Electrodynamics of Solids

This book presents a thorough discussion of the optical properties of solids, with a focus on electron states and their response to electrodynamic fields. A review of the fundamental aspects of the propagation of electromagnetic fields, and their interaction with condensed matter, is given. This is followed by a discussion of the optical properties of metals, semiconductors, and collective states of solids such as superconductors.

Theoretical concepts, measurement techniques, and experimental results are covered in three inter-related sections. Well-established, mature fields are discussed (for example, classical metals and semiconductors) together with modern topics at the focus of current interest, such as correlated metals, localisation, superconductivity, and other broken symmetry states. The substantial reference list included will also prove to be a valuable resource for those interested in the electronic properties of solids.

The book is intended for use by advanced undergraduate and graduate students, and researchers active in the fields of condensed matter physics, materials science, and optical engineering.

Martin Dressel received his Doctor of Sciences degree in 1989 from the Universität Göttingen where he subsequently worked as a postdoctoral research fellow. Since then he has held positions in the University of British Columbia at Vancouver; the University of California, Los Angeles; the Technische Universität, Darmstadt; and the Center of Electronic Correlations and Magnetism at the Universität Augsburg. Professor Dressel is now Head of the 1. Physikalisches Institut at the Universität Stuttgart.

George Grüner obtained his Doctor of Sciences degree from the Eötvös Lorand University, Budapest in 1972, and became Head of the the Central Research Institute of Physics in Budapest in 1974. In 1980 he took up the position of Professor of Physics at the University of California, Los Angeles, and later became Director of the Solid State Science Center there. Professor Grüner has been a distinguished visiting professor at numerous institutions worldwide and is a consultant for several international corporations and advisory panels. He is a Guggenheim Fellow and is also a recipient of the Alexander Humboldt Senior American Scientist Award.

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