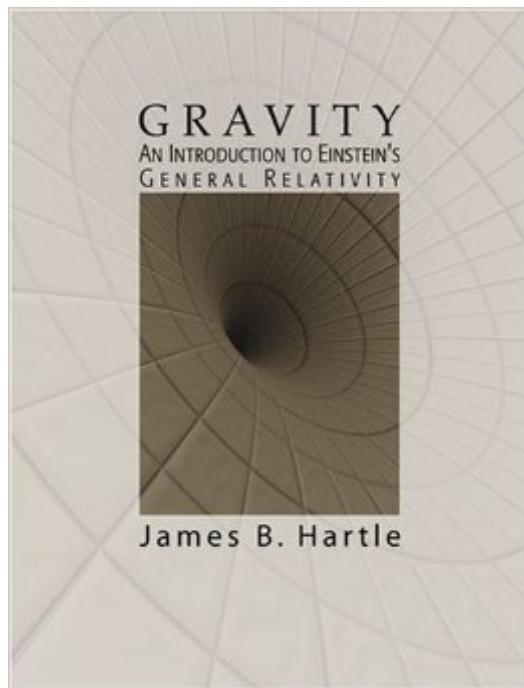


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# Gravity: An Introduction To Einstein's General Relativity



## Synopsis

The aim of this groundbreaking new book is to bring general relativity into the undergraduate curriculum and make this fundamental theory accessible to all physics majors. Using a "physics first" approach to the subject, renowned relativist James B. Hartle provides a fluent and accessible introduction that uses a minimum of new mathematics and is illustrated with a wealth of exciting applications. The emphasis is on the exciting phenomena of gravitational physics and the growing connection between theory and observation. The Global Positioning System, black holes, X-ray sources, pulsars, quasars, gravitational waves, the Big Bang, and the large scale structure of the universe are used to illustrate the widespread role of how general relativity describes a wealth of everyday and exotic phenomena.

## Book Information

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Average Customer Review: 4.5 out of 5 starsÂ  See all reviewsÂ  (36 customer reviews)

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## Customer Reviews

Many beginners in GR don't have a rudimentary intuitive understanding of what 4-vectors are and how to use them in a simple physical problem. This textbook helps with that - it gives you a workout in using 4-vectors and thinking geometrically about spacetime. It teaches you the basic notions of metric, embedding diagrams, hypersurfaces, observers carrying their orthonormal bases and performing measurements, geodesics, coordinate transformations, curvature and energy tensors. Along the way, it manages to explore in detail the three most important metrics in GR: black holes (static and rotating), cosmological models of the universe and gravitational radiation. The book covers the conceptual foundations (how Einstein developed the idea), the mathematical machinery, the analysis of the historical confirmations of GR as well as many contemporary observations like

gravitational lensing, cosmic background radiation, or acceleration of the universe expansion (by the way the cosmological chapters are the most logical introduction to cosmology I've seen), even future experiments like gravity probe B that is going to measure the 'frame dragging' around Earth. In the first 400 pages the book is exploring different metrics by calculating physical observable quantities like redshift, orbits, bending of light and so on using 4-vectors only. There are many examples that show you actual calculations right after a new concept is introduced and help you learn thinking in terms of 4-vectors. The usual tensor analysis, curvature, covariant derivative and Einstein equation are introduced in the last 100 pages.

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