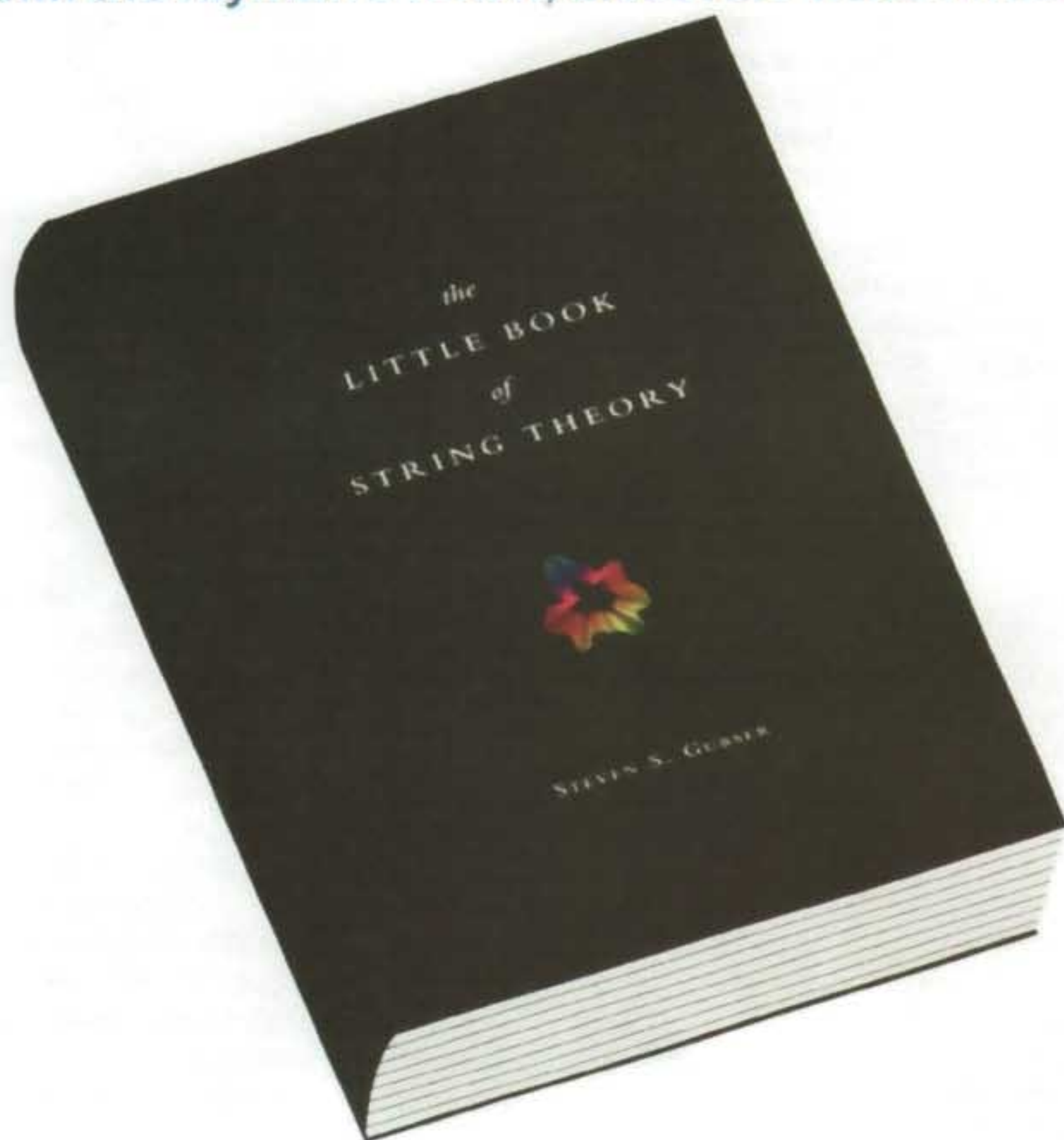


# A gateway for the imagination

Simple analogies put a complex subject well within the layman's reach, discovers Elias Kiritsis



**The Little Book of String Theory**  
By Steven S. Gubser  
Princeton University Press  
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**T**his is a small book that presents string theory and its aims, successes and shortcomings in layman's terms. Its author, Steven Gubser, of Princeton University, is a world leader in the field. It is a remarkable book because it arrives at presenting most of the abstract and sometimes strange concepts in string theory using everyday analogies that are inventive and effective.

He starts from high-school physics and everyday experience, and builds slowly to explain energy and the essence of special relativity. He then moves on to explain quantum mechanics, the photon and the workings of the atom. A chapter is devoted to gravity, starting with general relativity and

ending with a description of the basic properties of black holes.

String theory is subsequently introduced, and a rather clear explanation is given on how space-time emerges from string propagation. This is a very interesting description, as even string theorists do not always think in these terms. A chapter is devoted to "branes" (mostly D-branes) and how they arise and are tied to black holes. This has been a central aspect of string theory since the mid-1990s, and Gubser takes some time and effort to explain it. Dualities, central in string theory, are covered brilliantly. M-theory, one of the dark corners of string theory, its M-branes and the branes at the end of the world are beautifully presented. Supersymmetry, its relation to string theory, the associated extension of space to superspace and why it might appear in the Large Hadron Collider is explained in another

chapter. The final chapter clearly describes a rather unexpected contact string theory had recently with data coming from a new form of matter, the quark-gluon plasma. This is studied in heavy-ion experiments, currently being undertaken at the Relativistic Heavy Ion Collider at Brookhaven National Laboratory in the US and soon to be launched at the Large Hadron Collider.

In all of the above, the concept of extra dimensions, inherent in string theory, is explained in several places. Gubser stresses an important property, that of "evanescent dimensions": in string theory and for several distinct reasons, extra dimensions may not be visible. Under the heading "A dimension here, a dimension there, who's counting?", he explains T-duality and how it affects our view of seeing dimensions. As string theory touches on all of particle physics, Gubser provides simple descriptions and explanations for almost every important concept. He sometimes goes as far away as condensed-matter physics to provide his simple expositions.

This is a remarkably good book for laymen who are interested in string theory and fundamental physics in general. What sets this book apart is that it has been written by one of the foremost experts on the subject.

Many of the analogies from everyday life used to explain concepts from string theory are both original and very communicative. For example, the dancing-pair analogy to explain the concept of a duality and its impact is very interesting. The book contains an additional feature that ensures impact even for those that find some analogies obscure or impenetrable. After every such explanation, a short summary that captures the most important ingredients of the explanation is provided.

I would recommend *The Little Book of String Theory* even to seasoned researchers in the field. This is a thought-provoking book. With explanations offered in simple words, imagination can fly faster and perhaps lead to new and unexplored areas in the quest for the fundamental theory.

Elias Kiritsis is professor of physics at the university of Crete and director of research, Centre National de la Recherche Scientifique, France.