

“... the best book on contemporary gravitational physics for beginning graduate students to established researchers. It will remain one of the leading textbooks on gravity for years to come.”

Professor Renata Kallosh
Stanford University

“Carroll brings a relaxed authority to the teaching of general relativity at the graduate level. The text is beautifully written and succeeds in linking modern mathematical formalism to physical applications.”

Professor Roger Blandford
Kavli Institute for Particle Astrophysics and
Cosmology, Stanford University

“This book is a gem. Carroll’s course at MIT remains legendary and this book can be expected to spread the legend worldwide. Carroll gives a clear, well-motivated, and lively development of general relativity.”

Professor Alan Guth
Massachusetts Institute of Technology

Spacetime and Geometry is an introductory textbook on general relativity, specifically aimed at students. Using a lucid style, Carroll first covers the foundations of the theory and mathematical formalism, providing an approachable introduction to what can often be an intimidating subject. Three major applications of general relativity are then discussed: black holes, perturbation theory and gravitational waves, and cosmology. Students will learn the origin of how spacetime curves (the Einstein equation) and how matter moves through it (the geodesic equation). They will learn what black holes really are, how gravitational waves are generated and detected, and the modern view of the expansion of the universe. A brief introduction to quantum field theory in curved spacetime is also included. A student familiar with this book will be ready to tackle research-level problems in gravitational physics.

SEAN M. CARROLL is Research Professor of Physics at the California Institute of Technology. His research focuses on general relativity, cosmology, field theory, statistical mechanics, and quantum mechanics. He is the recipient of numerous awards, including the Gemant Award from the American Institute of Physics, the Winton Science Book Prize from the Royal Society, a Guggenheim fellowship, and teaching awards from MIT and the University of Chicago.