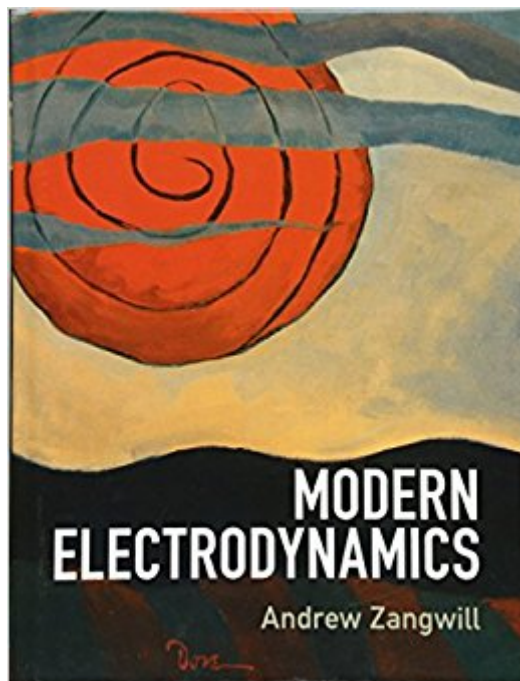


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# Modern Electrodynamics



## Synopsis

An engaging writing style and a strong focus on the physics make this comprehensive, graduate-level textbook unique among existing classical electromagnetism textbooks. Charged particles in vacuum and the electrodynamics of continuous media are given equal attention in discussions of electrostatics, magnetostatics, quasistatics, conservation laws, wave propagation, radiation, scattering, special relativity, and field theory. Extensive use of qualitative arguments similar to those used by working physicists makes Modern Electrodynamics a must-have for every student of this subject. In 24 chapters, the textbook covers many more topics than can be presented in a typical two-semester course, making it easy for instructors to tailor courses to their specific needs. Close to 120 worked examples and 80 applications boxes help the reader build physical intuition and develop technical skill. Nearly 600 end-of-chapter homework problems encourage students to engage actively with the material. A solutions manual is available for instructors at [www.cambridge.org/Zangwill](http://www.cambridge.org/Zangwill).

## Book Information

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## Customer Reviews

"An outstanding achievement on so many levels, including scope, depth, insight, pedagogy, and historical background. It will become an instant classic." John D. Joannopoulos, Massachusetts Institute of Technology  
"Zangwill's recreation of classical electromagnetic theory will surely become the standard text on the subject. His comprehensive and scholarly treatment clarifies subtle points that are often ignored or concealed." Sir Michael Berry, University of Bristol  
"I am happy to

recommend this book. It is carefully and creatively organized, clearly written, and has many, many interesting problems to solve." Gerald A. Miller, University of Washington "This book richly deserves the word 'modern' in its title. Zangwill develops an intuitive picture of electrodynamics that will be a great resource for all." Rob Phillips, California Institute of Technology "I am impressed by the careful and thorough way this book addresses subtle questions like the behavior of electromagnetic fields in dielectric matter. It will be an essential resource for both researchers and teachers who are not willing to sweep this and other delicate issues under the rug." Alain Aspect, Institut d'Optique and Ecole Polytechnique "Zangwill has written an excellent graduate textbook, with a large number of carefully chosen problems and examples. Boxes describing interesting and quirky applications add color to the presentation and references to quantum mechanics and modern topics will surely engage students." R. Merlin, University of Michigan "This comprehensive textbook gives refreshing insights into classical electrodynamics, with emphasis on the physics without sacrificing mathematical rigor. I particularly like the numerous worked examples and sections on applications, which show the relevance of the topics to modern research. The problems, with comprehensive solutions for the busy instructor, will be excellent for students to get to grips with the material." Shirley Chiang, University of California, Davis "Modern Electrodynamics is not just another book on electromagnetism. It provides a comprehensive introduction to the material, but also covers more advanced topics than are typically found in other volumes. The quotations from historical sources are particularly useful and engaging. Though addressed to engineers, there is also a strong focus on physics. Relationships to quantum electrodynamics are presented, and historical and axiomatic aspects are surprisingly well accounted for. The volume covers many more subjects than can be presented in a typical two-semester course, so instructors can choose topics that meet their specific needs. Numerous worked examples and applications boxes help the reader build physical intuition and develop technical skill. Nearly 600 end-of-chapter homework problems encourage students to engage actively with the material. A very useful solutions manual is available for registered and validated instructors at [www.cambridge.org/Zangwill](http://www.cambridge.org/Zangwill)." Optics and Photonics News "I enjoyed examining this handsome book, finding favorite topics described in fresh ways and learning about other topics. Zangwill's writing and mathematical demonstrations are crisp and to the point, and they generally complement each other well. Sprinkled throughout are various gems of historical and scientific interest." Physics Today "... clear and modern ... very well structured ... could make a hit in the textbook market and, more importantly, could have a serious impact on the future writing style of books on electromagnetics. This book is one of the best books about electrodynamics I have read, up to now. It greatly contributes to the development of physical understanding, is already used

heavily within my research group, and is thus highly recommended." Radio Science Bulletin

