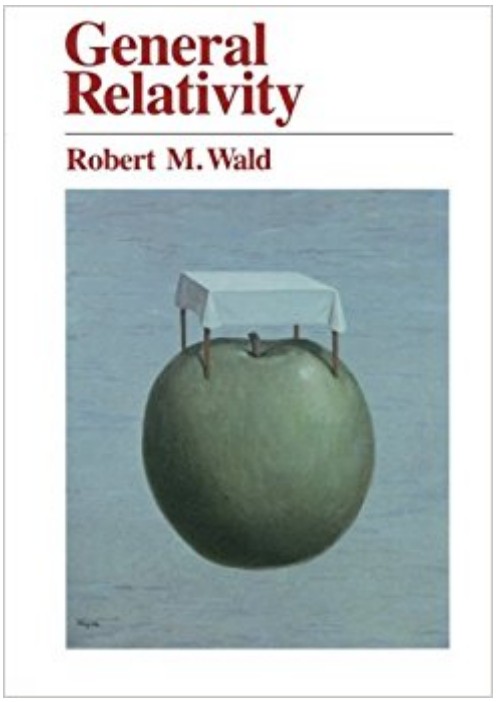
General Relativity



Synopsis

"Wald’s book is clearly the first textbook on general relativity with a totally modern point of view; and it succeeds very well where others are only partially successful. The book includes full discussions of many problems of current interest which are not treated in any extant book, and all these matters are considered with perception and understanding."Ã¢â ¬â •S. Chandrasekhar"A tour de force: lucid, straightforward, mathematically rigorous, exacting in the analysis of the theory in its physical aspect."Ã¢â ¬â •L. P. Hughston, Times Higher Education Supplement"Truly excellent. . . . A sophisticated text of manageable size that will probably be read by every student of relativity, astrophysics, and field theory for years to come."Ã¢â ¬â •James W. York, Physics Today

Book Information

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Customer Reviews

Robert M. Wald is professor in the Department of Physics and the Enrico Fermi Institute at the University of Chicago. He is the author of Space, Time, and Gravity: The Theory of the Big Bang and Black Holes, also published by the University of Chicago Press.

The first book I use for GR was Schutz, that is a wonderful book on its own but is only as it is named "A first course". Then I went through Carroll, to be honest GR has never been an easy one for me. Having said that I believe to had acquire a better mathematical and physical maturation for when I decided to pick Wald. I like the tensorial notation used, also it has the best derivation of Einstein’s equations I have come across so far, I would say much, much better than Carroll’s one, it is also self contained and I like the mathematical level used throughout. It consists of two parts, part one called

FUNDAMENTALS has 6 chapters, part two titled ADVANCED TOPICS continues from chapter 7 till 14, I have studied chapters 1-13: Introduction, Manifolds and Tensor Fields, Curvature, Einstein's Equations, Homogeneous Isotropic Cosmology, The Schwarszchild Solution, Methods for Solving Einstein's Equations, Casual Structure, Singularities, The Initial Value Formulation, Asymptotic Flatness, Black Holes, Spinors. The only chapter I have not read yet because of lack of time is the last Chapter 14 "Quantum Effects in Strong Gravitational Fields". What I most like of this book is the crystal clear explanatory level that R. Wald shows through out the entire material making evident that he is a brilliant expositor and teacher, for example, is the first time that I really understood the singularity theorems of Penrose and Hawking (mathematically), also for the Initial Value Formulation chapter, he provides and explains what is needed in the theory of partial differential equations which motivated me even further to look at another book to go more in depth into partial differential equations and their relations with GR; and just for the last example the "Spinors" chapter is a tour de force which after going through it made me (I believe) understood everything about the representations of the Poincare group and things like why the Klein Gordon equation describes a unitary representation of the Poincare group acting on physical states of spin zero, Dirac's equation acts on particles of spin 1/2, Maxwell's acts on particles of spin 1 and (linearized) gravity on particles of spin 2. As if this were not enough it also brings 6 Appendices which complement the whole book! All in all the best book on GR I have come across so far, I also prefer it much more rather than Weinberg.

I will keep my review just about the Kindle edition. Inline formulas are sometimes images, sometimes characters. Sometimes the font is lacking and a square appear. Worse yet sometimes they are a mix of imsge and characters like nabla subscript a where nabla is an image and the subscript is a char, if you zoom nabla will keep its zize but the subscript zooms in.When the formulas are images they may appear to small to be read. You need to click and view the image in a separate scrren, and that is a blurred scan of the book, sometimes unreadable. All stanalone formulas are images suffering the same problem.An expensive book great book, made virtually unreadable by a lazy electronic adaptation.

Hands down the best GR textbook I have ever read! The appendix on Lagrangian and Hamiltonian formulation has been incredibly clear for me and has helped me tremendously. I find Wald has done what I always want a physics text to do. He is mathematically rigorous enough to fully derive things properly while bot getting too bogged down in trying to prove ever little statement of differential

geometry theorem. This allows the reader to fully understand the precise mathematics that one need if they want to look further into subject, and still understand the physical reasoning behind everything. While this was my first GR text, I would not recommend that they use this book as an introduction to the field. It is quite mathematical in its approach and can be a little overwhelming in the beginning. The only downside of the text is the beginning differential geometry section which moves very quickly and can be a little confusing at parts (at least for me). The initial value problem section is also very helpful in not just understanding GR but initial value problems (pde) in general physics.

(Current graduate student at LSU)GR by Wald is absolutely excellent book for a grad student. It firmly establishes many elements and fundamentals of the theory with solid reasoning and mathematics.Note though that a bit of knowledge of sets and manifolds may be good to have beforehand (only a bit). I would suggest the first few chapters of Bishop & Goldberg 'Tensor Analysis on Manifolds'. Excellent text. Or the first 60 or so pages of Hawking & Ellis 'The large scale structure of space-time".As an additional note, Wald's text is somewhere in between Hawking & Ellis and Carrol's intro book regarding 'difficulty'. Probably leans a bit closer to Hawking & Ellis in that regard.