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Autor:

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Sinopsis

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This invaluable book is based on lecture notes developed for a one-semester graduate course entitled "Interaction of Radiation with Matter", taught in the Department of Nuclear Science and Engineering at the Massachusetts Institute of Technology. The main objective of the course is to teach enough quantum and classical radiation theory to allow students in engineering and the applied sciences to understand and have access to the vast literature on applications of ionizing and non-ionizing radiation in materials research.

Besides presenting the fundamental physics of radiation interactions, the book devotes individual chapters to some of the important modern-day experimental tools, such as nuclear magnetic resonance, photon correlation spectroscopy, and the various types of neutron, x-ray, and light-scattering techniques. End-of-chapter problems have been added for the new edition, making the book more appropriate as a course textbook.

Contents:
An Overview of Classical Mechanics
The Transition to Quantum Mechanics
Classical Treatment of Electromagnetic Fields and Radiation
Quantum Properties of the Field
Time-Dependent Perturbation Theory, Transition Probabilities, and Scattering
The Density Operator and Its Role in Quantum Statistics
First-Order Radiation Processes
Second-Order Processes and the Scattering of Photons
Principles of Nuclear Magnetic Resonance
Theory of Photon Counting Statistics
Dynamic Structure Factors
Linear Response Theory