Theory of everything

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This article is about the physical concept. For other uses, see Theory of everything (disambiguation).

A theory of everything (ToE) or final theory, also called the master theory, is a hypothetical, all-encompassing, coherent theoretical framework of physics that fully explains and links together all known physical phenomena. Many attempts to create such a theory have been made throughout the history of physics and science, most recently in the 20th century. The ultimate goal of the theory is to describe the fundamental nature of everything. Over the past few centuries, two theoretical frameworks have been developed that have withstood the test of time and have been accepted by most of the scientific community. Unfortunately, these two theories are mathematically incompatible with each other, so they do not fit together well. It is hoped that a theory of everything will be found that will provide a framework for understanding the universe in regions of both large scale and high mass, where Einstein's theory of gravity applies, and in regions of very small scale and low mass, where quantum mechanics applies. Such a theory would be a unified theory of physics, because it would unify the two theories into a single theoretical framework. Over the past few centuries, two theoretical frameworks have been developed that have withstood the test of time and have been accepted by most of the scientific community. Unfortunately, these two theories are mathematically incompatible with each other, so they do not fit together well. It is hoped that a theory of everything will be found that will provide a framework for understanding the universe in regions of both small scale and high mass, where Einstein's theory of gravity applies, and in regions of very small scale and low mass, where quantum mechanics applies. Such a theory would be a unified theory of physics, because it would unify the two theories into a single theoretical framework. Many attempts to create such a theory have been made throughout the history of physics and science, most recently in the 20th century. The ultimate goal of the theory is to describe the fundamental nature of everything.

Beyond the Standard Model: Unsolved problems in physics. Clockwise from upper left: Dark matter, Dark energy, Neutrino mass, Grand unification, Hierarchy problem, Gauge hierarchy, Flavor problem, Cosmological constant problem, Strong CP problem, Neutrino oscillations, Gravitational waves, Solar neutrino problem, Unification of gauge interactions, Quantum gravity, Unification of quark and lepton masses, Proton decay, Matter asymmetry, Quantum gravity, Dark matrix, Theory of everything, Zero-energy universe

Evidence · Free parameters · Unification · Hierarchy problem · Flavor problem · Cosmological constant problem · Neutrino mass · Dark matter · Dark energy · Horizon problem · Magnetic monopole · Antimatter · Symmetry problem · Matter · Flatness problem · Gauge hierarchy · Gauge unification · Grand unification · Neutrinoless quantum field theory · Proton decay · Quantum gravity · Soliton · Supersymmetry · Tachyon · Theory of everything · Vacuum energy · Weak gravity · Zero-energy universe

Theories · Three pillars · Electromagnetism · Electroweak interaction · Gravitation · Quantum mechanics · Quantum electrodynamics · Standard Model · Quantum field theory · Theory of everything · Vacuum state · Spacetime · Standard model · Gauge theory · Mathematical models · Scientific models · Calculus · Theoretical and experimental physics · Gravitational waves · Conformal gravity · Spacetime topology · Superstrings · Supersymmetry · Supergravity · Supersymmetry · Technicolor · Quantum foam · Quantum geometry · Topological defect · Twistor theory · Theory of everything · Loop quantum gravity · Quantum gravity · Theory of everything · Electroweak interaction · Gauge theory · Gauge theory · Electromagnetism · Fundamental interaction · Quantum field theory · Quantum mechanics · Dynamical system · Perturbation theory · Equation of motion · Classical mechanics · Newtonian mechanics · Theoretical mechanics · Applied mechanics · Chaos theory · Mechanical engineering · Quantum electrodynamics · Physical cosmology · Quantum chromodynamics · Electroweak interaction · Gauge theory · Electromagnetism · Kinematics · Dynamics (mechanics) · Newton's laws of motion · Free particle · Classical field theory · Classical mechanics · Gravitation · Classical electromagnetism · Equivalence principle · Special relativity · Classical mechanics · Theory of everything · Electromagnetism · Classical electromagnetism · Classical mechanics · Classical field theory · Special relativity · Classical electromagnetism · Classical mechanics · Classical electromagnetism · Classical mechanics · Classical electromagnetism · Classical mechanics