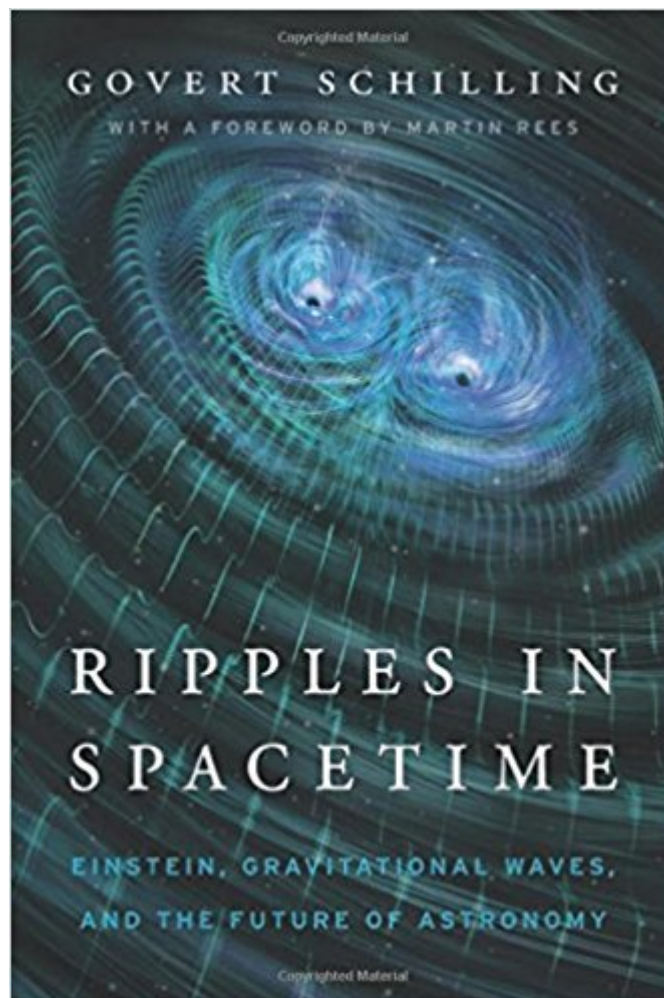




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# **Ripples In Spacetime: Einstein, Gravitational Waves, And The Future Of Astronomy**



## Synopsis

It has already been called the scientific breakthrough of the century: the detection of gravitational waves. Einstein predicted these tiny ripples in the fabric of spacetime nearly a hundred years ago, but they were never perceived directly until now. Decades in the making, this momentous discovery has given scientists a new understanding of the cataclysmic events that shape the universe and a new confirmation of Einstein's theory of general relativity. *Ripples in Spacetime* is an engaging account of the international effort to complete Einstein's project, capture his elusive ripples, and launch an era of gravitational-wave astronomy that promises to explain, more vividly than ever before, our universe's structure and origin. The quest for gravitational waves involved years of risky research and many personal and professional struggles that threatened to derail one of the world's largest scientific endeavors. Govert Schilling takes readers to sites where these stories unfolded—including Japan's KAGRA detector, Chile's Atacama Cosmology Telescope, the South Pole's BICEP detectors, and the United States' LIGO labs. He explains the seeming impossibility of developing technologies sensitive enough to detect waves from two colliding black holes in the very distant universe, and describes the astounding precision of the LIGO detectors. Along the way Schilling clarifies concepts such as general relativity, neutron stars, and the big bang using language that readers with little scientific background can grasp. *Ripples in Spacetime* provides a window into the next frontiers of astronomy, weaving far-reaching predictions and discoveries into a gripping story of human ambition and perseverance.

## Book Information

Hardcover: 340 pages

Publisher: Belknap Press: An Imprint of Harvard University Press (July 31, 2017)

Language: English

ISBN-10: 0674971663

ISBN-13: 978-0674971660

Product Dimensions: 5.8 x 1 x 8.5 inches

Shipping Weight: 1.2 pounds (View shipping rates and policies)

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## Customer Reviews

I read with great pleasure this friendly book. The placement of the detection of gravitational waves in the greater history of astronomy and physics is nicely done, and readers not yet familiar with many of the concepts will come away from the book having really learned some of the physics as well as having a sense of what real science and real scientists are like. The scope and organization makes it entertaining and leaves room for surprises. (David Shoemaker, Spokesperson, LIGO Scientific Collaboration and Senior Research Scientist, MIT Kavli Institute)

In this elegant and captivating book Govert Schilling takes us by the hand through a century of scientific adventures to one of the biggest discoveries of history. (Robbert Dijkgraaf, Director and Leon Levy Professor, Institute for Advanced Study)

A fascinating story of astronomy – Schilling walks readers through a lucid history of the universe, of general relativity, and of the bumpy search for Einstein’s last major unconfirmed prediction: the existence of gravitational waves – Schilling delivers a lively, expert, mostly comprehensible account, equal parts politics, personality, and science, of the search that ended two years ago – Schilling emphasizes that this is not simply another feather in Einstein’s cap, but a valuable new tool. The early universe was opaque to radiation until 380,000 years after the Big Bang, but gravity waves poured out from almost the beginning, so a new field of – gravitational wave astronomy – can look back almost to the birth of the cosmos. An exciting history of the second great breakthrough of 21st-century physics. (Kirkus Reviews (starred review) 2017-06-15)

[Ripples in Spacetime] explains complex ideas clearly and entertainingly – It details the personalities, rivalries, collaborations, controversies, setbacks and successes of the century-long quest to test Einstein’s theories. Bang up to date, the book describes science in progress and as a process: how ideas are developed and discoveries made and rejected or confirmed. The best part for me was the detail the book goes into about the first detection and the meticulous protocols in place to scrutinize and eliminate every possible error. Schilling also looks ahead to what we can expect in this whole new field of astronomy. This is a book for everyone who was as excited as I was when the [Laser Interferometer Gravitational-Wave Observatory] discovery first broke, but also for anyone who wants to know what all the fuss was about. (Jenny Winder BBC Sky at Night Magazine 2017-07-01)

Govert Schilling is an astronomy journalist and writer based in the Netherlands. Martin Rees is a cosmologist and space scientist based in Cambridge, England. He holds the honorary title of

Astronomer Royal.

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