise, and it continues to mesmerize physicists and mathematicians today.

全文：https://iopscience.iop.org/book/mono/978-1-6817-4117-8

Modern Physics: A critical approach

Editor Canio Noce

Published August 2020

Online ISBN: 978-0-7503-2678-0 • Print ISBN: 978-0-7503-2676-6

Intended for science and engineering students with a background in introductory physics and calculus, this textbook creates a bridge between classical and modern physics, filling the gap between descriptive elementary texts and formal graduate textbooks. The book presents the main topics and concepts of special relativity and quantum mechanics, starting from the basic aspects of classical physics and analysing these topics within a modern physics frame. The classical experiments that gave rise to modern physics are also critically discussed, and special emphasis is devoted to solid state physics and its relationship with modern physics.

全文：https://iopscience.iop.org/book/edit/978-0-7503-2678-0

Radiative Properties of Semiconductors

Authors N M Ravindra, Sita Rajyalaxmi Marthi and Asahel Bañobre

Published August 2017

Online ISBN: 978-1-6817-4112-3 • Print ISBN: 978-1-6817-4048-5
Optical properties, particularly in the infrared range of wavelengths, continue to be of enormous interest to both material scientists and device engineers. The need for the development of standards for data of optical properties in the infrared range of wavelengths is very timely considering the on-going transition of nano-technology from fundamental R&D to manufacturing. The recent progress in two-dimensional materials is an example of this evolution in materials science and engineering.
全文：https://iopscience.iop.org/book/mono/978-1-6817-4112-3

Optical Fiber Technology and Applications: Recent advances
Editors Mário F S Ferreira and Mukul Chandra Paul
Published August 2021

Online ISBN: 978-0-7503-3243-9 • Print ISBN: 978-0-7503-3241-5
Optical Fiber Technology and Applications: Recent advances, comprised of 10 chapters written by leading experts in the field, documents the cutting-edge work of new material composition and waveguide design-based specialty optical fibers and their photonic devices. Highlighting the most recent progress and trends in optical fiber technology, this book covers important topics such as specialty optical fibers, optical amplifiers, radiation dosimetry, borosilicate glass, radiation effect, fiber optic temperature sensors, pulsed fiber lasesr, non-linear fiber optics, solitons, supercontinuum generation, and fiber-optic-based 5G networks.
全文：https://iopscience.iop.org/book/edit/978-0-7503-3243-9

Fundamentals of Quantum Entanglement
Author F J Duarte
Published October 2019

Online ISBN: 978-0-7503-2228-7 • Print ISBN: 978-0-7503-2226-3
Quantum entanglement (QE) is undoubtedly one of the most, if not the most, mysterious and yet most promising subjects of current physics. With applications in

cryptographic space-to-space, space-to-earth, and fibre communications, in addition to teleportation and quantum computing, QE goes beyond fascination and into the pragmatic spheres of commerce and the military. This book is written by Professor Duarte, an expert in the field of quantum optics. He provides the first side-by-side description of the philosophical path and the physical path to quantum entanglement, and does so in a clear and cohesive manner. This is also the first book to describe and explain, in a transparent exposition, the interferometric derivation, à la Dirac, of the ubiquitous probability amplitude for quantum entanglement. The book will be useful for optical engineers working in the field of quantum entanglement and quantum communications as well as graduate students. The book includes 29 succinct, to the point, chapters and utilizes 10 useful appendices to further detail QE. Part of Series in Coherent Sources and Applications.

全文：https://iopscience.iop.org/book/mono/978-0-7503-2228-7

Ultrafast Lasers and Optics for Experimentalists

Author James David Pickering

Published March 2021

Online ISBN: 978-0-7503-3659-8 • Print ISBN: 978-0-7503-3657-4

The use of ultrafast lasers has expanded beyond use by specialist laser physicists and is increasingly commonplace in both physical and life sciences, where the high intensities, broad bandwidths, and short pulse durations make them ideal for investigating a wide range of chemical and physical phenomena. Working with these ultrashort femtosecond laser pulses requires some special care when compared to other laser systems, and this book provides an ideal starting point for the non-specialist to gain the necessary knowledge to start effectively working with ultrafast lasers and optics. The book walks the reader through the relevant parts of ultrashort pulse physics, pulse generation, and pulse characterisation, before discussing how to practically build an optical setup and manipulate these pulses. Many aspects of the practicalities of working with optics and lasers that are often considered assumed knowledge by experienced campaigners are discussed in detail. Aimed specifically at non-specialists, the emphasis is placed on intuitive, qualitative understanding of the concepts. The fundamental aim is that students starting a project

or PhD in a laser group, can pick this book up and quickly get up to speed with the fundamentals of ultrafast laser physics that enable effective laboratory working.

全文：https://iopscience.iop.org/book/mono/978-0-7503-3659-8