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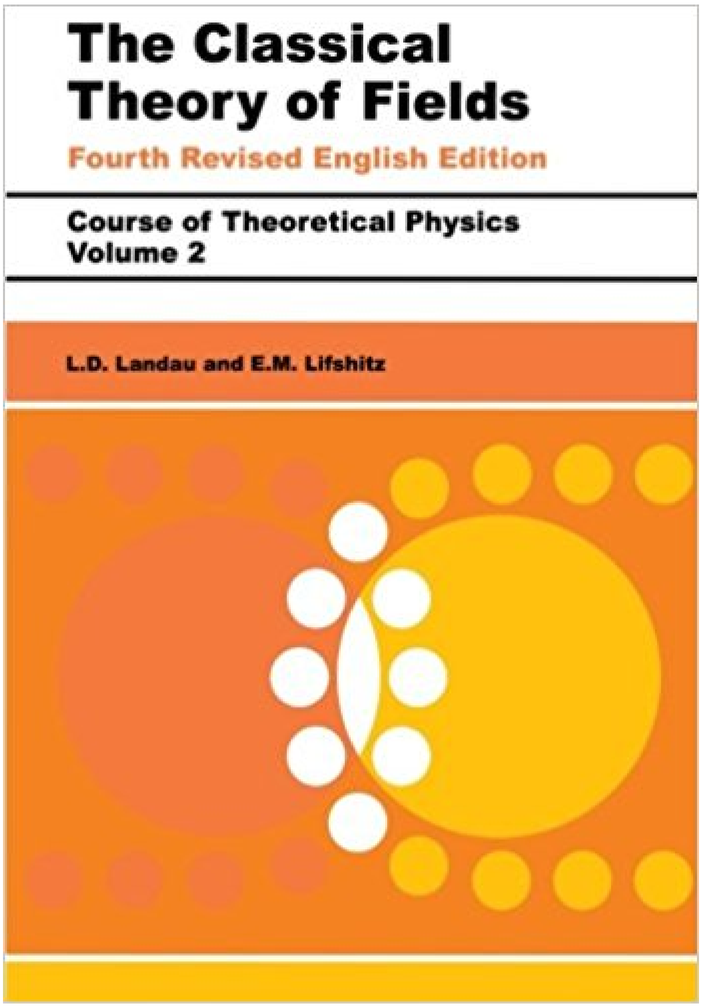
The Classical Theory Of Fields, Fourth Edition: Volume 2 (Course Of Theoretical Physics Series)



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Synopsis

The fourth edition contains seven new sections with chapters on General Relativity, Gravitational Waves and Relativistic Cosmology. The text has been thoroughly revised and additional problems inserted. The Complete course of Theoretical Physics by Landau and Lifshitz, recognized as two of the world's outstanding physicists, is published in full by Butterworth-Heinemann. It comprises nine volumes, covering all branches of the subject; translations from the Russian are by leading scientists.

Book Information

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Customer Reviews

'The clarity of style, the conciseness of treatment and the originality and variety of illustrative problems make this a book which can be highly recommended.' Proceedings of the Physical Society

Text: English, Russian (translation) --This text refers to an out of print or unavailable edition of this title.

I have read the old version in French which was very concise and the new one is even more concise.Landau & Lipchitz do not need recommendation as I think they are the best books I know of. I recommend the book of Field Theory to those who already are knowledgeable and who would like to add a high level overview on the field theory (including Relativity).This overview goes in parallel with a deep insight on the various aspects of the theory.(I also very strongly recommend Vol1 : Classical Mechanics of the same authors)

Landau's approach to Classical Field Theory demonstrates his ability to be clear, concise, and elegant without drowning out the physics with math. I will say, however, that Landau requires a certain maturity to appreciate his style (same goes for Rudin's books of analysis). I would recommend this title to those with a working knowledge of classical E & M, vector/tensor analysis, and of special relativity. It is also wise to work through the author's Theoretical Mechanics to get a taste of their style. I believe, contrary to many, that this book is appropriate for self study if one is willing to do the work (not only the exercises but following along pencil in hand). I suggest reading a passage and then covering it up and then trying to do the derivations by hand. My only complaint is the quality of print, which has is not the fault of the authors. It is especially annoying at first.

