1. Record Nr. UNINA9910300558203321

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Titolo	Classical Electrodynamics : A Modern Perspective / / by Kurt Lechner
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2018
ISBN	3-319-91809-5
Edizione	[1st ed. 2018.]
Descrizione fisica	1 online resource (XIX, 688 p.)
Collana	UNITEXT for Physics, , 2198-7882
Disciplina	537.6
Soggetti	Physics Optics Electrodynamics Elementary particles (Physics) Quantum field theory Mathematical Methods in Physics Classical Electrodynamics Elementary Particles, Quantum Field Theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Part I: THEORETICAL FOUNDATIONS -- 1 Foundations of special relativity -- 2 Fundamental equations of electrodynamics -- 3 Variational methods in field theory -- 4 The variational principle in electrodynamics -- Part II: APPLICATIONS -- 5 Electromagnetic waves -- 6 Generation of electromagnetic fields -- 7 Lienard-Wiechert fields -- 8 Radiation -- 9 Gravitational radiation -- 10 Radiation in the ultrarelativistic limit -- 11 Spectral analysis -- 12 Synchrotron radiation -- 13 The Cerenkov effect -- Part III: SELECTED TOPICS -- 14 Radiation reaction -- 15 A distribution-valued energy-momentum tensor -- 16 Charged particles traveling at the speed of light -- 17 Massive vector fields -- 18 Electrodynamics of p-branes -- 19 Magnetic monopoles in classical electrodynamics -- 20 Magnetic monopoles in quantum mechanics -- References -- INDEX.
Sommario/riassunto	This book addresses the theoretical foundations and the main physical consequences of electromagnetic interaction, generally considered to be one of the four fundamental interactions in nature, in a

mathematically rigorous yet straightforward way. The major focus is on the unifying features shared by classical electrodynamics and all other fundamental relativistic classical field theories. The book presents a balanced blend of derivations of phenomenological predictions from first principles on the one hand, and concrete applications on the other. Further, it highlights the internal inconsistencies of classical electrodynamics, and addresses and resolves often-ignored critical issues, such as the dynamics of massless charged particles, the infinite energy of the electromagnetic field, and the limits of the Green's function method. Presenting a rich, multilayered, and critical exposition on the electromagnetic paradigm underlying the whole Universe, the book offers a valuable resource for researchers and graduate students in theoretical physics alike.