

# **A Universe on a Single String: String Theory and the Quest for a Unified Theory**

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Finding a compelling description of the laws of nature within a single theoretical framework is among the chief goals of fundamental physics.

String Theory meets this challenge by combining the principle of relativity (covariance) and well-founded principles of quantum mechanics with a single new axiom: Particles are not pointlike, but are 1-dimensional objects called strings.

The colloquium will explain how this single extra assumption leads to a theory with no free dimensionless parameters from which the fundamental forces of modern physics follow almost as a corollary; we will explain why this String Theory is free of divergences, why it is naturally defined not in 4 but in 10 spacetime dimensions and in what sense it can be viewed nonetheless as perhaps the simplest possible theory.

The 4-dimensional solutions of this unified theory are then candidates for our universe and their phenomenological properties are to be compared with observations. We will sketch how in each solution the spectrum of elementary particles and their interactions are determined by the consistency conditions of the underlying theory. The existence of a multitude of consistent solutions leads to challenges and chances for the phenomenology of String Theory.