



Electricity, Relativity and Magnetism: A Unified Text

By Derek J. Craik

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Electricity, Relativity and Magnetism: A Unified Text By Derek J. Craik

Electricity, Relativity and Magnetism: A Unified Text presents the first complete and systematic derivation of the principles of magnetism and electromagnetism from Coulomb's law and the theory of special relativity alone. Most books on magnetism introduce the subject in terms of experimental observations, as if magnetism were distinct from, albeit associated with, electricity. The topic of relativity is often mentioned, but almost as an afterthought, rather than as a crucial element of the argument. In this new book from Dr Derek Craik, the important links between electricity and magnetism, via special relativity, are emphasized, leading the reader to a more meaningful and profound understanding of the subject.

Electricity, Relativity and Magnetism: A Unified Text gives a simple and brief review of Einstein's special theory of relativity, emphasizing force transformations. An outline of electrostatics, Coulomb's law and its consequences, is also given and is shown to lead to the basis of magnetostatics. Time-dependent electromagnetic effects are introduced naturally via the transformation equations for fields and for potentials, and Maxwell's equations are systematically derived. Magnetic dipoles and magnetization are shown to arise on transforming electric dipoles and polarizations. The author next discusses the application of the theory to practical magnetic calculations, and finally goes on to introduce the quantum theory of magnetism. The concept of spin is introduced, leading to spin statics and magnetic ordering, and spin dynamics and resonances. An account of crystal field theory is included. All whose work and research involves the understanding of magnetic phenomena will find Electricity, Relativity and Magnetism: A Unified Text an invaluable resource which will enhance and deepen their understanding of the subject.

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