

Tonelli

Matter

The Magnificent Illusion

What are we made up of? What holds material bodies together? Is there a difference between terrestrial matter and celestial matter – the matter that makes up the Earth and the matter that makes up the Sun and other stars? When Democritus stated, between the fifth and fourth centuries BCE, that we are made up of atoms, few people believed him. Not until Galileo and Newton in the seventeenth century did people take the idea seriously, and it was another four hundred years before we could reconstruct the elementary components of matter. Everything around us – the matter that forms rocks and planets, flowers and stars, even us – has very particular properties. These properties, which seem quite normal to us, are in fact very special, because the universe, whose evolution began almost fourteen billion years ago, is today a very cold environment. In this book, Guido Tonelli explains how elementary particles, which make up matter, combine into bizarre shapes to form correlated quantum states, primordial soups of quarks and gluons, or massive neutron stars. New questions that have emerged from the most recent research are answered: in what sense is the vacuum a material state? Why can space-time also vibrate and oscillate? Can elementary grains of space and time exist? What forms does matter assume inside large black holes? In clear and lively prose, Tonelli takes readers on an exhilarating journey into the latest discoveries of contemporary science, enabling them to see the universe, and themselves, in a new light. Also available as an audiobook

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