

Contents

Chapter 1	Maxwell's Theory	1
1	Introduction: Definition of the Fields	1
2	Maxwell's Equations	2
3	Solution of the Equations in Free Space	3
4	Applications to the Skin Effect and Metallic Reflection	6
5	Energy and Momentum of an Electromagnetic Field	9
6	Radiation from a Charge and Current Distribution	16
7	Solution of Maxwell's Equations in Terms of Retarded Potentials	27
8	Classification of Multipole Radiation	37
9	Energy of a Nearly Static Distribution of Charge	45
10	Lienard-Wiechert Point Potential	49
11	Field of a Uniformly Moving Point Charge	52
12	Field of an Accelerated Point Charge	59
13	Rate of Radiation of Energy from an Accelerated Point Charge	63
14	Application to a Simple Theory of Bremsstrahlung	67
15	Radiation Reaction	75
16	Self-energy of the Electron	85
17	Classical Theory of Scattering and Dispersion	89
18	Hamiltonian Theory for the Motion of a Charged Particle in an Electromagnetic Field	100
Chapter 2	Special Theory of Relativity	105
19	Transformation of Newton's Equations	105
20	Michelson-Morley and Kennedy-Thorndyke Experiments	108
21	Lorentz Transformation	111

22	Minkowski Diagram	118
23	Derivation of the Fresnel Coefficient and the Aberration Formula	121
24	Covariance	122
25	Transformation Laws of the Electromagnetic Quantities	127
26	Application to the Method of Virtual Quanta	133
27	Application to the Theory of the Čerenkov Effect	139
28	Transformation of Energy and Momentum	143
29	Inertia and Energy	154
30	Considerations Important for the Quantum Theory	155