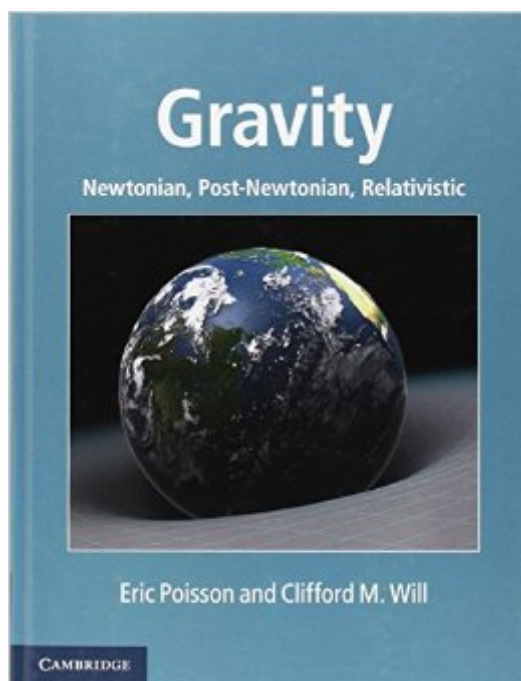


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Gravity: Newtonian, Post-Newtonian, Relativistic



Synopsis

This textbook explores approximate solutions to general relativity and their consequences. It offers a unique presentation of Einstein's theory by developing powerful methods that can be applied to astrophysical systems. Beginning with a uniquely thorough treatment of Newtonian gravity, the book develops post-Newtonian and post-Minkowskian approximation methods to obtain weak-field solutions to the Einstein field equations. The book explores the motion of self-gravitating bodies, the physics of gravitational waves, and the impact of radiative losses on gravitating systems. It concludes with a brief overview of alternative theories of gravity. Ideal for graduate courses on general relativity and relativistic astrophysics, the book examines real-life applications, such as planetary motion around the Sun, the timing of binary pulsars, and gravitational waves emitted by binary black holes. Text boxes explore related topics and provide historical context, and over 100 exercises present challenging tests of the material covered in the main text.

Book Information

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Customer Reviews

A recent acquisition and a joy to peruse. Wonderfully pedagogic (e.g., lucidly written, boxes for enrichment, exercises of varying degrees of difficulty) exposition of Gravity in all its (Newtonian, Post-Newtonian, Relativistic) ramifications. The authors have performed a valuable service to students, professors and researchers alike.(1). The background presumed should be the equivalent of a solid fourth year undergraduate student of physics.(2). A thorough review of Newtonian Gravity, Orbital Mechanics and a modernization of outlook for today's student. Page 26: "Equation 1.98 (compact form of Euler and Continuity Equations) is independent from, and indeed

more fundamental than, the Einstein Field Equations."Page 48: "There is no measurable way to determine the true position of the center of mass."See also Page 124 , Box, on the tidal deformation analogy to single harmonic oscillator driven by external force.(3). Up to date applications for Astrophysics. (Caveat/Preface: No Cosmology)(4). Succinct review of tensor analysis and assorted Mathematical techniques utilized throughout.Page 221: "Einstein's original Principle of Equivalence formulation is not an equivalence, but a tautology."Also, pay special attention to the end of chapter Exercises.(Page 285,# 5.2 pertaining to accelerated charges is a delight !).This procures proficiency in order to follow all subsequent developments.Chapters One to Five (up to page 285) will be in the nature of review for experts.

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