How the subject should be taught; masterfully presented...Landau was a master: Concise, insightful, and capable of prodding the student's intellect to solve problems for oneself.As this text elucidates, Electrodynamics cannot be properly understood without the uber-principle of Relativity as foundation; and that is just the beginning.I am still fascinated and a little exhilarated every time I am reminded of the gauge invariance associated with the Electrodynamic field. Landau broaches this subject near the very beginning of the text (Paragraph 18) in an elegant way. Because the definitions of the Magnetic field (B) and Electric field (E) contain only the DERIVATIVES of the corresponding potentials rather than the potentials themselves (A, and phi, respectively), it's easily proven that adding constants to the potentials will not affect the field intensities (remember the derivative of a constant = zero!).Here's the MathExample: E Field only:E = -1/c (dA/dt) - grad(phi)But if we change A and phi by adding constants to them, i.e.:A' = A + grad(f)phi' = phi - 1/c(df/dt)Thus, the new field E' = -1/c (dA'/dt) - grad (phi')or, expanding:E' = -1/c (dA/dt) - 1/c (d/dt grad(f)) - grad (phi) + 1/c grad (df/dt)The second and fourth terms on the right cancel, so E' = -1/c (dA/dt) - grad (phi) = E.The field intensity is unchanged despite changing the potentials.Same result obtains when considering the magnetic field B = curl AAnother bombshell is that no matter how one is moving, the Electrodynamic field does not change. Relative motion will change the measured intensity of the magnetic component B, or perhaps the electric component E depending on how one is moving, but there will always be a resultant compensating change in the one component when there is a change in the other, such that the full field remains unchanged. This represents the essential truth that the Electrodynamic field is a TENSOR, whose physical character is not affected by relative motion; it is invariant in any reference frame.An analogous result obtains when considering even mechanical motion and time: Motion through space (x,y,z, or r, theta, phi, or x1, x2, x3) sacrifices motion through time (ct, or x4) such that the interval through space-time (x1, x2, x3, x4) is always unchanged; invariant. This is how the measurement of time becomes relative. Motion through time is contracted to compensate for the motion through space, keeping the interval invariant.Both the Electrodynamic Field and the Gravitational Field are Gauge Fields.Another principle that bent my brain Landau covers in paragraph 95: The equations of the gravitational field also contain the equations for the matter which produces said field.From which the central conclusions may be deduced.Matter is FieldField and matter do not really fill space, like we all intuitively think. Rather, space has no objective measurable reality.Thus, Field is SpaceRelativity is required to understand Electrodynamics (Einstein invented Relativity on the backbone of Electrodynamics!), and Tensor mathematics is required to understand both; Landau's text make these requirements truly elucidating and enjoyable for the aspiring physicist.Study it continuously, not just once or twice

It's so simple to read and just to the point. I honestly had to use the Jackson book, which was not that great, but made a great grade because of the Landau-Lifshitz classic. Then there was the advanced MIT EM book which made so much more sense, but it was all math. Those 3 books alone will give you a pretty adequate understanding of EM, enough to make over 95 out of 100 on every assignment. The Landau, MIT book together are well pretty cool themselves.

This is a great upper-level E&M book. Every problem in the book has at least a partial solution to get you started and many have complete solutions. It's a great resource for studying E&M as well as general field theory.

useful

Great book for amature theorists to begin with.....

I just got this book in and haven't had a chance to read past chapter 1, so if you're looking for a book review see the below comments. However I just wanted to state that the print quality of the new addition is fantastic and is like that of more modern texts. Perhaps the quality of the older texts is sub par, but rest assured that if you buy the newer addition you will get your money's worth.

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