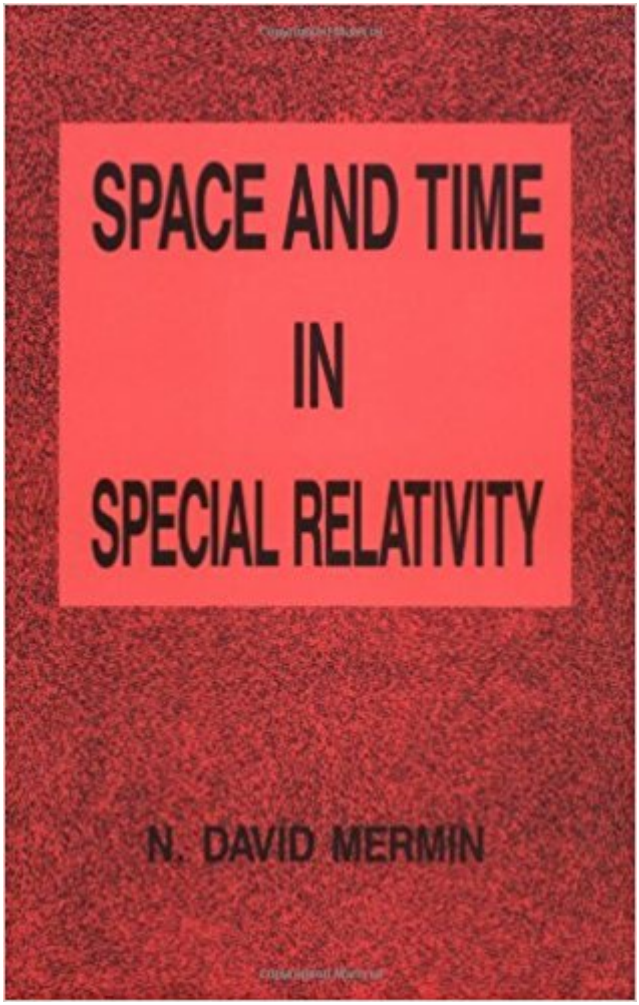
Space And Time In Special Relativity



Synopsis

A classic of elementary relativistic pedagogy! This straight- forward book introduces readers to the conceptually tricky subject of relativity in understandable terms. The writing is crisp and clearly written by someone who is aware of the conceptual difficulties that nonscientists have in coming to grips with relativity.

Book Information

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Customer Reviews

N. David Mermin was the 1988 recipient of The Julius Edgar Lilienfeld Prize (American Physical Society) that recognizes outstanding contributions to physics by an individual who has exceptional skills in lecturing to audiences of nonspecialists.

This is a book of great value to those interested in the foundations of physics. Mermin begins by establishing the basic ’phenomenal’ principles of special relativity (time dilation and length contraction) and uses these to construct the Lorentz equations. He then uses the equations to discuss the central "paradoxes" of special relativity. Mermin then goes through the material again using the Minkowsky spacetime construction. This is very useful, but I find the superposition of coordinates from two inertial systems on one graph to be consistently counter-intuitive because the lengths are different in the two systems. He closes with related material on energy and momentum, but his treatment is rather hasty.Mermin stresses the centrality of the constancy of the speed of light (in a vacuum) and the equivalence of inertial frames, but he does not mention that the Lorentz equations flow directly from the equivalence of inertial frames and the homogeneity and isotropy of

time and space alone. From these assumptions we derive the Lorentz equations, including a constant parameter c, which can be experimentally determined to be finite (excluding Newtonian relativity) and positive. This is the speed of light. This derivation appears not to be well known. I found it on the Web (I lost the URL), but I put a copy of it on my web site [...] under Papers-->PhysicsMermin could also have mentioned that conservation of energy and momentum also flow from time and space homogeneity assumptions.

An excellent treatment of a very non-intuitive subject. Loved the mini-play in which each observer considers the other’s measurements as flawed while their own perfectly accurate. Surprising how easily Mermin gets to the results of special relativity without getting bogged down in the math usually used.

Good

This book was astounding. I had my share of knowledge in physics: Newtonian Mechanics, Electrodynamics and Magnetism, Optics, etc. This book took my preconceived ideas of how the Universe worked and all but threw them out the window.Mermin’s description of why the old physical model is inadequate was very descriptive and informative - even for someone with a highschool physics background. Numerous examples and analogies bring to understanding many difficult and abstract concepts. As for the skeptic . . . well, he deals with them in the later part of the book (I was one of them).This book reads like a Science Fiction novel. Yet the topics presented could not be more real.We have Einstein to thank for the Principles and Theories of Special Relativity, and Mermin to thank for communicating them to the general population.I recommend this book to everybody; physicist or not. You cannot fool youself into thinking you have an understanding of the universe until you read and comprehend the topics covered in this book.Enjoy!

And that includes Epstein’s "Relativity Visualized" and Wolfson’s "Simply Einstein". My impression is that Mermin is truly intelligent and a good teacher. I found some of the other books talked down to me or spent time explaining how Michelson (or was it Morley) was abused as a child instead of sticking to the subject. I intend to buy Mermin’s other book on the subject "It’s About Time".I highly recommend this book to anyone who has a reasonably technical mind and wants to get a firm grasp on this subject.

For anyone who wants to understand special relativity, even those who may not be particularly adept at physics or higher math, this is the book. I spent months searching for a clear resolution of the "twin paradox" (aka, "clock paradox") without success. This is the *only* book I've ever found that accomplishes it, no other physics text I could find (and I examined 23 of them at the UCSD S&E library) provided a comprehensible explanation.This is nothing short of a spectacular piece of work. There is no way to go wrong with this book if you have any interest in the topic at all. I'm confident that even well-experienced professional physicists could find a good many new and useful insights in it. And the best part is, this book is easily accessible by practically anyone having even entry level scientific awareness. It's a genuine classic.

I'm writing this review based on my impressions of this book when I read it 9 years ago as an undergraduate physics major at Berkeley. We used it in an honors sophmore-level physics class for physics majors. I'm know a physics grad-student at UCSB. I want to dissavow the impression you might have that this is just a light-weight, pop-science book. This book is very axiomatic and it really tries to "prove" relativity to the reader. The beginning chapters will motivate the postulates of special relativity (eg: "the speed of light is the same in all reference-frames"), and you will learn how to DERIVE the Lorentz transformations from them. (...which is the major thrust of the book. On a side note: topics like why E=mc^2 aren't discussed until the end.) This is why we used it in our class. The students taking the regular Berkeley physics class only memorized the Lorentz transformations and plugged them in blindly. I felt we learned a great deal more than they did. I think this book is billed as a descriptive introduction to relativity for non-specialists because it's clear and easy to read (although perhaps a bit verbose), and because doesn't use any fancy math, just basic geometry (right-triangles, the pythagorean theorem). This doesn't mean it should be shuned by specialists-to-be. This was my first introduction to relativity and at the time, I felt completely satisfied with my understanding of the material after reading it.

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