

## THE IRRESISTIBLE ATTRACTION OF GRAVITY

The mystery of gravity has captivated us for centuries. But what is gravity and how does it work? This engaging book delves into the bizarre and often counter-intuitive world of gravitational physics. Join distinguished astrophysicist Professor Luciano Rezzolla on this virtual journey into Einstein's world of gravity, with each milestone presenting ever more fascinating aspects of gravitation. Through gentle exposure to concepts such as space-time curvature and general relativity, you will discover some of the most curious consequences of gravitational physics, such as black holes, neutron stars and gravitational waves. The author presents and explains one of the most impressive scientific achievements of recent times: the first image of a supermassive black hole. Written by one of the key scientists involved in producing these results, you'll get a behind-the-scenes view of how the image was captured and discover what happens to matter and light near a black hole.

Luciano Rezzolla is the Chair of Theoretical Astrophysics and Director at the Institute for Theoretical Physics in Frankfurt, Germany. His main research topics are the physics and astrophysics of compact objects, such as black holes and neutron stars. He is a member of the Event Horizon Telescope Collaboration (EHTC), where he sits on the Executive Board. He has received numerous prizes including the Karl Schwarzschild Prize, the Frankfurt Physics Prize, the Golden Seal of the University of Bari, the 2020 Breakthrough Prize for Fundamental Physics (with EHTC) and the Einstein Medal (with EHTC). Since 2019 he has been the Andrews Professor in Astronomy at Trinity College, Dublin.

*“What are ‘black holes’ and do they exist in our Universe? In his well-written and easy to understand account Prof. Luciano Rezzolla explains to the non-expert reader the basic theoretical ideas and the evolution of the scientific research over the past century. He then reveals how in the last few years we have been able to actually identify these weird but fascinating objects through very high resolution imaging with radio waves, as well as the detection of gravitational waves. This is a good read from a top expert in the field.”*

Prof. Reinhard Genzel, Max Planck Institute for Extraterrestrial Physics; Nobel laureate in Physics

*“In recent years there’s been a real surge in our knowledge of black holes and their role in the cosmos. Luciano Rezzolla clearly explains the new results, their contexts and the future prospects for research. Having himself been involved in the intricate computer modelling and imaging, he conveys his enthusiasm to the reader through his personal perspective on what it’s like to participate in these important discoveries.”*

Prof. Martin Rees, University of Cambridge; author of *Gravity’s Fatal Attraction*

*“Luciano Rezzolla offers an engaging overview of the powerful role of gravity, as the weakest but most consequential interaction shaping our universe. The narrative is engaging and scientifically accurate, with up-to-date details at the forefront of astrophysics and fundamental physics. Overall, Rezzolla offers the unique gift of a comprehensive, yet pedagogical summary of the latest exciting developments, such as imaging black holes and the use of gravitational waves as a new messenger across the cosmos.”*

Prof. Avi Loeb, Harvard University; author of *Extraterrestrial: The First Sign of Intelligent Life Beyond Earth*

*“Black holes are mysterious objects. Some of their secrets have now been revealed, not least due to the work of this author. In his book, he describes this fascinating story in an understandable, even entertaining, yet scientifically exact way. You will not stop reading until you have reached the final page!”*

Prof. Dr. Claus Kiefer, University of Cologne; author of *Quantum Gravity and Gravitation*

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*“Why do things fall? Starting from this simple question, Rezzolla takes us on a whirlwind tour of gravity, from Galileo and Newton at the birth of modern science, to Einstein’s 1915 revolution of warped spacetime. We are brought right up-to-date with the latest news on gravitational waves and black hole imaging, covering a lot of ground in an engaging style. Rezzolla makes the most complex topics accessible to both non-experts and those wanting to become experts.”*

Prof. Geraint Lewis, Sydney Institute for Astronomy; author of  
*The Cosmic Revolutionary’s Handbook*

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# The Irresistible Attraction of Gravity

A Journey to Discover Black Holes

LUCIANO REZZOLLA  
*Goethe-Universität Frankfurt Am Main*



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*To Emilia and Domenico  
The undisputed origin of everything*

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*As long as there is imagination, there will be questions  
As long as there are questions, there will be hope*

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## CONTENTS

THE BEGINNING OF THE JOURNEY	1
1 GRAVITY ... ATTRACTS!	4
2 THE FATHERS OF GRAVITY	13
3 SPACETIME, CURVATURE AND GRAVITY	25
4 HOW TO BEND SPACETIME	49
5 NEUTRON STARS: WONDERS OF PHYSICS	65
6 BLACK HOLES: CHAMPIONS OF CURVATURE	105
7 THE FIRST IMAGE OF A BLACK HOLE	146
8 GRAVITATIONAL WAVES: CURVATURE IN MOTION	205
THE END OF THE JOURNEY	260
Acknowledgements	262
Notes	263
Index	274

Colour plates can be found between pages 118 and 119.

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