An engaging writing style and a strong focus on the physics make this comprehensive, graduate-level textbook unique among existing classical electromagnetism textbooks. It features close to 120 worked examples, 80 applications boxes and nearly 600 end-of-chapter homework problems, with a solutions manual available to instructors at [ww.cambridge.org/Zangwill](http://ww.cambridge.org/Zangwill).

As the resident "knows something about physics" person in my research lab, this book came with the shock of fresh insight that rivals what an charged particle might feel along a Cherenkov wavefront. Yes, with this book, you too might be able to make your own physics-sounding analogies. In the past, having well exhausted Feynman's lectures and moved past introductory texts like Griffiths, you might suddenly find yourself stranded in an intellectual desert with none but the cold, formidable Jackson as a companion. No longer. This book provides the much needed intermediate resource with full language and excitement of modern electromagnetics. I admit, I sometimes relax by flipping through the book, watching the many subtle issues, both fundamental and sometimes self-inflicted, being brought out to clarity. There is the minor point that the figures are occasionally subpar. It's certainly nothing that will impede understanding, but anyone with basic training in Illustration might cringe at what is most probably the publisher's neglect.

After years and years of being force-fed Jackson, graduate students finally have another option to learn electrodynamics from. For a graduate electrodynamics text, the exposition is about as clear as it could ever get. The intricacies of each equation are explained thoroughly with enthusiasm, and, as a bonus, historical facts are included that give some context to the development of the subject. Plenty of examples are spread throughout each chapter, and they often involve real applications of the concepts at hand (cylindrically symmetric potentials act as electron lenses?). The one downside of the book is that, in spite of being quite thorough, the unique way Zangwill approaches the subject involved organizing topics in a way that makes learning from the book difficult for courses centered around Jackson's text. This is not a fault of the book however - more so the graduate courses that still cling to the tradition of using Jackson as first-year hazing. It seems that more and more universities are switching to Zangwill though, which is a good sign.

I have been lecturing a graduate course of Classical Electromagnetism over the last six years. Like many others, Jackson's was my first choice (together with Greiner's one). Now, with Zangwill book

in my hands, I could see more clearly that both scope and detailing were wrong with previous books. The applications, the updated references, and the very good balancing of content of this book fits perfectly in a two-semester course.

Good quality printing, considerable coverage of material, though grammatical and spelling mistakes and lack of derivations. Not so complex as Jackson, but more demanding than Griffiths.

Zangwill's book is definitely not Jackson's book. There is some good and some bad to that statement. The best things about this book are that it is very straightforward, reads well, and above all it is very practical. The downside is that the book does not feel as thorough as Jackson's book and at times I have been left wondering "but why?".

Excellent book. A modern replacement for Jackson's classic.

The biggest problem with Jackson is the absolute lack of organization, in my opinion. The first four chapters talk about the same things just with slightly different approaches. He develops Green's functions in all four chapters. It leaves you confused as to the structure of what you are doing for quite awhile. This is in contrast to my favorite feature of Zangwill's. This book is meticulously organized. Everything builds off the previous part and the logical structure is as well done as any book I've read. Absolutely excellent job doing that. One thing I don't like about this text is the abundance of "applications." You certainly don't have to read them, but they really didn't help me whatsoever. Listing a page and a half of algebra about phenomena I don't understand didn't do much for me. Or maybe it's my theory bias that doesn't enjoy applications. Also, the book is a bit dry and encyclopedic. The anti-Zee/Feynman/Griffiths. The author seemed to painstakingly avoid putting any personality in the book. Makes for a boring read at times. Reads more like a pure math book than most physics books.

I haven't begun to read yet, but I feel like this book looks promising and will help me in my self-study on my way to graduate school. Unfortunately, it doesn't delve into what I'm most interested in and that is plasma physics, but that is okay.

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