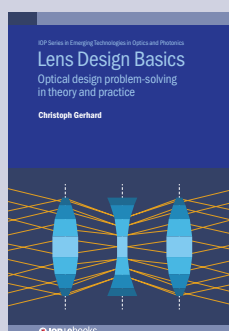
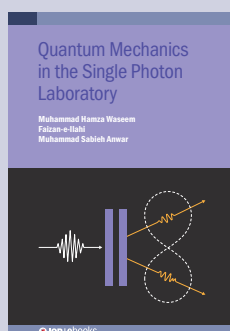
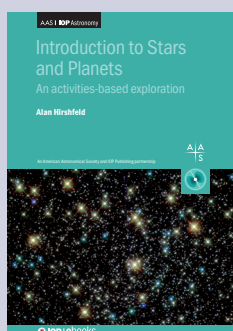


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Alan Hirshfeld

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Introduction to Stars and Planets: An activities-based exploration reveals the methods by which Earthbound observers have deduced the physical attributes of celestial bodies, whether situated within our solar neighborhood or at the far ends of the Galaxy.

Quantum Mechanics in the Single Photon Laboratory

Muhammad Hamza Waseem, Faizan-e-Ilahi, and Muhammad Sabieh Anwar

Course text

This book provides an overview of fundamental experiments that can be used to practically demonstrate the underlying principles of quantum physics and quantum information science. Those who would like to foray into quantum technologies would also find this narrative useful to learn about the terminology, key postulates of quantum physics, the collapse of states on measurement and how quantum computers could be implemented.

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

Christoph Gerhard

Research and reference text

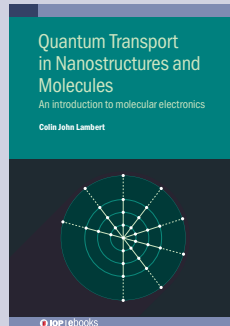
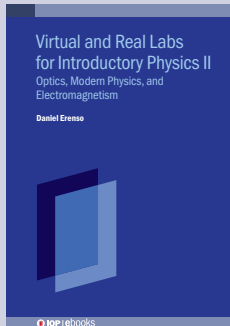
This book gives a comprehensive overview on the principles of optical imaging. Aside from the fundamentals of optics and imaging models, topics covered include calculations of simple optical components and systems, characterisation and quantification of aberrations and defects in optical systems, and optimisation of imaging performance. Part of IOP Series in Emerging Technologies in Optics and Photonics.

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**Virtual and Real Labs for Introductory Physics II: Optics, Modern Physics, and Electromagnetism****Daniel Erenso**

Course Text

This book is the Laboratory part to Introductory Physics II. The purpose of the Introductory Physics II course is to introduce students to optics, selected topics in modern physics (that is, the physics of the 20th century), and electricity and magnetism. It follows Introductory Physics I that covers selected topics in mechanics, thermodynamics, fluid dynamics and wave physics.

Quantum Transport in Nanostructures and Molecules: An Introduction to molecular electronics**Colin John Lambert**

Research and reference text

This reference text presents a conceptual framework for understanding room-temperature electron and phonon transport through molecules and other quantum objects. The flow of electricity through molecules is explained at the boundary of physics and chemistry, providing an authoritative introduction to molecular electronics for physicists, and quantum transport for chemists.



IPEM

Imaging Modalities for Biological and Preclinical Research: A Compendium, Volumes 1 and 2**Andreas Walter, Julia Mannheim and Carmel J Caruana**

Research and reference text

Imaging Modalities for Biological and Preclinical Research is designed to provide a comprehensive overview of currently available biological and preclinical imaging methods, including their benefits and limitations.

Volume 1 focuses on *ex-vivo* imaging. It covers all available advanced and basic light and fluorescence microscopy modalities, X-ray, electron, atomic force and helium ion microscopy, dynamic techniques such as fluorescence recovery after photobleaching as well as spectroscopic techniques such as coherent Raman imaging or mass spectrometry imaging.

Volume 2 focuses on *in-vivo* imaging methods, including intravital microscopy, ultrasound, MRI, CT and PET. Correlative multimodal imaging, (pre)clinical hybrid imaging techniques and multimodal image processing methods are also discussed. The volume concludes with a look ahead to emerging technologies and the future of imaging in biological and preclinical research.

Our featured author

Daniel Erenso has been a professor of physics at Middle Tennessee State University (MTSU) since 2003. Interested in both theoretical and experimental physics research, he has extended his research at MTSU to experimental biophysics and quantum optics/quantum information. He has received various awards throughout his career, including but not limited to, the MTSU College of Basic & Applied Sciences Distinguished Research Award (2016), and the Fulbright Scholar Award (2016).

- **What inspired you and your co-authors to write your book?**

The book was inspired by years of experience teaching upper-division undergraduate theoretical physics courses that included Classical Mechanics, Electricity and Magnetism, Quantum Mechanics, and General Relativity. Over the years, I have learned that teaching resources that use current technological advances are valuable and critical to effectively teach in this rapidly advancing globe to keep up with the rapidly technologically advancing student population in these fields.

Virtual and Real Labs for Introductory Physics II was inspired by the COVID-19 pandemic that hit the globe. The pandemic has created significant challenges for all people in the world. Simultaneously, it has also opened some ample opportunities to overcome these significant challenges of our time. In March 2020, like all universities in North America and Europe, MTSU had to move all ground teaching to remote teaching due to the pandemic. I have taught an Introductory Physics course (which has a lab component that students must do on-ground) for more than two decades. In conducting this course, I often try to keep up to date by revising and updating the teaching resources I use by integrating new helpful teaching resources that implement technological advances. One of these tools was the PhTH simulation labs. Using these simulation labs, one can effectively replicate the labs that students are usually required to do in a classroom using actual lab equipment, which has been problematic since the pandemic has begun. The urgent need to overcome this challenge by providing virtual and real labs that students can do in a safe, remote, and on-ground environment is the primary inspiration for writing this book.

- **How useful will your book be for universities?**

The purpose of the second book is to introduce science majors to the basic principles of physics. The book serves its purpose in three steps. It summarizes the fundamental physical theories followed by virtual and real lab activities with conceptual questions that the readers should answer as they go through the book. In the topics covered, the particular emphasis is placed on modern applications and topics with which any well-educated student of the sciences should be familiar. The book presents these topics in three parts: Part I Optics (covers the laws of reflection and refraction of light, the properties of thin lenses, vision defect and corrective lenses, and diffraction of light); Part II Modern Physics (covers blackbody radiation, photoelectric effect, quantum mechanics and atomic physics, and nuclear physics); Part III Electricity and Magnetism (Coulomb's law, conductors and insulators, Ohm's law, Kirchhoff's voltage and current laws, dc circuits, ac circuits and filters, and digital circuits). Whether Algebra-based or Calculus-based, introductory physics courses are core courses for science, engineering, pre-medicine, and pre-pharmacy students in all educational institutions across the world. Therefore, this book also can serve as a textbook for these courses' lab components, making it valuable to universities worldwide.

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