



Modern Physics:An Introductory Text

Jeremy I Pfeffer, Shlomo Nir

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This second edition of the successful textbook, *Modern Physics: An Introductory Text*, preserves the unique blend of readability, scientific rigour and authenticity that made its predecessor so indispensable a text for non-physics science majors. As in the first edition, it sets out to present 20th century physics in a form accessible and useful to students of the life sciences, medicine, agricultural, earth and environmental sciences. It is also valuable as a first reader and source text for students majoring in the physical sciences and engineering. Two new chapters have been added, one on Einstein's elucidation of Brownian Motion and the second on Quantum Electrodynamics.

Taking the discovery of the electron, the formulation of Maxwellian electromagnetism and Einstein's elucidation of Brownian motion as its starting point, the text proceeds to a comprehensive presentation of the three seminal ideas of 20th century physics: Special and General Relativity, Quantum Theory and the Nuclear Atom. From here the text moves on to the new discoveries prompted by these ideas, their impact on our understanding of natural phenomena and their application to the development and invention of the devices and technologies that define the 21st century.

Questions, exercises and problems for student assignments are found at the end of each of the six parts into which the text is divided; answers to the numerical questions are at the end of the book. The techniques by which trigonometric functions, phasors (rotating vectors) and complex numbers are employed in the mathematical description of wave motion are summarised in a supplementary section. In consideration of the audience for whom the book is intended, all mathematics other than that required for descriptive or illustrative purposes has been omitted from the main body of the text and incorporated into the 47 worked examples and 11 appendices.

Sample Chapter(s)

Preface and Table of Contents (69 KB)

Chapter 1.1: The Electron (65 KB)

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Contents:

- The Birth of a New Physics: The Electron and the Reality of Atoms; Relativity
- Quantum Theory: Photons and the Mechanics of Minute Particles
- The Nuclear Atom: The Bohr and Quantum Mechanical Atomic Models; Electron Spin
- Interactions of Electromagnetic Radiation and Matter: Molecular Spectra; Fluorescence in Biological Systems; Quantum Electrodynamics
- Nuclear Physics: Nuclear Structure and Nuclear Radiations; Elementary Particles and the Standard Model; Nuclear Energy; The Chernobyl and Fukushima Events
- Selected Applications: Lasers; Mössbauer Effect; Nuclear Magnetic Resonance; Conduction of Electricity in Solids; Semiconductor Devices; Symmetry and Conservation

Readership: Student: Non-physics science undergraduates and graduates, and students of the life sciences,

medicine, agricultural, earth and environmental sciences.

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