

1. Record Nr.	UNINA9910783101103321
Titolo	Approaches to quantum gravity : toward a new understanding of space, time, and matter / / edited by Daniele Oriti [[electronic resource]]
Pubbl/distr/stampa	Cambridge : , : Cambridge University Press, , 2009
ISBN	1-107-19646-9 1-282-10369-5 9786612103698 9786612104015 0-511-51725-4 0-511-51512-X 0-511-51774-2 0-511-51420-4 0-511-57554-8 0-511-51640-1
Descrizione fisica	1 online resource (xix, 583 pages) : digital, PDF file(s)
Disciplina	530.143
Soggetti	Quantum gravity
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Title from publisher's bibliographic system (viewed on 05 Oct 2015).
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Part I. Fundamental ideas and general formalisms. Unfinished revolution / C. Rovelli ; The fundamental nature of space and time / G. 't Hooft ; Does locality fail at intermediate length scales / R.D. Sorkin ; Prolegomena to any future quantum gravity / J. Stachel ; Spacetime symmetries in histories canonical gravity / N. Savvidou ; Categorical geometry and the mathematical foundations of quantum gravity / L. Crane ; Emergent relativity / O. Dreyer ; Asymptotic safety / R. Percacci ; New directions in background independent quantum gravity / F. Markopoulou -- Part II. String/M-theory. Gauge/gravity duality / G. Horowitz and J. Polchinski ; String theory, holography and quantum gravity / T. Banks ; String field theory / W. Taylor -- Part III. Loop quantum gravity and spin foam models. Loop quantum gravity / T. Thiemann ; Covariant loop quantum gravity? / E. Livine ; The spin foam

representation of loop quantum gravity / A. Perez ; Three-dimensional spin foam quantum gravity / L. Freidel ; The group field theory approach to quantum gravity / D. Oriti -- Part IV. Discrete quantum gravity. Quantum gravity : the art of building spacetime / J. Ambjorn, J. Jurkiewicz and R. Loll ; Quantum regge calculations / R. Williams ; Consistent discretizations as a road to quantum gravity / R. Gambini and J. Pullin ; The causal set approach to quantum gravity / J. Henson -- Part V. Effective models and quantum gravity phenomenology. Quantum gravity phenomenology / G. Amelino-Camelia ; Quantum gravity and precision tests / C. Burgess ; Algebraic approach to quantum gravity II : non-commutative spacetime / S. Majid ; Doubly special relativity / J. Kowalski-Glikman ; From quantum reference frames to deformed special relativity / F. Girelli ; Lorentz invariance violation and its role in quantum gravity phenomenology / J. Collins, A. Perez and D. Sudarsky ; Generic predictions of quantum theories of gravity / L. Smolin.

Sommario/riassunto

The theory of quantum gravity promises a revolutionary new understanding of gravity and spacetime, valid from microscopic to cosmological distances. Research in this field involves an exciting blend of rigorous mathematics and bold speculations, foundational questions and technical issues. Containing contributions from leading researchers in this field, this book presents the fundamental issues involved in the construction of a quantum theory of gravity and building up a quantum picture of space and time. It introduces the most current approaches to this problem, and reviews their main achievements. Each part ends in questions and answers, in which the contributors explore the merits and problems of the various approaches. This book provides a complete overview of this field from the frontiers of theoretical physics research for graduate students and researchers.
