



# Gauge/Gravity Duality: Foundations and Applications

By Martin Ammon, Johanna Erdmenger

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Gauge/gravity duality creates new links between quantum theory and gravity. It has led to new concepts in mathematics and physics, and provides new tools to solve problems in many areas of theoretical physics. This book is the first textbook on this important topic, enabling graduate students and researchers in string theory and particle, nuclear and condensed matter physics to get acquainted with the subject. Focusing on the fundamental aspects as well as on the applications, this textbook guides readers through a thorough explanation of the central concepts of gauge/gravity duality. For the AdS/CFT correspondence, it explains in detail how string theory provides the conjectured map. Generalisations to less symmetric cases of gauge/gravity duality and their applications are then presented, in particular to finite temperature and density, hydrodynamics, QCD-like theories, the quark-gluon plasma and condensed matter systems. The textbook features a large number of exercises, with solutions available online at [www.cambridge.org/9781107010345](http://www.cambridge.org/9781107010345).

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#### Review

"An excellent introduction to the gauge/gravity duality and its main applications. A valuable guide both for graduate students and experienced researchers."

Juan Maldacena, Institute for Advanced Study, Princeton

"This clear and precise book should be very helpful to any student or researcher that is interested in the gauge/gravity correspondence and its field theory applications."

Ofer Aharony, Weizmann Institute of Science, Rehovot

"A well-structured and illustrated introduction ... and an in depth and up-to-date discussion of all the essential features of the gauge/gravity correspondence."

Andreas Karch, University of Washington, Seattle

"Written by experts in the field, this book is remarkable for its broad survey of one of the most cutting-edge topics in theoretical physics of the past ten years."

Nick Evans, University of Southampton

#### About the Author

Martin Ammon is a Junior Professor at Friedrich Schiller University, Jena, Germany, leading a research group on gauge/gravity duality.

Johanna Erdmenger is a Research Group Leader at the Max Planck Institute for Physics (Werner Heisenberg Institute), Munich, Germany. She is one of the pioneers of applying gauge/gravity duality to elementary particle, nuclear and condensed matter physics.

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