What Is Time? What Is Space? (I Dialoghi)

Synopsis

â œA novel image of the world is taking shape in fundamental physics: a world without time and without space. Time and space as we know them will disappear from the scientific picture of the world, in the same way in which the centre of the universe didâ •. In this agile text, derived from a long interview, Carlo Rovelli, theoretical physicist and pioneer of modern quantum gravity, describes his personal and intellectual journey, starting from the rebellion of his young years and the discovery of the â œenchanting adventureâ • of theoretical research, till the vertiginous hypotheses of todayâ ™s physics. In a simple language, Rovelli introduces us to a â œspaceâ • made of grains, a â œtimeâ • which is the result of our ignorance, to hot black holes and how to think about the beginning of the universe. But he also discusses the value, the risks, and the fascination of this quest. Science, for Rovelli, is a continuous exploration of new ways of thinking the world, the desire of looking â œbeyond the hillâ • and seeing the world always with new eyes, the choice of never giving up dreams.

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Customer Reviews

The author barely presents an outline of loop theory then laments about the loss of critical thinking in our world today. nOt at all. What the title suggests. The essence of the book is the title and very little more.

Carlo Rovelli is a leading physicist with a strong background in philosophy. With these credentials he is the perfect spokesman to explain the mysteries of physical matter and time. In many ways the philosophical framework on how to view matter and space is just as important as the mathematical sentences about which they seek to analyze.This monograph is a broad overview of the modern explanation of the essential nature of space and time.Rovelli covers topics discussed by scores of physicists and modern philosophers. He is blessed with a special skill to explain difficult concepts, theories and discoveries with clarity, brevity, and, at the same time, with precision. With this is the ability to convey the right amount of information on relatively commonly known areas of physics. For example, Rovelli tells the reading the main features of the discoveries of Faraday and Maxwell without getting bogged down in extraneous minutia.The contents of this book consist of his responses to questions posed to him in an interview. His explications are intermingled with reminisces on his education and academic life, and in this respect is more an intellectual autobiography. While these portions are not quite as interesting as what he has to say about quantum mechanics or relativity, they do provide a context for the broader scope of the book. In the same way the progression from Newtonian physics to Faraday and Maxwell to relativity and quantum mechanics is an intellectual journey in its own right, one which Rovelli demonstrates is an on-going one.If you are like me and start seeing headlights when a sentence of calculus is printed on a page to describe the wave-length of light, this book is probably the best introduction to an occult aspect of science.

Rovelli provides an introduction to loop quantum gravity theory, which is an attempt to reconcile the incompatibilities of general relativity and quantum mechanics. In doing so, asks us to shed some conceptual baggage, namely the idea of space and time. He says neither of these things is "real," in the sense that they have classically been understood.Space is a fluctuating gravitational field. The field isn’t in space, rather, it is space. Moreover, itÃ¢Â Â™s quantized into "grains" that correspond to the intersection of gravitational field lines. These grains are organized in networks and itÃ¢Â Â™s these networks that we have been calling "space."Time is an illusion, albeit a useful one in the macroscopic world. The illusion is generated by the statistical nature of thermodynamic laws, but at the most fundamental level, physical reality is timeless.Those, in a nutshell, are the answers given

to the questions about the ontology of space and time. These answers apparently flow from mathematical elaborations on the Wheeler-Dewitt equation, but we are wisely spared the mathematics, since it wouldnÃ¢Â Â™t make any sense to most of us.The book is written in an easily-grasped and quickly-read conversational style, but it is peppered with minor, distracting grammatical errors that serve to remind one that English is not the authorÃ¢Â Â™s native language. Rovelli makes no attempt to conceal that most of what he writes is merely his opinion, including some extended comments on the moral superiority of Europe, compared with America. This topic would seem to be one about which his scientific expertise gives him little standing to litigate.The bulk of the text is concerned less with the ideas of loop quantum gravity and more with the luminaries and the relationships that gave birth to these ideas. Perhaps the main thrust of the book, however, is to celebrate and encourage outside-the-box thinking.In the early chapters, I was concerned that Rovelli was trying to sell his notions of loop quantum gravity as a Ã¢Â ÂœTruthÃ¢Â Â• about reality, but he comes clean in the last part of the book by allowing that the theory is still Ã¢Â Âœhypothetical,Ã¢Â Â• and it may or may not stand the tests of experience. (I would say Ã¢Â Âœtest of time,Ã¢Â Â• but since time doesnÃ¢Â Â™t exist I am reluctant to do so.) I suspect that, if pressed, Rovelli would probably agree with the formulation of the statistician George Box, who said that all models are wrong, but some are useful.

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