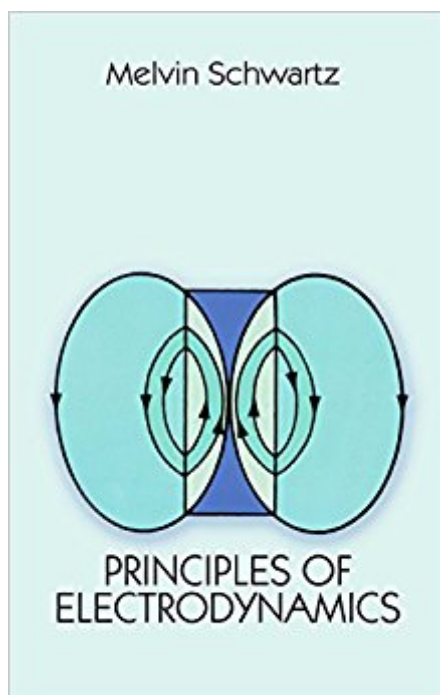


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Principles Of Electrodynamics (Dover Books On Physics)



Synopsis

Unlike most textbooks on electromagnetic theory, which treat electricity, magnetism, Coulomb's law and Faraday's law as almost independent subjects within the framework of the theory, this well-written text takes a relativistic point of view in which electric and magnetic fields are really different aspects of the same physical quantity. Suitable for advanced undergraduates and graduate students, this volume offers a superb exposition of the essential unity of electromagnetism in its natural, relativistic framework while demonstrating the powerful constraint of relativistic invariance. It will be seen that all electromagnetism follows from electrostatics and from the requirement for the simplest laws allowable under the relativistic constraint. By means of these insights, the author hopes to encourage students to think about theories as yet undeveloped and to see this model as useful in other areas of physics. After an introductory chapter establishing the mathematical background of the subject and a survey of some new mathematical ideas, the author reviews the principles of electrostatics. He then introduces Einstein's special theory of relativity and applies it throughout the rest of the book. Topics treated range from Gauss's theorem, Coulomb's law, the Faraday effect and Fresnel's equations to multiple expansion of the radiation field, interference and diffraction, waveguides and cavities and electric and magnetic susceptibility. Carefully selected problems at the end of each chapter invite readers to test their grasp of the material. Professor Schwartz received his Ph.D. from Columbia University and has taught physics there and at Stanford University. He is perhaps best known for his experimental research in the field of high-energy physics and was a co-discoverer of the muon-type neutrino in 1962. He shared the 1988 Nobel Prize in Physics with Leon M. Lederman and Jack Steinberger.

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Customer Reviews

This book is truly superb. I am a self-studier of physics and found this to be one of the best books on any subject in physics that I have read. Somehow it strikes a balance between explaining ideas at an introductory level yet takes a very mature and deep insight into the subject. As other readers have mentioned, the development of almost all of electrodynamics from Coulomb's Law, the Principle of Special Relativity, and a little 'intuition' and 'aesthetics' makes this book transcend the level of other physics texts and even makes it deeply philosophical. Very few words are wasted, and the careful reader can really master the field of electrodynamics with this book. Little prerequisite knowledge is assumed; probably multivariable calculus (with vector analysis) and introductory newtonian mechanics are all that are absolutely needed. One possible exception is that the discussion on special relativity is a little hard to follow if you have never had any exposure to it before. Thus, I would suggest having a good grasp of SR, especially including four-vectors (and ideally four-tensors) if possible before undertaking this book. One definite criticism I had of this book is its use of imaginary numbers in the definition of Minkowski four-vectors. Although this was Minkowski's original idea, it is virtually universally abandoned (as it should be) in every treatment of general relativity; because of this, almost all modern books on GR abandon its use in SR. It is too bad that it is used here, but this is really my only criticism of an otherwise near perfect book.

This is one of those great and inexpensive Dover books, it is definitely a book tailored for physicists, it's not a beginners book, rather an advanced EM book heavily based on relativism from the start. If you wish to learn EM from this book, then I would say that there are better options, but it is a great book for a second or third course on EM. I am an engineer and find the book to be out of my league, considering my current understanding of EM theory, applications are practically non-existent and mathematical derivations are profound and rigorous, however the author seems to be a good educator even though the book is quite dry in both writing style and looks (as most Dover books)

There are technical writers and then there are professionals who write. This is a book of the latter which is much better than most of the others. This subject in my opinion is perhaps one of the most

overlooked part of physics second only to light. Oh, may the Schwartz be with you! JK :) Really, thank you for writing this book Mr. Schwartz

Professors always told me electromagnetic theory can come from relativity, but pretty much never talked about it. Even the textbooks reference it but do not go into much depth. Well, this book does, and it is really a masterpiece to read. The author does a great job walking you through the steps and it's really eye-opening and brings deeper understanding. Definitely recommended as a complement to any student's normal textbooks. It should really be the standard.

Dover books offer a great wealth of knowledge in a tiny package! This one in particular fascinated me, even though I only was able to skim through it. I plan to read through the rest of the book at a later time, but from what I read it was really awesome. This is definitely recommended if you enjoy learning more about the fundamentals of electricity and magnetism.

This book has phenomenal problem sets, but unfortunately no solutions. Overall I find it a more enjoyable (and MUCH cheaper) read than Griffith's E&M. I would recommend buying this book in addition to your standard E&M textbook for undergraduate classes and solving the problems in tandem with your curriculum,

The book of Melvin Schwartz is well written and it is very nice that these type of books become available as ebook. However: You can not read the equations (small bitmaps) on your Kindle, they are too small! If you use the Kindle app on your computer it works fine. I suggest that you put some effort in to make all equations as large as possible that you can also read the indices!

This is a very good book, I could not have found a better derivation of Maxwell equations, Lienard-Wiechart potentials, and mostly it enhanced my understanding of partial differential equations and understanding of Quantum mechanics.

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