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Autore	Matsushita Teruo
Titolo	Electricity and Magnetism : New Formulation by Introduction of Superconductivity / / by Teruo Matsushita
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Descrizione fisica	1 online resource (543 pages)
Collana	Undergraduate Lecture Notes in Physics, , 2192-4805
Disciplina	537.623
Soggetti	Electrodynamics Superconductivity Superconductors Condensed matter Mathematical physics Electrical engineering Classical Electrodynamics Condensed Matter Mathematical Methods in Physics Electrical and Electronic Engineering
Lingua di pubblicazione	Inglese
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Nota di contenuto	Part I Static Electric Phenomena -- Electrostatic Field -- Conductors -- Conductor System in Vacuum -- Dielectric Materials -- Steady Current -- Part II Static Magnetic Phenomena -- Current and Magnetic Flux Density -- Superconductors -- Current Systems -- Magnetic Materials -- Part III Time- Dependent Electromagnetic Phenomena -- Electromagnetic Induction -- Displacement Current and Maxwell's Equations -- Electromagnetic Wave.
Sommario/riassunto	This comprehensive textbook covers electricity and magnetism in great depth, with the 3rd edition offering updated descriptions of electromagnetic phenomena to help students achieve a more thorough understanding of the subject. In the 1st edition, superconductivity was emphasized, a focus that continued in the 2nd edition, which strengthened the E-B analogy by comparing equipotential surfaces in

electricity to equivector potential surfaces in magnetism. The 3rd edition introduces the concept of mean magnetic flux, which aids in determining inductance from magnetic energy. It also demonstrates how vector potential can be directly used to calculate electromotive force. A unique phenomenon is presented when applying current to a superconducting transmission line, where the induced electric field's vector potential is perpendicular to the current. This deviation from common equations can still be explained through Maxwell's theory, leading to the correct solution. For a more in-depth grasp of electricity and magnetism, students are encouraged to use *Exercises in Electricity and Magnetism* by the same author, which offers 400 practice problems. This textbook is ideal for advanced students of physics, astrophysics, or engineering, as well as a valuable reference for professional scientists.
